

Identification of patatin as a novel allergen for children with positive skin prick test responses to raw potato

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Background: Peeling of raw potatoes may cause allergic symptoms, such as sneezing, wheezing, and contact urticaria, for adults. For children, potatoes as food may cause various allergic reactions. However, the identity and molecular structure of the putative allergens in potato have remained unknown. **Objective:** The aim of our study was to identify possible major allergens in potato by using sera of atopic children suspected of having food allergy and having positive skin prick test responses to raw potato.

Methods: Potato proteins were purified by standard methods of protein chemistry and characterized with amino-terminal sequencing and mass spectrometry. The IgE-binding ability of the purified proteins was verified by immunoblotting and ELISA with IgE antibodies from the sera of atopic children having positive skin prick test responses to raw potato.

Results: Immunoblotting showed strong IgE binding to a 43-kd protein, identified as patatin, the main storage protein of potato tubers. In ELISA, 20 of 27 (74%) children with positive skin prick test responses to potato and none of the control subjects showed specific binding of IgE antibodies to purified patatin. A positive wheal-and-flare reaction was seen in 8 of 14 children prick tested with purified patatin.

Conclusion: These results show that patatin in potatoes is a significant, previously unrecognized, IgE-binding protein for children with a positive skin prick test response to raw potato. Further studies are needed to confirm the clinical importance of potatoes, and especially patatin, as a food allergen. (*J Allergy Clin Immunol* 1999;103:165-71.)

Key words: Allergen, children, food, IgE, patatin, potato

Hypersensitivity reactions to fruits and vegetables have been associated with IgE-mediated reactions for years.¹⁻⁷ Symptoms range from oral itching and swelling to generalized urticaria and anaphylaxis.⁸ Profilin, a ubiquitous actin-binding protein in almost all eukaryotic organisms, has previously been shown to be involved in

Abbreviations used

HIC:	Hydrophobic interaction chromatography
HSA:	Human serum albumin
PVDF:	Polyvinylidene difluoride
TBS:	Tris-buffered saline
TFA:	Trifluoroacetic acid

commonly occurring cross-reactions between birch pollen and various fruits and vegetables such as apple, celery, and carrot.⁹ It has been suggested that profilin might be a putative allergen in potatoes.¹⁰

Sensitivity to potatoes is considered fairly uncommon,¹⁰ although potatoes are widely consumed as a staple, and they are one of the first solid foods encountered by infants. Several authors have shown that consumption of potatoes for food or peeling of raw potatoes may elicit type-I allergic reactions in children and adults,¹¹⁻¹⁶ but no systematic studies to support this view have yet been published. Hence there is an unquestionable need to identify the responsible allergens.

In this study we show that patatin, the main storage protein in potatoes (*Solanum tuberosum*),* binds IgE from the sera of atopic children with a positive skin prick test response to raw potato. In addition, purified patatin caused positive skin prick reactions in children suspected of having allergy from potatoes.

METHODS

Patient and control sera

Sera were obtained from 27 children (mean age, 4 years; range, 4 months to 10 years) examined for food allergy who had atopic dermatitis, asthma, or allergic rhinitis (Table I). The children were selected for having a positive skin prick test response to raw potato (size of the wheal $\geq$ histamine) and suspicion of having allergy to potatoes. These children also had a positive prick test response to common food allergens (ie, 16 of 27 to cow's milk, 11 of 27 to egg, and 12 of 27 to wheat). Control sera were obtained from 44 randomly chosen, healthy children (range, 7 to 36 months of age) participating in the National Finnish Vaccination Program (National Public Health Institute, Helsinki, Finland) and from 10 atopic children (range, 3 to 12 years of age) with negative skin prick test responses to potato and common food allergens. Sera from 2

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Patatin has been accepted by the WHO/IUIS Allergen Nomenclature Sub-Committee as Sol t 1 (AC.P15476).

