

# The State Medical and Pharmaceutical University “Nicolae Testemițanu”



## **Peritoneum. Development of the Digestive System**

Department of Human Anatomy

Lecturer Dr. Globa Lilian

# Plan

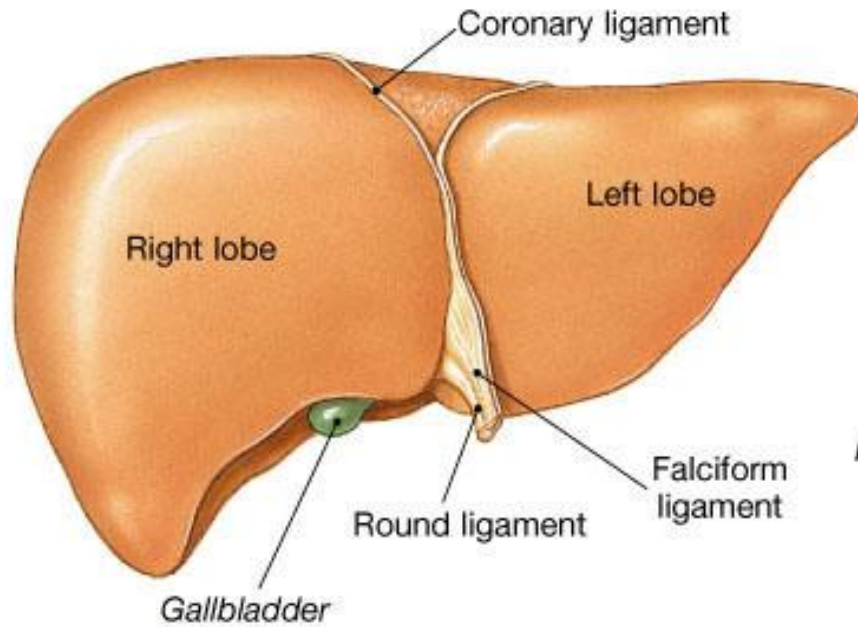


- Liver & Pancreas
  - Peritoneum
- Development of the Digestive System

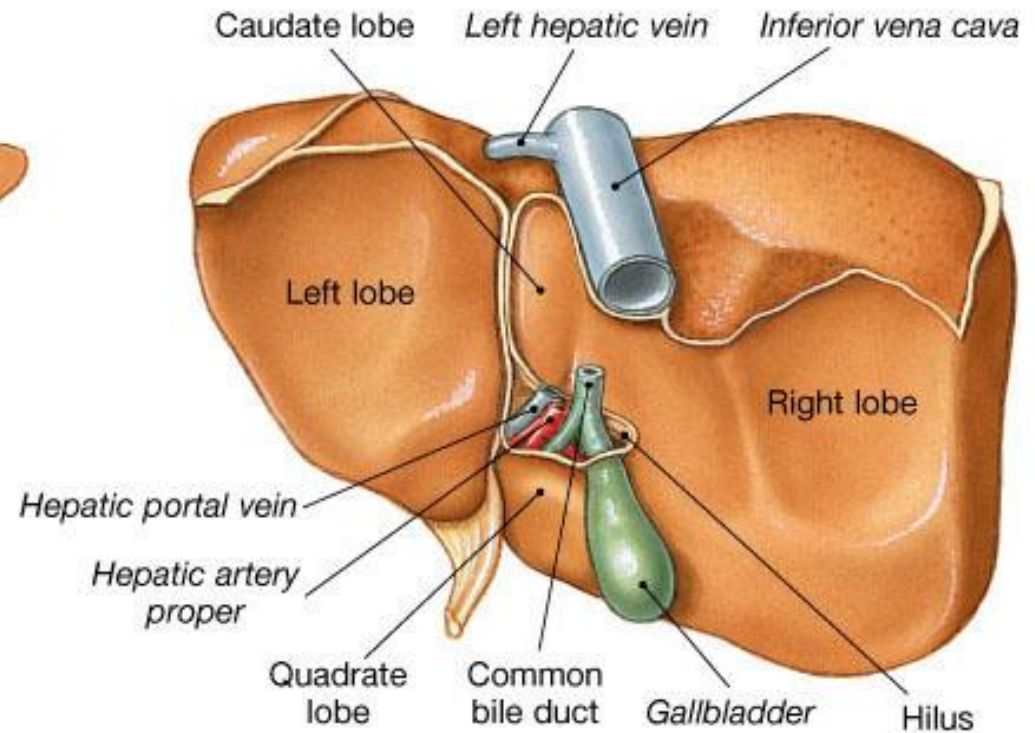
# The Liver

- Performs metabolic and hematological regulation and produces bile
- Histological organization morpho-functional unit
  - ▣ **Lobule** 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

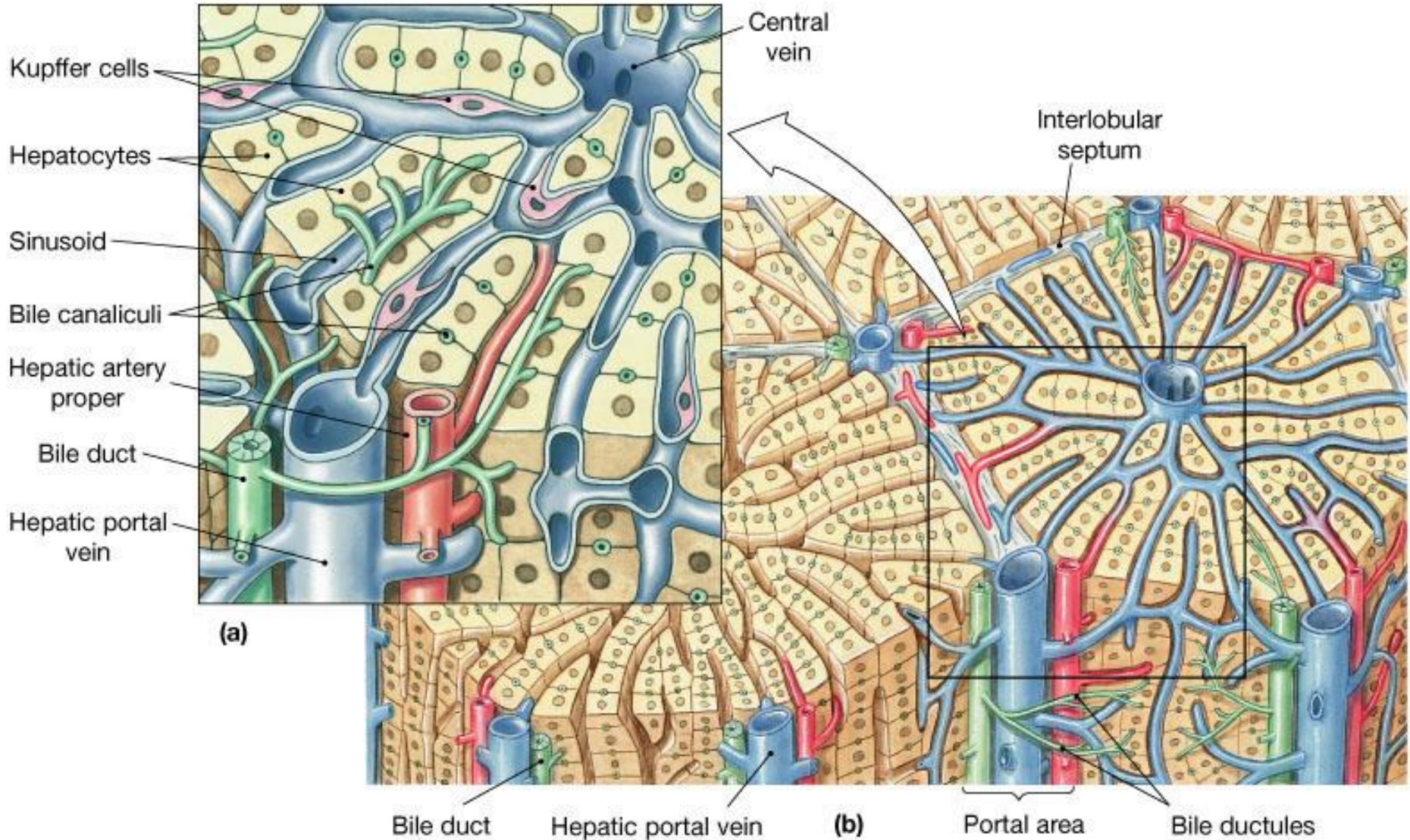


**(b) Anterior surface**

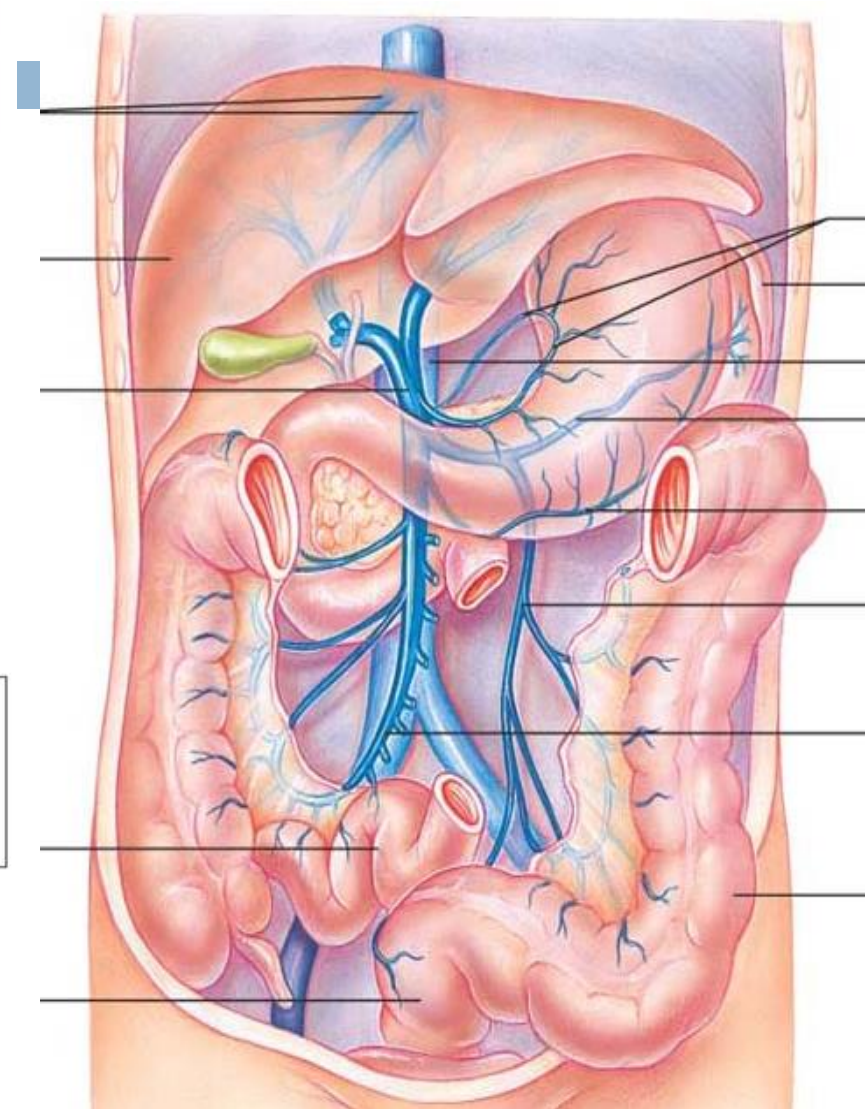
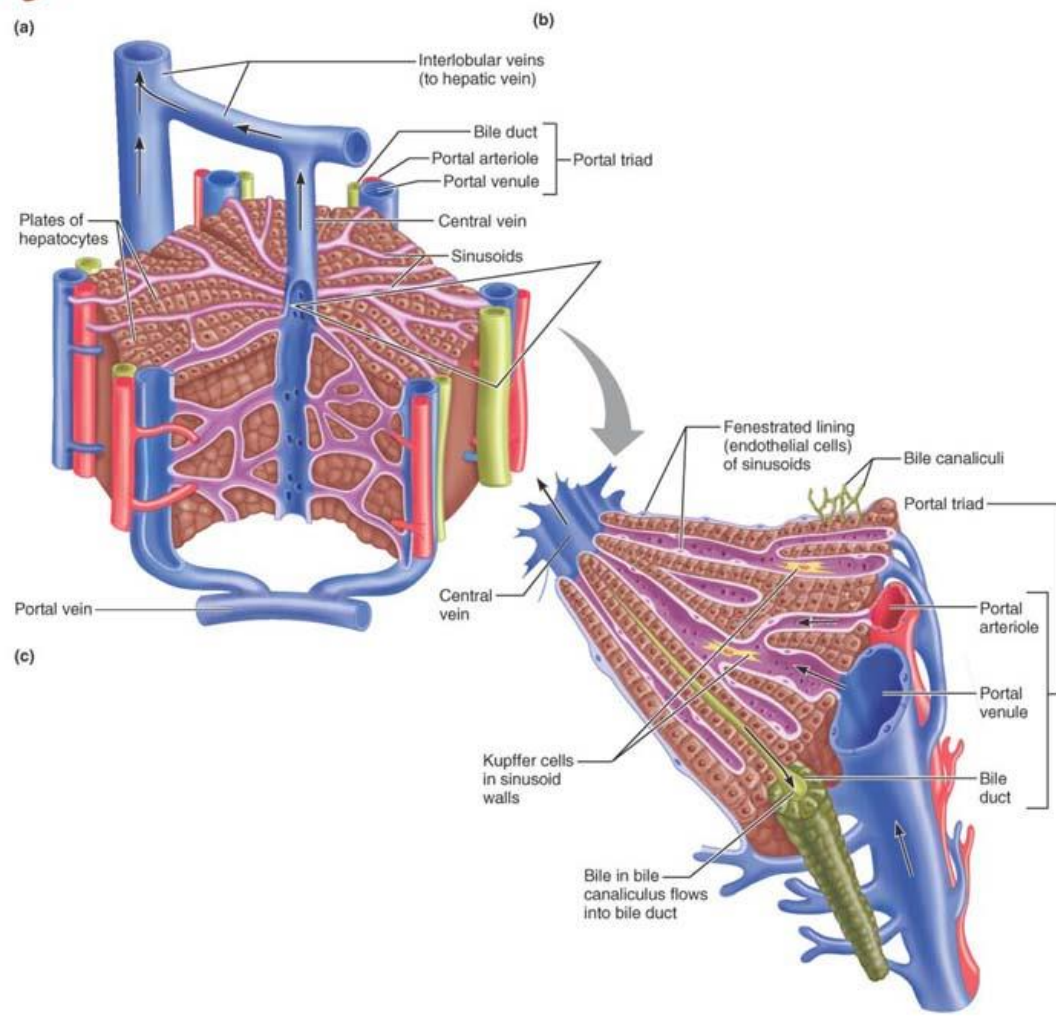
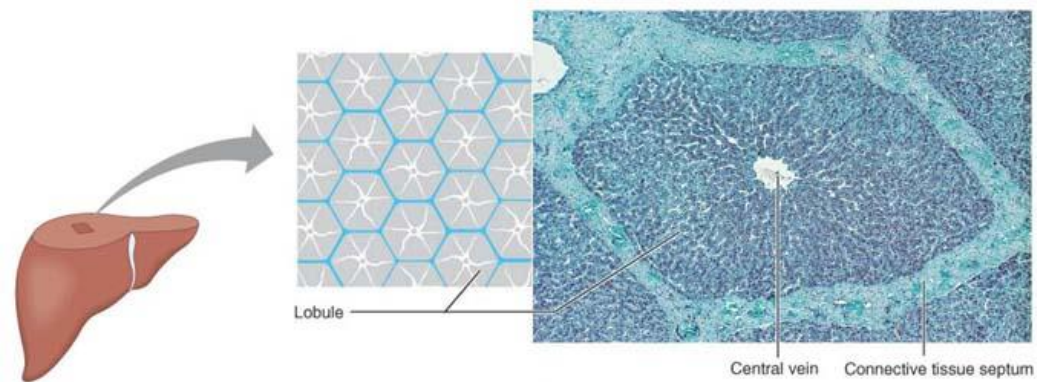


**(c) Posterior surface**

# Liver Histology



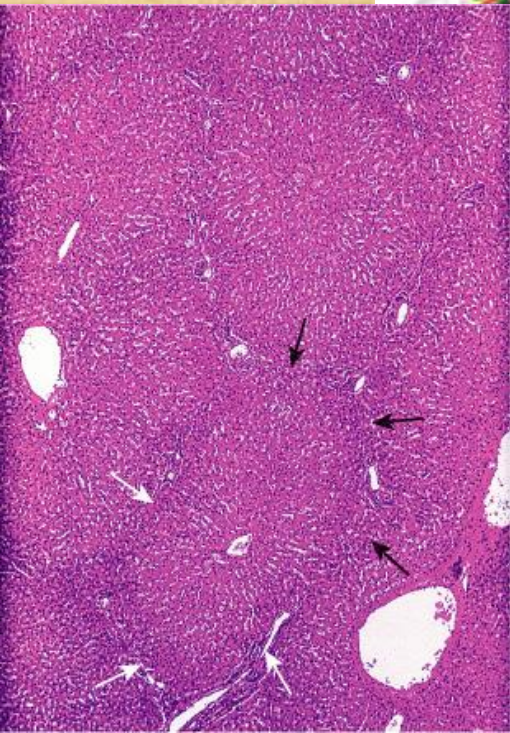
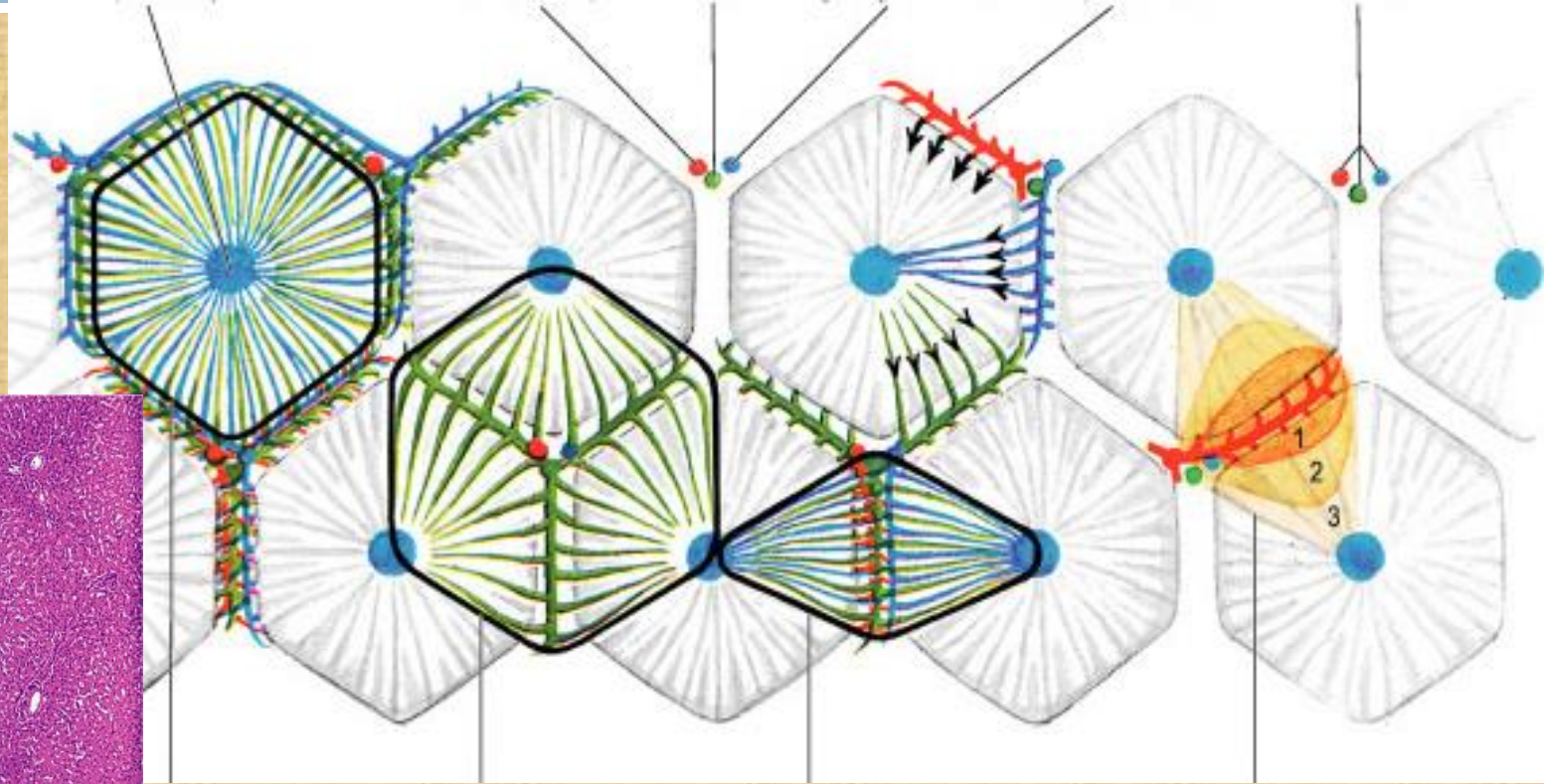




(d)



# Hepatic Lobul, Portal Lobul, Hepatic Acinus

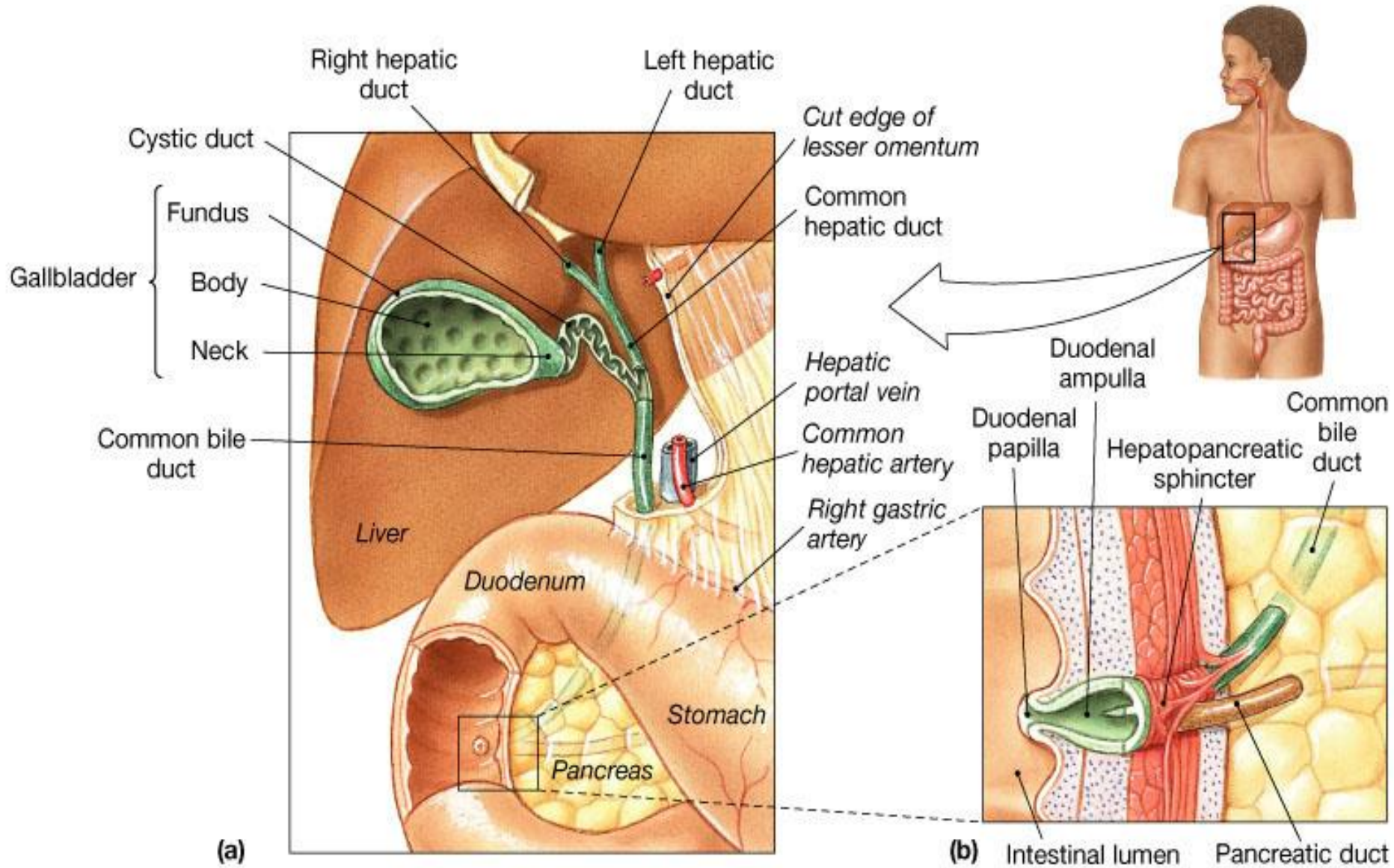


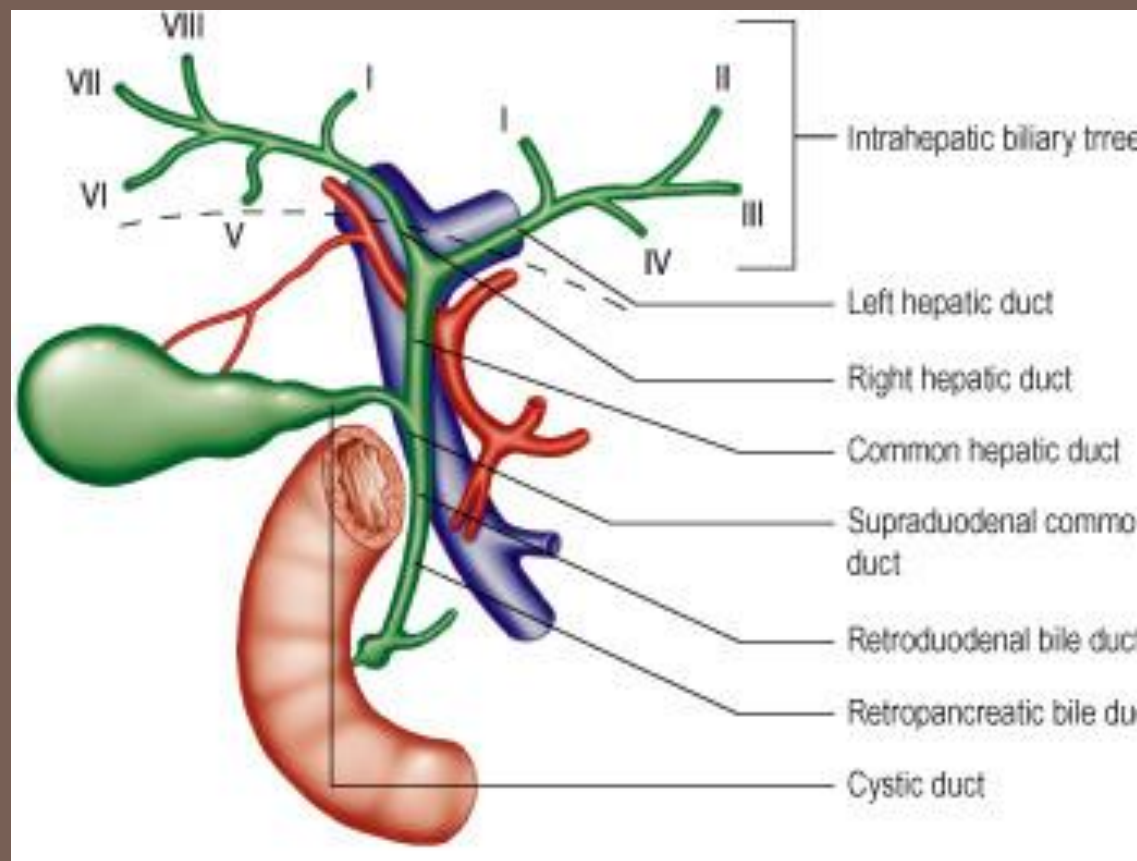
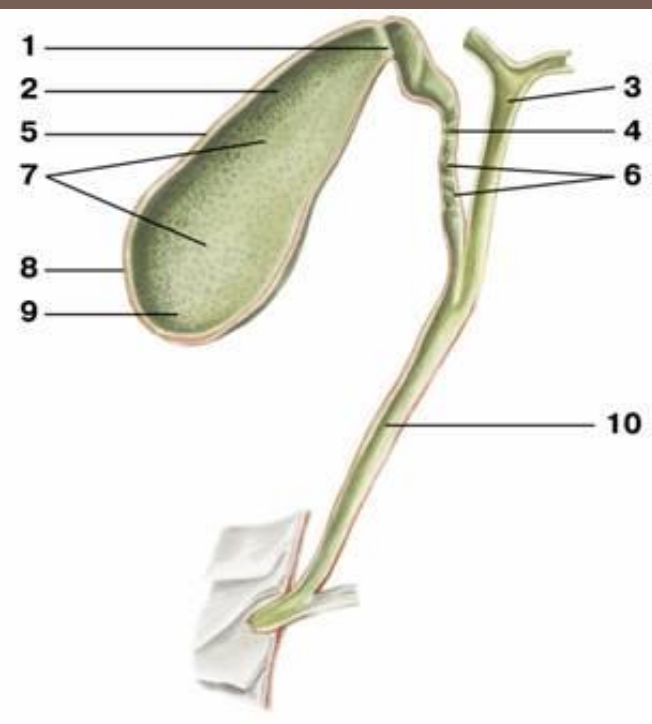
# The gallbladder

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



# The Gallbladder and Extrahepatic bile ducts



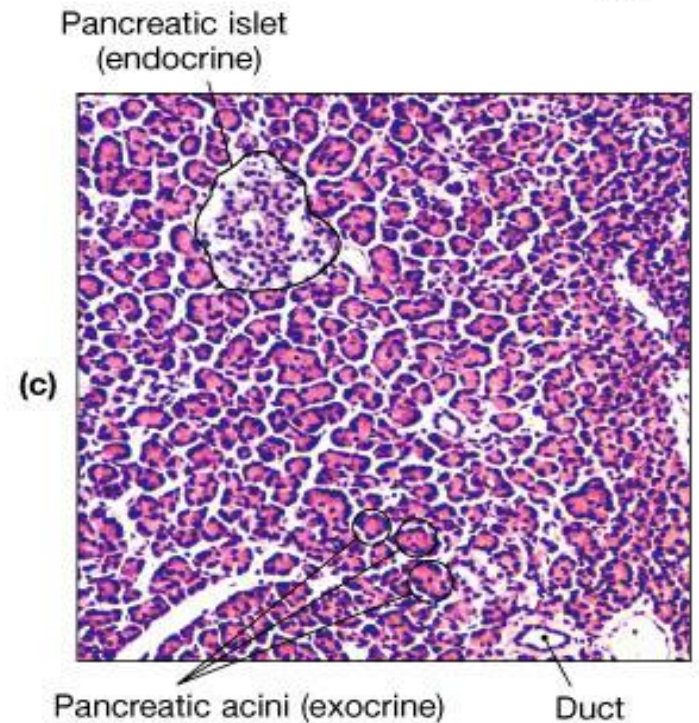
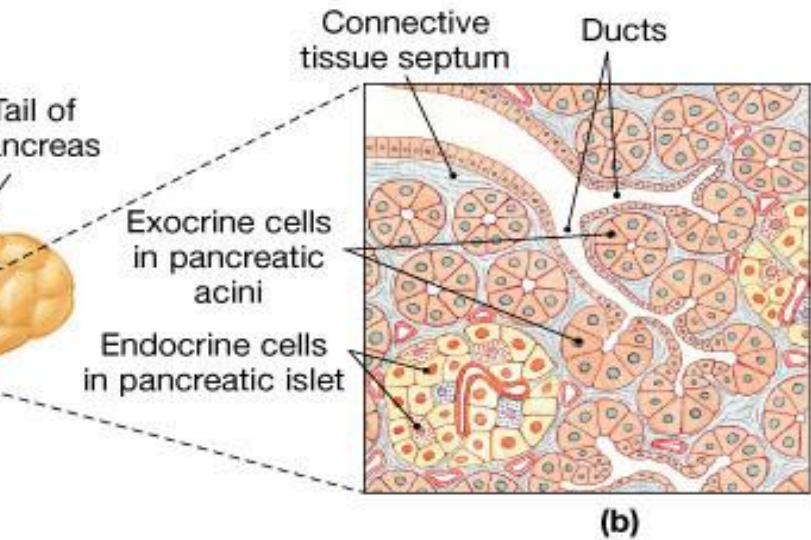
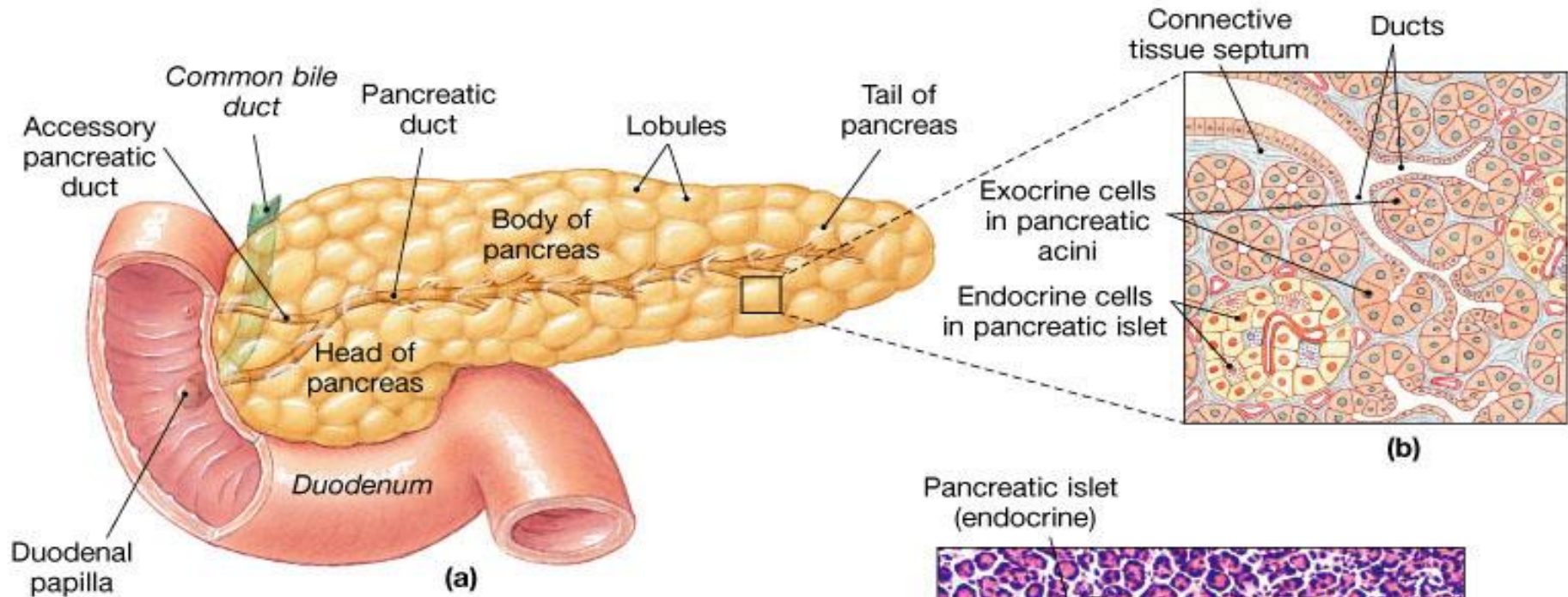


