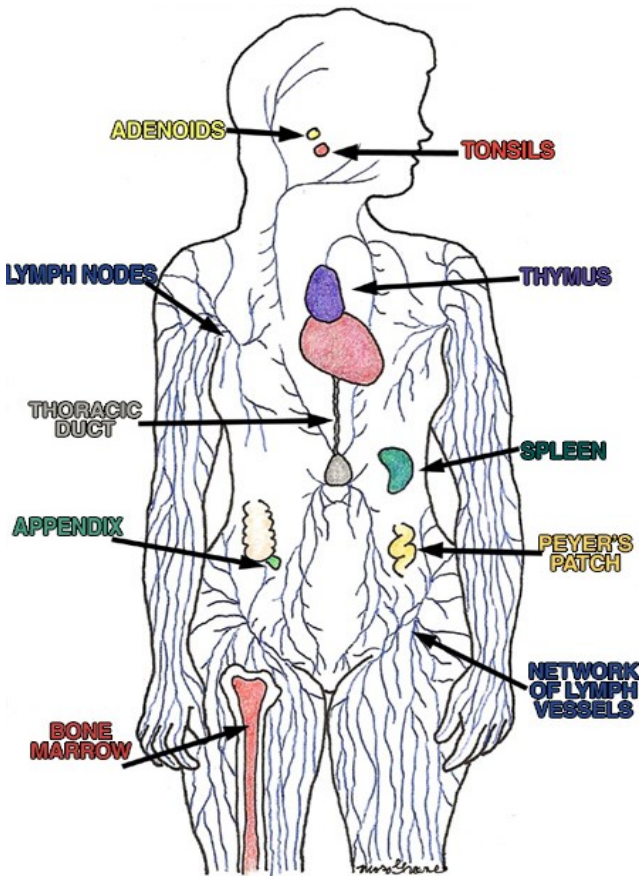


Immune system organization



Lymphoid organs are classified as:

Primary lymphoid organs:

Site of maturation of cells of the immune system

Thymus

Bone marrow

Secondary (effector) lymphoid organs/tissue

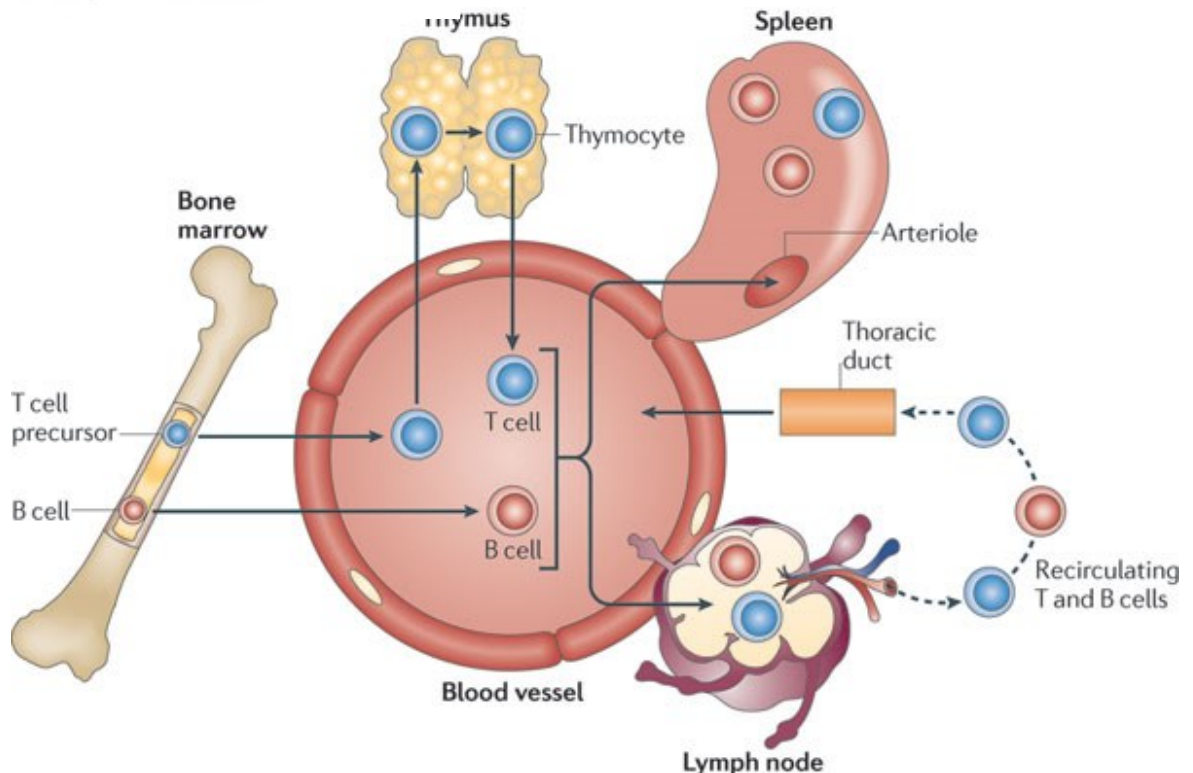
- Filter blood and lymph

- Site of antigen, immune system interaction

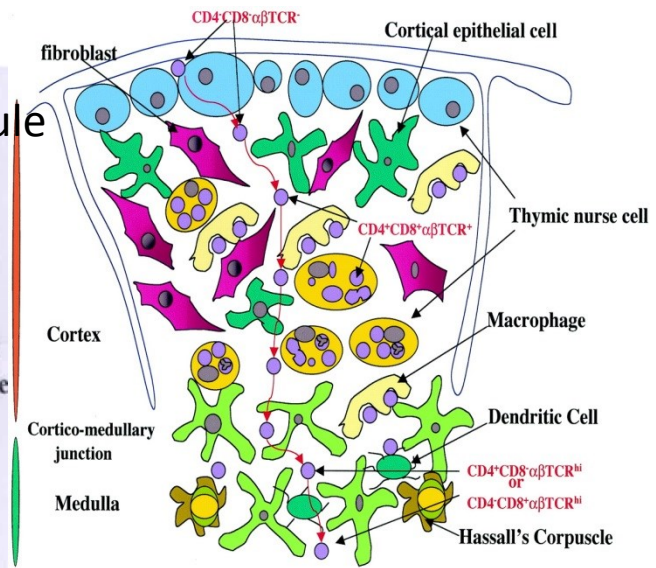
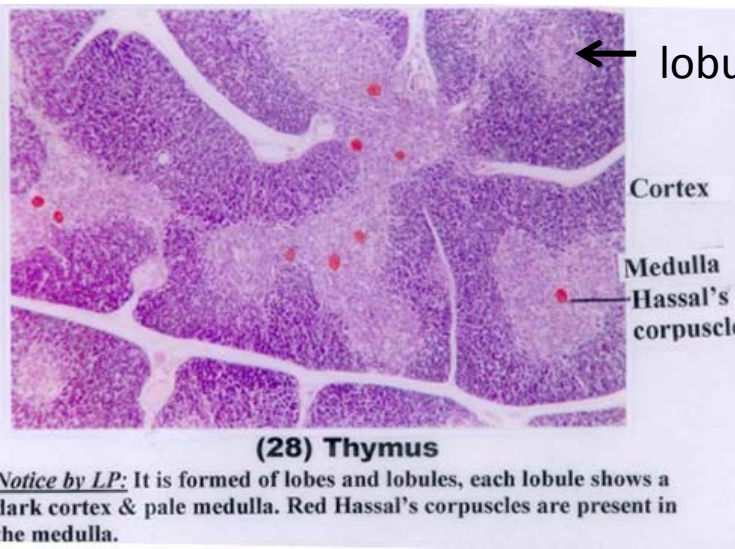
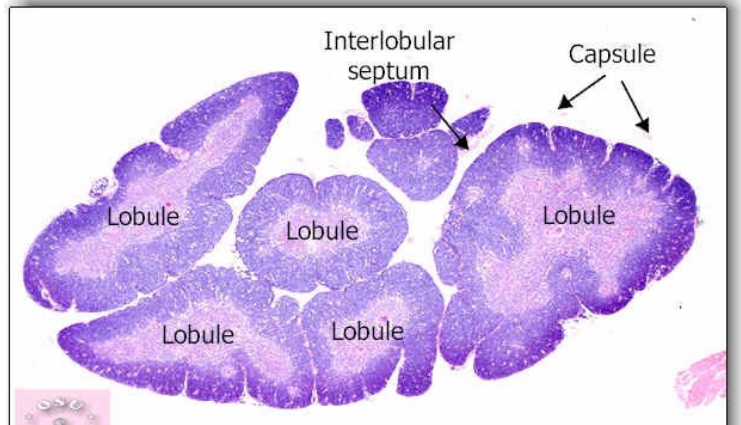
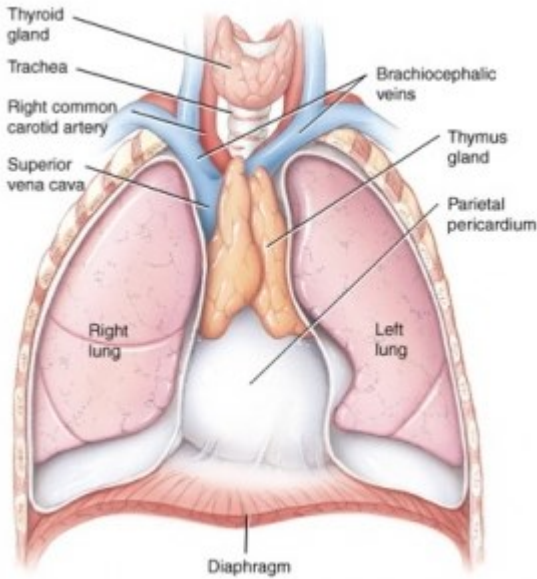
Lymphatic nodules

