Surface Landmarks

Umbilicus

Linea alba = white line

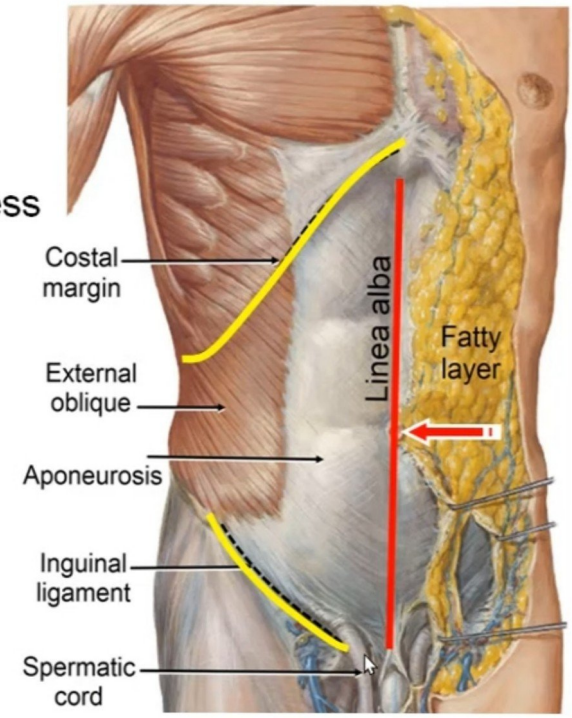
- Tendinous line
- Extends from Xiphoid process to pubic symphysis

SUPERIORLY:

- Costal margin

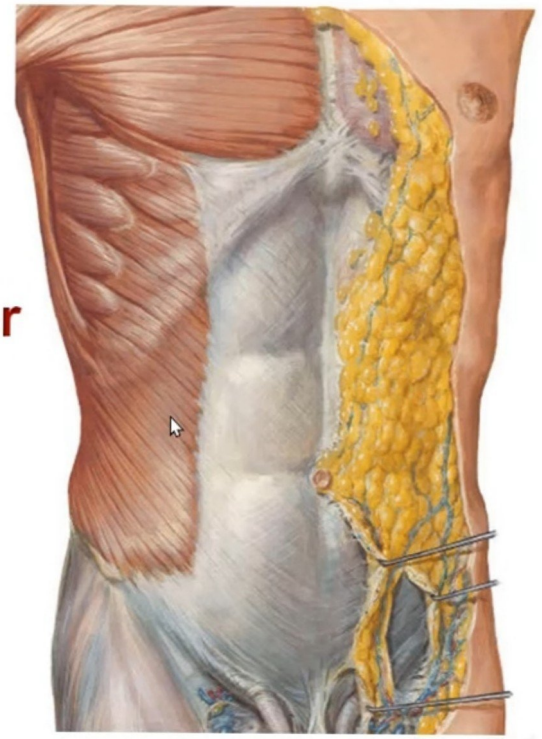
INFERIORLY:

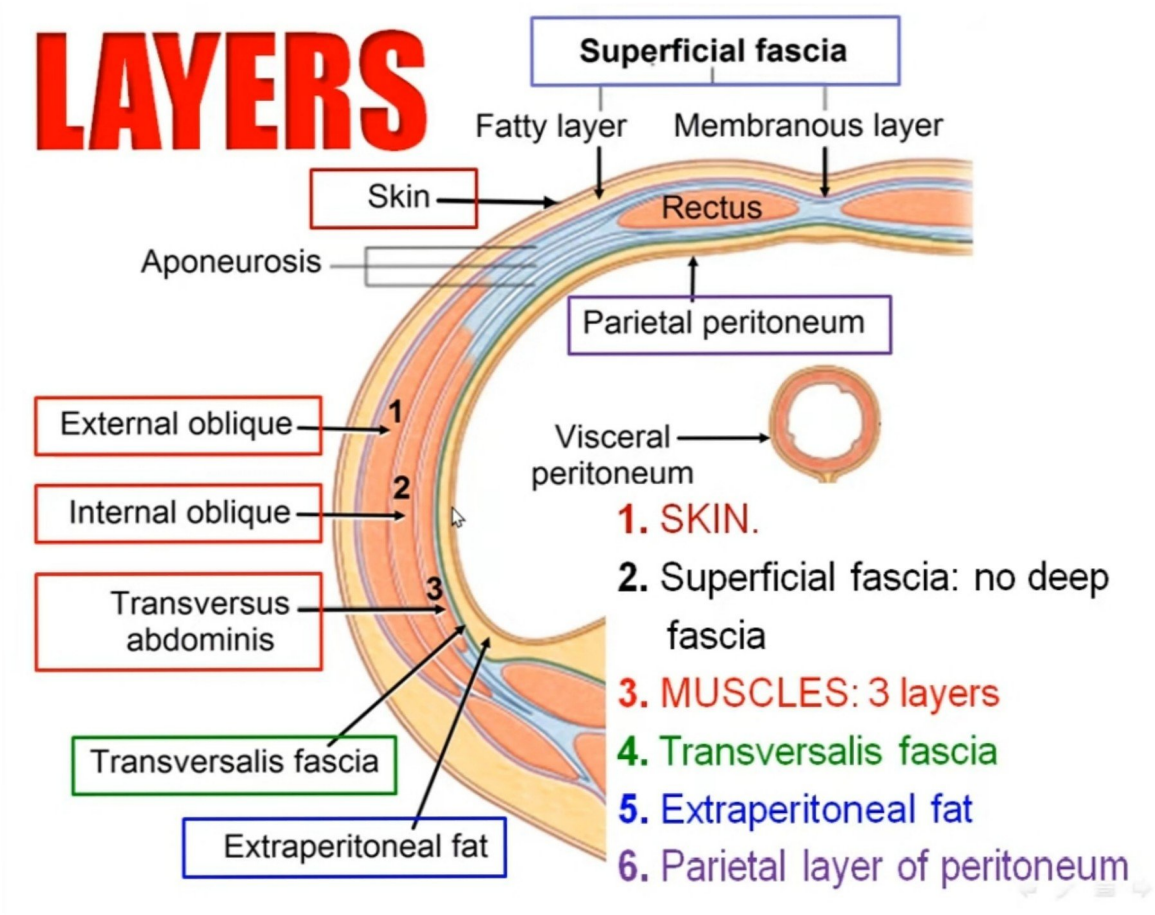
- Iliac crest
- Ant. Sup. Iliac spine
- Inguinal ligament
- Pubic tubercle & crest



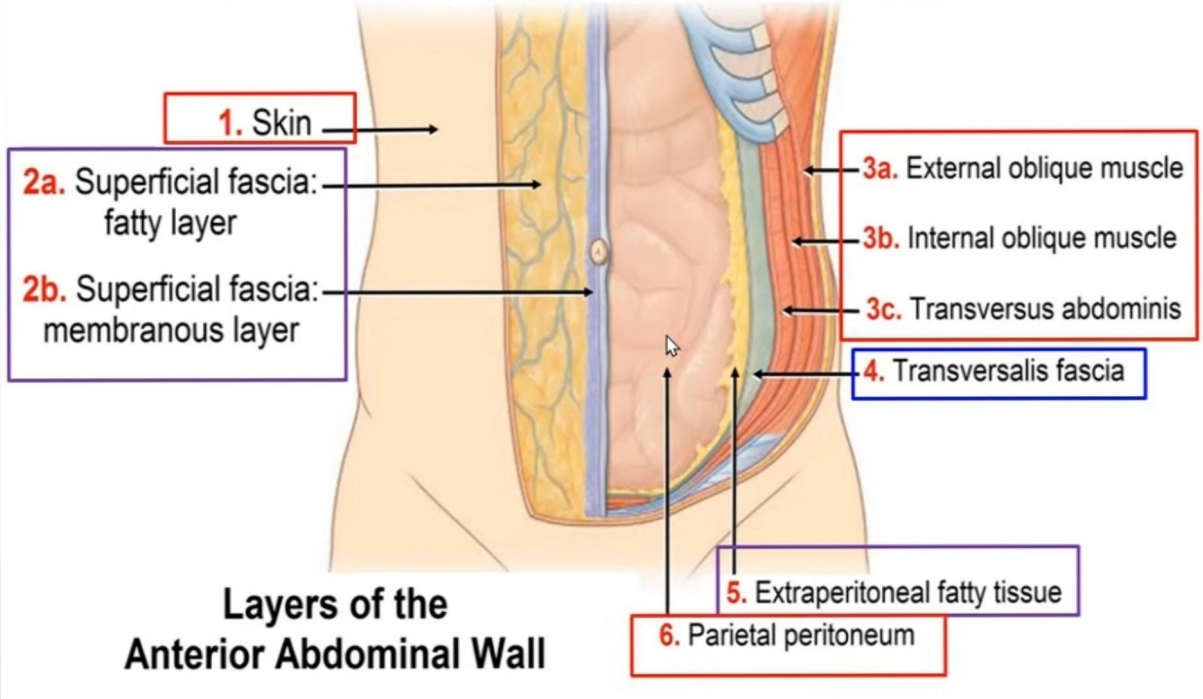
Structure of the Anterior Abdominal Wall

