Immune System Tissues

There are a variety of organs and cells in the immune system that contribute to the body's defense against foreign particles. The bone marrow is the site of haematopoiesis, which results in the formation of B and T cells. B cells participate in the humoral immune response, while T cells participate in cell-mediated immunity. B cells begin maturing in the bone marrow itself and finish becoming functional cells in the spleen. In contrast, T cells mature in the thymus where they are tested for self response. T cells are tested for autoimmunity to prevent released T cells from recognizing and attacking the body's own proteins and antigens.Both B and T cells reside in the lymph nodes, which are large organs spread throughout the body that filter and circulate lymph. Here, mature B and T cells monitor the lymph for pathogens and conduct their respective immune responses upon exposure to a foreign antigen. The spleen is a lymphatic organ where blood is filtered, and it is the site of B and T cells monitoring blood for pathogens.



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Characteristics

Bone Marrow
Bone Marilyn-Monroe
The bone marrow is where immature B and T cells form. They develop from stem cells located in the bone marrow.

B Cells and T Cells Formed
Baby Basketball and Tennis Ball in a Cradle
B and T cells are formed in the bone marrow from stem cells during a process called hematopoiesis.

B Cells Mature
Old Basketball
B cells reach a semi-mature level in bone marrow before traveling to the spleen to become fully-functional mature B cells.

Thymus
Thigh-mouse
The thymus is an immune system organ primarily involved in maturation of T cells. It is located in front of the heart and behind the sternum.

T Cells Tested For Self-Response
Tennis-balls fighting each other
T cells are tested for self response in the thymus. Autoimmunity is when the body's immune cells attack the body and cells. A functional thymus tests T cells to determine if they will attack the body's proteins and antigens.

T Cells Mature
Old Tennis-ball
T cells reach maturity in the thymus and are ready to destroy infected cells (cytotoxic and natural killer T cells) or assist by activating B and killer T cells (helper T cells).

Lymph Nodes
Lime-nose
The lymph nodes are the garrisons of immunity cells. They are distributed throughout the body and linked by lymphatic vessels. They filter and trap foreign pathogens and molecules.

Mature B Cells and T Cells Monitor Lymph For Pathogens
Old Basketball and Tennis-ball monitor Lime-juice for Pathogen
In lymph nodes, mature B and T cells monitor circulating lymph for pathogens. B cells respond to pathogens by producing antibodies, and cytotoxic and killer T cells destroy the pathogens.

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Spleen

Spleen-spoon

The spleen is analogous to the large lymph nodes for blood filtration. It holds a reserve of blood and filters red blood cells. In the immune system, it serves as a site for B and T cell activity.

Mature B Cells and T Cells Monitor Blood For Pathogens

Old Basketball and Tennis-ball monitor Blood for Pathogen

In the spleen, mature B and T cells look for pathogens and bind to any free floating antigens. With antigens from pathogens, they trigger the humoral-adaptive and cell-mediated adaptive immune responses.

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