Spleen & lymph nodes (organs)

Mucosal associated lymphoid tissue (MALT),

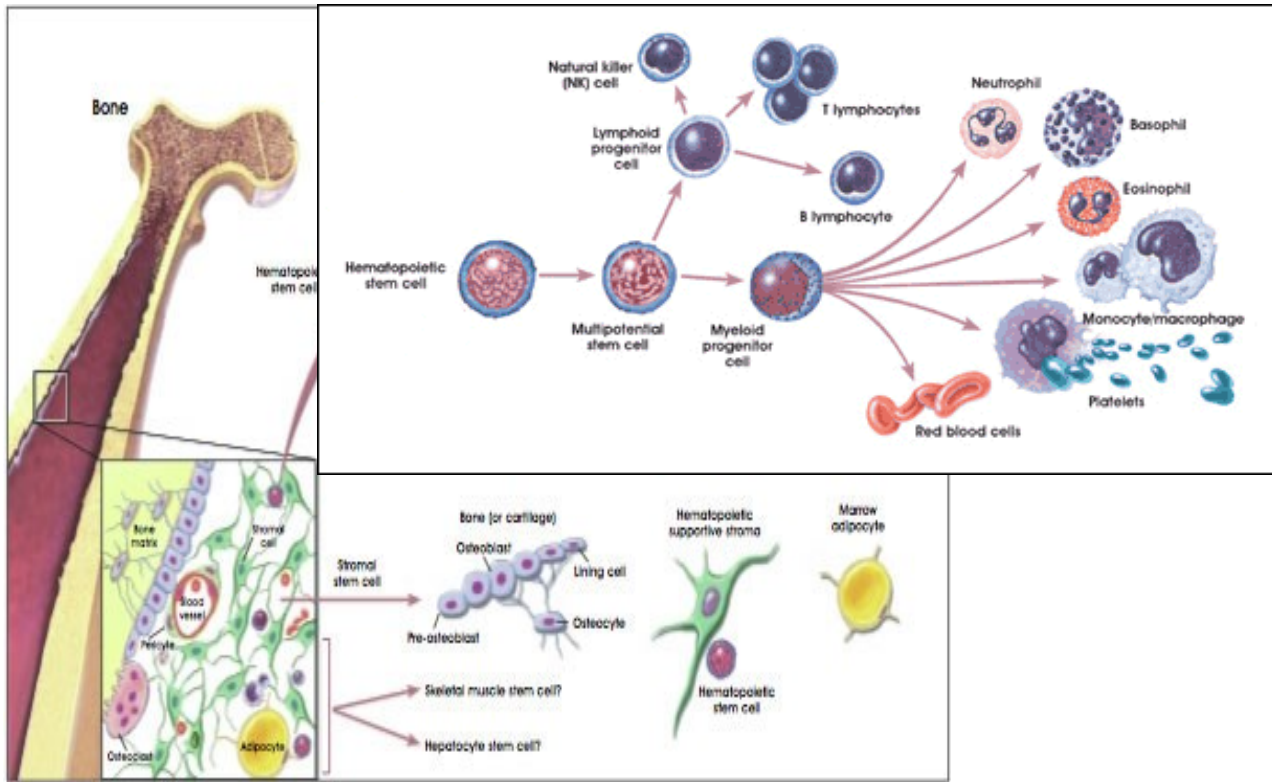


Thymus



Thymus
 The thymus is located posterior to the sternum.
 The thymus reaches its greatest absolute size at puberty and then gradually decreases in size as the functional cells die and are replaced by fibrous connective tissue.
 The thymus is an important primary lymphoid organ where lymphocytes mature into T lymphocytes.

