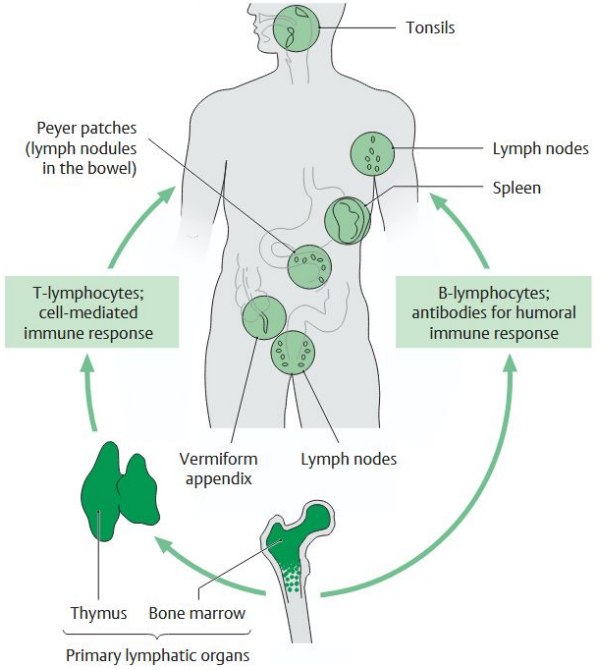
OVERVIEW OF THE LYMPHATIC SYSTEM

- the body is constantly exposed to harmful external and internal agents
  - Bacteria, viruses, fungi
  - Abrasions, bruises, burns
  - UV radiation, chemical toxins
- the ability to ward off harmful effects is called immunity
  - Particles that trigger an immune response are called antigens
  - Antigens are found on every cell
- innate (non-specific) immunity
  - immediate protection against foreign agents
  - from birth
  - unchanging (e.g., skin and mucosal barriers, inflammation)
- adaptive (specific) immunity
  - extremely effective
  - acquired through exposure to antigens
  - Has "memory"
  - Dependent on non-specific – after degradation, they present antigens of degraded material
  - Is a function of lymphocytes in lymph nodes and specialized tissues (spleen, MALT – mucosal associated lymphoid tissue in the submucosa of the SR, GIT, UGS)

OVERVIEW OF THE LYMPHATIC SYSTEM

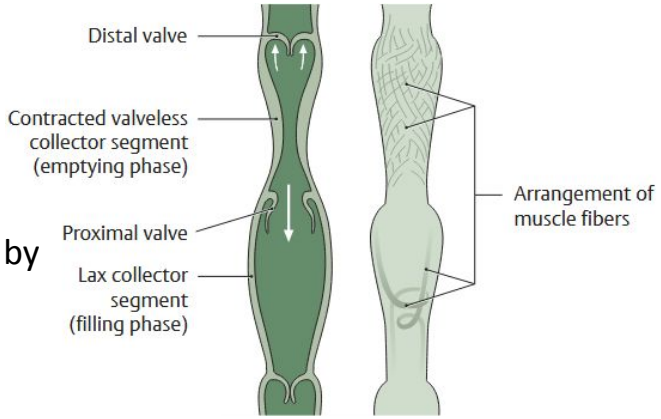
- to clear the interstitial spaces of tissue fluid and substances that cannot be reabsorbed in the venous capillary bed
- carries away food lipids (chylomicrons) that are absorbed in the bowel
- returns lymphocytes from the lymphatic organs to the blood
- lymphatic capillaries
  - begin peripherally as blind-ended vessels
- lymphatic vessels and interposed lymph nodes
- major lymphatic trunks
  - thoracic duct and right lymphatic duct

