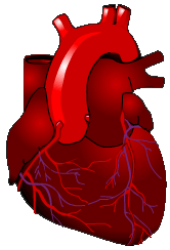
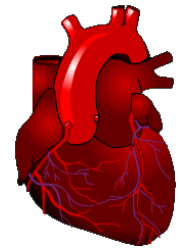




Systematic Anatomy



Angiology – Part 4



Lymphatic system 淋巴系统



Prof.& Ph.D 张红旗

复旦大学基础医学院解剖与组织胚胎学系

复旦大学枫林校区

Into Chinese:

1. Intercostal artery
2. Hemiazygos vein
3. Internal jugular vein
4. Brachiocephalic vein
5. Cephalic vein

Into English:

1. 肺静脉
2. 下腔静脉
3. 肝门静脉
4. 大隐静脉
5. 贵要静脉

Into Chinese:

1. Intercostal artery 肋间动脉
2. Hemiazygos vein 半奇静脉
3. Internal jugular vein 颈内静脉
4. Brachiocephalic vein 头臂静脉
5. Cephalic vein 头静脉

Into English:

1. 肺静脉 Pulmonary vein
2. 下腔静脉 Inferior vena cava
3. 子宫静脉 hepatic portal vein
4. 大隐静脉 Great saphenous vein
5. 贵要静脉 Baslic vein

Contents

- 1.General description to lymphatic system
- 2.Lymphatic vessels
- 3.Lymphatic organs
- 4.Main lymph nodes & lymph drainage all over the body.

Constitution of Lymphatic system

1. Lymphatic vessels

淋巴管道

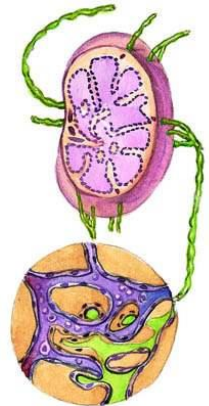
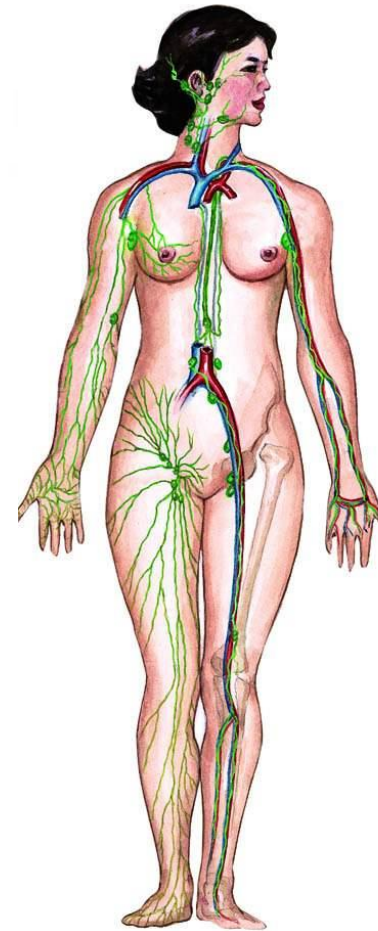
2. Lymphatic tissues

淋巴组织

3. Lymphatic organs

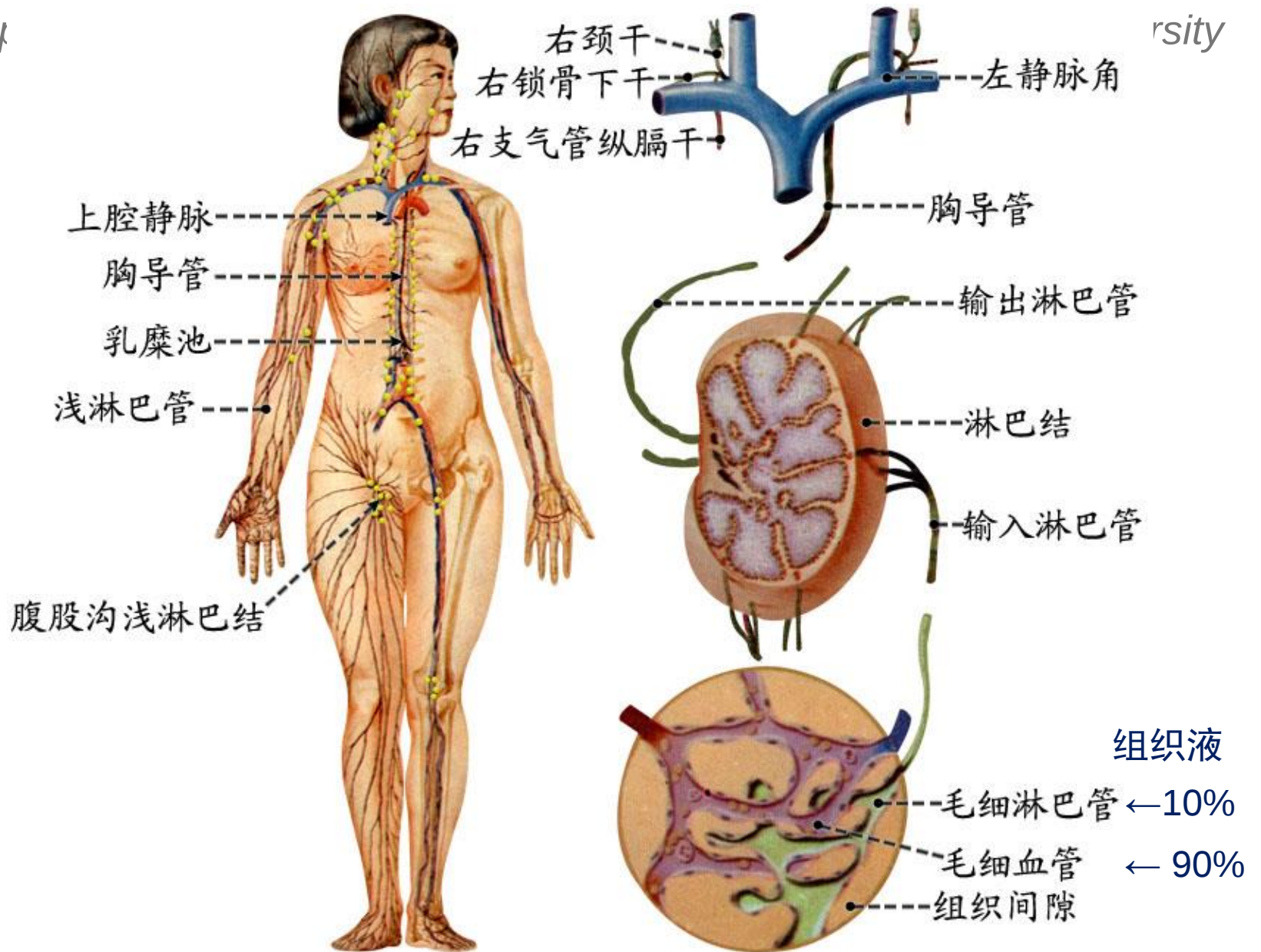
淋巴器官

淋巴系统是心血管的辅助系统。



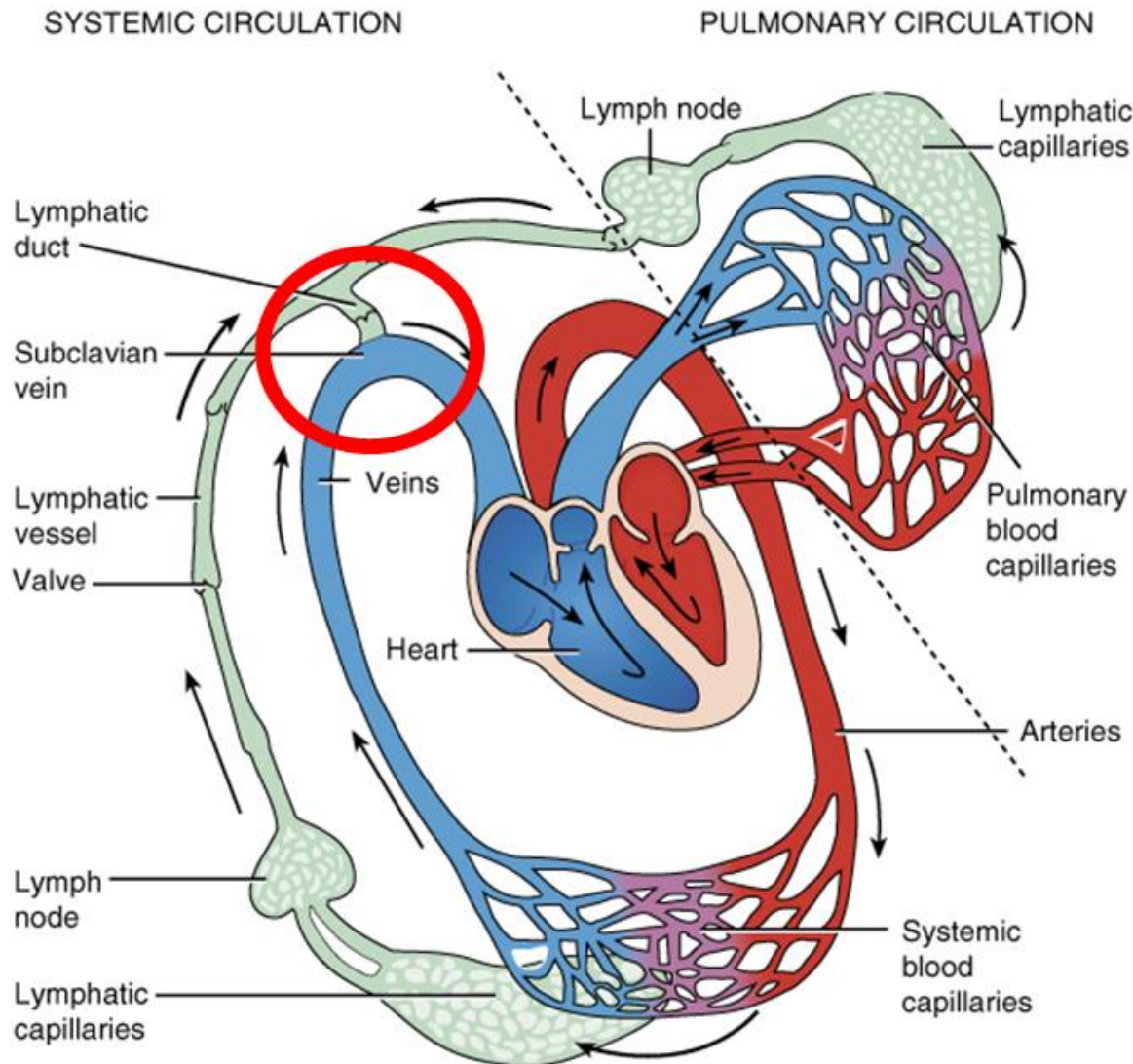
General Introduction of lymphatic system

- ◆ **Organization** lymphatic vessels, organs & tissues.
- ◆ **Lymph:liquid**, colorless or yellowish fluid, chyle-milky - from the small intestine.
- ◆ **Lymph formation**: drainage excess interstitial fluid. entering the lymphatic vessels.
- ◆ **Drainage: one-way** flow to the vein - heart.
- ◆ **Lymphatic vessel: assistant** vessels of the vein
- ◆ **Function**: response to immune, help to absorb fat & macromolecule; filter the lymph fluid & defence



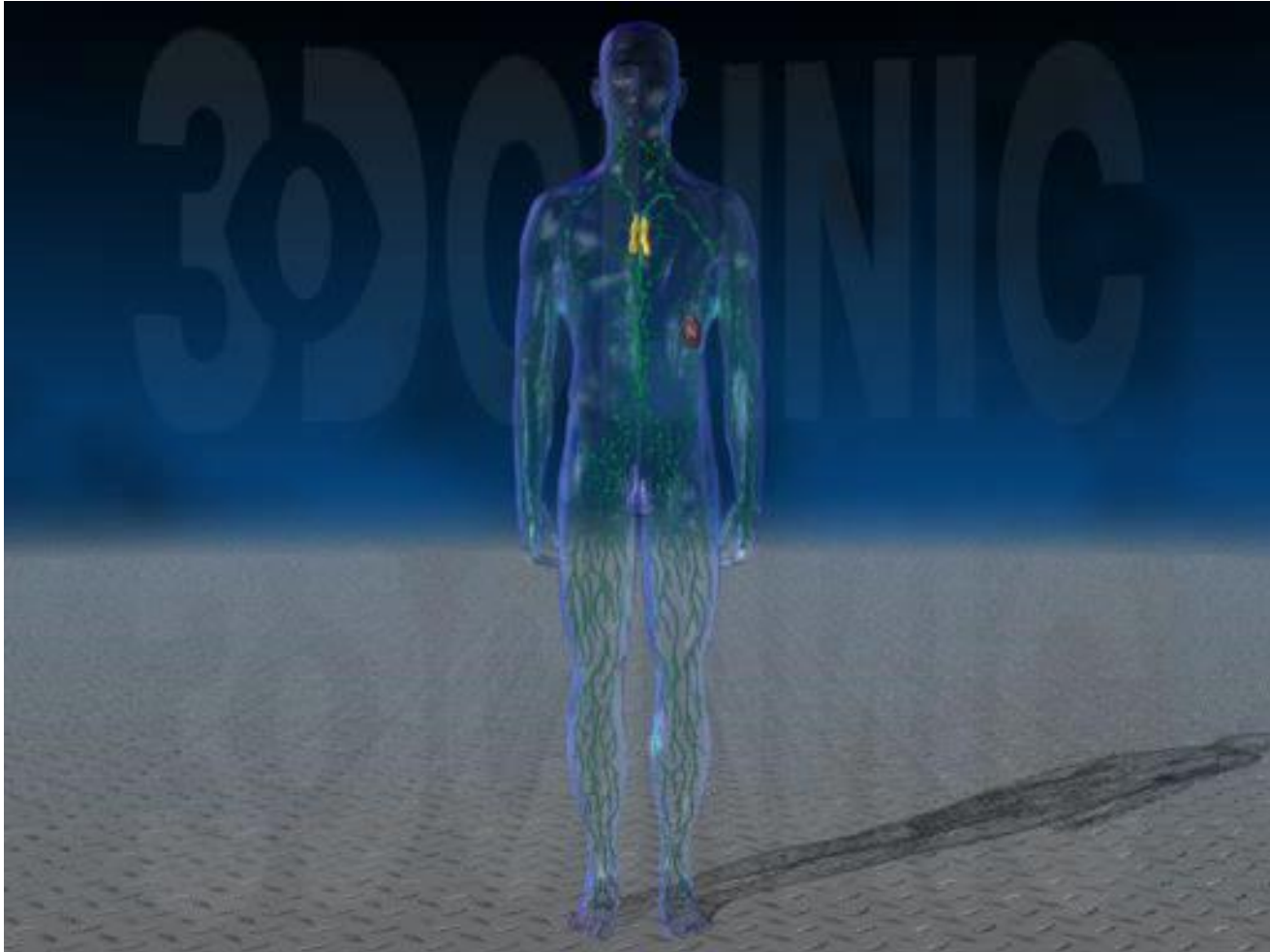
全身浅、深淋巴管和淋巴结示意图

The formation & drainage of lymphatic fluid



Blood capillary
(higher pressure)
↓
Interstitial fluid
↓
Lymph capillary
↓
Lymph vessels
↓
Lymph ducts
↓
Veins
↓
Large circulation

Lymph drainage 淋巴回流



Lymphatic vessels 淋巴管道

Four grades:

- ◆ Lymphatic capillary 毛细淋巴管: similar with capillary, but With more permeability (no base membrane & pericyte 淋巴细胞, thin endothelium, wide intercellular spaces)
- ◆ Lymphatic vessels 淋巴管: similar with vein, with valve, sup. and deep group. beaded lymph nodes.
- ◆ Lymphatic trunks 淋巴干: nine, four-paired, one-unpaired one.
- ◆ Lymphatic ducts 淋巴导管: thoracic duct and right lymph duct.

