Immune System

刘佳梅

Compose:

lymphoid organ

lymphoid tissue

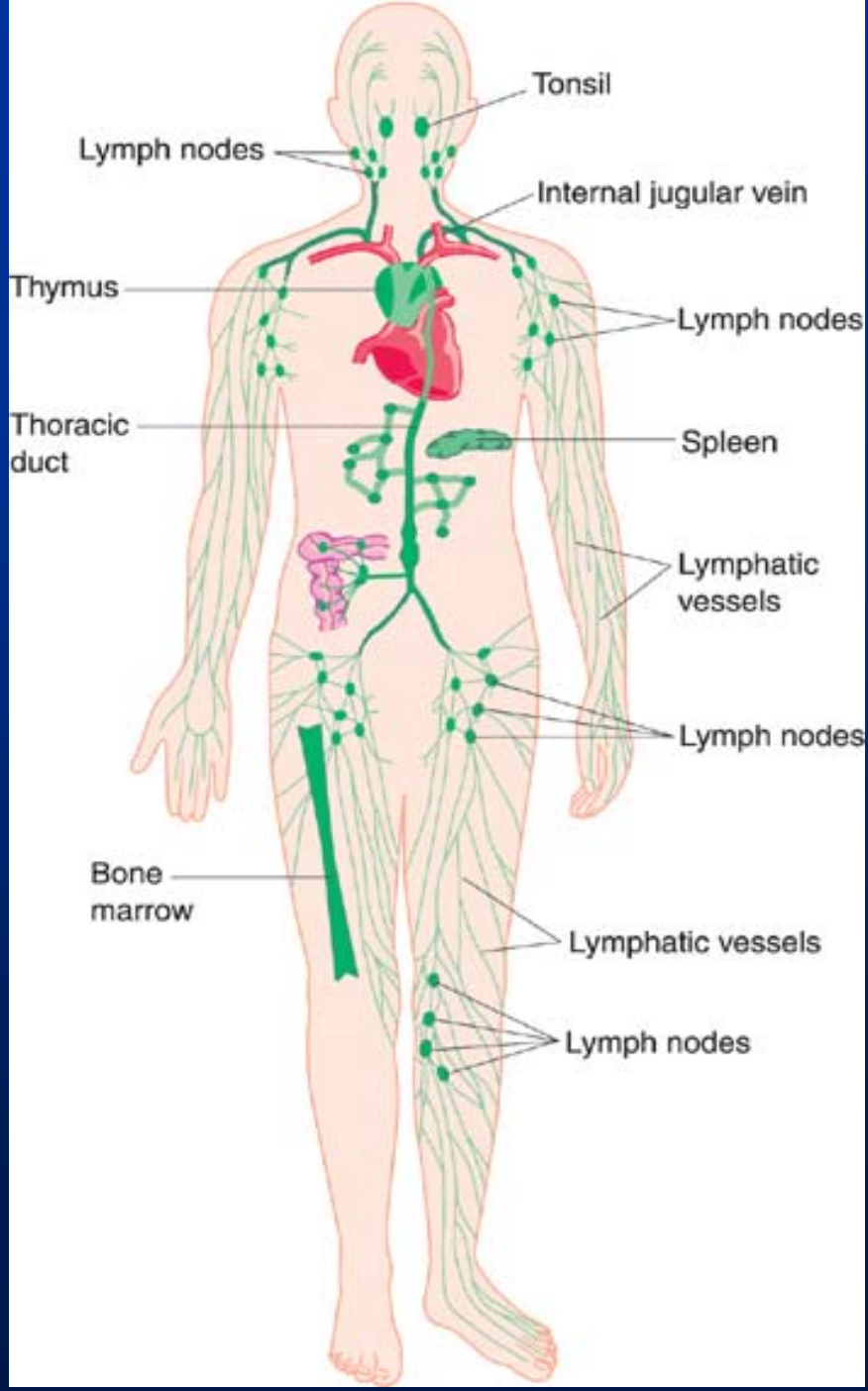
Immune cells

function:

Immunologic defense

Immunologic homeostasis

Immunologic surveillance



I Immune cells

1. lymphocyte

(1)thymus dependent lymphocyte, T cell

①cytotoxic cell, Tc cell

②helper cell, Th cell

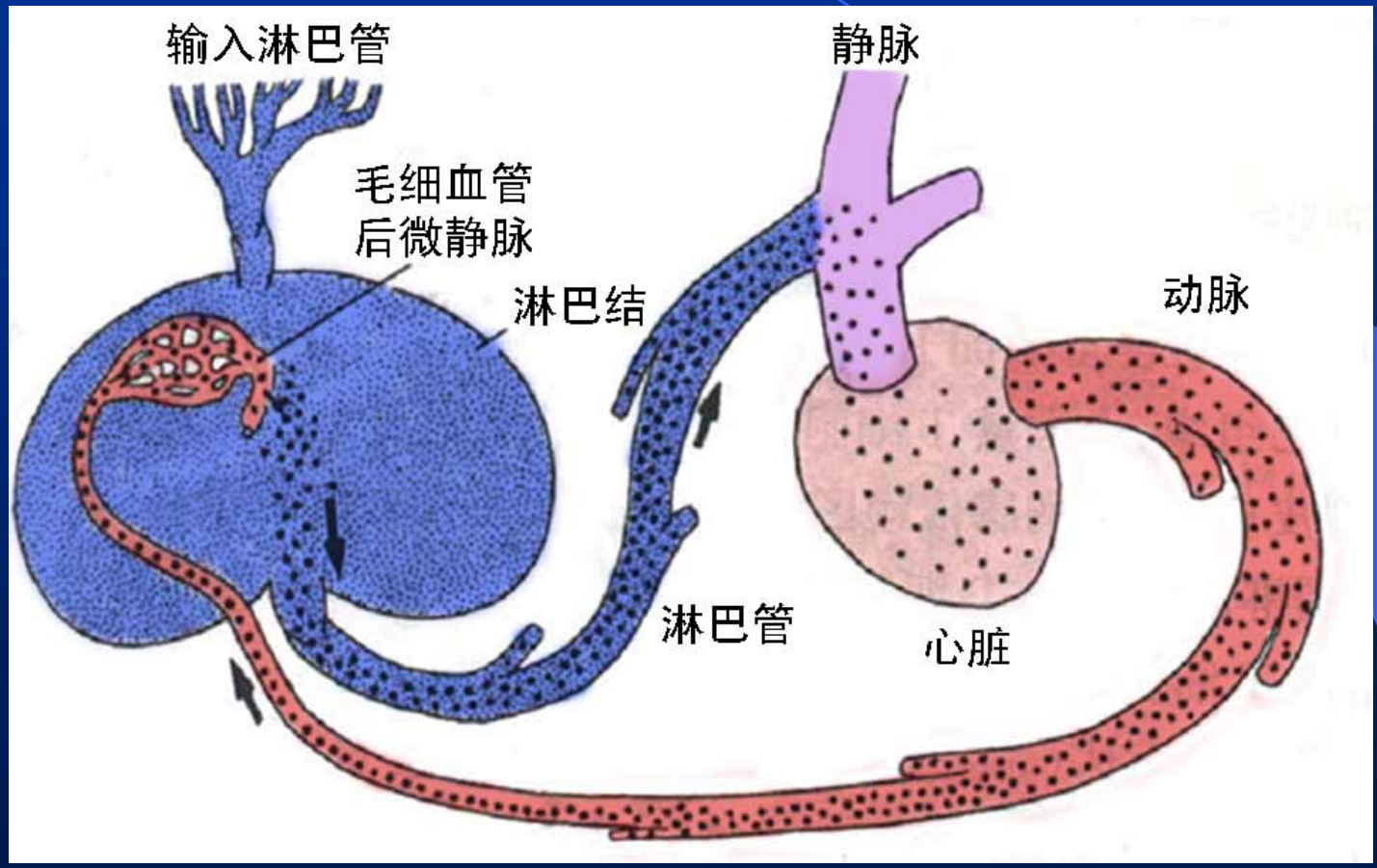
③suppressor cell, Ts cell

(2) bone marrow dependent lymphocyte, B cell

(3) natural killer cell, NK cell

Cellular immunity Humoral immunity

recirculation of lymphocyte



2 . mononuclear phagocyte system, MPS

3. antigen presenting cell, APC

① macrophage

② 树突状细胞(dendritic cell, DC)

郎格汉斯细胞(langerhans cell)

交错突细胞(interdigitating cell)

面纱细胞(veiled cell)

II lymphoid tissue

1. diffuse lymphoid tissue

T cell

2. lymphoid nodule

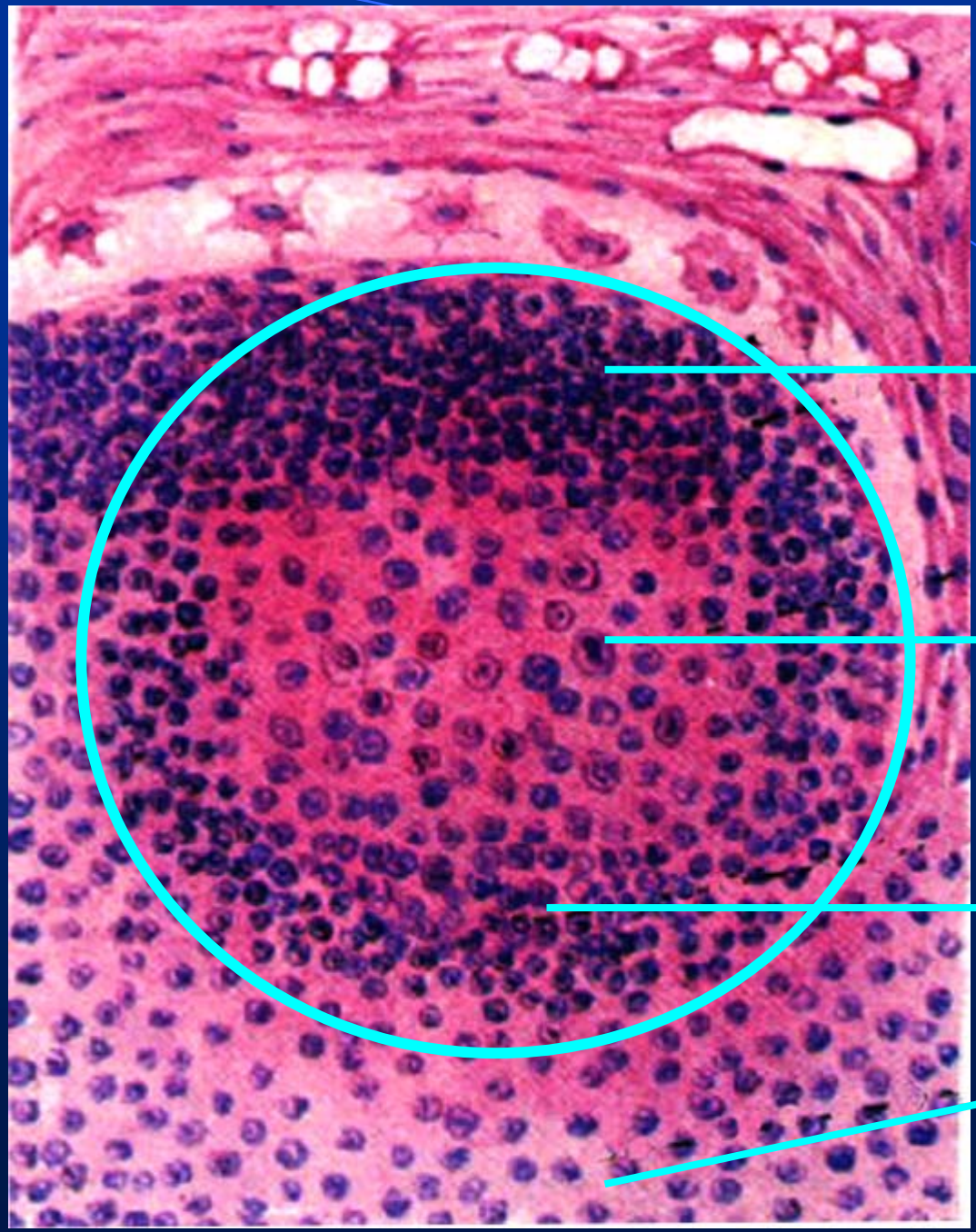
B cell

primary lymphoid nodule

secondary lymphoid nodule

germinal center (light zone, dark zone, and cap)