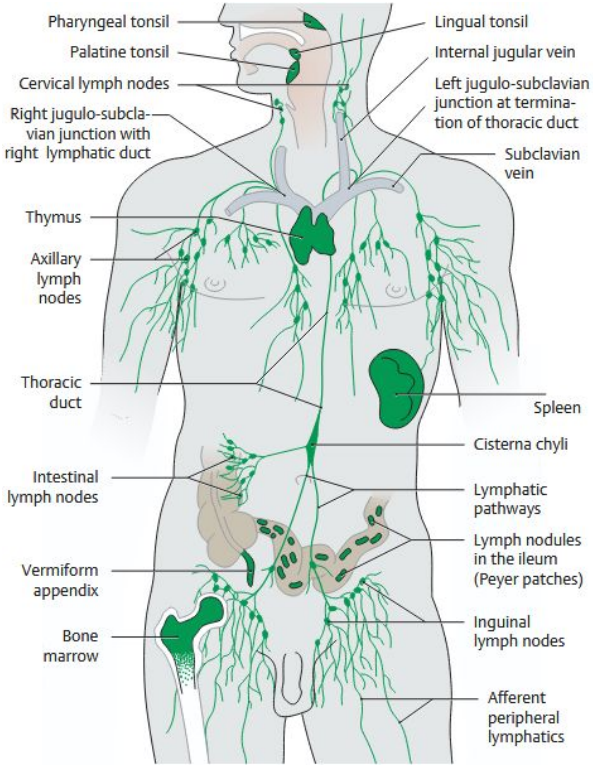
- primary lymphatic organs
  - production, maturation, and selection of immune cells
- secondary lymphatic organs
  - subsequently populated by the immunocompetent lymphocytes and are sites for various processes, such as antigen presentation, lymphocyte proliferation, and antibody formation



Lymph transport

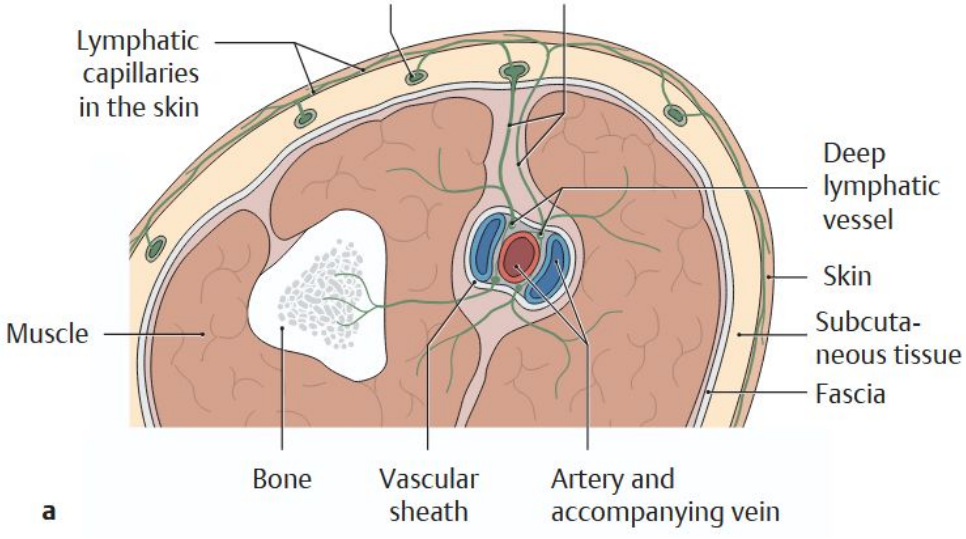
- series of rhythmic contractile waves (10–12/min) generated in the smooth-muscle, valveless collector segments
- direction of lymph flow is controlled by closing the distal valves and opening the proximal valves of the precollectors and collectors

