核心課程解剖學
2023

錢宗良教授

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110 學年度核心課程解剖學進度表

（甲班）物治系、職治系、護理系　教室：基301

日期	時間	主題	教師
09/06 (W)	9:10-10:00	Introduction	錢宗良
	10:10-12:10	Tissues (General Histology)	錢宗良
09/13 (W)	8:10-12:10	Skeletal System I	王淑慧
09/20 (W)	8:10-12:10	Skeletal System II/ Muscular System I	王淑慧
09/27 (W)	8:10-10:00	Muscular System II	王淑慧
	10:20-12:10	**Lab. I**	**全體教師**
10/04 (W)	9:10-12:10	Cardiovascular System	黃敏銓
10/11 (W)	9:10-12:10	Digestive System	李立仁
10/18 (W)	**9:10-12:10**	**Midterm Exam & Lab. Test I**	**全體教師**
10/25(W)	9:10-12:10	Nervous System I	錢宗良
11/01 (W)	9:10-12:10	Nervous System II	錢宗良
11/08 (W)	9:10-12:10	Somatic and Special Sense	廖孟琳
11/15 (W)	校慶 (停課不停班)		
11/22 (W)	9:10-12:10	Endocrine and Female Reproductive System	龔秀妮
11/29 (W)	9:10-12:10	Urinary and Male Reproductive System	張銘峰
12/06 (W)	**9:10-12:10**	**Lab. II**	**全體教師**
12/13 (W)	9:10-12:10	Lymphatic and Respiratory System	林能裕
12/20 (W)	**9:10-12 :10**	**Final Exam & Lab. Test II**	**全體教師**

Midterm Exam 範圍: 10/11 (含)以前課程

Final Exam 範圍: 10/25(含)以後課程，地點由教務分處統一分配

Lab. Test I 範圍: 9/27 Lab I 實習課程內容，

時間: Midterm Exam 筆試完後同地點考幻燈片(實體與模型)

Lab. Test II 範圍: 12/06 Lab II. 實習課程內容，

時間: Final Exam 筆試完後同地點考幻燈片(實體與模型)

平時成績 (10%): 實習課程及考試準時出席

期中、期末考試主要題型：選擇、是非、配合

負責助教：楊耀華 (23123456分機 262212)

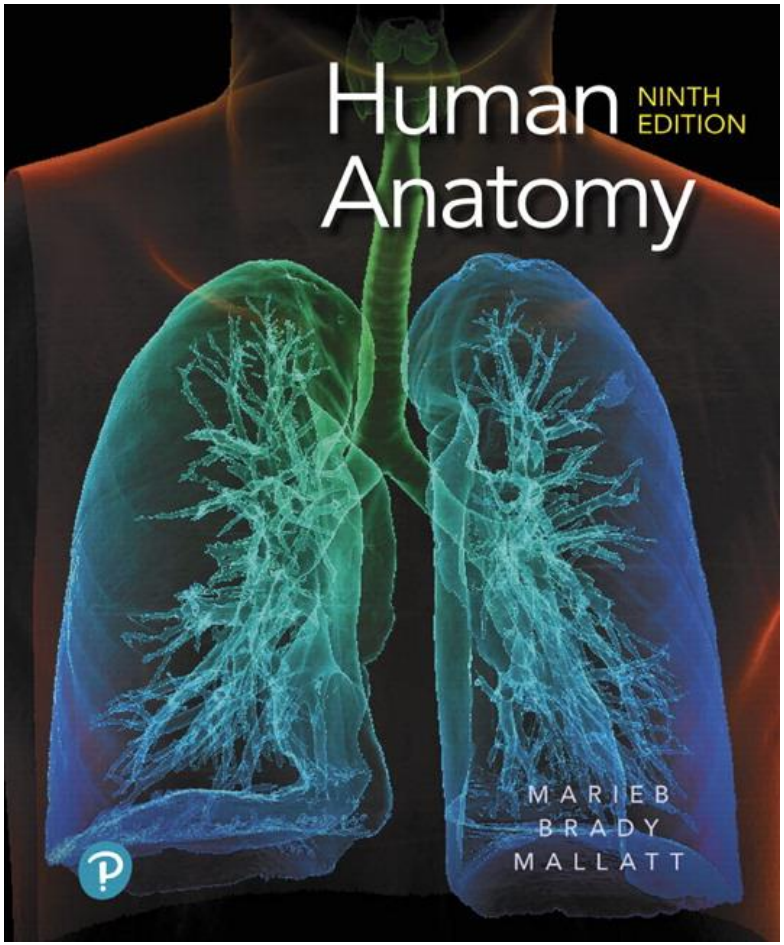
請選修課程同學請至乙班上課

Textbook:

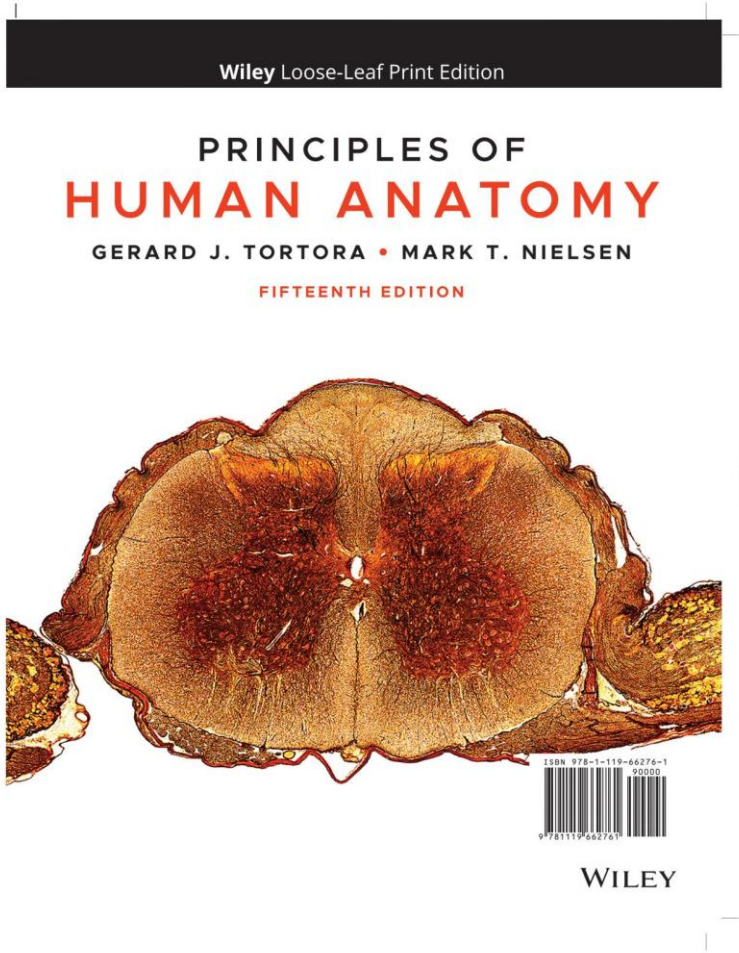
(1) **Human Anatomy.** MARIEB et al. (2019) 9th ed. Pearson Edu., Inc.

(2) **Principles of Human Anatomy.**

G. J. Tortora and M.T. Nielsen (2020) 15th ed. John Wiley & Sons, Inc.



台灣代理：偉明圖書

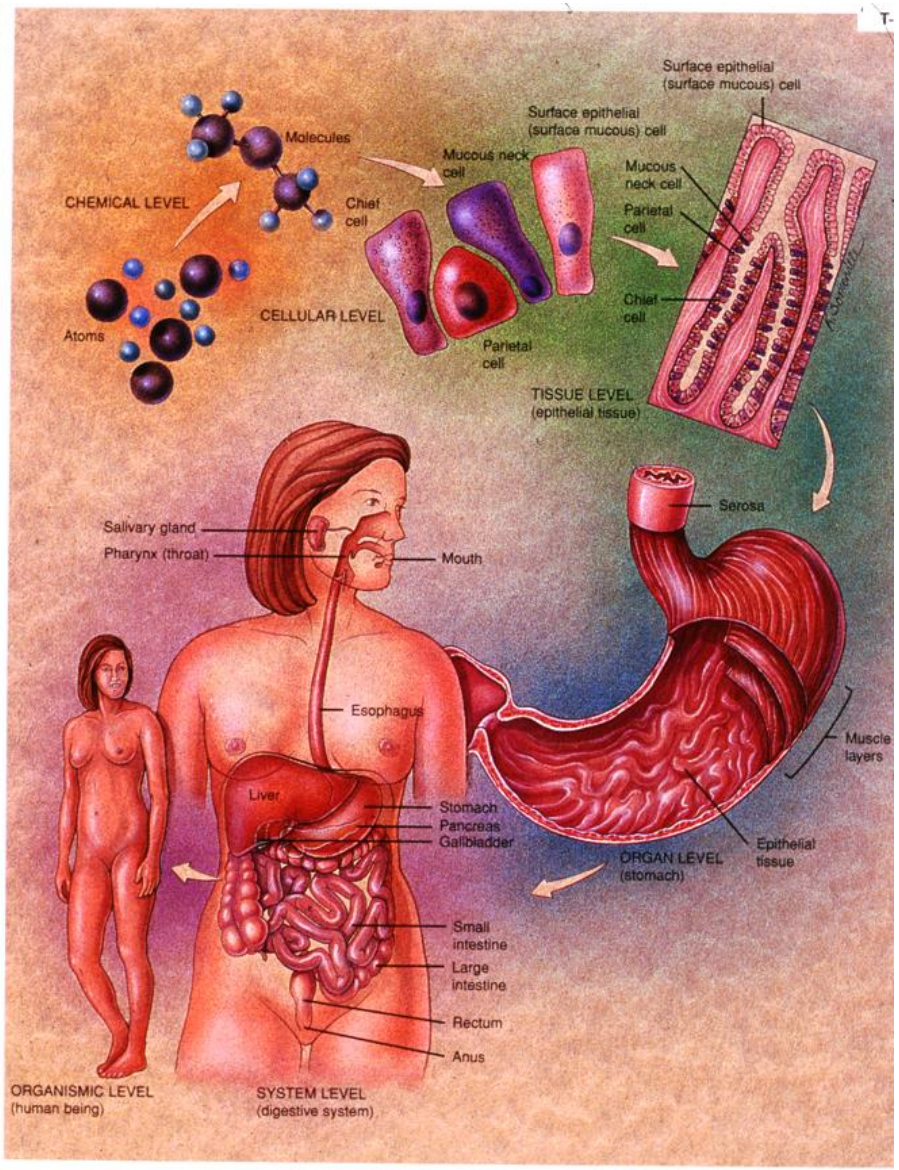


台灣代理：合記書局

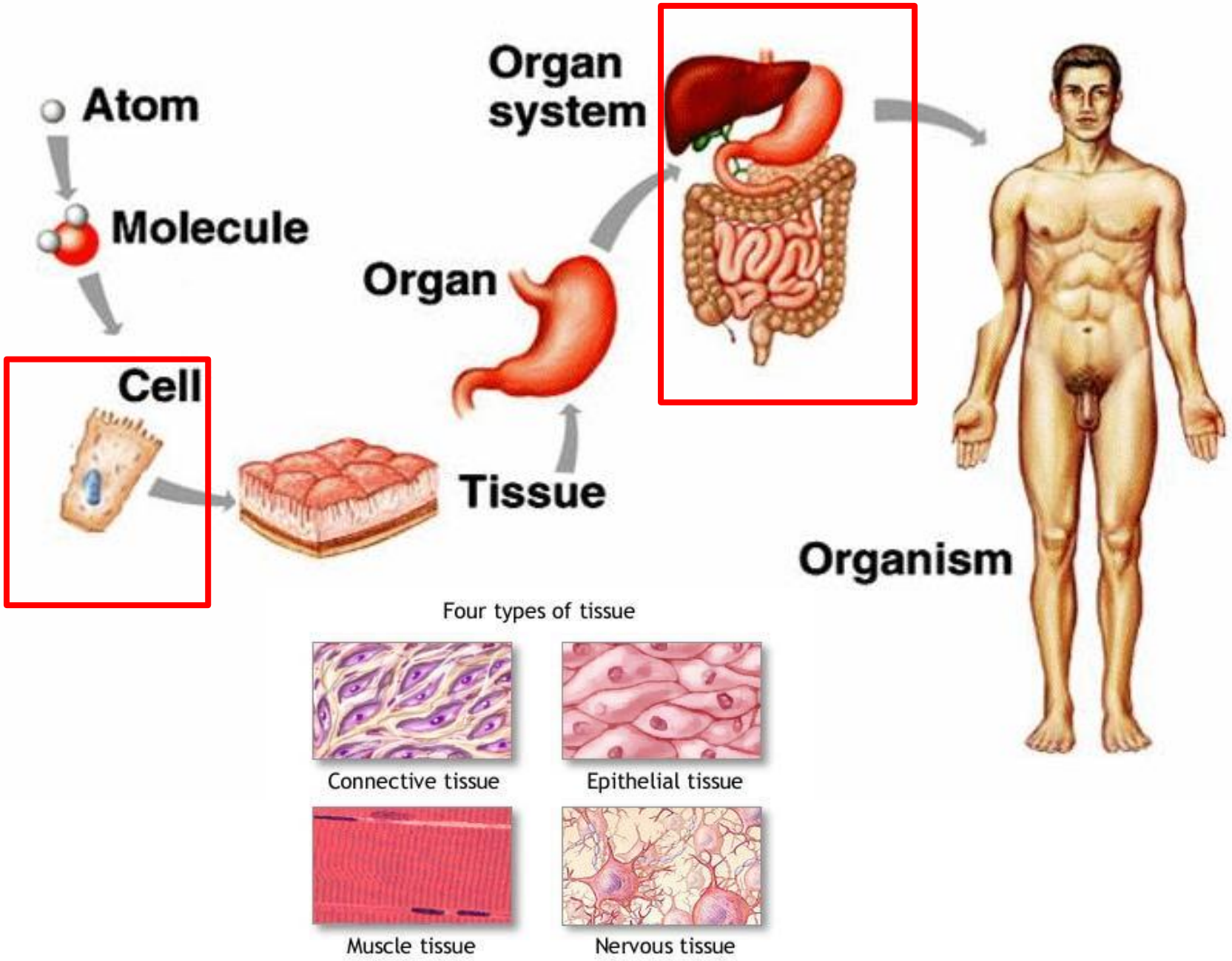
Anatomy

- **Gross anatomy**
① **Systemic anatomy**
② Regional anatomy
③ Surface anatomy

- **Microscopic anatomy** – Histology
- **Development anatomy** – Embryology
- **Pathological anatomy** – Pathology
- **Radiographic anatomy**
- **Surgical anatomy**



Levels of Structural organization that compose the human body, Fig# 1.1

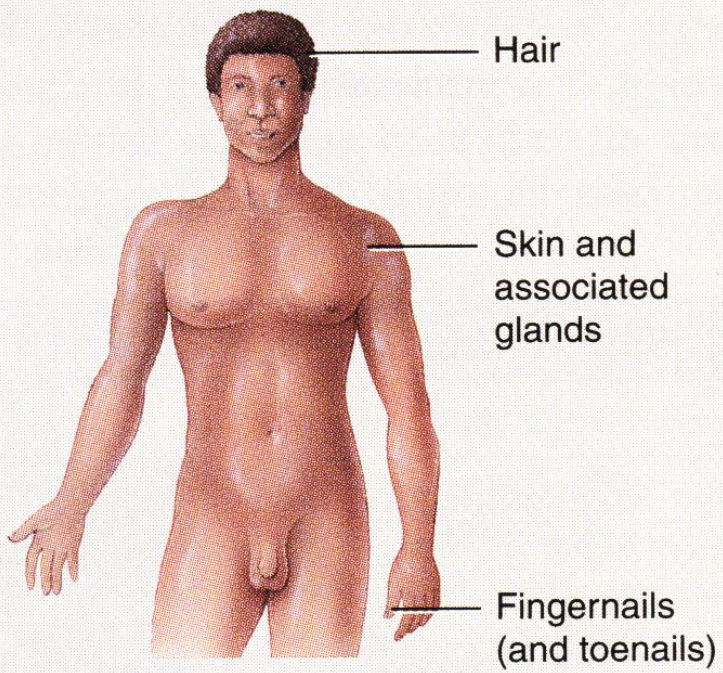

Atom
Molecule
Cell
Tissue
Organ
Organ system
Organism
Four types of tissue
Connective tissue
Epithelial tissue
Muscle tissue
Nervous tissue

Body Systems:
Integumentary system (皮膚系統)

Integumentary System

Components The skin and structures derived from it, such as hair, nails, and sweat and oil glands.

Functions Helps regulate body temperature; protects the body; eliminates some wastes; helps produce vitamin D; and detects sensations, such as pain, touch, hot, and cold.



INTEGUMENTARY SYSTEM

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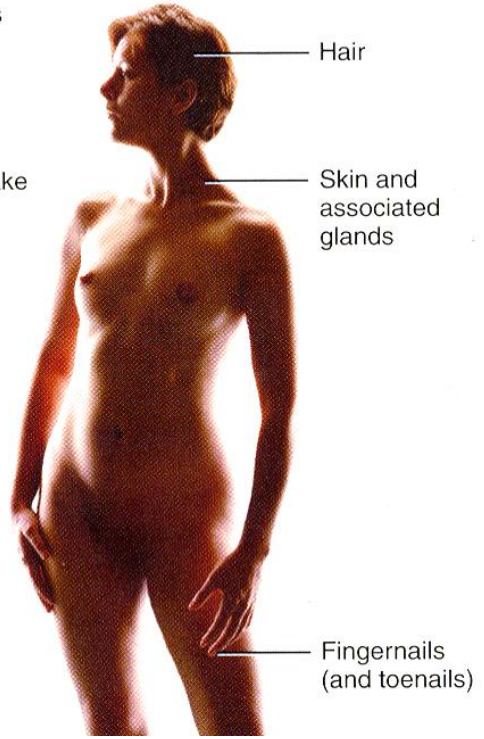
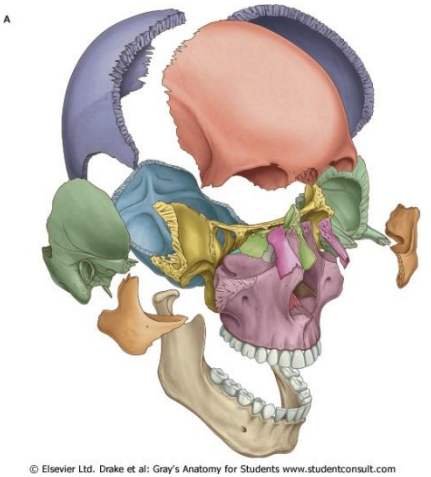


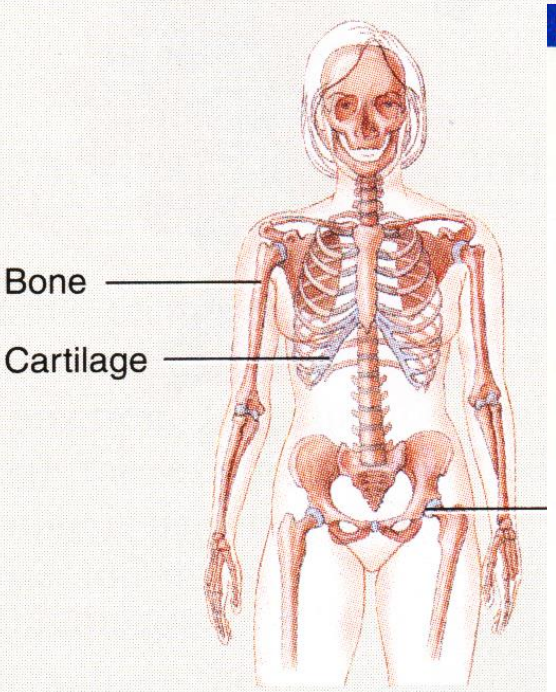
Skeletal system (骨骼系統)

Skeletal System

Components All the bones and joints of the body and their associated cartilages.

Functions Supports and protects the body; assists in body movements; houses cells that give rise to blood cells; and stores minerals and lipids (fats).

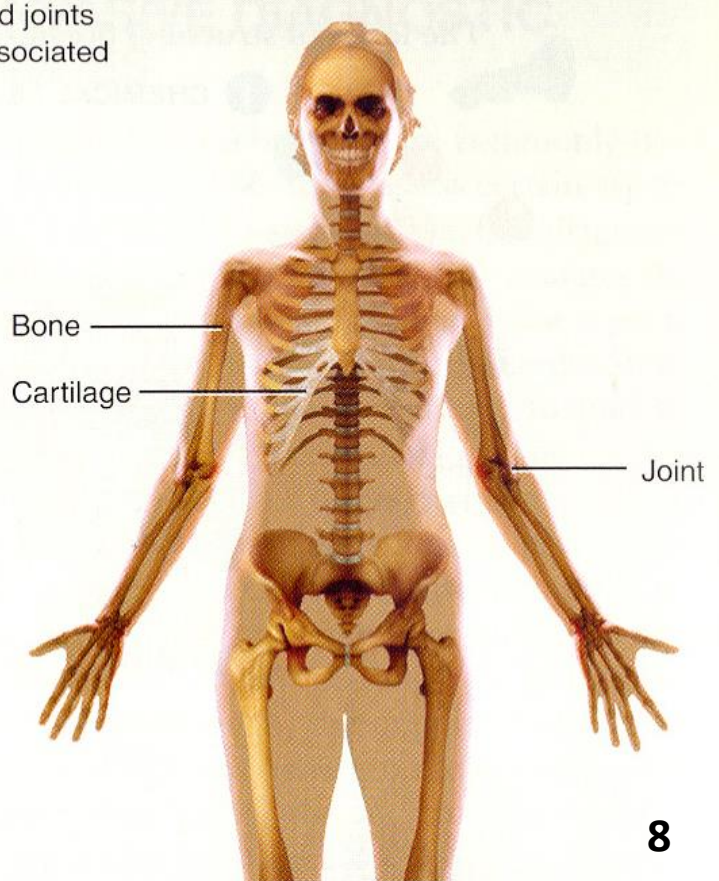




SKELETAL SYSTEM

Components Bones and joints of the body and their associated cartilages.

Functions Supports and protects the body; provides a surface area for muscle attachment; aids body movements; houses cells that produce blood cells; stores minerals and lipids (fats).

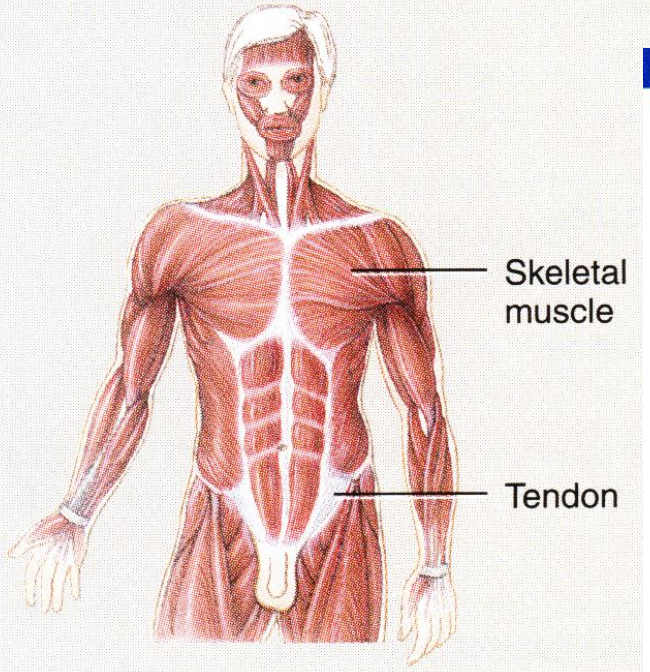


Muscular system (肌肉系統)

Muscular System

Components Refers specifically to skeletal muscle tissue, which is muscle usually attached to bones. Other muscle tissue types are smooth and cardiac.

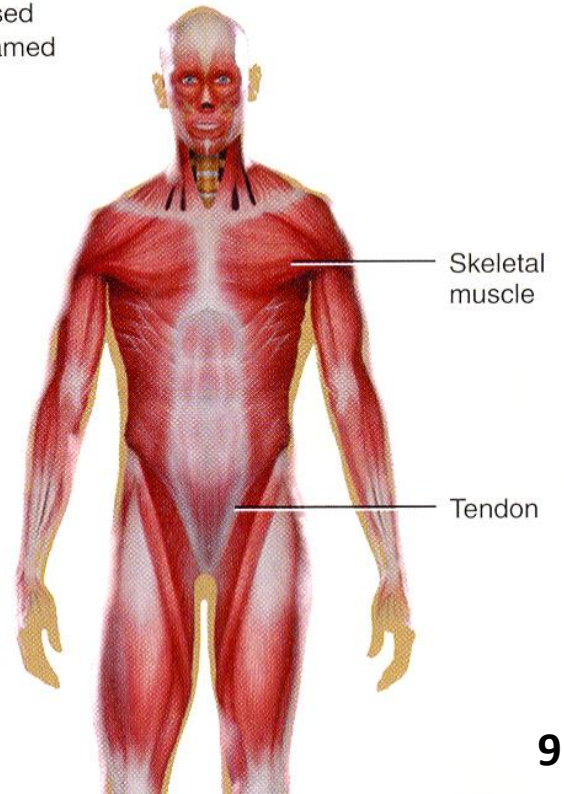
Functions Powers movements of the body, such as walking and throwing a ball; stabilizes body positions (posture); and generates heat.



MUSCULAR SYSTEM

Components Muscles composed of skeletal muscle tissue, so-named because it is usually attached to bones.

Functions Produces body movements, such as walking; stabilizes body position (posture); generates heat.

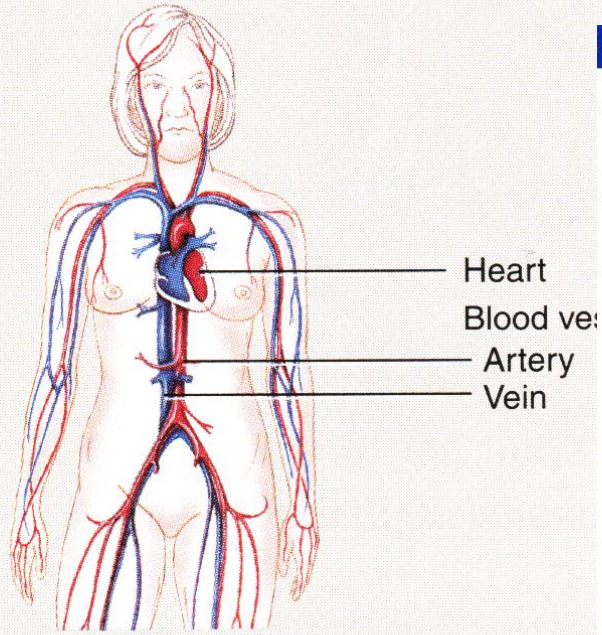


Cardiovascular system (心血管系統)

Cardiovascular System

Components Blood, heart, and blood vessels.

Functions Heart pumps blood through blood vessels; blood carries oxygen and nutrients to cells and carbon dioxide and wastes away from cells and helps regulate acid–base balance, temperature, and water content of body fluids; blood components help defend against disease and mend damaged blood vessels.



CARDIOVASCULAR SYSTEM

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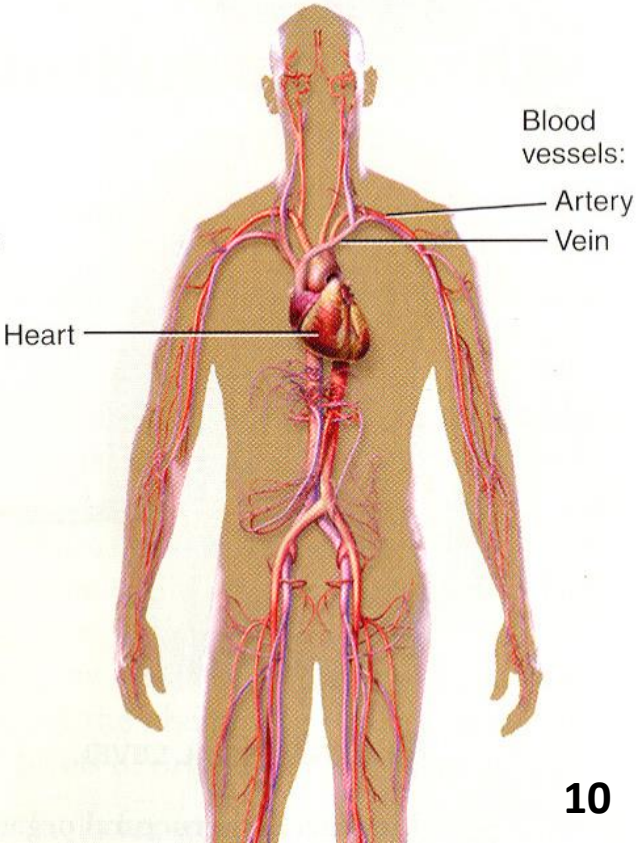
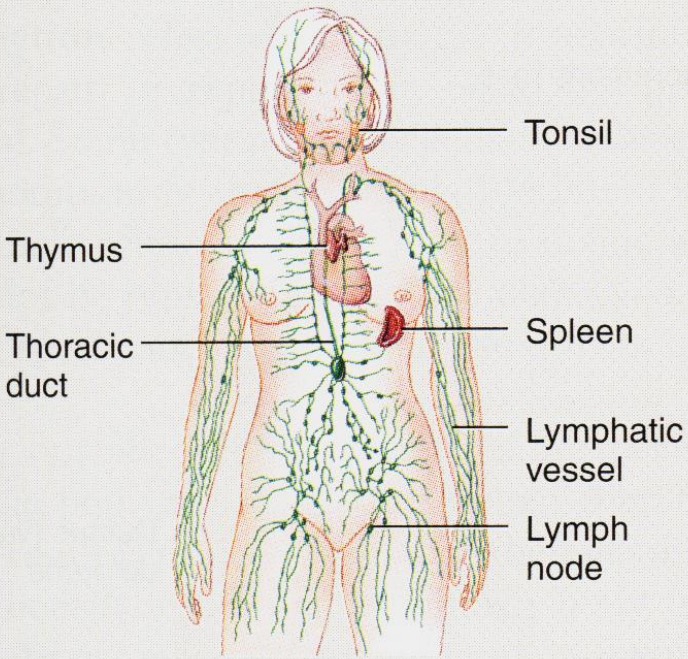


Lymphatic system (淋巴系統)

Lymphatic and Immune Systems

Components Lymph, lymphatic vessels, and structures or organs containing lymphatic tissue such as the spleen, thymus, lymph nodes, and tonsils. Lymphatic tissues contain large numbers of white blood cells called lymphocytes.

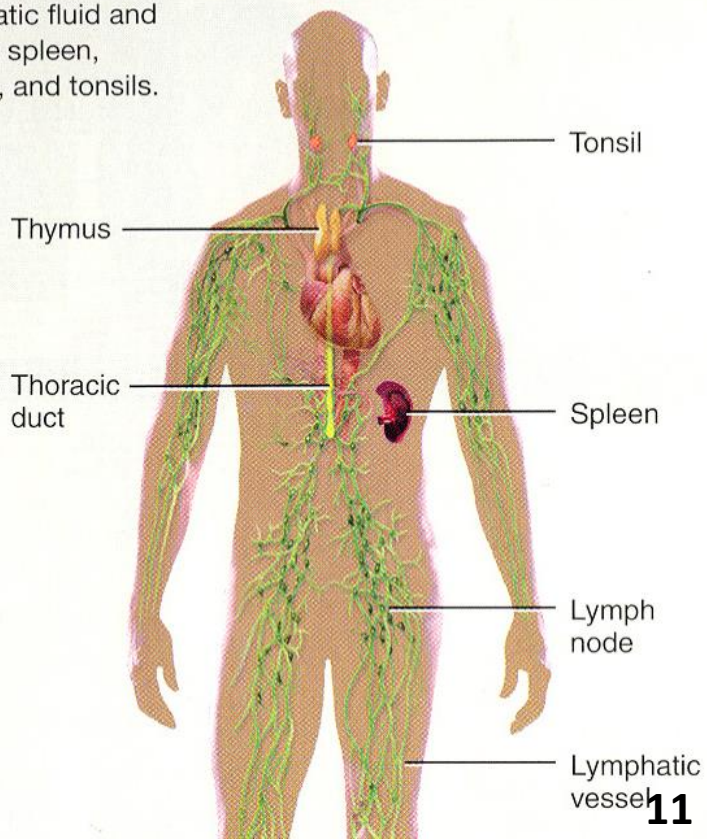
Functions Returns proteins and plasma (liquid portion of blood) to the cardiovascular system; transports triglycerides (fats) from the gastrointestinal tract to the cardiovascular system; serves as a site of maturation and proliferation of certain white blood cells; and helps protect against disease through the production of proteins called antibodies, as well as other responses.



LYMPHATIC AND IMMUNE SYSTEM

Components Lymphatic fluid and vessels; also includes spleen, thymus, lymph nodes, and tonsils.

Functions Returns proteins and fluid to blood; carries lipids from gastrointestinal tract to blood; includes structures where lymphocytes that protect against disease-causing organisms mature and proliferate.



Nervous system (神經系統)

Nervous System

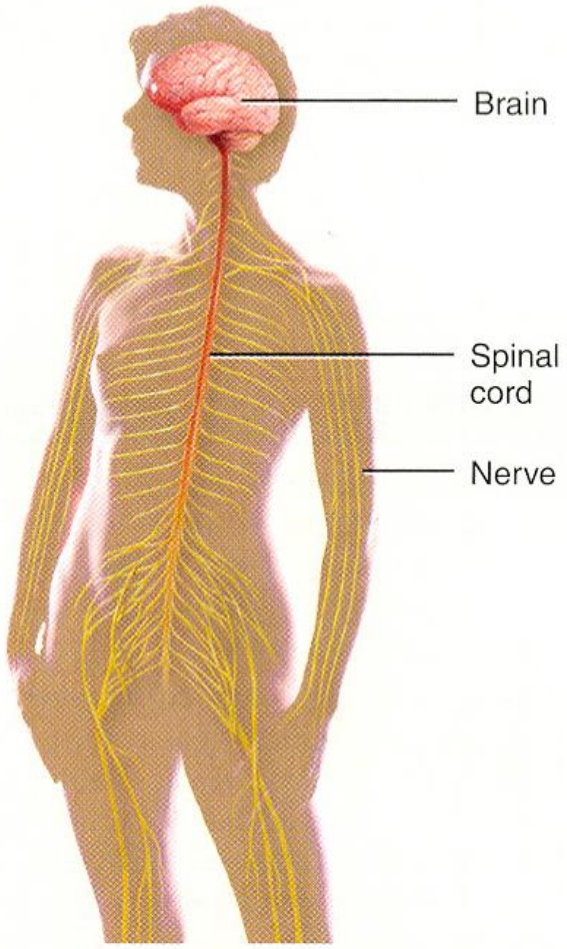
Components Brain, spinal cord, nerves, and special sense organs, such as the eyes and ears.

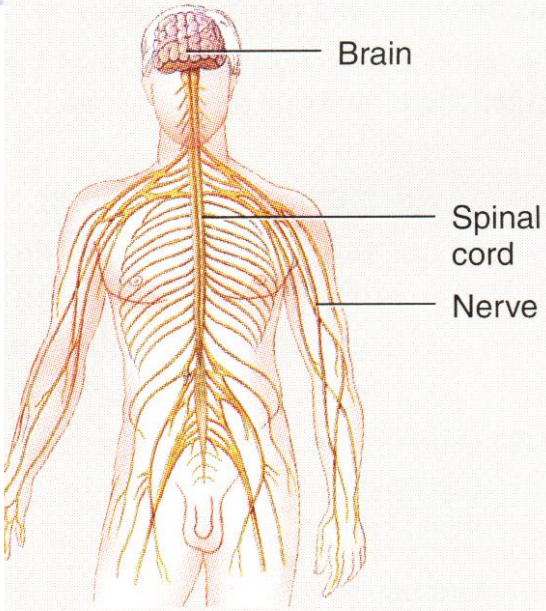
Functions Regulates body activities through action potentials (nerve impulses) stimulated by changes in the internal and external environments, interprets the changes, and responds to the changes by inducing muscular contractions or glandular secretions.

NERVOUS SYSTEM

Components Brain, spinal cord, nerves, and special sense organs, such as the eye and ear.

Functions Generates action potentials (nerve impulses) to regulate body activities; detects changes in the body's internal and external environment, interprets the changes, and responds by causing muscular contractions or glandular secretions.



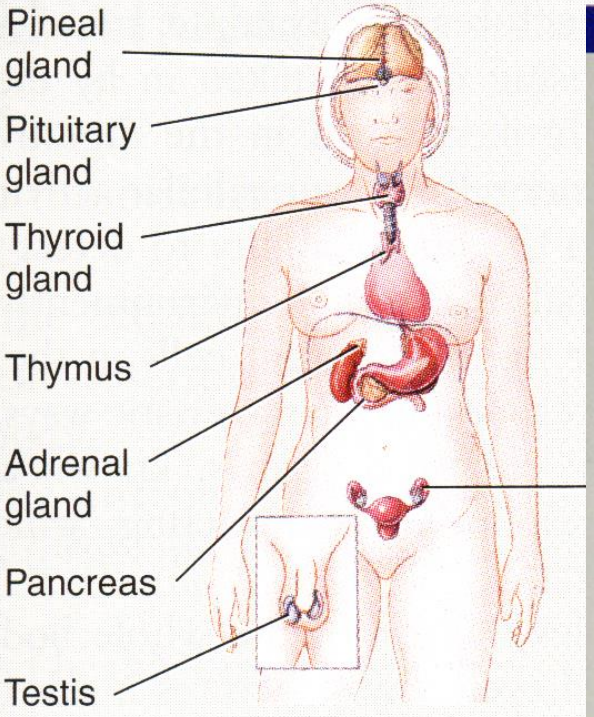


Endocrine system (內分泌系統)

Endocrine System

Components All hormone-producing cells and glands such as the pituitary and thyroid glands and pancreas.

