Hypersensitivity Reactions

1. There are 4 types of hypersensitivity reactions.
2. Type 1 reactions are immediate-type reactions, including anaphylaxis. Signs & symptoms are the result of the release of histamine and other autocoids from mast cells & basophils.
3. Type 2 reactions are cytotoxic reactions and are cell mediated. ABO-incompatibility reactions are of this type.
4. Type 3 reactions are the result of soluble antigens and antibodies combining to form insoluble complexes. Neutrophils are activated and tissue damage results. Serum sickness and Arthus reactions are examples of Type 3 reactions.
5. Type 4 reactions are also known as delayed hypersensitivity reactions. These are the result of antigens reacting with sensitized lymphocytes. Contact dermatitis is an example of a Type 4 reaction.

Type 1 hypersensitivity reactions involve the combination of antigen with circulating IgE. This produces degranulation of basophils and mast cells with the release of histamine and other autocoids. Type 1 reactions require previous exposure to the antigen, thereby causing the production of the IgE.

Type 2 hypersensitivity reactions are antibody dependent, cell-mediated reactions. These reactions are mediated through IgG or IgM antibodies directed against cellular surface antigens. Previous exposure, as in ABO-incompatibility reactions, is not required. Cell damage from type 2 reactions is the result of cell lysis with complement activation and subsequent phagocytosis.

Type 3 hypersensitivity reactions are also known as immune-complex reactions. These reactions result from soluble antigens and antibodies combining to form insoluble complexes, which deposit in the microvasculature. The subsequent inflammatory process then produces tissue damage.

Type 4 hypersensitivity reactions occur as a result of sensitized lymphocytes interacting with an antigen. Type 4 reactions usually require 18 – 24 hours after exposure to appear and frequently resolve several days after exposure, if the antigen is removed. This type of reaction requires killer T-cells, which attack and kill the cells containing the antigen. This hypersensitivity is the basis of transplant rejection and contact dermatitis.

Additional Reading: