

A Note on Hypersensitivity

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EDITORIAL NOTE

Hypersensitivity is also called as hypersensitivity reaction or intolerance. When there is an obnoxious responses produced by the interaction of the normal immune system with an allergen (antigen), are referred as Hypersensitivity. These reactions can be damaging, uncomfortable or might occasionally cause fatal.

The vulnerability of a person to these reactions can have a genetic link. Overreaction to these self-antigens is normally due to a failure in central tolerance, and this resulted in failure so we can see genetically-inheritable features.

In order to cause a hypersensitivity reaction, it needs two separate interactions between the immune system and the antigen.

The first time an antigen enters the body; it is picked up by APC, known as antigen presenting cells (such as macrophages or dendritic cells) and taken to the nearest lymph node, where T-cells are present. Cross-linking of the antigen with T-cells, this can lead to activation of that T-cell and following differentiation into "primed" Th1, Th2, or Th17 cells, and they can stimulate further immune responses if they meet the antigen again. The second time, this second meeting could result in a hypersensitivity reaction.

The Gells and Coombs classified the hypersensitivity reactions into four types:

Type 1 Hypersensitivity: Type 1 reactions are mediated by antibody IgE. The immunologic aspect of Type 1 is that it has quickest response which occurs in minutes, rather than hours or days. Free allergens cross link the IgE on mast cells/basophils which causes a release of biomolecules. Alternatives names for Type 1 are Allergy and Anaphylactic. Frequently mentioned disorders are Atopy, Anaphylaxis, Asthma.

Type 2 Hypersensitivity: Type 2 reactions are mediated by antibody IgM, IgG, or MAC (Membrane Attack Complex). Immunologic aspect of Type 2 is that antibody binds to antigen on a target cell. This target cell is actually a host cell which is recognized by the immune system as foreign and this leads to cellular destruction via the MAC. Alternatives names for Type 2 are Cytotoxic, Antibody-dependent.

Frequently mentioned disorders are Autoimmune hemolytic anemia, Rheumatic heart disease, Thrombocytopenia, Graves' disease

Type 3 Hypersensitivity: Type 3 reactions are mediated by antibody IgG, Complement, Neutrophils. Immunologic aspect of Type 3 is that antibody (IgG) binds to soluble antigen which forms a circulating immune complex. This is usually deposited in the vessel walls of the joints and kidney which initiates a local inflammatory reaction. Alternative name for Type 3 is Immune complex.

Frequently mentioned disorders are Serum sickness, Rheumatoid arthritis, Membranous nephropathy, Reactive arthritis, Lupus nephritis.

Type 4 Hypersensitivity: Type 4 reactions are mediated by T-cells. T helper cells get activated by an APC (antigen presenting cell). When the antigen is presented again in the future, the Th1 cells will activate and release chemokines to recruit macrophages. These macrophages release pro-inflammatory factors which lead to swelling, warmth, redness and this can damage body tissues. Type 4 is also called as Delayed hypersensitivity reactions, cell-mediated immune memory response, Antibody-independent.

Frequently mentioned disorders are Contact dermatitis, Mantoux test, Chronic transplant rejection, Multiple sclerosis, Coeliac disease, Hashimoto's thyroiditis.

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