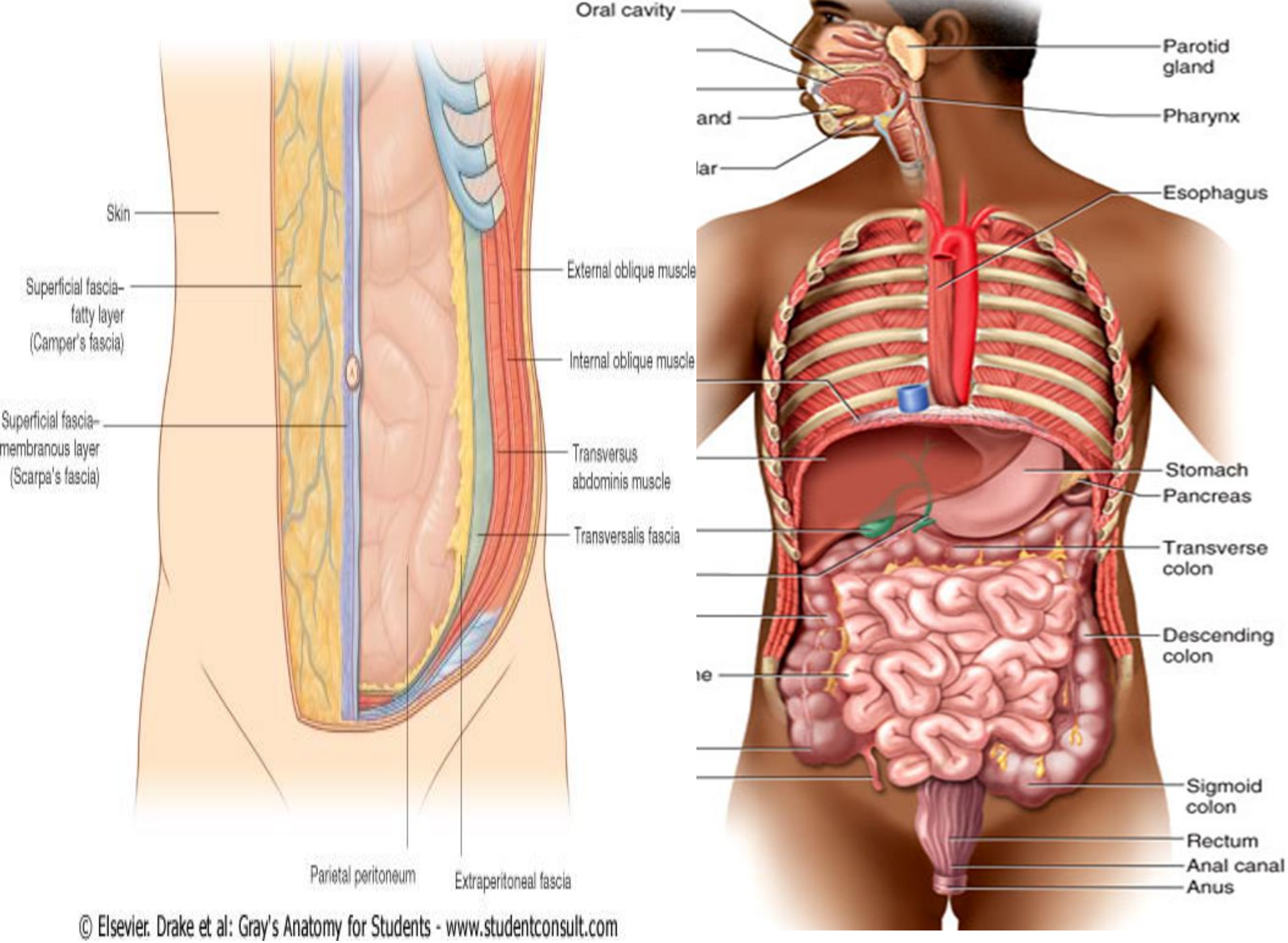
Peritoneum

Dr. ALSHIKH YOUSSEF Haiyan



General features

- The peritoneum is a thin serous membrane
- Consisting of:

1- Parietal peritoneum

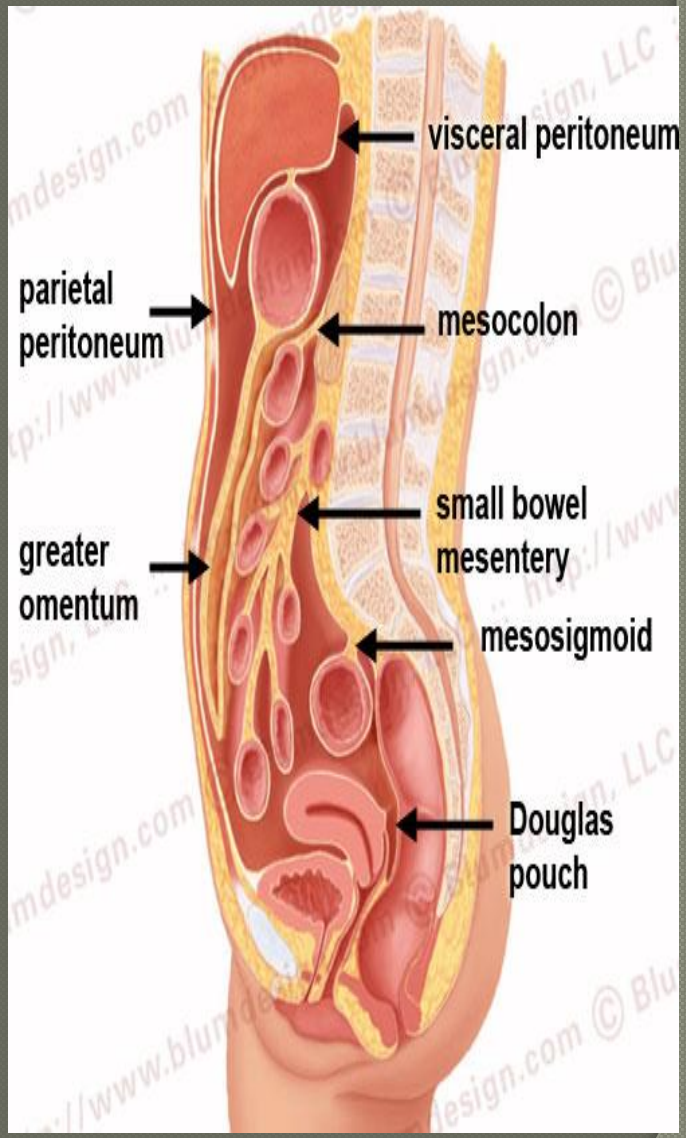
—lines the ant. Abdominal wall and the pelvis

2- Visceral peritoneum

- covers the viscera

3- Peritoneal cavity

- the potential space between the parietal and visceral layer of peritoneum
- in male, is a closed sac
- but in the female, there is a communication with the exterior through the uterine tubes, the uterus, and the vagina

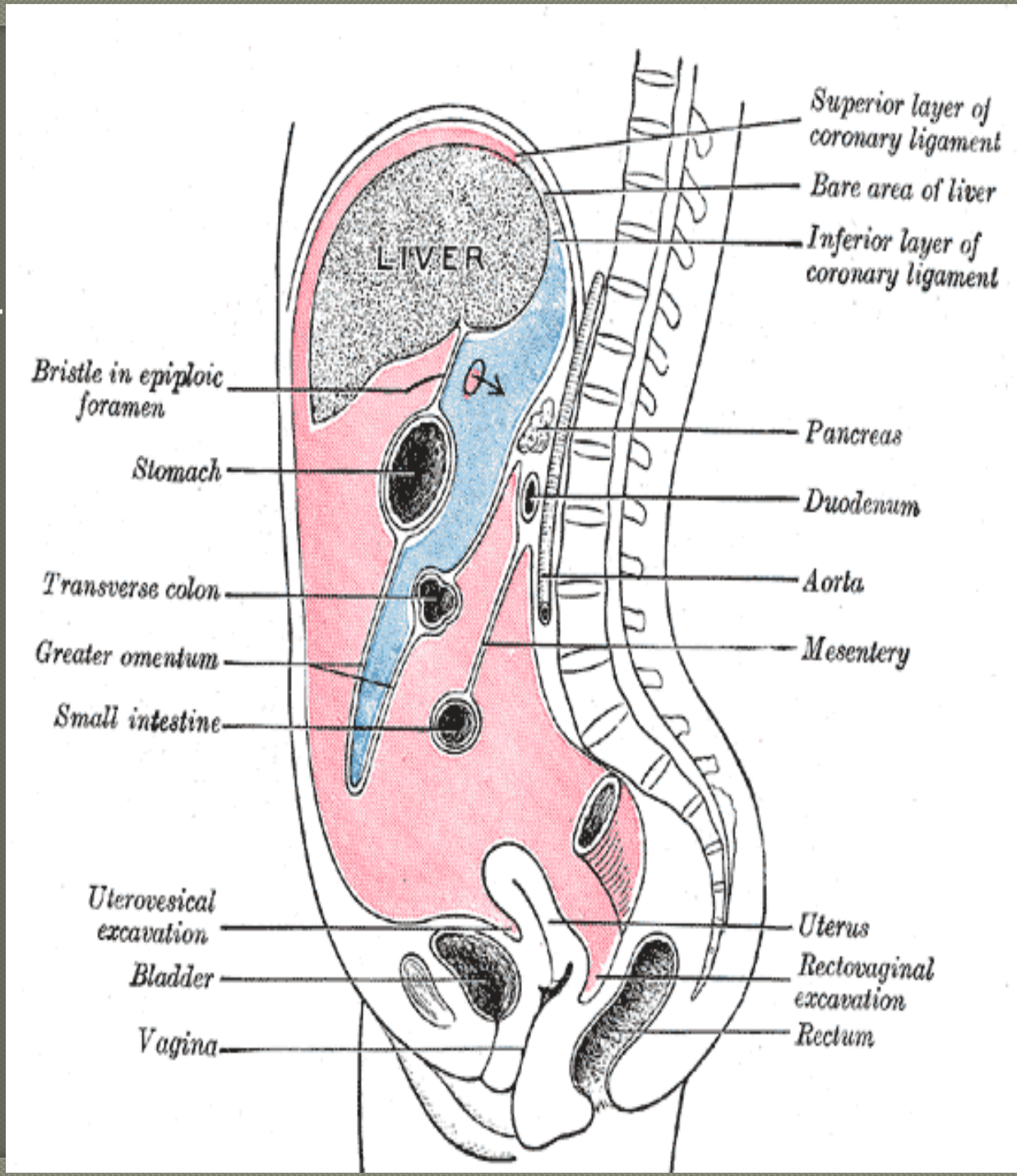


- Peritoneum cavity divided into

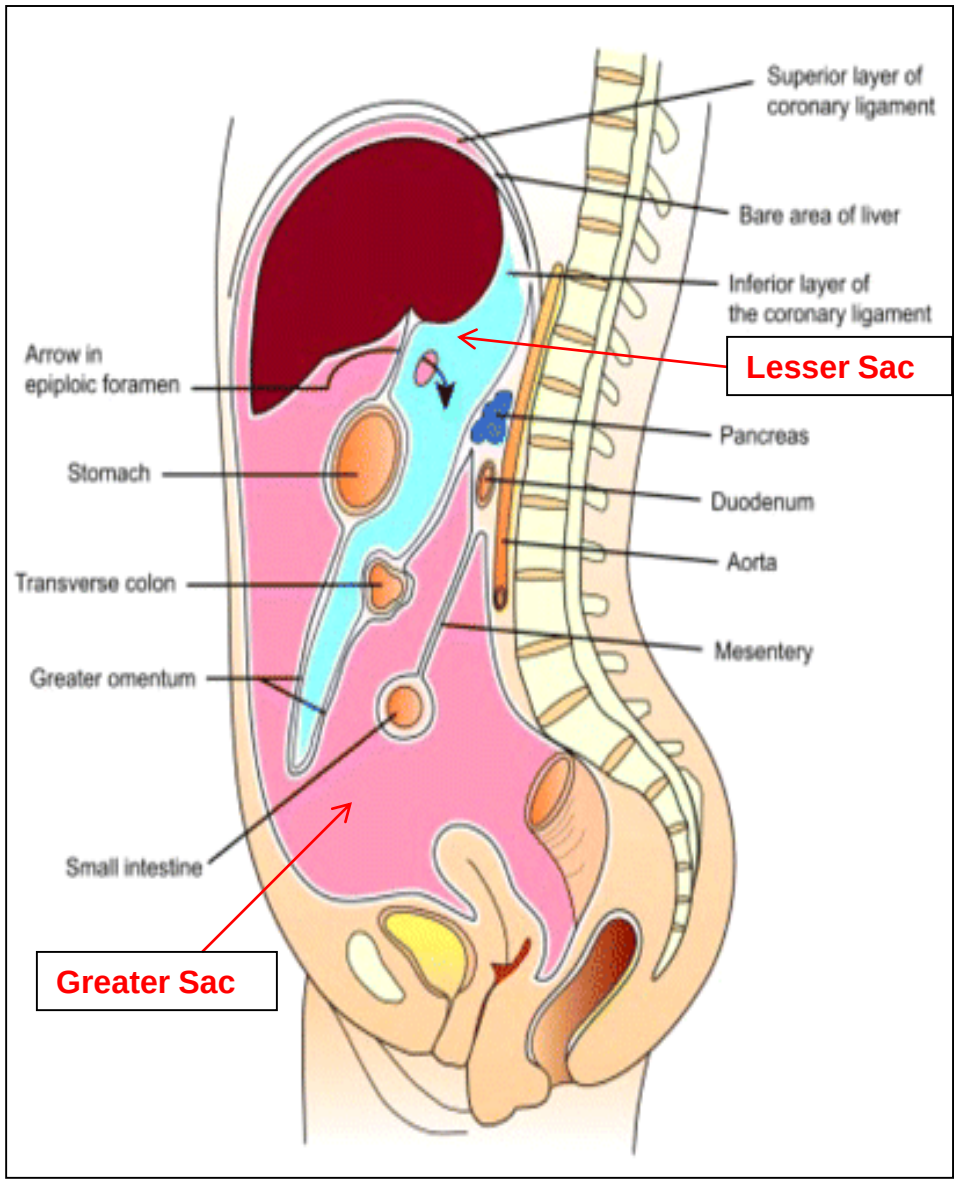
Greater sac

Lesser sac

- Communication between them by the epiploic foramen



The peritoneum



❖The peritoneal cavity is the largest one in the body.

❖**Divided into tow sac :**

- **Greater sac;** extends from diaphragm down to the pelvis.
- **Lesser sac or omental bursa**; lies behind the stomach.
- Both cavities are interconnected through the **epiploic foramen(winslow)**.
- In male : the peritoneum is a closed sac .
- In female : the sac is not completely closed because it communicates with the exterior through the uterine tubes, uterus and vagina.

Peritoneum in transverse section

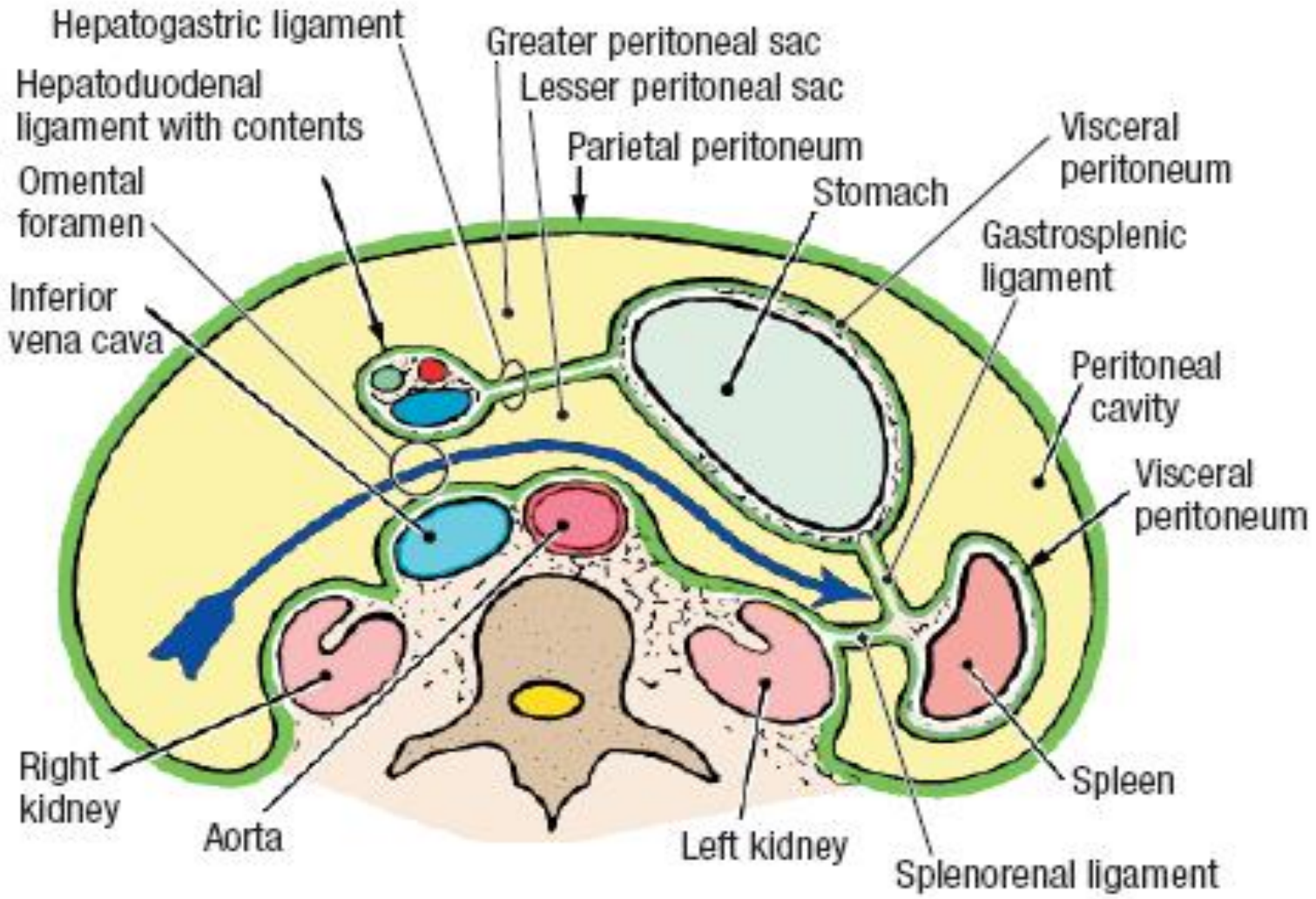
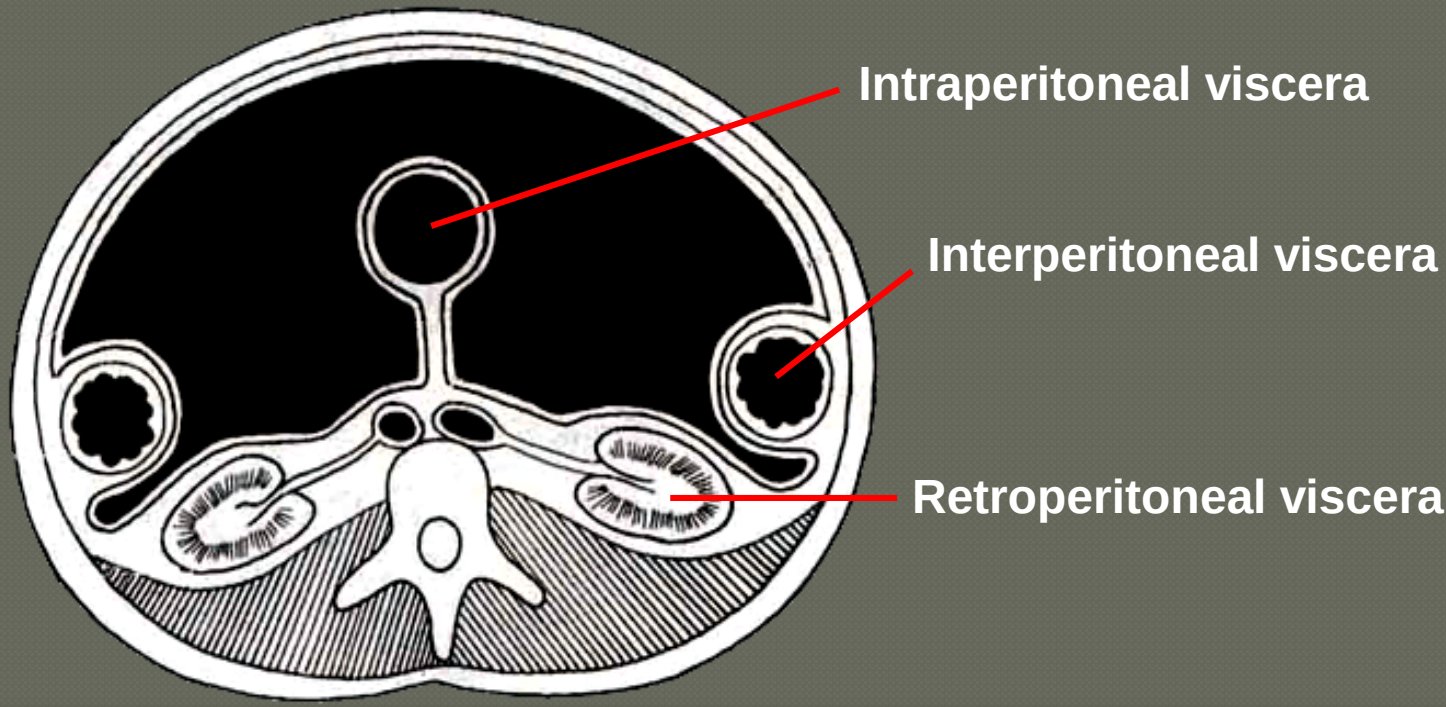


Figure 4.24. Schematic drawing of the peritoneal cavity in transverse section—inferior view. The arrow passes through the orrental foramen.

The relationship between viscera and peritoneum

- **Intraperitoneal viscera**
- viscera is almost totally covered with visceral peritoneum
- example, stomach, 1st & last inch of duodenum, jejunum, ileum, cecum, vermiform appendix, transverse and sigmoid colons, spleen and ovary

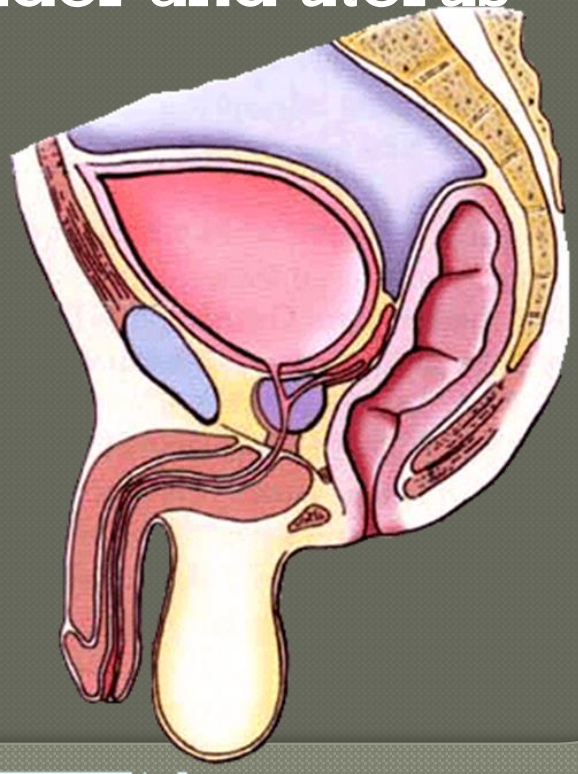


Interperitoneal viscera

- Such organs are not completely wrapped by peritoneum
- one surface attached to the abdominal walls or other organs.
- **Example**

liver, gallbladder, urinary bladder and uterus

- Upper part of the rectum,
- Ascending and
- Descending colon



Retroperitoneal viscera

- some organs lie on the posterior abdominal wall

- Behind the peritoneum
- they are partially covered by peritoneum on their anterior surfaces only
- **Example**

kidney, suprarenal gland, pancreas, upper 3rd of rectum

duodenum, and ureter, aorta and I.V.C

The Peritoneal Reflection

The peritoneal reflection include: omentum, mesenteries, ligaments, folds, recesses, pouches and fossae.

Many of them contain the blood vessels, lymphatics, and nerves that from the abdominal wall passed to viscera.

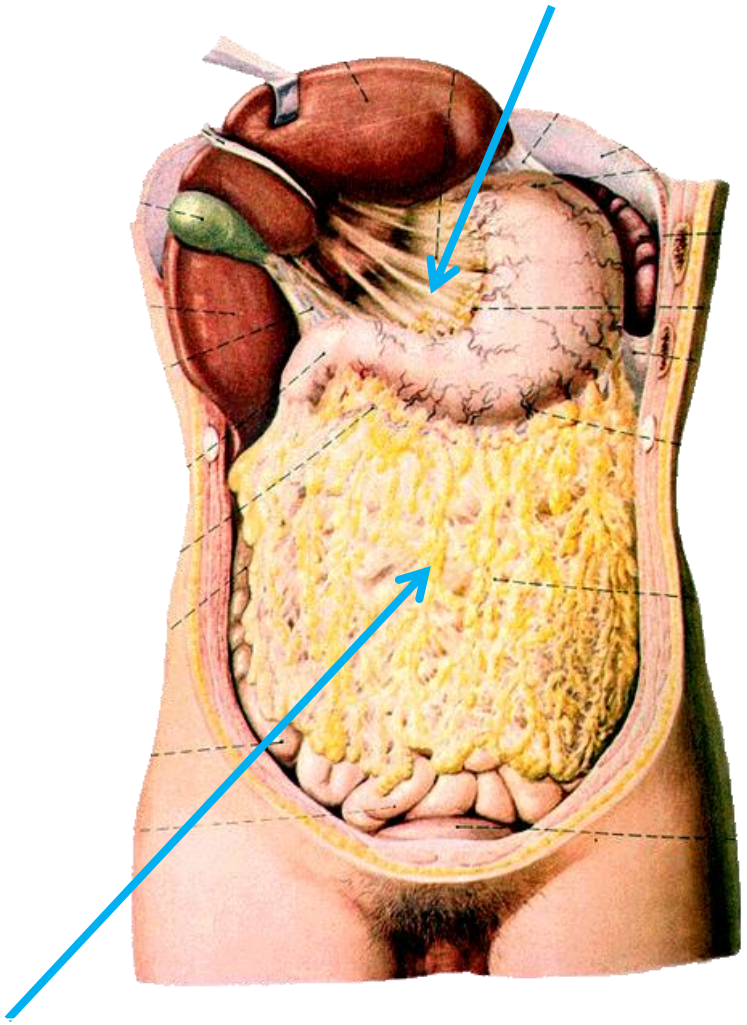
Folds of the peritoneum

Type :

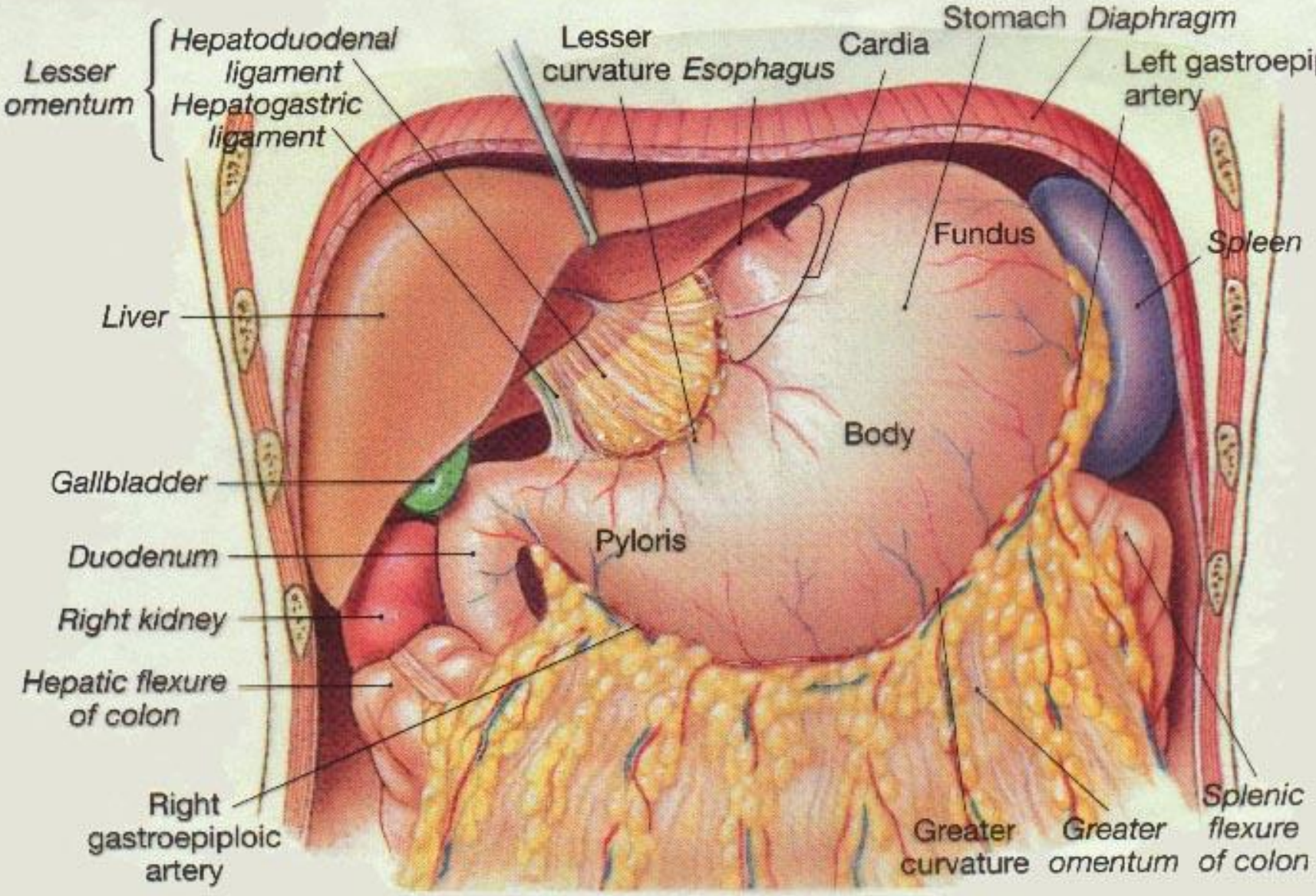
- Omenta
- Mesentery
- Ligamentes
- Fossae and recesse
- Pouches
-
-

Omenta

- Two layered fold of peritoneum connecting the stomach to another viscus.
- The **lesser omentum** attaches the lesser curvature of the stomach to the liver.
- The **greater omentum** connects the greater curvature of the stomach to the transverse colon.

