

Treatment for allergies always begins with measures to avoid exposure to allergens. Allergic reactions can be treated with pharmacological inhibitors of cellular and tissue responses and inflammation, including antihistamines, leukotriene inhibitors, and corticosteroids. An anti-IgE-antibody also can be effective, though expensive and difficult to administer. Antihistamines are used in the treatment of allergic rhinitis. These drugs inhibit histamine activity by binding and blocking histamine receptors on target cells. Immunotherapeutic approaches include attempts to desensitize allergic individuals by exposing them to increasing levels of their allergen. Immunotherapy by injection or sublingual administration of airborne allergens has been successful in preventing allergic rhinitis. Clinical trials are underway to desensitize children with food allergies by feeding increasing doses of allergen, which might work by inducing regulatory T cells and Th1 cells instead of Th2 cells, and the production of IgG4 instead of IgE antibodies.

Type II hypersensitivity

Transfusion reactions are an example of type II hypersensitivity. Transfusion reactions are caused by antibodies that bind to A, B or H carbohydrate antigens, which are expressed on the surface of red blood cells. Individuals with different blood types express different carbohydrate antigens. They are tolerant to their own antigens, but generate antibodies against the antigen that they do not express. All individuals express antigen H, so no antibodies are generated to this carbohydrate. Transfusion across differences in other blood-group antigens stimulating production of IgG antibodies, which cause delayed and less severe reactions.

Haemolytic disease of the newborn is caused by type II reactions. Haemolytic disease of the newborn is caused by maternal antibody reaction to the Rh antigen, which can happen if the mother of Rh negative and the father is Rh positive. As red blood cells from a fetus enter the maternal circulation during pregnancy and birth, the mother will develop Rh antibodies that can cause haemolytic disease in subsequent pregnancies. This can be prevented by several approaches to eliminate fetal red blood cells or the maternal antibodies. Similar immunization of mother against A and B blood group antigens of the fetus may also occur, blood group antigen antibodies cause less severe hemolytic disease of the newborn.

Drug induced haemolytic anaemia is another example of a type II hypersensitivity reaction. Certain antibiotics, eg. penicillin, cephalosporins, and streptomycin, as well as other drugs, including ibuprofen and naproxen, can adsorb nonspecifically to proteins on red blood cells membranes, forming a drug protein complex. In some patients, such drug protein complexes induce the formation of antibodies, these antibodies then bind to the adsorbed drug on the red blood cells, inducing complement mediated lysis, and thus progressive anemia. When the drug is withdrawn, the haemolytic anaemia disappears.

Type III hypersensitivity

The reaction of antibodies with antigen generates immune complexes. In general, the antigen-antibody complexes facilitate the clearance of antigen by phagocytic cells and red blood cells. In some cases, however, the presence of large numbers and networks of immune complexes can lead to tissue damaging type III hypersensitivity reactions. The