IP Universitatea de Stat de Medicină și Farmacie
"Nicolae Testemițanu"

Catedra de anatomie și anatomie clinică

Splanhnologie generală - Viscera

Anatomia Funcțională a Sistemului Digestiv

Asistent universitar Globa Lilian

Plan

- Viscera
- Sistem Digestive

- ***Organul*** *este o parte componentă a corpului uman format din anumite ţesuturi, istoric constituite, care are o structură şi dezvoltare specifică menit să execute o* ***FUNCŢIE*** *anume.*

- *Fiecare organ:*

a) *este anatomic izolat,*
b) *ocupă un anumit loc în corpul uman,*
c) *posedă o formă bine determinată,*
d) *surse proprii de vascularizaţie şi inervaţie.*

- ***Organul*** *pe parcursul vieții se modelează (modifică) acomodându-se la* ***cerințele funcționale*** *schimbătoare.*

- Sistemul locomotor – mișcări
- Organele interne – asigură Sistemul locomotor

Viscere *-totalitatea organelor care se află în marile cavități ale corpurilor (mai ales în cavitatea abdominală), la oameni și la animale.*

Organe interne *- organe situate în cavitățile abdominală și toracică.*

CLASIFICAREA ORGANELOR INTERNE

*Din punct de vedere **FUNCȚIONAL** viscerele se împart în următoarele sisteme:*

- **Sistemul Nervos cu Organele senzoriale**(coordonarea/indicarea activătăţii muşchilor şi glandelor);
- **Sistemul Digestiv** (asigură cu surse energetice, nutrienţi pentru creştere) /organele tubului digestiv şi glandele anexe/;
- **Sistemul Respirator** (schimbul de gaze O2/CO2 cu mediul extern, menţinând arderea intracelulră cu formarea ATP (respiraţia internă))/(căile aeriene şi plămânii);
- **Sistemul Urinar** (eliminarea substanelor inutile din organizm)
- **Sistemul Genital** (organe genitale ori reproductive (gonade)) – (multiplicarea individului ”viaţă, care se perpetuă, veşnică”);
- **Sistemul Endocrin** (glande şi celule producătoare de hormoni, substanţe biologic active, care dirijează diferiteb procese metabolice din organism);
- **Sistemul cardiovascular** (realizează unirea tuturor sistemelor prin vase sangvine şi limfatice, care vor efectua funcţii de transportare);
- **Sistemul limfoid** (menţinerea homeostazei antigenice a organismului (timus, măduva osoasă roşie, noduli limfoizi).
- **Sistemul Tegumentar** (pielea şi anexele sale glandele mamare , sudoripare, sebacee, părul, unghiile)

Organele se clasifică în

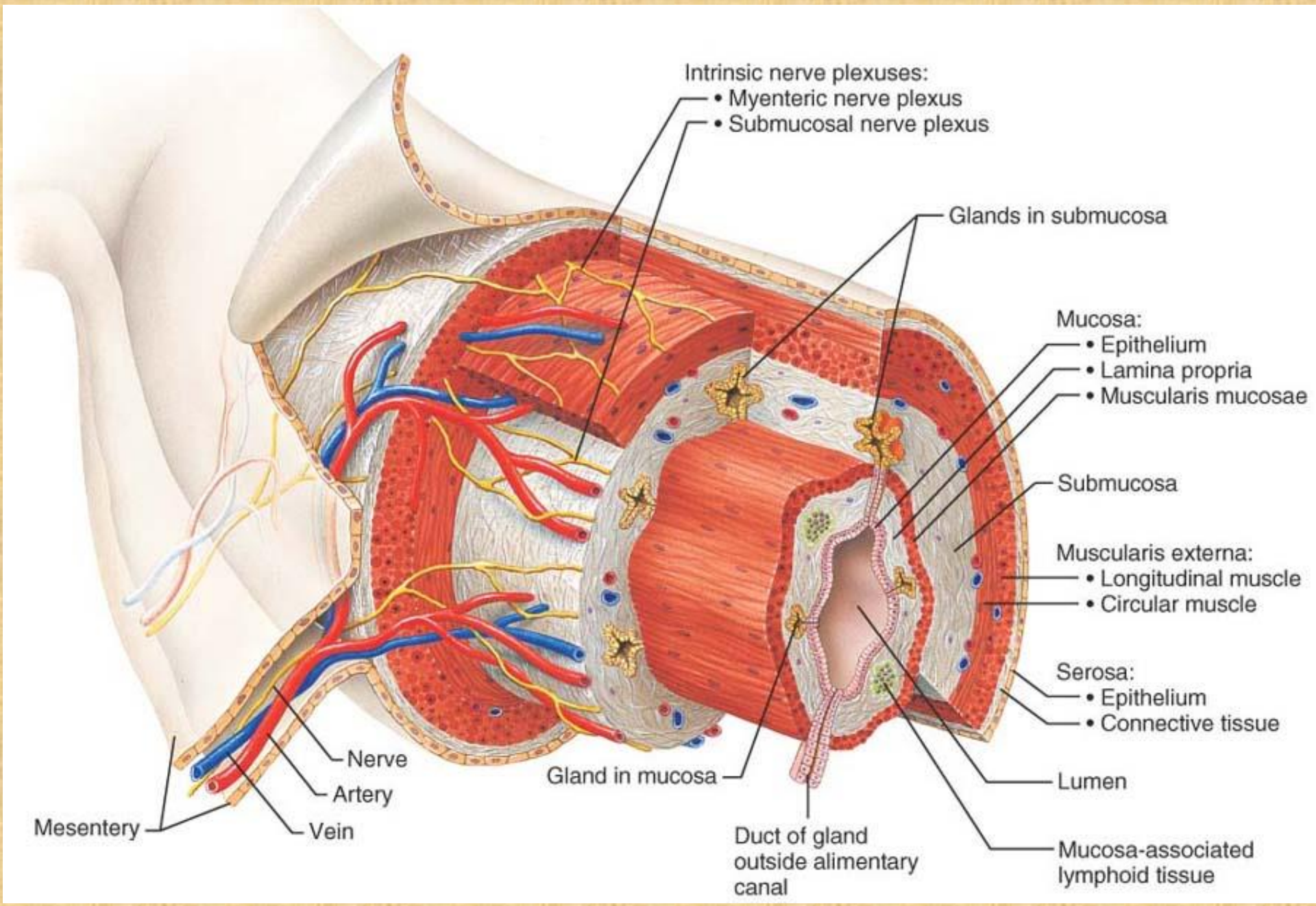
1. tubulare (cavitare) și

2. organe parenchimatoase.

Organele tubulare posedă o structură comună;

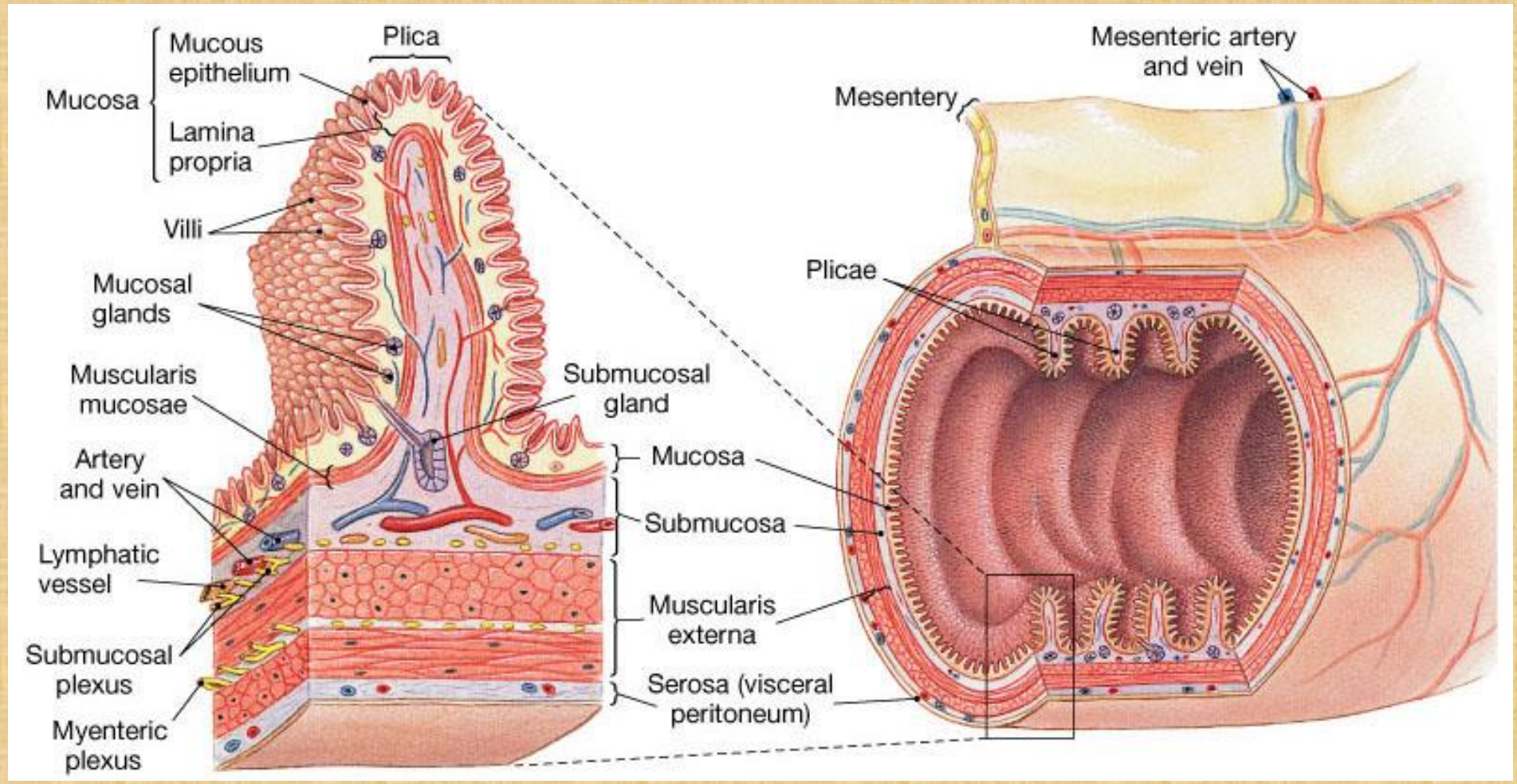
Peretele organului cavitar este compus din următoarele straturi:

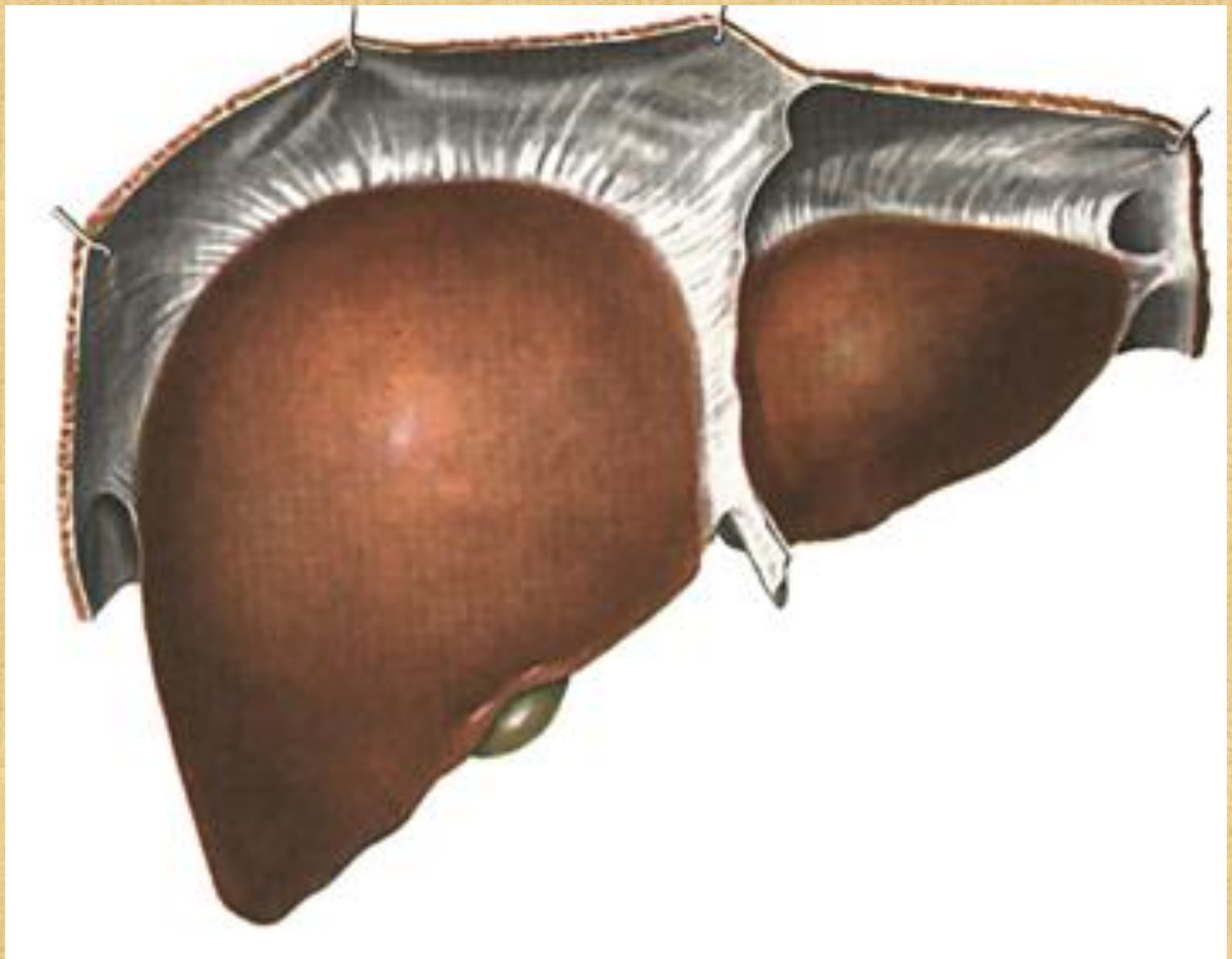
- **Tunica MUCOASĂ** (tunica mucosa)
- **Tela SUBMUCOASĂ** (tela submucosa)
- **Tunica MUSCULARĂ** (tunica muscularis)
- **Tunica SEROASĂ** (tunica serosa), sau **ADVETIȚIA** (tunica adventitia)


Intrinsic nerve plexuses:
• Myenteric nerve plexus
• Submucosal nerve plexus
Glands in submucosa
Mucosa:
• Epithelium
• Lamina propria
• Muscularis mucosae
Submucosa
Muscularis externa:
• Longitudinal muscle
• Circular muscle
Serosa:
• Epithelium
• Connective tissue
Lumen
Mucosa-associated lymphoid tissue
Duct of gland outside alimentary canal
Gland in mucosa
Nerve
Artery
Vein
Mesentery

Organul parenchimatos constă din **parenchimă** și **stromă**.

- ***Parenchima***, este formată de celule/țesuturi specifice, care asamblându-se într-un mod anume (*unitate morfofuncțională*) vor executa o funcție distinctivă organului dat;
- ***Stroma***, este carcasa, scheletul moale a organului (țesut conjunctiv), care susține deci parenchima și conduce spre ea vasele sangvine , limfatice și nervii.


Mucosa
Mucous epithelium
Lamina propria
Plica
Villi
Mucosal glands
Muscularis mucosae
Submucosal gland
Artery and vein
Lymphatic vessel
Submucosal plexus
Myenteric plexus
Mucosa
Submucosa
Muscularis externa
Serosa (visceral peritoneum)
Mesenteric artery and vein
Mesentery
Plicae



Clasificarea organelor în dependență de dezvoltarea lor:

- I. Organe derivate din **endodermă**
- II. Organe derivate din **mesoderma somatică**
- III. Organe derivate din **ectodermă**

Clasificarea organelor în dependență de amplasamentul topografic:

- I. Organele capului of the head
- II. Organele gâtului
- III. Organele cavității toracice
- IV. Organele cavității abdominale
- V. Organele bazinului (pelvisului).

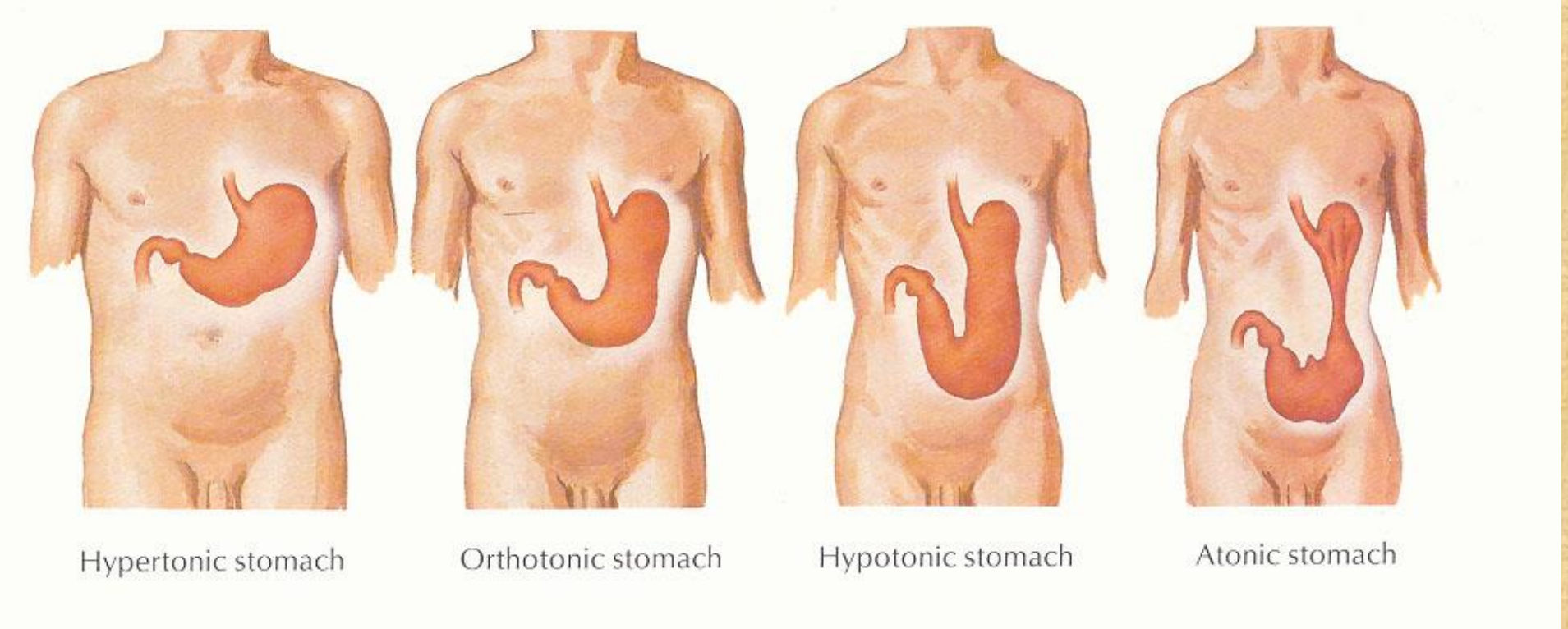
Viscerele și tipurile constituționale ale corpului uman

Mărimea, forma și poziția organelor depinde de tipul constituțional ale corpului uman.

- La **astenici:** organele sunt mai mici și au poziție mai joasă (de parcă ar fi în ptoză). Plămânii sunt mai alungiți pe contul toracelui îngust. Inima ocupă o poziție verticală, aorta fiind și ea mai îngustă. Stomacul și intestinele subțiri tind spre o poziție verticală. Ficatul, splina, pancreaaul și rinichii sunt relativ mici.
- La **hiperstenici:** cordul este relativ mare amplasat orizontal, aorta este mai largă. Plămânii subt scurți. Stomacul se aranjează mai transversal ca și ansele intestinului subțire. Ficatul, splina, pancreasul și rinichii sunt largi.