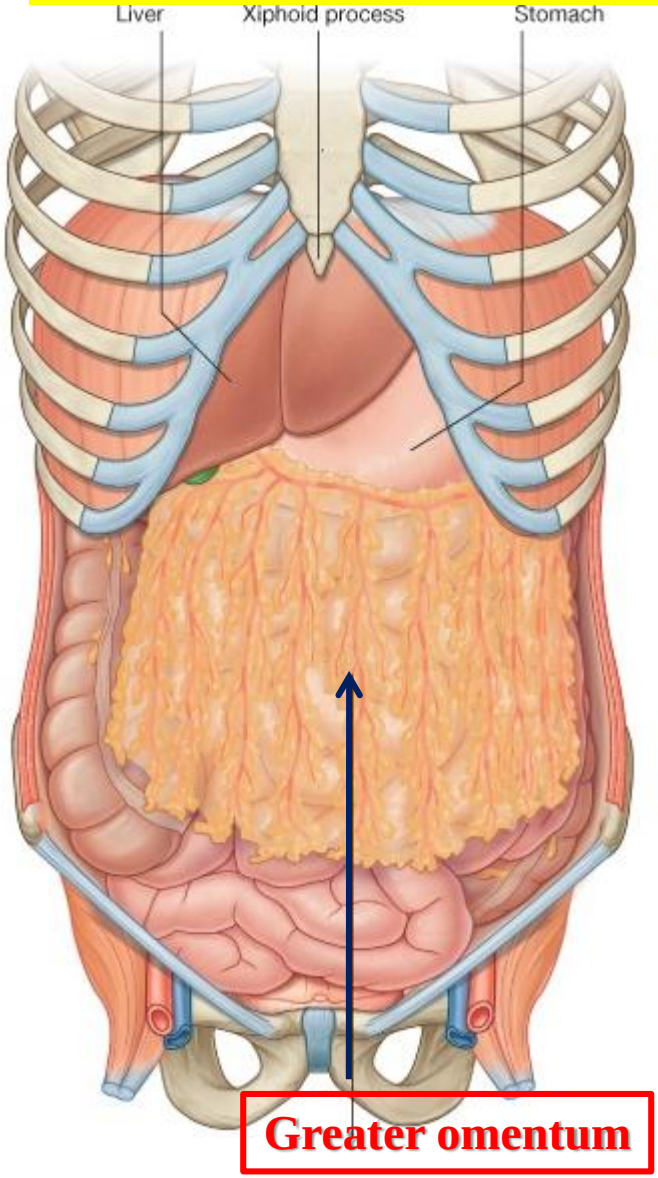


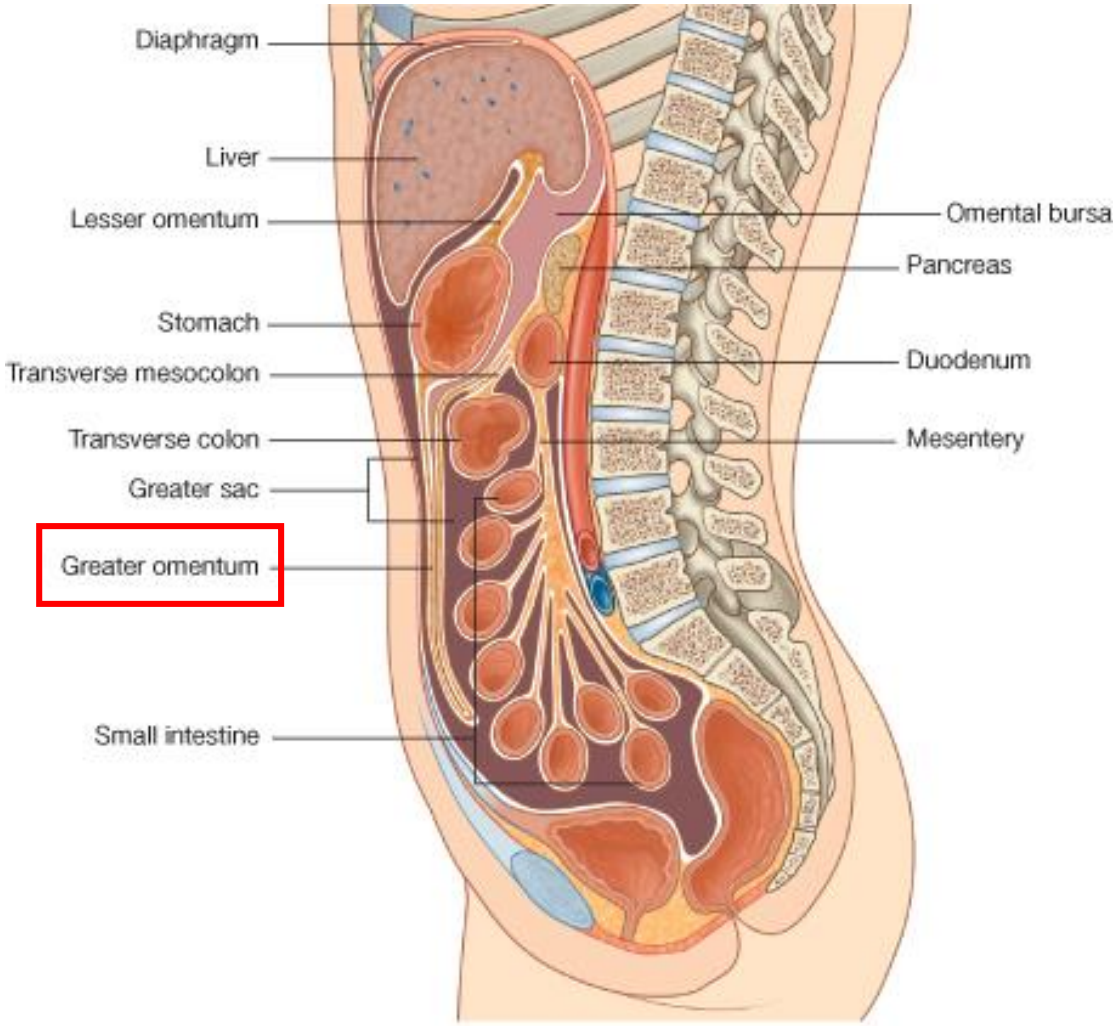
The Stomach and Omenta



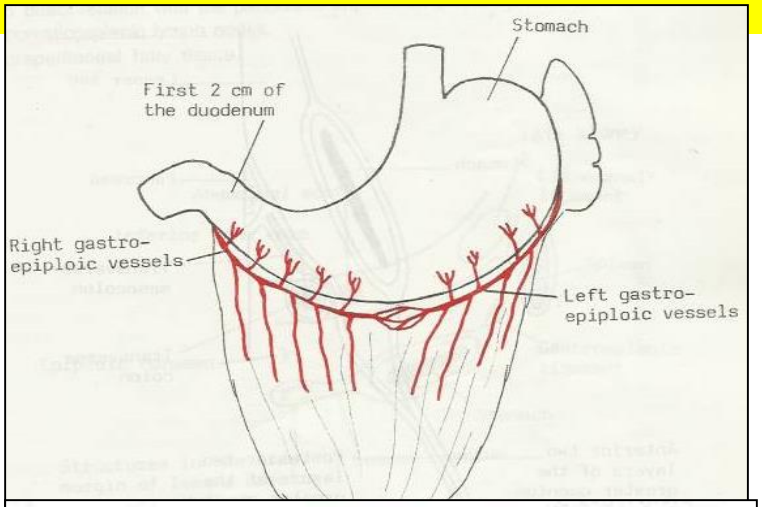
Stomach, anterior view

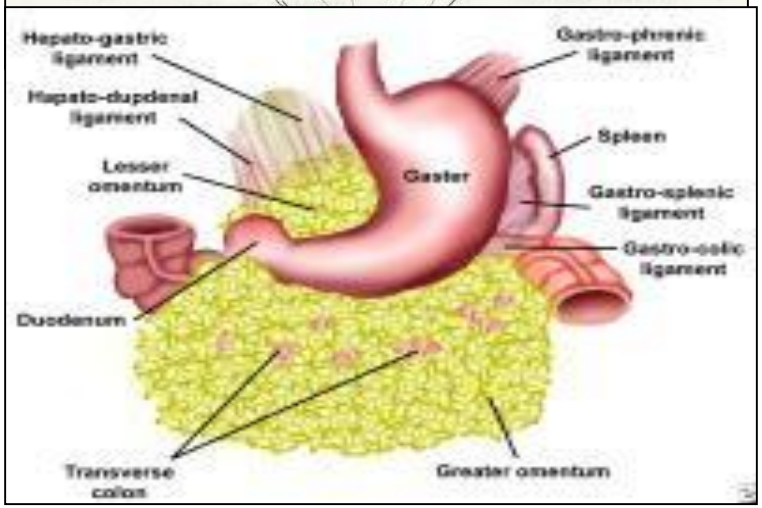
Greater omentum





Greater omentum





- The largest peritoneal fold, contains some adipose tissue.
- It consists of a <u>double sheet</u> of peritoneum, <u>folded on itself</u> so that it is made up of <u>four layers</u> (anterior 2 layers + posterior 2 layers).
- The two layers which descend from the greater curve of the **stomach** and commencement of the duodenum, pass downward in front of the small intestines, then turn upon themselves, and ascend to the **transverse colon,** where they separate and enclose it.
- The **left** border of the greater omentum is continuous with the **gastrosplenic ligament.**
- Its **right** border extends as far as the commencement of the duodenum.
- **Contents** : the anastomosis between the **right and left gastroepiploic vessels.**

Greater omentum

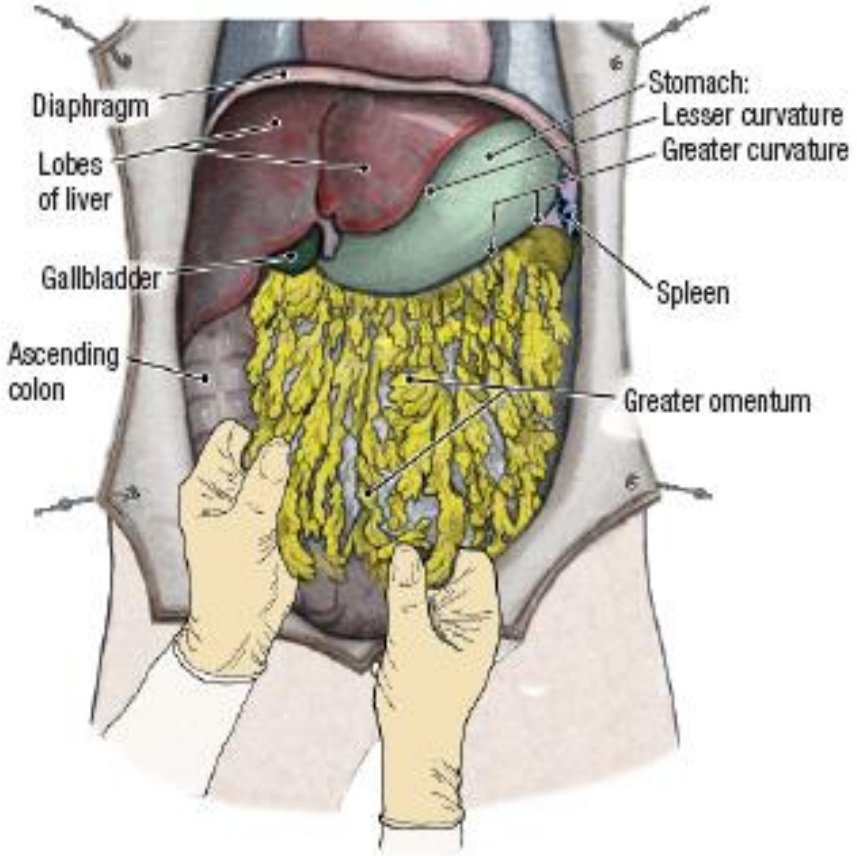


Figure 4.21. The relationship of the greater omentum to the abdomina viscera.

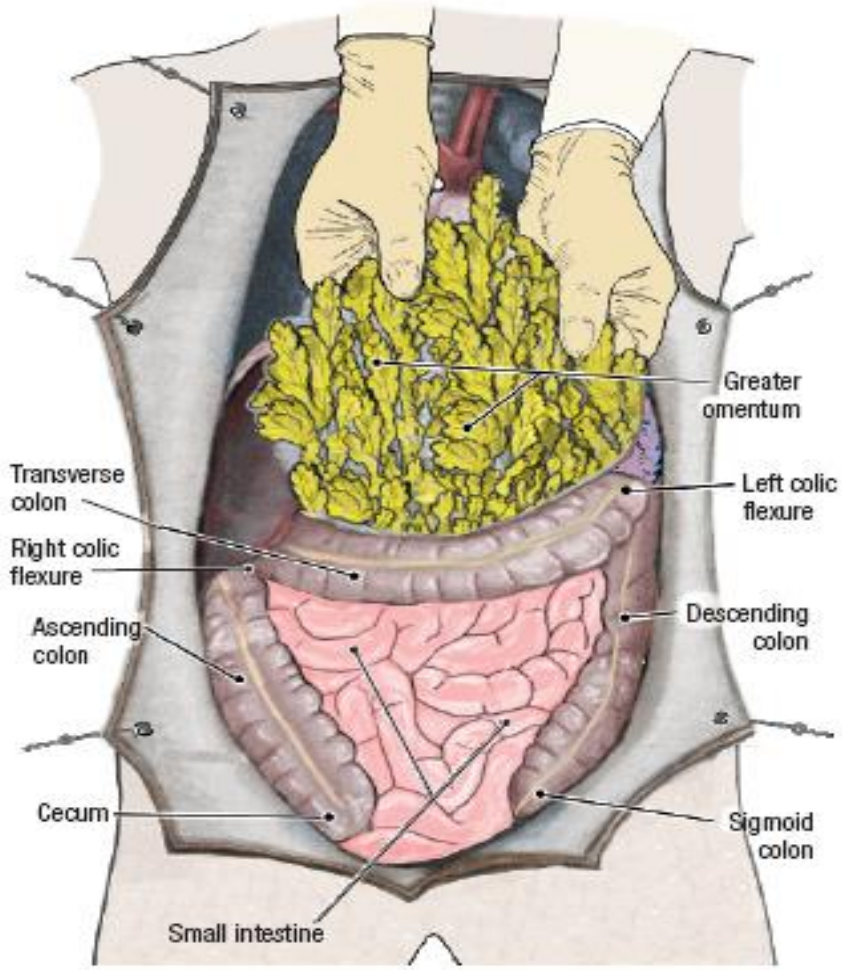
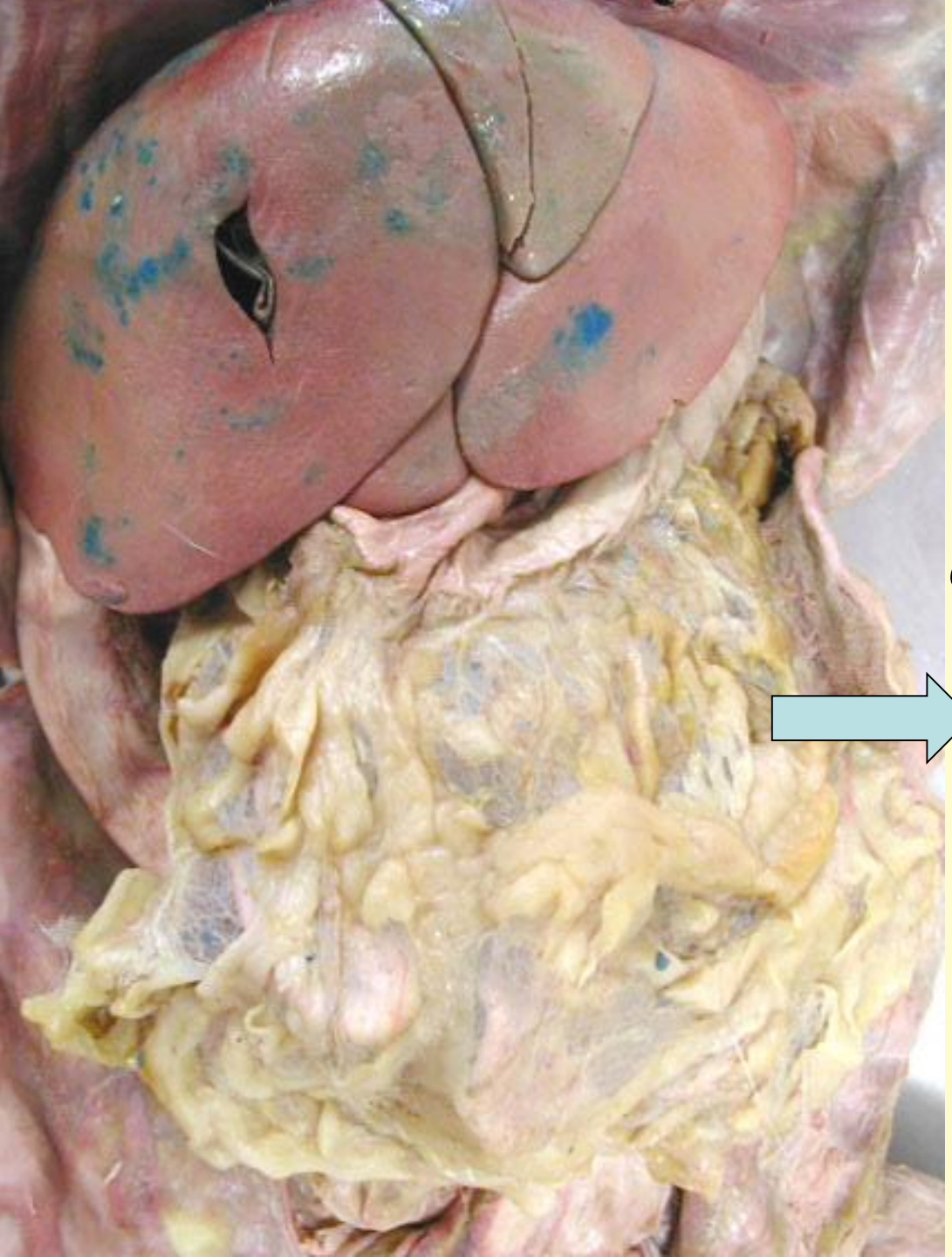
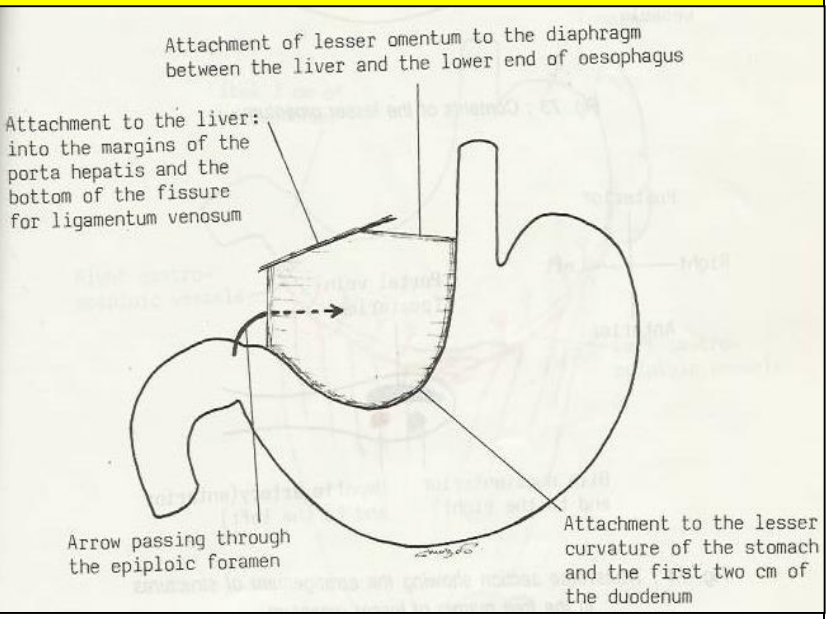


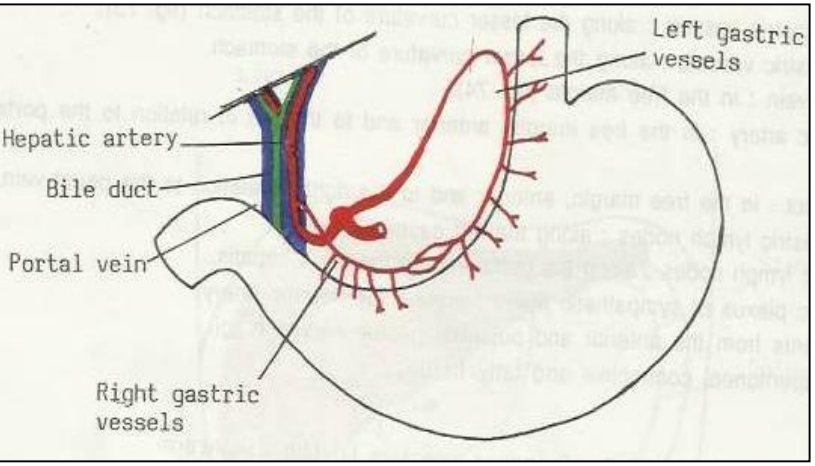
Figure 4.22. Reflect the greater omentum superiorly to expose the small intestine and large intestine.



This thin flesh-colored covering is the greater omentum.

Lesser omentum





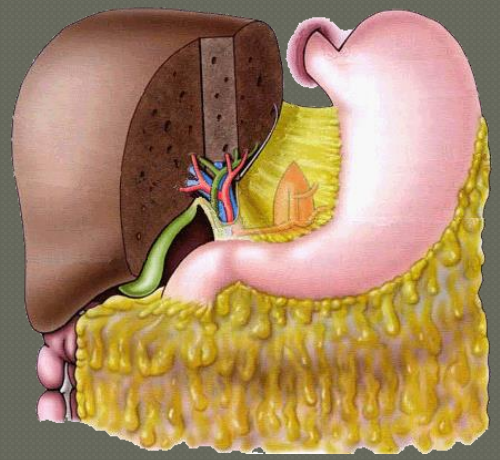
- Extends between the liver and the lesser curvature of the stomach.
- It is continuous with the two layers of peritoneum which cover the anterior & posterior surfaces of stomach and 1st part of the duodenum.
- Ascend as a double fold to the porta hepatis of liver, and fissure for ligamentum venosum.
- To the left of porta hepatis it is carried to the diaphragm.
- Its right border is a free margin; constitutes the anterior boundary of the epiploic foramen.

Contents between the two layers of the lesser omentum :

- Close to the right free margin, are the hepatic artery, the common bile duct, the portal vein, lymphatics, and the hepatic plexus of nerves.
- At the attachement to the stomach, run the right and left gastric vessels.

Lesser omentum

- **Hepatogastric ligament** from porta hepatis to lesser curvature of stomach
- **Hepatoduodenal ligament**



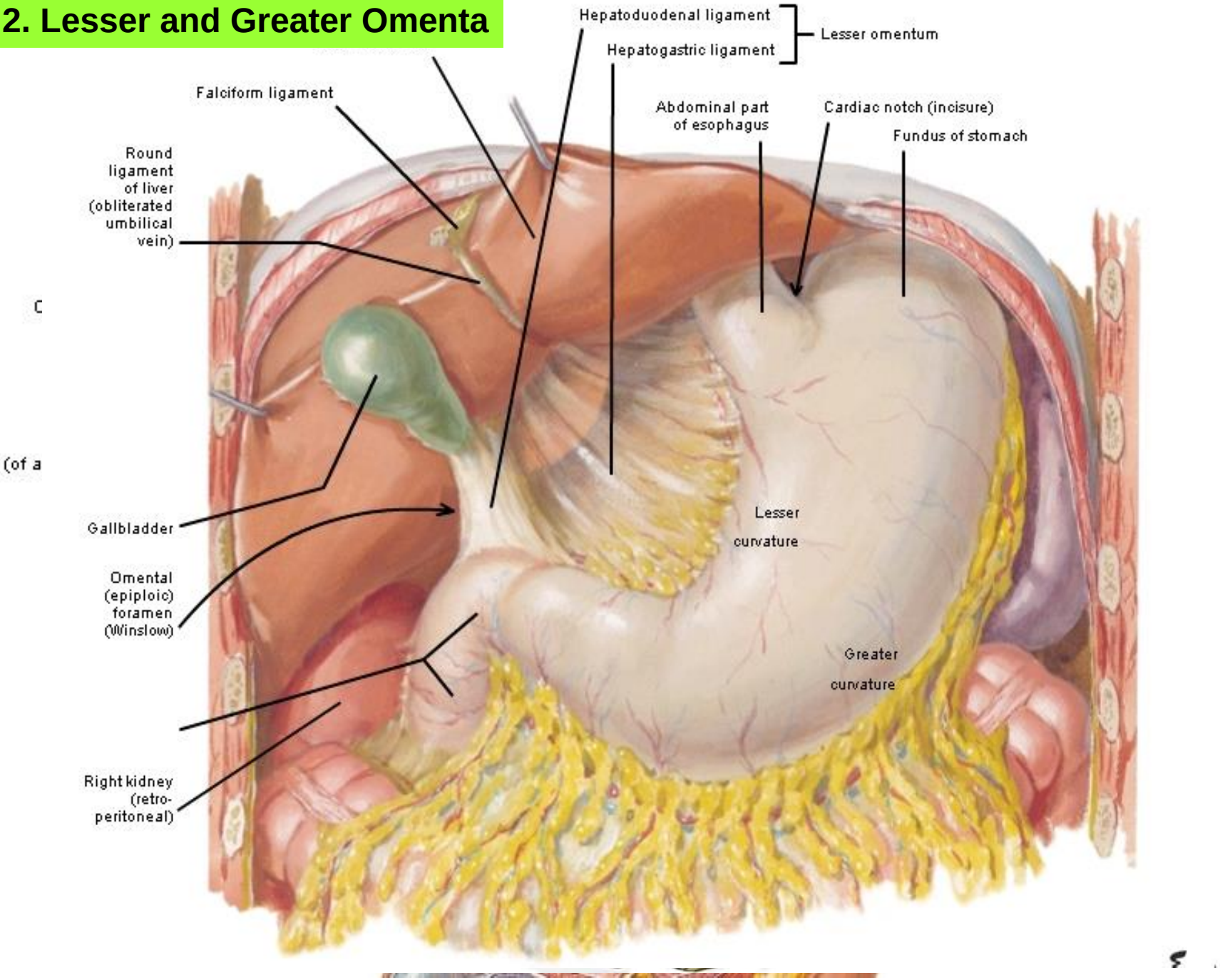
- Extends from porta hepatis to superior part of duodenum,
- at its free margine enclose 3 structures(3 key structures)

common bile duct→ Ant.
proper hepatic a→ At the Lt. of the common bile duct
hepatic portal v→ post.

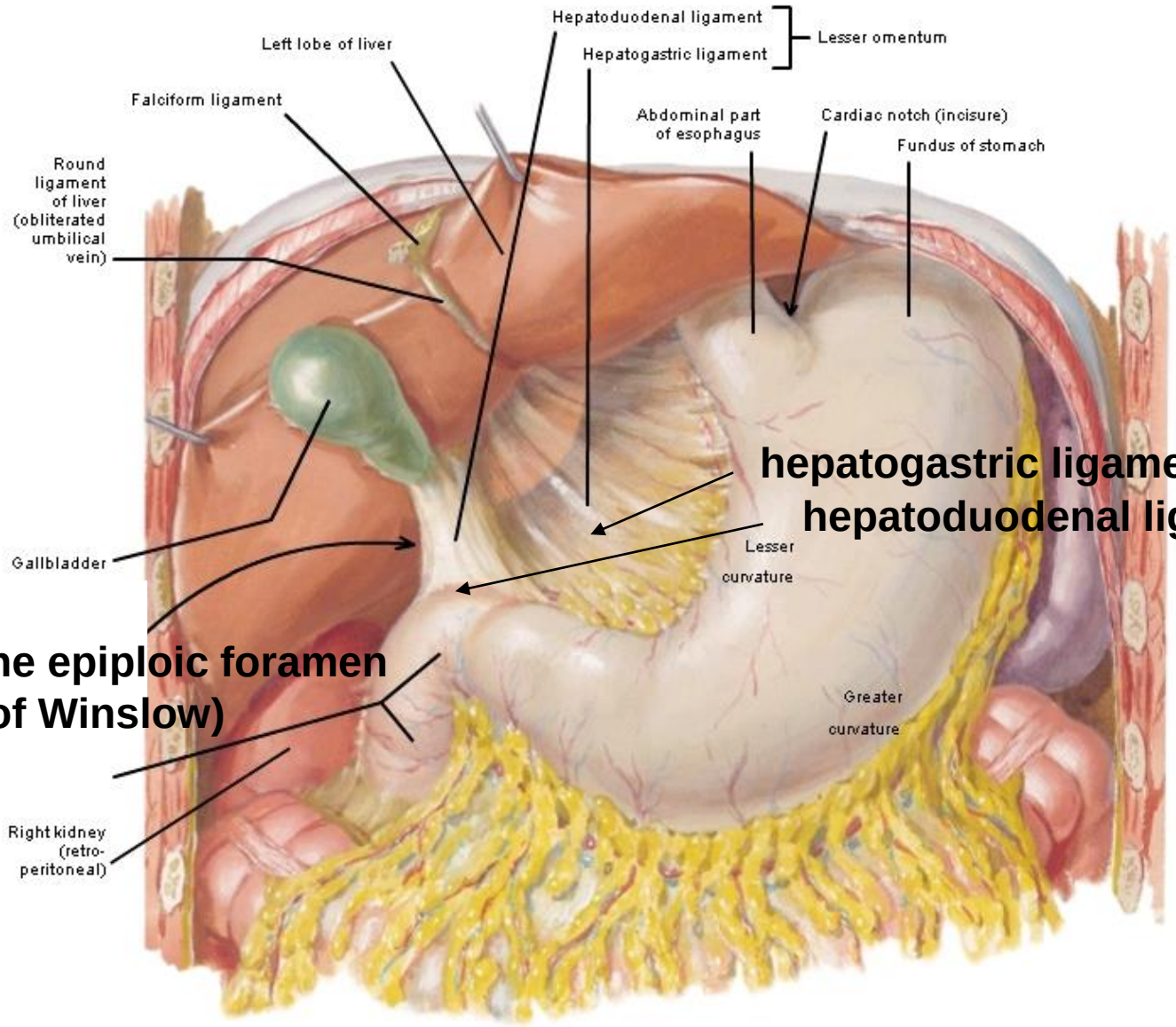
Contents of lesser omentum

- Blood vessels→ Rt. & Lt. gastric vessels
- Lymph nodes & lymphatic vessels
- Fat
- Autonomic N.S→ sympathetic + parasympathetic (vagus nerve)

2. Lesser and Greater Omenta



Lesser and Greater Omenta

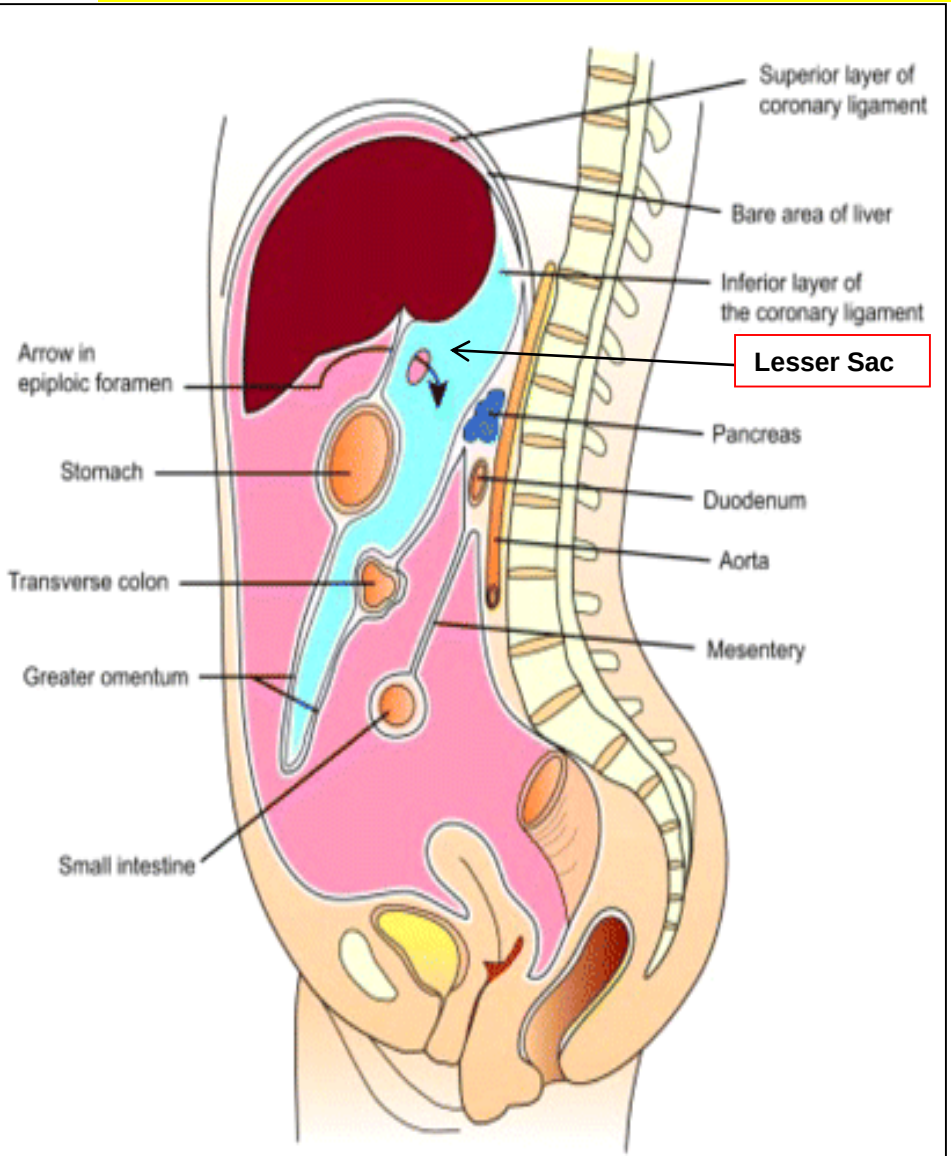


hepatogastric ligament
hepatoduodenal ligament

Lesser Omentum

the epiploic foramen (of Winslow)