Lymphatic trunk 淋巴干 9

Four-paired

- ◆ Left & right lumbar trunks 腰干
- ◆ Left & right bronchomediastinal trunks 支气管纵膈干
- ◆ Left & right subclavian trunks 锁骨下干
- ◆ Left & right cervical trunks 颈干

one-unpaired one

- ◆ Intestinal trunk 肠干

Lymphatic duct -two

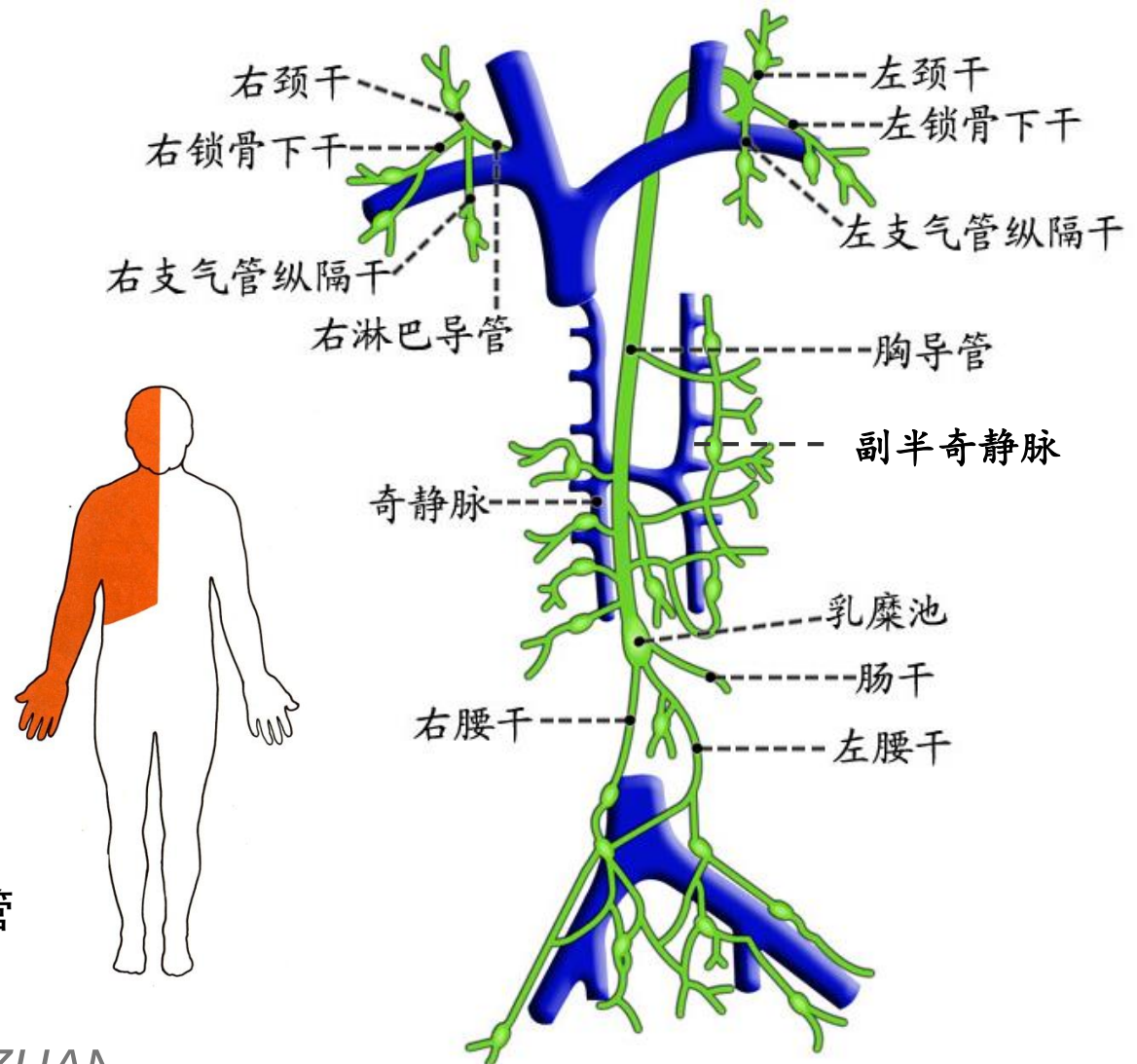
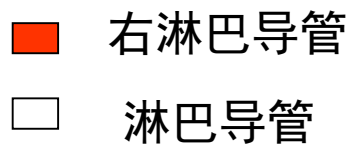
Thoracic duct 胸导管 — drain to left venous angle

Right lymph duct 右淋巴导管- drain to right venous angle

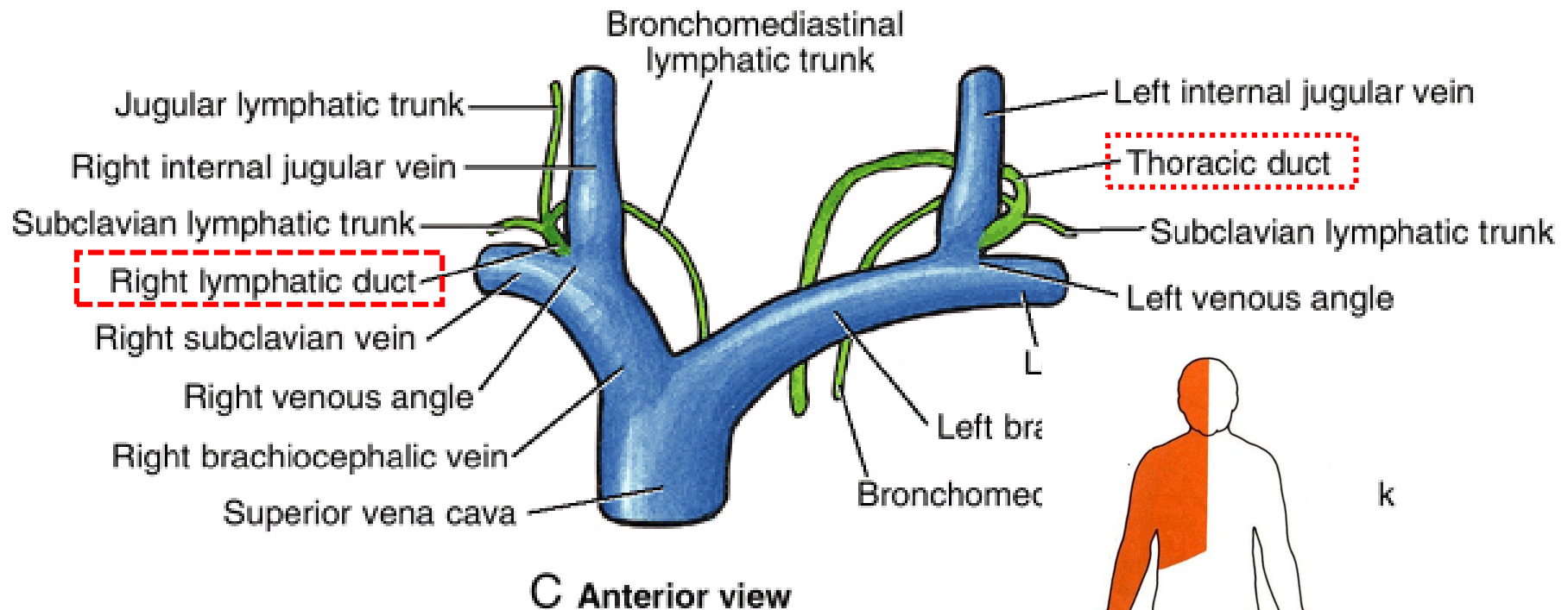
Copy Lymphatic trunk and lymphatic ductiversity

1. 腰干
2. 支气管纵膈干
3. 锁骨下干
4. 颈干
5. 肠干（单个）

1. 胸导管
2. 右淋巴导管



Lymphatic trunk and lymphatic ducts



胸导管注入左静脉角

右颈干
右锁骨下干
右支气管纵膈干

} 注入右静脉角

Factors related to lymph drainage

Quantity: 120ml/hour, 1/10 of interstitial fluid.

- ◆ Smooth muscle contraction of lymph vessel wall.
- ◆ Valve of lymphatic vessels.
- ◆ Arterial pulsation 搏动.
- ◆ Contraction of neighbouring skeleton muscle.
- ◆ Negative pressure of thoracic cavity.
- ◆ If the lymph drainage is not good, result in swelling.lymphatic swelling or edema 淋巴性水肿

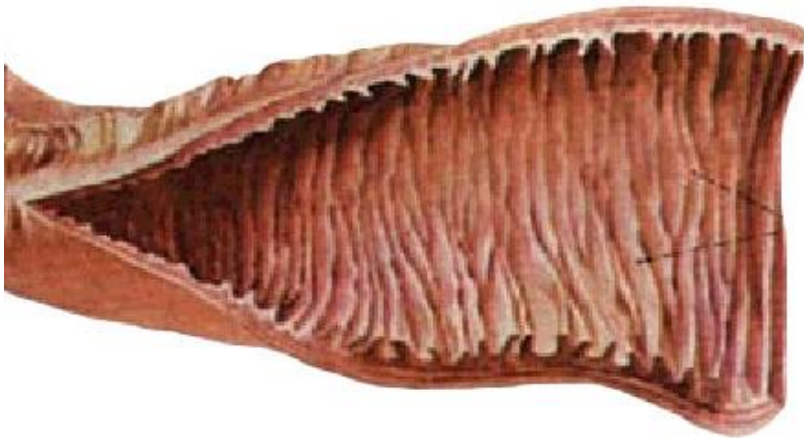
Lymphatic tissue

◆ Diffuse lymphoid tissue 弥漫性淋巴组织

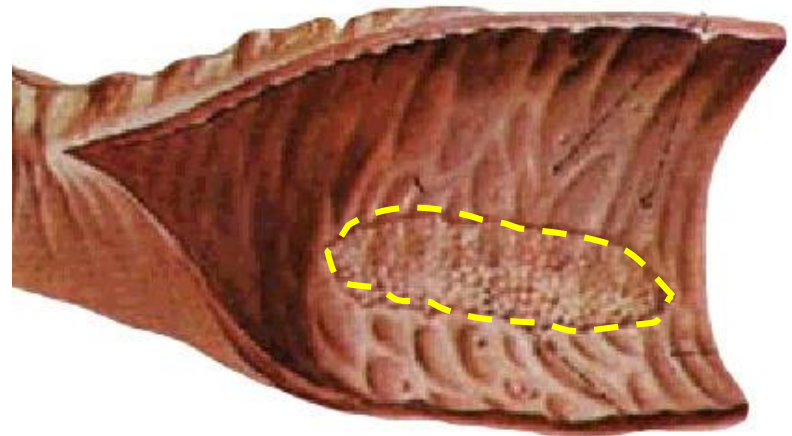
Situated in mucosa of digestive & respiratory tract

◆ Lymphatic nodule 淋巴小结

In proper layer of small intestine mucosa. there are solitary & aggregated follicles