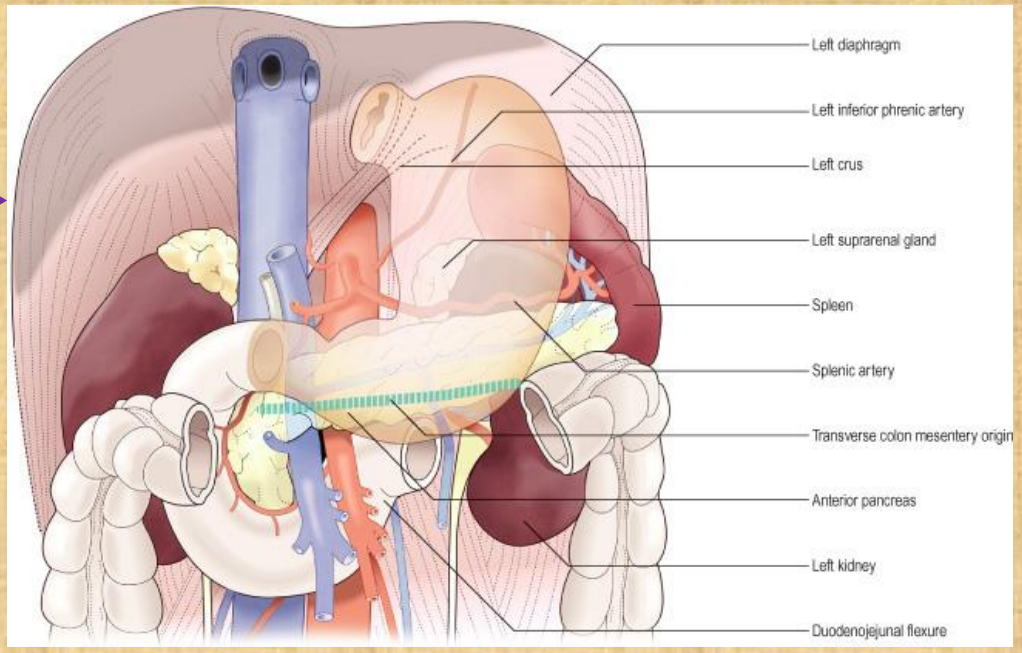
- **La normostenici** mărimile, formele și pozițiile organelor ocupă o poziție intermediară între tipurile menționate anterior.

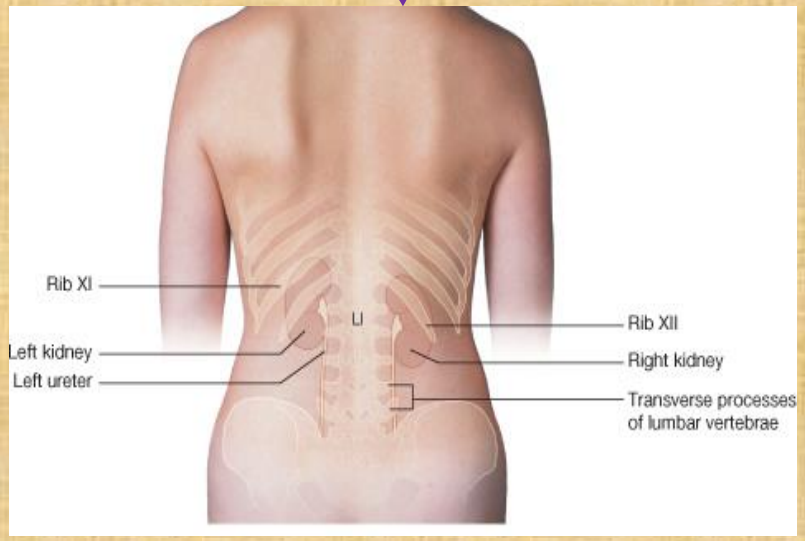
Structura organului (stomacului) în dependență de tonicitatea peretelui lui muscular

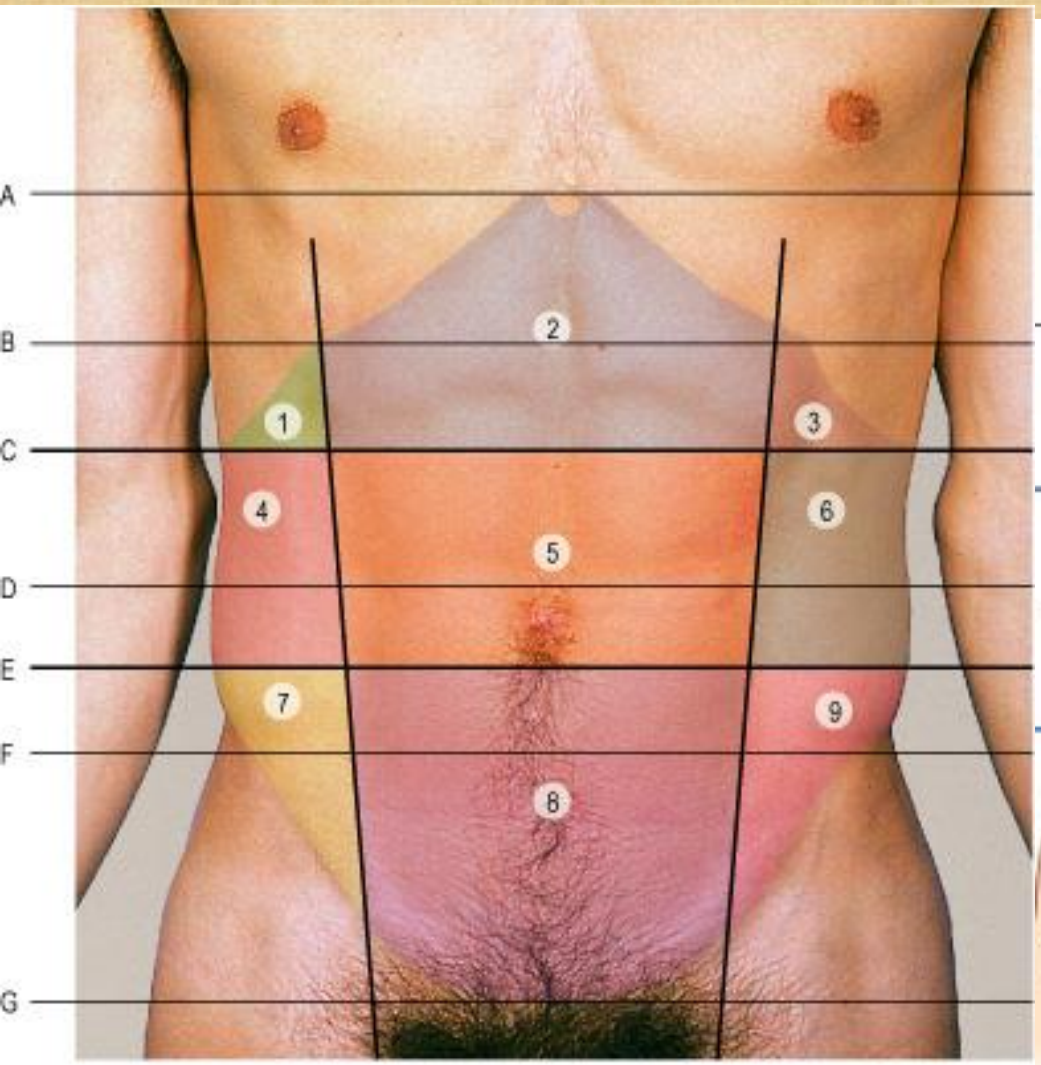


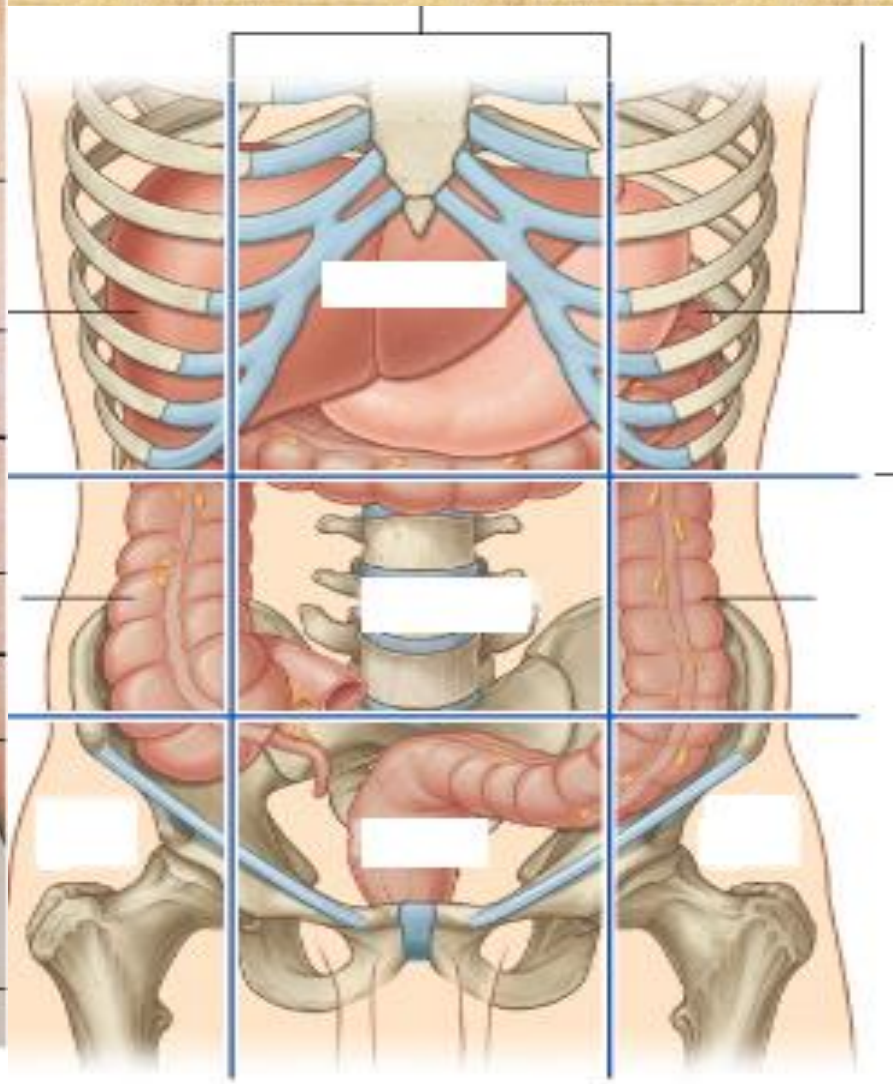
Topografie

- Sintopie
- Scheletotopie
- Holotopie



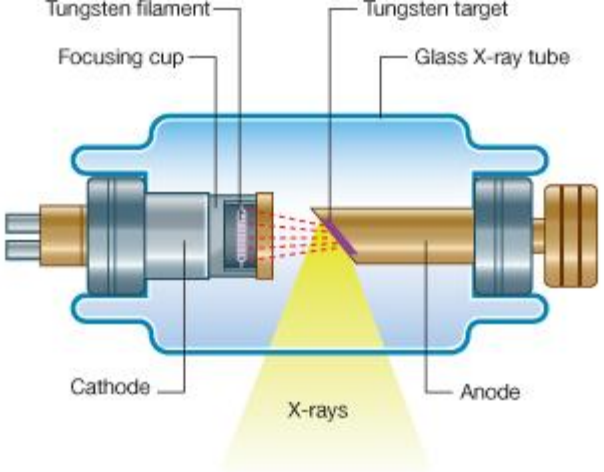


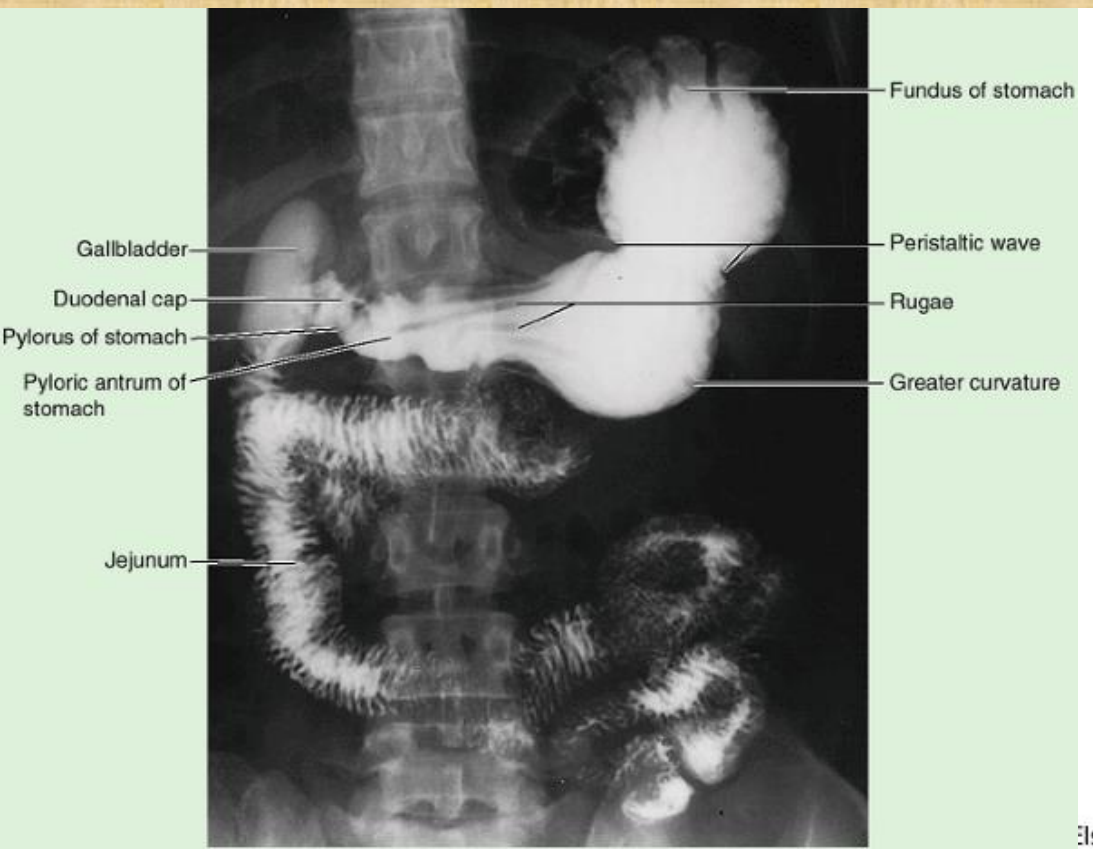


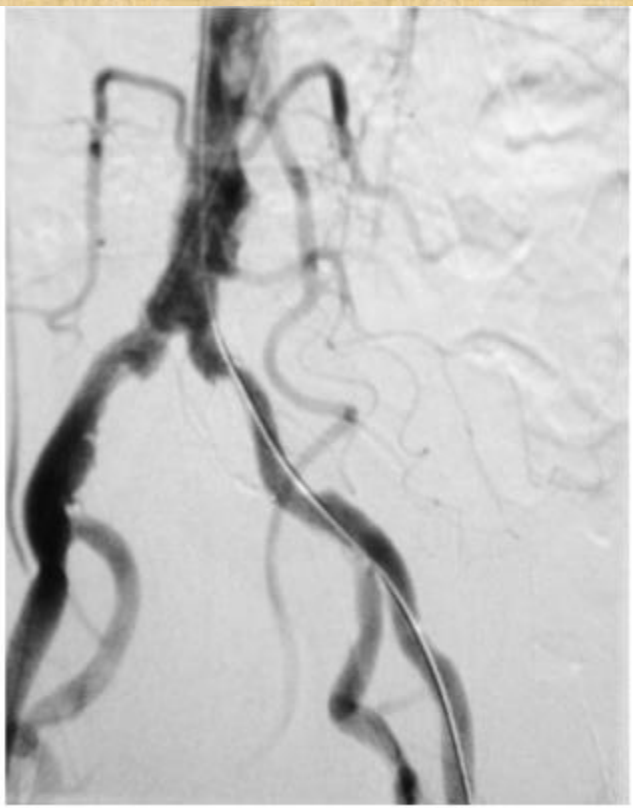


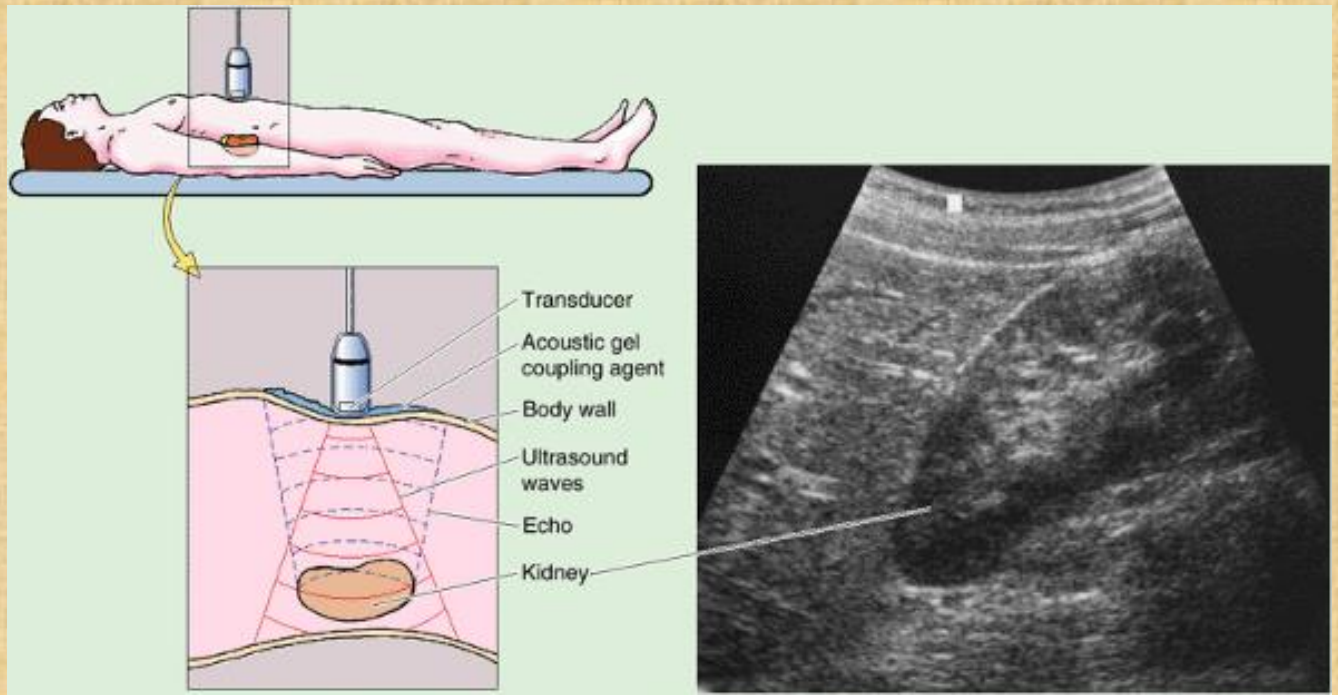
Key for planes:
A. Xiphisternal plane. **B.** Transpyloric plane. **C.** Subcostal plane. **D.** Supracristal plane. **E.** Transtubercular plane. **F.** Interspinous plane. **G.** Pubic crest plane.

Key for nine regions of the abdomen:
1. Right hypochondrium. **2.** Epigastric. **3.** Left hypochondrium. **4.** Right lumbar. **5.** Central/umbilical. **6.** Left lumbar. **7.** Right iliac fossa. **8.** Suprapubic/hypogastrium. **9.** Left iliac fossa.