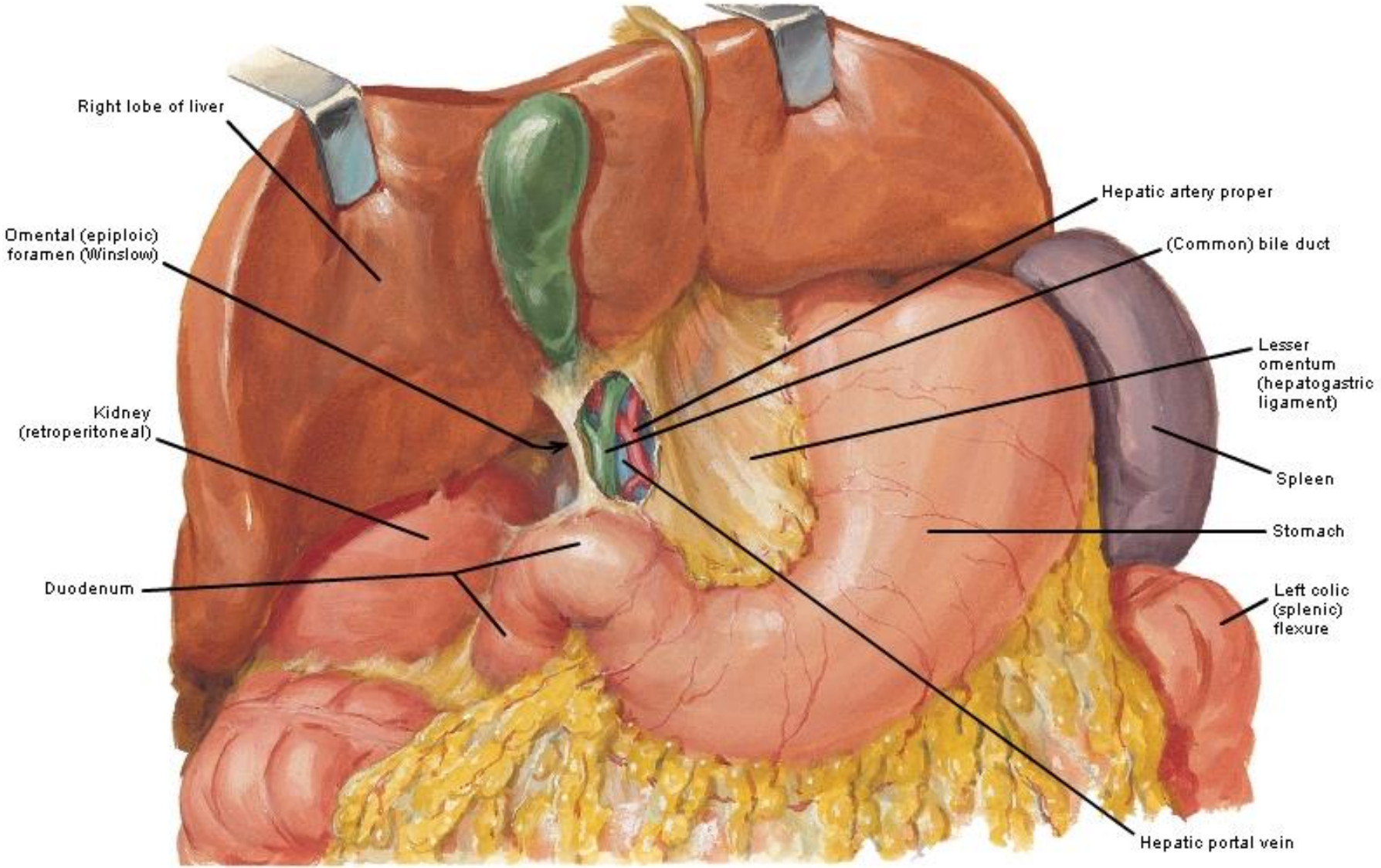
Omental bursa,
(Lesser Sac)



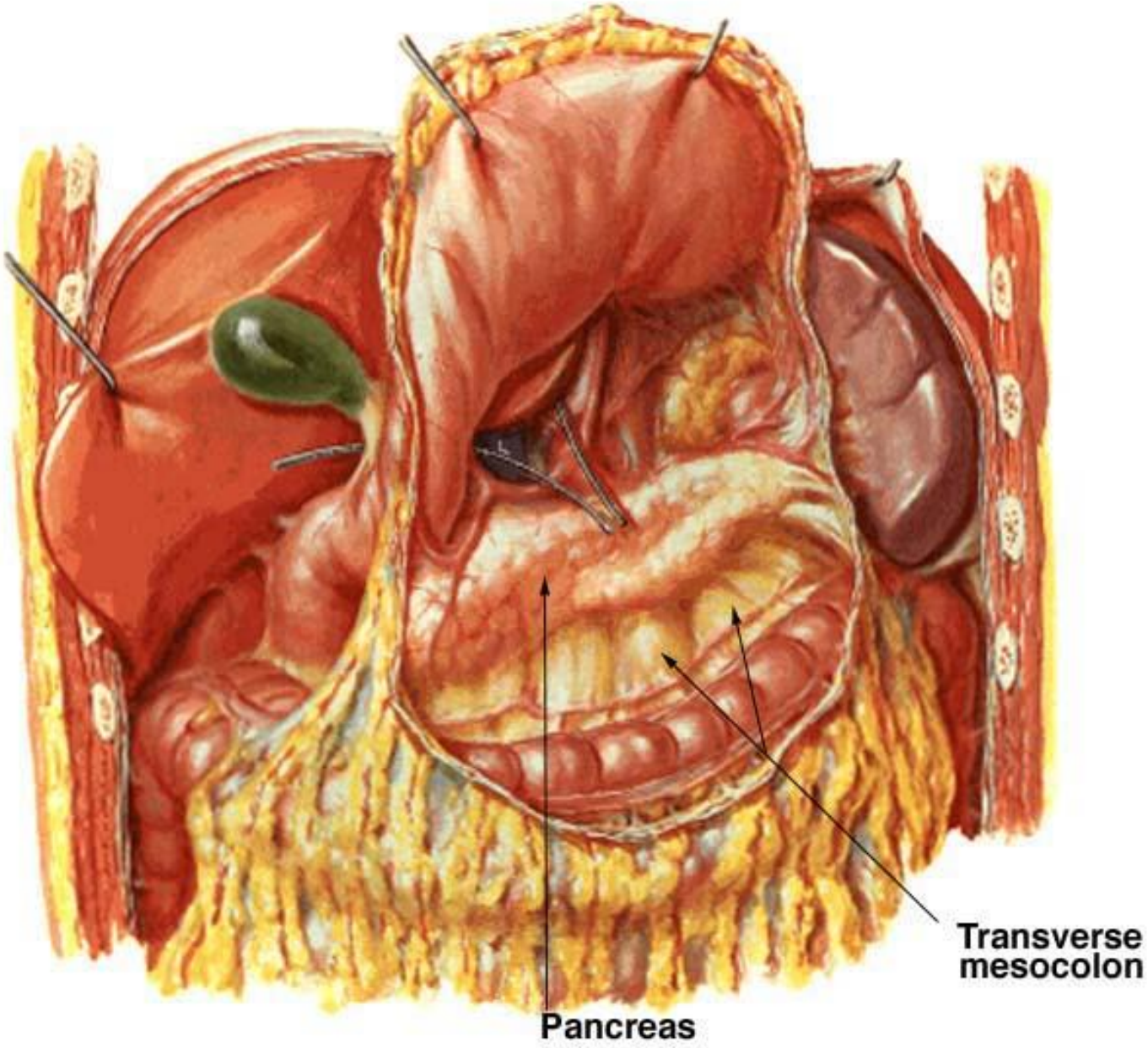
❑**It is a part of the peritonial cavity behind the stomach.**

❑**Boundaries of the *omental bursa* ;**

- **Anterior wall, from above downward, by the caudate lobe of the liver, the lesser omentum, back of the stomach, and the anterior two layers of the greater omentum.**
- **Posterior wall, from below upward, by the posterior two layers of the greater omentum, the transverse colon, and the ascending layer of the transverse mesocolon, the upper surface of the pancreas, the left suprarenal gland, and the upper end of the left kidney.**


Right lobe of liver
Omental (epiploic) foramen (Winslow)
Kidney (retroperitoneal)
Duodenum
Hepatic artery proper
(Common) bile duct
Lesser omentum (hepatogastric ligament)
Spleen
Stomach
Left colic (splenic) flexure
Hepatic portal vein

Omental Bursa



Omental bursa……cont

Walls :

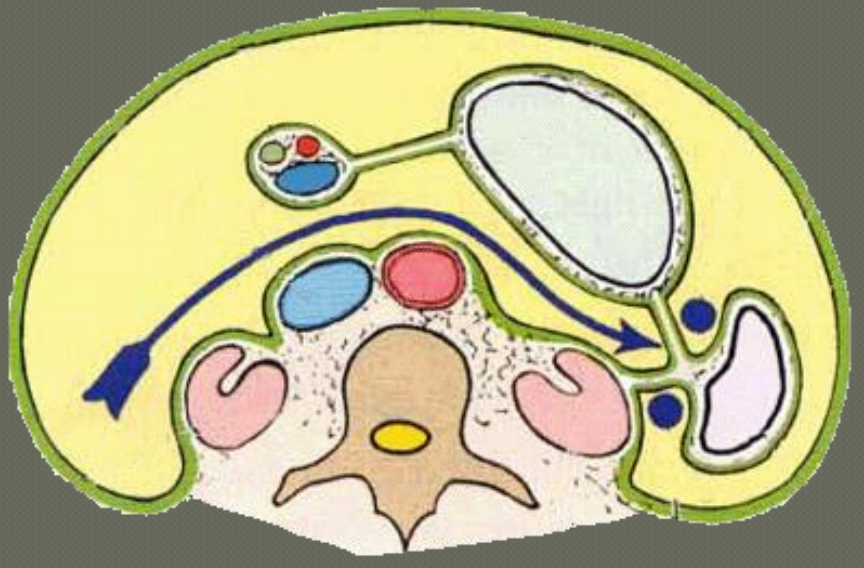
- **Superior**—peritoneum which covers the caudate lobe of liver and diaphragm
- **Anterior**—lesser omentum, peritoneum of posterior wall of stomach, and anterior two layers of greater omentum

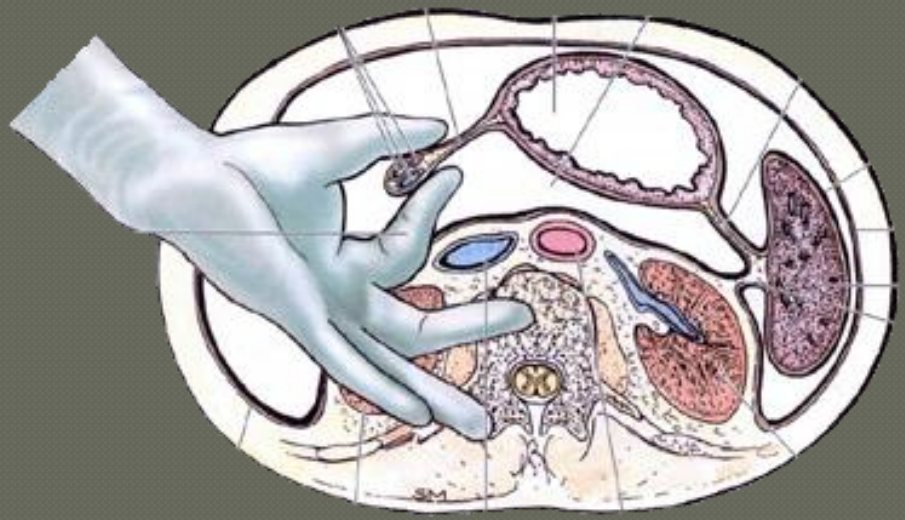
Omental bursa :

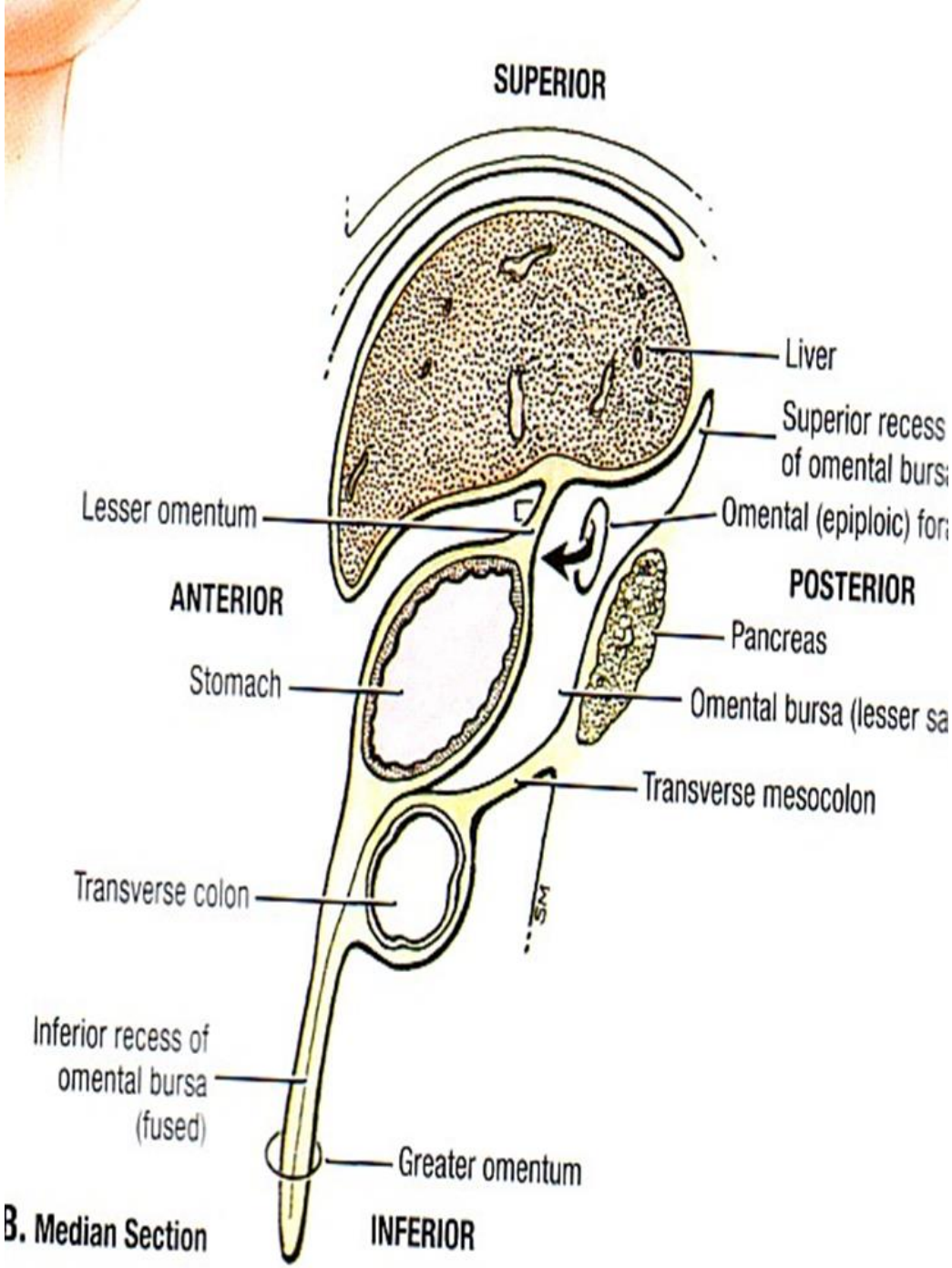
- **Inferior**—conjunctive area of anterior and posterior two layers of greater omentum
- **Posterior**—posterior two layers of greater omentum, transverse colon and transverse mesocolon, peritoneum covering posterior abdominal wall.

Omental bursa

- **Left**—spleen, gastrosplenic ligament splenorenal ligament
- **Right**—omental foramen

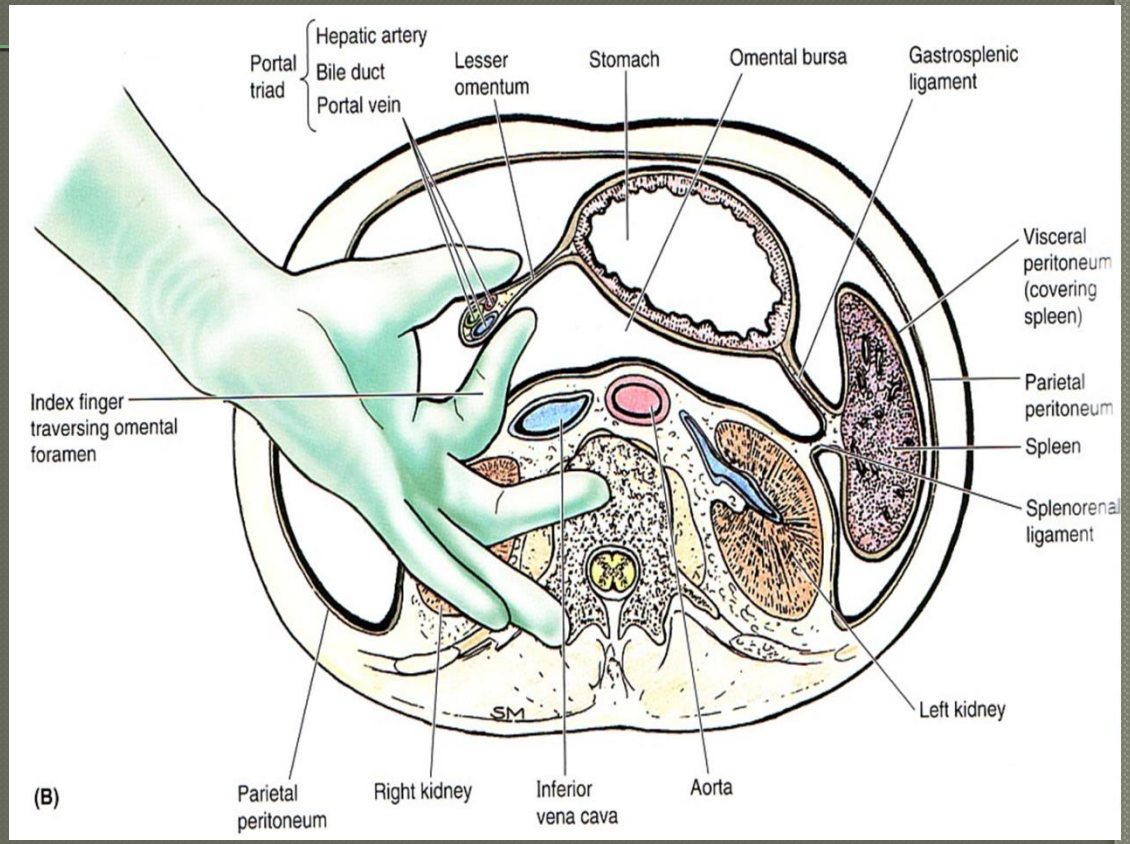


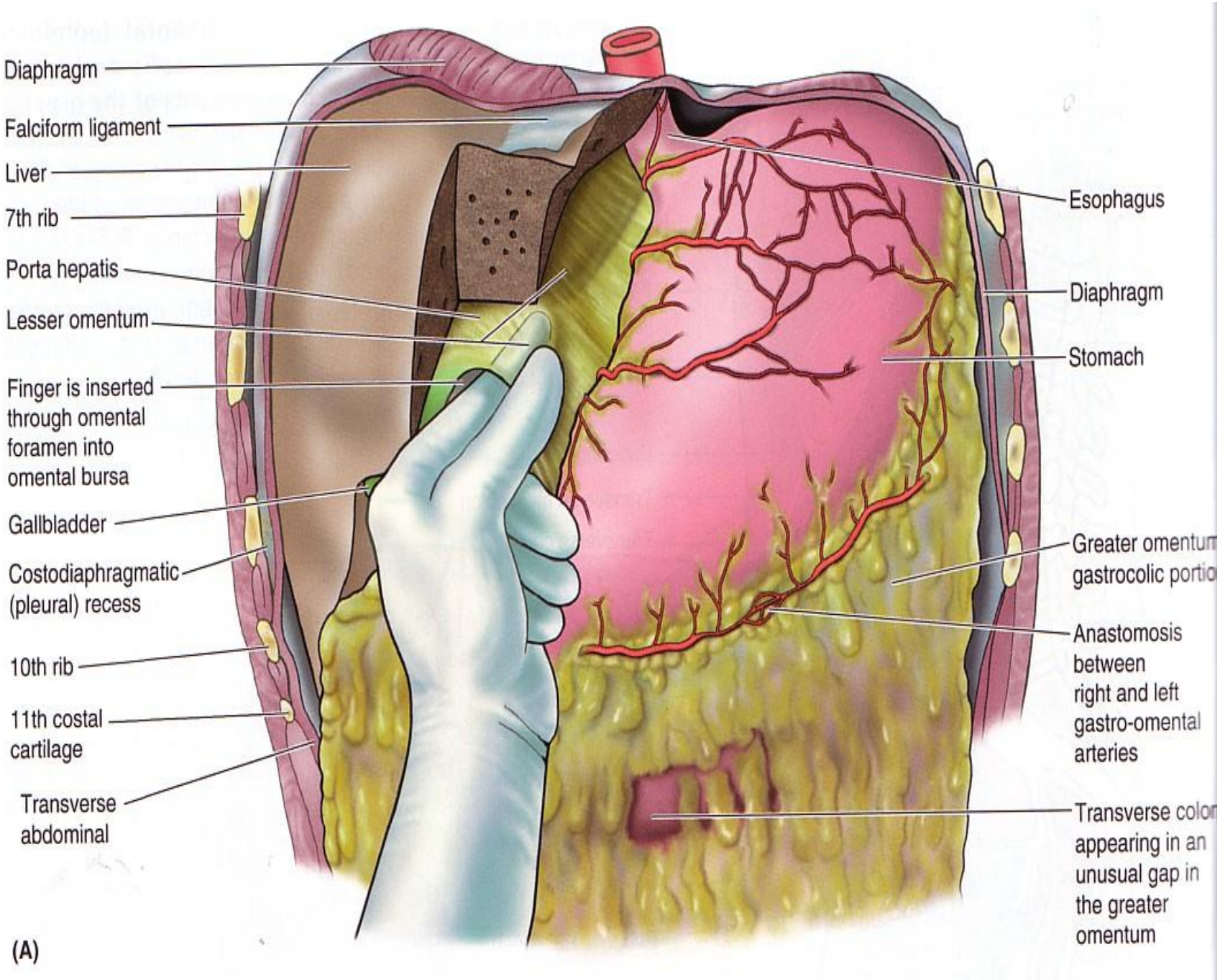



SUPERIOR
Liver
Superior recess
of omental bursa
Lesser omentum
Omental (epiploic) for
ANTERIOR
POSTERIOR
Pancreas
Stomach
Omental bursa (lesser sa
Transverse mesocolon
Transverse colon
SM
Inferior recess of
omental bursa
(fused)
Greater omentum
B. Median Section
INFERIOR

Epiploic foramen

- Boundaries
- Anteriorlly
  - Free border of lesser omentum contain
  1- Bile duct(Rt & ant)
  2- Hepatic artery(Lt & anT)
  3- Portal vein(post.)
- Posteriorly
  I.V.C
- Superiorly
  Caudate process of caudate lobe of liver
- Inferiorly
- First part of duodenum




Diaphragm
Falciform ligament
Liver
7th rib
Porta hepatis
Lesser omentum
Finger is inserted through omental foramen into omental bursa
Gallbladder
Costodiaphragmatic (pleural) recess
10th rib
11th costal cartilage
Transverse abdominal
Esophagus
Diaphragm
Stomach
Greater omentum gastrocolic portio
Anastomosis between right and left gastro-omental arteries
Transverse colon appearing in an unusual gap in the greater omentum
(A)

The Omental foramen(winslow)

Boundaries:

- Anterior: Hepatic portal vein, hepatic artery and bile duct contained within the lesser omentum.
- Posterior: Inferior vena cava & right crus of the diaphragm covered with parietal peritoneum.
- Superior: Caudate lobe of the liver covered with visceral peritoneum.
- Inferior: First part of the duodenum

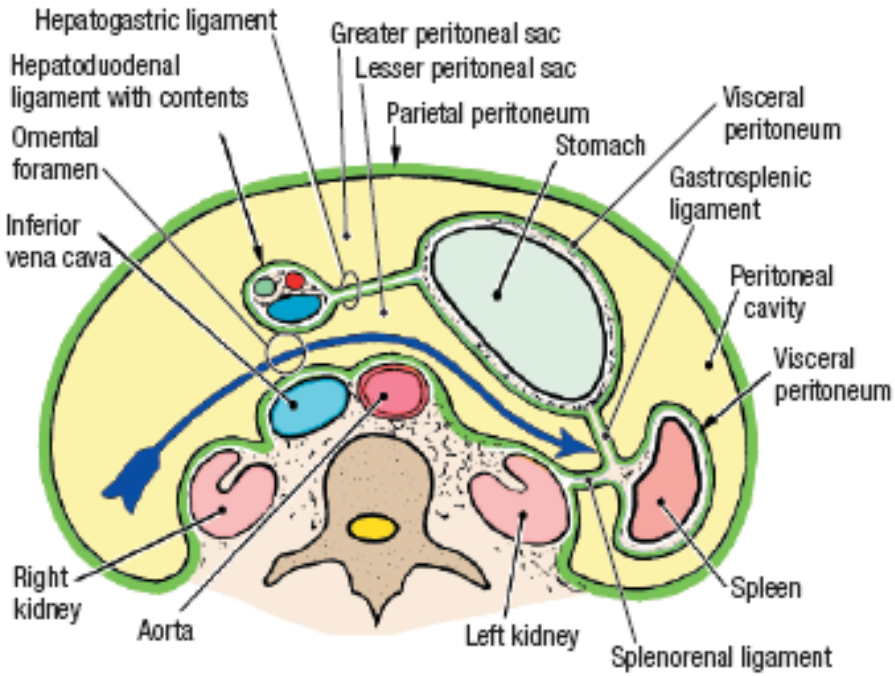


Figure 4.24. Schematic drawing of the peritoneal cavity in transverse section—inferior view. The arrow passes through the omental foramen.

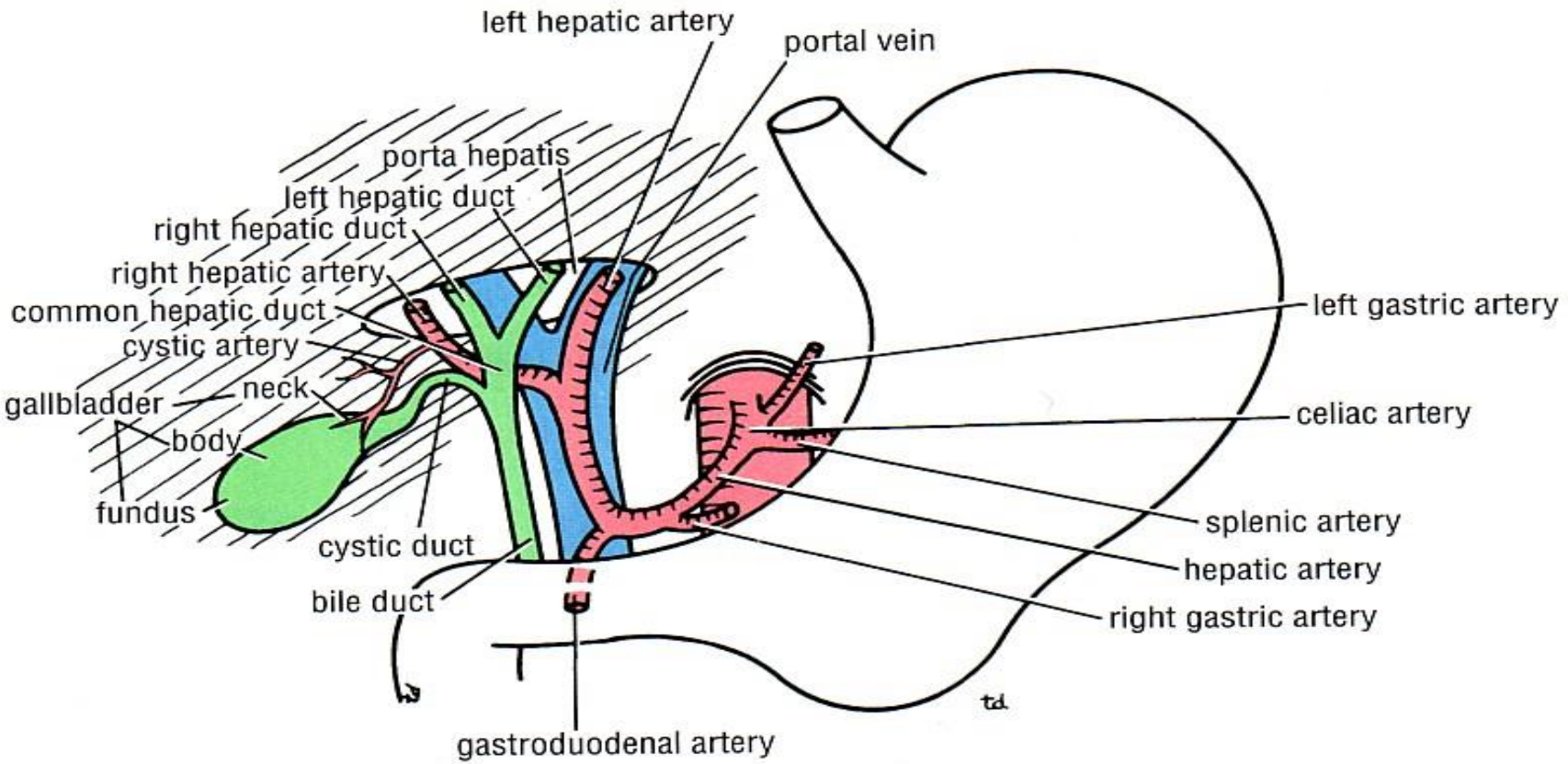
Epiploic Foramen: Boundaries

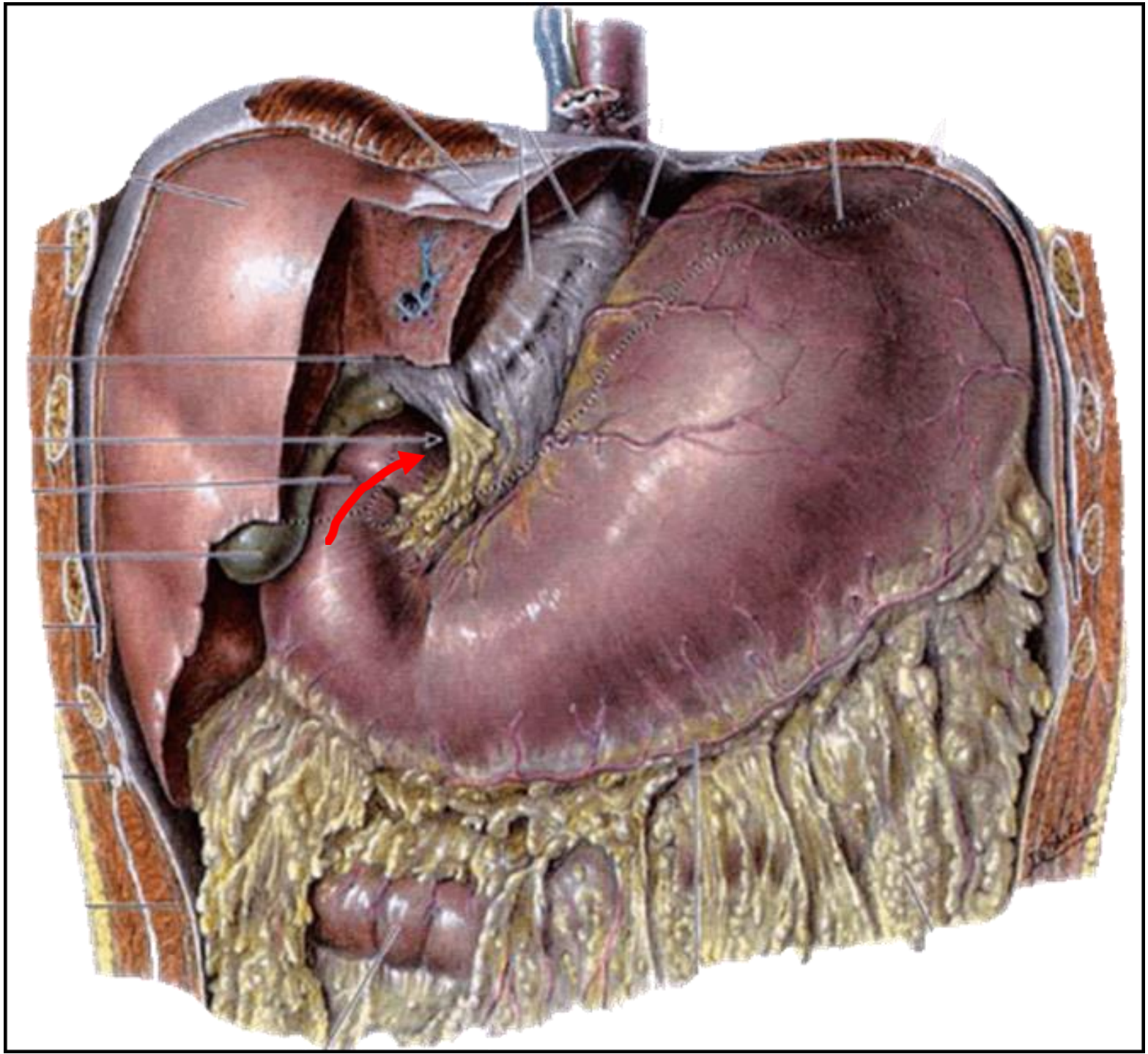
Anterior: free margin of lesser omentum, containing (hepatic artery, bile duct and portal vein)

