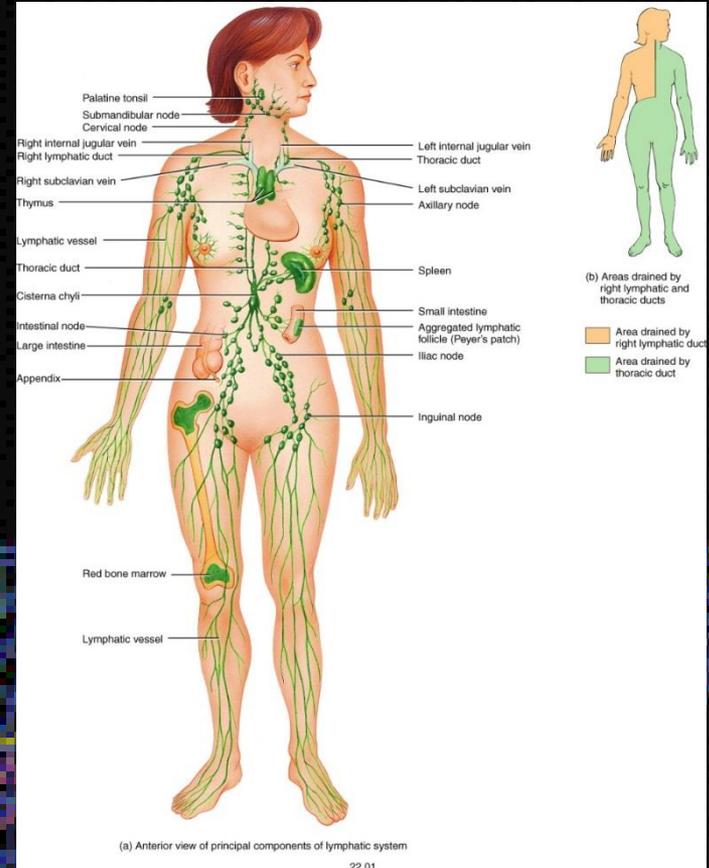


Sistema Linfático

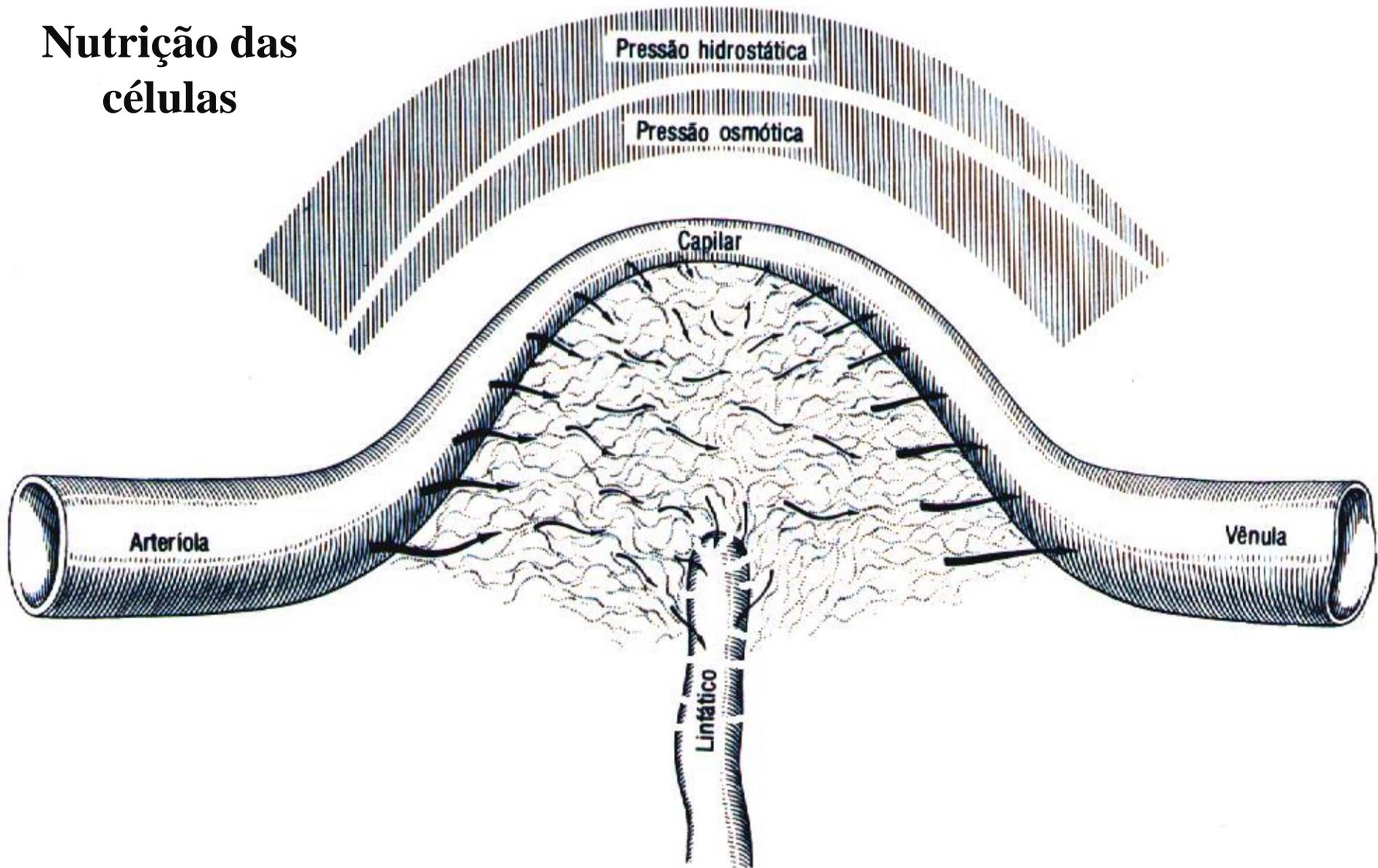
O sistema linfático consiste de:

Vasos linfáticos
Órgãos linfáticos



Dr. Ricardo Santos Simões
Prof. Me. Leandro Sabará de Mattos

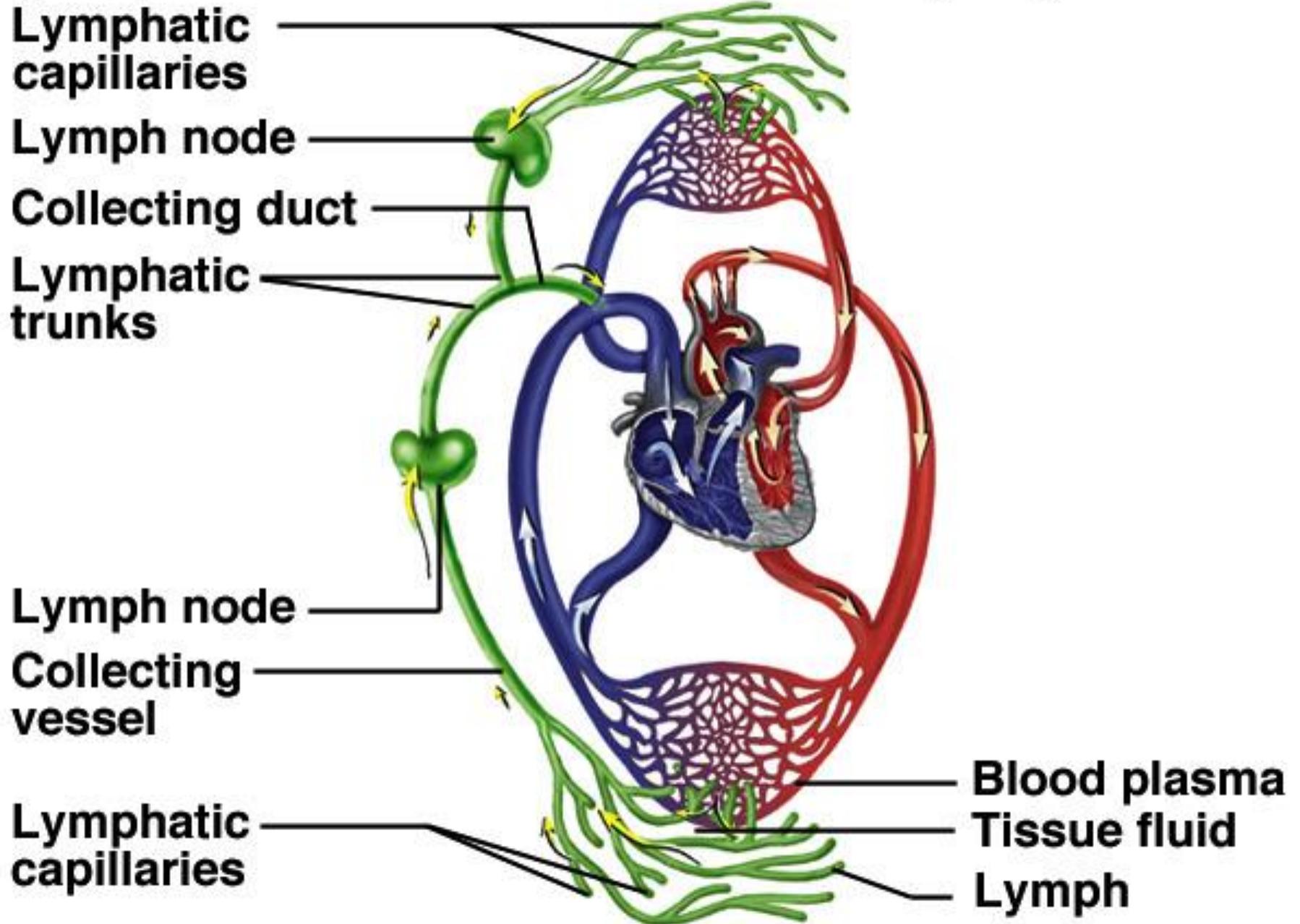
Nutrição das células



Sinal de Godet



Lymphatic and Circulatory Systems

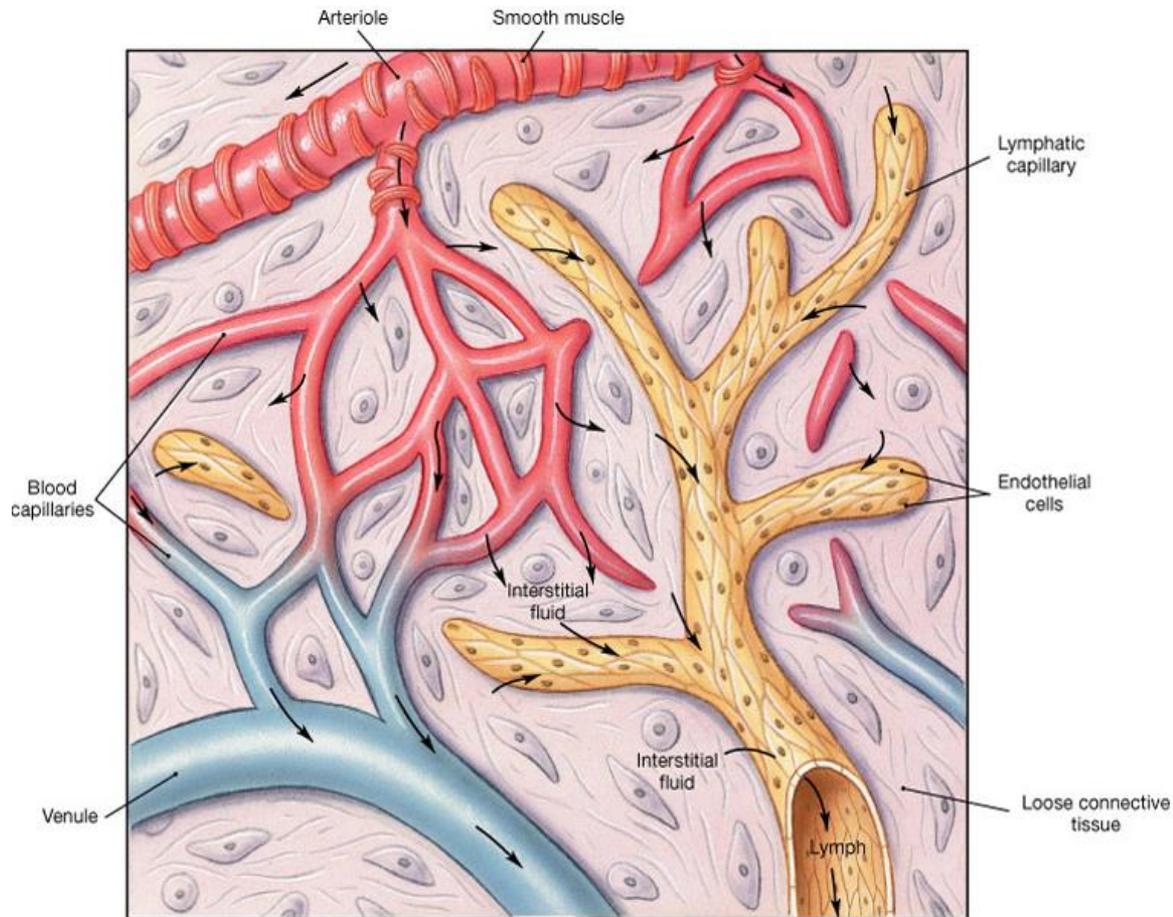


Capilares linfáticos

Parede delgada, sem membrana basal, apresentam valvas e são paralelos as veias.

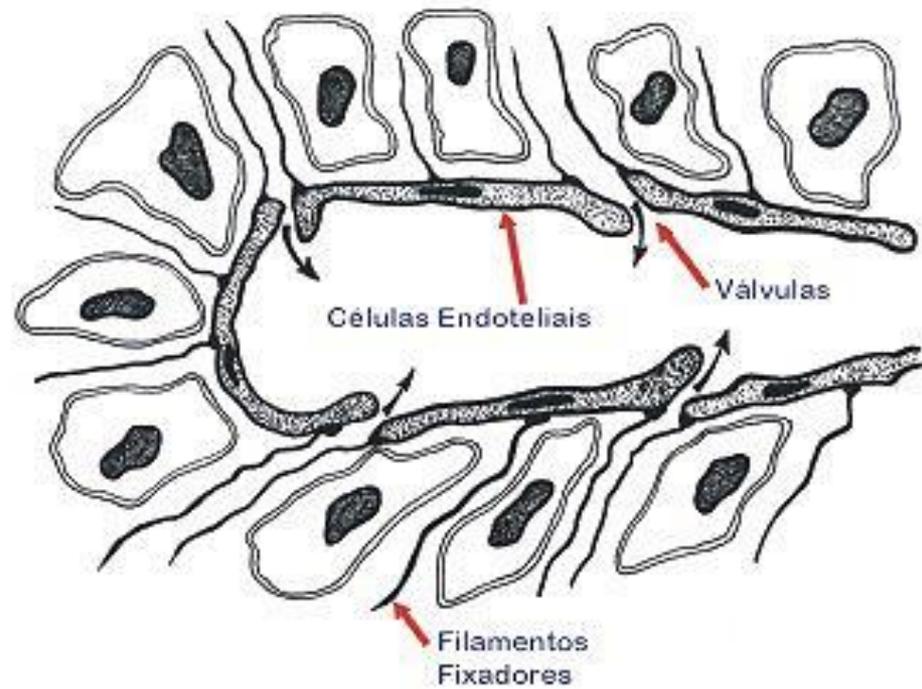
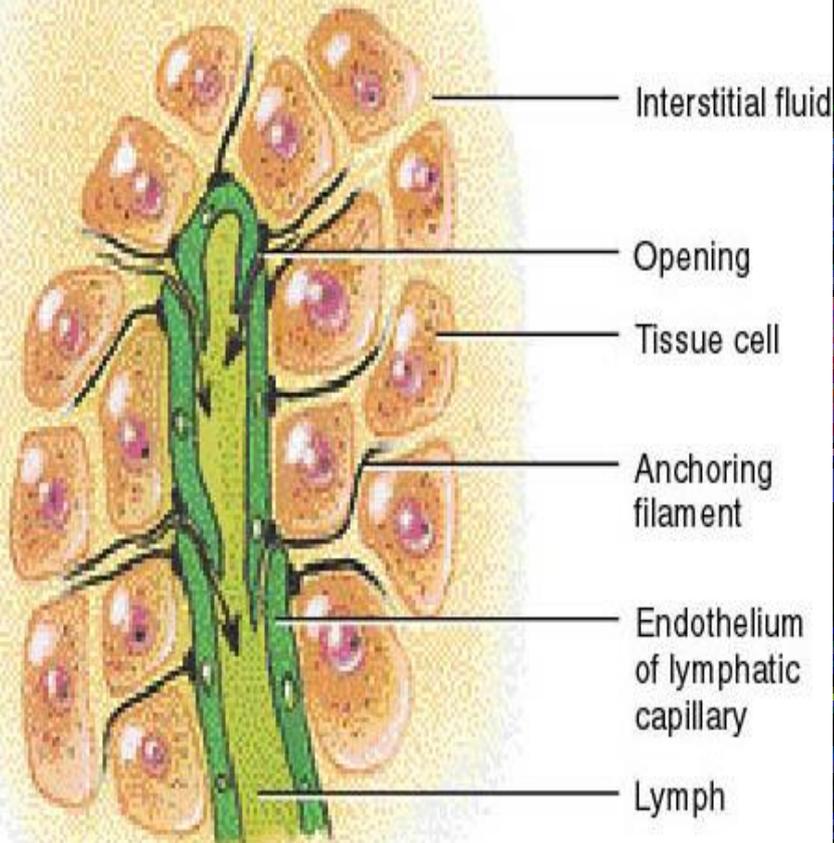
São fechados nas extremidades distais (fundo cego).

Captam e reciclam o líquido extra celular

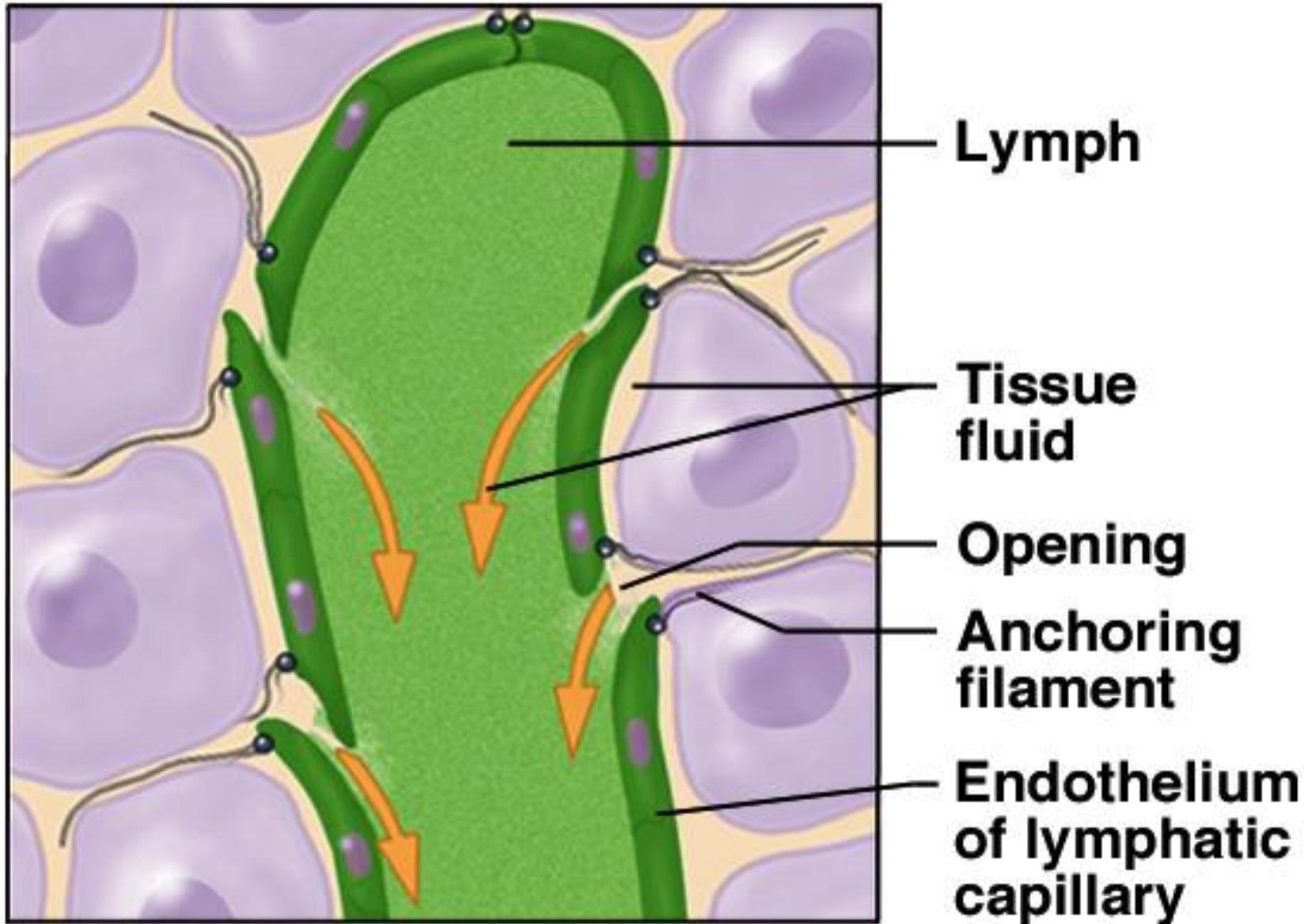


(a) Association of blood capillaries, tissue, and lymphatic capillaries

Capilar linfático

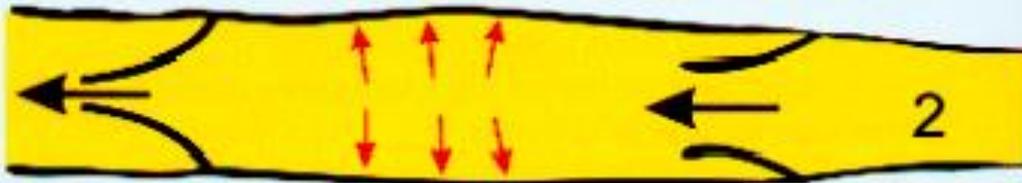


Lymphatic Capillary, Uptake of Tissue Fluid

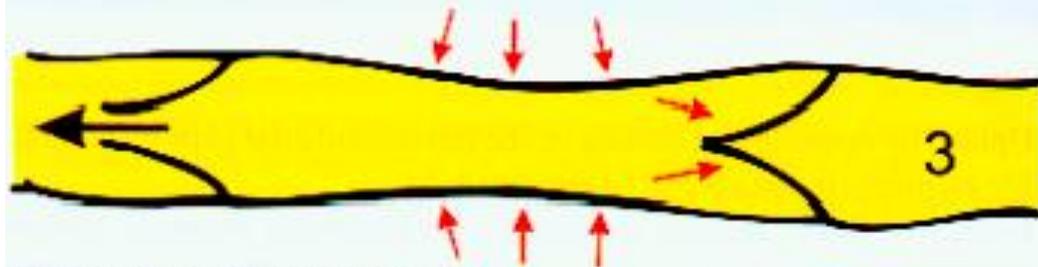




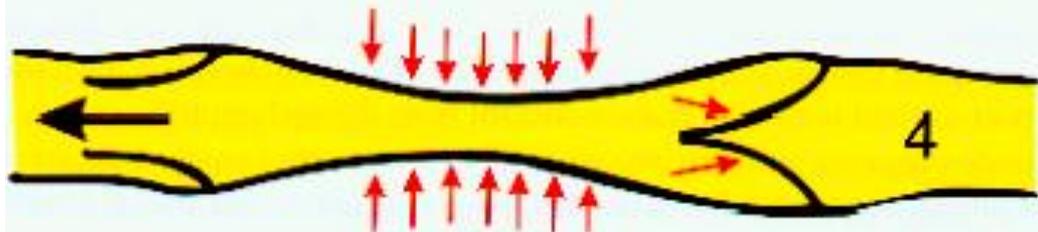
Continuous lymph flow
when both valves are open