1. Skin.
2. Superficial Fascia:
   - A. Fatty Layer
   - B. Membranous Layer
3. Muscles
4. Blood Vessels
5. Nerves
6. Lymphatics





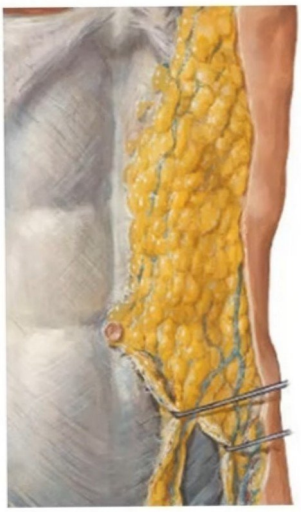
Layers of the Anterior Abdominal Wall



Layers of the Anterior Abdominal Wall

Skin

- Cleavage (Langer's) lines **run horizontally**
- Langer's lines are **formed by** the collagen fibers within the dermis
- **Incision along the lines** (parallel) heals with a minimal scar
- **Incision across the lines** leaves an ugly scar



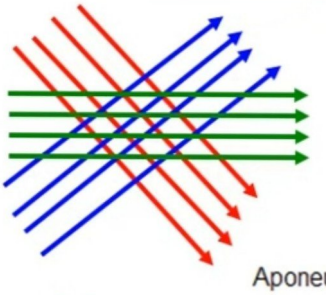
Superficial Fascia

2 Layers:

1. Outer fatty layer: Camper's fascia
2. Deep membranous layer: Scarpa's fascia

No Deep Fascia

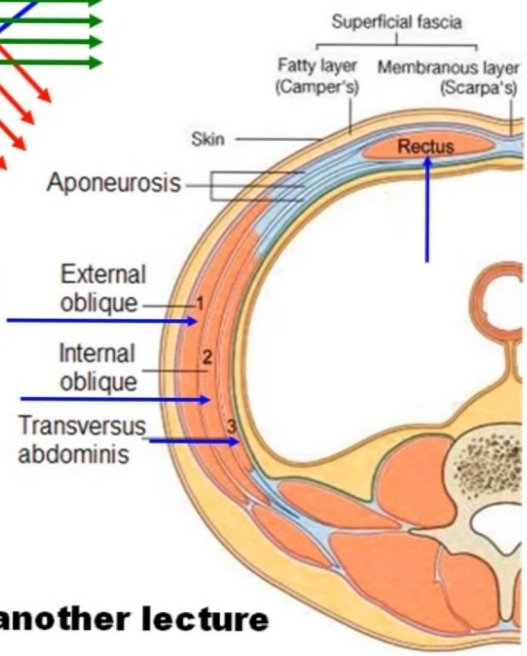
5 Anterior Abdominal Wall Muscles



3 OBLIQUE:

1. External oblique
2. Internal oblique
3. Transversus abdominis

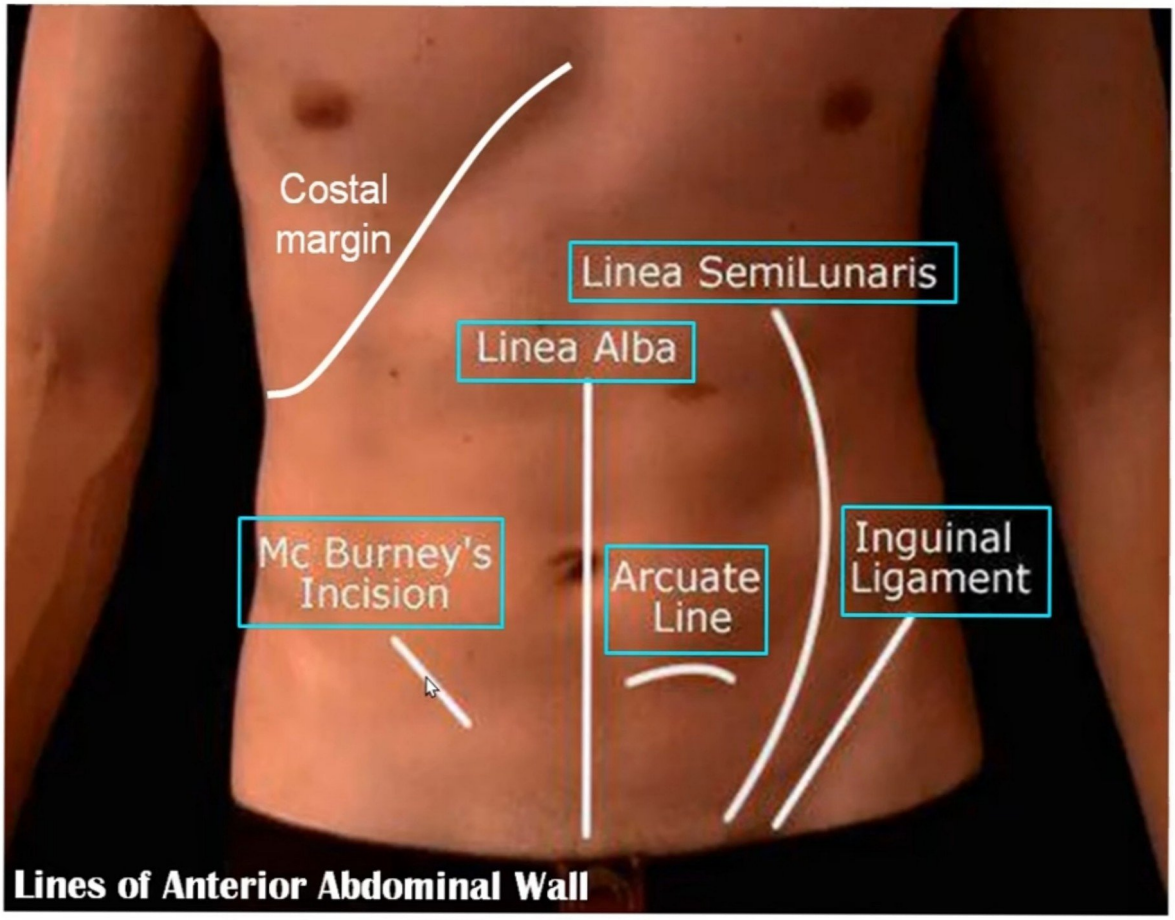
Direction of Fibers! Why?



2 VERTICAL:

1. Rectus abdominis
2. Pyramidalis

- **I will talk about the muscles in another lecture**



Q & A

What are the ribs forming the costal margin?

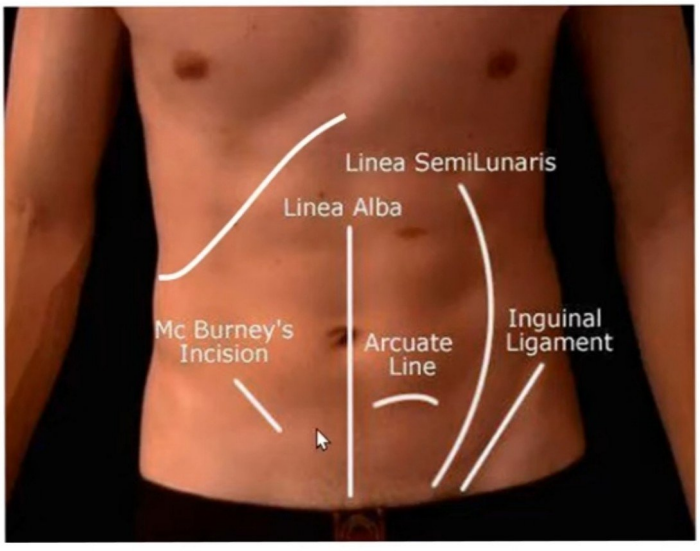
What are Langer's lines?

They are also called cleavage lines. These lines correspond to the direction of collagen fibers within the dermis

What is the linea alba?

