



Perspective

Food and Drug Administration reclassification of allergens for diagnosis and treatment: now is the time to be heard

Désirée E. S. Larenas-Linnemann, MD ^{*}; Ira Finegold, MD [†]; and Harold Nelson, MD [‡]^{*} Hospital Médica Sur, Mexico City, Mexico[†] Department of Allergy, St. Luke's-Roosevelt Hospital, New York, New York[‡] Department of Medicine, National Jewish Health, Denver, Colorado

ARTICLE INFO

Article history:

Received for publication February 20, 2012.

Received in revised form March 8, 2012.

Accepted for publication March 9, 2012.

Allergen-specific immunotherapy has been practiced for more than a century,¹ with the first allergen extracts being prepared in a noncommercial setting in laboratories associated with allergy treatment clinics.^{2,3} Subsequently, allergen extract manufacturers started to provide the allergen solutions needed to formulate immunotherapy extracts or vaccines. Initially, conditions and methods of preparation were variable, but as US agencies, such as the Food and Drug Administration (FDA), began examining these companies and manufacturers started to invest in better production and quality control technologies, the conditions of the preparation of allergen extracts have improved markedly. A more detailed discussion on how the manufacturing of the allergen extracts evolved and how this industrial process was supervised by the Hygienic Laboratory of Public Health and Marine Hospital Service and since 1972 by the FDA, can be found in a recent publication.⁴

As the practice of allergen immunotherapy expanded, allergen manufacturers produced and licensed an increasing number of allergen extracts. Currently, more than 1,200 allergen extracts are registered by the FDA. Since the early 1980s the FDA has been systematically reviewing data available on licensed allergen extracts in the medical and scientific literature and in other documents containing product information. The first set of data was created by an external advisory review panel, the Original Panel. Panel members analyzed available information on allergen extracts and published their findings in its final report in 1981 (21 CFR §601.25, also known as Panel I). The Reclassification Panel published the results of an updated literature review in a report in 1983 (21 CFR §601.26, also known as Panel II). Reports of the Original and Reclassification Panels are available at <http://www.fda.gov/BiologicsBloodVaccines/Allergenic/default.htm>.

During the following 2 decades from the more than 1,000 allergen extracts licensed by the FDA through its Center for Biologics Evaluation and Research Division (CBER), a total of 19 allergen extracts were standardized. In 2004, the FDA formed a new committee to review available scientific and medical data on the safety and effectiveness of extracts. As opposed to the panels from 1981 and 1983, this time the committee is internal in its origin, and the review is focused exclusively on nonstandardized allergenic extracts. The committee designed a data file to facilitate the storage of supporting data in a standardized manner. The data file contains for each product a report of its information, a list of associated and reviewed literature, and a discussion on the product. The complete data set created by an FDA internal committee containing the documentation of each allergen can be accessed online (<http://www.fda.gov/BiologicsBloodVaccines/Allergenic/ucm272115.htm>). Figure 1 shows an example of the information as it can be found in the FDA report on barnyard grass pollen. This approach to present the information on each allergen extract was presented by the FDA and discussed with a panel of external experts at the Allergenic Products Advisory Committee meetings in 2005 and 2006. Throughout the subsequent years the internal committee at the FDA proceeded to collect the information, which was finally presented in an FDA report on September 26, 2011 (<http://www.gpo.gov/fdsys/pkg/FR-2011-09-26/pdf/2011-24598.pdf>). According to the FDA, this process will assist the agency in its continued oversight of regulated products.

Origin of the Data Collected by the Internal Committee of the FDA

The internal committee of the FDA used 2 main sources to integrate the September 2011 report. First, the literature reviewed by the Allergenic Advisory Review Panels (Original and Reclassification Panels) in their reports from 1981 and 1983 was used as a source document. Second, all data concerning the effectiveness and safety of nonstandardized allergenic products that have become

Reprints: Dr. Désirée Erlinda Larenas-Linnemann, Hospital Médica Sur Torre 2, consultorio 602, Puente de piedra 150, Colonia Toriello Guerra Delegación, México, D.F. 14050, Mexico; E-mail: marlar1@prodigy.net.mx.

Disclosures: Authors have nothing to disclose.

Product: 597 - Pollens - Grasses, Barnyard Grass Echinochloa crusgalli**Recommended Scientific Name** Echinochloa crus-galli**Manufacturers of this Product**

Antigen Laboratories, Inc. - Liberty, MO (Lic. No. 468, STN No. 102223)

Hollister-Stier Labs, LLC - Spokane, WA (Lic. No. 1272, STN No. 103888)

ALK-Abello Inc. - Port Washington, NY (Lic. No. 1256, STN No. 103753)

Search Strategy

PubMed: Echinochloa crusgalli allergen, allergy, barnyard grass allergen allergy; Japanese Millet allergy, allergen; cockspur grass allergy, allergen; watergrass allergy, allergen

Google: barnyard grass pollen allergy; barnyard grass pollen allergy adverse; barnyard grass pollen allergen; barnyard grass pollen allergen adverse; same search results performed for Echinochloa crusgalli pollen

Nomenclature

According to ITIS, the correct spelling of Echinochloa crusgalli is Echinochloa crus-galli. Common names are barnyard grass, cockspur, Japanese millet, large barnyard grass, and watergrass. The common name is correct and current. The scientific name needs to be updated. Synonym is Panicum crus-galli. The Echinochloa genus is found in the Poaceae family.

Parent Product

597 - Pollens - Grasses, Barnyard Grass Echinochloa crusgalli

Published Data

PMID 15283881 supports cross-reactivity between species within the subfamily Panicoideae and tribe Paniceae.

<u>Documents</u>	<u>PubMed Number</u>	<u>Author</u>	<u>Year Published</u>
595_grass pollen allergens.pdf	15042916	Esch, R.E.	2004
595_characteristics and immunobio of grass pollen allergens.	12673063	Andersson, K.	2003
595_immunobiology of grass pollen allergens.pdf	16091211	Mohapatra, S.S.	2005
594_CurrAllAsthmaRepts-4-401.pdf	15283881	Weber, R.W.	2004

Panels:

	<u>Original Panel Recommendation</u>	<u>Reclassification Panel Recommendation</u>
<u>Diagnosis:</u>	none	none
<u>Therapy:</u>	none	none

Fig. 1. Example of a Food and Drug Administration report on barnyard grass pollen.

available since 1972 were searched. These data include not only published literature but also available manufacturer data and data from other external sources. In its official communication from September 26, 2011, the FDA further specifies this latter source (Tables 1 and 2).

However, not all information obtained was considered useful by the internal committee of the FDA. The following list is considered not adequate information:

1. Random experience
2. Studies that lack sufficient scientific detail (eg, imprecise nomenclature)
3. Isolated case reports (However, case reports are acceptable when corroborated by other case reports from independent authors, well-described allergen challenge data, or valid cross-reactivity data.)

Content of the FDA Communication

In the official communication dated September 26, 2011, the FDA made the final report with all the gathered information on

allergen extracts available to the public and announced that all nonstandardized allergen extracts were classified according to the level of evidence that exists, concerning their use in the diagnosis and treatment of allergic disease (Table 3). Extracts on list 1 are those with sufficient data on their usefulness as diagnostic and therapeutic agents. List 2 contains food extracts. List 3 includes allergen extracts with sufficient data on their usefulness as diagnostic agents but for which the internal committee could not find sufficient data to support their usefulness as therapeutic agents. List 4 contains those extracts for which conclusive data are lacking for their use as both diagnostic and therapeutic agents. List 5 contains extracts with potential safety issues.

The FDA further stated it is making the report available to provide information and obtain comments from public and private stakeholders. Additional input on the report was sought from the Allergenic Products Advisory Committee at a meeting held on October 25, 2011. In response to input received at that meeting, the

Table 1

Data sources for the Food and Drug Administration September 2011 report on the safety and effectiveness of nonstandardized allergen extracts

Published literature (from 1972 to the present)	This literature was acquired by searching for articles using a PubMed and/or Institute for Scientific Information (ISI) search engine (English-language literature articles only).
Publicly available manufacturer data	These data were obtained by reviewing information published in the literature.
Medwatch data (collected for years 1987 to 2010)	These data were evaluated for safety-related product trends.
Data from other external sources	These data were obtained by performing a broad Internet search (eg, Google) to check for any additional safety or effectiveness data not captured in published articles found via PubMed or ISI.

Table 2

Criteria for studies from which the Food and Drug Administration collected data

1. Provided identifiable, specific, and valid nomenclature for the source materials used in the preparation of the allergenic extracts in the studies
2. Were performed using aqueous-based extracts prepared from specifically identified source materials with correct nomenclature
3. Described identifiable, specific, and valid study methods.
4. Provided objective and evaluable data
5. For skin test data in the studies: obtained positive skin test results in index cases by either skin prick or intradermal methods, demonstrated by the following:
 - a. Wheal or erythema
 - b. Where appropriate, comparison to positive and negative control data in the same study participants
6. For studies with cross-reactivity data, demonstrated cross-reactivity by the following:
 - a. Enzyme-linked immunosorbent assay or radioallergosorbent test inhibition
 - b. Western immunoblot
 - c. Other valid immunochemical data

Table 3

Tables published online as an official Food and Drug Administration document, September 27, 2011^a

Table No.	Title	No. of allergen extracts included
1	Non-Standardized Allergenic Extracts: Use in Diagnosis and Treatment Addressed in Literature	480
2	Non-Standardized Allergenic Extracts (Foods): Use in Diagnosis Addressed in Literature	134
3	Non-Standardized Allergenic Extracts (Non Food): Use in Diagnosis Addressed in Literature	73
4	Non-Standardized Allergenic Extracts: Minimal or No Literature Relating to Use in Diagnosis and Treatment	565 ^b
5	Non-Standardized Allergenic Extracts: Potential Safety Issues	17

^aTo gain access to the tables, (1) go to www.regulations.gov; (2) look for area to "enter key word or ID": enter docket number FDA-2011-N-0599; and (3) at the bottom of the page, it will list "Report and Information on Non-Standardized Allergenic Extracts in Diagnosis and Treatment of Allergic Disease."