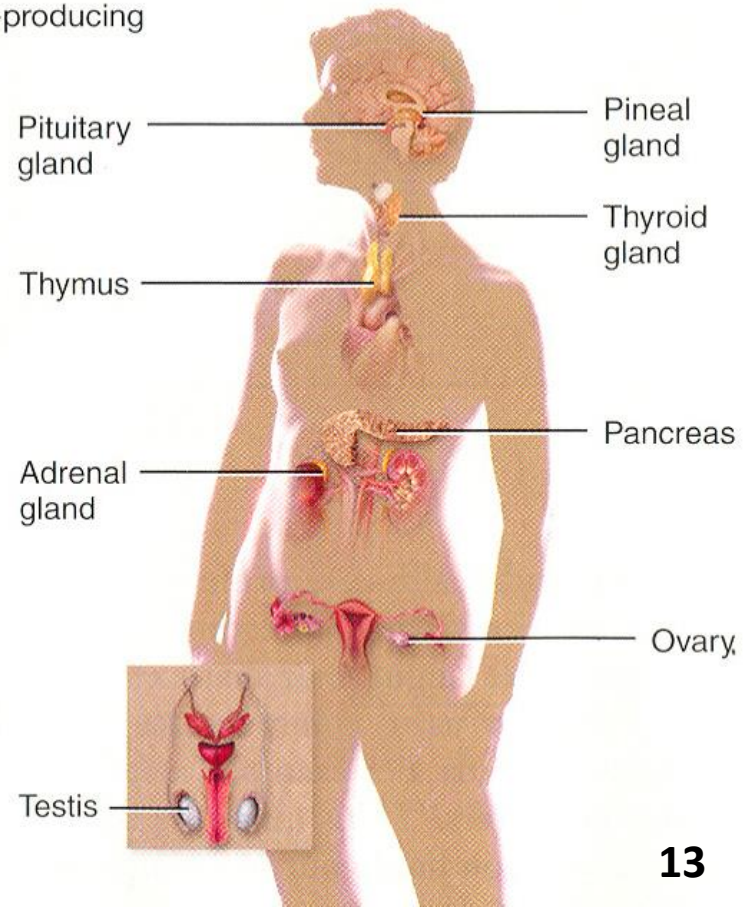
Functions Regulates body activities through hormones, chemicals transported in the blood to various target organs of the body.



ENDOCRINE SYSTEM

Components Hormone-producing glands (pineal gland, hypothalamus, pituitary gland, thymus, thyroid gland, parathyroid glands, adrenal glands, pancreas, ovaries, and testes) and hormone-producing cells in several other organs.

Functions Regulates body activities by releasing hormones, which are chemical messengers transported in blood from an endocrine gland to a target organ.



Respiratory system
(呼吸系統)

Respiratory System

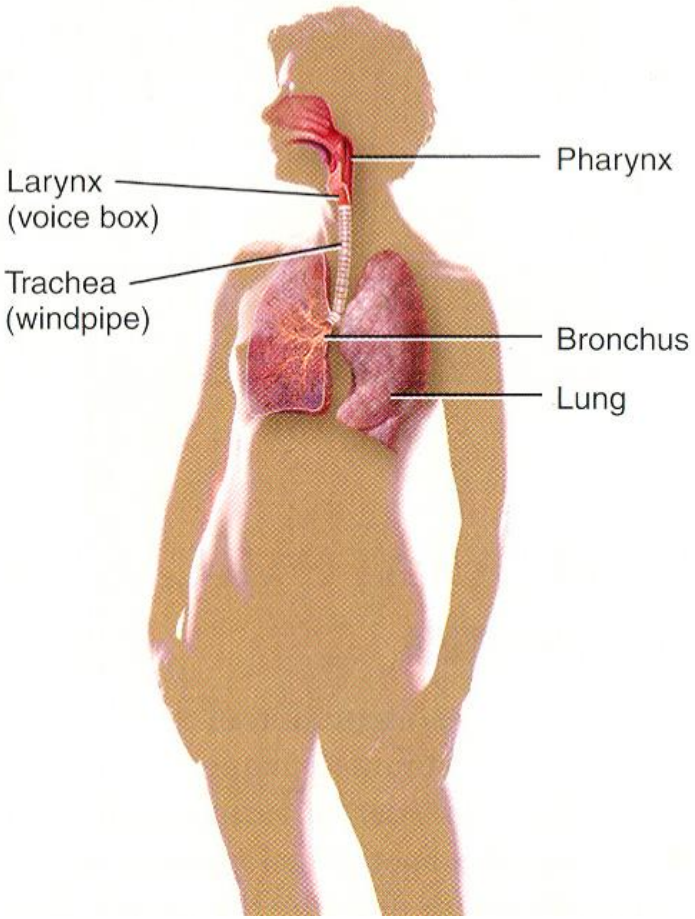
Components Lungs and the airways leading into and out of them.

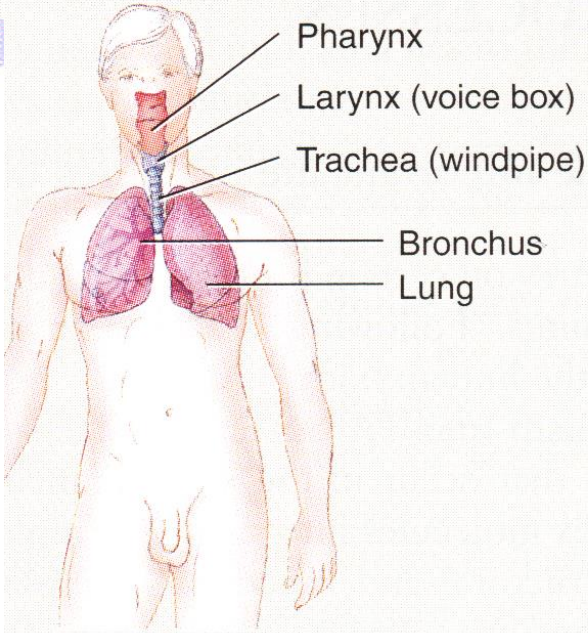
Functions Transfers oxygen from inhaled air to blood and carbon dioxide from blood to exhaled air; helps regulate acid–base balance of body fluids; air flowing out of lungs through vocal cords produces sounds.

RESPIRATORY SYSTEM

Components Lungs and air passageways such as the pharynx (throat), larynx (voice box), trachea (windpipe), and bronchial tubes leading into and out of them.

Functions Transfers oxygen from inhaled air to blood and carbon dioxide from blood to exhaled air; helps regulate acid–base balance of body fluids; air flowing out of lungs through vocal cords produces sounds.





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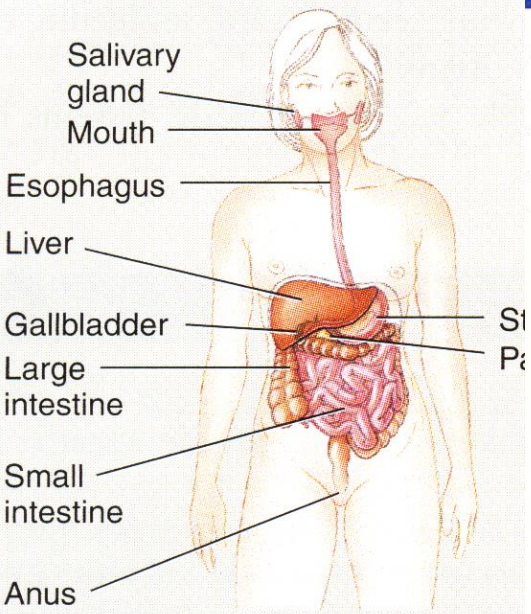
Digestive system (消化系統)

Digestive System

Components Organs of gastrointestinal tract, a long tube that includes the mouth, esophagus, stomach, intestines, and anus; also includes accessory organs that assist in digestive processes, such as the salivary glands, liver. gallbladder, and pancreas.

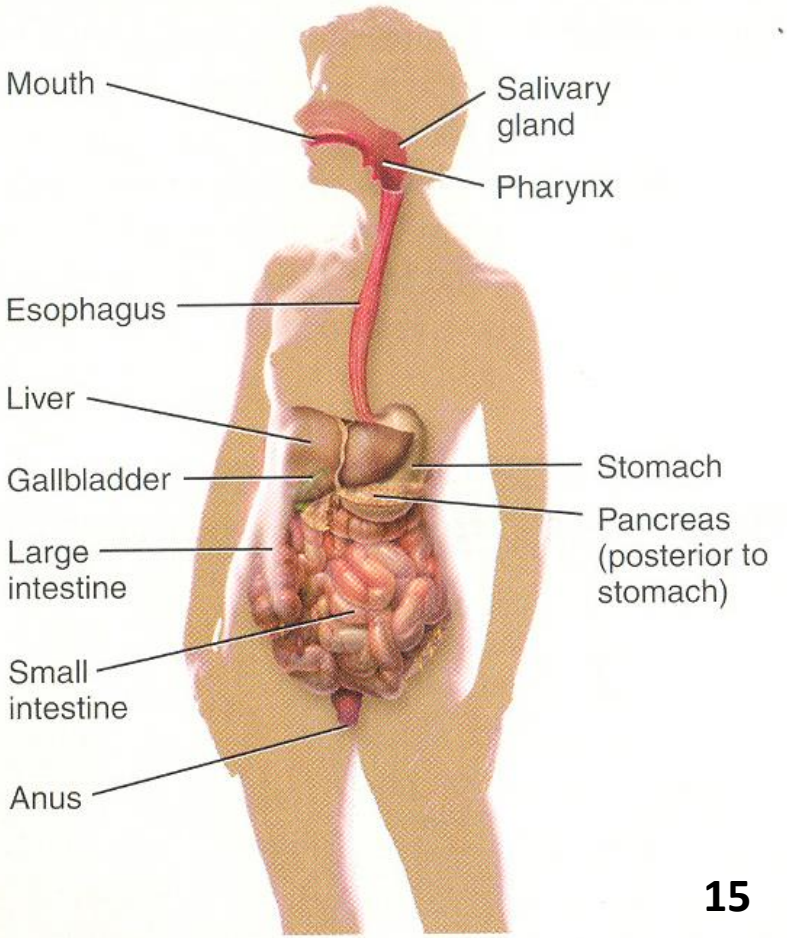
Functions Achieves physical and chemical breakdown of food; absorbs nutrients; eliminates solid wastes.



DIGESTIVE SYSTEM

Components
Organs of gastrointestinal tract, a long tube that includes the mouth, pharynx, esophagus, stomach, small and large intestines, and anus; also includes accessory organs that assist in digestive processes, such as the salivary glands, liver, gallbladder, and pancreas.

Functions Achieves physical and chemical breakdown of food; absorbs nutrients; eliminates solid wastes.

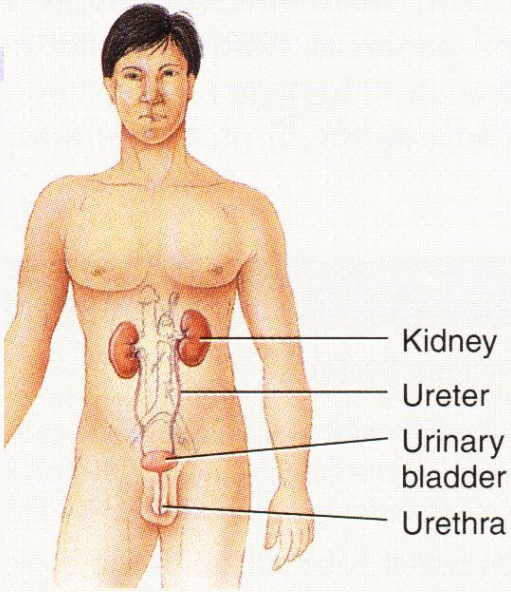


Urinary system
(泌尿系統)

Urinary System

Components Kidneys, ureters, urinary bladder, and urethra that together produce, store, and eliminate urine.

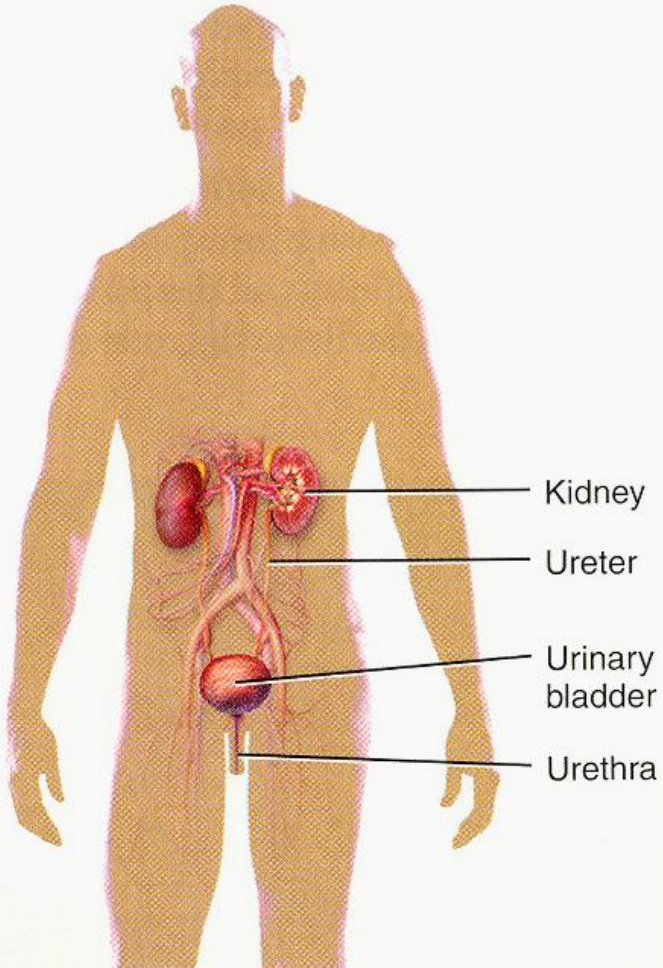
Functions Regulates the volume and chemical composition of blood; eliminates metabolic wastes; regulates fluid and electrolyte balance; helps maintain the acid–base balance of body fluids and calcium balance of the body; and secretes a hormone that regulates red blood cell production.



URINARY SYSTEM

Components Kidneys, ureters, urinary bladder, and urethra.

Functions Produces, stores, and eliminates urine; eliminates wastes and regulates volume and chemical composition of blood; helps maintain the acid–base balance of body fluids; maintains body's mineral balance; helps regulate production of red blood cells.

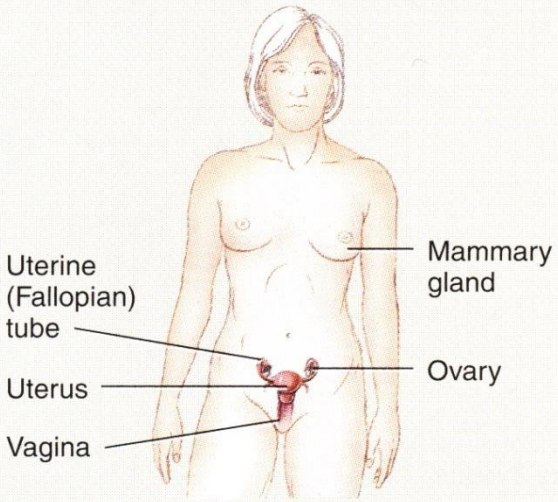


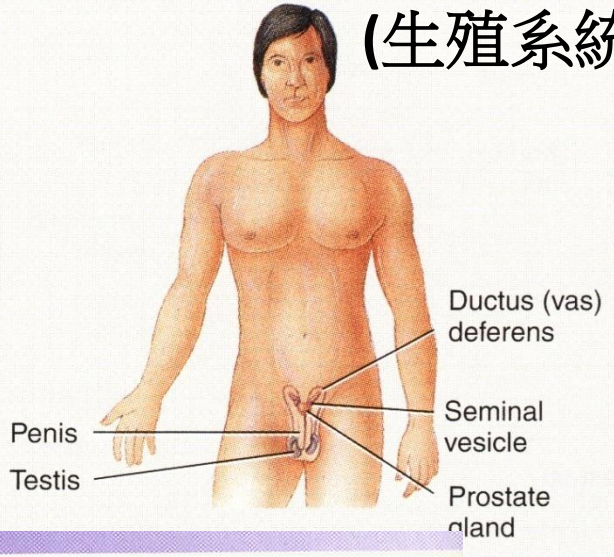
Reproductive Systems

Components Gonads (testes or ovaries) and associated organs: uterinetubes, uterus, and vagina in females and epididymis, ductus deferens, and penis in males.

Functions Gonads produce gametes (sperm or ova) that unite to form a new organism and release hormones that regulate reproduction and other body processes; associated organs transport and store gametes.

Reproductive system (生殖系統)

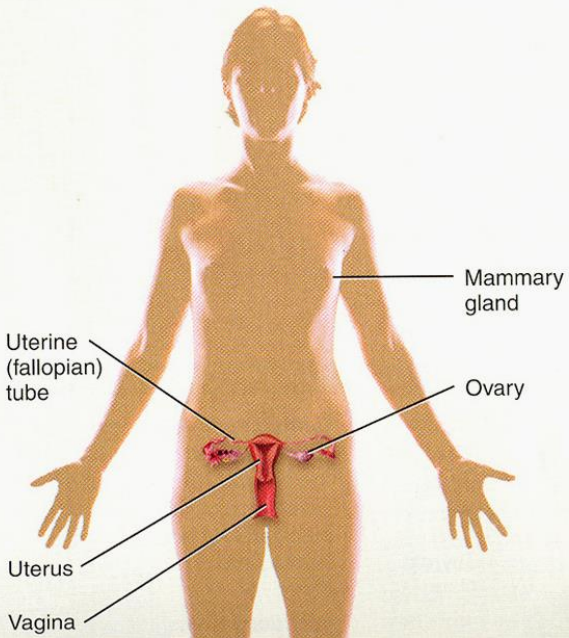


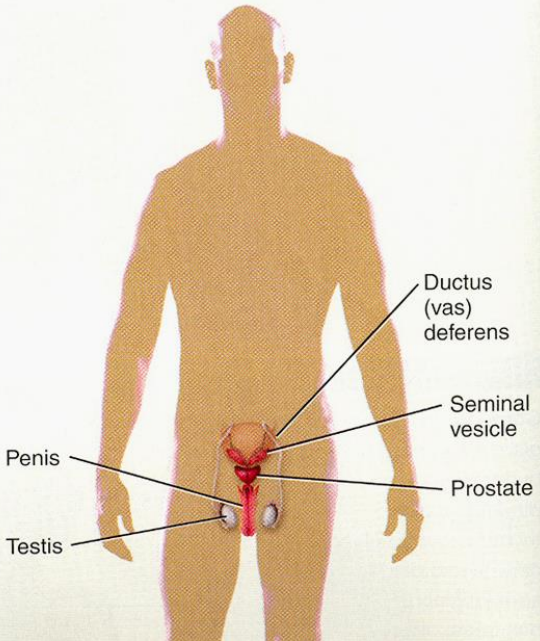


REPRODUCTIVE SYSTEM

Components Gonads (testes in males and ovaries in females) and associated organs (uterine tubes, uterus, and vagina in females and epididymis, ductus deferens, and penis in males).

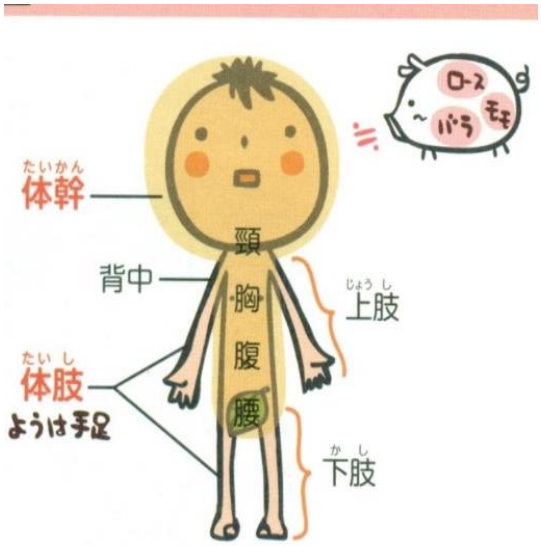
Functions Gonads produce gametes (sperm or oocytes) that unite to form a new organism; gonads also release hormones that regulate reproduction and other body processes; associated organs transport and store gametes.





[Male]

Gross Anatomy



Axial region

Cephalic (head)
- Frontal
- Orbital
- Nasal
- Oral
- Mental

Cervical (neck)

Thoracic
- Axillary
- Sternal
- Mammary

Abdominal
- Umbilical

Pelvic
- Inguinal (groin)

Pubic (genital)

Appendicular region

Upper limb
- Acromial
- Brachial (arm)
- Antecubital
- Antebrachial (forearm)
- Carpal (wrist)

Manus (hand)
- Pollex
- Palmar
- Digital

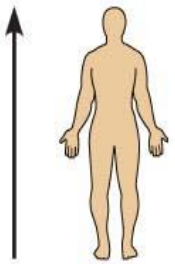
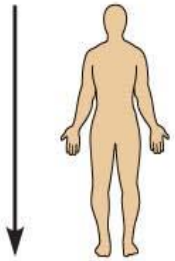
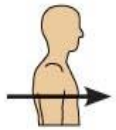
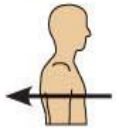
Lower limb
- Coxal (hip)
- Femoral (thigh)
- Patellar
- Crural (leg)
- Fibular or peroneal

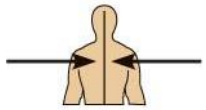
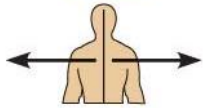
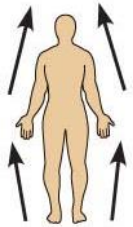
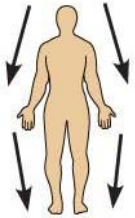
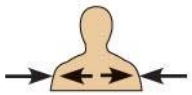
Pedal (foot)
- Tarsal (ankle)
- Metatarsal
- Digital
- Hallux

- Thorax
- Abdomen
- Back (Dorsum)

(a) Anterior/Ventral

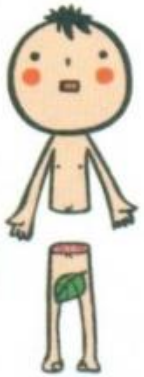
Orientation

Term	Definition		Example
Superior (cranial) 上 (頭顱)	Toward the head end or upper part of a structure or the body; above		The head is superior to the abdomen.
Inferior (caudal) 下 (尾部)	Away from the head end or toward the lower part of a structure or the body; below		The navel is inferior to the chin.
Anterior (ventral)* 前 (腹部)	Toward or at the front of the body; in front of		The breastbone is anterior to the spine.
Posterior (dorsal)* 後 (背部)	Toward or at the back of the body; behind		The heart is posterior to the breastbone.

Term	Definition		Example
Medial 內側	Toward or at the midline of the body; on the inner side of		The heart is medial to the arm.
Lateral 外側	Away from the midline of the body; on the outer side of		The arms are lateral to the chest.
Proximal 近端	Closer to the origin of the body part or the point of attachment of a limb to the body trunk		The elbow is proximal to the wrist.
Distal 遠端	Farther from the origin of a body part or the point of attachment of a limb to the body trunk		The knee is distal to the thigh.
Superficial (external) 表淺	Toward or at the body surface		The skin is superficial to the skeletal muscles.
Deep (internal) 深層	Away from the body surface; more internal		The lungs are deep to the skin.
Ipsilateral 同側	On the same side		The right hand and right foot are ipsilateral.
Contralateral 對側	On opposite sides		The right hand and left foot are contralateral.

人体の方向

上下に
水平面



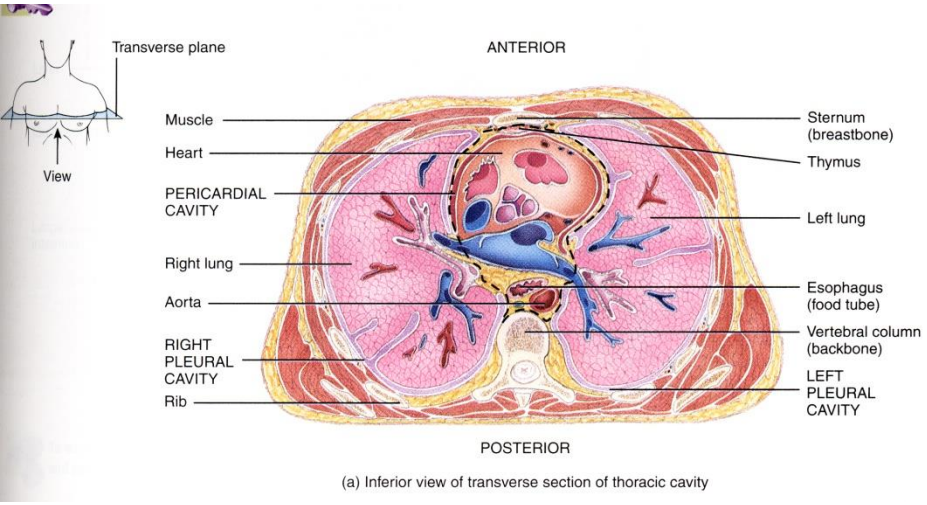
前後に
前頭面

真っ二つ
矢状面

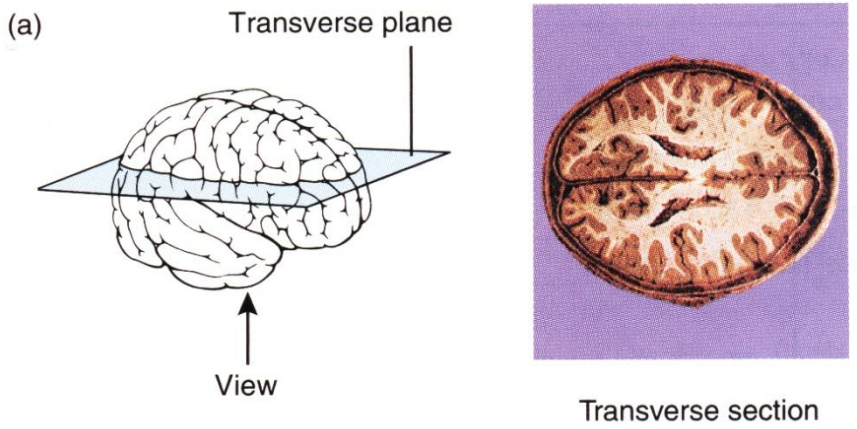
Body Planes:

Transverse plane (水平切面)
Frontal or Coronal plane (冠狀切面)
Sagittal plane (矢狀切面)
Midsagittal plane (正中矢狀切面)

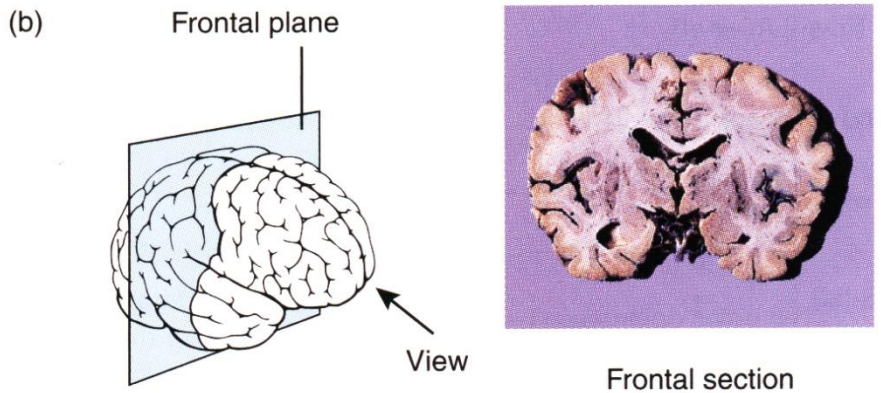
Cross plane (橫狀切面)
Oblique plane (斜切面)
Longitudinal plane (縱切面)



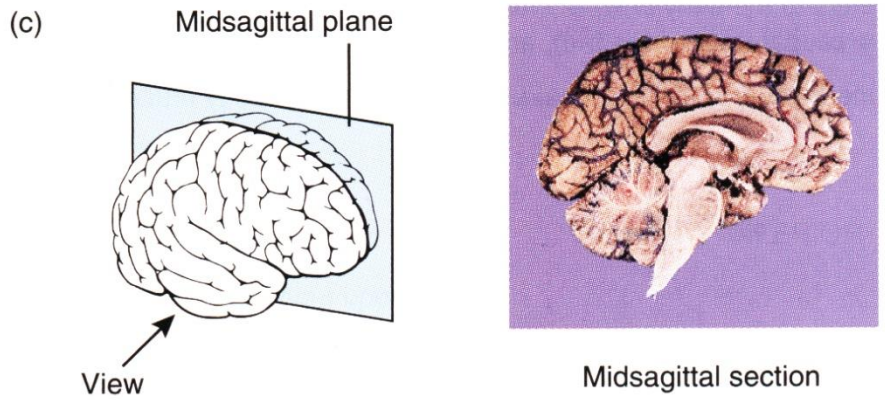
(a) Inferior view of transverse section of thoracic cavity



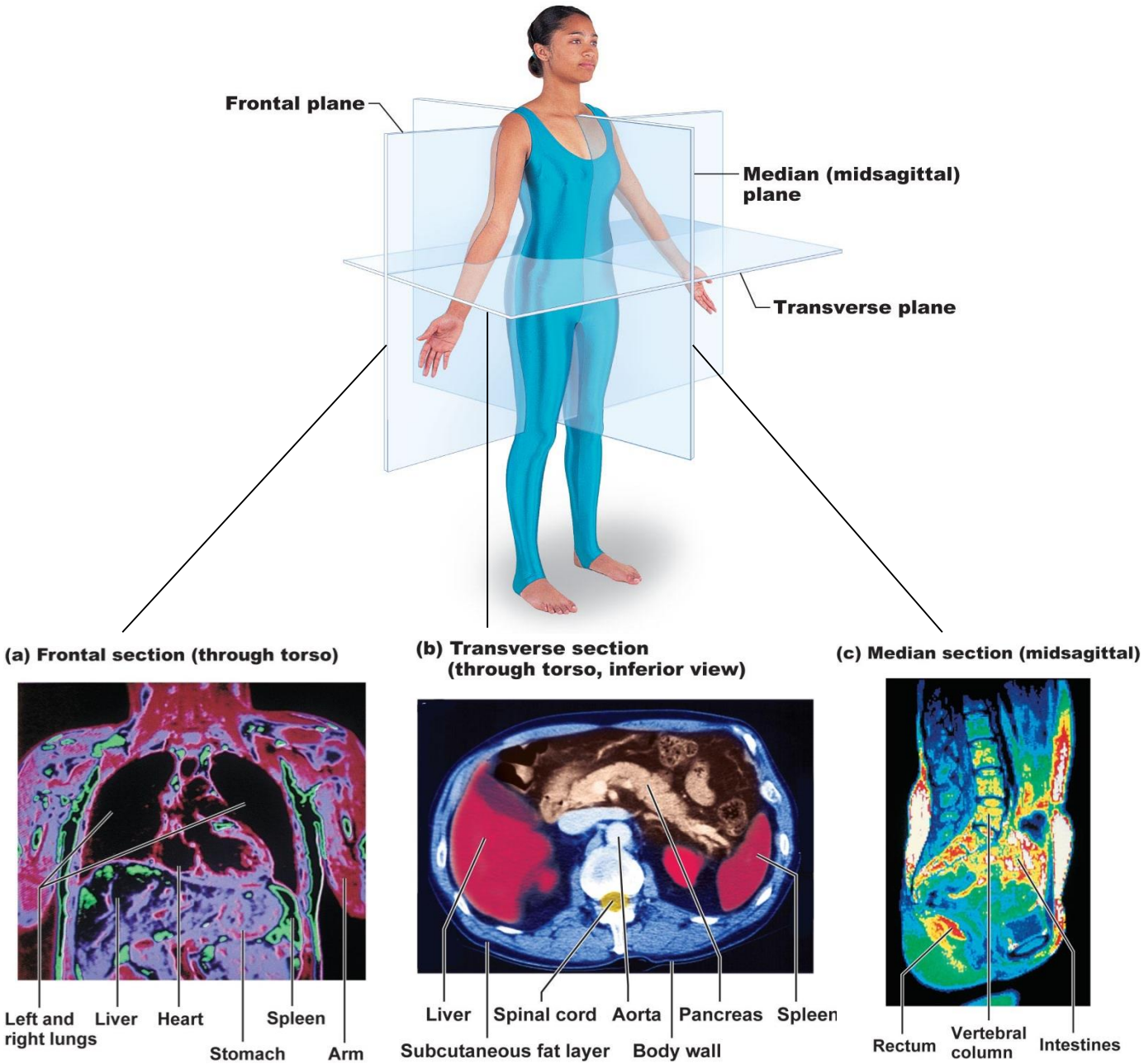
Transverse section



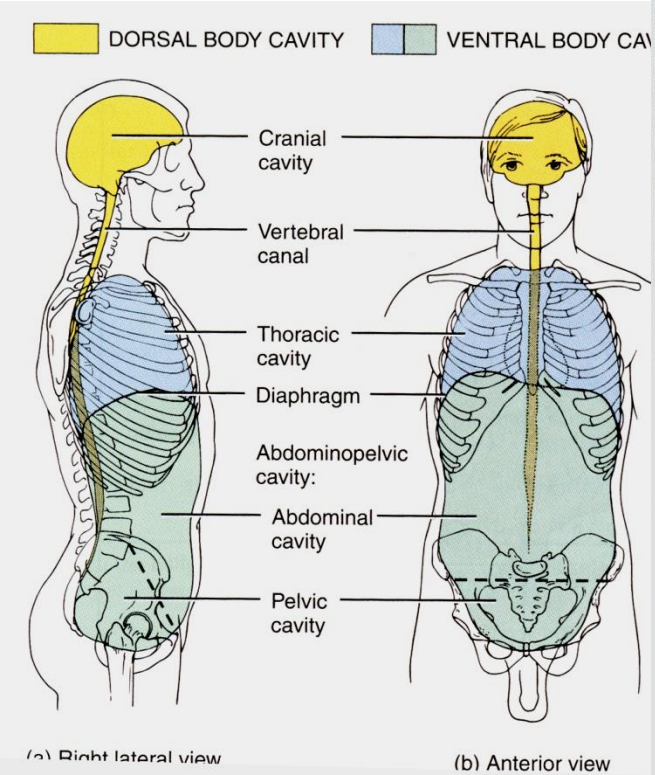
Frontal section



Midsagittal section


Frontal plane
Median (midsagittal) plane
Transverse plane
(a) Frontal section (through torso)
(b) Transverse section (through torso, inferior view)
(c) Median section (midsagittal)
Left and right lungs
Liver
Heart
Stomach
Spleen
Arm
Liver
Spinal cord
Aorta
Pancreas
Spleen
Subcutaneous fat layer
Body wall
Rectum
Vertebral column
Intestines

V. Body Cavities:



CAVITY	COMMENTS
DORSAL CAVITY	
Cranial cavity	Formed by cranial bones and contains brain.
Vertebral cavity	Formed by vertebral column and contains spinal cord and the beginnings of spinal nerves.
VENTRAL CAVITY*	
Thoracic cavity	Chest cavity; superior portion of ventral body cavity; contains pleural and pericardial cavities and mediastinum.
Pleural cavity	Each surrounds a lung; the serous membrane of the pleural cavities is the pleura.
Pericardial cavity	Surrounds the heart; the serous membrane of the pericardial cavity is the pericardium.
Mediastinum	Central portion of thoracic cavity between the lungs; extends from sternum to vertebral column and from neck to diaphragm; contains heart, thymus, esophagus, trachea, and several large blood vessels.
Abdominopelvic cavity	Inferior portion of ventral body cavity; subdivided into abdominal and pelvic cavities.
Abdominal cavity	Contains stomach, spleen, liver, gallbladder, small intestine, and most of large intestine; the serous membrane of the abdominal cavity is the peritoneum.
Pelvic cavity	Contains urinary bladder, portions of large intestine, and internal organs of reproduction.