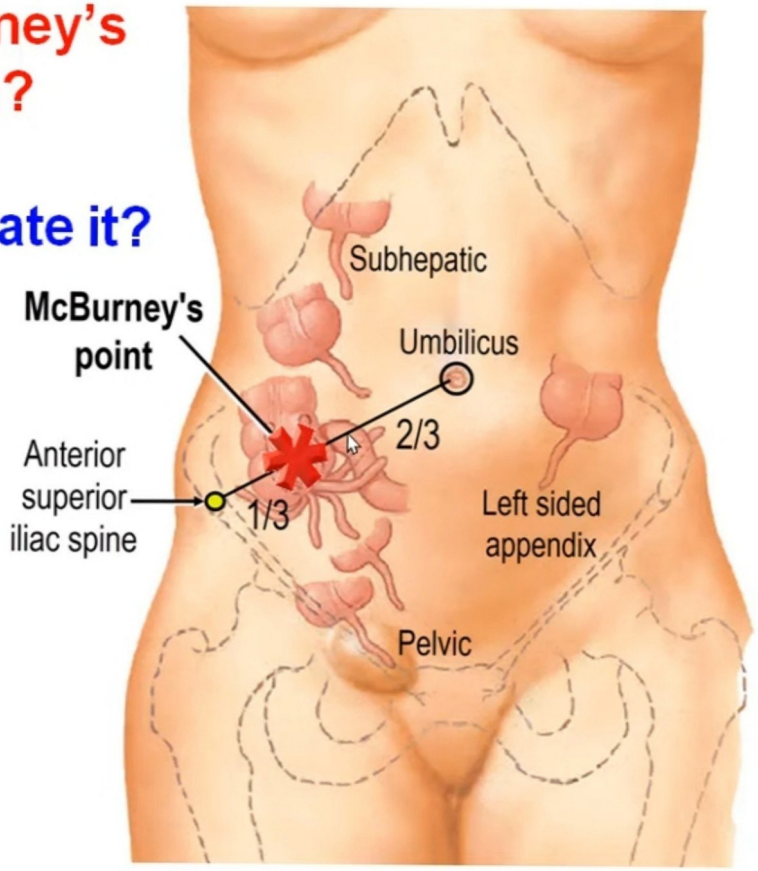
What is linea semilunaris?

What is the arcuate line?



What is Mc Burney's point & incision?

How do you locate it?

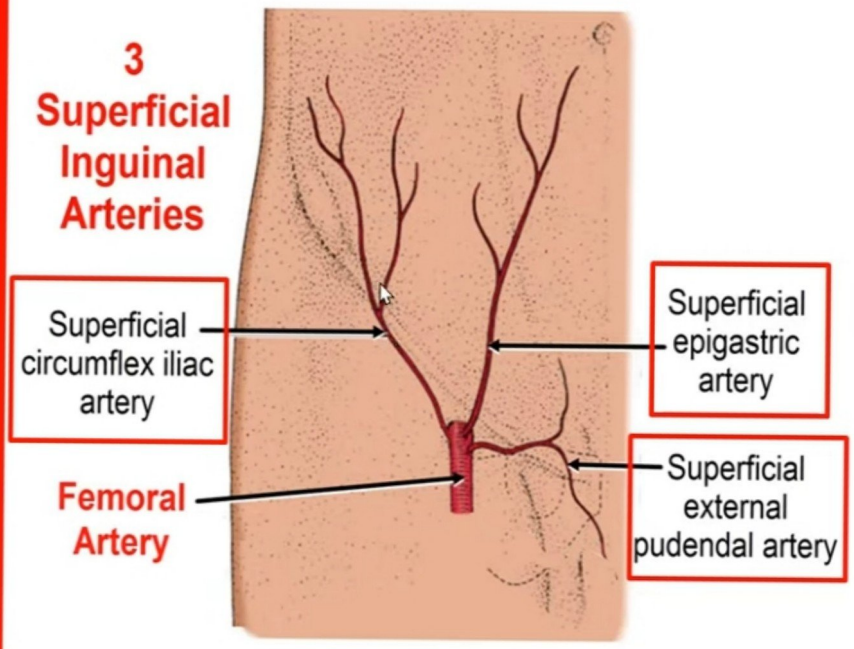


Arterial Supply of the Anterior Abdominal Wall 9

3 Superficial arteries

6 Deep arteries

3 Superficial Inguinal Arteries



6 Deep Arteries

2 FROM ABOVE:

From Internal Thoracic Art

1. Superior epigastric
2. Musculophrenic

2 FROM BELOW:

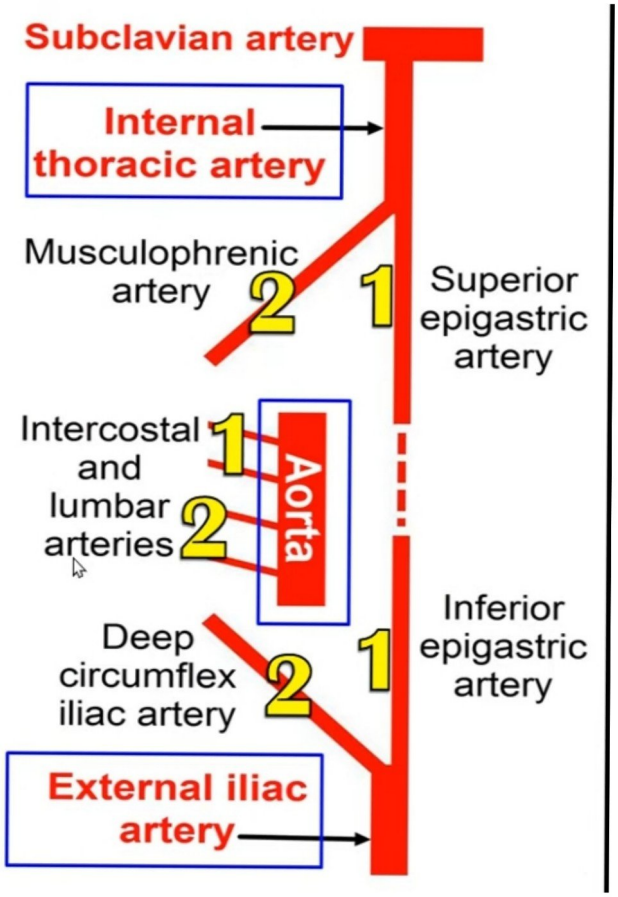
From External Iliac Art

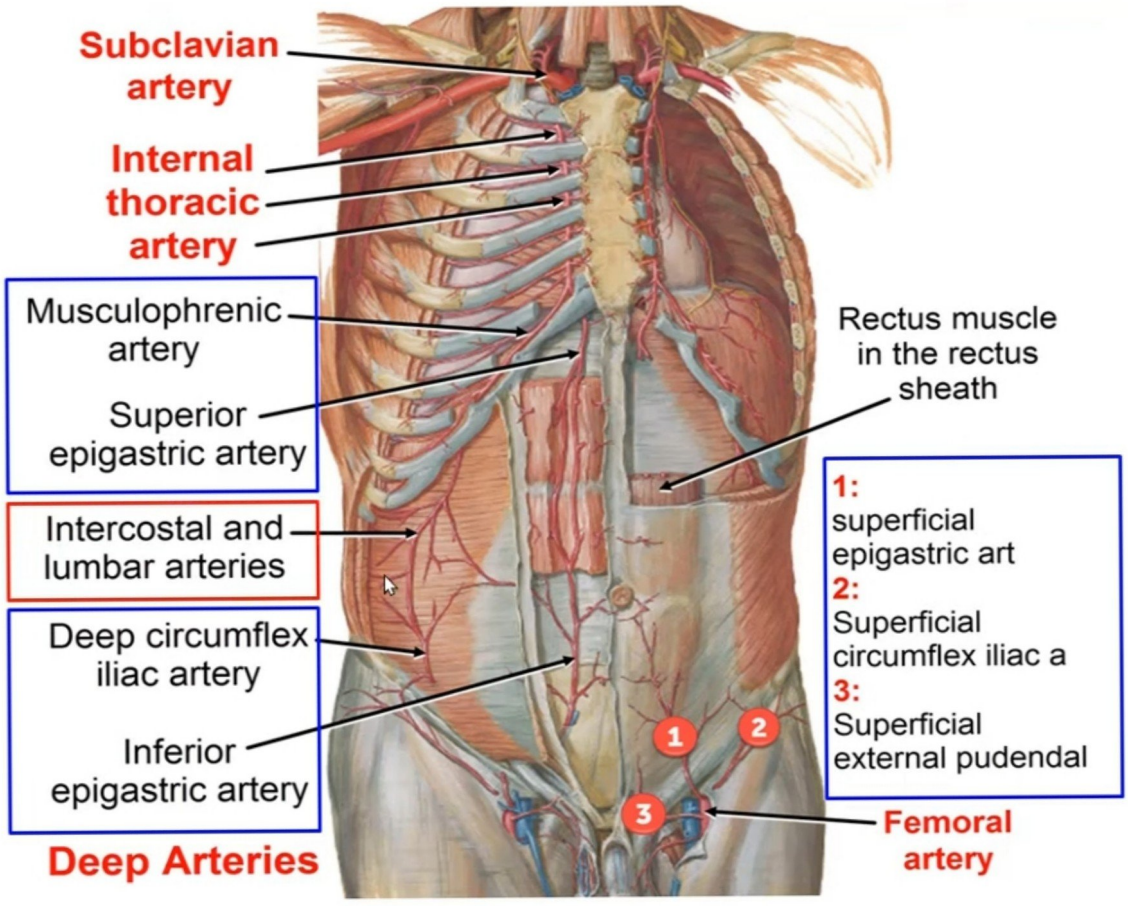
1. Inferior epigastric
2. Deep circumflex iliac

