Hypersensitivity Reactions

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A hypersensitive immune system is one which overreacts to a stimulus. A normal immune system reacts when the body identifies a foreign protein such as proteins on the outside of bacteria. This foreign material which invokes the immune response is called an antigen. The body can react to the antigen by producing protein molecules (antibodies) which bind the antigen. The combination of the antibody bound or attached to the antigen is called an immune complex.

In addition to antibodies, various cells can also be activated which produce chemicals such as histamines which can affect multiple parts of the body. In hypersensitivity, the body produces way too much antibody, the wrong kind of antibody, a large number of antigen-antibody complexes, or antibody to proteins which are not really foreign. In addition, an excessive number of cells may be activated to produce histamine and other chemicals. There are four major types of hypersensitivity.

Type I (Immediate) Hypersensitivity

In Type I hypersensitivity, the reaction of the immune system is immediate and severe. The symptoms are mostly due to cells over-reacting and releasing very large amounts of histamine and other chemicals. This is the type of reaction that occurs when a person or animal is allergic to bee stings or penicillin and is called anaphylaxis. Type I hypersensitivities also include allergies to things inhaled (atopy) such as pollens and dog or cat dander, flea allergy dermatitis, and other antigens which evoke symptoms of an allergy within minutes of when the person or animal was exposed. Urticaria (hives) is another Type I hypersensitivity.

Type II (Antibody mediated) Hypersensitivity

Type II hypersensitivities occur when the body produces antibodies to proteins on its own cells. This is called autoimmunity. In autoimmune hemolytic anemia, the body produces antibodies against its own red blood cells, destroying them, and producing an anemia (lower than normal number of red blood cells). Transfusion reactions are another example of this type of hypersensitivity.

Type III (Immune complex mediated) Hypersensitivity

The over-reaction of the immune system in Type III hypersensitivities causes large numbers of immune (antibody-antigen) complexes to form in the body and lodge in certain organs. A certain type of kidney disease called 'glomerulonephritis' occurs when these complexes lodge in the kidney and block its ability to filter the blood. Lupus erythematosus and rheumatoid arthritis are other examples of this type of hypersensitivity.

Type IV (Delayed) Hypersensitivity

Type IV or delayed hypersensitivity occurs more than 24 hours after the body was exposed to the antigen. Allergic contact dermatitis is one kind of Type IV hypersensitivity. This is the type of reaction that occurs in animals and people exposed to various dyes, chemicals, or metals. It is also the reaction we test for when a tuberculin test is performed.

Genetics and hypersensitivity

All cases of allergies, whether they are severe or mild, are genetic in nature. A dog or cat that becomes allergic to vaccines, drugs, food, pollens, fleas, etc., is genetically programmed to have an immune system capable of mounting the allergic response. An allergic reaction is not the fault of the medication, vaccine, food, or environment; it is a genetic trait inherited from the parents. It is unwise to use individuals with abnormal immune systems in a breeding program.

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