LYMPHOID ORGANS

The Immune System

Functions of Immune System

- Has the ability to distinguish 'self' from non-self
- Inactivates/destroys foreign substances
  - Foreign molecule
  - Molecules present in viruses, bacteria, parasites.
  - Microorganisms and other cells (virus-infected cells, cancer cells, cells of transplanted organs)

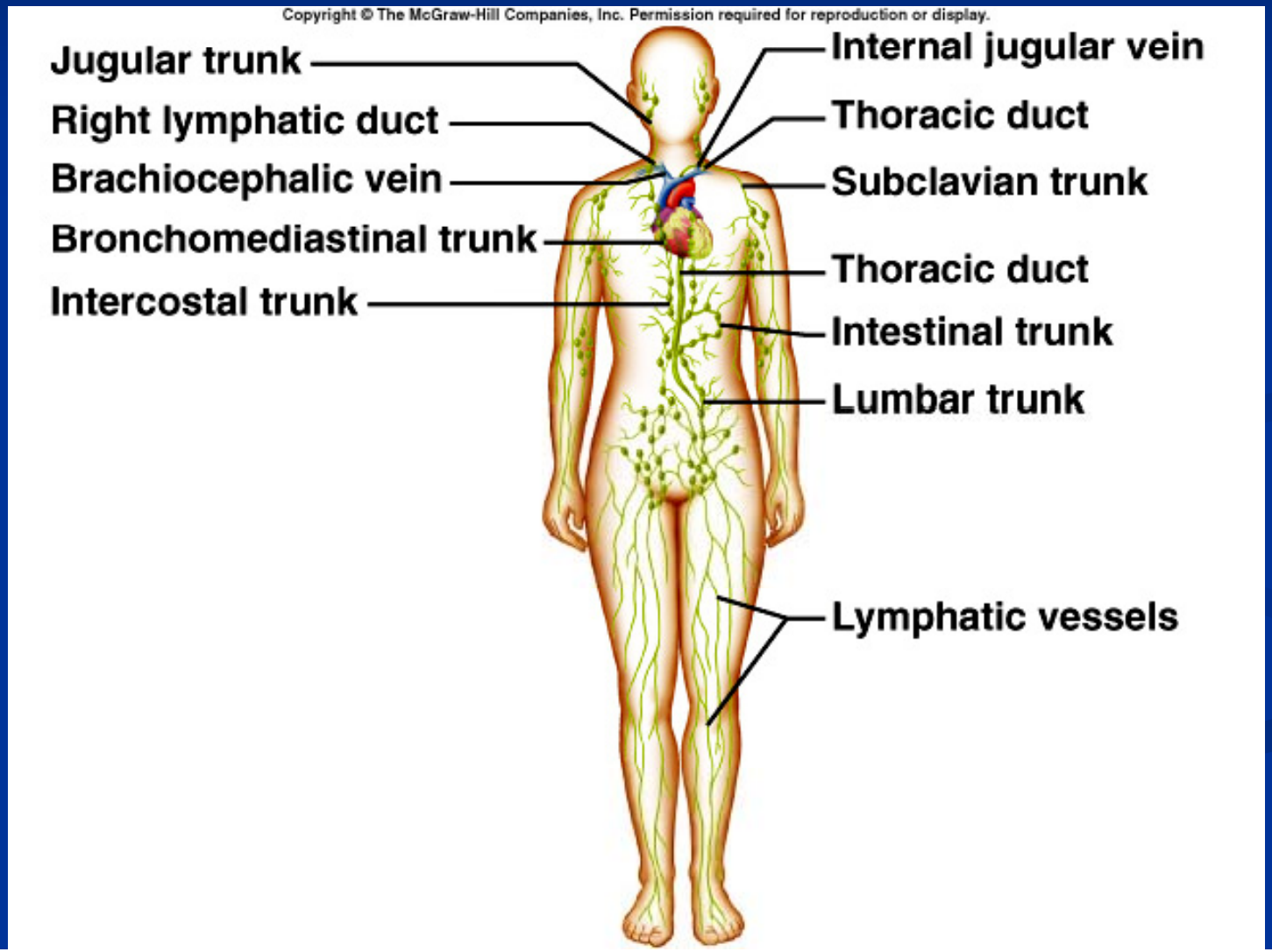
Where is the Immune System

- Cells of the immune system are:
  - Distributed throughout the body in the blood, lymph, epithelial and CT.
  - Arranged in small spherical nodules (lymphoid nodules) found in CT and inside various organs.
    - Found in the mucosa of digestive (tonsils, Peyer's patches), respiratory, reproductive, urinary systems are MALT (mucosa-associated lymphoid tissue.
  - Organized as differently sized organs—lymphoid organs—the lymph nodes, spleen, thymus, bone marrow.