TABLE I. Clinical diagnosis and laboratory results in 27 atopic children with sensitivity to potato

Patient no	Sex	Age	Main clinical symptoms	Skin prick test result of raw potato*	Potato RAST (kU/L)	Total IgE (kU/L)
1	M	9 mo	AD	7/4	0.4	ND
2	M	6 y	AD,A	8/5†	ND	900
3	M	6 y	AD,A,AR	10/5†	ND	1850
4	M	10 y	AD,AR	8/5†	ND	ND
5	F	6 y	AR,A	8/7†	ND	ND
6	F	8 y	AD,A	20/5†	ND	2127
7	M	5 y	AD,A	11/5	15.3	426
8	F	2 y	AD	12/5	3.8	455
9	M	9 y	U,A,AR	8/4†	ND	ND
10	M	9 y	AD,AR	10/5	ND	ND
11	F	6 y	AD,AR,A	10/5†	8.1	2492
12	M	2 y	AD	7/4	13.8	845
13	F	2 y	AD,A	8/5	ND	123
14	M	5 mo	AD	10/4	ND	13
15	F	2 y	AD	7/4	28.6	1497
16	M	7 y	AD,A	7/4	ND	2445
17	F	7 mo	AD	15/5	12.2	450
18	M	5 y	AD,A,AR	9/6†	78.7	5010
19	M	2 y	AD	7/5†	6.2	219
20	M	3 y	AD	8/4	5.7	1225
21	M	5 mo	AD	12/8	56.6	1069
22	M	2 y	AD	6/5	3.2	170
23	M	3 y	AD	8/6	6.9	1728
24	F	4 mo	AD	13/8	0.4	183
25	M	2 y	AD, AR	5/5	62.5	5193
26	F	5 mo	AD	6/3	6.4	96
27	M	3 y	AD,AR	7/7	14.0	876

A, Asthma; AD, atopic dermatitis; AR, allergic rhinitis; U, urticaria; ND, not done.

*Mean diameter of potato wheal/mean diameter of histamine control in millimeters.

†Positive skin prick test response to birch pollen.

patients that exhibited strong IgE binding to potato proteins (patients 7 and 18, in Table I) were used as references in immunoblotting experiments, and 6 sera with strong reactions in IgE-ELISA were pooled and used in immunologic inhibition studies. The study was approved by the ethical committee of Tampere University Hospital.

Protein extraction and isolation

Potato tubers were from a common cultivar (Bintje). Tubers were peeled, and the pulp (126.04 g) was homogenized in 150 mL of cold 50 mmol/L Tris-Cl (pH 8.0) and 150 mmol/L NaCl. The homogenate was filtered through a filter paper (Whatman 3M/M) at 4°C. Proteins were precipitated with 60% saturated ammonium sulfate on ice. The precipitate was collected by centrifugation at 10,000 rpm (Sorvall RC5C, SS34-rotor) for 15 minutes at 4°C, dissolved in 6.0 mL of 50 mmol/L Tris-Cl (pH 8.0) and 150 mmol/L NaCl, and stored at -20°C.

The dissolved proteins were first subjected to gel filtration on a 1.6 × 60 cm Superdex 75 Fast Flow column (Pharmacia Biotech, Uppsala, Sweden) in 50 mmol/L Tris-Cl (pH 8.0) and 75 mmol/L NaCl at a flow rate of 2.0 mL/min and monitored at 214 nm. Anion-exchange chromatography was then performed in a Mono Q HR5/5 column (Pharmacia Biotech) equilibrated with 50 mmol/L Tris-Cl (pH 8.0). The fractions chosen from the gel filtration chromatography were pooled, diluted (1:3), and applied to the column. Elution was performed with a linear gradient of NaCl (0 to 0.5 mol/L in 20 minutes) in the equilibration buffer. The flow rate was 1.0 mL/min, and chromatography was monitored at 214 nm. Hydrophobic interaction chromatography was performed on a 0.5 × 5.0 cm column

packed with Octyl Sepharose 4 Fast Flow (Pharmacia Biotech). The column was equilibrated with 10 mmol/L sodium phosphate (pH 7.0) and 1.0 mol/L (NH₄)₂SO₄. The fractions chosen from anion-exchange chromatography were brought to approximately 1.0 mol/L in (NH₄)₂SO₄ and applied to the column. The elution was performed with a decreasing linear gradient of (NH₄)₂SO₄ (1.0 to 0 mol/L in 20 minutes) followed by 2.0 mL of H₂O. The flow rate was 1.0 mL/min, and elution was monitored at 280 nm.¹⁷

Reversed-phase chromatography was performed in a 0.5 × 5.0 cm POROS 20 R2 (PerSeptive Biosystems, Framingham, Mass) column and in a 0.21 × 10 cm TSK TMS 250 (TosoHaas Corporation, Japan) column. Columns were equilibrated with 0.1% trifluoroacetic acid (TFA) and eluted with a linear gradient of acetonitrile (3% to 100% in 60 minutes) in 0.1% TFA. The flow rate in the POROS 20 R2 column was 1.0 mL/min, and that in the TSK TMS 250 column was 0.2 mL/min. Elution from both columns was monitored at 214 nm.