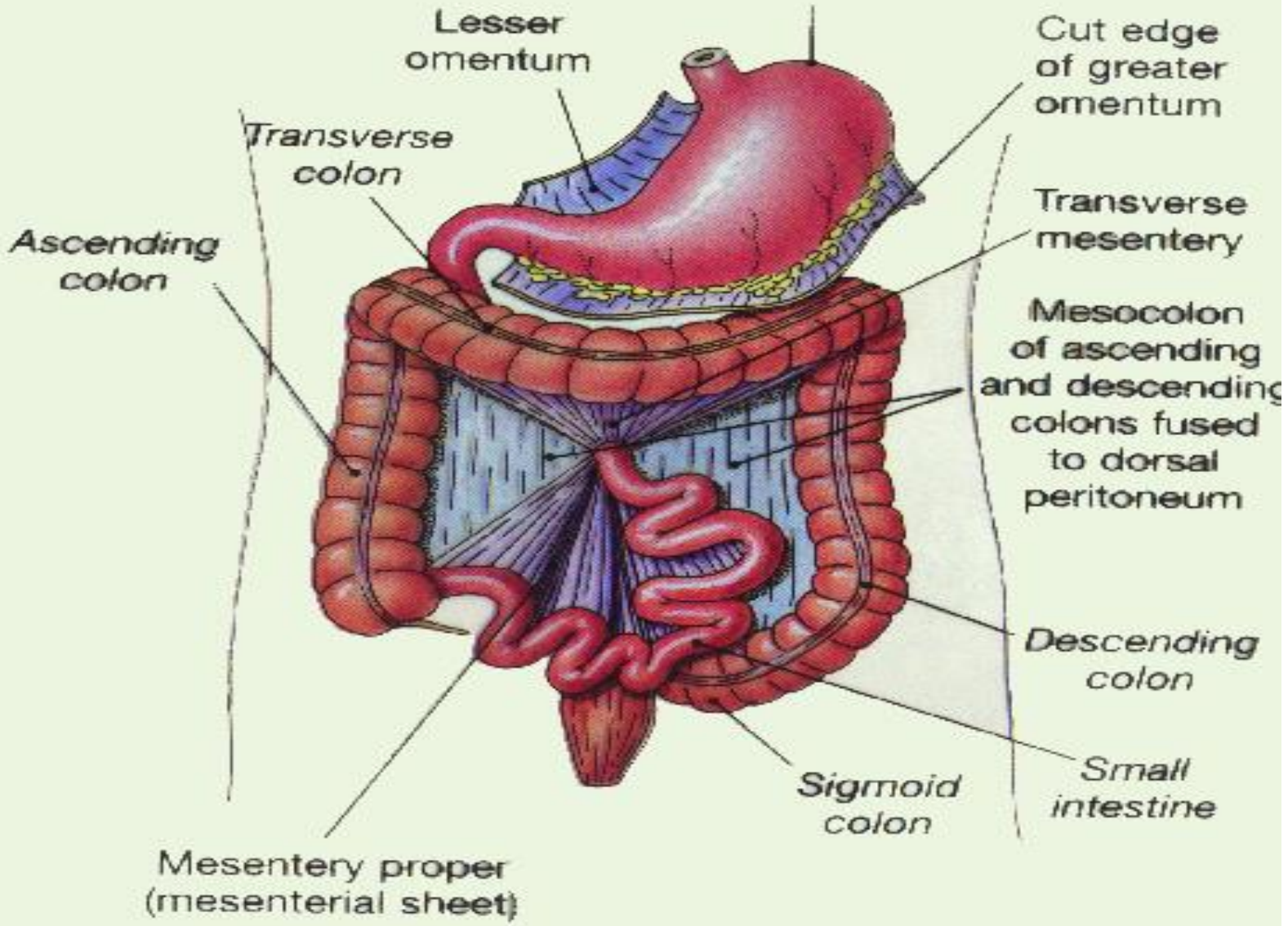
Posterior: peritoneum covering IVC.

Superior: Caudate process of the caudate lobe of the liver.

Inferior: 1st inch of the1st part of duodenum.

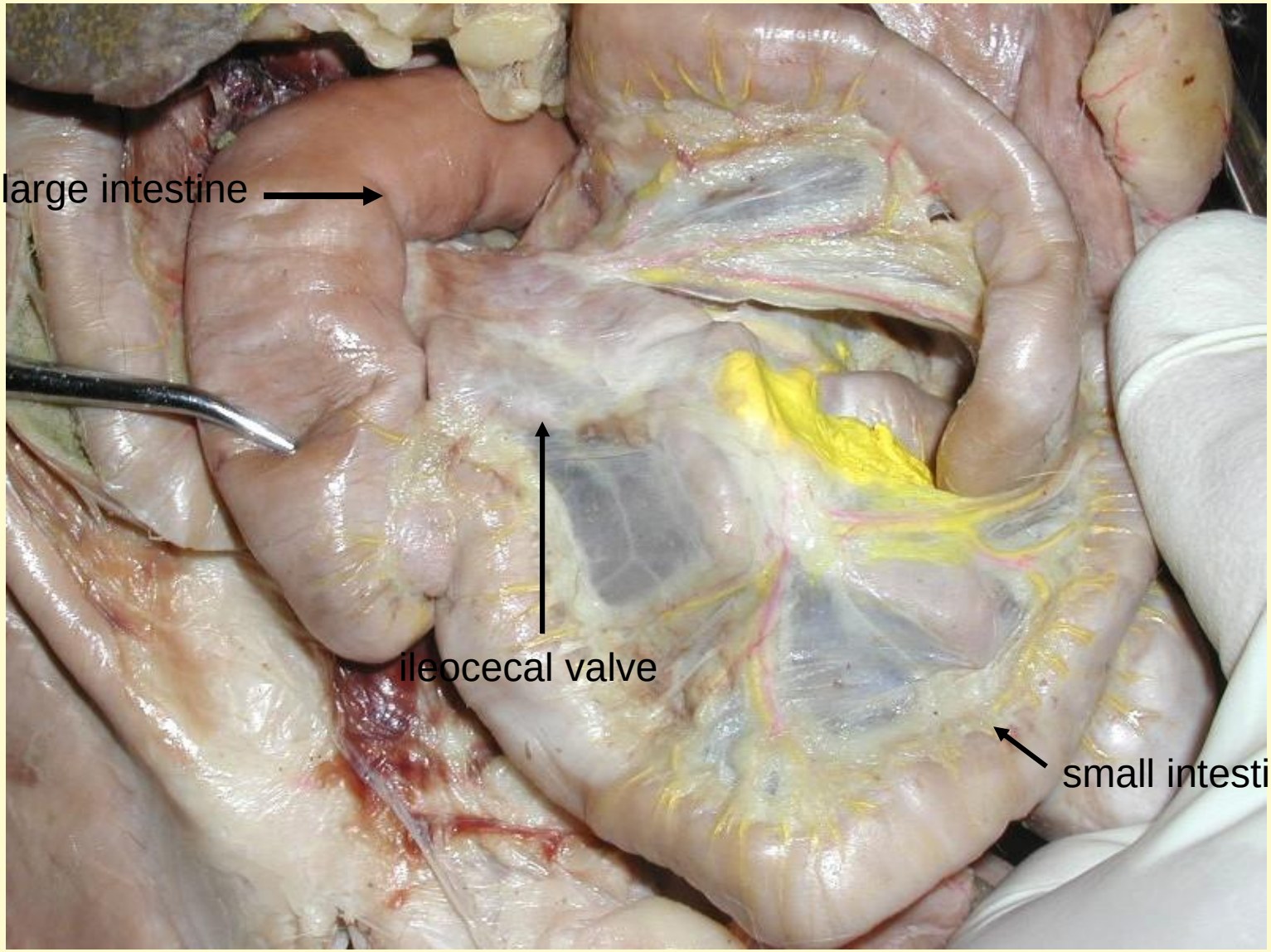






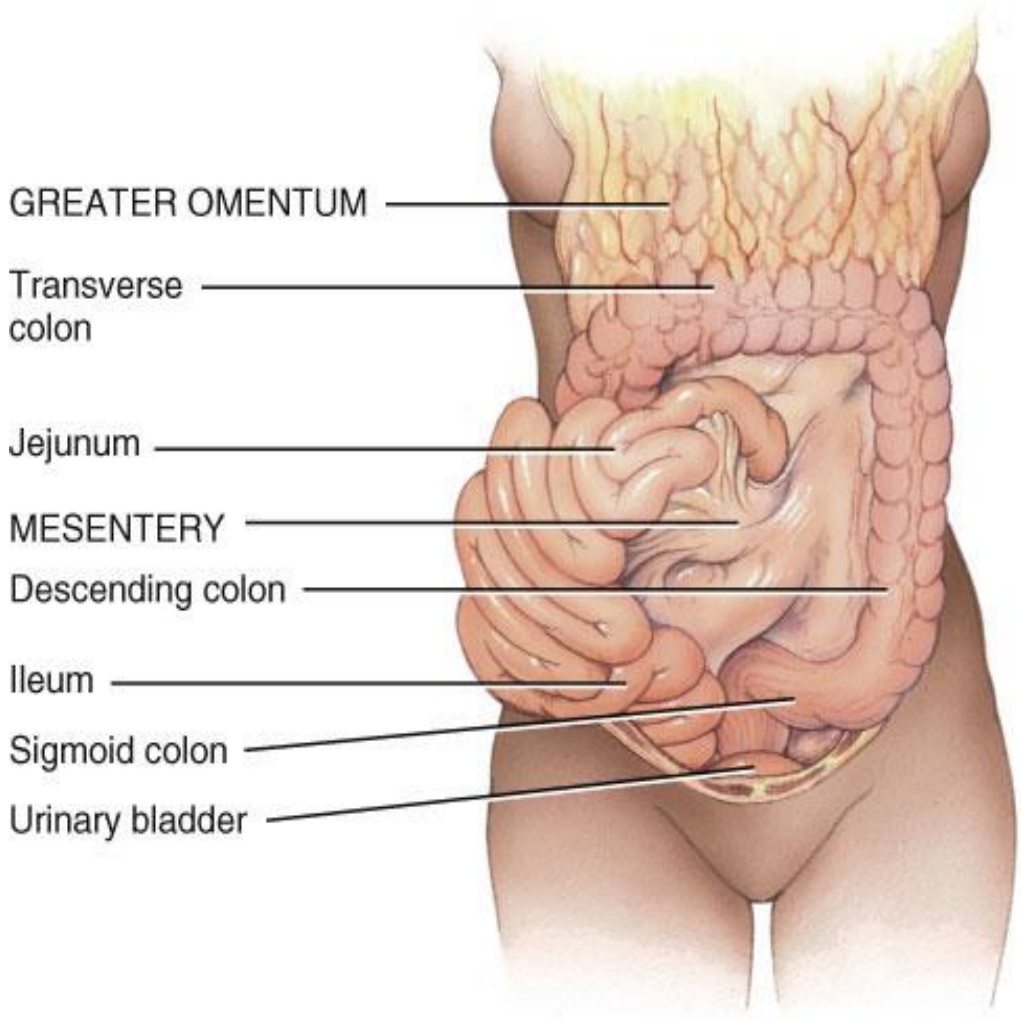
(d) Organization of mesenteries, anterior view

II) The mesenteries and mesocolons :



Mesentery of the small intestine

- The mesentery suspends the jejunum and ileum from the posterior abdominal wall.



(d) Anterior view (greater omentum lifted and small intestine reflected to right side)

- **Mesentery**

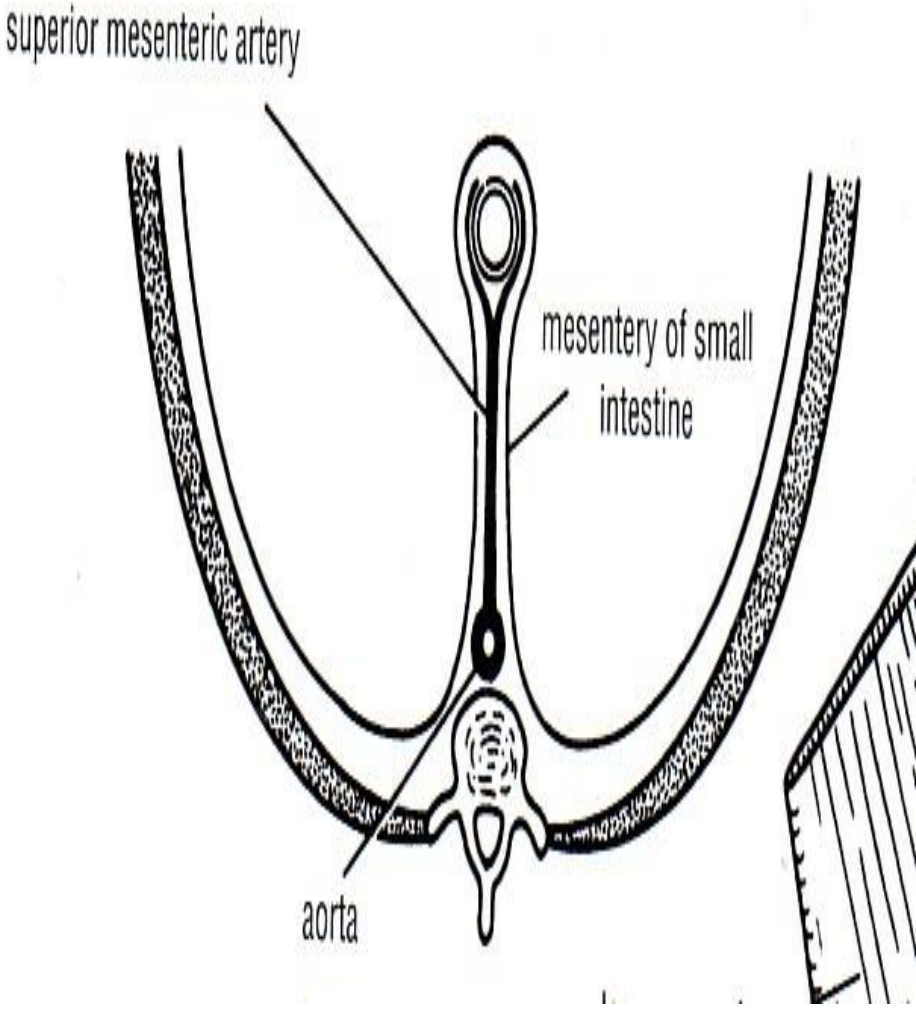
Two layers of peritoneum connecting small intestine to post abdominal wall.

It has 2 borders

1- A*ttached border*: to post abdominal wall &

2- F*ree border*: which encloses the jejunum & ileum.

- Vessels, nerves. Lymphatic enter small intestine between the two layers.



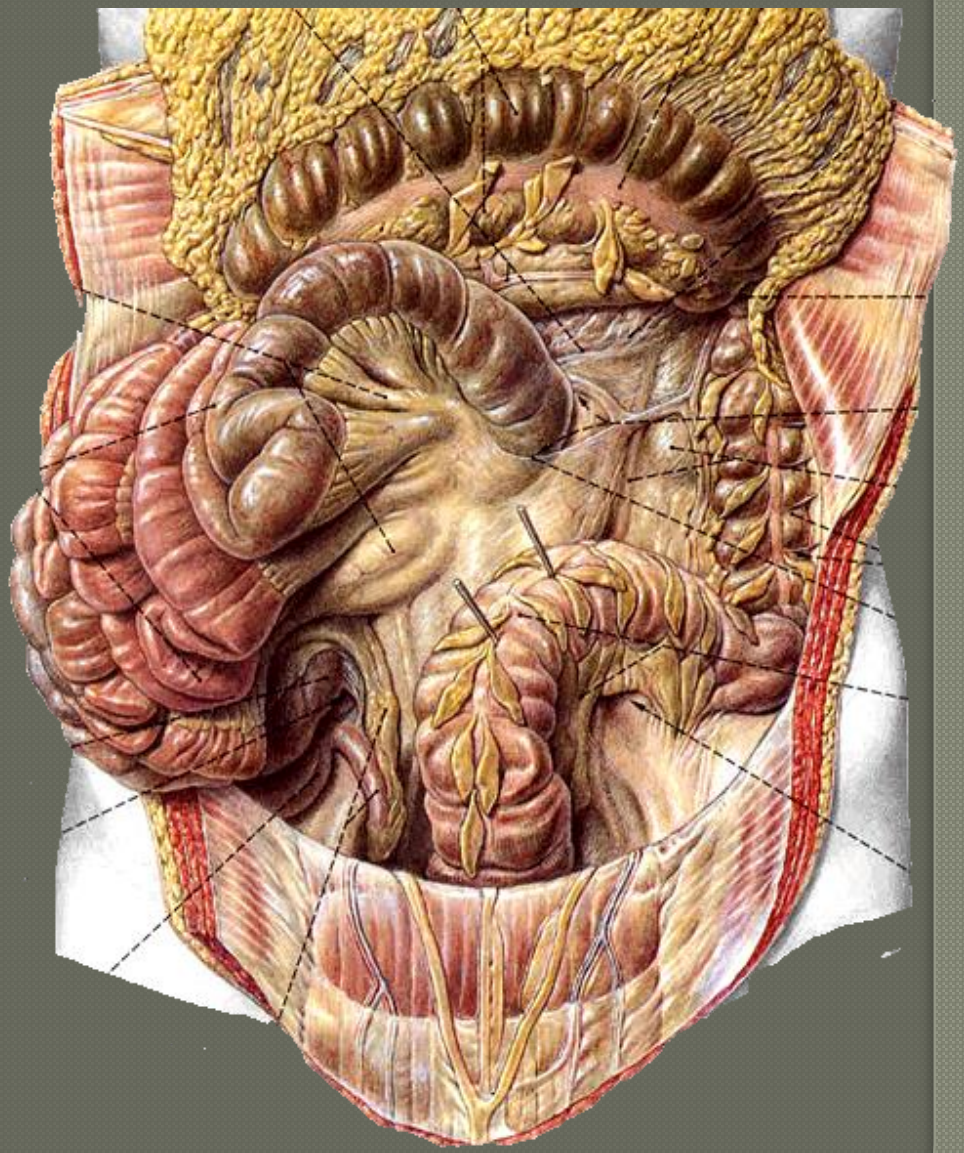
1- Mesentery of small intestine - suspends the small intestine from the posterior abdominal wall

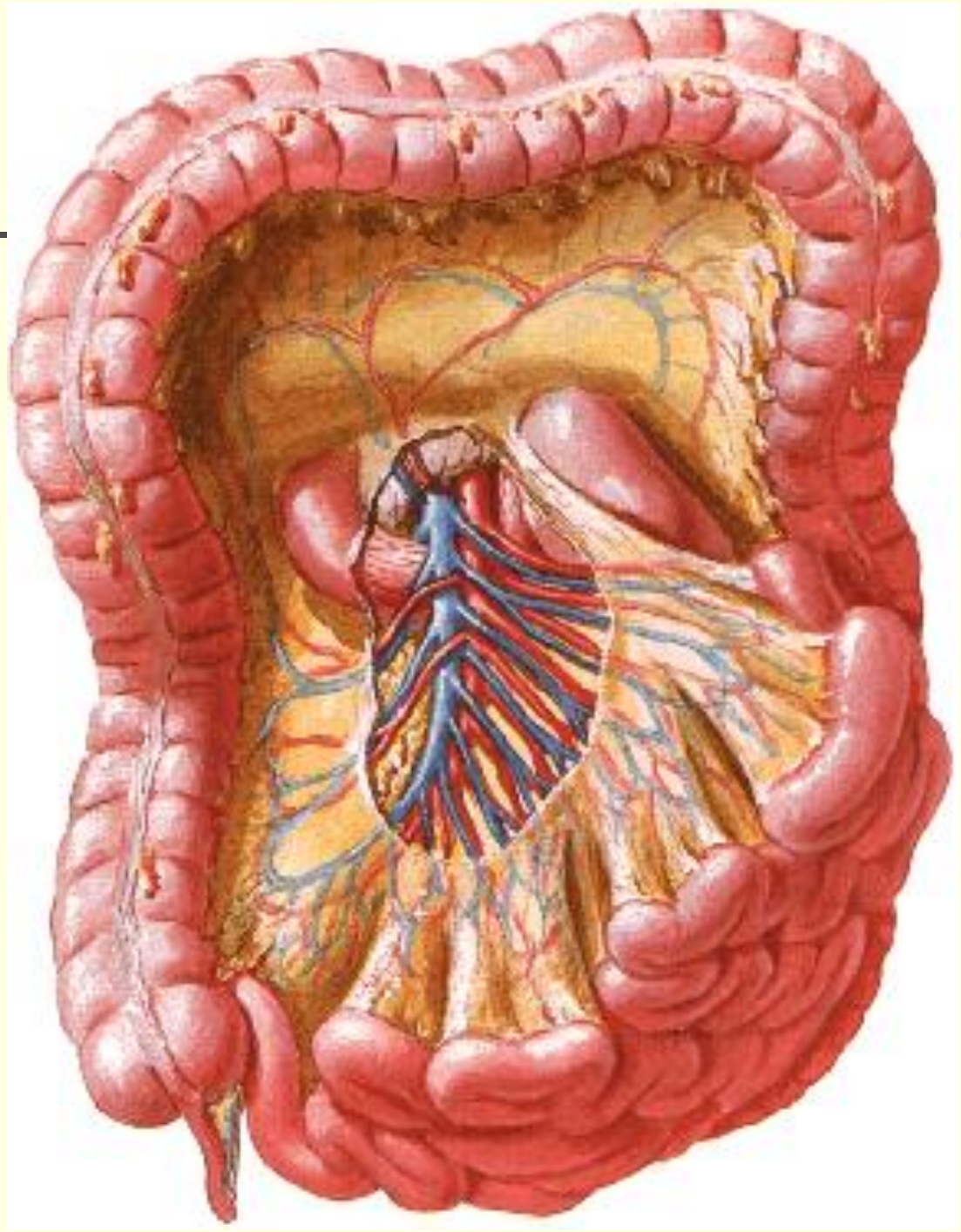
-Broad and a fan-shaped

- Root of mesentery
  - 15 cm long
  - Directed obliquely from left side of L2 vertebra to right sacroiliac joint

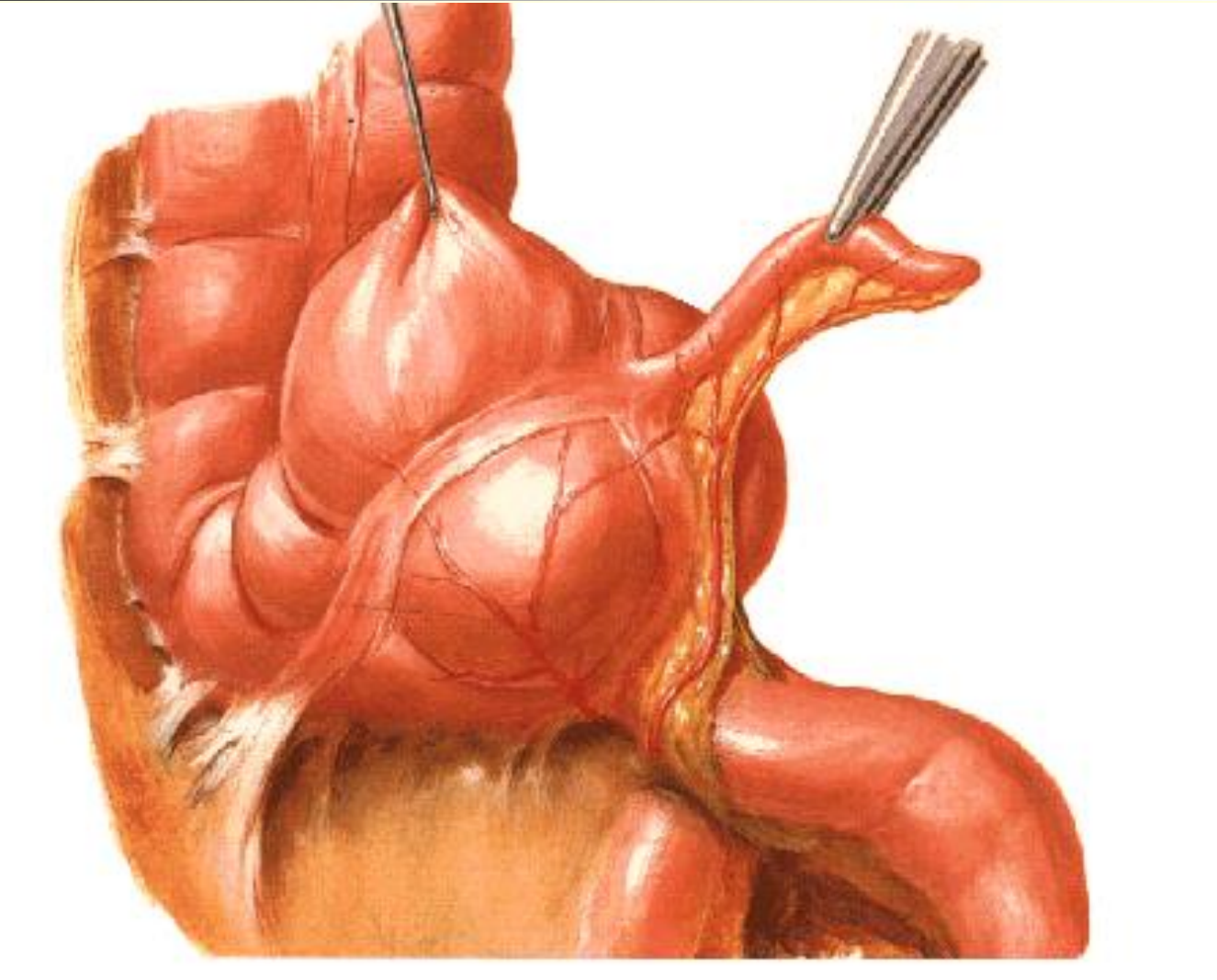
Contents of the mesentery

- the jejunal and ileal branches of the superior mesenteric artery &veins
- nerve plexuses
- lymphatic vessels
- the lymphatic nodes,
- connective tissue
- fat





2. The mesoappendix (mesentery of the appendix)



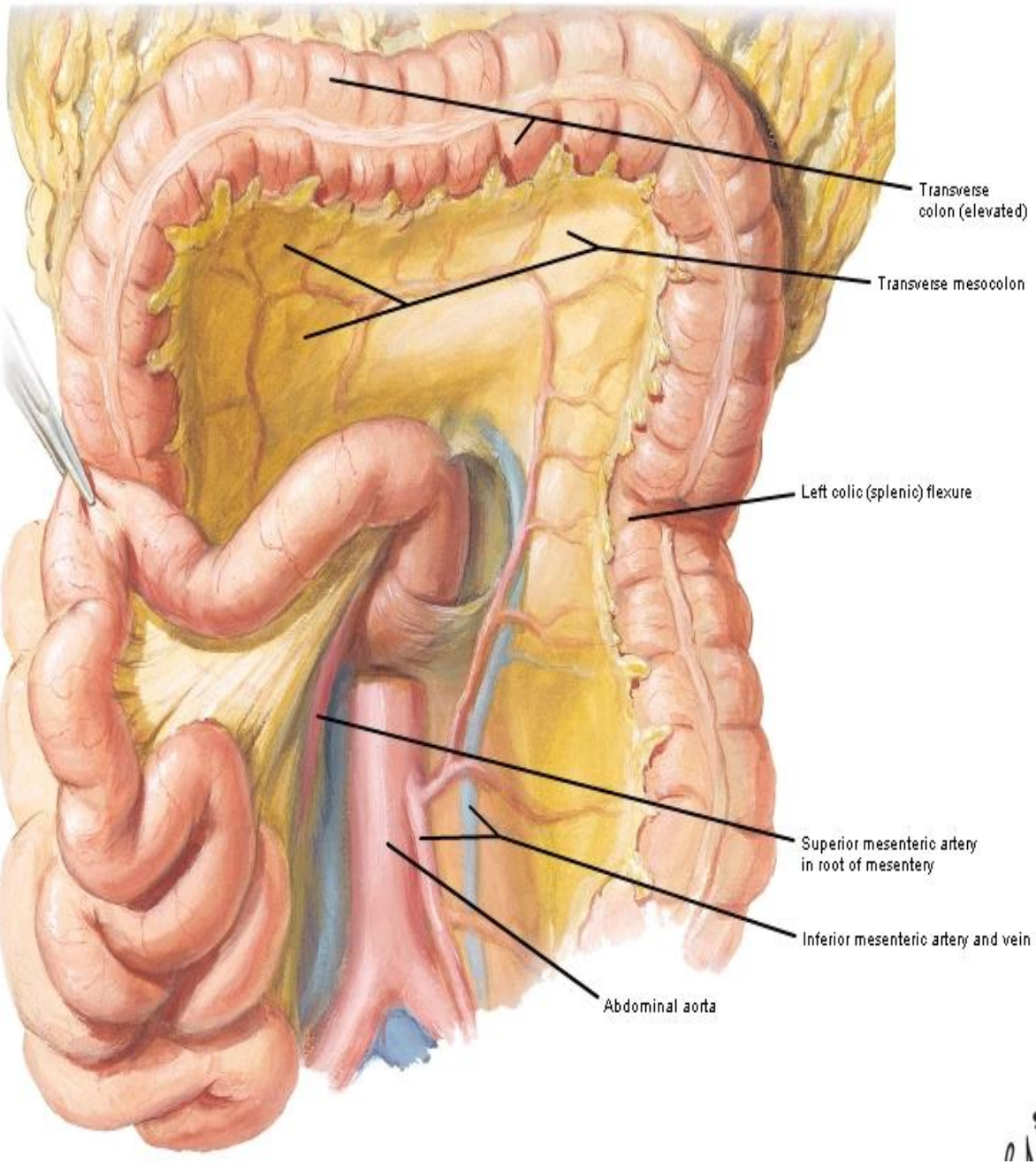
The mesenteries

Contents ?

