

Difference Between Hypersensitivity and Autoimmunity

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Key Difference – Hypersensitivity vs Autoimmunity

Autoimmunity is an [adaptive immune response](#) mounted against self-antigens. In simple terms, when your body is acting against its own [cells and tissues](#), this is called an autoimmune reaction. An exaggerated and inappropriate immune response to an antigenic stimulus is defined as a hypersensitivity reaction. **Unlike autoimmune reactions that are triggered only by the [endogenous antigens](#), hypersensitivity reactions are triggered by both [endogenous and exogenous antigens](#).** This is the key difference between hypersensitivity and autoimmunity.

What is Hypersensitivity?

An exaggerated and inappropriate immune response to an antigenic stimulus is defined as a hypersensitivity reaction. The first exposure to a particular [antigen](#) activates the immune system and, antibodies are produced as a result. This is called sensitization. Subsequent exposures to the same antigen give rise to hypersensitivity.

Few important facts regarding the hypersensitivity reactions are given below

- They can be elicited by both exogenous and endogenous agents.
- They are a result of an imbalance between the effector mechanisms and the countermeasures that are there to control any inappropriate execution of an immune response.
- The presence of a genetic susceptibility increases the likelihood of hypersensitivity reactions.
- The manner in which hypersensitivity reactions harm our body is similar to the way that the [pathogens](#) are destroyed by immune reactions.

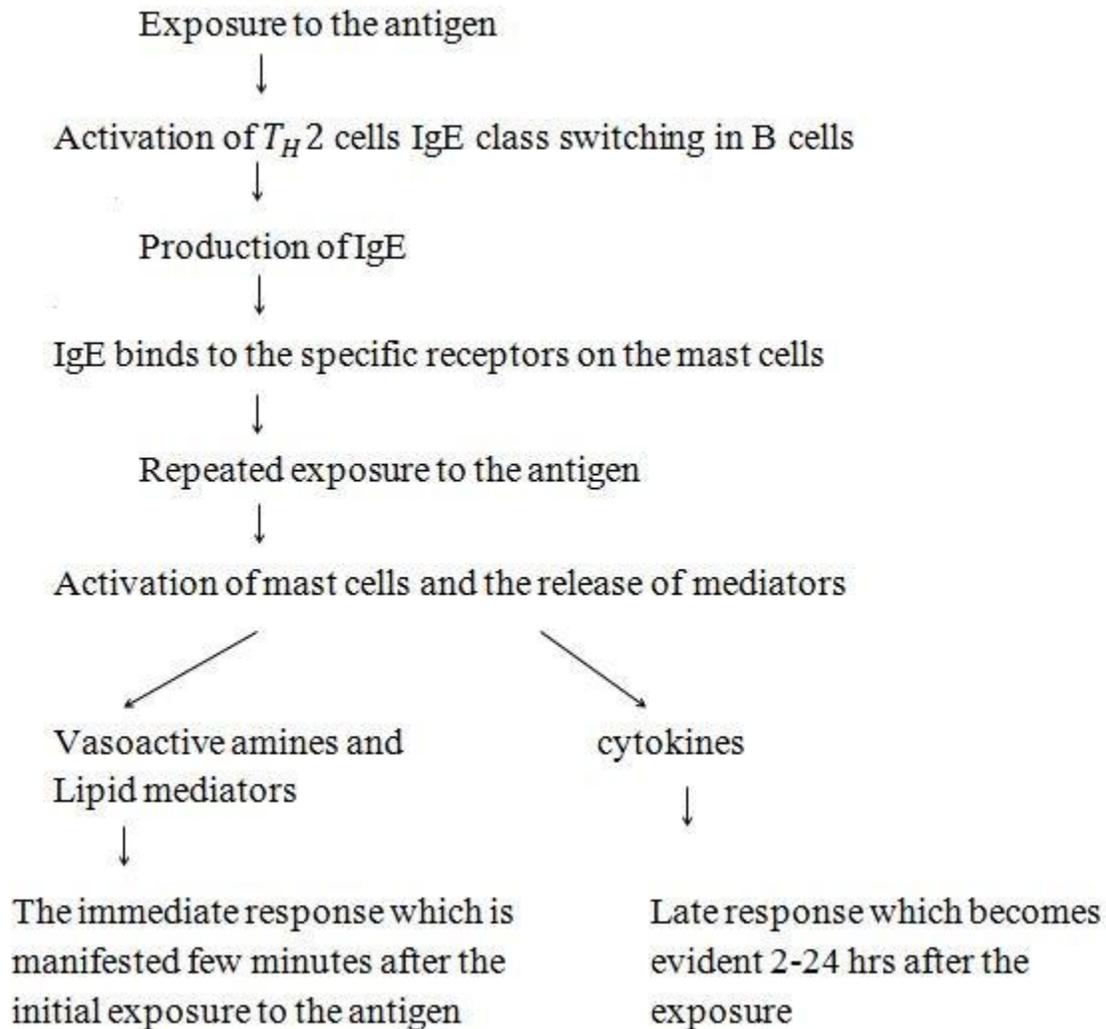


Figure 01: Allergy

According to the Coombs and Gell classification, there are four main types of hypersensitivity reactions.