^bOf these, 185 extracts are still sold with certain regularity and form the basis for the Mission Allergen Rescue Initiative.

deadline for receiving comments from the public, first set on November 25, 2011, has been postponed until April 26, 2012 (FDA, official communication, November 16, 2011) to allow for additional time to submit comments. Finally, the communication states that the FDA has not made any regulatory decisions until now concerning the report.

Reasons for Concern and Future Actions

As such, all 1,269 licensed, nonstandardized allergen extracts are accommodated into the 5 FDA lists (Table 3).⁴ List 4, called "Non-Standardized Allergenic Extracts: Minimal or No Literature Relating to Use in Diagnosis and Treatment," is the first reason for concern. It includes 565 allergen extracts, a third of which are still sold on a regular basis. If no information on these products is submitted by the public, it is not clear what actions the FDA will take regarding their continued availability. The second reason for concern is list 3, which is called "Non-Standardized Allergenic Extracts (Non Food): Use in Diagnosis Addressed in Literature." For the extracts on list 3, the internal committee of the FDA could not find sufficient data to document their efficacy as therapeutic agents. Again, it is unclear what the consequences of being on list 3 will be for the future use of these allergen extracts. A third concern is list 5, which is small, with only 16 extracts, including house dust, that are of doubtful composition or in which safety issues can be detected. Finally, food extracts on list 2 shall in the future probably only be available for diagnosis.

Leadership from professional allergists' organizations (the American Academy of Allergy, Asthma and Immunology [AAAAI], the American College of Allergy, Asthma and Immunology [ACAAI], and the American Association of Otolaryngologic Allergists [AAOA]) have decided to respond to the FDA's invitation to submit further evidence on the extracts from lists 3 and 4. Cooperation was sought with representatives of allergen manufacturers to establish which allergen extracts from list 4 are still commercially available. Extracts on list 4 that are rarely or never produced were excluded from the list of extracts to be rescued, reducing the 565 allergen extracts to 187. Next, experts from within and outside the immunotherapy committees of the 3 organizations mentioned have started searching for information on these 187 extracts that might have been missed by the FDA (see eResults, updated until March 8, 2012). Latest updates can be obtained from the e-mail account of the first author of this article (marlar1@prodigy.net.mx). Moreover, the general membership of all 3 organizations has been invited to submit information on the extracts

and comments on the FDA report. All information from allergists/immunologists is to be forwarded through the path described at the end of this article through the officers of the ACAAI and AAAAI so that there can be a coordinated reply to the FDA.

Information that Might be Acceptable to Rescue Allergen Extracts

According to strategies exposed in both federal letters published online by the FDA (September 26 and November 16, 2011), the following guidelines can be of help in the collection of useful information on allergen extracts from list 4, which might be acceptable to the FDA.

- A. Data published (PubMed, Institute for Scientific Information, other search instruments) but not found by the FDA panel on its search
 - a. Publications within the search field of the FDA but overlooked
 - b. Publications outside the search field of the FDA:
 - i. Publications in languages other than English
 - ii. Publications from before 1972
- B. Data from manufacturers, available to the public, but not found by the FDA
- C. Unpublished data. FDA states these data should include the following information, if available:
 - a. Date(s) of collection
 - b. Genus and species of the extract(s) studied and method of preparation
 - c. Dose and route of administration
 - d. Patient demography
 - e. Additional clinical information (including confirmatory testing, such as challenges or serum specific IgE determinations)
1. Case reports are acceptable when corroborated by the following:
 - a. Other case reports from independent authors
 - b. Well-described allergen challenge data
 - c. Valid cross-reactivity data.
2. For skin test data in the studies: obtained positive skin test results in index cases by either skin prick or intradermal methods, demonstrated by the following:
 - a. Wheal or erythema
 - b. Where appropriate, comparison to positive and negative control data in the same study participants
3. For studies with cross-reactivity data, demonstrated cross-reactivity by the following:
 - a. Enzyme-linked immunosorbent assay or radioallergosorbent test inhibition
 - b. Western immunoblot
 - c. Other valid immunochemical data

Conclusion

Recent reports by Bernstein et al and from the FDA presentations to the Allergenic Products Advisory Committee have shown that allergen immunotherapy is safer than ever, with no fatal events reported in a nationwide, ongoing surveillance study during the last 4 years,⁵⁻⁷ and through the FDA's MedWatch program, Adverse Event Reporting System (AERS),⁸ there was one fatal reaction reported in 2009. With these data on safety, along with studies of efficacy and cost-effectiveness,⁹⁻¹¹ it is clearer that immunotherapy is an important part of the medical treatment for allergic diseases, such as allergic rhinosinusitis, allergic asthma, insect sting hypersensitivity, and atopic dermatitis.¹² Part of the enhanced safety and efficacy of these products has been due to the efforts of CBER to enforce production of standardized extracts on one hand and of the

allergen manufacturers improving the general conditions for collection of raw material and production of allergenic vaccines for treatment and diagnosis on the other hand. As allergists we must applaud their efforts and assist them in this task of determining relevance for the allergens in question.

We ask your help in this undertaking. You will be helping yourselves and future allergists.

The AAAI and the ACAAI, together with the AAOA, are undertaking a joint effort to gather information and present a complete, coordinated report to the FDA. Submit your electronic comments on the report before April 15, 2012, to marlar1@prodigy.net.mx. After that deadline comments can only be submitted individually to the FDA docket by April 25, 2012.

Supplementary data

Supplementary data associated with this article can be found, in the online version, at doi:10.1016/j.anai.2012.03.007.

References

- [1] Noon L. Prophylactic inoculation against hay fever. *Lancet*. 1911;1:1572–1573.
- [2] Cooke R. The treatment of hay fever by active immunization. *Laryngoscope*. 1915;25:108–112.
- [3] Cohen SG, Frankland AW, Dworetzky M. Noon and Freeman on prophylactic inoculation against hay fever. *J Allergy Clin Immunol*. 2003;111:1142–1150.
- [4] Slater JE, Menzies SL, Bridgewater J, et al. The US Food and Drug Administration review of the safety and effectiveness of nonstandardized allergen extracts. *J Allergy Clin Immunol*. 2012. Epub ahead of print.
- [5] Bernstein DI, Wanner M, Borish L, Liss GM. Twelve-year survey of fatal reactions to allergen injections and skin testing: 1990–2001. *J Allergy Clin Immunol*. 2004;113:1129–1136.
- [6] Bernstein DI, Epstein T, Murphy-Berendts K, Liss GM. Surveillance of systemic reactions to subcutaneous immunotherapy injections: year 1 outcomes of the ACAAI and AAAAI collaborative study. *Ann Allergy Asthma Immunol*. 2010;104:530–535.
- [7] Bernstein DI, Blaiss MS, Cox LS, et al. Current standards and future directions in immunotherapy: perspectives on challenges and opportunities for the allergist. *Ann Allergy Asthma Immunol*. 2011;107:422–425.
- [8] MedWatch Online Voluntary Reporting Form (3500). Available at www.accessdata.fda.gov/scripts/medwatch/medwatch-online.htm. Accessed March 27, 2012.
- [9] Hankin CS, Cox L, Lang D, et al. Allergen immunotherapy and health care cost benefits for children with allergic rhinitis: a large-scale, retrospective, matched cohort study. *Ann Allergy Asthma Immunol*. 2010;104:79–85.
- [10] Hankin CS, Cox L, Bronstone A. The health economics of allergen immunotherapy. *Immunol Allergy Clin North Am*. 2011;31:325–341.
- [11] Lockey RF, Hankin CS. Health economics of allergen-specific immunotherapy in the United States. *J Allergy Clin Immunol*. 2011;127:39–43.
- [12] Cox L, Esch RE, Corbett M, Hankin C, Nelson M, Plunkett G. Allergen immunotherapy practice in the United States: guidelines, measures, and outcomes. *Ann Allergy Asthma Immunol*. 2011;107:289–299.

Count	Type	Product	SPT	SCIT	Xreact	Reference	Nr PDF	Species
186	Crop	Alfalfa	SPT	x	x	(1) this ref. for inhalant allergen, (2)[Liang 2010], [Wilkins 1999]	Review 30, comment 39, review 41, PDF 69, PDF 87; alfalfa crop risk factor for resp sympt: PDF 88.	Medicago sativa
1	Weed	Alkali Blite						Sueda??
106	Food	Apple	SPT	x	Bet v 1, apple, peach	(3, 4)	Review 23, 4 th allergen	
107	Food	Apricot	SPT	x	x		Review 105	
48	Mold	Aspergillus flavipes	x	x	x	Warner Carr	Review 62	
49	Mold	Aspergillus glaucus	SPT		Xreact other molds	(5, 6)	Review 55	
47	Mold	Aspergillus Mix						
50	Mold	Aspergillus nidulans	SPT		+ IgE	(7-9)	Comment 39, Review 40, PDF 73 (importance as airborne spores)	
51	Mold	Aspergillus ustus	x	x	x	DConstable, no data	Review 66	
2	Weed	Baccharis	SPT	x	X	(10)	PDF 26, review 49 could find no more data	19% SPT positive
52	Mold	Barley Smut	x	x	X	Mark Corbett	20 review	
108	Food	Basil						
109	Food	Bass, Black						
3	Weed	Bassia	SPT			(10)	PDF 26	32% SPT positive
110	Food	Bay Leaf	SPT	x		(11)	PDF 19, abst 24, abst 25	Bassia hyssopifolia 1 article on SPT; 2 abst on contact derm
111	Food	Beets	x	x	x	La shell no info	Review 33	
53	Mold	Bermuda Grain Smut	x	x	x	Linda Cox	Review 51	
112	Food	Blackberry	x	x	x	1 case report	Review 57	
113	Food	Blueberry						
18	Tree	Bottlebrush Tree	SPT	x	Xreact with malaleuca; Xreact with grass-pollen: paspalum notatum and malaleuca	(12, 13)	Abstract 85, review 107	Callistemon citrinus
4	Weed	Broom weed	SPT	x	x	(10), no further data from Chris Calabria	PDF 26	
114	Food	Brussel sprouts	x	x	Xreact Brassicaceae family	No clear data on BSP (10), WCarr could find no extra data	Review 58	
5	Weed	Burrobrush	SPT	x	x		PDF 26, review 62	27% SPT positive
115	Food	Cabbage	SPT	x	Xreact Pru p 3 LTP, SPT-IgE+	(14, 15)	Review 56	Hymenoclea salsola
116	Food	Casein						
117	Food	Cattail	SPT?			(16)	Review 68	'sensitization has been shown'
54	Mold	Cephalosporium	x	x	x	PCreticos	Review 90	
55	Mold	Chaetomium globosum						
118	Food	Cherry	x	x	x	Stan F	See comment 50	Prunus sp.
119	Food	Cinnamon	SPT	x	x	(17)	Review 75	Cinnamomum verum
56	Mold	Cladosporium sphaerospermum	x	X (only data for	Xreact with Clad herbarum	Xreact (Dixit 2000 abstr)	Review 23	Hormodendrum hordei