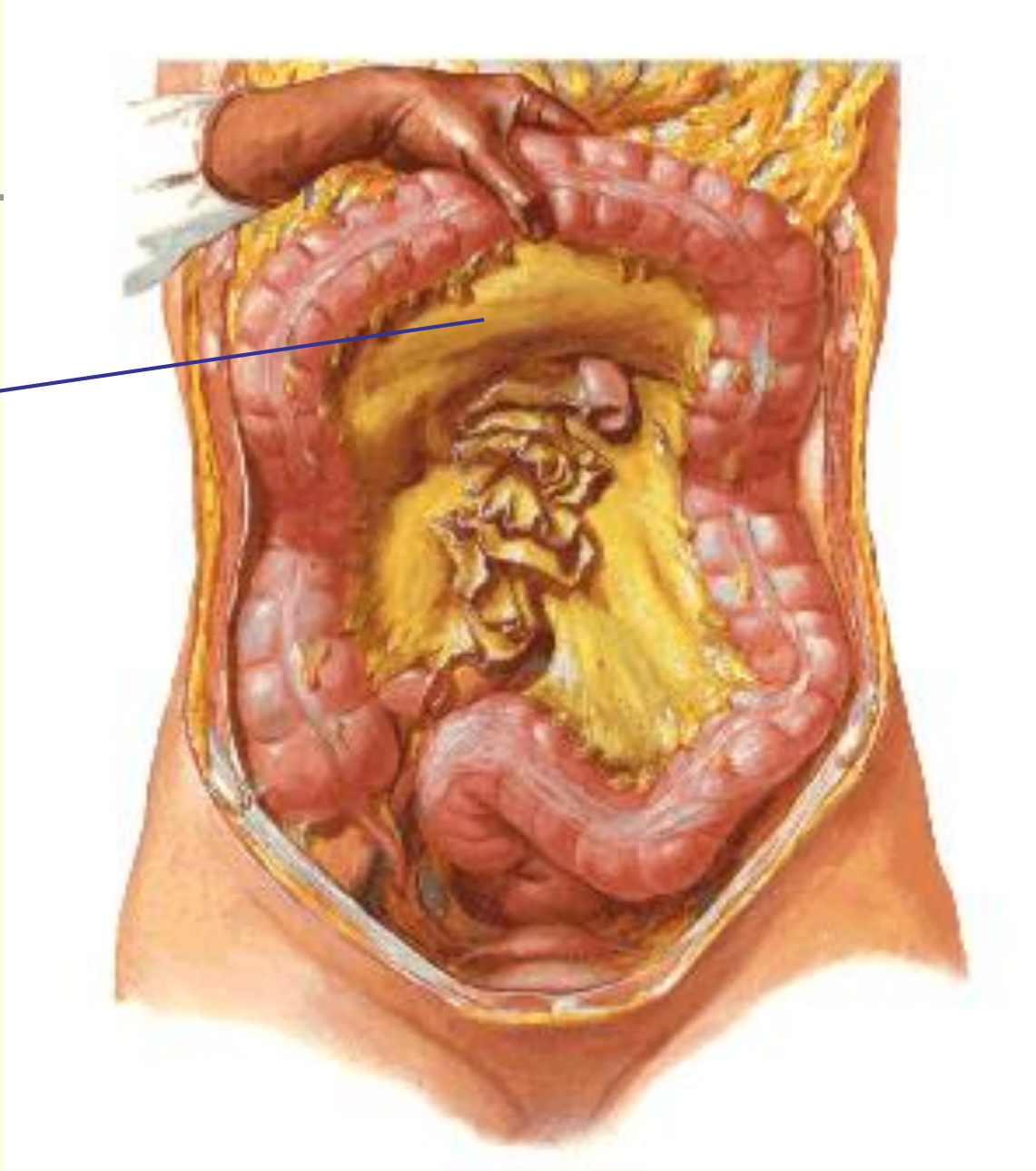
mesentery of the small intestine

transverse mesocolon

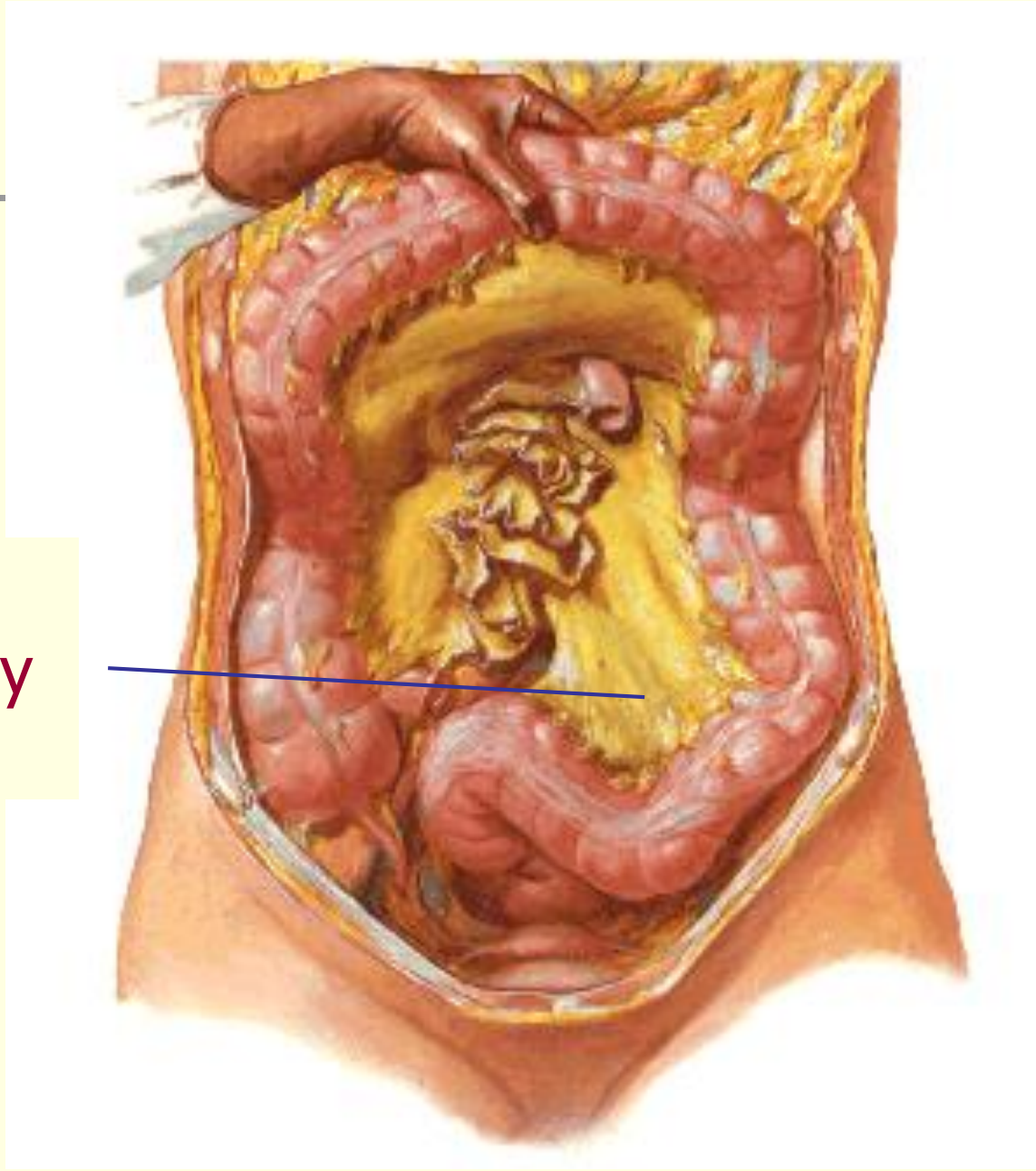
sigmoid mesocolon



3. The transverse mesocolon (mesentery of the transverse colon)



4. The sigmoid mesocolon (mesentery of the sigmoid colon)



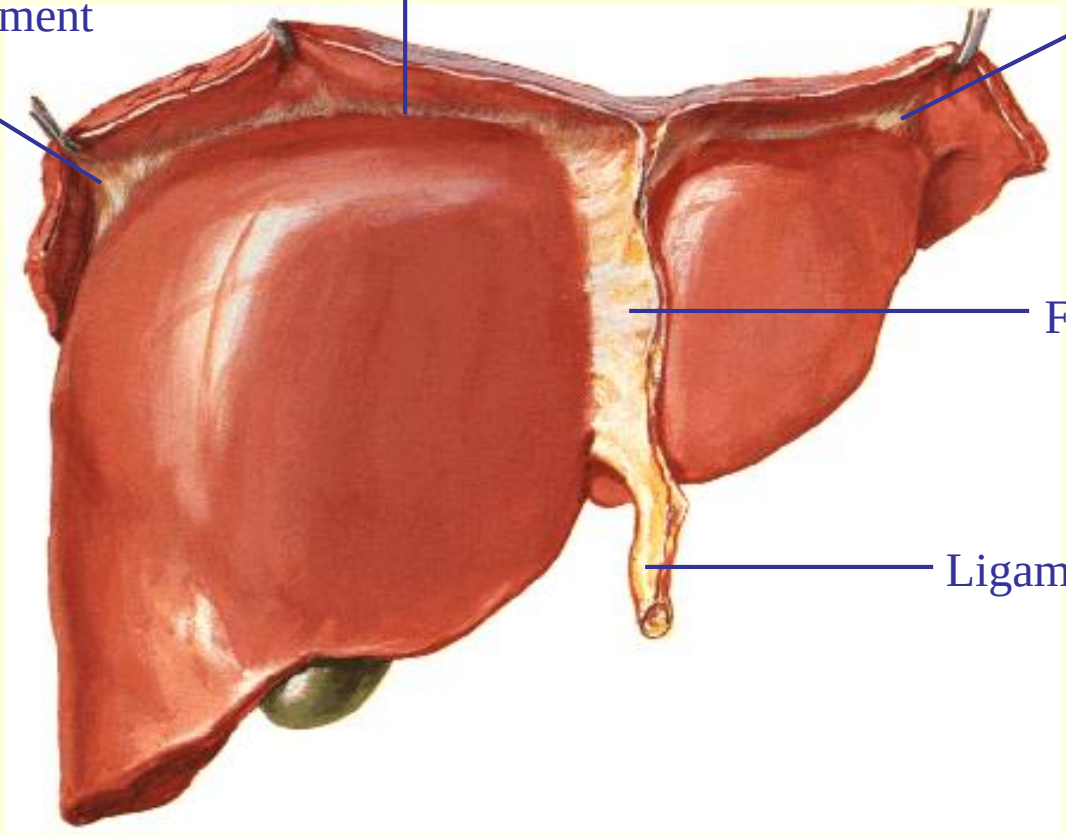
3- ligaments of the peritoneum

1. The ligaments of the liver

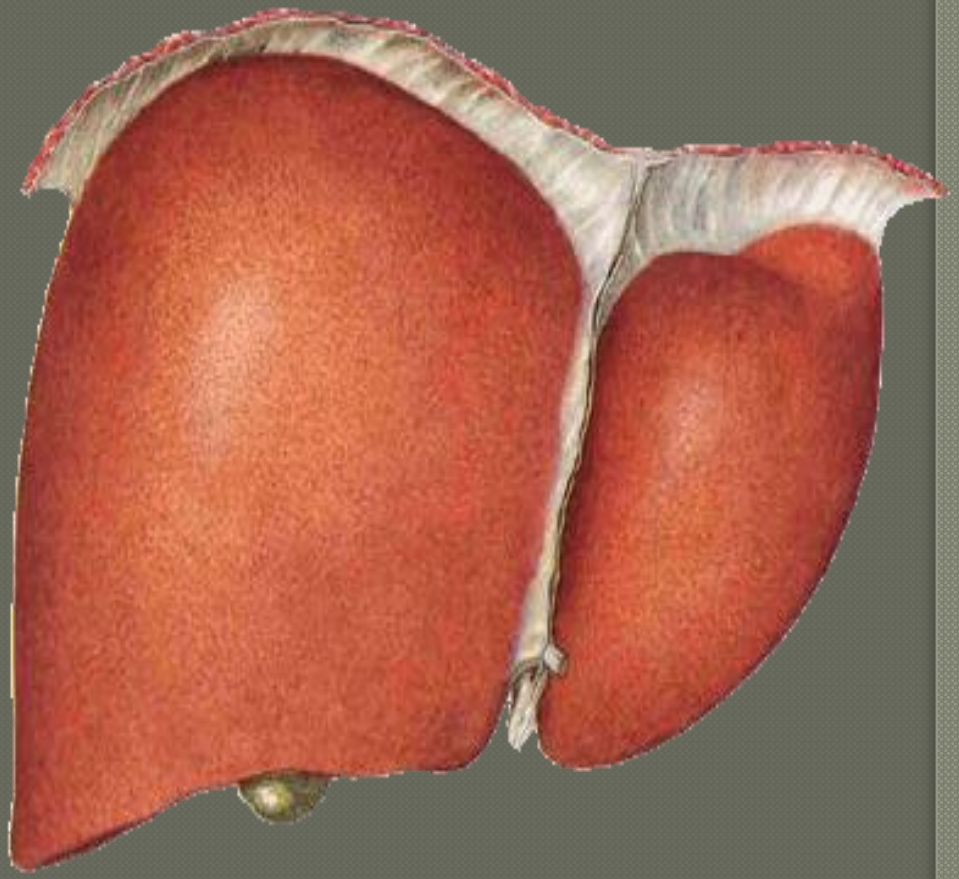
1- The **Falciform ligament of liver**
2- The **Ligamentum teres hepatis**
3- The **coronary ligament**
4- The **right triangular ligament**
5- The **left triangular ligament**
6- The **Hepatogastric ligament**
7- The **hepatoduonedenal ligament**
8- The Ligamentum Venoosum

III) The ligaments

1. The ligments of the liver

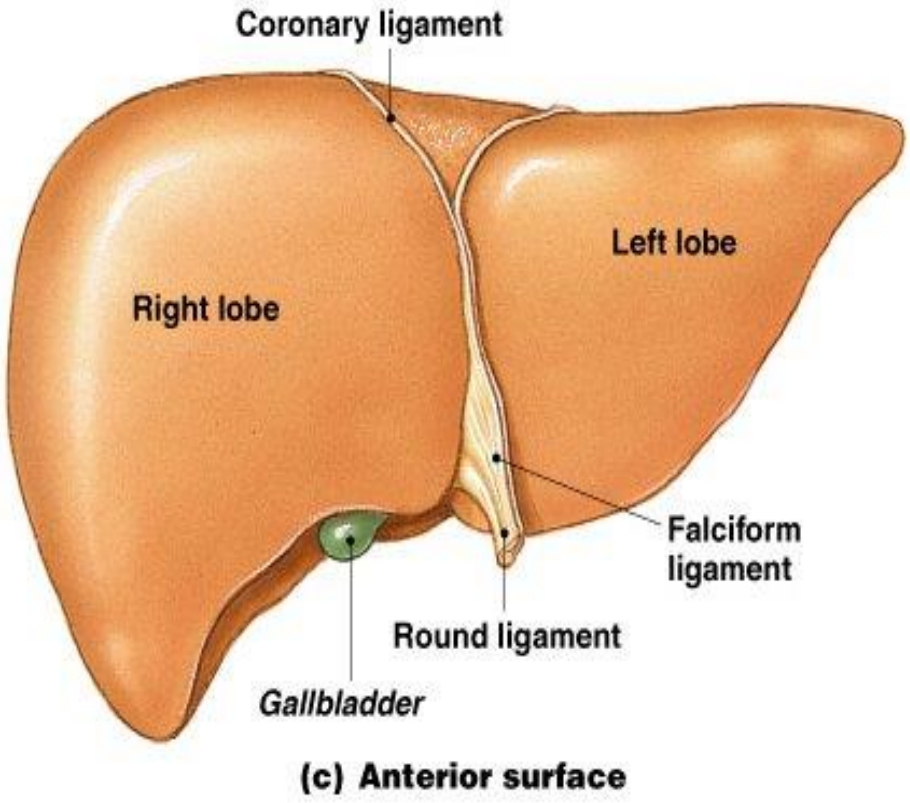


- **Falciform ligament of liver**
  - Consists of double peritoneal layer
  - Sickeleshape
  - Extends from anterior abdominal wall (umbilicus) to liver
  - Free border of the ligament contains Ligamentum teres (obliterated umbilical vein)

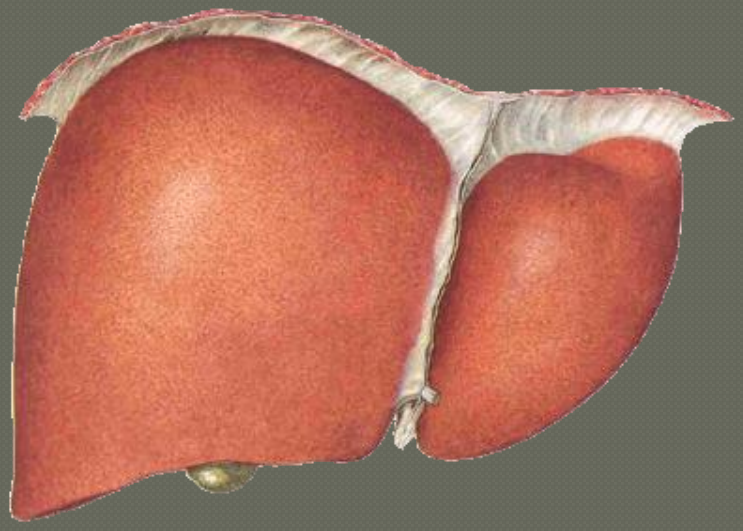


Peritoneal folds related to the Liver

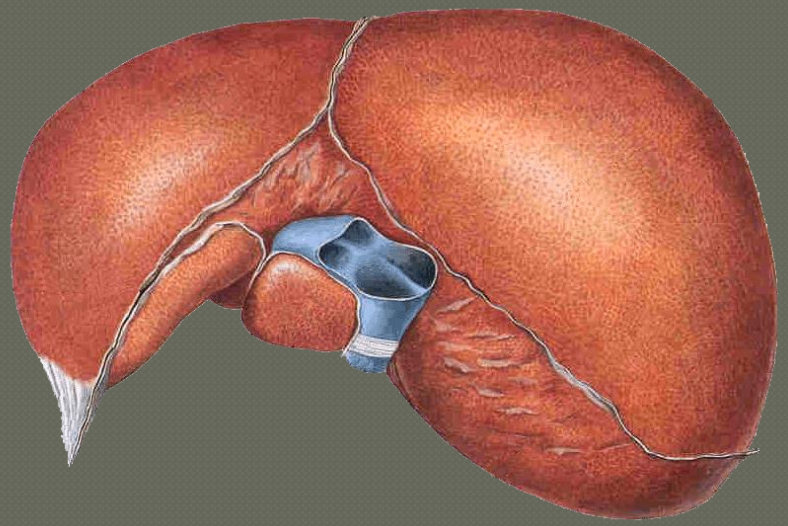
- The Falciform ligament:
  Passes from the parietal peritoneum on the anterior abdominal wall to the visceral peritoneum on the surface of the liver.
- The round ligament of the liver (ligamentum teres hepatis):
- Is the obliterated umbilical vein and it is found in the inferior free margin of the Falciform ligament.



- **Coronary ligament** the area between upper and lower layer of the coronary ligament is the bare area of liver which contract with the diaphragm;



- **Left and right triangular ligaments** formed by left and right extremity of coronary ligament



Peritoneal folds related to the Liver

- Coronary ligament:

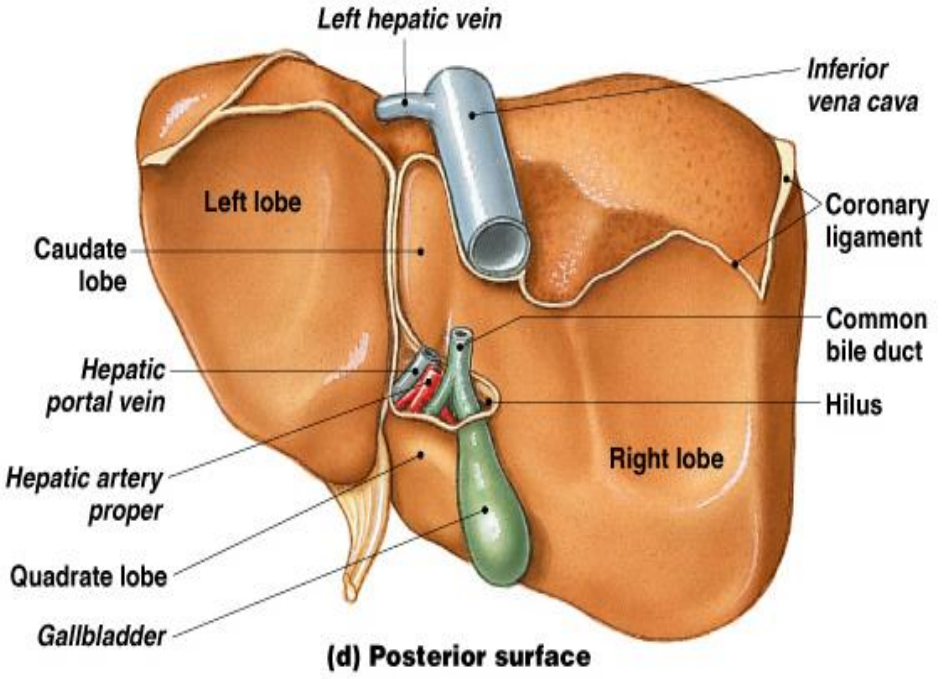
Attaches the liver to the diaphragm. Two peritoneal ligaments are parts of the coronary ligament:

1. Left triangular ligament:

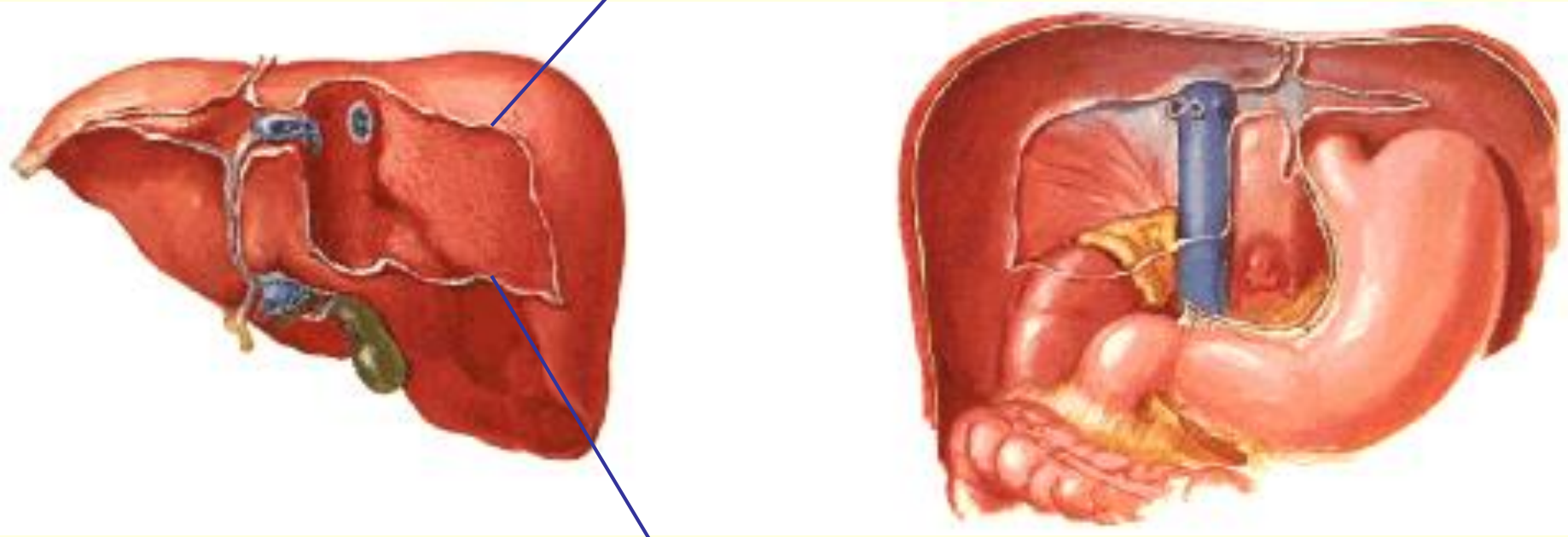
Is between the left lobe of the liver and the diaphragm.

2. Right triangular ligament:

Is between the right lobe of the liver and the diaphragm.



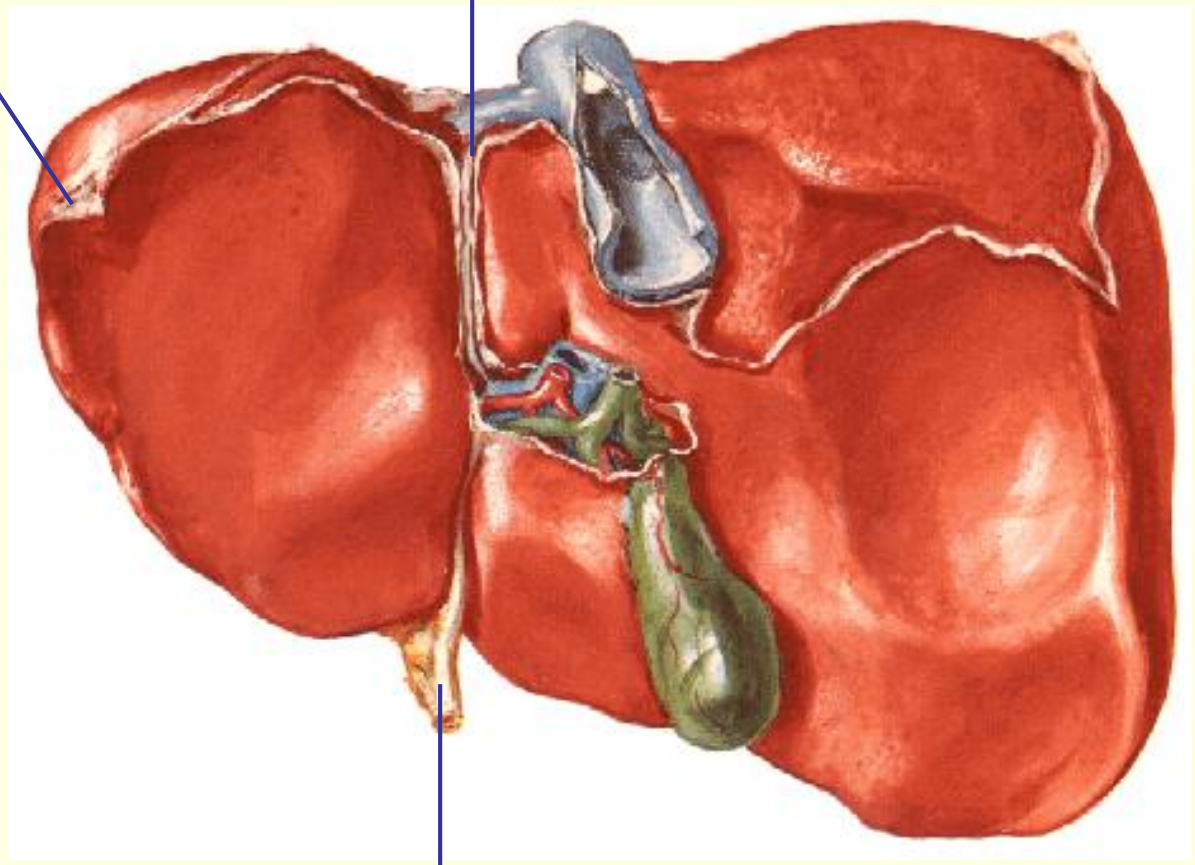
Posterior coronary ligament



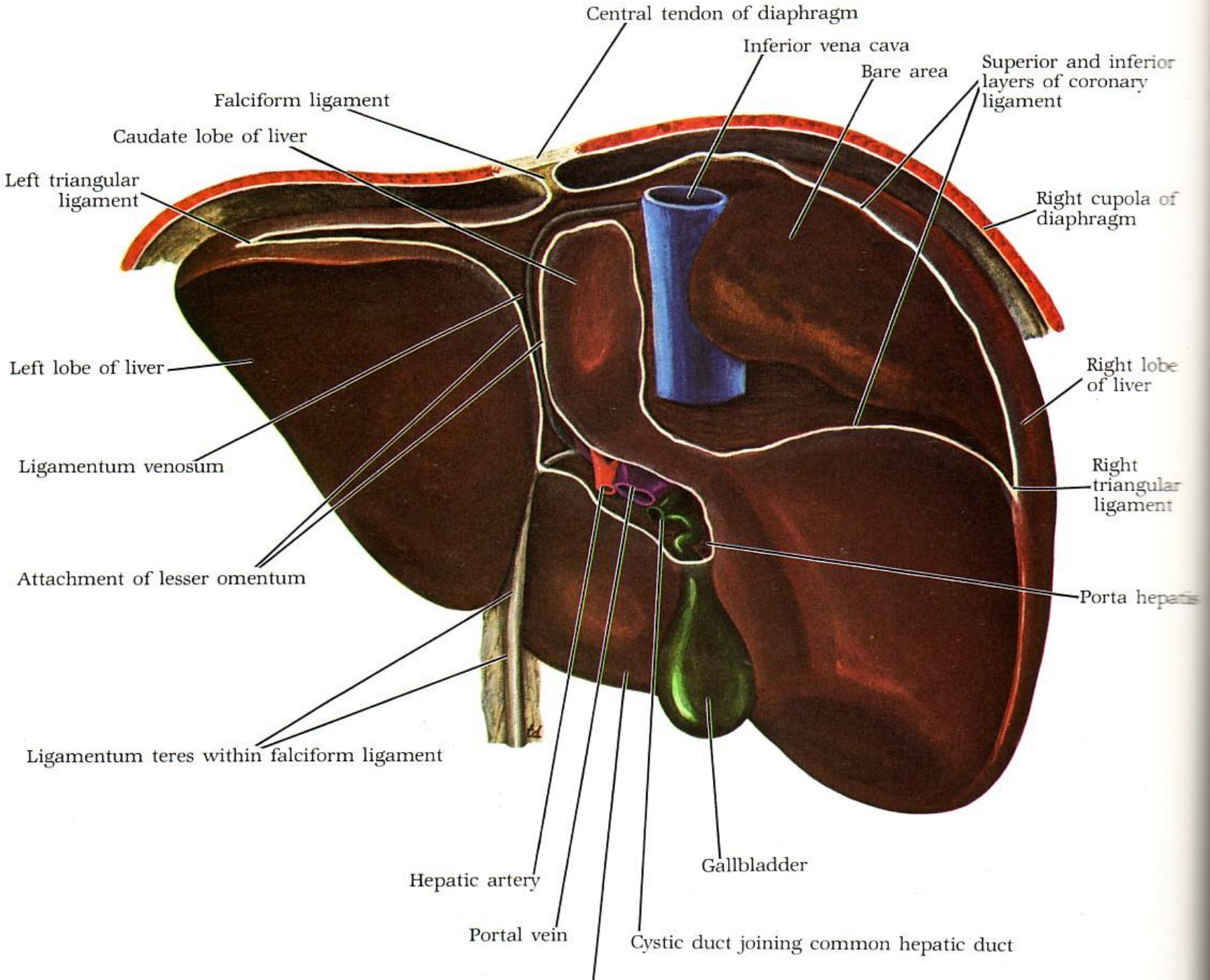
Anterior coronary ligament

Ligament venosum

Left triangular ligament



Ligamentum teres hepatis


Central tendon of diaphragm
Inferior vena cava
Bare area
Superior and inferior layers of coronary ligament
Falciform ligament
Caudate lobe of liver
Left triangular ligament
Right cupola of diaphragm
Left lobe of liver
Right lobe of liver
Ligamentum venosum
Right triangular ligament
Attachment of lesser omentum
Porta hepatis
Ligamentum teres within falciform ligament
Hepatic artery
Gallbladder
Portal vein
Cystic duct joining common hepatic duct

