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REVIEW

Molecular aspects of cyclophilins mediating therapeutic actions of their ligands

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Abstract Cyclosporine A (CsA) is an immunosuppressive cyclic peptide that binds with a high affinity to 18 kDa human cyclophilin-A (hCyPA). CsA and its several natural derivatives have some pharmacological potential in treatment of diverse immune disorders. More than 20 paralogues of CyPA are expressed in the human body while expression levels and functions of numerous ORFs encoding cyclophilin-like sequences remain unknown. Certain derivatives of CsA devoid of immunosuppressive activity may have some potential in treatments of Alzheimer diseases, Hepatitis C and HIV infections, amyotrophic lateral sclerosis, congenital muscular dystrophy, asthma and various parasitic infections. Here, we discuss structural and functional aspects of the human cyclophilins and their interaction with various intra-cellular targets that can be under the control of CsA or its complexes with diverse cyclophilins that are selectively expressed in different cellular compartments. Some molecular aspects of the cyclophilins expressed in parasites invading humans and causing diseases were also analyzed.

Keywords Cyclophilin · PPIase · Cyclosporine A · Immunophilin · Immunosuppression

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Introduction

The archetypal cyclophilin-A has been discovered to be a cyclosporine A (CsA) [1] binding protein [2] with catalytical activity for accelerating *cis*/*trans* isomerization of X-pro epitopes in model peptides [3, 4]. Several different groups of proteins exhibit peptidylprolyl *cis*/*trans* isomerase (PPIase) activity including the immunosuppressive macrocycle (FK506) binding proteins, known as the FKBPs [3, 4]. In a historical sense, the name 'cyclophilin' implied cyclic peptide (CsA) binding protein, but this may now be misleading since some cyclophilin-like domains (CLDs) of diverse proteins do not bind CsA, although they may still have PPIase activity [3, 4]. Cyclophilin-A (CyPA), one of its paralogues residing in the endoplasmic reticulum (cyclophilin-B, CyP-B), and a 40 kDa multidomain cyclophilin (CyP-40) have been isolated in sizable quantities which indicate that some members of the cyclophilin family of proteins are abundantly expressed in different mammalian organs [2, 5, 6]. Multiple other paralogues of the human CyPA have been cloned and some of their physico-chemical properties and biological functions established [3, 4]. Sequencing of the human genome has revealed that it encodes multiple cyclophilin-like open reading frames (ORFs) whose expression profiles and biological functions, if any, remain to be elucidated [7]. Likewise, exact biological functions and interaction networks in which are involved the human paralogues of the archetypal hCyPA remain far from being well established [3, 4]. Although considerable progress has been made in molecular characterization of some cyclophilins expressed in diverse parasites invading humans [8], the knowledge of functional aspects of the differentiated repertoires of the cyclophilins expressed in numerous parasites remains scarce [8–10].

Several members of the cyclophilin family of proteins are high affinity binders of the immunosuppressive drug CsA (thus called immunophilins) [3, 4]. Biochemical and immunological assays aided by analyses of the structural aspects of the hCyPA/CsA complex bound to the calcineurin phosphatase have revealed its plausible physiologically relevant modes of action [11–14]. On the PubMed server at the National Centre of Biotechnology Information (NCBI) (http://ncbi.nlm.nih.gov), one may find nearly 5,000 references on the cyclophilins, whereas about ten times that number, nearly 43,500 on 21 April 2010, concern different aspects of diverse medical applications of CsA and its analogues [7]. For example, CsA and some of its derivatives are often utilized in pharmacological interventions against some immunological disorders and in organ transplantation [1, 3, 4, 12, 15].

The cyclophilin-like domains (CLDs) contain from 145 to 180 amino acid residues (AAs) and have highly diversified sequences, but retain a significant conservation of PPIase activity site [3]. The closed β-barrel folds of the CLDs display a high level of structure conservation [16, 17]. The generic PPIase activity, however, is a property of the multiple paralogues of the archetypal CyPA that could imply that those paralogues fulfill some crucial biological functions other than *cis*/*trans* isomerization of X-Pro bonds [3, 4]. Moreover, it has been shown that the surface patches distant to the PPIase cavity can bind some epitopes [18]. Various cyclophilins have been localized to different cellular compartments where they are involved in a multitude of complexes, thereby their structures must comprise some patches having the capacity to bind diverse epitopes of intra-cellular entities [3]. It could be postulated that the spatial arrangement of different structural elements within the nominal cyclophilin 'fold' supply some plasticity to the surface patches distant to the PPIase cavity that have the capacity to bind various epitopes. In this review, we present analyses of the sequences and structures of the human cyclophilins and their orthologues expressed in some parasites. Our analyses unraveled some inter-connections between differentiation of their sequences and variations within the intra-molecular interaction networks [19]. Also, some functional aspects of the cyclophilins and their interactions with diverse cellular entities that could be in part under the control of CsA and its derivatives were discussed.

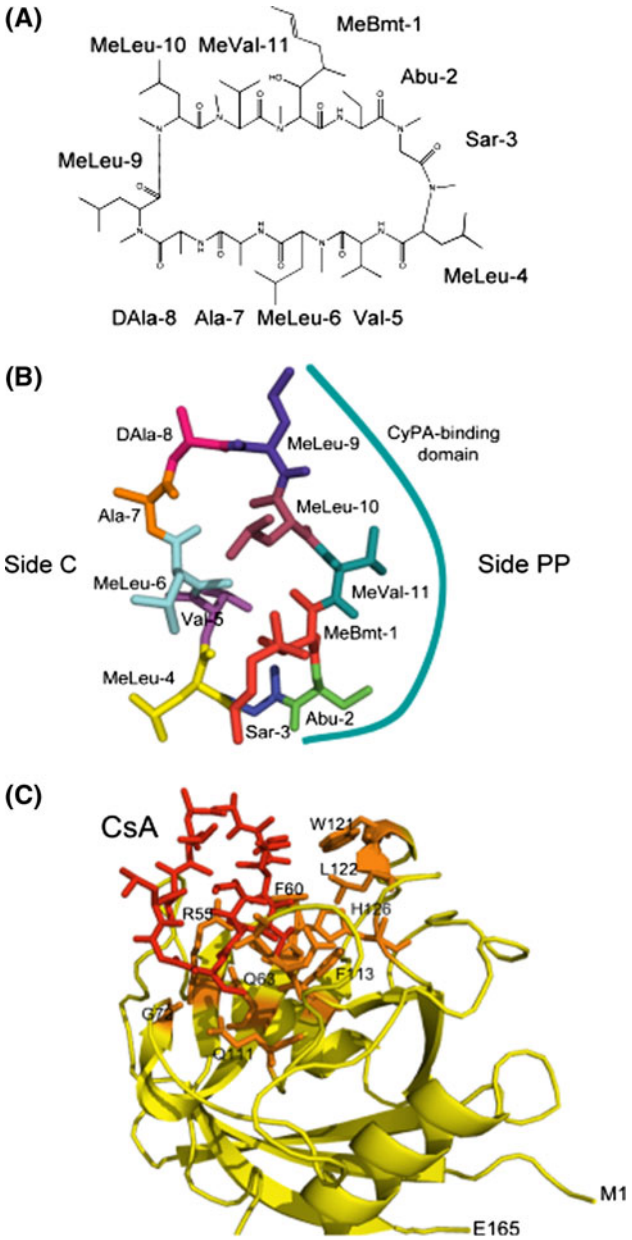


Fig. 1 Cyclosporine-A. **a** The chemical structure of CsA with the following abbreviations: *Abu* L-α-aminobutiric acid, *MeBmt* (4R)-4[(E)-2-butenyl]-4,N-dimethyl-L-threonine, *MeLeu* N-methylleucine, *MeVal* N-methylvaline, *Sar* sarcosine. **b** CsA structure extracted from its complex with hCyPA (1CWA.pdb); the side interacting with CyPA (*side PP*) is marked with the *solid line* and *side C* with the residues interacting with calcineurin. **c** Full structure of the hCyPA/CsA complex (1CWA.pdb); CsA is marked as *red sticks*, the AA residues forming the PPIase cavity are shown as *orange sticks* while the remaining backbone of the cyclophilin is in *yellow*. *M1* N-terminal methionine, *E165* C-terminal glutamic acid

The primary binding site of the CLDs (PPIase cavity)

CsA is a hydrophobic cyclic peptide (Fig. 1a) that is soluble in some organic solvents and only sparingly soluble in aqueous solution [3, 4, 20, 21]. Some cyclophilins dissolved in aqueous solution can quickly sequester added CsA with a concomitant loss of their PPIase activity [3, 4]. CsA displays significant conformational polymorphism that is dependent on the chemical composition of the solvent [20–23]. For example, CsA dissolved in chloroform has four internal hydrogen bonds and its conformation is different if bound to hCyPA [23]. The residues of CsA

Table 1 Intermolecular atomic contacts (distance ≤ 4.0 Å) calculated from the X-ray structures of the binary and ternary complexes of some cyclophilins

A. Complex residue-CsA	(hCyPA/CsA + CnA + CnB)			hCyPA/CsA	BmCyP18/CsA	hCyPF/CsA
	1M63.pdb			1CWA.pdb	1C5F.pdb	2Z6W.pdb
1 MeBmt1	9		5	7	10	6
2 Abu2	21	1		20	21	21
3 Sar3	4	3		6	4	5
4 MeLeu4		13	5			
5 Val5	2	7	6	3	2	3
6 MeLeu6		8				
7 Ala7		8				
8 DAla8	2	3				
9 MeLeu9	11	3		16	17	17
10 MeLeu10	6			7	8	10
11 MeVal11	19			20	18	22
Total	72	45	16	79	80	84

B. Ligand hCyPA	CsA 1M63.pdb	CsA 1CWA.pdb	Suc-AGPF-pna 1ZKF.pdb	hGag 1M9C.pdb	SfA 1YND.pdb
1 Arg55	7	8	8	10	6
2 Ile57			3		2
3 Gly59					4
4 Phe60	8	10	8	15	10
5 Met61		2		2	2
6 Gln63	9	6	9	9	9
7 Asn71					2
8 Gly72	8	10	5	7	2
9 Thr73			4	4	5
10 Ala101	5	4	2	2	7
11 Asn102	13	13	10	8	11
12 Ala103				2	7
13 Gly104					3
14 Gln111	7	6	2	4	9
15 Phe113	8	9	4	9	5
16 Trp121	5	9	4	8	7
17 Leu122	2	2	3	3	2
18 His126	3	3	6	6	10
19 Arg148	3				
Total	78	82	68	89	103

interacting with hCyPA are shown in Fig. 1b and are listed in Table 1A.

CsA and the archetypal hCyPA rapidly form a high affinity complex (1CWA.pdb) that is believed to be the principal vector of therapeutic actions of the immunosuppressive drug [3, 12]. At least 78 inter-molecular atomic distances below 4.0 Å were calculated from the hCyPA/CsA complex; the AAs of hCyPA that are shaded in Table 1B form the hydrophobic PPIase cavity (Fig. 1c) [24]. Some of the atomic contacts below 3 Å give rise to hydrogen bonding between CsA and the atoms in R55, N102 and W121 in hCyPA (Ts1_Dist_all file containing a list of molecular interactions in the complexes listed in Table 1 is in the electronic supplementary material, ESM). CsA bound to hCyPA buries about 50% (Fig. 1c) of its hydrophobic surface [17, 23, 25–27]. We calculated the root-mean-square distance (Rmsd) for the entire cyclophilin structure comprising a free form of hCyPA (2CPL.pdb) [16] and its complex with CsA (1CWA.pdb) [25], and separately for the AAs in its PPIase cavity. Two AAs in the PPIase activity site of hCyPA, namely R55 and Q111, and several other residues such as T5, S21, K31, F67-T68, were

affected by the binding of CsA. Different peptides and proteins bind to the CLDs at μM K_d [4, 27, 28]. The AAs of hCyPA having inter-molecular atomic contacts ($d \leq 4.0$ Å) with a peptide substrate Suc-Ala-Gly-Pro-Phe-pna bound to hCyPA (1ZKF.pdb) [29], and a Gag protein from HIV-1 bound to hCyPA (1M9C.pdb) [30] are shown in Table 1B which illustrates that the CsA-binding site overlaps with the peptide binding site.

Diverse experiments showed that the mammalian CyPA effectively catalyzes only *cis*/*trans* isomerization of Pro-X epitopes while its catalytical power is highly diminished if, in place of Pro, there is a six- or four-member ring [3, 4, 31, 32]. Moreover, CyPA does not catalyze isomerization of a secondary amide peptide bond [33, 34]. Both PPIase assays and phage display technique showed that hCyPA has a significant preference for catalyzing and binding Gly-Pro epitopes in linear peptides [35, 36]. Among 400 different dipeptides (diads), only 20 have a Pro in the second position; there are 8,000 triads and 160,000 tetrads that can be formed from 20 natural amino acids [two files containing tabulated data on AA diads (Ts1) and triads (Ts2) computed from the human genomic database are in the ESM]. Analyses of the human genomic database revealed that Gly-Pro is a highly represented diad that is often found in β-turn spatial motifs of many proteins [37]. Proline residue is a particular amino acid that, despite its highly hydrophobic nature, has the highest solubility level in aqueous solution in the series of 20 natural amino acids [38]. Specific affinity of Pro residue to the PPIase cavity may be due to both its hydrophobicity [38] and ring puckering [39], that allow it to well adapt itself to the geometric constraints of the PPIase binding site.

Binding constants for cyclophilin/drug complexes are usually expressed using IC_{50} (the half maximal inhibitory concentration at which 50% of activity is abolished), K_i (the dissociation constant for binding of inhibitor to enzyme) that can be calculated from a series of inhibition curves using one of the available software [3, 4, 40, 41], and K_D (binding constant) that can be estimated from binding experiments using, for example, tritiated CsA and a molecular filtration column [2]. Experimental conditions and methods used for the establishment of the inhibition constants usually influence the IC_{50}, K_i or K_D values. For example, the K_is for the hCyPA/CsA complex may vary in certain ranges according to the methods employed for their establishment, namely the K_is vary from 30 to 2 nM. Also, chemical modifications of CsA may weaken its binding to CyPA concomitant with the loss of its immunosuppressive activity. Curiously, it was shown, however, that several chemical modifications in both sides of CsA, namely side 'PP' which binds to CyPA (Fig. 1b) and side 'C' interacting with calcineurin, may enhance its immunosuppressive profile [42, 43].

The CsA/CyPA complex binds with a high affinity to the ternary complex formed with calcineurin-A (CnA), calcineurin-B (CnB) and calmodulin (Cdl) (Table 1A) and inhibits its phosphatase activity [11, 12]. Analyses of the X-ray data of the hCyPA-CsA/(CnA-CnB) complex showed that the CsA residues from 4 to 8 have atomic contacts with CnA and CnB, and thus their modifications may interfere with the tight binding in the ternary complex [13, 14]. Thus, some chemical modifications of residues from 4 to 8 of CsA (side 'C', Fig. 1b) may alter its immunosuppressive activity and produce non-immunosuppressive analogues. Moreover, several different natural structural variants of CsA have been characterized, such as CsH and CsG, and many synthetic derivatives of CsA have been assayed for their potentially interesting pharmacological properties in treatment of different diseases [1, 12, 15, 44–47]. Some of those compounds apparently bind to various hydrophobic entities, such as human MDR1 P-glycoprotein ABC transporter or human FPR1 formyl-peptide receptor [44, 45]. CyPA also binds several other natural molecules such as sanglifehrin-A (SfA) that was isolated from *Streptomyces A* [48, 49], cymbimicins isolated from *Actinomycetes* [50], or cyclolineopeptide A (CLA) isolated from linseed oil [51]. CLA has weaker binding constant to CyPA ($K_d = 125$ nM) that is almost one order of magnitude lower than for the CsA/CyPA complex (K_d = from 2 to 30 nM). However, CLA complexed with CyPA binds to CnA/CnB at K_d ten times weaker than does the hCyPA/CsA complex, which limits its potential application as an immunosuppressive drug. SfA binds to CyPA with an $IC_{50} = 6.9$ nM (Fig. 2) that is lower than $IC_{50} = 20$ nM for CsA, but it does not inhibit the CnA/CnB complex and acts as a tolerance inducer in T cells [52, 53].

It is worth mentioning, however, that due to the extreme hydrophobicity of CsA and its natural analogues, they may weakly bind to other proteins and diverse hydrophobic moieties [3]. For example, it was shown that interleukin-8 and actin weakly bind at μM ranges to CsA which might suggest that these are rather non-specific interactions [55, 56]. The diversified binding modes and conformational polymorphism displayed by CsA, its natural analogues and other hydrophobic compounds that bind to the various cyclophilins could imply that they might impinge activities of a multitude of cellular entities [3, 4, 12].

Conservation of the primary structure of the human CLDs

Analyses of several different multiple sequence alignments (MSAs) of the CLDs from different phyla revealed that the AAs, being in the sequence positions equivalent to those of the PPIase activity site of hCyPA, remain well conserved [57]. Fig. Fs1 (in ESM) shows an MSA of the human CLDs with the AAs (in bold face) that are crucial for the PPIase

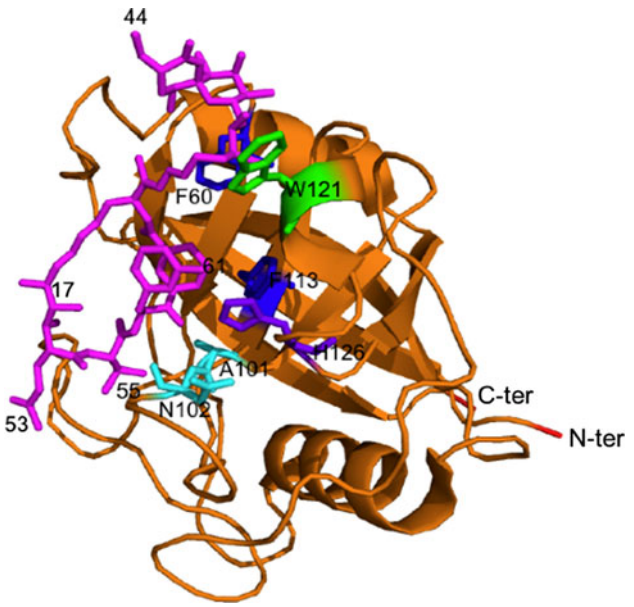


Fig. 2 Sanglifehrin A (*pink sticks*) bound to hCyPA (ribbon structure made from 1YND.pdb [52])

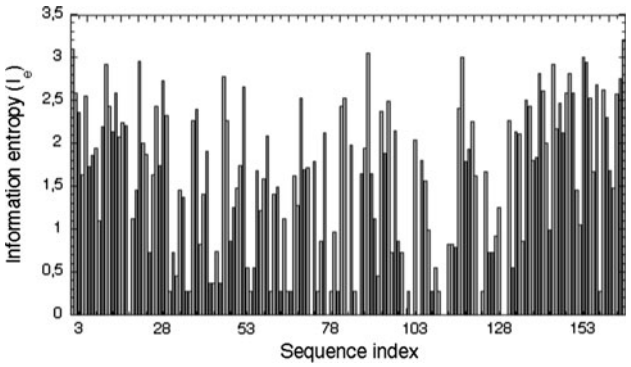


Fig. 3 Information entropy (I_e) histogram for the human CLDs (see ESM Fig. Fs5). Low I_e values indicate that thye given sequence position is well conserved (a low variability in the AAC) whereas the $I_e \geq 1.0$ indicate for a higher variability of the AAC at the given sequence position (maximal I_e for 20 natural AAs equals to $\log_2 20 = 4.322$)

activity whereas in ESM Fig. Fs2 is shown the MSA of 496 sequences comprising various CLDs from diverse organisms. It has been shown that the CLDs from different phyla contain a considerable content of F residues (10–15%) [3]. In consequence, high conservation levels (>0.8) and information entropy $I_e < 0.9$ were calculated for some of the F and Y residues involved in the hydrophobic interaction networks [19]; a plot of I_es for the human CLDs is shown in Fig. 3. The low I_e values indicate that the given sequence position is well conserved (a low variability in the amino acid composition, AAC), whereas the $I_e \geq 1.0$ indicate a higher variability of the AAC at the given sequence position. Although the averaged sequence similarity scores (IDs) in the analyzed MSAs of the cyclophilins are below 40%, some sequence patches crucial for the PPIase activity and fold-structuring interaction networks remain highly conserved (I_es ≤ 1.0).

Analysis of the aligned sequences of the human CLDs (ESM Figs. Fs1 and Fs2) revealed that the AAs crucial for PPIase activity and the 'aromatic/hydrophobic' AAs network are well conserved in all the 19 sequences (MSA19) of the human CLDs. For example, the equivalent sequence positions occupied by R55 in hCypA, that is critical for its catalytic activity, are well conserved in the sequences of the human CLDs (MSA19). It has, however, been recently shown that the R55/A55 substitution in hCyPA did not apparently influence the folding rate of carbonic anhydrase, which implies that R55 is crucial for the PPIase activity only if a linear peptide substrate is being used, while the protein itself behaves as a chaperone capable of rescuing misfolded molten globule intermediates [58, 59]. Likewise, the CLD of hCyP58 binds a Gly-Pro epitope of a linear peptide but does not influence its *cis*/*trans* equilibrium [54]. R55 was replaced by a P residue in the hCyP18c isoform, whereas in hCyP57 an R residue is positioned two AAs downstream. No data, however, exist to show whether the CLD of hCyP57 has PPIase activity. Q63 (hCyPA) is crucial for PPIase activity in the cyclophilins, and it is conserved in all the aligned sequences with the exception of the hCyP18c isoform, whereas the highly conserved Q111-F112-F113 triad (hCyPA) is also well conserved in the MSA19. W121 (hCyPA), a crucial AA in the PPIase activity site in hCyPA, is replaced in several human CLDs by H or Y residues which may significantly alter the K_d with CsA and its derivatives [3]; see also ESM Fig. Fs3.

Subtle variations within the intra-molecular interaction networks in the CLDs

Several X-ray structures of the cyclophilins [60] that are listed in ESM Table Ts3 were analyzed with the Cordan_Pro program, and triangular distance maps were generated for each of the structures [19]. The distance maps computed from the structures of hCyP19 (1QOI.pdb, upper triangle), that is involved in some stages of formation of the spliceosome [18], and the archetypal hCyPA (2CPL.pdb, lower triangle) are shown in Fig. 4a, whereas in Fig. 4b are shown the X-ray structures (ribbon display) with the explicitly indicated spatial positions of some aromatic AAs and several others from the PPIase cavity. The interaction networks of the aromatic residues are shown as red dotted lines; those networks also involve C, V, I and L (violet dotted lines). The aromatic/hydrophobic AAs network seems to have a substantial structuring capacity in the cyclophilin's fold [3]. These two maps (Fig. 4a) have similar distributions of the intra-molecular

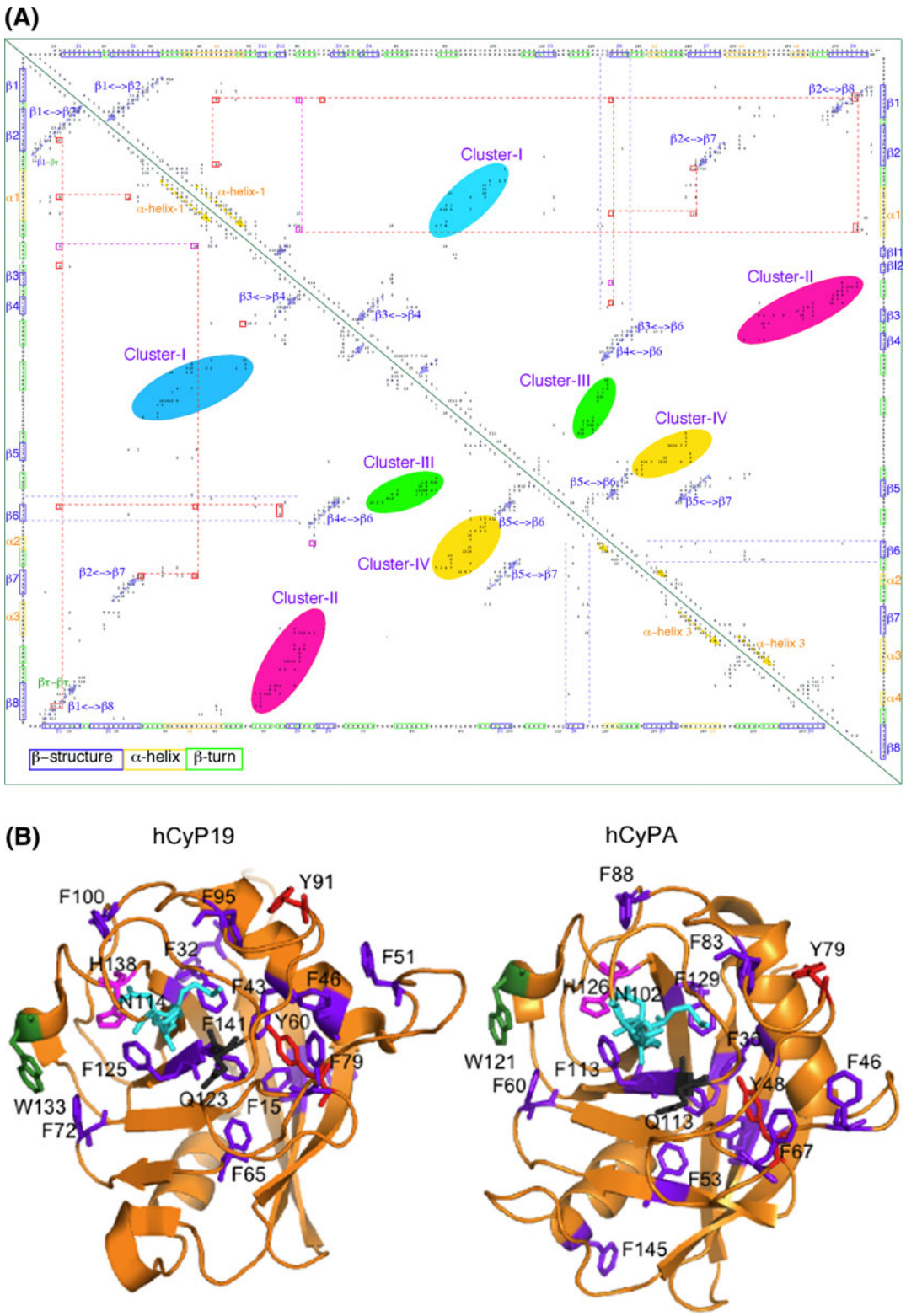


Fig. 4 **a** 2D map of intra-molecular atomic distances calculated in the range 2.7–4.5 Å in the structures of hCyP19 [18] (1QOI.pdb, *upper triangle*) and hCyPA (2CPL.pdb, *lower triangle*) [16]. Integer numbers correspond to the sum of the number of inter-residues distances (NIDs) for given pairs of AA residues. At the *upper axis* and the *right* side is shown the sequence of hCyP19, whereas the *bottom axis* has the sequence of hCyPA. **b** X-ray structures of hCyP19 (1QOI.pdb, *left panel*), and hCyPA (2CPL.pdb, *right panel*); the spatial positions of F (*violet*), Y (*red*), W (*deep green*), catalytically crucial MAN motif, E111 (hCyPA) and H126 (hCyPA) are indicated in *cyan*, *black* and *pink sticks*, respectively. The ribbon structures were made with the PyMol program [61]; see Fs4A in ESM

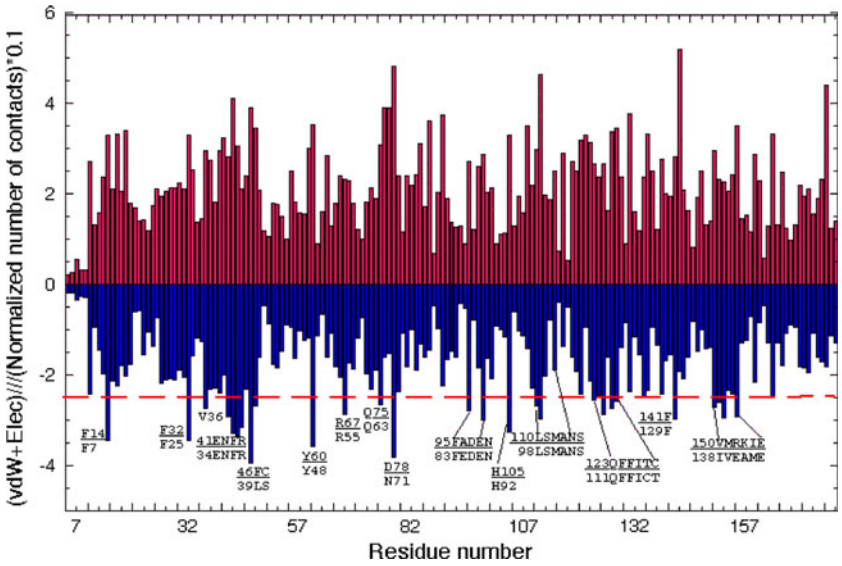


Fig. 5 Numbers of interactions (*upper panel*) and the sum of vdW and Coulombic energy terms [19] per each residue (*lower panel*) calculated from the X-ray structure of hCyP19 (1QOI.pdb) with written patches of sequences that are crucial for the PPIase cavity and the aromatic/hydrophobic AAs network; *red dashed line* was arbitrarily placed to indicate the largest energy contributions. The *upper parts* of the sequence patches come from hCyP19 whereas *lower parts* were taken from the sequence of hCyPA

interaction clusters to that shown in shown in ESM Table Ts1 which indicate that the tertiary structures of the CLDs are well conserved [17]. Orange, green and blue rectangles in the sequences axe at the top of Fig. 4a (ESM Fig. Fs4a is its high-resolution PDF image) correspond to α-helix, β-turn and β-strand structures, respectively. Interactions between β-strands in anti-parallel β-sheets that are close in the sequence form the perpendicular clusters (blue arrows) close to the diagonal, whereas the interactions between β-strands that are distant in the sequence form the clusters that are distant to the diagonal. Atomic interactions within α-helices are local, and thus their clusters (yellow arrows) are parallel to the diagonal of the 2D map; the remaining near-diagonal elements contain all the interactions between the neighboring AA-residues (close in the sequence). β-sheets and α-helices interact with diverse loops and β-turns and form specific clusters and super-clusters of interactions (color ellipsoids). For example, supercluster-2 (a salmon oval) is made up of three mini-clusters, namely: (1) β-strand 8 interacting with the loop linking β-strands 2 and 3; (2) the β-turns flanking β-strand 3 interacting with the β-turns in front of β-strand 8; and (3) α-helix 3 interacting with the β-turns following β-strand 4. The remaining three super-clusters consist of from 2 to 5 mini-clusters comprising diverse interactions between some elements of the secondary structure with the loop regions. Some β-strands have sparsely distributed networks of interactions, for example β-strand 6 (blue dotted lines).

Distribution of the numbers of distances and the sum of the van der Waals (vdW) and Coulombic energy terms calculated per AA residue [19] in hCyP19 (1QOI.pdb) are shown in Fig. 5. The AAs having higher than average energy contributions are indicated in the graph whereas at the bottom of each residue are given their equivalents in the sequence of the archetypal hCyPA. The majority of the AAs indicated in the graph are crucial in the PPIase activity, binding of CsA, and 'aromatic/hydrophobic' AA network. For example, R67 corresponds to R55 in hCyPA and is crucial for *cis*/*trans* isomerization of X-Pro epitopes in model peptides [4]. It is preceded by a highly conserved Y60 (Y48 in hCyPA) and is followed by Q75 (Q63 in hCyPA) that are a part of the PPIase activity site. As shown in Fig. 5, the AAs participating in the 'aromatic/hydrophobic' network and being a part of the PPIase activity site contribute significant stabilization energy terms. The AAs crucial for PPIase activity and structuring aromatic/hydrophobic network have the most significant vdW and Coulombic contributions to stability of the structure.

Analyses of 2D distance maps of different cyclophilins revealed that the 'aromatic/hydrophobic' network consisting of 12 AAs in the archetypal hCyPA (F7, F8, F22, F36, Y48, F53, L98, F112, I114, F129, I158, C161) remains well conserved in the majority of its human paralogues (see ESM Table Ts4) although not all of them exhibit *cis*/*trans* isomerization activity with standard peptide substrates; the sequence positions equivalent to the above hydrophobic network of the AAs are well conserved in the different MSAs of the cyclophilins [3, 56]. Larger differences were derived from the comparison of the interaction patterns of the free forms of hCyPA (2CPL.pdb) and hCyP19 (1QOI.pdb) which implies that the AA substitutions caused some subtle changes in the fold. Comparing the two structures yielded Rmsd = 0.344 for the CA atoms of the 'aromatic/hydrophobic' AAs network and Rmsd = 0.274 for the CA atoms of the AAs in the PPIase activity site. Despite the ID = 53% for hCyP19/hCyPA, the low values of the Rmsds indicate for a good conservation of the spatial positions of these two groups of crucial AAs.

The I_es for the AAs forming the PPIase activity site are small in the MSA containing 496 sequences of the CLDs

(MSA496; ESM Fig. Fs5), and in MSA19 (Fig. 3). However, there are multiple subtle AA changes taking place in each functional sub-group of the CLDs [57]. Even if relatively few AA substitutions took place in the triads comprising the AAs implicated in PPIase activity and in the aromatic/hydrophobic AAs network (see ESM Fig. Fs3), the AA triads become highly variable inbetween the conserved patches of AAs reaching the high I_es at particular sequence positions. We hypothesize that these highly variable sequence patches are the sites of functional optimization of diverse physicochemical properties of the CLDs, such as PPIase activity levels, structural stability, spatial distribution of charged AAs, hydrophobicity of binding surface patches, and its affinity to diverse epitopes.

Diversified binding sites of the CLDs

Inter-molecular distances calculated from X-ray structures of several ternary complexes between diverse CLDs and their ligands were summarized in Table 1. hCyPA/CsA binds to CnA/CnB complex (1M63.pdb [13] and 1MF8.pdb [14]) in a somewhat different fashion than is the case for the hFKBP12a/FK506 complex bound to CnA/CnB [62]. Figure 6a shows the structure of the ternary complex (hCyPA/CsA + CnA/CnB) in which CsA is embedded inside its interior (CsA is shown in red sticks marked with an arrow). There are multiple contacts between the residues of CsA and CnA, whereas a smaller number of them exist between CsA and CnB (Ts1_Dist_all file in ESM).

The HIV Gag protein binds to the PPIase cavity of hCyPA with X-Pro bond in a cis conformation as shown in the structure on Fig. 6b (1M9C.pdb) [63, 64]. There are numerous atomic contacts between the peptide and PPIase activity site that are similar to those existing in a complex between cyclophilin and a model peptide Suc-AGPF-pna bound to CyPA (1ZKF.pdb) (Table 1B). The solution [65] and X-ray [18] structures of the complex between a peptide coming from the U4/U6 snRNP-60K protein, which is known to interact with the spliceosomal cyclophilin hCyP19 [18], have revealed that the interaction network between the peptide and hCyP19 involves the AAs that are distant to its PPIase cavity; Fig. 6c shows the X-ray structure of the hCyP19/(the U4/U6 peptide) complex (1MZW.pdb).

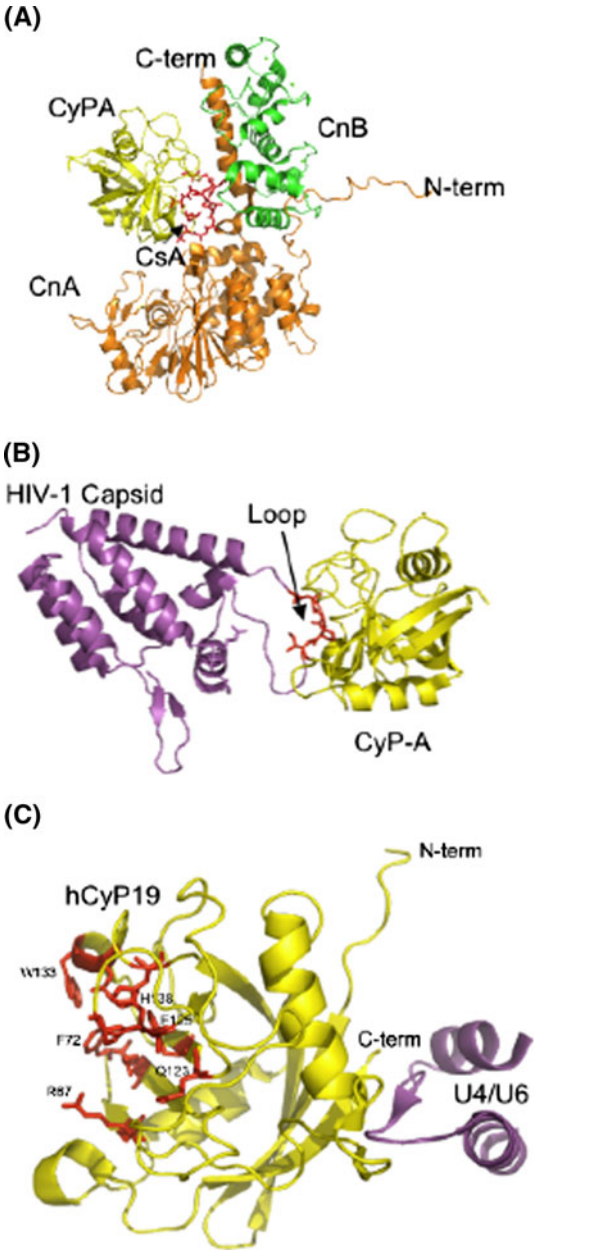


Fig. 6 Three X-ray structures of the binary and tertiary complexes; **a** the (hCyPA/CsA + CnA/CnB) complex [13]; CyPA (*yellow*) binds to CsA (*red*, indicated with a *black arrow*) and interacts with CnA (*orange ribbons*) and CnB (*green ribbon*) complex. **b** X-ray structure of HIV-1 capsid protein (*violet*) bound to the PPIase cavity of hCyPA (*yellow ribbon*); the loop in *red* comes from the capsid protein (1M9C.pdb, [30]). **c** X-ray structure of a short peptide from the U4/U6 snRNP-60K (*violet*) protein interacting with the hCyP19 (*yellow ribbon*) with some of the AAs forming its PPIase cavity (*red sticks*) (1MZW.pdb, [18])

Sequence attributes of the CLDs and some biological functions of the multidomain cyclophilins

Table 2 summarizes essential data, such as physicochemical properties, chromosomal localization and some of the biological functions of the human cyclophilins. The PDB codes are for human cyclophilins with two exceptions, namely for *Mus musculus* (Mm) and *Bos taurus* (Bt). Only 9 cyclophilins are mono-domain but their sequences are highly diversified. The remaining 11 expressed forms of the human cyclophilins contain distinct domains such as 40-residue Trp-Asp containing β propeller repeat domain (WD40), tetratricopeptide repeat (TPR), RNA-binding

(RRM), leucine-rich repeat (LRR), nucleporin domain (Nup), Really-Interesting-Gene-Product (RING) domain, and serine/arginine-rich (SR) domains that are crucial for assembly of spliceosomal complexes. For example, TPR, WD40 and LRR motifs are involved in protein–protein interactions, RING domain is a zinc-finger probably involved in interaction with DNA, RRM interacts with RNAs, and Nup domain is crucial for nucleoporin (hCyP358) forming pores in the nuclear membrane. Known cellular localizations are also indicated, namely nuclear, cytoplasmic, secreted form, membrane associated, and mitochondrial protein. Overall binding capacity of the cyclophilins to CsA are coded as strong for K_d or $K_i \leq 50$ nM, weak for these two values larger than 400 nM, and unknown if no experimental value was established.

The CLDs have the overall hydrophobicity (HI) ranging from low values, e.g., for the hydrophilic orthologues of hCyP58, to the highly hydrophobic membrane-associated CyPB, CyPC, CyPF and the spliceosome-associated hCyP19 [18, 57]. The overall hydrophobicity (HI) of some cyclophilins is very low which is due to a high content of charged AAs in the SR domains. The cyclophilins are present in different cellular compartments where they are involved in diverse biological functions such as assembly of mRNA splicing supracomplexes [73, 81], mitochondrial pore regulation [77–80], association to different molecular channels [85], and functioning as chaperone and folding co-factors [3].

Human TRIM5α is one of more than 70 tripartite motif-containing proteins that may impede HIV-1 replication. It has been shown that the cells of some monkeys living in South America express a fusion protein containing TRIM5α and a CLD that probably is one of the host factors restricting HIV-1 proliferation in the animal [92]. Multiple human ORFs have very similar sequences to those of the CLDs in the TRIM5α-cyclophilin fusion proteins that are expressed in the apes. Perhaps, due to evolutionary pressure, one of the human ORFs encoding a homologous CLD could undergo a gene fusion with the human TRIM5α gene and such a fusion protein would become a host restriction factor against HIV-1 infection [93].

The cyclophilins and diverse human diseases

Numerous reports have appeared on the involvement of CyPA and its diverse paralogues in functioning of different cellular entities [3, 4], some of which are summarized in Table 2. In this section, we discuss just four issues: (1) CsA-induced immunosuppression; (2) extracellular activities of some cyclophilins; (3) hypothetical involvement of CyPA in some stages of diseases caused by HIV-1 and HCV; and (4) cyclophilins and development of cancer cells.

CsA-induced Immunosuppression

The mechanism of CsA-induced suppression of T cell activation by antigen-presenting cells (T cell anergy) was proposed about two decades ago [11, 94]. It was postulated that the hCyPA/CsA complex binds to calcineurin and blocks its phosphatase activity that causes the retention of a phosphorylated form of the transcription factor called nuclear factor for activation of T cells (NF-AT) in the cytosol [11]. Pull-down experiments revealed that the hCyPA/CsA [11] and murine cyclophilin C (mCyPC) complexed to CsA were capable of binding calcineurin [94]. This would suggest that some of the paralogues of the archetypal hCyPA complexed to CsA, such as hCyPB/CsA or hCyPC/CsA, could bind to the phosphatase and block its active site. The membrane-associated mCyPC was not the physiologically relevant target for CsA since only the cytosolic CyPA bound to CsA supposed to be responsible for the inactivation of CnA/CnB in T cells, although no in vivo evidence was supplied to support such a mechanism of action [95]. Moreover, it should be mentioned that CyPA is an abundantly expressed protein whose PPIase activity cannot be entirely abolished in vivo since the concentration of CsA or its analogues would have to reach pharmacologically unacceptable levels [2, 5]. This would imply that the immunosuppressive effect of CsA in T cells could become effective because the expression level of the CnA/CnB phosphatase is low.

Although the *PPIA* gene is non-essential for mammalian cell viability, its knock-down rendered the mouse resistant to the immunosuppressive effects of CsA [96, 97]. Nothing was, however, established about what other effects could be induced by CsA in the mouse with the PPIA(−/−) gene. For example, it would be relevant to establish if CsA binds to the extracellular pool of mCyPB and if the complex may enter into T cells in the animal. Were some cellular processes controlled by the other paralogues of mCyPA affected by CsA in mouse with the PPIA(−/−) gene?

Extracellular effects of the cyclophilins

CyPB is the major component of the extracellular pool of the cyclophilins, namely a sizeable quantity of CyPB (ca. 20 μM), was found in the plasma [98, 99]. It could be secreted together with certain extracellular proteins and it should be able to sequester some quantity of the in vivo-administered CsA. It was also shown that a modified form of CsA anchored to the surface of T cells could exert its immunomodulatory effects [100], as negatively charged CsA derivatives rest in the extracellular space [101] whereas CsA binds well to the membranes in a temperature-dependent fashion [102]. If CsA binds to the extracellular pool of hCyPB, then such a complex has two

Table 2 The expressed forms of the human cyclophilins and some of their biological functions

No.	Protein name (alias)	Code	PDB	Chromosome/gene	Naa	Mass (Da)	Entire protein			CLD	Extra-domain	B_Pr[a]	Cellular localization and biological functions[b]	Reference
							pI	HI	CLD-length	pI; HI				
1	CyP18a (hCyPA)	NP_066953	2CPL	7p13-p11.2/PPIA	165	18013	7.8	37.6	Full			St	(C/S) Immunosuppression	[1–4, 11–15]
													Cell-related events	[66, 67]
													HIV-1 replication	[68, 69]
													HCV replication	[70, 71]
2	CyP18b*	NP_839944		1q21.1/PPIAL4G	164	18182	9.6	34.1	Full			Un	(N) Oncogene	[72]
3	CyP18c (hCyPJ)	NP_115861	1XYH	2q33.1/PPIL3a	165	18627	6.6	27.3	Full			Un	(N) Spliceosome	[73]
4	CyP18ci	NP_570981		2q33.1/PPIL3b	161	18155	6.3	27.3	Full			Un	(N) Spliceosome	[73]
5	CyP18d (CGI-124)	NP_057143	1XWN	6p21.1/PPIL1	166	18237	8.2	33.7	Full			Un	(N) Spliceosome, cancer growth	[73, 74]
6	CyP22b/p (hCyPB)	NP_000933	1CYN	15q21-q22/PPIB	208	22742	9.8	42.3	26-208	9.7; 38.3		St	(ER/S) Protein folding	[5]
													TPRV6 channel-associated	[75]
7	CyP22C/p (hCyPC)	NP_000934	2RMC (Mm)	5q23.2/PPIC	212	22763	8.7	52.8	28-208	9.4; 48.1		St	(Memb) Unknown	[76]
8	CyP22D/p (hCyPF)	NP_005720	2BIT,2Z6 W	10q22-q23/PPIF	207	22040	9.8	39.1	36-207	9.3; 35.8		St	(Mito) Mitochondrial pore	[77]
													Mitochondria/Muscular dystrophy	[78]
													Hexokinase II/apoptosis	[79]
													Mitochondrial function	[80]
9	CyP19 (hCyPH)	NP_006338	1MZW,1Q0I	1p34.1/PPIH	177	19208	8.1	44.1	Full			St	(N) Spliceosome	[73]
													Pre-RNA splicing	[81]
10	CyP33 (hCyPE)	NP_006103	1ZCX,1ZMF	1q32/PPIE	301	33431	5.3	33.2	130-301	8.4; 32.0	RRM	St	(N) RNA-binding/spliceosome	[82]
11	CyP35 (hCyP35)	NP_775943		6q21/PPIL6	311	35228	6.6	35.0	140-311	7.6; 35.5	RRM	Un	(N) Organism growth	[83]
12	CyP40 (hCyPD)	NP_005029	1IIP (Bt)	4q31.3/PPID	370	40764	6.8	31.6	6-192	6.8; 38.0	TPR	Wk	(C) HSP-steroid receptor	[84]
13	CyP46	NP_689542		14q21.1/PPIL5	414	46723	9.3	48.3	90-360	9.2; 43.5	LRR	Un	(C/N) Signal transduction	[85]
14	CyP54	NP_005860		5q12.3/SDCCAG10	472	53847	5.5	16.3	1-180	5.6; 31.7	WD40	Un	(N) Cancer marker/spliceosome	[86]
15	CyP57	NP_624311		6q24-q25/PPIL4	492	57225	5.6	20.9	1-165	5.0; 33.9	RRM	Un	(N) Spliceosome	[87]
16	CyP58 (hCyP60)	NP_680480	1ZKC	22q11.21/PPIL2	520	58824	9.0	22.5	271-446	8.6; 22.7	RING	St	(N) Spliceosome	[73]
17	CyP73	NP_056157	2A2 N	5q12.3/PPWD1	645	73444	6.7	32.7	476-645	6.8; 30.0	WD40	Un	(N) Spliceosome	[73]
18	CyP88 (hCyPG)	NP_004783	2GW2	2q31.1/PPIG	754	88618	10.7	8.5	1-184	8.4; 34.8	SR	St	(N) Spliceosome	[88]
19	CyP157	NP_005376	2HE9	3p23-p11/NKTR	1403	157712	10.3	13.3	51-238	8.3; 37.2	SR	St	(N) Spliceosome	[89]
20	CyP358	NP_006258		2q11-q13/RANBP2	3224	358221	5.8	25.7	3024-3224	6.7; 35.9	Nup	Un	(N) Nucleoporin	[90, 91]

[a] Overall binding capacity of the cyclophilins: strong (*St*) for K_d or $K_i \leq 50$ nM, weak (*Wk*) for these two values larger than 400 nM, and unknown (*Un*) if no experimental value was established

[b] Known cellular localizations: *N* nuclear, *C* cytoplasmic, *S* secreted form, *Memb* membrane associated, *Mito* mitochondrial protein

crucial attributes for entering into the cell's interior, namely the large exposed hydrophobic patch of CsA should have some affinity to the hydrophobic environment of the membranes while the positively charged patches of CyPB should induce a substantial driving force for entry into T cells. To what extent the extracellular pool of the hCyPB/CsA complex formed in vivo may enter into T cells and induce immunosuppression remains to be investigated [103].

hCyPB was shown to be involved in cell adhesion [104]. *Osteogenesis imperfecta* is a disease causing growth deficiency and reduced bone mass. This particular deficiency could be due to a mutation in the *PPIB* gene encoding hCyPB [105, 106]. Although the level of the extracellular CyPA was too low for detection by an Elisa assay [94], it was claimed that the secreted form of hCyPA is crucial for matrix assembly by hensin that is involved in epithelial differentiation [107]. Large numbers of secreted gene products [7] and extracellular domains (ECDs) of various receptors could interact with the extracellular pool of the small PPIases. But what exact biological effects could be due to those myriads of potential intermolecular interactions? Extracellular matrix re-organization, differentiation of cells, and their growth and proliferation are dependent on in vivo locally secreted gradients of growth factors (morphogens), proteases and other crucial factors [108, 109]. Perhaps the extracellular forms of hCyPA and hCyPB have an overall housekeeping function rather than exerting a profound influence on some crucial biological events. Assessment of functional interactions between the recombinant forms of the cyclophilins and distinct populations of cells under in vitro conditions, in some cases could have been misleading due to sizeable contamination of the former by the bacterial lypopolysaccharide (LPS), a powerful inducer of diverse cellular effects. For example, another abundantly expressed small protein found both in the interior of the cell and in the extracellular space, called macrophage migration inhibitory factor (MIF), had been considered to be a cytokine, although its biological activity was proven to be induced by the associated bacterial LPS [110, 111]. It should be noted, however, that CyPA, CyPB and MIF could be easily isolated from natural sources in a relatively large quantity [2, 5, 112]. Thus, application of CyPA and CyPB isolated from mammalian organs and free of LPS for in vitro assessments of their influence on diverse cells could resolve some doubts caused by the usage of the recombinant LPS-contaminated cyclophilins expressed in *E. coli*.

CyPA and infections caused by HIV-1 and Hepatitis C viruses (HCV)

Although hCyPA was found to be associated with HIV-1 viruses, probably bound to the Gag (CA) protein, the relevance of CyPA for proliferation of HIV-1 virions have remained enigmatic during the last 15 years [30, 68, 69, 113]. It has been suggested that binding of hCyPA to the CA protein shelters the latter from being sequestered by the cellular factors TRIM5α/Ref that may restrict replication of HIV-1 [114, 115]. The whole-genome siRNA interference experiments have pinpointed numerous intracellular targets that are crucial for different stages of the HIV-1 live cycle such as uncoating of the HIV-1 virus, its intracellular transport and integration with the host DNA, transcription of its 15 genes, assembly of genetic material as its coating, and, finally, budding of newly assembled viral particles from the host cell [115–117]. It is unknown if CyPA or some of its minor isoforms are crucial for any of the multiple candidate proteins established with the siRNA technique [116, 117].

Non-immunosuppressive analogues of CsA, namely Debio-025 or SCY-635, may alter certain replication steps of HCV [70, 71] and as such they could become useful as an additional drug to fight HCV infections in humans. These drugs could bind to the intracellular pool of CyPA and CyPB and interfere with a HCV replication step. However, Debio-025 or SCY-635 could suppress HCV infection due to its interaction with one of the paralogues of CyPA whose expression level is low in the hepatocytes or impair other cellular entities crucial for replication of HCV.

Cyclophilins, intra-cellular signaling and development of cancer

Even if CyPA and some of its paralogues are highly expressed proteins in human cells [2, 5], it has been suggested that they may be involved in some stages of cancer cell development and proliferation [67]. Recent reports show that CyPA interacts with Tp53 and Stat3 which are powerful regulators of gene transcription [118]. CyPA is also a crucial factor for CXCR4-activation transport of the heterogeneous nuclear ribonucleoprotein A2 [66], a spliceosomal RNA-binding protein. The hydrophobic cavity of CyPA and its different paralogues could be associated to various exposed loops of proteins or receptors, but what physiological effects all those interactions may have and to what extent those associations and their possible disruption by CsA could alter some cellular processes still remain unclear [3, 108]. The molecular events leading to formation of primary cancer cells, such as mutations of genes or other chromosomal alterations related to DNA repair or deletion of chromosomal segments, may create diversified populations of cancer cells [119–122]. To what extent the heterogeneous transformations of the genetic material leading to aberrant induction of gradients of morphogens and other auxiliary growth factors

and extracellular matrix remodeling enzymes could be controlled by the ubiquitous and abundantly expressed CyPA or its other isoforms still remain unexplored.

The cyclophilins in the protozoan parasites affecting humans

Basic information on the cyclophilins expressed in some protozoan parasites affecting humans is summarized in Table 3. From 11 to 15 different cyclophilins isoforms are encoded in the genomes of diverse parasites [9, 10]. Figure 7 shows overall sequence organization of the cyclophilins encoded in three different genomes that is only to some extent similar to that of the human cyclophilins' repertoire. The inhibitory constants for the complexes between CsA and diverse cyclophilins are similar to that of the archetypal human CyPA/CsA, which limits the potential therapeutic application of the drug against invading parasites [8, 124, 137].

It has been shown that the extracellular growth of *Leishmania donovani* is resistant to the actions of CsA which seems to be due to a low expression level of the archetypal cytosolic CyPA in this parasite [135]. It has also been suggested that the mammalian host cell CyPA seems to be involved in the intracellular parasite's replication cycle of *L. major* parasites, as CyPA siRNA interference or CsA reduced the parasite burden [134]. Some of the small cyclophilins from *Plasmodium falciparum* and *Toxoplasma gondii* (*Tg*CyP18) have similar inhibitory profiles as those established for the hCyPA (Table 3) [124, 126–129]. Interestingly, *Tg*CyP18 has the capacity to bind to the CXCR5 receptor and block the HIV infectivity on human T cells [129]. *T. gondii* also expresses an unusual protein (*Tg*FCBP57.3) containing one FKBP-like protein (N-terminus) and one CLD (C-terminus) linked together via three tetratricopeptide (TPR) motifs. Both domains can bind to CsA and FK506, respectively, but only the FKBD/FK506 complex could inhibit the endogenous calcineurin [130]. Knockdown of this dual family gene interfered with the growth of the parasite [130].

In proteomic analyses of *Leishmania mexicana* (*Lm*), belonging to *Trypanosomatids*, *Lm*CyP19, *Lm*CyP22, *Lm*CyP28 and *Lm*CyP40 paralogues were identified [133] that are orthologues to the cyclophilins of *T. cruzi* (Tc) eluted from CsA-affinity column [9]. The genome of *T. cruzi* does not encode the fully conserved orthologues of the human cyclophilins containing RNA binding domains probably due to the unusual type of mRNA processing in Trypanosomatids, in which polycistronic transcripts are processed to mature mRNAs through *trans*-splicing [144]. In contrast, those orthologues are encoded in the genomes of the *Apicomplexa* parasites [10]. Orthologous genes to that encoding *Tc*CyP40, which is related to the heat shock protein hCyP40, were also found in the genomes of *L. mexicana* and *L. major* (Fig. 7) [9].

It was demonstrated that CsA has anti-parasitic activity against a wide variety of parasites [8] with the exception of *Leishmania* that was resistant to the actions of CsA [135]. Figure 8 shows several derivatives of CsA which proved to exhibit anti-parasitic effects on *Cryptosporidium parvum*, *Plasmodium falciparum*, *Trypanosoma cruzi* and *Entamoeba histolytica* (see Table 3). Curiously, some of these compounds were more effective in inhibiting live functions in the parasites than CsA itself [137], and some of them did not bind the cytosolic cyclophilins [142]. This would imply that CsA and its derivatives could exert their parasiticidal effects that are not necessarily mediated by the archetypal cytosolic CyPA. Moreover, even if the tentative model of immunosuppression in humans involves hCyP18a/CsA inhibition of phosphatase activity of calcineurin in T cells, this model may not be valid in other organisms including the parasites.

For example, evidence that the CsA analogs with poor or no immunosuppressive activity were parasiticidal also argues against a mechanism involving calcineurin as the target of various CyPA/(CsA-derivative) complexes. It is possible that anti-parasitic activity of CsA could be due to its binding to other targets such as P-glycoprotein (P-gP), in which the some CsA analogues proved to be potent modifiers of its activity [123, 137, 142]. It was suggested, however, that calcineurin was the target of CsA complexed to the cytosolic cyclophilin expressed in *E. histolytica* [140]. Some information about the properties of the cylophilins expressed in Helminths is compiled in ESM Table Ts4.

Even if more than three decades have elapsed since the discovery of CsA as an effective parasiticidal drug little is so far known about the mechanisms of its anti-parasitic activity. Moreover, targeting of CsA or its non-immunosuppressive derivatives to the archetypal CyPA of the parasites affecting humans cannot be done selectively since hCyPA and some of its isoforms are highly expressed in diverse organs and tissues and are strong binders of those molecules. Thus, selective targeting of small natural [145] or synthetic molecules to the minor isoforms of the cyclophilins expressed in the parasites could become a method for curing some human diseases (see Table 3).

Perspectives on selective targeting of the multiple isoforms of the cyclophilins

Multiple side effects observed in the long-term usage of CsA in organ transplant recipients, especially the severe nephrotoxicity, remain one of the major obstacles for a broader use of the drug in the treatment of inflammation and other immune disorders [1, 3, 4, 15]. In fact, CyPA is

Table 3 Overall characteristics of some cyclophilins encoded in the genomes of parasites invading humans

Parasite	Species (disease)	Cyclophilin	Acc. No.	Observations	Ref.	CsA and its derivatives PPIase activity inhibition	Ref.	CsA and its derivatives Parasiticidal effect	Ref.	Probable CsA mechanism of action
Apicomplexa	*Plasmodium falciparum* (Malaria)	*Pf*CyP19A	XP_001351290	CyP highly expressed in intra-erythocytic parasites. Mature protein isolated	[124]	CsA K_d = 13 nM, K_i = 6.9 nM similar K_d/K_i with 11 CsA-analogs	[124]	[val^2]CsA inhibited parasites. PSC-833 EC_{50} = 0.032 mM CsA = 0.32 mM	[124, 125]	P- glycoprotein as target molecule *Pf*CyP19/ CsA can bind to calcineurin
		*Pf*CyP22	XP_001351841	Ibid. ER signal peptide. Mature protein isolated	[126]	CsA IC_{50} = 10 nM	[126]			
		*Pf*CyP24	XP_001349469	CyP highly expressed at the late-ring parasite stage	[127]			Trophozoites more sensitive to CsA due to a high level of *Pf*CyP24 expression	[127]	
	Toxoplasma gondii (Toxoplasmosis)	*Tg*CyP18	AAA17997	Mature protein isolated. Secreted. CyP binds to CCR5 receptor. Induces IL-12. Inhibits HIV infectivity by co-receptor antagonism	[128, 129]	CsA IC_{50} = 32 nM	[128]	*T. gondii* less susceptible than Plasmodium parasites. SDZ 215-918 EC_{50} = 0.45 mg/ml with low affinity for *T. gondii* CyPs	[123]	P- glycoprotein is likely the molecular target
		*Tg*CyP20	XP_002367801	Mature protein isolated. N-terminal sequence with identity to calcineurin	[128]	CsA IC_{50} = 5 nM	[128]			
		*Tg*FCBP57.3	AAX51680	Dual immunophilin, N-terminal FKBP and C-terminal CLD Essential for parasite survival.	[130]	FK506 IC_{50} = 70 nM CsA IC_{50} = 750 nM	[130]			
Trypanosomatids	*Leishmania major* (Cutaneous Leishmaniasis)	*Lm*CyP19	CAA73904	Cyps of 18, 19, 22 and 40 kDa were CsA affinity isolated. *Lm*CyP19, the most expressed. No affinity for calcineurin	[131, 133]	CsA K_i = 5.2 nM	[131]	Extracellular *L. major* growth inhibition. Relatively insensitive to CsA	[134]	A single AA mutation in *Lm*CyP19 fails to interact with calcineurin
	Leishmania donovani (Visceral Leishmaniasis)	*Ld*CyP	AAD46565	CyP of the endoplasmic reticulum. Secreted to culture medium under oxidative stress	[132]	CsA K_d = 135 nM	[135]		[135]	Low expression of *Ld*CyP in the cytosol Insensitivity to CsA
	Trypanosoma brucei (Sleeping sickness)	*Tb*CyP19	AAB07896	Expressed and differentially transcribed Secreted protein. Cytosolic and flagellum localized	[136]	CsA binds *Tb*CyP19 No inhibition experiments	[136]			
	Trypanosoma cruzi (Chagaś disease)	*Tc*CyP19	AAF05985	*Tc*CyP19, *Tc*CyP22, *Tc*CyP28 and *Tc*CyP40 isolated by CsA affinity. *Tc*CyP19 major cytosolic isoform, present in all parasite stages. Mitochondrial *Tc*CyP21was identified.	[9]	CsA IC_{50} = 14 nM and H-7-94 analog IC_{50} = 12 nM	[137, 138]	Trypanocidal activity in vitro and in vivo. H-7-94 CsA analog is the most effective: *Tc*CyP19 IC_{50} = 12.5 nM, *T. cruzi* EC_{50} = 0.8 mM, NIM811 is not effective	[137]	Besides *Tc*CyPs also P-glycoprotein could be a molecular target
Amebae	*Entamoeba histolytica* (Enteric diseases)	*Eh*Cyp	AAB86601	60 to 70% sequence identity with the other cyclophilins. Transcribed and expressed.	[139]	PPIase Inhibition with CsA at nM concentration	[139]	CsA EC_{50} at 1–10 mg/ml on thophozoites	[139, 140]	Interference the activity of calcineurin and P-gP
Flagellates	*Giardia intestinalis* (Enteric diseases)	*Gi*CyP1	XP_001707838	Found as a single gene. Similar to *Eh*CyP and hCyP18	[141]	Total PPIase Inhibition with 500 nM CsA	[141]			

Table 3 continued

Parasite	Species (disease)	Cyclophilin	Acc. No.	Observations	Ref.	CsA and its derivatives PPIase activity inhibition	Ref.	CsA and its derivatives Parasiticidal effect	Ref.	Probable CsA mechanism of action
Coccidia	*Cryptosporidium parvum* (Cryptosporidiosis)							CsA EC_{50} at 1.5 mM and IC50 of 1 mM for PSC-833 derivative	[142]	CsA inhibits CnA PSC-833 binds to P-glycoprotein
For comparison	*Homo sapiens*	*h*CyPA	CAA37039	Cyclophilin like domain characteristics in the text.		CsA IC_{50} = 20 nM, NIM811 K_i = 2.1 nM, Debio-025 K_i = 0.34 nM H-7-94 IC_{50} = 70 nM PSC-833 does not bind hCyPA	[8, 9, 137, 143]			

highly expressed in kidneys with a large portion of it tightly associated with the renal brush border membranes [146]. Non-immunosuppressive derivatives of CsA display some potential for being used in treatment of HIV-1 and HCV infections [143]. But are they nephrotoxic? CsA derivatives are cytoprotective (in vitro and ex vivo) when bound to hCyPD [147, 148]. For example, despite the deep differences between apoptosis and necrosis, the mitochondrial permeability transition pore (mPTP) was found to be involved in both types of cell death, but since the mPTP can be blocked by the CyPD/CsA complex, then cells are protected from injury and death [149]. Pharmacological targeting of the cyclophilins could be useful for treatments of Alzheimer [148], Huntington's disease [150], amyotrophic lateral sclerosis [151], and congenital muscular dystrophy [152], whereas CsA in aerosol form could be useful in the treatment of asthma [153] and airway inflammations [154].

Despite more than twenty-five years of research on the cyclophilins and their ligands still relatively few cyclophilins have been thoroughly investigated and many singular findings have never been independently confirmed or exploited [3, 4]. Among the diverse communications published to date only in a few of them have some uncertain results been addressed. For example, it was proven that the recombinant CyPA does not have nuclease activity [155] and the apparent activity recorded for the recombinant forms of hCyPA, hCyPB and hCyPC must have been due to a nuclease contaminant from *E.coli* [156]. Involvement of the calcium-modulating cyclophilin ligand (CAML) in restriction of cellular release of the HIV-1 retroviruses seems to be doubtful [157, 158]. Originally, CAML was found to be associated with the endoplasmic reticulum-residing CyPB [159].

If SfA and CsA bound to hCyPA cause different immunological effects, then it would be interesting to know if there are some other natural compounds that could bind to hCyPA and subtly influence different immune processes than those controlled by SfA, CsA and its various derivatives [160, 161]. There are no conclusive findings so far on the selective targeting of the PPIase cavity in diverse cyclophilins that function in various cellular compartments. For example, elucidation of crucial functional aspects of the nine cyclophilins (see Table 2) involved in the supraspliceosome assembly and other nuclear complexes could open some ways for pharmacological intervention in the transcription and splicing of the mRNAs [162–164]. It is still uncertain, however, to what extent the PPIases are associated with different extracellular domains (ECDs) of some receptors [3, 108, 165], as well as which functions of the intracellular proteins [166, 167] and their complexes are dependent on particular members of the cyclophilin family of proteins. Rough estimates have revealed that

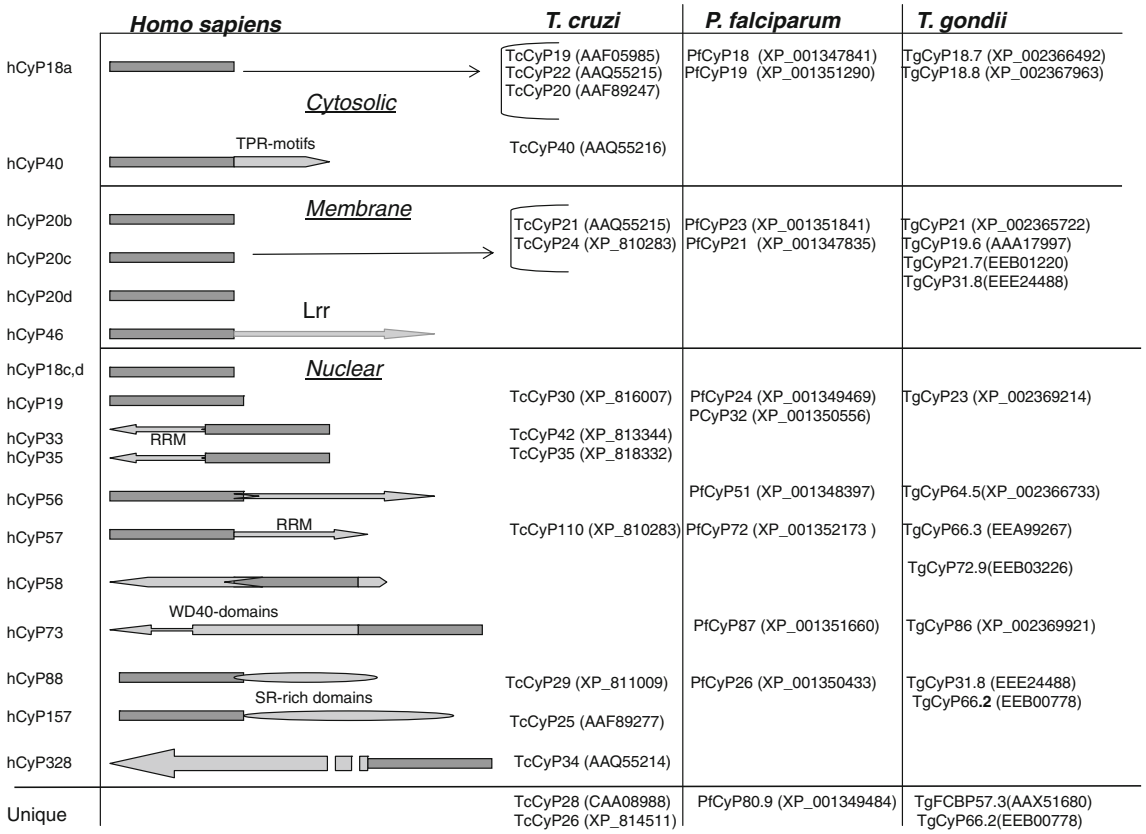


Fig. 7 The human cyclophilins and their respective orthologues encoded in the genomes of *Trypanosoma cruzi*, *Plasmodium falciparum* and *Toxoplasma gondii*. The proteins were arranged according to two criteria, namely (1) presence of similar domains, and (2) similar sequence attributes for their respective CLDs in the cases where the large cyclophilins were aligned with their small homologues

there are about 7,000 hydrophobic proteins some of which are expressed on the cell surface [38, 168]. Moreover, Pro residues account for about 6.5% of the total amino acid composition of proteins encoded in the human genome, and about 0.2% of the diads Gly-Pro occur in the human sequences (see ESM Ts1) [168]. This could imply that some of those residues in diverse proteins should be accessible for binding to the PPIase cavity of the cyclophilins although it has been shown that linear peptides containing the sequences of proteins that were proven to bind to CyPA do not always bind to the PPIase cavity [3, 4, 36]. It is thus crucial to find out what functional meanings, if any, might those diverse complexes have involving the cyclophilins, and if bound to CsA or the other ligands having high affinity to the cyclophilins [3], which cellular effects could they produce.

Conclusions

The members of the cyclophilin family of proteins are encoded in various genomes ranging from prokaryotes to higher animals [3, 4, 57], including the genome of Mimi virus although the latter cyclophilin lacks any PPIase activity [170]. Diverse paralogues of hCyPA are present in the nuclear compartment where they form complexes with various entities including one of the most sophisticated complexes known as the supraspliceosome entities [162]. Our analyses of the MSAs, 2D distance maps and Rmsds of specific groups of AAs, such as those involved in binding of CsA or being in the 'aromatic/hydrophobic' network, revealed that there is a high sequence conservation of the AAs forming the PPIase cavity (ESM Fs3 and Ts4). Moreover, the low I_es indicate that some sequence positions remain highly conserved in the cyclophilins from diverse phyla (ESM Fs5) despite multiple AA mutations and gene duplication events that took place during evolution of living species. The highly conserved sequence positions belong to two classes, namely (1) the AAs crucial for maintaining the structural integrity of the CLDs (the extensive interaction networks of the hydrophobic AAs), and (2) functionally-crucial AAs for PPIase activity and specific interactions with diverse cellular targets [3]. The conserved short patches of the AAs are spaced with the AA patches with low levels of sequence conservation that impose the final pI and hydrophobicity of the given CLD.

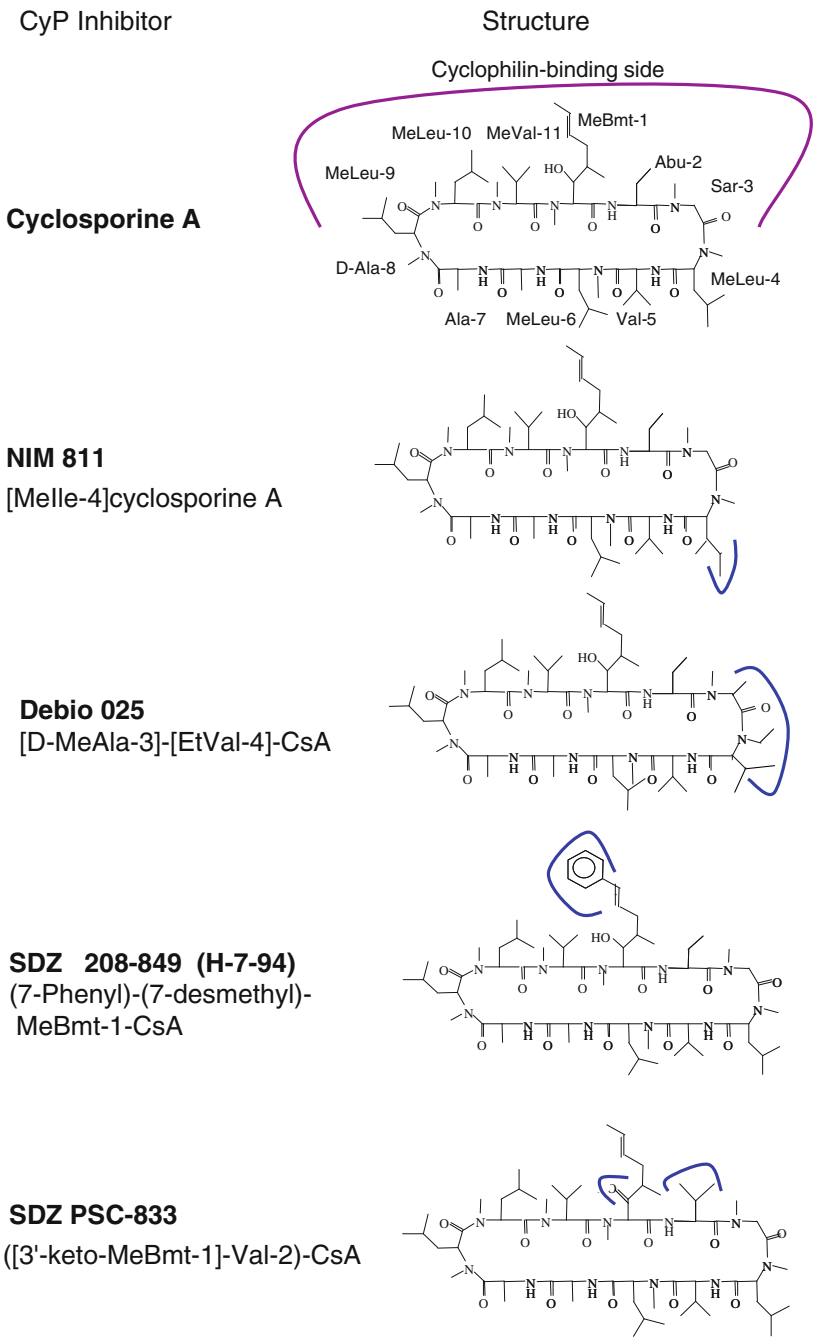


Fig. 8 Chemical structures of derivatives of CsA devoid of immunosuppressive activity in humans. *Continuous lines* indicate the places where chemical modifications were made while *stripped line* on CsA indicates the residues that should be hidden inside the PPIase cavity

We hypothesize that subtly changed spectra of physicochemical characteristics, such properties as amino acid (AA) hydrophobicity and bulkiness distribution, flexibility of the polypeptide chain and charge distribution, of the AA residues in the sequence patches with low sequence conservation induced 'functional drift of sequence attributes' [19]. In consequence, this 'functional drift' had to influence the intra-molecular interaction networks in the closed β-barrel fold of the CLDs [3] that adapted their overall properties to: (1) recognition profiles of their specific targets (biological profiles) [3, 18, 36, 172], and (2) the micro-environmental conditions inherent to various intracellular organelles (evolutionary niche). For example, the HIs of the human CLDs (Table 2) vary in a considerable range, namely from 23% for hCyP58 (also known as hCyP60) to 48% for hCyPC (Fig. 9). CyPC, CyPB and CyPF are the hydrophobic proteins associated with the membranes, whereas hCyP40 could interact with the membrane proteins via its hydrophobic TPR motifs [3, 168].

Moreover, it could be theorized that the hydrophilic CLD of hCyP58, the hydrophobic CLD of hCyP73 and the extremely hydrophobic hCyP19 are the cyclophilins that associate to specific spliceosomal entities using their optimized levels of hydrophobic patches (HI) on its surface and

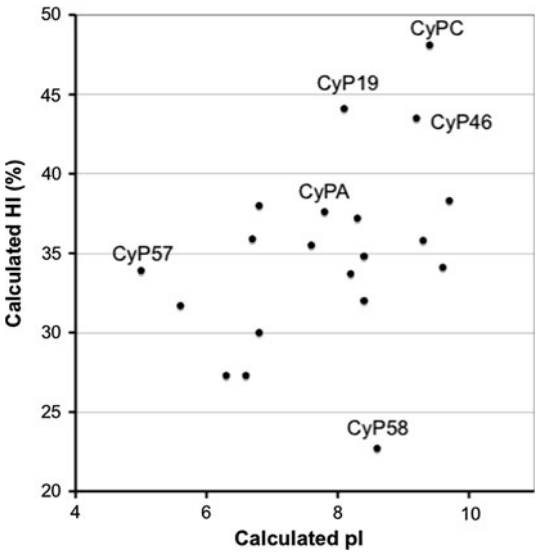


Fig. 9 Distribution of hydrophobicity versus pI of the human CLDs (see Table 2)

specific spatial charge distribution (pI). Our analyses may also indicate that fine alterations in the intra-molecular interaction patterns within the CLD's fold are crucial for their selective binding to diverse epitopes including CsA and its diverse analogues. Whether subtle functional changes in some cellular entities, such as neurotransmitter-gated ion channels [171] or cellular signalization cascades [3, 12], are solely due to intrinsic temperature-driven *cis*/*trans* isomerization of their X-Pro epitopes (conformational switches) is one possibility. Another possibility is that they may be due to a long-distance conformational allostery induced by one of the PPIases [169, 172, 173]. Unraveling the fine structural basis of in vivo specificity of the cyclophilins to their targets, however, would require a sizable number of high-resolution X-ray structures of their complexes with relevant cellular targets functioning in various organelles.

Diversified cellular effects induced by CsA and its derivatives and especially relevance of their in vivo aspects that are dependent on the formation of various interaction networks involving calcineurin, NF-ATs, TGFβ and other intra- and extracellular proteins are still at the beginning of exploration [174–176]. The large number of the ECDs containing accessible proline epitopes and the multitude of intracellular proteins that can be associated with the cyclophilins imply that there may be myriads of subtle cellular effects induced by CsA and its derivatives. For example, CsA can be used as an immunosuppressive drug [3, 4, 11], its derivative called valspodar (PSC 833) [177, 178] may add enhanced retention of anticancer drugs in the cell by blocking its P-gP activity, whereas some derivatives as NIM811 or Debio-025 could be useful drugs for suppression of viral infections by HIV-1 and HCV provided that they are devoid of profound nephrotoxic activity. In conclusion, in vivo-induced subtle interactions between the cyclic peptide CsA, and its non-immunosuppressive diverse derivatives [179] and diverse targets remain for thorough exploration. Certainly, it is challenging to selectively uncover in vivo essential extracellular and intracellular vectors for CsA and its derivatives and to classify the multiple effects exerted by the drugs on diverse in vivo relevant cellular events.

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References

1. Borel JF, Feurer C, Gubler HU, Stahelin H (1994) Biological effects of cyclosporine A: a new antilymphocytic agent. Agents Actions 43:179–186
2. Handschumacher RE, Harding MW, Rice J, Drugge RJ, Speicher DW (1984) Cyclophilin: a specific cytosolic binding protein for cyclosporine A. Science 226:544–546
3. Galat A, Riviere S (1998) Peptidylprolyl *cis*/*trans* isomerases. Oxford University Press, Oxford
4. Edlich F, Fischer G (2006) Pharmacological targeting of catalized protein folding: the example of peptide bond *cis*/*trans* isomerases. Hand Exp Pharmacol 172:359–404
5. Galat A, Bouet F (1994) Cyclophilin B is an abundant protein whose conformation is similar to that of cyclophilin A. FEBS Lett 347:31–36
6. Kieffer LJ, Thalhammer T, Handschumacher RE (1992) Isolation and characterization of a 40-kDa cyclophilin-related protein. J Biol Chem 267:5503–5507
7. Wheeler DL, Church DM, Federhen S, Lash AE, Madden TL, Pontius JU, Schuler GD, Schriml LM, Sequeira E, Tatusova TA, Wagner L (2003) Database resources of National Center for Biotechnology. Nucleic Acids Res 31:28–33
8. Bell A, Monaghan P, Page AP (2006) Peptidyl-prolyl *cis-trans* isomerases (immunophilins) and their roles in parasite biochemistry, host-parasite interaction and antiparasitic drug action. Int J Parasitol 36:261–276
9. Potenza M, Galat A, Minning TA, Ruiz AM, Duran R, Tarleton RL, Marín M, Fichera LE, Bua J (2006) Analysis of the *Trypanosoma cruzi* cyclophilin gene family and identification of cyclosporine A binding proteins. Parasitology 132:867–882
10. Krücken J, Greif G, von Samson-Himmelstjerna G (2009) In silico analysis of the cyclophilin repertoire of apicomplexan parasites. Parasit Vectors 2:27–51
11. Liu J, Farmer JD Jr, Lane WS, Friedman J, Weissman I, Schreiber SL (1991) Calcineurin is a common target of cyclophilin-cyclosporine A and FKBP-FK506 complexes. Cell 66:807–815
12. Sigal NH, Dumont F (1992) Cyclosporine A, FK506, and rapamycin: pharmacologic probes of lymphocyte signal transduction. Annu Rev Immunol 10:519–560
13. Huai Q, Kim HY, Liu Y, Zhao Y, Mondragon A, Liu JO, Ke H (2002) Crystal structure of calcineurin-cyclophilin-cyclosporineshows common but distinct recognition of immunophilin-drug complexes. Proc Natl Acad Sci USA 99:12037–12042

14. Jin L, Harrison SC (2002) Crystal structure of human calcineurin complexed with cyclosporine A and human cyclophilin. Proc Natl Acad Sci USA 99:13522–13526
15. Stahelin HF (1996) The history of cyclosporine A (Sandimmune) revisited: another point of view. Experientia 52:5–13
16. Ke H, Zydowsky LD, Liu J, Walsh CT (1991) Crystal structure of recombinant human T-cell cyclophilin A at 2.5 Å resolution. Proc Natl Acad Sci USA 88:9483–9487
17. Ke H, Huai Q (2004) Crystal structures of cyclophilin and its partners. Front Biosci 9:2285–2296
18. Reidt U, Wahl MC, Fasshauer D, Horowitz DS, Luhrmann R, Ficner R (2003) Crystal structure of a complex between human spliceosomal cyclophilin H and a U4/U6 snRNP-60K peptide. J Mol Biol 331:45–56
19. Galat A (2008) Functional drift of sequence attributes in the FK506-binding proteins (FKBPs). J Chem Inf Model 48:1118–1130
20. Loosli H-R, Kessler H, OshkiNatureH WeberH-P, Petcher TJ, Widmer A (1985) The conformation of cyclosporine A in the crystal and in solution. Helv Chim Acta 68:682–704
21. Kessler H, Kock M, Wein T, Gehrke M (1990) Reinvestigation of the conformation of cyclosporine A in chloroform. Helv Chim Acta 73:1818–1832
22. Altschuh D, Braun W, Kallen J, Mikol V, Spitzfaden C, Thierry C, Vix O, Walkinshaw MD, Wuthrich K (1994) Conformational polymorphism of cyclosporine A. Structure 2:963–972
23. Wuthrich K, von Freyberg B, Weber C, Wider G, Traber R, Widmer H, Braun W (1991) Receptor-induced conformation change of the immunosuppressant cyclosporine A. Science 254:953–954
24. Zydowsky L, Etzkorn FA, Chang HY, Ferguson SB, Stolz LA, Ho SI, Walsh CT (1992) Mutagenesis of human cyclophilin A defines the enzyme active site and separate peptidyl-prolyl isomerase activity from cyclosporin-A binding and calcineurin inhibition. Prot Sci 1:1092–1099
25. Mikol V, Kallen J, Pflugl G, Walkinshaw MD (1993) X-ray structure of a monomeric cyclophilin A-cyclosporine A crystal complex at 2.1 Å resolution. J Mol Biol 234:1119–1130
26. Kallen J, Spitzfaden C, Zurini MGM, Wider G, Widmer H, Wuthrich K, Walkinshaw MD (1991) Structure of human cyclophilin and its binding site for cyclosporine A determined by X-ray crystallography and NMR spectroscopy. Nature 353:276–279
27. Braun W, Kallen J, Mikol V, Walkinshaw MD, Wuthrich K (1995) Three-dimensional structure and actions of immunosuppressants and their immunophilins. FASEB J 9:63–72
28. Kallen J, Walkinshaw MD (1992) The X-ray structure of a tetrapeptide bound to the active site of human cyclophilin A. FEBS Lett 300:286–290
29. Eisenmesser EZ, Thai V, Pozharski E, Kern D. Mechanistic insights of cyclophilin-A from X-ray cyrstallographic and nuclear magnet resonance investigations (1ZKF). http://www.rcsb.org/pdb (accessed October 2007)
30. Gamble TR, Vajdos FF, Yoo S, Worthylake DK, Houseweart M, Sundquist WI, Hill CP (1996) Crystal structure of human cyclophilin A bound to the amino-terminal domain of HIV-1 capsid. Cell 87:1285–1294
31. Radzicka A, Acheson SA, Wolfenden R (1992) *Cis/trans* isomerization at proline: desolvation and its consequences for protein folding. Bioorg Chem 20:382–386
32. Zhao Y, Ke H (1996) Crystal structure implies that cyclophilin predominantly catalyzes the *trans* to *cis* isomerization. Biochemistry 35:7356–7361
33. Stein RL (1993) Mechanism of enzymatic and nonenzymatic prolyl *cis-trans* isomerization. Adv Protein Chem 44:1–24
34. Scholz C, Scherer G, Mayr LM, Schindler T, Fischer G, Schmid FX (1998) Prolyl isomerases do not catalyze isomerization of non-prolyl peptide bonds. Biol Chem 379:361–365
35. Harrison RK, Stein RL (1990) Substrate specificities of the peptidyl prolyl *cis-trans* isomerase activities of cyclophilin and FK-506 binding protein: evidence for the existence of a family of distinct enzymes. Biochemistry 29:3813–3816
36. Piotukh K, Gu W, Kofler M, Labudde D, Helms V, Freund C (2005) Cyclophilin A binds to linear peptide motifs containing a consensus that is present in many human proteins. J Biol Chem 280:23668–23674
37. MacArthur MW, Thornton JM (1991) Influence of proline residues on protein conformation. J Mol Biol 218:397–412
38. Galat A (2009) On transversal hydrophobicity of some proteins and their modules. J Chem Inf Model 49:1821–1830
39. Gibbs PR, Radzicka A, Wolfenden R (1991) The anomalous hydrophilic character of proline. J Am Chem Soc 113:4714–4715
40. Wang XJ, Etzkorn FA (2006) Peptidyl-prolyl isomerase inhibitors. Biopolymers 84:125–146
41. Galat A (1996) A large-scale processing of kinetic data files with derivation of the inhibitory constant K_i: an application to proline isomerases. Comput Chem 20:279–281
42. Papageorgiou C, Borer X, French RR (1994) Calcineurin has a very tight-binding pocket for the side chain of residue 4 of cyclosporin. Bioorg Med Chem Lett 4:267–272
43. Hu MK, Badger A, Rich DH (1995) Cyclosporine Analogs modified in the 3, 7, 8-positions: substituent effects on peptidylprolyl isomerase inhibition and immunosuppressive activity are nonadditive. J Med Chem 38:4164–4170
44. Loor F, Tiberghien F, Wenandy T, Didier A, Traber R (2002) Cyclosporins: structure-activity relationships for the inhibition of the human MDR1 P-glycoprotein ABC transporter. J Med Chem 45:4598–4612
45. Loor F, Tiberghien F, Wenandy T, Didier A, Traber R (2002) Cyclosporins: structure-activity relationships for the inhibition of the human FPR1 formylpeptide receptor. J Med Chem 45:4613–4628
46. Wenger R (1986) Cyclosporine and analogues: structural requirements for immunosuppressive activity. Transplant Proc 18:213–218
47. Billich A, Hammerschmid F, Peichl P, Wenger R, Zenke G, Quesniaux V, Rosenwirth B (1995) Mode of action of SDZ NIM 811, a nonimmunosuppressive cyclosporine A analog with activity against human immunodeficiency virus (HIV) type 1: interference with HIV protein-cyclophilin A interactions. J Virol 69:2451–2461
48. Fehr T, Kallen J, Oberer L, Sanglier JJ, Schilling W (1999) Sanglifehrins A, B, C and D, novel cyclophilin-binding compounds isolated from Streptomyces sp. A92-308110; Structure elucidation, stereochemistry and physico-chemical properties. J Antibiot (Tokyo) 52:474–479
49. Sanglier JJ, Quesniaux V, Fehr T, Hofmann H, Mahnke M, Memmert K, Schuler W, Zenke G, Gschwind L, Maurer C, Schilling W (1999) Sanglifehrins A, B, C and D, novel cyclophilin-binding compounds isolated from Streptomyces sp. A92-308110; Taxonomy, fermentation, isolation and biological activity. J Antibiot (Tokyo) 52:466–473
50. Fehr T, Quesniaux VF, Sanglier JJ, Oberer L, Gschwind L, Ponelle M, Schilling W, Wehrli S, Enz A, Zenke G, Schuler W (1997) Cymbimicin A and B, two novel cyclophilin-binding structures isolated from actinomycetes. J Antibiot (Tokyo) 50:893–899
51. Gaymes TJ, Cebrat M, Siemion IZ, Kay JE (1997) Cyclolinopeptide A (CLA) mediates its immunosuppressive activity

through cyclophilin-dependent calcineurin inactivation. FEBS Lett 418:224–227
52. Kallen J, Sedrani R, Zenke G, Wagner J (2005) Structure of human cyclophilin A in complex with the novel immunosuppressant sanglifehrin A at 1.6 Å resolution. J Biol Chem 280:21965–21971
53. Allen A, Zheng Y, Gardner L, Safford M, Horton MR, Powell JD (2004) The novel cyclophilin binding compound, sanglifehrin A, disassociates G1 cell cycle arrest from tolerance induction. J Immunol 172:4797–4803
54. Davis TL, Walker JR, Ouyang H, MacKenzie F, Butler-Cole C, Newman EM, Eisenmesser EZ, Dhe-Paganon S (2008) The crystal structure of human WD40 repeat-containing peptidylprolyl isomerase (PPWD1). FEBS J 275:2283–2295
55. Bang H, Brune K, Nager C, Feige U (1993) Interleukin-8 is a cyclosporine A binding protein. Experientia 49:533–538
56. Husi H, Zurini MG (1994) Comparative binding studies of cyclophilins to cyclosporine A and derivatives by fluorescence measurements. Anal Biochem 222:251–255
57. Galat A (2004) Function-dependent clustering of orthologues and paralogues of cyclophilins. Proteins Struct Funct Bioinform 56:808–820
58. Moparthi SB, Hammarström P, Carlsson U (2009) A nonessential role for Arg55 in cyclophilin18 for catalysis of proline isomerization during protein folding. Prot Sci 18:475–479
59. Moparthi SB, Fristedt R, Mishra R, Almstedt K, Karlsson M, Hammarström P, Carlsson U (2010) Chaperone activity of Cyp18 through hydrophobic condensation that enables rescue of transient misfolded molten globule intermediates. Biochemistry 49:1137–1145
60. Berman HM, Henrick K, Nakamura H, Markley JL (2007) The worldwide Protein Data Bank (wwPDB): ensuring a single, uniform archive of PDB data. Nucleic Acids Res 35:D301–D303
61. DeLano WL (2002) The PyMOL Molecular Graphics System. DeLano Scientific, San Carlos. (http://pymol.sourceforge.net/)
62. Griffith JP, Kim JL, Kim EE, Sintchak MD, Thomson JA, Fitzgibbon JM, Fleming MA, Caron PR, Hsiao NaviaMA (1995) X-ray structure of calcineurin inhibited by the immunophilin-immunosuppressant FKBP12-FK506 complex. Cell 82:507–522
63. Vajdos FF, Yoo S, Houseweart M, Sundquist WI, Hill CP (1997) Crystal structure of cyclophilin A complexed with a binding site peptide from the HIV-1 capsid protein. Prot Sci 6:2297–2307
64. Howard BR, Vajdos FF, Li S, Sundquist WI, Hill CP (2003) Structural insights into the catalytic mechanism of cyclophilin A. Nature Struct Biol 10:475–481
65. Ingelfinger D, Göthel SF, Marahiel MA, Reidt U, Ficner R, Lührmann R, Achsel T (2003) Two protein-protein interaction sites on the spliceosome-associated human cyclophilin CypH. Nucleic Acids Res 31:4791–4796
66. Pan H, Luo C, Li R, Qiao A, Zhang L, Mines M, Nyanda AM, Zhang J, Fan GH (2008) Cyclophilin A is required for CXCR4-mediated nuclear export of heterogeneous nuclear ribonucleoprotein A2, activation and nuclear translocation of ERK1/2, and chemotactic cell migration. J Biol Chem 283:623–637
67. Baum N, Schiene-Fischer C, Frost M, Schumann M, Sabapathy K, Ohlenschlager O, Grosse F, Schlott B (2009) The prolyl *cis*/*trans* isomerase cyclophilin 18 interacts with the tumor suppressor p53 and modifies its functions in cell cycle regulation and apoptosis. Oncogene 28:3915–3925
68. Braaten D, Luban J (2001) Cyclophilin A regulates HIV-1 infectivity, as demonstrated by gene targeting in human T cells. EMBO J 20:1300–1309
69. Cantin R, Méthot S, Tremblay MJ (2005) Plunder and stowaways: incorporation of cellular proteins by enveloped viruses. J Virol 79:6577–6587
70. Fernandes F, Ansari IU, Striker R (2010) Cyclosporine inhibits a direct interaction between cyclophilins and hepatitis C NS5A. PLoS One 5(3):e9815
71. Puyang X, Poulin DL, Mathy JE, Anderson LJ, Ma S, Fang Z, Zhu S, Lin K, Fujimoto R, Compton T, Wiedmann B (2010) Mechanism of resistance of hepatitis C virus replicons to structurally distinct cyclophilin inhibitors. Antimicrob Agents Chemother 54:1981–1987
72. Meza-Zepeda LA, Forus A, Lygren B, Dahlberg AB, Godager LH, South AP, Marenholz I, Lioumi M, Florenes VA, Maelandsmo GM, Serra M, Mischke D, Nizetic D, Ragoussis J, Tarkkanen M, Nesland JM, Knuutila S, Myklebost O (2002) Positional cloning identifies a novel cyclophilin as a candidate amplified oncogene in 1q21. Oncogene 21:2261–2269
73. Kuhn AN, van Santen MA, Schwienhorst A, Urlaub H, Lührmann R (2009) Stalling of spliceosome assembly at distinct stages by small-molecule inhibitors of protein acetylation and deacetylation. RNA 15:153–175
74. Obama K, Kato T, Hasegawa S, Satoh S, Nakamura Y, Furukawa Y (2006) Overexpression of peptidyl-prolyl isomerase-like 1 is associated with the growth of colon cancer cells. Clin Cancer Res 12:70–76
75. Stumpf T, Zhang Q, Hirnet D, Lewandrowski U, Sickmann A, Wissenbach U, Dorr J, Lohr C, Deitmer JW, Fecher-Trost C (2008) The Human TRPV6 channel protein is associated with cyclophilin B in human placenta. J Biol Chem 283:18086–18098
76. Schneider H, Charara N, Schmitz R, Wehrli S, Mikol V, Zurini MG, Quesniaux VF, Movva NR (1994) Human cyclophilin C: primary structure, tissue distribution, and determination of binding specificity for cyclosporins. Biochemistry 33:8218–8224
77. Halestrap AP, Clarke SJ, Javadov SA (2004) Mitochondrial permeability transition pore opening during myocardial reperfusion—a target for cardioprotection. Cardiovasc Res 61:372–385
78. Millay DP, Sargent MA, Osinska H, Baines CP, Barton ER, Vuagniaux G, Sweeney HL, Robbins J, Molkentin JD (2008) Genetic and pharmacologic inhibition of mitochondrial-dependent necrosis attenuates muscular dystrophy. Nature Med 14:442–447
79. Chiara F, Castellaro D, Marin O, Petronilli V, Brusilow WS, Juhaszova M, Sollott SJ, Forte M, Bernardi P, Rasola A (2008) Hexokinase II detachment from mitochondria triggers apoptosis through the permeability transition pore independent of voltage-dependent anion channels. PLoS ONE 3:e1852
80. Du H, Guo L, Fang F, Chen D, Sosunov AA, McKhann GM, Yan Y, Wang C, Zhang H, Molkentin JD, Gunn-Moore FJ, Vonsattel JP, Arancio O, Chen JX, Yan SD (2008) Cyclophilin D deficiency attenuates mitochondrial and neuronal perturbation and ameliorates learning and memory in Alzheimer's disease. Nature Med 14:1097–1105
81. Horowitz DS, Lee E, Mabon SA, Misteli T (2002) A cyclophilin functions in pre-mRNA splicing. EMBO J 21:470–480
82. Mi H, Kops O, Zimmermann E, Jaschke A, Tropschug M (1996) A nuclear RNA-binding cyclophilin in human T cells. FEBS Lett 378:201–205
83. Gudbjartsson DF, Walters GB, Thorleifsson G, Stefansson H, Halldorsson BV, Zusmanovich P, Sulem P, Thorlacius S, Gylfason A, Steinberg S, Helgadottir A, Ingason A, Steinthorsdottir V, Olafsdottir EJ, Olafsdottir GH, Jonsson T, Borch-Johnsen K, Hansen T, Andersen G, Jorgensen T, Pedersen O, Aben KK, Witjes JA, Swinkels DW, den Heijer M, Franke B, Verbeek AL, Becker DM, Yanek LR, Becker LC, Tryggvadottir L, Rafnar T, Gulcher J, Kiemeney LA, Kong A, Thorsteinsdottir U,

Stefansson K (2008) Many sequence variants affecting diversity of adult human height. Nature Genet 40:609–615
84. Carrello A, Allan RK, Morgan SL, Owen BA, Mok D, Ward BK, Minchin RF, Toft DO, Ratajczak T (2004) Interaction of the Hsp90 cochaperone cyclophilin 40 with Hsc70. Cell Stress Chaperones 9:167–181
85. Jang LK, Lee ZH, Kim HH, Hill JM, Kim JD, Kwon BS (2001) A novel leucine-rich repeat protein (LRR-1): potential involvement in 4-1BB-mediated signal transduction. Mol Cells 12:304–312
86. Peyrl A, Krapfenbauer K, Slavc I, Yang JW, Strobel T, Lubec G (2003) Protein profiles of medulloblastoma cell lines DAOY and D283: identification of tumor-related proteins and principles. Proteomics 3:1781–1800
87. Olsen JV, Blagoev B, Gnad F, Macek B, Kumar C, Mortensen P, Mann M (2006) Global, in vivo, and site-specific phosphorylation dynamics in signaling networks. Cell 127:635–648
88. Dubourg B, Kamphausen T, Weiwad M, Jahreis G, Feunteun J, Fischer G, Modjtahedi N (2004) The human nuclear SRcyp is a cell cycle-regulated cyclophilin. J Biol Chem 279:22322–22330
89. Sakashita E, Tatsumi S, Werner D, Endo H, Mayeda A (2004) Human RNPS1 and its associated factors: a versatile alternative pre-mRNA splicing regulator in vivo. Mol Cell Biol 24:1174–1187
90. Rundle NT, Nelson J, Flory MR, Joseph J, Th'ng J, Aebersold R, Dasso M, Andersen RJ, Roberge M (2006) An ent-kaurene that inhibits mitotic chromosome movement and binds the kinetochore protein Ran-binding protein 2. ACS Chem Biol 1:443–450
91. Dawlaty MM, Malureanu L, Jeganathan KB, Kao E, Sustmann C, Tahk S, Shuai K, Grosschedl R, van Deursen JM (2008) Resolution of sister centromeres requires RanBP2-mediated SUMOylation of topoisomerase IIα. Cell 133:103–115
92. Li Y, Li X, Stremlau M, Lee M, Sodroski J (2006) Removal of arginine 332 allows human TRIM5α to bind human immunodeficiency virus capsids and to restrict infection. J Virol 80:6738–6744
93. Neagu MR, Ziegler P, Pertel T, Strambio-De-Castillia C, Grutter C, Martinetti G, Mazzucchelli L, Grutter M, Manz MG, Luban J (2009) Potent inhibition of HIV-1 by TRIM5-cyclophilin fusion proteins engineered from human components. J Clin Invest 119:3035–3047
94. Friedman J, Weissman I (1991) Two cytoplasmic candidates for immunophilin action are revealed by affinity for a new cyclophilin: one in the presence and one in the absence of CsA. Cell 66:799–806
95. Bram RJ, Hung DT, Martin PK, Schreiber SL, Crabtree GR (1993) Identification of the immunophilins capable of mediating inhibition of signal transduction by cyclosporine A and FK506: roles of calcineurin binding and cellular location. Mol Cell Biol 13:4760–4769
96. Colgan J, Asmal M, Luban J (2000) Isolation, characterization and targeted disruption of mouse *PPIA:* cyclophilin A is not essential for mammalian cell viability. Genomics 68:167–178
97. Colgan J, Asmal M, Yu B, Luban J (2005) Cyclophilin A-deficient mice are resistant to immunosuppression by cyclosporin. J Immunol 174:6030–6038
98. Allain F, Boutillon C, Mariller C, Spik G (1995) Selective assay for CyPA and CyPB in human blood using highly specific anti-peptide antibodies. J Immunol Methods 178:113–120
99. Yang H, Elmquist WF (1996) The binding of cyclosporine-A to human plasma: an in vitro microdialysis study. Pharm Res 3:622–627
100. Cacalano NA, Chen BX, Cleveland WL, Erlanger BF (1992) Evidence for a functional receptor for cyclosporine A on the surface of lymphocytes. Proc Natl Acad Sci USA 89:4353–4357
101. Malesevic M, Kuhling J, Erdmann F, Balsley MA, Bukrinsky MI, Constant SL, Fischer G (2010) A cyclosporinederivative discriminates between extracellular and intracellular cyclophilins. Angew Chem Int Ed Engl 49:213–215
102. Augustijns PF, Brown SC, Willard DH, Consler TG, Annaert PP, Hendren RW, Bradshaw TP (2000) Hydration changes implicated in the remarkable temperature-dependent membrane permeation of cyclosporine A. Biochemistry 39:7621–7630
103. Denys A, Allain F, Masy E, Dessaint JP, Spik G (1998) Enhancing the effect of secreted cyclophilin B on immunosuppressive activity of cyclosporin. Transplantation 65:1076–1084
104. Allain F, Vanpouille C, Carpentier M, Slomianny MC, Durieux S, Spik G (2002) Interaction with glycosaminoglycans is required for cyclophilin B to trigger integrin-mediated adhesion of peripheral blood T lymphocytes to extracellular matrix. Proc Natl Acad Sci USA 99:2714–2719
105. Choi JW, Sutor SL, Lindquist L, Evans GL, Madden BJ, Bergen HR 3rd, Hefferan TE, Yaszemski MJ, Bram RJ (2009) Severe osteogenesis imperfecta in cyclophilin B-deficient mice. PLoS Genet 5:e1000750
106. Barnes AM, Carter EM, Cabral WA, Weis M, Chang W, Makareeva E, Leikin S, Rotimi CN, Eyre DR, Raggio CL, Marini JC (2010) Lack of cyclophilin B in *Osteogenesis imperfecta* with normal collagen folding. N Engl J Med 362:521–528
107. Peng H, Vijayakumar S, Schiene-Fischer C, Li H, Purkerson JM, Malesevic M, Liebscher J, Al-Awqati Q, Schwartz GJ (2009) Secreted cyclophilin A, a peptidylprolyl *cis-trans* isomerase, mediates matrix assembly of hensin, a protein implicated in epithelial differentiation. J Biol Chem 284:6465–6475
108. Chang H, Brown CW, Matzuk MM (2002) Genetic analysis of the mammalian transforming growth factor-β superfamily. Endocrine Rev 23:787–823
109. Lander AD (2007) Morpheus unbound: reimagining the morphogen gradient. Cell 128:245–256
110. Kudrin A, Scott M, Martin S, Chung CW, Donn R, McMaster A, Ellison S, Ray D, Ray K, Binks M (2006) Human macrophage migration inhibitory factor: a proven immunomodulatory cytokine? J Biol Chem 281:29641–29651
111. Kudrin A, Ray D (2008) Cunning factor: macrophage migration inhibitory factor as a redox-regulated target. Immunol Cell Biol 86:232–238
112. Galat A, Riviere S, Bouet F, Menez A (1994) A diversified family of 12-kDa proteins with a high amino acid sequence similarity to macrophage migration-inhibitory factor (MIF). Eur J Biochem 224:417–421
113. Franke EK, Yuan HEH, Luban J (1994) Specific incorporation of cyclophilin A into HIV-1 virions. Nature 372:359–362
114. Chatterji U, Bobardt MD, Stanfield R, Ptak RG, Pallansch LA, Ward PA, Jones MJ, Stoddart CA, Scalfaro P, Dumont JM, Besseghir K, Rosenwirth B, Gallay PA (2005) Naturally occurring capsid substitutions render HIV-1 cyclophilin A independent in human cells and TRIM-cyclophilin-resistant in Owl monkey cells. J Biol Chem 280:40293–40300
115. Strebel K, Luban J, Jeang KT (2009) Human cellular restriction factors that target HIV-1 replication. BMC Med 16(7):48
116. Brass AL, Dykxhoorn DM, Benita Y, Yan N, Engelman A, Xavier RJ, Lieberman J, Elledge SJ (2008) Identification of host proteins required for HIV infection through a functional genomic screen. Science 319:921–926
117. Bushman FD, Malani N, Fernandes J, D'Orso I, Cagney G, Diamond TL, Zhou H, Hazuda DJ, Espeseth AS, Konig R, Bandyopadhyay S, Ideker T, Goff SP, Krogan NJ, Frankel AD, Young JA, Chanda SK (2009) Host cell factors in HIV replication: meta-analysis of genome-wide studies. PLoS Pathog 5:e1000437

118. Bauer K, Kretzschmar AK, Cvijic H, Blumert C, Loffler D, Brocke-Heidrich K, Schiene-Fischer C, Fischer G, Sinz A, Clevenger CV, Horn F (2009) Cyclophilins contribute to Stat3 signaling and survival of multiple myeloma cells. Oncogene 28:2784–2795
119. Torlakovic EE, Keeler V, Wang C, Lim HJ, Lining LA, Laferté S (2009) CyclophilinC-associated protein (CyCAP) knock-out mice spontaneously develop colonic mucosal hyperplasia and exaggerated tumorigenesis after treatment with carcinogen azoxymethane. BMC Cancer 9:251
120. Bignell GR, Greenman CD, Davies H, Butler AP, Edkins S, Andrews JM, Buck G, Chen L, Beare D, Latimer C, Widaa S, Hinton J, Fahey C, Fu B, Swamy S, Dalgliesh GL, Teh BT, Deloukas P, Yang F, Campbell PJ, Futreal PA, Stratton MR (2010) Signatures of mutation and selection in the cancer genome. Nature 463:893–898
121. Stephens PJ, McBride DJ, Lin ML, Varela I, Pleasance ED, Simpson JT, Stebbings LA, Leroy C, Edkins S, Mudie LJ, Greenman CD, Jia M, Latimer C, Teague JW, Lau KW, Burton J, Quail MA, Swerdlow H, Churcher C, Natrajan R, Sieuwerts AM, Martens JW, Silver DP, Langerod A, Russnes HE, Foekens JA, Reis-Filho JS, van 't Veer L, Richardson AL, Borresen-Dale AL, Campbell PJ, Futreal PA, Stratton MR (2009) Complex landscapes of somatic rearrangement in human breast cancer genomes. Nature 462:1005–1010
122. Dalgliesh GL, Furge K, Greenman C, Chen L, Bignell G, Butler A, Davies H, Edkins S, Hardy C, Latimer C, Teague J, Andrews J, Barthorpe S, Beare D, Buck G, Campbell PJ, Forbes S, Jia M, Jones D, Knott H, Kok CY, Lau KW, Leroy C, Lin ML, McBride DJ, Maddison M, Maguire S, McLay K, Menzies A, Mironenko T, Mulderrig L, Mudie L, O'Meara S, Pleasance E, Rajasingham A, Shepherd R, Smith R, Stebbings L, Stephens P, Tang G, Tarpey PS, Turrell K, Dykema KJ, Khoo SK, Petillo D, Wondergem B, Anema J, Kahnoski RJ, Teh BT, Stratton MR, Futreal PA (2010) Systematic sequencing of renal carcinoma reveals inactivation of histone modifying genes. Nature 463:360–363
123. Silverman JA, Hayes ML, Luft BJ, Joiner KA (1997) Characterization of anti-*Toxoplasma* activity of SDZ 215–918, a cyclosporinederivative lacking immunosuppressive and peptidyl-prolyl isomerase-inhibiting activity: possible role of a P glycoprotein in *Toxoplasma* physiology. Antimicrob Agents Chemother 41:1859–1866
124. Berriman M, Fairlamb AH (1998) Detailed characterization of a cyclophilin from the human malaria parasite *Plasmodium falciparum*. Biochem J 334:437–445
125. Kumar R, Musiyenko A, Barik S (2005) *Plasmodium falciparum* calcineurin and its association with heat shock protein 90: mechanisms for the antimalarial activity of cyclosporine A and synergism with geldanamycin. Mol Biochem Parasitol 141:29–37
126. Hirtzlin J, Farber PM, Franklin RM, Bell A (1995) Molecular and biochemical characterization of a *Plasmodium falciparum* cyclophilin containing a cleavable signal sequence. Eur J Biochm 232:765–772
127. Reddy GR (1995) Cloning and characterization of a *Plasmodium falciparum* cyclophilin gene that is stage-specifically expressed. Mol Biochem Parasitol 73:111–121
128. High KP, Joiner KA, Handschumacher RE (1994) Isolation, cDNA sequences, and biochemical characterization of the major cyclosporin-binding proteins of *Toxoplasma gondii*. J Biol Chem 269:9105–9112
129. Golding H, Aliberti J, King LR, Manischewitz J, Andersen J, Valenzuela J, Landau NR, Sher A (2003) Inhibition of HIV-1 infection by a CCR5-binding cyclophilin from *Toxoplasma gondii*. Blood 102:3280–3286
130. Adams B, Musiyenko A, Kumar R, Barik S (2005) A novel class of dual-family immunophilins. J Biol Chem 280:24308–24314
131. Rascher C, Pahl A, Pecht A, Brune K, Solbach W, Bang H (1998) Leishmania major parasites express cyclophilin isoforms with an unusual interaction with calcineurin. Biochem J 334:659–667
132. Sen B, Venugopal V, Chakraborty A, Datta R, Dolai S, Banerjee R, Datta AK (2007) Amino acid residues of *Leishmania donovani* cyclophilin key to interaction with its adenosine kinase: biological implications. Biochemistry 46:7832–7843
133. Paape D, Barrios-Llerena ME, Le Bihan T, Mackay L, Aebischer T (2010) Gel free analysis of the proteome of intracellular *Leishmania mexicana*. Mol Biochem Parasitol 169:108–114
134. Hoerauf A, Rascher C, Bang R, Pahl A, Solbach W, Brune K, Rollinghoff M, Bang H (1997) Host-cell cyclophilin is important for the intracellular replication of *Leishmania major*. Mol Microbiol 24:421–429
135. Dutta M, Delhi P, Sinha KM, Banerjee R, Dutta AK (2001) Lack of abundance of cytoplasmic cyclosporine A-binding protein renders free-living *Leishmania donovani* resistant to cyclosporine A. J Biol Chem 276:19294–19300
136. Pelle R, McOdimba F, Chuma F, Wasawo D, Pearson TW, Murphy NB (2002) The African trypanosome cyclophilin A homologue contains unusual conserved central and N-terminal domains and is developmentally regulated. Gene 290:181–191
137. Bua J, Fichera LE, Fuchs A, Potenza M, Dubin M, Wenger RO, Moretti G, Scabone CM, Ruiz AM (2008) Anti-*Trypanosoma cruzi* effects of cyclosporine A derivatives: possible role of a P-glycoprotein and parasite cyclophilins. Parasitology 135:217–228
138. Bua J, Ruiz AM, Potenza M, Fichera LE (2004) In vitro antiparasitic activity of Cyclosporine A analogs on *Trypanosoma cruzi*. Bioorg Med Chem Lett 14:4633–4637
139. Ostoa-Saloma P, Cesar Carrero J, Petrossian P, Herion P, Landa A, Pedro Laclette J (2000) Cloning, characterization and functional expression of a cyclophilin of *Entamoeba histolytica*. Mol Biochem Parasitol 107:219–225
140. Carrero JC, Lugo H, Perez DG, Ortiz-Martınez C, Laclette JP (2004) Cyclosporine A inhibits calcineurin (phosphatase 2B) and P-glycoprotein activity in *Entamoeba histolytica*. Int J Parasitol 34:1091–1097
141. Yu HS, Kong HH, Chung DI (2002) Cloning and characterization of *Giardia intestinalis* cyclophilin. Korean J Parasitol 40:131–138
142. Perkins ME, Wu TW, Le Blancq SM (1998) Cyclosporine analogs inhibit in vitro growth of *Cryptosporidium parvum*. Antimicrob Agents Chemother 42:843–848
143. Gallay PA (2009) Cyclophilin inhibitors. Clin Liver Dis 13:403–417
144. Perry K, Agabian N (1991) mRNA processing in the Trypanosomatidae. Experientia 47:118–128
145. Pritchard DI (2005) Sourcing a chemical succession for cyclosporinefrom parasites and human pathogens. Drug Discov Today 10:688–691
146. Demeule M, Laplante A, Sepehr-Araé A, Murphy GM, Wenger RM, Béliveau R (2000) Association of cyclophilin A with renal brush border membranes: redistribution by cyclosporine A. Kidney Int 57:1590–1598
147. Malouitre S, Dube H, Selwood D, Crompton M (2010) Mitochondrial targeting of cyclosporine A enables selective inhibition of cyclophilin-D and enhanced cytoprotection after glucose and oxygen deprivation. Biochem J 425:137–148
148. Siu WP, Pun PB, Latchoumycandane C, Boelsterli UA (2008) Bax-mediated mitochondrial outer membrane permeabilization (MOMP), distinct from the mitochondrial permeability transition, is a key mechanism in diclofenac-induced hepatocyte

injury: multiple protective roles of cyclosporine A. Toxicol Appl Pharmacol 227:451–461
149. Norenberg MD, Rao KV (2007) The mitochondrial permeability transition in neurologic disease. Neurochem Int 50:983–997
150. Kristal BS, Stavrovskaya IG, Narayanan MV, Krasnikov BF, Brown AM, Beal MF, Friedlander RM (2004) The mitochondrial permeability transition as a target for neuroprotection. J Bioenerg Biomembr 36:309–312
151. Karlsson J, Fong KS, Hansson MJ, Elmér E, Csiszar K, Keep MF (2004) Life span extension and reduced neuronal death after weekly intraventricular cyclosporineinjections in the G93A transgenic mouse model of amyotrophic lateral sclerosis. J Neurosurg 101:128–137
152. Hicks D, Lampe AK, Laval SH, Allamand V, Jimenez-Mallebrera C, Walter MC, Muntoni F, Quijano-Roy S, Richard P, Straub V, Lochmüller H, Bushby KM (2009) Cyclosporine A treatment for Ullrich congenital muscular dystrophy: a cellular study of mitochondrial dysfunction and its rescue. Brain 132:147–155
153. Lee YC, Kim SH, Seo YB, Roh SS, Lee JC (2006) Inhibitory effects of Actinidia polygama extract and cyclosporine A on OVA-induced eosinophilia and bronchial hyperresponsiveness in a murine model of asthma. Int Immunopharmacol 6:703–713
154. Onoue S, Sato H, Kawabata Y, Mizumoto T, Hashimoto N, Yamada S (2009) In vitro and in vivo characterization on amorphous solid dispersion of cyclosporine A for inhalation therapy. J Control Release 138:16–23
155. Manteca A, Sanchez J (2004) Recombinant cyclophilins lack nuclease activity. J Bacteriol 186:6325–6326
156. Montague JW, Gaido ML, Frye C, Cidlowski JA (1994) A calcium-dependent nuclease from apoptotic rat thymocytes is homologous with cyclophilin. Recombinant cyclophilins A, B, and C have nuclease activity. J Biol Chem 269:18877–18880
157. Varthakavi V, Heimann-Nichols E, Smith RM, Sun Y, Bram RJ, Ali S, Rose J, Ding L, Spearman P (2008) Identification of calcium-modulating cyclophilin ligand as a human host restriction to HIV-1 release overcome by Vpu. Nature Med 14:641–647
158. Kuhl A, Munch J, Sauter D, Bertram S, Glowacka I, Steffen I, Specht A, Hofmann H, Schneider H, Behrens G, Pohlmann S (2010) Calcium-modulating cyclophilin ligand does not restrict retrovirus release. Nature Med 16:155–156
159. Bram RJ, Crabtree GR (1994) Calcium signalling in T cells stimulated by a cyclophilin B-binding protein. Nature 371:355–358
160. Hackstein H, Steinschulte C, Fiedel S, Eisele A, Rathke V, Stadlbauer T, Taner T, Thomson AW, Tillmanns H, Bein G, Hölschermann H (2007) Sanglifehrin-A blocks key dendritic cell functions in vivo and promotes long-term allograft survival together with low-dose CsA. Am J Transplant 7:789–798
161. Noris M, Casiraghi F, Todeschini M, Cravedi P, Cugini D, Monteferrante G, Aiello S, Cassis L, Gotti E, Gaspari F, Cattaneo D, Perico N, Remuzzi G (2007) Regulatory T cells and T cell depletion: role of immunosuppressive drugs. J Am Soc Nephrol 18:1007–1018
162. Wahl MC, Will CL, Lührmann R (2009) The spliceosome: design principles of a dynamic RNP machine. Cell 136:701–718
163. Zhu C, Wang X, Deinum J, Huang Z, Gao J, Modjtahedi N, Neagu MR, Nilsson M, Eriksson PS, Hagberg H, Luban J, Kroemer G, Blomgren K (2007) Cyclophilin A participates in the nuclear translocation of apoptosis-inducing factor in neurons after cerebral hypoxia-ischemia. J Exp Med 204:1741–1748
164. Le Hir M, Su Q, Weber L, Woerly G, Granelli-Piperno A, Ryffel B (1995) In situ detection of cyclosporine A: evidence for nuclear localization of cyclosporine and cyclophilins. Lab Invest 73:727–733
165. Arora K, Gwinn WM, Bower MA, Watson A, Okwumabua I, MacDonald HR, Bukrinsky MI, Constant SL (2005) Extracellular cyclophilins contribute to the regulation of inflammatory responses. J Immunol 175:517–522
166. Syed F, Rycyzyn MA, Westgate L, Clevenger CV (2003) A novel and functional interaction between cyclophilin A and prolactin receptor. Endocrine 20:83–90
167. Colgan J, Asmal M, Neagu M, Yu B, Schneidkraut J, Lee Y, Sokolskaja E, Andreotti A, Luban J (2004) Cyclophilin A regulates TCR signal strength in $CD4^+$ T cells via a proline-directed conformational switch in Itk. Immunity 21:189–201
168. Galat A (2006) Involvement of some large immunophilins and their ligands in the protection and regeneration of neurons: a hypothetical mode of action. Comput Biol Chem 30:348–359
169. Jakob RP, Schmid FX (2009) Molecular determinants of a native-state prolyl isomerization. J Mol Biol 387:1017–1031
170. Thai V, Renesto P, Fowler CA, Brown DJ, Davis T, Gu W, Pollock DD, Kern D, Raoult D, Eisenmesser EZ (2008) Structural, biochemical, and in vivo characterization of the first virally encoded cyclophilin from the Mimivirus. J Mol Biol 378:71–86
171. Lummis SC, Beene DL, Lee LW, Lester HA, Broadhurst RW, Dougherty DA (2005) *Cis-trans* isomerization at a proline opens the pore of a neurotransmitter-gated ion channel. Nature 438:248–252
172. Wang X, Zhang S, Zhang J, Huang X, Xu C, Wang W, Liu Z, Wu J, Shi Y (2010) A large intrinsically disordered region in SKIP and its disorder-order transition induced by PPIL1 binding revealed by NMR. J Biol Chem 285:4951–4963
173. Weininger U, Jakob RP, Eckert B, Schweimer K, Schmid FX, Balbach J (2009) A remote prolyl isomerization controls domain assembly via a hydrogen bonding network. Proc Natl Acad Sci USA 106:12335–12340
174. Akool el-S, Doller A, Babelova A, Tsalastra W, Moreth K, Schaefer L, Pfeilschifter J, Eberhardt W (2008) Molecular mechanisms of TGFβ receptor-triggered signaling cascades rapidly induced by the calcineurin inhibitors cyclosporine A and FK506. J Immunol 181:2831–2845
175. Fehr T, Lucas CL, Kurtz J, Onoe T, Zhao G, Hogan T, Vallot C, Rao A, Sykes M (2010) A CD8 T cell-intrinsic role for the calcineurin-NFAT pathway for tolerance induction in vivo. Blood 115:1280–1287
176. Medyouf H, Alcalde H, Berthier C, Guillemin MC, dos Santos NR, Janin A, Decaudin D, de Thé H, Ghysdael J (2007) Targeting calcineurin activation as a therapeutic strategy for T-cell acute lymphoblastic leukemia. Nature Med 13:736–741
177. Simon N, Dailly E, Combes O, Malaurie E, Lemaire M, Tillement JP, Urien S (1998) Role of lipoproteins in the plasma binding of SDZ PSC 833, a novel multidrug resistance-reversing cyclosporin. Br J Clin Pharmacol 45:173–175
178. Fischer V, Rodriguez-Gascon A, Heitz F, Tynes R, Hauck C, Cohen D, Vickers AE (1998) The multidrug resistance modulator valspodar (PSC 833) is metabolized by human cytochrome P450 3A; Implications for drug-drug interactions and pharmacological activity of the main metabolite. Drug Metab Dispos 26:802–811
179. Kawai R, Lemaire M, Steimer JL, Bruelisauer A, Niederberger W, Rowland M (1994) Physiologically based pharmacokinetic study on a cyclosporine derivative, SDZ IMM 125. J Pharmacokinet Biopharm 22:327–365

Figure Fs1

	Alias	PDB	ID%	1234567	8901234567	8901234567	89012345	678901234	567	890123456	7890-12345	6789012345
1	hCyP18a	2CPL		MVNPTVF	FDIAVDGEPL	GRVSFELFAD	KVPKTAEN--	-FRALSTGEK	GFG-------	-YKGSCFH**R**I	**I**PG**F**-M**C**Q**G**G	DFTRHN**GT**GG
2	hCyp18b		(85)	MVNSVVF	FDITVDGKPL	GRISIKLFAD	KILKTAEN--	-FRALSTGEK	GFR-------	-YKGSCFHRI	IPGF-MCQGG	DFTRHNGTGD
3	hCyPB	1CYN	(63)	GPKVTVKVY	FDLRIGDEDV	GRVIFGLFGK	TVPKTVDN--	-FVALATGEK	GFG-------	-YKNSKFHRV	IKDF-MIQGG	DFTRGDGTGG
4	hCyP33	1ZCX	(66)	SNPQVY	MDIKIGNKPA	GRIQMLLRSD	VVPMTAEN--	-FRCLCTHEK	GFG-------	-FKGSSFHRI	IPQF-MCQGG	DFTNHNGTGG
5	hCyP358		(65)	LSKETNPVVF	FDVCADGEPL	GRITMELFSN	IVPRTAEN--	-FRALCTGEK	GFG-------	-FKNSIFHRV	IPDF-VCQGG	DITKHDGTGG
6	hCyPD	2BIT	(75)	SGNPLVY	LDVDANGKPL	GRVVLELKAD	VVPKTAEN--	-FRALCTGEK	GFG-------	-YKGSTFHRV	IPSF-MCQAG	DFTNHNGTGG
7	hCyPC	2RMC	(54)	RGPSVTAKVF	FDVRIGDKDV	GRIVIGLFGK	VVPKTVEN--	-FVALATGEK	GYG-------	-YKGSKFHRV	IKDF-MIQGG	DITTGDGTGG
8	hCyP40	2Z6W	(61)	PSNPSNPRVF	FDVDIGGERV	GRIVLELFAD	IVPKTAEN--	-FRALCTGEK	GIGHTTGKPL	HFKGCPFHRI	IKKF-MIQGG	DFSNQNGTGG
9	hCyP88	2GW2	(52)	RPRCF	FDIAINNQPA	GRVVFELFSD	VCPKTCEN--	-FRCLCTGEK	GTGKSTQKPL	HYKSCLFHRV	VKDF-MVQGG	DFSEGNGRGG
10	hCyP157	2HE9	(50)	PQCH	FDIEINREPV	GRIMFQLFSD	ICPKTCKN--	-FLCLCSGEK	GLGKTTGKKL	CYKGSTFHRV	VKNF-MIQGG	DFSEGNGKGG
11	hCyP19	1QOI	(53)	NSSPVNPVVF	FDVSIGGQEV	GRMKIELFAD	VVPKTAEN--	-FRQFCTGEF	RKD---GVPI	GYKGSTFHRV	IKDF-MIQGG	DFVNGDGTGV
12	hCyP18d	1XWN	(38)	PPDSWQPP-N	VYLETS---M	GIIVLELYWK	HAPKTCKN--	-FAELARRGY	----------	-YNGTKFHRI	IKDF-MIQGG	DPTG-TGRGG
13	hCyP18c		(30)	MS	VTLHTD---V	GDIKIEVFCE	RTPKTCEMES	RCVPQAGVQW	----------	-RDLGSLQPP	PPGFKQVFCL	SLPR-TGRGG
14	hCyP18ci		(38)	MS	VTLHTD---V	GDIKIEVFCE	RTPKTCEN--	-FLALCASNY	----------	-YNGCIFHRN	IKGF-MVQTG	DPTG-TGRGG
15	hCyP58	1ZKC	(37)	GY	VRLHTN---K	GDLNLELHCD	LTPKTCEN--	-FIRLCKKHY	----------	-YDGTIFHRS	IRNF-VIQGG	DPTG-TGTGG
16	hCyP73	2A2N	(40)	AEGPKRVSDS	AIIHTS---M	GDIHTKLFPV	ECPKTVEN--	-FCVHSRNGY	----------	-YNGHTFHRI	IKGF-MIQTG	DPTG-TGMGG
17	hCyP57		(26)	MA	VLLETT---L	GDVVIDLYTE	ERPRACLN--	-FLKLCKIKY	----------	-YNYCLIHNV	QRDF-IIQTG	DPTG-TGRGG
18	hCyP54		(29)	IQEPPTNGK	VLLKTT---A	GDIDIELWSK	EAPKACRN--	-FIQLCLEAY	----------	-YDNTIFHRV	VPGF-IVQGG	DPTG-TGSGG
19	hCyP35		(43)	KHDFVFLD	ICIDSS--PI	GRLIFELYCD	VCPKTCKN--	-FQVLCTGKA	GFSQ-RGIRL	HYKNSIFHRI	VQNG-WIQGG	DIVYGKGDNG

	6789012345	6--------7	8901234567	8901234567	8901234567	8-90123456	7890123456	7890123456	789-0-1234	5678901234	5
1	KSIYGEKFED	E--------N	FILKHTGPGI	LSM**ANA**GPNT	NGS**QF**F**F**ICTA	K-TE**WL**DGK**H**	VVFGKVKEGM	NIVEAMERFG	SRN-G-KTSK	KITIADCGQL	E*
2	KSIYGEKFDD	E--------N	LIRKHTGSGI	LSMANAGPNT	NGSQFFICAA	K-TEWLDGKH	VAFGKVKERV	NIVEAMEHFG	YRN-S-KTSK	KITIADCGQF	*
3	KSIYGERFPD	E--------N	FKLKHYGPGW	VSMANAGKDT	NGSQFFITTV	K-TAWLDGKH	VVFGKVLEGM	EVVRKVESTK	TDSRD-KPLK	DVIIADCGKI	EVEKPFAIA
4	QSIYGKKFDD	E--------N	FILKHTGPGL	LSMANSGPNT	NGSQFFLTCD	K-TDWLDGKH	VVFGEVTEGL	DVLRQIEAQG	SKD-G-KPKQ	KVIIADCGEY	V
5	KSIYGDKFED	E--------N	FDVKHTGPGL	LSMANQGQNT	NNSQFVITLK	K-AEHLDFKH	VVFGFVKDGM	DTVKKIESFG	SPK-G-SVCR	RITITECGQI	*
6	VSIYGSRFPD	E--------N	FTLKHVGPGV	LSMANAGPNT	NGSQFFICTI	K-TDWLDGKH	VVFGHVKEGM	DVVKKIESFG	SKS-G-RTSK	KIVITDCGQL	S
7	ESIYGETFPD	E--------N	FKLKHYGIGW	VSMANAGPDT	NGSQFFITLT	K-PTWLDGKH	VVFGKVIDGM	TVVHSIELQA	TDGHD-RPLT	NCSIINSGKI	DVKTPFVVE
8	ESIYGEKFED	E--------N	FHYKHDREGL	LSMANAGRNT	NGSQFFITTV	P-TPHLDGKH	VVFGQVIKGI	GVARILENVE	VKG-E-KPAK	LCVIAECGEL	KEGDDGGI
9	ESIYGGFFED	E--------S	FAVKHNKEFL	LSMANRGKDT	NGSQFFITTK	P-TPHLDGHH	VVFGQVISGQ	EVVREIENQK	TDAAS-KPFA	EVRILSCGEL	IPKSKVK
10	ASIYGGYFKD	E--------N	FILKHDRAFL	LSMANRGKHT	NGSQFFITTK	P-APHLDGVH	VVFGLVISGF	EVIEQIENLK	TDAAS-RPYA	DVRVIDCGVL	ATKSIKDV
11	ASIYRGPFAD	E--------N	FKLRHSAPGL	LSMANSGPST	NGCQFFITCS	K-CDWLDGKH	VVFGKIIDGL	LVMRKIENVP	TGPNN-KPKL	PVVISQCGEM	
12	NSIYGKQFED	EL-------H	PDLKFTGAGI	LAMANAGPDT	NGSQFFVTLA	P-TQWLDGKH	TIFGRVCQGI	GMVNRVGMVE	TN-SQDRPVD	DVKIIKAYPS	G
13	NSIWGKKFED	EY-------S	EYLKHNVRGV	VSMANNGPNT	NGSQFFITYG	K-QPHLDMKY	TVFGKVIDGL	ETLDELEKLP	VNEKTYRPLN	DVHIKDITIH	ANPFAQ
14	ESIWGKKFED	EY-------S	EYLKHNVRGV	VSMANNGPNT	NGSQFFITYG	K-QPHLDMKY	TVFGKVIDGL	ETLDELEKLP	VNEKTYRPLN	DVHIKDITIH	ANPFAQ
15	ESYWGKPFKD	EF-------R	PNLSHTGRG-	ISMANSGPNS	NRSQFFITFR	S-CAYLDKKH	TIFGRVVGGF	DVLTAMENVE	SDPKTDRPKE	EIRIDATTVF	VDPYEEADA
16	ESIWGGEFED	EF-------H	STLRHDRPYT	LSMANAGSNT	NGSQFFITVV	P-TPWLDNKH	TVFGRVTKGM	EVVQRISNVK	VNPKTDKPYE	DVSIINITVK	
17	—SIFGQLYGD	QASFFEAEKV	PRIKHKKKGT	VSMVNNGSDQ	HGSQFLITTG	ENLDYLDGVH	TVFGEVTEGM	DIIKKINETF	VDK-DFVPYQ	DIRINHTVIL	DDP
18	ESIYGAPFKD	EF-------H	SRLRFNRRGL	VAMANAGSHD	NGSQFFFTLG	R-ADELNNKH	TIFGKVTGDT	VYNMLRLSEV	DID-DDERPH	NPHKIKSCEV	LFN
19	ESIYGPTFED	EN-------F	SVPHNKRGV-	LGMANKGRHS	NGSQFYITLQ	A-TPYLDRKF	VAFGQLIEGT	EVLKQLELVP	TQN-ERPIHM	CRITDSGDPY	A*