Because enzymatic and immunologic analyses of the plant extracts is disturbed by carbohydrates and polyphenolic compounds in plants,^{18,19} samples were treated stepwise after every purification step by reversed-phase chromatography in 0.5 × 5.0 cm POROS R2 (PerSeptive Biosystems) column. The proteins were bound to the column in 0.1% TFA and eluted with 60% acetonitrile in 0.1% TFA.

Electrophoresis and immunoblotting

Proteins were separated according to their molecular weights by SDS-PAGE in 15% gels according to the method of Laemmli²⁰ in a Mini Protean II device (Bio Rad Laboratories, Hercules, Calif). Electrophoresis was performed at a constant current of 25 mA/gel. Molecular weight standards were either prestained Kaleidoscope

(Bio Rad Laboratories) or low molecular weight standards (Pharmacia Biotech). The proteins were stained with Coomassie Brilliant Blue (PhastGel Blue R, Pharmacia Biotech).

For immunoblotting experiments, the SDS-PAGE-separated proteins were transferred to a polyvinylidene difluoride (PVDF) membrane (Immobilon-P, Millipore Corporation, Bedford, Mass).

Electroblotting was carried out at 100 V for 75 minutes (Mini Trans-blot cell, Bio Rad Laboratories) in 10 mmol/L 3-(cyclohexylamine)-1-propane sulfonic acid (CAPS) 10% methanol (pH 11).²¹ For amino-terminal sequencing, the proteins were transferred to a ProBlott (Applied Biosystems, Perkin Elmer, Foster City, Calif) PVDF membrane. Electroblotting was carried out at 50 V for 2.45 hours (Mini Trans-blot cell, Bio Rad Laboratories) in the CAPS buffer, and protein bands were visualized by staining with Coomassie Brilliant Blue (0.1% PhastGel Blue R-250 in 1% acetic acid/40% MeOH) (PhastGel Blue R, Pharmacia Biotech).²¹

For immunoblotting, the PVDF membrane was incubated for 45 minutes in a blocking buffer containing 5% nonfat milk powder in 10 mmol/L Tris-Cl (pH 7.5) and 0.9% NaCl (Tris-buffered saline [TBS]) and then transferred into a Miniblotter (Biometra, Göttingen, Germany). The membrane was again incubated overnight at 4°C with patient and control sera (diluted 1:5 in the blocking buffer, 120 mL/channel). The PVDF membrane was then washed with 0.1% Tween-20 in TBS, incubated for 30 minutes with biotinylated goat anti-human IgE antibodies (Vector, Burlingame, Calif) diluted 1:1000, removed from the blotter, and washed. An additional blocking step was carried out for 5 minutes, and the membrane was then washed again. Streptavidin-conjugated alkaline phosphatase (Zymed, Camarillo, Calif), diluted 1:24,000 in TBS, was added, and the membrane was incubated for 30 minutes at room temperature. After washing, the membrane was placed in a color development solution (Bio Rad Laboratories), and the reaction was stopped after 8 minutes by rinsing with water.

IgE-ELISA

For ELISA, the concentration of the purified protein was adjusted to 2.0 µg/mL in 50 mmol/L carbonate buffer (pH 9.6) applied onto 96-well polystyrene microtiter plates (100 µL/well) (Nunc, Roskilde, Denmark) and incubated for 3 hours at room temperature and then overnight at 4°C. Wells were then emptied and postcoated for 1 hour with 1% human serum albumin (HSA) in 100 µL of 50 mmol/L carbonate buffer (pH 9.6). After rinsing 3 times with 0.05% Tween-20 in PBS (PBS-T), 100 µL of patient and control sera (1:10), diluted with PBS-T containing 0.2% HSA (PBS-T-HSA), was added to the wells and incubated for 2 hours at room temperature. Wells were then washed 3 times with PBS-T. Biotinylated goat anti-human IgE (Vector) diluted 1:1000 with PBS-T-HSA was added and incubated for 1 hour on the plates. Wells were again washed 3 times with PBS-T and incubated for 1 hour with streptavidin-conjugated alkaline phosphatase (Bio Rad Laboratories) diluted 1:3000 with PBS-T-HSA. After 3 washes with PBS-T, the substrate development solution, paranitro-phenyl phosphate (104 Sigma; Sigma, St Louis, Mo), was added. The developed color was read at 405 nm with an automated ELISA reader (Titertek Multiskan; Eflab, Espoo, Finland).