lymphoid nodule



III lymphoid organ

central lymphoid organ

thymus ,bone marrow

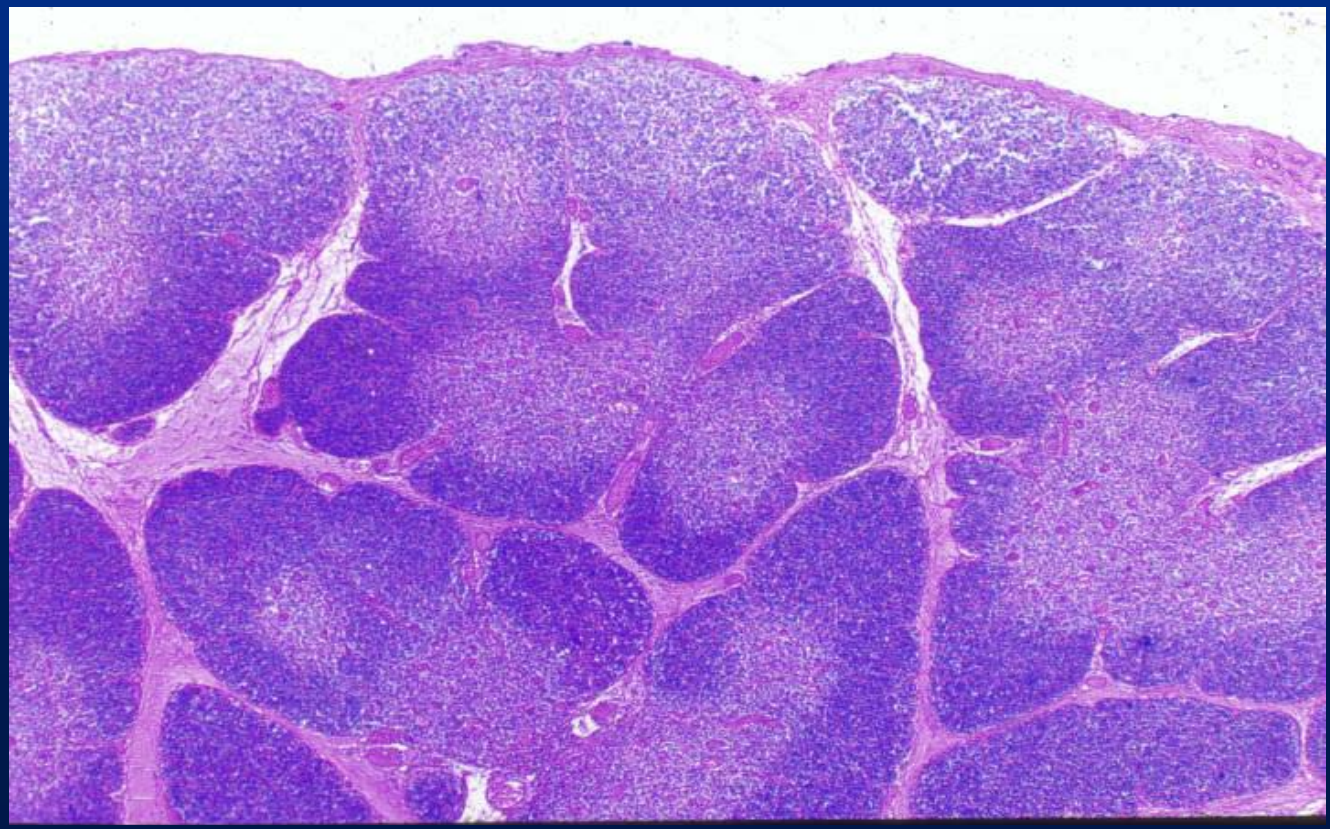
peripheral lymphoid organ

lymph node , spleen and tonsil

1. thymus

1.1 structure of thymus

capsule, interlobular septum, thymic lobule



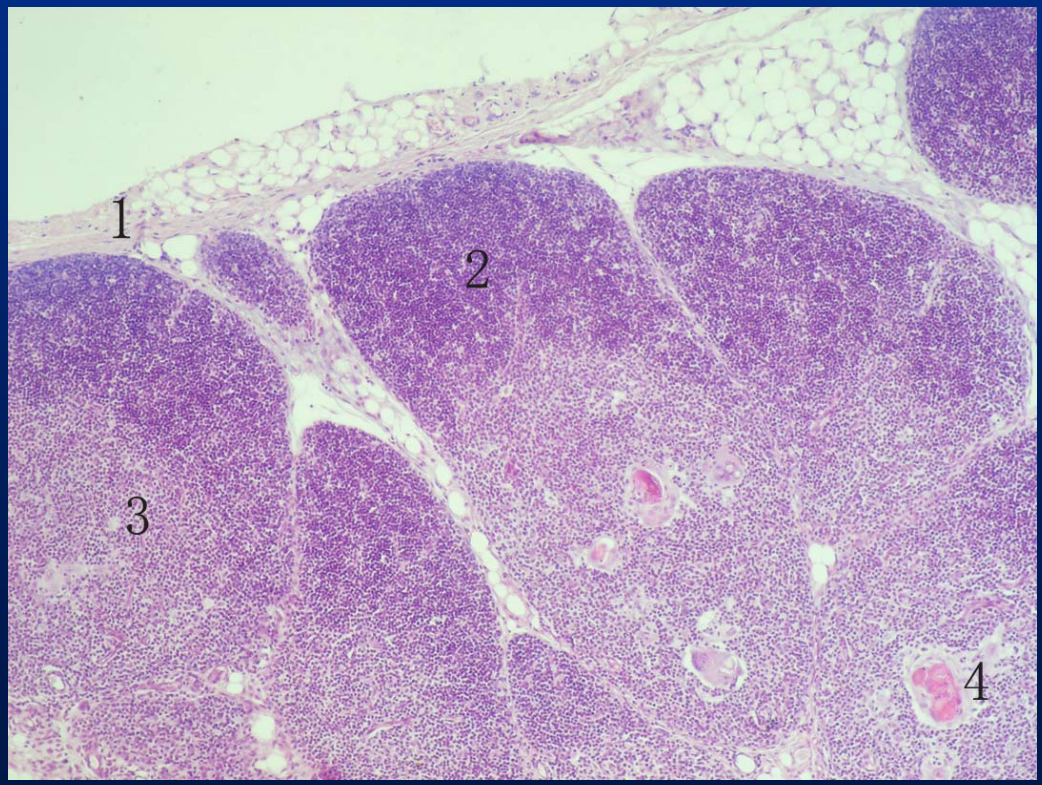
(1) cortex

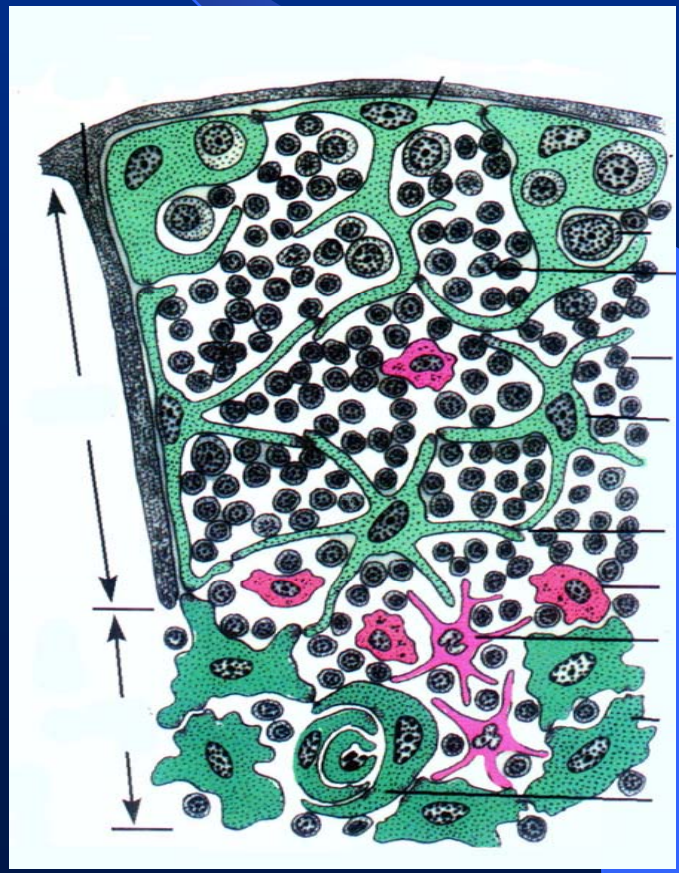
thymocyte

thymus epithelial cell (epithelial reticular cell)

secrete β 2 –microglobulin, thymosin, thymopoietin

nurse cell



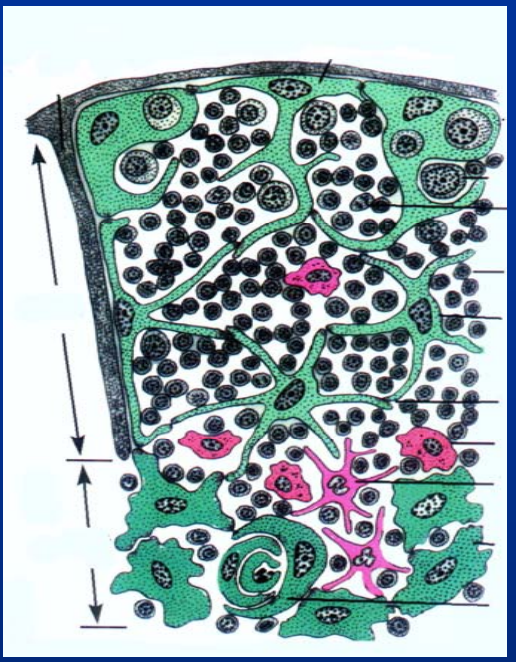


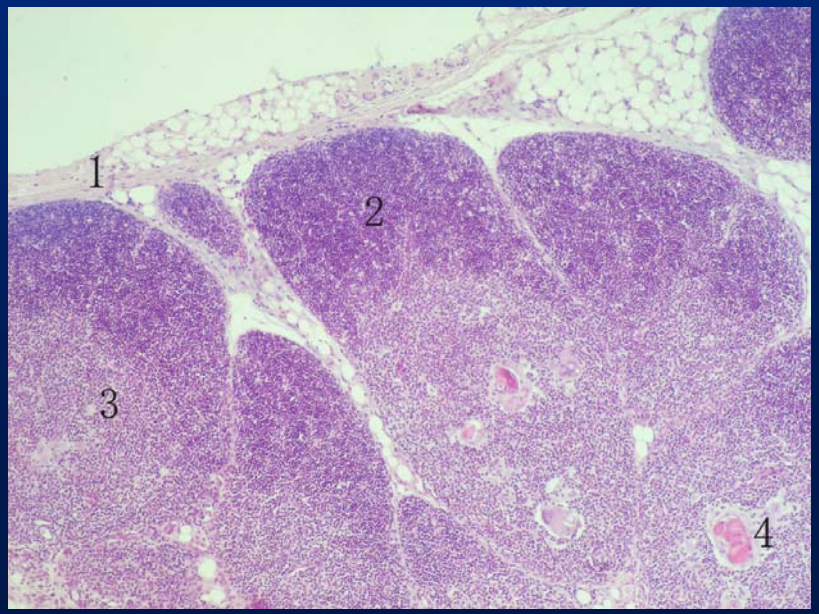
(2) medulla

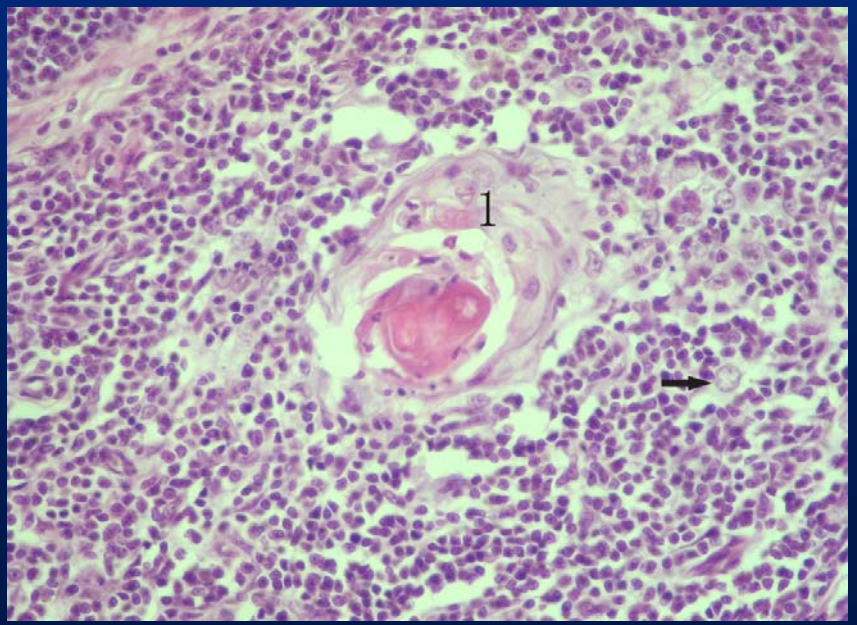
thymic corpuscle

thymocyte

thymus epithelial cell

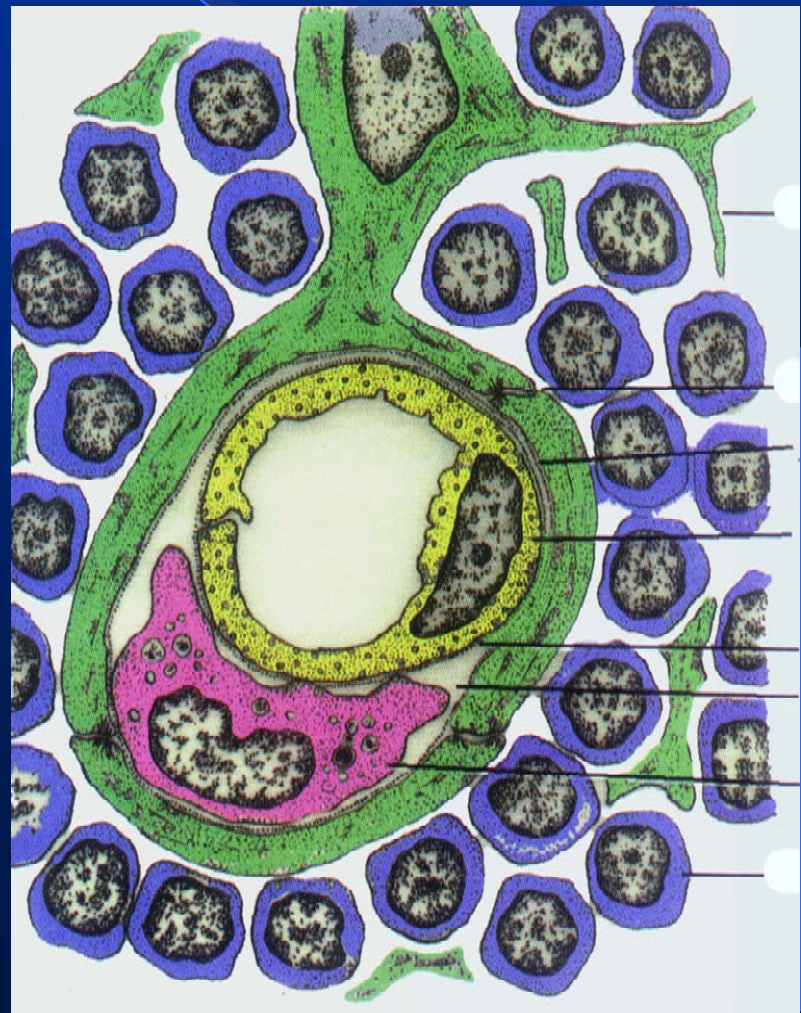






(3) blood –thymus barrier

① endothelium of continuous capillary
② basement membrane around endothelium
③ the space around the blood vessel and macrophages in it
④ the basement membrane of epithelial reticular cells
⑤ the processes of epithelial reticular cells



2. lymphoid node

2.1 the structure of lymphoid node

capsule , trabecula, afferent lymphatic vessels, efferent lymphatic vessels, hilus