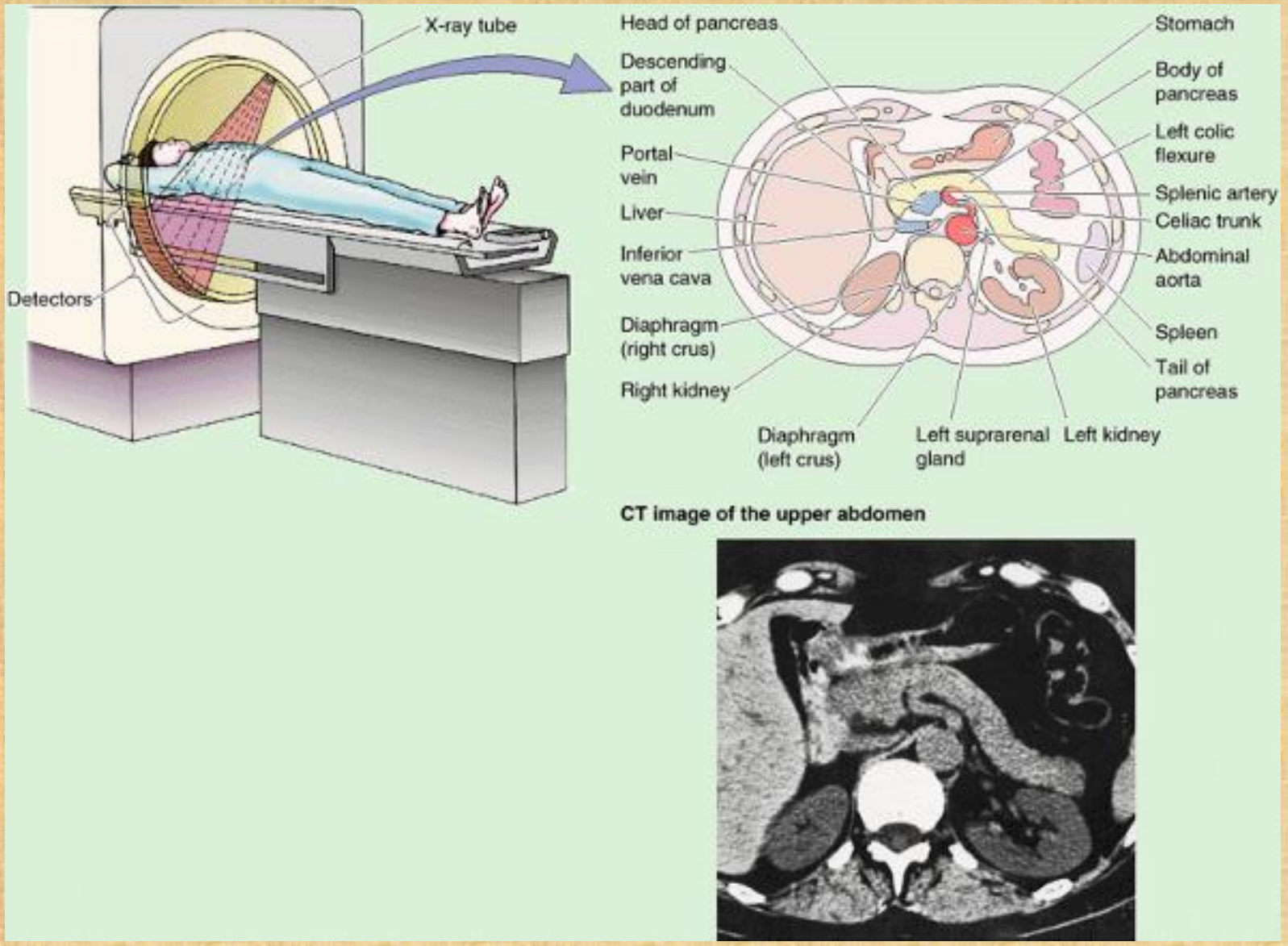


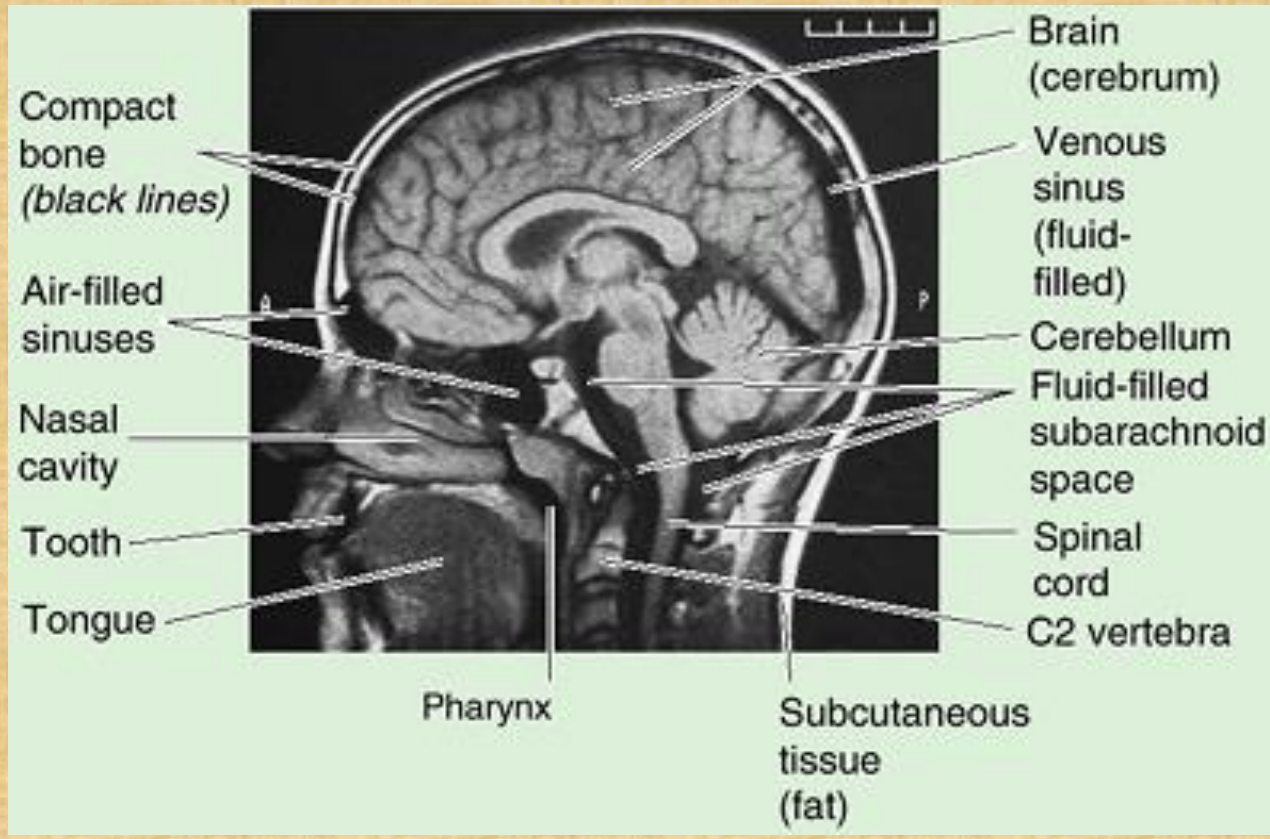






Examination on alive person




Brain (cerebrum)
Compact bone (black lines)
Venous sinus (fluid-filled)
Air-filled sinuses
Cerebellum
Fluid-filled subarachnoid space
Nasal cavity
Tooth
Spinal cord
Tongue
C2 vertebra
Pharynx
Subcutaneous tissue (fat)

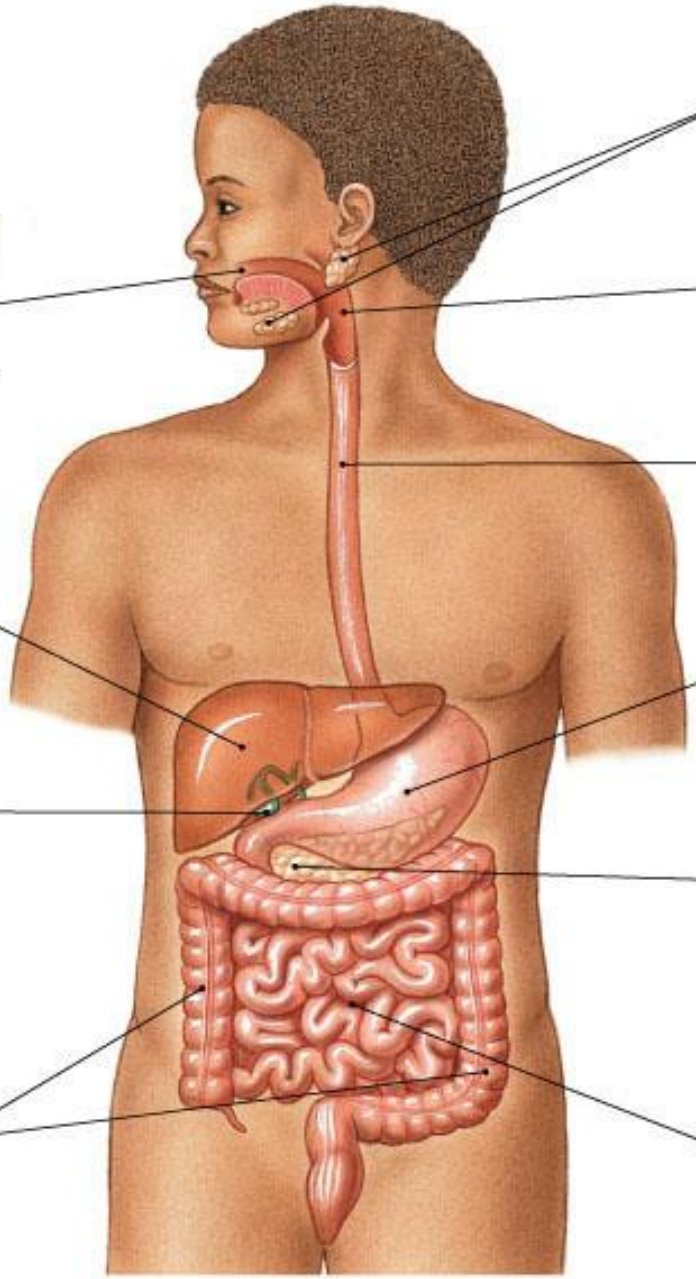
Sistemul Digestiv

Sistemul digestiv sau tubul digestiv (*systema digestorium*) este un complex de diferite organe, care sunt implicate în fărâmițarea alimentelor (mecanic și chimic) – **digestie**, apoi **absorbția** monomerilor obținuți în urma digestiei, și la final eliminarea rămășițelor nedigerate (**excreție**).

Componentele Systemului Digestiv

Organele tubului digestiv

Glande digestive



ORAL CAVITY, TEETH, TONGUE

Mechanical processing, moistening, mixing with salivary secretions

SALIVARY GLANDS

Secretion of lubricating fluid containing enzymes that break down carbohydrates

PHARYNX

Pharyngeal muscles propel materials into the esophagus

ESOPHAGUS

Transport of materials to the stomach

LIVER

Secretion of bile (important for lipid digestion), storage of nutrients, many other vital functions

STOMACH

Chemical breakdown of materials via acid and enzymes; mechanical processing through muscular contractions

GALLBLADDER

Storage and concentration of bile

PANCREAS

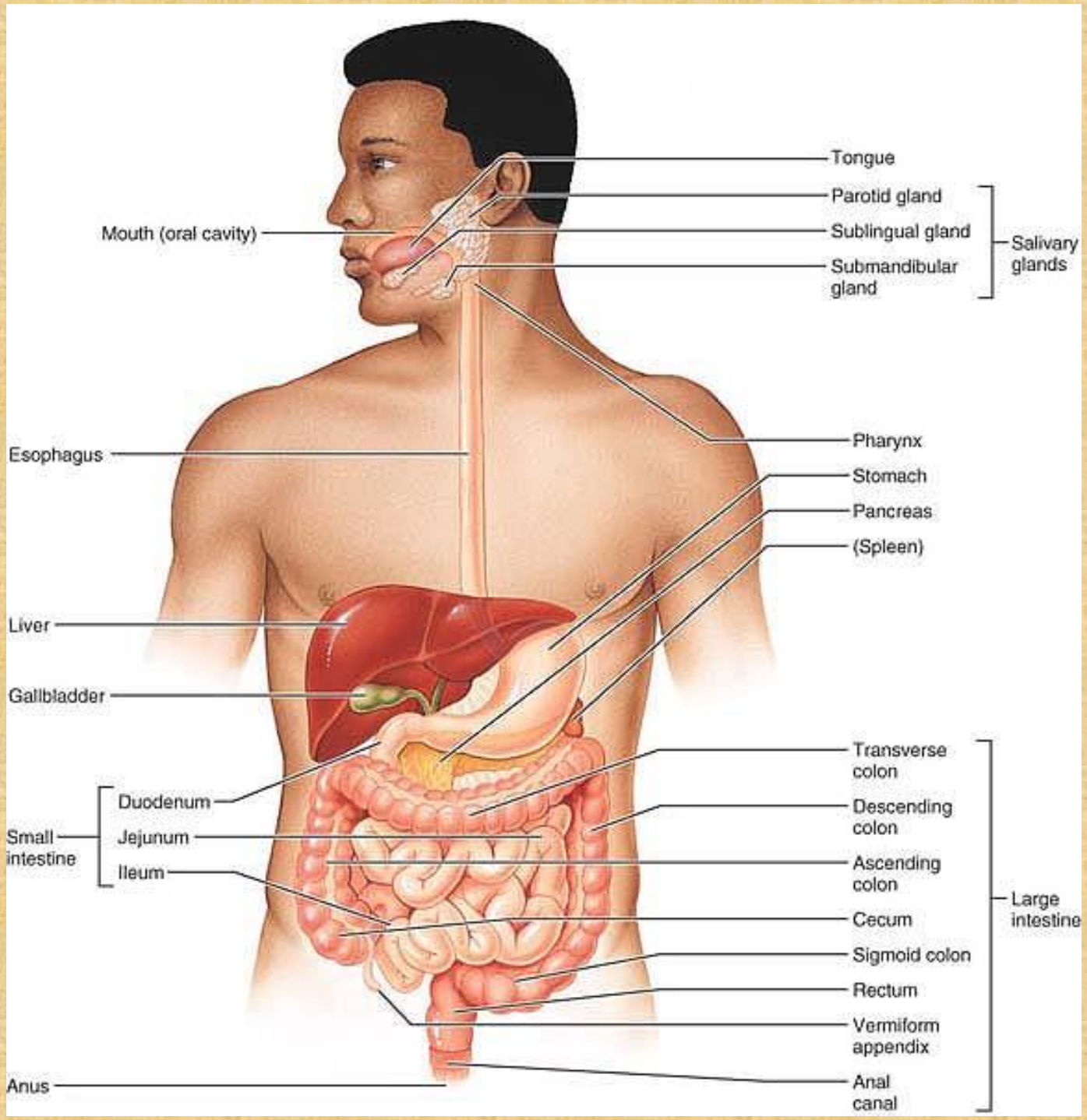
Exocrine cells secrete buffers and digestive enzymes; endocrine cells secrete hormones

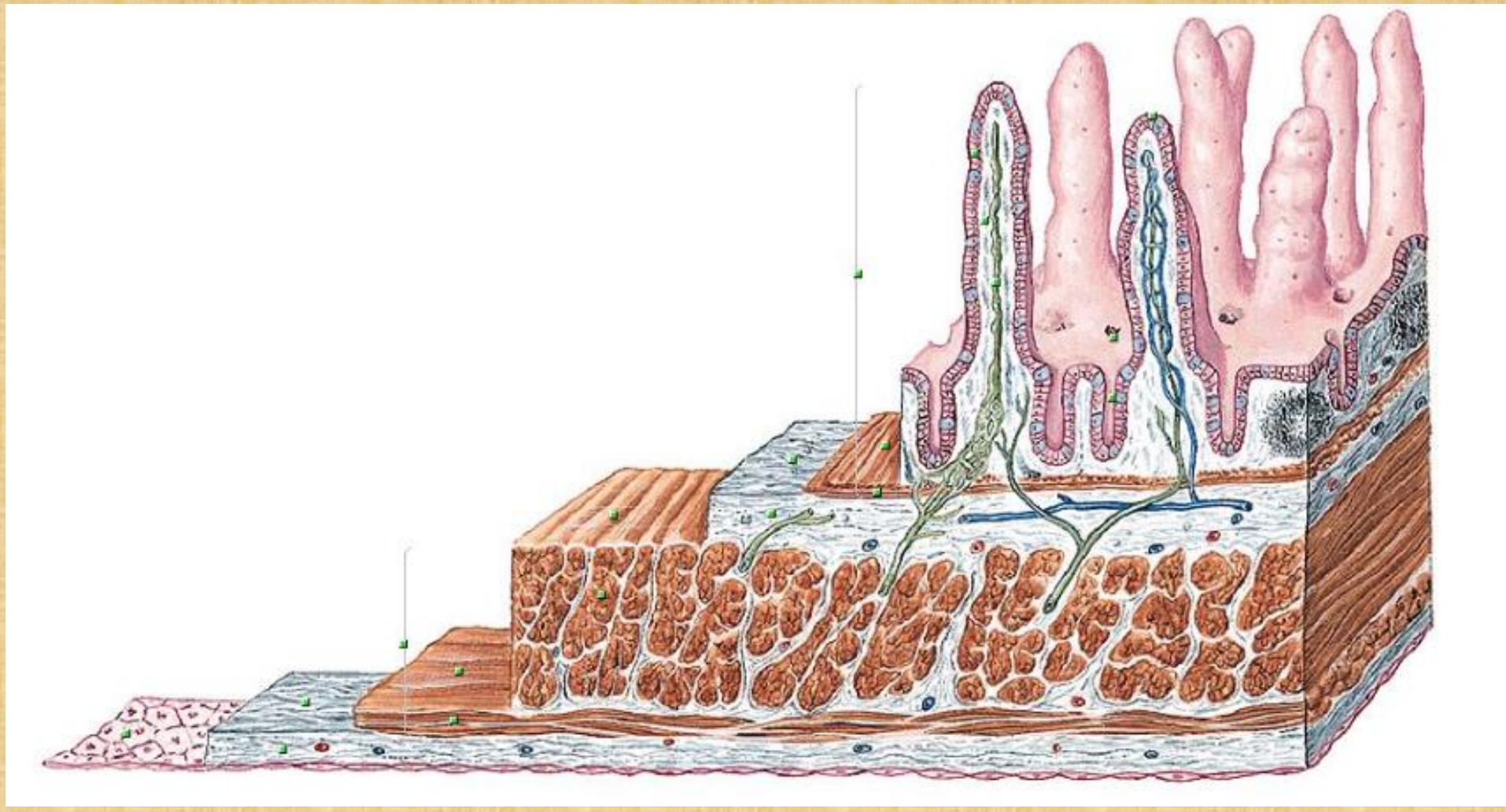
LARGE INTESTINE

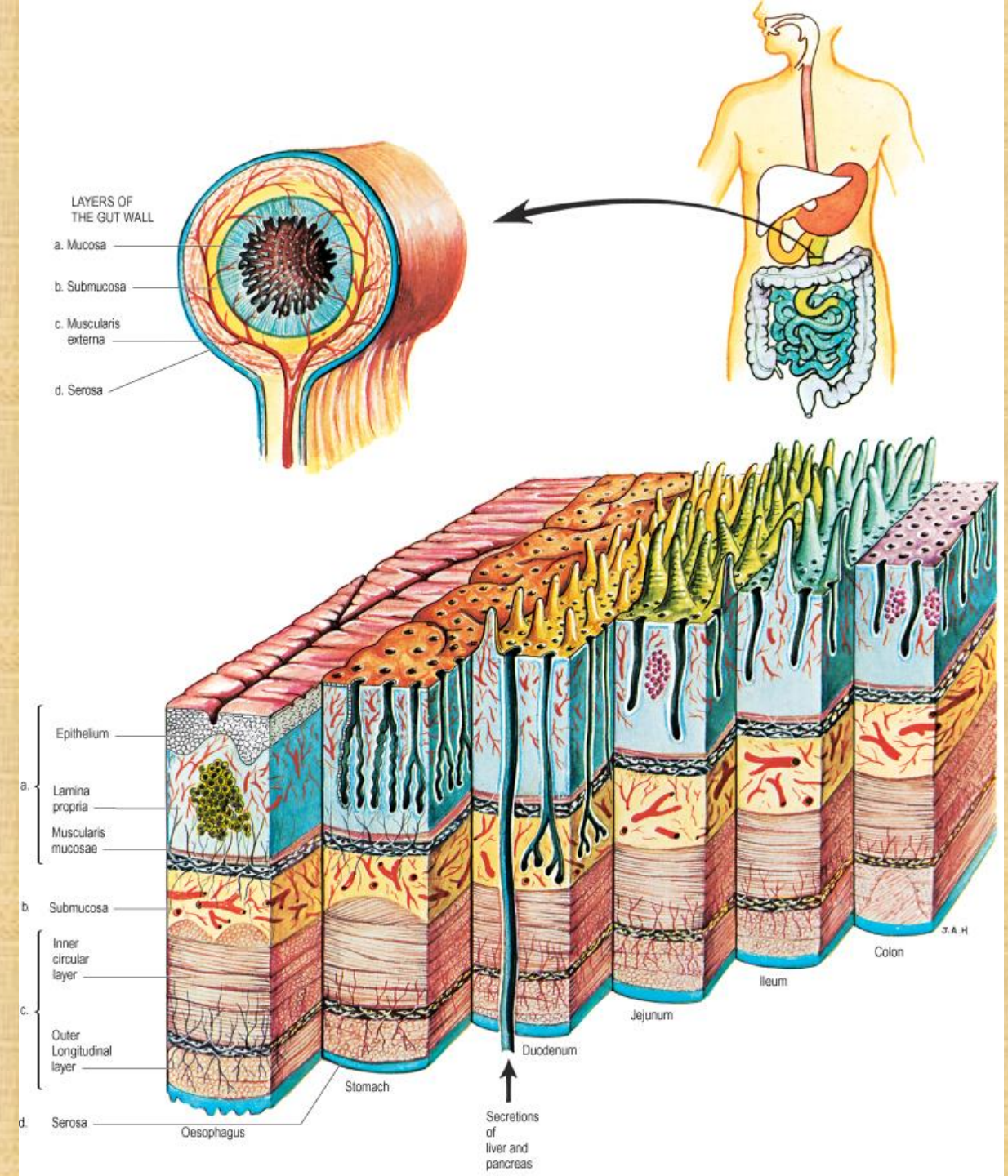
Dehydration and compaction of indigestible materials in preparation for elimination

