
Chapter 65: Adverse reactions to foods

Prepared by John Seyerle, MD, Ohio State University, and Sarah Bozeman, MD, University of Mississippi Health Care

1. What food allergy was used by Prausnitz and Kustner to demonstrate that the substance responsible for an ‘allergic’ reaction was present in blood serum?
   A. Prausnitz’ shrimp allergy
   B. Kustner’s shrimp allergy
   C. Prausnitz’ fish allergy
   D. Kustner’s fish allergy

2. A child less than one year is most likely to experience hypersensitivity to which of the following foods?
   A. Peanut
   B. Wheat
   C. Egg
   D. Shrimp

3. What percentage of children with moderate to severe eczema will have IgE mediated food allergy?
   A. 15%
   B. 25%
   C. 35%
   D. 45%

4. What percentage of adults develop de novo food-specific IgE antibodies with prolonged antacid therapy?
   A. 0.5%
   B. 5%
   C. 15%
   D. 25%

5. What percentage of children allergic to cow’s milk will react to goat’s milk?
   A. 10%
   B. 25%
   C. 50%
   D. 90%

6. In IgE mediated reactions, during the initial 4-8 hours, which cells invade the site of response?
   A. Lymphocytes
   B. Monocytes
7. Birch pollen allergic patients are at risk for oral allergy syndrome to which food listed?
A. Kiwi  
B. Cherry  
C. Banana  
D. Chestnut

8. Cow’s milk allergy is to both casein and whey proteins. Heating will destroy several whey proteins. Routine pasteurization may increase allergenicity of some milk proteins. Which of the following is increased?
A. α-lactalbumin  
B. lactoferrin  
C. β-lactoglobulin  
D. bovine serum albumin

9. Oral tolerance is defined as the specific immunological unresponsiveness to antigens induced by their prior feeding. Unresponsiveness of T cells to ingested food proteins may be the result of different mechanisms. Which mechanism is characterized by reduced proliferation following stimulation with antigen and functional antigen-presenting cells? (p 1142)
A. T cell deletion  
B. T cell anergy  
C. Induction of regulatory T cells  
D. Passive protection with breast milk s-IgA

10. An 18 month old boy with atopic dermatitis and allergy to eggs arrives with mother for evaluation. The mother has asthma and the father has allergic rhinitis. The mother would like to know what percent risk her child has of developing asthma or allergic rhinitis?
A. 50%  
B. 60%  
C. 70%  
D. 80%

Answers
1. D, page 1139
   Serum from Kustner was injected into the skin of Prausnitz’ forearm. When Prausnitz then ate fish, he developed a wheal and flare at the site of the injection.

2. C, page 1140
   While cow’s milk is the most likely food hypersensitivity found in children less than one year, of the foods listed above, egg is the most likely food hypersensitivity.
3. C, page 1140
About 35% of children with moderate to severe eczema will have IgE mediated food allergy.

4. C, page 1141
Prolonged use of antacid therapy has been shown to lead to the de novo production of food-specific IgE antibodies in about 15% of adults.

5. D, page 1143
90% of children allergic to cow’s milk will react to goat’s milk.

6. C, page 1147
During the initial 4–8 hours, primarily neutrophils and eosinophils invade the site of response. These infiltrating cells are activated and release a variety of mediators including PAF, peroxidases, eosinophil MBP, and eosinophil cationic protein. Lymphocytes and monocytes infiltrate the area in 24–48 hours.

7. B, page 1147
The PR-10-type proteins are homologous to the major birch pollen allergen, Bet v 1, and account for cross-reactivity between birch pollen and fruits of the Rosaceae species, such as apple (Mal d 1), cherry (Pru av 1), apricot (Pru ar 1), and pear (Pyr c 1), or vegetables of the Apiaceae species such as carrot (Dau c 1), celery (Api g 1), and parsley (pc PR 1 and 2), and hazel nut (Cor a 1).

8. C, page 1143
Extensive heating will destroy several of the whey proteins, however, routine pasteurization is not sufficient to denature these proteins, but may increase the allergenicity of some milk proteins, such as β-lactoglobulin.

9. B, page 1142
Unresponsiveness of T cells to ingested food proteins may be the result of three different mechanisms: T cell deletion – by apoptosis; T cell anergy – antigens presented to T cells in the absence of co-stimulatory factors, results in failure of effector function and thus tolerance ensues; production of inhibitory cytokines (TGFβ, IL-4, and IL-10) can lead to induction of regulator T cells which can mediate suppression to fed antigen. Also, breast milk s-IgA provides passive protection against foreign proteins and pathogens, which may induce earlier maturation of the gut barrier and the infant’s immune response.