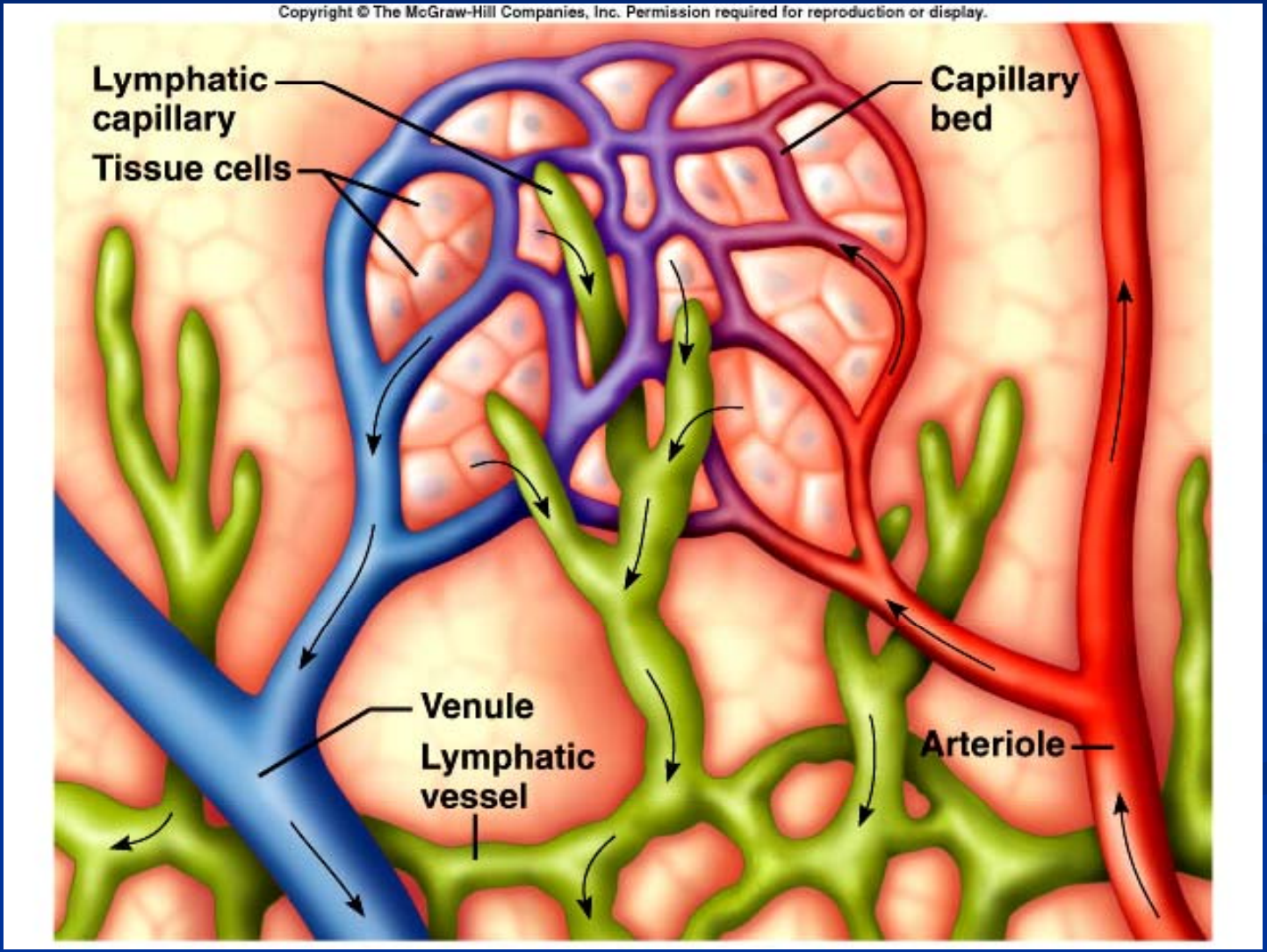
Lymphoid Tissue

- Lymphoid tissue is CT with rich supply of lymphocytes
- Exists free within regular CT or is surrounded by capsules.
- Very little cytoplasm so stain dark blue with H&E.
- Rich network of reticular fibrils produced by fibroblast whose many processes rest on fibrils.