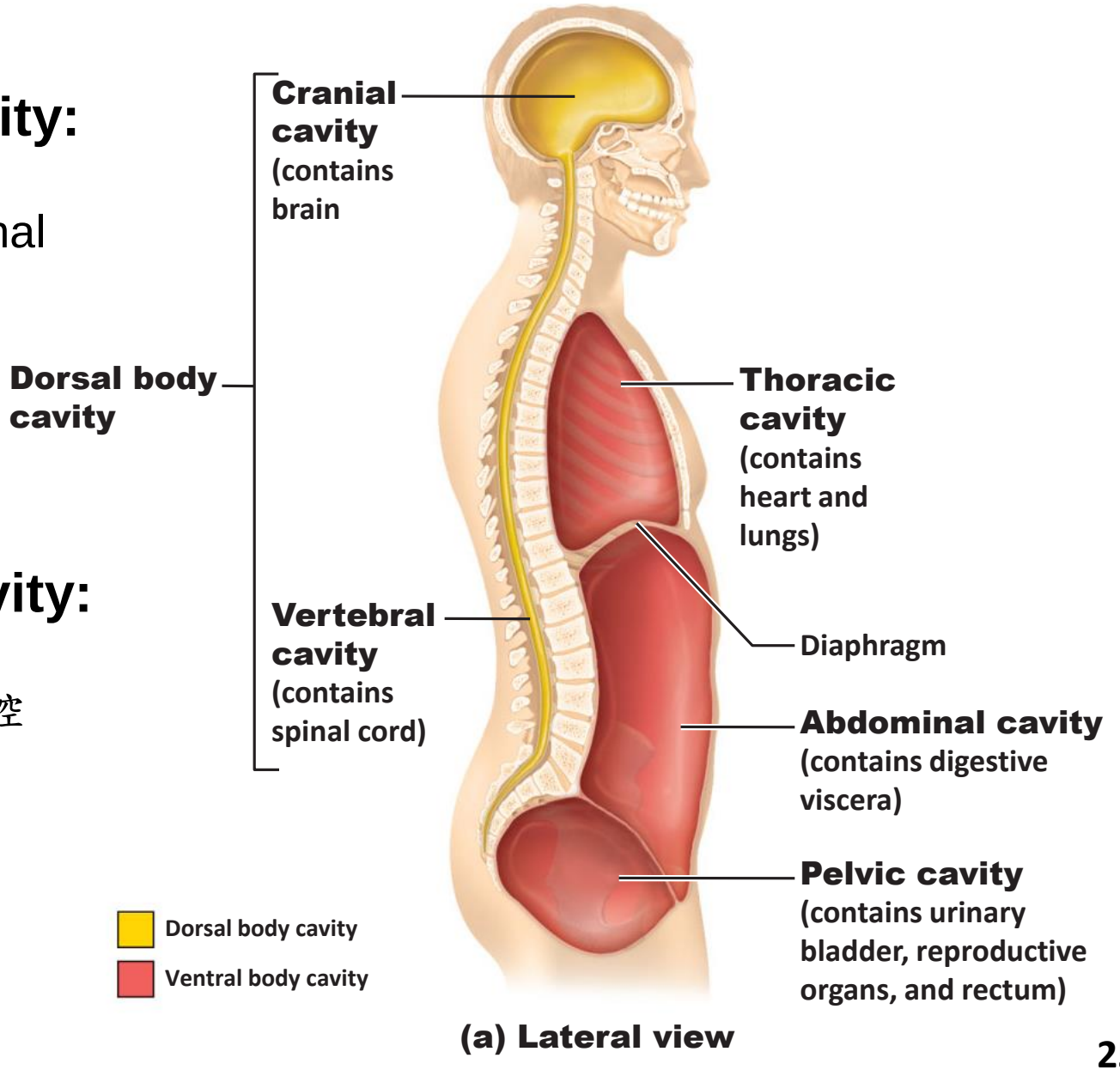
V. Body Cavities:

Dorsal body cavity:

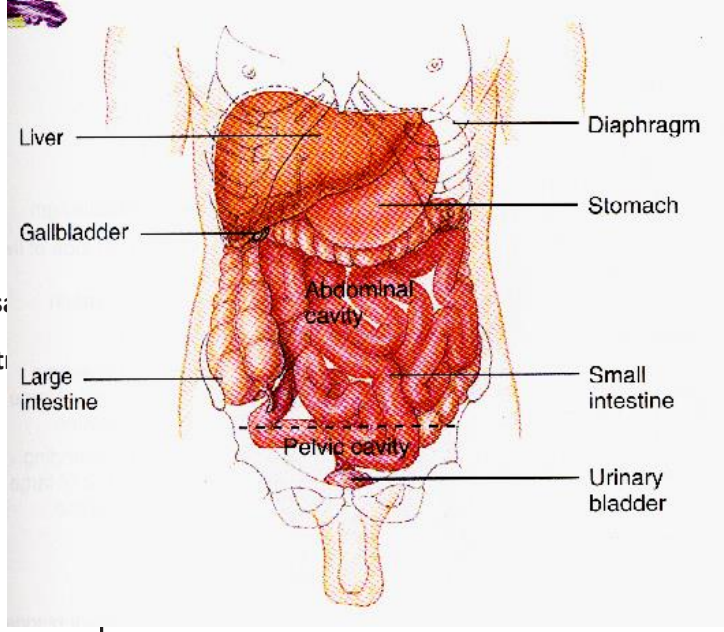
Cranial cavity 顱腔
Spinal (vertebral) canal
脊髓(脊椎)管

Ventral body cavity:

Thoracic cavity 胸腔
Abdominal cavity 腹腔
Pelvic cavity 骨盆腔



V. Body Cavities:



Cranial cavity

Vertebral cavity

Thoracic cavity (contains heart and lungs)

- Superior mediastinum
- Pleural cavity
- Pericardial cavity within the mediastinum

Diaphragm

Abdominal cavity (contains digestive viscera)

Pelvic cavity (contains urinary bladder, reproductive organs, and rectum)

Abdomino-pelvic cavity

Ventral body cavity (thoracic and abdominopelvic cavities)

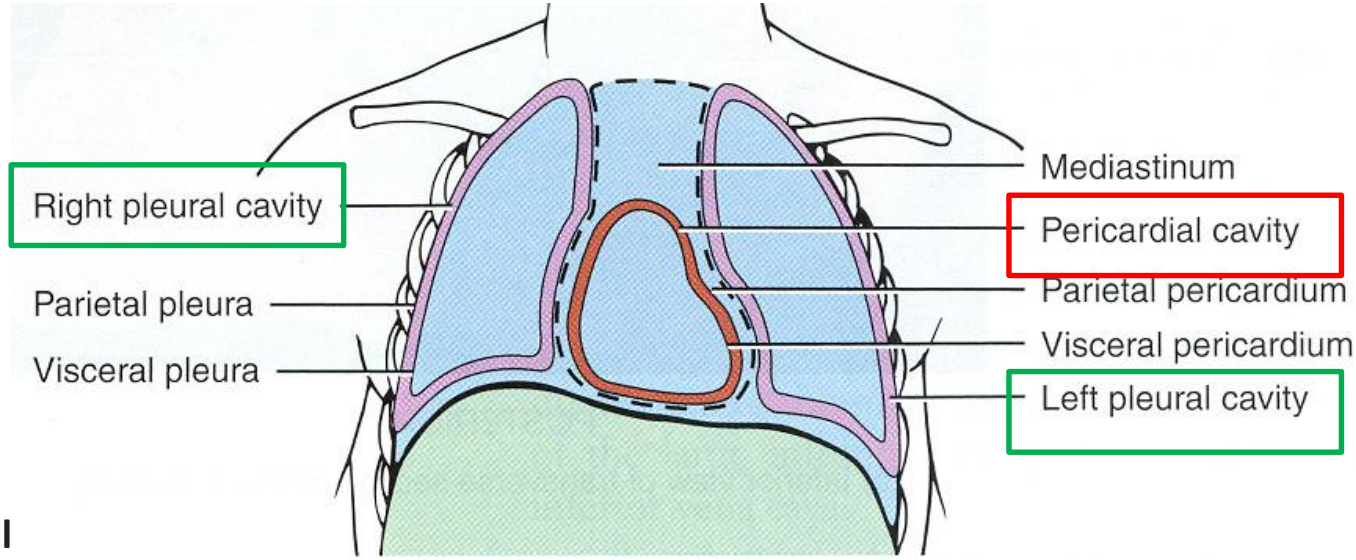
(b) Anterior view

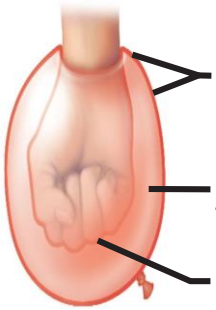
Thoracic cavity
胸腔

Mediastinum 縱膈

Pericardial cavity
心包腔

Pleural cavity 胸膜腔

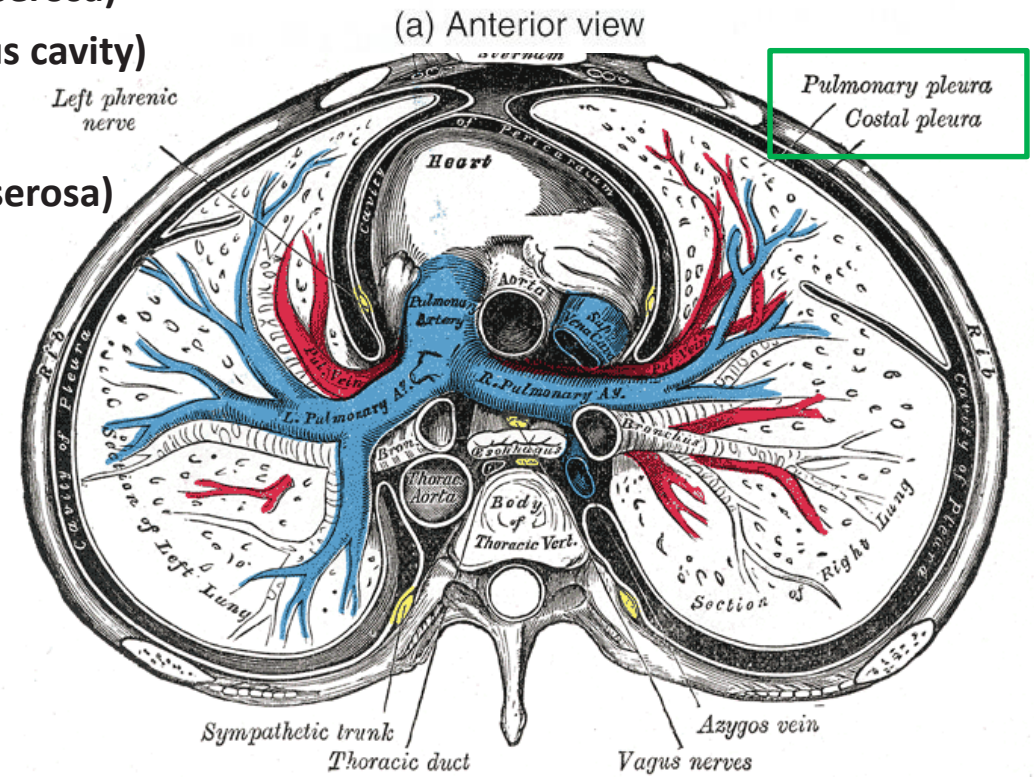




Outer balloon wall
(comparable to parietal serosa)

Air (comparable to serous cavity)

Inner balloon wall
(comparable to visceral serosa)

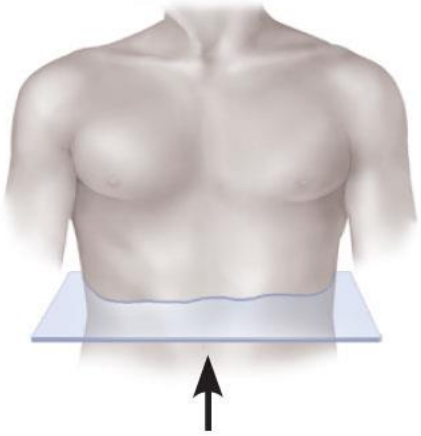


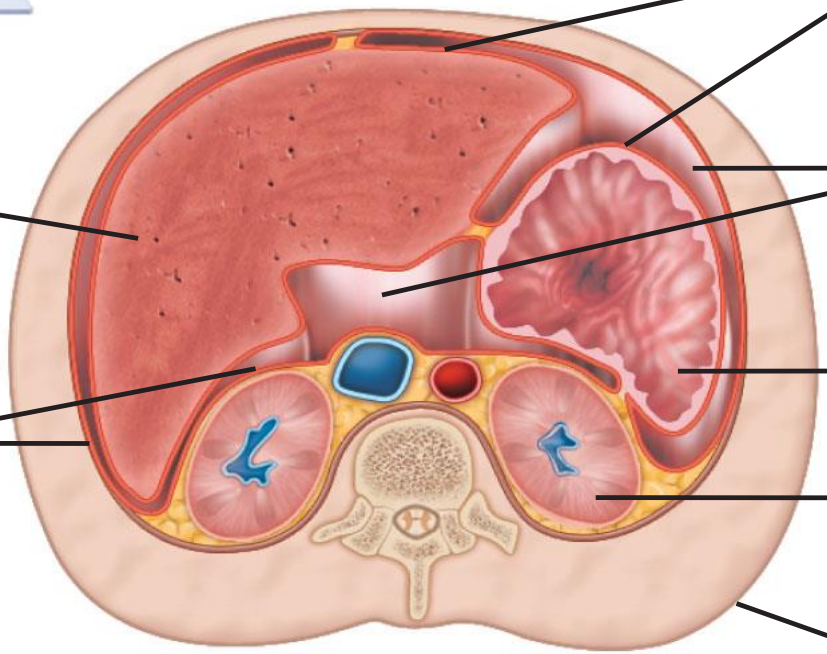
Abdominal cavity

腹腔

Peritoneal cavity 腹膜腔

Visceral peritoneum 腹膜





Visceral peritoneum (serosa)

Peritoneal cavity (with serous fluid)

Stomach

Kidney (retroperitoneal)

Wall of body trunk

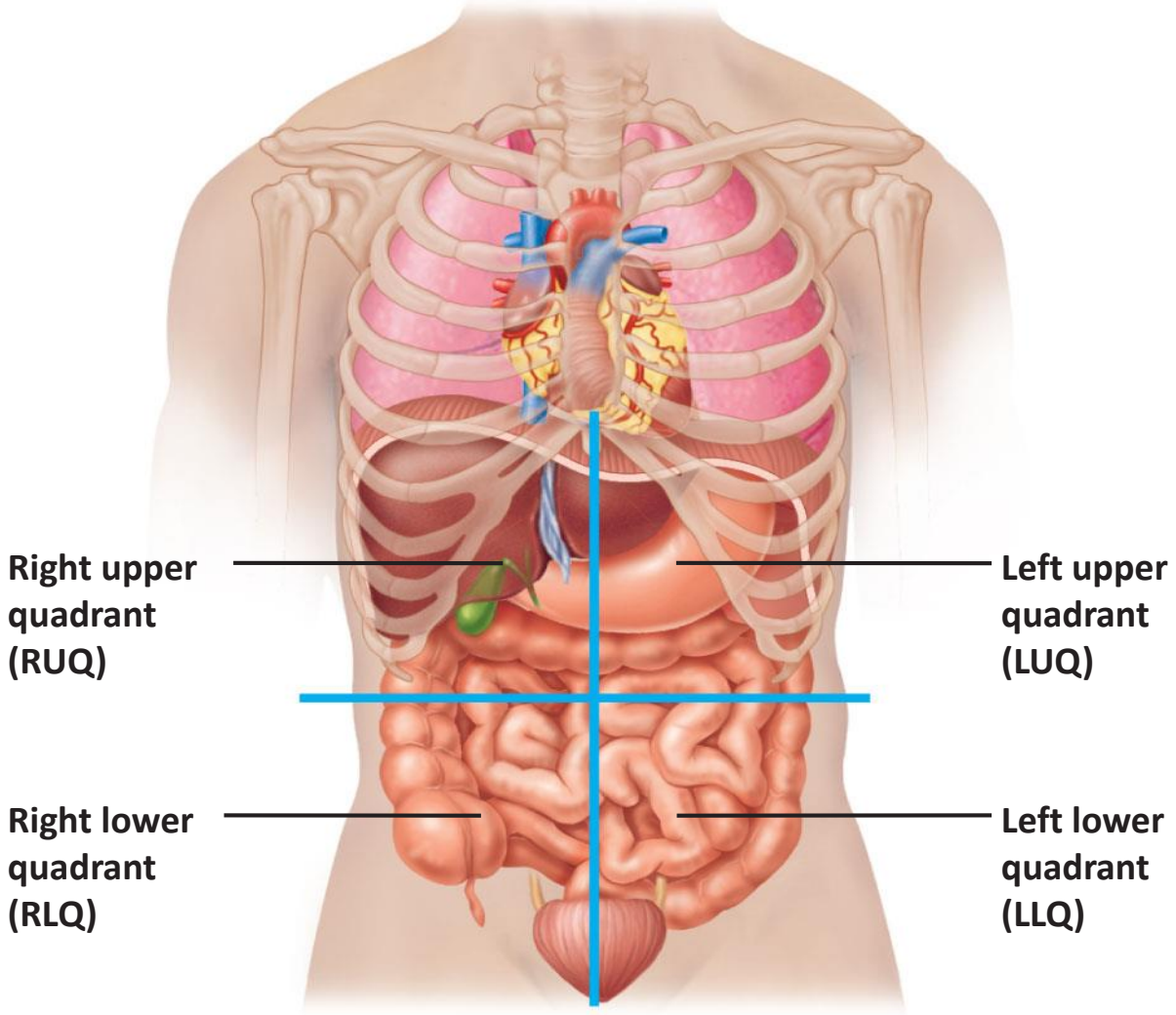
Liver

Parietal peritoneum

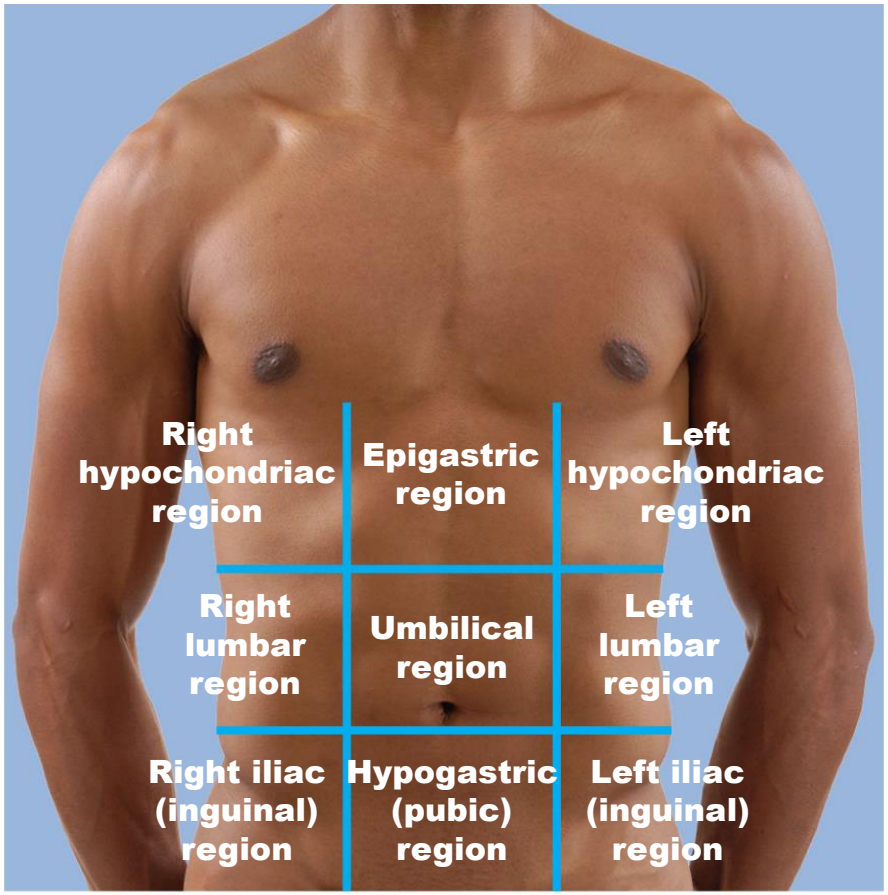
(serosa)

Abdominal cavity 腹腔區間

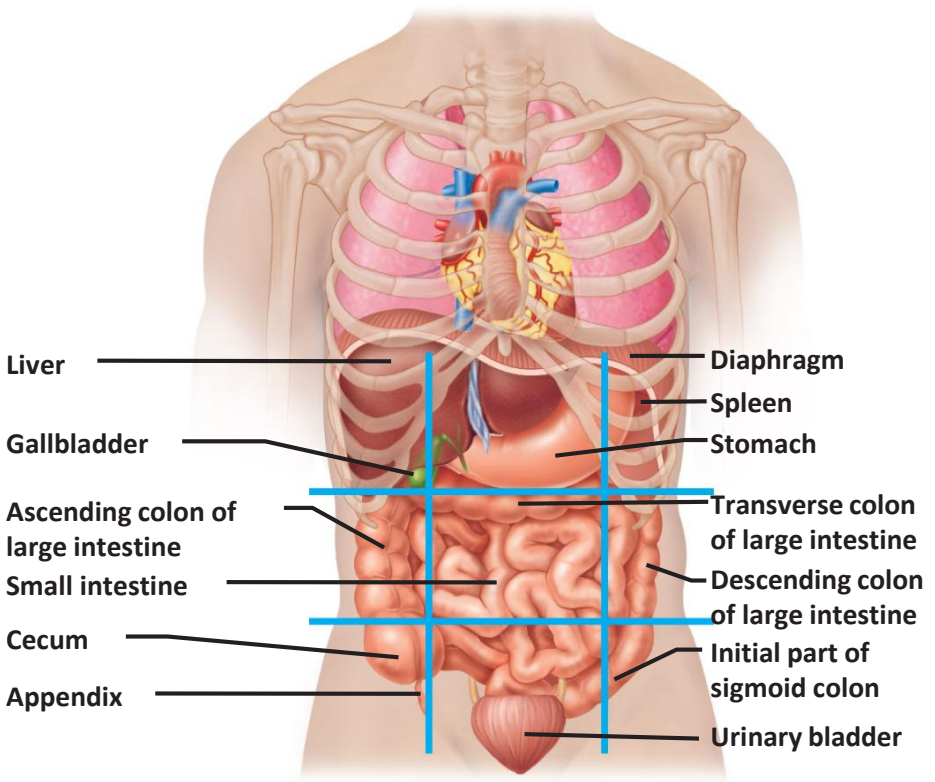
Abdominal Quadrants



Abdominal cavity 腹腔區間



(a) Nine regions delineated by four planes



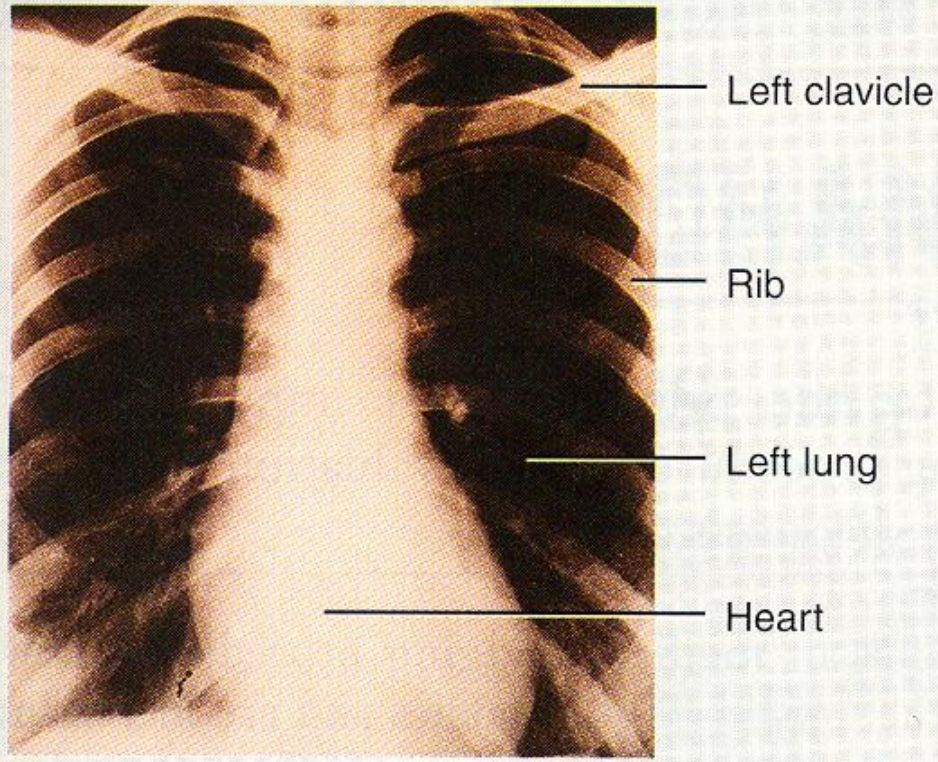
(b) Anterior view of the nine regions showing the superficial organs

Medical Imaging: Radiography

Radiography

Procedure: A single barrage of x-rays passes through the body, producing an image of interior structures on x-ray–sensitive film. The resulting two-dimensional image is a *radiograph* (RĀ-dē-ō-graf′), commonly called an *x-ray.*

Comments: Produces clear images of bony or dense structures, which appear bright, but poor images of soft tissues or organs, which appear hazy or dark.



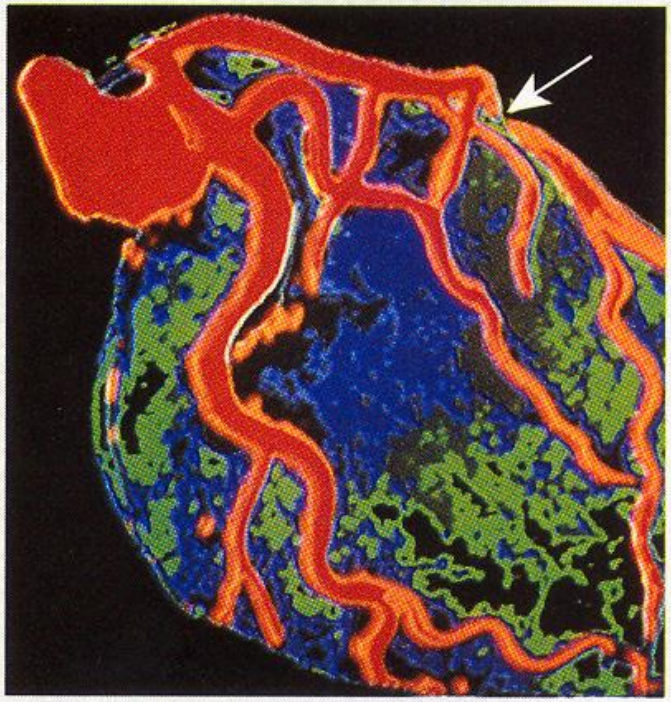
Anterior view of thorax

Medical Imaging: Digital subtraction angiography (DSA)
數位減影血管攝影

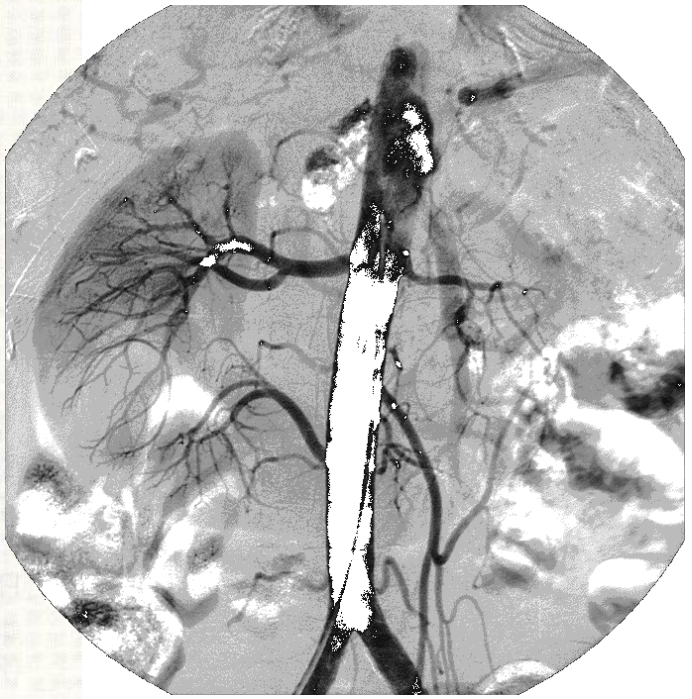
Digital Subtraction Angiography (DSA)

Procedure: A computer compares radiographs of a body region before and after a dye is injected into blood vessels. Tissues around the blood vessels are erased (digitally subtracted) from the second image. The result, shown on a monitor, is an unobstructed view of the blood vessels.

Comments: Used primarily to study blood vessels in the brain and heart.



Blood vessels (red) surrounding heart (arrow indicates narrowed vessel)



Medical Imaging: Computed tomography (CT) 電腦斷層掃瞄

https://v.ftcdn.net/02/33/52/70/700_F_233527007_urveK3Lo5VWVE1dZ6Ed9845orhI7pOuZ_ST.mp4

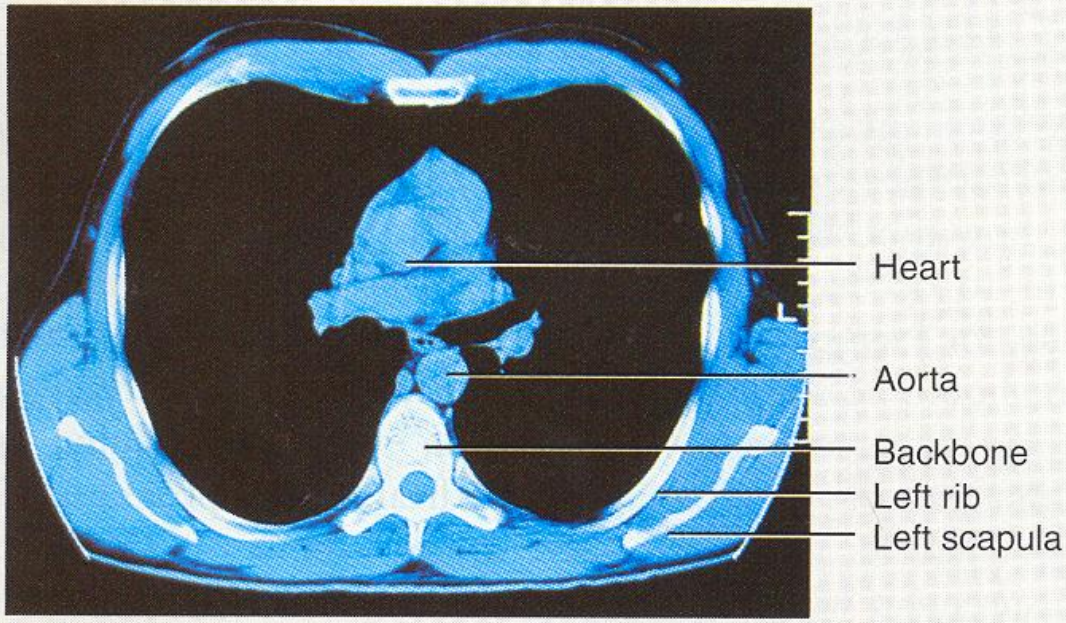
Computed Tomography (CT)

[formerly called computerized axial tomography (CAT) scanning]

Procedure: Computer-assisted radiography in which an x-ray beam traces an arc at multiple angles around a section of the body. The resulting transverse section of the body, called a *CT scan,* is reproduced on a video monitor.

Comments: Visualizes soft tissues and organs with much more detail than conventional radiographs. Differing tissue densities show up as various shades of gray. Multiple scans can be assembled to build three-dimensional views of structures.

ANTERIOR



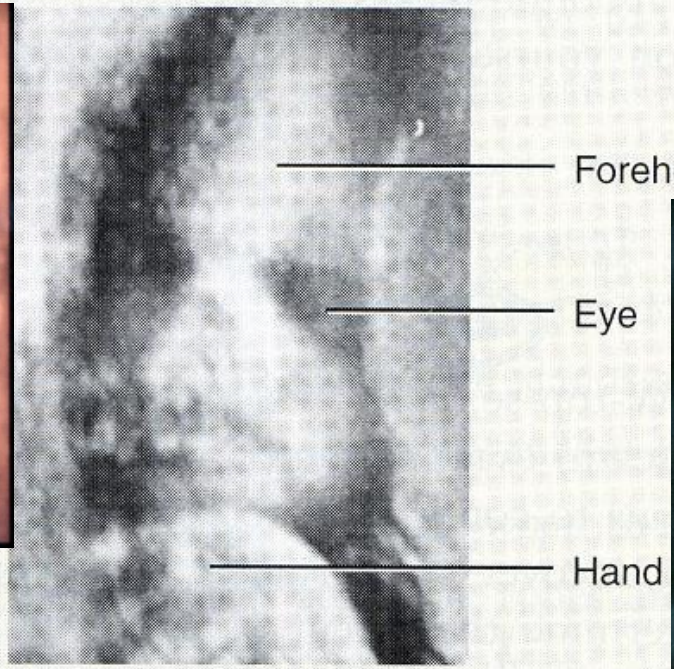
POSTERIOR

Medical Imaging: Sonography (超音波)

Sonography

Procedure: High-frequency sound waves produced by a handheld wand reflect off body tissues and are detected by the same instrument. The image, which may be still or moving, is called a *sonogram* (SŌ-nō-gram) and is reproduced on a video monitor.

Comments: Safe, noninvasive, painless, and uses no dyes. Most commonly used to visualize the fetus during pregnancy. Also used to observe the size, location, and actions of organs and blood flow through blood vessels.



Courtesy of Andrew Joseph Tortora and Damaris Soler

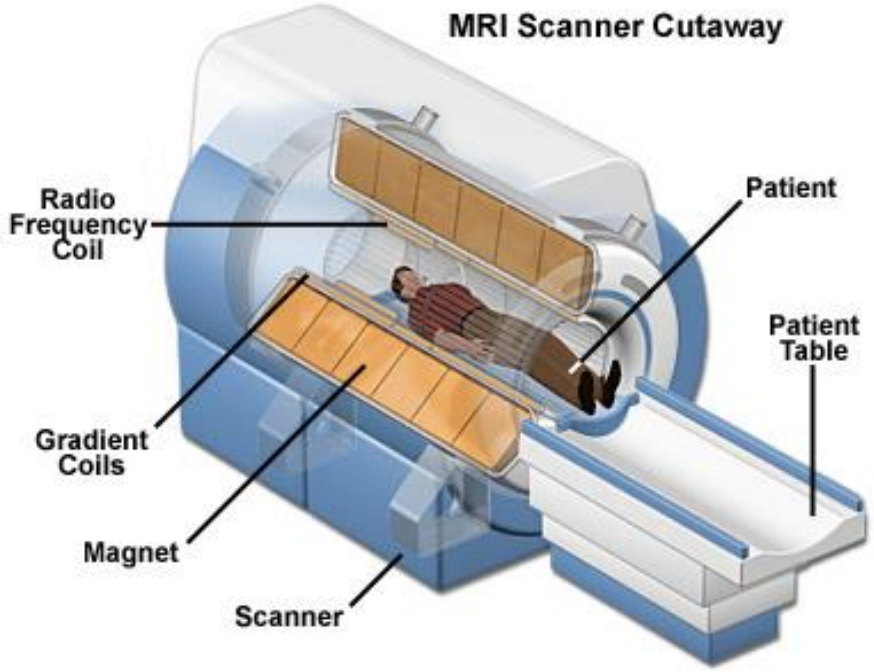
Medical Imaging: Magnetic resonance imaging (MRI)

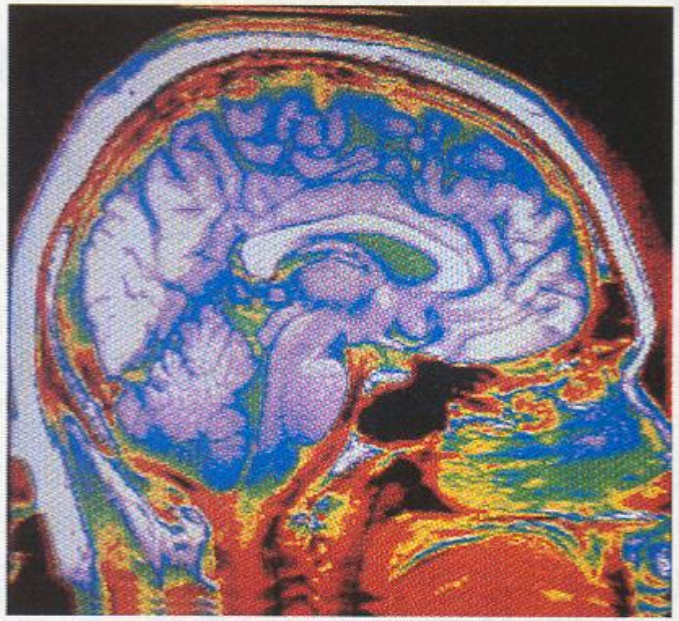
核磁共振攝影（磁振造影）

Magnetic Resonance Imaging (MRI)

Procedure The body is exposed to a high-energy magnetic field, which causes protons (small positive particles within atoms, such as hydrogen) in body fluids and tissues to arrange themselves in relation to the field. Then a pulse of radiowaves "reads" these ion patterns, and a color-coded image is assembled on a video monitor. The resulting image is a two- or three-dimensional blueprint of cellular chemistry.

Comments Relatively safe, but can't be used on patients with metal in their bodies. Shows fine details for soft tissues but not for bones. Most useful for differentiating between normal and abnormal tissues. Used to detect tumors and artery-clogging fatty plaques, reveal brain abnormalities, and measure blood flow.





Sagittal section of brain

Medical Imaging:

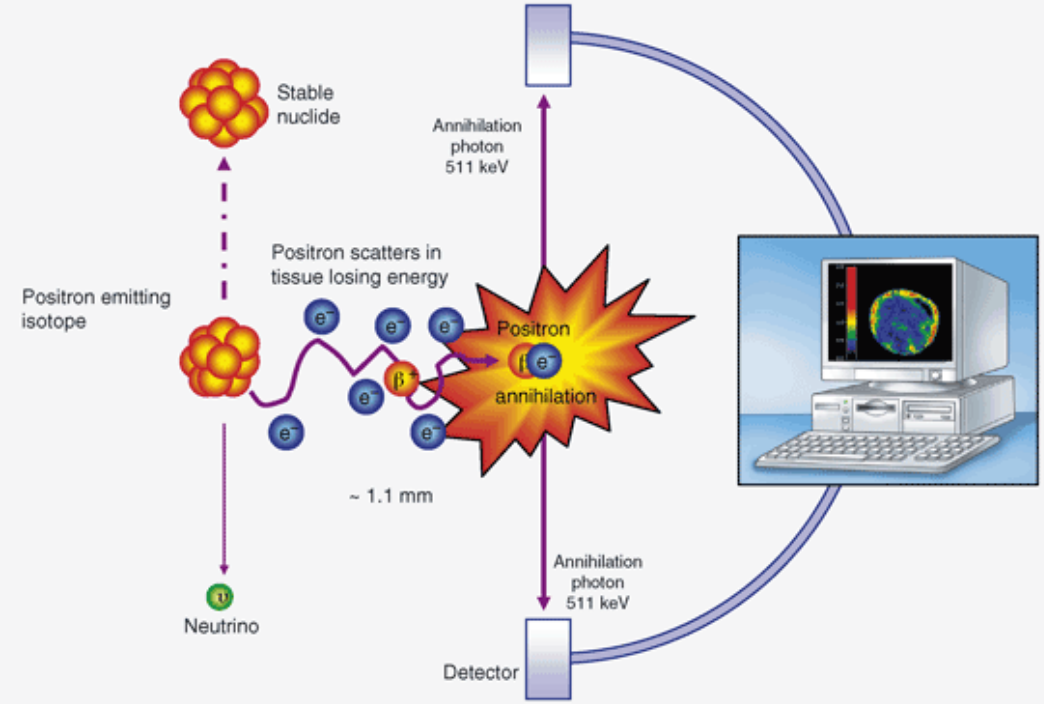
Positron emission tomography (PET)

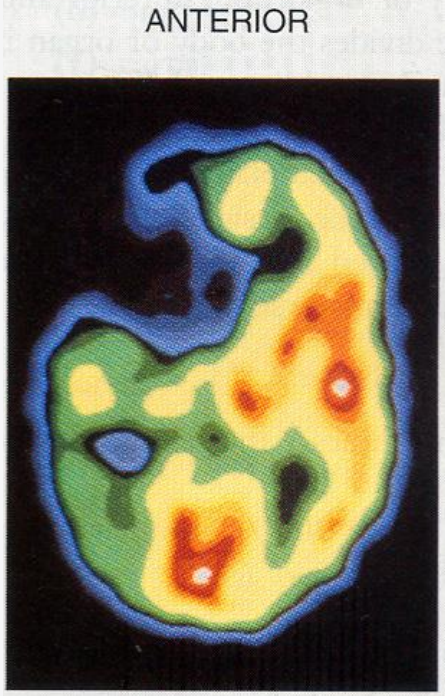
正子斷層掃描

Positron Emission Tomography (PET)

Procedure A substance that emits positrons (positively charged particles) is injected into the body, where it is taken up by tissues. The collision of positrons with negatively charged electrons in body tissues produces gamma rays (similar to x-rays) that are detected by gamma cameras positioned around the subject. A computer receives signals from the gamma cameras and constructs a *PET scan* image, displayed in color on a video monitor. The PET scan shows where the injected substance is being used in the body.

Comments Used to study the physiology of body structures, such as metabolism in the brain or heart.