Multiple sequence alignment of the human CLDs (MSA19). The MSA was structured into twenty blocks consisting of 10-AA residues. The PDB cod
shown in the third column. In parentheses are shown the sequence similarity scores IDs (expressed in percentage) between the archetypal hCyPA a
functional AAs were indicated in bold face. PPIL6 (culin) was omitted since it has a very weak sequence similarity with the CLD of hCyPA (ID=13%).

```
CLUSTAL 2.0.9 multiple sequence alignment


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D38552            ------------------------------------------------------------
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G2708309          ------------------------------------------------------------
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A47328            ------------------------------------------------------------
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XP_525294         ------------------------------------------------------------
XP_523512         ------------------------------------------------------------
XP_507866         ------------------------------------------------------------
XP_517783         ------------------------------------------------------------
XP_517773         ------------------------------------------------------------
XP_526904         ------------------------------------------------------------
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XP_515886         ------------------------------------------------------------
XP_525218         ------------------------------------------------------------
XP_507684         ---------------------------------------------MQNGPKIVAVRNGN
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XP_523437         ------------------------------------------------------------
XP_520485         ------------------------------------------MPIWDLVVSVHFLAVHAD-
XP_519076         ------------------------------------------------------------
XP_527705         ------------------------------------------------------------
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XP_518678         ---------------------------------------------HNKRGVLGMANKGR-
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CAG59915 ----------MLS
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ZP_00136576       ----------------------------------------------------MLKRL
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NP_115861         ---------------------MSVTLH----------------------------TDV
NP_570981         ---------------------MSVTLH----------------------------TDV
NP_057143         ----------MAAIPPDSWQPPNVYLE----------------------------TSM
CSHUB             ------------DEKKKGPKVTVKVYFD--------LRIG----------------DEDV
S66681            ------EPIAK------KARSNPQVYMD--------IKIG----------------NKPA
A57545            LMKLQKGHVSLAAELSKET--NPVVFFD--------VCADG----------------EPL
A41581            ----------DPSSSSSSG--NPLVYLD--------VDANG----------------KPL
A54204            ------------GFRKRGPSVTAKVFFD--------VRIG----------------DKDV
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D38552            EVMAATQA--EGPKR-----VSDSAIIH----------------------------TSM
NP_624311         ---------------------MAVLLE----------------------------TTL
G2708309          ------------MAVANSSPVNPVVFFD--------VSIG----------------GQEV
A45981            ------------PQAKPSNPSNPRVFFD--------VDIG----------------GERV
J40763            --------------MGIKVQ-RPRCFFDIA------INNQ------------------PA
A47328            ------------TSVAMGAQDRPQCHFDIE------INRE------------------PV
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XP_525294         ---------------MPPP--LGALYYQ--------PWSTPLFFN-------ISDEGKPL
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KP_517773          -----------------MV--KPIVFFD--------IAVDA----------------KPS
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KP_516556          YTRFADAAATGSPILPAMV--SPTMVFD--------IAVNN----------------KPL
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KP_513346          ------------------------------------G----------------NKPA
KP_524598          -------ATAGSPVLSATV--NPTVFID--------DES--------------------L
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A40047             ------------GVRKRGPSVTDKVFFD--------VRIG----------------DKDV
NKCR_MOUSE         ------------ALAMGAQDRPQCHFDIE------INRE------------------PV
AAH61645           ----------------------MSVTLH----------------------------TDV
BAC41068           ------------------------------------------------------------
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NF00508381         -----------------MV--NPTVFFD--------ITADD----------------EPL
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CSRTA              -----------------MV--NPTVFFD--------ITADG----------------EPL
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B38388             ----------------MST-LPRVFFD--------MTADN----------------EPL
AF132148           ----------------------MSVVIE-----------------------------TTM
NP_611113          --------------------KG-YVRLN-----------------------------TNL
NP_611695          ------------ADDSKGPKVTEKVFFD--------ITIG----------------GEPA
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NP_648508          ----------MSNIYIQEPPTSGKVLLK-----------------------------TTV
NP_648338          -------MEERKLLRAVKS-TNPLVYLD--------ISIGK----------------EDA
NP_476656          --------ASGLSFTVTSRIYMDVKHNK-----------------------------KPV
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NP_611935          ----------------------YENVVLH-----------------------------TTK
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EAL39647           ----------------------MSVVIE-----------------------------TTI
EAA13913           ----------------------QSVTFH-----------------------------TDV
EAA13914           IYASLPGDIEAATFTVTSQVYMDVSIDG-----------------------------EKI
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AAH62863           GSRALAQHPANGKESKAMA--RPKVFFD--------LTAGG----------------SPV
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NP_957285          RDYKGDELLASTMKEPEAKKTDKFNAAH-----------------------------YST
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NP_506561          ----------------Q--RPKVFFD--------VSIGE----------------EPA
NP_504522          ----------------NKFQPNRWFDS-----------------------IHYVTNT
NP_506751          ----------------MS--RSKVFFD--------ITIGG----------------KAS
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NP_501118        ----------MPAPIND--QAPYVILD----------------------------TTM
NP_496562        ----------MSNQYINEPITTGKVTLE----------------------------TTA
NP_495855        ----------------LRHPDNPIVFLE--------VTAG----------------GAPI
NP_496337        ------------RYSRVKKNA-FVRLV----------------------------TNF
NP_495417        ----------------------MSVTLH----------------------------TTS
NP_493378        ----------EGGEK----VLNKEAIIH----------------------------TSF
NP_492343        ----------------------MAVLIE----------------------------TTL
NP_493624        ------------DDAKGPKVTDKVYFD--------MEIG----------------GKPI
P06073           ----------------MA--FPKVYFD--------MTIDG---------------QPA
NP_175776        ----------------------MSVLIV----------------------------TSL
NP_567029        ----------NQVGEDLEGVTHKVYFD--------IQIN----------------GSPA
NP_201554        --------FELIKVEKNPKKKG-YVQFQ----------------------------TTH
NP_200679        ----------------------HKVYFD--------VEID----------------GKAA
NP_181407        ---------------RPPNPKNPVVFFD--------VSIG----------------GIPA
NP_191166        ----------------MA--NPKVFFD--------ILIGK---------------MKA
NP_171696        ---------------MVSRLSISVTLH----------------------------TNL
NP_195222        ------------KQVIEDHEITNRVFLD--------VDID----------------GQRL
NP_195213        ----------------MS--NPRVFFD--------MSLSG---------------TPI
NP_196816        ----------------------THKVYFD--------ISVGNPV------------GKLA
NP_188932        ------------------MANPKVFFD--------LTVDG----------------KPA
NP_191762        ----------------QAKVTNKVYFD--------VEIG----------------GEVA
NP_190046        ----------ATTS-----LPENVIMH----------------------------TTL
NP_180557        ----------SIQAKEDLKEVTHKVYFD--------VEID----------------GKSA
NP_181157        ----------MSARPEG--SPPEVTLE----------------------------TSM
NP_179251        ---------------MAT--NPKVYFD--------MTVGG---------------KSA
NP_179709        ---------------MAS--HPKVFFD--------MTIGG---------------APA
AAK02067         ------------------MGRSKCFMD--------ISIGG---------------ELE
P82869           ------------------------------------------------------------
P05352           ---------------MAKKKNPQVFMD--------VSIDG---------------DPA
P49181           ---------------MTKKKNPNVFLD--------VSIGG---------------DPV
P05314           ----------MSTVYVLEPPTKGKVIVN----------------------------TTH
CSZPA            --------------------MS-NCFFD--------VIANGQ--------------PL
E313994          --------------------MANVELQ----------------------------TSL
E1335804         ---------------NRGPKVTDTVYFD--------LQQG----------------DEFL
E1331567         ------------------MSTEPVVFMD--------IAIDGR--------------LL
G62327           --------------MS------TYAYFK--------ISID----------------GKIQ
G62590           ------AEEDYMLNHTRIKHKG-YARIV----------------------------TNH
E1294518         NILLG-----------------KAAIIH----------------------------TTQ
P39728           ----------------------MSVLIE----------------------------TTV
E1263915         ------------------PLATGTVILK----------------------------TTR
CSBY             --------------------MS-QVYFD--------VEADGQ--------------PI
G30507           ----------SRLFSNSASRLGKKVFFD--------PAVNGT--------------KI
G12324           ----------------DEVITQKVFFD--------IEHG----------------EEKV
G57050           ------------------MIQDPLVYLDIS------IDK-----------------KPI
G48567           -------------MT-----RPKTFFD--------ISIG----------------GKPQ
CSBYC3           ----------------HRGIITIEYFD---------PVSK--------------SMKE
G63359           --------------------NIGIVFTD---------PESS--------------EEAG
G38324           ----------------DPEITHKVYFD--------INHG----------------DKQI
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TcCyP19          -------MSYKPHHATVPT--NPKVFFD--------VSIGG----------------QSA
TcCyP20          ----------------------MSVVIS-----------------------------TTR
TcCyP21.1        LLLLLLLMLSAAVSARADPVVTDKVYFD--------ITIG----------------DEPV
TcCyP21.3        SRTWFWAQRKLPFYPINPK--NPLVFFE--------ISIGA----------------QPA
TcCyP24.3        YPQNARNSVVYLDTAVQEGYTWFGSASM-----------------------------KPI
TcCyP26          LVRRVHRGPIRNIFSYPLNEVNPVVFFE--------ITVEG----------------DAL
TcCyP28          INVPSKGERRRGIPVEVSR--NPKVFFD--------ISIDN----------------KPS
TcCyP30          LSFFFEGIKKMLHSSRHHLASAGRVFMDVA------IGS------------------CSP
TcCyP35.1        -------PADYAHSYEKMAYASWKKFLQERGNRYCWMSVSIDN--------------VPC
TcCyP35.3        ---------------SMVQQRQDLLASTK------GAGEP----------------EII
TcCyP40          ------------------MG-KLCWLQ--------ISIGGK---------------PAK
TcCyP110         QRVQHIITAATGRAMEWESSVIHVSLFV-----------------------------DVF
AAT44353         ----------------MG--KPQVFFD--------ISIGG----------------QPA
EAL37431         ------------------MPNPVVYFD--------ISIGQ----------------TPA
EAL37232         ----------------------MSVRII-----------------------------TNY
EAL37110         VSVFAEKGVRPS-TVTPSVVVELTVSID-----------------------------KEE
EAL36265         ----------------------MSVLIE-----------------------------TTL
EAL35294         -------MIKDPELRPQRHKDNPVVFLD--------ICLLDE--------------NNKI
J68268           -------MSYKPHHPTVPT--NPKVYFD--------ITIGG----------------TPA
J68269           -------MSYEPHHPIVPS--NPKVYFD--------ISIGG----------------QGA
AAQ15626         -----AAQRKIPFYPVNPS--NPLVYFD--------ISIGS----------------QKA
AAB07896         -------MSYRPHHATVPT--NPKVYFD--------VSIAG----------------QAA
AAK14937         ------FFDLFSQTLPEMSK-RPRVYFD--------LTVGG----------------AKA
CAC18541         --------PAPMVSERMNNPKNPVVFFD--------ISIG----------------GQDI
A45000           ----------------------GVKCFFD--------ISIGG----------------KPA
Q9Y0F5           ----------------------MSVRII-----------------------------TNY
J47811           ------------------MS--RPKVFFD--------ITIDG----------------SNA
J50388           -------MRTK-----KQKRNLPRVFFD--------IRIG-----------------NGDA
L46884           --------------------MAAKAFFD--------IKAGDE---------------RL
M93420           ----------K-----KQKRNLPRVFFD--------IRIG-----------------NADR
J50389           ---------------GNGPKVTEKVFFD--------IEVD----------------EQPL
G992633          ---------------ANGPKVTDKVFFD--------IEVD----------------GKPL
E323073          -----EEMRTK-----KQKRNLPRVFFD--------IRIG----------------NGDA
S52758           -----------LSQASADPEVTAKVYFD--------VMID----------------SEPL
E1203753         -------MPYTPHYPVVES--NPKVWMD--------IDIGG----------------KPA
CAB58290         ----------------MGQVARVVQVQ-----------------------------SSA
CAB58298         ----------------TT--NPKVFFD--------ISIDN----------------KAA
AAF69736         --------------------MPNTYCYLD--------IAIGGK---------------PKR
AAD46565         ---------------AAEPEVTAKVYFD--------VMID----------------SEPL
A53522           ----LAVSGAVAENAGVRKAYMDIDIDG-----------------------------EHA
NP_702112        ----------MSEVYSIEPKTHGKVIIY-----------------------------TSL
NP_701512        ------------------KSIRDYVFFD--------IAIEN----------------KYV
NP_701389        --MNIPNPRVFLDIAIGG-------------------------------------RNA
NP_701030        ----------------------MSLSIH-----------------------------TNY
NF01067443       ----------------MKKKKYVYLE--------FSIN----------------RITL
NF01067965       EEHNNNNIVPYYLSNLLTNPSNPVVFMD--------INLG----------------NHFL
NF01065889       SLISNPLKNIETIHKN----TPKSAIIY-----------------------------TTM
NF00926916       ------------------SKRSKVFFD--------ISIDN----------------SNA
S52760           FFLFHKYALCAEEHEITHKTYFDITIDD-----------------------------KPL
J10322           ----------YYLSNLLTNPSNPVVFMD--------INLG----------------NHFL
CAB39039         ----------------MSKRSKVFFD--------ISIDN----------------SNA
CAD51648         KEQKKSFEEKINYYKLKGNIERSHITIY-----------------------------TNL
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NF01497907        ------------------MSRAKVFFD--------ISIDN----------------KNA
NF01497552        SLLST--KSIENIEKNNNTKTPKSAIIY----------------------------TTM
NF01497379        LALFQTY-INAETPEITHKAYFDISIND----------------------------KPI
NF01497199        DE---NTIIPYYLSNLLTNPSNPVVFMD--------INLG----------------NNFL
NF01496968        ----------------MGKKKKYVYLE--------FSIN----------------TIRL
NF01495390        ------------------KAIRDYVFFD--------IAVEN----------------KYI
NF01495324        SEKTKSLEEKIAYYKMKGHTERGYITIY----------------------------TNL
NF01493974        ------------------------------------------------------------
NF01493918        ----------MSEVYSIEPKTCGKVIIY----------------------------TSL
E316521           --------------------MANVFFD--------VQFGGD----------------AP
CAC35733          ----------------------MSIVLE----------------------------TSL
J47812            ----------------MT--RPRVFFD--------ITIGG----------------QQS
J47813            ----------------MS--RPKVYFD--------ITIDG----------------SNA
G2624966          ------------------MARPKVFFD--------ITIG----------------GEKA
E1317902          ------VLDADTVKYARVSKNG-YVRII----------------------------TNY
E1319851          ------ILDADTVKYARVNKNG-YVRIL----------------------------TNY
G3057040          ------ALDADTVKYARVNKNG-YVRIL----------------------------TNY
AAB81959          ----------------MV--NPTVFFD--------IAVDG----------------EPL
AF023860          ----------------MV--NPTVFFD--------IAVDG----------------EPL
AAB81961          ----------------MV--NPTVFFD--------IAVDG----------------EPL
AAF22215          ----------------MV--NPTVFFD--------IAVDG----------------EPL
AF243140_1        --------------------------D--------IAVDG----------------EPL
AF252388          ------------SSSSSSG--NLLVYLD--------VGADG----------------QPL
CSBOAB            ----------------V--NPTVFFD--------IAVDG----------------EPL
NF01922219        ---------------MAVELHSTVYMD--------LSIGG----------------MDA
NF01725587        ----------------MS--NPRVFFD--------VTANG----------------KPV
NF01897292        NILKAEEDAPQIRVTKIAHLDITVNGEP----------------------------QEQ
CSHYAC            ----------------MV--NPTVFFD--------ISADG----------------EPL
NF00071027        ----------------MV--NPTVFFD--------IAVDG----------------EPL
NF01951405        TTHEAAAIEDDVVRYQYVKKKG-YVRLH----------------------------TNK
NF01059378        ----------------V--NPTVFFD--------IAVDG----------------EPL
NF01105745        ----------------MP--NPQVFFD--------MTVGG----------------APA
NF00495096        ----------------MV--NPTVFFD--------ISADG----------------EPL
NF01053198        ---------------MAS--NPKVFFD--------MEVGG----------------QPV
CSPGA             ----------------V--NPTVFFD--------IAVDG----------------EPL
NF01950932        --------------------MAVTLH----------------------------TDV
NF01951326        -------MSHPSPVERPGNPRNPRAFFD--------VDIG----------------GERV
NF00909389        ----------------MP--NPKVFFD--------MTIGG----------------QSA
NF01286555        ----------------MA--NPKVYFD--------MTIGG----------------APA
NF01737225        ----------------MAA--NPKVFFD--------MTVGG----------------SPA
NF01590839        --------MNNLKNIEALKEDGLYAAID----------------------------TDK
AAH51602          ---------HASAGIPHDTWQPPHVLVE----------------------------TSM
AAT69672          ----------------MA--LPRVFFD--------VAADG----------------CPL
AAH54186          EAAIYAPGKHCLLSFCTMA--LPRVFFD--------VAADG----------------CPL
AAH54168          --------SSVADDKKKGPKVTDKVYFD--------LKIG----------------DEEV
NF01208049        -THEAAAIAEDTVRYQYVKKKG-YVRLH----------------------------TNK
NF01844632        -------------MGVKVQ-RTRCFFDIA------VNNV------------------PA
NF01844615        ----------MSNIYIQEPPSNGKVLLK----------------------------TTA
NF01915773        ----------MSGIPHDTWQPPHVLLE----------------------------TSM
NF01915657        --------------------MSVTLH----------------------------TDL
NF01557564        -------MSNPSPVAKPSNPSNPKVFLD--------VEIG----------------GERV
AAH41536          ----------------MA--LPRVFFD--------IAANE----------------CPM
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AAH85963          -------------MGIKVQ-RPRCFFDIA------INNQ-----------------PA
AAH64250          ------------MAVPASNANNPIVFFD--------ISIG---------------GQEV
AAH61335          -------MSNPSPVAKPSNPSNPKVFLD--------VEIG---------------GERV
AAH59741          -----------------MA--LPRVFFD--------IAVDG--------------CPM
AAH67931          ----------------------CFFDIA------INNA-----------------PA
AAH44993          -----------TVRYQYVKKKG-YVRLH----------------------------TNK
A40516            ------------DERKKGPKVTAKVFFD--------LRVG---------------EEDA
CYPB_BOVIN        ------------DEKKKGPKVTVKVYFD--------LRIG---------------DEDI
AAR19276          ----------------------SAITAG----------ADG---------------QAL
A46579            ------------PQAKPSNPSNPRVFFD--------VDIG---------------GERV
AAV40687          --------------MDD----RPIVFFD--------IAIG---------------GQLA
NF01637248        ------------------RPLANVYFD--------ITINNQ--------------PA
CYPR_BOVIN        --------DSLTAEFSKET--NPVVFFD--------ICADD--------------EPL
CYPR_CALVI        -----------LSFTVTSKIYMDVKHQK----------------------------KPL
E1317906          ------VLDDDTVRYSRVKKNG-FVRLV----------------------------TNF
AAB87888          -----------------MST-LPRVFFD--------MTADG--------------EPL
AAB87889          -----------------MST-LPRVFFD--------MTADG--------------EPL
Q9XZZ5            -----------------MA--LPKVFFD--------ITIGG---------------NAT
S63995            -----------------MA--HPRVFFD--------MSADG---------------QPV
G1703696          -----------------MA--KPQVFFD--------LQANG---------------ENL
J36797            ------------------------------------------------------------
AF017738          -------------------------MK----------------------------TTV
L37292            ---------------MSKKDRRRVFLDVT------IDGN-----------------LA
AAS01736          ----------------------PNPFFD--------MTVGG---------------QPV
AAO61985          ----MGLFLGFELTSAKFYYKLPIVFYIINGSMWFIYSYSYIFYISN---------YSVS
CAC80550          ----------------MAA--NPKVFFD--------MTVGG---------------APA
AAO63777          -----------------MA--NPKVYFD--------MTIGG---------------APA
B53522            ------------YSSRLSTMPNPRVFFD--------ISIDK---------------KPA
E280557           --------ETNYDPVVTHKAFFDISIGS----------------------------KPI
J70827            ----------------MSKKDRRRVFFDVT------IDGN-----------------LA
J70884            ----------------MSKKDRRRVFLDVT------IDGS-----------------LA
J55771            ----KPKPVEPSHKVTHHVHLEVQTG-E----------------------------KAT
D1024669          -----------TEKKPKGPKVTDIVYFD--------ITIG---------------GKPA
I27879            ------------------E--NPRVFFD--------ITIGG---------------VEA
AAD48910          ------------SEAGKDPKITNKVFFD--------IEID---------------NKPA
AAO51811          --------STSLAPNNTLNNENPIVFMD--------VAIVNQQN------------PVHL
AAF76472          ----------------------MSVTLH----------------------------TNL
AAP80861          --------------------VTHKVYFD--------IEID---------------GKPA
AAP73848          ----------VDWHLRPPNPKNPVVFFD--------VTIG---------------SIPA
BAB62329          -----------MWGSADG--GTPEVTLE----------------------------TSM
AAL75728          ------------MAPAASSKSNPRVFLD--------IAIGG---------------EWV
S48017            -----------------MS--NTRVFFD--------MTVGG---------------APA
S48018            -----------------MASKNPKVFFD--------ILIGK---------------ARA
BAD53622          -----------KKSKADLTEVTHKVYFD--------VEID---------------GKPA
BAD53621          ------LIHLAKKSKADLTEVTHKVYFD--------VEID---------------GKPA
BAD53620          --AATLSLAQAVESEAELTKVTTKVFFD--------ITIN---------------GKPA
XP_507188         ---------------RTLGAELATCPD----------------------------SEPL
XP_483750         ELLAVSDLGKTATTS-----LPDNLVMH----------------------------TSM
XP_483749         -----------------VGKEAAAEEE----------------------------EMI
XP_482125         ---------------------IKDNPN----------------------------LED
XP_478742         ----------SVEKGDGSTFFPTAGGEP----------------------------KSV
XP_478741         -------VEFSVEKGDGSTFFPTAGGEP----------------------------KSV
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NP_385690          ------------MAEIKDPENTIIMET----------------------------TKG
NP_385689          AVAGALALAAFTGGALAQSGENILTVQL----------------------------EDG
NP_349373          ----------------MKNPIVTIEM----------------------------ENG
BAD45990           --------------------MSVLIV----------------------------TSV
BAD45991           --------------------MSVLIV----------------------------TSV
NP_908419          ------------LPVTAKAFLDVSIGG----------------------------EPA
NP_919903          ---------VSDKAFGDLLKLVKNILPG----------------------------GNKL
BAD35839           GGEGAESAAVASAAAAEVEVKNPRCFMD--------VSIGG----------------EIE
AAU87301           ----------------MP--NPKVFFD--------MQVGG----------------APA
CAG90469           AVLFFGKYINASKDLAENPPITHKVFFD--------VTEE----------------GKPI
CAG88330           -------------------MS-QVYFD--------ISADGN----------------KL
CAG88054           --------------------MSVLLE----------------------------TTE
CAG86818           ----GKKQKPVAVNK------SSKIILH----------------------------TTL
NF01109982         ----------------MA--NPKVFFE--------VSANG----------------EPL
NF00686348         ----------------MTPENTLNLDL----------------------------STG
NF00686217         ------------------------------------------------------------
NF02138644         ----------------MS--NPKVFFD--------IVIGK----------------MKA
NF00926921         FAAVGLFLFMGQTVEAKGPKITSKVYFD--------IEHD----------------GQPL
NF00909931         ----------------MP--NPKVFFD--------MTIGG----------------QPA
NF00956595         ---------------------QVYMD--------IKIG----------------NKPA
NF02035209         -------MDAAATSLPTNP--NPKVFFD--------MSIGG----------------APA
NF01329591         LATSLVLASG-------QLFANTIIDMK----------------------------TSM
CAG86678           --------------------MSVTFH----------------------------TKT
CAG86274           ----LITHKVHIEITKLAKRKNKDGVKP----------------------------VVI
CAG85447           ------------MSSLEPATTAKVALI----------------------------TTK
CAG85287           PVN---FTRQTRLFSSSARNWGTKVFIT--------PSIGGV----------------KQ
CAG84900           -------------MSDKLN-RPKVFFD--------ISAD----------------GKPK
CAG84822           --------------MKVELLRPCSYIDIS------IGG----------------SKT
CAG84723           -------------------MNPVVFLD--------VNKG----------------DVPL
CAG79895           -----LAFFVQPAQAEPDAEITHKVYFD--------IKQG----------------EESL
CAG78939           ------------------NCQG-----------------------------------KR
CAG82238           -------------MTN-----PRVFFE--------VAIG----------------GKTI
CAG81980           -------------------MSNQVYFD--------VSADGQ----------------PL
CAG81971           -------MFRQIRHFSTSPLVRNNVYFN--------VSANGN----------------PL
CAG81844           -------------------MT-ITFLD--------VTYD----------------GQRI
CAG84141           ---------------MEPQTTAKVVLT----------------------------TTK
CAG84091           -------------------MSAFVYMDFA------VGG----------------EPV
CAG83821           --------------------MRAYLD----------------------------VQSPA
CAG76968           LVAAAALISLTAFSPAFAASGTTHVLLT----------------------------TSA
CAG62671           ----------------------MKVYLDIA------IAG----------------EQI
CAG76052           ----------------------MITLH----------------------------TNH
CAG59915           RIS-----MQKRFLSSTVAKLGKKVYFE--------PSVNGS----------------RI
CAG58658           -------------------MS-KVYFD--------IEADGQ----------------PL
33777556           --------------------MVKCFFD--------VSIA----------------GKPS
AAF65770           ------------------------------------GG----------------APV
BAA25755           ----------------MS--NPKVFFD--------MTVGG----------------QNA
CSTO               ----------------MA--NPKVFFD--------LTIGG----------------APA
CSRP               ----------------MV--NPKVFFD--------MTVGD----------------KAA
CSZM               ----------------MA--NPRVFFD--------MTVGG----------------APA
CYPH_ALLCE         ------------------------------------------------------------
AAG01536           ----------------MA--NPKVFFD--------LTIGG----------------QPA
AAB51386           ----------------MA--NPRVFFD--------LTIGG----------------APA
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G54833          ----------------MP--NPKVFFD--------MTIGG----------------QPA
K85185          ----------------MP--NPRVFFD--------MSVGG----------------QPA
Y08273          ----------------MS--LPKVFFD--------MSIGG----------------QPC
Y08320          ----------------MS--NPKVFFD--------MTIGG----------------QPC
E1226445        ----------------MS--NPKVFFD--------MAIAG----------------NPA
L32095          --------------------VTSKIFFD--------IEIG----------------GESA
CAA10766        ----------VEWHQKLPNPKNPVVFFD--------VTIG----------------TIPA
AAF69796        --------------------MSQVYFD--------IAINNA----------------PA
AAF69795        --------------------MSDVYFD--------IAINSQ----------------PA
CSNCM           ----------------TSSIMSKVFFD--------LEWEGPVLGPNNKPTSEIKA--QS
NF01287451      ---------------------MSVLLE-----------------------------TSA
NF01527836      ---------------------MSVTLH-----------------------------TTL
NF01488902      ------------------------------------------------------------M
NF00648058      -----------MSSTDDVKQARSRVFFD--------ITIG----------------GKAA
NF01487278      ----------------GPKITHKVYFD--------IEQG----------------DKPL
NF01486260      TVLGGP----KKVEQKKAAETGTSAVIH-----------------------------TTY
NF00904102      LFLGAMLLFAQSAEAAKGPKITHKVYFD--------IEQG----------------DKPL
NF01484914      ---------------------MSVLLE-----------------------------TSA
NF01484255      -----------MAPTVLPASGNPLVFFD--------ITLG----------------GEPL
NF01483993      ----------MSAIYNLEPQPTASAIIH-----------------------------TTQ
NF01533203      ----------------MA--NPRVYFD--------MSVGG----------------SPA
NF01483647      -----------LKPSHRIKNKG-YVRME-----------------------------TNL
S71849          ----------------SAIMGNKVFFD--------IEWEGPVMQG-GKPTSTVKE--QS
J17900          ------ATLVS---ASTNPKVTNKVYFD--------IKQG----------------DKDL
NF00873669      --------------------MS-NVFFD--------ITKNGA----------------PL
NF01527595      --------------------MS-NVFFD--------ITKNGS----------------PL
NF01539217      ----------------KSNMAIKTYFD--------VTWEGPVLDASGKPTSTVQE--QA
D1035365        -------LFMGQTVEAKGPKITSKVYFD--------IEHD----------------GQPL
YP_116397       ---------------------MTKVNLE-----------------------------TNF
YP_119877       ---------------TTGGDATVSVSVE-----------------------------TNQ
CAD25897        -----EVLKALAMHGTPYLDVEYNVGGE-----------------------------KRS
CAD26352        ----------------MAKEASGNVYFD--------VYANEE----------------SL
AAD17998        --------ALVNASEPRGPKITNKVYFD--------IQHG----------------DESL
G2959712        ----------------MP--NPIVFFD--------ITADG----------------APV
CSNCC           --------------------MSKVFFD--------LEWEGPVLGPNNKPTSEIKA--QS
AJ006689        -------------FHQTPSAMSQVFFD--------VEYA---------PVGTAET--KV
AAF28343        ---------------------TVTLQ-----------------------------TTV
AAD50375        -------------MTG--IIRNKVFFQ--------IKQG----------------NTPL
AAK21908        ------------------------------------------------------------
AAG13968        --------NTTRVRFYSSTMSKPNVFFD--------ISFNG----------------VT
BAB58884        -------------------MSKPNVFFD--------ISFNG----------------VT
E1363908        --------------------MS-NVFFD--------ITKNGA----------------PL
AAD16142        ------------------MSGNTKAFFD--------IQYA---------PVGSSAP--KT
G1764137        ---------------------MANCYFD--------VSSNGK----------------PL
Z32674          --------------------MGNKVFFD--------IEWEGPVMQG-CKPTSTVKGSLVA
JT0686          --------------------GNKVFFD--------ITWEGPVFQN-GKPTSTVKE--QS
CSCK            -------------------MS-TVYFD--------VSADGQ----------------KL
NP_986490       -------------------MS-KVFFD--------VEADGQ----------------PL
NP_985014       NSSRSLLPSSRRLFSSSAASLGTKVFFD--------TSINGA----------------KA
NP_984799       -----------------MSGVTRVYIDIE------IGG-----------------CKS
NP_984183       -------------MTE----RQKTYFD--------LSIG----------------GKPA
NP_982586       --------------MSYFGVISAAQAKSVKMYPPNPPISQRVQML---LRYDGGEKQEE
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NP_982486        QVLFVLAQALLCAFALADPTVTHRVFFD--------LQHG----------------DEPL
AAT09096         FLLSLLAINQPGVAAKKLPKVTSKVFFD--------VEIG----------------GEKA
YP_014938        --------MTYPQLSKEVAPNEIEAEMI----------------------------TNR
NP_951950        ----------------MSEEQNPRVMLE----------------------------TSQ
NP_935388        ---MLKVICASLVLTSSLALAGPKVEFE----------------------------TSL
NP_907765        PSLFKLFLGFMLLPAWLWSAESPVVVLE----------------------------TTS
BAC91249         --KITRAERFNLVQTGDPSGKGTGGFTD----------------------------PAT
BAC90551         -------------KTLPQLTSKAYVKLD----------------------------TTK
BAC89441         -------------------TGKALVELT----------------------------TTQ
BAC88914         -----------ARADLPSLAGKATVDLN----------------------------TSK
AAV50868         -----------------NSGKNPRVYMD--------IVLN----------------NEII
AAV82698         IGLTAAIFISVSHAEIQPDNPFPRVKII----------------------------TSM
AAV81872         ----------------------MQVVLH----------------------------TNH
NP_736022        ----------FPQLDKAVAKNEAQVLIK----------------------------TSK
NP_734780        -------ELTFPQVDIENTEGPV-AVIK----------------------------TNH
YP_085398        -------------------MKTLGYILM----------------------------ENG
NP_643098        ------------EHVANIGTLAHERFWDG----------------------LSIYRSQ
NP_641352        --------------------MSLIATFD----------------------------TSR
BAB76758         ------------------------------------------------------------
YP_129479        -------MRILIRLNLYQHSAASMIIFT----------------------------TNF
YP_129310        ----------------------MVTLH----------------------------TTF
YP_129032        ---MHRYLLAFCLLLALPVTAATQVLVT----------------------------TNL
YP_101389        ---------------------EKETVLK----------------------------IETSM
YP_087816        -MKKFKFLTALFALFFVFNANAKNVTLH----------------------------TNY
YP_087815        ---------MRNQIPIHFYKENTMVTLH----------------------------TNF
YP_076496        ADQAGHKQWDKPPEMIIDPAKRYTATME----------------------------TSL
AAT91289         ------------------------------------------------------------
AAT91260         ------------------------------------------------------------
NP_868477        FGLTAGPASSTSAADPAKGEVTHKVYFD--------VSIG----------------SEPA
NP_867717        --------------------MKVATFD----------------------------TDR
NP_867158        PNLVEATVLSGNRSLRLD---------M----------------------------DGF
NP_865515        ----------------IDRDALPQVLFK----------------------------TTR
NP_992233        ----------------------MVTFH----------------------------TNH
NP_991569        LVTFIALCSLSAVAPAALAAGEPHVLLT----------------------------TSA
NP_280624        -----------MRRADCRNTMPVDATVH----------------------------TSE
BAC18575         EAGEASREVSTPETEDVPATGTVTVNLS----------------------------TNQ
BAC16839         PQTSETCGRLVGVIVVSMTLKTATAILH----------------------------TNR
BAB82272         --------------------MNPIVTIEM----------------------------ATG
BAB99042         ----------------MPATGTVTVNLT----------------------------TAQ
BAB97427         ---------LDVVMMGVMTSKTATAILH----------------------------TNR
BAC08372         ------YTPPKGYEHLPRLLGRATVEME----------------------------TTK
BAC07690         ----------------------ATVVLT----------------------------VND
YP_072215        LVTFIALCSLSAVAPAALAAGEPHVLLT----------------------------TSA
YP_069574        ----------------------MVTFH----------------------------TNH
NP_778719        --------------------MHLIAHLD----------------------------TVR
NP_245881        ----------------------MITLH----------------------------TNL
NP_245880        ---MLRIITALLLAGVVCVAQAKNVVLH----------------------------TNY
NP_354667        AFAGALFAGALAASTFASAAE-LLTVQL----------------------------KDG
NP_354666        ------------MTEIKDPENTIIMET----------------------------TTG
NP_298502        --------------------MHLIAHLD----------------------------TVR
AAN39296         -----------------MA--NPKVFFE--------VSANG----------------EPL
AAQ24380         -----------------MA--LPRVFFD--------ITAGG----------------QPL
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ZP_00353225      ----------------------------------------------------------
ZP_00244808      --------------------MTKTIELH----------------------------TNH
ZP_00244807      SRTWAAFALAAAVFAAPLTAAAQKVRLA--------------------------TSE
ZP_00358245      ------------MQIDVSKT--YRVTME--------------------------TTR
ZP_00350273      ----------------------MIKLH----------------------------TNF
ZP_00129494      ----------MSN---------PMVLLE--------------------------TSS
ZP_00130259      ----------------------------------------------------------M
ZP_00136576      LIATCTLLFAGSLLAATPAA-KPHVLIA--------------------------TSL
NF01760157       --------------------MATAVLE----------------------------TNF


CSHUA            GRVSFEL---FADKVPKTAEN---FRALSTGE----------------KGFG--------
NP_839944        GRISIKL---FADKILKTAEN---FRALSTGE----------------KGFR--------
NP_115861        GDIKIEVF---CERTPKTCEMESRCVPQAG------------------------VQW
NP_570981        GDIKIEVF---CERTPKTCEN---FLALCA------------------------SNY
NP_057143        GIIVLELY---WKHAPKTCKN---FAELAR------------------------RGY
CSHUB            GRVIFGL---FGKTVPKTVDN---FVALATGE----------------KGFG--------
366681           GRIQMLL---RSDVVPMTAEN---FRCLCTHE----------------KGFG--------
A57545           GRITMEL---FSNIVPRTAEN---FRALCTGE----------------KGFG--------
A41581           GRVVLEL---KADVVPKTAEN---FRALCTGE----------------KGFG--------
A54204           GRIVIGL---FGKVVPKTVEN---FVALATGE----------------KGYG--------
364705           GDLNLELH---CDLTPKTCEN---FIRLCK------------------------KHY
D38552           GDIHTKLF---PVECPKTVEN---FCVHSR------------------------NGY
NP_624311        GDVVIDLY---TEERPRACLN---FLKLCKIKY----------------------------
G2708309         GRMKIEL---FADVVPKTAEN---FRQFCTGEFR-------------KDGVP------IG
A45981           GRIVLEL---FADIVPKTAEN---FRALCTGEKG-----------IGHTTGKP------LH
J40763           GRVVFELF---SDVCPKTCEN---FRCLCTGEK----------------GTGKSTQKPLH
A47328           GRIMFQLF---SDICPKTCKN---FLCLCSGEK----------------GLGKTTGKKLC
KP_531396        GRVSFEL---FADKVPKTAEN---FRALSTGE----------------KGFG--------
KP_525294        GRVSFNL---FADKIPKTAEN---FHALSTGE----------------KGFG--------
KP_523512        -----------PDKLPKTAEN---FHALSTGE----------------KGFG--------
KP_507866        GRVVLEL---KADVVPKTAEN---FRALCTGE----------------KGFG--------
KP_517783        GRVSFEL---FADKFPQIAG-----------------------------------------
KP_517773        GCVSIKL---FADKIPKTAG-----------------------------------------
KP_526904        GRVSFKL---LADKFPKTAEN---FRALSTGE----------------KGFG--------
KP_516556        GHISFEL---FADKFPKTAEN---FHALSTGE----------------KRFG--------
KP_526001        GHIPFEL---FADKIPKTGG-----------------------------------------
KP_516021        GDIKIEVF---CERTPKTCEN---FLALCA------------------------SNY
KP_515886        GRVVFELF---SDVCPKTCEN---FRCLCTGEK----------------GTGKSTQKPLH
KP_525218        GHAKEIK---MSSDNQGSAD-----------------------------------------
KP_507684        GRVSFEL---FADKVPKTAEN---FRALSTGE----------------KGFG--------
KP_524688        GRMKIEL---FADVVPKTAEN---FRQFCTGEFR-------------KDGVP------IG
KP_513346        GRIQMLL---RSDVVPMTAEN---FRCLCTHE----------------KGFG--------
KP_524598        GHVSFKL---SADKFPNTAEN---VHAMSTGE----------------KGFG--------
KP_515004        ------TLL--PCATPKTCEN---FIRLCK------------------------KHY
KP_523437        GRISFEL---FADKFPTTAEN---FHALSTGE----------------KG----------
KP_520485        DRVSLEL---FADKFPKTAGN---FHALSTGE----------------KGFG--------
KP_519076        GRVSFEL---FADKVPKTAEN---FRALSTGE----------------KGFG--------
KP_527705        DHVSFEL---FAEKFPKTAEN---VRALSTEE----------------KGFG--------
KP_527529        GDVVIDLY---TEERPRACLN---FLKLCKIKY----------------------------
KP_518678        DRKFVAFG---QLIEGTEVLK---QLELVPTQNER-----------------------P
CSMSA            GRVSFEL---FADKVPKTAEN---FRALSTGE----------------KGFG--------
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NP_598845        GRVVLEL---KADVVPKTAEN---FRALCTGE----------------KGFG--------
AAH58369         GVIVLELY---WKHAPKTCKN---FAELAR-------------------------RGY
A56861           GRVVFGL---FGKTVPKTVDN---FVALATGE----------------KGFG--------
A40047           GRIVIGL---FGNVVPKTVEN---FVALATGE----------------KGYG--------
NKCR_MOUSE       GRIMFQLF---SDICPKTCKN---FLCLCSGEK----------------GLGKTTGKKLC
AAH61645         GDIKIEVF---CERTPKTCEN---FLALCA-------------------------SNY
BAC41068         -DLNLELH---CDLTPKTCEN---FIKLCK-------------------------KQY
BAC34686         GRIVLEL---FADIVPKTAEN---FRALCTGEKG----------TGSTTGKP------LH
BAB30711         GDVVIDLY---TEERPRACLN---FLKLCKIKY-----------------------
BAB25645         GRMKIEL---FADVVPKTAEN---FRQFCTGEFR-------------KDGVP------IG
BAB23880         GRMKIEL---FADVVPKTAEN---FRQFCTGEFR-------------KDGVP------IG
NF00527760       GRIIMEL---FSNIVPQTAEN---FRALCTGE----------------KGFG--------
NF01138503       GDIHIKLF---PVECPKTVEN---FCVHSR-------------------------NGY
NF00510830       GRIQMLL---RSDVVPMTAEN---FRCLCTHE----------------KGFG--------
NF00510932       GVIVLELY---WKHAPKTCKN---FAELAR-------------------------RGY
NF01595779       GPVSFEL---FSDKVQKTAEN---CPALSTGE----------------KGFG--------
NF02014914       GRVSFEL---FADKVPKTAEN---FQALSTGE----------------KGFG--------
NF01930249       GPCLFEL---FADKVPKTAEN---FHSLSPGE----------------KGFG--------
NF01929278       GLVSFKL---FADKVPKTAGN---FRALSTGE----------------KGFG--------
NF00523006       GRVSFEL---FADKVPKTAEN---FRALSTGE----------------KGFG--------
NF00508381       GRVSFEVGWLFADKVPKTAEN---FRALSTGE----------------KGFG--------
NF01215170       GDIKIEVF---CERTPRTCEN---FLALCA-------------------------SNY
CSRTA            GRVCFEL---FADKVPKTAEN---FRALSTGE----------------KGFG--------
NP_783638        GDIKIEVF---CERTPKTCEN---FLALCA-------------------------SNY
NF01612782       GGIVLEL---FADIVPKTAEN---FRALCTGEKG----------TGLTTGKP------LH
NF01612825       GRIQMLL---RSDVVPMTPEN---FRCLCTHE----------------KGFG--------
NF01607941       GRIVLEL---FADIVPKTAEN---FRALRTGEKG----------TGWTAGKP------LH
NF01607846       GCVSFKL---FADNVPKTAEN---FHALSTGE----------------KGFG--------
NF01609144       GRIVIGL---FGKVVPRTVEN---FVTLATGE----------------KGYG--------
NF01608897       GRVSLEL---FADKVPRTAEN---FRSLTTGE----------------KGFG--------
NP_758443        GRVVLEL---KADVVPKTAEN---FRALCTGE----------------KGFG--------
AAH61971         GRVTFGL---FGKTVPKTVDN---FVALATGE----------------KGFG--------
G2828710         GRVVFELF---SDVCPKTCEN---FRCLCTGEK----------------GTGKSTQKPLH
B38388           GRIVMELR---SDVVPKTAEN---FRALCTGE----------------KGFG--------
AF132148         GDLTVDLF---ISERPIACLN---FLKLCRLK-------------------------Y
NP_611113        GPLNLELF---CDQTPRACDN---FIKHCA-------------------------NGY
NP_611695        GRIEIGL---FGKTVPKTVEN---FKELALKP----------------QGEG--------
NP_610590        GDLKIELF---CDACPKACEN---FLALCA-------------------------SDY
NP_648697        GRIVMELR---SDVVPKTAEN---FRALCTGE----------------KGYG--------
NP_648508        GDIDIELW---ARECPKACRN---FVQLCLEG-------------------------Y
NP_648338        GRMIIELR---KDVVPKTAEN---FRALCTGE----------------CGIG-TLGKPLH
NP_476656        GRITFGLF---GKLAPKTVAN---FRHICLRG--------------------I-NGTS
NP_523874        GEITVELY---WKHAPNTCRN---FAELSR-------------------------RGY
NP_523773        GRIVMLL---RADVVPKTAEN---FRQLCTHE----------------QGYG--------
NP_610224        GRMIFEL---FADTVPRTAEN---FRQFCTGEYR-------------PDGVP------IG
NP_733246        GRIVFELF---NDVAPKTAEN---FRALCTGEK----------------GFGLITGKKLQ
NP_611935        GDIHMRLF---FKEVPKTVEN---FCVHAK-------------------------NGY
EAA03569         GRIVIELR---ADVVPRTAEN---FRALCTGE----------------RGIAPDTGTRLH
EAA03948         GRIVIGL---FGGTVPKTARN---FKELAEKTT----------------KGEG--------
EAA04625         GRMVFEL---YADVVPKTCEN---FRQFCTGEYK-------------KDGVP------IG
EAA06299         GRIVIELR---PDVVPKTSEN---FRALCTGE----------------KGFG--------
EAA08127         GRIVFELF---PAVAPKTCEN---FRALCTGEK----------------GIGQKTGKPLH
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EAA09839          GALNLELY---CEQVPKTCEN---FLKHCQ-------------------------SGY
EAA10133          GDVHLRLF---GKECPKTVEN---FCVHSK-------------------------NGY
EAL39647          GDITVDLF---LKERPRAALN---FLKLCKLK-----------------------Y
EAA13913          GDIKIELF---CDDCPKTCEN---FLALCA-------------------------SDY
EAA13914          GRITIGMF---GEEAPKTVAN---FRQLCTKD-------------------V-DGFS
EAA14200          GRIIMVL---RADVVPKTAEN---FRALCTGE---------------QGFG--------
EAA01474          GRILIEVR---NDVAPKMAKN---FGALCTGELG----------------------FG
KP_321072         GRILIEVR---NDVAPKMAKN---FGALCTGELG----------------------FG
KP_320182         GELTIELY---WKHAPNTCRN---FAELAR-------------------------RGY
KP_319131         GRITIGMF---GEEAPKTVAN---FRQLCTKD-------------------V-DGFS
KP_311949         GRIVFELF---PAVAPKTCEN---FRALCTGEK---------------GIGQKTGKPLH
CAI11739          GRLLFELF---SDVCPKTCRN---FKALCTGEAG-------------LSKSN---LELS
AAQ91263          GRIVMELR---ADVVPKTAEN---FRALCTGE---------------KGFG--------
NP_001004626      GRIIIEL---FADVVPKTVAN---FRALCTGE---------------HGFG--------
NP_001002065      GRVVFEL---FADVVPKTAEN---FRALCTGEKG----------VGKSTGKP------LH
NP_957499         GRMKIEL---FADIVPKTAEN---FRQFCTGEFK-------------KDGVP------VG
AAQ94596          GRMKIEL---FADIVPKTAEN---FRQFCTGEFK-------------KDGVP------VG
NP_998184         GRIVIGL---FGKTVPKTTEN---FLQLATGE----------------KGFG--------
NP_001002146      GDMKIELF---CEKAPKSCEN---FLALCA-------------------------GGF
AAQ91264          GRVVMELR---ADVVPRTAEN---FRQLCTGQ----------------PGYG--------
AAH59458          GRVVMELR---ADVVPRTAEN---FRQLCTGQ----------------PGYG--------
AAH56814          GDIVIDLY---TEERPKASLN---FLKLCKIKY------------------------
AAH62863          GRVVMELR---TDVVPRTAEN---FRQLCTGQ----------------PGYG--------
NP_998629         GRVVIELF---SDVCPKTCEN---FRCLCTGEK---------------GVGKTTQKPLH
NP_957285         GRVSASFTS--TAMAPATNHE---ADAIAD--------------------------DAV
NP_506749         GRIVMEL---YNDIVPKTAEN---FRALCTGE----------------KGVGKSG-KPLH
NP_506561         GRVTMEL---FNDVVPKTAEN---FRALCTGE----------------KGVGEQG-VALH
NP_504522         GKVIIQMN----EALKKNLTEL--FVKTARGEFVHP-------------SCG----KKIE
NP_506751         GRIVMEL---YDDVVPKTAGN---FRALCTGE----------------NGIGKSG-KPLH
NP_497745         GRIEIRLF---VEDAPKTCEN---FRALCTGEV---------------GMTPNNKARLH
NP_499828         GRIVMEL---YNDIVPKTAEN---FRALCTGE----------------KGKGKSG-KKLH
NP_497257         GKIVIGL---FGEVVPKTVKN---FVELAQRA----------------EGEG--------
NP_509506         GRIVFSLW---NHCCPRTVEN---FRAFCTGE-----------------LGKMNGHYAS
NP_503034         GRIVIEL---RTDVTPKTAEN---FRCLCTGE----------------RGFG--------
NP_501118         GKIALELY---WNHAPRTCQN---FSQLAK-------------------------RNY
NP_496562         GDIEIELW---TKEAPLACRN---FIQLCMEN-------------------------Y
NP_495855         GTIVIEL---FADVTPRTAEN---FRQFCTGEYK-------------KDGVP------NG
NP_496337         GPLNLELF---APKVPKACEN---FITHCS-------------------------NGY
NP_495417         GDIKIELY---VDDAPKACEN---FLALCA-------------------------SDY
NP_493378         GDITIRLF---GDECPKTVEN---FCTHSR-------------------------RGY
NP_492343         GDLIIDLF---VKERPRCSLN---FLKLCKKK-----------------------Y
NP_493624         GRIVIGL---FGKTVPKTATN---FIELAKKP----------------KGEG--------
P06073            GRIVMEL---YTDKTPRTAEN---FRALCTGE----------------KGVGGTG-KPLH
NP_175776         GDIVIDLH---SDKCPLTCKN---FLKLCKIK-----------------------Y
NP_567029         GRILIGL---FGNIVPKTAEN---FRSLCTGEKGVG--------N-MGKPLY--------
NP_201554         GDLNIELH---CDIAPRACEN---FITLCE-------------------------RGY
NP_200679         GRIVMGL---FGKTVPKTVEN---FRALCTGEKGIG--------K-NGKALH--------
NP_181407         GRIKMEL---FADIAPKTAEN---FRQFCTGELR-------------KAGKP------LG
NP_191166         GRVVMEL---FADVTPRTANN---FRALCTGE----------------NGIGKAG-KALH
NP_171696         GDIKCEIF---CDEVPKSAEN---FLALCA-------------------------SGY
NP_195222         GRIVIGL---YGTVVPKTVEN---FRALCTGEKGKT--------S-SGKPLH--------
NP_195213         GRIEMEL---FADTTPNTAEN---FRALCTGE----------------KGMGKLG-KPLH
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NP_196816        GRIVIGL---YGDDVPQTVEN---FRALCTGE----------------KGFG--------
NP_188932        GRIVIELF---ADLTPRTAEN---FRGLCTGE----------------RGIG-KCGKPIH
NP_191762        GRIVMGL---FGEVVPKTVEN---FRALCTGE----------------KKYG--------
NP_190046        GDIHMKLY---PEECPKTVEN---FTTHCR------------------------NGY
NP_180557        GRVVIGL---FGKAVPKTAEN---FRALCTGEKGVG--------K-SGKPLH--------
NP_181157        GPFTVEMY---YKHSPRTCRN---FLELSR------------------------RGY
NP_179251        GRIVMEL---YADTTPETAEN---FRALCTGE----------------RGIGKQG-KPLH
NP_179709        GKIVMEL---YTDKTPKTAEN---FRALCTGE----------------KGVGRSG-KPLH
AAK02067         GRIVIELY---DDVVPKTAEN---FRLLCTGE----------------KGLGPNTGVPLH
P82869           ----------------TAGN---FAKLVTSG------------------------A
P05352           ETMVFELF---PEVAPKTSEN---FRALCTGE----------------KGIGPRSGKPLH
P49181           QRIVIELF---ADVVPKTAEN---FRALCTGE----------------AGVGKSTGKPLH
P05314           GPIDVELW---PKEAPKSVRN---FVQLCLEG------------------------Y
CSZPA            GRIVFKL---FDDVVPKTAAN---FRALCTGE----------------KGYG--------
E313994          GKILIELY---TEHAPKTCQN---FYTLAK------------------------EGY
E1335804         GRVTIGL---FGKTVPKTAEN---FRALATGE----------------KGFG--------
E1331567         GRIKIRL---FSSIVPKTAEN---FRQFCTGETLG------------VNQKP------IG
S62327           PTIYFEL---FDNVVPKTVKN---FASLCNG--------------FEKDGRC------LT
S62590           GEINIELH---TDYAPHAVYN---FVQLAK------------------------QGY
E1294518         GDISIKLY---PEEAPKAVQN---FTTHAE------------------------NGY
P39728           GDLVIDLF---VKEAPKTCEN---FLKLCKLK------------------------Y
E1263915         GDIQIELW---CKEVPKACRN---FIQLCLEG------------------------Y
CSBY             GRVVFKL---YNDIVPKTAEN---FRALCTGE----------------KGFG--------
S30507           GRIEFEL---YDNVVPKTAEN---FRALCTGE----------------KGWG--------
S12324           GRIVIGL---YGKVCPKTAKN---FYKLSTTTN--------------SKKG--------
S57050           GRIVCKL---FREKAPKTTEN---FYKLCAGDV----------------KSPLKDQQYLS
S48567           GRIVFEL---YNDIVPKTAEN---FLKLCEGNAGM---------AKTKPDVP------LS
CSBYC3           ADLTFELY---GTVVPKTVNN---FAMLAHGVKAV------------IEGKDPNDIHTYS
S63359           RLITIDLY---GTMVPKTVMT---FCQYVDSVKDR------------LASR-----HSYS
S38324           GRIVMGL---YGLTTPQTVEN---FYQLTISRD----------------PKMG--------
PcCyP19          GRVVFEL---FADAVPKTAEN---FRALCTGE----------------KNFG--------
PcCyP20          GSLLIHLR---YTDCPKACFN---FLALCA------------------------SSY
PcCyP21.1        GRVVIGL---FGNDVPKTVEN---FKQLASGE----------------NGFG--------
PcCyP21.3        GRVEMEL---FKDAVPKTAEN---FRALCTGE----------------KGVGRSG-KALC
PcCyP24.3        GRVEVELF---DDTVPITARN---FRELCRGYQN----------------KTPEG-KPLH
PcCyP26          GQVTIELF---HDTVPKTSEN---FRSLCTGE----------------RGFI-QC--PLY
PcCyP28          GRIKMEL---YADTVPKTAEN---FRALCTGE----------------KGRGKSG-KPLH
PcCyP30          KRIEYELF---TRKCPVAVEN---FVKLCTGENVLPRVPSTAG--MGDPSFGDQFLPQVT
PcCyP35.1        GRITFELY---SXVVPKTCNN---FWHLCHGDLG--------SVSVVPDGESEAQPLELT
PcCyP35.3        LRIEFELFD---DESPKACAN---FRHLCAGQSTSR-----------KGQTYCYQGLTPC
PcCyP40          EKILLELF---DDITPKTCAN---FRALCTGNE----------------GKVTDETQIPMT
PcCyP110         GTIIVRLL---PHFAPKAVVN---FVGLAQ------------------------EGF
AAT44353         GRIVMELE---ADVVPKTAEN---FRALCTGE----------------KGFG--------
EAL37431         GRITMEL---FADKVPITAEN---FRALCTGE----------------KGMGQSG-KPLC
EAL37232         GDLKFELF---CSQCPKACKN---FLALSA------------------------SGY
EAL37110         SKLRIGLF---GVEVPKTANN---FYSLCVGGM----------------KDKDG-KEMS
EAL36265         GDLVIDLN---VDLCPKTCEN---FLKLCKLK------------------------F
EAL35294         GRLVIEL---FQDIVPKTSEN---FRQFCTGEYK-------------KNLKS------VG
J68268           GRITFEL---FADAVPKTAEN---FRALCTGE----------------KGFG--------
J68269           GRITFEL---FADAVPKTAEN---FRALCTGE----------------KGFG--------
AAQ15626         GRVEMEL---FKDVVPKTAEN---FRALCTGE----------------KGLGRSG-KALS
AAB07896         GRITFEL---FADAVPKTAEN---FRALCTGE----------------KGFG--------
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AAK14937          GRVVFEL---FSDVVPKTAEN---FRALCTGE---------------KSTP--G-NPLH
CAC18541          GRIQLEL---FADVTPKTAEN---FRQLCTGEYR-------------KDGVP------TG
A45000            GRIVFAL----FDDVPKTVEN---FRALCTGE---------------KGFG--------
Q9Y0F5            GDLKFELF---CSQCPKACKN---FLALSA-----------------------------SGY
J47811            GRIVMEL---FADIVPKTAEN---FRCLCTGE---------------RGMGRSG-KKLH
J50388            GRIVMEL---RSDIVPRTAEN---FRALCTGE---------------RGFG--------
L46884            GRIIFEL---FND-VPDTTRN---FRELCTHK---------------NNFG--------
M93420            GRIVMEL---RSDIVPRTAEN---FRALCTGD---------------RGFG--------
J50389            GRIIIGL---FGKTVPKTVEN---FKQLSIGTTLK-----------DGRTAA--------
G992633           ARIIIGL---FGKTVPKTVEN---FKQLSIGTQLK-----------DGRTAS--------
E323073           GRIVMEL---RSDIVPRTAEN---FRALCTGE---------------RGFG--------
S52758            GRITIGL---FGKDAPLTTEN---FRQLCTGE---------------HGFG--------
E1203753          GRVTMEL---FKDAVPQTAEN---FRALCTGE---------------KGFG--------
CAB58290          GALSIELYN------NFCADS---FWQLARSD-------------------------Q
CAB58298          GRIVMEL---YADTVPKTAEN---FRALCTGE---------------KGKGRSG-KPLH
AAF69736          ERVVLELF---ADVTPKTCEN---FRQLCLGND--------------GKKVEGTEVPMT
AAD46565          GRITIGL---FGKDAPLTTEN---FRQLCTGE---------------HGFG--------
A53522            GRIILELR---EDIAPKTVKN---FIGLFD-----------------------------K
NP_702112         GELEIHLF---SNECPEACRN---FIQHCLNN---------------------------Y
NP_701512         GRVLIGLY---SDQVPLSTEN---FIQLAEGYQIK------------DKYIG--------
NP_701389         GRMIFELF---MDKLPITCEN---FRCLCTGETG---------------LGYYL-KPRW
NP_701030         GDIKIELF---CYEVPKTCKN---FLALCA-------------------------SGY
NF01067443        GKVYFELFN--DEEIKKSVDN---FLSLCKGQ---------------DYHSIYSNDILS
NF01067965        GKFKFEL---FQNIVPRTSEN---FRKFCTGEHK-------------INNLP------VG
NF01065889        GDIHISLF---YKECKKTVQN---FSVHSI-----------------------------NGY
NF00926916        GRIIFEL---FSDITPRTCEN---FRALCTGE----------------K-IGSRG-KNLH
S52760            GRIVFGLY---GKVAPKTVEN---FVSICKG-----------------TVVDG-KMLH
J10322            GKFKFEL---FQNIVPRTSEN---FRKFCTGEHK-------------INNLP------VG
CAB39039          GRIIFEL---FSDITPRTCEN---FRALCTGE----------------K-IGSRG-KNLH
CAD51648          GEFQVELY---WYHSPKTCLN---FYTLCT-------------------------------MGY
NF01497907        GRIVFEL---FNDITPRTCEN---FKSLCVGD----------------K-VGSRG-KNLH
NF01497552        GEIHISFF---YKECKKTVLN---FATHST-----------------------------NGY
NF01497379        GRIVFGLY---GKVAPKTVEN---FVSICKG-----------------TVVND-KMLN
NF01497199        GKFKFEL---FQNIVPKTSEN---FRQFCTGEYK-------------VNNLP------VG
NF01496968        GKVYFELYN--DEGIEKSIEN---FLSLCKGN---------------EYHSIYSNEMLT
NF01495390        GRVLIGLY---SDQVPLSVEN---FIQLSEGYKVK------------DKYIG--------
NF01495324        GDFEVELY---WYHSPKTCLN---FYTLCE-------------------------------MGF
NF01493974        -------------------------------------------------------------
NF01493918        GELEILLF---SNECPIACKN---FIQLCLNN---------------------------Y
E316521           KKIVFKL---YDDVVPKTAAN---FRELATGS----------------RGFG--------
CAC35733          GDIIIDLH---TQVS-LAAKN---FIKLCKSK-------------------------F
J47812            GRIVMEL---FNDIVPKTAEN---FRALCTGE---------------KGVGKSG-KPLH
J47813            GRIVMEL---FADIVPKTAEN---FRCLCTGE---------------RGVGRSG-KKLH
G2624966          GRIVMEL---FNDIVPKTAEN---FRCLCTGEKG----------NG-----------LT
E1317902          GAINLELY---CKDVPRACEN---FIKHCK-------------------------NGY
E1319851          GAINLELF---CKDAPRACEN---FIKHCK-------------------------NGY
G3057040          GVINLELF---CKDAPRACGN---FIKHCK-------------------------NGY
AAB81959          GRVSFEL---FADKVPKTAEN---FRALSTGE---------------KGFG--------
AF023860          GRVSFEL---FADKVPKTAEN---FRALSTGE---------------KGFG--------
AAB81961          GRVSFEL---FADKVPKTAEN---FRALSTGE---------------KGFG--------
AAF22215          GRVSFEL---FADKVPKTAEN---FRALSTGE---------------KGFG--------
AF243140_1        GRVSFEL---FADKVPKTAEN---FRALSTGE---------------KGFG--------
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AF252388          GRVVLEL---KADVVPKTAEN---FRALCTGE---------------KGFG--------
CSBOAB            GRVSFEL---FADKVPKTAEN---FRALSTGE---------------KGFG--------
NF01922219        KRIEIEL----FADVPETAEN---FRQLCTGE---------------AGFG--------
NF01725587        GRIMMELR---GDVVPKTAEN---FRALCTGE---------------KGFG--------
NF01897292        GTVDIGLF---GDQVPKTVKN---FETLCGDGF--------------KREGDEQ-VYSY
CSHYAC            GRVSFEL---FADKVPKTAEN---FRALSTGE---------------KGFG--------
NF00071027        GRVSFEL---FADKVPKTAEN---FRALSTGE---------------KGFG--------
NF01951405        GDLNLELH---CDMTPRTCEN---FIKLCK-------------------------KNY
NF01059378        GRVSFEL---FADKVPKTAEN---FRALSTGE---------------KGFG--------
NF01105745        GRITFEL---FADKVPKTAEN---FRALCTGE---------------KGVGRSG-KPLH
NF00495096        GRVSFEL---FADKVPKTAEN---FRALSTGE---------------KGFG--------
NF01053198        GRIVMEL---YADTTPRTAEN---FRALCTGE---------------KGNGRSG-KPLH
CSPGA             GRVSFEL---FADKVPKTAEN---FRALSTGE---------------KGFG--------
NF01950932        GDIKIELF---CERTPKTCEN---FLALCA-------------------------SNY
NF01951326        GRIVFEL---FADIVPKTAEN---FRALCTGEKG----------TGATTGKP------LH
NF00909389        GRIVMEL---YADVTPRTAEN---FRALCTGE---------------KGVGRSG-KPLH
NF01286555        GRIVMEL---FADTTPRTAEN---FRALCTGE---------------KGKVRSG-KPLH
NF01737225        GRIVMEL---YADTTPETAEN---FRALCTGE---------------KGMGKSG-KPLH
NF01590839        GLIVLKLF---YKETPLTVCN---FVGLAEG-----------------TLDAAK-GKPF
AAH51602          GTITVELY---WLHAPVTCKN---FAELAR--------------------------RGY
AAT69672          GRIVMELR---SDVVPKTAEN---FRALCTHD---------------KGFG--------
AAH54186          GRIVMELR---SDVVPKTAEN---FRALCTHD---------------KGFG--------
AAH54168          GRIVIGL---FGKTVPKTVEN---FVTLATGE---------------KGYG--------
NF01208049        GDLNLELY---CDKTPKTCEN---FIKLCK-------------------------KNY
NF01844632        GRVVFELF---SDVCPKTCEN---FRSLCTGER---------------GIGKSTQKPLH
NF01844615        GEIDIELW---SKEAPKACRN---FVQLCLEG--------------------------Y
NF01915773        GTITVELY---WLHAPMTCKN---FAELAR--------------------------RGY
NF01915657        GEIKIELF---CERAPKASEN---FLALCA-------------------------SNY
NF01557564        GRIVLEL---FADVVPKTAEN---FRALSTGEKG----------IGQSTGKP------LH
AAH41536          GRIIMELR---SDVVPRTAEN---FRALCTHE---------------KGYG--------
AAH85963          GRVVFELF---SDVCPKTCEN---FRCLCTGEK---------------GTGKSTQKPLH
AAH64250          GRMKVEL---FADIVPKTAEN---FRQFCTGEFR-------------KDGVP------IG
AAH61335          GRIVLEL---FADVVPKTAEN---FRALSTGEKG----------IGQSTGKP------LH
AAH59741          GRIIMELR---SDVVPKTAEN---FRALCTNE---------------KGFG--------
AAH67931          GRVVFELF---SDVCPKTCEN---FRSLCTGER---------------GIGKSTQKPLH
AAH44993          GDLNLELY---CDKTPKTCEN---FIKLCK-------------------------KNY
A40516            GRVVIGL---FGKTVPKTVEN---FVALATGE---------------KGFG--------
CYPB_BOVIN        GRVVIGL---FGKTVPKTVDN---FVALATGE---------------KGFG--------
AAR19276          GRITLEL---FADTVPKTAEN---FRVLSTGE---------------KGFG--------
A46579            GRIVLEL---FADIVPKTAEN---FRALCTGEKG----------IGPTTGKP------LH
AAV40687          GRVAFRL---YSDLVPKTAEN---FRALCTGEKG----------LGQSGKP------LW
NF01637248        GRIVFKL---FDDVVPKTARN---FRELATGQ---------------NGFG--------
CYPR_BOVIN        GRITMEL---FSNIVPKTAEN---FRALCTGE---------------KGFG--------
CYPR_CALVI        GRIVFGLF---GKRAPKTVTN---FRHICLRG--------------------I-NGTT
E1317906          GPLNLELY---CQKAPKACEN---FITHCT-------------------------NGY
AAB87888          GRIIMELR---SDVVPKTAEN---FRALCTGE---------------KGFG--------
AAB87889          GRIIMELR---SDVVPKTAEN---FRALCTGE---------------KGFG--------
Q9XZZ5            GRIIMELR---SDVVPKTAEN---FRALSTGE---------------KGFG--------
S63995            GRIVMELR---SDVVPKTAEN---FRALCTGE---------------KGFG--------
G1703696          GRIVMELR---ADVVPKTAEN---FRALCTGE---------------KGFG--------
J36797            ----MELD---ADVVPKTAEN---FRALCTGE---------------KGFG--------
AF017738          GDIDIELW---SKECPLACRN---FIQLCMEG-------------------------Y
```

```
L37292          GRIVMELY---NDIAPRTCNN---FLMLCTGMA---------------GTGKISGKPLH
AAS01736        GRIVMEL---FADVVPRTAEN---FRALCTGE----------------KGVGRLG-KPLH
AAO61985        KNIIWNLY--WGEFFGGLGIS-YIFLKLANFS-----------------------QA
CAC80550        GRIVMEL---FADTTPRTAEN---FRALCTGE----------------KGVGRSG-KPLH
AAO63777        GRIVMEL---FADTTPRTAEN---FRALCTGE----------------KGKVRSG-KPLH
B53522          GRIEFEL---FADVVPKTAEN---FRALCTGE----------------KGTGRSG-KPLY
E280557         GRIVFGLF---ADLCPYTVRN---FASLVLGNT----------------TNSDG-ILLA
J70827          GRIVMELY---NDIAPRTCNN---FLMLCTGMA---------------GIGKISGKPLH
J70884          GRIVMELY---NDIAPRTCNN---FLMLCTGMA---------------GIGKLSGKPLH
J55771          ETLVVGLY---GDLVPKTVNN---FVSLCEG-----------------TKIGD-KHYS
D1024669        GRIEIGL---FGKTVPKTVKN---FVETATKHLTEK--------SEDDKLVG--------
227879          GKVVMEL---YANTVPKTAEN---FRALCTGE----------------KGIGKSG-KPLS
AAD48910        GRIVFGL---YGKTVPKTVEN---FRALCTGEKGLG--------T-SGKPLH--------
AAO51811        GRIKIEL---FADIVPKTAEN---FRQFCTGEHR-------------VAGLP------IG
AAF76472        GDIKCEIF---CDEVPKSAEN---FLALCA-------------------------SGY
AAP80861        GRVVMGL---FGKAVPKTAEN---FRALCTGEKGMG--------N-SGKPLH--------
AAP73848        GRIKMEL---FADIVPKTAEN---FRQFCTGEHR-------------KSGLP------QG
BAB62329        GAFTIEMY---YKHAPKTCRN---FLELSR-------------------------RGY
AAL75728        GRVVIELL---ADKVPDTAEN---FRRLCTGERAGR------------SGKS-----RLH
S48017          GRIVMEL---YAKDVPRTAEN---FRALCTGE----------------KGVGKSG-KPLH
S48018          GRVVMEL---FADTVPKTAEN---FRCLCTGE----------------KGLGASG-KPLH
BAD53622        GRVVMGL---FGKTVPKTAEN---FRALCTGEKGTG--------K-SGKALH--------
BAD53621        GRVVMGL---FGKTVPKTAEN---FRALCTGEKGTG--------K-SGKALH--------
BAD53620        GRIVMGL---FGNTVPKTAEN---FRAICTGEKGLG--------K-SGKPLS--------
XP_507188       GRVIFGLY---GRLLPLTTAN---FKAACTSA-------------------------A
XP_483750       GDIHLRLY---PEECPKTVEN---FTTHCR-------------------------NGY
XP_483749       GPAPVPPR--PRKKRPLQFEQ--AFLDALPSA----------------------AM
XP_482125       CVFRIVLD---GYNAPVTAGN---FLDLVERK-------------------------F
XP_478742       ATIQVVID---GYSAPLTAGN---FAKLVLDG-------------------------A
XP_478741       ATIQVVID---GYSAPLTAGN---FAKLVLDG-------------------------A
NP_385690       -RVVIELR---PDVAPGHVAR---IKELTREG-------------------------A
NP_385689       -PVVIELR---PDIAPKHVQQ---IKELAAAG-------------------------E
NP_349373       NKIKIELY---PHIAPNTVSN---FISLIN----------------------HNF
BAD45990        GDIEVDLH---TDMCPLTTKN---FLKLCKGNEGL-----------------------V
BAD45991        GDIEVDLH---TDMCPLTTKN---FLKLCKMK-------------------------Y
NP_908419       GRITIGLF---GDAAPAGASR---FLSLVTGVG--------------------------
NP_919903       PETTYEAK---KIVCPLGLEVH--KIHACPND----------------------CIL
BAD35839        GRIVIELY---ASVVPRTAEN---FRALCTGE----------------KGVGAVTGKHLH
AAU87301        GRIVMEL---YADVVPKTAEN---FRALCTGE----------------KGTGRSG-KPLH
CAG90469        GRITIGL---FGTVVPKTAEN---FRQLAISTD---------------PKFG--------
CAG88330        GRVTFKL---YDDVVPKTAEN---FRALCTGE----------------KGFG--------
CAG88054        GNIVIDLF---IDQQPLACYN---FLKLCKLN-------------------------Y
CAG86818        GDIKLKLF---NELVPKTTEN---FIKLCE-------------------------KGY
NF01109982      GKIVMELR---KDVVPKTAEN---FRALCTGE----------------KGYG--------
NF00686348      GRVVIQLR---PDKAPKSVER---IKILVREG-------------------------F
NF00686217      ------------------------------------------------------------
NF02138644      GRIVMEL---FADSTPKTAEN---FRALCTGE----------------KGIGLSG-KPLH
NF00926921      GRIVMGL---YGKTVPKTAEN---FRALATGE----------------KGFG--------
NF00909931      GKIVFEL---FADTTPRTAEN---FRALCTGE----------------KGVGRSG-KPLH
NF00956595      GRLRFLL---RADIVPMTAEN---FRCLCTHE----------------KGFG--------
NF02035209      GRIVMEL---FADVTPNTAEN---FRALCTGE----------------KEPGRSG-KPLH
NF01329591      GNIEIELF---NDKAPVSAKN---FENYVK-------------------------SNF
```

```
CAG86678          GPLKFELR-LSSIAQCKHVEN---FLRHCANG-------------------------T
CAG86274          GEIHAGLF---GYTVPFTVNN---FIQLAN-----------------KTNG-----YGY
CAG85447          GPIEIELW---AKEVPNITRV---FIQNCLDK-------------------------K
CAG85287          SPIKFEL---YDEVVPKTTEN---FRALCTGE---------------KGFG--------
CAG84900          GRVVFEL---YNDVVPKTAEN---FRALCTGEKGA---------SESS-GKQ------LH
CAG84822          GRIVVEL---FDDLAPKTSEN---FIKLCNGS-----------------QITKEGSPLT
CAG84723          GRIKLKL---FASELPKTCEN---FRQFCTGEYR-------------ENNRP------KG
CAG79895          GKIVMGL---YGDVVPKTVEN---FRALCTGE---------------TGKG--------
CAG78939          GQINLELY---PYNAPLTVYN---FVKLAQ-------------------------KGY
CAG82238          GKIYFEL---FADKVPKTAEN---FRALCTGEKG-----------NTQAGIP------LH
CAG81980          GRIEFKL---YNDIVPKTAEN---FRALCTGE---------------QGFG--------
CAG81971          GKISFKL---YKDQVPKTAEN---FRALCTGE---------------KGFG--------
CAG81844          GRIKFKL---YSEDLPKTCEN---FRQFCTGEYR-------------IDNVP------QG
CAG84141          GPIEAELF---AKEVPLACTR---FLQLCKSG-------------------------Y
CAG84091          GRVVFEL---FDD-TPLTSAN---FRALCKGD-----------------KPTPEGSVPLT
CAG83821          GRKRLFLEL-FPDRAPQACKN---FVGLCAAPDG------------------------
CAG76968          GNIELSLD---NQKAPISVKN---FVEYVN-------------------------NGF
CAG62671          GRIVCEL---YNDKAPKAVEN---FHRLCVG-------------------SGSVGGIHLT
CAG76052          GDIVINTF---ADKAPVTVEN---FLNYCR-------------------------SGF
CAG59915          GRIEFEL---YDDVVPKTAEN---FRALCTGE---------------KGWG--------
CAG58658          GRVVFQL---YDDVVPKTAAN---FRALCTGE---------------KGFG--------
G3777556          GRIVMEL---RPDVVPKTAEN---FRALCTGE---------------KGFG--------
AAF65770          GRIVMEL---YADTTPRTAEN---FRALCTGE---------------KGVGRSR-KPLH
BAA25755          GRIIFEL---FADVTPRTAEN---FRALCTGE---------------KGVGRSG-KPLH
CSTO              GRVVMEL---YADTTPKTAEN---FRALCTGE---------------KGVGKMG-KPLH
CSRP              GRIVMEL---YADTVPETAEN---FRALCTGE---------------RGIGKSG-KPLH
CSZM              GRIVMEL---YANEVPKTAEN---FRALCTGE---------------KGVGKSG-KPLH
CYPH_ALLCE        ----MEL---FQDVVPQTAEN---FRALCTGE---------------KGMGDR--KPLH
AAG01536          GRVVMEM---FANDVPKTAEN---FRALCTGE---------------KGVGRMG-KPLH
AAB51386          GRVVMEL---FADTTPKTAEN---FRALCTGE---------------KGVGKMG-KPLH
S54833            GRIVFEL---YADVTPRTAEN---FRALCTGE---------------KGVGRSG-KPVH
K85185            GRIVMEL---FADTTPRTAEN---FRALCTGE---------------KGTGRSG-KPLH
Y08273            GRIVMEL---YADVVPKTADN---FRALCTGE---------------KGVGKSG-KPLH
Y08320            GRIVMEL---YADVVPKTAEN---FRALCTGE---------------KGVGKTG-KPLH
E1226445          GRIVMEL---YADTTPRTAEN---FRALCTGE---------------KGVGRSG-KPLH
L32095            GRIVIGL---FGDAVPKTVEN---FKTLSTGA---------------KGYG--------
CAA10766          GRIKMEL---FADIVPRTAEN---FRQFCTGEYR-------------KAGIP------IG
AAF69796          GRITFKL---FDDVVPKTARN---FRELCTGQ---------------NGFG--------
AAF69795          GRITFKL---FDDVVPKTAQN---FRELCTGQ---------------NGFG--------
CSNCM             GRINFTL---YDDVVPKTARN---FKELCTGQ---------------NGFG--------
NF01287451        GDIVIDLL---VDYAPKMCEN---FLKLCKVK-------------------------Y
NF01527836        GDLKIEIF---CESVPKTAEN---FLALCA-------------------------SGY
NF01488902        GTFTLELY---TNHAPKTCKN---FATLAD-------------------------RGY
NF00648058        GRIVFEL---YNDIVPKTAEN---FRALCTGEKG-----------VGKLGKP------LH
NF01487278        GRIVMGL---YGKTVPKTAEN---FRALATGE---------------KGFG--------
NF01486260        GDIHIRLF---PDAAPKAVEN---FVTHAK-------------------------RGY
NF00904102        GRIVMGL---YGKTVPKTAEN---FRALATGE---------------KGFG--------
NF01484914        GDIVIDLL---VDYAPKMCEN---FLKLCKVK-------------------------Y
NF01484255        GRITFEL---FKDVVPRTAEN---FRQFCTGESKN-----------NLGRP------QG
NF01483993        GEIAVELF---AKQTPLTCRN---FLQLALDG-------------------------Y
NF01533203        GRIVMEL---FADVVPRTTEN---FRALCTGE---------------KGKGRSG-KPLH
NF01483647        GPLTLELL---PEFAPKAVWN---FLRLSE-------------------------KGY
```

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S71849          GRINFKL---YDDVVPKTAEN---FRALCTGE----------------KGFG--------
J17900          GRIVLGL---YGEVVPKTVEN---FRALATGE----------------KGYG--------
NF00873669      GTIKFKL---FDDVVPKTAAN---FRALCTGE----------------KGFG--------
NF01527595      DPIKFKL---FDDVVPKTTAN---FRALCTGE----------------KGFG--------
NF01539217      GRITFNL---YDDVVPKTAEN---FRALCTGE----------------KGFG--------
D1035365        GRIVMGL---YGKTVPKTAEN---FRALATGE----------------KGFG--------
YP_116397       GPIVLELD---DAKAPETVRN---FVDYVN--------------------------SGH
YP_119877       GPLGLTLN---NAESPCTVNS---FVSLAT-------------------------QGF
CAD25897        GRITFELY---WDITPKTARNFYEFVKGTEIGG---------------------KYYK
CAD26352        GRIVMKL---EDDIVPKTAKN---FRTLCERP----------------KGEG--------
AAD17998        GRIVLGL---YGKTVPETAEN---FRALATGE----------------KGFG--------
G2959712        GRIEMEL---YADDVPKTAEN---FRALCTGE----------------KGVGRSG-KPLH
CSNCC           GRINFTL---YDDVVPKTARN---FKELCTGQ----------------NGFG--------
AJ006689        GRIVFNL---FDKDVPKTAKN---FRELCKRP----------------AGEG--------
AAF28343        GDITLELY---YNHAPKACKN---FYELSK-------------------------RGY
AAD50375        GRVVFEL---YNDIVPKTAEN---FRALCTGEKG-----------IGKSGKP------LH
AAK21908        -------------VVPKTAEN---FRALCTGE----------------KGVGRSG-KPLW
AAG13968        KRVEFKL---YDDVVPKTADN---FRRLCVGE----------------PGVGG-------
BAB58884        KRVEFKL---YDDVVPKTADN---FRRLCVGE----------------PGVGG-------
E1363908        GTIKFKL---FDDVVPKTAAN---FRALCTGE----------------KGFG--------
AAD16142        GRVVFNL---FEKDVPKTAKN---FRELCKLP----------------QGQG--------
G1764137        GRIVFEL---YDDVVPRTTNN---FRQLCLNP----------------PGKG--------
Z32674          STSSCTM---TSSPRPPRTSA---LSAPARRA----------------SATR--------
JT0686          GRINFNL---FNEQVPKTAEN---FKALCTGE----------------KGFG--------
CSCK            GKITFKL---YDDVVPKTAEN---FRALCTGE----------------KGFG--------
NP_986490       GRIVFQL---YNDVTPKTAEN---FRALCTGE----------------KGFG--------
NP_985014       GRIEFEL---YDDVVPKTAEN---FRALCTGE----------------KGWG--------
NP_984799       GRIVFEL---FQDKAPLSAQN---FKQLCCG------------------GIELDGKHVS
NP_984183       GRVVFEV---YSDVTPKTAEN---FVRLCAGDAGE---------CRTKPGVP------LC
NP_982586       LEIGIELY---GSVVPDTVKN---FREIAKGVKAK------------IKGTD--QVLDIT
NP_982486       GRVVLGL---FGDVAPRTVAN---FVTLAKSQD----------------ASAG--------
AAT09096        GRIVMGL---YGKTVPKTAEN---FRALCTGEKGTG--------K-SGKPLH--------
YP_014938       GTIRIKLF---PEIAPKTVEN---FVTHSK-------------------------NGY
NP_951950       GNITIELF---RDKAPISARN---FLSYVK-------------------------DGY
NP_935388       GNFTVELN---EEKAPISVEN---FVKYVK-------------------------DGS
NP_907765       GTIELTLF---PKAAPKAVEN---FTTHVK-------------------------NGY
BAC91249        GKLRTIP----MEVRPARKEAEITASQVIQRR-----------------------VD
BAC90551        GAIVLELD---GPNAPVSAGN---FLDLVKRK-----------------------F
BAC89441        GPITIVLD---GDRAPINAGN---FIDLVQKG-----------------------V
BAC88914        GRILLEVD---GDNAPLSAGN---FVDLVKRG-----------------------F
AAV50868        GRLQIKLFR--D-AFPAGVEN---FVQLTNGK----------------TYR-VNSNGTGK
AAV82698        GNITVELN---RDAAPLTVKN---FFRYVK-------------------------KAQ
AAV81872        GDITLEMH---NETAPKTVDN---FLQYAR-------------------------DGF
NP_736022       GDINIKLF---PKYAPLAVEN---FLTHAK-------------------------EGY
NP_734780       GDMTVKLF---PDHAPKTVAN---FIGLAK-------------------------QGY
YP_085398       EKIDLEFF---PEEAPKTVEN---FKKLAE-------------------------QGF
NP_643098       DNFVVQFGD-PDGETPAKAKS------LGSAK-----------------------T
NP_641352       GPIVVELY---PDKAPLTVAN---FVNLAK----------------------R-G--F
BAB76758        -DLTVVVD---GYSAPVTAGN---FVDLVKRG-----------------------F
YP_129479       GDIEIELD---MKQTPVSSRN---FLKYCQ-------------------------DGF
YP_129310       GDIKIQLN---TEKAPETCAN---FLQYCR-------------------------DGF
YP_129032       GEFTIQLN---EEKAPISSEN---FLRYVE-------------------------DGS
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YP_101389         GDIKVKLY----NETPKHRDN---FIKLAKDG-------------------------T
YP_087816         GDIKIALN---EKKAPVSSKN---FLDYAQ-------------------------TGF
YP_087815         GDIKIALN---HEKAPETAAN---FEAYCK-------------------------EGF
YP_076496         GTMTFELF---ADEVPQTVNN---FVFLAR-------------------------EGF
AAT91289          GRIVFRL---YDQQVPITTKN---FRELATGQ---------------NGFG--------
AAT91260          GRIVFRL---YDQQVPITTKN---FRELATGQ---------------NGFG--------
NP_868477         GRIVLGL---FGKDVPKTAEN---FRALSTGEKGEG--------K-LGVPLD--------
NP_867717         GTIRIELF---DDKTPKTVEN---FETLCE----------------------K-K--Y
NP_867158         GDMVFELF---EQRAARPTER---VIDLAN-------------------------SGF
NP_865515         GDVLIELY---SGEAPSTVAN---FINLVEDG-----------------------F
NP_992233         GDIVINTF---ADKAPATVEN---FLNYCR-------------------------KGF
NP_991569         GNIELELN---SQKAPISTQN---FVDYVN-------------------------NGY
NP_280624         GEFDIELY---DERAPRTVEN---FLNLARHEPAADADPAPDTVTWEDPESGEIR-GDSL
BAC18575          GEIGMELD---RSVSPCTVNA---IEHFAA-------------------------EGY
BAC16839          GDISIDLF---GNHAPETVAN---FIGLA----------EGTKEYKTANASGSQ-EGPF
BAB82272          EKIKIELY---PEIAPNTVRN---FVSLVK-------------------------KGF
BAB99042          GNIGMELD---RSVSPCTVNA---VEHMAS-------------------------EGY
BAB97427          GDITIDLF---GNHAPETVAN---FVGLA----------QGTKDYQSANAQGDS-EGPF
BAC08372          GKLTIVVD---GYSAPLTAGN---FVDLVQRH-----------------------F
BAC07690          RPITIQVK---GDAAPITAGN---FVDLVNRG-----------------------V
YP_072215         GNIELELN---SQKAPISTQN---FVDYVN-------------------------NGY
YP_069574         GDIVINTF---ADKAPATVEN---FLNYCR-------------------------KGF
NP_778719         GPIKINLF---ADKTPLTVAN---FVNLAK---------------------R-G--F
NP_245881         GNIKIQLD---HEKAPNTAQN---FVNYCK-------------------------SGF
NP_245880         GDIKMVLE---EEKAPISTQN---FLRYSQ-------------------------AGF
NP_354667         -PVVIELM---PQVAPKHVAQ---IEALAKKG-----------------------A
NP_354666         -KVVIQLL---PEVAPGHVAR---IKELVSEG-----------------------A
NP_298502         GPIKINLF---ADKAPLTVAN---FVNLTK---------------------R-G--F
AAN39296          GKIVMELR---KDVVPKTAEN---FRALCTGE---------------KGYG--------
AAQ24380          GRVVMELR---ADVAPKTAEN---FRALCTGE---------------KSMG--------
ZP_00353225       ------------------MAN---FVGLA----------EGTKEWQDPATGEKK-SQPF
ZP_00244808       GVIRAELD---EVKAPATVAN---FLSYVK-------------------------AGH
ZP_00244807       GDIVLQLD---PAKAPKTVDN---FVAYVK-------------------------SGH
ZP_00358245       GTIELDLY---PQHAPLTVNN---FVFLVR---------------------E-G--F
ZP_00350273       GEITLELD---EEKAPVTTAN---FIQYVK-------------------------DGF
ZP_00129494       GDMLIELY---ADKAPETVKN---FLRYVE-------------------------EGF
ZP_00130259       GDFVVELD---AEKAPATCEN---FLQYVR-------------------------DGF
ZP_00136576       GEIEVELD---PTKAPISVKN---FLEYVD-------------------------SGY
NF01760157        GNIEIELF---EDDMPVTAGN---FRKLVE-------------------------SGF


CSHUA             YKGSCFHRIIPGF-------MCQGGDFTRHNGT-------------------------
NP_839944         YKGSCFHRIIPGF-------MCQGGDFTRHNGT-------------------------
NP_115861         RDLGSLQPPPPGF----K--QVFCLSLP-RTG--------------------------
NP_570981         YNGCIFHRNIKGF-------MVQTGDPT-GTG--------------------------
NP_057143         YNGTKFHRIIKDF-------MIQGGDPT-GTG--------------------------
CSHUB             YKNSKFHRVIKDF-------MIQGGDFTRGDGT-------------------------
366681            FKGSSFHRIIPQF-------MCQGGDFTNHNGT-------------------------
A57545            FKNSIFHRVIPDF-------VCQGGDITKHDGT-------------------------
A41581            YKGSTFHRVIPSF-------MCQAGDFTNHNGT-------------------------
A54204            YKGSKFHRVIKDF-------MIQGGDITTGDGT-------------------------
364705            YDGTIFHRSIRNF-------VIQGGDPT-GTG--------------------------
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D38552          YNGHTFHRIIKGF-------MIQTGDPT-GTG--------------------------
NP_624311       YNYCLIHN------VQR-DFIIQTGDPTGTGR--------------------------
G2708309        YKGSTFHRVIKDF-------MIQGGDFVNGDGT-------------------------
A45981          FKGCPFHRIIKKF-------MIQGGDFSNQNGT-------------------------
J40763          YKSCLFHRVVKDF-------MVQGGDFSEGNGR-------------------------
A47328          YKGSTFHRVVKNF-------MIQGGDFSEGNGK-------------------------
XP_531396       YKGSCFHRIIPGF-------MCQGGDFTCHNGT-------------------------
XP_525294       FKGFCFHRIIPGF-------MYQGGDFTRHNGT-------------------------
XP_523512       YKGSCFHRIIPGF-------MCQGGGFTCHNGT-------------------------
XP_507866       YKGSTFHRVIPSF-------MCQAGDFTNHNGT-------------------------
XP_517783       -----FHRIIPGF-------MYQGGDCTQHNGT-------------------------
XP_517773       -----FHRIIPRF-------MCQGGDFTHHNGT-------------------------
XP_526904       YKCSCLHRIIPGF-------ICQGDGFTRHNGT-------------------------
XP_516556       CKGSCFHRIIPGF-------VCQGGDFTCHNGT-------------------------
XP_526001       -------------------------NFTSHNGT-------------------------
XP_516021       YNGCIFHRNIKGF-------MVQTGDPT-GTG--------------------------
XP_515886       YKSCLFHRVVKDF-------MVQGGDFSEGNGR-------------------------
XP_525218       -------EIIPGS-------LCQGGDFTRHKGT-------------------------
XP_507684       YKGSCFHRIIPGF-------MCQGGDFTRRNGT-------------------------
XP_524688       YKGSTFHRVIKDF-------MIQGGDFVNGDGT-------------------------
XP_513346       FKGSSFHRIIPQF-------MCQGGDFTNHNGT-------------------------
XP_524598       YKGSCFHRIIPGF-------MCRGGDFTHHNDT-------------------------
XP_515004       YDGTIFHRSIRNF-------VIQGGDPT-GTG--------------------------
XP_523437       ------------------------------------------------------------
XP_520485       YKGSCFHKIIPGF-------MCQGGDFTHHNGT-------------------------
XP_519076       YKGSCFHRIIPGF-------MCQGGDFTRHNGT-------------------------
XP_527705       YKGPCFHRIIPAF-------MCQGGDFTHHNGT-------------------------
XP_527529       YNYCLIHN------VQR-DFIIQTGDPTGTGR--------------------------
XP_518678       IHMCRITDSGDPYAVQR-DFIIQTGDPTGTGR--------------------------
CSMSA           YKGSSFHRIIPGF-------MCQGGDFTRHNGT-------------------------
NP_598845       YKGSTFHRVIPAF-------MCQAGDFTNHNGT-------------------------
AAH58369        YNGTKFHRIIKDF-------MIQGGDPT-GTG--------------------------
A56861          YKNSKFHRVIKDF-------MIQGGDFTRGDGT-------------------------
A40047          YKGSIFHRVIKDF-------MIQGGDFTARDGT-------------------------
NKCR_MOUSE      YKGSTFHRVVKNF-------MIQGGDFSEGNGK-------------------------
AAH61645        YNGCVFHRNIKGF-------MVQTGDPT-GTG--------------------------
BAC41068        YDGTIFHRSIRNF-------VIQGGDPT-GTG--------------------------
BAC34686        FKGCPFHRIIKKF-------MIQGGDFSNQNGT-------------------------
BAB30711        YNYCLIHN------VQR-DFIIQTGDPTGTGR--------------------------
BAB25645        YKGSTFHRVIKDF-------MIQGGDFVNGDGT-------------------------
BAB23880        YKGSTFHRVIKDF-------MIQGGDFVNGDGT-------------------------
NF00527760      FKNSIFHRVVPDF-------ICQGGDITKYNGT-------------------------
NF01138503      YNGHTFHRIIKGF-------MIQTGDPT-GTG--------------------------
NF00510830      FKGSSFHRIIPQF-------MCQGGDFTNHNGT-------------------------
NF00510932      YNGTKFHRIIKDF-------MIQGGDPT-GTG--------------------------
NF01595779      YKGSFFHRITPEF-------MCQGGDFTRHNGT-------------------------
NF02014914      YKGSSFHRIIPGF-------MCQGGDFTRHNGT-------------------------
NF01930249      YKGSSFHGSTPGF-------TCQGGDFTRHNGT-------------------------
NF01929278      YKGSSFHRIIPGF-------MCQGGDFTRHNGT-------------------------
NF00523006      YKGSSFHRIIPGF-------MCQGGDFTRHNGT-------------------------
NF00508381      YKGSSFHRIIPGF-------MCQGGDFTRHNGT-------------------------
NF01215170      YNGCVFHRNIKGF-------MVQTGDPT-GTG--------------------------
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CSRTA              YKGSSFHRIIPGF-------MCQGGDFTRHNGT--------------------------
NP_783638          YNGCVFHRNIKGF-------MVQTGDPT-GTG---------------------------
NF01612782         FKGCPFHRIIKKF-------MIQGGDFSNQNGT--------------------------
NF01612825         FKGSSFHRIIPQF-------MCQGGDFTNHNGT--------------------------
NF01607941         FKGCPFHRIIKKF-------MIQGGDFSNQNGT--------------------------
NF01607846         YKGSFLHRIIPGF-------MCQGGNVICHNDT--------------------------
NF01609144         YKGSIFHRVIKDF-------MIQGGDFTARDGT--------------------------
NF01608897         YKGSSFHRIIPGF-------MCQGGKVTCHNGT--------------------------
NP_758443          YKGSTFHRVIPAF-------MCQAGDFTNHNGT--------------------------
AAH61971           YKNSKFHRVIKDF-------MIQGGDFTRGDGT--------------------------
G2828710           YKSCLFHRVVKDF-------MVQGGDFSEGNGR--------------------------
B38388             YKGSIFHRVIPNF-------MCQGGDFTNHNGT--------------------------
AF132148           YNFNLFHT------VQQ-GFIAQTGDPSGAGD---------------------------
NP_611113          YNNVMFHRSIRNF-------IVQGGDPT-GSG---------------------------
NP_611695          YKGSKFHRIIKDF-------MIQGGDFTKGDGT--------------------------
NP_610590          YSGCVFIRNIKGF-------IVQTGDPT-NTG---------------------------
NP_648697          YKGSPFHRVIPNF-------MCQGGDFTNQNGT--------------------------
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NP_648338          YKGTKFHKIKRVF-------VVQSGDVVKNDGS--------------------------
NP_476656          YVGSRFHRVVDRF-------LVQGGDIV-NGDG---------------------------
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EAA04625           YKGSSFHRVIKDF-------MIQGGDFVNGDGT--------------------------
EAA06299           YKGSIFHRVIPNF-------MCQGGDFQNHNGT--------------------------
EAA08127           YKGIIFHRVVKDF-------MIQSGDFSNGNGT--------------------------
EAA09839           YNGCLFHRSIRNF-------MIQGGDPT-GVG---------------------------
EAA10133           YNGHLFHRVIKGF-------MIQTGDPT-GTG---------------------------
EAL39647           YNYNLFHT------IQS-DFIAQTGDPTGAGD---------------------------
EAA13913           YNGNLFHRNIKGF-------IVQTGDPT-GTG---------------------------
EAA13914           YKGSRFHRVIQKF-------MIQGGDVV-SGDG---------------------------
EAA14200           YKGSTFHRIIPEF-------MCQGGDFTANNGS--------------------------
EAA01474           YKGCSIFQCWENE-------SIITGDFELNNGR--------------------------
KP_321072          YKGCSIFQCWENE-------SIITGDFELNNGR--------------------------
KP_320182          YNGTQFHRIIRDF-------MVQGGDPT-GTG---------------------------
KP_319131          YKGSRFHRVIQKF-------MIQGGDVV-SGDG---------------------------
KP_311949          YKGIIFHRVVKDF-------MIQSGDFSNGNGT--------------------------
CAI11739           YKGSIFHRVVPNG-------WIQGGDISPEKKG--------------------------
AAQ91263           YKGSGFHRVIPQF-------MCQGGDFTNHNGT--------------------------
NP_001004626       YKGSVFHRIIPEF-------MCQGGDFTNHNGT--------------------------
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NP_998184          YKGSKFHRVIKDF-------MIQGGDFTRGDGT--------------------------
NP_001002146       YNGCIFHRNIKGF-------IVQTGDPT-GTG---------------------------
AAQ91264           YKGSSFHRVIPGF-------MCQGGDFTNHNGT--------------------------
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AAH56814           YNYCLIHN------VQR-DFIIQTGDPTGTGR---------------------------
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NP_957285       RYQYVKKKGYVRL-------HTNKGDPT-GTG---------------------------
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NP_504522       YTGTILHQISTSKN------MIMGGDVLNGNGC--------------------------
NP_506751       FKGSKFHRIIPNF-------MIQGGDFTRGNGT--------------------------
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NP_497257       YVGSKFHRVIENF-------MIQGGDFTRGDGT--------------------------
NP_509506       YQGSVFHRVIKGF-------MIQGGDITHGNGT--------------------------
NP_503034       YEGSIFHRIIPKF-------MLQGGDFTKGDGT--------------------------
NP_501118       YNGTIFHRIIADF-------MIQGGDPT-GTG---------------------------
NP_496562       YKGTVFHRLVKN-------FILQGGDPTATGTGG-------------------------
NP_495855       YKNCTFHRVIKDF-------MIQGGDFCNGDGT--------------------------
NP_496337       YNNTKFHRLIKNF-------MLQGGDPT-GTG---------------------------
NP_495417       YNGCIFHRNIKDF-------MVQTGDPT-HSG---------------------------
NP_493378       YNGLTFHRVIKSF-------MIQTGDPS-GKG---------------------------
NP_492343       YNLNQFHS------IER-NYVAQTGDPTGTGK--------------------------
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NP_200679       YKGSSFHRIIPSF-------MLQGGDFTHGNGM--------------------------
NP_181407       YKECQFHRVIKDF-------MVQSGDFLKNDGS--------------------------
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NP_195222       YKGTPFHRIISGF-------VIQGGDIIHGDGK--------------------------
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NP_191762       YKGSSFHRIIKDF-------MIQGGDFTEGNGT--------------------------
NP_190046       YDNHLFHRVIRGF-------MIQTGDPL-GDG---------------------------
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P82869          YDGAKLNTVNQA-------VITEDGSGKV------------------------------
T05352          YKGSFFHRIMKGS-------SAQAGDFVNRNGT--------------------------
T49181          FKGSSFHRVIKGF-------MAQGGDFSNGNGT--------------------------
T05314          FDNTIFHRVIPG-------FLVQGGDPTGSGTGG-------------------------
CSZPA           YAGSTFHRVIPQF-------MLQGGDFTRGNGT--------------------------
E313994         YDGVIFHRVIPDF-------VIQGGDPT-GTG---------------------------
E1335804        YEGSIFHRVIPNF-------MIQGGDITKGDGT--------------------------
E1331567        YKNSTFHRIIQGF-------MIQGGDFVSGDGT--------------------------
G62327          YKGSRFHRVIKNF-------MLQGGDFTRGNGT--------------------------
G62590          YRNTIFHRNIARF-------MIQGGDPS-GTG---------------------------
E1294518        YDNTIFHRIIKNF-------MIQGGDPL-GDG---------------------------
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E1263915        YDGTIVHRVVPE-------FLIQGGDPTGTGMGG-------------------------
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G57050            YKGNGFHRVVKNF-------MIQAGDIVFG-TQKD------------------------
G48567            YKGSIFHRVIKDF-------MCQFGDFTNFNGT--------------------------
CSBYC3            YRKTKINKVYPNK-------YIQGG-VVAPDVG--------------------------
G63359            PER-DFDKILPNG-------AIEGSSVSSSSIE--------------------------
G38324            YLNSIFHRVIPNF-------MIQGGDFTHRSGI--------------------------
FcCyP19           YAGSGFHRIIPQF-------MCQGGDFTNHNGT--------------------------
FcCyP20           YDGCLFHRCVTNA-------FVLTGDPT-GTG---------------------------
FcCyP21.1         YKGSIFHRVIRNF-------MIQGGDFTNFDGT--------------------------
FcCyP21.3         YKGSKFHRVIPQF-------MCQGGDFTNGNGT--------------------------
FcCyP24.3         YKGSVFHRIIPGF-------MIQGGDITKGNG---------------------------
FcCyP26           YKGIPFHRIIPGF-------IVQGGDILTKDGR--------------------------
FcCyP28           YKGCVFHRVIPGF-------MIQGGDITRGNGT--------------------------
FcCyP30           YKNSTFHRVHRGY-------LIQGGDVVSGQGT--------------------------
FcCyP35.1         YRGSTFFRILRGA-------WVMGGDISRDHNG--------------------------
FcCyP35.3         YRGTYFHKIIPAF-------CVQGGDLTMRVNKG-------------------------
FcCyP40           YKGSTFHRIIAGF-------MIQGGDFTKHNGT--------------------------
FcCyP110          YNGLTFHRVVPGF-------MIQGGCPV-GDG---------------------------
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CAC18541          YKGCTFHRIIKDF-------MVQGGDFVNGDGT--------------------------
A45000            YKGSKFHRIIPGF-------MCQGGDFTAGNGT--------------------------
Q9Y0F5            YKNTIFHKNIKGF-------IIQGGDPT-GTG---------------------------
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J50389            YKGSTFHRVIKSF-------MIQGGDFTNHDGT--------------------------
G992633           YKGSTFHRVIKSF-------MIQGGDFTNHDGT--------------------------
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G52758            YKDSIFHRVIPNF-------MIQGGDFTNFDGT--------------------------
E1203753          YANSPFHRVIPDF-------MCQGGDFTNGNGT--------------------------
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NF01065889        YNNCIFHRVIKHF-------MVQTGDPS-GDG--------------------------
NF00926916        YKNSIFHRIIPQF-------MCQGGDITNGNGS--------------------------
S52760            YTNSIFHRIIPNF-------MAQGGDIT-NFNG--------------------------
J10322            YKNTTFHRVIKDF-------MIQGGDFVNYNGS--------------------------
CAB39039          YKNSIFHRIIPQF-------MCQGGDITNGNGS--------------------------
CAD51648          YDNTIFHRVIPDY-------IIQGGDPT-GTG--------------------------
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NF01497552        YNNCIFHRVIKHF-------MIQTGDPG-GDG--------------------------
NF01497379        YTNSIFHRIIPNF-------MAQGGDIT-NFNG--------------------------
NF01497199        YKNTIFHRVIKEF-------MIQGGDFINHNGS--------------------------
NF01496968        YKNCKIEKIKKNK-------SIKCGYLRNKVHLGN------KNNN----------FEYIS
NF01495390        YRNTYIHKIYPGI-------GLIGGNVLNDK-E--------------------------
NF01495324        YDNTIFHRVIPNF-------VIQGGDPT-GTG--------------------------
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CSBOAB            YKGSCFHRIIPGF-------MCQGGDFTRHNGT--------------------------
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NF01533203        YKGSTFHLVIPNF-------MCQGGDFTAGNET-------------------------
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G71849            YEGSSFHRIIPEF-------MLQGGDFTRGNGT-------------------------
J17900            YKNSKFHRVIKDF-------MIQGGDFTRGDGT-------------------------
NF00873669        YAGSHFHRVIPDF-------MLQGGDFTAGNGT-------------------------
NF01527595        YAGSHFHRVIPNF-------MLQGGDFTAGNGT-------------------------
NF01539217        YAGSSFHRIIPQF-------MLQGGDFTRGNGT-------------------------
D1035365          YEGSTFHRVIKDF-------MIQGGDFTNGDGT-------------------------
YP_116397         YNGTIFHRVIPGF------MIQGGGFEP-GMR---------------------------
YP_119877         FDGTDCHRMTADA----TLKVLQCGDPT-GTG---------------------------
CAD25897          YENGLFHRIIPGF-------MMQGGDVV-MGNG-------------------------
CAD26352          YKGSTFHRIIPGF-------MVQGGDYTAHNGT-------------------------
AAD17998          YEGSNFHRVIKDF-------MIQGGDFTRGDGT-------------------------
G2959712          FKGSTFHRVIPNF-------MCQGGDFTRGNGT-------------------------
CSNCC             YKGSSFHRIIPEF-------MLQGGDFTRGNGT-------------------------
AJ006689          YRESTFHRIIPNF-------MIQGGDFTRGNGT-------------------------
AAF28343          YDNTIFHRLIKDF-------MIQGGDPL-GNG---------------------------
AAD50375          YKGSSFHRVIKNF-------MVQGGDFTHGTGI-------------------------
AAK21908          YKGSAFHRVIKDF-------MCQGGDFTRGNGT-------------------------
AAG13968          YKDSGFHRIIPDF-------MLQGGDFTRGNGT-------------------------
BAB58884          YKDSGFHRIIPDF-------MLQGGDFTRGNGT-------------------------
E1363908          YAGSHFHRVIPDF-------MLQGGDFTAGNGT-------------------------
AAD16142          YKGSTFHRVIPQF-------MLQGGDFTRHNGT-------------------------
G1764137          FKHSIFHRVIPDF-------MIQGGDFTNGNGT-------------------------
```

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Z32674          ARPSTVS--SPSS-------CSRAATSPAVTGT-------------------------
JT0686          YKGSSFHRIIPDF-------MLQGGDFTRGNGT-------------------------
CSCK            YKGSIFHRVIPQF-------MLQGGDFTNFNGT-------------------------
NP_986490       YAGCPFHRVIPDF-------MLQGGDFTHGTGV-------------------------
NP_985014       YKGVPFHRIIPDF-------MLQGGDTDLTNGF-------------------------
NP_984799       FRGNRFHRVIKNF-------MVQAGDIMYG-MEG-------------------------
NP_984183       YQGSLFHRVIKGF-------MCQFGDFTNGDGT-------------------------
NP_982586       YKNTVFHRVVPEK-------YICGGKVLDY-----------------------------
NP_982486       YINSTFHRVIPNF-------MIQGGDFTHGTGV-------------------------
AAT09096        YKGSSFHRIIPQF-------MIQGGDFTQGNGR-------------------------
YP_014938       YDGLIFHRVIPEF-------MIQGGDPD-GRG--------------------------
NP_951950       YDGLIFHRVIKGF------MVQGGGMDE-NMQ--------------------------
NP_935388       YVGSQFHRVIPGF------MAQGGGFDE-KMN--------------------------
NP_907765       YDGLIFHRVIKRF-------MLQGGDPT-GTG--------------------------
BAC91249        YVQDRFELDPIKLR-------EEMSNLHKRYIAD------------------------
BAC90551        YDGLVFHRVVPD-------FVIQGGDPKGNG----------------------TGGF
BAC89441        YTGTAFNRFEKG-------YLVQVSDPQGKN----------------------DGGY
BAC88914        YNNLAFHRVVSG-------FVIQGGDPLGNG----------------------TGGF
AAV50868        YKYNRHINRTYEG-------CKFHNVLHNNYIVSG--------------------DIY
AAV82698        YNGTIFHRLVPGF------VIQGGGYDE-DFQ--------------------------
AAV81872        YDGTIFHRIISNF------MVQGGGFEP-GMK--------------------------
NP_736022       YNGLSFHRVIKDF-------MIQSGDPN-GDG--------------------------
NP_734780       YDGIIFHRIIPDF-------MIQGGDPT-GTG--------------------------
YP_085398       YDGVTFHRVIPGF-------VSQGGDPT-GTG--------------------------
NP_643098       HLPAEFER------------ASQGLDFQPLPDS--------------------------
NP_641352       YNGLSFHRVIADF-------MIQGGCPE-GSG--------------------------
BAB76758        YNGLEFTRSEES-------YVLQTGDPPGKE----------------------QGF
YP_129479       YDGTIFHRVIKGF------MIQGGGFTV-DMQ--------------------------
YP_129310       YNDTIFHRVIDGF------MVQGGGMSS-GMV--------------------------
YP_129032       YVDTIFHRVIPGF------MAQGGGFDQ-EMK--------------------------
YP_101389       YNGTLFHRVIKDF-------MVQAGDPESKNAP------------------------
YP_087816       YDNTIFHRVIDGF------MIQGGGFEP-GMN--------------------------
YP_087815       YNNTIFHRVIDGF------MIQGGGMEP-GMR--------------------------
YP_076496       YDGVTFHRIIKDF-------MIQGGDPT-GTG--------------------------
AAT91289        YEGSSFHRVIPQF-------MLQGGDFTKGNGT-------------------------
AAT91260        YEGSSFHRVIPQF-------MLQGGDFTKGNGT-------------------------
NP_868477       FEGSAFHRVIPGF-------MLQGGDFTAGNGT-------------------------
NP_867717       YDGLVFHRVIPNF-------MVQGGCPE-GSG--------------------------
NP_867158       YDGLIFHRVVNGF-------VIQGGDPT-GTG--------------------------
NP_865515       YDGMDFSQVVPNM-------LALSGDPTGDGRG------------------------
NP_992233       YDNTIFHRVIDGF------MIQGGGFEP-GMS--------------------------
NP_991569       YNNTIFHRVIPGF------MIQGGGFTA-DFK--------------------------
NP_280624       YAGVSFHRIIEGF-------MIQGGDPT-GTG--------------------------
BAC18575        YDDVVCHRLTTSG-----IYVLQCGDPS-GTG--------------------------
BAC16839        YDGAVFHRVIDRF-------MIQGGDPT-GTG--------------------------
BAB82272        YDGLTFHRIIPGF-------MIQGGCPE-GTG--------------------------
BAB99042        YNDTVCHRITTSG-----IYVLQCGDPS-STG--------------------------
BAB97427        YNGSVFHRVIDGF-------MIQGGDPT-GTG--------------------------
BAC08372        YDGLPFTRAEES-------YVLQAGDPPGPE----------------------VGF
BAC07690        YDGTIFHRVVREP---R-PFVVQGGDPQTKDPKVSPQLYG---------------TGSF
YP_072215       YNNTIFHRVIPGF------MIQGGGFTA-DFK--------------------------
YP_069574       YDNTIFHRVIDGF------MIQGGGFEP-GMS--------------------------
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NP_778719         YDGLNFHRVIANF-------MIQGGCPE-GSG--------------------------
NP_245881         YDNTIFHRVIDGF------MIQGGGMDE-AMR--------------------------
NP_245880         YNGTIFHRVIPGF------MIQAGGFEV-GMK--------------------------
NP_354667         YDNVAFHRVIDG-------FMAQTGDVQYG-----------------------------
NP_354666         YDGVVFHRVIED-------FMAQTGDVKFGK----------------------------
NP_298502         YDRLNFHRVIANF-------MIQGGCPE-GSG--------------------------
AAN39296          FKGSSFHRVIPGF-------MCQGGDFTNHNGT--------------------------
AAQ24380          YKGSTFHRVIPGF-------MCQGGDFIRGDGT--------------------------
ZP_00353225       YDGLTFHRVIDGF-------MIQGGCPR-GDG--------------------------
ZP_00244808       YDGTVFHRVIKGF------MVQGGGFEP-GLK--------------------------
ZP_00244807       YDGTIFHRVIDGF------MIQGGGFDK-DMK--------------------------
ZP_00358245       YDGLTFHRVIKDF-------VIQGGDPT-GRG--------------------------
ZP_00350273       YDNTIFHRVIDGF------MIQGGGFTP-DMQ--------------------------
ZP_00129494       YENTIFHRVIKNF------MIQGGGVTM-RME--------------------------
ZP_00130259       YDGTIFHRVMDGF------MVQGGGFTE-NMK--------------------------
ZP_00136576       YDGTLFHRVIPGF------MVQTGGFSA-GMQ--------------------------
NF01760157        YNGTIFHRVIKDF------VIQ-GGDPT-GTG--------------------------


CSHUA             ---------------GGK-SIYG-------------------------EKFEDENFIL-
NP_839944         ---------------GDK-SIYG-------------------------EKFDDENLIR-
NP_115861         ---------------RGGNSIWG-----------------------KKFEDEY----
NP_570981         ---------------RGGNSIWG-----------------------KKFEDEY----
NP_057143         ---------------RGGASIYG-----------------------KQFEDEL----
CSHUB             ---------------GGK-SIYG-------------------------ERFPDENFKL-
366681            ---------------GGK-SIYG-------------------------KKFDDENFIL-
A57545            ---------------GGQ-SIYG-------------------------DKFEDENFDV-
A41581            ---------------GGK-SIYG-------------------------SRFPDENFTL-
A54204            ---------------GGV-SIYG-------------------------ETFPDENFKL-
364705            ---------------TGGESYWG-----------------------KPFKDEF----
D38552            ---------------MGGESIWG-----------------------GEFEDEFHS--
NP_624311         ---------------GGESIFG-----------------QLYGDQASFFEAEKVPRI
32708309          ---------------GVA-SIYRG-------------------------PFADEN----
A45981            ---------------GGE-SIYG-------------------------EKFEDEN----
J40763            ---------------GGE-SIYG-------------------------GFFEDESFAV-
A47328            ---------------GGE-SIYG-------------------------GYFKDENFIL-
KP_531396         ---------------GGK-SIYG-------------------------EKFEDENFIL-
KP_525294         ---------------GGK-SIYR-------------------------EKFGDENFIL-
KP_523512         ---------------GGK-SIYE-------------------------EKLDDENFIL-
KP_507866         ---------------GGK-SIYG-------------------------SRFPDENFTL-
KP_517783         ---------------GGK-SIYG-------------------------EKFDDENFIL-
KP_517773         ---------------GGK-SIYG-------------------------EKFHDENLIR-
KP_526904         ---------------GGK-SVYG-------------------------EKFDDENFIL-
KP_516556         ---------------GGT-SIYR-------------------------EKFDCKNFIL-
KP_526001         ---------------GGK-SIYG-------------------------EKFDEENFIL-
KP_516021         ---------------RGGNSIWG-----------------------KKFEDEY----
KP_515886         ---------------GGE-SIYG-------------------------GFFEDESFAV-
KP_525218         ---------------GDK-SIYG-------------------------EKFDYENLIR-
KP_507684         ---------------GGK-SIYG-------------------------EKFEDENFIL-
KP_524688         ---------------GVA-SIYRG-------------------------PFADEN----
KP_513346         ---------------GGK-SIYG-------------------------KKFDDENFIL-
KP_524598         ---------------GGK-SVHQ-------------------------EKFDDENFIL-
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KP_515004          --------------TGGESYWG-------------------------KPFKDEFR---
KP_523437          ---------------------------------------------------KFEDETFIL-
KP_520485          --------------GSK-SIYG-------------------------EKFDDENFIL-
KP_519076          --------------GGK-SIYG-------------------------EKFEDENFIL-
KP_527705          --------------GGK-SIYG-------------------------EKFEDEKFIL-
KP_527529          ----------------GGESIFG-----------------QLYGDQASFFEAEKVPRI
KP_518678          ----------------GGESIFG-----------------QLYGDQASFFEAEKVPRI
CSMSA              --------------GGR-SIYG-------------------------EKFEDENFIL-
NP_598845          --------------GGR-SIYG-------------------------SRFPDENFTL-
AAH58369           --------------RGGASIYG-----------------------KQFEDEL----
A56861             --------------GGK-SIYG-------------------------ERFPDENFKL-
A40047             --------------GGM-SIYG-------------------------ETFPDENFKL-
NKCR_MOUSE         --------------GGE-SIYG-------------------------GYFKDENFIL-
AAH61645           --------------RGGSSIWA-----------------------KKFEDEY----
BAC41068           --------------TGGESFWG-----------------------KPFKDEF----
BAC34686           --------------GGE-SIYG-------------------------EKFEDEN----
BAB30711           ----------------GGESIFG-----------------QLYGDQASFFEAEKVPRI
BAB25645           --------------GVA-SIYRG-----------------------PFADEN----
BAB23880           --------------GVA-SIYRG-----------------------PFADEN----
NF00527760         --------------GGQ-SIYG-------------------------DKFDDENFDL-
NF01138503         --------------MGGESIWG-----------------------GEFEDEFHS--
NF00510830         --------------GGK-SIYG-------------------------KKFDDENFIL-
NF00510932         --------------RGGASIYG-----------------------KQFEDEL----
NF01595779         --------------GCR-SIYG-------------------------EKFEDENFIL-
NF02014914         --------------GGR-SIYG-------------------------EKFEDENFIL-
NF01930249         --------------GGR-SIYG-------------------------EKFEGKNFIL-
NF01929278         --------------GGR-SIYG-------------------------ERFEDEDFIL-
NF00523006         --------------GGR-SIYG-------------------------EKFEDENFIL-
NF00508381         --------------GGR-SIYG-------------------------EKFEDENFIL-
NF01215170         --------------RGGSSIWA-----------------------KKFEDEY----
CSRTA              --------------GGK-SIYG-------------------------EKFEDENFIL-
NP_783638          --------------RGGSSIWG-----------------------KKFEDEY----
NF01612782         --------------GGE-SIYG-------------------------EKFEDEN----
NF01612825         --------------GGK-SIYG-------------------------KKFDDENFIL-
NF01607941         --------------GGE-SIYG-------------------------EKFEDEN----
NF01607846         --------------GGM-SLYG-------------------------EKFEDENVIL-
NF01609144         --------------GGM-SIYG-------------------------ETFPDENFKL-
NF01608897         --------------GGK-SIYG-------------------------EKFENDSFIL-
NP_758443          --------------GGK-SIYG-------------------------SRFPDENFTL-
AAH61971           --------------GGK-SIYG-------------------------ERFPDENFKL-
G2828710           --------------GGE-SIYG-------------------------GFFEDESFAV-
B38388             --------------GGK-SIYG-------------------------NKFPDENFEL-
AF132148           ----------------GGSSIWG-----------------VVEGP--QKRFFEAEFLPKI
NP_611113          --------------SGGESIWG-----------------------KKFEDEF----
NP_611695          --------------GGR-SIYG-------------------------ERFEDENFKL-
NP_610590          --------------KNGQSIWG-----------------------QKFDDEF----
NP_648697          --------------GGR-SIYG-------------------------NKFPDENFEL-
NP_648508          ----------------ESIYG-------------------------QPFKDEFHSRL
NP_648338          --------------SGESIYG-------------------------PVFDDENFELS
NP_476656          --------------TGSISIYG-----------------------DYFPDEDK---
NP_523874          --------------RGGASIYG-----------------------SEFADEL----
NP_523773          --------------GGK-SIYG-------------------------KKFNDENFNL-
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NP_610224          ---------------GVT-SIYGN-------------------------TFGDEN----
NP_733246          ---------------GGE-SIYG-------------------------GTFEDESFEK-
NP_611935          ---------------TGGKSIWG-----------------------SDFKDEFVP--
EAA03569           ----------------GGESIYG-----------------------KTFEDENFTLL
EAA03948           ---------------GGR-SIYG-----------------------ERFADENFKL-
EAA04625           ---------------GVM-SIYGT----------------------PTFPDEH----
EAA06299           ---------------GGK-SIYG-----------------------NKFEDENFIL-
EAA08127           ---------------GGE-SIYG-----------------------GTFDDEEFTL-
EAA09839           ---------------NGGTSAWG-----------------------KKFADEI----
EAA10133           ---------------TGGQSIWG-----------------------GEFKDEFCS--
EAL39647           ----------------GGSSVWG-----------------ILEGA--EKRYFEGESVPKI
EAA13913           ---------------KGGQSIWK-----------------------RKFEDEF----
EAA13914           ---------------HGAISMYG-----------------------KYFDDE-----
EAA14200           ---------------GGK-SIYG-----------------------KKFADENFIL-
EAA01474           ---------------GGR-----------------------------SVFEEGFFMP-
KP_321072          ---------------GGR-----------------------------SVFEEGFFMP-
KP_320182          ---------------RGGQSIYG-----------------------ATFADEI----
KP_319131          ---------------HGAISMYG-----------------------KYFDDE-----
KP_311949          ---------------GGE-SIYG-----------------------GTFDDEEFTL-
CAI11739           ---------------TGGESIYG-----------------------PTFEDENFVI-
AAQ91263           ---------------GGK-SIYG-----------------------NKFEDENFTL-
NP_001004626       ---------------GGK-SIYG-----------------------KKFNDENFKL-
NP_001002065       ---------------GGE-SIYG-----------------------DKFEDEN----
NP_957499          ---------------GIC-SIYRG----------------------PFADEN----
AAQ94596           ---------------GIC-SIYRG----------------------PFADEN----
NP_998184          ---------------GGK-SIYG-----------------------DRFPDENFKL-
NP_001002146       ---------------KGGTSIWG-----------------------RKFEDEF----
AAQ91264           ---------------GGK-SIYG-----------------------NKFADENFNL-
AAH59458           ---------------GGK-SIYG-----------------------NKFADENFNL-
AAH56814           ----------------GGESVFC-----------------KLYGDQARFFESEKMPRI
AAH62863           ---------------GGK-SIYG-----------------------NKFADENFNL-
NP_998629          ---------------GGE-SIYG-----------------------GFFEDGSFSM-
NP_957285          ---------------TGGESFWG-----------------------KPFKDEF----
NP_506749          ---------------GGE-SIYG-----------------------EKFPDENFKE-
NP_506561          ---------------GGE-SIYG-----------------------NKFKDENFDL-
NP_504522          ---------------GRCAPVSR-----------------------KLFQENNFSS-
NP_506751          ---------------GGE-SIYG-----------------------EKFPDENFKE-
NP_497745          ---------------GGF-SIYG-----------------------RYFDDEKFKL-
NP_499828          ---------------GGE-SIHG-----------------------EKFDDENFKE-
NP_497257          ---------------GGR-SIYG-----------------------ERFEDENFKL-
NP_509506          ---------------GGY-SIYG-----------------------RTFDDENLAL-
NP_503034          ---------------GGK-SIYG-----------------------TKFDDENFTL-
NP_501118          ---------------RGGASIYG-----------------------DKFSDEI----
NP_496562          -----------------ESIYG-----------------------KPFKDEIHQRL
NP_495855          ---------------GLM-SIYGS----------------------KFRDEN----
NP_496337          ---------------HGGESIWD-----------------------KPFSDEF----
NP_495417          ---------------KGGESIWG-----------------------GPFEDEF----
NP_493378          ---------------TGGESIWG-----------------------EDFEDEFHP--
NP_492343          ----------------GGESVYS-----------------DMYGE--QGRYFEREDLPKM
NP_493624          ---------------GGR-SIYG-----------------------EKFADENFKL-
P06073             ---------------GGE-SIYG-----------------------SKFEDENFER-
NP_175776          -----------------GDSIY-----------------KFLYGEQA-RFYKDEIHLDL
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NP_567029          --------------GGE-SIYG-------------------------DKFADENFKL-
NP_201554          --------------KGGESIWG-----------------------KPFKDEP----
NP_200679          --------------GGE-SIYG-------------------------EKFADENFKL-
NP_181407          --------------GCM-SIYGH-----------------------KFEDEN----
NP_191166          --------------GGE-SIYG-------------------------SKFEDENFKL-
NP_171696          --------------KGGTSIWG-----------------------KKFNDEI----
NP_195222          --------------SSD-SIYG-------------------------GTFPDENFKI-
NP_195213          --------------GGE-SIYG-------------------------AKFKDENFIK-
NP_196816          --------------GGK-SVYG-------------------------RTFKDENFKL-
NP_188932          ----------------NEPIHS-------------------------EELDDEYFILN
NP_191762          --------------GGI-SIYG-------------------------AKFEDENFTL-
NP_190046          --------------TGGQSIWG-----------------------REFEDEFHK--
NP_180557          --------------GGE-SIYG-------------------------QKFADENFKL-
NP_181157          --------------RGGESIYG-----------------------SKFEDEI----
NP_179251          --------------GGE-SIYG-------------------------SKFKDENFIK-
NP_179709          --------------GGE-SIYG-------------------------AKFEDENFER-
AAK02067           --------------GGE-SIYG-------------------------LKFDDENFEL-
P82869             ------ESVSVPLEVMP-SGQFEP-----------------------LYRTPLSVQD
T05352             ----------------AGESIYA-----------------------GKFP-------
T49181             ----------------GGESIYG-----------------------GKFSDENFRLD
T05314             ------------------DSIYG-----------------------GVFADEFHSRL
CSZPA              --------------GGK-SIYG-------------------------EKFPDEN----
E313994            --------------RGGTSIYG-----------------------DKFDDEI----
E1335804           --------------GGK-SIYG-------------------------SRFPDENFKL-
E1331567           --------------GSA-TIFNS-----------------------RTFPDEN----
S62327             --------------GGE-SIYG-------------------------EKFEDEN----
S62590             --------------RGGQSIWG-----------------------KPFKDEF----
E1294518           --------------TGGESIWK-----------------------KDFEDEISP--
T39728             --------------DGGRCVWN----------------VLN---KGTRFFKAEFNPSL
E1263915           ----------------ESIYG-------------------------EPFAVETHPRL
CSBY               --------------GGK-SIYG-------------------------GKFPDEN----
S30507             --------------GGK-SIYG-------------------------SKFADEN----
S12324             --------------GGK-SIYG-------------------------DTFPDENFTL-
S57050             --------SSSSSVGKGGCSIYADKEEVKTD------------DESFCYGNFEDENLGE-
S48567             --------------GGE-SIYD-------------------------EKFEDEN----
CSBYC3             ----------------PFTVYG-------------------------PKFDDENFYL-
S63359             ----------------ETEMLA-------------------------PKLPEENHSL-
S38324             --------------GGK-SIFG-------------------------NTFKDENFDV-
TcCyP19            --------------GGR-SIYG-------------------------EKFADESFAG-
TcCyP20            --------------KGGESVFAPEQ----------------------RYFDDEG----
TcCyP21.1          --------------GGK-SIYG-------------------------TRFDDENLKI-
TcCyP21.3          --------------GGE-SIYG-------------------------MKFPDESFAG-
TcCyP24.3          --------------TGGCSIYG-------------------------VRFKDESFDSK
TcCyP26            ----------------GNVSVFG-------------------------FPFLDESFKGK
TcCyP28            --------------GGE-SIYG-------------------------MNFRDESFSG-
TcCyP30            ----------------EQLSIYG-------------------------ETFDAPDEVS-
TcCyP35.1          --------------NGGYSCYG-------------------------RYFPNESYAIP
TcCyP35.3          --------------ANHFSSFG-----------------------WGWFSDENKRR-
TcCyP40            --------------GGVSIYG-------------------------ERFDDENFDVP
TcCyP110           --------------SGGK---------SVF----------------GERFEDEGMNAM
AAT44353           --------------GGK-SIYG-------------------------NKFPDENFQL-
EAL37431           --------------GGE-SIYG-------------------------SKFRDENFVY-
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EAL37232          --------------KGGESIYG-------------------------RYFDDEI----
EAL37110          --------------TGGKSIYG-------------------------DSFEDEN----
EAL36265          ------------------SSLYQ----------------LLNNQKKDSISLELETTPKL
EAL35294          --------------GSI-SIYNT-----------------------SYFNDEN----
J68268            --------------GGK-SIYG-------------------------EKFPDESFAG-
J68269            --------------GGK-SIYG-------------------------AKFEDESFAG-
AAQ15626          --------------GGE-SIYG-------------------------LKFPDESFAG-
AAB07896          --------------CGK-SIYG-------------------------EKFPDESFAG-
AAK14937          --------------GGK-SIYG-------------------------AKFEDENFTL-
CAC18541          --------------GSC-SIYGG------------------------SKFSDEN----
A45000            --------------GGK-SIYG-------------------------SKFEDENFNH-
Q9Y0F5            --------------KGGESIYG-------------------------RYFDDEI----
J47811            --------------GGQ-SIYG-------------------------EKFPDENFQE-
J50388            --------------GGK-SIYG-------------------------RKFDDENIQL-
L46884            --------------GGK-SIYG-------------------------NKFKDEN----
M93420            --------------GGK-SIYG-------------------------RKFDDENFQL-
J50389            --------------GGF-SIYG-------------------------ERFPDENFKL-
G992633           --------------GGF-SIYG-------------------------DRFPDENFKL-
E323073           --------------GGK-SIYG-------------------------RKFDDENFQL-
G52758            --------------GGK-SIYG-------------------------EKFADENLKV-
E1203753          --------------GGK-SIYG-------------------------SKFADESFLG-
CAB58290          --------------ASEVDAA--------------------------AQSPDDVPLL-
CAB58298          --------------GGE-SIYG-------------------------TTFRDESFSG-
AAF69736          ---------------GGVSIYG-------------------------EKFEDENFTIP
AAD46565          --------------GGK-SIYG-------------------------EKFADENLNV-
A53522            --------------TGGHSIYG-------------------------RRFDDEN----
NP_702112         ------------------EYAFS-----------------------SPFKNEYNSRL
NP_701512         ----------------GLSIYG-------------------------KKFPDENFDM-
NP_701389         --------------YGGESIYG-------------------------QYFRNEKFIYK
NP_701030         --------------KGGQSIYG-------------------------KYFEDEF----
NF01067443        NSLKNKMKNSKKNKYEKVECIYG-----------------------NYYNKEYSKR-
NF01067965        --------------GCI-SIYG-------------------------EHFDDEN----
NF01065889        --------------TGGESIWG-------------------------NEFEDEFFD--
NF00926916        --------------GGE-SIYG-------------------------RSFTDENFNM-
G52760            --------------TGGLSIYG-------------------------KKFEDEN----
J10322            --------------GCI-SIYG-------------------------EHFDDEN----
CAB39039          --------------GGE-SIYG-------------------------RSFTDENFNM-
CAD51648          --------------KGGKSIYG-------------------------EYFEDEI----
NF01497907        --------------GGE-SIYG-------------------------RSFTDENFKM-
NF01497552        --------------TGGESIWG-------------------------SEFEDEFFD--
NF01497379        --------------TGGLSIYG-------------------------SRFEDEN----
NF01497199        --------------GSL-SIYG-------------------------EKFDDEN----
NF01496968        NNLLTN-----KNKYEKIECIYG-----------------------ETYNKEYSQR-
NF01495390        ----------------GLSIYG-------------------------KKFPDENFDM-
NF01495324        --------------KGGKSIYG-------------------------EYFEDEI----
NF01493974        --------------YGGESIYG-------------------------QYFRNEKFIYK
NF01493918        -------TLLLHEQNIYNEYAFK-----------------------EPFKNECNSRL
E316521           --------------GGK-SIYG-------------------------EKFADEN----
CAC35733          ------------------TVY------------------------NQPYFEDQINPLL
J47812            --------------GGE-SIYG-------------------------EKFEDENFKE-
J47813            --------------GGE-SIYG-------------------------EKFPDENFQE-
G2624966          --------------GGK-SIYG-------------------------TKFADEA----
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E1317902          --------------KGGDSIWG-------------------------KPFKDEI----
E1319851          --------------KGGDSIWG-------------------------KPFKDEV----
G3057040          --------------KGGDSIWG-------------------------KPFKDEF----
AAB81959          --------------GGK-SIYG-------------------------EKFEDENFIL-
AF023860          --------------GGK-SIYG-------------------------EKFEDENFIL-
AAB81961          --------------GGK-SIYG-------------------------EKFEDENFIL-
AAF22215          --------------GGK-SIYG-------------------------EKFEDENFLL-
AF243140_1        --------------GGK-SIYG-------------------------EKFDDENFIL-
AF252388          --------------GGK-SIYG-------------------------SRFPDENFTL-
CSBOAB            --------------GGK-SIYG-------------------------EKFDDENFIL-
NF01922219        --------------GGK-SIYG-------------------------AKFADENWNH-
NF01725587        --------------GGK-SIYG-------------------------EKFADENFTL-
NF01897292        --------------TGSISIYG-----------------------DTFDDEN----
CSHYAC            --------------GGR-SIYG-------------------------EKFEDENFIL-
NF00071027        --------------GGK-SIYG-------------------------EKFEDENFIL-
NF01951405        --------------TGGESYWG-----------------------KPFKDEF----
NF01059378        --------------GGK-SIYG-------------------------EKFEDENFIL-
NF01105745        --------------GGE-SIYG-------------------------EKFPDENFLL-
NF00495096        --------------GGR-SIYG-------------------------EKFEDENFIL-
NF01053198        --------------GGE-SIYG-------------------------AKFADENFIK-
CSPGA             --------------GGK-SIYG-------------------------EKFDDENFIL-
NF01950932        --------------KGGTSIWG-----------------------KKFEDEF----
NF01951326        --------------GGE-SIYG-------------------------EKFEDEN----
NF00909389        --------------GGE-SIYG-------------------------AKFADENFVK-
NF01286555        --------------GGE-SIYG-------------------------AKFADENFVK-
NF01737225        --------------GGE-SIYG-------------------------MKFKDENFTK-
NF01590839        --------------SGG-----------P----------------GYRFPDEIVEDL
AAH51602          --------------RGGASIYG-----------------------KQFEDEI----
AAT69672          --------------GGK-SIYG-------------------------NKFADENFTL-
AAH54186          --------------GGK-SIYG-------------------------NKFADENFTL-
AAH54168          --------------GGK-SIYG-------------------------DRFPDENFKL-
NF01208049        --------------TGGESFWG-----------------------KPFKDEI----
NF01844632        --------------GGE-SIYG-------------------------GFFEDENFSV-
NF01844615        ----------------ESVFG-----------------------KPFRDEFHSRL
NF01915773        --------------RGGASIYG-----------------------KQFEDEI----
NF01915657        --------------KGGQSIWG-----------------------RKFEDEY----
NF01557564        --------------GGE-SIYG-------------------------EKFEDEN----
AAH41536          --------------GGK-SIYG-------------------------EKFADENFTL-
AAH85963          --------------GGE-SIYG-------------------------GFFEDESFAV-
AAH64250          --------------GVA-SIYRG-----------------------PFADEN----
AAH61335          --------------GGE-SIYG-------------------------EKFEDEN----
AAH59741          --------------GGK-SIYG-------------------------NKFADENFQL-
AAH67931          --------------GGE-SIYG-------------------------GFFEDENFSI-
AAH44993          --------------TGGESFWG-----------------------KPFKDEI----
A40516            --------------GGK-SIYG-------------------------DRFPDENFKL-
CYPB_BOVIN        --------------GGK-SIYG-------------------------ERFPDENFKL-
AAR19276          --------------GGK-STYG-------------------------EKFADENFIL-
A46579            --------------GGE-SIYG-------------------------EKFEDEN----
AAV40687          --------------GGE-SIYG-------------------------EKFEDEG----
NF01637248        --------------GGK-SIYG-------------------------EKFADEN----
CYPR_BOVIN        --------------GGR-SIYG-------------------------DKFEDENFDV-
CYPR_CALVI        --------------TGSTSIYG-----------------------DFFQDE-----
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E1317906          --------------HGGESIWG-------------------------KPFTDQF----
AAB87888          --------------GGK-SIYG-------------------------NKFPDENFLL-
AAB87889          --------------GGK-SIYG-------------------------NKFADENFQL-
Q9XZZ5            --------------GGK-SIYG-------------------------EKFQDENFTL-
S63995            --------------GGK-SIYG-------------------------TKFEDENFQL-
G1703696          --------------GGK-SIYG-------------------------EKFADENFTL-
J36797            --------------GGK-SIYG-------------------------NKFEDENFKL-
AF017738          ------------------ESIYT-----------------------TSFKNEFHQRL
L37292            --------------GGE-SIYG-------------------------GMFDDEEFVM-
AAS01736          --------------GGE-SIYG-------------------------AKFADENFVR-
AAO61985          --------------VGGEILYS-----------------------KTFIDFNIIF-
CAC80550          --------------GGE-SIYG-------------------------AKFADENFIK-
AAO63777          --------------GGE-SIYG-------------------------AKFADENFVK-
B53522            --------------GGE-SIYG-------------------------EKFADENFSY-
E280557           --------------YGGLSIYG-----------------------KYFNDEN----
J70827            --------------GGE-SIYG-------------------------GMFDDEEFVM-
J70884            --------------GGE-SIYG-------------------------GMFDDEEFVM-
J55771            --------------TGSISIYG-----------------------DMFEDEN----
D1024669          --------------GGR-SIYG-------------------------ERFPDENFKL-
Z27879            --------------GGE-SIYG-------------------------NKFADENFK--
AAD48910          --------------GGE-SIYG-------------------------KKFNDENFKI-
AAO51811          --------------GRT-SIYGE------------------------R-FADEN----
AAF76472          --------------KGGTSIWG-----------------------KKFNDEI----
AAP80861          --------------GGE-SIYG-------------------------TKFGDENFKL-
AAP73848          --------------GCT-SIYGT------------------------KFDDEN----
BAB62329          --------------RGGESIYG-----------------------AKFEDEI----
AAL75728          --------------GGESALDG-------A-----------------ARHFPDEGFAV-
S48017            --------------GGE-SIYG-------------------------EKFADEVFKF-
S48018            --------------GGE-SIYG-------------------------DRFADENFKL-
BAD53622          --------------GGE-SIYG-------------------------TKFADENFKI-
BAD53621          --------------GGE-SIYG-------------------------TKFADENFKI-
BAD53620          --------------GCD-SIYG-------------------------GMFPDENFKI-
XP_507188         --------------GEVQPPTGLVRN---------------------AETIDPKAFEL-
XP_483750         --------------TGGQSIWG-------------------------REFEDEFHK--
XP_483749         --------------DGHLKFWKKKPAG-----------------IEFAKHFRSHLSPIE
XP_482125         IDPSTGKVRTIPLELMV-DGDKAP-------------------------VYGETLEELG
XP_478742         ------KGYTVPLEVMP-AGQFEP-------------------------LYRTPLSIQD
XP_478741         ------KGYTVPLEVMP-AGQFEP-------------------------LYRTPLSIQD
NP_385690         -----TGGEQFNPSRAGMGGSSKP-------------------------DLKAEFSDVS
NP_385689         -----DMKDGFQGDRAGTGGSSKP-------------------------NLPAEFSDVP
NP_349373         --------------MGG------------P-----------------GYAIKGEFSSNG
BAD45990          --------------SFPGYSFFLVFLSLHYFVHIQNYLFSRFLSGAMATRFFDDEIHPEL
BAD45991          ----------------GDSVY-----------------KFLYGDQA-RFFDDEIRPDL
NP_908419         ----------AVTERLAAEMG-------------------------AVRAQCGGER
NP_919903         --------------PGE--VDG-------------------------QLTKKRIPAK
BAD35839          --------------GGE-SIYG-------------------------LKFEDENFVL-
AAU87301          --------------GGE-SIYG-------------------------EKFADENFVK-
CAG90469          --------------GGK-SIYG-------------------------GKFDDENFEL-
CAG88330          --------------GGK-SIYG-------------------------EKFRDEN----
CAG88054          --------------TDGDAINS----------------FGDVNVNNTTVKQNKYLPVP
CAG86818          --------------TGGESYWG-------------------------GYIKDEFNS--
NF01109982        --------------GGK-SIYG-------------------------EKFADENFQL-
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NF00686348        ---------------GSGGSSLP-------------------------NLPAEFNDMP
NF00686217        ---------------GSGGSSLP-------------------------NLPAEFNDMP
NF02138644        --------------GGE-SIYG--------------------------AKFADENFKN-
NF00926921        --------------GGK-SIYG--------------------------NKFEDENFKL-
NF00909931        --------------GGE-SIYG--------------------------AKFADENFVK-
NF00956595        --------------GGK-SIYG--------------------------RKFDDENFVL-
NF02035209        --------------GGE-SIYG--------------------------SKFEDQNFER-
NF01329591        --------------ERA-----------T-----------------KSPIINEANNG-
CAG86678          --------------PADTKINTTNG-------------------YISKEFQYSNARG-
CAG86274          --------------YGGHSVYNN-----------------------KGRFRDEN----
CAG85447          ------------------------------------------ATLKLKDEFHSRL
CAG85287          --------------GGR-SIYG--------------------------QKFSDEN----
CAG84900          --------------GGE-SIYG--------------------------EKFEDEN----
CAG84822          --------YPNLNVGKGGISIYNNEA-----------------------FEDENLSEP
CAG84723          --------------GSI-SIYGG-------------------------NTFDDE----G
CAG79895          --------------GGE-SIYG--------------------------RKFPDENFQL-
CAG78939          --------------SGGESIFG-------------------------KTFRDECG-T-
CAG82238          --------------GGE-SIYG--------------------------EKFPDEA----
CAG81980          --------------GGK-SIYG--------------------------AKFPDEN----
CAG81971          --------------GGK-SIYG--------------------------QKFPDEN----
CAG81844          --------------GTV-SIFGS-------------------------ASFPDERTISG
CAG84141          ------------------------------------------SYPKLKDEPHTRI
CAG84091          -------------DGTGGTSIYGDQ-----------------------FDDENFVHN
CAG83821          --------------DGEFPIES-------------------------PGWCDLS----
CAG76968          --------------QKA-----------P----------------NAPIKNEADNG-
CAG62671          --------LDSDKVGLGGCSIYATEEEIKDDT-----------KELQCHGLFEDENVGE-
CAG76052          --------------QKE-----------T----------------NATIKNEANNG-
CAG59915          --------------GGK-SIYG--------------------------NKFADEN----
CAG58658          --------------GGK-SIYG--------------------------GKFPDEN----
G3777556          --------------GGK-SIYG--------------------------EKFEDENFTL-
AAF65770          --------------GGE-SIYG--------------------------AKFADENFIK-
BAA25755          --------------GGE-SIYG--------------------------SKFADENFIK-
CSTO              --------------GGE-SIYG--------------------------AKFNDENFVK-
CSRP              --------------GGE-SIYG--------------------------MKFKDENFVK-
CSZM              --------------GGE-SIYG--------------------------EKFPDEKFVR-
CYPH_ALLCE        --------------GGE-SIYG--------------------------AKFKDENFIK-
AAG01536          --------------GGE-SIYG--------------------------AKFADESFRG-
AAB51386          --------------GEEKSIYG--------------------------AKFKDENFVK-
G54833            --------------GGE-SIYG--------------------------AKFADENFVK-
K85185            --------------GGE-SIYG--------------------------AKFADENFIK-
Y08273            --------------GGE-SIYG--------------------------AKFADENFVK-
Y08320            --------------GGE-SIYG--------------------------AKFADENFVK-
E1226445          --------------GAE-SIYG--------------------------AKFADENFIK-
L32095            --------------GGV-SIYG--------------------------SKFEDESFDL-
CAA10766          --------------GCI-SIYGS-------------------------KFEDEN----
AAF69796          --------------GGK-SIYG--------------------------NKFADEE----
AAF69795          --------------GGK-SIYG--------------------------NKFADEN----
CSNCM             --------------GGK-SIYG--------------------------EKFADEN----
NF01287451        -------------SDGGQSIWG----------------LLSGD-PSEKTFPALFHPKL
NF01527836        ------------ENPKGGRSIYG-------------------------PTFEDEI----
NF01488902        --------------RGGSSIYG--------------------------EKFEDEI----
NF00648058        --------------GGE-SIYG--------------------------AKFEDEN----
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NF01487278        --------------GGK-SIYG-------------------------DKFPDENFKL-
NF01486260        --------------TGGESIWG-----------------------KEFEDEFS---
NF00904102        --------------GGK-SIYG-------------------------DKFPDENFKL-
NF01484914        -------------SDGGQSIWG----------------LLSGD-PSEKTFPALFHPKL
NF01484255        --------------GST-CIYGT-----------------------KSFADEN----
NF01483993        ------------------ESIYDNGALSGDLDPWPMDQR-RGKNAGPHGVNFKDEFHSRL
NF01533203        --------------GGE-SIYG-------------------------SKFADENFVK-
NF01483647        --------------RGGSSIWG-----------------------KNFEDEF----
G71849            --------------GGK-SIYG-------------------------EKFADEN----
J17900            --------------GGK-SIYG-------------------------ERFADENFKL-
NF00873669        --------------GGK-SIYG-------------------------AKFADEN----
NF01527595        --------------GGK-SIYG-------------------------AKFADEN----
NF01539217        --------------GGK-SIYG-------------------------EKFADEN----
O1035365          --------------GGK-SIYG-------------------------NKFEDENFKL-
YP_116397         --------------QKG-----------T-----------------KAPIQNEAANG-
YP_119877         --------------KGG-----------P-----------------GYVFGNEYPTDQ
CAD25897          --------------SGSISIYN-----------------------AEPFSDEN----
CAD26352          --------------GGR-SIYG-------------------------EKFPDEN----
AAD17998          --------------GGK-SIYG-------------------------AKFKDENFKL-
G2959712          --------------GGE-SIYG-------------------------EKFPDENFKH-
CSNCC             --------------GGK-SIYG-------------------------EKFADEN----
AJ006689          --------------GGR-SIYG-------------------------DKFADEN----
AAF28343          --------------RGGESIYG-----------------------KKFEDEI----
AAD50375          --------------GGE-SIYG-------------------------RTFNDEN----
AAK21908          --------------GGE-SIYG-------------------------DKFADENFSL-
AAG13968          --------------GGK-SVYG-------------------------EKFADEN----
BAB58884          --------------GGK-SVYG-------------------------EKFADEN----
E1363908          --------------GGK-SIYG-------------------------AKFADEN----
AAD16142          --------------GGR-SIYG-------------------------EKFADEN----
G1764137          --------------GGE-SIYG-------------------------KKFEDEN----
Z32674            --------------GGK-SIYG-------------------------EKFADEN----
JT0686            --------------GGK-SIYG-------------------------EKFADEN----
CSCK              --------------GGK-SIYG-------------------------TKFADEN----
NP_986490         --------------GGK-SIYG-------------------------GKFPDEN----
NP_985014         --------------GGK-SIYG-------------------------ARFPDEN----
NP_984799         --------ADEENLGKGGCSIYSQQD----------------EEGPCRGAFADENTGE-
NP_984183         --------------GGE-SIYG-------------------------EKFEDEN----
NP_982586         ----------------RFSIHG-------------------------QTFKDENFDI-
NP_982486         --------------GGR-SIYG-------------------------ATFEDESFAV-
AAT09096          --------------GGE-SIYG-------------------------EKFEDENFKL-
YP_014938         --------------TGGESIW-------------------------GESFEDEFSTE-
NP_951950         --------------PRK-----------T-----------------KFAIKNEATNG-
NP_935388         --------------RLP-----------S-----------------YAPIKNEASNG-
NP_907765         --------------TGGESIWG-----------------------KPFEDEIAL--
BAC91249          --------------DWKPVPYG-----------------------KTIESYPALY-
BAC90551          IDPATGRERTIPLEIKP-TGAKEP-----------------------VYGRIVET--
BAC89441          LDPATGKIRRVPIEIIP-EGASQP-----------------------VYGKTLRQAG
BAC88914          IDPATRQPRSLPLEIRATTGDGRPGE---------------------ILYGQTFSLSG
AAV50868          NSNGSSAG--TVYCDEPIPPVFG-----------------------DYFYPHES---
AAV82698          --------------DKP-----------S-----------------FEKIANESGNG-
AAV81872          --------------QKE-----------T-----------------RANIENEAPTA-
NP_736022         --------------TGGKSIWNSKDKKKDS----------------GNGFVNEISPY-
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NP_734780          ---------------MGGESIY-------------------------GESFEDEFSEE-
YP_085398          ---------------AGG-----------P-----------------GYSIPCETDGN-
NP_643098          ---------------DGWAPQVG-----------------------------FVDGFPVG-
NP_641352          ---------------RGG-----------P-----------------GYRFEDETN-NG
BAB76758           IDPKTGKYRAIPLEILA-EGDKKP-------------------------TYGITLEDAG
YP_129479          ---------------EKP-----------T-----------------RDAIVNEANRG-
YP_129310          ---------------EKE-----------T-----------------RETIKNEASNG-
YP_129032          ---------------RRD-----------S-----------------YSPIKNESTNG-
YP_101389          ---------------KGKMLGSGDVG----------------------YTVPAEFVYP-
YP_087816          ---------------QKK-----------T-----------------NEAIRNEANNG-
YP_087815          ---------------EKN-----------T-----------------KAPIKNEANNR-
YP_076496          ---------------TGG-----------P-----------------GYTIPDEYP---
AAT91289           ---------------GGQ-SIYG-------------------------EKFADEKPG--
AAT91260           ---------------GGQ-SIYG-------------------------EKXADXKPG--
NP_868477          ---------------GGE-SIYG-------------------------MKFADENFKF-
NP_867717          ---------------RGG-----------P-----------------GYQFEDEFHPEL
NP_867158          ---------------TGGS---------NLG-------------------DFDDEFHPDL
NP_865515          ---------------NSGKFLMD-----------------------------EHDNENS---
NP_992233          ---------------QKT-----------T-----------------DAPIKNEANNG-
NP_991569          ---------------EKT-----------P-----------------KTPIKNEADNG-
NP_280624          ---------------RGG-----------P-----------------GYEFADEFHDDL
BAC18575           ---------------AGG-----------P-----------------GFQFANEYPTDE
BAC16839           ---------------RGG-----------P-----------------GYNFGDEFHPEL
BAB82272           ---------------MGN-----------P-----------------GYRIKGEFTRNQ
BAB99042           ---------------AGG-----------P-----------------GFSFANEYPTDE
BAB97427           ---------------RGG-----------P-----------------GYTFADEFHPEL
BAC08372           IDPKTNQYRAIPLEILV-EGDKYP-------------------------LYGITLEDAG
BAC07690           IDPATNRPRYIPLEILG-QGSDTP-------------------------TY----SQAG
YP_072215          ---------------EKT-----------P-----------------KTPIKNEADNG-
YP_069574          ---------------QKT-----------T-----------------DAPIKNEANNG-
NP_778719          ---------------HGG-----------P-----------------GYHFEDETN-NG
NP_245881          ---------------EKK-----------T-----------------NAPIQNEANNG-
NP_245880          ---------------QKK-----------T-----------------DAPITNEANNG-
NP_354667          -----NMEKGFNAQRAGTGGSDMA-------------------------DIPAEFSKTP
NP_354666          -----KGSESFNPARAGMGGSEKE-------------------------DLKAEFSAIP
NP_298502          ---------------RGG-----------P-----------------GYRFEDETN-NG
AAN39296           ---------------GGK-SIYG-------------------------EKFADENFQL-
AAQ24380           ---------------GGK-SIYG-------------------------NKFADENFQL-
ZP_00353225        ---------------RGG-----------P-----------------GYQFDDEIHPDL
ZP_00244808        ---------------QKP-----------T-----------------QAPIANEANNG-
ZP_00244807        ---------------EKK-----------T-----------------GAPIALENRSG-
ZP_00358245        ---------------SGG-----------P-----------------GYRFRDEVVGNP
ZP_00350273        ---------------QKP-----------T-----------------NAAIKNEANNG-
ZP_00129494        ---------------DKK-----------G-----------------HEPIANEAGNG-
ZP_00130259        ---------------QKE-----------T-----------------REPVQNEADNG-
ZP_00136576        ---------------EKK-----------T-----------------RAPIKNEADNG-
NF01760157         ---------------MGG-----------P-----------------GYTIKDEFTNH-


CSHUA              -----------KHTGPGILSMA----------------NAG----PNTNGSQ-FFICTAK
NP_839944          -----------KHTGSGILSMA----------------NAG----PNTNGSQ-FFICAAK
NP_115861          -------SEYLKHNVRGVVSMA----------------NNG----PNTNGSQ-FFIT-YG
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NP_570981          -------SEYLKHNVRGVVSMA----------------NNG----PNTNGSQ-FFIT-YG
NP_057143          -------HPDLKFTGAGILAMA----------------NAG----PDTNGSQ-FFVT-LA
CSHUB              -----------KHYGPGWVSMA----------------NAG----KDTNGSQ-FFITTVK
G66681             -----------KHTGPGLLSMA----------------NSG----PNTNGSQ-FFLTCDK
A57545             -----------KHTGPGLLSMA----------------NQG----QNTNNSQ-FVITLKK
A41581             -----------KHVGPGVLSMA----------------NAG----PNTNGSQ-FFICTIK
A54204             -----------KHYGIGWVSMA----------------NAG----PDTNGSQ-FFITLTK
G64705             -------RPNLSHTGRGILSMA----------------NSG----PNSNRSQ-FFIT-FR
D38552             ---------TLRHDRPYTLSMA----------------NAGS----NTNGSQ-FFIT-VV
NP_624311          K-----------HKKKGTVSMVN------------------NGSDQHGSQFLITTGEN
G2708309           -------F-KLRHSAPGLLSM----------------ANSG----PSTNGCQ-FFITCSK
A45981             -------F-HYKHDREGLLSM----------------ANAG----RNTNGSQ-FFITTVP
J40763             -----------KHNKEFLLSMA----------------NRG----KDTNGSQ-FFITTKP
A47328             -----------KHDRAFLLSMA----------------NRG----KHTNGSQ-FFITTKP
XP_531396          -----------KHTGPGILSMA----------------NAG----PNTNGSQ-FFICTAK
XP_525294          -----------KHTGPGILSMA----------------NAG----PNTSGSQ-FFICTAK
XP_523512          -----------KHTCPGILSMA----------------NAG----PNTNGSR-FFICTAK
XP_507866          -----------KHVGPGVLSMA----------------NAG----PNTNGSQ-FFICTIK
XP_517783          -----------KHTGPGILSMA----------------SAG----PNINGSQ-FFICTAK
XP_517773          -----------KHTGSGILSMA----------------NAG----PNTNGSQ-FFICTAK
XP_526904          -----------KHTGPGILSVA----------------NAG----PNTNGSQ-FFICTAK
XP_516556          -----------KHTGPGILSMA----------------NAG----PNTSGSQ-FS-----
XP_526001          -----------RHRVPGILSM-----------------------------------------
XP_516021          -------SEYLKHNVRGVVSMA----------------NNG----PNTNGSQ-FFIT-YG
XP_515886          -----------KHNKEFLLSMA----------------NRG----KDTNGSQ-FFITTKP
XP_525218          -----------KHTGSGILSVA----------------NAG----PNTNGSQ-FFICAAK
XP_507684          -----------KHTGPGILSMA----------------NAG----PNTNGSQ-FFICTAK
XP_524688          -------F-KLRHSAPGLLSMLTWPGKLTAGIFGFYQANSG----PSTNGCQ-FFITCSK
XP_513346          -----------KHTGPGLLSMA----------------NSG----PNTNGSQ-FFLTCDK
XP_524598          -----------KHTGPGILSTA----------------NAG----PNTNGSR-FFICTAK
XP_515004          --------PNLSHTGRGILSMA----------------NSG----PNSNKSQ-LRVADFL
XP_523437          -----------KHTGPGILSLA----------------NAG----PNTNGSQ-FSTRTAK
XP_520485          -----------KHTGPGILSMA----------------NAE----PNTNGSQ-FCG----
XP_519076          -----------KHTGPGILSMA----------------NAG----PNTNGSQ-FFICTAK
XP_527705          -----------KRTGPGILSMA----------------NSG----PNTNCSV-FHLHCQD
XP_527529          K-----------HKKKGTVSMVN------------------NGSDQHGS---------
XP_518678          K-----------HKKKGTVSMVN------------------NGSDQHGSQFLITTGEN
CSMSA              -----------KHTGPGILSMA----------------NAG----PNTNGSQ-FFICTAK
NP_598845          -----------KHVGPGVLSMA----------------NAG----PNTNGSQ-FFICTIK
AAH58369           -------HPDLKFTGAGILAMA----------------NAG----PDTNGSQ-FFVT-LA
A56861             -----------KHYGPGWVSMA----------------NAG----KDTNGSQ-FFITTVK
A40047             -----------KHYGIGWVSMA----------------NAG----PDTNGSQ-FFITLTK
NKCR_MOUSE         -----------KHDRAFLLSMA----------------NRG----KHTNGSQ-FFITTKP
AAH61645           -------SEYLKHNVRGVVSMA----------------NNG----PNTNGSQ-FFIT-YG
BAC41068           -------RPNLSHTGRGVLSMA----------------NSG----PNTNKSQ-FFIT-FR
BAC34686           -------F-HYKHDREGLLSM----------------ANAG----PNTNGSQ-FFITTVP
BAB30711           K-----------HKKKGTVSMVN------------------NGSDQHGSQFLITTGEN
BAB25645           -------F-KLRHSAPGLLSM----------------ANSG----PSTNGCQ-FFITCSK
BAB23880           -------F-KLRHSAPGLLSM----------------ANSG----PSTNGCQ-FFITCSK
NF00527760         -----------KHTGPGLLSMA----------------NYG----QNTNSSQ-FFITLKK
NF01138503         ---------TLRHDRPYTLSMA----------------NAGS----NTNGSQ-FFIT-VV
NF00510830         -----------KHTGPGLLSMA----------------NSG----PNTNGSQ-FFLTCDK
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NF00510932        -------HPDLKFTGAGILAMA----------------NAG----PDTNGSQ-FFVT-LA
NF01595779        -----------KHTGPGILLMA----------------NAG----PNTNGSQ-FFICTAK
NF02014914        -----------KHTGPGILSMA----------------NAG----PNTNSSQ-FFICTAK
NF01930249        -----------KHTGPGILSMA----------------NAG----PNTNGSQ-FFICTVK
NF01929278        -----------KHTGPDILSMA----------------KAG----PNTNDSQ-FFICTAK
NF00523006        -----------KHTGPGILSMA----------------NAG----PNTNGSQ-FFICTAK
NF00508381        -----------KHTGPGILSMA----------------NAG----PNTNGSQ-FFICTAK
NF01215170        -------SEYLKHNVRGVVSMA----------------NNG----PNTNGSQ-FFIT-YG
CSRTA             -----------KHTGPGILSMA----------------NAG----PNTNGSQ-FFICTAK
NP_783638         -------SEYLKHNVRGVVSMA----------------NNG----PNTNGSQ-FFIT-YG
NF01612782        -------F-HYKHDREGLLSM----------------ANAG----PNTNGSQ-FFITTVP
NF01612825        -----------KHTGPGLLSMA----------------NSG----PNTNGSQ-FFLTCDK
NF01607941        -------F-HYKHDREGLLSV----------------ANAG----PNTNGSQ-FFITTGP
NF01607846        -----------KHTGPGILSMA----------------NAG----PNTNGSQ-FFICTAK
NF01609144        -----------KHYGIGWVSMA----------------NAG----PDTNGSQ-FFITLTK
NF01608897        -----------KHTGPGILSMA----------------NAG----PNTNGSQ-FFICTAK
NP_758443         -----------KHVGPGVLSMA----------------NAG----PNTNGSQ-FFICTIK
AAH61971          -----------KHYGPGWVSMA----------------NAG----KDTNGSQ-FFITTVK
G2828710          -----------KHNKEFLLSMA----------------NRG----KDTNGSQ-FFITTKP
B38388            -----------KHTGSGILSMA----------------NAG----ANTNGSQ-FFICTVK
AF132148          N-----------HSSAGMLSLVS--------------------AGKNLVGSQFFLTLGEN
NP_611113         -------KPNLTHTGRGVLSMA----------------NSG----PNTNGSQ-FFIT-YR
NP_611695         -----------KHYGAGWLSMA----------------NAG----KDTNGSQ-FFITTKQ
NP_610590         -------KETIKHTDRGMVSMA----------------NNG----PNANASQ-FFIT-YA
NP_648697         -----------KHTGAGVLSMA----------------NAG----ANTNGSQ-FFICTGK
NP_648508         R-----------YTRRGLVGMANSGK--------------------DDNGSQFFFTFAP-
NP_648338         H------------NEEGVVSMA----------------NYGK---PNSNNSQ-FFISAAG
NP_476656         -------ALAVEHNRPGYLGMA----------------NRG----PDTNGCQ-FYVTTVG
NP_523874         -------HGDLRHTGAGILSMA----------------NSG----PDTNGSQ-FFIT-LA
NP_523773         -----------KHNSFGTLSMA----------------NSG----ANTNGSQ-FFICTTK
NP_610224         -------F-TLKHDSPGLLSM----------------ANSG----KETNGCQ-FFITCAK
NP_733246         -----------KHDRPFLLSMA----------------NRG----KNTNGSQ-FFITTQP
NP_611935         ---------SLKHDRPYTVSMA----------------NAGP----NTNGSQ-FFIT-VL
EAA03569          H-------------EDGAVSMA----------------NLGK---AHTNNSQ-FFITSGE
EAA03948          -----------KHYGAGWLSMA----------------NAG----KDTNGSQ-FFITVKQ
EAA04625          -------F-LLKHDAPGLLSM----------------ANSG----KDTNGCQ-FFITCSK
EAA06299          -----------KHTGPGILSMA----------------NAG----PNTNGSQ-FFITTVK
EAA08127          -----------KHDRAFLLSMA----------------NRG----KNTNGSQ-FFITTQP
EAA09839          -------KPNLSHAGRGILSMA----------------NSG----PNTNGSQ-FFIT-YR
EAA10133          ---------TLKHDRPYTVSMA----------------NAGP----NTNGSQ-FFIT-VL
EAL39647          K-----------HSEPGLLSMVN--------------------AGEHLIGSQFFFTLGPD
EAA13913          -------KENLKHNERGMVSMA----------------NSG----PNTNGSQ-FFFT-YA
EAA13914          -------NLKINHTCSGFIAMA----------------NRG----PNTNGCQ-FYITTLP
EAA14200          -----------KHTGFGVLSMA----------------NSG----PNTNGSQ-FFICTEK
EAA01474          -------------DDTKILAIRG--------------SVGMRRSQKRHDNMGLVGSQFR
XP_321072         -------------DDTKILAIRG--------------SVGMRRSQKRHDNMGLVGSQFR
XP_320182         -------HSDLKHTGAGIVSMA----------------NSG----PDTNGSQ-FFIT-LG
XP_319131         -------NLKINHTCSGFIAMA----------------NRG----PNTNGCQ-FYITTLP
XP_311949         -----------KHDRAFLLSMA----------------NRG----KNTNGSQ-FFIGHTL
CAI11739          -----------SHNKRGILGMA----------------NQG----AHSNGSQ-FYITLQP
AAQ91263          -----------KHGGKGTLSMA----------------NAG----PNTNGSQ-FFICTAD
NP_001004626      -----------KHTGAGILSMA----------------NSG----PNTNGSQ-FFICTAK
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NP_001002065      -------F-HYKHDREGLLSM---------------ANAG----PNTNGSQ-FFITTVP
NP_957499         -------F-RMKHSGPGLLSM---------------ANSG----PGTNGCQ-FFITCTK
AAQ94596          -------F-RMKHSGPGLLSM---------------ANSG----PGTNGCQ-FFITCTK
NP_998184         -----------KHYGPGWLSMA---------------NAG----KDTNGSQ-FFITTVQ
NP_001002146      -------SEHLKHNVRGVVAMA---------------NNG----PNTNASQ-FFFT-YA
AAQ91264          -----------KHTGAGCLSMA---------------NAG----PNTNGSQ-FFICTAL
AAH59458          -----------KHTGAGCLSMA---------------NAG----PNTNGSQ-FFICTAL
AAH56814          K-----------HRKKGTVSMVN-------------------NGSDQHGSQFLITTGEN
AAH62863          -----------KHTGAGCLSMA---------------NAG----PNTNGSQ-FFICTAL
NP_998629         -----------KHTKEFLLSMA---------------NRG----KDTNGSQ-FFITTKP
NP_957285         -------RPNLSHTGRGILSMA---------------NSG----PNTNKSQ-FFIT-FR
NP_506749         -----------KHTGPGVLSMA---------------NAG----PNTNGSQ-FFLCTVK
NP_506561         -----------KHTGPGCLSMA---------------NAG----PNTNGSQ-FFICTVD
NP_504522         ---------TVQNTRGKVILLPS---------------DTN----PTVFSSLFYVLLDKS
NP_506751         -----------KHTGPGVLSMA---------------NAG----PNTNGSQ-FFLCTVK
NP_497745         -----------KHSRPYLLSMA---------------NKG----PNSNSSQ-FFITTAA
NP_499828         -----------KHTGPGVLSMA---------------NCG----ANTNGSQ-FFLCTVK
NP_497257         -----------QHYGPGWLSMA---------------NAG----EDTNGSQ-FFITTAK
NP_509506         -----------KHKKPYLLSMA---------------NRG----PDTNGSQ-FFITSEE
NP_503034         -----------RHTMPGTVSMA---------------NCG----ANTNGSQ-FFICTEK
NP_501118         -------DERLKHTGAGILSMA---------------NAG----PNTNGSQ-FFIT-LA
NP_496562         K-----------FNRRGIVGMANAGR-------------------DDNGSQFFFTIGDR
NP_495855         -------F-ELKHIGPGMLSM---------------ANAG----SDTNGCQ-FFITCAK
NP_496337         -------ISGFSHDARGVLSMA---------------NKG----SNTNGSQ-FFIT-FR
NP_495417         -------VSALKHDSRGCVSMA---------------NNG----PDSNRSQ-FFIT-YA
NP_493378         ---------RLRHDKPFKVSMA---------------NAGGG---NTNGSQ-FFIT-VC
NP_492343         R-----------HTRMGIVSFVN-------------------NGDNMLGSQFFITLGEN
NP_493624         -----------KHYGAGWLSMA---------------NAG----ADTNGSQ-FFITTVK
P06073            -----------KHTGPGILSMA---------------NAG----ANTNGSQ-FFICTVK
NP_175776         K-----------HSKTGTVAMAS-------------------GGENLNASQFYFTLRDD
NP_567029         -----------KHTGPGFLSMA---------------NSG----PDSNGSQ-FFITTVT
NP_201554         -------NSKLLHSGRGVVSMA---------------NSG----PHTNGSQ-FFVL-YK
NP_200679         -----------KHTGPGFLSMA---------------NAG----QDTNGSQ-FFITTVT
NP_181407         -------F-TAKHTGPGLLSM---------------ANSG----PNTNGCQ-FFITCAK
NP_191166         -----------KHTGPGILSMA---------------NSG----PNTNGSQ-FFICTEK
NP_171696         -------RDSLKHNARGMLSMA---------------NSG----PNTNGSQ-FFIT-YA
NP_195222         -----------QHSHAGMVAMA---------------NTG----PDSNGSQ-FFITTVK
NP_195213         -----------KHTGAGILSMA---------------NSG----PNTNGSQ-FFICTDK
NP_196816         -----------SHVGPGVLSMA---------------NAG----PNTNGSQ-FFICTIK
NP_188932         H-----------EDGPGIISMA---------------DS--------NGSQ-FQIHMKD
NP_191762         -----------KHTGPGILSMA---------------NAG----PNTNGSQ-FFICTVK
NP_190046         ---------SLRHDRPFTLSMA---------------NAGP----NTNGSQ-FFIT-TV
NP_180557         -----------KHTGPGVLSMA---------------NSG----EDTNGSQ-FFITTVT
NP_181157         -------NKELKHTGAGILSMA---------------NAG----PNTNGSQ-FFIT-LA
NP_179251         -----------KHTGPGILSMA---------------NAG----ANTNGSQ-FFICTEK
NP_179709         -----------KHTGPGILSMA---------------NAG----ANTNGSQ-FFICTVK
AAK02067          -----------KHERKGMLSMA---------------NSG----PNTNGSQ-FFITTTR
P82869            -----GELPVLPLSVYGAVAMAHSEN----------------SEEYSSPYQFFFYLYDK
P05352            ---------------GWFTTA---------------IFN----SN----L-FTITLAR
P49181            H-----------DGAGVLSMA---------------NCG----PNTNGSQ-FFILFKR
P05314            R-----------FSHRGIVAMANASSP-----------------NSNGSQFFFTLDK-
CSZPA             --------FALKHNKPGLLSMA---------------NAG----PNTNGSQ-FFITTVV
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E313994          -------HSDLHHTGAGILSMA----------------NAG----PNTNSSQ-FFIT-LA
E1335804         -----------SHQRPGLLSMA----------------NAG----PDSNGSQ-FFITTVK
E1331567         -------F-TLKHDRPGLLSM----------------ANAG----KDSNGCQ-FFITTVP
362327           -------F-ELKHDKPFLLSM----------------ANAG----PNTNGSQ-FFITTVP
362590           -------CNPLKHDDRGIISMA----------------NRG----KNTNGSQ-FFIL-YG
E1294518         ---------NLKHDRPFTVSMA----------------NSGP----NTNGSQ-FFIT-TD
T39728           V-----------HNKMGLVSMSTATISSR-------------DDKLLVCGSQFIITLSDN
E1263915         R-----------FIRRGLVGMACTEN-------------------EGNNSQFFITLGP-
CSBY             --------FKKHHDRPGLLSMA----------------NAG----PNTNGSQ-FFITTVP
330507           --------FVKKHDKAGLLSMA----------------NAG----PNTNGSQ-FFITTVP
312324           -----------KHDRKGRLSMA----------------NRG----KDTNGSQ-FFITTTE
357050           ------------FVEPFTLGMA----------------NLGS---PNTNNSQ-FFITTYA
348567           -------F-TVKHDKPFLLSM----------------ANAG----PNTNGSQ-AFITCVP
CSBYC3           -----------KHDRPERLAMAYFG-------------------PDSNTSE-FIITTKA
363359           -----------IHDRPGRVSMIK----------------------DDKGLK-FIIETSE
338324           -----------KHDKPGRLSMA----------------NRG----KNTNGSQ-FFITTVP
TcCyP19          --------KAGKHFGLGTLSMA----------------NAG----PNTNGSQ-FFICTAP
TcCyP20          -------LGTVHHDSRGVVSMA----------------HRGN--KPNTNASQ-FFII-FQ
TcCyP21.1        -----------KHF-VGAVSMA----------------NAG----PNSNGSQ-FFVTTAP
TcCyP21.3        --------RAGKHFGPGTLSMA----------------NAG----PNTNGSQ-FFICTAA
TcCyP24.3        A---------GAHKGPGILSMA----------------NAG----RNTNGSQ-FFICTVS
TcCyP26          AG----------KHLPGTVAMA----------------HSG----PNQNGSQ-FFFNMRR
TcCyP28          --------KAGKHTGVGCLSMA----------------NAG----PNTNGSQ-FFICTAN
TcCyP30          ---------SSVFDQRGLVGTAVS-------------------APHLNGSQ-FFILTAK
TcCyP35.1        ------------HDAPGVIGMC----------------NDN----EDTNASS-FYITMKA
TcCyP35.3        -----------RLNEVGLLLMA----------------NNG----PNSNGSQ-FFITTSD
TcCyP40          ------------CDKAGLLAMA----------------NAG----PNTNGSQ-FFITVNP
TcCyP110         DFFS--------YPSVYWLCMA----------------NCGP----NTNESQ-FFITVGE
AAT44353         -----------KPLGPGTLSMA----------------NAG----PNTNGSQ-FFICTEK
EAL37431         -----------THDAPFLLSMA----------------NAG----PNTNGSQ-FFITTVP
EAL37232         -------YPELKYDRRGILSMA----------------SKGASKKPNTNGSQ-FFIT-YS
EAL37110         ---------FKFIHESHVISMA----------------NRG----PNTNGSQ-FFITFTP
EAL36265         K-----------HKRMGVLGMVN-------------------HISKNSLGSEFYFTLKDE
EAL35294         -------F-EIKHTKPGLLSM----------------ANNGS---PNTNGCQ-FFITCNT
J68268           --------KAGKHFGPGTLSMA----------------NAG----PNTNGSQ-FFICTAR
J68269           --------KAGKHFGPGTLSMA----------------NAG----PNTNGSQ-FFICTAR
AAQ15626         --------RAGKHFGPGTLSMA----------------NAG----RNTNGSQ-FFICTAA
AAB07896         --------KAGKHFGAGTLSMA----------------NAG----PNTNGSQ-FFICTAP
AAK14937         -----------KHDRPFLLSMA----------------NAG----PNTNGSQ-FFVTTVV
CAC18541         -------F-IMKHSSPGMLSM----------------ANSG----KDTNGCQ-FFITCAP
A45000           -----------KHSKPMMLSMA----------------NAG----KNTNGSQ-FFITTAV
Q9Y0F5           -------YPELKYDRRGILSMA----------------SKGASKKPNTNGSQ-FFIT-YS
J47811           -----------KHTGLGVLSMA----------------NAG----PNTNGSQ-FFICTAK
J50388           -----------RHEGFGVLSMA----------------NSG----PNTNGSQ-FFICTTK
L46884           --------FNHKHEAFS-LSMA----------------NAG----PNTNGSQ-FFITTVP
M93420           -----------RHEGFGVLSMA----------------NSG----PNTNGSQ-FFICTTK
J50389           -----------KHVGAGWLSMA----------------NAG----PNTNGAQ-FFITTTQ
G992633          -----------RHVGAGWLSMA----------------NAG----PDTNGSQ-FFITTVK
E323073          -----------RHEGFGVLSMA----------------NSG----PNTNGSQ-FFICTTK
352758           -----------KHF-VGALSMA----------------NAG----PNTNGSQ-FFITTAP
E1203753         --------KAGKHFGPGTLSMA----------------NAG----PNTNGSQ-FFLCTAP
CAB58290         ------------HVGAGLLSCRP--------------TVG-----AVTASR-LLITLSP
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CAB58298          --------KAGRHTGLGCLSMA----------------NAG----PNTNGSQ-FFICTAA
AAF69736          ------------CDKSGLLAMA----------------NAG----ANTNGSQ-FFITTAP
AAD46565          -----------KHF-VGALSMA----------------NAG----PNTNGSQ-FFITTAP
A53522            ---------FDLKHERGVISMA----------------NAG----PNTNGSQ-FFITTVK
NP_702112         K-----------FLYTGCLSFANLNIDK-----------------PSNGSQFFITLDK-
NP_701512         -----------EFVQDGDVALFNEG-------------------PHSNSSQ-FIITFSP
NP_701389         ------------HSKRGILSMC----------------QTRI---KHTNNSQ-FFVTFKS
NP_701030         -------DSTLKHDKRGIVSMA----------------NKG---KPNTNGSQ-FFIT-YS
NF01067443        -----------KHTCAGLLTIV----------------QVE-----DKKYSSIFKITLNK
NF01067965        -------F-DIKHDKEGLLSM----------------ANTG----PNTNGCQ-FFIITKK
NF01065889        ---------HLNHSKPFMVSMA----------------NCGP----NTNGSQ-FFIT-TV
NF00926916        -----------KHDQPGLLSMA----------------NAG----PNTNSSQ-FLITLVP
G52760            --------FKVNHSKRGLLSMA----------------NAG----KNTNGSQ-FFILFIP
J10322            -------F-DIKHDKEGLLSM----------------ANTG----PNTNGCQ-FFIITKK
CAB39039          -----------KHDQPGLLSMA----------------NAG----PNTNSSQ-FFITLVP
CAD51648          -------NTELKHTGAGILSMS----------------NNG----PNTNGSQ-FFIT-LC
NF01497907        -----------KHDTPGLLSMA----------------NAG----PNTNSSQ-FFITLVP
NF01497552        ---------HLNHSKPFMVSMA----------------NCGP----NTNGSQ-FFIT-TV
NF01497379        --------FTLKHTKRGMLSMA----------------NAG----RNTNGSQ-FFILFVP
NF01497199        -------F-DIKHDKEGLLSM----------------ANSG----PNTNGCQ-FFITTKK
NF01496968        -----------KHLSAGLLTVI----------------QVG-----KKKCSSIFKITLNK
NF01495390        -----------EFVQDGDVALYNQG-------------------PHSNTSQ-FIITFAP
NF01495324        -------NKELKHTGAGILSMS----------------NNG----PNTNSSQ-FFIT-LA
NF01493974        ------------HSKRGVLSMC----------------QTSI---KHTNNSQ-FFVTFKS
NF01493918        K-----------FLYMGCVAFANLNIBS-----------------PXNGSQFFITLDK-
E316521           --------FKLKHTKPALLSMA----------------NAG----PNTNGSQ-FFITFVP
CAC35733          R-----------HNQYGVVATS-------------------NSKPHANNSDFYILLTQN
J47812            -----------KHTGPGVLSMA----------------NAG----PDTNGSQ-FFLCTVK
J47813            -----------KHTGPGVLSMA----------------NAG----PNTNGSQ-FFICTAK
G2624966          -------F-TVKHTKPGMLSM----------------ANAG----PNTNGSQ-FFITTVP
E1317902          -------IRSFSHNQRGILSMA----------------NQG----TDTNKSQ-FFIT-FR
E1319851          -------ISSLSHDQRGILSMA----------------NQG----TDTNKSQ-FFIT-FR
G3057040          -------KSTFSHDRRGVLSMA----------------NQG----TDTNKSQ-FFIT-FR
AAB81959          -----------KHTGPGILSMA----------------NAG----PNTNGSQ-FFICTAK
AF023860          -----------KHTGPGILSMA----------------NAG----PNTNGSQ-FFICTAK
AAB81961          -----------KHTGPGILSMA----------------NAG----PNTNGSQ-FFICTAK
AAF22215          -----------KHTGPGILSMA----------------NAG----PNTNGSQ-FFICTAK
AF243140_1        -----------KHTGPGILSMA----------------NAG----PNTNGSQ-FFICTAK
AF252388          -----------KHVGPGVLSMA----------------NAG----PNTNGSQ-FFICTIK
CSBOAB            -----------KHTGPGILSMA----------------NAG----PNTNGSQ-FFICTAK
NF01922219        -----------KHEGKGTLSMA----------------NAG----PNTNGSQ-FFLCFVK
NF01725587        -----------KHTGPGVLSMA----------------NAG----PNTNGSQ-FFLCTAR
NF01897292        --------FDLKHYDEQWVSMA----------------NNG----PNTNGCQ-FFVLY-D
CSHYAC            -----------KHTGPGILSMA----------------NAG----PNTNGSQ-FFICTAK
NF00071027        -----------KHTGPGILSMA----------------NAG----PNTNGSQ-FFICTAK
NF01951405        -------KPNLSHTGRGILSMA----------------NSG----PNTNKSQ-FFIT-FR
NF01059378        -----------KHTGPGILSMA----------------NAG----PNTNGSQ-FFICTAK
NF01105745        -----------KHKGEGILSMA----------------NAG----PNTNGSQ-FFICTVE
NF00495096        -----------KHTGPGILSMA----------------NAG----PNTNGSQ-FFICTAK
NF01053198        -----------KHTGPGILSMA----------------NAG----PGTNGSQ-FFICTAK
CSPGA             -----------KHTGPGILSMA----------------NAG----PNTNGSQ-FFICTAK
NF01950932        -------SEYLKHSVRGVVSMA----------------NNG----PNTNGSQ-FFIT-YG
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NF01951326        -------F-HYKHDKPGLLSM---------------ANAG----PGTNGSQ-FFITTVP
NF00909389        -----------KHTGPGILSMA---------------NAG----PGTNGSQ-FFICTEK
NF01286555        -----------KHTGPGILSMA---------------NSG----PGTNGSQ-FFICTDK
NF01737225        -----------KHTGPGILSMA---------------NAG----ANTNGSQ-FFICTEK
NF01590839        KHD-----------GPGVLSMA---------------NAG----PGTNGSQ-FFITHVE
AAH51602          -------HPDLKFTGAGILAMA---------------NAG----PDSNGSQ-FFLT-LA
AAT69672          -----------KHTGPGILSMA---------------NAG----ANTNGSQ-FFICTAK
AAH54186          -----------KHTGPGILSMA---------------NAG----ANTNGSQ-FFICTAK
AAH54168          -----------KHYGPFWLSMA---------------NAG----KDTNGSQ-FFITTVK
NF01208049        -------KPNLSHTGRGVLSMA---------------NTG----PNTNKSQ-FFIT-FR
NF01844632        -----------QHNKEFLLSMA---------------NRG----KDTNGSQ-FFIITKP
NF01844615        R-----------FNRRGLVAMANAGP-------------------HDNGSQFFFTLGR-
NF01915773        -------HPDLKFTGAGILAMA---------------NAG----PDSNGSQ-FFLT-LA
NF01915657        -------SEFLKHSVRGVVSMA---------------NNG----PNTNASQ-FFIT-YG
NF01557564        -------F-HYKHDKEGLLSM---------------ANAG----PNTNGSQ-FFITTVP
AAH41536          -----------KHTGPGILSMA---------------NAG----SNTNGSQ-FFICTAK
AAH85963          -----------KHNKEFLLSMA---------------NRG----KDTNGSQ-FFITTKP
AAH64250          -------F-KQKHSTPGLLSM---------------ANSG----PGTNGCQ-FFITCSK
AAH61335          -------F-HYKHDKEGLLSM---------------ANAG----PNTNGSQ-FFITTVP
AAH59741          -----------RHTGPGILSMA---------------NAG----ANTNGSQ-FFICTAK
AAH67931          -----------QHNKEFLLSMA---------------NRG----KDTNGSQ-FFITTKP
AAH44993          -------KPNLSHTGRGVLSMA---------------NTG----PNTNKSQ-FFIT-FR
A40516            -----------KHYGPGWVSMA---------------NAG----KDTNGSQ-FFITTVK
CYPB_BOVIN        -----------KHYGPGWVSMA---------------NAG----KDTNGSQ-FFITTVK
AAR19276          -----------KHTGPGILSMA---------------NAG----PNTNGSQ-FFICTEK
A46579            -------F-HYKHDKEGLLSM---------------ANAG----SNTNGSQ-FFITTVP
AAV40687          -------F-PVHHSRPFLLSM---------------ANAG----PNTNGSQ-FFITVSA
NF01637248        --------FQLKHTKPGLLSMA---------------NAG----KNTNGSQ-FFITTVV
CYPR_BOVIN        -----------KHTGPGLLSMA---------------NRG----QDTNNSQ-FFITLKK
CYPR_CALVI        -------ALDVEHLRPGYLGMA---------------NRG----PDTNGCQ-FYVTTVA
E1317906          -------VSGFSHDARGVLSMA---------------NKG----SNTNGSQ-FFIT-FR
AAB87888          -----------KHTGTGILSMA---------------NAG----ANTNGSQ-FFICTVK
AAB87889          -----------KHTGTGILSMA---------------NAG----ANTNGSQ-FFICTVK
Q9XZZ5            -----------KHQGEGTLSMA---------------NAG----PNTNGSQ-FFICTGQ
S63995            -----------KHTGPGILWMA---------------NAG----PNTNGSQ-FFITTAK
G1703696          -----------KHTQPGILSMA---------------NAG----VNTNGSQ-FFICTAV
J36797            -----------KHTGPGILSMA---------------NAG----KNTNGSQ-FFICTTK
AF017738          K-----------FNRRGLVGMASGND-------------------GMNGSQFFFTLNA-
L37292            -----------KHDEPFVVSMA---------------NKG----PNTNGSQ-FFITTTP
AAS01736          -----------KHTGPGVLSMA---------------NAG----PGTNGSQ-FFICTVK
AAO61985          -----------LMKIKCFNKLY---------------------EGKNGVEPLKEIVSS
CAC80550          -----------KHTGPGILSMA---------------NAG----PGTNGSQ-FFICTAK
AAO63777          -----------KHTGPGILSMA---------------NSG----PGTNGSQ-FFICTDK
B53522            -----------KHSEPFLLSMA---------------NAG----PNTNGSQ-FFITTVP
E280557           --------FKLCHHGFGWLGMA---------------NCG----PNTNGAQ-YYISTVD
J70827            -----------KHDEPFLVSMA---------------NKG----PNTNGSQ-FFITTTP
J70884            -----------KHDEPFLVSMA---------------NKG----PNTNGPQ-FFITTTP
J55771            ----------FTAKHKKGVIAMA---------------NRG----PNTNGSQ-FYITTVA
D1024669          -----------KHYGAGWLSMA---------------NAG----KDTNGSQ-FFITCKK
227879            ----------LKHFGQGTLSMA---------------NAG----ANTNGSQ-FFICVAP
AAD48910          -----------KHSKPGLLSMA---------------NAG----PNTNGSQ-FFITTVV
AAO51811          -------F-KIKHSGPGLLSM---------------VNSG----PNSNGCQ-FFITCVA
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AAF76472        -------RDSLKHNARGMLSMA----------------NSG----PNTNGSQ-FFIT-YA
AAP80861        -----------KHTGPGYLSMA----------------NAG----RDTNGSQ-FFITTVT
AAP73848        -------F-IAKHTGPGLLSM----------------ANSG----VNSNGSQ-FFITCAK
BAB62329        -------RPELKHTGAGILSMA----------------NAG----PNTNGSQ-FFIT-LA
AAL75728        -----------KHDGPGVVSMA----------------NAG----PNTNGSQ-FFITVDK
S48017          -----------KHDSPGILSMA----------------NAG----PNTNGSQ-FFICTVP
S48018          -----------RHTGPGVLSMA----------------NAG----PNTNGSQ-FFICTTR
BAD53622        -----------KHTGPGLLSMA----------------NAG----RDTNGSQ-FFITTVT
BAD53621        -----------KHTGPGLLSMA----------------NAG----RDTNGSQ-FFITTVT
BAD53620        -----------NHSAPGLLSMA----------------NYA----KDTNGSQ-FFITTVK
XP_507188       -----------KHARPGTLSLCLGQND----------DDDDIKLNPNYHNVE-FLVTTGP
XP_483750       ---------SLRHDRPFTLSMA----------------NAGP----NTNGSQ-FFIT-TV
XP_483749       G---------LAVSVDGLLCCTIS-------------SDWSVKIYDVVNYDMMFMMRLPF
XP_482125       R---YKAQTKLPFNAFGTMAMARD-E-----------------FDDNSASSQIFWLLKES
XP_478742       -----GELPVLPMSVYGAVAMAHSVD-----------------SDEYSSPSQFFFYLYDK
XP_478741       -----GELPVLPMSVYGAVAMAHSVD-----------------SDEYSSPSQFFFYLYDK
NP_385690       -------------HVRGTCSMARS-------------------QMPNSANSQFFICFTDA
NP_385689       -------------FERGTVGMARA-------------------QDPDSANSQFFIMLAPG
NP_349373       FQN-------NLKHERGVISMA----------------RTGF---PDSAGSQ-FFIMAED
BAD45990        R-----------HSKMGTIAMAS--------------------AGENCNASQFYITLRDG
BAD45991        R-----------HSKKGTIAMAS--------------------AGENCNASQFYITLRDD
NP_908419       S----------PHAAAGAVSIVVR--------------------DPSLPPPKPKLVARGG
NP_919903       ----------VMWYFPIIPRLRR---------------------LFRNKGNAGMLRWHAE
BAD35839        -----------KHERKGMLSMA----------------NSG----PNTNGSQ-FFITTTR
AAU87301        -----------KHTGPGILSMA----------------NAG----PNTNGSQ-FFICTAQ
CAG90469        -----------KHDRPYRLSMA----------------NSG----KNTNGSQ-FFITTVT
CAG88330        --------FVKKHEKPGLLSMA----------------NAG----PNTNGSQ-FFITTVT
CAG88054        NS-----QHEYVDNSIGLVSFVTKKDTN--------------GKDLVIGSQFTISLTEN
CAG86818        ---------LLRHSKPFMVSMA----------------NSGP----NTNGSQ-FFIT-TE
NF01109982      -----------KHTGPGILSMA----------------NAG----PNTNGSQ-FFLCTAT
NF00686348      -------------HVRGEVSMARA-----------------QEKDSANSQFFIVYQPT
NF00686217      -------------HVRGEVSMARA-----------------QEKDSANSQFFIVYQPT
NF02138644      -----------KHTGPGILSMA----------------NSG----PNTNGSQ-FFICTEK
NF00926921      -----------RHTKKGVLSMA----------------NAG----KDTNGSQ-FFITTAI
NF00909931      -----------KHTGPGILSMA----------------NAG----PGTNGSQ-FFICTTK
NF00956595      -----------KHTAPGQLSMA----------------NSG----PNTNGSQ-FFITTDK
NF02035209      -----------KHTGPGILSMA----------------NAG----PNTNGSQ-FFICTDE
NF01329591      -----------LKNARGTLAMA----------------RTSD---PNSATSQ-FFINVAD
CAG86678        ----------WNQIKRGTLLTVN---------------NAGN---EDGLGSQ-FFISLSN
CAG86274        --------FKLKHNKQGRMSMA----------------NGG----PNTNGGQ-FFITTKD
CAG85447        K-----------FNKRGLVGAVHDDKRN-----------------SNNVDSLFITLKP-
CAG85287        --------FQKKHEKAGLLSMA----------------NAG----PNTNGSQ-FFITTVP
CAG84900        -------F-QLTHDKPFLLSM----------------ANAG----ANTNGSQ-FFITTVP
CAG84822        ------------LDDPFKLCLA----------------NDGT---SNANKSQ-FFITTYP
CAG84723        -------F-PYDH-KKYSVSM----------------ANSG----PNSNGCQ-FFICCKE
CAG79895        -----------KHTKPYKLSMA----------------NAG----RDTNGSQ-FFITTVV
CAG78939        -------FNPHTHDSRGVLSMA----------------NRG----KGTNSSQ-FFIT-YS
CAG82238        -------F-PYPHDQPFLLSM----------------ANAG----PNTNGSQ-FFITTTE
CAG81980        --------FEAKHTRPGLLSMA----------------NSG----PNTNGSQ-FFVTTVP
CAG81971        --------FNVKHTRPGLLSMA----------------NAG----PNTNGSQ-FFITTVD
CAG81844        -------K-TFPH-IEGALSM----------------ANSG----KDTNGCQ-FFITTRK
CAG84141        K-----------LKRGYLAMASEYTENN-------------RRVPNSATTEFFIALKE-
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CAG84091          ----------HAEPFVLSMA---------------NAG----PNSNKSQ-FFVTLKG
CAG83821          ----------EGGYLCMAS--------------NDK-----GRNLCQ-WFITLEG
CAG76968          ----------LRNQRGTIAMA--------------RTSD---KDSATSQ-FFINIAD
CAG62671          ----------FDEPFLLAMA--------------NTGS---PNTNSSQ-FFITTYP
CAG76052          ----------LKNTRGTLAMA--------------RTND---PHSATAQ-FFINLID
CAG59915          --------FTKTHDKPGLLSMA---------------NAG----PNTNGSQ-FFITTVP
CAG58658          --------FVKRHERPGLLSMA---------------NAG----PNTNGSQ-FFITTVP
G3777556          ----------KHTGPGTLSMA---------------NAG----PNTNGSQ-FFICTET
AAF65770          ----------KHTGPGILSMA---------------NAG----PGTNGSQ-FFICTAK
BAA25755          ----------KHTGPGILSMA---------------NAG----PGTNGSQ-FFICTAK
CSTO              ----------KHTGPGILSMA---------------NAG----PGTNGSQ-FFICTAK
CSRP              ----------KHTGPGILSMR---------------NAG----SNTNGSQ-FFICTEK
CSZM              ----------KQPAPGVLSMA---------------NAG----PNTNGSQ-FFICTVA
CYPH_ALLCE        ----------KHTGPGVLSMA---------------NAG----PGTNGSQ-FFICTEK
AAG01536          ----------KHTGPGVLSMA---------------IA-----PGTNGSQFFIICTAE
AAB51386          ----------KHTGAGILSMA---------------NAG----PGTNGSQ-FLICSAK
G54833            ----------KHTGPGILSMA---------------NAG----PGTNGSQ-FFICTTK
K85185            ----------KHTGPGILSMA---------------NAG----PNTNGSQ-FFICTAK
Y08273            ----------KHTGPGILSMA---------------NAG----PGTNGSQ-FFICTEK
Y08320            ----------KHTGPGILSMA---------------NAG----PGTNGSQ-FFICTEK
E1226445          ----------RHTGPGILSMA---------------NAG----AGTNGSQ-FFICTEK
L32095            ----------KHVGPGVLSMA---------------NAG----PNTNGSQ-FFICTVP
CAA10766          -------F-IAKHTGPGLLSM---------------ANSG----PNTNGSQ-FFLTCAK
AAF69796          --------FKLRHDRPFLLSMA---------------NAG----PNTNGSQ-FFITTVV
AAF69795          --------FKLRHDRPFLLSMA---------------NAG----PNTNGSQ-FFITTVV
CSNCM             --------FAKKHVRPGLLSMA---------------NAG----PNTNGSQ-FFVTTVP
NF01287451        K----------HLERGTVSMATVPHPS-------------DPDTRLAGSQFIVTLGDN
NF01527836        -------RPVLRHNERGIVSMA---------------NKG----PNTNGSQ-FFIL-FD
NF01488902        -------HPGLKHTGAGVLSMA---------------NAG----PNTNGSQ-FFIT-LA
NF00648058        -------F-QLKHDRPFLLSM---------------ANAG----PGTNGSQ-FFVTTVP
NF01487278        ----------KHSKKGLLSMA---------------NAG----KDTNGSQ-FFITTVI
NF01486260        ---------SLKHDKPYTVSMA---------------NAGP----NTNGSQ-FFIT-TE
NF00904102        ----------KHSKKGLLSMA---------------NAG----KDTNGSQ-FFITTVI
NF01484914        K----------HLERGTVSMATVPHPS-------------DPDTRLAGSQFIVTLGDN
NF01484255        -------F-LLKHDTPGLLSM---------------ANAG----PNTNGSQ-FFITTVP
NF01483993        K----------FNRRGLLGMANEGAP-----------------DTNSSQFFFTLGK-
NF01533203        ----------KHTGPGILSMA---------------NAG----PGTNGSQ-FFICTAK
NF01483647        -------EGPNTHSARGIVSMA---------------NKG----KNTNSSQ-FFIT-YR
G71849            --------GQLKHDRPGLLSMA---------------NAG----PNTNGSQ-FFVTTVV
J17900            ----------RHTGPGILSMA---------------NAG----RDTNGSQ-FFITTVT
NF00873669        --------FQLKHNKPGLLSMA---------------NAG----PNTNGSQ-FFITTVV
NF01527595        --------FQLKHSKPGLLSMA---------------NAG----PNTNGSQ-FFITTVV
NF01539217        --------FERKHTRPGLLSMA---------------NAG----PNTNGSQ-FFVTTVV
D1035365          ----------RHTKKGVLSMA---------------NAG----KDTNGSQ-FFITTAI
YP_116397         ----------LKNDKYTVAMA---------------RTND---PHSATAQ-FFINVAD
YP_119877         YAEGDPMAMEAIAYKRGTLAMA---------------N-AG---PGTNGSQ-FFLVYGD
CAD25897          --------FEIAHDSIGKLSMA---------------NRG----PHTNGSQ-FFITFDK
CAD26352          --------FELKHTKEGILSMA---------------NCG----AHTNGSQ-FFITLGK
AAD17998          ----------RHTKTGLLSMA---------------NAG----KDTNGSQ-FFITTAV
G2959712          ----------RHTGPGVLSMA---------------NAG----PNTNGSQ-FFLCTVE
CSNCC             --------FAKKHVRPGLLSMA---------------NAG----PNTNGSQ-FFVTTVP
AJ006689          --------FSRKHDKKGILSMA---------------NAG----PNTNGSQ-FFITTAV
```