2. The ligaments of the stomach

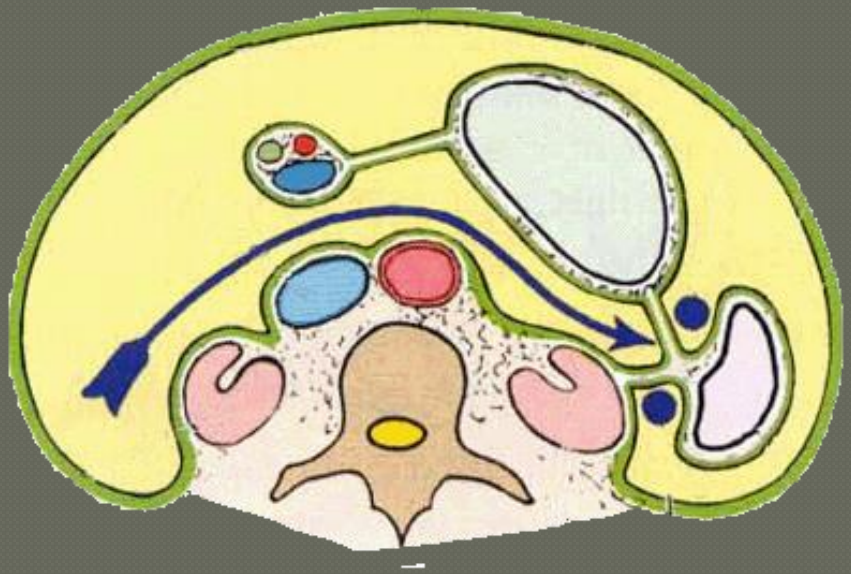
① The **gastrohepatic ligament**

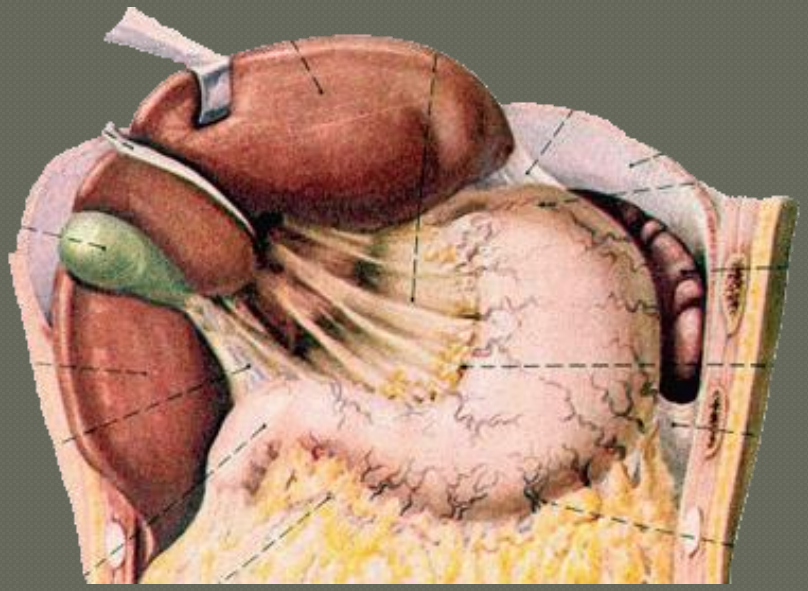
② The **gastrocolic ligament**

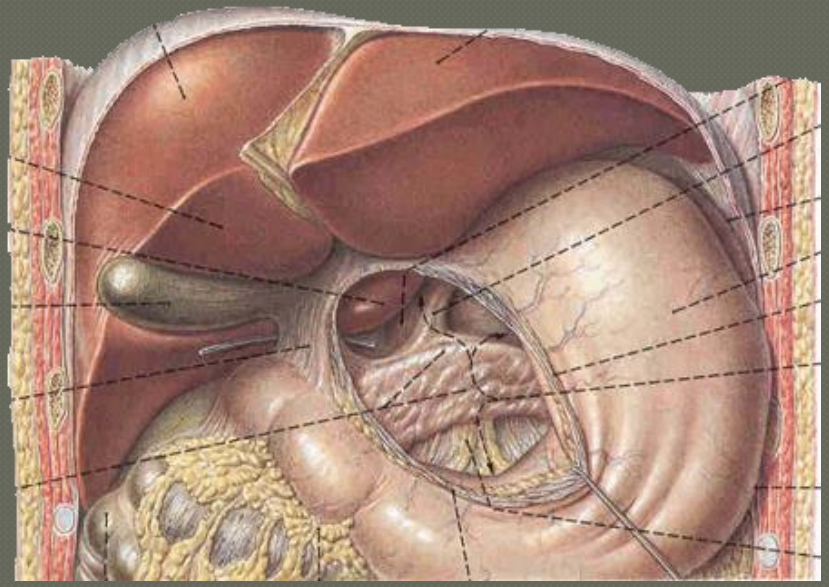
③ The **gastrosplenic ligament**

2- Ligaments of stomach

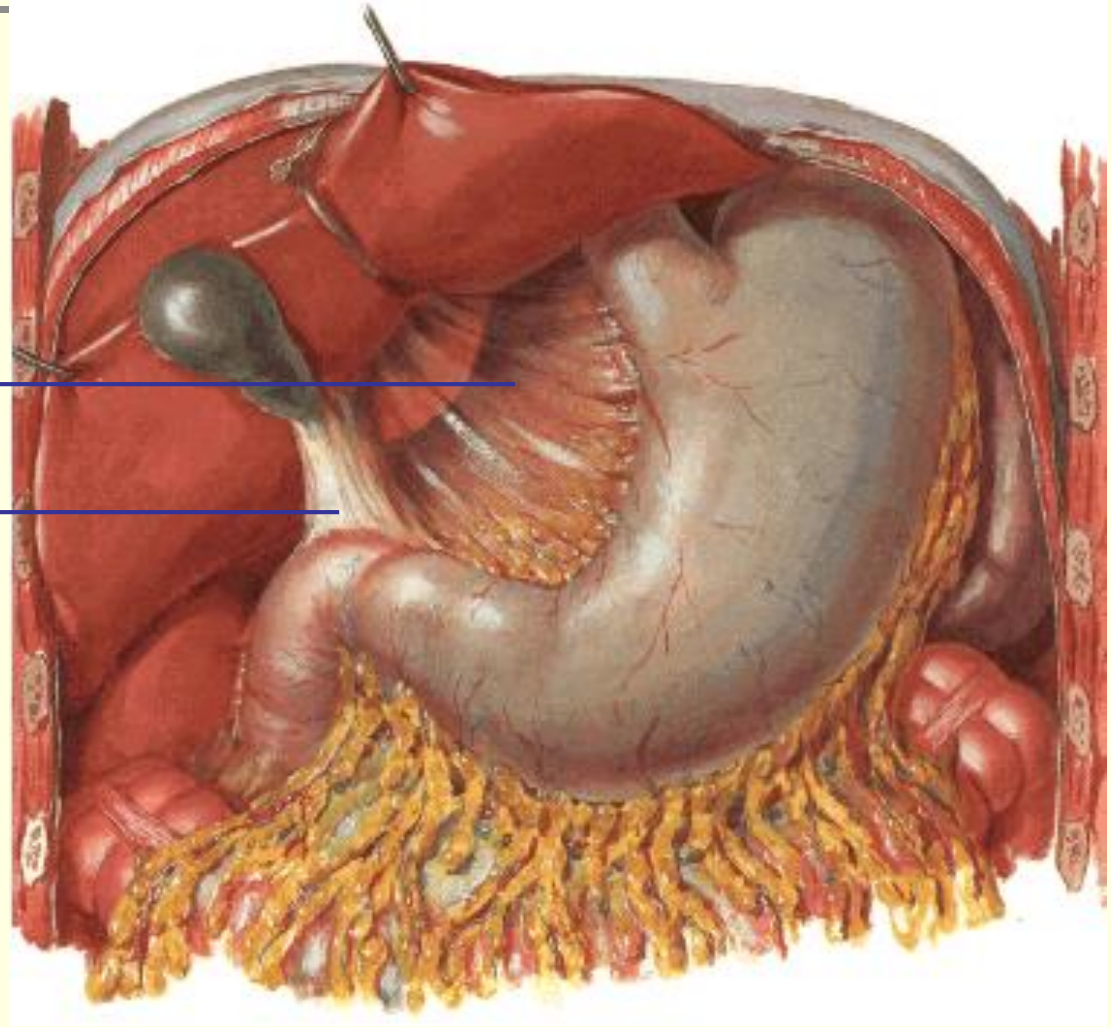
- Hepatogastric ligament
- Gastrosplenic ligament
- Gastrophrenic ligament
- Gastrocolic ligament
- **Gastropancrestic ligament**



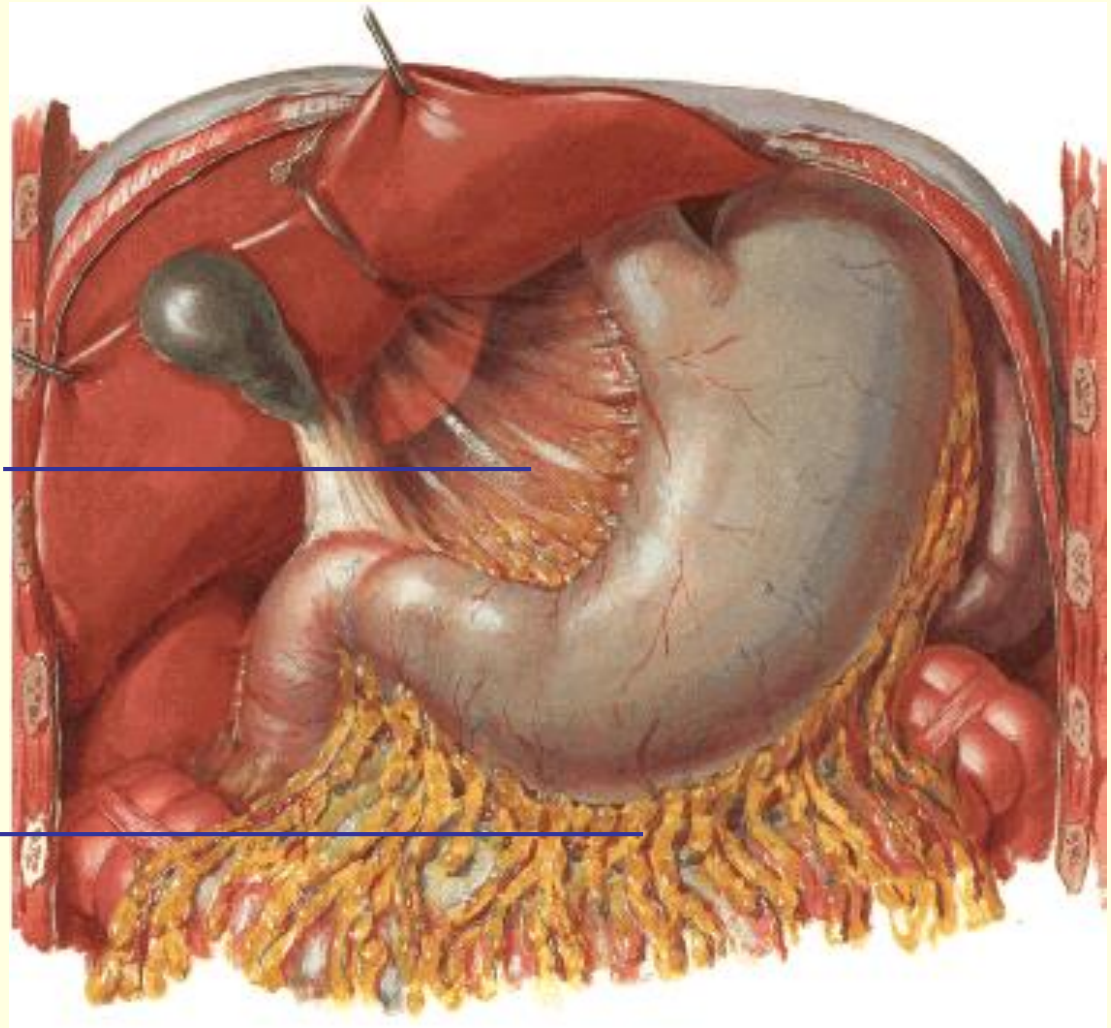




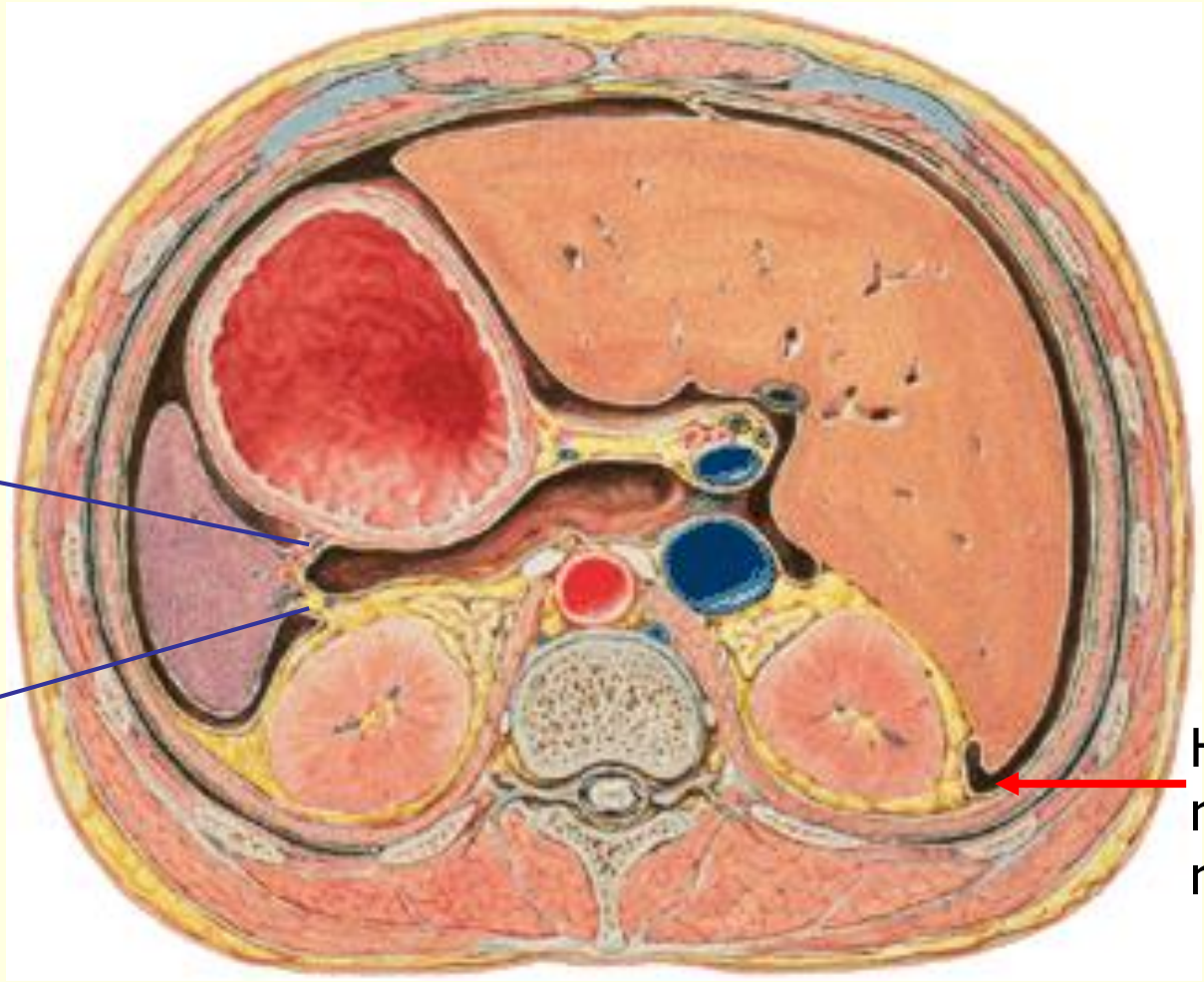
Omentum
- Hepatogastric lig.
- Hepatodudenal lig.



. The ligaments of the stomach



3. The ligaments of the spleen

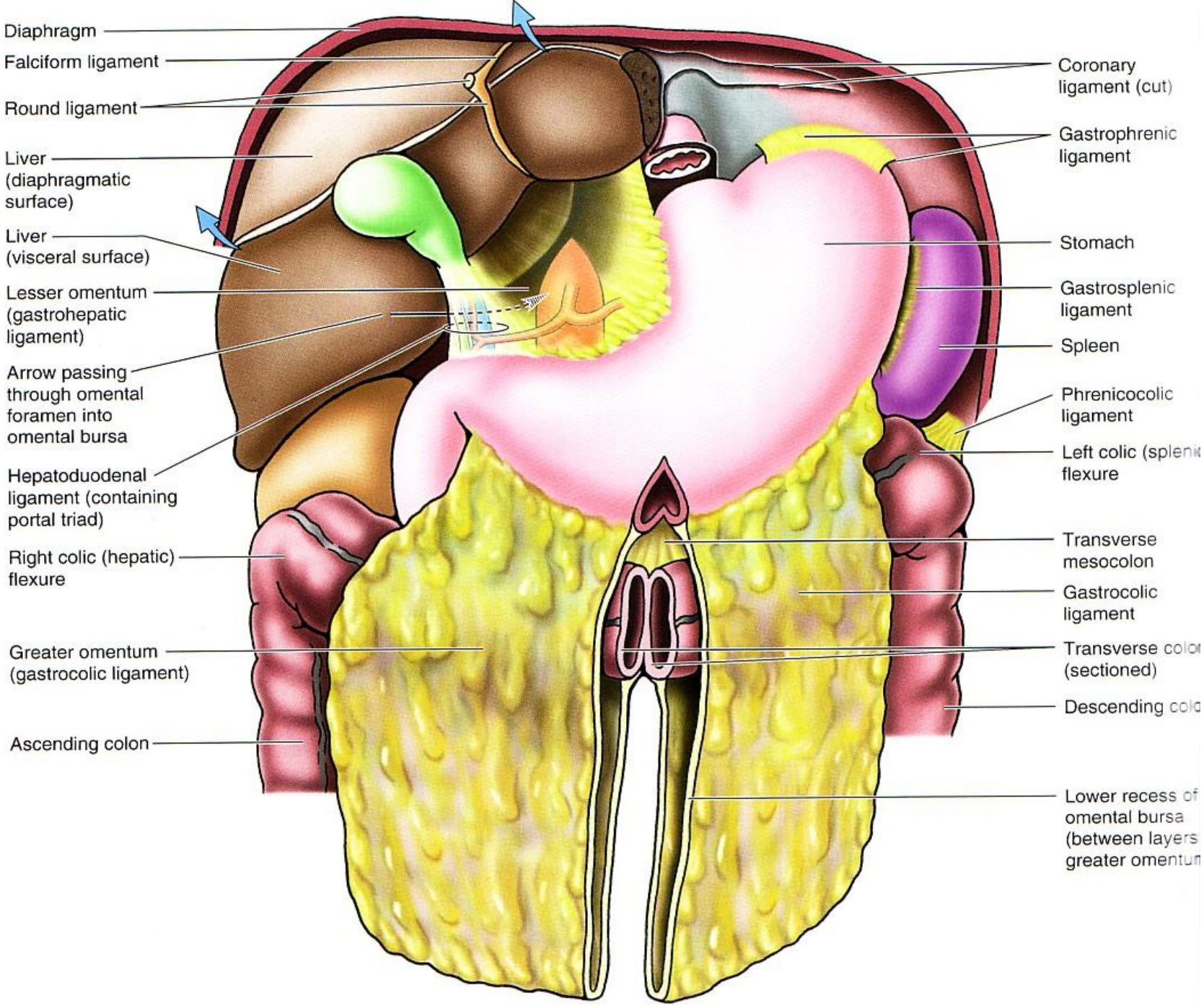


Spleen

- Peritoneum
- The spleen is completely covered with peritoneum → intraperitoneal organ
- Two ligaments

1- the gastrosplenic omentum (ligament)→ between the spleen & the greater curvature of the stomach (carrying the short gastric and left gastroepiploic vessels)

2- splenicorenal ligament→ between spleen & kidney (carrying the splenic vessels and the tail of the pancreas).


Diaphragm
Falciform ligament
Round ligament
Liver (diaphragmatic surface)
Liver (visceral surface)
Lesser omentum (gastrohepatic ligament)
Arrow passing through omental foramen into omental bursa
Hepatoduodenal ligament (containing portal triad)
Right colic (hepatic) flexure
Greater omentum (gastrocolic ligament)
Ascending colon
Coronary ligament (cut)
Gastrophrenic ligament
Stomach
Gastrosplenic ligament
Spleen
Phrenicocolic ligament
Left colic (splenic) flexure
Transverse mesocolon
Gastrocolic ligament
Transverse colon (sectioned)
Descending colon
Lower recess of omental bursa (between layers of greater omentum

- **Phrenicosplenic ligament**
- **Splenocolic ligament**

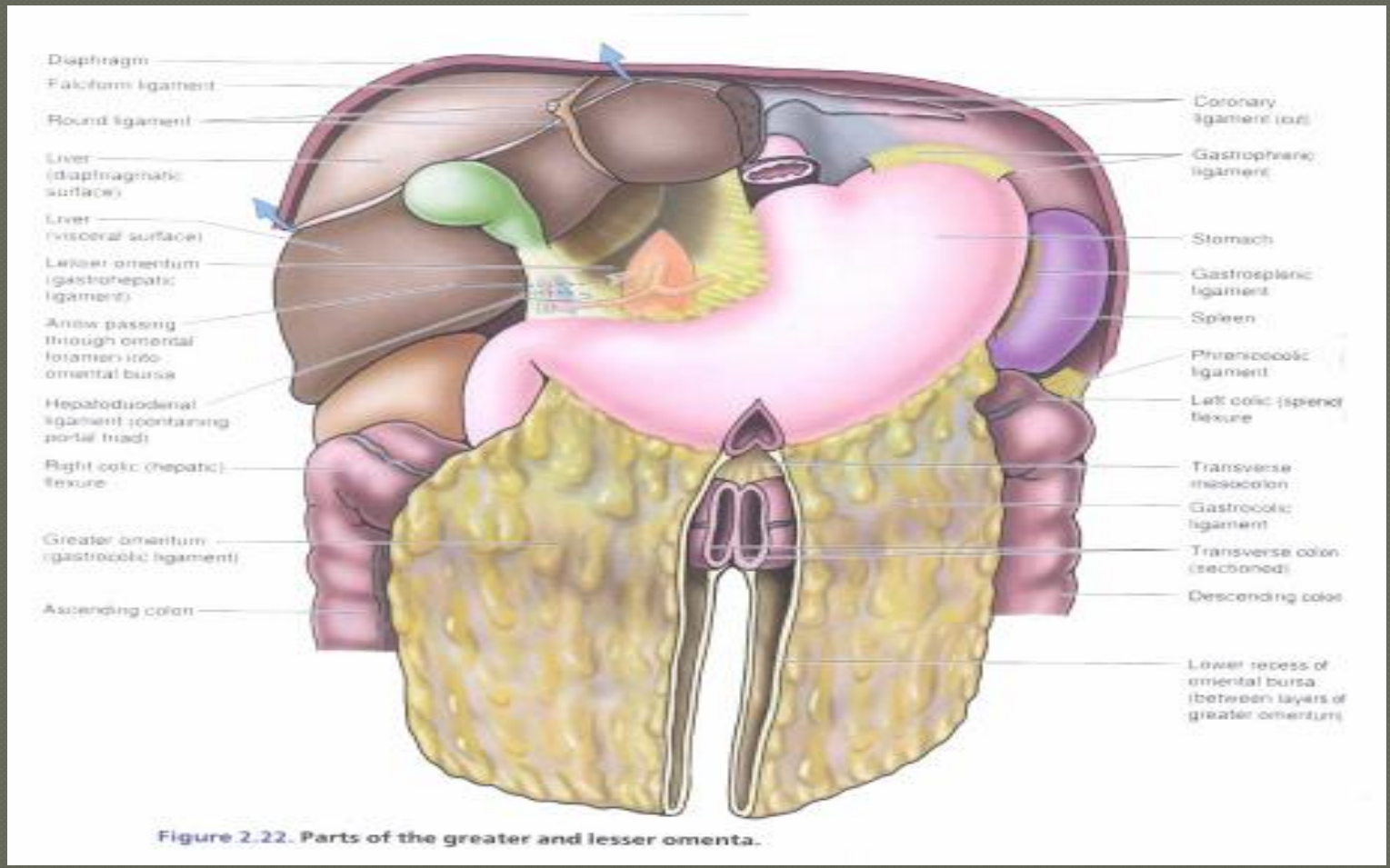


Figure 2.22. Parts of the greater and lesser omenta.

4. The suspensory ligament of the duodenum

Ligament of Treitz it is a fold containing the suspensory muscle of duodenum.

5. The **phrenicocolic ligament**

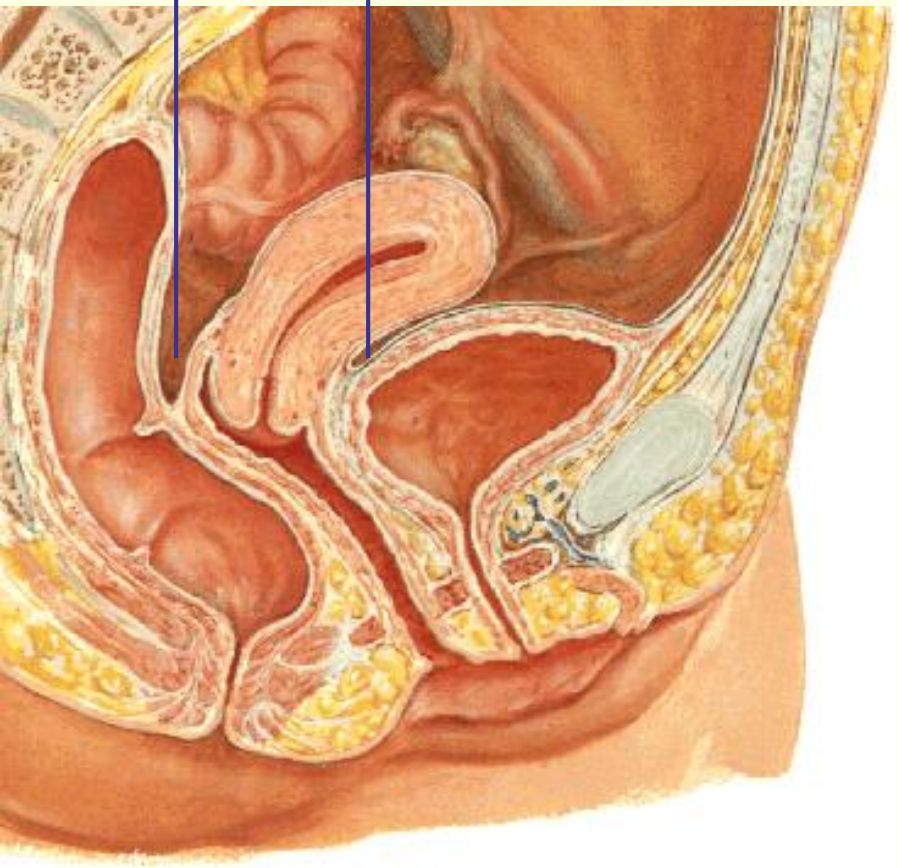
It is a fold of peritoneum which is continued from the left colic flexure to the diaphragm opposite the 10^{th} and 12^{th} ribs.

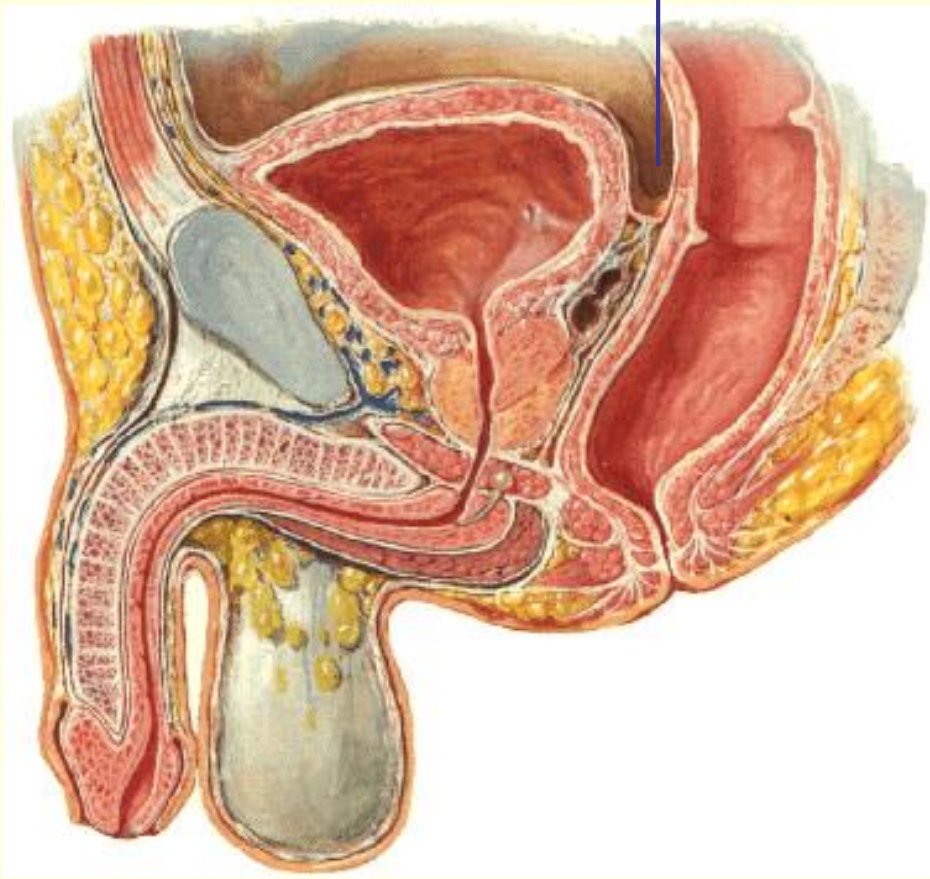
2. The pouches

Rectouterine pouch

Vesicouterine pouch

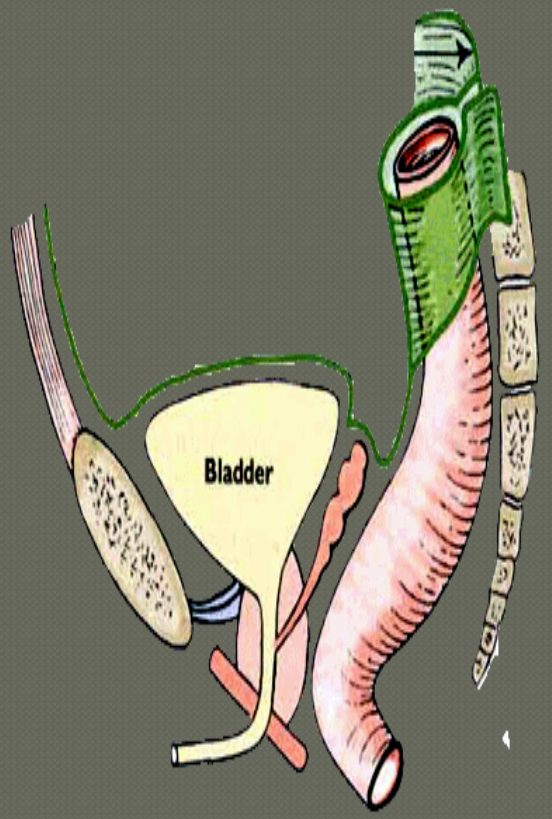
Rectovesical pouch





Pouches

- In male
- **rectovesical pouch**
- lies between rectum and urinary bladder (or the seminal vesicles and ampullae ductus deferentes).
- The rectovesical pouch is the lowest part of the peritoneal cavity in anatomical position in male.



