Immune System Types, Components & Diseases YouTube Lecture Handouts

Title: Immune System Types, Components & Diseases

The role of the immune system a collection of structures and processes within the body is to protect against disease or other potentially damaging foreign bodies. When functioning properly, the immune system identifies a variety of threats, including viruses, bacteria and parasites, and distinguishes them from the body's own healthy tissue

Types of Immune System

Innate

Adaptive

- Our immune system can be divided into two categories: the innate immune system and the adaptive immune system. The innate immune system refers to the immunity that you're born with, which targets general health threats, while adaptive immunity refers to acquired immunity, which targets more specific pathogens.
- Cytokines are "at the crossroads of bridging the communication between the innate and adaptive immune responses,"

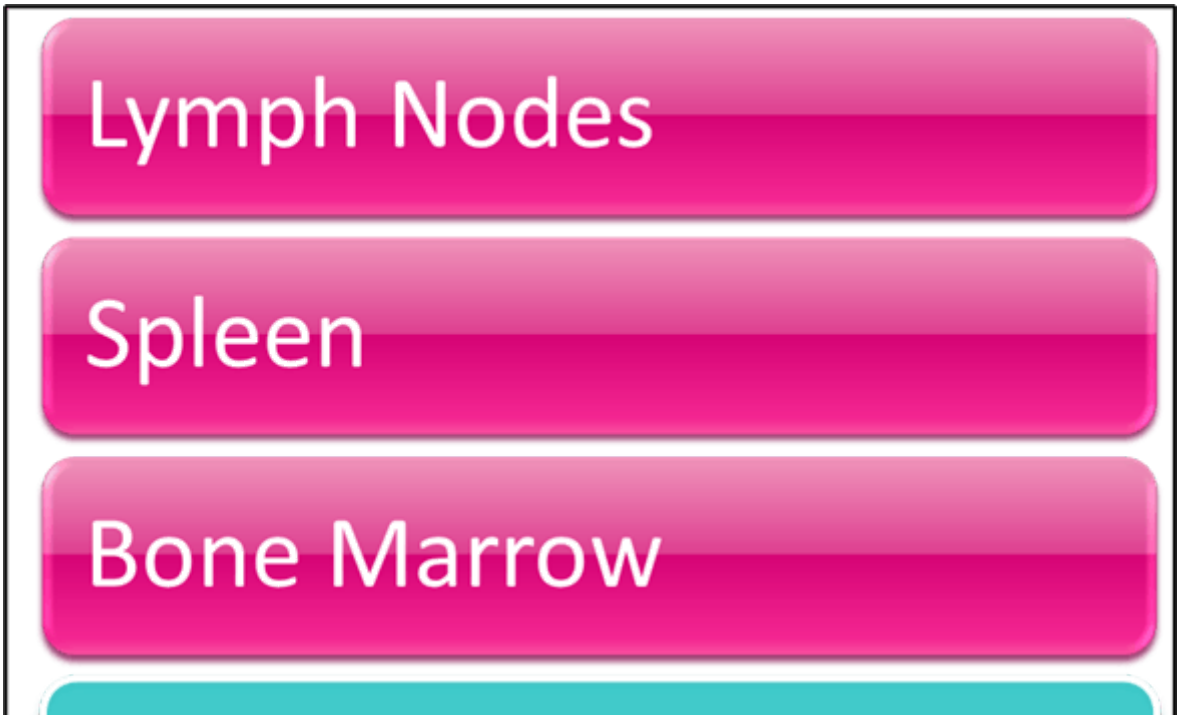
Innate Immunity

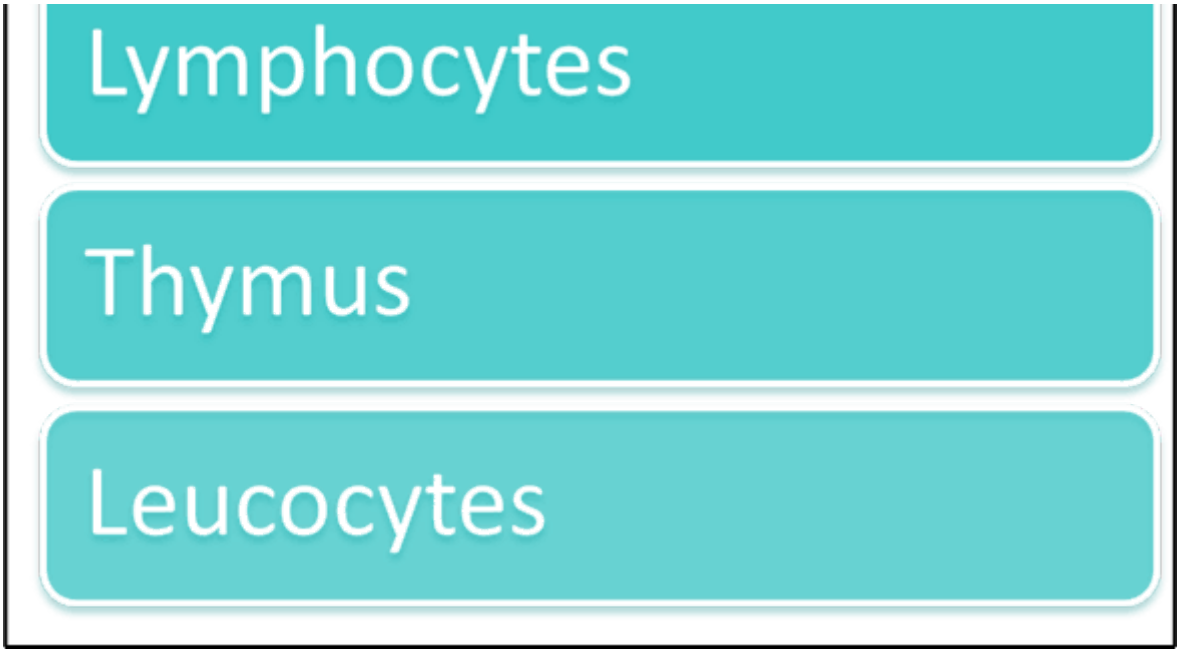
- Skin, stomach acid, enzymes found in tears and skin oils, mucus and the cough reflex
- Components of innate immunity include skin, stomach acid, enzymes found in tears and skin oils, mucus and the cough reflex. There are also chemical components of innate immunity, including substances called interferon and interleukin-1.
- Innate immunity is non-specific, meaning it doesn't protect against any specific threats.

Adaptive Immunity: More Complex Than Innate

Adaptive, or acquired, immunity targets specific threats to the body. In adaptive immunity, the threat must be processed and recognized by the body, and then the immune system creates antibodies specifically designed to the threat. After the threat is neutralized, the adaptive immune system "remembers" it, which makes future responses to the same germ more efficient.

Components of Immune System


Lymph Nodes
Spleen
Bone Marrow



Lymph Nodes

Small, bean-shaped structures that produce and store cells that fight infection and disease and are part of the lymphatic system — which consists of bone marrow, spleen, thymus and lymph nodes. Lymph nodes also contain lymph, the clear fluid that carries those cells to different parts of the body. When the body is fighting infection, lymph nodes can become enlarged and feel sore.

Spleen

The largest lymphatic organ in the body, which is on your left side, under your ribs and above your stomach, contains WBCs that fight infection or disease. Spleen also helps control the amount of blood in the body and disposes of old or damaged blood cells.