Filling phase with wall expansion
due to increased lymph flow from a distal direction



Start of emptying phase
with starting wall contraction



Expulsion of lymph content in a proximal direction
with maximum wall contraction

Funcionamento de um vaso linfático

**Vaso
linfático**

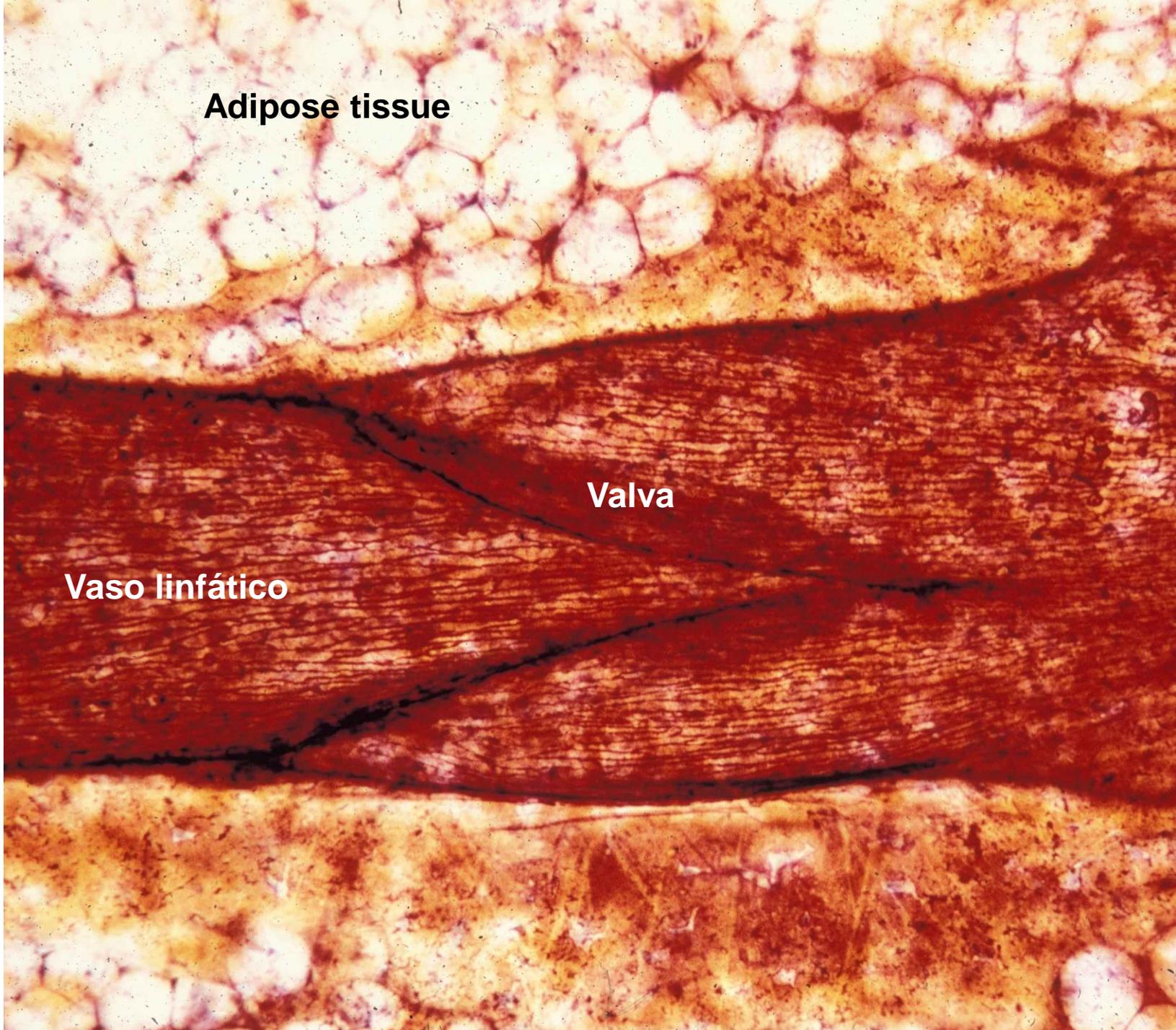
Adipose tissue

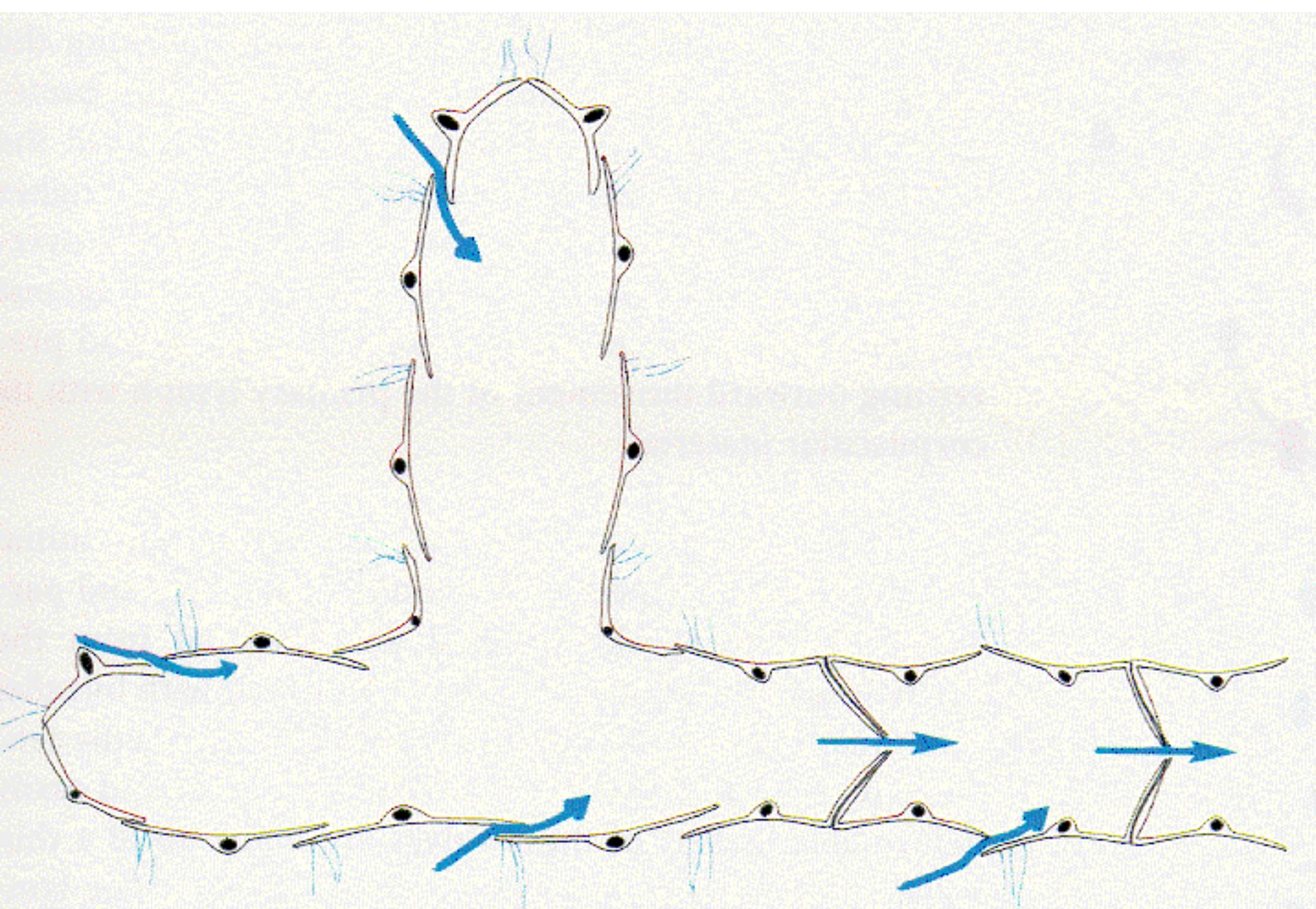
Fluxo



Valva

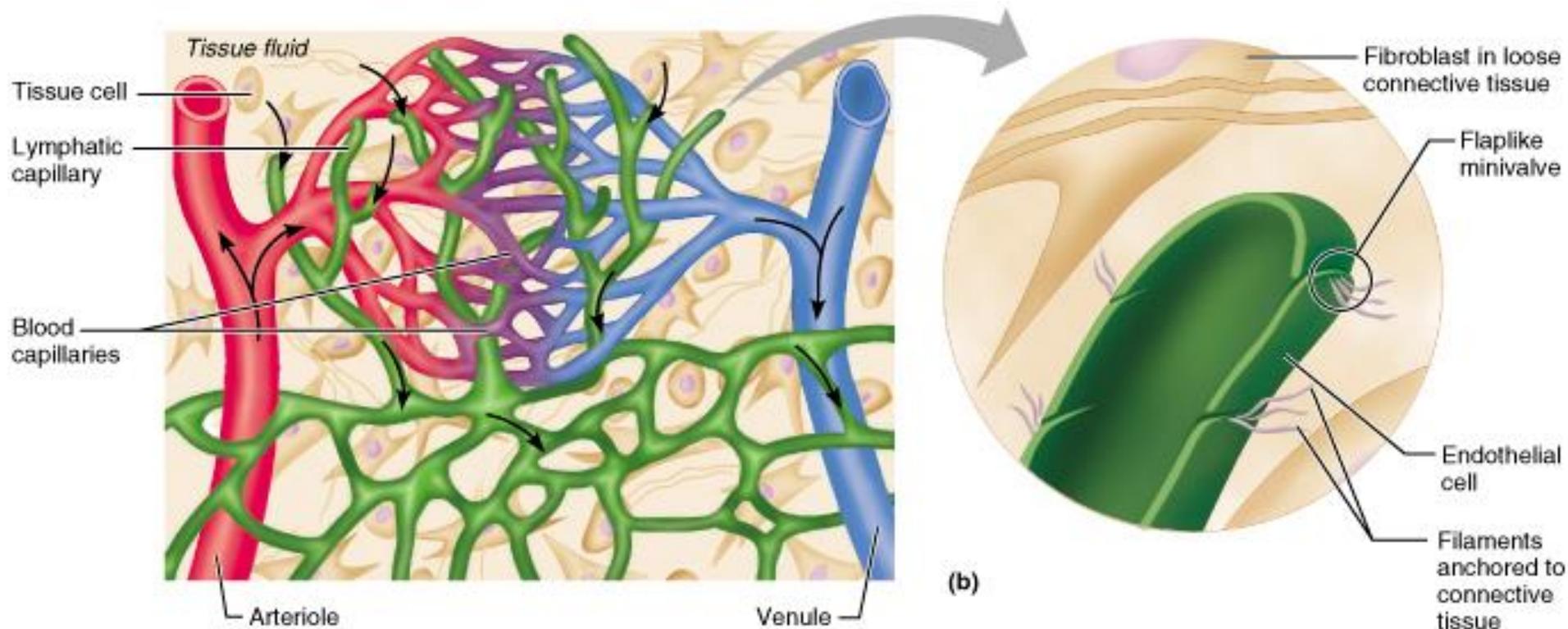
Vaso linfático





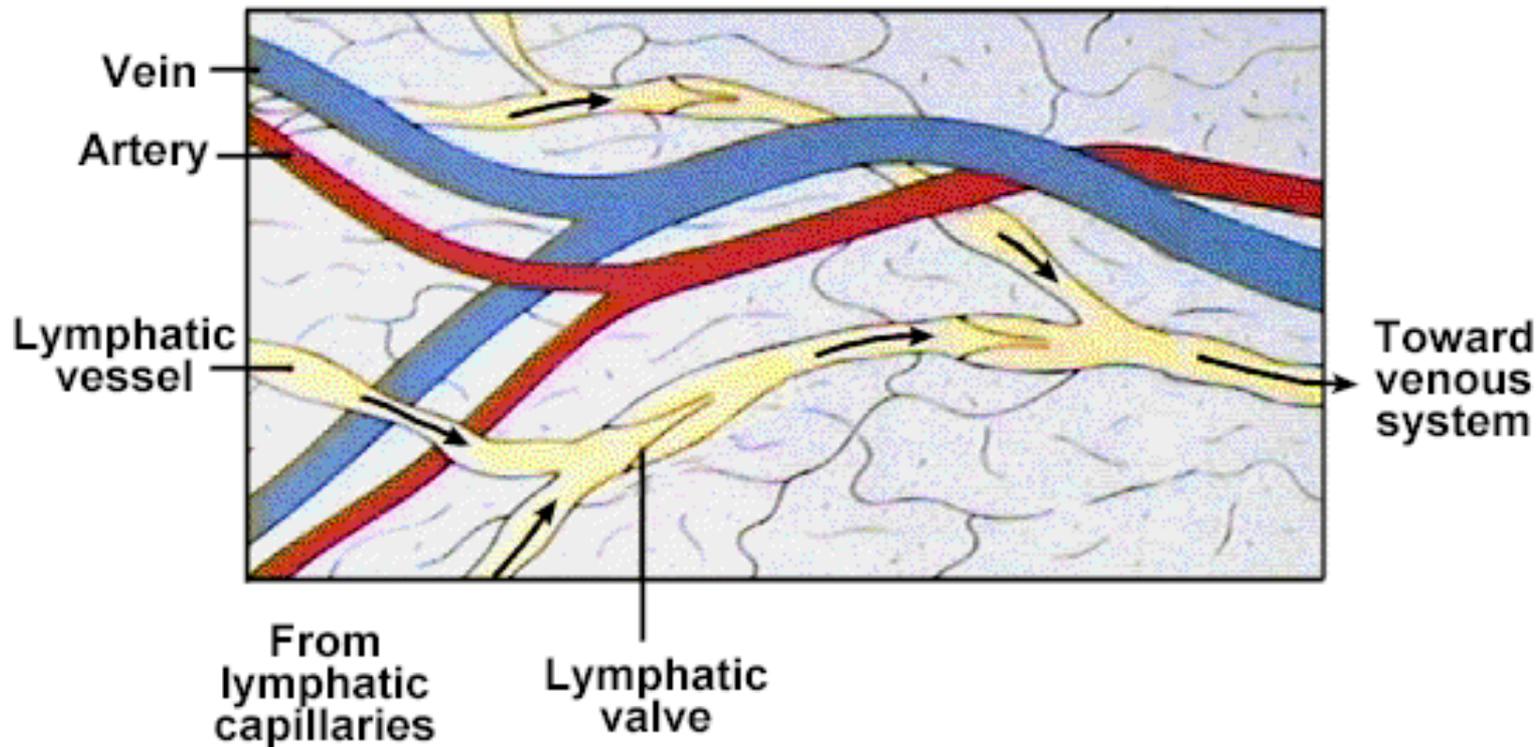
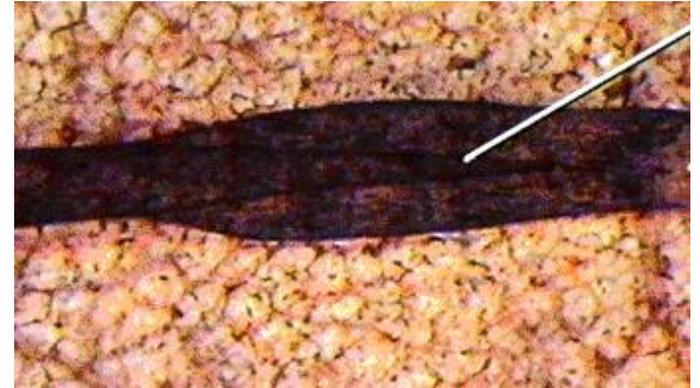
Vasos Linfáticos

- Capilares linfáticos
 - Vasos em fundo cego entre as células
 - Não é encontrado em tecidos avasculares (cartilagem, córnea), no sistema nervoso central, medula óssea, timo e polpa esplênica.

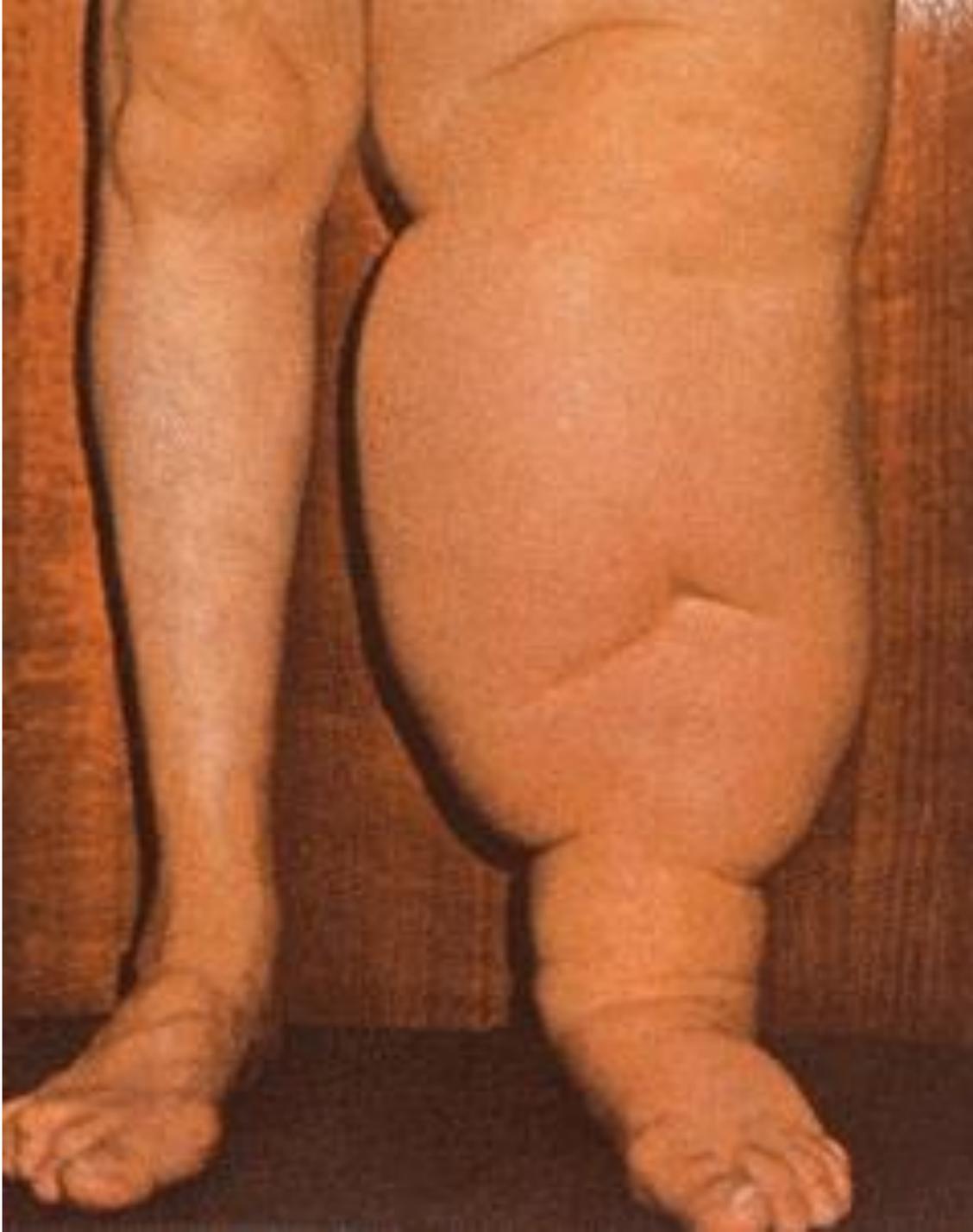


Vasos linfáticos

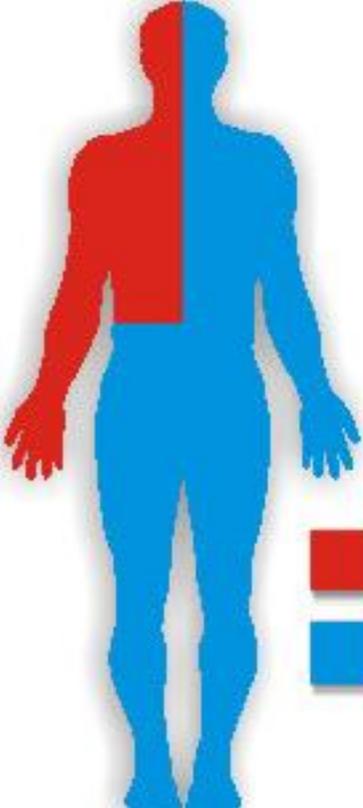
Comparados em sua estrutura com as veias



