

# Oral allergy syndrome

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**Oral allergy syndrome** or **OAS** is a type of food allergy typified by a cluster of allergic reactions in the mouth in response to eating certain (usually fresh) fruits, nuts, and vegetables that typically develops in adult hay fever sufferers.<sup>[1]</sup> Another term used for this syndrome is "Pollen-Food Allergy." In adults up to 60% of all food allergic reactions are due to cross-reactions between foods and inhalative allergens.<sup>[2]</sup>

OAS is a Type 1 or IgE-mediated immune response, which is sometimes called a "true allergy". The body's immune system produces IgE antibodies against pollen; in OAS, these antibodies also bind to (or cross-react with) other structurally similar proteins found in botanically related plants.

## Symptoms

OAS sufferers may have any of a number of allergic reactions that usually occur very rapidly, within minutes of eating a trigger food. The most common reaction is an itching or burning sensation in the lips, mouth, and/or pharynx. Sometimes other reactions can be triggered in the eyes, nose, and skin. Swelling of the lips, tongue, and uvula and a sensation of tightness in the throat may be observed. Seldom it can result in anaphylaxis.<sup>[3]</sup> If a sufferer swallows the food, and the allergen is not destroyed by the stomach acids there is a good chance that there will be a reaction from histamine release later in the gastrointestinal tract. Vomiting, diarrhea, severe indigestion, or cramps may occur.<sup>[4]</sup>

## Mechanism

In OAS, the immune system produces antibodies that are capable of binding to both pollen proteins and structurally similar food proteins. Consequently, the same immune system response can trigger allergy symptoms in two different situations: hay fever (in the presence of pollen) and food allergy (in the presence of certain foods). Histamine releases from mast cells located in the oropharynx, gut and skin when IgE binds to the molecule causing local inflammation - itching, swelling, pain, and so on.

The triggering molecule involved is known as an allergen. Allergens vary in their stability and may or may not survive digestion, storage, heat, cold, cooking or pasteurisation.

Lipid transfer proteins (LTP) are not easily denatured by digestion or cooking and are important triggers of anaphylaxis.

The antibody may react to the linear (amino acid) sequence of the protein or to a conformational epitope. If the response is to the conformational epitope, then the person with OAS may be able to eat the food when it is cooked, but not when it is raw. If the response is to the linear sequence (common in tree pollen/nut allergies), then cooking the food has no effect on its ability to trigger an allergic reaction.

## Cross reactions

Allergies to a certain pollen are associated with OAS reactions to certain foods. For instance, an allergy to ragweed is associated with OAS reactions to banana, watermelon, cantaloupe, honeydew, zucchini, and cucumber. This does not mean that all sufferers of an allergy to ragweed will experience adverse effects from all or even any of these foods. Reactions may begin with one type of food and with reactions to others developing later. However, it should be noted that reaction to one or more foods in any given category does not necessarily mean a person is allergic to all foods in that group.

- **Alder pollen:** almonds, apples, celery, cherries, hazel nuts, peaches, pears, parsley
- **Birch pollen:** almonds, apples, apricots, avocados, bananas,<sup>[5]</sup> carrots, celery, cherries, chicory,<sup>[6]</sup> coriander, fennel, fig,<sup>[7]</sup> hazelnuts, kiwifruit, nectarines, parsley, parsnips, peaches, pears, peppers, plums, potatoes, prunes, soy, strawberries, wheat; *Potential:* walnuts
- **Grass pollen:** fig,<sup>[7]</sup> melons, tomatoes, oranges
- **Mugwort pollen :** carrots, celery, coriander, fennel, parsley, peppers, sunflower
- **Ragweed pollen :** banana, cantaloupe, cucumber, honeydew, watermelon, zucchini, echinacea, artichoke, dandelions, hibiscus or chamomile tea
- **Possible cross-reactions (to any of the above):** berries (strawberries, blueberries, raspberries, etc), citrus (oranges, lemons, etc), grapes, mango, figs, peanut, pineapple, pomegranates, watermelon

## Diagnosis

The patient typically already has a history of atopy and an atopic family history. Eczema, otolaryngeal symptoms of hay fever or asthma will often dominate leading to the food allergy being unsuspected. Often well-cooked, canned, pasteurized or frozen food offenders cause little to no reaction due to denaturation of the cross-reacting proteins.<sup>[3]</sup> causing delay and confusion in diagnosis as the symptoms are elicited only to the raw or fully ripened fresh foods. Correct diagnosis of the allergen type/s involved is critical. OAS sufferers may be allergic to more than just pollen. Oral reactions to food are often mistakenly self-diagnosed by patients as caused by pesticides or other contaminants. Other reactions to food, the so called intolerances which result from a patient being unable to metabolize naturally occurring chemicals eg. salicylates and proteins eg. Lactose intolerance in food need to be distinguished from the systemic symptoms of OAS.