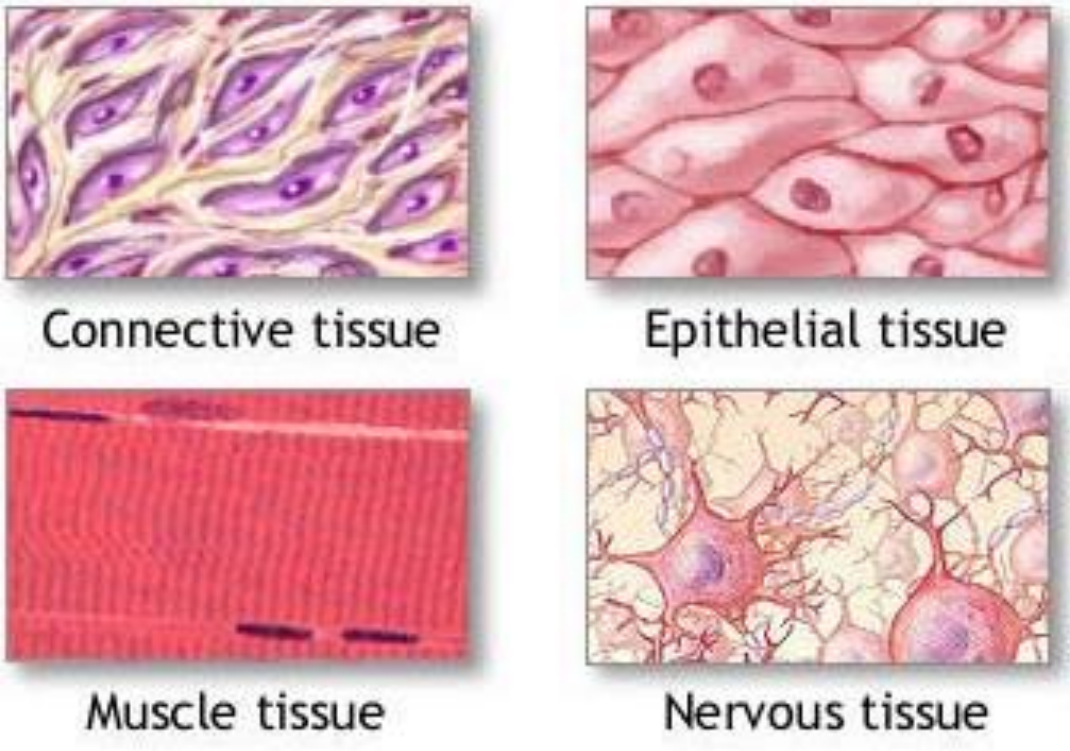


Transverse section showing blood flow through brain (darkened area at upper left indicates where a stroke has occurred)

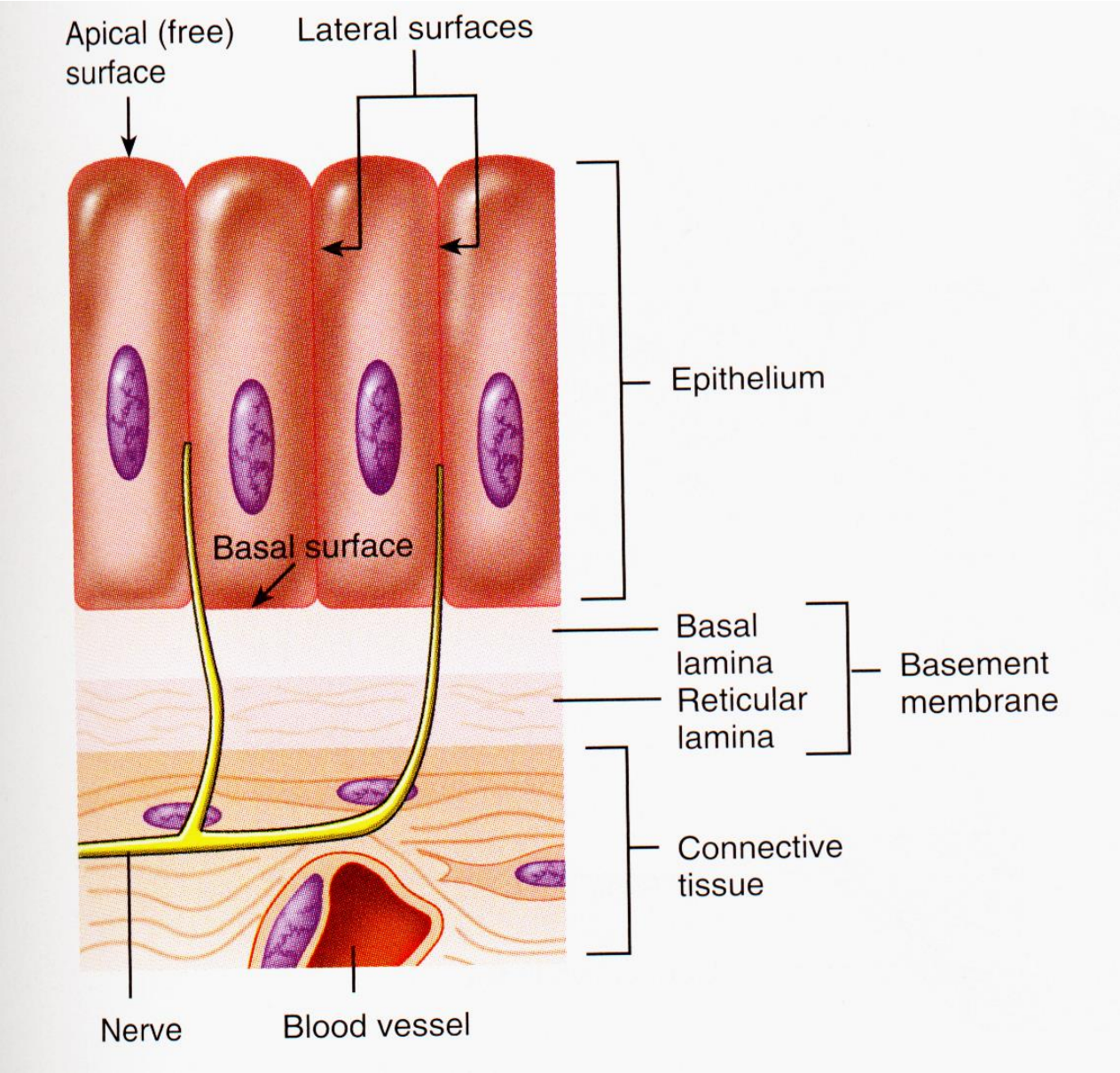
https://www.youtube.com/watch?v=yrTy03O0gWw

General Histology

- **Epithelial tissue** 上皮組織—covering
- **Connective tissue 結締組織**—support
- **Muscle tissue** 肌肉組織—movement
- **Nervous tissue**神經組織—control



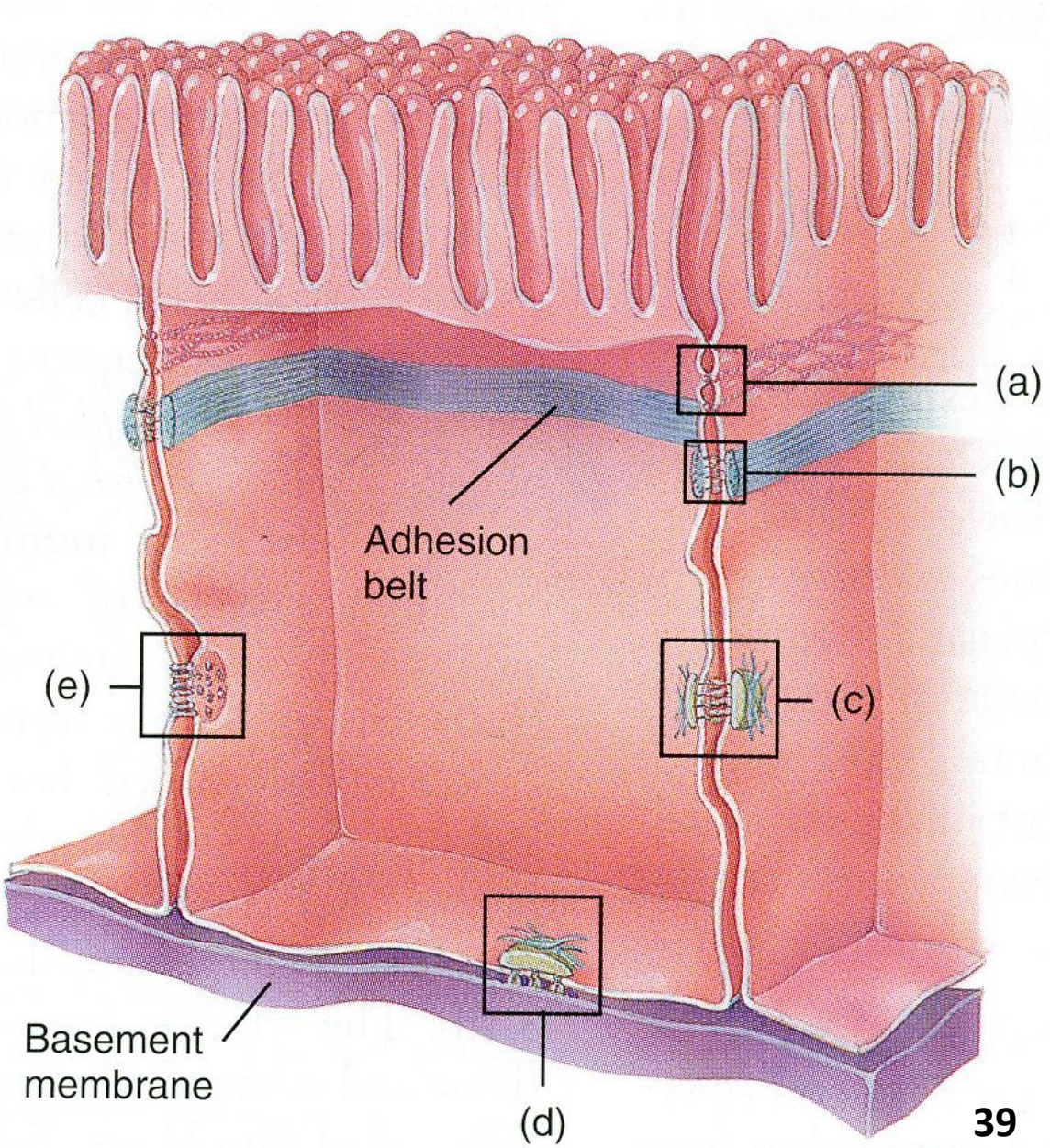
Epithelial tissues上皮組織



Cell Junctions 細胞接合

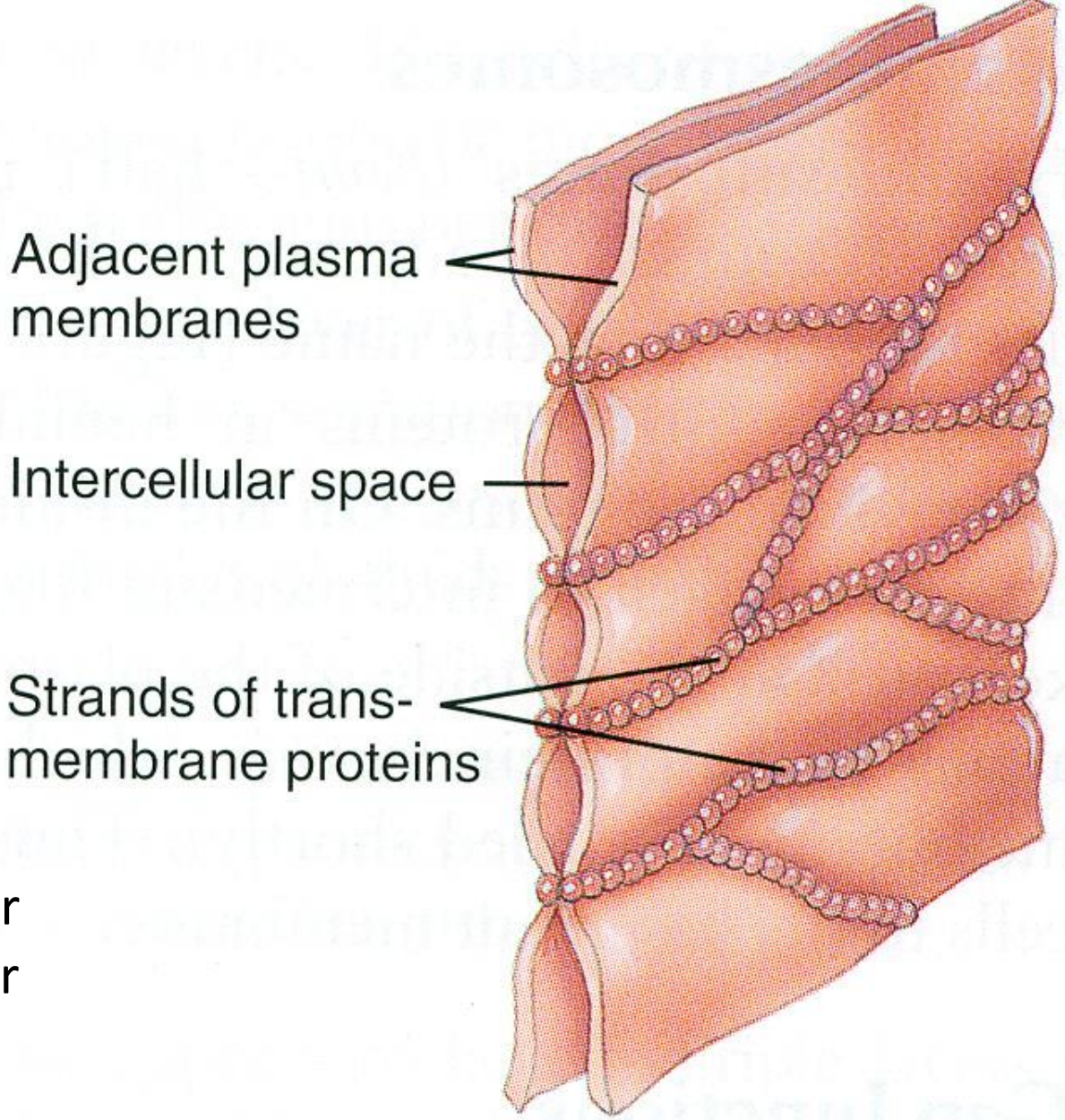
a. Tight junction
緊密接合
b. Adherens junction
黏連接合
c. Desmosome 鍵結體
e. Gap junction 溝通接合

d. Hemidesmosome 半鍵結體



Cell Junctions
細胞接合

a. Tight junction
緊密接合

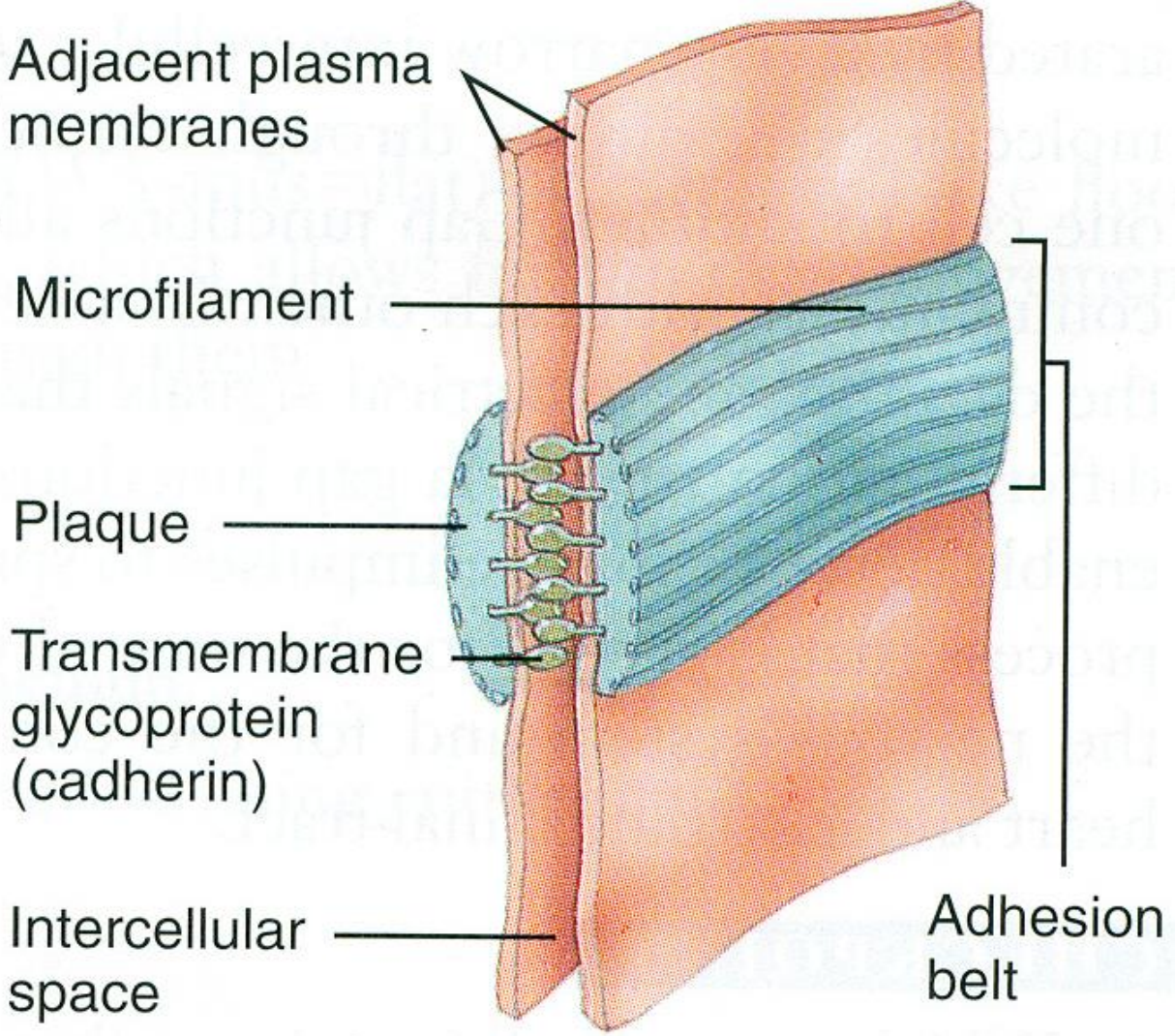


(a) Tight junction

BBB : blood brain barrier
BTB : blood testis barrier

Cell Junctions
細胞接合

b. Adherens junction
黏連接合

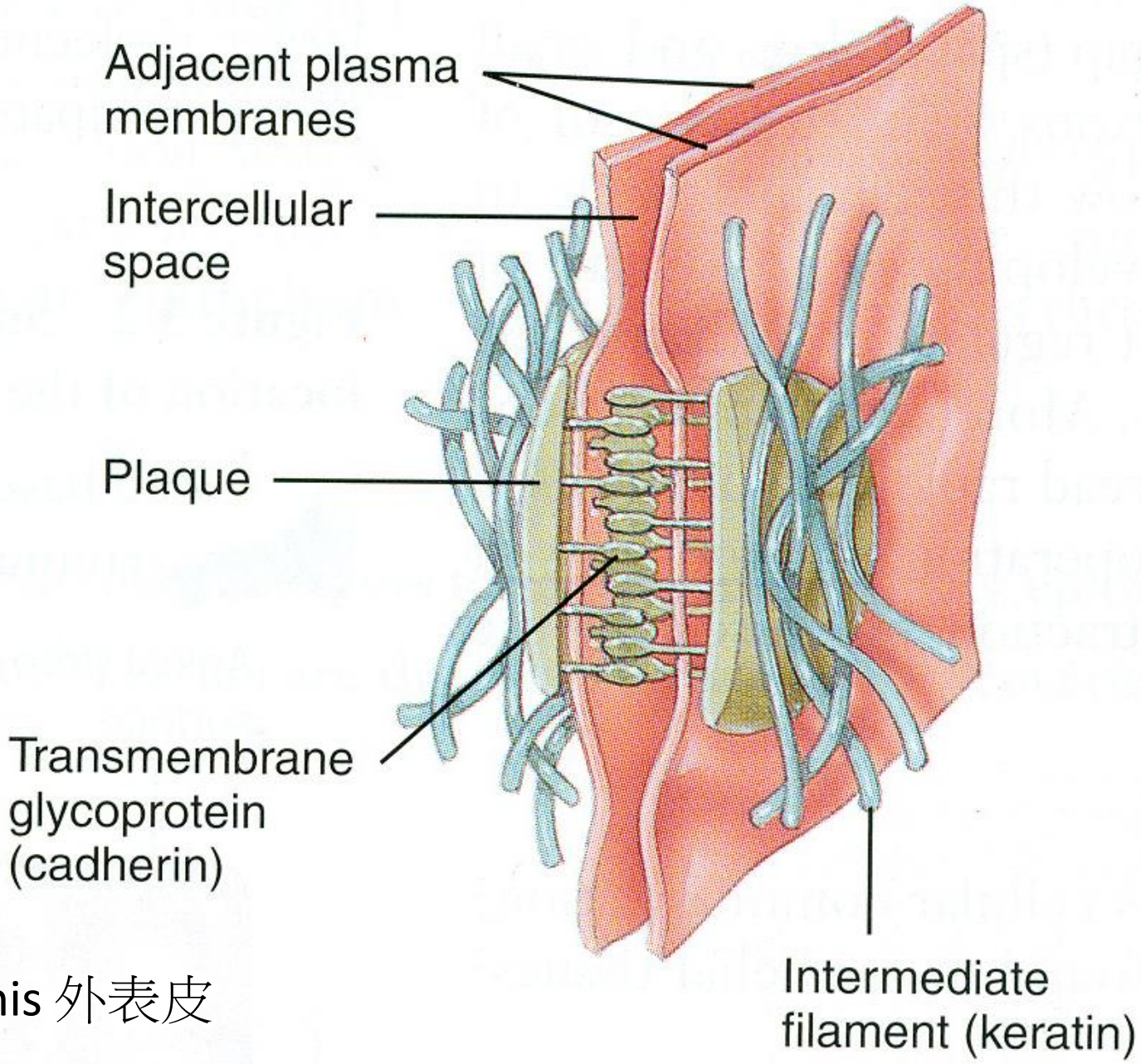


Cardiomyocyte 心肌細胞

(b) Adherens junction

Cell Junctions
細胞接合

c. Desmosome
鍵結體



Skin: epidermis 外表皮

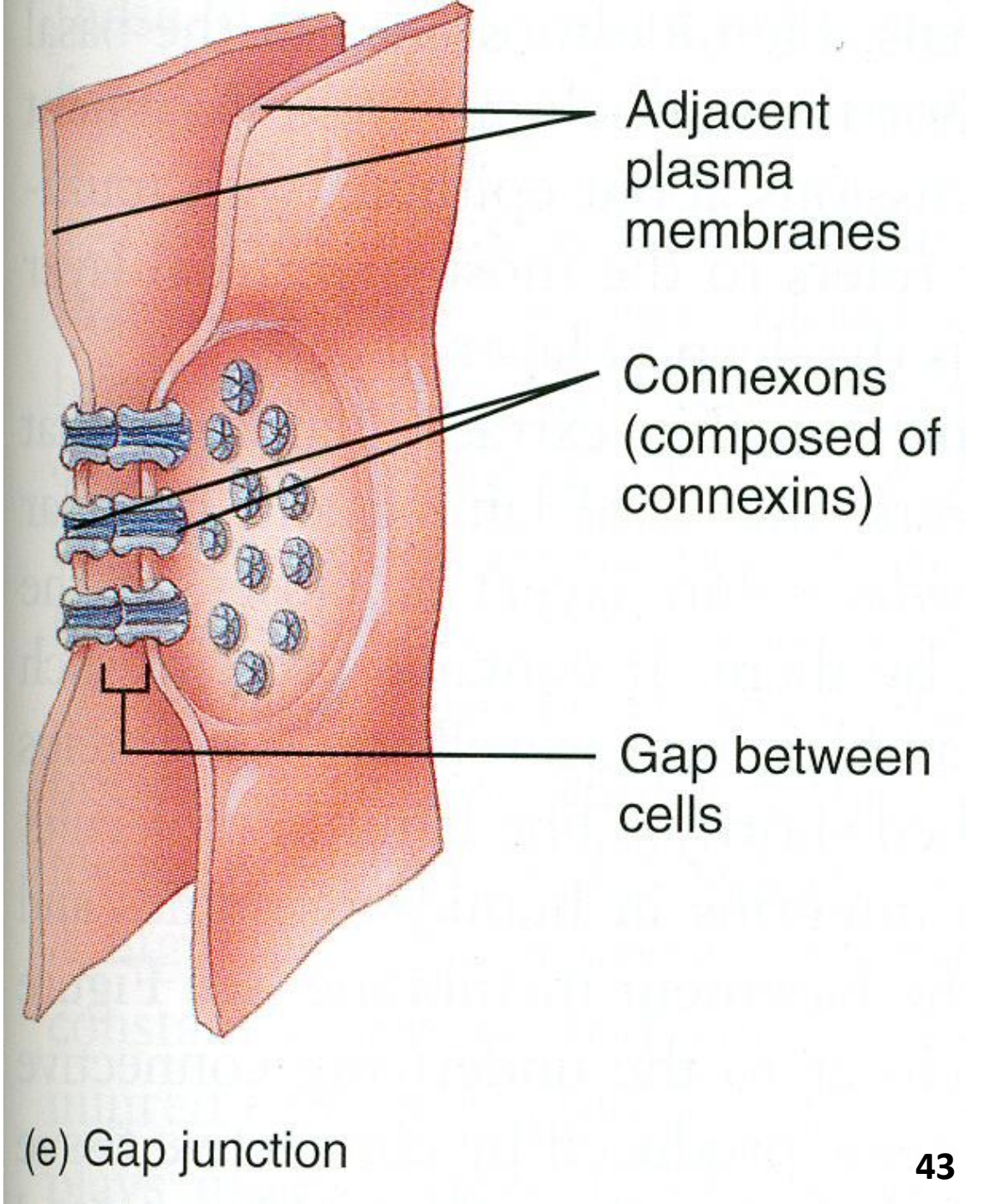
(c) Desmosome

Cell Junctions
細胞接合

e. Gap junction
溝通接合

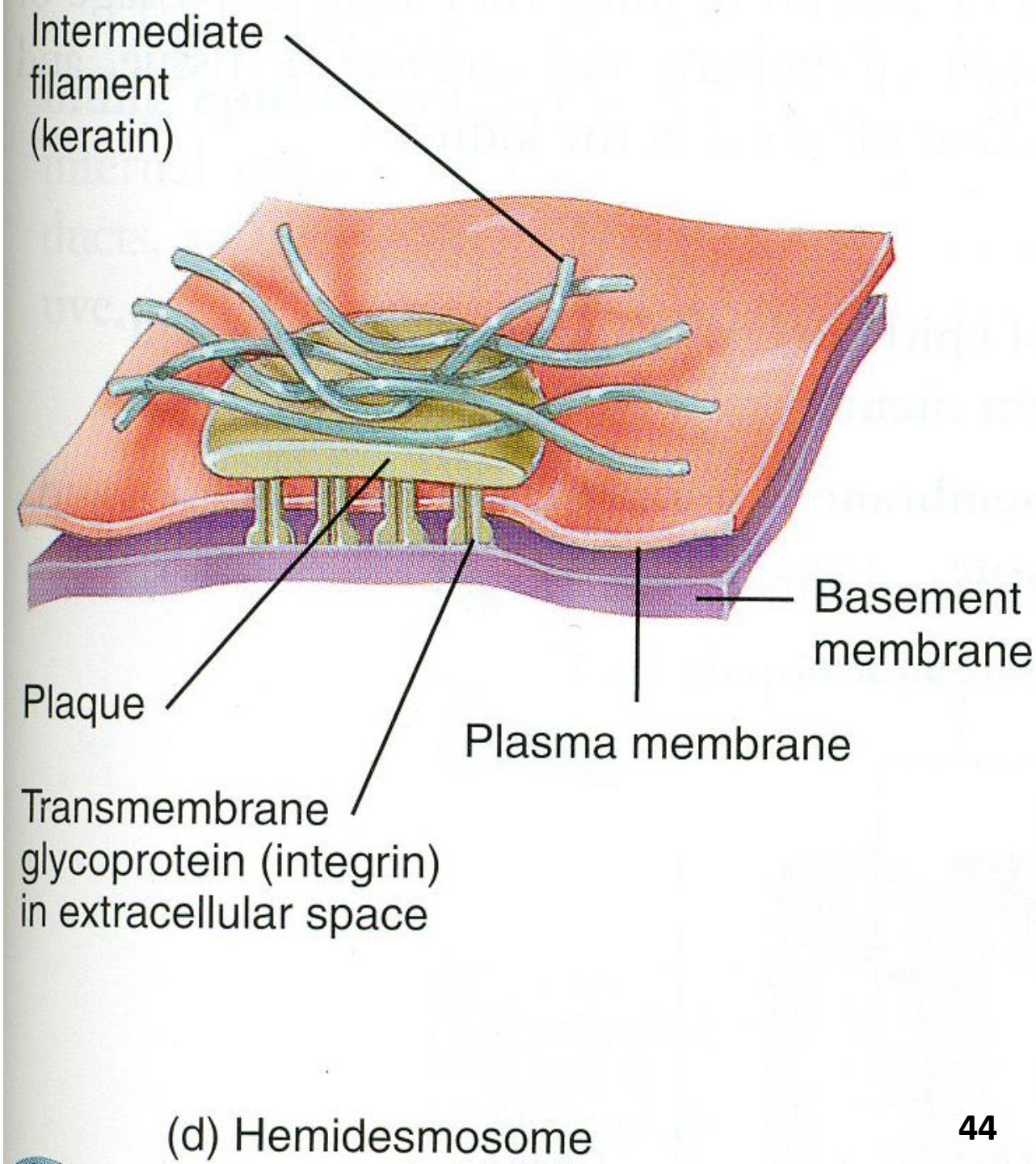
細胞訊息傳遞：
鈣離子 Ca^{++}

Cardiomyocyte
心肌細胞

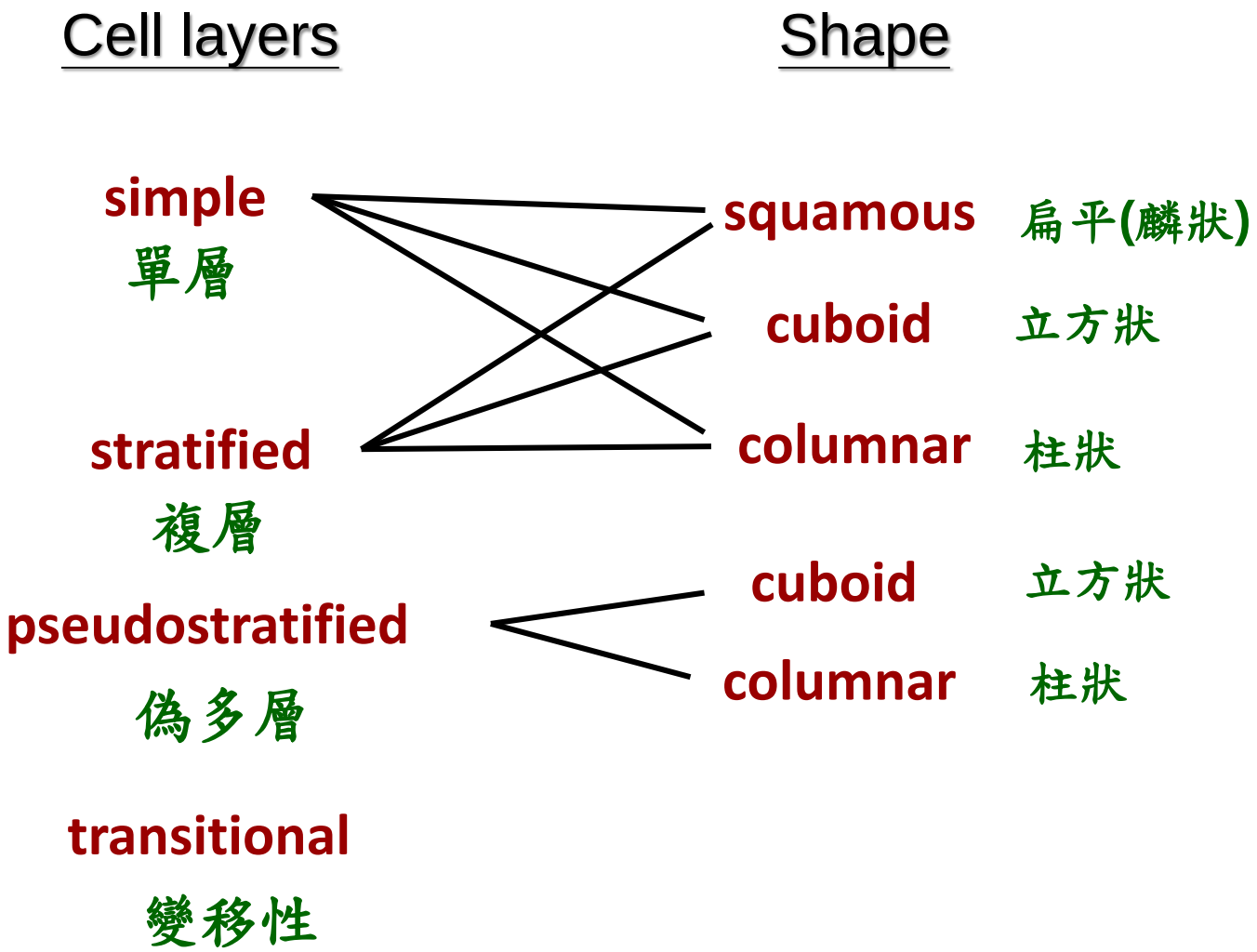


Cell Junctions
細胞接合

d. Hemidesmosome
半鍵結體



Classification of epithelial tissue (I)



Classification of epithelial tissue (II)

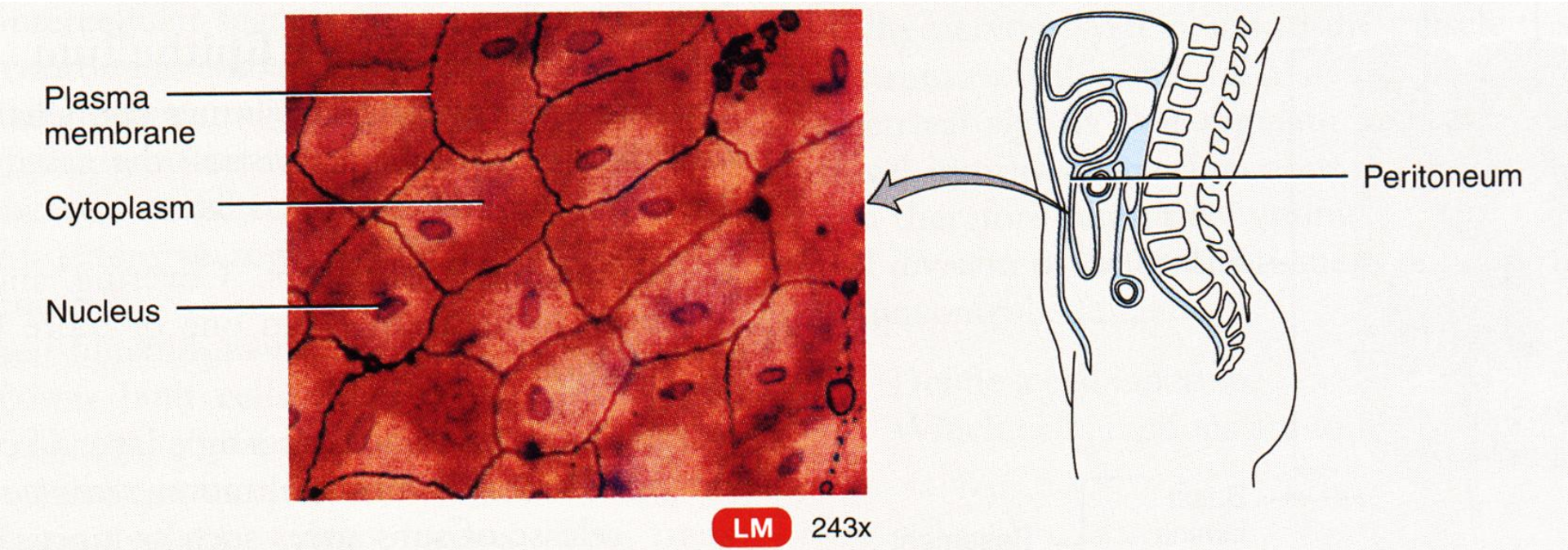
- Presence of apical surface modifications:
  cornified (keratinizied) 角質化 or non-cornified

- Cilia : ciliated 纖毛化 or non-ciliated

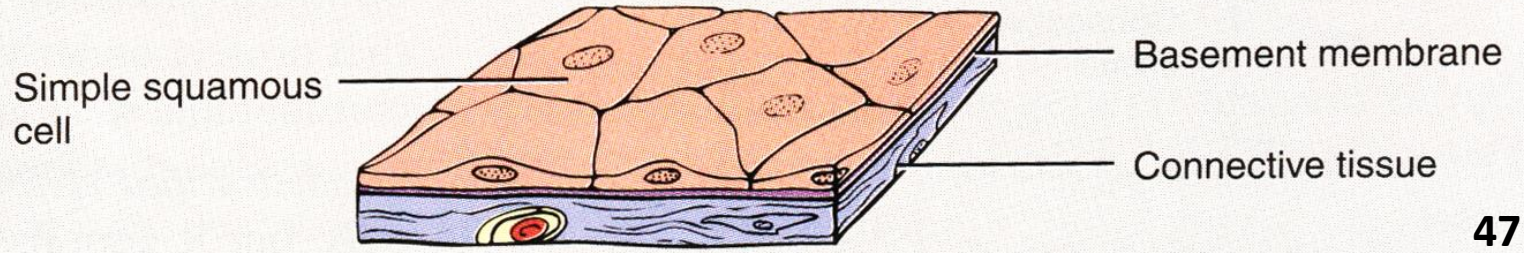
- Microvilli 微絨毛: Striated border - intestine
  Brush border - kidney (proximal tubule)
- Stereocilia 靜纖毛: long microvilli – epididymis 副睪 (ductus deferens 輸精管)

Simple squamous epithelium單層扁平(麟狀)上皮:

Endothelium 血管內皮, mesothelium 腹膜中皮

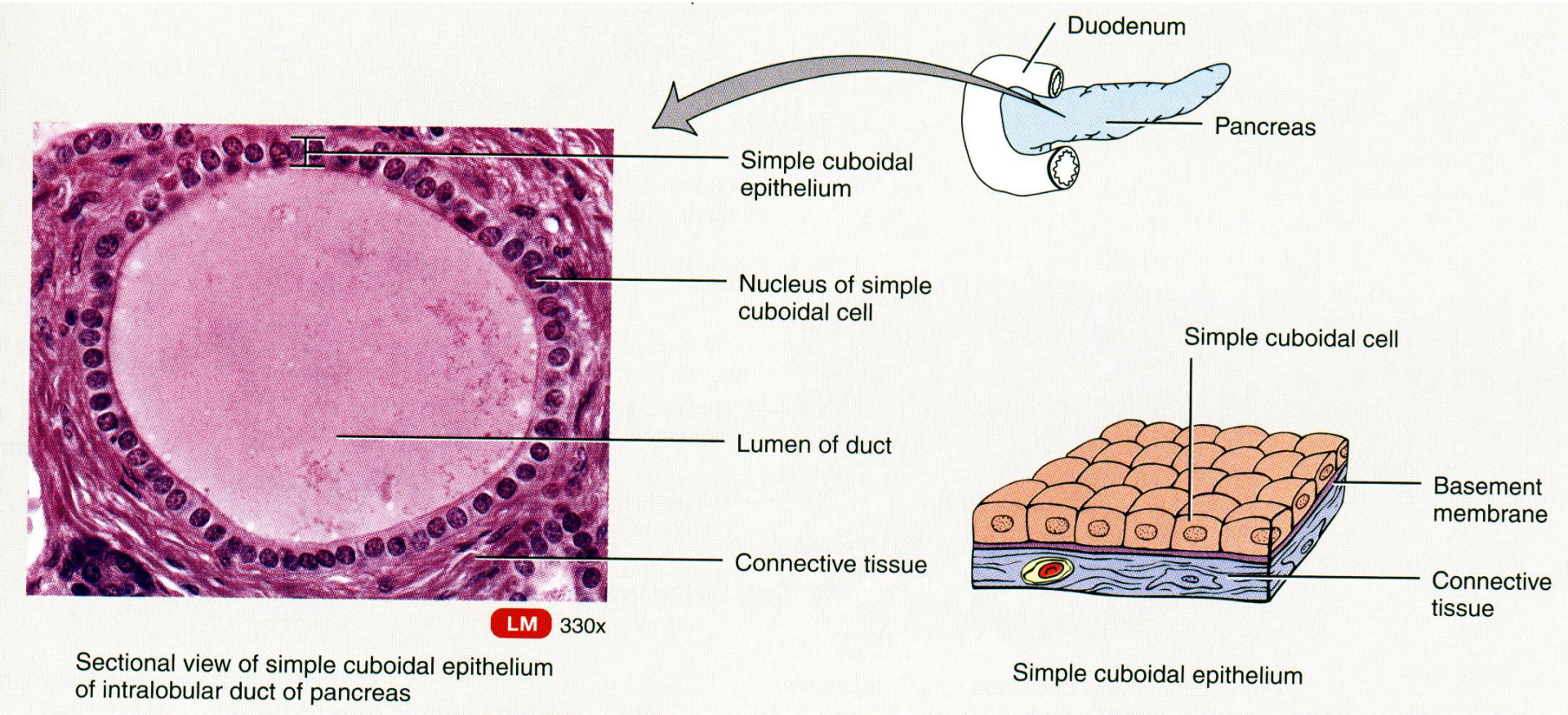


Surface view of simple squamous epithelium of mesothelial lining of peritoneum



Simple cuboidal epithelium單層立方狀上皮

Intralobular duct of Pancreas 胰臟葉內小管

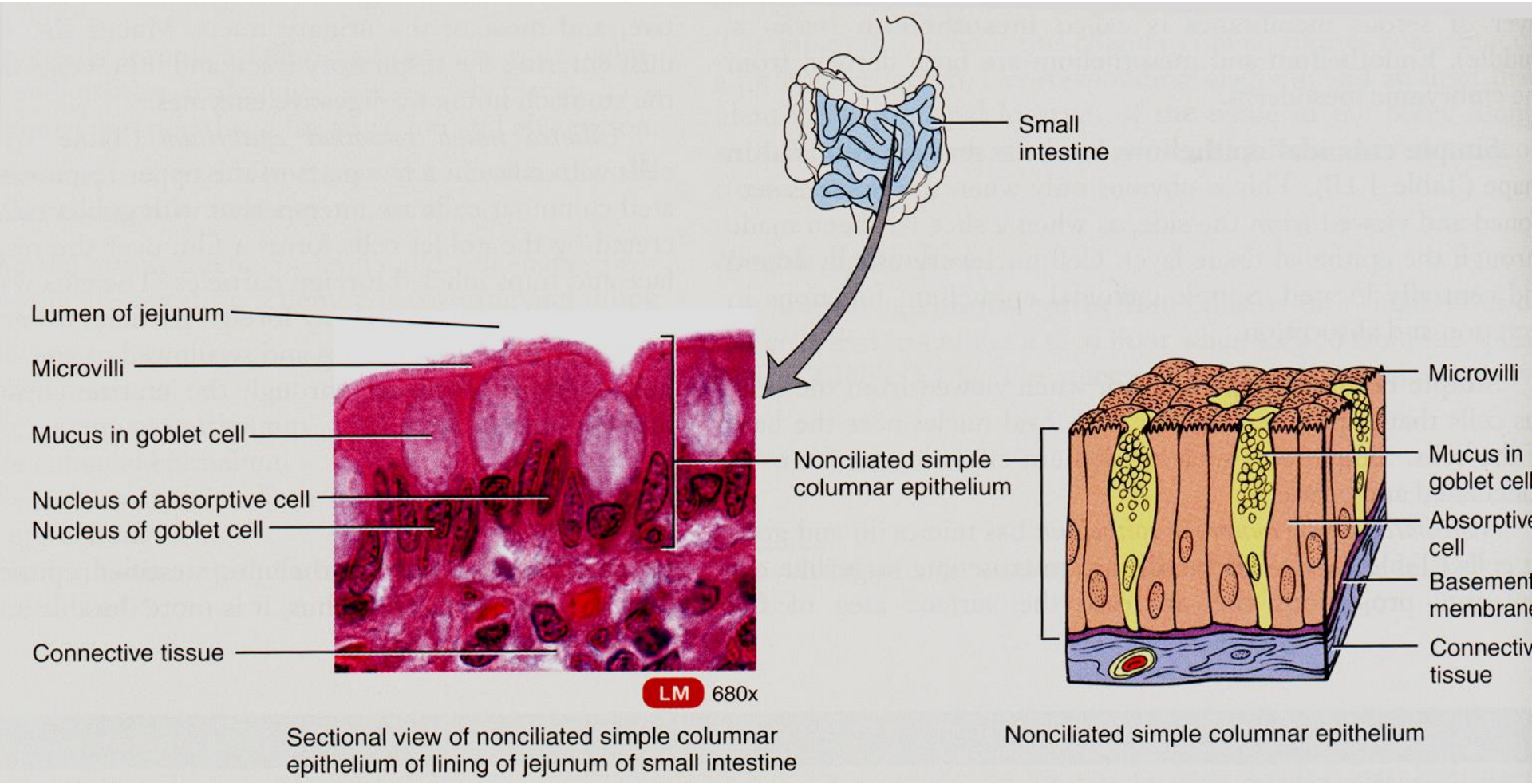


Sectional view of simple cuboidal epithelium of intralobular duct of pancreas

Simple cuboidal epithelium

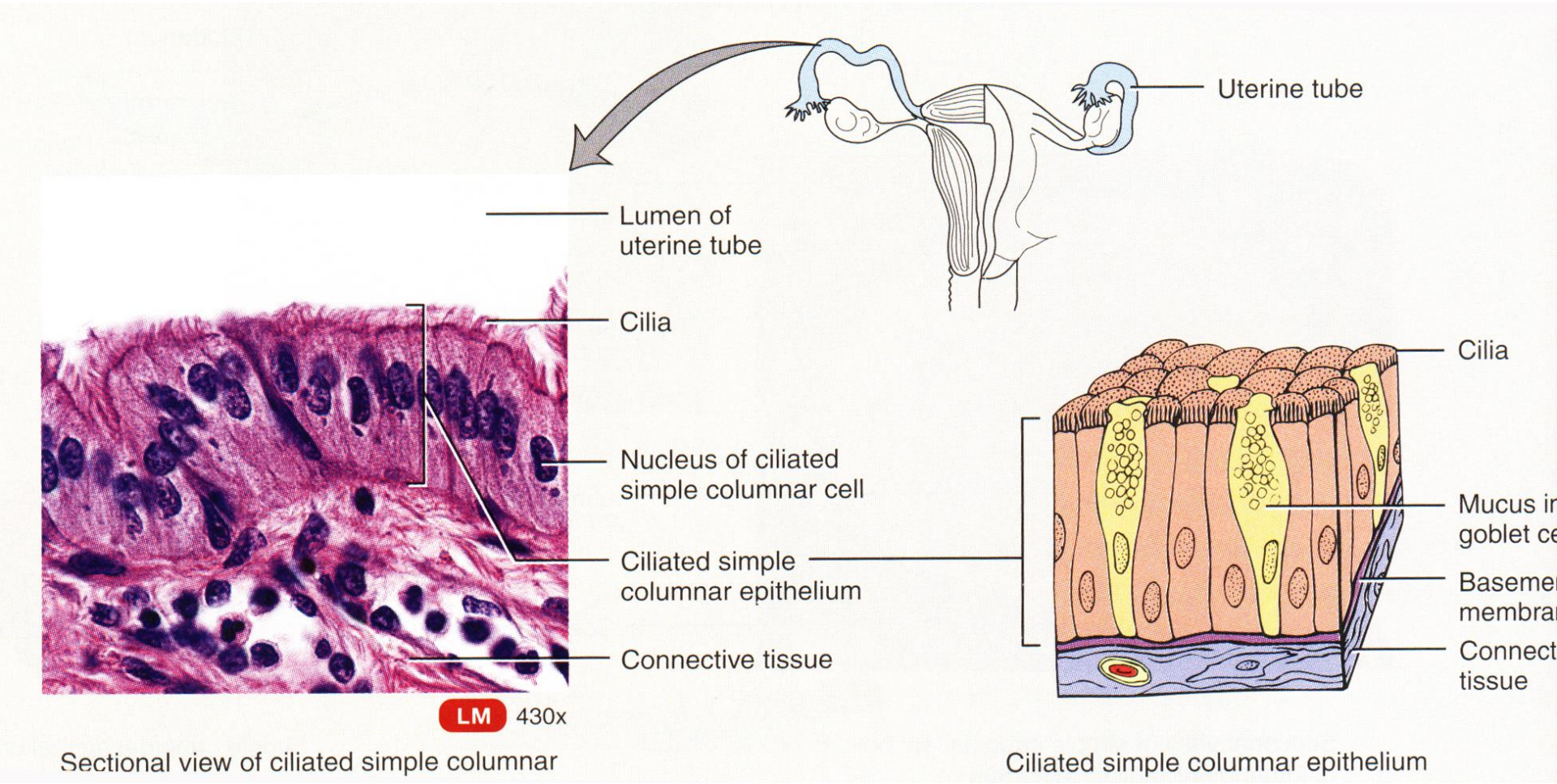
Nonciliated simple columnar epithelium非纖毛柱狀上皮

Intestinal villi小腸絨毛上皮



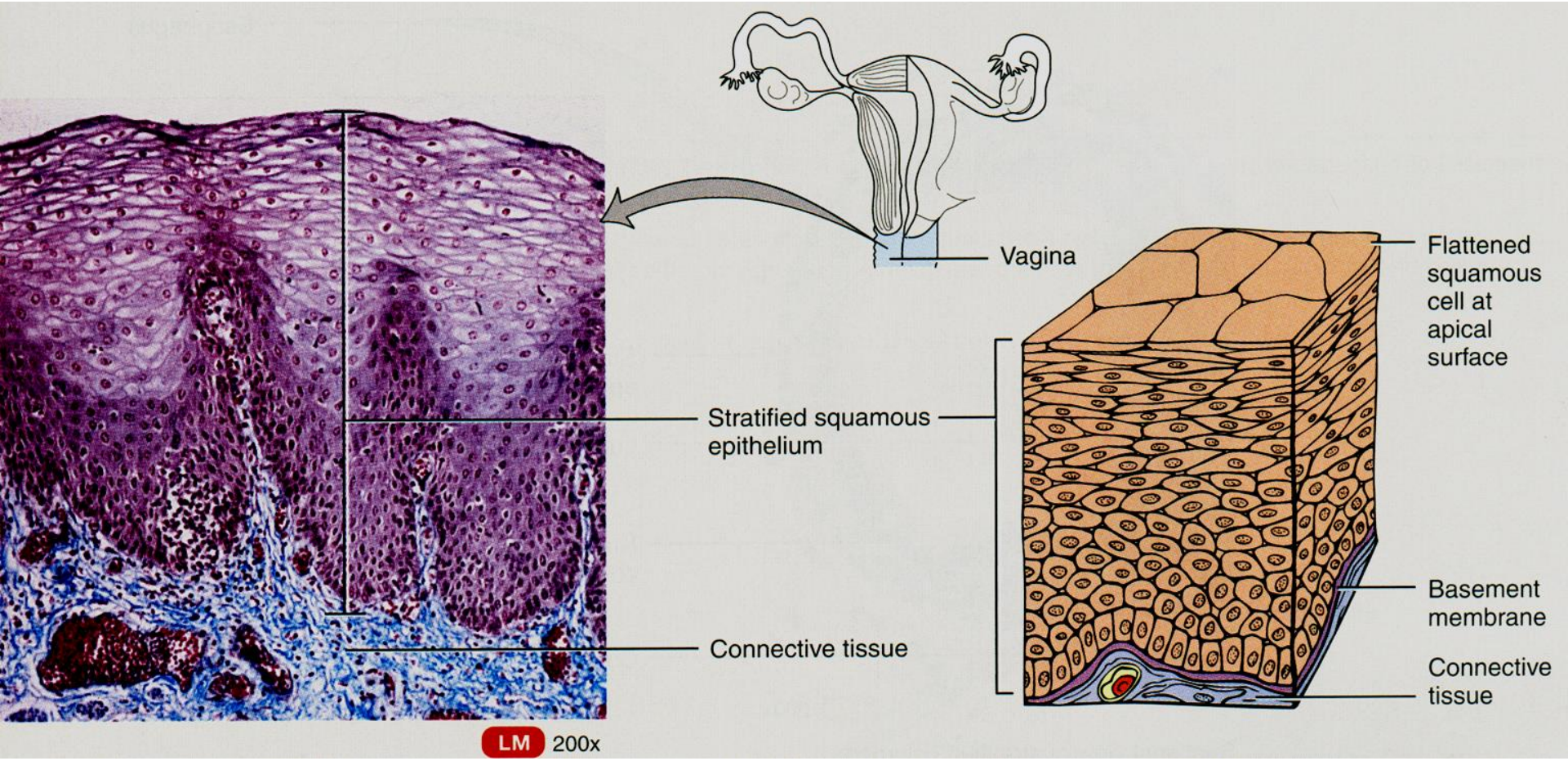
Ciliated simple columnar epithelium纖毛柱狀上皮

Uterine tube (Oviduct) 輸卵管上皮



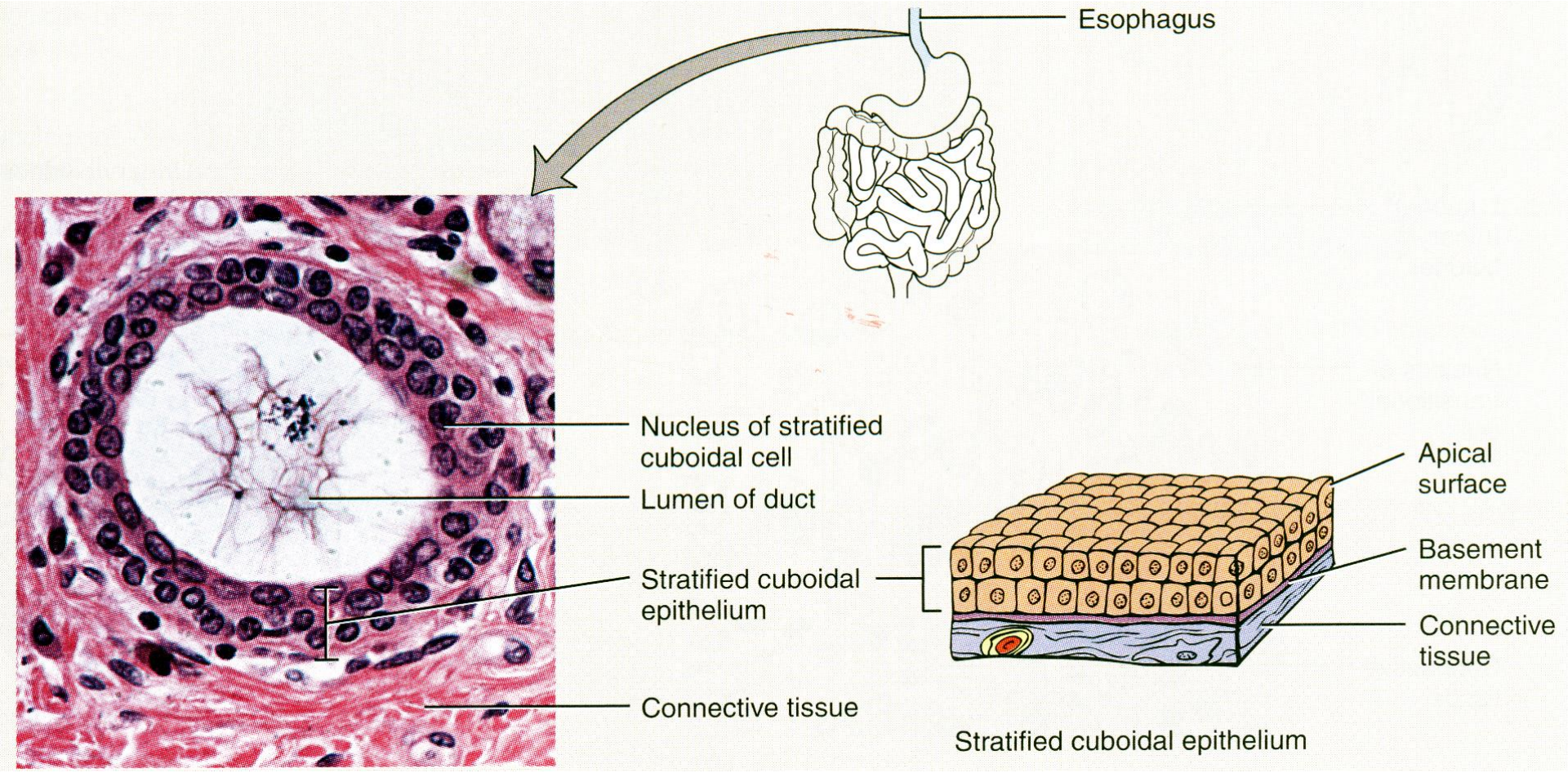
Stratified squamous epithelium複層扁平上皮

Skin epidermis 皮膚表皮; 食道、陰道上皮 Cornified / non-cornified



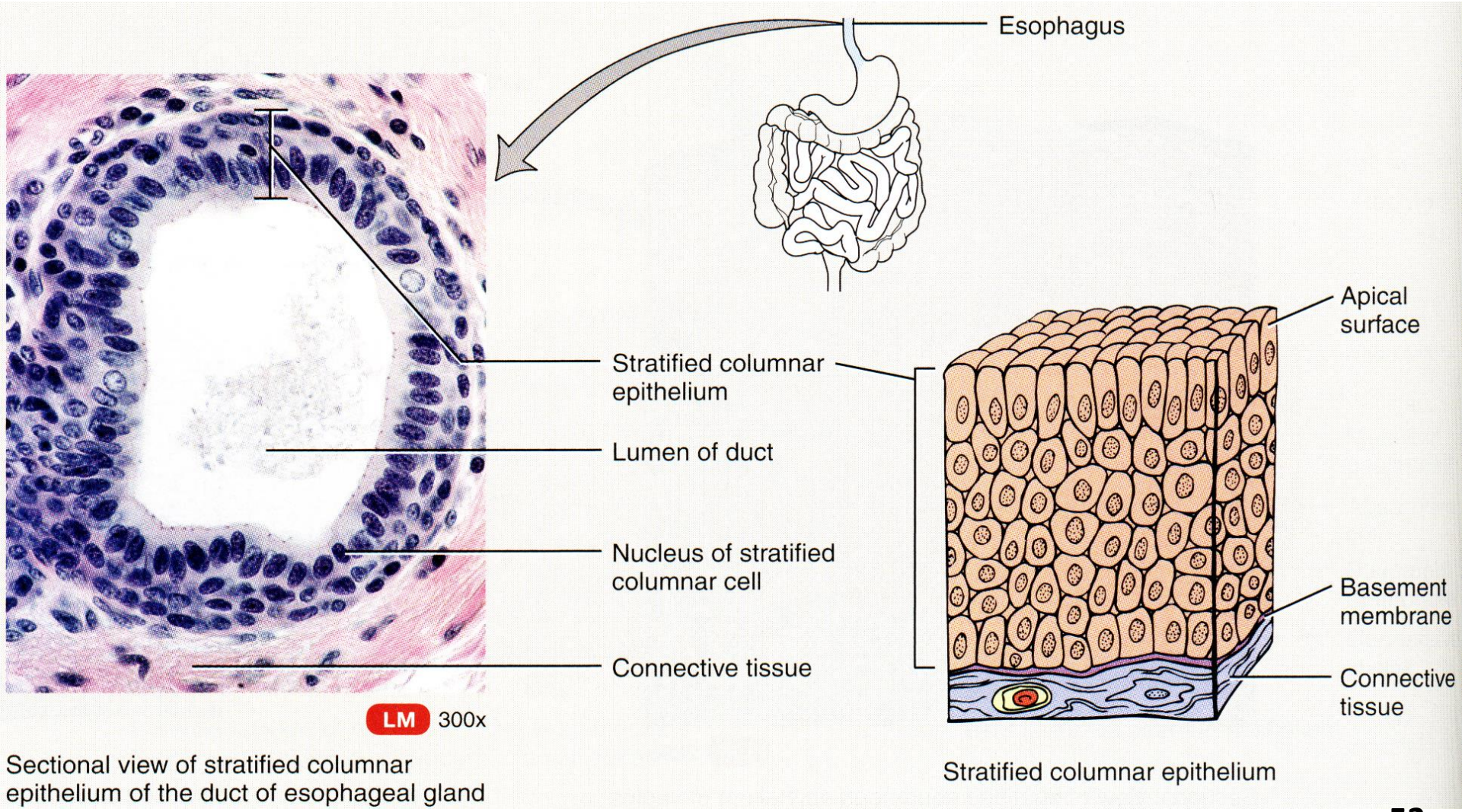
Stratified cuboidal epithelium複層立方上皮

Ducts of Esophageal gland 食道腺管道上皮



Stratified columnar epithelium複層柱狀上皮

Ducts of Esophageal gland食道腺管道上皮



Sectional view of stratified columnar epithelium of the duct of esophageal gland

Stratified columnar epithelium

Transitional epithelium
變移性上皮

Urinary bladder 膀胱,
Ureter 輸尿管上皮

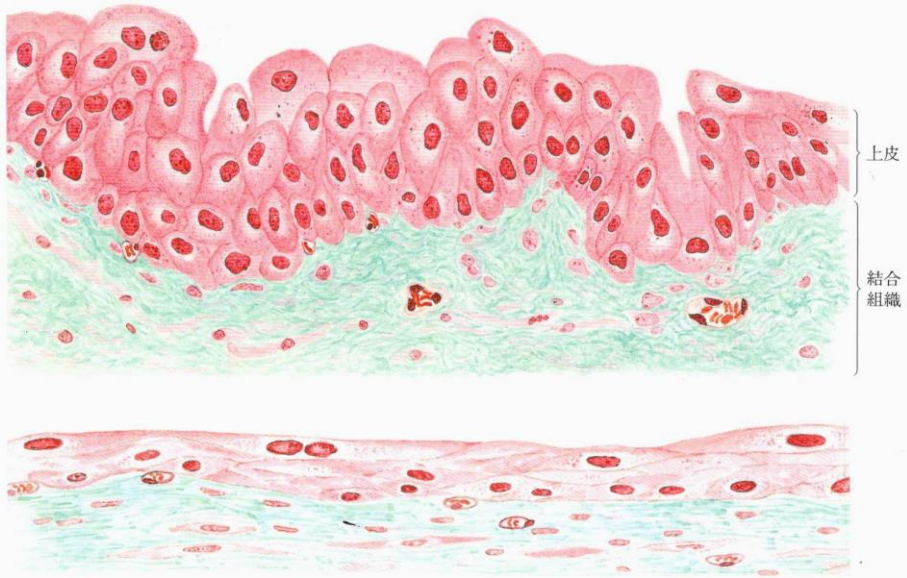
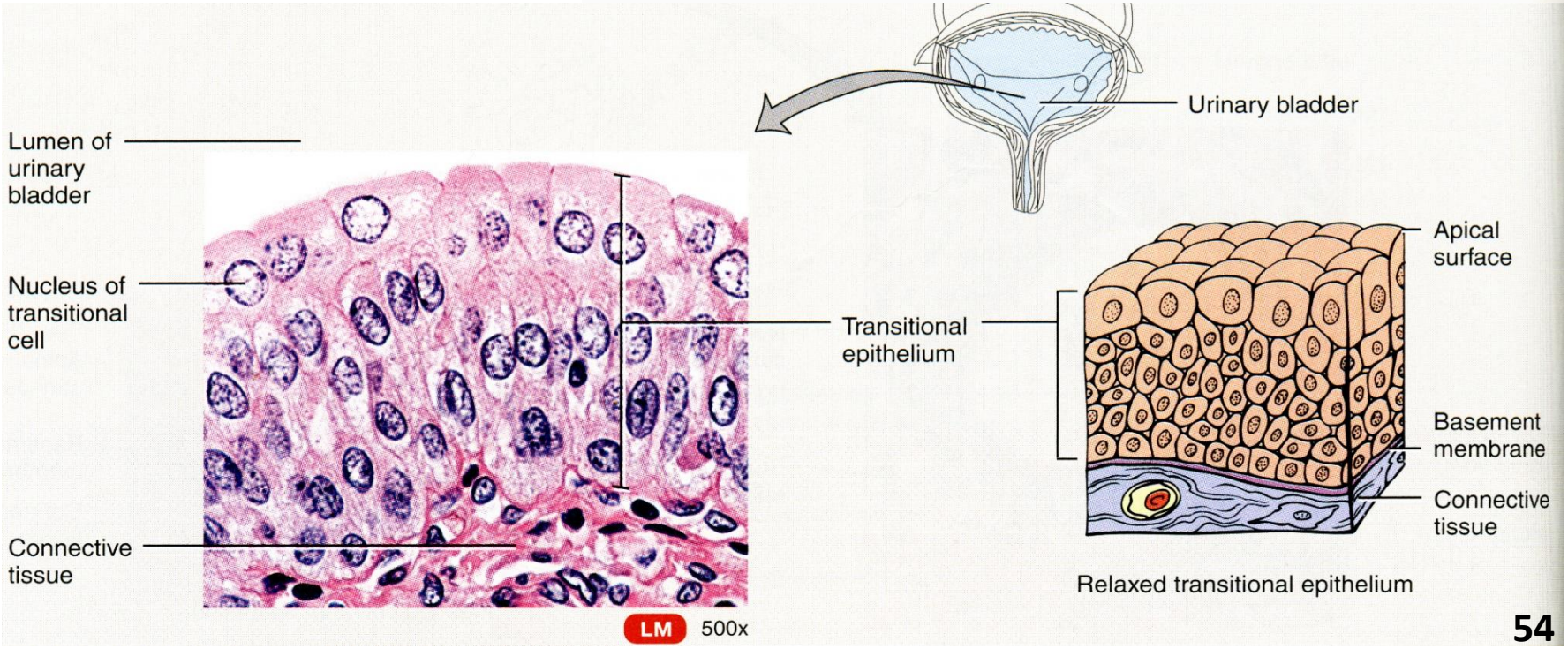
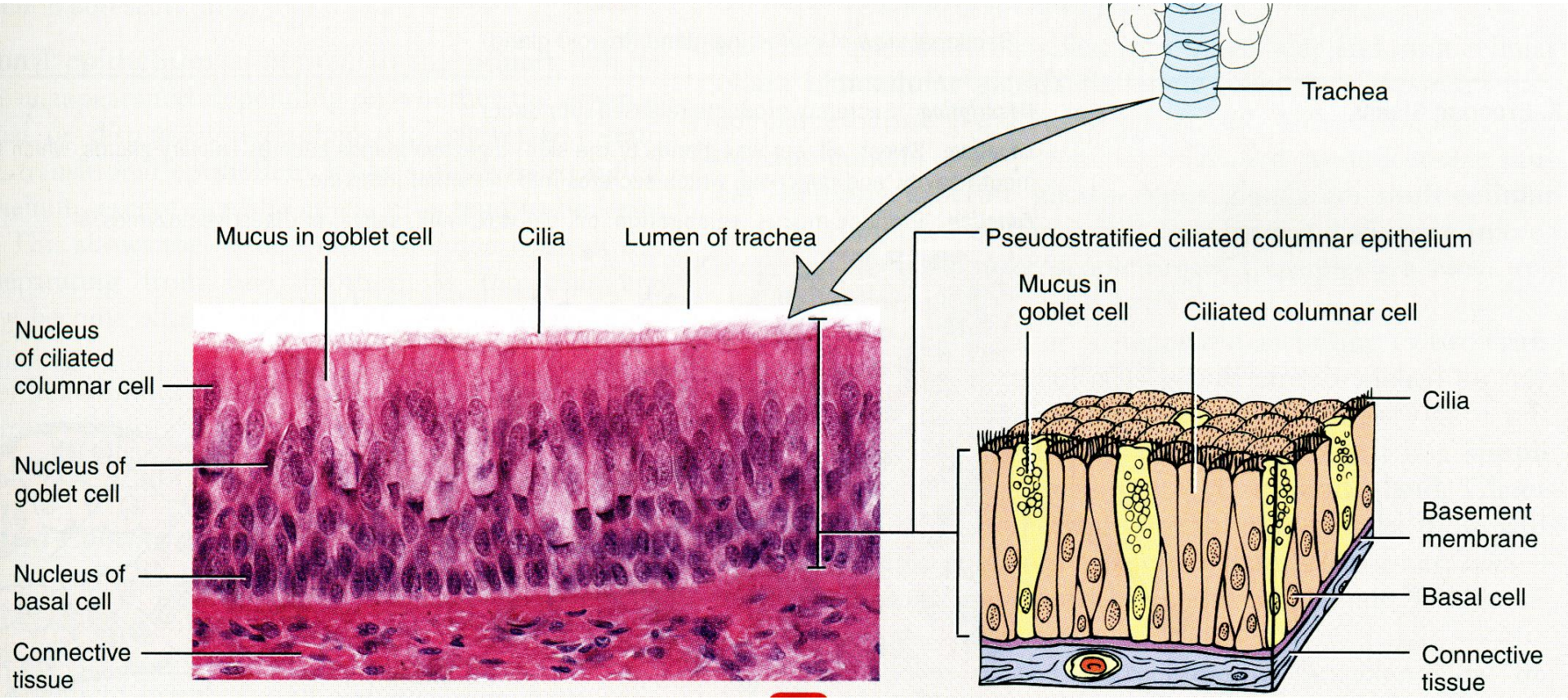


図 IV-6 移行上皮
上は 膀胱の収縮時，下は 伸展時。モルモット，Masson-Goldner 染色



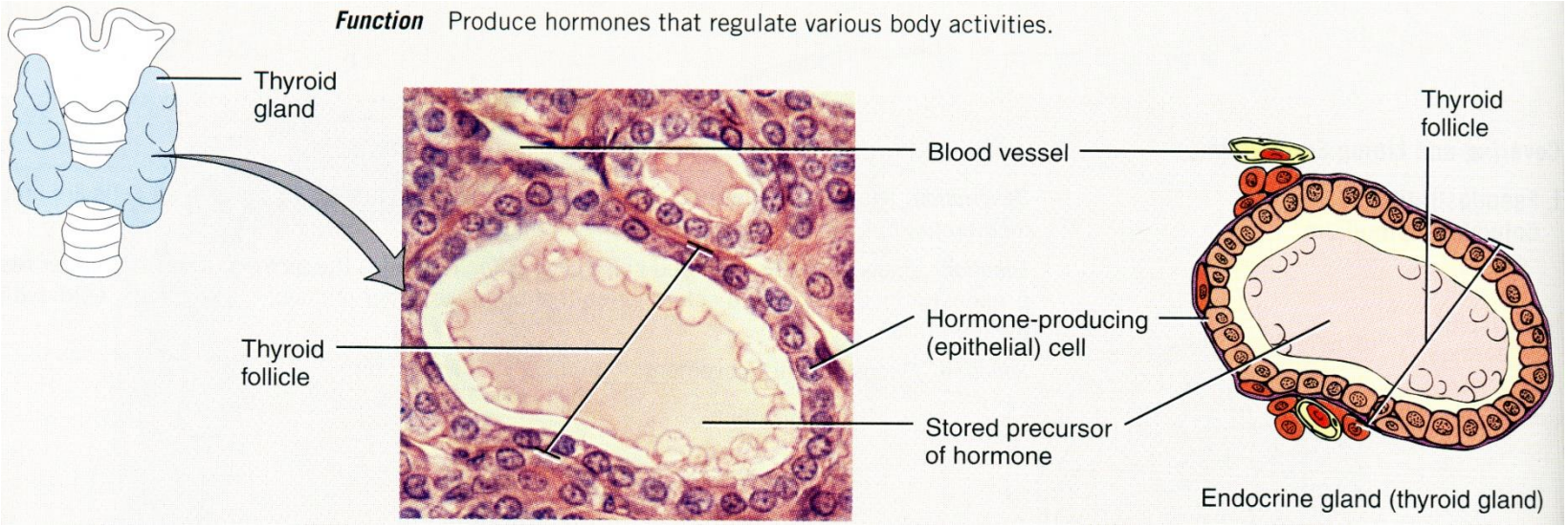
Pseudostratified columnar epithelium偽多層柱狀上皮

Trachea氣管上皮

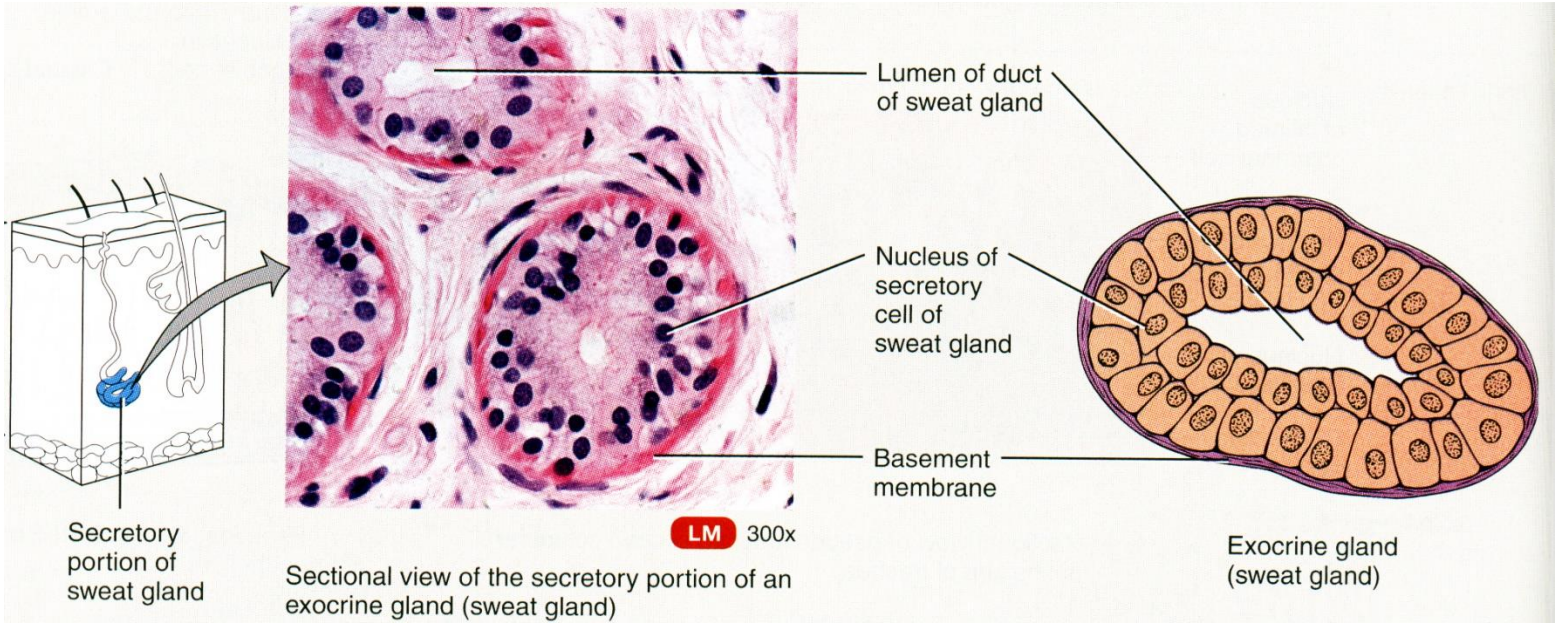


Glandular epithelium腺體上皮

endocrine glands內分泌腺：甲狀腺、腎上腺



exocrine gland外分泌腺：汗腺、消化腺

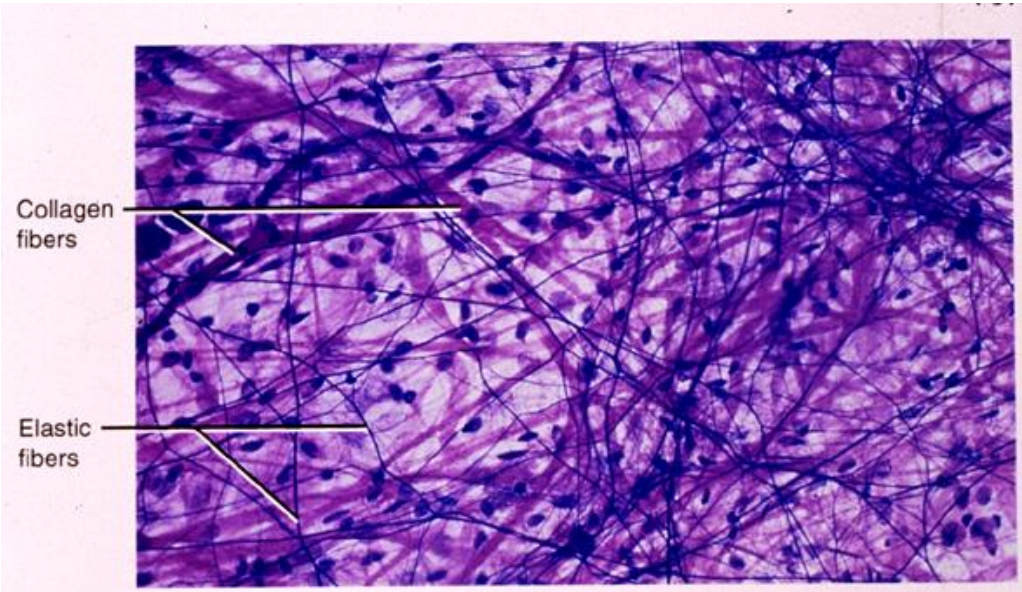


II. Connective tissues
結締組織

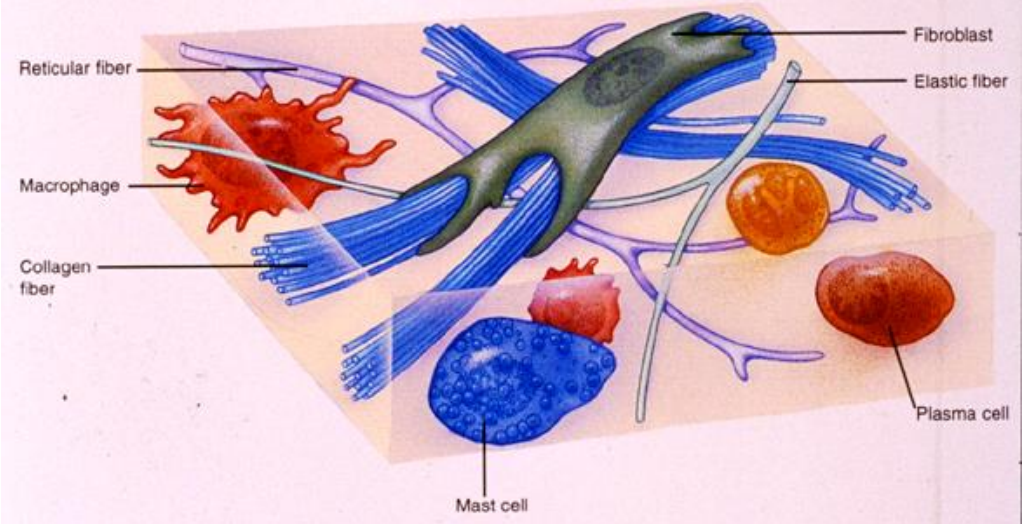
ECM: extracellular matrix
細胞外基質

Cells:
Fibroblast 纖維母細胞
Macrophage 巨噬細胞
Plasma cell 漿細胞
Mast cell 巨大細胞
Adipocyte 脂肪細胞
Lymphocyte 淋巴細胞

