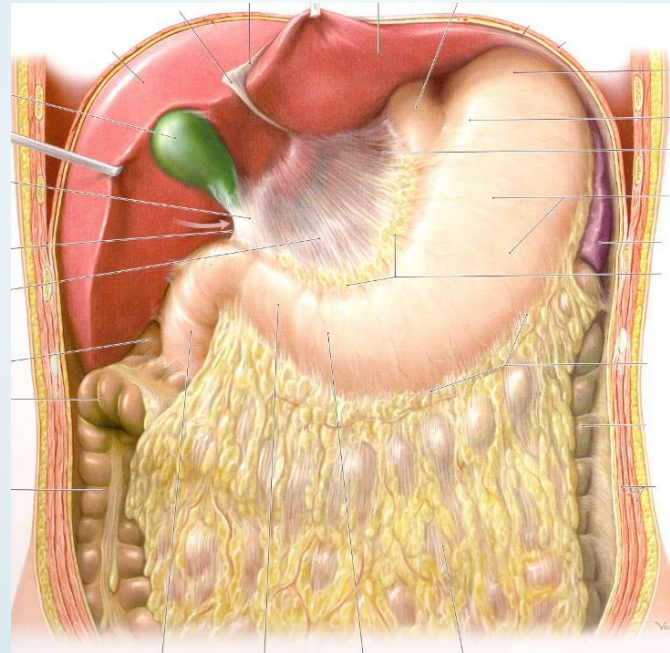


Peritoneum. Development of the serous membranes and the omental bursa. Separation of body cavities



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Anatomy, Histology Embryology Institute
2019.

PERITONEUM

The largest serous membrane of the human body; develops from the lateral plates of the mesoderm.
Two layers can be distinguished:

1. parietal peritoneum
2. visceral peritoneum

1. Parietal peritoneum makes the inner lining of the abdominal cavity. Different structures covered by peritoneum cause folds of fit.

2. Visceral peritoneum covers abdominal and pelvic viscera.

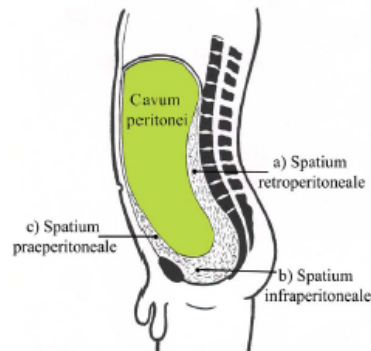
Organs totally covered (surrounded) by visceral peritoneum are called intraperitoneal organs.
(There is only one „really intraperitoneally” located organ: the ovary - which is situated within the peritoneal cavity.)

Peritoneal cavity: the virtual space between parietal and visceral peritoneal layers (filled with some peritoneal fluid for lubrication – allowing movements of abdominal organs).

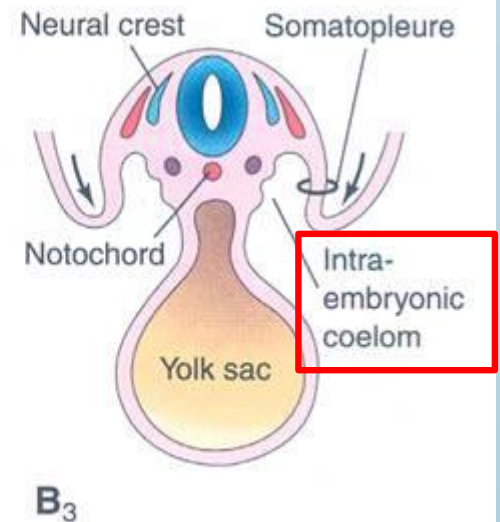
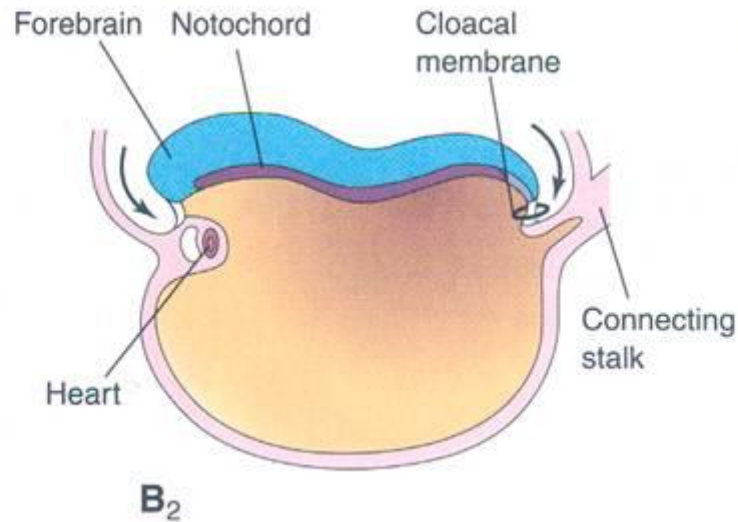
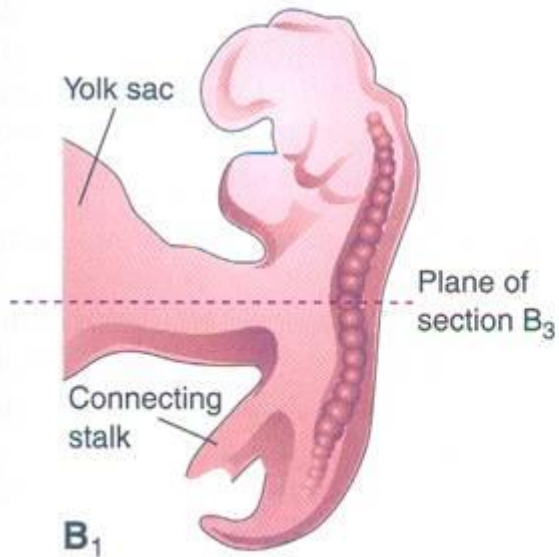
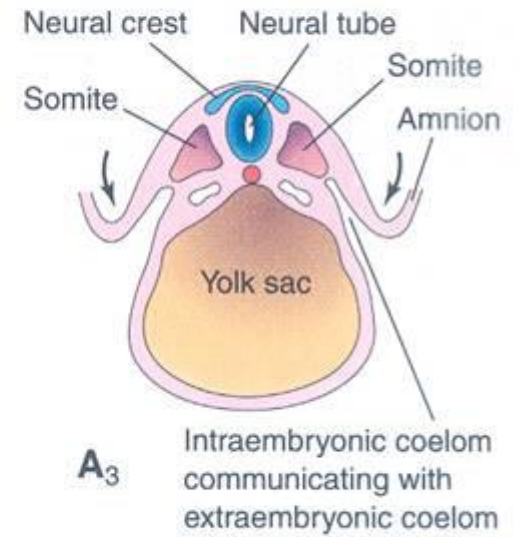
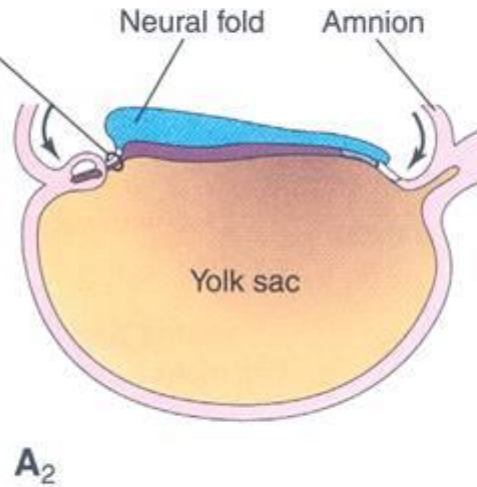
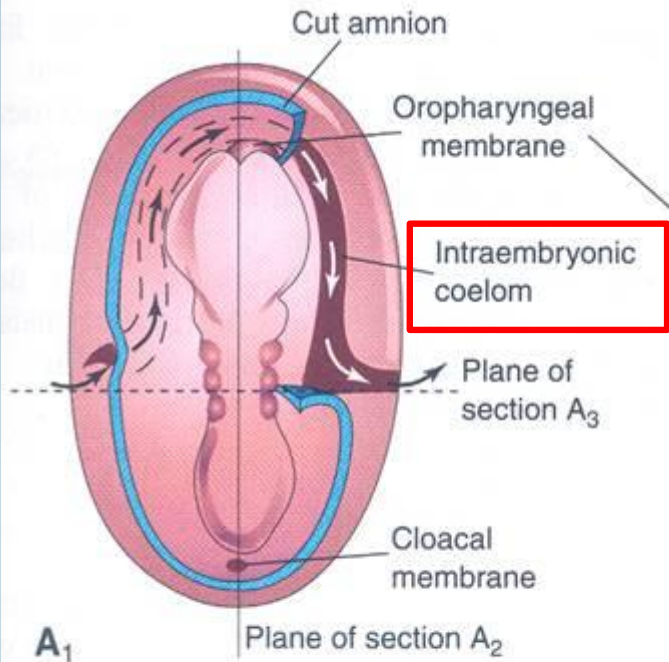
In males totally closed sac, in females the peritoneal cavity communicates with the outer world via the oviduct – uterus - vagina .

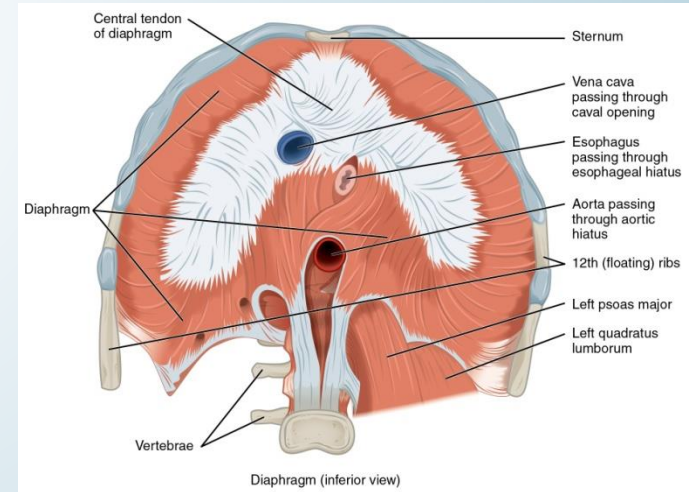
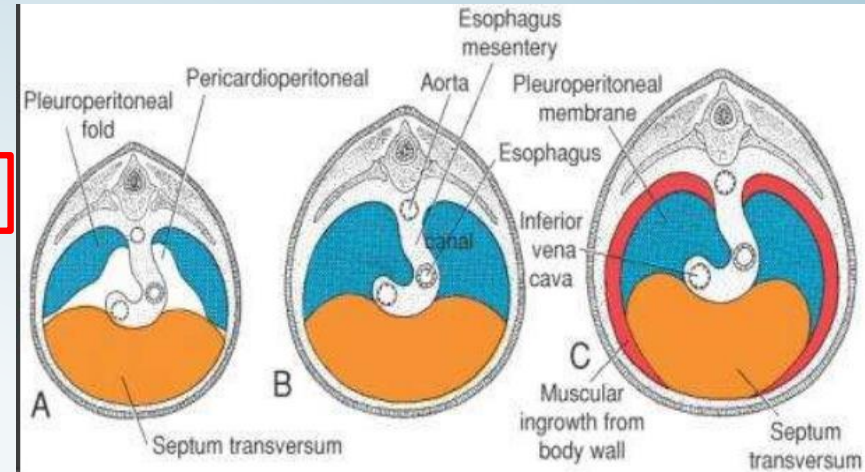
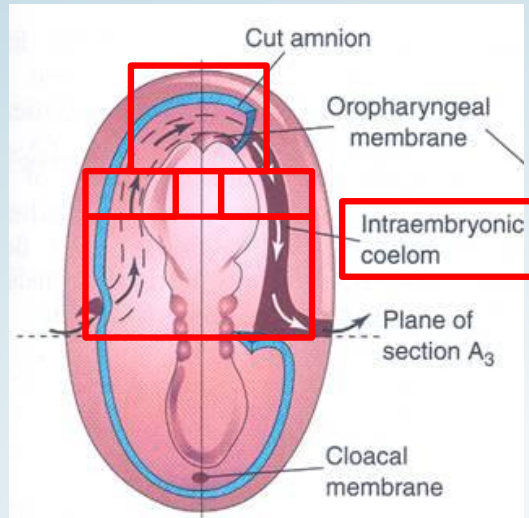
Abdominal and pelvic organs and structures -according to their peritoneal relations- can be divided into 2 main groups:

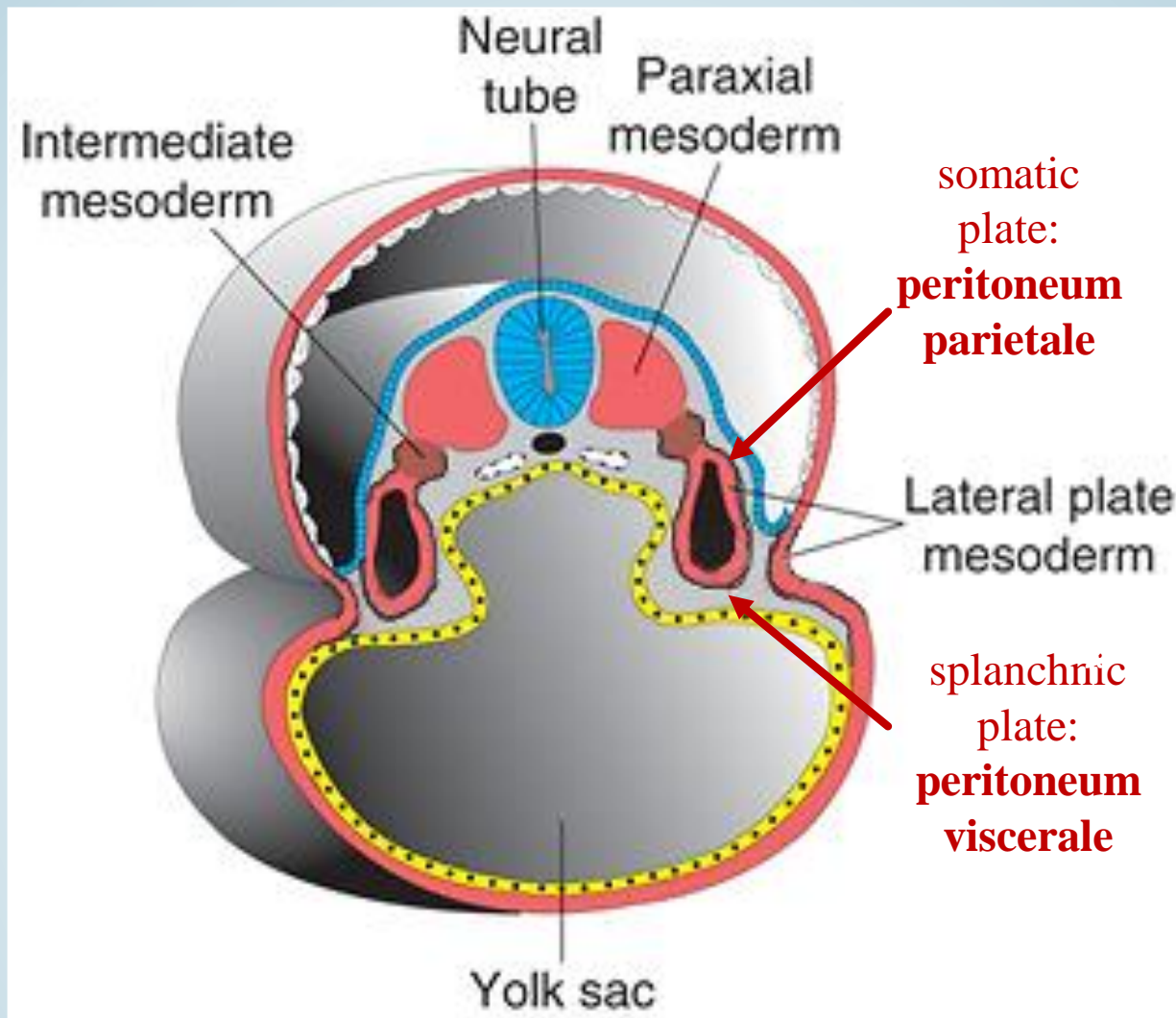
- A) **Intraperitoneal** (covered by peritoneum) and
- B) **Extraperitoneal** (not surrounded by the peritoneum) – within this:
 - a) **Retroperitoneal**
 - b) **Infraperitoneal**
 - c) **Preperitoneal** structures.



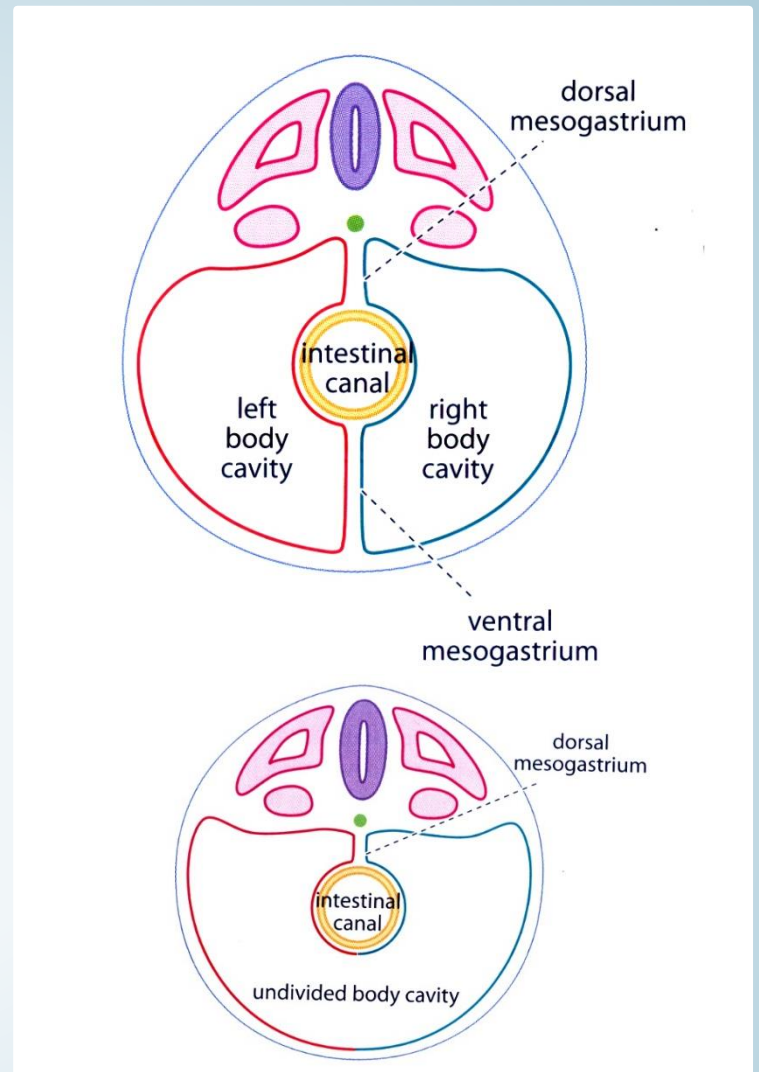
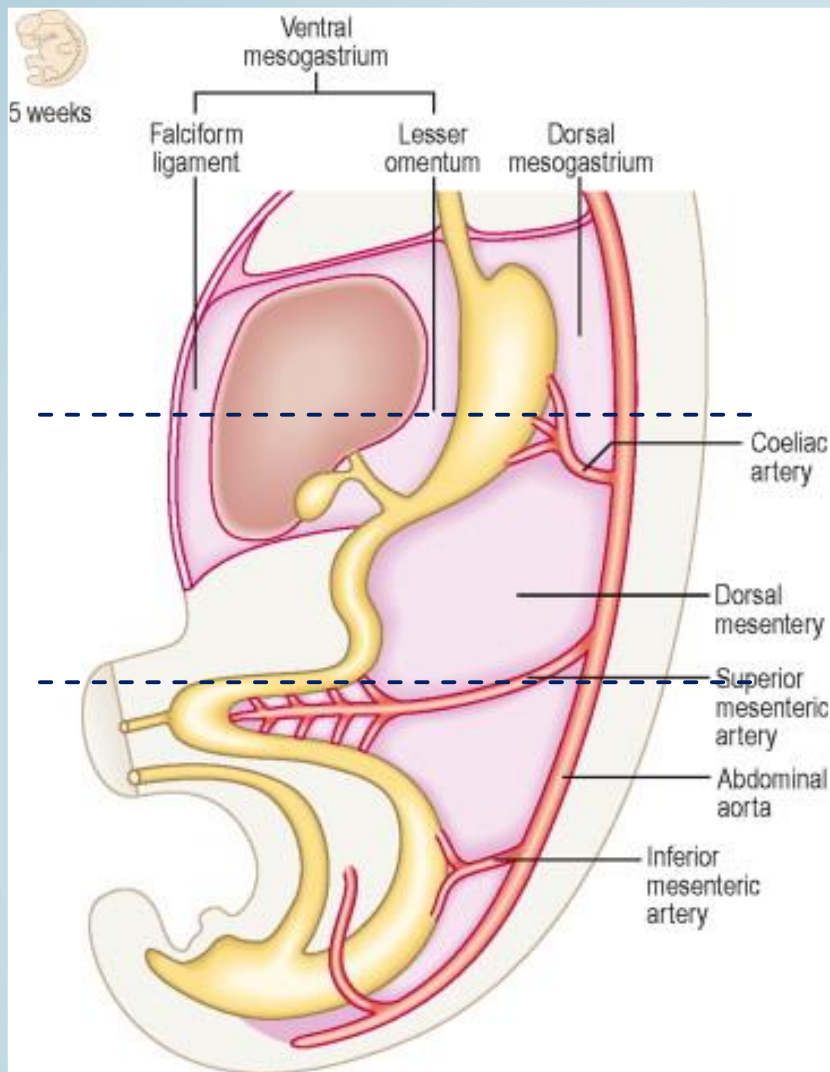
Folding







The lateral plates of intraembryonic mesoderm surrounding the intraembryonic coelom. The splanchnic plate next to the endoderm provides the visceral plate of the peritoneum, and the parietal peritoneum formed by the ectodermic somatic plate. (The total surface area of the peritoneum is about 2m², 10% to 90% for the visceral plate!)