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AAF28343        -------TKELKHTGAGILSMA---------------NSG----VNSNGSQ-FFIT-FG
AAD50375        -------F-LVKHKIG-CLSM---------------ANAG----KNTNGSQ-FFITTAE
AAK21908        ----------RHTGPGILSMA---------------NAG----PGTNGSQ-FFLCTVP
AAG13968        --------FQIKHTRPGLLSMA---------------NAG----PNTNGSQ-FFITTVK
BAB58884        --------FQIKHTRPGLLSMA---------------NAG----PNTNGSQ-FFITTVK
E1363908        --------FQLKHNKPGLLSMA---------------NAG----PNTNGSQ-FFITTVV
AAD16142        --------FIYKHNKPGLLSMA---------------NAG----PNTNGSQ-FFITTVV
G1764137        --------FQKKHVERGMLSMA---------------NAG----PNTNGSQ-FFITVTK
Z32674          --------FQLKHDRPGLLSMA---------------NAG----PNTNGSQ-FFVTTVV
JT0686          --------FKLEHSKPGLLSMA---------------NAG----PNTNGSQ-FFVTTVV
CSCK            --------FVKRHDRPGLLSMA---------------NAG----PNTNGSQ-FFITTVP
NP_986490       --------FVKKHEKPGLLSMA---------------NAG----PNTNGSQ-FFITTVP
NP_985014       --------FTKKHTRAGLLSMA---------------NAG----RNTNGSQ-FFITTVP
NP_984799       ------------FSEPFLLAMA---------------NMGA---PDSNSSQ-FFITTTA
NP_984183       -------F-ARKHDRPFLLSM---------------ANAG----PNTNGSQ-CFITCAP
NP_982586       ----------KHDRPGRLAMVNDG-------------------PDSNHSQ-FYIVTSL
NP_982486       ----------KHDKPGRLSMA---------------NRG----RDTNGSQ-FFITTVA
AAT09096        ----------RHTSPYQLSMA---------------NAG----PNTNGSQ-FFITTVK
YP_014938       ----------AFNLRGALSMA---------------NAGP----NTNGSQ-FFIVQKP
NP_951950       ----------LSNKRGTLAMA---------------RTAV---VDSATSQ-FFINLVD
NP_935388       ----------LKNVTGSIAMA---------------RTQD---PNSATRQ-FFINLVD
NP_907765       ---------GYAFDREGLLAMA---------------NSGP----NSNGSQ-FFIT-TA
BAC91249        ------------YGPPGVFSMAR-------------YEKD----PNSASSQ-FFISFSD
BAC90551        ------TTPPVLTHSKGALAWARD-------------------NNPNSASSQFYIALSDN
BAC89441        I---PEKIFPVMRHLPGAVGLAHTEK-----------------DPNSG--STQFYITYAN
BAC88914        RN--PRTQPPVLVHSRGALAMARS-------------------QNPNSASSQFYITLAET
AAV50868        ----------KGLLSLVPYTD---------------ESG-----NRYYDSTFMITLDD
AAV82698        ----------LKNEYGTIAMA---------------RERE---PHSGTRQ-FFFNLND
AAV81872        ----------KPNVVGSVAMA---------------RTPD---PHSASSQ-FFINVND
NP_736022       ----------LYNIRGSLAMA---------------NAGA----DTNGSQ-FFINQSQ
NP_734780       ----------LYNVRGALSMA---------------NAGP----NTNGSQ-FFIVQNT
YP_085398       ----------PHRHLVGSLSMA---------------HAG----RNTGGSQ-FFIVHEP
NP_643098       ----------RDTTTGKTWLAHCYG----------TLGAGRNNDEDSSIGAELYVVTGQ
NP_641352       VGH----------ERGVLSMA---------------NAG----PNTNGSQ-FFITHTA
BAB76758        R---YLDMPVLPFSSFGALAMARP-E-----------------TEVDGASSQVFFFLFEP
YP_129479       ----------LKNVVGSLAMA---------------RTDA---PHSATGQ-FFINLDD
YP_129310       ----------LSNKVGTLAMA---------------RTME---PHSASSQ-FFINVND
YP_129032       ----------LENNRATVAMA---------------RTQN---PDSATRQ-FYINYQN
YP_101389       ----------KYFHKKGALSAARQ-------------GDEVNPKKESSGCQFYIVTGKV
YP_087816       ----------LKNLRGTIAMA---------------RTSA---PHSATAQ-FFINLQD
YP_087815       ----------LSNKRGTIAMA---------------RTSD---PHSATAQ-FFINVAD
YP_076496       -----VTRP----YQRGTLAMA---------------RTTA---PNSAGSQ-FFICTGL
AAT91289        --------LALKHSKPGLLSMA---------------NAG----KNTNGSQ-FFITTVV
AAT91260        --------LALKHSKXGLLXMA---------------NAG----KNTNGSQ-FFITTVV
NP_868477       ----------QHTTPGLLSMA---------------NSG----RNTNGSQ-FFITVAP
NP_867717       KHD----------GPGVLSMA---------------NAG----PNTNGSQ-FFITHEA
NP_867158       QHN----------RTGVLSFA---------------KSSD----DTNDSQ-FFITEVE
NP_865515       ----------HHALRGSVVMAK-------------IPMGEGRFIENSASSQFAIFFLP
NP_992233       ----------LKNTRGTLAMA---------------RTND---PHSATAQ-FFINVAD
NP_991569       ----------LRNLRGTISMA---------------RTAD---KDSATSQ-FFLNVAD
NP_280624       THD----------GPGVLSMA---------------NSG----PDTNGSQ-FFITLDA
BAC18575        AAQEDLNTP--VIYERGTIAMA---------------N-AG---QDTNGSQ-FFLNYED
```

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BAC16839          RFD----------RAYLLAMA---------------NAG----PGTNGSQ-FFITTTP
BAB82272          FPN-------NLKHSRGVISMA---------------RAMN---FDSAGSQ-FFIMHEN
BAB99042          AT--DLTTP--VIYERGTIAMA---------------N-AG---ADTNGSQ-FFLNYED
BAB97427          RFD----------RAYLLAMA---------------NAG----PGTNGSQ-FFITVTP
BAC08372          R---YLEHPVLPFSAYGTVALARP-N----------------DDPNGGSSQFFFLLFEP
BAC07690          ------KVSPVLNHRRGAVAMARS-Q----------------LPDSA--SAQFYIALD-
YP_072215         ----------LRNLRGTISMA---------------RTAD---KDSATSQ-FFLNVAD
YP_069574         ----------LKNTRGTLAMA---------------RTND---PHSATAQ-FFINVAD
NP_778719         MCH----------ERGSLSMA---------------NAG----PNTNGSQ-FFITHVA
NP_245881         ----------LSNKRGTIAMA---------------RTSD---PHSATAQ-FFINVAD
NP_245880         ----------LKNLRGTVAMA---------------RTSD---PHSATAQ-FFINTVD
NP_354667         ------------FTRGVVGMARS----------------SDPNSANSQFFIMFADG
NP_354666         ------------HVRGTCSMARS----------------QSPNSANSQFFICFTDS
NP_298502         VSH----------ERGSLSMA---------------NAG----PNTNGSQ-FFITHVA
AAN39296          ----------KHTGPGILSMA---------------NAG----PNTNGSQ-FFLCTAT
AAQ24380          ----------KHTGKGILSMA---------------NAG----PNTNGSQ-FFLCTAK
ZP_00353225       RFD----------KKYLLAMA---------------NAGKIAGHGTNGSQ-FFITVAT
ZP_00244808       ----------LKNDKYTLAMA---------------RTNA---PHSASSQ-FFINATD
ZP_00244807       ----------LRNERGSIAMA---------------RTMD---PNSATAQ-FFVNLTN
ZP_00358245       LTH----------EAGVISMA---------------NAG----PNTNGSQ-FFITHTP
ZP_00350273       ----------LQNKTYTIAMA---------------RTPA---PDSASSQ-FFINVAD
ZP_00129494       ----------LKNVRGTIAMA---------------RTAA---PHSATSQ-FFINLVD
ZP_00130259       ----------LKNEEYTVAMA---------------RTQD---PHSATAQ-FFINVKD
ZP_00136576       ----------LLNERGTLAMA---------------RTGV---VDSATSQ-FFINLTD
NF01760157        ----------NRNDRGTISMA---------------NAG----PNTGGSQ-FFINLVN


CSHUA             TE-------WLDG--------------------KHVVFGKVKEG-------------MN
NP_839944         TE-------WLDG--------------------KHVAFGKVKER-------------VN
NP_115861         KQP------HLDM--------------------KYTVFGKV----------ID--G--L
NP_570981         KQP------HLDM--------------------KYTVFGKV----------ID--G--L
NP_057143         PTQ------WLDG--------------------KHTIFGRV----------CQ--G--I
CSHUB             TA-------WLDG--------------------KHVVFGKVLEG-------------ME
G66681            TD-------WLDG--------------------KHVVFGEVTEG-------------LD
A57545            AE-------HLDF--------------------KHVVFGFVKDG-------------MD
A41581            TD-------WLDG--------------------KHVVFGHVKEG-------------MD
A54204            PT-------WLDG--------------------KHVVFGKVIDG-------------MT
G64705            SCA------YLDK--------------------KHTIFGRV----------VG--G-FD
D38552            PTP------WLDN--------------------KHTVFGRV----------TK--G--M
NP_624311         -------LDYLDGV--------------------HTVFGEVTEG-------------M
G2708309          CD-------WLDG--------------------KHVVFGKII--D------------GL
A45981            TP-------HLDG--------------------KHVVFGQVIK-------------GI
J40763            TPH------LDG--------------------HHVVFGQVIS-------------GQ
A47328            APH------LDG--------------------VHVVFGLVIS-------------GF
XP_531396         TE-------WLDG--------------------KHVVFGKVKEG-------------MN
XP_525294         TE-------WLDG--------------------KHVVCGKAKEG-------------KN
XP_523512         T--------VVGQ--------------------KHVVSGKVKEG-------------MN
XP_507866         TD-------CVGI--------------------IPRARPPSLDP-------------LP
XP_517783         TE-------WLDG--------------------KHVLFGKVKEG-------------RN
XP_517773         TE-------CLDG--------------------KHVAFGKVKER-------------MN
XP_526904         TG-------WLDG--------------------THVVFGKAKEG-------------IN
XP_516556         ------------------------------------CALPRLS----------------
```

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XP_526001          ----------------------------------------VKED------------MD
XP_516021          KQP------HLDM--------------------KYTVFGKV----------ID--G--L
XP_515886          TPH-------LDG--------------------HHVVFGQVIS-------------GQ
XP_525218          TE-------WLDG--------------------KHVAFGKVKEH------------VN
XP_507684          TE-------WLDG--------------------KHVVFGKVKEG------------MN
XP_524688          CD-------WLDG--------------------KHVVFGKII--D------------GL
XP_513346          TD-------WLDG--------------------KHVVFGEVTEG------------LD
XP_524598          TE-------SLDG--------------------QHVVFGNMKEG------------MN
XP_515004          EVS------LLAS--------------------TMMILSFFWSSWDLWMWPLQ--G--Q
XP_523437          TE-------WLNA--------------------STWSPARXKKA------------XR
XP_520485          ------------G--------------------HGALWSRS------------------
XP_519076          TE-------WLDG--------------------KHVVFGKVKEG------------MN
XP_527705          GV-------VGWQ--------------------ACSLWQGERRH------------EY
XP_527529          ----------------------------------------------------------
XP_518678          -------LDYLDGV--------------------HT----------------------
CSMSA              TE-------WLDG--------------------KHVVFGKVKEG------------MN
NP_598845          TD-------WLDG--------------------KHVVFGHVKEG------------MD
AAH58369           PTQ------WLDG--------------------KHTIFGRV----------CQ--G--I
A56861             TS-------WLDG--------------------KHVVFGKVLEG------------MD
A40047             PT-------WLDG--------------------KHVVFGKVLDG------------MT
NKCR_MOUSE         APH-------LDG--------------------VHVVFGLVIS-------------GF
AAH61645           KQP------HLDM--------------------KYTVFGKV----------ID--G--L
BAC41068           SCA------YLDK--------------------KHTIFGRV----------VG--G-FD
BAC34686           TP-------HLDG--------------------KHVVFGQVIK-------------GL
BAB30711           -------LDYLDGV--------------------HTVFGEVTEG------------M
BAB25645           CD-------WLDG--------------------KHVVFGKII--D------------GL
BAB23880           CD-------WLDG--------------------KHVVFGKII--D------------GL
NF00527760         AE-------HLDF--------------------KHVVFGFVKDG------------MD
NF01138503         PTP------WLDN--------------------KHTVFGRV----------SK--G--M
NF00510830         TD-------WLDG--------------------KHVVFGEVTEG------------LD
NF00510932         PTQ------WLDG--------------------KHTIFGRV----------CQ--G--I
NF01595779         TE-------WLDG--------------------KHVVFGKGKEV------------MN
NF02014914         TE-------WLDG--------------------KHVVFEKVKEG------------MN
NF01930249         TE-------WLYG--------------------KHVVFGKMKEG------------MN
NF01929278         TE-------WLDG--------------------KHVVFGKVKES------------MN
NF00523006         TE-------WLDG--------------------KHVVFGKVKEG------------MN
NF00508381         TE-------WLDG--------------------KHVVFGKVKEG------------MN
NF01215170         KQP------HLDM--------------------KYTVFGKV----------ID--G--L
CSRTA              TE-------WLDG--------------------KHVVFGKVKEG------------MS
NP_783638          KQP------HLDM--------------------KYTVFGKV----------ID--G--L
NF01612782         TP-------HLDG--------------------KHVVFGQVIK-------------GL
NF01612825         TD-------WLDG--------------------KHVVFGEITDG------------LD
NF01607941         TP-------HVDG--------------------KRVVFGQVMK-------------GL
NF01607846         TE-------WLGG--------------------KHVVFGKVKDG------------TN
NF01609144         PA-------WLDG--------------------KHVVFGKVLDG------------MT
NF01608897         TS-------KKIT--------------------ISDCGQLLVSL------------IC
NP_758443          TD-------WLDG--------------------KHVVFGHVKEG------------MD
AAH61971           TS-------WLDG--------------------KHVVFGKVLEG------------MD
G2828710           TPH-------LDG--------------------HHVVFGQVIS-------------GQ
338388             TA-------WLDN--------------------KHVVFGEVVEG------------LD
AF132148           -------LTSLDGN--------------------HCVIGEVVEG-------------H
NP_611113          SCK------HLDG--------------------KHTIFGKL----------VG--G-LD
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NP_611695          TS-------WLDG--------------------RHVVFGKILSG-------------MN
NP_610590          AQP------NLDL--------------------KYTLFGRV----------ID--G--F
NP_648697          TT-------WLDN--------------------KHVVFGKVVEG-------------MD
NP_648508          -------TPELQNK--------------------NTLFGKIT-G-------------D
NP_648338          C-------ENLNG--------------------TNVVVGRVLRG-------------L
NP_476656          AK-------WLDG--------------------KHTVFGKVLEG-------------M
NP_523874          PTQ------WLDG--------------------KHTIFGRV----------YT--G--M
NP_523773          TD-------WLDN--------------------KHVVFGHVISG-------------AE
NP_610224          CN-------FLDG--------------------KHVVFGRVL--D------------GL
NP_733246          APH-------LDN--------------------IHVVFGQVIS--------------GQ
NP_611935          PTP------WLDN--------------------KHTVFGRV----------YR--G--M
EAA03569           C-------PHLNG--------------------TNVVVGYVIRG-------------G
EAA03948           TS-------WLDG--------------------RHVVFGKVLEG-------------MN
EAA04625           CN-------FLDY--------------------KHVVFGRVL--D------------GL
EAA06299           TS-------WLND--------------------RHVVFGSVVEG-------------MD
EAA08127           APH-------LDN--------------------VHVVFGHVVS--------------GQ
EAA09839           SCK------HLDG--------------------KHTIFGKL----------VG--G-LE
EAA10133           PTP------WLDN--------------------KHTVFGRV----------HK--G--M
EAL39647           -------LTSLDGR--------------------HTVIGEVTEG-------------H
EAA13913           AQP------ALDL--------------------KYTLFGQV----------ID--G--F
EAA13914           AP-------WLDG--------------------KHTIFGKVLDG-------------Q
EAA14200           TD-------WLDG--------------------KHVVFGNVISG-------------AD
EAA01474           IILR-----EMRG--------------------FTGIFAFVVEG-------------L
KP_321072          IILR-----EMRG--------------------FTGIFAFVVEG-------------L
KP_320182          PTQ------WLDG--------------------KHTIFGRI----------HT--G--M
KP_319131          AP-------WLDG--------------------KHTIFGKVLDG-------------Q
KP_311949          LP--------------------------------------------------------CQ
CAI11739           AT-------WMDH--------------------KYVAFGQLVEG-------------T
AAQ91263           TN-------WLDG--------------------KHVVFGKVVDG-------------LN
NP_001004626       TE-------WLDG--------------------KHVVFGQVKEG-------------ME
NP_001002065       TP-------HLDG--------------------KHVVFGQVLK-------------GM
NP_957499          CD-------WLDG--------------------KHVVFGKVV--D------------GL
AAQ94596           CD-------WLDG--------------------KHVVFGKVV--D------------GL
NP_998184          TP-------WLDG--------------------KHVVFGKILEG-------------MD
NP_001002146       KQP------HLDM--------------------KYTVFGKI----------ID--G--L
AAQ91264           TS-------WLDG--------------------KHVVFGQVVEG-------------LD
AAH59458           TS-------WLDG--------------------KHVVFGQVVEG-------------LD
AAH56814           -------VDYLDGV--------------------HTVFGEVTEG-------------M
AAH62863           TS-------WLDG--------------------KHVVFGQVVEG-------------LD
NP_998629          TPH-------LDG--------------------IHVVFGQVIT-------------GQ
NP_957285          SCA------YLDR--------------------KHSVFGRV----------VG--G-LE
NP_506749          TA-------WLDG--------------------KHVVFGRVVEG-------------LD
NP_506561          TP-------WLDG--------------------GHVVFGQVTDG-------------MS
NP_504522          GPS------VVDG----------------------CPIGDVIEG-------------I
NP_506751          TE-------WLDG--------------------KHVVFGRVVEG-------------LD
NP_497745          APH-------CNG--------------------KHVVFGEVVK-------------GQ
NP_499828          TT-------WLDG--------------------KHVVFGKVIEG-------------MD
NP_497257          TS-------WLDG--------------------KHVVFGKILEG-------------MD
NP_509506          VPH-------LDG--------------------KHCVFGEVIK-------------GV
NP_503034          TD-------WLDG--------------------KHVVFGHVVEG-------------MN
NP_501118          PTQ------HLDG--------------------KHTIFGRV----------AA--G--M
NP_496562          G------APELDKK--------------------HTIFGKVT-G-------------P
```

```
NP_495855        TD-------FLDN--------------------KHVVFGRVL--D------------GM
NP_496337        PCK------YLDR--------------------KHTIFGRL----------VG--G-QD
NP_495417        KQA------HLDM--------------------KYTLFGKV----------ID--G--F
NP_493378        PAD------WLDG--------------------KNTLFGEV----------TA--G--M
NP_492343        -------LDYLDDQ--------------------HTIFGQVTEG-------------L
NP_493624        TP-------WLDG--------------------RHVVFGKILEG-------------MD
P06073           TD-------WLDG--------------------KHVVFGQVVEG-------------LD
NP_175776        -------LDYLDGK--------------------HTVFGQIAEG-------------F
NP_567029        TS-------WLDG--------------------HHVVFGKVLSG-------------ME
NP_201554        SAT------HLNY--------------------KHTVFGGV----------VG--G-LA
NP_200679        TS-------WLDG--------------------RHVVFGKVVTG-------------MD
NP_181407        CD-------WLDN--------------------KHVVFGRVLG-D------------GL
NP_191166        TS-------WLDG--------------------KHVVFGKVVDG-------------YN
NP_171696        KQP------HLNG--------------------LYTIFGKV----------IH--G--F
NP_195222        AS-------WLEG--------------------EHVVLGKVIQG-------------MD
NP_195213        TS-------WLDG--------------------KHVVFGQVVKG-------------LD
NP_196816        TS-------WLDG--------------------RHVVFGQVIEG-------------ME
NP_188932        YG------LQVDG--------------------DHVVIGKVVEG-------------L
NP_191762        TS-------WLDN--------------------KHVVFGQVIEG-------------MK
NP_190046        ATP------WLDN--------------------KHTVFGRV----------VK--G--M
NP_180557        TS-------WLDG--------------------RHVVFGKVVQG-------------MD
NP_181157        PQP------SLDG--------------------KHTIFGRV----------CR--G--M
NP_179251        TS-------WLDG--------------------KHVVFGQVVEG-------------LN
NP_179709        TD-------WLDG--------------------KHVVFGQVVEG-------------LD
AAK02067         TS-------HLDG--------------------KHVVFGRVTKG-------------M
P82869           RNSGLGGLSFDEGQ--------------------FSVFGYTIAG-------------K
P05352           Y-------ESLDSLL--------------------NNVVFGKLIQG-------------K
P49181           Q-------PHLDG--------------------KHVVFGKVVEG-------------M
P05314           -------CDWLDKK--------------------HTIFGKVT-G-------------D
CSZPA            TP-------WLDG--------------------KHVVFGEVTEGM------------D-
E313994          PTP------WLDG--------------------KHTIFGRV----------VS--G--L
E1335804         TP-------WLDG--------------------HHVVFGEVLSG-------------YD
E1331567         CD-------FLDG--------------------KHVVFGEVI--E------------GY
G62327           TP-------HLDG--------------------KHVVFGKVIQ--------------GK
G62590           PAK------HLDN--------------------KHTIFGRV----------VG--G-LN
E1294518         LTP------WLDG--------------------KHTIFARA----------YA--G--L
P39728           -------LEGLDER--------------------YPIYGQVAEG-------------F
E1263915         -------TPEWNGK--------------------QTLFGRVV-G-------------D
CSBY             CP-------WLDG--------------------KHVVFGEVVDGY------------D-
G30507           CP-------WLDG--------------------KHVVFGEVTKGM------------D-
G12324           EAS------WLDG--------------------KHVVFGQVVDG-------------MD
G57050           AP-------HLNG--------------------KHSIFGQVVHG-------------K
G48567           TP-------HLDG--------------------KHVVFGEVIQ--------------GK
CSBYC3           DGN-----EELDG--------------------KSVVFGQITSG-------------LD
G63359           T--------PLEG--------------------ESVVFGQVTAG-------------LK
G38324           CP-------WLDG--------------------KHVVFGEVLDG-------------MD
PcCyP19          TQ-------WLDG--------------------KHVVFGQVLEG-------------IE
PcCyP20          PCP------SLDT--------------------KHTAFGCVDL------AWND--GESE
PcCyP21.1        TP-------WLDG--------------------RHVVFGKVVEG-------------MD
PcCyP21.3        TE-------WLDG--------------------KHVVFGQITKG-------------YE
PcCyP24.3        CP-------WLDG--------------------KHVVFGQVLRG-------------F
PcCyP26          N-------EHLDG--------------------KYVVCGQVLEG-------------W
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ΓcCyP28          TP-------WLDG--------------------KHVVFGRVTEG-------------ID
ΓcCyP30          EAP------HLNG--------------------TCICFGRVVKG-------------F
ΓcCyP35.1        MS-------WMNG--------------------RYVAFGRVIDG-------------M
ΓcCyP35.3        SEE-----KALNG--------------------RHVCFGRVVRG-------------LD
ΓcCyP40          AQ-------HLTG--------------------RHVVFGKVVRG-------------M
ΓcCyP110         VAP------WLNGK--------------------HTVFGFVVS-------------GK
ΑAT44353         TS-------WLDG--------------------KHVVFGRVTDG-------------MN
ΕAL37431         CP-------WLDG--------------------KHVVFGKVLEG-------------ME
ΕAL37232         SLP------QLNG--------------------EYVIFGRL----------ID--G--F
ΕAL37110         TP-------HLDG--------------------RHVVFGKLVD--------------D
ΕAL36265         -------LSHLDGN--------------------HVIFAQVEEG-------------I
ΕAL35294         CS-------WLDN--------------------KHVVFGQLLGHD------------SF
J68268           TA-------WLDG--------------------KHVVFGQVLDG-------------MN
J68269           TQ-------WLDG--------------------KHVVFGQVLEG-------------MN
ΑAQ15626         TP-------WLDG--------------------KHVVFGQVTKG-------------YE
ΑAB07896         TQ-------WLDG--------------------KHVVFGQVLEG-------------MD
ΑAK14937         TQ-------WLDG--------------------KHVVFGEVVEG-------------KD
ΣAC18541         CD-------FLDG--------------------KHVVFGQVV--D------------GM
Α45000           TS-------WLDG--------------------KHVVFG-EVESG------------ED
Q9Y0F5           SLP------QLNG--------------------EYVIFGKL----------ID--G--F
J47811           TE-------WLDG--------------------KHVVFNRVVEG-------------MN
J50388           CD-------WLDG--------------------KHVVFGRVVDG-------------QN
Ł46884           CS-------WLDG--------------------KHVVFGKVVSGI------------D-
Μ93420           CD-------WLDG--------------------KHVVFGRVVDG-------------QN
J50389           NP-------WLDG--------------------KHVVFGKVVEG-------------MS
G992633          TS-------WLDG--------------------KHVVFGKVVEG-------------MN
Ε323073          CD-------WLDG--------------------KHVVFGRVVDG-------------QN
Β52758           TP-------WLDG--------------------RHVVFGKVLDG-------------MD
Ε1203753         TS-------WLDG--------------------KHVVFGQVLEG-------------YE
ΣAB58290         QP-------QLDK--------------------THVVFGRVYSG-------------I
ΣAB58298         TP-------WLDG--------------------KHVVFGRVIDG-------------LD
ΑAF69736         AT-------HLTG--------------------RHVVFGRVVRG-------------M
ΑAD46565         TP-------WLDG--------------------RHVVFGKVLDG-------------MD
Α53522           TE-------WLDG--------------------RHVVFGKIT---------------T
ΝP_702112        -------AEYLNNK--------------------NTLFGKVA-K-------------H
ΝP_701512        MP-------ILHK--------------------HNVVIGTVLKG-------------MN
ΝP_701389        CP-------WLDK--------------------RHVVLGHLEYG-------------F
ΝP_701030        RQP------HLNG--------------------IYPVFGKV----------ID--G--M
ΝF01067443       TH-------TYNN--------------------KNIIIGQVIKN-------------M
ΝF01067965       CE-------WLDG--------------------KNVVFGRIIDND------------SL
ΝF01065889       PCP------WLDF--------------------KHTVFGKV----------TQ--G--S
ΝF00926916       CP-------WLDG--------------------KHVVFGKVIEG-------------MN
Β52760           TP-------WLDG--------------------RHVVFGEVVEG-------------L
J10322           CE-------WLDG--------------------KNVVFGRIIDND------------SL
ΣAB39039         CP-------WLDG--------------------KHVVFGKVIEG-------------MN
ΣAD51648         PLP------HLDG--------------------KHTIFARV----------SK--N--M
ΝF01497907       CP-------WLDG--------------------KHVVFGKVIEG-------------MN
ΝF01497552       PCP------WLDF--------------------KHTVFGKV----------TQ--G--T
ΝF01497379       TP-------WLDG--------------------RHVVFGEVIEG-------------I
ΝF01497199       CE-------WLDG--------------------KNVVFGRIIDND------------SL
ΝF01496968       IK-------KYDN--------------------KNVIIGRVIKN-------------M
ΝF01495390       MP-------ILHK--------------------HNVVIGTVLKG-------------MD
```

```
NF01495324      PLP------HLDG--------------------KHTIFARV----------SK--N--M
NF01493974      CP-------WLDK--------------------KHVVFGNLEYG-------------F
NF01493918      -------SECL----------------------------------------------
E316521         CP-------WLDG--------------------KHVVFGEVVDGF------------D-
CAC35733        -------APQLDGK--------------------HTIFGQVQEG-------------F
J47812          TD-------WLDG--------------------KHVVFGRVVDG-------------MD
J47813          TE-------WLDG--------------------KHVVFGRVVEG-------------MN
G2624966        CP-------WLDG--------------------KHVVFGQVVE-------------GY
E1317902        SCS------YLDG--------------------KHSIFGRV----------VG--G-TG
E1319851        SCS------YLDG--------------------KHTIFGRV----------VG--G-TE
G3057040        SCS------YLDG--------------------KHTIFGHV----------VG--G-TG
AAB81959        TE-------WLDG--------------------KHVVFGKVKEG-------------MN
AF023860        TE-------WLDG--------------------KHVVFGKVKEG-------------MN
AAB81961        TE-------WLDG--------------------KHVVFGKVKEG-------------MN
AAF22215        TE-------WLDG--------------------KHVVFGRVKEG-------------MS
AF243140_1      TE-------WLDG--------------------KHVVFGKVKEG-------------MN
AF252388        TD-------WLDG--------------------KHVVFGHVKEG-------------MD
CSBOAB          TE-------WLDG--------------------KHVVFGKVKEG-------------MN
NF01922219      TD-------WLDG--------------------AHVVFGRVVDHC------------LE
NF01725587      TE-------WLDG--------------------KHVVFGSVVEG-------------MD
NF01897292      EAR------FLDD--------------------EHVVFAKETVQ-------------S
CSHYAC          TE-------WLDG--------------------KHVVFGKVKEG-------------MN
NF00071027      TE-------WLDG--------------------KHVVFGKVKEG-------------MN
NF01951405      SCA------YLDK--------------------KHTVFGRV----------VG--G-FE
NF01059378      TE-------WLDG--------------------KHVVFGKVKEG-------------MN
NF01105745      TS-------WLDG--------------------KHVVFGRVVDG-------------MD
NF00495096      TE-------WLDG--------------------KHVVFGKVKEG-------------MN
NF01053198      TE-------WLDG--------------------KHVVFGQVVEG-------------LD
CSPGA           TE-------WLDG--------------------KHVVFGKVKEG-------------MN
NF01950932      KQP------HLDM--------------------KYTVFGKV----------ID--G--L
NF01951326      TS-------HLDG--------------------KHVVFGQVIK-------------GM
NF00909389      TE-------WLDG--------------------KHVVFGQVIEG-------------LN
NF01286555      TE-------WLDG--------------------KHVVFGRVVEG-------------MN
NF01737225      TS-------WLDG--------------------KHVVFGQVIEG-------------MD
NF01590839      TP-------WLDG--------------------KHTIFGRVVEG-------------Q
AAH51602        PTP------WLDG--------------------KHSIFGRV----------SH--G--L
AAT69672        TS-------WLDG--------------------KHVVFGQVIEG-------------MD
AAH54186        TS-------WLDG--------------------KHVVFGQVIEG-------------MD
AAH54168        TP-------WLDG--------------------KHVVFGKVLEG-------------TE
NF01208049      SCT------YLDK--------------------KHTVFGRV----------VG--G-FD
NF01844632      TPH-------LDG--------------------LHVVFGQVIS-------------GQ
NF01844615      -------ADELNNK--------------------HTIFGKVT-G-------------D
NF01915773      PTQ------WLDG--------------------KHSIFGRV----------SH--G--L
NF01915657      KQP------HLDM--------------------KYTVFGKV----------ID--G--L
NF01557564      TA-------HLDG--------------------KHVVFGQVLK-------------GY
AAH41536        TS-------WLDG--------------------KHVVFGRVVEG-------------MD
AAH85963        TPH-------LDG--------------------HHVVFGQVIS-------------GQ
AAH64250        CD-------WLDG--------------------KHVVFGKVI--D------------GL
AAH61335        TA-------HLDG--------------------KHVVFGQVLK-------------GY
AAH59741        TS-------WLDG--------------------KHVVFGTVIDG------------MD
AAH67931        TPH-------LDG--------------------LHVVFGQVIS-------------GQ
AAH44993        SCT------YLDK--------------------KHTVFGRV----------VG--G-FD
```

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A40516          TA-------WLDG--------------------KHVVFGKVLEG------------MD
CYPB_BOVIN      TA-------WLDG--------------------KHVGFGKVLEG------------MD
AAR19276        TE-------WLDG--------------------KHVVFGQVRGG------------MD
A46579          TP-------HLDG--------------------KHVVFGQVIK-------------GM
AAV40687        TP-------HLDG--------------------KHVVFGEVIK-------------GR
NF01637248      TS-------WLDG--------------------AHVVFGEVVEGF-----------D-
CYPR_BOVIN      AE-------RLDF--------------------KHVVFGFVKDG------------MD
CYPR_CALVI      AQ-------WLNG--------------------KHTVFGKVIEG-------------M
E1317906        PCK------YLDR--------------------KHTIFGRL----------VG--G-QD
AAB87888        TA-------WLDN--------------------KHVVFGEVVEG------------LD
AAB87889        TA-------WLDN--------------------KHVVFGEVVEG------------LD
Q9XZZ5          TS-------WLDG--------------------KHVVFGRVVEG------------LD
S63995          TS-------WLDN--------------------RHVVFGSVVEG------------MD
G1703696        TS-------WLDG--------------------KHVVFGAVTQG------------LD
J36797          TE-------WLDG--------------------KHVVFGRVVEG------------LD
AF017738        -------TPDLDKK--------------------HTLFGKIV-G-------------N
L37292          APH------LNN---------------------IHVVFGKVVS-------------GQ
AAS01736        TE-------WLDG--------------------KHVVFGQVVEG------------MD
AAO61985        SS--------FTS---------------------SPLIGLKSFS-------------L
CAC80550        TE-------WLDG--------------------KHVVFGRVVEG------------MD
AAO63777        TE-------WLDG--------------------KHVVFGRVVEG------------MN
B53522          CP-------WLDG--------------------KHVVFGKVVAG------------QE
E280557         TP-------WLDG--------------------LHNIFGIVLEG-------------A
J70827          APH------LNN---------------------IHVVFGKVVS-------------GQ
J70884          APH------LNN---------------------IHVVFGKVVS-------------GQ
J55771          TN-------WLDG--------------------RHVVFGELLE-------------G
D1024669        TS-------WLDG--------------------KHVVFGKVVKG------------MS
227879          TD-------WLDG--------------------KHVVFGFVTEG------------MD
AAD48910        TS-------WLDG--------------------RHTVFGEVIEG------------MD
AAO51811        AE-------WLDG--------------------KNVVFGKVI--D------------GL
AAF76472        KQP------HLNG--------------------LYTIFGKV----------IH--G--F
AAP80861        TS-------WLDG--------------------KHVVFGKVLSG------------MD
AAP73848        CE-------WLDN--------------------KHVVFGRVLG-D------------GM
BAB62329        PCQ------SLDG--------------------KHTIFGRV----------SK--G--M
AAL75728        AP-------WLDG--------------------RHVAFGRVVAG------------M
S48017          CS-------WLDG--------------------KHVVFGRVVEG------------MD
S48018          TT-------WLDG--------------------KHVVFGKVVDG------------YT
BAD53622        TS-------WLDG--------------------KHVVFGKVLSG------------MD
BAD53621        TS-------WLDG--------------------KHVVFGKVLSG------------MD
BAD53620        LT-------RLDG--------------------KHVVFGKVLSG------------MD
XP_507188       GPCP-----ELDG--------------------QNIVFGTVLEGMN------V--ITSI
XP_483750       ATP------WLDN--------------------KHTVFGRV----------VK--G--M
XP_483749       VPG---AIEWVYR--------------------QGDVKPKLAVSDR-----------NT
XP_482125       ELTPSN-ANILDGR--------------------YAVFGYVTEN-------------E
XP_478742       RNSGLGGISFDEGQ--------------------FSVFGYTTDG-------------R
XP_478741       RNSGLGGISFDEGQ--------------------FSVFGYTTDG-------------R
NP_385690       --------PWLNKQ--------------------YSVWGQVVEG-------------M
NP_385689       --------DFLNGQ--------------------YTVVGKVVEG-------------M
NP_349373       SP---HLDG------------------------DYAAFGRVTE-------------GI
BAD45990        -------VDYLDDK--------------------HTVFGMVAEG-------------F
BAD45991        -------VDYLDDK--------------------HTVFGMVAEG-------------F
NP_908419       ---------KLEVD--------------------QEQVGVVPNG-------------T
```

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NP_919903         ER-------QQDG-------------------MLRHPADGSQWRN-------------ID
BAD35839          TP-------HLDG---------------------KHVVFGRVIKG-------------M
AAU87301          TS-------WLDG---------------------KHVVFGQVVEG-------------LE
CAG90469          TS-------WLNN---------------------AHVVFGEVVDG-------------FD
CAG88330          CP-------WLDG---------------------KHVVFGEVVDGF------------D-
CAG88054          -------TENLKSFS---------------------QVYFGKVVEG-------------F
CAG86818          KAP------WLDN---------------------KHTIFGEV----------TD--G--F
NF01109982        TG-------WLDG---------------------KHVVFGKVVEG-------------LD
NF00686348        --------FSLDGE---------------------YTPIGRVVSG-------------M
NF00686217        --------FSLDGE---------------------YTPIGRVVSG-------------M
NF02138644        TS-------WLDG---------------------KHVVFGKVVDG-------------YS
NF00926921        TA-------WLDG---------------------KHVVFGEVLEG-------------YD
NF00909931        TE-------WLDG---------------------KHVVFGQVVEG-------------LN
NF00956595        TD-------WLDG---------------------KHVVFGELMEG-------------MD
NF02035209        TD-------WLDG---------------------KHVVFGQVVDG-------------ME
NF01329591        NS-------FLNRSA------MD----------AGYAVFGKVTK--------------GM
CAG86678          EHQN-----ILGDSS---------------------KYTAIGMVIDG-------------Y
CAG86274          ECS------WLDG---------------------KHVVFGQIING-------------F
CAG85447          -------TPEFNNN---------------------YVLFGKIM-G-------------D
CAG85287          CP-------WLDG---------------------AHVVFGEVIEGM------------D-
CAG84900          TP-------HLNG---------------------KHVVFGEVIQ--------------GK
CAG84822          QP-------HLTG---------------------KHTVFGRVIHG--------------K
CAG84723          VP-------HLDG---------------------KHVVFGEVV--E------------GF
CAG79895          TS-------WLDG---------------------KHVVFGEVLEG-------------QD
CAG78939          RAP------HLDG---------------------KHTVFGRV----------VD--N-SF
CAG82238          TP-------HLDN---------------------KHVVFGKLLS--------------GK
CAG81980          CP-------WLDG---------------------KHVVFGEVTNGM------------D-
CAG81971          TP-------WLDG---------------------AHVVFGEVTDGM------------D-
CAG81844          CP-------ELDG---------------------SHVVFGHVI--E------------GM
CAG84141          -------IPFSG-----------------------TVIGKIT-G--------------D
CAG84091          SP-------HLDG---------------------KHVAFGKVVAG-------------K
CAG83821          YP-------HLST---------------------SNTVFGRLLEPAALEYLKALGDIPVD
CAG76968          NA-------FLDHGQ------RD----------FGYAVFGKVVK--------------GM
CAG62671          SP-------HLTG---------------------KHSIFGRVIHG--------------K
CAG76052          ND-------FLNFRS------ERA-------DGWGYCVFAEVTE--------------GM
CAG59915          CP-------WLDG---------------------KHVVFGEVTKGM------------D-
CAG58658          CP-------WLDG---------------------KHVVFGEVSEGY------------D-
G3777556          TS-------WLDG---------------------KHVVFGKVVEG-------------MN
AAF65770          TE-------WLDG---------------------KHVVFGKVVEG-------------MD
BAA25755          TD-------WLDG---------------------KHVVFGQVVDG-------------LN
CSTO              TE-------WLNG---------------------KHVVFGQVVEG-------------MD
CSRP              TS-------WLDG---------------------KHVVFGQVVEG-------------MD
CSZM              TP-------WLDG---------------------KHVVFGQVVEG-------------MD
CYPH_ALLCE        TA-------WLDG---------------------KHVVFGQVVEG-------------MD
AAG01536          TE-------LLDR---------------------KAVVFGQVVEG-------------FD
AAB51386          TE-------WLDG---------------------KHVVFGQVVEG-------------LD
S54833            TE-------WLDG---------------------KHVVFGQVVEG-------------LD
K85185            TE-------WLDG---------------------KHVVFGQVVEG-------------MD
Y08273            TA-------WLDG---------------------KHVVFGQVVEG-------------MD
Y08320            TS-------WLDG---------------------KHVVFGQVVEG-------------MD
E1226445          TE-------WLDG---------------------KHVVFGKVIEG-------------MN
L32095            TP-------WLDN---------------------RHVVFGHVIEG-------------LD
```

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CAA10766          CD-------WLDN--------------------KHVVFGRVLG-E------------GL
AAF69796          TS-------WLDG--------------------KHVVFGEVSSGQ------------D-
AAF69795          TS-------WLDG--------------------KHVVFGEVSSGQ------------D-
CSNCM             TS-------WLDG--------------------RHVVFGEVADDE------------SM
NF01287451        -------TDYLDGK--------------------AAIFGKVVEG--------------F
NF01527836        KAP------HLDG--------------------LNTVFGKL----------IG--DESL
NF01488902        PTP------WLDG--------------------KHTIFGRV----------KK--G--M
NF00648058        TP-------HLDG--------------------KHVVFGEVLS--------------GK
NF01487278        TS-------WLDG--------------------KHVVFGEVLEG-------------YD
NF01486260        KTP------WLDN--------------------KHTIFGRG----------VQ--G--L
NF00904102        TS-------WLDG--------------------KHVVFGEVLEG-------------YD
NF01484914        -------TDYLDGK--------------------AAIFGKVVEG--------------F
NF01484255        TP-------FLDG--------------------KHVVFGKVV--D------------GM
NF01483993        -------ADELTGK--------------------NTMFGRVA-G--------------D
NF01533203        TE-------WLDG--------------------KHVVFGQVVYG-------------MD
NF01483647        PAS------HLDR--------------------KHTIFAKV----------IE--G-QD
G71849            TS-------WLNG--------------------RHVVFGEVADQE------------SL
J17900            TS-------WLDG--------------------RHVVFGKVIEG-------------MD
NF00873669        TS-------WLDG--------------------KHVVFGEVIDGM------------N-
NF01527595        AP-------WLDG--------------------KHVVFGEVIEGM------------D-
NF01539217        TS-------WLDG--------------------KHVVFGEVADDE------------SL
D1035365          TA-------WLDG--------------------KHVVFGEVLEG-------------YD
YP_116397         NA-------FLNHTA------PSP-------SGWGYAVFGQVVD--------------GT
YP_119877         SQ----LPP------------------------QYTIFGTVDE-N------------SM
CAD25897          QHH------LDG--------------------KHVVFGNVSG----------------
CAD26352          TQ-------WLDE--------------------KHVVFGEVVEGM------------D-
AAD17998          TP-------WLDG--------------------KHVVFGEVLEG-------------YD
G2959712          TA-------WLDG--------------------KHVVFGKVCKG-------------MD
CSNCC             TS-------WLDG--------------------RHVVFGEVADDE------------SM
AJ006689          TS-------WLDG--------------------KHVVFGEVADEK------------SY
AAF28343          PTP------WLDG--------------------KHTIFGRV----------KS--G--M
AAD50375          TP-------HLNG--------------------GHTVFGEVVE--------------GF
AAK21908          TP-------WLDG--------------------KHVVFGEVSKG-------------ME
AAG13968          TS-------WLDG--------------------KHVVFGEVVSGF------------ED
BAB58884          TS-------WLDG--------------------KHVVFGEVVSGF------------ED
E1363908          TS-------WLDG--------------------KHVVFGEVIDGM------------N-
AAD16142          TS-------WLDG--------------------KHVVFGEVADAE------------SM
G1764137          TP-------WLDG--------------------KHVVFGKVIEGY------------DQ
Z32674            TS-------WLNG--------------------HHVVFGEVADQE------------SL
JT0686            TS-------WLDG--------------------RHVVFGEVADEE------------SM
CSCK              CP-------WLDG--------------------KHVVFGEVTDGL------------D-
NP_986490         CP-------WLNG--------------------KHVVFGEVSEGM------------D-
NP_985014         CP-------WLDG--------------------KHVVFGEVTKGM------------D-
NP_984799         AP-------HLNG--------------------KHSIFGQVIHG--------------K
NP_984183         TP-------HLDG--------------------KHVVFGEVIQ--------------GK
NP_982586         EPL-----EENDG--------------------KNVVFGQVYDG-------------LE
NP_982486         TP-------WLDG--------------------RHVVFGQVLDG-------------MD
AAT09096          TS-------WLDG--------------------RHVVFGRVLEG-------------TD
YP_014938         DMPADMLGQMEQAGFPVEIIEAYK-QGGTPWLDGRHTVFGHVIEG--------------M
NP_951950         NA-------FLDNRG------KTP-------DLFGYAVFGQVVE--------------GM
NP_935388         NE-------FLDYDL----------------QPPGYAVFGQVTE--------------GF
NP_907765         RTP------WLNG--------------------KHTIFGEV----------SK--G--F
```

```
BAC91249        PELNPTGKNLSDG--------------------KYANFGYITQG-------------I
BAC90551        PS-----IRALDGR--------------------YAVFGRVVSG-------------M
BAC89441        NEMVNPRGNFLDGR--------------------YTVFGYVVDG-------------L
BAC88914        --------RQLDGE--------------------YAVFGKVLEG-------------Q
AAV50868        IRPS-NVLDELDR--------------------DQVVIGQVYGG-------------L
AAV82698        NT-------SLNP-D------NGD---------WGYAVFGRIVE-------------GL
AAV81872        NA-------FLNFQN------ETP-------NGYGYCVFAEVVE-------------GM
NP_736022       ---QDHSKQLSDKKVPKVIIKAYS-EGGNPSLDGGYTVFGQVISG-------------M
NP_734780       KIPYAKK-ELERGGWPTPIAELYAGQGGTPHLDRRHSVFGQLVNQS------------SF
YP_085398       QP---HLDG-----------------------VHTVFGKATS-------------GI
NP_643098       SPR------QLDR--------------------NITVVGRVVKG-------------M
NP_641352       TP-------WLDG--------------------KHTVFGKVTQG-------------L
BAB76758        ELTPAG-RNLLDGR--------------------YSVFGYLIEG-------------R
YP_129479       ND-------FLDYTA------TSN-------AGWGYAVFGKVSA-------------GM
YP_129310       NK-------FLDFKS------ETP-------DGWGYCVFAEVVE-------------GM
YP_129032       NS-------FLNAQG----------------GRAGYAVFGEVVK-------------GF
YP_101389       FNDS----TLLNME--------------------QQKNQNKVTEAFN---------ALAQ
YP_087816       ND-------FLNFTE------ESQ-------QGWGYAVFGKVTE-------------GM
YP_087815       NA-------FLDYRAKEMFGREVV-------QEWGYAVFGEVVE-------------GM
YP_076496       SCGGLDQQP-----------------------VYVIFGQLIEGD------------DV
AAT91289        TS-------WLDG--------------------VHVVFGEVVEGF------------D-
AAT91260        TS-------WLDG--------------------VHVXFGEVXEGF------------D-
NP_868477       TP-------WLDG--------------------KHVVFGRVIEG-------------MD
NP_867717       QP-------HLDN--------------------RHSVFGKVIEG-------------Q
NP_867158       TD-------FLDFN--------------------HSVFGQLVE-------------GE
NP_865515       VTS-------ASS--------------------NQTVFGRVIEG-------------M
NP_992233       ND-------FLNFRS------ERP-------DGWGYCVFAEVTD-------------GL
NP_991569       NA-------FLDHGQ------RD----------FGYAVFGKVVK-------------GM
NP_280624       QP-------HLDG--------------------RHAVFGAVTDG-------------M
BAC18575        SP----LPP-----------------------VYTYFGQITE-E------------GL
BAC16839        TP-------HLNN--------------------AHTIFGEVTDPE-----------SQ
BAB82272        SP---HLDG-----------------------QYASFGKVIE-------------GM
BAB99042        SP----LAP-----------------------NYTYFGQITE-E------------GL
BAB97427        TP-------HLNN--------------------AHTIFGEVTDAE-----------SQ
BAC08372        ELTPAG-LNLLDGR--------------------YAVFGYVVEG-------------E
BAC07690        ------QLDFLDGN--------------------YAVFGYVTDG-------------M
YP_072215       NA-------FLDHGQ------RD----------FGYAVFGKVVK-------------GM
YP_069574       ND-------FLNFRS------ERP-------DGWGYCVFAEVTD-------------GL
NP_778719       TP-------WLDG--------------------KHTVFGKVLDG-------------Q
NP_245881       NT-------FLDHRSKELFGKKVV-------QEWGYAVFGEVVE-------------GM
NP_245880       ND-------FLNFSA------ETQ-------KGWGYAVFANVVA-------------GM
NP_354667       --------PFLNGQ--------------------YTVVGKVVSG-------------M
NP_354666       --------PWLNKQ--------------------YTVWGQVIEG-------------M
NP_298502       TP-------WLDG--------------------KHTVFGKVVDG-------------Q
AAN39296        TG-------WLDG--------------------KHVVFGKVVEG-------------LD
AAQ24380        TD-------WLDG--------------------KHVVFGSVVEG-------------MD
ZP_00353225     TS-------HLNG--------------------KHTIFGEVADDA-----------SR
ZP_00244808     ND-------FLNFKS------ESP-------QGWGYAVFGKVVA-------------GT
ZP_00244807     NA-------FLDPAN-------SR-------DGNGYAVFGKVIE-------------GM
ZP_00358245     QP-------HLNG--------------------RHTVFGRVVAG-------------M
ZP_00350273     ND-------FLNFTA------PTS-------QGWGYAVFGKVTA-------------GT
ZP_00129494     NP-------DLDHQD------DSD-------AGFGYCVFGAVVE-------------GM
```

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ZP_00130259       NA-------FLNHRG------KSL-------SGWGYAVFGKVVK--------------GK
ZP_00136576       ND-------FLNHGA------RD----------FGYAVFGKVVR--------------GM
NF01760157        NN-------YLDKKH--------------------PVFGKVIN--------------GM


CSHUA             -IVEAMER------------FGSRNGKT-----SKK------ITIADCG---QLE----
NP_839944         -IVEAMEH------------FGYRNSKT-----SKK------ITIADCG---QF-----
NP_115861         ETLDELEKLPVNEKT--------YRPLND-------------VHIKDITIHANPFAQ--
NP_570981         ETLDELEKLPVNEKT--------YRPLND-------------VHIKDITIHANPFAQ--
NP_057143         GMVNRVGMVETNSQ---------DRPVDD-------------VKIIKAYPSG-------
CSHUB             -VVRKVEST-------------KTDSRD---KPLKD------VIIADCG---KIEVEKP
366681            -VLRQIEAQ--------------GSKDG---KPKQK------VIIADCG---EYV----
A57545            -TVKKIES------------FGSPKGSV-----CRR------ITITECG---QI-----
A41581            -VVKKIES------------FGSKSGRT-----SKK------IVITDCG---QLS----
A54204            -VVHSIELQ-------------ATDGHD---RPLTN------CSIINSG---KIDVKTP
364705            -VLTAMENVESDPKT--------DRPKEE-------------IRIDATTVFVDPYEEAD
D38552            EVVQRISNVKVNPKT--------DKPYED-------------VSIINITVK--------
NP_624311         DIIKKINETFVD---------KDFVPYQDI-------------RINHTVILDDP-----
G2708309          LVMRKIEN--------------VPTGP-----NNKPKL---PVVISQCG---EM-----
A45981            GVARILENV--------------EVKG------EKPAK---LCVIAECG---ELKEGDD
J40763            EVVREIENQKTD---------AASKPFAE-------------VRILSCGELIPKSKVK-
A47328            EVIEQIENLKTD---------AASRPYAD-------------VRVIDCGVLATKSIKDV
XP_531396         -IVEAMER------------FGSRNGRT-----SKK------ITIADCG---QLERYQF
XP_525294         -IVEAMER------------CGSRNGKT-----SKK------ITIADCE---QL-----
XP_523512         -IVEAMEH------------FGSRNGKT-----SKK------ITTADCG---QLEYV--
XP_507866         -AISLVDSALSWVLSSQLPLETGTESNRKS--FLSKE------LLVSTAPGDVEMQAVFA
XP_517783         -IVEAMEH------------FGYGNGKT-----SKK------TTISDCG---QF-----
XP_517773         -IVEAMEH------------FGYRNGKT-----SKK------ITIA-------------
XP_526904         -ILEAMEC------------LGPGMERP-----ARRSP---FLTVDNSN---KFDL-CF
XP_516556         --GWMASM------------WPLA----------------------------------
XP_526001         -IVEAMER------------FGSRNGGT-----SKK------ITTADCG---QL-----
XP_516021         ETLDELEKLPVNEKT--------YRPLND-------------VHIKDITIHANPFAQ--
XP_515886         EVVREIENQKTD---------AASKPFAE-------------VRILSCGELIPKSKGKN
XP_525218         -IVEAMEH------------FGYRNSKT-----SKK------ITIADCG---QF-----
XP_507684         -IVEAMER------------FGSRNGKT-----SKK------ITIADCG---QLE----
XP_524688         LVMRKIEN--------------VPTGP-----NNKPKL---PVVISQCG---EM-----
XP_513346         -VLRQIEVA-------------PDTKAS---KARGS------RKNTDGQ---ERNWGKS
XP_524598         -VVEAMER------------FGSRNGKT-----SKK------ITIADCG---QLQQI--
XP_515004         SGWVSPWHSGVNPGL--------SWLCRG-------------LPPAHCHTWSRLCGLAP
XP_523437         -LWRPWST------------LGPGMAKT-----SKK------ITIANCG---QLE----
XP_520485         --GKTSKK------------ISIADCRQ-----L----------------------
XP_519076         -IVEAMER------------FGSRNGKT-----SKK------ITIADCG---QLE----
XP_527705         -FGGHRAI------------WVQEWQDQ-----QEDHH---C----------------
XP_527529         ----------------------------------------------------------
XP_518678         ----------------------------------------------------------
CSMSA             -IVEAMER------------FGSRNGKT-----SKK------ITISDCG---QL-----
NP_598845         -VVKKIES------------FGSKSGKT-----SKK------IVITDCG---QLS----
AAH58369          GMVNRVGMVETNSQ---------DRPVDD-------------VKILKAYPSG-------
A56861            -VVRKVEST-------------KTDSRD---KPLKD------VIIVDSG---KIEVEKP
A40047            -VVHSIELQ-------------ATDGHD---RPLTD------CTIVNSG---KIDVKTP
NKCR_MOUSE        EVIEQIENLKTD---------AASRPYAD-------------VRVIDCGVLATKLTKDV
AAH61645          ETLDELEKLPVNEKT--------YRPLND-------------VHIKDITIHANPFAQ--
```

```
BAC41068          -TLTAMENVESDPKT--------DRPKEE-------------VLICTTTVFVDPYEEAD
BAC34686          GVARTLENV--------------EVNG------EKPAK---LCVIAECG---ELKEGDD
BAB30711          DIVKKINETFVD---------KDFVPYQDI-------------RINHTVILDDPFDDPP
BAB25645          LVMRKIEFQ-------------APLGKRVQAWTHSLTC---PALTGILA---LILMPTE
BAB23880          LVMRKIEN--------------VPTGP-----NNKPKL---PVVISQCG---EM-----
NF00527760        -TVRKIES-------------FGSPKGSV-----SRR------ICITECG---QL-----
NF01138503        EVVQRIFNVKVNPQT--------DKPYED-------------VSIINITVK--------
NF00510830        -VLRQIEAQ--------------GSKDG---KPKQK------VMIADCG---EYM----
NF00510932        GMVNRVGMVETNSQ---------DRPVDD-------------VKILKAYPSG-------
NF01595779        -IVEAMEC-------------FGSRNGKT-----SKK------ITIYDCG---QL-----
NF02014914        -TVEAMEH-------------FGSRNGKT-----SKK------ITISDCG---QL-----
NF01930249        -IVEAMER-------------FGSRNGKT-----SKK------ITISYCR---QL-----
NF01929278        -IVDAMER-------------FGSRNGKT-----SKK------ITISDCG---QL-----
NF00523006        -IVEAMER-------------FGSRNGKT-----SKK------ITISDCG---QL-----
NF00508381        -IVEAMER-------------FGSRNGKT-----SKK------ITISDCG---QL-----
NF01215170        ETLDELEKLPVNEKT--------YRPFND-------------VHIKDITIHANPFAQ--
CSRTA             -IVEAMER-------------FGSRNGKT-----SKK------ITISDCG---QL-----
NP_783638         ETLDELEKLPVNEKT--------YRPLND-------------VHIKDITIHANPFAQ--
NF01612782        GVARMLENV--------------EVNG------EKPAK---LCVIAE------------
NF01612825        -VLRQIEAQ--------------GSKDG---KPKQK------VIIADCG---EYM----
NF01607941        SVARMLENG--------------EVNG------EEPAK---LCVIAECG---ELKEGDD
NF01607846        -VVEVVER-------------LGPGMARP-----ARRSP---FPTVDDSN---FFDLWAF
NF01609144        -VVHSIELQ-------------ATDDHD---RPLTD------CTIVNSG---KIDVKTP
NF01608897        -GHFTHQT-------------IPSVAQES-----APTPS---ARNTL------------
NP_758443         -VVKKIES-------------FGSKSGKT-----SKK------IVITDCG---QLS----
AAH61971          -VVRKVENT-------------KTDSRD---KPLKD------VIIVDCG---KIEVEKP
G2828710          EVVREIENQKTD---------AASKPFAE-------------VRILSCGELVPKSKVKK
B38388            -VVKKIES-------------YGSQSGKT-----SKK------IIVANSG---SL-----
AF132148          EVLRKLNDAIVD---------DSFRPYQDI-------------RITHTVVLEDPFPNP-
NP_611113         -TLQKMENIEVDN-K--------DRPIED-------------IIIESSQV---------
NP_611695         -VVRQIENS-------------ATDARD---RPVKD------VVIANSG---TLPVSEA
NP_610590         DALDELEKLPVNPKN--------YRPHVD-------------KKINGVTIHANPLAT--
NP_648697         -IVQKVES-------------YGSQDGKT-----SKK------VIIEDCG---AL-----
NP_648508         TIYNMLKLEDGIVD------HQERPMHAH---------------RIVSTEVLS-------
NP_648338         GIVAEME-------------QNCTDEGDP-----TAP------IVIRDCG---EIAHNED
NP_476656         DTIYAIEDVKTDTD---------DFPVEP-------------VVISNCGE---------
NP_523874         EVVKRIGMVETDKN---------DRPVDP-------------LRIIKAKVEKL------
NP_523773         -VVRKMERC-------------GSKSG---TPSQK------IVIYSCG---ELK----
NP_610224         LIMRKIEN--------------VPTGP-----NNKPKL---PVTISQCG---QM-----
NP_733246         ELVRQLEGLPVD---------RNSRPLQD-------------AAIANCGELVRQTKA--
NP_611935         EVVLNICNSKANPKT--------DKPYDD-------------IKIISIHLSN-------
EAA03569          GIVGEME-------------RHSNDDGDP-----LVP------IVIEDCG---QIAPGDD
EAA03948          -VVRKIEST-------------ATDGRD---RPTND------VEIADSG---SLPVSEP
EAA04625          LIMRKIEN--------------VPTGP-----NNKPKL---PVVISQCG---QL-----
EAA06299          -VVRKIES-------------FGSHSGKP-----SKQ------ITVANCG---QL-----
EAA08127          DLVRQLEQLPVD---------RNSRPLQD-------------AMVSNCGELVRQVKGKT
EAA09839          -VLTEMERVEVDN-R--------DRPIEN-------------IFIQRAQV---------
EAA10133          EIVQNICNAKTNPKT--------DKPYDE-------------IRIISINLS--------
EAL39647          EVLRKLNEVICD---------DRHRPYKDV-------------RITHTVVLDDPFED--
EAA13913          EALDELEKLTVNPKT--------YRPVVE-------------KKINSVTIHANPLAG--
EAA13914          AVVHKVEQVRTDTD---------DYPVKP-------------VIIEDCGDLPILGPFTV
EAA14200          -VVRKMERC-------------GSKGG---RVQQK------VTIVACG---EVK----
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EAA01474        DLVEKISQAG-------------DSAGKPQS-----------TVLIANCG---KWQ----
KP_321072       DLVEKISQAG-------------DSAGKPQS-----------TVLIANCG---KWQ----
KP_320182       QVVKRIGLVETDKN---------DRPVEP--------------VKIVKGKVEKY------
KP_319131       AVVHKVEQVRTDTD---------DYPVKP--------------VII--------------
KP_311949       RFTAEQPQLP-------------------------------------------------
CAI11739        EVLKRLEAVP-----------TYNERPKQD--------------CKIVACG-IFEF-----
AAQ91263        -VVDAIEK-------------KGSSSGKC-----SAK------VVIANCG---QL-----
NP_001004626    -TVSLMES-------------YGLHDGGT-----VKK------VAITDCG---ELK----
NP_001002065    GVVKMLEAM--------------ETKE------DNPVK---PCVIAECG---EHKAGDD
NP_957499       LVMRKIEAV--------------VFINF--IGTAQNKIS---STITLPNA---DL-----
AAQ94596        LVMRKIENV--------------P------TGPNNKPKL---PIVVSQCG---EM-----
NP_998184       -VVRKIEAT--------------KTDGRD---KPLKD------VSIHDSG---KIDVEKP
NP_001002146    ETLDEIEKLPVNEKT--------FRPLND--------------VRIKDVTIHANPFAG--
AAQ91264        -VIKKVEG-------------FGSSSGKT-----SAK------IIIADCG---QL-----
AAH59458        -VIKKVEG-------------FGSSSGKT-----SAK------IIIADCG---QL-----
AAH56814        DVLAKINETFVD---------NDFIPFQDI--------------RINHTVILDDPFDDPA
AAH62863        -VIKKVEG-------------FGSSSGKT-----SAK------IIIADCG---QL-----
NP_998629       DVIRMIESQKTD---------TNSRPYAE--------------VKVLNCGELVPKSKAKK
NP_957285       -TLSAMENVESDPKT--------DKPKSE--------------IKILSTS----------
NP_506749       -IVSKVEG-------------NGSSSGTP-----KS------ECLIADCG---QL-----
NP_506561       -VVKKIEK-------------MGSRSGAP-----AK------TVTIADCG---ELKSE--
NP_504522       EILETIVKEYGS---------ENGRPGKK--------------LIVHNCGHL--------
NP_506751       -VVKAVES-------------NGSQSGKP-----VK------DCMIADCG---QLKA---
NP_497745       NVVDYIDNLAVD---------DKSKPLAK--------------VLISNCGELVKK-----
NP_499828       -VVKAIES-------------KGSEDGAP-----SA------PCVIADCG---EMK----
NP_497257       -VVREIEAT--------------PKGAGD---RPIED------VVIANAG---HIPVENP
NP_509506       EVVKAIENLETG---------NEDKPVCK--------------VEITHCGEMVRK-----
NP_503034       -IVRQVEQQ--------------GTPSGK----PQMV------VKIVESG---EIE----
NP_501118       KVIANMGRVDTDNH---------DRPKIE--------------IRILKAYPSESSVLS--
NP_496562       TLFNMLKITEVET-------EGDRPVTFY---------------KITGARIDN-------
NP_495855       LTVRKIEN---------------VPTGA-----NNKPKL---PIVVVQCG---QL-----
NP_496337       -TLTTIEKLETEEGT--------DVPMVS--------------VVIMRAEVFVDPF----
NP_495417       DTLEEIETIKVDNK---------YRPLVQ--------------QK--------------
NP_493378       SVVQRINQVSTFERS--------GRPRES--------------IQIMSISLK--------
NP_492343       ETLEKLNEQLAD---------TNNRPFKDI--------------RISHTIVLDDPFDEDA
NP_493624       -VVRKIEQT--------------EKLPGD---RPKQD------VIIAASG---HIAVDTP
P06073          -VVKAIEK-------------VGSSSGKP-----TK------PVVVADCG---QLS----
NP_175776       DTLTRINEAYVD---------PKNRPYKNI--------------RIKHTHILDDPFDDPP
NP_567029       -VVRKIEA---------------QGQDSG---VPKAN------VIIFASG---EVSL---
NP_201554       -TLAAMENVPVDE-S--------DRPLEE--------------IKIIEASVFV-------
NP_200679       -VVYKVEA---------------EGNQSG---TPKSK------VVIVDSG---ELPL---
NP_181407       LVMRKIEN---------------VAIGP-----NNRPKL---AVVITECG---EM-----
NP_191166       -VVKAMED-------------VGSDMGNP-----SE------RVVIEDCG---ELKNPSS
NP_171696       EVLDIMEKTQTGPG---------DRPLAE--------------IRLNRVTIHANPLAG--
NP_195222       -NVFAIEGG--------------AGTYSG---KPRKK------VVIADSG---EIPKDKW
NP_195213       -VVKAIEK-------------VGSDSGKT-----SK------VVTITDCG---QLS----
NP_196816       -VVKLIEEQ--------------ETDRGD---RPRKK------VVIADCG---QLPMSEA
NP_188932       DLMRNIEKE-----------VITTTTRTP-----SKP------VVIADCG---ELSDYRS
NP_191762       -LVRTLESQ--------------ETRAFD---VPKKG------CRIYACG---ELPLDA-
NP_190046       DVVQGIEKVKTD-KN--------DRPYQD--------------VKILNVTVPKS------
NP_180557       -VVYKIEA---------------EGKQSG---TPKSK------VVIADSG---ELPL---
NP_181157       EVIKRLGSVQTDNT---------DRPIHE--------------VKILRTKVID-------
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NP_179251          -VVRDIEK------------VGSDSGRT-----SK------PVVIADCG---QIS----
NP_179709          -VVKAIEK------------IGSSSGKP-----TK------PVVIADCG---EISS---
AAK02067           GVVRSIEHVSIE---------EQSCPSQD-------------VVIHDC----------
P82869             DILGQIKTG-------------DIIKSAK-------------LIEGQDRLSLPVQNNN
P05352             EILKKIE------------RVGDEEGKP-----TVS------VKIIRCG---EY-----
P49181             AVIKKME------------LVGTSDGKP-----TSP------VKIIDCG---ETS----
P05314             SIYNLLRLGEVDTS------KDDRPLDPAP-------------KILSVEVLW-------
CSZPA              -VVKKVESL------------GSNSG-----ATRAR------IVIDKCG---TV-----
E313994            SVCKRMGLIRTDSS---------DRPIEP-------------LKIIKAVALDKCGTVPN
E1335804           -IVKKISKA-------------ETDNRD---KPLED------VKIIKSG---QLSQENV
E1331567           DIVKEIES--------------TPVG-----ANSRPKS---NVAIVECG---EM-----
G62327             STVRTIENL---------------ETKN-----DDPVV---PVVIEECG---TCTKDQI
G62590             -VLDALEKVPTNS-N--------DHPKLP-------------IKLEDIIIFVDPFEEWK
E1294518           DVVHRIEQGETD-KY--------DRPLEP-------------TKIINISIVYT------
P39728             DTLLKINDAICD---------EEGQPYRDI-------------RIKHTIILDDPFEDPP
E1263915           TIYNVVRISELELD------ANQRPVFPP---------------KIISTEVID-------
CSBY               -IVKKVESL------------GSPSG-----ATKAR------IVVAKSG---EL-----
G30507             -IVKAIESY------------GTASG-----KPRAE------IVIEEAG---EL-----
G12324             -VVNYIQHV-------------SRDAND---KPLEA------VKIAKCG---EWTPELS
G57050             SVVRTIENCR------------VDSDGVP-----------ESDVRISDCGVWEKT-----
G48567             RIVRLIENQ-------------QCDQEN-----NKPLR---DVKIDDCG---VLPDD--
CSBYC3             QLMDAIQYTETD---------EYGKPQHE-------------LRFLYFVLEILKISNIL
G63359             DLMDKLANVKTD---------ENGKPEQP-------------ITIGYISSQEHRIQ---
G38324             -VVHYIENV-------------KTDSRN---MPVKE------VIIVESG---ELETVPL
PcCyP19            -VVKAMEA------------VGSQTGKT-----SK------PVKIEASG---QL-----
PcCyP20            RTLKKLEELRVDDKY--------NVLDKD-------------AKIVGTTVMYNPFAEGH
PcCyP21.1          -VVKKVENT-------------KTGLND---KPKKA------VKINDCG---VL-----
PcCyP21.3          -VIEKVEA------------NGSRSGAT-----RQ------PILITDCG---EVKNN--
PcCyP24.3          DHVKAIEEVGTPHG----------KPSKT-------------VLVSDCGVLKEAS----
PcCyP26            DLVERVA-A-----------LCGSRCGVP-----VSR------AWITDCG---QSSGAKL
PcCyP28            -VVRRVER------------LGSESGKT-----RG------RIIIADCG---EVVVPEP
PcCyP30            DAVEEIERVPLTP---------SGFPSRR-------------VTIVDCGRL--------
PcCyP35.1          NVVEAIHDVD------------VKHNQSP-----------CKVITISDCGVIDLTDN---
PcCyP35.3          EFLREVAPYG------------EINGNPSR-----------FVVVVDCGVGPLPETLGI
PcCyP40            NTVRALEHTETG---------ANDKPVKP-------------CVIVDCGVTD-------
PcCyP110           PVVRAIVQTARDD--DDK--PIAPVVIRR-------------VVATERTTEK-------
AAT44353           -VVKAMEA------------TGSQSGKP-----SKP------IKIENCG---QL-----
EAL37431           -VVKSIEKC------------GSQNGKP-----TKS------VCITASG---VLS----
EAL37232           ETLNALENCPSDKS---------HKPIDE-------------IIIKDIVIHSNPIADQE
EAL37110           ESKLTLTKIEQLGSYS-------GRTSKR-------------IEVTACSHYSGTPPSAK
EAL36265           PILSKLNQVITD---------ENSIPLQKV-------------MILHTYILDDPFEDSL
EAL35294           ATLKKIEN--------------ATVLP----PNSKPKI---PIIIYECG---QL-----
J68268             -VVEGMEA------------VGSQTGST-----DK------PVMISESG---QL-----
J68269             -VVKAVEG------------VGSQSGST-----TK------AVKIDSCG---QL-----
AAQ15626           -VIEKVET------------NGSQSGAT-----RQ------PITIMDCG---QIEQG--
AAB07896           -VVKAMEA------------VGSQGGST-----SK------PVKIDSCG---QL-----
AAK14937           -VVRAVEA------------VGTQSGKP-----TKP-----VV--------------
CAC18541           LVLKKIEN--------------VPTGP-----HNRPKV---PVVITQCG---EM-----
A45000             -VVKDMEA------------VGSSSGKT-----SQE------VLITDCG---QL-----
Q9Y0F5             ETLNTLENCPSDKS---------HKPIDE-------------IIIKDIVIHSNPIADQE
J47811             -VVKAVES------------KGSQSGRT-----SA------DIVISDCG---QL-----
J50388             -VVKKMESV--------------GSKSG---KVKEP------VIISRCG---ELI----
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L46884          -VVKKMESL-------------GSTSG-----KPSKK------IIIEDCG---EC-----
M93420          -VVKKMESV--------------GSKSG---KVKEP------VTISRCG---ELI----
J50389          -VVRQIENM--------------QTDSRD---RPVKS------VKIANCG---HIPVDVP
G992633         -IVRQIESE--------------TTDSRD---RPVKS------IKIASCG---HIPVEIP
E323073         -VVKKMESV--------------GSKSG---KVKEP------VIISRCG---ELI----
S52758          -VVVRIEKT--------------KTNSHD---QPGEAREDRCQWRAVERE---GVRWVVA
E1203753        -VVKAMEA-------------VGSRSGTT-----SK------PVRVSACG---QL-----
CAB58290        HTLEQISHMQVDADFVLYSPVTVMKCSTALLSRGTAPQSATARAAPASCVVTSQYPSSIL
CAB58298        -VVKKVER-------------LGSSSGKT-----RS------R-----------------
AAF69736        NTVRAVEQTPTA---------ANDKPVVD--------------CVIAGCGTLDALPE---
AAD46565        -VVLRIEKT--------------KTNSHD---RPVKP------VKIVASG---EL-----
A53522          ESWPTVQAIEALGGSG-------GRPSKV--------------AKITDIGLLE-------
NP_702112       SIYNLLKFNNIKTN------KHDKPIEDIP--------------YIEYVKIIE-------
NP_701512       -IIRMIENVGT----------KLGHPMYN--------------VRIVNCGLYKGLEKD--
NP_701389       DTLSFIEEQGTLIG----------KPKKQ--------------VFIYNCGVIPLDKIK--
NP_701030       DVLSVLENEPVGEK---------SRPIKD--------------IIIETITIHANPIAEEE
NF01067443      HILRAIEMLPTCN---------NGNPKVL--------------LYISDCNEVNEAFFKKE
NF01067965      ILLKKIEN---------------VSVTP----YIYKPKI---AINIVECG---EL-----
NF01065889      KIVLDIEKVRTD-KR--------DKPLED--------------IKILNIKINN-------
NF00926916      -VVREMEKE-------------GAKSGYV-----KRS------VVITDCG---EW-----
S52760          DKLVHIEAVGTDSGE----------PLKR--------------VLVKESGELPL------
J10322          ILLKKIEN---------------VSVTP----YIYKPKI---AINIVECG---EL-----
CAB39039        -VVREMEKE-------------GAKSGYV-----KRS------VVITDCG---EL-----
CAD51648        TCIENIASVQTTAT---------NKPIFD--------------VKILRTSTAVNVD----
NF01497907      -VVRDMERE-------------GSNSGYV-----KRP------VVITNCG---EL-----
NF01497552      KVVLDIEKVRTD-KR--------DKPLDE--------------IKILNIKINH-------
NF01497379      EKLVQIEAVGTDSGK----------PLSR--------------VLVTKSGVL--------
NF01497199      LLLKKIEN---------------VSVTP----YIYKPKI---PINVVECG---EL-----
NF01496968      HIIRAIELLPVNN---------FYQPKVN--------------IYISDCNEIHE------
NF01495390      -IIRTIETMGT----------KLGNPMYD--------------IKIIN------------
NF01495324      TCIENIASVQTTAT---------NKPIFD--------------LKILRTSTAVNAD----
NF01493974      DTLSYIEEQATLIG----------KPKKQ--------------VYIYNCGVIPLDKIKYK
NF01493918      --YNLIKFNNIKTN------KNDEPIEDIP--------------YIEYVKVIE-------
E316521         -TLELFKKN-------------SSQQG-----KPKTT------IKIVDSG---VV-----
CAC35733        EVLQQINRTHID---------DDGRPLLNI--------------RIKHTYILDDPFEDIP
J47812          -VVQKIEA-------------VGSQSGKT-----SK------DVVVANCG---QL-----
J47813          -VVKAIES-------------KGSQSGRT-----SA------DVVITDCG---QL-----
G2624966        DVVKMIENN--------------PTGAQ-----DKPKK---AVVIADCG---QL-----
E1317902        -TLAAIEKVETDE-G--------SRPIAD--------------VLFLNSEIFVDPFEEAE
E1319851        -TLNAIEKIETDE-S--------SRPIID--------------VIFLNAEIFVDPFEEAE
G3057040        -TLNTIEKIETDE-S--------GRPIVD--------------VIFLNAEIFVDPFEEAE
AAB81959        -IVEAMER-------------FGSRNGKT-----SKK------ITIADCG---QLE----
AF023860        -IVEAMER-------------FGSRNGKT-----SKK------ITIADCG---QLE----
AAB81961        -IVEAMER-------------FGSRNGKT-----SKK------ITIADCG---QLE----
AAF22215        -IVEAMEH-------------FGSENGKT-----SKK------ITIANCG---QL-----
AF243140_1      -IVEAMER-------------FGSRNGKT-----SKK------ITIADCG---QI-----
AF252388        -VVKKIES-------------FGSKSGET-----S-----------------------
CSBOAB          -IVEAMER-------------FGSRNGKT-----SKK------ITIADCG---QI-----
NF01922219      -VLEDLEA-------------VGSKSGKP-----SHE------VEIVDCG---QL-----
NF01725587      -VVKKIES-------------YGSQSGKT-----SEK------IIVADCG---QL-----
NF01897292      FFWKAERVVKAFHMT---------LAIEK--------------LKTRSFSYNST------
CSHYAC          -IVEAMER-------------FGSRNGKT-----SKK------ITISDCG---QL-----
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NF00071027      -IVEAMER------------FGSRNGKT-----SKK------ITIADCG---QLE----
NF01951405      -TLTAMENVESDPKT-----------------------------------------
NF01059378      -IVEAMER------------FGSRNGKT-----SKK------ITIADCG---QLE----
NF01105745      -VVKNIES------------VGSQSGQT-----KK------PVVVANCG---EL-----
NF00495096      -IVEAMER------------FGSRNGKT-----SKK------ITISDCG---QL-----
NF01053198      -IVKAIEK------------VGSSSGRT-----SK------PVVVADCG---QLS----
CSPGA           -IVEAMER------------FGSRNGKT-----SKK------ITIADCG---QI-----
NF01950932      ETLDELEKLPVNEKT--------YRPLND-------------VHIKDITIHANPFAL--
NF01951326      GVVKILENV-------------EVNG------ENPAK---LCVIAECG---ELKEGDD
NF00909389      -VVKDIEK------------VGSGSGRT-----SK------PVVIANCG---QPS----
NF01286555      -VVKAIEK------------VGSSGGRT-----SR------PVVVADCG---QLS----
NF01737225      -VVRAIEK------------VGSDSGKT-----SK------PVVVADCG---QIS----
NF01590839      NVVDSIQQGNKIKTVK------IIRTGNE-------------AKAFKTDQEAFYKYLAE
AAH51602        GTLNRLGMVETDSQ---------DRPLDE-------------VQVLRAYPSG-------
AAT69672        -VVKTMDR------------LGSQSGKP-----SKK------VVITNSG---QL-----
AAH54186        -VVKTMDR------------LGSQSGKP-----SKK------VVITNSG---QL-----
AAH54168        -IVRKIEST-------------KTDGRD---KPLKD------VVIADCG---KIEVEKP
NF01208049      -TVSAMEKVDTDHKT--------DRPKEE-------------IRIECTTVFVDPYEEAD
NF01844632      DVVREIENQKTD---------ASSKPSVE-------------ISIQNCGELVQKSKAKK
NF01844615      TIYNILRLAEVDIG------EDERPVNPH-------------KIKCTEVLF-------
NF01915773      GTLNRLGMVETDSQ---------DRSLDD-------------VRILRAYPSG-------
NF01915657      DTLDELEKLPVHEKS--------FRPLTE-------------VRIKDATIHANPFAL--
NF01557564      GIVKMLENV-------------EVKD------EKPAK---MCVIAECG---ELNDRDE
AAH41536        -IVENLDR------------LGSQSGKP-----SKK------VVITNCG---QL-----
AAH85963        EVVREIENQKTD---------AASKPFAE-------------VRILSCGELIPKSKVKK
AAH64250        LVMRKIEN-------------VPTGP-----NNKPKL---PVVIAQCG---EM-----
AAH61335        GIVKMLENV-------------EVKD------EKPAK---MCVIAECG---ELNDRDE
AAH59741        -VVRNMEK------------LGSQSGKP-----AKK------IVIANCG---QL-----
AAH67931        DLVREIENQKTD---------ASSKPSVD-------------VSIQNCGELVQKSKAKK
AAH44993        -TVSAMEKVDTDHKT--------DRPKEE-------------IRIECTTVFVDPYEEAD
A40516          -VVRKVENT------------KTDSRD---KPLKD------VTIADCG---TIEVEKP
CYPB_BOVIN      -VVRKVEST------------KTDGRD---KPLKD------VTIADCG---KIEVEKP
AAR19276        -IVRKIES------------FGSKNGKP-----SKK------IIISDCG---DMK----
A46579          GVAKILENV-------------EVKG------EKPAK---LCVIAECG---ELKEGDD
AAV40687        SVVRTIENN-------------PATNG-----DVPKE---PVVIADCG---QLSSDDP
NF01637248      -IVKKIEGY------------GSQSG-----KPSAT------IKISASG---TV-----
CYPR_BOVIN      -TVKKIES------------FGSPKGSV-----SRR------IIITECG---QI-----
CYPR_CALVI      DTVYAIEDVKTDTD---------DHPIDP-------------VIIVNCGEMPTEPYEFY
E1317906        -TLTTIEKLETEEGT--------DVPMVN-------------VMIMRAEVFVDPFEEAE
AAB87888        -IVKKIES------------FGSQSGKT-----SKK------I---------------
AAB87889        -IVKKIES------------FGSQSGKT-----SKK------I---------------
Q9XZZ5          -VVKKMEA------------VGSESGKT-----KQP------VLIANSG---QL-----
S63995          -VVKKLES------------LGSQSGKT-----NKK------IAVVDCG---QI-----
G1703696        -IIKKVES------------YGSDSGKT-----SKK------ITIADCG---QL-----
J36797          -VVKEVET------------FGTQSASP-----SSR------SSIADCG---QL-----
AF017738        TLFNMLRLGECETG------NDDKPLRTQ-------------KILQVEILS-------
L37292          EVVTKIEYLKTN---------SKNRPLAD-------------VVILNCGELVRRKKRQH
AAS01736        -VVKAIEK------------VGS---------------------------------
AAO61985        LTLRCLSPLWLQ----------LKHEGKS---------------LKNLGRN--------
CAC80550        -IVKAIEK------------VGSSSGRT-----SK------PVQIADCG---QLS----
AAO63777        -VVKAIEK------------VGSSGGRT-----SR------PVVVADCG---QLS----
B53522          -VVKMMEAE------------GRSNGQP-----KCA------VEISSCG---QLS----
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E280557          FVVRAIEKNPTSKGEN-----IKDRPILA-------------VVITDCGMLELEKPFTV
J70827           EVVTKIECLKTN---------SKNRPLAD-------------VIILNCGELVRRKKRHH
J70884           DVLTKLEYLRTN---------FKNRPLGD-------------VVILNCGELVRRKKRQN
J55771           EY--TLQAIEATGTDS-------GKPSVQ-------------TVIKSCK-------VKK
D1024669         -VVRKIEST-------------KTDSRD---KPVKD------VVIADSG---TIPVETP
227879           -VVKKMEA-------------AGSQSGKT-----TK------PVVIANCG---QL-----
AAD48910         -IVKLLES--------------IGSQSG---TPSKI------AKISNSG---EL-----
AAO51811         KVVRTIED--------------IPVNP----PPNRPKY---DVVITECG---QL-----
AAF76472         EVLDIMEKTQTGPG---------DRPLAE-------------IRLNRVTIHANPLAG--
AAP80861         -VVYKVEA--------------XGKQNG---TPKSK------VVIADSG---EVPL---
AAP73848         LAVRKIEN--------------VATGP-----NNRPKL---ACVISECG---EM-----
BAB62329         EIVKRLGSVQTDKS---------DRPIHE-------------VKILRTVVKD-------
AAL75728         GAVRAIDRT-------------GTWSGKT-----VKP------VVITDCG---VL-----
S48017           -VVKAIEK-------------VGSRGGST-----AK------PVVIADCG---QLS----
S48018           -VVEKMEQ-------------VGSGSGGT-----AE------RVLIEDCG---QLADDHA
BAD53622         -VVYKIEA--------------EGQQSG---SPKSK------VVIADSG---ELPM---
BAD53621         -VVYKIEA--------------EGQQSG---SPKSK------VVIADSG---ELPM---
BAD53620         -VVYKIEA--------------EGSQSG---TPRSK------VLISDSG---ELK----
XP_507188        ATIPTYKPAERIRFFNDFAQLIGDERAQTARALWDRP---LKTVYISDCGELKVTKPS--
XP_483750        DVVQQIEKVKTD-KN--------DKPYQD-------------VKILNVTVPKT------
XP_483749        PFVHIYDTH-------------SGSNDP---------------IISKE-----------
XP_482125        DYLADLKVG-------------DVIESIQ-------------VVSGLDNLANPS----
XP_478742        EVLSQIKTG-------------DIIRSAK-------------LVQGRERLVLPPEAP-
XP_478741        EVLSQIKTG-------------DIIRSAK-------------LVQGRERLVLPPEAP-
NP_385690        ENIDNIKRG-------------EPVRDPD-------------TIVSMRVAADA-----
NP_385689        ENVDKIKLGDDANN---------GAVADPD-------------RMISVKVGR-------
NP_349373        EEVDRIVSVKRDYSDK----PLEDQRIKT-------------MEIETFGENYPEVEIIE
BAD45990         DTITKINETYVD---------DKGRPFKDI-------------RIRHTYVLDDPFDDPP
BAD45991         DTLTKISETYVD---------DKGRPFKDI-------------RIKHTYVLDDPFDDPP
NP_908419        EFVITTGDAPELD---------ASALVVGR-------------VVDGMDVLGKI-----
NP_919903        RKFKEFGKDARNIRFG------PKQPGND-------------IDVYLRPLVEDLKQLWK
BAD35839         GVVRSVEHAPVG---------EADRPTSD-------------VEIVDCGELPEGAD---
AAU87301         -VVREIEK-------------VGSGSGRT-----SK------PVVIADSG---QLA----
CAG90469         -VVDYMENV-------------STSYGD---RPAKE------LKISAAG---EIAVEQN
CAG88330         -IVKKVESY-------------GSGSG-----ATKSR------ITIDASG---EL-----
CAG88054         QVLEKINLSVVENL-------ETRRLLKDI-------------RITHTHNIY-------
CAG86818         EAVKSIEDIETD-SD--------DKPLDQ-------------VILLSTSLED-------
NF01109982       -VVKKVEK-------------FGSDSGKT-----SKK------IVIDASG---EC-----
NF00686348       EYVDAVEKG-------------EPPAHPS-------------IIVRASIGSDKIHPPT
NF00686217       EYVDAVEKG-------------EPPAHPS-------------IIVRASIGSDKIHPPT
NF02138644       -VVKEMEK-------------VGSDGGNS-----KS------TVEIEECG---QIQEN--
NF00926921       -IVDKIQVV-------------PKGFQD---RPTKD------VKIVKCG---ELDMKEE
NF00909931       -VVKEIEK-------------VGSSSGKT-----SR------PVAIADCG---QLS----
NF00956595       -VLRQMEAQ-------------GAKDG---KTKQK------VIISDCG---EYA----
NF02035209       -VVEAIQK-------------VGSRGGTP-----KN------PL---------------
NF01329591       NVVDKIVNVPTG-NYG----MHQNVPKQP-------------IKIISVQIKK-------
CAG86678         EAIETLESDESLNNQD-----KTKKSGKPRGIWKKES-------WIKHVEIHFNPFVEQ-
CAG86274         DTLDLLNSARTDKND---------RPKEE-------------YVMSKITIET-------
CAG85447         SIYNVVKINESELK------SEETPMYPA-------------EITDIKILV-------
CAG85287         -IVKKIEAQ-------------GSGSG-----APQSS------IVIEECG---ELKDN--
CAG84900         SIVRQLERC-------------D-KGEN-----DKPVE---DWIISDCG---ELPSDYV
CAG84822         SVVREIERVN------------TDSQNIPTR---------EDIVLIEDCGDWT-------
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CAG84723          DIVDQIEK--------------TKVG-----VLDKPYP---DITITNCG---EM-----
CAG79895          -IVDAIENA-------------PTGARS---NPKVD------ITIADAG---EIPVEKS
CAG78939          --LTTLELSETVD---------DKPVKN-------------ITLESVSVS--------
CAG82238          GIVRQIERT-------------E-TGEQ-----DRPKQ---PVTIVDCG---ELPADFQ
CAG81980          -VVKKIESF-------------GSSSG-----ATRAK------ISIDKSG---EL-----
CAG81971          -VVKAIEKL-------------GSNSG-----RTSQK------IVIDDCG---QE-----
CAG81844          DVVKFVEN--------------VPV------VEEKPKR---DVVVSECG---EY-----
CAG84141          TIYNAQDIARGELT------EDGYPMYVQ--------------TVQNVEIVLGGGLVQE
CAG84091          SVLRQLEELD------------TAPGDVP----------VLPVTITNCGELKRDAKLLL
CAG83821          DNYRPLESVRVVKCGEMRWEEEEPRQGASCRDRHGSRSPGRSRRRRDRDRDRDRDRDRD
CAG76968          EVVDKISQVPTK-NVG----PYQNVPTTP-------------IVIQSVKVLP-------
CAG62671          SVVRTIEYGK------------VDKEGTP----------ENLVVIEDCGDWDETMSIPL
CAG76052          DVVDKIKGVATG-RSG----MHQDVPKED-------------VVITHVTVSE-------
CAG59915          -IVKTIESY-------------GTMSG-----QPRAK------IVVEESG---EIKE---
CAG58658          -VVKKVESM-------------GSSSG-----ATRAR------IIVSKSG---EL-----
G3777556          -VVRAVEAV-------------GTRSGS----TSQK------VSVTDAG---EC-----
AAF65770          -VVKAIEK-------------VGSSSGRT-----SK------PVVVSDCG---QLC----
BAA25755          -VVRDIEK-------------VGSGSGKT-----SK------PVVIANCG---QL-----
CSTO              -VIKKAEA-------------VGSSSGRC-----SK------PVVIADCG---QL-----
CSRP              -VVRDIEK-------------VGSDSGRT-----SK------KVVTCDCG---QL-----
CSZM              -VVKAIEK-------------VGTRNGST-----SK------VVKVADCG---QLS----
CYPH_ALLCE        -VVRAIEK-------------VGSQSGQT-----KK------PVKIADCG---QLS----
AAG01536          -VIS-----------------------------------SVIISPN-----I-----
AAB51386          -VIKKAEA-------------VGSSSGRC-----SK------PVVVADCG---QL-----
S54833            -VVKDIEK-------------VGSGSGKT-----AR------PVAIADCG---QLS----
K85185            -VVKAIEK-------------VGSSSGRT-----AK------KVVVEDCG---QLS----
Y08273            -VVRAIEK-------------VGSQSGKT-----AK------PVVVADCG---QLC----
Y08320            -VVRAIEK-------------VGSQSGKT-----AK------PVVIADCG---QIC----
E1226445          -VVRDIEK-------------VGSGSGKT-----SR------PVTIADCG---QLS----
L32095            -VVKQLESQ-------------ETSKLDN--SPKKP------CKIAKSG---ELPLDG-
CAA10766          LVLRKIEN--------------VQTGP-----NNRPKL---PCVIAECG---EM-----
AAF69796          -LVKNIESY-------------GSDSG-----KPKAK------VTITGSG---TV-----
AAF69795          -LVKKIESY-------------GSGSG-----ATKAK------ITIAASG---TV-----
CSNCM             KVVKALEAT-------------GSSSGAI---RYSKK------PTIVDCG---AL-----
NF01287451        DVLEKINDAIVD---------ERGHPLVDI-------------RIKHTVILDDPYPDPA
NF01527836        QTLAKLEGLEVDKK---------NRIKEE-------------VRIERVTVHANPLAK--
NF01488902        GVIRRMGMVPTDKE---------DRPATE-------------VKIVKARVVREEDMEA-
NF00648058        SVVRQIEN---------------LKTQG-----DKPTK---DAVIADCG---ELSGDAA
NF01487278        -VVEKIENT-------------KTGPRD---APAEP------IKIAKSG---ELEVPPE
NF01486260        DVIHRIENVKTH-K---------DKPVED-------------IKILNIDIM--------
NF00904102        -VVEKIENT-------------KTGPRD---APAEP------IKIAKSG---ELEVPPE
NF01484914        DVLEKINDAIVD---------ERGHPLVDI-------------RIKHTVILDDPYPDPA
NF01484255        DVVKKMEN--------------TKTGYR---GKDVPNL---DVVIAQCG---EM-----
NF01483993        TIYNLAKIGEAEVEE-----GGERPLYPI-------------KITRIEILI-------
NF01533203        -VVKAIEK-------------VGSGNGRT-----SK------PVVIADCG---QLS----
NF01483647        TTLTAMENVATDG-S--------DRPLNK-------------IVIKDMIILIDPFAEWM
S71849            DVVKALEAT-------------GSGSGAV---KYNKR------ATIVKSG---EL-----
J17900            -VVTAIETT-------------KTLPGD---RPATP------VIIADCG---ELPVSNN
NF00873669        -VVKAIEAE-------------GSGSG-----KPRSR------IEIAKCG---VC-----
NF01527595        -VVKAIEAE-------------GSNSG-----KTSSR------IEIAKCG---AC-----
NF01539217        MIVKALEAT-------------GSGSGKV---QYNKK------PTIVKSG---EL-----
D1035365          -IVDKIQVV-------------PKGFQD---RPTKD------VKIVKCG---ELDMKEE
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YP_116397        DVVDKIAGVSTG-SAG----MHQDVPVDD-------------VIITSASLA--------
YP_119877        ATLDKIAALGQDDSNG----PGDGKPTSP-------------VTIQSVRLD--------
CAD25897         ECLSLIRDIQKIDIDR-------DRPVHP-------------VRIVRSGIVEEGEEKYL
CAD26352         -VVHKIAKY------------GSESGQV---KKGYR------IEIRDCG---VLGSN--
AAD17998         -IVDKIQNV-------------PKGRND---RPLKD------VKIVKSG---ELEMEAD
G2959712         -VVKKVEG------------YGSSSGKT-----RA------TFAIADCA---QLA----
CSNCC            KVVKALEAT------------GSSSGAI---RYSKK------PTIVDCG---AL-----
AJ006689         SVVKEIEAL------------GSSSGSV---RSNTR------PKIVNCG---EL-----
AAF28343         KVVQKMNAMQTNN----------DKPIDE-------------IRIIKATAN--------
AAD50375         DIVKKVENA--------------ETDRS-----DRPKA---ACVIEDCG---QL-----
AAK21908         -VVRAIES------------VGSSSGKT-----SR------PVVIANCG---QLS----
AAG13968         -VIKPIEAL------------GSSSG-----TPKTK------VTIVNAG---TV-----
BAB58884         -VIKPIEAL------------GSSSG-----TPKTK------VTIVNAG---TV-----
E1363908         -VVKAIEAE------------GSGSG-----KPRSR------IEIAKCG---VC-----
AAD16142         QVVKEIEAL------------GSSSGSV---RSAVK------PTIVDCG---EL-----
G1764137         -VVKAMEKT------------GSQSG-----KTSSV------LKIEDCG---TL-----
Z32674           DVVKALEAT------------GSGSGAV---KYNKR------ATIVKSG---EL-----
JT0686           NVVKALEAT------------GSGSGAI---KYNKK------ATIVDCG---EL-----
CSCK             -IVKKIESF------------GSGSG-----ATSKK------IVIEESG---QL-----
NP_986490        -VVKKVESM------------GSSSG-----ATRAR------IVISKSG---EL-----
NP_985014        -VVKAIESY------------GTGNG-----QPSAK------VVIEDAG---ELKE---
NP_984799        AVVREIEKEA------------VDSDGVP-----------EKAVRIAGCGEWTQ------
NP_984183        RVVRAIERQ----------------ETAA-----DRPLA---DVRIDACG---ILPASYE
NP_982586        ELLEKVRHLPLD---------EQGKPTSN-------------LKIVGIHVDDLSIQNMD
NP_982486        -VVSAVEAV--------------PRNARD---VPDIS------VRIVACG---ELQDTPA
AAT09096         -VVDKIEA---------------AGSPSG---TPSKK------VTIVDSG---ELTDKSE
YP_014938        DVVDEIANLPTG---------MQDKPVND-------------VVIEKINIK--------
NP_951950        EVVDAIAGVKTG-NRA----GHSDVPVEN-------------VFITRASVIE--------
NP_935388        DVIQQMASKPTK-SQG----YMRDIPVEP-------------IVITKATLLP--------
NP_907765        DVVRRIEYTETD-RS--------DRPKKE-------------QKILKAYLK--------
BAC91249         RTLRQLKVG--------------DTIQK--------------AEILNCKAAAFNEYR--
BAC90551         EVVAAIRAG--------------DKILKAA-------------ETS---APPAGAVPKT
BAC89441         TNAEKLRIG--------------DKILSAK-------------VVLGTEKFQPSAAGK-
BAC88914         DVVDKIQVG--------------DKILSAT-------------VVSGGGDPVGGSAPG-
AAV50868         DVLDKINSMIKPY---------AGRKYPT-------------FSIGKCG----------
AAV82698         DVLEAMAKLESQAYSDEI--GWADVPVDP-------------PILKRIEVVPQN-----
AAV81872         DVVNTIKDVKTG-SAG----FHQDVPVED-------------VVIESVSVKD-------
NP_736022        ETVDKIASVEVT---------KSDQPKEK-------------ITITSIKVIK-------
NP_734780        EVLDEIAAVE-------------------------------------------------
YP_085398        ETVLNMR-----------------Q----------------------GDVMKEVKVWE
NP_643098        ELLSVTPRGPDPMG-------FYEDPAQR-------------APIRAIRLASEVPA---
NP_641352        DVVDSVAQGDTINTLT------IEGDTDA-------------VLAAKADRVAEWNKILA
BAB76758         DILDTLKAG--------------DKIESAT-------------VVQGLDNLVQPQSA--
YP_129479        DVVNAIAKAKTT-SKY----GHDDVPCEA-------------IIIEKVTITE-------
YP_129310        DVVNKIKAVSTG-NSGY---VHQDVPVED-------------VAINNVTIEE-------
YP_129032        STIEKMTDIPTT-TIGSL--GMKDVPQQP-------------IVIKAIKIIK-------
YP_101389        KHMKEIYKMR------------KANDQDG-------------LYALQD-----------
YP_087816        NVVDKIAKVATG-RVG----MHRDVPKED-------------VVIKSVTVE--------
YP_087815        DVVDKIKGVKTG-NAG----FHQDVPKED-------------VVITSVTVE--------
YP_076496        LTQLESVEVRQGNSFD----PVPSTPVNP-------------PVIRKVTIAEE------
AAT91289         -VVKEIEAR------------GTASG-----KPNAN------IKIAKSG---T------
AAT91260         -VIKEIEAR------------GTXSG-----KPNAN------IKIAKSG---TV-----
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NP_868477         -VVKKIEAQ--------------GSGSGQ----TRKL------IKITEAG---EVKE---
NP_867717         DVVDAIEQGDTMKTVR------VTEE--------------------------------
NP_867158         DVREAISNMQVNNSTSNK--PTTDIVINN-------------ATVFNDTENS-------
NP_865515         DRVSAMRRKD------------PSKTDEKK------------IQLPPDAIISAEVVRKG
NP_992233         DVVDKIKNVATG-RSG----MHQDVPKED-------------VIIKSVTISE-------
NP_991569         DVVEKISQVQTE-NVG----PYQNVPVKP-------------ITILSAKVLP-------
NP_280624         DVVETIGD---VETDA------NDAPASE-------------ITIDRVEIHE-------
BAC18575          ATLDAIAETGVEG--G----ATDGAPAEK-------------VVIETATVA--------
BAC16839          KVVDAIGT---TPTDR------MDRPIEP-------------VVIESVEIIK-------
BAB82272          DVVDKIANVKTDYNDM----PDEPQVMAK-------------VTVEN-AEGIEEPEIL-
BAB99042          ATLDAIAEVGTEG--G----TGDGAPAQE-------------VRIESAAVA--------
BAB97427          KVVDAIAT---TATDR------YDRPADA-------------VVIESVEITA-------
BAC08372          ETLRQLRQG-------------DKILSAK-------------VVDGLENLVQPA----
BAC07690          DVVDTIQQG-------------DRLQSAK-------------VVAGLENLQQP-----
YP_072215         DVVEKISQVQTE-NVG----PYQNVPVKP-------------ITILSAKVLP-------
YP_069574         DVVDKIKNVATG-RSG----MHQDVPKED-------------VIIKSVTISE-------
NP_778719         DVVDAIAQGDIINKIT------IEGDTDG-------------VLALKTDRIIEWNSILA
NP_245881         DVVDKIKGVKTG-NKG----FHQDVPQEA-------------IVITAVTVE--------
NP_245880         DVVDRISQVDTE-RSG----FHRDVPKAP-------------VIIKSVTIE--------
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NP_354666         EAIDKIKRG-------------EPVKDPD-------------SIVSIKLASAA-----
NP_298502         DVVDAIAQGDIINKIT------IEGDADS-------------VLALKADRIIKWNSILA
AAN39296          -VVKKVEK-------------FGSDSGKT-----SKK------IVIDASG---EC-----
AAQ24380          -VVTKVES-------------YGSGNGKT-----SAK------IVIANSG---QL-----
ZP_00353225       QVVDAIAN---MATGP------GDAPREP-------------VVISSVDVERD------
ZP_00244808       EVVDAIERVKTG-RQG----GHDDVPLED-------------VVITRANEVA-------
ZP_00244807       DVVDRIKGVPTT-NKG----PHQNVPATP-------------VLIKKATLEP-------
ZP_00358245       DVVYAIKQGDKMTKVT------VQEL--------------------------------
ZP_00350273       EVVDQIKKVKTG-SKN----GHQDVPLEP-------------VIIERAEIV--------
ZP_00129494       DVVDAIGKLKTKPMGEHD-----DVPVDS-------------VVITGAGLFDL------
ZP_00130259       STIDAIKGVPTG-SYG----PFENVPLVP-------------VVINKAVVMD-------
ZP_00136576       GVVDQIAKVPTT-RRN----GFADVPSDD-------------VVILSAKRL--------
NF01760157        DVVDKIGNLKTD---------ENDRPVER-------------AYIKRAYIK--------


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NP_115861         ----------------------------------------------------------
NP_570981         ----------------------------------------------------------
NP_057143         ----------------------------------------------------------
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A41581            ----------------------------------------------------------
A54204            FVVE-------------------------------------------------------
G64705            AQIA-------------------------------------------------------
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A45981            GGI--------------------------------------------------------
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KP_526904         ILTTRPFLL-----------------------------------------
KP_516556         ----------------------------------------------------
KP_526001         ----------------------------------------------------
KP_516021         ----------------------------------------------------
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NP_171696       --------------------------------------------------
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NP_188932       ERC-----------------------------------------------
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P82869          INEST---------------------------------------------
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T49181          --------------------------------------------------
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E1331567        --------------------------------------------------
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S62590          K-------------------------------------------------
E1294518        --------------------------------------------------
T39728          DLV-----------------------------------------------
E1263915        ------------NYFTDIKPRSTK--------------------------
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S57050          --------------------------------------------------
S48567          --------------------------------------------------
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TcCyP21.3       ------------------------------------------------------
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TcCyP26         EEAQRALCGERALHSMPGKEVLDLISPRY-------------------------
TcCyP28         KEQPTKQKDEV-------------------------------------------
TcCyP30         ------------------------------------------------------
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TcCyP35.3       ------------------------------------------------------
TcCyP40         ------------------------------------------------------
TcCyP110        ------------------------------------------------------
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EAL37110        LEL---------------------------------------------------
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G992633         FSVTNSDAVE--------------------------------------------
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E1203753        ------------------------------------------------------
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AAD46565        ------------------------------------------------------
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E1319851        IAV-------------------------------------------------
G3057040        KAV-------------------------------------------------
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AF252388        --------------------------------------------------
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AAH54168        FAIAKE----------------------------------------------
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CYPB_BOVIN      FAIAKE--------------------------------------------
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CYPR_BOVIN      --------------------------------------------------
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J36797          --------------------------------------------------
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BAB62329        --------------------------------------------------
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XP_483750       --------------------------------------------------
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XP_482125       --------------------------------------------------
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KP_478741          -AES-------------------------------------------------
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CAG86274           ------------------------------------------------------
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CAG85287           ------------------------------------------------------
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CAG79895           ETKEAEP-----------------------------------------------
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CAG81844           ------------------------------------------------------
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CAG84091           PFIGSQDGLTAD------------------------------------------
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CSZM               ------------------------------------------------------
CYPH_ALLCE         ------------------------------------------------------
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NF01488902      --------------------------------------------------
NF00648058      VSADTKTADAYGDEYE----------------------------------
NF01487278      GLEGQSEWASPAYANEDEK-------------------------------
NF01486260      --------------------------------------------------
NF00904102      GIHVEL--------------------------------------------
NF01484914      GMREPSASP-----------------------------------------
NF01484255      --------------------------------------------------
NF01483993      ------------NPFDDMQKREKKPRPQQISRPTPAE-------------
NF01533203      --------------------------------------------------
NF01483647      KEKKQKEG------------------------------------------
S71849          --------------------------------------------------
J17900          --NDAK--------------------------------------------
NF00873669      --------------------------------------------------
NF01527595      --------------------------------------------------
NF01539217      --------------------------------------------------
D1035365        AEGE----------------------------------------------
YP_116397       --------------------------------------------------
YP_119877       --------------------------------------------------
CAD25897        --------------------------------------------------
CAD26352        --------------------------------------------------
AAD17998        VANEG---------------------------------------------
G2959712        --------------------------------------------------
CSNCC           --------------------------------------------------
AJ006689        --------------------------------------------------
AAF28343        --------------------------------------------------
AAD50375        --------------------------------------------------
AAK21908        --------------------------------------------------
AAG13968        --------------------------------------------------
BAB58884        --------------------------------------------------
E1363908        --------------------------------------------------
AAD16142        --------------------------------------------------
G1764137        --------------------------------------------------
Z32674          --------------------------------------------------
JT0686          --------------------------------------------------
CSCK            --------------------------------------------------
NP_986490       --------------------------------------------------
NP_985014       --------------------------------------------------
NP_984799       --------------------------------------------------
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NP_984183         -VPADAEATPAD----------------------------------------
NP_982586         ELVALYKQSLVKYHAGDTSVGVP-----------------------------
NP_982486         DATGATLETDEL----------------------------------------
AAT09096          L---------------------------------------------------
YP_014938         ----------------------------------------------------
NP_951950         ----------------------------------------------------
NP_935388         ----------------------------------------------------
NP_907765         ----------------------------------------------------
BAC91249          ----------------------------------------------------
BAC90551          P---------------------------------------------------
BAC89441          ----------------------------------------------------
BAC88914          ----------------------------------------------------
AAV50868          ----------------------------------------------------
AAV82698          ----------------------------------------------------
AAV81872          ----------------------------------------------------
NP_736022         ----------------------------------------------------
NP_734780         ----------------------------------------------------
YP_085398         E---------------------------------------------------
NP_643098         ----------------------------------------------------
NP_641352         A---------------------------------------------------
BAB76758          ----------------------------------------------------
YP_129479         ----------------------------------------------------
YP_129310         ----------------------------------------------------
YP_129032         ----------------------------------------------------
YP_101389         ----------------------------------------------------
YP_087816         ----------------------------------------------------
YP_087815         ----------------------------------------------------
YP_076496         ----------------------------------------------------
AAT91289          ----------------------------------------------------
AAT91260          ----------------------------------------------------
NP_868477         ----------------------------------------------------
NP_867717         ----------------------------------------------------
NP_867158         ----------------------------------------------------
NP_865515         ----------------------------------------------------
NP_992233         ----------------------------------------------------
NP_991569         ----------------------------------------------------
NP_280624         ----------------------------------------------------
BAC18575          ----------------------------------------------------
BAC16839          ----------------------------------------------------
BAB82272          ----------------------------------------------------
BAB99042          ----------------------------------------------------
BAB97427          ----------------------------------------------------
BAC08372          ----------------------------------------------------
BAC07690          ----------------------------------------------------
YP_072215         ----------------------------------------------------
YP_069574         ----------------------------------------------------
NP_778719         T---------------------------------------------------
NP_245881         ----------------------------------------------------
NP_245880         ----------------------------------------------------
NP_354667         ----------------------------------------------------
NP_354666         ----------------------------------------------------
NP_298502         T---------------------------------------------------
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AAN39296        --------------------------------------------------
AAQ24380        --------------------------------------------------
ZP_00353225     --------------------------------------------------
ZP_00244808     --------------------------------------------------
ZP_00244807     --------------------------------------------------
ZP_00358245     --------------------------------------------------
ZP_00350273     --------------------------------------------------
ZP_00129494     --------------------------------------------------
ZP_00130259     --------------------------------------------------
ZP_00136576     --------------------------------------------------
NF01760157      --------------------------------------------------
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Analysis of the NCBI standard entries
Datapx program - Version V2.1 - Spring 2002
Programmed by A. Galat - Protein Profile

Sliding frame = 9

Number of used codes 496

Database used CYP.dab.2010

1# 165(165& 1 165) CSHUA 7.8 (7.8) 37.6 (37.6) 18.0 (18012.5)
> peptidylprolyl isomerase (EC 5.2.1.8) A - human.

2# 164(164& 1 164) NP_839944 9.6 (9.6) 34.1 (34.1) 18.2 (18181.8)
> cyclophilin-LC; cyclophilin homolog overexpressed in liver cancer;

3# 165(165& 1 165) NP_115861 6.6 (6.6) 27.3 (27.3) 18.6 (18627.3)
> peptidylprolyl isomerase-like protein 3 isoform PPIL3a [Homo

4# 161(161& 1 161) NP_570981 6.3 (6.3) 27.3 (27.3) 18.2 (18154.6)
> peptidylprolyl isomerase-like protein 3 isoform PPIL3b [Homo

5# 166(166& 1 166) NP_057143 8.2 (8.2) 33.7 (33.7) 18.2 (18236.9)
> peptidylprolyl isomerase-like 1 [Homo sapiens].

6# 183(208& 26 208) CSHUB 9.7 (9.8) 38.3 (42.3) 20.3 (22742.4)
> peptidylprolyl isomerase (EC 5.2.1.8) B precursor [validated] -

7# 172(301& 130 301) S66681 8.4 (5.3) 32.0 (33.2) 18.9 (33430.9)
> peptidylprolyl isomerase (EC 5.2.1.8) A - human.

8# 181(3224&30443224) A57545 6.7 (5.8) 35.9 (25.7) 19.9 (358220.6)
> nucleoporin Nup358 - human

9# 173(207& 36 208) A41581 9.3 (9.8) 35.8 (39.1) 18.5 (22040.3)
> peptidylprolyl isomerase (EC 5.2.1.8) 3 precursor - human.

10# 181(212& 28 208) A54204 9.4 (8.7) 48.1 (52.8) 19.6 (22763.3)
> peptidylprolyl isomerase (EC 5.2.1.8) C precursor - human.

11# 176(520& 271 446) S64705 8.6 (9.0) 22.7 (22.5) 20.0 (58823.6)
> cyclophilin-like protein CyP-60 - human.

12# 170(645& 476 645) D38552 6.8 (6.7) 30.0 (32.7) 18.9 (73443.9)
> Human mRNA for KIAA0073 gene, partial cds

13# 165(492& 1 165) NP_624311 5.0 (5.6) 33.9 (20.9) 18.7 (57225.3)
> peptidylprolyl isomerase-like 4 [Homo sapiens].

14# 177(177& 1 177) G2708309 8.1 (8.1) 44.1 (44.1) 19.2 (19208.2)
> U-snRNP-associated cyclophilin - Homo sapiens (human)

15# 187(370& 6 192) A45981 6.8 (6.8) 38.0 (31.6) 20.4 (40763.7)
> peptidylprolyl isomerase (EC 5.2.1.8) CyP-40 - human.

16# 184(754& 1 184) U40763 8.4 (10.7) 34.8 (8.5) 20.5 (88618.4)
> CARS-Cyp - Homo sapiens

17# 188(1403& 51 238) A47328 8.3 (10.3) 37.2 (13.3) 20.7 (157712.2)
> natural killer cell tumor-recognition protein - human.

18# 195(205& 25 219) XP_531396 8.5 (6.1) 38.5 (45.9) 21.4 (22517.7)
> PREDICTED: similar to peptidylprolyl isomerase A isoform 1;

19# 175(175& 1 175) XP_525294 9.2 (9.2) 31.4 (31.4) 19.2 (19236.0)
> PREDICTED: similar to peptidylprolyl isomerase A isoform 1;

20# 157(157& 1 157) XP_523512 8.5 (8.5) 28.0 (28.0) 17.0 (16976.4)
> PREDICTED: similar to peptidylprolyl isomerase A isoform 1;

21# 211(319& 40 250) XP_507866 7.0 (8.4) 50.2 (48.3) 22.3 (33195.2)
> PREDICTED: similar to Peptidyl-prolyl cis-trans isomerase,

22# 164(164& 1 164) XP_517783 5.9 (5.9) 42.1 (42.1) 17.8 (17772.2)
> PREDICTED: similar to TRIM5/cyclophilin A fusion protein [Pan

23# 141(141& 1 141) XP_517773 9.8 (9.8) 34.0 (34.0) 15.5 (15462.0)
> PREDICTED: similar to cyclophilin-LC; cyclophilin homolog

24# 180(180& 1 180) XP_526904 8.3 (8.3) 40.6 (40.6) 19.7 (19723.7)
> PREDICTED: similar to peptidylprolyl isomerase A isoform 1;

25# 180(229& 50 229) XP_516556 9.3 (8.4) 49.4 (40.2) 19.5 (25176.3)
> PREDICTED: similar to TRIM5/cyclophilin A fusion protein [Pan

26# 179(179& 1 179) XP_526001 8.3 (8.3) 34.1 (34.1) 19.7 (19675.6)
> PREDICTED: similar to cyclophilin A [Pan troglodytes].

27# 175(234& 60 234) XP_516021 7.7 (9.7) 30.9 (28.6) 19.6 (26441.3)
> PREDICTED: similar to peptidylprolyl isomerase-like protein 3

28# 205(205& 1 205) XP_515886 8.1 (8.1) 31.2 (31.2) 22.9 (22893.0)
> PREDICTED: similar to peptidyl-prolyl isomerase G (cyclophilin G);

29# 143(143& 1 143) XP_525218 8.4 (8.4) 26.6 (26.6) 15.7 (15702.7)
> PREDICTED: similar to cyclophilin-LC; cyclophilin homolog

30# 196(196& 1 196) XP_507684 9.2 (9.2) 39.3 (39.3) 21.3 (21324.4)
> PREDICTED: similar to peptidylprolyl isomerase A isoform 1;

31# 193(193& 1 193) XP_524688 8.4 (8.4) 47.2 (47.2) 21.0 (20989.3)
> PREDICTED: similar to peptidyl prolyl isomerase H; cyclophilin H;

32# 166(314& 149 314) XP_513346 9.0 (5.8) 29.5 (30.9) 18.3 (34964.5)
> PREDICTED: similar to peptidylprolyl isomerase E isoform 2;

33# 173(202& 30 202) XP_524598 6.8 (7.2) 34.1 (38.1) 18.6 (21649.4)
> PREDICTED: similar to TRIM5/cyclophilin A fusion protein [Pan

34# 166(812& 280 445) XP_515004 8.8 (8.7) 33.7 (33.5) 18.4 (88298.3)
> PREDICTED: similar to peptidylprolyl isomerase-like 2 isoform a;

35# 140(259& 120 259) XP_523437 10.1 (10.0) 33.6 (32.4) 15.0 (27651.6)
> PREDICTED: similar to peptidylprolyl isomerase A isoform 1;

36# 159(159& 1 159) XP_520485 6.8 (6.8) 42.1 (42.1) 17.1 (17072.4)
> PREDICTED: similar to TRIM5/cyclophilin A fusion protein [Pan

37# 169(218& 50 218) XP_519076 7.8 (8.4) 39.1 (35.3) 18.4 (23646.9)
> PREDICTED: similar to peptidylprolyl isomerase A isoform 1;

38# 158(158& 1 158) XP_527705 5.8 (5.8) 30.4 (30.4) 18.0 (17978.1)
> PREDICTED: similar to peptidylprolyl isomerase A isoform 1;

39# 166(770& 200 365) XP_527529 9.6 (9.3) 27.7 (20.3) 18.0 (87449.5)
> PREDICTED: similar to peptidylprolyl isomerase-like 4;

40# 156(302& 228 383) XP_518678 7.5 (9.0) 25.6 (29.1) 17.3 (34243.0)
> PREDICTED: similar to peptidylprolyl isomerase (cyclophilin)-like 6

41# 164(164& 1 164) CSMSA 8.0 (8.0) 31.7 (31.7) 18.0 (17971.4)
> peptidylprolyl isomerase A - mouse

42# 177(206& 30 206) NP_598845 8.7 (9.5) 35.6 (40.3) 18.7 (21737.0)
> peptidylprolyl isomerase F [Mus musculus].

43# 166(166& 1 166) AAH58369 8.2 (8.2) 33.1 (33.1) 18.2 (18236.9)
> Peptidylprolyl isomerase-like 1 [Mus musculus].

44# 184(216& 34 217) A56861 9.9 (10.0) 38.0 (41.7) 20.3 (23713.5)
> peptidylprolyl isomerase CyP-S1 precursor - mouse

45# 185(212& 28 212) A40047 6.6 (7.3) 48.6 (52.4) 20.2 (22794.2)
> peptidylprolyl isomerase (cyclophilin C) - mouse

46# 192(1466& 11 202) NKCR_MOUSE 8.8 (10.5) 35.9 (10.0) 21.3 (164745.2)
> NK-tumor recognition (natural-killer cells cyclophilin-related protein)

47# 161(161& 1 161) AAH61645 6.3 (6.3) 27.3 (27.3) 18.1 (18127.6)
> Ppil3 protein [Mus musculus].

48# 161(521& 290 450) BAC41068 6.1 (8.4) 24.8 (21.9) 18.1 (59064.8)
> unnamed protein product [Mus musculus].

49# 201(370& 10 210) BAC34686 5.3 (7.2) 32.3 (29.7) 21.9 (40742.7)

> unnamed protein product [Mus musculus].

50# 200(460& 1 200) BAB30711 4.4 (5.1) 28.5 (22.2) 22.6 (53188.8)
> unnamed protein product [Mus musculus].

51# 188(188& 1 188) BAB25645 8.1 (8.1) 45.7 (45.7) 20.5 (20463.8)
> unnamed protein product [Mus musculus].

52# 177(177& 1 177) BAB23880 8.1 (8.1) 44.1 (44.1) 19.2 (19208.2)
> unnamed protein product [Mus musculus].

53# 174(3053&28803053) NF00527760 5.9 (5.8) 38.5 (24.8) 19.2 (341092.6)
> Ran-binding protein 2 [Mus musculus]

54# 177(646& 470 646) NF01138503 6.5 (6.6) 31.1 (33.0) 19.7 (73430.9)
> Mus musculus 0 day neonate skin cDNA, RIKEN full-length enriched lib

55# 162(301& 140 301) NF00510830 7.7 (5.3) 34.0 (33.2) 17.9 (33449.0)
> Peptidyl-prolyl cis-trans isomerase E (EC 5.2.1.8) (PPIase E) (Rotam

56# 166(166& 1 166) NF00510932 8.2 (8.2) 33.1 (33.1) 18.2 (18236.9)
> Peptidyl-prolyl cis-trans isomerase like 1 (EC 5.2.1.8) (PPIase) (Ro

57# 164(164& 1 164) NF01595779 5.8 (5.8) 28.0 (28.0) 18.1 (18133.7)
> similar to Peptidyl-prolyl cis-trans isomerase A (PPIase) (Rotamase)

58# 164(164& 1 164) NF02014914 6.2 (6.2) 27.4 (27.4) 18.0 (18014.3)
> similar to Peptidyl-prolyl cis-trans isomerase A (PPIase) (Rotamase)

59# 180(180& 1 180) NF01930249 10.1 (10.1) 25.6 (25.6) 19.8 (19841.8)
> similar to Peptidyl-prolyl cis-trans isomerase A (PPIase) (Rotamase)

60# 165(165& 1 165) NF01929278 7.2 (7.2) 32.1 (32.1) 18.1 (18145.6)
> similar to Peptidyl-prolyl cis-trans isomerase A (PPIase) (Rotamase)

61# 164(164& 1 164) NF00523006 8.4 (8.4) 31.7 (31.7) 18.0 (17984.4)
> Mus musculus ES cells cDNA, RIKEN full-length enriched library, clon

62# 167(167& 1 167) NF00508381 8.0 (8.0) 32.9 (32.9) 18.3 (18313.8)
> Mus musculus 11 days embryo whole body cDNA, RIKEN full-length enric

63# 161(161& 1 161) NF01215170 6.3 (6.3) 27.3 (27.3) 18.2 (18189.6)
> CYP10L [Mus musculus]

64# 164(164& 1 164) CSRTA 8.2 (8.2) 35.4 (35.4) 17.9 (17874.4)
> peptidylprolyl isomerase A - rat

65# 161(161& 1 161) NP_783638 6.3 (6.3) 27.3 (27.3) 18.1 (18113.5)
> peptidylprolyl isomerase (cyclophilin)-like 3 [Rattus norvegicus].

66# 180(370& 1 180) NF01612782 7.3 (6.5) 35.6 (32.2) 19.5 (40710.7)
> similar to peptidylprolyl isomerase D (cyclophilin D) [Rattus norveg

67# 172(311& 140 311) NF01612825 8.4 (5.4) 29.1 (33.8) 19.0 (34395.1)
> similar to peptidylprolyl isomerase E (cyclophilin E) [Rattus norveg

68# 201(621& 130 330) NF01607941 5.7 (8.2) 32.8 (34.5) 21.7 (68896.2)
> similar to peptidylprolyl isomerase D (cyclophilin D) [Rattus norveg

69# 199(199& 1 199) NF01607846 6.4 (6.4) 38.7 (38.7) 21.6 (21574.5)
> similar to Peptidyl-prolyl cis-trans isomerase A (PPIase) (Rotamase)

70# 188(212& 25 212) NF01609144 6.6 (8.5) 48.4 (52.4) 20.6 (23009.5)
> Peptidylprolyl isomerase C [Rattus norvegicus]

71# 162(162& 1 162) NF01608897 8.7 (8.7) 35.8 (35.8) 17.4 (17352.9)
> similar to Peptidyl-prolyl cis-trans isomerase A (PPIase) (Rotamase)

72# 172(206& 35 206) NP_758443 9.3 (9.5) 36.0 (39.8) 18.3 (21810.0)
> peptidylprolyl isomerase F (cyclophilin F) [Rattus norvegicus].

73# 216(216& 1 216) AAH61971 9.9 (9.9) 41.2 (41.2) 23.8 (23802.6)
> Ppib protein [Rattus norvegicus].

74# 188(752& 1 188) G2828710 8.4 (10.7) 34.0 (8.5) 21.0 (88072.5)
> matrin cyclophilin - Rattus norvegicus

75# 165(165& 1 165) B38388 8.4 (8.4) 40.6 (40.6) 17.9 (17907.4)
> peptidylprolyl isomerase (EC 5.2.1.8) (cyclophilin) cyp-1 - fruit

76# 169(653& 1 169) AF132148 4.8 (10.3) 48.5 (19.4) 18.6 (75470.4)
> Drosophila melanogaster clone GH01073 unknown mRNA

77# 154(517& 279 432) NP_611113 7.2 (8.1) 20.8 (22.4) 17.1 (58959.1)
> CG7747-PA [Drosophila melanogaster].

78# 177(205& 19 195) NP_611695 9.4 (9.3) 32.2 (40.0) 19.3 (22199.3)
> CG2852-PA, isoform A [Drosophila melanogaster].

79# 168(168& 1 168) NP_610590 7.1 (7.1) 39.3 (39.3) 18.7 (18721.3)
> CG11777 gene product [Drosophila melanogaster].

80# 164(164& 1 164) NP_648697 8.2 (8.2) 33.5 (33.5) 17.8 (17771.2)
> CG7768-PB, isoform B [Drosophila melanogaster].

81# 170(502& 1 170) NP_648508 6.2 (6.2) 30.6 (17.1) 19.1 (56610.3)
> CG10907-PA [Drosophila melanogaster].

82# 189(383& 1 189) NP_648338 5.0 (7.5) 39.2 (27.4) 20.7 (43115.7)
> CG8336-PA, isoform A [Drosophila melanogaster].

83# 173(237& 18 190) NP_476656 6.6 (6.7) 41.0 (49.8) 18.9 (26351.3)
> CG3966-PA [Drosophila melanogaster].

 84# 169(176&   8 176) NP_523874   7.5 (6.7) 33.1 (31.8) 18.8 (19525.2)
> CG13892-PA [Drosophila melanogaster].

 85# 172(300& 129 300) NP_523773   9.0 (5.7) 32.6 (29.7) 19.0 (33276.4)
> CG4886-PA [Drosophila melanogaster].

 86# 183(183&   1 183) NP_610224   7.0 (7.0) 45.4 (45.4) 20.2 (20182.1)
> CG17266-PA [Drosophila melanogaster].

 87# 188(970&   1 188) NP_733246   8.9 (11.1) 40.4 (10.7) 20.6 (112795.7)
> CG1866-PA [Drosophila melanogaster].

 88# 157(637& 481 637) NP_611935   9.3 (6.7) 31.2 (33.6) 17.7 (71761.7)
> CG3511-PA [Drosophila melanogaster].

 89# 200(377&   1 200) EAA03569   4.7 (6.1) 32.5 (26.0) 21.8 (42936.2)
> ENSANGP00000013567 [Anopheles gambiae str. PEST].

 90# 202(202&   1 202) EAA03948   9.3 (9.3) 34.2 (34.2) 21.8 (21815.8)
> ENSANGP00000011257 [Anopheles gambiae str. PEST].

 91# 184(184&   1 184) EAA04625   7.6 (7.6) 45.7 (45.7) 20.4 (20435.7)
> ENSANGP00000018327 [Anopheles gambiae str. PEST].

 92# 164(164&   1 164) EAA06299   8.6 (8.6) 34.8 (34.8) 18.0 (18004.5)
> ENSANGP00000020778 [Anopheles gambiae str. PEST].

 93# 180(519&   1 180) EAA08127   8.6 (10.3) 36.7 (17.0) 19.8 (58606.6)
> ENSANGP00000010906 [Anopheles gambiae str. PEST].

 94# 161(530& 270 430) EAA09839   9.4 (8.7) 25.5 (23.8) 18.1 (59716.8)
> ENSANGP00000016027 [Anopheles gambiae str. PEST].

 95# 183(632& 450 632) EAA10133   7.3 (6.4) 25.7 (32.4) 20.5 (71854.0)
> ENSANGP00000014257 [Anopheles gambiae str. PEST].

 96# 168(168&   1 168) EAL39647   5.1 (5.1) 37.5 (37.5) 18.8 (18779.3)
> ENSANGP00000027110 [Anopheles gambiae str. PEST].

 97# 161(161&   1 161) EAA13913   5.8 (5.8) 31.1 (31.1) 18.0 (17977.3)
> ENSANGP00000023432 [Anopheles gambiae str. PEST].

 98# 191(253& 10 200) EAA13914   5.2 (5.4) 45.5 (49.0) 20.9 (28129.3)
> ENSANGP00000011942 [Anopheles gambiae str. PEST].

 99# 186(305& 120 305) EAA14200   8.6 (5.6) 36.6 (33.1) 20.3 (33487.8)
> ENSANGP00000015053 [Anopheles gambiae str. PEST].

100# 167(496& 330 496) EAA01474   7.7 (6.7) 45.5 (50.2) 18.4 (54540.2)
> ENSANGP00000018314 [Anopheles gambiae str. PEST].

