

## **FOOD ALLERGY AND TREATMENT**

Vishnukanta

Department of pharmacology,

B. N. Girls' College of Pharmacy, Udaipur, Rajasthan, India

### **Summary**

Food allergy is an abnormal response to food that is triggered by a specific reaction in the immune system and expressed by certain, often characteristic, symptoms. Although about 25% of people believe they have a food allergy, only about 2.5% of adults and about 6-8% of children, mainly younger than 6 years, have true food allergies. The mechanism of food allergy involves the immune system and heredity. Food allergy is a hypersensitivity reaction. The top allergens vary somewhat from country to country but milk, eggs, peanuts, tree nuts, fish, shellfish, soy, wheat and sesame tend to be in the top 10 in many countries.

Correspondent Author: Dr. Vishnu Kanta, Reader,

Ph: 9828140391

Email: vishnukanta2003@yahoo.co.in

Present address: Department of pharmacology,

B. N. Girls' College of Pharmacy, Udaipur, Raj

### **Introduction**

Food allergy is an abnormal response to food that is triggered by a specific reaction in the immune system and expressed by certain, often characteristic, symptoms. The allergens in food are those components that are responsible for inciting an allergic reaction. They are proteins that usually resist the heat of cooking, the acid in the stomach, and the intestinal digestive enzymes. As a result, the allergens survive to cross the gastrointestinal lining, enter the bloodstream, and go to target organs, causing allergic reactions throughout the body.<sup>1</sup>

Although about 25% of people believe they have a food allergy, only about 2.5% of adults and about 6-8% of children, mainly younger than 6 years, have true food allergies. Babies and young children are most often allergic to milk, eggs, wheat, soybean products and peanuts. Older children and adults are most often allergic to peanuts, tree nuts (walnuts, almonds and cashews), fish and shellfish.<sup>2</sup> Allergies to food dyes and colours are rare.<sup>3</sup> Many food intolerances are mistaken for allergies. A food intolerance is an adverse food-induced reaction that does not involve the immune system.<sup>4</sup>

### **Mechanism**

The mechanism of food allergy involves the immune system and heredity. Food allergy is a hypersensitivity reaction, meaning that before an allergic reaction to an allergen in food can occur, a person needs to have been exposed previously, that is, sensitized, to the food. At the initial exposure, the allergen stimulates lymphocytes (specialized white blood cells) to produce the IgE antibody that is specific for the allergen. This IgE then is released and attaches to the surface of the mast cells in different tissues of the body. The next time the person eats that food, its allergen hones in on the specific IgE antibody on the surface of the mast cells and prompts the cells to release chemicals such as histamine. Depending upon the tissue in which they are released, these chemicals cause the various symptoms of food allergy. For someone with a food allergy, eating or swallowing even a tiny amount of a particular food can cause symptoms such as skin rash, nausea, vomiting, cramping, and diarrhea. Because the body is reacting to something that is otherwise harmless, this type of allergic reaction is often called a hypersensitivity reaction.

Rarely, a severe allergic reaction can cause a life-threatening set of symptoms called anaphylaxis, or anaphylactic shock.

***Immune system:*** An allergic reaction to food involves two components of the immune system. One component is a type of protein, an antibody called immunoglobulin E (IgE), which circulates through the blood. The other is the mast cell, a specialized cell that is found in all tissues of the body. The mast cell is especially common, however, in areas of the body that are typical sites of allergic reactions, including the nose and throat, lungs, skin, and gastrointestinal tract.