Solitary lymphatic follicles
空肠孤立淋巴滤泡



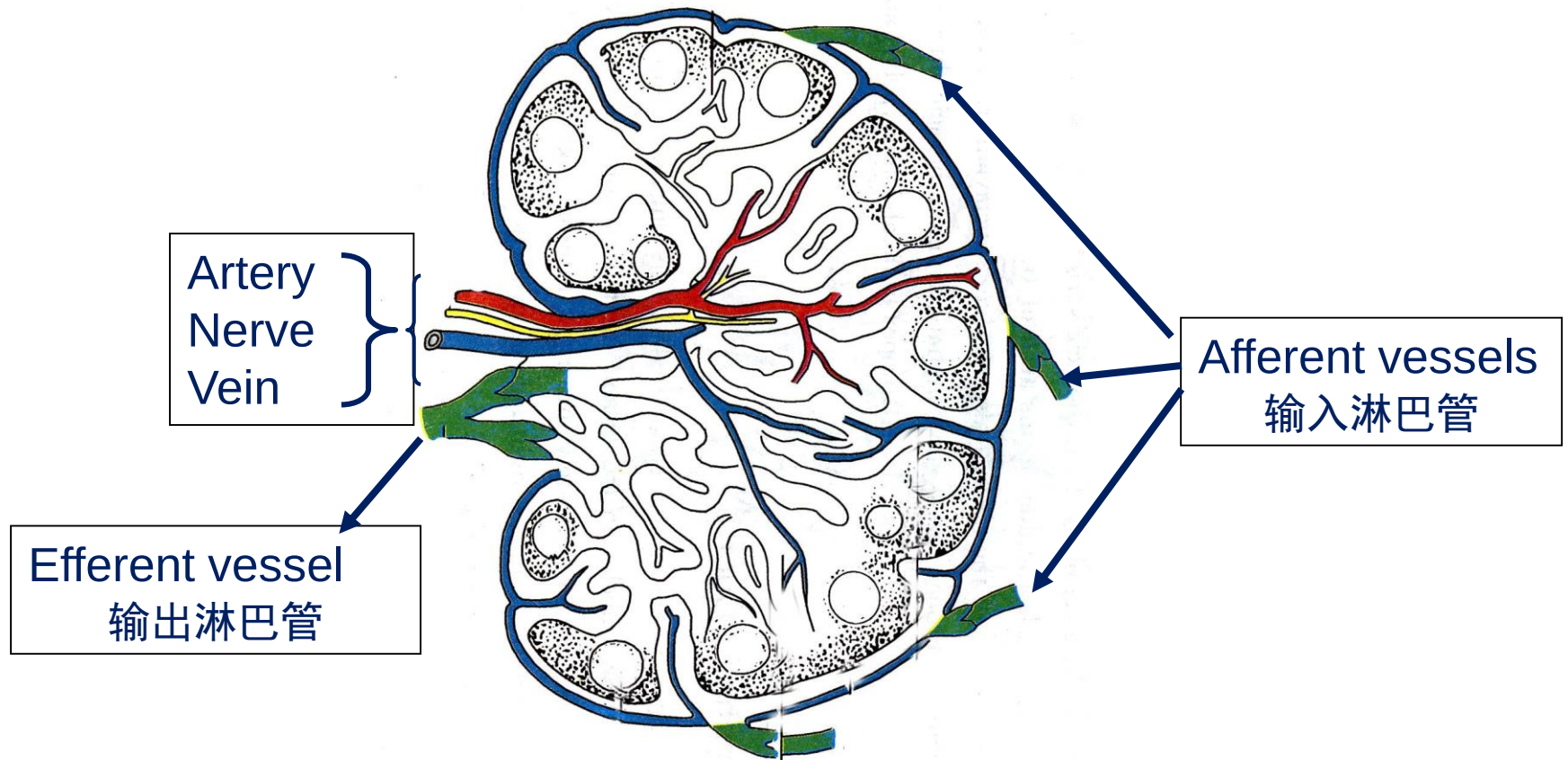
Aggregated follicles
回肠集合淋巴滤泡

Lymphatic organs 淋巴器官

- ◆ Lymph node 淋巴结
- ◆ Thymus 胸腺
- ◆ Spleen 脾
- ◆ Tonsil 扁桃体

- ◆ **Number & size** hundreds; 1~20mm in diameter
- ◆ **Distribution:** By groups, around blood vessels, run in shelter & flexed side, close to hilum, juncture between trunk & limbs
- ◆ **Location:** beaded 串珠状 lymph nodes in lymphatic vessel
- ◆ **Name:** location, sup. & deep, neighbouring organ
- ◆ **Regional (sentinel lymph node)** 局部（前哨）淋巴结
The lymph nodes draining the given region or organ are called the regional lymph node
- ◆ **Clinic importance**
Enlargement of nodes is significant in diagnosis of disease of the region or organ or metastasis

Lymph node 淋巴结



Lymph node 淋巴结



Lymphatic organ -Thymus 胸腺

- ◆ **Location:** the back of manubrium of sternum anterior part of superior mediastinum 纵膈
- ◆ **Lobes:** dissymmetric two lobes
- ◆ **Age changes:** developed in newborn (2 years)& child, degeneration and atrophy 萎缩 with age (from 15 years)

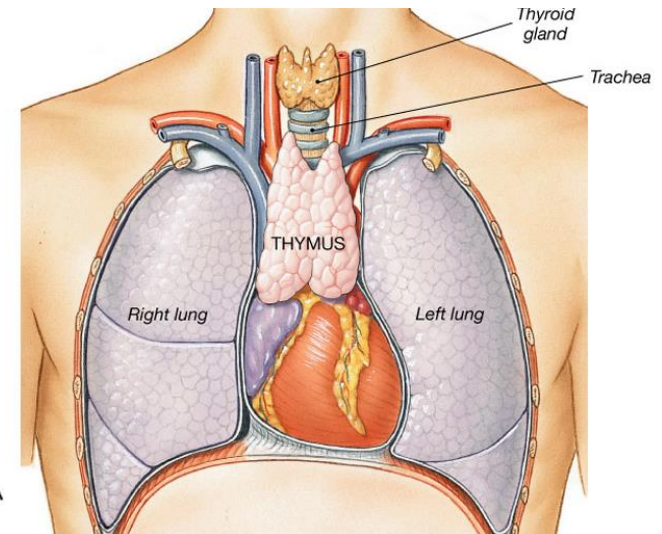
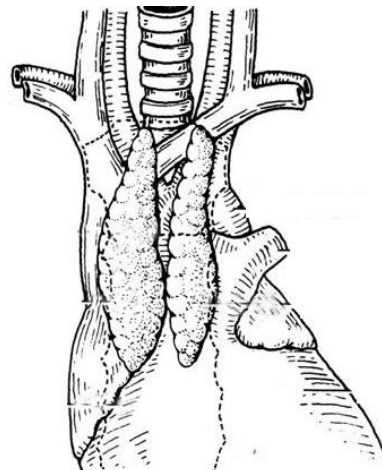
- ◆ **Function:**

Endocrine 内分泌

Thymulin 胸腺素

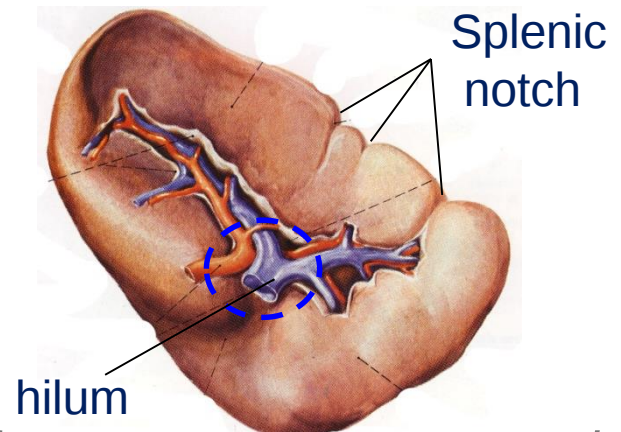
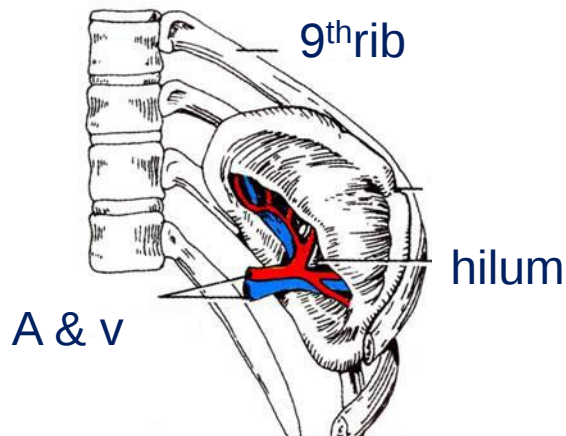
Thymosin 胸腺肽

- ◆ **T-cell Why?**

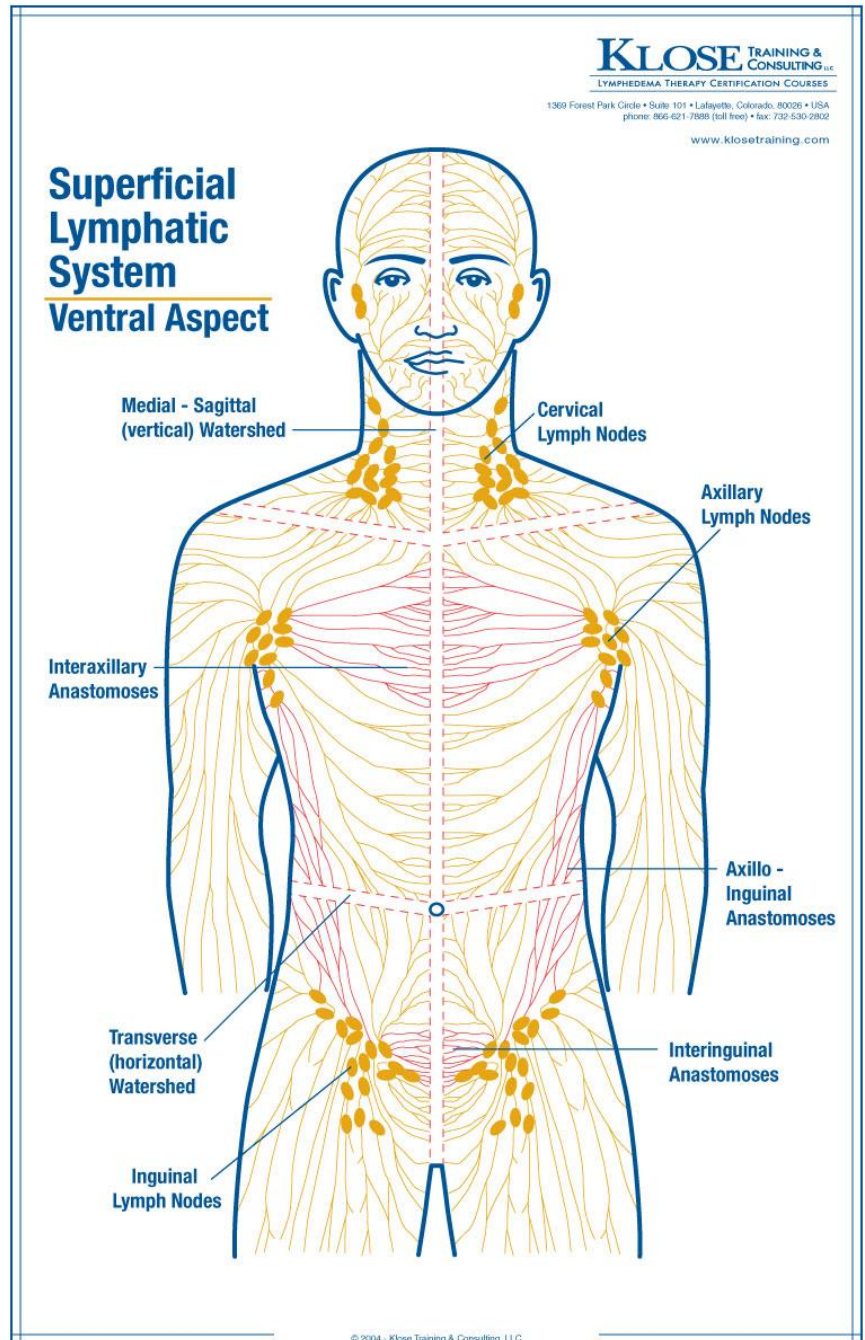


Lymphatic organ - Spleen

- ◆ **Feature** reddish or purple, weight 150g
- ◆ **Position:** deep to the left 9-11th rib
- ◆ **Appearance**
 - 2 extremities 两极, 2 surfaces, 2 borders, hilum
- ◆ **Function:** storage blood, haemagenesis, disposing aging red cell & platelet, immunologic response 免疫应答
- ◆ **Clinical importance** hypersplenism 功能亢进, lienectomy 脾摘除



The position of
important lymph
nodes & lymph
drainage all over
the body
全身重要淋巴结群
位置及回流



Lymphatic vessel & lymph nodes of head

Location: juncture of head & neck, around veins & around digestive & respiratory tract

Head:

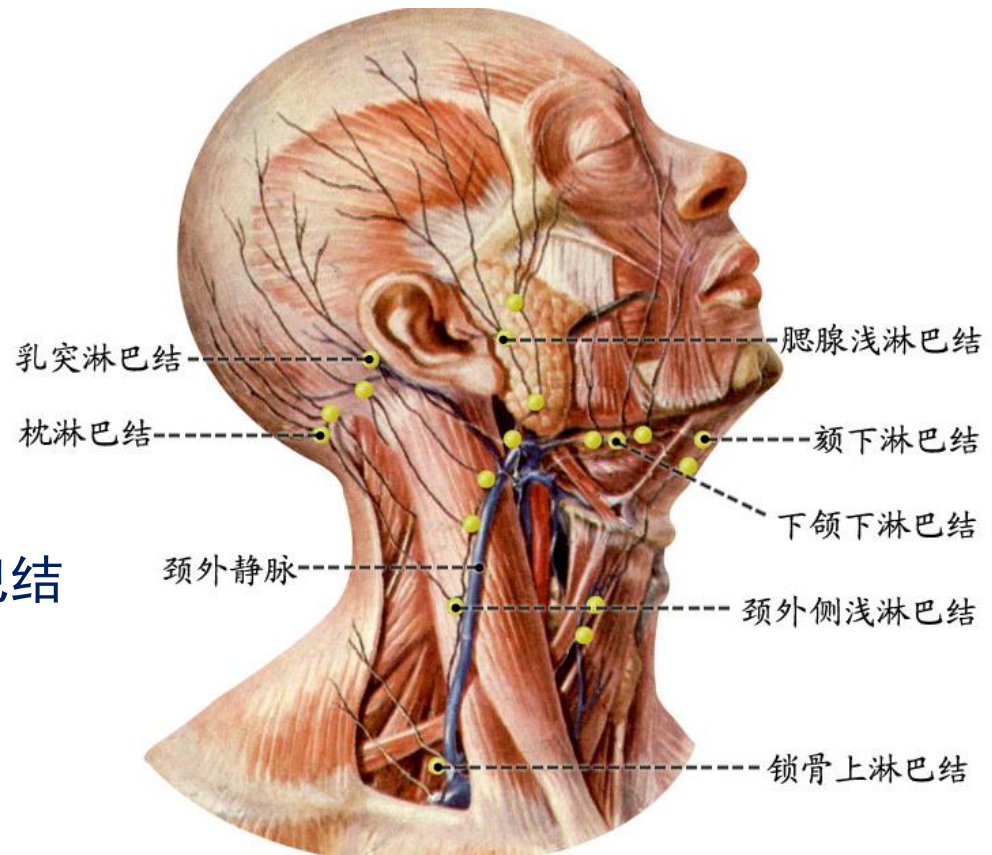
Submental Lnn. 颏下淋巴结

Submandibular Lnn. 下颌下淋巴结

Parotid Lnn. 腮腺淋巴结

Mastoid Lnn. 乳突淋巴结

Occipital Lnn. 枕淋巴结



Lymph nodes of neck

Mastoid Lnn.