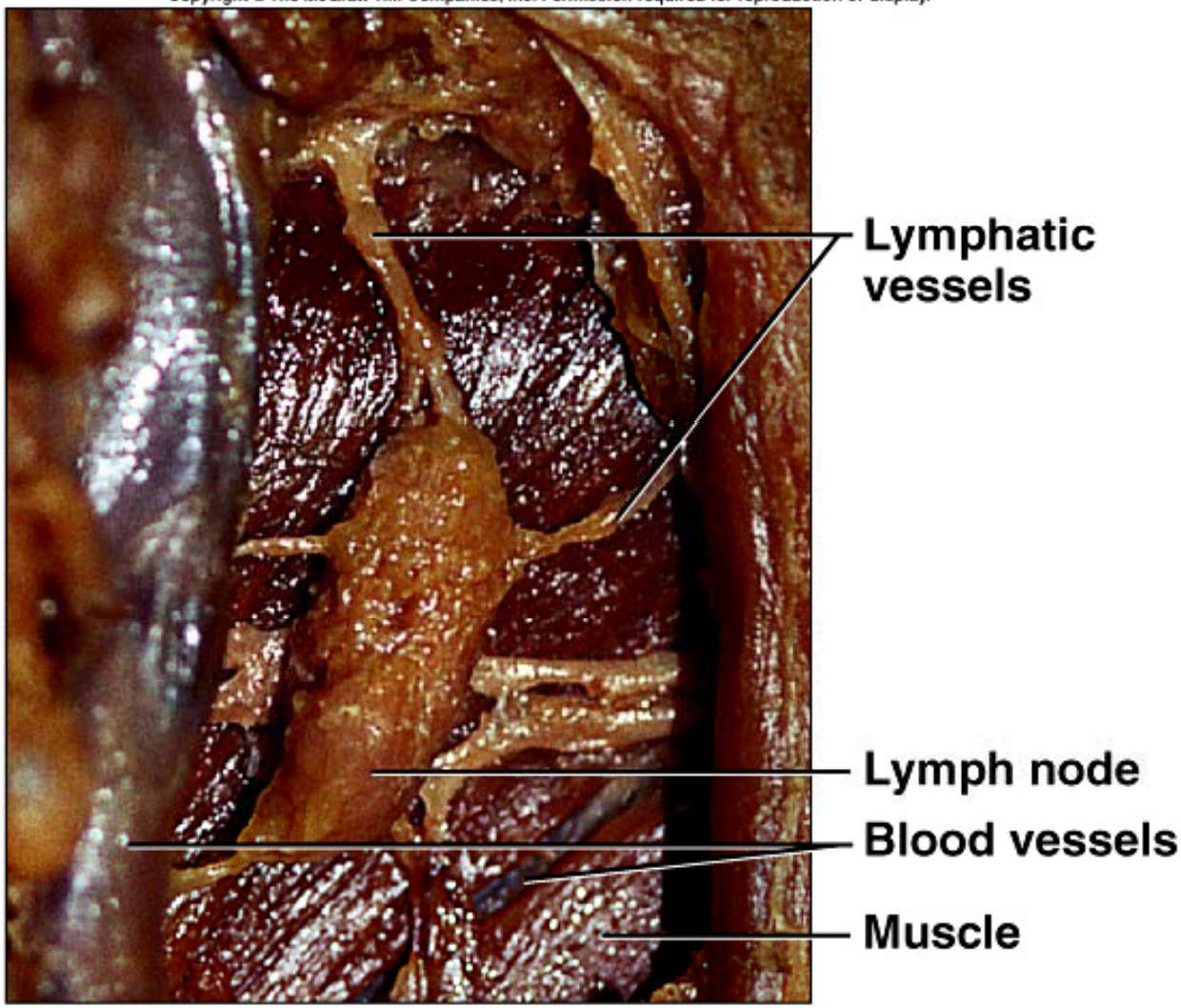
Lymphatic System



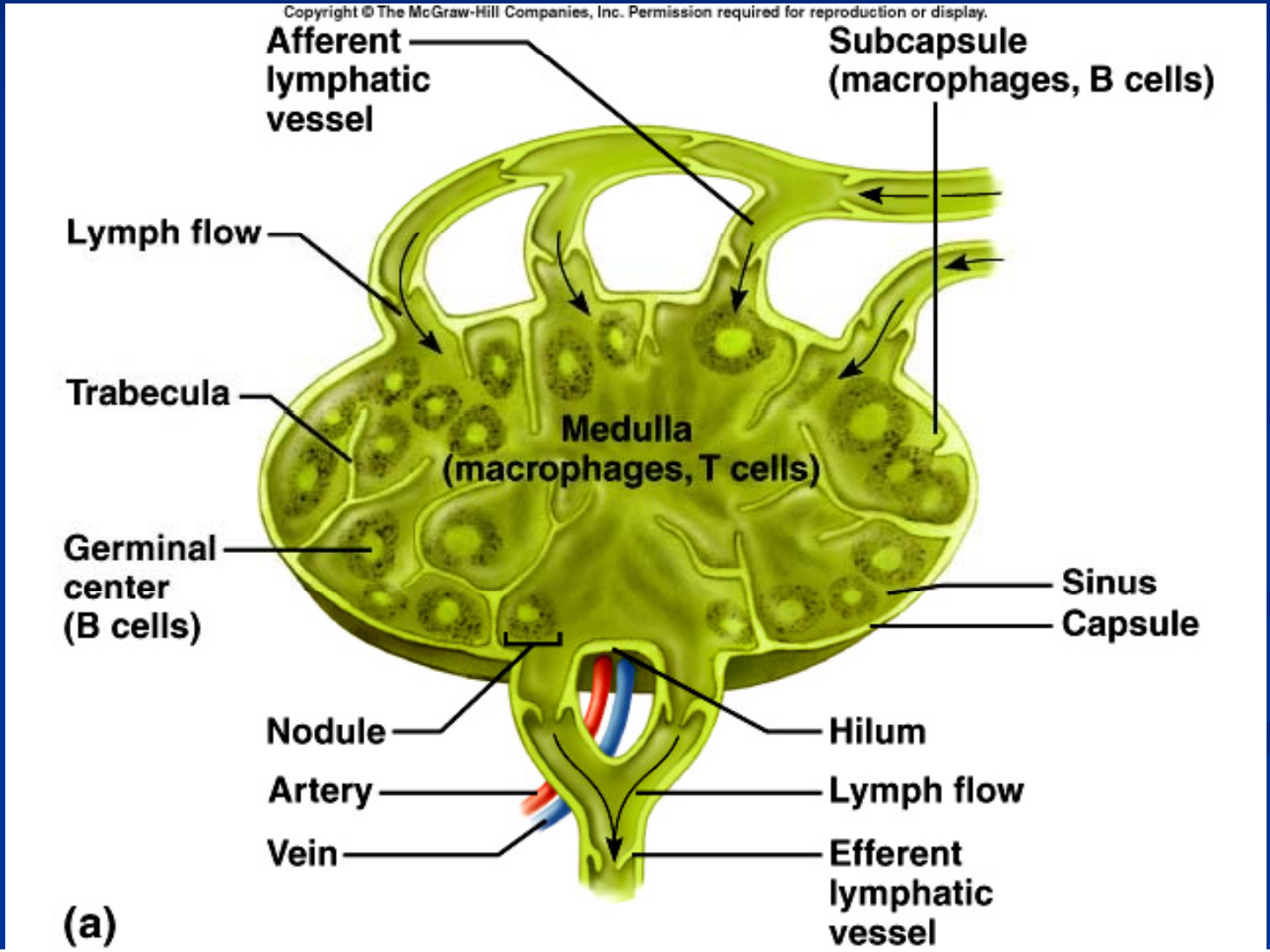
Lymphatic Capillaries



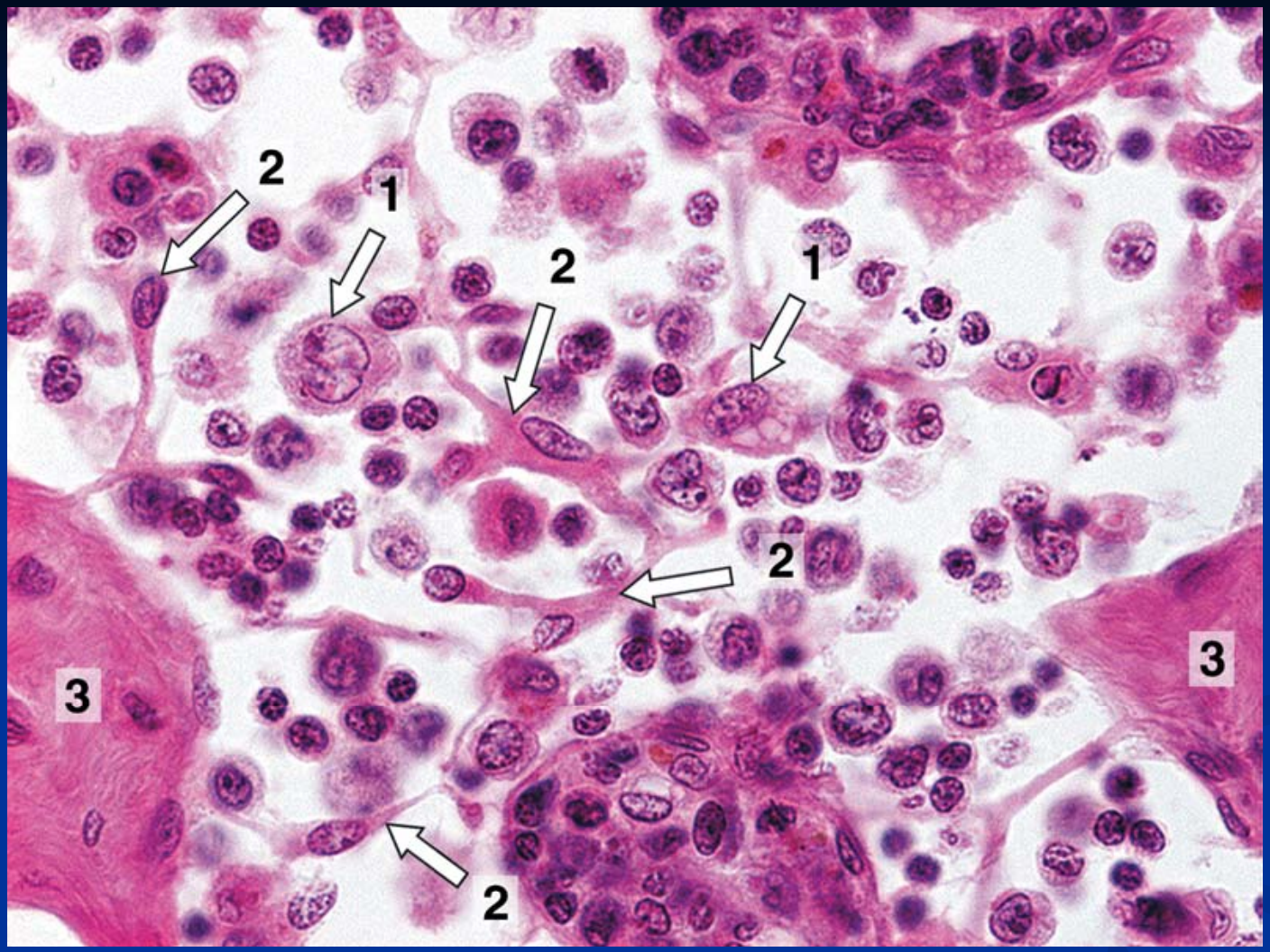
Lymph Node



Structure of Lymph Node



(b)



Medullary sinus of a lymph node containing reticular cells with long processes and elongated nuclei, macrophages, and many lymphocytes. (1) Macrophage; (2) reticular cell; (3) trabecula. H&E stain. High magnification. (Courtesy of PA Abrahamsohn.)