***Heredity:*** The tendency of an individual to produce IgE against something seemingly as innocuous as food appears to be inherited. Generally, people with allergies come from families in which allergies are common -- not necessarily to food but perhaps allergies to pollen, fur, feathers, or drugs. Thus, a person with two allergic parents is more likely to develop food allergies than someone with one allergic parent.<sup>5</sup>

### **Signs & Symptoms**

Symptoms typically appear within minutes to two hours after the person has eaten the food to which they are allergic. The symptoms of an Immunoglobulin E (IgE) allergic reaction can take place within a few minutes to an hour. The process of eating and digesting food affects the timing and location of a reaction. IgG reactions build over a period of hours to days, and therefore symptoms can be difficult to notice as allergy-related.<sup>4</sup>

Symptoms of food allergies are: -

- Anaphylaxis: - a severe, whole-body allergic reaction that can result in
- Death. Lead to vasodilation or, if severe, symptoms of life-threatening shock.
- Angioedema: - rapid swelling (edema) of the skin, mucosa and submucosal tissues, especially of the eyelids, face, lips, and tongue.
- Eczema is a form of dermatitis, or inflammation of the upper layers of the skin.

- Skin rashes, such as nettle rash (also called urticaria or hives). Some of these longer lasting rashes are called atopic dermatitis.<sup>6</sup>
- Itching of the mouth, throat, eyes, skin, or any area
- Nausea, vomiting, diarrhoea, stomach cramps, or abdominal pain
- Runny nose or nasal congestion
- Wheezing, scratchy throat, shortness of breath, or difficulty swallowing
- Mood swings, depression

### **Types of Allergenic Food**

There are a number of groups of foods that are responsible for causing the majority of food allergies.<sup>6</sup> Rice allergy is more common in East Asia where rice forms a large part of the diet. In Central Europe, celery allergy is more common. The top allergens vary somewhat from country to country but milk, eggs, peanuts, tree nuts, fish, shellfish, soy, wheat and sesame tend to be in the top 10 in many countries.<sup>4</sup>

The most common food allergies are: -

***Milk allergy:*** Two out of a hundred infants under one year old suffer from cow's milk allergy, making it the most common food allergy of childhood. In general children lose this sensitivity as they grow up. Symptoms are frequently vomiting and diarrhoea in children, with 30-50% also having skin rashes of some type. A small number of children have an anaphylactic reaction to milk which tends to be life long. The major allergens in milk are the caseins and the protein b-lactoglobulin. People are usually allergic to more than one kind of milk protein. The proteins from cow's milk are very similar to those from goat's and sheep's, thus goat's or sheep's milk cannot be used as a cow's milk substitute in allergic individuals.<sup>7</sup>

***Eggs allergy:*** Allergy to eggs is usually observed in young children rather than adults, and like cow's milk allergy, fades with time. Occasionally children suffer from a severe form of allergy which is not outgrown. The main allergens are the egg white proteins ovomucoid, ovalbumin, and ovotransferrin.<sup>6</sup>

***Peanut allergy:*** Peanuts are one of most allergenic foods and frequently cause very severe reactions, including anaphylaxis. Allergy to peanuts is established in childhood and usually maintained throughout life. Peanut allergy can be so severe that only very tiny amounts of peanut can cause a reaction. Thus the traces of nuts found in processed oils, or the carry over of materials on utensils used for serving foods, can be enough in some individuals, to cause a reaction. The main allergens in peanuts and Soya are the proteins used by the seed as a food store for it to grow into a seedling. One of the allergens in Soya bean is very similar to a major allergen from dust mites, a common environmental allergen.<sup>6</sup>

That peanut protein is secreted into breast milk, thus sensitizing the baby who is at risk for developing an allergy.

***Tree nut allergy:*** This group includes true tree nuts, such as Brazil nuts, hazelnuts, walnut and pecan. Tree nuts can cause symptoms as severe which can occasionally be fatal. Children who become sensitized to tree nuts tend to remain allergic throughout life. Hazelnut and almond allergies are more like those people get to fruit, and are linked to pollen allergies.

***Fish and shellfish allergy:*** Allergies to shellfish are unusual in children, mostly being experienced by adults. The incidence of seafood allergy is higher in those countries with a high consumption of fish and shellfish. Severe reactions are more frequently found with these foods, including anaphylaxis. Cooking does not destroy the allergens in fish and shellfish, and some individuals may be allergic to the cooked, but not raw, fish. The major allergens in fish are flesh proteins called parvalbumins which are very similar in all kinds of fish. Shellfish allergens are usually found in the flesh and are part of the muscle protein system, whilst in foods such as shrimps, allergens have also been found in the shells.<sup>6</sup>

***Fruits allergy:*** In general allergic reactions to fruits and vegetables are mild, and are often limited to the mouth, and are called the oral-allergy syndrome (OAS).

