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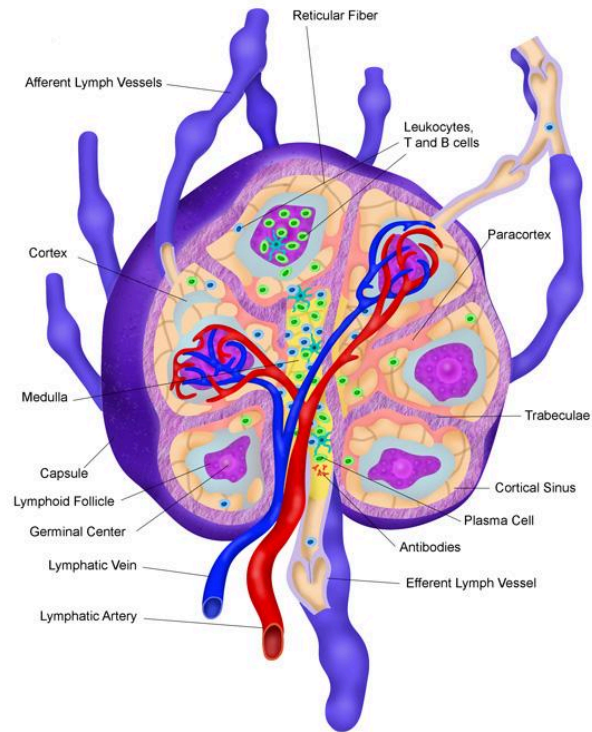
Lymphoid Tissue

Lymphoid tissues are cells and organs that make up the lymphatic system. We have many areas in our body that are very dense in lymphoid tissue. Primary lymphoid tissues (otherwise known as central lymphoid tissue) are the bone marrow and thymus. These are the locations where lymphocytes are produced and develop to maturity. T-cells start in the bone marrow and then go to the thymus to mature and differentiate. B-cells are produced, differentiate, and mature in the bone marrow.