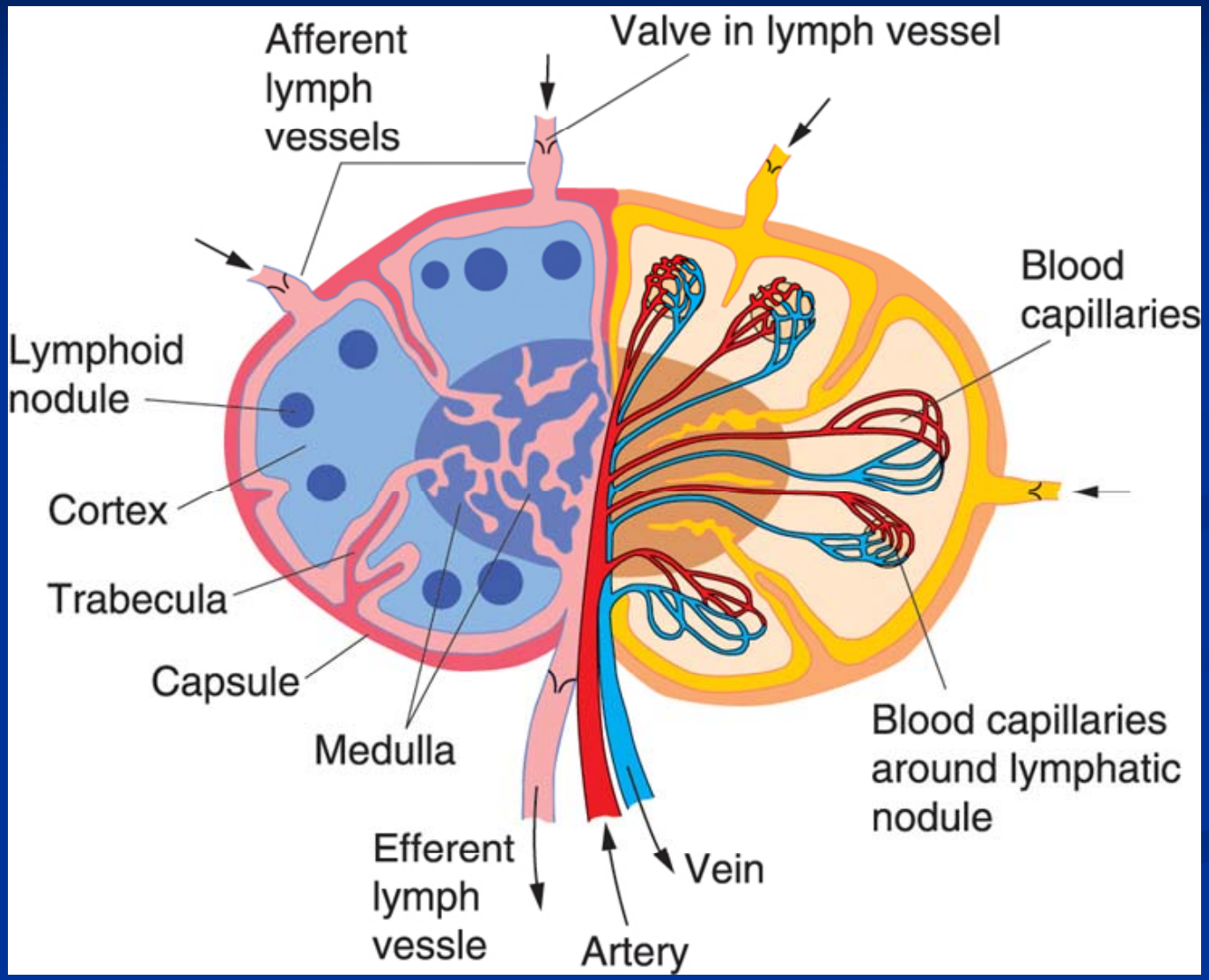
Lymph Nodes

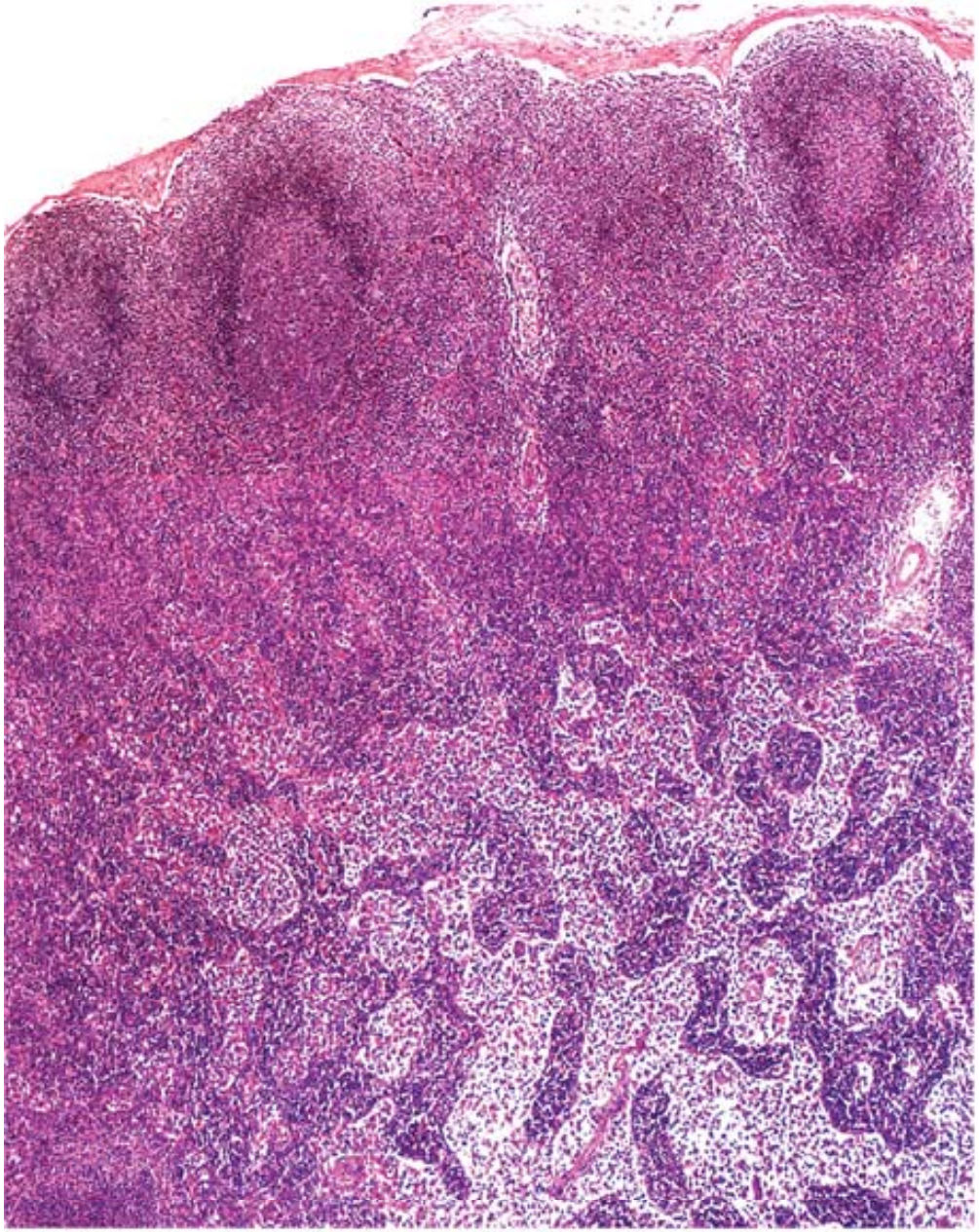
- Functions include:
- Filtration of particles and microorganisms to keep them out of general circulation.
- Interaction of circulating antigens in lymph with lymphocytes to initiate immune response.
- Activation, proliferation of B lymphocytes and antibody production.
- Activation, proliferation of T lymphocytes.

