

Week 1 Immune Response

- Hypersensitivity
- Immunodeficiency
- Autoimmunity

Weekly objectives

1. WO1.1-Analyze pathophysiological mechanisms associated with alterations in immune structure process. (CO1)
2. WO1.3- Differentiate between normal and abnormal immune structure and function. (CO1)
3. WO1.2- Describe outcomes of disruptive or alteration in immune processes. (CO2)
4. WO1.4- Apply a clinical practice guideline in the management of a patient with altered immune function. (CO5)

Hypersensitivity

Hypersensitivity Reactions

The immune system functions to eliminate pathogens from the body using various mechanisms. A pathogen is just simply a bacterium, virus or other microorganism that can cause disease. These mechanisms typically create a localized inflammatory response that effectively eliminates the pathogen without minimal damage to the surrounding tissue. Besides pathogens, individuals come into contact with numerous foreign antigens, such as plant pollen and food. Contact with these environmental antigens does not elicit an immune response in the majority of individuals. However, in certain predisposed individuals, the immune system can mount a response to these generally innocuous antigens, resulting in tissue damage that ranges from mild irritation to life-threatening anaphylactic shock. These immune responses are referred to as allergic reactions or hypersensitivity reactions. Hypersensitivity reactions can be divided into four categories, Type I to Type IV, distinguished by the cell types and effector molecules involved.

Type I: Allergic Reaction

On initial encounter with an allergen, the individual will first produce IgE antibodies. After the allergen is cleared, the remaining IgE molecules will be bound by mast cells, basophils, and eosinophils that contain receptors for the IgE molecules. This process is referred to as sensitization. On subsequent exposure to the allergen, the IgE molecules located on the sensitized cells induces their immediate degranulation. This causes the release of inflammatory mediators such as histamine, leukotrienes, and prostaglandins that results in vasodilation, bronchial smooth muscle contraction, and mucus production. Type I hypersensitivity reactions can be local or systemic. Systemic reactions can result in anaphylaxis, a potentially life-threatening condition. Allergic asthma is an example of a Type I hypersensitivity reaction. On exposure to certain allergens (typically inhaled), individuals with allergic asthma experience inflammation of the airways, characterized by tissue swelling and excessive mucus production. This narrowing of the airways makes it difficult to breathe.