2 FROM SIDE:

From Aorta

1. Post intercostal arteries
2. Lumbar arteries

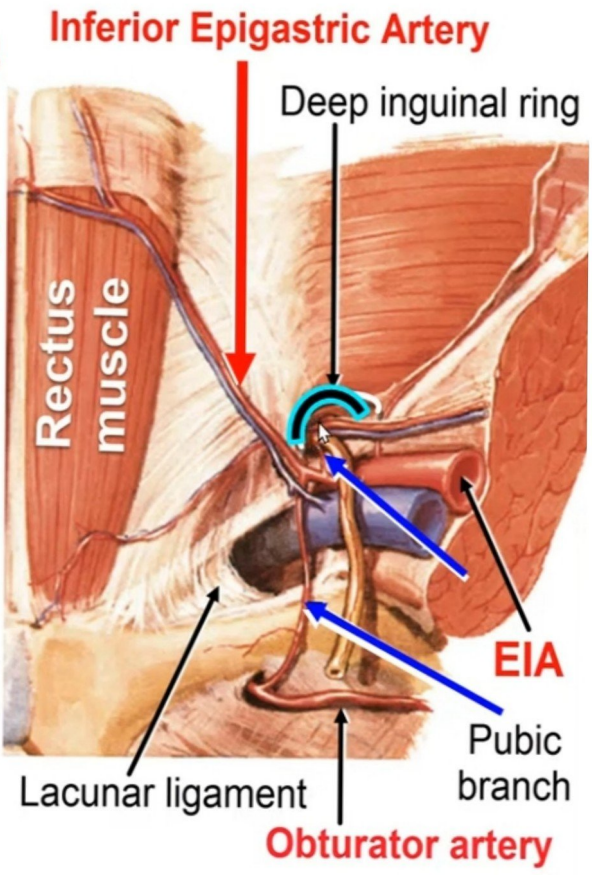




Inferior Epigastric Artery

- From the external iliac Art
- Medial to the deep inguinal ring
- Enters the rectus sheath
- **Has 2 branches:**
  1. Pubic branch:

     clinical importance?
  2. Cremastric artery



Venous Drainage

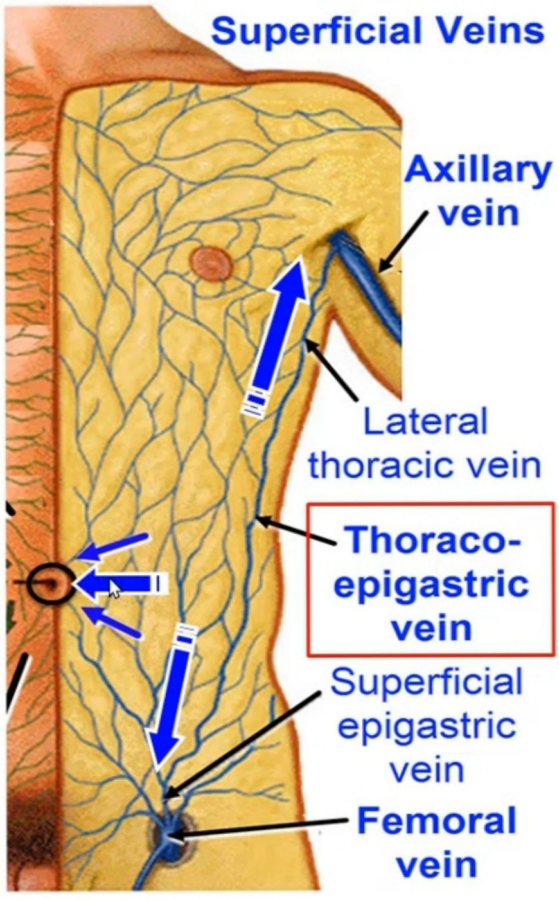
Superficial Veins:

They drain into 3 sites:

Superiorly: lateral thoracic vein ⇨ axillary vein

Inferiorly: superficial epigastric vein ⇨ great saphenous vein ⇨ femoral vein

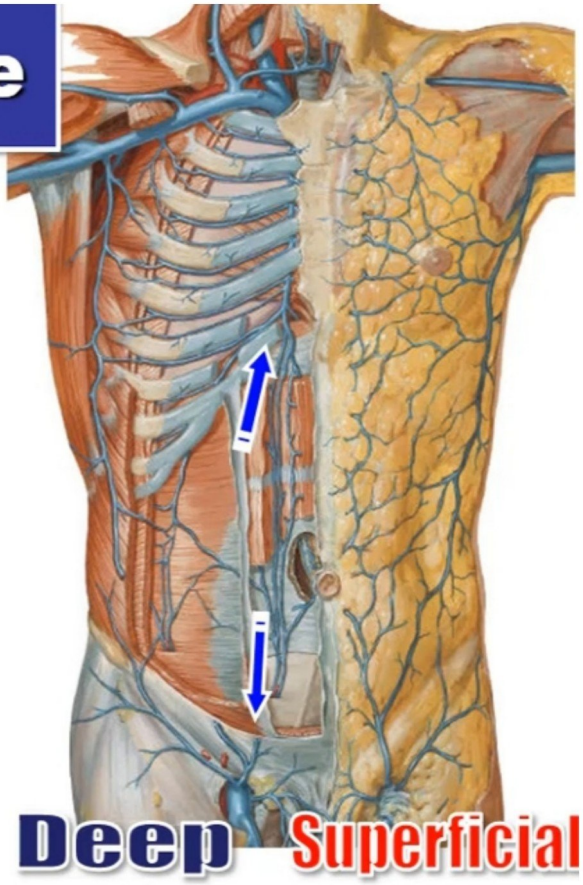
Medially: paraumbilical veins ⇨ portal vein



Venous Drainage

6 Deep Veins:

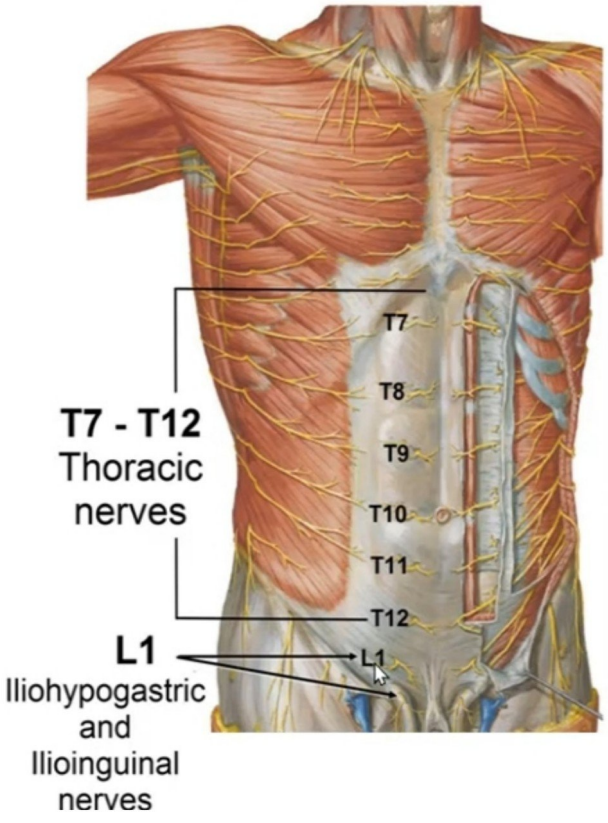
- Superior epigastric & Musculophrenic Veins
  ⇨ **Internal thoracic vein**
- Inferior epigastric & Deep circumflex iliac Veins
  ⇨ **External iliac Vein**
- Posterior intercostal veins
  ⇨ **Azygos vein**
- Lumbar veins
  ⇨ **Inferior vena Cava**