Lesão valvar ou bloqueio dos vasos linfáticos = edema

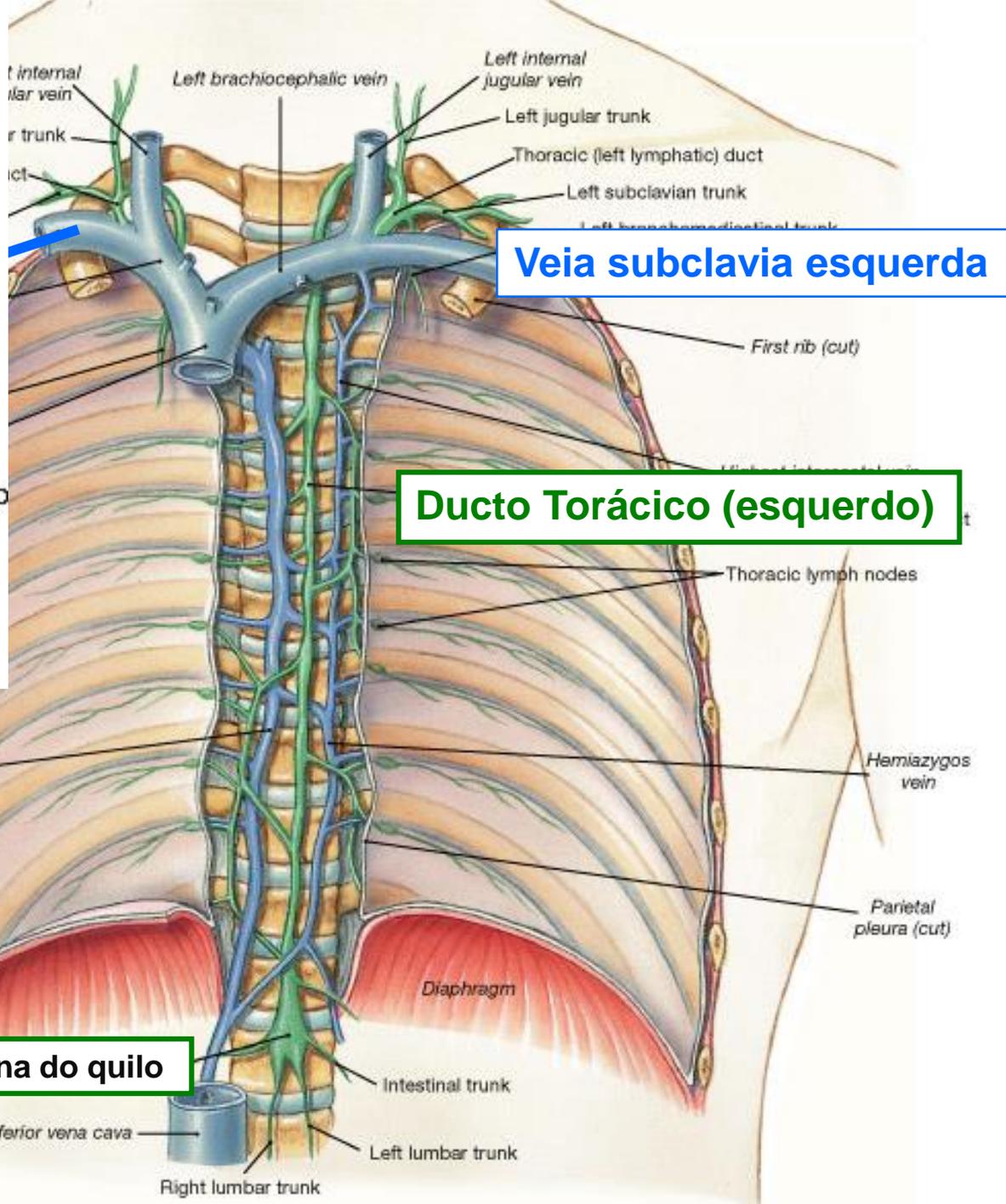


**Edema de
membro inferior**

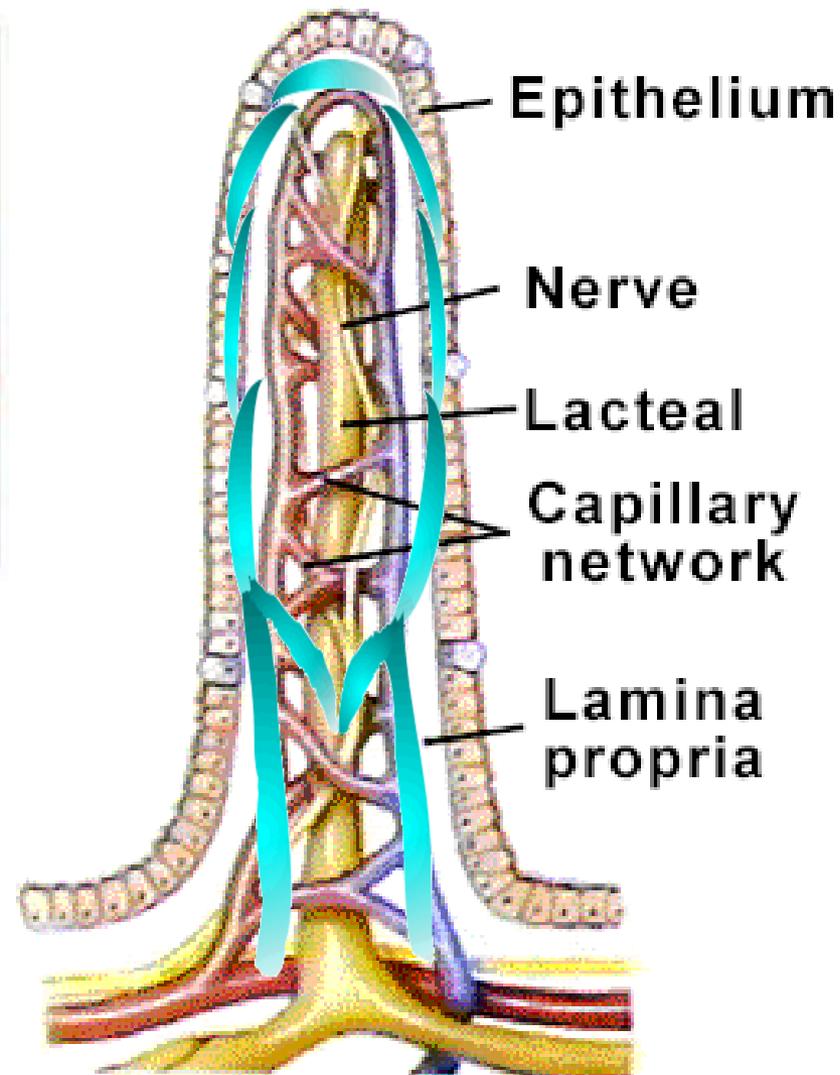
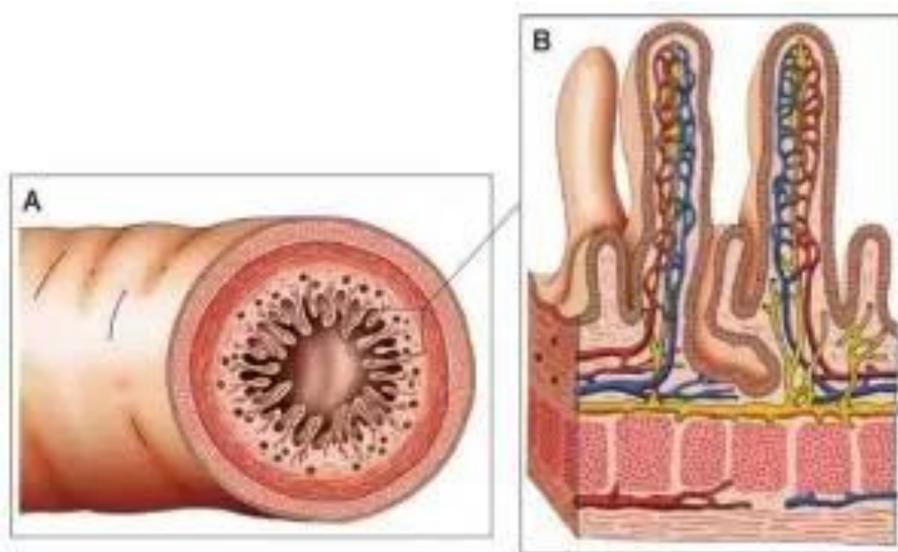


-  região drenada pelo ducto linfático direito
-  região drenada pelo ducto torácico

Lymph capillaries converge to become collecting vessels and end up as either Thoracic duct or right lymphatic duct



Função dos capilares linfáticos



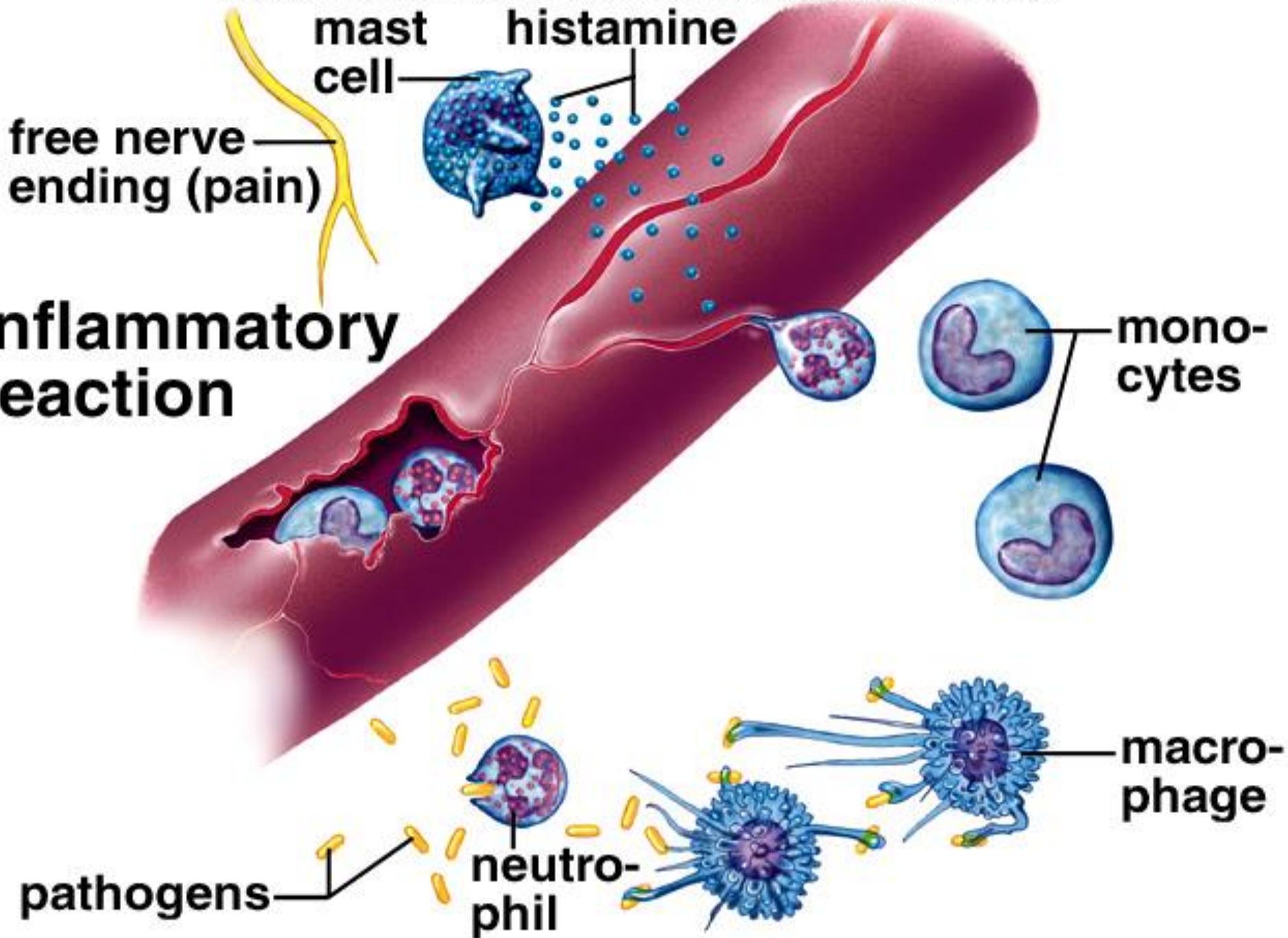
Os capilares das vilosidades intestinais têm por função a captação da gordura

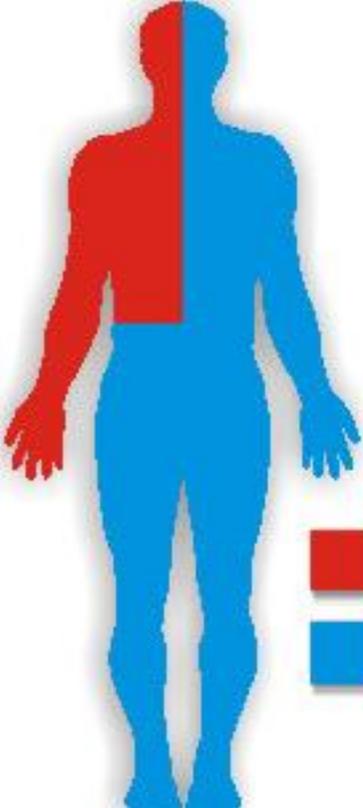
Vasos quilíferos (lácteo)

**DRENA OS VÁRIOS TECIDOS PODENDO
LEVAR BACTÉRIAS, CÉLULAS TUMORAIS,
VIRUS ETC**

SISTEMA LINFÁTICO —————> SISTEMA IMUNE

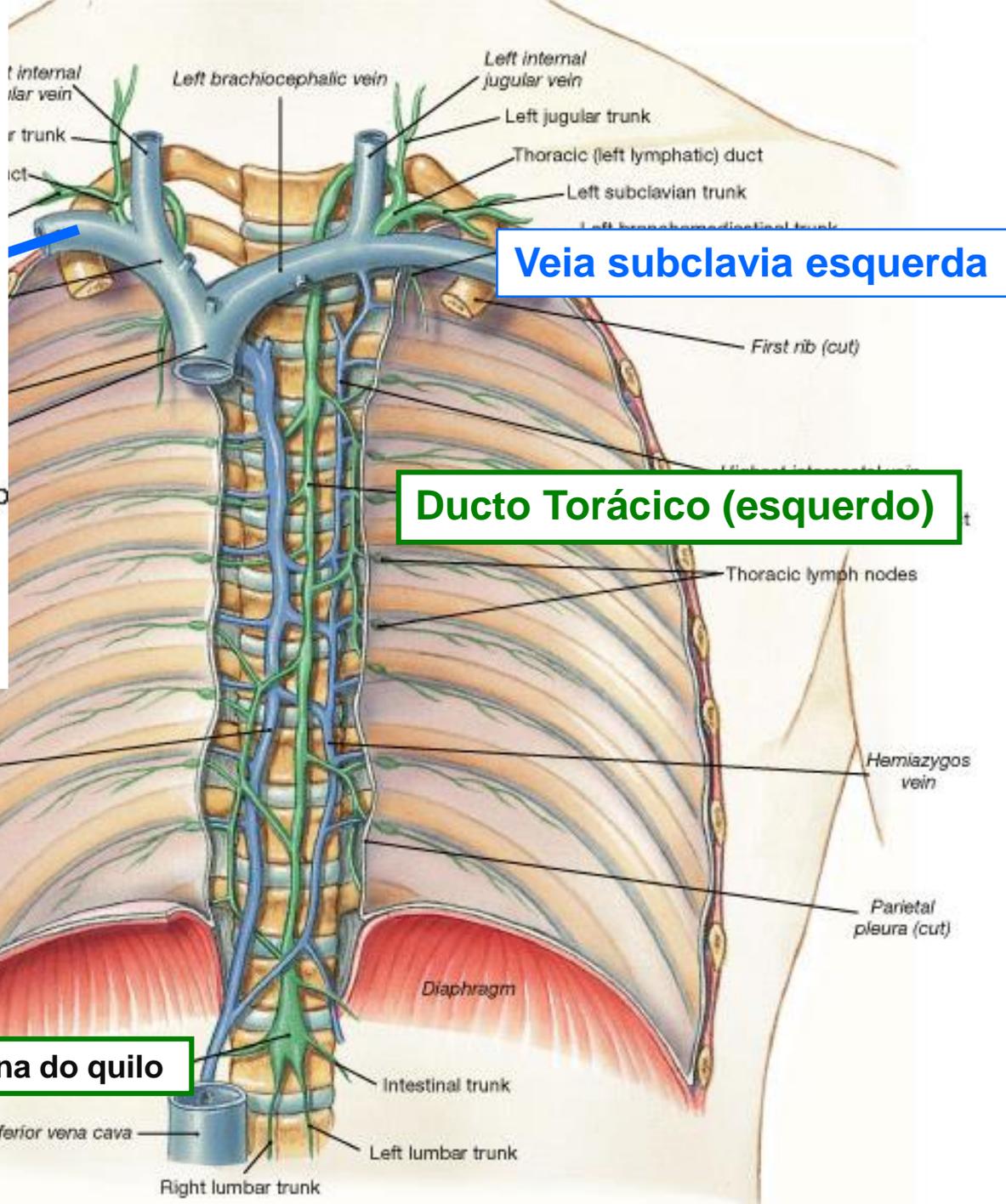
Inflammatory reaction



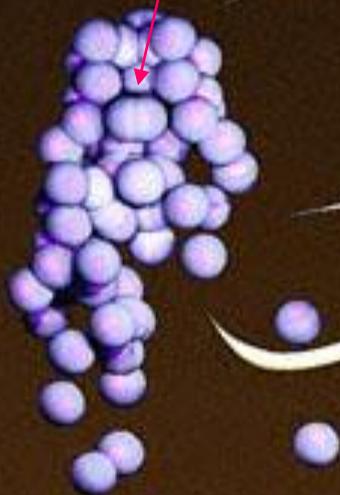


-  região drenada pelo ducto linfático direito
-  região drenada pelo ducto torácico

Lymph capillaries converge to become collecting vessels and end up as either Thoracic duct or right lymphatic duct