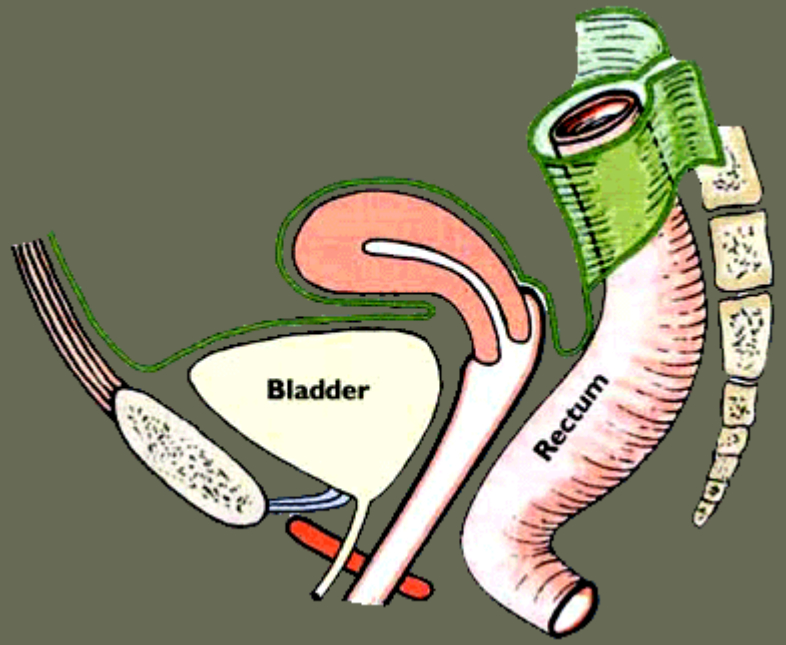
Pouches

In female

1- Rectouterine pouch(douglas)
between rectum and uterus

2- **Vesicouterine pouch**
between bladder and uterus

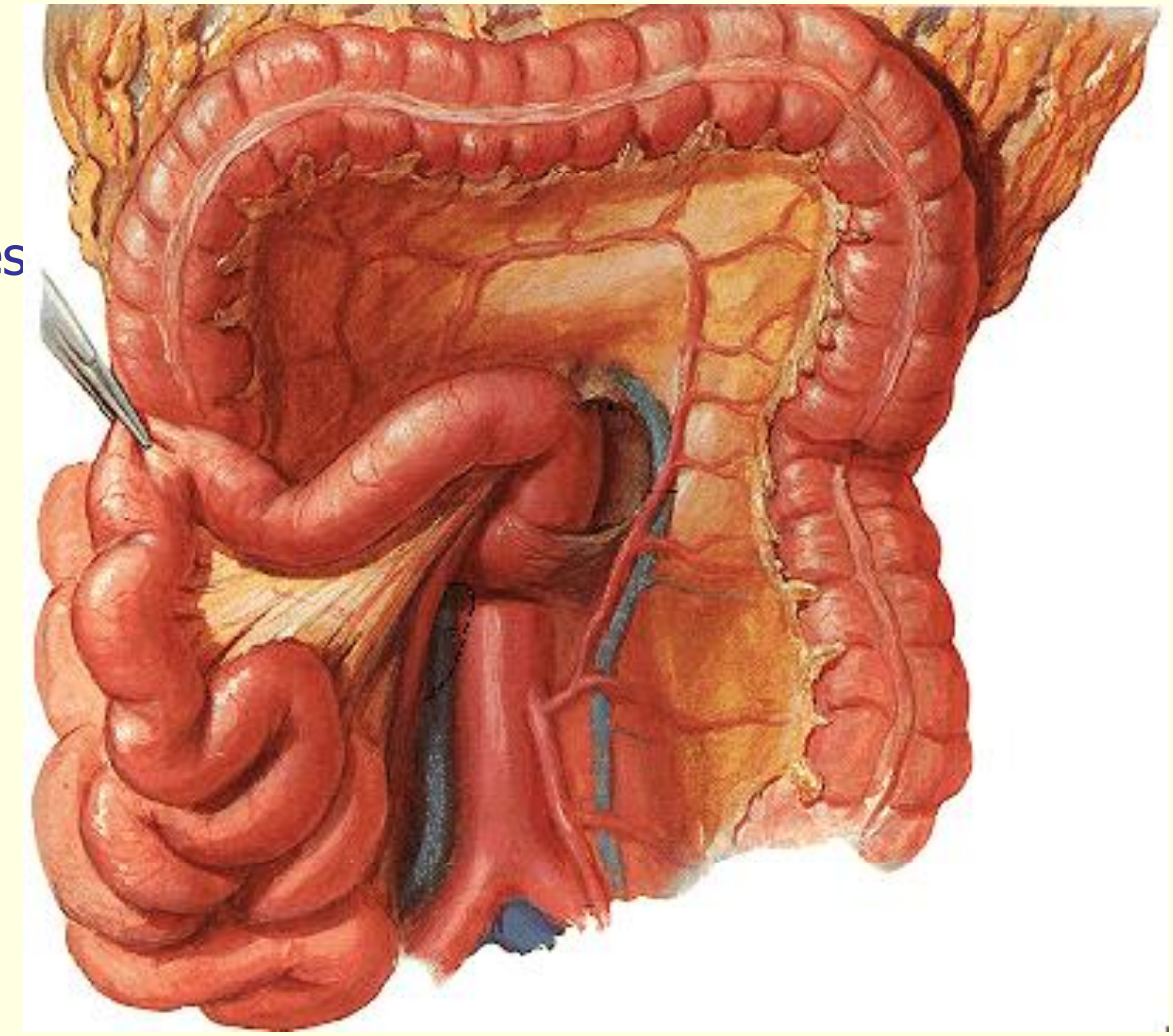
- The rectouterine pouch is formed between the anterior surface of the rectum and the posterosurface of the uterus and the upper part of vagina.



IV) The peritonal recesses, pouches, fossae and folds

1. The recesses

(1) The duodenal recesses



1. Duodenal Recesses

- The superior duodenal recess
- The inferior duodenal recess
- The paraduodenal recess
- The duodenojejunal recess

2. Cecal recesses

- The superior ileocecal,
- The inferior ileocecal
- The retrocecal recesses
- The rectocolic recess

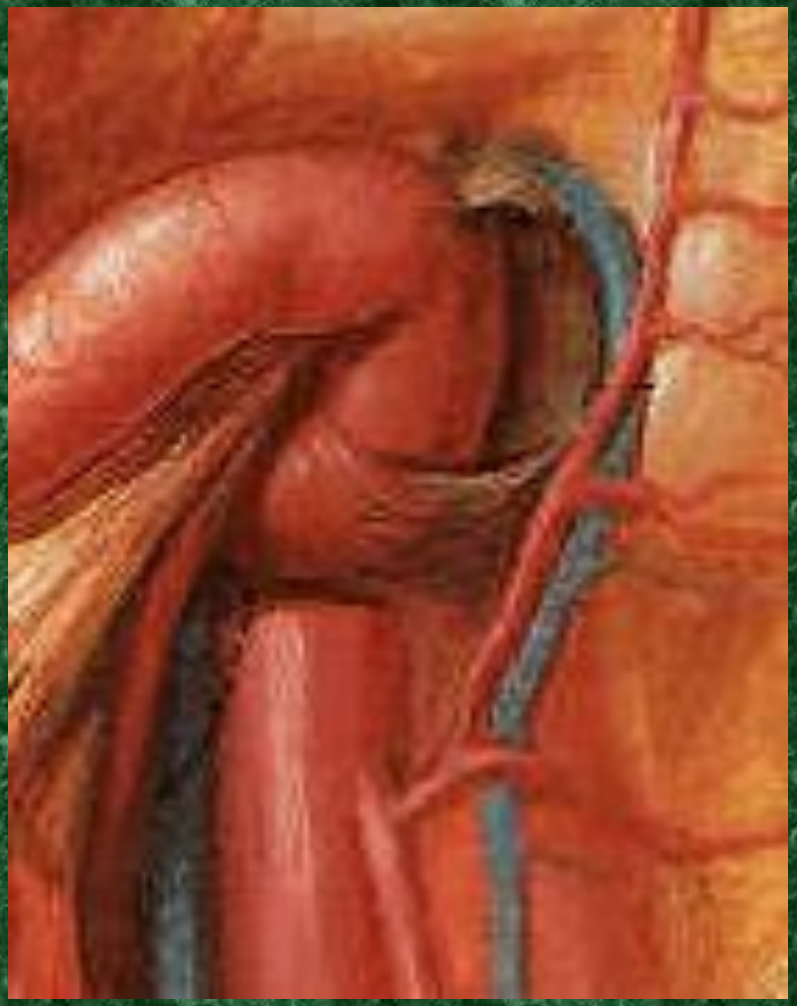
3. The intersigmoid recess

The Peritoneal Reflections

4. The folds

1) supraduodenal fold

2) infraduodenal fold

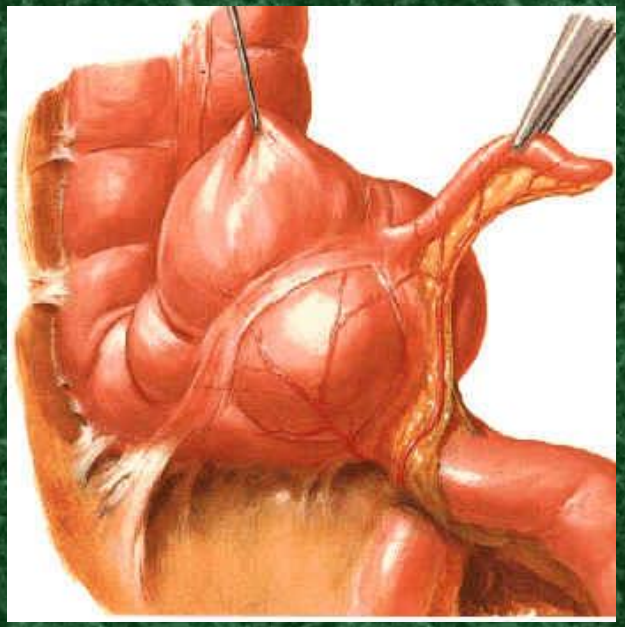


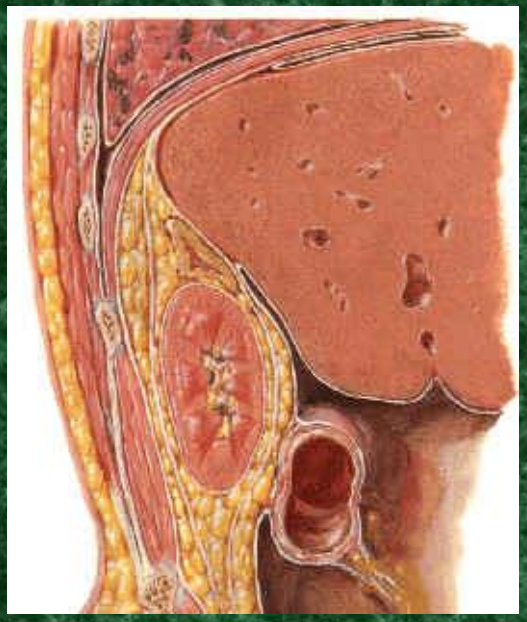
The Peritoneal Reflections

3) retrocecal recess

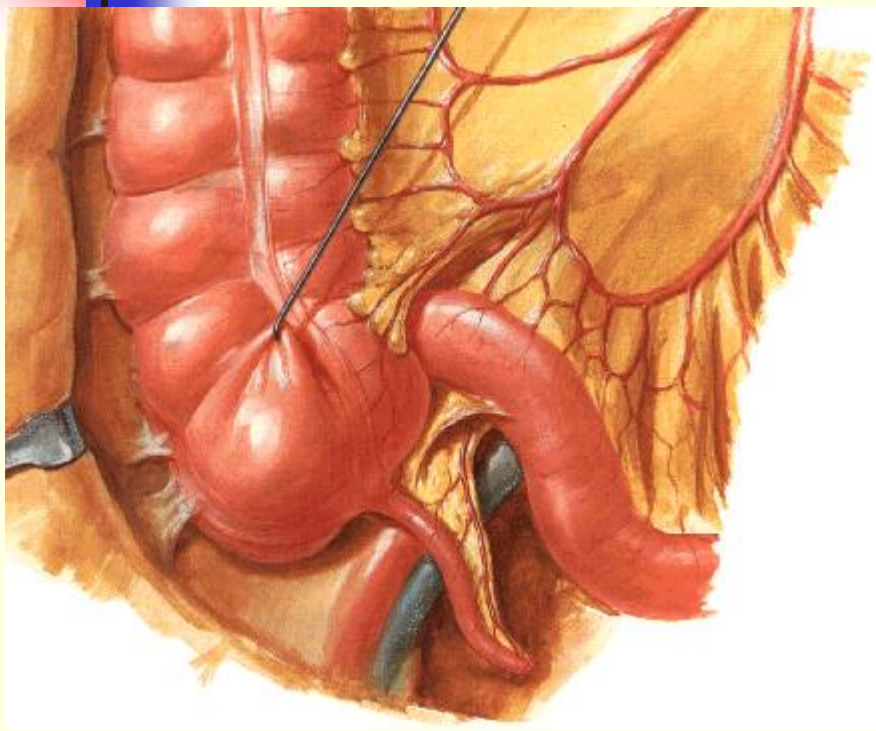
4) hepatorenal recess

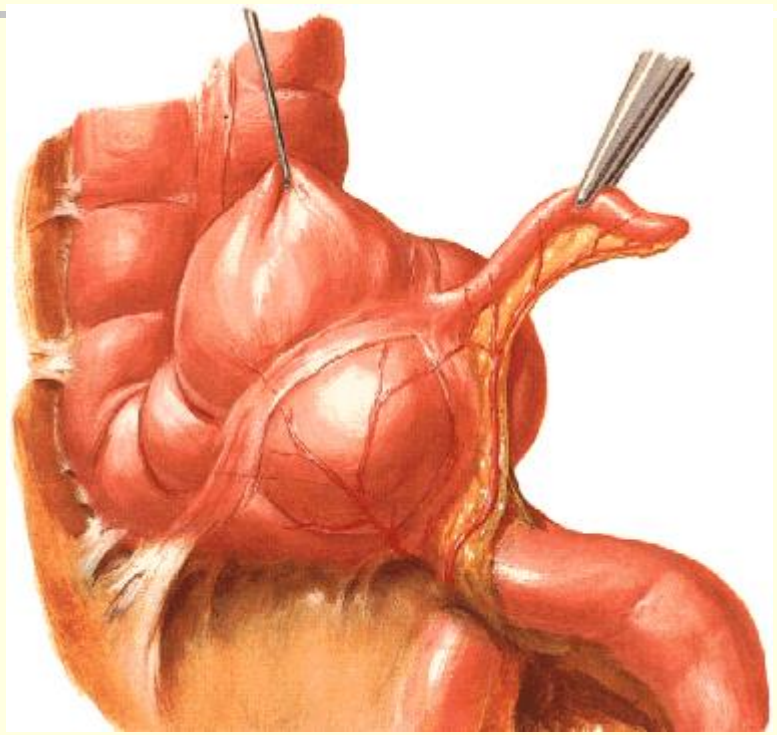
5) intersigmoid recess



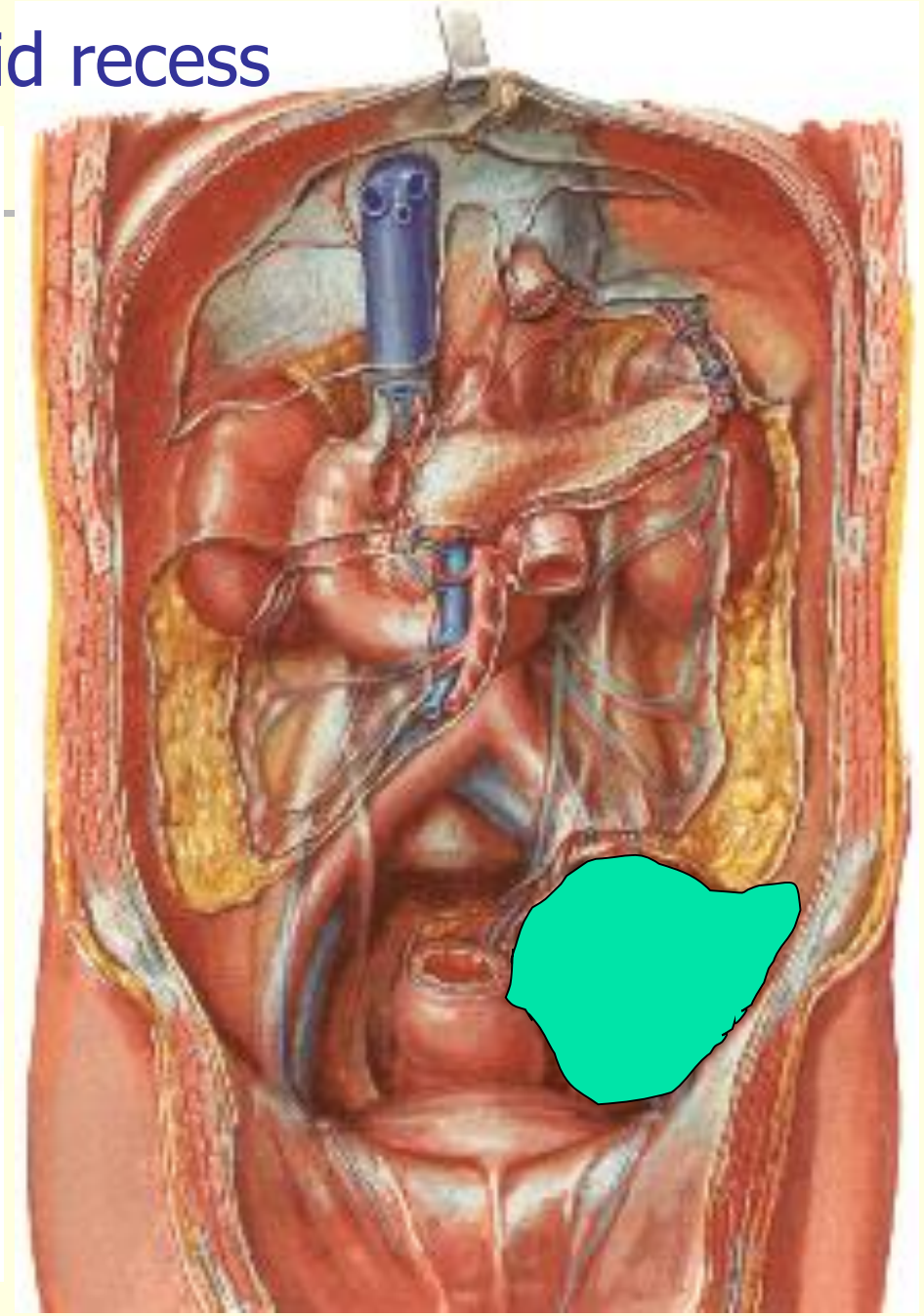


(2) The cecal recesses

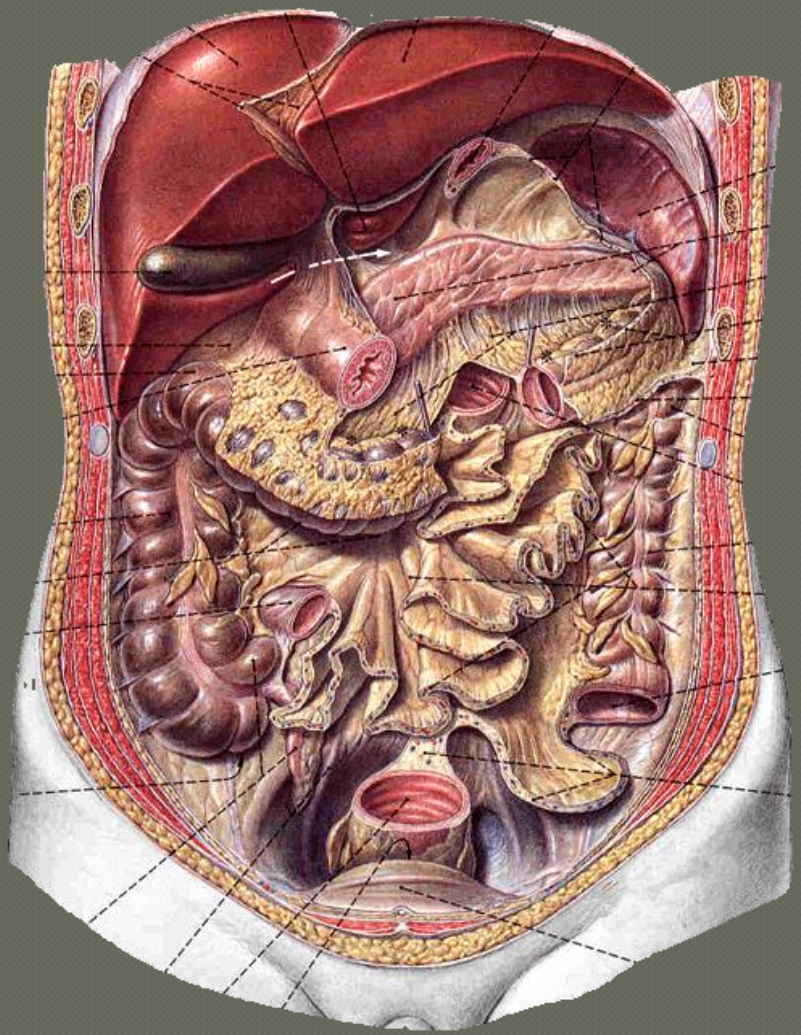




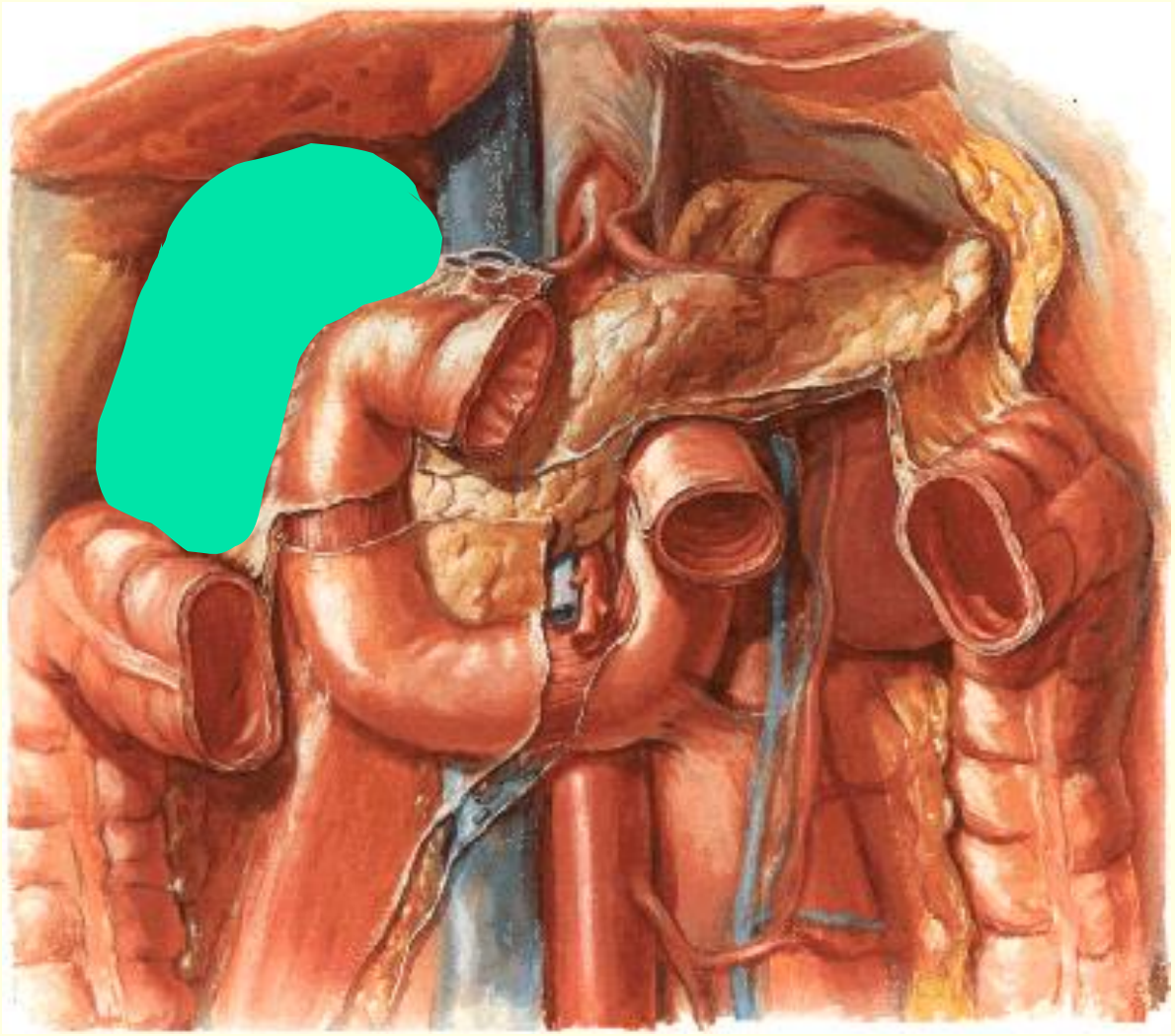
(3) The intersigmoid recess



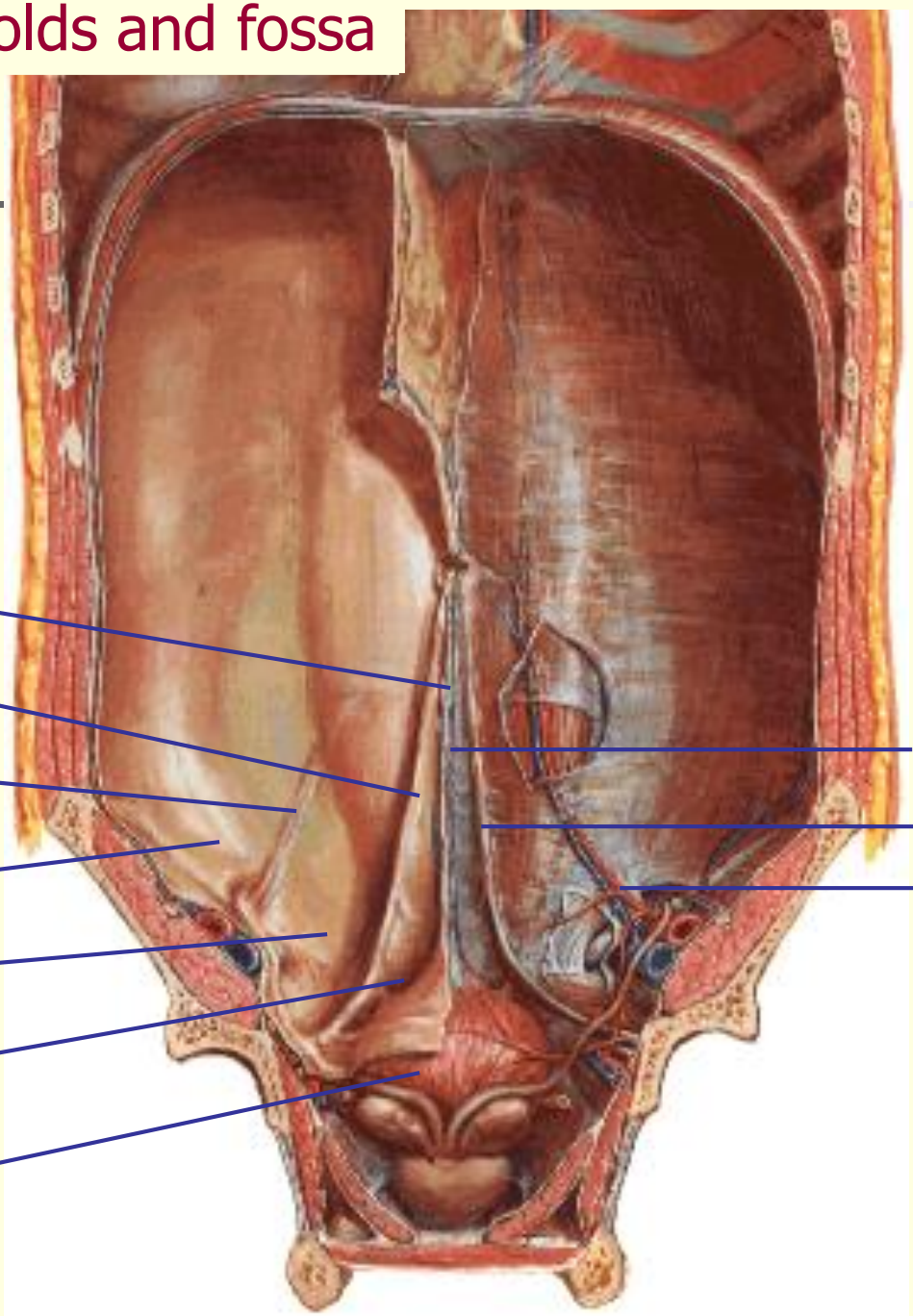
- **Retrocecal recess** in which the appendix frequently lies
- **Hepatorenal recess** lies between the right lobe of liver, right kidney, and right colic flexure, and is the lowest parts of the peritoneal cavity when the subject is supine



(4) The hepatorenal recess



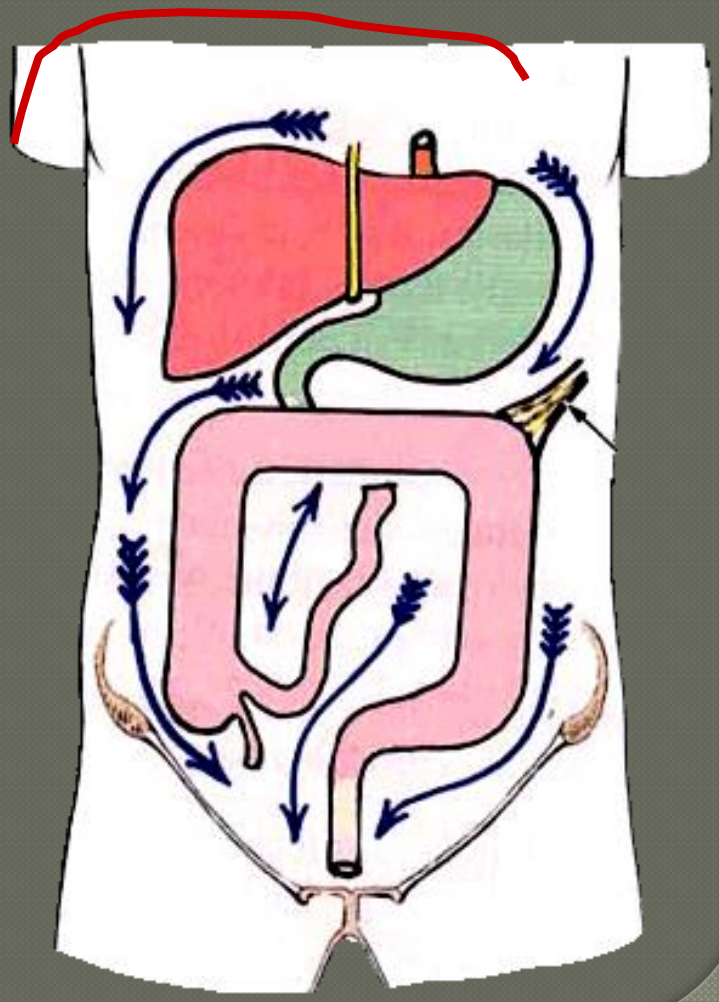
3. The folds and fossa



Peritoneal subdivisions

The transverse colon and transverse mesocolon divides the greater sac into

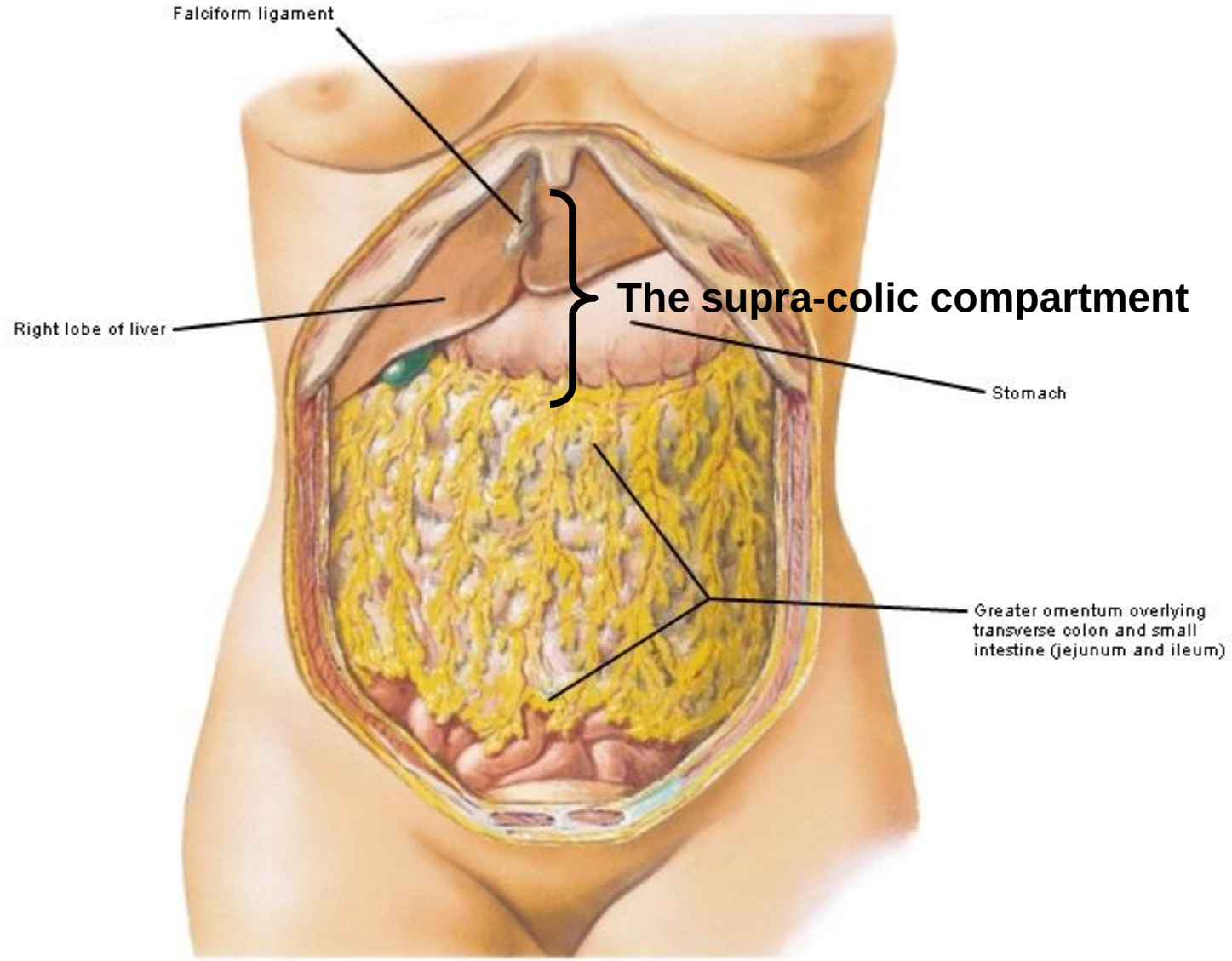
- Supracolic compartments
- Infracolic compartments.
- Rt.extraperitoneal space.(bare area of liver & diaphragm)