101# 173(592& 420 592) XP_321072   8.3 (7.0) 48.0 (52.0) 18.7 (63774.3)

> ENSANGP00000018314 [Anopheles gambiae].

l02# 212(212& 1 212) XP_320182 9.5 (9.5) 31.6 (31.6) 23.5 (23531.8)
> ENSANGP00000011602 [Anopheles gambiae].

l03# 173(257& 18 190) XP_319131 5.9 (5.4) 39.9 (48.6) 19.0 (28584.8)
> ENSANGP00000011942 [Anopheles gambiae].

l04# 155(155& 1 155) XP_311949 6.5 (6.5) 36.8 (36.8) 16.8 (16824.1)
> ENSANGP00000024687 [Anopheles gambiae].

l05# 188(307& 120 307) CAI11739 5.7 (5.9) 33.5 (35.2) 20.8 (34403.1)
> novel cyclophilin protein [Danio rerio].

l06# 164(164& 1 164) AAQ91263 8.4 (8.4) 36.0 (36.0) 17.5 (17487.9)
> peptidylprolyl isomerase A [Danio rerio].

l07# 189(189& 1 189) NP_001004626 8.4 (8.4) 48.7 (48.7) 20.5 (20465.6)
> peptidylprolyl isomerase F (cyclophilin F) [Danio rerio].

l08# 210(371& 1 210) NP_001002065 4.9 (5.7) 34.8 (27.2) 22.8 (41282.0)
> zgc:86711 [Danio rerio].

l09# 181(181& 1 181) NP_957499 7.6 (7.6) 49.2 (49.2) 19.8 (19766.9)
> similar to peptidyl prolyl isomerase H (cyclophilin H) [Danio

l10# 177(177& 1 177) AAQ94596 7.9 (7.9) 44.6 (44.6) 19.3 (19341.4)
> peptidyl prolyl isomerase H [Danio rerio].

l11# 196(216& 21 216) NP_998184 9.4 (9.7) 29.1 (32.9) 21.6 (23928.7)
> zgc:73214 [Danio rerio].

l12# 161(161& 1 161) NP_001002146 6.7 (6.7) 34.2 (34.2) 17.9 (17914.5)
> zgc:86715 [Danio rerio].

l13# 164(164& 1 164) AAQ91264 8.7 (8.7) 40.9 (40.9) 17.4 (17400.8)
> 2-peptidylprolyl isomerase A [Danio rerio].

l14# 183(183& 1 183) AAH59458 9.4 (9.4) 37.2 (37.2) 19.4 (19370.0)
> Unknown (protein for IMAGE:4199657) [Danio rerio].

l15# 201(454& 10 210) AAH56814 4.4 (5.8) 24.9 (23.1) 22.6 (52854.4)
> Unknown (protein for MGC:63746) [Danio rerio].

l16# 184(184& 1 184) AAH62863 9.5 (9.5) 38.6 (38.6) 19.5 (19472.2)
> Unknown (protein for IMAGE:7002384) [Danio rerio].

l17# 195(687& 1 195) NP_998629 9.4 (10.9) 34.9 (10.0) 21.6 (79984.3)
> peptidyl-prolyl isomerase G (cyclophilin G) [Danio rerio].

l18# 179(486& 210 388) NP_957285 9.5 (9.1) 22.3 (19.8) 19.7 (54669.7)
> similar to peptidylprolyl isomerase (cyclophilin)-like 2 [Danio

l19# 171(171&   1 171) NP_506749   8.6 (8.6) 36.3 (36.3) 18.4 (18401.0)
> CYcloPhilin family CYP-7 (18.4 kD) (cyp-7) [Caenorhabditis

l20# 173(192& 20 192) NP_506561   6.2 (7.8) 37.6 (38.5) 18.6 (20710.6)
> Peptidyl-prolyl cis-trans isomerase cyclophilin family member 1

l21# 178(517& 340 517) NP_504522   8.6 (6.6) 39.9 (23.8) 19.6 (57706.7)
> CYcloPhilin family CYP-17 (cyp-17) [Caenorhabditis elegans].

l22# 173(173&   1 173) NP_506751   8.9 (8.9) 39.9 (39.9) 18.6 (18550.2)
> Peptidyl-prolyl cis-trans isomerase cyclophilin family member 3

l23# 177(309&   1 177) NP_497745   8.8 (9.9) 36.7 (21.7) 19.8 (35796.3)
> Peptidyl-prolyl cis-trans isomerase cyclophilin family member 9

l24# 172(172&   1 172) NP_499828   8.1 (8.1) 37.2 (37.2) 18.5 (18535.3)
> Peptidyl-prolyl cis-trans isomerase cyclophilin family member 2

l25# 176(201& 20 195) NP_497257   5.3 (5.6) 37.5 (40.8) 19.3 (21863.9)
> Peptidyl-prolyl cis-trans isomerase cyclophilin family member 6

l26# 175(466&   5 179) NP_509506   7.7 (10.3) 36.0 (15.2) 19.4 (53565.4)
> CYcloPhilin family CYP-8 (53.6 kD) (cyp-8) [Caenorhabditis

l27# 166(331& 135 300) NP_503034   8.2 (5.6) 39.2 (33.8) 18.3 (36423.5)
> CYcloPhilin family CYP-13 (36.4 kD) (cyp-13) [Caenorhabditis

l28# 169(169&   1 169) NP_501118   8.5 (8.5) 35.5 (35.5) 18.5 (18524.1)
> CYcloPhilin family CYP-12 (cyp-12) [Caenorhabditis elegans].

l29# 178(222&   1 178) NP_496562   7.2 (7.2) 29.2 (24.8) 20.0 (25229.6)
> CYcloPhilin family CYP-16 (cyp-16) [Caenorhabditis elegans].

l30# 173(183& 11 183) NP_495855   7.1 (6.1) 44.5 (42.1) 18.9 (20193.2)
> Peptidyl-prolyl cis-trans isomerase cyclophilin family member 11

l31# 167(523& 272 438) NP_496337   8.8 (9.2) 36.5 (29.1) 18.8 (58534.0)
> Masculinisation Of Germline 6, sex determining protein, CYcloPhilin

l32# 147(147&   1 147) NP_495417   5.2 (5.2) 23.8 (23.8) 16.5 (16483.6)
> CYcloPhilin family CYP-10 (cyp-10) [Caenorhabditis elegans].

l33# 164(629& 466 629) NP_493378   6.6 (6.4) 33.5 (34.2) 18.2 (70844.8)
> cyclophilin [Caenorhabditis elegans]

l34# 172(381&   1 172) NP_492343   4.8 (5.4) 22.7 (19.4) 19.8 (44422.9)
> CYcloPhilin family CYP-14 (cyp-14) [Caenorhabditis elegans].

l35# 180(204& 20 199) NP_493624   9.3 (9.5) 37.8 (40.2) 19.6 (21927.3)
> Peptidyl-prolyl cis-trans isomerase cyclophilin family member 5

l36# 172(172&   1 172) T06073   7.8 (7.8) 38.4 (38.4) 18.4 (18372.9)
> peptidylprolyl isomerase (EC 5.2.1.8) ROC1 - Arabidopsis thaliana.

l37# 170(506&   1 170) NP_175776   5.9 (5.8) 26.5 (19.0) 19.1 (58829.2)
> cyclophilin-RNA interacting protein, putative; protein id:

l38# 181(228& 48 228) NP_567029   6.6 (6.6) 40.3 (44.7) 19.4 (24506.2)
> cyclophilin-like protein; protein id: At3g55920.1, supported by

l39# 168(595& 331 498) NP_201554   7.3 (8.2) 33.9 (32.3) 18.5 (65023.7)
> peptidylprolyl isomerase (cyclophilin)-like; protein id:

l40# 170(204& 35 204) NP_200679   9.0 (9.5) 39.4 (41.2) 18.3 (21961.3)
> cyclophilin ROC7; protein id: At5g58710.1, supported by cDNA:

l41# 175(199& 25 199) NP_181407   8.4 (8.1) 41.1 (41.2) 19.3 (21491.8)
> peptidyl-prolyl cis-trans isomerase, putative / cyclophilin,

l42# 176(176&   1 176) NP_191166   7.8 (7.8) 37.5 (37.5) 18.9 (18920.6)
> peptidylprolyl isomerase; protein id: At3g56070.1, supported by cDNA: gi_18

l43# 166(166&   1 166) NP_171696   8.8 (8.8) 35.5 (35.5) 18.2 (18158.8)
> hypothetical protein; protein id: At1g01940.1 [Arabidopsis thaliana]

l44# 188(224& 37 224) NP_195222   6.4 (6.4) 38.3 (42.9) 20.4 (24594.2)
> cyclophilin - like protein; protein id: At4g34960.1 [Arabidopsis

l45# 172(172&   1 172) NP_195213   8.9 (8.9) 41.3 (41.3) 18.4 (18378.1)
> peptidylprolyl isomerase (cyclophilin); protein id: At4g34870.1,

l46# 171(259& 89 259) NP_196816   7.9 (9.7) 42.1 (38.6) 18.7 (28306.2)
> peptidyl-prolyl isomerase protein; protein id: At5g13120.1, supported by cD

l47# 175(232&   1 175) NP_188932   4.6 (4.7) 34.9 (35.8) 19.4 (26045.0)
> cyclophilin, putative; protein id: At3g22920.1 [Arabidopsis

l48# 171(260& 90 260) NP_191762   7.8 (8.7) 43.3 (43.5) 18.7 (28208.3)
> peptidylprolyl isomerase - ROC4 - Arabidopsis thaliana

l49# 162(631& 470 631) NP_190046   6.8 (6.2) 30.2 (34.2) 18.3 (70984.0)
> putative protein; protein id: At3g44600.1, supported by cDNA: gi_17065153 [

l50# 182(201& 20 201) NP_180557   9.3 (9.5) 37.4 (42.3) 19.6 (21533.8)
> cyclophilin; protein id: At2g29960.1, supported by cDNA: 19211.,

l51# 164(164&   1 164) NP_181157   8.7 (8.7) 31.1 (31.1) 18.2 (18232.7)
> cyclophilin-like protein; protein id: At2g36130.1, supported by

l52# 173(173&   1 173) NP_179251   8.6 (8.6) 36.4 (36.4) 18.5 (18492.0)
> cytosolic cyclophilin (ROC3); protein id: At2g16600.1, supported by

l53# 174(174&   1 174) NP_179709   8.2 (8.2) 42.0 (42.0) 18.5 (18464.1)

> cyclophilin (CYP2); protein id: At2g21130.1, supported by cDNA:

l54# 170(361& 1 170) AAK02067 6.2 (5.5) 34.1 (27.4) 18.7 (40607.1)
> cyclophilin-40 [Arabidopsis thaliana].

l55# 162(461& 300 461) P82869 4.4 (8.3) 40.7 (42.3) 17.4 (49965.1)
> Peptidyl-prolyl cis-trans isomerase TLP38, chloroplast precursor

l56# 162(857& 1 162) T05352 9.4 (12.4) 35.8 (12.1) 17.9 (96855.4)
> hypothetical protein F8B4.120 - Arabidopsis thaliana.

l57# 176(570& 1 176) T49181 8.9 (11.4) 41.5 (13.2) 18.7 (63540.5)
> cyclophylin-like protein - Arabidopsis thaliana.

l58# 171(510& 1 171) T05314 5.9 (7.9) 40.9 (29.0) 18.9 (57118.8)
> hypothetical protein F26P21.180 - Arabidopsis thaliana.

l59# 162(162& 1 162) CSZPA 8.9 (8.9) 40.7 (40.7) 17.4 (17401.9)
> peptidylprolyl isomerase (EC 5.2.1.8) A - fission yeast

l60# 170(155& 1 170) E313994 6.3 (6.3) 42.9 (40.0) 18.4 (16864.3)
> unknown - Schizosaccharomyces pombe (fission yeast)

l61# 183(201& 20 202) E1335804 5.5 (5.5) 28.4 (32.8) 20.0 (22156.0)
> peptidyl-prolyl isomerase b precursor - Schizosaccharomyces pombe

l62# 173(173& 1 173) E1331567 5.5 (5.5) 43.9 (43.9) 18.9 (18905.6)
> u-snrnp-associated cyclophilin - Schizosaccharomyces pombe

l63# 180(356& 1 180) S62327 6.1 (8.0) 31.7 (26.4) 20.1 (40161.6)
> probable 40 kd peptidyl-prolyl cis-trans isomera se - fission yeast

l64# 178(471& 216 393) S62590 9.3 (9.2) 25.3 (22.1) 20.3 (53573.6)
> hypothetical protein SPAC21E11.05c - fission yeast

l65# 165(610& 447 611) E1294518 5.4 (5.5) 30.3 (30.8) 18.4 (69048.3)
> peptidyl prolyl cis/trans isomerase - Schizosaccharomyces pombe

l66# 180(432& 1 180) T39728 4.6 (5.5) 35.0 (27.5) 20.3 (50776.6)
> probable PPIase with RNA binding region - (Schizosaccharomyces pombe)

l67# 172(463& 9 180) E1263915 5.7 (8.7) 38.4 (22.2) 19.2 (52174.3)
> peptidyl-prolyl cis-trans isomerase - Schizosaccharomyces pombe

l68# 162(162& 1 162) CSBY 7.3 (7.3) 37.7 (37.7) 17.4 (17390.7)
> peptidylprolyl isomerase, cytosolic - Saccharomyces cerevisiae

l69# 174(182& 10 183) S30507 8.7 (9.1) 32.2 (31.9) 18.9 (19918.8)
> peptidylprolyl isomerase 3 precursor - Saccharomyces cerevisiae

l70# 176(205& 31 206) S12324 7.4 (5.7) 33.5 (38.5) 19.5 (22768.9)
> peptidylprolyl isomerase 2 - Saccharomyces cerevisiae

l71# 200(393&   1 200) S57050   5.5 (5.1) 28.5 (24.4) 22.2 (45134.0)
> hypothetical protein YJR032w CPR7 - Saccharomyces cerevisiae

l72# 178(371&   1 178) S48567   5.5 (5.8) 33.1 (28.3) 19.9 (42072.1)
> hypothetical protein YLR216c - Saccharomyces cerevisiae

l73# 194(318& 47 240) CSBYC3   5.1 (6.5) 40.7 (38.1) 22.0 (35780.0)
> peptidylprolyl isomerase SCC3 - Saccharomyces cerevisiae

l74# 174(308& 51 224) S63359   4.8 (6.6) 35.6 (34.1) 19.2 (34946.1)
> probable membrane protein YNR028w - CPR8 (Saccharomyces cerevisiae)

l75# 178(225& 29 206) S38324   6.0 (5.3) 36.0 (36.0) 20.0 (25326.8)
> peptidylprolyl isomerase D precursor - Saccharomyces cerevisiae

l76# 177(177&   1 177) TcCyP19   8.4 (8.4) 41.2 (41.2) 18.8 (18781.3)
> T.cruzi from Argentina

l77# 179(179&   1 179) TcCyP20   5.9 (5.9) 38.0 (38.0) 19.8 (19805.5)
> T.cruzi from Argentina

l78# 194(194&   1 194) TcCyP21.1   9.5 (9.5) 44.3 (44.3) 21.1 (21102.4)
> T.cruzi from Argentina

l79# 196(196&   1 196) TcCyP21.3   9.2 (9.2) 29.1 (29.1) 21.4 (21374.4)
> T.cruzi from Argentina

l80# 205(224& 20 224) TcCyP24.3   8.7 (8.9) 38.0 (43.3) 22.0 (24161.6)
> T.cruzi from Argentina

l81# 231(231&   1 231) TcCyP26   8.1 (8.1) 43.3 (43.3) 25.6 (25647.5)
> T.cruzi from Argentina

l82# 210(258&   1 210) TcCyP28   10.0 (10.2) 28.1 (23.3) 22.9 (28444.6)
> T.cruzi from Argentina

l83# 216(265& 50 265) TcCyP30   7.2 (8.1) 40.7 (43.0) 23.7 (29664.2)
> T.cruzi from Argentina

l84# 209(308& 100 308) TcCyP35.1   5.3 (5.7) 42.6 (40.9) 23.3 (34992.7)
> T.cruzi from Argentina

l85# 196(325& 55 250) TcCyP35.3   7.0 (5.6) 34.7 (33.5) 21.7 (35298.5)
> T.cruzi from Argentina

l86# 175(354&   1 175) TcCyP40   6.6 (5.6) 40.0 (34.7) 18.9 (38381.6)
> T.cruzi from Argentina

l87# 196(995& 800 995) TcCyP110   5.1 (5.3) 54.1 (48.3) 21.6 (110007.6)
> T.cruzi from Argentina

188# 164(164& 1 164) AAT44353 8.6 (8.6) 36.6 (36.6) 17.5 (17538.0)
> cyclophilin [Crassostrea gigas].

189# 172(172& 1 172) EAL37431 7.0 (7.0) 46.5 (46.5) 18.5 (18544.3)
> 20k cyclophilin [Cryptosporidium hominis].

190# 169(169& 1 169) EAL37232 6.3 (6.3) 36.1 (36.1) 18.9 (18862.5)
> cyclophilin-like protein [Cryptosporidium hominis].

191# 210(210& 1 210) EAL37110 7.4 (7.4) 40.0 (40.0) 22.9 (22925.2)
> cyclophilin Ta cyp [Cryptosporidium hominis].

192# 180(302& 1 180) EAL36265 5.5 (4.7) 36.7 (35.1) 20.6 (34538.6)
> cyclophilin-RNA interacting protein [Cryptosporidium hominis].

193# 189(189& 1 189) EAL35294 7.6 (7.6) 37.0 (37.0) 21.2 (21241.4)
> cyclophilin [Cryptosporidium hominis].

194# 177(177& 1 177) U68268 7.3 (7.3) 37.3 (37.3) 18.8 (18803.2)
> cyclophilin A - Trypanosoma congolense

195# 177(177& 1 177) U68269 7.8 (7.8) 39.5 (39.5) 18.7 (18715.1)
> cyclophilin A - Trypanosoma vivax

196# 189(196& 8 196) AAQ15626 9.2 (9.4) 27.0 (28.6) 20.3 (21165.1)
> cyclophilin, putative [Trypanosoma brucei].

197# 177(177& 1 177) AAB07896 8.1 (8.1) 39.0 (39.0) 18.8 (18763.3)
> cyclophilin A [Trypanosoma brucei brucei].

198# 174(188& 15 188) AAK14937 8.7 (9.6) 36.2 (35.1) 19.0 (20711.5)
> cyclophilin 1 [Theileria parva].

199# 182(185& 4 185) CAC18541 6.5 (6.5) 39.6 (40.5) 19.8 (20121.2)
> putative U-snRNP-associated cyclophilin [Echinococcus

200# 162(162& 1 162) A45000 6.1 (6.1) 36.4 (36.4) 17.2 (17223.5)
> cyclophilin - tapeworm (Echinococcus granulosus) (fragment)

201# 169(169& 1 169) Q9Y0F5 6.3 (6.3) 34.3 (34.3) 18.9 (18864.5)
> Cyclophilin - Cryptosporidium parvum

202# 171(171& 1 171) U47811 8.9 (8.9) 36.8 (36.8) 18.6 (18616.2)
> cyclophilin Bmcyp-2 - Brugia malayi

203# 172(172& 1 172) U50388 9.5 (9.5) 35.5 (35.5) 19.2 (19153.1)
> cyclophilin A - Schistosoma mansoni

204# 161(161& 1 161) L46884 8.1 (8.1) 34.2 (34.2) 17.7 (17671.1)
> cyclophilin - Schistosoma mansoni

205# 170(179& 11 180) M93420 9.7 (8.6) 30.6 (28.5) 19.0 (20049.9)

> cyclophilin - Schistosoma japonicum

206# 190(213& 25 214) U50389 9.2 (8.2) 38.9 (44.1) 20.8 (23237.7)
> cyclophilin B - Schistosoma japonicum

207# 190(213& 25 214) G992633 9.5 (8.8) 38.4 (42.7) 20.8 (23293.9)
> cyclophilin B - Schistosoma mansoni

208# 175(273& 100 274) E323073 9.4 (6.0) 35.4 (27.8) 19.5 (30905.0)
> Schistosoma mansoni cyclophylin-like protein trans-spliced mRNA

209# 183(366& 155 337) S52758 5.7 (8.1) 38.3 (41.0) 20.2 (39971.3)
> adenosine kinase (EC 2.7.1.20) - Leishmania donovani

210# 177(177& 1 177) E1203753 7.8 (7.8) 28.2 (28.2) 18.8 (18823.4)
> cyclophilin - Leishmania major

211# 192(192& 1 192) CAB58290 6.6 (6.6) 60.9 (60.9) 20.4 (20356.3)
> possible cyclophilin.

212# 165(295& 21 185) CAB58298 10.1 (10.4) 36.4 (27.1) 17.7 (31496.9)
> cyclophilin.

213# 180(354& 1 180) AAF69736 6.1 (5.5) 38.3 (28.0) 19.4 (38420.4)
> 354 PPIase (cyclophilin) D [Leishmania major].

214# 169(187& 20 188) AAD46565 6.2 (6.2) 45.0 (49.7) 18.5 (20429.5)
> Cyclophilin - Leishmania donovani

215# 171(179& 10 180) A53522 6.1 (6.1) 36.3 (39.1) 18.6 (19638.4)
> 18.5k cyclophilin precursor - Toxoplasma gondii

216# 180(440& 1 180) NP_702112 7.8 (6.6) 31.7 (14.5) 21.0 (51884.9)
> cyclophilin, putative [Plasmodium falciparum 3D7].

217# 173(280& 58 230) NP_701512 6.6 (9.7) 48.0 (38.6) 19.5 (32336.5)
> cyclophilin [Plasmodium falciparum 3D7].

218# 180(226& 1 180) NP_701389 9.5 (8.4) 36.7 (31.4) 20.9 (26429.4)
> cyclophilin, putative [Plasmodium falciparum 3D7].

219# 167(167& 1 167) NP_701030 5.9 (5.9) 31.7 (31.7) 18.6 (18588.0)
> cyclophilin, putative [Plasmodium falciparum 3D7].

220# 240(677& 1 240) NF01067443 9.6 (9.6) 25.8 (12.4) 28.4 (80923.0)
> Hypothetical protein PF08_0128 [Plasmodium falciparum]

221# 217(217& 1 217) NF01067965 6.3 (6.3) 38.7 (38.7) 24.9 (24892.4)
> Peptidyl-prolyl cis-trans isomerase (EC 5.2.1.8) [Plasmodium falcipa

222# 178(747& 570 747) NF01065889 7.8 (7.0) 36.0 (33.7) 20.2 (87040.3)
> Cyclophilin, putative (EC 5.2.1.8) [Plasmodium falciparum]

223# 170(170& 1 170) NF00926916 8.1 (8.1) 37.1 (37.1) 18.9 (18860.5)
> Cyclophilin [Plasmodium falciparum]

224# 195(195& 1 195) S52760 7.4 (7.4) 45.1 (45.1) 21.7 (21731.2)
> peptidylprolyl isomerase (EC 5.2.1.8) precursor - malaria parasite

225# 183(210& 29 211) U10322 7.1 (6.1) 43.7 (40.0) 20.9 (24049.4)
> cyclophilin - Plasmodium falciparum (malaria parasite P. falciparum)

226# 171(171& 1 171) CAB39039 8.1 (8.1) 36.8 (36.8) 19.0 (18952.6)
> cyclophilin [Plasmodium falciparum].

227# 180(204& 25 204) CAD51648 7.2 (5.3) 34.4 (30.9) 20.4 (23199.2)
> cyclophilin, putative [Plasmodium falciparum 3D7].

228# 170(170& 1 170) NF01497907 8.4 (8.4) 38.2 (38.2) 18.8 (18832.5)
> Peptidyl-prolyl cis-trans isomerase, cyclophilin-type [Plasmodium yo

229# 176(765& 590 765) NF01497552 7.8 (6.9) 36.4 (30.8) 20.0 (88434.4)
> Hypothetical protein [Plasmodium yoelii]

230# 192(192& 1 192) NF01497379 9.4 (9.4) 47.9 (47.9) 21.2 (21208.6)
> Peptidyl-prolyl cis-trans isomerase, cyclophilin-type [Plasmodium yo

231# 210(210& 1 210) NF01497199 5.4 (5.4) 37.1 (37.1) 23.9 (23909.3)
> Cyclophilin [Plasmodium yoelii]

232# 200(621& 1 200) NF01496968 9.8 (9.4) 29.0 (14.0) 23.6 (74002.7)
> Drosophila melanogaster CG12343 gene product, putative [Plasmodium y

233# 163(285& 58 220) NF01495390 6.5 (9.6) 45.4 (37.5) 18.5 (32765.9)
> Peptidyl-prolyl cis-trans isomerase, cyclophilin-type, putative [Pla

234# 202(202& 1 202) NF01495324 5.4 (5.4) 33.2 (33.2) 22.7 (22715.6)
> Cyclophilin-like protein [Plasmodium yoelii]

235# 157(157& 1 157) NF01493974 9.0 (9.0) 25.5 (25.5) 18.4 (18390.0)
> Cyclophilin-related [Plasmodium yoelii]

236# 200(354& 1 200) NF01493918 7.0 (4.5) 39.5 (28.0) 23.2 (41146.5)
> Peptidyl-prolyl cis-trans isomerase, cyclophilin-type, putative [Pla

237# 162(162& 1 162) E316521 9.4 (9.4) 34.6 (34.6) 17.7 (17704.2)
> peptidylprolyl isomerase - Paramecium primaurelia

238# 165(695& 1 165) CAC35733 5.8 (9.5) 33.3 (16.0) 18.8 (82646.6)
> cyclophilin-RNA interacting protein [Paramecium tetraurelia].

239# 171(171& 1 171) U47812 8.2 (8.2) 35.1 (35.1) 18.5 (18525.1)
> cyclophilin Ovcyp-2 - Onchocerca volvulus

240# 171(171& 1 171) U47813 8.6 (8.6) 38.0 (38.0) 18.5 (18542.1)
> cyclophilin Dicyp-2 - Dirofilaria immitis

241# 167(167& 1 167) G2624966 8.7 (8.7) 37.7 (37.7) 18.1 (18139.0)
> cyclophilin - Entamoeba histolytica

242# 180(526& 266 445) E1317902 7.8 (8.4) 30.0 (27.6) 20.0 (59564.1)
> cyclophilin 4 - Brugia malayi

243# 180(526& 266 445) E1319851 6.5 (8.5) 30.0 (28.3) 20.2 (59762.5)
> O. volvulus cyclophilin 4 - Onchocerca volvulus

244# 180(527& 266 445) G3057040 8.2 (8.1) 27.8 (26.2) 20.1 (59577.1)
> cyclophilin Dicyp-3 - Dirofilaria immitis

245# 165(165& 1 165) AAB81959 7.8 (7.8) 37.6 (37.6) 18.0 (18012.5)
> Cyclophilin - baboon - Papio hamadryas

246# 165(165& 1 165) AF023860 7.8 (7.8) 37.6 (37.6) 18.0 (18012.5)
> Cyclophilin - African green monkey - Chlorocebus aethiops

247# 165(165& 1 165) AAB81961 7.8 (7.8) 37.6 (37.6) 18.0 (18012.5)
> Cyclophilin - rhesus monkey - Macaca mulatta

248# 164(164& 1 164) AAF22215 7.2 (7.2) 38.4 (38.4) 17.8 (17837.3)
> cyclophilin 18 [Oryctolagus cuniculus].

249# 156(156& 1 156) AF243140_1 8.3 (8.3) 34.0 (34.0) 16.9 (16933.3)
> 156 - cyclophilin A [Canis familiaris].

250# 158(158& 1 158) AF252388 8.0 (8.0) 36.7 (36.7) 16.8 (16811.0)
> Cyclophilin from Macaca mulatta

251# 163(163& 1 163) CSBOAB 8.2 (8.2) 36.8 (36.8) 17.7 (17738.2)
> peptidylprolyl isomerase A - bovine

252# 167(167& 1 167) NF01922219 5.2 (5.2) 39.5 (39.5) 18.1 (18059.4)
> Peptidyl-prolyl cis-trans isomerase [Euplotes vannus]

253# 164(164& 1 164) NF01725587 8.6 (8.6) 32.9 (32.9) 17.7 (17713.2)
> Cyclophilin A [Chlamys farreri]

254# 198(198& 1 198) NF01897292 4.8 (4.8) 31.3 (31.3) 22.7 (22665.4)
> Peptidyl-prolyl cis-trans isomerase [Oikopleura dioica]

255# 164(164& 1 164) CSHYAC 8.4 (8.4) 32.3 (32.3) 17.9 (17899.3)
> peptidylprolyl isomerase A - Chinese hamster

256# 165(165& 1 165) NF00071027 7.8 (7.8) 37.6 (37.6) 18.0 (18012.5)
> cyclophilin A [Papio hamadryas]

257# 161(572& 340 500) NF01951405 8.8 (9.4) 21.1 (25.3) 18.2 (64075.1)

> PREDICTED: similar to peptidylprolyl isomerase-like 2 isoform a; cyc

258# 164(164& 1 164) NF01059378 7.8 (7.8) 37.2 (37.2) 17.9 (17881.3)
> Peptidyl-prolyl cis-trans isomerase A (EC 5.2.1.8) (PPIase) (Rotamas

259# 171(171& 1 171) NF01105745 7.8 (7.8) 36.8 (36.8) 18.3 (18319.9)
> Peptidylprolyl isomerase [Phytophthora infestans]

260# 164(164& 1 164) NF00495096 8.4 (8.4) 32.3 (32.3) 17.9 (17899.3)
> Peptidyl-prolyl cis-trans isomerase A (EC 5.2.1.8) (PPIase) (Rotamas

261# 173(173& 1 173) NF01053198 8.6 (8.6) 42.2 (42.2) 18.3 (18295.8)
> Peptidylprolyl isomerase (Cyclophilin) (EC 5.2.1.8) [Betula pendula]

262# 163(163& 1 163) CSPGA 8.2 (8.2) 36.8 (36.8) 17.7 (17738.2)
> peptidylprolyl isomerase A - pig

263# 161(161& 1 161) NF01950932 6.3 (6.3) 28.0 (28.0) 18.1 (18051.6)
> Hypothetical protein [Gallus gallus]

264# 220(341& 1 220) NF01951326 4.9 (5.5) 33.2 (31.1) 23.9 (37271.4)
> PREDICTED: similar to cyclophilin [Gallus gallus]

265# 172(172& 1 172) NF00909389 8.6 (8.6) 39.5 (39.5) 18.2 (18178.7)
> Cyclophilin [Glycine max]

266# 172(172& 1 172) NF01286555 8.9 (8.9) 42.4 (42.4) 18.2 (18241.8)
> Cyclophilin [Populus tremuloides]

267# 173(173& 1 173) NF01737225 8.6 (8.6) 41.6 (41.6) 18.4 (18384.1)
> Cyclophilin [Thellungiella halophila]

268# 190(322& 1 190) NF01590839 5.3 (6.1) 30.0 (32.3) 20.7 (35197.3)
> Peptidyl-prolyl cis-trans isomerase [Treponema denticola]

269# 168(168& 1 168) AAH51602 6.2 (6.2) 33.3 (33.3) 18.3 (18278.6)
> LOC398596 protein [Xenopus laevis].

270# 164(164& 1 164) AAT69672 9.0 (9.0) 37.8 (37.8) 17.7 (17720.3)
> cyclophilin A [Xenopus laevis].

271# 184(193& 10 193) AAH54186 8.7 (9.1) 42.9 (45.6) 19.9 (20909.2)
> LOC398630 protein [Xenopus laevis].

272# 187(216& 30 216) AAH54168 9.5 (9.7) 33.2 (38.4) 20.7 (23859.7)
> Ppib-prov protein [Xenopus laevis].

273# 221(521& 260 480) NF01208049 8.8 (8.9) 19.0 (22.3) 25.2 (59229.1)
> MGC53046 protein [Xenopus laevis]

274# 226(226& 1 226) NF01844632 8.0 (8.0) 30.5 (30.5) 25.0 (25034.9)
> LOC443580 protein (Fragment) [Xenopus laevis]

275# 200(477&   1 200) NF01844615   6.6 (5.0) 29.5 (15.7) 22.5 (54874.9)
> MGC84139 protein [Xenopus laevis]

276# 166(166&   1 166) NF01915773   6.4 (6.4) 33.7 (33.7) 18.3 (18253.7)
> MGC79515 protein [Xenopus tropicalis]

277# 161(161&   1 161) NF01915657   6.7 (6.7) 29.2 (29.2) 18.0 (18034.6)
> MGC89451 protein [Xenopus tropicalis]

278# 210(370&   1 210) NF01557564   5.1 (5.8) 31.9 (27.6) 22.9 (41035.5)
> Hypothetical protein MGC75854 [Xenopus tropicalis]

279# 164(164&   1 164) AAH41536   8.4 (8.4) 37.8 (37.8) 17.9 (17912.5)
> Cyp-7-prov protein [Xenopus laevis].

280# 185(752&   1 185) AAH85963   8.6 (10.7) 34.6 (8.5) 20.6 (88324.8)
> Unknown (protein for MGC:97908) [Xenopus laevis].

281# 177(177&   1 177) AAH64250   8.1 (8.1) 42.9 (42.9) 19.2 (19192.2)
> Hypothetical protein MGC76244 [Xenopus tropicalis].

282# 200(370&   1 200) AAH61335   5.7 (5.8) 33.5 (27.6) 21.8 (41035.5)
> Hypothetical protein MGC75854 [Xenopus tropicalis].

283# 164(164&   1 164) AAH59741   8.7 (8.7) 39.0 (39.0) 17.8 (17798.5)
> Hypothetical protein MGC75715 [Xenopus tropicalis].

284# 186(736& 10 195) AAH67931   8.3 (10.8) 32.3 (9.0) 20.7 (85639.4)
> Unknown (protein for MGC:69461) [Xenopus tropicalis].

285# 181(521& 270 450) AAH44993   8.6 (8.9) 19.3 (22.3) 20.6 (59229.1)
> MGC53046 protein [Xenopus laevis].

286# 184(207& 25 208) A40516   9.8 (9.9) 38.0 (42.0) 20.2 (22412.9)
> peptidylprolyl isomerase (S-cyclophilin) precursor - chicken

287# 184(208& 26 209) CYPB_BOVIN   9.7 (9.7) 35.3 (39.9) 20.2 (22701.3)
> Peptidyl-prolyl cis-trans isomerase b precursor

288# 160(160&   1 160) AAR19276   8.9 (8.9) 38.1 (38.1) 17.1 (17145.5)
> venom gland cyclophilin [Bitis gabonica].

289# 192(370&   6 197) A46579   6.3 (6.1) 37.5 (30.3) 20.9 (40620.4)
> estrogen receptor-binding cyclophilin - bovine

290# 180(371&   1 180) AAV40687   5.9 (5.7) 38.9 (29.1) 19.3 (40735.0)
> 40 kDa cyclophilin [Amanita muscaria].

291# 164(164&   1 164) NF01637248   9.8 (9.8) 39.6 (39.6) 17.6 (17614.9)
> putative cyclophilin [Pleurotus ostreatus] [Pleurotus pulmonarius]

292# 174(252& 80 253) CYPR_BOVIN   6.1 (7.1) 37.4 (33.7) 19.3 (28345.4)
> retina-specific cyclophilin - Bos taurus

293# 182(234& 20 201) CYPR_CALVI   5.4 (6.0) 34.6 (47.4) 20.3 (26380.5)
> PPIase from Calliphora vicina, rhodopsin specific isozyme precursor

294# 181(507& 265 445) E1317906   6.6 (8.3) 31.5 (26.8) 20.4 (56989.1)
> CB-CYP-4 - Caenorhabditis briggsae

295# 157(157&   1 157) AAB87888   8.9 (8.9) 41.4 (41.4) 17.1 (17118.6)
> cyclophilin 1 [Drosophila pseudoobscura].

296# 157(157&   1 157) AAB87889   8.9 (8.9) 40.1 (40.1) 17.1 (17107.6)
> cyclophilin 1 [Drosophila subobscura].

297# 164(164&   1 164) Q9XZZ5   9.5 (9.5) 35.4 (35.4) 17.6 (17599.1)
> CYPA - Lumbricus rubellus (Humus earthworm)

298# 164(164&   1 164) S63995   9.2 (9.2) 31.7 (31.7) 17.9 (17935.4)
> peptidylprolyl isomerase - German cockroach (Blattella germanica)

299# 164(164&   1 164) G1703696   8.6 (8.6) 38.4 (38.4) 17.7 (17678.2)
> Cyclophilin A from the sea urchin Hemicentrotus pulcherrimus

300# 143(143&   1 143) U36797   6.3 (6.3) 31.5 (31.5) 15.4 (15398.3)
> cyclophilin-A - Hirudo medicinalis (medicinal leech)

301# 164(172&   1 164) AF017738   7.1 (9.4) 37.2 (35.5) 18.5 (19544.5)
> Onchocerca volvulus cyclophilin-5 (Ovcyp5) mRNA, partial cds

302# 188(843&   1 188) L37292   9.9 (10.7) 39.4 (13.4) 20.9 (97817.8)
> peptidylprolyl isomerase - Brugia malayi

303# 151(151&   1 151) AAS01736   8.0 (8.0) 46.4 (46.4) 16.1 (16068.4)
> putative cyclophilin [Populus alba x Populus tremula].

304# 197(197&   1 197) AAO61985   9.4 (9.4) 66.5 (66.5) 23.0 (22964.2)
> cyclophilin D [Aster yellows phytoplasma].

305# 173(173&   1 173) CAC80550   8.9 (8.9) 44.5 (44.5) 18.2 (18153.8)
> cyclophilin [Ricinus communis].

306# 172(172&   1 172) AAO63777   8.9 (8.9) 42.4 (42.4) 18.2 (18241.8)
> cyclophilin [Populus tremuloides].

307# 179(348& 170 348) B53522   8.0 (8.5) 34.1 (40.5) 19.7 (38124.9)
> 20k cyclophilin - Toxoplasma gondii (fragment)

308# 194(223& 27 220) E280557   6.2 (6.2) 49.0 (51.1) 21.4 (24368.2)
> L. rubellus mRNA for cyclophilin

309# 189(213&   1 189) U70827   9.8 (10.3) 41.8 (37.1) 21.0 (23586.2)

> Onchocerca volvulus cyclophilin (Ovcyp-1) mRNA, partial cds

310# 188(188& 1 188) U70884 9.7 (9.7) 38.8 (38.8) 21.0 (20983.3)
> Dirofilaria immitis cyclophilin 1 mRNA, partial cds

311# 182(196& 15 196) U55771 7.4 (8.4) 39.6 (42.9) 19.9 (21607.9)
> cyclophilin homolog Ta cyp - Theileria annulata

312# 197(220& 25 221) D1024669 9.7 (9.6) 36.0 (40.9) 21.7 (24197.9)
> cyclophilin G - Tachypleus tridentatus

313# 171(179& 10 180) 227879 8.6 (8.6) 39.8 (37.4) 18.2 (19007.7)
> cyclophilin.

314# 178(197& 20 197) AAD48910 9.5 (9.7) 31.5 (36.0) 19.3 (21398.7)
> cyclophilin B.

315# 186(201& 16 201) AAO51811 7.1 (7.1) 36.6 (35.3) 20.5 (21998.0)
> similar to Homo sapiens (Human). U-snRNP-associated cyclophilin (EC

316# 160(160& 1 160) AAF76472 8.4 (8.4) 33.1 (33.1) 17.5 (17503.0)
> Contains similarity to cyclophilin E from Dictyostelium discoideum

317# 172(233& 61 232) AAP80861 9.7 (10.0) 40.7 (43.3) 18.4 (24791.5)
> cyclophilin [Triticum aestivum].

318# 180(204& 25 204) AAP73848 8.2 (8.1) 37.8 (40.7) 19.8 (21790.0)
> putative cyclophilin [Oryza sativa (japonica cultivar-group)].

319# 164(164& 1 164) BAB62329 8.7 (8.7) 32.3 (32.3) 18.1 (18083.6)
> cyclophilin [Oryza sativa (japonica cultivar-group)].

320# 181(181& 1 181) AAL75728 9.4 (9.4) 39.8 (39.8) 18.9 (18920.5)
> Putative cyclophilin [Oryza sativa].

321# 172(172& 1 172) S48017 8.4 (8.4) 41.3 (41.3) 18.4 (18361.1)
> peptidylprolyl isomerase (EC 5.2.1.8) Cyp2 - rice.

322# 179(179& 1 179) S48018 7.7 (7.7) 36.9 (36.9) 19.2 (19198.8)
> peptidylprolyl isomerase (EC 5.2.1.8) Cyp1 - rice.

323# 181(220& 40 220) BAD53622 9.7 (10.1) 38.1 (40.0) 19.3 (23492.2)
> putative cyclophilin [Oryza sativa (japonica cultivar-group)].

324# 186(225& 40 225) BAD53621 9.7 (10.1) 37.1 (41.3) 19.9 (24067.9)
> putative cyclophilin [Oryza sativa (japonica cultivar-group)].

325# 189(208& 20 208) BAD53620 9.4 (9.4) 40.2 (43.3) 20.0 (22111.5)
> putative cyclophilin [Oryza sativa (japonica cultivar-group)].

326# 211(327& 110 320) XP_507188 7.0 (7.3) 40.3 (39.1) 23.1 (35887.9)
> PREDICTED OSJNBb0075O18.114 gene product [Oryza sativa (japonica

327# 174(423& 250 423) XP_483750   6.2 (7.7) 31.0 (28.8) 19.6 (48177.0)
> putative cyclophilin (70.8 kD) (cyp-15) [Oryza sativa (japonica

328# 181(503& 40 220) XP_483749   6.4 (6.1) 39.8 (33.2) 20.3 (56069.0)
> putative cyclophilin (70.8 kD) (cyp-15) [Oryza sativa (japonica

329# 186(426& 236 421) XP_482125   4.0 (4.7) 37.6 (36.4) 20.5 (46482.0)
> putative Peptidyl-prolyl cis-trans isomerase, chloroplast precursor

330# 193(432& 240 432) XP_478742   4.5 (5.2) 41.5 (46.1) 20.6 (46090.9)
> putative peptidyl-prolycis-trans isomerase protein [Oryza sativa

331# 196(465& 270 465) XP_478741   4.5 (5.5) 40.8 (48.4) 21.0 (49787.2)
> putative peptidyl-prolycis-trans isomerase protein [Oryza sativa

332# 169(169&   1 169) NP_385690   5.1 (5.1) 25.4 (25.4) 18.6 (18639.1)
> PUTATIVE PEPTIDYL-PROLYL CIS-TRANS ISOMERASE B PROTEIN

333# 190(190&   1 190) NP_385689   4.5 (4.5) 40.0 (40.0) 20.1 (20055.7)
> PUTATIVE PEPTIDYL-PROLYL CIS-TRANS ISOMERASE A SIGNAL PEPTIDE

334# 174(174&   1 174) NP_349373   4.5 (4.5) 32.2 (32.2) 19.4 (19418.8)
> Peptidyl-prolyl cis-transisomerase, cyclophilin family [Clostridium

335# 200(548&   1 200) BAD45990   5.7 (5.9) 39.5 (23.4) 22.5 (63174.3)
> putative multidomain cyclophilin type peptidyl-prolyl cis-trans

336# 180(564&   1 180) BAD45991   4.6 (5.6) 22.8 (15.6) 20.3 (64975.5)
> peptidylprolyl isomerase-like [Oryza sativa (japonica

337# 170(304& 81 250) NP_908419   7.3 (9.4) 61.2 (55.6) 17.4 (31411.3)
> P0439B06.15 [Oryza sativa (japonica cultivar-group)].

338# 186(1089& 245 430) NP_919903   9.9 (8.4) 26.3 (33.7) 21.7 (124775.6)
> putative TNP2-like transposable element [Oryza sativa (japonica

339# 200(396&   1 200) BAD35839   5.3 (5.6) 44.5 (33.8) 21.1 (43249.7)
> putative cyclophilin-40 [Oryza sativa (japonica cultivar-group)].

340# 172(172&   1 172) AAU87301   8.4 (8.4) 40.7 (40.7) 18.2 (18198.7)
> cyclophilin [Pinus halepensis].

341# 208(208&   1 208) CAG90469   5.8 (5.8) 37.0 (37.0) 23.0 (22954.1)
> unnamed protein product [Debaryomyces hansenii CBS767].

342# 162(162&   1 162) CAG88330   8.2 (8.2) 34.0 (34.0) 17.6 (17596.8)
> unnamed protein product [Debaryomyces hansenii CBS767].

343# 180(331&   1 180) CAG88054   4.9 (5.1) 41.7 (40.2) 20.5 (37707.0)
> unnamed protein product [Debaryomyces hansenii CBS767].

344# 167(636& 470 636) CAG86818   5.8 (5.7) 31.1 (31.9) 18.6 (71946.7)
> unnamed protein product [Debaryomyces hansenii CBS767].

345# 164(164&   1 164) NF01109982   8.6 (8.6) 36.0 (36.0) 17.5 (17531.0)
> Cyclophilin A [Cordyceps bassiana]

346# 213(213&   1 213) NF00686348   7.9 (7.9) 23.0 (23.0) 23.8 (23785.0)
> Peptidyl prolyl cis-trans isomerase [Zymomonas mobilis]

347# 154(154&   1 154) NF00686217   6.0 (6.0) 18.2 (18.2) 17.1 (17132.2)
> Peptidyl prolyl cis trans isomerase (Fragment) [Zymomonas mobilis]

348# 174(174&   1 174) NF02138644   7.8 (7.8) 35.6 (35.6) 18.9 (18873.5)
> Cyclophilin 1 [Codonopsis lanceolata]

349# 226(226&   1 226) NF00926921   5.8 (5.8) 31.9 (31.9) 24.8 (24764.2)
> Cyclophilin [Arthroderma benhamiae]

350# 172(172&   1 172) NF00909931   8.6 (8.6) 40.7 (40.7) 18.2 (18206.8)
> CYP1 [Vigna radiata]

351# 161(300& 140 300) NF00956595   8.2 (5.5) 27.3 (30.7) 17.9 (33367.9)
> Cyclophilin [Takifugu rubripes]

352# 173(173&   1 173) NF02035209   5.0 (5.0) 38.2 (38.2) 18.2 (18197.4)
> Cyclophilin [Hyacinthus orientalis]

353# 182(182&   1 182) NF01329591 10.2 (10.2) 42.9 (42.9) 19.8 (19828.0)
> Rotamase [Pseudomonas citronellolis]

354# 190(190&   1 190) CAG86678   6.7 (6.7) 20.0 (20.0) 21.5 (21504.0)
> unnamed protein product [Debaryomyces hansenii CBS767].

355# 180(285& 41 220) CAG86274   9.6 (7.9) 32.2 (40.0) 20.4 (32650.5)
> unnamed protein product [Debaryomyces hansenii CBS767].

356# 180(327&   1 180) CAG85447   8.9 (6.7) 35.6 (22.3) 20.5 (37319.3)
> unnamed protein product [Debaryomyces hansenii CBS767].

357# 186(186&   1 186) CAG85287   8.0 (8.0) 33.9 (33.9) 20.4 (20373.1)
> unnamed protein product [Debaryomyces hansenii CBS767].

358# 200(370&   1 200) CAG84900   4.9 (5.3) 29.0 (28.1) 22.1 (40748.0)
> unnamed protein product [Debaryomyces hansenii CBS767].

359# 190(385&   1 190) CAG84822   5.1 (5.1) 31.1 (29.1) 21.1 (43947.1)
> unnamed protein product [Debaryomyces hansenii CBS767].

360# 169(169&   1 169) CAG84723   6.5 (6.5) 39.6 (39.6) 18.8 (18803.5)
> unnamed protein product [Debaryomyces hansenii CBS767].

361# 191(228& 15 205) CAG79895   5.2 (5.4) 32.5 (33.3) 20.9 (24946.3)

> unnamed protein product [Yarrowia lipolytica CLIB99].

362# 151(479& 250 400) CAG78939 8.6 (8.6) 23.2 (21.5) 16.7 (52765.7)
> unnamed protein product [Yarrowia lipolytica CLIB99].

363# 190(367& 1 190) CAG82238 5.1 (5.6) 35.3 (30.5) 20.6 (40061.3)
> unnamed protein product [Yarrowia lipolytica CLIB99].

364# 163(163& 1 163) CAG81980 7.3 (7.3) 32.5 (32.5) 17.7 (17734.0)
> unnamed protein product [Yarrowia lipolytica CLIB99].

365# 176(176& 1 176) CAG81971 9.1 (9.1) 32.4 (32.4) 19.3 (19270.7)
> unnamed protein product [Yarrowia lipolytica CLIB99].

366# 171(171& 1 171) CAG81844 5.8 (5.8) 36.3 (36.3) 19.1 (19109.7)
> unnamed protein product [Yarrowia lipolytica CLIB99].

367# 200(356& 1 200) CAG84141 8.7 (5.0) 34.5 (22.5) 22.1 (39665.4)
> unnamed protein product [Yarrowia lipolytica CLIB99].

368# 190(385& 1 190) CAG84091 4.9 (5.3) 43.2 (30.1) 20.4 (42637.2)
> unnamed protein product [Yarrowia lipolytica CLIB99].

369# 200(338& 1 200) CAG83821 6.4 (10.3) 36.0 (21.6) 22.8 (39408.9)
> unnamed protein product [Yarrowia lipolytica CLIB99].

370# 189(189& 1 189) CAG76968 9.8 (9.8) 46.6 (46.6) 20.3 (20285.1)
> peptidyl-prolyl cis-trans isomerase A [Erwinia carotovora subsp.

371# 200(387& 1 200) CAG62671 4.8 (5.2) 38.5 (28.9) 22.2 (44246.0)
> unnamed protein product [Candida glabrata CBS138].

372# 164(164& 1 164) CAG76052 5.3 (5.3) 37.2 (37.2) 18.1 (18092.3)
> peptidyl-prolyl cis-trans isomerase B [Erwinia carotovora subsp.

373# 183(183& 1 183) CAG59915 9.0 (9.0) 28.4 (28.4) 20.2 (20196.2)
> unnamed protein product [Candida glabrata CBS138].

374# 162(162& 1 162) CAG58658 7.2 (7.2) 34.6 (34.6) 17.4 (17391.7)
> unnamed protein product [Candida glabrata CBS138].

375# 162(162& 1 162) G3777556 7.8 (7.8) 37.7 (37.7) 17.3 (17253.6)
> cyclophilin - Griffithsia japonica

376# 160(160& 1 160) AAF65770 9.1 (9.1) 43.1 (43.1) 16.8 (16775.2)
> cyclophilin [Euphorbia esula].

377# 171(171& 1 171) BAA25755 9.0 (9.0) 37.4 (37.4) 18.1 (18065.6)
> vcCyP [Vicia faba].

378# 171(171& 1 171) CSTO 8.7 (8.7) 43.3 (43.3) 17.9 (17926.6)
> peptidylprolyl isomerase - tomato

379# 171(171&   1 171) CSRP   8.4 (8.4) 33.3 (33.3) 18.5 (18500.2)
> peptidylprolyl isomerase - rape

380# 172(172&   1 172) CSZM   8.9 (8.9) 42.4 (42.4) 18.3 (18349.1)
> peptidylprolyl isomerase - maize

381# 150(150&   1 150) CYPH_ALLCE   8.2 (8.2) 37.3 (37.3) 16.0 (16033.3)
> cyclophilin - Allium cepa (onion)

382# 155(155&   1 155) AAG01536   7.2 (7.2) 47.1 (47.1) 16.4 (16415.9)
> locus AF291180 - cyclophilin - Capsicum annuum - plant.

383# 172(172&   1 172) AAB51386   8.7 (8.7) 44.8 (44.8) 18.0 (18047.8)
> Cyclophilin - Commerson's wild potato - Solanum commersonii

384# 172(172&   1 172) S54833   8.2 (8.2) 41.3 (41.3) 18.2 (18159.7)
> peptidylprolyl isomerase Cyp - kidney bean

385# 172(172&   1 172) X85185   8.2 (8.2) 37.8 (37.8) 18.3 (18284.8)
> cyclophilin - Catharanthus roseus (Madagascar periwinkle)

386# 172(172&   1 172) Y08273   8.2 (8.2) 47.7 (47.7) 18.1 (18054.8)
> cyclophilin - Digitalis lanata

387# 172(172&   1 172) Y08320   8.2 (8.2) 44.8 (44.8) 18.1 (18127.9)
> cyclophylin - Digitalis lanata

388# 172(172&   1 172) E1226445   8.6 (8.6) 39.0 (39.0) 18.3 (18286.8)
> cytosolic form of cyclophilin - Lupinus luteus (yellow lupine)

389# 170(248& 80 249) L32095   5.8 (8.5) 41.8 (40.7) 18.2 (26547.1)
> cyclophilin - Vicia faba

390# 181(189& 10 190) CAA10766   8.4 (8.1) 42.0 (42.9) 20.0 (20649.9)
> Cyclophilin - Pseudotsuga menziesii (Douglas fir)

391# 162(162&   1 162) AAF69796   9.1 (9.1) 34.6 (34.6) 17.6 (17565.7)
> cyclophilin A [Filobasidiella neoformans var. neoformans] - 162 AA.

392# 162(162&   1 162) AAF69795   9.1 (9.1) 35.2 (35.2) 17.4 (17440.6)
>   cyclophilin A [Filobasidiella neoformans var. neoformans] - 162 AA.

393# 185(223& 40 224) CSNCM   9.1 (9.6) 28.1 (33.2) 20.0 (24064.3)
> peptidylprolyl isomerase precursor, mitochondrial - Neurospora crassa

394# 190(494&   1 190) NF01287451   4.8 (5.7) 37.9 (25.5) 20.7 (56499.9)
> Hypothetical protein B8G12.450 [Neurospora crassa]

395# 167(167&   1 167) NF01527836   7.4 (7.4) 35.3 (35.3) 18.4 (18405.1)
> Probable peptidylprolyl isomerase (Cyclophilin)-like protein [Neuros

396# 153(153&   1 153) NF01488902   9.1 (9.1) 30.7 (30.7) 16.8 (16808.2)
> Hypothetical protein (Probable cyclophilin E) [Neurospora crassa]

397# 200(375&   1 200) NF00648058   6.0 (5.8) 36.5 (32.0) 21.5 (40570.8)
> 41 kDa peptidyl-prolyl cis-trans isomerase (EC 5.2.1.8) (PPIase) (Ro

398# 191(282& 30 220) NF01487278   5.8 (7.7) 23.6 (33.0) 20.8 (30347.8)
> Hypothetical protein [Neurospora crassa]

399# 173(632& 460 632) NF01486260   9.0 (7.1) 26.6 (31.2) 19.3 (70602.4)
> Hypothetical protein [Neurospora crassa]

400# 207(207&   1 207) NF00904102   9.2 (9.2) 31.4 (31.4) 22.6 (22557.0)
> Probable cyclophilin [Neurospora crassa]

401# 190(803&   1 190) NF01484914   4.8 (9.0) 37.9 (27.4) 20.7 (90762.9)
> Hypothetical protein [Neurospora crassa]

402# 182(182&   1 182) NF01484255   7.1 (7.1) 40.7 (40.7) 19.7 (19733.6)
> Hypothetical protein (Probable U-snRNP-associated cyclophilin) [Neur

403# 220(541&   1 220) NF01483993   5.7 (8.4) 29.5 (19.2) 24.3 (60295.9)
> Hypothetical protein (Related to peptidylprolyl isomerase (Cyclophil

404# 172(172&   1 172) NF01533203   8.6 (8.6) 43.6 (43.6) 18.2 (18245.8)
> Cyclophilin [Kandelia candel]

405# 181(597& 320 500) NF01483647 10.0 (9.1) 26.0 (24.0) 20.5 (65800.9)
> Hypothetical protein [Neurospora crassa]

406# 184(227& 45 228) S71849   7.4 (9.7) 27.2 (32.6) 19.9 (24589.9)
> peptidylprolyl isomerase A precursor, mitochondrial - CsA fungi

407# 184(203& 17 200) U17900   9.1 (9.0) 37.5 (41.9) 19.9 (21969.1)
> cyclophilin B precursor - the anaerobic fungus Orpinomyces sp. strain PC-2

408# 162(162&   1 162) NF00873669   8.9 (8.9) 40.7 (40.7) 17.2 (17212.7)
> Allergen [Malassezia sympodialis]

409# 162(162&   1 162) NF01527595   8.0 (8.0) 38.9 (38.9) 17.2 (17243.6)
> Cyclophilin [Malassezia pachydermatis]

410# 184(223& 40 223) NF01539217   7.3 (9.5) 32.6 (33.2) 19.9 (24225.4)
> Putative mitochondrial cyclophilin 1 [Botryotinia fuckeliana]

411# 186(226& 20 205) D1035365   6.1 (5.8) 28.5 (31.9) 20.5 (24764.2)
> cyclophilin - Trichophyton mentagrophytes

412# 165(165&   1 165) YP_116397   5.1 (5.1) 38.8 (38.8) 17.6 (17554.7)
> putative peptidyl-prolyl cis-trans isomerase [Nocardia farcinica

413# 177(292& 116 292) YP_119877   3.9 (4.9) 36.2 (32.5) 18.3 (30326.0)

> putative peptidyl-prolyl cis-trans isomerase [Nocardia farcinica

114# 187(200& 14 200) CAD25897 5.9 (6.1) 34.2 (38.5) 21.1 (22558.7)
> PEPTIDYL-PROLYL CIS-TRANS ISOMERASE (CYCLOPHILIN) [Encephalitozoon

115# 172(172& 1 172) CAD26352 6.7 (6.7) 27.3 (27.3) 19.0 (19046.6)
> PEPTIDYL-PROLYL CIS-TRANS ISOMERASE [Encephalitozoon cuniculi

116# 186(214& 20 205) AAD17998 6.5 (7.8) 24.7 (30.4) 20.3 (23406.6)
> cyclophilin B; CYPB [Emericella nidulans].

117# 172(172& 1 172) G2959712 7.7 (7.7) 35.5 (35.5) 18.4 (18427.9)
> cyclophilin 1 - Chlamydomonas reinhardtii

118# 180(180& 1 180) CSNCC 8.7 (8.7) 26.1 (26.1) 19.5 (19523.1)
> peptidylprolyl isomerase, cytosolic - Neurospora crassa

119# 178(178& 1 178) AJ006689 9.1 (9.1) 31.5 (31.5) 19.6 (19554.0)
> Aspergillus fumigatus mRNA for rAsp f 11 allergen

120# 152(152& 1 152) AAF28343 9.5 (9.5) 28.9 (28.9) 16.9 (16925.3)
> cyclophilin E.

121# 174(174& 1 174) AAD50375 8.6 (8.6) 37.9 (37.9) 19.0 (19015.6)
> cyclophilin D.

122# 145(145& 1 145) AAK21908 9.0 (9.0) 37.9 (37.9) 15.3 (15303.4)
> cyclophilin [Vaucheria litorea].

123# 176(215& 40 215) AAG13968 9.6 (10.3) 33.0 (33.5) 19.2 (23552.9)
> cyclophilin [Magnaporthe grisea].

124# 165(165& 1 165) BAB58884 9.1 (9.1) 34.5 (34.5) 17.8 (17845.2)
> cyclophilin [Magnaporthe grisea].

125# 162(162& 1 162) E1363908 8.9 (8.9) 40.7 (40.7) 17.2 (17212.7)
> cyclophilin allergen - Malassezia furfur(fungi-Exobasidiomycetidae)

126# 174(174& 1 174) AAD16142 9.1 (9.1) 35.1 (35.1) 18.9 (18873.4)
> Cyclophilin - Aspergillus niger

127# 163(163& 1 163) G1764137 8.4 (8.4) 28.2 (28.2) 18.0 (17992.5)
> PIG28 - Uromyces fabae

128# 180(180& 1 180) Z32674 9.8 (9.8) 30.6 (30.6) 18.8 (18757.1)
> cyclophilin - Tolypocladium niveum

129# 179(179& 1 179) JT0686 6.4 (6.4) 29.6 (29.6) 19.4 (19375.7)
> peptidylprolyl isomerase a, cytosolic - fungus (Fusarium sporotich)

130# 162(162& 1 162) CSCK 8.2 (8.2) 37.7 (37.7) 17.6 (17575.0)
> peptidylprolyl isomerase - yeast (Candida albicans)

131# 162(162& 1 162) NP_986490 8.0 (8.0) 38.9 (38.9) 17.4 (17412.9)
> AGL177Cp [Eremothecium gossypii].

132# 188(188& 1 188) NP_985014 8.7 (8.7) 35.1 (35.1) 20.3 (20295.0)
> AER156Cp [Eremothecium gossypii].

133# 190(383& 1 190) NP_984799 5.0 (5.2) 37.4 (29.5) 20.6 (42800.6)
> AEL062Cp [Eremothecium gossypii].

134# 190(369& 1 190) NP_984183 5.3 (5.6) 37.9 (38.5) 20.6 (39990.3)
> ADR087Cp [Eremothecium gossypii].

135# 230(309& 21 250) NP_982586 5.6 (8.8) 29.1 (38.5) 25.8 (34317.4)
> AAR045Cp [Eremothecium gossypii].

136# 203(203& 1 203) NP_982486 4.8 (4.8) 49.3 (49.3) 21.8 (21765.6)
> AAL056Cp [Eremothecium gossypii].

137# 201(201& 1 201) AAT09096 9.7 (9.7) 33.3 (33.3) 21.7 (21676.8)
> cyclophilin [Bigelowiella natans].

138# 194(194& 1 194) YP_014938 4.4 (4.4) 33.0 (33.0) 21.4 (21434.3)
> peptidyl-prolyl cis-trans isomerase, cyclophilin-type [Listeria

139# 171(171& 1 171) NP_951950 6.2 (6.2) 43.3 (43.3) 18.8 (18801.4)
> peptidyl-prolyl cis-trans isomerase, cyclophilin-type [Geobacter

140# 181(181& 1 181) NP_935388 5.1 (5.1) 37.6 (37.6) 19.8 (19802.7)
> Peptidyl-prolyl cis-trans isomerase [Vibrio vulnificus YJ016].

141# 181(181& 1 181) NP_907765 9.5 (9.5) 41.4 (41.4) 20.2 (20185.2)
> CYCLOPHILIN-TYPE PEPTIDYL-PROLYL ISOMERASE [Wolinella succinogenes

142# 187(522& 300 486) BAC91249 9.5 (5.8) 16.6 (26.2) 21.2 (58429.5)
> gll3308 [Gloeobacter violaceus PCC 7421].

143# 189(246& 58 246) BAC90551 9.8 (9.7) 38.6 (46.3) 20.0 (25591.7)
> peptidyl-prolyl cis-trans isomerase [Gloeobacter violaceus PCC

144# 194(283& 90 283) BAC89441 9.4 (9.8) 38.7 (43.8) 20.9 (30471.1)
> glr1500 [Gloeobacter violaceus PCC 7421].

145# 199(243& 45 243) BAC88914 7.8 (9.2) 42.7 (44.0) 20.7 (25131.3)
> peptidyl-prolyl cis-trans isomerase [Gloeobacter violaceus PCC

146# 195(234& 10 204) AAV50868 7.2 (8.9) 34.9 (30.8) 22.0 (26538.9)
> peptidylprolyl isomerase [Mimivirus].

147# 196(196& 1 196) AAV82698 5.0 (5.0) 35.7 (35.7) 22.0 (21980.9)
> Peptidyl-prolyl cis-trans isomerase (rotamase), cyclophilin family

148# 165(165& 1 165) AAV81872 4.6 (4.6) 34.5 (34.5) 18.2 (18155.3)
> Peptidyl-prolyl cis-trans isomerase (rotamase), cyclophilin family

149# 199(267& 64 262) NP_736022 9.6 (9.7) 33.7 (31.8) 21.7 (29344.6)
> hypothetical protein gbs1586 [Streptococcus agalactiae NEM316].

150# 177(466& 270 446) NP_734780 4.5 (4.9) 34.5 (36.3) 19.3 (51902.9)
> hypothetical protein gbs0311 [Streptococcus agalactiae NEM316].

151# 145(145& 1 145) YP_085398 5.3 (5.3) 26.2 (26.2) 15.8 (15773.8)
> peptidyl-prolyl cis-trans isomerase B [Bacillus cereus ZK].

152# 181(323& 90 270) NP_643098 4.9 (5.9) 29.3 (36.5) 19.6 (35139.9)
> peptidyl-prolyl cis-trans isomerase [Xanthomonas axonopodis pv.

153# 164(164& 1 164) NP_641352 5.1 (5.1) 39.6 (39.6) 17.5 (17456.6)
> peptidyl-prolyl cis-trans isomerase [Xanthomonas axonopodis pv.

154# 179(368& 190 368) BAB76758 4.3 (5.0) 39.1 (35.9) 19.5 (40493.4)
> alr5059 [Nostoc sp. PCC 7120].

155# 180(180& 1 180) YP_129479 5.4 (5.4) 41.1 (41.1) 19.9 (19874.7)
> putative peptidyl-prolyl cis-trans isomerase B [Photobacterium

156# 165(165& 1 165) YP_129310 4.6 (4.6) 36.4 (36.4) 18.2 (18231.5)
> putative peptidyl-prolyl cis-trans isomerase B [Photobacterium

157# 183(183& 1 183) YP_129032 8.5 (8.5) 39.9 (39.9) 20.3 (20306.2)
> putative peptidyl-prolyl cis-trans isomerase A [Photobacterium

158# 171(279& 30 200) YP_101389 9.5 (6.7) 22.2 (29.0) 19.3 (31329.8)
> cyclophilin-type peptidyl-prolyl cis-trans isomerase [Bacteroides

159# 185(185& 1 185) YP_087816 9.7 (9.7) 36.2 (36.2) 20.6 (20609.5)
> PpiB protein [Mannheimia succiniciproducens MBEL55E].

160# 183(183& 1 183) YP_087815 6.1 (6.1) 27.3 (27.3) 20.5 (20536.3)
> PpiB protein [Mannheimia succiniciproducens MBEL55E].

161# 203(203& 1 203) YP_076496 4.5 (4.5) 33.5 (33.5) 21.9 (21943.6)
> peptidyl-prolyl cis-trans isomerase, cyclophilin-type

162# 148(148& 1 148) AAT91289 9.7 (9.7) 31.1 (31.1) 15.9 (15871.9)
> putative cyclophilin [Paxillus involutus].

163# 149(149& 1 149) AAT91260 9.9 (9.9) 31.5 (31.5) 16.0 (15985.1)
> putative cyclophilin [Paxillus filamentosus].

164# 207(207& 1 207) NP_868477 7.8 (7.8) 43.0 (43.0) 21.7 (21730.7)
> peptidylprolyl isomerase [Rhodopirellula baltica SH 1].

165# 143(143& 1 143) NP_867717 4.8 (4.8) 24.5 (24.5) 15.9 (15946.8)

> peptidylprolyl isomerase [Pirellula sp. 1].

166# 176(1541& 235 410) NP_867158 4.0 (3.8) 33.0 (45.3) 19.3 (159790.0)
> probable cyclophilin type peptidylprolyl isomerase [Pirellula sp.

167# 171(511& 310 480) NP_865515 4.9 (5.2) 42.1 (30.7) 18.6 (57308.9)
> peptidyl-prolyl cis-trans isomerase cyp2 [Pirellula sp. 1].

168# 164(164& 1 164) NP_992233 5.4 (5.4) 32.3 (32.3) 18.2 (18151.4)
> peptidyl-prolyl cis-trans isomerase B [Yersinia pestis biovar

169# 199(199& 1 199) NP_991569 9.3 (9.3) 44.2 (44.2) 21.7 (21663.8)
> peptidyl-prolyl cis-trans isomerase A [Yersinia pestis biovar

170# 189(189& 1 189) NP_280624 4.0 (4.0) 29.1 (29.1) 20.5 (20458.1)
> PpiA [Halobacterium salinarum NRC-1].

171# 190(324& 135 324) BAC18575 3.6 (4.3) 31.1 (27.5) 19.9 (34695.3)
> putative peptidylprolyl isomerase [Corynebacterium efficiens

172# 202(202& 1 202) BAC16839 5.0 (5.0) 40.6 (40.6) 21.8 (21829.5)
> putative peptidylprolyl isomerase [Corynebacterium efficiens

173# 170(170& 1 170) BAB82272 5.1 (5.1) 32.9 (32.9) 18.9 (18888.7)
> peptidyl-prolyl cis-trans isomerase B [Clostridium perfringens str.

174# 169(169& 1 169) BAB99042 3.7 (3.7) 32.5 (32.5) 17.5 (17506.1)
> Peptidyl-prolyl cis-trans isomerase (rotamase) - cyclophilin family

175# 187(187& 1 187) BAB97427 4.5 (4.5) 42.8 (42.8) 19.8 (19830.1)
> Peptidyl-prolyl cis-trans isomerase (rotamase) - cyclophilin family

176# 203(392& 190 392) BAC08372 4.5 (5.3) 40.4 (40.6) 22.4 (43449.1)
> peptidyl-prolyl cis-trans isomerase [Thermosynechococcus elongatus

177# 184(243& 60 243) BAC07690 5.1 (6.1) 37.5 (45.3) 19.9 (26003.7)
> peptidyl-prolyl cis-trans isomerase [Thermosynechococcus elongatus

178# 189(189& 1 189) YP_072215 9.0 (9.0) 45.5 (45.5) 20.5 (20526.5)
> peptidyl-prolyl cis-trans isomerase A [Yersinia pseudotuberculosis

179# 164(164& 1 164) YP_069574 5.4 (5.4) 32.3 (32.3) 18.2 (18151.4)
> peptidyl-prolyl cis-trans isomerase B [Yersinia pseudotuberculosis

180# 164(164& 1 164) NP_778719 5.6 (5.6) 42.7 (42.7) 17.7 (17744.1)
> peptidyl-prolyl cis-trans isomerase [Xylella fastidiosa Temecula1].

181# 169(169& 1 169) NP_245881 6.3 (6.3) 28.4 (28.4) 18.7 (18731.2)
> PpiB [Pasteurella multocida subsp. multocida str. Pm70].

182# 183(183& 1 183) NP_245880 8.5 (8.5) 39.3 (39.3) 20.1 (20067.1)
> hypothetical protein PM0943 [Pasteurella multocida subsp. multocida

183# 189(189&   1 189) NP_354667   9.6 (9.6) 47.1 (47.1) 19.9 (19881.9)
> AGR_C_3090p [Agrobacterium tumefaciens str. C58].

184# 169(169&   1 169) NP_354666   5.3 (5.3) 36.7 (36.7) 18.4 (18420.0)
> AGR_C_3088p [Agrobacterium tumefaciens str. C58].

185# 164(164&   1 164) NP_298502   6.7 (6.7) 43.9 (43.9) 17.8 (17788.2)
> peptidyl-prolyl cis-trans isomerase [Xylella fastidiosa 9a5c].

186# 164(164&   1 164) AAN39296   8.6 (8.6) 36.0 (36.0) 17.5 (17531.0)
> cyclophilin A [Beauveria bassiana].

187# 164(164&   1 164) AAQ24380   9.2 (9.2) 40.9 (40.9) 17.4 (17391.9)
> cyclophilin A; rotamase [Branchiostoma belcheri tsingtaunese].

188# 150(150&   1 150) ZP_00353225 5.0 (5.0) 37.3 (37.3) 16.1 (16097.9)
> COG0652: Peptidyl-prolyl cis-trans isomerase (rotamase) -

189# 167(167&   1 167) ZP_00244808 6.3 (6.3) 31.7 (31.7) 18.1 (18086.3)
> COG0652: Peptidyl-prolyl cis-trans isomerase (rotamase) -

190# 188(188&   1 188) ZP_00244807 9.8 (9.8) 44.7 (44.7) 20.1 (20104.1)
> COG0652: Peptidyl-prolyl cis-trans isomerase (rotamase) -

191# 150(150&   1 150) ZP_00358245 7.9 (7.9) 30.7 (30.7) 16.6 (16552.8)
> COG0652: Peptidyl-prolyl cis-trans isomerase (rotamase) -

192# 163(163&   1 163) ZP_00350273 5.0 (5.0) 35.6 (35.6) 17.9 (17931.2)
> COG0652: Peptidyl-prolyl cis-trans isomerase (rotamase) -

193# 169(169&   1 169) ZP_00129494 4.5 (4.5) 43.8 (43.8) 18.4 (18399.9)
> COG0652: Peptidyl-prolyl cis-trans isomerase (rotamase) -

194# 157(157&   1 157) ZP_00130259 5.2 (5.2) 35.7 (35.7) 17.3 (17303.6)
> COG0652: Peptidyl-prolyl cis-trans isomerase (rotamase) -

195# 187(187&   1 187) ZP_00136576 8.5 (8.5) 53.5 (53.5) 20.2 (20164.3)
> COG0652: Peptidyl-prolyl cis-trans isomerase (rotamase) -

196# 151(151&   1 151) NF01760157   5.9 (5.9) 32.5 (32.5) 16.7 (16736.9)
> Peptidyl-prolyl cis-trans isomerase (EC 5.2.1.8) [Picrophilus torrid

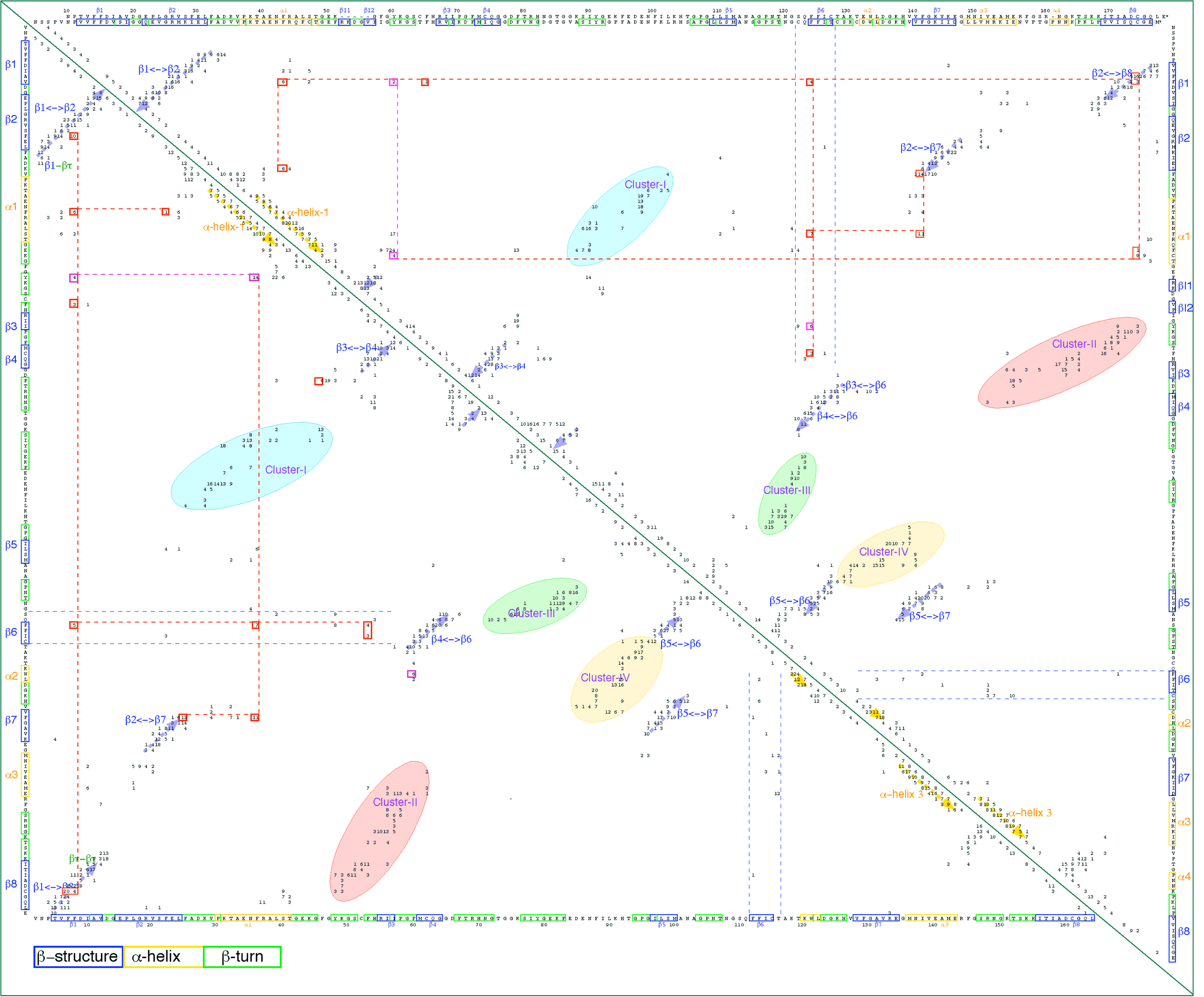
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          Minimal pI =   3.5908
          Maximal HI =   66.4975
          Minimal HI =   16.5775

     Sequences   245 246 have similar data
     Sequences   246 247 have similar data

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-> Datapx:  ((( Job finished )))
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Cyclophilin	Triads										Sequence Similarity	
PPIase-AAs(hCyPA)	R55	I57	F60	Q63	G72	101-ANA	111Q	113F	121W	126H	IDp	IDt
CyP18a (CyPA)	HRI	IIP	FMC	CQG	NGT	ANA	SQF	FFI	WLD	KHV		
CyP18b	HRI	IIP	FMC	CQG	NGT	ANA	SQF	FFI	WLD	KHV	100	85
CyP18bI1	HRI	IIP	FMC	CQG	NGT	ANA	SQF	FFI	WLD	KHV	100	85
CyP18bI2	HRI	IIP	FMC	CQG	NGT	ANA	SQF	FFI	WLD	KHV	100	85
CyP33	HRI	IIP	FMC	CQG	NGT	ANS	SQF	FFL	WLD	KHV	93	66
CyP22D	HRV	VIP	FMC	CQA	NGT	ANA	SQF	FFI	WLD	KHV	90	75
CyP40	HRI	IIK	FMI	IQG	NGT	ANA	SQF	FFI	HLD	KHV	86	61
CYp22B	HRV	VIK	FMI	IQG	DGT	ANA	SQF	FFI	WLD	KHV	80	63
CyP22C	HRV	VIK	FMI	IQG	DGT	ANA	SQF	FFI	WLD	KHV	80	54
CyP18d	HRI	IIK	FMI	IQG	TGR	ANA	SQF	FFV	WLD	KHT	76	38
CyP354	HRV	VIP	FVC	CQG	DGT	ANQ	SQF	FVI	HLD	KHV	76	65
CyP73	HRI	IIK	FMI	IQT	TGM	ANA	SQF	FFI	WLD	KHT	76	40
CyP19	HRV	VIK	FMI	IQG	DGT	ANS	CQF	FFI	WLD	KHV	73	53
CyP58	HRS	SIR	FVI	IQG	TGT	ANS	SQF	FFI	YLD	KHT	66	37
CyP88	HRV	VVK	FMV	VQG	NGR	ANR	SQF	FFI	HLD	HHV	66	38
CyP157	HRV	VVK	FMI	IQG	NGK	ANR	SQF	FFI	HLD	VHV	66	50
CyP18cI	HRN	NIK	FMV	VQT	TGR	ANN	SQF	FFI	HLD	KYT	60	38
CyP54	HRV	VVP	FIV	VQG	TGS	ANA	SQF	FFF	ELN	KHT	60	29
CyP35	HRI	IVQ	GWI	IQG	KGD	ANK	SQF	FYI	YLD	KFV	60	43
CyP18c	QPP	PPP	FQV	VFC	TGR	ANN	SQF	FFI	HLD	KYT	46	30
CyP57	HNV	VQR	FII	IQT	TGR	VNN	SQF	FLI	YLD	VHT	43	26
	:				*	.*	.**	* .	*:	..		

In violet are the amino acid in the PPIase cavity and black are its neighbors. Numbering was used for the archetypal hCyPA. IDp – sequence similarity calculated for the sequences shown whereas IDt is sequence similarity for the entire sequence if hCyPA is aligned with its paralogues.


β1
β2
α1
β3
β4
β5
β6
α2
β7
α3
β8
β1<->β2
β1−βτ
α-helix-1
β3<->β4
β1<->β8
β2<->β7
β4<->β6
β2<->β8
β2<->β7
β3<->β6
β4<->β6
β5<->β6
β5<->β7
α-helix 3
Cluster-I
Cluster-II
Cluster-III
Cluster-IV
Cluster-V
β−structure
α-helix
β-turn

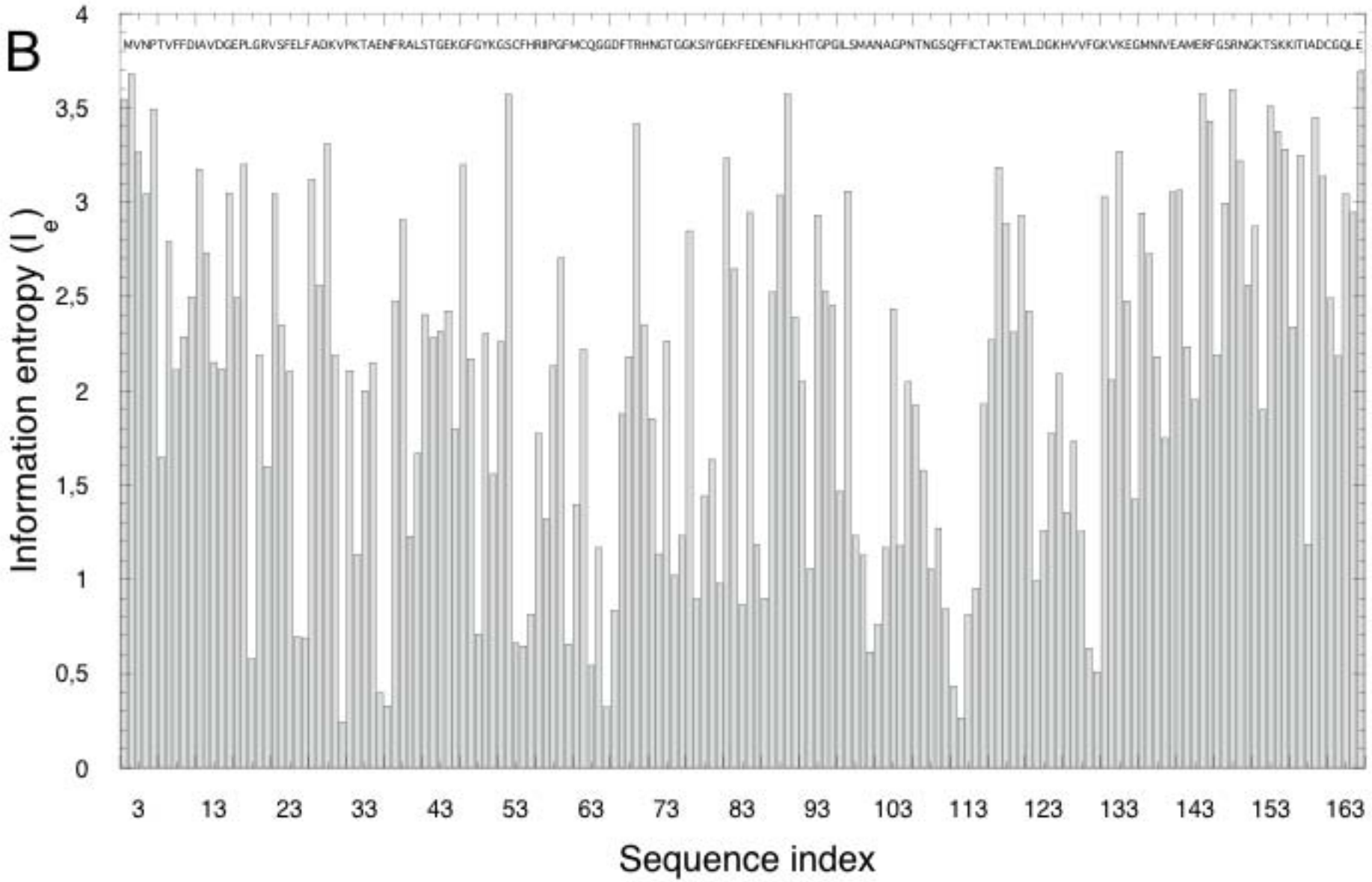

B
MVNPTVFFDIAVDGEPLGRVSFELFADKVPKTAENFRALSTGEKGFGYKGSCFHRIIPGFMCQGGDFTRHNGTGGKSIYGEKFEDENFILKHTGPGILSMANAGPNTNGSQFFICTAKTEWLDGKHVVFGKVKEGMNIVEAMERFGSRNGKTSKKITIADCGQLE
Information entropy (I_e)
0
0,5
1
1,5
2
2,5
3
3,5
4
3
13
23
33
43
53
63
73
83
93
103
113
123
133
143
153
163
Sequence index

Table Ts1. Fraction of all 400 amino acid dimers in the human genomic database containing 37391 sequences with 17,863,015 amino acid residues as total. Please see at the end of this file for a full output from the program used for the production of the analysis shown below.

Analysis of the human genomic database

#	Diad	Total	Fraction
1	AA	134116	0.007498345
2	AR	72892	0.004075348
3	AN	34598	0.001934353
4	AD	51028	0.002852945
5	AC	25965	0.001451688
6	AQ	60134	0.003362056
7	AE	86126	0.004815253
8	AG	95097	0.005316816
9	AH	29752	0.001663417
10	AI	48081	0.002688180
11	AL	130653	0.007304731
12	AK	58899	0.003293008
13	AM	24374	0.001362736
14	AF	48445	0.002708531
15	AP	84943	0.004749112
16	AS	106658	0.005963185
17	AT	66639	0.003725746
18	AW	15826	0.000884822
19	AY	26175	0.001463428
20	AV	85514	0.004781037
21	RA	77148	0.004313299
22	RR	86555	0.004839238
23	RN	37026	0.002070101
24	RD	49091	0.002744648
25	RC	23349	0.001305429
26	RQ	47744	0.002669338
27	RE	72588	0.004058352
28	RG	74481	0.004164188
29	RH	29703	0.001660677
30	RI	42871	0.002396892
31	RL	99137	0.005542690
32	RK	64875	0.003627122
33	RM	19024	0.001063620
34	RF	32431	0.001813198
35	RP	65675	0.003671850
36	RS	79568	0.004448599
37	RT	51026	0.002852833
38	RW	13695	0.000765679
39	RY	24519	0.001370843
40	RV	59081	0.003303183
41	NA	35339	0.001975782
42	NR	32004	0.001789324

43	NN	25478	0.001424460
44	ND	25417	0.001421049
45	NC	14747	0.000824496
46	NQ	27976	0.001564121
47	NE	38387	0.002146194
48	NG	42154	0.002356805
49	NH	16684	0.000932792
50	NI	35551	0.001987635
51	NL	63827	0.003568529
52	NK	37124	0.002075581
53	NM	14155	0.000791398
54	NF	24959	0.001395443
55	NP	37851	0.002116227
56	NS	53839	0.003010106
57	NT	33727	0.001885656
58	NW	7872	0.000440119
59	NY	19196	0.001073237
60	NV	37082	0.002073232
61	DA	51416	0.002874638
62	DR	42536	0.002378162
63	DN	28132	0.001572843
64	DD	44058	0.002463256
65	DC	18601	0.001039971
66	DQ	31301	0.001750020
67	DE	57752	0.003228880
68	DG	58057	0.003245932
69	DH	19891	0.001112094
70	DI	43039	0.002406285
71	DL	85344	0.004771532
72	DK	42016	0.002349089
73	DM	17505	0.000978694
74	DF	35757	0.001999152
75	DP	51689	0.002889901
76	DS	72735	0.004066570
77	DT	42963	0.002402036
78	DW	10880	0.000608294
79	DY	24136	0.001349429
80	DV	53062	0.002966664
81	CA	23394	0.001307945
82	CR	25154	0.001406345
83	CN	14598	0.000816165
84	CD	17769	0.000993454
85	CC	13528	0.000756342
86	CQ	20242	0.001131718
87	CE	23776	0.001329302
88	CG	36130	0.002020007
89	CH	12527	0.000700377
90	CI	16680	0.000932569
91	CL	39618	0.002215018
92	CK	21327	0.001192380
93	CM	6528	0.000364977
94	CF	15184	0.000848928

95	CP	27010	0.001510113
96	CS	37514	0.002097385
97	CT	19976	0.001116846
98	CW	5761	0.000322094
99	CY	10325	0.000577265
100	CV	23752	0.001327960
101	QA	64853	0.003625892
102	QR	55485	0.003102133
103	QN	31828	0.001779484
104	QD	40752	0.002278420
105	QC	17593	0.000983614
106	QQ	54172	0.003028724
107	QE	70352	0.003933338
108	QG	54616	0.003053548
109	QH	23961	0.001339645
110	QI	33717	0.001885097
111	QL	84009	0.004696893
112	QK	51215	0.002863400
113	QM	17328	0.000968798
114	QF	23347	0.001305317
115	QP	53172	0.002972815
116	QS	55321	0.003092964
117	QT	39905	0.002231065
118	QW	9829	0.000549534
119	QY	19061	0.001065689
120	QV	50335	0.002814200
121	EA	95182	0.005321568
122	ER	71967	0.004023632
123	EN	53947	0.003016145
124	ED	76689	0.004287636
125	EC	28440	0.001590063
126	EQ	54671	0.003056623
127	EE	139892	0.007821278
128	EG	76844	0.004296302
129	EH	26378	0.001474778
130	EI	53110	0.002969348
131	EL	111496	0.006233674
132	EK	95508	0.005339795
133	EM	27245	0.001523252
134	EF	34391	0.001922780
135	EP	59728	0.003339357
136	ES	76006	0.004249450
137	ET	60015	0.003355403
138	EW	12552	0.000701775
139	EY	26877	0.001502677
140	EV	73413	0.004104477
141	GA	90157	0.005040624
142	GR	74742	0.004178781
143	GN	41676	0.002330080
144	GD	56529	0.003160503
145	GC	25399	0.001420043
146	GQ	52353	0.002927025

147	GE	79357	0.004436802
148	GG	98839	0.005526029
149	GH	32079	0.001793518
150	GI	48317	0.002701374
151	GL	110989	0.006205328
152	GK	70387	0.003935295
153	GM	21281	0.001189808
154	GF	42785	0.002392084
155	GP	85896	0.004802394
156	GS	109231	0.006107040
157	GT	66284	0.003705899
158	GW	15573	0.000870677
159	GY	30059	0.001680581
160	GV	65792	0.003678391
161	HA	24731	0.001382695
162	HR	30419	0.001700708
163	HN	15039	0.000840821
164	HD	15519	0.000867658
165	HC	13471	0.000753156
166	HQ	25776	0.001441121
167	HE	23415	0.001309119
168	HG	29703	0.001660677
169	HH	17003	0.000950628
170	HI	21686	0.001212451
171	HL	53730	0.003004012
172	HK	23128	0.001293073
173	HM	9536	0.000533152
174	HF	19159	0.001071168
175	HP	31895	0.001783230
176	HS	42520	0.002377268
177	HT	30575	0.001709430
178	HW	6557	0.000366598
179	HY	13836	0.000773562
180	HV	26796	0.001498148
181	IA	44101	0.002465660
182	IR	40854	0.002284123
183	IN	30470	0.001703559
184	ID	32965	0.001843053
185	IC	19831	0.001108739
186	IQ	39117	0.002187008
187	IE	42725	0.002388729
188	IG	37352	0.002088328
189	IH	26494	0.001481264
190	II	40348	0.002255833
191	IL	78755	0.004403145
192	IK	43626	0.002439104
193	IM	15467	0.000864751
194	IF	32537	0.001819124
195	IP	45681	0.002553997
196	IS	63855	0.003570095
197	IT	44666	0.002497249
198	IW	9040	0.000505421

199	IY	24072	0.001345851
200	IV	42578	0.002380510
201	LA	124022	0.006933996
202	LR	109157	0.006102902
203	LN	59428	0.003322584
204	LD	81569	0.004560474
205	LC	40205	0.002247837
206	LQ	102974	0.005757215
207	LE	124896	0.006982861
208	LG	110942	0.006202701
209	LH	49392	0.002761477
210	LI	66334	0.003708694
211	LL	196321	0.010976190
212	LK	98253	0.005493266
213	LM	31111	0.001739397
214	LF	59003	0.003298822
215	LP	112491	0.006289304
216	LS	141489	0.007910565
217	LT	90747	0.005073610
218	LW	21376	0.001195119
219	LY	43237	0.002417355
220	LV	98606	0.005513002
221	KA	71962	0.004023352
222	KR	57748	0.003228656
223	KN	40094	0.002241632
224	KD	53167	0.002972535
225	KC	22285	0.001245941
226	KQ	44190	0.002470636
227	KE	87397	0.004886314
228	KG	58421	0.003266283
229	KH	24679	0.001379788
230	KI	47275	0.002643117
231	KL	86970	0.004862440
232	KK	80068	0.004476554
233	KM	22960	0.001283680
234	KF	29093	0.001626572
235	KP	57946	0.003239726
236	KS	67304	0.003762926
237	KT	53634	0.002998645
238	KW	10791	0.000603318
239	KY	26116	0.001460130
240	KV	59244	0.003312296
241	MA	35068	0.001960631
242	MR	18996	0.001062055
243	MN	15348	0.000858097
244	MD	21368	0.001194672
245	MC	7364	0.000411717
246	MQ	16270	0.000909646
247	ME	32156	0.001797823
248	MG	23712	0.001325724
249	MH	8276	0.000462706
250	MI	14166	0.000792013

251	ML	34575	0.001933067
252	MK	24845	0.001389069
253	MM	9059	0.000506483
254	MF	12332	0.000689475
255	MP	20010	0.001118747
256	MS	27841	0.001556574
257	MT	19751	0.001104267
258	MW	4509	0.000252095
259	MY	9975	0.000557696
260	MV	23894	0.001335899
261	FA	34061	0.001904330
262	FR	35660	0.001993729
263	FN	23095	0.001291228
264	FD	27657	0.001546286
265	FC	17057	0.000953647
266	FQ	32071	0.001793070
267	FE	33343	0.001864187
268	FG	38358	0.002144573
269	FH	18721	0.001046680
270	FI	31152	0.001741690
271	FL	71674	0.004007251
272	FK	30613	0.001711554
273	FM	11953	0.000668285
274	FF	27458	0.001535160
275	FP	37161	0.002077649
276	FS	61497	0.003438260
277	FT	35635	0.001992331
278	FW	9081	0.000507713
279	FY	20112	0.001124450
280	FV	36227	0.002025430
281	PA	97392	0.005445128
282	PR	69153	0.003866303
283	PN	31776	0.001776577
284	PD	49227	0.002752252
285	PC	22449	0.001255110
286	PQ	53714	0.003003117
287	PE	80747	0.004514516
288	PG	107570	0.006014174
289	PH	27610	0.001543659
290	PI	33408	0.001867821
291	PL	98395	0.005501206
292	PK	49355	0.002759408
293	PM	17051	0.000953311
294	PF	34853	0.001948610
295	PP	117339	0.006560353
296	PS	105989	0.005925782
297	PT	58084	0.003247441
298	PW	14096	0.000788099
299	PY	28715	0.001605438
300	PV	69088	0.003862669
301	SA	98026	0.005480575
302	SR	85459	0.004777961

303	SN	46276	0.002587263
304	SD	65251	0.003648144
305	SC	35332	0.001975391
306	SQ	69345	0.003877037
307	SE	91386	0.005109336
308	SG	103433	0.005782877
309	SH	39559	0.002211720
310	SI	55626	0.003110016
311	SL	146926	0.008214545
312	SK	69551	0.003888555
313	SM	25032	0.001399524
314	SF	54409	0.003041975
315	SP	111805	0.006250951
316	SS	168982	0.009447683
317	ST	81479	0.004555442
318	SW	21020	0.001175216
319	SY	35995	0.002012459
320	SV	85015	0.004753137
321	TA	69971	0.003912037
322	TR	45903	0.002566409
323	TN	29661	0.001658329
324	TD	41939	0.002344784
325	TC	24019	0.001342888
326	TQ	40944	0.002289155
327	TE	61339	0.003429427
328	TG	68168	0.003811232
329	TH	25496	0.001425466
330	TI	41059	0.002295584
331	TL	93598	0.005233008
332	TK	45589	0.002548854
333	TM	17848	0.000997871
334	TF	37218	0.002080836
335	TP	67374	0.003766840
336	TS	82572	0.004616551
337	TT	58778	0.003286243
338	TW	13013	0.000727549
339	TY	24874	0.001390690
340	TV	67307	0.003763094
341	WA	15885	0.000888121
342	WR	14757	0.000825055
343	WN	9829	0.000549534
344	WD	11462	0.000640834
345	WC	4530	0.000253270
346	WQ	9801	0.000547968
347	WE	15208	0.000850270
348	WG	14803	0.000827627
349	WH	5556	0.000310633
350	WI	9484	0.000530245
351	WL	22543	0.001260366
352	WK	14662	0.000819744
353	WM	5215	0.000291568
354	WF	7886	0.000440902

355	WP	10981	0.000613941
356	WS	16313	0.000912050
357	WT	12166	0.000680194
358	WW	3681	0.000205802
359	WY	5898	0.000329754
360	WV	13129	0.000734035
361	YA	23605	0.001319741
362	YR	28036	0.001567476
363	YN	18280	0.001022024
364	YD	20994	0.001173762
365	YC	11501	0.000643014
366	YQ	21649	0.001210383
367	YE	29026	0.001622826
368	YG	28535	0.001595375
369	YH	12893	0.000720840
370	YI	24182	0.001352001
371	YL	45601	0.002549525
372	YK	26242	0.001467175
373	YM	9426	0.000527002
374	YF	20808	0.001163363
375	YP	22942	0.001282673
376	YS	37560	0.002099957
377	YT	25585	0.001430442
378	YW	6354	0.000355248
379	YY	15582	0.000871180
380	YV	27120	0.001516263
381	VA	78053	0.004363896
382	VR	54656	0.003055784
383	VN	38053	0.002127521
384	VD	50102	0.002801173
385	VC	26274	0.001468964
386	VQ	48318	0.002701430
387	VE	66960	0.003743693
388	VG	63059	0.003525591
389	VH	28950	0.001618577
390	VI	49794	0.002783953
391	VL	110675	0.006187773
392	VK	56665	0.003168106
393	VM	20761	0.001160735
394	VF	41838	0.002339137
395	VP	66789	0.003734133
396	VS	86550	0.004838958
397	VT	67009	0.003746433
398	VW	12923	0.000722517
399	VY	28072	0.001569489
400	VV	70793	0.003957994

Output from the Cube program (Macintosh computers only) available upon request
galat@dsvidf.cea.fr

```
Triad_DataB >   * * * * Genomic Database Analysis * * * *

Triad_DataB>    Analysis of human database
                Database used ::: Hsapa2.gbk
                Sliding frame =  19

   Min-Mina     43   5158
   Max-Maxa  26267   6316
   Max-Tot    17886079

   Total of fractions  0.9999996000
   Max-fraction  0.0014685721  SSS
   Min-fraction  0.0000024041  MWW Ratio 610.86

   Total-of-dimers-fractions  1.000
   Max-dimer-fraction  0.0109761900  LL
   Min-dimer-fraction  0.0002058025  WW Ratio  53.33

          Overall number of entries         37391
          Minimal length of protein    25  NP_0010303
          Maximal length of protein 33423  NP_596869
          Number of AA residues      17863015
          Total number of lines       3993454
          Sliding frame (AA)          19
          Signal_peptides           2177
          Transit_peptides           205
          Mature_proteins           2699
          Database contains:::     37609

              General statistics of the database

     >10000    10K-20K    20K-30K    30K-40K    40K-50K
     2249       7169       5478       4953       3906

     50K-60K   60K-70K    70K-100K   100K-150K    > 150K
     3337       2278       4026       2561       1652

     < 3pI      3-4pI      4-5pI      5-6pI     6-7pI
        9        191       3580       6908       5919

     7-8pI      8-9pI      9-10pI     10-11pI    >pI 11
     4730       5729       4848       2711       2984

            Distribution of hydrophobicity indexes

     0-10%      10-20%    20-30%     30-40%     40-50%
     5447       8163       9361       6873       3583

     50-60%     60-70%     70-80%      80-90%    90-100%
     1902       1167        687        408         18

 Total of masses 37609    Total of pIs 37609  Total of HIs37609

   A       R       N       D       C       Q       E       G       H       I
1280167 1047713  624395  831947  410844  851028 1254946 1214190  474957  754842
 7.0834  5.7972  3.4549  4.6033  2.2733  4.7089  6.9438  6.7183  2.6280  4.1767
   L       K       M       F       P       S       T       W       Y       V
1751498 1003711  377131  632056 1164098 1489662  956200  222862  456476 1064292
 9.6914  5.5537  2.0867  3.4973  6.4412  8.2426  5.2908  1.2331  2.5258  5.8889

         Group No.    1   5447

   A       R       N       D       C       Q       E       G       H       I
```

6.8834	8.1570	3.2521	4.4068	2.2980	5.4456	8.4882	7.5969	3.0314	2.8693
L	K	M	F	P	S	T	W	Y	V
7.1972	7.3086	2.1266	2.6406	7.3845	8.6482	4.9037	1.1832	2.1704	4.0059

Group No. 2 8163

A	R	N	D	C	Q	E	G	H	I
7.3602	7.0048	3.3396	4.6091	2.2937	4.9630	7.3474	7.3460	2.6600	3.4648
L	K	M	F	P	S	T	W	Y	V
8.6448	5.9908	2.1360	3.0251	7.4244	8.5216	5.1512	1.3134	2.3098	5.0899

Group No. 3 9361

A	R	N	D	C	Q	E	G	H	I
7.4939	6.3389	3.3572	4.5887	2.4570	4.7046	6.5969	7.2047	2.7122	3.9519
L	K	M	F	P	S	T	W	Y	V
9.6615	5.3544	2.1638	3.4603	6.8262	8.1453	5.1793	1.4009	2.5145	5.8838

Group No. 4 6873

A	R	N	D	C	Q	E	G	H	I
7.6699	5.8612	3.2269	4.4372	2.5617	4.3483	5.9945	7.1335	2.6469	4.3202
L	K	M	F	P	S	T	W	Y	V
10.6919	4.8524	2.2515	3.8082	6.5350	7.9115	5.2176	1.4822	2.5433	6.4997

Group No. 5 3583

A	R	N	D	C	Q	E	G	H	I
8.1041	5.4784	3.0777	4.0279	2.7311	4.1392	5.4382	7.1757	2.6810	4.5914
L	K	M	F	P	S	T	W	Y	V
11.6340	4.3736	2.3755	4.1230	6.1164	7.7150	5.2212	1.4888	2.4928	7.0130

Group No. 6 1902

A	R	N	D	C	Q	E	G	H	I
8.0821	5.0063	2.8840	3.5544	3.2088	3.8706	4.6653	7.3119	2.5669	5.0234
L	K	M	F	P	S	T	W	Y	V
12.4951	3.8275	2.4221	4.5063	5.6590	7.8444	5.2135	1.6530	2.6082	7.5961

Group No. 7 1167

A	R	N	D	C	Q	E	G	H	I
8.4323	4.3775	2.6923	2.8977	3.6033	3.3776	3.5713	7.0780	2.3699	5.7687
L	K	M	F	P	S	T	W	Y	V
13.0783	3.2668	2.6735	5.3929	5.1988	7.9471	5.4512	1.7850	3.1889	7.8475

Group No. 8 687

A	R	N	D	C	Q	E	G	H	I
8.3070	3.5742	2.6849	2.3856	3.0728	2.6929	2.9723	6.6437	2.4361	6.5581
L	K	M	F	P	S	T	W	Y	V
14.0662	2.9777	3.2474	6.1777	4.8981	7.8242	5.6591	1.6626	3.7258	8.4283

Group No. 9 408

A	R	N	D	C	Q	E	G	H	I
7.4816	3.1211	2.6586	2.2519	3.4719	2.3927	2.3137	5.7227	2.8160	7.9777
L	K	M	F	P	S	T	W	Y	V
14.1920	2.8001	3.5267	6.3269	4.5781	7.9442	6.0652	0.9667	4.2971	9.0869

Group No. 10 18

A	R	N	D	C	Q	E	G	H	I

L	K	M	F	P	S	T	W	Y	V
7.9176	1.3882	1.0552	3.0372	4.2554	0.8711	4.8239	3.2153	3.7439	10.0689
13.1135	1.6532	3.3890	2.5609	4.9687	5.3866	4.9072	0.5040	8.6948	14.4217

TAAr.f>	37391	Entries
	37391	Codes
	37391	Sequences
	3711693	Info lines
	3993454	Total

Distribution of pIs vs. mass

	0.	3.	4.	5.	6.	7.	8.	9.	10.	11.	14.
0- 10	1	57	244	178	133	270	266	270	358	472	
10- 20	0	75	727	809	582	722	891	1054	985	1324	
20- 30	0	25	579	840	692	611	784	750	550	647	
30- 40	0	11	419	784	638	678	1025	764	330	304	
40- 50	5	3	372	740	636	496	740	588	196	130	
50- 60	1	2	266	705	659	522	595	441	103	43	
60- 70	0	0	170	462	465	329	436	333	62	21	
70- 100	1	0	453	974	928	594	577	392	77	30	
100- 150	0	6	209	785	710	322	285	197	39	8	
150- 0	0	0	0	0	0	0	0	0	0	0	

Distribution of HI vs. mass

	0.	10.	20.	30.	40.	50.	60.	70.	80.	90.	100.
0- 10	815	347	324	326	201	120	82	28	6	0	
10- 20	1423	1665	1566	1085	632	384	241	127	46	0	
20- 30	739	1238	1353	979	533	304	197	83	48	4	
30- 40	460	953	1136	918	445	302	203	254	275	7	
40- 50	406	746	1042	795	405	232	186	73	16	5	
50- 60	333	658	939	646	379	172	102	94	13	1	
60- 70	336	473	625	443	230	75	70	25	1	0	
70- 100	514	888	1224	816	342	165	71	3	2	1	
100- 150	254	678	742	528	251	96	12	0	0	0	
150- 0	0	0	0	0	0	0	0	0	0	0	

-> Triad_DataB.f: (((Job finished)))

Table Ts2. Different trimers in the human genomic database (see also Table Ts1).

Analysis of human genomic database with the Cube.f program (AG)

#	Triad	Total	Fraction	Bulkiness/3	N-Bulk	Hydro/3
1	AAA	22220	0.0012423070	90.00	0.394	1.800
2	AAR	7997	0.0004471075	124.67	0.546	-0.300
3	AAN	2700	0.0001509554	101.57	0.445	0.033
4	AAD	4153	0.0002321917	99.10	0.434	0.033
5	AAC	2482	0.0001387671	94.43	0.414	2.033
6	AAQ	5957	0.0003330523	109.80	0.481	0.033
7	AAE	7668	0.0004287133	107.40	0.471	0.033
8	AAG	11220	0.0006273035	81.63	0.358	1.067
9	AAH	2918	0.0001631436	113.33	0.497	0.133
10	AAI	3942	0.0002203949	114.63	0.502	2.700
11	AAL	12636	0.0007064712	114.67	0.502	2.467
12	AAK	4994	0.0002792116	115.77	0.507	-0.100
13	AAM	2312	0.0001292625	115.67	0.507	1.833
14	AAF	3978	0.0002224076	123.97	0.543	2.133
15	AAP	9271	0.0005183360	100.97	0.442	0.667
16	AAS	10556	0.0005901796	91.80	0.402	0.933
17	AAT	6313	0.0003529560	100.50	0.440	0.967
18	AAW	1470	0.0000821868	136.07	0.596	0.900
19	AAY	2397	0.0001340148	125.67	0.551	0.767
20	AAV	8929	0.0004992150	106.33	0.466	2.600
21	ARA	7057	0.0003945526	124.67	0.546	-0.300
22	ARR	6467	0.0003615661	159.33	0.698	-2.400
23	ARN	2217	0.0001239511	136.23	0.597	-2.067
24	ARD	3321	0.0001856751	133.77	0.586	-2.067
25	ARC	1469	0.0000821309	129.10	0.566	-0.067
26	ARQ	3187	0.0001781833	144.47	0.633	-2.067
27	ARE	4827	0.0002698747	142.07	0.623	-2.067
28	ARG	5973	0.0003339468	116.30	0.510	-1.033
29	ARH	1888	0.0001055569	148.00	0.649	-1.967
30	ARI	2534	0.0001416744	149.30	0.654	0.600
31	ARL	7118	0.0003979631	149.33	0.654	0.367
32	ARK	3722	0.0002080948	150.43	0.659	-2.200
33	ARM	1279	0.0000715081	150.33	0.659	-0.267
34	ARF	2004	0.0001120424	158.63	0.695	0.033
35	ARP	4912	0.0002746270	135.63	0.594	-1.433
36	ARS	4930	0.0002756334	126.47	0.554	-1.167
37	ART	3431	0.0001918252	135.17	0.592	-1.133
38	ARW	926	0.0000517721	170.73	0.748	-1.200
39	ARY	1534	0.0000857650	160.33	0.703	-1.333
40	ARV	4096	0.0002290049	141.00	0.618	0.500
41	ANA	2238	0.0001251252	101.57	0.445	0.033
42	ANR	1785	0.0000997983	136.23	0.597	-2.067
43	ANN	1342	0.0000750304	113.13	0.496	-1.733
44	AND	1353	0.0000756454	110.67	0.485	-1.733
45	ANC	743	0.0000415407	106.00	0.465	0.267
46	ANQ	1498	0.0000837523	121.37	0.532	-1.733

47	ANE	2212	0.0001236716	118.97	0.521	-1.733
48	ANG	2692	0.0001505081	93.20	0.408	-0.700
49	ANH	954	0.0000533376	124.90	0.547	-1.633
50	ANI	1938	0.0001083524	126.20	0.553	0.933
51	ANL	3488	0.0001950120	126.23	0.553	0.700
52	ANK	1832	0.0001024260	127.33	0.558	-1.867
53	ANM	842	0.0000470757	127.23	0.558	0.067
54	ANF	1271	0.0000710608	135.53	0.594	0.367
55	ANP	2081	0.0001163475	112.53	0.493	-1.100
56	ANS	2889	0.0001615223	103.37	0.453	-0.833
57	ANT	1781	0.0000995746	112.07	0.491	-0.800
58	ANW	320	0.0000178910	147.63	0.647	-0.867
59	ANY	981	0.0000548471	137.23	0.601	-1.000
60	ANV	2357	0.0001317785	117.90	0.517	0.833
61	ADA	3569	0.0001995406	99.10	0.434	0.033
62	ADR	2686	0.0001501727	133.77	0.586	-2.067
63	ADN	1371	0.0000766518	110.67	0.485	-1.733
64	ADD	2416	0.0001350771	108.20	0.474	-1.733
65	ADC	1143	0.0000639044	103.53	0.454	0.267
66	ADQ	1816	0.0001015315	118.90	0.521	-1.733
67	ADE	3106	0.0001736546	116.50	0.511	-1.733
68	ADG	4256	0.0002379504	90.73	0.398	-0.700
69	ADH	1130	0.0000631776	122.43	0.537	-1.633
70	ADI	2889	0.0001615223	123.73	0.542	0.933
71	ADL	5451	0.0003047621	123.77	0.542	0.700
72	ADK	2361	0.0001320021	124.87	0.547	-1.867
73	ADM	1081	0.0000604381	124.77	0.547	0.067
74	ADF	2286	0.0001278089	133.07	0.583	0.367
75	ADP	3100	0.0001733191	110.07	0.482	-1.100
76	ADS	4509	0.0002520955	100.90	0.442	-0.833
77	ADT	2693	0.0001505640	109.60	0.480	-0.800
78	ADW	569	0.0000318124	145.17	0.636	-0.867
79	ADY	1237	0.0000691599	134.77	0.591	-1.000
80	ADV	3359	0.0001877997	115.43	0.506	0.833
81	ACA	2087	0.0001166829	94.43	0.414	2.033
82	ACR	1667	0.0000932010	129.10	0.566	-0.067
83	ACN	684	0.0000382420	106.00	0.465	0.267
84	ACD	1146	0.0000640722	103.53	0.454	0.267
85	ACC	830	0.0000464048	98.87	0.433	2.267
86	ACQ	1235	0.0000690481	114.23	0.501	0.267
87	ACE	1395	0.0000779936	111.83	0.490	0.267
88	ACG	2227	0.0001245102	86.07	0.377	1.300
89	ACH	695	0.0000388570	117.77	0.516	0.367
90	ACI	1016	0.0000568040	119.07	0.522	2.933
91	ACL	2480	0.0001386553	119.10	0.522	2.700
92	ACK	1180	0.0000659731	120.20	0.527	0.133
93	ACM	474	0.0000265011	120.10	0.526	2.067
94	ACF	951	0.0000531698	128.40	0.563	2.367
95	ACP	1649	0.0000921946	105.40	0.462	0.900
96	ACS	2345	0.0001311075	96.23	0.422	1.167
97	ACT	1320	0.0000738004	104.93	0.460	1.200
98	ACW	369	0.0000206306	140.50	0.616	1.133

99	ACY	648	0.0000362293	130.10	0.570	1.000
100	ACV	1567	0.0000876100	110.77	0.485	2.833
101	AQA	5848	0.0003269582	109.80	0.481	0.033
102	AQR	4152	0.0002321358	144.47	0.633	-2.067
103	AQN	1962	0.0001096942	121.37	0.532	-1.733
104	AQD	2710	0.0001515145	118.90	0.521	-1.733
105	AQC	1030	0.0000575867	114.23	0.501	0.267
106	AQQ	3430	0.0001917692	129.60	0.568	-1.733
107	AQE	4535	0.0002535491	127.20	0.557	-1.733
108	AQG	4487	0.0002508655	101.43	0.444	-0.700
109	AQH	1617	0.0000904055	133.13	0.583	-1.633
110	AQI	2298	0.0001284798	134.43	0.589	0.933
111	AQL	6095	0.0003407678	134.47	0.589	0.700
112	AQK	3270	0.0001828237	135.57	0.594	-1.867
113	AQM	1222	0.0000683213	135.47	0.594	0.067
114	AQF	1430	0.0000799504	143.77	0.630	0.367
115	AQP	4034	0.0002255385	120.77	0.529	-1.100
116	AQS	3761	0.0002102752	111.60	0.489	-0.833
117	AQT	2697	0.0001507877	120.30	0.527	-0.800
118	AQW	616	0.0000344402	155.87	0.683	-0.867
119	AQY	1246	0.0000696631	145.47	0.637	-1.000
120	AQV	3692	0.0002064175	126.13	0.553	0.833
121	AEA	8151	0.0004557175	107.40	0.471	0.033
122	AER	5477	0.0003062158	142.07	0.623	-2.067
123	AEN	3528	0.0001972484	118.97	0.521	-1.733
124	AED	4653	0.0002601465	116.50	0.511	-1.733
125	AEC	1374	0.0000768195	111.83	0.490	0.267
126	AEQ	3737	0.0002089334	127.20	0.557	-1.733
127	AEE	8633	0.0004826658	124.80	0.547	-1.733
128	AEG	5988	0.0003347855	99.03	0.434	-0.700
129	AEH	1686	0.0000942632	130.73	0.573	-1.633
130	AEI	3624	0.0002026157	132.03	0.579	0.933
131	AEL	8419	0.0004707012	132.07	0.579	0.700
132	AEK	5586	0.0003123099	133.17	0.584	-1.867
133	AEM	1973	0.0001103092	133.07	0.583	0.067
134	AEF	2200	0.0001230007	141.37	0.619	0.367
135	AEP	4531	0.0002533255	118.37	0.519	-1.100
136	AES	5024	0.0002808888	109.20	0.479	-0.833
137	AET	3736	0.0002088775	117.90	0.517	-0.800
138	AEW	732	0.0000409257	153.47	0.673	-0.867
139	AEY	1777	0.0000993510	143.07	0.627	-1.000
140	AEV	5297	0.0002961521	123.73	0.542	0.833
141	AGA	9521	0.0005323134	81.63	0.358	1.067
142	AGR	5818	0.0003252809	116.30	0.510	-1.033
143	AGN	2634	0.0001472654	93.20	0.408	-0.700
144	AGD	3931	0.0002197798	90.73	0.398	-0.700
145	AGC	1847	0.0001032647	86.07	0.377	1.300
146	AGQ	3893	0.0002176553	101.43	0.444	-0.700
147	AGE	5675	0.0003172859	99.03	0.434	-0.700
148	AGG	9073	0.0005072660	73.27	0.321	0.333
149	AGH	2151	0.0001202611	104.97	0.460	-0.600
150	AGI	3556	0.0001988138	106.27	0.466	1.967

151	AGL	8865	0.0004956368	106.30	0.466	1.733
152	AGK	4097	0.0002290608	107.40	0.471	-0.833
153	AGM	1628	0.0000910205	107.30	0.470	1.100
154	AGF	2790	0.0001559872	115.60	0.507	1.400
155	AGP	7443	0.0004161337	92.60	0.406	-0.067
156	AGS	8399	0.0004695831	83.43	0.366	0.200
157	AGT	5009	0.0002800502	92.13	0.404	0.233
158	AGW	1181	0.0000660290	127.70	0.560	0.167
159	AGY	1860	0.0001039915	117.30	0.514	0.033
160	AGV	5723	0.0003199695	97.97	0.429	1.867
161	AHA	2025	0.0001132165	113.33	0.497	0.133
162	AHR	1996	0.0001115952	148.00	0.649	-1.967
163	AHN	857	0.0000479144	124.90	0.547	-1.633
164	AHD	824	0.0000460693	122.43	0.537	-1.633
165	AHC	859	0.0000480262	117.77	0.516	0.367
166	AHQ	1623	0.0000907410	133.13	0.583	-1.633
167	AHE	1491	0.0000833609	130.73	0.573	-1.633
168	AHG	2151	0.0001202611	104.97	0.460	-0.600
169	AHH	890	0.0000497594	136.67	0.599	-1.533
170	AHI	1161	0.0000649108	137.97	0.605	1.033
171	AHL	3581	0.0002002116	138.00	0.605	0.800
172	AHK	1361	0.0000760927	139.10	0.610	-1.767
173	AHM	494	0.0000276192	139.00	0.609	0.167
174	AHF	1202	0.0000672031	147.30	0.645	0.467
175	AHP	2097	0.0001172420	124.30	0.545	-1.000
176	AHS	2636	0.0001473772	115.13	0.505	-0.733
177	AHT	1629	0.0000910764	123.83	0.543	-0.700
178	AHW	417	0.0000233142	159.40	0.699	-0.767
179	AHY	759	0.0000424352	149.00	0.653	-0.900
180	AHV	1698	0.0000949342	129.67	0.568	0.933
181	AIA	3624	0.0002026157	114.63	0.502	2.700
182	AIR	2676	0.0001496136	149.30	0.654	0.600
183	AIN	1874	0.0001047742	126.20	0.553	0.933
184	AID	1968	0.0001100297	123.73	0.542	0.933
185	AIC	1527	0.0000853737	119.07	0.522	2.933
186	AIQ	2437	0.0001362512	134.43	0.589	0.933
187	AIE	2908	0.0001625845	132.03	0.579	0.933
188	AIG	2523	0.0001410594	106.27	0.466	1.967
189	AIH	1322	0.0000739122	137.97	0.605	1.033
190	AII	2480	0.0001386553	139.27	0.610	3.600
191	AIL	5046	0.0002821188	139.30	0.610	3.367
192	AIK	2924	0.0001634791	140.40	0.615	0.800
193	AIM	988	0.0000552385	140.30	0.615	2.733
194	AIF	1962	0.0001096942	148.60	0.651	3.033
195	AIP	2561	0.0001431840	125.60	0.550	1.567
196	AIS	3867	0.0002162016	116.43	0.510	1.833
197	AIT	2515	0.0001406121	125.13	0.548	1.867
198	AIW	455	0.0000254388	160.70	0.704	1.800
199	AIY	1495	0.0000835845	150.30	0.659	1.667
200	AIV	2929	0.0001637586	130.97	0.574	3.500
201	ALA	11084	0.0006196998	114.67	0.502	2.467
202	ALR	9091	0.0005082724	149.33	0.654	0.367

203	ALN	3885	0.0002172080	126.23	0.553	0.700
204	ALD	5821	0.0003254486	123.77	0.542	0.700
205	ALC	3116	0.0001742137	119.10	0.522	2.700
206	ALQ	7465	0.0004173637	134.47	0.589	0.700
207	ALE	8951	0.0005004450	132.07	0.579	0.700
208	ALG	9567	0.0005348852	106.30	0.466	1.733
209	ALH	3763	0.0002103871	138.00	0.605	0.800
210	ALI	4328	0.0002419759	139.30	0.610	3.367
211	ALL	14841	0.0008297514	139.33	0.611	3.133
212	ALK	6985	0.0003905272	140.43	0.615	0.567
213	ALM	2342	0.0001309398	140.33	0.615	2.500
214	ALF	3645	0.0002037898	148.63	0.651	2.800
215	ALP	7842	0.0004384415	125.63	0.551	1.333
216	ALS	9846	0.0005504839	116.47	0.510	1.600
217	ALT	6145	0.0003435633	125.17	0.548	1.633
218	ALW	1562	0.0000873305	160.73	0.704	1.567
219	ALY	3044	0.0001701882	150.33	0.659	1.433
220	ALV	7329	0.0004097600	131.00	0.574	3.267
221	AKA	5076	0.0002837961	115.77	0.507	-0.100
222	AKR	3581	0.0002002116	150.43	0.659	-2.200
223	AKN	2306	0.0001289271	127.33	0.558	-1.867
224	AKD	3176	0.0001775683	124.87	0.547	-1.867
225	AKC	967	0.0000540644	120.20	0.527	0.133
226	AKQ	2648	0.0001480481	135.57	0.594	-1.867
227	AKE	5316	0.0002972144	133.17	0.584	-1.867
228	AKG	3723	0.0002081507	107.40	0.471	-0.833
229	AKH	1496	0.0000836405	139.10	0.610	-1.767
230	AKI	2604	0.0001455881	140.40	0.615	0.800
231	AKL	5109	0.0002856411	140.43	0.615	0.567
232	AKK	4619	0.0002582455	141.53	0.620	-2.000
233	AKM	1272	0.0000711168	141.43	0.620	-0.067
234	AKF	1525	0.0000852618	149.73	0.656	0.233
235	AKP	3035	0.0001696850	126.73	0.555	-1.233
236	AKS	3631	0.0002030070	117.57	0.515	-0.967
237	AKT	2954	0.0001651564	126.27	0.553	-0.933
238	AKW	591	0.0000330425	161.83	0.709	-1.000
239	AKY	1545	0.0000863800	151.43	0.664	-1.133
240	AKV	3722	0.0002080948	132.10	0.579	0.700
241	AMA	2467	0.0001379285	115.67	0.507	1.833
242	AMR	1201	0.0000671472	150.33	0.659	-0.267
243	AMN	964	0.0000538967	127.23	0.558	0.067
244	AMD	1214	0.0000678740	124.77	0.547	0.067
245	AMC	421	0.0000235379	120.10	0.526	2.067
246	AMQ	1147	0.0000641281	135.47	0.594	0.067
247	AME	2122	0.0001186397	133.07	0.583	0.067
248	AMG	1592	0.0000890078	107.30	0.470	1.100
249	AMH	498	0.0000278429	139.00	0.609	0.167
250	AMI	804	0.0000449512	140.30	0.615	2.733
251	AML	2362	0.0001320580	140.33	0.615	2.500
252	AMK	1730	0.0000967233	141.43	0.620	-0.067
253	AMM	632	0.0000353347	141.33	0.619	1.867
254	AMF	740	0.0000413730	149.63	0.656	2.167

255	AMP	1102	0.0000616122	126.63	0.555	0.700
256	AMS	1777	0.0000993510	117.47	0.515	0.967
257	AMT	1237	0.0000691599	126.17	0.553	1.000
258	AMW	268	0.0000149837	161.73	0.709	0.933
259	AMY	552	0.0000308620	151.33	0.663	0.800
260	AMV	1544	0.0000863241	132.00	0.578	2.633
261	AFA	3166	0.0001770092	123.97	0.543	2.133
262	AFR	2975	0.0001663305	158.63	0.695	0.033
263	AFN	2073	0.0001159002	135.53	0.594	0.367
264	AFD	1850	0.0001034324	133.07	0.583	0.367
265	AFC	1252	0.0000699986	128.40	0.563	2.367
266	AFQ	2220	0.0001241189	143.77	0.630	0.367
267	AFE	2300	0.0001285916	141.37	0.619	0.367
268	AFG	2976	0.0001663864	115.60	0.507	1.400
269	AFH	1283	0.0000717318	147.30	0.645	0.467
270	AFI	2321	0.0001297657	148.60	0.651	3.033
271	AFL	5417	0.0003028612	148.63	0.651	2.800
272	AFK	2271	0.0001269702	149.73	0.656	0.233
273	AFM	928	0.0000518839	149.63	0.656	2.167
274	AFF	1916	0.0001071224	157.93	0.692	2.467
275	AFP	2704	0.0001511790	134.93	0.591	1.000
276	AFS	5414	0.0003026935	125.77	0.551	1.267
277	AFT	2488	0.0001391026	134.47	0.589	1.300
278	AFW	646	0.0000361175	170.03	0.745	1.233
279	AFY	1480	0.0000827459	159.63	0.700	1.100
280	AFV	2764	0.0001545336	140.30	0.615	2.933
281	APA	9760	0.0005456757	100.97	0.442	0.667
282	APR	5567	0.0003112476	135.63	0.594	-1.433
283	APN	1764	0.0000986242	112.53	0.493	-1.100
284	APD	2992	0.0001672809	110.07	0.482	-1.100
285	APC	1453	0.0000812364	105.40	0.462	0.900
286	APQ	3453	0.0001930552	120.77	0.529	-1.100
287	APE	5737	0.0003207522	118.37	0.519	-1.100
288	APG	9266	0.0005180565	92.60	0.406	-0.067
289	APH	1756	0.0000981769	124.30	0.545	-1.000
290	API	1900	0.0001062279	125.60	0.550	1.567
291	APL	6621	0.0003701761	125.63	0.551	1.333
292	APK	2955	0.0001652123	126.73	0.555	-1.233
293	APM	1023	0.0000571953	126.63	0.555	0.700
294	APF	1885	0.0001053892	134.93	0.591	1.000
295	APP	9245	0.0005168824	111.93	0.491	-0.467
296	APS	7763	0.0004340247	102.77	0.450	-0.200
297	APT	4540	0.0002538287	111.47	0.488	-0.167
298	APW	1053	0.0000588726	147.03	0.644	-0.233
299	APY	1344	0.0000751422	136.63	0.599	-0.367
300	APV	4866	0.0002720551	117.30	0.514	1.467
301	ASA	8609	0.0004813240	91.80	0.402	0.933
302	ASR	6244	0.0003490983	126.47	0.554	-1.167
303	ASN	2805	0.0001568259	103.37	0.453	-0.833
304	ASD	4173	0.0002333099	100.90	0.442	-0.833
305	ASC	2323	0.0001298775	96.23	0.422	1.167
306	ASQ	4872	0.0002723906	111.60	0.489	-0.833

307	ASE	6166	0.0003447373	109.20	0.479	-0.833
308	ASG	8267	0.0004622030	83.43	0.366	0.200
309	ASH	2520	0.0001408917	115.13	0.505	-0.733
310	ASI	3666	0.0002049639	116.43	0.510	1.833
311	ASL	10702	0.0005983424	116.47	0.510	1.600
312	ASK	4496	0.0002513686	117.57	0.515	-0.967
313	ASM	1755	0.0000981210	117.47	0.515	0.967
314	ASF	3644	0.0002037339	125.77	0.551	1.267
315	ASP	8404	0.0004698626	102.77	0.450	-0.200
316	ASS	11970	0.0006692355	93.60	0.410	0.067
317	AST	6107	0.0003414387	102.30	0.448	0.100
318	ASW	1419	0.0000793354	137.87	0.604	0.033
319	ASY	2266	0.0001266907	127.47	0.559	-0.100
320	ASV	6244	0.0003490983	108.13	0.474	1.733
321	ATA	6291	0.0003517260	100.50	0.440	0.967
322	ATR	3126	0.0001747728	135.17	0.592	-1.133
323	ATN	2092	0.0001169625	112.07	0.491	-0.800
324	ATD	2874	0.0001606836	109.60	0.480	-0.800
325	ATC	1508	0.0000843114	104.93	0.460	1.200
326	ATQ	2834	0.0001584472	120.30	0.527	-0.800
327	ATE	4101	0.0002292844	117.90	0.517	-0.800
328	ATG	5251	0.0002935803	92.13	0.404	0.233
329	ATH	1441	0.0000805654	123.83	0.543	-0.700
330	ATI	2499	0.0001397176	125.13	0.548	1.867
331	ATL	6505	0.0003636906	125.17	0.548	1.633
332	ATK	2748	0.0001536390	126.27	0.553	-0.933
333	ATM	1196	0.0000668676	126.17	0.553	1.000
334	ATF	2346	0.0001311635	134.47	0.589	1.300
335	ATP	4766	0.0002664642	111.47	0.488	-0.167
336	ATS	5888	0.0003291946	102.30	0.448	0.100
337	ATT	3997	0.0002234699	111.00	0.486	0.133
338	ATW	820	0.0000458457	146.57	0.642	0.067
339	ATY	1533	0.0000857091	136.17	0.597	-0.067
340	ATV	4820	0.0002694833	116.83	0.512	1.767
341	AWA	1281	0.0000716199	136.07	0.596	0.900
342	AWR	1079	0.0000603262	170.73	0.748	-1.200
343	AWN	621	0.0000347197	147.63	0.647	-0.867
344	AWD	736	0.0000411493	145.17	0.636	-0.867
345	AWC	332	0.0000185619	140.50	0.616	1.133
346	AWQ	719	0.0000401989	155.87	0.683	-0.867
347	AWE	1017	0.0000568599	153.47	0.673	-0.867
348	AWG	1287	0.0000719554	127.70	0.560	0.167
349	AWH	373	0.0000208542	159.40	0.699	-0.767
350	AWI	592	0.0000330984	160.70	0.704	1.800
351	AWL	1703	0.0000952137	160.73	0.704	1.567
352	AWK	880	0.0000492003	161.83	0.709	-1.000
353	AWM	356	0.0000199037	161.73	0.709	0.933
354	AWF	468	0.0000261656	170.03	0.745	1.233
355	AWP	866	0.0000484175	147.03	0.644	-0.233
356	AWS	1120	0.0000626185	137.87	0.604	0.033
357	AWT	782	0.0000437211	146.57	0.642	0.067
358	AWW	232	0.0000129710	182.13	0.798	0.000

359	AWY	354	0.0000197919	171.73	0.753	-0.133
360	AWV	1028	0.0000574749	152.40	0.668	1.700
361	AYA	1680	0.0000939278	125.67	0.551	0.767
362	AYR	1633	0.0000913000	160.33	0.703	-1.333
363	AYN	957	0.0000535053	137.23	0.601	-1.000
364	AYD	1377	0.0000769872	134.77	0.591	-1.000
365	AYC	678	0.0000379066	130.10	0.570	1.000
366	AYQ	1157	0.0000646872	145.47	0.637	-1.000
367	AYE	1503	0.0000840318	143.07	0.627	-1.000
368	AYG	1867	0.0001043829	117.30	0.514	0.033
369	AYH	724	0.0000404784	149.00	0.653	-0.900
370	AYI	1442	0.0000806214	150.30	0.659	1.667
371	AYL	2719	0.0001520177	150.33	0.659	1.433
372	AYK	1198	0.0000669795	151.43	0.664	-1.133
373	AYM	509	0.0000284579	151.33	0.663	0.800
374	AYF	1029	0.0000575308	159.63	0.700	1.100
375	AYP	1273	0.0000711727	136.63	0.599	-0.367
376	AYS	2111	0.0001180247	127.47	0.559	-0.100
377	AYT	1478	0.0000826341	136.17	0.597	-0.067
378	AYW	327	0.0000182824	171.73	0.753	-0.133
379	AYY	853	0.0000476907	161.33	0.707	-0.267
380	AYV	1659	0.0000927537	142.00	0.622	1.567
381	AVA	8096	0.0004526425	106.33	0.466	2.600
382	AVR	4433	0.0002478464	141.00	0.618	0.500
383	AVN	2801	0.0001566022	117.90	0.517	0.833
384	AVD	3864	0.0002160339	115.43	0.506	0.833
385	AVC	2139	0.0001195902	110.77	0.485	2.833
386	AVQ	3945	0.0002205626	126.13	0.553	0.833
387	AVE	5062	0.0002830134	123.73	0.542	0.833
388	AVG	5858	0.0003275173	97.97	0.429	1.867
389	AVH	2151	0.0001202611	129.67	0.568	0.933
390	AVI	3556	0.0001988138	130.97	0.574	3.500
391	AVL	8981	0.0005021223	131.00	0.574	3.267
392	AVK	3933	0.0002198917	132.10	0.579	0.700
393	AVM	1595	0.0000891755	132.00	0.578	2.633
394	AVF	3140	0.0001755555	140.30	0.615	2.933
395	AVP	5371	0.0003002894	117.30	0.514	1.467
396	AVS	6815	0.0003810225	108.13	0.474	1.733
397	AVT	4849	0.0002711047	116.83	0.512	1.767
398	AVW	994	0.0000555739	152.40	0.668	1.700
399	AVY	2180	0.0001218825	142.00	0.622	1.567
400	AVV	5764	0.0003222618	122.67	0.538	3.400
401	RAA	7965	0.0004453184	124.67	0.546	-0.300
402	RAR	6524	0.0003647529	159.33	0.698	-2.400
403	RAN	1531	0.0000855973	136.23	0.597	-2.067
404	RAD	2173	0.0001214911	133.77	0.586	-2.067
405	RAC	1591	0.0000889519	129.10	0.566	-0.067
406	RAQ	4012	0.0002243085	144.47	0.633	-2.067
407	RAE	4817	0.0002693156	142.07	0.623	-2.067
408	RAG	6143	0.0003434515	116.30	0.510	-1.033
409	RAH	2181	0.0001219384	148.00	0.649	-1.967
410	RAI	2596	0.0001451408	149.30	0.654	0.600

411	RAL	8842	0.0004943509	149.33	0.654	0.367
412	RAK	3552	0.0001985902	150.43	0.659	-2.200
413	RAM	1311	0.0000732972	150.33	0.659	-0.267
414	RAF	2714	0.0001517381	158.63	0.695	0.033
415	RAP	5153	0.0002881011	135.63	0.594	-1.433
416	RAS	5741	0.0003209759	126.47	0.554	-1.167
417	RAT	3257	0.0001820969	135.17	0.592	-1.133
418	RAW	1094	0.0000611649	170.73	0.748	-1.200
419	RAY	1359	0.0000759809	160.33	0.703	-1.333
420	RAV	4592	0.0002567360	141.00	0.618	0.500
421	RRA	6740	0.0003768294	159.33	0.698	-2.400
422	RRR	10416	0.0005823523	194.00	0.850	-4.500
423	RRN	2352	0.0001314989	170.90	0.749	-4.167
424	RRD	2859	0.0001598450	168.43	0.738	-4.167
425	RRC	1890	0.0001056688	163.77	0.718	-2.167
426	RRQ	4291	0.0002399072	179.13	0.785	-4.167
427	RRE	5174	0.0002892752	176.73	0.774	-4.167
428	RRG	6524	0.0003647529	150.97	0.662	-3.133
429	RRH	2743	0.0001533595	182.67	0.800	-4.067
430	RRI	2819	0.0001576086	183.97	0.806	-1.500
431	RRL	8550	0.0004780254	184.00	0.806	-1.733
432	RRK	5232	0.0002925180	185.10	0.811	-4.300
433	RRM	1402	0.0000783850	185.00	0.811	-2.367
434	RRF	2577	0.0001440785	193.30	0.847	-2.067
435	RRP	5327	0.0002978294	170.30	0.746	-3.533
436	RRS	6835	0.0003821407	161.13	0.706	-3.267
437	RRT	3594	0.0002009384	169.83	0.744	-3.233
438	RRW	1310	0.0000732413	205.40	0.900	-3.300
439	RRY	1752	0.0000979533	195.00	0.855	-3.433
440	RRV	4167	0.0002329745	175.67	0.770	-1.600
441	RNA	2152	0.0001203170	136.23	0.597	-2.067
442	RNR	2379	0.0001330085	170.90	0.749	-4.167
443	RNN	1316	0.0000735768	147.80	0.648	-3.833
444	RND	1443	0.0000806773	145.33	0.637	-3.833
445	RNC	852	0.0000476348	140.67	0.616	-1.833
446	RNQ	1658	0.0000926978	156.03	0.684	-3.833
447	RNE	1836	0.0001026497	153.63	0.673	-3.833
448	RNG	2285	0.0001277530	127.87	0.560	-2.800
449	RNH	1159	0.0000647990	159.57	0.699	-3.733
450	RNI	2009	0.0001123220	160.87	0.705	-1.167
451	RNL	4376	0.0002446595	160.90	0.705	-1.400
452	RNK	2278	0.0001273616	162.00	0.710	-3.967
453	RNM	790	0.0000441684	161.90	0.709	-2.033
454	RNF	1435	0.0000802300	170.20	0.746	-1.733
455	RNP	2273	0.0001270821	147.20	0.645	-3.200
456	RNS	3133	0.0001751642	138.03	0.605	-2.933
457	RNT	1883	0.0001052774	146.73	0.643	-2.900
458	RNW	492	0.0000275074	182.30	0.799	-2.967
459	RNY	1060	0.0000592640	171.90	0.753	-3.100
460	RNV	2217	0.0001239511	152.57	0.669	-1.267
461	RDA	3397	0.0001899242	133.77	0.586	-2.067
462	RDR	3545	0.0001981988	168.43	0.738	-4.167

463	RDN	1355	0.0000757572	145.33	0.637	-3.833
464	RDD	1792	0.0001001896	142.87	0.626	-3.833
465	RDC	1162	0.0000649667	138.20	0.606	-1.833
466	RDQ	1922	0.0001074579	153.57	0.673	-3.833
467	RDE	2801	0.0001566022	151.17	0.662	-3.833
468	RDG	3582	0.0002002675	125.40	0.550	-2.800
469	RDH	1286	0.0000718995	157.10	0.688	-3.733
470	RDI	2196	0.0001227770	158.40	0.694	-1.167
471	RDL	5772	0.0003227091	158.43	0.694	-1.400
472	RDK	2246	0.0001255725	159.53	0.699	-3.967
473	RDM	915	0.0000511571	159.43	0.699	-2.033
474	RDF	2137	0.0001194784	167.73	0.735	-1.733
475	RDP	3146	0.0001758910	144.73	0.634	-3.200
476	RDS	4096	0.0002290049	135.57	0.594	-2.933
477	RDT	2172	0.0001214352	144.27	0.632	-2.900
478	RDW	784	0.0000438330	179.83	0.788	-2.967
479	RDY	1467	0.0000820191	169.43	0.742	-3.100
480	RDV	3317	0.0001854515	150.10	0.658	-1.267
481	RCA	1247	0.0000697190	129.10	0.566	-0.067
482	RCR	1824	0.0001019787	163.77	0.718	-2.167
483	RCN	729	0.0000407580	140.67	0.616	-1.833
484	RCD	916	0.0000512130	138.20	0.606	-1.833
485	RCC	767	0.0000428825	133.53	0.585	0.167
486	RCQ	1304	0.0000729059	148.90	0.652	-1.833
487	RCE	1305	0.0000729618	146.50	0.642	-1.833
488	RCG	1573	0.0000879455	120.73	0.529	-0.800
489	RCH	872	0.0000487530	152.43	0.668	-1.733
490	RCI	990	0.0000553503	153.73	0.674	0.833
491	RCL	2436	0.0001361953	153.77	0.674	0.600
492	RCK	939	0.0000524989	154.87	0.679	-1.967
493	RCM	316	0.0000176674	154.77	0.678	-0.033
494	RCF	873	0.0000488089	163.07	0.715	0.267
495	RCP	1718	0.0000960523	140.07	0.614	-1.200
496	RCS	1994	0.0001114833	130.90	0.574	-0.933
497	RCT	964	0.0000538967	139.60	0.612	-0.900
498	RCW	422	0.0000235938	175.17	0.768	-0.967
499	RCY	764	0.0000427148	164.77	0.722	-1.100
500	RCV	1396	0.0000780495	145.43	0.637	0.733
501	RQA	3838	0.0002145803	144.47	0.633	-2.067
502	RQR	4198	0.0002347077	179.13	0.785	-4.167
503	RQN	1477	0.0000825782	156.03	0.684	-3.833
504	RQD	1798	0.0001005251	153.57	0.673	-3.833
505	RQC	938	0.0000524430	148.90	0.652	-1.833
506	RQQ	3115	0.0001741578	164.27	0.720	-3.833
507	RQE	3660	0.0002046284	161.87	0.709	-3.833
508	RQG	2990	0.0001671691	136.10	0.596	-2.800
509	RQH	1461	0.0000816836	167.80	0.735	-3.733
510	RQI	1849	0.0001033765	169.10	0.741	-1.167
511	RQL	5576	0.0003117508	169.13	0.741	-1.400
512	RQK	3038	0.0001698528	170.23	0.746	-3.967
513	RQM	990	0.0000553503	170.13	0.746	-2.033
514	RQF	1367	0.0000764282	178.43	0.782	-1.733

515	RQP	2524	0.0001411153	155.43	0.681	-3.200
516	RQS	2750	0.0001537509	146.27	0.641	-2.933
517	RQT	1871	0.0001046065	154.97	0.679	-2.900
518	RQW	569	0.0000318124	190.53	0.835	-2.967
519	RQY	1045	0.0000584253	180.13	0.789	-3.100
520	RQV	2690	0.0001503963	160.80	0.705	-1.267
521	REA	6134	0.0003429482	142.07	0.623	-2.067
522	RER	6324	0.0003535711	176.73	0.774	-4.167
523	REN	2578	0.0001441344	153.63	0.673	-3.833
524	RED	3430	0.0001917692	151.17	0.662	-3.833
525	REC	1292	0.0000722349	146.50	0.642	-1.833
526	REQ	3865	0.0002160898	161.87	0.709	-3.833
527	REE	6721	0.0003757671	159.47	0.699	-3.833
528	REG	4374	0.0002445477	133.70	0.586	-2.800
529	REH	1753	0.0000980092	165.40	0.725	-3.733
530	REI	2919	0.0001631995	166.70	0.730	-1.167
531	REL	7551	0.0004221719	166.73	0.731	-1.400
532	REK	5547	0.0003101294	167.83	0.735	-3.967
533	REM	1522	0.0000850941	167.73	0.735	-2.033
534	REF	2009	0.0001123220	176.03	0.771	-1.733
535	REP	3226	0.0001803637	153.03	0.671	-3.200
536	RES	4118	0.0002302349	143.87	0.630	-2.933
537	RET	3087	0.0001725923	152.57	0.669	-2.900
538	REW	748	0.0000418202	188.13	0.824	-2.967
539	REY	1428	0.0000798386	177.73	0.779	-3.100
540	REV	3962	0.0002215130	158.40	0.694	-1.267
541	RGA	5824	0.0003256163	116.30	0.510	-1.033
542	RGR	7287	0.0004074118	150.97	0.662	-3.133
543	RGN	2071	0.0001157884	127.87	0.560	-2.800
544	RGD	3137	0.0001753878	125.40	0.550	-2.800
545	RGC	1619	0.0000905173	120.73	0.529	-0.800
546	RGQ	3234	0.0001808110	136.10	0.596	-2.800
547	RGE	4142	0.0002315767	133.70	0.586	-2.800
548	RGG	6507	0.0003638025	107.93	0.473	-1.767
549	RGH	2120	0.0001185279	139.63	0.612	-2.700
550	RGI	2288	0.0001279207	140.93	0.618	-0.133
551	RGL	7007	0.0003917572	140.97	0.618	-0.367
552	RGK	3338	0.0001866256	142.07	0.623	-2.933
553	RGM	1176	0.0000657495	141.97	0.622	-1.000
554	RGF	2592	0.0001449172	150.27	0.658	-0.700
555	RGP	5987	0.0003347296	127.27	0.558	-2.167
556	RGS	6460	0.0003611747	118.10	0.518	-1.900
557	RGT	3256	0.0001820410	126.80	0.556	-1.867
558	RGW	1206	0.0000674267	162.37	0.712	-1.933
559	RGY	1812	0.0001013078	151.97	0.666	-2.067
560	RGV	3417	0.0001910424	132.63	0.581	-0.233
561	RHA	1402	0.0000783850	148.00	0.649	-1.967
562	RHR	2561	0.0001431840	182.67	0.800	-4.067
563	RHN	836	0.0000467403	159.57	0.699	-3.733
564	RHD	816	0.0000456221	157.10	0.688	-3.733
565	RHC	859	0.0000480262	152.43	0.668	-1.733
566	RHQ	1912	0.0001068988	167.80	0.735	-3.733

567	RHE	1408	0.0000787204	165.40	0.725	-3.733
568	RHG	2033	0.0001136638	139.63	0.612	-2.700
569	RHH	1100	0.0000615003	171.33	0.751	-3.633
570	RHI	1224	0.0000684331	172.63	0.757	-1.067
571	RHL	3440	0.0001923283	172.67	0.757	-1.300
572	RHK	1656	0.0000925860	173.77	0.761	-3.867
573	RHM	703	0.0000393043	173.67	0.761	-1.933
574	RHF	1166	0.0000651904	181.97	0.797	-1.633
575	RHP	1875	0.0001048301	158.97	0.697	-3.100
576	RHS	2537	0.0001418421	149.80	0.656	-2.833
577	RHT	1351	0.0000755336	158.50	0.695	-2.800
578	RHW	478	0.0000267247	194.07	0.850	-2.867
579	RHY	846	0.0000472994	183.67	0.805	-3.000
580	RHV	1500	0.0000838641	164.33	0.720	-1.167
581	RIA	2396	0.0001339589	149.30	0.654	0.600
582	RIR	2732	0.0001527445	183.97	0.806	-1.500
583	RIN	1418	0.0000792795	160.87	0.705	-1.167
584	RID	1382	0.0000772668	158.40	0.694	-1.167
585	RIC	906	0.0000506539	153.73	0.674	0.833
586	RIQ	2339	0.0001307721	169.10	0.741	-1.167
587	RIE	2218	0.0001240071	166.70	0.730	-1.167
588	RIG	2006	0.0001121543	140.93	0.618	-0.133
589	RIH	3784	0.0002115612	172.63	0.757	-1.067
590	RII	2011	0.0001124338	173.93	0.762	1.500
591	RIL	4611	0.0002577982	173.97	0.762	1.267
592	RIK	2321	0.0001297657	175.07	0.767	-1.300
593	RIM	828	0.0000462930	174.97	0.767	0.633
594	RIF	1701	0.0000951019	183.27	0.803	0.933
595	RIP	2493	0.0001393821	160.27	0.702	-0.533
596	RIS	3390	0.0001895329	151.10	0.662	-0.267
597	RIT	2217	0.0001239511	159.80	0.700	-0.233
598	RIW	543	0.0000303588	195.37	0.856	-0.300
599	RIY	1401	0.0000783291	184.97	0.811	-0.433
600	RIV	2174	0.0001215470	165.63	0.726	1.400
601	RLA	7154	0.0003999758	149.33	0.654	0.367
602	RLR	8178	0.0004572271	184.00	0.806	-1.733
603	RLN	2801	0.0001566022	160.90	0.705	-1.400
604	RLD	3762	0.0002103312	158.43	0.694	-1.400
605	RLC	2331	0.0001303248	153.77	0.674	0.600
606	RLQ	6640	0.0003712384	169.13	0.741	-1.400
607	RLE	6874	0.0003843212	166.73	0.731	-1.400
608	RLG	5842	0.0003266227	140.97	0.618	-0.367
609	RLH	3226	0.0001803637	172.67	0.757	-1.300
610	RLI	3245	0.0001814260	173.97	0.762	1.267
611	RLL	11907	0.0006657132	174.00	0.762	1.033
612	RLK	5402	0.0003020226	175.10	0.767	-1.533
613	RLM	1601	0.0000895109	175.00	0.767	0.400
614	RLF	3276	0.0001831592	183.30	0.803	0.700
615	RLP	6162	0.0003445137	160.30	0.702	-0.767
616	RLS	7459	0.0004170282	151.13	0.662	-0.500
617	RLT	4202	0.0002349313	159.83	0.700	-0.467
618	RLW	1557	0.0000870509	195.40	0.856	-0.533

619	RLY	2374	0.0001327289	185.00	0.811	-0.667
620	RLV	5141	0.0002874302	165.67	0.726	1.167
621	RKA	4708	0.0002632214	150.43	0.659	-2.200
622	RKR	5332	0.0002981089	185.10	0.811	-4.300
623	RKN	2390	0.0001336235	162.00	0.710	-3.967
624	RKD	2775	0.0001551486	159.53	0.699	-3.967
625	RKC	1188	0.0000664204	154.87	0.679	-1.967
626	RKQ	3089	0.0001727041	170.23	0.746	-3.967
627	RKE	5013	0.0002802738	167.83	0.735	-3.967
628	RKG	3699	0.0002068089	142.07	0.623	-2.933
629	RKH	1850	0.0001034324	173.77	0.761	-3.867
630	RKI	2924	0.0001634791	175.07	0.767	-1.300
631	RKL	6162	0.0003445137	175.10	0.767	-1.533
632	RKK	5496	0.0003072781	176.20	0.772	-4.100
633	RKM	1489	0.0000832491	176.10	0.772	-2.167
634	RKF	1991	0.0001113156	184.40	0.808	-1.867
635	RKP	3222	0.0001801401	161.40	0.707	-3.333
636	RKS	4466	0.0002496914	152.23	0.667	-3.067
637	RKT	3180	0.0001777919	160.93	0.705	-3.033
638	RKW	727	0.0000406461	196.50	0.861	-3.100
639	RKY	1607	0.0000898464	186.10	0.816	-3.233
640	RKV	3567	0.0001994288	166.77	0.731	-1.400
641	RMA	1489	0.0000832491	150.33	0.659	-0.267
642	RMR	1199	0.0000670354	185.00	0.811	-2.367
643	RMN	713	0.0000398634	161.90	0.709	-2.033
644	RMD	878	0.0000490885	159.43	0.699	-2.033
645	RMC	345	0.0000192887	154.77	0.678	-0.033
646	RMQ	908	0.0000507657	170.13	0.746	-2.033
647	RME	1531	0.0000855973	167.73	0.735	-2.033
648	RMG	1032	0.0000576985	141.97	0.622	-1.000
649	RMH	612	0.0000342166	173.67	0.761	-1.933
650	RMI	722	0.0000403666	174.97	0.767	0.633
651	RML	1943	0.0001086320	175.00	0.767	0.400
652	RMK	1336	0.0000746950	176.10	0.772	-2.167
653	RMM	434	0.0000242647	176.00	0.771	-0.233
654	RMF	704	0.0000393602	184.30	0.808	0.067
655	RMP	941	0.0000526107	161.30	0.707	-1.400
656	RMS	1393	0.0000778818	152.13	0.667	-1.133
657	RMT	887	0.0000495916	160.83	0.705	-1.100
658	RMW	234	0.0000130828	196.40	0.861	-1.167
659	RMY	520	0.0000290729	186.00	0.815	-1.300
660	RMV	1203	0.0000672590	166.67	0.730	0.533
661	RFA	1617	0.0000904055	158.63	0.695	0.033
662	RFR	2219	0.0001240630	193.30	0.847	-2.067
663	RFN	1043	0.0000583135	170.20	0.746	-1.733
664	RFD	1346	0.0000752541	167.73	0.735	-1.733
665	RFC	944	0.0000527785	163.07	0.715	0.267
666	RFQ	1720	0.0000961642	178.43	0.782	-1.733
667	RFE	1602	0.0000895669	176.03	0.771	-1.733
668	RFG	2065	0.0001154529	150.27	0.658	-0.700
669	RFH	1077	0.0000602144	181.97	0.797	-1.633
670	RFI	1385	0.0000774345	183.27	0.803	0.933

671	RFL	4024	0.0002249794	183.30	0.803	0.700
672	RFK	1438	0.0000803977	184.40	0.808	-1.867
673	RFM	600	0.0000335456	184.30	0.808	0.067
674	RFF	1353	0.0000756454	192.60	0.844	0.367
675	RFP	2040	0.0001140552	169.60	0.743	-1.100
676	RFS	3010	0.0001682873	160.43	0.703	-0.833
677	RFT	1668	0.0000932569	169.13	0.741	-0.800
678	RFW	518	0.0000289611	204.70	0.897	-0.867
679	RFY	1082	0.0000604940	194.30	0.851	-1.000
680	RFV	1678	0.0000938160	174.97	0.767	0.833
681	RPA	5094	0.0002848025	135.63	0.594	-1.433
682	RPR	5809	0.0003247777	170.30	0.746	-3.533
683	RPN	1375	0.0000768754	147.20	0.645	-3.200
684	RPD	2603	0.0001455322	144.73	0.634	-3.200
685	RPC	1321	0.0000738563	140.07	0.614	-1.200
686	RPQ	2972	0.0001661627	155.43	0.681	-3.200
687	RPE	3768	0.0002106666	153.03	0.671	-3.200
688	RPG	6572	0.0003674366	127.27	0.558	-2.167
689	RPH	1699	0.0000949901	158.97	0.697	-3.100
690	RPI	1603	0.0000896228	160.27	0.702	-0.533
691	RPL	5939	0.0003320459	160.30	0.702	-0.767
692	RPK	2520	0.0001408917	161.40	0.707	-3.333
693	RPM	845	0.0000472434	161.30	0.707	-1.400
694	RPF	2288	0.0001279207	169.60	0.743	-1.100
695	RPP	6384	0.0003569256	146.60	0.642	-2.567
696	RPS	5840	0.0003265109	137.43	0.602	-2.300
697	RPT	2829	0.0001581677	146.13	0.640	-2.267
698	RPW	953	0.0000532817	181.70	0.796	-2.333
699	RPY	1797	0.0001004692	171.30	0.751	-2.467
700	RPV	3464	0.0001936702	151.97	0.666	-0.633
701	RSA	5116	0.0002860325	126.47	0.554	-1.167
702	RSR	7412	0.0004144005	161.13	0.706	-3.267
703	RSN	2103	0.0001175775	138.03	0.605	-2.933
704	RSD	2562	0.0001432399	135.57	0.594	-2.933
705	RSC	1883	0.0001052774	130.90	0.574	-0.933
706	RSQ	3675	0.0002054670	146.27	0.641	-2.933
707	RSE	3779	0.0002112816	143.87	0.630	-2.933
708	RSG	5192	0.0002902816	118.10	0.518	-1.900
709	RSH	2797	0.0001563786	149.80	0.656	-2.833
710	RSI	2829	0.0001581677	151.10	0.662	-0.267
711	RSL	8696	0.0004861881	151.13	0.662	-0.500
712	RSK	3742	0.0002092130	152.23	0.667	-3.067
713	RSM	1287	0.0000719554	152.13	0.667	-1.133
714	RSF	2777	0.0001552604	160.43	0.703	-0.833
715	RSP	6626	0.0003704557	137.43	0.602	-2.300
716	RSS	8236	0.0004604698	128.27	0.562	-2.033
717	RST	3603	0.0002014416	136.97	0.600	-2.000
718	RSW	1271	0.0000710608	172.53	0.756	-2.067
719	RSY	1878	0.0001049979	162.13	0.710	-2.200
720	RSV	4101	0.0002292844	142.80	0.626	-0.367
721	RTA	3827	0.0002139653	135.17	0.592	-1.133
722	RTR	3194	0.0001785746	169.83	0.744	-3.233