Bactérias

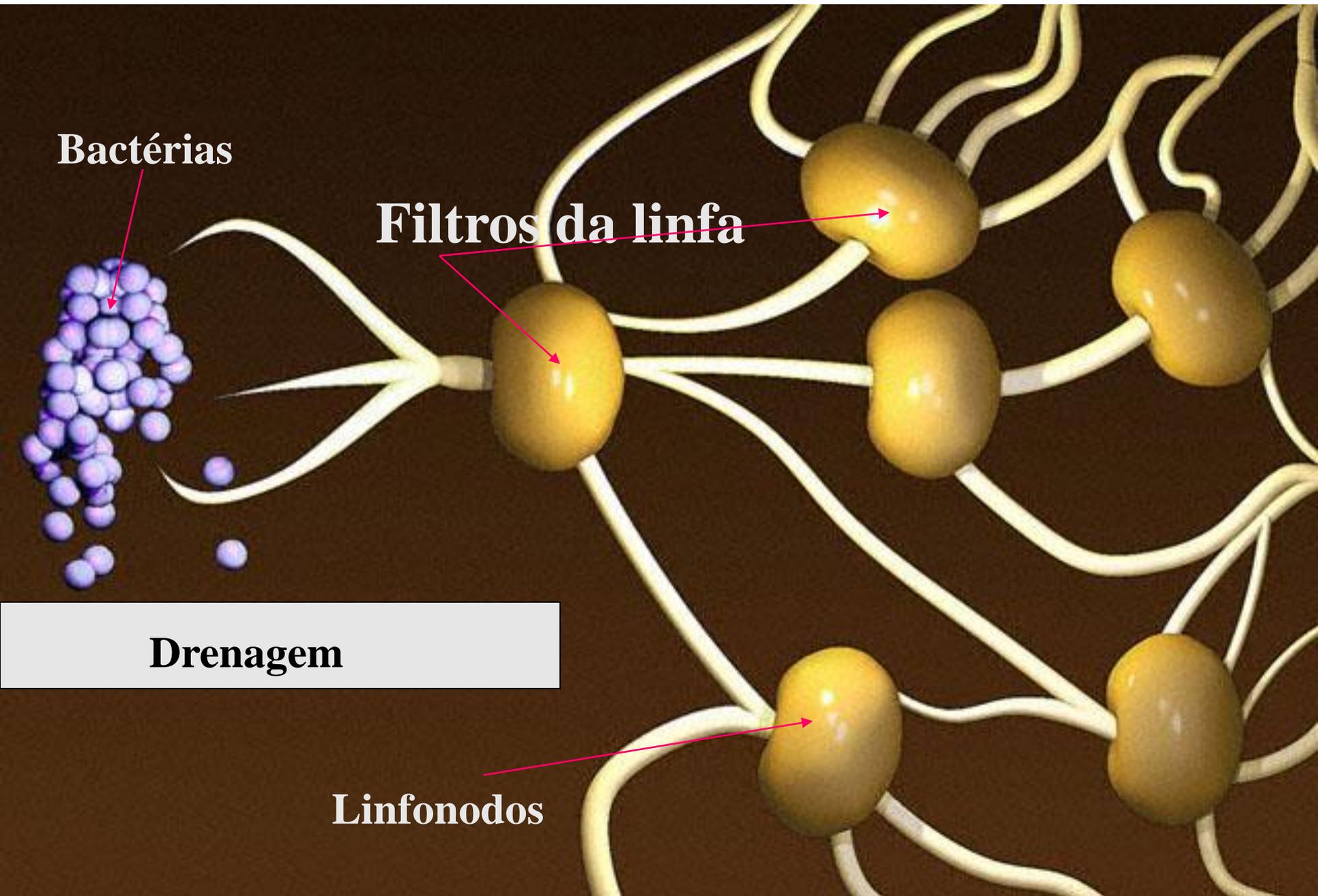


Filtros da linfa



Drenagem

Linfonodos

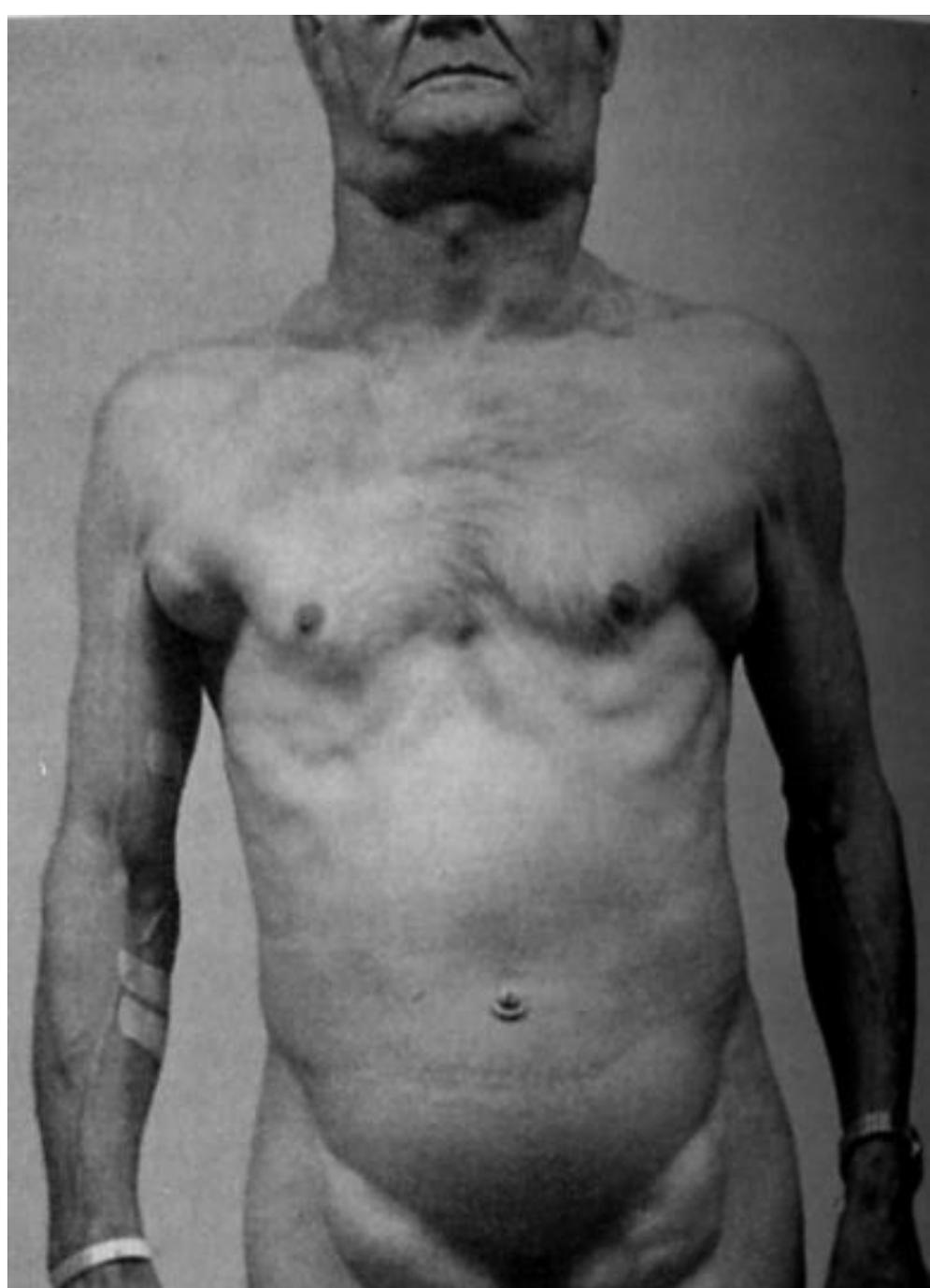


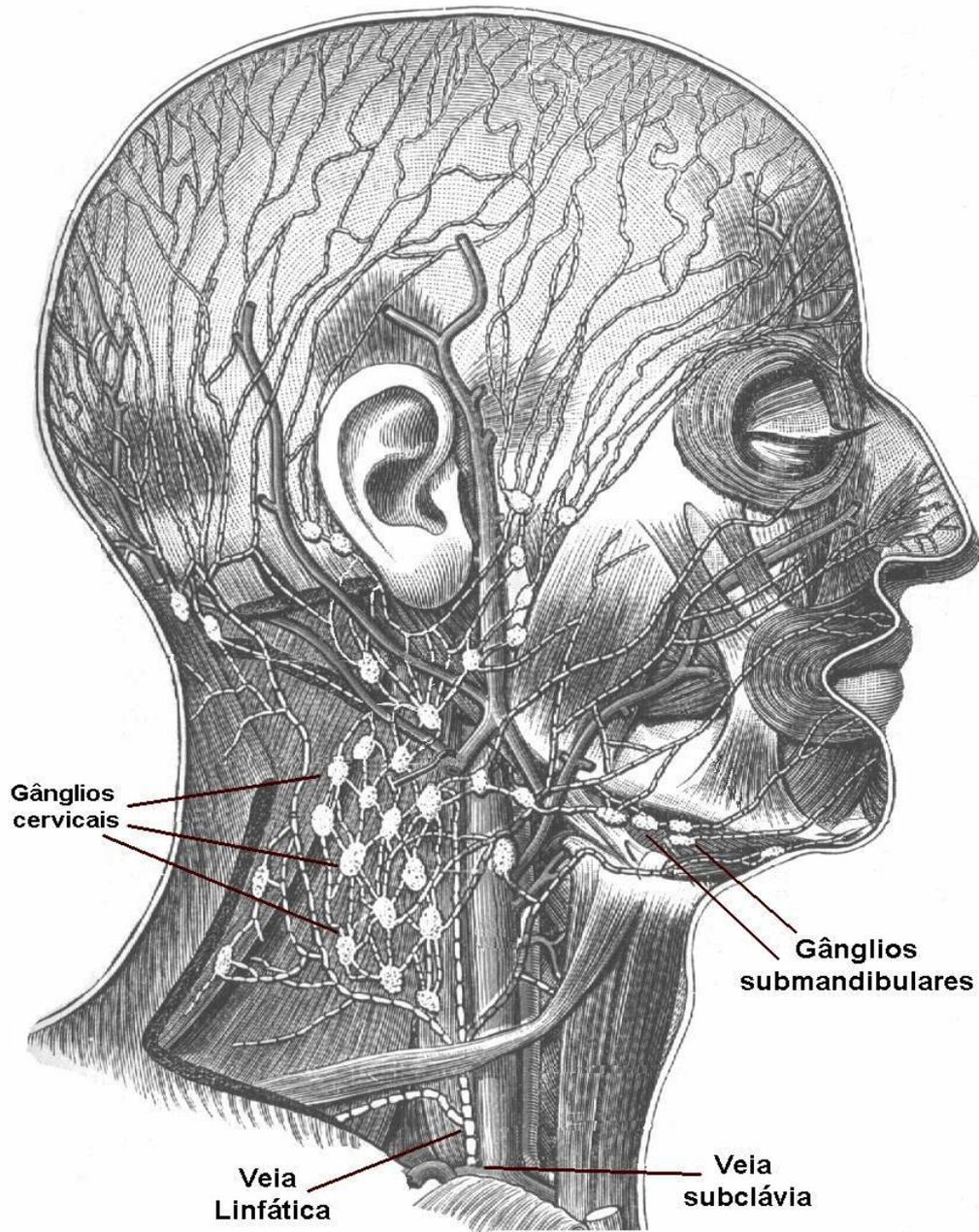
Linfoadenopatia

Nos locais de lesão ou infecção ocorre aumento da drenagem

O aumento no tamanho dos linfonodos pode estar associado a tumores, infecções bacterianas ou virais.

Linfoadenopatia severa →







Axila

**Linfonodo
infartado
(íngua)**



Linfonodo infartado



Linfonodo

Função:

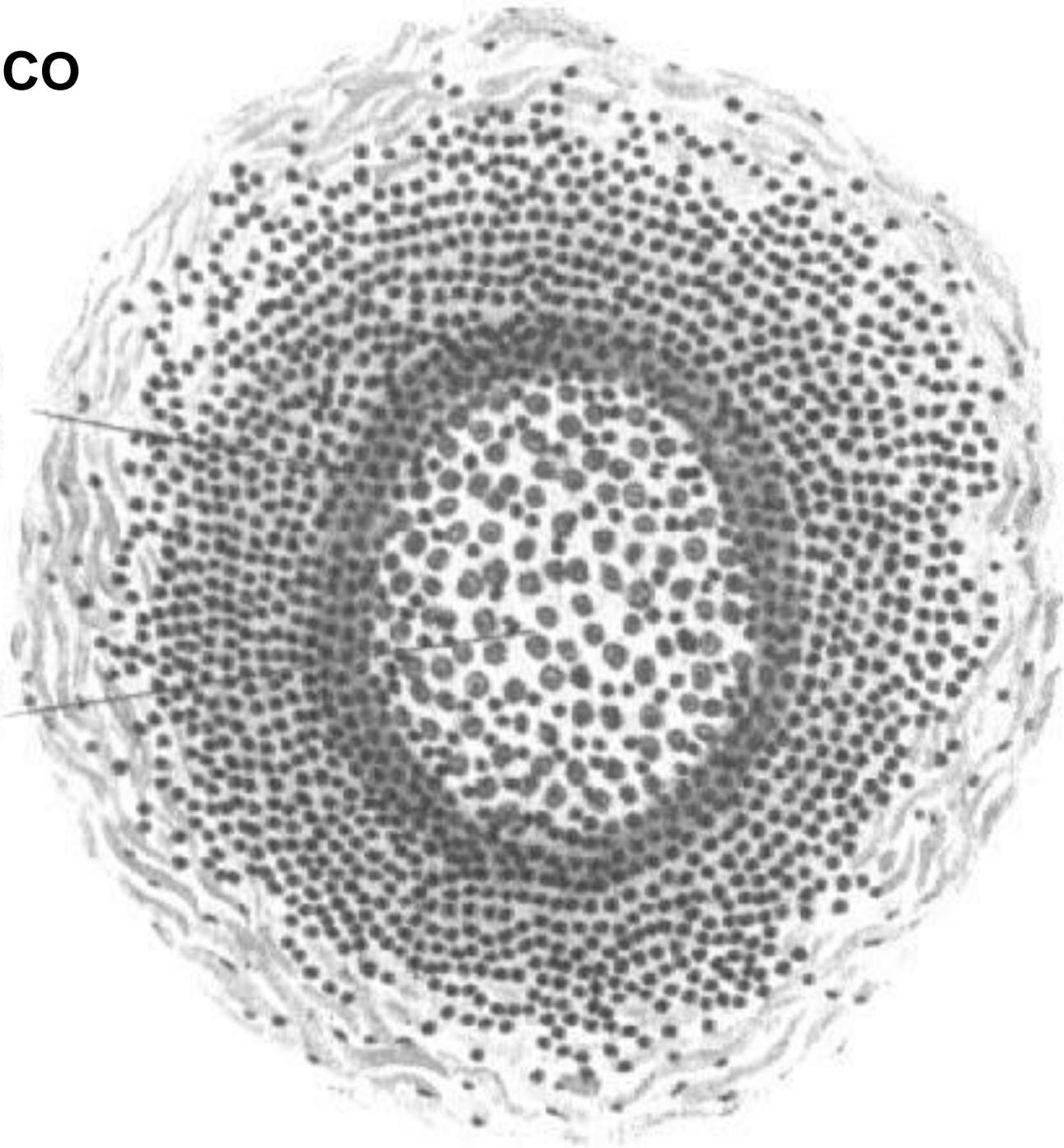
Filtrar a linfa;

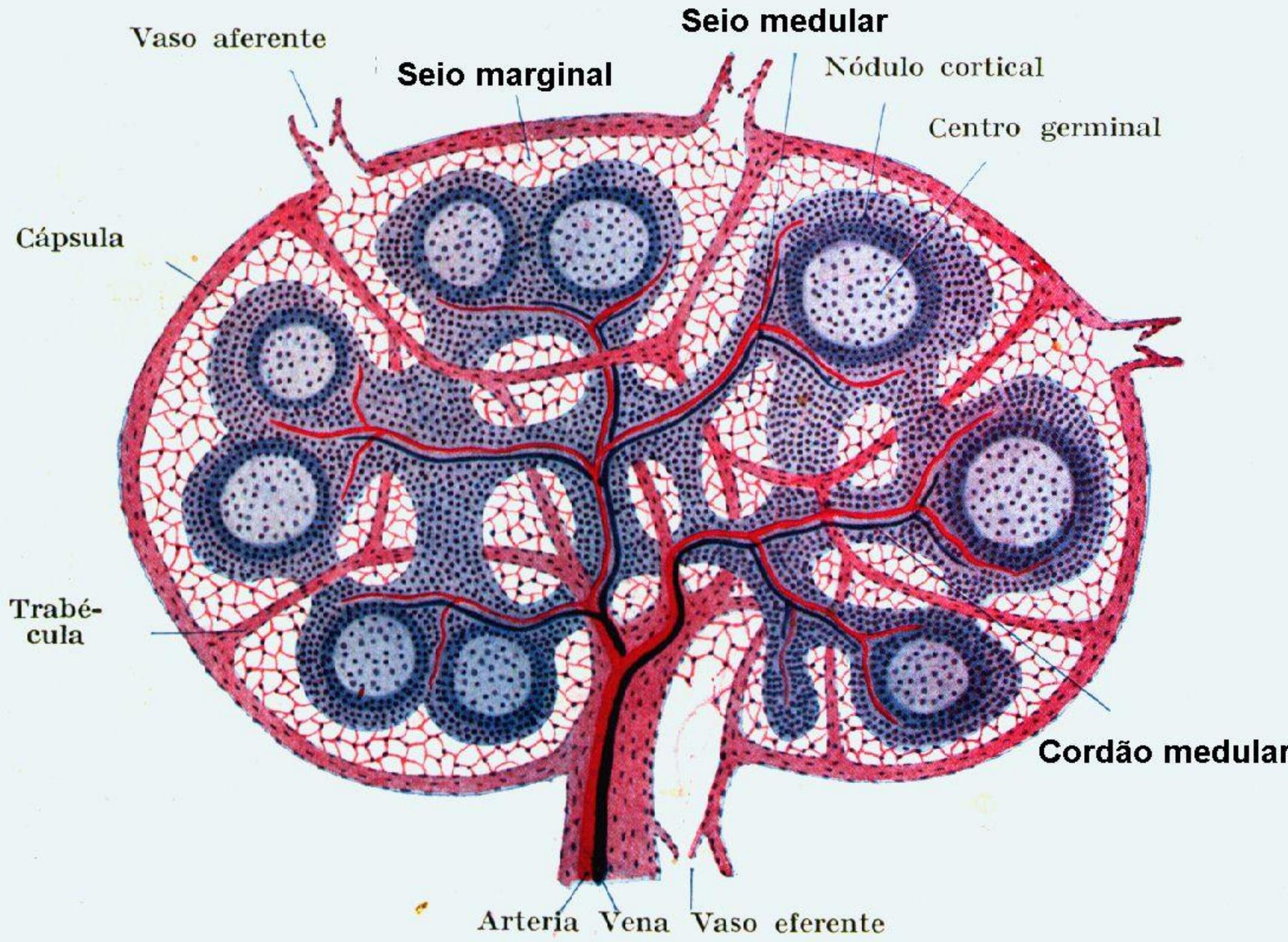
**Local de defesa do organismo
multiplicação de linfócitos**

NÓDULO LINFÁTICO

Região periférica
(Predomínio de linfócitos)

Centro germinativo
(Predomínio de linfoblastos)





Vaso aferente

Seio medular

Seio marginal

Nódulo cortical

Centro germinal

Cápsula

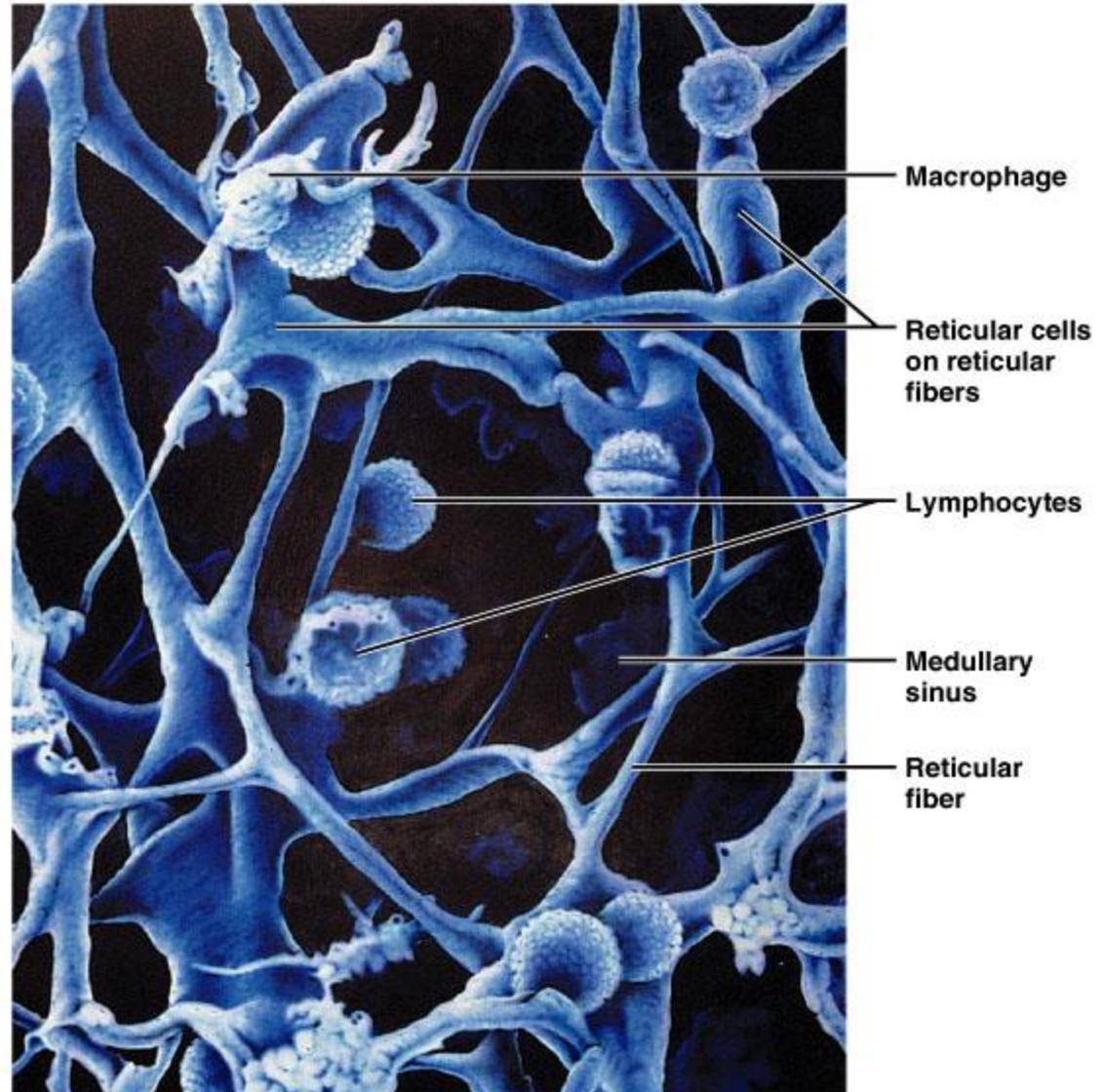
Trabécula

Cordão medular

Arteria Vena Vaso eferente

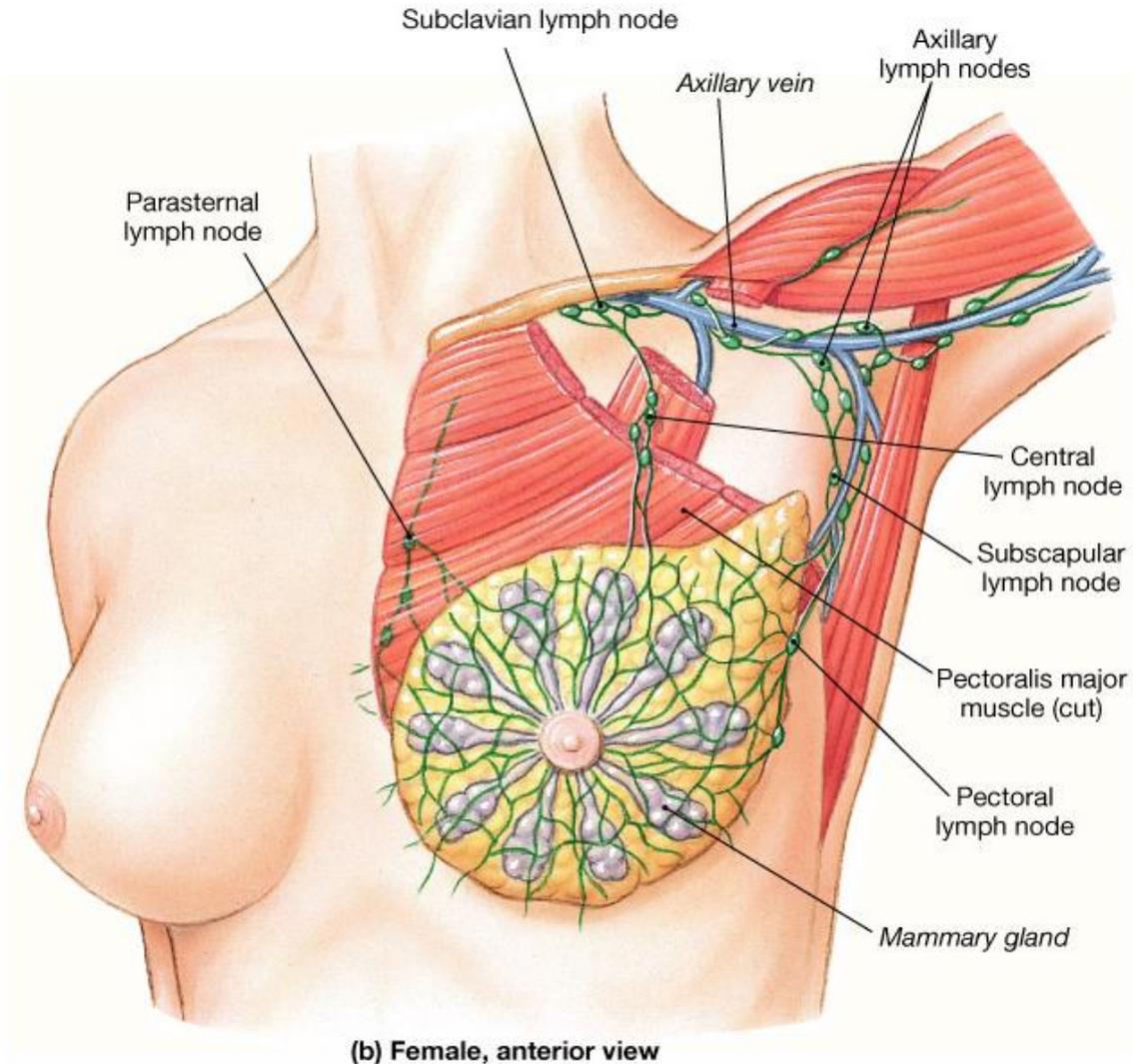
Estrutura do linfonodo

- Rede celular formada por células reticulares e fibras reticulares
- Os macrófagos residem nas fibras reticulares e fagocitam corpos estranhos