Bone Marrow

The yellow tissue in the center of the bones produces WBCs. This spongy tissue inside some bones, such as the hip and thigh bones, contains immature cells, called stem cells. Stem cells, especially embryonic stem cells, which are derived from eggs fertilized in vitro (outside of the body) , are known for being able to morph into any human cell.

Lymphocytes

These small WBCs large role in defending the body against disease. The two types of lymphocytes are B-cells, which make antibodies that attack bacteria and toxins, and T-cells, which help destroy infected or cancerous cells. Killer T-cells are a subgroup of T-cells that kill cells that are infected with viruses and other pathogens or are otherwise damaged. Helper T-cells help determine which immune responses the body makes to a particular pathogen.

Thymus

This small organ is where T-cells mature. This often-overlooked part of the immune system, which is situated beneath the breastbone (and is shaped like a thyme leaf, hence the name) , can trigger or maintain the production of antibodies that can result in muscle weakness. Thymus is somewhat large in infants, grows until puberty, then starts to slowly shrink and become replaced by fat with age.

Leukocytes

- These disease-fighting WBCs identify and eliminate pathogens and are the second arm of the innate immune system. A high white blood cell count is referred to as leukocytosis. The innate leukocytes include phagocytes (macrophages, neutrophils and dendritic cells) , mast cells, eosinophils and basophils.
- Immunodeficiency occurs when the immune system is not as strong as normal, resulting in recurring and life-threatening infections
- Common autoimmune diseases include Hashimoto's thyroiditis, rheumatoid arthritis, diabetes mellitus type 1 and systemic lupus erythematosus. Another disease considered to be an autoimmune disorder is myasthenia gravis
- Diagnosed by blood test, skin allergy test
- Treatment includes monoclonal antibodies. A monoclonal antibody is a type of protein made in a lab that can bind to substances in the body. They can be used to regulate parts of the immune response that are causing inflammation. They are being used to treat cancer. They can carry drugs, toxins or radioactive substances directly to cancer cells.
- Other treatments include corticosteroids or other immune suppressive agents or replacement of missing or deficiency elements

✍ Mayank