乳突淋巴结

Occipital Lnn.

枕淋巴结

Parotid Lnn.

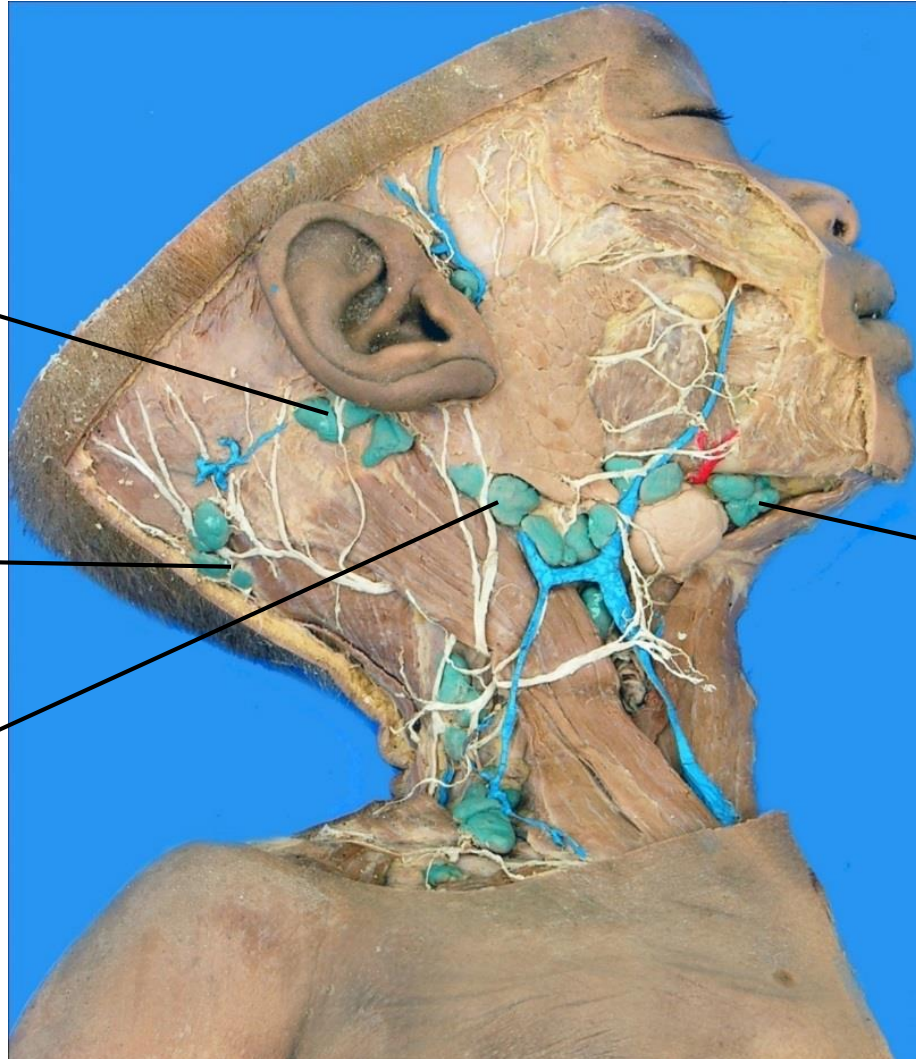
腮腺淋巴结

Submental Lnn.

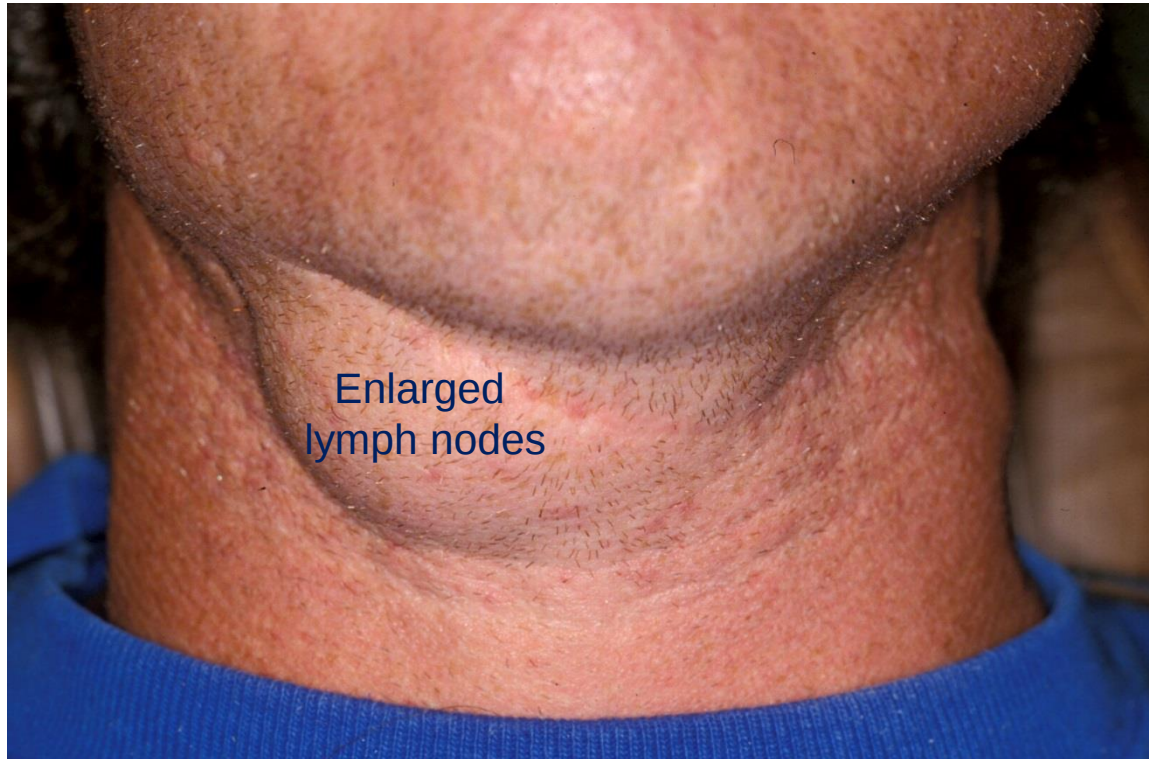
颏下淋巴结

Submandibular Lnn.

下颌下淋巴结



Lymph nodes tuberculosis (TB) of neck



Cervical lymph nodes TB
(tuberculosis)

Lymph nodes tuberculosis (TB) of neck



Ant.cervical lymph nodes 颈前淋巴结

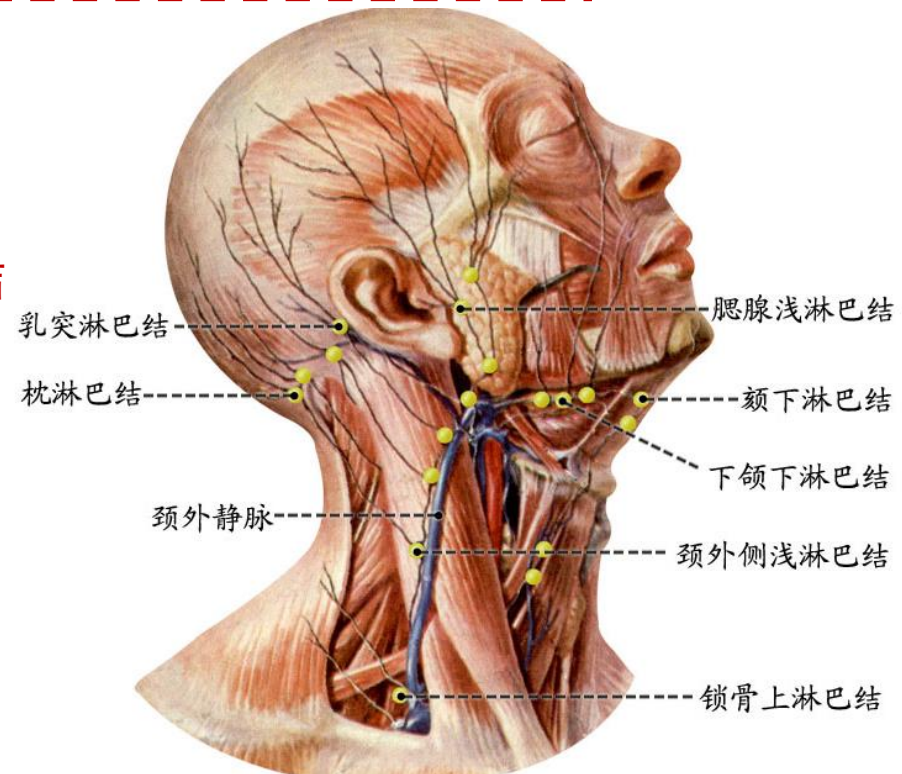
Lat.cervical lymph nodes 颈外侧淋巴结

Sup.ant.cervical Lnn. 颈前浅淋巴结

Locate around ant.jugular v.

Deep.ant.cervical Lnn. 颈前深淋巴结

1. Prelaryngeal Lnn. 喉前淋巴结
2. Thyroid Lnn. 甲状腺淋巴结
3. Pretracheal Lnn. 气管前淋巴结
4. Paratracheal Lnn. 器官旁淋巴结



Superficial lymph nodes drainage to deep lymph node.
At last. drainage to subclavian trunk

Lateral cervical lymph nodes 颈外侧淋巴结

Sup.lat.cervical Lnn. 颈外浅淋巴结

Locate around external jugular v.沿颈外静脉排列，颈淋巴结核多见。

Deep.lateral cervical Lnn.颈外深淋巴结

Locate around internal jugular v.沿颈内静脉排列

颈外侧上淋巴结：沿颈内静脉上段排列

颈外侧下淋巴结：沿颈内静脉下段排列

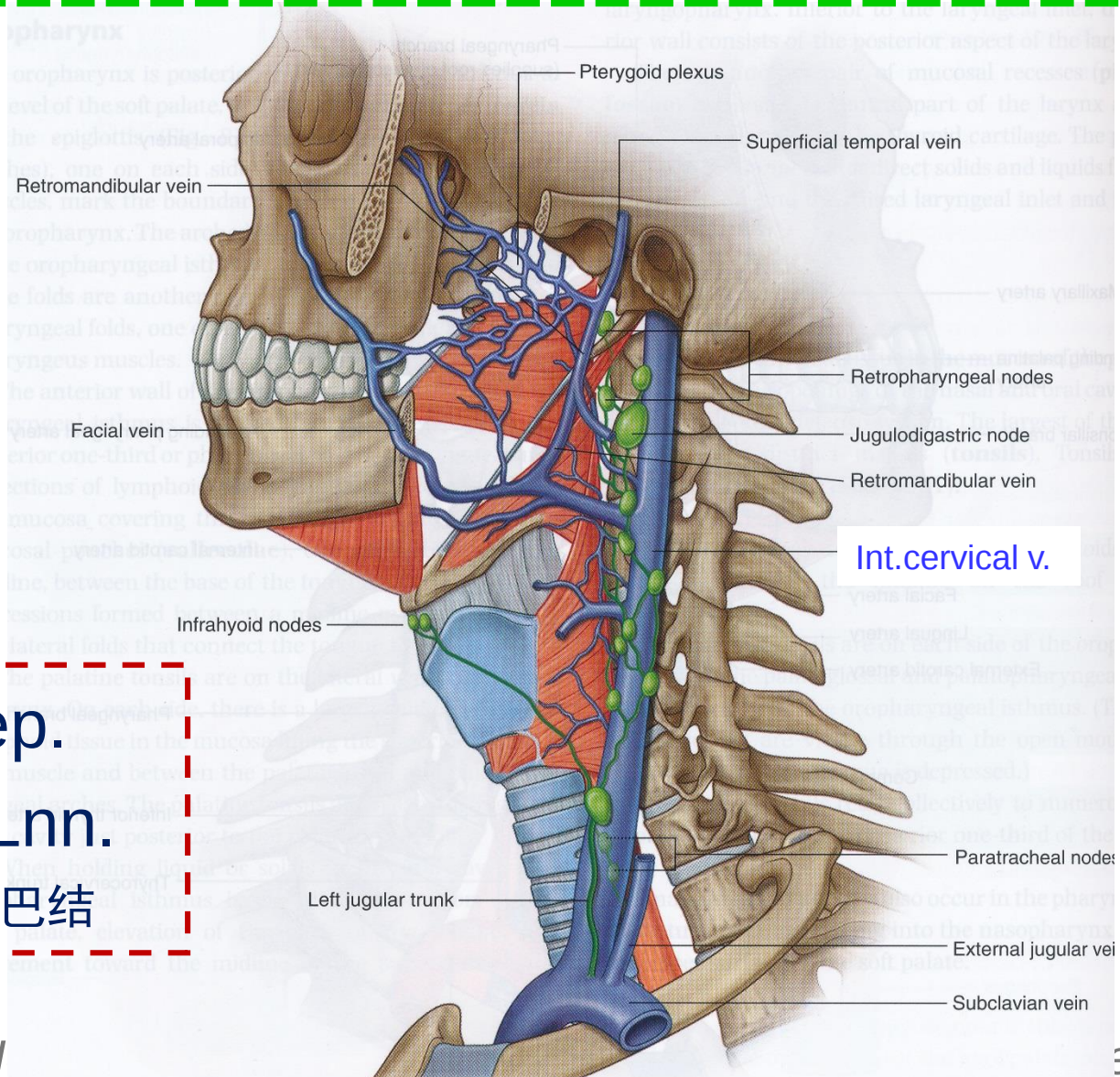
沿颈横动脉排列的淋巴结称**锁骨上淋巴结**，其中左侧的斜角肌淋巴结又称

Virchow 淋巴结：胸部、腹部（食道癌、胃癌）、盆部易转移cancer metastasis 至此淋巴结。

Superficial lymph nodes drainage to deep lymph node.