# The pancreas

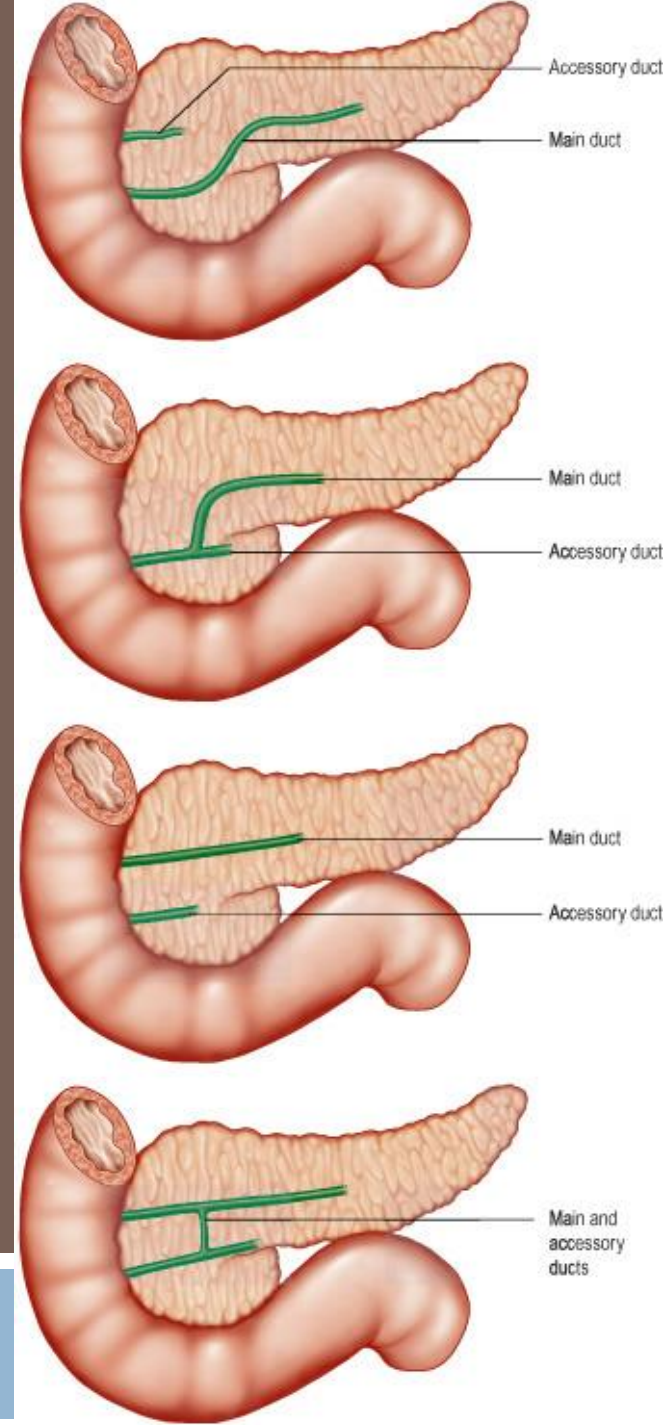
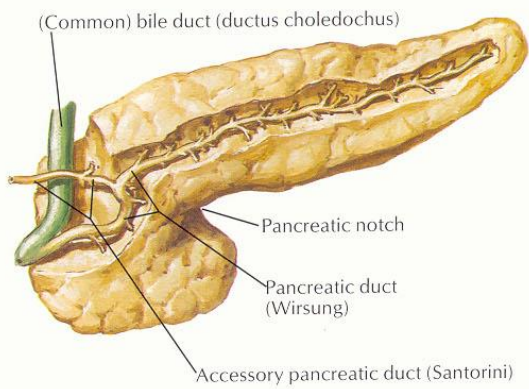
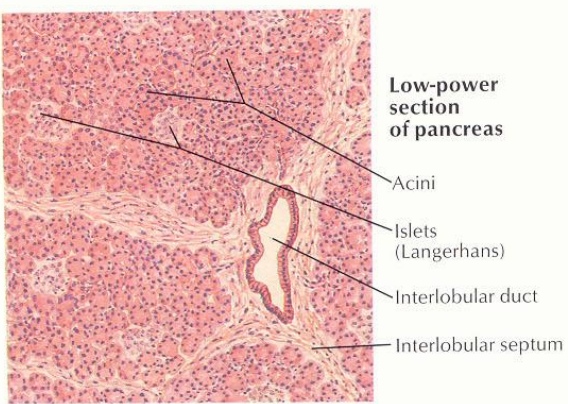
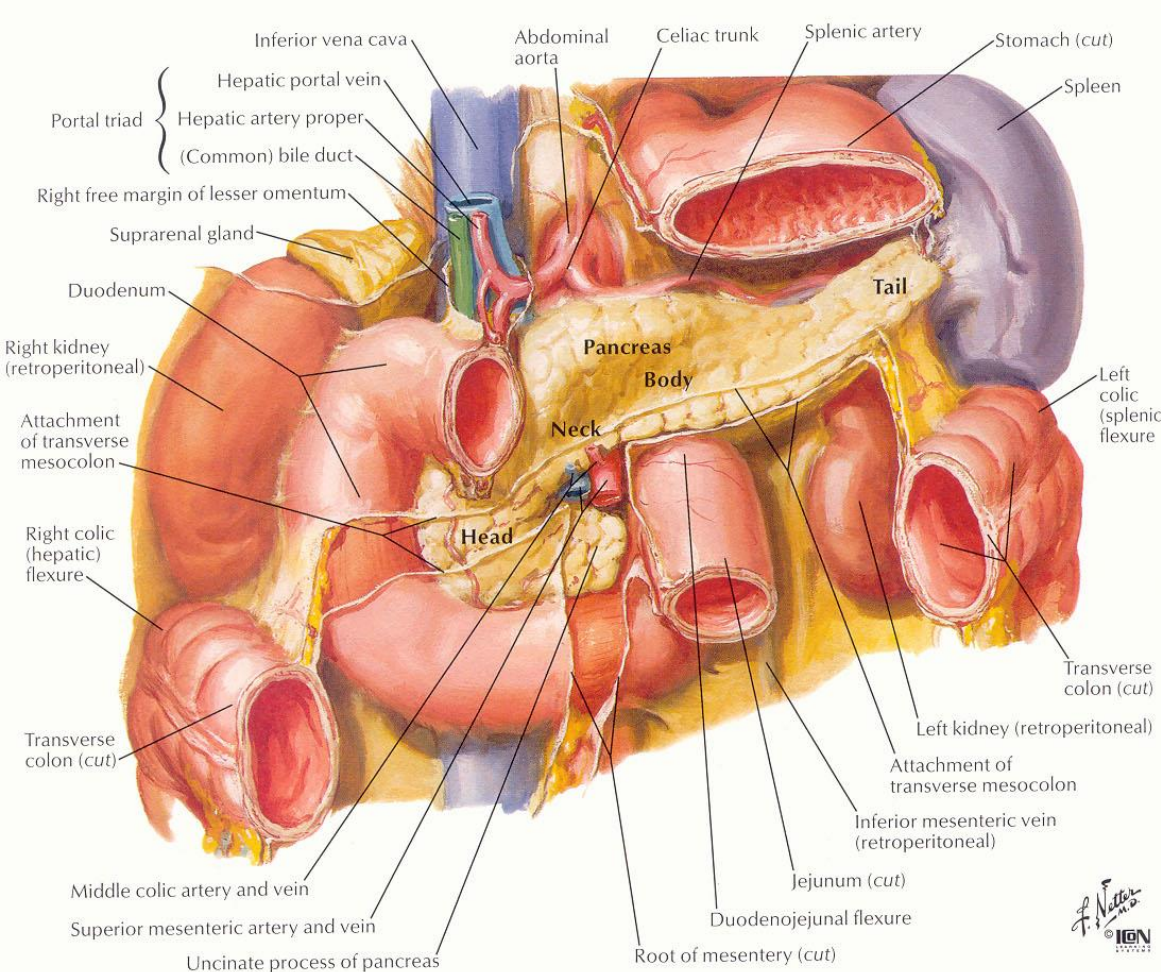
- Pancreatic duct penetrates duodenal wall
- Exocrine functions
  - ▣ Majority of pancreatic secretions
  - ▣ Pancreatic juice secreted into small intestine
    - Carbohydrases
    - Lipases
    - Nucleases
    - Proteolytic enzymes
- Endocrine functions
  - ▣ Insulin and glucagon.



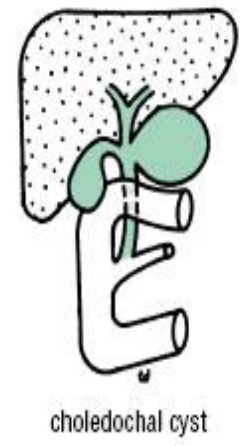
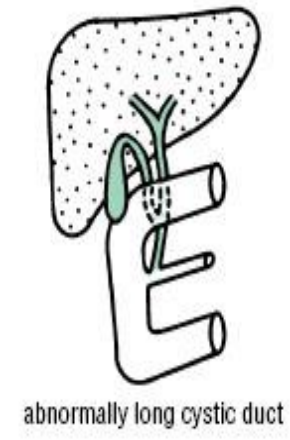
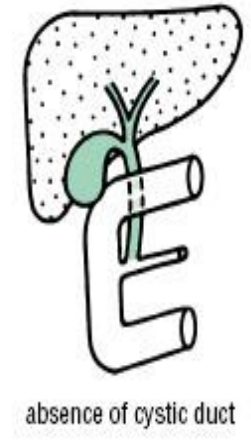
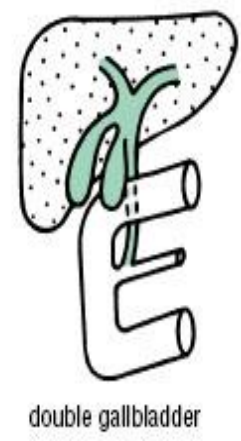
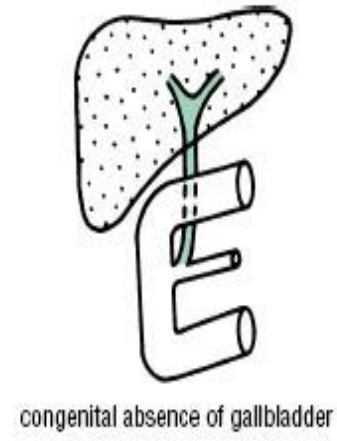
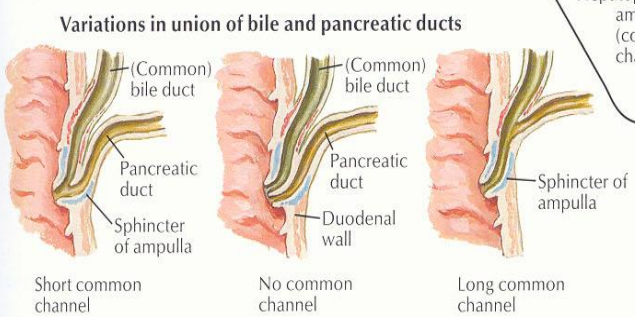
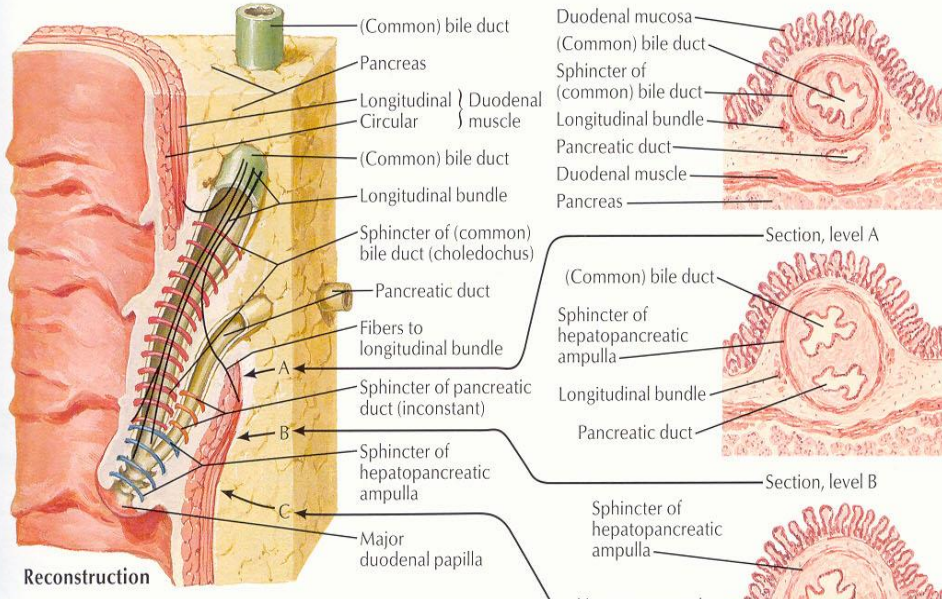
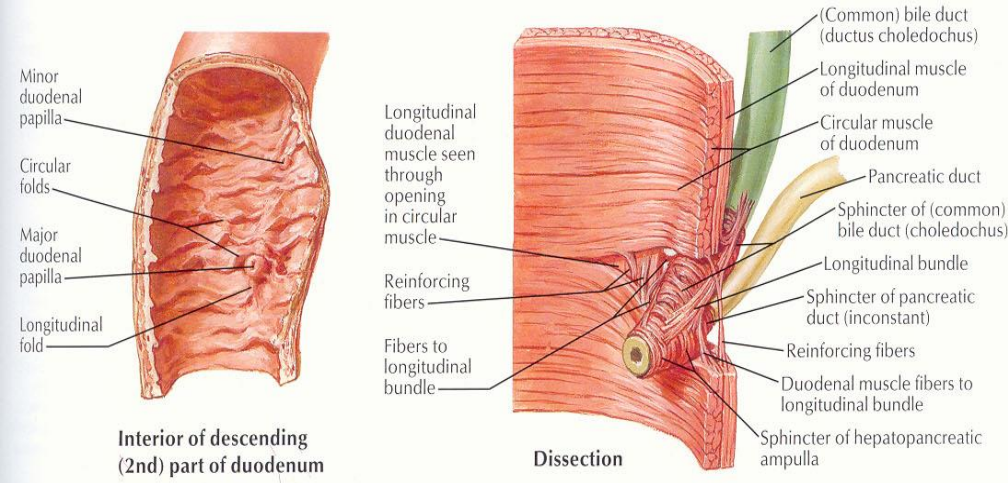
# The Pancreas





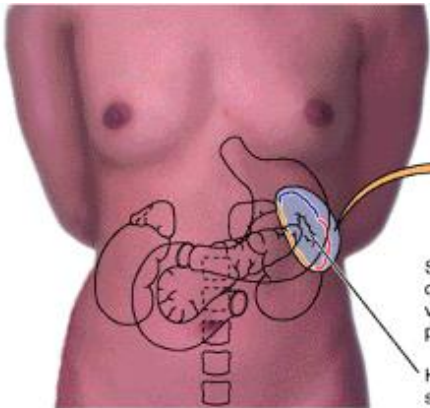




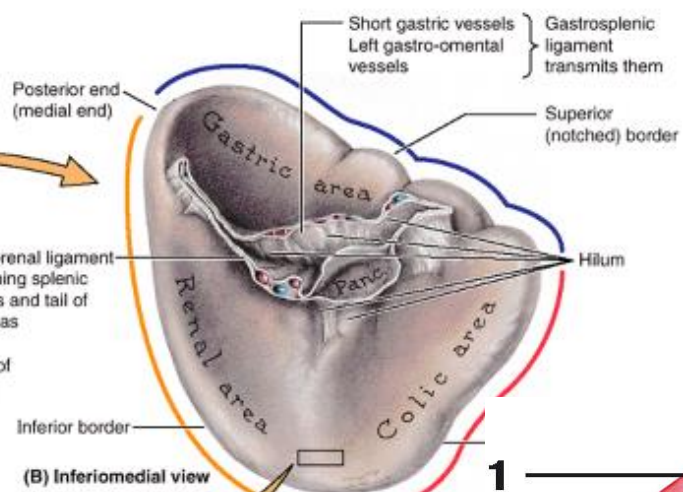




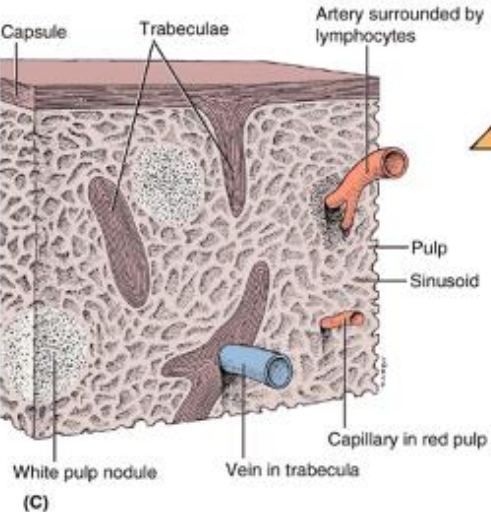
# Lien



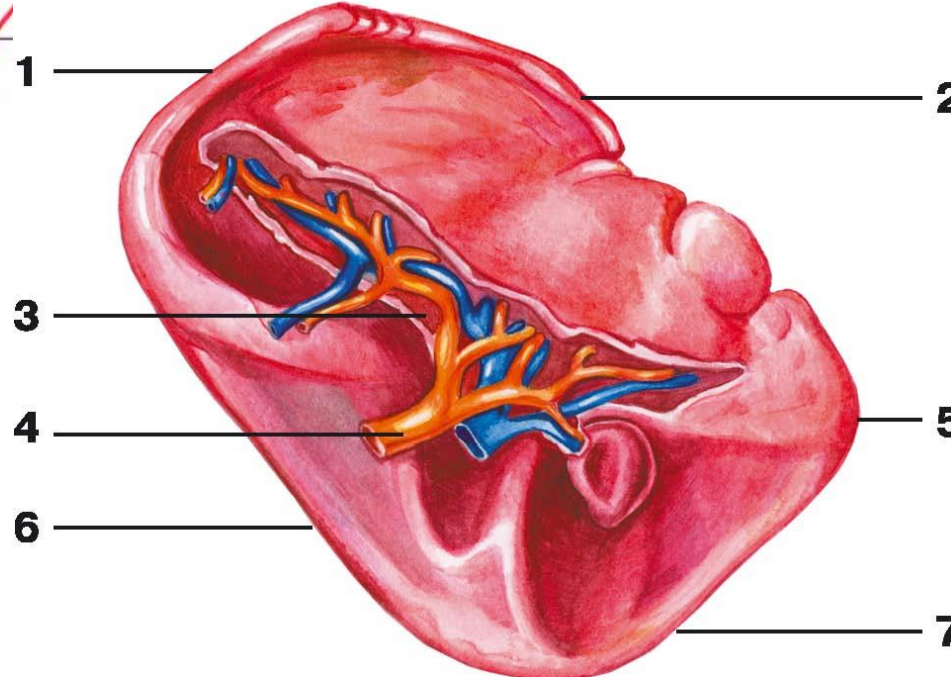
(A) Anterior view



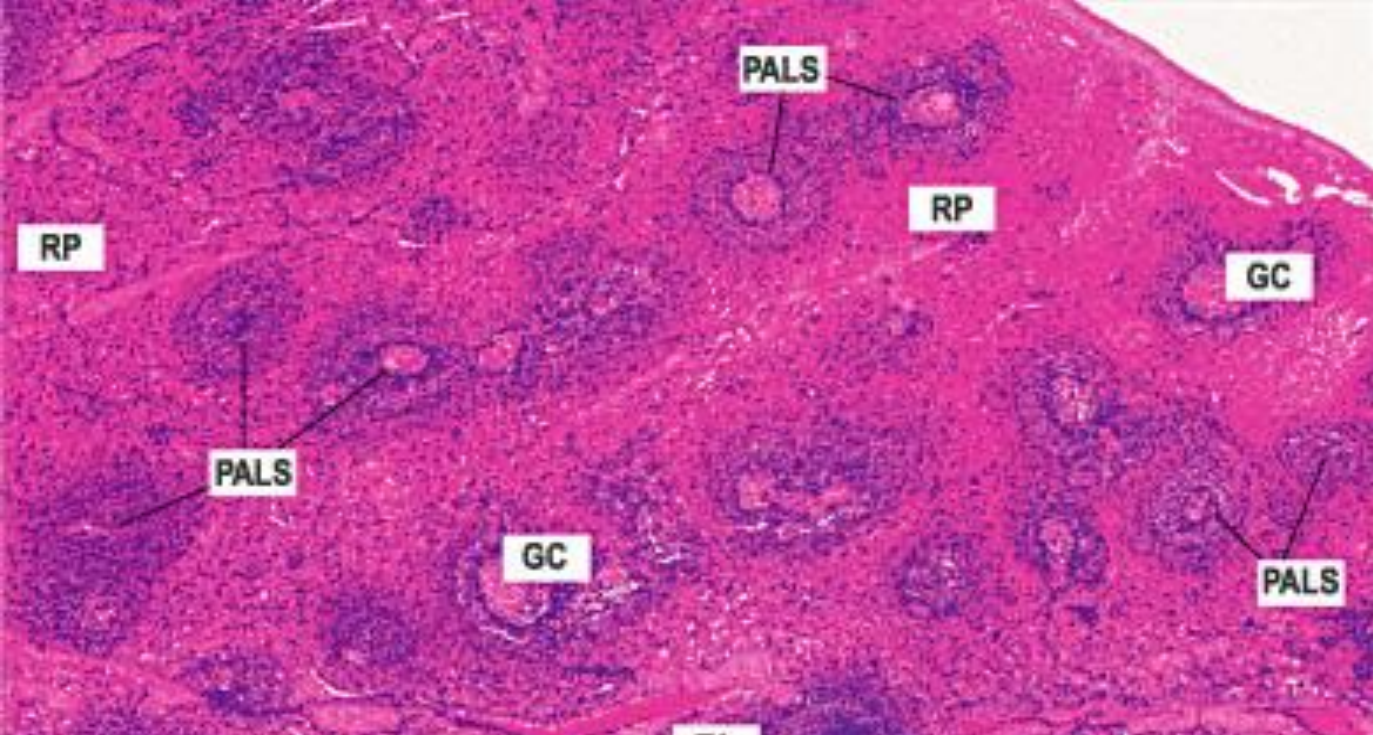
(B) Inferiomedial view

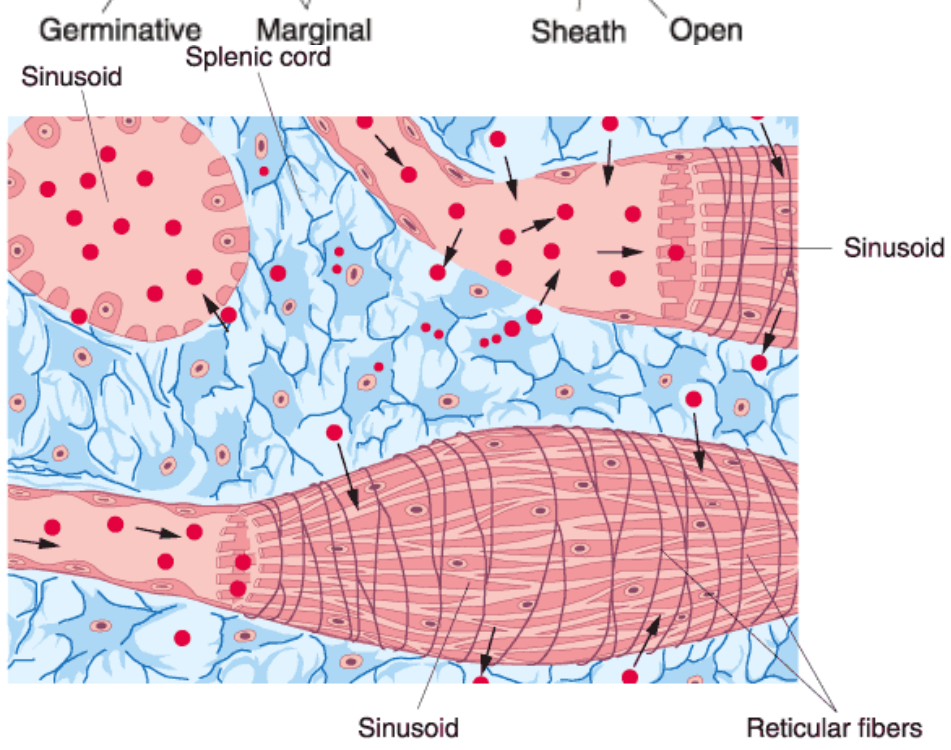
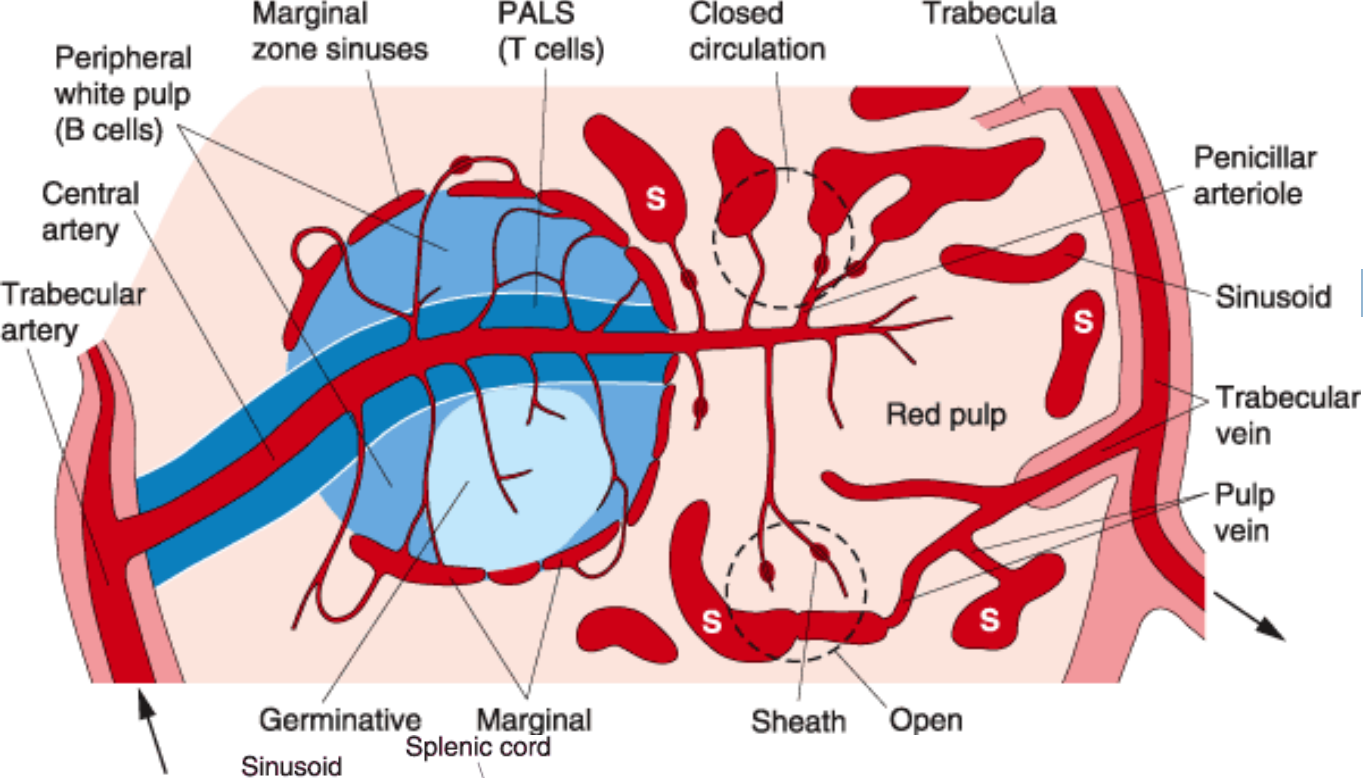


(C)

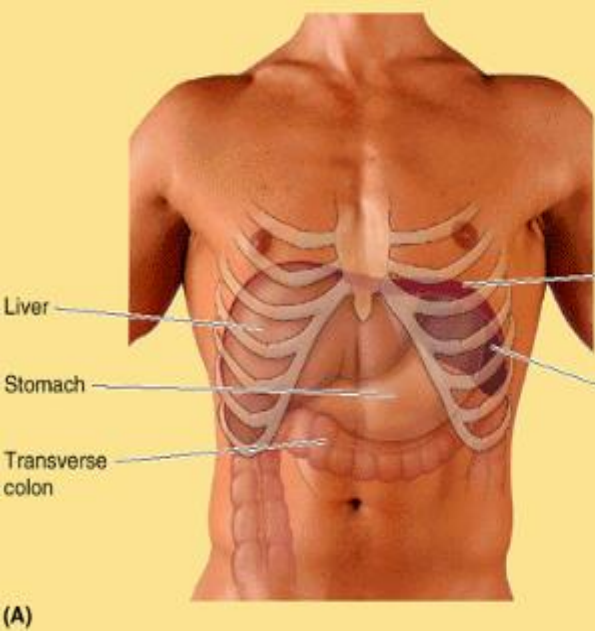




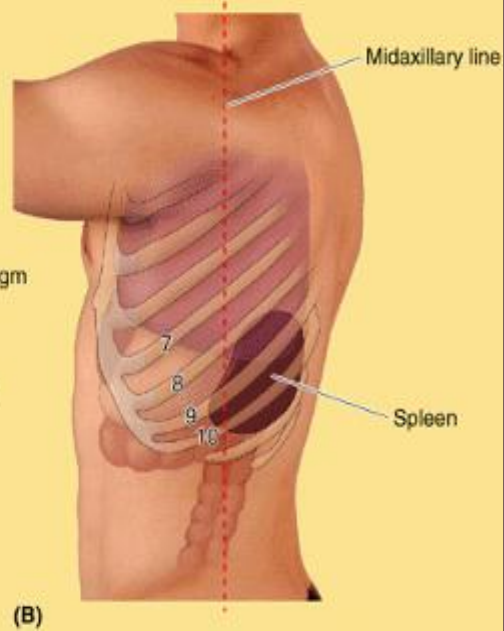




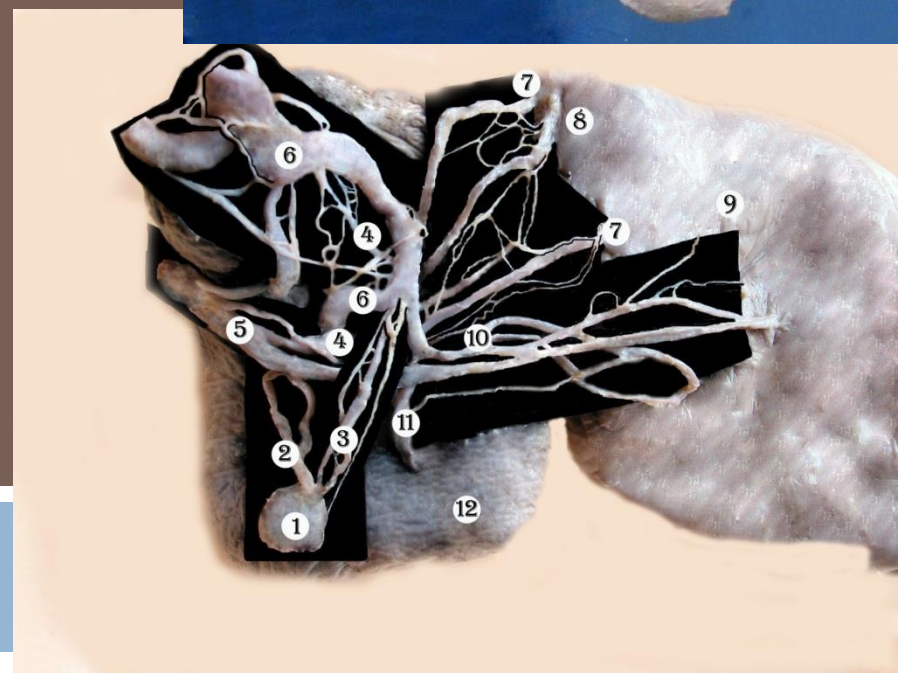
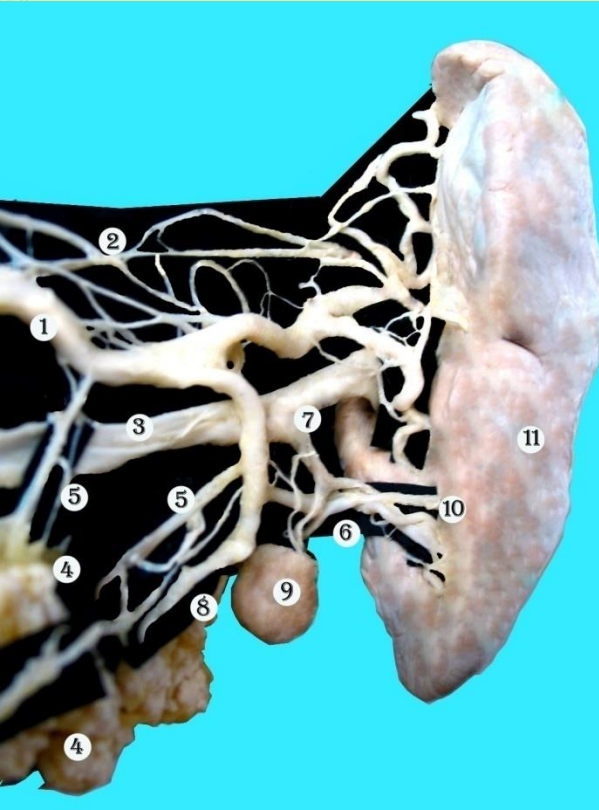
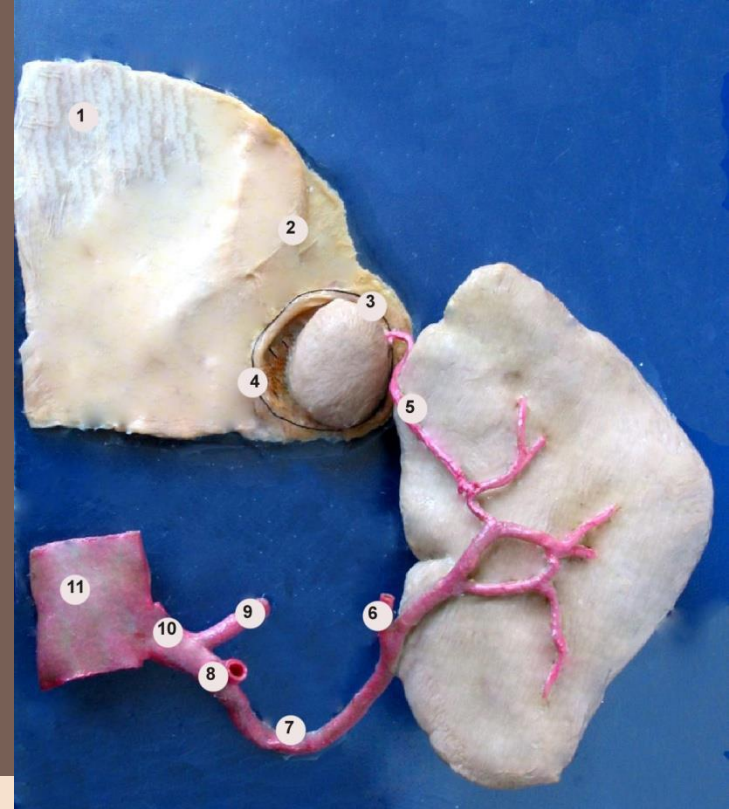