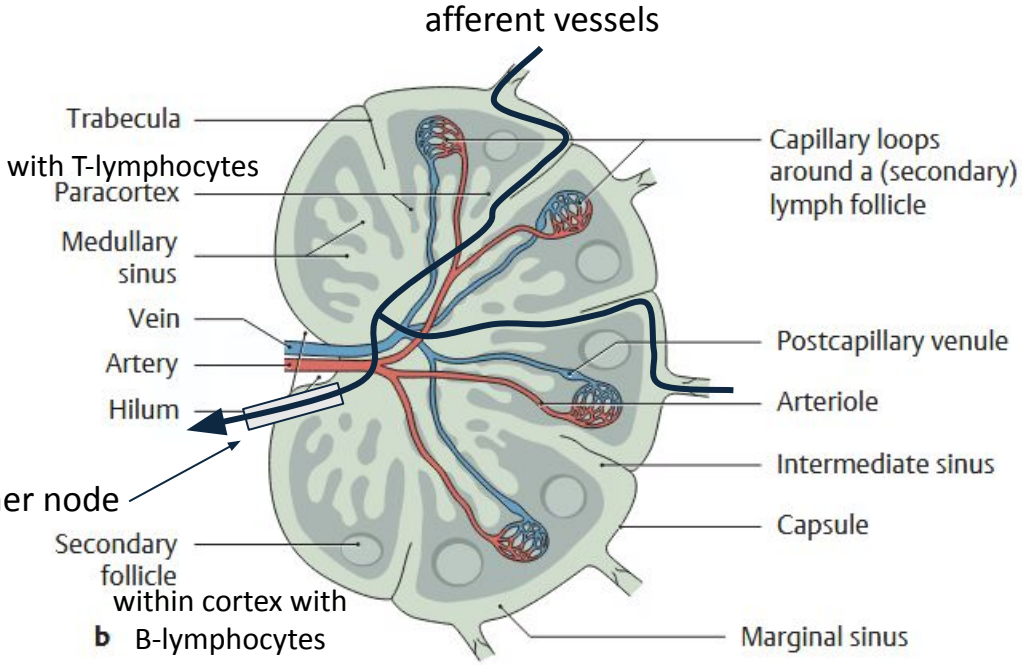




OVERVIEW OF THE LYMPHATIC SYSTEM

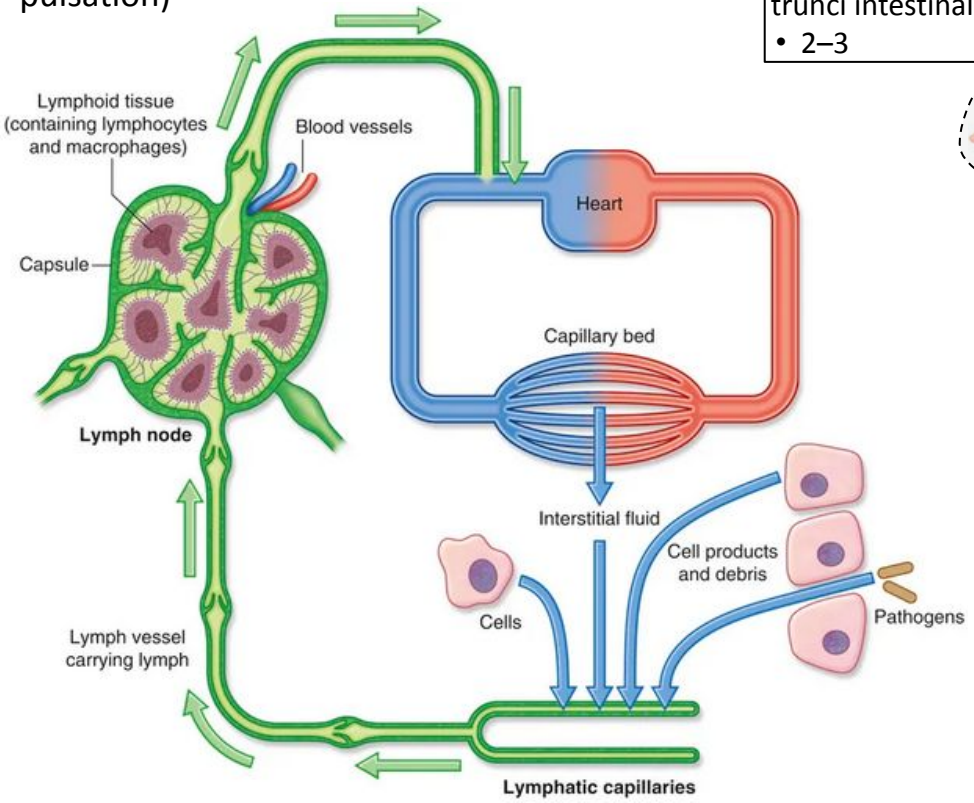
- three compartments based on topographical and functional criteria:
  - superficial system → drains the skin and subcutaneous tissue.
  - deep system → drains lymph from the muscles, joints, tendon sheaths, and nerves
  - organ-specific system → drains the organs and shows organ-specific differences
- system of perforator vessels interconnects the deep to superficial systems
- lymphatic vascular system can be subdivided into four different regions based on the histologic structure of the vessel walls:
  - lymphatic capillaries
  - precollectors
  - collectors
  - lymphatic trunks





efferent vessel with a valve
often become afferent vessel of other node

- lymph capillaries begin blindly, tissue fluid flows only inward.
- capillaries collect into lymph vessels, which have lymph nodes along their length
- lymph vessels flow into lymph trunks
- lymphatic trunks flow into lymphatic ducts
- lymphatic ducts open into the angulus venosus into the brachiocephalic vein
- lymph movement is ensured indirectly (muscle contraction, arterial pulsation)



thymus
- lymphoepithelial organ
- maturation of T lymphocytes
- from puberty involution

nodi lymphoidei colli
- along IJV
- truncus v. jugularis

ductus lymphaticus dx.