On one hand the abdominal part of the gastrointestinal tract is attached by the peritoneal duplications to the body wall. On the other hand, while the organs of upper third of the abdominal cavity are attached to the anterior and posterior abdominal wall, organs in the lower two thirds only on one side, whereas the lower abdomen only has a posterior peritoneal duplication. The lower free edge of the ventral mesogastrium denotes the foregut-midgut transition of the intestine.

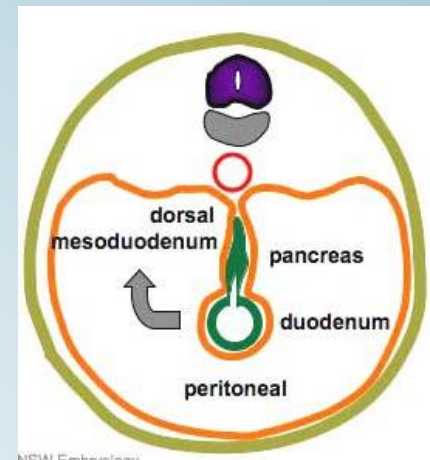
Serous membranes

from lateral plates of mesoderm.

Two parts:

1. parietal peritoneum
2. visceral peritoneum

They have a continuous mesothelial lining.



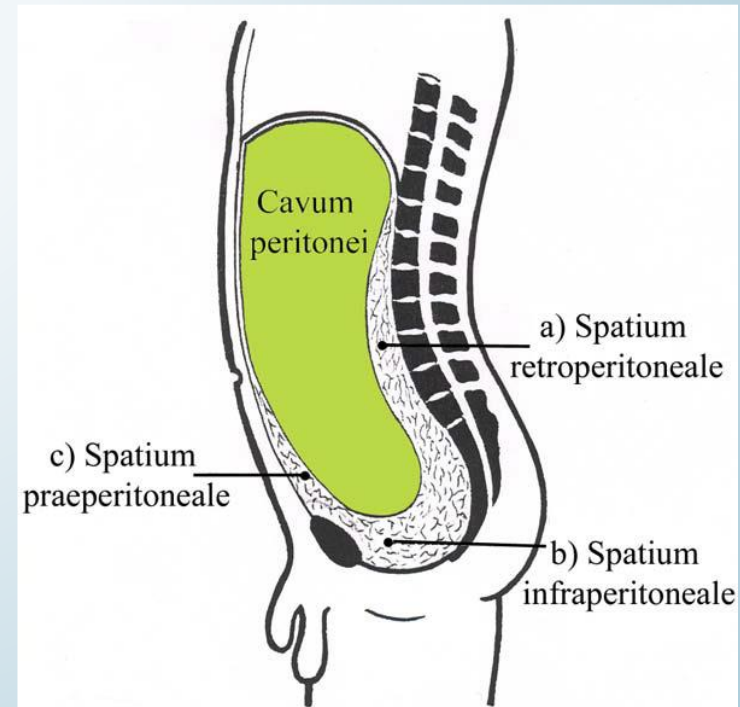
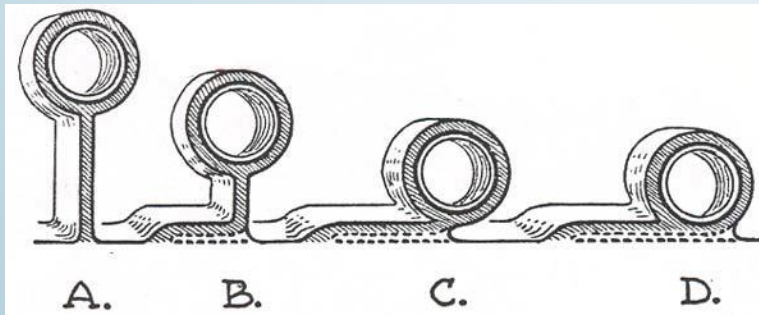
Abdominal and pelvic organs and structures – according to their peritoneal relations - can be divided into 2 main groups:

Intraperitoneal - covered by peritoneum

- generally they have a duplication **Duplication = meso- or ...ligament!**

Extraperitoneal (not surrounded by the peritoneum) within this:

- Praeperitoneal
- Retroperitoneal (primary or secondary)
- Infraperitoneal structures.



Intraperitoneal and extraperitoneal organs

Intraperitoneal:

abdominal part of the esophagus
stomach
sup. hor. part of the duodenum
liver (except bare area)
spleen
jejunum
ileum
coecum (mostly)
vermiform appendix
transvers colon and sigmoid
upper 1/3 of the rectum
uterine tube
uterus (fundus, body)

Inside the peritoneal cavity:

ovaries

Extraperitoneal:

1. retroperitoneal:

primary:

kidney, adrenal gland
ureter
middle 1/3 of the rectum

secondary:

duodenum
(except sup. hor. part)
pancreas
coecum
(sometimes)
ascending and descending colon

2. infraperitoneal

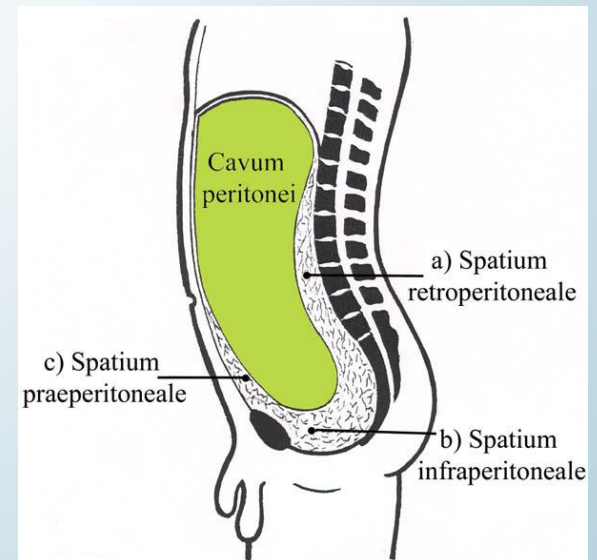
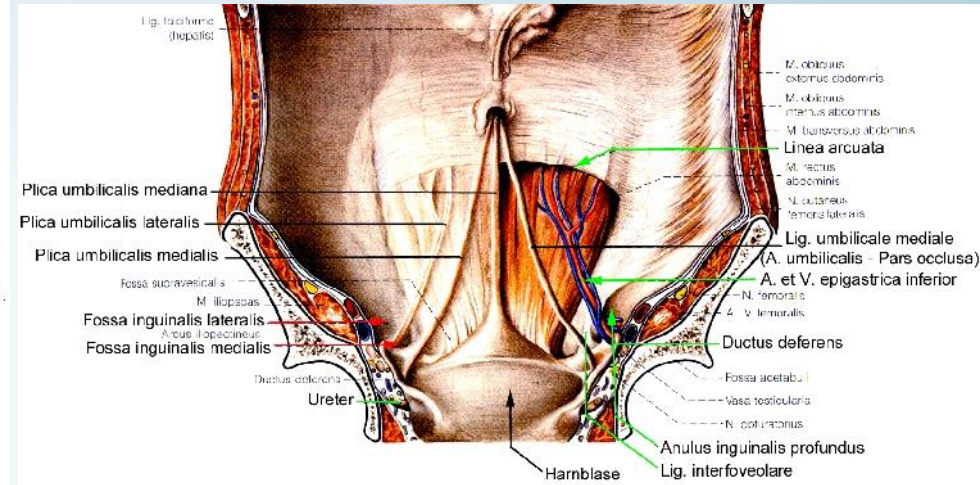
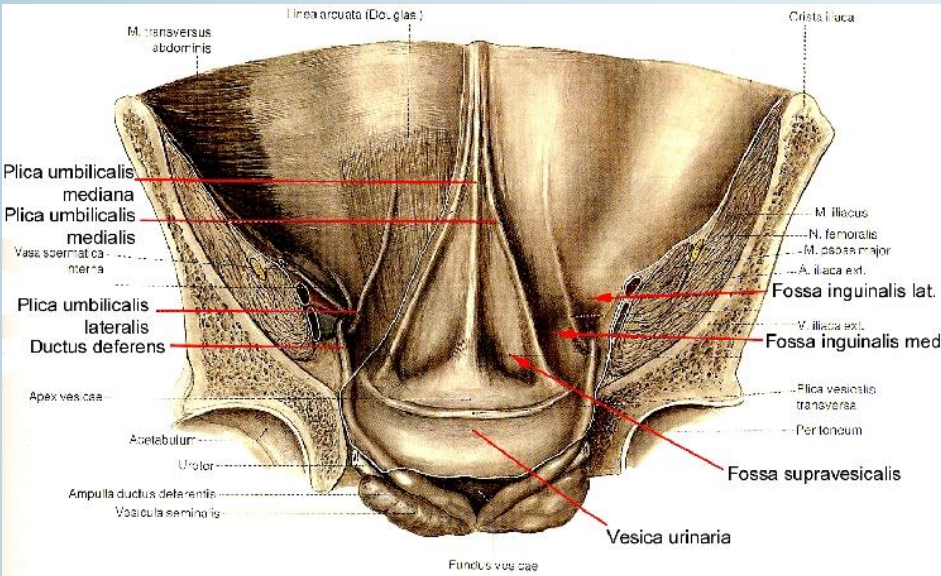
bladder
lower 1/3 of the rectum
prostate, seminal vesicle, vas deferens
cervix of the uterus, vagina, urethra

3. preperitoneal:

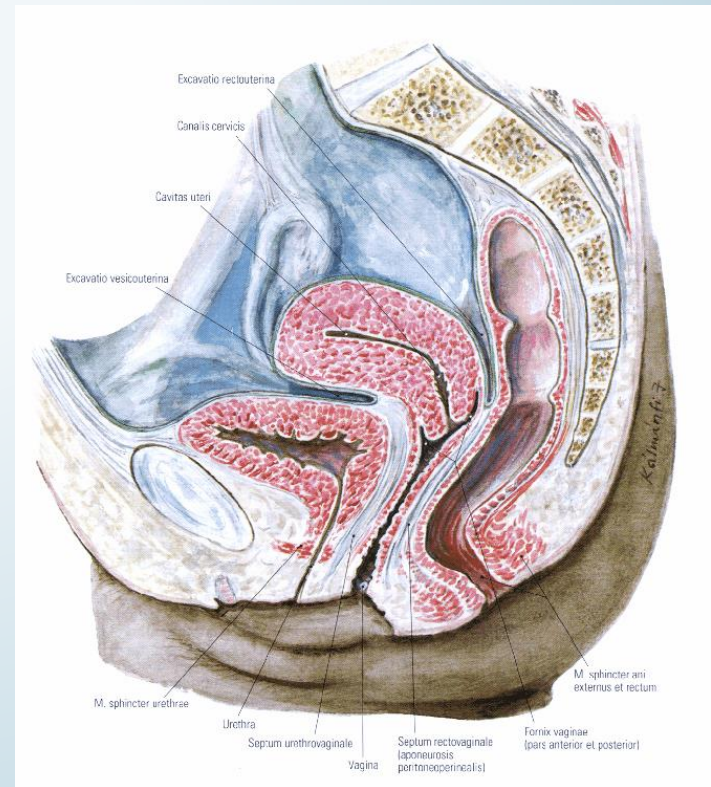
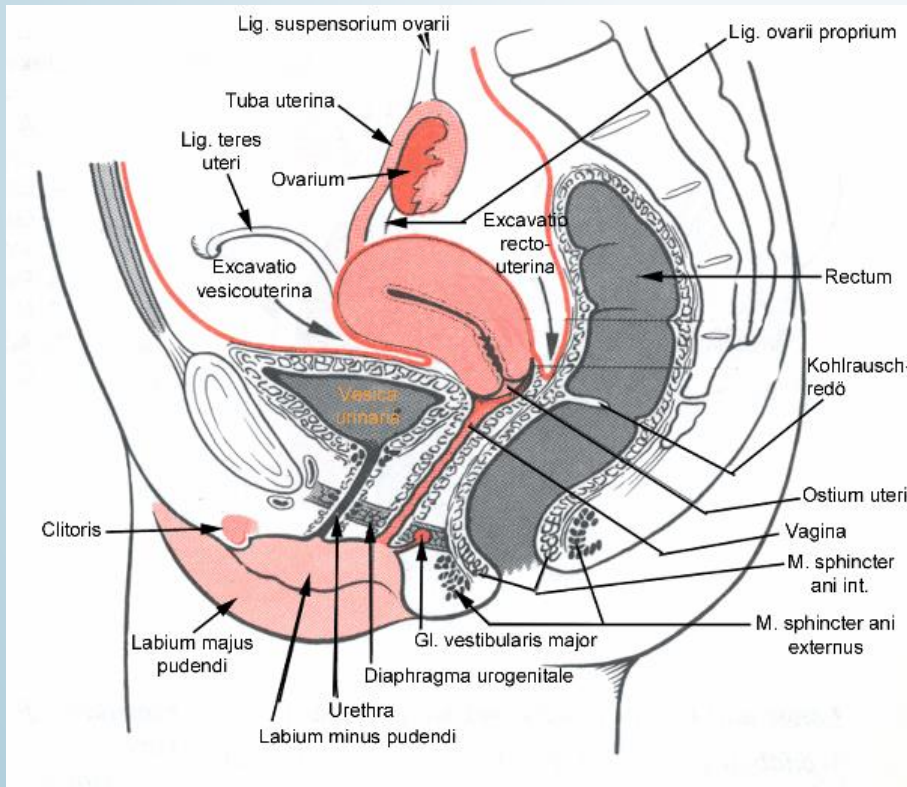
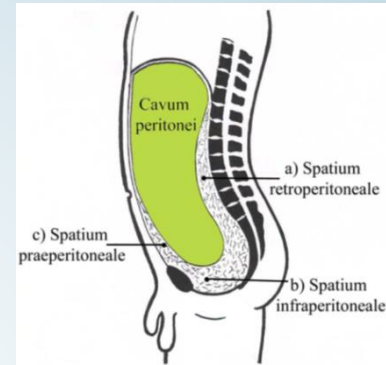
preperitoneal space exists, but no internal organs

Praeperitoneal structures

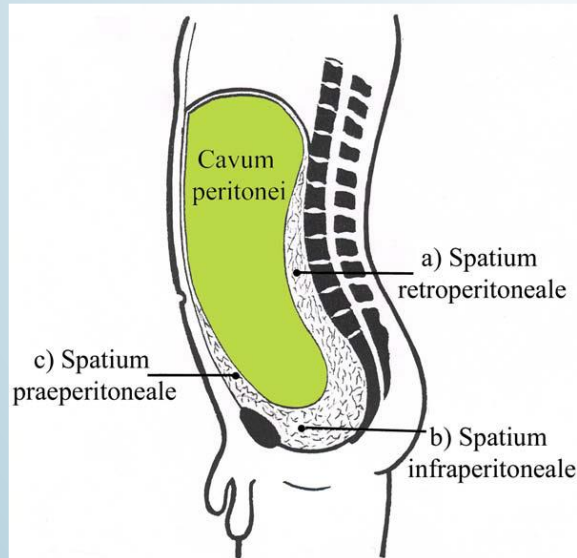
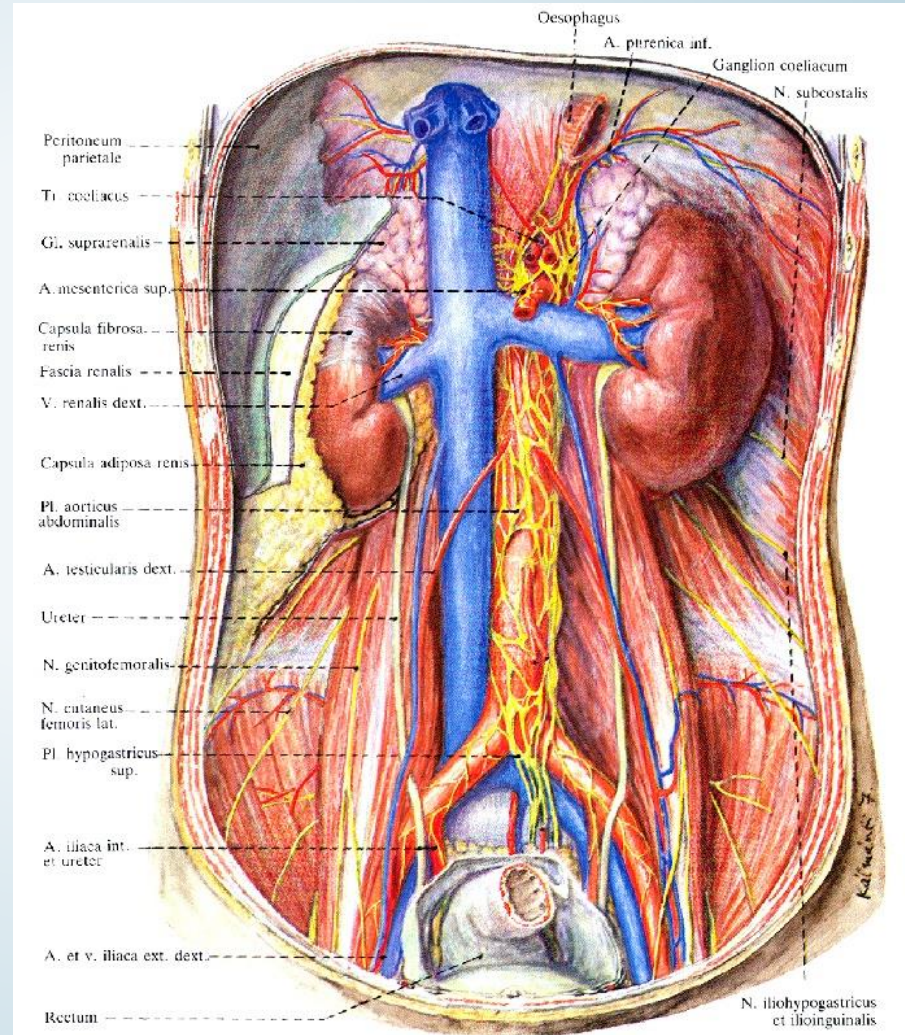
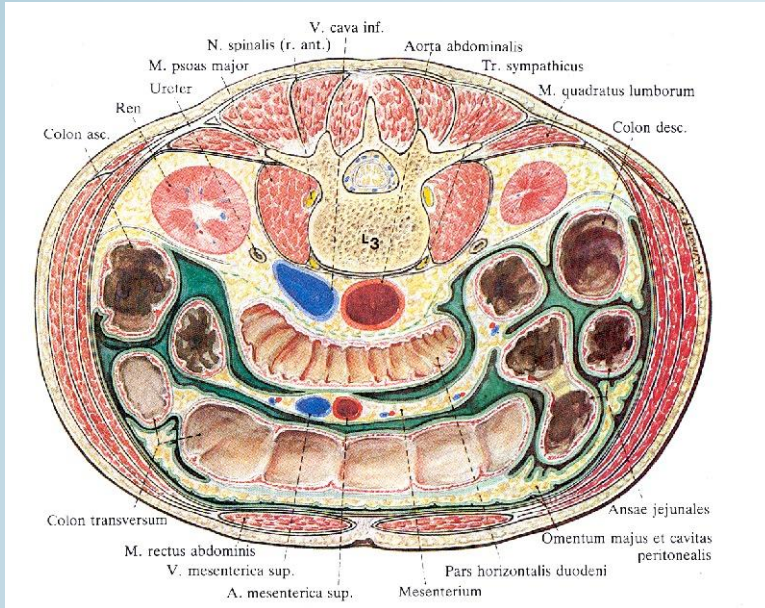
umbilical folds