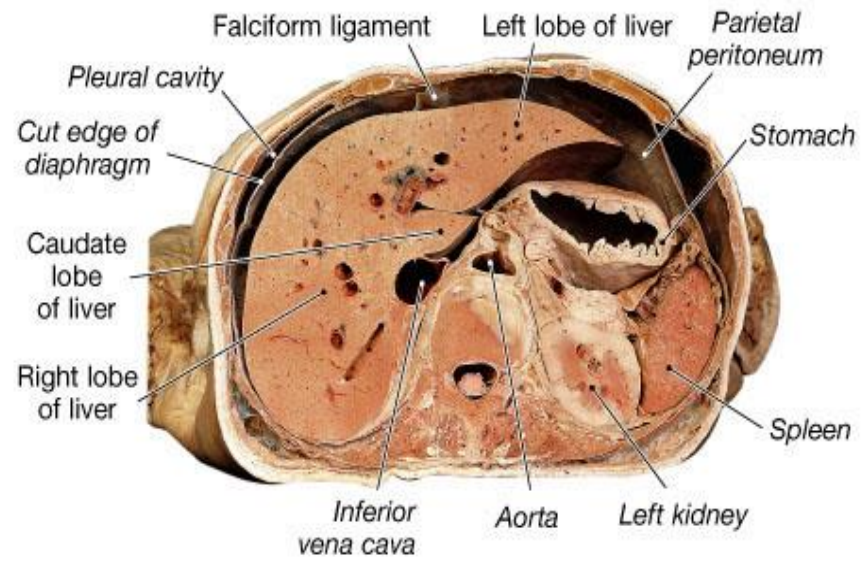
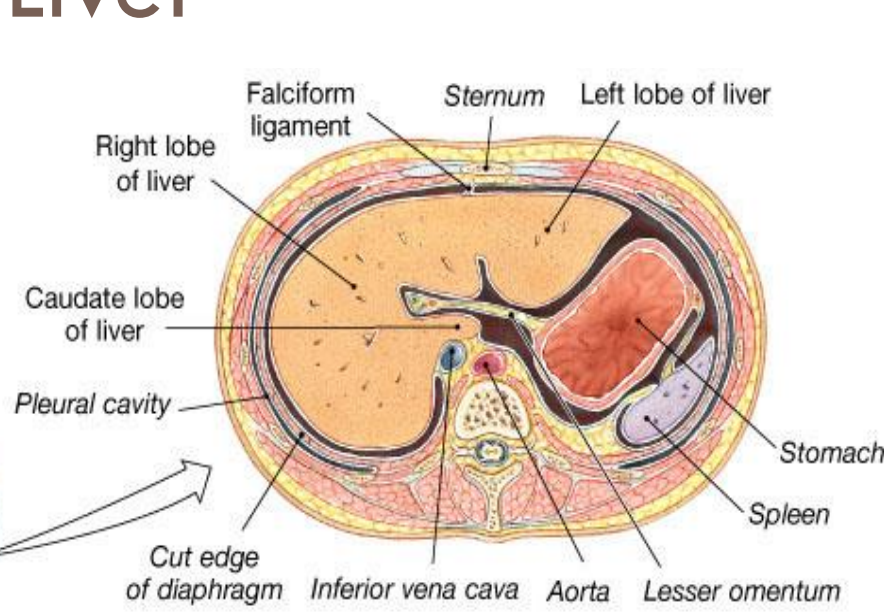
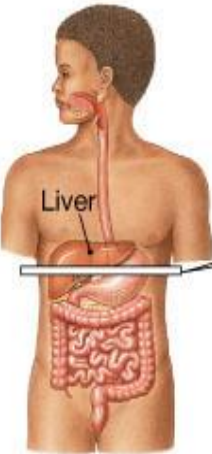
(A)



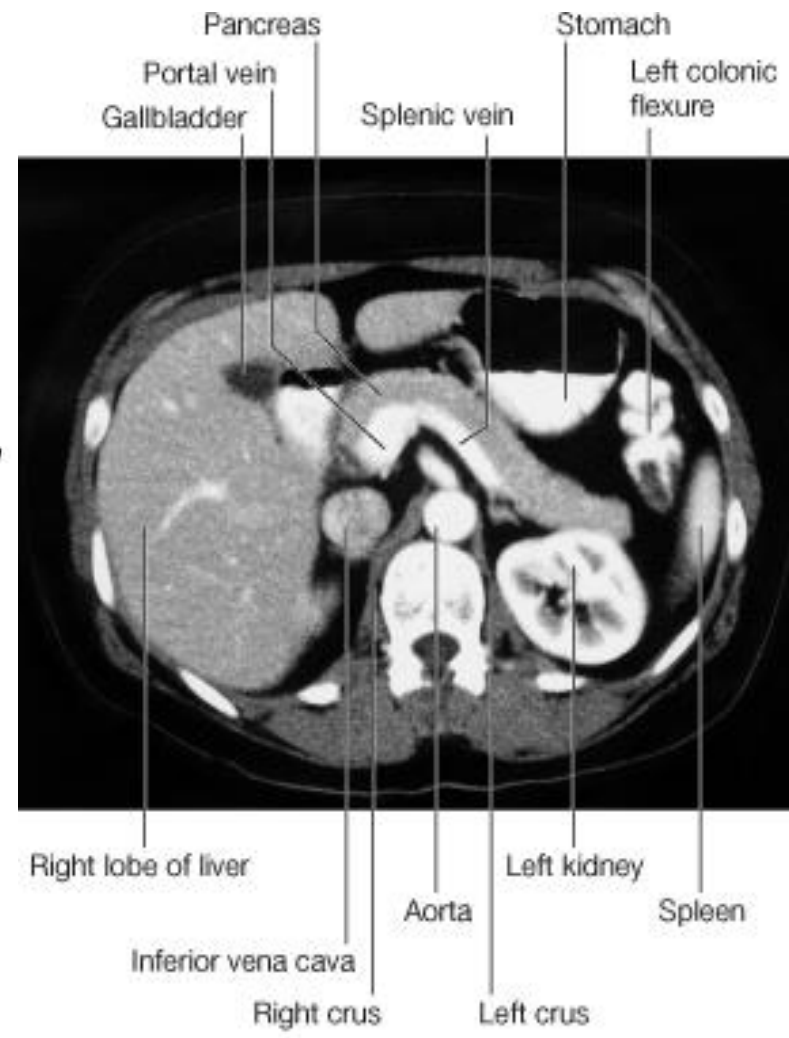
(B)



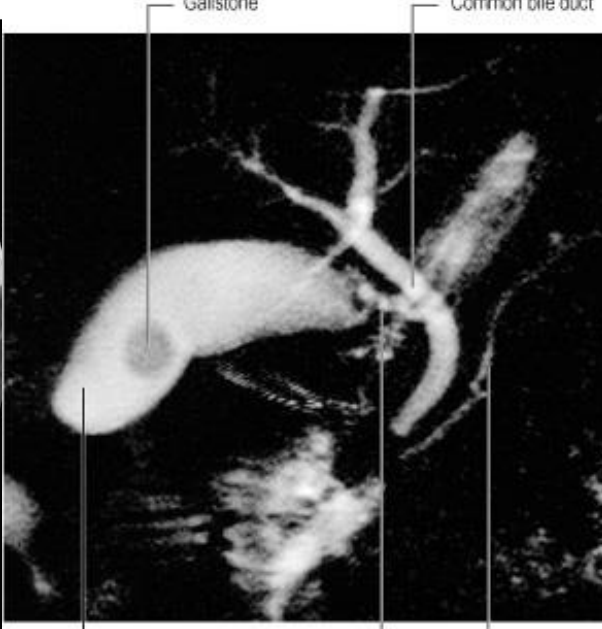
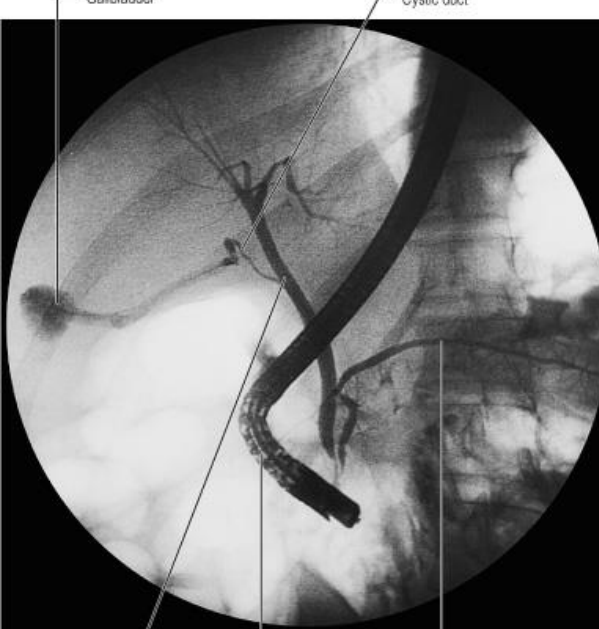
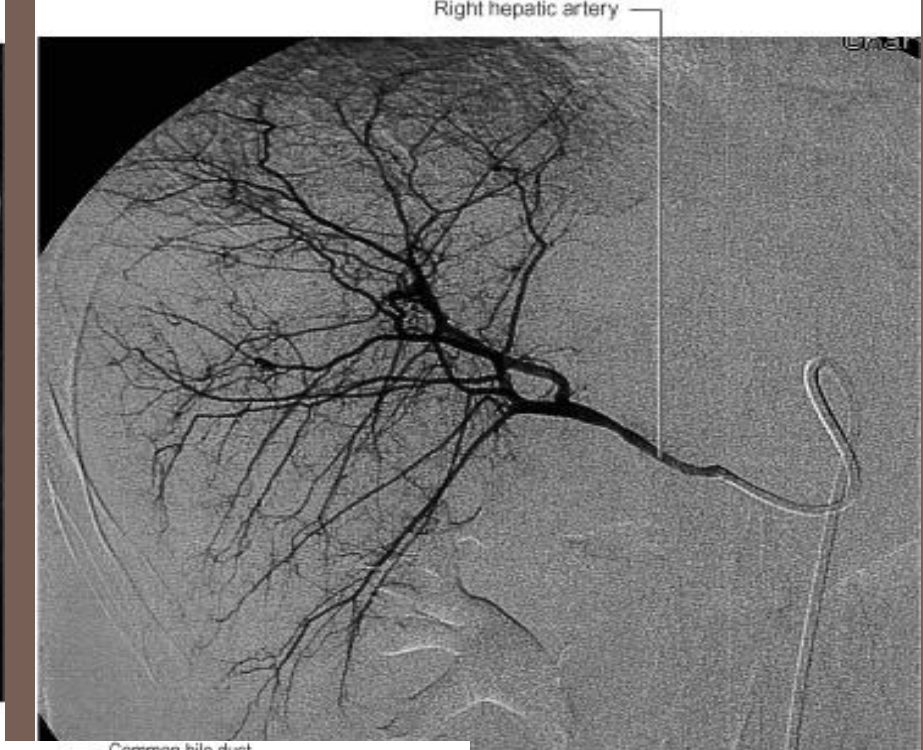
# The Liver

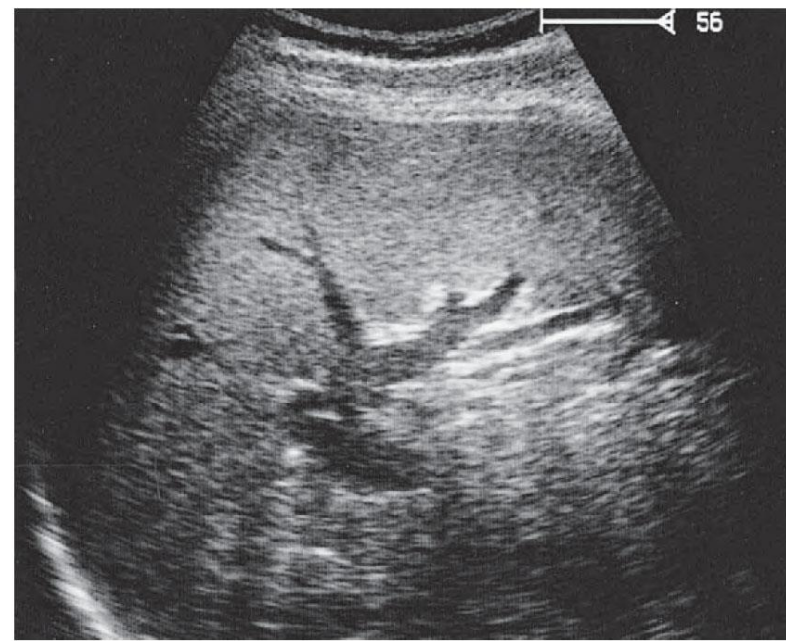
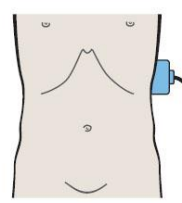
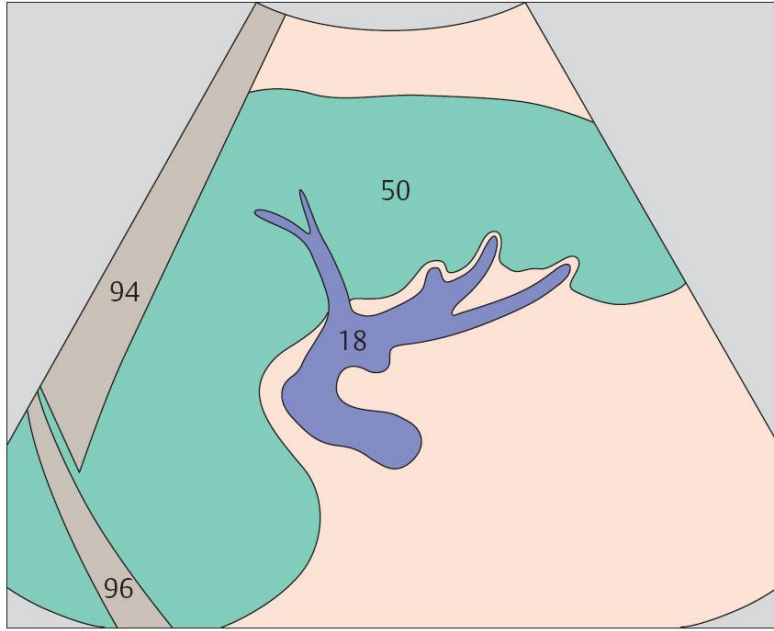


(a) Horizontal section



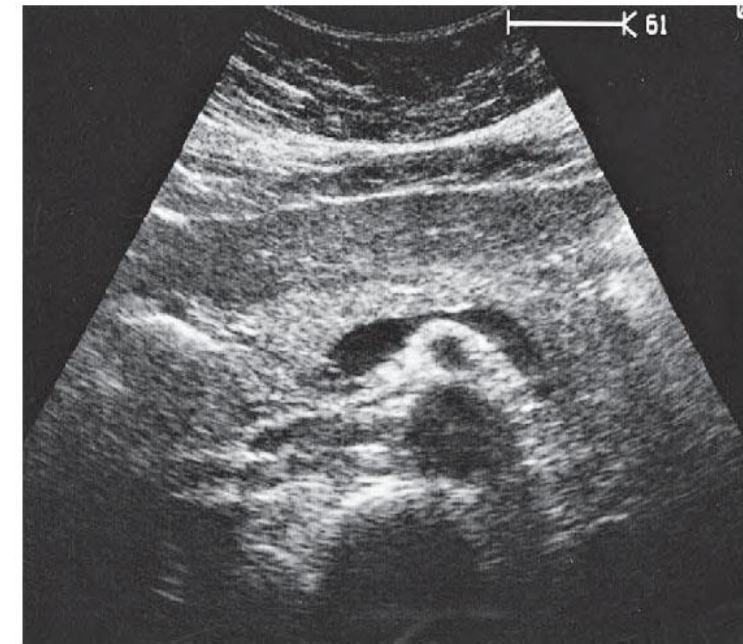
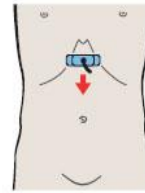
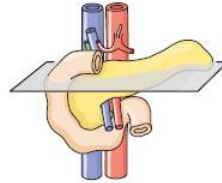
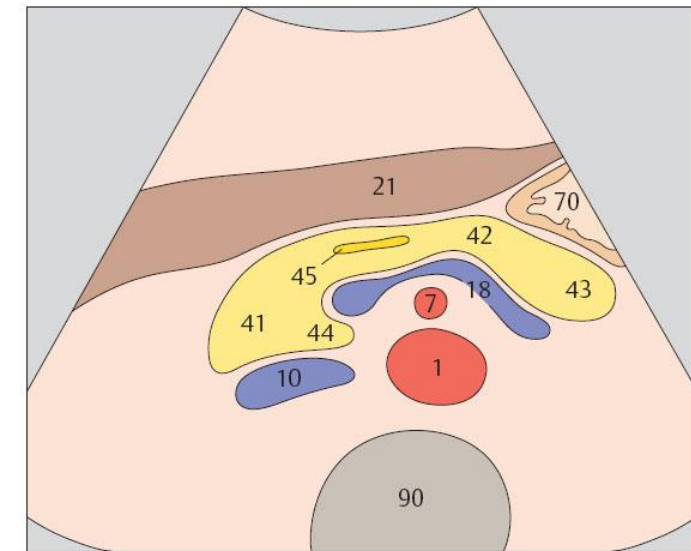






A flank scan at the level of the hilum displays the spleen in its greatest longitudinal dimension.

▶ 148 Splenic hilum, splenic vein



The splenic vein is the landmark for locating the pancreas. The superior mesenteric artery lies between the splenic vein and the aorta, appearing as an echo-free spot surrounded by bright echoes.

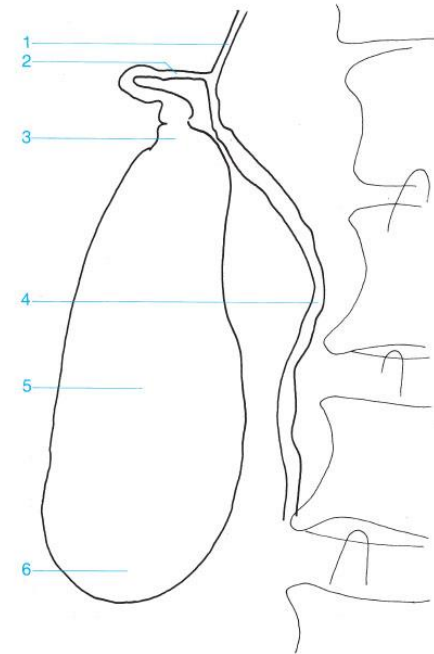
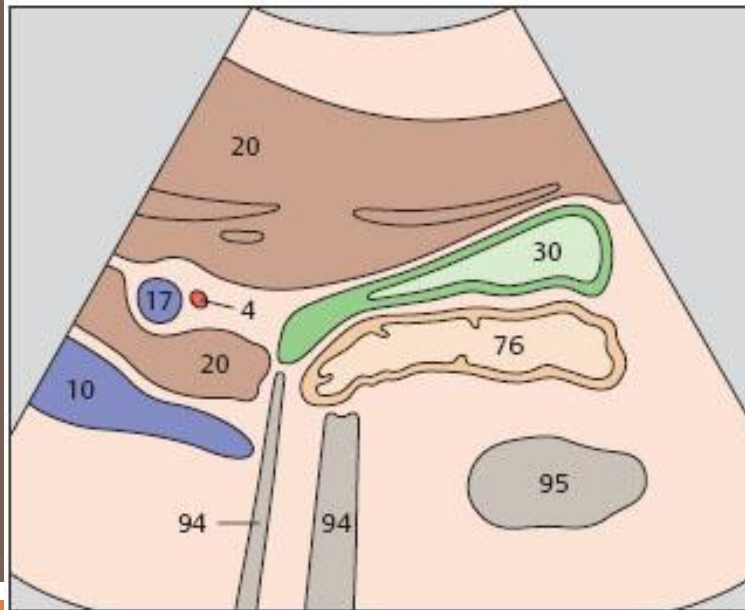


▶ 133 Body of pancreas, splenic vein, superior mesenteric artery, aorta





▶ 109 Right portal vein branch, body and neck of gallbladder



*The shape and position of the gallbladder are highly variable. However, the neck of the gallbladder is always located in the porta hepatis, caudal to the right portal vein branch.*

- 1 Common hepatic duct
- 2 Cystic duct
- 3 Neck of the gallbladder

- 4 Common bile duct
- 5 Body of the gallbladder
- 6 Fundus of the gallbladder

# Peritoneum

**Peritoneum** is the serous membrane located within abdominal cavity (loose ct, and mezothelium)

**The peritoneum consists of two layers:**

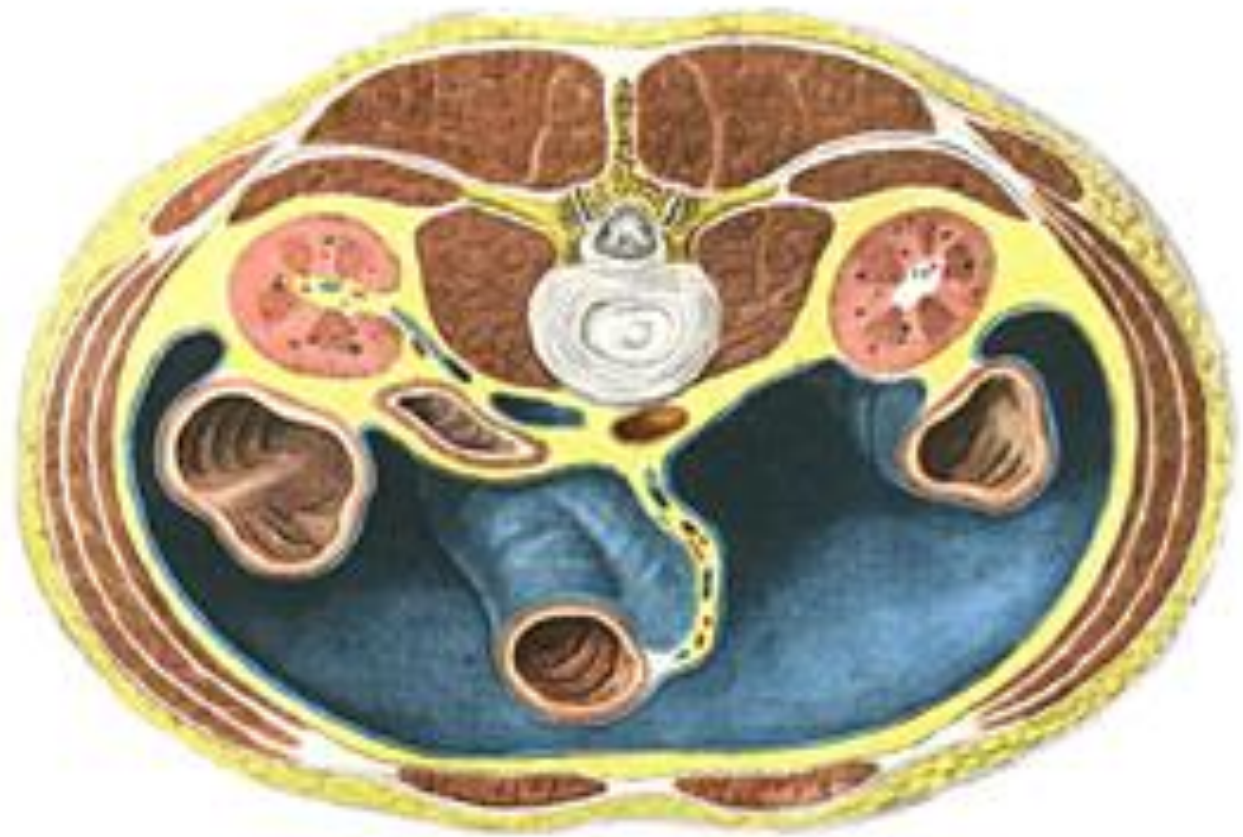
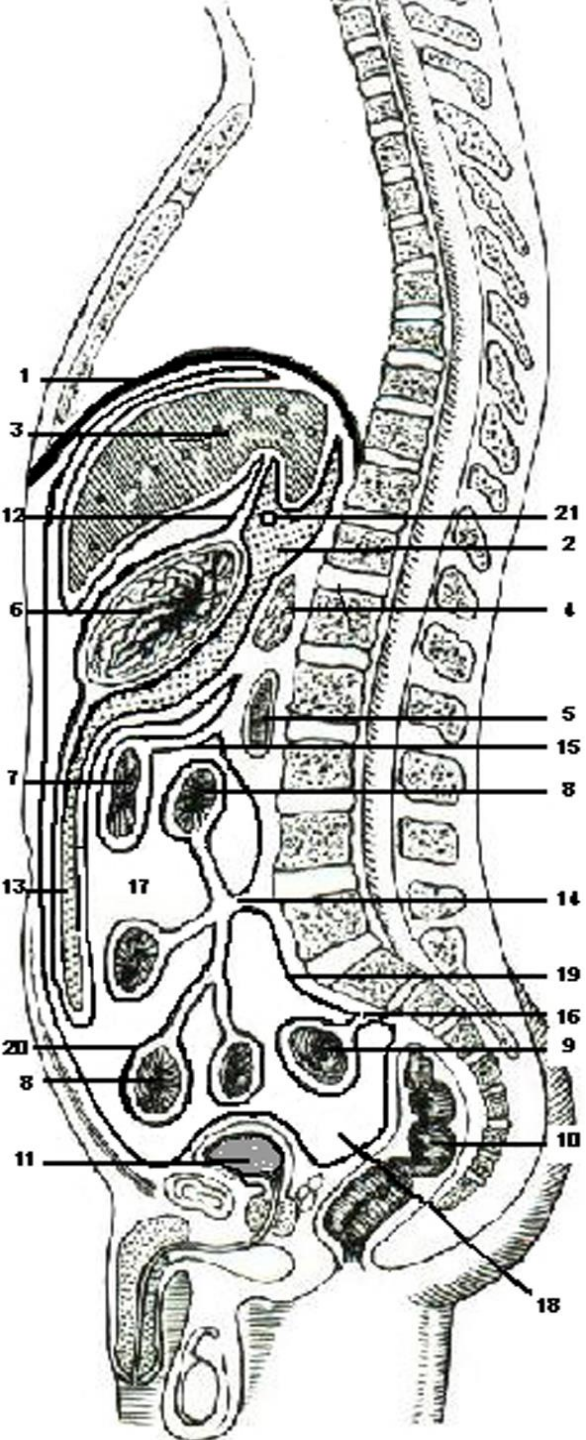
- **Parietal peritoneum** (*peritoneum parietale*);
- **Visceral peritoneum** (*peritoneum viscerale*).



# Peritoneum

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- Abdominal Cavity
- Peritoneal Cavity
- Extraperitoneal space (retroperitoneal, subperitoneal, preperitoneal spaces)





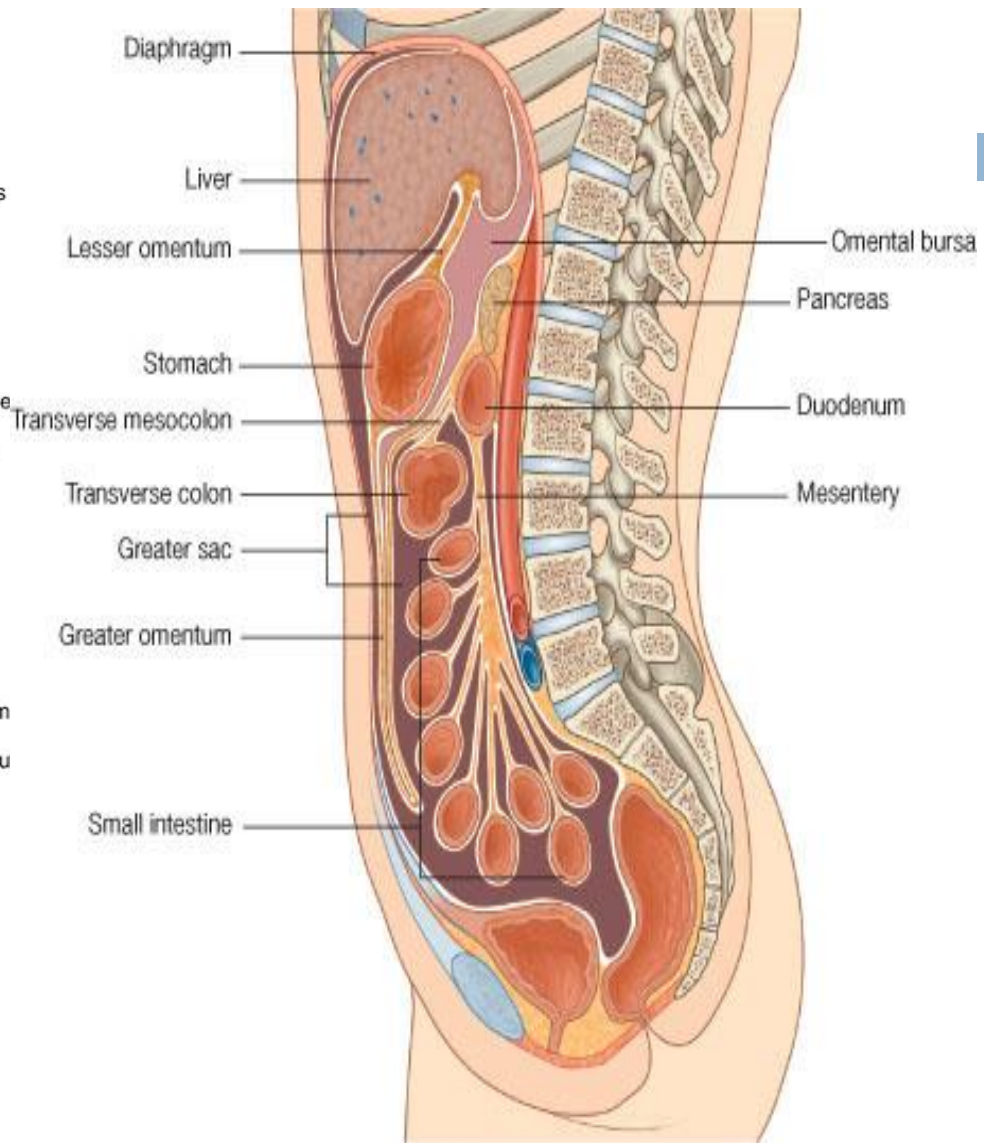
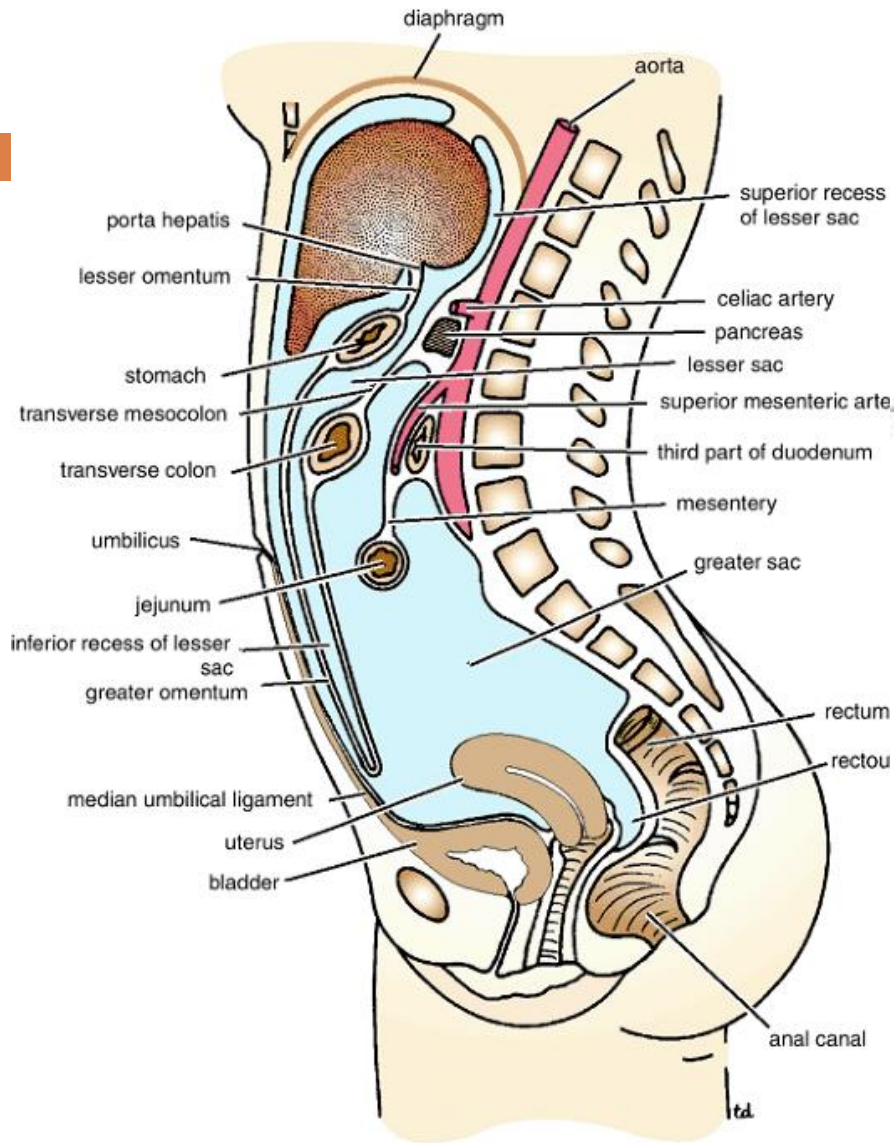
# Derivatives of the peritoneum

- ▶ **Peritoneal folds** are small peritoneal continuations, which sometimes are formed by the blood vessels, different ducts or fibrous ligaments.
- ▶ **Peritoneal ligaments** are two-layer folds of peritoneum that connects viscera to the abdominal and pelvic walls, or realize connections between organs.
  - divided into *primary* and *secondary*.

# Derivatives of the peritoneum

- ▶ **Mezou** are two-layered folds of the peritoneum by means of which the small intestines and some parts of the large intestine are attached to the posterior abdominal wall; the small intestine - **mesenterie** , the transverse colon – **mesocolon transversum**, the sigmoid- **mesocolon sigmoide**
- ▶ **Omenta** are two-layered folds of the peritoneum, which connect the stomach to other organs.
  - The **greater omentum** connects the greater curvature of the stomach to the transverse colon .The part of the greater omentum situated between the stomach and the transverse colon is called – **gastrocolic ligament**.
  - The **lesser omentum** consists of hepatogastric and hepatoduodenal ligaments.