723	RTN	1356	0.0000758131	146.73	0.643	-2.900
724	RTD	1838	0.0001027615	144.27	0.632	-2.900
725	RTC	1290	0.0000721231	139.60	0.612	-0.900
726	RTQ	2228	0.0001245661	154.97	0.679	-2.900
727	RTE	2818	0.0001575527	152.57	0.669	-2.900
728	RTG	3306	0.0001848365	126.80	0.556	-1.867
729	RTH	2703	0.0001511231	158.50	0.695	-2.800
730	RTI	1947	0.0001088556	159.80	0.700	-0.233
731	RTL	5573	0.0003115831	159.83	0.700	-0.467
732	RTK	2321	0.0001297657	160.93	0.705	-3.033
733	RTM	811	0.0000453425	160.83	0.705	-1.100
734	RTF	1863	0.0001041592	169.13	0.741	-0.800
735	RTP	4000	0.0002236376	146.13	0.640	-2.267
736	RTS	4114	0.0002300113	136.97	0.600	-2.000
737	RTT	2537	0.0001418421	145.67	0.638	-1.967
738	RTW	741	0.0000414289	181.23	0.794	-2.033
739	RTY	1175	0.0000656935	170.83	0.749	-2.167
740	RTV	3380	0.0001889738	151.50	0.664	-0.333
741	RWA	955	0.0000533935	170.73	0.748	-1.200
742	RWR	1125	0.0000628981	205.40	0.900	-3.300
743	RWN	467	0.0000261097	182.30	0.799	-2.967
744	RWD	537	0.0000300233	179.83	0.788	-2.967
745	RWC	282	0.0000157665	175.17	0.768	-0.967
746	RWQ	676	0.0000377948	190.53	0.835	-2.967
747	RWE	823	0.0000460134	188.13	0.824	-2.967
748	RWG	911	0.0000509335	162.37	0.712	-1.933
749	RWH	424	0.0000237056	194.07	0.850	-2.867
750	RWI	474	0.0000265011	195.37	0.856	-0.300
751	RWL	1574	0.0000880014	195.40	0.856	-0.533
752	RWK	918	0.0000513248	196.50	0.861	-3.100
753	RWM	340	0.0000190092	196.40	0.861	-1.167
754	RWF	571	0.0000319243	204.70	0.897	-0.867
755	RWP	714	0.0000399193	181.70	0.796	-2.333
756	RWS	857	0.0000479144	172.53	0.756	-2.067
757	RWT	668	0.0000373475	181.23	0.794	-2.033
758	RWW	284	0.0000158783	216.80	0.950	-2.100
759	RWY	361	0.0000201833	206.40	0.904	-2.233
760	RWV	734	0.0000410375	187.07	0.820	-0.400
761	RYA	1187	0.0000663645	160.33	0.703	-1.333
762	RYR	1758	0.0000982887	195.00	0.855	-3.433
763	RYN	853	0.0000476907	171.90	0.753	-3.100
764	RYD	953	0.0000532817	169.43	0.742	-3.100
765	RYC	632	0.0000353347	164.77	0.722	-1.100
766	RYQ	1173	0.0000655817	180.13	0.789	-3.100
767	RYE	1417	0.0000792236	177.73	0.779	-3.100
768	RYG	1616	0.0000903496	151.97	0.666	-2.067
769	RYH	827	0.0000462371	183.67	0.805	-3.000
770	RYI	1281	0.0000716199	184.97	0.811	-0.433
771	RYL	2908	0.0001625845	185.00	0.811	-0.667
772	RYK	1231	0.0000688245	186.10	0.816	-3.233
773	RYM	507	0.0000283461	186.00	0.815	-1.300
774	RYF	1205	0.0000673708	194.30	0.851	-1.000

775	RYP	1252	0.0000699986	171.30	0.751	-2.467
776	RYS	1907	0.0001066192	162.13	0.710	-2.200
777	RYT	1157	0.0000646872	170.83	0.749	-2.167
778	RYW	374	0.0000209101	206.40	0.904	-2.233
779	RYY	880	0.0000492003	196.00	0.859	-2.367
780	RYV	1401	0.0000783291	176.67	0.774	-0.533
781	RVA	4254	0.0002378386	141.00	0.618	0.500
782	RVR	4010	0.0002241967	175.67	0.770	-1.600
783	RVN	1743	0.0000974501	152.57	0.669	-1.267
784	RVD	2215	0.0001238393	150.10	0.658	-1.267
785	RVC	1435	0.0000802300	145.43	0.637	0.733
786	RVQ	2708	0.0001514027	160.80	0.705	-1.267
787	RVE	3331	0.0001862342	158.40	0.694	-1.267
788	RVG	3535	0.0001976397	132.63	0.581	-0.233
789	RVH	2449	0.0001369221	164.33	0.720	-1.167
790	RVI	2480	0.0001386553	165.63	0.726	1.400
791	RVL	6993	0.0003909744	165.67	0.726	1.167
792	RVK	3127	0.0001748287	166.77	0.731	-1.400
793	RVM	1074	0.0000600467	166.67	0.730	0.533
794	RVF	2262	0.0001264671	174.97	0.767	0.833
795	RVP	3766	0.0002105548	151.97	0.666	-0.633
796	RVS	4318	0.0002414168	142.80	0.626	-0.367
797	RVT	3366	0.0001881910	151.50	0.664	-0.333
798	RVW	834	0.0000466284	187.07	0.820	-0.400
799	RVY	1513	0.0000845909	176.67	0.774	-0.533
800	RVV	3679	0.0002056907	157.33	0.689	1.300
801	NAA	2791	0.0001560431	101.57	0.445	0.033
802	NAR	1717	0.0000959964	136.23	0.597	-2.067
803	NAN	1243	0.0000694954	113.13	0.496	-1.733
804	NAD	1561	0.0000872746	110.67	0.485	-1.733
805	NAC	691	0.0000386334	106.00	0.465	0.267
806	NAQ	1476	0.0000825223	121.37	0.532	-1.733
807	NAE	2289	0.0001279766	118.97	0.521	-1.733
808	NAG	1946	0.0001087997	93.20	0.408	-0.700
809	NAH	807	0.0000451189	124.90	0.547	-1.633
810	NAI	1901	0.0001062838	126.20	0.553	0.933
811	NAL	3461	0.0001935024	126.23	0.553	0.700
812	NAK	1898	0.0001061160	127.33	0.558	-1.867
813	NAM	702	0.0000392484	127.23	0.558	0.067
814	NAF	1425	0.0000796709	135.53	0.594	0.367
815	NAP	1930	0.0001079051	112.53	0.493	-1.100
816	NAS	3273	0.0001829915	103.37	0.453	-0.833
817	NAT	2384	0.0001332880	112.07	0.491	-0.800
818	NAW	481	0.0000268924	147.63	0.647	-0.867
819	NAY	917	0.0000512689	137.23	0.601	-1.000
820	NAV	2446	0.0001367544	117.90	0.517	0.833
821	NRA	1915	0.0001070665	136.23	0.597	-2.067
822	NRR	2306	0.0001289271	170.90	0.749	-4.167
823	NRN	1345	0.0000751981	147.80	0.648	-3.833
824	NRD	1414	0.0000790559	145.33	0.637	-3.833
825	NRC	711	0.0000397516	140.67	0.616	-1.833
826	NRQ	1481	0.0000828018	156.03	0.684	-3.833

827	NRE	2073	0.0001159002	153.63	0.673	-3.833
828	NRG	1741	0.0000973383	127.87	0.560	-2.800
829	NRH	902	0.0000504303	159.57	0.699	-3.733
830	NRI	1791	0.0001001337	160.87	0.705	-1.167
831	NRL	3062	0.0001711946	160.90	0.705	-1.400
832	NRK	1951	0.0001090792	162.00	0.710	-3.967
833	NRM	781	0.0000436652	161.90	0.709	-2.033
834	NRF	1313	0.0000734090	170.20	0.746	-1.733
835	NRP	1610	0.0000900141	147.20	0.645	-3.200
836	NRS	2415	0.0001350212	138.03	0.605	-2.933
837	NRT	1996	0.0001115952	146.73	0.643	-2.900
838	NRW	376	0.0000210219	182.30	0.799	-2.967
839	NRY	949	0.0000530580	171.90	0.753	-3.100
840	NRV	1872	0.0001046624	152.57	0.669	-1.267
841	NNA	1262	0.0000705577	113.13	0.496	-1.733
842	NNR	1261	0.0000705018	147.80	0.648	-3.833
843	NNN	1359	0.0000759809	124.70	0.546	-3.500
844	NND	893	0.0000499271	122.23	0.536	-3.500
845	NNC	587	0.0000328188	117.57	0.515	-1.500
846	NNQ	1223	0.0000683772	132.93	0.583	-3.500
847	NNE	1391	0.0000777700	130.53	0.572	-3.500
848	NNG	1387	0.0000775463	104.77	0.459	-2.467
849	NNH	673	0.0000376270	136.47	0.598	-3.400
850	NNI	1542	0.0000862123	137.77	0.604	-0.833
851	NNL	2686	0.0001501727	137.80	0.604	-1.067
852	NNK	1457	0.0000814600	138.90	0.609	-3.633
853	NNM	697	0.0000389689	138.80	0.608	-1.700
854	NNF	1196	0.0000668676	147.10	0.645	-1.400
855	NNP	1518	0.0000848705	124.10	0.544	-2.867
856	NNS	2270	0.0001269143	114.93	0.504	-2.600
857	NNT	1438	0.0000803977	123.63	0.542	-2.567
858	NNW	330	0.0000184501	159.20	0.698	-2.633
859	NNY	853	0.0000476907	148.80	0.652	-2.767
860	NNV	1455	0.0000813482	129.47	0.567	-0.933
861	NDA	1255	0.0000701663	110.67	0.485	-1.733
862	NDR	1129	0.0000631217	145.33	0.637	-3.833
863	NDN	1756	0.0000981769	122.23	0.536	-3.500
864	NDD	1250	0.0000698868	119.77	0.525	-3.500
865	NDC	703	0.0000393043	115.10	0.504	-1.500
866	NDQ	878	0.0000490885	130.47	0.572	-3.500
867	NDE	1445	0.0000807891	128.07	0.561	-3.500
868	NDG	1382	0.0000772668	102.30	0.448	-2.467
869	NDH	688	0.0000384657	134.00	0.587	-3.400
870	NDI	1587	0.0000887282	135.30	0.593	-0.833
871	NDL	2636	0.0001473772	135.33	0.593	-1.067
872	NDK	1235	0.0000690481	136.43	0.598	-3.633
873	NDM	551	0.0000308061	136.33	0.597	-1.700
874	NDF	1223	0.0000683772	144.63	0.634	-1.400
875	NDP	1398	0.0000781613	121.63	0.533	-2.867
876	NDS	2031	0.0001135520	112.47	0.493	-2.600
877	NDT	1546	0.0000864359	121.17	0.531	-2.567
878	NDW	321	0.0000179469	156.73	0.687	-2.633

879	NDY	812	0.0000453984	146.33	0.641	-2.767
880	NDV	1591	0.0000889519	127.00	0.557	-0.933
881	NCA	684	0.0000382420	106.00	0.465	0.267
882	NCR	736	0.0000411493	140.67	0.616	-1.833
883	NCN	566	0.0000316447	117.57	0.515	-1.500
884	NCD	584	0.0000326511	115.10	0.504	-1.500
885	NCC	445	0.0000248797	110.43	0.484	0.500
886	NCQ	656	0.0000366766	125.80	0.551	-1.500
887	NCE	857	0.0000479144	123.40	0.541	-1.500
888	NCG	972	0.0000543439	97.63	0.428	-0.467
889	NCH	406	0.0000226992	129.33	0.567	-1.400
890	NCI	748	0.0000418202	130.63	0.572	1.167
891	NCL	1365	0.0000763163	130.67	0.573	0.933
892	NCK	740	0.0000413730	131.77	0.577	-1.633
893	NCM	251	0.0000140333	131.67	0.577	0.300
894	NCF	536	0.0000299674	139.97	0.613	0.600
895	NCP	832	0.0000465166	116.97	0.513	-0.867
896	NCS	1775	0.0000992392	107.80	0.472	-0.600
897	NCT	1064	0.0000594876	116.50	0.511	-0.567
898	NCW	199	0.0000111260	152.07	0.666	-0.633
899	NCY	413	0.0000230906	141.67	0.621	-0.767
900	NCV	918	0.0000513248	122.33	0.536	1.067
901	NQA	1603	0.0000896228	121.37	0.532	-1.733
902	NQR	1400	0.0000782732	156.03	0.684	-3.833
903	NQN	1254	0.0000701104	132.93	0.583	-3.500
904	NQD	1319	0.0000737445	130.47	0.572	-3.500
905	NQC	640	0.0000357820	125.80	0.551	-1.500
906	NQQ	1519	0.0000849264	141.17	0.619	-3.500
907	NQE	2308	0.0001290389	138.77	0.608	-3.500
908	NQG	1531	0.0000855973	113.00	0.495	-2.467
909	NQH	740	0.0000413730	144.70	0.634	-3.400
910	NQI	1460	0.0000816277	146.00	0.640	-0.833
911	NQL	2882	0.0001611309	146.03	0.640	-1.067
912	NQK	1658	0.0000926978	147.13	0.645	-3.633
913	NQM	667	0.0000372916	147.03	0.644	-1.700
914	NQF	946	0.0000528903	155.33	0.681	-1.400
915	NQP	1502	0.0000839759	132.33	0.580	-2.867
916	NQS	2115	0.0001182484	123.17	0.540	-2.600
917	NQT	1712	0.0000957169	131.87	0.578	-2.567
918	NQW	370	0.0000206865	167.43	0.734	-2.633
919	NQY	693	0.0000387452	157.03	0.688	-2.767
920	NQV	1657	0.0000926419	137.70	0.603	-0.933
921	NEA	2401	0.0001342385	118.97	0.521	-1.733
922	NER	1748	0.0000977296	153.63	0.673	-3.833
923	NEN	1869	0.0001044947	130.53	0.572	-3.500
924	NED	2875	0.0001607395	128.07	0.561	-3.500
925	NEC	1841	0.0001029292	123.40	0.541	-1.500
926	NEQ	1278	0.0000714522	138.77	0.608	-3.500
927	NEE	3510	0.0001962420	136.37	0.598	-3.500
928	NEG	1899	0.0001061720	110.60	0.485	-2.467
929	NEH	789	0.0000441125	142.30	0.624	-3.400
930	NEI	2094	0.0001170743	143.60	0.629	-0.833

931	NEL	3397	0.0001899242	143.63	0.629	-1.067
932	NEK	2720	0.0001520736	144.73	0.634	-3.633
933	NEM	1001	0.0000559653	144.63	0.634	-1.700
934	NEF	1332	0.0000744713	152.93	0.670	-1.400
935	NEP	1318	0.0000736886	129.93	0.569	-2.867
936	NES	2199	0.0001229448	120.77	0.529	-2.600
937	NET	2077	0.0001161238	129.47	0.567	-2.567
938	NEW	443	0.0000247679	165.03	0.723	-2.633
939	NEY	1068	0.0000597112	154.63	0.678	-2.767
940	NEV	2526	0.0001412271	135.30	0.593	-0.933
941	NGA	2396	0.0001339589	93.20	0.408	-0.700
942	NGR	2201	0.0001230566	127.87	0.560	-2.800
943	NGN	1907	0.0001066192	104.77	0.459	-2.467
944	NGD	2223	0.0001242866	102.30	0.448	-2.467
945	NGC	692	0.0000386893	97.63	0.428	-0.467
946	NGQ	2090	0.0001168506	113.00	0.495	-2.467
947	NGE	2860	0.0001599009	110.60	0.485	-2.467
948	NGG	2837	0.0001586150	84.83	0.372	-1.433
949	NGH	1385	0.0000774345	116.53	0.511	-2.367
950	NGI	2134	0.0001193107	117.83	0.516	0.200
951	NGL	3549	0.0001984225	117.87	0.517	-0.033
952	NGK	2684	0.0001500608	118.97	0.521	-2.600
953	NGM	869	0.0000485853	118.87	0.521	-0.667
954	NGF	1525	0.0000852618	127.17	0.557	-0.367
955	NGP	1699	0.0000949901	104.17	0.456	-1.833
956	NGS	3844	0.0002149157	95.00	0.416	-1.567
957	NGT	3152	0.0001762264	103.70	0.454	-1.533
958	NGW	488	0.0000272838	139.27	0.610	-1.600
959	NGY	1178	0.0000658613	128.87	0.565	-1.733
960	NGV	2441	0.0001364748	109.53	0.480	0.100
961	NHA	726	0.0000405902	124.90	0.547	-1.633
962	NHR	983	0.0000549589	159.57	0.699	-3.733
963	NHN	628	0.0000351111	136.47	0.598	-3.400
964	NHD	592	0.0000330984	134.00	0.587	-3.400
965	NHC	397	0.0000221960	129.33	0.567	-1.400
966	NHQ	826	0.0000461812	144.70	0.634	-3.400
967	NHE	832	0.0000465166	142.30	0.624	-3.400
968	NHG	779	0.0000435534	116.53	0.511	-2.367
969	NHH	598	0.0000334338	148.23	0.650	-3.300
970	NHI	916	0.0000512130	149.53	0.655	-0.733
971	NHL	1832	0.0001024260	149.57	0.655	-0.967
972	NHK	864	0.0000483057	150.67	0.660	-3.533
973	NHM	389	0.0000217488	150.57	0.660	-1.600
974	NHF	793	0.0000443362	158.87	0.696	-1.300
975	NHP	1120	0.0000626185	135.87	0.595	-2.767
976	NHS	1545	0.0000863800	126.70	0.555	-2.500
977	NHT	1100	0.0000615003	135.40	0.593	-2.467
978	NHW	231	0.0000129151	170.97	0.749	-2.533
979	NHY	524	0.0000292965	160.57	0.704	-2.667
980	NHV	1009	0.0000564126	141.23	0.619	-0.833
981	NIA	1764	0.0000986242	126.20	0.553	0.933
982	NIR	1719	0.0000961083	160.87	0.705	-1.167

983	NIN	1433	0.0000801182	137.77	0.604	-0.833
984	NID	1490	0.0000833050	135.30	0.593	-0.833
985	NIC	848	0.0000474112	130.63	0.572	1.167
986	NIQ	1871	0.0001046065	146.00	0.640	-0.833
987	NIE	1863	0.0001041592	143.60	0.629	-0.833
988	NIG	1347	0.0000753100	117.83	0.516	0.200
989	NIH	1017	0.0000568599	149.53	0.655	-0.733
990	NII	2085	0.0001165711	150.83	0.661	1.833
991	NIL	3957	0.0002212335	150.87	0.661	1.600
992	NIK	2032	0.0001136079	151.97	0.666	-0.967
993	NIM	790	0.0000441684	151.87	0.665	0.967
994	NIF	1722	0.0000962760	160.17	0.702	1.267
995	NIP	2146	0.0001199816	137.17	0.601	-0.200
996	NIS	3161	0.0001767296	128.00	0.561	0.067
997	NIT	2709	0.0001514586	136.70	0.599	0.100
998	NIW	392	0.0000219165	172.27	0.755	0.033
999	NIY	1081	0.0000604381	161.87	0.709	-0.100
1000	NIV	2124	0.0001187516	142.53	0.625	1.733
1001	NLA	4057	0.0002268244	126.23	0.553	0.700
1002	NLR	3309	0.0001850042	160.90	0.705	-1.400
1003	NLN	2627	0.0001468740	137.80	0.604	-1.067
1004	NLD	2833	0.0001583913	135.33	0.593	-1.067
1005	NLC	1262	0.0000705577	130.67	0.573	0.933
1006	NLQ	3621	0.0002024479	146.03	0.640	-1.067
1007	NLE	4210	0.0002353786	143.63	0.629	-1.067
1008	NLG	3273	0.0001829915	117.87	0.517	-0.033
1009	NLH	1585	0.0000886164	149.57	0.655	-0.967
1010	NLI	3065	0.0001713623	150.87	0.661	1.600
1011	NLL	6601	0.0003690580	150.90	0.661	1.367
1012	NLK	3946	0.0002206185	152.00	0.666	-1.200
1013	NLM	1211	0.0000677063	151.90	0.666	0.733
1014	NLF	2262	0.0001264671	160.20	0.702	1.033
1015	NLP	3633	0.0002031188	137.20	0.601	-0.433
1016	NLS	5554	0.0003105208	128.03	0.561	-0.167
1017	NLT	4404	0.0002462250	136.73	0.599	-0.133
1018	NLW	638	0.0000356702	172.30	0.755	-0.200
1019	NLY	1977	0.0001105329	161.90	0.709	-0.333
1020	NLV	3759	0.0002101634	142.57	0.625	1.500
1021	NKA	2358	0.0001318344	127.33	0.558	-1.867
1022	NKR	1843	0.0001030410	162.00	0.710	-3.967
1023	NKN	1614	0.0000902378	138.90	0.609	-3.633
1024	NKD	2277	0.0001273057	136.43	0.598	-3.633
1025	NKC	920	0.0000514366	131.77	0.577	-1.633
1026	NKQ	1519	0.0000849264	147.13	0.645	-3.633
1027	NKE	3065	0.0001713623	144.73	0.634	-3.633
1028	NKG	1743	0.0000974501	118.97	0.521	-2.600
1029	NKH	1048	0.0000585931	150.67	0.660	-3.533
1030	NKI	2182	0.0001219943	151.97	0.666	-0.967
1031	NKL	3357	0.0001876879	152.00	0.666	-1.200
1032	NKK	2856	0.0001596772	153.10	0.671	-3.767
1033	NKM	964	0.0000538967	153.00	0.670	-1.833
1034	NKF	1248	0.0000697749	161.30	0.707	-1.533

1035	NKP	1862	0.0001041033	138.30	0.606	-3.000
1036	NKS	2359	0.0001318903	129.13	0.566	-2.733
1037	NKT	2152	0.0001203170	137.83	0.604	-2.700
1038	NKW	427	0.0000238733	173.40	0.760	-2.767
1039	NKY	1095	0.0000612208	163.00	0.714	-2.900
1040	NKV	2235	0.0001249575	143.67	0.630	-1.067
1041	NMA	964	0.0000538967	127.23	0.558	0.067
1042	NMR	575	0.0000321479	161.90	0.709	-2.033
1043	NMN	757	0.0000423234	138.80	0.608	-1.700
1044	NMD	833	0.0000465725	136.33	0.597	-1.700
1045	NMC	247	0.0000138096	131.67	0.577	0.300
1046	NMQ	550	0.0000307502	147.03	0.644	-1.700
1047	NME	1106	0.0000618358	144.63	0.634	-1.700
1048	NMG	821	0.0000459016	118.87	0.521	-0.667
1049	NMH	315	0.0000176115	150.57	0.660	-1.600
1050	NMI	589	0.0000329306	151.87	0.665	0.967
1051	NML	1390	0.0000777141	151.90	0.666	0.733
1052	NMK	997	0.0000557417	153.00	0.670	-1.833
1053	NMM	356	0.0000199037	152.90	0.670	0.100
1054	NMF	514	0.0000287374	161.20	0.706	0.400
1055	NMP	735	0.0000410934	138.20	0.606	-1.067
1056	NMS	1004	0.0000561330	129.03	0.565	-0.800
1057	NMT	889	0.0000497035	137.73	0.604	-0.767
1058	NMW	164	0.0000091691	173.30	0.759	-0.833
1059	NMY	436	0.0000243765	162.90	0.714	-0.967
1060	NMV	913	0.0000510453	143.57	0.629	0.867
1061	NFA	1257	0.0000702781	135.53	0.594	0.367
1062	NFR	1316	0.0000735768	170.20	0.746	-1.733
1063	NFN	1074	0.0000600467	147.10	0.645	-1.400
1064	NFD	1376	0.0000769313	144.63	0.634	-1.400
1065	NFC	578	0.0000323156	139.97	0.613	0.600
1066	NFQ	1182	0.0000660849	155.33	0.681	-1.400
1067	NFE	1303	0.0000728500	152.93	0.670	-1.400
1068	NFG	1204	0.0000673149	127.17	0.557	-0.367
1069	NFH	713	0.0000398634	158.87	0.696	-1.300
1070	NFI	1316	0.0000735768	160.17	0.702	1.267
1071	NFL	2721	0.0001521295	160.20	0.702	1.033
1072	NFK	1219	0.0000681536	161.30	0.707	-1.533
1073	NFM	477	0.0000266688	161.20	0.706	0.400
1074	NFF	1108	0.0000619476	169.50	0.743	0.700
1075	NFP	1322	0.0000739122	146.50	0.642	-0.767
1076	NFS	2661	0.0001487749	137.33	0.602	-0.500
1077	NFT	1727	0.0000965555	146.03	0.640	-0.467
1078	NFW	319	0.0000178351	181.60	0.796	-0.533
1079	NFY	736	0.0000411493	171.20	0.750	-0.667
1080	NFV	1350	0.0000754777	151.87	0.665	1.167
1081	NPA	2603	0.0001455322	112.53	0.493	-1.100
1082	NPR	1911	0.0001068429	147.20	0.645	-3.200
1083	NPN	1701	0.0000951019	124.10	0.544	-2.867
1084	NPD	2178	0.0001217707	121.63	0.533	-2.867
1085	NPC	803	0.0000448952	116.97	0.513	-0.867
1086	NPQ	1733	0.0000968910	132.33	0.580	-2.867

1087	NPE	3006	0.0001680637	129.93	0.569	-2.867
1088	NPG	2528	0.0001413390	104.17	0.456	-1.833
1089	NPH	981	0.0000548471	135.87	0.595	-2.767
1090	NPI	1488	0.0000831932	137.17	0.601	-0.200
1091	NPL	3017	0.0001686787	137.20	0.601	-0.433
1092	NPK	2039	0.0001139993	138.30	0.606	-3.000
1093	NPM	727	0.0000406461	138.20	0.606	-1.067
1094	NPF	1544	0.0000863241	146.50	0.642	-0.767
1095	NPP	2576	0.0001440226	123.50	0.541	-2.233
1096	NPS	3063	0.0001712505	114.33	0.501	-1.967
1097	NPT	1883	0.0001052774	123.03	0.539	-1.933
1098	NPW	570	0.0000318684	158.60	0.695	-2.000
1099	NPY	1222	0.0000683213	148.20	0.649	-2.133
1100	NPV	2278	0.0001273616	128.87	0.565	-0.300
1101	NSA	3040	0.0001699646	103.37	0.453	-0.833
1102	NSR	2594	0.0001450290	138.03	0.605	-2.933
1103	NSN	2375	0.0001327848	114.93	0.504	-2.600
1104	NSD	2419	0.0001352448	112.47	0.493	-2.600
1105	NSC	1105	0.0000617799	107.80	0.472	-0.600
1106	NSQ	2408	0.0001346298	123.17	0.540	-2.600
1107	NSE	3159	0.0001766178	120.77	0.529	-2.600
1108	NSG	3065	0.0001713623	95.00	0.416	-1.567
1109	NSH	1471	0.0000822427	126.70	0.555	-2.500
1110	NSI	2644	0.0001478245	128.00	0.561	0.067
1111	NSL	5202	0.0002908407	128.03	0.561	-0.167
1112	NSK	2785	0.0001557077	129.13	0.566	-2.733
1113	NSM	1050	0.0000587049	129.03	0.565	-0.800
1114	NSF	2072	0.0001158443	137.33	0.602	-0.500
1115	NSP	3126	0.0001747728	114.33	0.501	-1.967
1116	NSS	6595	0.0003687225	105.17	0.461	-1.700
1117	NST	3515	0.0001965215	113.87	0.499	-1.667
1118	NSW	730	0.0000408139	149.43	0.655	-1.733
1119	NSY	1298	0.0000725704	139.03	0.609	-1.867
1120	NSV	3185	0.0001780714	119.70	0.525	-0.033
1121	NTA	2461	0.0001375930	112.07	0.491	-0.800
1122	NTR	1447	0.0000809009	146.73	0.643	-2.900
1123	NTN	1299	0.0000726263	123.63	0.542	-2.567
1124	NTD	1585	0.0000886164	121.17	0.531	-2.567
1125	NTC	788	0.0000440566	116.50	0.511	-0.567
1126	NTQ	1318	0.0000736886	131.87	0.578	-2.567
1127	NTE	2259	0.0001262993	129.47	0.567	-2.567
1128	NTG	2019	0.0001128811	103.70	0.454	-1.533
1129	NTH	847	0.0000473553	135.40	0.593	-2.467
1130	NTI	1590	0.0000888959	136.70	0.599	0.100
1131	NTL	3163	0.0001768414	136.73	0.599	-0.133
1132	NTK	1726	0.0000964996	137.83	0.604	-2.700
1133	NTM	700	0.0000391366	137.73	0.604	-0.767
1134	NTF	1426	0.0000797268	146.03	0.640	-0.467
1135	NTP	1931	0.0001079611	123.03	0.539	-1.933
1136	NTS	2969	0.0001659950	113.87	0.499	-1.667
1137	NTT	2305	0.0001288712	122.57	0.537	-1.633
1138	NTW	422	0.0000235938	158.13	0.693	-1.700

1139	NTY	1057	0.0000590962	147.73	0.647	-1.833
1140	NTV	2415	0.0001350212	128.40	0.563	0.000
1141	NWA	485	0.0000271161	147.63	0.647	-0.867
1142	NWR	508	0.0000284020	182.30	0.799	-2.967
1143	NWN	405	0.0000226433	159.20	0.698	-2.633
1144	NWD	404	0.0000225874	156.73	0.687	-2.633
1145	NWC	142	0.0000079391	152.07	0.666	-0.633
1146	NWQ	334	0.0000186737	167.43	0.734	-2.633
1147	NWE	468	0.0000261656	165.03	0.723	-2.633
1148	NWG	441	0.0000246560	139.27	0.610	-1.600
1149	NWH	189	0.0000105669	170.97	0.749	-2.533
1150	NWI	407	0.0000227551	172.27	0.755	0.033
1151	NWL	773	0.0000432180	172.30	0.755	-0.200
1152	NWK	600	0.0000335456	173.40	0.760	-2.767
1153	NWM	213	0.0000119087	173.30	0.759	-0.833
1154	NWF	333	0.0000186178	181.60	0.796	-0.533
1155	NWP	333	0.0000186178	158.60	0.695	-2.000
1156	NWS	560	0.0000313093	149.43	0.655	-1.733
1157	NWT	490	0.0000273956	158.13	0.693	-1.700
1158	NWW	94	0.0000052555	193.70	0.849	-1.767
1159	NWY	267	0.0000149278	183.30	0.803	-1.900
1160	NWV	426	0.0000238174	163.97	0.719	-0.067
1161	NYA	842	0.0000470757	137.23	0.601	-1.000
1162	NYR	1145	0.0000640163	171.90	0.753	-3.100
1163	NYN	811	0.0000453425	148.80	0.652	-2.767
1164	NYD	911	0.0000509335	146.33	0.641	-2.767
1165	NYC	500	0.0000279547	141.67	0.621	-0.767
1166	NYQ	847	0.0000473553	157.03	0.688	-2.767
1167	NYE	1076	0.0000601585	154.63	0.678	-2.767
1168	NYG	1101	0.0000615562	128.87	0.565	-1.733
1169	NYH	439	0.0000245442	160.57	0.704	-2.667
1170	NYI	1361	0.0000760927	161.87	0.709	-0.100
1171	NYL	1890	0.0001056688	161.90	0.709	-0.333
1172	NYK	957	0.0000535053	163.00	0.714	-2.900
1173	NYM	419	0.0000234260	162.90	0.714	-0.967
1174	NYF	861	0.0000481380	171.20	0.750	-0.667
1175	NYP	814	0.0000455103	148.20	0.649	-2.133
1176	NYS	1773	0.0000991274	139.03	0.609	-1.867
1177	NYT	1348	0.0000753659	147.73	0.647	-1.833
1178	NYW	224	0.0000125237	183.30	0.803	-1.900
1179	NYY	719	0.0000401989	172.90	0.758	-2.033
1180	NYV	1158	0.0000647431	153.57	0.673	-0.200
1181	NVA	2312	0.0001292625	117.90	0.517	0.833
1182	NVR	1547	0.0000864918	152.57	0.669	-1.267
1183	NVN	1503	0.0000840318	129.47	0.567	-0.933
1184	NVD	1874	0.0001047742	127.00	0.557	-0.933
1185	NVC	979	0.0000547353	122.33	0.536	1.067
1186	NVQ	1568	0.0000876659	137.70	0.603	-0.933
1187	NVE	2247	0.0001256284	135.30	0.593	-0.933
1188	NVG	1800	0.0001006369	109.53	0.480	0.100
1189	NVH	993	0.0000555180	141.23	0.619	-0.833
1190	NVI	2012	0.0001124897	142.53	0.625	1.733

1191	NVL	3717	0.0002078152	142.57	0.625	1.500
1192	NVK	2126	0.0001188634	143.67	0.630	-1.067
1193	NVM	755	0.0000422116	143.57	0.629	0.867
1194	NVF	1596	0.0000892314	151.87	0.665	1.167
1195	NVP	1980	0.0001107006	128.87	0.565	-0.300
1196	NVS	3215	0.0001797487	119.70	0.525	-0.033
1197	NVT	3022	0.0001689582	128.40	0.563	0.000
1198	NVW	339	0.0000189533	163.97	0.719	-0.067
1199	NVY	1105	0.0000617799	153.57	0.673	-0.200
1200	NVV	2401	0.0001342385	134.23	0.588	1.633
1201	DAA	4628	0.0002587487	99.10	0.434	0.033
1202	DAR	2456	0.0001373135	133.77	0.586	-2.067
1203	DAN	1537	0.0000859327	110.67	0.485	-1.733
1204	DAD	2920	0.0001632554	108.20	0.474	-1.733
1205	DAC	1180	0.0000659731	103.53	0.454	0.267
1206	DAQ	2120	0.0001185279	118.90	0.521	-1.733
1207	DAE	3769	0.0002107225	116.50	0.511	-1.733
1208	DAG	3964	0.0002216249	90.73	0.398	-0.700
1209	DAH	1259	0.0000703899	122.43	0.537	-1.633
1210	DAI	2217	0.0001239511	123.73	0.542	0.933
1211	DAL	5429	0.0003035321	123.77	0.542	0.700
1212	DAK	2363	0.0001321139	124.87	0.547	-1.867
1213	DAM	959	0.0000536171	124.77	0.547	0.067
1214	DAF	2181	0.0001219384	133.07	0.583	0.367
1215	DAP	2671	0.0001493340	110.07	0.482	-1.100
1216	DAS	3861	0.0002158662	100.90	0.442	-0.833
1217	DAT	2196	0.0001227770	109.60	0.480	-0.800
1218	DAW	590	0.0000329865	145.17	0.636	-0.867
1219	DAY	1234	0.0000689922	134.77	0.591	-1.000
1220	DAV	3882	0.0002170403	115.43	0.506	0.833
1221	DRA	2556	0.0001429044	133.77	0.586	-2.067
1222	DRR	2540	0.0001420099	168.43	0.738	-4.167
1223	DRN	1576	0.0000881132	145.33	0.637	-3.833
1224	DRD	2481	0.0001387112	142.87	0.626	-3.833
1225	DRC	1140	0.0000637367	138.20	0.606	-1.833
1226	DRQ	1591	0.0000889519	153.57	0.673	-3.833
1227	DRE	3644	0.0002037339	151.17	0.662	-3.833
1228	DRG	2850	0.0001593418	125.40	0.550	-2.800
1229	DRH	1073	0.0000599908	157.10	0.688	-3.733
1230	DRI	2014	0.0001126015	158.40	0.694	-1.167
1231	DRL	4218	0.0002358258	158.43	0.694	-1.400
1232	DRK	2393	0.0001337912	159.53	0.699	-3.967
1233	DRM	861	0.0000481380	159.43	0.699	-2.033
1234	DRF	1711	0.0000956610	167.73	0.735	-1.733
1235	DRP	2202	0.0001231125	144.73	0.634	-3.200
1236	DRS	3056	0.0001708591	135.57	0.594	-2.933
1237	DRT	1935	0.0001081847	144.27	0.632	-2.900
1238	DRW	590	0.0000329865	179.83	0.788	-2.967
1239	DRY	1671	0.0000934246	169.43	0.742	-3.100
1240	DRV	2434	0.0001360835	150.10	0.658	-1.267
1241	DNA	1731	0.0000967792	110.67	0.485	-1.733
1242	DNR	1340	0.0000749186	145.33	0.637	-3.833

1243	DNN	1018	0.0000569158	122.23	0.536	-3.500
1244	DND	1336	0.0000746950	119.77	0.525	-3.500
1245	DNC	701	0.0000391925	115.10	0.504	-1.500
1246	DNQ	1110	0.0000620594	130.47	0.572	-3.500
1247	DNE	1746	0.0000976178	128.07	0.561	-3.500
1248	DNG	1727	0.0000965555	102.30	0.448	-2.467
1249	DNH	702	0.0000392484	134.00	0.587	-3.400
1250	DNI	1791	0.0001001337	135.30	0.593	-0.833
1251	DNL	2903	0.0001623050	135.33	0.593	-1.067
1252	DNK	1499	0.0000838082	136.43	0.598	-3.633
1253	DNM	620	0.0000346638	136.33	0.597	-1.700
1254	DNF	1297	0.0000725145	144.63	0.634	-1.400
1255	DNP	1650	0.0000922505	121.63	0.533	-2.867
1256	DNS	2460	0.0001375371	112.47	0.493	-2.600
1257	DNT	1430	0.0000799504	121.17	0.531	-2.567
1258	DNW	394	0.0000220283	156.73	0.687	-2.633
1259	DNY	939	0.0000524989	146.33	0.641	-2.767
1260	DNV	1738	0.0000971705	127.00	0.557	-0.933
1261	DDA	2374	0.0001327289	108.20	0.474	-1.733
1262	DDR	1727	0.0000965555	142.87	0.626	-3.833
1263	DDN	1531	0.0000855973	119.77	0.525	-3.500
1264	DDD	4272	0.0002388450	117.30	0.514	-3.500
1265	DDC	892	0.0000498712	112.63	0.494	-1.500
1266	DDQ	1336	0.0000746950	128.00	0.561	-3.500
1267	DDE	4096	0.0002290049	125.60	0.550	-3.500
1268	DDG	2729	0.0001525768	99.83	0.437	-2.467
1269	DDH	860	0.0000480821	131.53	0.576	-3.400
1270	DDI	2639	0.0001475449	132.83	0.582	-0.833
1271	DDL	4187	0.0002340927	132.87	0.582	-1.067
1272	DDK	1858	0.0001038797	133.97	0.587	-3.633
1273	DDM	1008	0.0000563567	133.87	0.587	-1.700
1274	DDF	2152	0.0001203170	142.17	0.623	-1.400
1275	DDP	2232	0.0001247898	119.17	0.522	-2.867
1276	DDS	3745	0.0002093807	110.00	0.482	-2.600
1277	DDT	1961	0.0001096383	118.70	0.520	-2.567
1278	DDW	508	0.0000284020	154.27	0.676	-2.633
1279	DDY	1265	0.0000707254	143.87	0.630	-2.767
1280	DDV	2686	0.0001501727	124.53	0.546	-0.933
1281	DCA	1117	0.0000624508	103.53	0.454	0.267
1282	DCR	998	0.0000557976	138.20	0.606	-1.833
1283	DCN	579	0.0000323715	115.10	0.504	-1.500
1284	DCD	878	0.0000490885	112.63	0.494	-1.500
1285	DCC	482	0.0000269483	107.97	0.473	0.500
1286	DCQ	690	0.0000385775	123.33	0.540	-1.500
1287	DCE	1118	0.0000625067	120.93	0.530	-1.500
1288	DCG	1999	0.0001117629	95.17	0.417	-0.467
1289	DCH	493	0.0000275633	126.87	0.556	-1.400
1290	DCI	819	0.0000457898	128.17	0.562	1.167
1291	DCL	1691	0.0000945428	128.20	0.562	0.933
1292	DCK	962	0.0000537848	129.30	0.567	-1.633
1293	DCM	293	0.0000163815	129.20	0.566	0.300
1294	DCF	752	0.0000420439	137.50	0.603	0.600

1295	DCP	1217	0.0000680417	114.50	0.502	-0.867
1296	DCS	1703	0.0000952137	105.33	0.462	-0.600
1297	DCT	923	0.0000516044	114.03	0.500	-0.567
1298	DCW	308	0.0000172201	149.60	0.656	-0.633
1299	DCY	466	0.0000260538	139.20	0.610	-0.767
1300	DCV	1113	0.0000622272	119.87	0.525	1.067
1301	DQA	2039	0.0001139993	118.90	0.521	-1.733
1302	DQR	1673	0.0000935364	153.57	0.673	-3.833
1303	DQN	1290	0.0000721231	130.47	0.572	-3.500
1304	DQD	1917	0.0001071783	128.00	0.561	-3.500
1305	DQC	669	0.0000374034	123.33	0.540	-1.500
1306	DQQ	1469	0.0000821309	138.70	0.608	-3.500
1307	DQE	2610	0.0001459235	136.30	0.597	-3.500
1308	DQG	2041	0.0001141111	110.53	0.484	-2.467
1309	DQH	824	0.0000460693	142.23	0.623	-3.400
1310	DQI	1534	0.0000857650	143.53	0.629	-0.833
1311	DQL	3497	0.0001955152	143.57	0.629	-1.067
1312	DQK	1633	0.0000913000	144.67	0.634	-3.633
1313	DQM	654	0.0000365647	144.57	0.634	-1.700
1314	DQF	936	0.0000523312	152.87	0.670	-1.400
1315	DQP	1599	0.0000893991	129.87	0.569	-2.867
1316	DQS	1978	0.0001105888	120.70	0.529	-2.600
1317	DQT	1421	0.0000794473	129.40	0.567	-2.567
1318	DQW	481	0.0000268924	164.97	0.723	-2.633
1319	DQY	836	0.0000467403	154.57	0.677	-2.767
1320	DQV	2200	0.0001230007	135.23	0.593	-0.933
1321	DEA	4039	0.0002258181	116.50	0.511	-1.733
1322	DER	2220	0.0001241189	151.17	0.662	-3.833
1323	DEN	2768	0.0001547572	128.07	0.561	-3.500
1324	DED	5525	0.0003088994	125.60	0.550	-3.500
1325	DEC	1543	0.0000862682	120.93	0.530	-1.500
1326	DEQ	2026	0.0001132724	136.30	0.597	-3.500
1327	DEE	7431	0.0004154627	133.90	0.587	-3.500
1328	DEG	3432	0.0001918811	108.13	0.474	-2.467
1329	DEH	1134	0.0000634013	139.83	0.613	-3.400
1330	DEI	2638	0.0001474890	141.13	0.618	-0.833
1331	DEL	5221	0.0002919030	141.17	0.619	-1.067
1332	DEK	3477	0.0001943970	142.27	0.623	-3.633
1333	DEM	1239	0.0000692717	142.17	0.623	-1.700
1334	DEF	1817	0.0001015874	150.47	0.659	-1.400
1335	DEP	2169	0.0001212675	127.47	0.559	-2.867
1336	DES	3296	0.0001842774	118.30	0.518	-2.600
1337	DET	2342	0.0001309398	127.00	0.557	-2.567
1338	DEW	552	0.0000308620	162.57	0.712	-2.633
1339	DEY	1349	0.0000754218	152.17	0.667	-2.767
1340	DEV	3534	0.0001975838	132.83	0.582	-0.933
1341	DGA	3808	0.0002129030	90.73	0.398	-0.700
1342	DGR	3493	0.0001952915	125.40	0.550	-2.800
1343	DGN	2004	0.0001120424	102.30	0.448	-2.467
1344	DGD	3099	0.0001732632	99.83	0.437	-2.467
1345	DGC	1057	0.0000590962	95.17	0.417	-0.467
1346	DGQ	2624	0.0001467063	110.53	0.484	-2.467

1347	DGE	4140	0.0002314649	108.13	0.474	-2.467
1348	DGG	4348	0.0002430941	82.37	0.361	-1.433
1349	DGH	1531	0.0000855973	114.07	0.500	-2.367
1350	DGI	2450	0.0001369780	115.37	0.506	0.200
1351	DGL	4877	0.0002726701	115.40	0.506	-0.033
1352	DGK	3955	0.0002211217	116.50	0.511	-2.600
1353	DGM	895	0.0000500389	116.40	0.510	-0.667
1354	DGF	2196	0.0001227770	124.70	0.546	-0.367
1355	DGP	2961	0.0001655477	101.70	0.446	-1.833
1356	DGS	5300	0.0002963198	92.53	0.405	-1.567
1357	DGT	3591	0.0002007706	101.23	0.444	-1.533
1358	DGW	713	0.0000398634	136.80	0.599	-1.600
1359	DGY	1571	0.0000878337	126.40	0.554	-1.733
1360	DGV	3444	0.0001925520	107.07	0.469	0.100
1361	DHA	1039	0.0000580899	122.43	0.537	-1.633
1362	DHR	1090	0.0000609412	157.10	0.688	-3.733
1363	DHN	703	0.0000393043	134.00	0.587	-3.400
1364	DHD	871	0.0000486971	131.53	0.576	-3.400
1365	DHC	509	0.0000284579	126.87	0.556	-1.400
1366	DHQ	984	0.0000550149	142.23	0.623	-3.400
1367	DHE	1127	0.0000630099	139.83	0.613	-3.400
1368	DHG	1328	0.0000742477	114.07	0.500	-2.367
1369	DHH	598	0.0000334338	145.77	0.639	-3.300
1370	DHI	1118	0.0000625067	147.07	0.644	-0.733
1371	DHL	2316	0.0001294862	147.10	0.645	-0.967
1372	DHK	878	0.0000490885	148.20	0.649	-3.533
1373	DHM	476	0.0000266129	148.10	0.649	-1.600
1374	DHF	843	0.0000471316	156.40	0.685	-1.300
1375	DHP	1281	0.0000716199	133.40	0.585	-2.767
1376	DHS	1651	0.0000923064	124.23	0.544	-2.500
1377	DHT	962	0.0000537848	132.93	0.583	-2.467
1378	DHW	272	0.0000152074	168.50	0.738	-2.533
1379	DHY	665	0.0000371798	158.10	0.693	-2.667
1380	DHV	1179	0.0000659172	138.77	0.608	-0.833
1381	DIA	2493	0.0001393821	123.73	0.542	0.933
1382	DIR	2009	0.0001123220	158.40	0.694	-1.167
1383	DIN	2051	0.0001146702	135.30	0.593	-0.833
1384	DID	2259	0.0001262993	132.83	0.582	-0.833
1385	DIC	1164	0.0000650785	128.17	0.562	1.167
1386	DIQ	1867	0.0001043829	143.53	0.629	-0.833
1387	DIE	2703	0.0001511231	141.13	0.618	-0.833
1388	DIG	1736	0.0000970587	115.37	0.506	0.200
1389	DIH	1016	0.0000568040	147.07	0.644	-0.733
1390	DII	2407	0.0001345739	148.37	0.650	1.833
1391	DIL	4511	0.0002522073	148.40	0.650	1.600
1392	DIK	2583	0.0001444140	149.50	0.655	-0.967
1393	DIM	968	0.0000541203	149.40	0.655	0.967
1394	DIF	2054	0.0001148379	157.70	0.691	1.267
1395	DIP	2343	0.0001309957	134.70	0.590	-0.200
1396	DIS	3651	0.0002041252	125.53	0.550	0.067
1397	DIT	2490	0.0001392144	134.23	0.588	0.100
1398	DIW	623	0.0000348316	169.80	0.744	0.033

1399	DIY	1470	0.0000821868	159.40	0.699	-0.100
1400	DIV	2641	0.0001476567	140.07	0.614	1.733
1401	DLA	5402	0.0003020226	123.77	0.542	0.700
1402	DLR	4959	0.0002772547	158.43	0.694	-1.400
1403	DLN	3182	0.0001779037	135.33	0.593	-1.067
1404	DLD	4611	0.0002577982	132.87	0.582	-1.067
1405	DLC	1848	0.0001033206	128.20	0.562	0.933
1406	DLQ	4425	0.0002473991	143.57	0.629	-1.067
1407	DLE	7041	0.0003936581	141.17	0.619	-1.067
1408	DLG	5041	0.0002818393	115.40	0.506	-0.033
1409	DLH	2108	0.0001178570	147.10	0.645	-0.967
1410	DLI	3898	0.0002179348	148.40	0.650	1.600
1411	DLL	9193	0.0005139751	148.43	0.650	1.367
1412	DLK	5436	0.0003039235	149.53	0.655	-1.200
1413	DLM	1579	0.0000882809	149.43	0.655	0.733
1414	DLF	2750	0.0001537509	157.73	0.691	1.033
1415	DLP	4644	0.0002596432	134.73	0.590	-0.433
1416	DLS	6985	0.0003905272	125.57	0.550	-0.167
1417	DLT	4260	0.0002381740	134.27	0.588	-0.133
1418	DLW	890	0.0000497594	169.83	0.744	-0.200
1419	DLY	2163	0.0001209320	159.43	0.699	-0.333
1420	DLV	4928	0.0002755215	140.10	0.614	1.500
1421	DKA	2828	0.0001581118	124.87	0.547	-1.867
1422	DKR	1852	0.0001035442	159.53	0.699	-3.967
1423	DKN	1799	0.0001005810	136.43	0.598	-3.633
1424	DKD	2845	0.0001590622	133.97	0.587	-3.633
1425	DKC	788	0.0000440566	129.30	0.567	-1.633
1426	DKQ	1438	0.0000803977	144.67	0.634	-3.633
1427	DKE	3651	0.0002041252	142.27	0.623	-3.633
1428	DKG	2483	0.0001388230	116.50	0.511	-2.600
1429	DKH	971	0.0000542880	148.20	0.649	-3.533
1430	DKI	2229	0.0001246220	149.50	0.655	-0.967
1431	DKL	4022	0.0002248676	149.53	0.655	-1.200
1432	DKK	3046	0.0001703000	150.63	0.660	-3.767
1433	DKM	926	0.0000517721	150.53	0.660	-1.833
1434	DKF	1383	0.0000773227	158.83	0.696	-1.533
1435	DKP	2098	0.0001172979	135.83	0.595	-3.000
1436	DKS	2725	0.0001523531	126.67	0.555	-2.733
1437	DKT	2148	0.0001200934	135.37	0.593	-2.700
1438	DKW	522	0.0000291847	170.93	0.749	-2.767
1439	DKY	1331	0.0000744154	160.53	0.703	-2.900
1440	DKV	2931	0.0001638705	141.20	0.619	-1.067
1441	DMA	1343	0.0000750863	124.77	0.547	0.067
1442	DMR	775	0.0000433298	159.43	0.699	-2.033
1443	DMN	744	0.0000415966	136.33	0.597	-1.700
1444	DMD	1185	0.0000662526	133.87	0.587	-1.700
1445	DMC	328	0.0000183383	129.20	0.566	0.300
1446	DMQ	701	0.0000391925	144.57	0.634	-1.700
1447	DME	1604	0.0000896787	142.17	0.623	-1.700
1448	DMG	962	0.0000537848	116.40	0.510	-0.667
1449	DMH	392	0.0000219165	148.10	0.649	-1.600
1450	DMI	764	0.0000427148	149.40	0.655	0.967

1451	DML	1711	0.0000956610	149.43	0.655	0.733
1452	DMK	1145	0.0000640163	150.53	0.660	-1.833
1453	DMM	439	0.0000245442	150.43	0.659	0.100
1454	DMF	692	0.0000386893	158.73	0.696	0.400
1455	DMP	728	0.0000407020	135.73	0.595	-1.067
1456	DMS	1164	0.0000650785	126.57	0.555	-0.800
1457	DMT	841	0.0000470198	135.27	0.593	-0.767
1458	DMW	292	0.0000163255	170.83	0.749	-0.833
1459	DMY	503	0.0000281224	160.43	0.703	-0.967
1460	DMV	1192	0.0000666440	141.10	0.618	0.867
1461	DFA	1755	0.0000981210	133.07	0.583	0.367
1462	DFR	1858	0.0001038797	167.73	0.735	-1.733
1463	DFN	1189	0.0000664763	144.63	0.634	-1.400
1464	DFD	1794	0.0001003015	142.17	0.623	-1.400
1465	DFC	824	0.0000460693	137.50	0.603	0.600
1466	DFQ	1761	0.0000984565	152.87	0.670	-1.400
1467	DFE	2352	0.0001314989	150.47	0.659	-1.400
1468	DFG	2392	0.0001337353	124.70	0.546	-0.367
1469	DFH	1016	0.0000568040	156.40	0.685	-1.300
1470	DFI	1954	0.0001092470	157.70	0.691	1.267
1471	DFL	4355	0.0002434854	157.73	0.691	1.033
1472	DFK	1780	0.0000995187	158.83	0.696	-1.533
1473	DFM	665	0.0000371798	158.73	0.696	0.400
1474	DFF	1489	0.0000832491	167.03	0.732	0.700
1475	DFP	1747	0.0000976737	144.03	0.631	-0.767
1476	DFS	3150	0.0001761146	134.87	0.591	-0.500
1477	DFT	1824	0.0001019787	143.57	0.629	-0.467
1478	DFW	581	0.0000324834	179.13	0.785	-0.533
1479	DFY	1106	0.0000618358	168.73	0.739	-0.667
1480	DFV	2165	0.0001210438	149.40	0.655	1.167
1481	DPA	4290	0.0002398513	110.07	0.482	-1.100
1482	DPR	3062	0.0001711946	144.73	0.634	-3.200
1483	DPN	2283	0.0001276412	121.63	0.533	-2.867
1484	DPD	3132	0.0001751082	119.17	0.522	-2.867
1485	DPC	946	0.0000528903	114.50	0.502	-0.867
1486	DPQ	2500	0.0001397735	129.87	0.569	-2.867
1487	DPE	4486	0.0002508096	127.47	0.559	-2.867
1488	DPG	3741	0.0002091571	101.70	0.446	-1.833
1489	DPH	1213	0.0000678181	133.40	0.585	-2.767
1490	DPI	1555	0.0000869391	134.70	0.590	-0.200
1491	DPL	3914	0.0002188294	134.73	0.590	-0.433
1492	DPK	2644	0.0001478245	135.83	0.595	-3.000
1493	DPM	701	0.0000391925	135.73	0.595	-1.067
1494	DPF	1685	0.0000942073	144.03	0.631	-0.767
1495	DPP	2798	0.0001564345	121.03	0.530	-2.233
1496	DPS	4929	0.0002755774	111.87	0.490	-1.967
1497	DPT	2543	0.0001421776	120.57	0.528	-1.933
1498	DPW	565	0.0000315888	156.13	0.684	-2.000
1499	DPY	1436	0.0000802859	145.73	0.639	-2.133
1500	DPV	3266	0.0001826001	126.40	0.554	-0.300
1501	DSA	4324	0.0002417522	100.90	0.442	-0.833
1502	DSR	3358	0.0001877438	135.57	0.594	-2.933

1503	DSN	2243	0.0001254048	112.47	0.493	-2.600
1504	DSD	4866	0.0002720551	110.00	0.482	-2.600
1505	DSC	1712	0.0000957169	105.33	0.462	-0.600
1506	DSQ	2958	0.0001653800	120.70	0.529	-2.600
1507	DSE	5948	0.0003325491	118.30	0.518	-2.600
1508	DSG	5820	0.0003253927	92.53	0.405	-1.567
1509	DSH	1489	0.0000832491	124.23	0.544	-2.500
1510	DSI	2808	0.0001569936	125.53	0.550	0.067
1511	DSL	7113	0.0003976836	125.57	0.550	-0.167
1512	DSK	3354	0.0001875201	126.67	0.555	-2.733
1513	DSM	1262	0.0000705577	126.57	0.555	-0.800
1514	DSF	2713	0.0001516822	134.87	0.591	-0.500
1515	DSP	4396	0.0002457777	111.87	0.490	-1.967
1516	DSS	7767	0.0004342483	102.70	0.450	-1.700
1517	DST	3526	0.0001971365	111.40	0.488	-1.667
1518	DSW	1057	0.0000590962	146.97	0.644	-1.733
1519	DSY	1804	0.0001008606	136.57	0.598	-1.867
1520	DSV	4217	0.0002357699	117.23	0.514	-0.033
1521	DTA	2902	0.0001622491	109.60	0.480	-0.800
1522	DTR	1864	0.0001042151	144.27	0.632	-2.900
1523	DTN	1323	0.0000739681	121.17	0.531	-2.567
1524	DTD	2262	0.0001264671	118.70	0.520	-2.567
1525	DTC	1030	0.0000575867	114.03	0.500	-0.567
1526	DTQ	1623	0.0000907410	129.40	0.567	-2.567
1527	DTE	3092	0.0001728719	127.00	0.557	-2.567
1528	DTG	2785	0.0001557077	101.23	0.444	-1.533
1529	DTH	965	0.0000539526	132.93	0.583	-2.467
1530	DTI	2142	0.0001197579	134.23	0.588	0.100
1531	DTL	4237	0.0002368881	134.27	0.588	-0.133
1532	DTK	1946	0.0001087997	135.37	0.593	-2.700
1533	DTM	927	0.0000518280	135.27	0.593	-0.767
1534	DTF	1868	0.0001044388	143.57	0.629	-0.467
1535	DTP	2546	0.0001423453	120.57	0.528	-1.933
1536	DTS	3829	0.0002140771	111.40	0.488	-1.667
1537	DTT	2337	0.0001306603	120.10	0.526	-1.633
1538	DTW	719	0.0000401989	155.67	0.682	-1.700
1539	DTY	1354	0.0000757013	145.27	0.637	-1.833
1540	DTV	3212	0.0001795810	125.93	0.552	0.000
1541	DWA	643	0.0000359497	145.17	0.636	-0.867
1542	DWR	678	0.0000379066	179.83	0.788	-2.967
1543	DWN	530	0.0000296320	156.73	0.687	-2.633
1544	DWD	601	0.0000336016	154.27	0.676	-2.633
1545	DWC	252	0.0000140892	149.60	0.656	-0.633
1546	DWQ	482	0.0000269483	164.97	0.723	-2.633
1547	DWE	771	0.0000431061	162.57	0.712	-2.633
1548	DWG	540	0.0000301911	136.80	0.599	-1.600
1549	DWH	264	0.0000147601	168.50	0.738	-2.533
1550	DWI	626	0.0000349993	169.80	0.744	0.033
1551	DWL	1164	0.0000650785	169.83	0.744	-0.200
1552	DWK	681	0.0000380743	170.93	0.749	-2.767
1553	DWM	257	0.0000143687	170.83	0.749	-0.833
1554	DWF	374	0.0000209101	179.13	0.785	-0.533

1555	DWP	477	0.0000266688	156.13	0.684	-2.000
1556	DWS	797	0.0000445598	146.97	0.644	-1.733
1557	DWT	606	0.0000338811	155.67	0.682	-1.700
1558	DWW	289	0.0000161578	191.23	0.838	-1.767
1559	DWY	248	0.0000138655	180.83	0.792	-1.900
1560	DWV	600	0.0000335456	161.50	0.708	-0.067
1561	DYA	1146	0.0000640722	134.77	0.591	-1.000
1562	DYR	1317	0.0000736327	169.43	0.742	-3.100
1563	DYN	937	0.0000523871	146.33	0.641	-2.767
1564	DYD	1458	0.0000815159	143.87	0.630	-2.767
1565	DYC	546	0.0000305265	139.20	0.610	-0.767
1566	DYQ	840	0.0000469639	154.57	0.677	-2.767
1567	DYE	2005	0.0001120983	152.17	0.667	-2.767
1568	DYG	1389	0.0000776582	126.40	0.554	-1.733
1569	DYH	602	0.0000336575	158.10	0.693	-2.667
1570	DYI	1607	0.0000898464	159.40	0.699	-0.100
1571	DYL	2414	0.0001349653	159.43	0.699	-0.333
1572	DYK	1185	0.0000662526	160.53	0.703	-2.900
1573	DYM	525	0.0000293524	160.43	0.703	-0.967
1574	DYF	1176	0.0000657495	168.73	0.739	-0.667
1575	DYP	1012	0.0000565803	145.73	0.639	-2.133
1576	DYS	1901	0.0001062838	136.57	0.598	-1.867
1577	DYT	1116	0.0000623949	145.27	0.637	-1.833
1578	DYW	311	0.0000173878	180.83	0.792	-1.900
1579	DYY	1051	0.0000587608	170.43	0.747	-2.033
1580	DYV	1598	0.0000893432	151.10	0.662	-0.200
1581	DVA	3845	0.0002149716	115.43	0.506	0.833
1582	DVR	2431	0.0001359157	150.10	0.658	-1.267
1583	DVN	2301	0.0001286475	127.00	0.557	-0.933
1584	DVD	3243	0.0001813142	124.53	0.546	-0.933
1585	DVC	1169	0.0000653581	119.87	0.525	1.067
1586	DVQ	2270	0.0001269143	135.23	0.593	-0.933
1587	DVE	3442	0.0001924402	132.83	0.582	-0.933
1588	DVG	2770	0.0001548690	107.07	0.469	0.100
1589	DVH	1218	0.0000680977	138.77	0.608	-0.833
1590	DVI	2753	0.0001539186	140.07	0.614	1.733
1591	DVL	5291	0.0002958166	140.10	0.614	1.500
1592	DVK	2862	0.0001600127	141.20	0.619	-1.067
1593	DVM	1334	0.0000745831	141.10	0.618	0.867
1594	DVF	2093	0.0001170184	149.40	0.655	1.167
1595	DVP	2768	0.0001547572	126.40	0.554	-0.300
1596	DVS	4059	0.0002269363	117.23	0.514	-0.033
1597	DVT	3163	0.0001768414	125.93	0.552	0.000
1598	DVW	801	0.0000447834	161.50	0.708	-0.067
1599	DVY	1455	0.0000813482	151.10	0.662	-0.200
1600	DVV	3803	0.0002126234	131.77	0.577	1.633
1601	CAA	1937	0.0001082965	94.43	0.414	2.033
1602	CAR	1405	0.0000785527	129.10	0.566	-0.067
1603	CAN	741	0.0000414289	106.00	0.465	0.267
1604	CAD	1065	0.0000595435	103.53	0.454	0.267
1605	CAC	701	0.0000391925	98.87	0.433	2.267
1606	CAQ	1121	0.0000626744	114.23	0.501	0.267

1607	CAE	1410	0.0000788323	111.83	0.490	0.267
1608	CAG	1691	0.0000945428	86.07	0.377	1.300
1609	CAH	635	0.0000355025	117.77	0.516	0.367
1610	CAI	885	0.0000494798	119.07	0.522	2.933
1611	CAL	2466	0.0001378726	119.10	0.522	2.700
1612	CAK	996	0.0000556858	120.20	0.527	0.133
1613	CAM	443	0.0000247679	120.10	0.526	2.067
1614	CAF	898	0.0000502066	128.40	0.563	2.367
1615	CAP	1481	0.0000828018	105.40	0.462	0.900
1616	CAS	1923	0.0001075138	96.23	0.422	1.167
1617	CAT	1132	0.0000632894	104.93	0.460	1.200
1618	CAW	322	0.0000180028	140.50	0.616	1.133
1619	CAY	539	0.0000301352	130.10	0.570	1.000
1620	CAV	1603	0.0000896228	110.77	0.485	2.833
1621	CRA	1903	0.0001063956	129.10	0.566	-0.067
1622	CRR	1949	0.0001089674	163.77	0.718	-2.167
1623	CRN	1076	0.0000601585	140.67	0.616	-1.833
1624	CRD	1321	0.0000738563	138.20	0.606	-1.833
1625	CRC	910	0.0000508776	133.53	0.585	0.167
1626	CRQ	1171	0.0000654699	148.90	0.652	-1.833
1627	CRE	1741	0.0000973383	146.50	0.642	-1.833
1628	CRG	1743	0.0000974501	120.73	0.529	-0.800
1629	CRH	760	0.0000424911	152.43	0.668	-1.733
1630	CRI	777	0.0000434416	153.73	0.674	0.833
1631	CRL	2217	0.0001239511	153.77	0.674	0.600
1632	CRK	1469	0.0000821309	154.87	0.679	-1.967
1633	CRM	435	0.0000243206	154.77	0.678	-0.033
1634	CRF	741	0.0000414289	163.07	0.715	0.267
1635	CRP	1690	0.0000944869	140.07	0.614	-1.200
1636	CRS	1801	0.0001006928	130.90	0.574	-0.933
1637	CRT	1097	0.0000613326	139.60	0.612	-0.900
1638	CRW	366	0.0000204628	175.17	0.768	-0.967
1639	CRY	576	0.0000322038	164.77	0.722	-1.100
1640	CRV	1411	0.0000788882	145.43	0.637	0.733
1641	CNA	655	0.0000366207	106.00	0.465	0.267
1642	CNR	698	0.0000390248	140.67	0.616	-1.833
1643	CNN	601	0.0000336016	117.57	0.515	-1.500
1644	CND	626	0.0000349993	115.10	0.504	-1.500
1645	CNC	494	0.0000276192	110.43	0.484	0.500
1646	CNQ	659	0.0000368443	125.80	0.551	-1.500
1647	CNE	1679	0.0000938719	123.40	0.541	-1.500
1648	CNG	894	0.0000499830	97.63	0.428	-0.467
1649	CNH	455	0.0000254388	129.33	0.567	-1.400
1650	CNI	791	0.0000442243	130.63	0.572	1.167
1651	CNL	1262	0.0000705577	130.67	0.573	0.933
1652	CNK	887	0.0000495916	131.77	0.577	-1.633
1653	CNM	266	0.0000148719	131.67	0.577	0.300
1654	CNF	516	0.0000288493	139.97	0.613	0.600
1655	CNP	864	0.0000483057	116.97	0.513	-0.867
1656	CNS	1105	0.0000617799	107.80	0.472	-0.600
1657	CNT	777	0.0000434416	116.50	0.511	-0.567
1658	CNW	182	0.0000101755	152.07	0.666	-0.633

1659	CNY	417	0.0000233142	141.67	0.621	-0.767
1660	CNV	770	0.0000430502	122.33	0.536	1.067
1661	CDA	954	0.0000533376	103.53	0.454	0.267
1662	CDR	1011	0.0000565244	138.20	0.606	-1.833
1663	CDN	626	0.0000349993	115.10	0.504	-1.500
1664	CDD	856	0.0000478584	112.63	0.494	-1.500
1665	CDC	733	0.0000409816	107.97	0.473	0.500
1666	CDQ	720	0.0000402548	123.33	0.540	-1.500
1667	CDE	1132	0.0000632894	120.93	0.530	-1.500
1668	CDG	1122	0.0000627303	95.17	0.417	-0.467
1669	CDH	454	0.0000253829	126.87	0.556	-1.400
1670	CDI	1055	0.0000589844	128.17	0.562	1.167
1671	CDL	1657	0.0000926419	128.20	0.562	0.933
1672	CDK	1101	0.0000615562	129.30	0.567	-1.633
1673	CDM	352	0.0000196801	129.20	0.566	0.300
1674	CDF	700	0.0000391366	137.50	0.603	0.600
1675	CDP	1200	0.0000670913	114.50	0.502	-0.867
1676	CDS	1482	0.0000828577	105.33	0.462	-0.600
1677	CDT	798	0.0000446157	114.03	0.500	-0.567
1678	CDW	178	0.0000099519	149.60	0.656	-0.633
1679	CDY	450	0.0000251592	139.20	0.610	-0.767
1680	CDV	1188	0.0000664204	119.87	0.525	1.067
1681	CCA	724	0.0000404784	98.87	0.433	2.267
1682	CCR	1162	0.0000649667	133.53	0.585	0.167
1683	CCN	342	0.0000191210	110.43	0.484	0.500
1684	CCD	431	0.0000240970	107.97	0.473	0.500
1685	CCC	806	0.0000450630	103.30	0.453	2.500
1686	CCQ	876	0.0000489766	118.67	0.520	0.500
1687	CCE	607	0.0000339370	116.27	0.509	0.500
1688	CCG	965	0.0000539526	90.50	0.397	1.533
1689	CCH	408	0.0000228110	122.20	0.535	0.600
1690	CCI	523	0.0000292406	123.50	0.541	3.167
1691	CCL	1239	0.0000692717	123.53	0.541	2.933
1692	CCK	622	0.0000347756	124.63	0.546	0.367
1693	CCM	164	0.0000091691	124.53	0.546	2.300
1694	CCF	495	0.0000276752	132.83	0.582	2.600
1695	CCP	967	0.0000540644	109.83	0.481	1.133
1696	CCS	1166	0.0000651904	100.67	0.441	1.400
1697	CCT	513	0.0000286815	109.37	0.479	1.433
1698	CCW	257	0.0000143687	144.93	0.635	1.367
1699	CCY	361	0.0000201833	134.53	0.590	1.233
1700	CCV	900	0.0000503185	115.20	0.505	3.067
1701	CQA	1564	0.0000874423	114.23	0.501	0.267
1702	CQR	1179	0.0000659172	148.90	0.652	-1.833
1703	CQN	873	0.0000488089	125.80	0.551	-1.500
1704	CQD	1069	0.0000597671	123.33	0.540	-1.500
1705	CQC	598	0.0000334338	118.67	0.520	0.500
1706	CQQ	1086	0.0000607176	134.03	0.587	-1.500
1707	CQE	1681	0.0000939837	131.63	0.577	-1.500
1708	CQG	1333	0.0000745272	105.87	0.464	-0.467
1709	CQH	606	0.0000338811	137.57	0.603	-1.400
1710	CQI	701	0.0000391925	138.87	0.609	1.167

1711	CQL	1721	0.0000962201	138.90	0.609	0.933
1712	CQK	1178	0.0000658613	140.00	0.613	-1.633
1713	CQM	356	0.0000199037	139.90	0.613	0.300
1714	CQF	506	0.0000282902	148.20	0.649	0.600
1715	CQP	1574	0.0000880014	125.20	0.549	-0.867
1716	CQS	1379	0.0000770991	116.03	0.508	-0.600
1717	CQT	857	0.0000479144	124.73	0.547	-0.567
1718	CQW	227	0.0000126914	160.30	0.702	-0.633
1719	CQY	515	0.0000287933	149.90	0.657	-0.767
1720	CQV	1236	0.0000691040	130.57	0.572	1.067
1721	CEA	1709	0.0000955492	111.83	0.490	0.267
1722	CER	1220	0.0000682095	146.50	0.642	-1.833
1723	CEN	1028	0.0000574749	123.40	0.541	-1.500
1724	CED	1437	0.0000803418	120.93	0.530	-1.500
1725	CEC	719	0.0000401989	116.27	0.509	0.500
1726	CEQ	980	0.0000547912	131.63	0.577	-1.500
1727	CEE	3160	0.0001766737	129.23	0.566	-1.500
1728	CEG	1395	0.0000779936	103.47	0.453	-0.467
1729	CEH	573	0.0000320361	135.17	0.592	-1.400
1730	CEI	952	0.0000532257	136.47	0.598	1.167
1731	CEL	1738	0.0000971705	136.50	0.598	0.933
1732	CEK	1764	0.0000986242	137.60	0.603	-1.633
1733	CEM	460	0.0000257183	137.50	0.603	0.300
1734	CEF	670	0.0000374593	145.80	0.639	0.600
1735	CEP	1061	0.0000593199	122.80	0.538	-0.867
1736	CES	1346	0.0000752541	113.63	0.498	-0.600
1737	CET	1166	0.0000651904	122.33	0.536	-0.567
1738	CEW	248	0.0000138655	157.90	0.692	-0.633
1739	CEY	500	0.0000279547	147.50	0.646	-0.767
1740	CEV	1649	0.0000921946	128.17	0.562	1.067
1741	CGA	2019	0.0001128811	86.07	0.377	1.300
1742	CGR	2269	0.0001268584	120.73	0.529	-0.800
1743	CGN	1179	0.0000659172	97.63	0.428	-0.467
1744	CGD	1504	0.0000840877	95.17	0.417	-0.467
1745	CGC	814	0.0000455103	90.50	0.397	1.533
1746	CGQ	1353	0.0000756454	105.87	0.464	-0.467
1747	CGE	1983	0.0001108683	103.47	0.453	-0.467
1748	CGG	2418	0.0001351889	77.70	0.340	0.567
1749	CGH	1116	0.0000623949	109.40	0.479	-0.367
1750	CGI	1127	0.0000630099	110.70	0.485	2.200
1751	CGL	2462	0.0001376489	110.73	0.485	1.967
1752	CGK	7887	0.0004409574	111.83	0.490	-0.600
1753	CGM	421	0.0000235379	111.73	0.490	1.333
1754	CGF	941	0.0000526107	120.03	0.526	1.633
1755	CGP	1813	0.0001013637	97.03	0.425	0.167
1756	CGS	2650	0.0001481599	87.87	0.385	0.433
1757	CGT	1476	0.0000825223	96.57	0.423	0.467
1758	CGW	412	0.0000230347	132.13	0.579	0.400
1759	CGY	722	0.0000403666	121.73	0.533	0.267
1760	CGV	1562	0.0000873305	102.40	0.449	2.100
1761	CHA	606	0.0000338811	117.77	0.516	0.367
1762	CHR	885	0.0000494798	152.43	0.668	-1.733

1763	CHN	417	0.0000233142	129.33	0.567	-1.400
1764	CHD	457	0.0000255506	126.87	0.556	-1.400
1765	CHC	514	0.0000287374	122.20	0.535	0.600
1766	CHQ	674	0.0000376829	137.57	0.603	-1.400
1767	CHE	578	0.0000323156	135.17	0.592	-1.400
1768	CHG	810	0.0000452866	109.40	0.479	-0.367
1769	CHH	395	0.0000220842	141.10	0.618	-1.300
1770	CHI	533	0.0000297997	142.40	0.624	1.267
1771	CHL	1377	0.0000769872	142.43	0.624	1.033
1772	CHK	611	0.0000341606	143.53	0.629	-1.533
1773	CHM	177	0.0000098960	143.43	0.629	0.400
1774	CHF	496	0.0000277311	151.73	0.665	0.700
1775	CHP	1074	0.0000600467	128.73	0.564	-0.767
1776	CHS	1138	0.0000636249	119.57	0.524	-0.500
1777	CHT	626	0.0000349993	128.27	0.562	-0.467
1778	CHW	109	0.0000060941	163.83	0.718	-0.533
1779	CHY	355	0.0000198478	153.43	0.672	-0.667
1780	CHV	695	0.0000388570	134.10	0.588	1.167
1781	CIA	1156	0.0000646313	119.07	0.522	2.933
1782	CIR	833	0.0000465725	153.73	0.674	0.833
1783	CIN	696	0.0000389129	130.63	0.572	1.167
1784	CID	770	0.0000430502	128.17	0.562	1.167
1785	CIC	601	0.0000336016	123.50	0.541	3.167
1786	CIQ	842	0.0000470757	138.87	0.609	1.167
1787	CIE	922	0.0000515485	136.47	0.598	1.167
1788	CIG	733	0.0000409816	110.70	0.485	2.200
1789	CIH	619	0.0000346079	142.40	0.624	1.267
1790	CII	897	0.0000501507	143.70	0.630	3.833
1791	CIL	1489	0.0000832491	143.73	0.630	3.600
1792	CIK	743	0.0000415407	144.83	0.635	1.033
1793	CIM	335	0.0000187296	144.73	0.634	2.967
1794	CIF	709	0.0000396398	153.03	0.671	3.267
1795	CIP	1020	0.0000570276	130.03	0.570	1.800
1796	CIS	1529	0.0000854855	120.87	0.530	2.067
1797	CIT	833	0.0000465725	129.57	0.568	2.100
1798	CIW	217	0.0000121323	165.13	0.724	2.033
1799	CIY	782	0.0000437211	154.73	0.678	1.900
1800	CIV	954	0.0000533376	135.40	0.593	3.733
1801	CLA	2846	0.0001591181	119.10	0.522	2.700
1802	CLR	2334	0.0001304925	153.77	0.674	0.600
1803	CLN	1404	0.0000784968	130.67	0.573	0.933
1804	CLD	2035	0.0001137756	128.20	0.562	0.933
1805	CLC	1248	0.0000697749	123.53	0.541	2.933
1806	CLQ	2236	0.0001250134	138.90	0.609	0.933
1807	CLE	2792	0.0001560990	136.50	0.598	0.933
1808	CLG	2431	0.0001359157	110.73	0.485	1.967
1809	CLH	1194	0.0000667558	142.43	0.624	1.033
1810	CLI	1310	0.0000732413	143.73	0.630	3.600
1811	CLL	4349	0.0002431500	143.77	0.630	3.367
1812	CLK	2088	0.0001167388	144.87	0.635	0.800
1813	CLM	645	0.0000360616	144.77	0.634	2.733
1814	CLF	1221	0.0000682654	153.07	0.671	3.033

1815	CLP	2837	0.0001586150	130.07	0.570	1.567
1816	CLS	3142	0.0001756673	120.90	0.530	1.833
1817	CLT	1818	0.0001016433	129.60	0.568	1.867
1818	CLW	469	0.0000262215	165.17	0.724	1.800
1819	CLY	906	0.0000506539	154.77	0.678	1.667
1820	CLV	2313	0.0001293184	135.43	0.593	3.500
1821	CKA	1566	0.0000875541	120.20	0.527	0.133
1822	CKR	952	0.0000532257	154.87	0.679	-1.967
1823	CKN	988	0.0000552385	131.77	0.577	-1.633
1824	CKD	1298	0.0000725704	129.30	0.567	-1.633
1825	CKC	594	0.0000332102	124.63	0.546	0.367
1826	CKQ	1070	0.0000598231	140.00	0.613	-1.633
1827	CKE	2615	0.0001462031	137.60	0.603	-1.633
1828	CKG	1061	0.0000593199	111.83	0.490	-0.600
1829	CKH	493	0.0000275633	143.53	0.629	-1.533
1830	CKI	958	0.0000535612	144.83	0.635	1.033
1831	CKL	1535	0.0000858209	144.87	0.635	0.800
1832	CKK	1580	0.0000883368	145.97	0.640	-1.767
1833	CKM	454	0.0000253829	145.87	0.639	0.167
1834	CKF	617	0.0000344961	154.17	0.676	0.467
1835	CKP	1142	0.0000638485	131.17	0.575	-1.000
1836	CKS	1231	0.0000688245	122.00	0.535	-0.733
1837	CKT	1015	0.0000567480	130.70	0.573	-0.700
1838	CKW	210	0.0000117410	166.27	0.729	-0.767
1839	CKY	575	0.0000321479	155.87	0.683	-0.900
1840	CKV	1373	0.0000767636	136.53	0.598	0.933
1841	CMA	530	0.0000296320	120.10	0.526	2.067
1842	CMR	323	0.0000180587	154.77	0.678	-0.033
1843	CMN	254	0.0000142010	131.67	0.577	0.300
1844	CMD	423	0.0000236497	129.20	0.566	0.300
1845	CMC	215	0.0000120205	124.53	0.546	2.300
1846	CMQ	297	0.0000166051	139.90	0.613	0.300
1847	CME	591	0.0000330425	137.50	0.603	0.300
1848	CMG	376	0.0000210219	111.73	0.490	1.333
1849	CMH	153	0.0000085541	143.43	0.629	0.400
1850	CMI	219	0.0000122442	144.73	0.634	2.967
1851	CML	638	0.0000356702	144.77	0.634	2.733
1852	CMK	409	0.0000228669	145.87	0.639	0.167
1853	CMM	124	0.0000069328	145.77	0.639	2.100
1854	CMF	236	0.0000131946	154.07	0.675	2.400
1855	CMP	247	0.0000138096	131.07	0.574	0.933
1856	CMS	398	0.0000222519	121.90	0.534	1.200
1857	CMT	320	0.0000178910	130.60	0.572	1.233
1858	CMW	72	0.0000040255	166.17	0.728	1.167
1859	CMY	279	0.0000155987	155.77	0.683	1.033
1860	CMV	424	0.0000237056	136.43	0.598	2.867
1861	CFA	757	0.0000423234	128.40	0.563	2.367
1862	CFR	817	0.0000456780	163.07	0.715	0.267
1863	CFN	496	0.0000277311	139.97	0.613	0.600
1864	CFD	684	0.0000382420	137.50	0.603	0.600
1865	CFC	552	0.0000308620	132.83	0.582	2.600
1866	CFQ	788	0.0000440566	148.20	0.649	0.600

1867	CFE	837	0.0000467962	145.80	0.639	0.600
1868	CFG	882	0.0000493121	120.03	0.526	1.633
1869	CFH	445	0.0000248797	151.73	0.665	0.700
1870	CFI	712	0.0000398075	153.03	0.671	3.267
1871	CFL	1782	0.0000996306	153.07	0.671	3.033
1872	CFK	543	0.0000303588	154.17	0.676	0.467
1873	CFM	263	0.0000147042	154.07	0.675	2.400
1874	CFF	620	0.0000346638	162.37	0.712	2.700
1875	CFP	944	0.0000527785	139.37	0.611	1.233
1876	CFS	1531	0.0000855973	130.20	0.571	1.500
1877	CFT	844	0.0000471875	138.90	0.609	1.533
1878	CFW	249	0.0000139214	174.47	0.765	1.467
1879	CFY	483	0.0000270042	164.07	0.719	1.333
1880	CFV	955	0.0000533935	144.73	0.634	3.167
1881	CPA	2200	0.0001230007	105.40	0.462	0.900
1882	CPR	1899	0.0001061720	140.07	0.614	-1.200
1883	CPN	806	0.0000450630	116.97	0.513	-0.867
1884	CPD	1304	0.0000729059	114.50	0.502	-0.867
1885	CPC	681	0.0000380743	109.83	0.481	1.133
1886	CPQ	1235	0.0000690481	125.20	0.549	-0.867
1887	CPE	2072	0.0001158443	122.80	0.538	-0.867
1888	CPG	1985	0.0001109802	97.03	0.425	0.167
1889	CPH	834	0.0000466284	128.73	0.564	-0.767
1890	CPI	886	0.0000495357	130.03	0.570	1.800
1891	CPL	2248	0.0001256843	130.07	0.570	1.567
1892	CPK	1007	0.0000563008	131.17	0.575	-1.000
1893	CPM	413	0.0000230906	131.07	0.574	0.933
1894	CPF	866	0.0000484175	139.37	0.611	1.233
1895	CPP	2452	0.0001370899	116.37	0.510	-0.233
1896	CPS	2291	0.0001280884	107.20	0.470	0.033
1897	CPT	1197	0.0000669236	115.90	0.508	0.067
1898	CPW	386	0.0000215810	151.47	0.664	0.000
1899	CPY	597	0.0000333779	141.07	0.618	-0.133
1900	CPV	1649	0.0000921946	121.73	0.533	1.700
1901	CSA	2472	0.0001382080	96.23	0.422	1.167
1902	CSR	2096	0.0001171861	130.90	0.574	-0.933
1903	CSN	1120	0.0000626185	107.80	0.472	-0.600
1904	CSD	1750	0.0000978414	105.33	0.462	-0.600
1905	CSC	1339	0.0000748627	100.67	0.441	1.400
1906	CSQ	1781	0.0000995746	116.03	0.508	-0.600
1907	CSE	2606	0.0001456999	113.63	0.498	-0.600
1908	CSG	2430	0.0001358598	87.87	0.385	0.433
1909	CSH	1219	0.0000681536	119.57	0.524	-0.500
1910	CSI	1382	0.0000772668	120.87	0.530	2.067
1911	CSL	3503	0.0001958506	120.90	0.530	1.833
1912	CSK	1658	0.0000926978	122.00	0.535	-0.733
1913	CSM	620	0.0000346638	121.90	0.534	1.200
1914	CSF	1340	0.0000749186	130.20	0.571	1.500
1915	CSP	2556	0.0001429044	107.20	0.470	0.033
1916	CSS	4222	0.0002360495	98.03	0.430	0.300
1917	CST	1708	0.0000954933	106.73	0.468	0.333
1918	CSW	511	0.0000285697	142.30	0.624	0.267

1919	CSY	799	0.0000446716	131.90	0.578	0.133
1920	CSV	2399	0.0001341266	112.57	0.493	1.967
1921	CTA	1468	0.0000820750	104.93	0.460	1.200
1922	CTR	1061	0.0000593199	139.60	0.612	-0.900
1923	CTN	698	0.0000390248	116.50	0.511	-0.567
1924	CTD	1121	0.0000626744	114.03	0.500	-0.567
1925	CTC	845	0.0000472434	109.37	0.479	1.433
1926	CTQ	799	0.0000446716	124.73	0.547	-0.567
1927	CTE	1286	0.0000718995	122.33	0.536	-0.567
1928	CTG	1203	0.0000672590	96.57	0.423	0.467
1929	CTH	533	0.0000297997	128.27	0.562	-0.467
1930	CTI	901	0.0000503744	129.57	0.568	2.100
1931	CTL	1882	0.0001052215	129.60	0.568	1.867
1932	CTK	904	0.0000505421	130.70	0.573	-0.700
1933	CTM	398	0.0000222519	130.60	0.572	1.233
1934	CTF	806	0.0000450630	138.90	0.609	1.533
1935	CTP	1175	0.0000656935	115.90	0.508	0.067
1936	CTS	1676	0.0000937042	106.73	0.468	0.333
1937	CTT	878	0.0000490885	115.43	0.506	0.367
1938	CTW	325	0.0000181706	151.00	0.662	0.300
1939	CTY	579	0.0000323715	140.60	0.616	0.167
1940	CTV	1434	0.0000801741	121.27	0.531	2.000
1941	CWA	536	0.0000299674	140.50	0.616	1.133
1942	CWR	319	0.0000178351	175.17	0.768	-0.967
1943	CWN	229	0.0000128033	152.07	0.666	-0.633
1944	CWD	342	0.0000191210	149.60	0.656	-0.633
1945	CWC	153	0.0000085541	144.93	0.635	1.367
1946	CWQ	235	0.0000131387	160.30	0.702	-0.633
1947	CWE	362	0.0000202392	157.90	0.692	-0.633
1948	CWG	398	0.0000222519	132.13	0.579	0.400
1949	CWH	211	0.0000117969	163.83	0.718	-0.533
1950	CWI	211	0.0000117969	165.13	0.724	2.033
1951	CWL	568	0.0000317565	165.17	0.724	1.800
1952	CWK	385	0.0000215251	166.27	0.729	-0.767
1953	CWM	141	0.0000078832	166.17	0.728	1.167
1954	CWF	200	0.0000111819	174.47	0.765	1.467
1955	CWP	273	0.0000152633	151.47	0.664	0.000
1956	CWS	384	0.0000214692	142.30	0.624	0.267
1957	CWT	273	0.0000152633	151.00	0.662	0.300
1958	CWW	75	0.0000041932	186.57	0.818	0.233
1959	CWY	132	0.0000073800	176.17	0.772	0.100
1960	CWV	334	0.0000186737	156.83	0.687	1.933
1961	CYA	544	0.0000304147	130.10	0.570	1.000
1962	CYR	676	0.0000377948	164.77	0.722	-1.100
1963	CYN	495	0.0000276752	141.67	0.621	-0.767
1964	CYD	484	0.0000270602	139.20	0.610	-0.767
1965	CYC	338	0.0000188974	134.53	0.590	1.233
1966	CYQ	430	0.0000240410	149.90	0.657	-0.767
1967	CYE	606	0.0000338811	147.50	0.646	-0.767
1968	CYG	677	0.0000378507	121.73	0.533	0.267
1969	CYH	309	0.0000172760	153.43	0.672	-0.667
1970	CYI	533	0.0000297997	154.73	0.678	1.900

1971	CYL	1033	0.0000577544	154.77	0.678	1.667
1972	CYK	497	0.0000277870	155.87	0.683	-0.900
1973	CYM	215	0.0000120205	155.77	0.683	1.033
1974	CYF	442	0.0000247120	164.07	0.719	1.333
1975	CYP	437	0.0000244324	141.07	0.618	-0.133
1976	CYS	984	0.0000550149	131.90	0.578	0.133
1977	CYT	523	0.0000292406	140.60	0.616	0.167
1978	CYW	140	0.0000078273	176.17	0.772	0.100
1979	CYY	382	0.0000213574	165.77	0.726	-0.033
1980	CYV	580	0.0000324275	146.43	0.642	1.800
1981	CVA	1888	0.0001055569	110.77	0.485	2.833
1982	CVR	1273	0.0000711727	145.43	0.637	0.733
1983	CVN	1067	0.0000596553	122.33	0.536	1.067
1984	CVD	1174	0.0000656376	119.87	0.525	1.067
1985	CVC	1117	0.0000624508	115.20	0.505	3.067
1986	CVQ	901	0.0000503744	130.57	0.572	1.067
1987	CVE	1425	0.0000796709	128.17	0.562	1.067
1988	CVG	1222	0.0000683213	102.40	0.449	2.100
1989	CVH	684	0.0000382420	134.10	0.588	1.167
1990	CVI	944	0.0000527785	135.40	0.593	3.733
1991	CVL	2317	0.0001295421	135.43	0.593	3.500
1992	CVK	1065	0.0000595435	136.53	0.598	0.933
1993	CVM	356	0.0000199037	136.43	0.598	2.867
1994	CVF	858	0.0000479703	144.73	0.634	3.167
1995	CVP	1575	0.0000880573	121.73	0.533	1.700
1996	CVS	1974	0.0001103652	112.57	0.493	1.967
1997	CVT	1079	0.0000603262	121.27	0.531	2.000
1998	CVW	356	0.0000199037	156.83	0.687	1.933
1999	CVY	861	0.0000481380	146.43	0.642	1.800
2000	CVV	1630	0.0000911323	127.10	0.557	3.633
2001	QAA	6235	0.0003485951	109.80	0.481	0.033
2002	QAR	3716	0.0002077593	144.47	0.633	-2.067
2003	QAN	1519	0.0000849264	121.37	0.532	-1.733
2004	QAD	2093	0.0001170184	118.90	0.521	-1.733
2005	QAC	1291	0.0000721790	114.23	0.501	0.267
2006	QAQ	4330	0.0002420877	129.60	0.568	-1.733
2007	QAE	4712	0.0002634451	127.20	0.557	-1.733
2008	QAG	4191	0.0002343163	101.43	0.444	-0.700
2009	QAH	1559	0.0000871628	133.13	0.583	-1.633
2010	QAI	2399	0.0001341266	134.43	0.589	0.933
2011	QAL	8024	0.0004486170	134.47	0.589	0.700
2012	QAK	2975	0.0001663305	135.57	0.594	-1.867
2013	QAM	1418	0.0000792795	135.47	0.594	0.067
2014	QAF	2287	0.0001278648	143.77	0.630	0.367
2015	QAP	4119	0.0002302908	120.77	0.529	-1.100
2016	QAS	4858	0.0002716079	111.60	0.489	-0.833
2017	QAT	3011	0.0001683432	120.30	0.527	-0.800
2018	QAW	963	0.0000538408	155.87	0.683	-0.867
2019	QAY	1136	0.0000635131	145.47	0.637	-1.000
2020	QAV	4017	0.0002245881	126.13	0.553	0.833
2021	QRA	3730	0.0002085421	144.47	0.633	-2.067
2022	QRR	4339	0.0002425909	179.13	0.785	-4.167

2023	QRN	1756	0.0000981769	156.03	0.684	-3.833
2024	QRD	2009	0.0001123220	153.57	0.673	-3.833
2025	QRC	1164	0.0000650785	148.90	0.652	-1.833
2026	QRQ	3154	0.0001763382	164.27	0.720	-3.833
2027	QRE	3701	0.0002069207	161.87	0.709	-3.833
2028	QRG	3218	0.0001799164	136.10	0.596	-2.800
2029	QRH	1519	0.0000849264	167.80	0.735	-3.733
2030	QRI	3362	0.0001879674	169.10	0.741	-1.167
2031	QRL	6428	0.0003593856	169.13	0.741	-1.400
2032	QRK	3219	0.0001799724	170.23	0.746	-3.967
2033	QRM	1208	0.0000675386	170.13	0.746	-2.033
2034	QRF	1673	0.0000935364	178.43	0.782	-1.733
2035	QRP	3151	0.0001761705	155.43	0.681	-3.200
2036	QRS	3722	0.0002080948	146.27	0.641	-2.933
2037	QRT	2780	0.0001554281	154.97	0.679	-2.900
2038	QRW	740	0.0000413730	190.53	0.835	-2.967
2039	QRY	1225	0.0000684890	180.13	0.789	-3.100
2040	QRV	3387	0.0001893651	160.80	0.705	-1.267
2041	QNA	1738	0.0000971705	121.37	0.532	-1.733
2042	QNR	1726	0.0000964996	156.03	0.684	-3.833
2043	QNN	1241	0.0000693836	132.93	0.583	-3.500
2044	QND	1110	0.0000620594	130.47	0.572	-3.500
2045	QNC	672	0.0000375711	125.80	0.551	-1.500
2046	QNQ	1640	0.0000916914	141.17	0.619	-3.500
2047	QNE	1876	0.0001048860	138.77	0.608	-3.500
2048	QNG	2324	0.0001299334	113.00	0.495	-2.467
2049	QNH	813	0.0000454543	144.70	0.634	-3.400
2050	QNI	1782	0.0000996306	146.00	0.640	-0.833
2051	QNL	3581	0.0002002116	146.03	0.640	-1.067
2052	QNK	1915	0.0001070665	147.13	0.645	-3.633
2053	QNM	741	0.0000414289	147.03	0.644	-1.700
2054	QNF	1245	0.0000696072	155.33	0.681	-1.400
2055	QNP	1945	0.0001087438	132.33	0.580	-2.867
2056	QNS	2726	0.0001524090	123.17	0.540	-2.600
2057	QNT	1685	0.0000942073	131.87	0.578	-2.567
2058	QNW	411	0.0000229788	167.43	0.734	-2.633
2059	QNY	863	0.0000482498	157.03	0.688	-2.767
2060	QNV	1793	0.0001002456	137.70	0.603	-0.933
2061	QDA	2592	0.0001449172	118.90	0.521	-1.733
2062	QDR	1872	0.0001046624	153.57	0.673	-3.833
2063	QDN	1218	0.0000680977	130.47	0.572	-3.500
2064	QDD	1629	0.0000910764	128.00	0.561	-3.500
2065	QDC	911	0.0000509335	123.33	0.540	-1.500
2066	QDQ	1721	0.0000962201	138.70	0.608	-3.500
2067	QDE	2462	0.0001376489	136.30	0.597	-3.500
2068	QDG	2691	0.0001504522	110.53	0.484	-2.467
2069	QDH	1021	0.0000570835	142.23	0.623	-3.400
2070	QDI	2219	0.0001240630	143.53	0.629	-0.833
2071	QDL	5074	0.0002836843	143.57	0.629	-1.067
2072	QDK	2002	0.0001119306	144.67	0.634	-3.633
2073	QDM	874	0.0000488648	144.57	0.634	-1.700
2074	QDF	1691	0.0000945428	152.87	0.670	-1.400

2075	QDP	2625	0.0001467622	129.87	0.569	-2.867
2076	QDS	3706	0.0002072002	120.70	0.529	-2.600
2077	QDT	2192	0.0001225534	129.40	0.567	-2.567
2078	QDW	475	0.0000265570	164.97	0.723	-2.633
2079	QDY	1078	0.0000602703	154.57	0.677	-2.767
2080	QDV	2696	0.0001507317	135.23	0.593	-0.933
2081	QCA	893	0.0000499271	114.23	0.501	0.267
2082	QCR	1082	0.0000604940	148.90	0.652	-1.833
2083	QCN	622	0.0000347756	125.80	0.551	-1.500
2084	QCD	656	0.0000366766	123.33	0.540	-1.500
2085	QCC	550	0.0000307502	118.67	0.520	0.500
2086	QCQ	1189	0.0000664763	134.03	0.587	-1.500
2087	QCE	903	0.0000504862	131.63	0.577	-1.500
2088	QCG	1580	0.0000883368	105.87	0.464	-0.467
2089	QCH	560	0.0000313093	137.57	0.603	-1.400
2090	QCI	730	0.0000408139	138.87	0.609	1.167
2091	QCL	2041	0.0001141111	138.90	0.609	0.933
2092	QCK	857	0.0000479144	140.00	0.613	-1.633
2093	QCM	260	0.0000145364	139.90	0.613	0.300
2094	QCF	565	0.0000315888	148.20	0.649	0.600
2095	QCP	1215	0.0000679299	125.20	0.549	-0.867
2096	QCS	1444	0.0000807332	116.03	0.508	-0.600
2097	QCT	682	0.0000381302	124.73	0.547	-0.567
2098	QCW	268	0.0000149837	160.30	0.702	-0.633
2099	QCY	337	0.0000188415	149.90	0.657	-0.767
2100	QCV	1157	0.0000646872	130.57	0.572	1.067
2101	QQA	3587	0.0002005470	129.60	0.568	-1.733
2102	QQR	3296	0.0001842774	164.27	0.720	-3.833
2103	QQN	1714	0.0000958287	141.17	0.619	-3.500
2104	QQD	1792	0.0001001896	138.70	0.608	-3.500
2105	QQC	842	0.0000470757	134.03	0.587	-1.500
2106	QQQ	7927	0.0004431938	149.40	0.655	-3.500
2107	QQE	3810	0.0002130148	147.00	0.644	-3.500
2108	QQG	2685	0.0001501167	121.23	0.531	-2.467
2109	QQH	1571	0.0000878337	152.93	0.670	-3.400
2110	QQI	2107	0.0001178011	154.23	0.676	-0.833
2111	QQL	6574	0.0003675484	154.27	0.676	-1.067
2112	QQK	2772	0.0001549809	155.37	0.681	-3.633
2113	QQM	1214	0.0000678740	155.27	0.680	-1.700
2114	QQF	1428	0.0000798386	163.57	0.717	-1.400
2115	QQP	3458	0.0001933347	140.57	0.616	-2.867
2116	QQS	2752	0.0001538627	131.40	0.576	-2.600
2117	QQT	2016	0.0001127134	140.10	0.614	-2.567
2118	QQW	534	0.0000298556	175.67	0.770	-2.633
2119	QQY	1125	0.0000628981	165.27	0.724	-2.767
2120	QQV	2968	0.0001659391	145.93	0.639	-0.933
2121	QEA	5837	0.0003263432	127.20	0.557	-1.733
2122	QER	4041	0.0002259299	161.87	0.709	-3.833
2123	QEN	2569	0.0001436312	138.77	0.608	-3.500
2124	QED	3377	0.0001888061	136.30	0.597	-3.500
2125	QEC	1084	0.0000606058	131.63	0.577	-1.500
2126	QEQ	3796	0.0002122321	147.00	0.644	-3.500

2127	QEE	7960	0.0004450388	144.60	0.634	-3.500
2128	QEG	3926	0.0002195003	118.83	0.521	-2.467
2129	QEH	1561	0.0000872746	150.53	0.660	-3.400
2130	QEI	3061	0.0001711387	151.83	0.665	-0.833
2131	QEL	7936	0.0004436970	151.87	0.665	-1.067
2132	QEK	4755	0.0002658492	152.97	0.670	-3.633
2133	QEM	1619	0.0000905173	152.87	0.670	-1.700
2134	QEF	1970	0.0001101415	161.17	0.706	-1.400
2135	QEP	3187	0.0001781833	138.17	0.605	-2.867
2136	QES	4145	0.0002317445	129.00	0.565	-2.600
2137	QET	3061	0.0001711387	137.70	0.603	-2.567
2138	QEW	685	0.0000382979	173.27	0.759	-2.633
2139	QEY	1578	0.0000882250	162.87	0.714	-2.767
2140	QEV	4204	0.0002350431	143.53	0.629	-0.933
2141	QGA	3753	0.0002098280	101.43	0.444	-0.700
2142	QGR	3363	0.0001880233	136.10	0.596	-2.800
2143	QGN	1815	0.0001014756	113.00	0.495	-2.467
2144	QGD	2404	0.0001344062	110.53	0.484	-2.467
2145	QGC	1240	0.0000693277	105.87	0.464	-0.467
2146	QGQ	3220	0.0001800283	121.23	0.531	-2.467
2147	QGE	3261	0.0001823206	118.83	0.521	-2.467
2148	QGG	3518	0.0001966893	93.07	0.408	-1.433
2149	QGH	1594	0.0000891196	124.77	0.547	-2.367
2150	QGI	2308	0.0001290389	126.07	0.552	0.200
2151	QGL	5771	0.0003226532	126.10	0.553	-0.033
2152	QGK	2754	0.0001539745	127.20	0.557	-2.600
2153	QGM	901	0.0000503744	127.10	0.557	-0.667
2154	QGF	1921	0.0001074020	135.40	0.593	-0.367
2155	QGP	4539	0.0002537728	112.40	0.493	-1.833
2156	QGS	4614	0.0002579660	103.23	0.452	-1.567
2157	QGT	2734	0.0001528563	111.93	0.491	-1.533
2158	QGW	744	0.0000415966	147.50	0.646	-1.600
2159	QGY	1289	0.0000720672	137.10	0.601	-1.733
2160	QGV	2873	0.0001606277	117.77	0.516	0.100
2161	QHA	1138	0.0000636249	133.13	0.583	-1.633
2162	QHR	1544	0.0000863241	167.80	0.735	-3.733
2163	QHN	748	0.0000418202	144.70	0.634	-3.400
2164	QHD	597	0.0000333779	142.23	0.623	-3.400
2165	QHC	576	0.0000322038	137.57	0.603	-1.400
2166	QHQ	2228	0.0001245661	152.93	0.670	-3.400
2167	QHE	1240	0.0000693277	150.53	0.660	-3.400
2168	QHG	1480	0.0000827459	124.77	0.547	-2.367
2169	QHH	870	0.0000486412	156.47	0.686	-3.300
2170	QHI	1204	0.0000673149	157.77	0.691	-0.733
2171	QHL	3104	0.0001735428	157.80	0.691	-0.967
2172	QHK	1124	0.0000628422	158.90	0.696	-3.533
2173	QHM	482	0.0000269483	158.80	0.696	-1.600
2174	QHF	956	0.0000534494	167.10	0.732	-1.300
2175	QHP	1536	0.0000858768	144.10	0.631	-2.767
2176	QHS	1780	0.0000995187	134.93	0.591	-2.500
2177	QHT	903	0.0000504862	143.63	0.629	-2.467
2178	QHW	352	0.0000196801	179.20	0.785	-2.533

2179	QHY	694	0.0000388011	168.80	0.740	-2.667
2180	QHV	1403	0.0000784409	149.47	0.655	-0.833
2181	QIA	1919	0.0001072901	134.43	0.589	0.933
2182	QIR	2055	0.0001148938	169.10	0.741	-1.167
2183	QIN	1311	0.0000732972	146.00	0.640	-0.833
2184	QID	1401	0.0000783291	143.53	0.629	-0.833
2185	QIC	749	0.0000418761	138.87	0.609	1.167
2186	QIQ	2076	0.0001160679	154.23	0.676	-0.833
2187	QIE	1847	0.0001032647	151.83	0.665	-0.833
2188	QIG	1408	0.0000787204	126.07	0.552	0.200
2189	QIH	1063	0.0000594317	157.77	0.691	-0.733
2190	QII	1798	0.0001005251	159.07	0.697	1.833
2191	QIL	4090	0.0002286695	159.10	0.697	1.600
2192	QIK	2042	0.0001141670	160.20	0.702	-0.967
2193	QIM	713	0.0000398634	160.10	0.702	0.967
2194	QIF	1348	0.0000753659	168.40	0.738	1.267
2195	QIP	2040	0.0001140552	145.40	0.637	-0.200
2196	QIS	2682	0.0001499490	136.23	0.597	0.067
2197	QIT	1887	0.0001055010	144.93	0.635	0.100
2198	QIW	463	0.0000258861	180.50	0.791	0.033
2199	QIY	972	0.0000543439	170.10	0.745	-0.100
2200	QIV	1852	0.0001035442	150.77	0.661	1.733
2201	QLA	5581	0.0003120304	134.47	0.589	0.700
2202	QLR	5492	0.0003070544	169.13	0.741	-1.400
2203	QLN	2597	0.0001451967	146.03	0.640	-1.067
2204	QLD	3361	0.0001879115	143.57	0.629	-1.067
2205	QLC	1837	0.0001027056	138.90	0.609	0.933
2206	QLQ	6345	0.0003547451	154.27	0.676	-1.067
2207	QLE	6469	0.0003616779	151.87	0.665	-1.067
2208	QLG	4195	0.0002345399	126.10	0.553	-0.033
2209	QLH	2477	0.0001384876	157.80	0.691	-0.967
2210	QLI	3052	0.0001706355	159.10	0.697	1.600
2211	QLL	10546	0.0005896206	159.13	0.697	1.367
2212	QLK	4714	0.0002635569	160.23	0.702	-1.200
2213	QLM	1520	0.0000849823	160.13	0.702	0.733
2214	QLF	2932	0.0001639264	168.43	0.738	1.033
2215	QLP	4861	0.0002717756	145.43	0.637	-0.433
2216	QLS	6433	0.0003596652	136.27	0.597	-0.167
2217	QLT	4007	0.0002240290	144.97	0.635	-0.133
2218	QLW	995	0.0000556299	180.53	0.791	-0.200
2219	QLY	2037	0.0001138875	170.13	0.746	-0.333
2220	QLV	4557	0.0002547791	150.80	0.661	1.500
2221	QKA	3690	0.0002063057	135.57	0.594	-1.867
2222	QKR	2954	0.0001651564	170.23	0.746	-3.967
2223	QKN	1726	0.0000964996	147.13	0.645	-3.633
2224	QKD	2194	0.0001226652	144.67	0.634	-3.633
2225	QKC	919	0.0000513807	140.00	0.613	-1.633
2226	QKQ	2885	0.0001612986	155.37	0.681	-3.633
2227	QKE	4291	0.0002399072	152.97	0.670	-3.633
2228	QKG	2683	0.0001500049	127.20	0.557	-2.600
2229	QKH	1255	0.0000701663	158.90	0.696	-3.533
2230	QKI	2852	0.0001594536	160.20	0.702	-0.967

2231	QKL	5743	0.0003210877	160.23	0.702	-1.200
2232	QKK	3847	0.0002150835	161.33	0.707	-3.767
2233	QKM	1144	0.0000639604	161.23	0.707	-1.833
2234	QKF	1509	0.0000843673	169.53	0.743	-1.533
2235	QKP	2288	0.0001279207	146.53	0.642	-3.000
2236	QKS	3319	0.0001855633	137.37	0.602	-2.733
2237	QKT	2756	0.0001540863	146.07	0.640	-2.700
2238	QKW	585	0.0000327070	181.63	0.796	-2.767
2239	QKY	1437	0.0000803418	171.23	0.750	-2.900
2240	QKV	3137	0.0001753878	151.90	0.666	-1.067
2241	QMA	1300	0.0000726822	135.47	0.594	0.067
2242	QMR	893	0.0000499271	170.13	0.746	-2.033
2243	QMN	688	0.0000384657	147.03	0.644	-1.700
2244	QMD	792	0.0000442802	144.57	0.634	-1.700
2245	QMC	380	0.0000212456	139.90	0.613	0.300
2246	QMQ	965	0.0000539526	155.27	0.680	-1.700
2247	QME	1441	0.0000805654	152.87	0.670	-1.700
2248	QMG	813	0.0000454543	127.10	0.557	-0.667
2249	QMH	413	0.0000230906	158.80	0.696	-1.600
2250	QMI	708	0.0000395839	160.10	0.702	0.967
2251	QML	2038	0.0001139434	160.13	0.702	0.733
2252	QMK	1146	0.0000640722	161.23	0.707	-1.833
2253	QMM	422	0.0000235938	161.13	0.706	0.100
2254	QMF	668	0.0000373475	169.43	0.742	0.400
2255	QMP	933	0.0000521635	146.43	0.642	-1.067
2256	QMS	1164	0.0000650785	137.27	0.602	-0.800
2257	QMT	855	0.0000478025	145.97	0.640	-0.767
2258	QMW	244	0.0000136419	181.53	0.796	-0.833
2259	QMY	426	0.0000238174	171.13	0.750	-0.967
2260	QMV	1039	0.0000580899	151.80	0.665	0.867
2261	QFA	1232	0.0000688804	143.77	0.630	0.367
2262	QFR	1321	0.0000738563	178.43	0.782	-1.733
2263	QFN	822	0.0000459575	155.33	0.681	-1.400
2264	QFD	859	0.0000480262	152.87	0.670	-1.400
2265	QFC	629	0.0000351670	148.20	0.649	0.600
2266	QFQ	1332	0.0000744713	163.57	0.717	-1.400
2267	QFE	1213	0.0000678181	161.17	0.706	-1.400
2268	QFG	1280	0.0000715640	135.40	0.593	-0.367
2269	QFH	770	0.0000430502	167.10	0.732	-1.300
2270	QFI	1068	0.0000597112	168.40	0.738	1.267
2271	QFL	3045	0.0001702441	168.43	0.738	1.033
2272	QFK	1151	0.0000643517	169.53	0.743	-1.533
2273	QFM	485	0.0000271161	169.43	0.742	0.400
2274	QFF	1085	0.0000606617	177.73	0.779	0.700
2275	QFP	1362	0.0000761486	154.73	0.678	-0.767
2276	QFS	2050	0.0001146143	145.57	0.638	-0.500
2277	QFT	1215	0.0000679299	154.27	0.676	-0.467
2278	QFW	307	0.0000171642	189.83	0.832	-0.533
2279	QFY	732	0.0000409257	179.43	0.786	-0.667
2280	QFV	1389	0.0000776582	160.10	0.702	1.167
2281	QPA	3770	0.0002107784	120.77	0.529	-1.100
2282	QPR	2879	0.0001609632	155.43	0.681	-3.200

2283	QPN	1273	0.0000711727	132.33	0.580	-2.867
2284	QPD	1836	0.0001026497	129.87	0.569	-2.867
2285	QPC	1155	0.0000645754	125.20	0.549	-0.867
2286	QPQ	3576	0.0001999320	140.57	0.616	-2.867
2287	QPE	2957	0.0001653241	138.17	0.605	-2.867
2288	QPG	4521	0.0002527664	112.40	0.493	-1.833
2289	QPH	1561	0.0000872746	144.10	0.631	-2.767
2290	QPI	1626	0.0000909087	145.40	0.637	-0.200
2291	QPL	5397	0.0003017430	145.43	0.637	-0.433
2292	QPK	1929	0.0001078492	146.53	0.642	-3.000
2293	QPM	867	0.0000484734	146.43	0.642	-1.067
2294	QPF	1457	0.0000814600	154.73	0.678	-0.767
2295	QPP	6110	0.0003416064	131.73	0.577	-2.233
2296	QPS	4738	0.0002648987	122.57	0.537	-1.967
2297	QPT	2429	0.0001358039	131.27	0.575	-1.933
2298	QPW	715	0.0000399752	166.83	0.731	-2.000
2299	QPY	1219	0.0000681536	156.43	0.686	-2.133
2300	QPV	3156	0.0001764501	137.10	0.601	-0.300
2301	QSA	3242	0.0001812583	111.60	0.489	-0.833
2302	QSR	3095	0.0001730396	146.27	0.641	-2.933
2303	QSN	1519	0.0000849264	123.17	0.540	-2.600
2304	QSD	1905	0.0001065074	120.70	0.529	-2.600
2305	QSC	1252	0.0000699986	116.03	0.508	-0.600
2306	QSQ	3137	0.0001753878	131.40	0.576	-2.600
2307	QSE	3003	0.0001678959	129.00	0.565	-2.600
2308	QSG	3188	0.0001782392	103.23	0.452	-1.567
2309	QSH	1488	0.0000831932	134.93	0.591	-2.500
2310	QSI	2356	0.0001317225	136.23	0.597	0.067
2311	QSL	6526	0.0003648647	136.27	0.597	-0.167
2312	QSK	2649	0.0001481040	137.37	0.602	-2.733
2313	QSM	977	0.0000546235	137.27	0.602	-0.800
2314	QSF	2075	0.0001160120	145.57	0.638	-0.500
2315	QSP	4514	0.0002523750	122.57	0.537	-1.967
2316	QSS	6352	0.0003551365	113.40	0.497	-1.700
2317	QST	2740	0.0001531918	122.10	0.535	-1.667
2318	QSW	764	0.0000427148	157.67	0.691	-1.733
2319	QSY	1339	0.0000748627	147.27	0.645	-1.867
2320	QSV	3199	0.0001788542	127.93	0.561	-0.033
2321	QTA	2662	0.0001488308	120.30	0.527	-0.800
2322	QTR	1993	0.0001114274	154.97	0.679	-2.900
2323	QTN	1156	0.0000646313	131.87	0.578	-2.567
2324	QTD	1597	0.0000892873	129.40	0.567	-2.567
2325	QTC	826	0.0000461812	124.73	0.547	-0.567
2326	QTQ	2168	0.0001212116	140.10	0.614	-2.567
2327	QTE	2449	0.0001369221	137.70	0.603	-2.567
2328	QTG	2350	0.0001313871	111.93	0.491	-1.533
2329	QTH	1136	0.0000635131	143.63	0.629	-2.467
2330	QTI	1662	0.0000929214	144.93	0.635	0.100
2331	QTL	4976	0.0002782052	144.97	0.635	-0.133
2332	QTK	1882	0.0001052215	146.07	0.640	-2.700
2333	QTM	806	0.0000450630	145.97	0.640	-0.767
2334	QTF	1538	0.0000859887	154.27	0.676	-0.467

2335	QTP	3032	0.0001695173	131.27	0.575	-1.933
2336	QTS	3171	0.0001772887	122.10	0.535	-1.667
2337	QTT	2054	0.0001148379	130.80	0.573	-1.633
2338	QTW	575	0.0000321479	166.37	0.729	-1.700
2339	QTY	1095	0.0000612208	155.97	0.683	-1.833
2340	QTV	2777	0.0001552604	136.63	0.599	0.000
2341	QWA	550	0.0000307502	155.87	0.683	-0.867
2342	QWR	582	0.0000325393	190.53	0.835	-2.967
2343	QWN	401	0.0000224197	167.43	0.734	-2.633
2344	QWD	450	0.0000251592	164.97	0.723	-2.633
2345	QWC	212	0.0000118528	160.30	0.702	-0.633
2346	QWQ	473	0.0000264451	175.67	0.770	-2.633
2347	QWE	700	0.0000391366	173.27	0.759	-2.633
2348	QWG	466	0.0000260538	147.50	0.646	-1.600
2349	QWH	302	0.0000168846	179.20	0.785	-2.533
2350	QWI	410	0.0000229229	180.50	0.791	0.033
2351	QWL	1326	0.0000741359	180.53	0.791	-0.200
2352	QWK	728	0.0000407020	181.63	0.796	-2.767
2353	QWM	216	0.0000120764	181.53	0.796	-0.833
2354	QWF	381	0.0000213015	189.83	0.832	-0.533
2355	QWP	474	0.0000265011	166.83	0.731	-2.000
2356	QWS	624	0.0000348875	157.67	0.691	-1.733
2357	QWT	509	0.0000284579	166.37	0.729	-1.700
2358	QWW	140	0.0000078273	201.93	0.885	-1.767
2359	QWY	284	0.0000158783	191.53	0.839	-1.900
2360	QWV	601	0.0000336016	172.20	0.755	-0.067
2361	QYA	898	0.0000502066	145.47	0.637	-1.000
2362	QYR	1241	0.0000693836	180.13	0.789	-3.100
2363	QYN	623	0.0000348316	157.03	0.688	-2.767
2364	QYD	771	0.0000431061	154.57	0.677	-2.767
2365	QYC	452	0.0000252710	149.90	0.657	-0.767
2366	QYQ	1130	0.0000631776	165.27	0.724	-2.767
2367	QYE	1188	0.0000664204	162.87	0.714	-2.767
2368	QYG	1061	0.0000593199	137.10	0.601	-1.733
2369	QYH	589	0.0000329306	168.80	0.740	-2.667
2370	QYI	971	0.0000542880	170.10	0.745	-0.100
2371	QYL	2324	0.0001299334	170.13	0.746	-0.333
2372	QYK	975	0.0000545117	171.23	0.750	-2.900
2373	QYM	376	0.0000210219	171.13	0.750	-0.967
2374	QYF	957	0.0000535053	179.43	0.786	-0.667
2375	QYP	997	0.0000557417	156.43	0.686	-2.133
2376	QYS	1536	0.0000858768	147.27	0.645	-1.867
2377	QYT	838	0.0000468521	155.97	0.683	-1.833
2378	QYW	354	0.0000197919	191.53	0.839	-1.900
2379	QYY	695	0.0000388570	181.13	0.794	-2.033
2380	QYV	1082	0.0000604940	161.80	0.709	-0.200
2381	QVA	3772	0.0002108903	126.13	0.553	0.833
2382	QVR	2400	0.0001341826	160.80	0.705	-1.267
2383	QVN	1471	0.0000822427	137.70	0.603	-0.933
2384	QVD	2156	0.0001205407	135.23	0.593	-0.933
2385	QVC	1026	0.0000573630	130.57	0.572	1.067
2386	QVQ	2735	0.0001529122	145.93	0.639	-0.933

2387	QVE	3410	0.0001906511	143.53	0.629	-0.933
2388	QVG	2429	0.0001358039	117.77	0.516	0.100
2389	QVH	1387	0.0000775463	149.47	0.655	-0.833
2390	QVI	2401	0.0001342385	150.77	0.661	1.733
2391	QVL	5937	0.0003319341	150.80	0.661	1.500
2392	QVK	2787	0.0001558195	151.90	0.666	-1.067
2393	QVM	915	0.0000511571	151.80	0.665	0.867
2394	QVF	1997	0.0001116511	160.10	0.702	1.167
2395	QVP	3213	0.0001796369	137.10	0.601	-0.300
2396	QVS	3852	0.0002153630	127.93	0.561	-0.033
2397	QVT	3211	0.0001795251	136.63	0.599	0.000
2398	QVW	691	0.0000386334	172.20	0.755	-0.067
2399	QVY	1304	0.0000729059	161.80	0.709	-0.200
2400	QVV	3252	0.0001818174	142.47	0.624	1.633
2401	EAA	9515	0.0005319779	107.40	0.471	0.033
2402	EAR	5308	0.0002967671	142.07	0.623	-2.067
2403	EAN	2179	0.0001218266	118.97	0.521	-1.733
2404	EAD	3560	0.0001990375	116.50	0.511	-1.733
2405	EAC	1849	0.0001033765	111.83	0.490	0.267
2406	EAQ	4896	0.0002737324	127.20	0.557	-1.733
2407	EAE	9016	0.0005040792	124.80	0.547	-1.733
2408	EAG	6383	0.0003568697	99.03	0.434	-0.700
2409	EAH	1844	0.0001030969	130.73	0.573	-1.633
2410	EAI	3798	0.0002123439	132.03	0.579	0.933
2411	EAL	10869	0.0006076792	132.07	0.579	0.700
2412	EAK	4909	0.0002744592	133.17	0.584	-1.867
2413	EAM	2056	0.0001149497	133.07	0.583	0.067
2414	EAF	3433	0.0001919370	141.37	0.619	0.367
2415	EAP	5155	0.0002882130	118.37	0.519	-1.100
2416	EAS	6543	0.0003658152	109.20	0.479	-0.833
2417	EAT	4486	0.0002508096	117.90	0.517	-0.800
2418	EAW	1241	0.0000693836	153.47	0.673	-0.867
2419	EAY	1760	0.0000984005	143.07	0.627	-1.000
2420	EAV	6382	0.0003568138	123.73	0.542	0.833
2421	ERA	5070	0.0002834607	142.07	0.623	-2.067
2422	ERR	5724	0.0003200254	176.73	0.774	-4.167
2423	ERN	2377	0.0001328966	153.63	0.673	-3.833
2424	ERD	3393	0.0001897006	151.17	0.662	-3.833
2425	ERC	1369	0.0000765400	146.50	0.642	-1.833
2426	ERQ	3340	0.0001867374	161.87	0.709	-3.833
2427	ERE	6690	0.0003740339	159.47	0.699	-3.833
2428	ERG	4582	0.0002561769	133.70	0.586	-2.800
2429	ERH	1694	0.0000947105	165.40	0.725	-3.733
2430	ERI	3292	0.0001840537	166.70	0.730	-1.167
2431	ERL	7969	0.0004455420	166.73	0.731	-1.400
2432	ERK	4527	0.0002531018	167.83	0.735	-3.967
2433	ERM	1512	0.0000845350	167.73	0.735	-2.033
2434	ERF	2216	0.0001238952	176.03	0.771	-1.733
2435	ERP	4346	0.0002429822	153.03	0.671	-3.200
2436	ERS	4381	0.0002449391	143.87	0.630	-2.933
2437	ERT	3145	0.0001758351	152.57	0.669	-2.900
2438	ERW	842	0.0000470757	188.13	0.824	-2.967

2439	ERY	1606	0.0000897905	177.73	0.779	-3.100
2440	ERV	3892	0.0002175994	158.40	0.694	-1.267
2441	ENA	2923	0.0001634232	118.97	0.521	-1.733
2442	ENR	2484	0.0001388790	153.63	0.673	-3.833
2443	ENN	2129	0.0001190311	130.53	0.572	-3.500
2444	END	2259	0.0001262993	128.07	0.561	-3.500
2445	ENC	1208	0.0000675386	123.40	0.541	-1.500
2446	ENQ	2434	0.0001360835	138.77	0.608	-3.500
2447	ENE	4173	0.0002333099	136.37	0.598	-3.500
2448	ENG	3855	0.0002155307	110.60	0.485	-2.467
2449	ENH	1268	0.0000708931	142.30	0.624	-3.400
2450	ENI	3383	0.0001891415	143.60	0.629	-0.833
2451	ENL	5703	0.0003188513	143.63	0.629	-1.067
2452	ENK	3423	0.0001913779	144.73	0.634	-3.633
2453	ENM	1301	0.0000727381	144.63	0.634	-1.700
2454	ENF	2250	0.0001257962	152.93	0.670	-1.400
2455	ENP	2735	0.0001529122	129.93	0.569	-2.867
2456	ENS	4202	0.0002349313	120.77	0.529	-2.600
2457	ENT	2566	0.0001434635	129.47	0.567	-2.567
2458	ENW	576	0.0000322038	165.03	0.723	-2.633
2459	ENY	1776	0.0000992951	154.63	0.678	-2.767
2460	ENV	3298	0.0001843892	135.30	0.593	-0.933
2461	EDA	5098	0.0002850261	116.50	0.511	-1.733
2462	EDR	3172	0.0001773446	151.17	0.662	-3.833
2463	EDN	2115	0.0001182484	128.07	0.561	-3.500
2464	EDD	5118	0.0002861443	125.60	0.550	-3.500
2465	EDC	1648	0.0000921387	120.93	0.530	-1.500
2466	EDQ	2810	0.0001571054	136.30	0.597	-3.500
2467	EDE	7705	0.0004307819	133.90	0.587	-3.500
2468	EDG	5572	0.0003115272	108.13	0.474	-2.467
2469	EDH	1370	0.0000765959	139.83	0.613	-3.400
2470	EDI	3887	0.0002173198	141.13	0.618	-0.833
2471	EDL	7878	0.0004404543	141.17	0.619	-1.067
2472	EDK	3747	0.0002094925	142.27	0.623	-3.633
2473	EDM	1670	0.0000933687	142.17	0.623	-1.700
2474	EDF	3259	0.0001822087	150.47	0.659	-1.400
2475	EDP	3993	0.0002232462	127.47	0.559	-2.867
2476	EDS	6146	0.0003436192	118.30	0.518	-2.600
2477	EDT	3572	0.0001997084	127.00	0.557	-2.567
2478	EDW	945	0.0000528344	162.57	0.712	-2.633
2479	EDY	2209	0.0001235039	152.17	0.667	-2.767
2480	EDV	4775	0.0002669674	132.83	0.582	-0.933
2481	ECA	1271	0.0000710608	111.83	0.490	0.267
2482	ECR	1543	0.0000862682	146.50	0.642	-1.833
2483	ECN	1200	0.0000670913	123.40	0.541	-1.500
2484	ECD	1143	0.0000639044	120.93	0.530	-1.500
2485	ECC	508	0.0000284020	116.27	0.509	0.500
2486	ECQ	1109	0.0000620035	131.63	0.577	-1.500
2487	ECE	1663	0.0000929773	129.23	0.566	-1.500
2488	ECG	5998	0.0003353446	103.47	0.453	-0.467
2489	ECH	656	0.0000366766	135.17	0.592	-1.400
2490	ECI	953	0.0000532817	136.47	0.598	1.167

2491	ECL	2441	0.0001364748	136.50	0.598	0.933
2492	ECK	2026	0.0001132724	137.60	0.603	-1.633
2493	ECM	429	0.0000239851	137.50	0.603	0.300
2494	ECF	743	0.0000415407	145.80	0.639	0.600
2495	ECP	1339	0.0000748627	122.80	0.538	-0.867
2496	ECS	2173	0.0001214911	113.63	0.498	-0.600
2497	ECT	1003	0.0000560771	122.33	0.536	-0.567
2498	ECW	247	0.0000138096	157.90	0.692	-0.633
2499	ECY	530	0.0000296320	147.50	0.646	-0.767
2500	ECV	1465	0.0000819073	128.17	0.562	1.067
2501	EQA	3823	0.0002137416	127.20	0.557	-1.733
2502	EQR	3510	0.0001962420	161.87	0.709	-3.833
2503	EQN	1719	0.0000961083	138.77	0.608	-3.500
2504	EQD	2306	0.0001289271	136.30	0.597	-3.500
2505	EQC	998	0.0000557976	131.63	0.577	-1.500
2506	EQQ	3484	0.0001947883	147.00	0.644	-3.500
2507	EQE	5677	0.0003173977	144.60	0.634	-3.500
2508	EQG	3282	0.0001834946	118.83	0.521	-2.467
2509	EQH	1205	0.0000673708	150.53	0.660	-3.400
2510	EQI	2653	0.0001483276	151.83	0.665	-0.833
2511	EQL	6936	0.0003877876	151.87	0.665	-1.067
2512	EQK	3229	0.0001805315	152.97	0.670	-3.633
2513	EQM	1308	0.0000731295	152.87	0.670	-1.700
2514	EQF	1780	0.0000995187	161.17	0.706	-1.400
2515	EQP	2589	0.0001447494	138.17	0.605	-2.867
2516	EQS	3010	0.0001682873	129.00	0.565	-2.600
2517	EQT	2015	0.0001126574	137.70	0.603	-2.567
2518	EQW	625	0.0000349434	173.27	0.759	-2.633
2519	EQY	1344	0.0000751422	162.87	0.714	-2.767
2520	EQV	3178	0.0001776801	143.53	0.629	-0.933
2521	EEA	10224	0.0005716177	124.80	0.547	-1.733
2522	EER	7023	0.0003926517	159.47	0.699	-3.833
2523	EEN	4848	0.0002710488	136.37	0.598	-3.500
2524	EED	8621	0.0004819949	133.90	0.587	-3.500
2525	EEC	3275	0.0001831033	129.23	0.566	-1.500
2526	EEQ	6028	0.0003370219	144.60	0.634	-3.500
2527	EEE	23582	0.0013184554	142.20	0.623	-3.500
2528	EEG	7616	0.0004258060	116.43	0.510	-2.467
2529	EEH	2150	0.0001202052	148.13	0.649	-3.400
2530	EEI	6073	0.0003395378	149.43	0.655	-0.833
2531	EEL	13718	0.0007669652	149.47	0.655	-1.067
2532	EEK	9944	0.0005559631	150.57	0.660	-3.633
2533	EEM	3308	0.0001849483	150.47	0.659	-1.700
2534	EEF	3714	0.0002076475	158.77	0.696	-1.400
2535	EEP	5520	0.0003086199	135.77	0.595	-2.867
2536	EES	7089	0.0003963417	126.60	0.555	-2.600
2537	EET	5628	0.0003146581	135.30	0.593	-2.567
2538	EEW	1572	0.0000878896	170.87	0.749	-2.633
2539	EEY	2611	0.0001459794	160.47	0.703	-2.767
2540	EEV	7346	0.0004107105	141.13	0.618	-0.933
2541	EGA	5531	0.0003092349	99.03	0.434	-0.700
2542	EGR	4728	0.0002643396	133.70	0.586	-2.800

2543	EGN	2514	0.0001405562	110.60	0.485	-2.467
2544	EGD	4038	0.0002257622	108.13	0.474	-2.467
2545	EGC	1678	0.0000938160	103.47	0.453	-0.467
2546	EGQ	3447	0.0001927197	118.83	0.521	-2.467
2547	EGE	6235	0.0003485951	116.43	0.510	-2.467
2548	EGG	5442	0.0003042590	90.67	0.397	-1.433
2549	EGH	1918	0.0001072342	122.37	0.536	-2.367
2550	EGI	3027	0.0001692378	123.67	0.542	0.200
2551	EGL	7219	0.0004036100	123.70	0.542	-0.033
2552	EGK	4580	0.0002560650	124.80	0.547	-2.600
2553	EGM	1370	0.0000765959	124.70	0.546	-0.667
2554	EGF	2477	0.0001384876	133.00	0.583	-0.367
2555	EGP	4823	0.0002696510	110.00	0.482	-1.833
2556	EGS	6625	0.0003703998	100.83	0.442	-1.567
2557	EGT	4291	0.0002399072	109.53	0.480	-1.533
2558	EGW	1081	0.0000604381	145.10	0.636	-1.600
2559	EGY	1823	0.0001019228	134.70	0.590	-1.733
2560	EGV	3996	0.0002234140	115.37	0.506	0.100
2561	EHA	1370	0.0000765959	130.73	0.573	-1.633
2562	EHR	1651	0.0000923064	165.40	0.725	-3.733
2563	EHN	771	0.0000431061	142.30	0.624	-3.400
2564	EHD	872	0.0000487530	139.83	0.613	-3.400
2565	EHC	705	0.0000394161	135.17	0.592	-1.400
2566	EHQ	1515	0.0000847027	150.53	0.660	-3.400
2567	EHE	1488	0.0000831932	148.13	0.649	-3.400
2568	EHG	1750	0.0000978414	122.37	0.536	-2.367
2569	EHH	854	0.0000477466	154.07	0.675	-3.300
2570	EHI	1301	0.0000727381	155.37	0.681	-0.733
2571	EHL	3251	0.0001817615	155.40	0.681	-0.967
2572	EHK	1318	0.0000736886	156.50	0.686	-3.533
2573	EHM	632	0.0000353347	156.40	0.685	-1.600
2574	EHF	1174	0.0000656376	164.70	0.722	-1.300
2575	EHP	1610	0.0000900141	141.70	0.621	-2.767
2576	EHS	1982	0.0001108124	132.53	0.581	-2.500
2577	EHT	1195	0.0000668117	141.23	0.619	-2.467
2578	EHW	373	0.0000208542	176.80	0.775	-2.533
2579	EHY	835	0.0000466843	166.40	0.729	-2.667
2580	EHV	1730	0.0000967233	147.07	0.644	-0.833
2581	EIA	2908	0.0001625845	132.03	0.579	0.933
2582	EIR	3119	0.0001743814	166.70	0.730	-1.167
2583	EIN	2082	0.0001164034	143.60	0.629	-0.833
2584	EID	2328	0.0001301571	141.13	0.618	-0.833
2585	EIC	1198	0.0000669795	136.47	0.598	1.167
2586	EIQ	3201	0.0001789660	151.83	0.665	-0.833
2587	EIE	4245	0.0002373354	149.43	0.655	-0.833
2588	EIG	2086	0.0001166270	123.67	0.542	0.200
2589	EIH	1262	0.0000705577	155.37	0.681	-0.733
2590	EII	3052	0.0001706355	156.67	0.687	1.833
2591	EIL	6046	0.0003380282	156.70	0.687	1.600
2592	EIK	3662	0.0002047402	157.80	0.691	-0.967
2593	EIM	1236	0.0000691040	157.70	0.691	0.967
2594	EIF	1868	0.0001044388	166.00	0.727	1.267

2595	EIP	2704	0.0001511790	143.00	0.627	-0.200
2596	EIS	4076	0.0002278867	133.83	0.586	0.067
2597	EIT	2991	0.0001672250	142.53	0.625	0.100
2598	EIW	581	0.0000324834	178.10	0.780	0.033
2599	EIY	1475	0.0000824664	167.70	0.735	-0.100
2600	EIV	2990	0.0001671691	148.37	0.650	1.733
2601	ELA	7420	0.0004148477	132.07	0.579	0.700
2602	ELR	7289	0.0004075236	166.73	0.731	-1.400
2603	ELN	3752	0.0002097721	143.63	0.629	-1.067
2604	ELD	5108	0.0002855852	141.17	0.619	-1.067
2605	ELC	2424	0.0001355244	136.50	0.598	0.933
2606	ELQ	7437	0.0004157982	151.87	0.665	-1.067
2607	ELE	10448	0.0005841414	149.47	0.655	-1.067
2608	ELG	5967	0.0003336114	123.70	0.542	-0.033
2609	ELH	2690	0.0001503963	155.40	0.681	-0.967
2610	ELI	4549	0.0002543319	156.70	0.687	1.600
2611	ELL	12737	0.0007121181	156.73	0.687	1.367
2612	ELK	6843	0.0003825880	157.83	0.692	-1.200
2613	ELM	2203	0.0001231684	157.73	0.691	0.733
2614	ELF	3668	0.0002050757	166.03	0.728	1.033
2615	ELP	5768	0.0003224854	143.03	0.627	-0.433
2616	ELS	8089	0.0004522511	133.87	0.587	-0.167
2617	ELT	5039	0.0002817275	142.57	0.625	-0.133
2618	ELW	1232	0.0000688804	178.13	0.781	-0.200
2619	ELY	2677	0.0001496695	167.73	0.735	-0.333
2620	ELV	6153	0.0003440105	148.40	0.650	1.500
2621	EKA	6210	0.0003471974	133.17	0.584	-1.867
2622	EKR	5075	0.0002837402	167.83	0.735	-3.967
2623	EKN	3216	0.0001798046	144.73	0.634	-3.633
2624	EKD	4330	0.0002420877	142.27	0.623	-3.633
2625	EKC	1704	0.0000952696	137.60	0.603	-1.633
2626	EKQ	4418	0.0002470077	152.97	0.670	-3.633
2627	EKE	9468	0.0005293502	150.57	0.660	-3.633
2628	EKG	4944	0.0002764161	124.80	0.547	-2.600
2629	EKH	1978	0.0001105888	156.50	0.686	-3.533
2630	EKI	4652	0.0002600905	157.80	0.691	-0.967
2631	EKL	9997	0.0005589263	157.83	0.692	-1.200
2632	EKK	6782	0.0003791775	158.93	0.696	-3.767
2633	EKM	2681	0.0001498931	158.83	0.696	-1.833
2634	EKF	2657	0.0001485513	167.13	0.732	-1.533
2635	EKP	9046	0.0005057564	144.13	0.632	-3.000
2636	EKS	5634	0.0003149936	134.97	0.591	-2.733
2637	EKT	4222	0.0002360495	143.67	0.630	-2.700
2638	EKW	906	0.0000506539	179.23	0.785	-2.767
2639	EKY	2329	0.0001302130	168.83	0.740	-2.900
2640	EKV	5256	0.0002938598	149.50	0.655	-1.067
2641	EMA	2016	0.0001127134	133.07	0.583	0.067
2642	EMR	1346	0.0000752541	167.73	0.735	-2.033
2643	EMN	1022	0.0000571394	144.63	0.634	-1.700
2644	EMD	1426	0.0000797268	142.17	0.623	-1.700
2645	EMC	504	0.0000281783	137.50	0.603	0.300
2646	EMQ	1365	0.0000763163	152.87	0.670	-1.700

2647	EME	2936	0.0001641500	150.47	0.659	-1.700
2648	EMG	1280	0.0000715640	124.70	0.546	-0.667
2649	EMH	477	0.0000266688	156.40	0.685	-1.600
2650	EMI	1285	0.0000718436	157.70	0.691	0.967
2651	EML	2911	0.0001627523	157.73	0.691	0.733
2652	EMK	2139	0.0001195902	158.83	0.696	-1.833
2653	EMM	759	0.0000424352	158.73	0.696	0.100
2654	EMF	914	0.0000511012	167.03	0.732	0.400
2655	EMP	1204	0.0000673149	144.03	0.631	-1.067
2656	EMS	1578	0.0000882250	134.87	0.591	-0.800
2657	EMT	1340	0.0000749186	143.57	0.629	-0.767
2658	EMW	295	0.0000164933	179.13	0.785	-0.833
2659	EMY	666	0.0000372357	168.73	0.739	-0.967
2660	EMV	1782	0.0000996306	149.40	0.655	0.867
2661	EFA	1789	0.0001000219	141.37	0.619	0.367
2662	EFR	1899	0.0001061720	176.03	0.771	-1.733
2663	EFN	1152	0.0000644076	152.93	0.670	-1.400
2664	EFD	1638	0.0000915796	150.47	0.659	-1.400
2665	EFC	859	0.0000480262	145.80	0.639	0.600
2666	EFQ	1834	0.0001025378	161.17	0.706	-1.400
2667	EFE	2232	0.0001247898	158.77	0.696	-1.400
2668	EFG	1714	0.0000958287	133.00	0.583	-0.367
2669	EFH	896	0.0000500948	164.70	0.722	-1.300
2670	EFI	1833	0.0001024819	166.00	0.727	1.267
2671	EFL	4134	0.0002311295	166.03	0.728	1.033
2672	EFK	1914	0.0001070106	167.13	0.732	-1.533
2673	EFM	763	0.0000426589	167.03	0.732	0.400
2674	EFF	1508	0.0000843114	175.33	0.768	0.700
2675	EFP	1665	0.0000930891	152.33	0.668	-0.767
2676	EFS	2852	0.0001594536	143.17	0.627	-0.500
2677	EFT	1736	0.0000970587	151.87	0.665	-0.467
2678	EFW	523	0.0000292406	187.43	0.821	-0.533
2679	EFY	1148	0.0000641840	177.03	0.776	-0.667
2680	EFV	2302	0.0001287034	157.70	0.691	1.167
2681	EPA	4533	0.0002534373	118.37	0.519	-1.100
2682	EPR	3401	0.0001901479	153.03	0.671	-3.200
2683	EPN	1350	0.0000754777	129.93	0.569	-2.867
2684	EPD	2374	0.0001327289	127.47	0.559	-2.867
2685	EPC	1231	0.0000688245	122.80	0.538	-0.867
2686	EPQ	2926	0.0001635909	138.17	0.605	-2.867
2687	EPE	5220	0.0002918471	135.77	0.595	-2.867
2688	EPG	5773	0.0003227650	110.00	0.482	-1.833
2689	EPH	1243	0.0000694954	141.70	0.621	-2.767
2690	EPI	1947	0.0001088556	143.00	0.627	-0.200
2691	EPL	5526	0.0003089554	143.03	0.627	-0.433
2692	EPK	2587	0.0001446376	144.13	0.632	-3.000
2693	EPM	875	0.0000489207	144.03	0.631	-1.067
2694	EPF	1387	0.0000775463	152.33	0.668	-0.767
2695	EPP	5624	0.0003144345	129.33	0.567	-2.233
2696	EPS	5036	0.0002815597	120.17	0.527	-1.967
2697	EPT	2818	0.0001575527	128.87	0.565	-1.933
2698	EPW	926	0.0000517721	164.43	0.721	-2.000

2699	EPY	983	0.0000549589	154.03	0.675	-2.133
2700	EPV	3968	0.0002218485	134.70	0.590	-0.300
2701	ESA	4369	0.0002442682	109.20	0.479	-0.833
2702	ESR	4223	0.0002361054	143.87	0.630	-2.933
2703	ESN	2122	0.0001186397	120.77	0.529	-2.600
2704	ESD	3569	0.0001995406	118.30	0.518	-2.600
2705	ESC	1828	0.0001022024	113.63	0.498	-0.600
2706	ESQ	3684	0.0002059702	129.00	0.565	-2.600
2707	ESE	6189	0.0003460233	126.60	0.555	-2.600
2708	ESG	4995	0.0002792675	100.83	0.442	-1.567
2709	ESH	1697	0.0000948783	132.53	0.581	-2.500
2710	ESI	3184	0.0001780155	133.83	0.586	0.067
2711	ESL	8150	0.0004556616	133.87	0.587	-0.167
2712	ESK	3948	0.0002207303	134.97	0.591	-2.733
2713	ESM	1374	0.0000768195	134.87	0.591	-0.800
2714	ESF	2760	0.0001543099	143.17	0.627	-0.500
2715	ESP	4759	0.0002660728	120.17	0.527	-1.967
2716	ESS	7706	0.0004308378	111.00	0.486	-1.700
2717	EST	4065	0.0002272717	119.70	0.525	-1.667
2718	ESW	1062	0.0000593758	155.27	0.680	-1.733
2719	ESY	1760	0.0000984005	144.87	0.635	-1.867
2720	ESV	4562	0.0002550587	125.53	0.550	-0.033
2721	ETA	3706	0.0002072002	117.90	0.517	-0.800
2722	ETR	3004	0.0001679518	152.57	0.669	-2.900
2723	ETN	1717	0.0000959964	129.47	0.567	-2.567
2724	ETD	2540	0.0001420099	127.00	0.557	-2.567
2725	ETC	1245	0.0000696072	122.33	0.536	-0.567
2726	ETQ	2996	0.0001675046	137.70	0.603	-2.567
2727	ETE	4748	0.0002654578	135.30	0.593	-2.567
2728	ETG	3535	0.0001976397	109.53	0.480	-1.533
2729	ETH	1374	0.0000768195	141.23	0.619	-2.467
2730	ETI	2700	0.0001509554	142.53	0.625	0.100
2731	ETL	6577	0.0003677161	142.57	0.625	-0.133
2732	ETK	3396	0.0001898683	143.67	0.630	-2.700
2733	ETM	1129	0.0000631217	143.57	0.629	-0.767
2734	ETF	2332	0.0001303807	151.87	0.665	-0.467
2735	ETP	3688	0.0002061939	128.87	0.565	-1.933
2736	ETS	4853	0.0002713283	119.70	0.525	-1.667
2737	ETT	4153	0.0002321917	128.40	0.563	-1.633
2738	ETW	805	0.0000450071	163.97	0.719	-1.700
2739	ETY	1508	0.0000843114	153.57	0.673	-1.833
2740	ETV	4007	0.0002240290	134.23	0.588	0.000
2741	EWA	763	0.0000426589	153.47	0.673	-0.867
2742	EWR	742	0.0000414848	188.13	0.824	-2.967
2743	EWN	560	0.0000313093	165.03	0.723	-2.633
2744	EWD	603	0.0000337134	162.57	0.712	-2.633
2745	EWC	198	0.0000110701	157.90	0.692	-0.633
2746	EWQ	677	0.0000378507	173.27	0.759	-2.633
2747	EWE	1058	0.0000591521	170.87	0.749	-2.633
2748	EWG	696	0.0000389129	145.10	0.636	-1.600
2749	EWH	294	0.0000164374	176.80	0.775	-2.533
2750	EWI	656	0.0000366766	178.10	0.780	0.033

2751	EWL	1361	0.0000760927	178.13	0.781	-0.200
2752	EWK	972	0.0000543439	179.23	0.785	-2.767
2753	EWM	284	0.0000158783	179.13	0.785	-0.833
2754	EWF	456	0.0000254947	187.43	0.821	-0.533
2755	EWP	418	0.0000233701	164.43	0.721	-2.000
2756	EWS	813	0.0000454543	155.27	0.680	-1.733
2757	EWT	721	0.0000403107	163.97	0.719	-1.700
2758	EWW	212	0.0000118528	199.53	0.874	-1.767
2759	EWY	366	0.0000204628	189.13	0.829	-1.900
2760	EWV	702	0.0000392484	169.80	0.744	-0.067
2761	EYA	1422	0.0000795032	143.07	0.627	-1.000
2762	EYR	1415	0.0000791118	177.73	0.779	-3.100
2763	EYN	951	0.0000531698	154.63	0.678	-2.767
2764	EYD	1204	0.0000673149	152.17	0.667	-2.767
2765	EYC	679	0.0000379625	147.50	0.646	-0.767
2766	EYQ	1403	0.0000784409	162.87	0.714	-2.767
2767	EYE	2148	0.0001200934	160.47	0.703	-2.767
2768	EYG	1372	0.0000767077	134.70	0.590	-1.733
2769	EYH	635	0.0000355025	166.40	0.729	-2.667
2770	EYI	1539	0.0000860446	167.70	0.735	-0.100
2771	EYL	3212	0.0001795810	167.73	0.735	-0.333
2772	EYK	1654	0.0000924741	168.83	0.740	-2.900
2773	EYM	669	0.0000374034	168.73	0.739	-0.967
2774	EYF	1386	0.0000774904	177.03	0.776	-0.667
2775	EYP	987	0.0000551826	154.03	0.675	-2.133
2776	EYS	1909	0.0001067310	144.87	0.635	-1.867
2777	EYT	1345	0.0000751981	153.57	0.673	-1.833
2778	EYW	367	0.0000205187	189.13	0.829	-1.900
2779	EYY	872	0.0000487530	178.73	0.783	-2.033
2780	EYV	1708	0.0000954933	159.40	0.699	-0.200
2781	EVA	5102	0.0002852498	123.73	0.542	0.833
2782	EVR	3611	0.0002018888	158.40	0.694	-1.267
2783	EVN	2460	0.0001375371	135.30	0.593	-0.933
2784	EVD	3660	0.0002046284	132.83	0.582	-0.933
2785	EVC	1441	0.0000805654	128.17	0.562	1.067
2786	EVQ	3617	0.0002022243	143.53	0.629	-0.933
2787	EVE	6181	0.0003455760	141.13	0.618	-0.933
2788	EVG	3572	0.0001997084	115.37	0.506	0.100
2789	EVH	1565	0.0000874982	147.07	0.644	-0.833
2790	EVI	3731	0.0002085980	148.37	0.650	1.733
2791	EVL	7867	0.0004398393	148.40	0.650	1.500
2792	EVK	4549	0.0002543319	149.50	0.655	-1.067
2793	EVM	1638	0.0000915796	149.40	0.655	0.867
2794	EVF	2784	0.0001556518	157.70	0.691	1.167
2795	EVP	3984	0.0002227431	134.70	0.590	-0.300
2796	EVS	5081	0.0002840756	125.53	0.550	-0.033
2797	EVT	4669	0.0002610410	134.23	0.588	0.000
2798	EVW	892	0.0000498712	169.80	0.744	-0.067
2799	EVY	1754	0.0000980651	159.40	0.699	-0.200
2800	EVV	5261	0.0002941393	140.07	0.614	1.633
2801	GAA	9783	0.0005469617	81.63	0.358	1.067
2802	GAR	5669	0.0003169504	116.30	0.510	-1.033

2803	GAN	2137	0.0001194784	93.20	0.408	-0.700
2804	GAD	3598	0.0002011620	90.73	0.398	-0.700
2805	GAC	1841	0.0001029292	86.07	0.377	1.300
2806	GAQ	3863	0.0002159780	101.43	0.444	-0.700
2807	GAE	5260	0.0002940834	99.03	0.434	-0.700
2808	GAG	10142	0.0005670331	73.27	0.321	0.333
2809	GAH	1942	0.0001085761	104.97	0.460	-0.600
2810	GAI	2899	0.0001620814	106.27	0.466	1.967
2811	GAL	8198	0.0004583453	106.30	0.466	1.733
2812	GAK	3259	0.0001822087	107.40	0.471	-0.833
2813	GAM	1412	0.0000789441	107.30	0.470	1.100
2814	GAF	2768	0.0001547572	115.60	0.507	1.400
2815	GAP	7391	0.0004132264	92.60	0.406	-0.067
2816	GAS	7113	0.0003976836	83.43	0.366	0.200
2817	GAT	4417	0.0002469518	92.13	0.404	0.233
2818	GAW	1193	0.0000666999	127.70	0.560	0.167
2819	GAY	1505	0.0000841436	117.30	0.514	0.033
2820	GAV	5765	0.0003223177	97.97	0.429	1.867
2821	GRA	5602	0.0003132045	116.30	0.510	-1.033
2822	GRR	6685	0.0003737543	150.97	0.662	-3.133
2823	GRN	1993	0.0001114274	127.87	0.560	-2.800
2824	GRD	3148	0.0001760028	125.40	0.550	-2.800
2825	GRC	1874	0.0001047742	120.73	0.529	-0.800
2826	GRQ	2914	0.0001629200	136.10	0.596	-2.800
2827	GRE	3938	0.0002201712	133.70	0.586	-2.800
2828	GRG	7938	0.0004438088	107.93	0.473	-1.767
2829	GRH	1882	0.0001052215	139.63	0.612	-2.700
2830	GRI	2759	0.0001542540	140.93	0.618	-0.133
2831	GRL	6528	0.0003649766	140.97	0.618	-0.367
2832	GRK	3834	0.0002143566	142.07	0.623	-2.933
2833	GRM	1167	0.0000652463	141.97	0.622	-1.000
2834	GRF	2090	0.0001168506	150.27	0.658	-0.700
2835	GRP	5517	0.0003084521	127.27	0.558	-2.167
2836	GRS	5522	0.0003087317	118.10	0.518	-1.900
2837	GRT	3692	0.0002064175	126.80	0.556	-1.867
2838	GRW	1254	0.0000701104	162.37	0.712	-1.933
2839	GRY	1801	0.0001006928	151.97	0.666	-2.067
2840	GRV	4603	0.0002573510	132.63	0.581	-0.233
2841	GNA	2454	0.0001372017	93.20	0.408	-0.700
2842	GNR	2137	0.0001194784	127.87	0.560	-2.800
2843	GNN	1454	0.0000812923	104.77	0.459	-2.467
2844	GND	1457	0.0000814600	102.30	0.448	-2.467
2845	GNC	1027	0.0000574190	97.63	0.428	-0.467
2846	GNQ	1676	0.0000937042	113.00	0.495	-2.467
2847	GNE	2221	0.0001241748	110.60	0.485	-2.467
2848	GNG	2720	0.0001520736	84.83	0.372	-1.433
2849	GNH	1028	0.0000574749	116.53	0.511	-2.367
2850	GNI	2461	0.0001375930	117.83	0.516	0.200
2851	GNL	4550	0.0002543878	117.87	0.517	-0.033
2852	GNK	2359	0.0001318903	118.97	0.521	-2.600
2853	GNM	875	0.0000489207	118.87	0.521	-0.667
2854	GNF	1716	0.0000959405	127.17	0.557	-0.367