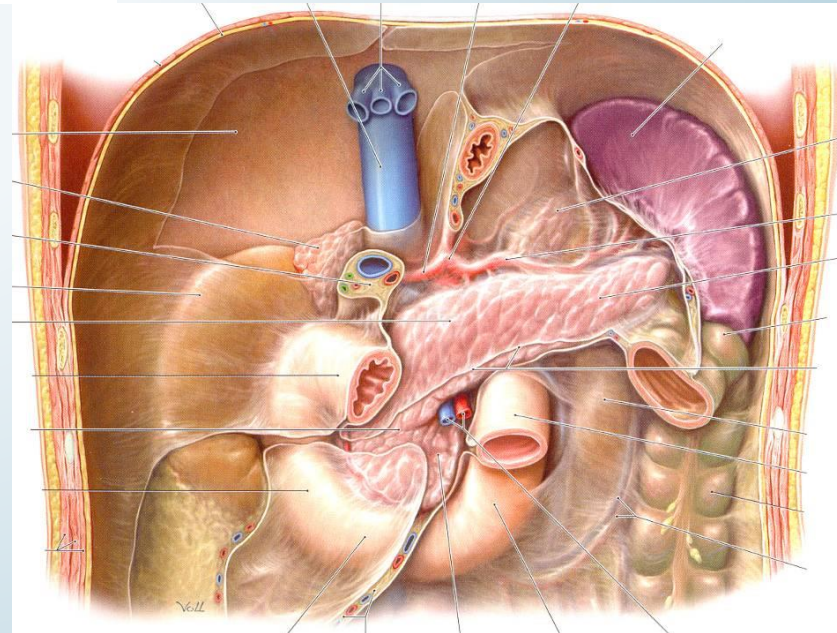
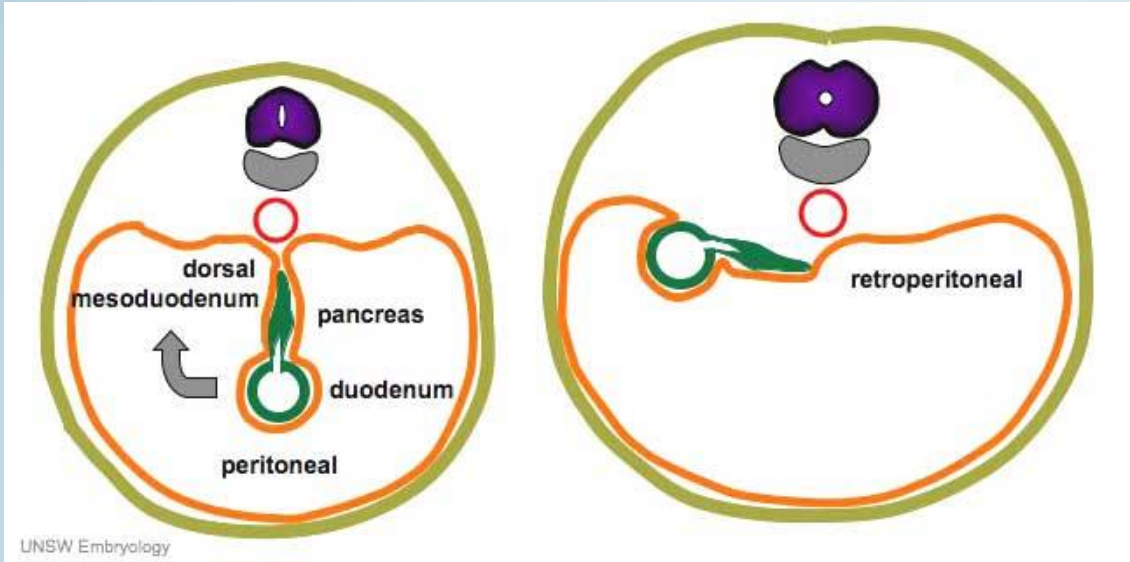
Infraperitoneal organs



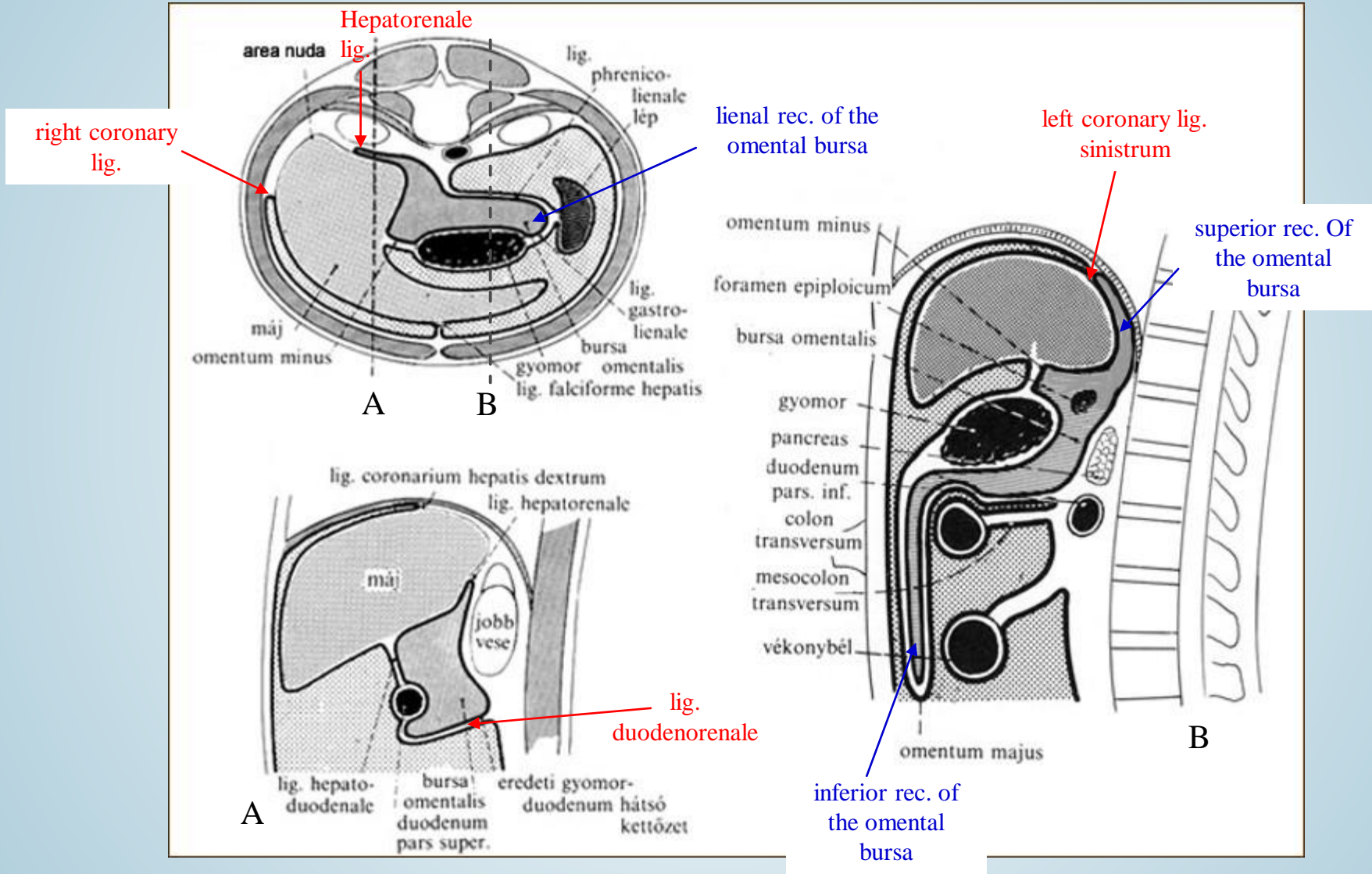
(primary) Retroperitoneal organs



(Secondary) Retroperitoneal organs

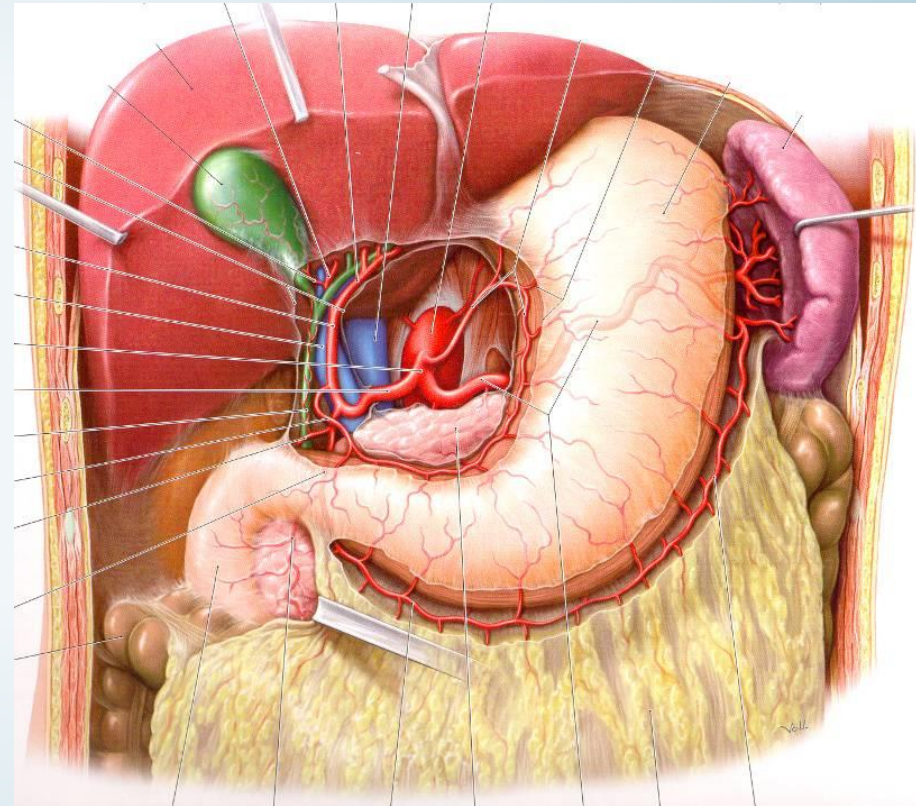
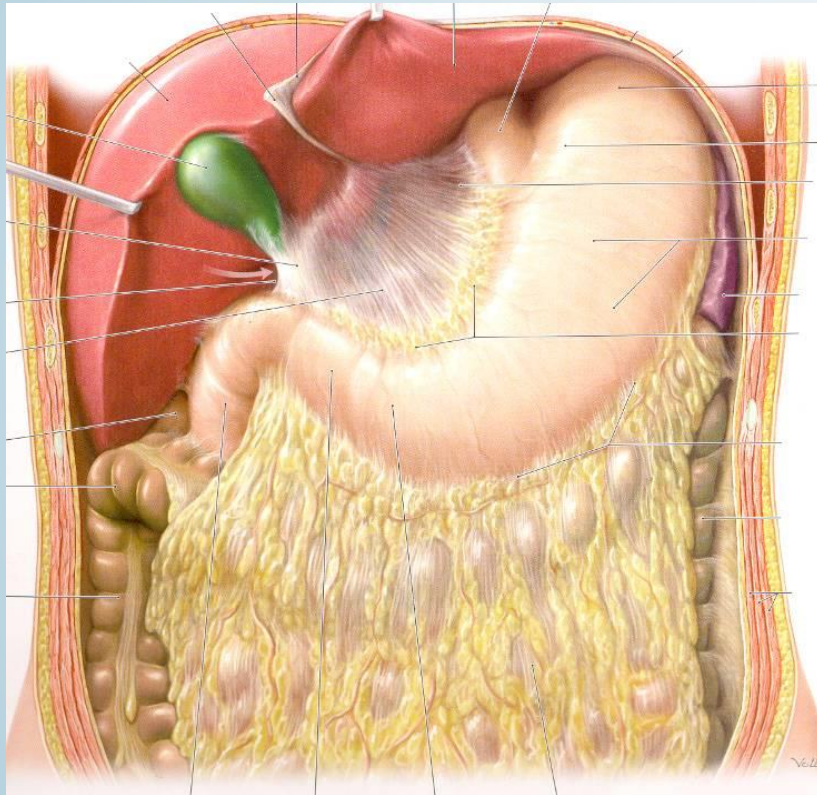


Peritoneal relations of the epigastrium



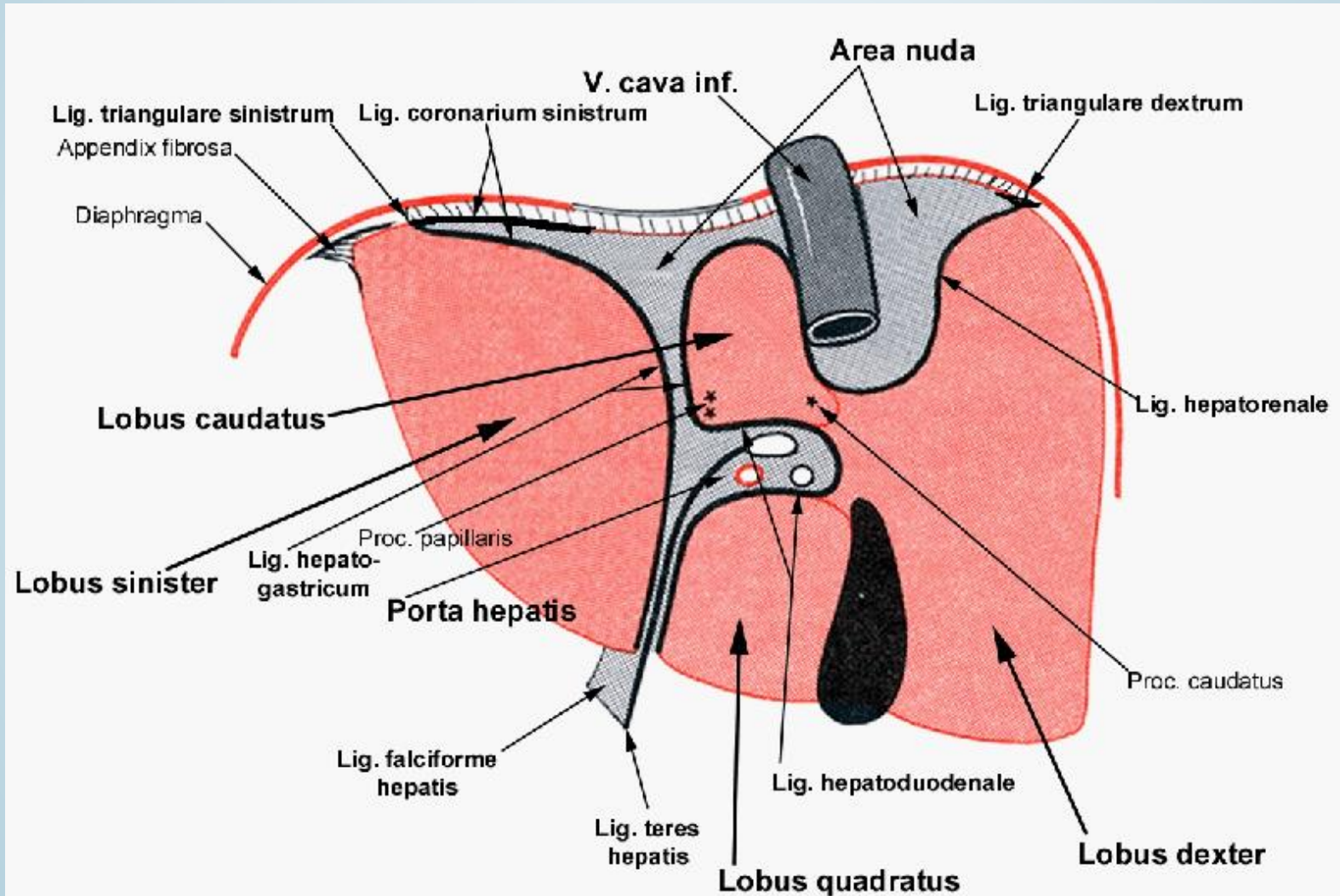
Lesser and greater omentum

(omentum minus et majus)

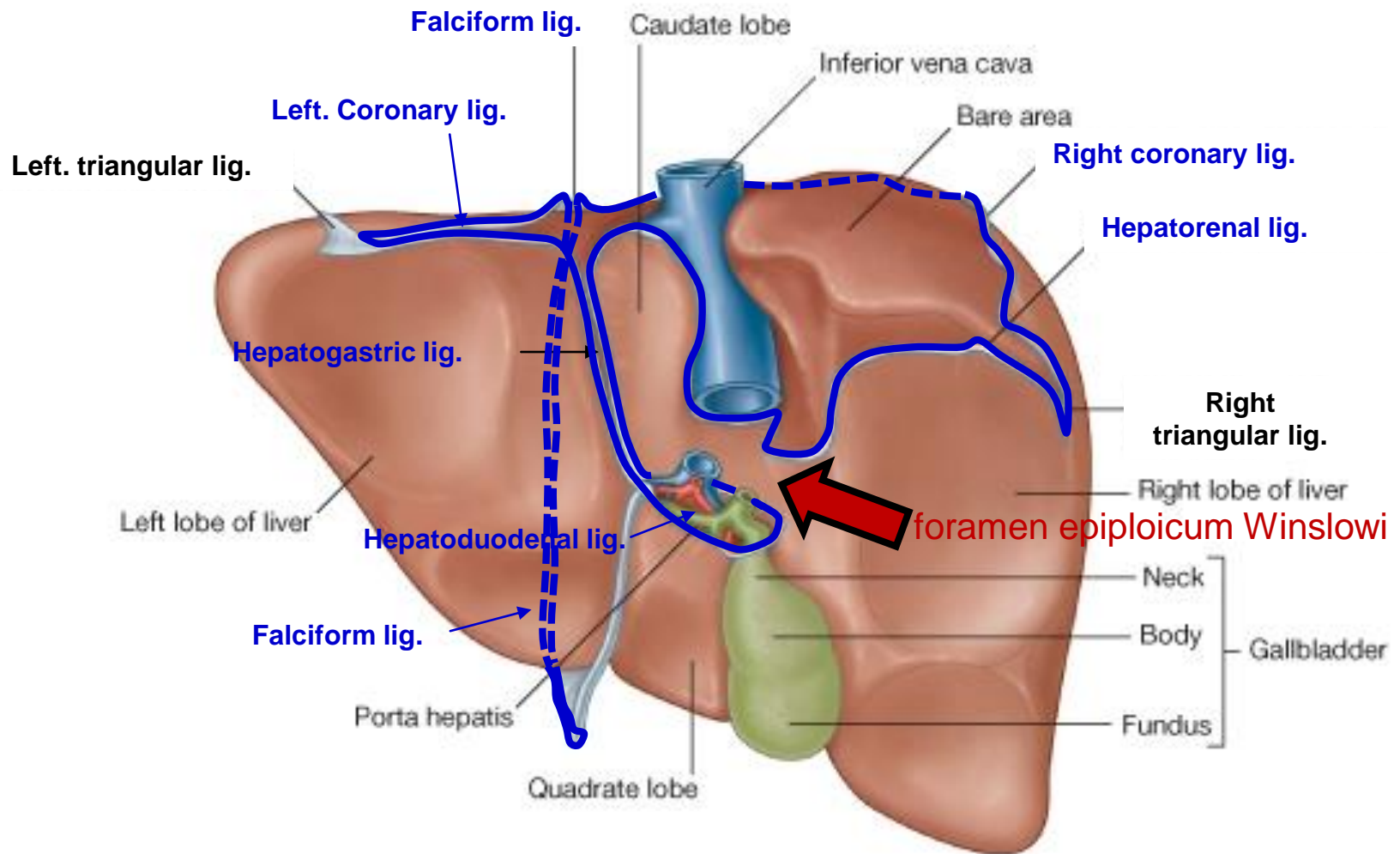


Lesser omentum:

- Hepatogastric lig.
- Hepatoduodenal lig.