In ELISA-inhibition experiments, coating and postcoating of the microtiter plates were performed as previously described for ELISA assays. The serum of a reference patient (no 18 from Table I, diluted 1:40 with PBS-T-HSA) and pooled sera from 6 other patients (nos 4, 6, 7, 8, 11, and 20 from Table I, diluted 1:20 with PBS-HSA) previously shown to contain highly reactive IgE antibodies against patatin were chosen for inhibition studies. Sera (50 µL) were first incubated for 1 hour at room temperature with an equal volume of the inhibitor solution. The final concentrations of the purified pro-

tein used as inhibitor were 10.0, 3.0, 1.0, 0.3, 0.1, and 0.01 µg/mL. The mixtures containing the sera and the inhibitor (or sera without inhibitor as a control) were incubated in the wells for 2 hours at room temperature and washed 3 times with PBS-T. Biotinylated anti-human IgE diluted 1:1000 was added, and the assay continued as described above for IgE-ELISA.

Amino-terminal sequencing and mass spectrometry

Amino-terminal sequencing of the proteins was performed with an Applied Biosystems 494 A Procise sequencer (Perkin Elmer).

The molecular weight of the protein was determined by matrix-assisted desorption/ionization time-of-flight mass spectrometry with a Biflex II instrument (Bruker-Franzen Analytik, Bremen, Germany). Sinapic acid (saturated solution in 33% acetonitrile in 0.1% TFA) was used as the matrix, and BSA was used as an external standard.

Skin prick tests and RASTs

Skin prick tests were performed with commercial cow's milk, egg, wheat, and birch pollen allergens (ALK, Allergologisk Laboratorium A/S, Denmark).²² The prick-prick technique was used to test raw potato, and the ordinary skin prick technique was used to test purified patatin (concentration, 100 µg/mL) on the volar aspect of the forearm by using histamine dihydrochloride (10 mg/mL, ALK) as a positive control and physiologic saline as a negative control.

Potato RAST (Pharmacia Biotech) was performed as previously described,²² and values greater than 0.4 kU/L were considered positive.

RESULTS

Extraction and purification of potato proteins and demonstration of their IgE-binding properties by immunoblotting

Gel filtration of the dissolved ammonium sulfate precipitate from the pulp revealed a chromatogram as shown in Fig 1. Selected fractions were, after analysis by SDS-PAGE, combined into 3 pools (I to III), desalted by stepwise reversed-phase chromatography, and analyzed by immunoblotting. Binding of IgE to the fractions (I to III) was assessed by immunoblotting with 2 reference sera (patients 7 and 18, Table I). The strongest reaction (a band with an apparent molecular weight of 43 kd) was found in gel-filtration pool I, which was subjected to anion-exchange chromatography. The eluted fractions were again individually subjected to stepwise reversed-phase chromatography and further analyzed by SDS-PAGE and immunoblotting. SDS-PAGE analysis showed that the material eluting from the anion-exchange column consisted mainly of a protein of 43 kd appearing as a double band. Amino-terminal sequencing of both of the individual bands gave a sequence of KLEDMVTVL-SIDGGGIKGIIPAIL, which could be identified by a computer-assisted search against the Swissprot database as the patatin of potato tuber (AC.P15476; 96.0% identity in a 25 aa overlap). To ensure that no other proteins of similar molecular weight were interfering with the IgE binding of the reference sera, the fractions from anion exchange chromatography containing the 43-kd band were subjected to hydrophobic interaction chromatography (HIC), which is reported to efficiently separate