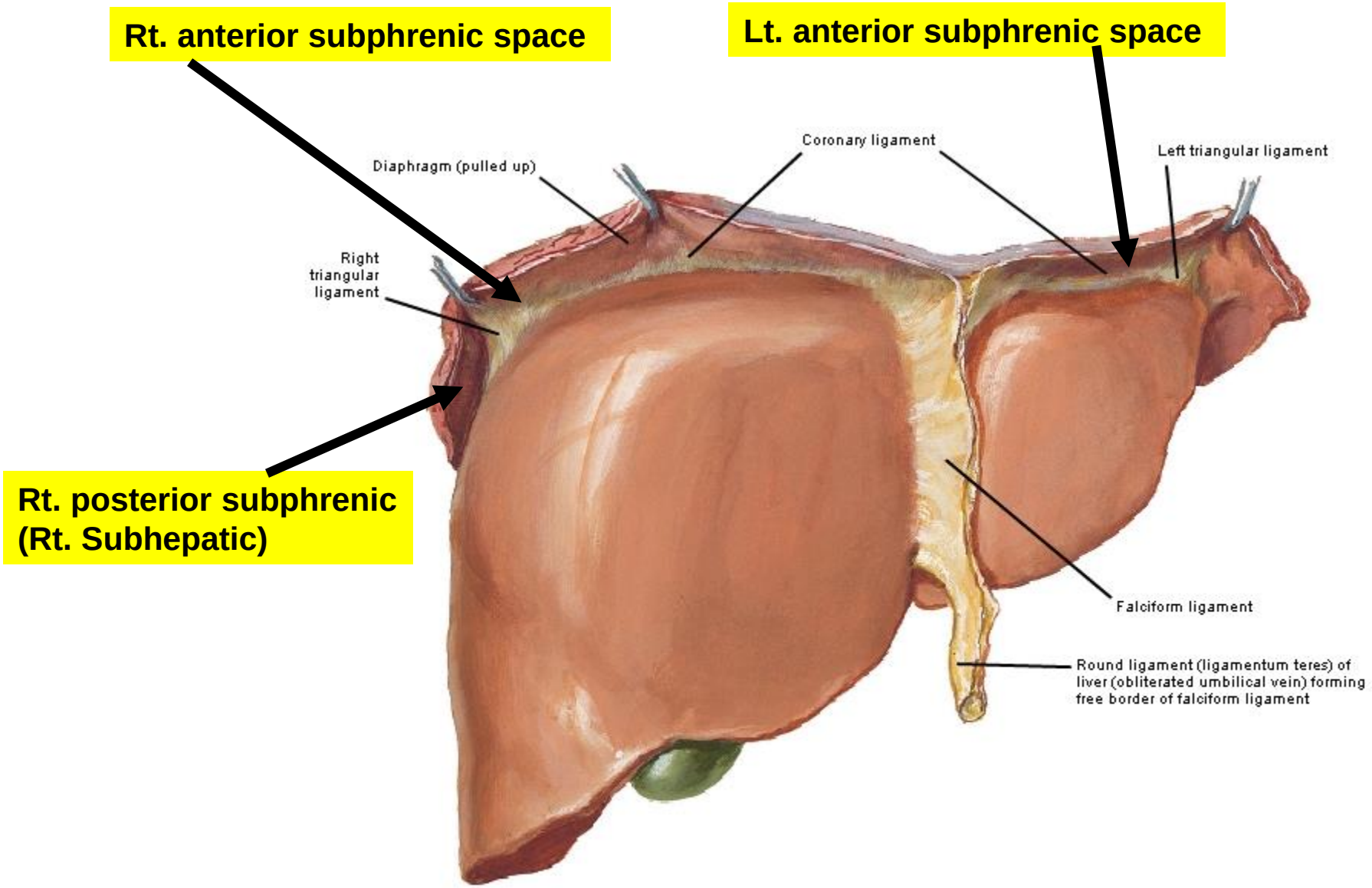


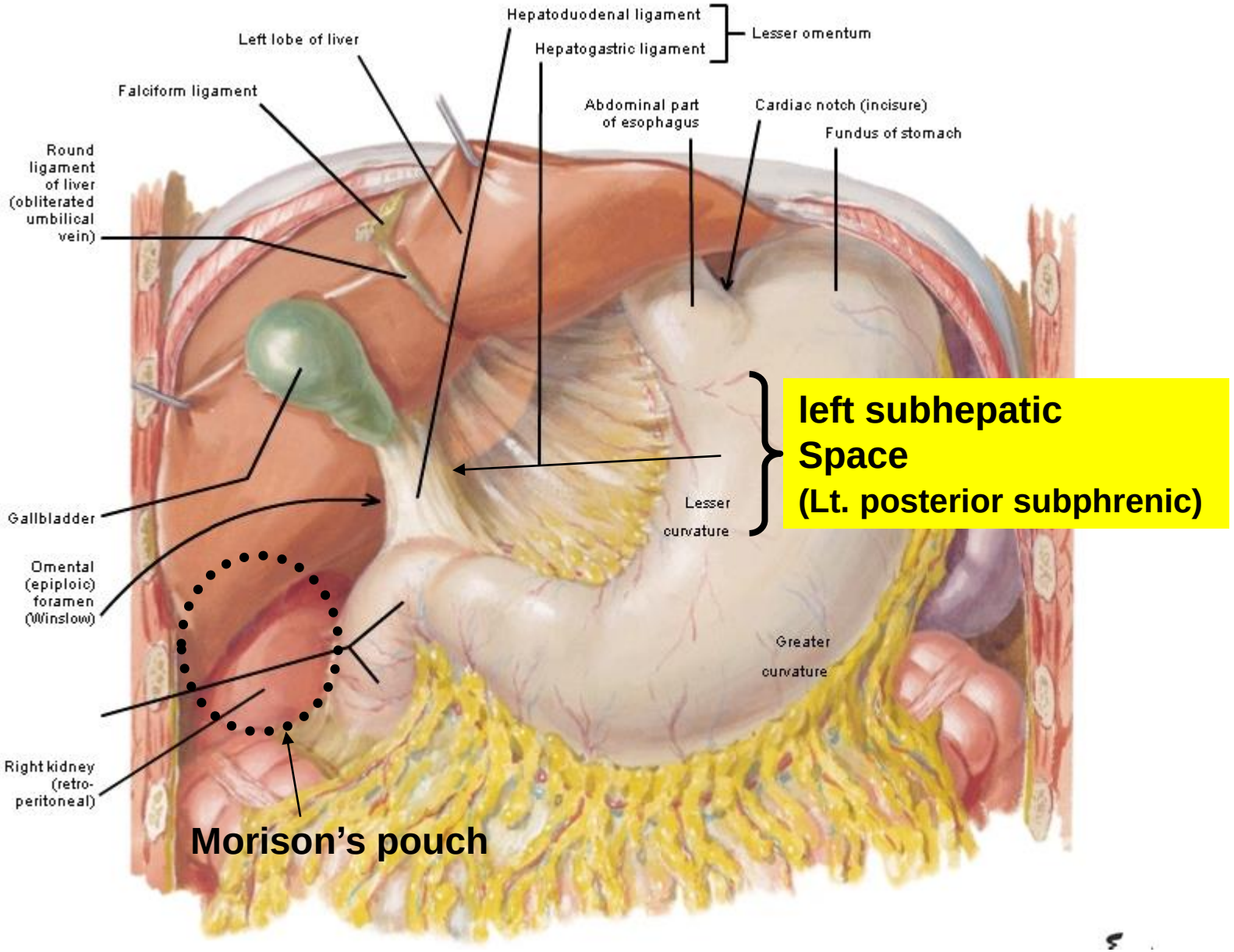
Supracolic compartments

Subphrenic space

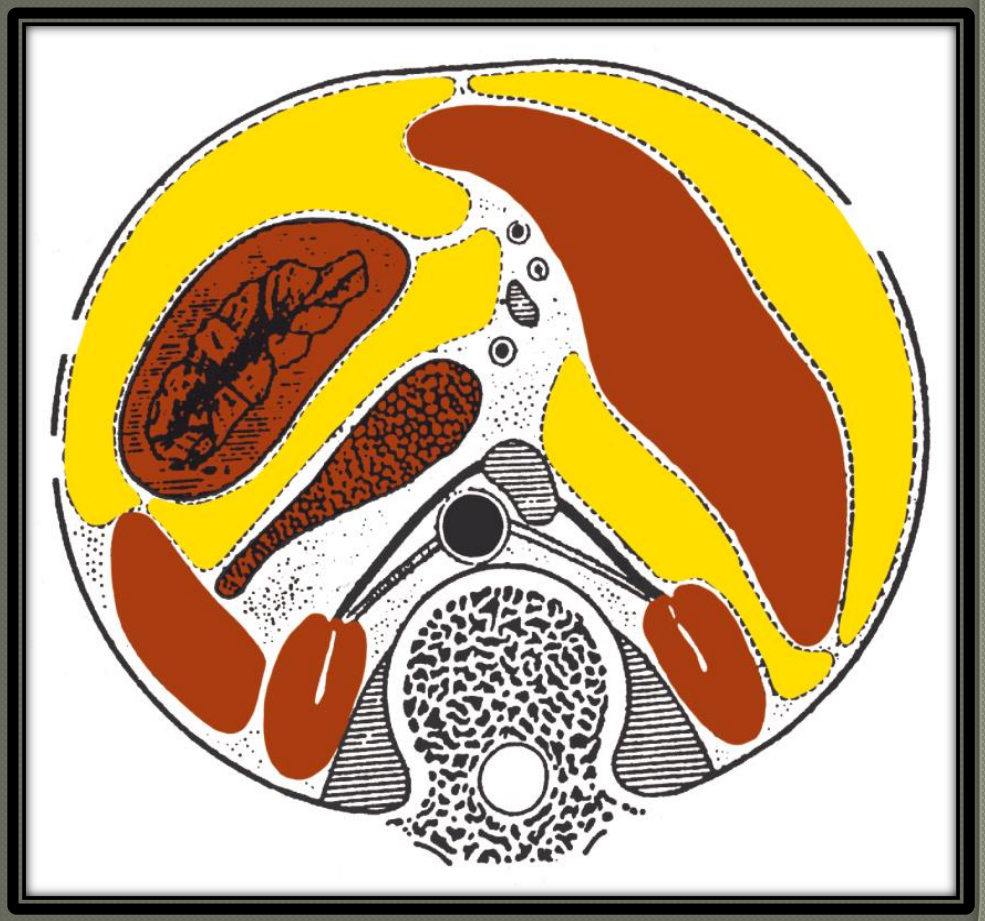
Sub hepatic space


Falciform ligament
Right lobe of liver
The supra-colic compartment
Stomach
Greater omentum overlying transverse colon and small intestine (jejunum and ileum)


Rt. anterior subphrenic space
Lt. anterior subphrenic space
Diaphragm (pulled up)
Coronary ligament
Left triangular ligament
Right triangular ligament
Rt. posterior subphrenic (Rt. Subhepatic)
Falciform ligament
Round ligament (ligamentum teres) of liver (obliterated umbilical vein) forming free border of falciform ligament


Hepatoduodenal ligament
Lesser omentum
Hepatogastric ligament
Left lobe of liver
Falciform ligament
Abdominal part of esophagus
Cardiac notch (incisure)
Fundus of stomach
Round ligament of liver (obliterated umbilical vein)
left subhepatic Space
(Lt. posterior subphrenic)
Lesser curvature
Gallbladder
Omental (epiploic) foramen (Winslow)
Greater curvature
Right kidney (retro-peritoneal)
Morison's pouch

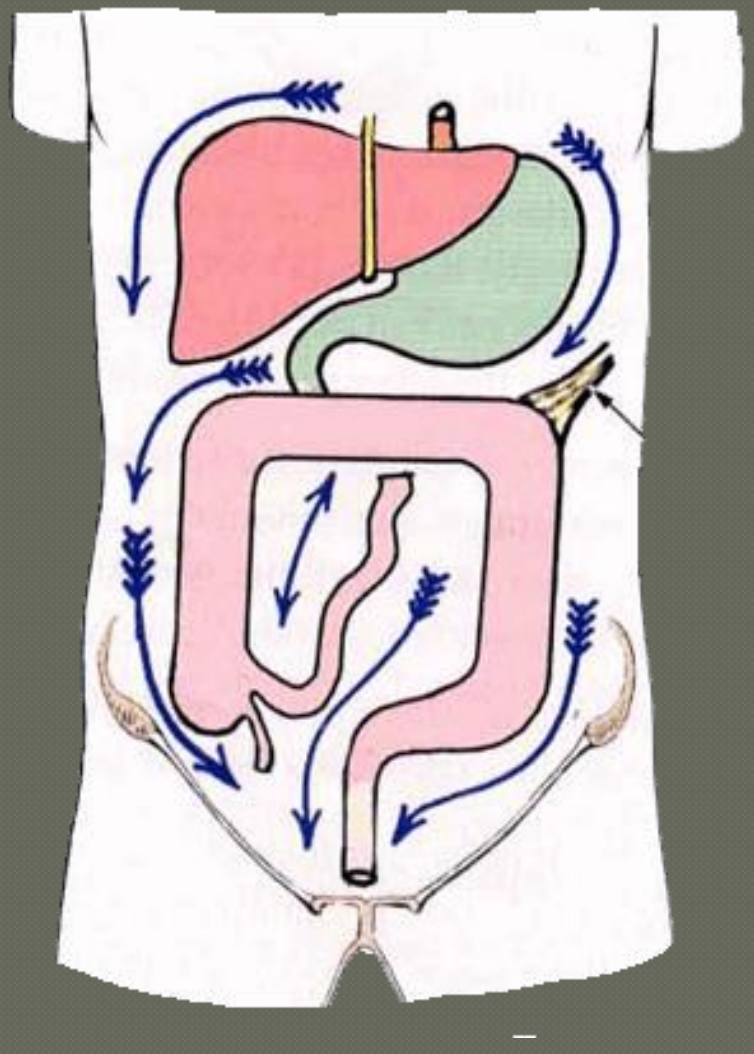
- Subphrenic space
- Divided by the attachment of Falciform ligament into
- Rt.subphrenic space
- Lt.subphrenic space



- Subhepatic space divided into:
- Rt.subhepatic space(morison's pouch)
- Lt.subhepatic space(lesser sac)

Infracolic compartment

- lies below the transverse colon and transverse mesocolon
  - Divided by root of the mesentery of small intestine into:
  - Rt. Infracolic compartment
  - Lt. infracolic compartment



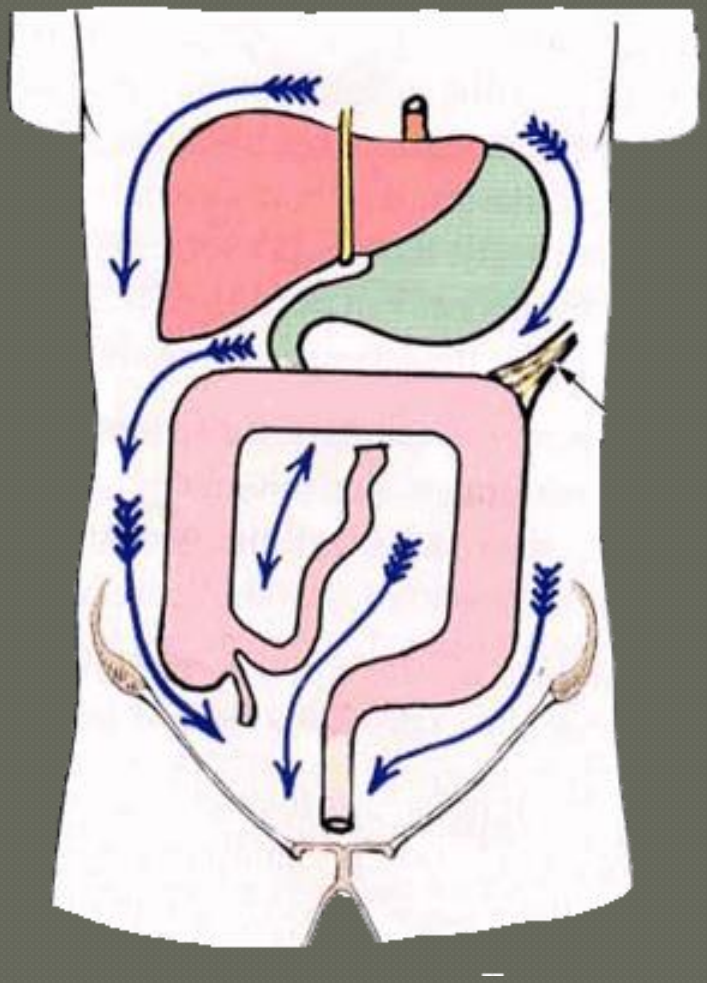
Infracolic compartments

- **Right paracolic sulcus** (gutter)

- Subdivide into:
- - Rt.medial.paracolic
- - Rt.Lateral.paracolic

- Rt.Lateral.paracolic communicates with the hepatorenal recess and the pelvic cavity.

- It provides a route for the spread of infection between the pelvic and the upper abdominal region.

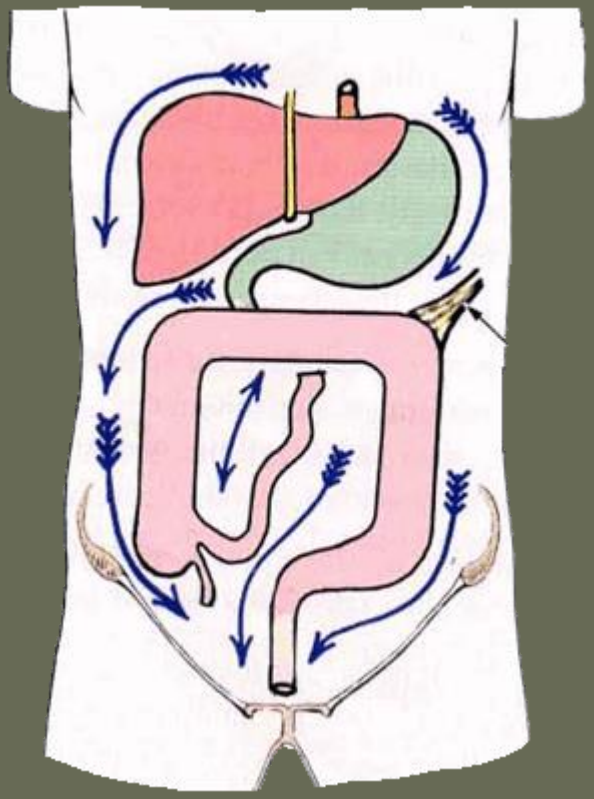


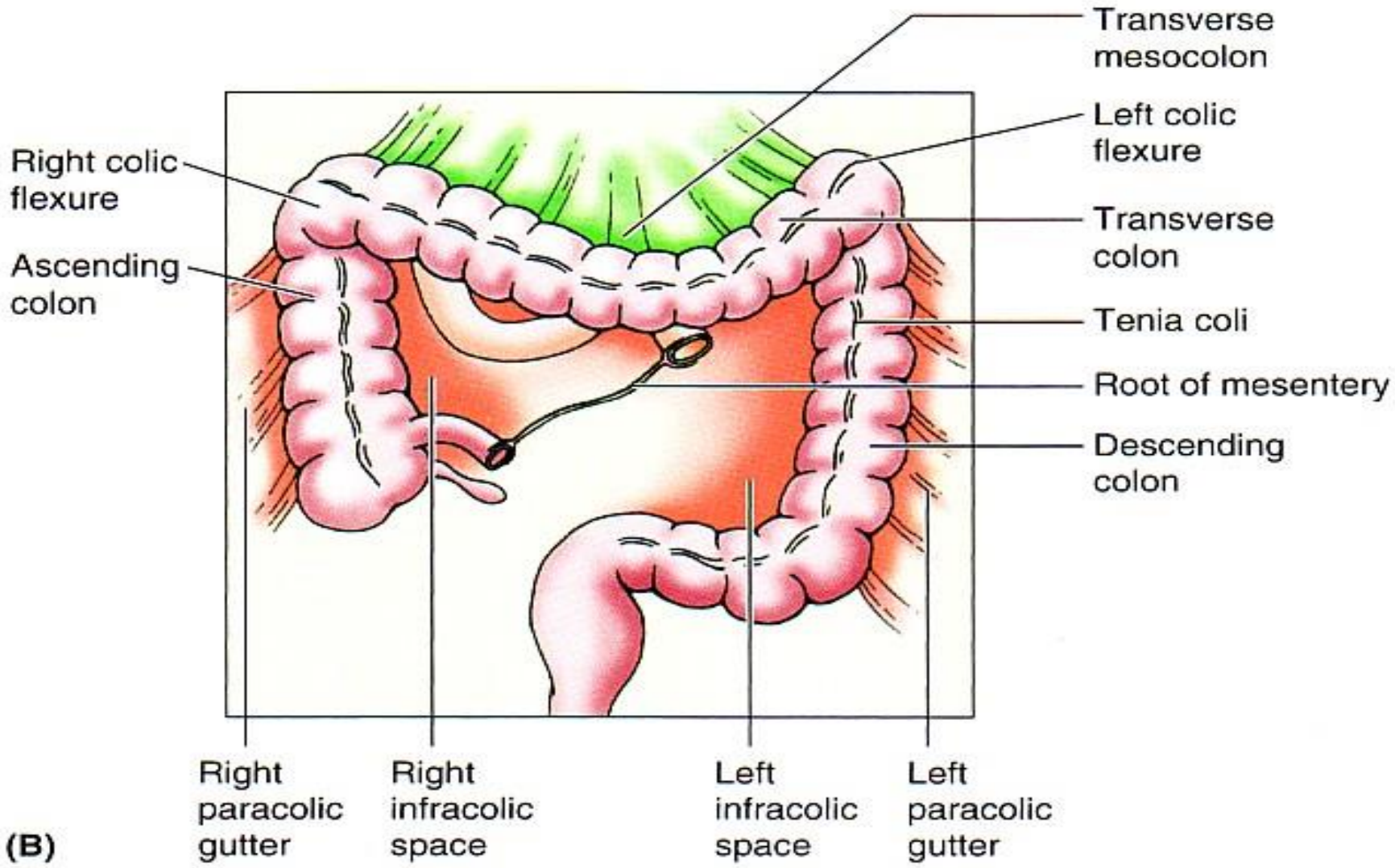
Left paracolic (gutter)

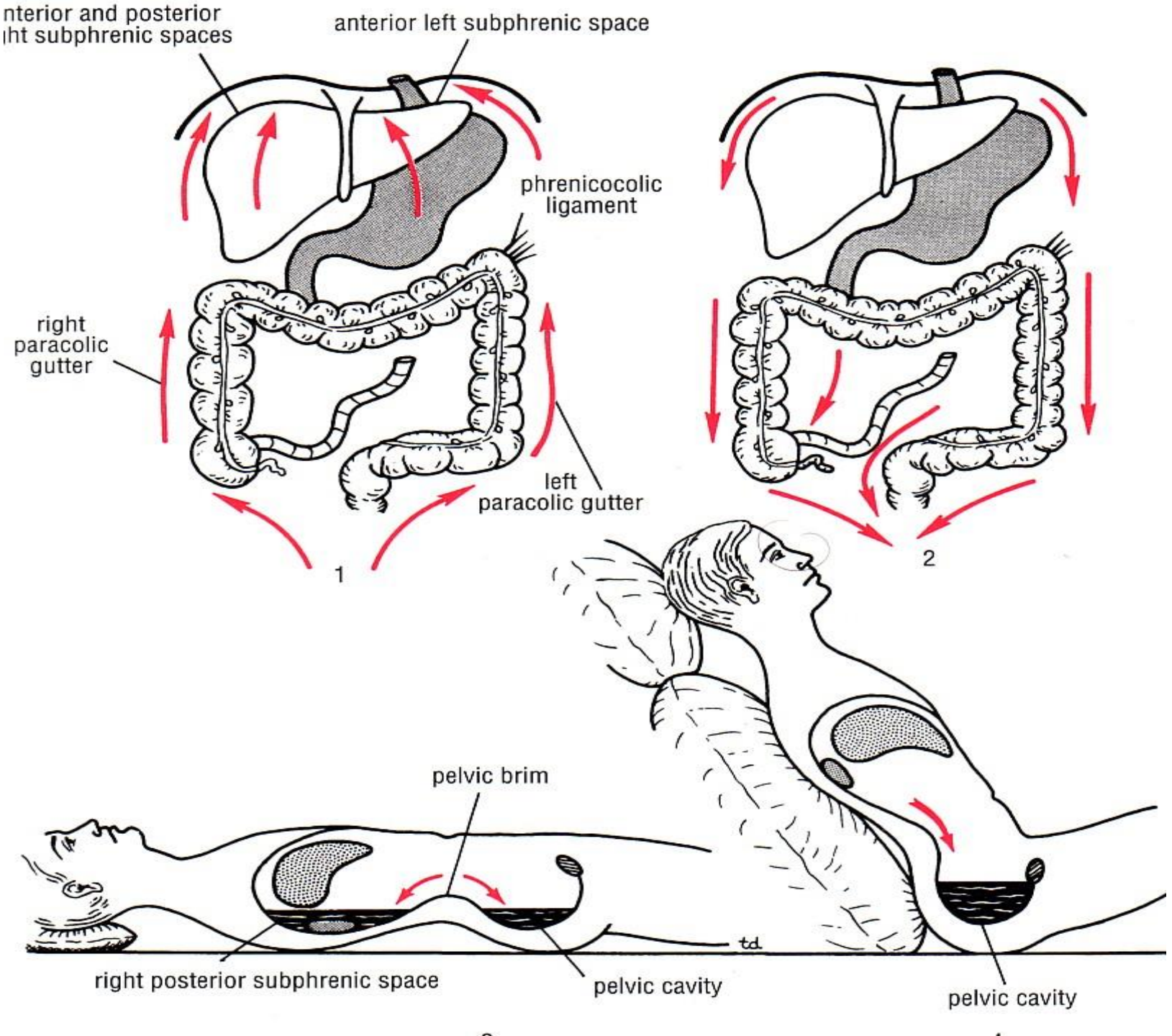
Subdivide into:
- Lt.medial.paracolic
- Lt.Lateral.paracolic

- Lt. lateral paracolic separated from the area around the spleen by the phrenicocolic ligament(a fold of peritoneum that passes from the colic flexure to the diaphragm)

- Lt.medial.paracolic open to the outside through the pelvis

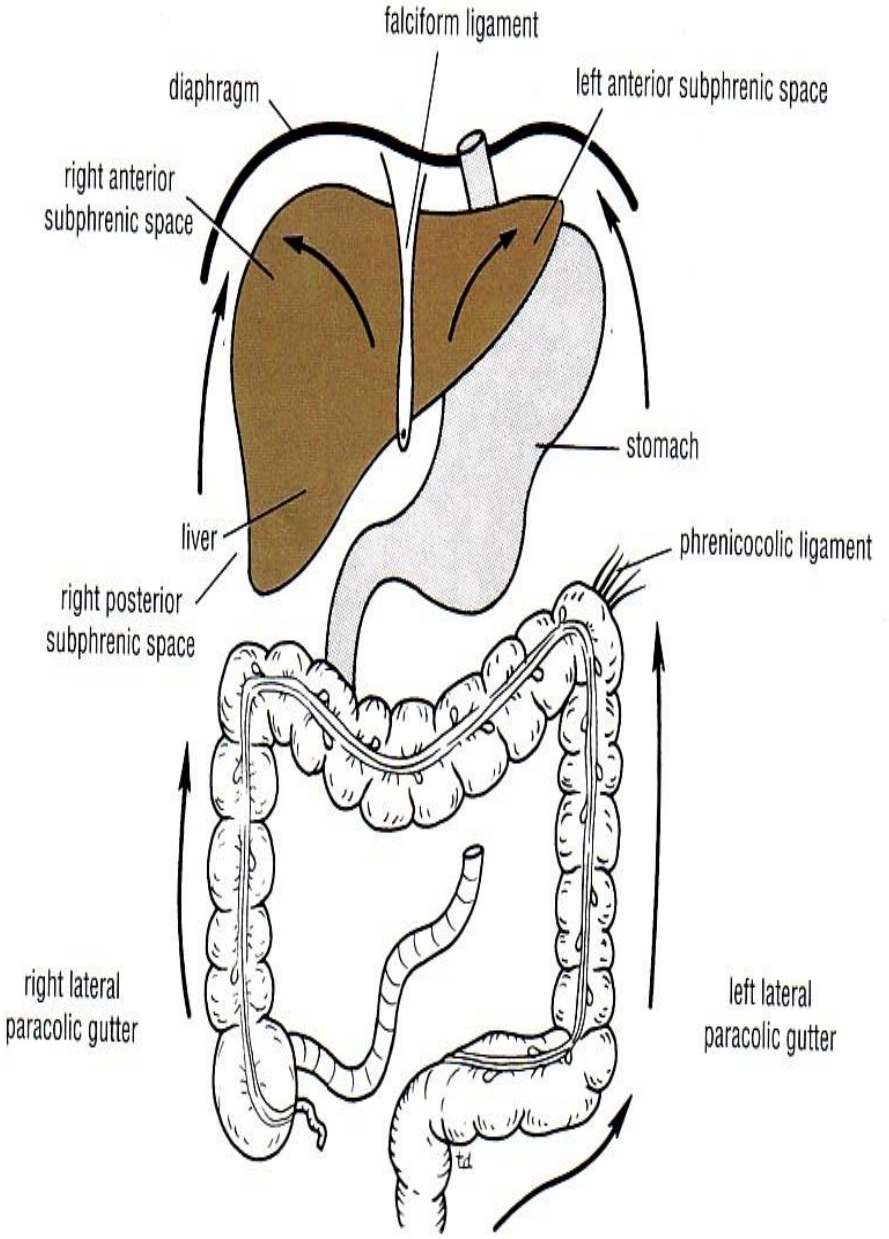



Transverse mesocolon
Left colic flexure
Right colic flexure
Transverse colon
Ascending colon
Tenia coli
Root of mesentery
Descending colon
Right paracolic gutter
Right infracolic space
Left infracolic space
Left paracolic gutter
(B)


nterior and posterior
ght subphrenic spaces
anterior left subphrenic space
phrenicocolic ligament
right paracolic gutter
left paracolic gutter
1
2
pelvic brim
right posterior subphrenic space
pelvic cavity
pelvic cavity
td

• Peritoneal fluid

- Peritoneal fluid is pale yellow fluid rich in leukocytes
- Mobile viscera glide easily on one another.
- Peritoneal fluid moves *upward* towards subphrenic spaces- whatever the position of the body- *by:*
- *1- Movements of diaphragm.*
- *2- Movements of abdominal muscles*
- *3- Peristaltic movements.*
- Peritoneum is extensive in the region of diaphragm.



Nerve supply to the peritoneum

The parietal peritoneum

phrenic nerve

Intercostal (T7-T12)

first lumbar nerves(L1)

obturator nerve for pelvis

The visceral peritoneum

autonomic

Function of the peritoneum

- Secretes a lubricating serous fluid that continuously moistens the associated organs
- Fat storage

Defense role→ the presence of lymphatic vessels & nodes , Greater omentum is called the ***policeman*** of abdomen to prevent spread of infection

It secretes the peritoneal fluid

- Support viscera
- Absorb