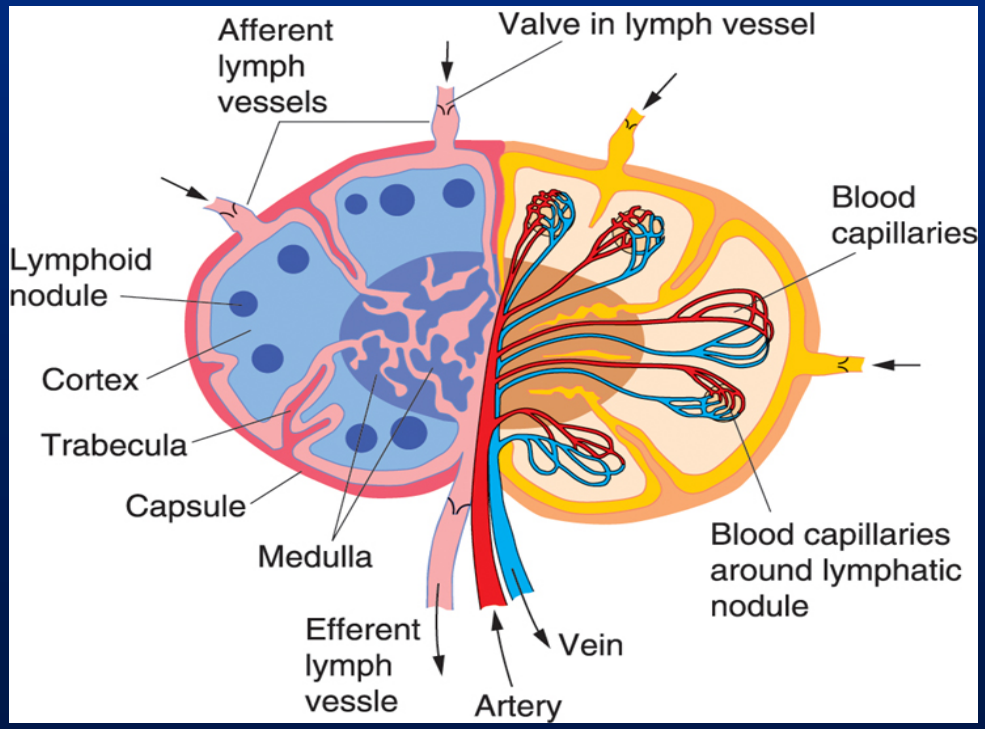
(1) cortex

1) superfacial cortex

lymphoid nodule

2) paracortex zone

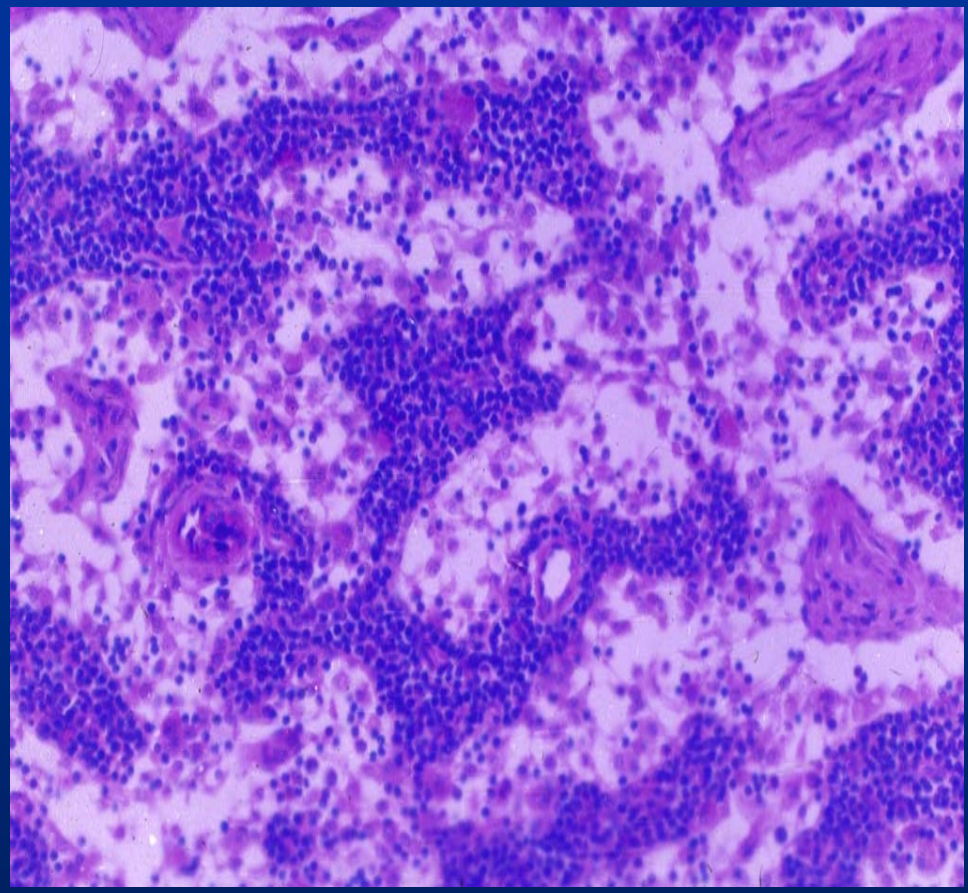
3) cortical sinus



(2) medulla

Medullary cord

Medullary sinus



2.2 function of lymph node

(1) to filter lymphoid fluid

(2) the area of immune response

3 spleen

3.1 structure of spleen

(1) capsule and trabecula

(2) white pulp

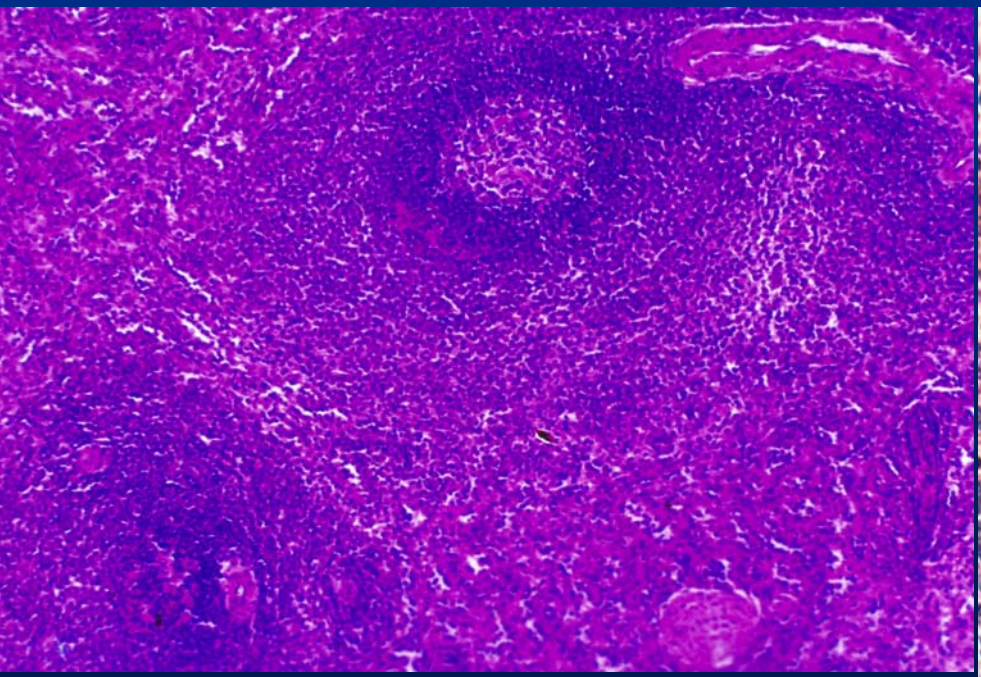
(3) marginal zone

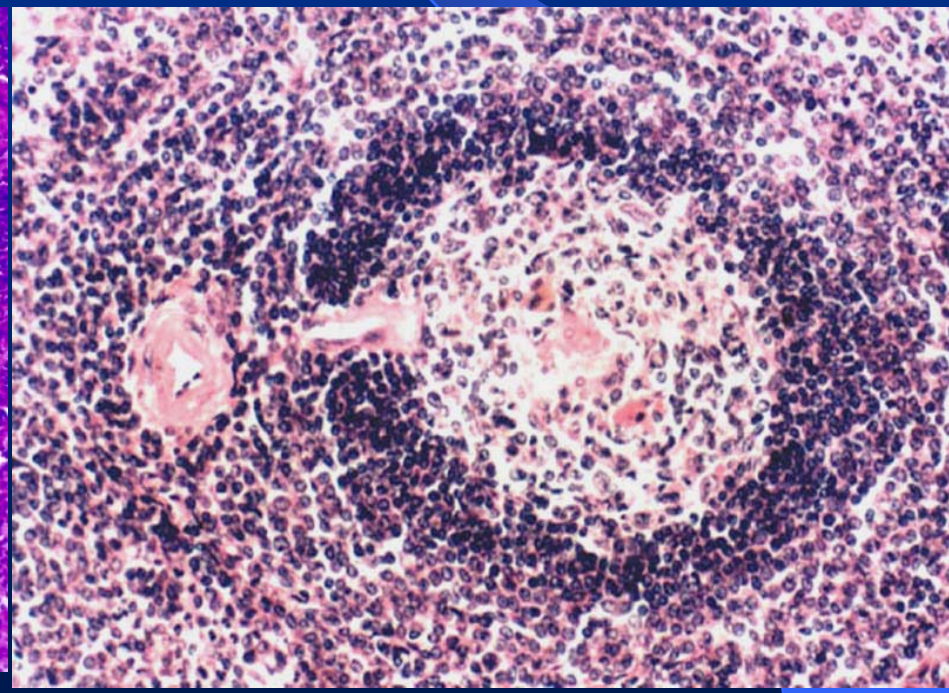
(4) red pulp

(2) white pulp

① periarterial lymphatic sheath

② splenic corpuscle



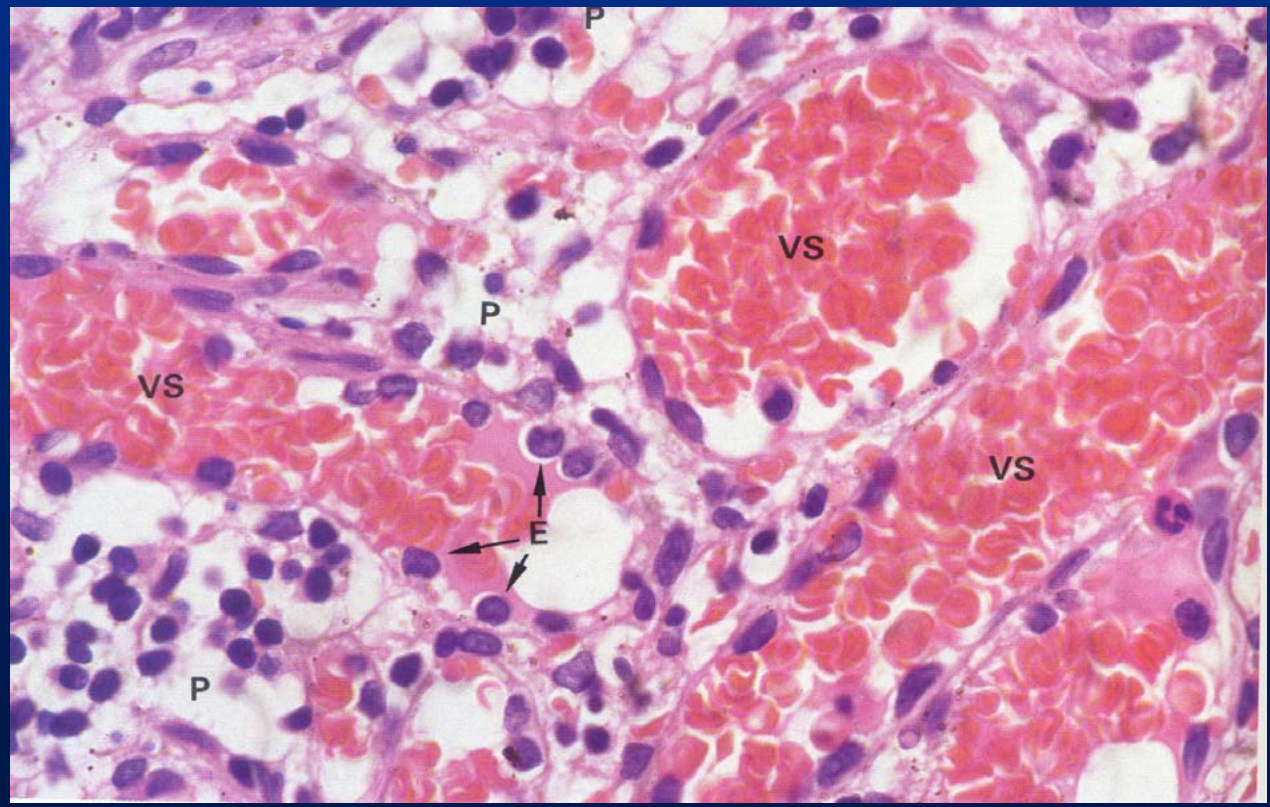


(3) marginal zone

(4) red pulp

1）splenic cord

2) splenic sinusoid



3.2 blood circulation of spleen

splenic arteries

trabecular arteries

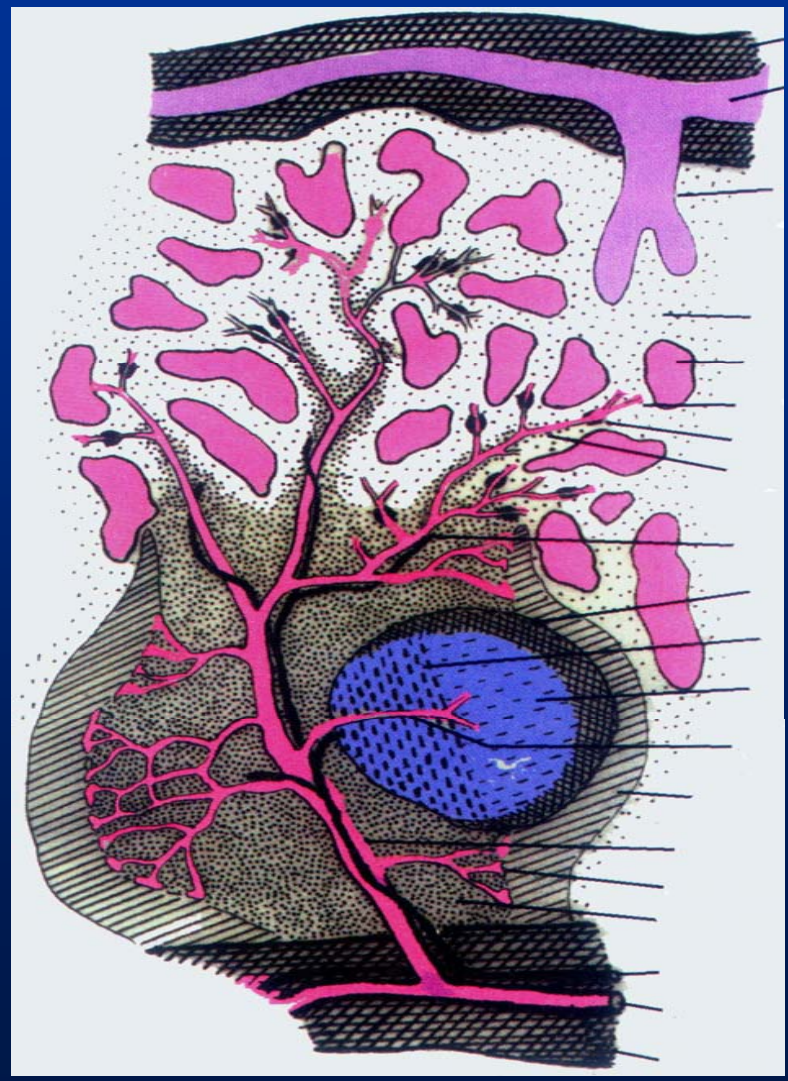
central arteries

penicillar arteriole

pulp venules

trabecula vein

splenic vein



3.3 function of spleen:

(1) filtrate blood

(2) blood storage

(3) produce blood cells

(4) defense

4 tonsil

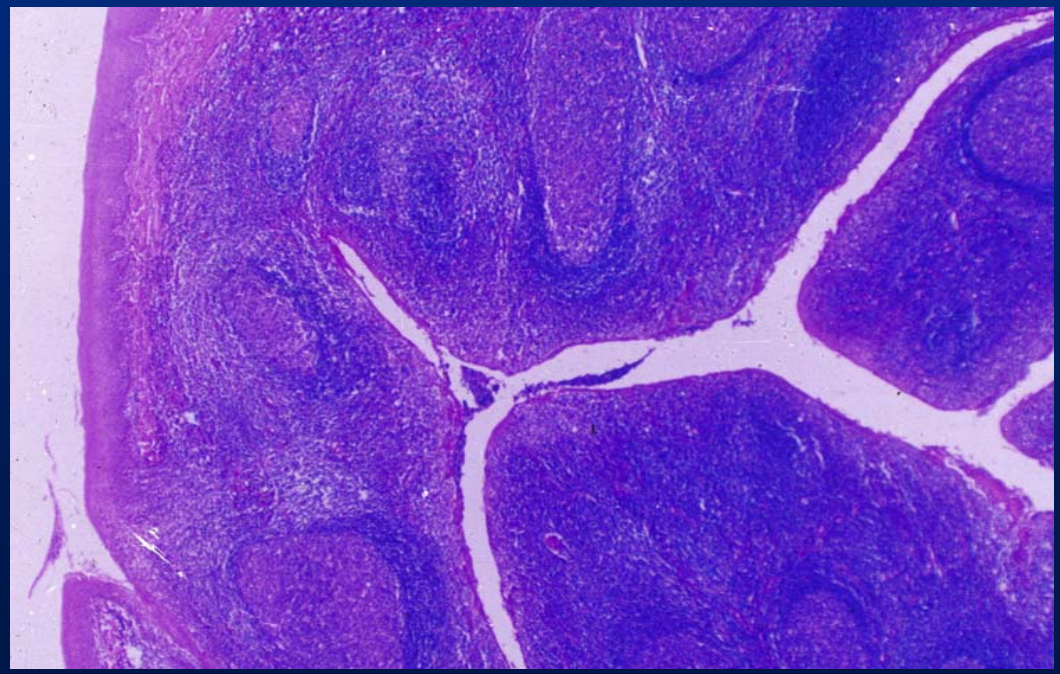
palatine tonsil

stratified squamous epithelial cells

tonsil crypts

lamina propria:

diffuse lymphoid tissue and lymphoid nodules



T细胞与B细胞的比较

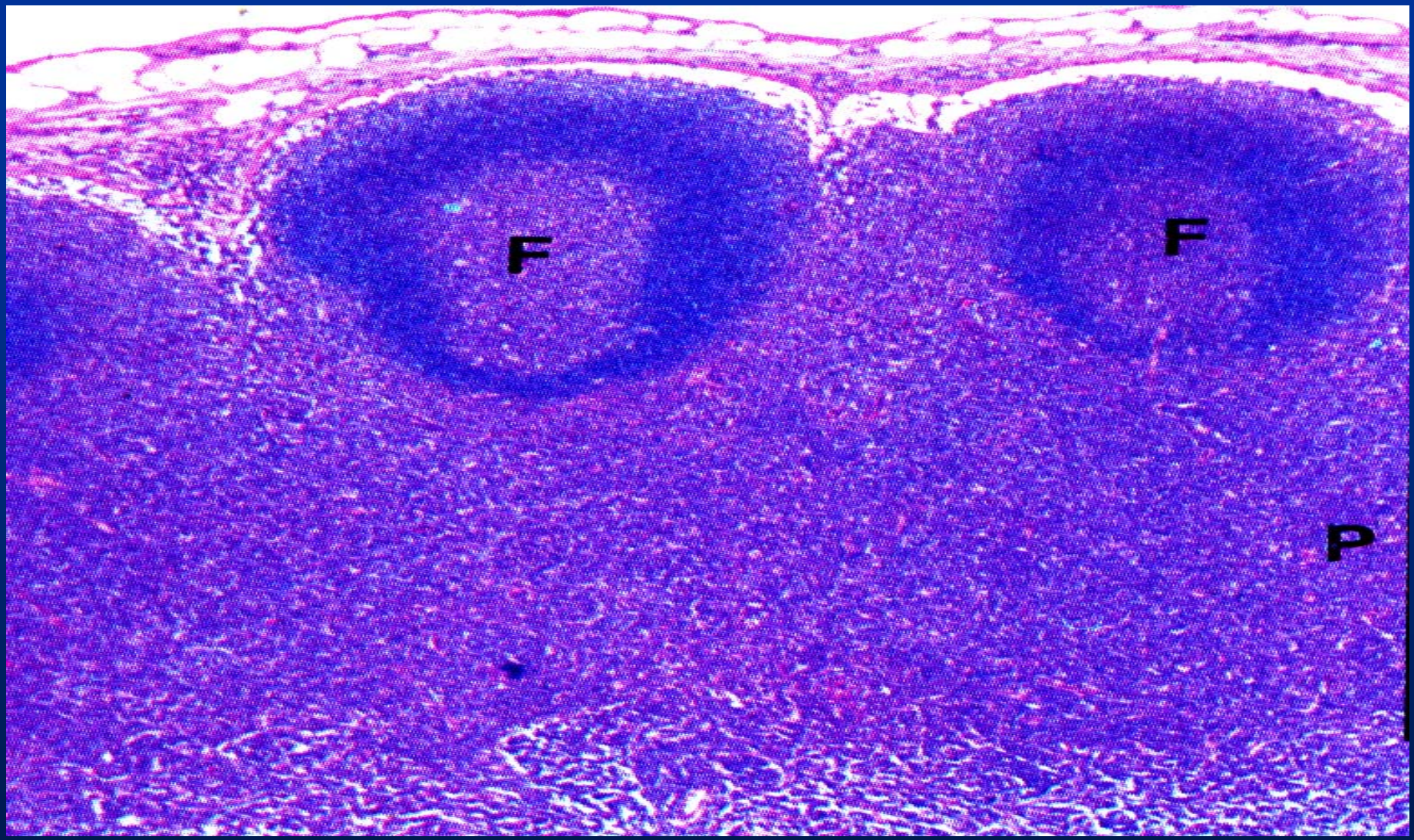
	T细胞	B细胞
来源	来源于胸腺淋巴干细胞	来源于骨髓淋巴干细胞
发育成熟的场所	胸腺	骨髓、肠道淋巴组织
占淋巴细胞总数	70%	20%
功能	参与细胞免疫	参与体液免疫；产生免疫球蛋白

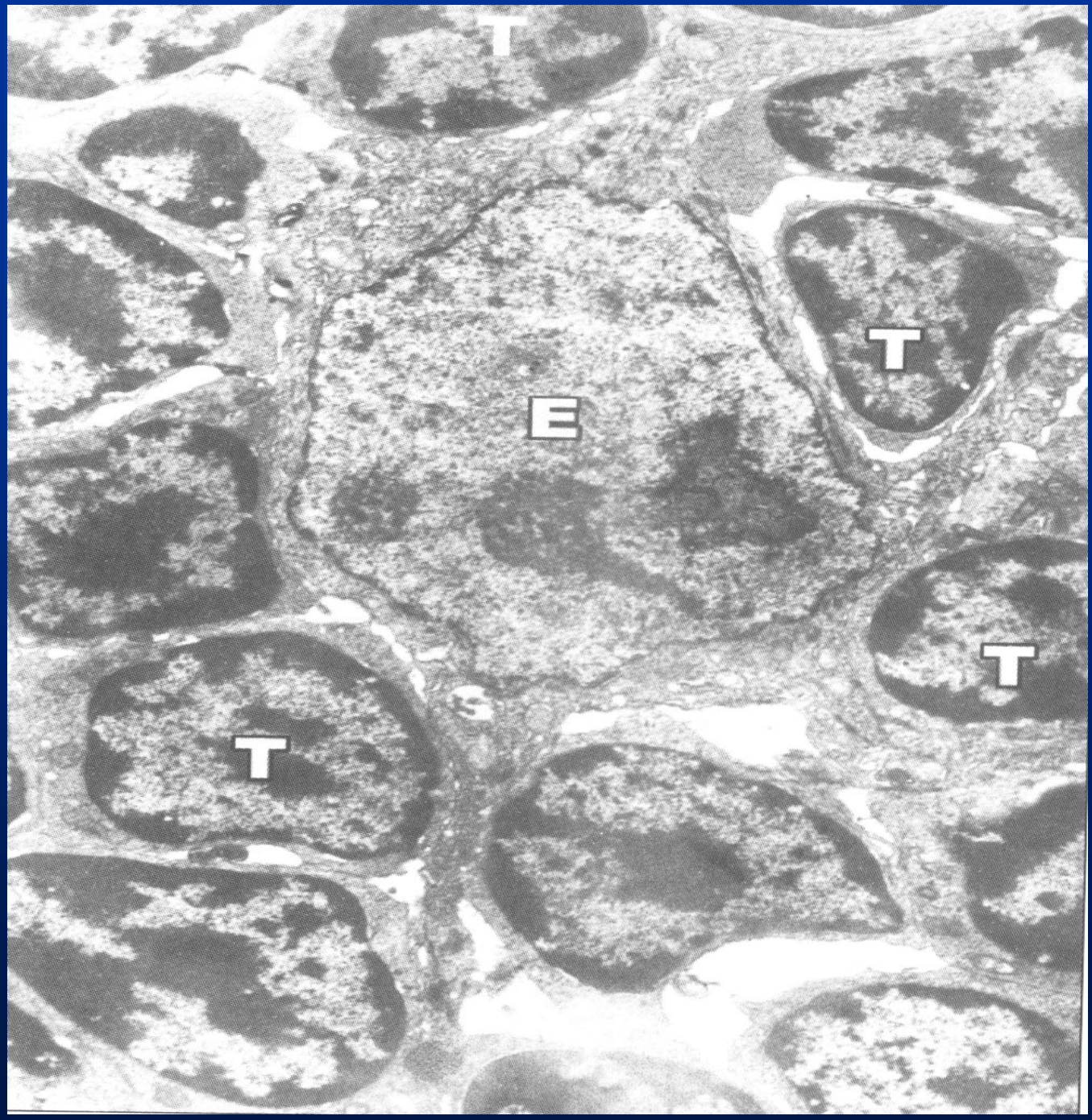
两种淋巴组织的比较

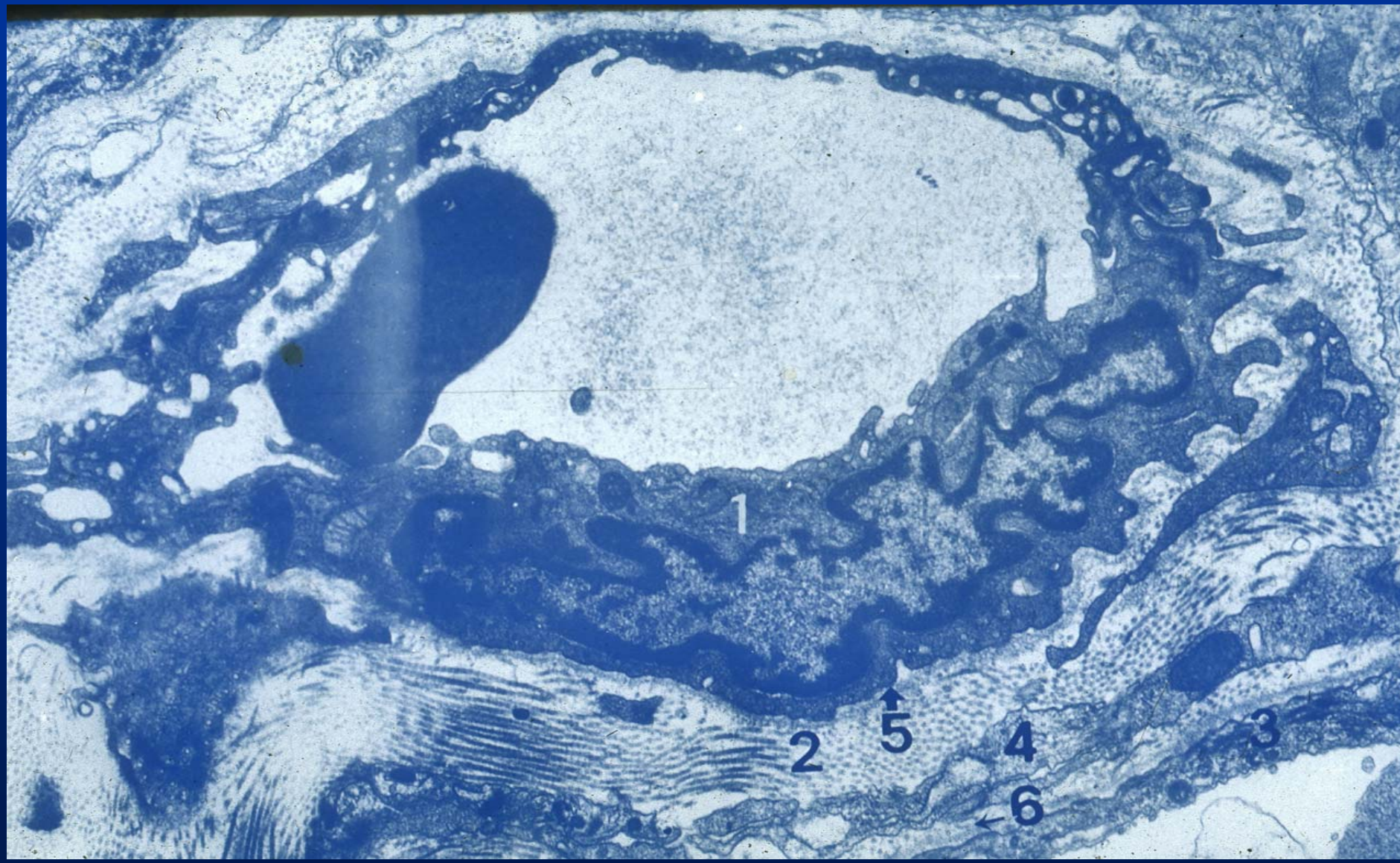
	弥散淋巴组织	淋巴小结
界限	无明确的界限	有明确的界限
形态	弥散	直径1－2mm的球形小体
结构	见毛细血管后微静脉	受抗原刺激后产生生发中心
细胞组成	主要由T细胞构成	主要由B细胞构成，并含一定量的Th细胞，滤泡树突状细胞、巨噬细胞等
功能	主要参与细胞免疫	主要参与体液免疫

