

II. The human body and the different reactions to food that may occur

A. Wesley Burks

A variety of hypersensitivity responses to an ingested food antigen may result from the lack of development of oral tolerance or a breakdown in oral tolerance. IgE-mediated reactions to food antigens are the most studied, but some of the disorders may involve more than one immunologic mechanism.

IgE-mediated reactions

Various symptoms have been associated with immunologically-mediated allergic reactions. Those that are best characterized include IgE-mediated reactions that are primarily manifested as gastrointestinal symptoms, respiratory symptoms, cutaneous symptoms, and generalized systemic symptoms. Other target organs are probably affected although the scientific studies to validate this information is distinctly lacking.

Upon ingestion of a food, the food allergens cross the gastrointestinal mucosal barrier. Food-specific IgE antibodies on various cell types within a distant target organ then bind the food allergen causing release of a variety of mediators including histamine, prostaglandins, and leukotrienes. These mediators then cause symptoms of immediate hypersensitivity in the target organ.

The signs and symptoms of food-induced IgE-mediated gastrointestinal allergy may be due to a variety of syndromes including oral anaphylaxis ("Oral allergy syndrome"), gastrointestinal anaphylaxis, a subgroup of eosinophilic gastroenteritis, and infantile colic. The oral allergy syndrome is confined almost exclusively to the oropharynx and includes pruritus and angioedema of the lips, palate, and throat. IgE-mediated gastrointestinal hypersensitivity will often accompany symptoms in other target organs. The symptoms include nausea, abdominal pain, abdominal cramping, vomiting, and/or diarrhea.

Respiratory symptoms, both upper and lower, have been provoked through food challenges.

Upper respiratory symptoms include periocular erythema, pruritus, and tearing as well as, nasal congestion, pruritus, sneezing, and rhinorrhea. Isolated upper respiratory symptoms are an uncommon manifestation of food hypersensitivity. Lower respiratory symptoms include coughing, voice changes, and wheezing.

The ingestion of food allergens can lead either to immediate cutaneous symptoms or aggravate more chronic cutaneous symptoms. Acute urticaria and angioedema are thought to be the most common manifestation of food hypersensitivity. Many patients with atopic dermatitis have food allergic reactions causing a markedly pruritic, erythematous, morbiliform rash.

Generalized anaphylactic reactions secondary to the ingestion of foods are not a rare phenomenon. Patients develop, in addition to cutaneous, respiratory, and gastrointestinal symptoms, cardiovascular manifestations including hypotension, vascular collapse, and cardiac dysrhythmias.

Non-IgE-mediated reactions

Non-IgE-mediated food hypersensitivity disorders include food-induced enterocolitis, food-induced colitis, and malabsorption syndromes including celiac disease.

Other target organs

Various clinical reports and investigations have linked adverse food reactions to other target organs throughout the body. Adverse food reactions solely manifested in the ear, sinuses, or nose would be quite uncommon phenomena. The central nervous system manifestations of adverse food reactions have been discussed at length by several investigations. To date there has been no consistent relationship between symptoms of the central nervous system and food allergy. There are children who become sleepy or drowsy during positive food challenge but these symptoms never occur

alone as a manifestation of an adverse food reaction. There is no consistent data to confirm the role of food allergies in hyperactivity disorders. Immunologic sensitivity to a food has not been documented as a common cause of rheumatic disease of the muscles and joints.

There are some anecdotal reports on food adverse reaction and enuresis but this has not been confirmed. Another point is the possible role of food allergy in nephrotic syndrome, but reports in this field are very rare and systematic studies are lacking.

Prevalence

Food allergies may affect up to 8% of children less than 3 years of age and 1% to 2% of the general population. Our understanding of the basic immunopathologic mechanisms of food hypersensitivity remains incomplete. Because of the public's misconceptions about food allergies, physicians must carefully diagnose specific food sensitivities and educate patients in the appropriate elimination of the food from their diet.

A. Wesley Burks, M.D.
Pediatric Immunology and Allergy
Department of Pediatrics
University of Arkansas for Medical Sciences
Arkansas Children's Hospital
800 Marshall Street, Little Rock, Arkansas