				Clad Herbar.					
120	Food	Clam	SPT			Also IgE serum	(18, 19)	Review 75, PDF 83	
121	Food	Clove	SPT neg	x	x		Negative study(20), (21) (22)	Review 23	
122	Food	Coffee	SPT	x	x				
123	Food	Corn Food	SPT	x	x		(23)	PDF 38	
99	Misc	Cottonseed	SPT	x	challenge		(24)	20 review, 21 PDF	
124	Food	Crab	SPT	x	x		(18, 25-31)	Review 48	
125	Food	Cranberry	x	x	x		No data found	20 review	
57	Mold	Curvularia inaequalis	SPT?	x	x		Non-specified 'curvularia(32-34)	Review 58, 59 and 68; 60 PDF	
6	Weed	Dog Fennel	SPT	x	x		[Liang 2010]	PDF 87,	Eupatorium capillifolium
19	Tree	Elm, Cedar							Ulmus crassifolia
58	Mold	Epidermophyton floccosum							
179	EPITH	Feathers, Mixed							Duck, Goose, Chicken California: 10.6% SPT positive
20	Tree	Fir, Douglas	SPT				SPT California: (10) No other data found No data found. Probably XReact w/other fishes because of parvalbumin	Overview 5, 26 PDF	
126	Food	Flounder	x	x	x			Review 66	
59	Mold	Geotrichum candidum							
		Gerbil Epithelium	SPT	x	X		(35, 36)	Review 27	Meriones unguiculatus
180	EPITH								
60	Mold	Gliocladium	SPT	x	X		(34)	Review 68	
181	EPITH	Goose Feathers	x	x	X		No data found		
61	Mold	Grain Smut Mix							
127	Food	Grapefruit	SPT ?	x	XReact fruit-pectine and cashew/pistache		(37, 38)	Review 42, 39	Citrus paradisi
128	Food	Grapes	SPT	x	X		(39-42)		
62	Mold	Grass Smut Mix	x	x	X		No data found	Review 56	
7	Weed	Greasewood	x	x	X		No data found		Sarcobatus vermiculatus
21	Tree	Groundsel Tree	x	x	X		Important aeroallergen(43, 44)	reviewed 17	
22	Tree	Hackberry							Celtis occidentalis
182	EPITH	Hamster Epithelium	SPT	x	X		(45-50)	Review 32	Mesocricetus auratus
183	EPITH	Hamster Epithelium							Cricetus sp. = Spondylocladium atrovirens= helminthosporium atrovirens
63	Mold	Helminthosporium solani	SPT?	x	X		Non-specified 'helminthosp'(32, 33, 51-56)	Review 58, complete review 72	
184	EPITH	Hog Hair	x	x	X		No data found	Review 62	

130	Food	Horseradish	x	x	X	No data found		33% SPT positive Allenrolfea occidentalis
8	Weed	Iodine Bush	SPT	x	X	(10)	PDF 26, comment 39	
64	Mold	Johnson Grass Smut						
9	Weed	Jute	indirect	x	X	No direct data No data found, but search doubtful	Review 66, abstr 84	Corchorus sp.
131	Food	Lactalbumin (Cow Alpha)	x	x	X			
132	Food	Lemon						
133	Food	Lima Bean	SPT?	x	Xreact mesquite	(57) (58)	31 review, 57 review, PDF 67	
134	Food	Lime	SPT			VSaper, still in review	comment 14, PDF 36	Citrus Aurantifolia
135	Food	Malt						
23	Tree	Mesquite	SPT	x	IgE RAST and challenge testing; Xreact lima bean	(10)	PDF 26, review, PDF 86 several abstr and articles, 30, review 31, abstr 80, four more links 81, review 94	California: 36% SPT positive, Prosopis sp.
65	Mold	Microsporum aud.						
66	Mold	Microsporum canis	x	x	x	No data found SBahna, old papers: strong Xreact cow/sheep milk 1 abstr on goat hair reaction	Review 33	Only 1 case report of chron.sinusitis
136	Food	Milk, Goat	x	x	x		Review 57, abstr 79	
137	Food	Millet						
67	Mold	Monilia Mix						
102	Insect	Mosquito				See below under list 3		Culex pipens
68	Mold	Mucor circinelloides f. lusitanicus						
69	Mold	Mucor Mix						
138	Food	Mushroom	x	x	x	No data found, but search doubtful		Agaricus sp. 1. Also specific IgE and SPT correlate 2. Musta rd-mugwort syndrome Brassica campestris, synon= Brassica Rapa
		Mustard Seed	SPT	x	Xreact peach, melon LTP. Xreact mugwort	(59-67)	Review 32	
139	Food							
10	Weed	Mustard, Field	SPT SPT doubtful	x	x	(58, 68, 69) (70)	review 20, PDF 36 Review 106	
70	Mold	Mycogone						
71	Mold	Neurospora intermedia						Neurospora sitaphila or Monilia sitophila
72	Mold	Nigrospora oryzae						
73	Mold	Nigrospora sphaerica	X	x	x	No data found	Reviewed 17	
140	Food	Nutmeg	SPT	x	Case-report, IgE& im- munoblot	(71), Negative study(20)	Review 62	One case-report well developed; one neg. study
74	Mold	Oat smut	SPT	x	x	(72)[Waldbott 1940]	Review 27	
141	Food	Onion	SPT			(20, 73)		Allium spp.

142	Food	Orange	SPT		Xreact orange tree		PDF 9, 71 and 72. review 43 and 44 and 45; comment 39,	Occupational allergy
24	Tree	Orange Pollen	SPT		Xreact orange fruit	(74, 75)	PDF 9, PDF 10	Occupational allergy
129, 143	Food	Oregano	SPT	x	Also IgE serum high	Case report (76)	Review 62 and 66	Extract was prepared with Frugoni method(?)
100	Misc	Orris Root						
25	Tree	Osage Orange						
75	Mold	Paecilomyces variotii						
27	Tree	Palm, Queen (Coco Palm)	x	x	Xreact among palms	(77-80)	Review 53 , PDF 54	Cocos plumosa
26	Tree	Palo Verde	SPT			(10)	PDF 26, review 93	California: 31% SPT + Cercidium torreyana
144	Food	Papaya	SPT	x	Xreact latex, + challenge	(81)	review 20, 22 PDF	
		Paprika	SPT	x	Xreact birch or vegetable, Bet v 1;RAST, histamine release, challenge	(65, 66, 71, 82-85)	Review 52	Also specific IgE and SPT correlate
145	Food	Parsley						
146	Food	Pea, Black-eyed	SPT			(23)	PDF 38	
147	Food	Pea, Black-eyed	SPT			(23)	PDF 38	
148	Food	Pear	SPT	x	Bet v 1, apple, peach	(3, 86, 87)	Review 23, 4 th allergen	Pyrus communis
149	Food	Pecan Food	x	x	x	No data found	See comment 50	
76	Mold	Penicillium digitatum	x	x	x	No data found		
77	Mold	Penicillium roseum						
151	Food	Pepper, Bell (Green)			Xreact Bet v 1	(85) (88-93)	Review 56, review 68	Capsicum annum var.annuum
152	Food	Pepper, Cayenne						
153	Food	Pepper, Red	SPT				Review 56	
154	Food	Peppermint	x	x	x	Only contact dermatitis	Review 58	
28	Tree	Peppertree, California	SPT	x	x	(94) (10, 95)	abst 4, PDF 26, review 14, PDF 87	California 26% SPT + Schinus molle
150	Food	Perch	x	x	Xreact mustard, melon	(60, 96)	nothing comment 50	
78	Mold	Phoma betae						
79	Mold	Phoma destructiva						
80	Mold	Phoma herbarum						
81	Mold	Phycomyces	X	x	x	No data found		
155	Food	Pimento All Spice)						
						N o d a t a f o		
29	Tree	Pine Mix (Lodgepole & Western Yellow Pine)		x	x			