The cornerstone of diagnosis remains an accurate history of symptoms, an elimination diet followed by a food challenge. Skin prick testing and RAST testing are used as adjuncts to the clinical history. They cannot be used for diagnosis alone. Prick to prick testing with fresh foods is more reliable for some extremely labile allergens such as those found in apple than testing with commercial extracts which will commonly give a false negative. If the history is suggestive and the skin prick test negative fresh foods should be used.

## Treatment

OAS must be managed in conjunction with the patient's other allergies, primarily the allergy to pollen. The symptom severity may wax and wane with the pollen count. Published pollen counts and seasonal charts are useful but may be ineffective in wind spread as extreme or unusual weather as pollen can travel hundreds of kilometers from other areas. The syndrome will abate within 2-3 years if the patient moves to an area free of the triggering pollen. Moving usually results in the development of allergy to the local pollens. In the first instance the patient will follow general treatment advice for airborne allergens.

In addition the patient will be advised to avoid the triggering foods particularly nuts. Peeling or cooking the foods has shown to eliminate the effects of some allergens such as mal d 1 (apple), but not others such as (apple) celery or strawberry. In the case of foods such as hazelnut which have more than one allergen the effects can be mixed - eliminating one but not the other. Antihistamines may also relieve the symptoms of the allergy by blocking the immune pathway. Persons with a history of severe anaphylactic reaction may carry injectable emergence dose of epinephrin (such as an EpiPen). Allergy immunotherapy has been reported to improve or cure OAS in some patients. A year-long study ending in 2004 indicated that immunotherapy with extracts containing birch pollen has benefit to OAS sufferers of apple or hazelnut related to birch pollen-allergens. Even still, the increase in the amount of apple/hazelnut tolerated was still small (from 12.6 to 32.6 g apple), and as a result, a patient's management of OAS would be limited.<sup>[8]</sup>

## Notes

1. ^ "Oral Allergy Syndrome". Canadian Food Inspection Agency. January 2000. <http://www.inspection.gc.ca/english/fssa/concen/tipcon/orale.shtml>. Retrieved 2008-01-25.
2. ^ "Food allergy" Journal der Deutschen Dermatologischen Gesellschaft Volume 6 Issue 7, Pages 573 - 583 Published Online: 16 Jul 2008 Thomas Werfel 1 (1)Department of Dermatology and Venerology, Medical University of Hannover, Germany Correspondence to Prof. Dr. med. Thomas Werfel Klinik für Dermatologie und Venerologie Medizinische Hochschule Hannover Ricklinger Straße 5 D-30449 Hannover E-mail: werfel.thomas@mh-hannover.de
3. ^ <sup>a</sup> <sup>b</sup> More D (April 28, 2007). "Oral Allergy Syndrome". About.com. <http://allergies.about.com/od/foodallergies/a/oas.htm>. Retrieved 2008-01-25.

4. <sup>^</sup> Pong AH (June 2000). *Oral Allergy Syndrome*. Allergy/Asthma Information Association (AAIA) newsletter.  
[http://www.calgaryallergy.ca/Articles/English/Oral\\_Food\\_Allergy.htm](http://www.calgaryallergy.ca/Articles/English/Oral_Food_Allergy.htm). Retrieved 2008-01-25.
5. <sup>^</sup> [http://foodallergens.ifr.ac.uk/food.lasso?selected\\_food=5](http://foodallergens.ifr.ac.uk/food.lasso?selected_food=5)
6. <sup>^</sup> Cadot; Kochuyt; van Ree; Ceuppens (2003), "Oral Allergy Syndrome to Chicory Associated with Birch Pollen Allergy". *International Archives of Allergy & Immunology*. **131** (1):19-24
7. <sup>^</sup> <sup>a</sup> <sup>b</sup> Antico; Zoccatelli; Marcotulli; Curioni (2003), "Oral Allergy Syndrome to Fig". *International Archives of Allergy & Immunology*. **131** (2):138
8. <sup>^</sup> Bucher, X.; Pichler, W. J.; Dahinden, C. A.; Helbling, A. (December 2004), "Effect of tree pollen specific, subcutaneous immunotherapy on the oral allergy syndrome to apple and hazelnut". *Allergy*. **59** (12):1272-1276

## Published studies

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- Marcucci, F.; Frati, F.; Sensi, L.; Cara, G. D.; Novembre, E.; Bernardini, R.; Canonica, G. W.; Passalacqua, G. (April 2005), "Evaluation of food-pollen cross-reactivity by nose-mouth cross-challenge in pollinosis with oral allergy syndrome". *Allergy*. **60** (4):501-505
- Roehr, C.C.; Edenharter, G.; Reimann, S.; Ehlers, I.; Worm, M.; Zuberbier, T.; Niggemann, B. (October 2004), "Food allergy and non-allergic food hypersensitivity in children and adolescents". *Clinical & Experimental Allergy*. **34** (10):1534-1541

## External links

- "Oral Allergy Syndrome", at About.com
- "Oral Allergy Syndrome Made Worse By Ragweed, Fruits And Vegetables", at Medical News Today (August 17, 2007)
- "Oral Allergy Syndrome", from iVillage.com

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