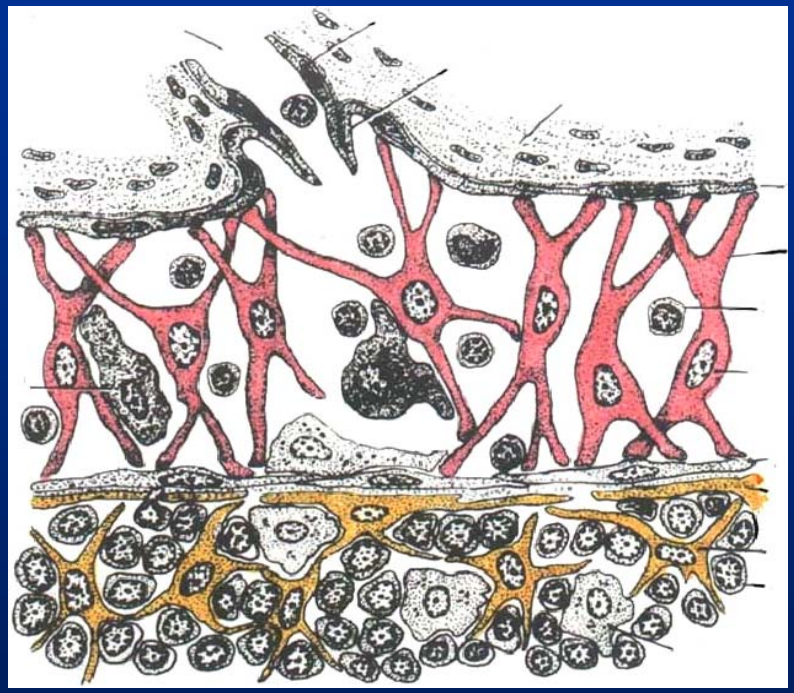
淋巴结与脾脏的比较

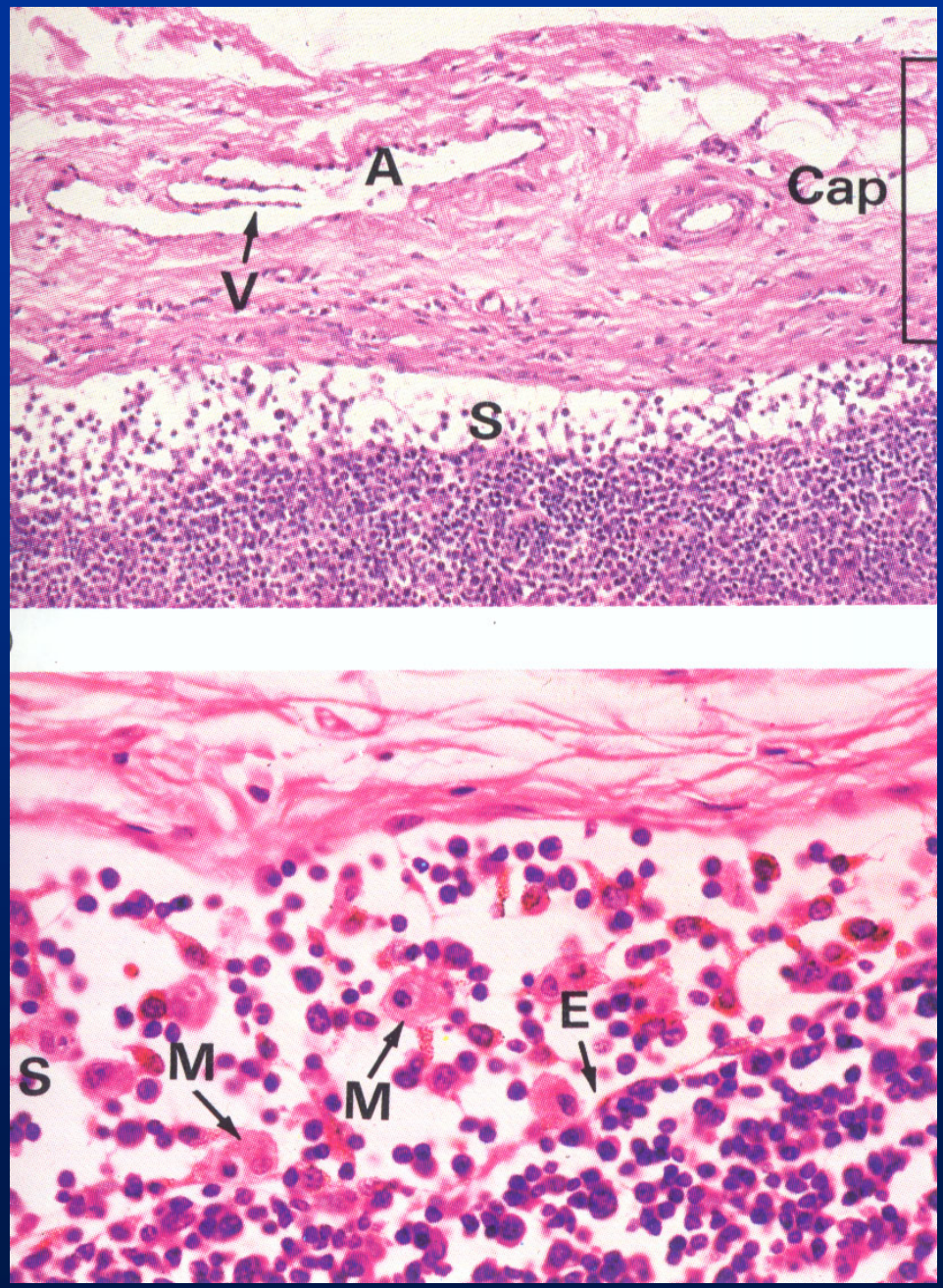
		淋巴结	脾脏
位置		位于淋巴回流的通路上	腹腔左上部，位于血液循环通路上
数量		人有300－500个	一个
分类		均为外周淋巴器官	
光镜结构	被膜	薄，有输入淋巴管穿越，无间皮	厚，含平滑肌纤维，表面覆有间皮
	小梁	有	有，内含平滑肌纤维
	实质	由皮质和髓质构成；主要结构为淋巴小结、副皮质区、淋巴窦、髓索等	由红髓、白髓、边缘区构成；主要结构为脾小体、动脉周围淋巴鞘、脾血窦、脾索
功能		滤过淋巴，参与免疫应答	滤血，造血并参与免疫应答

