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Food Allergies[1]

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What are food allergies?

A food allergy is an immune system reaction that happens after eating food that is usually considered safe. Food allergies are more common in children than in adults. Approximately 5%–8% of children under 4 years old and about 2% of adults have food allergies (FDA 2022). Each year, food allergies lead to over 30,000 emergency room visits and 2,000 hospitalizations (FDA 2024b; Radke et al. 2016). There are approximately 150 fatalities associated with food allergic reactions in the US annually (FDA 2022).

While most food allergies in adults are caused by a small group of foods or food products, adverse reactions in young children can be caused by a wider variety of food. Generally, most food allergies emerge at an early age but can disappear after a few months (Taylor and Hefle 2001). Dairy, eggs, and soy allergies are often outgrown, whereas peanut, tree nut, and seafood allergies usually persist (Wood 2003; Joshi and Frith 2017; Taylor and Hefle 2001).

In 2021, sesame was officially added to the list of major allergens regulated by the Food and Drug Administration (FDA) on April 23, 2021. This decision was part of the Food Allergy Safety, Treatment, Education, and Research (FASTER) Act, which expanded the list of allergens that require labeling to include sesame, reflecting the growing recognition of its significance as a common allergen (FDA 2024a; FDA 2024b). The following major food allergens (also known as the "Big Nine") and products made with them account for 90% of food allergies in the US (FDA 2024a). To protect consumers with food allergies, the presence of these major allergens in food must be clearly stated in the food label under the Food Allergen Labeling and Consumer Protection Act of 2004 (FALCPA).

1. Wheat
2. Shellfish (e.g., crab, lobster, shrimp, and crayfish)
3. Egg
4. Fish (all species of finfish)
5. Peanuts
6. Milk
7. Tree nuts (walnuts, almonds, cashews, pistachios, pecans, and hazelnuts)
8. Soy
9. Sesame

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What causes food allergies?

A true food allergic reaction occurs when a person's immune system reacts to a specific protein(s) in certain foods. The process begins the first time the food is consumed as the body "remembers" the specific protein(s) in the food. When the same food is eaten again, the immune system overreacts, potentially causing severe and life-threatening reactions.

True food allergies are caused by the rapid release of immunoglobulin E (IgE) antibodies after ingesting the allergenic food. This overproduction of IgE is triggered by the food allergen and causes either a local or systemic (affecting the whole body) effect, such as inflammation, severe swelling, or hypersensitivity reactions.

There are other reactions that can occur after eating food, which present with similar symptoms to foodborne allergens. Reactions such as food intolerances (e.g., lactose intolerance) refer to adverse reactions that occur when the body has difficulty digesting certain foods, leading to symptoms like bloating, gas, diarrhea, and abdominal pain. Unlike food allergies, which involve the immune system and can trigger severe reactions, intolerances are often linked to enzyme deficiencies or sensitivities to specific compounds, such as lactose in dairy or gluten in wheat (ASCIA 2024).

A survey by Cianferoni and Spergel (2009) suggested that up to 25% of adult Americans believe they have a food allergy. However, the actual confirmed percentage of adults in the US population with at least one food allergy is less than 2%. It is important to consult proper medical authorities for confirmation and guidance.

What are the symptoms associated with food allergies?

The reaction to an allergen is related to the overproduction of IgE after consuming the problematic food. The IgE then attaches to mast cells that stimulate the release of chemicals such as histamine after exposure (Joshi and Frith 2017). These reactions may cause symptoms within seconds of consumption or may take several hours to develop. Symptoms can occur locally, in multiple locations, or can spread over the entire body. Redness, itching, and swelling (inflammation) are the most recognizable and common symptoms, although several other types of symptoms are possible (Table 1) (FDA 2023; FARE 2024). Symptoms associated with the digestive tract may include any one or more of the following (AAAAI 2017):

- Itching/tingling of the lips, palate, tongue, or throat
- Hoarseness and sensation of tightness in the throat
- Swelling of the lips or tongue
- Abdominal pain or cramps
- Nausea and/or vomiting
- Diarrhea

Table 1. Symptoms associated with food allergies and the affected area of the body.

Affected Area	Symptom
Skin	Hives Flushing Itching
Airways	Chest tightness Wheezing Shortness of breath
Throat (pharynx)	Difficulty speaking Tongue swelling Vocal cord swelling
Nose	Nasal congestion Itching Runny nose Sneezing
Eyes	Itching Tearing
Systemic	Decreased blood pressure Loss of consciousness

Source: Food Allergy Research & Education (FARE) 2024. https://www.foodallergy.org/symptoms

Who is at risk?