Around four out of ten people having OAS are also allergic to tree and weed pollens. Thus people who are allergic to birch pollen are much more likely to be allergic to apples. There allergens in fruits and vegetables are not as complicated as other foods. Many of them are very like the allergens in pollens. Many fruit allergens are destroyed by cooking, and thus cooked fruits are often safe for fruit allergic people to eat. Allergies to latex gloves, especially amongst health professionals, are increasing. As many of the latex allergens are like those found in certain tropical fruits, such as bananas, these people can get an allergic reaction to handling or eating these foods.<sup>6,8</sup>

**Cereals allergy:** Suffered by children and adults alike, wheat allergy appears to be particularly associated with exercise-induced anaphylaxis. The more of a cereal (wheat, rye, barley, oats, maize or rice) we eat the more likely we are to suffer an allergy. Thus rice allergy is found more frequently in populations eating ethnic diets. Seed storage proteins (such as wheat gluten) and other proteins present in grain to protect it from attack by moulds and bacteria, have been found to be major allergens.<sup>6</sup>

### **Diagnosis**

Food allergy can be diagnosed by following ways-

**History:** The physician interviews the patient to determine if the facts are consistent with a food allergy. The doctor asks such questions as: What was the timing of the reaction? Did the reaction come on quickly, usually within an hour after eating the food? Was treatment for allergy successful? For example, if hives stem from a food allergy, antihistamines should relieve them.<sup>9</sup>

**Dietary Diary:** To keep a record of the contents of each meal and whether reactions occurred that are consistent with allergy. The dietary diary provides more details than the oral history, so that the doctor and patient can better determine if there is a consistent relationship between a food and the allergic reactions.<sup>9</sup>

**Elimination Diet:** The next step is an elimination diet. The patient does not eat a food suspected of causing the allergy, for example, eggs, and substitutes another food, in this instance, another source of protein. If after the patient removes the food, the symptoms go away, the doctor almost always can make a diagnosis of food allergy. This technique is also not suitable if the allergic reactions have been infrequent.

***Skin Prick Tests:*** The skin prick is easy to do and results are available in minutes. Different allergists may use different devices for skin prick testing. Some use a "bifurcated needle", which looks like a fork with 2 prongs. Others use a "multi-test", which may look like a small board with several pins sticking out of it.<sup>4</sup>

In a scratch-the-skin test, a dilute extract of the suspected food is placed on the skin of the forearm or back. This portion of the skin then is scratched with a needle and observed for swelling or redness, which would signify a local allergic reaction to the food. A positive scratch test indicates that the patient has the IgE that is specific for the food being tested on the skin's mast cells.

In some highly allergic patients, however, especially if they have had anaphylactic reactions, skin tests should not be done because they could provoke another dangerous reaction. Skin tests also cannot be done in patients with extensive eczema.<sup>9</sup>

***Blood Tests:*** Blood tests such as the RAST (radioallergosorbent test) and the ELISA (enzyme-linked immunosorbent assay). These tests measure the presence of food-specific IgE antibodies in the blood of patients, but they cost more than skin tests, and the results are not available immediately. Blood tests allow for hundreds of allergens to be screened from a single sample, and cover food allergies as well as inhalants. However, non-IgE mediated allergies cannot be detected by this method.