SMALL INTESTINE

Enzymatic digestion and absorption of water, organic substrates, vitamins, and ions


Tongue
Parotid gland
Mouth (oral cavity)
Sublingual gland
Salivary glands
Submandibular gland
Pharynx
Esophagus
Stomach
Pancreas
(Spleen)
Liver
Gallbladder
Transverse colon
Duodenum
Descending colon
Small intestine
Jejunum
Ascending colon
Ileum
Large intestine
Cecum
Sigmoid colon
Rectum
Vermiform appendix
Anus
Anal canal



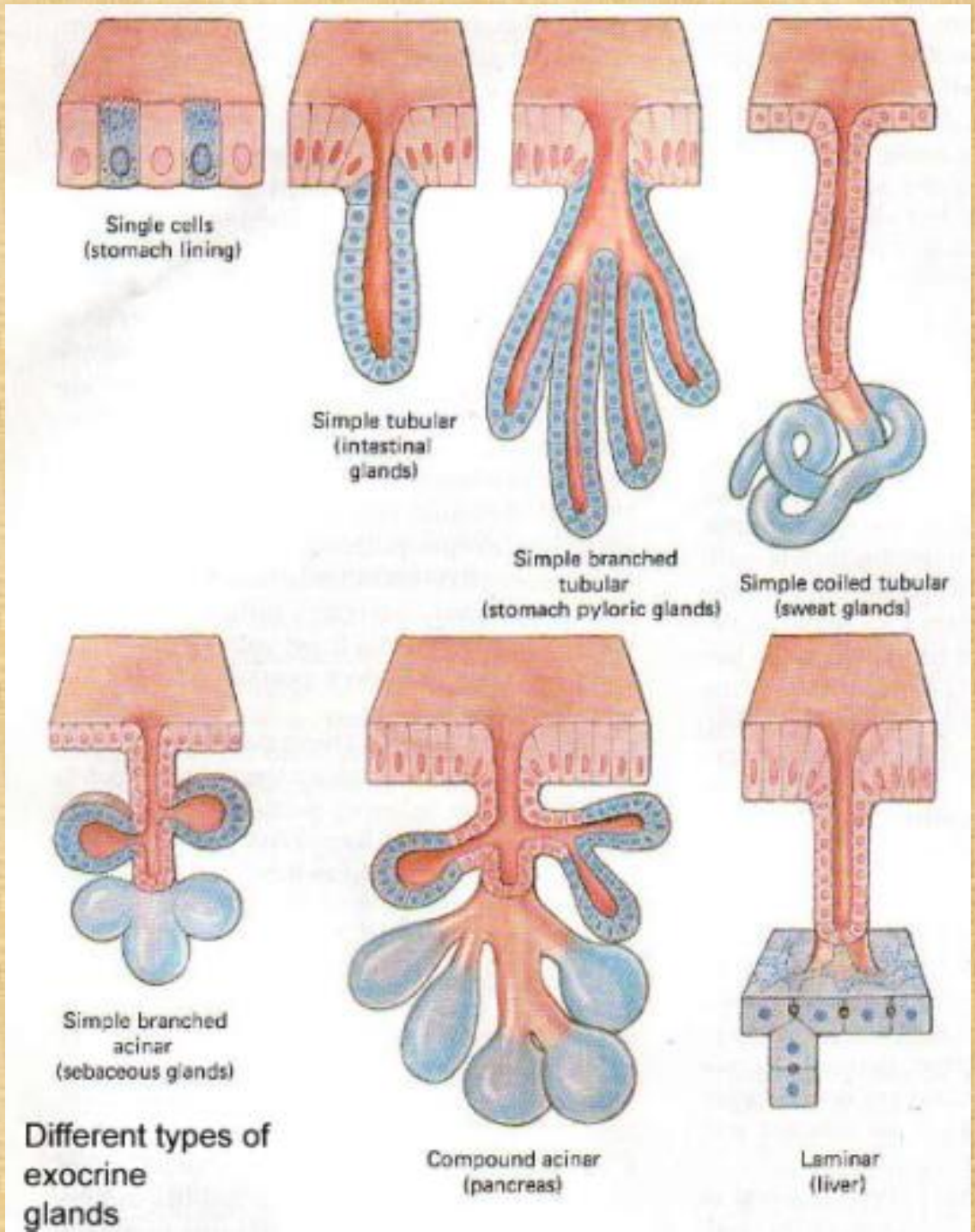

LAYERS OF
THE GUT WALL
a. Mucosa
b. Submucosa
c. Muscularis
externa
d. Serosa
a.
Epithelium
Lamina
propria
Muscularis
mucosae
b.
Submucosa
c.
Inner
circular
layer
Outer
Longitudinal
layer
d.
Serosa
Oesophagus
Stomach
Duodenum
Jejunum
Ileum
Colon
J. A. H
Secretions
of
liver and
pancreas

Funcțiile sistemului digestiv

- Ingestie
- Procesare (fărâmițare) mecanică
- Digestion - (fărâmițare) Chimică
- Secreție
- Absorpbție
- Excreție (egestie)

Glande

exocrine
endocrine



Mișcarea conținutului tubului digestiv

- Masticarea voluntară (conștientă) din cavitatea bucală/
- Înghițirea (deglutiția) –conștientă, trifazică
- Mișcarea ritmică, ciclică a mușchilor netezi (vicerali) ai organelor tubulare

  Celule Pacemaker
- Peristaltism

  Mișcarea sinusoidală a bolului alimentar

  În sens opus antiperistaltism reflex de apărare (voma)
- Segmentație

  Fragmentarea bolului alimentar

Peristaltism

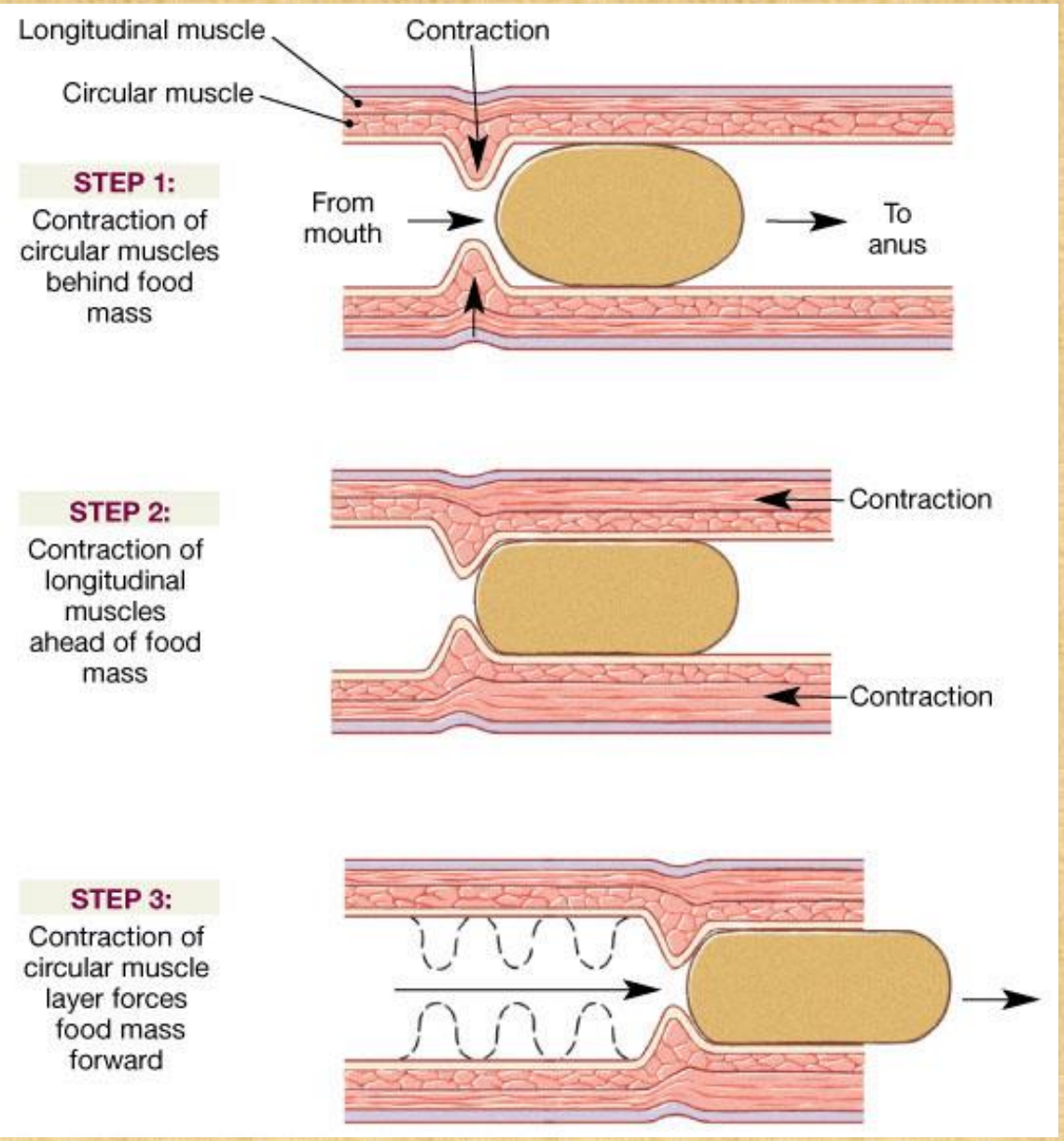
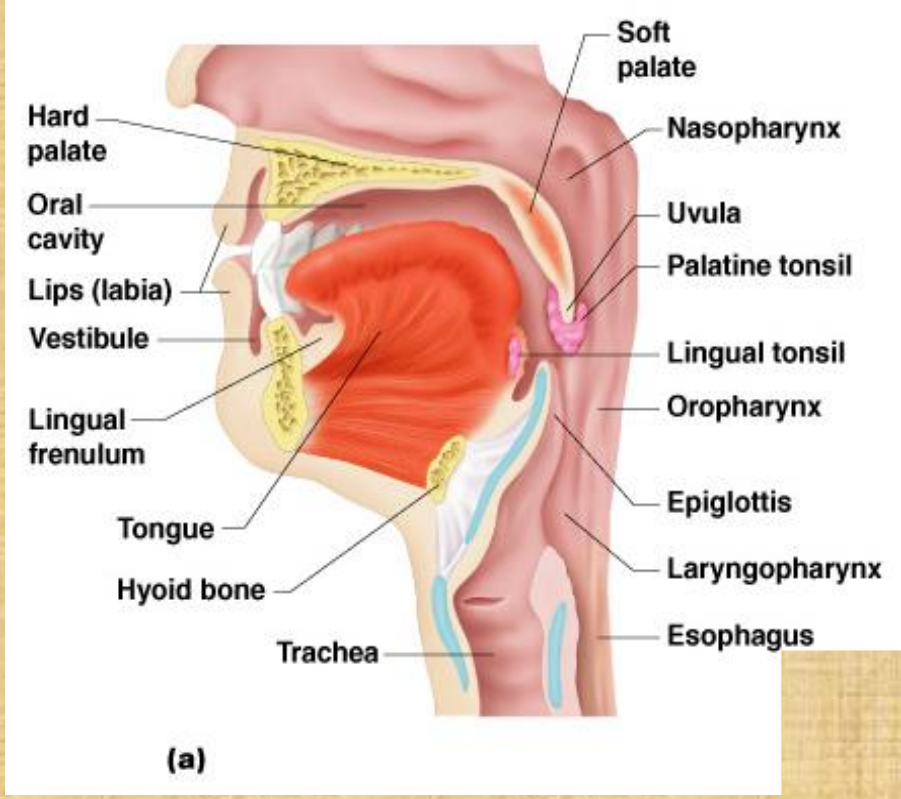


Figure 24.4

Cavitatea bucală

- Lips (labia) – protect the anterior opening
- Cheeks – form the lateral walls
- Hard palate – forms the anterior roof
- Soft palate – forms the posterior roof
- Uvula – fleshy projection of the soft palate

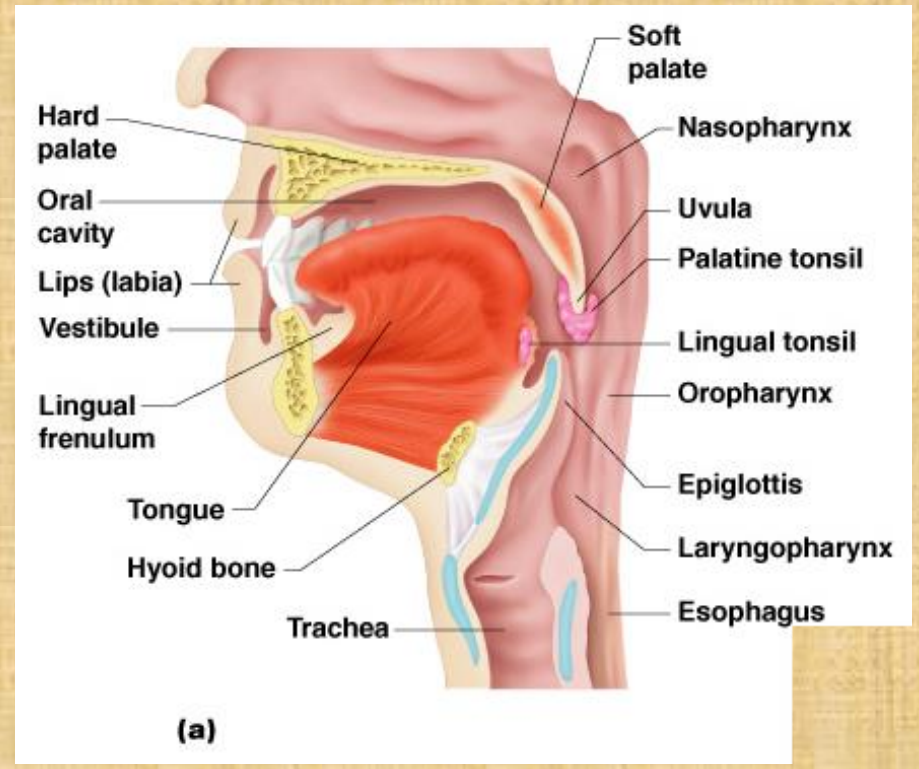


The tongue

- primary functions include:
  - Mechanical processing
  - Assistance in chewing and swallowing
  - Sensory analysis by touch, temperature, and taste receptors

The pharynx

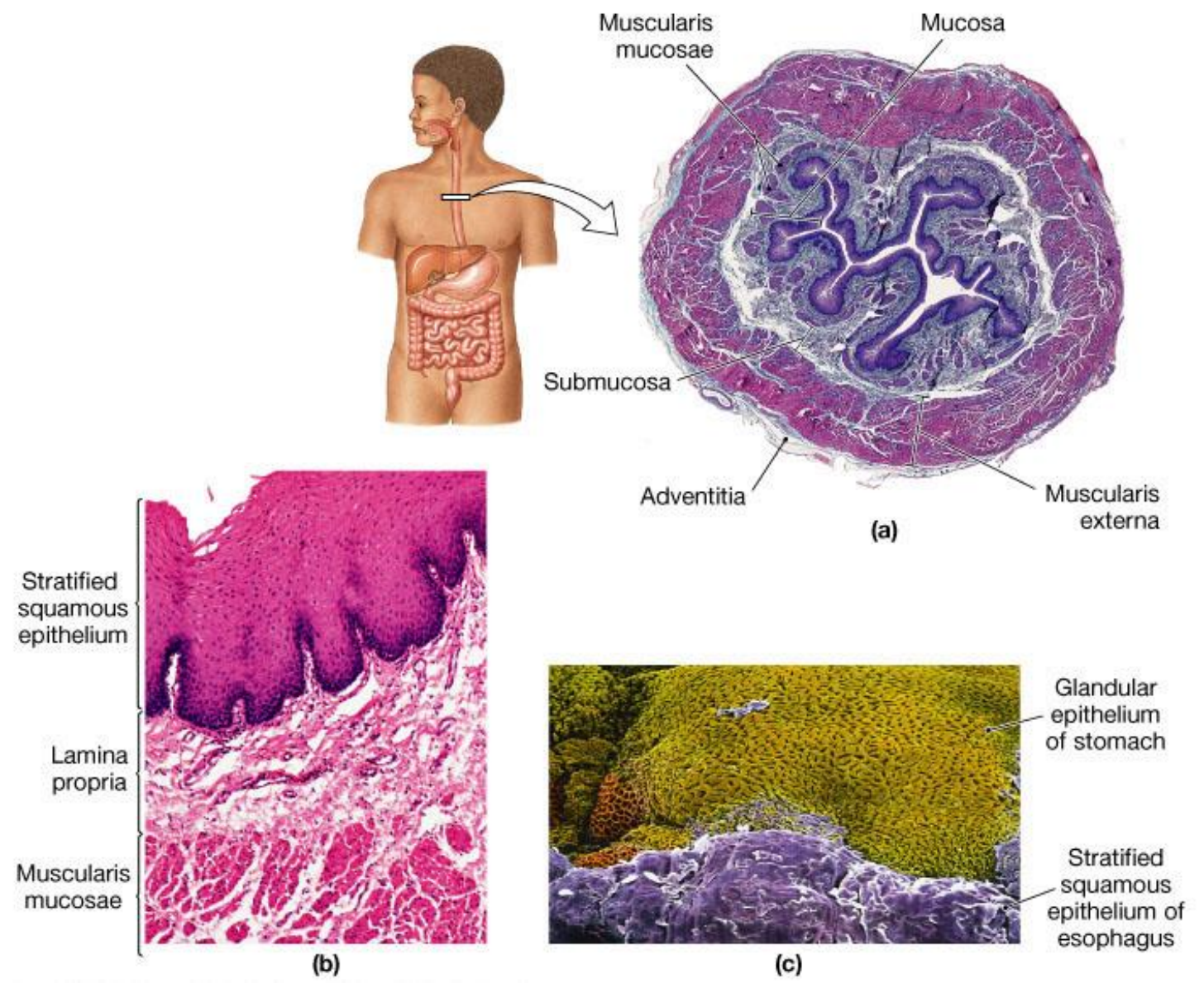
- Common passageway for food, liquids, and air
- Lined with stratified squamous epithelium
- Pharyngeal muscles assist in swallowing
  - Pharyngeal constrictor muscles
  - Palatal muscles



Histology of the esophagus

- Distinctive features of the esophageal wall include
  - Nonkeratinized, stratified squamous epithelium
  - Folded mucosa and submucosa
    - Mucous secretions by esophageal glands
  - A muscularis with both smooth and skeletal muscle portions
  - Lacks serosa
    - Anchored by an adventitia

The Esophagus



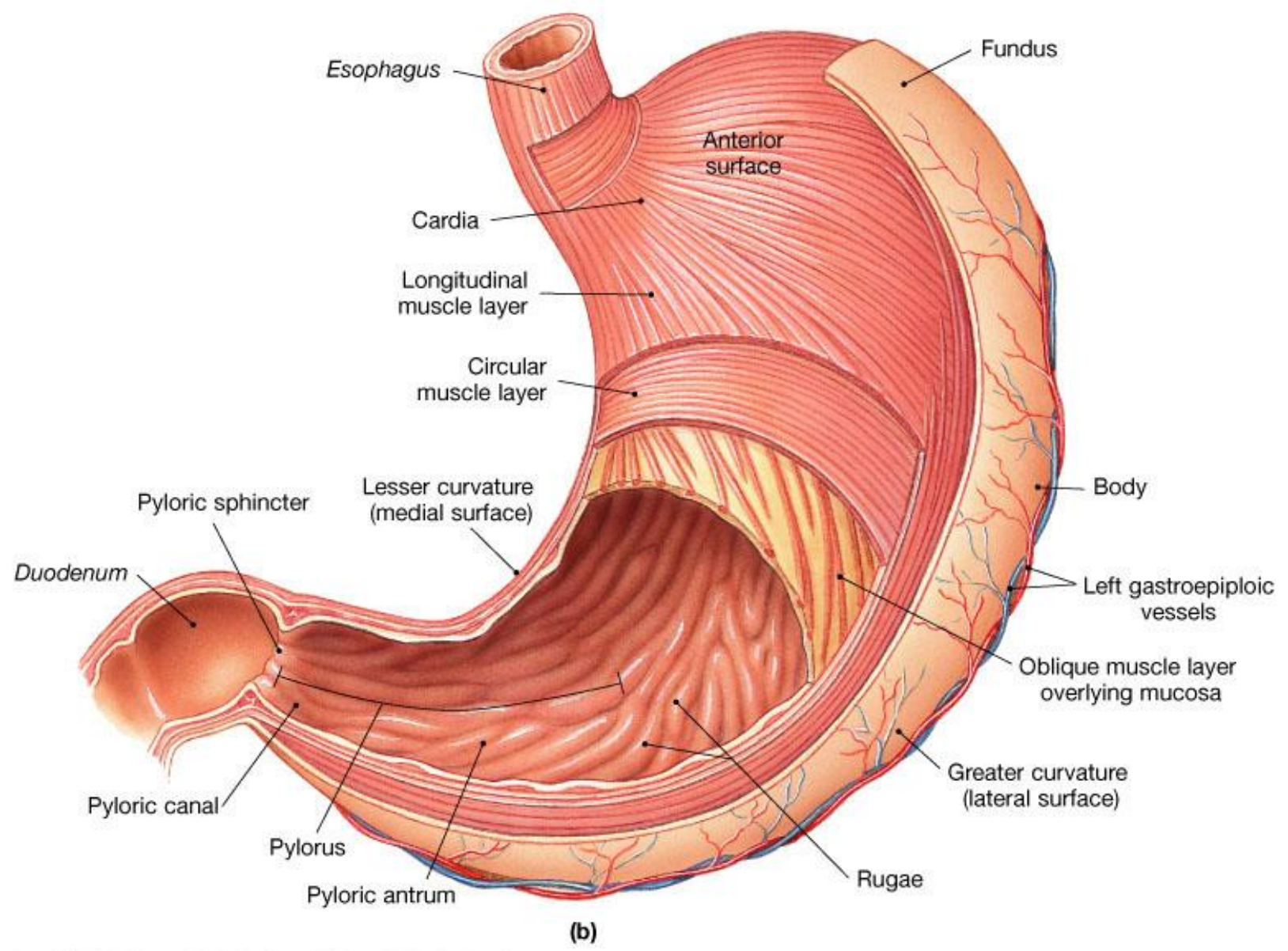
Functions of the stomach

- Bulk storage of undigested food
- Mechanical breakdown of food
- Disruption of chemical bonds via acids and enzymes
- Production of intrinsic factor

