

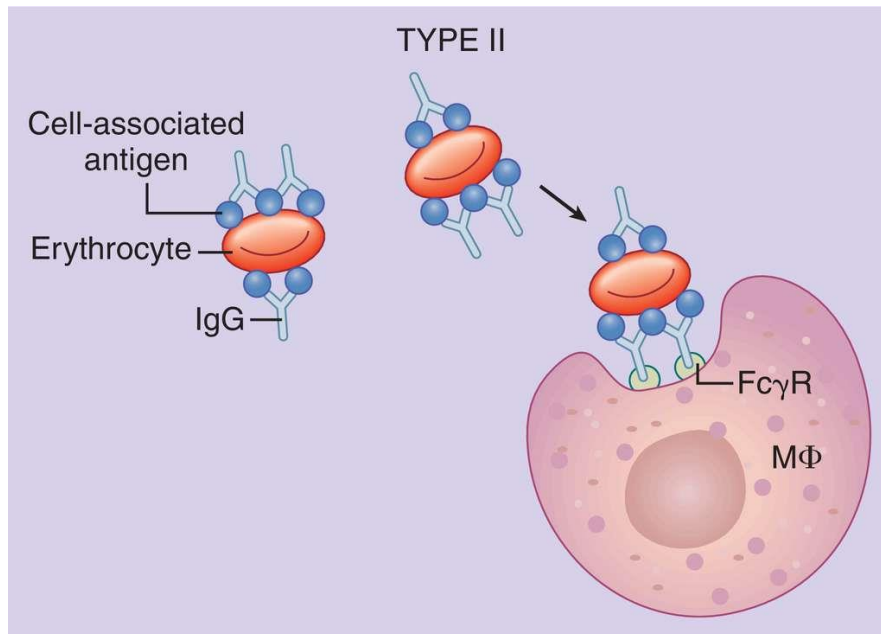
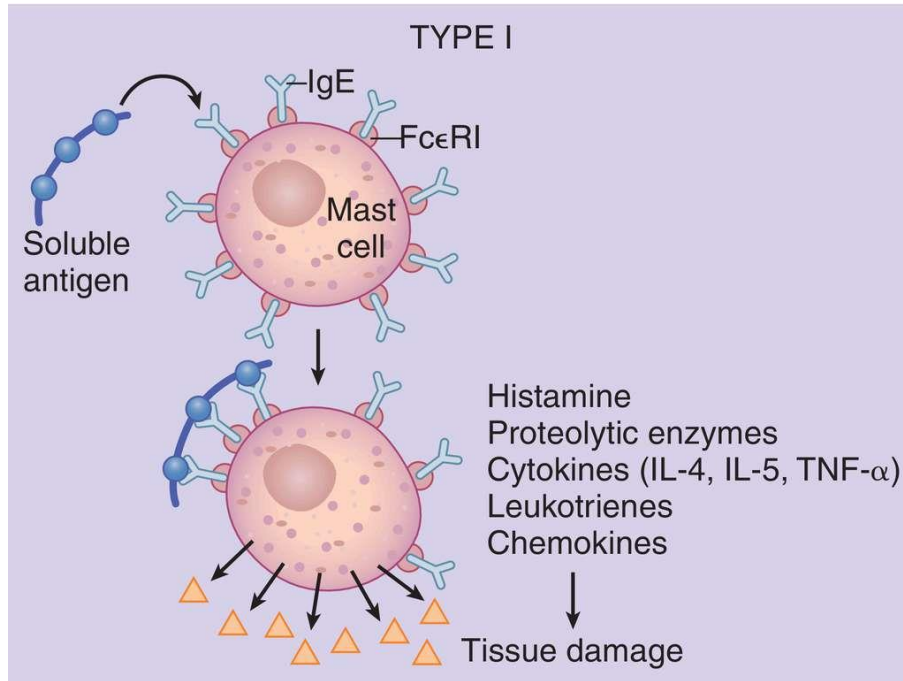