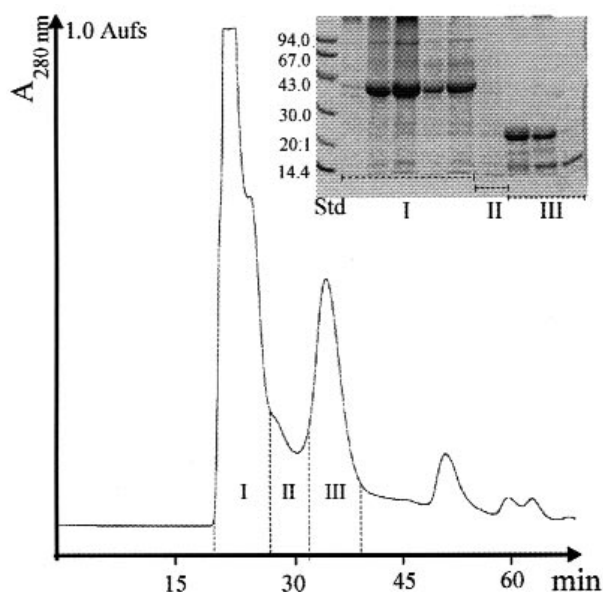


FIG 1. Gel filtration and SDS-PAGE analysis of $(\text{NH}_4)_2\text{SO}_4$ -precipitated potato proteins from the extract. Fractions from gel filtration chromatography were pooled (I to III) and analyzed in SDS-PAGE.

patatin from other potato proteins.¹⁶ The IgE binding of the reference sera to the HIC-purified patatin was unchanged (data not shown), thereby excluding possible interfering molecules of the same molecular weight. For a final purification step, the patatin fraction from the HIC was subjected to reversed-phase chromatography in TSK-250 TMS column. Only 1 peak was observed (Fig 2), which in SDS-PAGE and immunoblotting appeared as a similar 43-kD double band. Amino-terminal sequence analysis of each of the 2 bands gave identical results, the amino-terminal sequence of patatin. Mass spectrometric analysis of the peak from reversed-phase chromatography gave an average molecular mass of 40,729 d (Fig 3), which is compatible with that reported for patatin of potato tuber.

IgE antibodies to patatin and to potato proteins measured by ELISA

ELISA assays were performed both against denatured (after reversed-phase chromatography) and native (after anion-exchange chromatography) forms of patatin, as well as against all the ammonium sulfate-precipitated proteins from the potato tuber extract. The reaction patterns of the patients were similar in ELISA against both the native and the denatured forms of purified patatin. The results of ELISA assays against the ammonium sulfate precipitate of potato extract were very similar to those for purified patatin (data not shown). Against the purified patatin, 20 of 27 (74%) atopic children showed ELISA values that exceeded the mean +3SD of 44 control children (Fig 4). By using this level (absorbance value, 0.200) as the cut-off point, none of the control children showed any response against patatin. In ELISA inhibition, purified patatin at a final concentration of 10

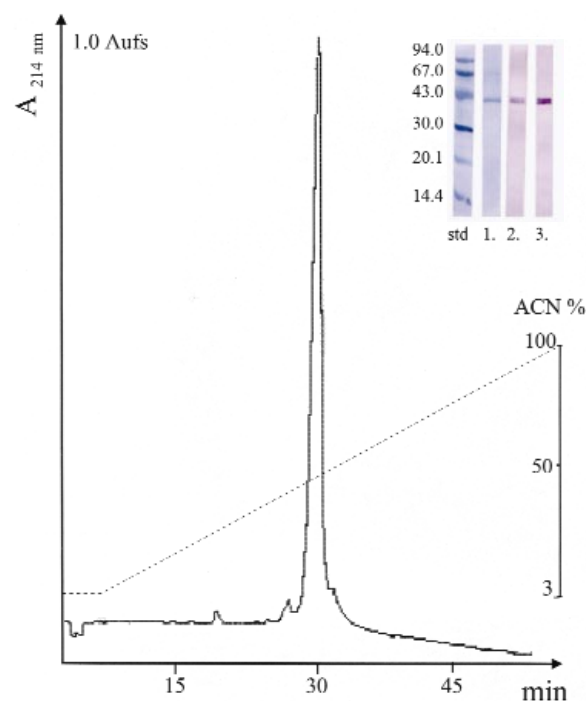


FIG 2. Result of reversed-phase chromatography of purified patatin. Elution of patatin was performed with linear gradient of acetonitrile (3% to 100% in 60 minutes) at a flow rate of 0.2 mL/min. Also shown in the upper right corner is immunoblot analysis of binding of IgE to purified patatin. Coomassie Brilliant Blue-stained patatin (~2 $\mu\text{g/mL}$) on PVDF-membrane (1), sera from patient number 7 (2), and sera from patient number 18 are shown (3).

