

Food Allergy and Food Intolerance



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INTRODUCTION

Adverse reactions to foods include true food allergy and non-allergic food intolerance. Surveys of both children and adults indicate that up to 25% of the population believe they have some sort of food allergy.^{1,2} The true prevalence of food allergy is much less. The prevalence of food allergy is highest in young children, with up to 6% of children up to the age of 3 years experiencing allergic reactions to specific foods. The prevalence declines with advancing age and in adults, the prevalence is about 1.5%.^{3,4,5,6}

FOOD ALLERGY

Food allergy refers to a group of disorders in which there are abnormal or exaggerated immunologic responses to specific food allergens, resulting in a variety of symptoms. The majority of food allergic reactions appear to be related to responses mediated by the immunoglobulin IgE, responses mediated through cells of the immune system (lymphocytes), and a combination of these responses.

IgE-mediated responses

IgE-mediated responses are the classic Type I allergic responses. This type of response occurs when previous exposure to a food allergen has stimulated the formation of IgE antibodies which are specific for that particular allergen. These IgE antibodies attach to cells associated with the immune response within the wall of the gastrointestinal tract, including mast cells and basophils. On further ingestion of that food, the food allergen binds to its specific antibodies. This causes the cells to release substances which cause symptoms of immediate hypersensitivity. A late phase

response may also occur, in which circulating white blood cells (eosinophils, lymphocytes and monocytes) are attracted to the site and promote an inflammatory reaction.

Non-IgE mediated responses

Non-IgE mediated responses refer to other types of immune responses. With regard to food allergy, this most commonly refers to cell-mediated hypersensitivity, in which food allergens bind with specific receptors on lymphocytes and sensitise them to that allergen. Subsequent exposure of lymphocytes to that allergen provokes an inflammatory reaction.

HEALTH EFFECTS OF FOOD ALLERGY

IgE-mediated effects begin within minutes to 2 hours of ingestion. Symptoms may include:-

- itching/swelling/tightness of the tongue, throat and lips, with hoarseness and cough
- nausea, abdominal cramps, vomiting, diarrhoea
- itchy rash with wheals (urticaria), swelling (angioedema) of the face, limbs, trunk
- cough, chest tightness, wheeze, shortness of breath, difficulty breathing
- nasal congestion, sneezing, watering or itchy eyes
- shock, death
- repeated exposure may cause chronic eczema in children

Non-IgE-mediated effects may be difficult to distinguish from IgE-mediated effects.

Onset of symptoms occurs several hours after the food is ingested. The gut and skin are most frequently involved. Food-induced irritation of the bowel (enterocolitis) may cause persistent vomiting, malabsorption and diarrhoea, which may be bloody. Infants may fail to gain weight. Most adults with food-induced symptoms related to non-IgE-mediated responses have other signs of allergy, including asthma and hayfever.

FOODS THAT CAUSE ALLERGY

A limited number of foods are responsible for the majority of food allergies. Typically, individuals are allergic to specific allergens in only one or a small number of foods. (An exception is the rare condition, allergic eosinophilic gastroenteritis, characterised by allergy to multiple foods.) Most food allergens are glycoproteins with a large molecular weight. Heat and pressure tend to reduce allergenicity. More than 40 different proteins in cow's milk have been identified as potential allergens, and many different allergens have been identified in eggs. There is a lot of research yet to be done to look at how these different proteins act on the immune system to produce allergy.

In babies, food allergy may be related to cows' milk and soy. In infants and older children, the common allergenic foods are cows' milk, egg, fish, nuts (especially peanuts), soy and wheat. Children with eczema and asthma are more likely to have food allergy. A history of asthma, eczema or food allergy in a parent increases the risk that a child will have food allergy. About one-third of children "grow out" of their food allergy.

Peanut allergy is the most persistent of all food allergies. Among adults, fish, shellfish, peanuts, nuts and fruit are the most common causes of food allergy. Peanuts, fish and shellfish are the foods usually associated with severe life-threatening allergic reactions.

Food allergy may also occur from exposure in the workplace. About 20% of bakers who work for 20 years become sensitised to flour, developing asthma and rhinitis.⁷ Cooks who handle food may develop urticaria and contact dermatitis.

INVESTIGATION OF SUSPECTED FOOD ALLERGY

Skin prick allergen testing

Skin prick allergen tests, conducted by skin or allergy specialists, involve injection of minute amounts of allergen into the epidermis of the skin. If a history suggests some specific causative agents, these can be included in the panel of allergens used in skin testing.

The value of skin testing is limited because it measures the presence of IgE antibodies to specific food allergens. There are a lot of false positives: about 60% of positives do not reflect symptomatic food allergy. However, there are very few false negatives. If an IgE-mediated allergic reaction is present, it generally shows up in the test.

Serum tests for IgE

Radioallergosorbent (RAST) tests, or allergen specific IgE tests, measure the presence of specific IgE antibodies to a particular allergen. These tests provide information similar to that provided by skin testing. Tests can be ordered by general practitioners or by specialists.

Elimination diets and food challenge tests

Elimination diets are used in the diagnosis and management of adverse food reactions. Foods suspected of causing allergic reactions are eliminated completely from the diet for 1 to 4 weeks. They are then reintroduced one at a time, commencing with small quantities which are increased gradually until normal quantities are reached. This tests if the symptoms disappear when the suspect foods are removed, and tests also for recurrence of symptoms when suspect foods are reintroduced.