### **Treatment of Food Allergy**

***Dietary avoidance:*** Avoiding the offending allergen in the diet is the primary treatment of food allergy. Once a food to which the patient is sensitive has been identified, the food must be removed from the diet. To do this, affected people need to read lengthy, detailed lists of ingredients on the label for each food they consider eating. Many allergy-producing foods such as peanuts, eggs, and milk appear in foods that are not ordinarily associated with them. For example, peanuts often are used as protein supplements, eggs are found in some salad dressings, and milk is in bakery products. People can avoid most of the foods to which they are sensitive if they carefully read the labels on foods and, when in restaurants, avoid ordering foods that might contain ingredients to which they are allergic.<sup>10,11,12</sup>

***Treating an anaphylactic reaction:*** People with severe food allergies, must be prepared to treat an anaphylactic reaction. Even those who know a lot about their own allergies can either make an error or be served food that does not comply with their instructions. To protect themselves, people who have had anaphylactic reactions to a food should wear medical alert bracelets or necklaces stating that they have a food allergy and that they are subject to severe reactions. These individuals also always should carry a syringe of adrenaline (Epipen), obtained by prescription from their doctors, and be prepared to self-administer it if they think they are developing an allergic reaction. They then should immediately seek medical help by either calling the rescue squad or having themselves transported to an emergency room.

Several medications are available for treating the other symptoms of food allergy. For example, antihistamines can relieve gastrointestinal symptoms, hives, sneezing, and a runny nose. Bronchodilators can relieve the symptoms of asthma. These medications are taken after a person inadvertently has ingested a food to which he is allergic. They are not effective, however, in preventing an allergic reaction when taken prior to eating the food. In fact, no medication in any form is available to reliably prevent an allergic reaction to a certain food before eating that food.

### **Summary And Conclusion**

Food allergy is caused by immunological reactions to foods, sometimes in individuals or families predisposed to allergies. A number of foods, especially shellfish, milk, eggs, peanuts, and fruit can cause allergic reactions (notably hives, asthma, abdominal symptoms, lightheadedness, and anaphylaxis) in adults or children. When a food allergy is suspected, a medical evaluation is the key to proper management. The differential diagnosis comprises other abnormal responses to food, that is, food intolerances, which actually are far more common than food allergy. Once the diagnosis of food allergy is made (primarily by the medical history) and the allergen is identified (usually by skin tests), the treatment basically is to avoid the offending food. People with food allergies should work with their physicians and become knowledgeable about allergies and how they are diagnosed and treated.

In conclusion, an individual suffering from food allergies needs to avoid that particular food, always carry some emergency anti allergy measures on his person and carry the information regarding a particular food allergy on his person. Information is the key to living a healthy and food allergy free life.



**References**

1. <http://www.wjgnet.com/1007-9327/12/7744.asp>
2. [http://www.allergy-clinic.co.uk/food\\_allergy\\_for\\_public.htm](http://www.allergy-clinic.co.uk/food_allergy_for_public.htm)
3. [http://www.allergy-clinic.co.uk/what\\_is\\_allergy.htm](http://www.allergy-clinic.co.uk/what_is_allergy.htm)
4. [http://en.wikipedia.org/wiki/Food\\_allergy](http://en.wikipedia.org/wiki/Food_allergy)
5. [http://www.medicinenet.com/food\\_allergy/article.htm](http://www.medicinenet.com/food_allergy/article.htm)
6. <http://www.foodreaction.org/allergy/index.htm/to/top>
7. Koers WJ, Van Der Elst AM, Van Dijk AG, Berrens L. Cow's milk allergy in an adult patient. *Ann Allergy* 1986; Mar 56 (3): 267-9.
8. Sami L, Bahna MD, Dr PH. New Findings in Food Allergy Research. *Tomato Allergy* 1999; November: 16.
9. [http://www.foodallergy.org/research\\_archive/researcharchive.html#lactate](http://www.foodallergy.org/research_archive/researcharchive.html#lactate)
10. [http://www.medicinenet.com/food\\_allergy/page5.htm](http://www.medicinenet.com/food_allergy/page5.htm)
11. <http://en.wikipedia.org/wiki/milk-allergy>
12. [http://en.wikipedia.org/wiki/tree\\_nut\\_allergy](http://en.wikipedia.org/wiki/tree_nut_allergy)