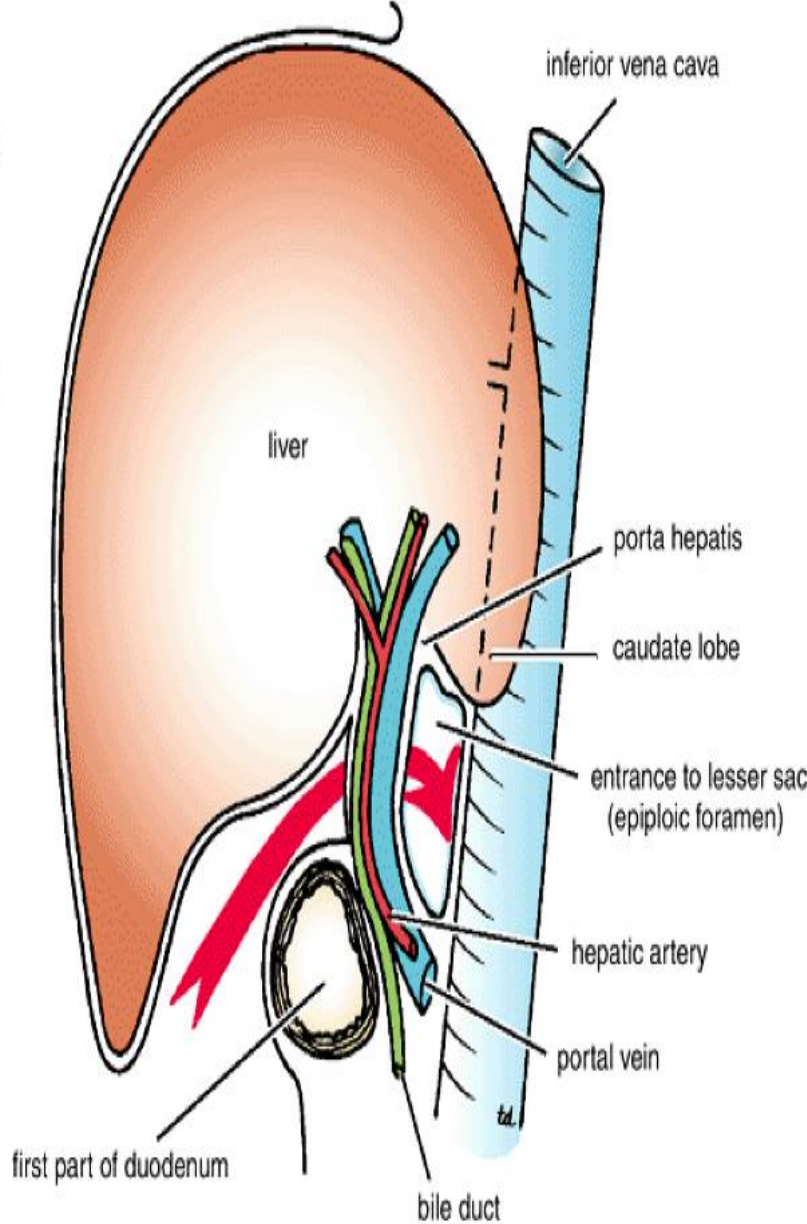
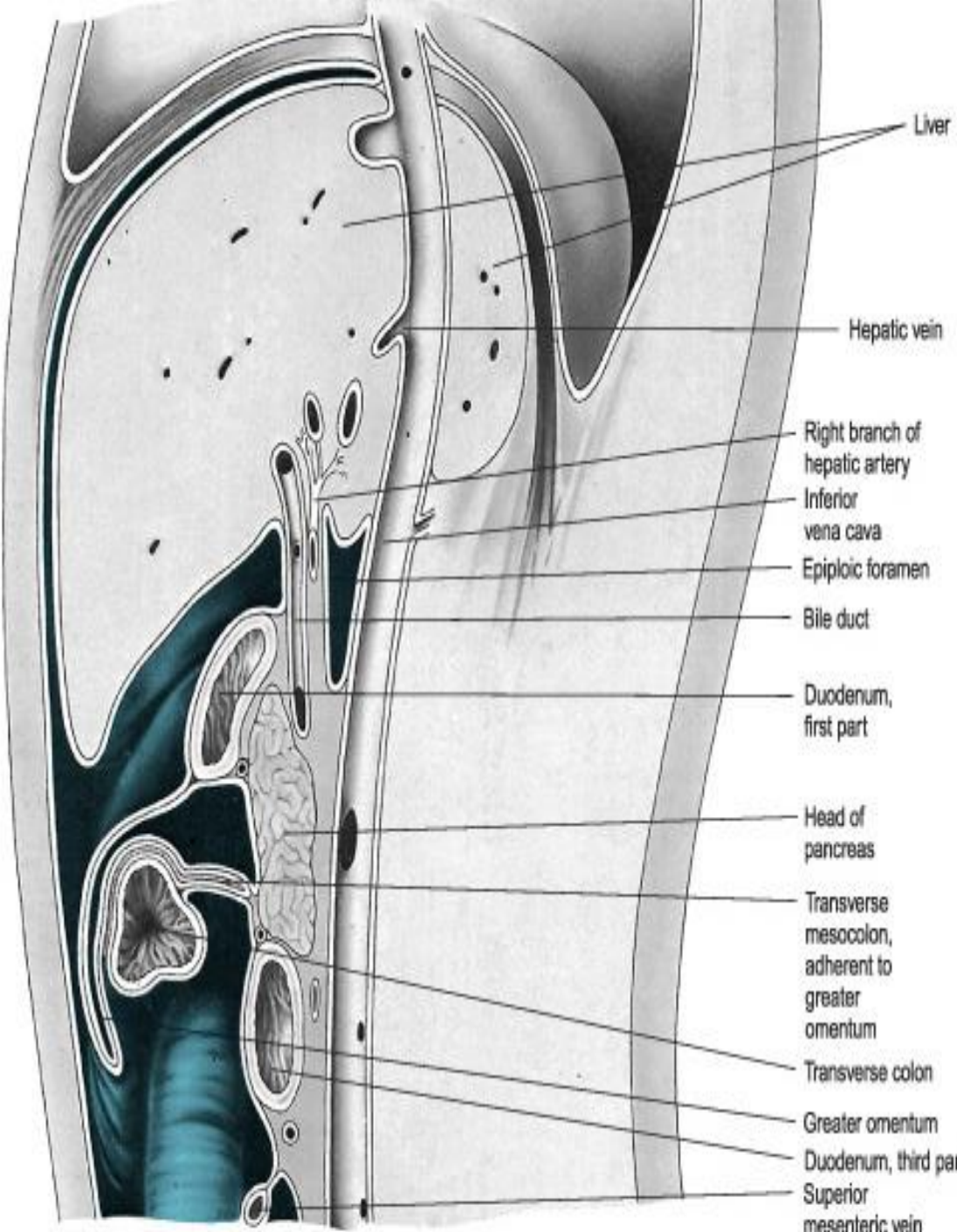




# The supramesocolic storey

- ▶ **In the supramesocolic storey** are situated: the liver and the gallbladder, the stomach, the spleen and the upper part of the duodenum.
- ▶ The supramesocolic storey of the peritoneum is divided into three sacs, named bursae.
  1. **Hepatic bursa**, *bursa hepatica*
  2. **Pregastric bursa**
  3. **Omental bursa**, *bursa omentalis*
    - **epiploic foramen** (*Winslow's orifice*).
- ▶
- ▶ **Recesses located in the omental bursa**
  - The **superior omental recess** (*recessus omentalis superior*)
  - The **splenic recess** (*recessus lienalis*).





Liver

Hepatic vein

Right branch of hepatic artery

Inferior vena cava

Epiploic foramen

Bile duct

Duodenum, first part

Head of pancreas

Transverse mesocolon, adherent to greater omentum

Transverse colon

Greater omentum

Duodenum, third part

Superior mesenteric vein

inferior vena cava

liver

porta hepatis

caudate lobe

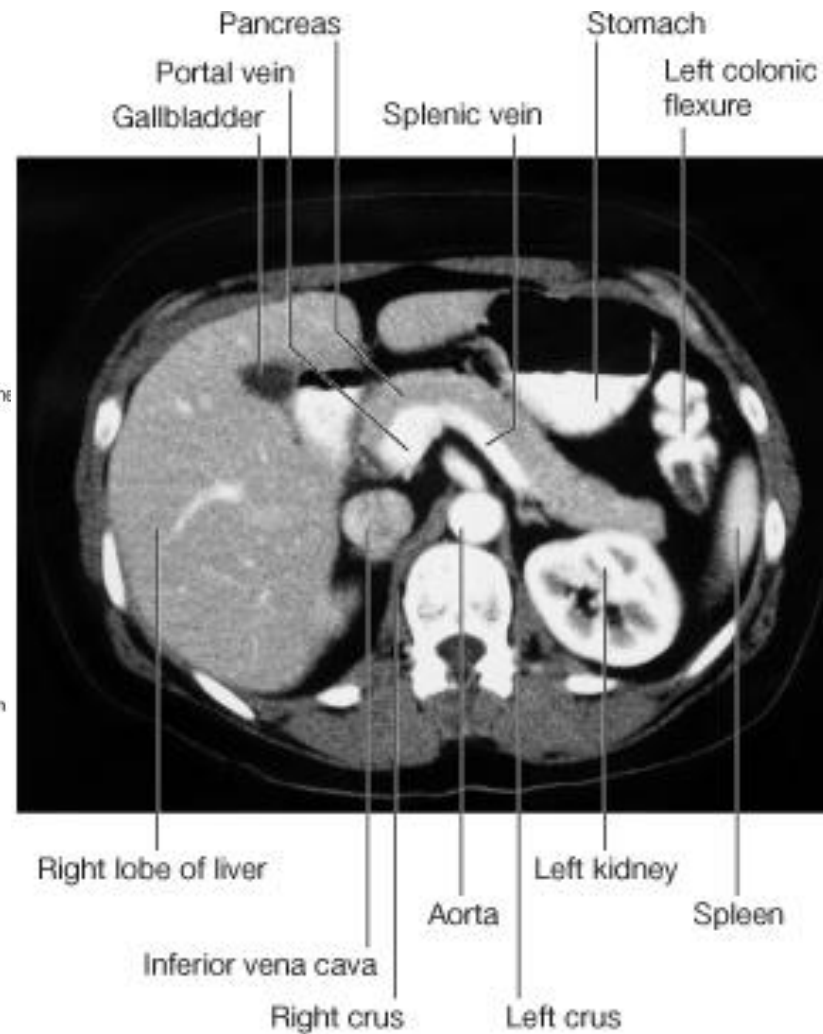
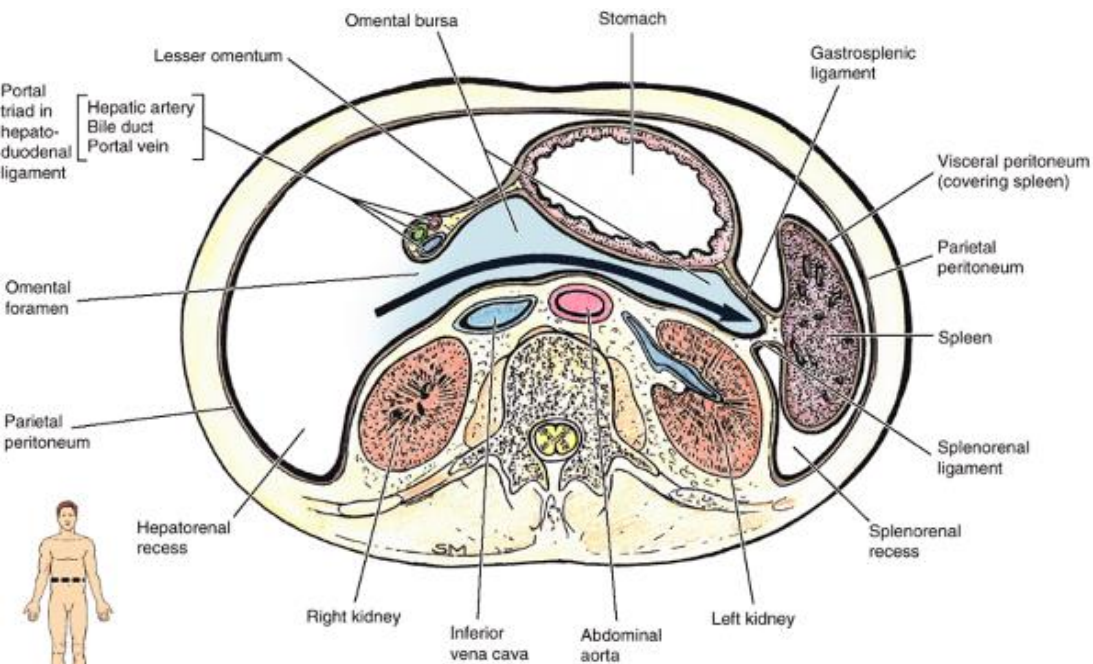
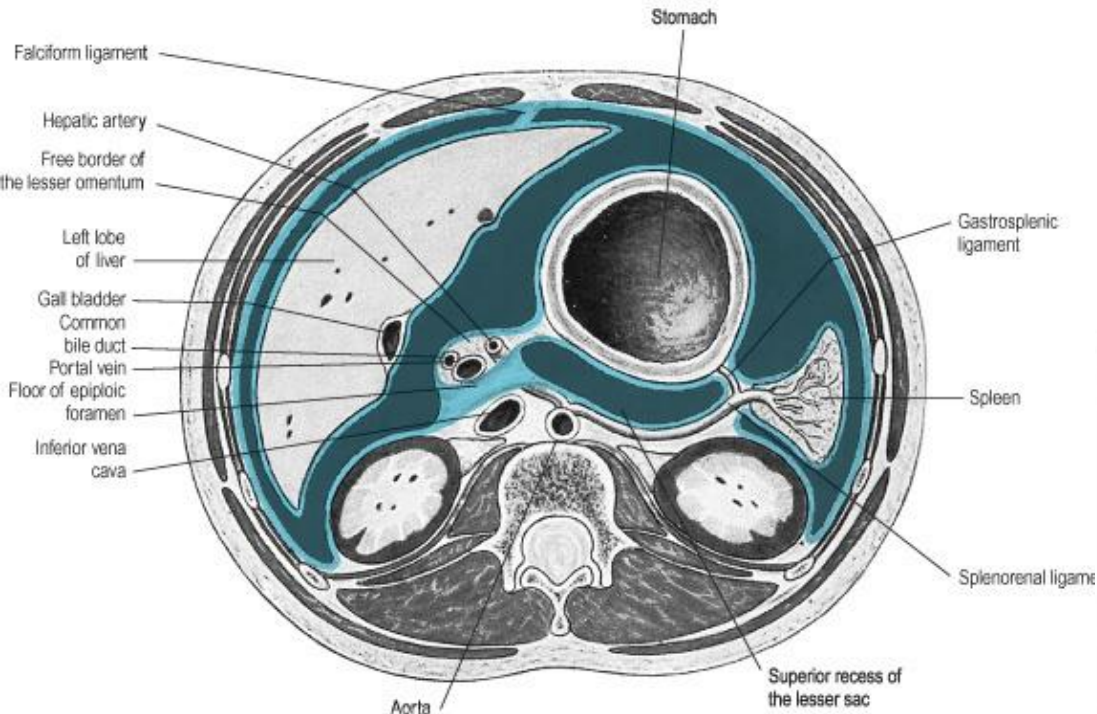
entrance to lesser sac (epiploic foramen)

hepatic artery

portal vein

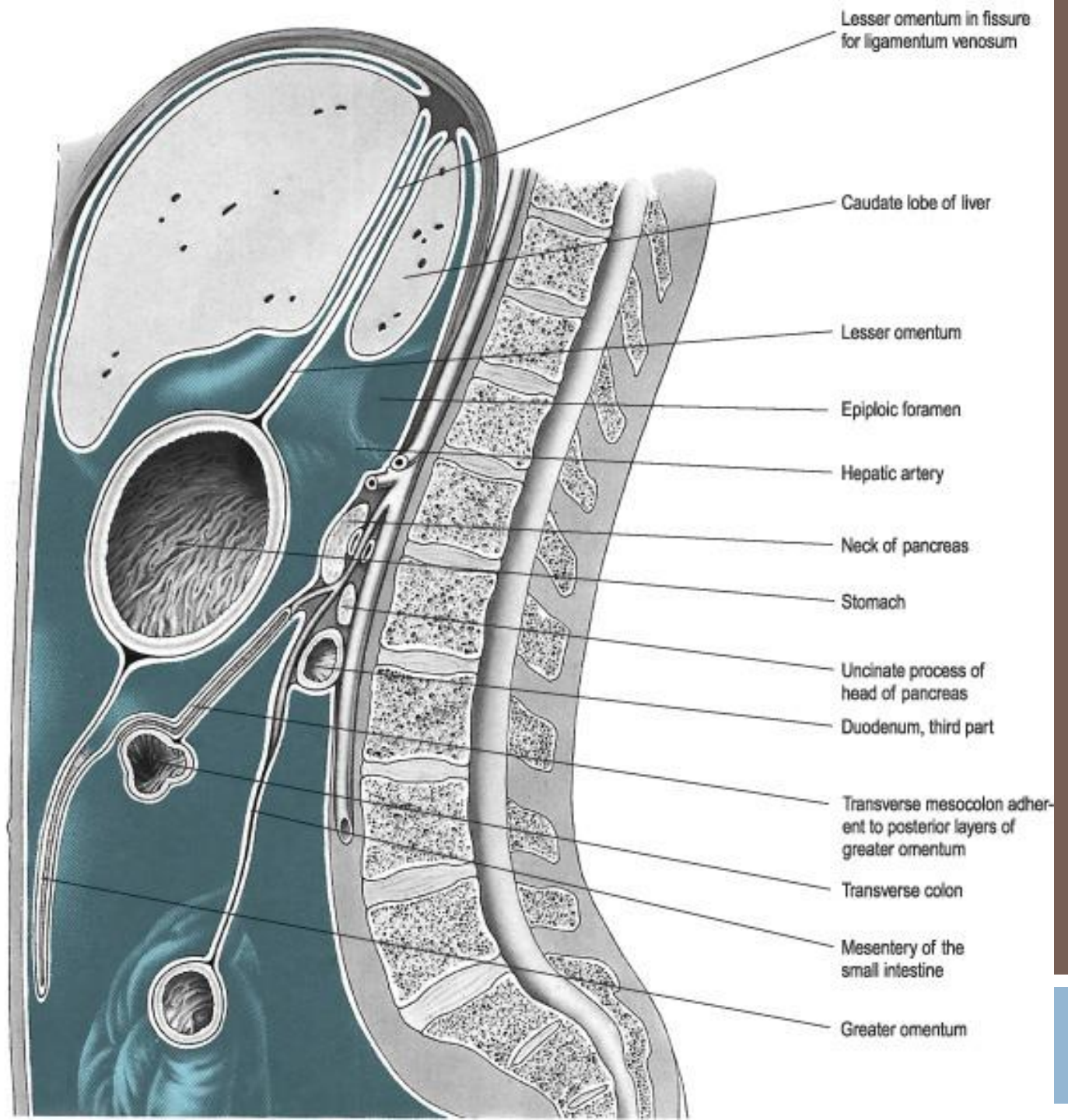
first part of duodenum

bile duct



Inferior view of transverse section



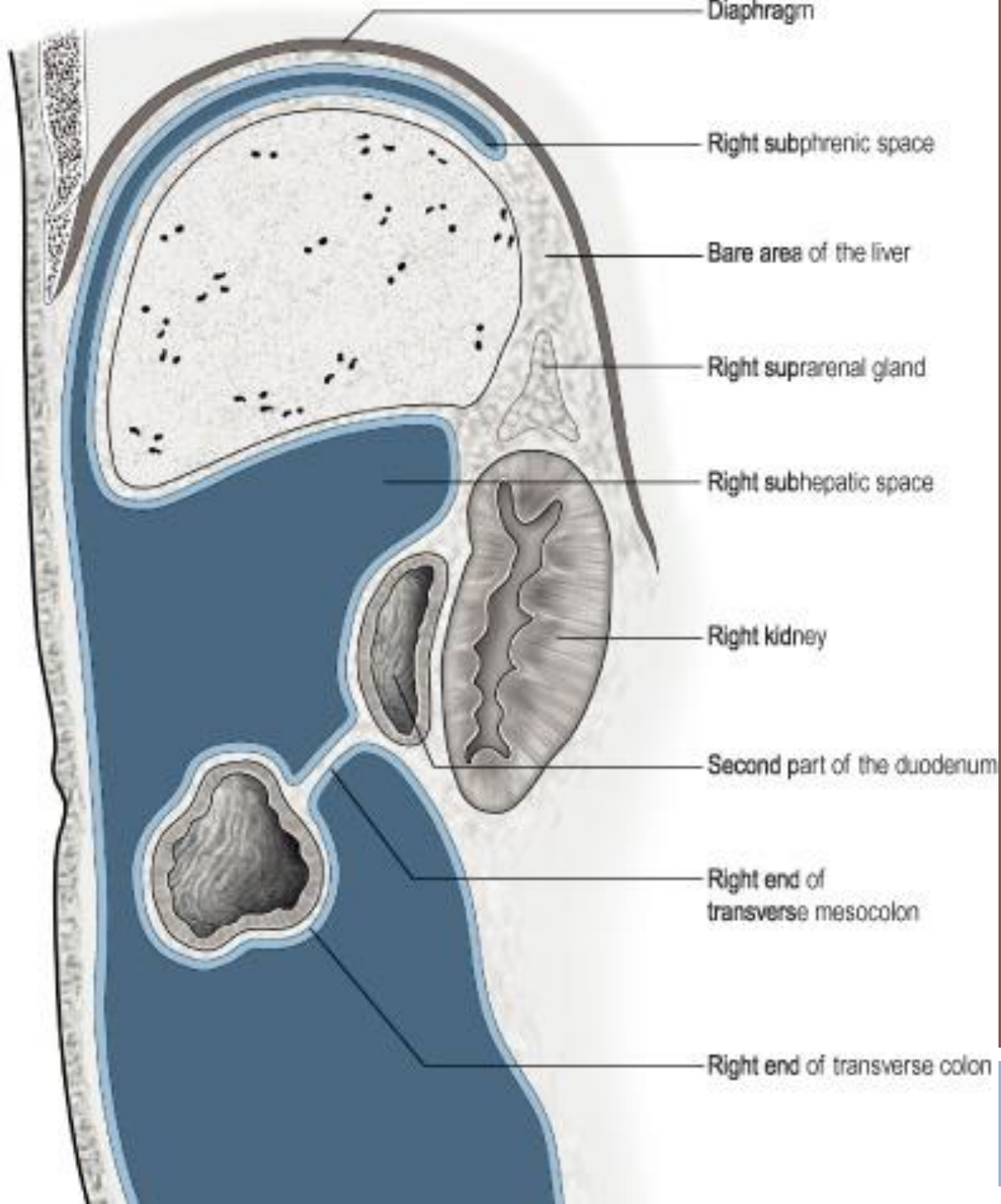


# The inframesocolic storey

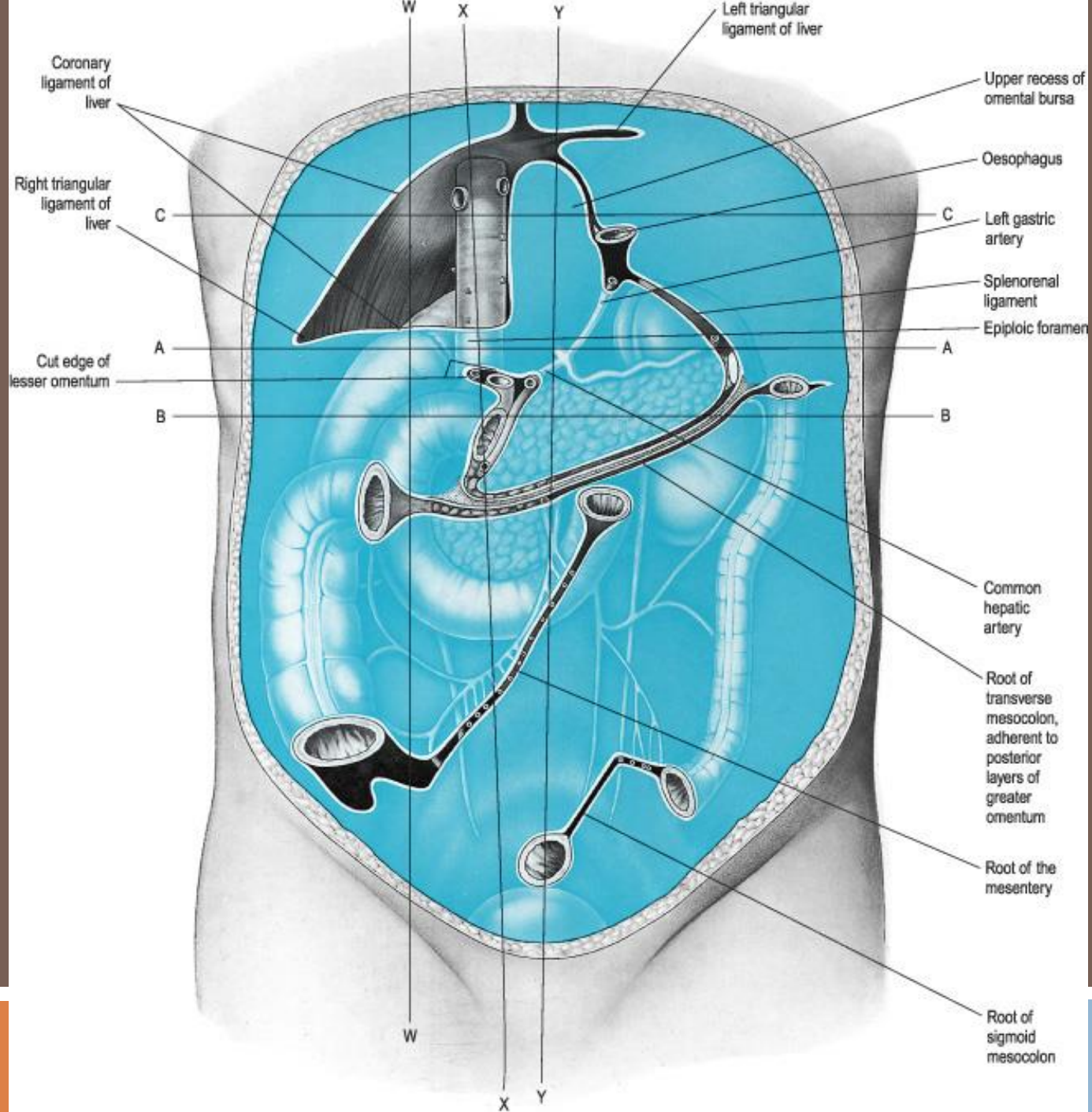
- ▶ two **paracolic grooves, or canals** (*sulci, or canales paracolici dexter and sinister*).
- ▶ the **right and left mesenteric sinuses**, *sinus mesentericus dexter and sinus mesentericus sinister*.

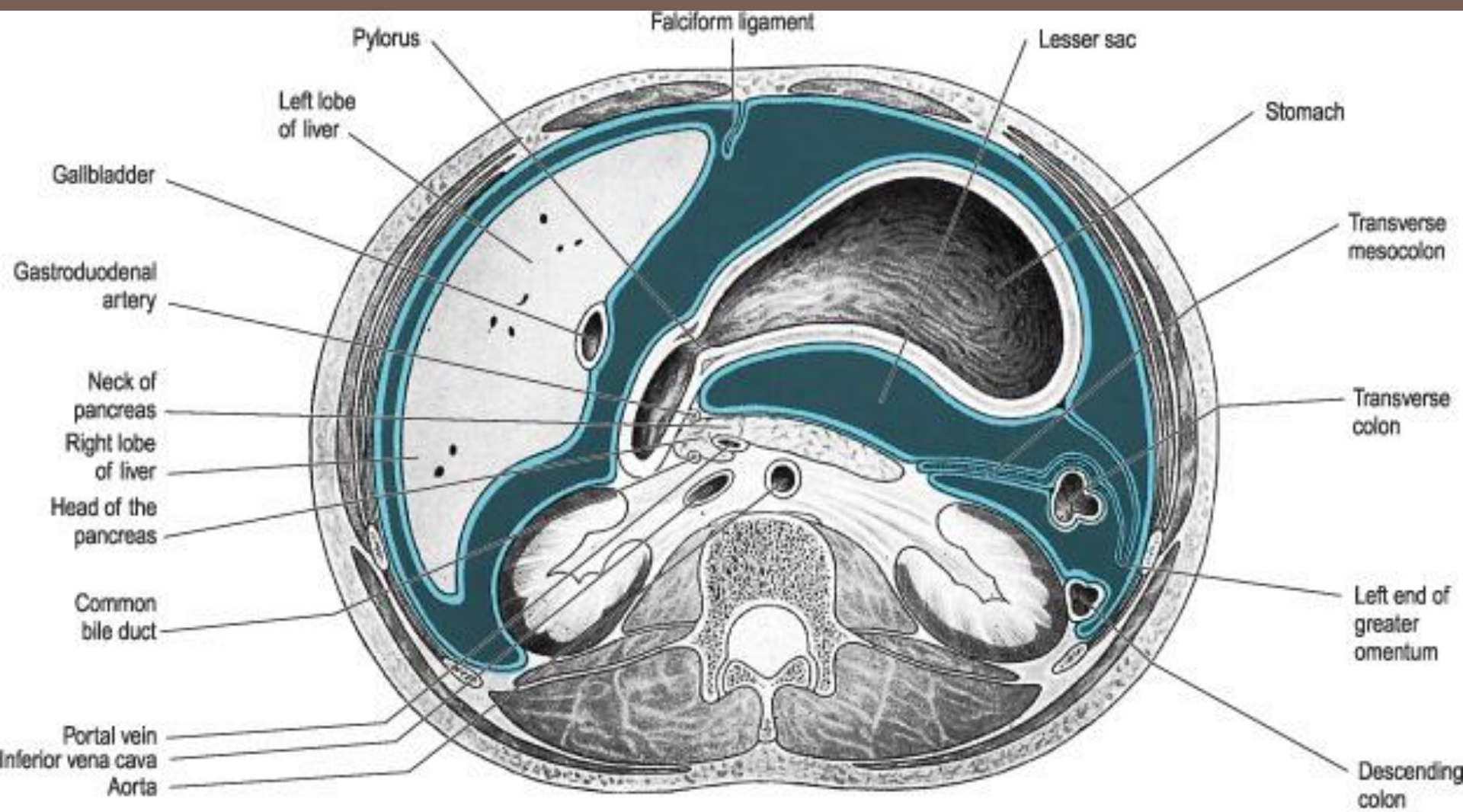
## **Recesses of the inframesocolic storey**

- ▶ **Recesses located the next to the duodenum**
  - Superior duodenal recess,
  - Inferior duodenal recess,
  - Paraduodenal recess,
  - Retroduodenal recess
- ▶ **Recesses located the next to the caecum**
  - Superior iliocaecal recess, Inferior iliocaecal recess,
  - Retrocaecal recesses.
- ▶ **Recesses located the next to the sigmoid colon**
  - Intersigmoid recess.
- ▶ **Peritoneal pouches** are two pouches in **female** the **utero-vesical pouch** (*excavatio vesico-uterina*) and the **recto-uterine pouch** (*excavatio recto-uterina*).
- ▶ In male there is a single pouch called the **recto-vesical pouch** (*excavatio rectovesicalis*)