The effectiveness of elimination diets depends on the ability to identify foods suspected of causing allergic reactions and compliance with the diet. If a lot of foods are suspected, the elimination diet should be designed and supervised by experts in nutrition. Very restricted diets should be used only for short periods of time.

Controlled food challenge tests

The "gold standard" test of food hypersensitivity is the double blind placebo controlled food challenge test. It is a cumbersome test, in which foods suspected of causing allergic reactions are eliminated completely from the diet. Active foodstuffs or placebo are reintroduced in random order, with the foodstuff homogenised and disguised amidst other food or juice such as blackcurrant. The subject and the specialist supervising the test are both "blinded" - that is, neither knows when foodstuff or placebo are being consumed.

A diary of symptoms is kept. This method controls for psychogenic factors and observer bias. Diagnostic accuracy is excellent. These tests are usually arranged by allergy specialists.

OTHER THERAPY OF FOOD ALLERGY

Elimination of the identified allergenic food is the treatment of food allergy. If it involves elimination of an essential dietary component, it should be done under the supervision of a nutritional expert. Those who suffer from food allergy must be taught to scrutinise food labels and question food caterers regarding the content of food. However, contamination with an unrelated food during manufacturing is a common cause of accidental exposure to known food allergens (eg peanut traces in plain chocolate).

If exposure to the food allergen causes laryngeal or pulmonary symptoms, prompt treatment with adrenaline is indicated. Doctors can prescribe adrenaline in pre-packed pencil syringes for self-injection. People with a history of severe food allergy reaction or those with asthma and food allergy should be taught how to self-administer adrenaline and to keep it available at all times. If adrenaline is required, the person should be kept under medical observation for at least 4 hours, as further symptoms may develop.

Antihistamines may modify symptoms of food allergy, but their effect is limited.

With regard to prevention, some studies suggest that exclusive breast-feeding for at least 4 months and delaying the introduction of allergenic foods such as eggs, fish,

peanuts and wheat are helpful in reducing the risk of allergic disease.

NON-ALLERGIC FOOD INTOLERANCE

Food intolerance is used to describe an abnormal physiological response to an ingested food or food additive. There are several different types of food intolerance.

Metabolic

Lactase deficiency is an example of a metabolic food intolerance. It manifests as abdominal pain, cramping and diarrhoea after ingestion of dairy products containing lactose.

Pharmacological

- Food with a high histamine content may provoke flushing, urticaria, and shock-like reactions. An example of this is scombroid poisoning due to ingestion of brown oily fish (eg mackerel, tuna) that has gone off.
- Tyramine in cheese and red wine may provoke migraine.
- Monosodium glutamate may provoke flushing, headache, abdominal cramps and diarrhoea and may exacerbate asthma.

Toxic

Food may contain naturally occurring toxins, or be contaminated by added chemicals or bacterial toxins.

Other

- Coeliac disease is a sensitivity to gliadin, the alcohol-soluble portion of gluten found in wheat, oat, rye and barley. It produces inflammation and destruction of the villi of the small bowel, which are the microscopic finger-like projections on the surface of the bowel through which nutrients are

absorbed into the blood stream. The symptoms of coeliac disease include diarrhoea, malabsorption and weight loss. Once the diagnosis is established, lifelong elimination of gluten-containing foods is necessary to control the disease.

- benzoic acid in citrus fruits may cause an inflamed red flare about the mouth.
- food additives and colourings may aggravate urticaria and asthma.
- benzoates, salicylates, sulphites and tartrazine may aggravate asthma/urticaria.

CONTROVERSIAL ISSUES

Some people describe unusual and non-specific symptoms which they ascribe to food allergy, but which are probably better described as food aversion. People who suffer such symptoms may be unable to identify specific foods, or attribute their symptoms to foods which do not typically induce food allergy. However, the symptoms may be distressing and it may be unhelpful to dismiss the possibility that the symptoms are provoked or aggravated by food. In such circumstances, tests of allergy are usually negative. However, referral for specialist advice may provide reassurance.⁷

Sensitivity to foods and food additives has been anecdotally linked with behavioural disorders, especially hyperactivity. Epidemiological studies have failed to support a causal link.

There is also no firm evidence that specific diets (eg diets free of preservatives, salicylates and artificial flavours) are beneficial for children with such disorders.^{7,9}

Evidence that there are associations between food allergy and multiple chemical sensitivity and chronic fatigue syndrome is also largely anecdotal. Studies of these disorders are complicated by many non-specific symptoms and the lack of widely-accepted tests to confirm these diagnoses. "Alternative" tests for food allergy include provocation-neutralisation testing, leukocytotoxic testing, hair analysis, Vega testing, applied kinesiology and radiaesthesia. Provocation-neutralisation testing and leukocytotoxic testing have been scrutinised by medical bodies and have been found to be unhelpful in establishing the diagnosis of food allergy. The other tests mentioned have never been objectively evaluated⁹.

There is little scientific evidence, therefore, to support claims that multiple chemical sensitivity and chronic fatigue syndrome are related to food allergy. Food allergy is a diagnosis that should be made on the basis of tests that link food allergens with evidence of allergy. It is inappropriate to label a description of symptoms as food allergy in the absence of any indication of an immune response.

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