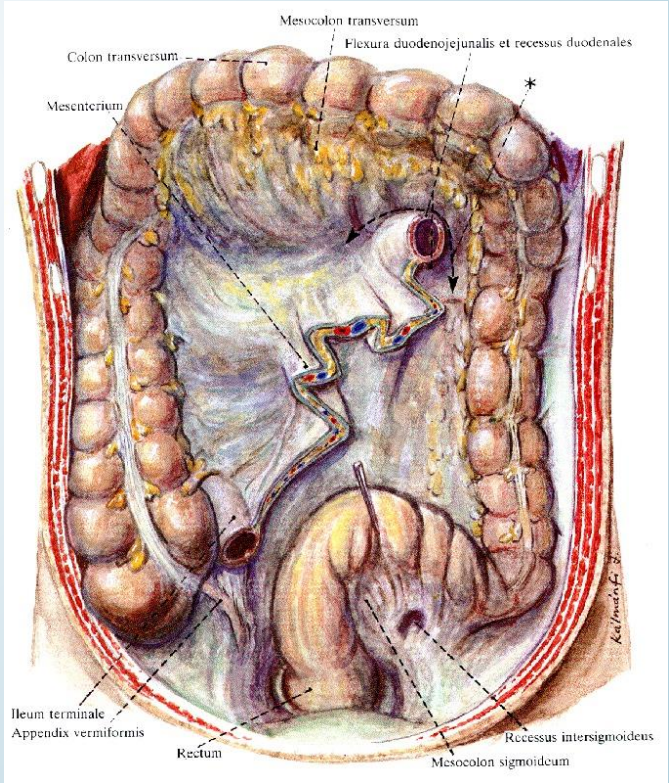
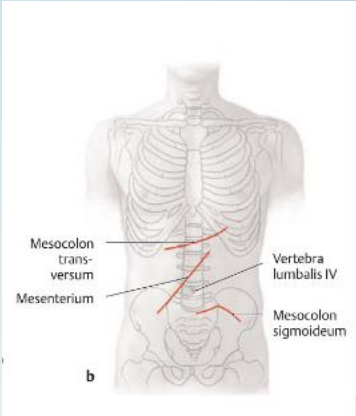
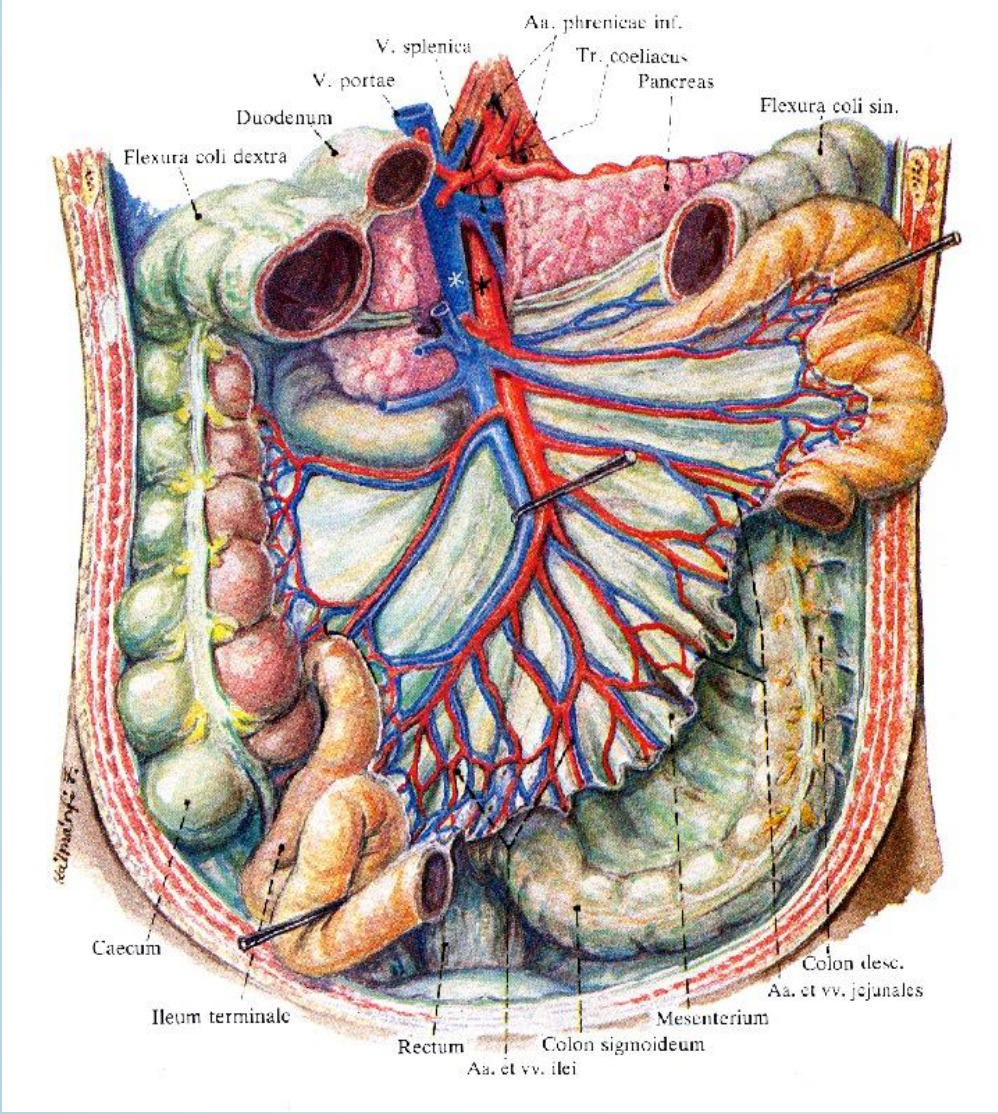


Peritoneal relations of the liver



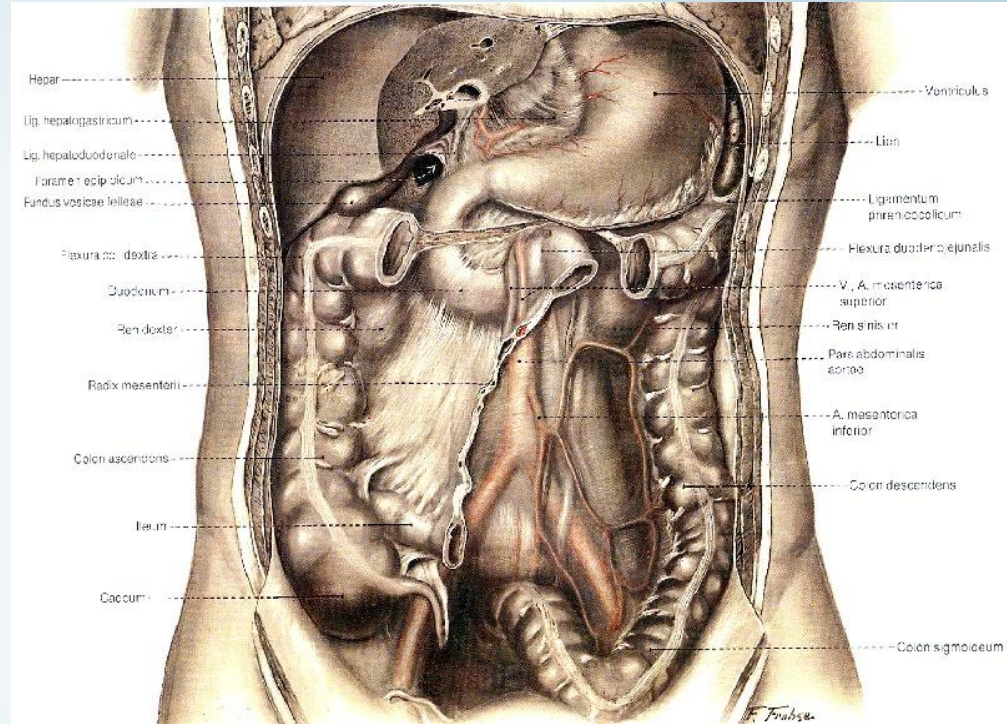
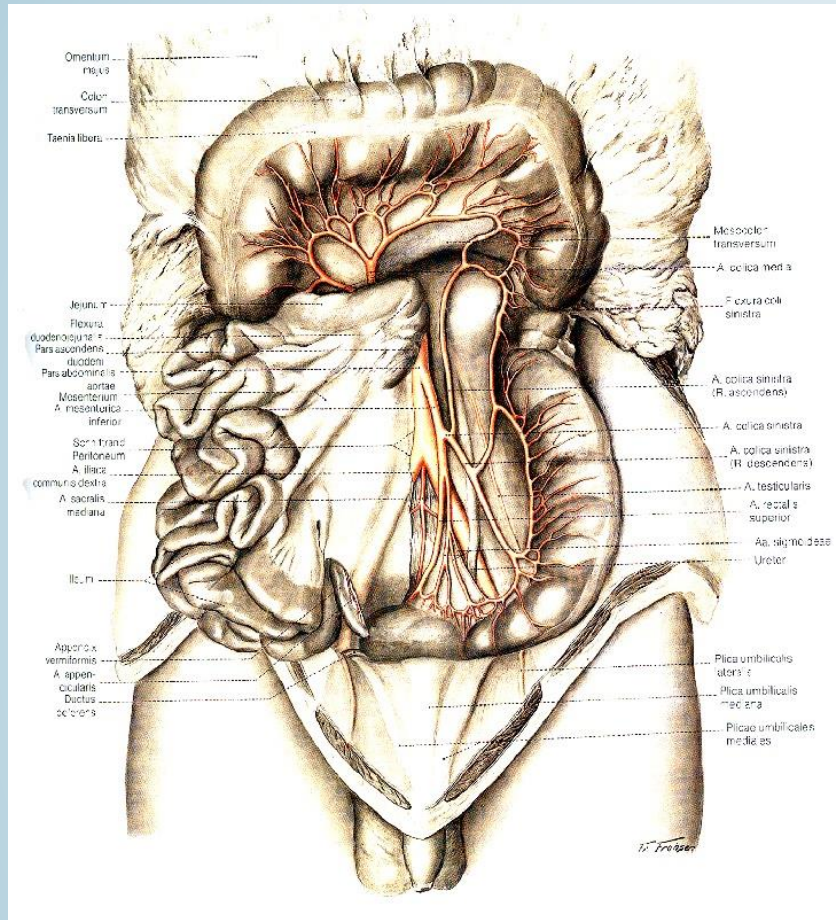
Mesentery (root of the mesentery)

From the duodeno-jejunal flexure (L2) to the right iliac fossa



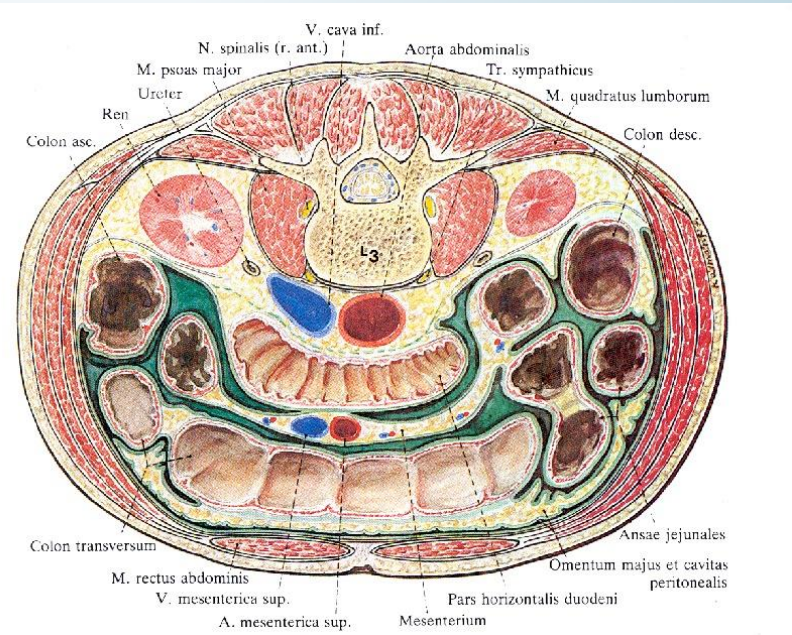
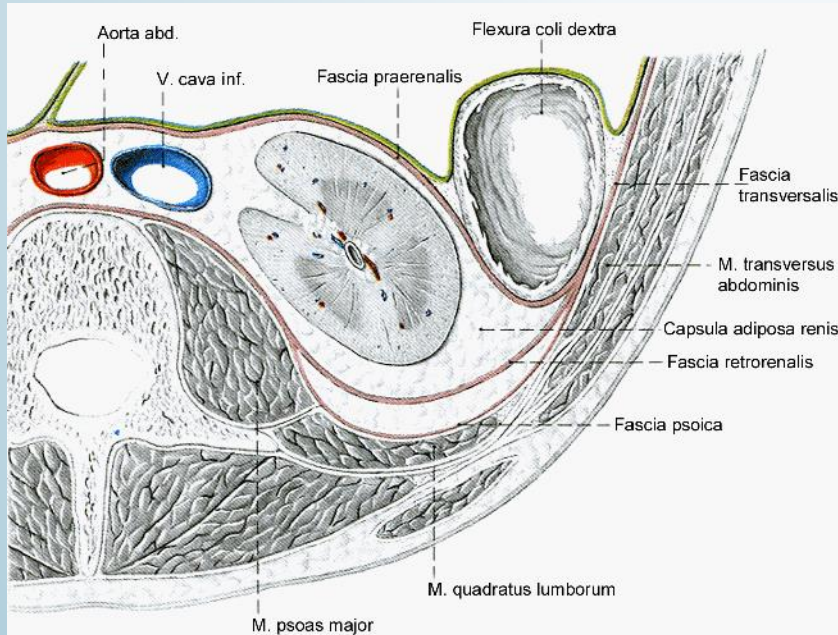
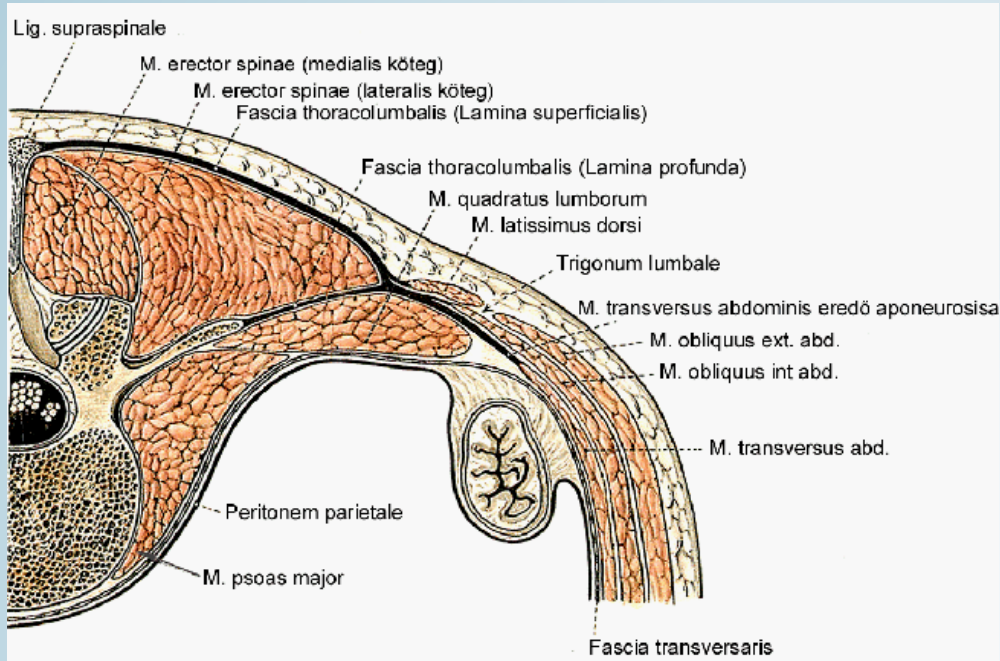
Mesoappendix

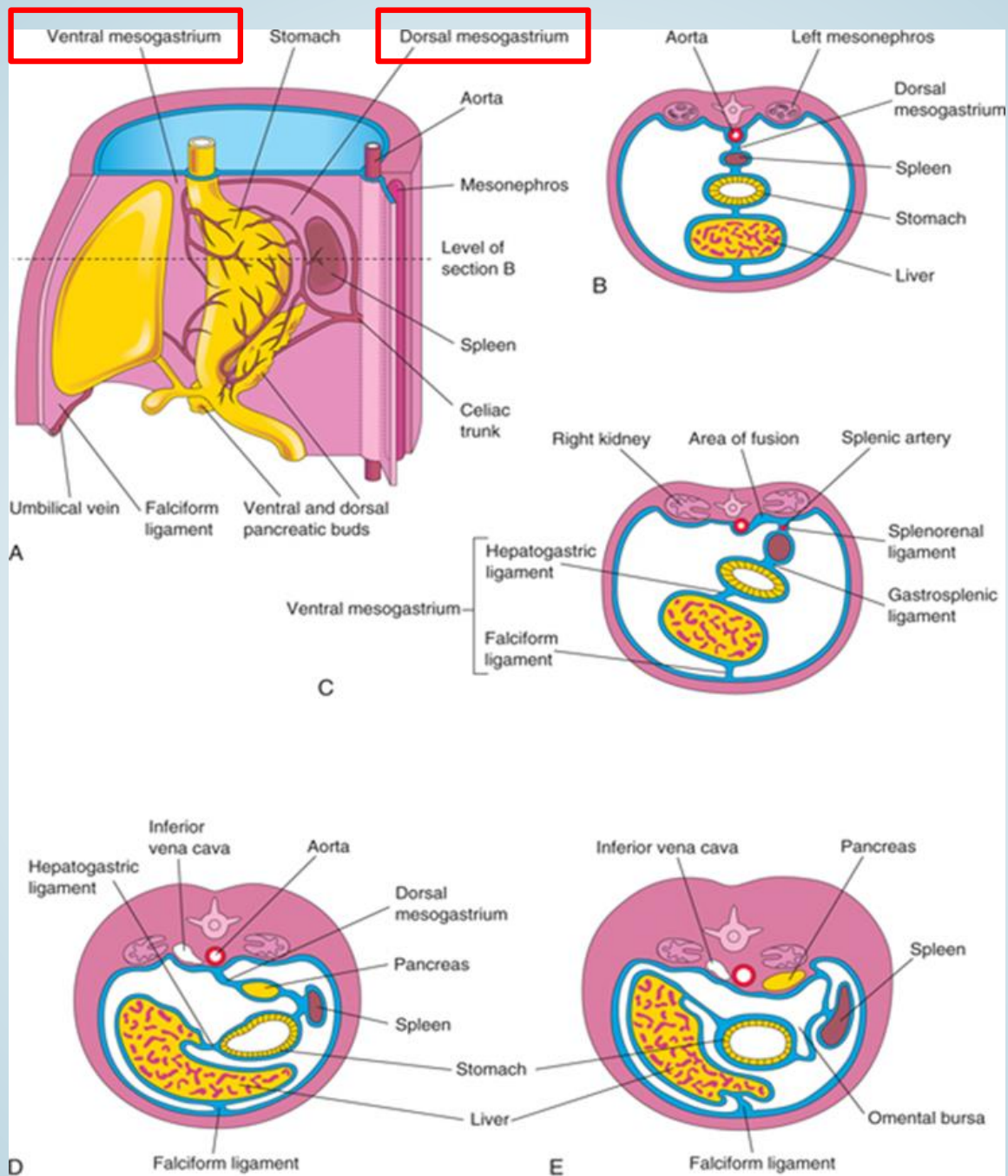
Transverse mesocolon, mesosigmoid



„Semi“-intraperitoneal:

Rectum:
 -(semi)intra
 -retro
 -infra

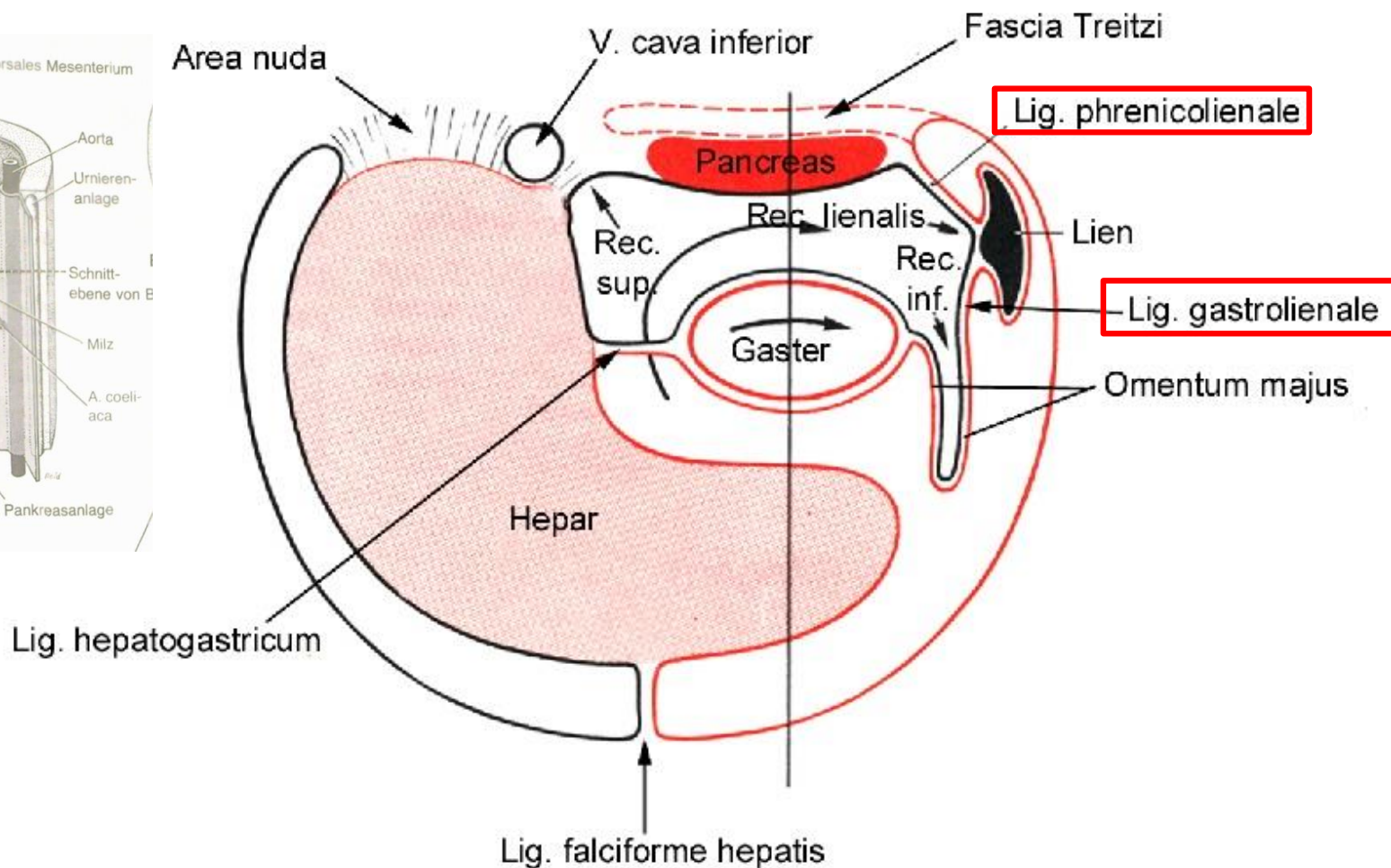
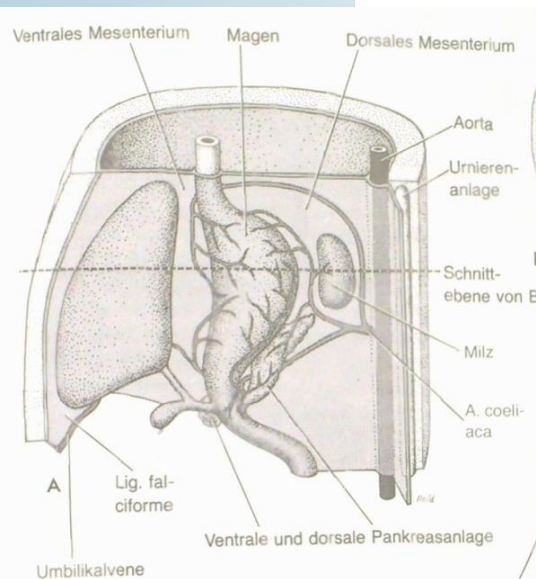
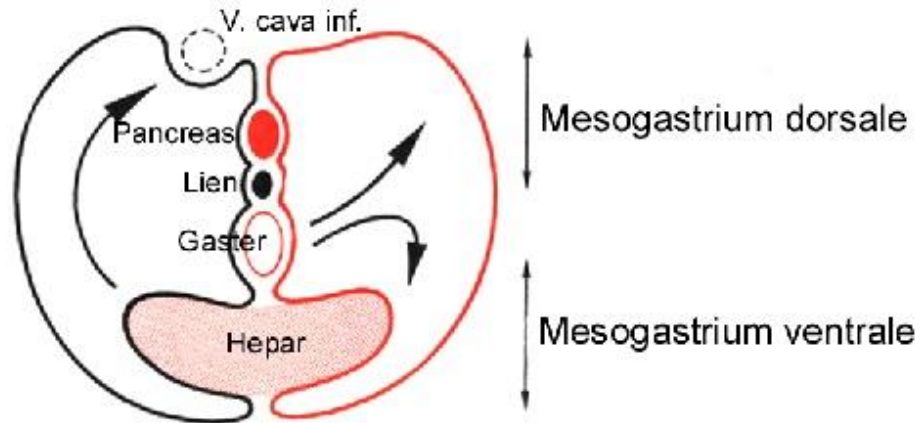