Fibers:
Collagen fiber 膠原纖維
Elastic fiber 彈性纖維
Reticular fiber 網狀纖維



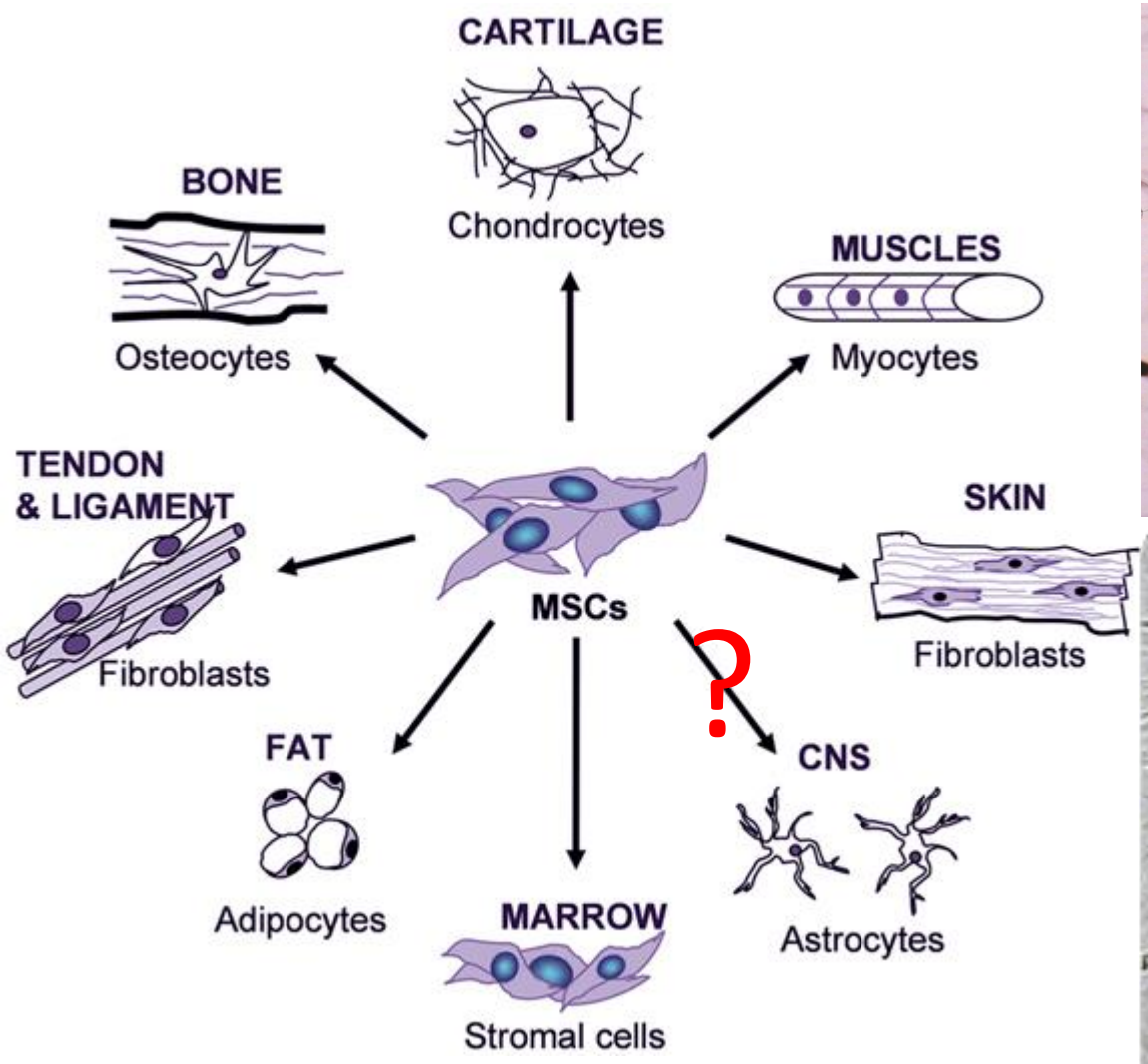
Sectional view of subcutaneous tissue

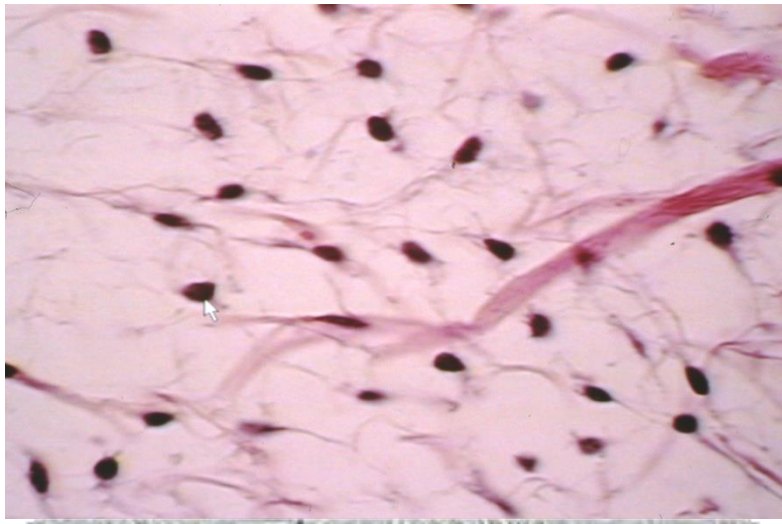


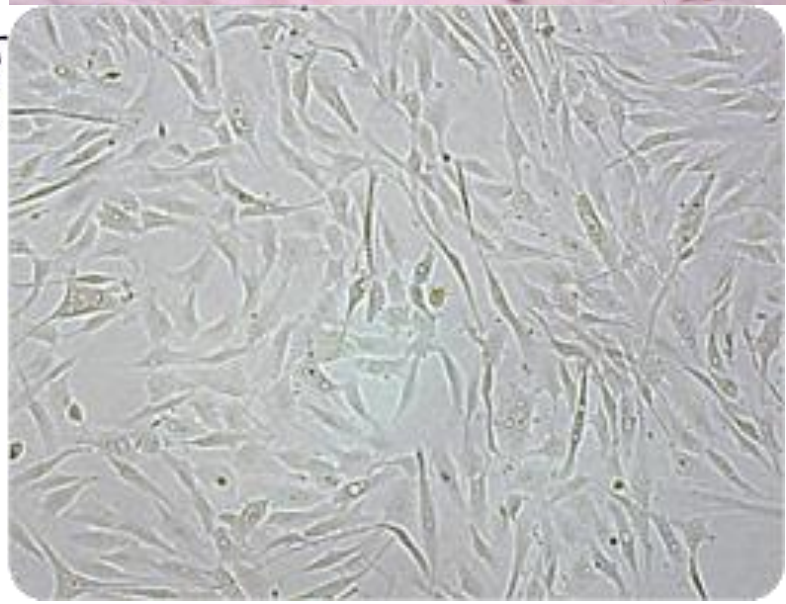
Mature connective tissue, Ex. 3.2

Mesenchymal stem cells 間葉幹細胞

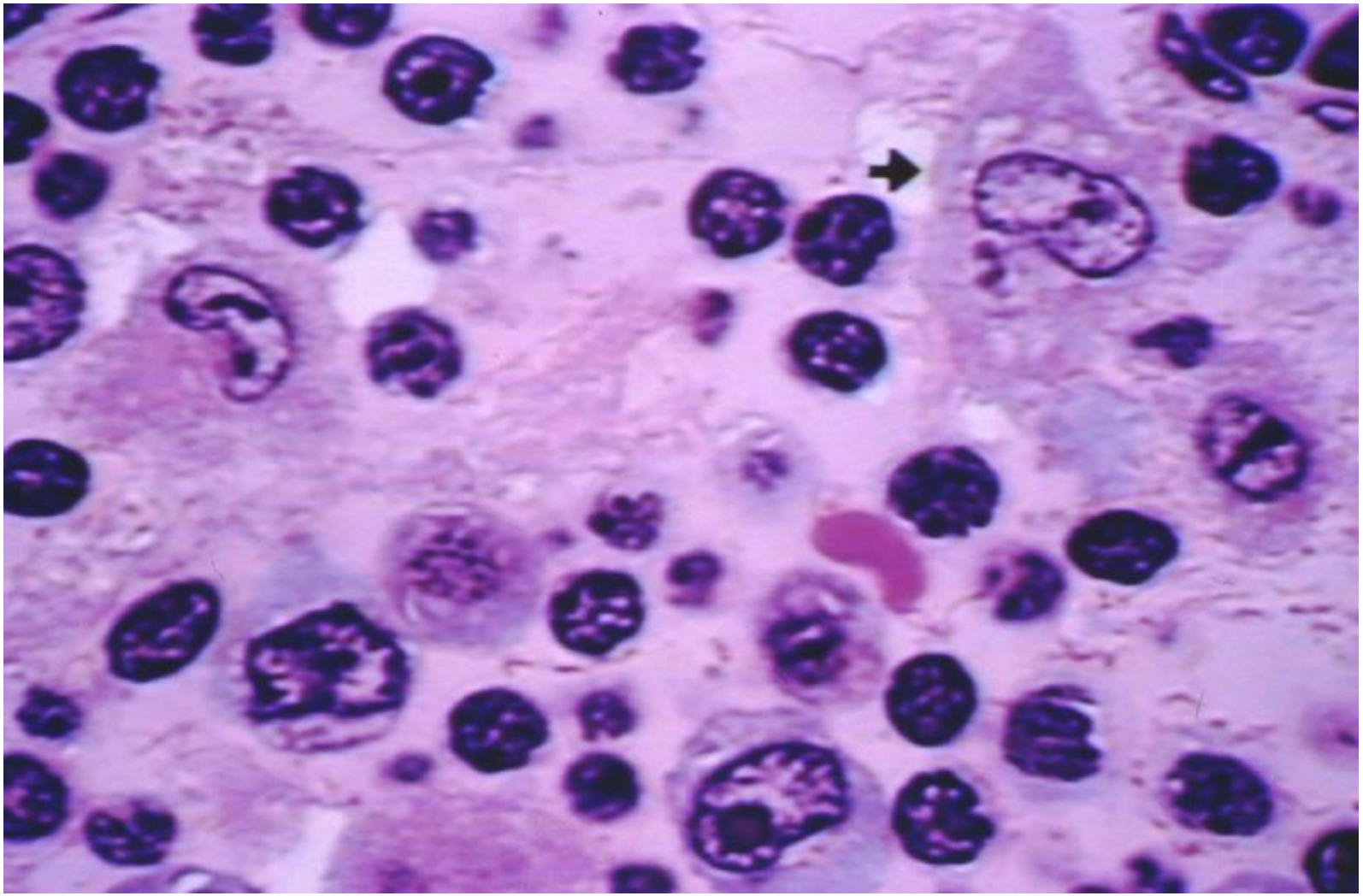
Fibroblast 纖維母細胞: 製造組織纖維 (Collagen fiber; Elastic fiber ; Reticular fiber)





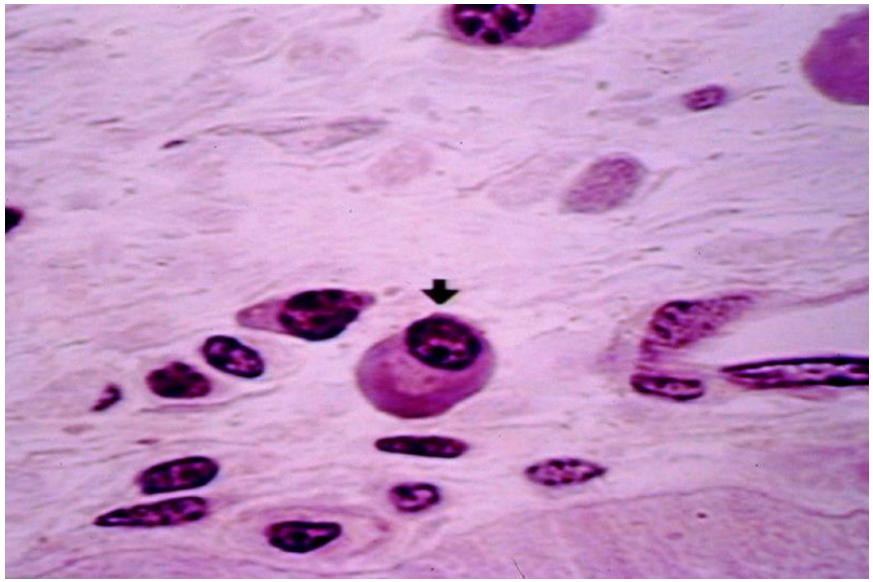


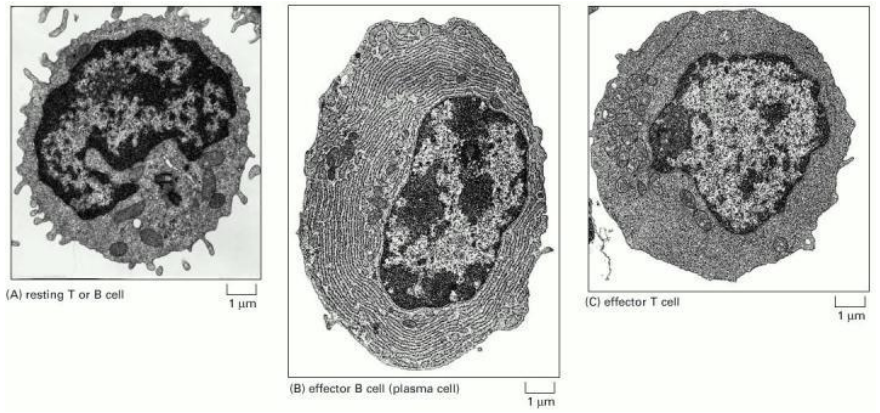
Macrophage 巨噬細胞：具吞噬作用清理壞死細胞或外來物

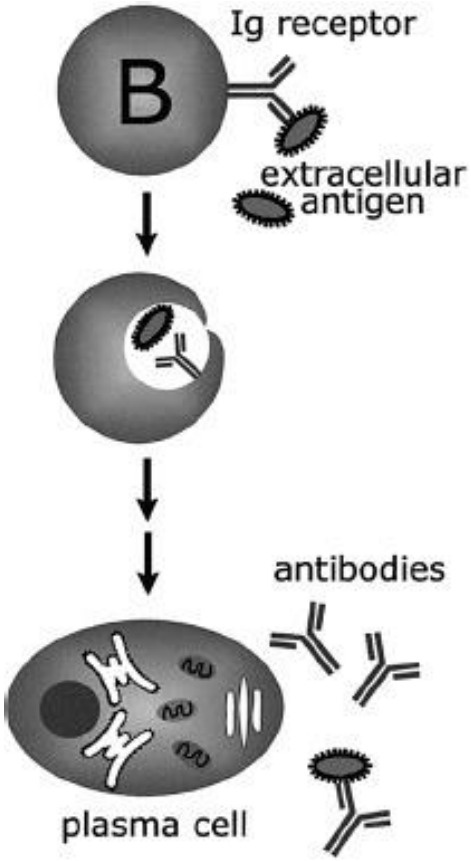


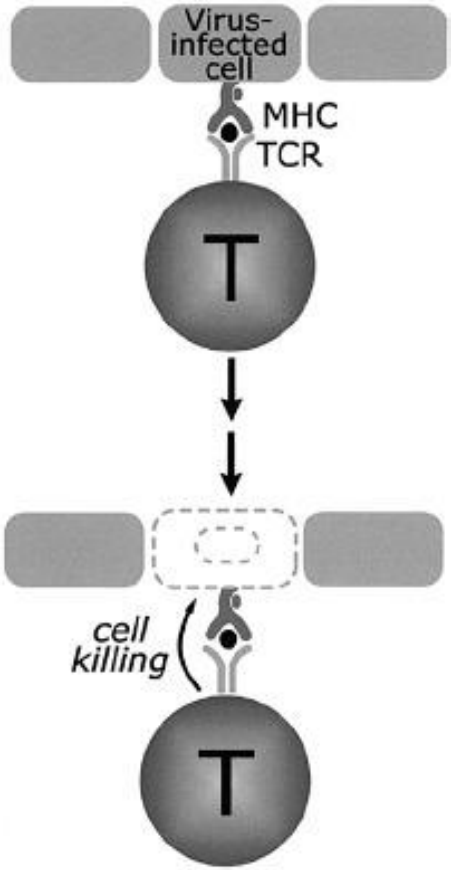
Plasma cell 漿細胞：來自B 淋巴球(B lymphocyte)

Making antibodies!! 製造抗體



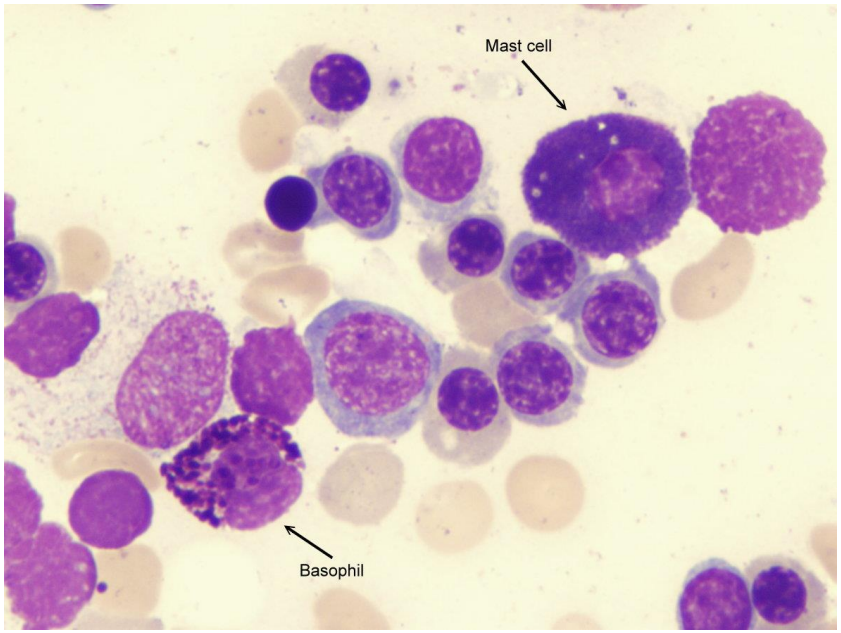


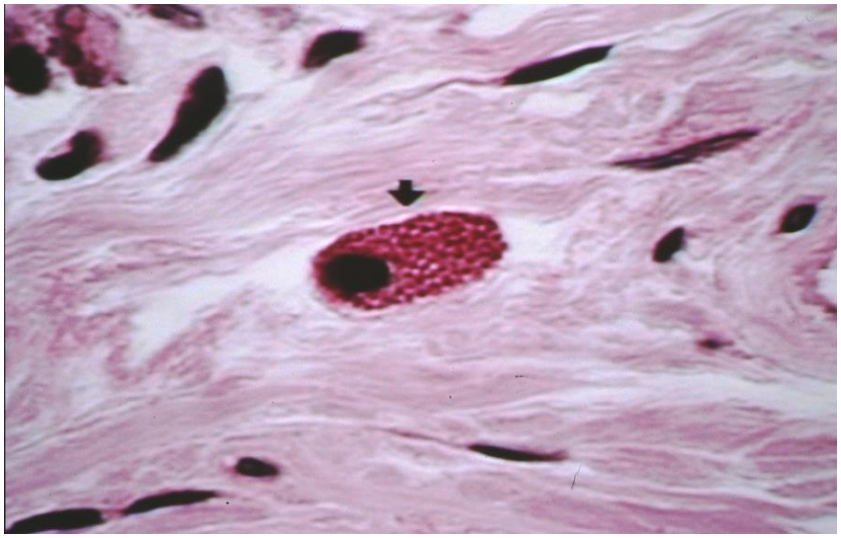


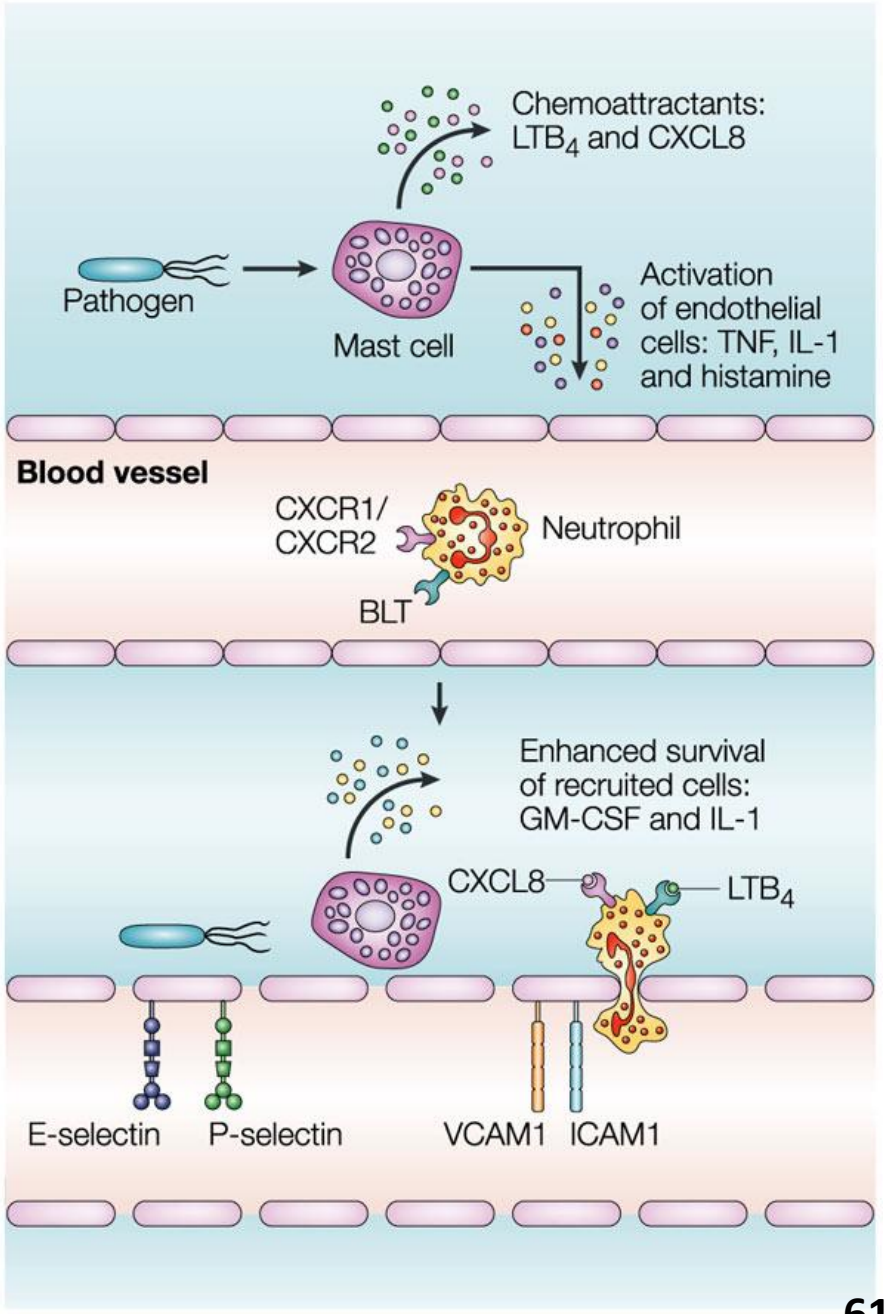


Mast cell 巨大細胞

分泌Histamine; Cytokines







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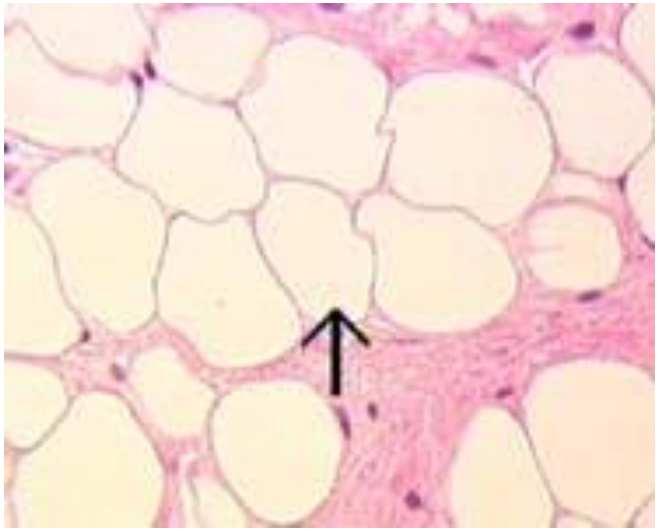
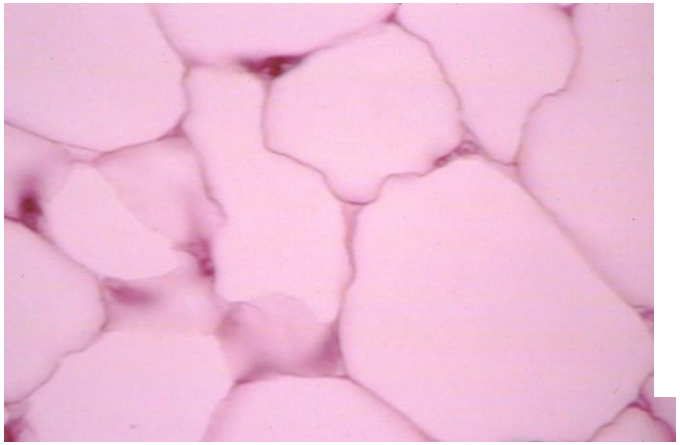
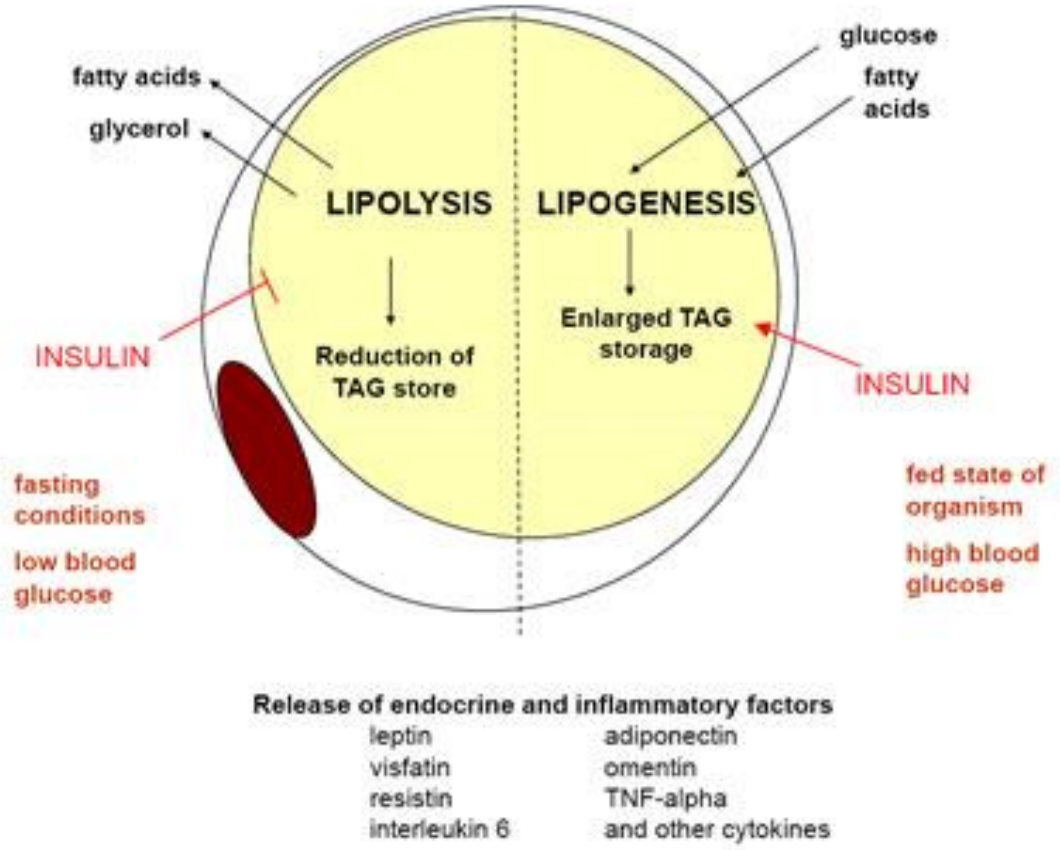
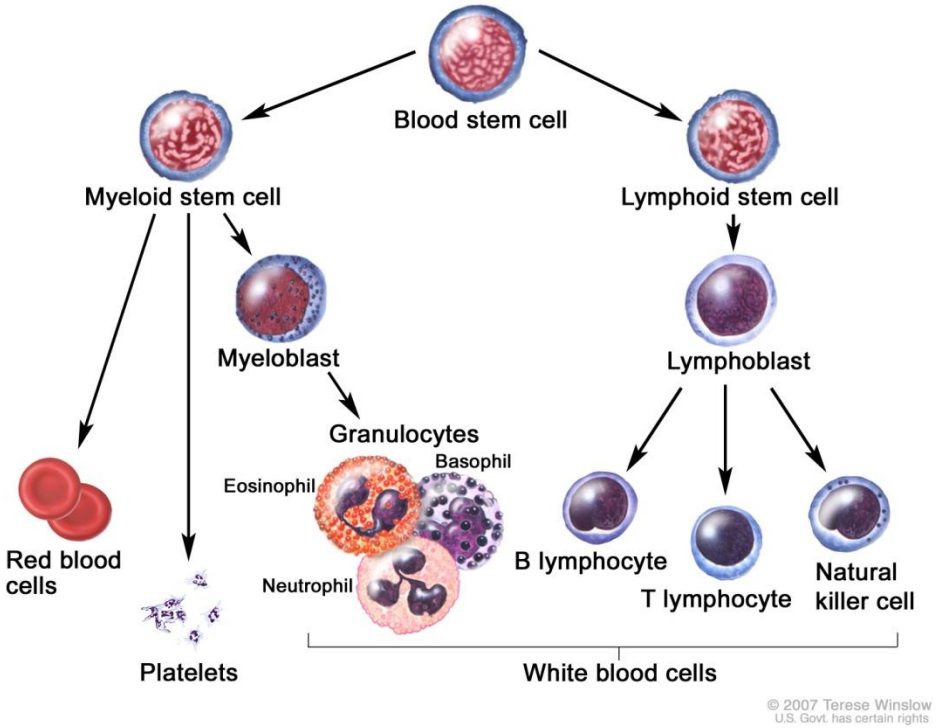
Adipocyte 脂肪細胞