truncus subclavius

trunci intestinales
- 2–3

Waldeyer's tonsillar ring
- tonsilla palatina
- tonsilla lingualis
- tonsilla pharyngea
- tonsilla tubaria

nodi lymphoidei axillares
- in 3 levels

truncus bronchomediastinalis

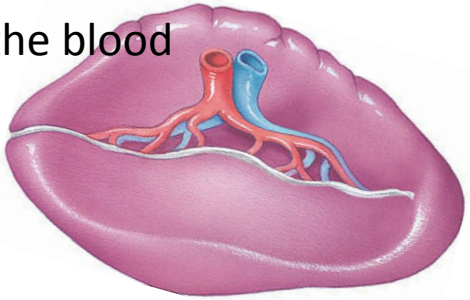
ductus thoracicus
- confluence of the lumbar trunks
- cisterna chyli (Th11–L1)

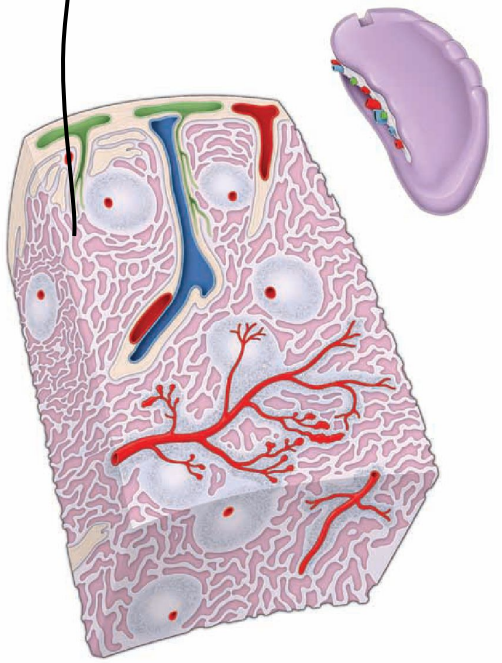
truncus lumbalis
- collectors from the lower limb
- lymph from the pelvis

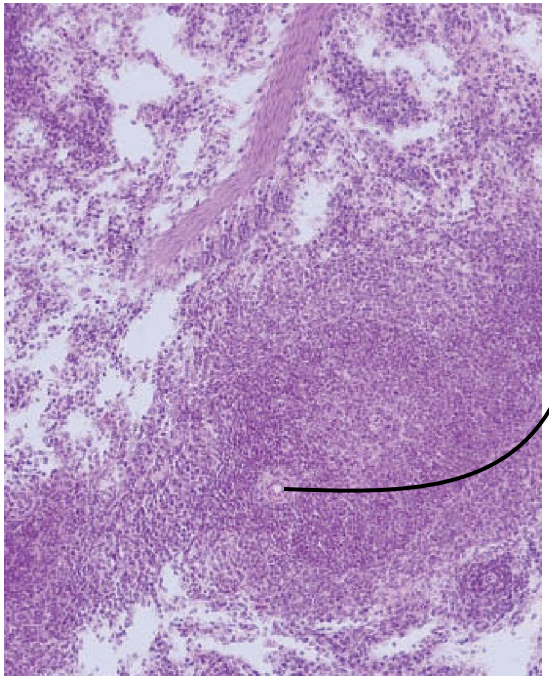
nodi lymphoidei inguinales
- entire lower limb, external genitalia, part of the anterior and lateral abdominal wall