النخاع العظمي Bone marrow

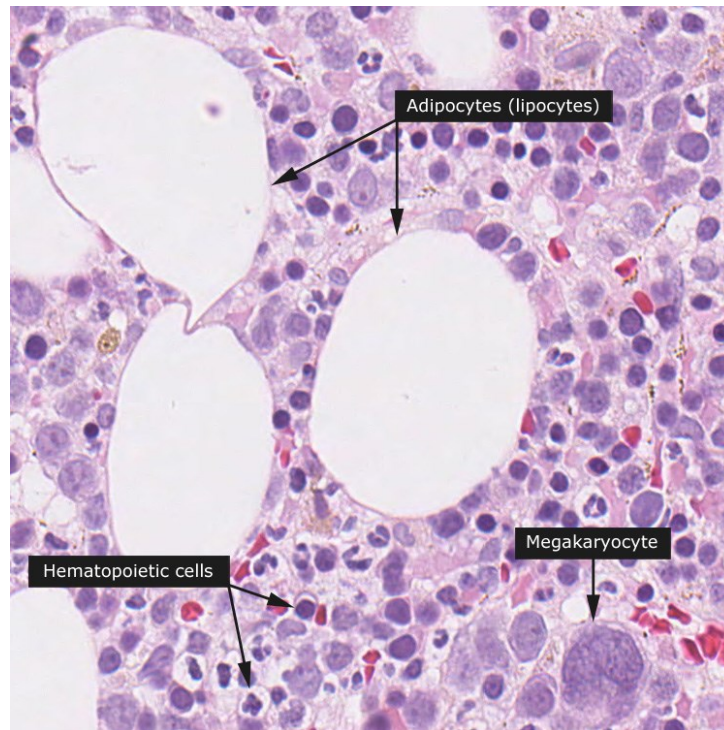


Functions of the bone marrow

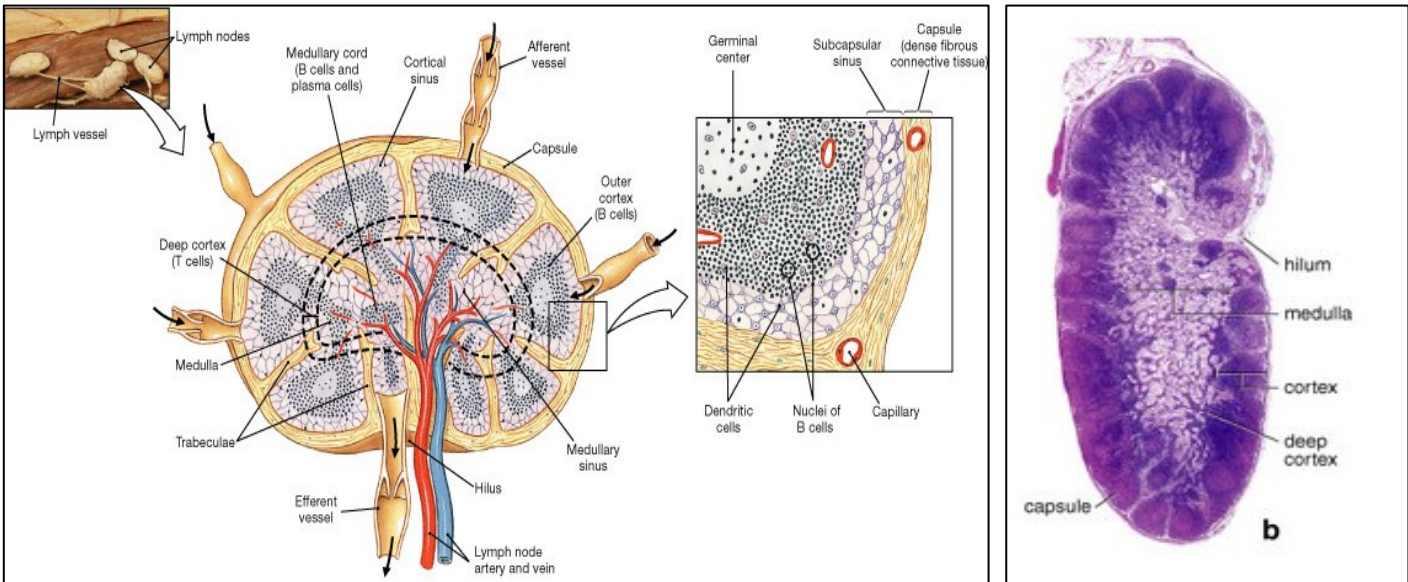
-All the cells of the immune system are initially derived from the bone marrow through a process called **hematopoiesis**.