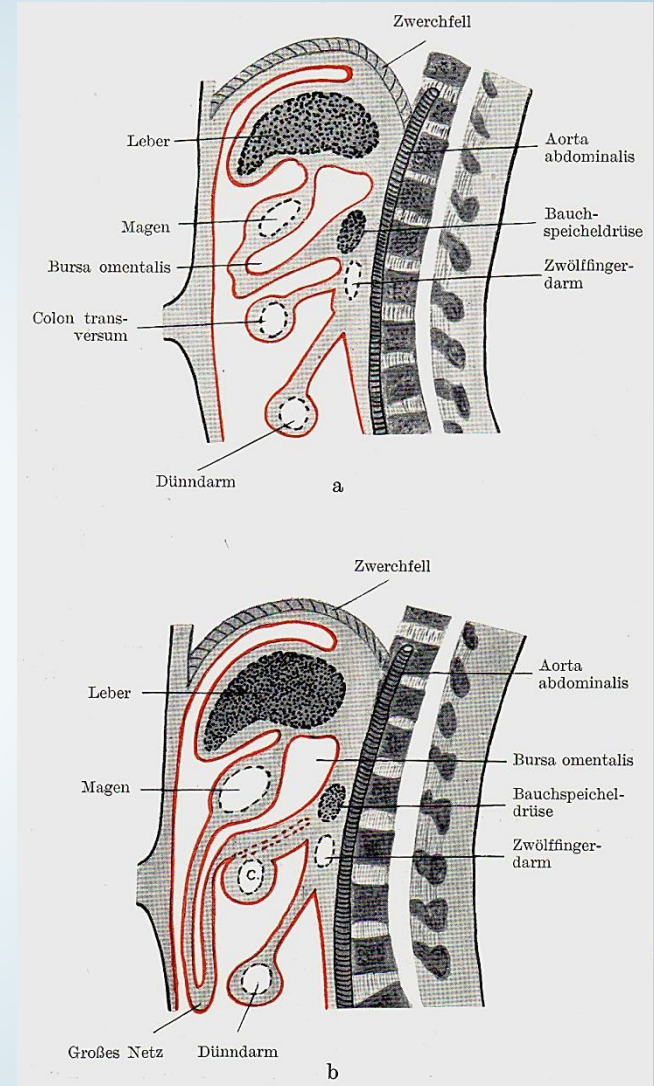
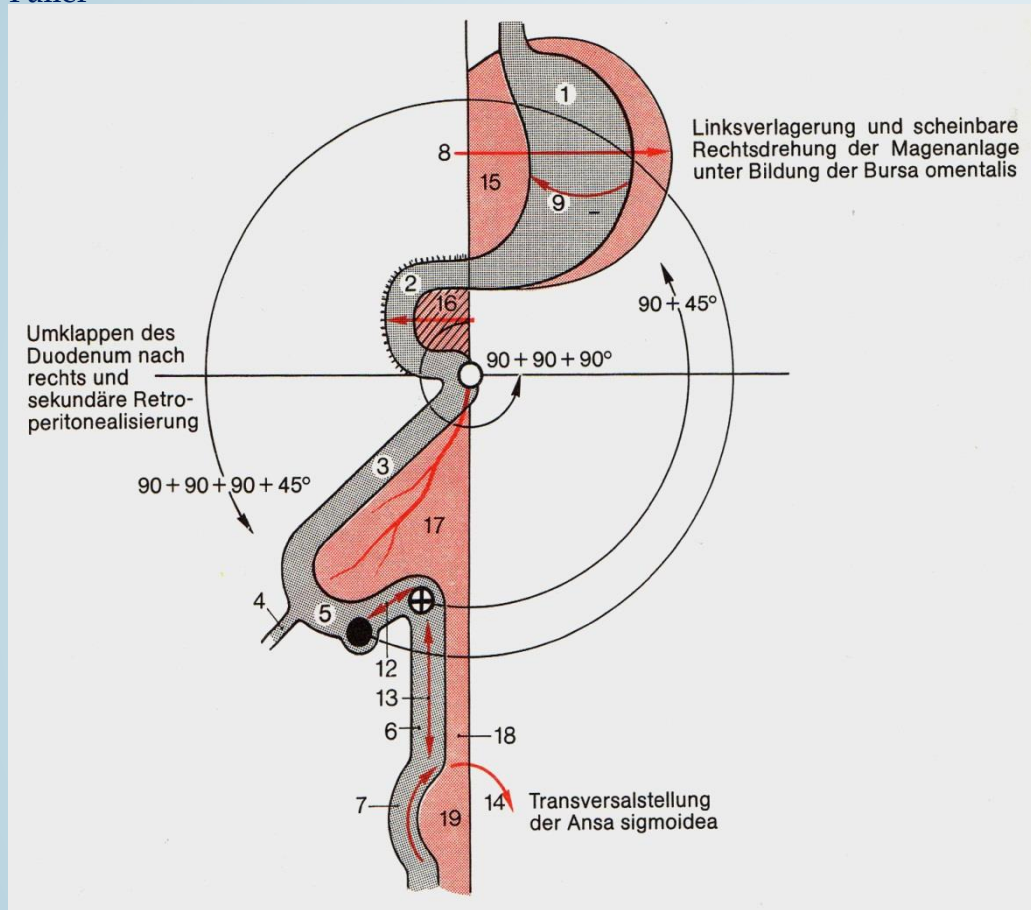
Lesser sac (=omental bursa):
from the
right celoma cavity!

Mesohepaticum dorsale =
Lig. hepatogastricum

Mesohepaticum ventrale =
Lig. falciforme hepatis

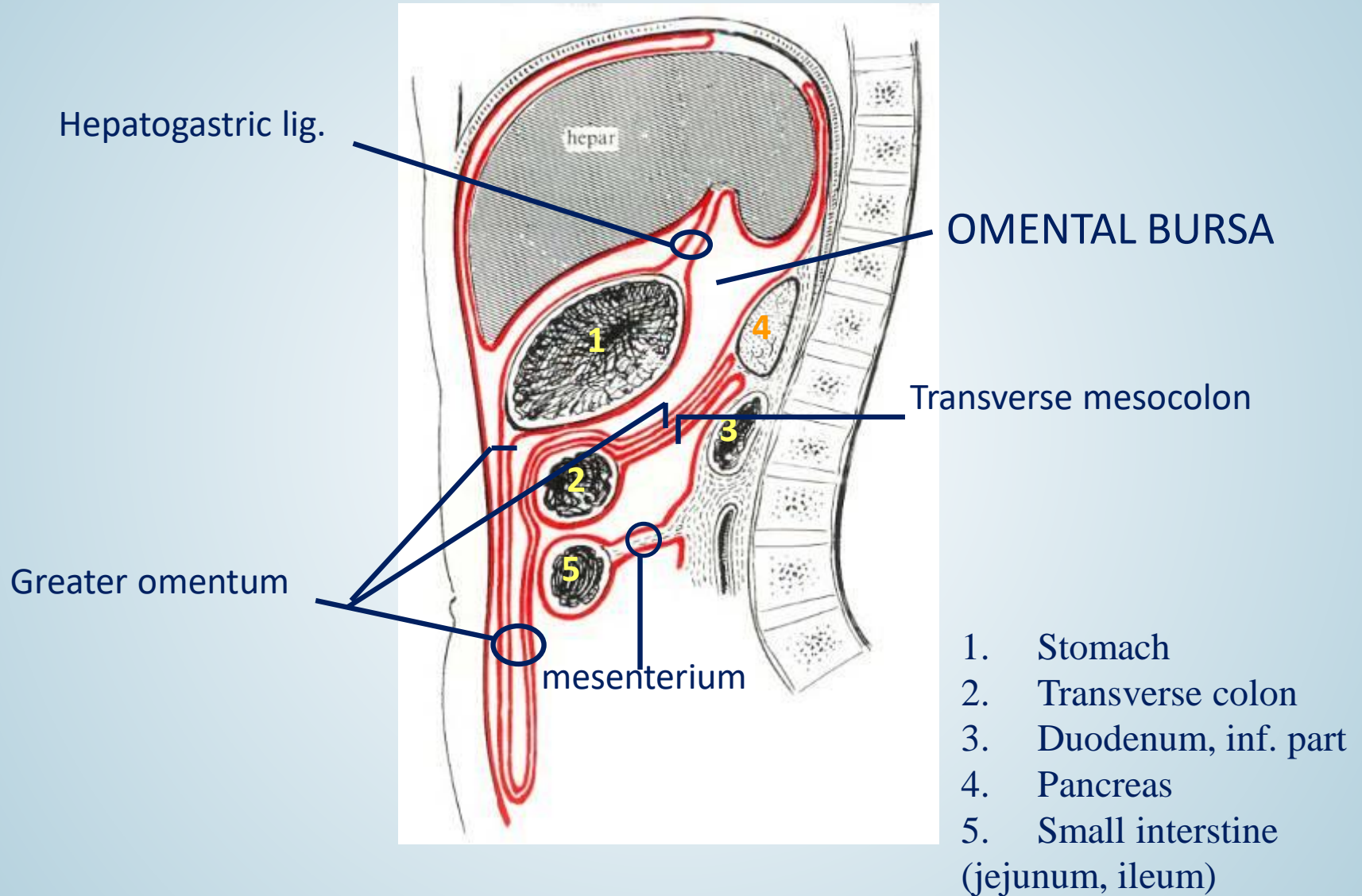


Faller

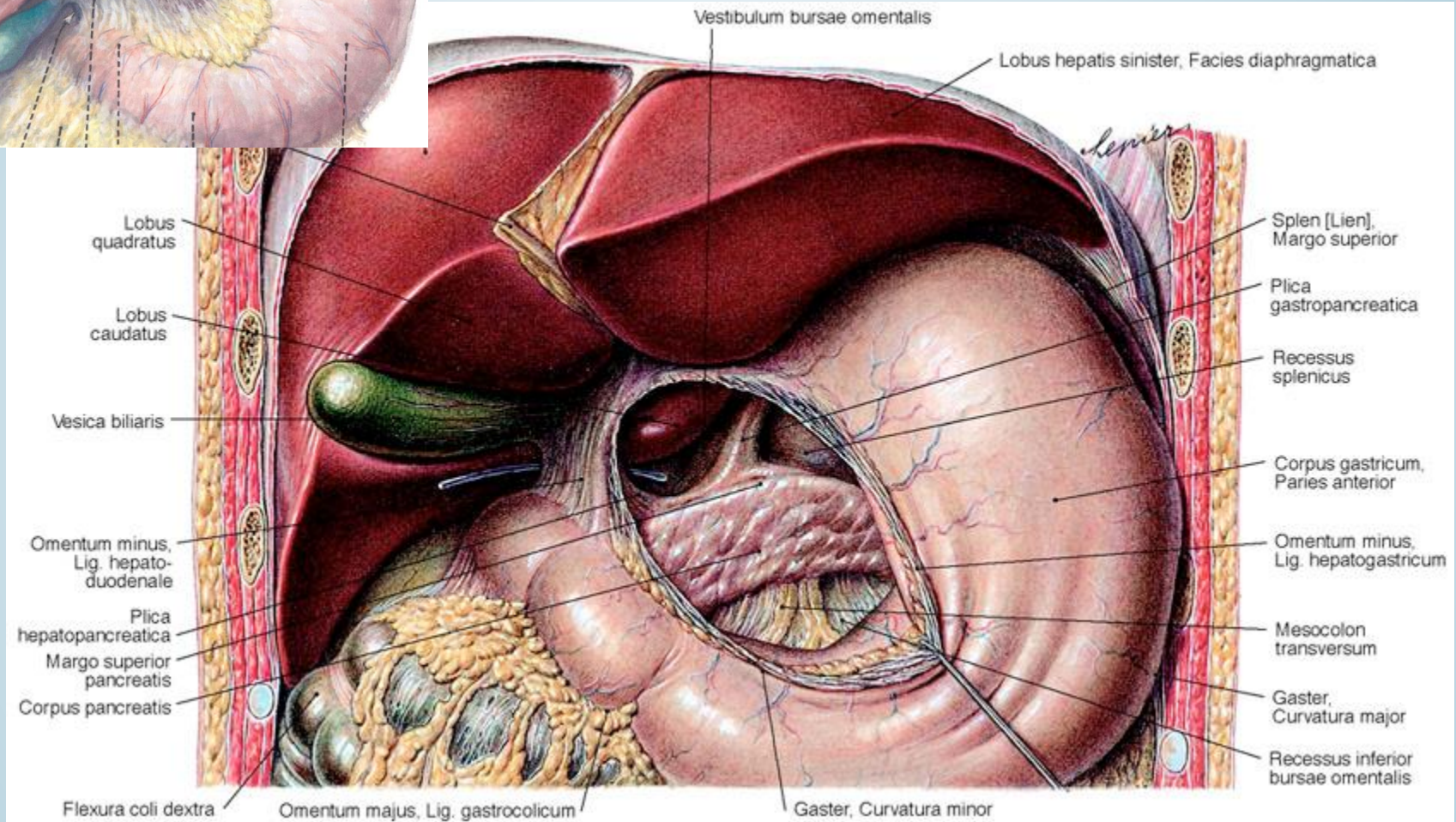


2 layers, 4 layers, 6 layers

Gastrocolic lig. =
Greater omentum + transverse mesocolon



OMENTAL BURSA

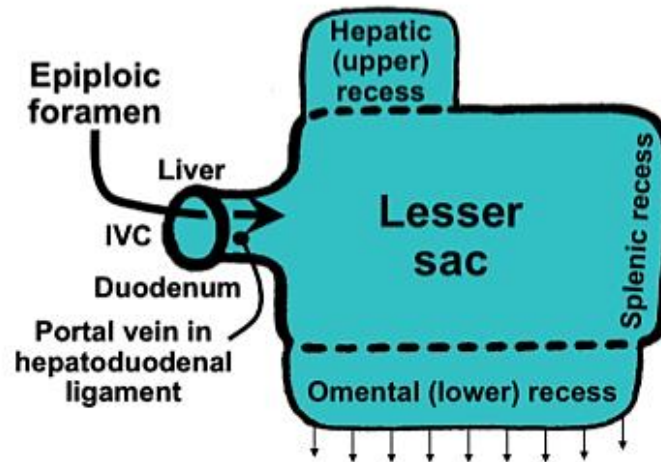
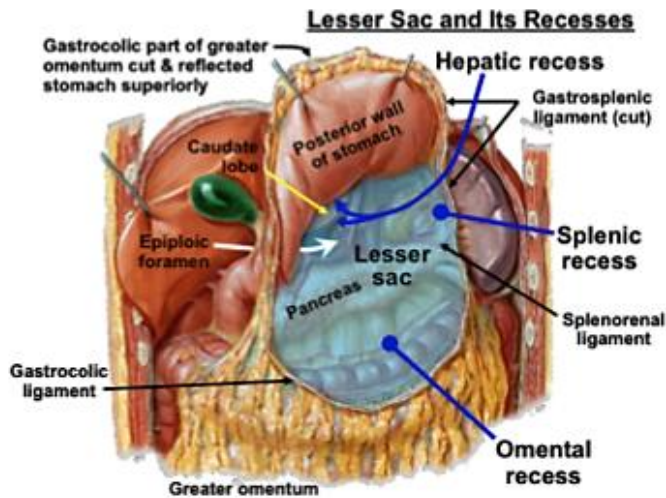


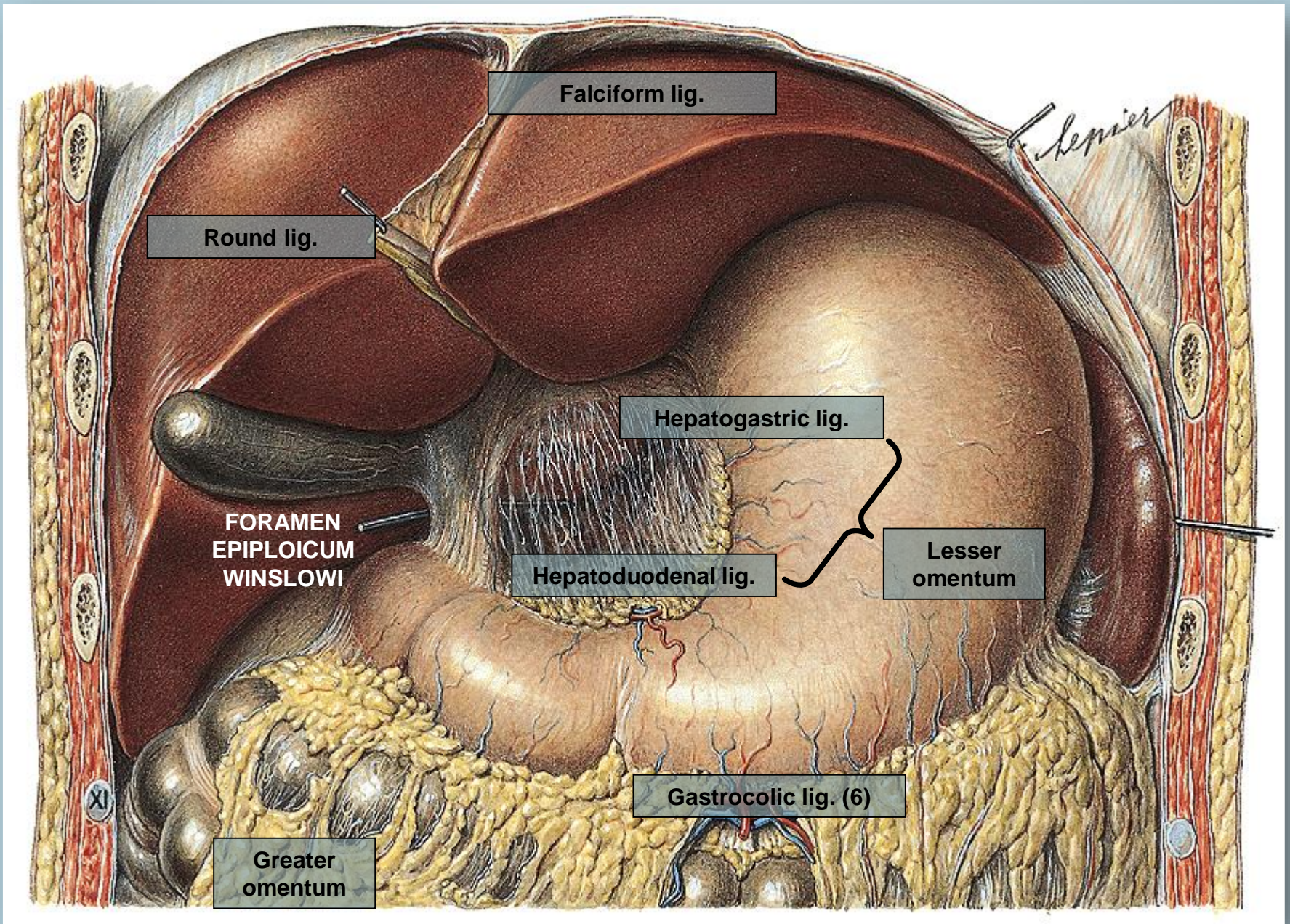
Foramen omentale (Winslow):
 Hepatoduodenal, duodenorenal, hepatorenal ligaments

Omental bursa

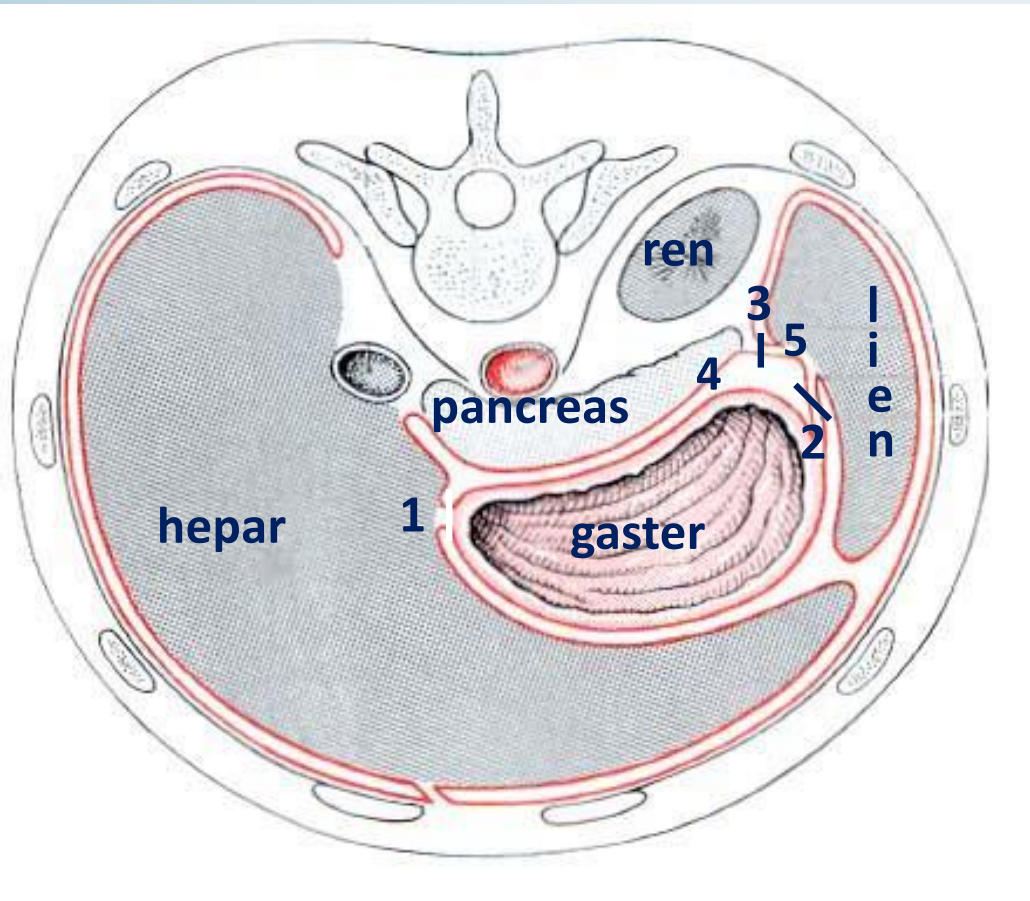
Omental bursa is the cavity formed by the rotation of the epigastric organs in the abdominal cavity, mainly behind the stomach and in front of the pancreas.