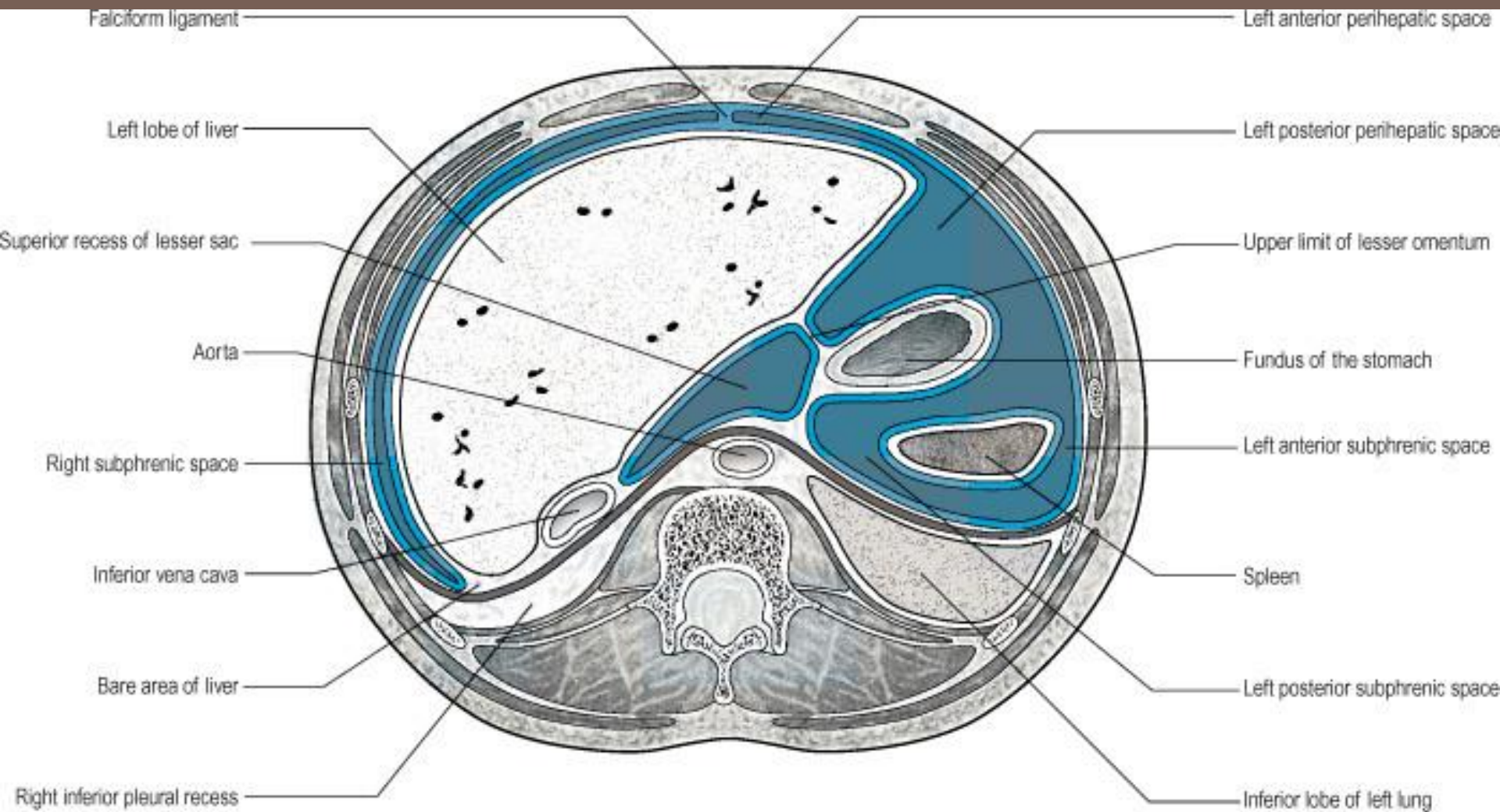




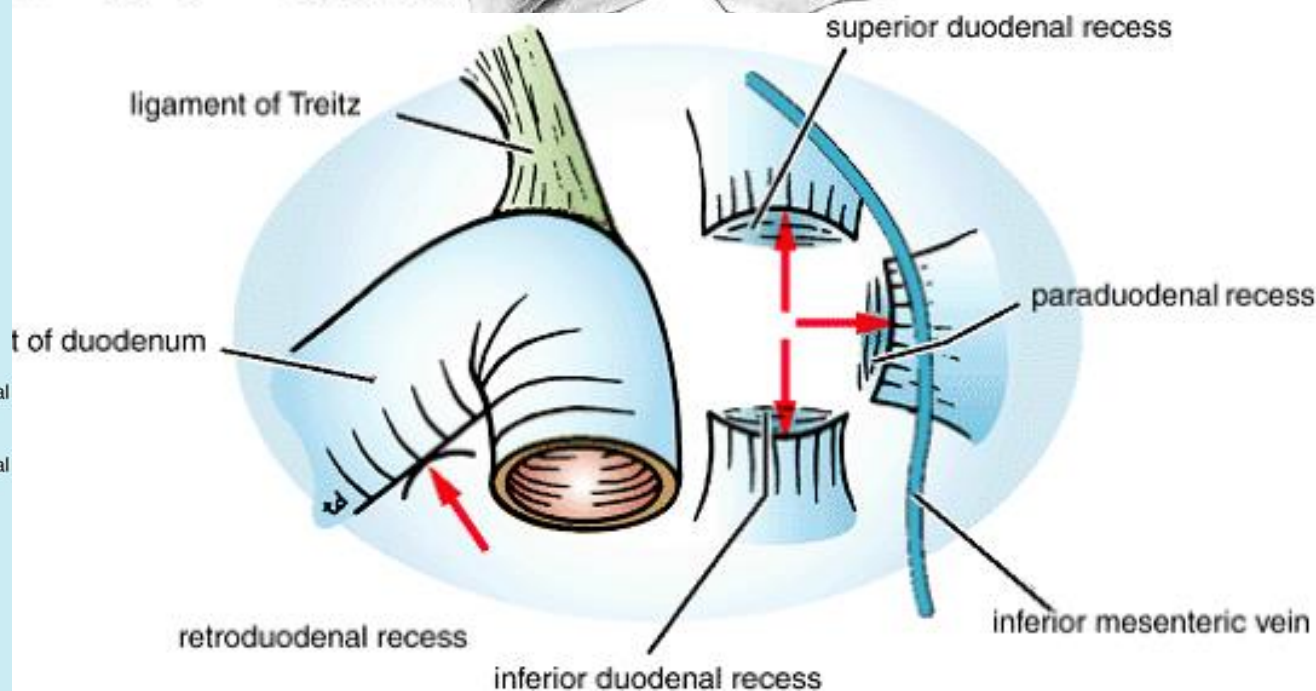
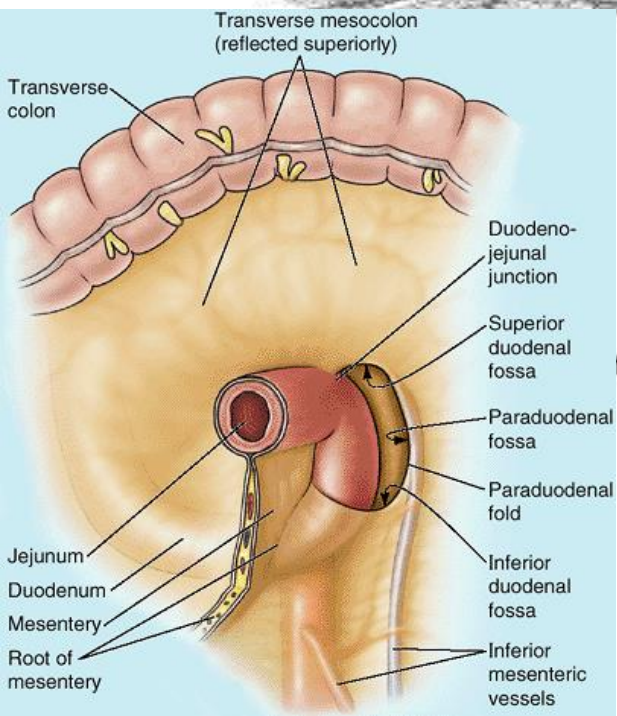
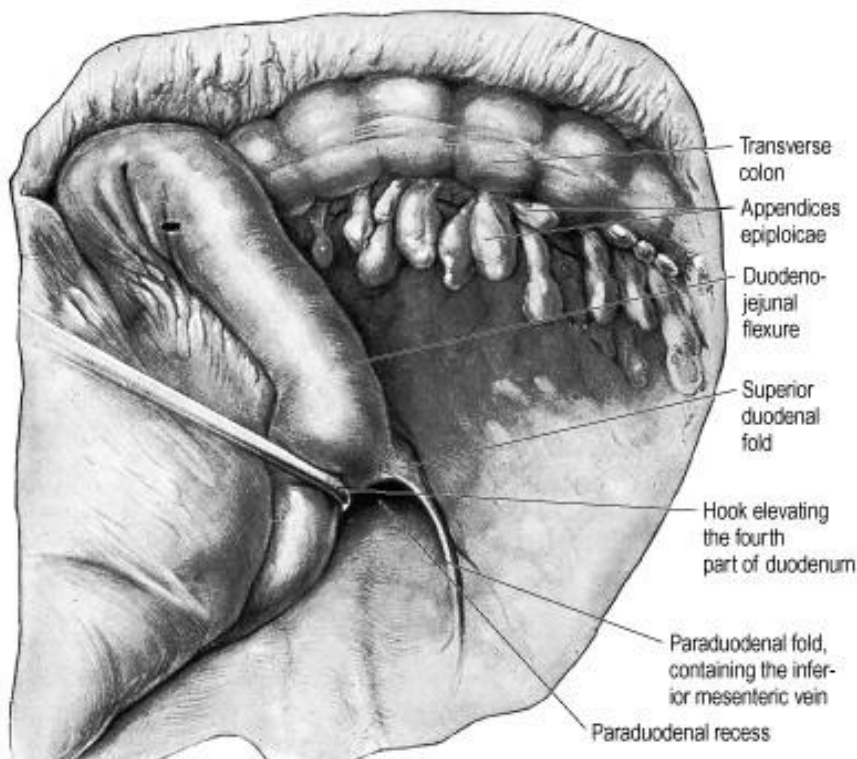
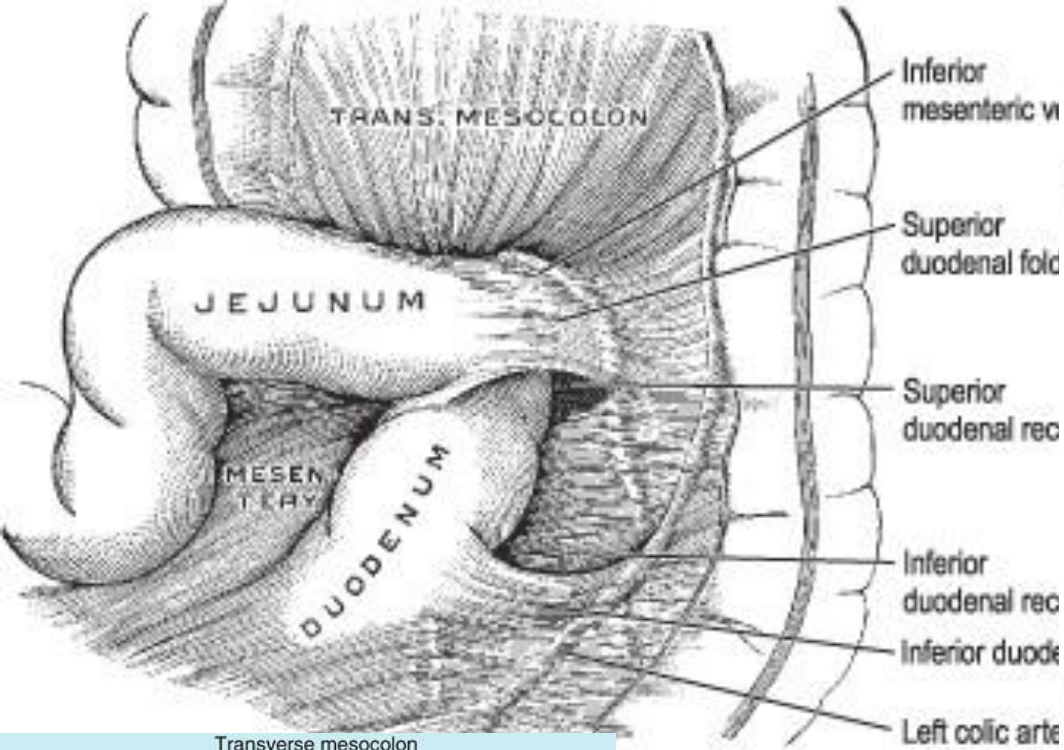


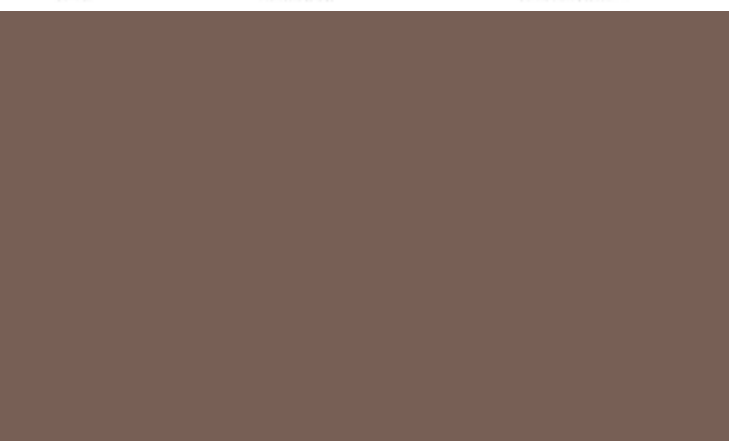
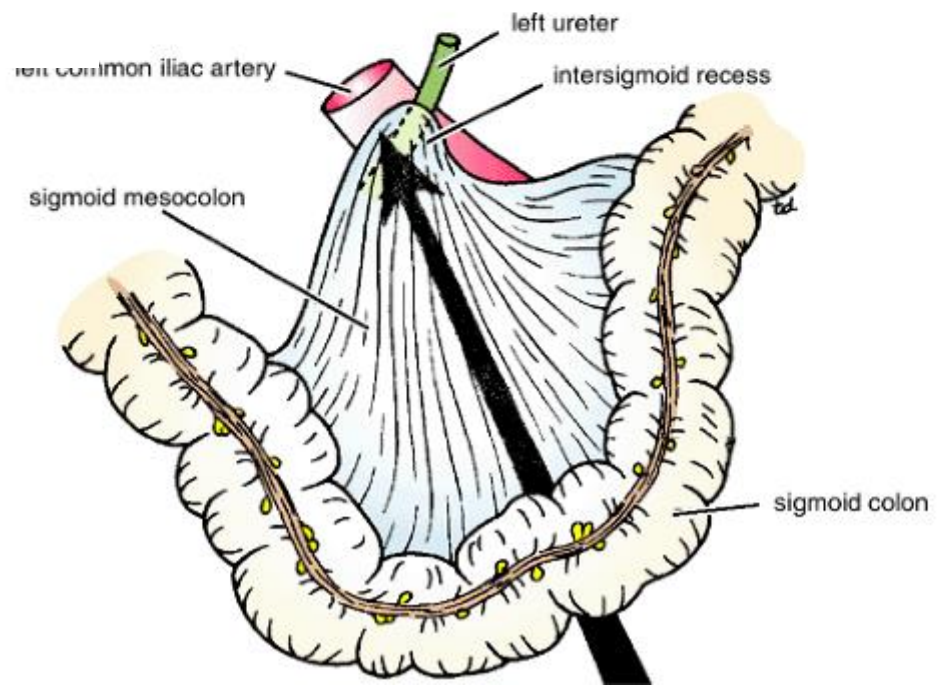
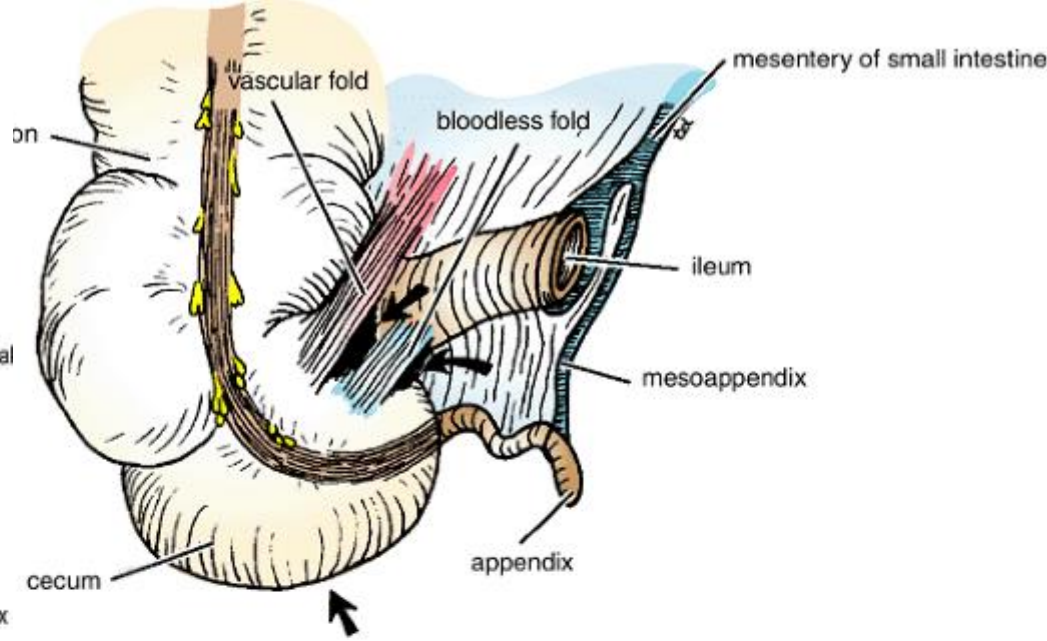
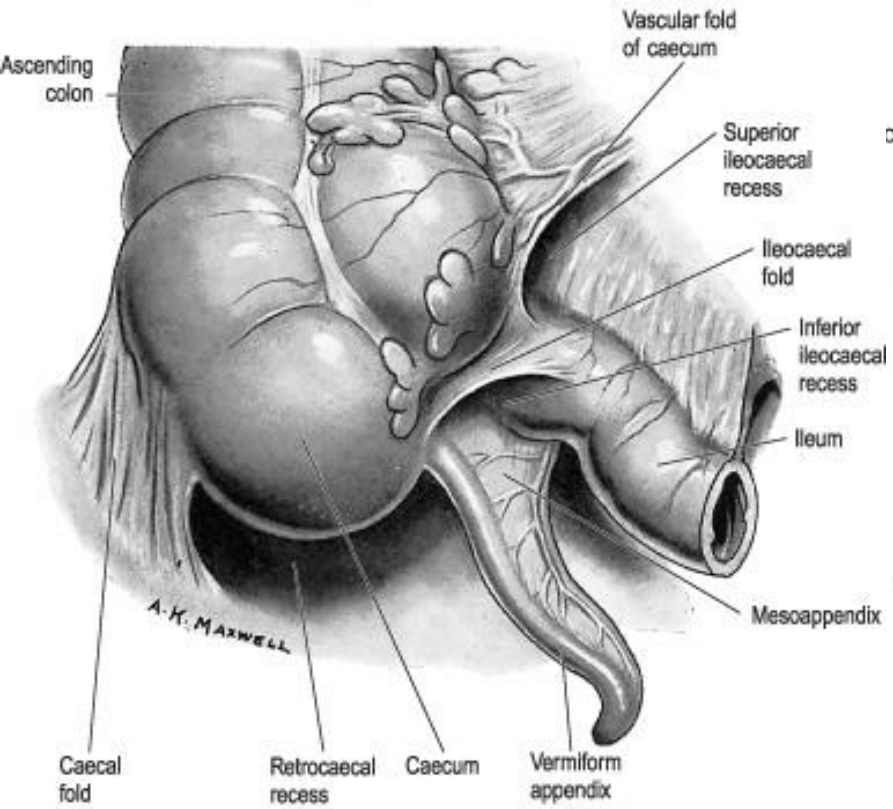












# Anterior abdominal wall

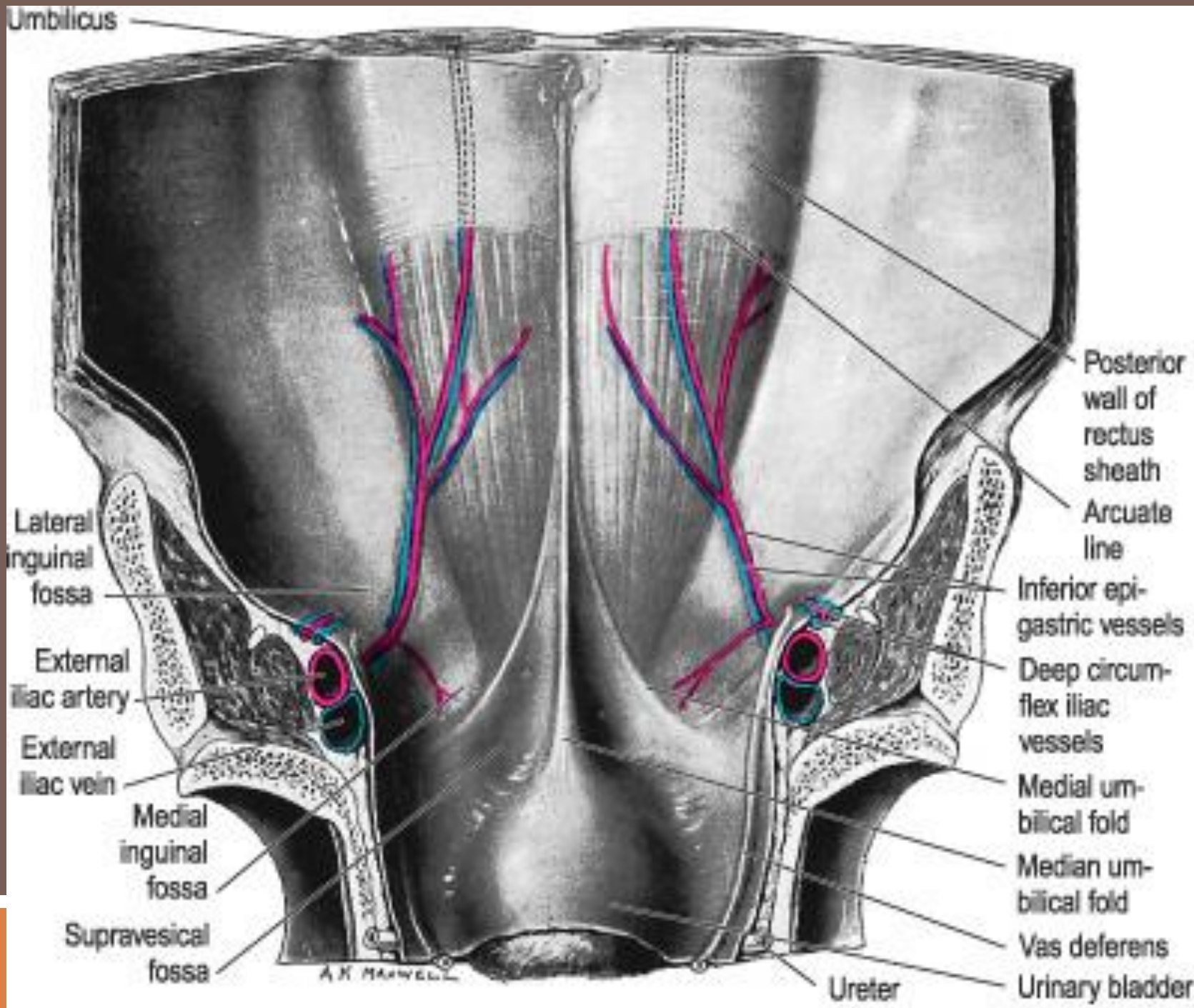
On anterior abdominal wall there are **five** peritoneal **folds**:

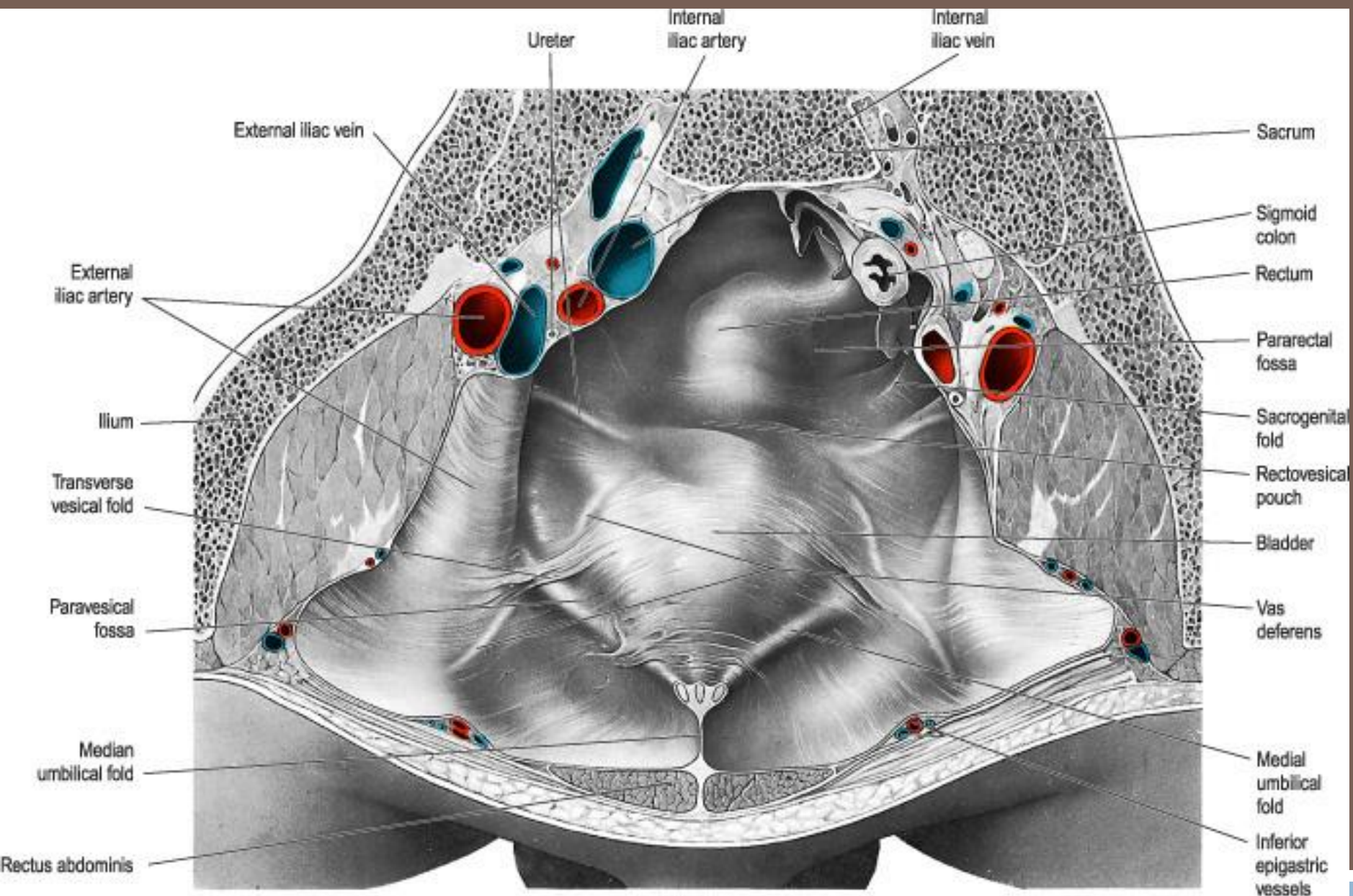
1. The **median** umbilical fold (contains the urachus);
2. The right and left **medial** umbilical folds (contain the obliterated umbilical arteries);
3. The right and left **lateral** umbilical folds (contain the inferior epigastric arteries and veins).

Between the named above folds form some peritoneal depressions:

1. The supravesical fossae
2. The medial inguinal fossae
3. The lateral inguinal fossae

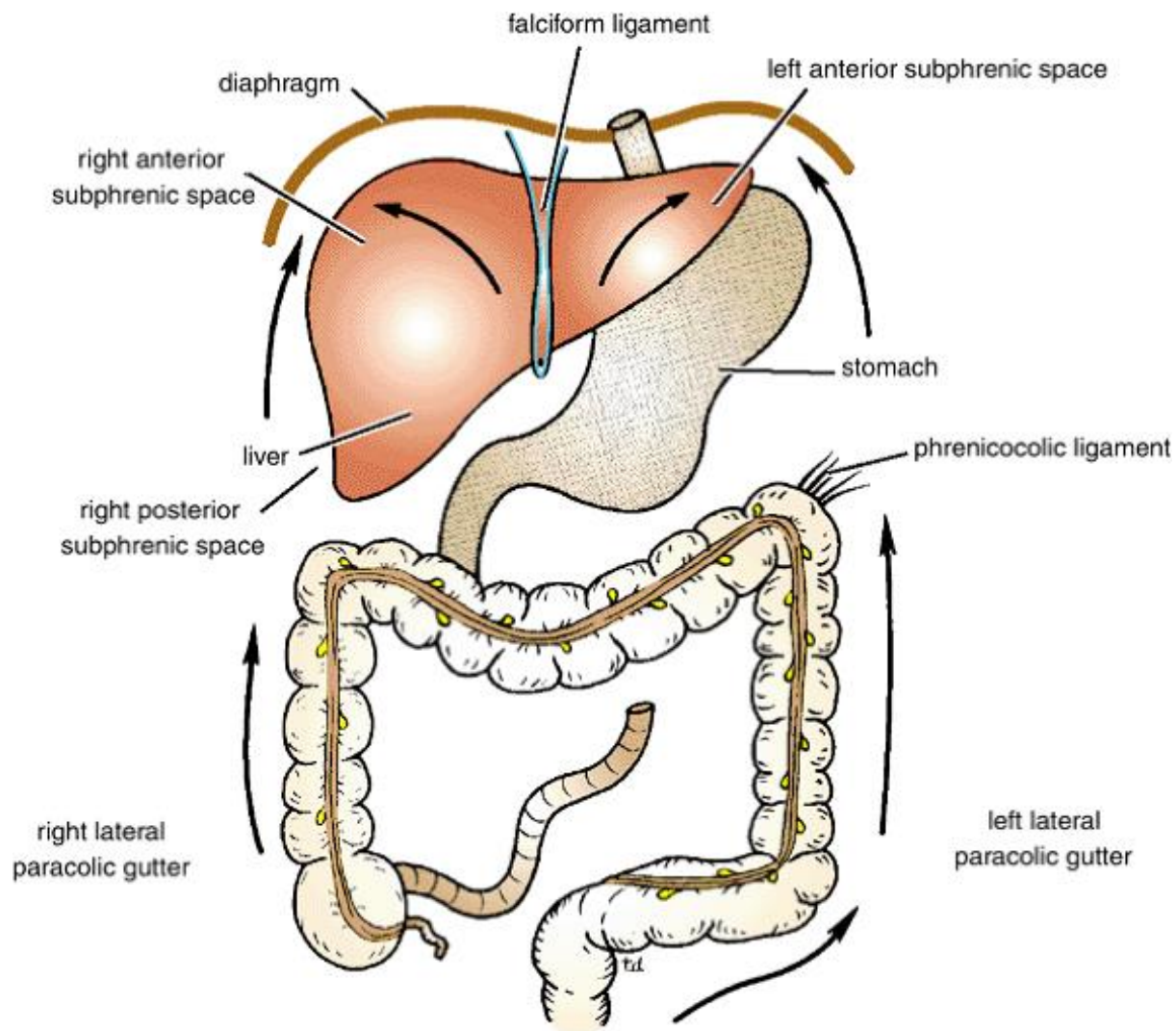








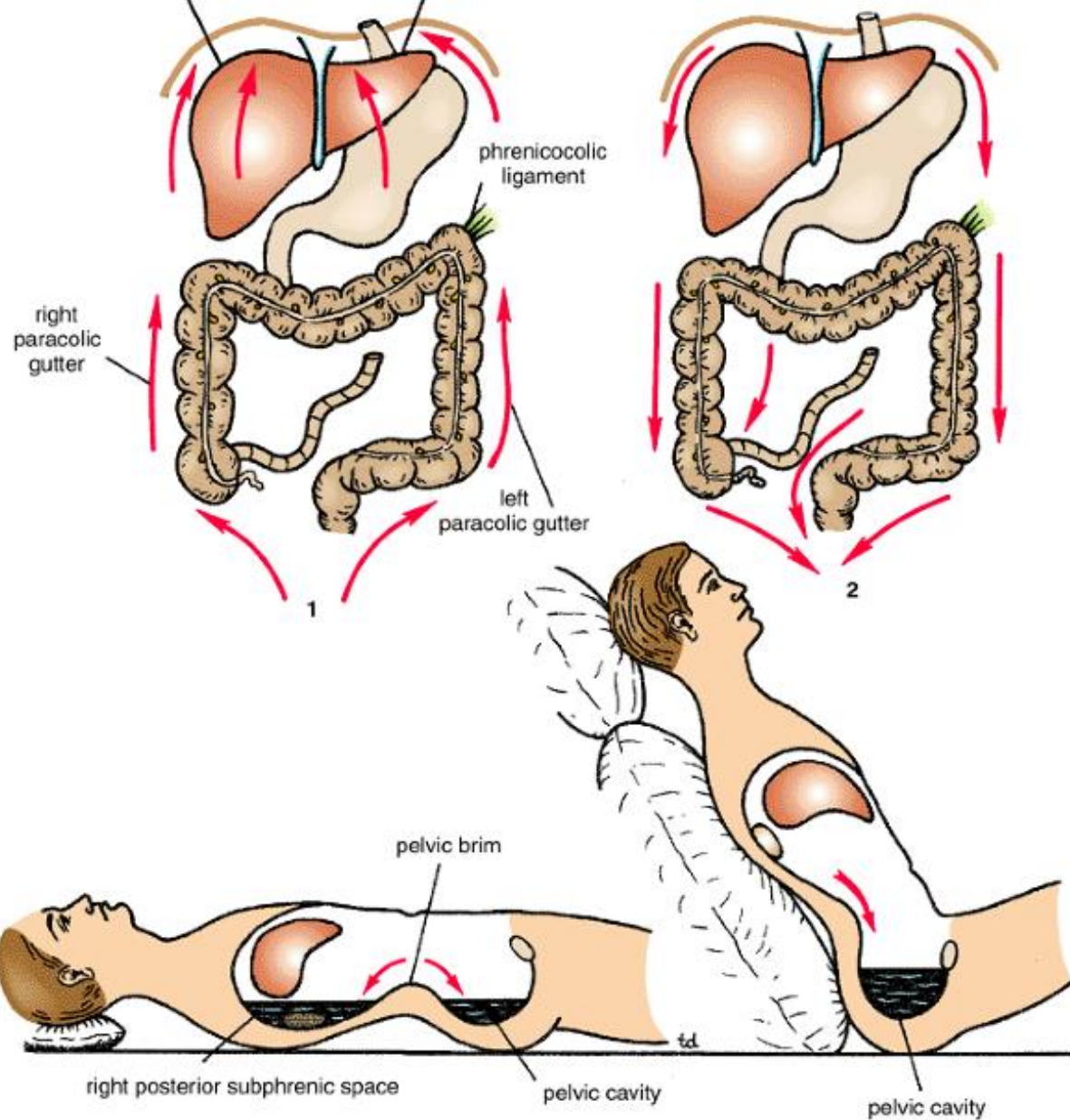
# Normal direction of flow of the peritoneal fluid from different parts of the peritoneal cavity to the subphrenic spaces





anterior and posterior  
right subphrenic spaces

anterior left subphrenic space



# Clinical significance

- In one form of dialysis, called peritoneal dialysis, a glucose solution is sent through a tube into the peritoneal cavity. The fluid is left there for a prescribed amount of time to absorb waste products, and then removed through the tube. The reason for this effect is the high number of arteries and veins in the peritoneal cavity. Through the mechanism of diffusion, waste products are removed from the blood.
- **Peritonitis** is the inflammation of the peritoneum. It is more commonly associated to infection from a punctured organ of the abdominal cavity. It can also be provoked by the presence of fluids that produce chemical irritation, such as gastric acid or pancreatic juice. Peritonitis causes fever, tenderness, and pain in the abdominal area, which can be localized or diffuse. The treatment involves rehydration, administration of antibiotics, and surgical correction of the underlying cause. Mortality is higher in the elderly and if present for a prolonged time.
- Primary peritoneal cancer is a cancer of the cells lining the peritoneum.



*5 weeks*



*6 weeks*



*7 weeks*



*8 weeks*



*10 weeks*



*12 weeks*



# 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.

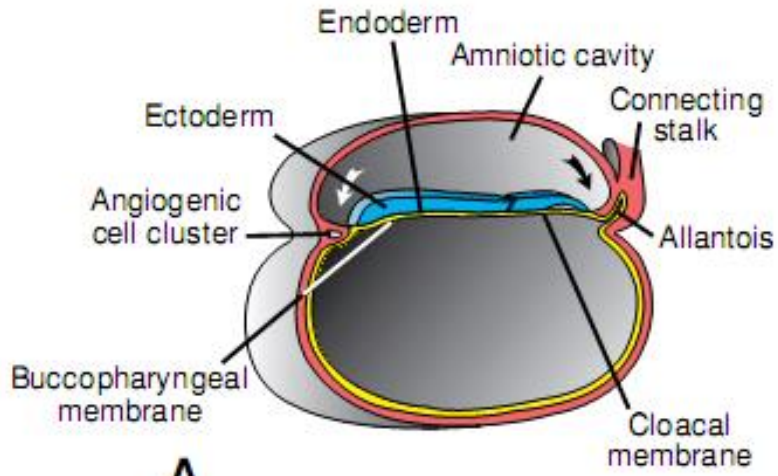
In the cephalic and caudal parts of the embryo, the primitive gut forms a blind-ending tube, the **foregut** and **hindgut**, respectively. The middle part, the **midgut**, remains temporarily connected to the yolk sac by means of the viteline duct, or yolk stalk.

*Development of the primitive gut and its derivatives:*

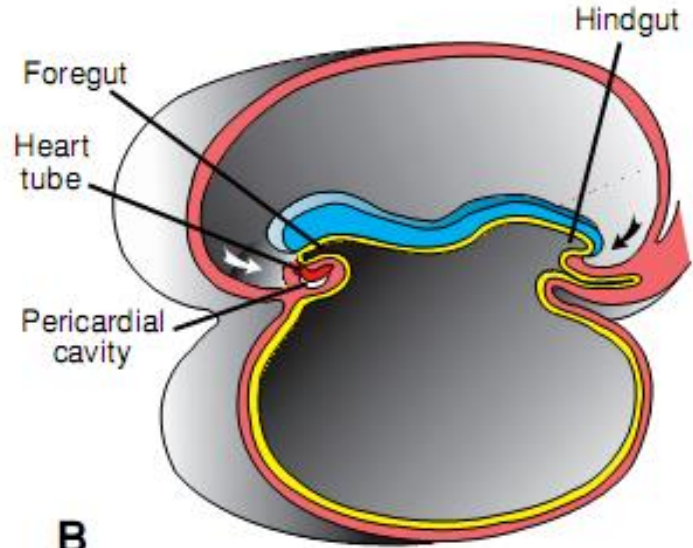
- ▶ The **pharyngeal gut**, or pharynx, extends from the buccopharyngeal membrane to the tracheobronchial diverticulum;
- ▶ The **foregut** lies caudal to the pharyngeal tube and extends as far caudally as the liver outgrowth;
- ▶ The **midgut** begins caudal to the liver bud and extends to the junction 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.