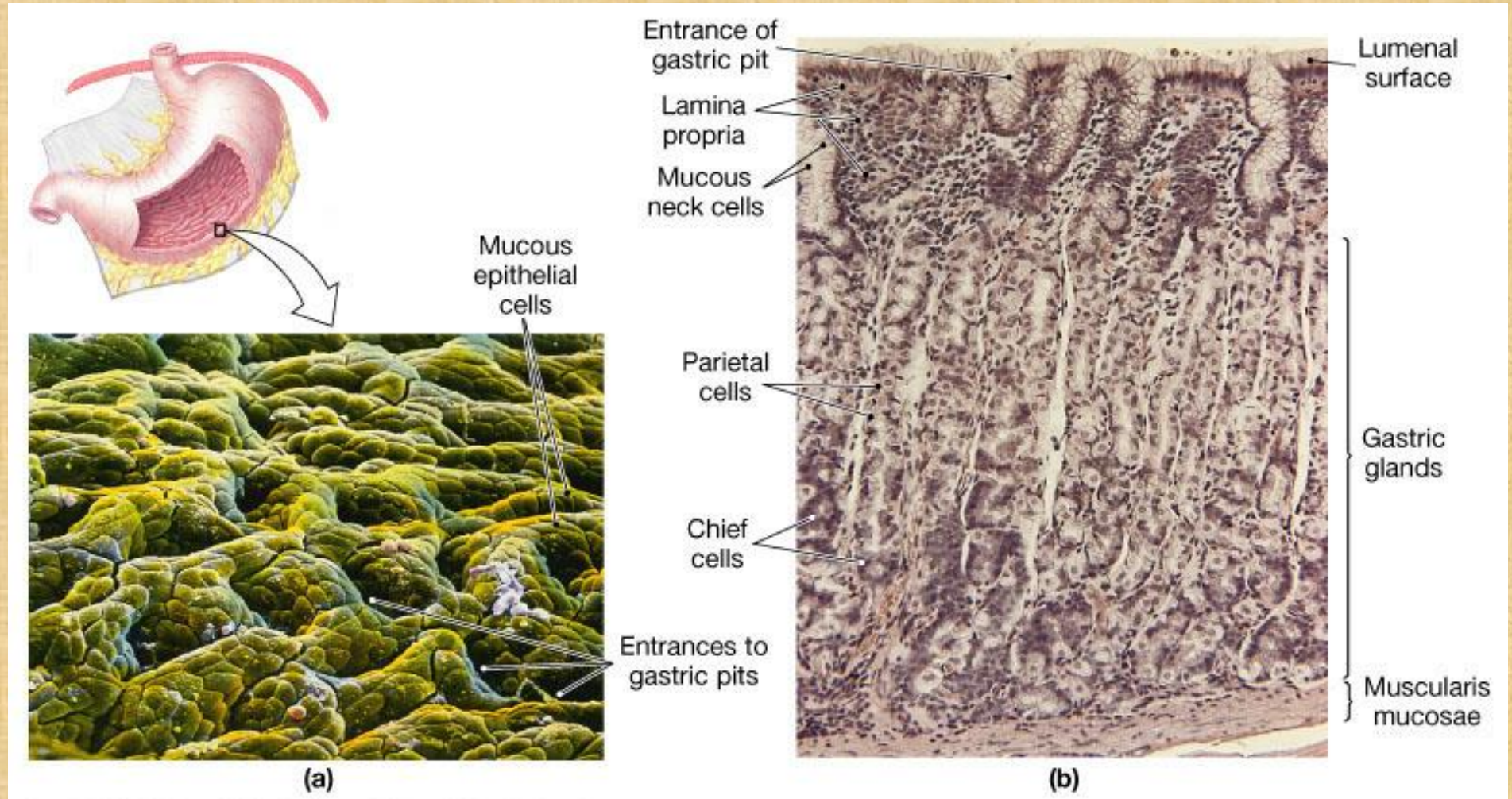
Digestion and absorption in the stomach

- Preliminary digestion of proteins
  - Pepsin
- Permits digestion of carbohydrates
- Very little absorption of nutrients
  - Some drugs, however, are absorbed
  - Mucous secretion containing several hormones
- Enteroendocrine cells
  - G cells secrete gastrin
  - D cells secrete somatostatin

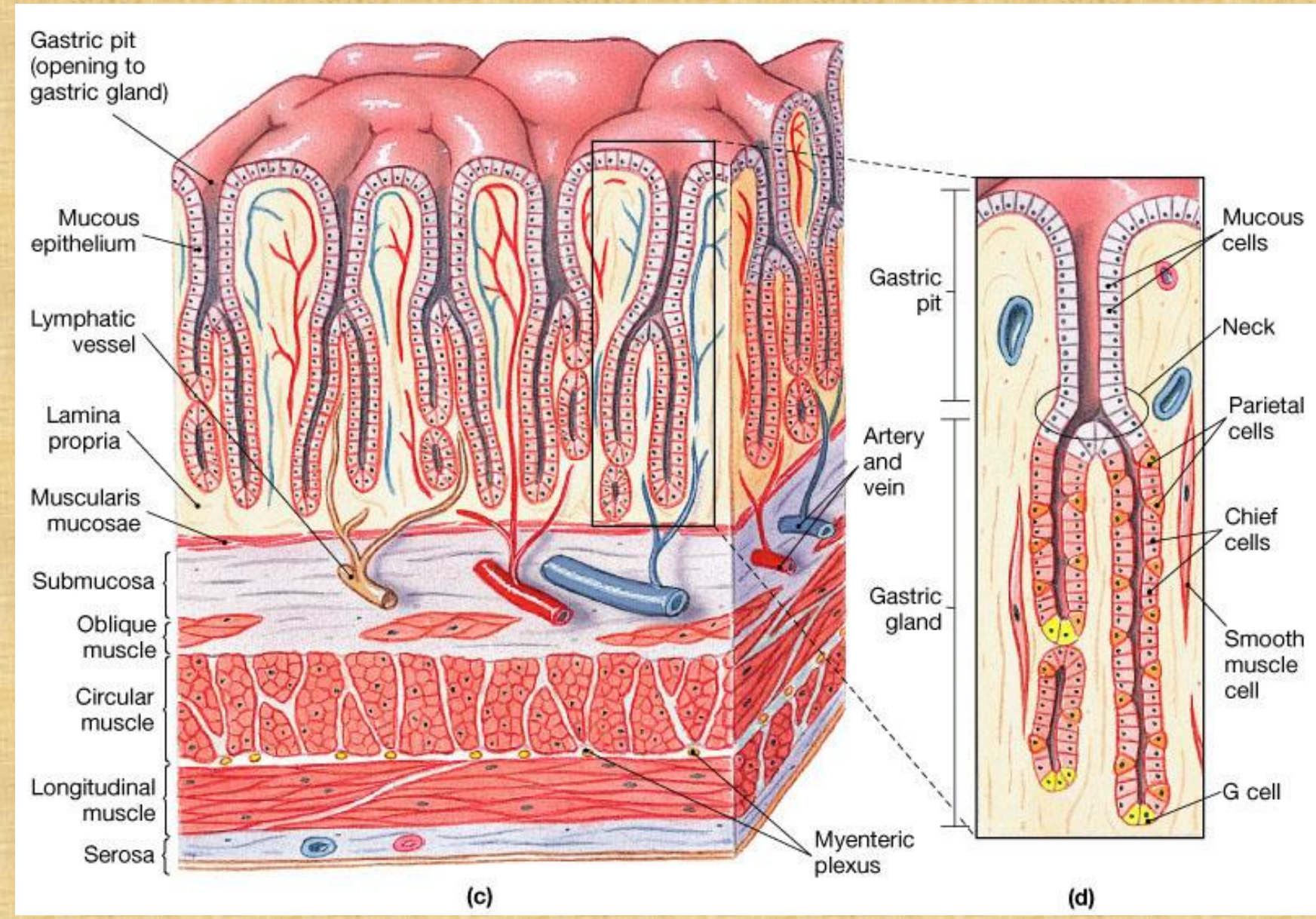
The Stomach


Esophagus
Fundus
Anterior surface
Cardia
Longitudinal muscle layer
Circular muscle layer
Lesser curvature (medial surface)
Pyloric sphincter
Duodenum
Body
Left gastroepiploic vessels
Oblique muscle layer overlying mucosa
Greater curvature (lateral surface)
Pyloric canal
Pylorus
Pyloric antrum
Rugae
(b)

The Stomach Lining



The Stomach Lining



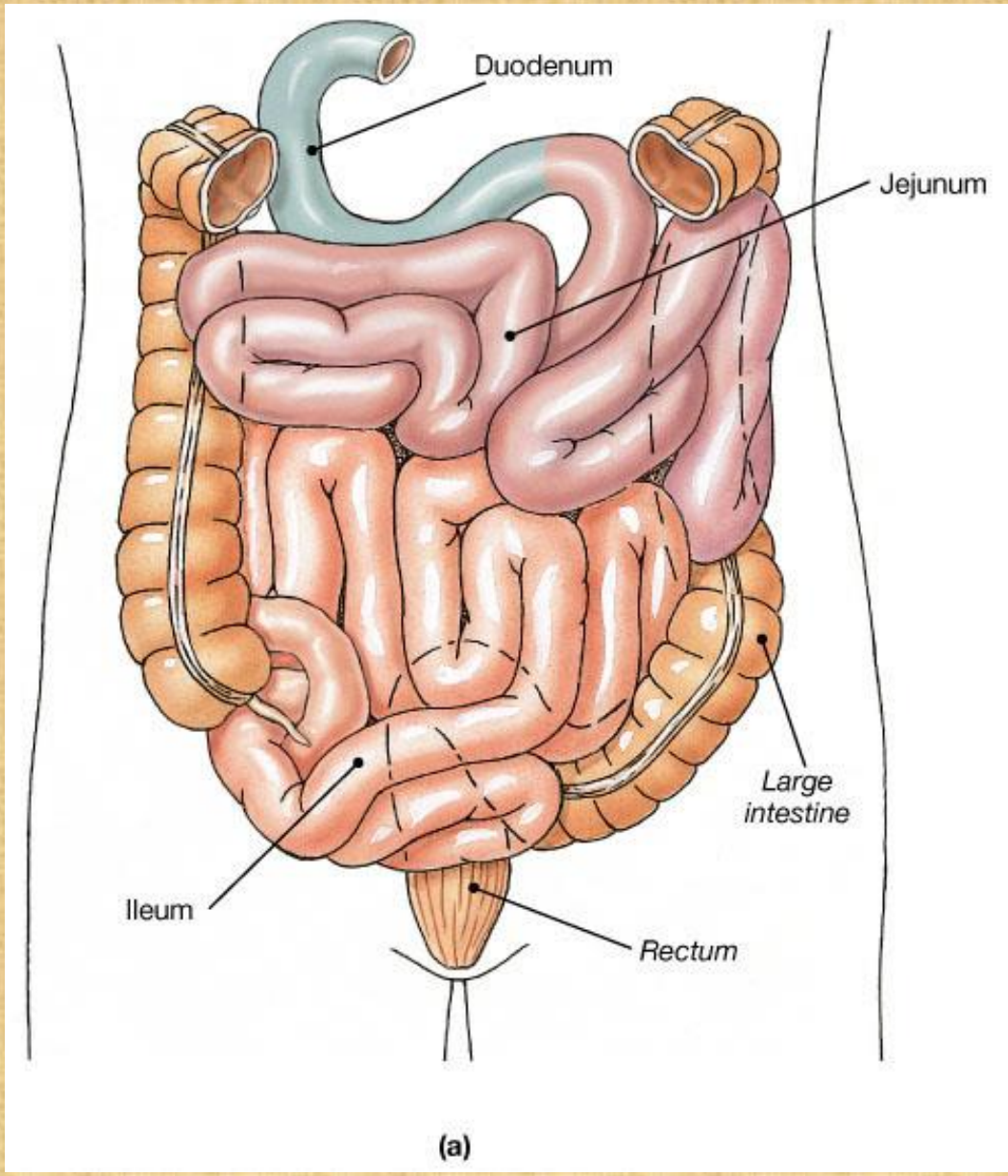
Histology of the stomach

- Gastric glands
  - Parietal cells
    - Intrinsic factor, and HCl
  - Chief cells
    - Pepsinogen
- Pyloric glands

Small intestine

- Important digestive and absorptive functions
  - Secretions and buffers provided by pancreas, liver, gall bladder
- Three subdivisions:
  - Duodenum
  - Jejunum
  - Ileum
- Ileocecal sphincter
  - Transition between small and large intestine

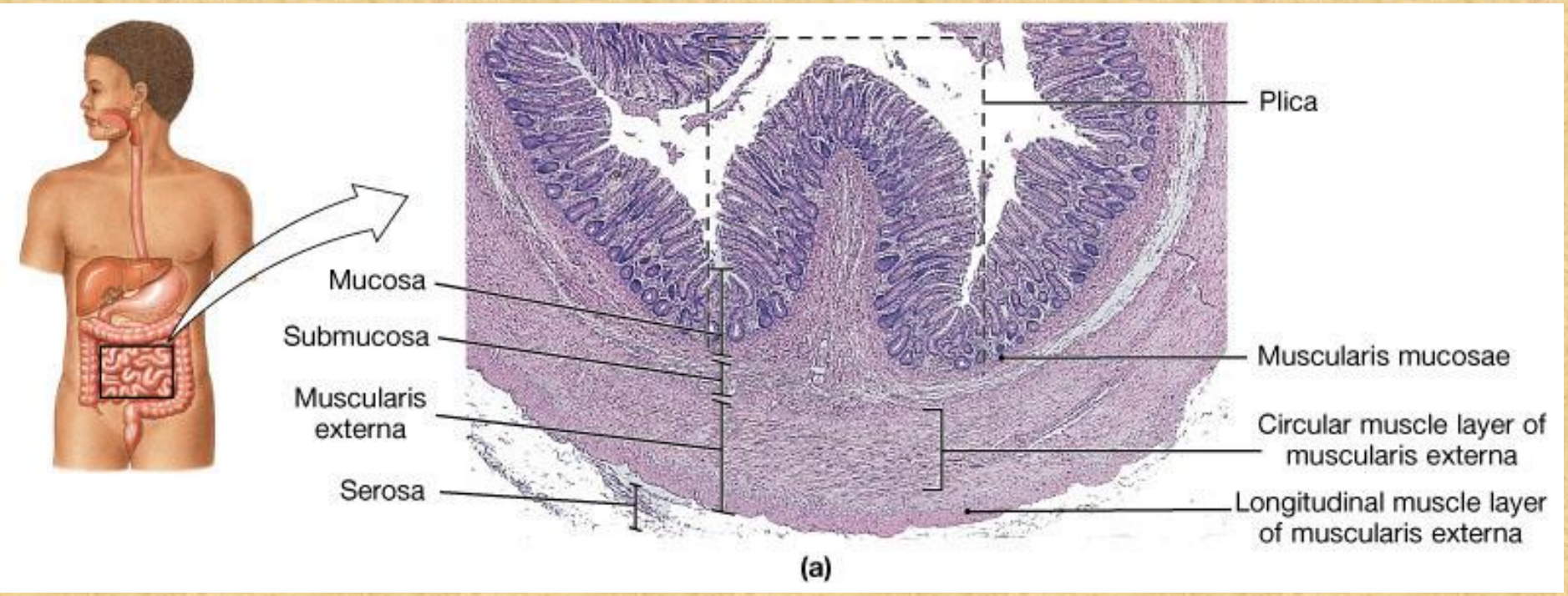
Regions of the Small Intestine



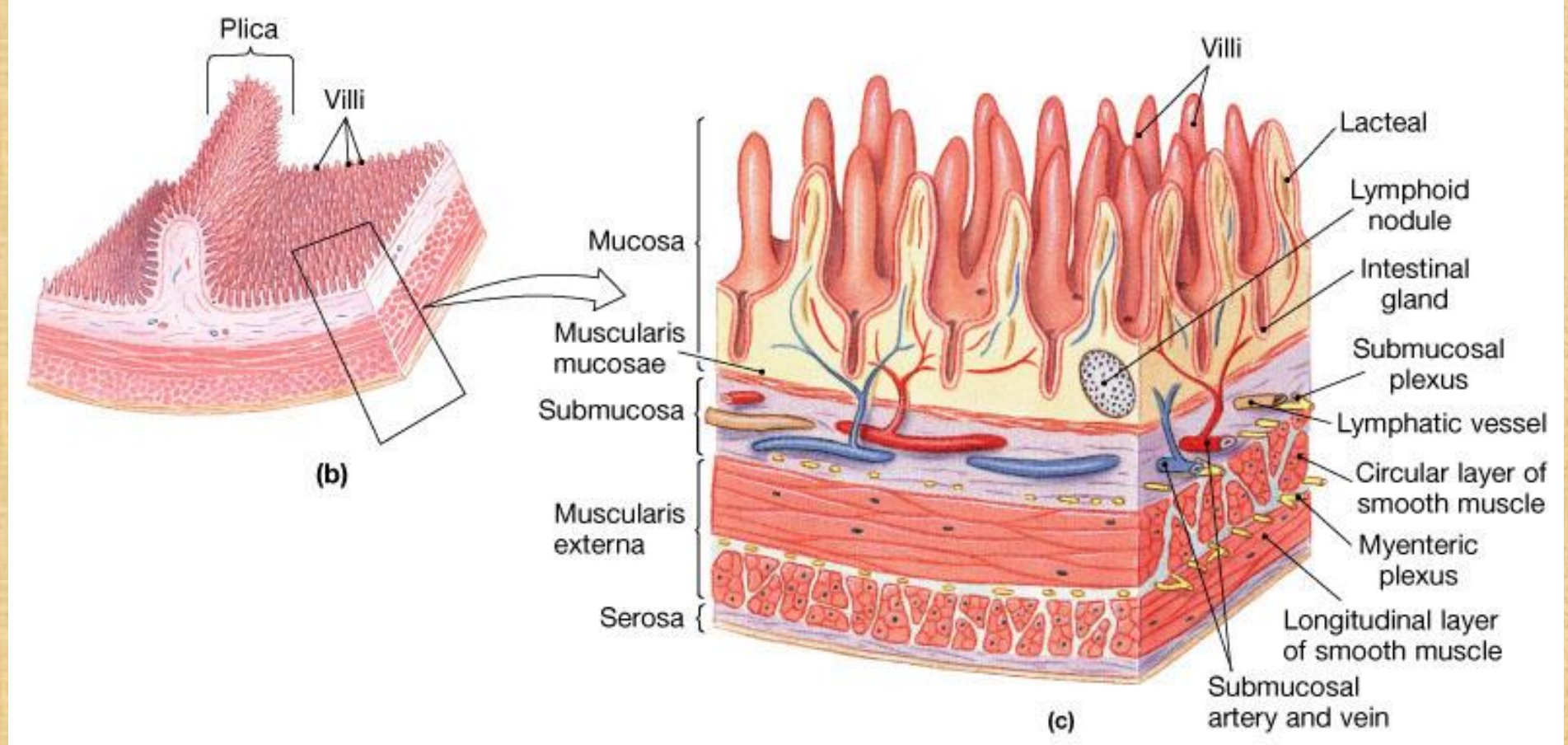
Histology of the small intestine

- Plicae
  - Transverse folds of the intestinal lining
- Villi
  - Fingerlike projections of the mucosa
- Lacteals
  - Terminal lymphatic in villus
- Intestinal glands
  - Lined by enteroendocrine, goblet and stem cells