Cells of Lymph Node

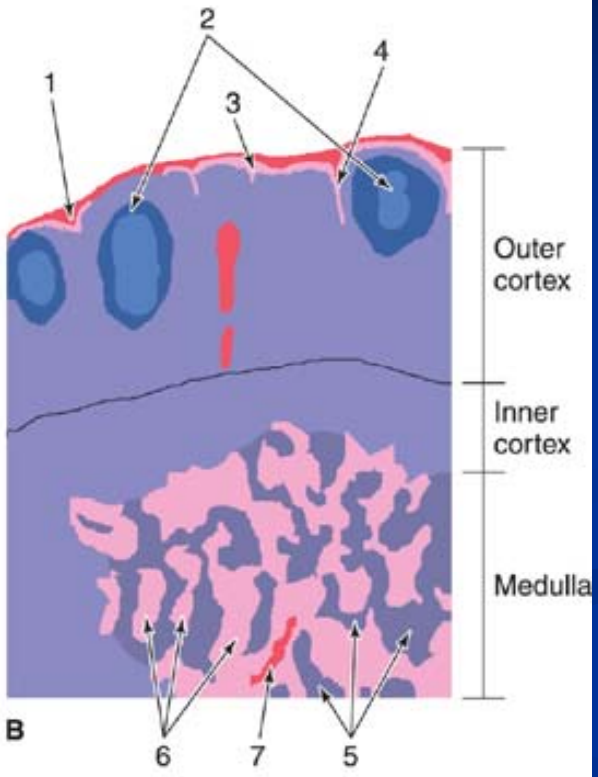
- Lymphoid cells
- Macrophages and other phagocytic antigen processing cells
- Lymphatic and vascular endothelial cells and fibroblasts responsible for lymph node supporting framework.

Lymph Node


Afferent lymph vessels
Valve in lymph vessel
Blood capillaries
Lymphoid nodule
Cortex
Trabecula
Capsule
Medulla
Blood capillaries around lymphatic nodule
Efferent lymph vessle
Vein
Artery



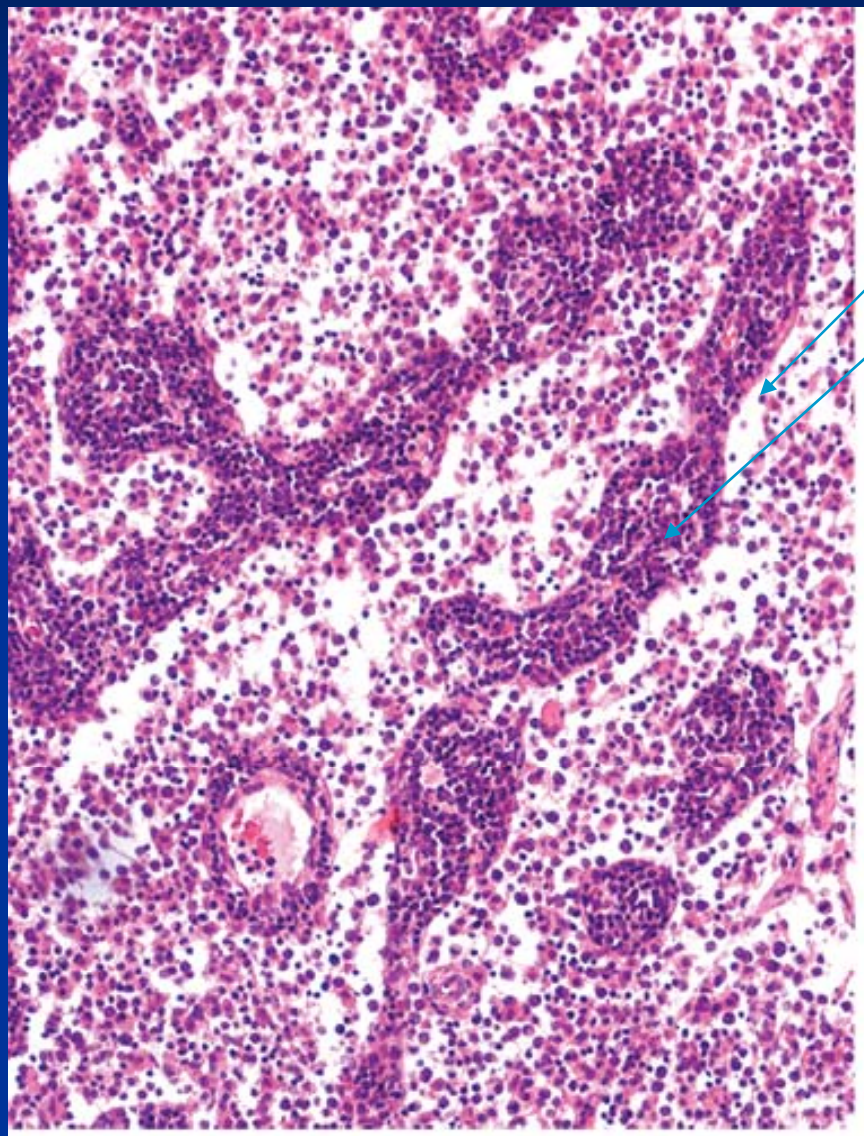
A



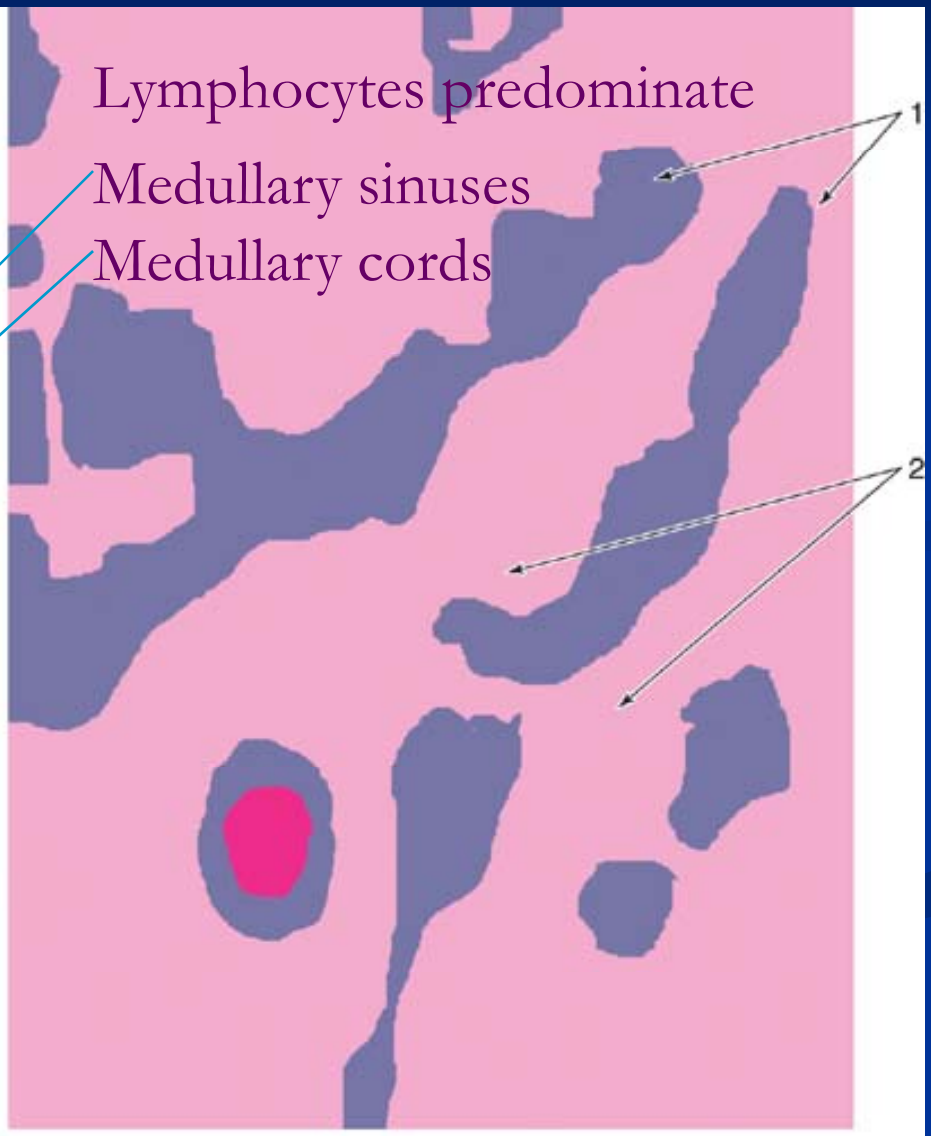
Section of a lymph node showing the cortex and the medulla 1 Capsule 2 lymphoid nodule with germinative center 3