# Foregut Derivatives

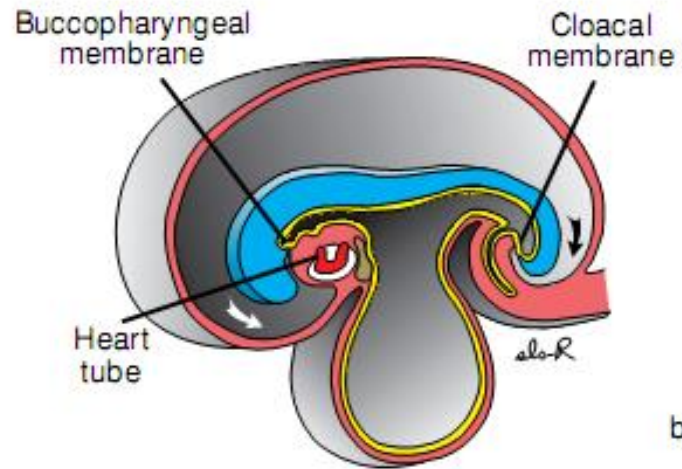
- **Foregut Derivatives** are supplied by the **celiac trunk**. The foregut gives rise to
  - the posterior part of the mouth,
  - the pharynx (except for the superior area close to the choanae which is of ectodermal origin),
  - the oesophagus,
  - the stomach, and the initial part of the duodenum (the bulb). The junction of the foregut and midgut is just distal to the opening of the common bile duct.



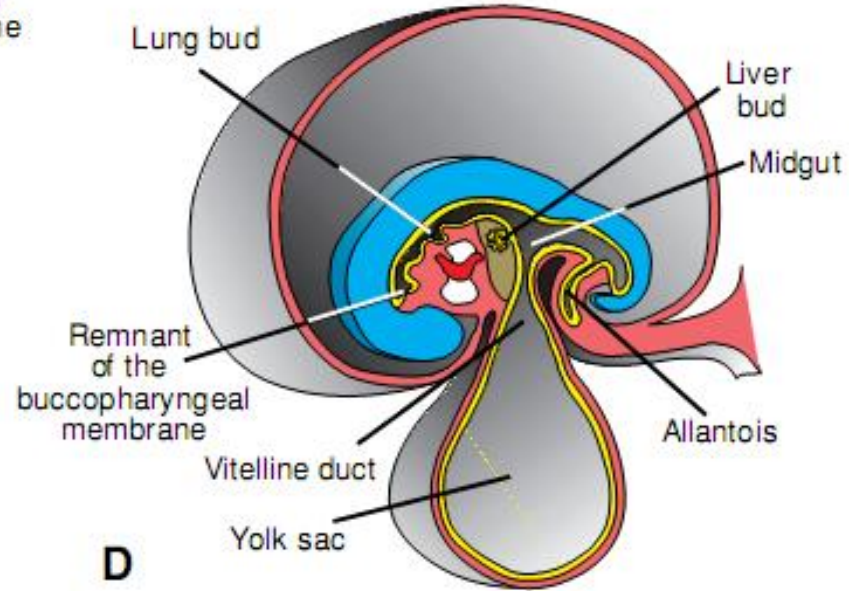
**A**



**B**

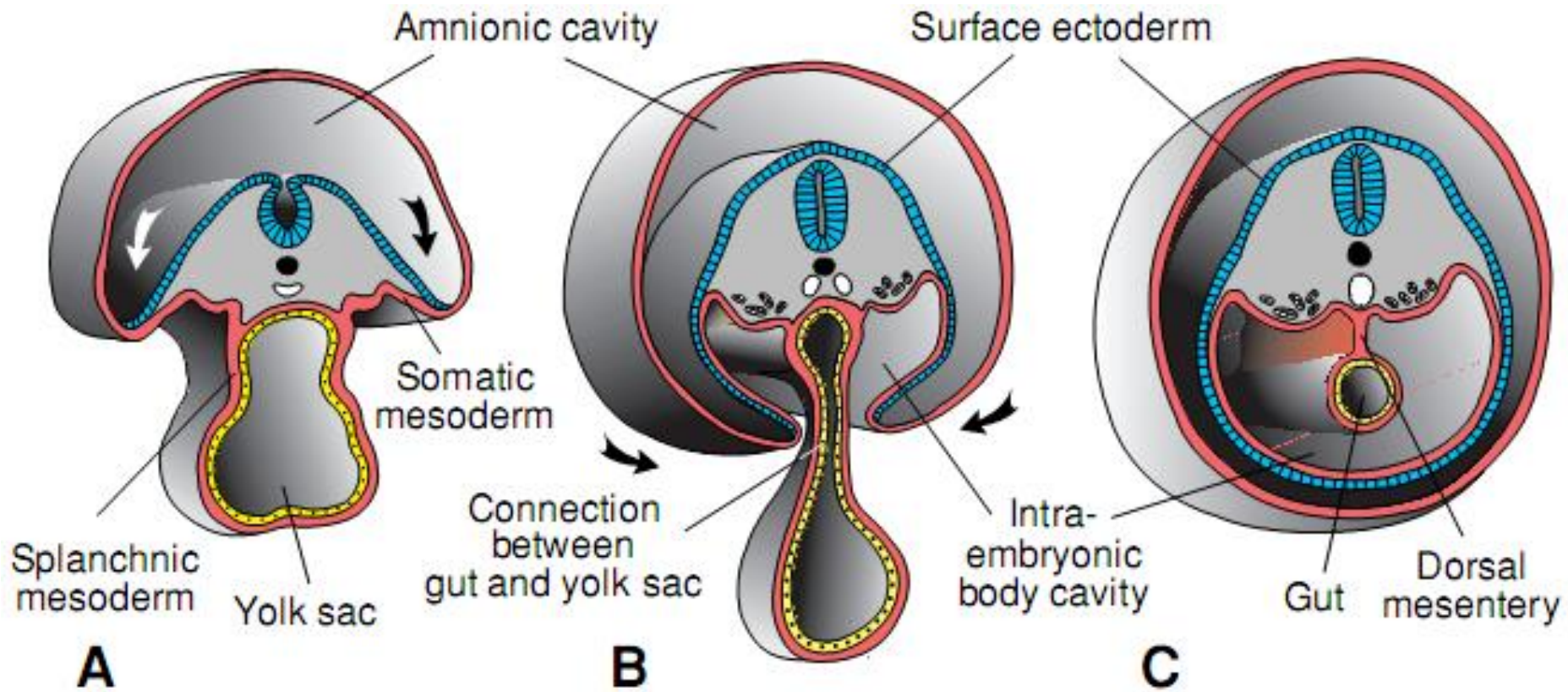


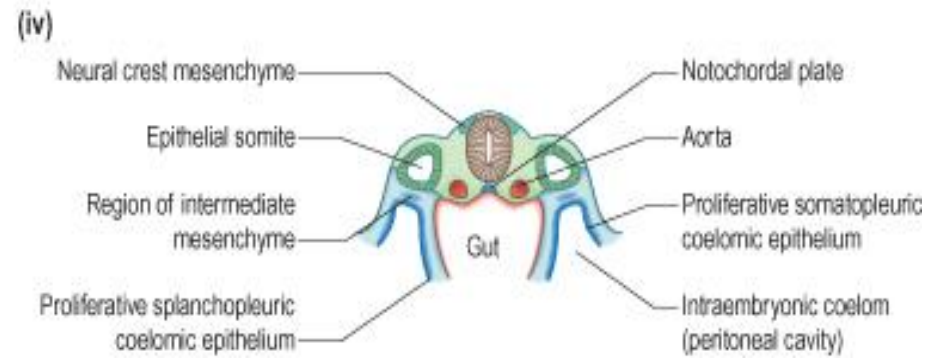
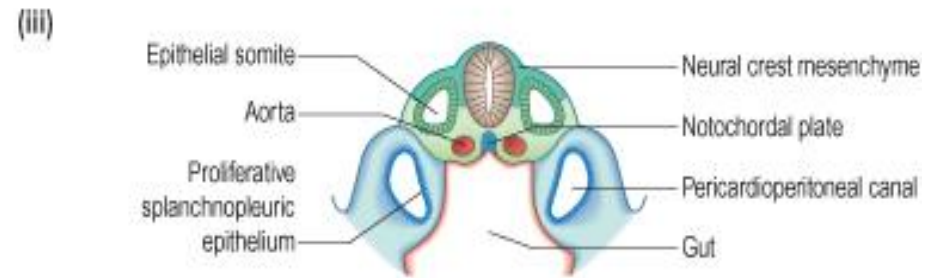
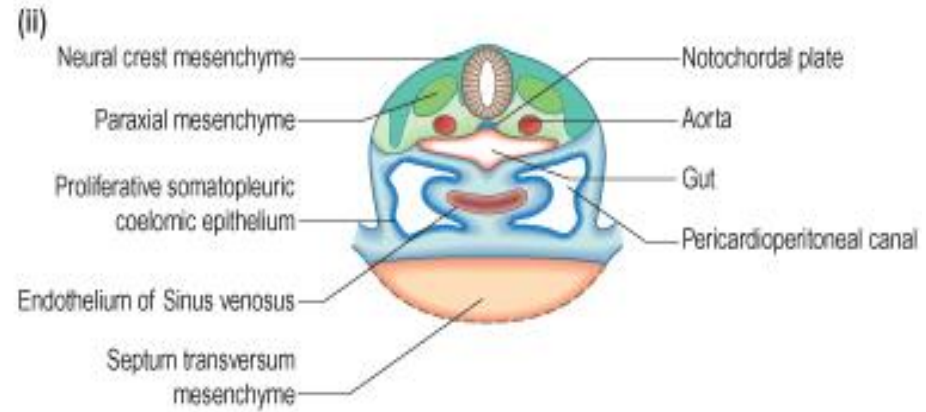
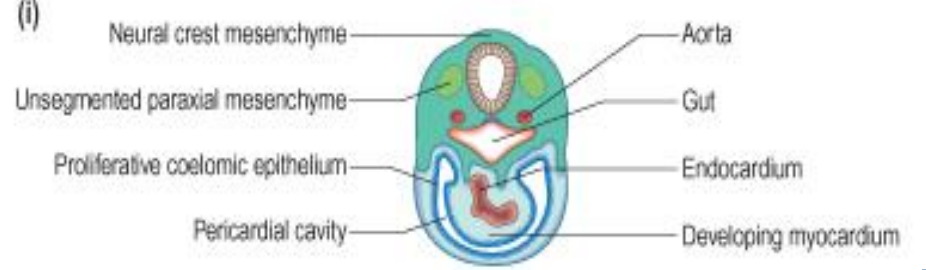
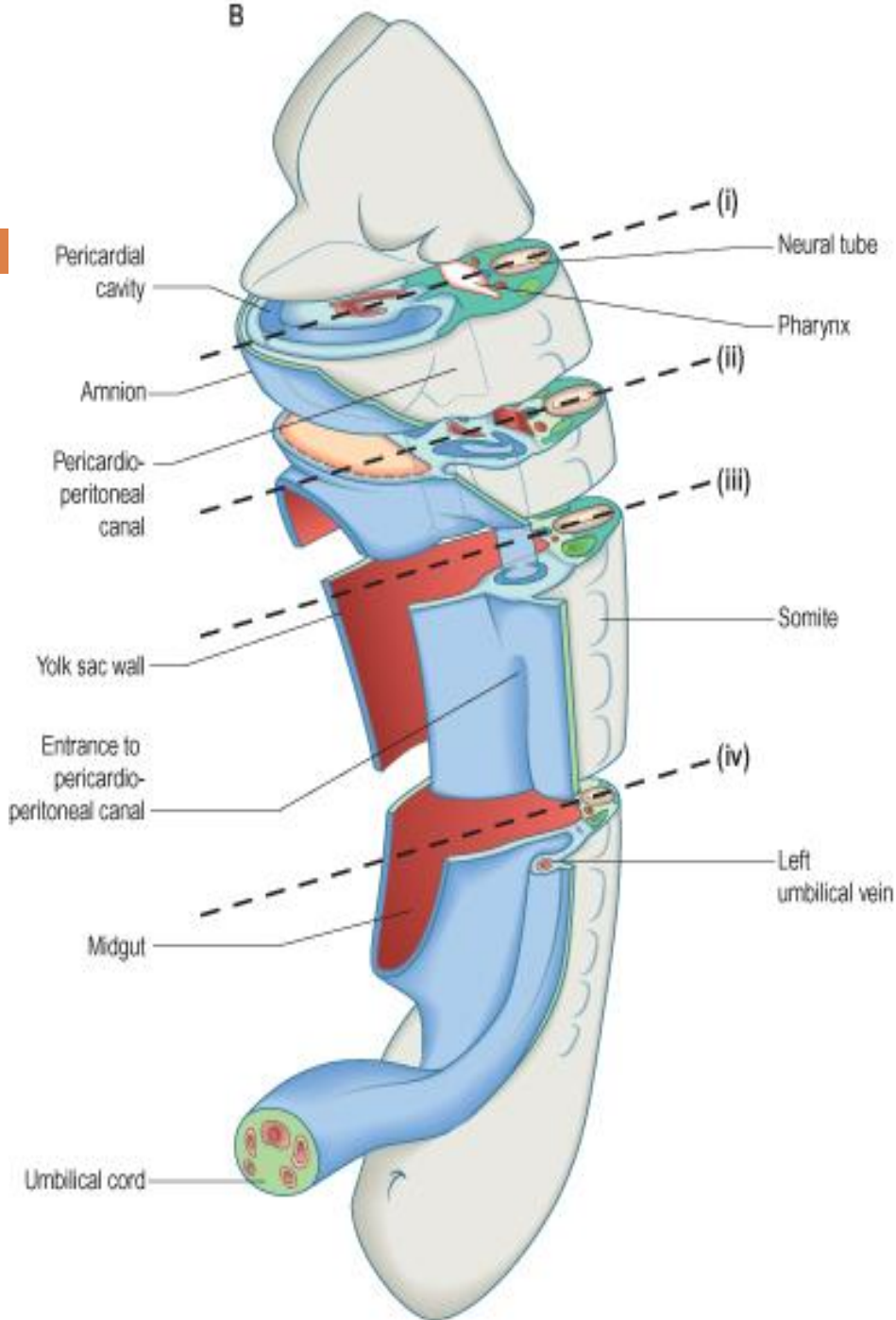
**C**



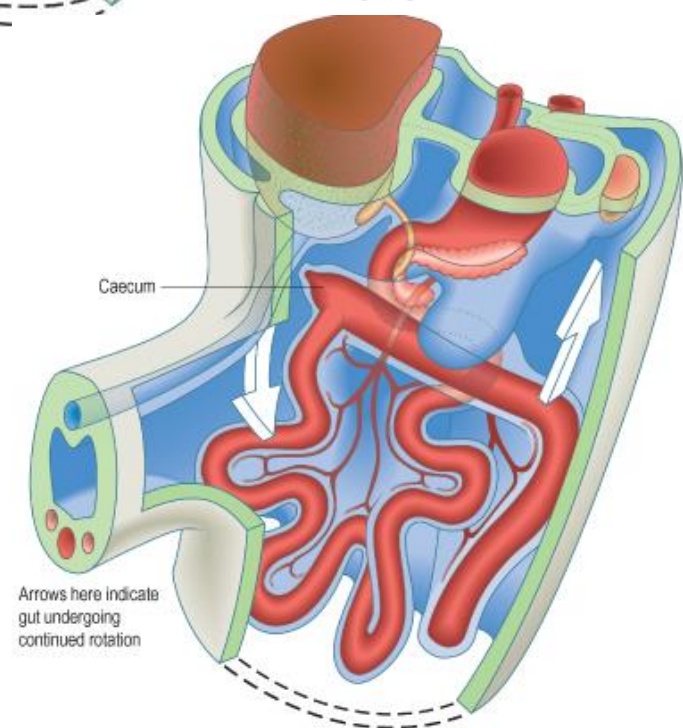
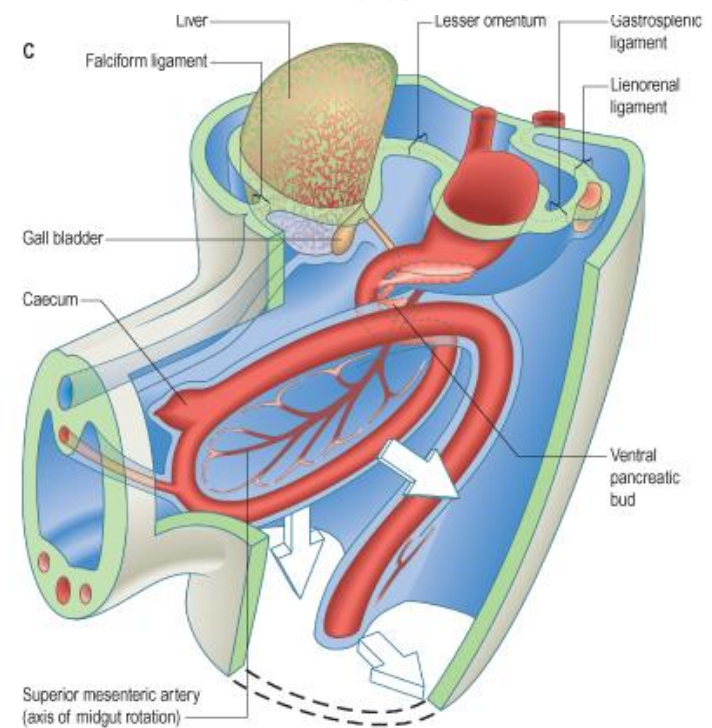
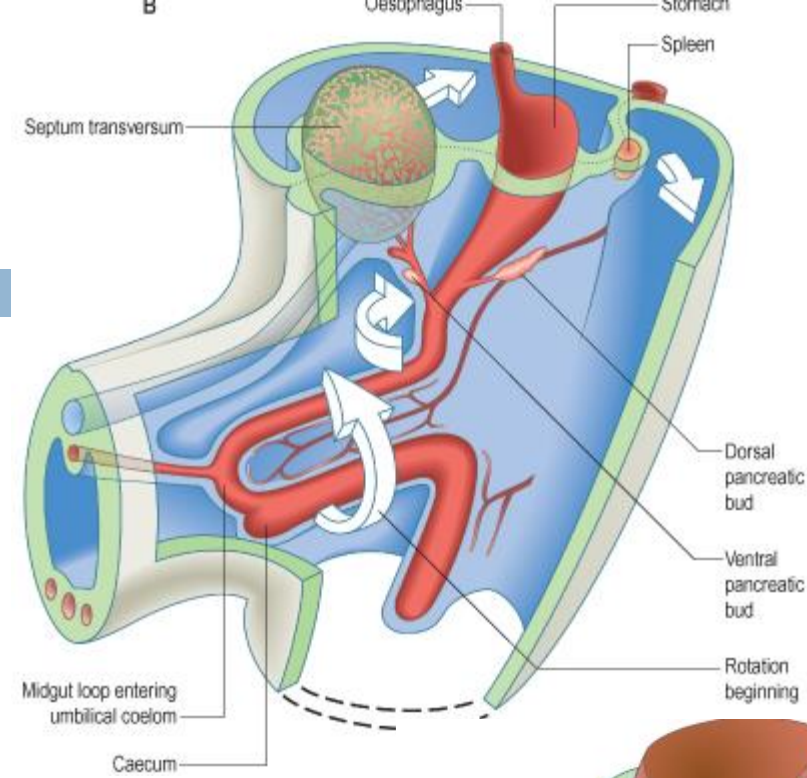
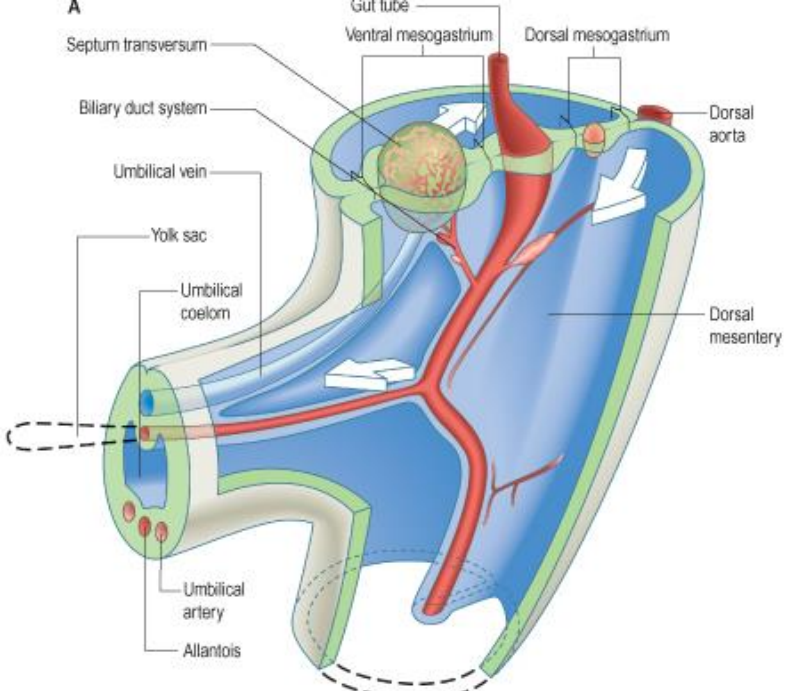
**D**





**B**





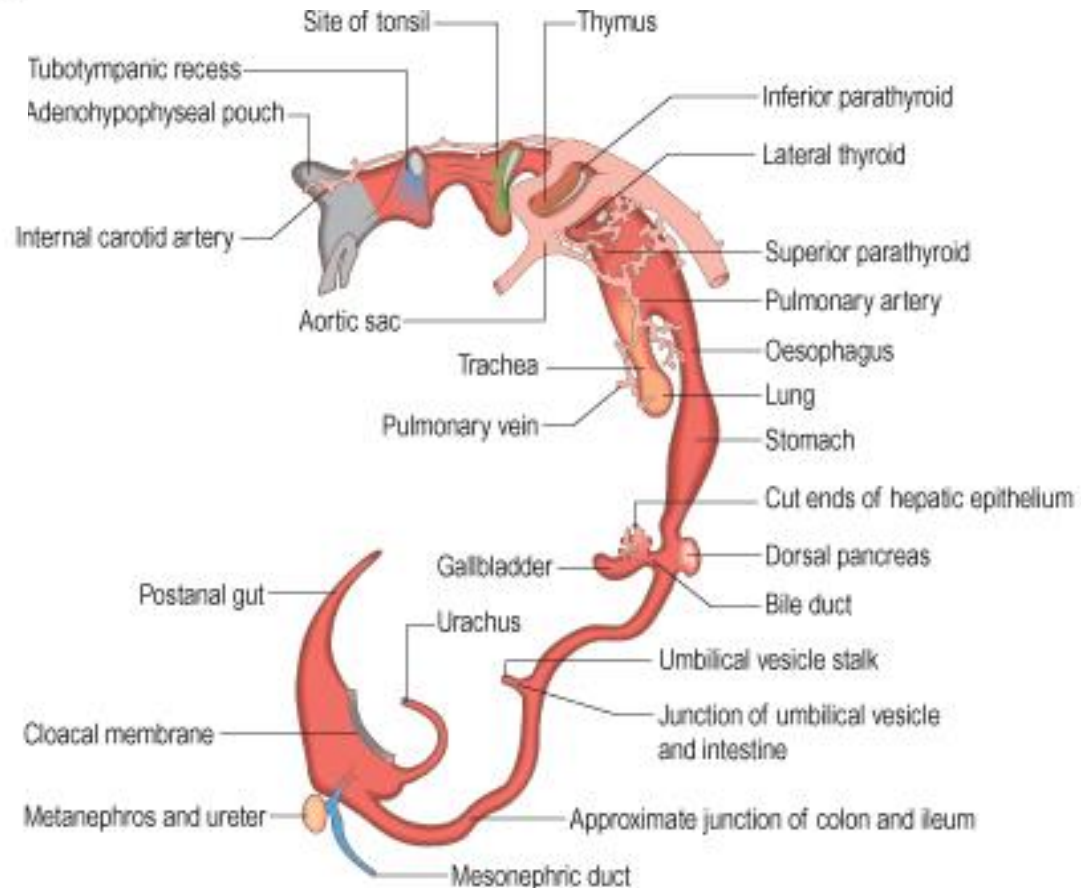
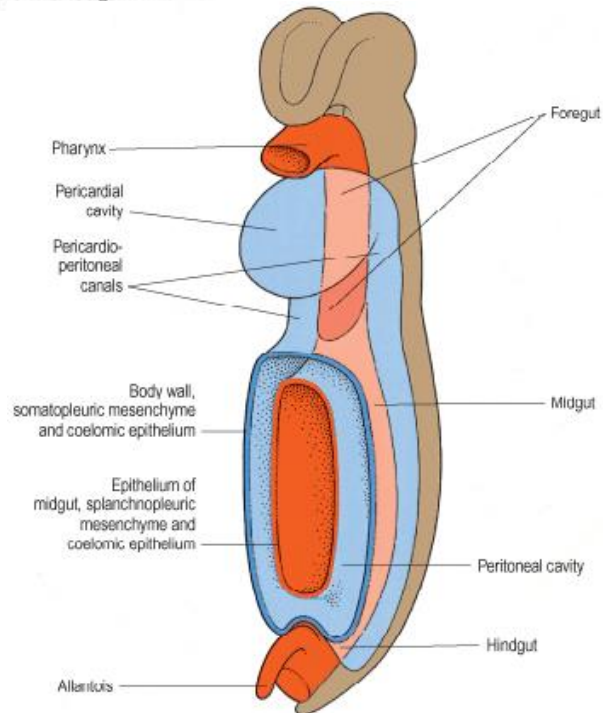
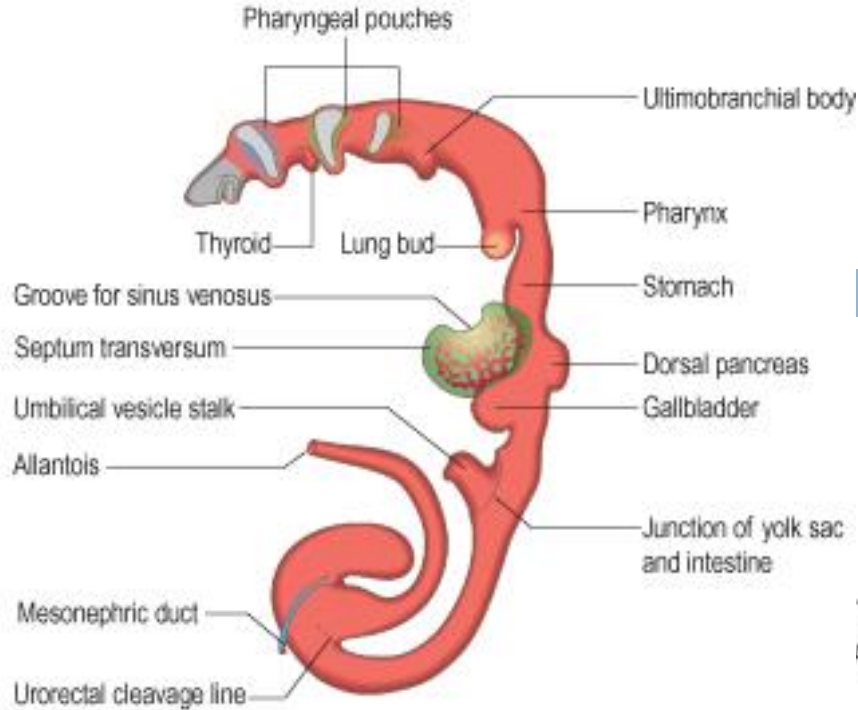


# Midgut Derivatives

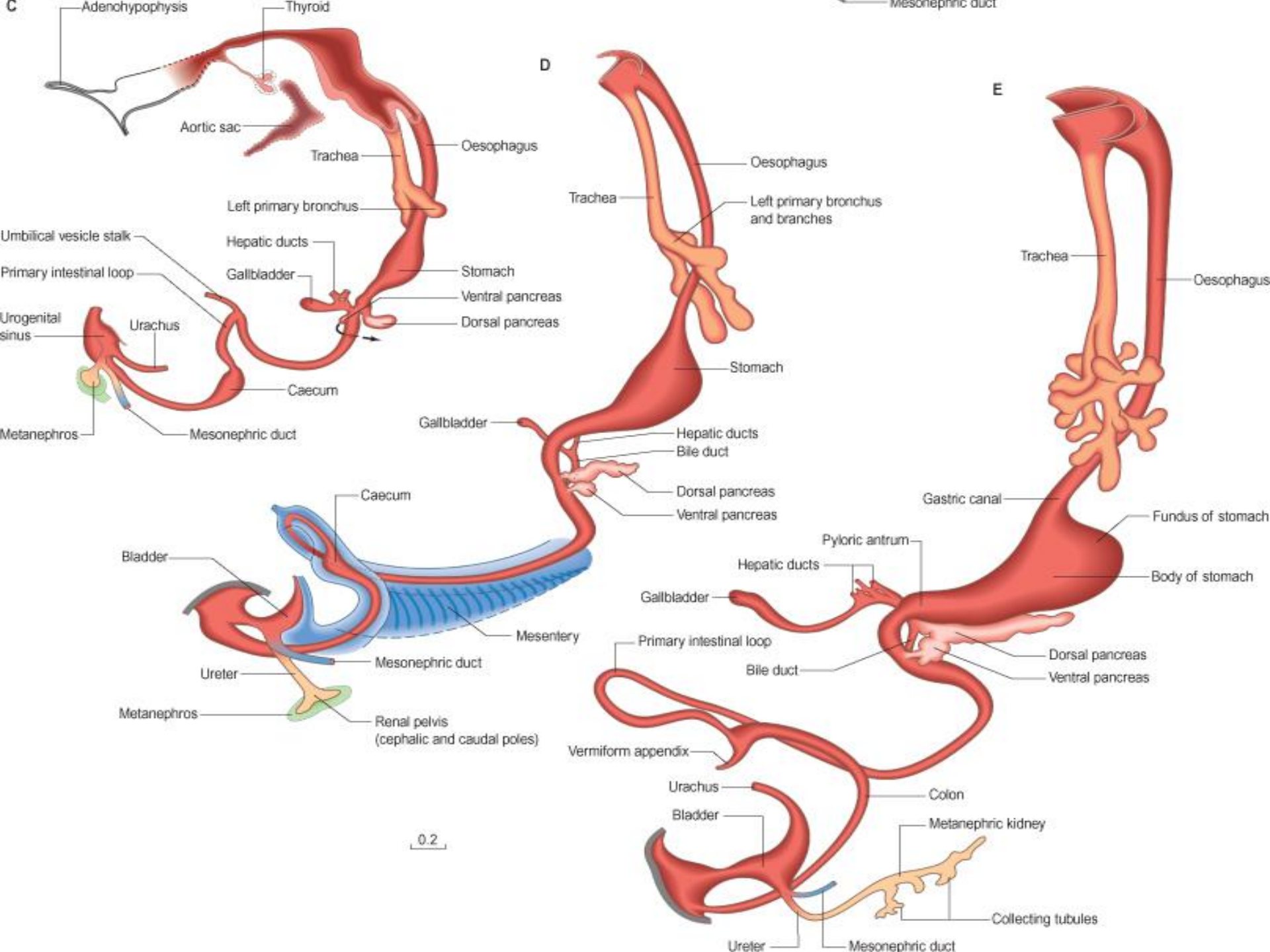
- **Midgut Derivatives** are supplied by the **superior mesenteric artery**. The midgut communicates with the yolk sac, and from its cranial portion develop the lower part of the duodenum, and also as derivatives of the midgut are
  - **the jejunum, ileum,**
  - **caecum,** or the blind gut, appendix,
  - ascending colon, and
  - proximal two thirds of the transverse colon.
- **Hindgut Derivatives** are supplied by **the inferior mesenteric artery**. This part of the primitive gut gives rise to the distal third of the transverse colon, to the descending colon, and to the sigmoid colon.

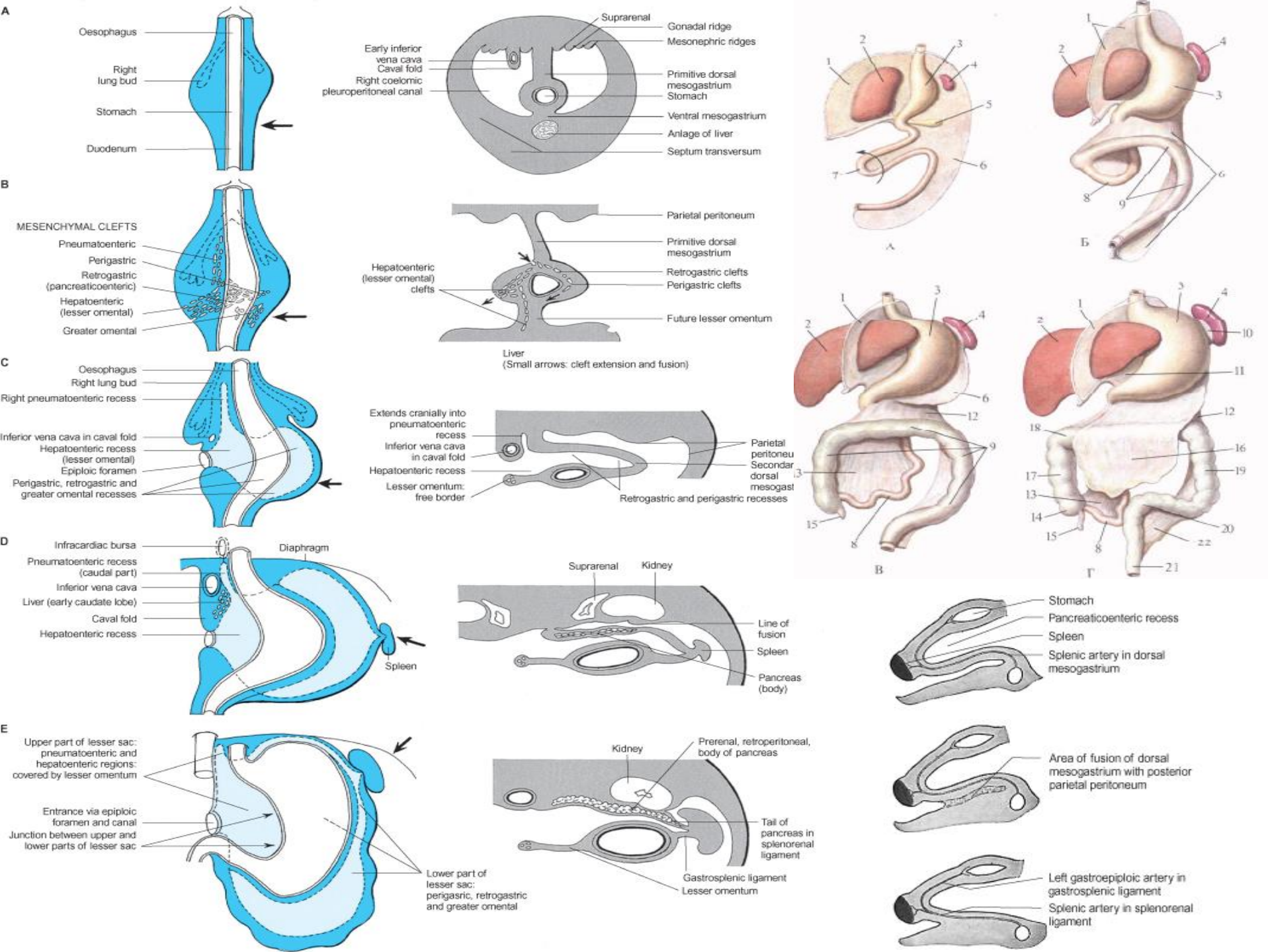
# Hindgut Derivatives

- **Hindgut Derivatives** are supplied by the **inferior mesenteric artery**. This part of the primitive gut gives rise to
  - the distal third of the transverse colon,
  - the descending colon, and
  - the sigmoid colon.