$\mu\text{g/mL}$ inhibited 75% of the binding of IgE from the pool of sera against solid-phase potato proteins (Fig 5).

Skin prick test results of purified patatin and raw potato

Fourteen children were skin prick tested with patatin and retested at the same time with raw potato, after being followed up from 12 to 36 months (Table II). Eight children had a wheal response (3 mm in diameter) to purified patatin. Seven of these children had histories of adverse reactions, such as exacerbation of atopic dermatitis or lip swelling, from cooked potatoes, but no oral challenges could be performed on these children. When retested after a follow-up with the raw potato, 8 of the 14 children showed smaller test reactions than in the previous skin prick testing (Tables I and II).

DISCUSSION

Previous studies of IgE-mediated allergic reactions to potatoes were made by Castells et al¹⁴ and Wahl et al.¹⁶ These authors used immunoblotting to demonstrate IgE binding to potato extracts and approximated the molecular weight of IgE-binding proteins to between 14 and 65 kD. However, the identity of these proteins in potatoes remained unknown.

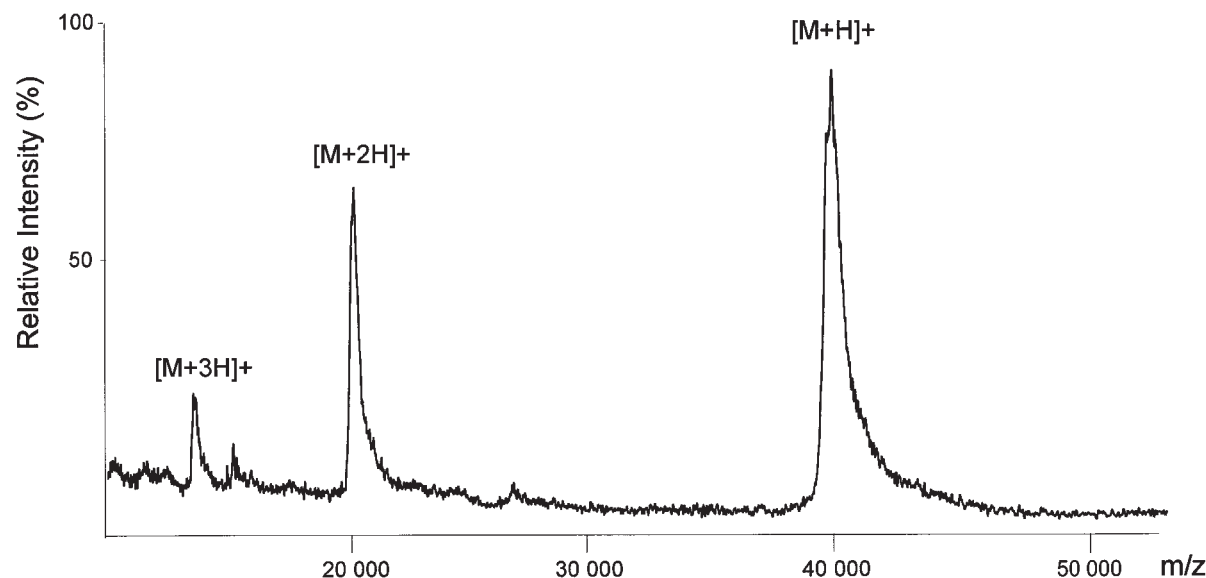


FIG 3. Matrix-assisted laser desorption ionization time-of-flight mass spectrum of purified patatin.

TABLE II. Skin prick test results and IgE-ELISA values for purified patatin

Patient no	Clinical history of adverse reactions from potatoes	Skin prick test to patatin (100 µg/mL)*	ELISA values to patatin†	Skin prick test to raw potato‡
1	—	0	0.766	5/4
7	+	5	0.711	7/5
8	NK	0	0.396	8/3
9	—	0	0.122	6/4
11	—	0	0.763	5/4
15	+	3	1.315	5/6
18	—	2	0.666	7/4
20	NK	0	0.373	4/6
21	+	6	1.196	12/8
22	+	3	0.165	4/4
23	—	3	0.424	4/4
25	+	3	1.996	7/5
26	+	6	0.51	6/3
27	+	6	1.09	7/7

Patients number 7 and 26 were tested with patatin at a concentration of 200 µg/mL.

NK, Not known.

*Mean diameter of patatin wheal in millimeters.