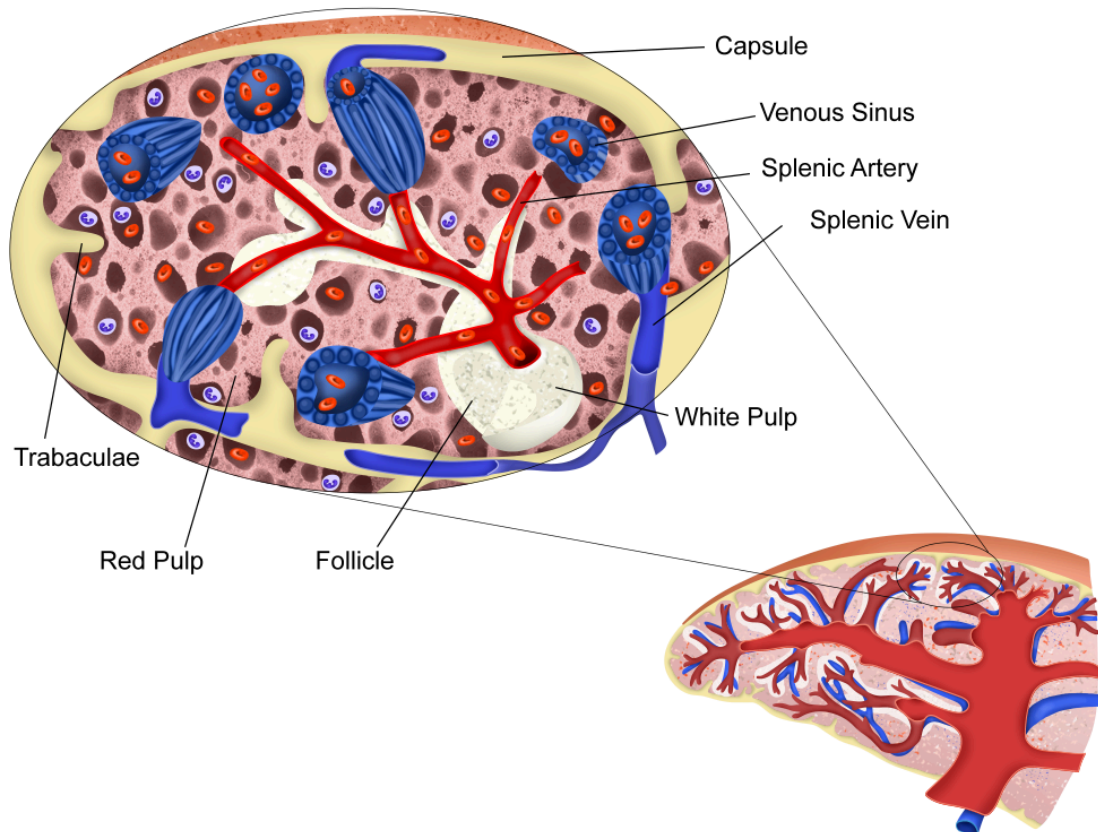
Secondary lymphoid tissues (otherwise known as peripheral lymphoid tissues) are where lymphocytes are activated. These tissues include the lymph nodes, lymph nodules, tonsils, spleen, Peyer's patches and **mucosa associated lymphoid tissue (MALT)**. MALT is found in areas of the body most vulnerable to pathogen entry including the gastrointestinal tract, reproductive tracts, nasopharynx, lungs, oral region, and tissue around the eyes. MALT contains lymphoid aggregations (concentrations of lymphoid tissue). The tonsils and adenoids are examples of these aggregations of lymph tissue. Peyer's patches are another well-known group of lymphoid tissue aggregations located in MALT. Peyer's patches line the walls of the intestine and are strategically located to have close proximity with consumed antigens. Dense aggregations of lymphoid tissue found in MALT are often called lymph nodules. Lymph nodules are different from lymph nodes in that they are smaller, aren't part of a lymphatic vessel, and don't have a well-defined capsule.

Lymph nodes are aggregations of lymphoid tissues that are situated along lymphatic system pathways. Their two major functions are filtering lymph and helping the body initiate a specific immune response. Lymph is a milky fluid that is generated from the interstitial fluids. It is collected by lymph vessels and directed to lymph nodes where lymphocytes are concentrated. Lymph nodes screen extracellular fluid for potential antigens and return the lymph back to the blood.

Lymph nodes are covered by a capsule of dense connective tissue. The cortex of a lymph node is divided into an inner and outer cortex. The outer cortex has lymphatic lobules and contains B-cells that are being stimulated and activated in areas called germinal centers. The inner cortex contains mostly T-cells. The medulla or medullary cords contain antibody-secreting plasma cells. The image below shows a lymph node with these areas labeled.



Lymph Node



Spleen

Image by Becky Torgerson BYU-Idaho S19

The spleen is a lymphatic organ responsible for filtering the blood and destroying old and damaged red blood cells. Because of the biconcave shape of red blood cells, they are normally able to fold and bend to fit through the smallest of venules and arterioles. Near the end of their 120 day life-span, they lose their ability to bend and fold. These old red blood cells then get caught in the narrow passageways of the splenic cords (also called **Cords of Billroth**) and are phagocytosed by splenic macrophages. Because of this process, the spleen is considered an important part of the reticuloendothelial system. The reticuloendothelial system is the term used to describe areas in the body that have fine reticular connective tissue strands that support a population of macrophages. These leukocytes are exposed to blood that travels through the system and detect foreign particles or worn out cells and remove them from the blood.

Another function of the spleen is to monitor the blood for foreign antigens. The spleen is basically the lymph node of the blood and it works to screen for antigens in much the same way that lymph nodes screen the interstitial fluid. Histologically, we can see the different lymphatic tissue within the spleen. Red pulp consists of venous sinuses and splenic cords. White pulp consists of B-cells and T-cells.



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