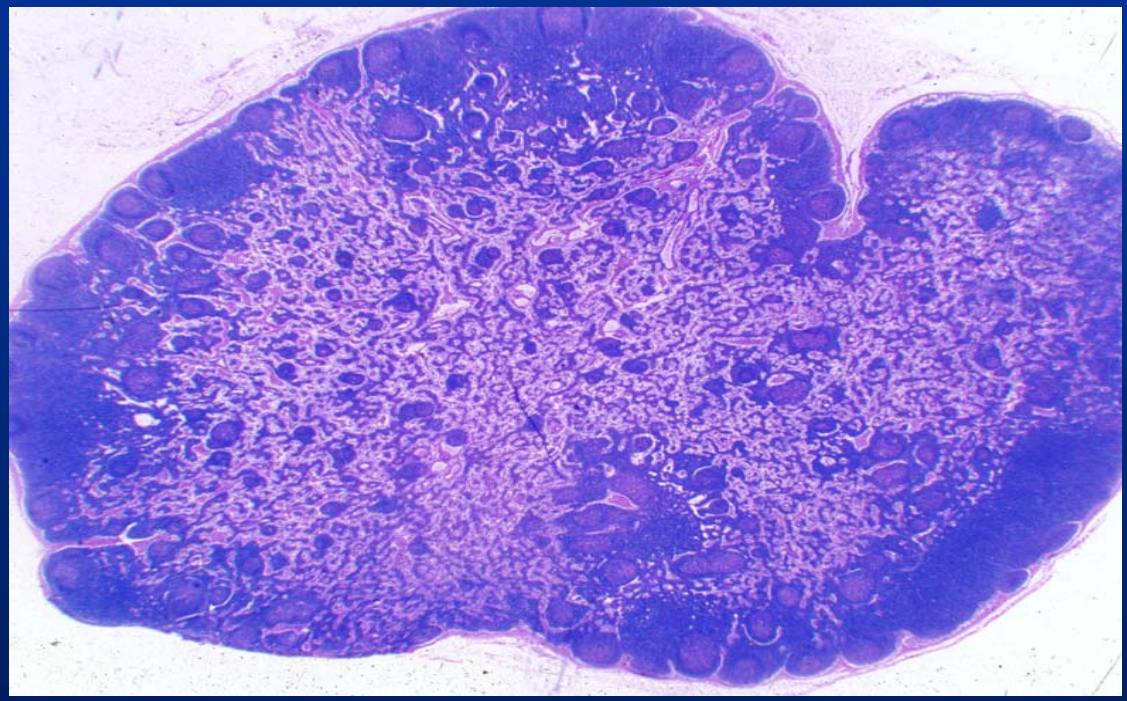

F
F
P

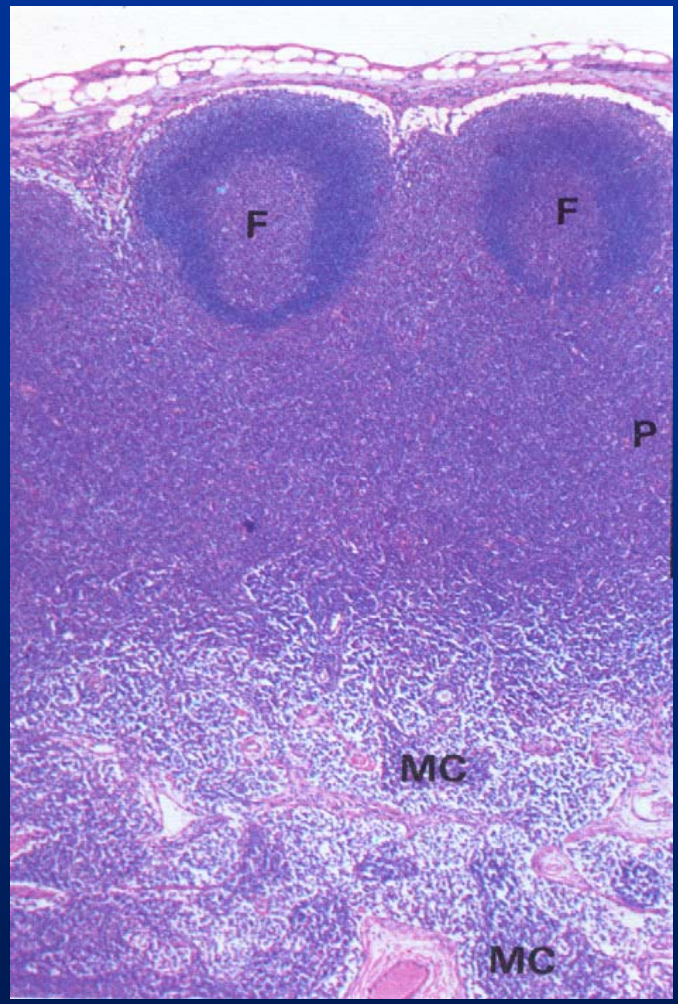

T
T
E
T
T

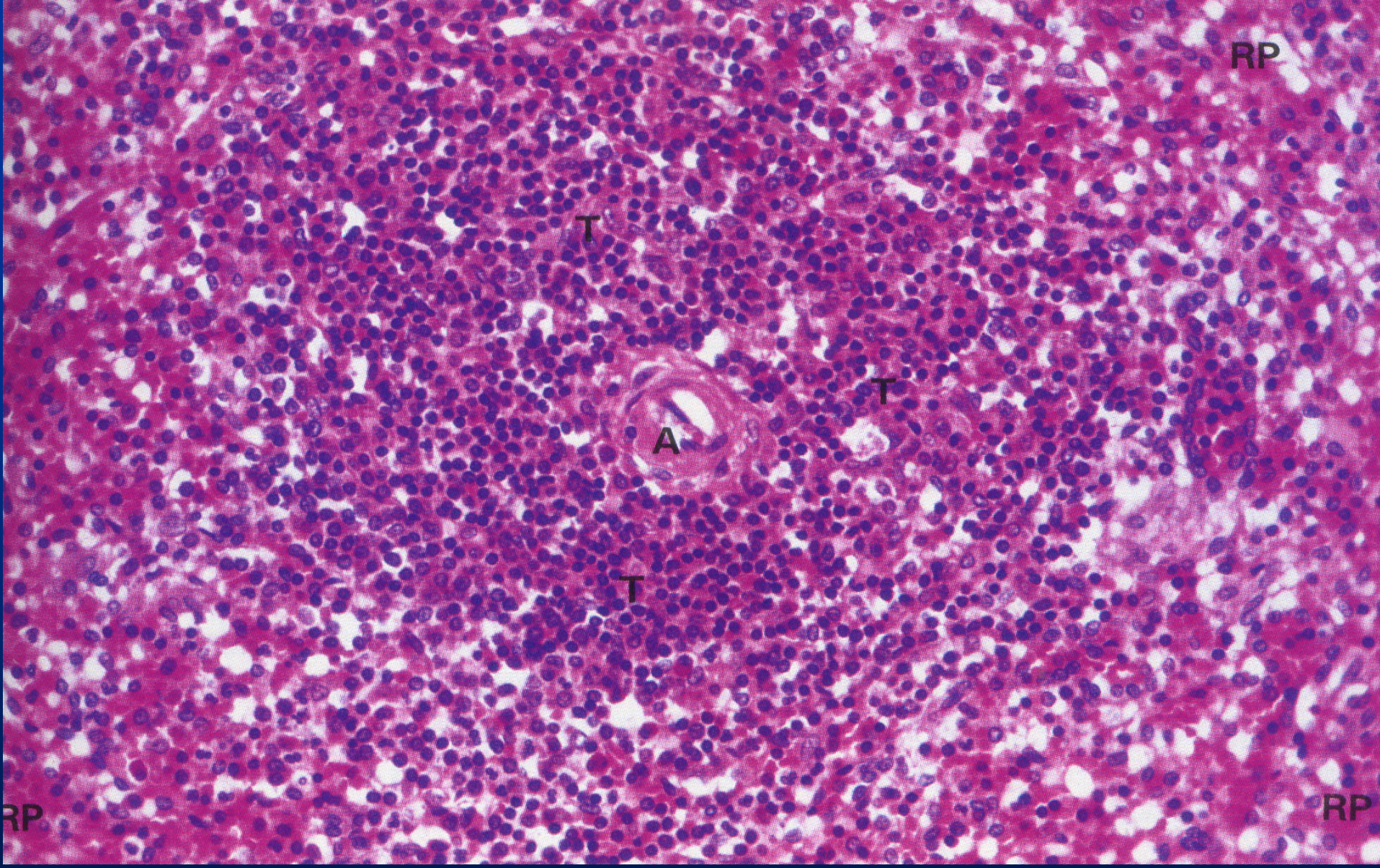

1
2
5
4
3
6

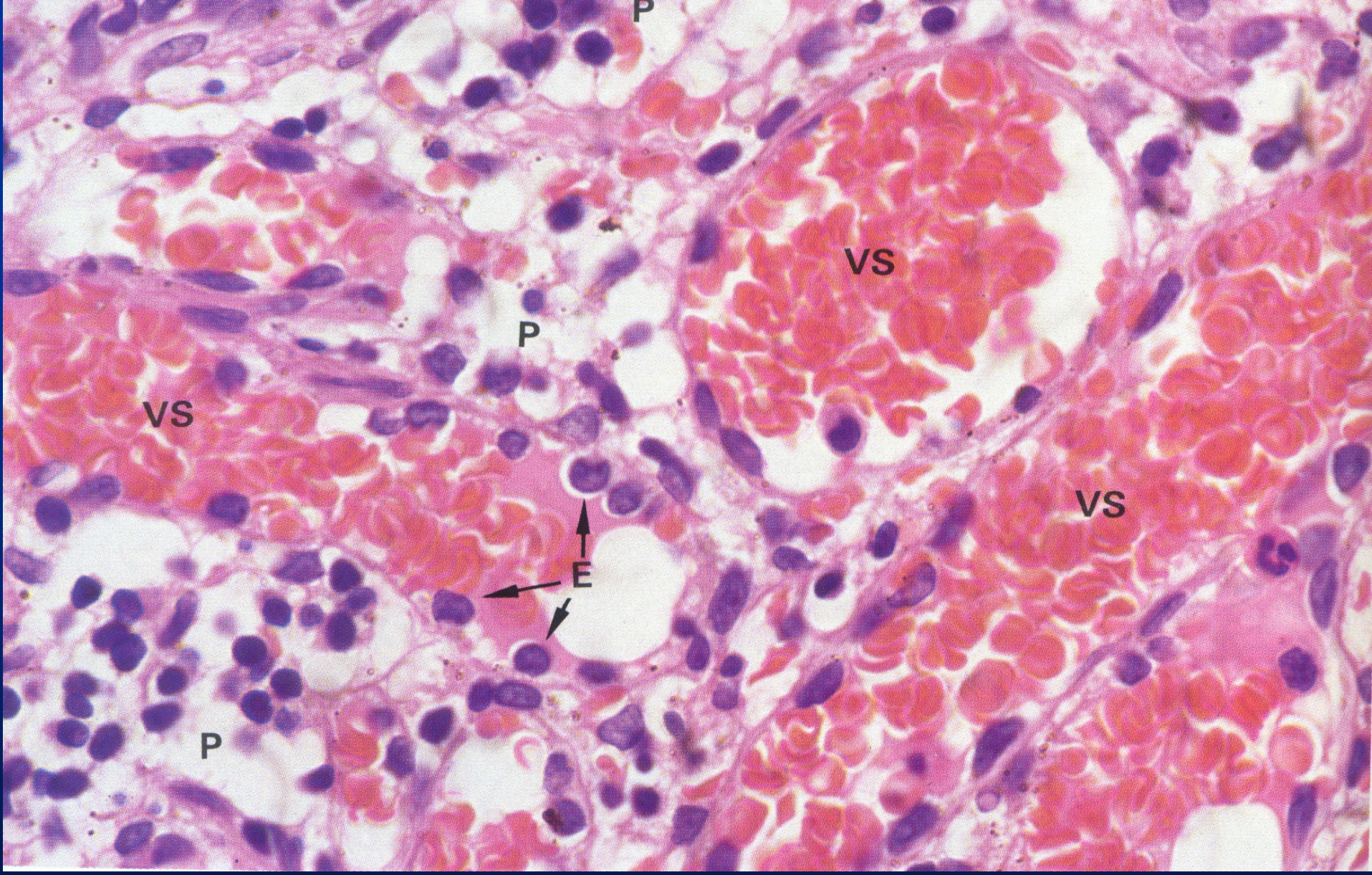


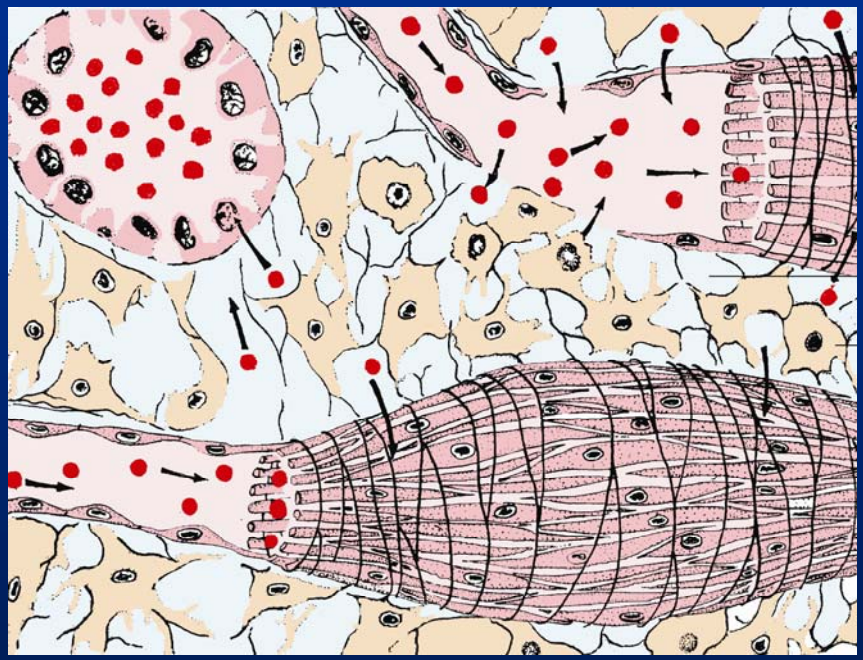

A
V
Cap
S
S
M
M
E



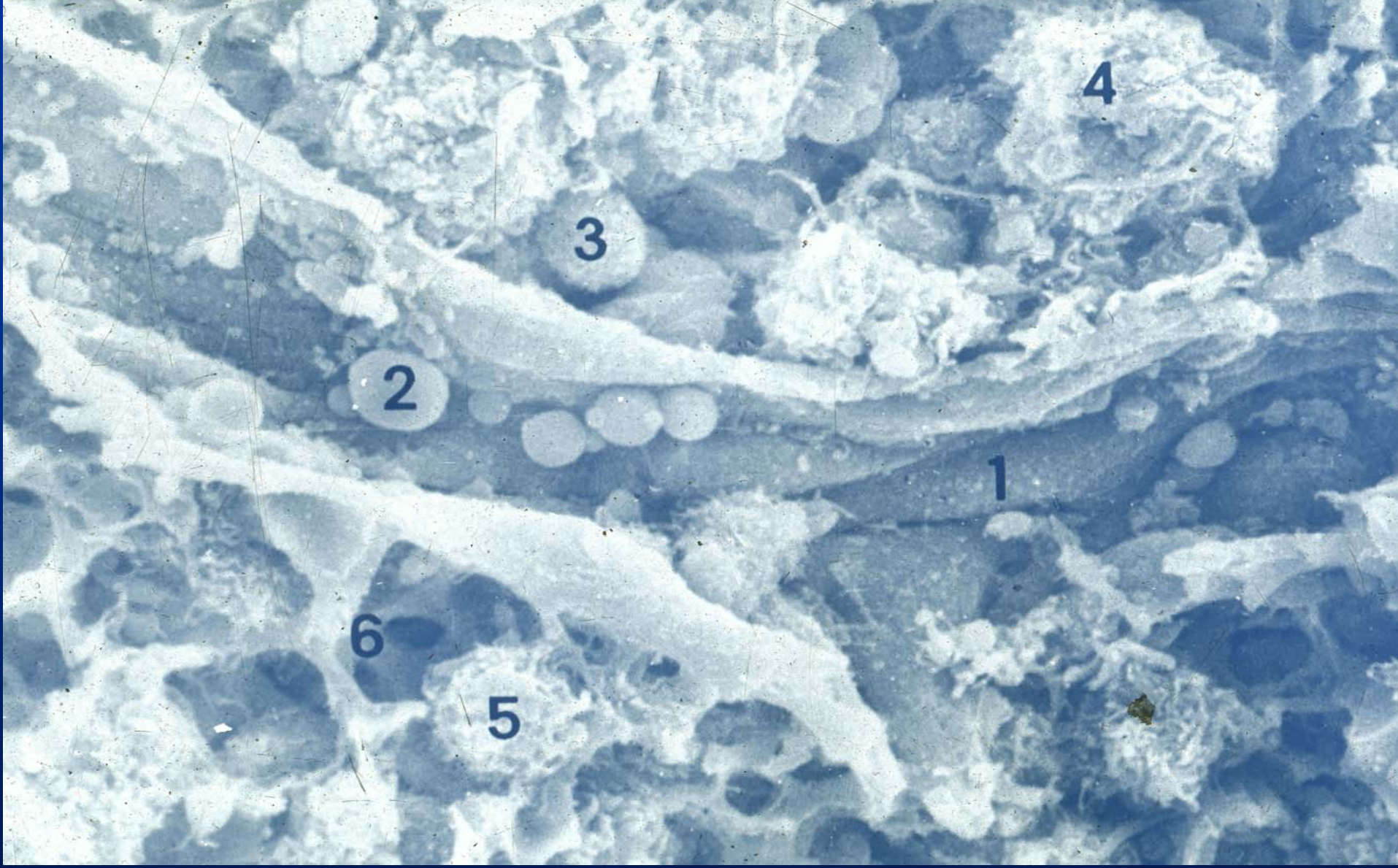

F
F
P
MC
MC

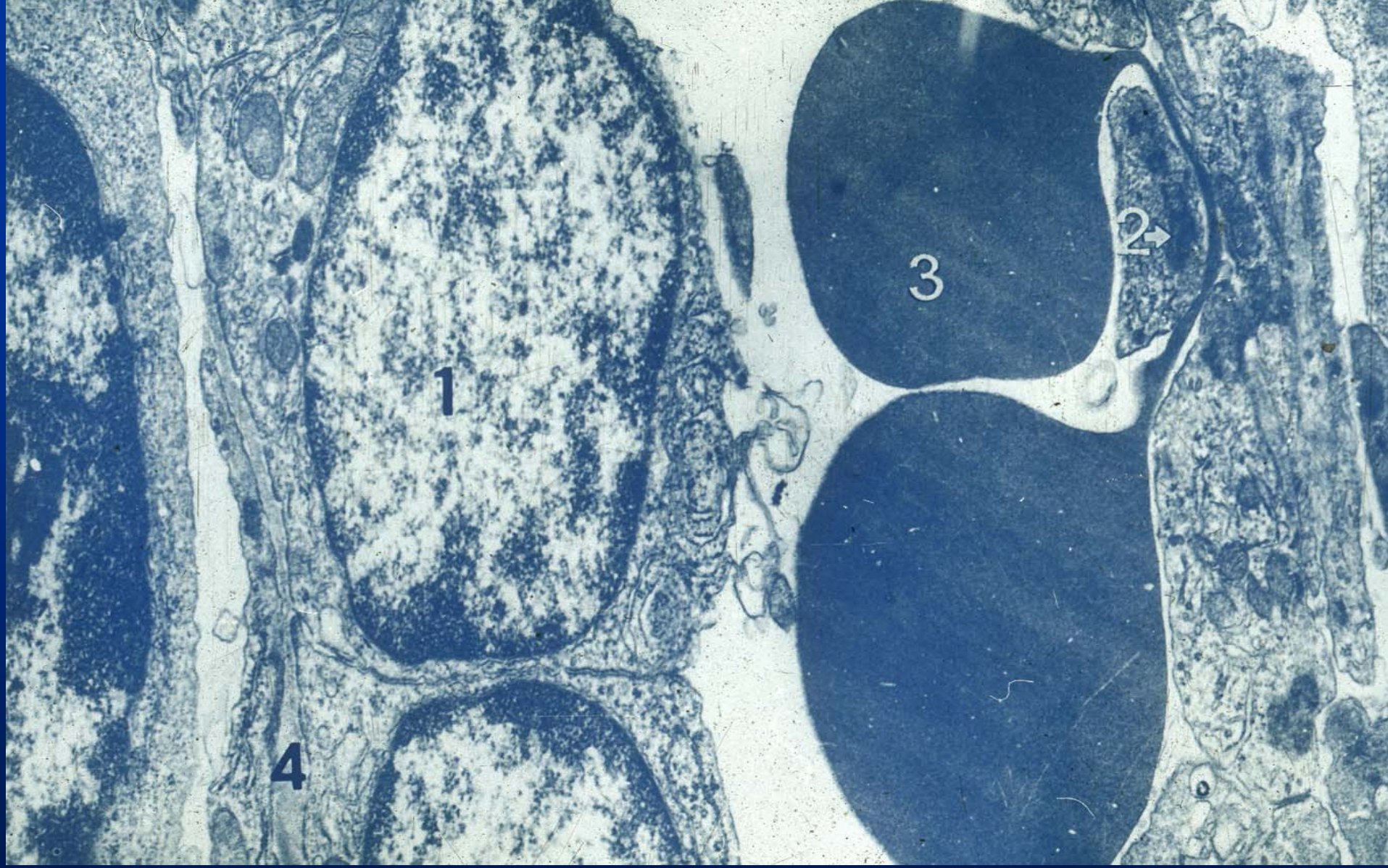

RP
T
T
A
T
RP
RP

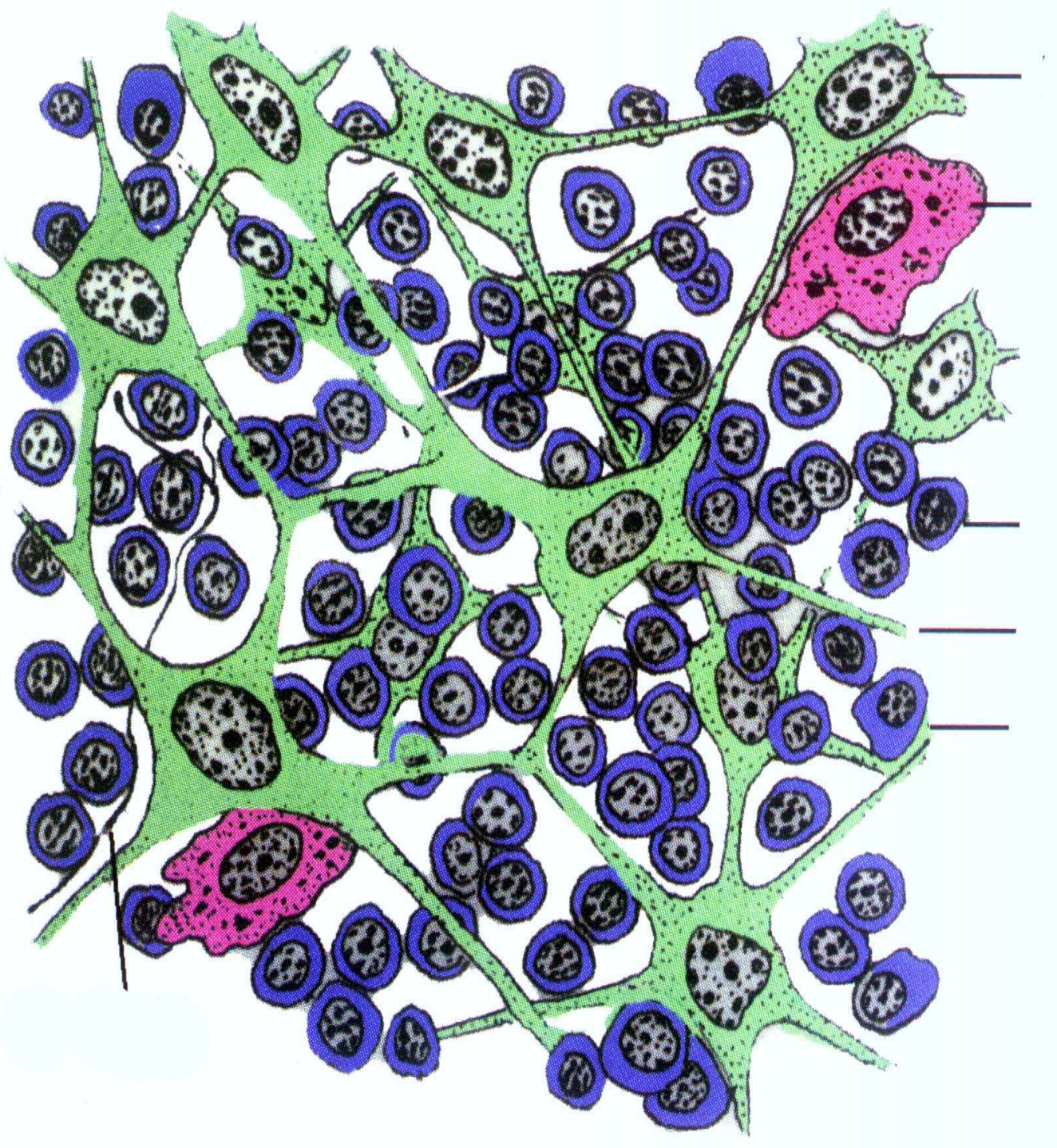