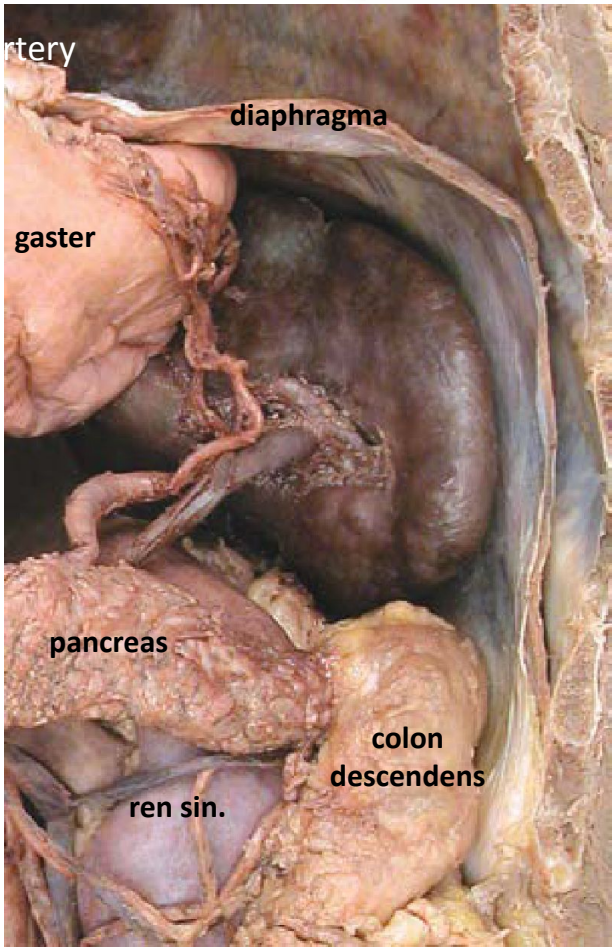
SPLEEN

- serves to initiate an immune response against antigens filtered from the blood
- breakdown of red blood cells
- largest lymphatic organ – but not vitally important
- covered by a connective tissue capsule on the surface
  - bars extend from it and form a spatial network
  - mesh filled with red pulp – blood sinuses and Billroth's cords
  - and white pulp – Malpighian bodies (lymphatic tissue around the central artery





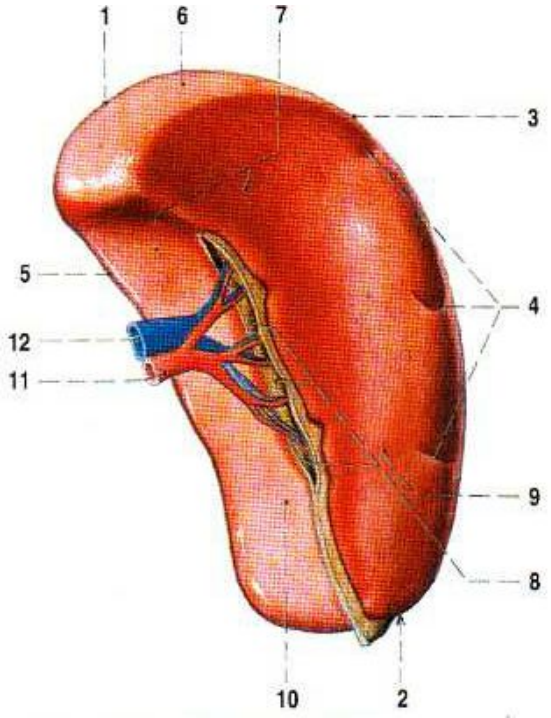




SPLEEN

- located in the left diaphragmatic dome to the left of the stomach in the saccus splenicus
  - fixed by the phrenicosplenic, pancreaticosplenic, gastrosplenic, and phrenicocolic ligaments
  - the longitudinal axis follows the 10th rib or intercostal space
- extremities – posterior (superior) and anterior (inferior)
- margo – superior (margo crenatus) and inferior
- facies – diaphragmatic and visceral (facies renalis, gastrica, variable colica)
- hilustní colica)
- hilus

- structure
  - tunica serosa, tunica fibrosa – trabeculae splenicae et pulpa splenica
  - trabeculae splenicae – dense connective tissue beams, extending from the tunica fibrosa into the interior of the spleen, forming a spongy stroma (coegenic and reticular connective tissue with smooth muscle cells)



Obr. 122. SLEZINA; pohled zprava zpředu
1 extremitas posterior
2 extremitas anterior
3 margo superior (margo crenatus)
4 crenae lienis
5 margo inferior
6 facies diaphragmatica
7 facies visceralis
8 hilum lienis
9 facies gastrica
10 facies colica
11 a. lienalis
12 v. lienalis