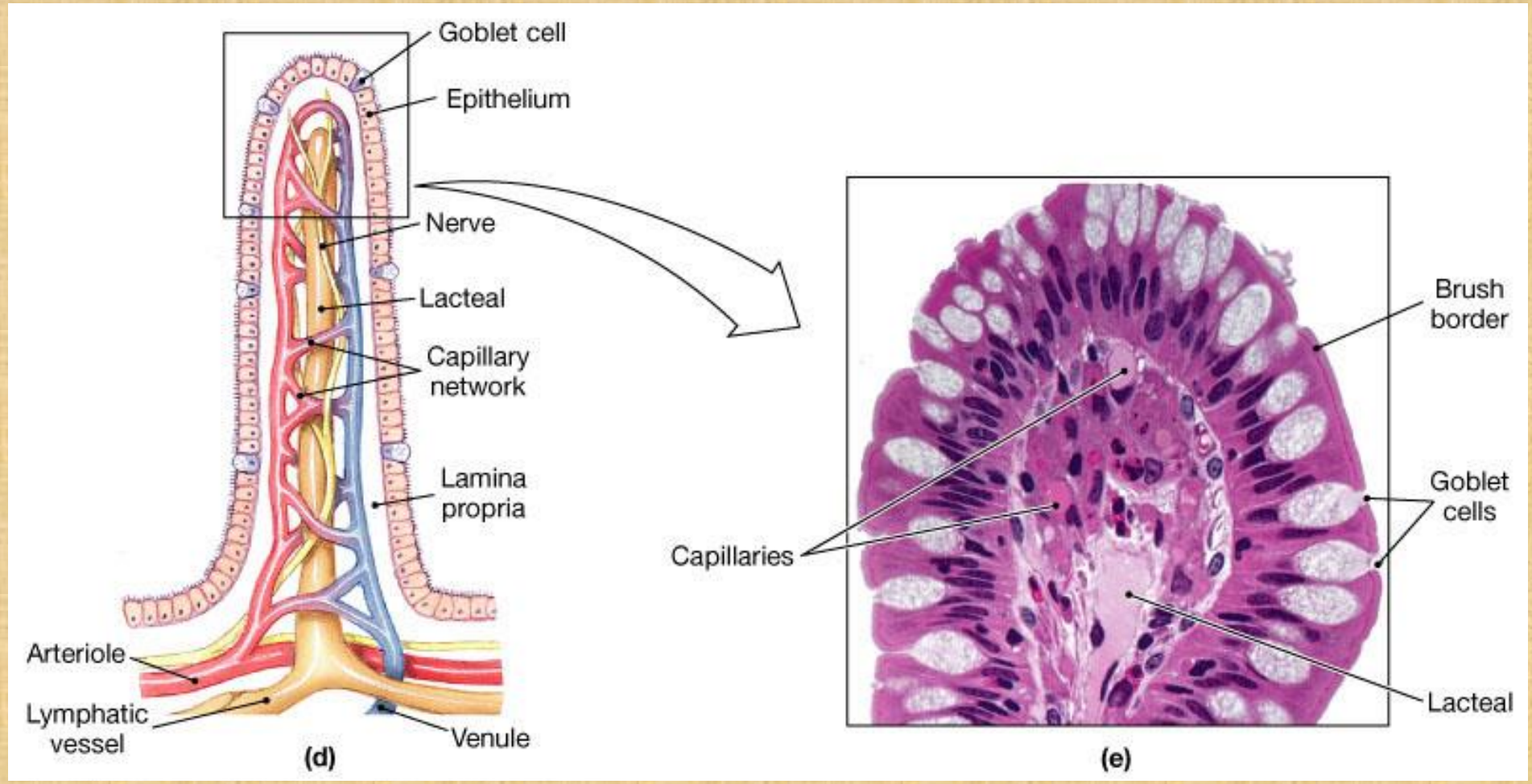
The Intestinal Wall



The Intestinal Wall



The Intestinal Wall



Small Intestine

- Duodenal glands (Brunner's glands)
  - produce mucus, buffers, urogastrone
- Ileum
  - aggregated lymphoid nodules (Peyer's patches)

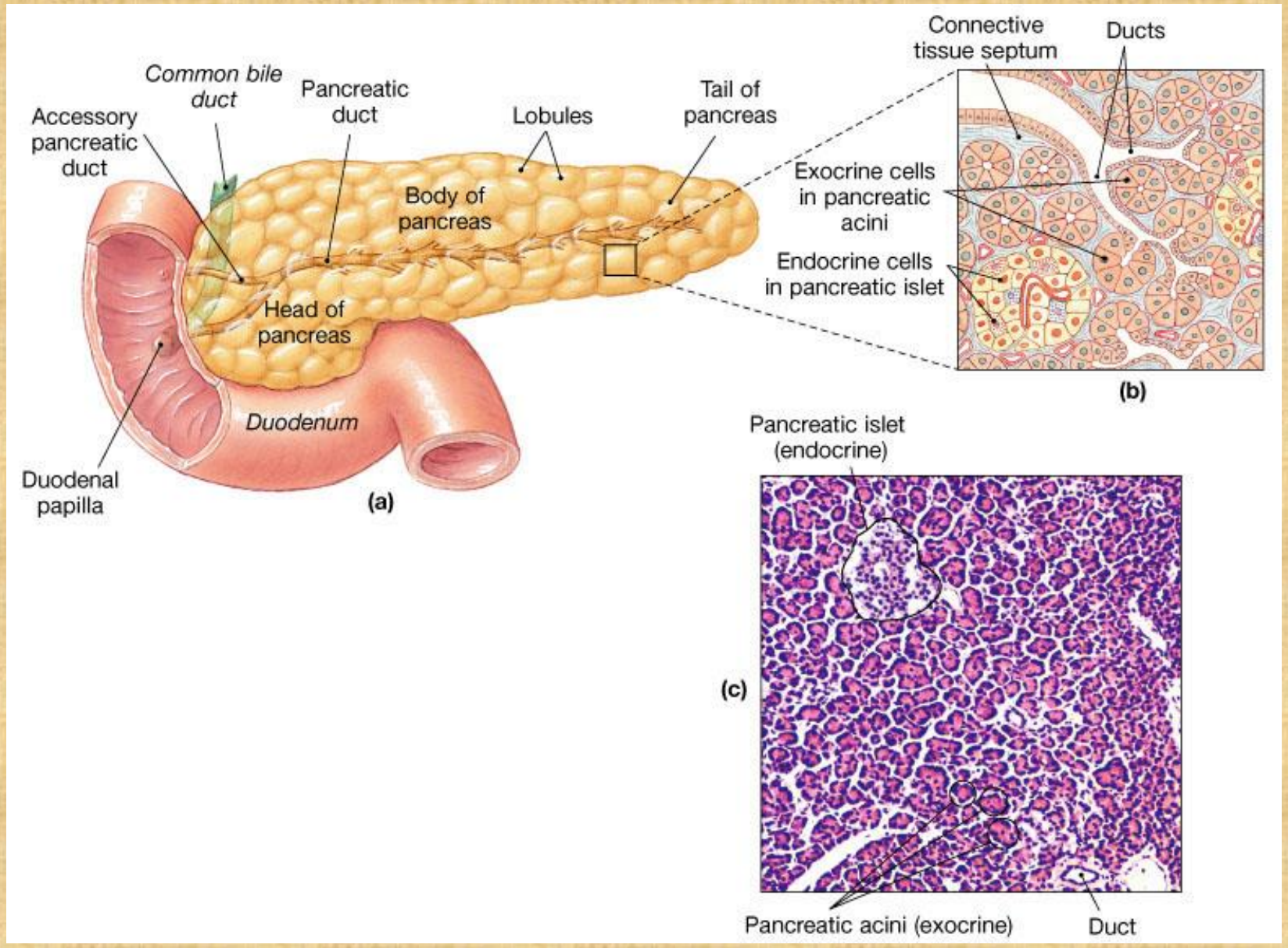
Intestinal movements

- Peristalsis
- Segmentation
- Gastroenteric reflexes
  - Initiated by stretch receptors in stomach
- Gastroileal reflex
  - Triggers relaxation of ileocecal valve

The pancreas

- Pancreatic duct penetrates duodenal wall
- Endocrine functions
  - Insulin and glucagons
- Exocrine functions
  - Majority of pancreatic secretions
  - Pancreatic juice secreted into small intestine
    - Carbohydrases
    - Lipases
    - Nucleases
    - Proteolytic enzymes

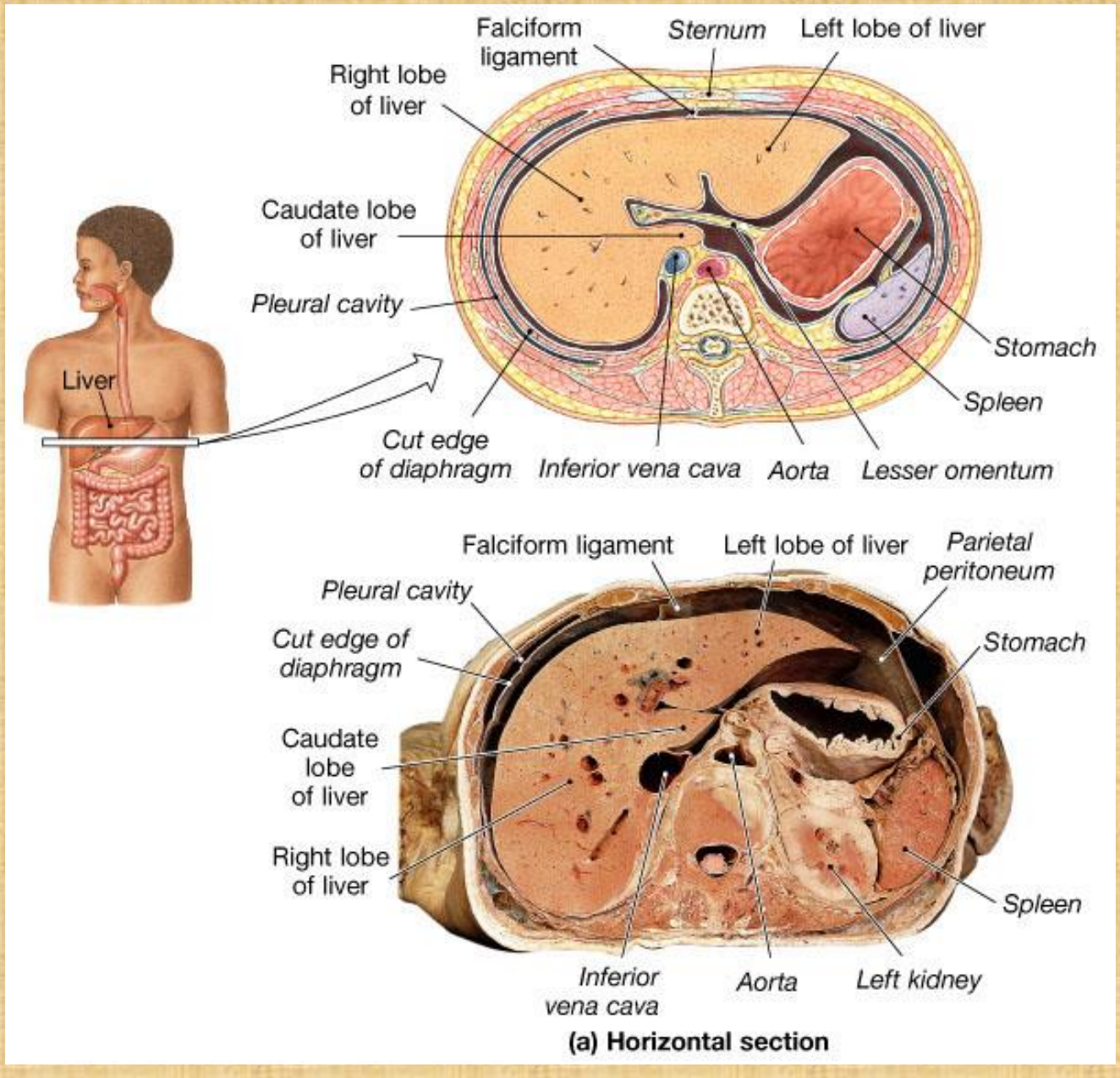
The Pancreas



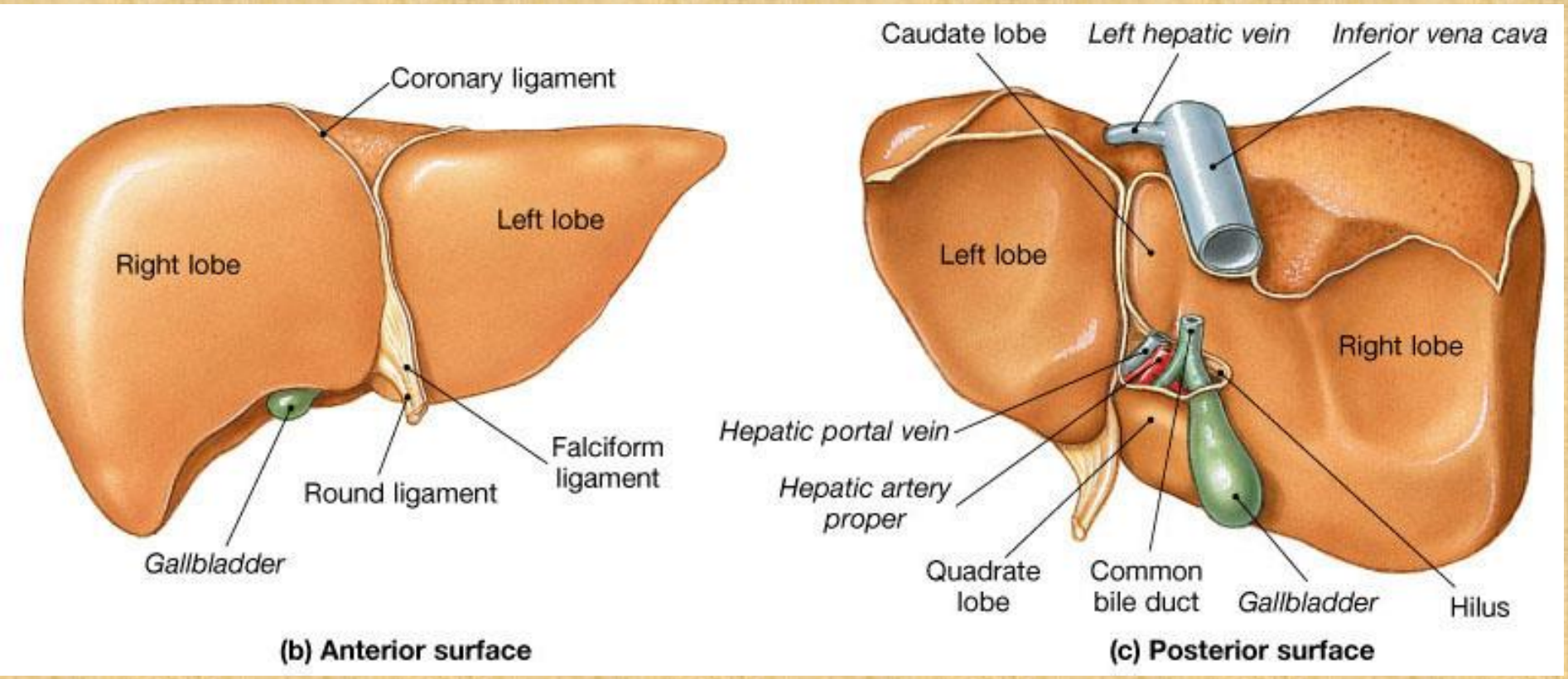
The Liver

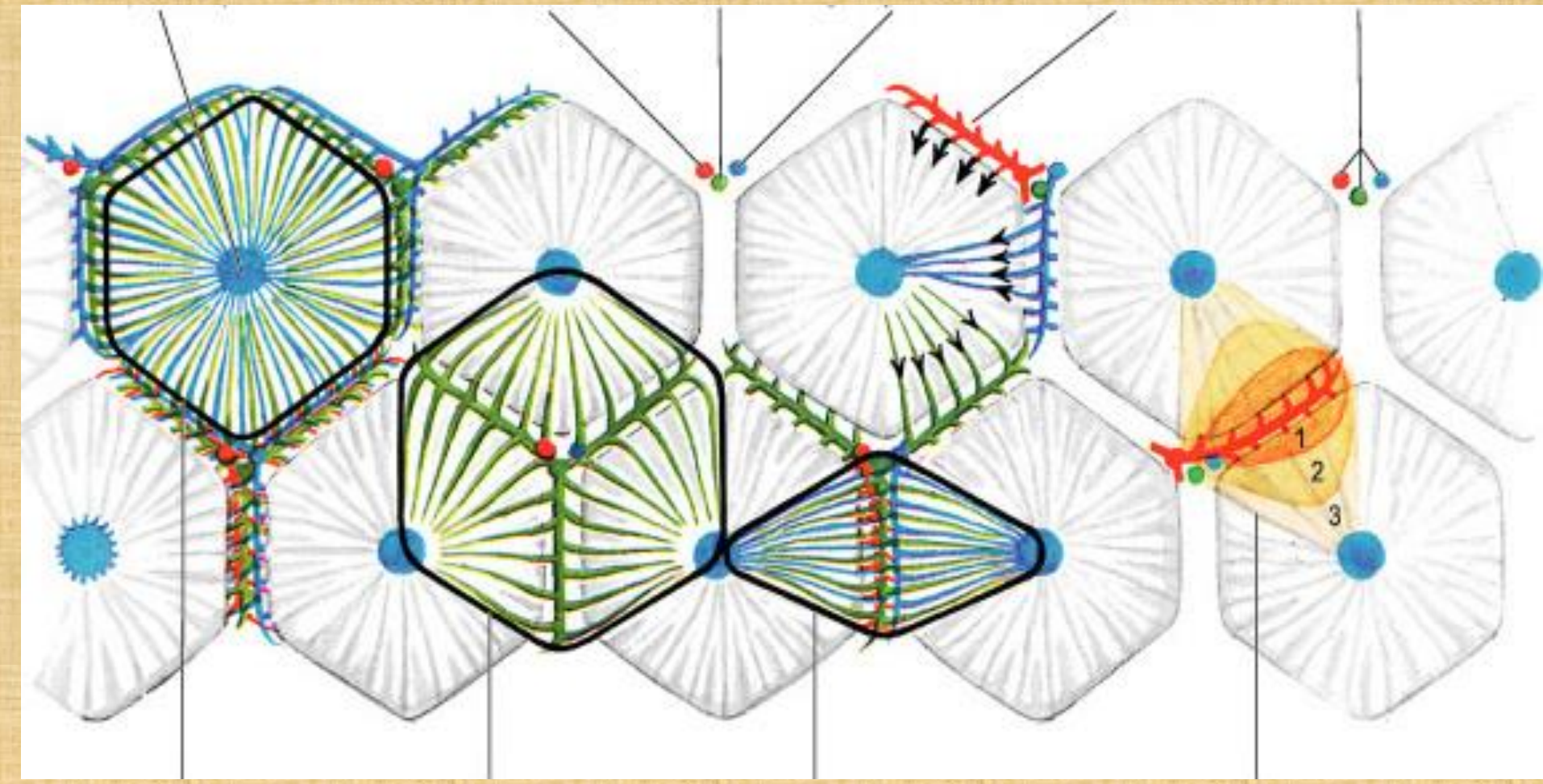
- Performs metabolic and hematological regulation and produces bile
- Histological organization
  - Lobules containing single-cell thick plates of hepatocytes
  - Lobules unite to form common hepatic duct
    - Duct meets cystic duct to form common bile duct