Dranagem axilar

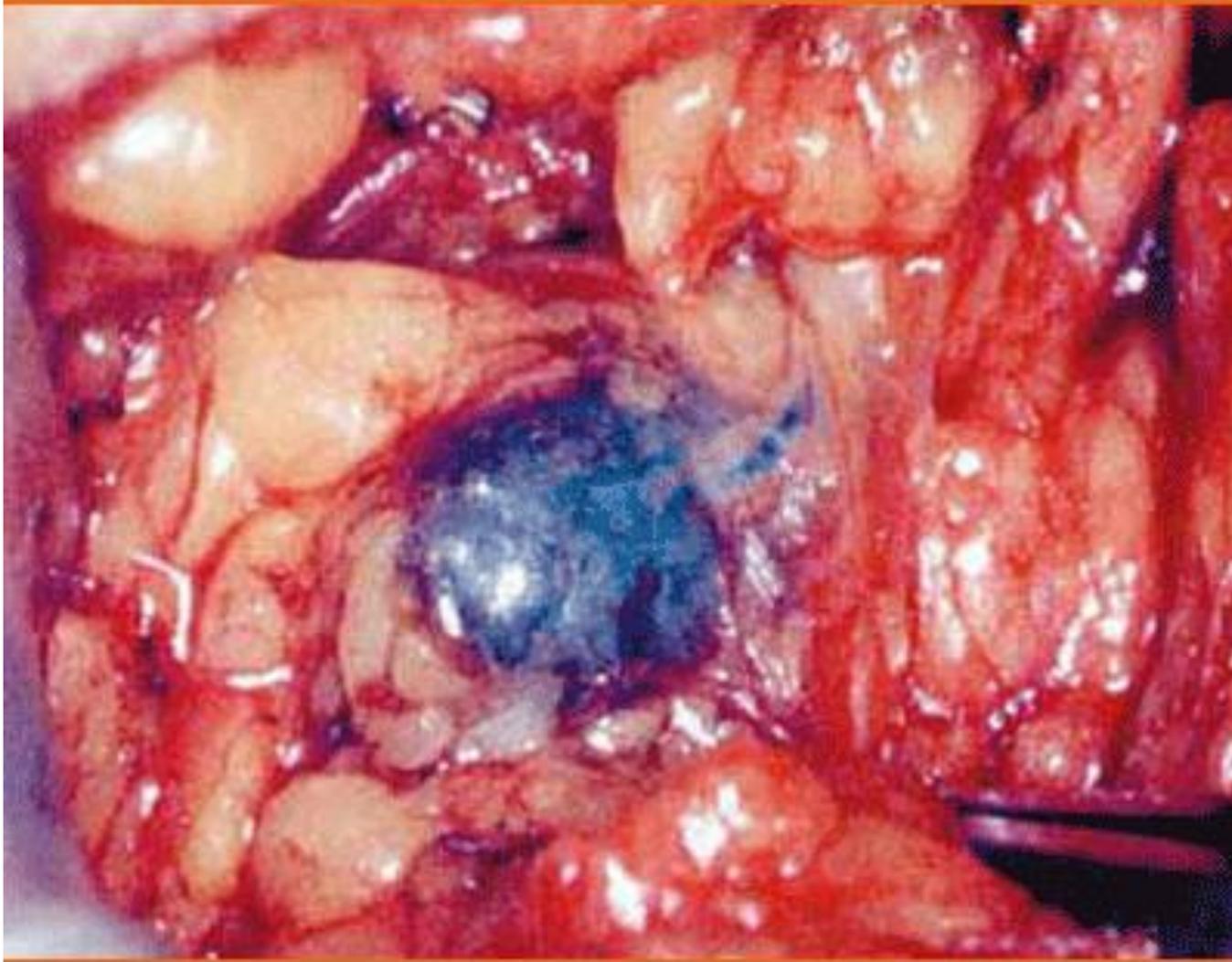
Drenagem da mama e do braço



Injeção de corante

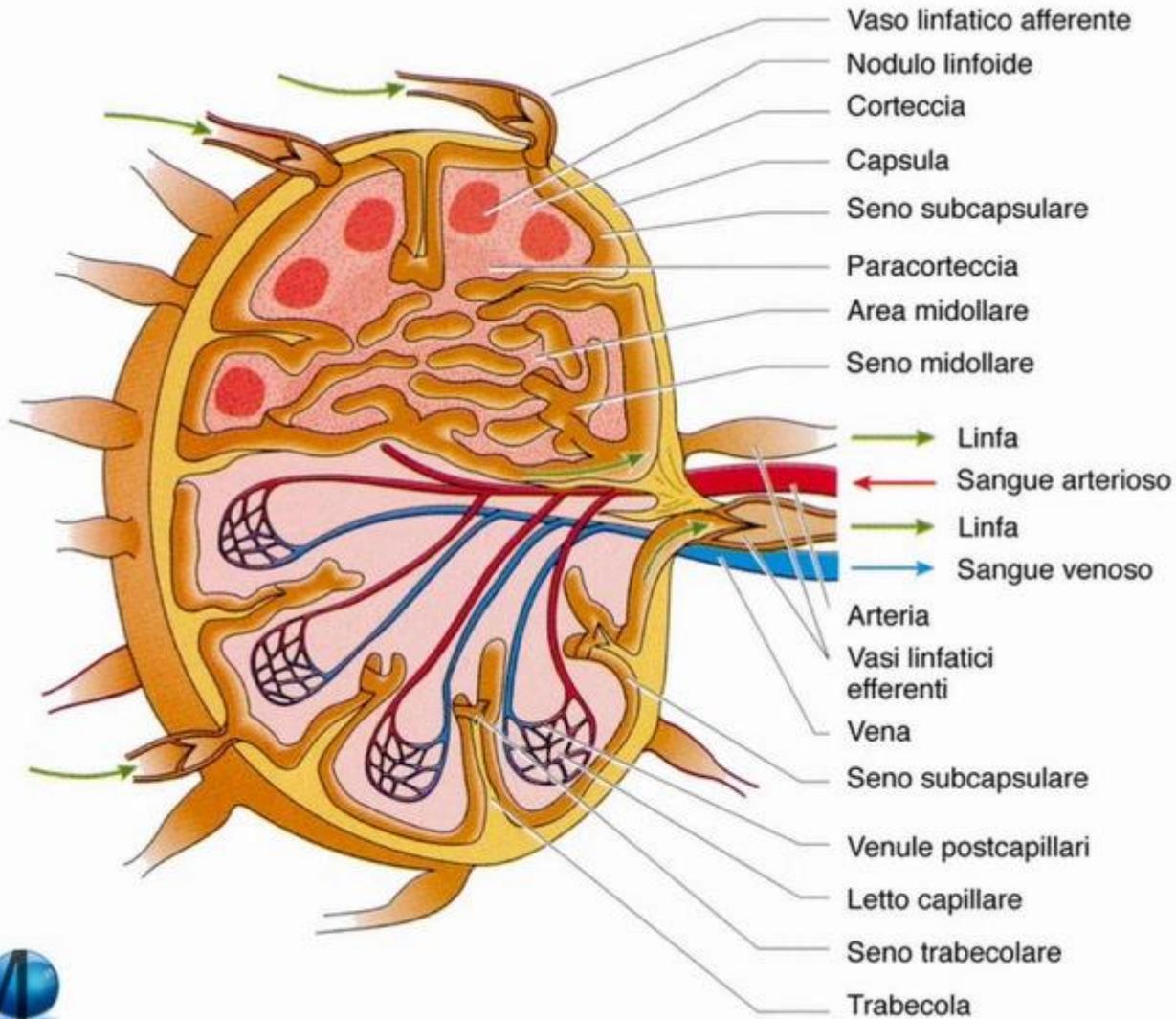


Tumor de mama



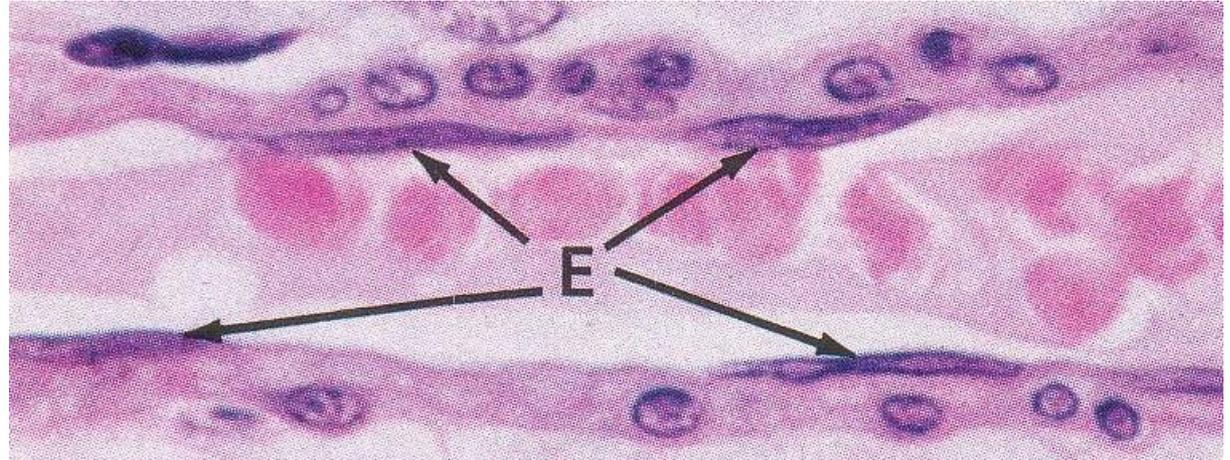
Source: Nat Clin Pract Oncol © 2005 Nature Publishing Group

Linfonodo sentinela mapeia o trajeto da linfa e com isso pode indicar onde poderia se alojar possíveis células cancerosas.

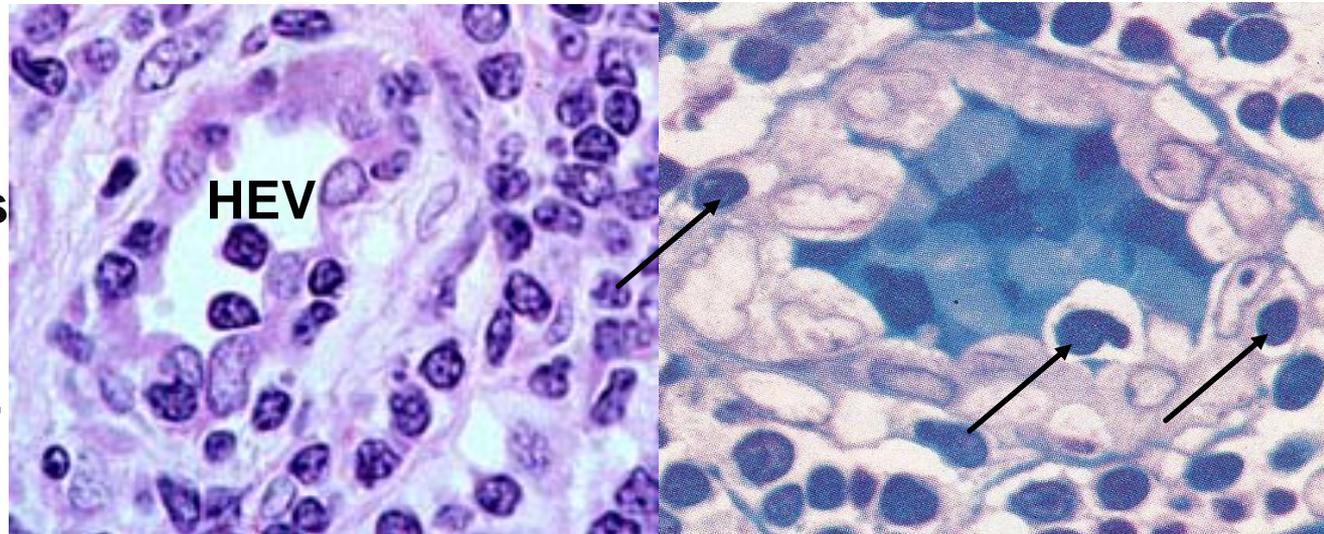


Endotélio das vênulas

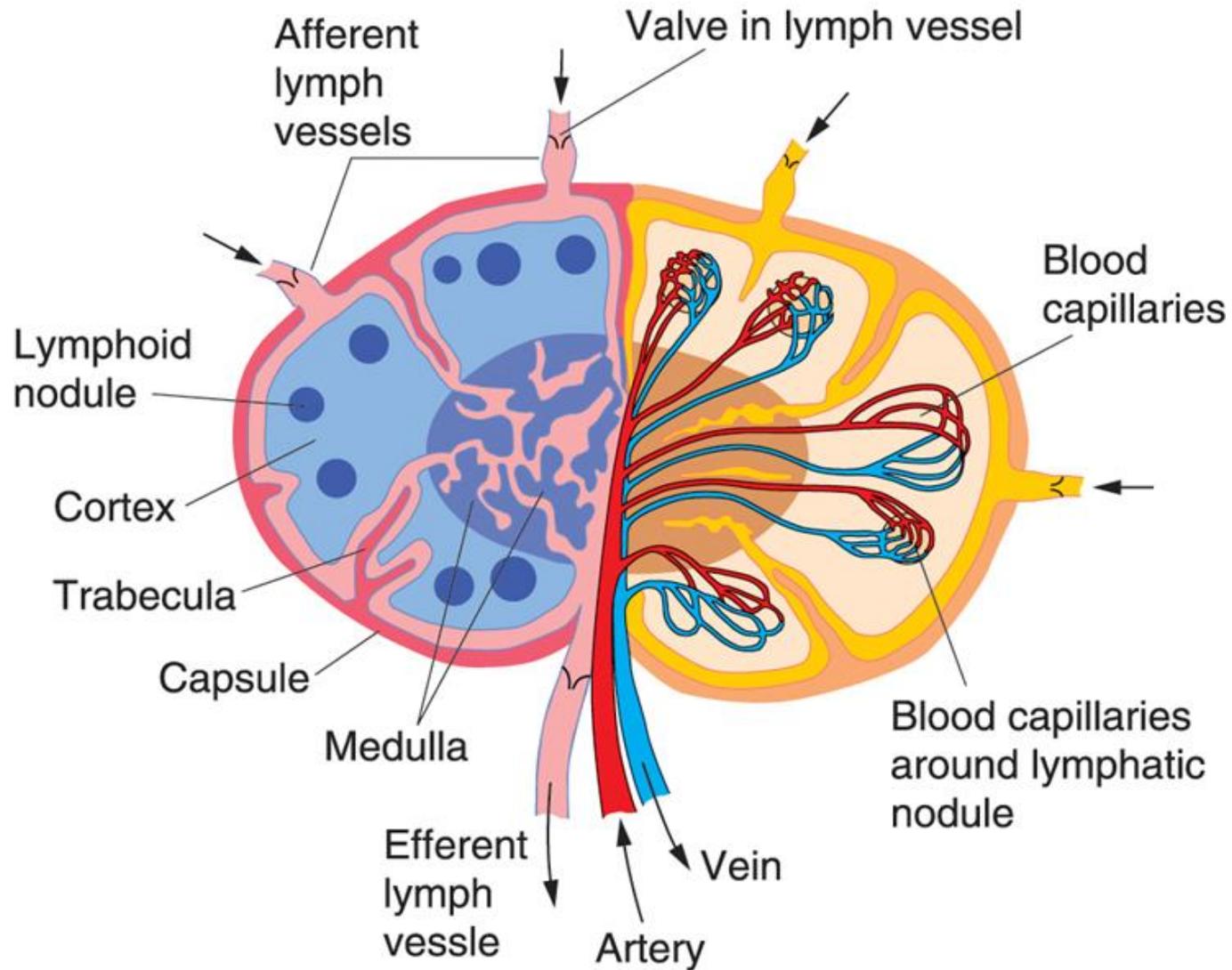
As vênulas pós-capilares nos tecidos normalmente são revestidas por células endoteliais pavimentosas



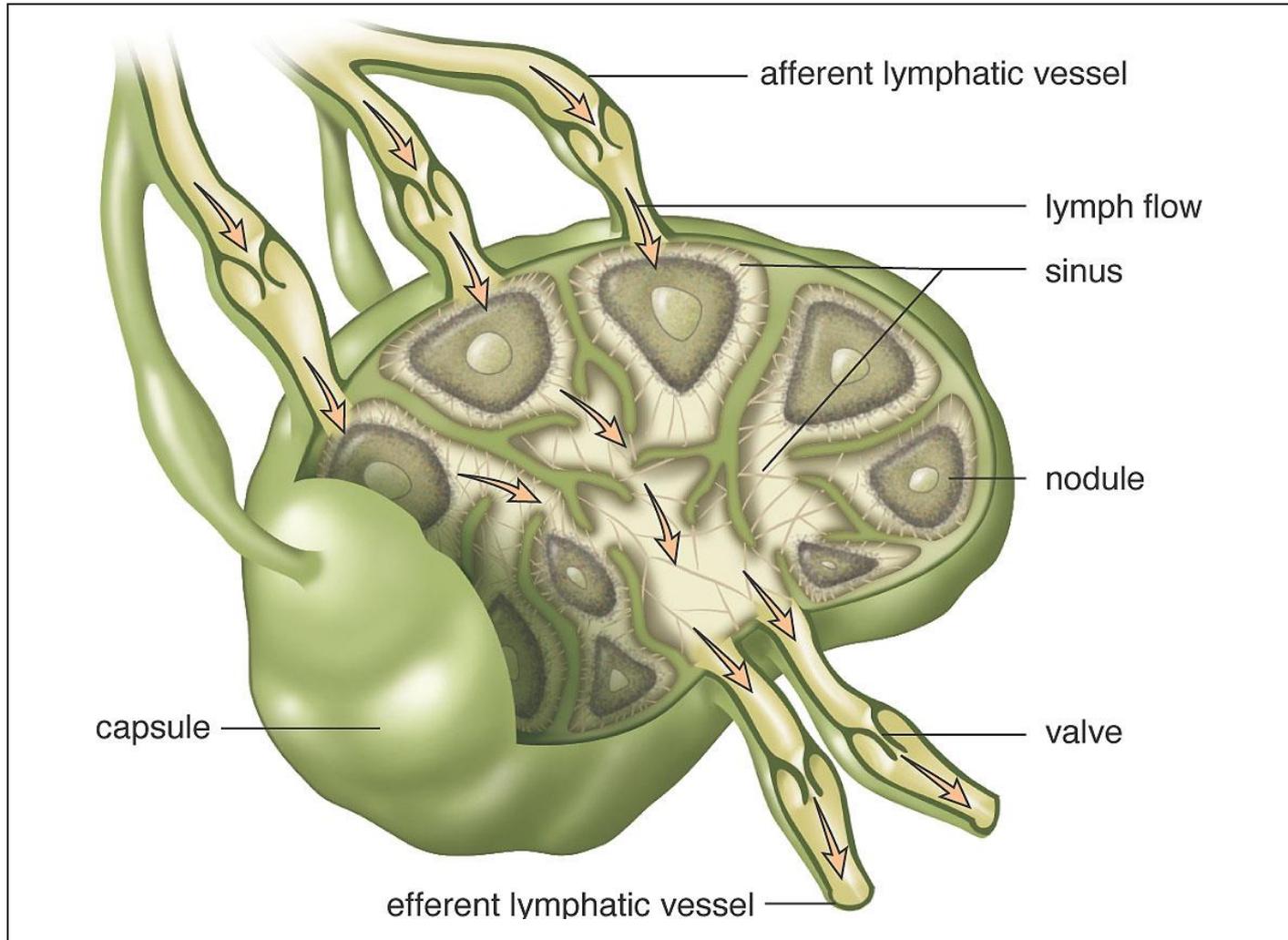
As vênulas pós-capilares no tecido linfóide são revestidas por epitélio cúbico simples (HIGH ENDOTHELIAL VENULES)



Linfonodo

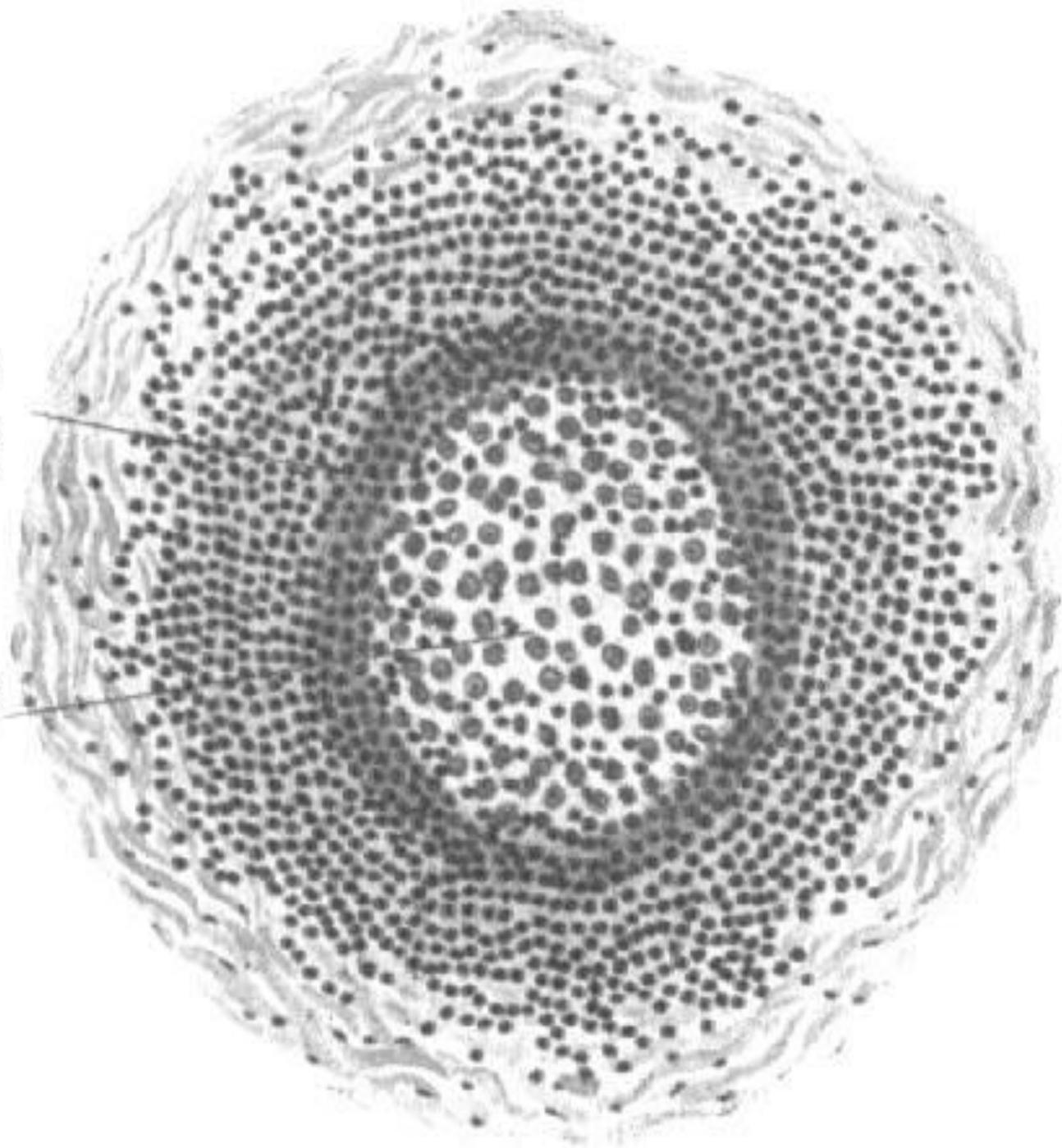


Linfonodo

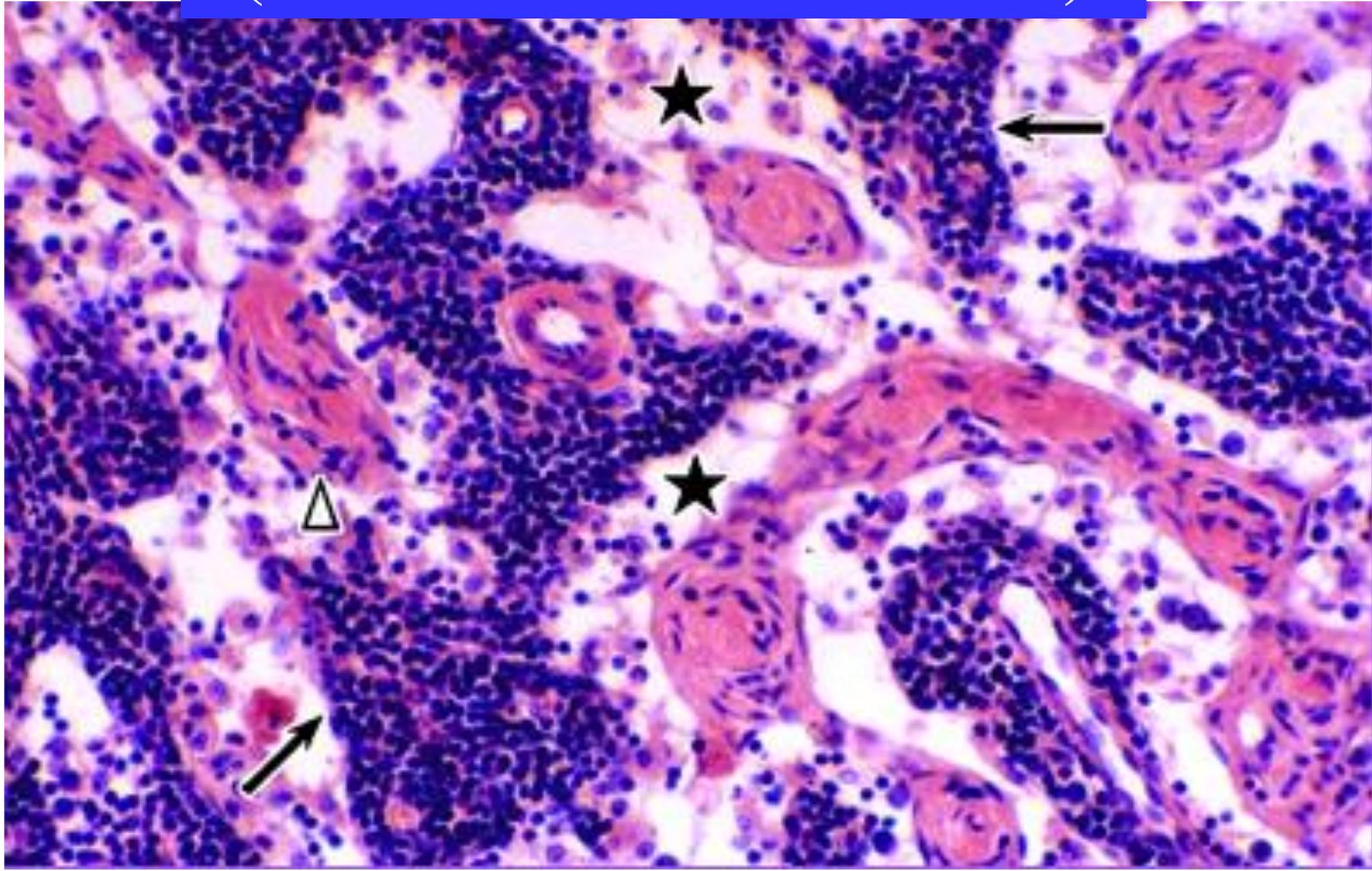


Região periférica
(Predomínio de linfócitos)