-During hematopoiesis, bone marrow-derived **stem cells** differentiate into either mature cells of the immune system or into **precursors** of cells that migrate out of the bone marrow to continue their maturation elsewhere.

The bone marrow produces B cells, natural killer cells, granulocytes and immature thymocytes, in addition to red blood cells and platelets.



The lymph nodes العقد اللمفاوية



Lymph nodes

Lymph nodes vary in size from 1 to 25 mm and are designed to filter and purify lymph before it reaches the venous system.

Lymph nodes are shaped like lima beans with an indentation called a hilum. The hilum is where blood vessels and nerves enter the node.

Lymph is delivered to the lymph node by afferent lymphatics and is carried away from the lymph node by efferent lymphatics.

The node can be divided into two regions:

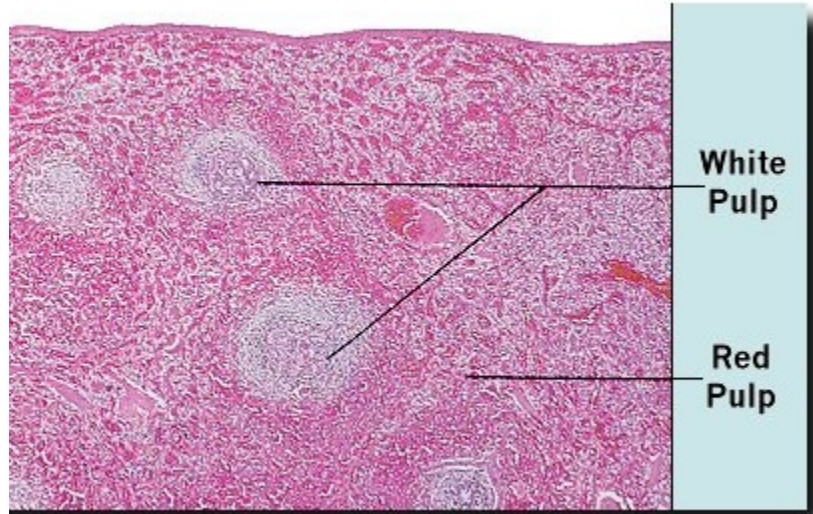
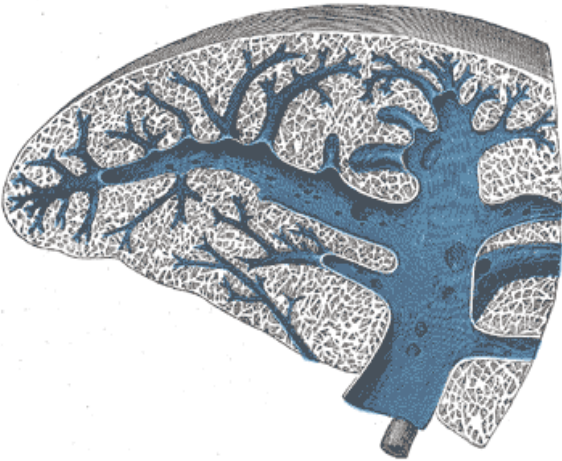
1. Cortex

The outer region of the node, near the fibrous capsule, is called the cortex. It contains lymphoid nodules with germinal centers.

2. Medulla

The medulla is deeper inside the node where elongate masses of cells called medullary cords are found.

Spleen : الطحال



Spleen

The spleen is the largest lymphoid organ in the body.