subcapsular sinus; (4) intermediate sinus; (5) medullary cords; (6) medullary sinus; (7) trabecula. (Courtesy of PA Abrahamsohn.)

Medulla of Lymph Node



A

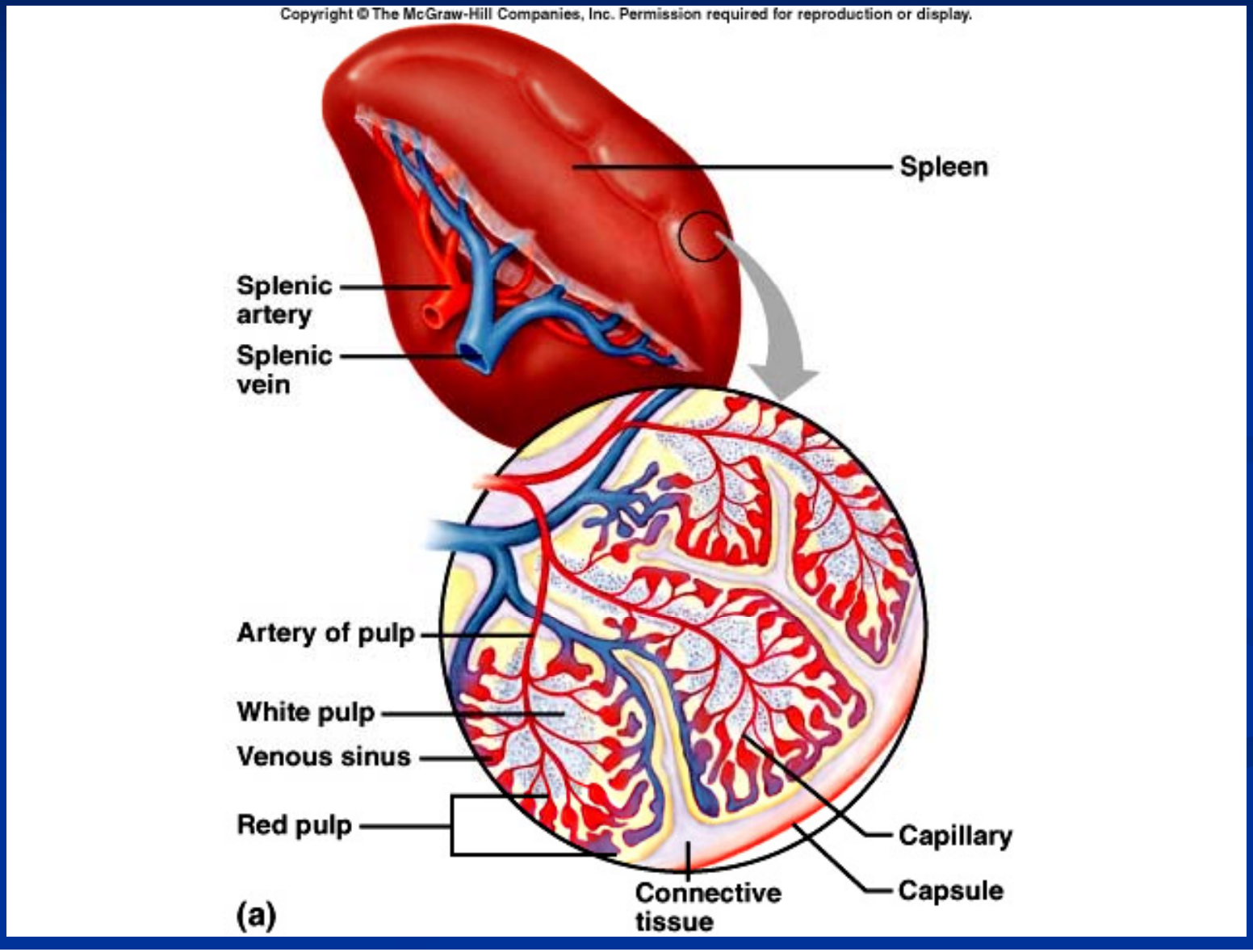


B

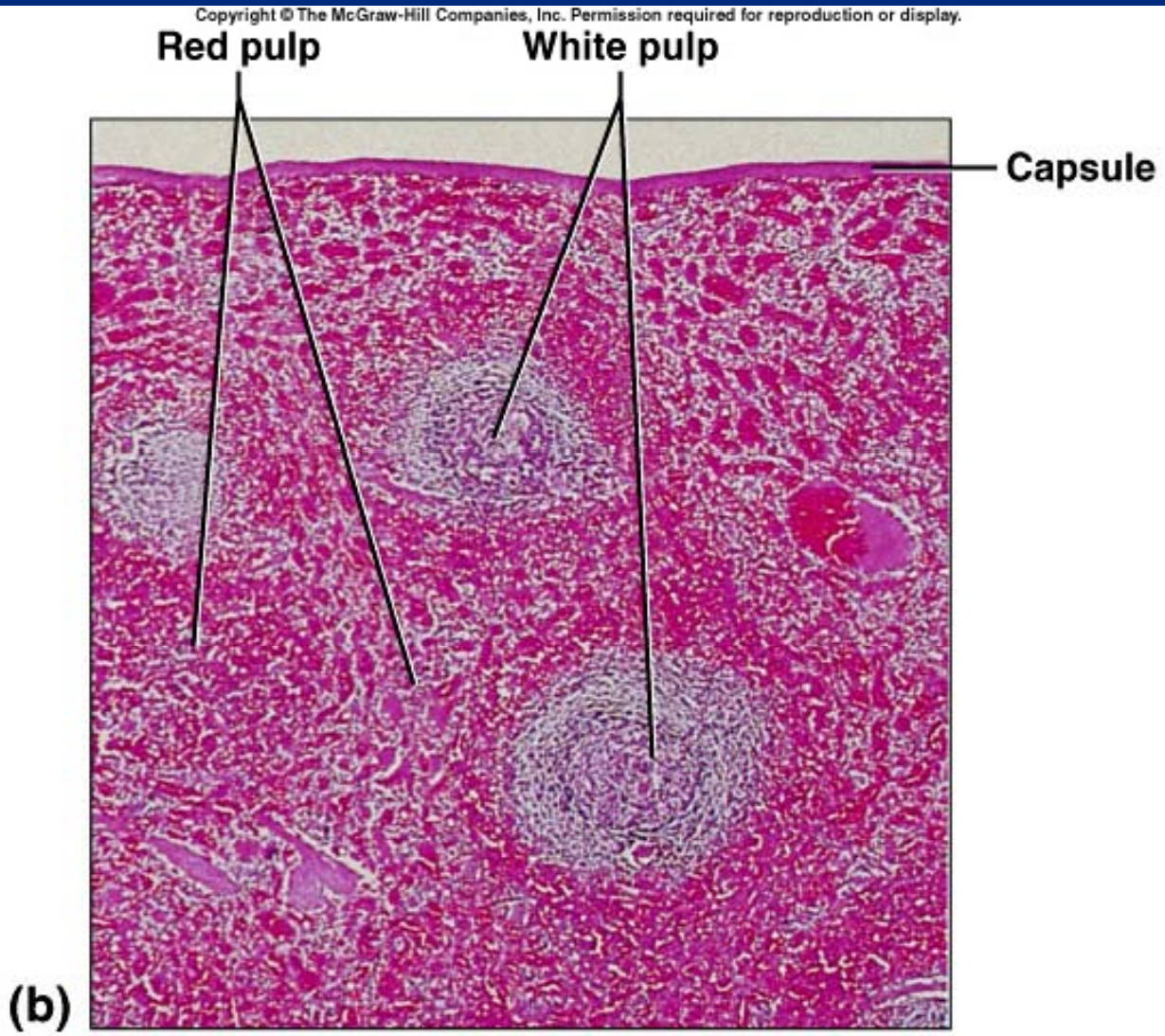
Spleen

- Largest accumulation of lymphoid tissue
- Abundant phagocytic cells—defense against antigens in blood
- Site of destruction of aged erythrocytes.