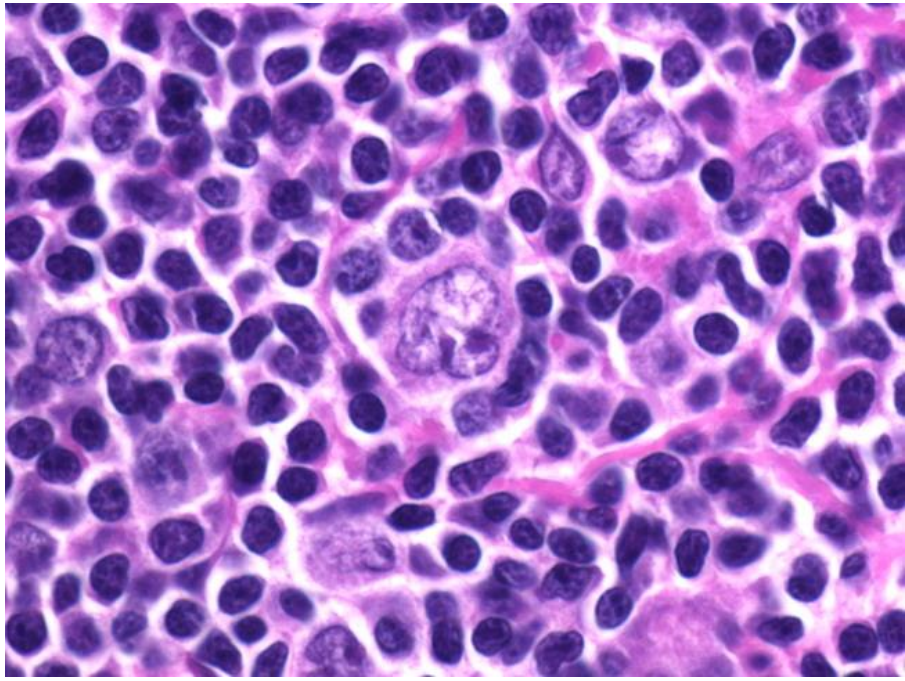


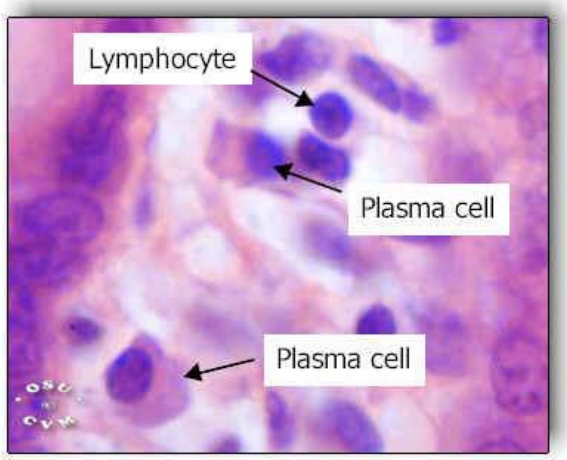


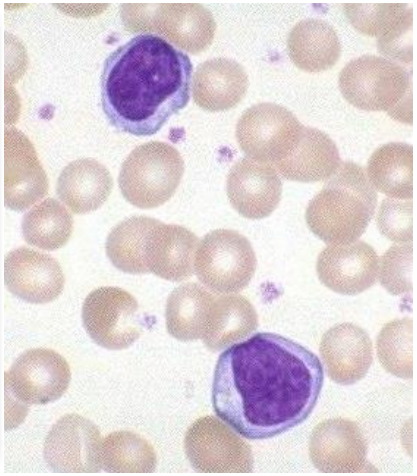


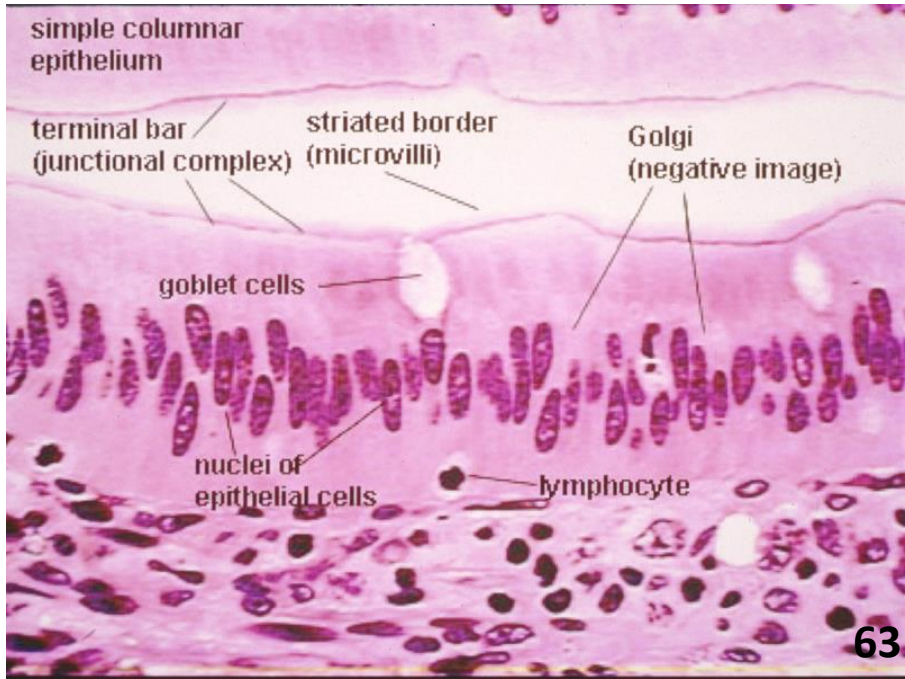
Lymphocyte 淋巴細胞



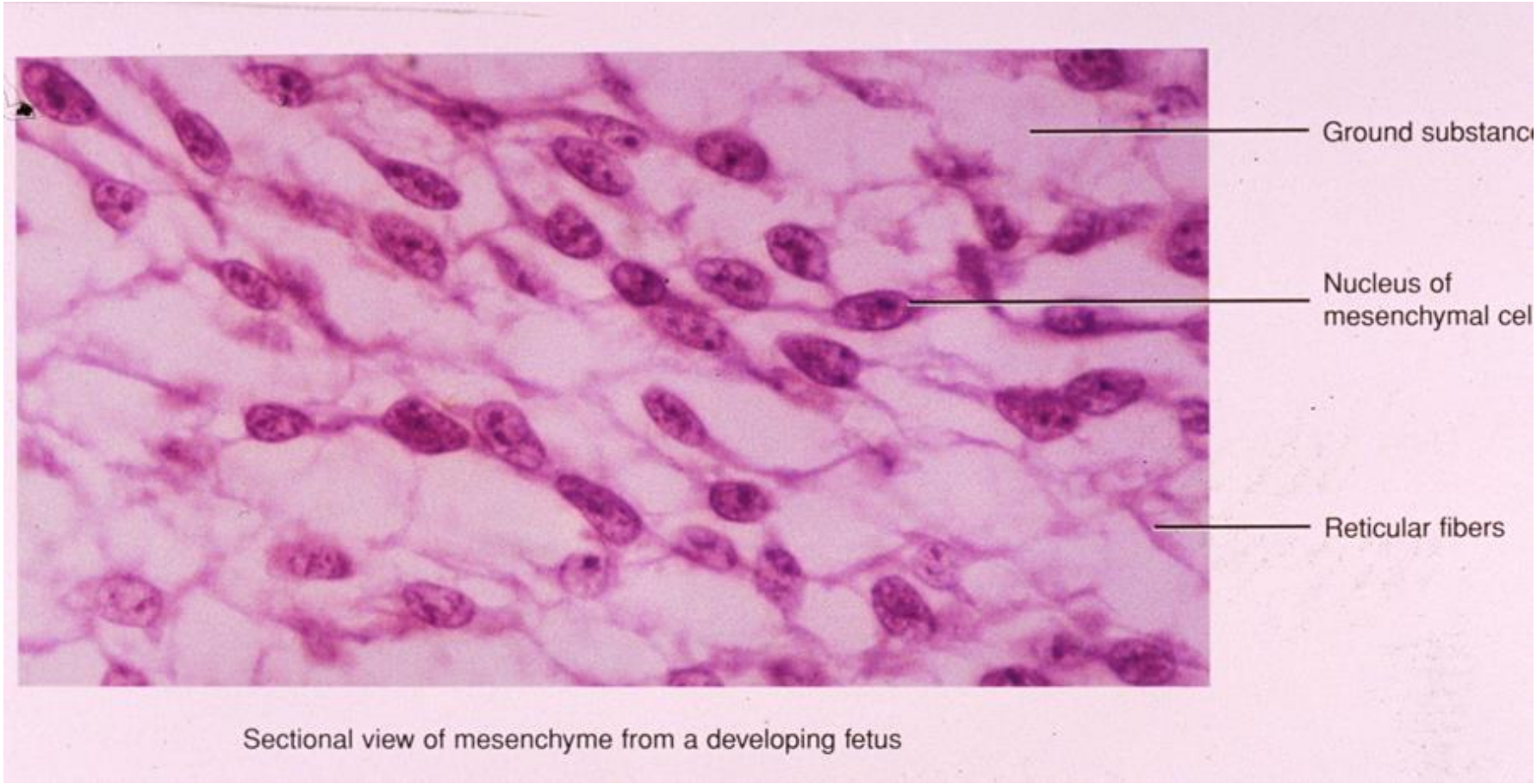






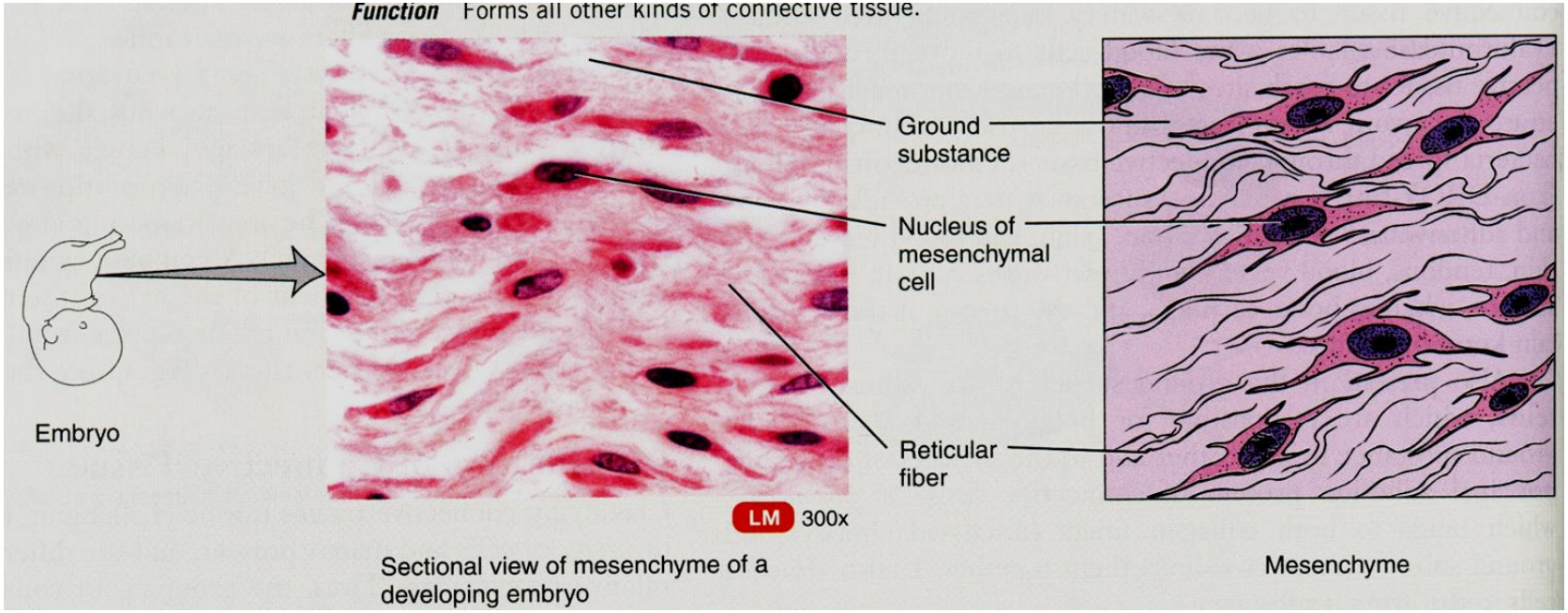


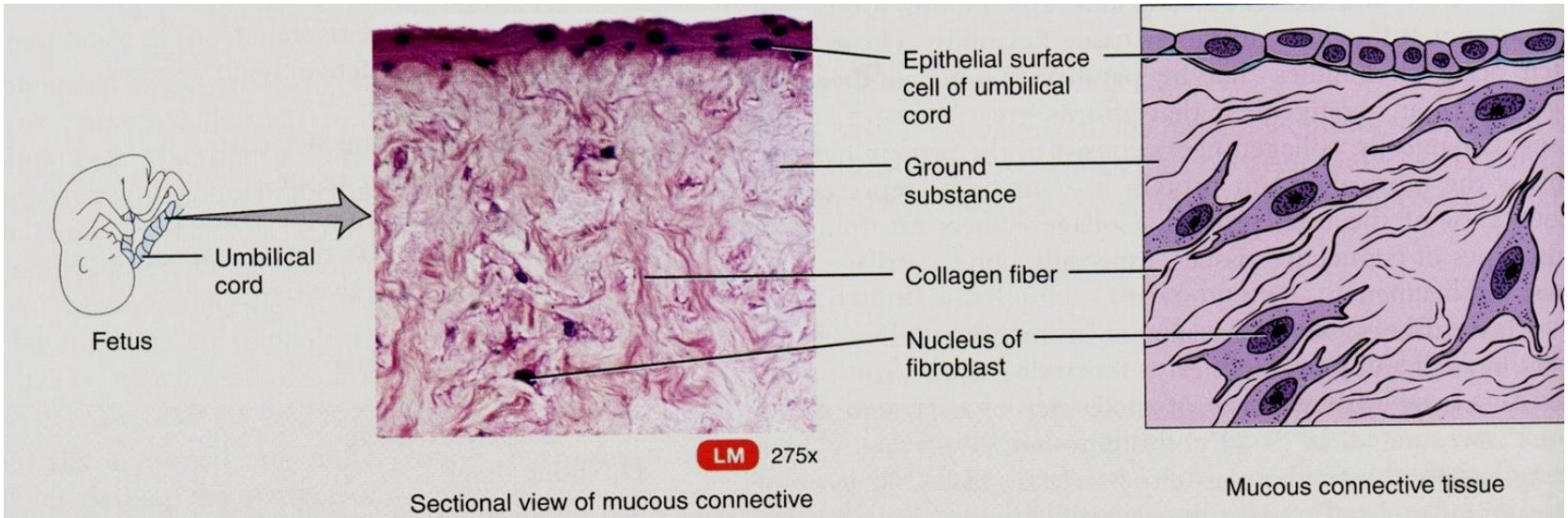
Tissues:
Embryonic connective tissue胚胎結締組織 (臍帶)
Mesenchyme 間葉 fibroblast 纖維母細胞



Sectional view of mesenchyme from a developing fetus

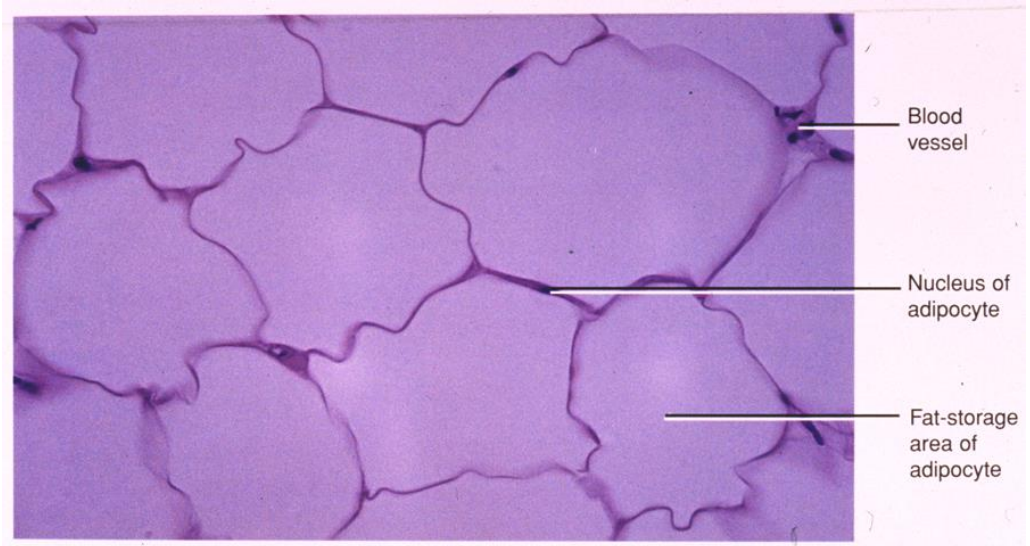
Tissues:
Embryonic connective tissue胚胎結締組織 (臍帶)
Mesenchyme 間葉 fibroblast 纖維母細胞

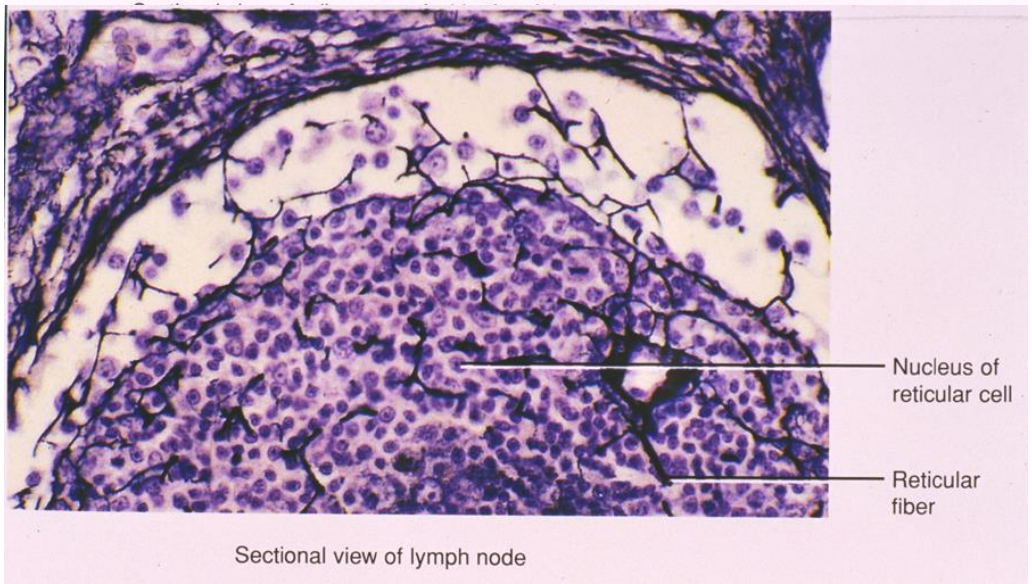




Loose connective tissue 疏鬆結締組織

1. Adipose tissue 脂肪組織 (皮下、心、腎旁)
2. Reticular connective tissue 網狀結締組織 (淋巴結)

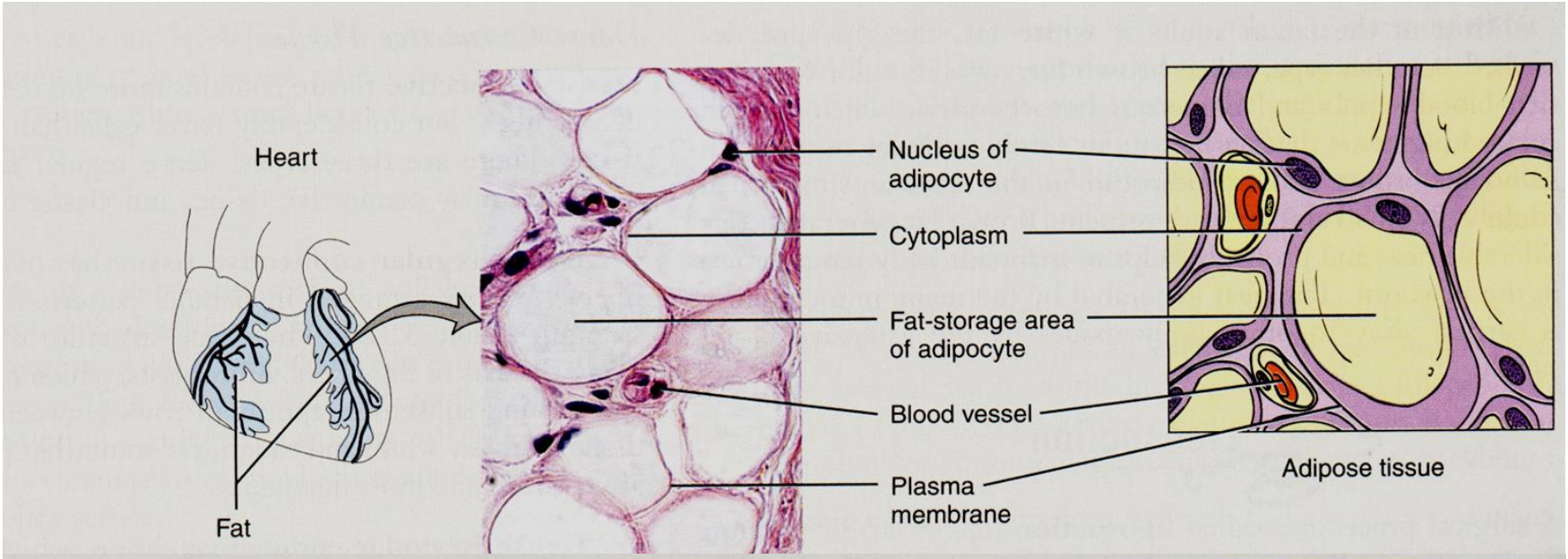


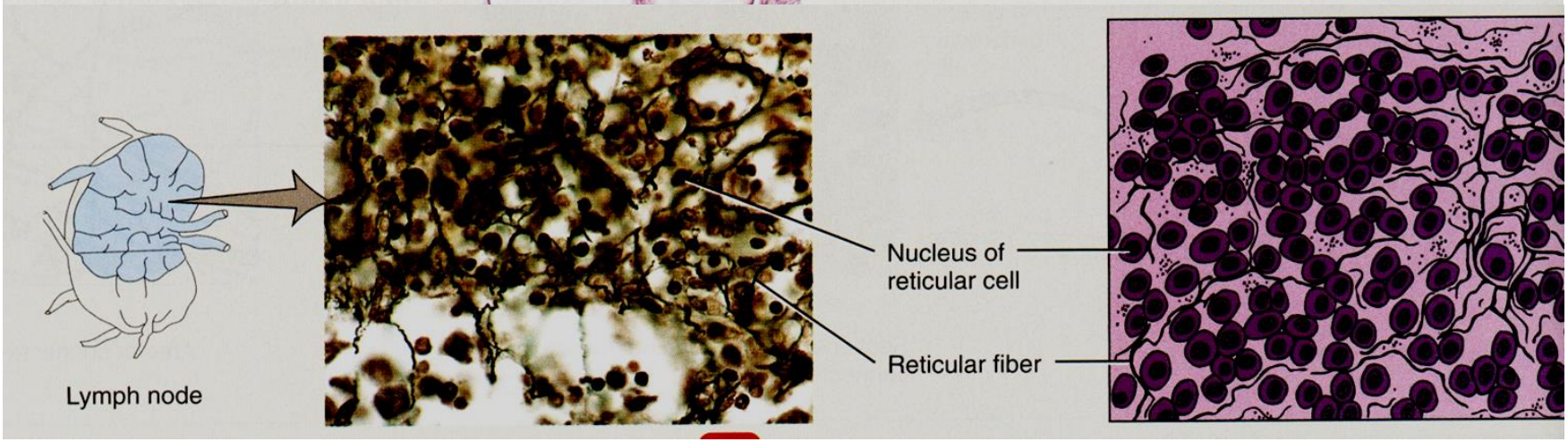


Cell and extracellular space > fiber

Loose connective tissue 疏鬆結締組織

1. Adipose tissue 脂肪組織 (皮下、心、腎旁)
2. Reticular connective tissue 網狀結締組織 (淋巴結)

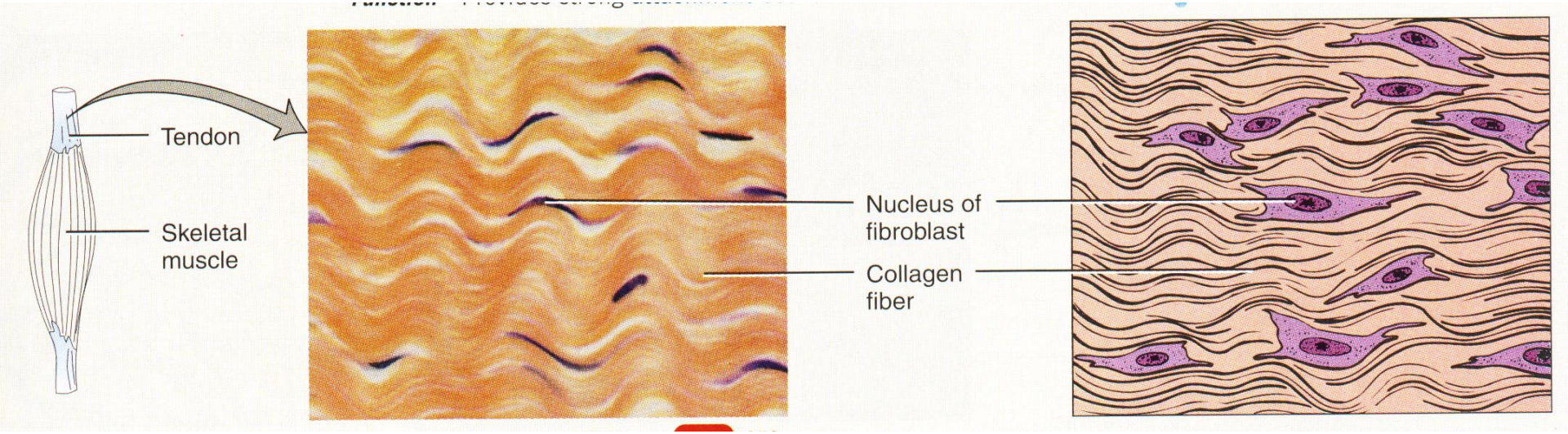


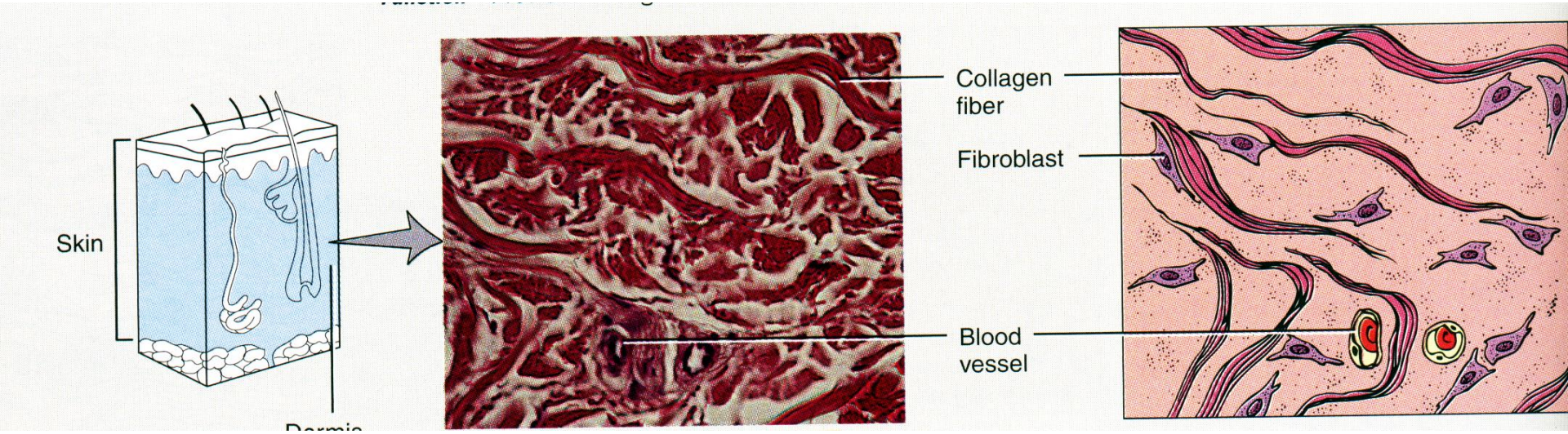


Fibers > Cell and extracellular space

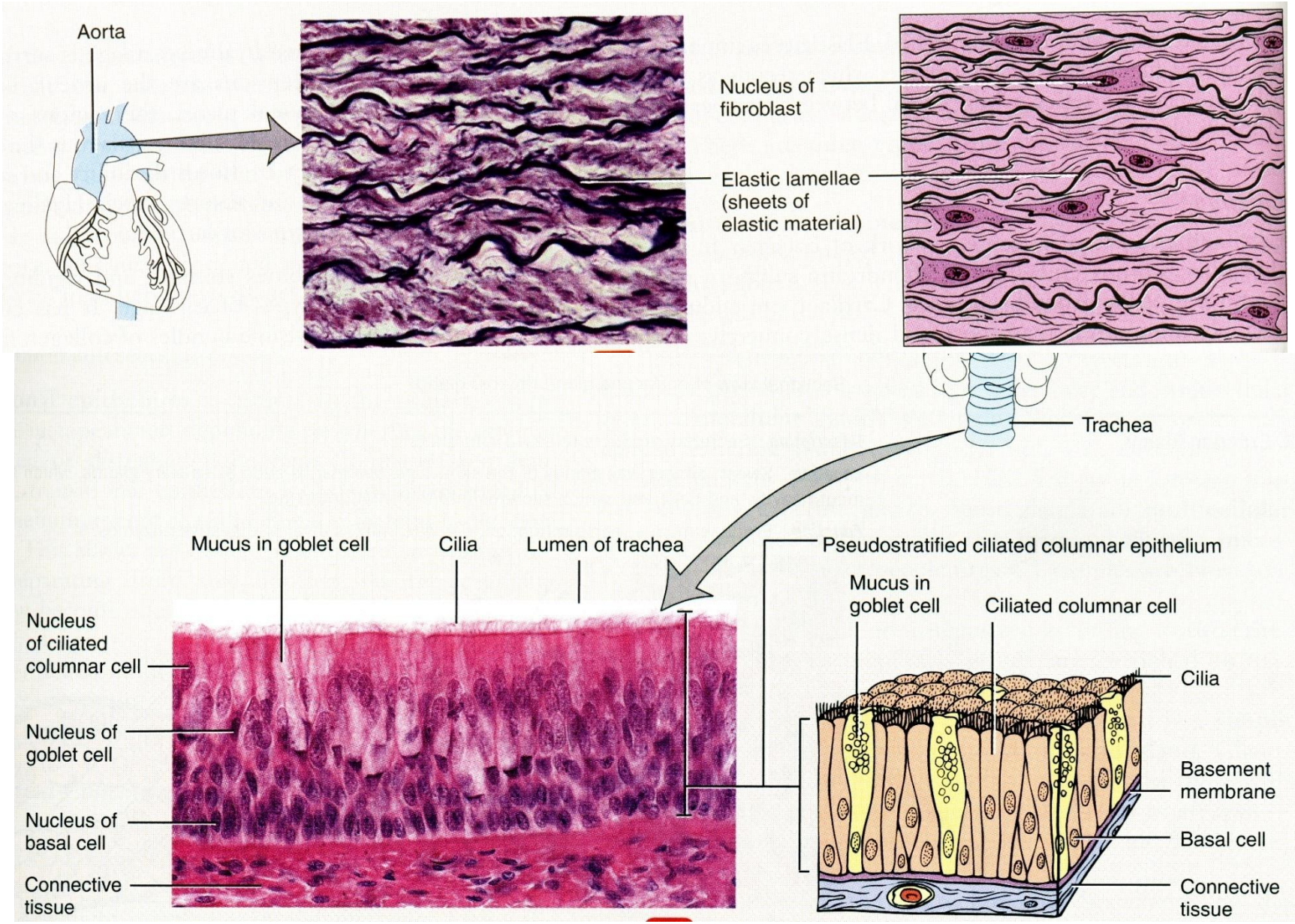
Dense connective tissue 緻密結締組織

1. Dense regular connective tissue 規則緻密結締組織 (Tendon 韌帶)
2. Dense irregular connective tissue 不規則緻密結締組織 (dermis 真皮)





Elastic connective tissue 彈性結締組織 (Artery 動脈壁, Trachea)



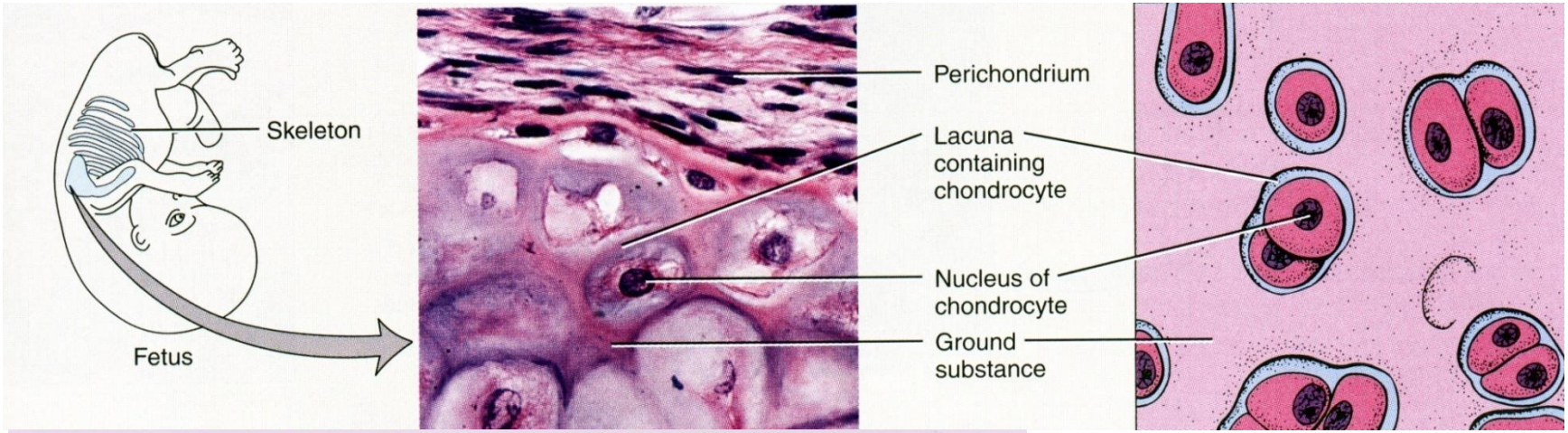
Cartilage

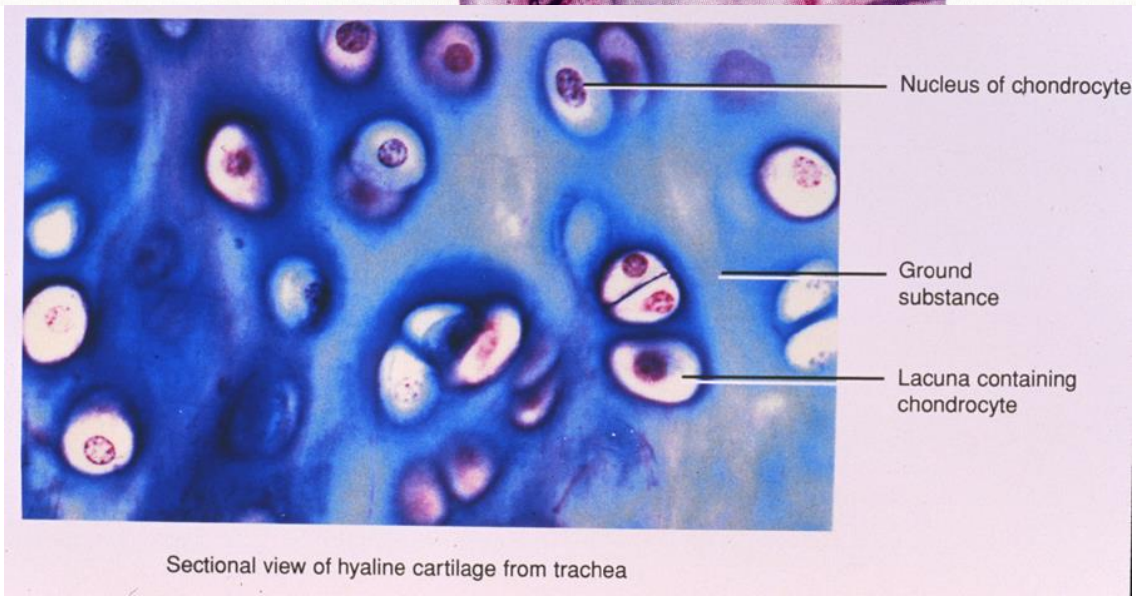
Hyaline cartilage 透明軟骨(硬骨端、氣管)

Chondroblast 軟骨母細胞→Chondrocyte 軟骨細胞

Fibrocartilage 纖維軟骨

Elastic cartilage 彈性軟骨

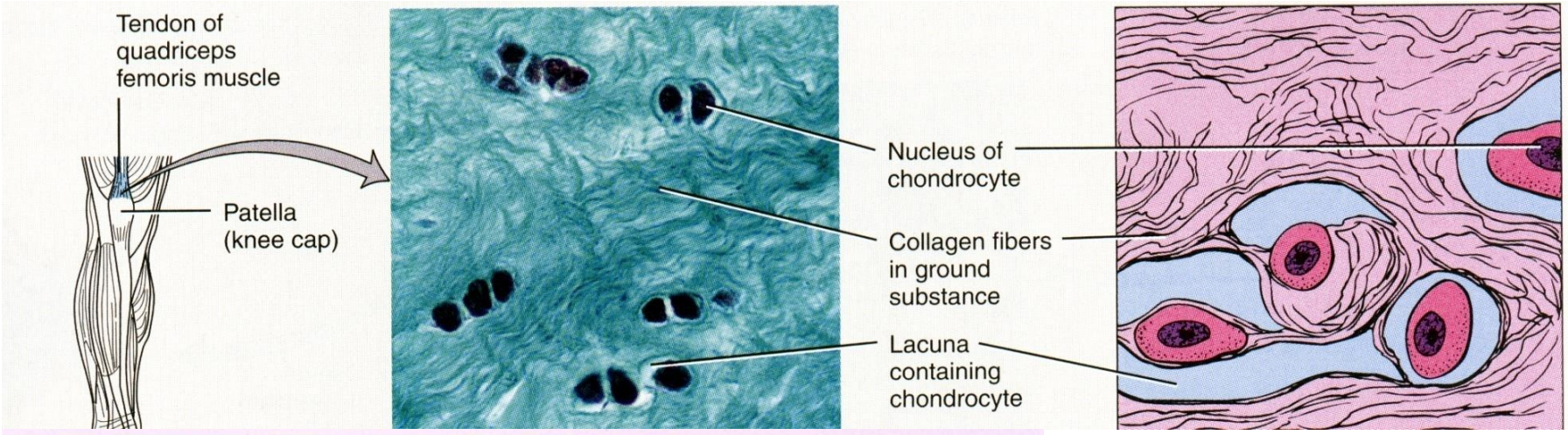


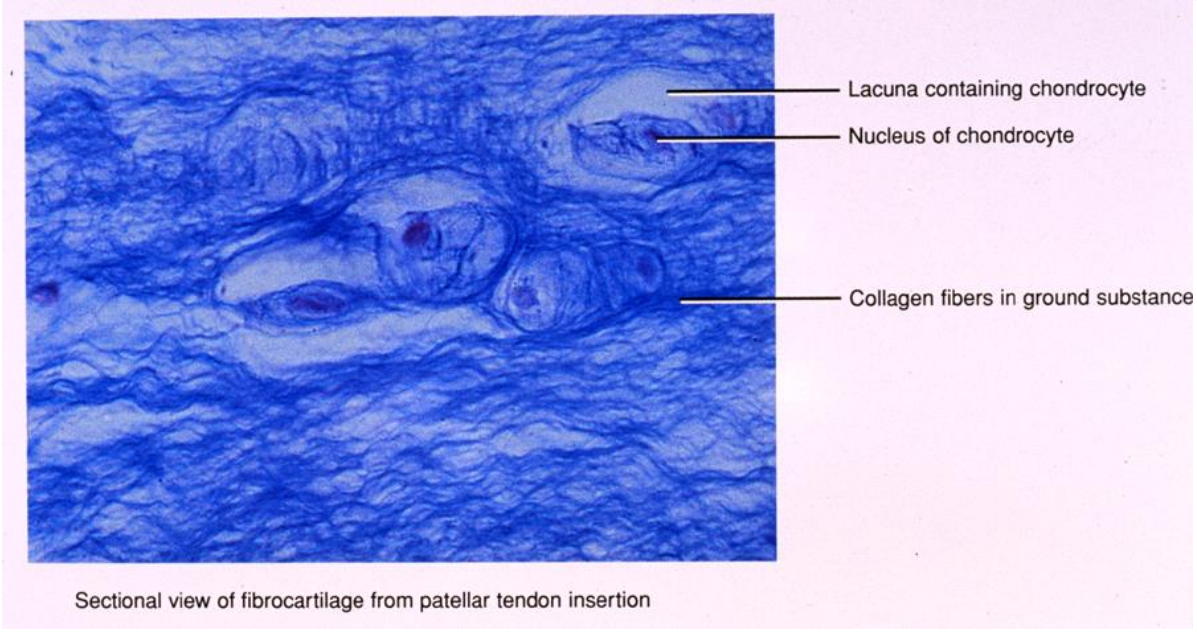


Sectional view of hyaline cartilage from trachea

Cartilage

Fibrocartilage 纖維軟骨 (Pubic symphysis 恥骨聯合；椎間盤；髕骨韌帶)

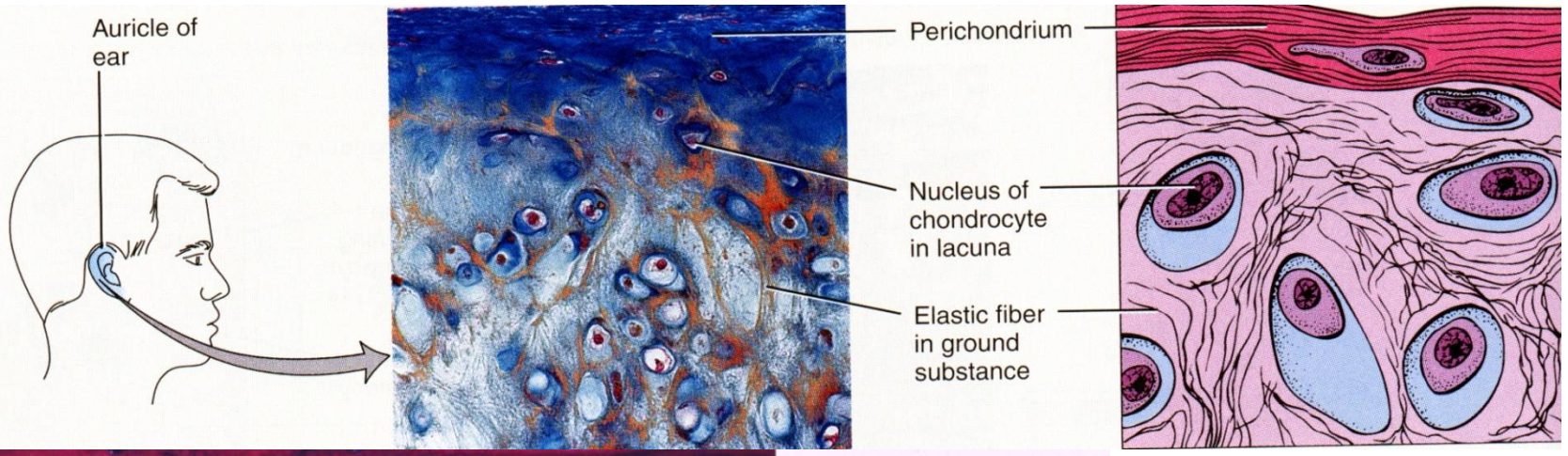


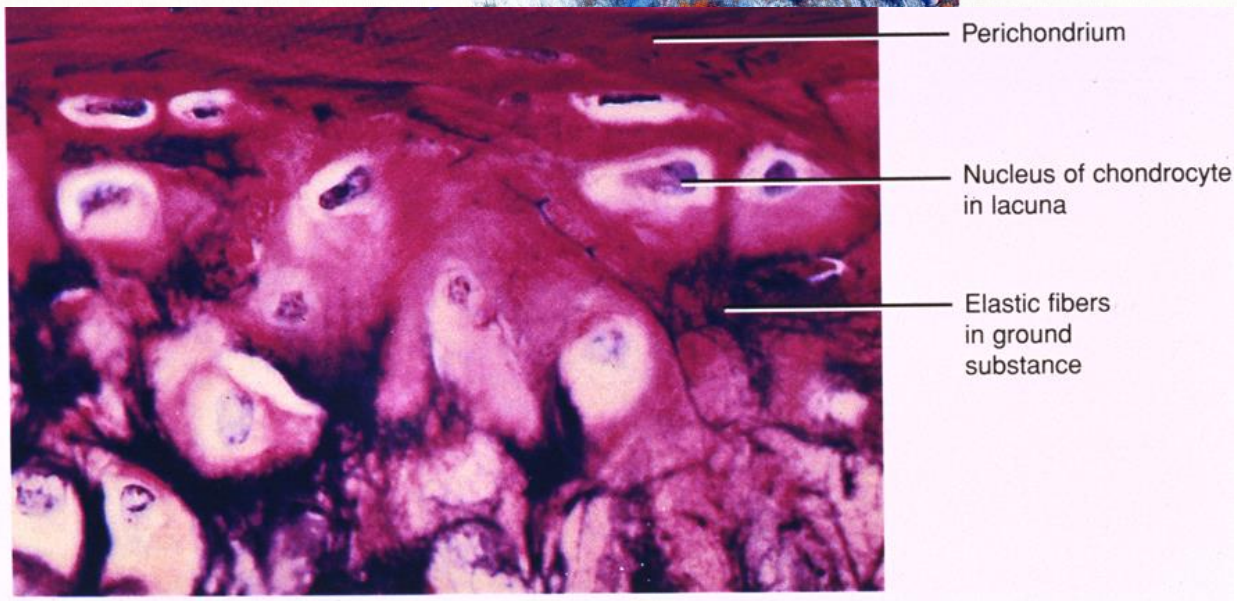


Sectional view of fibrocartilage from patellar tendon insertion

Cartilage

Elastic cartilage 彈性軟骨 (Epiglottis 會厭; 外耳殼)