The Anatomy of the Liver



The Anatomy of the Liver

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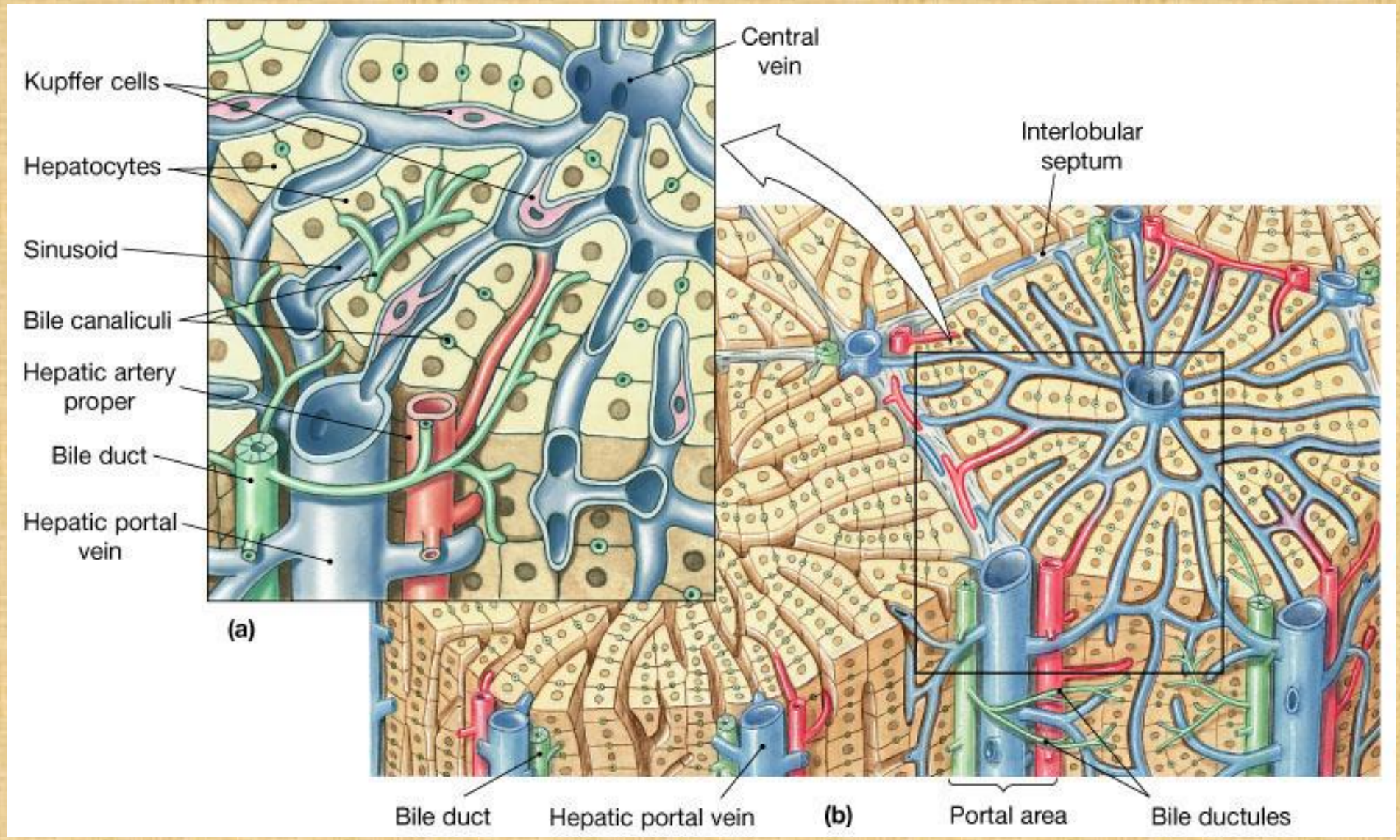
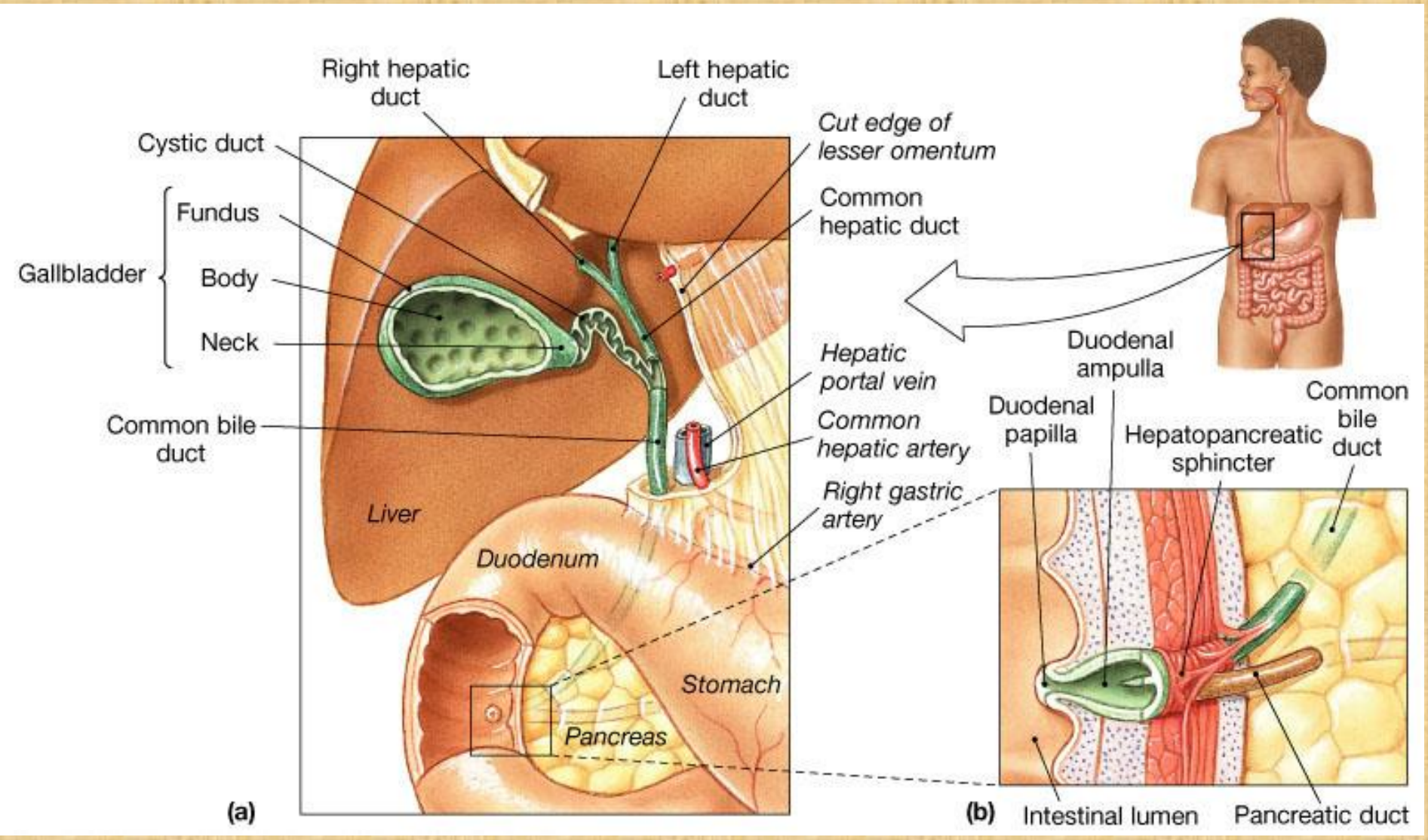
Liver Histology



The gallbladder

- Hollow, pear-shaped organ
- Stores, modifies and concentrates bile

The Gallbladder



Functions of the large intestine

- Reabsorb water and compact material into feces
- Absorb vitamins produced by bacteria
- Store fecal matter prior to defecation

The Large Intestine

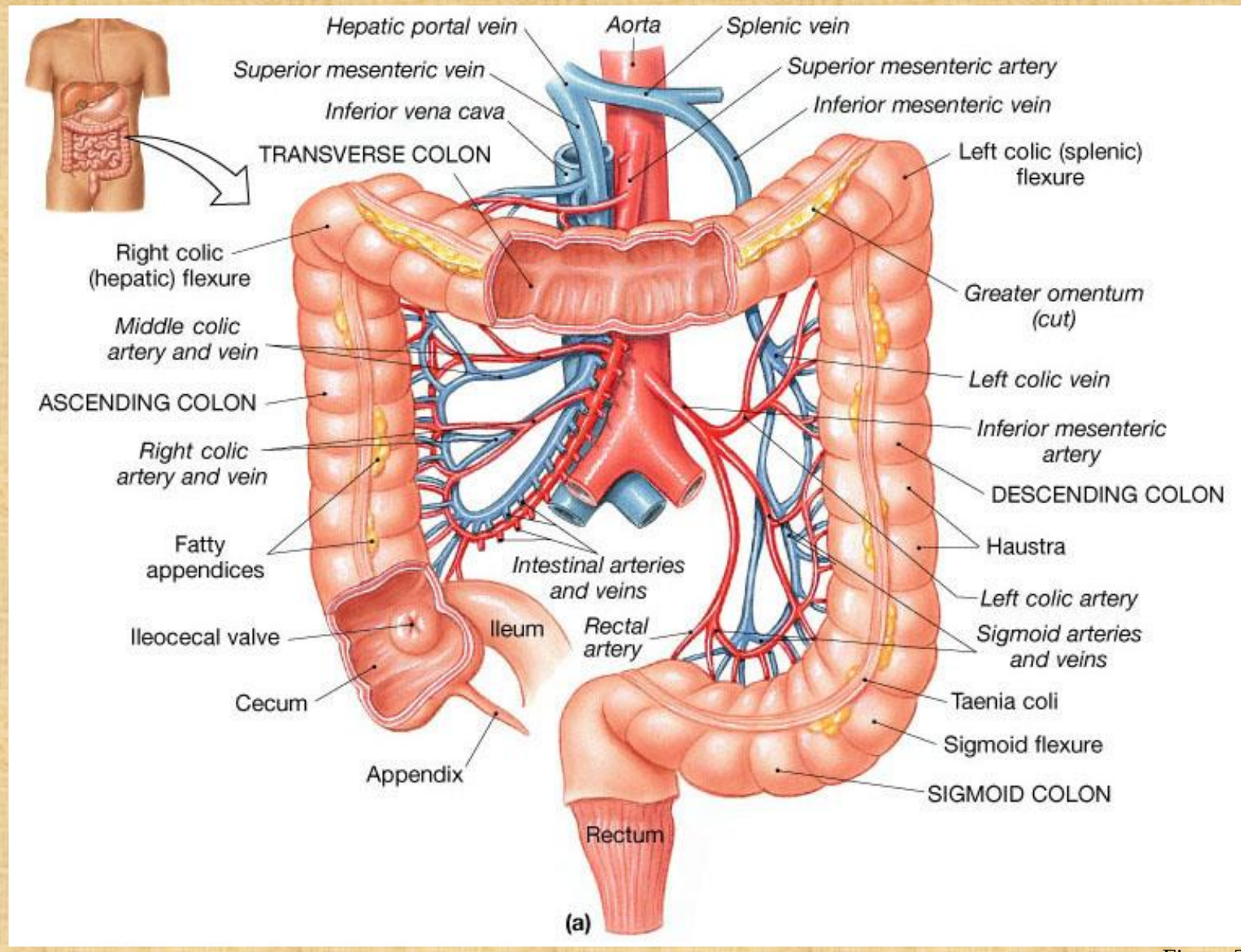
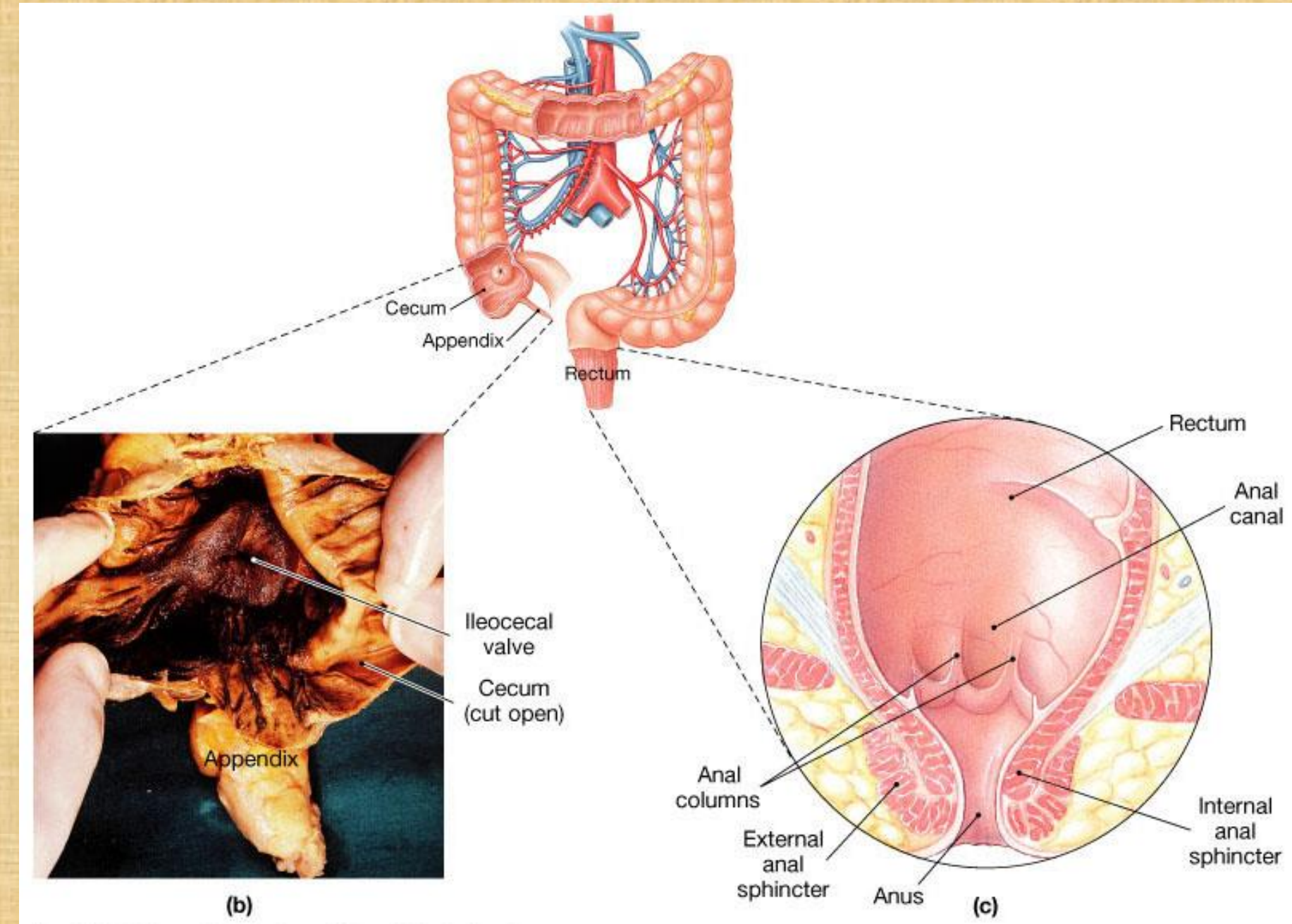
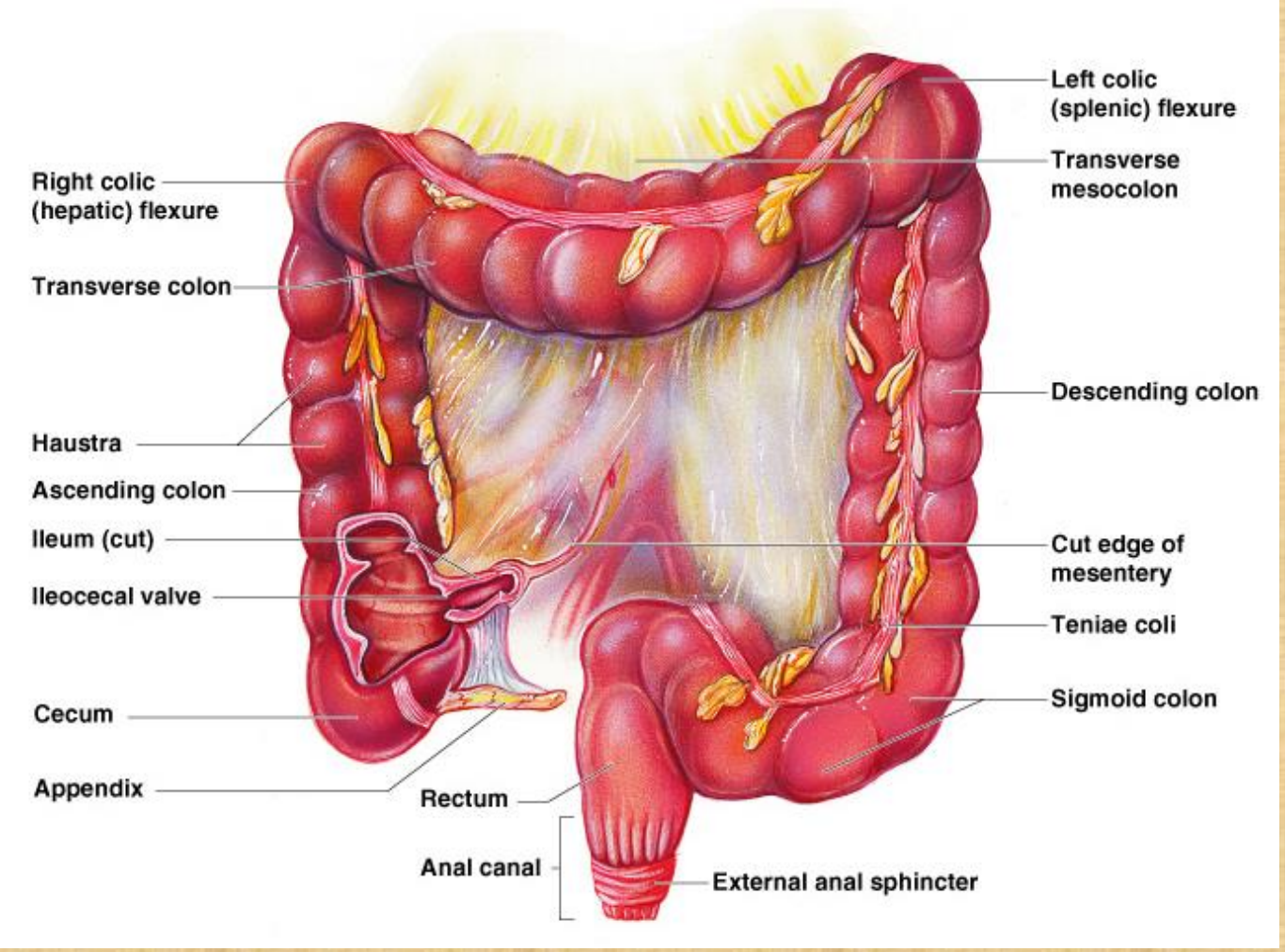
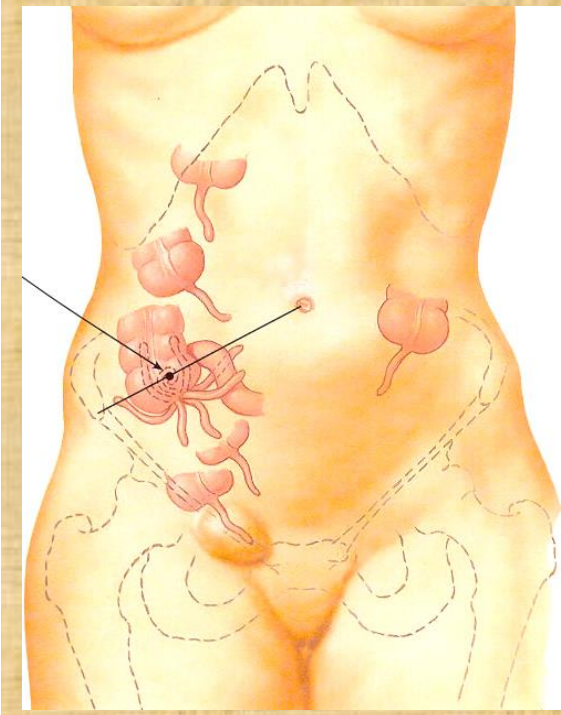