- Production site of activated lymphocytes which are delivered to the blood.
- THUS, an important blood filter and antibody-forming organ.

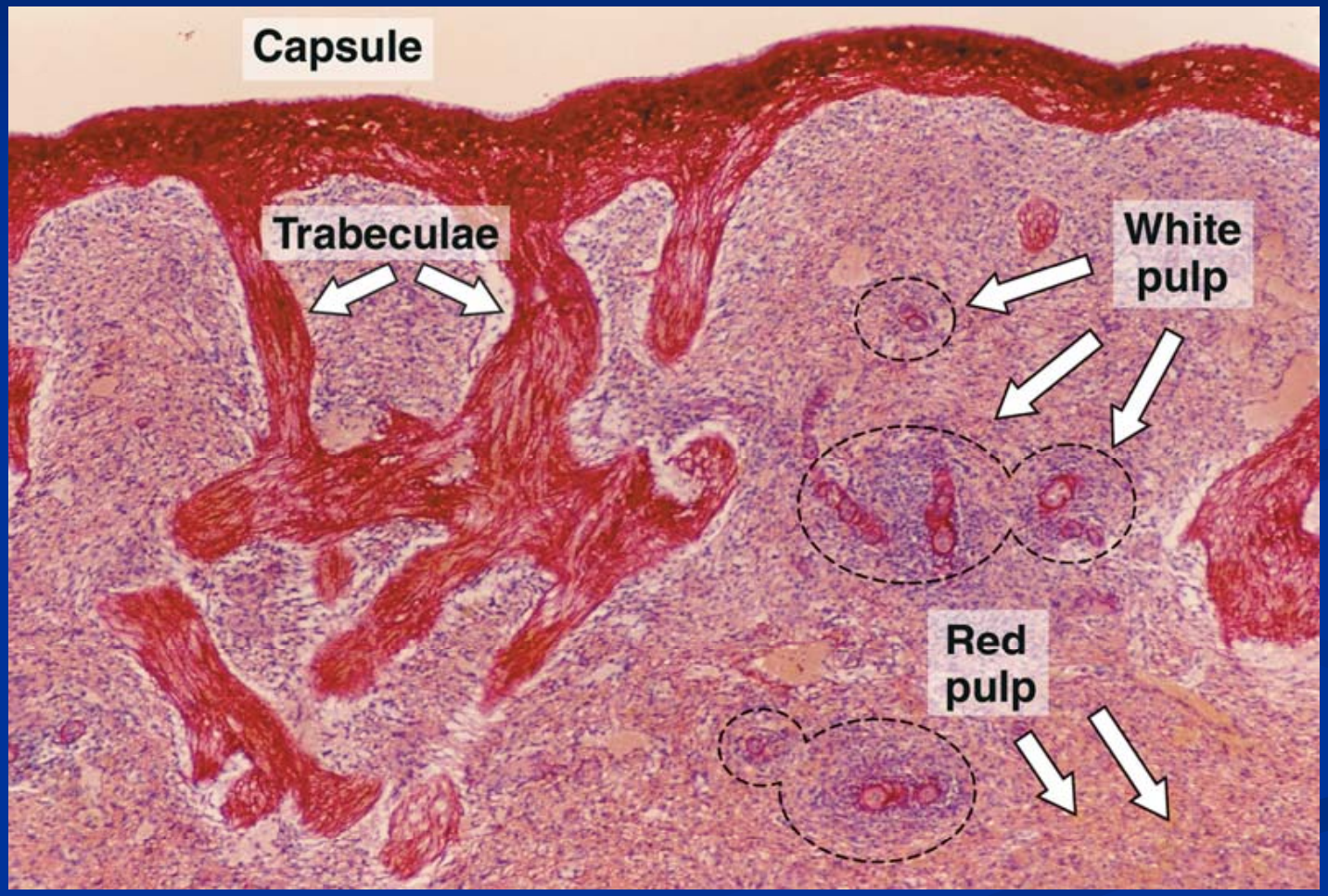
Spleen


Copyright © The McGraw-Hill Companies, Inc. Permission required for reproduction or display.
Spleen
Splenic artery
Splenic vein
Artery of pulp
White pulp
Venous sinus
Red pulp
Capillary
Capsule
Connective tissue
(a)