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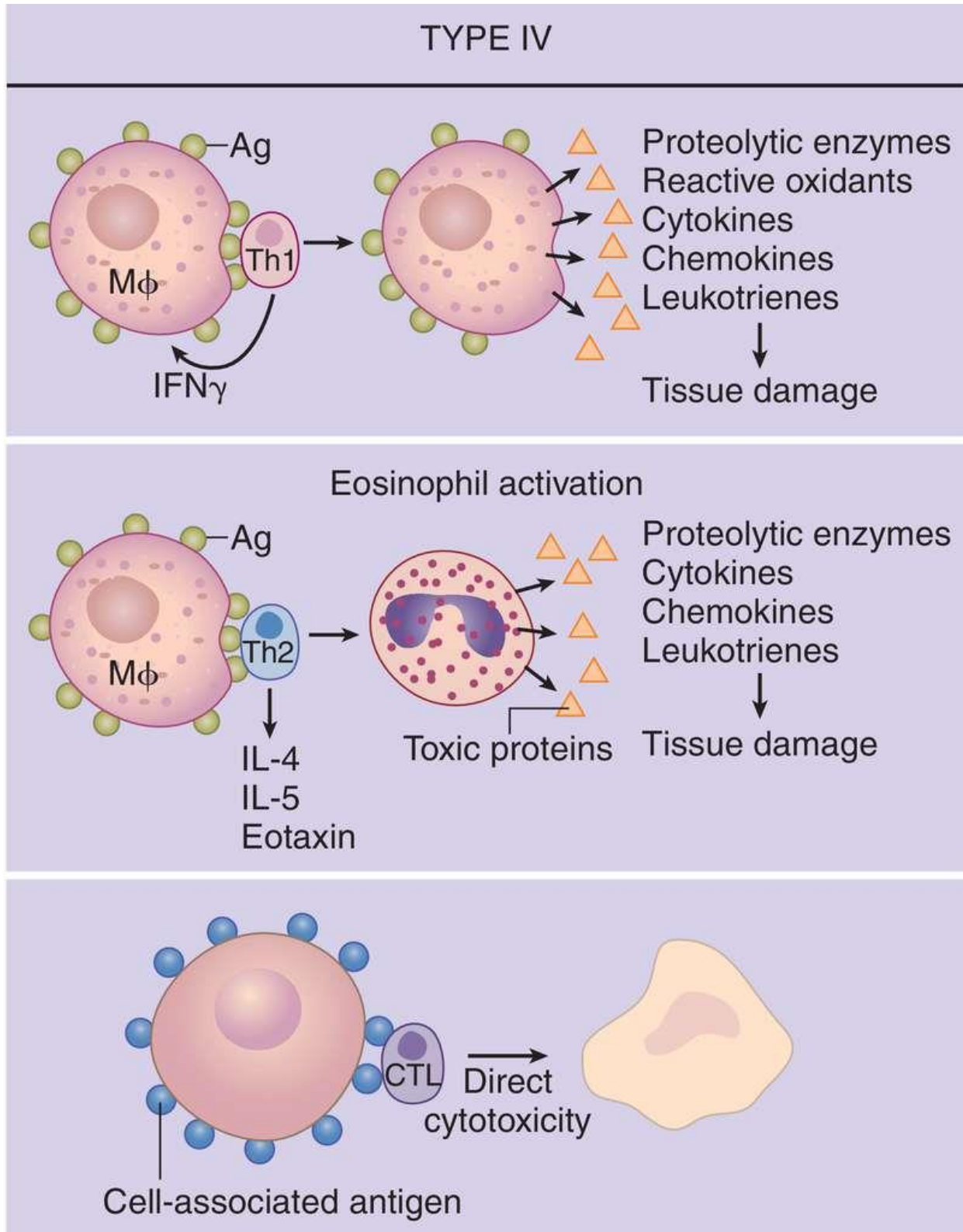
Hypersensitivity