P
VS
P
VS
VS
E
P

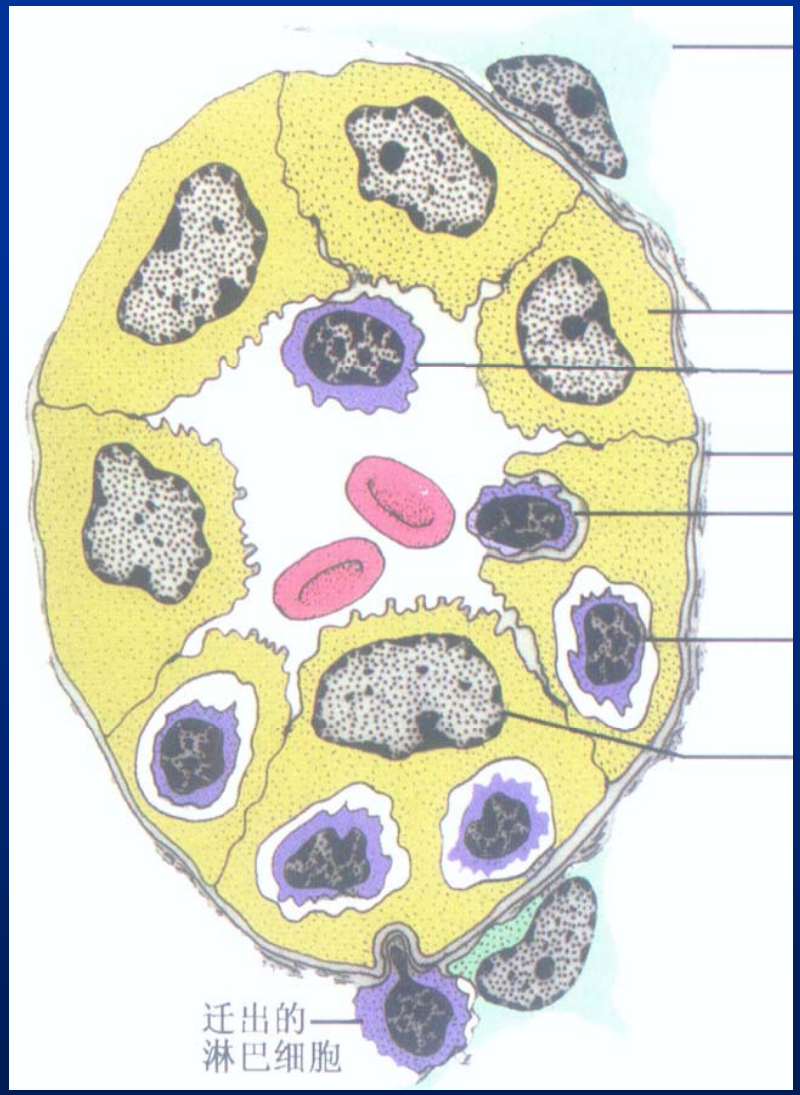


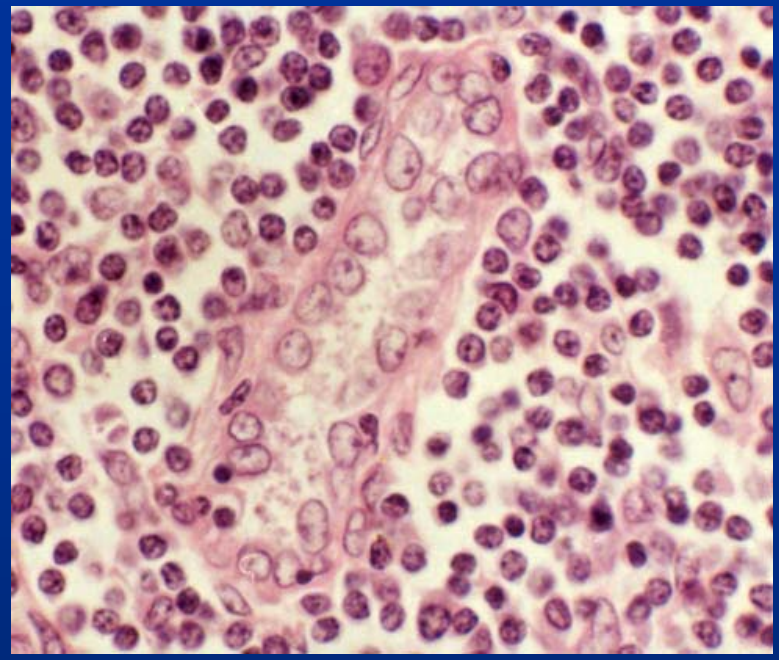

1
2

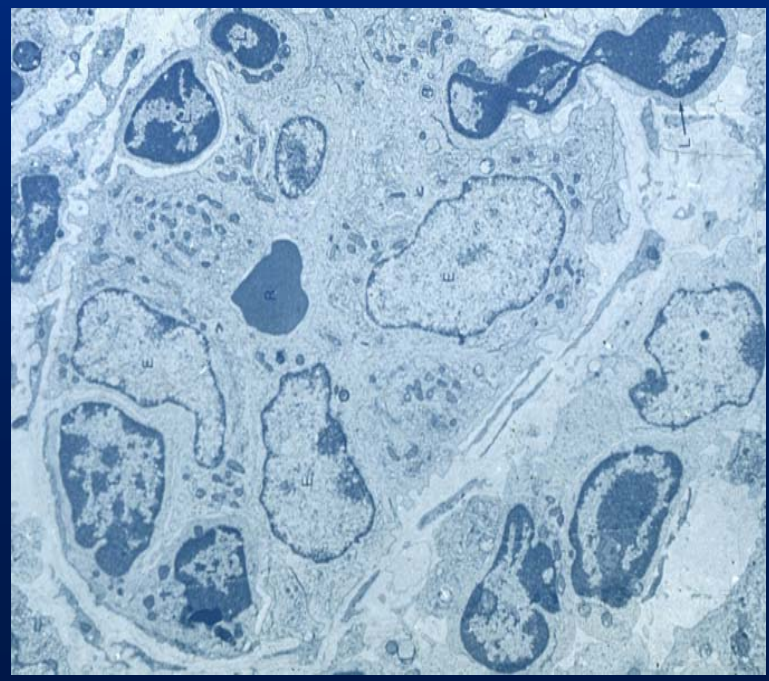

4
3
2
1
6
5


1
2
3
4

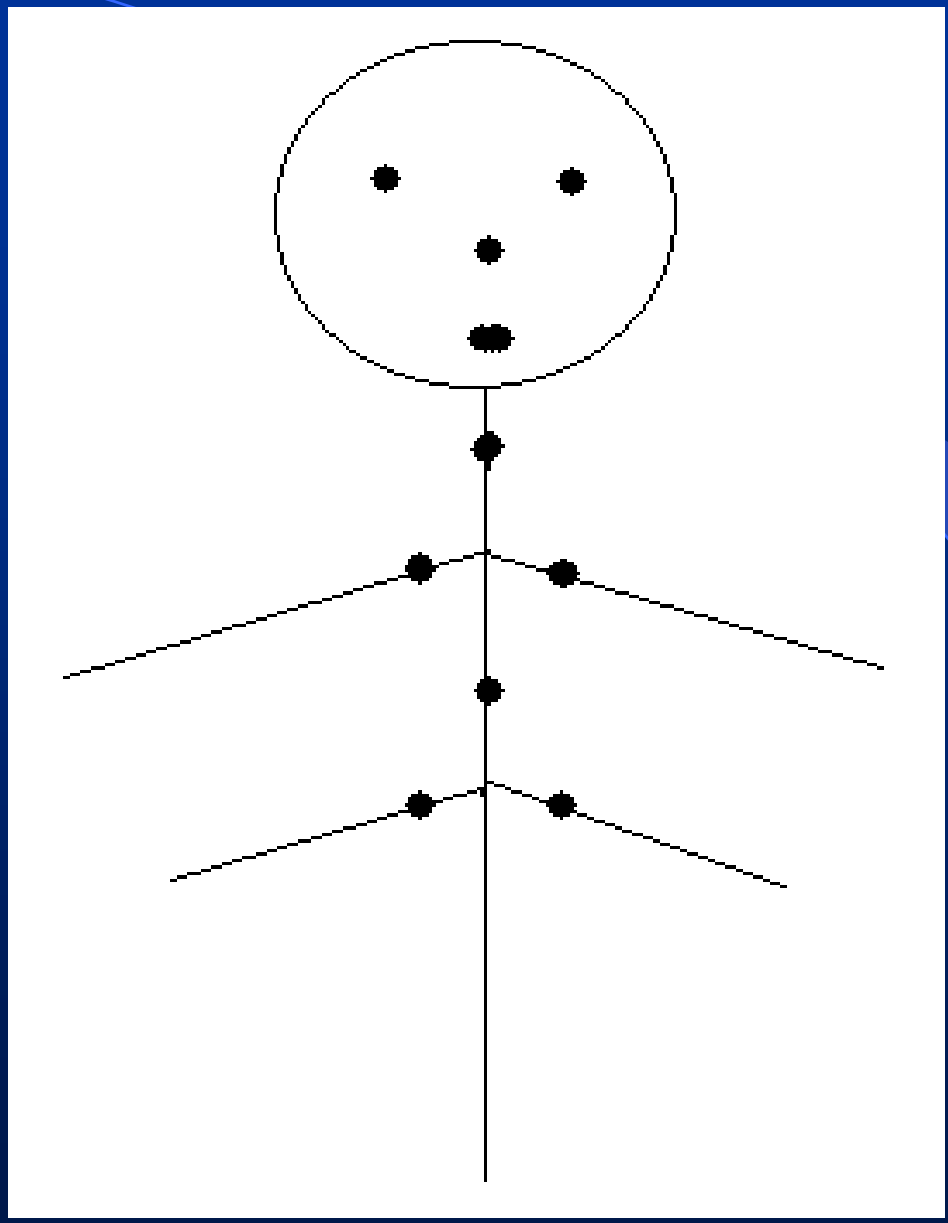




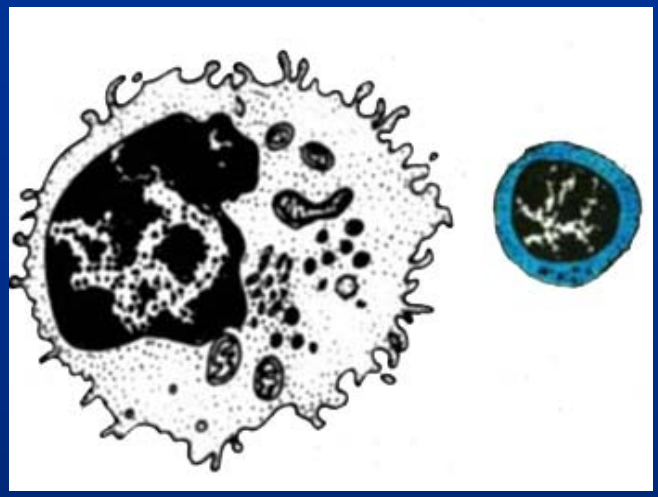




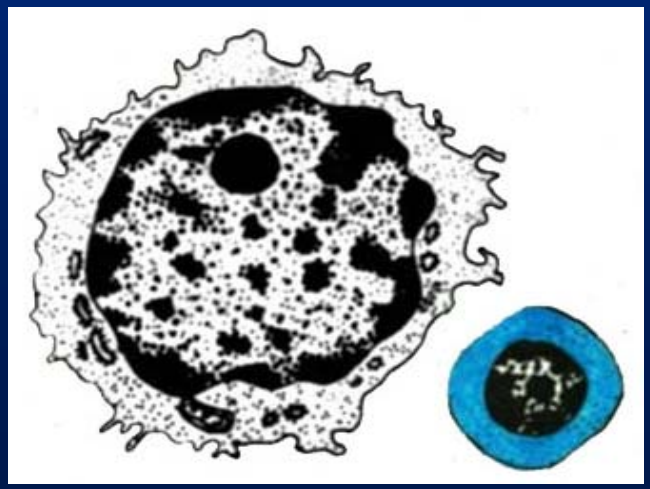
recirculation of lymphocyte



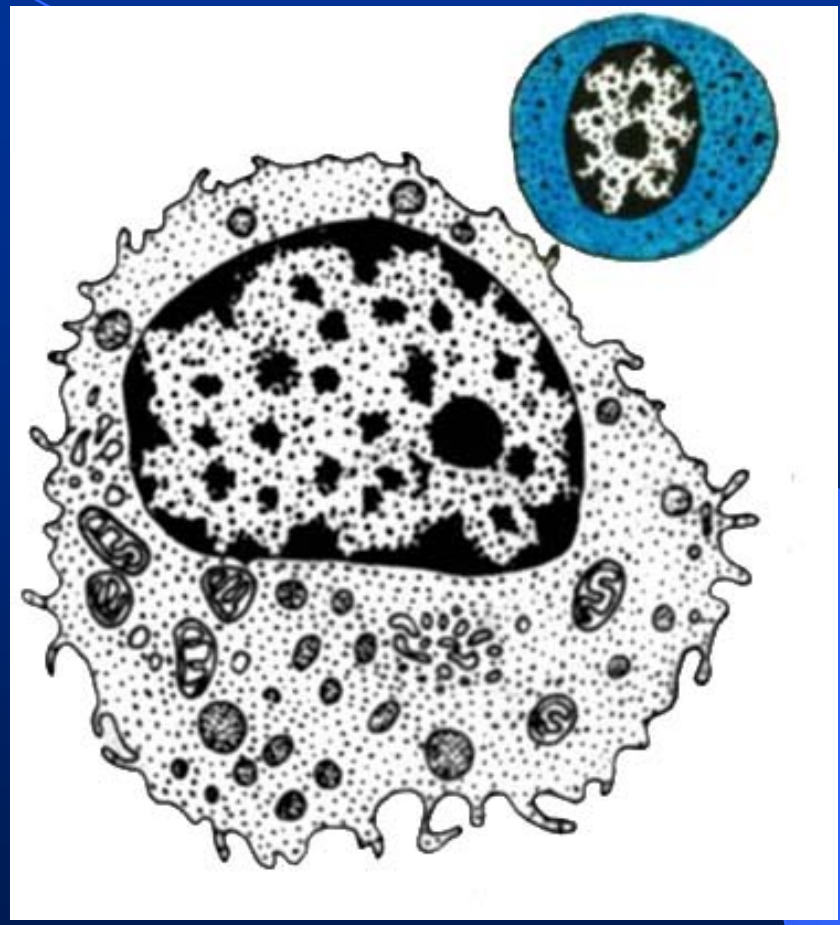
Lymphocyte