Centro germinativo
(Predomínio de linfoblastos)

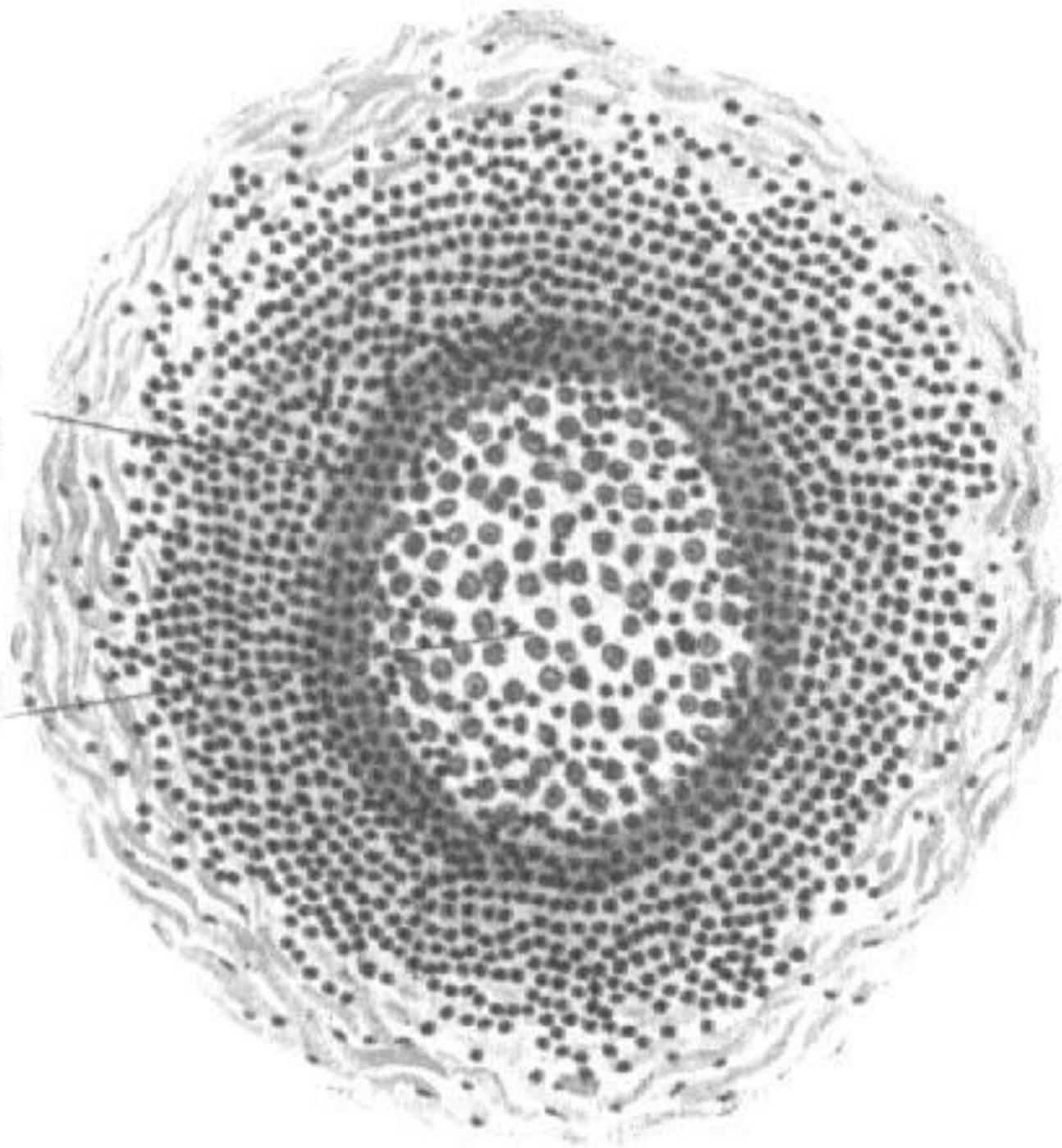


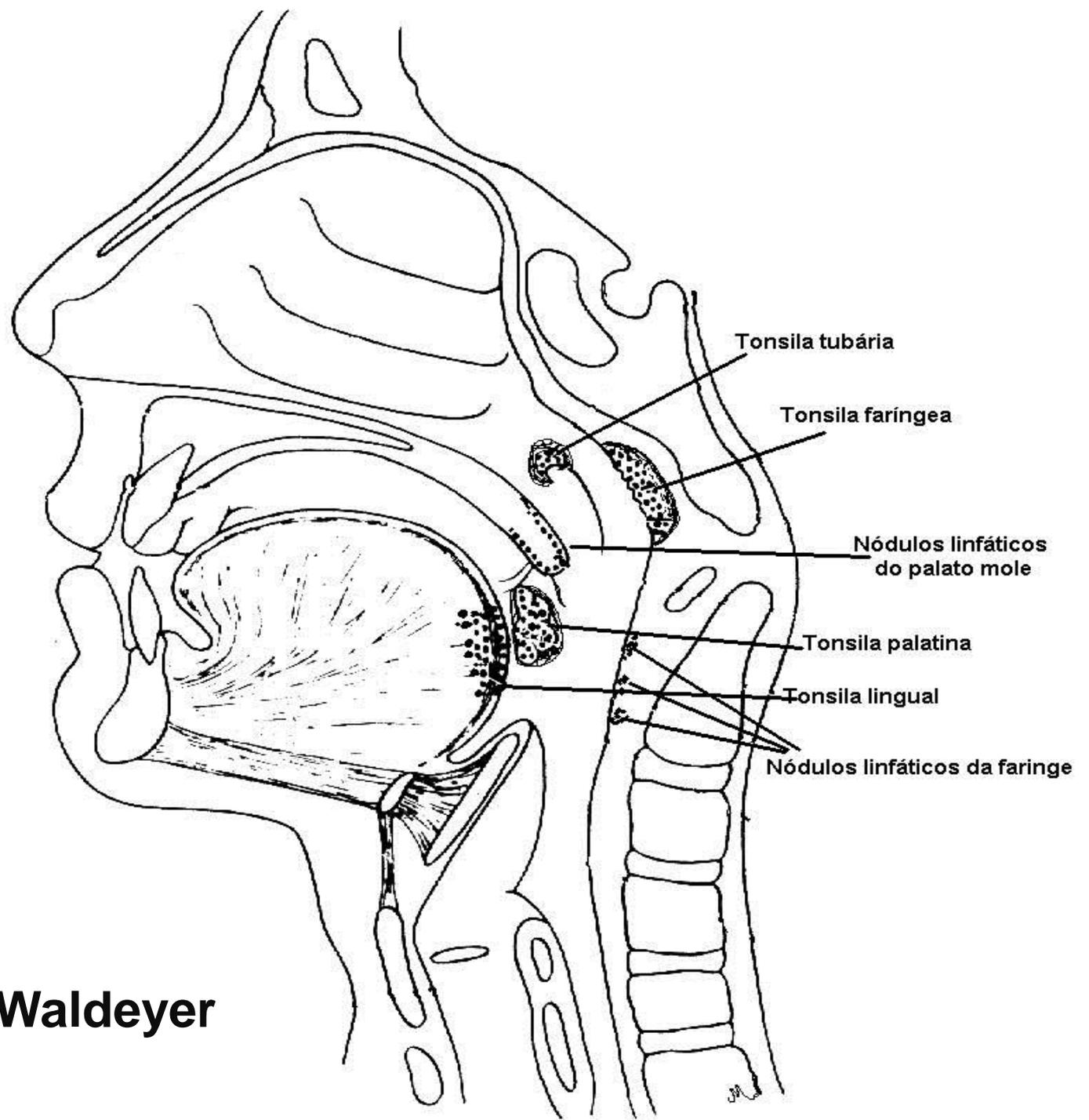
Região medular do linfonodo (cordões e seios medulares)



Região periférica
(Predomínio de linfócitos)

Centro germinativo
(Predomínio de linfoblastos)



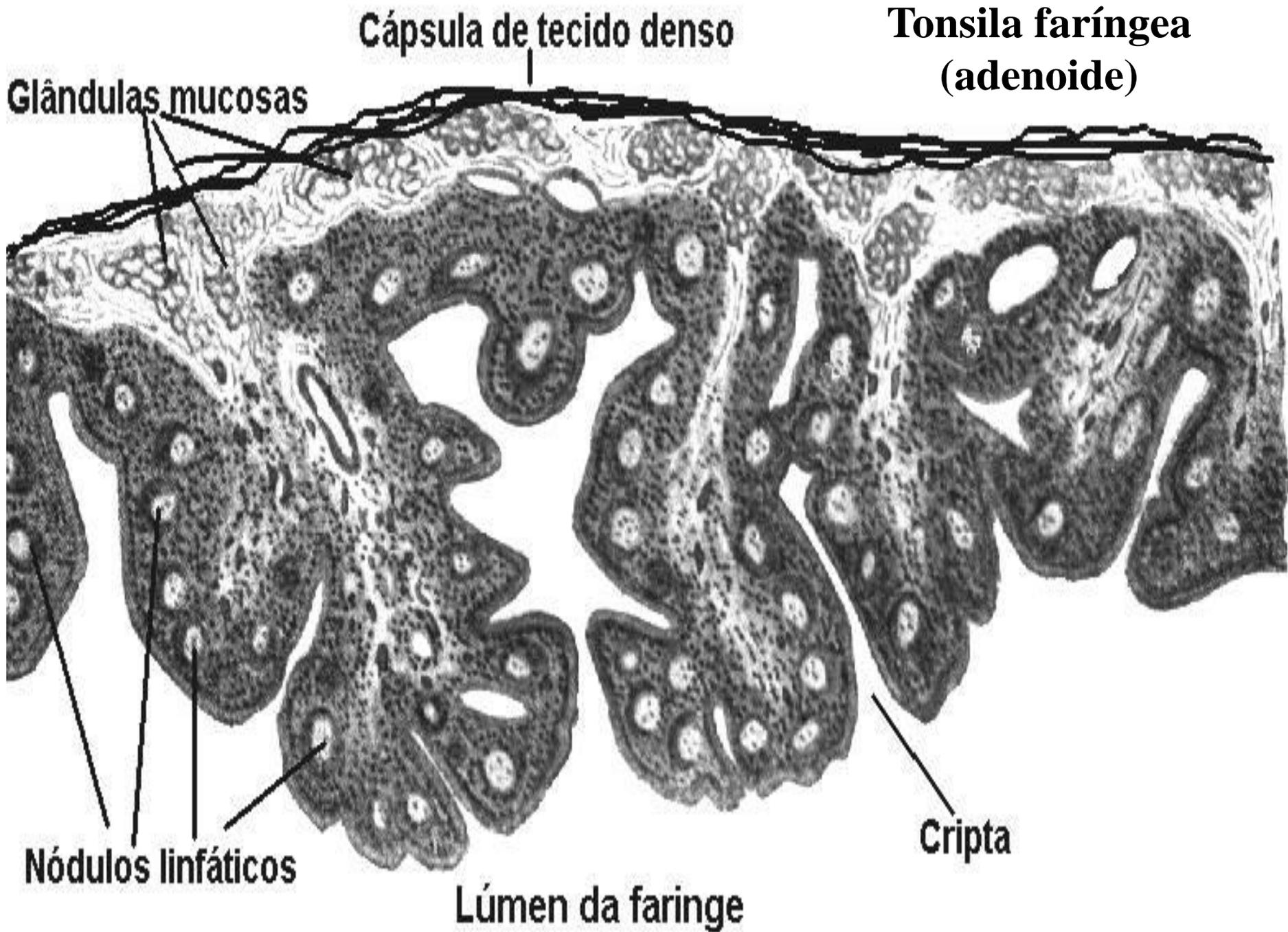


Anel de Waldeyer

Tonsilas (agregado de nódulos linfáticos)

- Tonsila faríngea (adenoide)
- Tonsilas palatinas (amígdala)
- Tonsilas linguais





Cápsula de tecido denso

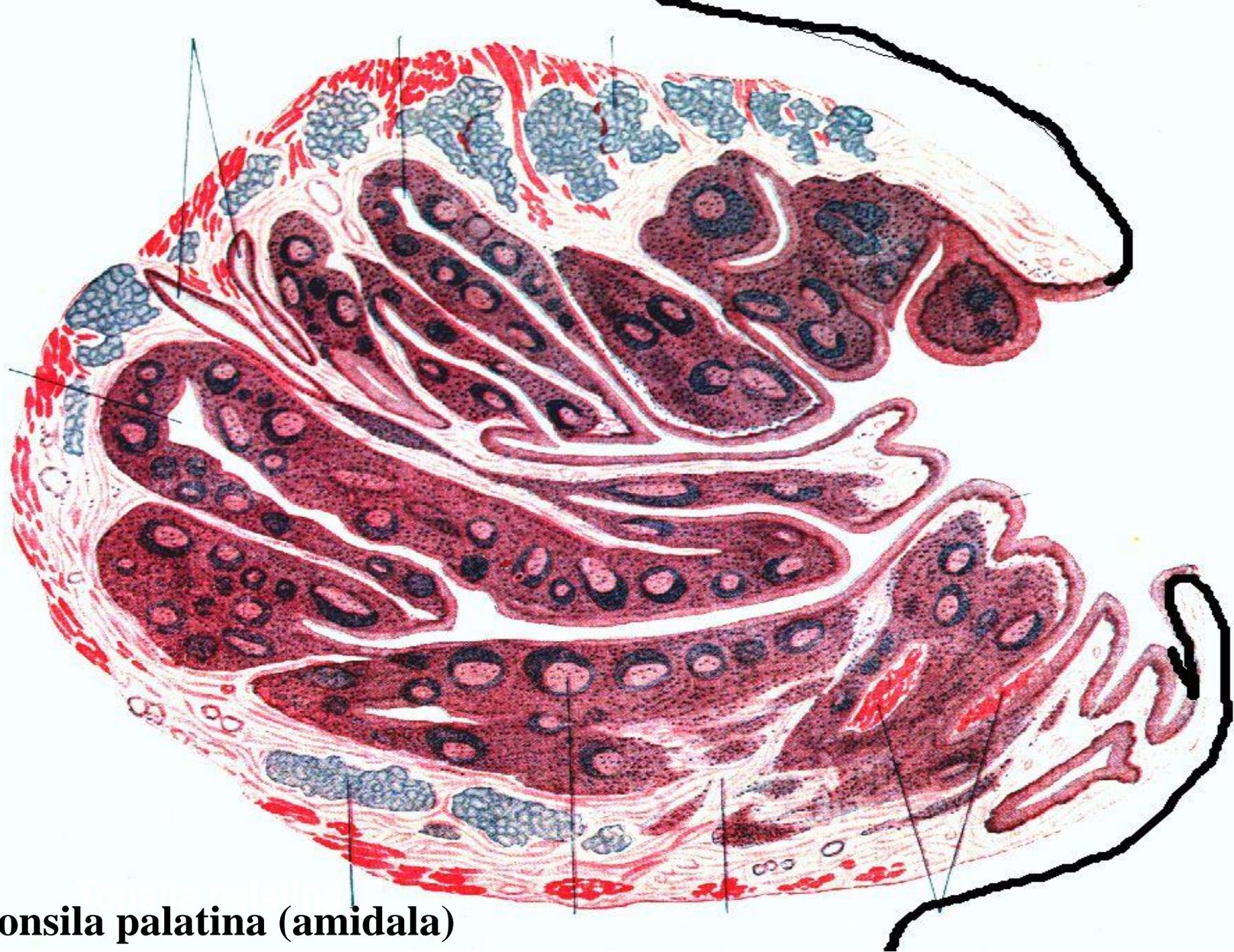
**Tonsila faríngea
(adenoide)**

Glândulas mucosas

Cripta

Nódulos linfáticos

Lúmen da faringe



Tonsila palatina (amandala)