2855	GNP	2850	0.0001593418	104.17	0.456	-1.833
2856	GNS	3654	0.0002042929	95.00	0.416	-1.567
2857	GNT	2346	0.0001311635	103.70	0.454	-1.533
2858	GNW	563	0.0000314770	139.27	0.610	-1.600
2859	GNY	1536	0.0000858768	128.87	0.565	-1.733
2860	GNV	2591	0.0001448613	109.53	0.480	0.100
2861	GDA	3659	0.0002045725	90.73	0.398	-0.700
2862	GDR	3530	0.0001973602	125.40	0.550	-2.800
2863	GDN	1627	0.0000909646	102.30	0.448	-2.467
2864	GDD	2615	0.0001462031	99.83	0.437	-2.467
2865	GDC	1189	0.0000664763	95.17	0.417	-0.467
2866	GDQ	2050	0.0001146143	110.53	0.484	-2.467
2867	GDE	3219	0.0001799724	108.13	0.474	-2.467
2868	GDG	4530	0.0002532696	82.37	0.361	-1.433
2869	GDH	1340	0.0000749186	114.07	0.500	-2.367
2870	GDI	2837	0.0001586150	115.37	0.506	0.200
2871	GDL	5457	0.0003050976	115.40	0.506	-0.033
2872	GDK	2933	0.0001639823	116.50	0.511	-2.600
2873	GDM	1122	0.0000627303	116.40	0.510	-0.667
2874	GDF	2419	0.0001352448	124.70	0.546	-0.367
2875	GDP	4029	0.0002252590	101.70	0.446	-1.833
2876	GDS	4928	0.0002755215	92.53	0.405	-1.567
2877	GDT	2986	0.0001669455	101.23	0.444	-1.533
2878	GDW	810	0.0000452866	136.80	0.599	-1.600
2879	GDY	1566	0.0000875541	126.40	0.554	-1.733
2880	GDV	3683	0.0002059143	107.07	0.469	0.100
2881	GCA	1584	0.0000885605	86.07	0.377	1.300
2882	GCR	1629	0.0000910764	120.73	0.529	-0.800
2883	GCN	660	0.0000369002	97.63	0.428	-0.467
2884	GCD	964	0.0000538967	95.17	0.417	-0.467
2885	GCC	1028	0.0000574749	90.50	0.397	1.533
2886	GCQ	1104	0.0000617240	105.87	0.464	-0.467
2887	GCE	1270	0.0000710049	103.47	0.453	-0.467
2888	GCG	2709	0.0001514586	77.70	0.340	0.567
2889	GCH	737	0.0000412052	109.40	0.479	-0.367
2890	GCI	1038	0.0000580340	110.70	0.485	2.200
2891	GCL	2355	0.0001316666	110.73	0.485	1.967
2892	GCK	993	0.0000555180	111.83	0.490	-0.600
2893	GCM	401	0.0000224197	111.73	0.490	1.333
2894	GCF	949	0.0000530580	120.03	0.526	1.633
2895	GCP	1660	0.0000928096	97.03	0.425	0.167
2896	GCS	2306	0.0001289271	87.87	0.385	0.433
2897	GCT	1341	0.0000749745	96.57	0.423	0.467
2898	GCW	465	0.0000259979	132.13	0.579	0.400
2899	GCY	641	0.0000358379	121.73	0.533	0.267
2900	GCV	1559	0.0000871628	102.40	0.449	2.100
2901	GQA	4024	0.0002249794	101.43	0.444	-0.700
2902	GQR	3324	0.0001858428	136.10	0.596	-2.800
2903	GQN	1573	0.0000879455	113.00	0.495	-2.467
2904	GQD	2322	0.0001298216	110.53	0.484	-2.467
2905	GQC	1275	0.0000712845	105.87	0.464	-0.467
2906	GQQ	2679	0.0001497813	121.23	0.531	-2.467

2907	GQE	3653	0.0002042370	118.83	0.521	-2.467
2908	GQG	3887	0.0002173198	93.07	0.408	-1.433
2909	GQH	1408	0.0000787204	124.77	0.547	-2.367
2910	GQI	1983	0.0001108683	126.07	0.552	0.200
2911	GQL	4735	0.0002647310	126.10	0.553	-0.033
2912	GQK	2928	0.0001637027	127.20	0.557	-2.600
2913	GQM	1022	0.0000571394	127.10	0.557	-0.667
2914	GQF	1506	0.0000841996	135.40	0.593	-0.367
2915	GQP	4165	0.0002328627	112.40	0.493	-1.833
2916	GQS	3688	0.0002061939	103.23	0.452	-1.567
2917	GQT	2634	0.0001472654	111.93	0.491	-1.533
2918	GQW	828	0.0000462930	147.50	0.646	-1.600
2919	GQY	1261	0.0000705018	137.10	0.601	-1.733
2920	GQV	3458	0.0001933347	117.77	0.516	0.100
2921	GEA	5747	0.0003213113	99.03	0.434	-0.700
2922	GER	5406	0.0003022462	133.70	0.586	-2.800
2923	GEN	2764	0.0001545336	110.60	0.485	-2.467
2924	GED	4246	0.0002373913	108.13	0.474	-2.467
2925	GEC	1461	0.0000816836	103.47	0.453	-0.467
2926	GEQ	2768	0.0001547572	118.83	0.521	-2.467
2927	GEE	7022	0.0003925958	116.43	0.510	-2.467
2928	GEG	5903	0.0003300332	90.67	0.397	-1.433
2929	GEH	1406	0.0000786086	122.37	0.536	-2.367
2930	GEI	3030	0.0001694055	123.67	0.542	0.200
2931	GEL	6106	0.0003413828	123.70	0.542	-0.033
2932	GEK	10113	0.0005654118	124.80	0.547	-2.600
2933	GEM	1348	0.0000753659	124.70	0.546	-0.667
2934	GEF	1877	0.0001049419	133.00	0.583	-0.367
2935	GEP	4798	0.0002682533	110.00	0.482	-1.833
2936	GES	4460	0.0002493559	100.83	0.442	-1.567
2937	GET	3664	0.0002048520	109.53	0.480	-1.533
2938	GEW	928	0.0000518839	145.10	0.636	-1.600
2939	GEY	1545	0.0000863800	134.70	0.590	-1.733
2940	GEV	4765	0.0002664083	115.37	0.506	0.100
2941	GGA	8150	0.0004556616	73.27	0.321	0.333
2942	GGR	6808	0.0003806312	107.93	0.473	-1.767
2943	GGN	2730	0.0001526327	84.83	0.372	-1.433
2944	GGD	4055	0.0002267126	82.37	0.361	-1.433
2945	GGC	2317	0.0001295421	77.70	0.340	0.567
2946	GGQ	3811	0.0002130707	93.07	0.408	-1.433
2947	GGE	4944	0.0002764161	90.67	0.397	-1.433
2948	GGG	14827	0.0008289687	64.90	0.284	-0.400
2949	GGH	2402	0.0001342944	96.60	0.423	-1.333
2950	GGI	3051	0.0001705796	97.90	0.429	1.233
2951	GGL	7678	0.0004292724	97.93	0.429	1.000
2952	GGK	4204	0.0002350431	99.03	0.434	-1.567
2953	GGM	1311	0.0000732972	98.93	0.434	0.367
2954	GGF	2988	0.0001670573	107.23	0.470	0.667
2955	GGP	6919	0.0003868371	84.23	0.369	-0.800
2956	GGS	9577	0.0005354443	75.07	0.329	-0.533
2957	GGT	4506	0.0002519278	83.77	0.367	-0.500
2958	GGW	1311	0.0000732972	119.33	0.523	-0.567

2959	GGY	2248	0.0001256843	108.93	0.477	-0.700
2960	GGV	4998	0.0002794352	89.60	0.393	1.133
2961	GHA	1750	0.0000978414	104.97	0.460	-0.600
2962	GHR	2225	0.0001243984	139.63	0.612	-2.700
2963	GHN	862	0.0000481939	116.53	0.511	-2.367
2964	GHD	1020	0.0000570276	114.07	0.500	-2.367
2965	GHC	984	0.0000550149	109.40	0.479	-0.367
2966	GHQ	1377	0.0000769872	124.77	0.547	-2.367
2967	GHE	1479	0.0000826900	122.37	0.536	-2.367
2968	GHG	2265	0.0001266348	96.60	0.423	-1.333
2969	GHH	1045	0.0000584253	128.30	0.562	-2.267
2970	GHI	1367	0.0000764282	129.60	0.568	0.300
2971	GHL	3545	0.0001981988	129.63	0.568	0.067
2972	GHK	1268	0.0000708931	130.73	0.573	-2.500
2973	GHM	624	0.0000348875	130.63	0.572	-0.567
2974	GHF	1208	0.0000675386	138.93	0.609	-0.267
2975	GHP	2379	0.0001330085	115.93	0.508	-1.733
2976	GHS	3165	0.0001769533	106.77	0.468	-1.467
2977	GHT	1871	0.0001046065	115.47	0.506	-1.433
2978	GHW	529	0.0000295761	151.03	0.662	-1.500
2979	GHY	991	0.0000554062	140.63	0.616	-1.633
2980	GHV	2125	0.0001188075	121.30	0.532	0.200
2981	GIA	2983	0.0001667777	106.27	0.466	1.967
2982	GIR	2561	0.0001431840	140.93	0.618	-0.133
2983	GIN	1674	0.0000935923	117.83	0.516	0.200
2984	GID	1901	0.0001062838	115.37	0.506	0.200
2985	GIC	1259	0.0000703899	110.70	0.485	2.200
2986	GIQ	2261	0.0001264111	126.07	0.552	0.200
2987	GIE	1952	0.0001091352	123.67	0.542	0.200
2988	GIG	2848	0.0001592300	97.90	0.429	1.233
2989	GIH	1254	0.0000701104	129.60	0.568	0.300
2990	GII	2720	0.0001520736	130.90	0.574	2.867
2991	GIL	5242	0.0002930771	130.93	0.574	2.633
2992	GIK	2315	0.0001294303	132.03	0.579	0.067
2993	GIM	934	0.0000522194	131.93	0.578	2.000
2994	GIF	2263	0.0001265230	140.23	0.615	2.300
2995	GIP	4140	0.0002314649	117.23	0.514	0.833
2996	GIS	4100	0.0002292285	108.07	0.474	1.100
2997	GIT	2671	0.0001493340	116.77	0.512	1.133
2998	GIW	650	0.0000363411	152.33	0.668	1.067
2999	GIY	1547	0.0000864918	141.93	0.622	0.933
3000	GIV	3042	0.0001700764	122.60	0.537	2.767
3001	GLA	8401	0.0004696949	106.30	0.466	1.733
3002	GLR	6707	0.0003749843	140.97	0.618	-0.367
3003	GLN	2958	0.0001653800	117.87	0.517	-0.033
3004	GLD	4618	0.0002581896	115.40	0.506	-0.033
3005	GLC	2683	0.0001500049	110.73	0.485	1.967
3006	GLQ	5682	0.0003176772	126.10	0.553	-0.033
3007	GLE	6608	0.0003694493	123.70	0.542	-0.033
3008	GLG	9085	0.0005079369	97.93	0.429	1.000
3009	GLH	2825	0.0001579441	129.63	0.568	0.067
3010	GLI	4157	0.0002324154	130.93	0.574	2.633

3011	GLL	11906	0.0006656573	130.97	0.574	2.400
3012	GLK	4814	0.0002691479	132.07	0.579	-0.167
3013	GLM	1779	0.0000994628	131.97	0.578	1.767
3014	GLF	3868	0.0002162576	140.27	0.615	2.067
3015	GLP	9176	0.0005130246	117.27	0.514	0.600
3016	GLS	9523	0.0005324252	108.10	0.474	0.867
3017	GLT	5393	0.0003015194	116.80	0.512	0.900
3018	GLW	1522	0.0000850941	152.37	0.668	0.833
3019	GLY	2624	0.0001467063	141.97	0.622	0.700
3020	GLV	6658	0.0003722448	122.63	0.537	2.533
3021	GKA	7331	0.0004098718	107.40	0.471	-0.833
3022	GKR	3649	0.0002040134	142.07	0.623	-2.933
3023	GKN	2348	0.0001312753	118.97	0.521	-2.600
3024	GKD	3248	0.0001815937	116.50	0.511	-2.600
3025	GKC	1208	0.0000675386	111.83	0.490	-0.600
3026	GKQ	2264	0.0001265789	127.20	0.557	-2.600
3027	GKE	4738	0.0002648987	124.80	0.547	-2.600
3028	GKG	5162	0.0002886043	99.03	0.434	-1.567
3029	GKH	1435	0.0000802300	130.73	0.573	-2.500
3030	GKI	3191	0.0001784069	132.03	0.579	0.067
3031	GKL	5347	0.0002989476	132.07	0.579	-0.167
3032	GKK	5269	0.0002945866	133.17	0.584	-2.733
3033	GKM	1381	0.0000772109	133.07	0.583	-0.800
3034	GKF	2050	0.0001146143	141.37	0.619	-0.500
3035	GKP	4206	0.0002351549	118.37	0.519	-1.967
3036	GKS	5465	0.0003055449	109.20	0.479	-1.700
3037	GKT	4718	0.0002637806	117.90	0.517	-1.667
3038	GKW	914	0.0000511012	153.47	0.673	-1.733
3039	GKY	1823	0.0001019228	143.07	0.627	-1.867
3040	GKV	4640	0.0002594196	123.73	0.542	-0.033
3041	GMA	1694	0.0000947105	107.30	0.470	1.100
3042	GMR	1002	0.0000560212	141.97	0.622	-1.000
3043	GMN	915	0.0000511571	118.87	0.521	-0.667
3044	GMD	1163	0.0000650226	116.40	0.510	-0.667
3045	GMC	419	0.0000234260	111.73	0.490	1.333
3046	GMQ	942	0.0000526667	127.10	0.557	-0.667
3047	GME	1532	0.0000856532	124.70	0.546	-0.667
3048	GMG	1587	0.0000887282	98.93	0.434	0.367
3049	GMH	407	0.0000227551	130.63	0.572	-0.567
3050	GMI	900	0.0000503185	131.93	0.578	2.000
3051	GML	1927	0.0001077374	131.97	0.578	1.767
3052	GMK	1318	0.0000736886	133.07	0.583	-0.800
3053	GMM	551	0.0000308061	132.97	0.583	1.133
3054	GMF	789	0.0000441125	141.27	0.619	1.433
3055	GMP	1349	0.0000754218	118.27	0.518	-0.033
3056	GMS	1397	0.0000781054	109.10	0.478	0.233
3057	GMT	1128	0.0000630658	117.80	0.516	0.267
3058	GMW	235	0.0000131387	153.37	0.672	0.200
3059	GMY	550	0.0000307502	142.97	0.626	0.067
3060	GMV	1476	0.0000825223	123.63	0.542	1.900
3061	GFA	2238	0.0001251252	115.60	0.507	1.400
3062	GFR	2368	0.0001323935	150.27	0.658	-0.700

3063	GFN	1381	0.0000772109	127.17	0.557	-0.367
3064	GFD	1643	0.0000918591	124.70	0.546	-0.367
3065	GFC	1156	0.0000646313	120.03	0.526	1.633
3066	GFQ	2021	0.0001129929	135.40	0.593	-0.367
3067	GFE	1882	0.0001052215	133.00	0.583	-0.367
3068	GFG	3530	0.0001973602	107.23	0.470	0.667
3069	GFH	1280	0.0000715640	138.93	0.609	-0.267
3070	GFI	2013	0.0001125456	140.23	0.615	2.300
3071	GFL	4605	0.0002574628	140.27	0.615	2.067
3072	GFK	1687	0.0000943192	141.37	0.619	-0.500
3073	GFM	771	0.0000431061	141.27	0.619	1.433
3074	GFF	1801	0.0001006928	149.57	0.655	1.733
3075	GFP	3226	0.0001803637	126.57	0.555	0.267
3076	GFS	4377	0.0002447155	117.40	0.514	0.533
3077	GFT	2396	0.0001339589	126.10	0.553	0.567
3078	GFW	613	0.0000342725	161.67	0.708	0.500
3079	GFY	1342	0.0000750304	151.27	0.663	0.367
3080	GFV	2455	0.0001372576	131.93	0.578	2.200
3081	GPA	7720	0.0004316206	92.60	0.406	-0.067
3082	GPR	6022	0.0003366864	127.27	0.558	-2.167
3083	GPN	1973	0.0001103092	104.17	0.456	-1.833
3084	GPD	3264	0.0001824883	101.70	0.446	-1.833
3085	GPC	1741	0.0000973383	97.03	0.425	0.167
3086	GPQ	4068	0.0002274394	112.40	0.493	-1.833
3087	GPE	5379	0.0003007367	110.00	0.482	-1.833
3088	GPG	10388	0.0005807868	84.23	0.369	-0.800
3089	GPH	1885	0.0001053892	115.93	0.508	-1.733
3090	GPI	2306	0.0001289271	117.23	0.514	0.833
3091	GPL	6623	0.0003702879	117.27	0.514	0.600
3092	GPK	3245	0.0001814260	118.37	0.519	-1.967
3093	GPM	1295	0.0000724027	118.27	0.518	-0.033
3094	GPF	1992	0.0001113715	126.57	0.555	0.267
3095	GPP	10285	0.0005750282	103.57	0.454	-1.200
3096	GPS	7026	0.0003928194	94.40	0.414	-0.933
3097	GPT	3448	0.0001927756	103.10	0.452	-0.900
3098	GPW	1221	0.0000682654	138.67	0.608	-0.967
3099	GPY	1411	0.0000788882	128.27	0.562	-1.100
3100	GPV	4602	0.0002572951	108.93	0.477	0.733
3101	GSA	7335	0.0004100954	83.43	0.366	0.200
3102	GSR	6992	0.0003909185	118.10	0.518	-1.900
3103	GSN	2946	0.0001647091	95.00	0.416	-1.567
3104	GSD	4395	0.0002457218	92.53	0.405	-1.567
3105	GSC	2677	0.0001496695	87.87	0.385	0.433
3106	GSQ	4587	0.0002564564	103.23	0.452	-1.567
3107	GSE	6613	0.0003697289	100.83	0.442	-1.567
3108	GSG	10712	0.0005989015	75.07	0.329	-0.533
3109	GSH	2694	0.0001506199	106.77	0.468	-1.467
3110	GSI	3663	0.0002047961	108.07	0.474	1.100
3111	GSL	10216	0.0005711704	108.10	0.474	0.867
3112	GSK	4300	0.0002404104	109.20	0.479	-1.700
3113	GSM	1551	0.0000867155	109.10	0.478	0.233
3114	GSF	3808	0.0002129030	117.40	0.514	0.533

3115	GSP	9004	0.0005034083	94.40	0.414	-0.933
3116	GSS	11690	0.0006535809	85.23	0.374	-0.667
3117	GST	5433	0.0003037558	93.93	0.412	-0.633
3118	GSW	1829	0.0001022583	129.50	0.567	-0.700
3119	GSY	2752	0.0001538627	119.10	0.522	-0.833
3120	GSV	6034	0.0003373573	99.77	0.437	1.000
3121	GTA	4957	0.0002771429	92.13	0.404	0.233
3122	GTR	3535	0.0001976397	126.80	0.556	-1.867
3123	GTN	1865	0.0001042710	103.70	0.454	-1.533
3124	GTD	2663	0.0001488867	101.23	0.444	-1.533
3125	GTC	1690	0.0000944869	96.57	0.423	0.467
3126	GTQ	2863	0.0001600686	111.93	0.491	-1.533
3127	GTE	4032	0.0002254267	109.53	0.480	-1.533
3128	GTG	5226	0.0002921825	83.77	0.367	-0.500
3129	GTH	1516	0.0000847586	115.47	0.506	-1.433
3130	GTI	2697	0.0001507877	116.77	0.512	1.133
3131	GTL	6232	0.0003484274	116.80	0.512	0.900
3132	GTK	2642	0.0001477126	117.90	0.517	-1.667
3133	GTM	1282	0.0000716759	117.80	0.516	0.267
3134	GTF	2458	0.0001374253	126.10	0.553	0.567
3135	GTP	5492	0.0003070544	103.10	0.452	-0.900
3136	GTS	5564	0.0003110799	93.93	0.412	-0.633
3137	GTT	3720	0.0002079830	102.63	0.450	-0.600
3138	GTW	1072	0.0000599349	138.20	0.606	-0.667
3139	GTY	1896	0.0001060042	127.80	0.560	-0.800
3140	GTV	4882	0.0002729497	108.47	0.475	1.033
3141	GWA	1176	0.0000657495	127.70	0.560	0.167
3142	GWR	1113	0.0000622272	162.37	0.712	-1.933
3143	GWN	698	0.0000390248	139.27	0.610	-1.600
3144	GWD	688	0.0000384657	136.80	0.599	-1.600
3145	GWC	366	0.0000204628	132.13	0.579	0.400
3146	GWQ	559	0.0000312534	147.50	0.646	-1.600
3147	GWE	1005	0.0000561889	145.10	0.636	-1.600
3148	GWG	1558	0.0000871068	119.33	0.523	-0.567
3149	GWH	318	0.0000177792	151.03	0.662	-1.500
3150	GWI	539	0.0000301352	152.33	0.668	1.067
3151	GWL	1532	0.0000856532	152.37	0.668	0.833
3152	GWK	891	0.0000498153	153.47	0.673	-1.733
3153	GWM	350	0.0000195683	153.37	0.672	0.200
3154	GWF	514	0.0000287374	161.67	0.708	0.500
3155	GWP	717	0.0000400870	138.67	0.608	-0.967
3156	GWS	1123	0.0000627863	129.50	0.567	-0.700
3157	GWT	849	0.0000474671	138.20	0.606	-0.667
3158	GWW	336	0.0000187856	173.77	0.761	-0.733
3159	GWY	330	0.0000184501	163.37	0.716	-0.867
3160	GWV	911	0.0000509335	144.03	0.631	0.967
3161	GYA	1477	0.0000825782	117.30	0.514	0.033
3162	GYR	2051	0.0001146702	151.97	0.666	-2.067
3163	GYN	1261	0.0000705018	128.87	0.565	-1.733
3164	GYD	1296	0.0000724586	126.40	0.554	-1.733
3165	GYC	741	0.0000414289	121.73	0.533	0.267
3166	GYQ	1319	0.0000737445	137.10	0.601	-1.733

3167	GYE	1474	0.0000824105	134.70	0.590	-1.733
3168	GYG	2608	0.0001458117	108.93	0.477	-0.700
3169	GYH	855	0.0000478025	140.63	0.616	-1.633
3170	GYI	1564	0.0000874423	141.93	0.622	0.933
3171	GYL	2808	0.0001569936	141.97	0.622	0.700
3172	GYK	1309	0.0000731854	143.07	0.627	-1.867
3173	GYM	629	0.0000351670	142.97	0.626	0.067
3174	GYF	1315	0.0000735209	151.27	0.663	0.367
3175	GYP	1950	0.0001090233	128.27	0.562	-1.100
3176	GYS	2418	0.0001351889	119.10	0.522	-0.833
3177	GYT	1700	0.0000950460	127.80	0.560	-0.800
3178	GYW	463	0.0000258861	163.37	0.716	-0.867
3179	GYY	1078	0.0000602703	152.97	0.670	-1.000
3180	GYV	1743	0.0000974501	133.63	0.586	0.833
3181	GVA	4842	0.0002707133	97.97	0.429	1.867
3182	GVR	3666	0.0002049639	132.63	0.581	-0.233
3183	GVN	2117	0.0001183602	109.53	0.480	0.100
3184	GVD	2849	0.0001592859	107.07	0.469	0.100
3185	GVC	1842	0.0001029851	102.40	0.449	2.100
3186	GVQ	2755	0.0001540304	117.77	0.516	0.100
3187	GVE	3234	0.0001808110	115.37	0.506	0.100
3188	GVG	5086	0.0002843552	89.60	0.393	1.133
3189	GVH	1585	0.0000886164	121.30	0.532	0.200
3190	GVI	3364	0.0001880792	122.60	0.537	2.767
3191	GVL	6520	0.0003645293	122.63	0.537	2.533
3192	GVK	3178	0.0001776801	123.73	0.542	-0.033
3193	GVM	1070	0.0000598231	123.63	0.542	1.900
3194	GVF	2519	0.0001408358	131.93	0.578	2.200
3195	GVP	5028	0.0002811125	108.93	0.477	0.733
3196	GVS	5250	0.0002935244	99.77	0.437	1.000
3197	GVT	3681	0.0002058025	108.47	0.475	1.033
3198	GVW	891	0.0000498153	144.03	0.631	0.967
3199	GVY	1746	0.0000976178	133.63	0.586	0.833
3200	GVV	4588	0.0002565123	114.30	0.501	2.667
3201	HAA	2306	0.0001289271	113.33	0.497	0.133
3202	HAR	1467	0.0000820191	148.00	0.649	-1.967
3203	HAN	703	0.0000393043	124.90	0.547	-1.633
3204	HAD	1027	0.0000574190	122.43	0.537	-1.633
3205	HAC	535	0.0000299115	117.77	0.516	0.367
3206	HAQ	1206	0.0000674267	133.13	0.583	-1.633
3207	HAE	1520	0.0000849823	130.73	0.573	-1.633
3208	HAG	2045	0.0001143347	104.97	0.460	-0.600
3209	HAH	794	0.0000443921	136.67	0.599	-1.533
3210	HAI	1019	0.0000569717	137.97	0.605	1.033
3211	HAL	2526	0.0001412271	138.00	0.605	0.800
3212	HAK	1077	0.0000602144	139.10	0.610	-1.767
3213	HAM	422	0.0000235938	139.00	0.609	0.167
3214	HAF	869	0.0000485853	147.30	0.645	0.467
3215	HAP	1386	0.0000774904	124.30	0.545	-1.000
3216	HAS	1932	0.0001080170	115.13	0.505	-0.733
3217	HAT	1217	0.0000680417	123.83	0.543	-0.700
3218	HAW	325	0.0000181706	159.40	0.699	-0.767

3219	HAY	624	0.0000348875	149.00	0.653	-0.900
3220	HAV	1731	0.0000967792	129.67	0.568	0.933
3221	HRA	2202	0.0001231125	148.00	0.649	-1.967
3222	HRR	2610	0.0001459235	182.67	0.800	-4.067
3223	HRN	904	0.0000505421	159.57	0.699	-3.733
3224	HRD	1923	0.0001075138	157.10	0.688	-3.733
3225	HRC	636	0.0000355584	152.43	0.668	-1.733
3226	HRQ	1302	0.0000727940	167.80	0.735	-3.733
3227	HRE	1751	0.0000978974	165.40	0.725	-3.733
3228	HRG	2127	0.0001189193	139.63	0.612	-2.700
3229	HRH	1166	0.0000651904	171.33	0.751	-3.633
3230	HRI	1419	0.0000793354	172.63	0.757	-1.067
3231	HRL	3008	0.0001681755	172.67	0.757	-1.300
3232	HRK	1697	0.0000948783	173.77	0.761	-3.867
3233	HRM	532	0.0000297438	173.67	0.761	-1.933
3234	HRF	961	0.0000537289	181.97	0.797	-1.633
3235	HRP	1902	0.0001063397	158.97	0.697	-3.100
3236	HRS	2133	0.0001192547	149.80	0.656	-2.833
3237	HRT	1252	0.0000699986	158.50	0.695	-2.800
3238	HRW	357	0.0000199597	194.07	0.850	-2.867
3239	HRY	722	0.0000403666	183.67	0.805	-3.000
3240	HRV	1815	0.0001014756	164.33	0.720	-1.167
3241	HNA	819	0.0000457898	124.90	0.547	-1.633
3242	HNR	731	0.0000408698	159.57	0.699	-3.733
3243	HNN	675	0.0000377388	136.47	0.598	-3.400
3244	HND	575	0.0000321479	134.00	0.587	-3.400
3245	HNC	424	0.0000237056	129.33	0.567	-1.400
3246	HNQ	650	0.0000363411	144.70	0.634	-3.400
3247	HNE	777	0.0000434416	142.30	0.624	-3.400
3248	HNG	1221	0.0000682654	116.53	0.511	-2.367
3249	HNH	439	0.0000245442	148.23	0.650	-3.300
3250	HNI	821	0.0000459016	149.53	0.655	-0.733
3251	HNL	1748	0.0000977296	149.57	0.655	-0.967
3252	HNK	795	0.0000444480	150.67	0.660	-3.533
3253	HNM	294	0.0000164374	150.57	0.660	-1.600
3254	HNF	719	0.0000401989	158.87	0.696	-1.300
3255	HNP	886	0.0000495357	135.87	0.595	-2.767
3256	HNS	1202	0.0000672031	126.70	0.555	-2.500
3257	HNT	748	0.0000418202	135.40	0.593	-2.467
3258	HNW	199	0.0000111260	170.97	0.749	-2.533
3259	HNY	515	0.0000287933	160.57	0.704	-2.667
3260	HNV	801	0.0000447834	141.23	0.619	-0.833
3261	HDA	946	0.0000528903	122.43	0.537	-1.633
3262	HDR	772	0.0000431621	157.10	0.688	-3.733
3263	HDN	633	0.0000353907	134.00	0.587	-3.400
3264	HDD	717	0.0000400870	131.53	0.576	-3.400
3265	HDC	348	0.0000194565	126.87	0.556	-1.400
3266	HDQ	656	0.0000366766	142.23	0.623	-3.400
3267	HDE	879	0.0000491444	139.83	0.613	-3.400
3268	HDG	1239	0.0000692717	114.07	0.500	-2.367
3269	HDH	460	0.0000257183	145.77	0.639	-3.300
3270	HDI	855	0.0000478025	147.07	0.644	-0.733

3271	HDL	1688	0.0000943751	147.10	0.645	-0.967
3272	HDK	744	0.0000415966	148.20	0.649	-3.533
3273	HDM	292	0.0000163255	148.10	0.649	-1.600
3274	HDF	749	0.0000418761	156.40	0.685	-1.300
3275	HDP	967	0.0000540644	133.40	0.585	-2.767
3276	HDS	1264	0.0000706695	124.23	0.544	-2.500
3277	HDT	652	0.0000364529	132.93	0.583	-2.467
3278	HDW	190	0.0000106228	168.50	0.738	-2.533
3279	HDY	452	0.0000252710	158.10	0.693	-2.667
3280	HDV	1016	0.0000568040	138.77	0.608	-0.833
3281	HCA	793	0.0000443362	117.77	0.516	0.367
3282	HCR	834	0.0000466284	152.43	0.668	-1.733
3283	HCN	416	0.0000232583	129.33	0.567	-1.400
3284	HCD	571	0.0000319243	126.87	0.556	-1.400
3285	HCC	411	0.0000229788	122.20	0.535	0.600
3286	HCQ	703	0.0000393043	137.57	0.603	-1.400
3287	HCE	764	0.0000427148	135.17	0.592	-1.400
3288	HCG	958	0.0000535612	109.40	0.479	-0.367
3289	HCH	535	0.0000299115	141.10	0.618	-1.300
3290	HCI	566	0.0000316447	142.40	0.624	1.267
3291	HCL	1254	0.0000701104	142.43	0.624	1.033
3292	HCK	728	0.0000407020	143.53	0.629	-1.533
3293	HCM	204	0.0000114055	143.43	0.629	0.400
3294	HCF	581	0.0000324834	151.73	0.665	0.700
3295	HCP	999	0.0000558535	128.73	0.564	-0.767
3296	HCS	1307	0.0000730736	119.57	0.524	-0.500
3297	HCT	642	0.0000358938	128.27	0.562	-0.467
3298	HCW	172	0.0000096164	163.83	0.718	-0.533
3299	HCY	287	0.0000160460	153.43	0.672	-0.667
3300	HCV	746	0.0000417084	134.10	0.588	1.167
3301	HQA	1736	0.0000970587	133.13	0.583	-1.633
3302	HQR	3751	0.0002097162	167.80	0.735	-3.733
3303	HQN	871	0.0000486971	144.70	0.634	-3.400
3304	HQD	1078	0.0000602703	142.23	0.623	-3.400
3305	HQC	475	0.0000265570	137.57	0.603	-1.400
3306	HQQ	1433	0.0000801182	152.93	0.670	-3.400
3307	HQE	1724	0.0000963878	150.53	0.660	-3.400
3308	HQG	1496	0.0000836405	124.77	0.547	-2.367
3309	HQH	854	0.0000477466	156.47	0.686	-3.300
3310	HQI	981	0.0000548471	157.77	0.691	-0.733
3311	HQL	2434	0.0001360835	157.80	0.691	-0.967
3312	HQK	1824	0.0001019787	158.90	0.696	-3.533
3313	HQM	397	0.0000221960	158.80	0.696	-1.600
3314	HQF	630	0.0000352229	167.10	0.732	-1.300
3315	HQP	1334	0.0000745831	144.10	0.631	-2.767
3316	HQS	1508	0.0000843114	134.93	0.591	-2.500
3317	HQT	1027	0.0000574190	143.63	0.629	-2.467
3318	HQW	332	0.0000185619	179.20	0.785	-2.533
3319	HQY	481	0.0000268924	168.80	0.740	-2.667
3320	HQV	1410	0.0000788323	149.47	0.655	-0.833
3321	HEA	1942	0.0001085761	130.73	0.573	-1.633
3322	HER	1843	0.0001030410	165.40	0.725	-3.733

3323	HEN	1089	0.0000608853	142.30	0.624	-3.400
3324	HED	1499	0.0000838082	139.83	0.613	-3.400
3325	HEC	564	0.0000315329	135.17	0.592	-1.400
3326	HEQ	998	0.0000557976	150.53	0.660	-3.400
3327	HEE	2018	0.0001128252	148.13	0.649	-3.400
3328	HEG	1470	0.0000821868	122.37	0.536	-2.367
3329	HEH	586	0.0000327629	154.07	0.675	-3.300
3330	HEI	1035	0.0000578662	155.37	0.681	-0.733
3331	HEL	2161	0.0001208202	155.40	0.681	-0.967
3332	HEK	1516	0.0000847586	156.50	0.686	-3.533
3333	HEM	523	0.0000292406	156.40	0.685	-1.600
3334	HEF	730	0.0000408139	164.70	0.722	-1.300
3335	HEP	910	0.0000508776	141.70	0.621	-2.767
3336	HES	1302	0.0000727940	132.53	0.581	-2.500
3337	HET	1031	0.0000576426	141.23	0.619	-2.467
3338	HEW	255	0.0000142569	176.80	0.775	-2.533
3339	HEY	500	0.0000279547	166.40	0.729	-2.667
3340	HEV	1443	0.0000806773	147.07	0.644	-0.833
3341	HGA	2070	0.0001157325	104.97	0.460	-0.600
3342	HGR	1880	0.0001051097	139.63	0.612	-2.700
3343	HGN	1069	0.0000597671	116.53	0.511	-2.367
3344	HGD	1578	0.0000882250	114.07	0.500	-2.367
3345	HGC	650	0.0000363411	109.40	0.479	-0.367
3346	HGQ	1316	0.0000735768	124.77	0.547	-2.367
3347	HGE	1734	0.0000969469	122.37	0.536	-2.367
3348	HGG	2369	0.0001324494	96.60	0.423	-1.333
3349	HGH	1097	0.0000613326	128.30	0.562	-2.267
3350	HGI	1368	0.0000764841	129.60	0.568	0.300
3351	HGL	2748	0.0001536390	129.63	0.568	0.067
3352	HGK	1412	0.0000789441	130.73	0.573	-2.500
3353	HGM	483	0.0000270042	130.63	0.572	-0.567
3354	HGF	1046	0.0000584812	138.93	0.609	-0.267
3355	HGP	1859	0.0001039356	115.93	0.508	-1.733
3356	HGS	2579	0.0001441903	106.77	0.468	-1.467
3357	HGT	1433	0.0000801182	115.47	0.506	-1.433
3358	HGW	356	0.0000199037	151.03	0.662	-1.500
3359	HGY	808	0.0000451748	140.63	0.616	-1.633
3360	HGV	1848	0.0001033206	121.30	0.532	0.200
3361	HHA	882	0.0000493121	136.67	0.599	-1.533
3362	HHR	1203	0.0000672590	171.33	0.751	-3.633
3363	HHN	463	0.0000258861	148.23	0.650	-3.300
3364	HHD	564	0.0000315329	145.77	0.639	-3.300
3365	HHC	552	0.0000308620	141.10	0.618	-1.300
3366	HHQ	975	0.0000545117	156.47	0.686	-3.300
3367	HHE	825	0.0000461253	154.07	0.675	-3.300
3368	HHG	991	0.0000554062	128.30	0.562	-2.267
3369	HHH	1654	0.0000924741	160.00	0.701	-3.200
3370	HHI	716	0.0000400311	161.30	0.707	-0.633
3371	HHL	1741	0.0000973383	161.33	0.707	-0.867
3372	HHK	636	0.0000355584	162.43	0.712	-3.433
3373	HHM	265	0.0000148160	162.33	0.711	-1.500
3374	HHF	582	0.0000325393	170.63	0.748	-1.200

3375	HHP	1318	0.0000736886	147.63	0.647	-2.667
3376	HHS	1217	0.0000680417	138.47	0.607	-2.400
3377	HHT	759	0.0000424352	147.17	0.645	-2.367
3378	HHW	271	0.0000151514	182.73	0.801	-2.433
3379	HHY	440	0.0000246001	172.33	0.755	-2.567
3380	HHV	949	0.0000530580	153.00	0.670	-0.733
3381	HIA	1147	0.0000641281	137.97	0.605	1.033
3382	HIR	1407	0.0000786645	172.63	0.757	-1.067
3383	HIN	869	0.0000485853	149.53	0.655	-0.733
3384	HID	853	0.0000476907	147.07	0.644	-0.733
3385	HIC	719	0.0000401989	142.40	0.624	1.267
3386	HIQ	1153	0.0000644635	157.77	0.691	-0.733
3387	HIE	1075	0.0000601026	155.37	0.681	-0.733
3388	HIG	1063	0.0000594317	129.60	0.568	0.300
3389	HIH	835	0.0000466843	161.30	0.707	-0.633
3390	HII	979	0.0000547353	162.60	0.713	1.933
3391	HIL	2197	0.0001228329	162.63	0.713	1.700
3392	HIK	1304	0.0000729059	163.73	0.717	-0.867
3393	HIM	383	0.0000214133	163.63	0.717	1.067
3394	HIF	948	0.0000530021	171.93	0.753	1.367
3395	HIP	1411	0.0000788882	148.93	0.653	-0.100
3396	HIS	1830	0.0001023142	139.77	0.612	0.167
3397	HIT	1199	0.0000670354	148.47	0.651	0.200
3398	HIW	294	0.0000164374	184.03	0.806	0.133
3399	HIY	932	0.0000521076	173.63	0.761	0.000
3400	HIV	1088	0.0000608294	154.30	0.676	1.833
3401	HLA	3794	0.0002121203	138.00	0.605	0.800
3402	HLR	3426	0.0001915456	172.67	0.757	-1.300
3403	HLN	1818	0.0001016433	149.57	0.655	-0.967
3404	HLD	2488	0.0001391026	147.10	0.645	-0.967
3405	HLC	1390	0.0000777141	142.43	0.624	1.033
3406	HLQ	3166	0.0001770092	157.80	0.691	-0.967
3407	HLE	3749	0.0002096043	155.40	0.681	-0.967
3408	HLG	3192	0.0001784628	129.63	0.568	0.067
3409	HLH	1837	0.0001027056	161.33	0.707	-0.867
3410	HLI	2094	0.0001170743	162.63	0.713	1.700
3411	HLL	5720	0.0003198018	162.67	0.713	1.467
3412	HLK	3066	0.0001714182	163.77	0.718	-1.100
3413	HLM	860	0.0000480821	163.67	0.717	0.833
3414	HLF	1677	0.0000937601	171.97	0.754	1.133
3415	HLP	3519	0.0001967452	148.97	0.653	-0.333
3416	HLS	4011	0.0002242526	139.80	0.613	-0.067
3417	HLT	2783	0.0001555959	148.50	0.651	-0.033
3418	HLW	652	0.0000364529	184.07	0.807	-0.100
3419	HLY	1366	0.0000763722	173.67	0.761	-0.233
3420	HLV	3121	0.0001744932	154.33	0.676	1.600
3421	HKA	1545	0.0000863800	139.10	0.610	-1.767
3422	HKR	1991	0.0001113156	173.77	0.761	-3.867
3423	HKN	890	0.0000497594	150.67	0.660	-3.533
3424	HKD	1214	0.0000678740	148.20	0.649	-3.533
3425	HKC	653	0.0000365088	143.53	0.629	-1.533
3426	HKQ	1012	0.0000565803	158.90	0.696	-3.533

3427	HKE	1713	0.0000957728	156.50	0.686	-3.533
3428	HKG	1384	0.0000773786	130.73	0.573	-2.500
3429	HKH	634	0.0000354466	162.43	0.712	-3.433
3430	HKI	1365	0.0000763163	163.73	0.717	-0.867
3431	HKL	1905	0.0001065074	163.77	0.718	-1.100
3432	HKK	1809	0.0001011401	164.87	0.722	-3.667
3433	HKM	466	0.0000260538	164.77	0.722	-1.733
3434	HKF	682	0.0000381302	173.07	0.758	-1.433
3435	HKP	1102	0.0000616122	150.07	0.658	-2.900
3436	HKS	1391	0.0000777700	140.90	0.617	-2.633
3437	HKT	1070	0.0000598231	149.60	0.656	-2.600
3438	HKW	198	0.0000110701	185.17	0.811	-2.667
3439	HKY	640	0.0000357820	174.77	0.766	-2.800
3440	HKV	1464	0.0000818514	155.43	0.681	-0.967
3441	HMA	710	0.0000396957	139.00	0.609	0.167
3442	HMR	644	0.0000360057	173.67	0.761	-1.933
3443	HMN	381	0.0000213015	150.57	0.660	-1.600
3444	HMD	499	0.0000278988	148.10	0.649	-1.600
3445	HMC	224	0.0000125237	143.43	0.629	0.400
3446	HMQ	488	0.0000272838	158.80	0.696	-1.600
3447	HME	695	0.0000388570	156.40	0.685	-1.600
3448	HMG	586	0.0000327629	130.63	0.572	-0.567
3449	HMH	299	0.0000167169	162.33	0.711	-1.500
3450	HMI	396	0.0000221401	163.63	0.717	1.067
3451	HML	872	0.0000487530	163.67	0.717	0.833
3452	HMK	685	0.0000382979	164.77	0.722	-1.733
3453	HMM	230	0.0000128592	164.67	0.722	0.200
3454	HMF	324	0.0000181146	172.97	0.758	0.500
3455	HMP	531	0.0000296879	149.97	0.657	-0.967
3456	HMS	498	0.0000278429	140.80	0.617	-0.700
3457	HMT	433	0.0000242088	149.50	0.655	-0.667
3458	HMW	88	0.0000049200	185.07	0.811	-0.733
3459	HMY	319	0.0000178351	174.67	0.765	-0.867
3460	HMV	634	0.0000354466	155.33	0.681	0.967
3461	HFA	975	0.0000545117	147.30	0.645	0.467
3462	HFR	1097	0.0000613326	181.97	0.797	-1.633
3463	HFN	746	0.0000417084	158.87	0.696	-1.300
3464	HFD	759	0.0000424352	156.40	0.685	-1.300
3465	HFC	510	0.0000285138	151.73	0.665	0.700
3466	HFQ	1128	0.0000630658	167.10	0.732	-1.300
3467	HFE	968	0.0000541203	164.70	0.722	-1.300
3468	HFG	1019	0.0000569717	138.93	0.609	-0.267
3469	HFH	717	0.0000400870	170.63	0.748	-1.200
3470	HFI	873	0.0000488089	171.93	0.753	1.367
3471	HFL	2103	0.0001175775	171.97	0.754	1.133
3472	HFK	879	0.0000491444	173.07	0.758	-1.433
3473	HFM	365	0.0000204069	172.97	0.758	0.500
3474	HFF	900	0.0000503185	181.27	0.794	0.800
3475	HFP	1220	0.0000682095	158.27	0.694	-0.667
3476	HFS	1827	0.0001021465	149.10	0.653	-0.400
3477	HFT	1122	0.0000627303	157.80	0.691	-0.367
3478	HFW	287	0.0000160460	193.37	0.847	-0.433

3479	HFY	640	0.0000357820	182.97	0.802	-0.567
3480	HFV	1024	0.0000572512	163.63	0.717	1.267
3481	HPA	2420	0.0001353008	124.30	0.545	-1.000
3482	HPR	1703	0.0000952137	158.97	0.697	-3.100
3483	HPN	1286	0.0000718995	135.87	0.595	-2.767
3484	HPD	1834	0.0001025378	133.40	0.585	-2.767
3485	HPC	623	0.0000348316	128.73	0.564	-0.767
3486	HPQ	1669	0.0000933128	144.10	0.631	-2.767
3487	HPE	2454	0.0001372017	141.70	0.621	-2.767
3488	HPG	2829	0.0001581677	115.93	0.508	-1.733
3489	HPH	1143	0.0000639044	147.63	0.647	-2.667
3490	HPI	892	0.0000498712	148.93	0.653	-0.100
3491	HPL	2601	0.0001454203	148.97	0.653	-0.333
3492	HPK	1149	0.0000642399	150.07	0.658	-2.900
3493	HPM	427	0.0000238733	149.97	0.657	-0.967
3494	HPF	1098	0.0000613885	158.27	0.694	-0.667
3495	HPP	2407	0.0001345739	135.27	0.593	-2.133
3496	HPS	3028	0.0001692937	126.10	0.553	-1.867
3497	HPT	1466	0.0000819632	134.80	0.591	-1.833
3498	HPW	414	0.0000231465	170.37	0.747	-1.900
3499	HPY	737	0.0000412052	159.97	0.701	-2.033
3500	HPV	1715	0.0000958846	140.63	0.616	-0.200
3501	HSA	2664	0.0001489426	115.13	0.505	-0.733
3502	HSR	2397	0.0001340148	149.80	0.656	-2.833
3503	HSN	1285	0.0000718436	126.70	0.555	-2.500
3504	HSD	1749	0.0000977855	124.23	0.544	-2.500
3505	HSC	898	0.0000502066	119.57	0.524	-0.500
3506	HSQ	2059	0.0001151175	134.93	0.591	-2.500
3507	HSE	2376	0.0001328407	132.53	0.581	-2.500
3508	HSG	3395	0.0001898124	106.77	0.468	-1.467
3509	HSH	1485	0.0000830255	138.47	0.607	-2.400
3510	HSI	1507	0.0000842555	139.77	0.612	0.167
3511	HSL	4435	0.0002479582	139.80	0.613	-0.067
3512	HSK	1872	0.0001046624	140.90	0.617	-2.633
3513	HSM	789	0.0000441125	140.80	0.617	-0.700
3514	HSF	1641	0.0000917473	149.10	0.653	-0.400
3515	HSP	3308	0.0001849483	126.10	0.553	-1.867
3516	HSS	4566	0.0002552823	116.93	0.512	-1.600
3517	HST	2187	0.0001222739	125.63	0.551	-1.567
3518	HSW	605	0.0000338252	161.20	0.706	-1.633
3519	HSY	1076	0.0000601585	150.80	0.661	-1.767
3520	HSV	2226	0.0001244543	131.47	0.576	0.067
3521	HTA	1851	0.0001034883	123.83	0.543	-0.700
3522	HTR	1391	0.0000777700	158.50	0.695	-2.800
3523	HTN	703	0.0000393043	135.40	0.593	-2.467
3524	HTD	1041	0.0000582017	132.93	0.583	-2.467
3525	HTC	669	0.0000374034	128.27	0.562	-0.467
3526	HTQ	1217	0.0000680417	143.63	0.629	-2.467
3527	HTE	1553	0.0000868273	141.23	0.619	-2.467
3528	HTG	7355	0.0004112136	115.47	0.506	-1.433
3529	HTH	872	0.0000487530	147.17	0.645	-2.367
3530	HTI	914	0.0000511012	148.47	0.651	0.200

3531	HTL	2608	0.0001458117	148.50	0.651	-0.033
3532	HTK	1238	0.0000692158	149.60	0.656	-2.600
3533	HTM	392	0.0000219165	149.50	0.655	-0.667
3534	HTF	963	0.0000538408	157.80	0.691	-0.367
3535	HTP	1766	0.0000987360	134.80	0.591	-1.833
3536	HTS	1912	0.0001068988	125.63	0.551	-1.567
3537	HTT	1307	0.0000730736	134.33	0.589	-1.533
3538	HTW	283	0.0000158224	169.90	0.745	-1.600
3539	HTY	765	0.0000427707	159.50	0.699	-1.733
3540	HTV	1773	0.0000991274	140.17	0.614	0.100
3541	HWA	540	0.0000301911	159.40	0.699	-0.767
3542	HWR	459	0.0000256624	194.07	0.850	-2.867
3543	HWN	256	0.0000143128	170.97	0.749	-2.533
3544	HWD	306	0.0000171083	168.50	0.738	-2.533
3545	HWC	149	0.0000083305	163.83	0.718	-0.533
3546	HWQ	315	0.0000176115	179.20	0.785	-2.533
3547	HWE	371	0.0000207424	176.80	0.775	-2.533
3548	HWG	370	0.0000206865	151.03	0.662	-1.500
3549	HWH	205	0.0000114614	182.73	0.801	-2.433
3550	HWI	276	0.0000154310	184.03	0.806	0.133
3551	HWL	677	0.0000378507	184.07	0.807	-0.100
3552	HWK	451	0.0000252151	185.17	0.811	-2.667
3553	HWM	115	0.0000064296	185.07	0.811	-0.733
3554	HWF	196	0.0000109582	193.37	0.847	-0.433
3555	HWP	375	0.0000209660	170.37	0.747	-1.900
3556	HWS	503	0.0000281224	161.20	0.706	-1.633
3557	HWT	304	0.0000169965	169.90	0.745	-1.600
3558	HWW	84	0.0000046964	205.47	0.900	-1.667
3559	HWY	190	0.0000106228	195.07	0.855	-1.800
3560	HWV	414	0.0000231465	175.73	0.770	0.033
3561	HYA	834	0.0000466284	149.00	0.653	-0.900
3562	HYR	864	0.0000483057	183.67	0.805	-3.000
3563	HYN	575	0.0000321479	160.57	0.704	-2.667
3564	HYD	664	0.0000371238	158.10	0.693	-2.667
3565	HYC	360	0.0000201274	153.43	0.672	-0.667
3566	HYQ	670	0.0000374593	168.80	0.740	-2.667
3567	HYE	784	0.0000438330	166.40	0.729	-2.667
3568	HYG	795	0.0000444480	140.63	0.616	-1.633
3569	HYH	390	0.0000218047	172.33	0.755	-2.567
3570	HYI	707	0.0000395279	173.63	0.761	0.000
3571	HYL	1390	0.0000777141	173.67	0.761	-0.233
3572	HYK	719	0.0000401989	174.77	0.766	-2.800
3573	HYM	282	0.0000157665	174.67	0.765	-0.867
3574	HYF	679	0.0000379625	182.97	0.802	-0.567
3575	HYP	774	0.0000432739	159.97	0.701	-2.033
3576	HYS	1087	0.0000607735	150.80	0.661	-1.767
3577	HYT	725	0.0000405343	159.50	0.699	-1.733
3578	HYW	274	0.0000153192	195.07	0.855	-1.800
3579	HYY	500	0.0000279547	184.67	0.809	-1.933
3580	HYV	763	0.0000426589	165.33	0.725	-0.100
3581	HVA	2051	0.0001146702	129.67	0.568	0.933
3582	HVR	1497	0.0000836964	164.33	0.720	-1.167

3583	HVN	922	0.0000515485	141.23	0.619	-0.833
3584	HVD	1318	0.0000736886	138.77	0.608	-0.833
3585	HVC	677	0.0000378507	134.10	0.588	1.167
3586	HVQ	1283	0.0000717318	149.47	0.655	-0.833
3587	HVE	1690	0.0000944869	147.07	0.644	-0.833
3588	HVG	1492	0.0000834168	121.30	0.532	0.200
3589	HVH	783	0.0000437771	153.00	0.670	-0.733
3590	HVI	1337	0.0000747509	154.30	0.676	1.833
3591	HVL	2601	0.0001454203	154.33	0.676	1.600
3592	HVK	1404	0.0000784968	155.43	0.681	-0.967
3593	HVM	458	0.0000256065	155.33	0.681	0.967
3594	HVF	1113	0.0000622272	163.63	0.717	1.267
3595	HVP	1648	0.0000921387	140.63	0.616	-0.200
3596	HVS	1969	0.0001100856	131.47	0.576	0.067
3597	HVT	1495	0.0000835845	140.17	0.614	0.100
3598	HVW	309	0.0000172760	175.73	0.770	0.033
3599	HVY	838	0.0000468521	165.33	0.725	-0.100
3600	HVV	1926	0.0001076815	146.00	0.640	1.733
3601	IAA	3640	0.0002035102	114.63	0.502	2.700
3602	IAR	2244	0.0001254607	149.30	0.654	0.600
3603	IAN	1817	0.0001015874	126.20	0.553	0.933
3604	IAD	2222	0.0001242307	123.73	0.542	0.933
3605	IAC	829	0.0000463489	119.07	0.522	2.933
3606	IAQ	2038	0.0001139434	134.43	0.589	0.933
3607	IAE	3187	0.0001781833	132.03	0.579	0.933
3608	IAG	2741	0.0001532477	106.27	0.466	1.967
3609	IAH	1106	0.0000618358	137.97	0.605	1.033
3610	IAI	2031	0.0001135520	139.27	0.610	3.600
3611	IAL	3968	0.0002218485	139.30	0.610	3.367
3612	IAK	2625	0.0001467622	140.40	0.615	0.800
3613	IAM	1073	0.0000599908	140.30	0.615	2.733
3614	IAF	1580	0.0000883368	148.60	0.651	3.033
3615	IAP	2012	0.0001124897	125.60	0.550	1.567
3616	IAS	3428	0.0001916574	116.43	0.510	1.833
3617	IAT	2771	0.0001549249	125.13	0.548	1.867
3618	IAW	478	0.0000267247	160.70	0.704	1.800
3619	IAY	1185	0.0000662526	150.30	0.659	1.667
3620	IAV	3126	0.0001747728	130.97	0.574	3.500
3621	IRA	2595	0.0001450849	149.30	0.654	0.600
3622	IRR	2787	0.0001558195	183.97	0.806	-1.500
3623	IRN	2068	0.0001156206	160.87	0.705	-1.167
3624	IRD	2368	0.0001323935	158.40	0.694	-1.167
3625	IRC	820	0.0000458457	153.73	0.674	0.833
3626	IRQ	2017	0.0001127693	169.10	0.741	-1.167
3627	IRE	3235	0.0001808669	166.70	0.730	-1.167
3628	IRG	2358	0.0001318344	140.93	0.618	-0.133
3629	IRH	1466	0.0000819632	172.63	0.757	-1.067
3630	IRI	1929	0.0001078492	173.93	0.762	1.500
3631	IRL	3107	0.0001737105	173.97	0.762	1.267
3632	IRK	3055	0.0001708032	175.07	0.767	-1.300
3633	IRM	797	0.0000445598	174.97	0.767	0.633
3634	IRF	1151	0.0000643517	183.27	0.803	0.933

3635	IRP	1859	0.0001039356	160.27	0.702	-0.533
3636	IRS	3018	0.0001687346	151.10	0.662	-0.267
3637	IRT	2249	0.0001257402	159.80	0.700	-0.233
3638	IRW	493	0.0000275633	195.37	0.856	-0.300
3639	IRY	1093	0.0000611090	184.97	0.811	-0.433
3640	IRV	2389	0.0001335676	165.63	0.726	1.400
3641	INA	1842	0.0001029851	126.20	0.553	0.933
3642	INR	1535	0.0000858209	160.87	0.705	-1.167
3643	INN	1517	0.0000848146	137.77	0.604	-0.833
3644	IND	1436	0.0000802859	135.30	0.593	-0.833
3645	INC	629	0.0000351670	130.63	0.572	1.167
3646	INQ	1377	0.0000769872	146.00	0.640	-0.833
3647	INE	2221	0.0001241748	143.60	0.629	-0.833
3648	ING	2058	0.0001150615	117.83	0.516	0.200
3649	INH	934	0.0000522194	149.53	0.655	-0.733
3650	INI	1576	0.0000881132	150.83	0.661	1.833
3651	INL	2709	0.0001514586	150.87	0.661	1.600
3652	INK	2133	0.0001192547	151.97	0.666	-0.967
3653	INM	668	0.0000373475	151.87	0.665	0.967
3654	INF	1166	0.0000651904	160.17	0.702	1.267
3655	INP	1636	0.0000914678	137.17	0.601	-0.200
3656	INS	2469	0.0001380403	128.00	0.561	0.067
3657	INT	1713	0.0000957728	136.70	0.599	0.100
3658	INW	315	0.0000176115	172.27	0.755	0.033
3659	INY	930	0.0000519957	161.87	0.709	-0.100
3660	INV	1606	0.0000897905	142.53	0.625	1.733
3661	IDA	1914	0.0001070106	123.73	0.542	0.933
3662	IDR	1846	0.0001032088	158.40	0.694	-1.167
3663	IDN	1352	0.0000755895	135.30	0.593	-0.833
3664	IDD	1845	0.0001031528	132.83	0.582	-0.833
3665	IDC	662	0.0000370120	128.17	0.562	1.167
3666	IDQ	1430	0.0000799504	143.53	0.629	-0.833
3667	IDE	2370	0.0001325053	141.13	0.618	-0.833
3668	IDG	2049	0.0001145584	115.37	0.506	0.200
3669	IDH	924	0.0000516603	147.07	0.644	-0.733
3670	IDI	1869	0.0001044947	148.37	0.650	1.833
3671	IDL	3055	0.0001708032	148.40	0.650	1.600
3672	IDK	1887	0.0001055010	149.50	0.655	-0.967
3673	IDM	729	0.0000407580	149.40	0.655	0.967
3674	IDF	1480	0.0000827459	157.70	0.691	1.267
3675	IDP	1980	0.0001107006	134.70	0.590	-0.200
3676	IDS	2580	0.0001442463	125.53	0.550	0.067
3677	IDT	1587	0.0000887282	134.23	0.588	0.100
3678	IDW	467	0.0000261097	169.80	0.744	0.033
3679	IDY	994	0.0000555739	159.40	0.699	-0.100
3680	IDV	1944	0.0001086879	140.07	0.614	1.733
3681	ICA	1059	0.0000592081	119.07	0.522	2.933
3682	ICR	1169	0.0000653581	153.73	0.674	0.833
3683	ICN	883	0.0000493680	130.63	0.572	1.167
3684	ICD	921	0.0000514926	128.17	0.562	1.167
3685	ICC	592	0.0000330984	123.50	0.541	3.167
3686	ICQ	969	0.0000541762	138.87	0.609	1.167

3687	ICE	1162	0.0000649667	136.47	0.598	1.167
3688	ICG	1287	0.0000719554	110.70	0.485	2.200
3689	ICH	692	0.0000386893	142.40	0.624	1.267
3690	ICI	930	0.0000519957	143.70	0.630	3.833
3691	ICL	1874	0.0001047742	143.73	0.630	3.600
3692	ICK	1355	0.0000757572	144.83	0.635	1.033
3693	ICM	429	0.0000239851	144.73	0.634	2.967
3694	ICF	748	0.0000418202	153.03	0.671	3.267
3695	ICP	858	0.0000479703	130.03	0.570	1.800
3696	ICS	1838	0.0001027615	120.87	0.530	2.067
3697	ICT	1160	0.0000648549	129.57	0.568	2.100
3698	ICW	232	0.0000129710	165.13	0.724	2.033
3699	ICY	506	0.0000282902	154.73	0.678	1.900
3700	ICV	1167	0.0000652463	135.40	0.593	3.733
3701	IQA	2926	0.0001635909	134.43	0.589	0.933
3702	IQR	2335	0.0001305484	169.10	0.741	-1.167
3703	IQN	1945	0.0001087438	146.00	0.640	-0.833
3704	IQD	2117	0.0001183602	143.53	0.629	-0.833
3705	IQC	714	0.0000399193	138.87	0.609	1.167
3706	IQQ	2353	0.0001315548	154.23	0.676	-0.833
3707	IQE	3597	0.0002011061	151.83	0.665	-0.833
3708	IQG	2204	0.0001232243	126.07	0.552	0.200
3709	IQH	1355	0.0000757572	157.77	0.691	-0.733
3710	IQI	1498	0.0000837523	159.07	0.697	1.833
3711	IQL	3023	0.0001690141	159.10	0.697	1.600
3712	IQK	2862	0.0001600127	160.20	0.702	-0.967
3713	IQM	913	0.0000510453	160.10	0.702	0.967
3714	IQF	1053	0.0000588726	168.40	0.738	1.267
3715	IQP	1823	0.0001019228	145.40	0.637	-0.200
3716	IQS	2639	0.0001475449	136.23	0.597	0.067
3717	IQT	2014	0.0001126015	144.93	0.635	0.100
3718	IQW	494	0.0000276192	180.50	0.791	0.033
3719	IQY	919	0.0000513807	170.10	0.745	-0.100
3720	IQV	2332	0.0001303807	150.77	0.661	1.733
3721	IEA	3022	0.0001689582	132.03	0.579	0.933
3722	IER	2604	0.0001455881	166.70	0.730	-1.167
3723	IEN	2390	0.0001336235	143.60	0.629	-0.833
3724	IED	3082	0.0001723128	141.13	0.618	-0.833
3725	IEC	828	0.0000462930	136.47	0.598	1.167
3726	IEQ	1892	0.0001057806	151.83	0.665	-0.833
3727	IEE	4559	0.0002548910	149.43	0.655	-0.833
3728	IEG	2442	0.0001365308	123.67	0.542	0.200
3729	IEH	1015	0.0000567480	155.37	0.681	-0.733
3730	IEI	2007	0.0001122102	156.67	0.687	1.833
3731	IEL	2801	0.0001566022	156.70	0.687	1.600
3732	IEK	3676	0.0002055230	157.80	0.691	-0.967
3733	IEM	951	0.0000531698	157.70	0.691	0.967
3734	IEF	1270	0.0000710049	166.00	0.727	1.267
3735	IEP	1490	0.0000833050	143.00	0.627	-0.200
3736	IES	2623	0.0001466504	133.83	0.586	0.067
3737	IET	2138	0.0001195343	142.53	0.625	0.100
3738	IEW	444	0.0000248238	178.10	0.780	0.033

3739	IEY	1012	0.0000565803	167.70	0.735	-0.100
3740	IEV	2479	0.0001385994	148.37	0.650	1.733
3741	IGA	2329	0.0001302130	106.27	0.466	1.967
3742	IGR	2100	0.0001174097	140.93	0.618	-0.133
3743	IGN	1745	0.0000975619	117.83	0.516	0.200
3744	IGD	2083	0.0001164593	115.37	0.506	0.200
3745	IGC	767	0.0000428825	110.70	0.485	2.200
3746	IGQ	1533	0.0000857091	126.07	0.552	0.200
3747	IGE	2438	0.0001363071	123.67	0.542	0.200
3748	IGG	2691	0.0001504522	97.90	0.429	1.233
3749	IGH	993	0.0000555180	129.60	0.568	0.300
3750	IGI	1945	0.0001087438	130.90	0.574	2.867
3751	IGL	3369	0.0001883588	130.93	0.574	2.633
3752	IGK	2188	0.0001223298	132.03	0.579	0.067
3753	IGM	819	0.0000457898	131.93	0.578	2.000
3754	IGF	1568	0.0000876659	140.23	0.615	2.300
3755	IGP	1890	0.0001056688	117.23	0.514	0.833
3756	IGS	2843	0.0001589504	108.07	0.474	1.100
3757	IGT	1920	0.0001073460	116.77	0.512	1.133
3758	IGW	526	0.0000294083	152.33	0.668	1.067
3759	IGY	1179	0.0000659172	141.93	0.622	0.933
3760	IGV	2426	0.0001356362	122.60	0.537	2.767
3761	IHA	1247	0.0000697190	137.97	0.605	1.033
3762	IHR	1516	0.0000847586	172.63	0.757	-1.067
3763	IHN	952	0.0000532257	149.53	0.655	-0.733
3764	IHD	909	0.0000508216	147.07	0.644	-0.733
3765	IHC	609	0.0000340488	142.40	0.624	1.267
3766	IHQ	1383	0.0000773227	157.77	0.691	-0.733
3767	IHE	1296	0.0000724586	155.37	0.681	-0.733
3768	IHG	1320	0.0000738004	129.60	0.568	0.300
3769	IHH	833	0.0000465725	161.30	0.707	-0.633
3770	IHI	1291	0.0000721790	162.60	0.713	1.933
3771	IHL	2033	0.0001136638	162.63	0.713	1.700
3772	IHK	1212	0.0000677622	163.73	0.717	-0.867
3773	IHM	552	0.0000308620	163.63	0.717	1.067
3774	IHF	910	0.0000508776	171.93	0.753	1.367
3775	IHP	1381	0.0000772109	148.93	0.653	-0.100
3776	IHS	2229	0.0001246220	139.77	0.612	0.167
3777	IHT	4691	0.0002622710	148.47	0.651	0.200
3778	IHW	269	0.0000150396	184.03	0.806	0.133
3779	IHY	581	0.0000324834	173.63	0.761	0.000
3780	IHV	1280	0.0000715640	154.30	0.676	1.833
3781	IIA	2365	0.0001322257	139.27	0.610	3.600
3782	IIR	1956	0.0001093588	173.93	0.762	1.500
3783	IIN	1923	0.0001075138	150.83	0.661	1.833
3784	IID	2097	0.0001172420	148.37	0.650	1.833
3785	IIC	850	0.0000475230	143.70	0.630	3.833
3786	IIQ	1894	0.0001058924	159.07	0.697	1.833
3787	IIE	2274	0.0001271380	156.67	0.687	1.833
3788	IIG	2251	0.0001258521	130.90	0.574	2.867
3789	IIH	1945	0.0001087438	162.60	0.713	1.933
3790	III	2119	0.0001184720	163.90	0.718	4.500

3791	IIL	3696	0.0002066411	163.93	0.718	4.267
3792	IIK	2403	0.0001343503	165.03	0.723	1.700
3793	IIM	771	0.0000431061	164.93	0.723	3.633
3794	IIF	1839	0.0001028174	173.23	0.759	3.933
3795	IIP	2182	0.0001219943	150.23	0.658	2.467
3796	IIS	3481	0.0001946206	141.07	0.618	2.733
3797	IIT	2423	0.0001354685	149.77	0.656	2.767
3798	IIW	409	0.0000228669	185.33	0.812	2.700
3799	IIY	1315	0.0000735209	174.93	0.767	2.567
3800	IIV	2155	0.0001204848	155.60	0.682	4.400
3801	ILA	5560	0.0003108563	139.30	0.610	3.367
3802	ILR	4475	0.0002501946	173.97	0.762	1.267
3803	ILN	3404	0.0001903156	150.87	0.661	1.600
3804	ILD	4243	0.0002372236	148.40	0.650	1.600
3805	ILC	1627	0.0000909646	143.73	0.630	3.600
3806	ILQ	4482	0.0002505859	159.10	0.697	1.600
3807	ILE	5681	0.0003176213	156.70	0.687	1.600
3808	ILG	5027	0.0002810566	130.93	0.574	2.633
3809	ILH	2243	0.0001254048	162.63	0.713	1.700
3810	ILI	3319	0.0001855633	163.93	0.718	4.267
3811	ILL	7470	0.0004176432	163.97	0.719	4.033
3812	ILK	5074	0.0002836843	165.07	0.723	1.467
3813	ILM	1371	0.0000766518	164.97	0.723	3.400
3814	ILF	2888	0.0001614663	173.27	0.759	3.700
3815	ILP	3825	0.0002138535	150.27	0.658	2.233
3816	ILS	6236	0.0003486510	141.10	0.618	2.500
3817	ILT	4604	0.0002574069	149.80	0.656	2.533
3818	ILW	789	0.0000441125	185.37	0.812	2.467
3819	ILY	2069	0.0001156766	174.97	0.767	2.333
3820	ILV	4364	0.0002439886	155.63	0.682	4.167
3821	IKA	2989	0.0001671132	140.40	0.615	0.800
3822	IKR	2241	0.0001252930	175.07	0.767	-1.300
3823	IKN	2179	0.0001218266	151.97	0.666	-0.967
3824	IKD	2656	0.0001484954	149.50	0.655	-0.967
3825	IKC	787	0.0000440007	144.83	0.635	1.033
3826	IKQ	2098	0.0001172979	160.20	0.702	-0.967
3827	IKE	4167	0.0002329745	157.80	0.691	-0.967
3828	IKG	2324	0.0001299334	132.03	0.579	0.067
3829	IKH	1290	0.0000721231	163.73	0.717	-0.867
3830	IKI	2156	0.0001205407	165.03	0.723	1.700
3831	IKL	3125	0.0001747169	165.07	0.723	1.467
3832	IKK	3640	0.0002035102	166.17	0.728	-1.100
3833	IKM	866	0.0000484175	166.07	0.728	0.833
3834	IKF	1269	0.0000709490	174.37	0.764	1.133
3835	IKP	2104	0.0001176334	151.37	0.663	-0.333
3836	IKS	3038	0.0001698528	142.20	0.623	-0.067
3837	IKT	2394	0.0001338471	150.90	0.661	-0.033
3838	IKW	534	0.0000298556	186.47	0.817	-0.100
3839	IKY	1113	0.0000622272	176.07	0.772	-0.233
3840	IKV	2655	0.0001484395	156.73	0.687	1.600
3841	IMA	1247	0.0000697190	140.30	0.615	2.733
3842	IMR	777	0.0000434416	174.97	0.767	0.633

3843	IMN	795	0.0000444480	151.87	0.665	0.967
3844	IMD	967	0.0000540644	149.40	0.655	0.967
3845	IMC	330	0.0000184501	144.73	0.634	2.967
3846	IMQ	702	0.0000392484	160.10	0.702	0.967
3847	IME	1354	0.0000757013	157.70	0.691	0.967
3848	IMG	1011	0.0000565244	131.93	0.578	2.000
3849	IMH	428	0.0000239292	163.63	0.717	1.067
3850	IMI	554	0.0000309738	164.93	0.723	3.633
3851	IML	1192	0.0000666440	164.97	0.723	3.400
3852	IMK	1197	0.0000669236	166.07	0.728	0.833
3853	IMM	316	0.0000176674	165.97	0.727	2.767
3854	IMF	473	0.0000264451	174.27	0.764	3.067
3855	IMP	615	0.0000343843	151.27	0.663	1.600
3856	IMS	1064	0.0000594876	142.10	0.623	1.867
3857	IMT	918	0.0000513248	150.80	0.661	1.900
3858	IMW	144	0.0000080510	186.37	0.817	1.833
3859	IMY	435	0.0000243206	175.97	0.771	1.700
3860	IMV	948	0.0000530021	156.63	0.686	3.533
3861	IFA	1848	0.0001033206	148.60	0.651	3.033
3862	IFR	1639	0.0000916355	183.27	0.803	0.933
3863	IFN	1378	0.0000770432	160.17	0.702	1.267
3864	IFD	1438	0.0000803977	157.70	0.691	1.267
3865	IFC	801	0.0000447834	153.03	0.671	3.267
3866	IFQ	1697	0.0000948783	168.40	0.738	1.267
3867	IFE	1642	0.0000918032	166.00	0.727	1.267
3868	IFG	2116	0.0001183043	140.23	0.615	2.300
3869	IFH	926	0.0000517721	171.93	0.753	1.367
3870	IFI	1854	0.0001036560	173.23	0.759	3.933
3871	IFL	3469	0.0001939497	173.27	0.759	3.700
3872	IFK	1620	0.0000905732	174.37	0.764	1.133
3873	IFM	645	0.0000360616	174.27	0.764	3.067
3874	IFF	1473	0.0000823545	182.57	0.800	3.367
3875	IFP	1627	0.0000909646	159.57	0.699	1.900
3876	IFS	3009	0.0001682314	150.40	0.659	2.167
3877	IFT	2101	0.0001174656	159.10	0.697	2.200
3878	IFW	420	0.0000234819	194.67	0.853	2.133
3879	IFY	1100	0.0000615003	184.27	0.807	2.000
3880	IFV	1734	0.0000969469	164.93	0.723	3.833
3881	IPA	3471	0.0001940615	125.60	0.550	1.567
3882	IPR	2298	0.0001284798	160.27	0.702	-0.533
3883	IPN	1534	0.0000857650	137.17	0.601	-0.200
3884	IPD	2095	0.0001171302	134.70	0.590	-0.200
3885	IPC	823	0.0000460134	130.03	0.570	1.800
3886	IPQ	2167	0.0001211557	145.40	0.637	-0.200
3887	IPE	3691	0.0002063616	143.00	0.627	-0.200
3888	IPG	3598	0.0002011620	117.23	0.514	0.833
3889	IPH	1079	0.0000603262	148.93	0.653	-0.100
3890	IPI	1851	0.0001034883	150.23	0.658	2.467
3891	IPL	3836	0.0002144685	150.27	0.658	2.233
3892	IPK	2400	0.0001341826	151.37	0.663	-0.333
3893	IPM	828	0.0000462930	151.27	0.663	1.600
3894	IPF	1774	0.0000991833	159.57	0.699	1.900

3895	IPP	3444	0.0001925520	136.57	0.598	0.433
3896	IPS	3667	0.0002050198	127.40	0.558	0.700
3897	IPT	2343	0.0001309957	136.10	0.596	0.733
3898	IPW	453	0.0000253270	171.67	0.752	0.667
3899	IPY	1085	0.0000606617	161.27	0.707	0.533
3900	IPV	3244	0.0001813701	141.93	0.622	2.367
3901	ISA	3964	0.0002216249	116.43	0.510	1.833
3902	ISR	3613	0.0002020007	151.10	0.662	-0.267
3903	ISN	2525	0.0001411712	128.00	0.561	0.067
3904	ISD	3308	0.0001849483	125.53	0.550	0.067
3905	ISC	1285	0.0000718436	120.87	0.530	2.067
3906	ISQ	3042	0.0001700764	136.23	0.597	0.067
3907	ISE	4369	0.0002442682	133.83	0.586	0.067
3908	ISG	3935	0.0002200035	108.07	0.474	1.100
3909	ISH	1774	0.0000991833	139.77	0.612	0.167
3910	ISI	2897	0.0001619695	141.07	0.618	2.733
3911	ISL	5663	0.0003166149	141.10	0.618	2.500
3912	ISK	3760	0.0002102193	142.20	0.623	-0.067
3913	ISM	1156	0.0000646313	142.10	0.623	1.867
3914	ISF	2570	0.0001436872	150.40	0.659	2.167
3915	ISP	3639	0.0002034543	127.40	0.558	0.700
3916	ISS	6574	0.0003675484	118.23	0.518	0.967
3917	IST	3356	0.0001876319	126.93	0.556	1.000
3918	ISW	878	0.0000490885	162.50	0.712	0.933
3919	ISY	1813	0.0001013637	152.10	0.667	0.800
3920	ISV	3734	0.0002087657	132.77	0.582	2.633
3921	ITA	3143	0.0001757232	125.13	0.548	1.867
3922	ITR	1955	0.0001093029	159.80	0.700	-0.233
3923	ITN	1856	0.0001037678	136.70	0.599	0.100
3924	ITD	2327	0.0001301012	134.23	0.588	0.100
3925	ITC	1052	0.0000588167	129.57	0.568	2.100
3926	ITQ	1880	0.0001051097	144.93	0.635	0.100
3927	ITE	2813	0.0001572731	142.53	0.625	0.100
3928	ITG	3063	0.0001712505	116.77	0.512	1.133
3929	ITH	1229	0.0000687127	148.47	0.651	0.200
3930	ITI	2297	0.0001284239	149.77	0.656	2.767
3931	ITL	3877	0.0002167607	149.80	0.656	2.533
3932	ITK	2526	0.0001412271	150.90	0.661	-0.033
3933	ITM	865	0.0000483616	150.80	0.661	1.900
3934	ITF	1805	0.0001009165	159.10	0.697	2.200
3935	ITP	2305	0.0001288712	136.10	0.596	0.733
3936	ITS	3645	0.0002037898	126.93	0.556	1.000
3937	ITT	2784	0.0001556518	135.63	0.594	1.033
3938	ITW	718	0.0000401429	171.20	0.750	0.967
3939	ITY	1300	0.0000726822	160.80	0.705	0.833
3940	ITV	3222	0.0001801401	141.47	0.620	2.667
3941	IWA	623	0.0000348316	160.70	0.704	1.800
3942	IWR	440	0.0000246001	195.37	0.856	-0.300
3943	IWN	538	0.0000300793	172.27	0.755	0.033
3944	IWD	737	0.0000412052	169.80	0.744	0.033
3945	IWC	137	0.0000076596	165.13	0.724	2.033
3946	IWQ	338	0.0000188974	180.50	0.791	0.033

3947	IWE	608	0.0000339929	178.10	0.780	0.033
3948	IWG	531	0.0000296879	152.33	0.668	1.067
3949	IWH	236	0.0000131946	184.03	0.806	0.133
3950	IWI	382	0.0000213574	185.33	0.812	2.700
3951	IWL	708	0.0000395839	185.37	0.812	2.467
3952	IWK	640	0.0000357820	186.47	0.817	-0.100
3953	IWM	232	0.0000129710	186.37	0.817	1.833
3954	IWF	396	0.0000221401	194.67	0.853	2.133
3955	IWP	314	0.0000175556	171.67	0.752	0.667
3956	IWS	807	0.0000451189	162.50	0.712	0.933
3957	IWT	515	0.0000287933	171.20	0.750	0.967
3958	IWW	128	0.0000071564	206.77	0.906	0.900
3959	IWY	258	0.0000144246	196.37	0.861	0.767
3960	IWV	472	0.0000263892	177.03	0.776	2.600
3961	IYA	1220	0.0000682095	150.30	0.659	1.667
3962	IYR	1247	0.0000697190	184.97	0.811	-0.433
3963	IYN	1198	0.0000669795	161.87	0.709	-0.100
3964	IYD	1277	0.0000713963	159.40	0.699	-0.100
3965	IYC	596	0.0000333220	154.73	0.678	1.900
3966	IYQ	1265	0.0000707254	170.10	0.745	-0.100
3967	IYE	1478	0.0000826341	167.70	0.735	-0.100
3968	IYG	1420	0.0000793913	141.93	0.622	0.933
3969	IYH	743	0.0000415407	173.63	0.761	0.000
3970	IYI	1252	0.0000699986	174.93	0.767	2.567
3971	IYL	1920	0.0001073460	174.97	0.767	2.333
3972	IYK	1438	0.0000803977	176.07	0.772	-0.233
3973	IYM	443	0.0000247679	175.97	0.771	1.700
3974	IYF	1181	0.0000660290	184.27	0.807	2.000
3975	IYP	1064	0.0000594876	161.27	0.707	0.533
3976	IYS	1983	0.0001108683	152.10	0.667	0.800
3977	IYT	1735	0.0000970028	160.80	0.705	0.833
3978	IYW	327	0.0000182824	196.37	0.861	0.767
3979	IYY	710	0.0000396957	185.97	0.815	0.633
3980	IYV	1575	0.0000880573	166.63	0.730	2.467
3981	IVA	2886	0.0001613545	130.97	0.574	3.500
3982	IVR	2031	0.0001135520	165.63	0.726	1.400
3983	IVN	1801	0.0001006928	142.53	0.625	1.733
3984	IVD	2338	0.0001307162	140.07	0.614	1.733
3985	IVC	858	0.0000479703	135.40	0.593	3.733
3986	IVQ	1920	0.0001073460	150.77	0.661	1.733
3987	IVE	3085	0.0001724805	148.37	0.650	1.733
3988	IVG	2862	0.0001600127	122.60	0.537	2.767
3989	IVH	1363	0.0000762045	154.30	0.676	1.833
3990	IVI	2109	0.0001179129	155.60	0.682	4.400
3991	IVL	3780	0.0002113375	155.63	0.682	4.167
3992	IVK	2390	0.0001336235	156.73	0.687	1.600
3993	IVM	911	0.0000509335	156.63	0.686	3.533
3994	IVF	1688	0.0000943751	164.93	0.723	3.833
3995	IVP	2101	0.0001174656	141.93	0.622	2.367
3996	IVS	3446	0.0001926638	132.77	0.582	2.633
3997	IVT	2731	0.0001526886	141.47	0.620	2.667
3998	IVW	383	0.0000214133	177.03	0.776	2.600

3999	IVY	1158	0.0000647431	166.63	0.730	2.467
4000	IVV	2741	0.0001532477	147.30	0.645	4.300
4001	LAA	12435	0.0006952334	114.67	0.502	2.467
4002	LAR	7471	0.0004176991	149.33	0.654	0.367
4003	LAN	3814	0.0002132385	126.23	0.553	0.700
4004	LAD	5363	0.0002998421	123.77	0.542	0.700
4005	LAC	2671	0.0001493340	119.10	0.522	2.700
4006	LAQ	6550	0.0003662066	134.47	0.589	0.700
4007	LAE	8672	0.0004848463	132.07	0.579	0.700
4008	LAG	8214	0.0004592398	106.30	0.466	1.733
4009	LAH	2966	0.0001658273	138.00	0.605	0.800
4010	LAI	4350	0.0002432059	139.30	0.610	3.367
4011	LAL	13066	0.0007305122	139.33	0.611	3.133
4012	LAK	6110	0.0003416064	140.43	0.615	0.567
4013	LAM	2310	0.0001291507	140.33	0.615	2.500
4014	LAF	4137	0.0002312972	148.63	0.651	2.800
4015	LAP	6914	0.0003865576	125.63	0.551	1.333
4016	LAS	10648	0.0005953233	116.47	0.510	1.600
4017	LAT	6080	0.0003399292	125.17	0.548	1.633
4018	LAW	1680	0.0000939278	160.73	0.704	1.567
4019	LAY	2363	0.0001321139	150.33	0.659	1.433
4020	LAV	8208	0.0004589044	131.00	0.574	3.267
4021	LRA	8398	0.0004695271	149.33	0.654	0.367
4022	LRR	9030	0.0005048619	184.00	0.806	-1.733
4023	LRN	4685	0.0002619356	160.90	0.705	-1.400
4024	LRD	5574	0.0003116390	158.43	0.694	-1.400
4025	LRC	2193	0.0001226093	153.77	0.674	0.600
4026	LRQ	5628	0.0003146581	169.13	0.741	-1.400
4027	LRE	8530	0.0004769072	166.73	0.731	-1.400
4028	LRG	7052	0.0003942731	140.97	0.618	-0.367
4029	LRH	3121	0.0001744932	172.67	0.757	-1.300
4030	LRI	3732	0.0002086539	173.97	0.762	1.267
4031	LRL	9923	0.0005547890	174.00	0.762	1.033
4032	LRK	7368	0.0004119404	175.10	0.767	-1.533
4033	LRM	1651	0.0000923064	175.00	0.767	0.400
4034	LRF	3098	0.0001732073	183.30	0.803	0.700
4035	LRP	6354	0.0003552483	160.30	0.702	-0.767
4036	LRS	8028	0.0004488407	151.13	0.662	-0.500
4037	LRT	5179	0.0002895548	159.83	0.700	-0.467
4038	LRW	1254	0.0000701104	195.40	0.856	-0.533
4039	LRY	2399	0.0001341266	185.00	0.811	-0.667
4040	LRV	5957	0.0003330523	165.67	0.726	1.167
4041	LNA	3257	0.0001820969	126.23	0.553	0.700
4042	LNR	3319	0.0001855633	160.90	0.705	-1.400
4043	LNN	2552	0.0001426808	137.80	0.604	-1.067
4044	LND	2670	0.0001492781	135.33	0.593	-1.067
4045	LNC	1289	0.0000720672	130.67	0.573	0.933
4046	LNQ	2911	0.0001627523	146.03	0.640	-1.067
4047	LNE	4131	0.0002309617	143.63	0.629	-1.067
4048	LNG	3720	0.0002079830	117.87	0.517	-0.033
4049	LNH	1678	0.0000938160	149.57	0.655	-0.967
4050	LNI	3035	0.0001696850	150.87	0.661	1.600

4051	LNL	5601	0.0003131485	150.90	0.661	1.367
4052	LNK	3676	0.0002055230	152.00	0.666	-1.200
4053	LNM	1278	0.0000714522	151.90	0.666	0.733
4054	LNF	2168	0.0001212116	160.20	0.702	1.033
4055	LNP	3784	0.0002115612	137.20	0.601	-0.433
4056	LNS	5442	0.0003042590	128.03	0.561	-0.167
4057	LNT	3135	0.0001752760	136.73	0.599	-0.133
4058	LNW	741	0.0000414289	172.30	0.755	-0.200
4059	LNY	1511	0.0000844791	161.90	0.709	-0.333
4060	LNV	3528	0.0001972484	142.57	0.625	1.500
4061	LDA	5082	0.0002841316	123.77	0.542	0.700
4062	LDR	4737	0.0002648428	158.43	0.694	-1.400
4063	LDN	2904	0.0001623609	135.33	0.593	-1.067
4064	LDD	4207	0.0002352108	132.87	0.582	-1.067
4065	LDC	1613	0.0000901819	128.20	0.562	0.933
4066	LDQ	3501	0.0001957388	143.57	0.629	-1.067
4067	LDE	5855	0.0003273495	141.17	0.619	-1.067
4068	LDG	5107	0.0002855293	115.40	0.506	-0.033
4069	LDH	2122	0.0001186397	147.10	0.645	-0.967
4070	LDI	3879	0.0002168726	148.40	0.650	1.600
4071	LDL	8418	0.0004706453	148.43	0.650	1.367
4072	LDK	4479	0.0002504182	149.53	0.655	-1.200
4073	LDM	1710	0.0000956051	149.43	0.655	0.733
4074	LDF	3280	0.0001833828	157.73	0.691	1.033
4075	LDP	5134	0.0002870389	134.73	0.590	-0.433
4076	LDS	7022	0.0003925958	125.57	0.550	-0.167
4077	LDT	4308	0.0002408577	134.27	0.588	-0.133
4078	LDW	970	0.0000542321	169.83	0.744	-0.200
4079	LDY	2324	0.0001299334	159.43	0.699	-0.333
4080	LDV	4917	0.0002749065	140.10	0.614	1.500
4081	LCA	2724	0.0001522972	119.10	0.522	2.700
4082	LCR	2586	0.0001445817	153.77	0.674	0.600
4083	LCN	1368	0.0000764841	130.67	0.573	0.933
4084	LCD	1851	0.0001034883	128.20	0.562	0.933
4085	LCC	1344	0.0000751422	123.53	0.541	2.933
4086	LCQ	2065	0.0001154529	138.90	0.609	0.933
4087	LCE	2216	0.0001238952	136.50	0.598	0.933
4088	LCG	3070	0.0001716419	110.73	0.485	1.967
4089	LCH	1290	0.0000721231	142.43	0.624	1.033
4090	LCI	1398	0.0000781613	143.73	0.630	3.600
4091	LCL	4333	0.0002422554	143.77	0.630	3.367
4092	LCK	2031	0.0001135520	144.87	0.635	0.800
4093	LCM	602	0.0000336575	144.77	0.634	2.733
4094	LCF	1474	0.0000824105	153.07	0.671	3.033
4095	LCP	2531	0.0001415067	130.07	0.570	1.567
4096	LCS	3569	0.0001995406	120.90	0.530	1.833
4097	LCT	1975	0.0001104211	129.60	0.568	1.867
4098	LCW	579	0.0000323715	165.17	0.724	1.800
4099	LCY	1052	0.0000588167	154.77	0.678	1.667
4100	LCV	2145	0.0001199257	135.43	0.593	3.500
4101	LQA	8848	0.0004946864	134.47	0.589	0.700
4102	LQR	6558	0.0003666538	169.13	0.741	-1.400

4103	LQN	4067	0.0002273835	146.03	0.640	-1.067
4104	LQD	5871	0.0003282441	143.57	0.629	-1.067
4105	LQC	1805	0.0001009165	138.90	0.609	0.933
4106	LQQ	6830	0.0003818612	154.27	0.676	-1.067
4107	LQE	9869	0.0005517699	151.87	0.665	-1.067
4108	LQG	6416	0.0003587147	126.10	0.553	-0.033
4109	LQH	2967	0.0001658832	157.80	0.691	-0.967
4110	LQI	3368	0.0001883029	159.10	0.697	1.600
4111	LQL	9030	0.0005048619	159.13	0.697	1.367
4112	LQK	6680	0.0003734748	160.23	0.702	-1.200
4113	LQM	1870	0.0001045506	160.13	0.702	0.733
4114	LQF	2429	0.0001358039	168.43	0.738	1.033
4115	LQP	6006	0.0003357918	145.43	0.637	-0.433
4116	LQS	6773	0.0003786744	136.27	0.597	-0.167
4117	LQT	4709	0.0002632774	144.97	0.635	-0.133
4118	LQW	1085	0.0000606617	180.53	0.791	-0.200
4119	LQY	2005	0.0001120983	170.13	0.746	-0.333
4120	LQV	5788	0.0003236036	150.80	0.661	1.500
4121	LEA	9824	0.0005492539	132.07	0.579	0.700
4122	LER	7931	0.0004434175	166.73	0.731	-1.400
4123	LEN	6406	0.0003581556	143.63	0.629	-1.067
4124	LED	7592	0.0004244642	141.17	0.619	-1.067
4125	LEC	2086	0.0001166270	136.50	0.598	0.933
4126	LEQ	6977	0.0003900799	151.87	0.665	-1.067
4127	LEE	14262	0.0007973799	149.47	0.655	-1.067
4128	LEG	7280	0.0004070204	123.70	0.542	-0.033
4129	LEH	2862	0.0001600127	155.40	0.681	-0.967
4130	LEI	4284	0.0002395159	156.70	0.687	1.600
4131	LEL	10193	0.0005698845	156.73	0.687	1.367
4132	LEK	10198	0.0005701641	157.83	0.692	-1.200
4133	LEM	2497	0.0001396058	157.73	0.691	0.733
4134	LEF	2832	0.0001583354	166.03	0.728	1.033
4135	LEP	5690	0.0003181245	143.03	0.627	-0.433
4136	LES	8131	0.0004545993	133.87	0.587	-0.167
4137	LET	5894	0.0003295300	142.57	0.625	-0.133
4138	LEW	1175	0.0000656935	178.13	0.781	-0.200
4139	LEY	2479	0.0001385994	167.73	0.735	-0.333
4140	LEV	6302	0.0003523410	148.40	0.650	1.500
4141	LGA	8391	0.0004691358	106.30	0.466	1.733
4142	LGR	6571	0.0003673807	140.97	0.618	-0.367
4143	LGN	4067	0.0002273835	117.87	0.517	-0.033
4144	LGD	5013	0.0002802738	115.40	0.506	-0.033
4145	LGC	2486	0.0001389908	110.73	0.485	1.967
4146	LGQ	4735	0.0002647310	126.10	0.553	-0.033
4147	LGE	6226	0.0003480919	123.70	0.542	-0.033
4148	LGG	7741	0.0004327947	97.93	0.429	1.000
4149	LGH	2839	0.0001587268	129.63	0.568	0.067
4150	LGI	4861	0.0002717756	130.93	0.574	2.633
4151	LGL	12504	0.0006990911	130.97	0.574	2.400
4152	LGK	5612	0.0003137636	132.07	0.579	-0.167
4153	LGM	2195	0.0001227211	131.97	0.578	1.767
4154	LGF	4102	0.0002293404	140.27	0.615	2.067

4155	LGP	7886	0.0004409015	117.27	0.514	0.600
4156	LGS	9796	0.0005476885	108.10	0.474	0.867
4157	LGT	5857	0.0003274613	116.80	0.512	0.900
4158	LGW	1378	0.0000770432	152.37	0.668	0.833
4159	LGY	2580	0.0001442463	141.97	0.622	0.700
4160	LGV	6101	0.0003411032	122.63	0.537	2.533
4161	LHA	2709	0.0001514586	138.00	0.605	0.800
4162	LHR	3253	0.0001818733	172.67	0.757	-1.300
4163	LHN	1852	0.0001035442	149.57	0.655	-0.967
4164	LHD	1848	0.0001033206	147.10	0.645	-0.967
4165	LHC	1443	0.0000806773	142.43	0.624	1.033
4166	LHQ	2791	0.0001560431	157.80	0.691	-0.967
4167	LHE	2675	0.0001495576	155.40	0.681	-0.967
4168	LHG	2900	0.0001621373	129.63	0.568	0.067
4169	LHH	1646	0.0000920269	161.33	0.707	-0.867
4170	LHI	2169	0.0001212675	162.63	0.713	1.700
4171	LHL	5682	0.0003176772	162.67	0.713	1.467
4172	LHK	2341	0.0001308839	163.77	0.718	-1.100
4173	LHM	876	0.0000489766	163.67	0.717	0.833
4174	LHF	1852	0.0001035442	171.97	0.754	1.133
4175	LHP	3108	0.0001737664	148.97	0.653	-0.333
4176	LHS	4360	0.0002437650	139.80	0.613	-0.067
4177	LHT	2886	0.0001613545	148.50	0.651	-0.033
4178	LHW	673	0.0000376270	184.07	0.807	-0.100
4179	LHY	1599	0.0000893991	173.67	0.761	-0.233
4180	LHV	2729	0.0001525768	154.33	0.676	1.600
4181	LIA	3948	0.0002207303	139.30	0.610	3.367
4182	LIR	3789	0.0002118407	173.97	0.762	1.267
4183	LIN	2778	0.0001553163	150.87	0.661	1.600
4184	LID	3192	0.0001784628	148.40	0.650	1.600
4185	LIC	1597	0.0000892873	143.73	0.630	3.600
4186	LIQ	3973	0.0002221280	159.10	0.697	1.600
4187	LIE	3845	0.0002149716	156.70	0.687	1.600
4188	LIG	3782	0.0002114494	130.93	0.574	2.633
4189	LIH	2018	0.0001128252	162.63	0.713	1.700
4190	LII	3288	0.0001838301	163.93	0.718	4.267
4191	LIL	6625	0.0003703998	163.97	0.719	4.033
4192	LIK	4152	0.0002321358	165.07	0.723	1.467
4193	LIM	1131	0.0000632335	164.97	0.723	3.400
4194	LIF	2812	0.0001572172	173.27	0.759	3.700
4195	LIP	3714	0.0002076475	150.27	0.658	2.233
4196	LIS	5710	0.0003192427	141.10	0.618	2.500
4197	LIT	3694	0.0002065293	149.80	0.656	2.533
4198	LIW	700	0.0000391366	185.37	0.812	2.467
4199	LIY	2012	0.0001124897	174.97	0.767	2.333
4200	LIV	3574	0.0001998202	155.63	0.682	4.167
4201	LLA	14751	0.0008247196	139.33	0.611	3.133
4202	LLR	11656	0.0006516800	174.00	0.762	1.033
4203	LLN	6419	0.0003588824	150.90	0.661	1.367
4204	LLD	9691	0.0005418180	148.43	0.650	1.367
4205	LLC	4580	0.0002560650	143.77	0.630	3.367
4206	LLQ	11691	0.0006536368	159.13	0.697	1.367

4207	LLE	13494	0.0007544414	156.73	0.687	1.367
4208	LLG	12966	0.0007249213	130.97	0.574	2.400
4209	LLH	5526	0.0003089554	162.67	0.713	1.467
4210	LLI	6289	0.0003516142	163.97	0.719	4.033
4211	LLL	25279	0.0014133340	164.00	0.719	3.800
4212	LLK	10290	0.0005753077	165.10	0.723	1.233
4213	LLM	3046	0.0001703000	165.00	0.723	3.167
4214	LLF	6514	0.0003641938	173.30	0.759	3.467
4215	LLP	11945	0.0006678378	150.30	0.659	2.000
4216	LLS	15494	0.0008662603	141.13	0.618	2.267
4217	LLT	9409	0.0005260516	149.83	0.657	2.300
4218	LLW	2431	0.0001359157	185.40	0.812	2.233
4219	LLY	4189	0.0002342045	175.00	0.767	2.100
4220	LLV	10653	0.0005956028	155.67	0.682	3.933
4221	LKA	7056	0.0003944967	140.43	0.615	0.567
4222	LKR	5678	0.0003174536	175.10	0.767	-1.533
4223	LKN	4818	0.0002693715	152.00	0.666	-1.200
4224	LKD	5946	0.0003324373	149.53	0.655	-1.200
4225	LKC	1610	0.0000900141	144.87	0.635	0.800
4226	LKQ	5105	0.0002854175	160.23	0.702	-1.200
4227	LKE	9920	0.0005546212	157.83	0.692	-1.200
4228	LKG	5413	0.0003026376	132.07	0.579	-0.167
4229	LKH	2637	0.0001474331	163.77	0.718	-1.100
4230	LKI	4051	0.0002264890	165.07	0.723	1.467
4231	LKL	7526	0.0004207741	165.10	0.723	1.233
4232	LKK	8178	0.0004572271	166.20	0.728	-1.333
4233	LKM	2119	0.0001184720	166.10	0.728	0.600
4234	LKF	2428	0.0001357480	174.40	0.764	0.900
4235	LKP	4910	0.0002745152	151.40	0.663	-0.567
4236	LKS	6767	0.0003783389	142.23	0.623	-0.300
4237	LKT	5454	0.0003049299	150.93	0.661	-0.267
4238	LKW	933	0.0000521635	186.50	0.817	-0.333
4239	LKY	2383	0.0001332321	176.10	0.772	-0.467
4240	LKV	5321	0.0002974939	156.77	0.687	1.367
4241	LMA	2634	0.0001472654	140.33	0.615	2.500
4242	LMR	1649	0.0000921946	175.00	0.767	0.400
4243	LMN	1340	0.0000749186	151.90	0.666	0.733
4244	LMD	1869	0.0001044947	149.43	0.655	0.733
4245	LMC	542	0.0000303029	144.77	0.634	2.733
4246	LMQ	1433	0.0000801182	160.13	0.702	0.733
4247	LME	2783	0.0001555959	157.73	0.691	0.733
4248	LMG	1991	0.0001113156	131.97	0.578	1.767
4249	LMH	741	0.0000414289	163.67	0.717	0.833
4250	LMI	1059	0.0000592081	164.97	0.723	3.400
4251	LML	2663	0.0001488867	165.00	0.723	3.167
4252	LMK	2289	0.0001279766	166.10	0.728	0.600
4253	LMM	650	0.0000363411	166.00	0.727	2.533
4254	LMF	953	0.0000532817	174.30	0.764	2.833
4255	LMP	1419	0.0000793354	151.30	0.663	1.367
4256	LMS	2214	0.0001237834	142.13	0.623	1.633
4257	LMT	1743	0.0000974501	150.83	0.661	1.667
4258	LMW	411	0.0000229788	186.40	0.817	1.600

4259	LMY	723	0.0000404225	176.00	0.771	1.467
4260	LMV	2002	0.0001119306	156.67	0.687	3.300
4261	LFA	3344	0.0001869610	148.63	0.651	2.800
4262	LFR	3249	0.0001816496	183.30	0.803	0.700
4263	LFN	2186	0.0001222179	160.20	0.702	1.033
4264	LFD	2602	0.0001454763	157.73	0.691	1.033
4265	LFC	1651	0.0000923064	153.07	0.671	3.033
4266	LFQ	3084	0.0001724246	168.43	0.738	1.033
4267	LFE	3148	0.0001760028	166.03	0.728	1.033
4268	LFG	3752	0.0002097721	140.27	0.615	2.067
4269	LFH	1661	0.0000928655	171.97	0.754	1.133
4270	LFI	2665	0.0001489985	173.27	0.759	3.700
4271	LFL	7025	0.0003927635	173.30	0.759	3.467
4272	LFK	2607	0.0001457558	174.40	0.764	0.900
4273	LFM	1131	0.0000632335	174.30	0.764	2.833
4274	LFF	2539	0.0001419540	182.60	0.800	3.133
4275	LFP	3568	0.0001994847	159.60	0.699	1.667
4276	LFS	5658	0.0003163354	150.43	0.659	1.933
4277	LFT	3081	0.0001722569	159.13	0.697	1.967
4278	LFW	801	0.0000447834	194.70	0.853	1.900
4279	LFY	1846	0.0001032088	184.30	0.808	1.767
4280	LFV	3404	0.0001903156	164.97	0.723	3.600
4281	LPA	9031	0.0005049178	125.63	0.551	1.333
4282	LPR	6484	0.0003625166	160.30	0.702	-0.767
4283	LPN	3085	0.0001724805	137.20	0.601	-0.433
4284	LPD	4752	0.0002656815	134.73	0.590	-0.433
4285	LPC	2256	0.0001261316	130.07	0.570	1.567
4286	LPQ	5270	0.0002946426	145.43	0.637	-0.433
4287	LPE	7597	0.0004247437	143.03	0.627	-0.433
4288	LPG	10168	0.0005684868	117.27	0.514	0.600
4289	LPH	2743	0.0001533595	148.97	0.653	-0.333
4290	LPI	2992	0.0001672809	150.27	0.658	2.233
4291	LPL	10289	0.0005752518	150.30	0.659	2.000
4292	LPK	4834	0.0002702660	151.40	0.663	-0.567
4293	LPM	1425	0.0000796709	151.30	0.663	1.367
4294	LPF	3480	0.0001945647	159.60	0.699	1.667
4295	LPP	12055	0.0006739878	136.60	0.599	0.200
4296	LPS	10362	0.0005793332	127.43	0.558	0.467
4297	LPT	5436	0.0003039235	136.13	0.597	0.500
4298	LPW	1415	0.0000791118	171.70	0.752	0.433
4299	LPY	2135	0.0001193666	161.30	0.707	0.300
4300	LPV	6681	0.0003735307	141.97	0.622	2.133
4301	LSA	9620	0.0005378484	116.47	0.510	1.600
4302	LSR	8668	0.0004846227	151.13	0.662	-0.500
4303	LSN	4826	0.0002698188	128.03	0.561	-0.167
4304	LSD	6631	0.0003707352	125.57	0.550	-0.167
4305	LSC	3414	0.0001908747	120.90	0.530	1.833
4306	LSQ	7027	0.0003928753	136.27	0.597	-0.167
4307	LSE	9032	0.0005049737	133.87	0.587	-0.167
4308	LSG	9053	0.0005061478	108.10	0.474	0.867
4309	LSH	4006	0.0002239731	139.80	0.613	-0.067
4310	LSI	4772	0.0002667996	141.10	0.618	2.500

4311	LSL	14141	0.0007906148	141.13	0.618	2.267
4312	LSK	7050	0.0003941613	142.23	0.623	-0.300
4313	LSM	2307	0.0001289830	142.13	0.623	1.633
4314	LSF	4831	0.0002700983	150.43	0.659	1.933
4315	LSP	11049	0.0006177429	127.43	0.558	0.467
4316	LSS	14383	0.0008041449	118.27	0.518	0.733
4317	LST	7349	0.0004108782	126.97	0.556	0.767
4318	LSW	2152	0.0001203170	162.53	0.712	0.700
4319	LSY	3289	0.0001838860	152.13	0.667	0.567
4320	LSV	7889	0.0004410692	132.80	0.582	2.400
4321	LTA	6814	0.0003809666	125.17	0.548	1.633
4322	LTR	4829	0.0002699865	159.83	0.700	-0.467
4323	LTN	3210	0.0001794692	136.73	0.599	-0.133
4324	LTD	4194	0.0002344840	134.27	0.588	-0.133
4325	LTC	2317	0.0001295421	129.60	0.568	1.867
4326	LTQ	4410	0.0002465605	144.97	0.635	-0.133
4327	LTE	6462	0.0003612865	142.57	0.625	-0.133
4328	LTG	5710	0.0003192427	116.80	0.512	0.900
4329	LTH	2300	0.0001285916	148.50	0.651	-0.033
4330	LTI	3754	0.0002098839	149.80	0.656	2.533
4331	LTL	8808	0.0004924500	149.83	0.657	2.300
4332	LTK	4533	0.0002534373	150.93	0.661	-0.267
4333	LTM	1565	0.0000874982	150.83	0.661	1.667
4334	LTF	3440	0.0001923283	159.13	0.697	1.967
4335	LTP	6128	0.0003426128	136.13	0.597	0.500
4336	LTS	7443	0.0004161337	126.97	0.556	0.767
4337	LTT	4954	0.0002769752	135.67	0.595	0.800
4338	LTW	1350	0.0000754777	171.23	0.750	0.733
4339	LTY	2220	0.0001241189	160.83	0.705	0.600
4340	LTV	6306	0.0003525647	141.50	0.620	2.433
4341	LWA	1731	0.0000967792	160.73	0.704	1.567
4342	LWR	1522	0.0000850941	195.40	0.856	-0.533
4343	LWN	939	0.0000524989	172.30	0.755	-0.200
4344	LWD	1215	0.0000679299	169.83	0.744	-0.200
4345	LWC	400	0.0000223638	165.17	0.724	1.800
4346	LWQ	892	0.0000498712	180.53	0.791	-0.200
4347	LWE	1616	0.0000903496	178.13	0.781	-0.200
4348	LWG	1504	0.0000840877	152.37	0.668	0.833
4349	LWH	490	0.0000273956	184.07	0.807	-0.100
4350	LWI	786	0.0000439448	185.37	0.812	2.467
4351	LWL	2127	0.0001189193	185.40	0.812	2.233
4352	LWK	1463	0.0000817954	186.50	0.817	-0.333
4353	LWM	428	0.0000239292	186.40	0.817	1.600
4354	LWF	657	0.0000367325	194.70	0.853	1.900
4355	LWP	1093	0.0000611090	171.70	0.752	0.433
4356	LWS	1455	0.0000813482	162.53	0.712	0.700
4357	LWT	1065	0.0000595435	171.23	0.750	0.733
4358	LWW	295	0.0000164933	206.80	0.906	0.667
4359	LWY	449	0.0000251033	196.40	0.861	0.533
4360	LWV	1249	0.0000698308	177.07	0.776	2.367
4361	LYA	2465	0.0001378167	150.33	0.659	1.433
4362	LYR	3071	0.0001716978	185.00	0.811	-0.667

4363	LYN	1802	0.0001007487	161.90	0.709	-0.333
4364	LYD	2054	0.0001148379	159.43	0.699	-0.333
4365	LYC	1096	0.0000612767	154.77	0.678	1.667
4366	LYQ	2172	0.0001214352	170.13	0.746	-0.333
4367	LYE	2664	0.0001489426	167.73	0.735	-0.333
4368	LYG	2773	0.0001550368	141.97	0.622	0.700
4369	LYH	1356	0.0000758131	173.67	0.761	-0.233
4370	LYI	1777	0.0000993510	174.97	0.767	2.333
4371	LYL	4269	0.0002386772	175.00	0.767	2.100
4372	LYK	2602	0.0001454763	176.10	0.772	-0.467
4373	LYM	842	0.0000470757	176.00	0.771	1.467
4374	LYF	1823	0.0001019228	184.30	0.808	1.767
4375	LYP	2297	0.0001284239	161.30	0.707	0.300
4376	LYS	3492	0.0001952356	152.13	0.667	0.567
4377	LYT	2334	0.0001304925	160.83	0.705	0.600
4378	LYW	621	0.0000347197	196.40	0.861	0.533
4379	LYY	1369	0.0000765400	186.00	0.815	0.400
4380	LYV	2358	0.0001318344	166.67	0.730	2.233
4381	LVA	7586	0.0004241287	131.00	0.574	3.267
4382	LVR	5132	0.0002869270	165.67	0.726	1.167
4383	LVN	3826	0.0002139094	142.57	0.625	1.500
4384	LVD	4855	0.0002714401	140.10	0.614	1.500
4385	LVC	2325	0.0001299893	135.43	0.593	3.500
4386	LVQ	4842	0.0002707133	150.80	0.661	1.500
4387	LVE	6481	0.0003623488	148.40	0.650	1.500
4388	LVG	6242	0.0003489865	122.63	0.537	2.533
4389	LVH	2719	0.0001520177	154.33	0.676	1.600
4390	LVI	4065	0.0002272717	155.63	0.682	4.167
4391	LVL	10552	0.0005899560	155.67	0.682	3.933
4392	LVK	5187	0.0002900021	156.77	0.687	1.367
4393	LVM	1752	0.0000979533	156.67	0.687	3.300
4394	LVF	3636	0.0002032866	164.97	0.723	3.600
4395	LVP	5758	0.0003219263	141.97	0.622	2.133
4396	LVS	8030	0.0004489525	132.80	0.582	2.400
4397	LVT	5908	0.0003303127	141.50	0.620	2.433
4398	LVW	1131	0.0000632335	177.07	0.776	2.367
4399	LVY	2353	0.0001315548	166.67	0.730	2.233
4400	LVV	6255	0.0003497133	147.33	0.646	4.067
4401	KAA	5813	0.0003250013	115.77	0.507	-0.100
4402	KAR	3579	0.0002000997	150.43	0.659	-2.200
4403	KAN	2078	0.0001161797	127.33	0.558	-1.867
4404	KAD	2801	0.0001566022	124.87	0.547	-1.867
4405	KAC	1284	0.0000717877	120.20	0.527	0.133
4406	KAQ	3154	0.0001763382	135.57	0.594	-1.867
4407	KAE	5308	0.0002967671	133.17	0.584	-1.867
4408	KAG	4032	0.0002254267	107.40	0.471	-0.833
4409	KAH	1570	0.0000877778	139.10	0.610	-1.767
4410	KAI	3311	0.0001851160	140.40	0.615	0.800
4411	KAL	7461	0.0004171400	140.43	0.615	0.567
4412	KAK	5117	0.0002860884	141.53	0.620	-2.000
4413	KAM	1558	0.0000871068	141.43	0.620	-0.067
4414	KAF	6202	0.0003467501	149.73	0.656	0.233

4415	KAP	3082	0.0001723128	126.73	0.555	-1.233
4416	KAS	4962	0.0002774225	117.57	0.515	-0.967
4417	KAT	3443	0.0001924961	126.27	0.553	-0.933
4418	KAW	709	0.0000396398	161.83	0.709	-1.000
4419	KAY	1760	0.0000984005	151.43	0.664	-1.133
4420	KAV	4735	0.0002647310	132.10	0.579	0.700
4421	KRA	3261	0.0001823206	150.43	0.659	-2.200
4422	KRR	5160	0.0002884925	185.10	0.811	-4.300
4423	KRN	2135	0.0001193666	162.00	0.710	-3.967
4424	KRD	2087	0.0001166829	159.53	0.699	-3.967
4425	KRC	1016	0.0000568040	154.87	0.679	-1.967
4426	KRQ	2810	0.0001571054	170.23	0.746	-3.967
4427	KRE	3892	0.0002175994	167.83	0.735	-3.967
4428	KRG	3158	0.0001765619	142.07	0.623	-2.933
4429	KRH	1675	0.0000936482	173.77	0.761	-3.867
4430	KRI	3236	0.0001809228	175.07	0.767	-1.300
4431	KRL	5702	0.0003187954	175.10	0.767	-1.533
4432	KRK	6214	0.0003474210	176.20	0.772	-4.100
4433	KRM	1205	0.0000673708	176.10	0.772	-2.167
4434	KRF	2062	0.0001152852	184.40	0.808	-1.867
4435	KRP	2857	0.0001597332	161.40	0.707	-3.333
4436	KRS	3950	0.0002208421	152.23	0.667	-3.067
4437	KRT	2545	0.0001422894	160.93	0.705	-3.033
4438	KRW	657	0.0000367325	196.50	0.861	-3.100
4439	KRY	1429	0.0000798945	186.10	0.816	-3.233
4440	KRV	2694	0.0001506199	166.77	0.731	-1.400
4441	KNA	2131	0.0001191429	127.33	0.558	-1.867
4442	KNR	2239	0.0001251811	162.00	0.710	-3.967
4443	KNN	1683	0.0000940955	138.90	0.609	-3.633
4444	KND	1565	0.0000874982	136.43	0.598	-3.633
4445	KNC	1074	0.0000600467	131.77	0.577	-1.633
4446	KNQ	1676	0.0000937042	147.13	0.645	-3.633
4447	KNE	2354	0.0001316107	144.73	0.634	-3.633
4448	KNG	2717	0.0001519058	118.97	0.521	-2.600
4449	KNH	965	0.0000539526	150.67	0.660	-3.533
4450	KNI	2422	0.0001354126	151.97	0.666	-0.967
4451	KNL	4187	0.0002340927	152.00	0.666	-1.200
4452	KNK	3276	0.0001831592	153.10	0.671	-3.767
4453	KNM	988	0.0000552385	153.00	0.670	-1.833
4454	KNF	1638	0.0000915796	161.30	0.707	-1.533
4455	KNP	2035	0.0001137756	138.30	0.606	-3.000
4456	KNS	3104	0.0001735428	129.13	0.566	-2.733
4457	KNT	1818	0.0001016433	137.83	0.604	-2.700
4458	KNW	562	0.0000314211	173.40	0.760	-2.767
4459	KNY	1257	0.0000702781	163.00	0.714	-2.900
4460	KNV	2401	0.0001342385	143.67	0.630	-1.067
4461	KDA	2981	0.0001666659	124.87	0.547	-1.867
4462	KDR	2679	0.0001497813	159.53	0.699	-3.967
4463	KDN	1844	0.0001030969	136.43	0.598	-3.633
4464	KDD	2426	0.0001356362	133.97	0.587	-3.633
4465	KDC	1216	0.0000679858	129.30	0.567	-1.633
4466	KDQ	1972	0.0001102533	144.67	0.634	-3.633

4467	KDE	3317	0.0001854515	142.27	0.623	-3.633
4468	KDG	3866	0.0002161457	116.50	0.511	-2.600
4469	KDH	1255	0.0000701663	148.20	0.649	-3.533
4470	KDI	2981	0.0001666659	149.50	0.655	-0.967
4471	KDL	5775	0.0003228768	149.53	0.655	-1.200
4472	KDK	3861	0.0002158662	150.63	0.660	-3.767
4473	KDM	1312	0.0000733531	150.53	0.660	-1.833
4474	KDF	2384	0.0001332880	158.83	0.696	-1.533
4475	KDP	2732	0.0001527445	135.83	0.595	-3.000
4476	KDS	4357	0.0002435973	126.67	0.555	-2.733
4477	KDT	2529	0.0001413949	135.37	0.593	-2.700
4478	KDW	643	0.0000359497	170.93	0.749	-2.767
4479	KDY	1529	0.0000854855	160.53	0.703	-2.900
4480	KDV	3506	0.0001960184	141.20	0.619	-1.067
4481	KCA	851	0.0000475789	120.20	0.527	0.133
4482	KCR	1022	0.0000571394	154.87	0.679	-1.967
4483	KCN	1421	0.0000794473	131.77	0.577	-1.633
4484	KCD	1176	0.0000657495	129.30	0.567	-1.633
4485	KCC	579	0.0000323715	124.63	0.546	0.367
4486	KCQ	928	0.0000518839	140.00	0.613	-1.633
4487	KCE	2343	0.0001309957	137.60	0.603	-1.633
4488	KCG	1566	0.0000875541	111.83	0.490	-0.600
4489	KCH	638	0.0000356702	143.53	0.629	-1.533
4490	KCI	905	0.0000505980	144.83	0.635	1.033
4491	KCL	1979	0.0001106447	144.87	0.635	0.800
4492	KCK	1740	0.0000972824	145.97	0.640	-1.767
4493	KCM	314	0.0000175556	145.87	0.639	0.167
4494	KCF	906	0.0000506539	154.17	0.676	0.467
4495	KCP	1284	0.0000717877	131.17	0.575	-1.000
4496	KCS	1748	0.0000977296	122.00	0.535	-0.733
4497	KCT	965	0.0000539526	130.70	0.573	-0.700
4498	KCW	210	0.0000117410	166.27	0.729	-0.767
4499	KCY	538	0.0000300793	155.87	0.683	-0.900
4500	KCV	1172	0.0000655258	136.53	0.598	0.933
4501	KQA	2780	0.0001554281	135.57	0.594	-1.867
4502	KQR	2889	0.0001615223	170.23	0.746	-3.967
4503	KQN	1672	0.0000934805	147.13	0.645	-3.633
4504	KQD	1770	0.0000989596	144.67	0.634	-3.633
4505	KQC	969	0.0000541762	140.00	0.613	-1.633
4506	KQQ	2847	0.0001591741	155.37	0.681	-3.633
4507	KQE	3914	0.0002188294	152.97	0.670	-3.633
4508	KQG	2088	0.0001167388	127.20	0.557	-2.600
4509	KQH	1168	0.0000653022	158.90	0.696	-3.533
4510	KQI	2221	0.0001241748	160.20	0.702	-0.967
4511	KQL	5099	0.0002850820	160.23	0.702	-1.200
4512	KQK	3738	0.0002089893	161.33	0.707	-3.767
4513	KQM	1168	0.0000653022	161.23	0.707	-1.833
4514	KQF	1304	0.0000729059	169.53	0.743	-1.533
4515	KQP	2072	0.0001158443	146.53	0.642	-3.000
4516	KQS	2496	0.0001395499	137.37	0.602	-2.733
4517	KQT	1944	0.0001086879	146.07	0.640	-2.700
4518	KQW	497	0.0000277870	181.63	0.796	-2.767

4519	KQY	1122	0.0000627303	171.23	0.750	-2.900
4520	KQV	2432	0.0001359717	151.90	0.666	-1.067
4521	KEA	6012	0.0003361273	133.17	0.584	-1.867
4522	KER	4972	0.0002779815	167.83	0.735	-3.967
4523	KEN	4020	0.0002247558	144.73	0.634	-3.633
4524	KED	4169	0.0002330863	142.27	0.623	-3.633
4525	KEC	2192	0.0001225534	137.60	0.603	-1.633
4526	KEQ	3958	0.0002212894	152.97	0.670	-3.633
4527	KEE	8995	0.0005029051	150.57	0.660	-3.633
4528	KEG	4805	0.0002686447	124.80	0.547	-2.600
4529	KEH	1689	0.0000944310	156.50	0.686	-3.533
4530	KEI	4457	0.0002491882	157.80	0.691	-0.967
4531	KEL	8833	0.0004938477	157.83	0.692	-1.200
4532	KEK	8652	0.0004837281	158.93	0.696	-3.767
4533	KEM	2040	0.0001140552	158.83	0.696	-1.833
4534	KEF	2664	0.0001489426	167.13	0.732	-1.533
4535	KEP	3474	0.0001942293	144.13	0.632	-3.000
4536	KES	4717	0.0002637247	134.97	0.591	-2.733
4537	KET	3865	0.0002160898	143.67	0.630	-2.700
4538	KEW	775	0.0000433298	179.23	0.785	-2.767
4539	KEY	2078	0.0001161797	168.83	0.740	-2.900
4540	KEV	5030	0.0002812243	149.50	0.655	-1.067
4541	KGA	3495	0.0001954034	107.40	0.471	-0.833
4542	KGR	3339	0.0001866815	142.07	0.623	-2.933
4543	KGN	2405	0.0001344621	118.97	0.521	-2.600
4544	KGD	3364	0.0001880792	116.50	0.511	-2.600
4545	KGC	1069	0.0000597671	111.83	0.490	-0.600
4546	KGQ	2558	0.0001430163	127.20	0.557	-2.600
4547	KGE	4721	0.0002639483	124.80	0.547	-2.600
4548	KGG	3225	0.0001803078	99.03	0.434	-1.567
4549	KGH	1535	0.0000858209	130.73	0.573	-2.500
4550	KGI	2627	0.0001468740	132.03	0.579	0.067
4551	KGL	5276	0.0002949780	132.07	0.579	-0.167
4552	KGK	4995	0.0002792675	133.17	0.584	-2.733
4553	KGM	990	0.0000553503	133.07	0.583	-0.800
4554	KGF	2924	0.0001634791	141.37	0.619	-0.500
4555	KGP	3124	0.0001746610	118.37	0.519	-1.967
4556	KGS	4568	0.0002553941	109.20	0.479	-1.700
4557	KGT	2897	0.0001619695	117.90	0.517	-1.667
4558	KGW	745	0.0000416525	153.47	0.673	-1.733
4559	KGY	1690	0.0000944869	143.07	0.627	-1.867
4560	KGV	2873	0.0001606277	123.73	0.542	-0.033
4561	KHA	1158	0.0000647431	139.10	0.610	-1.767
4562	KHR	1513	0.0000845909	173.77	0.761	-3.867
4563	KHN	774	0.0000432739	150.67	0.660	-3.533
4564	KHD	686	0.0000383538	148.20	0.649	-3.533
4565	KHC	568	0.0000317565	143.53	0.629	-1.533
4566	KHQ	1523	0.0000851500	158.90	0.696	-3.533
4567	KHE	1322	0.0000739122	156.50	0.686	-3.533
4568	KHG	1512	0.0000845350	130.73	0.573	-2.500
4569	KHH	725	0.0000405343	162.43	0.712	-3.433
4570	KHI	1271	0.0000710608	163.73	0.717	-0.867

4571	KHL	3003	0.0001678959	163.77	0.718	-1.100
4572	KHK	2073	0.0001159002	164.87	0.722	-3.667
4573	KHM	604	0.0000337693	164.77	0.722	-1.733
4574	KHF	1254	0.0000701104	173.07	0.758	-1.433
4575	KHP	1230	0.0000687686	150.07	0.658	-2.900
4576	KHS	1902	0.0001063397	140.90	0.617	-2.633
4577	KHT	1083	0.0000605499	149.60	0.656	-2.600
4578	KHW	414	0.0000231465	185.17	0.811	-2.667
4579	KHY	775	0.0000433298	174.77	0.766	-2.800
4580	KHV	1286	0.0000718995	155.43	0.681	-0.967
4581	KIA	2588	0.0001446935	140.40	0.615	0.800
4582	KIR	2613	0.0001460913	175.07	0.767	-1.300
4583	KIN	1973	0.0001103092	151.97	0.666	-0.967
4584	KID	1779	0.0000994628	149.50	0.655	-0.967
4585	KIC	1060	0.0000592640	144.83	0.635	1.033
4586	KIQ	2444	0.0001366426	160.20	0.702	-0.967
4587	KIE	2954	0.0001651564	157.80	0.691	-0.967
4588	KIG	1916	0.0001071224	132.03	0.579	0.067
4589	KIH	1999	0.0001117629	163.73	0.717	-0.867
4590	KII	3172	0.0001773446	165.03	0.723	1.700
4591	KIL	5037	0.0002816156	165.07	0.723	1.467
4592	KIK	3476	0.0001943411	166.17	0.728	-1.100
4593	KIM	1109	0.0000620035	166.07	0.728	0.833
4594	KIF	1976	0.0001104770	174.37	0.764	1.133
4595	KIP	2408	0.0001346298	151.37	0.663	-0.333
4596	KIS	3507	0.0001960743	142.20	0.623	-0.067
4597	KIT	2698	0.0001508436	150.90	0.661	-0.033
4598	KIW	737	0.0000412052	186.47	0.817	-0.100
4599	KIY	1456	0.0000814041	176.07	0.772	-0.233
4600	KIV	2372	0.0001326171	156.73	0.687	1.600
4601	KLA	5144	0.0002875979	140.43	0.615	0.567
4602	KLR	5257	0.0002939157	175.10	0.767	-1.533
4603	KLN	3216	0.0001798046	152.00	0.666	-1.200
4604	KLD	3638	0.0002033984	149.53	0.655	-1.200
4605	KLC	1836	0.0001026497	144.87	0.635	0.800
4606	KLQ	5450	0.0003047062	160.23	0.702	-1.200
4607	KLE	6786	0.0003794012	157.83	0.692	-1.200
4608	KLG	4279	0.0002392363	132.07	0.579	-0.167
4609	KLH	2441	0.0001364748	163.77	0.718	-1.100
4610	KLI	3704	0.0002070884	165.07	0.723	1.467
4611	KLL	9450	0.0005283438	165.10	0.723	1.233
4612	KLK	7060	0.0003947204	166.20	0.728	-1.333
4613	KLM	1733	0.0000968910	166.10	0.728	0.600
4614	KLF	3259	0.0001822087	174.40	0.764	0.900
4615	KLP	4380	0.0002448832	151.40	0.663	-0.567
4616	KLS	6246	0.0003492101	142.23	0.623	-0.300
4617	KLT	4586	0.0002564005	150.93	0.661	-0.267
4618	KLW	1144	0.0000639604	186.50	0.817	-0.333
4619	KLY	2623	0.0001466504	176.10	0.772	-0.467
4620	KLV	4737	0.0002648428	156.77	0.687	1.367
4621	KKA	5053	0.0002825102	141.53	0.620	-2.000
4622	KKR	5143	0.0002875420	176.20	0.772	-4.100

4623	KKN	2940	0.0001643736	153.10	0.671	-3.767
4624	KKD	3539	0.0001978634	150.63	0.660	-3.767
4625	KKC	1546	0.0000864359	145.97	0.640	-1.767
4626	KKQ	3581	0.0002002116	161.33	0.707	-3.767
4627	KKE	6435	0.0003597770	158.93	0.696	-3.767
4628	KKG	4274	0.0002389568	133.17	0.584	-2.733
4629	KKH	2017	0.0001127693	164.87	0.722	-3.667
4630	KKI	4172	0.0002332540	166.17	0.728	-1.100
4631	KKL	7583	0.0004239610	166.20	0.728	-1.333
4632	KKK	9228	0.0005159319	167.30	0.733	-3.900
4633	KKM	1944	0.0001086879	167.20	0.733	-1.967
4634	KKF	2301	0.0001286475	175.50	0.769	-1.667
4635	KKP	4282	0.0002394040	152.50	0.668	-3.133
4636	KKS	4984	0.0002786524	143.33	0.628	-2.867
4637	KKT	4004	0.0002238612	152.03	0.666	-2.833
4638	KKW	736	0.0000411493	187.60	0.822	-2.900
4639	KKY	2237	0.0001250693	177.20	0.777	-3.033
4640	KKV	4061	0.0002270481	157.87	0.692	-1.200
4641	KMA	1719	0.0000961083	141.43	0.620	-0.067
4642	KMR	1249	0.0000698308	176.10	0.772	-2.167
4643	KMN	900	0.0000503185	153.00	0.670	-1.833
4644	KMD	1151	0.0000643517	150.53	0.660	-1.833
4645	KMC	408	0.0000228110	145.87	0.639	0.167
4646	KMQ	1020	0.0000570276	161.23	0.707	-1.833
4647	KME	1898	0.0001061160	158.83	0.696	-1.833
4648	KMG	1116	0.0000623949	133.07	0.583	-0.800
4649	KMH	563	0.0000314770	164.77	0.722	-1.733
4650	KMI	1059	0.0000592081	166.07	0.728	0.833
4651	KML	2335	0.0001305484	166.10	0.728	0.600
4652	KMK	2017	0.0001127693	167.20	0.733	-1.967
4653	KMM	607	0.0000339370	167.10	0.732	-0.033
4654	KMF	783	0.0000437771	175.40	0.769	0.267
4655	KMP	1121	0.0000626744	152.40	0.668	-1.200
4656	KMS	1532	0.0000856532	143.23	0.628	-0.933
4657	KMT	1189	0.0000664763	151.93	0.666	-0.900
4658	KMW	325	0.0000181706	187.50	0.822	-0.967
4659	KMY	571	0.0000319243	177.10	0.776	-1.100
4660	KMV	1397	0.0000781054	157.77	0.691	0.733
4661	KFA	1568	0.0000876659	149.73	0.656	0.233
4662	KFR	1543	0.0000862682	184.40	0.808	-1.867
4663	KFN	1119	0.0000625626	161.30	0.707	-1.533
4664	KFD	1347	0.0000753100	158.83	0.696	-1.533
4665	KFC	808	0.0000451748	154.17	0.676	0.467
4666	KFQ	1458	0.0000815159	169.53	0.743	-1.533
4667	KFE	1610	0.0000900141	167.13	0.732	-1.533
4668	KFG	1579	0.0000882809	141.37	0.619	-0.500
4669	KFH	841	0.0000470198	173.07	0.758	-1.433
4670	KFI	1561	0.0000872746	174.37	0.764	1.133
4671	KFL	3201	0.0001789660	174.40	0.764	0.900
4672	KFK	1981	0.0001107565	175.50	0.769	-1.667
4673	KFM	587	0.0000328188	175.40	0.769	0.267
4674	KFF	1329	0.0000743036	183.70	0.805	0.567

4675	KFP	1408	0.0000787204	160.70	0.704	-0.900
4676	KFS	2475	0.0001383758	151.53	0.664	-0.633
4677	KFT	1471	0.0000822427	160.23	0.702	-0.600
4678	KFW	474	0.0000265011	195.80	0.858	-0.667
4679	KFY	1117	0.0000624508	185.40	0.812	-0.800
4680	KFV	1615	0.0000902937	166.07	0.728	1.033
4681	KPA	3407	0.0001904833	126.73	0.555	-1.233
4682	KPR	2954	0.0001651564	161.40	0.707	-3.333
4683	KPN	1559	0.0000871628	138.30	0.606	-3.000
4684	KPD	2452	0.0001370899	135.83	0.595	-3.000
4685	KPC	949	0.0000530580	131.17	0.575	-1.000
4686	KPQ	2370	0.0001325053	146.53	0.642	-3.000
4687	KPE	3945	0.0002205626	144.13	0.632	-3.000
4688	KPG	4020	0.0002247558	118.37	0.519	-1.967
4689	KPH	1358	0.0000759250	150.07	0.658	-2.900
4690	KPI	2028	0.0001133843	151.37	0.663	-0.333
4691	KPL	4857	0.0002715520	151.40	0.663	-0.567
4692	KPK	3594	0.0002009384	152.50	0.668	-3.133
4693	KPM	797	0.0000445598	152.40	0.668	-1.200
4694	KPF	2675	0.0001495576	160.70	0.704	-0.900
4695	KPP	3951	0.0002208980	137.70	0.603	-2.367
4696	KPS	4523	0.0002528782	128.53	0.563	-2.100
4697	KPT	2674	0.0001495017	137.23	0.601	-2.067
4698	KPW	646	0.0000361175	172.80	0.757	-2.133
4699	KPY	5755	0.0003217586	162.40	0.712	-2.267
4700	KPV	3430	0.0001917692	143.07	0.627	-0.433
4701	KSA	3632	0.0002030629	117.57	0.515	-0.967
4702	KSR	3646	0.0002038457	152.23	0.667	-3.067
4703	KSN	2248	0.0001256843	129.13	0.566	-2.733
4704	KSD	2800	0.0001565463	126.67	0.555	-2.733
4705	KSC	1527	0.0000853737	122.00	0.535	-0.733
4706	KSQ	3353	0.0001874642	137.37	0.602	-2.733
4707	KSE	4298	0.0002402986	134.97	0.591	-2.733
4708	KSG	3737	0.0002089334	109.20	0.479	-1.700
4709	KSH	1925	0.0001076256	140.90	0.617	-2.633
4710	KSI	2830	0.0001582236	142.20	0.623	-0.067
4711	KSL	6832	0.0003819730	142.23	0.623	-0.300
4712	KSK	5039	0.0002817275	143.33	0.628	-2.867
4713	KSM	1225	0.0000684890	143.23	0.628	-0.933
4714	KSF	3596	0.0002010502	151.53	0.664	-0.633
4715	KSP	4145	0.0002317445	128.53	0.563	-2.100
4716	KSS	6343	0.0003546333	119.37	0.523	-1.833
4717	KST	3625	0.0002026716	128.07	0.561	-1.800
4718	KSW	841	0.0000470198	163.63	0.717	-1.867
4719	KSY	1995	0.0001115393	153.23	0.671	-2.000
4720	KSV	3664	0.0002048520	133.90	0.587	-0.167
4721	KTA	3184	0.0001780155	126.27	0.553	-0.933
4722	KTR	2527	0.0001412831	160.93	0.705	-3.033
4723	KTN	1651	0.0000923064	137.83	0.604	-2.700
4724	KTD	2180	0.0001218825	135.37	0.593	-2.700
4725	KTC	1281	0.0000716199	130.70	0.573	-0.700
4726	KTQ	2236	0.0001250134	146.07	0.640	-2.700

4727	KTE	3807	0.0002128471	143.67	0.630	-2.700
4728	KTG	3002	0.0001678400	117.90	0.517	-1.667
4729	KTH	1704	0.0000952696	149.60	0.656	-2.600
4730	KTI	2703	0.0001511231	150.90	0.661	-0.033
4731	KTL	5530	0.0003091790	150.93	0.661	-0.267
4732	KTK	3784	0.0002115612	152.03	0.666	-2.833
4733	KTM	1080	0.0000603822	151.93	0.666	-0.900
4734	KTF	2871	0.0001605159	160.23	0.702	-0.600
4735	KTP	3179	0.0001777360	137.23	0.601	-2.067
4736	KTS	4210	0.0002353786	128.07	0.561	-1.800
4737	KTT	2989	0.0001671132	136.77	0.599	-1.767
4738	KTW	654	0.0000365647	172.33	0.755	-1.833
4739	KTY	1519	0.0000849264	161.93	0.710	-1.967
4740	KTV	3543	0.0001980870	142.60	0.625	-0.133
4741	KWA	558	0.0000311974	161.83	0.709	-1.000
4742	KWR	609	0.0000340488	196.50	0.861	-3.100
4743	KWN	491	0.0000274515	173.40	0.760	-2.767
4744	KWD	466	0.0000260538	170.93	0.749	-2.767
4745	KWC	263	0.0000147042	166.27	0.729	-0.767
4746	KWQ	577	0.0000322597	181.63	0.796	-2.767
4747	KWE	764	0.0000427148	179.23	0.785	-2.767
4748	KWG	447	0.0000249915	153.47	0.673	-1.733
4749	KWH	259	0.0000144805	185.17	0.811	-2.667
4750	KWI	624	0.0000348875	186.47	0.817	-0.100
4751	KWL	1052	0.0000588167	186.50	0.817	-0.333
4752	KWK	842	0.0000470757	187.60	0.822	-2.900
4753	KWM	344	0.0000192328	187.50	0.822	-0.967
4754	KWF	442	0.0000247120	195.80	0.858	-0.667
4755	KWP	407	0.0000227551	172.80	0.757	-2.133
4756	KWS	848	0.0000474112	163.63	0.717	-1.867
4757	KWT	576	0.0000322038	172.33	0.755	-1.833
4758	KWW	163	0.0000091132	207.90	0.911	-1.900
4759	KWY	354	0.0000197919	197.50	0.865	-2.033
4760	KWV	705	0.0000394161	178.17	0.781	-0.200
4761	KYA	1172	0.0000655258	151.43	0.664	-1.133
4762	KYR	1508	0.0000843114	186.10	0.816	-3.233
4763	KYN	1085	0.0000606617	163.00	0.714	-2.900
4764	KYD	1180	0.0000659731	160.53	0.703	-2.900
4765	KYC	588	0.0000328747	155.87	0.683	-0.900
4766	KYQ	1251	0.0000699427	171.23	0.750	-2.900
4767	KYE	1674	0.0000935923	168.83	0.740	-2.900
4768	KYG	1726	0.0000964996	143.07	0.627	-1.867
4769	KYH	652	0.0000364529	174.77	0.766	-2.800
4770	KYI	1542	0.0000862123	176.07	0.772	-0.233
4771	KYL	2780	0.0001554281	176.10	0.772	-0.467
4772	KYK	1837	0.0001027056	177.20	0.777	-3.033
4773	KYM	602	0.0000336575	177.10	0.776	-1.100
4774	KYF	1324	0.0000740240	185.40	0.812	-0.800
4775	KYP	1300	0.0000726822	162.40	0.712	-2.267
4776	KYS	1955	0.0001093029	153.23	0.671	-2.000
4777	KYT	1240	0.0000693277	161.93	0.710	-1.967
4778	KYW	370	0.0000206865	197.50	0.865	-2.033

4779	KYY	913	0.0000510453	187.10	0.820	-2.167
4780	KYV	1417	0.0000792236	167.77	0.735	-0.333
4781	KVA	3685	0.0002060261	132.10	0.579	0.700
4782	KVR	2857	0.0001597332	166.77	0.731	-1.400
4783	KVN	2233	0.0001248457	143.67	0.630	-1.067
4784	KVD	2610	0.0001459235	141.20	0.619	-1.067
4785	KVC	1171	0.0000654699	136.53	0.598	0.933
4786	KVQ	2599	0.0001453085	151.90	0.666	-1.067
4787	KVE	4069	0.0002274953	149.50	0.655	-1.067
4788	KVG	2462	0.0001376489	123.73	0.542	-0.033
4789	KVH	1545	0.0000863800	155.43	0.681	-0.967
4790	KVI	3239	0.0001810906	156.73	0.687	1.600
4791	KVL	6717	0.0003755434	156.77	0.687	1.367
4792	KVK	4359	0.0002437091	157.87	0.692	-1.200
4793	KVM	1201	0.0000671472	157.77	0.691	0.733
4794	KVF	3082	0.0001723128	166.07	0.728	1.033
4795	KVP	3130	0.0001749964	143.07	0.627	-0.433
4796	KVS	4326	0.0002418641	133.90	0.587	-0.167
4797	KVT	3684	0.0002059702	142.60	0.625	-0.133
4798	KVW	838	0.0000468521	178.17	0.781	-0.200
4799	KVY	1573	0.0000879455	167.77	0.735	-0.333
4800	KVV	3881	0.0002169844	148.43	0.650	1.500
4801	MAA	4131	0.0002309617	115.67	0.507	1.833
4802	MAR	1744	0.0000975060	150.33	0.659	-0.267
4803	MAN	1020	0.0000570276	127.23	0.558	0.067
4804	MAD	1548	0.0000865477	124.77	0.547	0.067
4805	MAC	649	0.0000362852	120.10	0.526	2.067
4806	MAQ	1508	0.0000843114	135.47	0.594	0.067
4807	MAE	2533	0.0001416185	133.07	0.583	0.067
4808	MAG	2220	0.0001241189	107.30	0.470	1.100
4809	MAH	776	0.0000433857	139.00	0.609	0.167
4810	MAI	1177	0.0000658054	140.30	0.615	2.733
4811	MAL	3171	0.0001772887	140.33	0.615	2.500
4812	MAK	1759	0.0000983446	141.43	0.620	-0.067
4813	MAM	756	0.0000422675	141.33	0.619	1.867
4814	MAF	1228	0.0000686567	149.63	0.656	2.167
4815	MAP	1924	0.0001075697	126.63	0.555	0.700
4816	MAS	3192	0.0001784628	117.47	0.515	0.967
4817	MAT	2151	0.0001202611	126.17	0.553	1.000
4818	MAW	332	0.0000185619	161.73	0.709	0.933
4819	MAY	1010	0.0000564685	151.33	0.663	0.800
4820	MAV	2239	0.0001251811	132.00	0.578	2.633
4821	MRA	1354	0.0000757013	150.33	0.659	-0.267
4822	MRR	1606	0.0000897905	185.00	0.811	-2.367
4823	MRN	766	0.0000428266	161.90	0.709	-2.033
4824	MRD	809	0.0000452307	159.43	0.699	-2.033
4825	MRC	362	0.0000202392	154.77	0.678	-0.033
4826	MRQ	886	0.0000495357	170.13	0.746	-2.033
4827	MRE	1487	0.0000831373	167.73	0.735	-2.033
4828	MRG	1117	0.0000624508	141.97	0.622	-1.000
4829	MRH	506	0.0000282902	173.67	0.761	-1.933
4830	MRI	788	0.0000440566	174.97	0.767	0.633

4831	MRL	1756	0.0000981769	175.00	0.767	0.400
4832	MRK	1470	0.0000821868	176.10	0.772	-2.167
4833	MRM	418	0.0000233701	176.00	0.771	-0.233
4834	MRF	574	0.0000320920	184.30	0.808	0.067
4835	MRP	1061	0.0000593199	161.30	0.707	-1.400
4836	MRS	1335	0.0000746391	152.13	0.667	-1.133
4837	MRT	996	0.0000556858	160.83	0.705	-1.100
4838	MRW	272	0.0000152074	196.40	0.861	-1.167
4839	MRY	344	0.0000192328	186.00	0.815	-1.300
4840	MRV	1089	0.0000608853	166.67	0.730	0.533
4841	MNA	871	0.0000486971	127.23	0.558	0.067
4842	MNR	911	0.0000509335	161.90	0.709	-2.033
4843	MNN	606	0.0000338811	138.80	0.608	-1.700
4844	MND	626	0.0000349993	136.33	0.597	-1.700
4845	MNC	283	0.0000158224	131.67	0.577	0.300
4846	MNQ	684	0.0000382420	147.03	0.644	-1.700
4847	MNE	1000	0.0000559094	144.63	0.634	-1.700
4848	MNG	1077	0.0000602144	118.87	0.521	-0.667
4849	MNH	471	0.0000263333	150.57	0.660	-1.600
4850	MNI	880	0.0000492003	151.87	0.665	0.967
4851	MNL	1336	0.0000746950	151.90	0.666	0.733
4852	MNK	938	0.0000524430	153.00	0.670	-1.833
4853	MNM	385	0.0000215251	152.90	0.670	0.100
4854	MNF	580	0.0000324275	161.20	0.706	0.400
4855	MNP	967	0.0000540644	138.20	0.606	-1.067
4856	MNS	1410	0.0000788323	129.03	0.565	-0.800
4857	MNT	819	0.0000457898	137.73	0.604	-0.767
4858	MNW	185	0.0000103432	173.30	0.759	-0.833
4859	MNY	451	0.0000252151	162.90	0.714	-0.967
4860	MNV	868	0.0000485294	143.57	0.629	0.867
4861	MDA	1360	0.0000760368	124.77	0.547	0.067
4862	MDR	1158	0.0000647431	159.43	0.699	-2.033
4863	MDN	797	0.0000445598	136.33	0.597	-1.700
4864	MDD	1161	0.0000649108	133.87	0.587	-1.700
4865	MDC	402	0.0000224756	129.20	0.566	0.300
4866	MDQ	874	0.0000488648	144.57	0.634	-1.700
4867	MDE	1585	0.0000886164	142.17	0.623	-1.700
4868	MDG	1251	0.0000699427	116.40	0.510	-0.667
4869	MDH	515	0.0000287933	148.10	0.649	-1.600
4870	MDI	1047	0.0000585371	149.40	0.655	0.967
4871	MDL	2117	0.0001183602	149.43	0.655	0.733
4872	MDK	1104	0.0000617240	150.53	0.660	-1.833
4873	MDM	463	0.0000258861	150.43	0.659	0.100
4874	MDF	916	0.0000512130	158.73	0.696	0.400
4875	MDP	1351	0.0000755336	135.73	0.595	-1.067
4876	MDS	1863	0.0001041592	126.57	0.555	-0.800
4877	MDT	1251	0.0000699427	135.27	0.593	-0.767
4878	MDW	267	0.0000149278	170.83	0.749	-0.833
4879	MDY	607	0.0000339370	160.43	0.703	-0.967
4880	MDV	1279	0.0000715081	141.10	0.618	0.867
4881	MCA	345	0.0000192887	120.10	0.526	2.067
4882	MCR	429	0.0000239851	154.77	0.678	-0.033

4883	MCN	306	0.0000171083	131.67	0.577	0.300
4884	MCD	325	0.0000181706	129.20	0.566	0.300
4885	MCC	193	0.0000107905	124.53	0.546	2.300
4886	MCQ	356	0.0000199037	139.90	0.613	0.300
4887	MCE	432	0.0000241529	137.50	0.603	0.300
4888	MCG	450	0.0000251592	111.73	0.490	1.333
4889	MCH	257	0.0000143687	143.43	0.629	0.400
4890	MCI	546	0.0000305265	144.73	0.634	2.967
4891	MCL	628	0.0000351111	144.77	0.634	2.733
4892	MCK	433	0.0000242088	145.87	0.639	0.167
4893	MCM	146	0.0000081628	145.77	0.639	2.100
4894	MCF	288	0.0000161019	154.07	0.675	2.400
4895	MCP	409	0.0000228669	131.07	0.574	0.933
4896	MCS	632	0.0000353347	121.90	0.534	1.200
4897	MCT	372	0.0000207983	130.60	0.572	1.233
4898	MCW	101	0.0000056468	166.17	0.728	1.167
4899	MCY	184	0.0000102873	155.77	0.683	1.033
4900	MCV	532	0.0000297438	136.43	0.598	2.867
4901	MQA	1181	0.0000660290	135.47	0.594	0.067
4902	MQR	1057	0.0000590962	170.13	0.746	-2.033
4903	MQN	734	0.0000410375	147.03	0.644	-1.700
4904	MQD	878	0.0000490885	144.57	0.634	-1.700
4905	MQC	278	0.0000155428	139.90	0.613	0.300
4906	MQQ	1045	0.0000584253	155.27	0.680	-1.700
4907	MQE	1385	0.0000774345	152.87	0.670	-1.700
4908	MQG	887	0.0000495916	127.10	0.557	-0.667
4909	MQH	430	0.0000240410	158.80	0.696	-1.600
4910	MQI	620	0.0000346638	160.10	0.702	0.967
4911	MQL	1571	0.0000878337	160.13	0.702	0.733
4912	MQK	1133	0.0000633454	161.23	0.707	-1.833
4913	MQM	343	0.0000191769	161.13	0.706	0.100
4914	MQF	432	0.0000241529	169.43	0.742	0.400
4915	MQP	905	0.0000505980	146.43	0.642	-1.067
4916	MQS	1111	0.0000621153	137.27	0.602	-0.800
4917	MQT	866	0.0000484175	145.97	0.640	-0.767
4918	MQW	188	0.0000105110	181.53	0.796	-0.833
4919	MQY	305	0.0000170524	171.13	0.750	-0.967
4920	MQV	921	0.0000514926	151.80	0.665	0.867
4921	MEA	2268	0.0001268025	133.07	0.583	0.067
4922	MER	1825	0.0001020347	167.73	0.735	-2.033
4923	MEN	1613	0.0000901819	144.63	0.634	-1.700
4924	MED	1751	0.0000978974	142.17	0.623	-1.700
4925	MEC	515	0.0000287933	137.50	0.603	0.300
4926	MEQ	1565	0.0000874982	152.87	0.670	-1.700
4927	MEE	3358	0.0001877438	150.47	0.659	-1.700
4928	MEG	1751	0.0000978974	124.70	0.546	-0.667
4929	MEH	771	0.0000431061	156.40	0.685	-1.600
4930	MEI	1292	0.0000722349	157.70	0.691	0.967
4931	MEL	2708	0.0001514027	157.73	0.691	0.733
4932	MEK	2573	0.0001438549	158.83	0.696	-1.833
4933	MEM	783	0.0000437771	158.73	0.696	0.100
4934	MEF	820	0.0000458457	167.03	0.732	0.400

4935	MEP	1456	0.0000814041	144.03	0.631	-1.067
4936	MES	2220	0.0001241189	134.87	0.591	-0.800
4937	MET	1916	0.0001071224	143.57	0.629	-0.767
4938	MEW	311	0.0000173878	179.13	0.785	-0.833
4939	MEY	807	0.0000451189	168.73	0.739	-0.967
4940	MEV	1853	0.0001036001	149.40	0.655	0.867
4941	MGA	1428	0.0000798386	107.30	0.470	1.100
4942	MGR	1382	0.0000772668	141.97	0.622	-1.000
4943	MGN	1013	0.0000566362	118.87	0.521	-0.667
4944	MGD	981	0.0000548471	116.40	0.510	-0.667
4945	MGC	518	0.0000289611	111.73	0.490	1.333
4946	MGQ	962	0.0000537848	127.10	0.557	-0.667
4947	MGE	1169	0.0000653581	124.70	0.546	-0.667
4948	MGG	1515	0.0000847027	98.93	0.434	0.367
4949	MGH	655	0.0000366207	130.63	0.572	-0.567
4950	MGI	1275	0.0000712845	131.93	0.578	2.000
4951	MGL	2285	0.0001277530	131.97	0.578	1.767
4952	MGK	1405	0.0000785527	133.07	0.583	-0.800
4953	MGM	616	0.0000344402	132.97	0.583	1.133
4954	MGF	977	0.0000546235	141.27	0.619	1.433
4955	MGP	1711	0.0000956610	118.27	0.518	-0.033
4956	MGS	2133	0.0001192547	109.10	0.478	0.233
4957	MGT	1399	0.0000782173	117.80	0.516	0.267
4958	MGW	288	0.0000161019	153.37	0.672	0.200
4959	MGY	746	0.0000417084	142.97	0.626	0.067
4960	MGV	1254	0.0000701104	123.63	0.542	1.900
4961	MHA	459	0.0000256624	139.00	0.609	0.167
4962	MHR	525	0.0000293524	173.67	0.761	-1.933
4963	MHN	315	0.0000176115	150.57	0.660	-1.600
4964	MHD	257	0.0000143687	148.10	0.649	-1.600
4965	MHC	198	0.0000110701	143.43	0.629	0.400
4966	MHQ	449	0.0000251033	158.80	0.696	-1.600
4967	MHE	415	0.0000232024	156.40	0.685	-1.600
4968	MHG	476	0.0000266129	130.63	0.572	-0.567
4969	MHH	292	0.0000163255	162.33	0.711	-1.500
4970	MHI	387	0.0000216369	163.63	0.717	1.067
4971	MHL	808	0.0000451748	163.67	0.717	0.833
4972	MHK	474	0.0000265011	164.77	0.722	-1.733
4973	MHM	193	0.0000107905	164.67	0.722	0.200
4974	MHF	348	0.0000194565	172.97	0.758	0.500
4975	MHP	521	0.0000291288	149.97	0.657	-0.967
4976	MHS	752	0.0000420439	140.80	0.617	-0.700
4977	MHT	574	0.0000320920	149.50	0.655	-0.667
4978	MHW	129	0.0000072123	185.07	0.811	-0.733
4979	MHY	275	0.0000153751	174.67	0.765	-0.867
4980	MHV	429	0.0000239851	155.33	0.681	0.967
4981	MIA	873	0.0000488089	140.30	0.615	2.733
4982	MIR	792	0.0000442802	174.97	0.767	0.633
4983	MIN	556	0.0000310856	151.87	0.665	0.967
4984	MID	743	0.0000415407	149.40	0.655	0.967
4985	MIC	310	0.0000173319	144.73	0.634	2.967
4986	MIQ	803	0.0000448952	160.10	0.702	0.967