Generally, food allergies are developed at an early age, but they can appear at any time. People who have had previous allergic reactions to foods or non-food items (such as insect bites or latex) or who have a family history of allergies are most susceptible to developing allergies. In a survey of approximately 38,000 children in the US, 8.0% were found to have food allergies. Among these children, 38.7% had a history of severe reactions, and 30.4% were allergic to multiple foods (Gupta et al. 2011).

What is anaphylaxis?

Anaphylaxis is a severe allergic reaction that rapidly affects the entire body and, if not treated, can be fatal. The symptoms are caused by the body's tissue releasing histamines and other substances. This results in the tightening of airways, making the reaction more severe than a normal allergic reaction. Along with the risk of suffocation, patients can go into shock or lose consciousness due to decreased blood flow, which can be life-threatening (Dugdale 2012). Anaphylaxis can also result in cardiac arrhythmias and cardiac arrest. It is commonly seen in children and young adults but can affect anyone.

Managing Food Allergies

If a person has an allergy to a particular food, any meal containing that food, even as a flavoring, may cause an allergic response. For example, if someone is allergic to peanuts, they will be sensitive to any food containing peanuts or peanut products (e.g., peanut butter, unrefined peanut oil, chopped or diced peanuts). Treatment or processing of a food does not necessarily affect its ability to cause an allergic response. **It is important to carefully read food labels and ingredient lists if a person has a known food allergy.**

Almost any food that contains protein has the potential to cause an allergy or hypersensitivity reaction in a susceptible person. Food allergies are only triggered by proteins; sugars and fats do not cause food allergies. Highly refined oils, such as peanut and soy, typically don't contain allergens (Taylor and Hefle 2004) and are unlikely to elicit an allergic response. If a person is unsure whether an oil is highly refined and/or that they are extremely sensitive to a particular allergen, it is best to avoid these products.

How can a person deal with a severe allergic reaction?

Most individuals, once diagnosed, may have to manage their condition for life. In some cases, young children may "outgrow" certain allergies as their immune system develops over time (Fleischer et al. 2005; Skolnick et al. 2001; Spergel 2013; Savage et al. 2010). **If a person has an allergy to a particular food, the only proven therapy is strict avoidance of the food or its products**. If a person has a minor allergic reaction to a food, oral antihistamines can be taken. However, in the case of severe reactions, the medication of choice is an injection of epinephrine. A person with severe food allergies should always carry a dose of epinephrine in case of an emergency. **If someone is suffering from anaphylaxis, they should be taken to a hospital immediately**. Even if epinephrine is administered, anaphylactic symptoms may reappear within minutes to several hours after treatment. Observation by trained medical personnel is important during this period. The use of inhaled medications, such as those used for asthma attacks, has not been shown to be safe or effective in combating anaphylaxis due to food allergies.

While there is no "cure" for food allergies, there are some promising studies of new treatments. These include oral, subcutaneous, sublingual, and epicutaneous immunotherapies. These treatments can potentially result in desensitization after gradual exposure to food allergens (Wang and Sampson 2009). Oral immunotherapy (OIT) has shown positive results for desensitizing individuals to food allergens (Wood 2017; Freeland et al. 2016).

What is being done to help prevent food allergy reactions?

In 2008, the US Food and Drug Administration (FDA) held a public hearing to determine the best course of action to help food processors identify the potential manufacturing areas that could lead to an allergic reaction (FDA 2022). This initiative bolstered the labeling campaign signed into law in 2006. Currently, food manufacturers are required to declare all major food allergens (the "Big Nine") found in the final food product (FDA 2023). Guidelines and regulations are updated as more research is conducted. With every new finding, the most accurate information is passed on to the consumers, minimizing the risk of adverse allergic reactions.

In September 2015, the FDA finalized the Preventive Controls for Human Food (PCHF) rule under the Food Safety Modernization Act (FSMA) of 2011 (FDA 2023). The PCHF rule applies hazard analysis and risk-based preventive controls for major food allergens, elevating their status as a potential hazard to be considered and controlled. Furthermore, the regulation has updated Current Good Manufacturing Practices (CGMPs), which emphasize allergens as a specific area of concern. Ultimately, any food processing facility covered under the PCHF rule must have a written food safety plan that identifies preventive controls for probable hazards, including major food allergens.

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