†Cut-off level for positivity = 0.200.

‡Mean diameter of potato wheal/mean diameter of histamine control in millimeters.

The results of our study suggest that patatin of potato tubers is a significant allergen for atopic children suspected of having food allergy and with positive prick test responses to raw potato. In ELISA, 74% of the 27 children had positive results against purified patatin. The role of patatin as an important allergen among potato proteins was further supported by the finding that a low concentration of patatin (10 µg/mL) was able to inhibit at least 75% of the IgE binding of pooled sera to a mixture of solid-phase potato proteins. In addition, 8 children exhibited positive skin prick test reactions to purified patatin, showing that patatin can elicit IgE-mediated reactions *in vivo*. The reason why all 14 children did not have posi-

tive reactions to patatin by skin prick test could be the partial or complete avoidance of potatoes in the diet and the time lap between serum sampling and skin prick testing with patatin. Another, although unlikely, reason could be that some denaturation or aggregation of patatin occurred during and after the purification process.

Interestingly, 8 of the 14 children, when retested with raw potato after a follow-up from 12 to 36 months, showed decreased skin prick test reactions. We were also able to examine 1 child by ELISA before and after exclusion of potatoes from the diet and observed a decreasing value from 1.724 to 0.666.

Although potatoes are a very important food in North

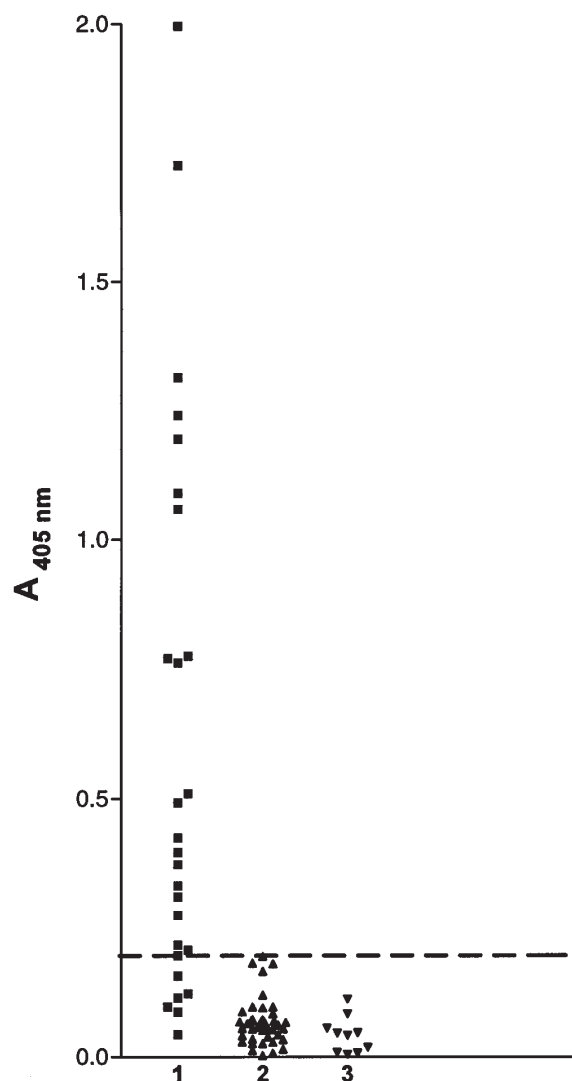


FIG 4. Occurrence of IgE-antibodies against purified patatin by ELISA. Microtiter plates were coated with patatin at a concentration of 2.0 µg/mL, and the sera were diluted 1:10. Atopic children ($n = 27$) with a positive SPT with raw potato (1), control children from the National Vaccination Program ($n = 44$) (2), and atopic control children ($n = 10$) (3) are shown. Cut-off level for a positive response (mean OD value + 3 SD of the 44 control subjects) is indicated by horizontal line.