4987	MIE	810	0.0000452866	157.70	0.691	0.967
4988	MIG	837	0.0000467962	131.93	0.578	2.000
4989	MIH	398	0.0000222519	163.63	0.717	1.067
4990	MII	683	0.0000381861	164.93	0.723	3.633
4991	MIL	1496	0.0000836405	164.97	0.723	3.400
4992	MIK	787	0.0000440007	166.07	0.728	0.833
4993	MIM	317	0.0000177233	165.97	0.727	2.767
4994	MIF	620	0.0000346638	174.27	0.764	3.067
4995	MIP	783	0.0000437771	151.27	0.663	1.600
4996	MIS	1138	0.0000636249	142.10	0.623	1.867
4997	MIT	823	0.0000460134	150.80	0.661	1.900
4998	MIW	203	0.0000113496	186.37	0.817	1.833
4999	MIY	401	0.0000224197	175.97	0.771	1.700
5000	MIV	793	0.0000443362	156.63	0.686	3.533
5001	MLA	2453	0.0001371458	140.33	0.615	2.500
5002	MLR	2206	0.0001233361	175.00	0.767	0.400
5003	MLN	1392	0.0000778259	151.90	0.666	0.733
5004	MLD	1595	0.0000891755	149.43	0.655	0.733
5005	MLC	782	0.0000437211	144.77	0.634	2.733
5006	MLQ	2035	0.0001137756	160.13	0.702	0.733
5007	MLE	2720	0.0001520736	157.73	0.691	0.733
5008	MLG	2005	0.0001120983	131.97	0.578	1.767
5009	MLH	795	0.0000444480	163.67	0.717	0.833
5010	MLI	1233	0.0000689363	164.97	0.723	3.400
5011	MLL	3832	0.0002142448	165.00	0.723	3.167
5012	MLK	2092	0.0001169625	166.10	0.728	0.600
5013	MLM	744	0.0000415966	166.00	0.727	2.533
5014	MLF	1159	0.0000647990	174.30	0.764	2.833
5015	MLP	1792	0.0001001896	151.30	0.663	1.367
5016	MLS	2761	0.0001543659	142.13	0.623	1.633
5017	MLT	1788	0.0000999660	150.83	0.661	1.667
5018	MLW	375	0.0000209660	186.40	0.817	1.600
5019	MLY	837	0.0000467962	176.00	0.771	1.467
5020	MLV	1979	0.0001106447	156.67	0.687	3.300
5021	MKA	1650	0.0000922505	141.43	0.620	-0.067
5022	MKR	1504	0.0000840877	176.10	0.772	-2.167
5023	MKN	1164	0.0000650785	153.00	0.670	-1.833
5024	MKD	1331	0.0000744154	150.53	0.660	-1.833
5025	MKC	447	0.0000249915	145.87	0.639	0.167
5026	MKQ	1096	0.0000612767	161.23	0.707	-1.833
5027	MKE	2284	0.0001276971	158.83	0.696	-1.833
5028	MKG	1308	0.0000731295	133.07	0.583	-0.800
5029	MKH	710	0.0000396957	164.77	0.722	-1.733
5030	MKI	1091	0.0000609972	166.07	0.728	0.833
5031	MKL	2203	0.0001231684	166.10	0.728	0.600
5032	MKK	2211	0.0001236157	167.20	0.733	-1.967
5033	MKM	703	0.0000393043	167.10	0.732	-0.033
5034	MKF	686	0.0000383538	175.40	0.769	0.267
5035	MKP	990	0.0000553503	152.40	0.668	-1.200
5036	MKS	1637	0.0000915237	143.23	0.628	-0.933
5037	MKT	1563	0.0000873864	151.93	0.666	-0.900
5038	MKW	282	0.0000157665	187.50	0.822	-0.967

5039	MKY	583	0.0000325952	177.10	0.776	-1.100
5040	MKV	1402	0.0000783850	157.77	0.691	0.733
5041	MMA	674	0.0000376829	141.33	0.619	1.867
5042	MMR	441	0.0000246560	176.00	0.771	-0.233
5043	MMN	391	0.0000218606	152.90	0.670	0.100
5044	MMD	499	0.0000278988	150.43	0.659	0.100
5045	MMC	174	0.0000097282	145.77	0.639	2.100
5046	MMQ	479	0.0000267806	161.13	0.706	0.100
5047	MME	722	0.0000403666	158.73	0.696	0.100
5048	MMG	637	0.0000356143	132.97	0.583	1.133
5049	MMH	223	0.0000124678	164.67	0.722	0.200
5050	MMI	319	0.0000178351	165.97	0.727	2.767
5051	MML	730	0.0000408139	166.00	0.727	2.533
5052	MMK	596	0.0000333220	167.10	0.732	-0.033
5053	MMM	275	0.0000153751	167.00	0.732	1.900
5054	MMF	308	0.0000172201	175.30	0.768	2.200
5055	MMP	512	0.0000286256	152.30	0.667	0.733
5056	MMS	743	0.0000415407	143.13	0.627	1.000
5057	MMT	465	0.0000259979	151.83	0.665	1.033
5058	MMW	96	0.0000053673	187.40	0.821	0.967
5059	MMY	242	0.0000135301	177.00	0.776	0.833
5060	MMV	533	0.0000297997	157.67	0.691	2.667
5061	MFA	708	0.0000395839	149.63	0.656	2.167
5062	MFR	704	0.0000393602	184.30	0.808	0.067
5063	MFN	533	0.0000297997	161.20	0.706	0.400
5064	MFD	640	0.0000357820	158.73	0.696	0.400
5065	MFC	345	0.0000192887	154.07	0.675	2.400
5066	MFQ	579	0.0000323715	169.43	0.742	0.400
5067	MFE	830	0.0000464048	167.03	0.732	0.400
5068	MFG	726	0.0000405902	141.27	0.619	1.433
5069	MFH	342	0.0000191210	172.97	0.758	0.500
5070	MFI	573	0.0000320361	174.27	0.764	3.067
5071	MFL	1249	0.0000698308	174.30	0.764	2.833
5072	MFK	534	0.0000298556	175.40	0.769	0.267
5073	MFM	255	0.0000142569	175.30	0.768	2.200
5074	MFF	497	0.0000277870	183.60	0.805	2.500
5075	MFP	746	0.0000417084	160.60	0.704	1.033
5076	MFS	1126	0.0000629540	151.43	0.664	1.300
5077	MFT	695	0.0000388570	160.13	0.702	1.333
5078	MFW	162	0.0000090573	195.70	0.858	1.267
5079	MFY	351	0.0000196242	185.30	0.812	1.133
5080	MFV	737	0.0000412052	165.97	0.727	2.967
5081	MPA	1407	0.0000786645	126.63	0.555	0.700
5082	MPR	1085	0.0000606617	161.30	0.707	-1.400
5083	MPN	641	0.0000358379	138.20	0.606	-1.067
5084	MPD	754	0.0000421557	135.73	0.595	-1.067
5085	MPC	343	0.0000191769	131.07	0.574	0.933
5086	MPQ	869	0.0000485853	146.43	0.642	-1.067
5087	MPE	1283	0.0000717318	144.03	0.631	-1.067
5088	MPG	1744	0.0000975060	118.27	0.518	-0.033
5089	MPH	498	0.0000278429	149.97	0.657	-0.967
5090	MPI	631	0.0000352788	151.27	0.663	1.600

5091	MPL	1684	0.0000941514	151.30	0.663	1.367
5092	MPK	1039	0.0000580899	152.40	0.668	-1.200
5093	MPM	365	0.0000204069	152.30	0.667	0.733
5094	MPF	719	0.0000401989	160.60	0.704	1.033
5095	MPP	1800	0.0001006369	137.60	0.603	-0.433
5096	MPS	1865	0.0001042710	128.43	0.563	-0.167
5097	MPT	1157	0.0000646872	137.13	0.601	-0.133
5098	MPW	258	0.0000144246	172.70	0.757	-0.200
5099	MPY	555	0.0000310297	162.30	0.711	-0.333
5100	MPV	1313	0.0000734090	142.97	0.626	1.500
5101	MSA	1866	0.0001043269	117.47	0.515	0.967
5102	MSR	1487	0.0000831373	152.13	0.667	-1.133
5103	MSN	879	0.0000491444	129.03	0.565	-0.800
5104	MSD	1268	0.0000708931	126.57	0.555	-0.800
5105	MSC	566	0.0000316447	121.90	0.534	1.200
5106	MSQ	1304	0.0000729059	137.27	0.602	-0.800
5107	MSE	1834	0.0001025378	134.87	0.591	-0.800
5108	MSG	1791	0.0001001337	109.10	0.478	0.233
5109	MSH	727	0.0000406461	140.80	0.617	-0.700
5110	MSI	1045	0.0000584253	142.10	0.623	1.867
5111	MSL	2704	0.0001511790	142.13	0.623	1.633
5112	MSK	1412	0.0000789441	143.23	0.628	-0.933
5113	MSM	607	0.0000339370	143.13	0.627	1.000
5114	MSF	1007	0.0000563008	151.43	0.664	1.300
5115	MSP	1828	0.0001022024	128.43	0.563	-0.167
5116	MSS	3099	0.0001732632	119.27	0.523	0.100
5117	MST	1571	0.0000878337	127.97	0.561	0.133
5118	MSW	403	0.0000225315	163.53	0.717	0.067
5119	MSY	741	0.0000414289	153.13	0.671	-0.067
5120	MSV	1702	0.0000951578	133.80	0.586	1.767
5121	MTA	1428	0.0000798386	126.17	0.553	1.000
5122	MTR	935	0.0000522753	160.83	0.705	-1.100
5123	MTN	659	0.0000368443	137.73	0.604	-0.767
5124	MTD	973	0.0000543998	135.27	0.593	-0.767
5125	MTC	431	0.0000240970	130.60	0.572	1.233
5126	MTQ	928	0.0000518839	145.97	0.640	-0.767
5127	MTE	1308	0.0000731295	143.57	0.629	-0.767
5128	MTG	1053	0.0000588726	117.80	0.516	0.267
5129	MTH	524	0.0000292965	149.50	0.655	-0.667
5130	MTI	821	0.0000459016	150.80	0.661	1.900
5131	MTL	1794	0.0001003015	150.83	0.661	1.667
5132	MTK	1010	0.0000564685	151.93	0.666	-0.900
5133	MTM	434	0.0000242647	151.83	0.665	1.033
5134	MTF	830	0.0000464048	160.13	0.702	1.333
5135	MTP	1412	0.0000789441	137.13	0.601	-0.133
5136	MTS	1785	0.0000997983	127.97	0.561	0.133
5137	MTT	1319	0.0000737445	136.67	0.599	0.167
5138	MTW	219	0.0000122442	172.23	0.755	0.100
5139	MTY	489	0.0000273397	161.83	0.709	-0.033
5140	MTV	1399	0.0000782173	142.50	0.624	1.800
5141	MWA	325	0.0000181706	161.73	0.709	0.933
5142	MWR	342	0.0000191210	196.40	0.861	-1.167

5143	MWN	216	0.0000120764	173.30	0.759	-0.833
5144	MWD	224	0.0000125237	170.83	0.749	-0.833
5145	MWC	59	0.0000032987	166.17	0.728	1.167
5146	MWQ	197	0.0000110142	181.53	0.796	-0.833
5147	MWE	359	0.0000200715	179.13	0.785	-0.833
5148	MWG	253	0.0000141451	153.37	0.672	0.200
5149	MWH	128	0.0000071564	185.07	0.811	-0.733
5150	MWI	202	0.0000112937	186.37	0.817	1.833
5151	MWL	436	0.0000243765	186.40	0.817	1.600
5152	MWK	289	0.0000161578	187.50	0.822	-0.967
5153	MWM	85	0.0000047523	187.40	0.821	0.967
5154	MWF	146	0.0000081628	195.70	0.858	1.267
5155	MWP	199	0.0000111260	172.70	0.757	-0.200
5156	MWS	426	0.0000238174	163.53	0.717	0.067
5157	MWT	241	0.0000134742	172.23	0.755	0.100
5158	MWW	43	0.0000024041	207.80	0.911	0.033
5159	MWY	114	0.0000063737	197.40	0.865	-0.100
5160	MWV	224	0.0000125237	178.07	0.780	1.733
5161	MYA	567	0.0000317006	151.33	0.663	0.800
5162	MYR	575	0.0000321479	186.00	0.815	-1.300
5163	MYN	388	0.0000216928	162.90	0.714	-0.967
5164	MYD	446	0.0000249356	160.43	0.703	-0.967
5165	MYC	191	0.0000106787	155.77	0.683	1.033
5166	MYQ	488	0.0000272838	171.13	0.750	-0.967
5167	MYE	527	0.0000294643	168.73	0.739	-0.967
5168	MYG	610	0.0000341047	142.97	0.626	0.067
5169	MYH	267	0.0000149278	174.67	0.765	-0.867
5170	MYI	640	0.0000357820	175.97	0.771	1.700
5171	MYL	973	0.0000543998	176.00	0.771	1.467
5172	MYK	421	0.0000235379	177.10	0.776	-1.100
5173	MYM	187	0.0000104551	177.00	0.776	0.833
5174	MYF	688	0.0000384657	185.30	0.812	1.133
5175	MYP	514	0.0000287374	162.30	0.711	-0.333
5176	MYS	868	0.0000485294	153.13	0.671	-0.067
5177	MYT	581	0.0000324834	161.83	0.709	-0.033
5178	MYW	137	0.0000076596	197.40	0.865	-0.100
5179	MYY	318	0.0000177792	187.00	0.819	-0.233
5180	MYV	589	0.0000329306	167.67	0.735	1.600
5181	MVA	1756	0.0000981769	132.00	0.578	2.633
5182	MVR	1125	0.0000628981	166.67	0.730	0.533
5183	MVN	899	0.0000502626	143.57	0.629	0.867
5184	MVD	1114	0.0000622831	141.10	0.618	0.867
5185	MVC	525	0.0000293524	136.43	0.598	2.867
5186	MVQ	1241	0.0000693836	151.80	0.665	0.867
5187	MVE	1568	0.0000876659	149.40	0.655	0.867
5188	MVG	1317	0.0000736327	123.63	0.542	1.900
5189	MVH	706	0.0000394720	155.33	0.681	0.967
5190	MVI	1167	0.0000652463	156.63	0.686	3.533
5191	MVL	2315	0.0001294303	156.67	0.687	3.300
5192	MVK	1211	0.0000677063	157.77	0.691	0.733
5193	MVM	615	0.0000343843	157.67	0.691	2.667
5194	MVF	807	0.0000451189	165.97	0.727	2.967

5195	MVP	1359	0.0000759809	142.97	0.626	1.500
5196	MVS	2047	0.0001144465	133.80	0.586	1.767
5197	MVT	1531	0.0000855973	142.50	0.624	1.800
5198	MVW	416	0.0000232583	178.07	0.780	1.733
5199	MVY	584	0.0000326511	167.67	0.735	1.600
5200	MVV	1594	0.0000891196	148.33	0.650	3.433
5201	FAA	2596	0.0001451408	123.97	0.543	2.133
5202	FAR	1755	0.0000981210	158.63	0.695	0.033
5203	FAN	1368	0.0000764841	135.53	0.594	0.367
5204	FAD	1727	0.0000965555	133.07	0.583	0.367
5205	FAC	841	0.0000470198	128.40	0.563	2.367
5206	FAQ	1537	0.0000859327	143.77	0.630	0.367
5207	FAE	2292	0.0001281443	141.37	0.619	0.367
5208	FAG	2199	0.0001229448	115.60	0.507	1.400
5209	FAH	853	0.0000476907	147.30	0.645	0.467
5210	FAI	1503	0.0000840318	148.60	0.651	3.033
5211	FAL	3215	0.0001797487	148.63	0.651	2.800
5212	FAK	1942	0.0001085761	149.73	0.656	0.233
5213	FAM	717	0.0000400870	149.63	0.656	2.167
5214	FAF	1569	0.0000877218	157.93	0.692	2.467
5215	FAP	1694	0.0000947105	134.93	0.591	1.000
5216	FAS	2690	0.0001503963	125.77	0.551	1.267
5217	FAT	1685	0.0000942073	134.47	0.589	1.300
5218	FAW	428	0.0000239292	170.03	0.745	1.233
5219	FAY	931	0.0000520517	159.63	0.700	1.100
5220	FAV	2519	0.0001408358	140.30	0.615	2.933
5221	FRA	2144	0.0001198698	158.63	0.695	0.033
5222	FRR	2516	0.0001406681	193.30	0.847	-2.067
5223	FRN	1650	0.0000922505	170.20	0.746	-1.733
5224	FRD	2104	0.0001176334	167.73	0.735	-1.733
5225	FRC	1132	0.0000632894	163.07	0.715	0.267
5226	FRQ	1642	0.0000918032	178.43	0.782	-1.733
5227	FRE	2500	0.0001397735	176.03	0.771	-1.733
5228	FRG	2220	0.0001241189	150.27	0.658	-0.700
5229	FRH	1087	0.0000607735	181.97	0.797	-1.633
5230	FRI	1483	0.0000829136	183.27	0.803	0.933
5231	FRL	2884	0.0001612427	183.30	0.803	0.700
5232	FRK	2408	0.0001346298	184.40	0.808	-1.867
5233	FRM	673	0.0000376270	184.30	0.808	0.067
5234	FRF	1137	0.0000635690	192.60	0.844	0.367
5235	FRP	1668	0.0000932569	169.60	0.743	-1.100
5236	FRS	2685	0.0001501167	160.43	0.703	-0.833
5237	FRT	1604	0.0000896787	169.13	0.741	-0.800
5238	FRW	445	0.0000248797	204.70	0.897	-0.867
5239	FRY	981	0.0000548471	194.30	0.851	-1.000
5240	FRV	2696	0.0001507317	174.97	0.767	0.833
5241	FNA	1218	0.0000680977	135.53	0.594	0.367
5242	FNR	1310	0.0000732413	170.20	0.746	-1.733
5243	FNN	979	0.0000547353	147.10	0.645	-1.400
5244	FND	997	0.0000557417	144.63	0.634	-1.400
5245	FNC	579	0.0000323715	139.97	0.613	0.600
5246	FNQ	1278	0.0000714522	155.33	0.681	-1.400

5247	FNE	1328	0.0000742477	152.93	0.670	-1.400
5248	FNG	1165	0.0000651345	127.17	0.557	-0.367
5249	FNH	692	0.0000386893	158.87	0.696	-1.300
5250	FNI	1404	0.0000784968	160.17	0.702	1.267
5251	FNL	2300	0.0001285916	160.20	0.702	1.033
5252	FNK	1396	0.0000780495	161.30	0.707	-1.533
5253	FNM	504	0.0000281783	161.20	0.706	0.400
5254	FNF	1033	0.0000577544	169.50	0.743	0.700
5255	FNP	1435	0.0000802300	146.50	0.642	-0.767
5256	FNS	1902	0.0001063397	137.33	0.602	-0.500
5257	FNT	1311	0.0000732972	146.03	0.640	-0.467
5258	FNW	380	0.0000212456	181.60	0.796	-0.533
5259	FNY	648	0.0000362293	171.20	0.750	-0.667
5260	FNV	1236	0.0000691040	151.87	0.665	1.167
5261	FDA	1627	0.0000909646	133.07	0.583	0.367
5262	FDR	1519	0.0000849264	167.73	0.735	-1.733
5263	FDN	1185	0.0000662526	144.63	0.634	-1.400
5264	FDD	1552	0.0000867714	142.17	0.623	-1.400
5265	FDC	578	0.0000323156	137.50	0.603	0.600
5266	FDQ	1031	0.0000576426	152.87	0.670	-1.400
5267	FDE	1985	0.0001109802	150.47	0.659	-1.400
5268	FDG	1798	0.0001005251	124.70	0.546	-0.367
5269	FDH	767	0.0000428825	156.40	0.685	-1.300
5270	FDI	1381	0.0000772109	157.70	0.691	1.267
5271	FDL	2583	0.0001444140	157.73	0.691	1.033
5272	FDK	1380	0.0000771550	158.83	0.696	-1.533
5273	FDM	550	0.0000307502	158.73	0.696	0.400
5274	FDF	1355	0.0000757572	167.03	0.732	0.700
5275	FDP	1678	0.0000938160	144.03	0.631	-0.767
5276	FDS	2224	0.0001243425	134.87	0.591	-0.500
5277	FDT	1290	0.0000721231	143.57	0.629	-0.467
5278	FDW	383	0.0000214133	179.13	0.785	-0.533
5279	FDY	1041	0.0000582017	168.73	0.739	-0.667
5280	FDV	1750	0.0000978414	149.40	0.655	1.167
5281	FCA	970	0.0000542321	128.40	0.563	2.367
5282	FCR	1065	0.0000595435	163.07	0.715	0.267
5283	FCN	645	0.0000360616	139.97	0.613	0.600
5284	FCD	928	0.0000518839	137.50	0.603	0.600
5285	FCC	612	0.0000342166	132.83	0.582	2.600
5286	FCQ	810	0.0000452866	148.20	0.649	0.600
5287	FCE	990	0.0000553503	145.80	0.639	0.600
5288	FCG	1284	0.0000717877	120.03	0.526	1.633
5289	FCH	522	0.0000291847	151.73	0.665	0.700
5290	FCI	721	0.0000403107	153.03	0.671	3.267
5291	FCL	1764	0.0000986242	153.07	0.671	3.033
5292	FCK	838	0.0000468521	154.17	0.676	0.467
5293	FCM	312	0.0000174437	154.07	0.675	2.400
5294	FCF	730	0.0000408139	162.37	0.712	2.700
5295	FCP	958	0.0000535612	139.37	0.611	1.233
5296	FCS	1431	0.0000800063	130.20	0.571	1.500
5297	FCT	823	0.0000460134	138.90	0.609	1.533
5298	FCW	278	0.0000155428	174.47	0.765	1.467

5299	FCY	531	0.0000296879	164.07	0.719	1.333
5300	FCV	845	0.0000472434	144.73	0.634	3.167
5301	FQA	2312	0.0001292625	143.77	0.630	0.367
5302	FQR	1978	0.0001105888	178.43	0.782	-1.733
5303	FQN	1643	0.0000918591	155.33	0.681	-1.400
5304	FQD	1769	0.0000989037	152.87	0.670	-1.400
5305	FQC	949	0.0000530580	148.20	0.649	0.600
5306	FQQ	1749	0.0000977855	163.57	0.717	-1.400
5307	FQE	2663	0.0001488867	161.17	0.706	-1.400
5308	FQG	2213	0.0001237275	135.40	0.593	-0.367
5309	FQH	882	0.0000493121	167.10	0.732	-1.300
5310	FQI	1361	0.0000760927	168.40	0.738	1.267
5311	FQL	2661	0.0001487749	168.43	0.738	1.033
5312	FQK	2153	0.0001203729	169.53	0.743	-1.533
5313	FQM	552	0.0000308620	169.43	0.742	0.400
5314	FQF	934	0.0000522194	177.73	0.779	0.700
5315	FQP	1674	0.0000935923	154.73	0.678	-0.767
5316	FQS	1929	0.0001078492	145.57	0.638	-0.500
5317	FQT	1660	0.0000928096	154.27	0.676	-0.467
5318	FQW	325	0.0000181706	189.83	0.832	-0.533
5319	FQY	729	0.0000407580	179.43	0.786	-0.667
5320	FQV	1935	0.0001081847	160.10	0.702	1.167
5321	FEA	2081	0.0001163475	141.37	0.619	0.367
5322	FER	1804	0.0001008606	176.03	0.771	-1.733
5323	FEN	1739	0.0000972264	152.93	0.670	-1.400
5324	FED	2730	0.0001526327	150.47	0.659	-1.400
5325	FEC	986	0.0000551267	145.80	0.639	0.600
5326	FEQ	1394	0.0000779377	161.17	0.706	-1.400
5327	FEE	3437	0.0001921606	158.77	0.696	-1.400
5328	FEG	2098	0.0001172979	133.00	0.583	-0.367
5329	FEH	782	0.0000437211	164.70	0.722	-1.300
5330	FEI	1595	0.0000891755	166.00	0.727	1.267
5331	FEL	2320	0.0001297098	166.03	0.728	1.033
5332	FEK	2453	0.0001371458	167.13	0.732	-1.533
5333	FEM	670	0.0000374593	167.03	0.732	0.400
5334	FEF	972	0.0000543439	175.33	0.768	0.700
5335	FEP	1178	0.0000658613	152.33	0.668	-0.767
5336	FES	2140	0.0001196461	143.17	0.627	-0.500
5337	FET	1730	0.0000967233	151.87	0.665	-0.467
5338	FEW	287	0.0000160460	187.43	0.821	-0.533
5339	FEY	878	0.0000490885	177.03	0.776	-0.667
5340	FEV	2069	0.0001156766	157.70	0.691	1.167
5341	FGA	2422	0.0001354126	115.60	0.507	1.400
5342	FGR	1854	0.0001036560	150.27	0.658	-0.700
5343	FGN	1781	0.0000995746	127.17	0.557	-0.367
5344	FGD	2019	0.0001128811	124.70	0.546	-0.367
5345	FGC	805	0.0000450071	120.03	0.526	1.633
5346	FGQ	1687	0.0000943192	135.40	0.593	-0.367
5347	FGE	2224	0.0001243425	133.00	0.583	-0.367
5348	FGG	3088	0.0001726482	107.23	0.470	0.667
5349	FGH	1020	0.0000570276	138.93	0.609	-0.267
5350	FGI	1888	0.0001055569	140.23	0.615	2.300

5351	FGL	3460	0.0001934465	140.27	0.615	2.067
5352	FGK	2345	0.0001311075	141.37	0.619	-0.500
5353	FGM	830	0.0000464048	141.27	0.619	1.433
5354	FGF	1936	0.0001082406	149.57	0.655	1.733
5355	FGP	2108	0.0001178570	126.57	0.555	0.267
5356	FGS	3150	0.0001761146	117.40	0.514	0.533
5357	FGT	1981	0.0001107565	126.10	0.553	0.567
5358	FGW	417	0.0000233142	161.67	0.708	0.500
5359	FGY	1072	0.0000599349	151.27	0.663	0.367
5360	FGV	2271	0.0001269702	131.93	0.578	2.200
5361	FHA	964	0.0000538967	147.30	0.645	0.467
5362	FHR	1130	0.0000631776	181.97	0.797	-1.633
5363	FHN	658	0.0000367884	158.87	0.696	-1.300
5364	FHD	668	0.0000373475	156.40	0.685	-1.300
5365	FHC	598	0.0000334338	151.73	0.665	0.700
5366	FHQ	910	0.0000508776	167.10	0.732	-1.300
5367	FHE	974	0.0000544558	164.70	0.722	-1.300
5368	FHG	1206	0.0000674267	138.93	0.609	-0.267
5369	FHH	632	0.0000353347	170.63	0.748	-1.200
5370	FHI	849	0.0000474671	171.93	0.753	1.367
5371	FHL	1880	0.0001051097	171.97	0.754	1.133
5372	FHK	972	0.0000543439	173.07	0.758	-1.433
5373	FHM	369	0.0000206306	172.97	0.758	0.500
5374	FHF	938	0.0000524430	181.27	0.794	0.800
5375	FHP	1312	0.0000733531	158.27	0.694	-0.667
5376	FHS	1721	0.0000962201	149.10	0.653	-0.400
5377	FHT	959	0.0000536171	157.80	0.691	-0.367
5378	FHW	238	0.0000133064	193.37	0.847	-0.433
5379	FHY	636	0.0000355584	182.97	0.802	-0.567
5380	FHV	1107	0.0000618917	163.63	0.717	1.267
5381	FIA	1705	0.0000953255	148.60	0.651	3.033
5382	FIR	1660	0.0000928096	183.27	0.803	0.933
5383	FIN	1363	0.0000762045	160.17	0.702	1.267
5384	FID	1562	0.0000873305	157.70	0.691	1.267
5385	FIC	933	0.0000521635	153.03	0.671	3.267
5386	FIQ	1597	0.0000892873	168.40	0.738	1.267
5387	FIE	1539	0.0000860446	166.00	0.727	1.267
5388	FIG	1680	0.0000939278	140.23	0.615	2.300
5389	FIH	1010	0.0000564685	171.93	0.753	1.367
5390	FII	1844	0.0001030969	173.23	0.759	3.933
5391	FIL	3295	0.0001842215	173.27	0.759	3.700
5392	FIK	1674	0.0000935923	174.37	0.764	1.133
5393	FIM	570	0.0000318684	174.27	0.764	3.067
5394	FIF	1558	0.0000871068	182.57	0.800	3.367
5395	FIP	1655	0.0000925301	159.57	0.699	1.900
5396	FIS	2537	0.0001418421	150.40	0.659	2.167
5397	FIT	1783	0.0000996865	159.10	0.697	2.200
5398	FIW	395	0.0000220842	194.67	0.853	2.133
5399	FIY	1149	0.0000642399	184.27	0.807	2.000
5400	FIV	1643	0.0000918591	164.93	0.723	3.833
5401	FLA	4647	0.0002598110	148.63	0.651	2.800
5402	FLR	4188	0.0002341486	183.30	0.803	0.700

5403	FLN	2737	0.0001530240	160.20	0.702	1.033
5404	FLD	3417	0.0001910424	157.73	0.691	1.033
5405	FLC	1812	0.0001013078	153.07	0.671	3.033
5406	FLQ	3808	0.0002129030	168.43	0.738	1.033
5407	FLE	4608	0.0002576305	166.03	0.728	1.033
5408	FLG	4501	0.0002516482	140.27	0.615	2.067
5409	FLH	2036	0.0001138315	171.97	0.754	1.133
5410	FLI	2964	0.0001657155	173.27	0.759	3.700
5411	FLL	8126	0.0004543198	173.30	0.759	3.467
5412	FLK	4184	0.0002339249	174.40	0.764	0.900
5413	FLM	1278	0.0000714522	174.30	0.764	2.833
5414	FLF	2847	0.0001591741	182.60	0.800	3.133
5415	FLP	4051	0.0002264890	159.60	0.699	1.667
5416	FLS	5739	0.0003208641	150.43	0.659	1.933
5417	FLT	3663	0.0002047961	159.13	0.697	1.967
5418	FLW	921	0.0000514926	194.70	0.853	1.900
5419	FLY	1888	0.0001055569	184.30	0.808	1.767
5420	FLV	4259	0.0002381181	164.97	0.723	3.600
5421	FKA	1844	0.0001030969	149.73	0.656	0.233
5422	FKR	1797	0.0001004692	184.40	0.808	-1.867
5423	FKN	1538	0.0000859887	161.30	0.707	-1.533
5424	FKD	2108	0.0001178570	158.83	0.696	-1.533
5425	FKC	1203	0.0000672590	154.17	0.676	0.467
5426	FKQ	1462	0.0000817395	169.53	0.743	-1.533
5427	FKE	2610	0.0001459235	167.13	0.732	-1.533
5428	FKG	1919	0.0001072901	141.37	0.619	-0.500
5429	FKH	742	0.0000414848	173.07	0.758	-1.433
5430	FKI	1455	0.0000813482	174.37	0.764	1.133
5431	FKL	2307	0.0001289830	174.40	0.764	0.900
5432	FKK	2257	0.0001261875	175.50	0.769	-1.667
5433	FKM	685	0.0000382979	175.40	0.769	0.267
5434	FKF	874	0.0000488648	183.70	0.805	0.567
5435	FKP	1421	0.0000794473	160.70	0.704	-0.900
5436	FKS	1939	0.0001084083	151.53	0.664	-0.633
5437	FKT	1592	0.0000890078	160.23	0.702	-0.600
5438	FKW	372	0.0000207983	195.80	0.858	-0.667
5439	FKY	789	0.0000441125	185.40	0.812	-0.800
5440	FKV	1699	0.0000949901	166.07	0.728	1.033
5441	FMA	910	0.0000508776	149.63	0.656	2.167
5442	FMR	574	0.0000320920	184.30	0.808	0.067
5443	FMN	495	0.0000276752	161.20	0.706	0.400
5444	FMD	772	0.0000431621	158.73	0.696	0.400
5445	FMC	345	0.0000192887	154.07	0.675	2.400
5446	FMQ	506	0.0000282902	169.43	0.742	0.400
5447	FME	1023	0.0000571953	167.03	0.732	0.400
5448	FMG	840	0.0000469639	141.27	0.619	1.433
5449	FMH	233	0.0000130269	172.97	0.758	0.500
5450	FMI	509	0.0000284579	174.27	0.764	3.067
5451	FML	1038	0.0000580340	174.30	0.764	2.833
5452	FMK	723	0.0000404225	175.40	0.769	0.267
5453	FMM	244	0.0000136419	175.30	0.768	2.200
5454	FMF	429	0.0000239851	183.60	0.805	2.500

5455	FMP	575	0.0000321479	160.60	0.704	1.033
5456	FMS	773	0.0000432180	151.43	0.664	1.300
5457	FMT	614	0.0000343284	160.13	0.702	1.333
5458	FMW	147	0.0000082187	195.70	0.858	1.267
5459	FMY	421	0.0000235379	185.30	0.812	1.133
5460	FMV	782	0.0000437211	165.97	0.727	2.967
5461	FFA	1403	0.0000784409	157.93	0.692	2.467
5462	FFR	1641	0.0000917473	192.60	0.844	0.367
5463	FFN	1134	0.0000634013	169.50	0.743	0.700
5464	FFD	1188	0.0000664204	167.03	0.732	0.700
5465	FFC	871	0.0000486971	162.37	0.712	2.700
5466	FFQ	1209	0.0000675945	177.73	0.779	0.700
5467	FFE	1258	0.0000703340	175.33	0.768	0.700
5468	FFG	1497	0.0000836964	149.57	0.655	1.733
5469	FFH	752	0.0000420439	181.27	0.794	0.800
5470	FFI	1650	0.0000922505	182.57	0.800	3.367
5471	FFL	3261	0.0001823206	182.60	0.800	3.133
5472	FFK	1507	0.0000842555	183.70	0.805	0.567
5473	FFM	556	0.0000310856	183.60	0.805	2.500
5474	FFF	1329	0.0000743036	191.90	0.841	2.800
5475	FFP	1431	0.0000800063	168.90	0.740	1.333
5476	FFS	2472	0.0001382080	159.73	0.700	1.600
5477	FFT	1580	0.0000883368	168.43	0.738	1.633
5478	FFW	393	0.0000219724	204.00	0.894	1.567
5479	FFY	785	0.0000438889	193.60	0.848	1.433
5480	FFV	1540	0.0000861005	174.27	0.764	3.267
5481	FPA	2869	0.0001604041	134.93	0.591	1.000
5482	FPR	1913	0.0001069547	169.60	0.743	-1.100
5483	FPN	1326	0.0000741359	146.50	0.642	-0.767
5484	FPD	1924	0.0001075697	144.03	0.631	-0.767
5485	FPC	887	0.0000495916	139.37	0.611	1.233
5486	FPQ	1524	0.0000852059	154.73	0.678	-0.767
5487	FPE	2731	0.0001526886	152.33	0.668	-0.767
5488	FPG	3453	0.0001930552	126.57	0.555	0.267
5489	FPH	956	0.0000534494	158.27	0.694	-0.667
5490	FPI	1198	0.0000669795	159.57	0.699	1.900
5491	FPL	3100	0.0001733191	159.60	0.699	1.667
5492	FPK	1780	0.0000995187	160.70	0.704	-0.900
5493	FPM	580	0.0000324275	160.60	0.704	1.033
5494	FPF	1544	0.0000863241	168.90	0.740	1.333
5495	FPP	2662	0.0001488308	145.90	0.639	-0.133
5496	FPS	3319	0.0001855633	136.73	0.599	0.133
5497	FPT	1742	0.0000973942	145.43	0.637	0.167
5498	FPW	428	0.0000239292	181.00	0.793	0.100
5499	FPY	921	0.0000514926	170.60	0.748	-0.033
5500	FPV	2304	0.0001288153	151.27	0.663	1.800
5501	FSA	3609	0.0002017770	125.77	0.551	1.267
5502	FSR	3536	0.0001976956	160.43	0.703	-0.833
5503	FSN	2235	0.0001249575	137.33	0.602	-0.500
5504	FSD	2865	0.0001601804	134.87	0.591	-0.500
5505	FSC	1567	0.0000876100	130.20	0.571	1.500
5506	FSQ	3481	0.0001946206	145.57	0.638	-0.500

5507	FSE	3662	0.0002047402	143.17	0.627	-0.500
5508	FSG	3791	0.0002119525	117.40	0.514	0.533
5509	FSH	1901	0.0001062838	149.10	0.653	-0.400
5510	FSI	2657	0.0001485513	150.40	0.659	2.167
5511	FSL	5757	0.0003218704	150.43	0.659	1.933
5512	FSK	3210	0.0001794692	151.53	0.664	-0.633
5513	FSM	1031	0.0000576426	151.43	0.664	1.300
5514	FSF	2557	0.0001429603	159.73	0.700	1.600
5515	FSP	3686	0.0002060821	136.73	0.599	0.133
5516	FSS	6254	0.0003496574	127.57	0.559	0.400
5517	FST	3481	0.0001946206	136.27	0.597	0.433
5518	FSW	909	0.0000508216	171.83	0.753	0.367
5519	FSY	1703	0.0000952137	161.43	0.707	0.233
5520	FSV	3605	0.0002015534	142.10	0.623	2.067
5521	FTA	2300	0.0001285916	134.47	0.589	1.300
5522	FTR	1669	0.0000933128	169.13	0.741	-0.800
5523	FTN	1326	0.0000741359	146.03	0.640	-0.467
5524	FTD	1838	0.0001027615	143.57	0.629	-0.467
5525	FTC	1200	0.0000670913	138.90	0.609	1.533
5526	FTQ	1777	0.0000993510	154.27	0.676	-0.467
5527	FTE	2092	0.0001169625	151.87	0.665	-0.467
5528	FTG	2104	0.0001176334	126.10	0.553	0.567
5529	FTH	845	0.0000472434	157.80	0.691	-0.367
5530	FTI	1753	0.0000980092	159.10	0.697	2.200
5531	FTL	3318	0.0001855074	159.13	0.697	1.967
5532	FTK	1915	0.0001070665	160.23	0.702	-0.600
5533	FTM	611	0.0000341606	160.13	0.702	1.333
5534	FTF	1619	0.0000905173	168.43	0.738	1.633
5535	FTP	1849	0.0001033765	145.43	0.637	0.167
5536	FTS	2987	0.0001670014	136.27	0.597	0.433
5537	FTT	2047	0.0001144465	144.97	0.635	0.467
5538	FTW	511	0.0000285697	180.53	0.791	0.400
5539	FTY	1066	0.0000595994	170.13	0.746	0.267
5540	FTV	2807	0.0001569377	150.80	0.661	2.100
5541	FWA	651	0.0000363970	170.03	0.745	1.233
5542	FWR	629	0.0000351670	204.70	0.897	-0.867
5543	FWN	473	0.0000264451	181.60	0.796	-0.533
5544	FWD	528	0.0000295202	179.13	0.785	-0.533
5545	FWC	200	0.0000111819	174.47	0.765	1.467
5546	FWQ	351	0.0000196242	189.83	0.832	-0.533
5547	FWE	597	0.0000333779	187.43	0.821	-0.533
5548	FWG	601	0.0000336016	161.67	0.708	0.500
5549	FWH	168	0.0000093928	193.37	0.847	-0.433
5550	FWI	407	0.0000227551	194.67	0.853	2.133
5551	FWL	869	0.0000485853	194.70	0.853	1.900
5552	FWK	709	0.0000396398	195.80	0.858	-0.667
5553	FWM	222	0.0000124119	195.70	0.858	1.267
5554	FWF	287	0.0000160460	204.00	0.894	1.567
5555	FWP	442	0.0000247120	181.00	0.793	0.100
5556	FWS	545	0.0000304706	171.83	0.753	0.367
5557	FWT	505	0.0000282342	180.53	0.791	0.400
5558	FWW	165	0.0000092251	216.10	0.947	0.333

5559	FWY	236	0.0000131946	205.70	0.901	0.200
5560	FWV	496	0.0000277311	186.37	0.817	2.033
5561	FYA	1048	0.0000585931	159.63	0.700	1.100
5562	FYR	1256	0.0000702222	194.30	0.851	-1.000
5563	FYN	946	0.0000528903	171.20	0.750	-0.667
5564	FYD	942	0.0000526667	168.73	0.739	-0.667
5565	FYC	536	0.0000299674	164.07	0.719	1.333
5566	FYQ	934	0.0000522194	179.43	0.786	-0.667
5567	FYE	1214	0.0000678740	177.03	0.776	-0.667
5568	FYG	1264	0.0000706695	151.27	0.663	0.367
5569	FYH	621	0.0000347197	182.97	0.802	-0.567
5570	FYI	989	0.0000552944	184.27	0.807	2.000
5571	FYL	1870	0.0001045506	184.30	0.808	1.767
5572	FYK	1096	0.0000612767	185.40	0.812	-0.800
5573	FYM	386	0.0000215810	185.30	0.812	1.133
5574	FYF	972	0.0000543439	193.60	0.848	1.433
5575	FYP	1014	0.0000566921	170.60	0.748	-0.033
5576	FYS	1670	0.0000933687	161.43	0.707	0.233
5577	FYT	1270	0.0000710049	170.13	0.746	0.267
5578	FYW	269	0.0000150396	205.70	0.901	0.200
5579	FYY	664	0.0000371238	195.30	0.856	0.067
5580	FYV	1151	0.0000643517	175.97	0.771	1.900
5581	FVA	2537	0.0001418421	140.30	0.615	2.933
5582	FVR	1932	0.0001080170	174.97	0.767	0.833
5583	FVN	1601	0.0000895109	151.87	0.665	1.167
5584	FVD	1778	0.0000994069	149.40	0.655	1.167
5585	FVC	1132	0.0000632894	144.73	0.634	3.167
5586	FVQ	1592	0.0000890078	160.10	0.702	1.167
5587	FVE	2210	0.0001235598	157.70	0.691	1.167
5588	FVG	2526	0.0001412271	131.93	0.578	2.200
5589	FVH	989	0.0000552944	163.63	0.717	1.267
5590	FVI	1652	0.0000923623	164.93	0.723	3.833
5591	FVL	3617	0.0002022243	164.97	0.723	3.600
5592	FVK	2078	0.0001161797	166.07	0.728	1.033
5593	FVM	711	0.0000397516	165.97	0.727	2.967
5594	FVF	1643	0.0000918591	174.27	0.764	3.267
5595	FVP	1999	0.0001117629	151.27	0.663	1.800
5596	FVS	2690	0.0001503963	142.10	0.623	2.067
5597	FVT	1960	0.0001095824	150.80	0.661	2.100
5598	FVW	363	0.0000202951	186.37	0.817	2.033
5599	FVY	897	0.0000501507	175.97	0.771	1.900
5600	FVV	2329	0.0001302130	156.63	0.686	3.733
5601	PAA	10516	0.0005879432	100.97	0.442	0.667
5602	PAR	5273	0.0002948103	135.63	0.594	-1.433
5603	PAN	2197	0.0001228329	112.53	0.493	-1.100
5604	PAD	3552	0.0001985902	110.07	0.482	-1.100
5605	PAC	1837	0.0001027056	105.40	0.462	0.900
5606	PAQ	4110	0.0002297876	120.77	0.529	-1.100
5607	PAE	5338	0.0002984444	118.37	0.519	-1.100
5608	PAG	8123	0.0004541521	92.60	0.406	-0.067
5609	PAH	2202	0.0001231125	124.30	0.545	-1.000
5610	PAI	2448	0.0001368662	125.60	0.550	1.567

5611	PAL	9034	0.0005050855	125.63	0.551	1.333
5612	PAK	3409	0.0001905952	126.73	0.555	-1.233
5613	PAM	1368	0.0000764841	126.63	0.555	0.700
5614	PAF	2792	0.0001560990	134.93	0.591	1.000
5615	PAP	12350	0.0006904811	111.93	0.491	-0.467
5616	PAS	9441	0.0005278406	102.77	0.450	-0.200
5617	PAT	5367	0.0003000658	111.47	0.488	-0.167
5618	PAW	1022	0.0000571394	147.03	0.644	-0.233
5619	PAY	1498	0.0000837523	136.63	0.599	-0.367
5620	PAV	5514	0.0003082844	117.30	0.514	1.467
5621	PRA	5992	0.0003350091	135.63	0.594	-1.433
5622	PRR	5791	0.0003237713	170.30	0.746	-3.533
5623	PRN	1903	0.0001063956	147.20	0.645	-3.200
5624	PRD	2908	0.0001625845	144.73	0.634	-3.200
5625	PRC	1397	0.0000781054	140.07	0.614	-1.200
5626	PRQ	2291	0.0001280884	155.43	0.681	-3.200
5627	PRE	4018	0.0002246440	153.03	0.671	-3.200
5628	PRG	6127	0.0003425569	127.27	0.558	-2.167
5629	PRH	1747	0.0000976737	158.97	0.697	-3.100
5630	PRI	1852	0.0001035442	160.27	0.702	-0.533
5631	PRL	6103	0.0003412151	160.30	0.702	-0.767
5632	PRK	3370	0.0001884147	161.40	0.707	-3.333
5633	PRM	996	0.0000556858	161.30	0.707	-1.400
5634	PRF	1877	0.0001049419	169.60	0.743	-1.100
5635	PRP	7610	0.0004254705	146.60	0.642	-2.567
5636	PRS	5856	0.0003274054	137.43	0.602	-2.300
5637	PRT	3595	0.0002009943	146.13	0.640	-2.267
5638	PRW	915	0.0000511571	181.70	0.796	-2.333
5639	PRY	1208	0.0000675386	171.30	0.751	-2.467
5640	PRV	3596	0.0002010502	151.97	0.666	-0.633
5641	PNA	1972	0.0001102533	112.53	0.493	-1.100
5642	PNR	1455	0.0000813482	147.20	0.645	-3.200
5643	PNN	1161	0.0000649108	124.10	0.544	-2.867
5644	PND	1171	0.0000654699	121.63	0.533	-2.867
5645	PNC	821	0.0000459016	116.97	0.513	-0.867
5646	PNQ	1352	0.0000755895	132.33	0.580	-2.867
5647	PNE	1436	0.0000802859	129.93	0.569	-2.867
5648	PNG	2528	0.0001413390	104.17	0.456	-1.833
5649	PNH	811	0.0000453425	135.87	0.595	-2.767
5650	PNI	1842	0.0001029851	137.17	0.601	-0.200
5651	PNL	3022	0.0001689582	137.20	0.601	-0.433
5652	PNK	1530	0.0000855414	138.30	0.606	-3.000
5653	PNM	666	0.0000372357	138.20	0.606	-1.067
5654	PNF	1214	0.0000678740	146.50	0.642	-0.767
5655	PNP	2549	0.0001425131	123.50	0.541	-2.233
5656	PNS	2983	0.0001667777	114.33	0.501	-1.967
5657	PNT	2104	0.0001176334	123.03	0.539	-1.933
5658	PNW	395	0.0000220842	158.60	0.695	-2.000
5659	PNY	1013	0.0000566362	148.20	0.649	-2.133
5660	PNV	1751	0.0000978974	128.87	0.565	-0.300
5661	PDA	3343	0.0001869051	110.07	0.482	-1.100
5662	PDR	2020	0.0001129370	144.73	0.634	-3.200

5663	PDN	1458	0.0000815159	121.63	0.533	-2.867
5664	PDD	2436	0.0001361953	119.17	0.522	-2.867
5665	PDC	1186	0.0000663085	114.50	0.502	-0.867
5666	PDQ	1759	0.0000983446	129.87	0.569	-2.867
5667	PDE	2707	0.0001513467	127.47	0.559	-2.867
5668	PDG	4218	0.0002358258	101.70	0.446	-1.833
5669	PDH	1297	0.0000725145	133.40	0.585	-2.767
5670	PDI	2153	0.0001203729	134.70	0.590	-0.200
5671	PDL	4999	0.0002794911	134.73	0.590	-0.433
5672	PDK	1880	0.0001051097	135.83	0.595	-3.000
5673	PDM	908	0.0000507657	135.73	0.595	-1.067
5674	PDF	1887	0.0001055010	144.03	0.631	-0.767
5675	PDP	3929	0.0002196680	121.03	0.530	-2.233
5676	PDS	4820	0.0002694833	111.87	0.490	-1.967
5677	PDT	3001	0.0001677841	120.57	0.528	-1.933
5678	PDW	705	0.0000394161	156.13	0.684	-2.000
5679	PDY	1429	0.0000798945	145.73	0.639	-2.133
5680	PDV	3092	0.0001728719	126.40	0.554	-0.300
5681	PCA	1447	0.0000809009	105.40	0.462	0.900
5682	PCR	1236	0.0000691040	140.07	0.614	-1.200
5683	PCN	636	0.0000355584	116.97	0.513	-0.867
5684	PCD	764	0.0000427148	114.50	0.502	-0.867
5685	PCC	818	0.0000457339	109.83	0.481	1.133
5686	PCQ	1169	0.0000653581	125.20	0.549	-0.867
5687	PCE	1042	0.0000582576	122.80	0.538	-0.867
5688	PCG	1745	0.0000975619	97.03	0.425	0.167
5689	PCH	712	0.0000398075	128.73	0.564	-0.767
5690	PCI	784	0.0000438330	130.03	0.570	1.800
5691	PCL	2154	0.0001204288	130.07	0.570	1.567
5692	PCK	917	0.0000512689	131.17	0.575	-1.000
5693	PCM	258	0.0000144246	131.07	0.574	0.933
5694	PCF	725	0.0000405343	139.37	0.611	1.233
5695	PCP	2672	0.0001493899	116.37	0.510	-0.233
5696	PCS	2227	0.0001245102	107.20	0.470	0.033
5697	PCT	1202	0.0000672031	115.90	0.508	0.067
5698	PCW	330	0.0000184501	151.47	0.664	0.000
5699	PCY	494	0.0000276192	141.07	0.618	-0.133
5700	PCV	1117	0.0000624508	121.73	0.533	1.700
5701	PQA	4269	0.0002386772	120.77	0.529	-1.100
5702	PQR	2984	0.0001668336	155.43	0.681	-3.200
5703	PQN	2003	0.0001119865	132.33	0.580	-2.867
5704	PQD	2719	0.0001520177	129.87	0.569	-2.867
5705	PQC	1031	0.0000576426	125.20	0.549	-0.867
5706	PQQ	3128	0.0001748846	140.57	0.616	-2.867
5707	PQE	3709	0.0002073680	138.17	0.605	-2.867
5708	PQG	4523	0.0002528782	112.40	0.493	-1.833
5709	PQH	1407	0.0000786645	144.10	0.631	-2.767
5710	PQI	1748	0.0000977296	145.40	0.637	-0.200
5711	PQL	4569	0.0002554501	145.43	0.637	-0.433
5712	PQK	2347	0.0001312194	146.53	0.642	-3.000
5713	PQM	911	0.0000509335	146.43	0.642	-1.067
5714	PQF	1251	0.0000699427	154.73	0.678	-0.767

5715	PQP	5676	0.0003173418	131.73	0.577	-2.233
5716	PQS	3991	0.0002231344	122.57	0.537	-1.967
5717	PQT	2750	0.0001537509	131.27	0.575	-1.933
5718	PQW	532	0.0000297438	166.83	0.731	-2.000
5719	PQY	1085	0.0000606617	156.43	0.686	-2.133
5720	PQV	3080	0.0001722009	137.10	0.601	-0.300
5721	PEA	6384	0.0003569256	118.37	0.519	-1.100
5722	PER	3861	0.0002158662	153.03	0.671	-3.200
5723	PEN	3424	0.0001914338	129.93	0.569	-2.867
5724	PED	5216	0.0002916234	127.47	0.559	-2.867
5725	PEC	1456	0.0000814041	122.80	0.538	-0.867
5726	PEQ	3055	0.0001708032	138.17	0.605	-2.867
5727	PEE	7939	0.0004438647	135.77	0.595	-2.867
5728	PEG	5945	0.0003323814	110.00	0.482	-1.833
5729	PEH	1777	0.0000993510	141.70	0.621	-2.767
5730	PEI	3046	0.0001703000	143.00	0.627	-0.200
5731	PEL	6646	0.0003715739	143.03	0.627	-0.433
5732	PEK	4554	0.0002546114	144.13	0.632	-3.000
5733	PEM	1556	0.0000869950	144.03	0.631	-1.067
5734	PEF	2040	0.0001140552	152.33	0.668	-0.767
5735	PEP	6640	0.0003712384	129.33	0.567	-2.233
5736	PES	5622	0.0003143226	120.17	0.527	-1.967
5737	PET	4310	0.0002409695	128.87	0.565	-1.933
5738	PEW	712	0.0000398075	164.43	0.721	-2.000
5739	PEY	1552	0.0000867714	154.03	0.675	-2.133
5740	PEV	5012	0.0002802179	134.70	0.590	-0.300
5741	PGA	9630	0.0005384075	92.60	0.406	-0.067
5742	PGR	6055	0.0003385314	127.27	0.558	-2.167
5743	PGN	2638	0.0001474890	104.17	0.456	-1.833
5744	PGD	4177	0.0002335336	101.70	0.446	-1.833
5745	PGC	2118	0.0001184161	97.03	0.425	0.167
5746	PGQ	4305	0.0002406900	112.40	0.493	-1.833
5747	PGE	5863	0.0003277968	110.00	0.482	-1.833
5748	PGG	8142	0.0004552143	84.23	0.369	-0.800
5749	PGH	2650	0.0001481599	115.93	0.508	-1.733
5750	PGI	3254	0.0001819292	117.23	0.514	0.833
5751	PGL	9692	0.0005418739	117.27	0.514	0.600
5752	PGK	4179	0.0002336454	118.37	0.519	-1.967
5753	PGM	1870	0.0001045506	118.27	0.518	-0.033
5754	PGF	3393	0.0001897006	126.57	0.555	0.267
5755	PGP	13683	0.0007650083	103.57	0.454	-1.200
5756	PGS	10289	0.0005752518	94.40	0.414	-0.933
5757	PGT	6532	0.0003652002	103.10	0.452	-0.900
5758	PGW	1292	0.0000722349	138.67	0.608	-0.967
5759	PGY	2434	0.0001360835	128.27	0.562	-1.100
5760	PGV	5373	0.0003004012	108.93	0.477	0.733
5761	PHA	1633	0.0000913000	124.30	0.545	-1.000
5762	PHR	1546	0.0000864359	158.97	0.697	-3.100
5763	PHN	761	0.0000425471	135.87	0.595	-2.767
5764	PHD	781	0.0000436652	133.40	0.585	-2.767
5765	PHC	858	0.0000479703	128.73	0.564	-0.767
5766	PHQ	1212	0.0000677622	144.10	0.631	-2.767

5767	PHE	1102	0.0000616122	141.70	0.621	-2.767
5768	PHG	1899	0.0001061720	115.93	0.508	-1.733
5769	PHH	1136	0.0000635131	147.63	0.647	-2.667
5770	PHI	1089	0.0000608853	148.93	0.653	-0.100
5771	PHL	3152	0.0001762264	148.97	0.653	-0.333
5772	PHK	1084	0.0000606058	150.07	0.658	-2.900
5773	PHM	427	0.0000238733	149.97	0.657	-0.967
5774	PHF	1121	0.0000626744	158.27	0.694	-0.667
5775	PHP	2827	0.0001580559	135.27	0.593	-2.133
5776	PHS	2853	0.0001595095	126.10	0.553	-1.867
5777	PHT	1515	0.0000847027	134.80	0.591	-1.833
5778	PHW	359	0.0000200715	170.37	0.747	-1.900
5779	PHY	701	0.0000391925	159.97	0.701	-2.033
5780	PHV	1552	0.0000867714	140.63	0.616	-0.200
5781	PIA	1683	0.0000940955	125.60	0.550	1.567
5782	PIR	1698	0.0000949342	160.27	0.702	-0.533
5783	PIN	1090	0.0000609412	137.17	0.601	-0.200
5784	PID	1225	0.0000684890	134.70	0.590	-0.200
5785	PIC	1036	0.0000579221	130.03	0.570	1.800
5786	PIQ	1530	0.0000855414	145.40	0.637	-0.200
5787	PIE	1505	0.0000841436	143.00	0.627	-0.200
5788	PIG	1714	0.0000958287	117.23	0.514	0.833
5789	PIH	952	0.0000532257	148.93	0.653	-0.100
5790	PII	1986	0.0001110361	150.23	0.658	2.467
5791	PIL	3286	0.0001837183	150.27	0.658	2.233
5792	PIK	1750	0.0000978414	151.37	0.663	-0.333
5793	PIM	686	0.0000383538	151.27	0.663	1.600
5794	PIF	1367	0.0000764282	159.57	0.699	1.900
5795	PIP	2877	0.0001608513	136.57	0.598	0.433
5796	PIS	3076	0.0001719773	127.40	0.558	0.700
5797	PIT	2564	0.0001433517	136.10	0.596	0.733
5798	PIW	403	0.0000225315	171.67	0.752	0.667
5799	PIY	1023	0.0000571953	161.27	0.707	0.533
5800	PIV	1957	0.0001094147	141.93	0.622	2.367
5801	PLA	6796	0.0003799603	125.63	0.551	1.333
5802	PLR	5415	0.0003027494	160.30	0.702	-0.767
5803	PLN	2877	0.0001608513	137.20	0.601	-0.433
5804	PLD	4315	0.0002412491	134.73	0.590	-0.433
5805	PLC	2183	0.0001220502	130.07	0.570	1.567
5806	PLQ	4883	0.0002730056	145.43	0.637	-0.433
5807	PLE	5637	0.0003151613	143.03	0.627	-0.433
5808	PLG	6648	0.0003716857	117.27	0.514	0.600
5809	PLH	3366	0.0001881910	148.97	0.653	-0.333
5810	PLI	3436	0.0001921047	150.27	0.658	2.233
5811	PLL	10901	0.0006094684	150.30	0.659	2.000
5812	PLK	3858	0.0002156985	151.40	0.663	-0.567
5813	PLM	1753	0.0000980092	151.30	0.663	1.367
5814	PLF	3124	0.0001746610	159.60	0.699	1.667
5815	PLP	10985	0.0006141647	136.60	0.599	0.200
5816	PLS	8417	0.0004705894	127.43	0.558	0.467
5817	PLT	5357	0.0002995066	136.13	0.597	0.500
5818	PLW	1175	0.0000656935	171.70	0.752	0.433

5819	PLY	2086	0.0001166270	161.30	0.707	0.300
5820	PLV	5182	0.0002897225	141.97	0.622	2.133
5821	PKA	3580	0.0002001557	126.73	0.555	-1.233
5822	PKR	2852	0.0001594536	161.40	0.707	-3.333
5823	PKN	1605	0.0000897346	138.30	0.606	-3.000
5824	PKD	2706	0.0001512908	135.83	0.595	-3.000
5825	PKC	989	0.0000552944	131.17	0.575	-1.000
5826	PKQ	1804	0.0001008606	146.53	0.642	-3.000
5827	PKE	3851	0.0002153071	144.13	0.632	-3.000
5828	PKG	3916	0.0002189412	118.37	0.519	-1.967
5829	PKH	1033	0.0000577544	150.07	0.658	-2.900
5830	PKI	2001	0.0001118747	151.37	0.663	-0.333
5831	PKL	3549	0.0001984225	151.40	0.663	-0.567
5832	PKK	3632	0.0002030629	152.50	0.668	-3.133
5833	PKM	1110	0.0000620594	152.40	0.668	-1.200
5834	PKF	1395	0.0000779936	160.70	0.704	-0.900
5835	PKP	4370	0.0002443241	137.70	0.603	-2.367
5836	PKS	3688	0.0002061939	128.53	0.563	-2.100
5837	PKT	2838	0.0001586709	137.23	0.601	-2.067
5838	PKW	451	0.0000252151	172.80	0.757	-2.133
5839	PKY	1124	0.0000628422	162.40	0.712	-2.267
5840	PKV	2861	0.0001599568	143.07	0.627	-0.433
5841	PMA	1344	0.0000751422	126.63	0.555	0.700
5842	PMR	698	0.0000390248	161.30	0.707	-1.400
5843	PMN	665	0.0000371798	138.20	0.606	-1.067
5844	PMD	1036	0.0000579221	135.73	0.595	-1.067
5845	PMC	314	0.0000175556	131.07	0.574	0.933
5846	PMQ	606	0.0000338811	146.43	0.642	-1.067
5847	PME	1279	0.0000715081	144.03	0.631	-1.067
5848	PMG	1254	0.0000701104	118.27	0.518	-0.033
5849	PMH	378	0.0000211338	149.97	0.657	-0.967
5850	PMI	573	0.0000320361	151.27	0.663	1.600
5851	PML	1554	0.0000868832	151.30	0.663	1.367
5852	PMK	761	0.0000425471	152.40	0.668	-1.200
5853	PMM	449	0.0000251033	152.30	0.667	0.733
5854	PMF	588	0.0000328747	160.60	0.704	1.033
5855	PMP	1353	0.0000756454	137.60	0.603	-0.433
5856	PMS	1303	0.0000728500	128.43	0.563	-0.167
5857	PMT	938	0.0000524430	137.13	0.601	-0.133
5858	PMW	163	0.0000091132	172.70	0.757	-0.200
5859	PMY	743	0.0000415407	162.30	0.711	-0.333
5860	PMV	1052	0.0000588167	142.97	0.626	1.500
5861	PFA	1844	0.0001030969	134.93	0.591	1.000
5862	PFR	1876	0.0001048860	169.60	0.743	-1.100
5863	PFN	933	0.0000521635	146.50	0.642	-0.767
5864	PFD	1319	0.0000737445	144.03	0.631	-0.767
5865	PFC	922	0.0000515485	139.37	0.611	1.233
5866	PFQ	1854	0.0001036560	154.73	0.678	-0.767
5867	PFE	1597	0.0000892873	152.33	0.668	-0.767
5868	PFG	2070	0.0001157325	126.57	0.555	0.267
5869	PFH	968	0.0000541203	158.27	0.694	-0.667
5870	PFI	1607	0.0000898464	159.57	0.699	1.900

5871	PFL	3991	0.0002231344	159.60	0.699	1.667
5872	PFK	1759	0.0000983446	160.70	0.704	-0.900
5873	PFM	590	0.0000329865	160.60	0.704	1.033
5874	PFF	1520	0.0000849823	168.90	0.740	1.333
5875	PFP	2811	0.0001571613	145.90	0.639	-0.133
5876	PFS	3603	0.0002014416	136.73	0.599	0.133
5877	PFT	2017	0.0001127693	145.43	0.637	0.167
5878	PFW	543	0.0000303588	181.00	0.793	0.100
5879	PFY	1138	0.0000636249	170.60	0.748	-0.033
5880	PFV	1891	0.0001057247	151.27	0.663	1.800
5881	PPA	10937	0.0006114811	111.93	0.491	-0.467
5882	PPR	6942	0.0003881231	146.60	0.642	-2.567
5883	PPN	2230	0.0001246780	123.50	0.541	-2.233
5884	PPD	3601	0.0002013297	121.03	0.530	-2.233
5885	PPC	1789	0.0001000219	116.37	0.510	-0.233
5886	PPQ	5330	0.0002979971	131.73	0.577	-2.233
5887	PPE	6162	0.0003445137	129.33	0.567	-2.233
5888	PPG	12384	0.0006923820	103.57	0.454	-1.200
5889	PPH	2527	0.0001412831	135.27	0.593	-2.133
5890	PPI	2297	0.0001284239	136.57	0.598	0.433
5891	PPL	8972	0.0005016191	136.60	0.599	0.200
5892	PPK	4102	0.0002293404	137.70	0.603	-2.367
5893	PPM	1373	0.0000767636	137.60	0.603	-0.433
5894	PPF	2271	0.0001269702	145.90	0.639	-0.133
5895	PPP	22029	0.0012316281	122.90	0.539	-1.600
5896	PPS	10320	0.0005769850	113.73	0.498	-1.333
5897	PPT	5854	0.0003272936	122.43	0.537	-1.300
5898	PPW	879	0.0000491444	158.00	0.692	-1.367
5899	PPY	1775	0.0000992392	147.60	0.647	-1.500
5900	PPV	5562	0.0003109681	128.27	0.562	0.333
5901	PSA	7944	0.0004441443	102.77	0.450	-0.200
5902	PSR	5872	0.0003283000	137.43	0.602	-2.300
5903	PSN	2852	0.0001594536	114.33	0.501	-1.967
5904	PSD	4155	0.0002323036	111.87	0.490	-1.967
5905	PSC	2391	0.0001336794	107.20	0.470	0.033
5906	PSQ	4996	0.0002793234	122.57	0.537	-1.967
5907	PSE	5648	0.0003157763	120.17	0.527	-1.967
5908	PSG	7436	0.0004157423	94.40	0.414	-0.933
5909	PSH	2543	0.0001421776	126.10	0.553	-1.867
5910	PSI	3316	0.0001853956	127.40	0.558	0.700
5911	PSL	9778	0.0005466821	127.43	0.558	0.467
5912	PSK	3976	0.0002222958	128.53	0.563	-2.100
5913	PSM	1626	0.0000909087	128.43	0.563	-0.167
5914	PSF	3118	0.0001743255	136.73	0.599	0.133
5915	PSP	12461	0.0006966870	113.73	0.498	-1.333
5916	PSS	12723	0.0007113353	104.57	0.458	-1.067
5917	PST	6024	0.0003367982	113.27	0.496	-1.033
5918	PSW	1327	0.0000741918	148.83	0.652	-1.100
5919	PSY	2188	0.0001223298	138.43	0.607	-1.233
5920	PSV	5613	0.0003138195	119.10	0.522	0.600
5921	PTA	4435	0.0002479582	111.47	0.488	-0.167
5922	PTR	2654	0.0001483836	146.13	0.640	-2.267

5923	PTN	1473	0.0000823545	123.03	0.539	-1.933
5924	PTD	2268	0.0001268025	120.57	0.528	-1.933
5925	PTC	1431	0.0000800063	115.90	0.508	0.067
5926	PTQ	2362	0.0001320580	131.27	0.575	-1.933
5927	PTE	3335	0.0001864579	128.87	0.565	-1.933
5928	PTG	3997	0.0002234699	103.10	0.452	-0.900
5929	PTH	1487	0.0000831373	134.80	0.591	-1.833
5930	PTI	2112	0.0001180807	136.10	0.596	0.733
5931	PTL	5228	0.0002922943	136.13	0.597	0.500
5932	PTK	2285	0.0001277530	137.23	0.601	-2.067
5933	PTM	996	0.0000556858	137.13	0.601	-0.133
5934	PTF	2030	0.0001134961	145.43	0.637	0.167
5935	PTP	6531	0.0003651443	122.43	0.537	-1.300
5936	PTS	5738	0.0003208081	113.27	0.496	-1.033
5937	PTT	3945	0.0002205626	121.97	0.534	-1.000
5938	PTW	718	0.0000401429	157.53	0.690	-1.067
5939	PTY	1303	0.0000728500	147.13	0.645	-1.200
5940	PTV	3756	0.0002099957	127.80	0.560	0.633
5941	PWA	1066	0.0000595994	147.03	0.644	-0.233
5942	PWR	963	0.0000538408	181.70	0.796	-2.333
5943	PWN	570	0.0000318684	158.60	0.695	-2.000
5944	PWD	585	0.0000327070	156.13	0.684	-2.000
5945	PWC	302	0.0000168846	151.47	0.664	0.000
5946	PWQ	662	0.0000370120	166.83	0.731	-2.000
5947	PWE	848	0.0000474112	164.43	0.721	-2.000
5948	PWG	1181	0.0000660290	138.67	0.608	-0.967
5949	PWH	293	0.0000163815	170.37	0.747	-1.900
5950	PWI	566	0.0000316447	171.67	0.752	0.667
5951	PWL	1368	0.0000764841	171.70	0.752	0.433
5952	PWK	684	0.0000382420	172.80	0.757	-2.133
5953	PWM	341	0.0000190651	172.70	0.757	-0.200
5954	PWF	396	0.0000221401	181.00	0.793	0.100
5955	PWP	1071	0.0000598790	158.00	0.692	-1.367
5956	PWS	993	0.0000555180	148.83	0.652	-1.100
5957	PWT	788	0.0000440566	157.53	0.690	-1.067
5958	PWW	249	0.0000139214	193.10	0.846	-1.133
5959	PWY	298	0.0000166610	182.70	0.801	-1.267
5960	PWV	871	0.0000486971	163.37	0.716	0.567
5961	PYA	1418	0.0000792795	136.63	0.599	-0.367
5962	PYR	1432	0.0000800623	171.30	0.751	-2.467
5963	PYN	855	0.0000478025	148.20	0.649	-2.133
5964	PYD	952	0.0000532257	145.73	0.639	-2.133
5965	PYC	692	0.0000386893	141.07	0.618	-0.133
5966	PYQ	1212	0.0000677622	156.43	0.686	-2.133
5967	PYE	2834	0.0001584472	154.03	0.675	-2.133
5968	PYG	1621	0.0000906291	128.27	0.562	-1.100
5969	PYH	731	0.0000408698	159.97	0.701	-2.033
5970	PYI	1111	0.0000621153	161.27	0.707	0.533
5971	PYL	2337	0.0001306603	161.30	0.707	0.300
5972	PYK	3287	0.0001837742	162.40	0.712	-2.267
5973	PYM	541	0.0000302470	162.30	0.711	-0.333
5974	PYF	1115	0.0000623390	170.60	0.748	-0.033

5975	PYP	1934	0.0001081288	147.60	0.647	-1.500
5976	PYS	2247	0.0001256284	138.43	0.607	-1.233
5977	PYT	1527	0.0000853737	147.13	0.645	-1.200
5978	PYW	377	0.0000210778	182.70	0.801	-1.267
5979	PYY	847	0.0000473553	172.30	0.755	-1.400
5980	PYV	1641	0.0000917473	152.97	0.670	0.433
5981	PVA	4824	0.0002697069	117.30	0.514	1.467
5982	PVR	3282	0.0001834946	151.97	0.666	-0.633
5983	PVN	2039	0.0001139993	128.87	0.565	-0.300
5984	PVD	2919	0.0001631995	126.40	0.554	-0.300
5985	PVC	1723	0.0000963319	121.73	0.533	1.700
5986	PVQ	3025	0.0001691259	137.10	0.601	-0.300
5987	PVE	3576	0.0001999320	134.70	0.590	-0.300
5988	PVG	4304	0.0002406341	108.93	0.477	0.733
5989	PVH	1752	0.0000979533	140.63	0.616	-0.200
5990	PVI	3008	0.0001681755	141.93	0.622	2.367
5991	PVL	6838	0.0003823085	141.97	0.622	2.133
5992	PVK	2895	0.0001618577	143.07	0.627	-0.433
5993	PVM	1191	0.0000665881	142.97	0.626	1.500
5994	PVF	2584	0.0001444699	151.27	0.663	1.800
5995	PVP	6631	0.0003707352	128.27	0.562	0.333
5996	PVS	6443	0.0003602243	119.10	0.522	0.600
5997	PVT	5061	0.0002829575	127.80	0.560	0.633
5998	PVW	717	0.0000400870	163.37	0.716	0.567
5999	PVY	1694	0.0000947105	152.97	0.670	0.433
6000	PVV	4598	0.0002570714	133.63	0.586	2.267
6001	SAA	9319	0.0005210197	91.80	0.402	0.933
6002	SAR	4923	0.0002752420	126.47	0.554	-1.167
6003	SAN	2565	0.0001434076	103.37	0.453	-0.833
6004	SAD	4069	0.0002274953	100.90	0.442	-0.833
6005	SAC	1845	0.0001031528	96.23	0.422	1.167
6006	SAQ	4189	0.0002342045	111.60	0.489	-0.833
6007	SAE	6006	0.0003357918	109.20	0.479	-0.833
6008	SAG	7047	0.0003939935	83.43	0.366	0.200
6009	SAH	2237	0.0001250693	115.13	0.505	-0.733
6010	SAI	3556	0.0001988138	116.43	0.510	1.833
6011	SAL	9935	0.0005554599	116.47	0.510	1.600
6012	SAK	3789	0.0002118407	117.57	0.515	-0.967
6013	SAM	1805	0.0001009165	117.47	0.515	0.967
6014	SAF	3513	0.0001964097	125.77	0.551	1.267
6015	SAP	7782	0.0004350870	102.77	0.450	-0.200
6016	SAS	10676	0.0005968888	93.60	0.410	0.067
6017	SAT	5652	0.0003159999	102.30	0.448	0.100
6018	SAW	1156	0.0000646313	137.87	0.604	0.033
6019	SAY	1962	0.0001096942	127.47	0.559	-0.100
6020	SAV	5998	0.0003353446	108.13	0.474	1.733
6021	SRA	6199	0.0003465824	126.47	0.554	-1.167
6022	SRR	6471	0.0003617897	161.13	0.706	-3.267
6023	SRN	2935	0.0001640941	138.03	0.605	-2.933
6024	SRD	4085	0.0002283899	135.57	0.594	-2.933
6025	SRC	1642	0.0000918032	130.90	0.574	-0.933
6026	SRQ	3470	0.0001940056	146.27	0.641	-2.933

6027	SRE	5519	0.0003085640	143.87	0.630	-2.933
6028	SRG	6418	0.0003588265	118.10	0.518	-1.900
6029	SRH	2388	0.0001335117	149.80	0.656	-2.833
6030	SRI	3262	0.0001823765	151.10	0.662	-0.267
6031	SRL	7843	0.0004384974	151.13	0.662	-0.500
6032	SRK	4427	0.0002475109	152.23	0.667	-3.067
6033	SRM	1403	0.0000784409	152.13	0.667	-1.133
6034	SRF	2609	0.0001458676	160.43	0.703	-0.833
6035	SRP	5749	0.0003214231	137.43	0.602	-2.300
6036	SRS	9365	0.0005235915	128.27	0.562	-2.033
6037	SRT	4427	0.0002475109	136.97	0.600	-2.000
6038	SRW	1051	0.0000587608	172.53	0.756	-2.067
6039	SRY	1772	0.0000990715	162.13	0.710	-2.200
6040	SRV	4424	0.0002473432	142.80	0.626	-0.367
6041	SNA	2433	0.0001360276	103.37	0.453	-0.833
6042	SNR	2045	0.0001143347	138.03	0.605	-2.933
6043	SNN	1929	0.0001078492	114.93	0.504	-2.600
6044	SND	1655	0.0000925301	112.47	0.493	-2.600
6045	SNC	1056	0.0000590403	107.80	0.472	-0.600
6046	SNQ	1935	0.0001081847	123.17	0.540	-2.600
6047	SNE	2144	0.0001198698	120.77	0.529	-2.600
6048	SNG	3020	0.0001688464	95.00	0.416	-1.567
6049	SNH	1133	0.0000633454	126.70	0.555	-2.500
6050	SNI	2601	0.0001454203	128.00	0.561	0.067
6051	SNL	5427	0.0003034203	128.03	0.561	-0.167
6052	SNK	2381	0.0001331203	129.13	0.566	-2.733
6053	SNM	1139	0.0000636808	129.03	0.565	-0.800
6054	SNF	1776	0.0000992951	137.33	0.602	-0.500
6055	SNP	3262	0.0001823765	114.33	0.501	-1.967
6056	SNS	4976	0.0002782052	105.17	0.461	-1.700
6057	SNT	2704	0.0001511790	113.87	0.499	-1.667
6058	SNW	588	0.0000328747	149.43	0.655	-1.733
6059	SNY	1351	0.0000755336	139.03	0.609	-1.867
6060	SNV	2718	0.0001519618	119.70	0.525	-0.033
6061	SDA	3584	0.0002003793	100.90	0.442	-0.833
6062	SDR	2775	0.0001551486	135.57	0.594	-2.933
6063	SDN	2103	0.0001175775	112.47	0.493	-2.600
6064	SDD	3685	0.0002060261	110.00	0.482	-2.600
6065	SDC	1454	0.0000812923	105.33	0.462	-0.600
6066	SDQ	2305	0.0001288712	120.70	0.529	-2.600
6067	SDE	4523	0.0002528782	118.30	0.518	-2.600
6068	SDG	4380	0.0002448832	92.53	0.405	-1.567
6069	SDH	1564	0.0000874423	124.23	0.544	-2.500
6070	SDI	3146	0.0001758910	125.53	0.550	0.067
6071	SDL	6468	0.0003616220	125.57	0.550	-0.167
6072	SDK	3013	0.0001684550	126.67	0.555	-2.733
6073	SDM	1187	0.0000663645	126.57	0.555	-0.800
6074	SDF	2617	0.0001463149	134.87	0.591	-0.500
6075	SDP	4478	0.0002503623	111.87	0.490	-1.967
6076	SDS	7872	0.0004401188	102.70	0.450	-1.700
6077	SDT	3591	0.0002007706	111.40	0.488	-1.667
6078	SDW	835	0.0000466843	146.97	0.644	-1.733

6079	SDY	1825	0.0001020347	136.57	0.598	-1.867
6080	SDV	3845	0.0002149716	117.23	0.514	-0.033
6081	SCA	1858	0.0001038797	96.23	0.422	1.167
6082	SCR	1870	0.0001045506	130.90	0.574	-0.933
6083	SCN	1018	0.0000569158	107.80	0.472	-0.600
6084	SCD	1440	0.0000805095	105.33	0.462	-0.600
6085	SCC	1686	0.0000942632	100.67	0.441	1.400
6086	SCQ	1848	0.0001033206	116.03	0.508	-0.600
6087	SCE	1737	0.0000971146	113.63	0.498	-0.600
6088	SCG	2638	0.0001474890	87.87	0.385	0.433
6089	SCH	1054	0.0000589285	119.57	0.524	-0.500
6090	SCI	1302	0.0000727940	120.87	0.530	2.067
6091	SCL	3646	0.0002038457	120.90	0.530	1.833
6092	SCK	1579	0.0000882809	122.00	0.535	-0.733
6093	SCM	557	0.0000311415	121.90	0.534	1.200
6094	SCF	1389	0.0000776582	130.20	0.571	1.500
6095	SCP	2693	0.0001505640	107.20	0.470	0.033
6096	SCS	4031	0.0002253708	98.03	0.430	0.300
6097	SCT	1747	0.0000976737	106.73	0.468	0.333
6098	SCW	436	0.0000243765	142.30	0.624	0.267
6099	SCY	851	0.0000475789	131.90	0.578	0.133
6100	SCV	1950	0.0001090233	112.57	0.493	1.967
6101	SQA	5389	0.0003012957	111.60	0.489	-0.833
6102	SQR	3951	0.0002208980	146.27	0.641	-2.933
6103	SQN	2408	0.0001346298	123.17	0.540	-2.600
6104	SQD	3460	0.0001934465	120.70	0.529	-2.600
6105	SQC	1361	0.0000760927	116.03	0.508	-0.600
6106	SQQ	3554	0.0001987020	131.40	0.576	-2.600
6107	SQE	5798	0.0003241627	129.00	0.565	-2.600
6108	SQG	4772	0.0002667996	103.23	0.452	-1.567
6109	SQH	1856	0.0001037678	134.93	0.591	-2.500
6110	SQI	2571	0.0001437431	136.23	0.597	0.067
6111	SQL	6505	0.0003636906	136.27	0.597	-0.167
6112	SQK	3652	0.0002041811	137.37	0.602	-2.733
6113	SQM	1424	0.0000796150	137.27	0.602	-0.800
6114	SQF	1763	0.0000985683	145.57	0.638	-0.500
6115	SQP	5321	0.0002974939	122.57	0.537	-1.967
6116	SQS	5900	0.0003298655	113.40	0.497	-1.700
6117	SQT	3517	0.0001966334	122.10	0.535	-1.667
6118	SQW	694	0.0000388011	157.67	0.691	-1.733
6119	SQY	1461	0.0000816836	147.27	0.645	-1.867
6120	SQV	3984	0.0002227431	127.93	0.561	-0.033
6121	SEA	6767	0.0003783389	109.20	0.479	-0.833
6122	SER	4563	0.0002551146	143.87	0.630	-2.933
6123	SEN	3993	0.0002232462	120.77	0.529	-2.600
6124	SED	6329	0.0003538506	118.30	0.518	-2.600
6125	SEC	2018	0.0001128252	113.63	0.498	-0.600
6126	SEQ	3426	0.0001915456	129.00	0.565	-2.600
6127	SEE	9561	0.0005345498	126.60	0.555	-2.600
6128	SEG	5830	0.0003259518	100.83	0.442	-1.567
6129	SEH	1837	0.0001027056	132.53	0.581	-2.500
6130	SEI	3755	0.0002099398	133.83	0.586	0.067

6131	SEL	7829	0.0004377147	133.87	0.587	-0.167
6132	SEK	5825	0.0003256722	134.97	0.591	-2.733
6133	SEM	1836	0.0001026497	134.87	0.591	-0.800
6134	SEF	2296	0.0001283680	143.17	0.627	-0.500
6135	SEP	5044	0.0002820070	120.17	0.527	-1.967
6136	SES	7247	0.0004051754	111.00	0.486	-1.700
6137	SET	5604	0.0003133163	119.70	0.525	-1.667
6138	SEW	886	0.0000495357	155.27	0.680	-1.733
6139	SEY	1802	0.0001007487	144.87	0.635	-1.867
6140	SEV	4938	0.0002760806	125.53	0.550	-0.033
6141	SGA	7272	0.0004065731	83.43	0.366	0.200
6142	SGR	6015	0.0003362951	118.10	0.518	-1.900
6143	SGN	3758	0.0002101075	95.00	0.416	-1.567
6144	SGD	4776	0.0002670233	92.53	0.405	-1.567
6145	SGC	2154	0.0001204288	87.87	0.385	0.433
6146	SGQ	4264	0.0002383977	103.23	0.452	-1.567
6147	SGE	6400	0.0003578202	100.83	0.442	-1.567
6148	SGG	8514	0.0004760126	75.07	0.329	-0.533
6149	SGH	2756	0.0001540863	106.77	0.468	-1.467
6150	SGI	4031	0.0002253708	108.07	0.474	1.100
6151	SGL	9147	0.0005114033	108.10	0.474	0.867
6152	SGK	5547	0.0003101294	109.20	0.479	-1.700
6153	SGM	1762	0.0000985124	109.10	0.478	0.233
6154	SGF	3424	0.0001914338	117.40	0.514	0.533
6155	SGP	7043	0.0003937699	94.40	0.414	-0.933
6156	SGS	11604	0.0006487727	85.23	0.374	-0.667
6157	SGT	5956	0.0003329964	93.93	0.412	-0.633
6158	SGW	1270	0.0000710049	129.50	0.567	-0.700
6159	SGY	2493	0.0001393821	119.10	0.522	-0.833
6160	SGV	5246	0.0002933007	99.77	0.437	1.000
6161	SHA	1806	0.0001009724	115.13	0.505	-0.733
6162	SHR	2439	0.0001363630	149.80	0.656	-2.833
6163	SHN	1207	0.0000674826	126.70	0.555	-2.500
6164	SHD	1309	0.0000731854	124.23	0.544	-2.500
6165	SHC	1062	0.0000593758	119.57	0.524	-0.500
6166	SHQ	1746	0.0000976178	134.93	0.591	-2.500
6167	SHE	1729	0.0000966674	132.53	0.581	-2.500
6168	SHG	2480	0.0001386553	106.77	0.468	-1.467
6169	SHH	1481	0.0000828018	138.47	0.607	-2.400
6170	SHI	1659	0.0000927537	139.77	0.612	0.167
6171	SHL	5494	0.0003071663	139.80	0.613	-0.067
6172	SHK	1591	0.0000889519	140.90	0.617	-2.633
6173	SHM	763	0.0000426589	140.80	0.617	-0.700
6174	SHF	1650	0.0000922505	149.10	0.653	-0.400
6175	SHP	2768	0.0001547572	126.10	0.553	-1.867
6176	SHS	4684	0.0002618796	116.93	0.512	-1.600
6177	SHT	2231	0.0001247339	125.63	0.551	-1.567
6178	SHW	530	0.0000296320	161.20	0.706	-1.633
6179	SHY	982	0.0000549030	150.80	0.661	-1.767
6180	SHV	1948	0.0001089115	131.47	0.576	0.067
6181	SIA	3113	0.0001740460	116.43	0.510	1.833
6182	SIR	2798	0.0001564345	151.10	0.662	-0.267

6183	SIN	2235	0.0001249575	128.00	0.561	0.067
6184	SID	2305	0.0001288712	125.53	0.550	0.067
6185	SIC	1440	0.0000805095	120.87	0.530	2.067
6186	SIQ	2655	0.0001484395	136.23	0.597	0.067
6187	SIE	2715	0.0001517940	133.83	0.586	0.067
6188	SIG	2783	0.0001555959	108.07	0.474	1.100
6189	SIH	1847	0.0001032647	139.77	0.612	0.167
6190	SII	2840	0.0001587827	141.07	0.618	2.733
6191	SIL	6162	0.0003445137	141.10	0.618	2.500
6192	SIK	2628	0.0001469299	142.20	0.623	-0.067
6193	SIM	1224	0.0000684331	142.10	0.623	1.867
6194	SIF	2486	0.0001389908	150.40	0.659	2.167
6195	SIP	3847	0.0002150835	127.40	0.558	0.700
6196	SIS	5623	0.0003143786	118.23	0.518	0.967
6197	SIT	3462	0.0001935583	126.93	0.556	1.000
6198	SIW	639	0.0000357261	162.50	0.712	0.933
6199	SIY	1666	0.0000931451	152.10	0.667	0.800
6200	SIV	3156	0.0001764501	132.77	0.582	2.633
6201	SLA	10172	0.0005687104	116.47	0.510	1.600
6202	SLR	8444	0.0004720990	151.13	0.662	-0.500
6203	SLN	4599	0.0002571273	128.03	0.561	-0.167
6204	SLD	6988	0.0003906949	125.57	0.550	-0.167
6205	SLC	3160	0.0001766737	120.90	0.530	1.833
6206	SLQ	8132	0.0004546552	136.27	0.597	-0.167
6207	SLE	9983	0.0005581435	133.87	0.587	-0.167
6208	SLG	9944	0.0005559631	108.10	0.474	0.867
6209	SLH	3898	0.0002179348	139.80	0.613	-0.067
6210	SLI	5415	0.0003027494	141.10	0.618	2.500
6211	SLL	15834	0.0008852694	141.13	0.618	2.267
6212	SLK	7328	0.0004097041	142.23	0.623	-0.300
6213	SLM	2473	0.0001382639	142.13	0.623	1.633
6214	SLF	5081	0.0002840756	150.43	0.659	1.933
6215	SLP	10953	0.0006123757	127.43	0.558	0.467
6216	SLS	13839	0.0007737302	118.27	0.518	0.733
6217	SLT	7784	0.0004351988	126.97	0.556	0.767
6218	SLW	1701	0.0000951019	162.53	0.712	0.700
6219	SLY	3357	0.0001876879	152.13	0.667	0.567
6220	SLV	7837	0.0004381620	132.80	0.582	2.400
6221	SKA	4946	0.0002765279	117.57	0.515	-0.967
6222	SKR	3875	0.0002166489	152.23	0.667	-3.067
6223	SKN	2570	0.0001436872	129.13	0.566	-2.733
6224	SKD	3664	0.0002048520	126.67	0.555	-2.733
6225	SKC	1276	0.0000713404	122.00	0.535	-0.733
6226	SKQ	2719	0.0001520177	137.37	0.602	-2.733
6227	SKE	5788	0.0003236036	134.97	0.591	-2.733
6228	SKG	4216	0.0002357140	109.20	0.479	-1.700
6229	SKH	1568	0.0000876659	140.90	0.617	-2.633
6230	SKI	3229	0.0001805315	142.20	0.623	-0.067
6231	SKL	6196	0.0003464146	142.23	0.623	-0.300
6232	SKK	5065	0.0002831811	143.33	0.628	-2.867
6233	SKM	1579	0.0000882809	143.23	0.628	-0.933
6234	SKF	2174	0.0001215470	151.53	0.664	-0.633

6235	SKP	4372	0.0002444359	128.53	0.563	-2.100
6236	SKS	5826	0.0003257281	119.37	0.523	-1.833
6237	SKT	4032	0.0002254267	128.07	0.561	-1.800
6238	SKW	697	0.0000389689	163.63	0.717	-1.867
6239	SKY	1819	0.0001016992	153.23	0.671	-2.000
6240	SKV	3940	0.0002202830	133.90	0.587	-0.167
6241	SMA	2080	0.0001162916	117.47	0.515	0.967
6242	SMR	1124	0.0000628422	152.13	0.667	-1.133
6243	SMN	1019	0.0000569717	129.03	0.565	-0.800
6244	SMD	1558	0.0000871068	126.57	0.555	-0.800
6245	SMC	464	0.0000259420	121.90	0.534	1.200
6246	SMQ	970	0.0000542321	137.27	0.602	-0.800
6247	SME	1966	0.0001099179	134.87	0.591	-0.800
6248	SMG	1560	0.0000872187	109.10	0.478	0.233
6249	SMH	569	0.0000318124	140.80	0.617	-0.700
6250	SMI	1064	0.0000594876	142.10	0.623	1.867
6251	SML	2076	0.0001160679	142.13	0.623	1.633
6252	SMK	1509	0.0000843673	143.23	0.628	-0.933
6253	SMM	628	0.0000351111	143.13	0.627	1.000
6254	SMF	836	0.0000467403	151.43	0.664	1.300
6255	SMP	1682	0.0000940396	128.43	0.563	-0.167
6256	SMS	2066	0.0001155088	119.27	0.523	0.100
6257	SMT	1388	0.0000776022	127.97	0.561	0.133
6258	SMW	265	0.0000148160	163.53	0.717	0.067
6259	SMY	607	0.0000339370	153.13	0.671	-0.067
6260	SMV	1601	0.0000895109	133.80	0.586	1.767
6261	SFA	2715	0.0001517940	125.77	0.551	1.267
6262	SFR	3074	0.0001718655	160.43	0.703	-0.833
6263	SFN	1830	0.0001023142	137.33	0.602	-0.500
6264	SFD	2243	0.0001254048	134.87	0.591	-0.500
6265	SFC	1608	0.0000899023	130.20	0.571	1.500
6266	SFQ	2811	0.0001571613	145.57	0.638	-0.500
6267	SFE	2650	0.0001481599	143.17	0.627	-0.500
6268	SFG	3171	0.0001772887	117.40	0.514	0.533
6269	SFH	1674	0.0000935923	149.10	0.653	-0.400
6270	SFI	2513	0.0001405003	150.40	0.659	2.167
6271	SFL	6350	0.0003550247	150.43	0.659	1.933
6272	SFK	2348	0.0001312753	151.53	0.664	-0.633
6273	SFM	975	0.0000545117	151.43	0.664	1.300
6274	SFF	2382	0.0001331762	159.73	0.700	1.600
6275	SFP	3455	0.0001931670	136.73	0.599	0.133
6276	SFS	6227	0.0003481478	127.57	0.559	0.400
6277	SFT	3132	0.0001751082	136.27	0.597	0.433
6278	SFW	705	0.0000394161	171.83	0.753	0.367
6279	SFY	1714	0.0000958287	161.43	0.707	0.233
6280	SFV	2828	0.0001581118	142.10	0.623	2.067
6281	SPA	10286	0.0005750841	102.77	0.450	-0.200
6282	SPR	6437	0.0003598888	137.43	0.602	-2.300
6283	SPN	2855	0.0001596213	114.33	0.501	-1.967
6284	SPD	4829	0.0002699865	111.87	0.490	-1.967
6285	SPC	2253	0.0001259639	107.20	0.470	0.033
6286	SPQ	4933	0.0002758011	122.57	0.537	-1.967

6287	SPE	7943	0.0004440884	120.17	0.527	-1.967
6288	SPG	10114	0.0005654677	94.40	0.414	-0.933
6289	SPH	2596	0.0001451408	126.10	0.553	-1.867
6290	SPI	2974	0.0001662745	127.40	0.558	0.700
6291	SPL	9093	0.0005083842	127.43	0.558	0.467
6292	SPK	4405	0.0002462809	128.53	0.563	-2.100
6293	SPM	1627	0.0000909646	128.43	0.563	-0.167
6294	SPF	3124	0.0001746610	136.73	0.599	0.133
6295	SPP	9606	0.0005370657	113.73	0.498	-1.333
6296	SPS	12506	0.0006992029	104.57	0.458	-1.067
6297	SPT	6280	0.0003511110	113.27	0.496	-1.033
6298	SPW	1248	0.0000697749	148.83	0.652	-1.100
6299	SPY	2163	0.0001209320	138.43	0.607	-1.233
6300	SPV	6532	0.0003652002	119.10	0.522	0.600
6301	SSA	10877	0.0006081265	93.60	0.410	0.067
6302	SSR	8566	0.0004789199	128.27	0.562	-2.033
6303	SSN	5219	0.0002917912	105.17	0.461	-1.700
6304	SSD	7345	0.0004106546	102.70	0.450	-1.700
6305	SSC	4151	0.0002320799	98.03	0.430	0.300
6306	SSQ	7074	0.0003955031	113.40	0.497	-1.700
6307	SSE	9346	0.0005225292	111.00	0.486	-1.700
6308	SSG	11838	0.0006618555	85.23	0.374	-0.667
6309	SSH	4244	0.0002372795	116.93	0.512	-1.600
6310	SSI	5457	0.0003050976	118.23	0.518	0.967
6311	SSL	16141	0.0009024336	118.27	0.518	0.733
6312	SSK	6524	0.0003647529	119.37	0.523	-1.833
6313	SSM	2638	0.0001474890	119.27	0.523	0.100
6314	SSF	5519	0.0003085640	127.57	0.559	0.400
6315	SSP	13129	0.0007340345	104.57	0.458	-1.067
6316	SSS	26267	0.0014685721	95.40	0.418	-0.800
6317	SST	9969	0.0005573608	104.10	0.456	-0.767
6318	SSW	1997	0.0001116511	139.67	0.612	-0.833
6319	SSY	3743	0.0002092689	129.27	0.566	-0.967
6320	SSV	8937	0.0004996623	109.93	0.482	0.867
6321	STA	6457	0.0003610070	102.30	0.448	0.100
6322	STR	3417	0.0001910424	136.97	0.600	-2.000
6323	STN	2340	0.0001308280	113.87	0.499	-1.667
6324	STD	3439	0.0001922724	111.40	0.488	-1.667
6325	STC	1934	0.0001081288	106.73	0.468	0.333
6326	STQ	3094	0.0001729837	122.10	0.535	-1.667
6327	STE	5207	0.0002911202	119.70	0.525	-1.667
6328	STG	5453	0.0003048739	93.93	0.412	-0.633
6329	STH	1911	0.0001068429	125.63	0.551	-1.567
6330	STI	3203	0.0001790778	126.93	0.556	1.000
6331	STL	7973	0.0004457656	126.97	0.556	0.767
6332	STK	3233	0.0001807551	128.07	0.561	-1.800
6333	STM	1438	0.0000803977	127.97	0.561	0.133
6334	STF	2884	0.0001612427	136.27	0.597	0.433
6335	STP	6779	0.0003790098	113.27	0.496	-1.033
6336	STS	8994	0.0005028491	104.10	0.456	-0.767
6337	STT	5662	0.0003165590	112.80	0.494	-0.733
6338	STW	961	0.0000537289	148.37	0.650	-0.800

6339	STY	1809	0.0001011401	137.97	0.605	-0.933
6340	STV	5291	0.0002958166	118.63	0.520	0.900
6341	SWA	1517	0.0000848146	137.87	0.604	0.033
6342	SWR	1402	0.0000783850	172.53	0.756	-2.067
6343	SWN	753	0.0000420998	149.43	0.655	-1.733
6344	SWD	1105	0.0000617799	146.97	0.644	-1.733
6345	SWC	422	0.0000235938	142.30	0.624	0.267
6346	SWQ	881	0.0000492562	157.67	0.691	-1.733
6347	SWE	1419	0.0000793354	155.27	0.680	-1.733
6348	SWG	1506	0.0000841996	129.50	0.567	-0.700
6349	SWH	478	0.0000267247	161.20	0.706	-1.633
6350	SWI	894	0.0000499830	162.50	0.712	0.933
6351	SWL	1876	0.0001048860	162.53	0.712	0.700
6352	SWK	1256	0.0000702222	163.63	0.717	-1.867
6353	SWM	471	0.0000263333	163.53	0.717	0.067
6354	SWF	798	0.0000446157	171.83	0.753	0.367
6355	SWP	1096	0.0000612767	148.83	0.652	-1.100
6356	SWS	1746	0.0000976178	139.67	0.612	-0.833
6357	SWT	1137	0.0000635690	148.37	0.650	-0.800
6358	SWW	375	0.0000209660	183.93	0.806	-0.867
6359	SWY	597	0.0000333779	173.53	0.760	-1.000
6360	SWV	1291	0.0000721790	154.20	0.676	0.833
6361	SYA	1796	0.0001004133	127.47	0.559	-0.100
6362	SYR	2087	0.0001166829	162.13	0.710	-2.200
6363	SYN	1475	0.0000824664	139.03	0.609	-1.867
6364	SYD	1610	0.0000900141	136.57	0.598	-1.867
6365	SYC	830	0.0000464048	131.90	0.578	0.133
6366	SYQ	1631	0.0000911882	147.27	0.645	-1.867
6367	SYE	1874	0.0001047742	144.87	0.635	-1.867
6368	SYG	2210	0.0001235598	119.10	0.522	-0.833
6369	SYH	945	0.0000528344	150.80	0.661	-1.767
6370	SYI	1807	0.0001010283	152.10	0.667	0.800
6371	SYL	4042	0.0002259858	152.13	0.667	0.567
6372	SYK	1778	0.0000994069	153.23	0.671	-2.000
6373	SYM	709	0.0000396398	153.13	0.671	-0.067
6374	SYF	1522	0.0000850941	161.43	0.707	0.233
6375	SYP	1940	0.0001084642	138.43	0.607	-1.233
6376	SYS	3636	0.0002032866	129.27	0.566	-0.967
6377	SYT	2140	0.0001196461	137.97	0.605	-0.933
6378	SYW	465	0.0000259979	173.53	0.760	-1.000
6379	SYY	1195	0.0000668117	163.13	0.715	-1.133
6380	SYV	2302	0.0001287034	143.80	0.630	0.700
6381	SVA	5725	0.0003200813	108.13	0.474	1.733
6382	SVR	4215	0.0002356581	142.80	0.626	-0.367
6383	SVN	2870	0.0001604600	119.70	0.525	-0.033
6384	SVD	3973	0.0002221280	117.23	0.514	-0.033
6385	SVC	2075	0.0001160120	112.57	0.493	1.967
6386	SVQ	3543	0.0001980870	127.93	0.561	-0.033
6387	SVE	4873	0.0002724465	125.53	0.550	-0.033
6388	SVG	5034	0.0002814479	99.77	0.437	1.000
6389	SVH	2272	0.0001270262	131.47	0.576	0.067
6390	SVI	3847	0.0002150835	132.77	0.582	2.633

6391	SVL	9180	0.0005132483	132.80	0.582	2.400
6392	SVK	4040	0.0002258740	133.90	0.587	-0.167
6393	SVM	1552	0.0000867714	133.80	0.586	1.767
6394	SVF	3210	0.0001794692	142.10	0.623	2.067
6395	SVP	6032	0.0003372455	119.10	0.522	0.600
6396	SVS	8676	0.0004850700	109.93	0.482	0.867
6397	SVT	5603	0.0003132604	118.63	0.520	0.900
6398	SVW	967	0.0000540644	154.20	0.676	0.833
6399	SVY	2129	0.0001190311	143.80	0.630	0.700
6400	SVV	5219	0.0002917912	124.47	0.545	2.533
6401	TAA	7020	0.0003924840	100.50	0.440	0.967
6402	TAR	3519	0.0001967452	135.17	0.592	-1.133
6403	TAN	2005	0.0001120983	112.07	0.491	-0.800
6404	TAD	2661	0.0001487749	109.60	0.480	-0.800
6405	TAC	1297	0.0000725145	104.93	0.460	1.200
6406	TAQ	3005	0.0001680077	120.30	0.527	-0.800
6407	TAE	4524	0.0002529341	117.90	0.517	-0.800
6408	TAG	4616	0.0002580778	92.13	0.404	0.233
6409	TAH	1460	0.0000816277	123.83	0.543	-0.700
6410	TAI	2969	0.0001659950	125.13	0.548	1.867
6411	TAL	7167	0.0004007027	125.17	0.548	1.633
6412	TAK	2972	0.0001661627	126.27	0.553	-0.933
6413	TAM	1413	0.0000790000	126.17	0.553	1.000
6414	TAF	2466	0.0001378726	134.47	0.589	1.300
6415	TAP	4343	0.0002428145	111.47	0.488	-0.167
6416	TAS	6816	0.0003810785	102.30	0.448	0.100
6417	TAT	4825	0.0002697629	111.00	0.486	0.133
6418	TAW	791	0.0000442243	146.57	0.642	0.067
6419	TAY	1468	0.0000820750	136.17	0.597	-0.067
6420	TAV	4630	0.0002588605	116.83	0.512	1.767
6421	TRA	3398	0.0001899801	135.17	0.592	-1.133
6422	TRR	3259	0.0001822087	169.83	0.744	-3.233
6423	TRN	1647	0.0000920828	146.73	0.643	-2.900
6424	TRD	2068	0.0001156206	144.27	0.632	-2.900
6425	TRC	848	0.0000474112	139.60	0.612	-0.900
6426	TRQ	1929	0.0001078492	154.97	0.679	-2.900
6427	TRE	3279	0.0001833269	152.57	0.669	-2.900
6428	TRG	2919	0.0001631995	126.80	0.556	-1.867
6429	TRH	1569	0.0000877218	158.50	0.695	-2.800
6430	TRI	1931	0.0001079611	159.80	0.700	-0.233
6431	TRL	4337	0.0002424791	159.83	0.700	-0.467
6432	TRK	2789	0.0001559313	160.93	0.705	-3.033
6433	TRM	897	0.0000501507	160.83	0.705	-1.100
6434	TRF	1448	0.0000809568	169.13	0.741	-0.800
6435	TRP	2877	0.0001608513	146.13	0.640	-2.267
6436	TRS	3861	0.0002158662	136.97	0.600	-2.000
6437	TRT	2549	0.0001425131	145.67	0.638	-1.967
6438	TRW	520	0.0000290729	181.23	0.794	-2.033
6439	TRY	1133	0.0000633454	170.83	0.749	-2.167
6440	TRV	2645	0.0001478804	151.50	0.664	-0.333
6441	TNA	1760	0.0000984005	112.07	0.491	-0.800
6442	TNR	1500	0.0000838641	146.73	0.643	-2.900

6443	TNN	1128	0.0000630658	123.63	0.542	-2.567
6444	TND	1103	0.0000616681	121.17	0.531	-2.567
6445	TNC	688	0.0000384657	116.50	0.511	-0.567
6446	TNQ	1312	0.0000733531	131.87	0.578	-2.567
6447	TNE	1835	0.0001025937	129.47	0.567	-2.567
6448	TNG	1965	0.0001098620	103.70	0.454	-1.533
6449	TNH	925	0.0000517162	135.40	0.593	-2.467
6450	TNI	1668	0.0000932569	136.70	0.599	0.100
6451	TNL	2930	0.0001638145	136.73	0.599	-0.133
6452	TNK	1680	0.0000939278	137.83	0.604	-2.700
6453	TNM	660	0.0000369002	137.73	0.604	-0.767
6454	TNF	1143	0.0000639044	146.03	0.640	-0.467
6455	TNP	1679	0.0000938719	123.03	0.539	-1.933
6456	TNS	2648	0.0001480481	113.87	0.499	-1.667
6457	TNT	1960	0.0001095824	122.57	0.537	-1.633
6458	TNW	332	0.0000185619	158.13	0.693	-1.700
6459	TNY	895	0.0000500389	147.73	0.647	-1.833
6460	TNV	1849	0.0001033765	128.40	0.563	0.000
6461	TDA	2663	0.0001488867	109.60	0.480	-0.800
6462	TDR	2031	0.0001135520	144.27	0.632	-2.900
6463	TDN	1506	0.0000841996	121.17	0.531	-2.567
6464	TDD	2177	0.0001217148	118.70	0.520	-2.567
6465	TDC	885	0.0000494798	114.03	0.500	-0.567
6466	TDQ	1472	0.0000822986	129.40	0.567	-2.567
6467	TDE	2838	0.0001586709	127.00	0.557	-2.567
6468	TDG	2712	0.0001516263	101.23	0.444	-1.533
6469	TDH	932	0.0000521076	132.93	0.583	-2.467
6470	TDI	2145	0.0001199257	134.23	0.588	0.100
6471	TDL	4205	0.0002350990	134.27	0.588	-0.133
6472	TDK	2108	0.0001178570	135.37	0.593	-2.700
6473	TDM	998	0.0000557976	135.27	0.593	-0.767
6474	TDF	1773	0.0000991274	143.57	0.629	-0.467
6475	TDP	2557	0.0001429603	120.57	0.528	-1.933
6476	TDS	3802	0.0002125675	111.40	0.488	-1.667
6477	TDT	2551	0.0001426249	120.10	0.526	-1.633
6478	TDW	570	0.0000318684	155.67	0.682	-1.700
6479	TDY	1162	0.0000649667	145.27	0.637	-1.833
6480	TDV	2852	0.0001594536	125.93	0.552	0.000
6481	TCA	1293	0.0000722909	104.93	0.460	1.200
6482	TCR	1403	0.0000784409	139.60	0.612	-0.900
6483	TCN	815	0.0000455662	116.50	0.511	-0.567
6484	TCD	959	0.0000536171	114.03	0.500	-0.567
6485	TCC	737	0.0000412052	109.37	0.479	1.433
6486	TCQ	1231	0.0000688245	124.73	0.547	-0.567
6487	TCE	1433	0.0000801182	122.33	0.536	-0.567
6488	TCG	1677	0.0000937601	96.57	0.423	0.467
6489	TCH	749	0.0000418761	128.27	0.562	-0.467
6490	TCI	1051	0.0000587608	129.57	0.568	2.100
6491	TCL	2351	0.0001314430	129.60	0.568	1.867
6492	TCK	1162	0.0000649667	130.70	0.573	-0.700
6493	TCM	387	0.0000216369	130.60	0.572	1.233
6494	TCF	914	0.0000511012	138.90	0.609	1.533

6495	TCP	1670	0.0000933687	115.90	0.508	0.067
6496	TCS	2425	0.0001355803	106.73	0.468	0.333
6497	TCT	1298	0.0000725704	115.43	0.506	0.367
6498	TCW	325	0.0000181706	151.00	0.662	0.300
6499	TCY	652	0.0000364529	140.60	0.616	0.167
6500	TCV	1485	0.0000830255	121.27	0.531	2.000
6501	TQA	3235	0.0001808669	120.30	0.527	-0.800
6502	TQR	2309	0.0001290948	154.97	0.679	-2.900
6503	TQN	1597	0.0000892873	131.87	0.578	-2.567
6504	TQD	2021	0.0001129929	129.40	0.567	-2.567
6505	TQC	807	0.0000451189	124.73	0.547	-0.567
6506	TQQ	2128	0.0001189752	140.10	0.614	-2.567
6507	TQE	3307	0.0001848924	137.70	0.603	-2.567
6508	TQG	2643	0.0001477685	111.93	0.491	-1.533
6509	TQH	1308	0.0000731295	143.63	0.629	-2.467
6510	TQI	1737	0.0000971146	144.93	0.635	0.100
6511	TQL	3860	0.0002158103	144.97	0.635	-0.133
6512	TQK	2268	0.0001268025	146.07	0.640	-2.700
6513	TQM	809	0.0000452307	145.97	0.640	-0.767
6514	TQF	1176	0.0000657495	154.27	0.676	-0.467
6515	TQP	2603	0.0001455322	131.27	0.575	-1.933
6516	TQS	2915	0.0001629759	122.10	0.535	-1.667
6517	TQT	2467	0.0001379285	130.80	0.573	-1.633
6518	TQW	432	0.0000241529	166.37	0.729	-1.700
6519	TQY	864	0.0000483057	155.97	0.683	-1.833
6520	TQV	2458	0.0001374253	136.63	0.599	0.000
6521	TEA	4776	0.0002670233	117.90	0.517	-0.800
6522	TER	3001	0.0001677841	152.57	0.669	-2.900
6523	TEN	2607	0.0001457558	129.47	0.567	-2.567
6524	TED	3760	0.0002102193	127.00	0.557	-2.567
6525	TEC	1221	0.0000682654	122.33	0.536	-0.567
6526	TEQ	2367	0.0001323375	137.70	0.603	-2.567
6527	TEE	6558	0.0003666538	135.30	0.593	-2.567
6528	TEG	4038	0.0002257622	109.53	0.480	-1.533
6529	TEH	1447	0.0000809009	141.23	0.619	-2.467
6530	TEI	2667	0.0001491104	142.53	0.625	0.100
6531	TEL	5387	0.0003011839	142.57	0.625	-0.133
6532	TEK	4207	0.0002352108	143.67	0.630	-2.700
6533	TEM	1342	0.0000750304	143.57	0.629	-0.767
6534	TEF	1773	0.0000991274	151.87	0.665	-0.467
6535	TEP	3137	0.0001753878	128.87	0.565	-1.933
6536	TES	4077	0.0002279426	119.70	0.525	-1.667
6537	TET	3453	0.0001930552	128.40	0.563	-1.633
6538	TEW	609	0.0000340488	163.97	0.719	-1.700
6539	TEY	1362	0.0000761486	153.57	0.673	-1.833
6540	TEV	3550	0.0001984784	134.23	0.588	0.000
6541	TGA	4355	0.0002434854	92.13	0.404	0.233
6542	TGR	3619	0.0002023361	126.80	0.556	-1.867
6543	TGN	2236	0.0001250134	103.70	0.454	-1.533
6544	TGD	2992	0.0001672809	101.23	0.444	-1.533
6545	TGC	1107	0.0000618917	96.57	0.423	0.467
6546	TGQ	2846	0.0001591181	111.93	0.491	-1.533

6547	TGE	9007	0.0005035760	109.53	0.480	-1.533
6548	TGG	4145	0.0002317445	83.77	0.367	-0.500
6549	TGH	1821	0.0001018110	115.47	0.506	-1.433
6550	TGI	2651	0.0001482158	116.77	0.512	1.133
6551	TGL	5738	0.0003208081	116.80	0.512	0.900
6552	TGK	3787	0.0002117289	117.90	0.517	-1.667
6553	TGM	1134	0.0000634013	117.80	0.516	0.267
6554	TGF	2203	0.0001231684	126.10	0.553	0.567
6555	TGP	4058	0.0002268804	103.10	0.452	-0.900
6556	TGS	5989	0.0003348414	93.93	0.412	-0.633
6557	TGT	4376	0.0002446595	102.63	0.450	-0.600
6558	TGW	752	0.0000420439	138.20	0.606	-0.667
6559	TGY	1806	0.0001009724	127.80	0.560	-0.800
6560	TGV	3544	0.0001981429	108.47	0.475	1.033
6561	THA	1212	0.0000677622	123.83	0.543	-0.700
6562	THR	1354	0.0000757013	158.50	0.695	-2.800
6563	THN	795	0.0000444480	135.40	0.593	-2.467
6564	THD	742	0.0000414848	132.93	0.583	-2.467
6565	THC	593	0.0000331543	128.27	0.562	-0.467
6566	THQ	1271	0.0000710608	143.63	0.629	-2.467
6567	THE	1089	0.0000608853	141.23	0.619	-2.467
6568	THG	1421	0.0000794473	115.47	0.506	-1.433
6569	THH	790	0.0000441684	147.17	0.645	-2.367
6570	THI	1255	0.0000701663	148.47	0.651	0.200
6571	THL	2810	0.0001571054	148.50	0.651	-0.033
6572	THK	1246	0.0000696631	149.60	0.656	-2.600
6573	THM	500	0.0000279547	149.50	0.655	-0.667
6574	THF	961	0.0000537289	157.80	0.691	-0.367
6575	THP	1617	0.0000904055	134.80	0.591	-1.833
6576	THS	2502	0.0001398853	125.63	0.551	-1.567
6577	THT	2998	0.0001676164	134.33	0.589	-1.533
6578	THW	292	0.0000163255	169.90	0.745	-1.600
6579	THY	718	0.0000401429	159.50	0.699	-1.733
6580	THV	1328	0.0000742477	140.17	0.614	0.100
6581	TIA	2463	0.0001377048	125.13	0.548	1.867
6582	TIR	2137	0.0001194784	159.80	0.700	-0.233
6583	TIN	1583	0.0000885046	136.70	0.599	0.100
6584	TID	1685	0.0000942073	134.23	0.588	0.100
6585	TIC	1018	0.0000569158	129.57	0.568	2.100
6586	TIQ	2026	0.0001132724	144.93	0.635	0.100
6587	TIE	2451	0.0001370339	142.53	0.625	0.100
6588	TIG	2003	0.0001119865	116.77	0.512	1.133
6589	TIH	1271	0.0000710608	148.47	0.651	0.200
6590	TII	2081	0.0001163475	149.77	0.656	2.767
6591	TIL	4003	0.0002238053	149.80	0.656	2.533
6592	TIK	2376	0.0001328407	150.90	0.661	-0.033
6593	TIM	946	0.0000528903	150.80	0.661	1.900
6594	TIF	1736	0.0000970587	159.10	0.697	2.200
6595	TIP	2578	0.0001441344	136.10	0.596	0.733
6596	TIS	3922	0.0002192767	126.93	0.556	1.000
6597	TIT	3056	0.0001708591	135.63	0.594	1.033
6598	TIW	433	0.0000242088	171.20	0.750	0.967

6599	TIY	1164	0.0000650785	160.80	0.705	0.833
6600	TIV	2126	0.0001188634	141.47	0.620	2.667
6601	TLA	6422	0.0003590502	125.17	0.548	1.633
6602	TLR	6049	0.0003381960	159.83	0.700	-0.467
6603	TLN	3423	0.0001913779	136.73	0.599	-0.133
6604	TLD	3887	0.0002173198	134.27	0.588	-0.133
6605	TLC	1960	0.0001095824	129.60	0.568	1.867
6606	TLQ	5280	0.0002952016	144.97	0.635	-0.133
6607	TLE	6428	0.0003593856	142.57	0.625	-0.133
6608	TLG	5546	0.0003100735	116.80	0.512	0.900
6609	TLH	2476	0.0001384317	148.50	0.651	-0.033
6610	TLI	3652	0.0002041811	149.80	0.656	2.533
6611	TLL	9457	0.0005287352	149.83	0.657	2.300
6612	TLK	5490	0.0003069426	150.93	0.661	-0.267
6613	TLM	1638	0.0000915796	150.83	0.661	1.667
6614	TLF	2867	0.0001602923	159.13	0.697	1.967
6615	TLP	6405	0.0003580997	136.13	0.597	0.500
6616	TLS	7921	0.0004428583	126.97	0.556	0.767
6617	TLT	6334	0.0003541301	135.67	0.595	0.800
6618	TLW	1096	0.0000612767	171.23	0.750	0.733
6619	TLY	2282	0.0001275853	160.83	0.705	0.600
6620	TLV	4985	0.0002787084	141.50	0.620	2.433
6621	TKA	3203	0.0001790778	126.27	0.553	-0.933
6622	TKR	2297	0.0001284239	160.93	0.705	-3.033
6623	TKN	1896	0.0001060042	137.83	0.604	-2.700
6624	TKD	2501	0.0001398294	135.37	0.593	-2.700
6625	TKC	845	0.0000472434	130.70	0.573	-0.700
6626	TKQ	1899	0.0001061720	146.07	0.640	-2.700
6627	TKE	4235	0.0002367763	143.67	0.630	-2.700
6628	TKG	2610	0.0001459235	117.90	0.517	-1.667
6629	TKH	1310	0.0000732413	149.60	0.656	-2.600
6630	TKI	1980	0.0001107006	150.90	0.661	-0.033
6631	TKL	3823	0.0002137416	150.93	0.661	-0.267
6632	TKK	3426	0.0001915456	152.03	0.666	-2.833
6633	TKM	1013	0.0000566362	151.93	0.666	-0.900
6634	TKF	1284	0.0000717877	160.23	0.702	-0.600
6635	TKP	2738	0.0001530799	137.23	0.601	-2.067
6636	TKS	3191	0.0001784069	128.07	0.561	-1.800
6637	TKT	2655	0.0001484395	136.77	0.599	-1.767
6638	TKW	522	0.0000291847	172.33	0.755	-1.833
6639	TKY	1196	0.0000668676	161.93	0.710	-1.967
6640	TKV	2965	0.0001657714	142.60	0.625	-0.133
6641	TMA	1523	0.0000851500	126.17	0.553	1.000
6642	TMR	813	0.0000454543	160.83	0.705	-1.100
6643	TMN	674	0.0000376829	137.73	0.604	-0.767
6644	TMD	1019	0.0000569717	135.27	0.593	-0.767
6645	TMC	365	0.0000204069	130.60	0.572	1.233
6646	TMQ	797	0.0000445598	145.97	0.640	-0.767
6647	TME	1460	0.0000816277	143.57	0.629	-0.767
6648	TMG	1017	0.0000568599	117.80	0.516	0.267
6649	TMH	363	0.0000202951	149.50	0.655	-0.667
6650	TMI	658	0.0000367884	150.80	0.661	1.900

6651	TML	1549	0.0000866037	150.83	0.661	1.667
6652	TMK	1095	0.0000612208	151.93	0.666	-0.900
6653	TMM	470	0.0000262774	151.83	0.665	1.033
6654	TMF	537	0.0000300233	160.13	0.702	1.333
6655	TMP	1050	0.0000587049	137.13	0.601	-0.133
6656	TMS	1521	0.0000850382	127.97	0.561	0.133
6657	TMT	1184	0.0000661967	136.67	0.599	0.167
6658	TMW	164	0.0000091691	172.23	0.755	0.100
6659	TMY	440	0.0000246001	161.83	0.709	-0.033
6660	TMV	1149	0.0000642399	142.50	0.624	1.800
6661	TFA	1815	0.0001014756	134.47	0.589	1.300
6662	TFR	2095	0.0001171302	169.13	0.741	-0.800
6663	TFN	1497	0.0000836964	146.03	0.640	-0.467
6664	TFD	1713	0.0000957728	143.57	0.629	-0.467
6665	TFC	1014	0.0000566921	138.90	0.609	1.533
6666	TFQ	1947	0.0001088556	154.27	0.676	-0.467
6667	TFE	2092	0.0001169625	151.87	0.665	-0.467
6668	TFG	1998	0.0001117070	126.10	0.553	0.567
6669	TFH	1186	0.0000663085	157.80	0.691	-0.367
6670	TFI	1695	0.0000947664	159.10	0.697	2.200
6671	TFL	3897	0.0002178789	159.13	0.697	1.967
6672	TFK	1930	0.0001079051	160.23	0.702	-0.600
6673	TFM	606	0.0000338811	160.13	0.702	1.333
6674	TFF	1508	0.0000843114	168.43	0.738	1.633
6675	TFP	2331	0.0001303248	145.43	0.637	0.167
6676	TFS	3824	0.0002137975	136.27	0.597	0.433
6677	TFT	2540	0.0001420099	144.97	0.635	0.467
6678	TFW	490	0.0000273956	180.53	0.791	0.400
6679	TFY	1115	0.0000623390	170.13	0.746	0.267
6680	TFV	1925	0.0001076256	150.80	0.661	2.100
6681	TPA	5722	0.0003199136	111.47	0.488	-0.167
6682	TPR	3561	0.0001990934	146.13	0.640	-2.267
6683	TPN	1823	0.0001019228	123.03	0.539	-1.933
6684	TPD	2613	0.0001460913	120.57	0.528	-1.933
6685	TPC	1066	0.0000595994	115.90	0.508	0.067
6686	TPQ	2947	0.0001647650	131.27	0.575	-1.933
6687	TPE	4997	0.0002793793	128.87	0.565	-1.933
6688	TPG	5507	0.0003078931	103.10	0.452	-0.900
6689	TPH	1340	0.0000749186	134.80	0.591	-1.833
6690	TPI	2099	0.0001173538	136.10	0.596	0.733
6691	TPL	6249	0.0003493778	136.13	0.597	0.500
6692	TPK	3108	0.0001737664	137.23	0.601	-2.067
6693	TPM	1238	0.0000692158	137.13	0.601	-0.133
6694	TPF	1682	0.0000940396	145.43	0.637	0.167
6695	TPP	5712	0.0003193545	122.43	0.537	-1.300
6696	TPS	7025	0.0003927635	113.27	0.496	-1.033
6697	TPT	4522	0.0002528223	121.97	0.534	-1.000
6698	TPW	595	0.0000332661	157.53	0.690	-1.067
6699	TPY	1353	0.0000756454	147.13	0.645	-1.200
6700	TPV	4214	0.0002356022	127.80	0.560	0.633
6701	TSA	5968	0.0003336673	102.30	0.448	0.100
6702	TSR	4217	0.0002357699	136.97	0.600	-2.000

6703	TSN	2565	0.0001434076	113.87	0.499	-1.667
6704	TSD	3489	0.0001950679	111.40	0.488	-1.667
6705	TSC	1669	0.0000933128	106.73	0.468	0.333
6706	TSQ	3645	0.0002037898	122.10	0.535	-1.667
6707	TSE	4734	0.0002646751	119.70	0.525	-1.667
6708	TSG	5622	0.0003143226	93.93	0.412	-0.633
6709	TSH	2175	0.0001216029	125.63	0.551	-1.567
6710	TSI	3186	0.0001781273	126.93	0.556	1.000
6711	TSL	7923	0.0004429702	126.97	0.556	0.767
6712	TSK	3498	0.0001955711	128.07	0.561	-1.800
6713	TSM	1285	0.0000718436	127.97	0.561	0.133
6714	TSF	2865	0.0001601804	136.27	0.597	0.433
6715	TSP	6325	0.0003536270	113.27	0.496	-1.033
6716	TSS	10005	0.0005593735	104.10	0.456	-0.767
6717	TST	5559	0.0003108004	112.80	0.494	-0.733
6718	TSW	990	0.0000553503	148.37	0.650	-0.800
6719	TSY	1779	0.0000994628	137.97	0.605	-0.933
6720	TSV	5072	0.0002835725	118.63	0.520	0.900
6721	TTA	4775	0.0002669674	111.00	0.486	0.133
6722	TTR	2443	0.0001365867	145.67	0.638	-1.967
6723	TTN	1702	0.0000951578	122.57	0.537	-1.633
6724	TTD	2235	0.0001249575	120.10	0.526	-1.633
6725	TTC	1295	0.0000724027	115.43	0.506	0.367
6726	TTQ	2229	0.0001246220	130.80	0.573	-1.633
6727	TTE	3338	0.0001866256	128.40	0.563	-1.633
6728	TTG	3564	0.0001992611	102.63	0.450	-0.600
6729	TTH	1534	0.0000857650	134.33	0.589	-1.533
6730	TTI	2550	0.0001425690	135.63	0.594	1.033
6731	TTL	5043	0.0002819511	135.67	0.595	0.800
6732	TTK	2522	0.0001410035	136.77	0.599	-1.767
6733	TTM	1062	0.0000593758	136.67	0.599	0.167
6734	TTF	1966	0.0001099179	144.97	0.635	0.467
6735	TTP	4325	0.0002418082	121.97	0.534	-1.000
6736	TTS	5626	0.0003145463	112.80	0.494	-0.733
6737	TTT	6238	0.0003487628	121.50	0.532	-0.700
6738	TTW	628	0.0000351111	157.07	0.688	-0.767
6739	TTY	1268	0.0000708931	146.67	0.643	-0.900
6740	TTV	4434	0.0002479023	127.33	0.558	0.933
6741	TWA	925	0.0000517162	146.57	0.642	0.067
6742	TWR	831	0.0000464607	181.23	0.794	-2.033
6743	TWN	606	0.0000338811	158.13	0.693	-1.700
6744	TWD	654	0.0000365647	155.67	0.682	-1.700
6745	TWC	205	0.0000114614	151.00	0.662	0.300
6746	TWQ	553	0.0000309179	166.37	0.729	-1.700
6747	TWE	870	0.0000486412	163.97	0.719	-1.700
6748	TWG	716	0.0000400311	138.20	0.606	-0.667
6749	TWH	401	0.0000224197	169.90	0.745	-1.600
6750	TWI	499	0.0000278988	171.20	0.750	0.967
6751	TWL	1291	0.0000721790	171.23	0.750	0.733
6752	TWK	859	0.0000480262	172.33	0.755	-1.833
6753	TWM	323	0.0000180587	172.23	0.755	0.100
6754	TWF	418	0.0000233701	180.53	0.791	0.400

6755	TWP	635	0.0000355025	157.53	0.690	-1.067
6756	TWS	1037	0.0000579780	148.37	0.650	-0.800
6757	TWT	882	0.0000493121	157.07	0.688	-0.767
6758	TWW	177	0.0000098960	192.63	0.844	-0.833
6759	TWY	396	0.0000221401	182.23	0.799	-0.967
6760	TWV	735	0.0000410934	162.90	0.714	0.867
6761	TYA	1280	0.0000715640	136.17	0.597	-0.067
6762	TYR	1652	0.0000923623	170.83	0.749	-2.167
6763	TYN	924	0.0000516603	147.73	0.647	-1.833
6764	TYD	1073	0.0000599908	145.27	0.637	-1.833
6765	TYC	653	0.0000365088	140.60	0.616	0.167
6766	TYQ	1290	0.0000721231	155.97	0.683	-1.833
6767	TYE	1569	0.0000877218	153.57	0.673	-1.833
6768	TYG	1564	0.0000874423	127.80	0.560	-0.800
6769	TYH	768	0.0000429384	159.50	0.699	-1.733
6770	TYI	1443	0.0000806773	160.80	0.705	0.833
6771	TYL	2337	0.0001306603	160.83	0.705	0.600
6772	TYK	1253	0.0000700545	161.93	0.710	-1.967
6773	TYM	606	0.0000338811	161.83	0.709	-0.033
6774	TYF	941	0.0000526107	170.13	0.746	0.267
6775	TYP	1162	0.0000649667	147.13	0.645	-1.200
6776	TYS	2222	0.0001242307	137.97	0.605	-0.933
6777	TYT	1577	0.0000881691	146.67	0.643	-0.900
6778	TYW	251	0.0000140333	182.23	0.799	-0.967
6779	TYY	777	0.0000434416	171.83	0.753	-1.100
6780	TYV	1532	0.0000856532	152.50	0.668	0.733
6781	TVA	4532	0.0002533814	116.83	0.512	1.767
6782	TVR	3366	0.0001881910	151.50	0.664	-0.333
6783	TVN	2476	0.0001384317	128.40	0.563	0.000
6784	TVD	2850	0.0001593418	125.93	0.552	0.000
6785	TVC	1579	0.0000882809	121.27	0.531	2.000
6786	TVQ	2936	0.0001641500	136.63	0.599	0.000
6787	TVE	4233	0.0002366645	134.23	0.588	0.000
6788	TVG	3547	0.0001983106	108.47	0.475	1.033
6789	TVH	1937	0.0001082965	140.17	0.614	0.100
6790	TVI	3199	0.0001788542	141.47	0.620	2.667
6791	TVL	6590	0.0003684429	141.50	0.620	2.433
6792	TVK	3686	0.0002060821	142.60	0.625	-0.133
6793	TVM	1342	0.0000750304	142.50	0.624	1.800
6794	TVF	2639	0.0001475449	150.80	0.661	2.100
6795	TVP	4238	0.0002369440	127.80	0.560	0.633
6796	TVS	5954	0.0003328846	118.63	0.520	0.900
6797	TVT	5510	0.0003080608	127.33	0.558	0.933
6798	TVW	789	0.0000441125	162.90	0.714	0.867
6799	TVY	1722	0.0000962760	152.50	0.668	0.733
6800	TVV	4204	0.0002350431	133.17	0.584	2.567
6801	WAA	1474	0.0000824105	136.07	0.596	0.900
6802	WAR	1026	0.0000573630	170.73	0.748	-1.200
6803	WAN	348	0.0000194565	147.63	0.647	-0.867
6804	WAD	617	0.0000344961	145.17	0.636	-0.867
6805	WAC	427	0.0000238733	140.50	0.616	1.133
6806	WAQ	742	0.0000414848	155.87	0.683	-0.867

6807	WAE	962	0.0000537848	153.47	0.673	-0.867
6808	WAG	1099	0.0000614444	127.70	0.560	0.167
6809	WAH	366	0.0000204628	159.40	0.699	-0.767
6810	WAI	545	0.0000304706	160.70	0.704	1.800
6811	WAL	1820	0.0001017551	160.73	0.704	1.567
6812	WAK	688	0.0000384657	161.83	0.709	-1.000
6813	WAM	281	0.0000157105	161.73	0.709	0.933
6814	WAF	603	0.0000337134	170.03	0.745	1.233
6815	WAP	1162	0.0000649667	147.03	0.644	-0.233
6816	WAS	1320	0.0000738004	137.87	0.604	0.033
6817	WAT	827	0.0000462371	146.57	0.642	0.067
6818	WAW	309	0.0000172760	182.13	0.798	0.000
6819	WAY	273	0.0000152633	171.73	0.753	-0.133
6820	WAV	996	0.0000556858	152.40	0.668	1.700
6821	WRA	894	0.0000499830	170.73	0.748	-1.200
6822	WRR	1463	0.0000817954	205.40	0.900	-3.300
6823	WRN	541	0.0000302470	182.30	0.799	-2.967
6824	WRD	745	0.0000416525	179.83	0.788	-2.967
6825	WRC	363	0.0000202951	175.17	0.768	-0.967
6826	WRQ	782	0.0000437211	190.53	0.835	-2.967
6827	WRE	1030	0.0000575867	188.13	0.824	-2.967
6828	WRG	1065	0.0000595435	162.37	0.712	-1.933
6829	WRH	365	0.0000204069	194.07	0.850	-2.867
6830	WRI	499	0.0000278988	195.37	0.856	-0.300
6831	WRL	1247	0.0000697190	195.40	0.856	-0.533
6832	WRK	982	0.0000549030	196.50	0.861	-3.100
6833	WRM	291	0.0000162696	196.40	0.861	-1.167
6834	WRF	504	0.0000281783	204.70	0.897	-0.867
6835	WRP	899	0.0000502626	181.70	0.796	-2.333
6836	WRS	1097	0.0000613326	172.53	0.756	-2.067
6837	WRT	687	0.0000384098	181.23	0.794	-2.033
6838	WRW	252	0.0000140892	216.80	0.950	-2.100
6839	WRY	335	0.0000187296	206.40	0.904	-2.233
6840	WRV	715	0.0000399752	187.07	0.820	-0.400
6841	WNA	490	0.0000273956	147.63	0.647	-0.867
6842	WNR	577	0.0000322597	182.30	0.799	-2.967
6843	WNN	366	0.0000204628	159.20	0.698	-2.633
6844	WND	462	0.0000258301	156.73	0.687	-2.633
6845	WNC	223	0.0000124678	152.07	0.666	-0.633
6846	WNQ	488	0.0000272838	167.43	0.734	-2.633
6847	WNE	633	0.0000353907	165.03	0.723	-2.633
6848	WNG	649	0.0000362852	139.27	0.610	-1.600
6849	WNH	235	0.0000131387	170.97	0.749	-2.533
6850	WNI	460	0.0000257183	172.27	0.755	0.033
6851	WNL	953	0.0000532817	172.30	0.755	-0.200
6852	WNK	601	0.0000336016	173.40	0.760	-2.767
6853	WNM	226	0.0000126355	173.30	0.759	-0.833
6854	WNF	370	0.0000206865	181.60	0.796	-0.533
6855	WNP	615	0.0000343843	158.60	0.695	-2.000
6856	WNS	906	0.0000506539	149.43	0.655	-1.733
6857	WNT	532	0.0000297438	158.13	0.693	-1.700
6858	WNW	191	0.0000106787	193.70	0.849	-1.767

6859	WNY	290	0.0000162137	183.30	0.803	-1.900
6860	WNV	562	0.0000314211	163.97	0.719	-0.067
6861	WDA	621	0.0000347197	145.17	0.636	-0.867
6862	WDR	682	0.0000381302	179.83	0.788	-2.967
6863	WDN	376	0.0000210219	156.73	0.687	-2.633
6864	WDD	525	0.0000293524	154.27	0.676	-2.633
6865	WDC	313	0.0000174996	149.60	0.656	-0.633
6866	WDQ	550	0.0000307502	164.97	0.723	-2.633
6867	WDE	699	0.0000390807	162.57	0.712	-2.633
6868	WDG	698	0.0000390248	136.80	0.599	-1.600
6869	WDH	315	0.0000176115	168.50	0.738	-2.533
6870	WDI	481	0.0000268924	169.80	0.744	0.033
6871	WDL	1239	0.0000692717	169.83	0.744	-0.200
6872	WDK	505	0.0000282342	170.93	0.749	-2.767
6873	WDM	263	0.0000147042	170.83	0.749	-0.833
6874	WDF	424	0.0000237056	179.13	0.785	-0.533
6875	WDP	856	0.0000478584	156.13	0.684	-2.000
6876	WDS	897	0.0000501507	146.97	0.644	-1.733
6877	WDT	745	0.0000416525	155.67	0.682	-1.700
6878	WDW	219	0.0000122442	191.23	0.838	-1.767
6879	WDY	358	0.0000200156	180.83	0.792	-1.900
6880	WDV	695	0.0000388570	161.50	0.708	-0.067
6881	WCA	234	0.0000130828	140.50	0.616	1.133
6882	WCR	334	0.0000186737	175.17	0.768	-0.967
6883	WCN	136	0.0000076037	152.07	0.666	-0.633
6884	WCD	162	0.0000090573	149.60	0.656	-0.633
6885	WCC	176	0.0000098401	144.93	0.635	1.367
6886	WCQ	249	0.0000139214	160.30	0.702	-0.633
6887	WCE	273	0.0000152633	157.90	0.692	-0.633
6888	WCG	309	0.0000172760	132.13	0.579	0.400
6889	WCH	152	0.0000084982	163.83	0.718	-0.533
6890	WCI	159	0.0000088896	165.13	0.724	2.033
6891	WCL	478	0.0000267247	165.17	0.724	1.800
6892	WCK	211	0.0000117969	166.27	0.729	-0.767
6893	WCM	54	0.0000030191	166.17	0.728	1.167
6894	WCF	216	0.0000120764	174.47	0.765	1.467
6895	WCP	339	0.0000189533	151.47	0.664	0.000
6896	WCS	395	0.0000220842	142.30	0.624	0.267
6897	WCT	154	0.0000086100	151.00	0.662	0.300
6898	WCW	115	0.0000064296	186.57	0.818	0.233
6899	WCY	154	0.0000086100	176.17	0.772	0.100
6900	WCV	230	0.0000128592	156.83	0.687	1.933
6901	WQA	709	0.0000396398	155.87	0.683	-0.867
6902	WQR	686	0.0000383538	190.53	0.835	-2.967
6903	WQN	433	0.0000242088	167.43	0.734	-2.633
6904	WQD	537	0.0000300233	164.97	0.723	-2.633
6905	WQC	268	0.0000149837	160.30	0.702	-0.633
6906	WQQ	620	0.0000346638	175.67	0.770	-2.633
6907	WQE	737	0.0000412052	173.27	0.759	-2.633
6908	WQG	679	0.0000379625	147.50	0.646	-1.600
6909	WQH	320	0.0000178910	179.20	0.785	-2.533
6910	WQI	309	0.0000172760	180.50	0.791	0.033

6911	WQL	836	0.0000467403	180.53	0.791	-0.200
6912	WQK	677	0.0000378507	181.63	0.796	-2.767
6913	WQM	196	0.0000109582	181.53	0.796	-0.833
6914	WQF	280	0.0000156546	189.83	0.832	-0.533
6915	WQP	601	0.0000336016	166.83	0.731	-2.000
6916	WQS	560	0.0000313093	157.67	0.691	-1.733
6917	WQT	401	0.0000224197	166.37	0.729	-1.700
6918	WQW	171	0.0000095605	201.93	0.885	-1.767
6919	WQY	221	0.0000123560	191.53	0.839	-1.900
6920	WQV	560	0.0000313093	172.20	0.755	-0.067
6921	WEA	1092	0.0000610531	153.47	0.673	-0.867
6922	WER	1035	0.0000578662	188.13	0.824	-2.967
6923	WEN	610	0.0000341047	165.03	0.723	-2.633
6924	WED	846	0.0000472994	162.57	0.712	-2.633
6925	WEC	299	0.0000167169	157.90	0.692	-0.633
6926	WEQ	812	0.0000453984	173.27	0.759	-2.633
6927	WEE	1486	0.0000830814	170.87	0.749	-2.633
6928	WEG	918	0.0000513248	145.10	0.636	-1.600
6929	WEH	373	0.0000208542	176.80	0.775	-2.533
6930	WEI	614	0.0000343284	178.10	0.780	0.033
6931	WEL	1112	0.0000621713	178.13	0.781	-0.200
6932	WEK	1182	0.0000660849	179.23	0.785	-2.767
6933	WEM	337	0.0000188415	179.13	0.785	-0.833
6934	WEF	343	0.0000191769	187.43	0.821	-0.533
6935	WEP	980	0.0000547912	164.43	0.721	-2.000
6936	WES	885	0.0000494798	155.27	0.680	-1.733
6937	WET	735	0.0000410934	163.97	0.719	-1.700
6938	WEW	208	0.0000116292	199.53	0.874	-1.767
6939	WEY	294	0.0000164374	189.13	0.829	-1.900
6940	WEV	1047	0.0000585371	169.80	0.744	-0.067
6941	WGA	943	0.0000527226	127.70	0.560	0.167
6942	WGR	1101	0.0000615562	162.37	0.712	-1.933
6943	WGN	472	0.0000263892	139.27	0.610	-1.600
6944	WGD	615	0.0000343843	136.80	0.599	-1.600
6945	WGC	350	0.0000195683	132.13	0.579	0.400
6946	WGQ	779	0.0000435534	147.50	0.646	-1.600
6947	WGE	818	0.0000457339	145.10	0.636	-1.600
6948	WGG	1170	0.0000654140	119.33	0.523	-0.567
6949	WGH	455	0.0000254388	151.03	0.662	-1.500
6950	WGI	468	0.0000261656	152.33	0.668	1.067
6951	WGL	1544	0.0000863241	152.37	0.668	0.833
6952	WGK	715	0.0000399752	153.47	0.673	-1.733
6953	WGM	191	0.0000106787	153.37	0.672	0.200
6954	WGF	442	0.0000247120	161.67	0.708	0.500
6955	WGP	1294	0.0000723468	138.67	0.608	-0.967
6956	WGS	1265	0.0000707254	129.50	0.567	-0.700
6957	WGT	825	0.0000461253	138.20	0.606	-0.667
6958	WGW	311	0.0000173878	173.77	0.761	-0.733
6959	WGY	356	0.0000199037	163.37	0.716	-0.867
6960	WGV	686	0.0000383538	144.03	0.631	0.967
6961	WHA	245	0.0000136978	159.40	0.699	-0.767
6962	WHR	437	0.0000244324	194.07	0.850	-2.867

6963	WHN	135	0.0000075478	170.97	0.749	-2.533
6964	WHD	223	0.0000124678	168.50	0.738	-2.533
6965	WHC	207	0.0000115732	163.83	0.718	-0.533
6966	WHQ	295	0.0000164933	179.20	0.785	-2.533
6967	WHE	288	0.0000161019	176.80	0.775	-2.533
6968	WHG	331	0.0000185060	151.03	0.662	-1.500
6969	WHH	228	0.0000127473	182.73	0.801	-2.433
6970	WHI	224	0.0000125237	184.03	0.806	0.133
6971	WHL	607	0.0000339370	184.07	0.807	-0.100
6972	WHK	352	0.0000196801	185.17	0.811	-2.667
6973	WHM	97	0.0000054232	185.07	0.811	-0.733
6974	WHF	185	0.0000103432	193.37	0.847	-0.433
6975	WHP	442	0.0000247120	170.37	0.747	-1.900
6976	WHS	500	0.0000279547	161.20	0.706	-1.633
6977	WHT	280	0.0000156546	169.90	0.745	-1.600
6978	WHW	76	0.0000042491	205.47	0.900	-1.667
6979	WHY	151	0.0000084423	195.07	0.855	-1.800
6980	WHV	253	0.0000141451	175.73	0.770	0.033
6981	WIA	459	0.0000256624	160.70	0.704	1.800
6982	WIR	574	0.0000320920	195.37	0.856	-0.300
6983	WIN	458	0.0000256065	172.27	0.755	0.033
6984	WID	413	0.0000230906	169.80	0.744	0.033
6985	WIC	279	0.0000155987	165.13	0.724	2.033
6986	WIQ	521	0.0000291288	180.50	0.791	0.033
6987	WIE	619	0.0000346079	178.10	0.780	0.033
6988	WIG	590	0.0000329865	152.33	0.668	1.067
6989	WIH	323	0.0000180587	184.03	0.806	0.133
6990	WII	465	0.0000259979	185.33	0.812	2.700
6991	WIL	1009	0.0000564126	185.37	0.812	2.467
6992	WIK	589	0.0000329306	186.47	0.817	-0.100
6993	WIM	159	0.0000088896	186.37	0.817	1.833
6994	WIF	339	0.0000189533	194.67	0.853	2.133
6995	WIP	542	0.0000303029	171.67	0.752	0.667
6996	WIS	711	0.0000397516	162.50	0.712	0.933
6997	WIT	513	0.0000286815	171.20	0.750	0.967
6998	WIW	129	0.0000072123	206.77	0.906	0.900
6999	WIY	313	0.0000174996	196.37	0.861	0.767
7000	WIV	479	0.0000267806	177.03	0.776	2.600
7001	WLA	1409	0.0000787763	160.73	0.704	1.567
7002	WLR	1595	0.0000891755	195.40	0.856	-0.533
7003	WLN	800	0.0000447275	172.30	0.755	-0.200
7004	WLD	1050	0.0000587049	169.83	0.744	-0.200
7005	WLC	626	0.0000349993	165.17	0.724	1.800
7006	WLQ	1374	0.0000768195	180.53	0.791	-0.200
7007	WLE	1400	0.0000782732	178.13	0.781	-0.200
7008	WLG	1441	0.0000805654	152.37	0.668	0.833
7009	WLH	629	0.0000351670	184.07	0.807	-0.100
7010	WLI	732	0.0000409257	185.37	0.812	2.467
7011	WLL	2483	0.0001388230	185.40	0.812	2.233
7012	WLK	1356	0.0000758131	186.50	0.817	-0.333
7013	WLM	349	0.0000195124	186.40	0.817	1.600
7014	WLF	726	0.0000405902	194.70	0.853	1.900

7015	WLP	1439	0.0000804536	171.70	0.752	0.433
7016	WLS	1859	0.0001039356	162.53	0.712	0.700
7017	WLT	1076	0.0000601585	171.23	0.750	0.733
7018	WLW	425	0.0000237615	206.80	0.906	0.667
7019	WLY	585	0.0000327070	196.40	0.861	0.533
7020	WLV	1189	0.0000664763	177.07	0.776	2.367
7021	WKA	969	0.0000541762	161.83	0.709	-1.000
7022	WKR	1079	0.0000603262	196.50	0.861	-3.100
7023	WKN	630	0.0000352229	173.40	0.760	-2.767
7024	WKD	755	0.0000422116	170.93	0.749	-2.767
7025	WKC	334	0.0000186737	166.27	0.729	-0.767
7026	WKQ	692	0.0000386893	181.63	0.796	-2.767
7027	WKE	1182	0.0000660849	179.23	0.785	-2.767
7028	WKG	903	0.0000504862	153.47	0.673	-1.733
7029	WKH	387	0.0000216369	185.17	0.811	-2.667
7030	WKI	509	0.0000284579	186.47	0.817	-0.100
7031	WKL	1244	0.0000695513	186.50	0.817	-0.333
7032	WKK	1271	0.0000710608	187.60	0.822	-2.900
7033	WKM	306	0.0000171083	187.50	0.822	-0.967
7034	WKF	475	0.0000265570	195.80	0.858	-0.667
7035	WKP	851	0.0000475789	172.80	0.757	-2.133
7036	WKS	970	0.0000542321	163.63	0.717	-1.867
7037	WKT	777	0.0000434416	172.33	0.755	-1.833
7038	WKW	227	0.0000126914	207.90	0.911	-1.900
7039	WKY	321	0.0000179469	197.50	0.865	-2.033
7040	WKV	779	0.0000435534	178.17	0.781	-0.200
7041	WMA	500	0.0000279547	161.73	0.709	0.933
7042	WMR	300	0.0000167728	196.40	0.861	-1.167
7043	WMN	249	0.0000139214	173.30	0.759	-0.833
7044	WMD	317	0.0000177233	170.83	0.749	-0.833
7045	WMC	101	0.0000056468	166.17	0.728	1.167
7046	WMQ	228	0.0000127473	181.53	0.796	-0.833
7047	WME	342	0.0000191210	179.13	0.785	-0.833
7048	WMG	340	0.0000190092	153.37	0.672	0.200
7049	WMH	110	0.0000061500	185.07	0.811	-0.733
7050	WMI	212	0.0000118528	186.37	0.817	1.833
7051	WML	482	0.0000269483	186.40	0.817	1.600
7052	WMK	375	0.0000209660	187.50	0.822	-0.967
7053	WMM	134	0.0000074919	187.40	0.821	0.967
7054	WMF	185	0.0000103432	195.70	0.858	1.267
7055	WMP	247	0.0000138096	172.70	0.757	-0.200
7056	WMS	312	0.0000174437	163.53	0.717	0.067
7057	WMT	238	0.0000133064	172.23	0.755	0.100
7058	WMW	81	0.0000045287	207.80	0.911	0.033
7059	WMY	101	0.0000056468	197.40	0.865	-0.100
7060	WMV	361	0.0000201833	178.07	0.780	1.733
7061	WFA	382	0.0000213574	170.03	0.745	1.233
7062	WFR	506	0.0000282902	204.70	0.897	-0.867
7063	WFN	226	0.0000126355	181.60	0.796	-0.533
7064	WFD	312	0.0000174437	179.13	0.785	-0.533
7065	WFC	237	0.0000132505	174.47	0.765	1.467
7066	WFQ	570	0.0000318684	189.83	0.832	-0.533

7067	WFE	365	0.0000204069	187.43	0.821	-0.533
7068	WFG	488	0.0000272838	161.67	0.708	0.500
7069	WFH	316	0.0000176674	193.37	0.847	-0.433
7070	WFI	338	0.0000188974	194.67	0.853	2.133
7071	WFL	808	0.0000451748	194.70	0.853	1.900
7072	WFK	495	0.0000276752	195.80	0.858	-0.667
7073	WFM	108	0.0000060382	195.70	0.858	1.267
7074	WFF	318	0.0000177792	204.00	0.894	1.567
7075	WFP	499	0.0000278988	181.00	0.793	0.100
7076	WFS	622	0.0000347756	171.83	0.753	0.367
7077	WFT	409	0.0000228669	180.53	0.791	0.400
7078	WFW	242	0.0000135301	216.10	0.947	0.333
7079	WFY	197	0.0000110142	205.70	0.901	0.200
7080	WFV	448	0.0000250474	186.37	0.817	2.033
7081	WPA	773	0.0000432180	147.03	0.644	-0.233
7082	WPR	723	0.0000404225	181.70	0.796	-2.333
7083	WPN	338	0.0000188974	158.60	0.695	-2.000
7084	WPD	504	0.0000281783	156.13	0.684	-2.000
7085	WPC	305	0.0000170524	151.47	0.664	0.000
7086	WPQ	518	0.0000289611	166.83	0.731	-2.000
7087	WPE	783	0.0000437771	164.43	0.721	-2.000
7088	WPG	972	0.0000543439	138.67	0.608	-0.967
7089	WPH	294	0.0000164374	170.37	0.747	-1.900
7090	WPI	240	0.0000134183	171.67	0.752	0.667
7091	WPL	1102	0.0000616122	171.70	0.752	0.433
7092	WPK	378	0.0000211338	172.80	0.757	-2.133
7093	WPM	167	0.0000093369	172.70	0.757	-0.200
7094	WPF	461	0.0000257742	181.00	0.793	0.100
7095	WPP	889	0.0000497035	158.00	0.692	-1.367
7096	WPS	977	0.0000546235	148.83	0.652	-1.100
7097	WPT	515	0.0000287933	157.53	0.690	-1.067
7098	WPW	338	0.0000188974	193.10	0.846	-1.133
7099	WPY	176	0.0000098401	182.70	0.801	-1.267
7100	WPV	524	0.0000292965	163.37	0.716	0.567
7101	WSA	1028	0.0000574749	137.87	0.604	0.033
7102	WSR	1031	0.0000576426	172.53	0.756	-2.067
7103	WSN	426	0.0000238174	149.43	0.655	-1.733
7104	WSD	782	0.0000437211	146.97	0.644	-1.733
7105	WSC	505	0.0000282342	142.30	0.624	0.267
7106	WSQ	822	0.0000459575	157.67	0.691	-1.733
7107	WSE	961	0.0000537289	155.27	0.680	-1.733
7108	WSG	1020	0.0000570276	129.50	0.567	-0.700
7109	WSH	437	0.0000244324	161.20	0.706	-1.633
7110	WSI	578	0.0000323156	162.50	0.712	0.933
7111	WSL	1704	0.0000952696	162.53	0.712	0.700
7112	WSK	856	0.0000478584	163.63	0.717	-1.867
7113	WSM	259	0.0000144805	163.53	0.717	0.067
7114	WSF	675	0.0000377388	171.83	0.753	0.367
7115	WSP	1317	0.0000736327	148.83	0.652	-1.100
7116	WSS	1674	0.0000935923	139.67	0.612	-0.833
7117	WST	691	0.0000386334	148.37	0.650	-0.800
7118	WSW	286	0.0000159901	183.93	0.806	-0.867

7119	WSY	386	0.0000215810	173.53	0.760	-1.000
7120	WSV	875	0.0000489207	154.20	0.676	0.833
7121	WTA	880	0.0000492003	146.57	0.642	0.067
7122	WTR	702	0.0000392484	181.23	0.794	-2.033
7123	WTN	357	0.0000199597	158.13	0.693	-1.700
7124	WTD	594	0.0000332102	155.67	0.682	-1.700
7125	WTC	281	0.0000157105	151.00	0.662	0.300
7126	WTQ	485	0.0000271161	166.37	0.729	-1.700
7127	WTE	802	0.0000448393	163.97	0.719	-1.700
7128	WTG	757	0.0000423234	138.20	0.606	-0.667
7129	WTH	307	0.0000171642	169.90	0.745	-1.600
7130	WTI	478	0.0000267247	171.20	0.750	0.967
7131	WTL	1186	0.0000663085	171.23	0.750	0.733
7132	WTK	749	0.0000418761	172.33	0.755	-1.833
7133	WTM	226	0.0000126355	172.23	0.755	0.100
7134	WTF	465	0.0000259979	180.53	0.791	0.400
7135	WTP	1019	0.0000569717	157.53	0.690	-1.067
7136	WTS	958	0.0000535612	148.37	0.650	-0.800
7137	WTT	591	0.0000330425	157.07	0.688	-0.767
7138	WTW	186	0.0000103991	192.63	0.844	-0.833
7139	WTY	366	0.0000204628	182.23	0.799	-0.967
7140	WTV	777	0.0000434416	162.90	0.714	0.867
7141	WWA	293	0.0000163815	182.13	0.798	0.000
7142	WWR	223	0.0000124678	216.80	0.950	-2.100
7143	WWN	123	0.0000068769	193.70	0.849	-1.767
7144	WWD	146	0.0000081628	191.23	0.838	-1.767
7145	WWC	69	0.0000038577	186.57	0.818	0.233
7146	WWQ	170	0.0000095046	201.93	0.885	-1.767
7147	WWE	269	0.0000150396	199.53	0.874	-1.767
7148	WWG	302	0.0000168846	173.77	0.761	-0.733
7149	WWH	87	0.0000048641	205.47	0.900	-1.667
7150	WWI	157	0.0000087778	206.77	0.906	0.900
7151	WWL	334	0.0000186737	206.80	0.906	0.667
7152	WWK	212	0.0000118528	207.90	0.911	-1.900
7153	WWM	76	0.0000042491	207.80	0.911	0.033
7154	WWF	153	0.0000085541	216.10	0.947	0.333
7155	WWP	240	0.0000134183	193.10	0.846	-1.133
7156	WWS	247	0.0000138096	183.93	0.806	-0.867
7157	WWT	175	0.0000097841	192.63	0.844	-0.833
7158	WWW	89	0.0000049759	228.20	1.000	-0.900
7159	WWY	139	0.0000077714	217.80	0.954	-1.033
7160	WWV	177	0.0000098960	198.47	0.870	0.800
7161	WYA	255	0.0000142569	171.73	0.753	-0.133
7162	WYR	524	0.0000292965	206.40	0.904	-2.233
7163	WYN	269	0.0000150396	183.30	0.803	-1.900
7164	WYD	236	0.0000131946	180.83	0.792	-1.900
7165	WYC	134	0.0000074919	176.17	0.772	0.100
7166	WYQ	366	0.0000204628	191.53	0.839	-1.900
7167	WYE	275	0.0000153751	189.13	0.829	-1.900
7168	WYG	261	0.0000145924	163.37	0.716	-0.867
7169	WYH	224	0.0000125237	195.07	0.855	-1.800
7170	WYI	224	0.0000125237	196.37	0.861	0.767