At last. drainage to subclavian trunk

Lymphatic vessel & lymph nodes of neck



Lat.deep.
cervical Lnn.
颈外侧深淋巴结

Main lymphatic vessel & Lnn. of upper limb

Position: Axillary fossa & around axillary vessels 腋窝淋巴结

Supratrochlear Ln.滑车上淋巴结

Lnn. of axillary fossa (five groups)

Pectoral Lnn.胸肌淋巴结- lat.pectoral blood vessels

Lateral Lnn.外侧淋巴结- distal segment of axillary v.

Subscapular Lnn.肩胛下淋巴结 - subscapular vessels

Central Lnn.中央淋巴结- central of axillary fossa

Apical Lnn.尖群淋巴结.-proximal segment of axillary v.

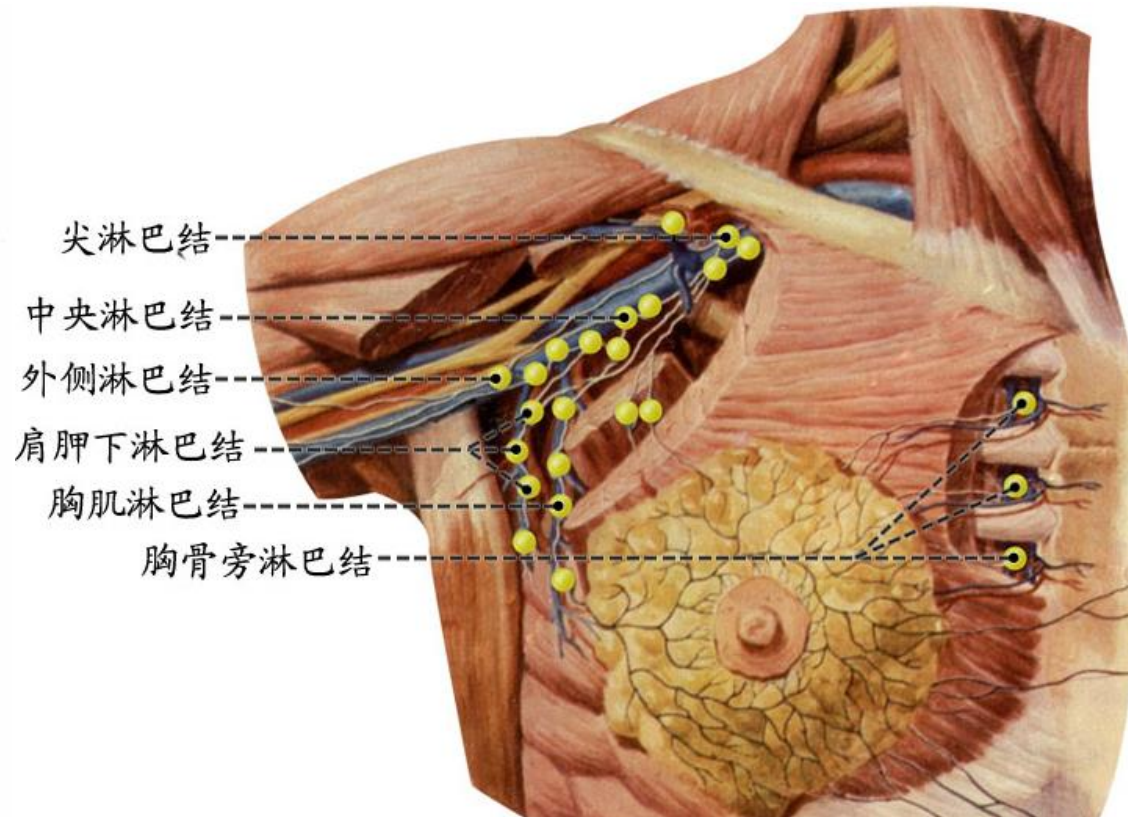
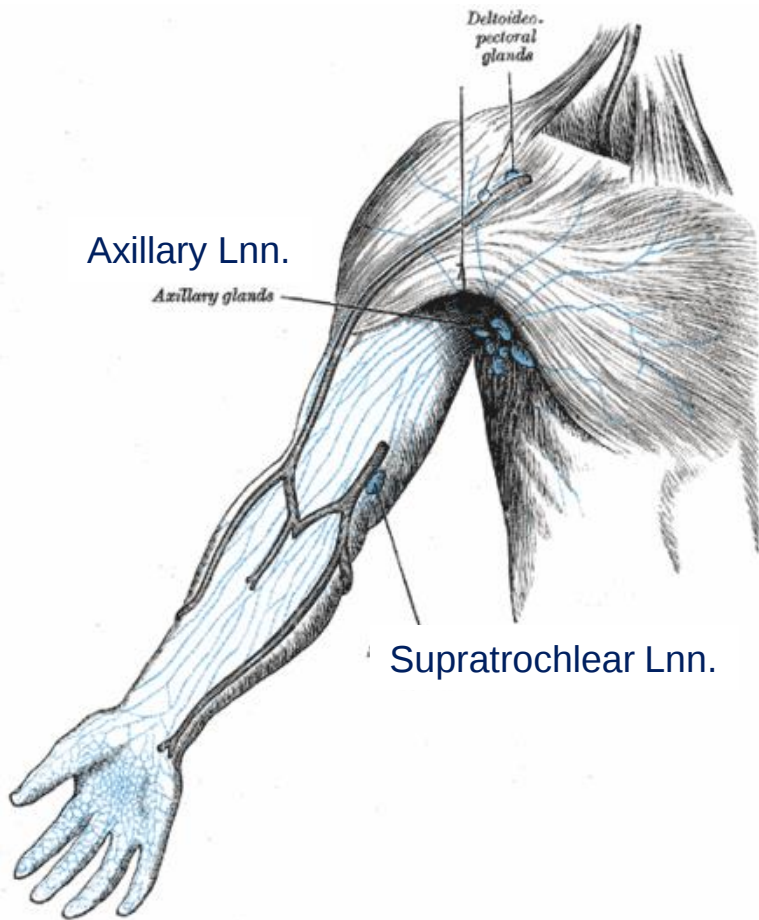
Supratrachlear Lnn. 1-3

Clinic infection of upper limb, breast carcinoma.

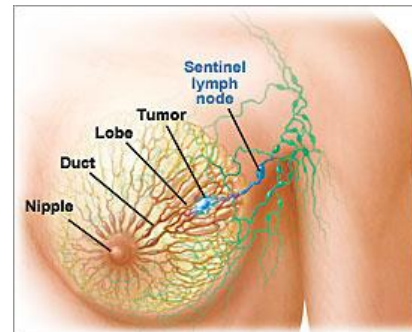
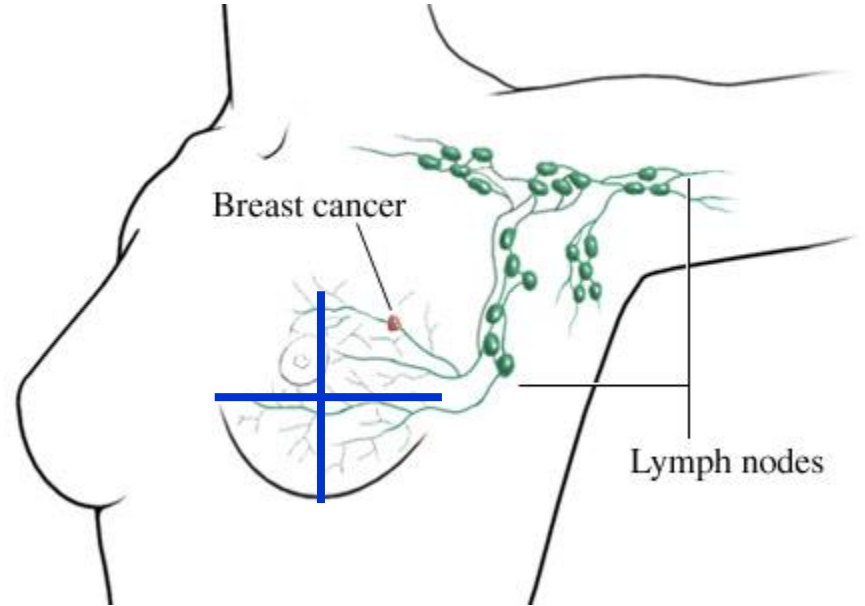
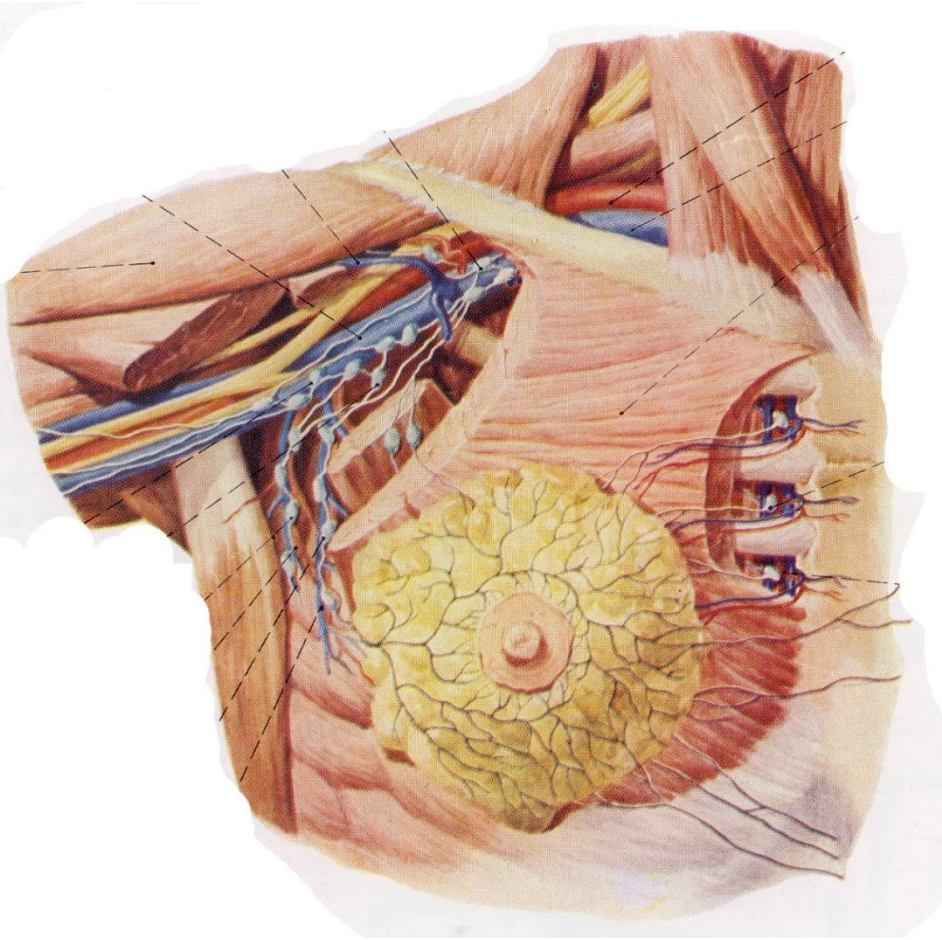
胸肌淋巴结
外侧淋巴结
肩胛下淋巴结

中央淋巴结→尖群淋巴结→锁骨下干→

左侧 胸导管
右侧 右淋巴导管



Lymph nodes of parasternal and axillary fossa



Lymphatic vessels & lymph nodes of thorax

Position: in chest wall & around viscera of thoracic cavity

Thoracic wall lymph nodes 胸壁淋巴结:

Parasternal Lnn 胸骨旁淋巴结. around internal thoracic a.& v.