America and Europe, they are rarely reported to cause food allergy in contrast to other common foods.¹⁰⁻¹⁶ In our study children were selected because of a positive skin prick reaction to raw potato and suspicion of having food allergy. A few of these children had exhibited clinical symptoms suggestive of allergy to raw or cooked potatoes, which may have been hidden in other children by concomitant suspicion of allergy to cow's milk, egg, and wheat. In our hospital, children suspected of having multiple food allergies are commonly skin prick tested with raw potatoes; for example, in 1997, 16% of the 590 children tested had a positive reaction (unpublished observation). It is evident that further studies, such as

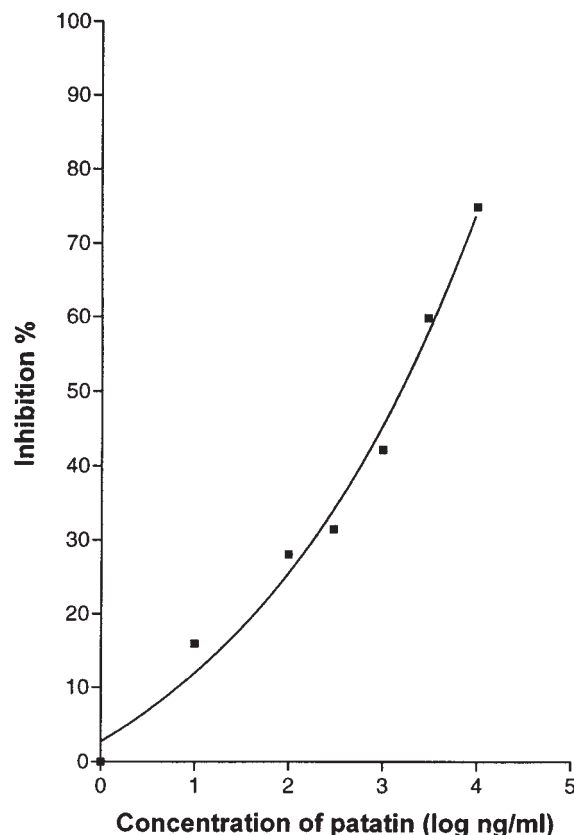


FIG 5. Inhibition of IgE binding to solid-phase total protein extract of potato by different concentrations of purified patatin in ELISA. Patatin inhibited approximately 75% of the IgE binding of pooled serum IgE (diluted 1:20) to the total protein extract.

double-blind food challenge studies, are needed to show the clinical relevance of the positive prick test reactions to raw potato and simultaneous occurrence of IgE antibodies to patatin in children suspected of having allergy to potatoes.

Patatin, first described as tuberin, is the major tuber protein (40%) of the potato plant and belongs to a family of glycoproteins.²³ Patatin is mainly known as a storage protein and also has excellent nutritional value. It is present in all cultivars of potato and shows extensive charge heterogeneity between cultivars. This heterogeneity was reflected in our results from anion-exchange chromatography, as well as in the double band in SDS-PAGE. However, all forms of patatin appear to be immunologically identical and have homologous amino-terminal amino acid sequences.²³⁻²⁵ Patatin has been shown to have phospholipase A₂ activity.²⁶ Because this activity is not likely to survive digestion, it probably has no relevance in its function as a food allergen.

The potato has been extensively studied, and many of its proteins have been characterized at the level of primary structure. The first genetic map of the potato was based on single-copy DNA probes from the tomato, suggesting a very close relationship between these 2 mem-

bers of the family Solanaceae. Through linkage analysis with restriction fragment length polymorphism markers, cloned genes for patatin have been mapped in both potato and tomato.²⁷ This suggests that potential allergic cross-reactions could occur among members of the family Solanaceae, such as eggplant, red pepper, and tomato.

Furthermore, several authors have reported that IgE in sera from patients sensitized to birch pollen recognize proteins from potato extract.^{7,28} In this study all 9 children with positive skin prick test responses to birch pollen had positive reactions against patatin (Table I). However, there remained 12 children who had clear-cut positive reactions against patatin but negative skin prick test responses for birch pollen. Ebner et al⁷ have previously shown, by immunoblot inhibition, that recombinant birch pollen profilin (rBet v 2) completely inhibited binding of IgE from pollen-allergic sera to 12 to 14 kd proteins in potato extracts, whereas a major 43-kd protein band, which in all likelihood represented patatin, remained unaffected. Further studies to disclose the identity and molecular structure of all potato allergens will be helpful in attempts to explain the basis for cross-reactions between potatoes and other allergenic food.

In conclusion, this study identified patatin of the potato tuber as a novel allergen recognized by IgE in sera from 74% of the atopic children suspected of having allergy to potato. Further studies, such as double-blind, placebo-controlled food challenge studies,²⁹ are needed to show the significance of potatoes, and especially of patatin, as a food allergen for atopic children.

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