Amigdalite



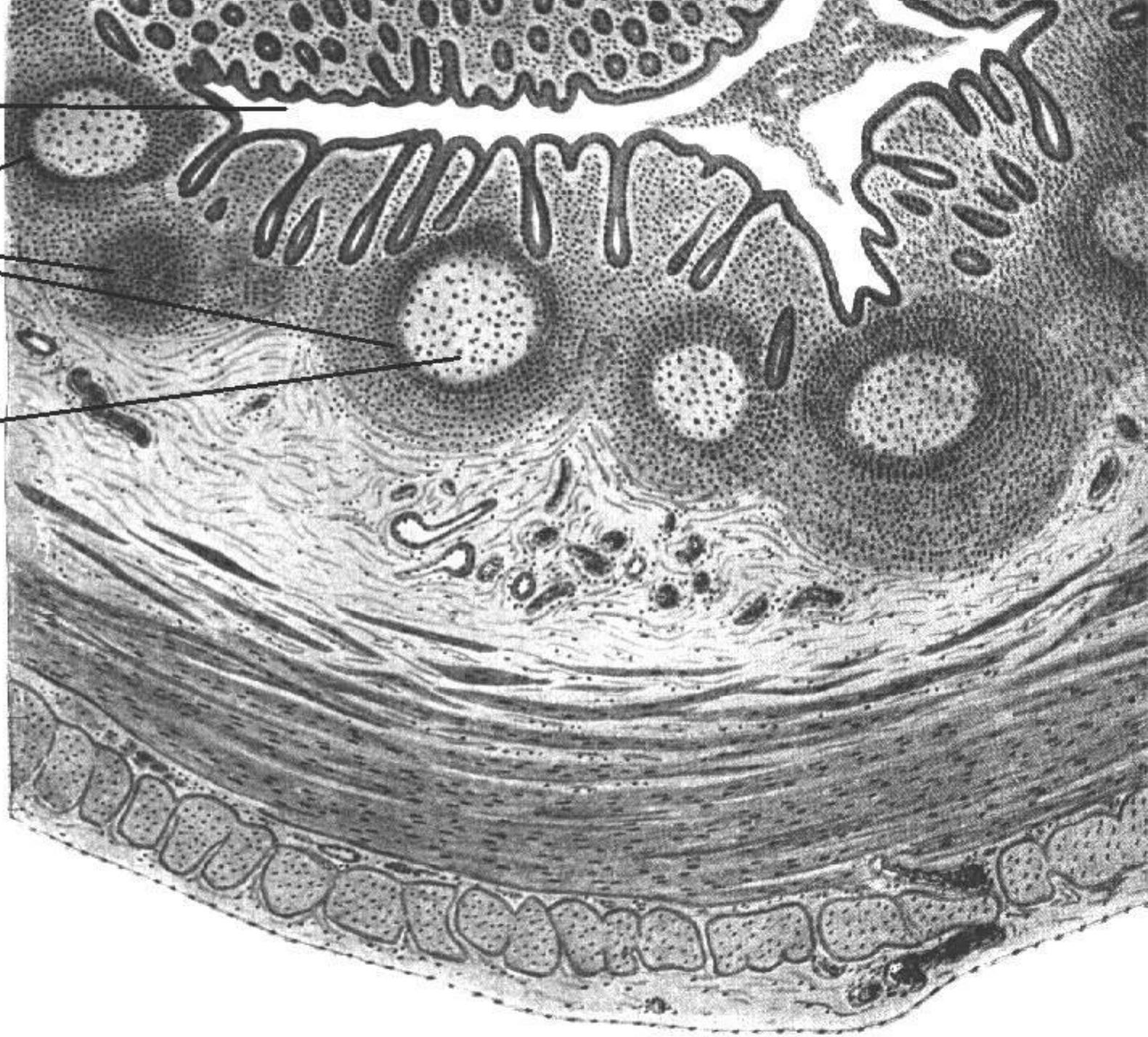
Tonsila lingual

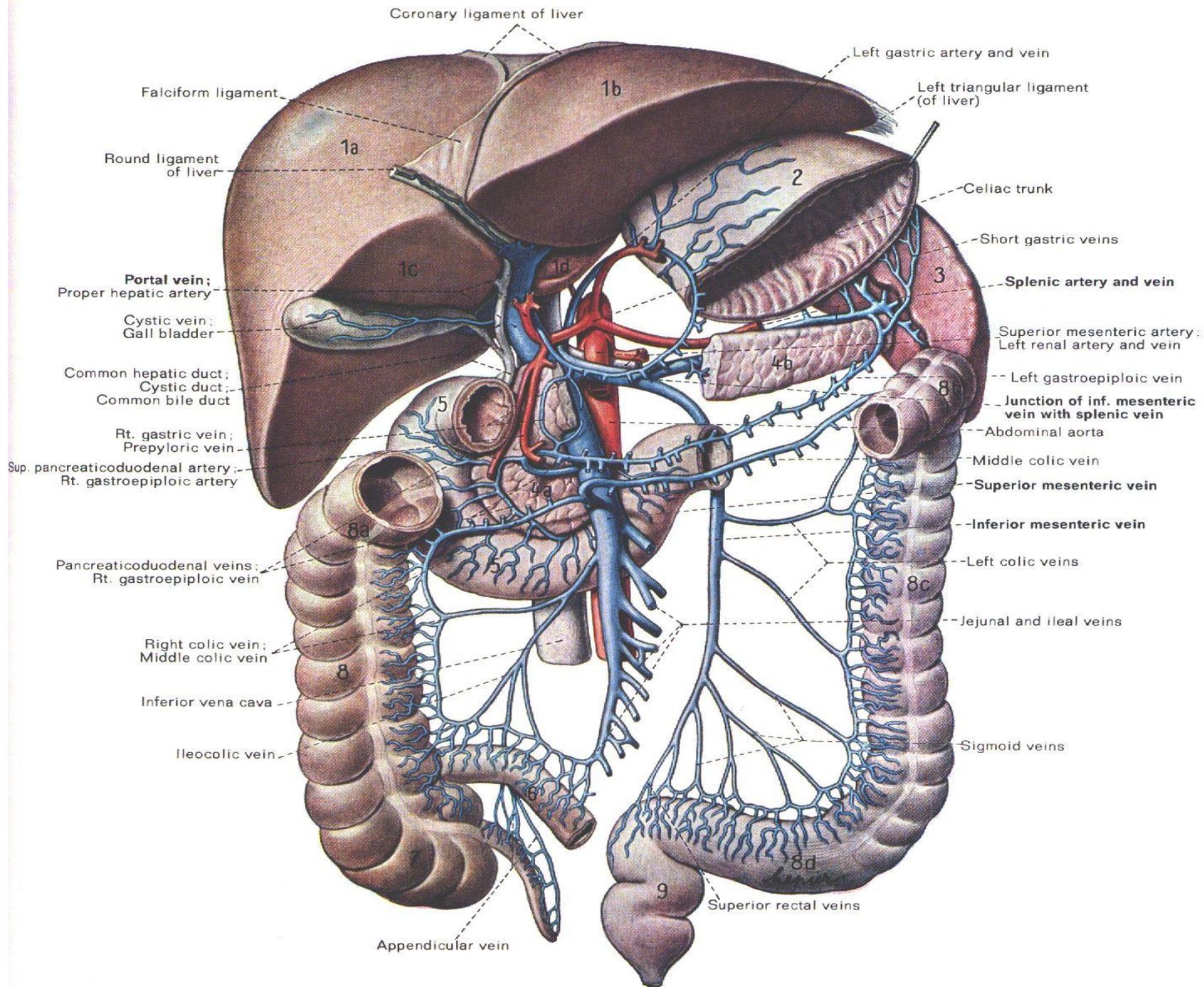


Lúmen do apêndice

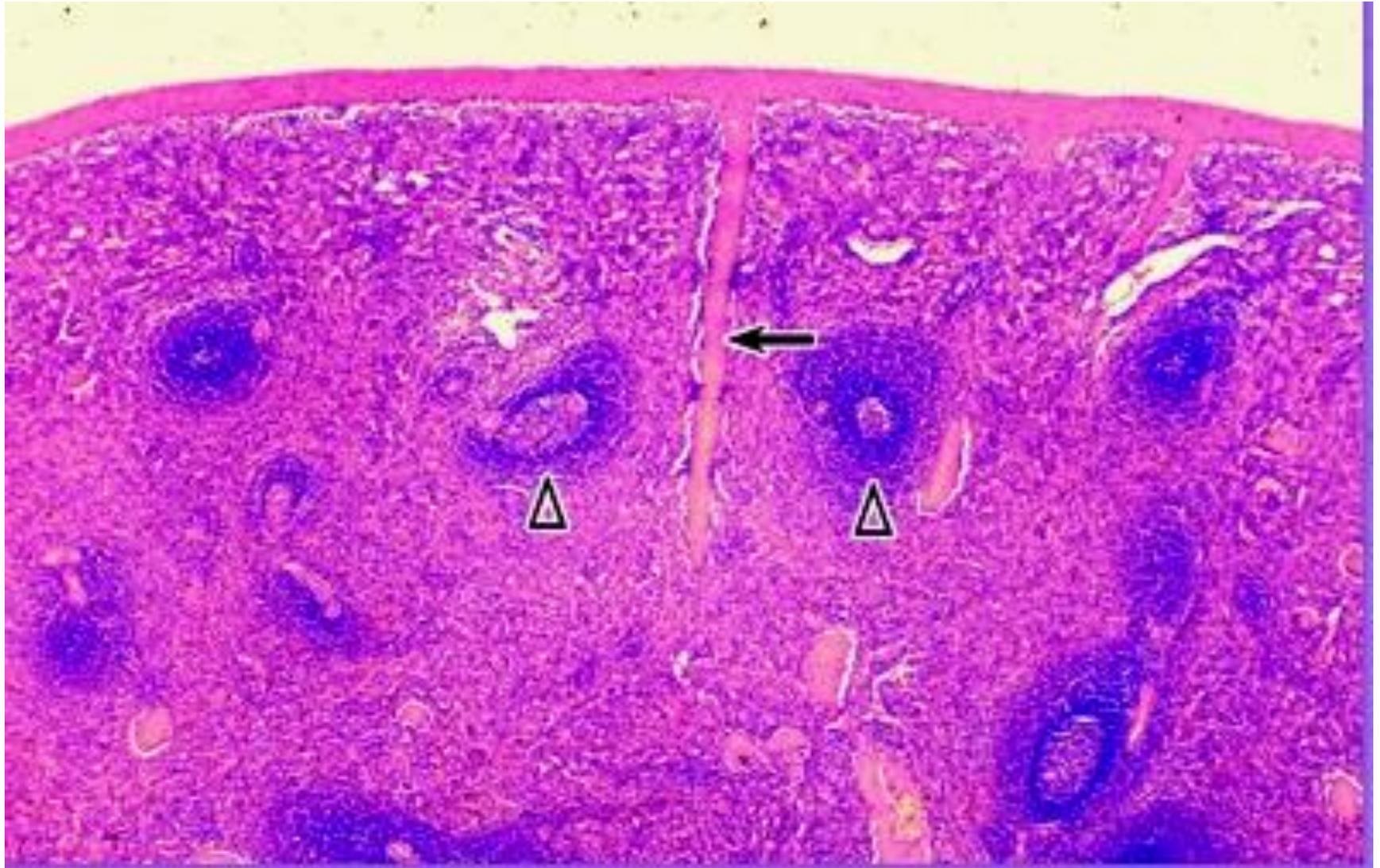
Nódulos linfáticos

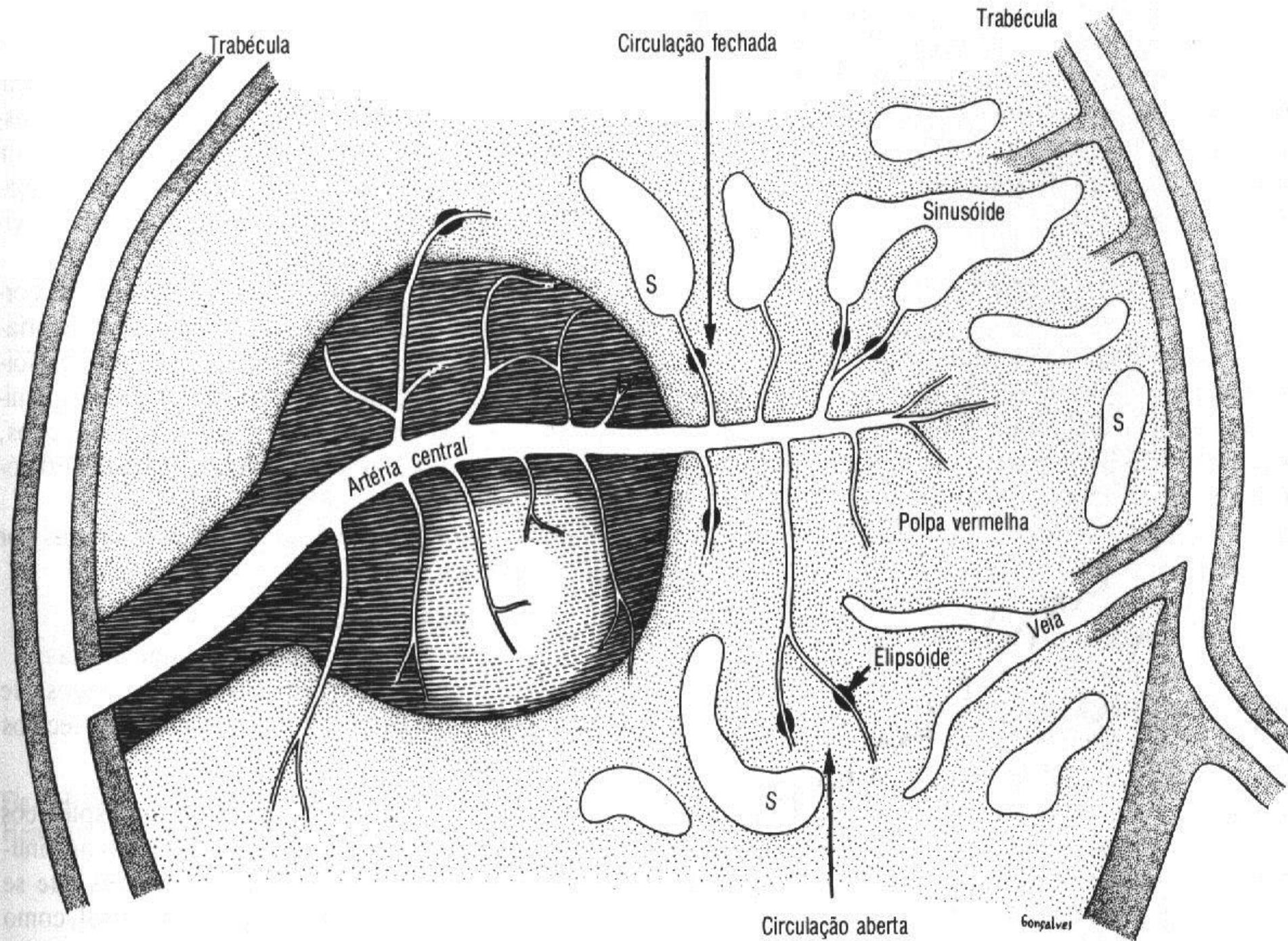
Centro germinativo





Baço





Artérias centro-nodulares

Veia trabecular

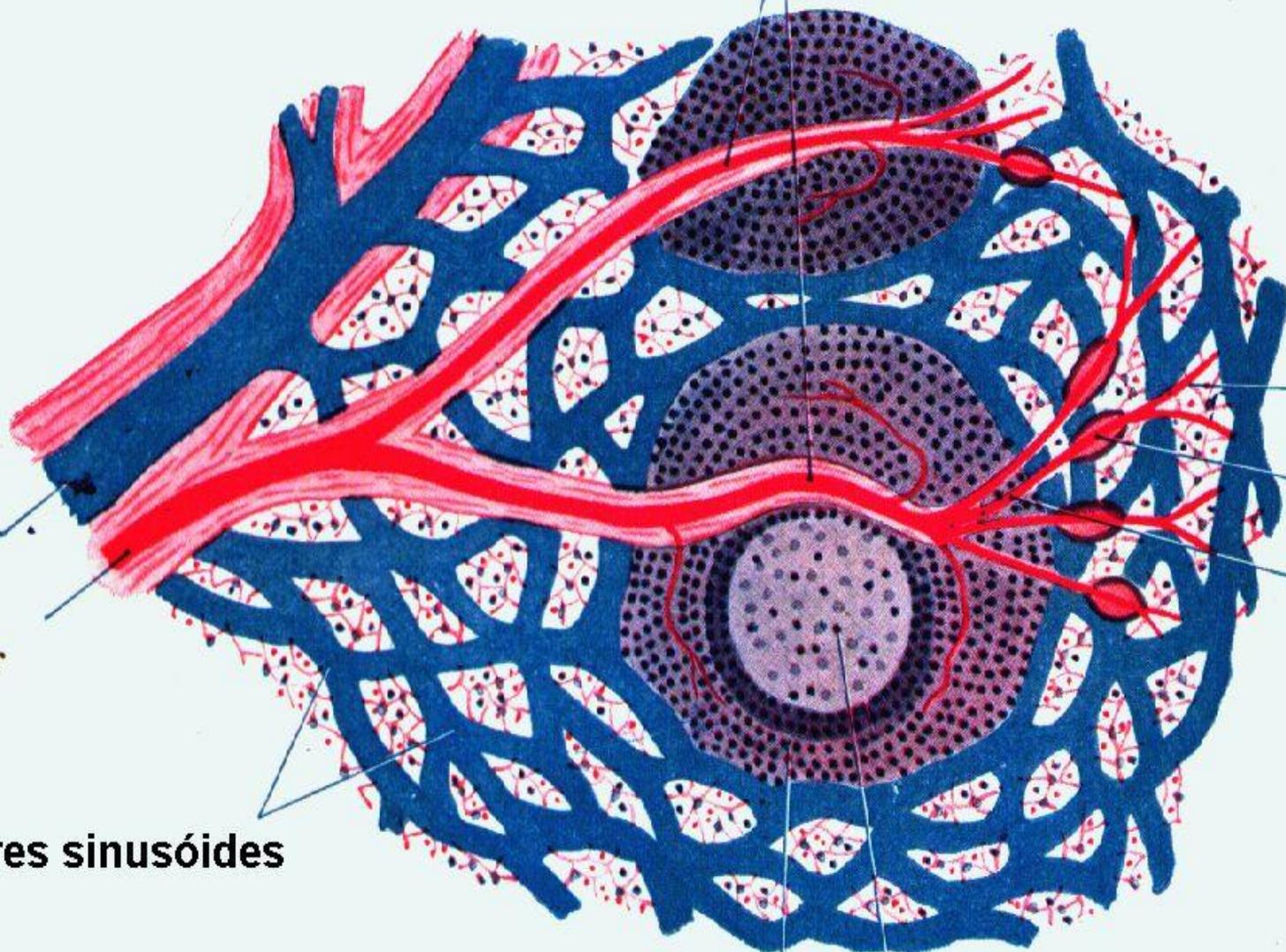
Arteria trabecular

Capilares sinusóides

Corpúsculo de Malpighi

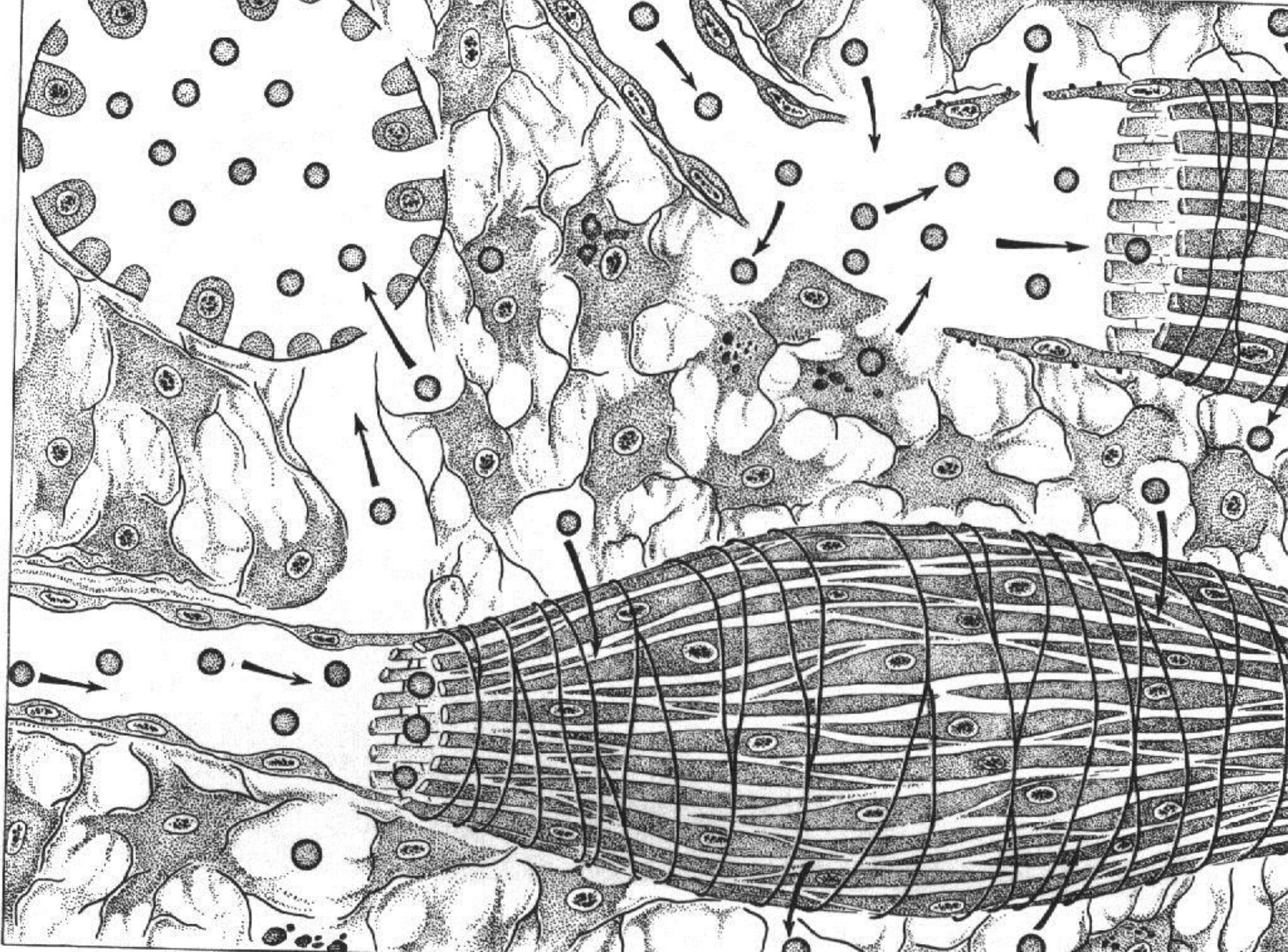
Centro germinativo

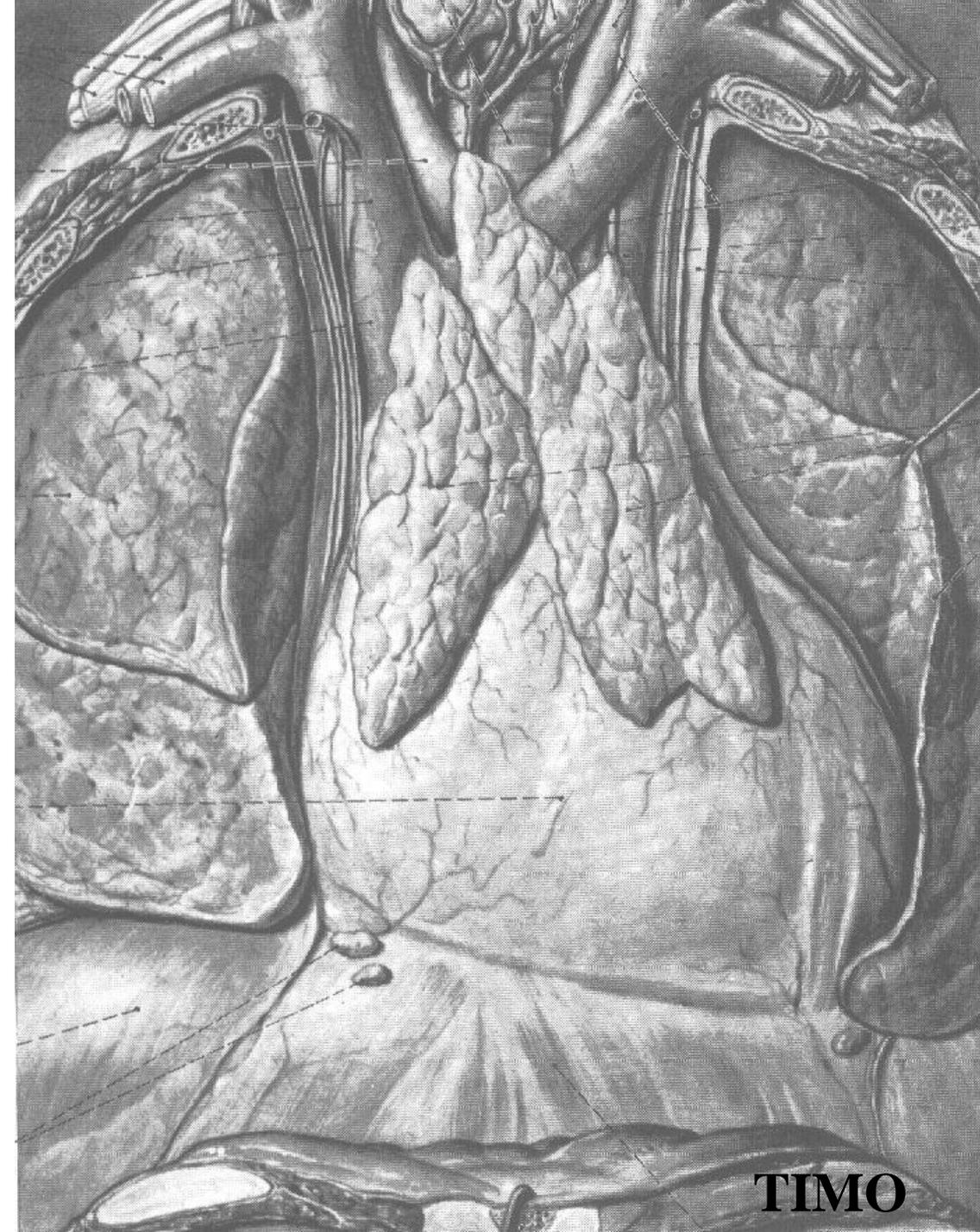
Capilar arterial
**Arteria envai-
nada**
**Arteria
en pincel**



Funções do baço

- **Filtração do sangue ;**
- **Armazenamento do sangue;**
- **Defesa imunológica e formação de linfócitos ;**
- **Hemocaterese;**
- **Armazenamento de ferro e produção de bilirrubina.**