Entrance is the foramen epiploicum Winslowi, which is bordered by the hepatoduodenal lig., sup. horizontal duodenum, duodenorenal lig., hepatorenal lig., caudate lobe of the liver and the IVC. Through this we get into the vestibulum of the omental bursa, which extends to the gastropancreatic crest (left gastric a. and ventricular v.). Beyond the crest, we are talking about the proper part of the omental bursa. There are three recesses: sup. recess between the liver and the compartment of the hepatorenal lig., inf. recess adjoins the frontal and dorsal layers the greater omentum, splenic recess extends to gastrosplenic and phrenicocolic.

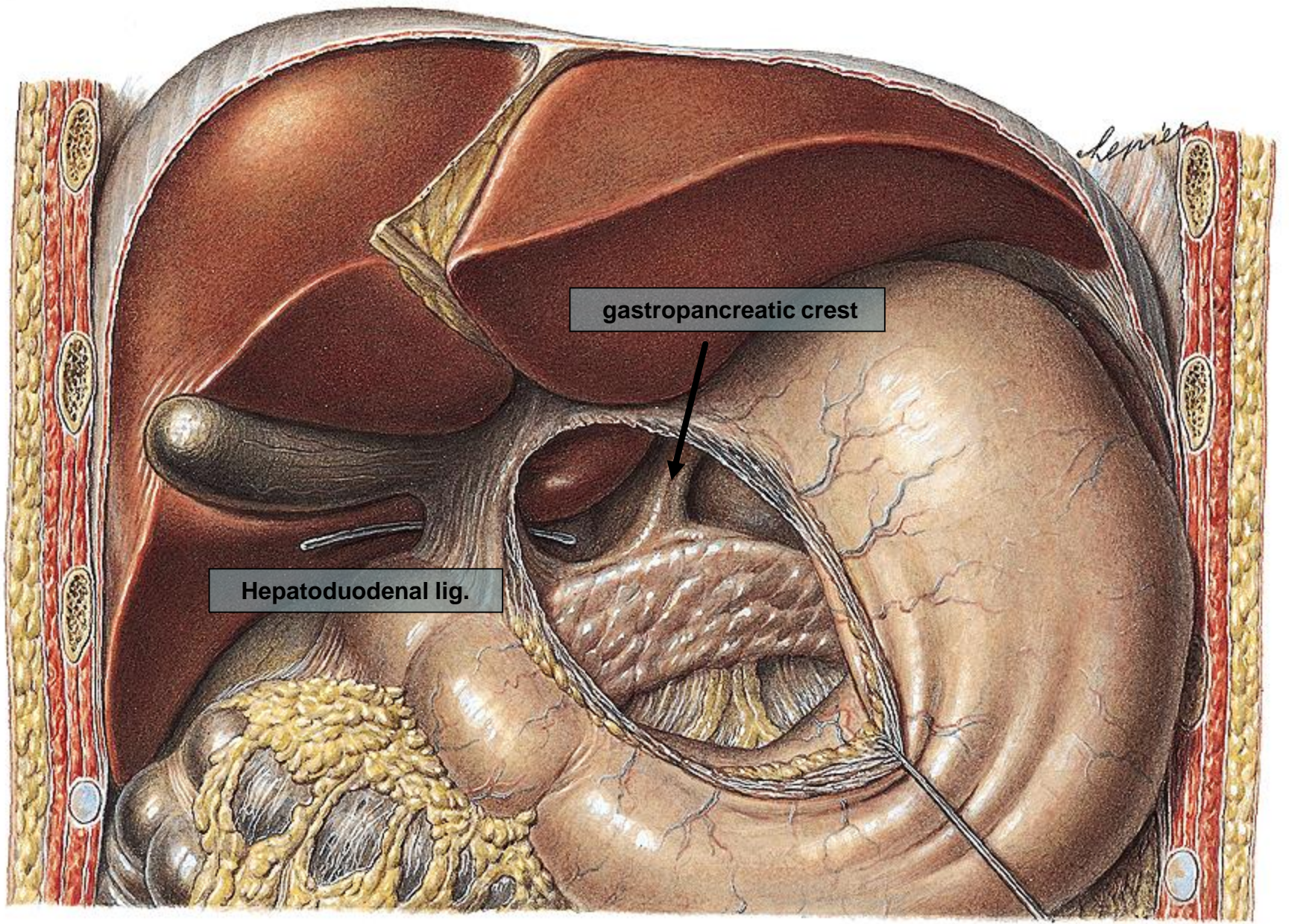




Omental bursa = lesser sac

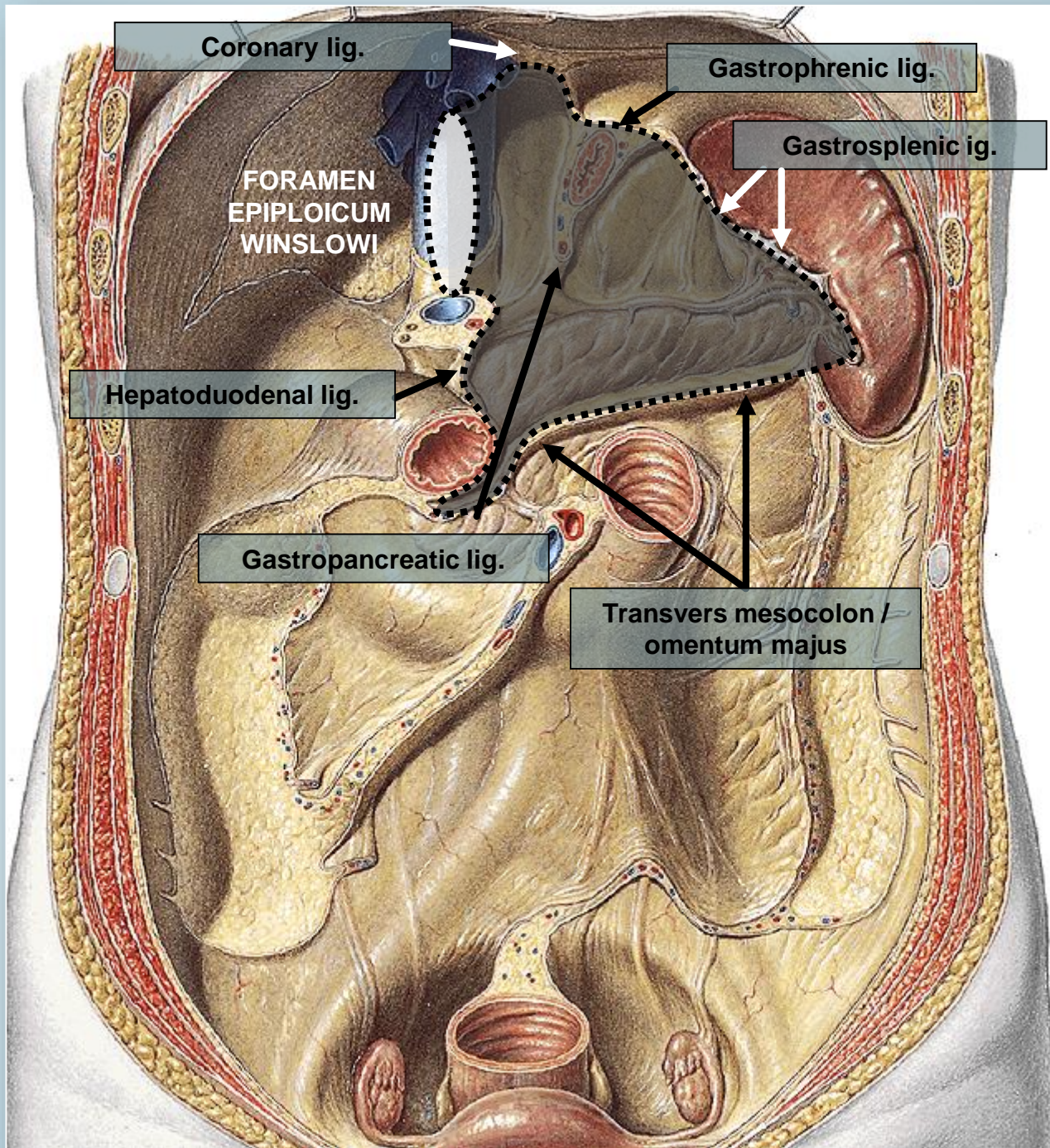


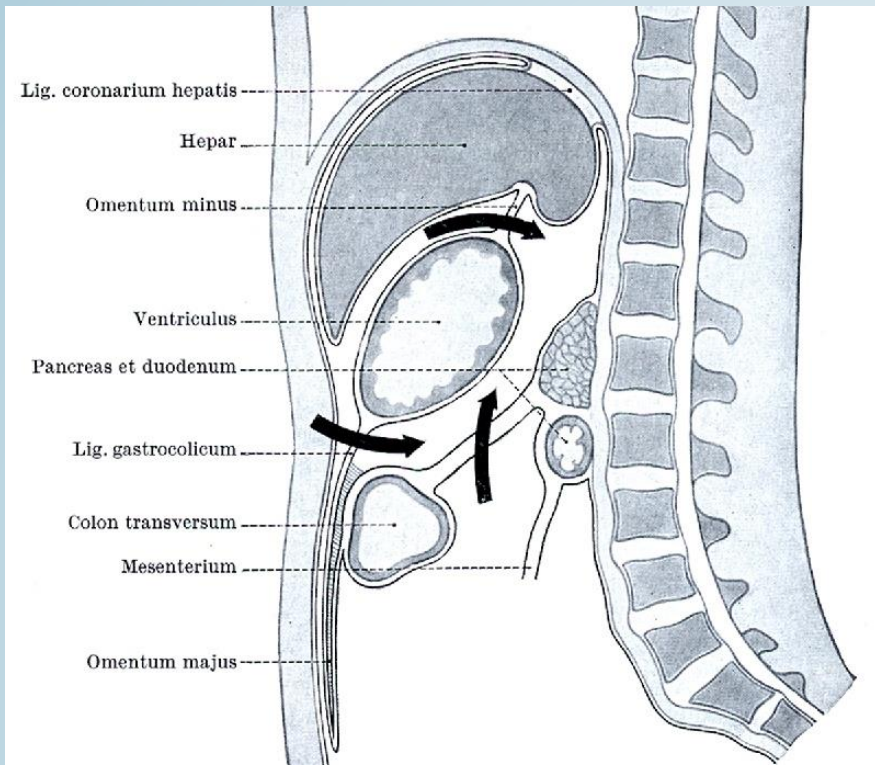
1. Hepatogastric ligament
2. Gastrosplenic ligament
3. Phrenicosplenic ligament
4. OMENTAL BURSA
5. *Splenic recess*



gastropancreatic crest

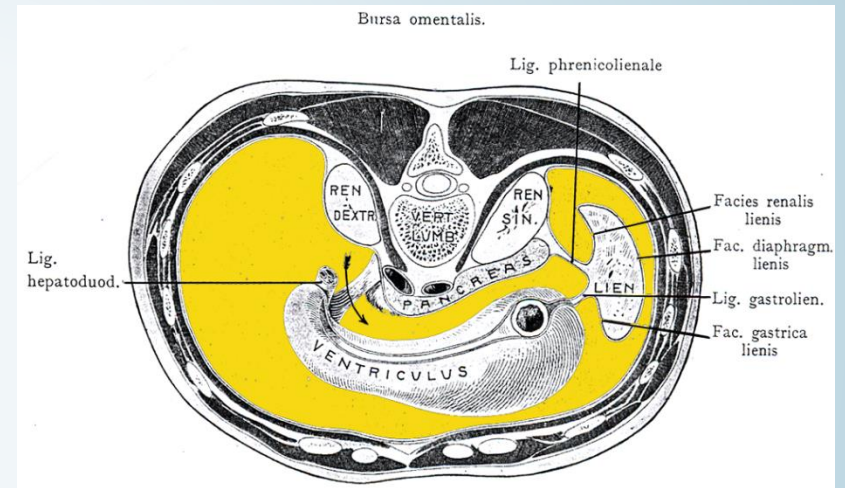
Hepatoduodenal lig.





Omental bursa:

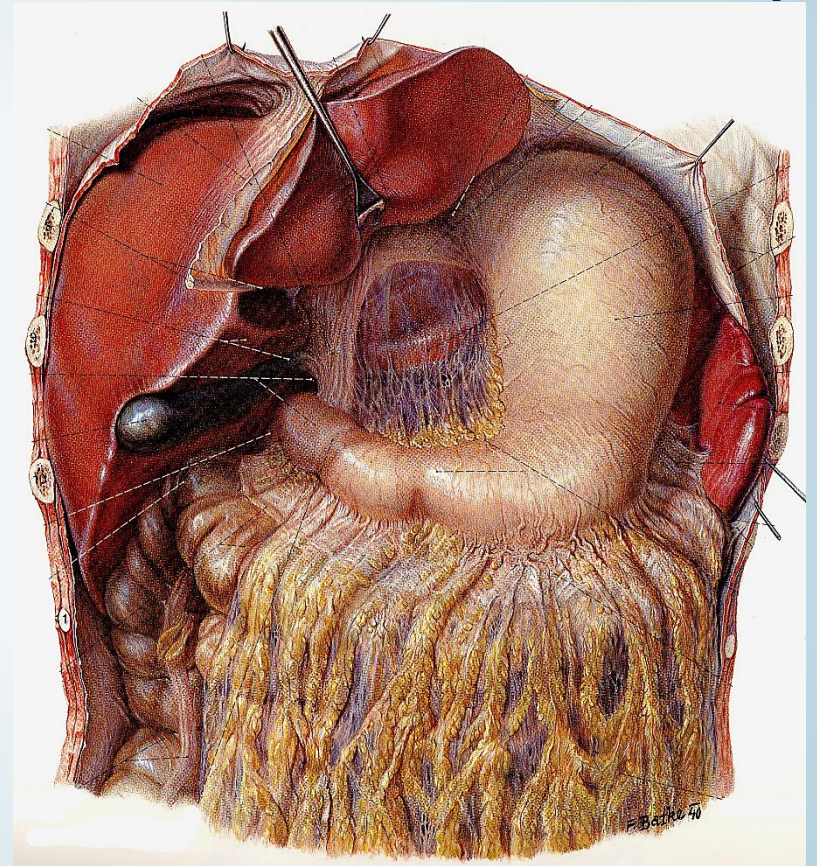
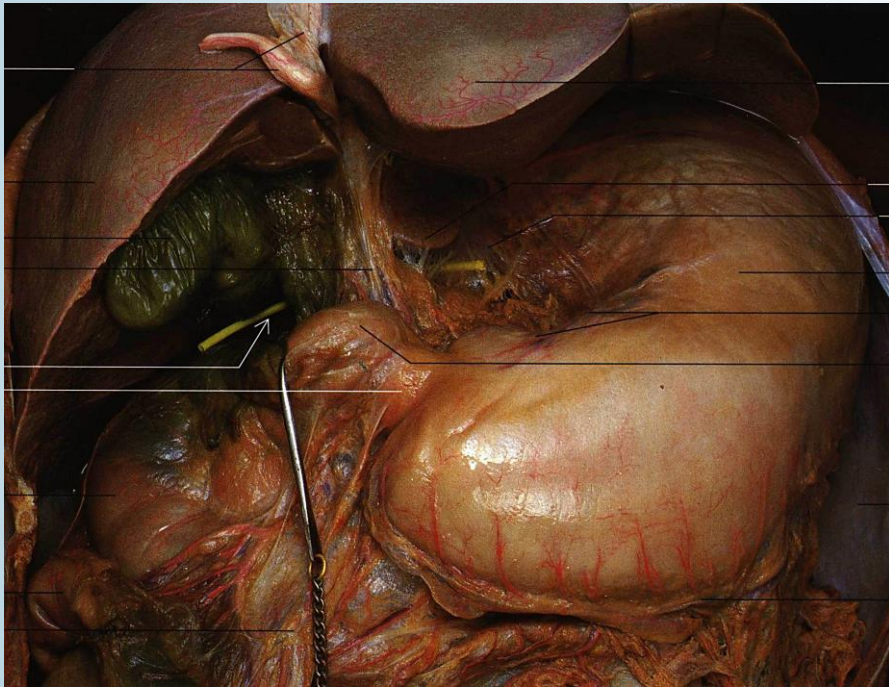
- Epiploic (Winslow) foramen
- Vestibule
- Gastropancreatic fold
- Proper cavity
- *Recesses: sup., inf. and splenic*