30	Tree	Pine, Lombolly	x	x	x	No data found		
31	Tree	Pine, Ponderosa	SPT	x	x	(10, 97)	PDF 26, review 96	California 15% SPT+
32	Tree	Pine, Slash						
33	Tree	Pine, Southern Yellow	x	x	x	No data found	See comment 50	Pinus echinata
34	Tree	Pine, White						Pinus strobus
						(98) high cross-reactivity to birch pollen and latex profilins Bet v 2 Hev b 8		Prunus sp.
156	Food	Pineapple	x SPT(extr act made by own lab)	x	Xreact Birch and latex		Review 33, PDF 35	Ipomoea batatas
157	Food	Potato, Sweet		x	IgE, ELISA	JACI abstract	PDF 78, review 14	
11	Weed	Povertyweed	SPT	x	x	(10)	PDF 26, no further SPT data review 89	19% SPT positive Iva axillaris
		Pumpkin	SPT	x	x	Extracts used not always clear, one study found	Review of pumpkin 104.	
158	Food							
101	Misc	Pyrethrum	SPT+?	x	x	Articles from 30-50ies	7 overview	
		Rabbit Bush						21% SPT positive Chryothamnus nauseosus
12	Weed		SPT			(10)	PDF 26	
159	Food	Radish food						
160	Food	Raspberry						
35	Tree	Redwood Pollen	SPT	x	x	(99, 100) (101-103)	18 review	Sequoia sempervirens?
82	Mold	Rhizopus nigricans	SPT				2, 14 review, PDF 76 and 77	
83	Mold	Rhizopus oryzae						Rhizopus arrhizus or Rhizopus nigricans
84	Mold	Rhizopus stolonifer	x	x	x	No data found		
161	Food	Rice, Wild	SPT	x	x	(23)	PDF 38	
103	Grass	Rye Grass, Italian	SPT	x	x	(104, 105)	Review 27	Lolium multiflorum
162	Food	Safflower Seed	x	x	x	No data found		
		Sage, Mixed	x	x	Much Xreactivity of sages	(106)[Liang 2010]	Review 68, PDF 87	Might be no advantage of mix over single sage extract
13	Weed							California 23% SPT+
36	Tree	Salt Cedar, Tamarisk	SPT	x	x	(10, 58)	PDF 26, PDF 34, PDF 36	
85	Mold	Scopulariopsis	x	x	x	No data found	Review 96	
14	Weed	Scotch Broom	x SPT	x	x	No data found	23 comment	Cytisus scoparius
163	Food	Shellfish, Mixed 4	'shellfish'	x	X	(23)	PDF 38, review 6	Multiple
164	Food	Shrimp	SPT	x	Also IgE	(18, 67, 107, 108)	17 reviewed, PDF 83	
15	Weed	Sorrel/Dock Mix						Multiple
165	Food	Soybean	SPT			Soyoil(109) Soy (23)	PDF 38	

166	Food	Spinach	SPT	x	Some Xreact with Alternaria/Cladosporium and mushroom		Review 95	
86	Mold	Spodylocladium atrovirens						Helminthosporium solani
87	Mold	Sporotrichum						
37	Tree	Spruce, Blue						
167	Food	Squash						
88	Mold	Stachybotrys						
89	Mold	Stemphylium sarcinaeforme	SPT?	x		Non-specified 'stemphylium(32, 33)	Review 58; 59 till 61 PDF	
90	Mold	Stemphylium solani						
168	Food	Strawberry						
91	Mold	Streptomyces griseus	x	x	x	No data found	Review 96	
169	Food	Sugar Beet						
187	Crop	Sugar Beet Pollen	SPT	x	Also IgE positive, Strong Xreact cheno-podium SPT and in vitro	(110, 111)	PDF 11, PDF 12, review 66	2 allergens were identified in sugar beet pollen
38	Tree	Sumac, Upland	x	x	x	X	58. Review Nathanael Horne	
170	Food	Sweet Potato	SPT no use		In vitro positive	(112), In mice SPT (113)	3 PDF, 14 comment	SPT was of no use: negative in all 3 pts
16	Weed	Sweet White Clover						
39	Tree	Sweetgum	SPT			(10)	PDF 26	California 22% SPT+; Liquidambar styraciflua
40	Tree	Sycamore Western	SPT	x	x	(114)'sycamore'(115)	Review 56	Platanus racemosa
171	Food	Tapioca						
172	Food	Tea	x	x	x	LSher		Thea sinensis
92	Mold	Tetracoccusporium						
173	Food	Thyme	SPT extract prepared with Frugoni method	x	Also specific IgE positivity	(11, 76) (116) (42, 117-130) (23, 93, 131-133)	PDF 19, review 96	
174	Food	Tomato	SPT	x	SPT and DBPCFC, Presence of profilin and LTP, Xreact with latex, cherry, apple, Cannabis sativa, grass-pollen, banana, olive tree, Jap.Cedar		Review 56, last article on pepper; complete review is 74, PDF 38	
93	Mold	Trichoderma harzianum	SPT	x	IgE binding protein bands in SDS-PAGE	(134){Das 2009}(135) see refs in the review	Review 109	
94	Mold	Trichoderma lignorum	x	x	x	No data found		
95	Mold	Trichoderma viride					Some data in 1 article from review 109	
96	Mold	Trichophyton mentagrophytes	x	x	x	No data found		Trichophyton mentagrophytes
175	Food	Trout, Lake						Salvelinus sp.
185	EPITH	Turkey Feathers	x	x	x	No data found		
176	Food	Vanilla	x	x	x	No data found	Review 75	

41	Tree	Walnut, California Black	SPT	x	X	(10, 136-138)'black walnut'(114)	PDF 26, review 27	California: 26% SPT+ Juglans californica
42	Tree	Walnut, English						Juglans regia
177	Food	Watermelon	x	x	Xreact with ragweed, allergy to profilin in watermelon (Xreact citrus fruits)	(139){Asero, #872}	Review 57, PDF 68	Citrullus lanatus
104	Grass	Wheat Pollen						Triticum aestivum
97	Mold	Wheat Rust	x	x	x	No data found		
98	Mold	Wheat Smut	x	x	x	No data found	17 reviewed	
178	Food	White Fish	x	x	x	No data found	Review 75	
105	Grass	Wild Oat						Avena fatua
43	Tree	Willow, Black						Salix nigra
44	Tree	Willow, Black Western						
45	Tree	Willow, Pussy						
46	Tree	Winterfat	SPT			(10)	PDF 26	30% SPT positive Krascheninnikovia lanata
17	Weed	Yellow Dock	SPT			(10)	PDF 26	28.5% SPT positive Rumex crispus
List 3								
	Insects (WB)	Cockroach German Blatella germanica		SCIT		(140)	Abstr 29, 108 part of new pract parameters	non-specified cockroach
	Insects (WB)	Cockroach American Periplaneta americana	SPT	SCIT		(140, 141)	Abstr 28, abstr 29, 108 part of new pract parameters	29 = non-specified cockroach
	Insects (WB)	Ant, Fire Solenopsis invicta	SPT	SCIT			Abstr 46, comment on extracts 47	
	Insects (WB)	Mosquito Aedes taeniorhynchus	SPT	DBPC, SCIT	X react 3 most freq species	(142-145)	1 PDF, 15 abstr, 16 abstr	Annals article DBPC mosquito SCIT
	Molds	Aspergillus fumigatus	SPT			(101)	2	
	Molds	Penicillium notatum						
	Molds	Trichophyton tonsurans						SCIT with mixed Tricophyton/Candida extract
			SPT	SCIT	x	(146); and one more case report(147)	No species name given	
	Insects (WB)	Bee, Honey Apis mellifera						
	Insects (WB)	Cockroach Blatella orientalis						
	Molds	Aspergillus terreus						
	Molds	Aureobasidium pullulans						
	Molds	Aspergillus flavus						
	Molds	Aspergillus niger					PDF 12	
	Molds	Aspergillus ochraceus						

Molds	Aspergillus oryzae						
Molds	Candida albicans	SPT	SCIT	Challenge testing in article from 1986	(148, 149), SCIT case report (147, 150-154)	PDF 36, review 97, PDF 98-100, 102, 103	Some articles are older and of lower Q.
Molds	Epicoccum nigrum						
Molds	Penicillium chrysogenum						
Molds	Bipolaris sorokiniana						Bipolaris sorokiniana = (Helminthosporium sativum).
Insects (WB)	Ant, Fire Solenopsis richteri					Review 72	