TIMO



Grécia



Thimus spp

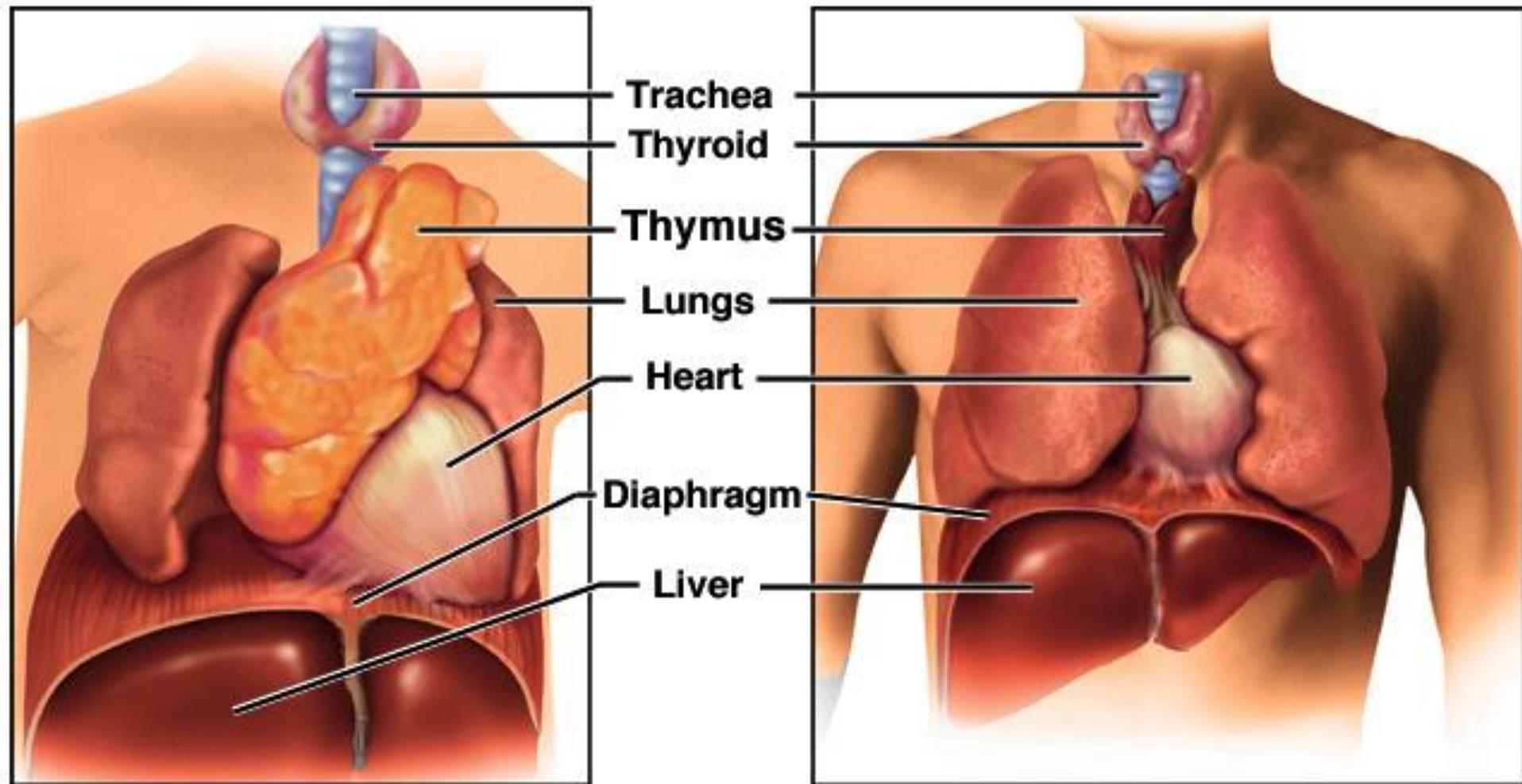
Transplante

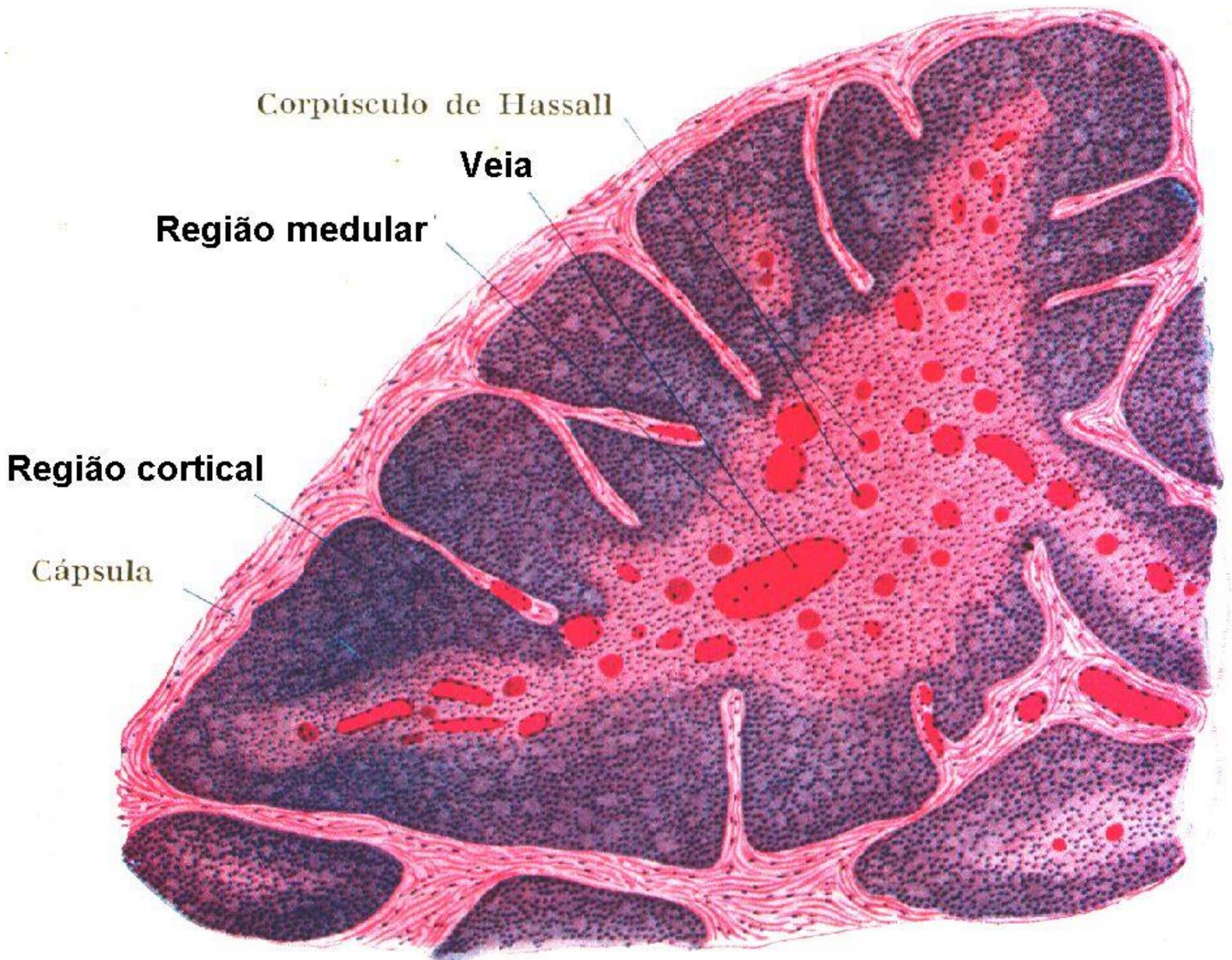


Thymus

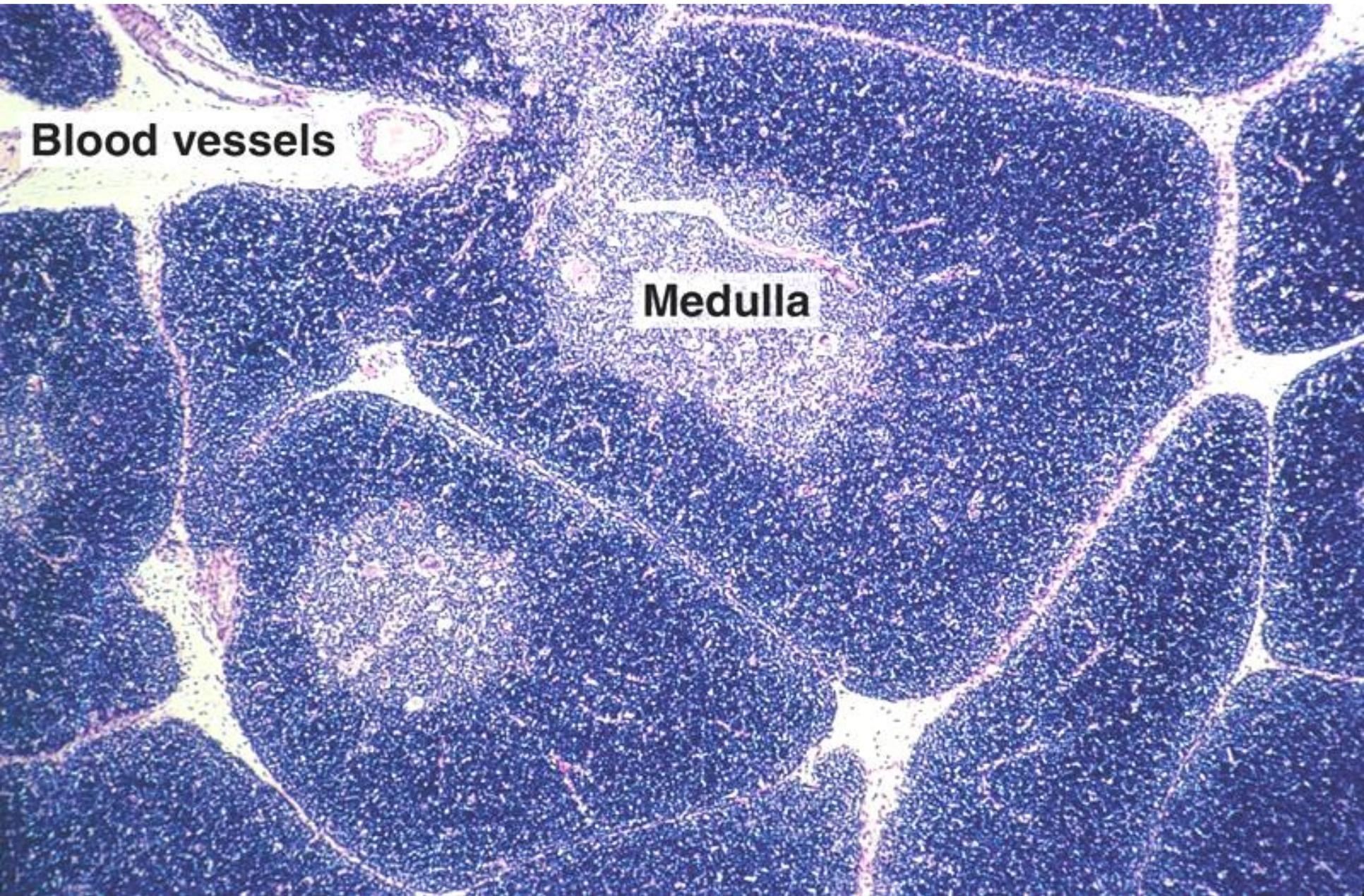
Newborn

Adult





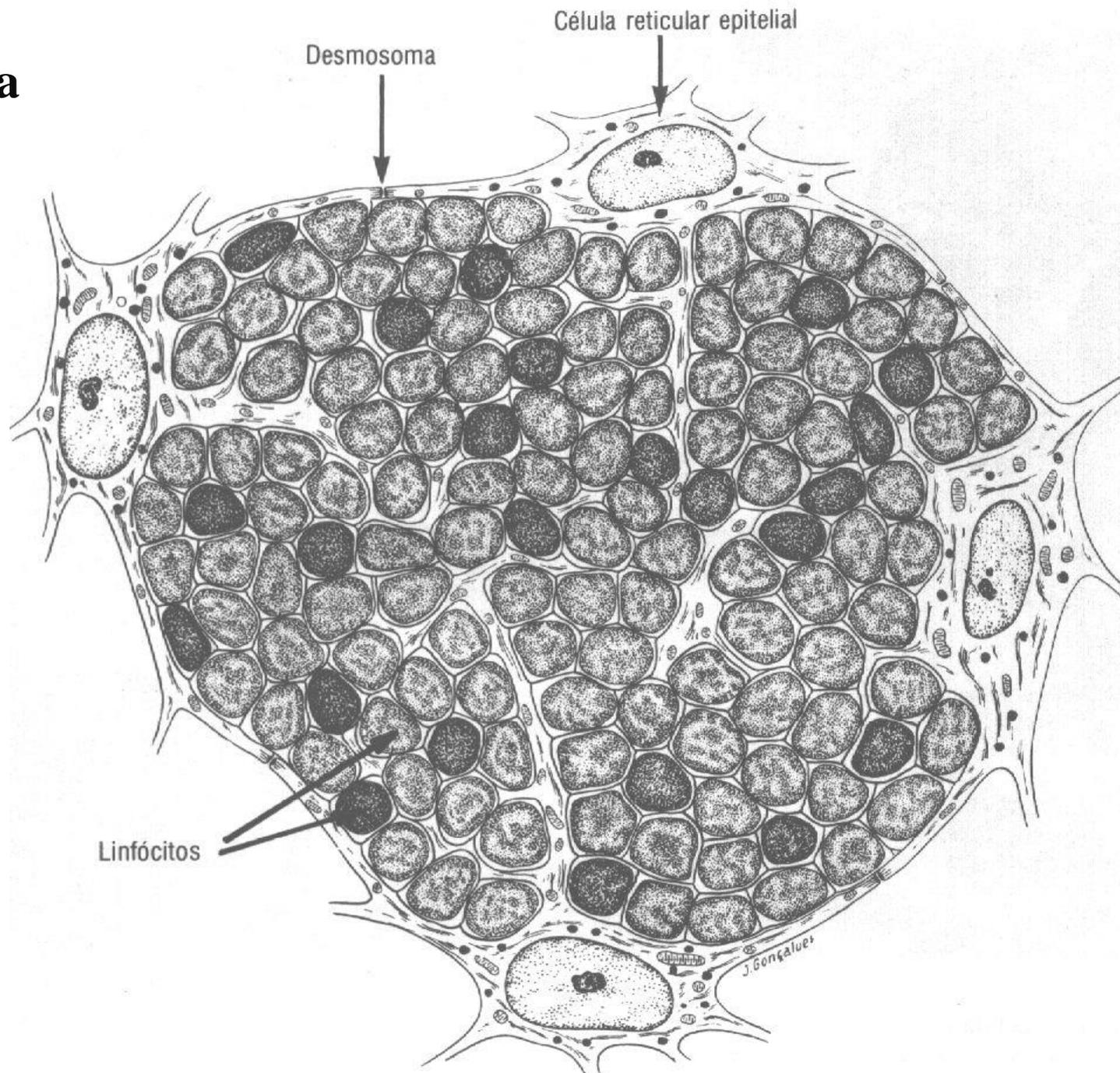
Timo



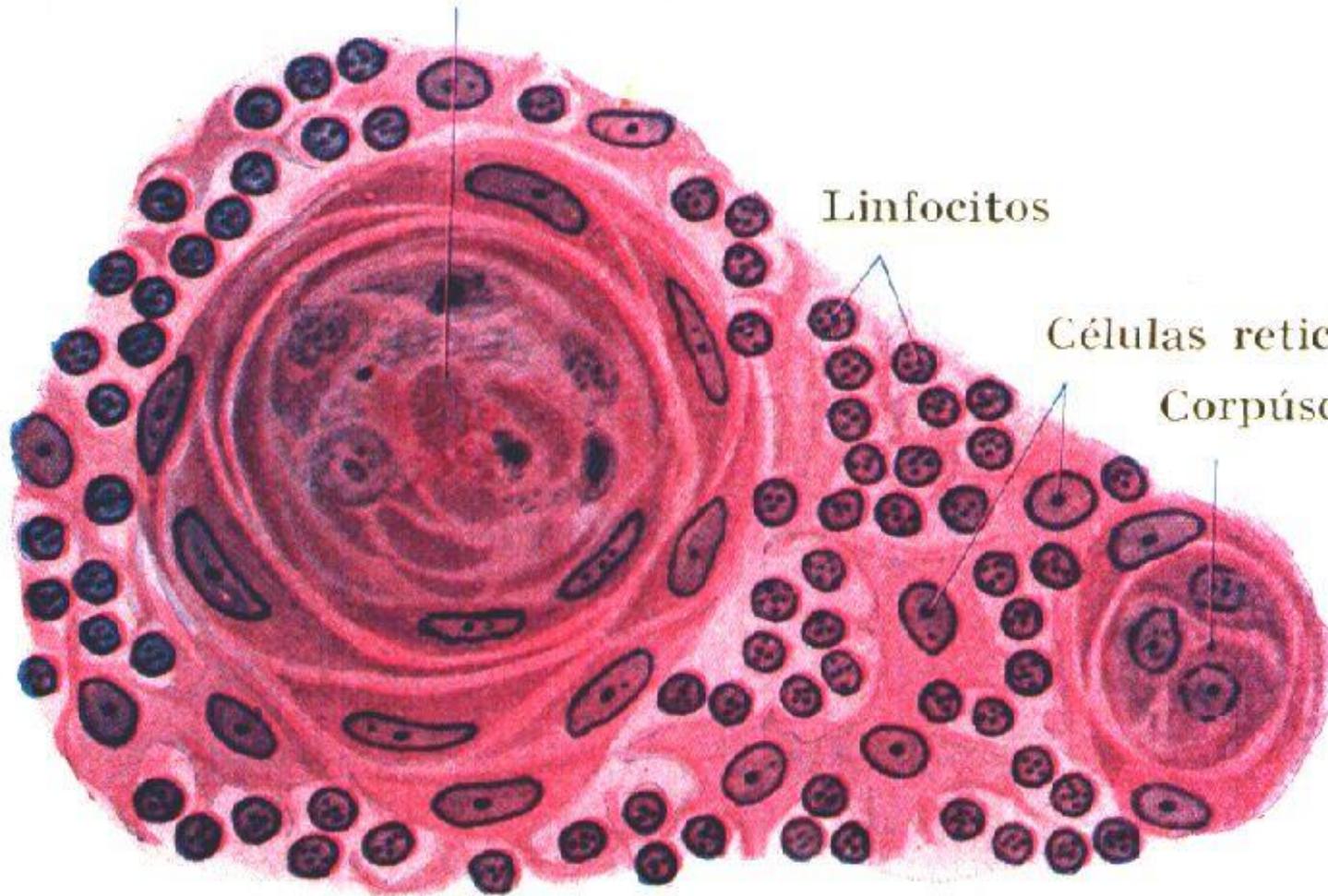
Blood vessels

Medulla

Estroma



Corpúsculo de Hassall



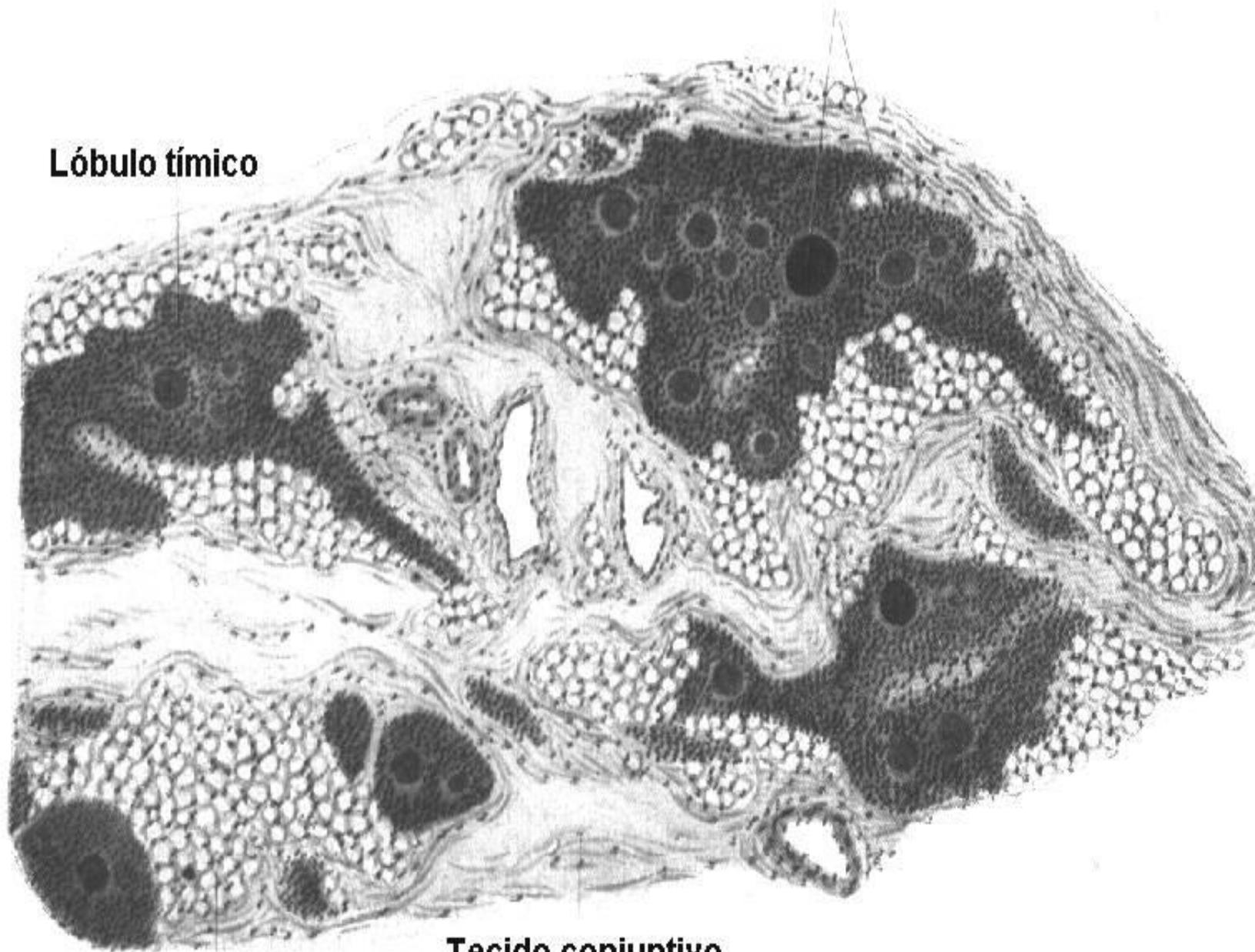
Linfocitos

Células reticulares

Corpúsculo de Hassall

Corpúsculo de Hassall

Lóbulo tímico



Tecido adiposo

Tecido conjuntivo