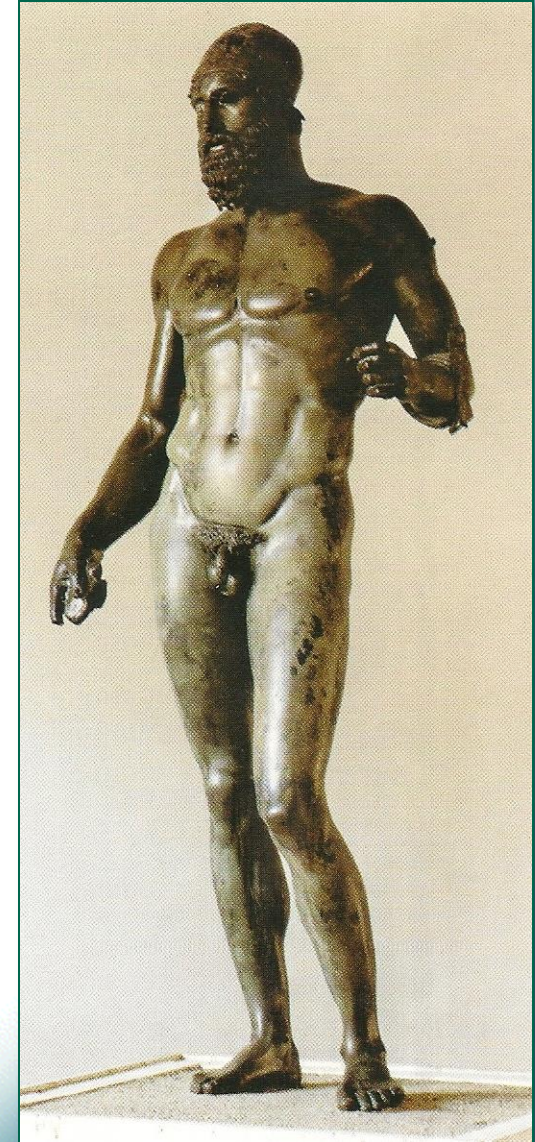


Abdomen

Abdomen

- ❖ The abdomen is the part of the trunk between the thorax and the pelvis.
- ❖ It is a flexible, dynamic container, housing most of the organs of the alimentary system and part of the urogenital system.

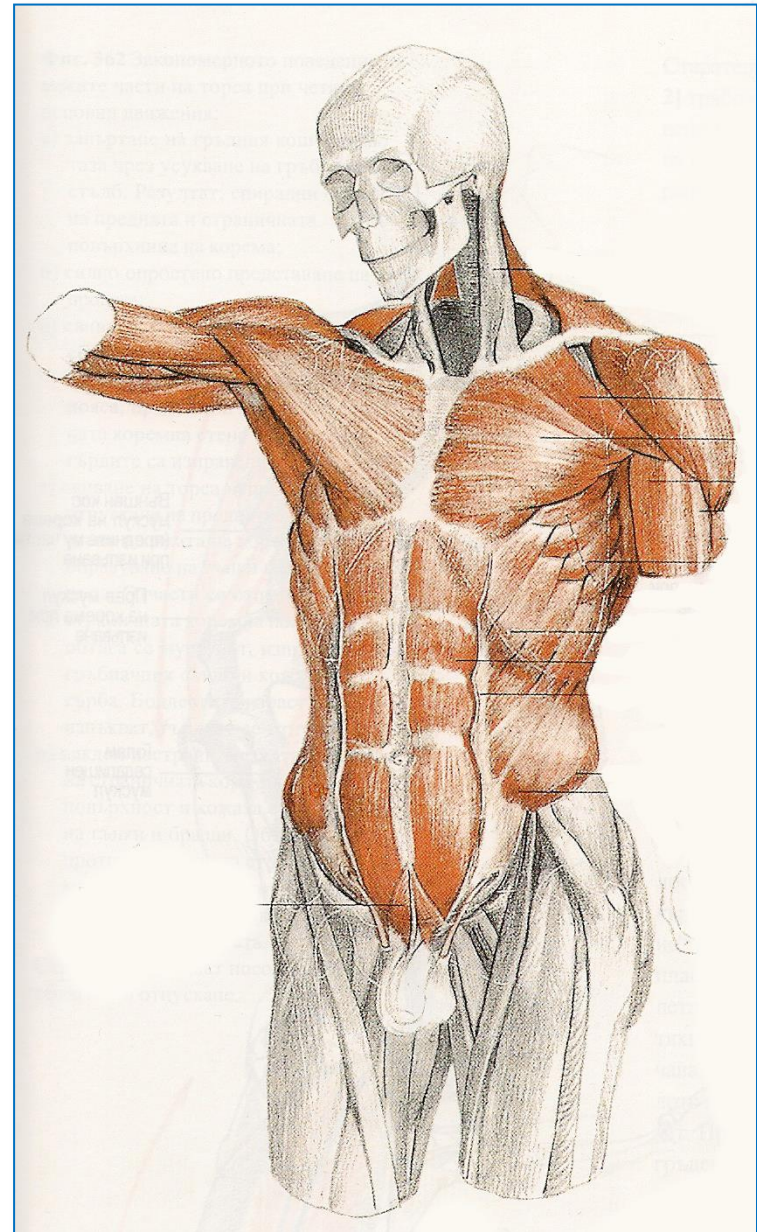
- ❖ The abdomen consists of:
 - abdominal walls
 - abdominal cavity
 - abdominal viscera



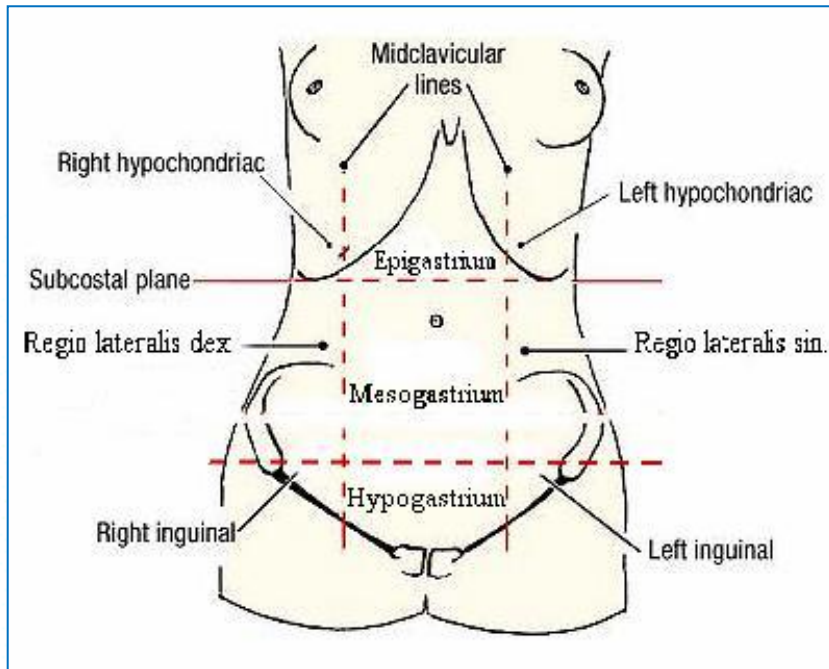
ABDOMINAL WALL

❖ Boundaries:

- Superior :
 - xiphoid proc.
 - costal arch
 - XII rib
- Inferior :
 - pubic symphysis
 - inguinal groove
 - iliac crest
- Lateral:
 - posterior axillary line



ABDOMINAL WALL



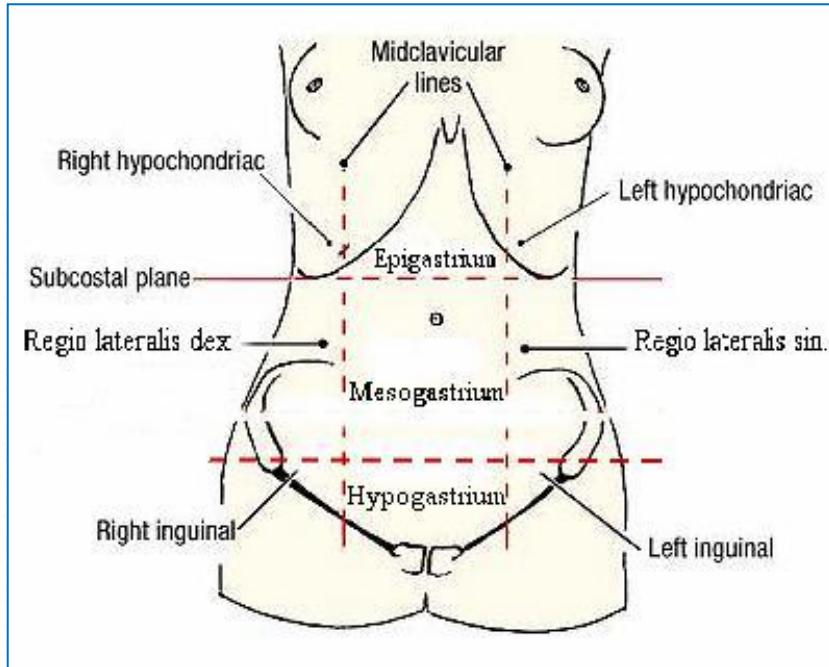
- ❖ The regional system divides the abdomen based on:
 - the subcostal plane
 - **linea bicostalis:** between X-th ribs
 - the transtubercular plane
 - **linea bispinalis:** between ASIS.

❖ **Epigastrium**

❖ **Mesogastrium**

❖ **Hypogastrium**

ABDOMINAL WALL



❖ The right and left midclavicular lines subdivide it into:

❖ **Epigastrium:**

- Epigastric region
- Right hypochondric region
- Left hypochondric region

❖ **Mesogastrium:**

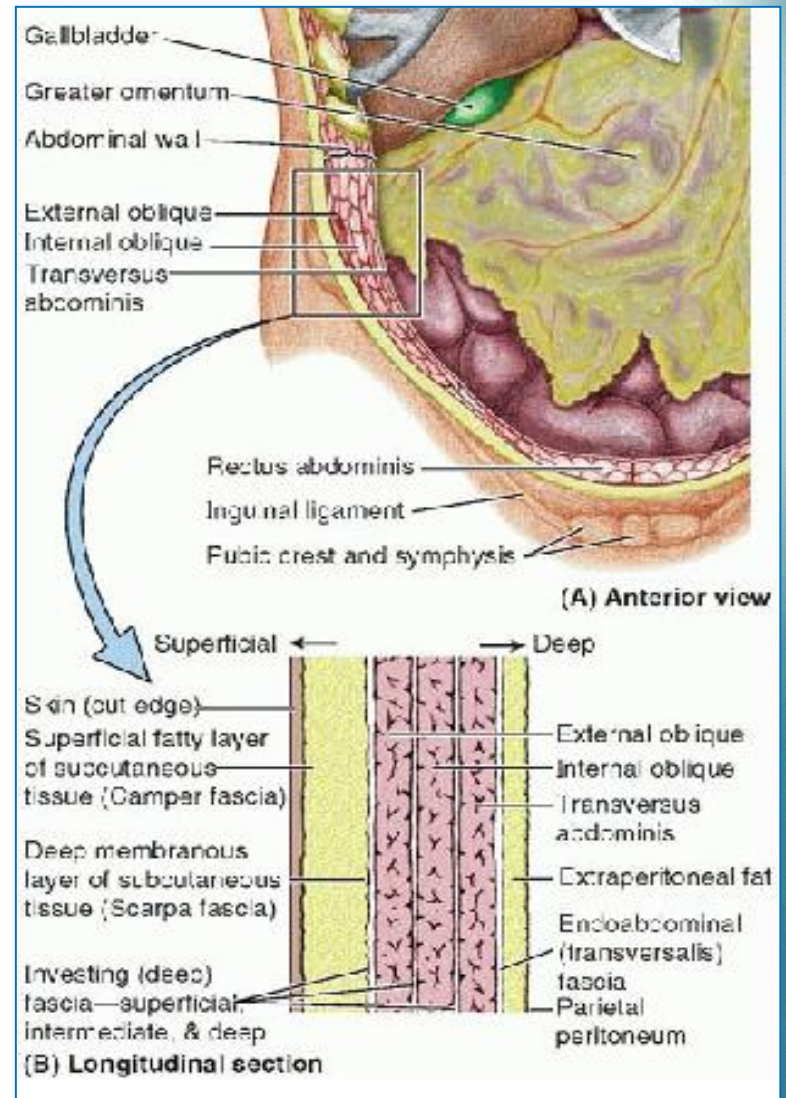
- Umbilical region
- Regio lateralis dex.
- Regio lateralis sin.

❖ **Hypogastrium:**

- Pubic region
- Right inguinal region
- Left inguinal region

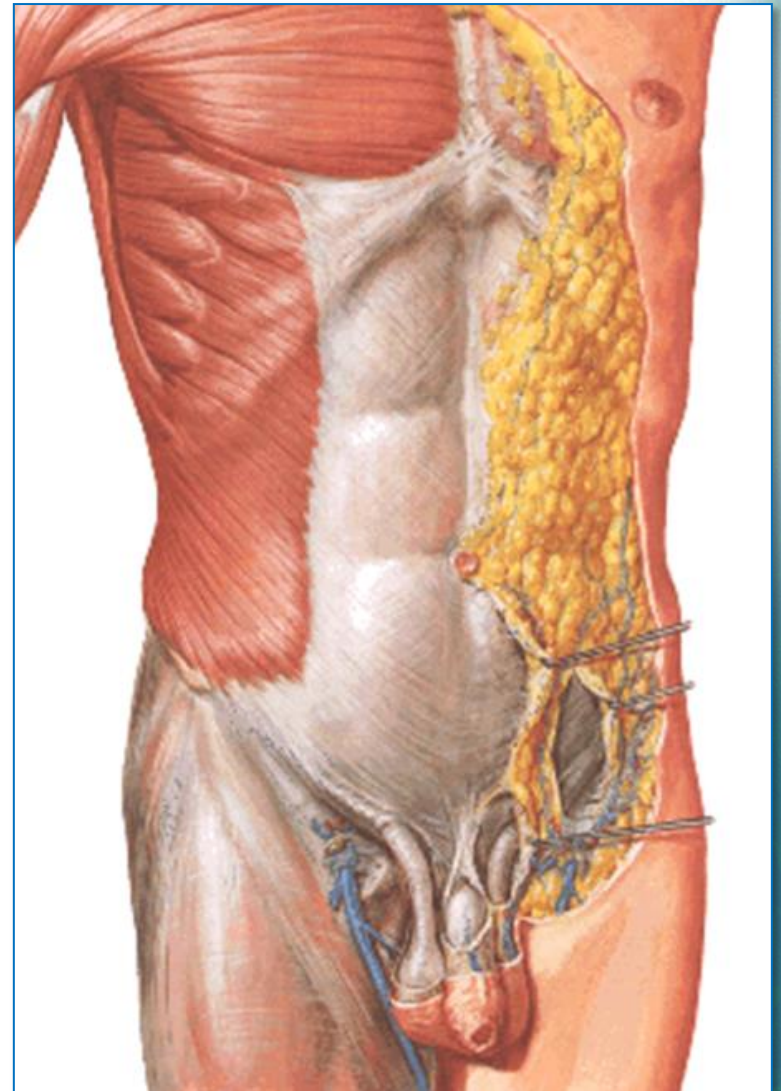
Organization of the layers

- ❖ Skin
- ❖ Subcutaneous tissue
- ❖ superficial fatty layer - Camper's fascia
- ❖ deep membranous layer - Scarpa's fascia
- ❖ Muscles
- ❖ Transversalis fascia
- ❖ Extraperitoneal fat
- ❖ Parietal peritoneum



Organization of the layers

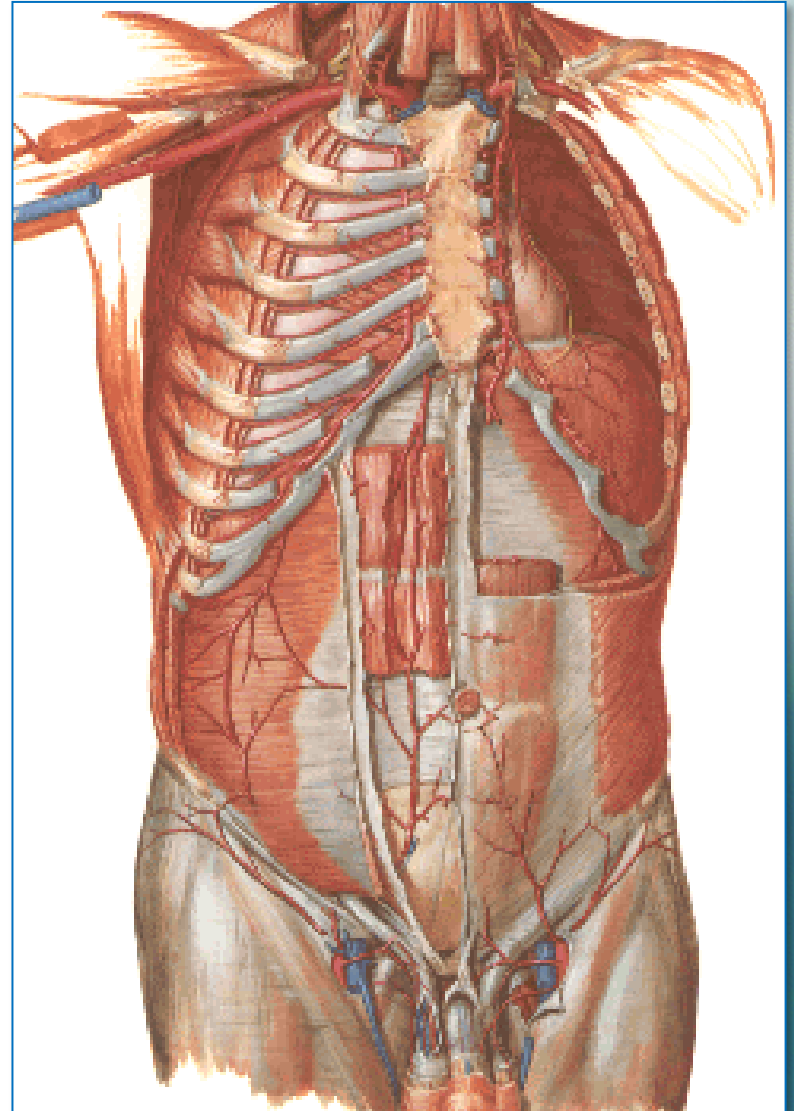
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- ❖ Extraperitoneal fat
- ❖ Parietal peritoneum



Superficial structures

❖ Arteries:

- Superficial epigastric a.
- Superficial circumflex iliac a.
- External pudendal a.



Superficial structures

❖ Veins:

➤ In the upper abdomen:

- Thoracoepigastric v.

➤ In the lower abdomen:

- Superficial epigastric v.

- Superficial circumflex iliac v.

- External pudendal v.

➤ Around the umbilicus:

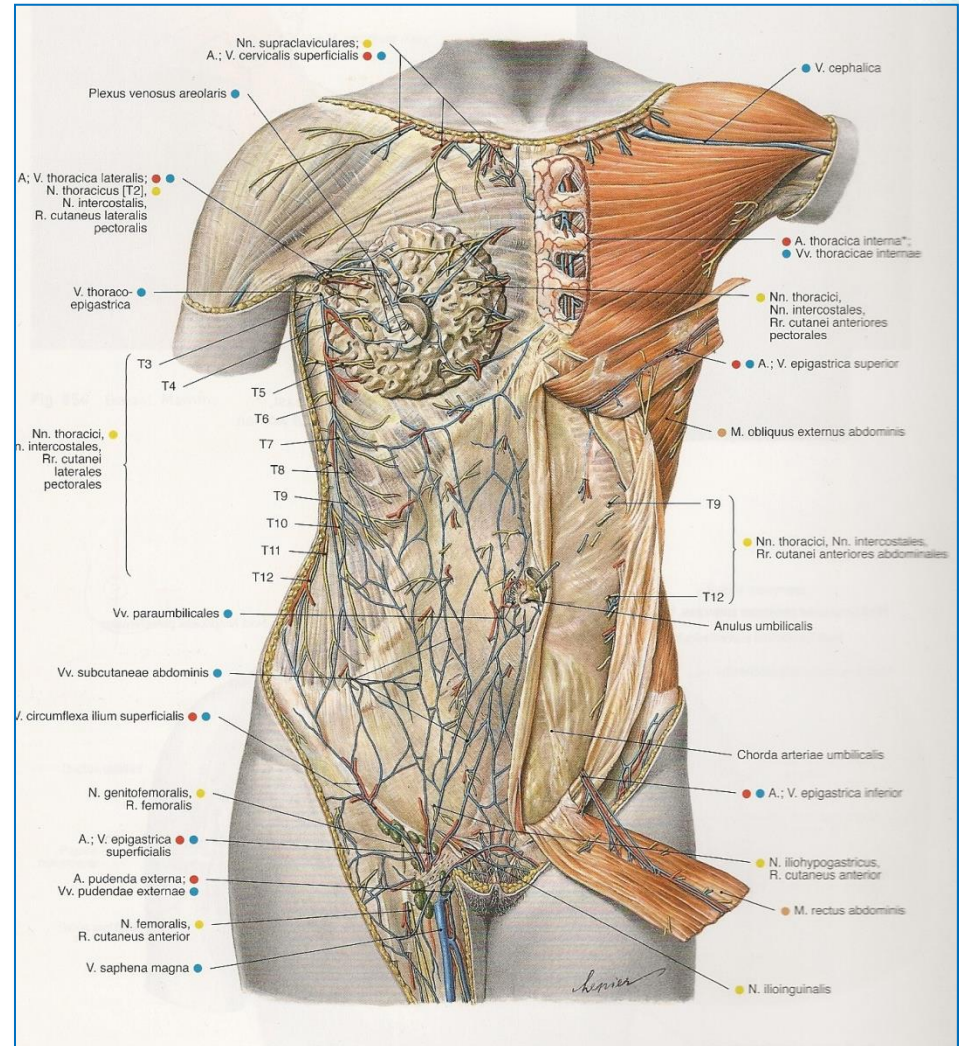
- Parumbilical veins

• Deep veins:

- Intercostal vv.

- Superior epigastric v.

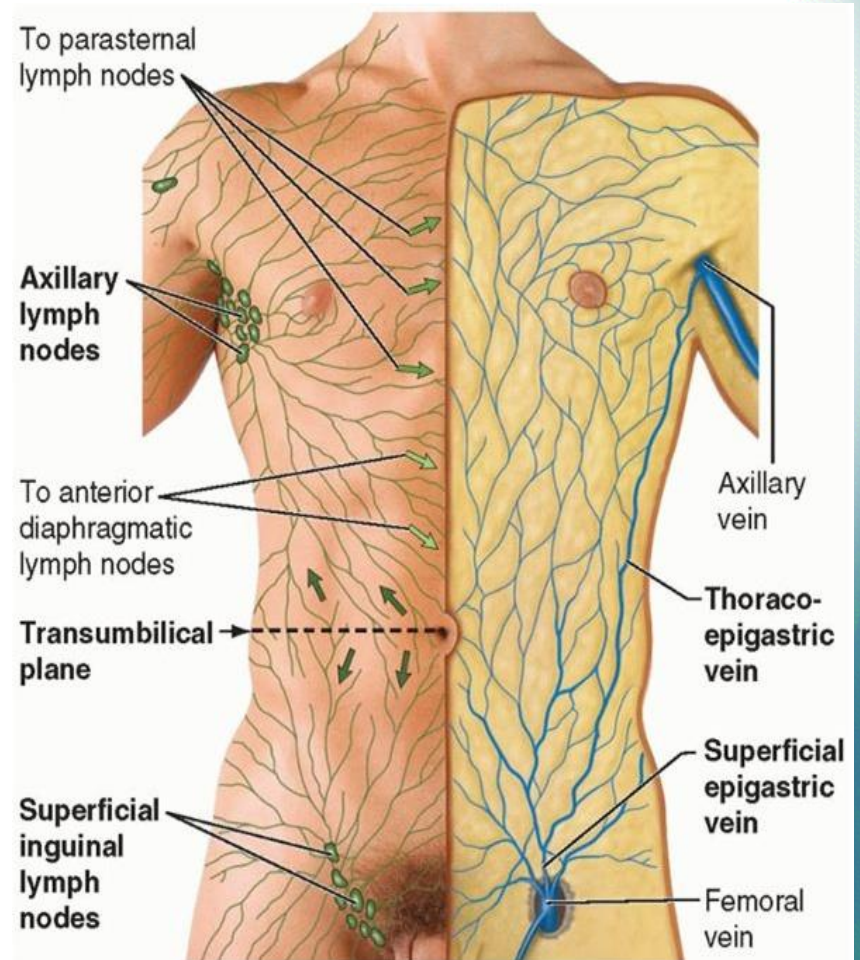
- Inferior epigastric v.



Superficial structures

❖ Veins:

- In the upper abdomen:
 - Thoracoepigastric v.
- In the lower abdomen:
 - Superficial epigastric v.
 - Superficial circumflex iliac v.
 - External pudendal v.
- Around the umbilicus:
 - Parumbilical veins
- Deep veins:
 - Intercostal vv.
 - Superior epigastric v.
 - Inferior epigastric v.



Superficial structures

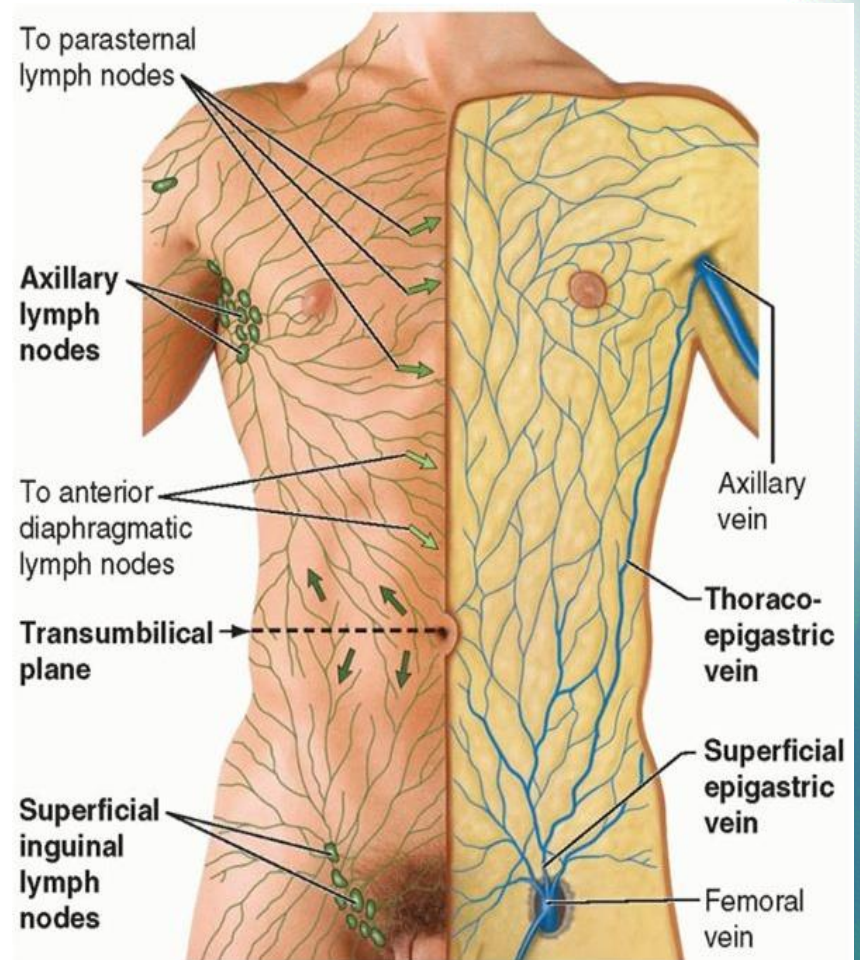
❖ Lymphatic drainage

➤ From the upper abdominal half to:

- Axillary lymph nodes

➤ From the lower abdominal half to :

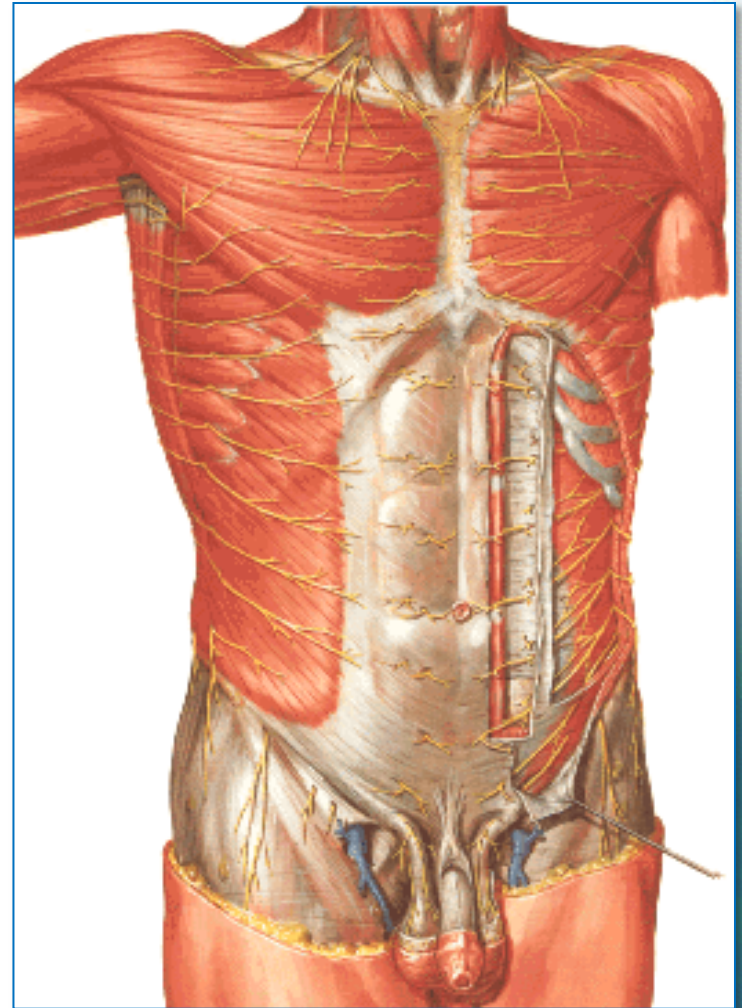
- Superficial inguinal lymph nodes



Superficial structures

❖ Nerves:

- Intercostal nn. Th7 – Th11
- Subcostal n.Th12
- Branches of lumbal plexus Th12 – L4:
 - Iliohypogastric n.
 - Ilioinguinal n.
 - Genitofemoral n.



Anterolateral Abdominal Wall

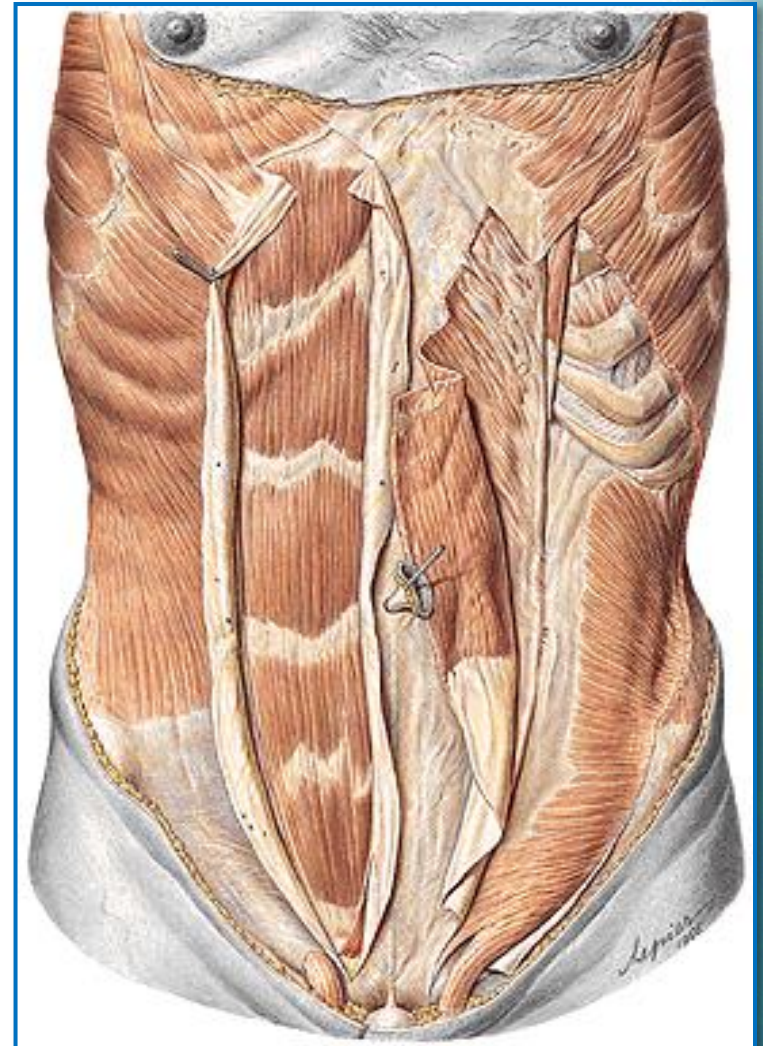
❖ There are five (bilaterally paired) muscles in the anterolateral abdominal wall:

three flat muscles -

- **external oblique,**
- **internal oblique,** and
- **transversus abdominis**

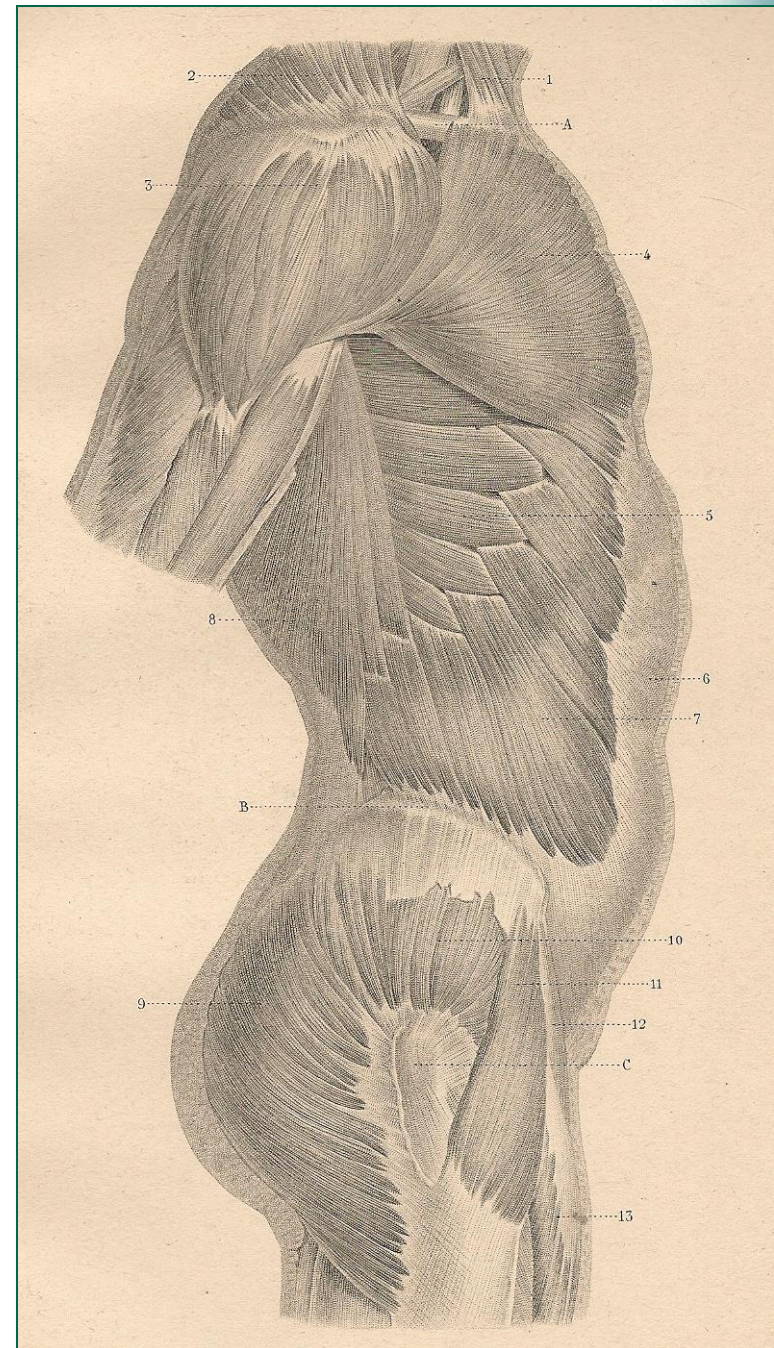
two vertical muscles –

- **rectus abdominis** and
- **pyramidalis**



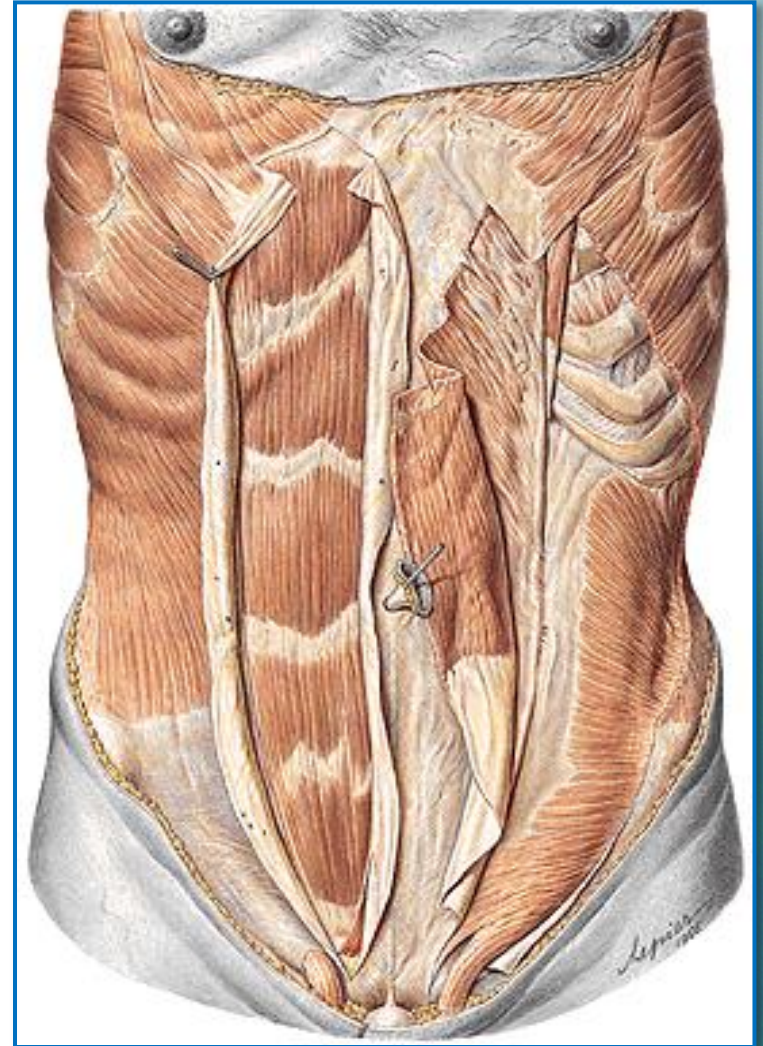
❖ The **external oblique muscle**

- ✓ Is the largest and most superficial
- ✓ The proximal attachments are the external surfaces of ribs 5 to 12.
- ✓ The distal attachments are the linea alba, pubic tubercle, and anterior half of the iliac crest.
- ✓ the **inguinal ligament** is the inferior border of the aponeurosis of the external oblique muscle.



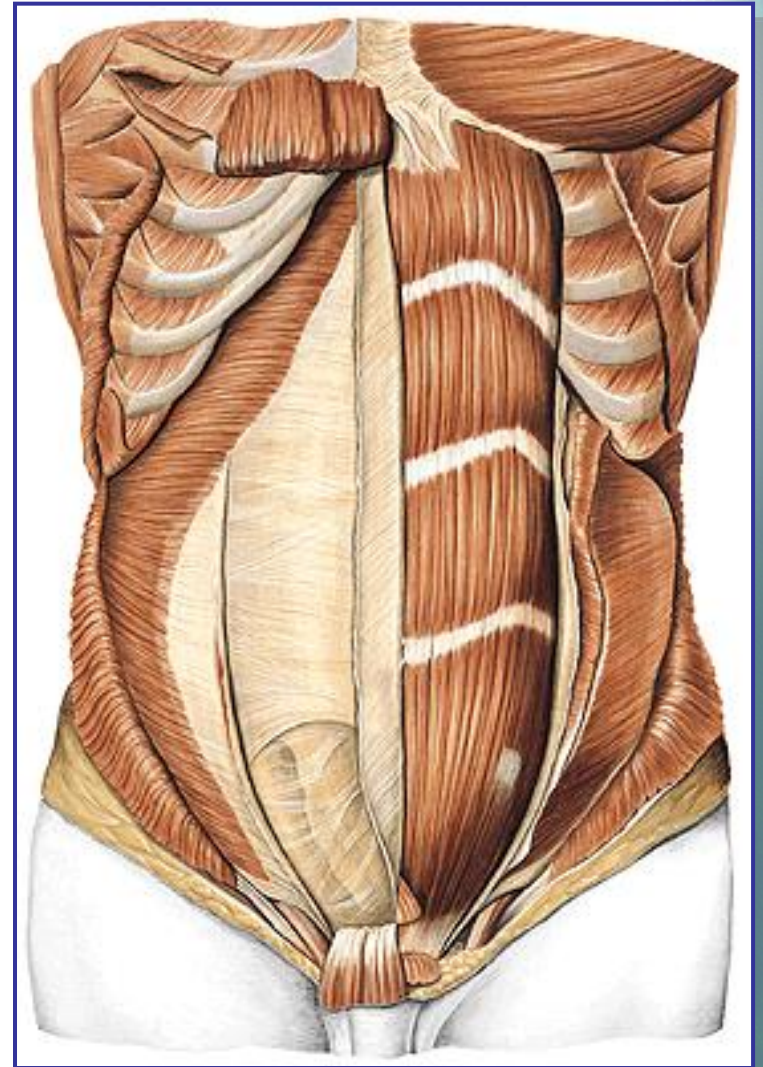
❖ The **internal oblique muscle**

- ✓ Is the intermediate of the three flat abdominal muscles
- ✓ The proximal attachments are thoracolumbar fascia, anterior two thirds of iliac crest
- ✓ The distal attachments are inferior borders of 10th-12th ribs, linea alba
- ✓ its fleshy fibers run perpendicular to those of the external oblique.



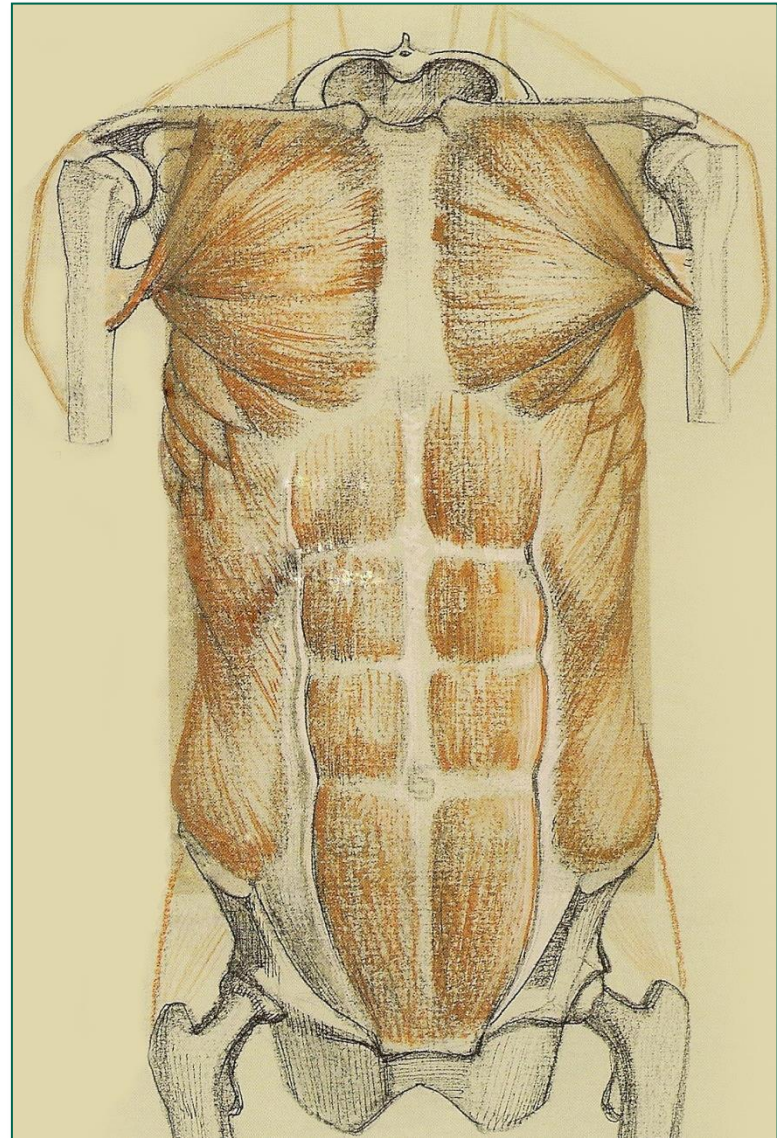
❖ The **transversus abdominis**

- ❖ Is the innermost of the three flat abdominal muscles
- ✓ The proximal attachments are internal surfaces of 7th-12th costal cartilages, thoracolumbar fascia, iliac crest
- ✓ The distal attachments are linea alba with aponeurosis of internal oblique, pubic crest
- ✓ run more or less transversally.



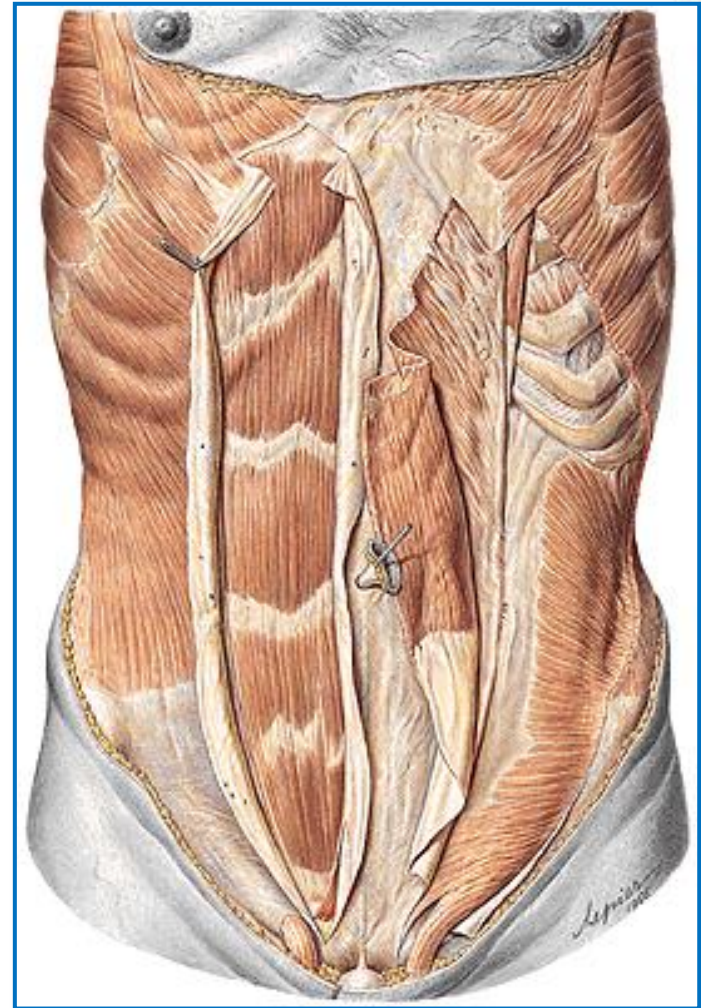
Rectus abdominis m.

- ❖ long, broad, strap-like muscle
- ❖ is the principal vertical muscle
- ❖ Origin:
 - xiphoid process and 5th-7th costal cartilages
- ❖ Insertion:
 - pubic symphysis, pubic crest



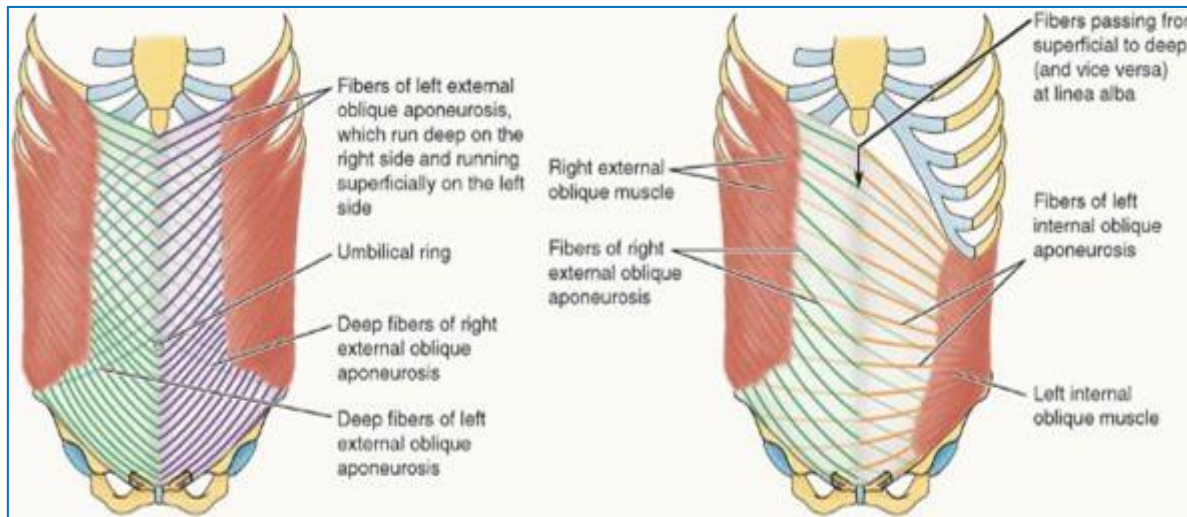
Rectus abdominis m.

- ❖ The rectus muscle is divided into 4-5 bellies by **tendinous intersections**:
 - at the level of the xiphoid process, umbilicus, and halfway between these structures.
- ❖ The rectus muscle is anchored transversely by attachment to the anterior layer of the rectus sheath at these intersections.
- ❖ The **pyramidalis** is a small, insignificant triangular muscle that is absent in approximately 20% of people.



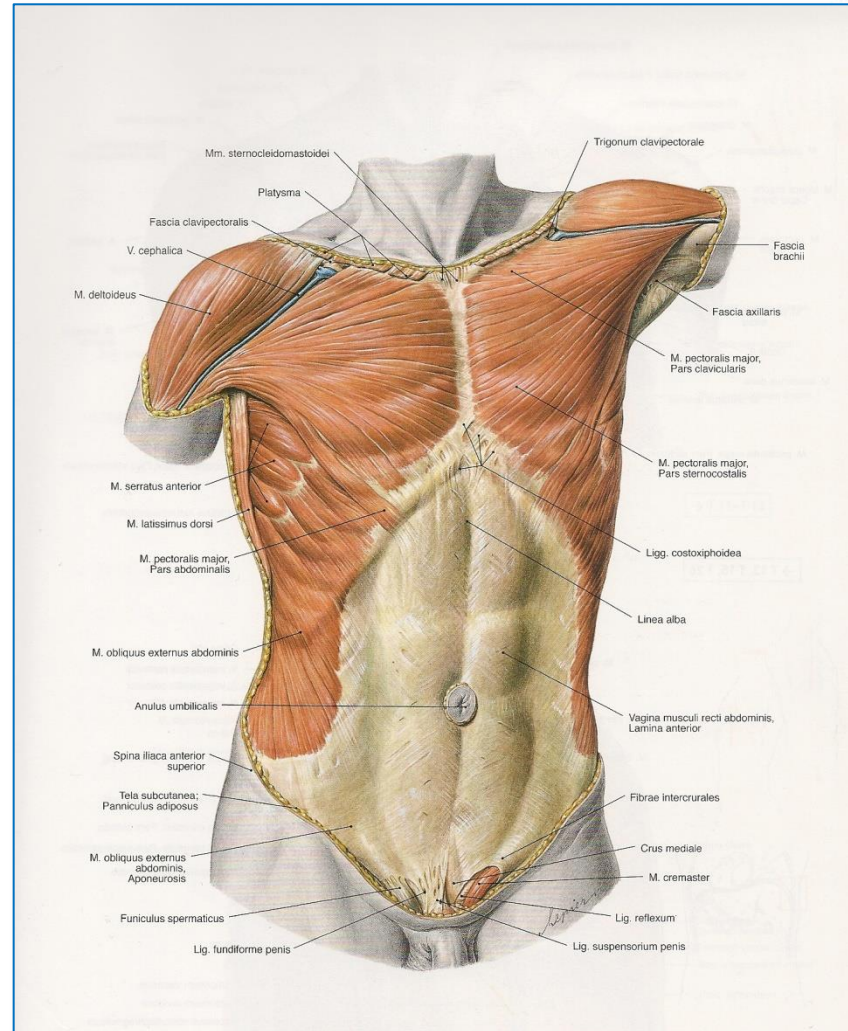
Functions and actions of anterolateral abdominal muscles

- Move the trunk and help to maintain posture (resisting lumbar lordosis).
- The rectus abdominis is a powerful flexor
- Support the abdominal viscera and protect them from most injuries.
- Compress the abdominal contents to maintain or increase the intra-abdominal pressure
- Produce the force required for defecation (discharge of feces), micturition (urination), vomiting, and parturition (childbirth).

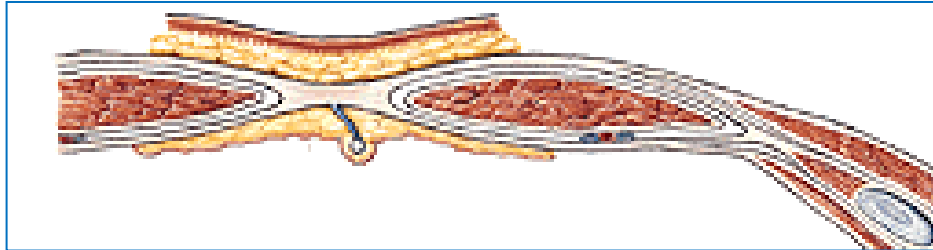


Rectus sheath (vagina m. recti abdominis)

- ❖ Strong, incomplete fibrous compartment of the rectus abdominis and pyramidalis muscles.
- ❖ It is formed by the decussation and interweaving of the aponeuroses of the flat abdominal muscles.



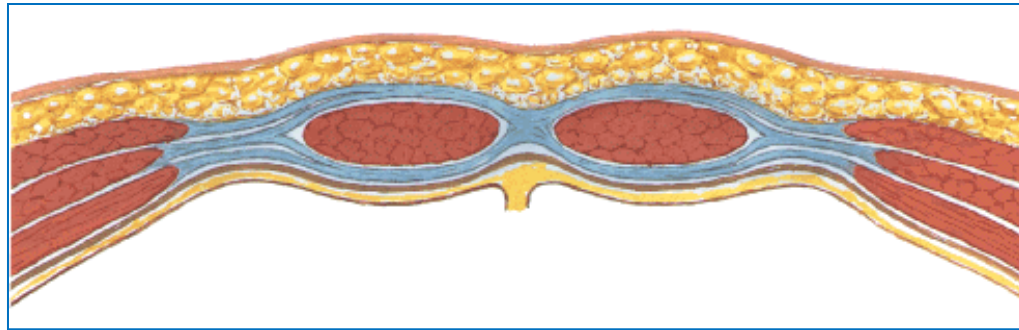
Rectus sheath (vagina m. recti abdominis)



❖ **First part:**

- ✓ between V-th rib and costal arch
- ✓ Only anterior wall of the sheath:
 - the external oblique aponeurosis contributes to it.

Rectus sheath (vagina m. recti abdominis)



❖ **Second part:**

✓ between the costal arch and two fingers below the umbilicus.

✓ Two laminae exist:

• **Anterior lamina:**

the external oblique aponeurosis

+ **one half of the** internal oblique aponeurosis

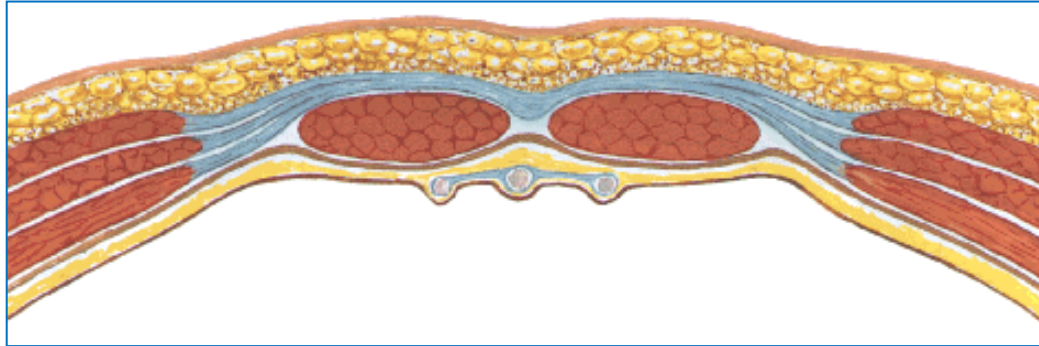
• **Posterior lamina:**

one half of the internal oblique aponeurosis

+ **aponeurosis of the transversus abdominis**

A crescentic **arcuate line** demarcates the transition between second and third parts

Rectus sheath (vagina m. recti abdominis)

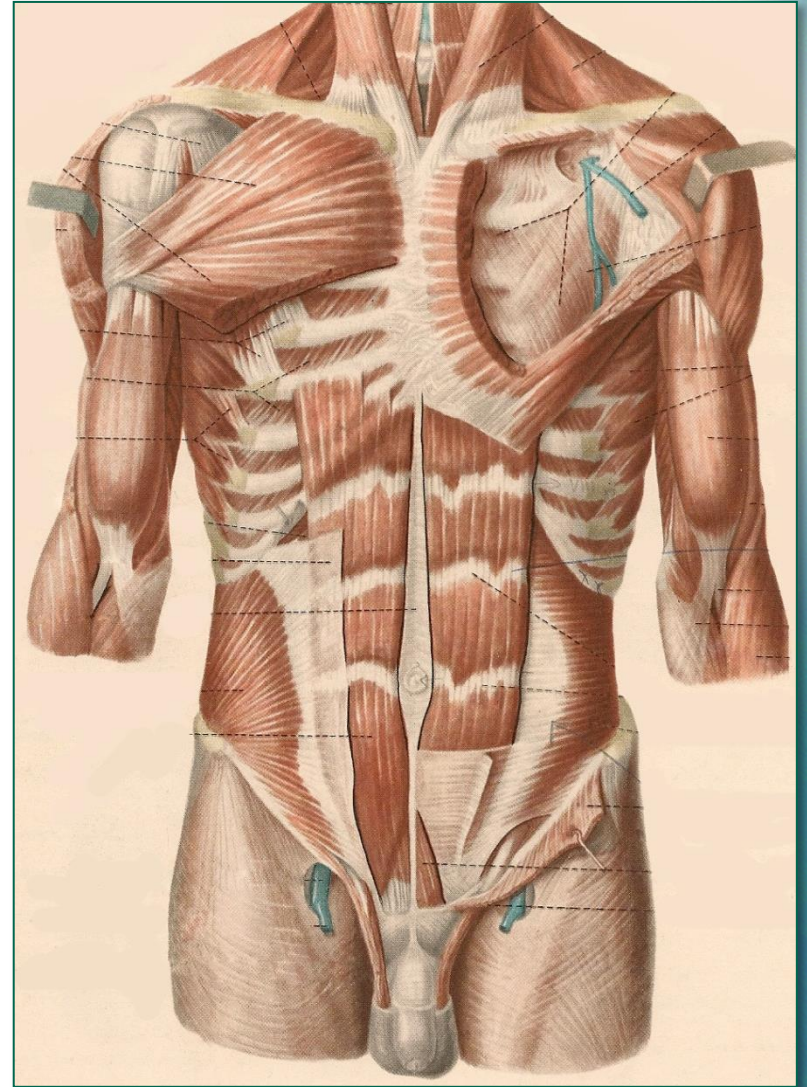


❖ **Third part:**

- ✓ below the arcuate line
- ✓ the aponeuroses of the three flat muscles pass anterior to the rectus abdominis to form the anterior layer
- ✓ the relatively thin fascia transversalis covers the rectus abdominis posteriorly
- ✓ parietal peritoneum

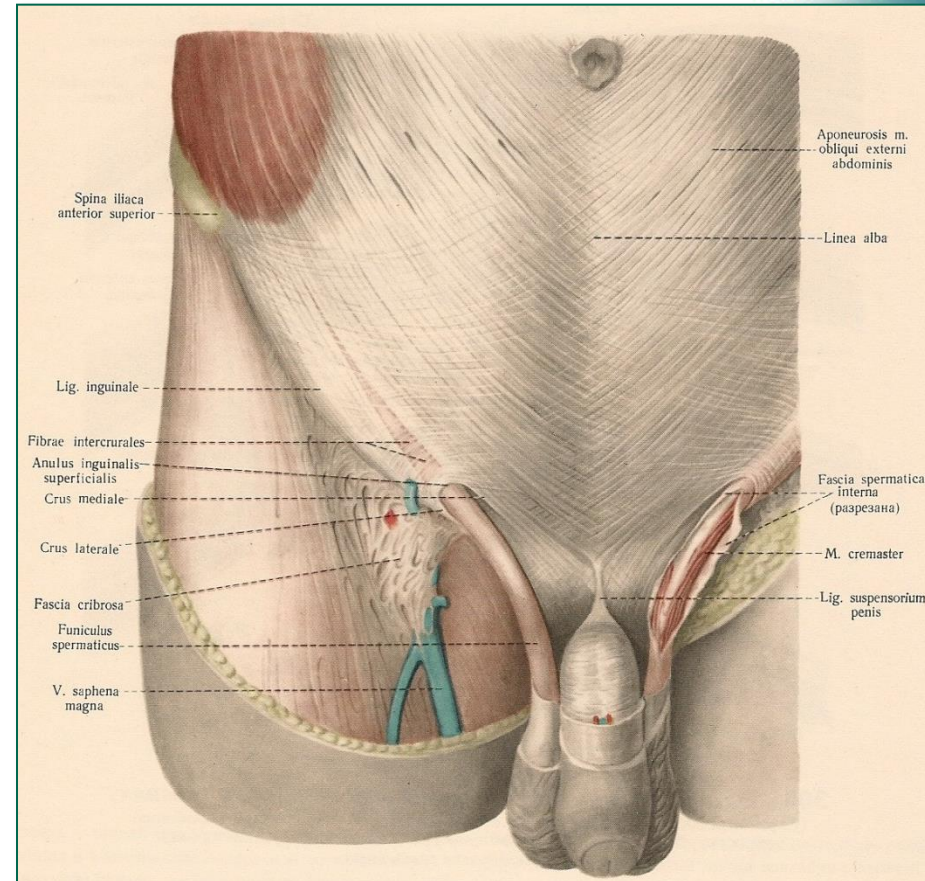
Linea alba

- ❖ Separates the bilateral rectus sheaths.
- ❖ All layers of the anterolateral abdominal wall fuse in the midline
- ❖ Between xiphoid process and pubic symphysis.
- ❖ the linea alba contains the **umbilical ring**.



Inguinal canal, canalis inguinalis

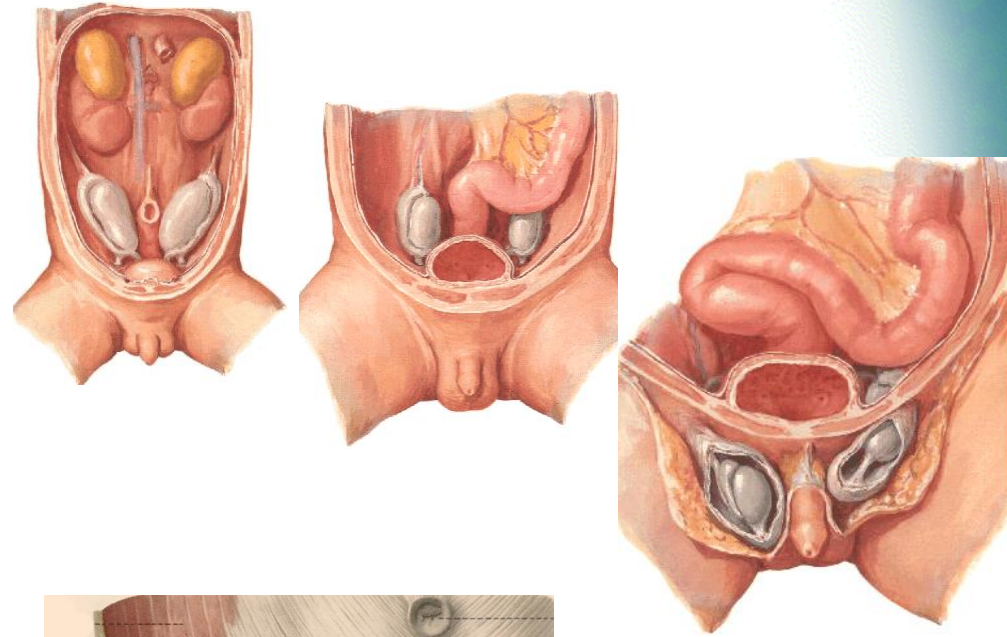
- ❖ It lies parallel and superior to the medial half of the inguinal ligament .
- ❖ The inguinal canal has an opening at each end:
 - the **deep** (internal) **inguinal ring** is the entrance
 - the **superficial** (external) **inguinal ring** is the exit.



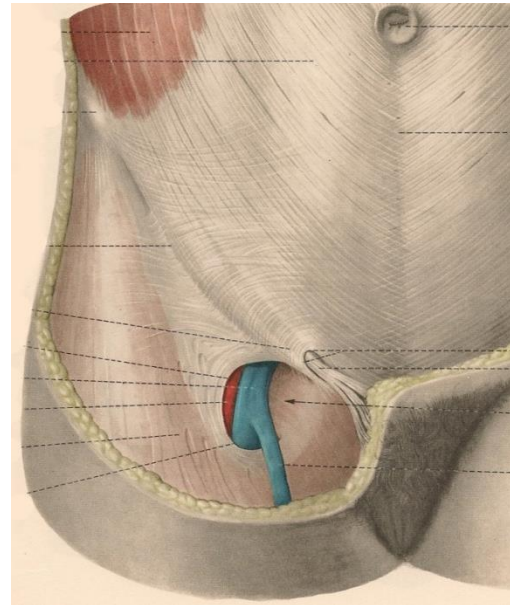
Inguinal canal, canalis inguinalis

- ❖ The main occupants of the inguinal canal are:
 - the spermatic cord (**funiculus spermaticus**) in males.

The inguinal canal is formed in relation to the relocation of the testis during fetal development.



- the round ligament of the uterus (**lig. teres uteri**) in females.
- Ilioinguinal n.



Inguinal canal, canalis inguinalis

❖ The inguinal canal has two walls (anterior and posterior), a roof, and a floor:

1. Anterior wall:

- external oblique aponeurosis

2. Posterior wall:

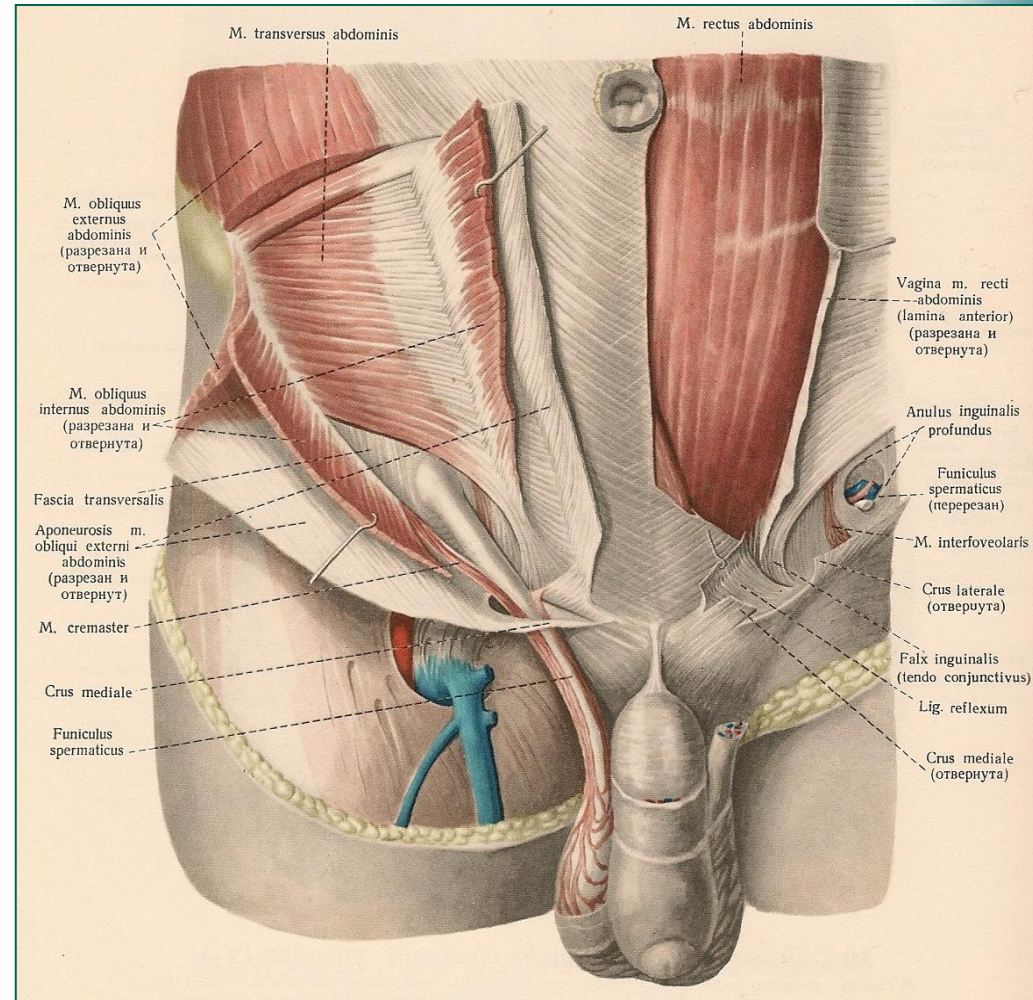
- fascia transversalis

3. Roof – formed by:

- arches of the internal oblique and transversus abdominis

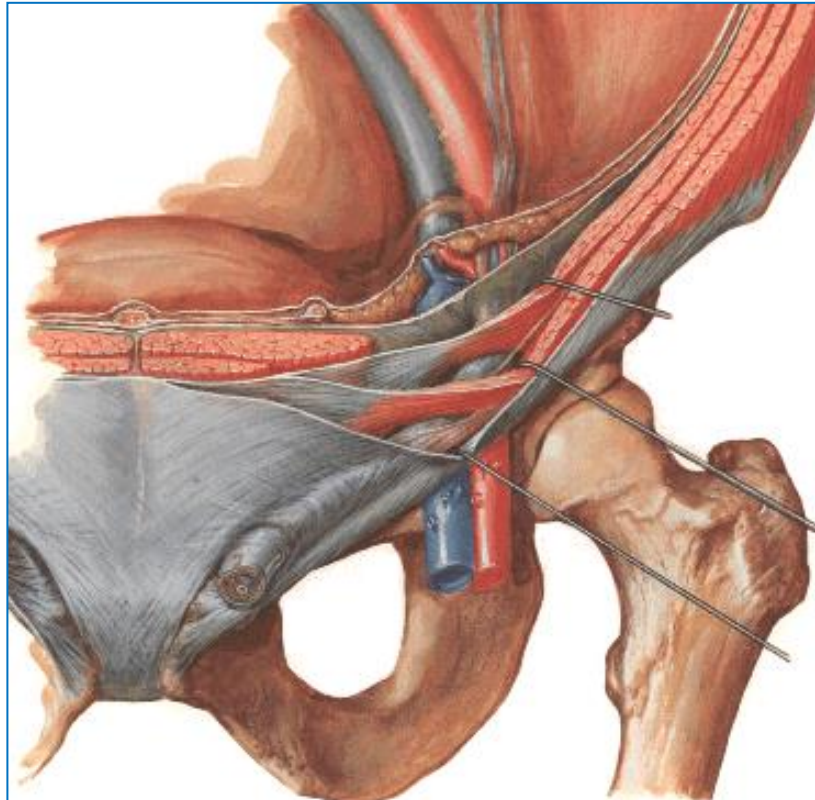
4. Floor:

- gutter formed by the inguinal ligament



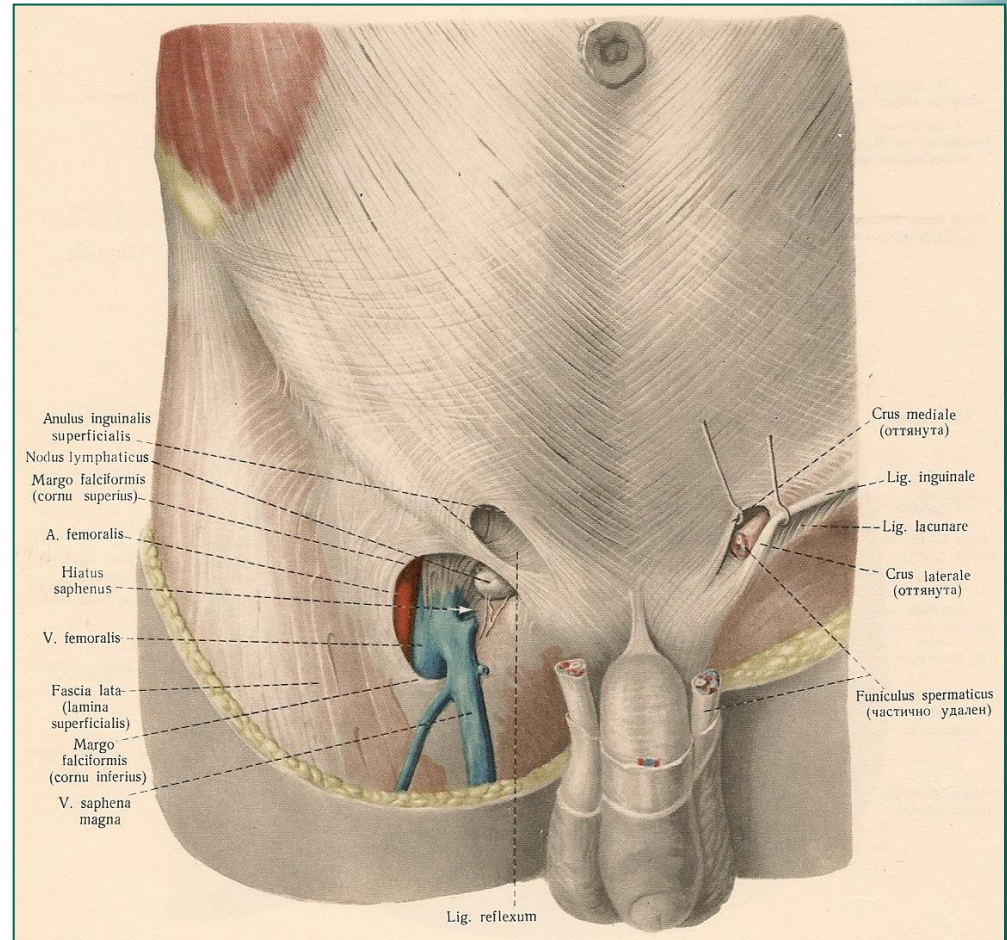
Inguinal canal, canalis inguinalis

- ❖ The inguinal canal has two openings:
 - Superficial - **anulus inguinalis superficialis**
 - Deep – **anulus inguinalis profundus**



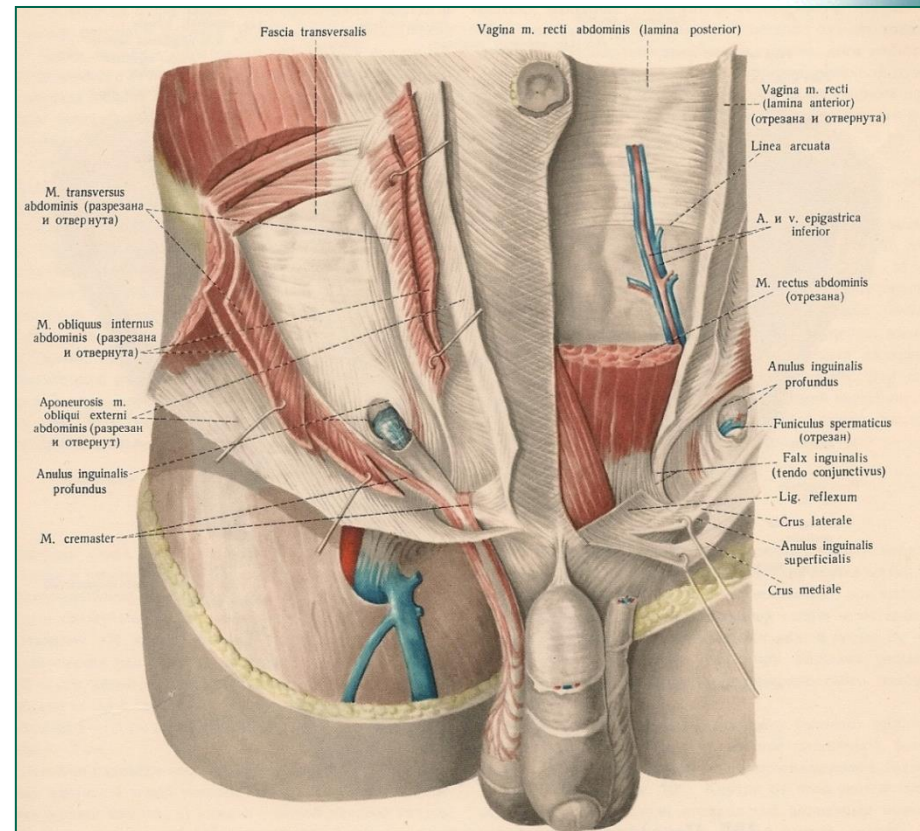
Inguinal canal, canalis inguinalis

- ❖ **Superficial inguinal ring**, anulus inguinalis superficialis
 - a split in the external oblique aponeurosis superolateral to the pubic tubercle.
 - It is surrounded by:
 - **medial crus**
 - **lateral crus**
 - **intercrural fibers** - superiorly



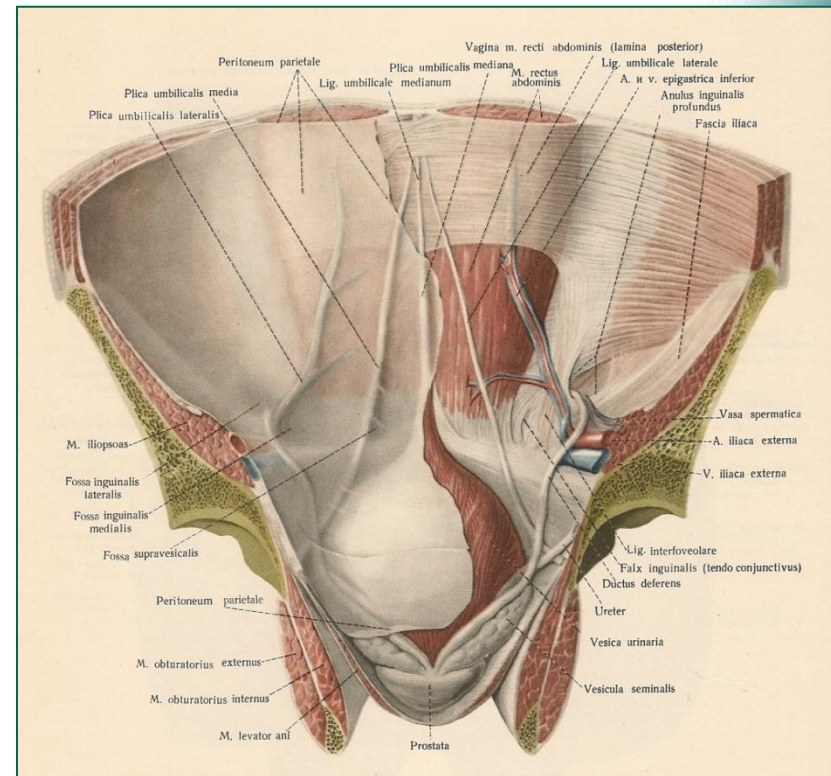
Inguinal canal, canalis inguinalis

- ❖ **Deep inguinal ring**, anulus inguinalis profundus
- It is located superior to the middle of the inguinal ligament and lateral to the inferior epigastric artery
- Through this opening, the ductus deferens (vas deferens) and testicular vessels in males pass to enter the inguinal canal.
- **Lateral inguinal fossa** – shallow pit over the deep ring.



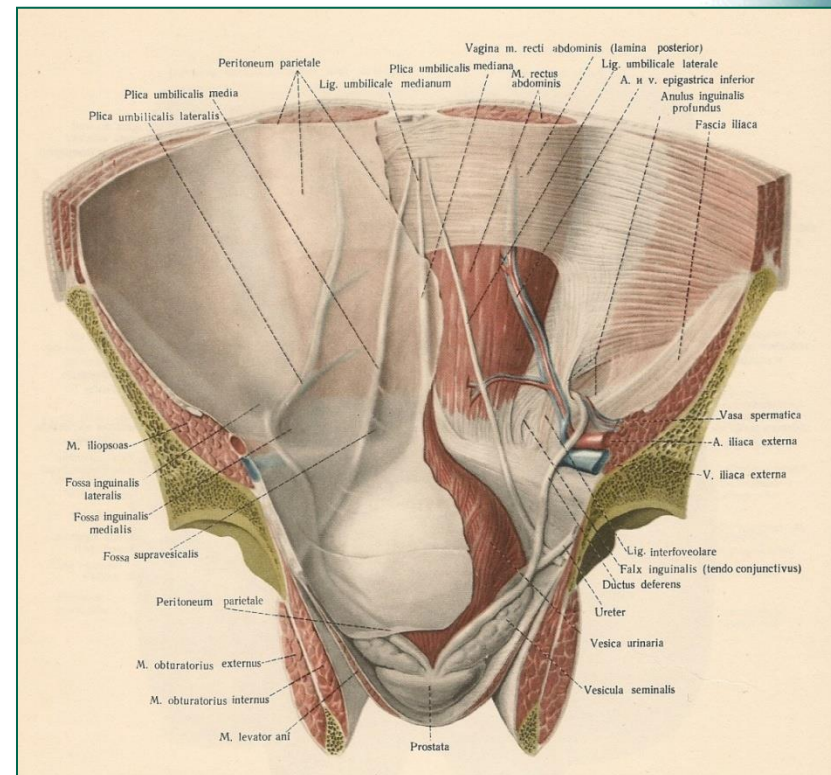
Internal Surface of Anterolateral Abdominal Wall

- ❖ covered with fascia transversalis and parietal peritoneum.
- ❖ this surface exhibits five umbilical peritoneal folds passing toward the umbilicus.
- The **median umbilical fold** extends from the apex of the urinary bladder to the umbilicus and covers the median umbilical ligament.
- Two **medial umbilical folds** cover the medial umbilical ligaments, formed by occluded parts of the umbilical arteries.
- Two **lateral umbilical folds** cover the inferior epigastric vessels.



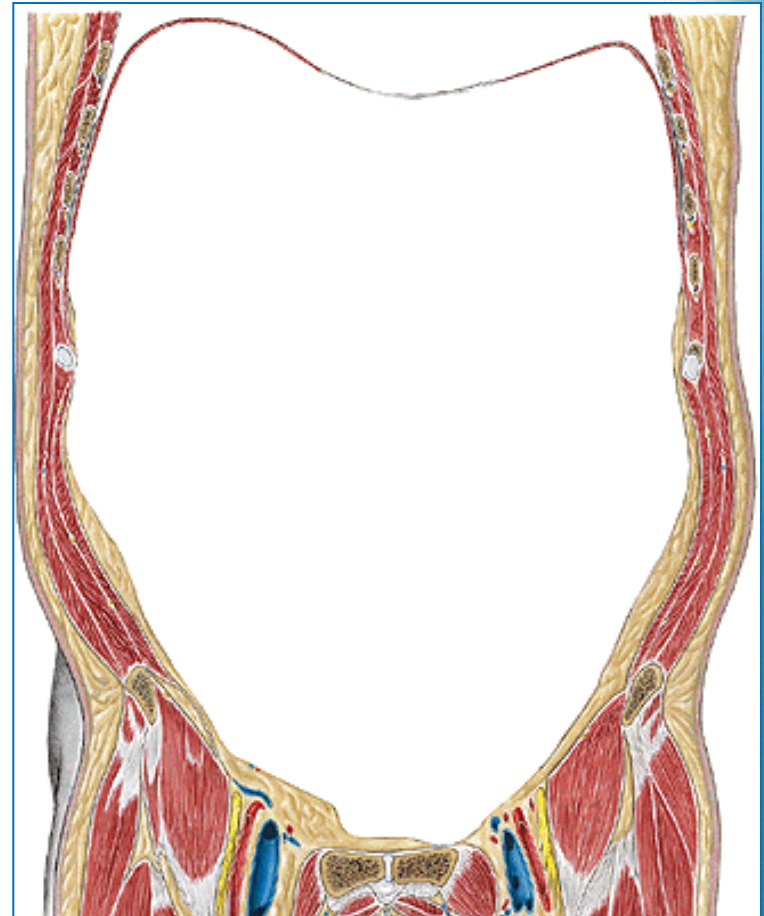
Internal Surface of Anterolateral Abdominal Wall

- ❖ covered with fascia transversalis and parietal peritoneum.
- ❖ this surface exhibits five umbilical peritoneal folds passing toward the umbilicus.
- ❖ The shallow fossae between the umbilical folds are the:
 - **Supravesical fossae** between the median and the medial umbilical folds.
 - **Medial inguinal fossae** between the medial and the lateral umbilical folds.
 - **Lateral inguinal fossae**, lateral to the lateral umbilical folds, include the deep inguinal rings.



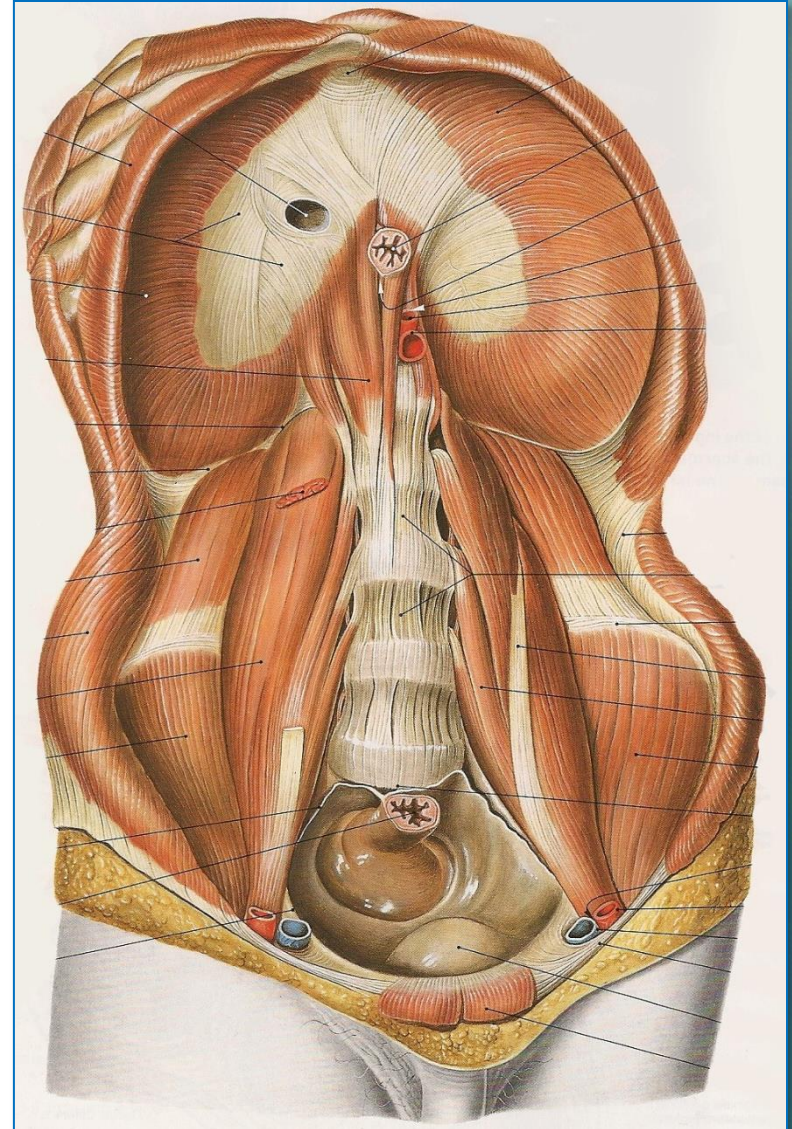
Abdominal cavity

- ❖ forms the superior and major part of the **abdominopelvic cavity**
- ❖ has no floor of its own because it is continuous with the **pelvic cavity**.
- ❖ The plane of the *pelvic inlet* separates the abdominal and the pelvic cavities.
- ❖ is the location of most digestive organs, parts of the urogenital system (kidneys and most of the ureters), and the spleen.



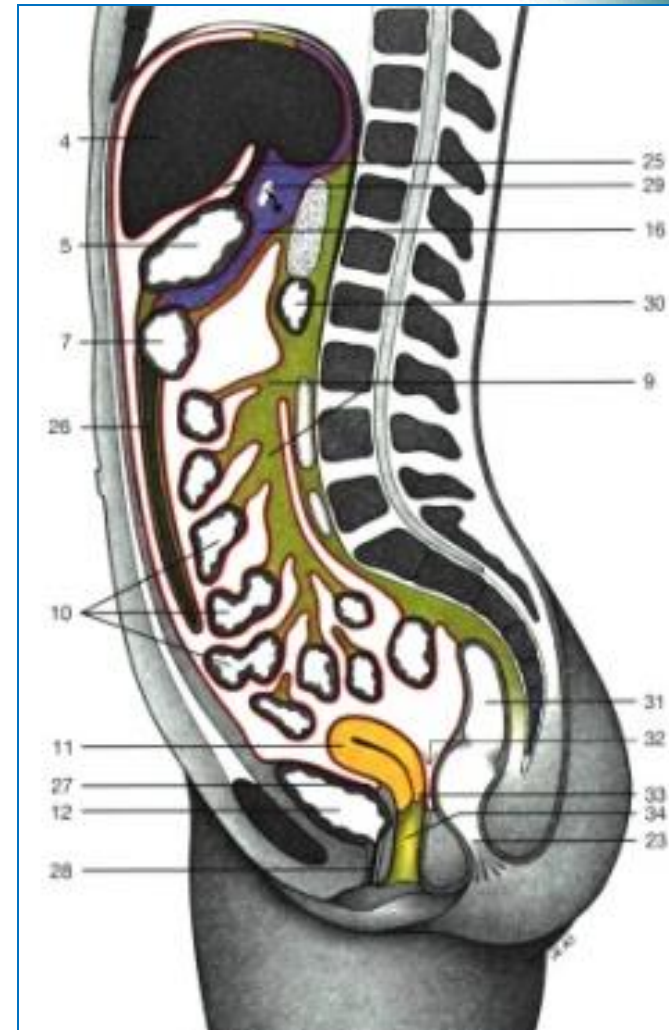
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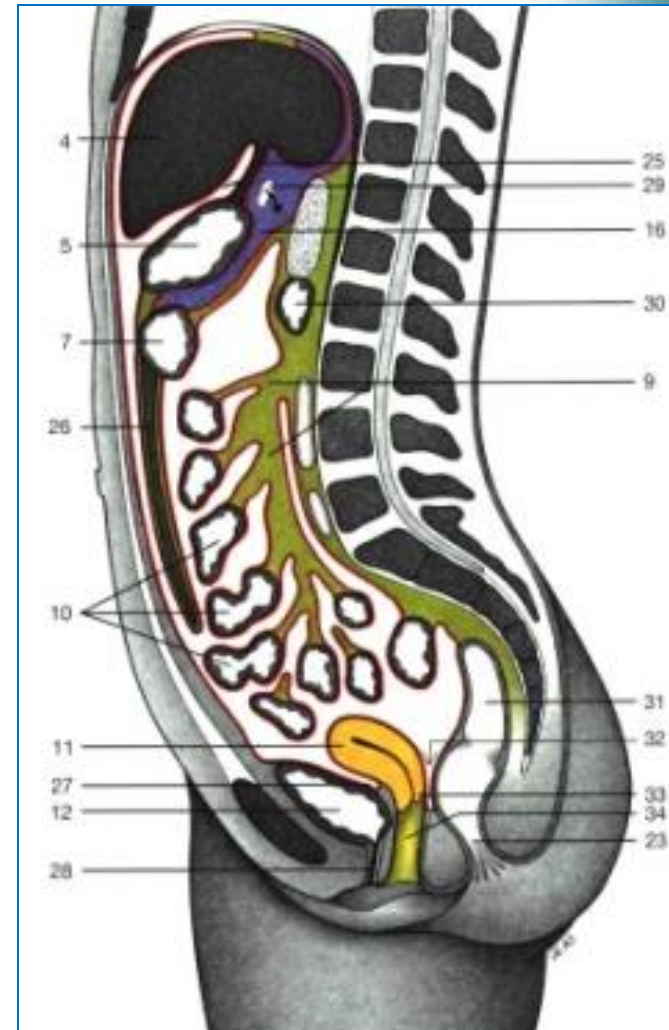
Peritoneum

- ❖ The **peritoneum** is a continuous, glistening, and slippery transparent serous membrane.
- ❖ It lines the abdominopelvic cavity and invests the viscera
- ❖ The peritoneum consists of two continuous layers:
 - ❖ the **parietal peritoneum**, which lines the internal surface of the abdominopelvic wall
 - ❖ the **visceral peritoneum**, which invests viscera



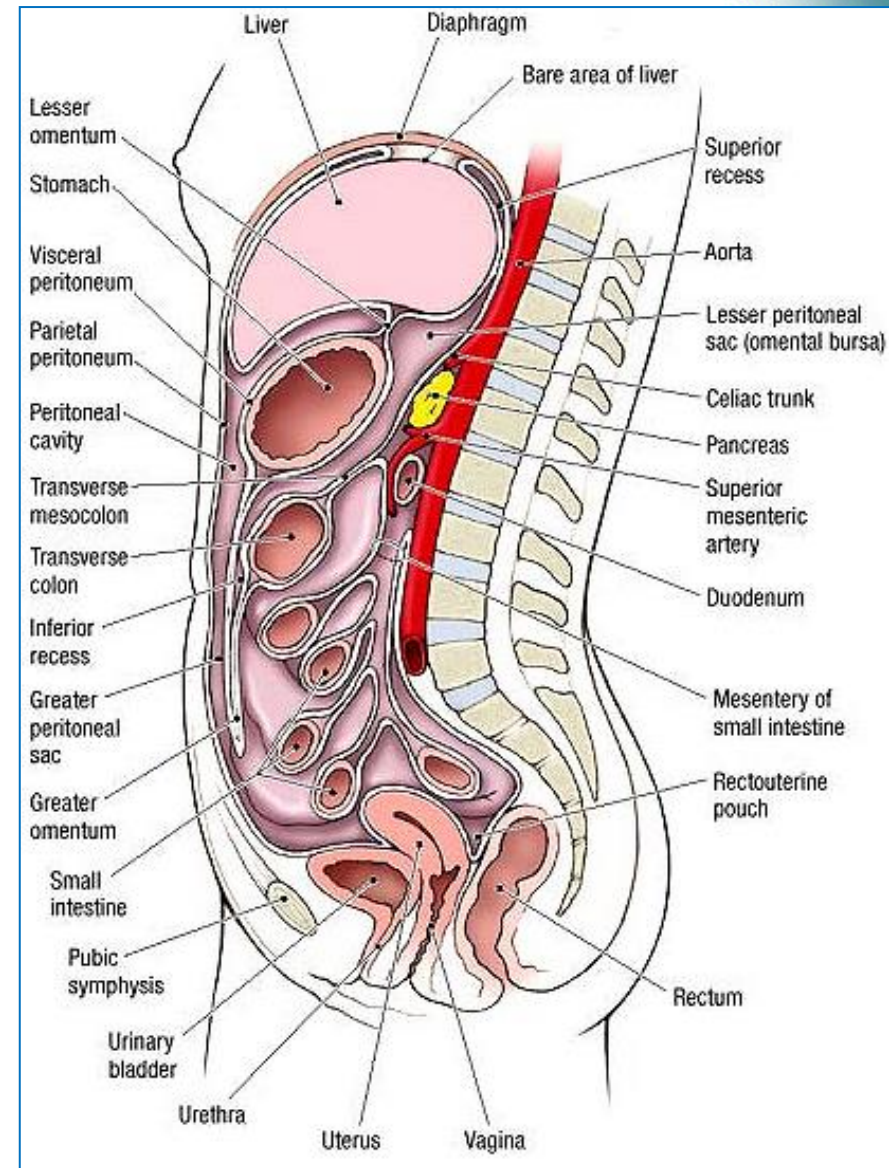
Peritoneum

- ❖ The relationship of the viscera to the peritoneum is as follows:
- ❖ **Intraperitoneal organs** are almost completely covered with visceral peritoneum
- ❖ **Extraperitoneal organs** are outside the peritoneal cavity and are only partially covered with peritoneum.
 - ✓ **Retroperitoneal organs** such as the kidneys are between the parietal peritoneum and the posterior abdominal wall
 - ✓ **Subperitoneal organs** (urinary bladder) have parietal peritoneum only on its superior surface.
 - ✓ **Preperitoneal organs** - between the parietal peritoneum and the anterior abdominal wall



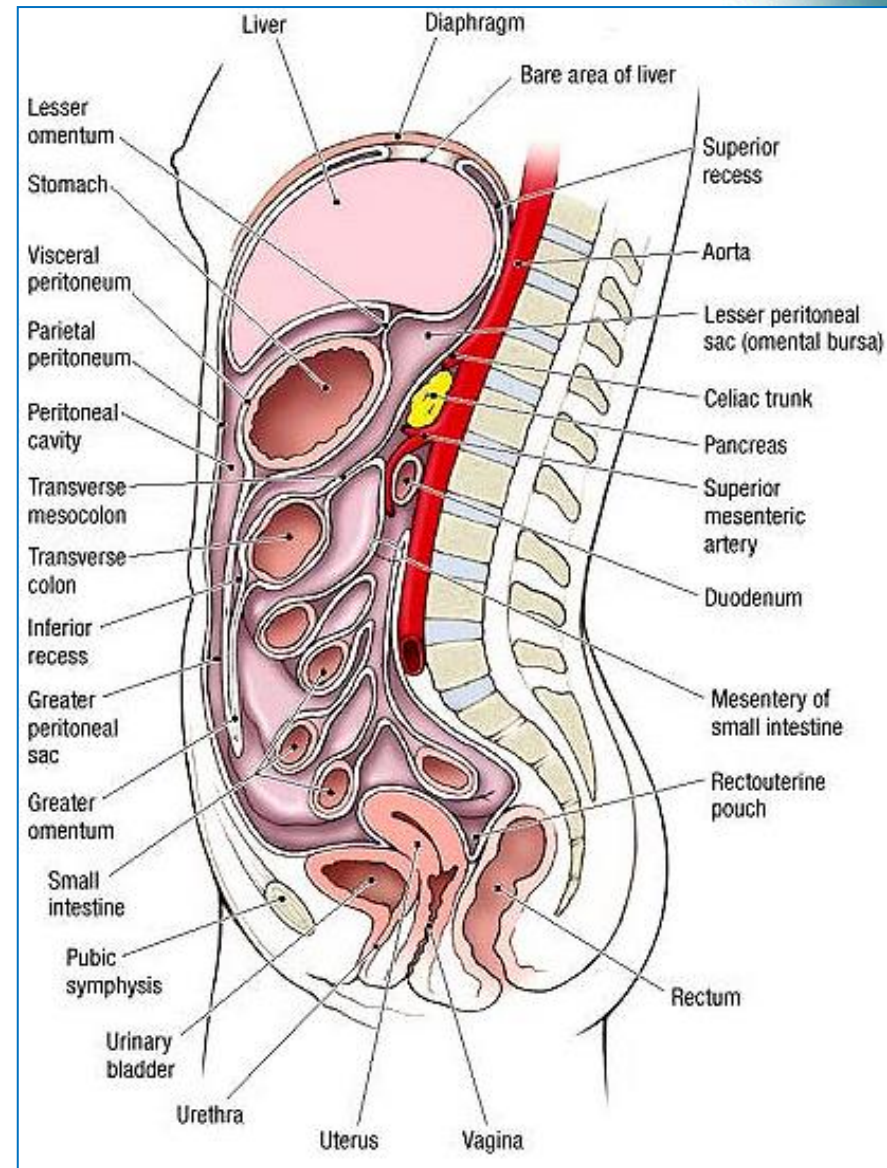
Peritoneal cavity

- ❖ The **peritoneal cavity** is a potential space of capillary thinness between the parietal and visceral layers of peritoneum.
- ❖ It contains no organs but contains a thin film of **peritoneal fluid**, which lubricates the peritoneal surfaces, enabling the viscera to move.



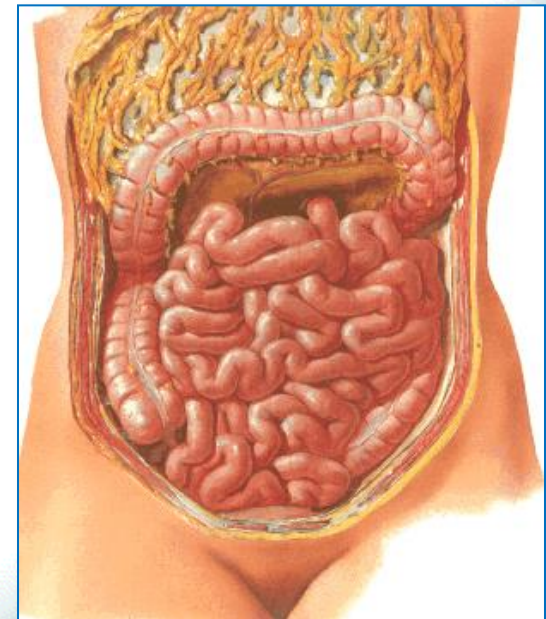
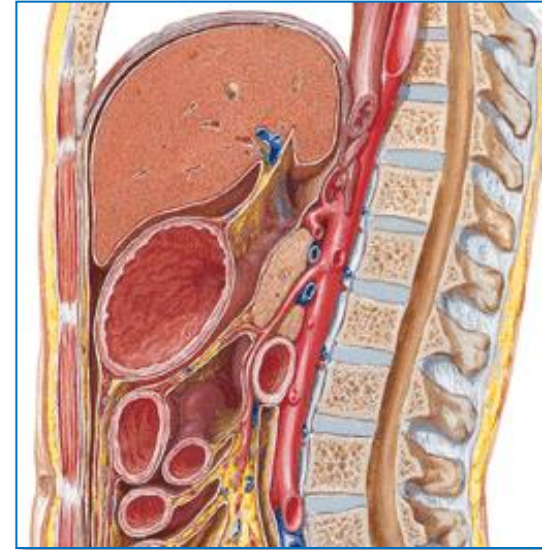
Peritoneal cavity

- ❖ Parts of the peritoneum that connect organs with other organs or to the abdominal wall form:
 - **Mesentery** is a double layer of peritoneum. Transverse and sigmoid **mesocolons** - related to other specific parts.
 - An **omentum** is a double-layered extension or fold of peritoneum that passes from the stomach to adjacent organs.
 - A **peritoneal ligament** consists of a double layer of peritoneum that connects an organ with another organ or to the abdominal wall.



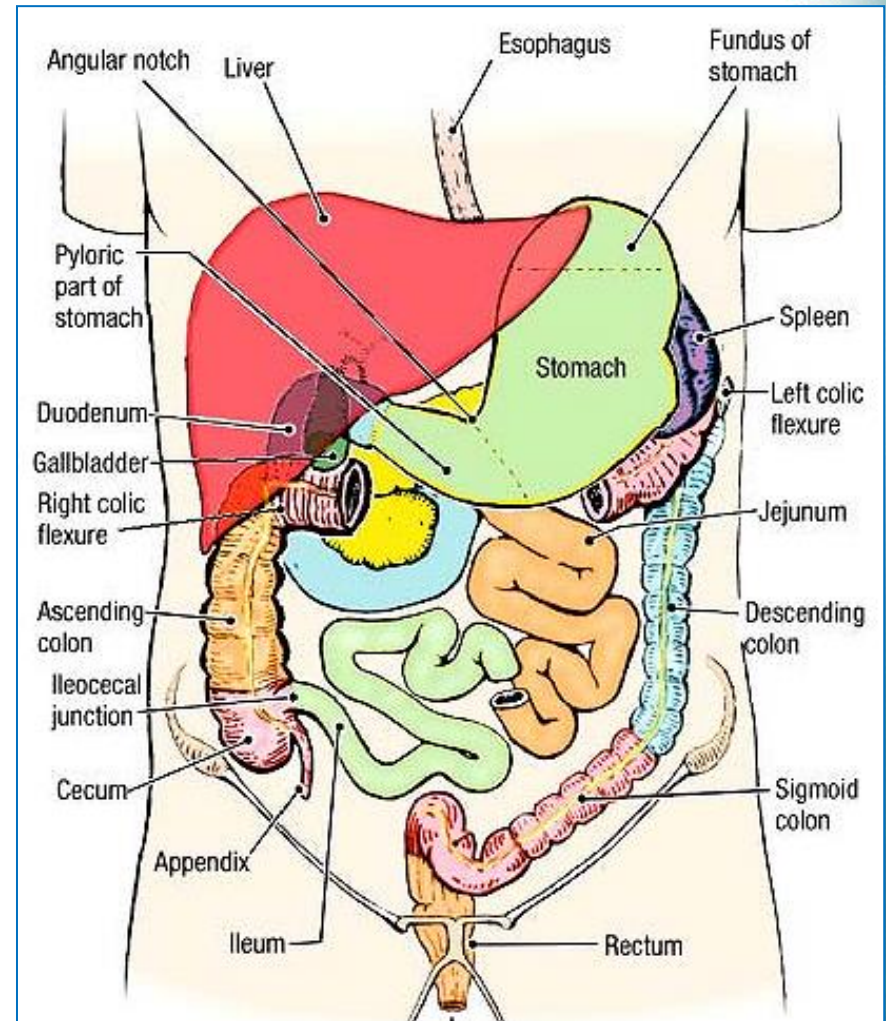
Peritoneal cavity

- ❖ The transverse mesocolon (mesentery of the transverse colon) divides the abdominal cavity into:
- ❖ **supracolic compartment**, containing the stomach, liver, and spleen
- ❖ **infracolic compartment**, containing the small intestine and ascending and descending colon



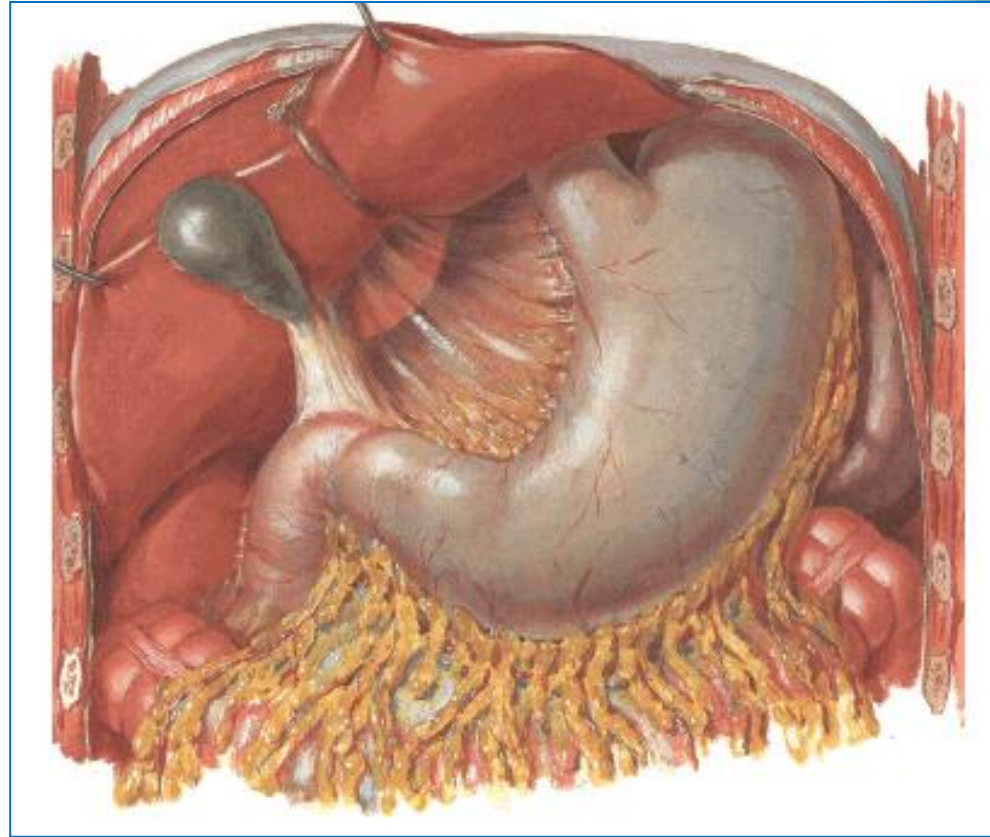
Supracolic compartment. Organs.

- ❖ The principal viscera of the supracolic compartment are:
 - the abdominal part of the esophagus,
 - the stomach and superior part of duodenum,
 - spleen,
 - liver and gallbladder



Supracolic compartment. Organs.

- ❖ The principal viscera of the supracolic compartment are:
 - the abdominal part of the esophagus,
 - the stomach and superior part of duodenum,
 - spleen,
 - liver and gallbladder



Supracolic compartment. Organs.

Liver, hepar

❖ Facies diaphragmatica

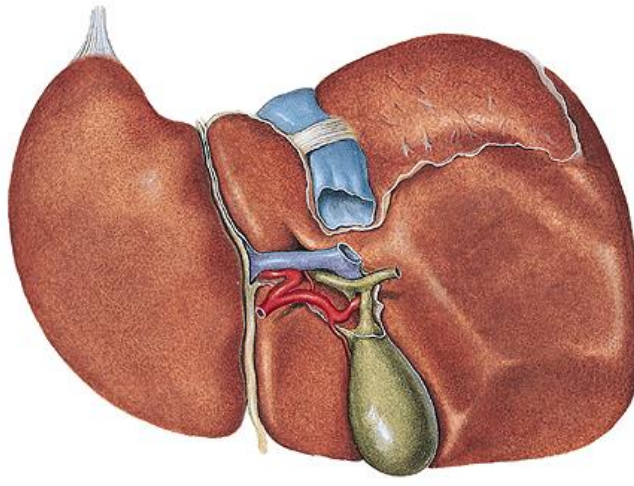
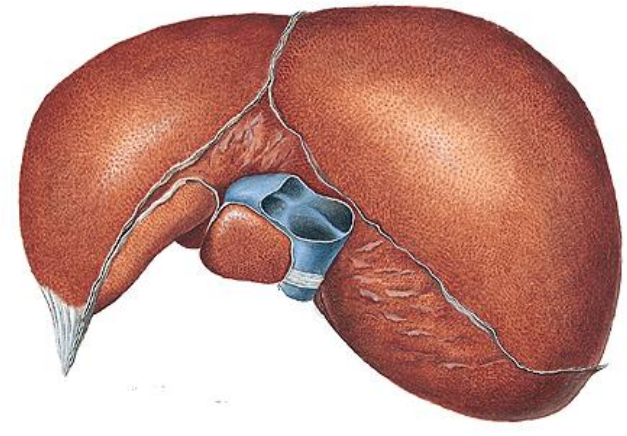
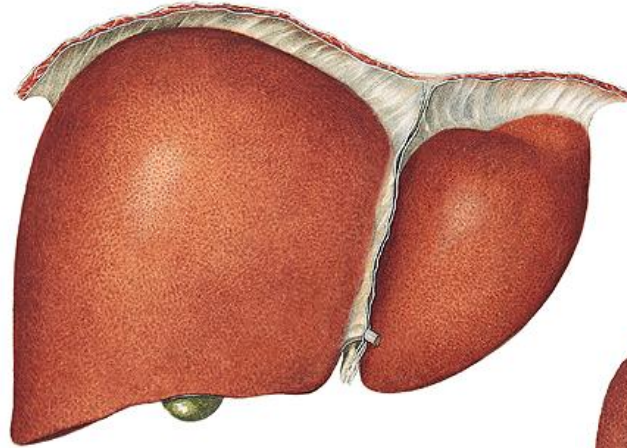
- lobus dexter
- lobus sinister

❖ Facies visceralis

- lobus dexter
- lobus sinister
- lobus quadratus
- lobus caudatus

❖ Porta hepatis

- Proper hepatic a.
- Portal v.
- Common hepatic duct



Supracolic compartment. Organs.

Stomach, Gaster, Ventriculus

❖ Walls:

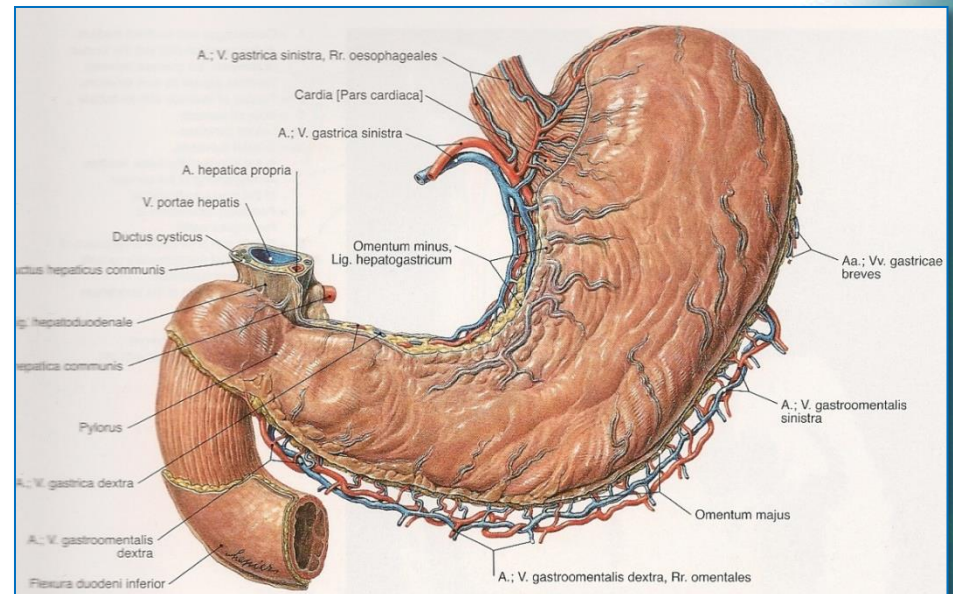
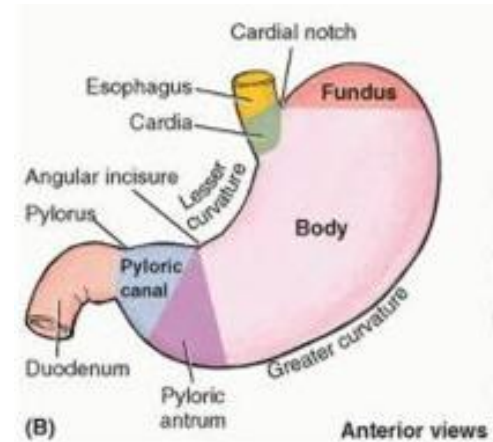
- Paries anterior
- Paries posterior

❖ Parts:

- Cardia, fundus
- Corpus gastricus
- Pars pylorica
 - *Pyloric antrum*
 - *Pyloric canal*

❖ Curves:

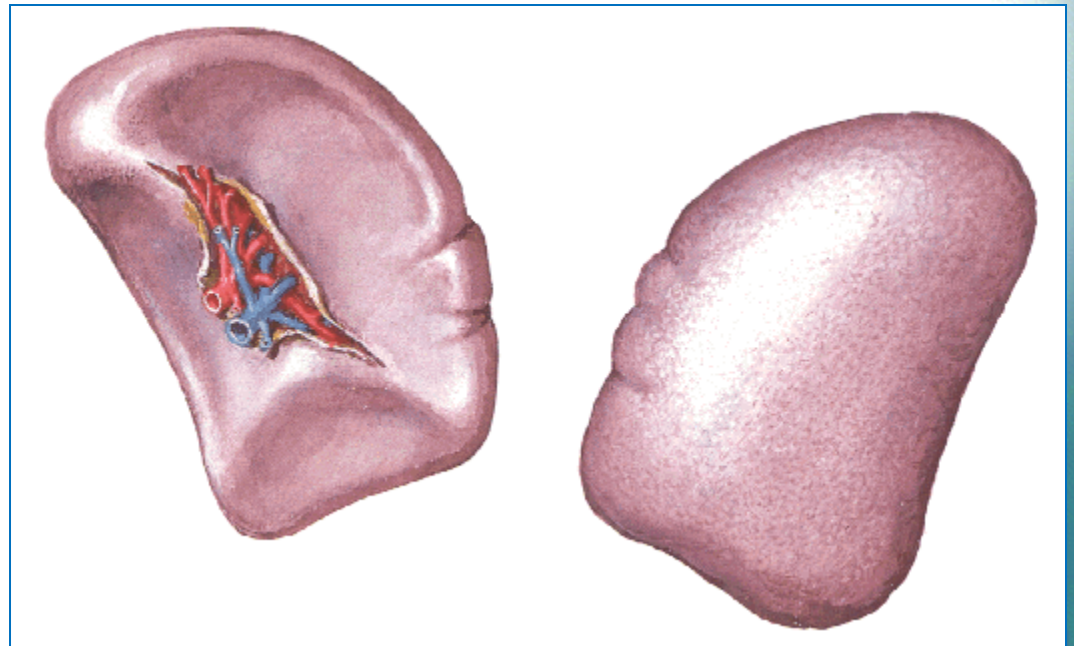
- Lesser curvature
 - angular notch*
- Greater curvature
 - cardiac notch*



Supracolic compartment. Organs.

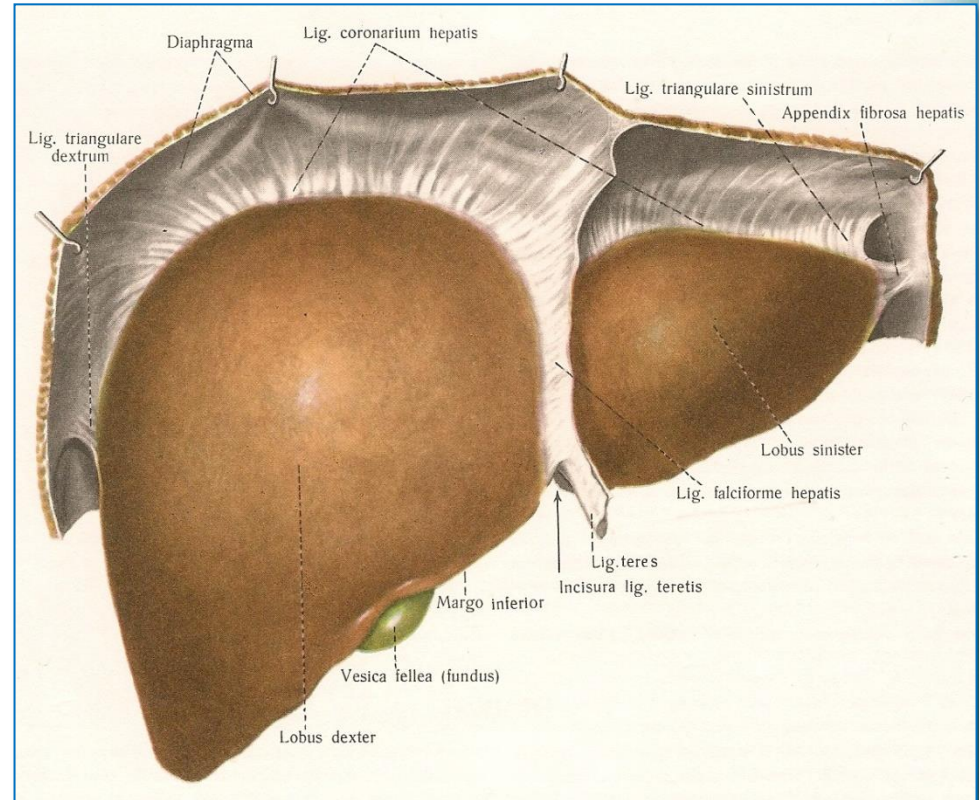
Spleen, Lien

- ❖ Facies diaphragmatica
- ❖ Facies visceralis
- ❖ Hilum splenicum
Splenic a. and v.



Supracolic compartment. Peritoneal structures.

- The liver is connected to the:
 - diaphragm by **coronary ligament**.
 - anterior abdominal wall by the **falciform ligament** and **round ligament**
 - right and left **triangular ligaments**.



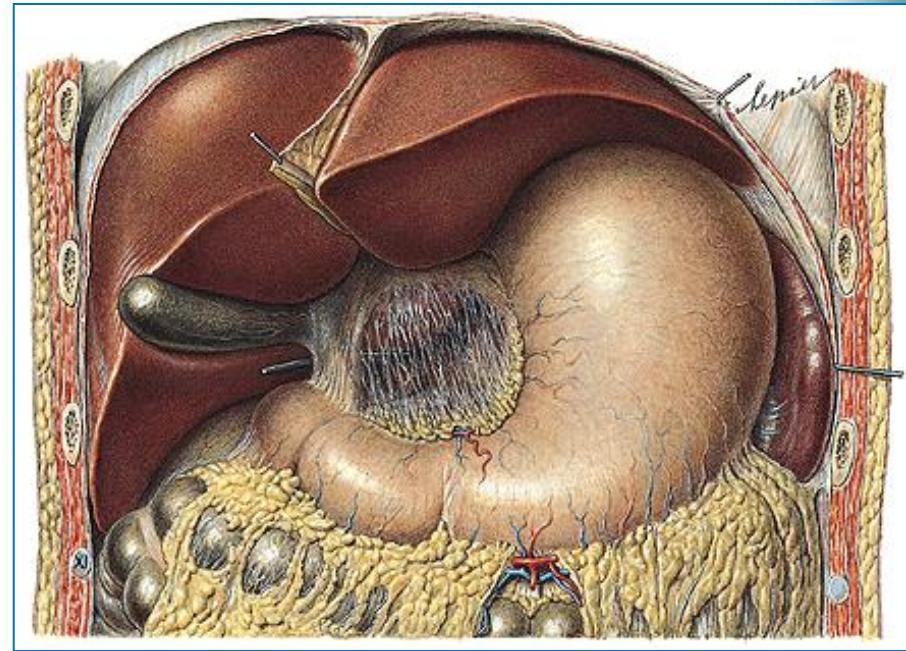
Supracolic compartment. Peritoneal structures.

❖ The **lesser omentum**

passes from the liver to the lesser curvature of the stomach and superior part of the duodenum.

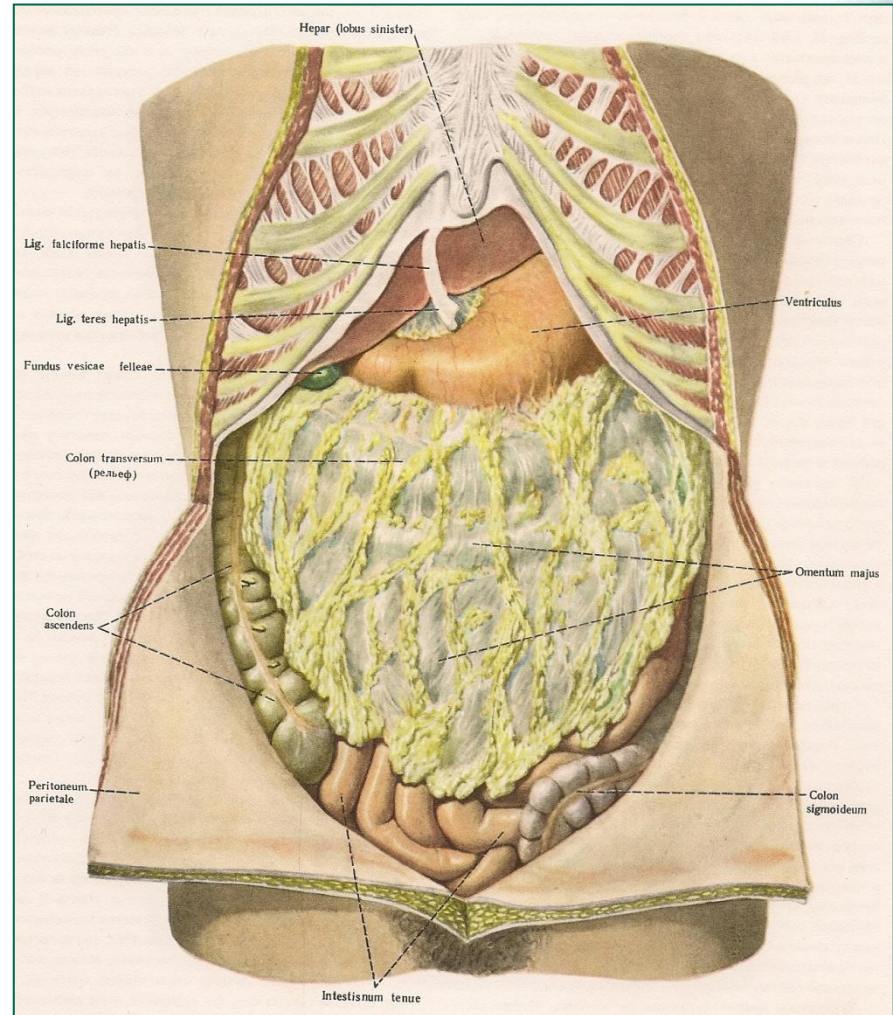
It is connected with the:

- Stomach by the **hepatogastric ligament**, the membranous portion of the lesser omentum
- Duodenum by the **hepatoduodenal ligament**, the thickened free edge of the lesser omentum
- conducts the portal triad:
 - proper hepatic artery
 - portal vein
 - bile duct



Supracolic compartment. Peritoneal structures.

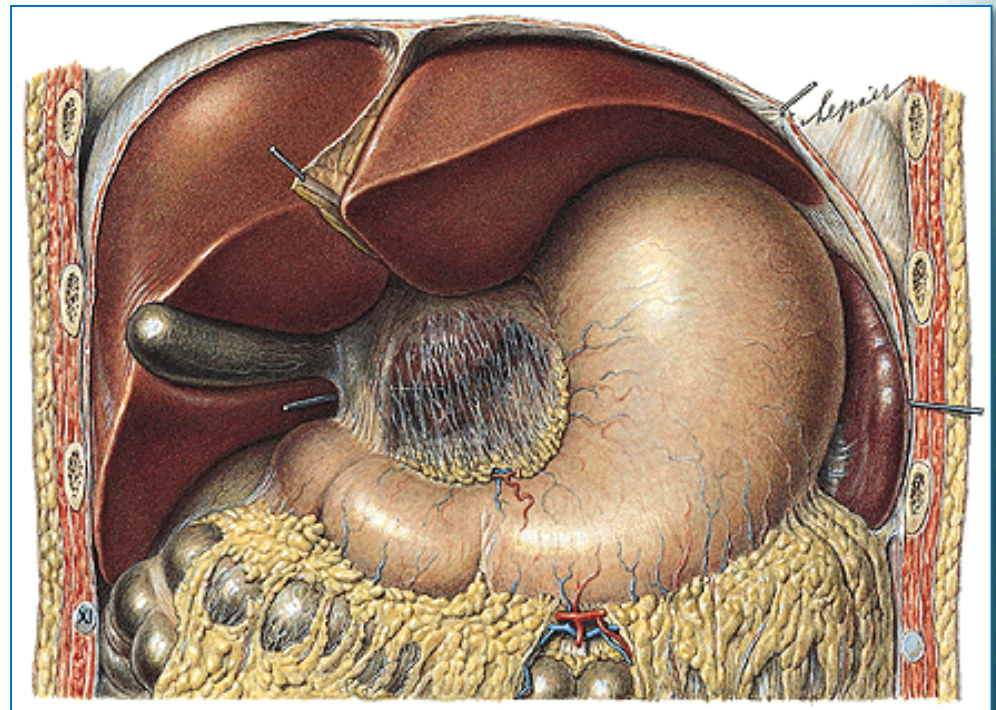
- ❖ **Greater omentum, omentum majus:**
 - Arises from the **greater curvature**
 - It is connected to:
 - Inferior surface of the diaphragm by the **gastrophrenic ligament**
 - Spleen by the **gastrosplenic ligament**
 - Transverse colon by the **gastrocolic ligament**
- ❖ **Phrenicosplenic lig.**



Supracolic compartment. Peritoneal recesses.

❖ Right and left subphrenic recesses:

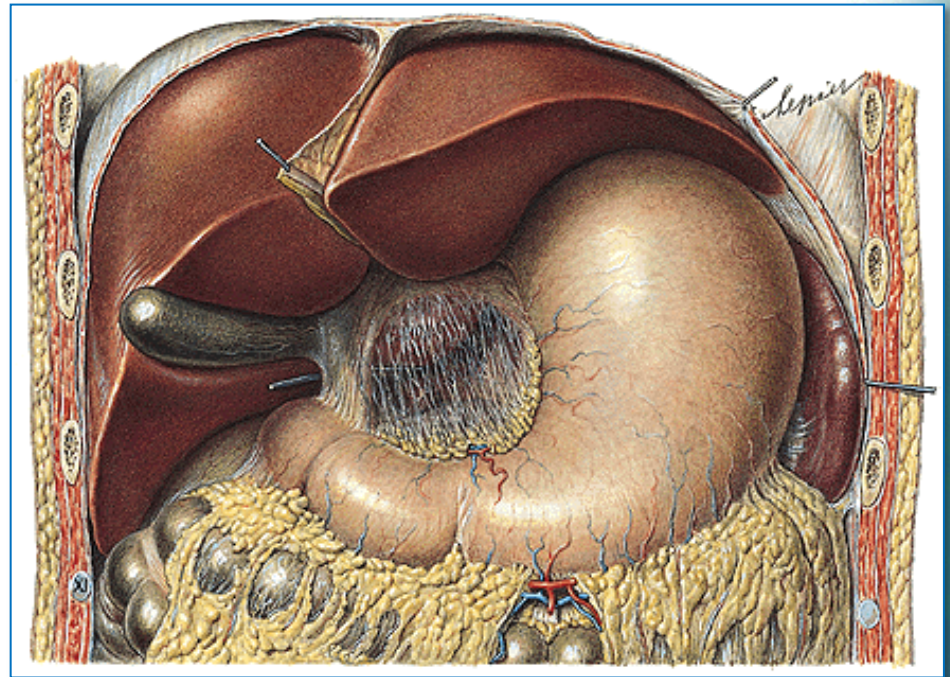
- between the diaphragm, liver and spleen
- posterior to the coronary lig.
- divided by falciform lig.



Supracolic compartment. Peritoneal recesses.

❖ Subhepatic recesses:

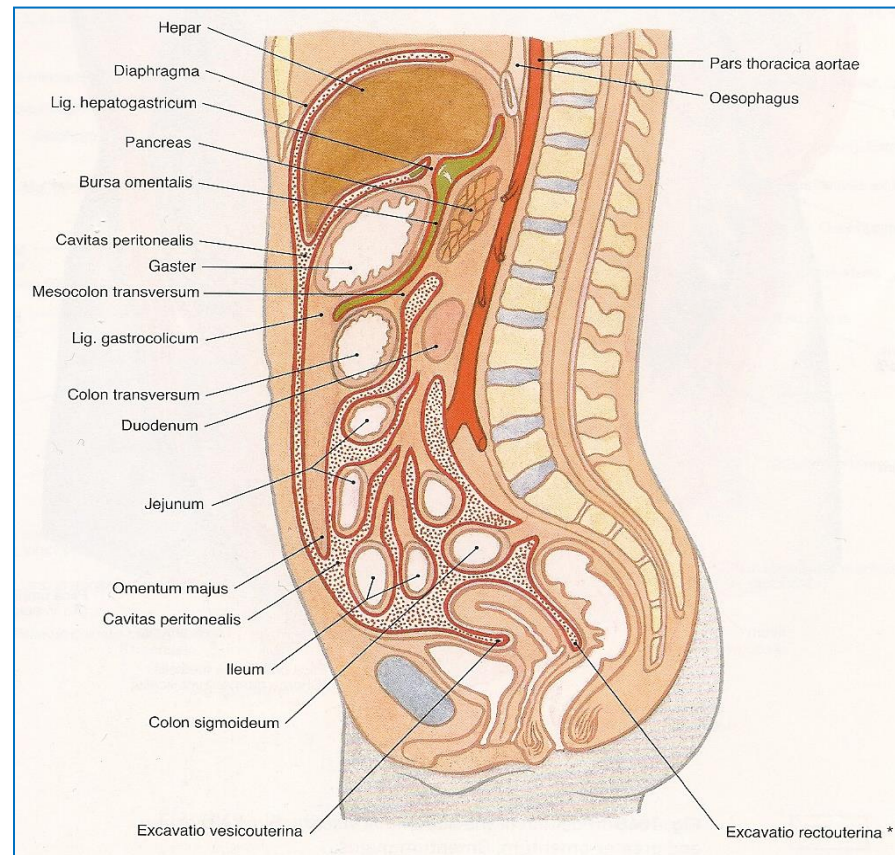
- Right subhepatic recess
- Left subhepatic recess
- Hepatorenal recess



Supracolic compartment. Peritoneal recesses.

❖ Omental bursa, bursa omentalis

- Sac-like cavity that lies posterior to the stomach.
- Permits free movement of the stomach on the structures posterior and inferior to it

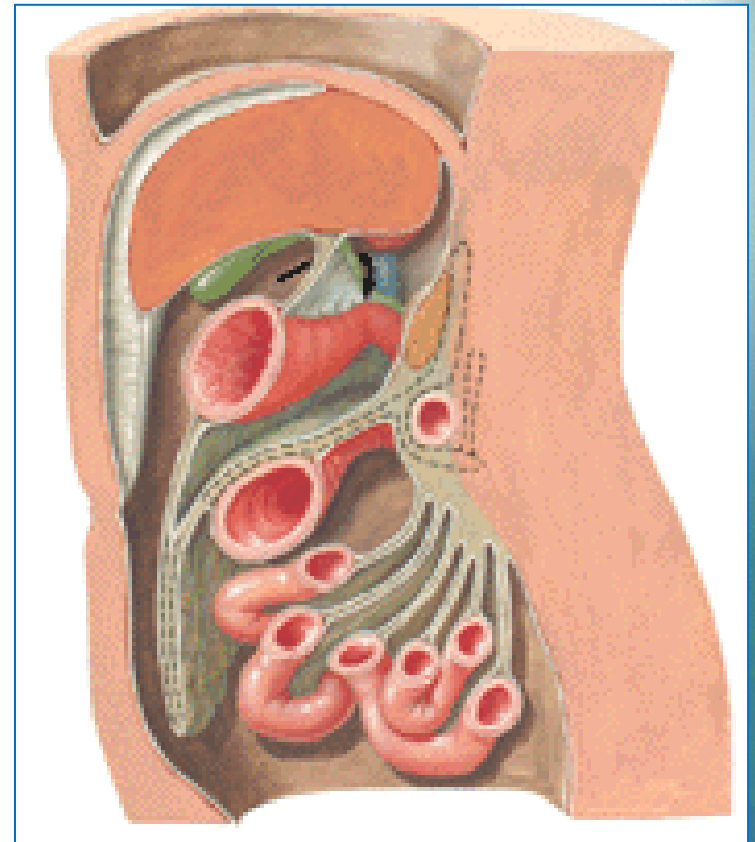
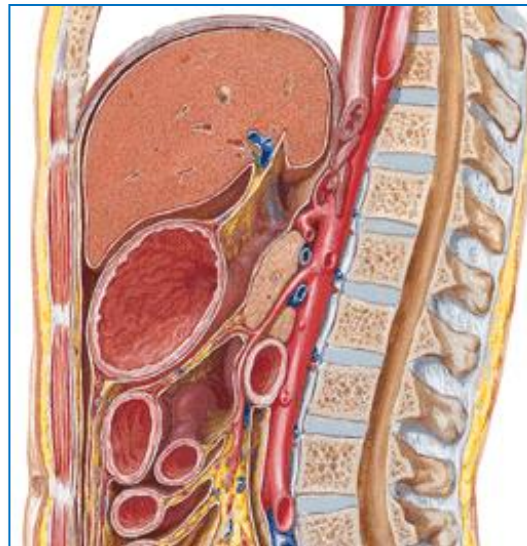


Supracolic compartment. Peritoneal recesses.

❖ **Omental bursa, bursa omentalis**

➤ **Anterior wall:**

1. Lesser omentum
2. Stomach
3. Gastrocolic lig.
4. Gastrosplenic lig.

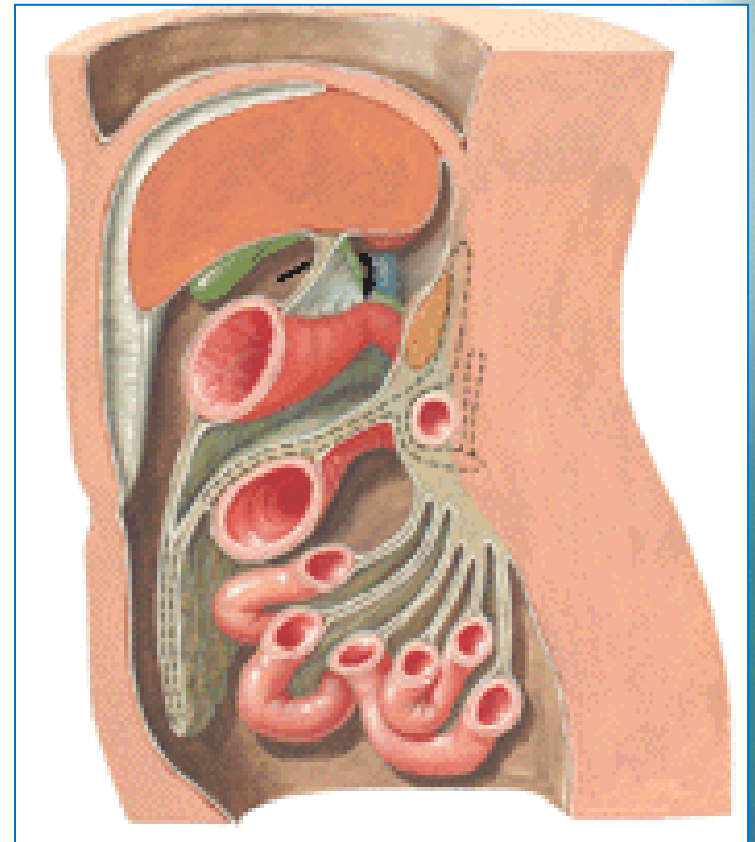


Supracolic compartment. Peritoneal recesses.

❖ **Omental bursa, bursa omentalis**

➤ **Floor:**

1. mesocolon transversum



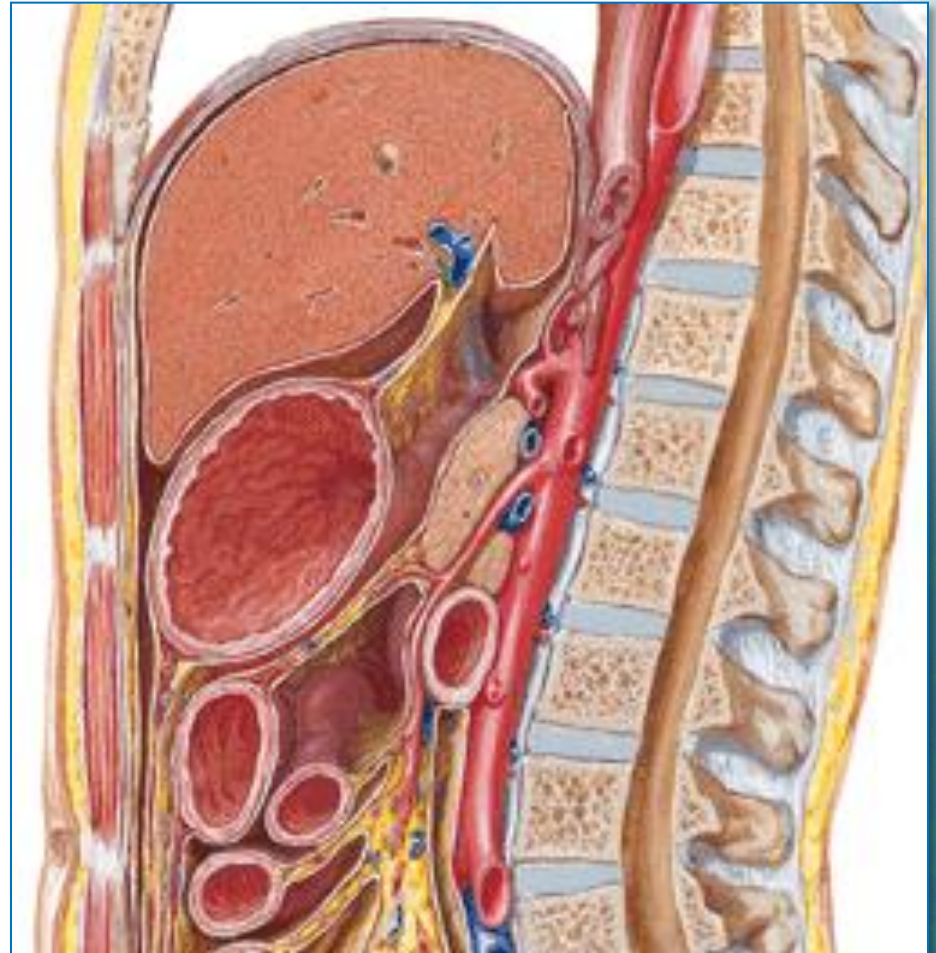
Supracolic compartment. Peritoneal recesses.

❖ **Omental bursa**, bursa omentalis

❖ **Posterior wall:**

➤ Parietal peritoneum that covers:

1. pancreas
2. aorta
3. Inferior vena cava
4. Left kidney
5. Left suprarenal gland



Supracolic compartment. Peritoneal recesses.

❖ **Omental bursa**, bursa omentalis

➤ Entrance – **epiploic foramen**

Surrounded by:

- Caudate lobe of liver – superior
- Superior part of the duodenum – inferior
- Hepatoduodenal lig. - anterior
- Peritoneum over the inferior vena cava