Visceral lymph nodes 胸腔脏器淋巴结

Pulmonary Lnn.肺淋巴结

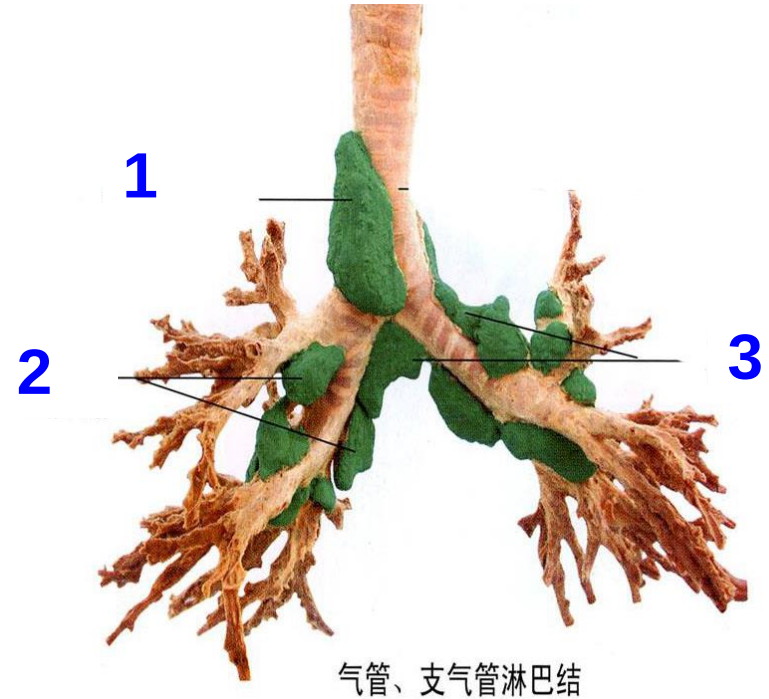
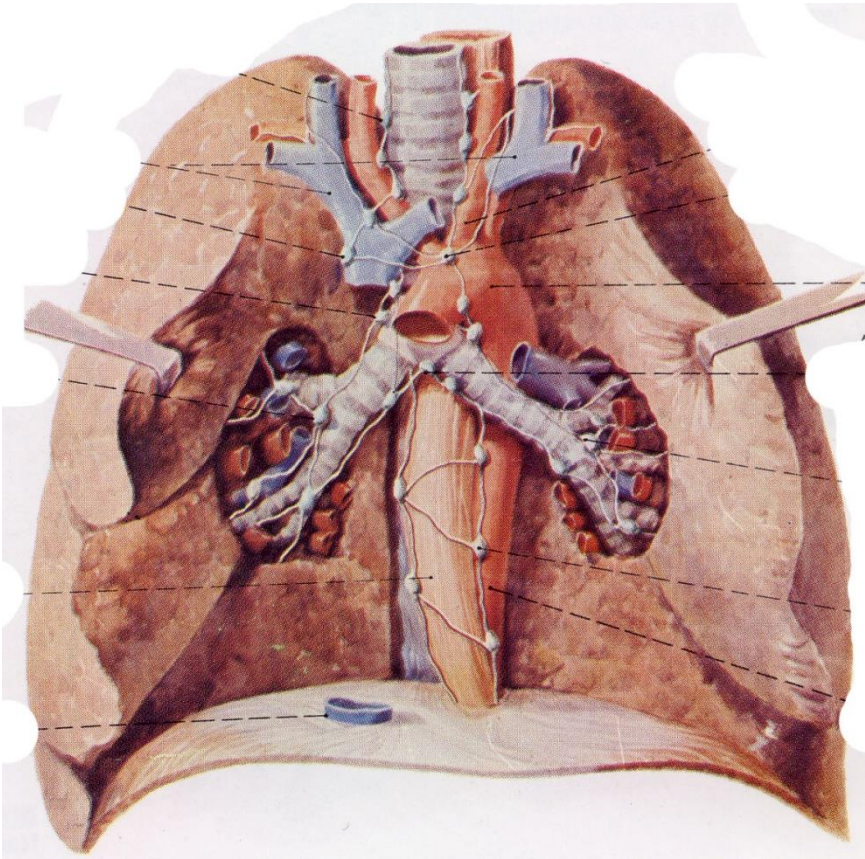
Bronchopulmonary Lnn.支气管肺淋巴结 一hilum

Tracheobronchial Lnn. 气管支气管淋巴结 一around the bifurcation

Paratrecheal Lnn. 器官旁淋巴结 一both side of trachea

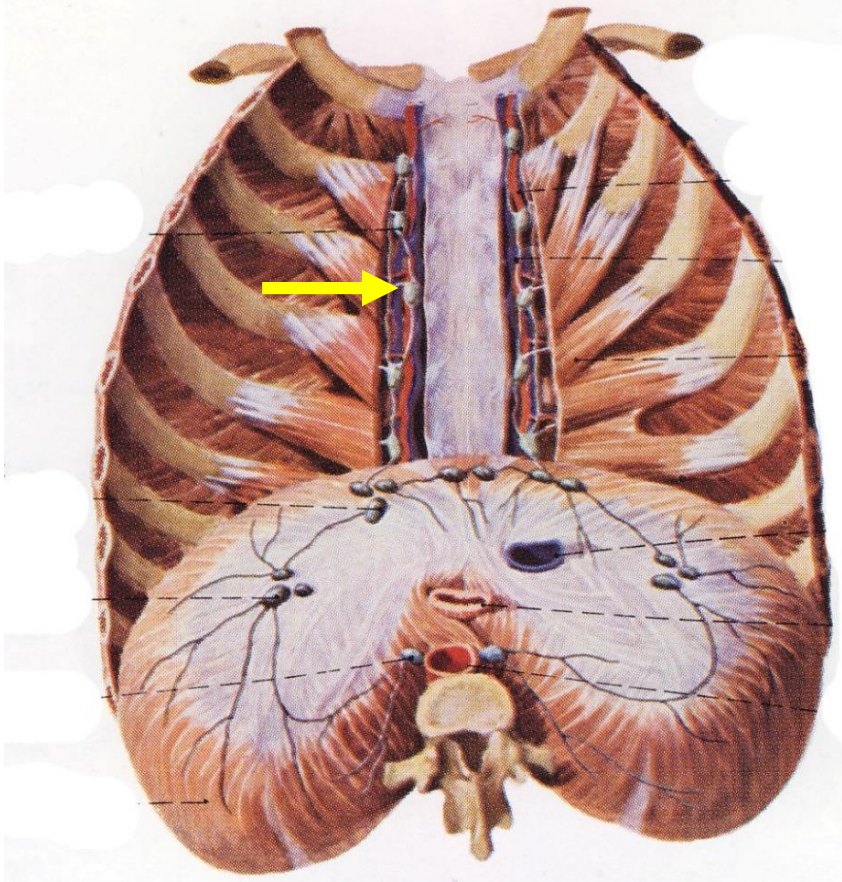
Clinic: metastasis of lung cancer

Bronchopulmonary hilar lymph nodes

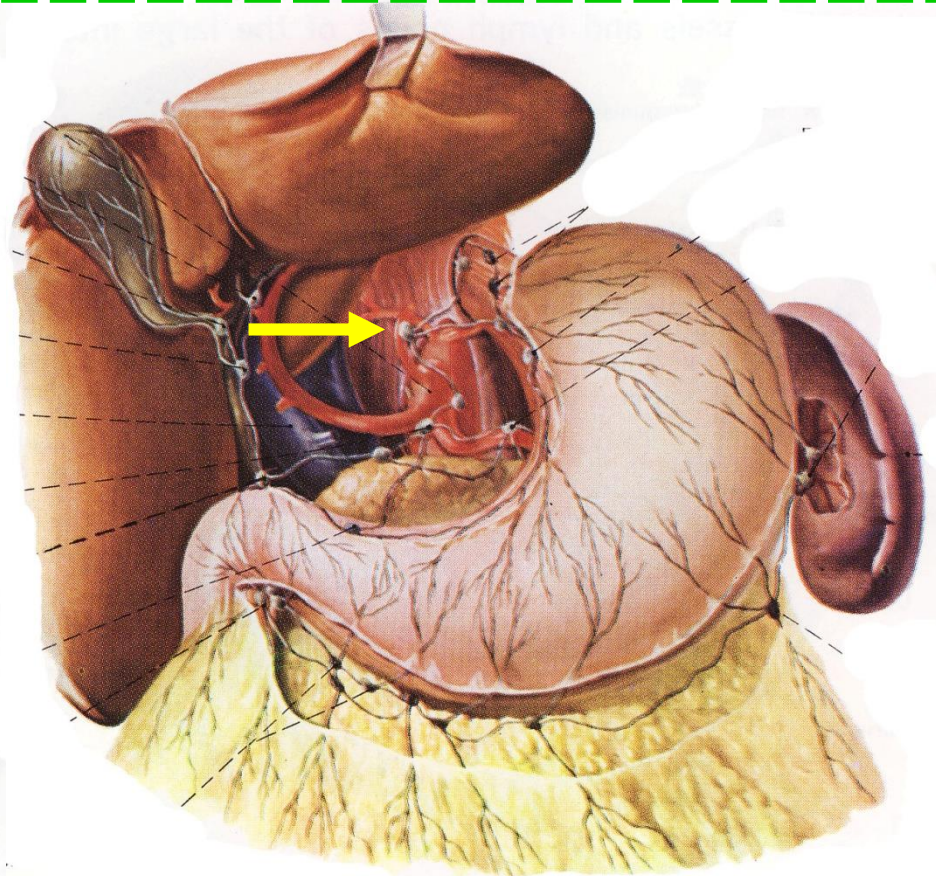


Green indicate mesenteric Lnn.

1. Pulmonary Lnn.
2. Bronchopulmonary Lnn.
Tracheobronchial Lnn.
3. Paratreacheal Lnn.

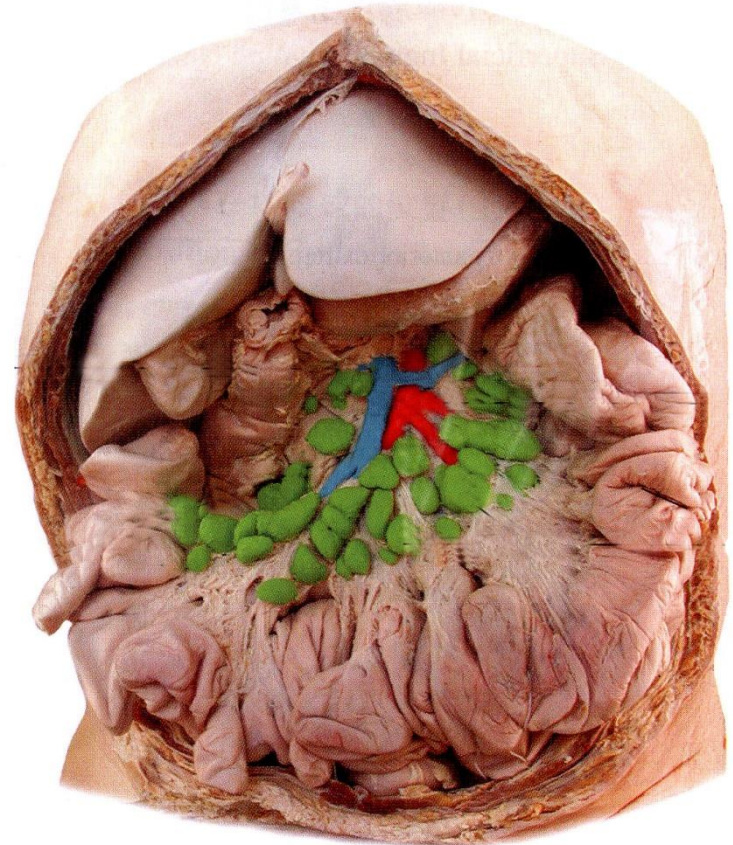
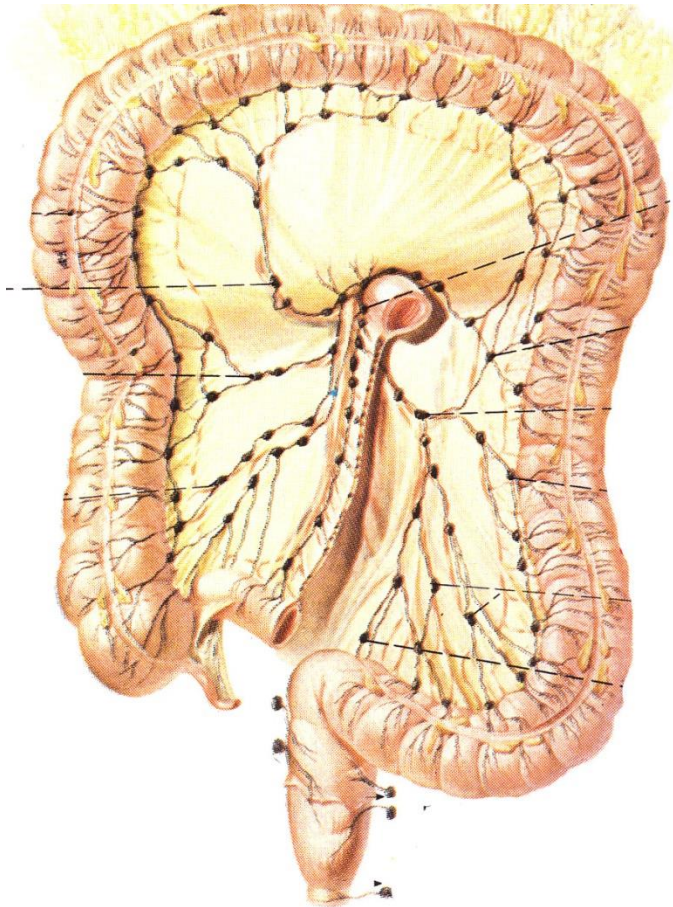


Parasternal Lnn.
胸骨旁淋巴结



Celiac Lnn.
腹腔淋巴结

Lymph node of abdominal vesera-correspond with related blood vessel



Green indicate mesenteric lymph node

Mesenteric lymph node

Lymphatic vessels & lymph nodes of lower limb

◆ Popliteal Lnn. 腘淋巴结

Superficial. group – along lesser saphenous v.

Deep. group – around popliteal blood vessels.