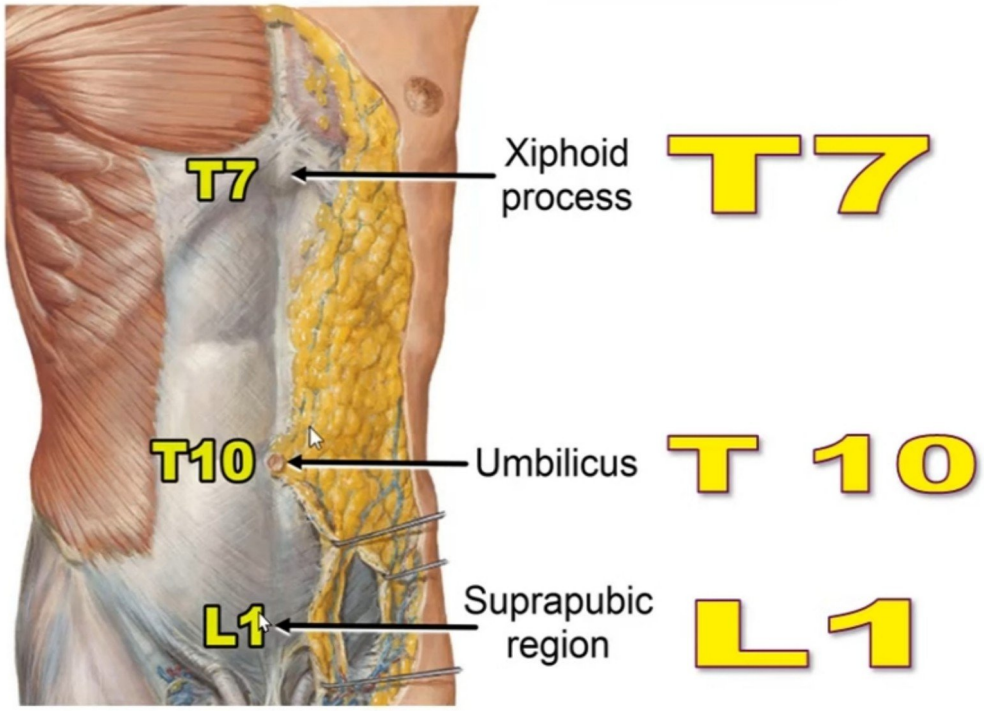
NERVE SUPPLY

Lower 6 thoracic nerves
T7 – T12
and
Iliohypogastric & ilioinguinal nerves
L1

Nerve Supply of the Anterior Abdominal Wall



DERMATOMES



Lymph Drainage

Skin

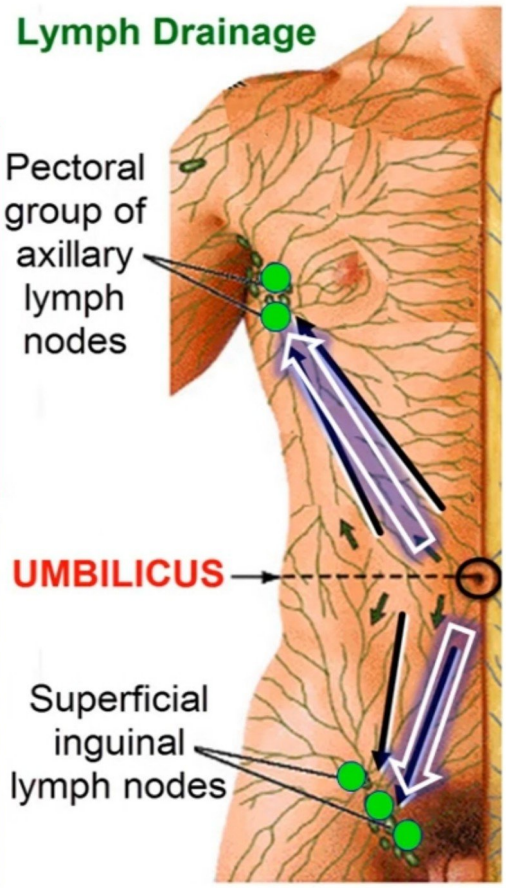
Above the umbilicus: to anterior axillary (pectoral) lymph nodes

Below the umbilicus: to superficial inguinal lymph nodes

Deep Structures

With the deep arteries to

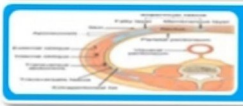
1. Internal thoracic lymph nodes
2. External iliac lymph nodes
3. Para-aortic lymph nodes



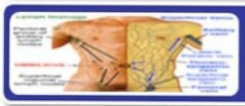
Anterior Abdominal Wall


Bony Landmarks

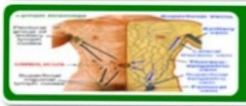

Surface Landmarks


Structure & Layers


Arterial Supply

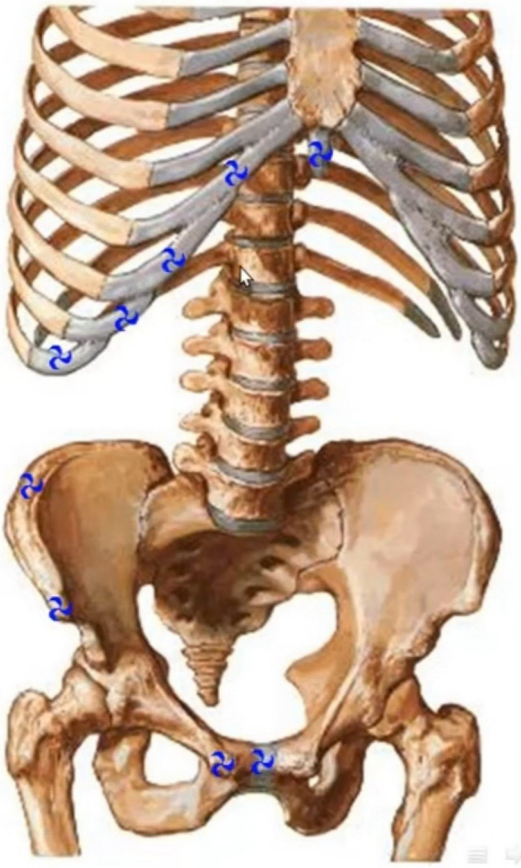

Venous Drainage


Nerve Supply

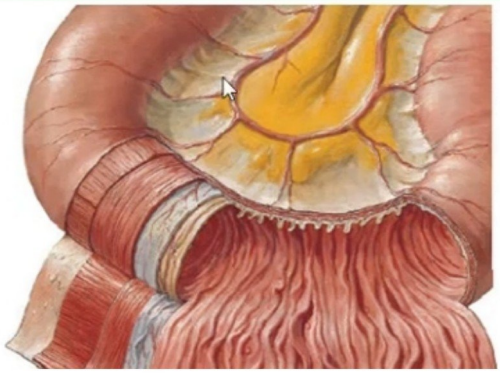

Lymph Drainage

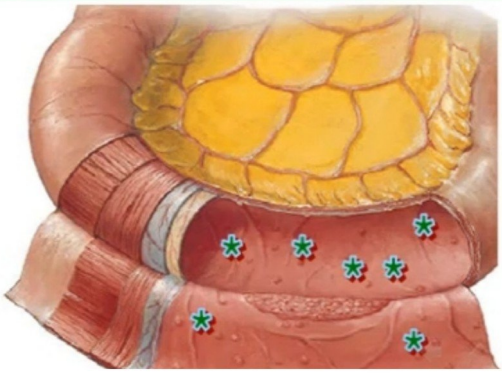
BONY LANDMARKS

- ❑ Xiphoid process
- ❑ Costal margin
- ❑ Iliac crest
- ❑ Anterior sup iliac spine
- ❑ Pubic tubercle & crest
- ❑ Pubic symphysis