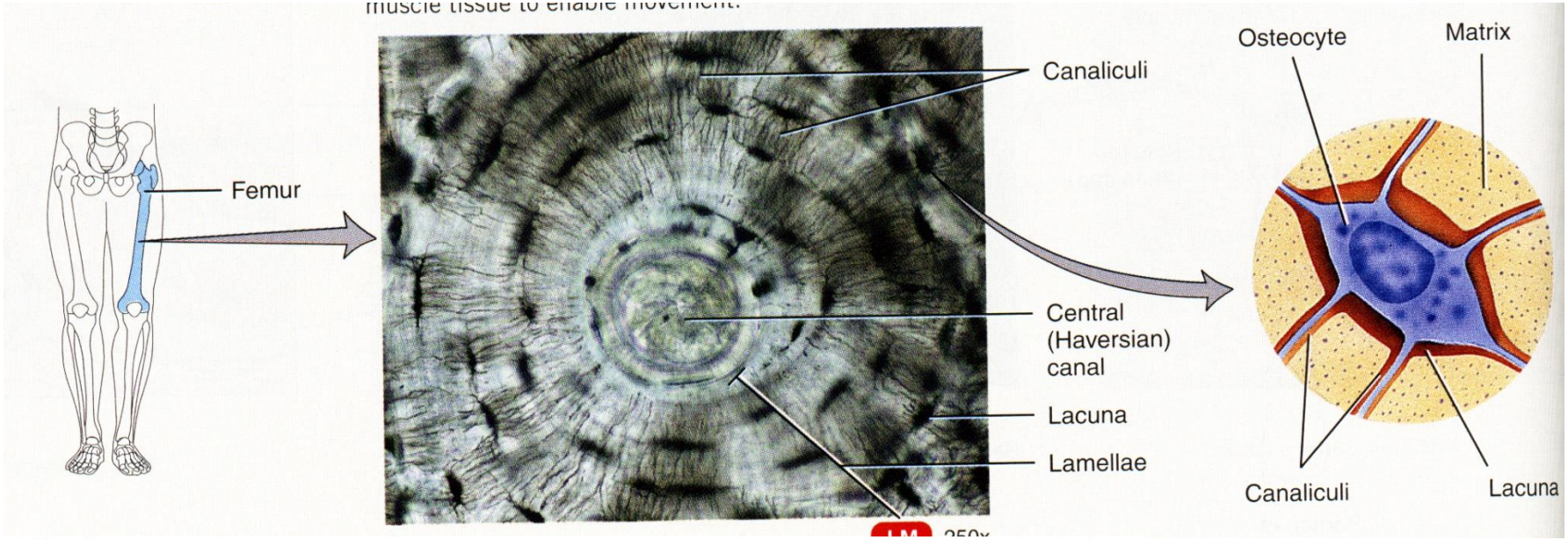


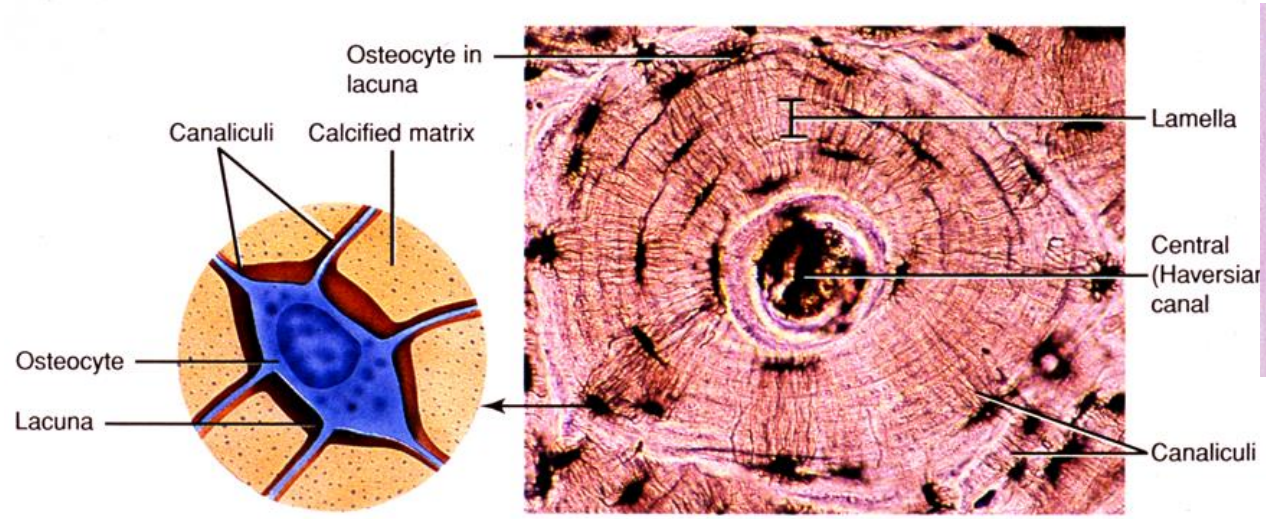


Sectional view of elastic cartilage from auricle of ear

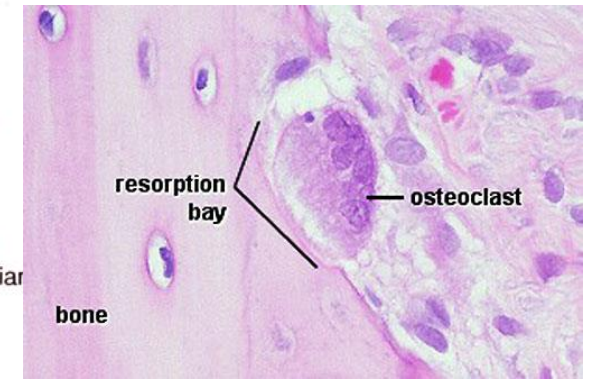
Bone (osseous) tissue

Osteoblast 骨母細胞 → Osteocyte骨細胞　　Osteoclast 蝕骨細胞





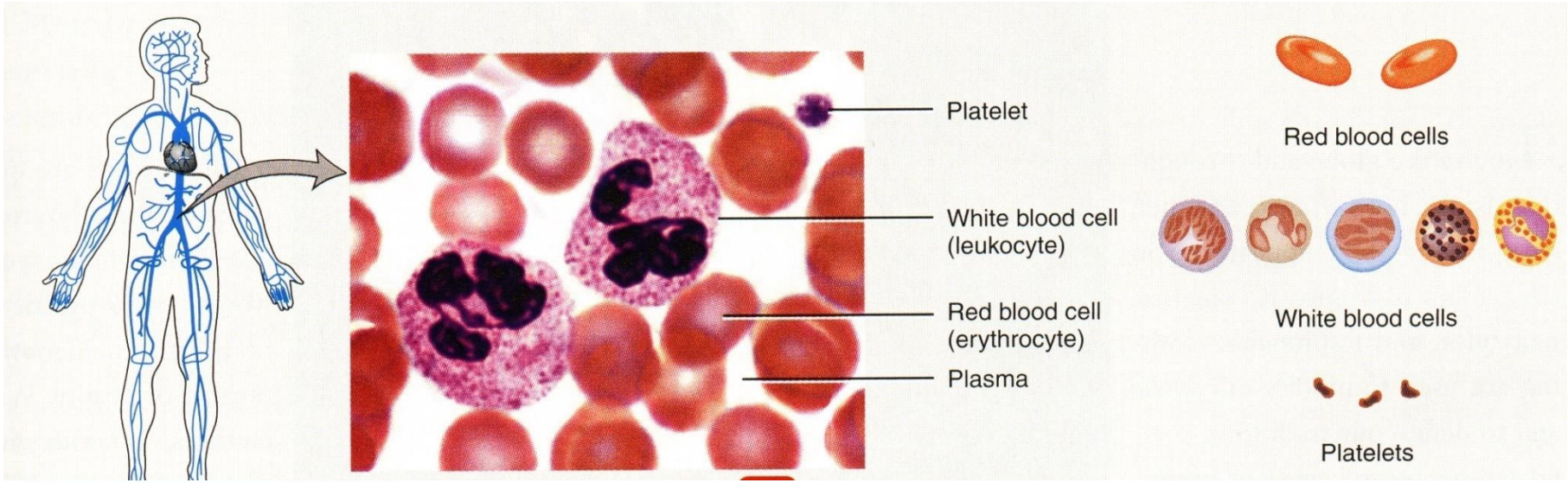
Sectional view of an osteon (Haversian system) from the femur (thigh bone)

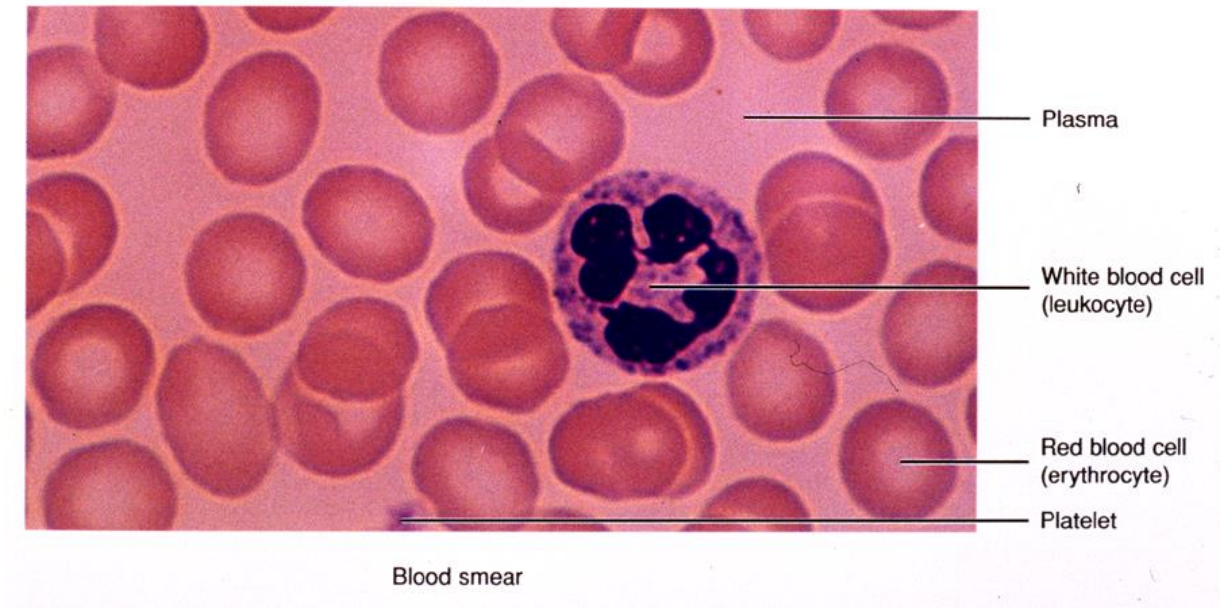


Blood

Red blood cell ~ 7 μm

White blood cells: lymphocyte, monocyte, neutrophil I, basophil, eosinophil





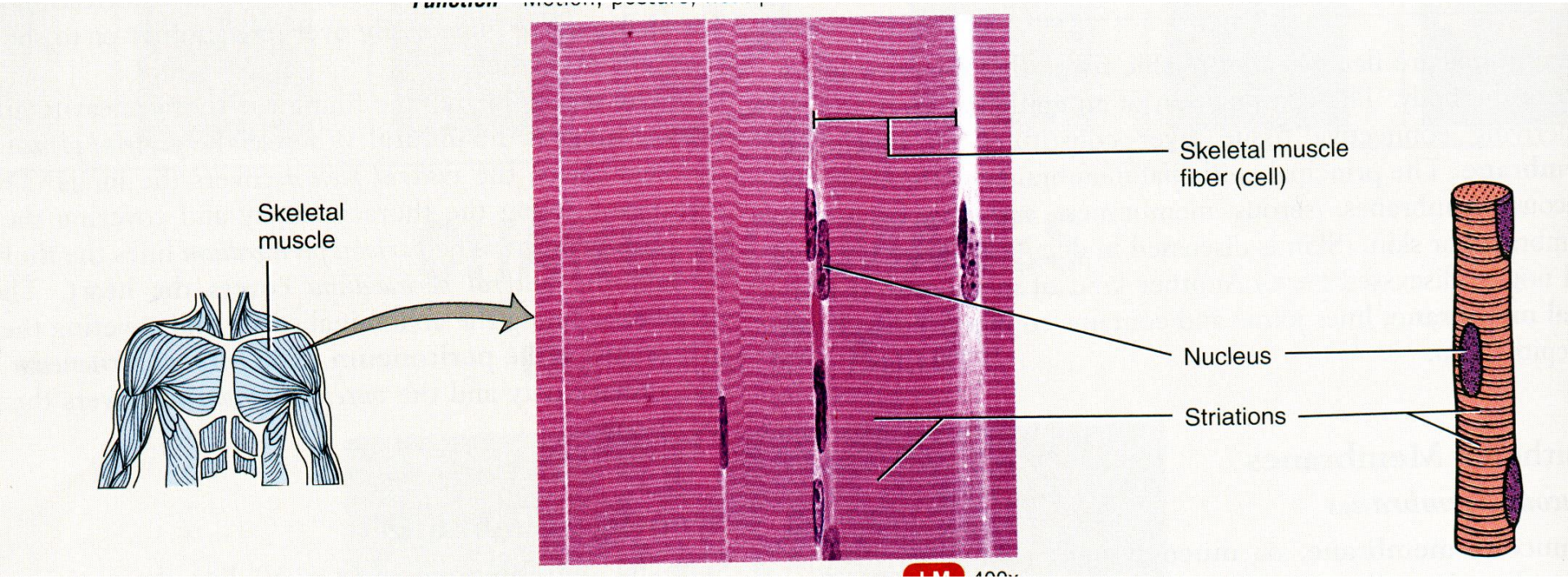
Blood smear

Muscle tissues

Skeletal muscle骨骼肌 (四肢、颜面、消化道上部)

Cardiac muscle心肌 (心臟)

Smooth muscle 平滑肌 (腸胃、血管、內臟臟壁管道)

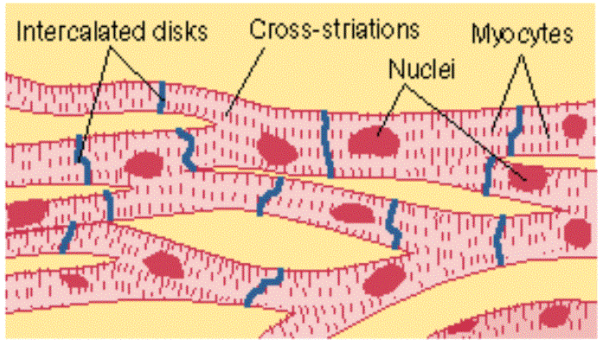


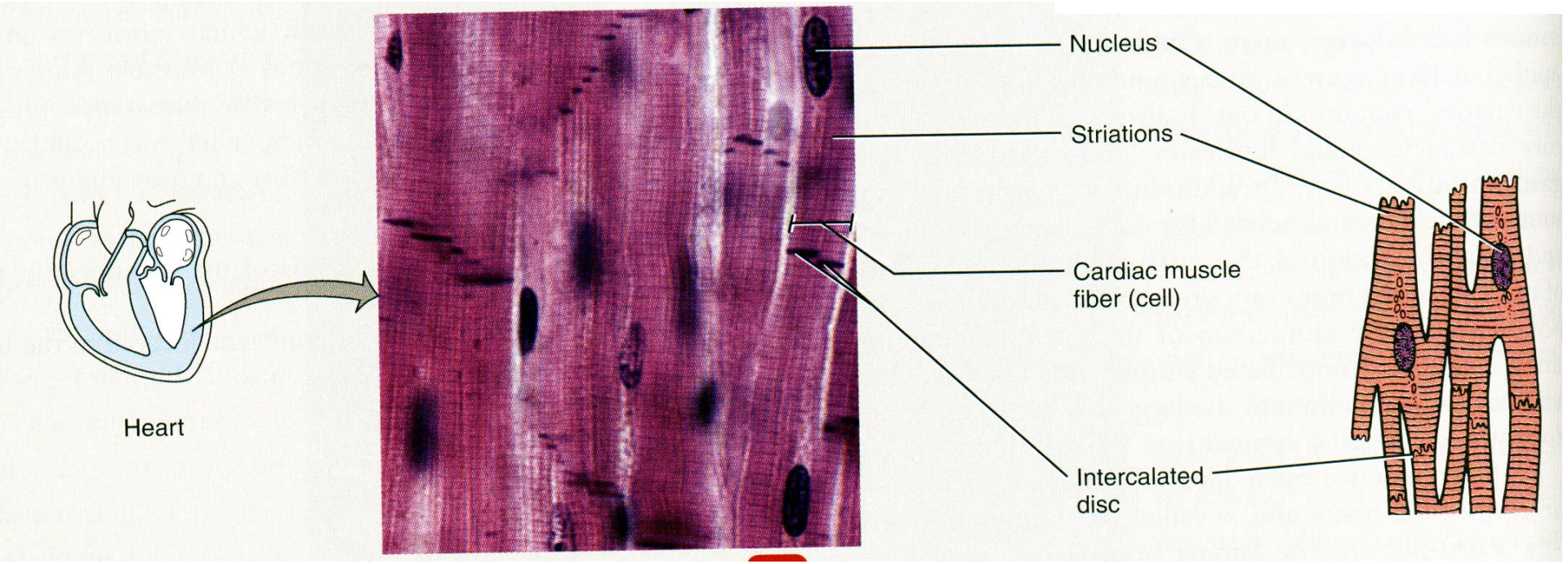
Muscle tissues

Skeletal muscle骨骼肌 (四肢、顏面、消化道上部)

Cardiac muscle心肌 (心臟)

Smooth muscle 平滑肌 (腸胃、血管、內臟臟壁管道)





Intermediate junction + gap junction

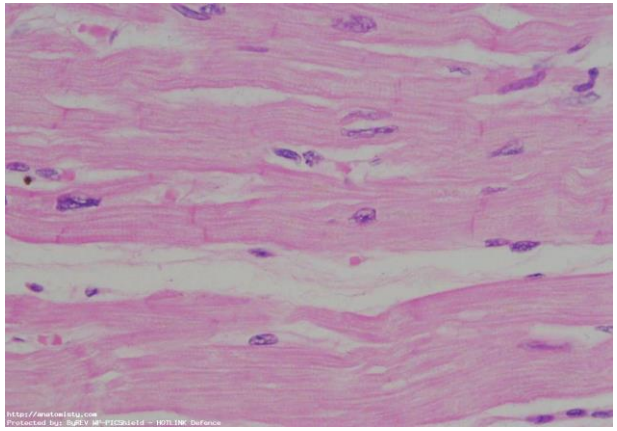
Muscle tissues

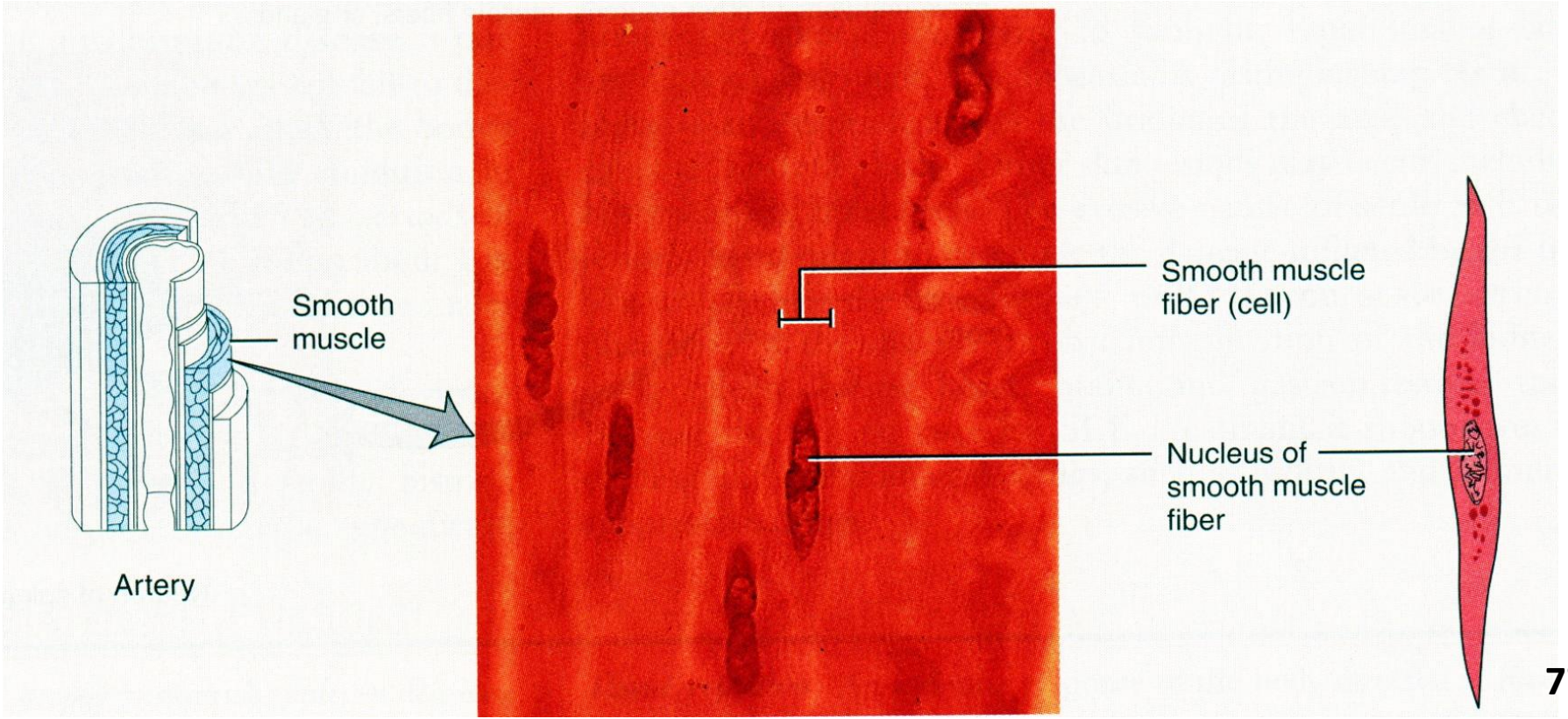
Skeletal muscle骨骼肌 (四肢、顏面、消化道上部)

Cardiac muscle心肌 (心臟)

Smooth muscle 平滑肌

(腸胃、血管、內臟臟壁管道)



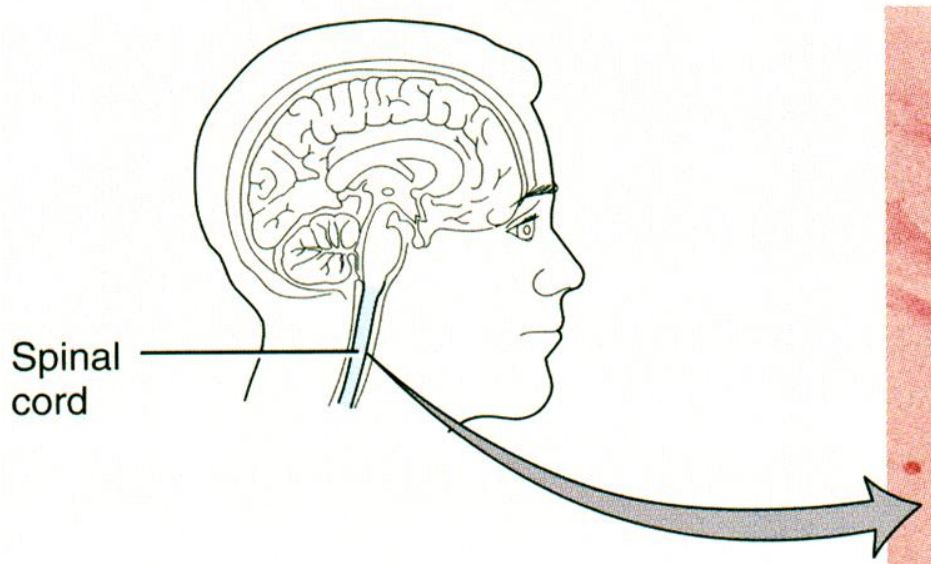


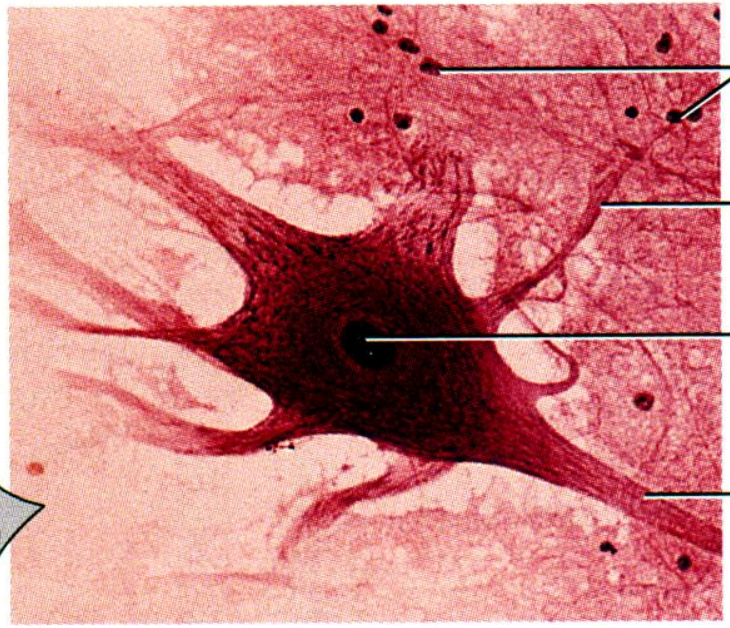
Nervous tissues

Neuron 神經元　CNS中樞神經, PNS週邊神經

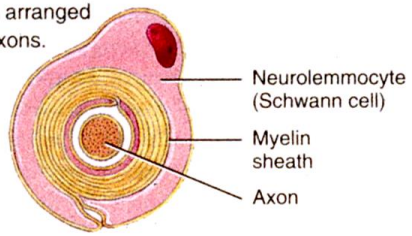
Supporting cell

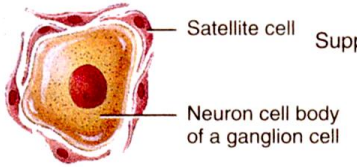
Glia 神經膠細胞：Schwann cell 許旺氏細胞

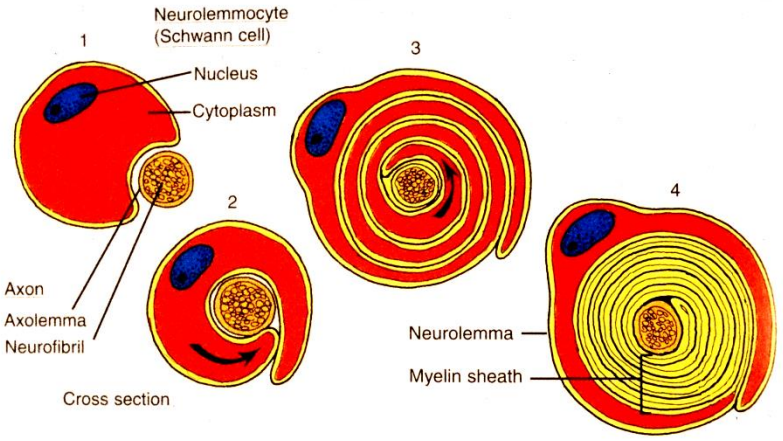




Type	*Appearance*	*Function*
Neurolemmocytes (Schwann Cells)	Flattened cells arranged around PNS axons.	Each cell produces part of the m around a single axon of a PNS n
Satellite cells	Flattened cells arranged around the cell bodies of neurons in ganglia (collections of neuronal cell bodies in the PNS).	Support neurons in PNS ganglia.







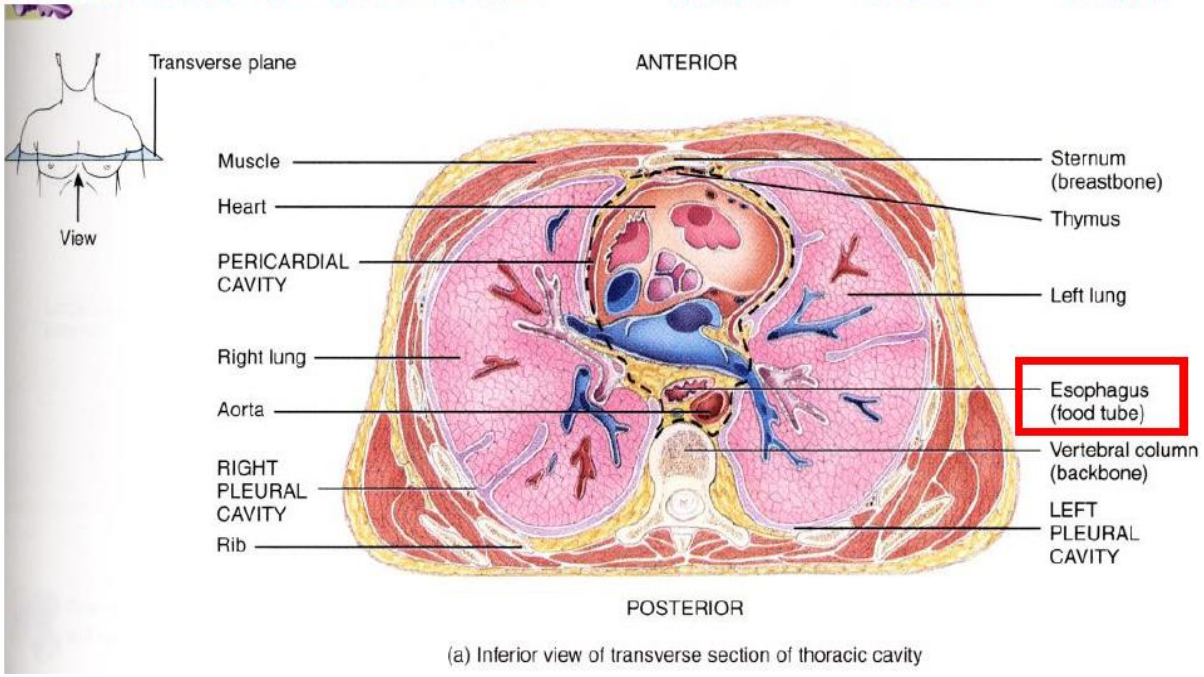
(a) Stages in the formation of a myelin sheath

以“國考”重點“曉以大義”!

面對專業訓練所需要之基礎課程，同學學習態度以“學到賺到”!

102年第一次專門職業及技術人員高等考試牙醫師考試分試考試、藥師、醫事放射師、助產師、物理 治療師 職能治療師、呼吸治療師、獸醫師考試
代 號：1306 類科名稱：呼吸治療師　科目名稱：心肺基礎醫學（包括解剖學、生理學、藥理學）

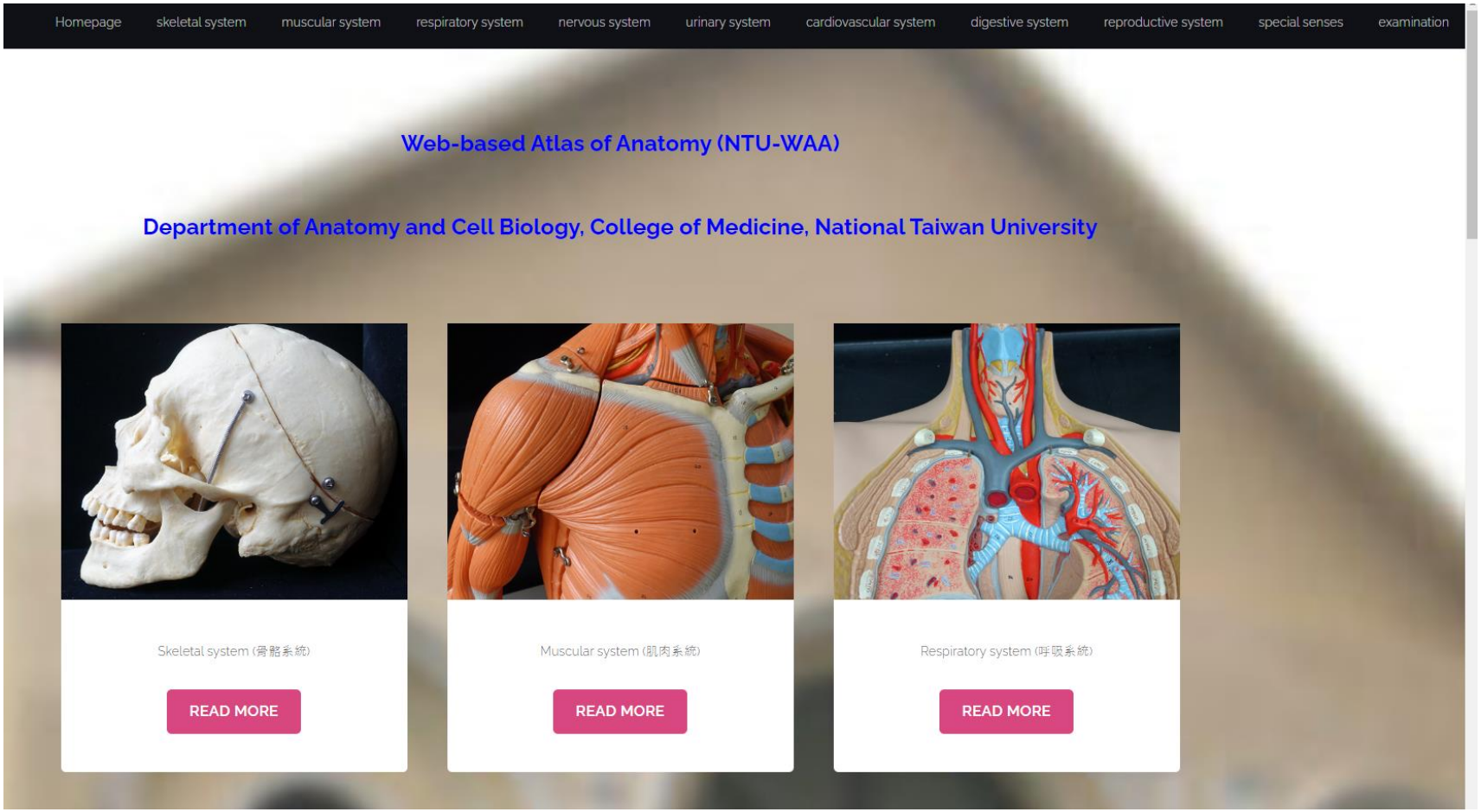
12. 緊貼在心臟後方的結構是： A.胸腺 B.胸管 C.氣管 D.食道



(a) Inferior view of transverse section of thoracic cavity

Web-based Atlas of Anatomy (NTU-WAA)-1

http://140.112.120.113/~mfc/ahakjshdashdasidoais/



Web-based Atlas of Anatomy (NTU-WAA)-2

http://140.112.120.113/~mfc/ahakjshdashdasidoais/

實體圖譜 (非考試題目)

cranium, face and foramina

Skull anterior view
Separated skull anterior view
Skull lateral view
Separated skull lateral view
Separated skull posterior view
Cranial base superior view
Cranial base inferior view

vertebral column

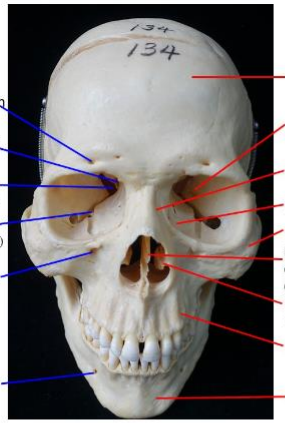
Cervical vertebrae atlas (C1)
Cervical vertebrae axis (C2)
Typical cervical vertebrae
Typical thoracic vertebrae
Typical lumbar vertebrae
Sacrum

thorax

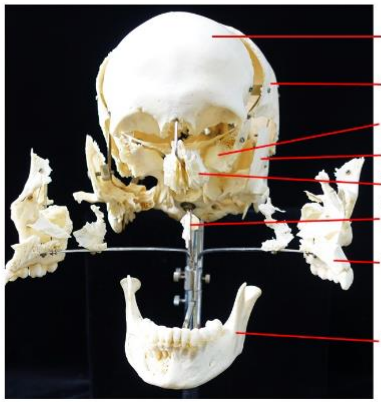
Sternum
Rib 1
Typical rib

upper extremities

Clavicle
Scapula
Humerus
Ulna



Skull anterior view



Separated skull anterior view

考試練習系統(非考試題目)

留言交流系統

國立臺灣大學醫學院
解剖學暨細胞生物學研究所
Graduate Institute of Anatomy and Cell Biology

解剖學教育展示館

歡迎預約參觀

- 地點：
  臺北市中正區仁愛路一段一號1F
- 聯絡方式：
  （1）電話：02-23123456-262212
  （2）Email：anatomy@ntu.edu.tw
  （3）詳情請見臺大解剖學研究所網站

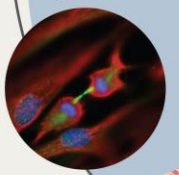
詳細資訊

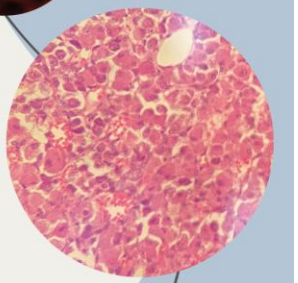
預約參觀可申請學習歷程時數證明

圖源自於canva 請勿擅自將海報用於其他用途

國立臺灣大學醫學院
解剖學暨細胞生物學研究所
Graduate Institute of Anatomy and Cell Biology

OPEN HOUSE

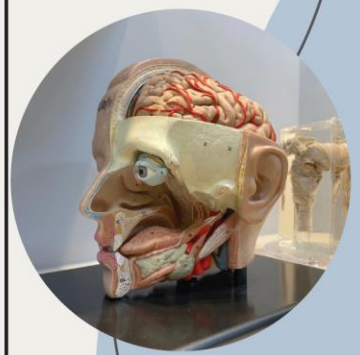




- 活動日期：112/6/30、9/8
  上午10：00 -12：00
- 地點：臺北市中正區仁愛路
  一段一號6F 603室
- 報名方式：
  （1）電話：02-23123456
  轉分機262212
  （2）Email：
  anatomy@ntu.edu.tw

本所網址

報名表單
詳細活動內容



圖源自於canva 請勿擅自將海報用於其他用途