Type I- Immediate Type/ Anaphylactic

Mechanism



[Vasodilation](#), [edema](#), and contraction of smooth muscles are the pathological changes that take place during the immediate phase of the reaction. Late response is characterized by inflammation and extensive tissue damage. [Allergies](#) and [bronchial asthma](#) are due to this sort of type I hypersensitivity reactions.

Type II – Antibody Mediated Hypersensitivity Reactions

Antibodies can be considered as immunological agents that disintegrate antigens through various mechanisms. In doing so, they can harm the normal body tissues and structures also by triggering inflammation and interfering the normal metabolic processes.

Mechanism

Type II hypersensitivity reactions cause tissue damage in three ways.

Opsonization and Phagocytosis

The cells that are opsonized by [IgG](#) antibodies are engulfed and destroyed through phagocytosis occasionally with the contribution of the complement system.

Inflammation

The deposition of antibodies either in the basement membrane or the extracellular matrix gives rise to [inflammation](#).

Cellular Dysfunction

Without causing any structural damages, tissues are destroyed by interrupting the vital processes that keep them alive.

Good pasture syndrome, myasthenia gravis, and pemphigus vulgaris are some examples of the diseases caused by the type II hypersensitivity reactions.

Type III – Immune Complex Mediated Hypersensitivity Reactions

In this type of hypersensitivity reactions, the tissue damage is caused by antigen-antibody complexes. These immune complexes get deposited at different sites and trigger immune reactions that result in tissue damage.

Mechanism

Formation of the immune complex



Deposition of immune complex



Inflammation and tissue damage

SLE, post-streptococcal glomerulonephritis, and polyarthritis nodosa are some of the diseases caused by type III hypersensitivity reactions.

Morphological Features

Acute vasculitis is the hallmark feature of an immune complex injury and it is accompanied by neutrophilic infiltration and fibrinoid [necrosis](#) of the vascular wall.

Type IV- T Cell Mediated Hypersensitivity Reactions

The tissue damage in these reactions is due to the inflammatory response that is elicited by the CD4+ cells and the cytotoxic action of the CD 8+ cells.

Diseases such as [Psoriasis](#), [multiple sclerosis](#), and inflammatory bowel disease are caused by type IV hypersensitivity reactions.

What is Autoimmunity?

Autoimmunity is an adaptive immune response mounted against self-antigens. As in a normal immune response, the antigen presentation elicits a rapid proliferation of [T and B cells](#) which are responsible for the activation of effector mechanisms. While the normal immune responses try to eliminate exogenous antigens from the body, autoimmune responses aim at eliminating a specific variety of endogenous antigens from our biological systems.

Few common autoimmune diseases and the autoantigens that give rise to them are enumerated below.

- [Rheumatoid arthritis](#) – synovial proteins
- SLE – nucleic acid
- Autoimmune hemolytic anemia – Rhesus protein
- Myasthenia gravis – choline esterase

There are two main categories of autoimmune diseases

Organ-Specific Autoimmune Diseases

Type I diabetes mellitus, Graves disease, multiple sclerosis, Good pasture syndrome

System Specific Autoimmune Diseases

SLE, Scleroderma, Rheumatoid arthritis

As previously mentioned, an autoimmune response is mounted against self-antigens. But it is impossible to completely eliminate these intrinsic molecules with antigenic properties from our body. Therefore autoimmune diseases cause a chronic tissue damage because of the repeated attempts to get rid of the self-antigens.

Why are Only Some Affected?

During the development of T cells, they are made tolerant to self-antigens. However, in some people, this tolerance is either lost or disrupted because of genetic and environmental factors. This gives rise to autoimmunity.

Usually, there are several defense mechanisms that promote the apoptosis of the self-reactive T cells. Despite these countermeasures, some self-reactive cells can remain in our body. In a genetically susceptible individual, these cells get activated resulting in an autoimmune disease under the appropriate environmental conditions.



Figure 02: Rheumatoid Arthritis

What are the similarities between Hypersensitivity and Autoimmunity?

- Both autoimmunity and hypersensitivity are defective immune responses.

What is the difference between Hypersensitivity and Autoimmunity?

Hypersensitivity vs Autoimmunity

An exaggerated and inappropriate immune response to an antigenic stimulus is defined as a hypersensitivity reaction.

Autoimmunity is an adaptive immune response mounted against self-antigens.

Antigens

This is only triggered by endogenous antigens.

This is triggered by both endogenous and exogenous antigens.

Structure

This can have both acute and chronic manifestations.

This only has chronic manifestations.

Summary – Hypersensitivity vs Autoimmunity

Autoimmunity is an adaptive immune response mounted against self-antigens. Hypersensitivity is an exaggerated and inappropriate immune response to an antigenic stimulus. The main difference between hypersensitivity and autoimmunity is that hypersensitivity can be elicited by both exogenous and endogenous antigens whereas autoimmunity is elicited only by the endogenous antigens.

References:

1. Kumar, Vinay, Stanley Leonard Robbins, Ramzi S. Cotran, Abul K. Abbas, and Nelson Fausto. Robbins and Cotran pathologic basis of disease. 9th ed. Philadelphia, Pa: Elsevier Saunders, 2010. Print.

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