References

1. Bener A, Safa W, Abdulhalik S, Lestringant GG. An analysis of skin prick test reactions in asthmatics in a hot climate and desert environment. *Allergie et immunologie*. 2002;34(8):281-6. Epub 2002/11/27.
2. Suliaman FA, Holmes WF, Kwick S, Khouri F, Ratard R. Pattern of immediate type hypersensitivity reactions in the Eastern Province, Saudi Arabia. *Ann Allergy Asthma Immunol*. 1997;78(4):415-8. Epub 1997/04/01.
3. Fernandez-Rivas M, van Ree R, Cuevas M. Allergy to Rosaceae fruits without related pollinosis. *J Allergy Clin Immunol*. 1997;100(6 Pt 1):728-33. Epub 1998/01/23.
4. Asero R, Mistrello G, Roncarolo D, Casarini M, Falagiani P. Allergy to nonspecific lipid transfer proteins in Rosaceae: a comparative study of different in vivo diagnostic methods. *Ann Allergy Asthma Immunol*. 2001;87(1):68-71. Epub 2001/07/31.
5. O'Neil CE, Reed MA, Hughes JM, Butcher BT, Lehrer SB. *Fusarium solani*: evidence for common antigenic/allergenic determinants with other Fungi Imperfecti. *Clin Allergy*. 1987;17(2):127-33. Epub 1987/03/01.
6. Karr RM, Wilson MR, Anicetti VR, Lehrer SB, Butcher BT, Salvaggio JE. An approach to fungal antigen relationships by radioallergosorbent test inhibition. *J Allergy Clin Immunol*. 1981;67(3):194-8. Epub 1981/03/01.
7. Sharma R, Gaur SN, Singh VP, Singh AB. Association between indoor fungi in Delhi homes and sensitization in children with respiratory allergy. *Medical mycology : official publication of the International Society for Human and Animal Mycology*. 2011. Epub 2011/11/23.
8. Lugauskas A, Krikstaponis A, Sveistyte L. Airborne fungi in industrial environments--potential agents of respiratory diseases. *Annals of agricultural and environmental medicine : AAEM*. 2004;11(1):19-25. Epub 2004/07/09.
9. Singh A, Prakash D, Singh AB. Sensitization to different species of *Aspergillus* in bakery workers and general atopic population. *Asian Pacific journal of allergy and immunology / launched by the Allergy and Immunology Society of Thailand*. 1998;16(1):5-15. Epub 1998/07/29.
10. Galant S, Berger W, Gillman S, Goldsobel A, Incaudo G, Kanter L, et al. Prevalence of sensitization to aeroallergens in California patients with respiratory allergy. Allergy Skin Test Project Team. *Ann Allergy Asthma Immunol*. 1998;81(3):203-10. Epub 1998/10/06.
11. Lemiere C, Cartier A, Lehrer SB, Malo JL. Occupational asthma caused by aromatic herbs. *Allergy*. 1996;51(9):647-9. Epub 1996/09/01.
12. Sweeney M, Hosseiny S, Hunter S, Klotz SD, Gennaro RN, White RS. Immunodetection and comparison of melaleuca, bottlebrush, and bahia pollens. *Int Arch Allergy Immunol*. 1994;105(3):289-96. Epub 1994/11/01.
13. Stanaland BE, Gennaro RN, Bausher MG, Klotz SD, White RS, Sweeney MJ. Allergenic cross-reactivity between *Callistemon citrinis* and *Melaleuca quinquenervia* pollens. *International archives of allergy and applied immunology*. 1988;86(1):35-41. Epub 1988/01/01.
14. Palacin A, Cumplido J, Figueroa J, Ahrazem O, Sanchez-Monge R, Carrillo T, et al. Cabbage lipid transfer protein Bra o 3 is a major allergen responsible for cross-reactivity between plant foods and pollens. *J Allergy Clin Immunol*. 2006;117(6):1423-9. Epub 2006/06/06.
15. Hermanides HK, Lahey-de Boer AM, Zuidmeer L, Guikers C, van Ree R, Knulst AC. Brassica oleracea pollen, a new source of occupational allergens. *Allergy*. 2006;61(4):498-502. Epub 2006/03/04.
16. Solomon WR, Burge HA. Airborne allergens: assessing exposure risks. *Bull N Y Acad Med*. 1981;57(7):507-23. Epub 1981/09/01.
17. Stager J, Wuthrich B, Johansson SG. Spice allergy in celery-sensitive patients. *Allergy*. 1991;46(6):475-8. Epub 1991/08/01.
18. Desjardins A, Malo JL, L'Archeveque J, Cartier A, McCants M, Lehrer SB. Occupational IgE-mediated sensitization and asthma caused by clam and shrimp. *J Allergy Clin Immunol*. 1995;96(5 Pt 1):608-17. Epub 1995/11/01.
19. Castillo R, Carrilo T, Blanco C, Quiralte J, Cuevas M. Shellfish hypersensitivity: clinical and immunological characteristics. *Allergol Immunopathol (Madr)*. 1994;22(2):83-7. Epub 1994/03/01.

20. Moneret-Vautrin DA, Morisset M, Lemerdy P, Croizier A, Kanny G. Food allergy and IgE sensitization caused by spices: CICBAA data (based on 589 cases of food allergy). *Allergie et immunologie*. 2002;34(4):135-40. Epub 2002/06/25.
21. Chen JL, Bahna SL. Spice allergy. *Ann Allergy Asthma Immunol*. 2011;107(3):191-9; quiz 9, 265. Epub 2011/08/31.
22. Lemiere C, Malo JL, McCants M, Lehrer S. Occupational asthma caused by roasted coffee: immunologic evidence that roasted coffee contains the same antigens as green coffee, but at a lower concentration. *J Allergy Clin Immunol*. 1996;98(2):464-6. Epub 1996/08/01.
23. Spergel JM, Beausoleil JL, Mascarenhas M, Liacouras CA. The use of skin prick tests and patch tests to identify causative foods in eosinophilic esophagitis. *J Allergy Clin Immunol*. 2002;109(2):363-8. Epub 2002/02/14.
24. Atkins FM, Wilson M, Bock SA. Cottonseed hypersensitivity: new concerns over an old problem. *J Allergy Clin Immunol*. 1988;82(2):242-50. Epub 1988/08/01.
25. Cartier A, Malo JL, Ghezzi H, McCants M, Lehrer SB. IgE sensitization in snow crab-processing workers. *J Allergy Clin Immunol*. 1986;78(2):344-8. Epub 1986/08/01.
26. Gautrin D, Cartier A, Howse D, Horth-Susin L, Jong M, Swanson M, et al. Occupational asthma and allergy in snow crab processing in Newfoundland and Labrador. *Occupational and environmental medicine*. 2010;67(1):17-23. Epub 2009/09/09.
27. Lao-Araya M, Trakultivakorn M. Prevalence of food allergy among preschool children in northern Thailand. *Pediatrics international : official journal of the Japan Pediatric Society*. 2011. Epub 2011/12/16.
28. Gill BV, Rice TR, Cartier A, Gautrin D, Neis B, Horth-Susin L, et al. Identification of crab proteins that elicit IgE reactivity in snow crab-processing workers. *J Allergy Clin Immunol*. 2009;124(5):1055-61. Epub 2009/08/12.
29. Thong BY, Cheng YK, Leong KP, Tang CY, Chng HH. Immediate food hypersensitivity among adults attending a clinical immunology/allergy centre in Singapore. *Singapore medical journal*. 2007;48(3):236-40. Epub 2007/03/08.
30. Jong M, Neis B, Cartier A, Horth-Susin L, Howse D. Knowledge, attitudes and beliefs regarding crab asthma in four communities of Newfoundland and Labrador. *International journal of circumpolar health*. 2004;63 Suppl 2:337-42. Epub 2005/03/02.
31. Cartier A, Lehrer SB, Horth-Susin L, Swanson M, Neis B, Howse D, et al. Prevalence of crab asthma in crab plant workers in Newfoundland and Labrador. *International journal of circumpolar health*. 2004;63 Suppl 2:333-6. Epub 2005/03/02.
32. Mabry RL, Marple BF, Mabry CS. Mold testing by RAST and skin test methods in patients with allergic fungal sinusitis. *Otolaryngology--head and neck surgery : official journal of American Academy of Otolaryngology-Head and Neck Surgery*. 1999;121(3):252-4. Epub 1999/09/03.
33. Koivikko A, Viander M, Lanner A. Use of the extended Phadebas RAST panel in the diagnosis of mould allergy in asthmatic children. *Allergy*. 1991;46(2):85-91. Epub 1991/02/01.
34. Rabito FA, Perry S, Davis WE, Yau CL, Levetin E. The Relationship between Mold Exposure and Allergic Response in Post-Katrina New Orleans. *Journal of allergy*. 2010;2010. Epub 2010/10/16.
35. McGivern D, Longbottom J, Davies D. Allergy to gerbils. *Clin Allergy*. 1985;15(2):163-5. Epub 1985/03/01.
36. de las Heras M, Cuesta-Herranz J, Cases B, de Miguel J, Fernandez-Nieto M, Sastre J, et al. Occupational asthma caused by gerbil: purification and partial characterization of a new gerbil allergen. *Ann Allergy Asthma Immunol*. 2010;104(6):540-2. Epub 2010/06/24.
37. Stogmann W, Kurz H. [Atopic dermatitis and food allergy in infancy and childhood]. *Wien Med Wochenschr*. 1996;146(15):411-4. Epub 1996/01/01. *Atopische Dermatitis und Nahrungsmittelallergie im Sauglings- und Kindesalter*.
38. Ferdman RM, Ong PY, Church JA. Pectin anaphylaxis and possible association with cashew allergy. *Ann Allergy Asthma Immunol*. 2006;97(6):759-60. Epub 2007/01/05.
39. Kalogeromitros DC, Makris MP, Gregoriou SG, Katoulis AC, Straurianeas NG. Sensitization to other foods in subjects with reported allergy to grapes. *Allergy Asthma Proc*. 2006;27(1):68-71. Epub 2006/04/08.
40. Kalogeromitros DC, Makris MP, Gregoriou SG, Mousatou VG, Lyras NG, Tarassi KE, et al. Grape anaphylaxis: a study of 11 adult onset cases. *Allergy Asthma Proc*. 2005;26(1):53-8. Epub 2005/04/09.