Hypersensitivity (also called **hypersensitivity reaction** or **intolerance**) is a set of undesirable reactions produced by the normal immune system, including allergies and autoimmunity. They are usually referred to as an over-reaction of the immune system and these reactions may be damaging, uncomfortable, or occasionally fatal. Hypersensitivity reactions require a pre-sensitized (immune) state of the host. They are classified in four groups after the proposal of P. G. H. Gell and Robin Coombs in 1963.

Type	Alternative names	Often mentioned disorders	Mediators	Description
<u>I</u>	Allergy (immediate)	<ul style="list-style-type: none"> • Atopy • Anaphylaxis • Asthma 	<ul style="list-style-type: none"> • IgE 	Fast response which occurs in minutes, rather than multiple hours or days. Free antigens cross link the IgE on mast cells and basophils which causes a release of vasoactive biomolecules. Testing can be done via skin test for specific IgE.
<u>II</u>	Cytotoxic, antibody-dependent	<ul style="list-style-type: none"> • Autoimmune hemolytic anemia • Rheumatic heart disease • Thrombocytopenia • Erythroblastosis fetalis • Goodpasture's syndrome • Graves' disease *see type V explanation below 	<ul style="list-style-type: none"> • IgM or IgG • (Complement) • MAC 	Antibody (IgM or IgG) binds to antigen on a target cell, which is actually a host cell that is perceived by the immune system as foreign, leading to cellular

		<ul style="list-style-type: none"> • Myasthenia gravis*see type V explanation below 		destruction via the MAC . Testing includes both the direct and indirect Coombs test.
III	Immune complex disease	<ul style="list-style-type: none"> • Serum sickness • Arthus reaction • Rheumatoid arthritis • Post streptococcal glomerulonephritis • Membranous nephropathy • Lupus nephritis • Systemic lupus erythematosus • Extrinsic allergic alveolitis(hypersensitivity pneumonitis) 	<ul style="list-style-type: none"> • IgG • (Complement) • Neutrophils 	Antibody (IgG) binds to soluble antigen, forming a circulating immune complex . This is often deposited in the vessel walls of the joints and kidney, initiating a local inflammatory reaction. ^[4]
IV	Delayed-type hypersensitivity, ^{[2][3]} cell-mediated immune memory response, antibody-independent	<ul style="list-style-type: none"> • Contact dermatitis, including Urushiol-induced contact dermatitis (poison ivy rash). • Mantoux test • Chronic transplant rejection • Multiple sclerosis^[5] 	<ul style="list-style-type: none"> • T-cells 	Helper T cells (specifically Th1 helper t cells) are activated by an antigen presenting cell. When the antigen is presented again in the future, the memory Th1 cells will activate macrophages and cause an inflammatory response. This ultimately can lead to tissue damage. ^[6]
V	Autoimmune disease, receptor mediated (see below)	<ul style="list-style-type: none"> • Graves' disease • Myasthenia gravis 	<ul style="list-style-type: none"> • IgM or IgG • (Complement) 	





Immune Tolerance

Immune Tolerance : is a state of unresponsiveness of the immune system to substances or tissue that have the capacity to elicit an immune response in given organism.

There are two types of tolerance

- Central tolerance which occur in primary lymphoid organ
- Peripheral tolerance which occur in secondary lymphoid organ

Failure of tolerance lead to occurrence of state called autoimmunity or the response to self antigen which cause autoimmune diseases.

Immunodeficiency Disorders

When the system errs by failing to protect the host from disease causing agents, the result is immunodeficiency.

Immunodeficiency resulting from an inherited genetic or developmental defect in the immune system is called a primary immunodeficiency.

In such a condition, the defect is present at birth, although it may not manifest until later in life. These diseases can be caused by defects in virtually any gene involved in immune development or function, innate or adaptive, humoral or cell mediated,

Secondary immunodeficiency, also known as acquired immunodeficiency, is the loss of immune function that results from exposure to an external agent, often an infection. Although several external factors can affect immune function, by far the most well-known secondary immunodeficiency is acquired immunodeficiency syndrome (AIDS), which results from infection with the human immunodeficiency virus(HIV).

Transplantation Immunology

Graft Rejection Occurs Based on Immunologic Principles.

The degree and type of immune response to a transplant varies with the type and source of the grafted tissue. The following terms denote different types of transplants:

- **Autograft** is self tissue transferred from one body site to another in the same individual. Examples include transferring healthy skin to a burned area in burn patients and using healthy blood vessels to replace blocked coronary arteries.
- **Isograft** is tissue transferred between genetically identical individuals. This occurs in inbred strains of mice or identical human twins, when the donor and recipient are syngeneic.
- **Allograft** is tissue transferred between genetically different members of the same species. In mice this means transferring tissue from one strain to another, and in humans this occurs in transplants in which the donor and recipient are not genetically identical (the majority of cases).
- **Xenograft** is tissue transferred between different species (e.g., the graft of a baboon heart into a human). Because of significant shortages of donated organs, raising animals for the specific purpose of serving as organ donors for humans is under serious consideration.