10. C, page 1163
Sensitization to egg white in children with atopic dermatitis and a family history of atopy is associated with a 70% risk for respiratory allergic disease (asthma or allergic rhinitis) at age 5 years. Therefore, patients with past and current food allergy should be considered at high risk for asthma and environmental allergy.

Chapter 66: Adverse Reactions to Food and Drug Additives

Prepared by John Seyerle, MD, Ohio State University

1. Which of the following synthetic food colorings has been most implicated with adverse reactions?
   A. Tartrazine
   B. Sunset Yellow
   C. Amaranth
   D. Indigo Carmine

2. Which of the following natural colorants imparts a deep-yellow color to finished food and is derived from the seeds of the Central and South American tree, Bixa orellana?
   A. Paprika
   B. Carotene
   C. Annatto
   D. Carmine

3. Which of the following natural colorants is derived from dried female insects of the species Dactylopius coccus?
   A. Paprika
   B. Carotene
   C. Annatto
   D. Carmine

4. Prior to its ban in 1986, what substance was routinely applied to lettuce and caused asthma exacerbations and anaphylactic-like reactions?
   A. Nitrites
   B. Nitrates
   C. Sulfites
   D. Sulfates

5. What chemical in aminophyline has produced urticaria, exfoliative dermatitis, and anaphylaxis in sensitized individuals?
   A. Ethylenediamine
   B. Benzalkonium chloride
   C. Sulfite
   D. Nitrite

6. What chemical is found in bronchodilator solutions that may cause bronchoconstriction when inhaled?
   A. Ethylenediamine
   B. Benzalkonium chloride
   C. Sulfite
   D. Nitrite
7. Since commercially available epinephrine contains sulfites, what medication should be used in the patient experiencing anaphylaxis to sulfites?
   A. Epinephrine
   B. Cromolyn
   C. Atropine
   D. Doxepin

8. A 400mg dose of monosodium glutamate has been shown to exacerbate which condition?
   A. Chinese restaurant syndrome
   B. Urticaria
   C. Asthma
   D. Rhinitis

9. Which of the following would likely have the highest levels of sulfites?
   A. Grape juice
   B. Frozen potatoes
   C. Lettuce
   D. Malt Vinegar

10. Which of the following medications may contain soy lecithin?
    A. EpiPen
    B. Isoproteranol
    C. Dexamethasone
    D. Combivent

**Answers**

1. A, page 1175
   Adverse reactions have been reported to only a few synthetic food colorants, primarily tartrazine, also known as FD&C Yellow #5.

2. C, page 1176
   Annato is derived from the seeds of Bixa orellana and is used to impart an orange or deep-yellow color to finished foods. Nish et al reported a possible IgE-mediated allergic reaction to annatto extract.

3. C, page 1177
   Carmine is derived from dried female insects of the species *Dactylopius coccus*, has a red color, and is widely used in cosmetics.

4. C, page 1177
   Because lettuce is composed mostly of cellulose and water, there was little chance for sulfite to react with other food components. The presence of free sulfite in lettuce may explain why sulfite-sensitive individuals reacted so vigorously to sulfited lettuce in salad bars before its use was banned.
5. A, page 1171
Ethylene diamine in amino phyline has produced urticaria, exfoliative dermatitis, and anaphylaxis in sensitized individuals. Benzalkonium chloride is found in bronchodilators and may cause bronchoconstriction.

6. B, page 1171
Benzalkonium chloride in bronchodilator solutions may cause bronchoconstriction when inhaled.

7. A, page 1181
If the patient exhibits hypotension or other evidence of systemic reaction, injectable epinephrine is appropriate, even though the epinephrine solution may contain sulfite as a preservative.

8. D, page 1182
Challenges with up to 400mg of MSG elicited both subjective and objective symptoms of rhinitis in 8 of 20 patients who reported improvement in rhinitis on the additive-free diet. Studies in urticaria and asthma have not supported an association. Studies in MSG syndrome have been inconsistent, and only showed reactions to 5g of MSG when given without food.

9. A, page 1178
Sulfites are found in the highest concentrations in lemon, lime and grape juice, dried fruit, wine, molasses, sauerkraut, and pickled cocktail onions. Potatoes and malt vinegar contain less. It’s use on fruits and vegetables except potatoes has been banned.

10. D, page 1178
Combivent (ipratropium/albuterol inhaler) contains soy lecithin. The other medications listed may contain sulfites. Soy lecithin may contain soy protein.