Figure 24.23a

The Large Intestine

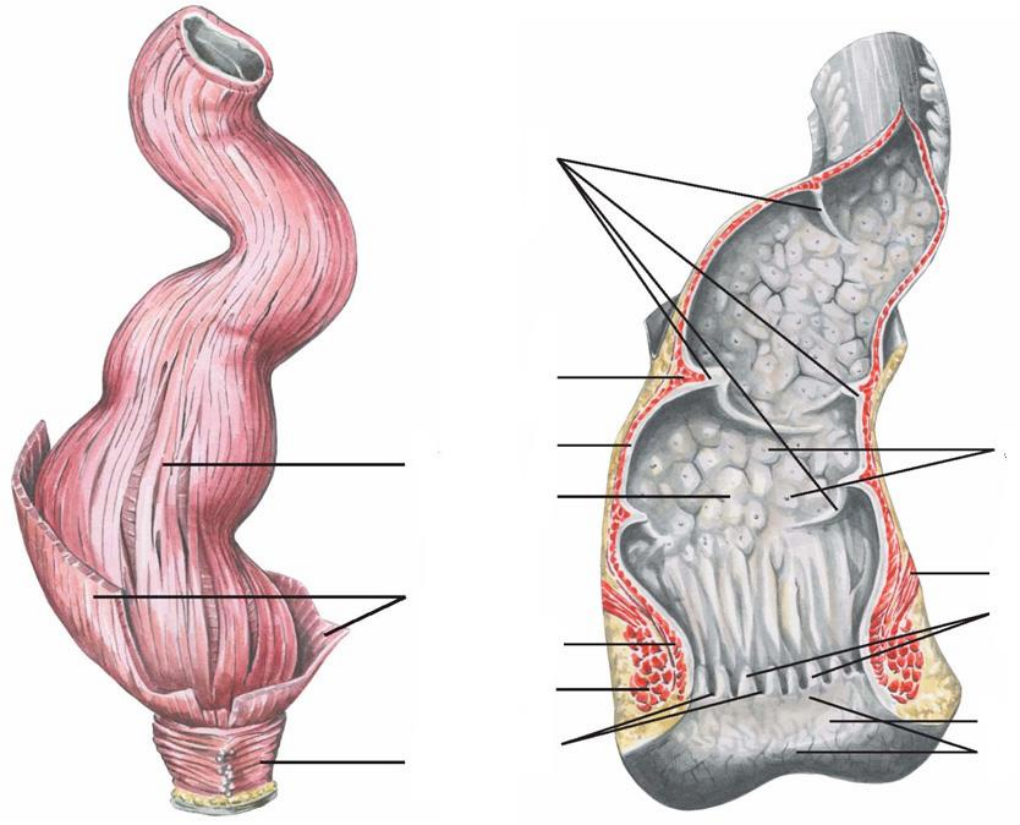



Left colic (splenic) flexure
Transverse mesocolon
Right colic (hepatic) flexure
Transverse colon
Descending colon
Haustra
Ascending colon
Ileum (cut)
Cut edge of mesentery
Ileocecal valve
Teniae coli
Sigmoid colon
Cecum
Appendix
Rectum
Anal canal
External anal sphincter



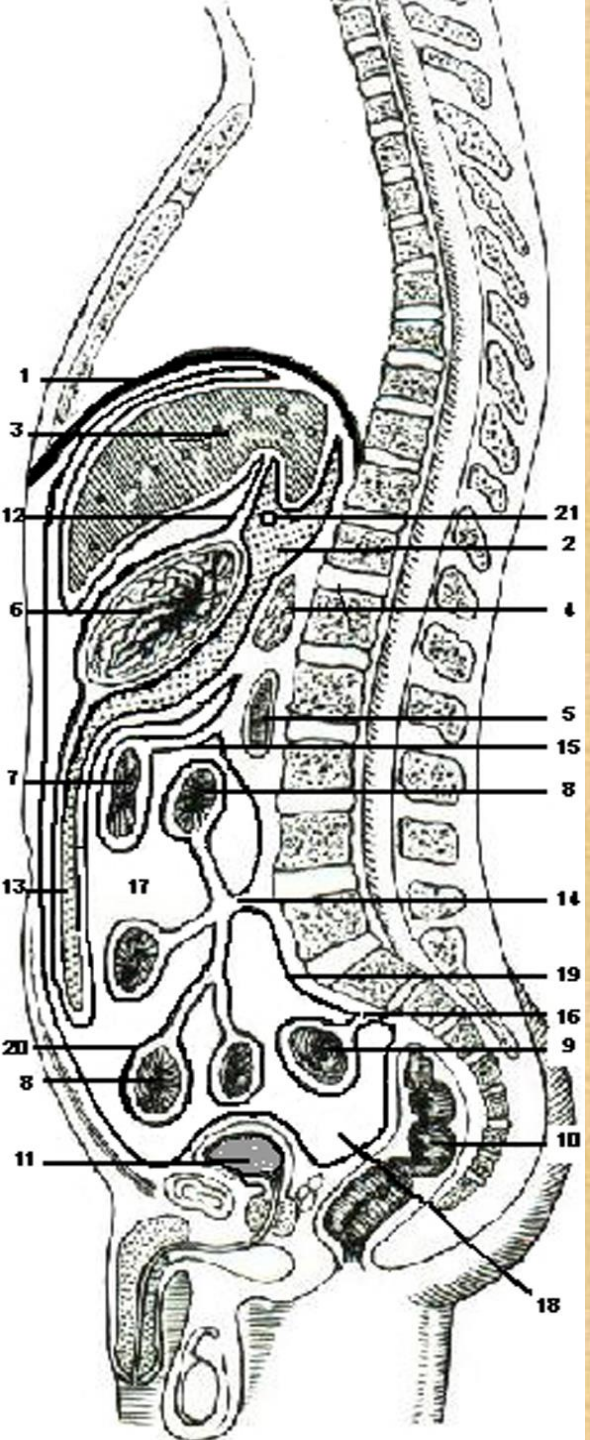
The rectum

- Last portion of the digestive tract
- Terminates at the anal canal
- Internal and external anal sphincters



Histology of the large intestine

- Absence of villi
- Presence of goblet cells
- Deep intestinal glands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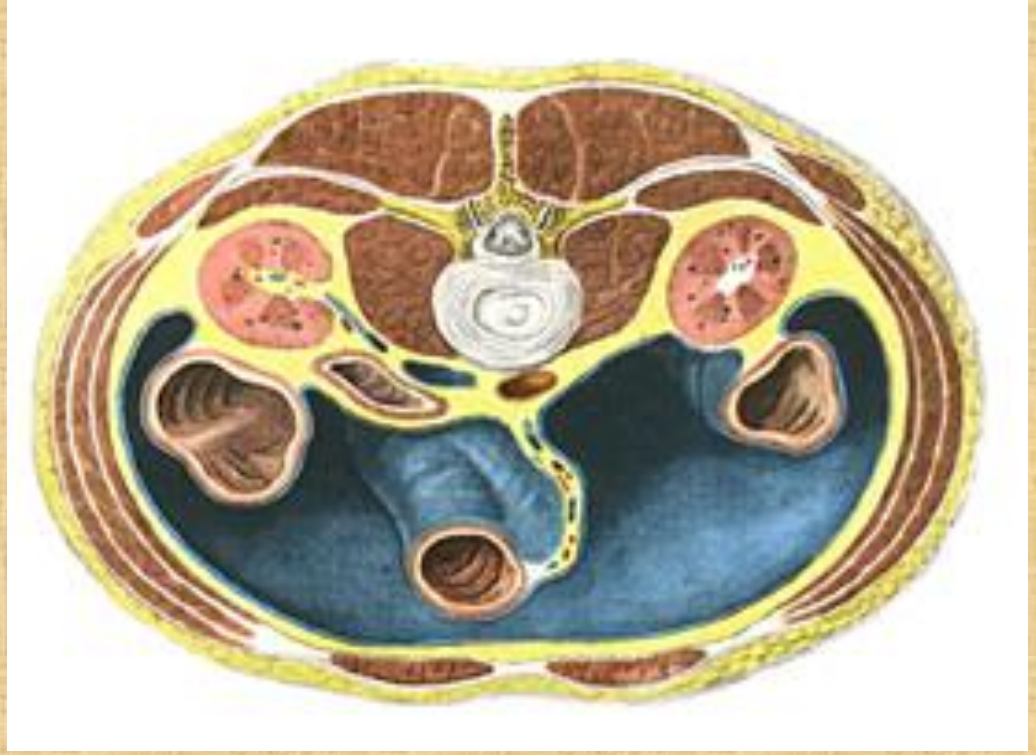


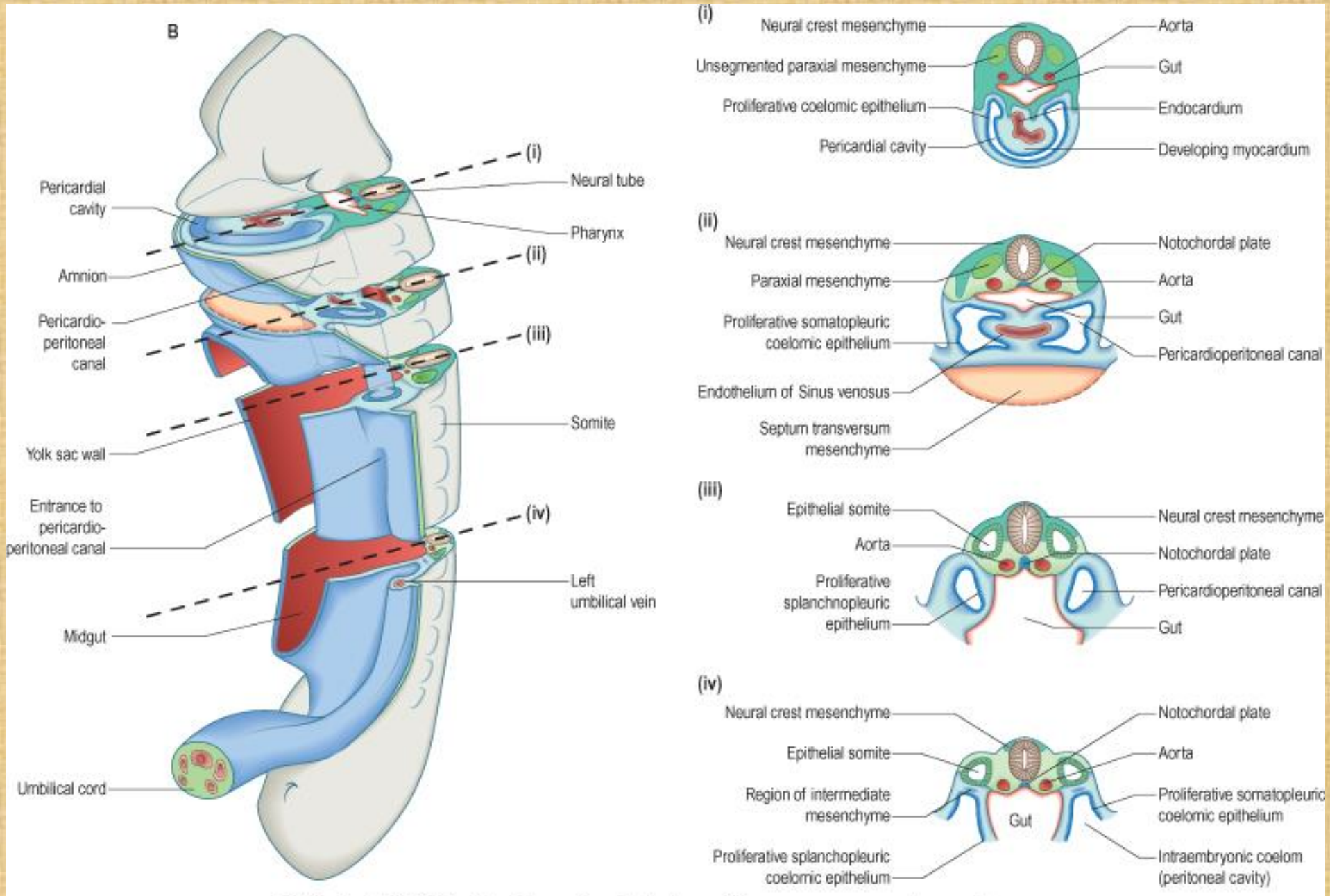
THE DEVELOPMENT OF THE DIGESTIVE SYSTEM

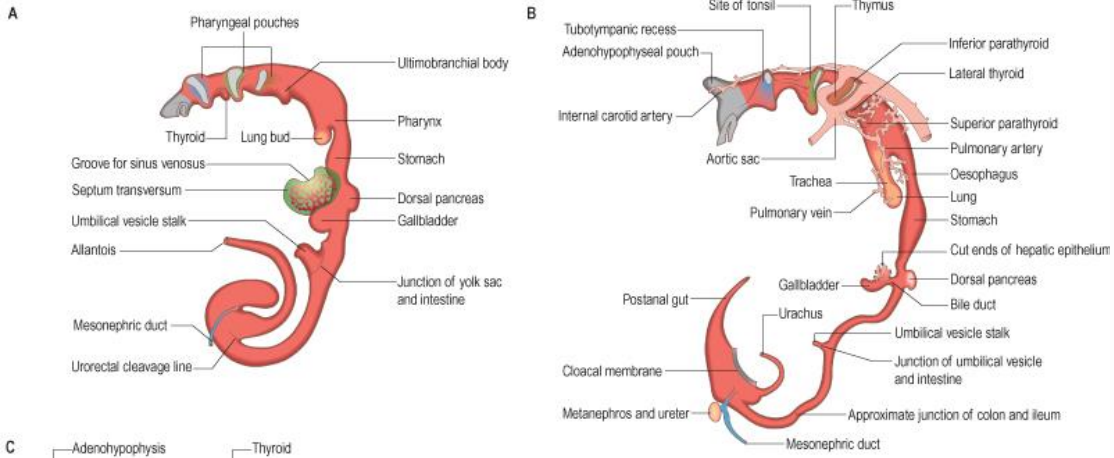
The digestive tube derives from the primitive gut. As a result of cephalocaudal and lateral folding of the embryo, a portion of the endoderm-lined yolk sac cavity is incorporated into the embryo to form the **primitive gut**. Two other portions of the endoderm-lined cavity, the yolk sac and the allantois, remain outside the embryo.

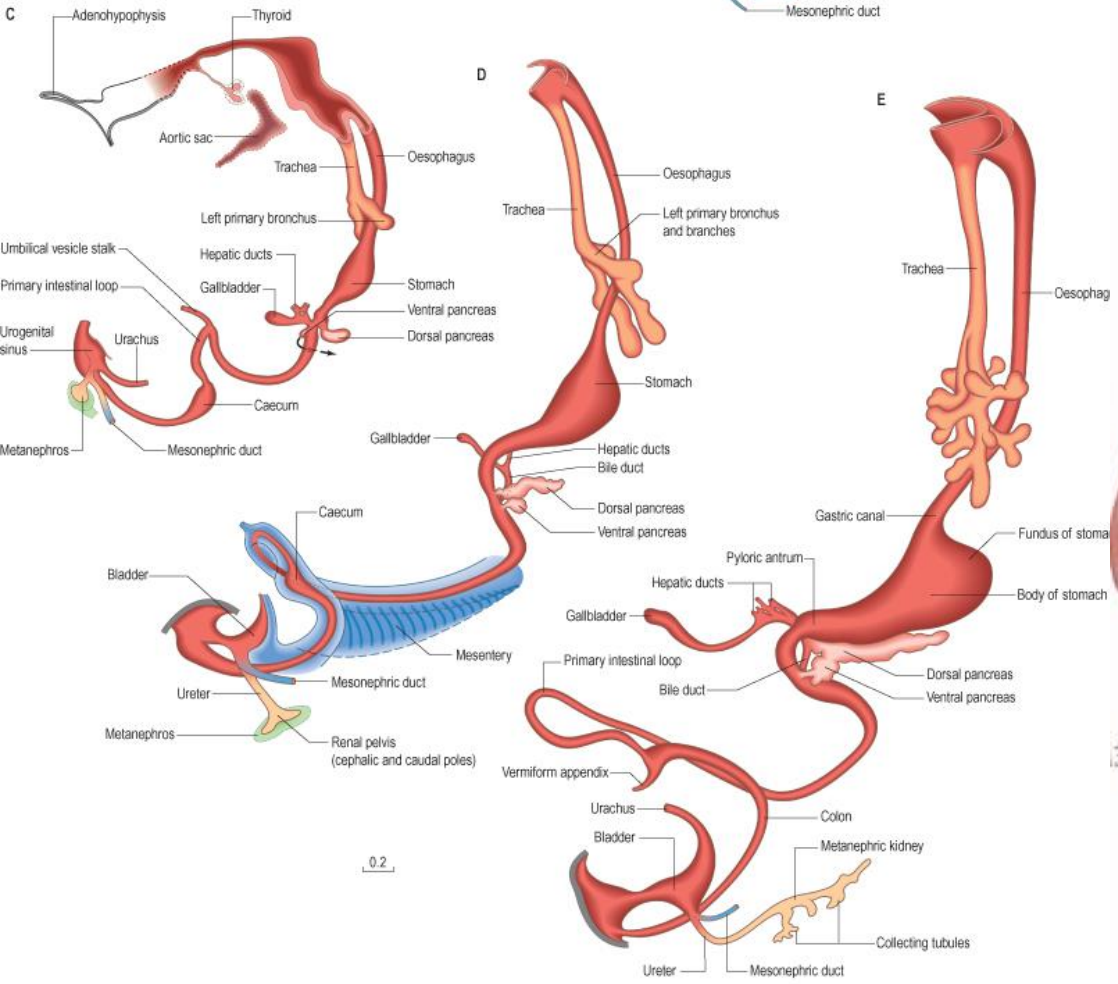
In the cephalic and caudal parts of the embryo, the primitive gut forms a blind-ending tube, the foregut and hindgut, respectively. The middle part, the midgut, remains temporary connected to the yolk sac by means of the viteline duct, or yolk stalk.

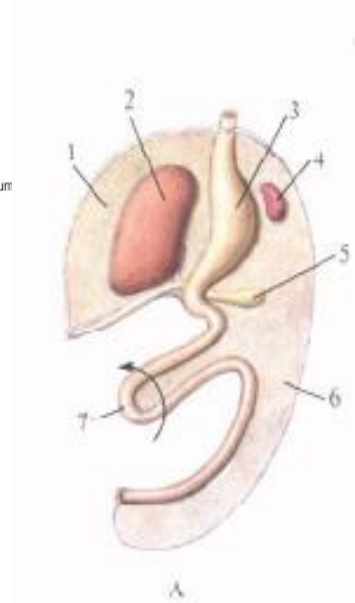
Development of the primitive gut and its derivatives:

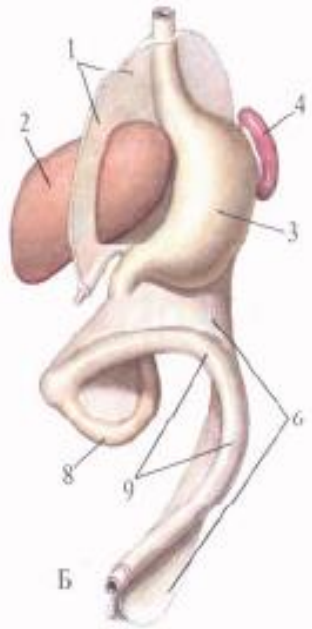
- The **pharyngeal gut**, or pharynx, extends from the bucopharyngeal membrane to the tracheobronchial diverticulum;
- The **foregut** lies caudal to the pharyngeal tube and extends as far caudally as the liver outgrowth;
- The **midgut** begins caudal to the liver bud and extends to the junction of the right two-thirds and left third of the transverse colon in the adult;
- The **hindgut** extends from the left third of the transverse colon to the cloacal membrane.

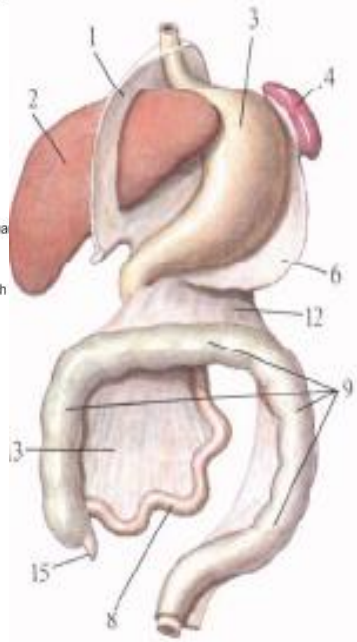


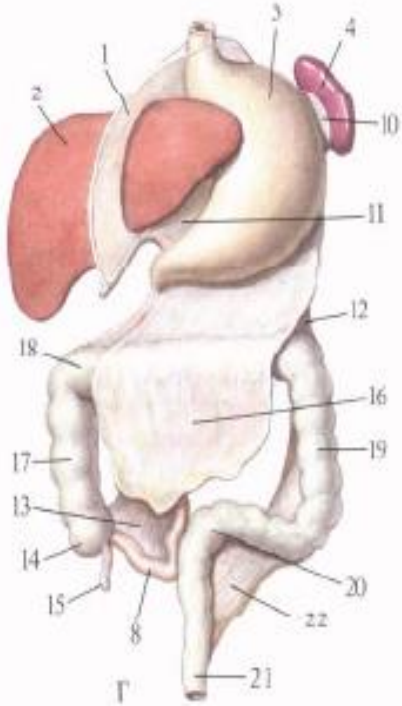












VĂ MULȚUMESC PENTRU ATENȚIE!