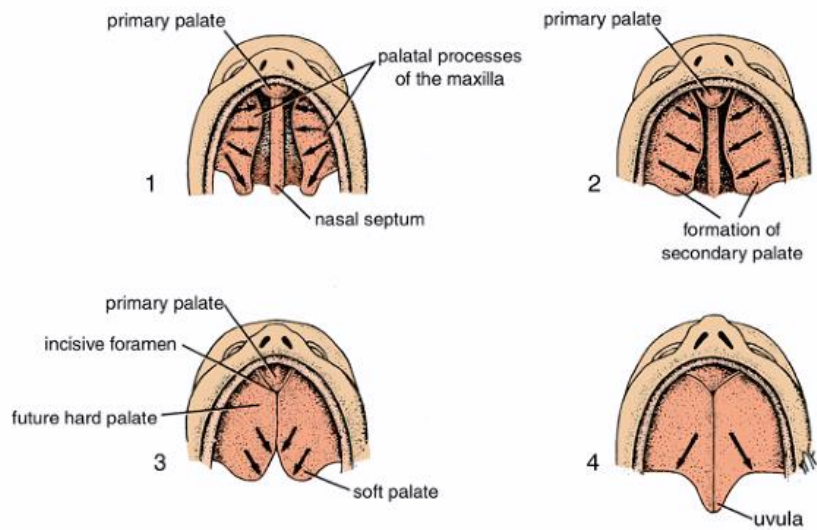
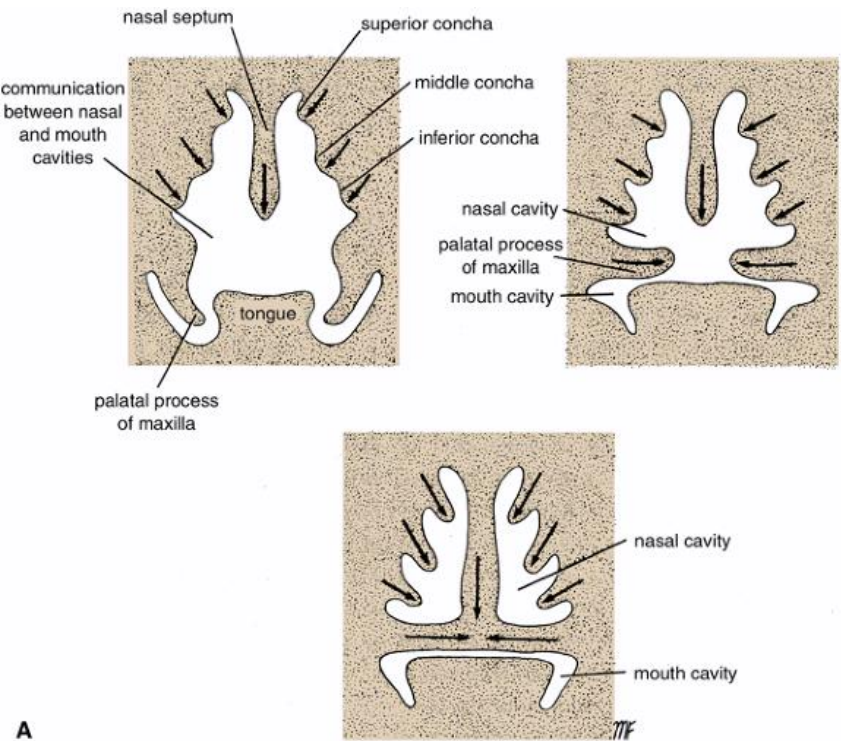


# Abnormalities

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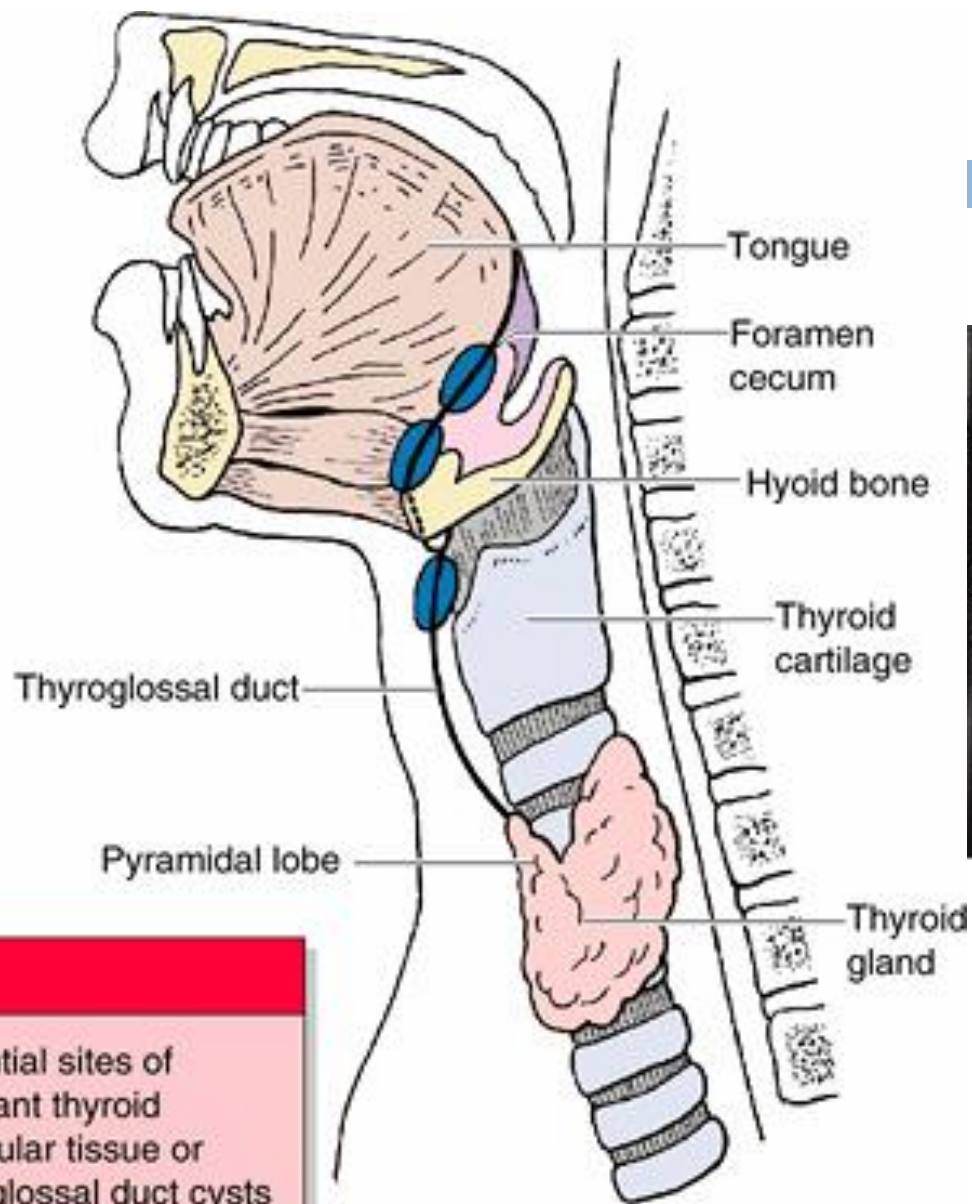
- Macrostomia
- Microstomia
- Hare-lip
- Cleft palate





- Ankyloglossia (tongue-tie)
- Bifurcated tongue
- Persistence of the thyroglossal duct



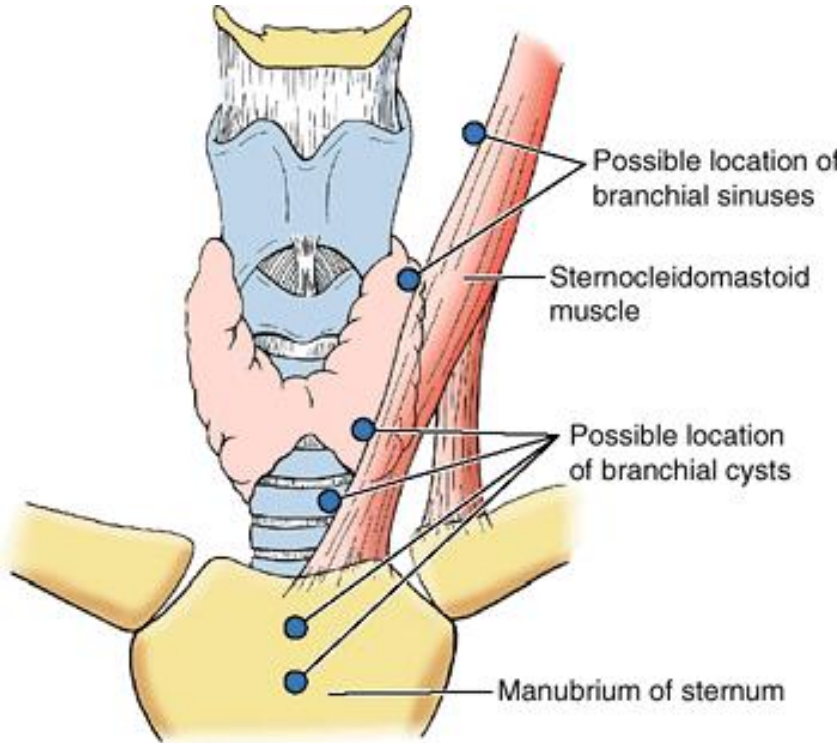
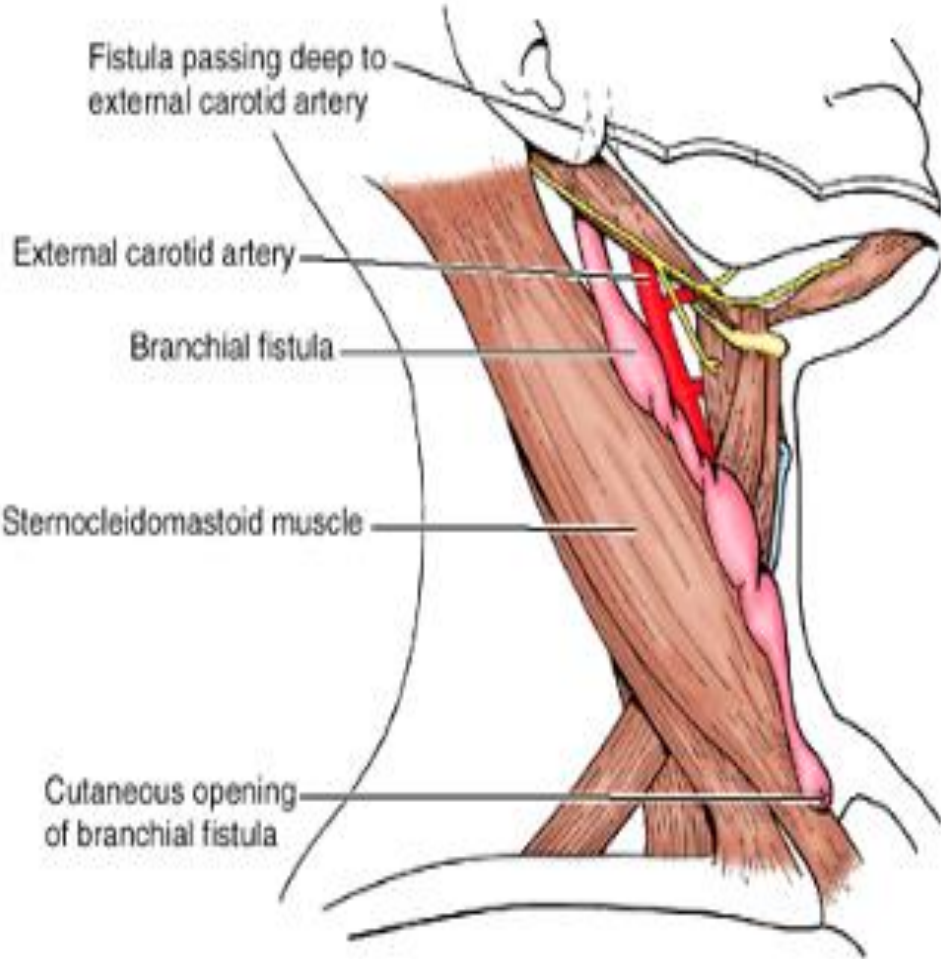


**Key**

■ Potential sites of aberrant thyroid glandular tissue or thyroglossal duct cysts



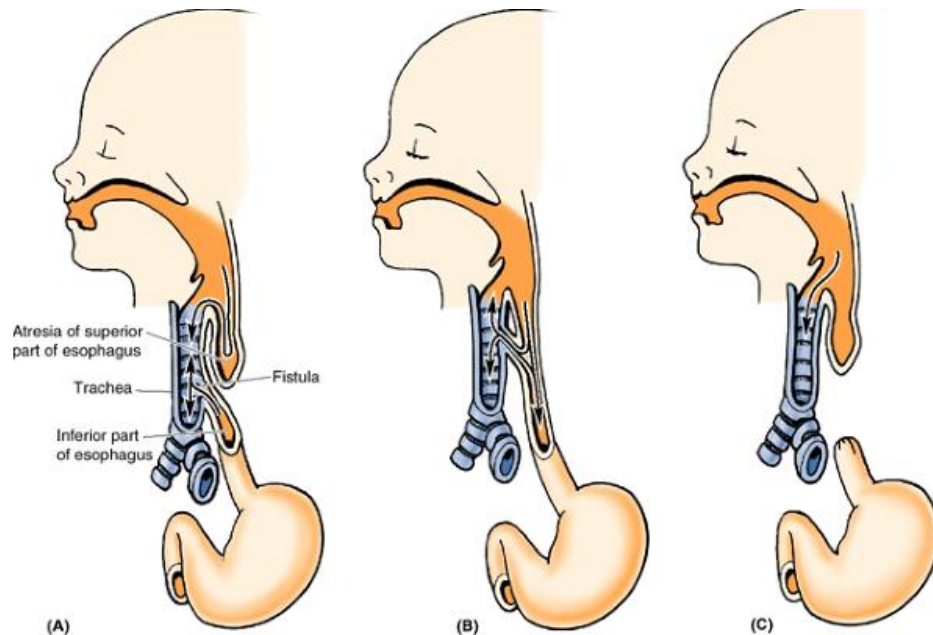
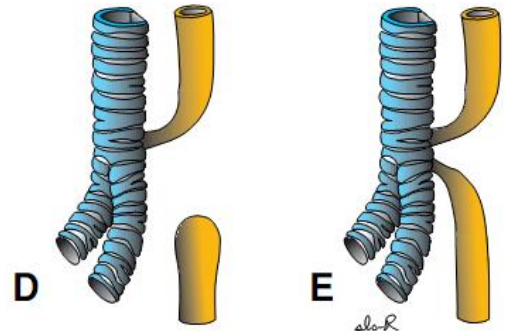
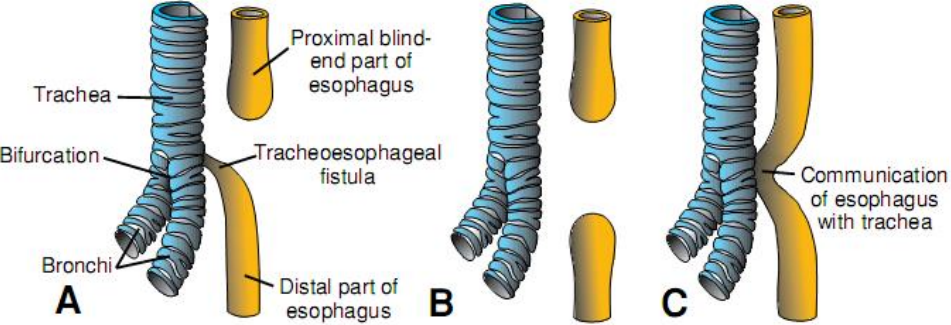
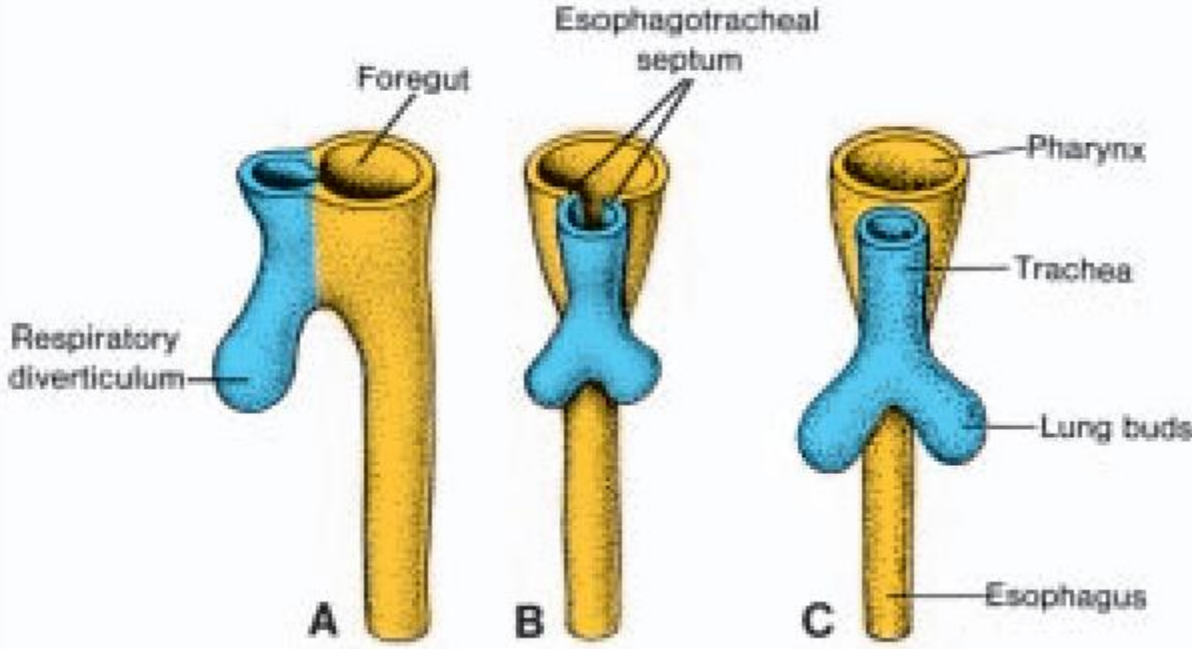
# Branchial Fistula



# Branchial Fistula

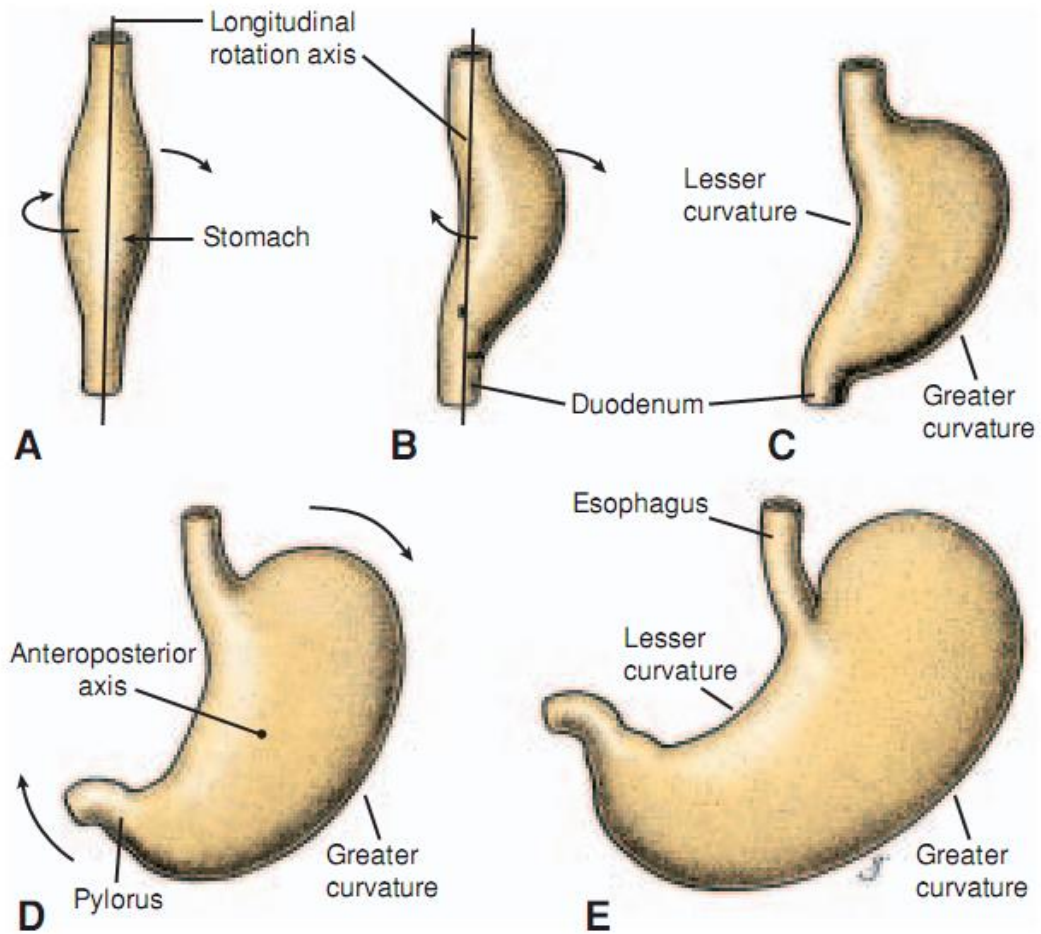
- A branchial fistula is an abnormal canal that opens internally into the tonsillar cleft and externally on the side of the neck.
- This uncommon cervical canal results from persistence of remnants of the 2nd pharyngeal pouch and 2nd pharyngeal groove.
- The fistula ascends from its cervical opening, usually along the anterior border of the SCM in the inferior third of the neck, through the subcutaneous tissue, platysma, and fascia of the neck to enter the carotid sheath. It then passes between the internal and the external carotid arteries on its way to its opening in the tonsillar cleft.

# Esophagus

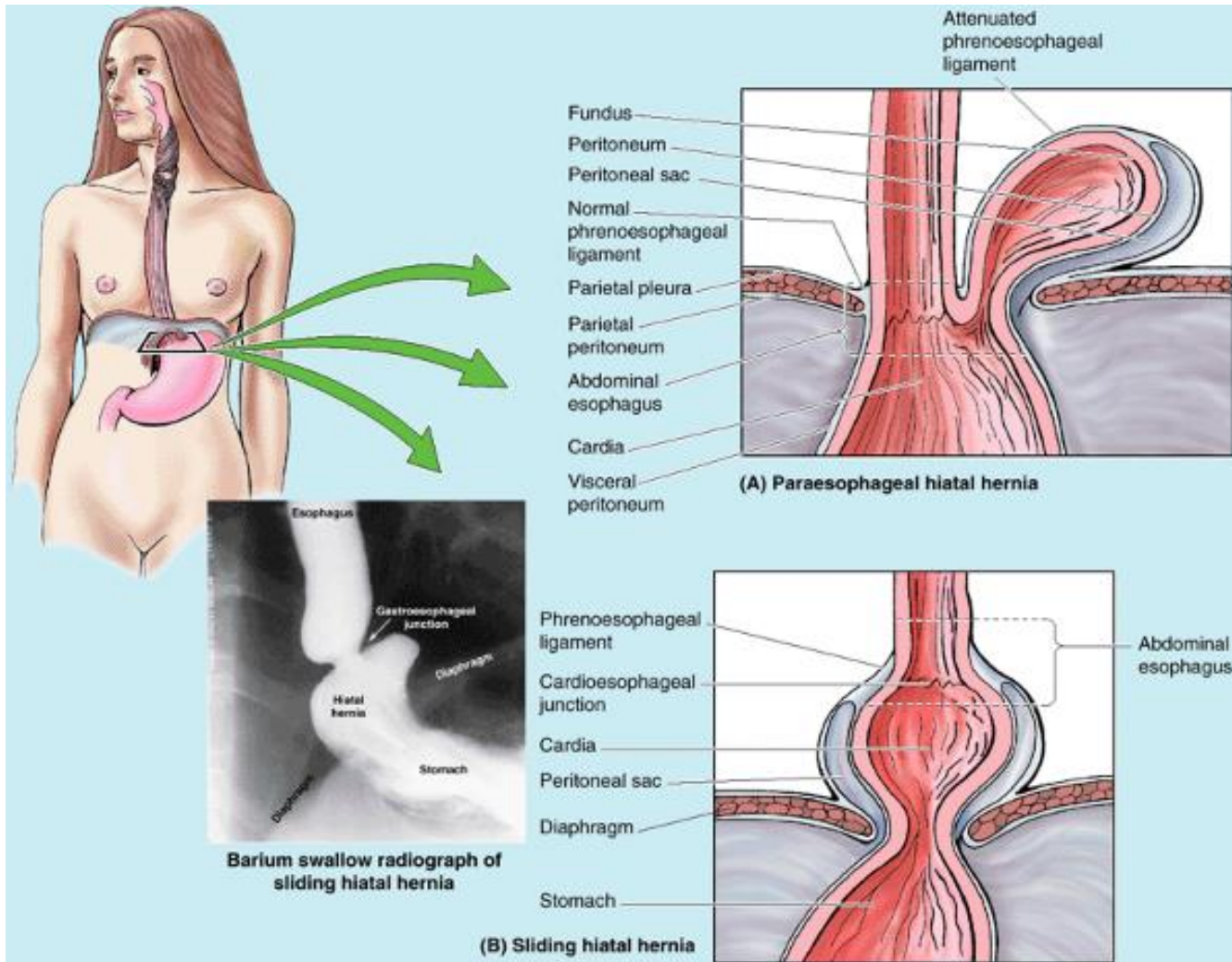




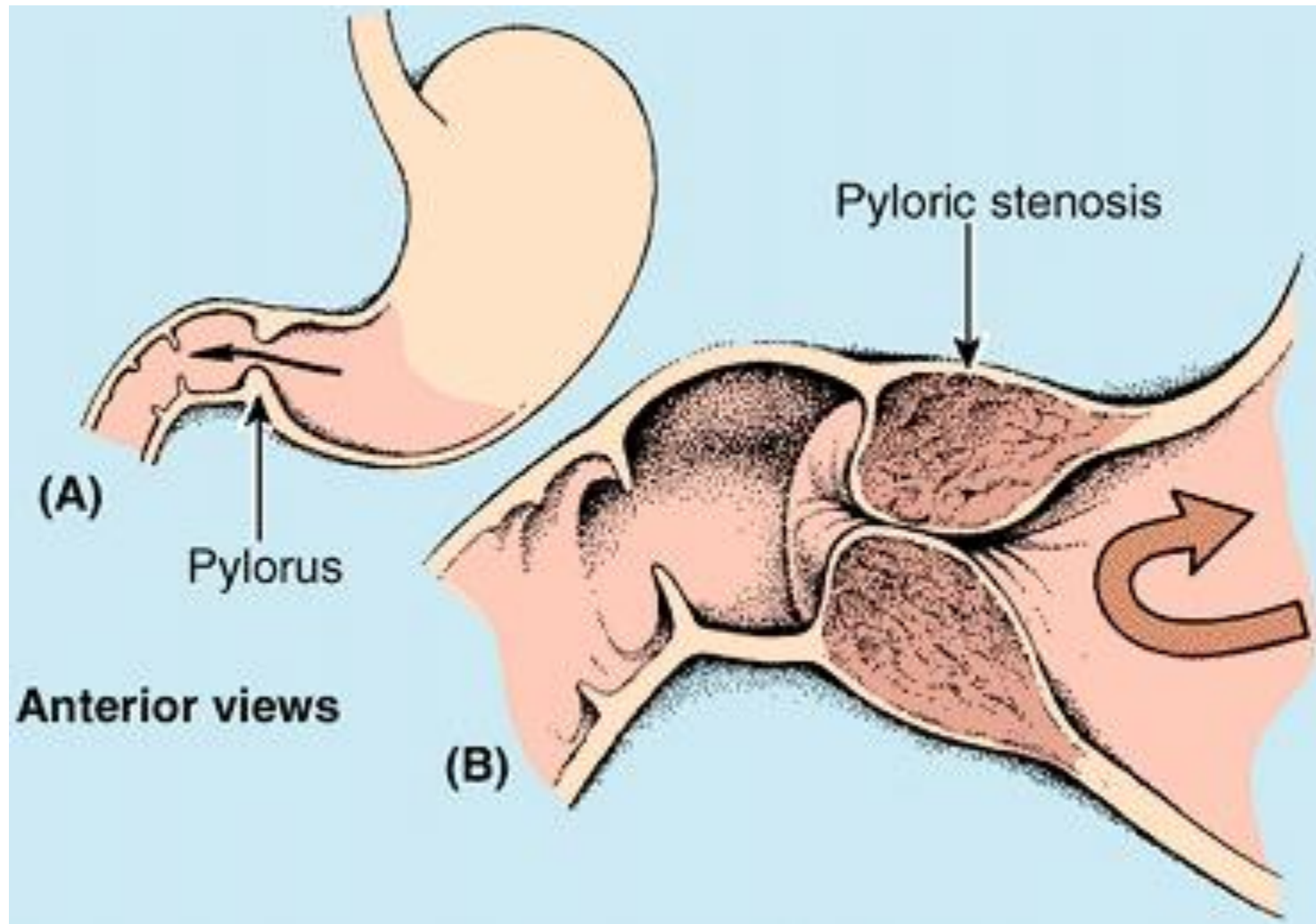
# Stomach



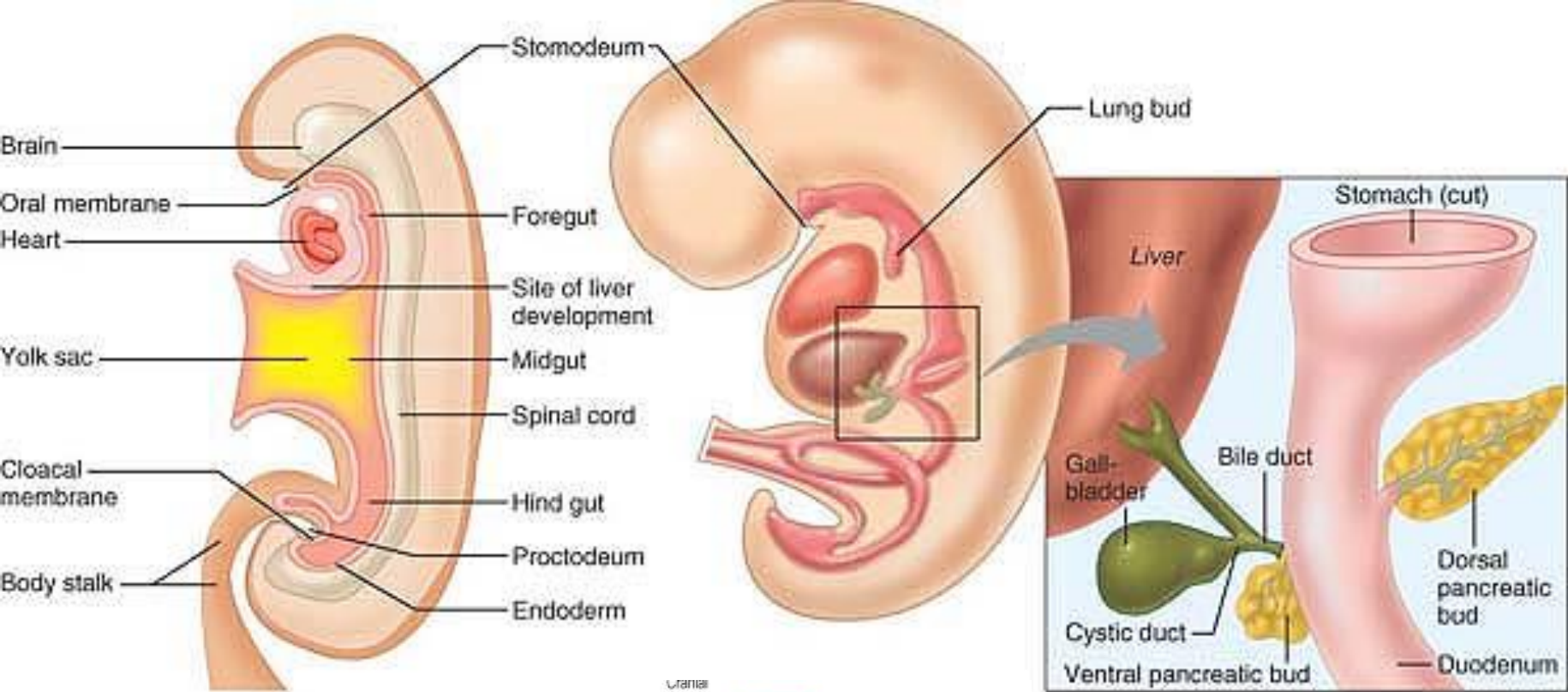
# Congenital Diaphragmatic Hernia



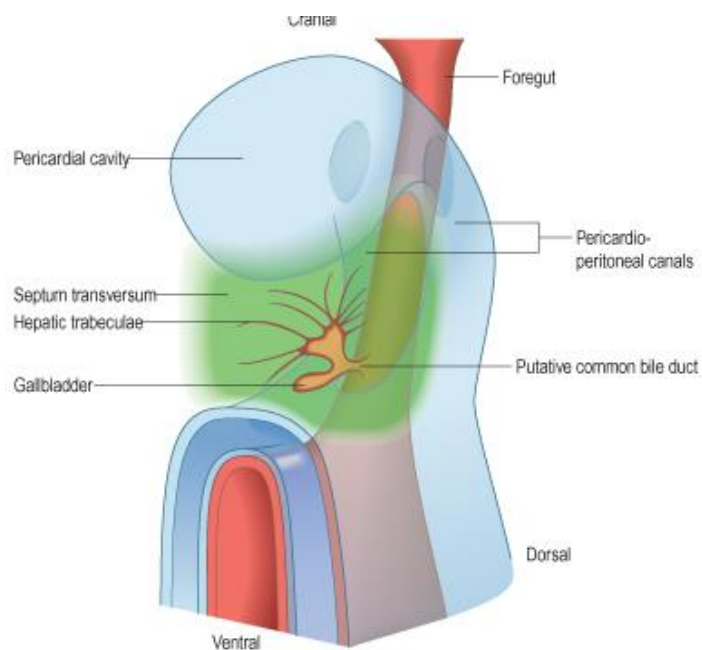
# Congenital hypertrophic pyloric stenosis