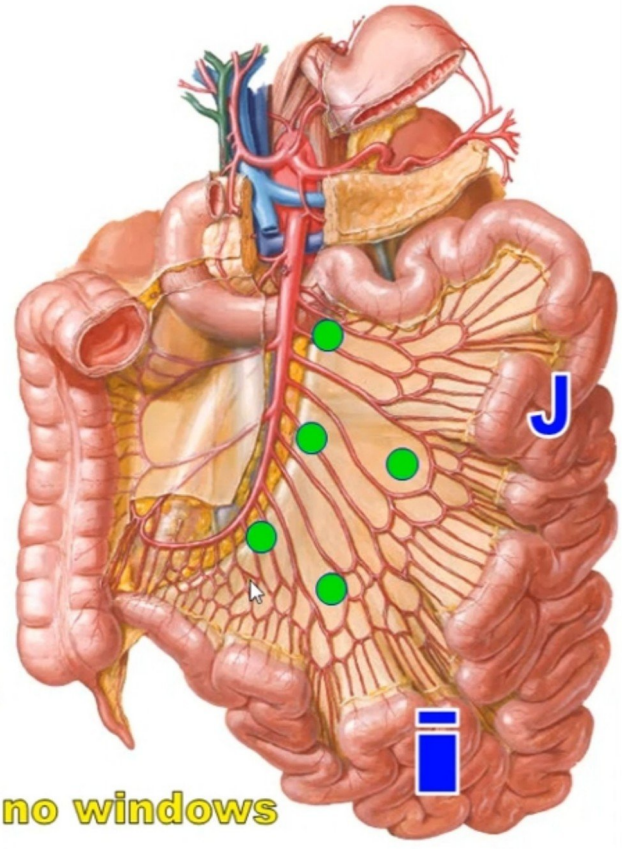
JEJUNUM	ILEUM
JEJUNAL ARTERIES: form 1 - 2 simple arcades	**ILEAL ARTERIES:** form 3 - 4 complicated arcades
MESENTERIC FAT: Small amount forming windows between the arteries	**MESENTERIC FAT:** Large amount forming no windows between the arteries
LYMPHOID FOLLICLES: Absent I the upper part Few in the lower part	**LYMPH DRAINAGE:** Solitary and aggregations in the lower part called Peyer's patches





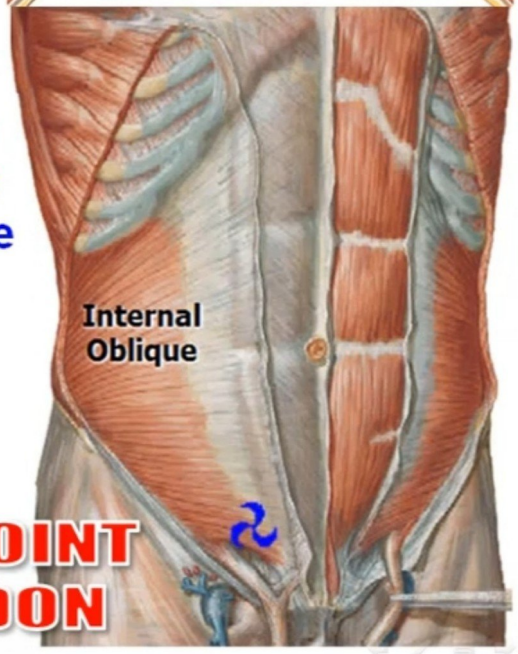
CONTENTS OF THE MESENERY

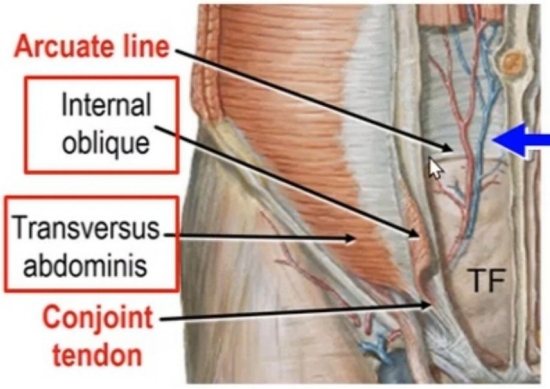
1. Jejunum & ileum in free border
2. Superior mesenteric vessels in the root
3. Jejunal & ileal branches which anastomose forming arcades. From the terminal branches, vasa racta supply the intestine
4. Sympathetic fibers around the blood vessels
5. Mesenteric lymph nodes
6. Extraperitoneal fat:
   a. Less in the jejunal part forming windows
   b. Dense in the ileal part: no windows



Internal Oblique Aponeurosis

1. **At the lateral border of the rectus muscle:** it splits into 2 layers
2. **Lower part of the muscle:** fuses with the transversus abdominis
   ⇨ form the **Conjoint Tendon**
3. **Lower border of the aponeurosis:** fuses with that of the **transversus abdominis** to form the **arcuate line**





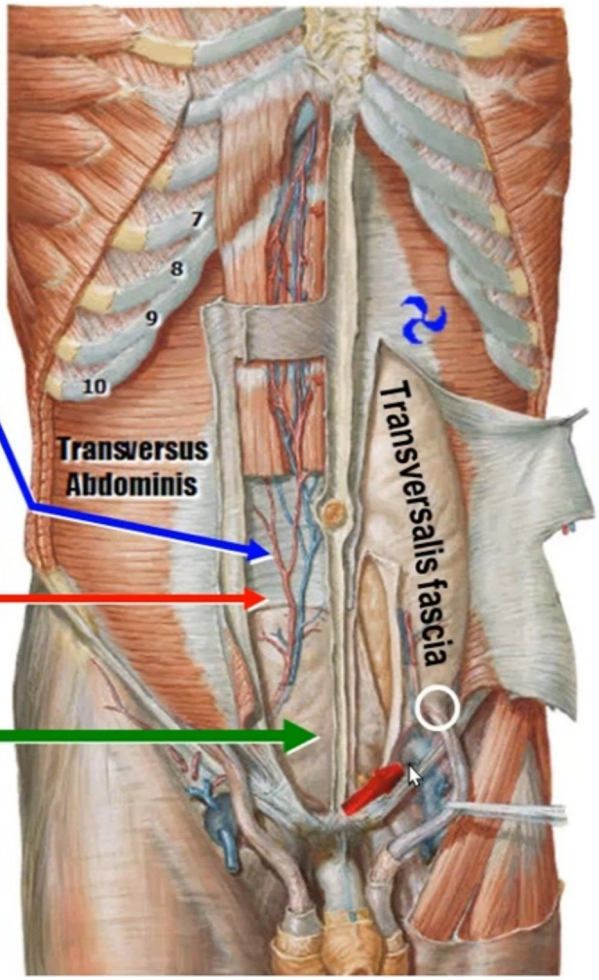
Features of Transversus Abdominis

Forms the Posterior wall of the Rectus Sheath

Arcuate Line: Lower border of internal oblique & transversus abd aponeurosis

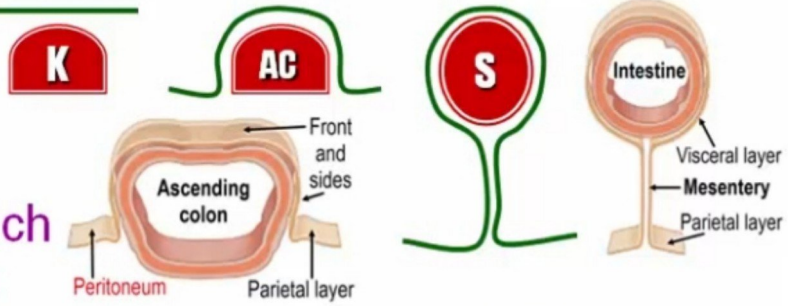
Transversalis Fascia: lines the musle and contains the deep inguinal ring

Iliopubic tract: thickened band of transversalis fascia over the external iliac vessels



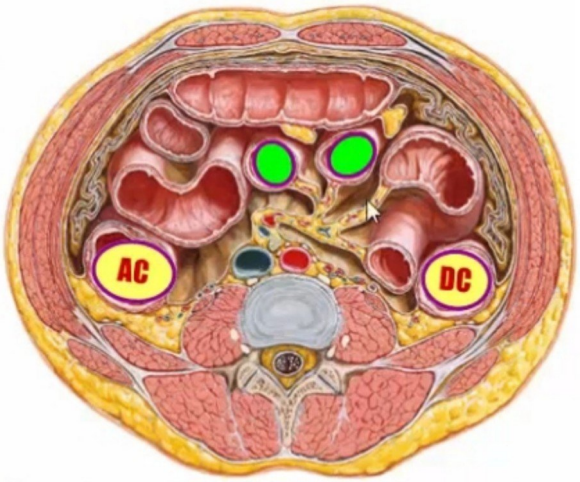
PERITONEAL FOLDS

FORMATION:



NAMES:

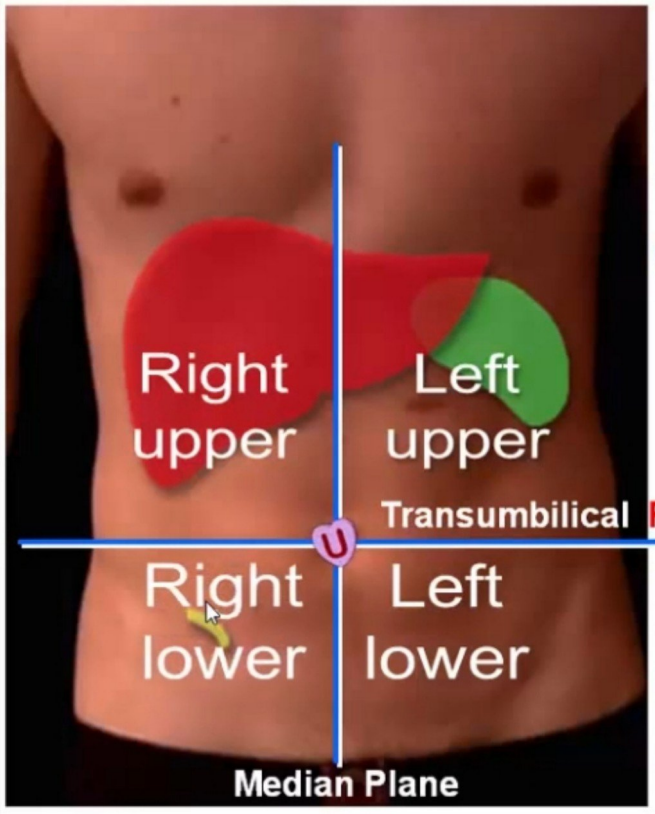
1. **Omentum:** stomach
   - **a.** Greater omentum
   - **b.** Lesser omentum
2. **Mesentery:** small intestine
3. **Mesocolon:** large intestine
4. **Ligaments:** liver & spleen
   - **a.** Falciform ligament
   - **b.** Coronary & triangular lig.
   - **c.** Gastrosplenic ligament
   - **d.** Lienorenal ligament

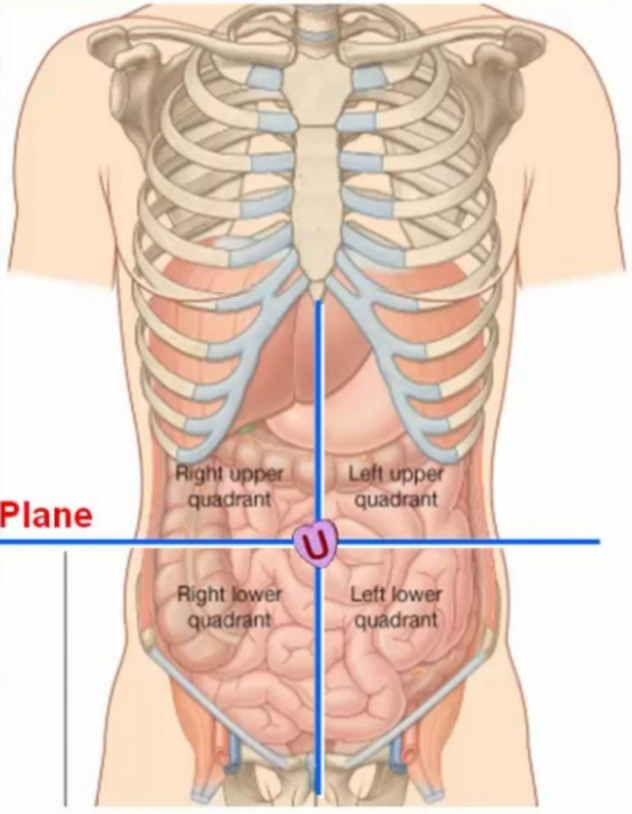


FUNCTION:

Transmit vessels, nerves & lymphatics to supply the viscera

4 Quadrants of the Abdomen





Internal Oblique Muscle

ORIGIN

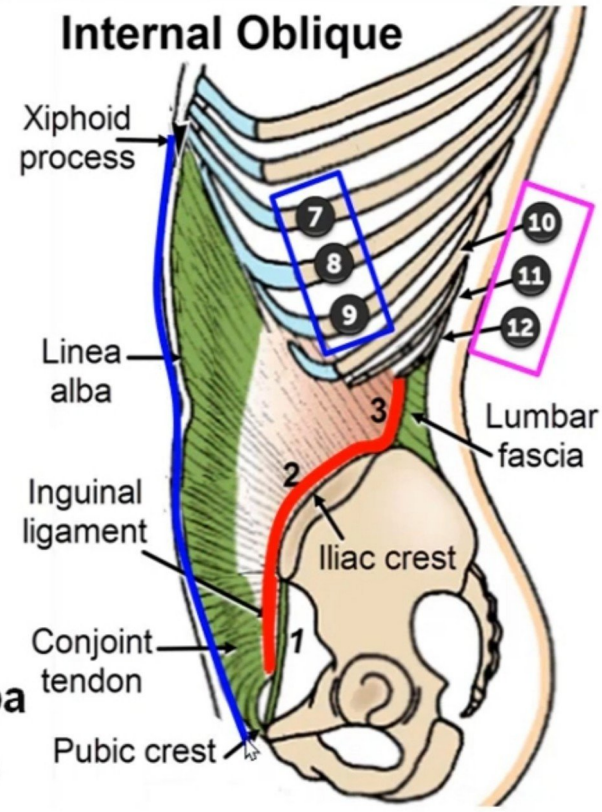
1. Lateral 2/3 of the inguinal ligament.
2. Iliac crest (middle area).
3. Lumbar fascia

INSERTION

A. Fleshy fibers: last 3 ribs

B. Aponeurosis: inserted into

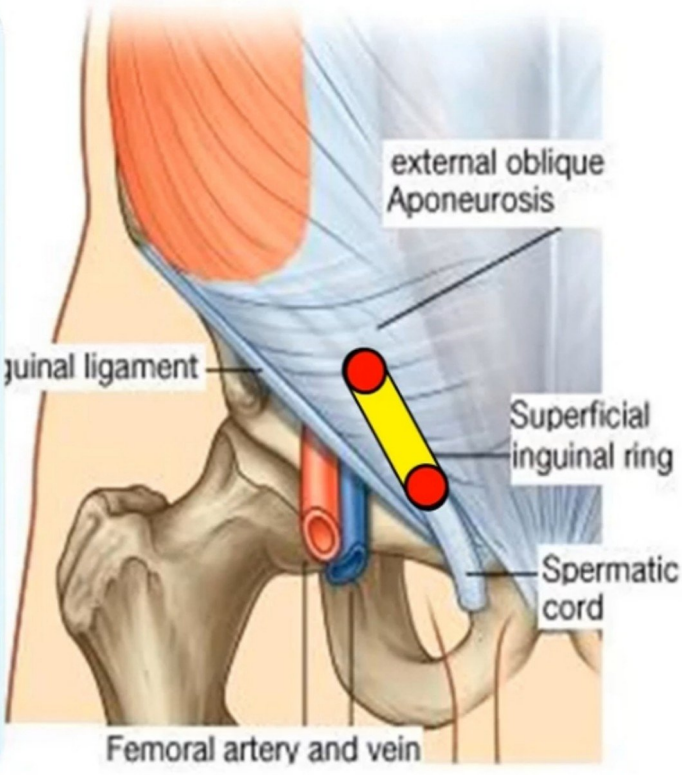
1. Next 3 costal cartilages
2. Xiphoid process & linea alba
c. Pubic crest & pectineal line

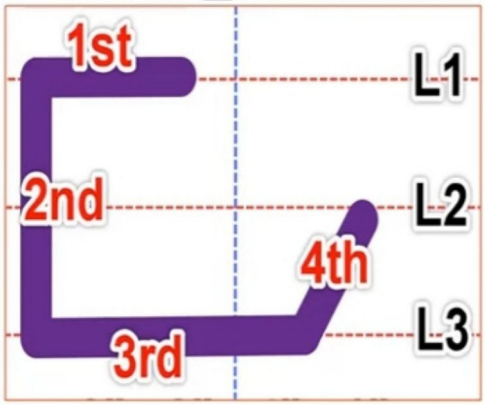


Inguinal Canal

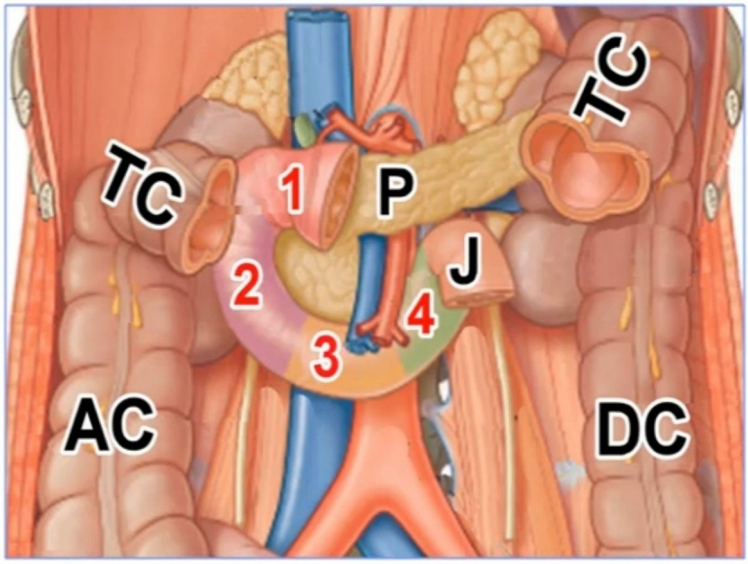
Oblique fibromuscular canal above the medial half of the inguinal ligament