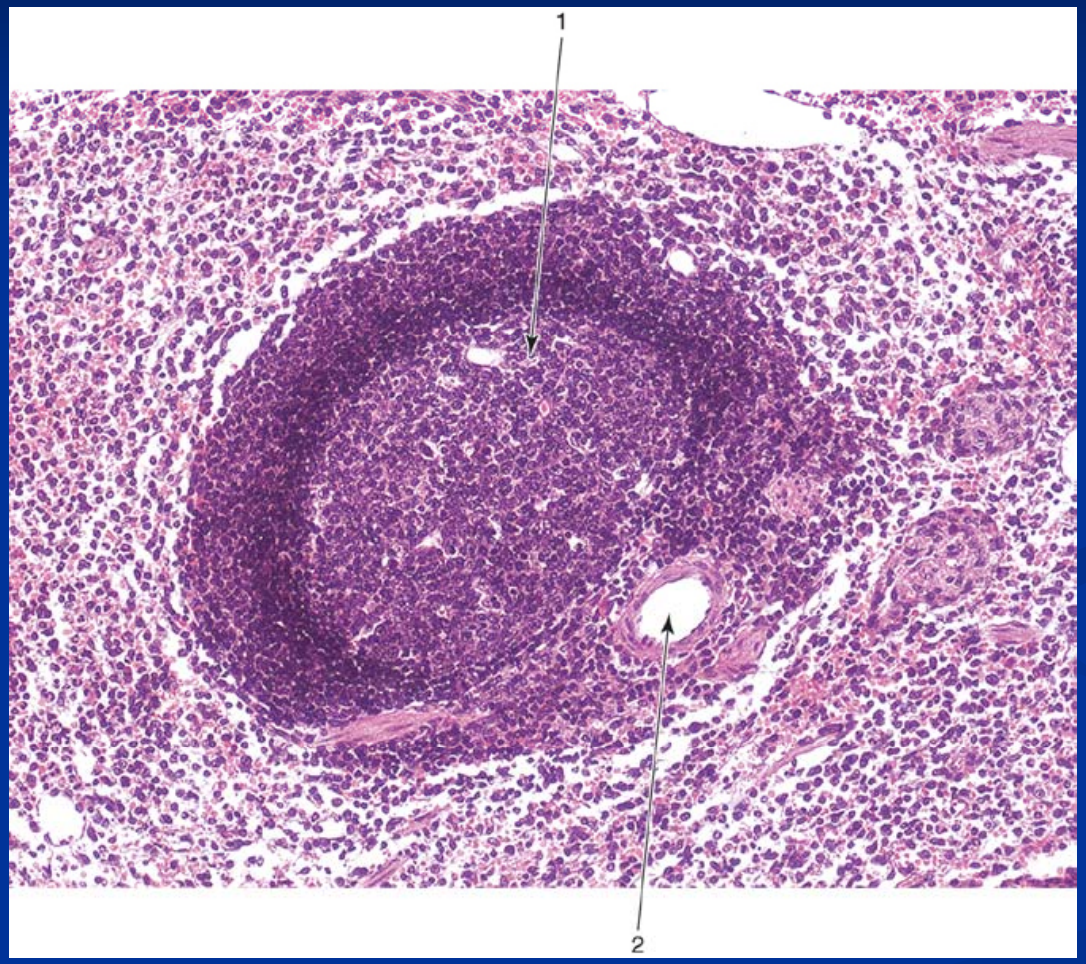
Spleen


Copyright © The McGraw-Hill Companies, Inc. Permission required for reproduction or display.
Red pulp
White pulp
Capsule
(b)

Spleen

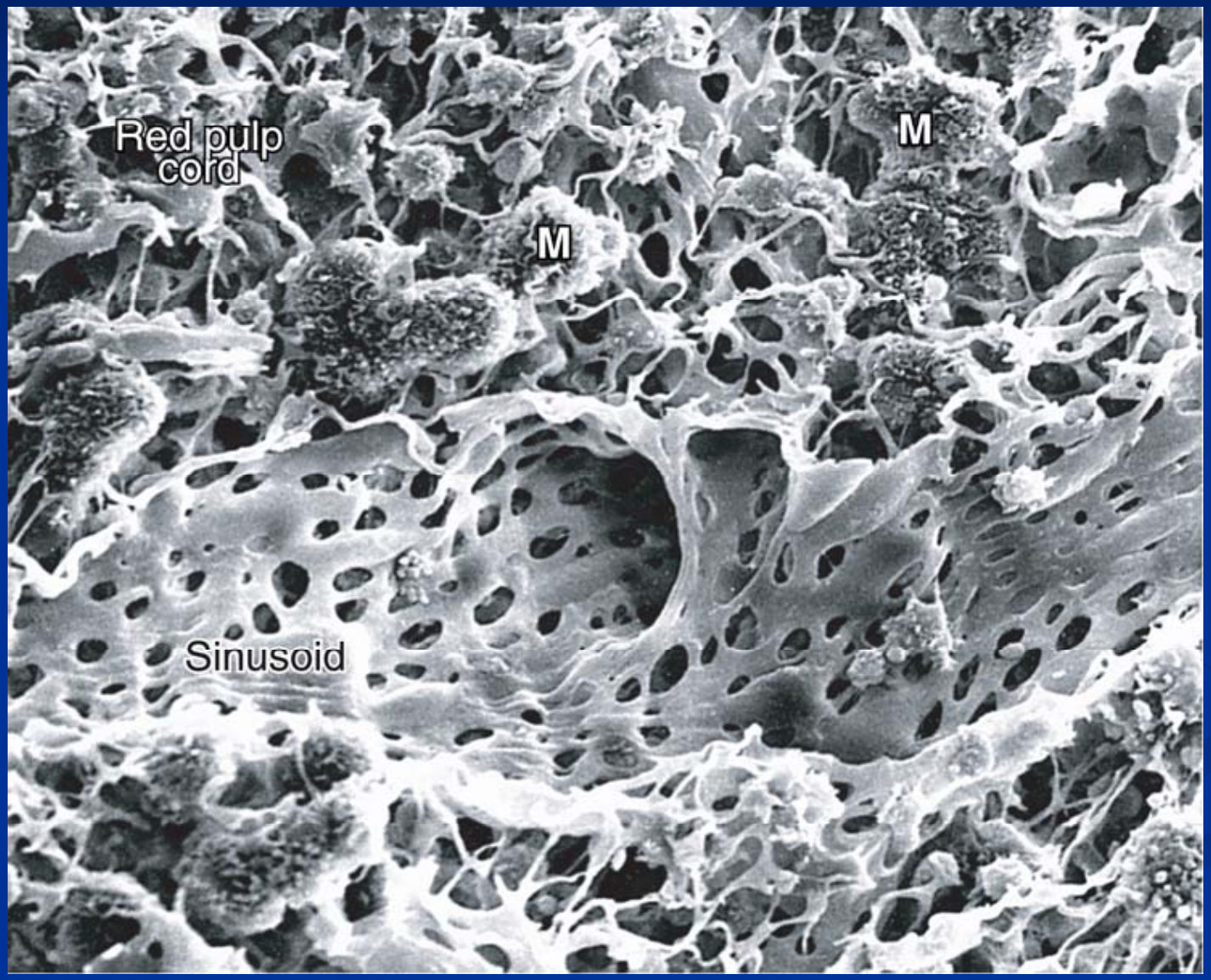


Lymphoid Nodule



1. Germinative Center
2. Central artery

Red Pulp of Spleen



Macrophages

Fenestrated endothelium