The functions of the spleen include:

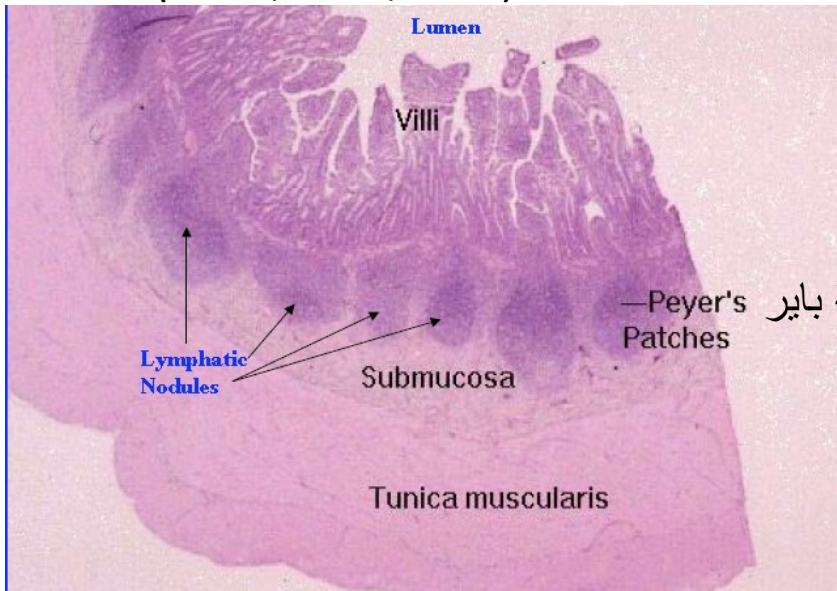
1. The removal of abnormal rbc's and other cells by phagocytosis.
2. The storage of iron from recycled from broken down rbc's.
3. The initiation of the immune response.

Monitoring antigens in blood

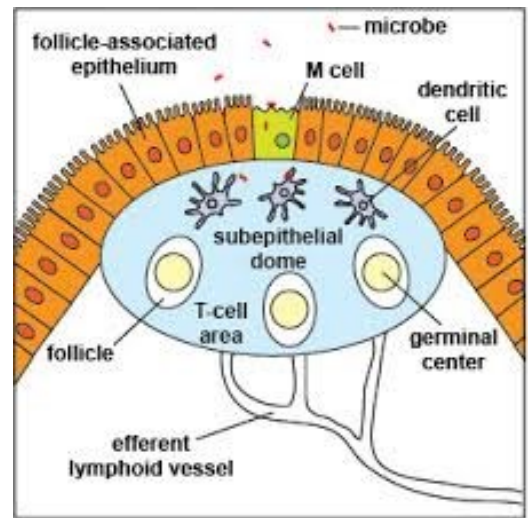
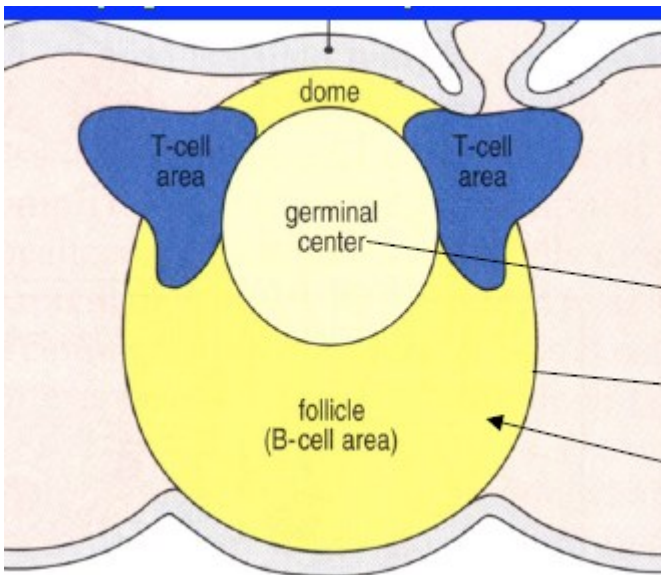
Proliferation of lymphocytes

Production of humoral antibodies

Immune tissue (MALT, GLAT, SALT) النسيج اللمفي



لطفة باير — Peyer's Patches



Immune tissue associated with various organs:

GALT—gut-associated lymphatic tissue; comprised of lymphoid tissue (lymph nodules) in the intestinal wall containing lymphocytes, plasma cells and macrophages.

MALT—mucosa-associated lymphatic tissue; النسيج اللمفي المرتبط بالأغشية المخاطية lymphoid tissue associated with the mucosa of the female reproductive tract, respiratory tract, etc.

SALT—skin-associated lymphatic tissue; lymphatic tissue associated with the dermis of the skin.