

Chemical Properties of Allergic Proteins and their Exposure Frequency

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Perspective

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DESCRIPTION

Allergy is a hypersensitive state acquired through exposure to a particular antigen which acts as an allergen. Re-exposure to the allergen reveals an altered capacity to react. The tendency to develop immunoglobulin E antibodies in response to small amounts of allergens is known as atopy. An allergen is an antigen not derived from a parasite, capable of stimulating a type-I hypersensitivity reaction in atopic individuals. The chemical properties of allergens are identical to those of other antigens. But ordinary antigens elicit the production of antibodies or antigen reactive lymphocytes that eliminate them whereas the combination of allergens with appropriate antibodies or lymphocytes causes tissue damaging reactions resulting in allergic diseases. The term allergen is applied to those antigens which can cause allergic symptoms. Nearly all allergens are proteins, glycoproteins or carbohydrates.

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For immunological responses, the important aspect of the allergen is the surface topography of its three dimensional structure, which contains critically important surface groupings, for example; Amino-acids in a globular protein or protruding sugar side chains in a polysaccharide or glycoprotein. The parts of the molecule that an antibody binds with are these exposed active regions. They are also known as antigenic determinants or determinant groups. The majority of allergens are macromolecules that can cause sensitization through covalent or non-covalent bonds. These complexes can be formed by binding of low molecular weight inorganic or organic molecules to the body's own proteins. To differentiate allergens as a subset of antigen molecules, no distinctly allergenic characteristics have been discovered. The ability of the host's immune system to recognize the antigen as an allergen depends on host related factors regulating the immune response. The route of entry, dosage frequency of exposure and molecular characteristics of an allergen are additional factors determining whether the antigen will be clinically important as an allergen in the population at large. Dust mite excretion, pollen and pet dander are among the most common allergens but it is possible to be allergic to anything from chlorine to perfume. Food allergies are not as common as food sensitivity, but some foods such as peanuts, nuts, sea food and shellfish cause serious allergies in many people.

Officially, the food and drug administration recognizes eight foods as being common causes of allergic reactions in a large segment of the sensitive population. They include peanuts, tree nuts, eggs, milk, shellfish, fish, wheat and wheat products, soy and its derivatives and sulphites which are chemically based, often found in flavours and colors in foods or as preservatives at 10 ppm and over. In different countries due to differences in the genetic profiles of its citizens and different levels of exposure to different foods, the list of food allergens is different.

Also there are some allergies that occur due to hormones, which are chemicals released by a cell in one part of the body that sends out messages that affect cells in other parts of the organism. Only a small amount of hormone is required to alter cell metabolism. It is essentially a chemical messenger that transports a signal from one cell to another. All multicellular organisms produce hormones including plants. Hormones in animals are transported in the blood. Cells respond to a hormone when they express a specific receptor for that hormone. The hormone binds to the receptor protein, resulting in the activation of a signal transduction mechanism that ultimately leads to cell-type-specific responses.