Bursa omentalis

Pernkopf

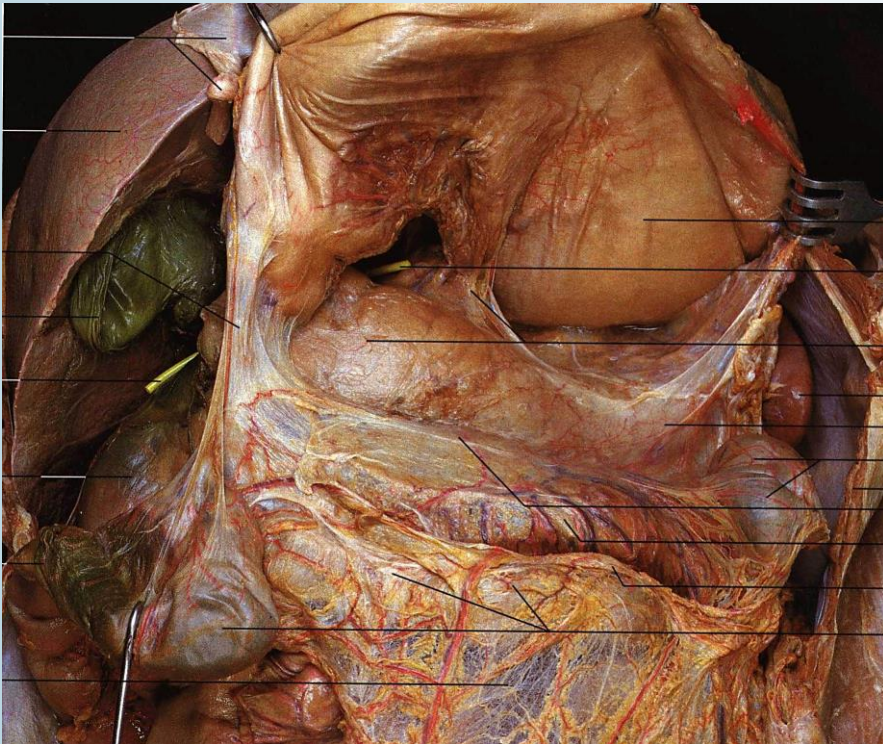
Yokochi



Bursa omentalis

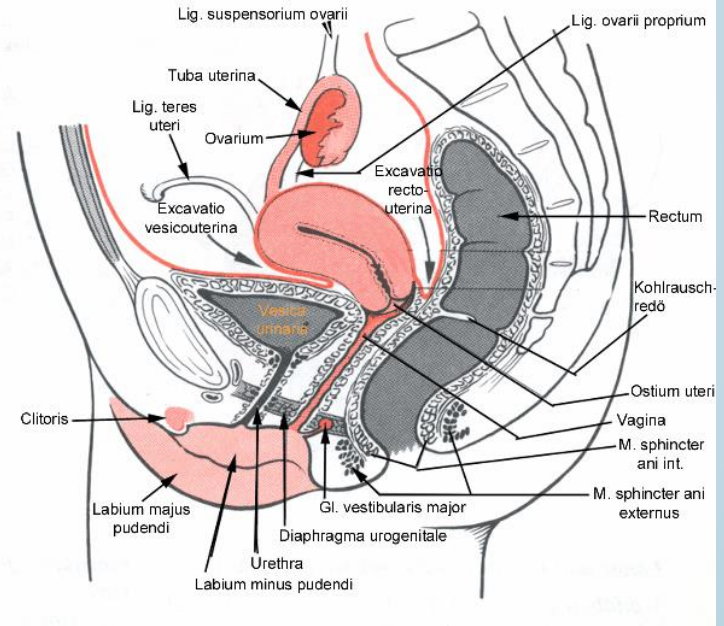
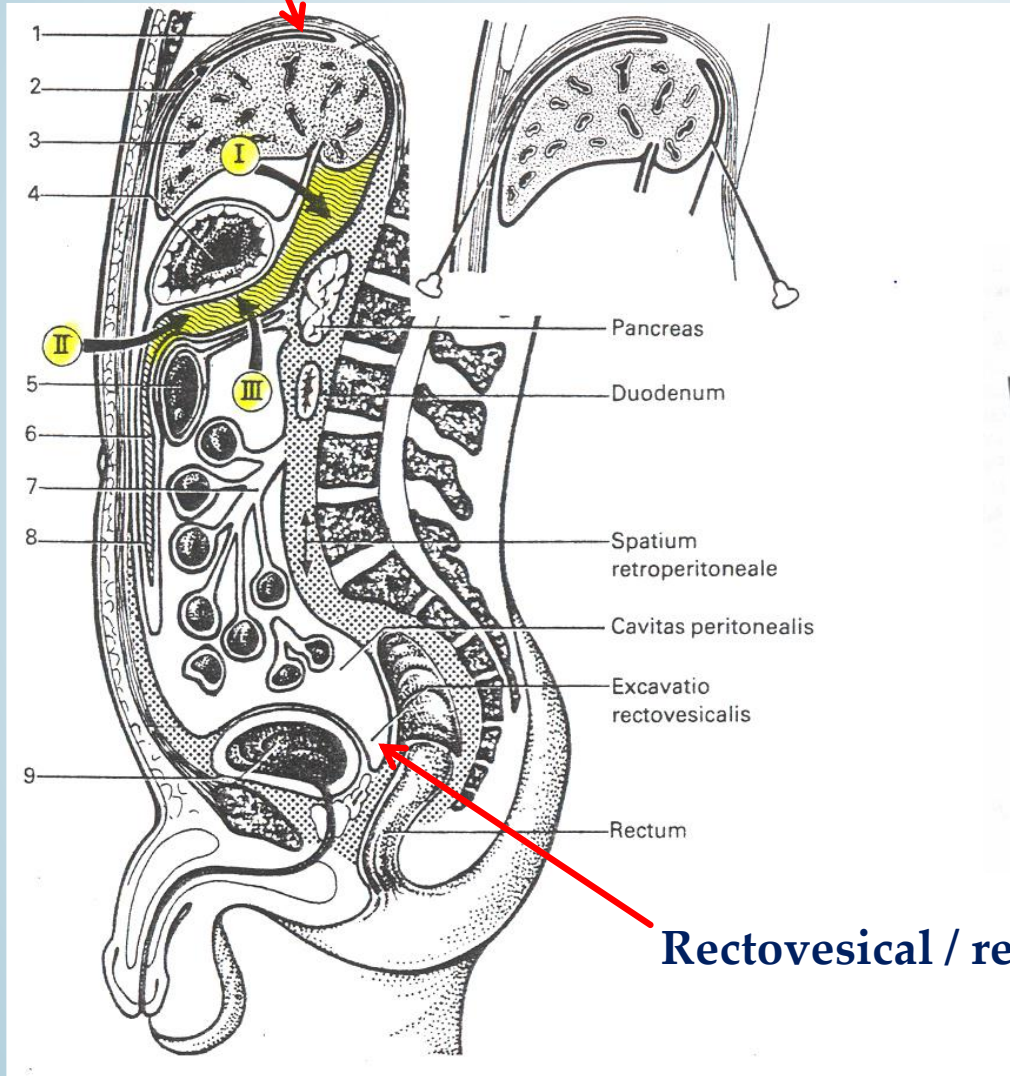
Pernkopf

Yokochi



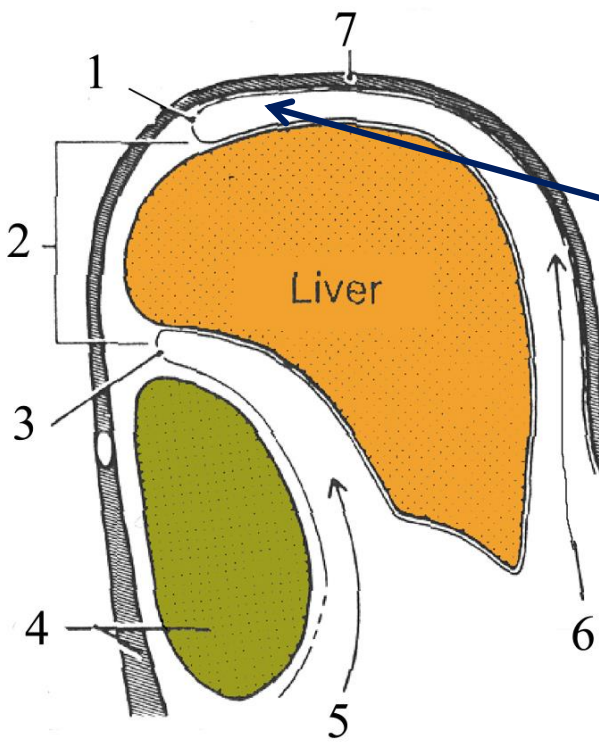
The highest and lowest points of the peritoneal cavity

hepatophrenic =
subphrenic recess

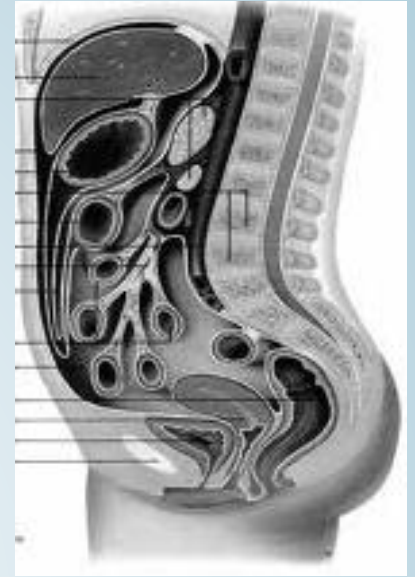


Rectovesical / rectouterine pouch (Douglas pouch)

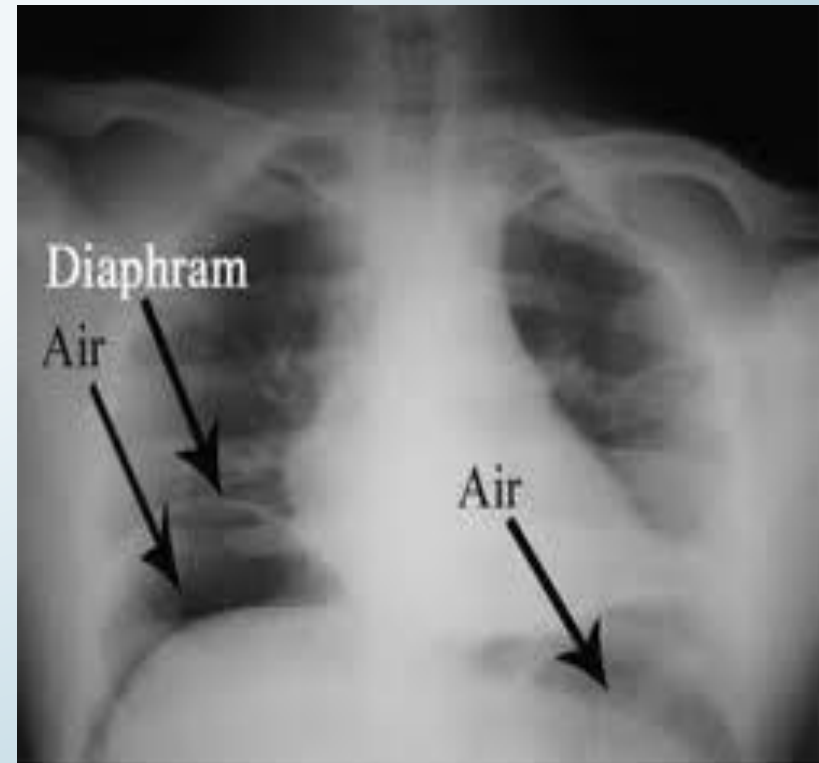
Cavum peritonei

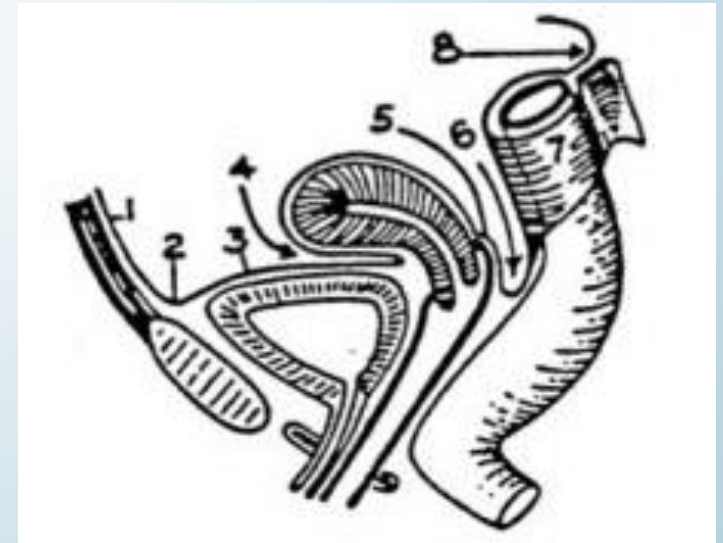
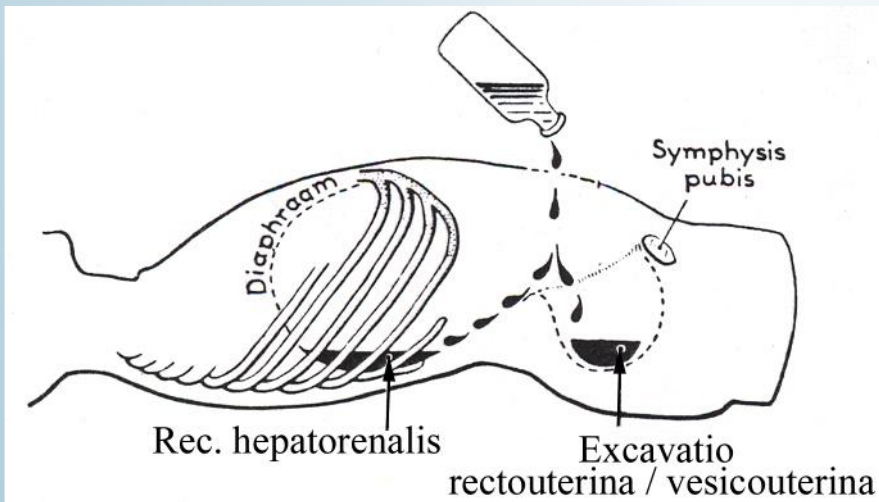
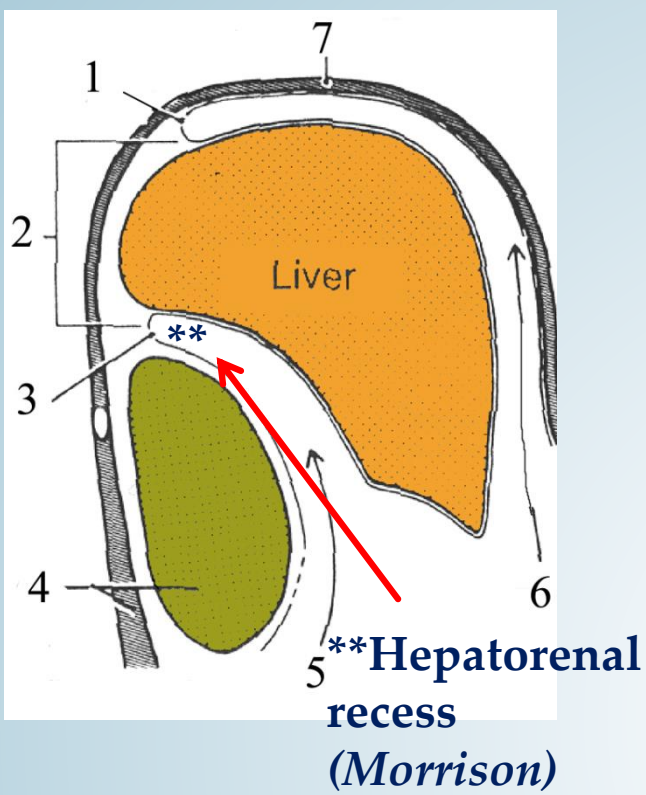


*Hepatophrenic recess



Perforation



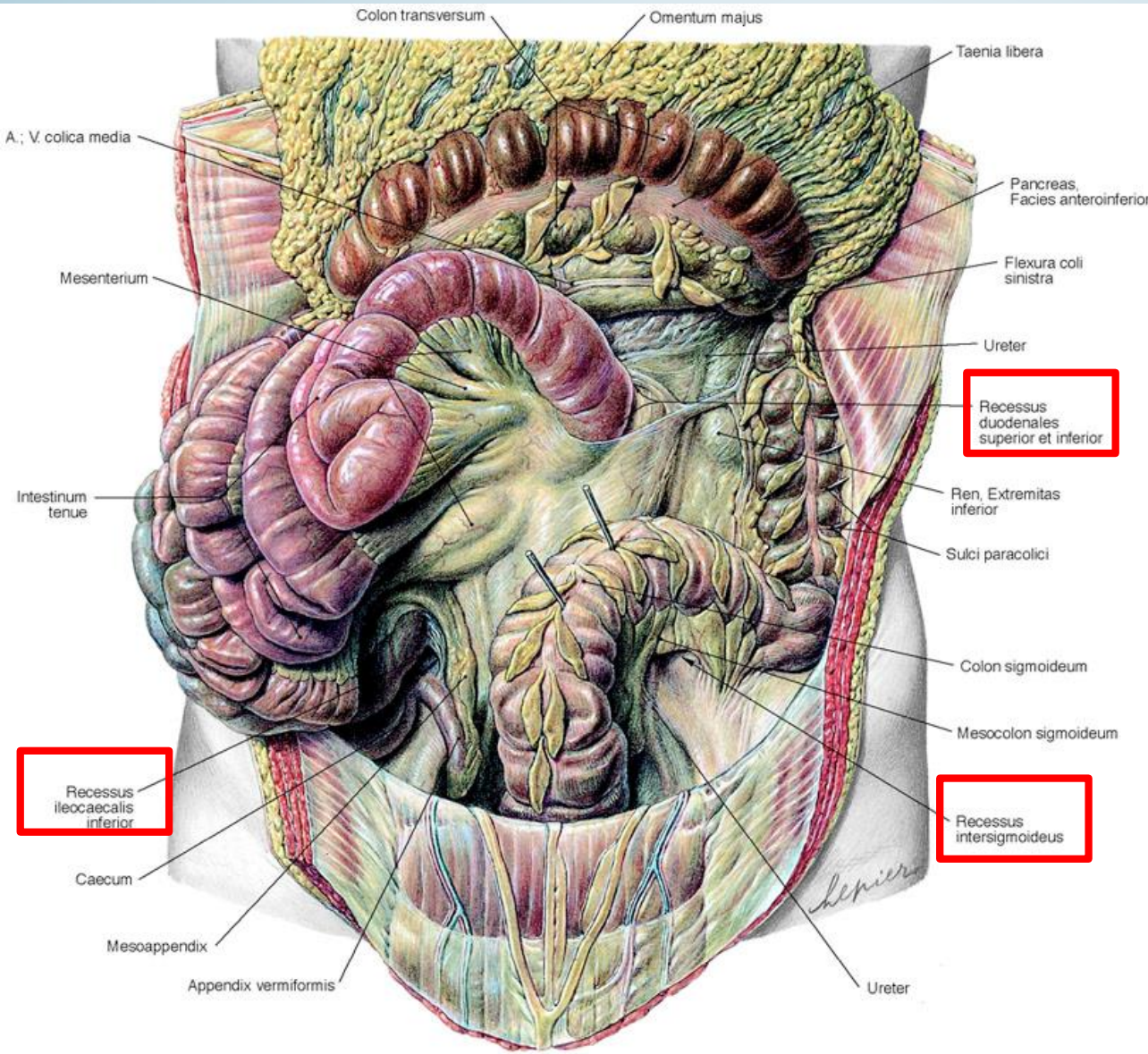


Peritoneal recesses



Their significance lies in the fact that they can rarely serve as internal hernias. Usually they occur where the peritoneal covering disappears or returns!

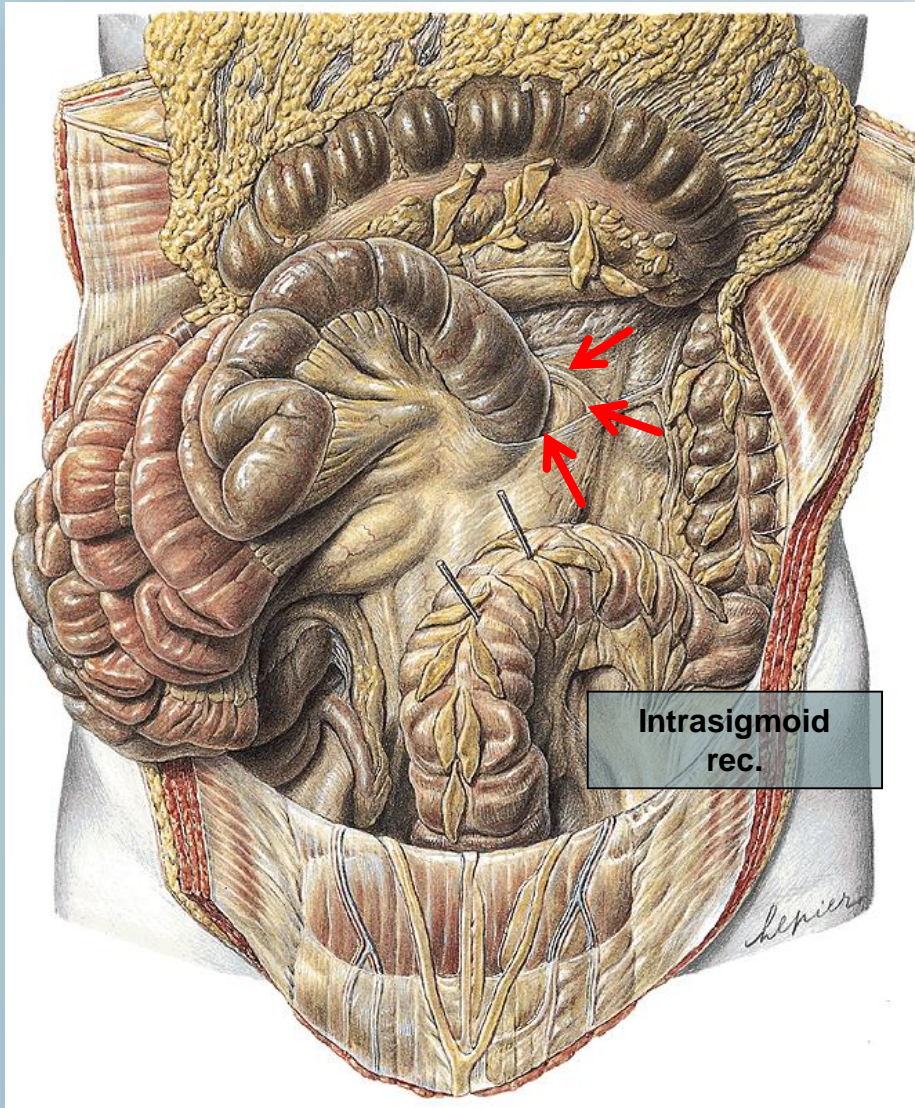
Peritoneal recesses



internal herniation

- Omental bursa
- Sup., inf. duodenal recesses
- Sup., inf. ileocecal recesses
- intersigmoid,...