41. Vaswani SK, Chang BW, Carey RN, Hamilton RG. Adult onset grape hypersensitivity causing life threatening anaphylaxis. *Ann Allergy Asthma Immunol.* 1999;83(1):25-6. Epub 1999/08/07.
42. Czaja-Bulsa G, Bachorska J. [Food allergy in children with pollinosis in the Western sea coast region]. *Polski merkuriusz lekarski : organ Polskiego Towarzystwa Lekarskiego.* 1998;5(30):338-40. Epub 1999/04/02. Alergia pokarmowa u dzieci z pyłkowicą w rejonie pomorza zachodniego.
43. Esch RE, Hartsell CJ, Crenshaw R, Jacobson RS. Common allergenic pollens, fungi, animals, and arthropods. *Clin Rev Allergy Immunol.* 2001;21(2-3):261-92. Epub 2001/12/01.
44. McEldowney SJ, Bush RK. Pollen immunotherapy: selection, prevention, and future directions. *Curr Allergy Asthma Rep.* 2006;6(5):420-6. Epub 2006/08/11.
45. Liccardi G, Passalacqua G, Salzillo A, Piccolo A, Falagiani P, Russo M, et al. Is sensitization to furry animals an independent allergic phenotype in nonoccupationally exposed individuals? *J Investig Allergol Clin Immunol.* 2011;21(2):137-41. Epub 2011/04/06.
46. Berto JM, Pelaez A, Fernandez E, Lombardero M, Ferrer M. Siberian hamster: a new indoor source of allergic sensitization and respiratory disease. *Allergy.* 2002;57(2):155-9. Epub 2002/04/04.
47. Muljono IS, Voorhorst R. Atopy to dander from domestic animals. *Allergie und Immunologie.* 1978;24(1):50-60. Epub 1978/01/01.
48. Horiguchi T, Tachikawa S, Kasahara J, Kondo R, Miyazaki J, Shiga M, et al. Clinical studies on bronchial asthma caused by contact with hamsters. *Asian Pacific journal of allergy and immunology / launched by the Allergy and Immunology Society of Thailand.* 2000;18(3):141-5. Epub 2001/03/29.
49. Osuna H, Maeda Y, Mita H, Yasueda H, Kaneko F, Hayakawa T, et al. [18 cases of asthma induced by hamster or guinea-pig bred as pets]. *Arerugi = [Allergy].* 1997;46(10):1072-5. Epub 1997/12/24.
50. Desjardins A, Benoit C, Ghezze H, L'Archeveque J, Leblanc C, Paquette L, et al. Exposure to domestic animals and risk of immunologic sensitization in subjects with asthma. *J Allergy Clin Immunol.* 1993;91(5):979-86. Epub 1993/05/01.
51. Karlsson-Borga A, Jonsson P, Rolfsen W. Specific IgE antibodies to 16 widespread mold genera in patients with suspected mold allergy. *Ann Allergy.* 1989;63(6 Pt 1):521-6. Epub 1989/12/01.
52. Stewart AE, Hunsaker DH. Fungus-specific IgG and IgE in allergic fungal rhinosinusitis. *Otolaryngology--head and neck surgery : official journal of American Academy of Otolaryngology-Head and Neck Surgery.* 2002;127(4):324-32. Epub 2002/10/29.
53. Horner WE, Helbling A, Salvaggio JE, Lehrer SB. Fungal allergens. *Clinical microbiology reviews.* 1995;8(2):161-79. Epub 1995/04/01.
54. Szantho A, Osvath P, Horvath Z, Novak EK, Kujalek E. Study of mold allergy in asthmatic children in Hungary. *J Investig Allergol Clin Immunol.* 1992;2(2):84-90. Epub 1992/03/01.
55. King WP. Clinical significance of molds newly available for radioallergosorbent testing. *Otolaryngology--head and neck surgery : official journal of American Academy of Otolaryngology-Head and Neck Surgery.* 1989;101(1):1-4. Epub 1989/07/01.
56. Santilli J, Jr., Rockwell WJ, Collins RP. Individual patterns of immediate skin reactivity to mold extracts. *Ann Allergy.* 1990;65(6):454-8. Epub 1990/12/01.
57. Dhyani A, Arora N, Jain VK, Sridhara S, Singh BP. Immunoglobulin E (IgE)-mediated cross-reactivity between mesquite pollen proteins and lima bean, an edible legume. *Clin Exp Immunol.* 2007;149(3):517-24. Epub 2007/07/07.
58. Mari A. Multiple pollen sensitization: a molecular approach to the diagnosis. *Int Arch Allergy Immunol.* 2001;125(1):57-65. Epub 2001/06/01.
59. Vereda A, Sirvent S, Villalba M, Rodriguez R, Cuesta-Herranz J, Palomares O. Improvement of mustard (*Sinapis alba*) allergy diagnosis and management by linking clinical features and component-resolved approaches. *J Allergy Clin Immunol.* 2011;127(5):1304-7. Epub 2011/02/26.
60. Sirvent S, Palomares O, Vereda A, Villalba M, Cuesta-Herranz J, Rodriguez R. nsLTP and profilin are allergens in mustard seeds: cloning, sequencing and recombinant production of Sin a 3 and Sin a 4. *Clin Exp Allergy.* 2009;39(12):1929-36. Epub 2010/01/21.
61. Shim YY, Wanasundara JP. Quantitative detection of allergenic protein Sin a 1 from yellow mustard (*Sinapis alba* L.) seeds using enzyme-linked immunosorbent assay. *Journal of agricultural and food chemistry.* 2008;56(4):1184-92. Epub 2008/01/26.
62. Rance F, Dutau G, Abbal M. Mustard allergy in children. *Allergy.* 2000;55(5):496-500. Epub 2000/06/08.

63. Caballero T, San-Martin MS, Padial MA, Contreras J, Cabanas R, Barranco P, et al. Clinical characteristics of patients with mustard hypersensitivity. *Ann Allergy Asthma Immunol.* 2002;89(2):166-71. Epub 2002/08/29.
64. Figueroa J, Blanco C, Dumpierrez AG, Almeida L, Ortega N, Castillo R, et al. Mustard allergy confirmed by double-blind placebo-controlled food challenges: clinical features and cross-reactivity with mugwort pollen and plant-derived foods. *Allergy.* 2005;60(1):48-55. Epub 2004/12/04.
65. Niinimäki A, Hannuksela M, Makinen-Kiljunen S. Skin prick tests and in vitro immunoassays with native spices and spice extracts. *Ann Allergy Asthma Immunol.* 1995;75(3):280-6. Epub 1995/09/01.
66. Niinimäki A, Björkstén F, Puukka M, Tolonen K, Hannuksela M. Spice allergy: results of skin prick tests and RAST with spice extracts. *Allergy.* 1989;44(1):60-5. Epub 1989/01/01.
67. Stricker WE, Anorve-Lopez E, Reed CE. Food skin testing in patients with idiopathic anaphylaxis. *J Allergy Clin Immunol.* 1986;77(3):516-9. Epub 1986/03/01.
68. Poikonen S, Puumalainen TJ, Kautiainen H, Burri P, Palosuo T, Reunala T, et al. Turnip rape and oilseed rape are new potential food allergens in children with atopic dermatitis. *Allergy.* 2006;61(1):124-7. Epub 2005/12/21.
69. Puumalainen TJ, Poikonen S, Kotovuori A, Vaali K, Kalkkinen N, Reunala T, et al. Napins, 2S albumins, are major allergens in oilseed rape and turnip rape. *J Allergy Clin Immunol.* 2006;117(2):426-32. Epub 2006/02/08.
70. Lane AP, Pine HS, Pillsbury HC, 3rd. Allergy testing and immunotherapy in an academic otolaryngology practice: a 20-year review. *Otolaryngology--head and neck surgery : official journal of American Academy of Otolaryngology-Head and Neck Surgery.* 2001;124(1):9-15. Epub 2001/03/03.
71. Sastre J, Olmo M, Novalvos A, Ibanez D, Lahoz C. Occupational asthma due to different spices. *Allergy.* 1996;51(2):117-20. Epub 1996/02/01.
72. McDevitt TJ, Mallea M, Dominick T, Holte KE. Allergic evaluation of cereal smuts. *Ann Allergy.* 1977;38(1):12-5. Epub 1977/01/01.
73. Asero R, Mistrello G, Roncarolo D, Amato S. A case of onion allergy. *J Allergy Clin Immunol.* 2001;108(2):309-10. Epub 2001/08/10.
74. Iraneta SG, Seoane MA, Laucella SA, Apicella C, Alonso A, Duschak VG. Antigenicity and immunocrossreactivity of orange tree pollen and orange fruit allergenic extracts. *Int Arch Allergy Immunol.* 2005;137(4):265-72. Epub 2005/06/23.
75. El-Qutob Lopez D, Morales Rubio C, Cervera Aznar R, Pelaez Hernandez A. Allergic reaction after ingestion of orange blossom pollen. *J Investig Allergol Clin Immunol.* 2006;16(2):140-1. Epub 2006/05/13.
76. Benito M, Jorro G, Morales C, Pelaez A, Fernandez A. Labiatae allergy: systemic reactions due to ingestion of oregano and thyme. *Ann Allergy Asthma Immunol.* 1996;76(5):416-8. Epub 1996/05/01.
77. Chowdhury I, Chakraborty P, Gupta-Bhattacharya S, Chanda S. Allergenic relationship among four common and dominant airborne palm pollen grains from Eastern India. *Clin Exp Allergy.* 1998;28(8):977-83. Epub 1998/10/02.
78. Chowdhury I, Chakraborty P, Gupta-Bhattacharya S, Chanda S. Antigenic relationship between four airborne palm pollen grains from Calcutta, India. *Annals of agricultural and environmental medicine : AAEM.* 1999;6(1):53-6. Epub 1999/06/29.
79. Jelks ML. Florida pollen review. *Allergy proceedings : the official journal of regional and state allergy societies.* 1990;11(6):273-80. Epub 1990/11/01.
80. Waisel Y, Keynan N, Gil T, Tayar D, Bezerano A, Goldberg A, et al. [Allergic responses to date palm and pecan pollen in Israel]. *Harefuah.* 1994;126(6):305-10, 68. Epub 1994/03/15.
81. Blanco C, Ortega N, Castillo R, Alvarez M, Dumpierrez AG, Carrillo T. Carica papaya pollen allergy. *Ann Allergy Asthma Immunol.* 1998;81(2):171-5. Epub 1998/09/02.
82. van Toorenbergen AW, Dieges PH. Occupational allergy in horticulture: demonstration of immediate-type allergic reactivity to freesia and paprika plants. *International archives of allergy and applied immunology.* 1984;75(1):44-7. Epub 1984/01/01.
83. Leitner A, Jensen-Jarolim E, Grimm R, Wuthrich B, Ebner H, Scheiner O, et al. Allergens in pepper and paprika. Immunologic investigation of the celery-birch-mugwort-spice syndrome. *Allergy.* 1998;53(1):36-41. Epub 1998/03/10.