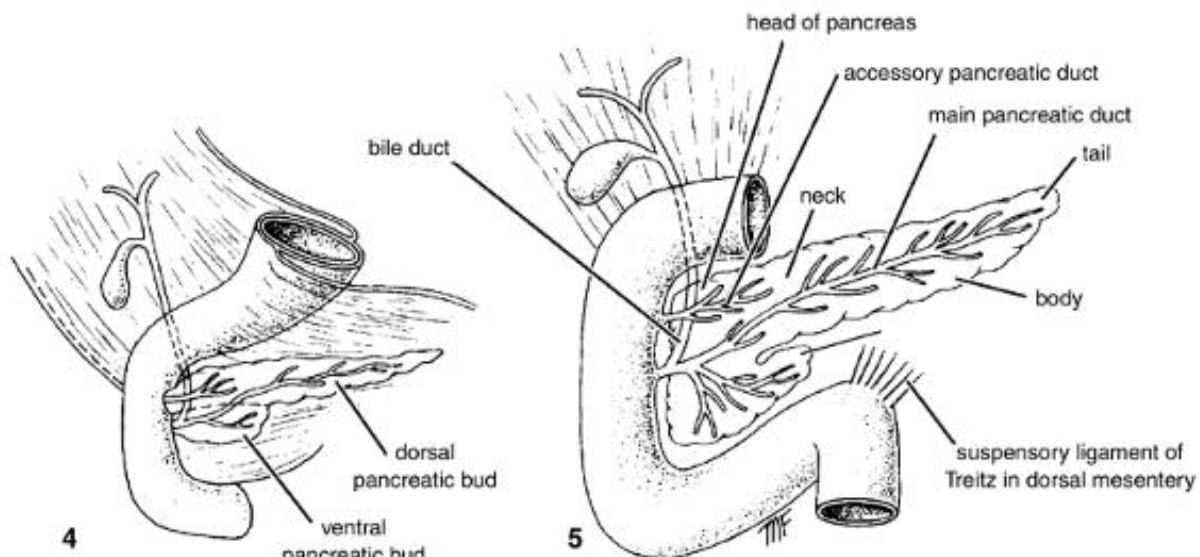
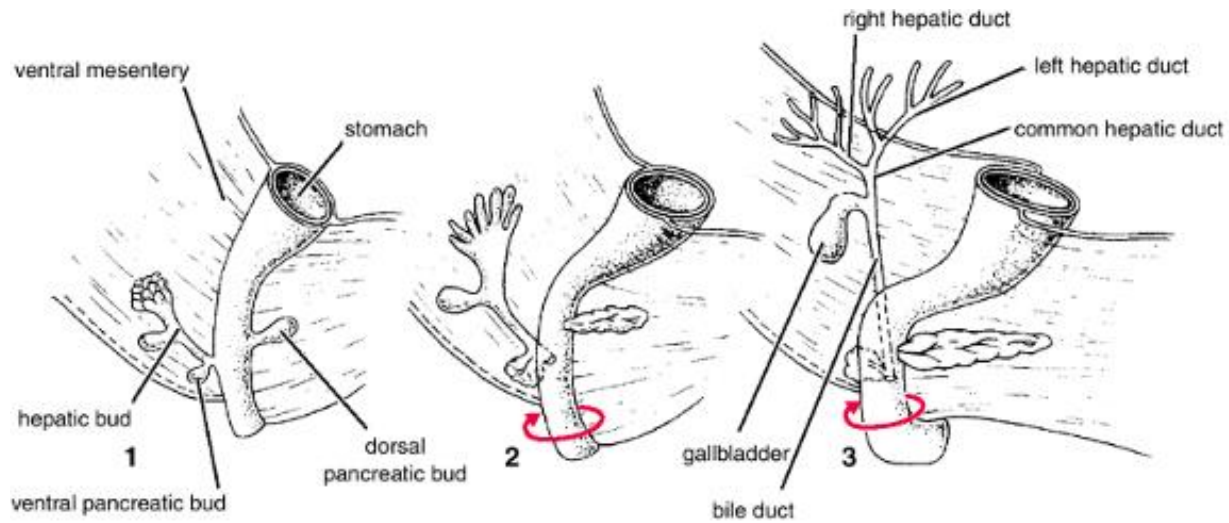


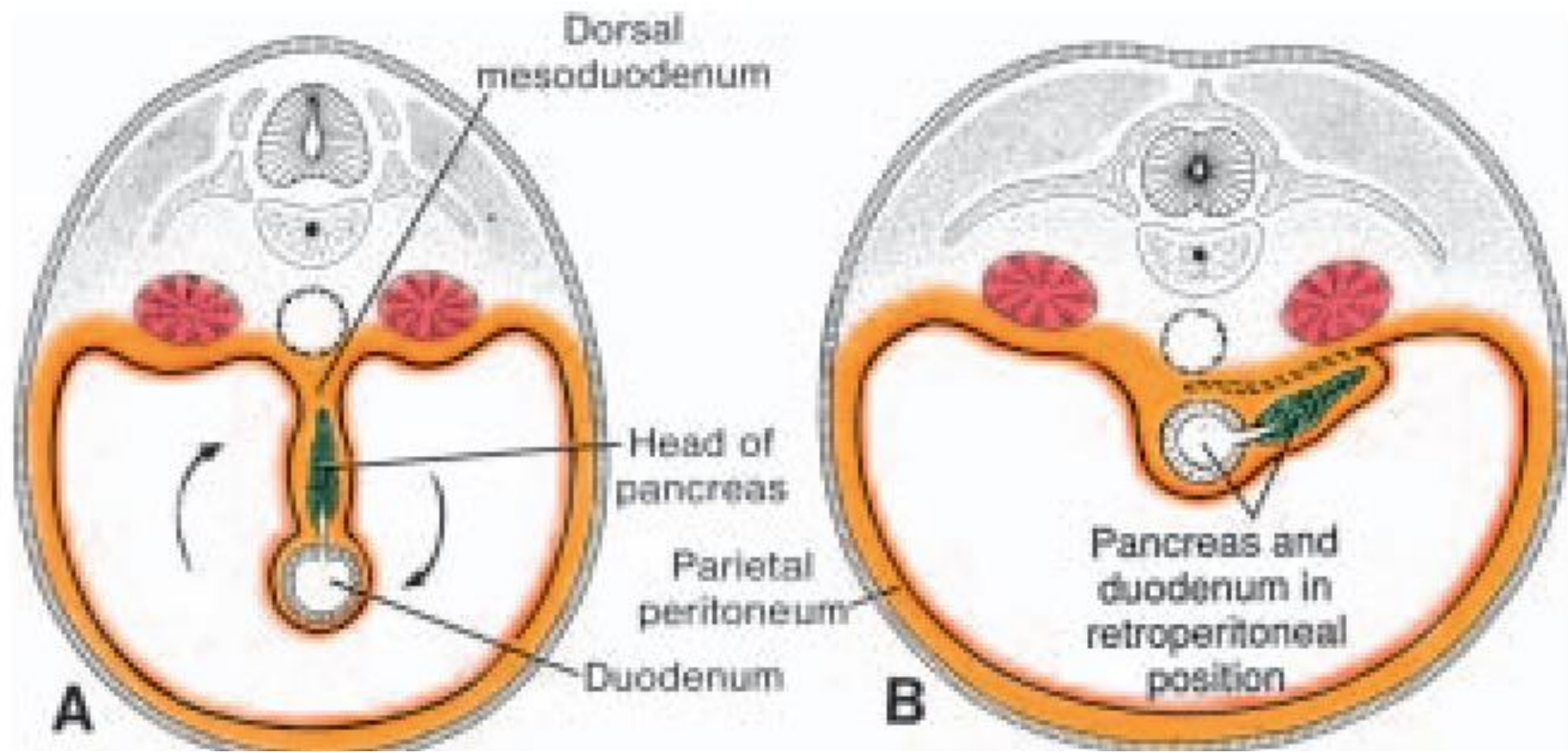




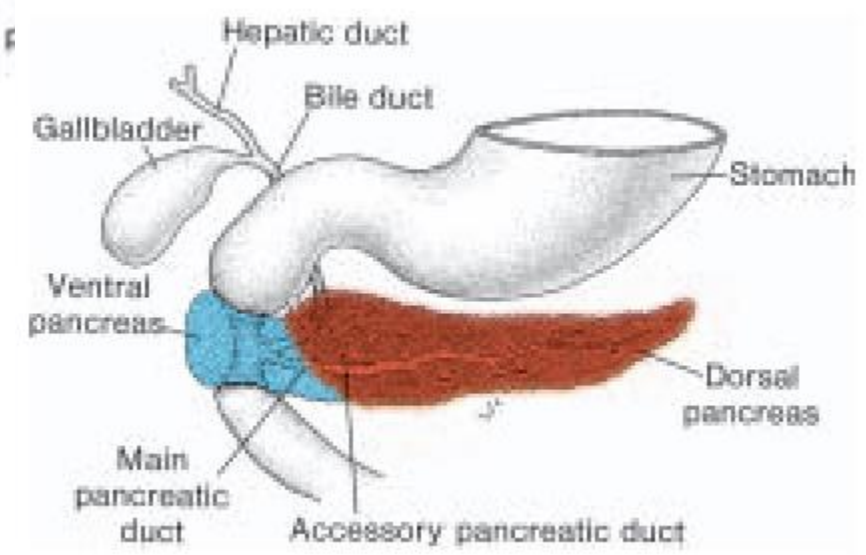
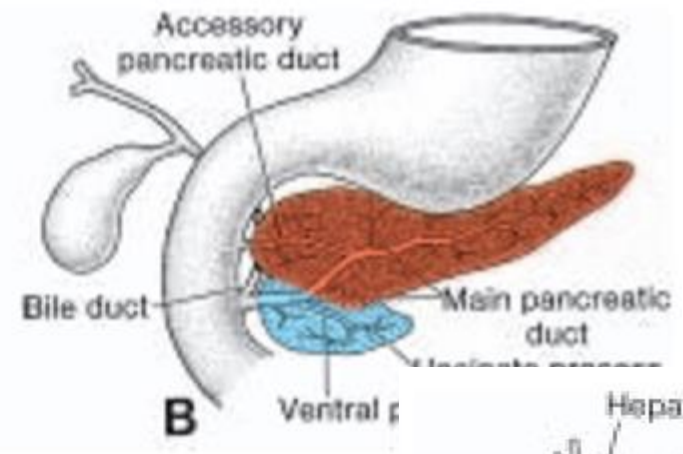
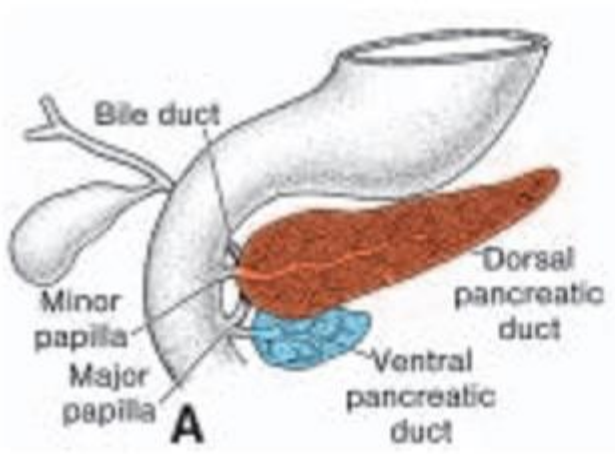
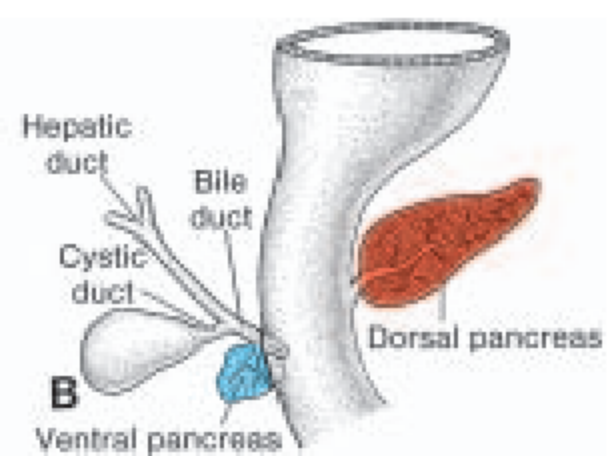
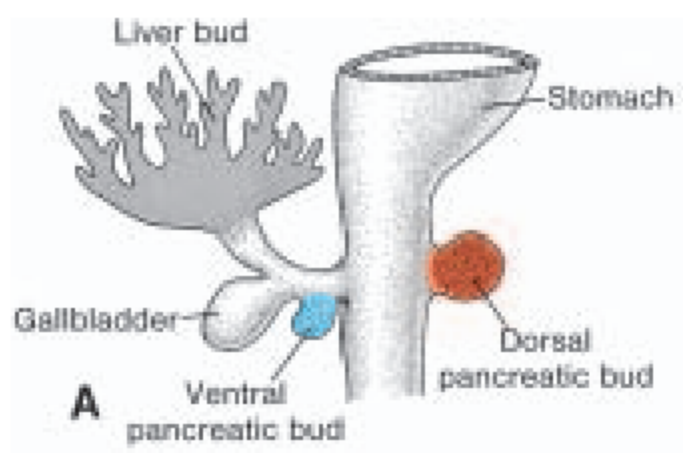
(a)



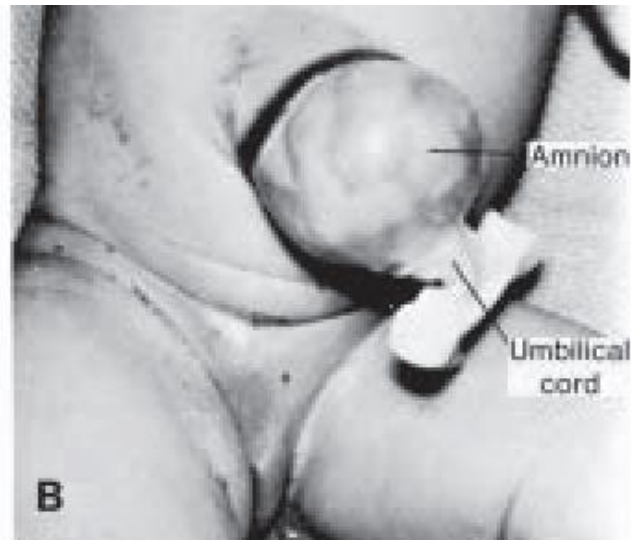
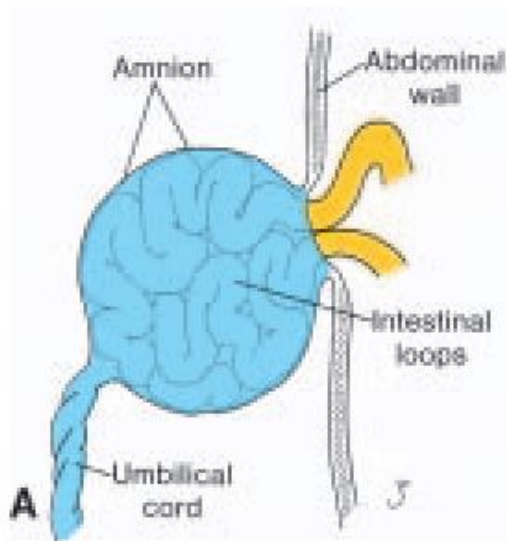




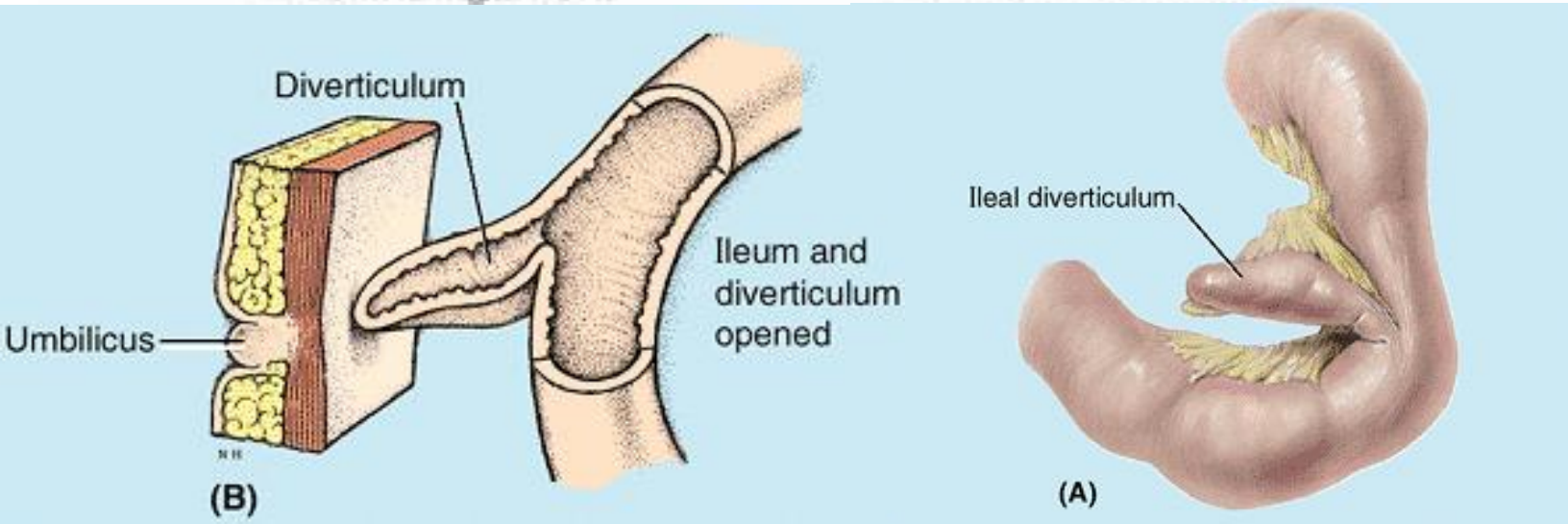
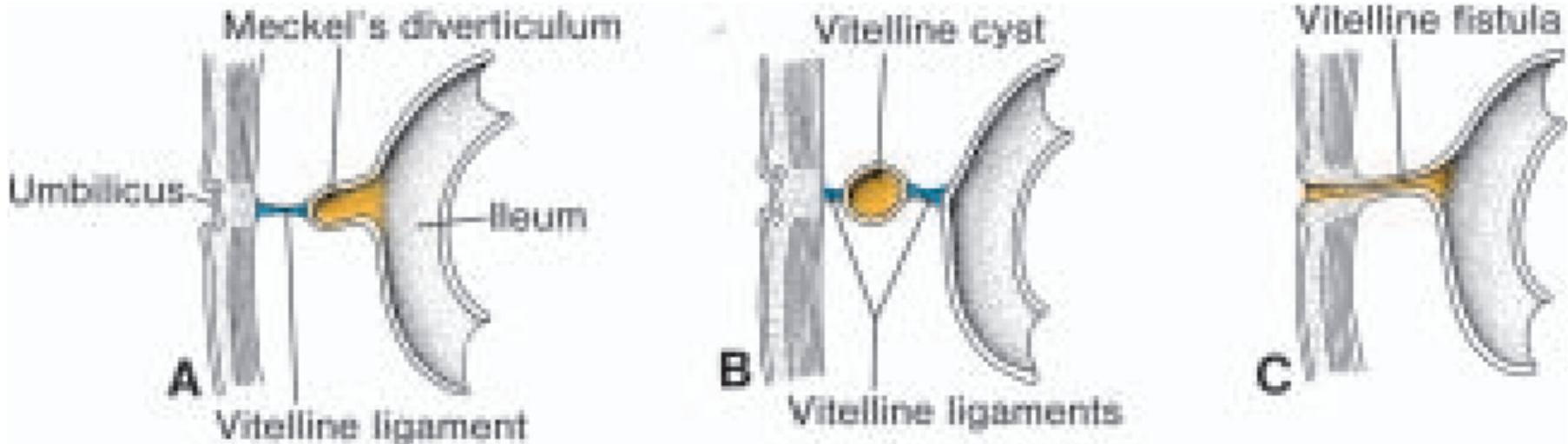




# Omphalocele

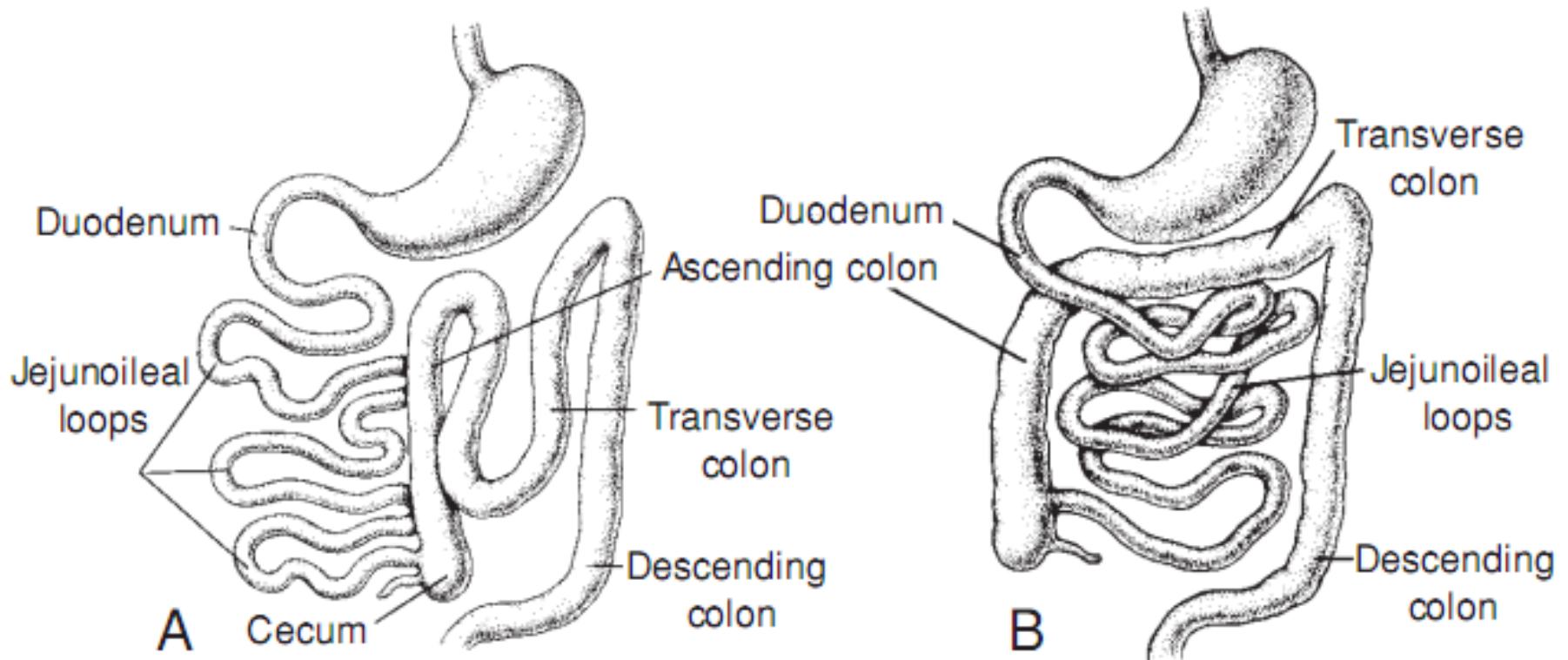


# Remnants of the vitelline duct

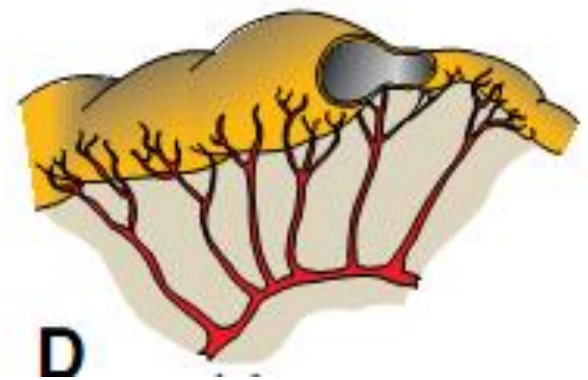
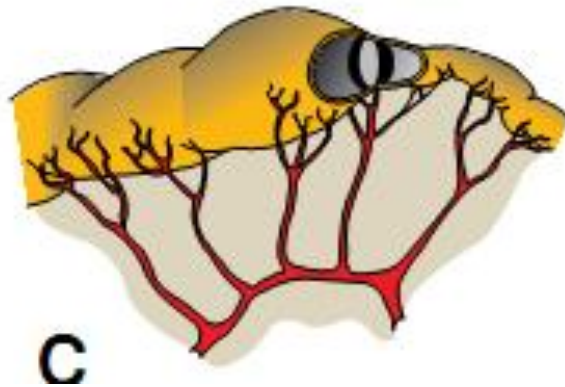
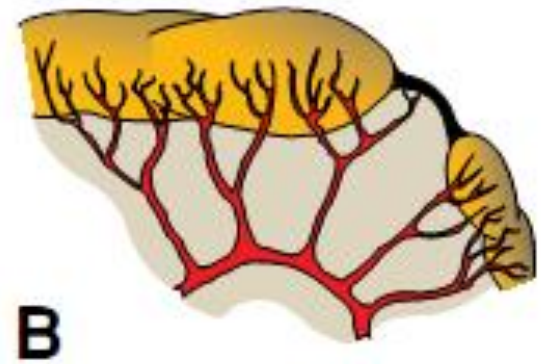
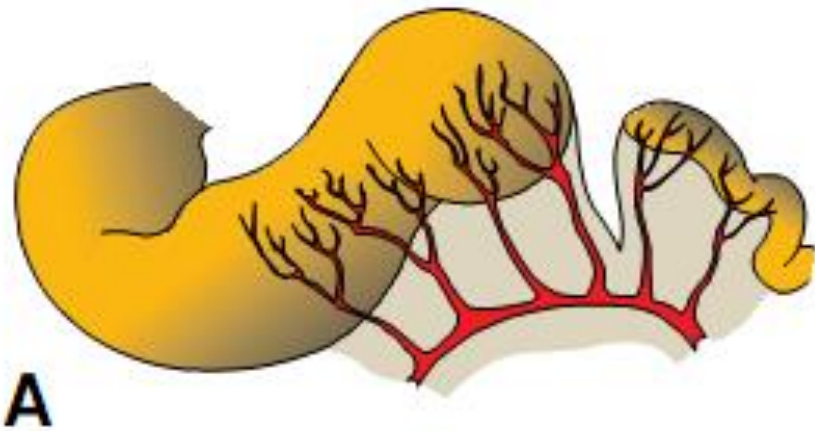




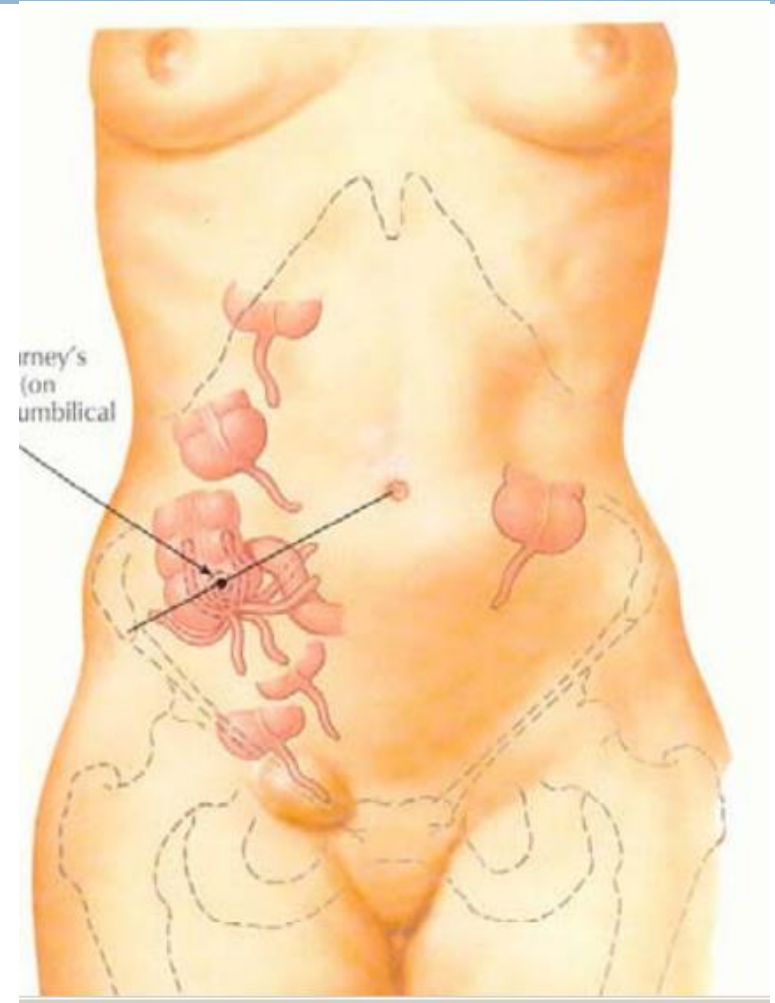
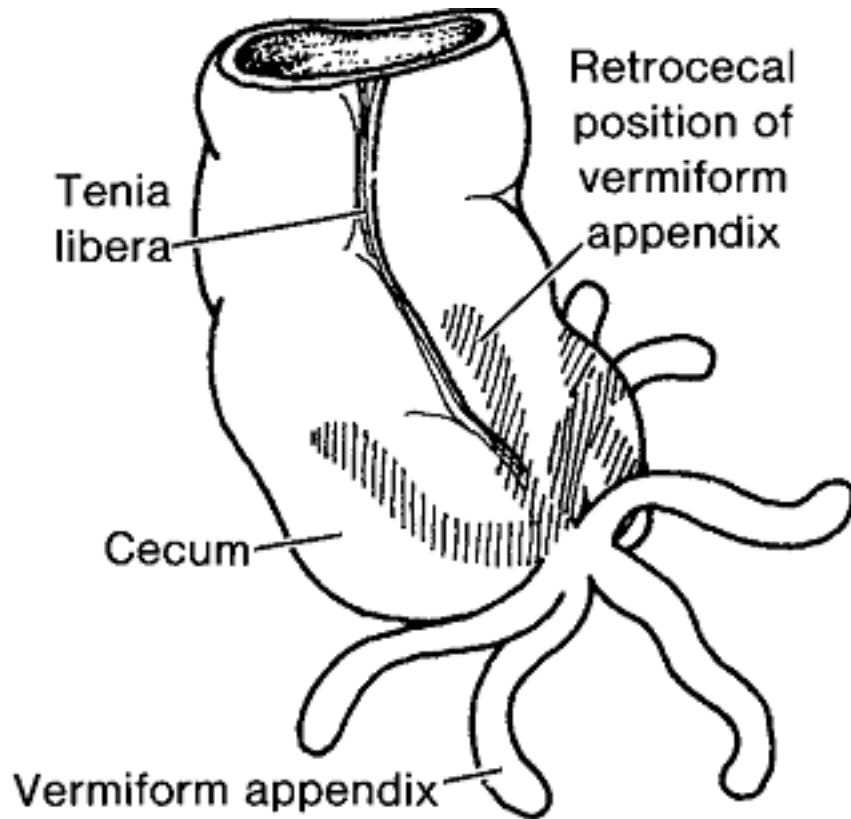
# Abnormal rotation of the primary intestinal loop



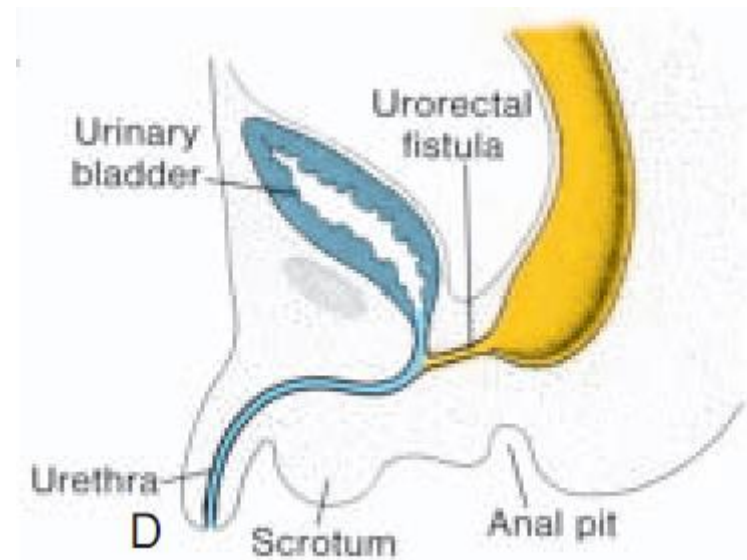
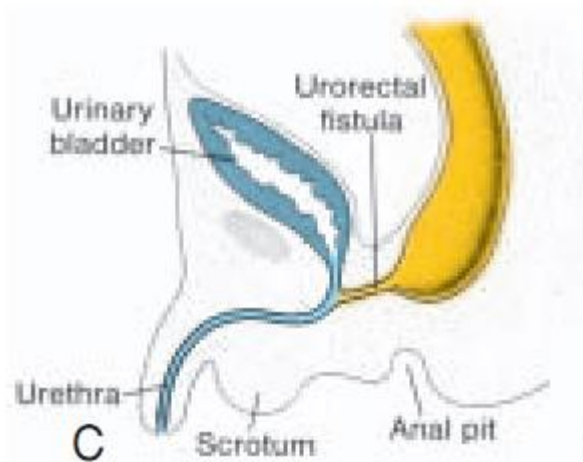
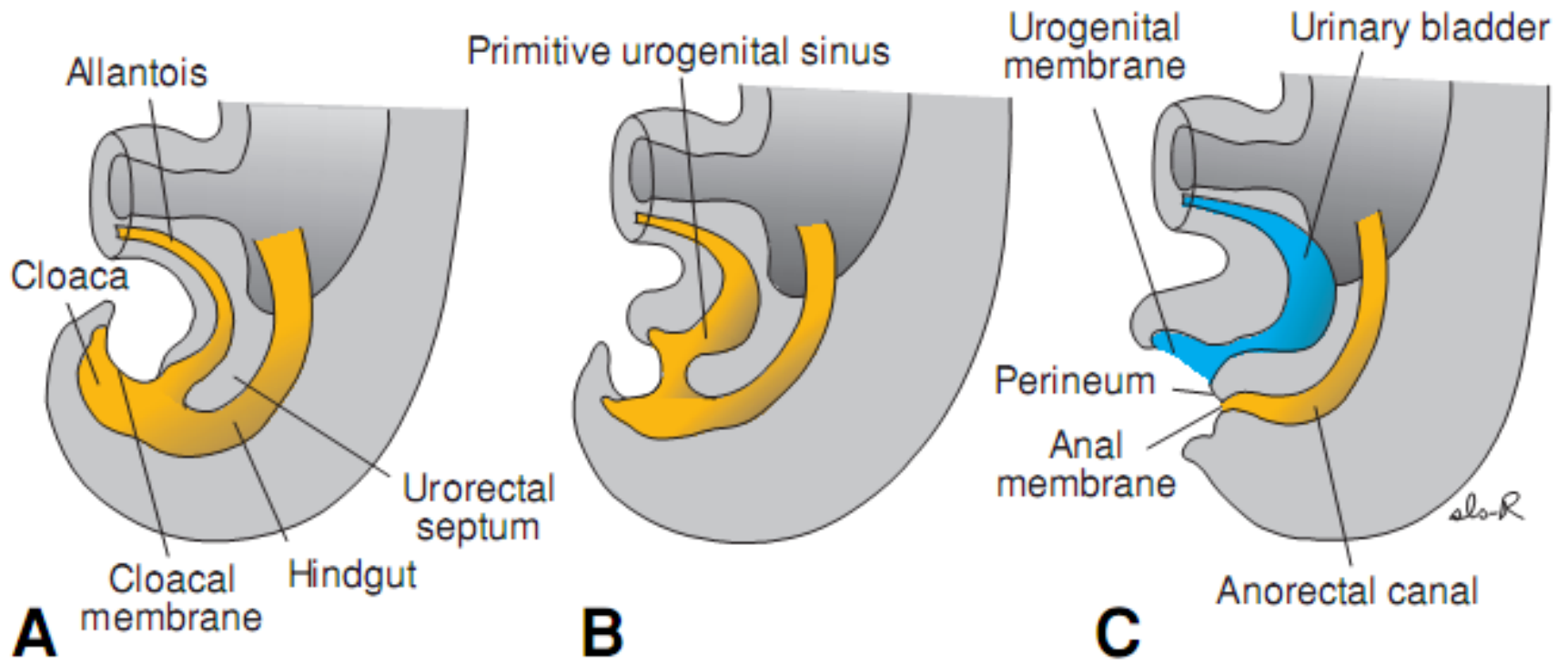
# Atresias and stenoses



# Vermiform Appendix









□ **Multumesc!**