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## **Common Beliefs About Peanut Allergy: Fact or Fiction?**

by Michael C. Young, M.D.

To meet the challenge of peanut anaphylaxis, it is natural and necessary for families to be meticulous in their attention to detail regarding their child's potential exposure. The anxiety this causes, accompanied by several widely held beliefs that would seem to make peanut hard to avoid in our diet and in the environment, is stressful. It is important to examine the scientific basis of these ideas before accepting them as fact. In the following article, I review these beliefs and ideas in the context of available studies from medical literature.

A commonly held belief is that the odor from peanut products such as peanut butter can result in allergic reactions and anaphylaxis. There are, in fact, a number of case reports in the medical literature of patients who report symptoms of difficulty breathing, chest tightness, skin rashes, itching, and various other symptoms—all from smelling peanut butter or being in the presence of peanut products. However, a recent blinded, placebo-controlled trial of children exposed to open peanut butter was unable to document any reactions (Sicherer et al).

Based on these reports of allergic reactions resulting from “inhalation”, many parents express concern that the mere presence of any peanut product can contaminate the surrounding airborne environment resulting in an entire room or area being unsafe for a child with peanut allergy. In evaluating these reactions from “airborne exposure,” it is important to remember several facts.

First, allergic reactions to food are triggered by specific food proteins. Without contact with protein, there is no allergic reaction.

Second, food particles containing proteins become airborne through several mechanisms. This can be through grinding and pulverization. For example, the mass shelling of peanuts can result in a cloud of peanut particles which then can be dispersed by the wind.

Another mechanism is through the release of peanut particles under pressure, such as occurs with the simultaneous opening of hundreds of peanut snacks in a pressurized airplane cabin. The presence of peanut protein in the filters of commercial airliners was documented in a study from the Mayo Clinic in 1996, confirming the possibility of airborne exposure.

Food proteins also can be aerosolized into a vapor phase from the high heating conditions of cooking such as with steaming, boiling, and frying. This is one of the more common ways for food protein to become airborne. Workers in the food industry, involved in food handling, processing, preparation, and cooking, often develop occupational allergies to the foods with which they work.

Airborne exposure consists of small amounts of food protein which can trigger allergic reactions, usually dermatologic or respiratory symptoms. There are case reports of severe asthma from airborne exposure to food but the typical inhalation reaction would be similar to that suffered by a cat-allergic person exposed to a cat walking into a room: itchy eyes, sneezing, and runny nose. The chance of a life-threatening anaphylactic reaction from airborne exposure is very small.

Is inhaling food protein as described above equivalent to smelling the odor of a food? Can allergic reactions occur from an odor? To answer these questions, we must analyze the actual process of smelling.

The brain registers the sensation of an odor when it receives a nerve impulse from the nose. The nerve impulse is triggered by chemicals in foods that stimulate nerve endings on the mucous membranes of the nasal passages. The key fact is that these chemicals are not proteins and, therefore, are incapable of causing allergic reactions. The chemicals that are responsible for the odor and flavor of peanuts are called pyrazines. Pyrazines are volatile organic compounds and have no protein structure; they do not cause allergic reactions, they only cause odors and flavors.

How then do we explain the case reports that have been associated with the odor of peanuts? These can be conditioned physiologic responses, akin to the famous experiment of Pavlov, in which dogs were conditioned to salivate at the sound of a bell. Almost any physiologic response can be conditioned, including changes in blood pressure, heart rate, body temperature, skin rashes, and respiration. The conditioning stimulus can be the sound of a bell or in this case, the smell and aroma of peanuts and peanut butter.

In summary, inhalation of peanut protein can cause allergic reactions (but usually not systemic anaphylaxis), while odors can cause conditioned physiologic responses. In a well-ventilated school cafeteria located away from the kitchen and food preparation areas, the main source of peanut protein would be from direct ingestion or skin contact, not airborne contact.

There is also the widely held belief that peanut residue found on surfaces such as sports equipment, toys, doorknobs, and washroom faucets can result in anaphylaxis. There is an unpublished report from Canada of two children with rashes developing after playing with basketballs handled by other children who had eaten peanut butter, with the problem resolving once the basketballs were cleaned. There were no symptoms of anaphylaxis in the two children and no specific evaluation was performed. Other anecdotal reports in the literature regarding exposure to peanut residue consist mostly of similar contact skin reactions, with no reports of anaphylaxis.

Anaphylactic reactions from food are, unfortunately, very unpredictable. Food exposures can result in a wide range of symptoms, from no symptoms to fatal anaphylaxis. Successive peanut exposures can result in more severe symptoms according to two studies, or milder symptoms, according to a third study. Each reaction should be treated as an independent event, not necessarily as a progression of increasing and worsening severity.

There is no evidence that casual contact and minor exposure from inhalation or skin contact, have an additive or cumulative effect, resulting in a worsening of the overall allergy. The most dangerous exposure in this regard remains direct ingestion with a clear-cut clinical reaction.

Most reasonable action plans that include no food sharing, hand washing, and peanut-free zone guidelines will prevent this from occurring. The anxiety that comes from being prepared for the “worst case scenario” can be allayed with the knowledge that casual contact probably will not cause anaphylaxis and not worsen the allergy long term.

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