◆ Inguinal Lnn. 腹股沟淋巴结 - two groups

Superficial group:

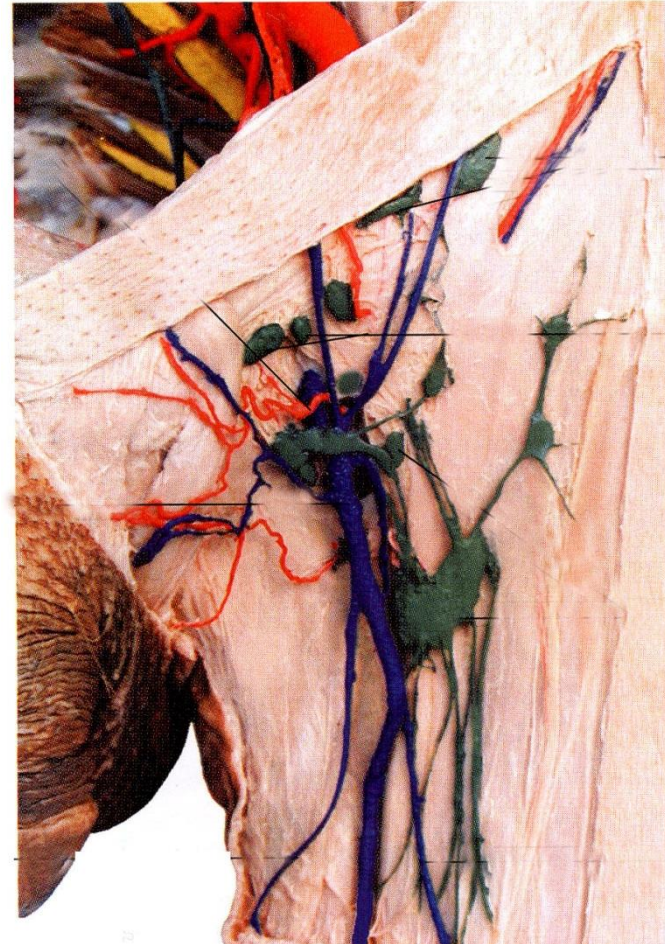
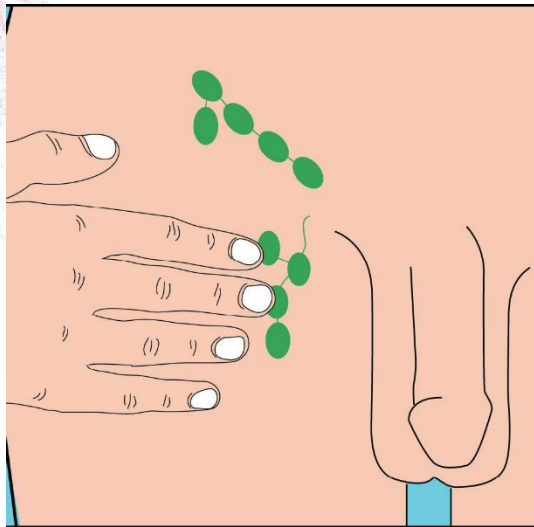
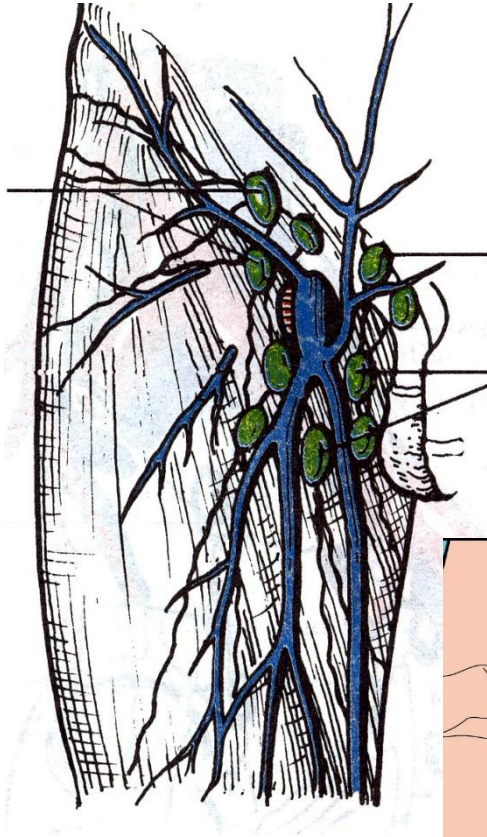
Superior group: along inguinal ligament

Inferior group: along terminal end of greater saphenous v.

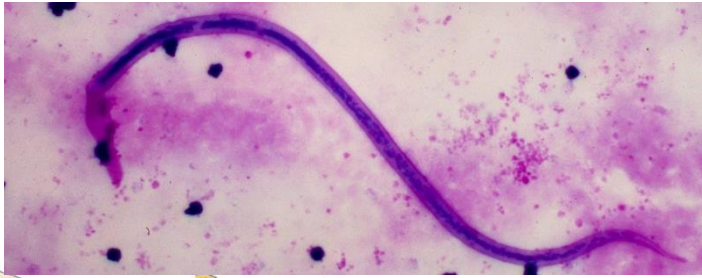
Deep group: along femoral v.

Receive the lymph from anterolateral abdominal wall, (below the umbilicus), buttocks, perineum & pelvic organs.

The clinic significance: Enlargement after infection of lower limb, pelvic organs and perineum.



Superficial lymph vessel of the lower limb



Elephantiasis

Filariasis – lymphedema
丝虫病导致的淋巴水肿



Elephantiasis-橡皮肿

Lymphangiography of the abdomen & lower limb

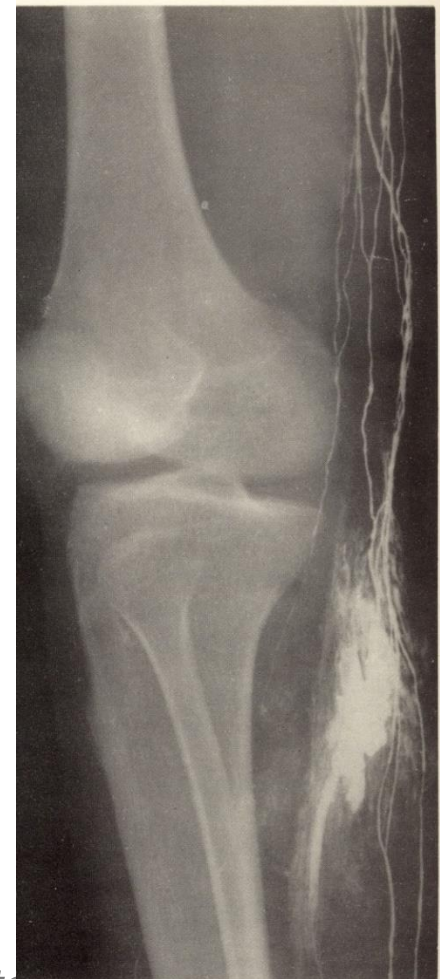
External iliac lymphatic vessel



Inguinal sup.
lymphatic vessel



Popliteal lymph node &
lymphatic vessel



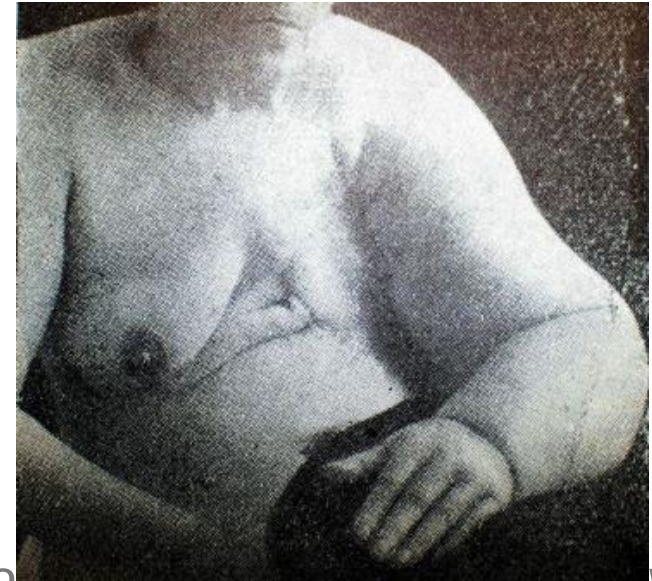
C Lymphatic filariasis or elephantiasis 橡皮腿

Lymphatic filariasis – 淋巴性丝虫病

Elephantiasis – 橡皮腿

全球有73个国家的1.4亿人受到该病的威胁，主要发生在东南亚和非洲。是由于晚间被含有丝虫的雌性蚊子叮咬后，在淋巴管内生长繁殖（一般6-8个月），导致皮肤和组织水肿。儿童时期收到感染，成年喉晚期才发病。建议使用药物处理过的文章可以起到较好的效果。

Lymphatic filariasis or elephantiasis 橡皮腿 ity



C Edema caused by lymphatic reflux disorder



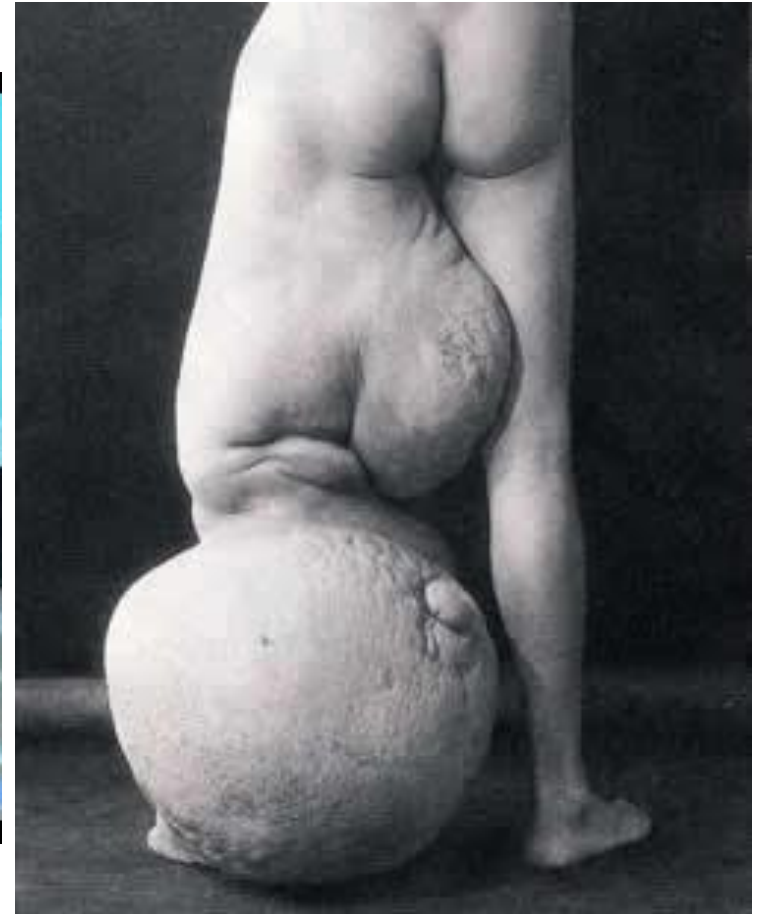
C Edema caused by lymphatic reflux disorder



Lymphedema – 淋巴水肿

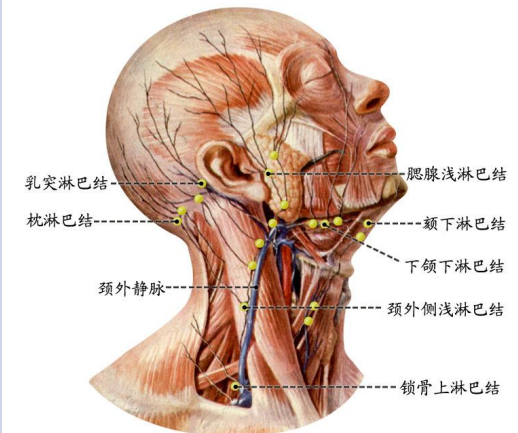


C Edema caused by lymphatic reflux disorder



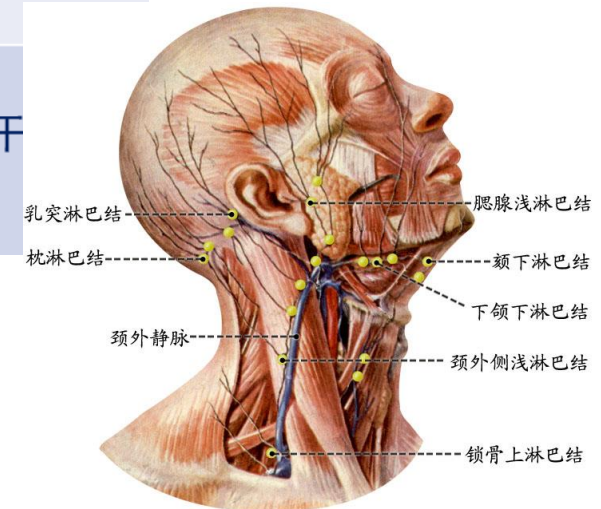
头部的淋巴结-Lymph nodes of the head

名称	位置	引流范围	输出管流注
颌下淋巴结	颌下部	颌部、下唇中部、舌尖	颈外侧淋巴结
下颌下淋巴结	下颌下腺周围	颜面、口腔、颌下腺周围	
腮腺淋巴结	腮腺表面及实质内	颅顶、颞区、耳郭、腮腺	
耳后淋巴结	乳突周围	乳突附近	
枕淋巴结	枕部皮下	枕部、项部	



颈部的淋巴结-Lymph nodes of the neck

名称	位置	引流范围	输出管流注
颈前淋巴结	舌骨下、喉、甲状腺和颈段气管前方	所在局部的淋巴	颈外侧淋巴结
颈外侧浅淋巴结	沿颈外静脉排列	枕部、耳后及腮腺区	颈外侧深淋巴结
颈外侧深淋巴结 上群：如咽后淋巴结 下群：如锁骨上淋巴结	沿颈内静脉排列	接受头面部及颈浅、深部的淋巴	颈干



上肢的淋巴结-Lymph nodes of upper limb

名称	位置	引流范围	输出管流注
肘淋巴结 (滑车上淋巴结)	肱骨内上髁上方	手和前臂的尺侧	腋淋巴结
腋淋巴结群 - 胸肌淋巴结 - 外侧淋巴结 - 肩胛下淋巴结 - 中央淋巴结 - 尖淋巴结	腋窝内: 沿胸外侧血管排列 沿腋静脉排列 沿肩胛下血管排列 位于腋窝中央 锁骨下方, 腋静脉近端	胸壁、乳房、上腹壁 上肢 肩背部 以上范围	<pre> graph LR A[胸肌淋巴结] --- B[中央淋巴结群] C[外侧淋巴结] --- B D[肩胛下淋巴结] --- B B --> E[尖淋巴结] E --> F[锁骨下干] </pre>

Cop 胸部淋巴结-Lymph nodes of the thorax ity

内容	名称	位置	引流范围	输出管流注
胸壁淋巴结	胸骨旁淋巴结 肋间淋巴结 膈上淋巴结	沿胸廓内血管排列 肋小头附近 位于膈的胸腔面	胸、腹前壁深部及乳房 胸后壁深部 膈、心包及肝上面	支气管纵隔干 胸导管 胸骨旁淋巴结或纵隔前、后淋巴结
胸腔器官淋巴结	纵隔前淋巴结 纵隔后淋巴结 肺淋巴结 支气管肺淋巴结 气管支气管淋巴结 气管旁淋巴结	上纵隔前部和后纵隔 上纵隔后部和后纵隔 沿肺内支气管 肺门处 气管杈周围 气管周围	胸腺、心包、心、胸膜 心包、食管、胸主动脉、膈 } 肺、支气管、气管	支气管纵隔干 胸导管 } 支气管纵隔干