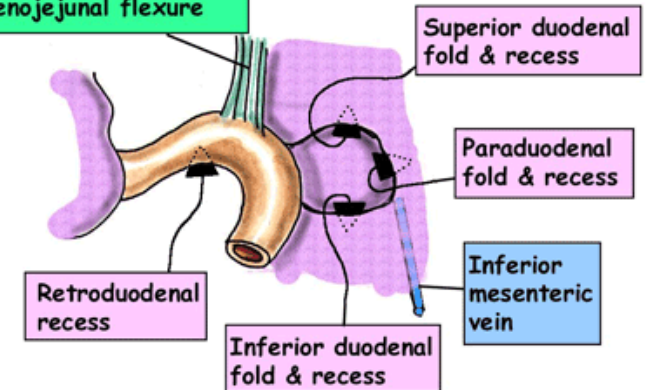
Peritoneal recesses



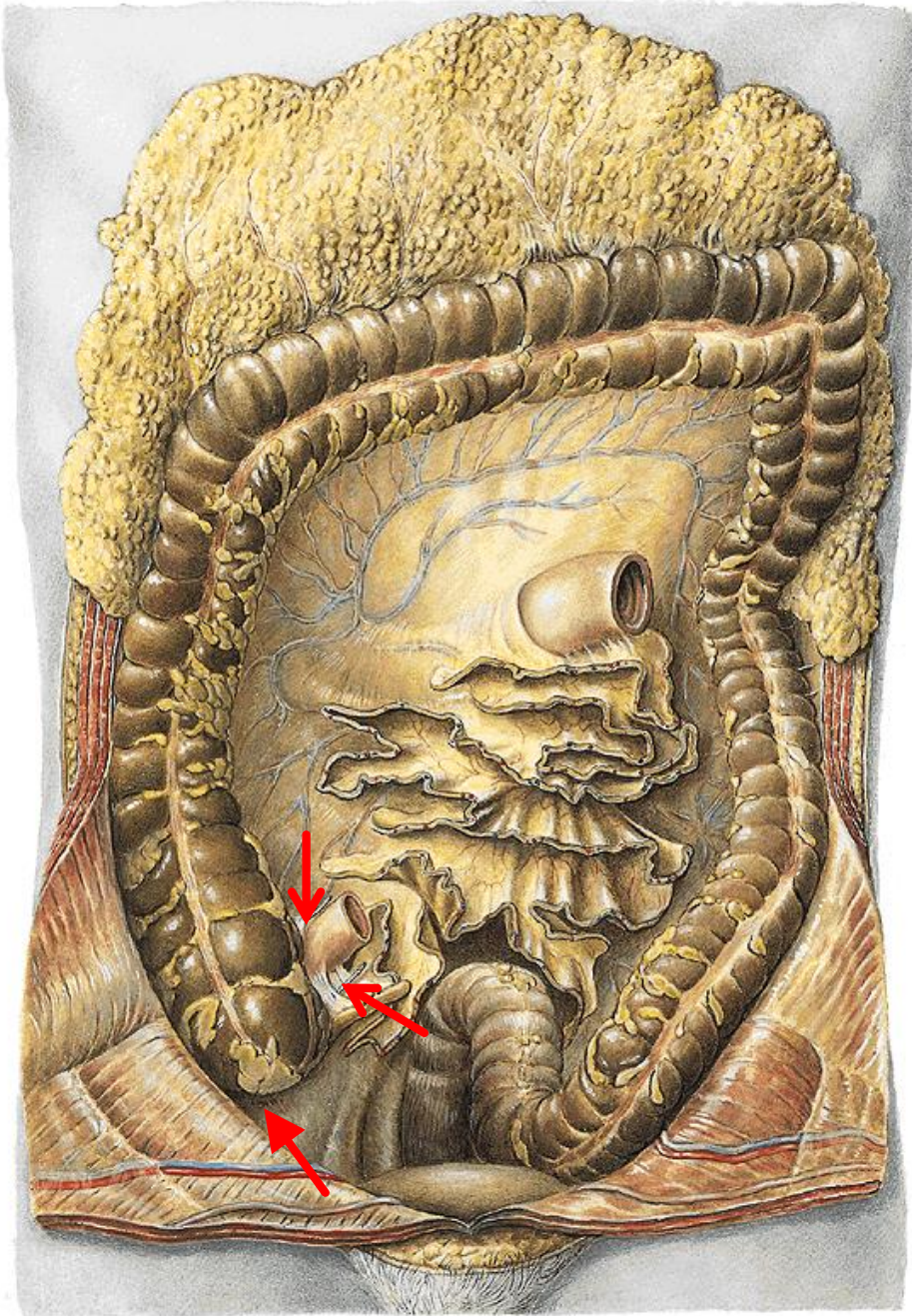
PERITONEAL RECESSES

There are a number of small recesses, as shown below, that are potential areas for internal herniation of bowel or other structures

Ligament of Treitz
Thin band of smooth muscle from right crus, passing anterior to aorta/renal vessels but behind pancreas, to blend with outer coat of duodenojejunal flexure

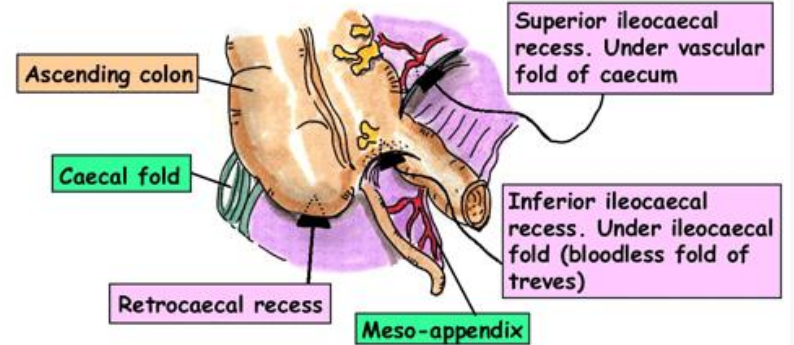


The arrows are pointing at the supra and infra duodenal recess and the paraduodenal recess.

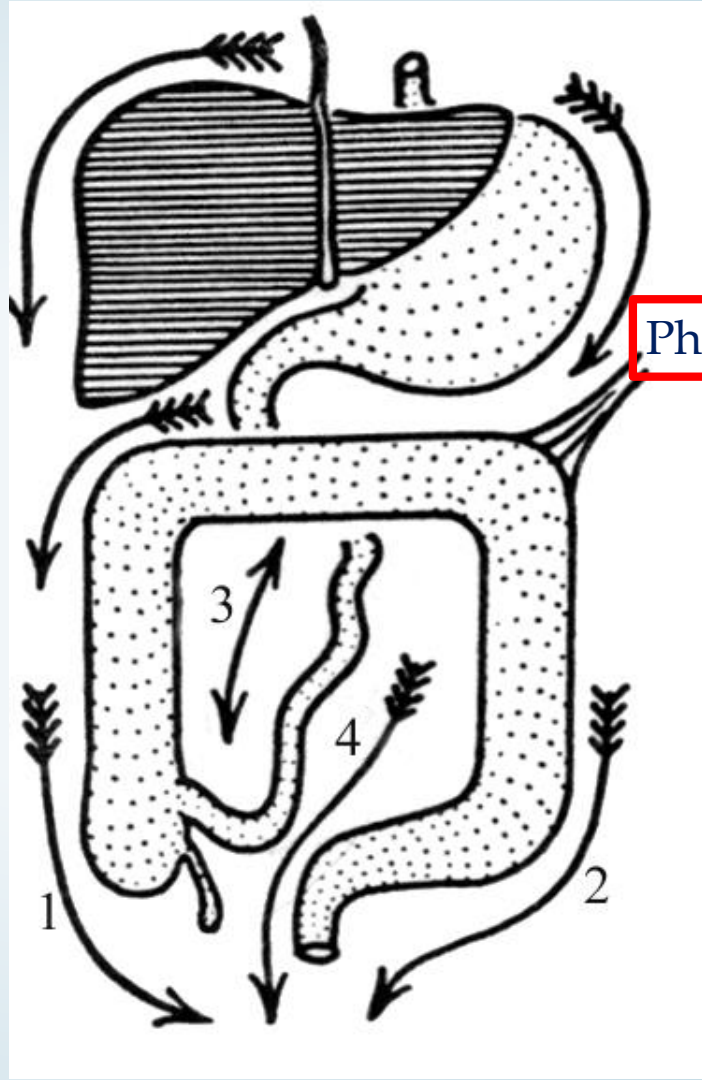
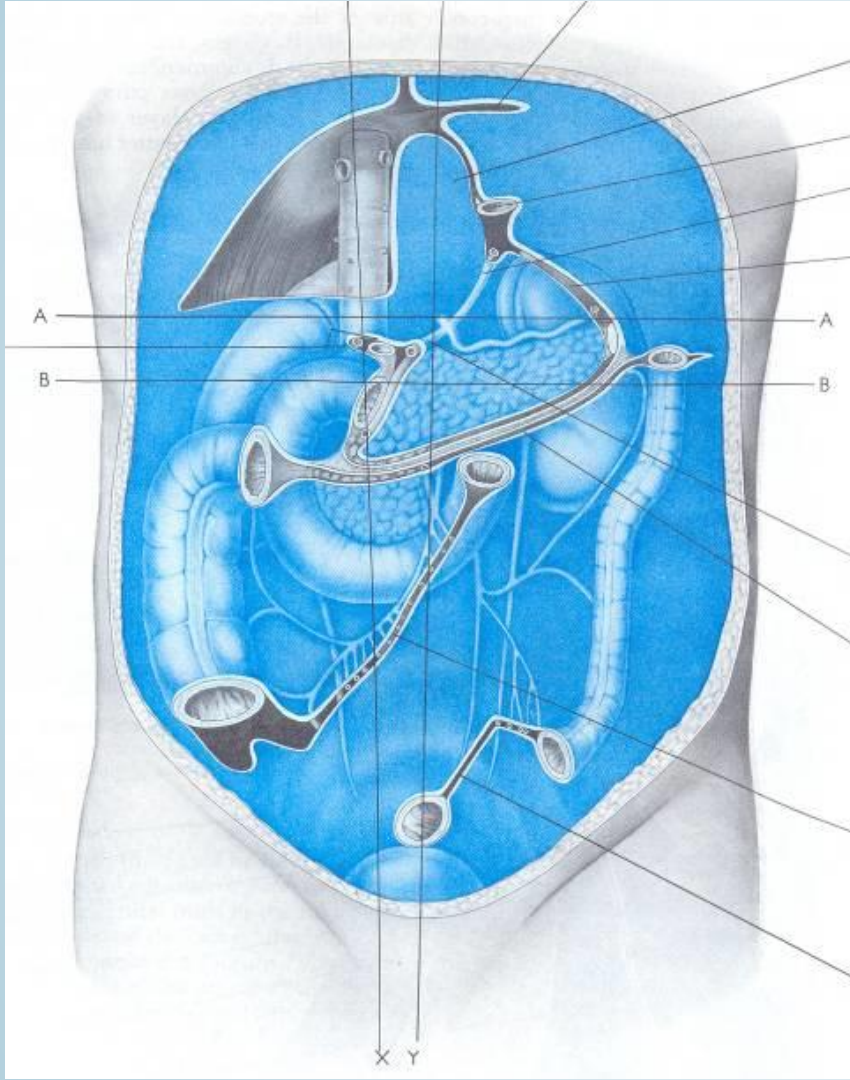


PERITONEAL RECESSES

There are a number of small recesses, as shown below, that are potential areas for internal herniation of bowel or other structures

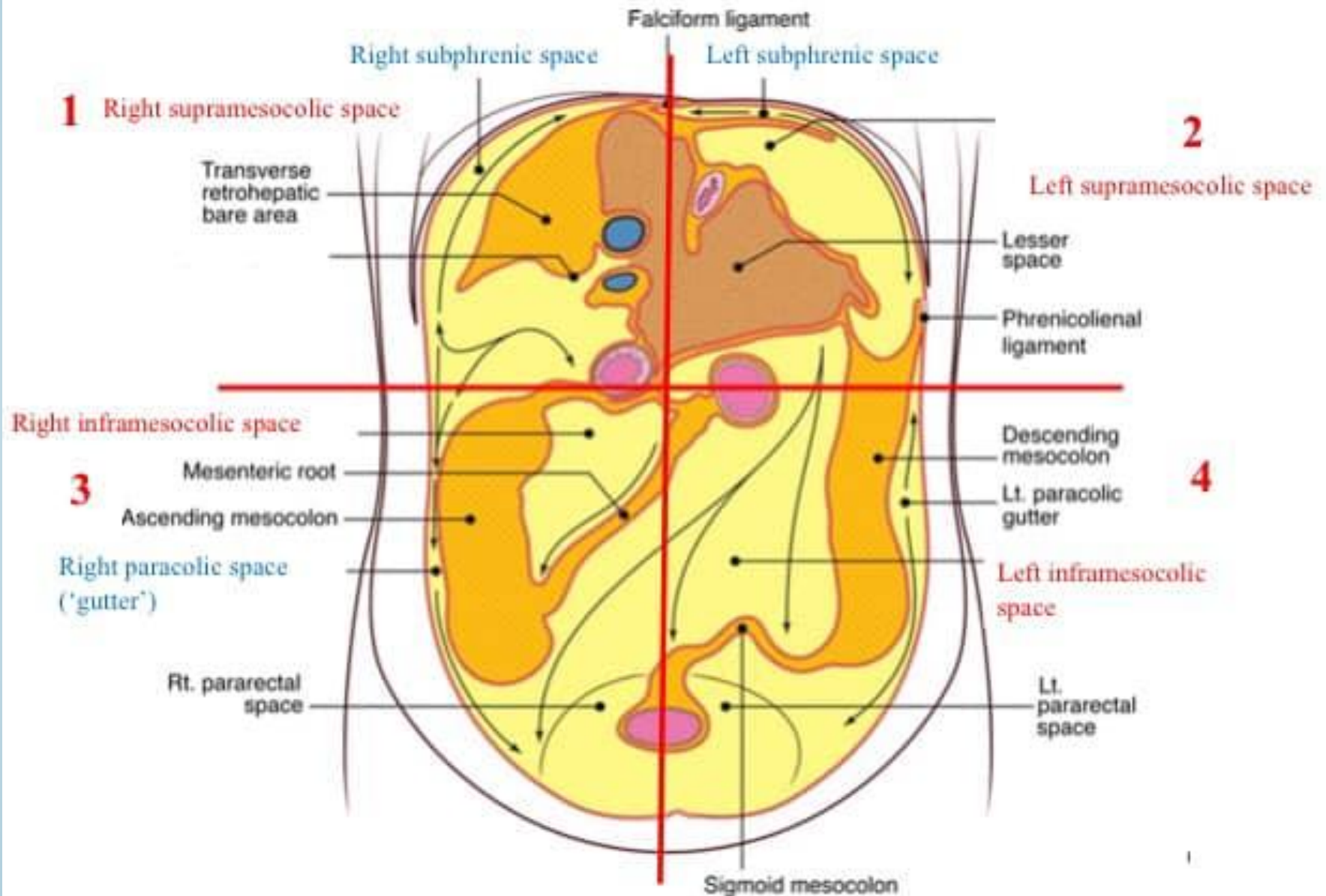


The arrows are pointing at the supra and infra ileocecal recesses and the retrocaecal recess.

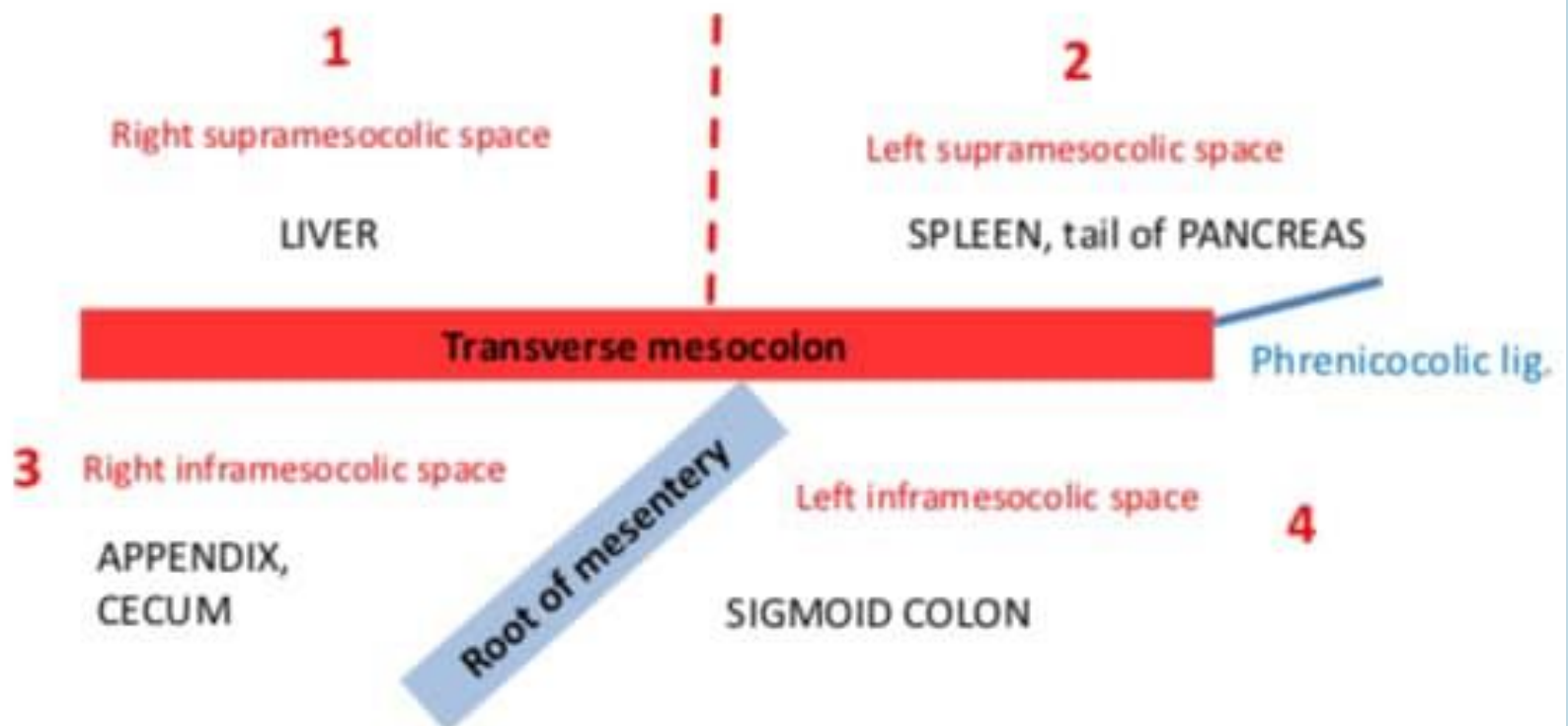


Phrenico-colic lig

Regions of the peritoneal cavity

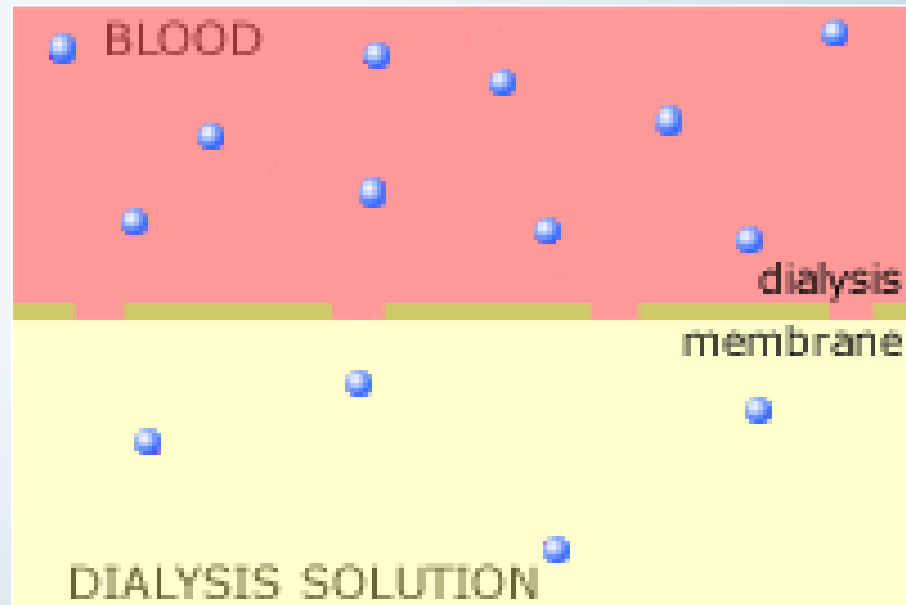
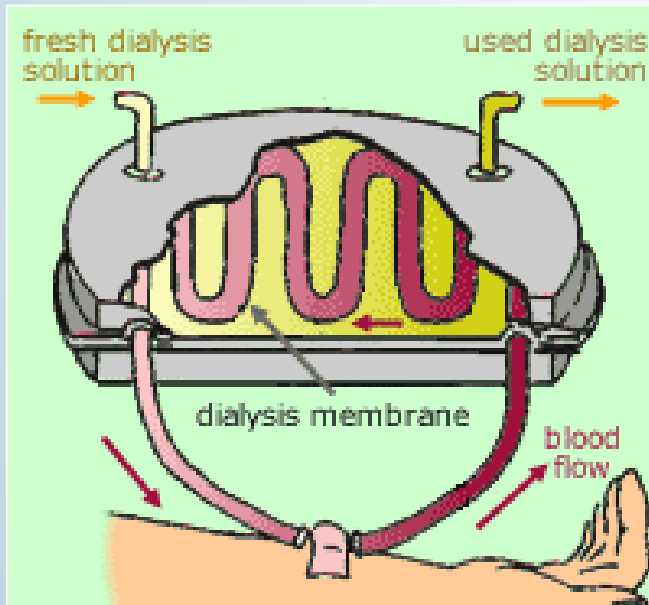


Regions of the peritoneal cavity



Peritoneal dialysis

- In the case of renal failure, certain substances are unable to pass through the kidneys, so they become enriched in the body (water, urea, creatinine, K^+ -ions, H^+ -ions, etc.)
- The purpose of the treatment is to remove these substances through a semi-permeable membrane using the concentration gradient as a driving force.



- The big idea is the richly veined peritoneum as a semi-permeable membrane. A method that can be used at home under certain conditions.
- A long-lasting cannula inserted into the abdominal cavity should be filled with 1-2 liters of dialysis solution and drained after half an hour.
- Usually more cycles are required