84. Vega de la Osada F, Esteve Krauel P, Alonso Lebrero E, Ibanez Sandin MD, Munoz Martinez MC, Laso Borrego MT. [Sensitization to paprika: anaphylaxis after intake and rhinoconjunctivitis after contact through airways]. *Medicina clinica*. 1998;111(7):263-6. Epub 1998/10/28. Sensibilizacion al pimenton: anafilaxia por ingestion y rinoconjuntivitis tras contacto por via aerea.
85. Ebner C, Jensen-Jarolim E, Leitner A, Breiteneder H. Characterization of allergens in plant-derived spices: Apiaceae spices, pepper (Piperaceae), and paprika (bell peppers, Solanaceae). *Allergy*. 1998;53(46 Suppl):52-4. Epub 1998/11/24.
86. Florido Lopez JF, Quiralte Enriquez J, Arias de Saavedra Alias JM, Saenz de San Pedro B, Martin Casanez E. An allergen from *Olea europaea* pollen (Ole e 7) is associated with plant-derived food anaphylaxis. *Allergy*. 2002;57 Suppl 71:53-9. Epub 2002/08/14.
87. Moneret-Vautrin DA, Kanny G, Morisset M, Rance F, Fardeau MF, Beaudouin E. Severe food anaphylaxis: 107 cases registered in 2002 by the Allergy Vigilance Network. *Eur Ann Allergy Clin Immunol*. 2004;36(2):46-51. Epub 2004/04/06.
88. Gerth van Wijk R, Patiwaal JA, de Jong NW, de Groot H, Burdorf A. Occupational rhinitis in bell pepper greenhouse workers: determinants of leaving work and the effects of subsequent allergen avoidance on health-related quality of life. *Allergy*. 2011;66(7):903-8. Epub 2011/02/10.
89. Groenewoud GC, de Groot H, van Wijk RG. Impact of occupational and inhalant allergy on rhinitis-specific quality of life in employees of bell pepper greenhouses in the Netherlands. *Ann Allergy Asthma Immunol*. 2006;96(1):92-7. Epub 2006/01/31.
90. Groenewoud GC, de Jong NW, van Oorschot-van Nes AJ, Vermeulen AM, van Toorenenbergen AW, Mulder PG, et al. Prevalence of occupational allergy to bell pepper pollen in greenhouses in the Netherlands. *Clin Exp Allergy*. 2002;32(3):434-40. Epub 2002/04/10.
91. Wagner S, Radauer C, Hafner C, Fuchs H, Jensen-Jarolim E, Wuthrich B, et al. Characterization of cross-reactive bell pepper allergens involved in the latex-fruit syndrome. *Clin Exp Allergy*. 2004;34(11):1739-46. Epub 2004/11/17.
92. Vermeulen AM, Groenewoud GC, de Jong NW, de Groot H, Gerth van Wijk R, van Toorenenbergen AW. Primary sensitization to sweet bell pepper pollen in greenhouse workers with occupational allergy. *Clin Exp Allergy*. 2003;33(10):1439-42. Epub 2003/10/02.
93. Willeroider M, Fuchs H, Ballmer-Weber BK, Focke M, Susani M, Thalhamer J, et al. Cloning and molecular and immunological characterisation of two new food allergens, Cap a 2 and Lyc e 1, profilins from bell pepper (*Capsicum annuum*) and Tomato (*Lycopersicon esculentum*). *Int Arch Allergy Immunol*. 2003;131(4):245-55. Epub 2003/08/14.
94. Vargas Correa JB, Sanchez Solis L, Farfan Ale JA, Noguchi H, Moguel Banos MT, Vargas de la Pena MI. [Allergological study of pollen of mango (*Mangifera indica*) and cross reactivity with pollen of piru (*Schinus molle*)]. *Revista alergica : organo oficial de la Sociedad Mexicana de Alergia e Inmunologia*. 1991;38(5):134-8. Epub 1991/09/01. Estudio alergologico del polen del mango (*Mangifera indica*) y reactividad cruzada con el polen del piru (*Schinus molle*).
95. Liang KL, Su MC, Shiao JY, Wu SH, Li YH, Jiang RS. Role of pollen allergy in Taiwanese patients with allergic rhinitis. *Journal of the Formosan Medical Association = Taiwan yi zhi*. 2010;109(12):879-85. Epub 2011/01/05.
96. Asero R, Jimeno L, Barber D. Component-resolved diagnosis of plant food allergy by SPT. *Eur Ann Allergy Clin Immunol*. 2008;40(4):115-21. Epub 2009/02/21.
97. Freeman GL. Pine pollen allergy in northern Arizona. *Ann Allergy*. 1993;70(6):491-4. Epub 1993/06/01.
98. Reindl J, Rihs HP, Scheurer S, Wangorsch A, Hausteiner D, Vieths S. IgE reactivity to profilin in pollen-sensitized subjects with adverse reactions to banana and pineapple. *Int Arch Allergy Immunol*. 2002;128(2):105-14. Epub 2002/06/18.
99. Midoro-Horiuti T, Nouno S, Seino Y. Skin tests of pollen grains of taxodiaceae and cupressaceae in children with bronchial asthma. *Acta paediatrica Japonica; Overseas edition*. 1992;34(5):501-4. Epub 1992/10/01.
100. Schwiertz LA, Goetz DW, Whisman BA, Reid MJ. Cross-reactivity among conifer pollens. *Ann Allergy Asthma Immunol*. 2000;84(1):87-93. Epub 2000/02/16.
101. Zhang Y, Chen J, Chen Y, Dong J, Wei Q, Lou J. Environmental mycological study and allergic respiratory disease among tobacco processing workers. *Journal of occupational health*. 2005;47(2):181-7. Epub 2005/04/13.
102. Gravesen S. Fungi as a cause of allergic disease. *Allergy*. 1979;34(3):135-54. Epub 1979/06/01.
103. Sridhara S, Gangal SV, Joshi AP. Immunochemical investigation of allergens from *Rhizopus nigricans*. *Allergy*. 1990;45(8):577-86. Epub 1990/11/01.

104. Sopelete MC, Moreira PF, Silva DA, Cunha-Junior JP, Vieira FA, Sung SS, et al. Sensitization to *Lolium multiflorum* grass pollen in pollinosis patients: evaluation of allergenic fractions recognized by specific IgE antibodies. *Int Arch Allergy Immunol*. 2006;140(2):121-30. Epub 2006/04/08.
105. Millman M, Wolter GH, Millman S, Rosen R. A New in Vitro Test for the Detection of Antibody in Sera of Patients Allergic to *Lolium Multiflorum* (Italian Rye Grass). *Ann Allergy*. 1964;22:136-45. Epub 1964/03/01.
106. Katial RK, Lin FL, Stafford WW, Ledoux RA, Westley CR, Weber RW. Mugwort and sage (*Artemisia*) pollen cross-reactivity: ELISA inhibition and immunoblot evaluation. *Ann Allergy Asthma Immunol*. 1997;79(4):340-6. Epub 1997/11/14.
107. Yang AC, Arruda LK, Santos AB, Barbosa MC, Chapman MD, Galvao CE, et al. Measurement of IgE antibodies to shrimp tropomyosin is superior to skin prick testing with commercial extract and measurement of IgE to shrimp for predicting clinically relevant allergic reactions after shrimp ingestion. *J Allergy Clin Immunol*. 2010;125(4):872-8. Epub 2010/03/17.
108. Lemiere C, Desjardins A, Lehrer S, Malo JL. Occupational asthma to lobster and shrimp. *Allergy*. 1996;51(4):272-3. Epub 1996/04/01.
109. Moneret-Vautrin DA, Morisset M, Flabbee J, Kanny G, Kirch F, Parisot L. Unusual soy oil allergy. *Allergy*. 2002;57(3):266-7. Epub 2002/03/22.
110. Luoto S, Lambert W, Blomqvist A, Emanuelsson C. The identification of allergen proteins in sugar beet (*Beta vulgaris*) pollen causing occupational allergy in greenhouses. *Clinical and molecular allergy : CMA*. 2008;6:7. Epub 2008/08/13.
111. Hohenleutner S, Pfau A, Hohenleutner U, Landthaler M. [Sugar beet pollen allergy as a rare occupational disease]. *Hautarzt*. 1996;47(6):462-4. Epub 1996/06/01. Zuckerrubenpollenallergie als seltene Berufserkrankung.
112. Velloso A, Baeza M, Tornero P, Herrero T, Fernández M, Rubio M, et al. Anaphylaxis caused by *Ipomoea Batatas*. *J Allergy Clin Immunol*. 2004;114:s242.
113. Birmingham N, Payankulam S, Thanesvorakul S, Stefura B, HayGlass K, Gangur V. An ELISA-based method for measurement of food-specific IgE antibody in mouse serum: an alternative to the passive cutaneous anaphylaxis assay. *Journal of immunological methods*. 2003;275(1-2):89-98. Epub 2003/04/02.
114. Lewis WH, Imber WE. Allergy epidemiology in the St. Louis, Missouri, area. III. Trees. *Ann Allergy*. 1975;35(2):113-9. Epub 1975/08/01.
115. Farhoudi A, Razavi A, Chavoshzadeh Z, Heidarzadeh M, Bermanian MH, Nabavi M. Descriptive study of 226 patients with allergic rhinitis and asthma in karaj city. *Iranian journal of allergy, asthma, and immunology*. 2005;4(2):99-101. Epub 2007/02/16.
116. Ballmer-Weber BK, Hoffmann-Sommergruber K. Molecular diagnosis of fruit and vegetable allergy. *Curr Opin Allergy Clin Immunol*. 2011;11(3):229-35. Epub 2011/04/05.
117. Mattila L, Kilpelainen M, Terho EO, Koskenvuo M, Helenius H, Kalimo K. Food hypersensitivity among Finnish university students: association with atopic diseases. *Clin Exp Allergy*. 2003;33(5):600-6. Epub 2003/05/20.
118. Larramendi CH, Ferrer A, Huertas AJ, Garcia-Abujeta JL, Andreu C, Tella R, et al. Sensitization to tomato peel and pulp extracts in the Mediterranean Coast of Spain: prevalence and co-sensitization with aeroallergens. *Clin Exp Allergy*. 2008;38(1):169-77. Epub 2007/11/17.
119. de Larramendi CH, Carnes J, Garcia-Abujeta JL, Garcia-Endrino A, Munoz-Palomino E, Huertas AJ, et al. Sensitization and allergy to *Cannabis sativa* leaves in a population of tomato (*Lycopersicon esculentum*)-sensitized patients. *Int Arch Allergy Immunol*. 2008;146(3):195-202. Epub 2008/02/13.
120. de Martino M, Novembre E, Cozza G, de Marco A, Bonazza P, Vierucci A. Sensitivity to tomato and peanut allergens in children monosensitized to grass pollen. *Allergy*. 1988;43(3):206-13. Epub 1988/04/01.
121. Reche M, Pascual CY, Vicente J, Caballero T, Martin-Munoz F, Sanchez S, et al. Tomato allergy in children and young adults: cross-reactivity with latex and potato. *Allergy*. 2001;56(12):1197-201. Epub 2001/12/12.
122. Kondo Y, Tokuda R, Urisu A, Matsuda T. Assessment of cross-reactivity between Japanese cedar (*Cryptomeria japonica*) pollen and tomato fruit extracts by RAST inhibition and immunoblot inhibition. *Clin Exp Allergy*. 2002;32(4):590-4. Epub 2002/04/26.
123. Zacharisen MC, Elms NP, Kurup VP. Severe tomato allergy (*Lycopersicon esculentum*). *Allergy Asthma Proc*. 2002;23(2):149-52. Epub 2002/05/11.
124. Eriksson EM, Bovy A, Manning K, Harrison L, Andrews J, De Silva J, et al. Effect of the Colorless non-ripening mutation on cell wall biochemistry and gene expression during tomato fruit development and ripening. *Plant physiology*. 2004;136(4):4184-97. Epub 2004/11/26.
125. Petersen A, Vieths S, Aulepp H, Schlaak M, Becker WM. Ubiquitous structures responsible for IgE cross-reactivity between tomato fruit and grass pollen allergens. *J Allergy Clin Immunol*. 1996;98(4):805-15. Epub 1996/10/01.