7171	WYL	615	0.0000343843	196.40	0.861	0.533
7172	WYK	549	0.0000306943	197.50	0.865	-2.033
7173	WYM	136	0.0000076037	197.40	0.865	-0.100
7174	WYF	297	0.0000166051	205.70	0.901	0.200
7175	WYP	261	0.0000145924	182.70	0.801	-1.267
7176	WYS	390	0.0000218047	173.53	0.760	-1.000
7177	WYT	297	0.0000166051	182.23	0.799	-0.967
7178	WYW	125	0.0000069887	217.80	0.954	-1.033
7179	WYY	185	0.0000103432	207.40	0.909	-1.167
7180	WYV	275	0.0000153751	188.07	0.824	0.667
7181	WVA	817	0.0000456780	152.40	0.668	1.700
7182	WVR	886	0.0000495357	187.07	0.820	-0.400
7183	WVN	519	0.0000290170	163.97	0.719	-0.067
7184	WVD	679	0.0000379625	161.50	0.708	-0.067
7185	WVC	318	0.0000177792	156.83	0.687	1.933
7186	WVQ	636	0.0000355584	172.20	0.755	-0.067
7187	WVE	758	0.0000423793	169.80	0.744	-0.067
7188	WVG	825	0.0000461253	144.03	0.631	0.967
7189	WVH	307	0.0000171642	175.73	0.770	0.033
7190	WVI	556	0.0000310856	177.03	0.776	2.600
7191	WVL	1403	0.0000784409	177.07	0.776	2.367
7192	WVK	707	0.0000395279	178.17	0.781	-0.200
7193	WVM	227	0.0000126914	178.07	0.780	1.733
7194	WVF	432	0.0000241529	186.37	0.817	2.033
7195	WVP	910	0.0000508776	163.37	0.716	0.567
7196	WVS	1078	0.0000602703	154.20	0.676	0.833
7197	WVT	859	0.0000480262	162.90	0.714	0.867
7198	WVW	194	0.0000108464	198.47	0.870	0.800
7199	WVY	318	0.0000177792	188.07	0.824	0.667
7200	WVV	703	0.0000393043	168.73	0.739	2.500
7201	YAA	2059	0.0001151175	125.67	0.551	0.767
7202	YAR	1263	0.0000706136	160.33	0.703	-1.333
7203	YAN	835	0.0000466843	137.23	0.601	-1.000
7204	YAD	1177	0.0000658054	134.77	0.591	-1.000
7205	YAC	750	0.0000419320	130.10	0.570	1.000
7206	YAQ	961	0.0000537289	145.47	0.637	-1.000
7207	YAE	1411	0.0000788882	143.07	0.627	-1.000
7208	YAG	1533	0.0000857091	117.30	0.514	0.033
7209	YAH	540	0.0000301911	149.00	0.653	-0.900
7210	YAI	1111	0.0000621153	150.30	0.659	1.667
7211	YAL	2244	0.0001254607	150.33	0.659	1.433
7212	YAK	1233	0.0000689363	151.43	0.664	-1.133
7213	YAM	561	0.0000313652	151.33	0.663	0.800
7214	YAF	1034	0.0000578103	159.63	0.700	1.100
7215	YAP	1120	0.0000626185	136.63	0.599	-0.367
7216	YAS	1727	0.0000965555	127.47	0.559	-0.100
7217	YAT	1308	0.0000731295	136.17	0.597	-0.067
7218	YAW	335	0.0000187296	171.73	0.753	-0.133
7219	YAY	666	0.0000372357	161.33	0.707	-0.267
7220	YAV	1737	0.0000971146	142.00	0.622	1.567
7221	YRA	1737	0.0000971146	160.33	0.703	-1.333
7222	YRR	1833	0.0001024819	195.00	0.855	-3.433

7223	YRN	1261	0.0000705018	171.90	0.753	-3.100
7224	YRD	1823	0.0001019228	169.43	0.742	-3.100
7225	YRC	1246	0.0000696631	164.77	0.722	-1.100
7226	YRQ	1390	0.0000777141	180.13	0.789	-3.100
7227	YRE	1761	0.0000984565	177.73	0.779	-3.100
7228	YRG	1765	0.0000986801	151.97	0.666	-2.067
7229	YRH	839	0.0000469080	183.67	0.805	-3.000
7230	YRI	1220	0.0000682095	184.97	0.811	-0.433
7231	YRL	2454	0.0001372017	185.00	0.811	-0.667
7232	YRK	1718	0.0000960523	186.10	0.816	-3.233
7233	YRM	519	0.0000290170	186.00	0.815	-1.300
7234	YRF	820	0.0000458457	194.30	0.851	-1.000
7235	YRP	1410	0.0000788323	171.30	0.751	-2.467
7236	YRS	2064	0.0001153970	162.13	0.710	-2.200
7237	YRT	1343	0.0000750863	170.83	0.749	-2.167
7238	YRW	388	0.0000216928	206.40	0.904	-2.233
7239	YRY	777	0.0000434416	196.00	0.859	-2.367
7240	YRV	1668	0.0000932569	176.67	0.774	-0.533
7241	YNA	1076	0.0000601585	137.23	0.601	-1.000
7242	YNR	901	0.0000503744	171.90	0.753	-3.100
7243	YNN	927	0.0000518280	148.80	0.652	-2.767
7244	YND	737	0.0000412052	146.33	0.641	-2.767
7245	YNC	513	0.0000286815	141.67	0.621	-0.767
7246	YNQ	869	0.0000485853	157.03	0.688	-2.767
7247	YNE	1089	0.0000608853	154.63	0.678	-2.767
7248	YNG	1057	0.0000590962	128.87	0.565	-1.733
7249	YNH	458	0.0000256065	160.57	0.704	-2.667
7250	YNI	1050	0.0000587049	161.87	0.709	-0.100
7251	YNL	1678	0.0000938160	161.90	0.709	-0.333
7252	YNK	988	0.0000552385	163.00	0.714	-2.900
7253	YNM	385	0.0000215251	162.90	0.714	-0.967
7254	YNF	847	0.0000473553	171.20	0.750	-0.667
7255	YNP	1203	0.0000672590	148.20	0.649	-2.133
7256	YNS	1395	0.0000779936	139.03	0.609	-1.867
7257	YNT	980	0.0000547912	147.73	0.647	-1.833
7258	YNW	271	0.0000151514	183.30	0.803	-1.900
7259	YNY	778	0.0000434975	172.90	0.758	-2.033
7260	YNV	1077	0.0000602144	153.57	0.673	-0.200
7261	YDA	1238	0.0000692158	134.77	0.591	-1.000
7262	YDR	1257	0.0000702781	169.43	0.742	-3.100
7263	YDN	819	0.0000457898	146.33	0.641	-2.767
7264	YDD	1144	0.0000639604	143.87	0.630	-2.767
7265	YDC	506	0.0000282902	139.20	0.610	-0.767
7266	YDQ	741	0.0000414289	154.57	0.677	-2.767
7267	YDE	1396	0.0000780495	152.17	0.667	-2.767
7268	YDG	1358	0.0000759250	126.40	0.554	-1.733
7269	YDH	458	0.0000256065	158.10	0.693	-2.667
7270	YDI	1179	0.0000659172	159.40	0.699	-0.100
7271	YDL	2018	0.0001128252	159.43	0.699	-0.333
7272	YDK	1073	0.0000599908	160.53	0.703	-2.900
7273	YDM	426	0.0000238174	160.43	0.703	-0.967
7274	YDF	878	0.0000490885	168.73	0.739	-0.667

7275	YDP	1381	0.0000772109	145.73	0.639	-2.133
7276	YDS	1561	0.0000872746	136.57	0.598	-1.867
7277	YDT	1080	0.0000603822	145.27	0.637	-1.833
7278	YDW	277	0.0000154869	180.83	0.792	-1.900
7279	YDY	911	0.0000509335	170.43	0.747	-2.033
7280	YDV	1292	0.0000722349	151.10	0.662	-0.200
7281	YCA	604	0.0000337693	130.10	0.570	1.000
7282	YCR	810	0.0000452866	164.77	0.722	-1.100
7283	YCN	560	0.0000313093	141.67	0.621	-0.767
7284	YCD	618	0.0000345520	139.20	0.610	-0.767
7285	YCC	345	0.0000192887	134.53	0.590	1.233
7286	YCQ	624	0.0000348875	149.90	0.657	-0.767
7287	YCE	721	0.0000403107	147.50	0.646	-0.767
7288	YCG	779	0.0000435534	121.73	0.533	0.267
7289	YCH	387	0.0000216369	153.43	0.672	-0.667
7290	YCI	422	0.0000235938	154.73	0.678	1.900
7291	YCL	980	0.0000547912	154.77	0.678	1.667
7292	YCK	651	0.0000363970	155.87	0.683	-0.900
7293	YCM	195	0.0000109023	155.77	0.683	1.033
7294	YCF	447	0.0000249915	164.07	0.719	1.333
7295	YCP	695	0.0000388570	141.07	0.618	-0.133
7296	YCS	932	0.0000521076	131.90	0.578	0.133
7297	YCT	561	0.0000313652	140.60	0.616	0.167
7298	YCW	103	0.0000057587	176.17	0.772	0.100
7299	YCY	351	0.0000196242	165.77	0.726	-0.033
7300	YCV	716	0.0000400311	146.43	0.642	1.800
7301	YQA	1387	0.0000775463	145.47	0.637	-1.000
7302	YQR	1286	0.0000718995	180.13	0.789	-3.100
7303	YQN	863	0.0000482498	157.03	0.688	-2.767
7304	YQD	1071	0.0000598790	154.57	0.677	-2.767
7305	YQC	930	0.0000519957	149.90	0.657	-0.767
7306	YQQ	1280	0.0000715640	165.27	0.724	-2.767
7307	YQE	1867	0.0001043829	162.87	0.714	-2.767
7308	YQG	1348	0.0000753659	137.10	0.601	-1.733
7309	YQH	599	0.0000334897	168.80	0.740	-2.667
7310	YQI	914	0.0000511012	170.10	0.745	-0.100
7311	YQL	2057	0.0001150056	170.13	0.746	-0.333
7312	YQK	1289	0.0000720672	171.23	0.750	-2.900
7313	YQM	477	0.0000266688	171.13	0.750	-0.967
7314	YQF	755	0.0000422116	179.43	0.786	-0.667
7315	YQP	1142	0.0000638485	156.43	0.686	-2.133
7316	YQS	1224	0.0000684331	147.27	0.645	-1.867
7317	YQT	951	0.0000531698	155.97	0.683	-1.833
7318	YQW	239	0.0000133623	191.53	0.839	-1.900
7319	YQY	652	0.0000364529	181.13	0.794	-2.033
7320	YQV	1317	0.0000736327	161.80	0.709	-0.200
7321	YEA	1905	0.0001065074	143.07	0.627	-1.000
7322	YER	1409	0.0000787763	177.73	0.779	-3.100
7323	YEN	1233	0.0000689363	154.63	0.678	-2.767
7324	YED	1792	0.0001001896	152.17	0.667	-2.767
7325	YEC	2591	0.0001448613	147.50	0.646	-0.767
7326	YEQ	1122	0.0000627303	162.87	0.714	-2.767

7327	YEE	2848	0.0001592300	160.47	0.703	-2.767
7328	YEG	1593	0.0000890637	134.70	0.590	-1.733
7329	YEH	601	0.0000336016	166.40	0.729	-2.667
7330	YEI	1311	0.0000732972	167.70	0.735	-0.100
7331	YEL	2189	0.0001223857	167.73	0.735	-0.333
7332	YEK	2098	0.0001172979	168.83	0.740	-2.900
7333	YEM	655	0.0000366207	168.73	0.739	-0.967
7334	YEF	1039	0.0000580899	177.03	0.776	-0.667
7335	YEP	1001	0.0000559653	154.03	0.675	-2.133
7336	YES	1560	0.0000872187	144.87	0.635	-1.867
7337	YET	1366	0.0000763722	153.57	0.673	-1.833
7338	YEW	268	0.0000149837	189.13	0.829	-1.900
7339	YEY	716	0.0000400311	178.73	0.783	-2.033
7340	YEV	1729	0.0000966674	159.40	0.699	-0.200
7341	YGA	1950	0.0001090233	117.30	0.514	0.033
7342	YGR	1507	0.0000842555	151.97	0.666	-2.067
7343	YGN	1383	0.0000773227	128.87	0.565	-1.733
7344	YGD	1363	0.0000762045	126.40	0.554	-1.733
7345	YGC	817	0.0000456780	121.73	0.533	0.267
7346	YGQ	1248	0.0000697749	137.10	0.601	-1.733
7347	YGE	1586	0.0000886723	134.70	0.590	-1.733
7348	YGG	2119	0.0001184720	108.93	0.477	-0.700
7349	YGH	768	0.0000429384	140.63	0.616	-1.633
7350	YGI	1303	0.0000728500	141.93	0.622	0.933
7351	YGL	2316	0.0001294862	141.97	0.622	0.700
7352	YGK	1769	0.0000989037	143.07	0.627	-1.867
7353	YGM	583	0.0000325952	142.97	0.626	0.067
7354	YGF	1245	0.0000696072	151.27	0.663	0.367
7355	YGP	1620	0.0000905732	128.27	0.562	-1.100
7356	YGS	2390	0.0001336235	119.10	0.522	-0.833
7357	YGT	1517	0.0000848146	127.80	0.560	-0.800
7358	YGW	304	0.0000169965	163.37	0.716	-0.867
7359	YGY	972	0.0000543439	152.97	0.670	-1.000
7360	YGV	1775	0.0000992392	133.63	0.586	0.833
7361	YHA	736	0.0000411493	149.00	0.653	-0.900
7362	YHR	734	0.0000410375	183.67	0.805	-3.000
7363	YHN	488	0.0000272838	160.57	0.704	-2.667
7364	YHD	509	0.0000284579	158.10	0.693	-2.667
7365	YHC	524	0.0000292965	153.43	0.672	-0.667
7366	YHQ	638	0.0000356702	168.80	0.740	-2.667
7367	YHE	602	0.0000336575	166.40	0.729	-2.667
7368	YHG	800	0.0000447275	140.63	0.616	-1.633
7369	YHH	415	0.0000232024	172.33	0.755	-2.567
7370	YHI	607	0.0000339370	173.63	0.761	0.000
7371	YHL	1418	0.0000792795	173.67	0.761	-0.233
7372	YHK	664	0.0000371238	174.77	0.766	-2.800
7373	YHM	292	0.0000163255	174.67	0.765	-0.867
7374	YHF	489	0.0000273397	182.97	0.802	-0.567
7375	YHP	783	0.0000437771	159.97	0.701	-2.033
7376	YHS	1083	0.0000605499	150.80	0.661	-1.767
7377	YHT	660	0.0000369002	159.50	0.699	-1.733
7378	YHW	183	0.0000102314	195.07	0.855	-1.800

7379	YHY	487	0.0000272279	184.67	0.809	-1.933
7380	YHV	781	0.0000436652	165.33	0.725	-0.100
7381	YIA	1338	0.0000748068	150.30	0.659	1.667
7382	YIR	1307	0.0000730736	184.97	0.811	-0.433
7383	YIN	1121	0.0000626744	161.87	0.709	-0.100
7384	YID	1141	0.0000637926	159.40	0.699	-0.100
7385	YIC	1094	0.0000611649	154.73	0.678	1.900
7386	YIQ	1126	0.0000629540	170.10	0.745	-0.100
7387	YIE	1344	0.0000751422	167.70	0.735	-0.100
7388	YIG	1032	0.0000576985	141.93	0.622	0.933
7389	YIH	1054	0.0000589285	173.63	0.761	0.000
7390	YII	1132	0.0000632894	174.93	0.767	2.567
7391	YIL	2260	0.0001263552	174.97	0.767	2.333
7392	YIK	1281	0.0000716199	176.07	0.772	-0.233
7393	YIM	456	0.0000254947	175.97	0.771	1.700
7394	YIF	1171	0.0000654699	184.27	0.807	2.000
7395	YIP	1520	0.0000849823	161.27	0.707	0.533
7396	YIS	1858	0.0001038797	152.10	0.667	0.800
7397	YIT	1222	0.0000683213	160.80	0.705	0.833
7398	YIW	273	0.0000152633	196.37	0.861	0.767
7399	YIY	1084	0.0000606058	185.97	0.815	0.633
7400	YIV	1368	0.0000764841	166.63	0.730	2.467
7401	YLA	3097	0.0001731514	150.33	0.659	1.433
7402	YLR	2646	0.0001479363	185.00	0.811	-0.667
7403	YLN	1943	0.0001086320	161.90	0.709	-0.333
7404	YLD	2390	0.0001336235	159.43	0.699	-0.333
7405	YLC	1179	0.0000659172	154.77	0.678	1.667
7406	YLQ	2580	0.0001442463	170.13	0.746	-0.333
7407	YLE	3329	0.0001861224	167.73	0.735	-0.333
7408	YLG	2608	0.0001458117	141.97	0.622	0.700
7409	YLH	1452	0.0000811804	173.67	0.761	-0.233
7410	YLI	1903	0.0001063956	174.97	0.767	2.333
7411	YLL	4375	0.0002446036	175.00	0.767	2.100
7412	YLK	2555	0.0001428485	176.10	0.772	-0.467
7413	YLM	911	0.0000509335	176.00	0.771	1.467
7414	YLF	1692	0.0000945987	184.30	0.808	1.767
7415	YLP	2450	0.0001369780	161.30	0.707	0.300
7416	YLS	3463	0.0001936143	152.13	0.667	0.567
7417	YLT	2479	0.0001385994	160.83	0.705	0.600
7418	YLW	606	0.0000338811	196.40	0.861	0.533
7419	YLY	1343	0.0000750863	186.00	0.815	0.400
7420	YLV	2600	0.0001453644	166.67	0.730	2.233
7421	YKA	1435	0.0000802300	151.43	0.664	-1.133
7422	YKR	1180	0.0000659731	186.10	0.816	-3.233
7423	YKN	1155	0.0000645754	163.00	0.714	-2.900
7424	YKD	1534	0.0000857650	160.53	0.703	-2.900
7425	YKC	3304	0.0001847247	155.87	0.683	-0.900
7426	YKQ	1052	0.0000588167	171.23	0.750	-2.900
7427	YKE	1964	0.0001098061	168.83	0.740	-2.900
7428	YKG	1515	0.0000847027	143.07	0.627	-1.867
7429	YKH	611	0.0000341606	174.77	0.766	-2.800
7430	YKI	1111	0.0000621153	176.07	0.772	-0.233

7431	YKL	1828	0.0001022024	176.10	0.772	-0.467
7432	YKK	1786	0.0000998542	177.20	0.777	-3.033
7433	YKM	548	0.0000306384	177.10	0.776	-1.100
7434	YKF	883	0.0000493680	185.40	0.812	-0.800
7435	YKP	1124	0.0000628422	162.40	0.712	-2.267
7436	YKS	1534	0.0000857650	153.23	0.671	-2.000
7437	YKT	1136	0.0000635131	161.93	0.710	-1.967
7438	YKW	301	0.0000168287	197.50	0.865	-2.033
7439	YKY	821	0.0000459016	187.10	0.820	-2.167
7440	YKV	1420	0.0000793913	167.77	0.735	-0.333
7441	YMA	777	0.0000434416	151.33	0.663	0.800
7442	YMR	472	0.0000263892	186.00	0.815	-1.300
7443	YMN	448	0.0000250474	162.90	0.714	-0.967
7444	YMD	491	0.0000274515	160.43	0.703	-0.967
7445	YMC	415	0.0000232024	155.77	0.683	1.033
7446	YMQ	358	0.0000200156	171.13	0.750	-0.967
7447	YME	758	0.0000423793	168.73	0.739	-0.967
7448	YMG	545	0.0000304706	142.97	0.626	0.067
7449	YMH	237	0.0000132505	174.67	0.765	-0.867
7450	YMI	416	0.0000232583	175.97	0.771	1.700
7451	YML	773	0.0000432180	176.00	0.771	1.467
7452	YMK	640	0.0000357820	177.10	0.776	-1.100
7453	YMM	195	0.0000109023	177.00	0.776	0.833
7454	YMF	320	0.0000178910	185.30	0.812	1.133
7455	YMP	459	0.0000256624	162.30	0.711	-0.333
7456	YMS	585	0.0000327070	153.13	0.671	-0.067
7457	YMT	384	0.0000214692	161.83	0.709	-0.033
7458	YMW	95	0.0000053114	197.40	0.865	-0.100
7459	YMY	471	0.0000263333	187.00	0.819	-0.233
7460	YMV	587	0.0000328188	167.67	0.735	1.600
7461	YFA	1156	0.0000646313	159.63	0.700	1.100
7462	YFR	1222	0.0000683213	194.30	0.851	-1.000
7463	YFN	851	0.0000475789	171.20	0.750	-0.667
7464	YFD	881	0.0000492562	168.73	0.739	-0.667
7465	YFC	567	0.0000317006	164.07	0.719	1.333
7466	YFQ	858	0.0000479703	179.43	0.786	-0.667
7467	YFE	1193	0.0000666999	177.03	0.776	-0.667
7468	YFG	1219	0.0000681536	151.27	0.663	0.367
7469	YFH	611	0.0000341606	182.97	0.802	-0.567
7470	YFI	1255	0.0000701663	184.27	0.807	2.000
7471	YFL	2081	0.0001163475	184.30	0.808	1.767
7472	YFK	1058	0.0000591521	185.40	0.812	-0.800
7473	YFM	415	0.0000232024	185.30	0.812	1.133
7474	YFF	1111	0.0000621153	193.60	0.848	1.433
7475	YFP	1035	0.0000578662	170.60	0.748	-0.033
7476	YFS	1809	0.0001011401	161.43	0.707	0.233
7477	YFT	1201	0.0000671472	170.13	0.746	0.267
7478	YFW	274	0.0000153192	205.70	0.901	0.200
7479	YFY	734	0.0000410375	195.30	0.856	0.067
7480	YFV	1277	0.0000713963	175.97	0.771	1.900
7481	YPA	1629	0.0000910764	136.63	0.599	-0.367
7482	YPR	1046	0.0000584812	171.30	0.751	-2.467

7483	YPN	932	0.0000521076	148.20	0.649	-2.133
7484	YPD	1325	0.0000740800	145.73	0.639	-2.133
7485	YPC	540	0.0000301911	141.07	0.618	-0.133
7486	YPQ	977	0.0000546235	156.43	0.686	-2.133
7487	YPE	1720	0.0000961642	154.03	0.675	-2.133
7488	YPG	2062	0.0001152852	128.27	0.562	-1.100
7489	YPH	654	0.0000365647	159.97	0.701	-2.033
7490	YPI	749	0.0000418761	161.27	0.707	0.533
7491	YPL	1838	0.0001027615	161.30	0.707	0.300
7492	YPK	1041	0.0000582017	162.40	0.712	-2.267
7493	YPM	412	0.0000230347	162.30	0.711	-0.333
7494	YPF	826	0.0000461812	170.60	0.748	-0.033
7495	YPP	1792	0.0001001896	147.60	0.647	-1.500
7496	YPS	1955	0.0001093029	138.43	0.607	-1.233
7497	YPT	1101	0.0000615562	147.13	0.645	-1.200
7498	YPW	307	0.0000171642	182.70	0.801	-1.267
7499	YPY	670	0.0000374593	172.30	0.755	-1.400
7500	YPV	1366	0.0000763722	152.97	0.670	0.433
7501	YSA	2140	0.0001196461	127.47	0.559	-0.100
7502	YSR	1940	0.0001084642	162.13	0.710	-2.200
7503	YSN	1309	0.0000731854	139.03	0.609	-1.867
7504	YSD	1805	0.0001009165	136.57	0.598	-1.867
7505	YSC	1285	0.0000718436	131.90	0.578	0.133
7506	YSQ	1709	0.0000955492	147.27	0.645	-1.867
7507	YSE	2140	0.0001196461	144.87	0.635	-1.867
7508	YSG	2286	0.0001278089	119.10	0.522	-0.833
7509	YSH	1060	0.0000592640	150.80	0.661	-1.767
7510	YSI	1704	0.0000952696	152.10	0.667	0.800
7511	YSL	3866	0.0002161457	152.13	0.667	0.567
7512	YSK	1682	0.0000940396	153.23	0.671	-2.000
7513	YSM	716	0.0000400311	153.13	0.671	-0.067
7514	YSF	1668	0.0000932569	161.43	0.707	0.233
7515	YSP	2279	0.0001274175	138.43	0.607	-1.233
7516	YSS	3827	0.0002139653	129.27	0.566	-0.967
7517	YST	2157	0.0001205966	137.97	0.605	-0.933
7518	YSW	535	0.0000299115	173.53	0.760	-1.000
7519	YSY	1168	0.0000653022	163.13	0.715	-1.133
7520	YSV	2284	0.0001276971	143.80	0.630	0.700
7521	YTA	1683	0.0000940955	136.17	0.597	-0.067
7522	YTR	1114	0.0000622831	170.83	0.749	-2.167
7523	YTN	839	0.0000469080	147.73	0.647	-1.833
7524	YTD	1187	0.0000663645	145.27	0.637	-1.833
7525	YTC	1457	0.0000814600	140.60	0.616	0.167
7526	YTQ	941	0.0000526107	155.97	0.683	-1.833
7527	YTE	1429	0.0000798945	153.57	0.673	-1.833
7528	YTG	1649	0.0000921946	127.80	0.560	-0.800
7529	YTH	831	0.0000464607	159.50	0.699	-1.733
7530	YTI	1265	0.0000707254	160.80	0.705	0.833
7531	YTL	2589	0.0001447494	160.83	0.705	0.600
7532	YTK	1113	0.0000622272	161.93	0.710	-1.967
7533	YTM	564	0.0000315329	161.83	0.709	-0.033
7534	YTF	1144	0.0000639604	170.13	0.746	0.267

7535	YTP	1413	0.0000790000	147.13	0.645	-1.200
7536	YTS	1816	0.0001015315	137.97	0.605	-0.933
7537	YTT	1268	0.0000708931	146.67	0.643	-0.900
7538	YTW	343	0.0000191769	182.23	0.799	-0.967
7539	YTY	1082	0.0000604940	171.83	0.753	-1.100
7540	YTV	1858	0.0001038797	152.50	0.668	0.733
7541	YWA	391	0.0000218606	171.73	0.753	-0.133
7542	YWR	418	0.0000233701	206.40	0.904	-2.233
7543	YWN	351	0.0000196242	183.30	0.803	-1.900
7544	YWD	312	0.0000174437	180.83	0.792	-1.900
7545	YWC	174	0.0000097282	176.17	0.772	0.100
7546	YWQ	240	0.0000134183	191.53	0.839	-1.900
7547	YWE	503	0.0000281224	189.13	0.829	-1.900
7548	YWG	311	0.0000173878	163.37	0.716	-0.867
7549	YWH	137	0.0000076596	195.07	0.855	-1.800
7550	YWI	276	0.0000154310	196.37	0.861	0.767
7551	YWL	579	0.0000323715	196.40	0.861	0.533
7552	YWK	467	0.0000261097	197.50	0.865	-2.033
7553	YWM	171	0.0000095605	197.40	0.865	-0.100
7554	YWF	208	0.0000116292	205.70	0.901	0.200
7555	YWP	363	0.0000202951	182.70	0.801	-1.267
7556	YWS	400	0.0000223638	173.53	0.760	-1.000
7557	YWT	422	0.0000235938	182.23	0.799	-0.967
7558	YWW	77	0.0000043050	217.80	0.954	-1.033
7559	YWY	187	0.0000104551	207.40	0.909	-1.167
7560	YWV	367	0.0000205187	188.07	0.824	0.667
7561	YYA	819	0.0000457898	161.33	0.707	-0.267
7562	YYR	1070	0.0000598231	196.00	0.859	-2.367
7563	YYN	739	0.0000413170	172.90	0.758	-2.033
7564	YYD	756	0.0000422675	170.43	0.747	-2.033
7565	YYC	498	0.0000278429	165.77	0.726	-0.033
7566	YYQ	807	0.0000451189	181.13	0.794	-2.033
7567	YYE	1039	0.0000580899	178.73	0.783	-2.033
7568	YYG	944	0.0000527785	152.97	0.670	-1.000
7569	YYH	443	0.0000247679	184.67	0.809	-1.933
7570	YYI	702	0.0000392484	185.97	0.815	0.633
7571	YYL	1382	0.0000772668	186.00	0.815	0.400
7572	YYK	837	0.0000467962	187.10	0.820	-2.167
7573	YYM	287	0.0000160460	187.00	0.819	-0.233
7574	YYF	779	0.0000435534	195.30	0.856	0.067
7575	YYP	700	0.0000391366	172.30	0.755	-1.400
7576	YYS	1266	0.0000707813	163.13	0.715	-1.133
7577	YYT	763	0.0000426589	171.83	0.753	-1.100
7578	YYW	245	0.0000136978	207.40	0.909	-1.167
7579	YYY	697	0.0000389689	197.00	0.863	-1.300
7580	YYV	809	0.0000452307	177.67	0.779	0.533
7581	YVA	2071	0.0001157884	142.00	0.622	1.567
7582	YVR	1375	0.0000768754	176.67	0.774	-0.533
7583	YVN	1079	0.0000603262	153.57	0.673	-0.200
7584	YVD	1307	0.0000730736	151.10	0.662	-0.200
7585	YVC	1179	0.0000659172	146.43	0.642	1.800
7586	YVQ	1099	0.0000614444	161.80	0.709	-0.200

7587	YVE	1584	0.0000885605	159.40	0.699	-0.200
7588	YVG	1545	0.0000863800	133.63	0.586	0.833
7589	YVH	789	0.0000441125	165.33	0.725	-0.100
7590	YVI	1230	0.0000687686	166.63	0.730	2.467
7591	YVL	2567	0.0001435194	166.67	0.730	2.233
7592	YVK	1512	0.0000845350	167.77	0.735	-0.333
7593	YVM	537	0.0000300233	167.67	0.735	1.600
7594	YVF	1145	0.0000640163	175.97	0.771	1.900
7595	YVP	1493	0.0000834727	152.97	0.670	0.433
7596	YVS	1888	0.0001055569	143.80	0.630	0.700
7597	YVT	1464	0.0000818514	152.50	0.668	0.733
7598	YVW	308	0.0000172201	188.07	0.824	0.667
7599	YVY	1242	0.0000694395	177.67	0.779	0.533
7600	YVV	1715	0.0000958846	158.33	0.694	2.367
7601	VAA	7948	0.0004443679	106.33	0.466	2.600
7602	VAR	3971	0.0002220162	141.00	0.618	0.500
7603	VAN	2341	0.0001308839	117.90	0.517	0.833
7604	VAD	3217	0.0001798605	115.43	0.506	0.833
7605	VAC	1458	0.0000815159	110.77	0.485	2.833
7606	VAQ	3478	0.0001944529	126.13	0.553	0.833
7607	VAE	5583	0.0003121422	123.73	0.542	0.833
7608	VAG	5678	0.0003174536	97.97	0.429	1.867
7609	VAH	1809	0.0001011401	129.67	0.568	0.933
7610	VAI	3494	0.0001953474	130.97	0.574	3.500
7611	VAL	7436	0.0004157423	131.00	0.574	3.267
7612	VAK	3388	0.0001894210	132.10	0.579	0.700
7613	VAM	1561	0.0000872746	132.00	0.578	2.633
7614	VAF	2857	0.0001597332	140.30	0.615	2.933
7615	VAP	4212	0.0002354904	117.30	0.514	1.467
7616	VAS	6203	0.0003468060	108.13	0.474	1.733
7617	VAT	4240	0.0002370559	116.83	0.512	1.767
7618	VAW	930	0.0000519957	152.40	0.668	1.700
7619	VAY	1630	0.0000911323	142.00	0.622	1.567
7620	VAV	6619	0.0003700643	122.67	0.538	3.400
7621	VRA	4521	0.0002527664	141.00	0.618	0.500
7622	VRR	3868	0.0002162576	175.67	0.770	-1.600
7623	VRN	1945	0.0001087438	152.57	0.669	-1.267
7624	VRD	2730	0.0001526327	150.10	0.658	-1.267
7625	VRC	1244	0.0000695513	145.43	0.637	0.733
7626	VRQ	2553	0.0001427367	160.80	0.705	-1.267
7627	VRE	3905	0.0002183262	158.40	0.694	-1.267
7628	VRG	3727	0.0002083743	132.63	0.581	-0.233
7629	VRH	1417	0.0000792236	164.33	0.720	-1.167
7630	VRI	2278	0.0001273616	165.63	0.726	1.400
7631	VRL	4962	0.0002774225	165.67	0.726	1.167
7632	VRK	3257	0.0001820969	166.77	0.731	-1.400
7633	VRM	1041	0.0000582017	166.67	0.730	0.533
7634	VRF	1958	0.0001094706	174.97	0.767	0.833
7635	VRP	2869	0.0001604041	151.97	0.666	-0.633
7636	VRS	3698	0.0002067530	142.80	0.626	-0.367
7637	VRT	3023	0.0001690141	151.50	0.664	-0.333
7638	VRW	702	0.0000392484	187.07	0.820	-0.400

7639	VRY	1298	0.0000725704	176.67	0.774	-0.533
7640	VRV	3656	0.0002044048	157.33	0.689	1.300
7641	VNA	2365	0.0001322257	117.90	0.517	0.833
7642	VNR	1714	0.0000958287	152.57	0.669	-1.267
7643	VNN	1567	0.0000876100	129.47	0.567	-0.933
7644	VND	1980	0.0001107006	127.00	0.557	-0.933
7645	VNC	917	0.0000512689	122.33	0.536	1.067
7646	VNQ	1597	0.0000892873	137.70	0.603	-0.933
7647	VNE	2364	0.0001321698	135.30	0.593	-0.933
7648	VNG	3124	0.0001746610	109.53	0.480	0.100
7649	VNH	919	0.0000513807	141.23	0.619	-0.833
7650	VNI	2150	0.0001202052	142.53	0.625	1.733
7651	VNL	3525	0.0001970806	142.57	0.625	1.500
7652	VNK	2202	0.0001231125	143.67	0.630	-1.067
7653	VNM	868	0.0000485294	143.57	0.629	0.867
7654	VNF	1451	0.0000811245	151.87	0.665	1.167
7655	VNP	1958	0.0001094706	128.87	0.565	-0.300
7656	VNS	3107	0.0001737105	119.70	0.525	-0.033
7657	VNT	2052	0.0001147261	128.40	0.563	0.000
7658	VNW	469	0.0000262215	163.97	0.719	-0.067
7659	VNY	1171	0.0000654699	153.57	0.673	-0.200
7660	VNV	2553	0.0001427367	134.23	0.588	1.633
7661	VDA	3228	0.0001804755	115.43	0.506	0.833
7662	VDR	2446	0.0001367544	150.10	0.658	-1.267
7663	VDN	1617	0.0000904055	127.00	0.557	-0.933
7664	VDD	2405	0.0001344621	124.53	0.546	-0.933
7665	VDC	1102	0.0000616122	119.87	0.525	1.067
7666	VDQ	1836	0.0001026497	135.23	0.593	-0.933
7667	VDE	3736	0.0002088775	132.83	0.582	-0.933
7668	VDG	3588	0.0002006029	107.07	0.469	0.100
7669	VDH	1163	0.0000650226	138.77	0.608	-0.833
7670	VDI	2703	0.0001511231	140.07	0.614	1.733
7671	VDL	4842	0.0002707133	140.10	0.614	1.500
7672	VDK	2595	0.0001450849	141.20	0.619	-1.067
7673	VDM	1116	0.0000623949	141.10	0.618	0.867
7674	VDF	2228	0.0001245661	149.40	0.655	1.167
7675	VDP	3024	0.0001690700	126.40	0.554	-0.300
7676	VDS	3986	0.0002228549	117.23	0.514	-0.033
7677	VDT	2546	0.0001423453	125.93	0.552	0.000
7678	VDW	775	0.0000433298	161.50	0.708	-0.067
7679	VDY	1474	0.0000824105	151.10	0.662	-0.200
7680	VDV	3691	0.0002063616	131.77	0.577	1.633
7681	VCA	1687	0.0000943192	110.77	0.485	2.833
7682	VCR	1837	0.0001027056	145.43	0.637	0.733
7683	VCN	1045	0.0000584253	122.33	0.536	1.067
7684	VCD	1362	0.0000761486	119.87	0.525	1.067
7685	VCC	732	0.0000409257	115.20	0.505	3.067
7686	VCQ	1188	0.0000664204	130.57	0.572	1.067
7687	VCE	1580	0.0000883368	128.17	0.562	1.067
7688	VCG	2386	0.0001333998	102.40	0.449	2.100
7689	VCH	755	0.0000422116	134.10	0.588	1.167
7690	VCI	1119	0.0000625626	135.40	0.593	3.733

7691	VCL	2235	0.0001249575	135.43	0.593	3.500
7692	VCK	1425	0.0000796709	136.53	0.598	0.933
7693	VCM	495	0.0000276752	136.43	0.598	2.867
7694	VCF	948	0.0000530021	144.73	0.634	3.167
7695	VCP	1383	0.0000773227	121.73	0.533	1.700
7696	VCS	2199	0.0001229448	112.57	0.493	1.967
7697	VCT	1319	0.0000737445	121.27	0.531	2.000
7698	VCW	353	0.0000197360	156.83	0.687	1.933
7699	VCY	589	0.0000329306	146.43	0.642	1.800
7700	VCV	1636	0.0000914678	127.10	0.557	3.633
7701	VQA	3888	0.0002173758	126.13	0.553	0.833
7702	VQR	3072	0.0001717537	160.80	0.705	-1.267
7703	VQN	1792	0.0001001896	137.70	0.603	-0.933
7704	VQD	2304	0.0001288153	135.23	0.593	-0.933
7705	VQC	1071	0.0000598790	130.57	0.572	1.067
7706	VQQ	2623	0.0001466504	145.93	0.639	-0.933
7707	VQE	3939	0.0002202271	143.53	0.629	-0.933
7708	VQG	3184	0.0001780155	117.77	0.516	0.100
7709	VQH	1442	0.0000806214	149.47	0.655	-0.833
7710	VQI	1876	0.0001048860	150.77	0.661	1.733
7711	VQL	4540	0.0002538287	150.80	0.661	1.500
7712	VQK	3032	0.0001695173	151.90	0.666	-1.067
7713	VQM	891	0.0000498153	151.80	0.665	0.867
7714	VQF	1521	0.0000850382	160.10	0.702	1.167
7715	VQP	2723	0.0001522413	137.10	0.601	-0.300
7716	VQS	2994	0.0001673927	127.93	0.561	-0.033
7717	VQT	2471	0.0001381521	136.63	0.599	0.000
7718	VQW	601	0.0000336016	172.20	0.755	-0.067
7719	VQY	1181	0.0000660290	161.80	0.709	-0.200
7720	VQV	3171	0.0001772887	142.47	0.624	1.633
7721	VEA	5057	0.0002827338	123.73	0.542	0.833
7722	VER	3739	0.0002090452	158.40	0.694	-1.267
7723	VEN	2990	0.0001671691	135.30	0.593	-0.933
7724	VED	3961	0.0002214571	132.83	0.582	-0.933
7725	VEC	1142	0.0000638485	128.17	0.562	1.067
7726	VEQ	2721	0.0001521295	143.53	0.629	-0.933
7727	VEE	7037	0.0003934345	141.13	0.618	-0.933
7728	VEG	4242	0.0002371677	115.37	0.506	0.100
7729	VEH	1628	0.0000910205	147.07	0.644	-0.833
7730	VEI	2779	0.0001553722	148.37	0.650	1.733
7731	VEL	5559	0.0003108004	148.40	0.650	1.500
7732	VEK	4832	0.0002701542	149.50	0.655	-1.067
7733	VEM	1637	0.0000915237	149.40	0.655	0.867
7734	VEF	2110	0.0001179688	157.70	0.691	1.167
7735	VEP	3028	0.0001692937	134.70	0.590	-0.300
7736	VES	4013	0.0002243644	125.53	0.550	-0.033
7737	VET	3327	0.0001860106	134.23	0.588	0.000
7738	VEW	731	0.0000408698	169.80	0.744	-0.067
7739	VEY	1602	0.0000895669	159.40	0.699	-0.200
7740	VEV	4822	0.0002695951	140.07	0.614	1.633
7741	VGA	4985	0.0002787084	97.97	0.429	1.867
7742	VGR	3550	0.0001984784	132.63	0.581	-0.233

7743	VGN	2355	0.0001316666	109.53	0.480	0.100
7744	VGD	3261	0.0001823206	107.07	0.469	0.100
7745	VGC	1368	0.0000764841	102.40	0.449	2.100
7746	VGQ	2540	0.0001420099	117.77	0.516	0.100
7747	VGE	4033	0.0002254826	115.37	0.506	0.100
7748	VGG	5294	0.0002959844	89.60	0.393	1.133
7749	VGH	1404	0.0000784968	121.30	0.532	0.200
7750	VGI	2840	0.0001587827	122.60	0.537	2.767
7751	VGL	5765	0.0003223177	122.63	0.537	2.533
7752	VGK	3118	0.0001743255	123.73	0.542	-0.033
7753	VGM	1259	0.0000703899	123.63	0.542	1.900
7754	VGF	2228	0.0001245661	131.93	0.578	2.200
7755	VGP	3617	0.0002022243	108.93	0.477	0.733
7756	VGS	5381	0.0003008485	99.77	0.437	1.000
7757	VGT	3697	0.0002066970	108.47	0.475	1.033
7758	VGW	815	0.0000455662	144.03	0.631	0.967
7759	VGY	1475	0.0000824664	133.63	0.586	0.833
7760	VGV	4073	0.0002277190	114.30	0.501	2.667
7761	VHA	1655	0.0000925301	129.67	0.568	0.933
7762	VHR	1903	0.0001063956	164.33	0.720	-1.167
7763	VHN	857	0.0000479144	141.23	0.619	-0.833
7764	VHD	996	0.0000556858	138.77	0.608	-0.833
7765	VHC	901	0.0000503744	134.10	0.588	1.167
7766	VHQ	1488	0.0000831932	149.47	0.655	-0.833
7767	VHE	1476	0.0000825223	147.07	0.644	-0.833
7768	VHG	1819	0.0001016992	121.30	0.532	0.200
7769	VHH	868	0.0000485294	153.00	0.670	-0.733
7770	VHI	1390	0.0000777141	154.30	0.676	1.833
7771	VHL	2823	0.0001578322	154.33	0.676	1.600
7772	VHK	1448	0.0000809568	155.43	0.681	-0.967
7773	VHM	642	0.0000358938	155.33	0.681	0.967
7774	VHF	1110	0.0000620594	163.63	0.717	1.267
7775	VHP	1688	0.0000943751	140.63	0.616	-0.200
7776	VHS	2403	0.0001343503	131.47	0.576	0.067
7777	VHT	2350	0.0001313871	140.17	0.614	0.100
7778	VHW	375	0.0000209660	175.73	0.770	0.033
7779	VHY	864	0.0000483057	165.33	0.725	-0.100
7780	VHV	1891	0.0001057247	146.00	0.640	1.733
7781	VIA	3246	0.0001814819	130.97	0.574	3.500
7782	VIR	2510	0.0001403326	165.63	0.726	1.400
7783	VIN	2020	0.0001129370	142.53	0.625	1.733
7784	VID	2518	0.0001407799	140.07	0.614	1.733
7785	VIC	1267	0.0000708372	135.40	0.593	3.733
7786	VIQ	2576	0.0001440226	150.77	0.661	1.733
7787	VIE	2972	0.0001661627	148.37	0.650	1.733
7788	VIG	3061	0.0001711387	122.60	0.537	2.767
7789	VIH	1554	0.0000868832	154.30	0.676	1.833
7790	VII	2376	0.0001328407	155.60	0.682	4.400
7791	VIL	4850	0.0002711606	155.63	0.682	4.167
7792	VIK	2692	0.0001505081	156.73	0.687	1.600
7793	VIM	975	0.0000545117	156.63	0.686	3.533
7794	VIF	2138	0.0001195343	164.93	0.723	3.833

7795	VIP	2783	0.0001555959	141.93	0.622	2.367
7796	VIS	4166	0.0002329186	132.77	0.582	2.633
7797	VIT	2966	0.0001658273	141.47	0.620	2.667
7798	VIW	516	0.0000288493	177.03	0.776	2.600
7799	VIY	1379	0.0000770991	166.63	0.730	2.467
7800	VIV	3229	0.0001805315	147.30	0.645	4.300
7801	VLA	8004	0.0004474988	131.00	0.574	3.267
7802	VLR	6585	0.0003681634	165.67	0.726	1.167
7803	VLN	3684	0.0002059702	142.57	0.625	1.500
7804	VLD	5863	0.0003277968	140.10	0.614	1.500
7805	VLC	2410	0.0001347417	135.43	0.593	3.500
7806	VLQ	6421	0.0003589943	150.80	0.661	1.500
7807	VLE	7883	0.0004407338	148.40	0.650	1.500
7808	VLG	7565	0.0004229546	122.63	0.537	2.533
7809	VLH	2909	0.0001626404	154.33	0.676	1.600
7810	VLI	4108	0.0002296758	155.63	0.682	4.167
7811	VLL	11692	0.0006536927	155.67	0.682	3.933
7812	VLK	5886	0.0003290827	156.77	0.687	1.367
7813	VLM	2118	0.0001184161	156.67	0.687	3.300
7814	VLF	3701	0.0002069207	164.97	0.723	3.600
7815	VLP	6064	0.0003390346	141.97	0.622	2.133
7816	VLS	8788	0.0004913318	132.80	0.582	2.400
7817	VLT	5786	0.0003234918	141.50	0.620	2.433
7818	VLW	1258	0.0000703340	177.07	0.776	2.367
7819	VLY	2903	0.0001623050	166.67	0.730	2.233
7820	VLV	7046	0.0003939376	147.33	0.646	4.067
7821	VKA	4046	0.0002262094	132.10	0.579	0.700
7822	VKR	2997	0.0001675605	166.77	0.731	-1.400
7823	VKN	2431	0.0001359157	143.67	0.630	-1.067
7824	VKD	3174	0.0001774564	141.20	0.619	-1.067
7825	VKC	1046	0.0000584812	136.53	0.598	0.933
7826	VKQ	2434	0.0001360835	151.90	0.666	-1.067
7827	VKE	5238	0.0002928534	149.50	0.655	-1.067
7828	VKG	3204	0.0001791337	123.73	0.542	-0.033
7829	VKH	1310	0.0000732413	155.43	0.681	-0.967
7830	VKI	2723	0.0001522413	156.73	0.687	1.600
7831	VKL	4656	0.0002603142	156.77	0.687	1.367
7832	VKK	4447	0.0002486291	157.87	0.692	-1.200
7833	VKM	1378	0.0000770432	157.77	0.691	0.733
7834	VKF	1767	0.0000987919	166.07	0.728	1.033
7835	VKP	2948	0.0001648209	143.07	0.627	-0.433
7836	VKS	3707	0.0002072561	133.90	0.587	-0.167
7837	VKT	3124	0.0001746610	142.60	0.625	-0.133
7838	VKW	691	0.0000386334	178.17	0.781	-0.200
7839	VKY	1398	0.0000781613	167.77	0.735	-0.333
7840	VKV	3946	0.0002206185	148.43	0.650	1.500
7841	VMA	1697	0.0000948783	132.00	0.578	2.633
7842	VMR	1066	0.0000595994	166.67	0.730	0.533
7843	VMN	816	0.0000456221	143.57	0.629	0.867
7844	VMD	1273	0.0000711727	141.10	0.618	0.867
7845	VMC	343	0.0000191769	136.43	0.598	2.867
7846	VMQ	903	0.0000504862	151.80	0.665	0.867

7847	VME	1775	0.0000992392	149.40	0.655	0.867
7848	VMG	1294	0.0000723468	123.63	0.542	1.900
7849	VMH	412	0.0000230347	155.33	0.681	0.967
7850	VMI	721	0.0000403107	156.63	0.686	3.533
7851	VML	2337	0.0001306603	156.67	0.687	3.300
7852	VMK	1127	0.0000630099	157.77	0.691	0.733
7853	VMM	506	0.0000282902	157.67	0.691	2.667
7854	VMF	681	0.0000380743	165.97	0.727	2.967
7855	VMP	1040	0.0000581458	142.97	0.626	1.500
7856	VMS	1347	0.0000753100	133.80	0.586	1.767
7857	VMT	1030	0.0000575867	142.50	0.624	1.800
7858	VMW	212	0.0000118528	178.07	0.780	1.733
7859	VMY	582	0.0000325393	167.67	0.735	1.600
7860	VMV	1599	0.0000893991	148.33	0.650	3.433
7861	VFA	2543	0.0001421776	140.30	0.615	2.933
7862	VFR	2291	0.0001280884	174.97	0.767	0.833
7863	VFN	1464	0.0000818514	151.87	0.665	1.167
7864	VFD	2081	0.0001163475	149.40	0.655	1.167
7865	VFC	987	0.0000551826	144.73	0.634	3.167
7866	VFQ	2078	0.0001161797	160.10	0.702	1.167
7867	VFE	2309	0.0001290948	157.70	0.691	1.167
7868	VFG	2733	0.0001528004	131.93	0.578	2.200
7869	VFH	1294	0.0000723468	163.63	0.717	1.267
7870	VFI	2026	0.0001132724	164.93	0.723	3.833
7871	VFL	4341	0.0002427027	164.97	0.723	3.600
7872	VFK	1963	0.0001097502	166.07	0.728	1.033
7873	VFM	795	0.0000444480	165.97	0.727	2.967
7874	VFF	1755	0.0000981210	174.27	0.764	3.267
7875	VFP	2090	0.0001168506	151.27	0.663	1.800
7876	VFS	3934	0.0002199476	142.10	0.623	2.067
7877	VFT	2451	0.0001370339	150.80	0.661	2.100
7878	VFW	558	0.0000311974	186.37	0.817	2.033
7879	VFY	1335	0.0000746391	175.97	0.771	1.900
7880	VFV	2810	0.0001571054	156.63	0.686	3.733
7881	VPA	5681	0.0003176213	117.30	0.514	1.467
7882	VPR	3607	0.0002016652	151.97	0.666	-0.633
7883	VPN	1688	0.0000943751	128.87	0.565	-0.300
7884	VPD	2919	0.0001631995	126.40	0.554	-0.300
7885	VPC	1350	0.0000754777	121.73	0.533	1.700
7886	VPQ	2812	0.0001572172	137.10	0.601	-0.300
7887	VPE	4930	0.0002756334	134.70	0.590	-0.300
7888	VPG	6048	0.0003381401	108.93	0.477	0.733
7889	VPH	1326	0.0000741359	140.63	0.616	-0.200
7890	VPI	2205	0.0001232802	141.93	0.622	2.367
7891	VPL	5769	0.0003225413	141.97	0.622	2.133
7892	VPK	2719	0.0001520177	143.07	0.627	-0.433
7893	VPM	1109	0.0000620035	142.97	0.626	1.500
7894	VPF	2190	0.0001224416	151.27	0.663	1.800
7895	VPP	5650	0.0003158881	128.27	0.562	0.333
7896	VPS	6007	0.0003358478	119.10	0.522	0.600
7897	VPT	3417	0.0001910424	127.80	0.560	0.633
7898	VPW	757	0.0000423234	163.37	0.716	0.567

7899	VPY	1491	0.0000833609	152.97	0.670	0.433
7900	VPV	5113	0.0002858647	133.63	0.586	2.267
7901	VSA	6371	0.0003561988	108.13	0.474	1.733
7902	VSR	4692	0.0002623269	142.80	0.626	-0.367
7903	VSN	2797	0.0001563786	119.70	0.525	-0.033
7904	VSD	3587	0.0002005470	117.23	0.514	-0.033
7905	VSC	2103	0.0001175775	112.57	0.493	1.967
7906	VSQ	3905	0.0002183262	127.93	0.561	-0.033
7907	VSE	5648	0.0003157763	125.53	0.550	-0.033
7908	VSG	6026	0.0003369100	99.77	0.437	1.000
7909	VSH	2019	0.0001128811	131.47	0.576	0.067
7910	VSI	3269	0.0001827678	132.77	0.582	2.633
7911	VSL	8223	0.0004597430	132.80	0.582	2.400
7912	VSK	3942	0.0002203949	133.90	0.587	-0.167
7913	VSM	1568	0.0000876659	133.80	0.586	1.767
7914	VSF	3280	0.0001833828	142.10	0.623	2.067
7915	VSP	5497	0.0003073340	119.10	0.522	0.600
7916	VSS	9170	0.0005126892	109.93	0.482	0.867
7917	VST	4966	0.0002776461	118.63	0.520	0.900
7918	VSW	1517	0.0000848146	154.20	0.676	0.833
7919	VSY	2280	0.0001274734	143.80	0.630	0.700
7920	VSV	5689	0.0003180686	124.47	0.545	2.533
7921	VTA	4870	0.0002722788	116.83	0.512	1.767
7922	VTR	3140	0.0001755555	151.50	0.664	-0.333
7923	VTN	2089	0.0001167947	128.40	0.563	0.000
7924	VTD	3280	0.0001833828	125.93	0.552	0.000
7925	VTC	1517	0.0000848146	121.27	0.531	2.000
7926	VTQ	2648	0.0001480481	136.63	0.599	0.000
7927	VTE	4488	0.0002509214	134.23	0.588	0.000
7928	VTG	4857	0.0002715520	108.47	0.475	1.033
7929	VTH	1513	0.0000845909	140.17	0.614	0.100
7930	VTI	3136	0.0001753319	141.47	0.620	2.667
7931	VTL	6712	0.0003752639	141.50	0.620	2.433
7932	VTK	3215	0.0001797487	142.60	0.625	-0.133
7933	VTM	1433	0.0000801182	142.50	0.624	1.800
7934	VTF	2667	0.0001491104	150.80	0.661	2.100
7935	VTP	4142	0.0002315767	127.80	0.560	0.633
7936	VTS	5574	0.0003116390	118.63	0.520	0.900
7937	VTT	3764	0.0002104430	127.33	0.558	0.933
7938	VTW	999	0.0000558535	162.90	0.714	0.867
7939	VTY	1542	0.0000862123	152.50	0.668	0.733
7940	VTV	5420	0.0003030289	133.17	0.584	2.567
7941	VWA	910	0.0000508776	152.40	0.668	1.700
7942	VWR	810	0.0000452866	187.07	0.820	-0.400
7943	VWN	653	0.0000365088	163.97	0.719	-0.067
7944	VWD	852	0.0000476348	161.50	0.708	-0.067
7945	VWC	234	0.0000130828	156.83	0.687	1.933
7946	VWQ	487	0.0000272279	172.20	0.755	-0.067
7947	VWE	830	0.0000464048	169.80	0.744	-0.067
7948	VWG	814	0.0000455103	144.03	0.631	0.967
7949	VWH	314	0.0000175556	175.73	0.770	0.033
7950	VWI	523	0.0000292406	177.03	0.776	2.600

7951	VWL	1277	0.0000713963	177.07	0.776	2.367
7952	VWK	803	0.0000448952	178.17	0.781	-0.200
7953	VWM	262	0.0000146483	178.07	0.780	1.733
7954	VWF	515	0.0000287933	186.37	0.817	2.033
7955	VWP	509	0.0000284579	163.37	0.716	0.567
7956	VWS	1076	0.0000601585	154.20	0.676	0.833
7957	VWT	681	0.0000380743	162.90	0.714	0.867
7958	VWW	193	0.0000107905	198.47	0.870	0.800
7959	VWY	354	0.0000197919	188.07	0.824	0.667
7960	VWV	826	0.0000461812	168.73	0.739	2.500
7961	VYA	1581	0.0000883928	142.00	0.622	1.567
7962	VYR	1568	0.0000876659	176.67	0.774	-0.533
7963	VYN	1167	0.0000652463	153.57	0.673	-0.200
7964	VYD	1370	0.0000765959	151.10	0.662	-0.200
7965	VYC	798	0.0000446157	146.43	0.642	1.800
7966	VYQ	1301	0.0000727381	161.80	0.709	-0.200
7967	VYE	1713	0.0000957728	159.40	0.699	-0.200
7968	VYG	1674	0.0000935923	133.63	0.586	0.833
7969	VYH	821	0.0000459016	165.33	0.725	-0.100
7970	VYI	1745	0.0000975619	166.63	0.730	2.467
7971	VYL	2492	0.0001393262	166.67	0.730	2.233
7972	VYK	1473	0.0000823545	167.77	0.735	-0.333
7973	VYM	579	0.0000323715	167.67	0.735	1.600
7974	VYF	1154	0.0000645194	175.97	0.771	1.900
7975	VYP	1283	0.0000717318	152.97	0.670	0.433
7976	VYS	2290	0.0001280325	143.80	0.630	0.700
7977	VYT	1939	0.0001084083	152.50	0.668	0.733
7978	VYW	348	0.0000194565	188.07	0.824	0.667
7979	VYY	918	0.0000513248	177.67	0.779	0.533
7980	VYV	1858	0.0001038797	158.33	0.694	2.367
7981	VVA	5596	0.0003128690	122.67	0.538	3.400
7982	VVR	3663	0.0002047961	157.33	0.689	1.300
7983	VVN	2408	0.0001346298	134.23	0.588	1.633
7984	VVD	3418	0.0001910983	131.77	0.577	1.633
7985	VVC	1617	0.0000904055	127.10	0.557	3.633
7986	VVQ	3159	0.0001766178	142.47	0.624	1.633
7987	VVE	4586	0.0002564005	140.07	0.614	1.633
7988	VVG	4731	0.0002645074	114.30	0.501	2.667
7989	VVH	1802	0.0001007487	146.00	0.640	1.733
7990	VVI	3254	0.0001819292	147.30	0.645	4.300
7991	VVL	7088	0.0003962858	147.33	0.646	4.067
7992	VVK	3661	0.0002046843	148.43	0.650	1.500
7993	VVM	1588	0.0000887841	148.33	0.650	3.433
7994	VVF	2699	0.0001508995	156.63	0.686	3.733
7995	VVP	3908	0.0002184939	133.63	0.586	2.267
7996	VVS	5608	0.0003135399	124.47	0.545	2.533
7997	VVT	4240	0.0002370559	133.17	0.584	2.567
7998	VVW	742	0.0000414848	168.73	0.739	2.500
7999	VVY	1693	0.0000946546	158.33	0.694	2.367
8000	VVV	5363	0.0002998421	139.00	0.609	4.200

Table Ts3. Analyses of the 3D structures of the cyclophilins.

No.	PDB	Res(Å)	Length	NID	B-factor	Description	Reference
Human/vertebrates							
1	2CPL	1.63	165	3586	15E,44K,81E	hCyPA	16
2	1CWA	2.10	165	3591	69RHGEK,144R	hCyPA/CsA	25
3	1YND	1.60	164	3519	13DGEP,69RHN,148RN,153SK	hCyPA/(Sanglifehrin A)	52
4	1ZKF	2.55	165	3528	80G,81E,82K	hCyPA/(Suc-AGPF-pNA)	29
5	2X7K	1.15	166	2757	-	hPPIL1 (CGI-124)	R1
6	1XYH	2.60	160	3396	156AN	hCyPJ (PPIL3)	R2
7	1CYN	1.85	178	3704	7GP,51EKG,77R	hCyPB/CsA	R3
8	2RMC	1.64	182	3867	48D,182D,184H	mCyPC/CsA	R4
9	2BIT	1.71	164	3664	44K,68TNHNG,147SKS,150GRK	hCyPF	R5
10	2Z6W	0.96	164	3668	13NGK,144S,149S,153SK	hCyPF/CsA	R6
11	1MZW	2.00	173	3756	50E,52RKDGVP,112M,161P	hCyP19 (hCyPH)	18
12	1QOI	2.00	173	3747	53KD,83D	hCyP19	R7
13	1ZMF	1.88	162	3729	150NKP,215YGKK,239SGP	hCyP33 (AA:137-301)	R8
14	1IIP	2.00	297	6916	100GE,123A	bCyP40 orthogonal	R9
15	1ZKC	1.65	187	4205	414EDPKT,423KE	CLD of hCyP60 (AA:271-457)	54
16	2A2N	1.65	164	3700	567HST,573D	CLD of hCyP73	R10
17	2GW2	1.80	173	3976	68V,85R,126I	CLD of hCyP88	R11
18	2HE9	2.00	172	3844	54GKK,70NG,80E,160A	CLD of hCyP157	R12
Invertebrates/Parasites							
1	1DYW	1.80	172	3869	87GEK	CeCyp3 (CeCyP18d)	R13
2	1E3B	1.85	172	3839	87GE,111G	CeCyP3/(Complex-Au)	R14
3	1H0P	1.75	182	4154	67P,70E,189IAVDT	CeCyP5	R15
4	1A58	1.95	177	3837	none	BmCyP18	R16
5	1C5F	2.47	177	3858	51KIS	BmCyP18/CsA	R17
6	1Z81	2.80	186	4066	99I,156I,182L	PyCyP23/p	R18
7	2B71	2.50	169	3844	101GKS,105YGEY	PyCyP18	R18
8	1QNG	2.10	170	3933	45KIGSRGKN	PfCyP18/CsA	R19
9	2FU0	1.80	155	3563	62SGDGTG,73GN,106FFIT	PfCyP87	R18
10	2HAQ	1.97	166	3376	50K,103GE,170NSH	LdCyP18 (CyPA)	R20
11	2CMT	1.50	164	3650	43F,73F,76VKGDGT	SmCyP18	R21

All the X-ray files were taken from the PDB server whereas the structures were analyzed with the methods recently described [19]. The numbers of the intra-molecular distances (NID) between the AAs in $i \geq i+2$ sequence positions and at atomic distances $d_{ij} \leq 4.5$ Å are dependent on the size of the CLD and structure resolution. In average, about 3700 inter-atomic interactions take place within 2.7-4.5 Å that contribute to the overall stability of the CLD. The residues having higher than the average flexibility (Debye/Waller B-factors) are explicitly indicated. **Abbreviations:** NID, the number of intramolecular interatomic distances calculated between the $i \geq i+2$ AA residues (AAs) in the distance range (2.7 Å $\geq d \leq 4.5$ Å); B-factor, the AAs that have a

higher flexibility than average; b, *Bos taurus*; Py, *Plasmodium yoelii*; Pf, *Plasmodium falciparum*; Ld, *Leishmania donovani*; Bm, *Brugia malayi*; Ce, *Caenorhabditis elegans;* Sm, *Schistosoma mansoni.* The chemical name of Sanglifehrin A: (3S,6S,9R,10R,11S,12S,13E,15E,18S,21S)-18-{(1E,3E,7S,8S)-9-[(2S,3R,4S,5S,6R,9S,11S)-9-ethyl-4-hydroxy-3,5,11-trimethyl-8-oxo-1-oxa-7-azaspiro[5.5]undec-2-yl]-8-hydroxy-1,7-dimethylnona-1,3-dienyl}-10,12-dihydroxy-3-(3-hydroxybenzyl)-6-isopropyl-11-methyl-9-(3-oxobutyl)-19-oxa-1,4,7,25-tetraazabicyclo[19.3.1]pentacosa-13,15-diene-2,5,8,20-tetrone.

References

R1. Stegmann CM, Luhrmann R, Wahl MC (2010) The crystal structure of PPIL1 bound to cyclosporine A suggests a binding mode for a linear epitope of the SKIP protein. PLoS One 5:e10013

R2. Huang LL, Zhao XM, Huang CQ, Yu L, Xia ZX (2005) Structure of recombinant human cyclophilin J, a novel member of the cyclophilin family. Acta Crystallogr D Biol Crystallogr 61:316-321

R3. Mikol V, Kallen J, Walkinshaw MD (1994) X-ray structure of a cyclophilin B/cyclosporin complex: comparison with cyclophilin A and delineation of its calcineurin-binding domain. Proc Natl Acad Sci USA 91:5183-5186

R4. Ke H, Zhao Y, Luo F, Weissman I, Friedman J (1993) Crystal structure of murine cyclophilin C complexed with immunosuppressive drug cyclosporin A. Proc Natl Acad Sci USA 90:11850-11854

R5. Schlatter D, Thoma R, Kung E, Stihle M, Muller F, Borroni E, Cesura A, Hennig M (2005) Crystal engineering yields crystals of cyclophilin D diffracting to 1.7 Å resolution. Acta Crystallogr D Biol Crystallogr 61:513-519

R6. Kajitani K, Fujihashi M, Kobayashi Y, Shimizu S, Tsujimoto Y, Miki K (2008) Crystal structure of human cyclophilin D in complex with its inhibitor, cyclosporin A at 0.96-Å resolution. Proteins 70:1635-1639

R7. Reidt U, Reuter K, Achsel T, Ingelfinger D, Luhrmann R, Ficner R (2000) Crystal structure of the human U4/U6 small nuclear ribonucleoprotein particle-specific SnuCyp-20, a nuclear cyclophilin. J Biol Chem 275:7439-7442

R8. Wang T, Yun CH, Gu SY, Chang WR, Liang DC (2005) 1.88 Å crystal structure of the C domain of hCyP33: a novel domain of peptidyl-prolyl cis-trans isomerase. Biochem Biophys Res Commun 333:845-849

R9. Taylor P, Dornan J, Carrello A, Minchin RF, Ratajczak T, Walkinshaw MD (2001) Two structures of cyclophilin 40: folding and fidelity in the TPR domains. Structure 9:431-438

R10. Davis T, Walker JR, Newman EM, Mackenzie, F, Butler-Cole, C, Finerty, PJ Jr, Weigelt J, Sundstrom M, Arrowsmith C, Edwards A, Bochkarev A, Dhe-Paganon S (2007) Structural Genomics Consortium (SGC). Crystal structure of the peptidylprolyl domain of human PPWD1 (2A2N), http://www.rcsb.org/pdb

R11. Stegmann CM, Seeliger D, Sheldrick GM, de Groot BL, Wahl MC (2009) The thermodynamic influence of trapped water molecules on a protein-ligand interaction. Angew Chem Int Ed Engl 48:5207-5210

R12. Davis T, Walker JR, Newman EM, Mackenzie F, Butler-Cole C, Finerty PJ Jr, Weigelt J, Sundstrom M, Arrowsmith C, Edwards, A, Bochkarev A, Dhe-Paganon, S (2007) Structural Genomics Consortium (SGC). Structure of the PPIase cyclophilin-type domain of the human NK-tumor recognition protein (2HE9), http://www.rcsb.org/pdb

R13. Dornan J, Page AP, Taylor P, Wu S, Winter AD, Husi H, Walkinshaw MD (1999)

R15. Picken NC, Eschenlauer S, Taylor P, Page AP, Walkinshaw MD (2002) Structural and biological characterisation of the gut-associated cyclophilin B isoforms from *Caenorhabditis elegans*. J Mol Biol 322:15-25

R16. Taylor P, Page AP, Kontopidis G, Husi H, Walkinshaw MD (1998) The X-ray structure of a divergent cyclophilin from the nematode parasite *Brugia malayi*. FEBS Lett 425:361-366

R17. Ellis PJ, Carlow CK, Ma D, Kuhn P (2000) Crystal structure of the complex of *Brugia malayi* cyclophilin and cyclosporin A. Biochemistry 39:592-598

R18. Vedadi M, Lew J, Artz J, Amani M, Zhao Y, Dong A, Wasney GA, Gao M, Hills T, Brokx S, Qiu W, Sharma S, Diassiti A, Alam Z, Melone M, Mulichak A, Wernimont A, Bray J, Loppnau P, Plotnikova O, Newberry K, Sundararajan E, Houston S, Walker J, Tempel W, Bochkarev A, Kozieradzki I, Edwards A, Arrowsmith C, Roos D, Kain K, Hu, R (2007) Genome-scale protein expression and structural biology of *Plasmodium falciparum* and related *Apicomplexan* organisms. Mol Biochem Parasitol 151:100-110

R19. Peterson MR, Hall DR, Berriman M, Nunes JA, Leonard GA, Fairlamb AH, Hunter WN (2000) The three-dimensional structure of a *Plasmodium falciparum* cyclophilin in complex with the potent anti-malarial cyclosporin A. J Mol Biol 298:123-133

R20. Venugopal V, Sen B, Datta AK, Banerjee R (2007) Structure of cyclophilin from *Leishmania donovani* at 1.97 Å resolution. Acta Crystal F63:60-64

R21. Gourlay LJ, Angelucci F, Baiocco P, Boumis G, Brunori M, Bellelli A, Miele AE (2007) The three-dimensional structure of two redox states of cyclophilin A from *Schistosoma mansoni*. Evidence for redox regulation of peptidyl-prolyl cis-trans isomerase activity. J Biol Chem 282:24851-24857

Table Ts4. Conservation of some sequence motifs in the cyclophilins based on the MSA496. The number assigned to gi
residue is based on the sequence of hCyPA.

Case	AA-residues	Conservation	— Divergence	- Similarity	Comments
1	R55,F60,M61,Q63,F113,W121,L122,H126	0.81	0.23	0.46	PPIase site
2	R55,F60,M61,Q63,G72,M100,A101,N102, A103,Q111,F113,I114,W121,L122,D123,H126	0.83	0.18	0.26	Extended PPIase site
3	F25,A26,D27,K28,V29,P30,K31,T32,A33	0.67	0.33	0.32	α-helix I
4	E34,N35,F36,R37,A38,L39,S40,T41	0.70	0.34	0.32	α-helix II
5	C52,F53,H54,R55	0.77	0.33	0.57	part of β-strand III
6	F60,M61,C62,Q63,G64	0.78	0.32	0.52	β-strand IV
7	G96,I97,L98,S99,M100,A101,N102,A103,G104	0.79	0.26	0.35	β-strand V + AA
8	S110,Q111,F112,F113,I114	0.91	0.15	0.58	part of β-strand VI
9	W121,L122,Q123,G124,K125,H126	0.70	0.36	0.44	PPIase site/α-helix
10	F7,F8,F22,F36,Y48,F53,L98,F112,I114, F129,I158,C161	0.79	0.19	0.52	Aromatic / Hydrophobic netwo
11	V6,F8,I10,V20,F22,L24,F36,L39,Y48,F53, I56,C62,L98,M100,F112,I114,F129,V132, V139,M142,I158	0.81	0.11	0.45	Extended network of Aromatic / Hydrophobic resid
10	F7	0.51			Aromatic network
11	F8	0.61			ibid
12	F36	0.94			ibid
13	Y48	0.86			ibid

14	F53	0.89	ibid
15	F60	0.87	ibid
16	Y79	0.71	ibid
17	F83	0.86	ibid
18	F112	0.96	ibid
19	F113	0.88	ibid
20	F129	0.90	ibid

The sequence conservation was calculated using the Blosum30 matrix. Divergence and similarity scores were calculat using the AAC derived from the human genome database containing 28243 entries. The program used for this analysis described in [168].

Table Ts5. Supplementary table with material concerning some cyclophilins from Helminth Parasite.

Helminth parasite	Species - Disease - Number of genes encoding CyPs	Cyclophilin	Acc N°	Observations	Ref	CsA and its derivatives PPIase activity inhibition	Ref	CsA and its derivatives Parasiticidal effect	Ref	Probable CsA Mechanism of Action
Nematodes	*Brugia malayi* **Filariasis**	*Bm*CYP-1 *Bm*CYP-2	AAC37249 AAC47231	*Bm*CYP-1 expressed in adult tegument and gut tissues.	H1, H2	BmCYP-1 Low sensitivity to CsA IC_{50}= 860 nM	H1	Resistant to CsA	H1	
	Onchocerca volvulus **Onchocerciasis**	*Ov*CyP-16	AAD01617	25 kDa CyP, homologous to *C. elegans* CyP16, this CyP is not present in the mammalian CyPs.	H3	Resistant to CsA even at 5 mM concentration	H3			
Cestodes	*Echinococcus granulosus* **Hydatid disease**	*Eg*CyP-1	AAN62875	Gene codes for a CyP20, two introns, expressed in all stages.	H4	PPIase activity is CsA sensitive	H4	Effective as early CsA treatment *in vivo*. CsA is toxic for protoscoleces at 10 ug/ml.	H5	
Trematodes	*Schistosoma mansoni* **Schistosomiasis**	*Sm*CypA	AAC47317	CyP contains a disulfide bridge between two cysteins	H6	CsA IC_{50} = 14 nM	H7	CsA derivatives effective *in vivo* and *in vitro*. Larvicidal action of CsA.	H8 - H10	
		*Sm*p17.7	AAB41257	CyP expressed in adult tegument and gut tissues	H11	PPIase activity is CsA sensitive	H11			
		*Sm*CyPB	AAC46985	Predominant CyP. Main target for CsA. With a cleavable signal peptide. Expressed in adult tegument and associated tubercles.	H6			No correlation between parasiticidal effect and inhibition of *Sm*CyPB found	H12	CsA activity not based on PPIase inhibition

Several ORFs encoding the cyclophilin-like sequences were found in the genomes of Nematodes, Cestodes and Trematodes (Helminthes parasites). Most of them have their direct orthologues that were previously described for the free-living *Caenorhabditis elegans* CyPs [8], a model of multicellular organism, as it was the case of 22.4 kDa *Bm*CyP5 (TIGR locus 14702.m00390) encoded in the genome of *Brugia malayi* that has been recently identified as a mature secreted protein of 20.1 kDa in adult worms closely related to the membrane-associated *Ce*CyP5 (NP_493624) of *C. elegans* [H13]. Most of the Helmintic parasites are susceptible to CsA except for *Brugia malayi* that proved to be resistant to the actions of this drug, probably because of residue mutations in the cyclosporin binding [H1].

References cited in the Table .

H1. Page AP, Landry D, Wilson GG, Carlow CKS (1995) Molecular characterization of a cyclosporin A-insensitive cyclophilin from the parasitic nematode *Brugia malayi*. Biochemistry 34:11545–11550

H2. Ma D, Hong X, Raghavan N, ScottAL, McCarthy JS, Nutman TB, Williams SA, Carlow CK (1996) A Cyclosporin A-sensitive small molecular weight cyclophilin of filarial parasites. Mol Biochem Parasitol 79:235-241

H3. Ma D, Nelson LS, LeCoz K, Poole C, Carlow CK (2002) A novel cyclophilin from parasitic and free-living nematodes with a unique substrate- and drug-binding domain. J Biol Chem 277:14925-14932

H4. Colebrook AL, Jenkins DD, Lightowlers MW (2002) Anti-parasitic effect of cyclosporin A on Echinococcus granulosus and characterization of the associated cyclophilin protein. Parasitology 5:485-493

H5. Hurd H, Mackenzie KS, Chappell LH (1993) Anthelmintic effects of cyclosporin A on protoscoleces and secondary hydatid cysts of Echinococcus granulosus in the mouse. Int J Parasitol 23:315-320

H6. Klinkert MQ, Bugli F, Engels B, Carrasquillo E, Valle C, Cioli D (1995) Characterization of a *Schistosoma mansoni* cDNA-encoding a B-like cyclophilin and its expression in *Escherichia coli*. Mol Biochem Parasitol 75:99–111

H7. Argaet VP, Mitchell GF (1992) Cyclophilin of *Schistosoma japonicum.* J Parasitol 78:660–664

H8. Chappell LH, Thomson AW, Barker GC, Smith SW (1987) Dosage, timing, and route of administration of cyclosporin A and nonimmunosuppressive derivatives of dihydrocyclosporin A and cyclosporin C against *Schistosoma mansoni in vivo* and *in vitro*. Antimicrob Agents Chemother 31:1567-1571

H9. Bueding E, Hawkins J, Cha YN (1981) Antischistosomal effects of cyclosporin A. Agents Actions 11:380-383

H10. Munro GH, Brannan LR, Chappell LH, Thomson AW, McLaren DJ (1991) The larvicidal activity of cyclosporin A against *Schistosoma mansoni in mice*. Parasitology 102:57-63

H11. Kiang D, Elghazalie NN, Medhat AM, Abdelfattah M, Karim AM, Lo Verde P (1996) Identification and characterization of *Schistosoma mansoni* p17.7, a cyclophilin. Mol Biochem Parasitol 76:73–82

H12. Khattab A, Pica-Mattoccia L, Klinkert MQ, Wenger R, Cioli D (1998) Cyclosporins: lack of correlation between antischistosomal properties and inhibition of cyclophilin isomerase activity. Exp Parasitol;90:103–109

H13. Bennuru S, Semnani R, Meng Z, Ribeiro JM, Veenstra TD, Nutman TB (2009) *Brugia malayi* excreted/secreted proteins at the host/parasite interface: stage- and gender-specific proteomic profiling. PLoS Negl Trop Dis 3:e410

Some output from X-ray file-geometry computing with Seqelf18 (AG-April-2010)

```
> Minimal and maximal distance for atomic interactions  2.70  4.00

                Sigma { VDW } factor  1.000 (Seqelf18)

              Codes for 1M63.pdb (CnA/CnB/hCyPA/CsA complex)

CnA ==== A ****  CnB ==== B **** CyP-A ==== C ***** CsA ==== D

                  This is step * * *   1 * * *

          * * * The PDB coordinates /users/andrzej/musca/cypx/1M63.pdb
          Chain identifier (sequence) >>> |D|
          Number of residues in IDRES(*)    11
          Starting from the index IDRES   1
          Number of effective XYZ-coordinates    84

          * * * The PDB coordinates /users/andrzej/musca/cypx/1M63.pdb
          Chain identifier (sequence) >>> |B|
          Number of residues in IDRES(*)   158
          Starting from the index IDRES  12
          Number of effective XYZ-coordinates  1262

  Number of used coordinates   84 1262

   1   3.86       1-BMT   CE    122-ASN   ND2
   2   3.71       1-BMT   CZ    122-ASN   CB
   3   3.45       1-BMT   CZ    122-ASN   ND2
   4   3.96       1-BMT   CH    122-ASN   CB
   5   4.00       1-BMT   CH    122-ASN   CG
   6   3.10       1-BMT   CH    122-ASN   ND2
   7   3.91       4-MLE   CD1   118-MET   CB
   8   3.78       4-MLE   CD1   119-VAL   N
   9   3.91       4-MLE   CD1   119-VAL   CA
  10   3.88       4-MLE   CD1   119-VAL   CB
  11   3.40       6-MLE   CD1   122-ASN   O
  12   3.90       6-MLE   CD2   123-LEU   CG
  13   3.79       6-MLE   CD2   123-LEU   CD1

   <.......> Number of potential hydrogen bonds    0

              AA-residue-###     Contacts
               BMT-----  1         5
               MLE-----  4         5
               MLE-----  6         4

>>>> Inter-molecular distances  13 Below 4-A  13
>>> Hydrophobic    6 Hydrophilic    0 Mixed    7
>> Main-chain/Main-chain    0 Side-chain/Side-chain    7 Mixed    6

                  This is step * * *   2 * * *

          * * * The PDB coordinates /users/andrzej/musca/cypx/1M63.pdb
          Chain identifier (sequence) >>> |D|
          Number of residues in IDRES(*)    11
          Starting from the index IDRES   1
          Number of effective XYZ-coordinates    84

          * * * The PDB coordinates /users/andrzej/musca/cypx/1M63.pdb
          Chain identifier (sequence) >>> |A|
          Number of residues in IDRES(*)   372
          Starting from the index IDRES   1
```

```
         Number of effective XYZ-coordinates  3013

  Number of used coordinates   84 3013

   1   3.78        2-ABA   O      356-PHE   CE1
   2   3.46        3-SAR   CA     356-PHE   CD1
   3   3.85        3-SAR   CA     356-PHE   CE1
   4   3.94        3-SAR   C      356-PHE   CD1
   5   3.76        4-MLE   CA     352-TRP   NE1
   6   3.80        4-MLE   CB     352-TRP   NE1
   7   3.92        4-MLE   CB     352-TRP   CE2
   8   3.90        4-MLE   CB     352-TRP   CZ2
   9   3.97        4-MLE   CG     356-PHE   CD2
  10   3.99        4-MLE   CD1    352-TRP   CZ2
  11   3.26        4-MLE   CD2    352-TRP   O
  12   3.98        4-MLE   CD2    352-TRP   CD2
  13   3.87        4-MLE   CD2    352-TRP   CE2
  14   3.95        4-MLE   CD2    353-SER   CA
  15   3.91        4-MLE   CD2    356-PHE   CB
  16   3.66        4-MLE   C      352-TRP   NE1
  17   3.60        5-VAL   N      352-TRP   NE1
  18   3.76        5-VAL   C      352-TRP   NE1
  19   3.71        5-VAL   O      344-PRO   CG
  20   3.73        5-VAL   O      344-PRO   CD
  21   3.37        5-VAL   O      352-TRP   CD1
  22   2.84 *      5-VAL   O      352-TRP   NE1
  23   3.92        6-MLE   CA     341-TYR   OH
  24   3.36        6-MLE   CB     341-TYR   OH
  25   3.59        6-MLE   CD2    352-TRP   CZ2
  26   3.90        6-MLE   C      341-TYR   OH
  27   3.67        6-MLE   C      344-PRO   CD
  28   3.68        6-MLE   O      344-PRO   CG
  29   3.70        6-MLE   O      344-PRO   CD
  30   3.86        7-ALA   N      341-TYR   CZ
  31   2.99        7-ALA   N      341-TYR   OH
  32   3.85        7-ALA   N      344-PRO   CD
  33   3.80        7-ALA   CA     341-TYR   OH
  34   3.71        7-ALA   CB     341-TYR   CZ
  35   3.61        7-ALA   CB     341-TYR   OH
  36   3.50        7-ALA   CB     342-TRP   O
  37   3.99        8-DAL   CA     312-LEU   O
  38   3.56        8-DAL   CB     312-LEU   O
  39   3.75        9-MLE   CN     312-LEU   O
  40   3.95        9-MLE   CD1    312-LEU   CD2

   <.......> Number of potential hydrogen bonds    1

              AA-residue-###     Contacts
               ABA-----  2         1
               SAR-----  3         3
               MLE-----  4        13
               VAL-----  5         7
               MLE-----  6         8
               ALA-----  7         8
               DAL-----  8         3
               MLE-----  9         3

>>>> Inter-molecular distances  40 Below 4-A  40
>>> Hydrophobic   15 Hydrophilic    3 Mixed   22
>> Main-chain/Main-chain    1 Side-chain/Side-chain   13 Mixed   26

                  This is step * * *   3 * * *
```

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        * * * The PDB coordinates /users/andrzej/musca/cypx/1M63.pdb
        Chain identifier (sequence) >>> |D|
        Number of residues in IDRES(*)    11
        Starting from the index IDRES   1
        Number of effective XYZ-coordinates    84

        * * * The PDB coordinates /users/andrzej/musca/cypx/1M63.pdb
        Chain identifier (sequence) >>> |C|
        Number of residues in IDRES(*)   165
        Starting from the index IDRES   1
        Number of effective XYZ-coordinates  1265

Number of used coordinates   84 1265

 1   3.86       1-BMT   CN     55-ARG   CZ
 2   3.65       1-BMT   CN     55-ARG   NH2
 3   3.91       1-BMT   CN     63-GLN   NE2
 4   3.13       1-BMT   CA    102-ASN   O
 5   3.36       1-BMT   C     102-ASN   O
 6   3.67       1-BMT   O      63-GLN   OE1
 7   3.65       1-BMT   O      63-GLN   NE2
 8   3.51       1-BMT   CB    102-ASN   O
 9   3.51       1-BMT   CD1   102-ASN   O
10   3.45       1-BMT   CD1   102-ASN   OD1
11   3.86       2-ABA   N     102-ASN   C
12   2.78 *     2-ABA   N     102-ASN   O
13   3.30       2-ABA   CA     72-GLY   O
14   3.77       2-ABA   CA    102-ASN   O
15   3.20       2-ABA   C      72-GLY   O
16   3.67       2-ABA   O      72-GLY   O
17   3.57       2-ABA   CB     72-GLY   O
18   3.62       2-ABA   CB    102-ASN   O
19   3.93       2-ABA   CB    111-GLN   CD
20   3.34       2-ABA   CB    111-GLN   NE2
21   3.71       2-ABA   CG    101-ALA   C
22   3.66       2-ABA   CG    101-ALA   O
23   3.75       2-ABA   CG    101-ALA   CB
24   3.85       2-ABA   CG    102-ASN   N
25   3.87       2-ABA   CG    102-ASN   C
26   3.41       2-ABA   CG    102-ASN   O
27   3.89       2-ABA   CG    111-GLN   CB
28   3.62       2-ABA   CG    111-GLN   CD
29   3.80       2-ABA   CG    111-GLN   OE1
30   3.49       2-ABA   CG    111-GLN   NE2
31   3.39       3-SAR   N      72-GLY   O
32   3.72       3-SAR   CN     72-GLY   C
33   3.35       3-SAR   CN     72-GLY   O
34   3.80       5-VAL   CG1    55-ARG   NH1
35   3.28       8-DAL   O     148-ARG   NH2
36   3.96       9-MLE   CB    121-TRP   NE1
37   3.49       9-MLE   CD1   148-ARG   NH2
38   3.53       9-MLE   CD2   121-TRP   CZ2
39   3.84       9-MLE   C      60-PHE   CE2
40   3.58       9-MLE   C      60-PHE   CZ
41   3.80       9-MLE   O      60-PHE   CE1
42   3.96       9-MLE   O      60-PHE   CE2
43   3.25       9-MLE   O      60-PHE   CZ
44   3.79       9-MLE   O     121-TRP   CD1
45   3.15 *     9-MLE   O     121-TRP   NE1
46   3.61      10-MLE   CN     55-ARG   NH1
47   3.36      10-MLE   O      55-ARG   CZ
48   2.81      10-MLE   O      55-ARG   NH1
49   3.10 *    10-MLE   O      55-ARG   NH2
```

```
  50   3.79       10-MLE   O       60-PHE   CE2
  51   3.70       11-MVA   CN     122-LEU   CD2
  52   3.65       11-MVA   CN     126-HIS   CE1
  53   3.26       11-MVA   CN     126-HIS   NE2
  54   3.92       11-MVA   CA      55-ARG   NH2
  55   3.88       11-MVA   CA      63-GLN   NE2
  56   3.95       11-MVA   CB      63-GLN   NE2
  57   3.86       11-MVA   CB     113-PHE   CD1
  58   3.95       11-MVA   CG1     63-GLN   CD
  59   2.92       11-MVA   CG1     63-GLN   NE2
  60   3.75       11-MVA   CG1    101-ALA   CB
  61   3.89       11-MVA   CG1    113-PHE   CB
  62   3.79       11-MVA   CG1    113-PHE   CG
  63   3.41       11-MVA   CG1    113-PHE   CD1
  64   3.68       11-MVA   CG2     60-PHE   CZ
  65   3.78       11-MVA   CG2    113-PHE   CG
  66   3.86       11-MVA   CG2    113-PHE   CD1
  67   3.89       11-MVA   CG2    113-PHE   CD2
  68   3.98       11-MVA   C       63-GLN   NE2

   <.......> Number of potential hydrogen bonds    3

              AA-residue-###     Contacts
               BMT-----  1         9
               ABA-----  2        21
               SAR-----  3         4
               VAL-----  5         2
               DAL-----  8         2
               MLE-----  9        11
               MLE----- 10         6
               MVA----- 11        19

>>>> Inter-molecular distances  68 Below 4-A  68
>>> Hydrophobic   19 Hydrophilic    9 Mixed   40
>> Main-chain/Main-chain    9 Side-chain/Side-chain   24 Mixed   35

            This is step * * *   4 * * *

          * * * The PDB coordinates /users/andrzej/musca/cypx/1M63.pdb
          Chain identifier (sequence) >>> |C|
          Number of residues in IDRES(*)   165
          Starting from the index IDRES   1
          Number of effective XYZ-coordinates  1265

          * * * The PDB coordinates /users/andrzej/musca/cypx/1M63.pdb
          Chain identifier (sequence) >>> |D|
          Number of residues in IDRES(*)    11
          Starting from the index IDRES   1
          Number of effective XYZ-coordinates    84

  Number of used coordinates 1265   84

   1   3.86       55-ARG   CZ       1-BMT   CN
   2   3.36       55-ARG   CZ      10-MLE   O
   3   3.80       55-ARG   NH1      5-VAL   CG1
   4   3.61       55-ARG   NH1     10-MLE   CN
   5   2.81       55-ARG   NH1     10-MLE   O
   6   3.65       55-ARG   NH2      1-BMT   CN
   7   3.10 *     55-ARG   NH2     10-MLE   O
   8   3.92       55-ARG   NH2     11-MVA   CA
   9   3.80       60-PHE   CE1      9-MLE   O
  10   3.84       60-PHE   CE2      9-MLE   C
  11   3.96       60-PHE   CE2      9-MLE   O
```

12	3.79		60-PHE	CE2	10-MLE	O
13	3.58		60-PHE	CZ	9-MLE	C
14	3.25		60-PHE	CZ	9-MLE	O
15	3.68		60-PHE	CZ	11-MVA	CG2
16	3.95		63-GLN	CD	11-MVA	CG1
17	3.67		63-GLN	OE1	1-BMT	O
18	3.91		63-GLN	NE2	1-BMT	CN
19	3.65		63-GLN	NE2	1-BMT	O
20	3.88		63-GLN	NE2	11-MVA	CA
21	3.95		63-GLN	NE2	11-MVA	CB
22	2.92		63-GLN	NE2	11-MVA	CG1
23	3.98		63-GLN	NE2	11-MVA	C
24	3.72		72-GLY	C	3-SAR	CN
25	3.30		72-GLY	O	2-ABA	CA
26	3.20		72-GLY	O	2-ABA	C
27	3.67		72-GLY	O	2-ABA	O
28	3.57		72-GLY	O	2-ABA	CB
29	3.39		72-GLY	O	3-SAR	N
30	3.35		72-GLY	O	3-SAR	CN
31	3.71		101-ALA	C	2-ABA	CG
32	3.66		101-ALA	O	2-ABA	CG
33	3.75		101-ALA	CB	2-ABA	CG
34	3.75		101-ALA	CB	11-MVA	CG1
35	3.85		102-ASN	N	2-ABA	CG
36	3.86		102-ASN	C	2-ABA	N
37	3.87		102-ASN	C	2-ABA	CG
38	3.13		102-ASN	O	1-BMT	CA
39	3.36		102-ASN	O	1-BMT	C
40	3.51		102-ASN	O	1-BMT	CB
41	3.51		102-ASN	O	1-BMT	CD1
42	2.78	*	102-ASN	O	2-ABA	N
43	3.77		102-ASN	O	2-ABA	CA
44	3.62		102-ASN	O	2-ABA	CB
45	3.41		102-ASN	O	2-ABA	CG
46	3.45		102-ASN	OD1	1-BMT	CD1
47	3.89		111-GLN	CB	2-ABA	CG
48	3.93		111-GLN	CD	2-ABA	CB
49	3.62		111-GLN	CD	2-ABA	CG
50	3.80		111-GLN	OE1	2-ABA	CG
51	3.34		111-GLN	NE2	2-ABA	CB
52	3.49		111-GLN	NE2	2-ABA	CG
53	3.89		113-PHE	CB	11-MVA	CG1
54	3.79		113-PHE	CG	11-MVA	CG1
55	3.78		113-PHE	CG	11-MVA	CG2
56	3.86		113-PHE	CD1	11-MVA	CB
57	3.41		113-PHE	CD1	11-MVA	CG1
58	3.86		113-PHE	CD1	11-MVA	CG2
59	3.89		113-PHE	CD2	11-MVA	CG2
60	3.79		121-TRP	CD1	9-MLE	O
61	3.96		121-TRP	NE1	9-MLE	CB
62	3.15	*	121-TRP	NE1	9-MLE	O
63	3.53		121-TRP	CZ2	9-MLE	CD2
64	3.70		122-LEU	CD2	11-MVA	CN
65	3.65		126-HIS	CE1	11-MVA	CN
66	3.26		126-HIS	NE2	11-MVA	CN
67	3.28		148-ARG	NH2	8-DAL	O
68	3.49		148-ARG	NH2	9-MLE	CD1

<.......> Number of potential hydrogen bonds 3

AA-residue-###	Contacts
ARG----- 55	7
PHE----- 60	8

```
                GLN----- 63         9
                GLY----- 72         8
                ALA-----101         5
                ASN-----102        13
                GLN-----111         7
                PHE-----113         8
                TRP-----121         5
                LEU-----122         2
                HIS-----126         3
                ARG-----148         3

>>>> Inter-molecular distances  68 Below 4-A  68
>>> Hydrophobic   19 Hydrophilic    9 Mixed   40
>> Main-chain/Main-chain    9 Side-chain/Side-chain   24 Mixed   35

                  This is step * * *   5 * * *

          * * * The PDB coordinates /users/andrzej/musca/cypx/1M63.pdb
          Chain identifier (sequence) >>> |A|
          Number of residues in IDRES(*)   372
          Starting from the index IDRES   1
          Number of effective XYZ-coordinates  3013

          * * * The PDB coordinates /users/andrzej/musca/cypx/1M63.pdb
          Chain identifier (sequence) >>> |D|
          Number of residues in IDRES(*)    11
          Starting from the index IDRES   1
          Number of effective XYZ-coordinates    84

  Number of used coordinates 3013   84

   1   3.99      312-LEU   O       8-DAL   CA
   2   3.56      312-LEU   O       8-DAL   CB
   3   3.75      312-LEU   O       9-MLE   CN
   4   3.95      312-LEU   CD2     9-MLE   CD1
   5   3.86      341-TYR   CZ      7-ALA   N
   6   3.71      341-TYR   CZ      7-ALA   CB
   7   3.92      341-TYR   OH      6-MLE   CA
   8   3.36      341-TYR   OH      6-MLE   CB
   9   3.90      341-TYR   OH      6-MLE   C
  10   2.99      341-TYR   OH      7-ALA   N
  11   3.80      341-TYR   OH      7-ALA   CA
  12   3.61      341-TYR   OH      7-ALA   CB
  13   3.50      342-TRP   O       7-ALA   CB
  14   3.71      344-PRO   CG      5-VAL   O
  15   3.68      344-PRO   CG      6-MLE   O
  16   3.73      344-PRO   CD      5-VAL   O
  17   3.67      344-PRO   CD      6-MLE   C
  18   3.70      344-PRO   CD      6-MLE   O
  19   3.85      344-PRO   CD      7-ALA   N
  20   3.26      352-TRP   O       4-MLE   CD2
  21   3.37      352-TRP   CD1     5-VAL   O
  22   3.98      352-TRP   CD2     4-MLE   CD2
  23   3.76      352-TRP   NE1     4-MLE   CA
  24   3.80      352-TRP   NE1     4-MLE   CB
  25   3.66      352-TRP   NE1     4-MLE   C
  26   3.60      352-TRP   NE1     5-VAL   N
  27   3.76      352-TRP   NE1     5-VAL   C
  28   2.84 *    352-TRP   NE1     5-VAL   O
  29   3.92      352-TRP   CE2     4-MLE   CB
  30   3.87      352-TRP   CE2     4-MLE   CD2
  31   3.90      352-TRP   CZ2     4-MLE   CB
  32   3.99      352-TRP   CZ2     4-MLE   CD1
```

```
  33   3.59     352-TRP   CZ2     6-MLE   CD2
  34   3.95     353-SER   CA      4-MLE   CD2
  35   3.91     356-PHE   CB      4-MLE   CD2
  36   3.46     356-PHE   CD1     3-SAR   CA
  37   3.94     356-PHE   CD1     3-SAR   C
  38   3.97     356-PHE   CD2     4-MLE   CG
  39   3.78     356-PHE   CE1     2-ABA   O
  40   3.85     356-PHE   CE1     3-SAR   CA

   <.......> Number of potential hydrogen bonds    1

              AA-residue-###     Contacts
               LEU-----312         3
               TYR-----341         9
               TRP-----342         2
               PRO-----344         7
               TRP-----352        15
               SER-----353         2
               PHE-----356         7

>>>> Inter-molecular distances  40 Below 4-A  40
>>> Hydrophobic   15 Hydrophilic    3 Mixed   22
>> Main-chain/Main-chain    1 Side-chain/Side-chain   13 Mixed   26

                This is step * * *   7 * * *

> Minimal and maximal distance for atomic interactions  2.70  4.00

                    Sigma { VDW } factor     1.000


          * * * The PDB coordinates /users/andrzej/musca/cypx/1M63.pdb
          Chain identifier (sequence) >>> |B|
          Number of residues in IDRES(*)   158
          Starting from the index IDRES  12
          Number of effective XYZ-coordinates  1262

          * * * The PDB coordinates /users/andrzej/musca/cypx/1M63.pdb
          Chain identifier (sequence) >>> |D|
          Number of residues in IDRES(*)    11
          Starting from the index IDRES   1
          Number of effective XYZ-coordinates    84

  Number of used coordinates 1262   84

   1   3.91     118-MET   CB      4-MLE   CD1
   2   3.78     119-VAL   N       4-MLE   CD1
   3   3.91     119-VAL   CA      4-MLE   CD1
   4   3.88     119-VAL   CB      4-MLE   CD1
   5   3.40     122-ASN   O       6-MLE   CD1
   6   3.71     122-ASN   CB      1-BMT   CZ
   7   3.96     122-ASN   CB      1-BMT   CH
   8   4.00     122-ASN   CG      1-BMT   CH
   9   3.86     122-ASN   ND2     1-BMT   CE
  10   3.45     122-ASN   ND2     1-BMT   CZ
  11   3.10     122-ASN   ND2     1-BMT   CH
  12   3.90     123-LEU   CG      6-MLE   CD2
  13   3.79     123-LEU   CD1     6-MLE   CD2

   <.......> Number of potential hydrogen bonds    0

              AA-residue-###     Contacts
               MET-----118         1
```

```
                VAL-----119         3
                ASN-----122         8
                LEU-----123         3

>>>> Inter-molecular distances  13 Below 4-A  13
>>> Hydrophobic    6 Hydrophilic    0 Mixed    7
>> Main-chain/Main-chain    0 Side-chain/Side-chain    7 Mixed    6

                  This is step * * *   8 * * *

          * * * The PDB coordinates /users/andrzej/musca/cypx/1M63.pdb
          Chain identifier (sequence) >>> |A|
          Number of residues in IDRES(*)   372
          Starting from the index IDRES   1
          Number of effective XYZ-coordinates  3013

          * * * The PDB coordinates /users/andrzej/musca/cypx/1M63.pdb
          Chain identifier (sequence) >>> |C|
          Number of residues in IDRES(*)   165
          Starting from the index IDRES   1
          Number of effective XYZ-coordinates  1265

  Number of used coordinates 3013 1265

   1   3.82     159-TYR   O     148-ARG   CB
   2   3.93     159-TYR   CE1   148-ARG   CB
   3   3.91     159-TYR   CZ    147-SER   C
   4   3.66     159-TYR   CZ    148-ARG   N
   5   3.87     159-TYR   OH     58-PRO   CG
   6   3.64     159-TYR   OH     58-PRO   CD
   7   3.56     159-TYR   OH    147-SER   CA
   8   3.25     159-TYR   OH    147-SER   C
   9   3.62     159-TYR   OH    147-SER   O
  10   3.40     159-TYR   OH    148-ARG   N
  11   4.00     159-TYR   OH    148-ARG   CA
  12   3.99     160-PHE   CD1   148-ARG   CD
  13   3.85     314-VAL   CG1   121-TRP   CG
  14   3.55     314-VAL   CG1   121-TRP   CD2
  15   3.75     314-VAL   CG1   121-TRP   CE2
  16   3.85     314-VAL   CG1   121-TRP   CE3
  17   3.45     314-VAL   CG2   121-TRP   CB
  18   3.45     314-VAL   CG2   121-TRP   CG
  19   3.70     314-VAL   CG2   121-TRP   CD1
  20   3.88     315-TYR   CE1   121-TRP   CZ3
  21   3.82     315-TYR   CE1   121-TRP   CH2
  22   3.68     355-PRO   C      73-THR   CG2
  23   3.53     355-PRO   O      73-THR   CG2
  24   3.87     355-PRO   CB     73-THR   CG2
  25   3.97     356-PHE   N      73-THR   CG2
  26   3.73     359-GLU   CG     73-THR   O
  27   3.02     359-GLU   OE2    69-ARG   CG
  28   3.79     359-GLU   OE2    69-ARG   CD
  29   3.41     359-GLU   OE2    69-ARG   NE
  30   3.90     362-THR   CB     69-ARG   NH1
  31   3.31     362-THR   CG2    69-ARG   NH1

   <.......> Number of potential hydrogen bonds    0

              AA-residue-###     Contacts
               TYR-----159        10
               PHE-----160         2
               VAL-----314         8
               TYR-----315         3
```

```
                PRO-----355         4
                PHE-----356         2
                GLU-----359         5
                THR-----362         3

>>>> Inter-molecular distances  31 Below 4-A  31
>>> Hydrophobic   14 Hydrophilic    3 Mixed   14
>> Main-chain/Main-chain    0 Side-chain/Side-chain   19 Mixed   12

                  This is step * * *   9 * * *

          * * * The PDB coordinates /users/andrzej/musca/cypx/1M63.pdb
          Chain identifier (sequence) >>> |C|
          Number of residues in IDRES(*)   165
          Starting from the index IDRES   1
          Number of effective XYZ-coordinates  1265

          * * * The PDB coordinates /users/andrzej/musca/cypx/1M63.pdb
          Chain identifier (sequence) >>> |A|
          Number of residues in IDRES(*)   372
          Starting from the index IDRES   1
          Number of effective XYZ-coordinates  3013

  Number of used coordinates 1265 3013

   1   3.87      58-PRO   CG    159-TYR   OH
   2   3.64      58-PRO   CD    159-TYR   OH
   3   3.02      69-ARG   CG    359-GLU   OE2
   4   3.79      69-ARG   CD    359-GLU   OE2
   5   3.41      69-ARG   NE    359-GLU   OE2
   6   3.90      69-ARG   NH1   362-THR   CB
   7   3.31      69-ARG   NH1   362-THR   CG2
   8   3.73      73-THR   O     359-GLU   CG
   9   3.68      73-THR   CG2   355-PRO   C
  10   3.53      73-THR   CG2   355-PRO   O
  11   3.87      73-THR   CG2   355-PRO   CB
  12   3.97      73-THR   CG2   356-PHE   N
  13   3.45     121-TRP   CB    314-VAL   CG2
  14   3.85     121-TRP   CG    314-VAL   CG1
  15   3.45     121-TRP   CG    314-VAL   CG2
  16   3.70     121-TRP   CD1   314-VAL   CG2
  17   3.55     121-TRP   CD2   314-VAL   CG1
  18   3.75     121-TRP   CE2   314-VAL   CG1
  19   3.85     121-TRP   CE3   314-VAL   CG1
  20   3.88     121-TRP   CZ3   315-TYR   CE1
  21   3.82     121-TRP   CH2   315-TYR   CE1
  22   3.56     147-SER   CA    159-TYR   OH
  23   3.91     147-SER   C     159-TYR   CZ
  24   3.25     147-SER   C     159-TYR   OH
  25   3.62     147-SER   O     159-TYR   OH
  26   3.66     148-ARG   N     159-TYR   CZ
  27   3.40     148-ARG   N     159-TYR   OH
  28   4.00     148-ARG   CA    159-TYR   OH
  29   3.82     148-ARG   CB    159-TYR   O
  30   3.93     148-ARG   CB    159-TYR   CE1
  31   3.99     148-ARG   CD    160-PHE   CD1

   <.......> Number of potential hydrogen bonds    0

              AA-residue-###     Contacts
               PRO----- 58         1
               ARG----- 69         6
               THR----- 73         6
```

```
                TRP-----121        10
                SER-----147         5
                ARG-----148         7

>>>> Inter-molecular distances  31 Below 4-A  31
>>> Hydrophobic   14 Hydrophilic    3 Mixed   14
>> Main-chain/Main-chain    0 Side-chain/Side-chain   19 Mixed   12

             This is step * * *   10 * * *

          * * * The PDB coordinates file-name /users/andrzej/musca/cypx/1M63.pdb
          Chain identifier (sequence) >>> |C|
          Number of residues in IDRES(*)   165
          Starting from the index IDRES   1
          Number of effective XYZ-coordinates  1265

          * * * The PDB coordinates file-name /users/andrzej/musca/cypx/1M63.pdb
          Chain identifier (sequence) >>> |B|
          Number of residues in IDRES(*)   158
          Starting from the index IDRES  12
          Number of effective XYZ-coordinates  1262

  Number of used coordinates 1265 1262

   1   3.85       69-ARG   CZ    164-LYS   O
   2   3.51       69-ARG   NH1   164-LYS   O
   3   3.73       69-ARG   NH2   164-LYS   CA
   4   3.39       69-ARG   NH2   164-LYS   O
   5   3.44       69-ARG   NH2   164-LYS   CB
   6   3.66       69-ARG   NH2   164-LYS   CG
   7   3.96       71-ASN   CG    164-LYS   NZ
   8   3.56       71-ASN   ND2   164-LYS   CE
   9   2.79       71-ASN   ND2   164-LYS   NZ
  10   3.41      103-ALA   C     122-ASN   ND2
  11   3.06 *    103-ALA   O     122-ASN   ND2
  12   3.51      104-GLY   N     122-ASN   ND2
  13   3.88      104-GLY   CA    122-ASN   CG
  14   3.91      104-GLY   CA    122-ASN   OD1
  15   3.25      104-GLY   CA    122-ASN   ND2
  16   3.86      105-PRO   CD    122-ASN   OD1

   <.......> Number of potential hydrogen bonds    1

              AA-residue-###     Contacts
               ARG----- 69         5
               ASN----- 71         4
               ALA-----103         3
               GLY-----104         5
               PRO-----105         2

>>>> Inter-molecular distances  16 Below 4-A  16
>>> Hydrophobic    1 Hydrophilic    5 Mixed   10
>> Main-chain/Main-chain    0 Side-chain/Side-chain    6 Mixed   10

                This is step * * *   11 * * *

          * * * The PDB coordinates file-name /users/andrzej/musca/cypx/1CWA.pdb
          Chain identifier (sequence) >>> |C|
          Number of residues in IDRES(*)    11
          Starting from the index IDRES   1
          Number of effective XYZ-coordinates    84

          * * * The PDB coordinates file-name /users/andrzej/musca/cypx/1CWA.pdb
```

```
        Chain identifier (sequence) >>> |A|
        Number of residues in IDRES(*)   165
        Starting from the index IDRES   1
        Number of effective XYZ-coordinates  1265

Number of used coordinates   84 1265

 1   3.63       1-BMT   CN     55-ARG   NH1
 2   3.05       1-BMT   CA    102-ASN   O
 3   3.41       1-BMT   C     102-ASN   O
 4   3.15 *     1-BMT   O      63-GLN   NE2
 5   3.39       1-BMT   CB    102-ASN   O
 6   3.41       1-BMT   CD1   102-ASN   O
 7   3.95       1-BMT   CD1   102-ASN   ND2
 8   3.64       1-BMT   CH    103-ALA   O
 9   3.86       2-ABA   N     102-ASN   C
10   2.92 *     2-ABA   N     102-ASN   O
11   3.27       2-ABA   CA     72-GLY   O
12   3.16       2-ABA   C      72-GLY   O
13   3.82       2-ABA   O      72-GLY   O
14   3.94       2-ABA   O     103-ALA   CB
15   3.55       2-ABA   CB     72-GLY   O
16   3.94       2-ABA   CB    102-ASN   O
17   3.64       2-ABA   CB    111-GLN   NE2
18   3.80       2-ABA   CG    101-ALA   C
19   3.72       2-ABA   CG    101-ALA   CB
20   3.58       2-ABA   CG    102-ASN   N
21   3.78       2-ABA   CG    102-ASN   CA
22   3.86       2-ABA   CG    102-ASN   C
23   3.64       2-ABA   CG    102-ASN   O
24   3.87       2-ABA   CG    111-GLN   CB
25   3.72       2-ABA   CG    111-GLN   CD
26   3.81       2-ABA   CG    111-GLN   OE1
27   3.78       2-ABA   CG    111-GLN   NE2
28   3.98       3-SAR   N      72-GLY   C
29   3.16 *     3-SAR   N      72-GLY   O
30   3.99       3-SAR   CA     72-GLY   O
31   3.88       3-SAR   CN     72-GLY   C
32   3.32       3-SAR   CN     72-GLY   O
33   3.81       5-VAL   CG1    55-ARG   NE
34   3.77       5-VAL   CG1    55-ARG   NH2
35   3.93       9-MLE   CB     60-PHE   CE2
36   3.81       9-MLE   CB    121-TRP   NE1
37   3.70       9-MLE   CB    121-TRP   CZ2
38   3.50       9-MLE   CD1   121-TRP   CZ2
39   3.94       9-MLE   CD1   121-TRP   CH2
40   3.89       9-MLE   CD2    60-PHE   CD2
41   3.68       9-MLE   C      60-PHE   CE2
42   3.60       9-MLE   C      60-PHE   CZ
43   3.96       9-MLE   C     121-TRP   NE1
44   3.89       9-MLE   O      60-PHE   CE1
45   3.73       9-MLE   O      60-PHE   CE2
46   3.19       9-MLE   O      60-PHE   CZ
47   3.74       9-MLE   O     121-TRP   CD1
48   2.90 *     9-MLE   O     121-TRP   NE1
49   3.88       9-MLE   O     121-TRP   CE2
50   3.32      10-MLE   CN     55-ARG   NH2
51   3.92      10-MLE   C      55-ARG   NH1
52   3.25      10-MLE   O      55-ARG   CZ
53   2.77      10-MLE   O      55-ARG   NH1
54   2.85 *    10-MLE   O      55-ARG   NH2
55   3.70      10-MLE   O      60-PHE   CE2
56   3.63      11-MVA   CN    122-LEU   CD2
```

```
  57   3.40       11-MVA   CN    126-HIS   CE1
  58   3.23       11-MVA   CN    126-HIS   NE2
  59   3.80       11-MVA   CA     55-ARG   NH1
  60   3.85       11-MVA   CB    113-PHE   CD1
  61   3.96       11-MVA   CB    113-PHE   CE1
  62   3.93       11-MVA   CG1    63-GLN   CG
  63   3.54       11-MVA   CG1    63-GLN   CD
  64   3.50       11-MVA   CG1    63-GLN   OE1
  65   3.99       11-MVA   CG1    63-GLN   NE2
  66   3.74       11-MVA   CG1   101-ALA   CB
  67   3.88       11-MVA   CG1   113-PHE   CB
  68   3.74       11-MVA   CG1   113-PHE   CG
  69   3.49       11-MVA   CG1   113-PHE   CD1
  70   3.50       11-MVA   CG2    60-PHE   CZ
  71   3.89       11-MVA   CG2    61-MET   CG
  72   3.90       11-MVA   CG2   113-PHE   CG
  73   3.88       11-MVA   CG2   113-PHE   CD2
  74   3.95       11-MVA   CG2   113-PHE   CE2

   <.......> Number of potential hydrogen bonds    5

              AA-residue-###     Contacts

               BMT-----  1         7
               ABA-----  2        20
               SAR-----  3         6
               VAL-----  5         3
               MLE-----  9        16
               MLE----- 10         7
               MVA----- 11        20

>>>> Inter-molecular distances  74 Below 4-A  74

>>> Hydrophobic   26 Hydrophilic    7 Mixed   41

>> Main-chain/Main-chain   10 Side-chain/Side-chain   30 Mixed   34

                 This is step * * *   12 * * *

* * * The PDB coordinates file-name /users/andrzej/musca/cypx/1CWA.pdb
          Chain identifier (sequence) >>> |A|
          Number of residues in IDRES(*)   165
          Starting from the index IDRES   1
          Number of effective XYZ-coordinates  1265

          * * * The PDB coordinates file-name /users/andrzej/musca/cypx/1CWA.pdb
          Chain identifier (sequence) >>> |C|
          Number of residues in IDRES(*)    11
          Starting from the index IDRES   1
          Number of effective XYZ-coordinates    84

  Number of used coordinates 1265   84

   1   3.81       55-ARG   NE      5-VAL   CG1
   2   3.25       55-ARG   CZ     10-MLE   O
   3   3.63       55-ARG   NH1     1-BMT   CN
   4   3.92       55-ARG   NH1    10-MLE   C
   5   2.77       55-ARG   NH1    10-MLE   O
   6   3.80       55-ARG   NH1    11-MVA   CA
   7   3.77       55-ARG   NH2     5-VAL   CG1
   8   3.32       55-ARG   NH2    10-MLE   CN
   9   2.85 *     55-ARG   NH2    10-MLE   O
  10   3.89       60-PHE   CD2     9-MLE   CD2
```

11	3.89		60-PHE	CE1	9-MLE	O
12	3.93		60-PHE	CE2	9-MLE	CB
13	3.68		60-PHE	CE2	9-MLE	C
14	3.73		60-PHE	CE2	9-MLE	O
15	3.70		60-PHE	CE2	10-MLE	O
16	3.60		60-PHE	CZ	9-MLE	C
17	3.19		60-PHE	CZ	9-MLE	O
18	3.50		60-PHE	CZ	11-MVA	CG2
19	3.89		61-MET	CG	11-MVA	CG2
20	3.93		63-GLN	CG	11-MVA	CG1
21	3.54		63-GLN	CD	11-MVA	CG1
22	3.50		63-GLN	OE1	11-MVA	CG1
23	3.15	*	63-GLN	NE2	1-BMT	O
24	3.99		63-GLN	NE2	11-MVA	CG1
25	3.98		72-GLY	C	3-SAR	N
26	3.88		72-GLY	C	3-SAR	CN
27	3.27		72-GLY	O	2-ABA	CA
28	3.16		72-GLY	O	2-ABA	C
29	3.82		72-GLY	O	2-ABA	O
30	3.55		72-GLY	O	2-ABA	CB
31	3.16	*	72-GLY	O	3-SAR	N
32	3.99		72-GLY	O	3-SAR	CA
33	3.32		72-GLY	O	3-SAR	CN
34	3.80		101-ALA	C	2-ABA	CG
35	3.72		101-ALA	CB	2-ABA	CG
36	3.74		101-ALA	CB	11-MVA	CG1
37	3.58		102-ASN	N	2-ABA	CG
38	3.78		102-ASN	CA	2-ABA	CG
39	3.86		102-ASN	C	2-ABA	N
40	3.86		102-ASN	C	2-ABA	CG
41	3.05		102-ASN	O	1-BMT	CA
42	3.41		102-ASN	O	1-BMT	C
43	3.39		102-ASN	O	1-BMT	CB
44	3.41		102-ASN	O	1-BMT	CD1
45	2.92	*	102-ASN	O	2-ABA	N
46	3.94		102-ASN	O	2-ABA	CB
47	3.64		102-ASN	O	2-ABA	CG
48	3.95		102-ASN	ND2	1-BMT	CD1
49	3.64		103-ALA	O	1-BMT	CH
50	3.94		103-ALA	CB	2-ABA	O
51	3.87		111-GLN	CB	2-ABA	CG
52	3.72		111-GLN	CD	2-ABA	CG
53	3.81		111-GLN	OE1	2-ABA	CG
54	3.64		111-GLN	NE2	2-ABA	CB
55	3.78		111-GLN	NE2	2-ABA	CG
56	3.88		113-PHE	CB	11-MVA	CG1
57	3.74		113-PHE	CG	11-MVA	CG1
58	3.90		113-PHE	CG	11-MVA	CG2
59	3.85		113-PHE	CD1	11-MVA	CB
60	3.49		113-PHE	CD1	11-MVA	CG1
61	3.88		113-PHE	CD2	11-MVA	CG2
62	3.96		113-PHE	CE1	11-MVA	CB
63	3.95		113-PHE	CE2	11-MVA	CG2
64	3.74		121-TRP	CD1	9-MLE	O
65	3.81		121-TRP	NE1	9-MLE	CB
66	3.96		121-TRP	NE1	9-MLE	C
67	2.90	*	121-TRP	NE1	9-MLE	O
68	3.88		121-TRP	CE2	9-MLE	O
69	3.70		121-TRP	CZ2	9-MLE	CB
70	3.50		121-TRP	CZ2	9-MLE	CD1
71	3.94		121-TRP	CH2	9-MLE	CD1
72	3.63		122-LEU	CD2	11-MVA	CN
73	3.40		126-HIS	CE1	11-MVA	CN

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  74   3.23     126-HIS   NE2    11-MVA   CN

   <.......> Number of potential hydrogen bonds    5

               AA-residue-###     Contacts

                ARG----- 55         8
                PHE----- 60        10
                MET----- 61         2
                GLN----- 63         6
                GLY----- 72        10
                ALA-----101         4
                ASN-----102        13
                ALA-----103         3
                GLN-----111         6
                PHE-----113         9
                TRP-----121         9
                LEU-----122         2
                HIS-----126         3

>>>> Inter-molecular distances  74 Below 4-A  74

>>> Hydrophobic   26 Hydrophilic    7 Mixed   41

>> Main-chain/Main-chain   10 Side-chain/Side-chain   30 Mixed   34

                  This is step * * *   13 * * *

          * * * The PDB coordinates file-name /users/andrzej/musca/cypx/1ZKF.pdb
          Chain identifier (sequence) >>> |A|
          Number of residues in IDRES(*)   165
          Starting from the index IDRES   1
          Number of effective XYZ-coordinates  1265

          * * * The PDB coordinates file-name /users/andrzej/musca/cypx/1ZKF.pdb
          Chain identifier (sequence) >>> |C|
          Number of residues in IDRES(*)     6
          Starting from the index IDRES   1
          Number of effective XYZ-coordinates    43

  Number of used coordinates 1265   43

   1   3.40       55-ARG   CZ      4-PRO   O
   2   3.92       55-ARG   NH1     2-ALA   O
   3   3.62       55-ARG   NH1     3-GLY   C
   4   3.77       55-ARG   NH1     3-GLY   O
   5   3.70       55-ARG   NH1     4-PRO   N
   6   3.94       55-ARG   NH1     4-PRO   C
   7   2.95       55-ARG   NH1     4-PRO   O
   8   3.85       55-ARG   NH1     4-PRO   CD
   9   2.98 *     55-ARG   NH2     4-PRO   O
  10   3.69       57-ILE   CG2     6-NIT   ON1
  11   3.97       57-ILE   CD1     6-NIT   C5
  12   3.81       60-PHE   CD2     6-NIT   C4
  13   3.70       60-PHE   CD2     6-NIT   C5
  14   3.65       60-PHE   CE2     6-NIT   C1
  15   3.86       60-PHE   CE2     6-NIT   C2
  16   3.89       60-PHE   CE2     6-NIT   C5
  17   3.75       60-PHE   CZ      4-PRO   CG
  18   3.88       60-PHE   CZ      5-PHE   O
  19   3.99       63-GLN   CD      2-ALA   O
  20   3.45       63-GLN   CD      3-GLY   O
  21   3.77       63-GLN   OE1     2-ALA   O
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  22    3.91       63-GLN    OE1      3-GLY    C
  23    3.16       63-GLN    OE1      3-GLY    O
  24    3.83       63-GLN    OE1      4-PRO    CD
  25    3.35       63-GLN    NE2      2-ALA    O
  26    3.34       63-GLN    NE2      3-GLY    O
  27    3.56       72-GLY    O        1-SIN    C3
  28    3.82       72-GLY    O        1-SIN    C4
  29    3.11 *     72-GLY    O        2-ALA    N
  30    3.93       72-GLY    O        2-ALA    CB
  31    3.78       73-THR    CG2      1-SIN    C1
  32    3.80       73-THR    CG2      1-SIN    O1
  33    3.77       73-THR    CG2      1-SIN    O2
  34    3.47      101-ALA    CB       3-GLY    O
  35    3.89      102-ASN    N        2-ALA    CB
  36    3.97      102-ASN    C        2-ALA    CA
  37    3.82      102-ASN    C        2-ALA    CB
  38    3.76      102-ASN    C        3-GLY    N
  39    3.52      102-ASN    O        2-ALA    CA
  40    3.52      102-ASN    O        2-ALA    C
  41    3.71      102-ASN    O        2-ALA    CB
  42    2.69 *    102-ASN    O        3-GLY    N
  43    3.57      102-ASN    O        3-GLY    CA
  44    3.86      111-GLN    OE1      2-ALA    CB
  45    3.66      113-PHE    CD1      4-PRO    CD
  46    3.77      113-PHE    CE1      4-PRO    CD
  47    3.99      113-PHE    CZ       4-PRO    CG
  48    3.33      121-TRP    NE1      5-PHE    O
  49    3.84      121-TRP    CZ2      6-NIT    C2
  50    3.67      121-TRP    CZ2      6-NIT    C3
  51    3.76      122-LEU    CD1      4-PRO    CB
  52    3.50      122-LEU    CD2      4-PRO    CB
  53    3.84      126-HIS    CE1      4-PRO    N
  54    3.73      126-HIS    CE1      4-PRO    CA
  55    3.97      126-HIS    CE1      4-PRO    CB
  56    3.58      126-HIS    NE2      4-PRO    CA
  57    3.62      126-HIS    NE2      4-PRO    CB

   <.......> Number of potential hydrogen bonds    3

              AA-residue-###     Contacts

               ARG----- 55         8
               ILE----- 57         3
               PHE----- 60         8
               GLN----- 63         9
               GLY----- 72         5
               THR----- 73         4
               ALA-----101         2
               ASN-----102        10
               GLN-----111         2
               PHE-----113         4
               TRP-----121         4
               LEU-----122         3
               HIS-----126         6

>>>> Inter-molecular distances  57 Below 4-A  57

>>> Hydrophobic   10 Hydrophilic   12 Mixed   35

                  This is step * * *   14 * * *

          * * * The PDB coordinates file-name /users/andrzej/musca/cypx/1YND.pdb
          Chain identifier (sequence) >>> |A|
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        Number of residues in IDRES(*)   164
        Starting from the index IDRES   2
        Number of effective XYZ-coordinates  1257

        * * * The PDB coordinates file-name /users/andrzej/musca/cypx/1YND.pdb
        Chain identifier (sequence) >>> | |
        Number of residues in IDRES(*)     2
        Starting from the index IDRES 401
        Number of effective XYZ-coordinates   155

Number of used coordinates 1257  155

 1   3.20      55-ARG   CD    401-SFA   O66
 2   4.00      55-ARG   CZ    401-SFA   C19
 3   3.91      55-ARG   NH1   401-SFA   C17
 4   3.68      55-ARG   NH1   401-SFA   O72
 5   3.21      55-ARG   NH2   401-SFA   O69
 6   3.71      55-ARG   NH2   401-SFA   N65
 7   3.71      55-ARG   NH2   401-SFA   O66
 8   3.75      57-ILE   CG2   401-SFA   C45
 9   3.51      59-GLY   O     401-SFA   C35
10   3.56      59-GLY   O     401-SFA   C34
11   3.74      59-GLY   O     401-SFA   C47
12   3.98      60-PHE   CD1   401-SFA   C45
13   3.93      60-PHE   CD2   401-SFA   C32
14   3.94      60-PHE   CE1   401-SFA   C26
15   3.60      60-PHE   CE1   401-SFA   C25
16   3.61      60-PHE   CE1   401-SFA   C24
17   3.98      60-PHE   CE1   401-SFA   O65
18   3.97      60-PHE   CE1   401-SFA   C3
19   3.94      60-PHE   CE2   401-SFA   C48
20   3.85      60-PHE   CZ    401-SFA   C3
21   3.57      61-MET   CE    401-SFA   O66
22   3.98      63-GLN   CD    401-SFA   N6
23   3.97      63-GLN   CD    401-SFA   N65
24   3.39      63-GLN   OE1   401-SFA   N6
25   3.06      63-GLN   OE1   401-SFA   N65
26   3.65      63-GLN   OE1   401-SFA   C5
27   3.87      63-GLN   OE1   401-SFA   O66
28   3.88      63-GLN   NE2   401-SFA   C10
29   3.03      63-GLN   NE2   401-SFA   O69
30   3.98      72-GLY   O     401-SFA   C55
31   3.74      73-THR   O     401-SFA   C54
32   3.92      73-THR   CB    401-SFA   C53
33   3.44      73-THR   CB    401-SFA   O71
34   3.41      73-THR   CG2   401-SFA   O71
35   3.30     101-ALA   CA    401-SFA   O67
36   3.62     101-ALA   C     401-SFA   O67
37   3.86     101-ALA   CB    401-SFA   C57
38   3.93     101-ALA   CB    401-SFA   C7
39   3.35     101-ALA   CB    401-SFA   O67
40   3.98     101-ALA   CB    401-SFA   C5
41   3.90     102-ASN   N     401-SFA   C57
42   2.99     102-ASN   N     401-SFA   O67
43   3.88     102-ASN   C     401-SFA   N9
44   3.65     102-ASN   O     401-SFA   C11
45   3.68     102-ASN   O     401-SFA   C10
46   2.80     102-ASN   O     401-SFA   N9
47   3.59     102-ASN   O     401-SFA   C8
48   3.50     102-ASN   O     401-SFA   C58
49   3.87     102-ASN   O     401-SFA   C7
50   3.26     102-ASN   O     401-SFA   O67
51   3.74     103-ALA   CA    401-SFA   O70
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52	3.49	103-ALA	C	402-SFA	O73
53	3.79	103-ALA	O	402-SFA	O73
54	3.83	103-ALA	O	402-SFA	C15
55	3.98	103-ALA	O	402-SFA	C51
56	3.27	103-ALA	CB	401-SFA	O70
57	3.40	104-GLY	N	402-SFA	O73
58	3.73	104-GLY	CA	402-SFA	O73
59	3.89	111-GLN	CB	401-SFA	C57
60	3.79	111-GLN	CD	401-SFA	C55
61	3.57	111-GLN	CD	401-SFA	C57
62	3.71	111-GLN	OE1	401-SFA	C55
63	3.55	111-GLN	OE1	401-SFA	C57
64	3.64	111-GLN	NE2	401-SFA	C55
65	3.72	111-GLN	NE2	401-SFA	C56
66	3.84	111-GLN	NE2	401-SFA	C57
67	3.54	113-PHE	CD1	401-SFA	C5
68	3.96	113-PHE	CD1	401-SFA	C4
69	3.69	113-PHE	CE1	401-SFA	C5
70	3.83	113-PHE	CE1	401-SFA	C4
71	3.99	118-LYS	O	401-SFA	C47
72	3.75	119-THR	CB	401-SFA	C48
73	3.87	121-TRP	CB	401-SFA	C29
74	3.89	121-TRP	CZ2	402-SFA	C49
75	3.72	121-TRP	CZ3	401-SFA	O68
76	3.90	121-TRP	CZ3	402-SFA	C22
77	3.97	121-TRP	CH2	402-SFA	C49
78	3.51	121-TRP	CH2	402-SFA	C22
79	3.32	122-LEU	CD2	401-SFA	O68
80	3.92	126-HIS	ND1	401-SFA	O67
81	3.59	126-HIS	CD2	401-SFA	O68
82	3.65	126-HIS	CE1	401-SFA	C60
83	3.72	126-HIS	CE1	401-SFA	O68
84	4.00	126-HIS	CE1	401-SFA	C7
85	3.17	126-HIS	CE1	401-SFA	O67
86	3.45	126-HIS	NE2	401-SFA	C60
87	3.49	126-HIS	NE2	401-SFA	C61
88	2.71	126-HIS	NE2	401-SFA	O68

<.......> Number of potential hydrogen bonds 0

AA-residue-###	Contacts
ARG----- 55	6
ILE----- 57	2
GLY----- 59	4
PHE----- 60	10
MET----- 61	2
GLN----- 63	9
GLY----- 72	2
THR----- 73	5
ALA-----101	7
ASN-----102	11
ALA-----103	7
GLY-----104	3
GLN-----111	9
PHE-----113	5
LYS-----118	2
THR-----119	2
TRP-----121	7
LEU-----122	2
HIS-----126	10

>>>> Inter-molecular distances 88 Below 4-A 88

```
>>> Hydrophobic    0 Hydrophilic    0 Mixed   88

>> Main-chain/Main-chain    0 Side-chain/Side-chain    0 Mixed   88

                  This is step * * *   15 * * *

          * * * The PDB coordinates file-name /users/andrzej/musca/cypx/1YND.pdb
          Chain identifier (sequence) >>> | |
          Number of residues in IDRES(*)     2
          Starting from the index IDRES 401
          Number of effective XYZ-coordinates   155

          * * * The PDB coordinates file-name /users/andrzej/musca/cypx/1YND.pdb
          Chain identifier (sequence) >>> |B|
          Number of residues in IDRES(*)   164
          Starting from the index IDRES   2
          Number of effective XYZ-coordinates  1257

  Number of used coordinates  155 1257

   1   3.88     401-SFA   C43   121-TRP   CG
   2   3.45     401-SFA   C43   121-TRP   CD2
   3   3.95     401-SFA   C43   121-TRP   CE2
   4   3.40     401-SFA   C43   121-TRP   CE3
   5   3.87     401-SFA   C43   121-TRP   CZ3
   6   3.86     401-SFA   C44   121-TRP   CE3
   7   3.84     401-SFA   C38   121-TRP   CZ2
   8   3.73     401-SFA   C45   121-TRP   CZ2
   9   3.81     401-SFA   C20   125-LYS   CE
  10   3.99     401-SFA   C19   125-LYS   CE
  11   3.77     401-SFA   C19   125-LYS   NZ
  12   3.81     401-SFA   C18   125-LYS   NZ
  13   3.84     401-SFA   O73   103-ALA   CA
  14   3.36     401-SFA   O73   103-ALA   C
  15   3.80     401-SFA   O73   103-ALA   O
  16   3.19     401-SFA   O73   104-GLY   N
  17   3.60     401-SFA   O73   104-GLY   CA
  18   3.85     401-SFA   O73   125-LYS   NZ
  19   3.75     401-SFA   C15   103-ALA   O
  20   3.82     401-SFA   C51   103-ALA   O
  21   3.75     402-SFA   C45    57-ILE   CG2
  22   3.90     402-SFA   C45    60-PHE   CD1
  23   3.60     402-SFA   C35    59-GLY   O
  24   3.55     402-SFA   C34    59-GLY   O
  25   3.53     402-SFA   C47    59-GLY   O
  26   3.81     402-SFA   C32    60-PHE   CD2
  27   3.89     402-SFA   C32    60-PHE   CE2
  28   3.95     402-SFA   C30    60-PHE   CE2
  29   3.91     402-SFA   C30    60-PHE   CZ
  30   3.84     402-SFA   C48    60-PHE   CE2
  31   3.77     402-SFA   C48   119-THR   CB
  32   3.94     402-SFA   C26    60-PHE   CE1
  33   3.65     402-SFA   C25    60-PHE   CE1
  34   3.66     402-SFA   C24    60-PHE   CE1
  35   3.98     402-SFA   C19    55-ARG   NH1
  36   3.95     402-SFA   C17    55-ARG   NH1
  37   3.67     402-SFA   O72    55-ARG   NH1
  38   3.75     402-SFA   C54    73-THR   O
  39   3.64     402-SFA   O71    73-THR   CB
  40   3.75     402-SFA   O71    73-THR   CG2
  41   3.84     402-SFA   O70   103-ALA   CA
  42   3.40     402-SFA   O70   103-ALA   CB
```

43	3.72	402-SFA	C11	102-ASN	O
44	3.86	402-SFA	C55	72-GLY	O
45	3.83	402-SFA	C55	111-GLN	CD
46	3.73	402-SFA	C55	111-GLN	OE1
47	3.61	402-SFA	C55	111-GLN	NE2
48	3.88	402-SFA	C56	72-GLY	O
49	3.66	402-SFA	C56	111-GLN	NE2
50	3.84	402-SFA	C57	101-ALA	CB
51	3.88	402-SFA	C57	102-ASN	N
52	3.94	402-SFA	C57	111-GLN	CB
53	3.57	402-SFA	C57	111-GLN	CD
54	3.53	402-SFA	C57	111-GLN	OE1
55	3.77	402-SFA	C57	111-GLN	NE2
56	3.86	402-SFA	C10	63-GLN	NE2
57	3.74	402-SFA	C10	102-ASN	O
58	3.19	402-SFA	O69	55-ARG	NH2
59	3.03	402-SFA	O69	63-GLN	NE2
60	3.90	402-SFA	N9	102-ASN	C
61	2.85	402-SFA	N9	102-ASN	O
62	3.65	402-SFA	C8	102-ASN	O
63	3.57	402-SFA	C58	102-ASN	O
64	3.91	402-SFA	C60	125-LYS	CE
65	3.68	402-SFA	C60	126-HIS	CE1
66	3.48	402-SFA	C60	126-HIS	NE2
67	3.83	402-SFA	C61	125-LYS	CE
68	3.55	402-SFA	C61	126-HIS	NE2
69	3.46	402-SFA	O68	122-LEU	CD2
70	3.61	402-SFA	O68	125-LYS	CD
71	3.37	402-SFA	O68	125-LYS	CE
72	3.62	402-SFA	O68	126-HIS	CD2
73	3.72	402-SFA	O68	126-HIS	CE1
74	2.73	402-SFA	O68	126-HIS	NE2
75	3.92	402-SFA	C7	101-ALA	CB
76	3.97	402-SFA	C7	102-ASN	O
77	3.26	402-SFA	O67	101-ALA	CA
78	3.58	402-SFA	O67	101-ALA	C
79	3.31	402-SFA	O67	101-ALA	CB
80	2.96	402-SFA	O67	102-ASN	N
81	3.36	402-SFA	O67	102-ASN	O
82	3.98	402-SFA	O67	126-HIS	ND1
83	3.24	402-SFA	O67	126-HIS	CE1
84	3.99	402-SFA	N6	63-GLN	CD
85	3.44	402-SFA	N6	63-GLN	OE1
86	3.69	402-SFA	N65	55-ARG	NH2
87	3.99	402-SFA	N65	63-GLN	CD
88	3.10	402-SFA	N65	63-GLN	OE1
89	3.72	402-SFA	C5	63-GLN	OE1
90	3.98	402-SFA	C5	101-ALA	CB
91	3.52	402-SFA	C5	113-PHE	CD1
92	3.69	402-SFA	C5	113-PHE	CE1
93	3.86	402-SFA	C4	113-PHE	CD1
94	3.74	402-SFA	C4	113-PHE	CE1
95	3.96	402-SFA	C4	113-PHE	CZ

<.......> Number of potential hydrogen bonds 0

AA-residue-###	Contacts
SFA-----401	19
SFA-----402	76

>>>> Inter-molecular distances 95 Below 4-A 95

```
>>> Hydrophobic    0 Hydrophilic    0 Mixed   95

>> Main-chain/Main-chain    0 Side-chain/Side-chain    0 Mixed   95

                This is step * * *   16 * * *

          * * * The PDB coordinates file-name /users/andrzej/musca/cypx/1C5F.pdb
          Chain identifier (sequence) >>> |B|
          Number of residues in IDRES(*)    11
          Starting from the index IDRES   1
          Number of effective XYZ-coordinates    84

          * * * The PDB coordinates file-name /users/andrzej/musca/cypx/1C5F.pdb
          Chain identifier (sequence) >>> |A|
          Number of residues in IDRES(*)   177
          Starting from the index IDRES   1
          Number of effective XYZ-coordinates  1364

  Number of used coordinates   84 1364

    1   3.95        1-BMT   CN      66-ARG   CZ
    2   3.70        1-BMT   CN      66-ARG   NH1
    3   2.88        1-BMT   CA     113-ASN   O
    4   3.30        1-BMT   C      113-ASN   O
    5   3.24        1-BMT   O       74-GLN   NE2
    6   3.29        1-BMT   CB     113-ASN   O
    7   3.74        1-BMT   CG2    113-ASN   O
    8   3.86        1-BMT   CD1    113-ASN   C
    9   2.98        1-BMT   CD1    113-ASN   O
   10   3.91        1-BMT   CD1    113-ASN   OD1
   11   3.99        1-BMT   CD1    137-HIS   CE1
   12   3.74        2-ABA   N      113-ASN   C
   13   2.90 *      2-ABA   N      113-ASN   O
   14   3.09        2-ABA   CA      83-GLY   O
   15   3.08        2-ABA   C       83-GLY   O
   16   3.74        2-ABA   O       83-GLY   O
   17   3.74        2-ABA   O      114-LYS   CB
   18   3.58        2-ABA   O      114-LYS   CD
   19   3.48        2-ABA   CB      83-GLY   O
   20   3.96        2-ABA   CB     122-GLN   CD
   21   3.40        2-ABA   CB     122-GLN   NE2
   22   3.74        2-ABA   CG     112-ALA   C
   23   3.91        2-ABA   CG     112-ALA   O
   24   3.92        2-ABA   CG     112-ALA   CB
   25   3.61        2-ABA   CG     113-ASN   N
   26   3.65        2-ABA   CG     113-ASN   CA
   27   3.75        2-ABA   CG     113-ASN   C
   28   3.61        2-ABA   CG     113-ASN   O
   29   3.79        2-ABA   CG     122-GLN   CD
   30   3.97        2-ABA   CG     122-GLN   OE1
   31   3.71        2-ABA   CG     122-GLN   NE2
   32   3.13 *      3-SAR   N       83-GLY   O
   33   4.00        3-SAR   CA      83-GLY   O
   34   3.26        3-SAR   CN      83-GLY   O
   35   3.90        5-VAL   CG1     66-ARG   NE
   36   3.67        9-MLE   CA      71-PHE   CE2
   37   3.96        9-MLE   CB      71-PHE   CD2
   38   3.74        9-MLE   CB      71-PHE   CE2
   39   3.89        9-MLE   CB      71-PHE   CZ
   40   3.79        9-MLE   CB     132-HIS   NE2
   41   3.90        9-MLE   CD2     68-ILE   CG2
   42   3.96        9-MLE   CD2     71-PHE   CG
   43   3.79        9-MLE   CD2     71-PHE   CD2
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  44   3.49        9-MLE   C       71-PHE   CE2
  45   3.61        9-MLE   C       71-PHE   CZ
  46   3.86        9-MLE   C      132-HIS   NE2
  47   3.62        9-MLE   O       71-PHE   CE2
  48   3.26        9-MLE   O       71-PHE   CZ
  49   3.58        9-MLE   O      132-HIS   CD2
  50   3.75        9-MLE   O      132-HIS   CE1
  51   2.73 *      9-MLE   O      132-HIS   NE2
  52   3.94       10-MLE   N       71-PHE   CE2
  53   3.41       10-MLE   CN      66-ARG   NH2
  54   3.96       10-MLE   C       66-ARG   NH1
  55   3.85       10-MLE   C       66-ARG   NH2
  56   3.15       10-MLE   O       66-ARG   CZ
  57   2.87       10-MLE   O       66-ARG   NH1
  58   2.66 *     10-MLE   O       66-ARG   NH2
  59   3.82       11-MVA   CN     133-LEU   CD2
  60   3.86       11-MVA   CN     137-HIS   CE1
  61   3.27       11-MVA   CN     137-HIS   NE2
  62   3.77       11-MVA   CA      66-ARG   NH1
  63   3.96       11-MVA   CB     124-PHE   CD1
  64   3.36       11-MVA   CG1     74-GLN   CD
  65   3.46       11-MVA   CG1     74-GLN   OE1
  66   3.36       11-MVA   CG1     74-GLN   NE2
  67   3.54       11-MVA   CG1    112-ALA   CB
  68   3.84       11-MVA   CG1    124-PHE   CB
  69   3.78       11-MVA   CG1    124-PHE   CG
  70   3.60       11-MVA   CG1    124-PHE   CD1
  71   3.80       11-MVA   CG2     71-PHE   CZ
  72   3.77       11-MVA   CG2     72-MET   CG
  73   3.76       11-MVA   CG2     72-MET   SD
  74   3.89       11-MVA   CG2    124-PHE   CG
  75   3.83       11-MVA   CG2    124-PHE   CD2

   <.......> Number of potential hydrogen bonds    4

              AA-residue-###     Contacts

               BMT-----  1        10
               ABA-----  2        21
               SAR-----  3         4
               VAL-----  5         2
               MLE-----  9        17
               MLE----- 10         8
               MVA----- 11        18

>>>> Inter-molecular distances  75 Below 4-A  75

>>> Hydrophobic   28 Hydrophilic    7 Mixed   40

>> Main-chain/Main-chain    9 Side-chain/Side-chain   29 Mixed   37

                This is step * * *   17 * * *

          * * * The PDB coordinates file-name /users/andrzej/musca/cypx/2Z6W.pdb
          Chain identifier (sequence) >>> |M|
          Number of residues in IDRES(*)    11
          Starting from the index IDRES   1
          Number of effective XYZ-coordinates    84

          * * * The PDB coordinates file-name /users/andrzej/musca/cypx/2Z6W.pdb
          Chain identifier (sequence) >>> |A|
          Number of residues in IDRES(*)   164
          Starting from the index IDRES   2
```

Number of effective XYZ-coordinates 1239

Number of used coordinates 84 1239

1	3.59		1-BMT	CN	55-ARG	NH1
2	2.95		1-BMT	CA	102-ASN	O
3	3.36		1-BMT	C	102-ASN	O
4	3.12	*	1-BMT	O	63-GLN	NE2
5	3.30		1-BMT	CB	102-ASN	O
6	3.91		1-BMT	CG2	102-ASN	O
7	3.31		1-BMT	CD1	102-ASN	O
8	3.64		1-BMT	CD1	102-ASN	OD1
9	3.85		1-BMT	CH	103-ALA	C
10	3.66		1-BMT	CH	103-ALA	O
11	3.92		2-ABA	N	102-ASN	C
12	2.93	*	2-ABA	N	102-ASN	O
13	3.13		2-ABA	CA	72-GLY	O
14	3.90		2-ABA	CA	102-ASN	O
15	3.00		2-ABA	C	72-GLY	O
16	3.62		2-ABA	O	72-GLY	O
17	3.82		2-ABA	O	103-ALA	CB
18	3.69		2-ABA	CB	72-GLY	O
19	3.71		2-ABA	CB	102-ASN	O
20	3.57		2-ABA	CB	111-GLN	NE2
21	3.93		2-ABA	CG	101-ALA	C
22	3.59		2-ABA	CG	101-ALA	CB
23	3.68		2-ABA	CG	102-ASN	N
24	3.92		2-ABA	CG	102-ASN	CA
25	3.90		2-ABA	CG	102-ASN	C
26	3.59		2-ABA	CG	102-ASN	O
27	3.89		2-ABA	CG	111-GLN	CB
28	3.62		2-ABA	CG	111-GLN	CD
29	3.74		2-ABA	CG	111-GLN	OE1
30	3.56		2-ABA	CG	111-GLN	NE2
31	3.07	*	3-SAR	N	72-GLY	O
32	3.82		3-SAR	CA	72-GLY	O
33	3.98		3-SAR	CN	72-GLY	C
34	3.21		3-SAR	CN	72-GLY	O
35	3.84		5-VAL	CG1	55-ARG	NE
36	3.78		5-VAL	CG1	55-ARG	NH2
37	3.76		9-MLE	CA	60-PHE	CE2
38	3.91		9-MLE	CA	60-PHE	CZ
39	3.85		9-MLE	CB	60-PHE	CE2
40	3.83		9-MLE	CB	60-PHE	CZ
41	3.99		9-MLE	CB	121-TRP	NE1
42	3.84		9-MLE	CB	121-TRP	CZ2
43	3.92		9-MLE	CD1	121-TRP	CZ2
44	3.83		9-MLE	CD2	60-PHE	CD2
45	3.53		9-MLE	C	60-PHE	CE2
46	3.30		9-MLE	C	60-PHE	CZ
47	3.70		9-MLE	O	60-PHE	CE1
48	3.83		9-MLE	O	60-PHE	CE2
49	3.13		9-MLE	O	60-PHE	CZ
50	3.78		9-MLE	O	121-TRP	CD1
51	2.87	*	9-MLE	O	121-TRP	NE1
52	3.87		9-MLE	O	121-TRP	CE2
53	3.81		10-MLE	N	60-PHE	CE2
54	3.75		10-MLE	N	60-PHE	CZ
55	3.59		10-MLE	CN	55-ARG	NH2
56	3.88		10-MLE	C	60-PHE	CZ
57	3.39		10-MLE	O	55-ARG	CZ
58	2.93		10-MLE	O	55-ARG	NH1
59	2.95	*	10-MLE	O	55-ARG	NH2

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  60   3.49      10-MLE   O      60-PHE   CE2
  61   3.67      10-MLE   O      60-PHE   CZ
  62   3.83      11-MVA   CN    122-LEU   CD2
  63   3.46      11-MVA   CN    126-HIS   CE1
  64   3.27      11-MVA   CN    126-HIS   NE2
  65   3.83      11-MVA   CA     55-ARG   NH1
  66   3.80      11-MVA   CB    113-PHE   CD1
  67   3.90      11-MVA   CB    113-PHE   CE1
  68   3.91      11-MVA   CG1    63-GLN   CG
  69   3.45      11-MVA   CG1    63-GLN   CD
  70   3.37      11-MVA   CG1    63-GLN   OE1
  71   3.82      11-MVA   CG1    63-GLN   NE2
  72   3.78      11-MVA   CG1   101-ALA   CB
  73   3.88      11-MVA   CG1   113-PHE   CG
  74   3.55      11-MVA   CG1   113-PHE   CD1
  75   3.67      11-MVA   CG2    60-PHE   CZ
  76   3.87      11-MVA   CG2    61-MET   CG
  77   3.87      11-MVA   CG2   113-PHE   CG
  78   3.86      11-MVA   CG2   113-PHE   CD1
  79   3.90      11-MVA   CG2   113-PHE   CD2
  80   3.90      11-MVA   CG2   113-PHE   CE1
  81   3.92      11-MVA   CG2   113-PHE   CE2
  82   3.91      11-MVA   CG2   113-PHE   CZ

   <.......> Number of potential hydrogen bonds    5

              AA-residue-###     Contacts

               BMT-----  1         9
               ABA-----  2        21
               SAR-----  3         5
               VAL-----  5         3
               MLE-----  9        17
               MLE----- 10        10
               MVA----- 11        22

>>>> Inter-molecular distances  82 Below 4-A  82

>>> Hydrophobic   31 Hydrophilic    7 Mixed   44

>> Main-chain/Main-chain   10 Side-chain/Side-chain   32 Mixed   40

                  This is step * * *   18 * * *

          * * * The PDB coordinates file-name /users/andrzej/musca/cypx/1M9C.pdb
          Chain identifier (sequence) >>> |A|
          Number of residues in IDRES(*)   165
          Starting from the index IDRES   1
          Number of effective XYZ-coordinates  1265

          * * * The PDB coordinates file-name /users/andrzej/musca/cypx/1M9C.pdb
          Chain identifier (sequence) >>> |D|
          Number of residues in IDRES(*)   136
          Starting from the index IDRES  11
          Number of effective XYZ-coordinates  1058

  Number of used coordinates 1265 1058

   1   3.21      55-ARG   CZ     90-PRO   O
   2   3.97      55-ARG   NH1    89-GLY   CA
   3   3.93      55-ARG   NH1    89-GLY   C
   4   3.73      55-ARG   NH1    90-PRO   N
   5   3.81      55-ARG   NH1    90-PRO   C
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6	2.69		55-ARG	NH1	90-PRO	O
7	3.50		55-ARG	NH1	90-PRO	CD
8	2.89	*	55-ARG	NH2	90-PRO	O
9	3.69		55-ARG	NH2	95-GLN	CD
10	2.94	*	55-ARG	NH2	95-GLN	OE1
11	3.88		55-ARG	NH2	95-GLN	NE2
12	3.82		60-PHE	CD2	92-ALA	CA
13	3.28		60-PHE	CD2	92-ALA	CB
14	3.90		60-PHE	CE2	90-PRO	O
15	3.79		60-PHE	CE2	91-ILE	C
16	3.80		60-PHE	CE2	91-ILE	O
17	3.61		60-PHE	CE2	92-ALA	N
18	3.35		60-PHE	CE2	92-ALA	CA
19	3.30		60-PHE	CE2	92-ALA	CB
20	3.93		60-PHE	CZ	90-PRO	CB
21	3.87		60-PHE	CZ	90-PRO	CG
22	3.70		60-PHE	CZ	91-ILE	C
23	3.30		60-PHE	CZ	91-ILE	O
24	3.92		60-PHE	CZ	92-ALA	N
25	3.66		60-PHE	CZ	92-ALA	CA
26	3.99		61-MET	SD	90-PRO	CG
27	3.92		63-GLN	CD	88-ALA	O
28	3.83		63-GLN	CD	89-GLY	CA
29	3.41		63-GLN	OE1	89-GLY	CA
30	3.58		63-GLN	OE1	90-PRO	CD
31	3.53		63-GLN	NE2	88-ALA	C
32	2.97	*	63-GLN	NE2	88-ALA	O
33	3.86		63-GLN	NE2	89-GLY	N
34	3.69		63-GLN	NE2	89-GLY	CA
35	3.48		71-ASN	O	87-HIS	ND1
36	3.75		72-GLY	C	88-ALA	N
37	3.70		72-GLY	O	87-HIS	CA
38	3.68		72-GLY	O	87-HIS	C
39	2.76	*	72-GLY	O	88-ALA	N
40	3.69		72-GLY	O	88-ALA	CA
41	3.51		72-GLY	O	88-ALA	CB
42	3.98		73-THR	CG2	86-VAL	O
43	3.61		73-THR	CG2	87-HIS	ND1
44	3.57		73-THR	CG2	87-HIS	CE1
45	3.93		101-ALA	CB	89-GLY	CA
46	3.79		102-ASN	C	88-ALA	CB
47	3.46		102-ASN	O	88-ALA	CA
48	3.74		102-ASN	O	88-ALA	C
49	3.64		102-ASN	O	88-ALA	CB
50	3.01	*	102-ASN	O	89-GLY	N
51	3.88		102-ASN	O	89-GLY	CA
52	3.92		102-ASN	O	89-GLY	O
53	3.67		103-ALA	CB	86-VAL	CG1
54	3.83		111-GLN	CD	88-ALA	CB
55	3.88		111-GLN	OE1	88-ALA	CB
56	3.61		111-GLN	NE2	88-ALA	CB
57	3.91		113-PHE	CD1	90-PRO	CG
58	3.77		113-PHE	CD1	90-PRO	CD
59	3.97		113-PHE	CD2	90-PRO	CG
60	3.80		113-PHE	CE1	90-PRO	CG
61	3.91		113-PHE	CE1	90-PRO	CD
62	3.96		113-PHE	CE2	90-PRO	CG
63	3.95		113-PHE	CZ	90-PRO	CB
64	3.80		113-PHE	CZ	90-PRO	CG
65	3.56		121-TRP	NE1	91-ILE	O
66	3.95		121-TRP	NE1	93-PRO	CD
67	3.89		121-TRP	CE2	93-PRO	CG
68	3.82		121-TRP	CE2	93-PRO	CD

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  69   3.35     121-TRP   CZ2    93-PRO   CG
  70   3.29     121-TRP   CZ2    93-PRO   CD
  71   3.78     121-TRP   CH2    93-PRO   CG
  72   3.64     122-LEU   CD1    90-PRO   CB
  73   3.82     122-LEU   CD2    90-PRO   CB
  74   3.86     126-HIS   CE1    90-PRO   N
  75   3.73     126-HIS   CE1    90-PRO   CA
  76   3.82     126-HIS   CE1    90-PRO   CB
  77   3.82     126-HIS   NE2    90-PRO   CA
  78   3.76     126-HIS   NE2    90-PRO   CB

   <.......> Number of potential hydrogen bonds    5

               AA-residue-###     Contacts

                ARG----- 55        10
                PHE----- 60        15
                MET----- 61         2
                GLN----- 63         9
                ASN----- 71         2
                GLY----- 72         7
                THR----- 73         4
                ALA-----101         2
                ASN-----102         8
                ALA-----103         2
                GLN-----111         4
                PHE-----113         9
                TRP-----121         8
                LEU-----122         3
                HIS-----126         6

>>>> Inter-molecular distances  78 Below 4-A  78

>>> Hydrophobic   33 Hydrophilic   12 Mixed   33

>> Main-chain/Main-chain   10 Side-chain/Side-chain   34 Mixed   34
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