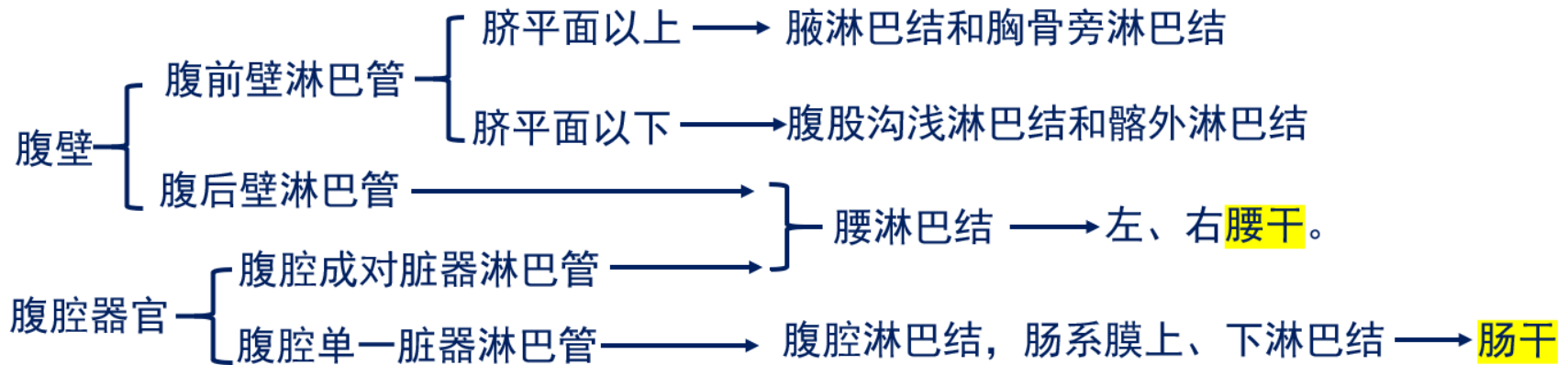
盆部淋巴结-Lymph nodes of the pelvis

名称	位置	引流范围	输出管流注
髂外淋巴结	沿髂外血管排列	下肢、腹前壁下部、膀胱、前列腺、子宫颈、阴道上部	 髂总淋巴结
髂内淋巴结	沿髂内动脉及其分支排列	大部分的盆壁和盆腔脏器、会阴部、臀部及大腿后面	
骶淋巴结	骶骨前面	盆后壁、直肠后面、及子宫(部分)	
髂总淋巴结	沿髂总血管排列	下肢、盆壁及盆腔脏器	→腰淋巴结→腰干

下肢淋巴结-Lymph nodes of lower limb

名称	位置	引流范围	输出管流注
腓淋巴结	腓窝	足外侧缘和小腿后外侧的浅淋巴以及足和小腿深部的淋巴	腹股沟深淋巴结
腹股沟浅淋巴结	上群：沿腹股沟韧带下方排列 下群：沿大隐静脉末端排列	腹前壁下部、臀部、会阴及外生殖器，除了足外侧缘和小腿后部之外的下肢大部分的浅淋巴	腹股沟深淋巴结或髂外淋巴结
腹股沟深淋巴结	股管内	下肢深部和会阴部的淋巴、也收集腹股沟浅淋巴结和腓淋巴结的输出管	髂外淋巴结

腹部淋巴结-Lymph nodes of the abdomen



腹腔淋巴结 Celiac lymph nodes

【位置】位于腹腔干或腹腔动脉周围，

【输入管来源】胃左、右淋巴结、胃网膜左、右淋巴结，幽门上、下淋巴结、肝淋巴结、胰淋巴结、脾淋巴结。

【引流范围】肝、胆、胃、胰、脾、十二指肠的淋巴。

【输出管注入】参与组成肠干。

肠系膜上、下淋巴结 Superior & inferior mesenteric lymph nodes

【位置】位于肠系膜上、下动脉的根部周围。

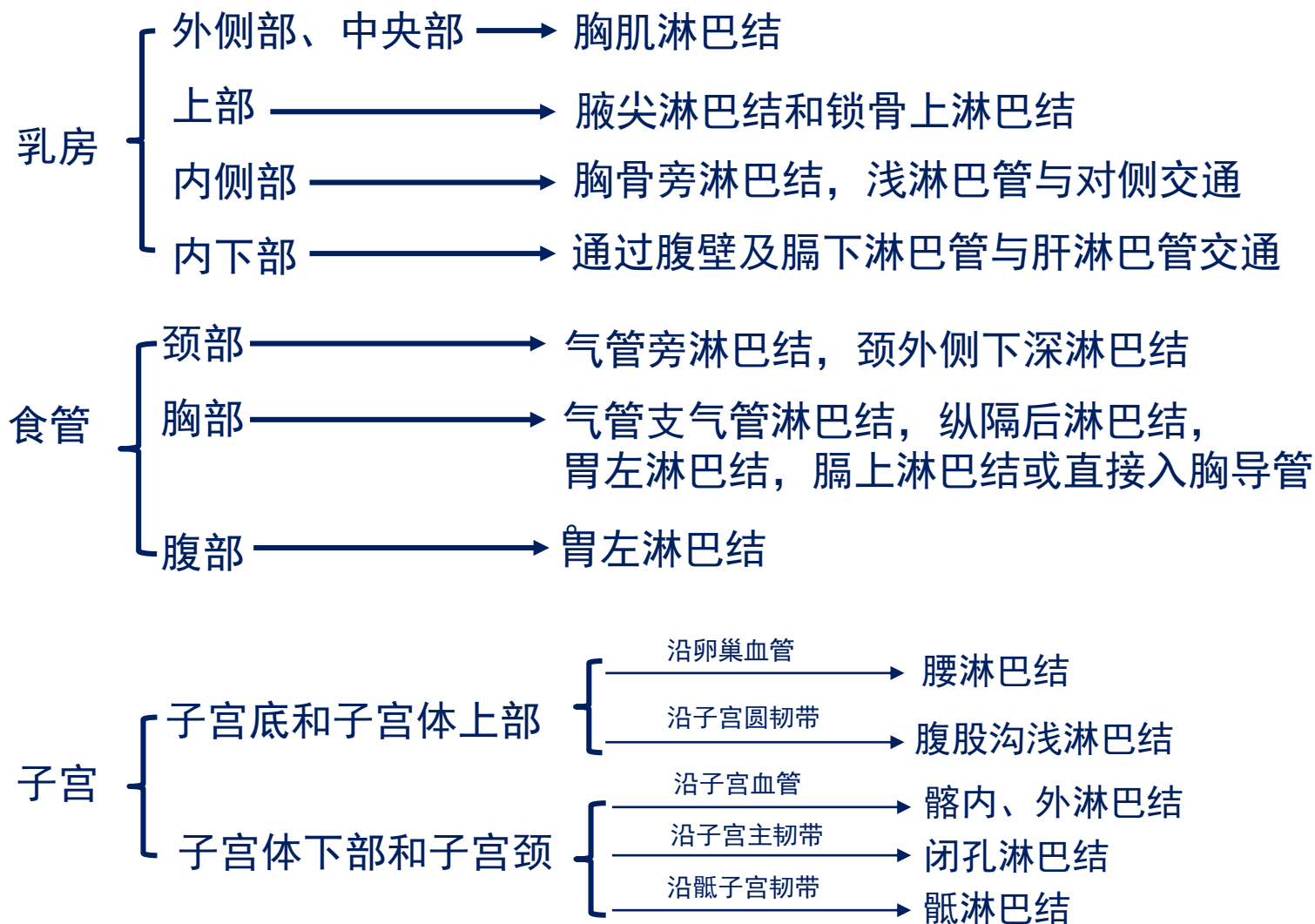
【输入管来源】

肠系膜上淋巴结—肠系膜淋巴结、回结肠淋巴结、右结肠淋巴结、中结肠淋巴结。

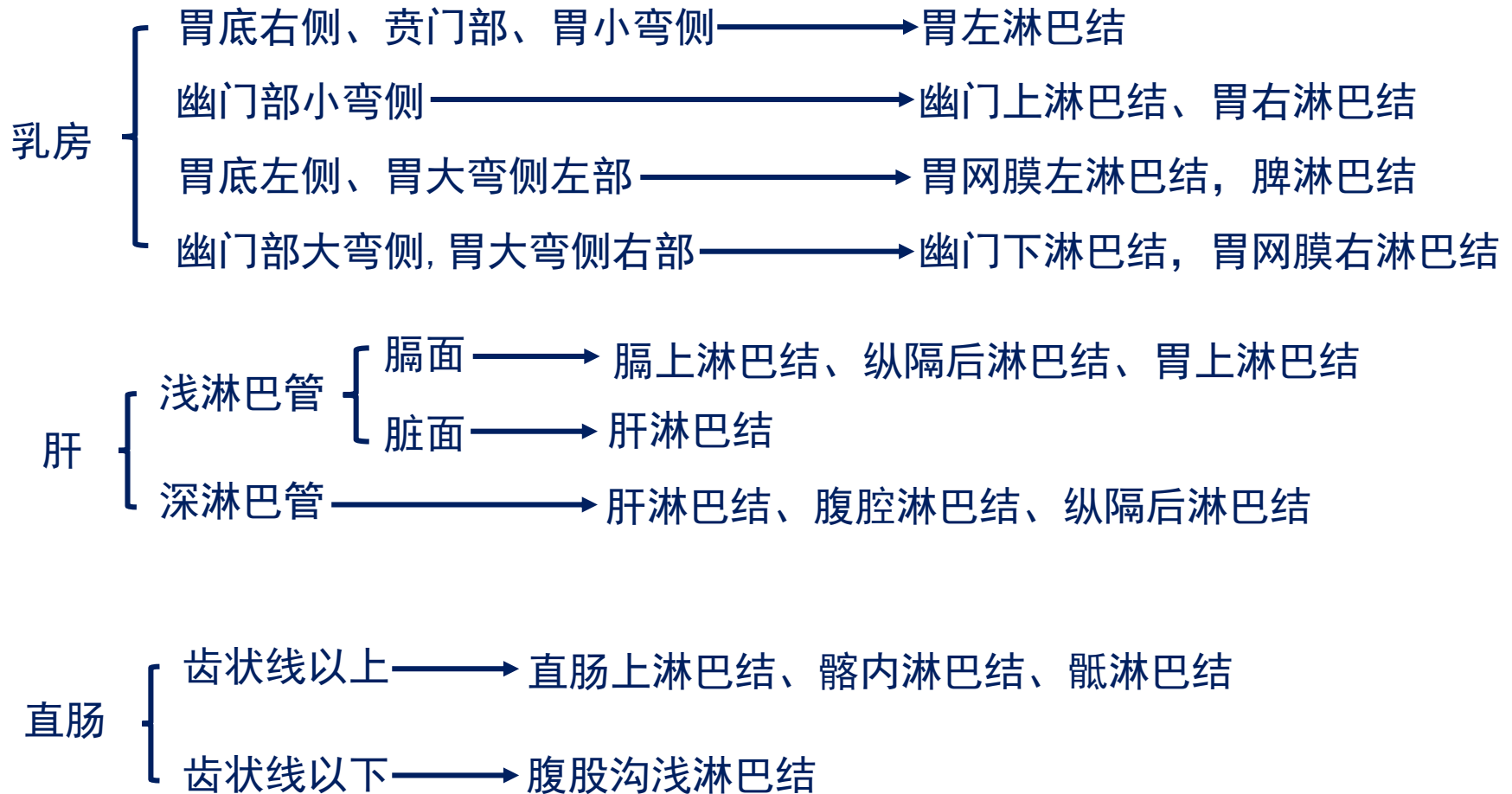
肠系膜下淋巴结—左结肠淋巴结、乙状结肠淋巴结、直肠上淋巴结。

【引流范围】来自小肠和大肠的淋巴结。

【输出管注入】参与组成肠干。



胃、肝、直肠的淋巴引流



淋巴系统小结

1. 淋巴系统包括淋巴组织，淋巴器官和淋巴管道。可以看作是静脉的辅助部分。具有产生淋巴细胞、过滤淋巴液、参与免疫过程的作用。
2. 淋巴管道包括毛细淋巴管、淋巴管、淋巴干（9条）和淋巴导管（2条）四种。淋巴器官包括扁桃体、胸腺，脾和淋巴结。淋巴组织包括位于消化道和呼吸道等处的淋巴小结等。
3. 淋巴结为椭圆或圆形的灰红色小体，直径2-25mm不等，与输入和输出淋巴管相连，常聚集成群，多沿血管排列，位于身体屈侧凹陷处或器官的门附近。
4. 局部淋巴结或前哨淋巴结在肿大常反映其引流范围的病变。肿瘤经淋巴道转移是肿瘤转移的重要途径。掌握个脏器局部淋巴结的位置与淋巴引流有重要意义。
5. 临床上各种原因导致的淋巴回流不畅，可以可导致引流区域的水肿。

1. Lymphatic system 淋巴系统
2. Lymphatic capillary 毛细淋巴管
3. cisterna chyli 乳糜池
4. Spleen 脾
5. Thymus 胸腺
6. lymphatic trunk 淋巴干
7. Lymphatic vessel 淋巴管
8. lymph node 淋巴结
9. Regional lymph node 局部淋巴结
10. Submandibular lymph node 下颌下淋巴结
11. Superficial anterior cervical lymph node
颈前浅淋巴结
12. Paratracheal lymph node 气管旁淋巴结
13. Axillary lymph node 腋淋巴结

1. Superior phrenic lymph node 膈上淋巴结
2. Internal iliac lymph node 髂内淋巴结
3. Deep inguinal lymph node 腹股沟深淋巴结
4. Tissue fluid 淋巴液
5. Lymphedema 淋巴性水肿
6. Diffuse lymphatic tissue 弥漫淋巴组织
7. Lymphatic nodule 淋巴小结
8. Tonsil 扁桃体
9. Inflammation 炎症
10. Humoral immunity 体液免疫
11. Immunoglobulin 免疫球蛋白
12. Edema 水肿

The end !



Good Bye!