126. Barral P, Batanero E, Palomares O, Quiralte J, Villalba M, Rodriguez R. A major allergen from pollen defines a novel family of plant proteins and shows intra- and interspecies [correction of interspecie] cross-reactivity. *J Immunol.* 2004;172(6):3644-51. Epub 2004/03/09.
127. Palomares O, Villalba M, Quiralte J, Polo F, Rodriguez R. 1,3-beta-glucanases as candidates in latex-pollen-vegetable food cross-reactivity. *Clin Exp Allergy.* 2005;35(3):345-51. Epub 2005/03/24.
128. Lopez-Matas MA, Ferrer A, Larramendi CH, Huertas AJ, Pagan JA, Garcia-Abujeta JL, et al. In vitro cross-reactivity between tomato and other plant allergens. *Ann Allergy Asthma Immunol.* 2009;103(5):425-31. Epub 2009/11/26.
129. Asero R, Mistrello G, Roncarolo D, de Vries SC, Gautier MF, Ciurana CL, et al. Lipid transfer protein: a pan-allergen in plant-derived foods that is highly resistant to pepsin digestion. *Int Arch Allergy Immunol.* 2000;122(1):20-32. Epub 2000/06/22.
130. Armentia A, Callejo A, Diaz-Perales A, Martin-Gil FJ, Salcedo G. Enhancement of tomato allergenicity after treatment with plant hormones. *Allergol Immunopathol (Madr).* 2003;31(1):44-6. Epub 2003/02/08.
131. Dolle S, Lehmann K, Schwarz D, Weckwert W, Scheler C, George E, et al. Allergenic activity of different tomato cultivars in tomato allergic subjects. *Clin Exp Allergy.* 2011;41(11):1643-52. Epub 2011/10/01.
132. Asero R, Mistrello G, Amato S. Anaphylaxis caused by tomato lipid transfer protein. *Eur Ann Allergy Clin Immunol.* 2011;43(4):125-6. Epub 2011/10/11.
133. van Toorenenbergen AW, Waanders J, Gerth Van Wijk R, Vermeulen AM. Immunoblot analysis of IgE-binding antigens in paprika and tomato pollen. *Int Arch Allergy Immunol.* 2000;122(4):246-50. Epub 2000/09/06.
134. Bissett J. Fungi associated with urea-formaldehyde foam insulation in Canada. *Mycopathologia.* 1987;99(1):47-56. Epub 1987/07/01.
135. Hansen VM, Winding A, Madsen AM. Exposure to bioaerosols during the growth season of tomatoes in an organic greenhouse using *Supresivit* (*Trichoderma harzianum*) and *Mycostop* (*Streptomyces griseoviridis*). *Applied and environmental microbiology.* 2010;76(17):5874-81. Epub 2010/07/14.
136. Shapiro RS, Eisenberg BC, Binder W. Pollen and mold spores. An atmospheric and field survey in Los Angeles. *California medicine.* 1965;103(5):340-2. Epub 1965/11/01.
137. Shapiro RS, Eisenberg BC, Binder W. The importance of field studies and meteorologic factors in pollen and mold surveys. A three-year report of Southern California. *Ann Allergy.* 1965;23(10):484-91. Epub 1965/10/01.
138. Small WS, Small GM. Botanical survey of Southern California. *Ann Allergy.* 1946;4(5):352-71. Epub 1946/09/01.
139. Asero R, Mistrello G, Amato S. The nature of melon allergy in ragweed-allergic subjects: A study of 1000 patients. *Allergy Asthma Proc.* 2011;32(1):64-7. Epub 2011/01/26.
140. Kang BC, Johnson J, Morgan C, Chang JL. The role of immunotherapy in cockroach asthma. *The Journal of asthma : official journal of the Association for the Care of Asthma.* 1988;25(4):205-18. Epub 1988/01/01.
141. Srivastava D, Gaur SN, Arora N, Singh BP. Clinico-immunological changes post-immunotherapy with *Periplaneta americana*. *European journal of clinical investigation.* 2011;41(8):879-88. Epub 2011/02/18.
142. Ariano R, Panzani RC. Efficacy and safety of specific immunotherapy to mosquito bites. *Eur Ann Allergy Clin Immunol.* 2004;36(4):131-8. Epub 2004/06/08.
143. McCormack DR, Salata KF, Hershey JN, Carpenter GB, Engler RJ. Mosquito bite anaphylaxis: immunotherapy with whole body extracts. *Ann Allergy Asthma Immunol.* 1995;74(1):39-44. Epub 1995/01/01.
144. Peng Z, Simons FE. Cross-reactivity of skin and serum specific IgE responses and allergen analysis for three mosquito species with worldwide distribution. *J Allergy Clin Immunol.* 1997;100(2):192-8. Epub 1997/08/01.
145. Srivastava D, Singh BP, Sudha VT, Arora N, Gaur SN. Immunotherapy with mosquito (*Culex quinquefasciatus*) extract: a double-blind, placebo-controlled study. *Ann Allergy Asthma Immunol.* 2007;99(3):273-80. Epub 2007/10/04.
146. Palma-Carlos AG, Palma-Carlos ML. Trichophyton allergy: review of 89 cases. *Eur Ann Allergy Clin Immunol.* 2006;38(6):177-81. Epub 2006/08/26.
147. Palma-Carlos AG, Hanna KM, Median M, Palma-Carlos MM. Effect of immunotherapy on fungal allergy: a case report. *Eur Ann Allergy Clin Immunol.* 2006;38(4):122-3. Epub 2006/06/30.
148. Palma-Carlos AG, Palma-Carlos ML, Costa AC. Candida and allergy. *Allergie et immunologie.* 2002;34(9):322-4. Epub 2003/01/07.

149. Ciprandi G, Cirillo I, Fenoglio D, Marseglia G, Tosca MA. Sublingual immunotherapy induces spirometric improvement associated with IL-10 production: Preliminary reports. *Intl Pharmacoimmunol* 2006;6(8):1370-3.
150. Benoliel P. [Treatment of sino-nasal polyposis by *Candida albicans* immunotherapy: apropos of 4 cases]. *Allerg Immunol (Paris)*. 2001;33(10):388-94. Epub 2002/01/23. Traitement d'une polypose nasosinusienne (PNS) par immunotherapie au *Candida albicans*: a propos de 4 cas.
151. Rigg D, Miller MM, Metzger WJ. Recurrent allergic vulvovaginitis: treatment with *Candida albicans* allergen immunotherapy. *Am J Obstet Gynecol*. 1990;162(2):332-6. Epub 1990/02/01.
152. Rancourt MF, Turbie P. [Diagnosis of respiratory allergies to fungi and *Candida albicans*]. *Revue de pneumologie clinique*. 1986;42(4):183-6. Epub 1986/01/01. Contribution au diagnostic des allergies respiratoires aux moisissures et a *Candida albicans*.
153. Halmy K, Serfozo J, Toth-Jakab A. [Changes in the immunoreactivity of patients with dyshidrosis caused by *Candida* species and treated with desensitization]. *Dermatologische Monatschrift*. 1983;169(7):446-51. Epub 1983/01/01. Veranderungen der Immunreaktivitat bei Patienten mit durch *Candida*-Arten verursachten und Desensibilisierung behandelten Dyshidrosen.
154. Rosedale N, Browne K. Hyposensitisation in the management of recurring vaginal candidiasis. *Ann Allergy*. 1979;43(4):250-3. Epub 1979/10/01.