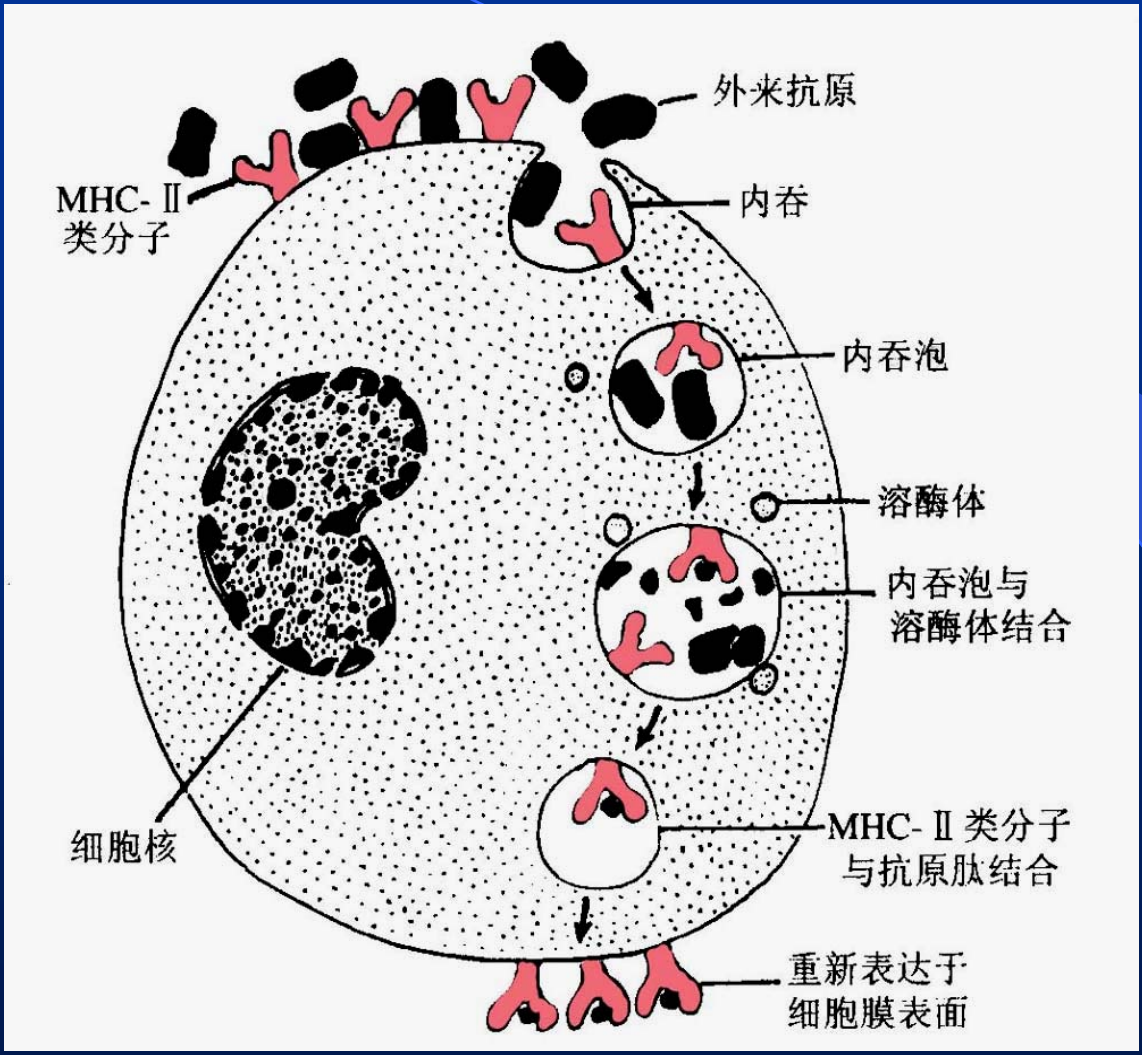
T Cell

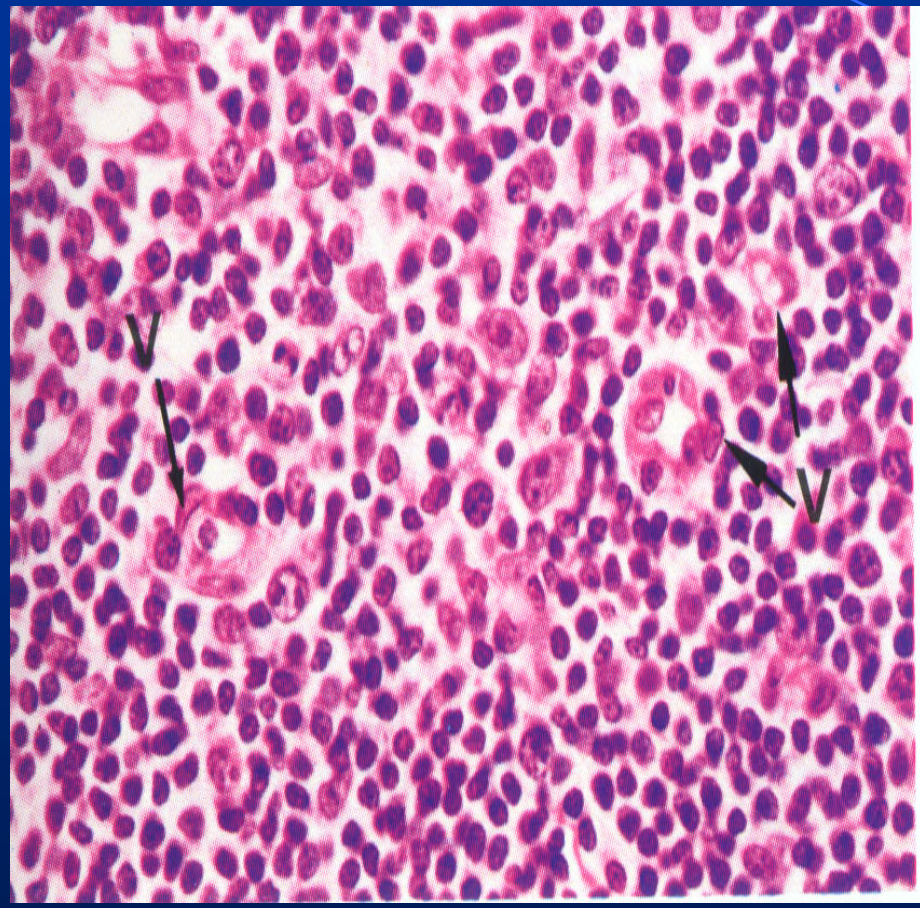


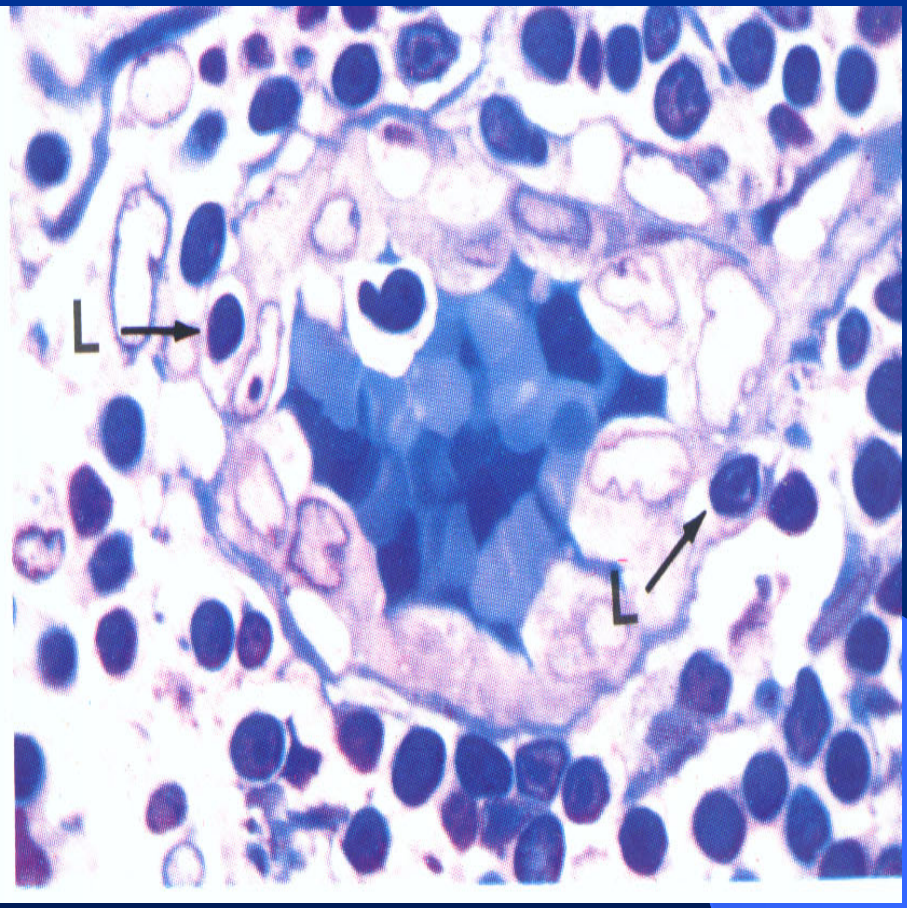
B Cell

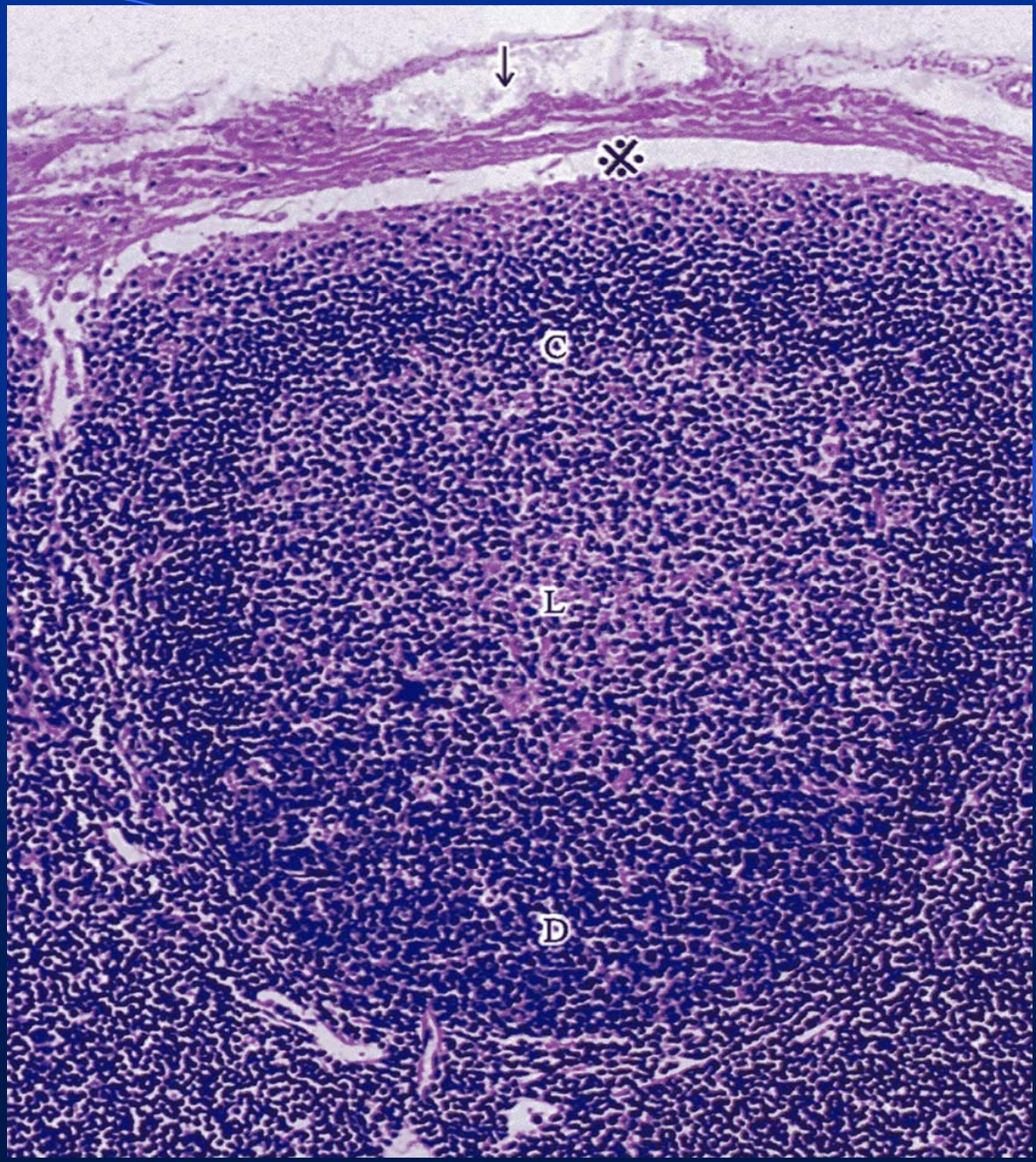


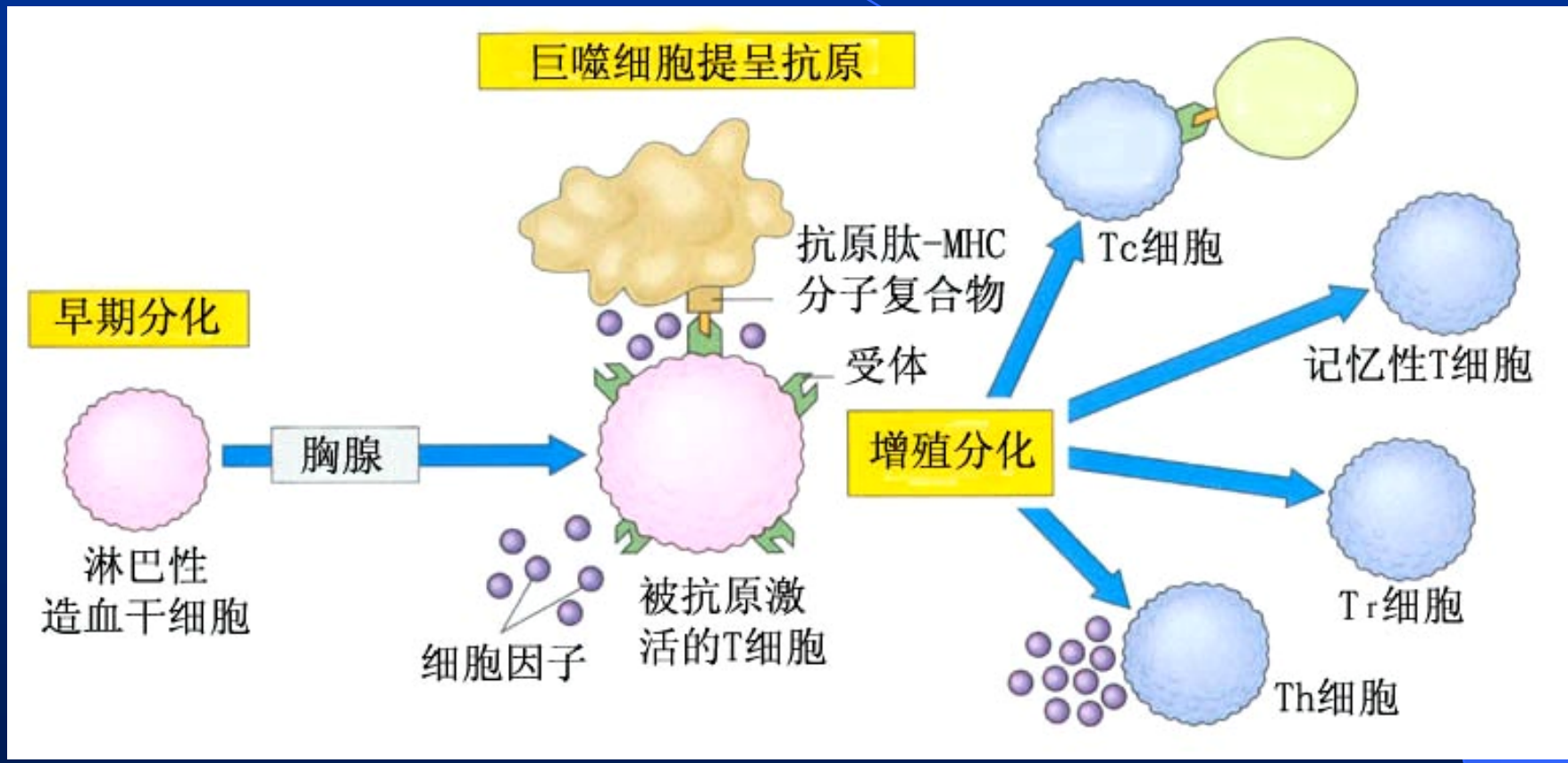
NK Cell


外来抗原
MHC-Ⅱ
类分子
内吞
内吞泡
溶酶体
内吞泡与
溶酶体结合
细胞核
MHC-Ⅱ类分子
与抗原肽结合
重新表达于
细胞膜表面


V
V


L
L


C
L
D


巨噬细胞提呈抗原
抗原肽-MHC
分子复合物
受体
早期分化
胸腺
淋巴性
造血干细胞
细胞因子
被抗原激
活的T细胞
增殖分化
Tc细胞
记忆性T细胞
Tr细胞
Th细胞