- Location
- Length: 4cm; 1.5 inches
- Direction
- Extent: From - To
- Boundaries
- Contents
- Clinical Importance
- Mechanics





2"-3"-4"-1"



External Oblique Muscle

ORIGIN

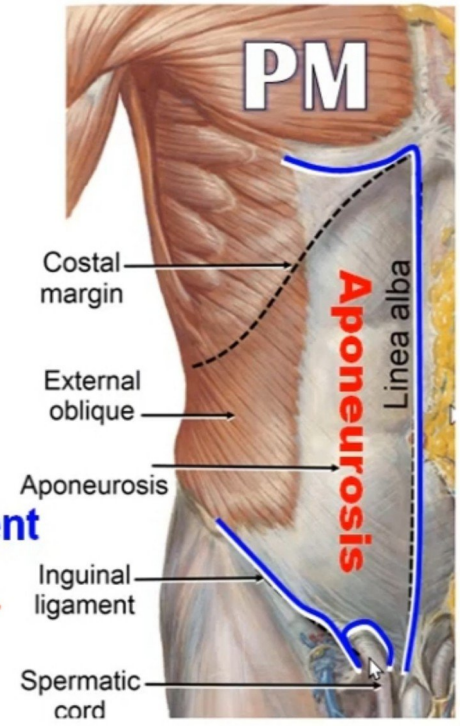
Lower 8 ribs

INSERTION

1. Fleshy fibers: iliac crest
2. Aponeurosis:
   - a. Upper part: to xiphoid process & gives origin to pectoralis major
   - b. Middle part: to linea alba
   - c. Lower part: forms inguinal ligament

@ Contains the superficial inguinal ring.

@ Extension from the margin forms the external spermatic fascia



What are the functions of the liver?

1. **Produces bile**
2. **Produces** the blood proteins (albumin)
3. **Stores glucose** as glycogen
4. **Stores** fat soluble **vitamins** (A, D, E, K)
5. **Metabolizes** lipids and amino acids
6. **Detoxifies** drugs, alcohol and poisons

What is the function of the gall bladder?

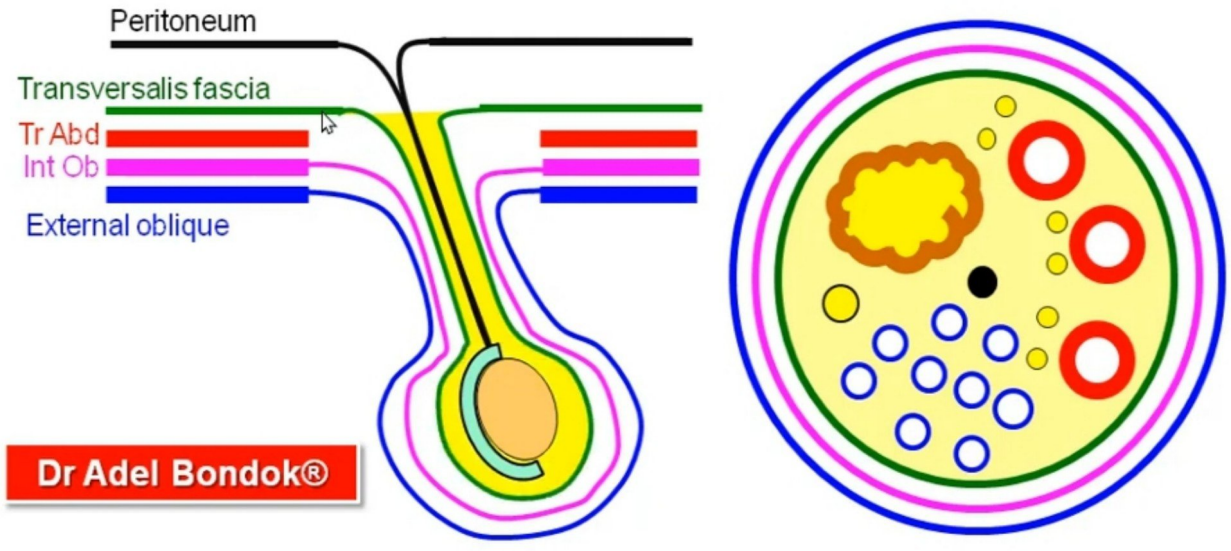
Storage and concentration of bile

What are the functions of the pancreas?

1. **Exocrine part:** pancreatic juice (digestive enzymes)
2. **Endocrine part:** produces **insulin** & **glucagon**

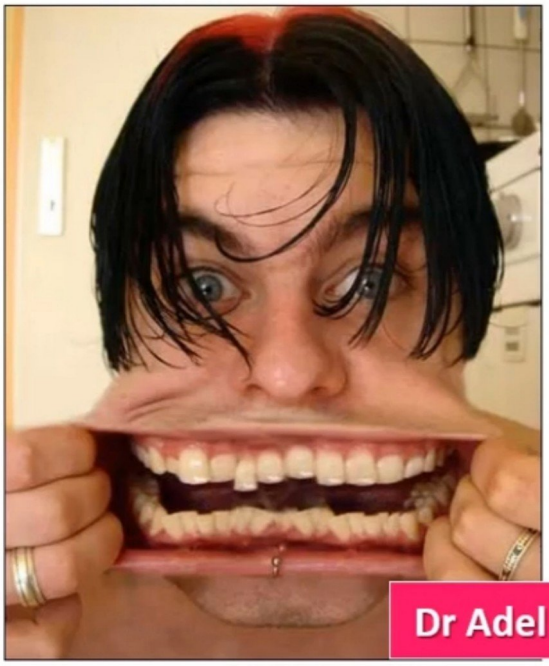
Covering of the Spermatic Cord

1. **External spermatic fascia:** from external oblique aponeurosis
2. **Cremasteric muscle and fascia:** from the internal oblique.
3. **Internal spermatic fascia:** from transversalis fascia



What is the name of this space?

Which salivary duct opens into it?



Dr Adel Bondok®

6 ABDOMINAL PLANES

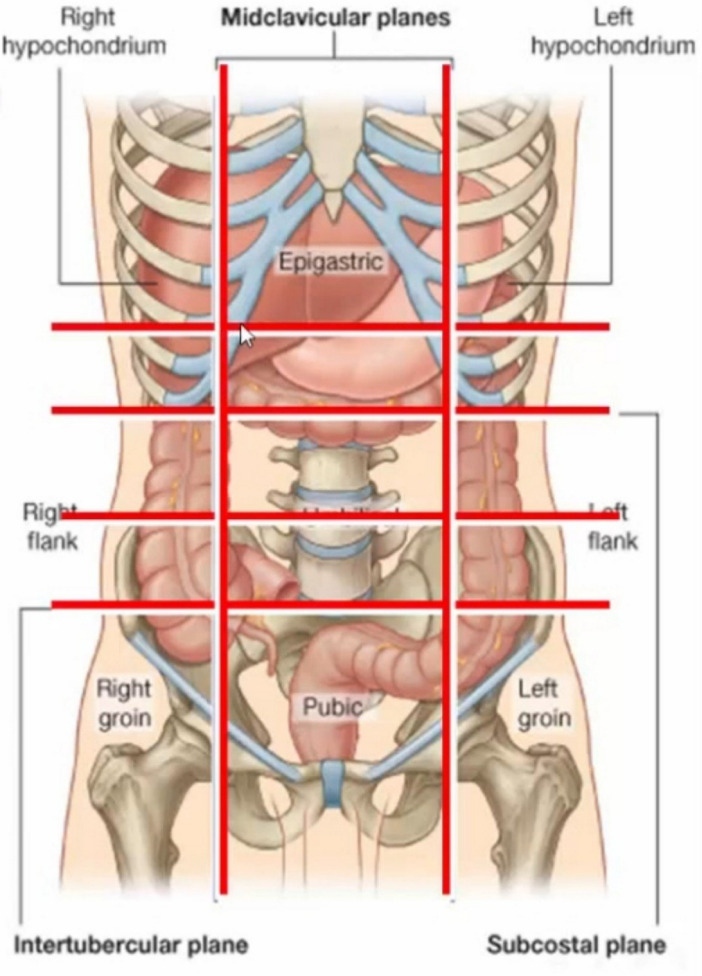
Transpyloric Plane:
L1

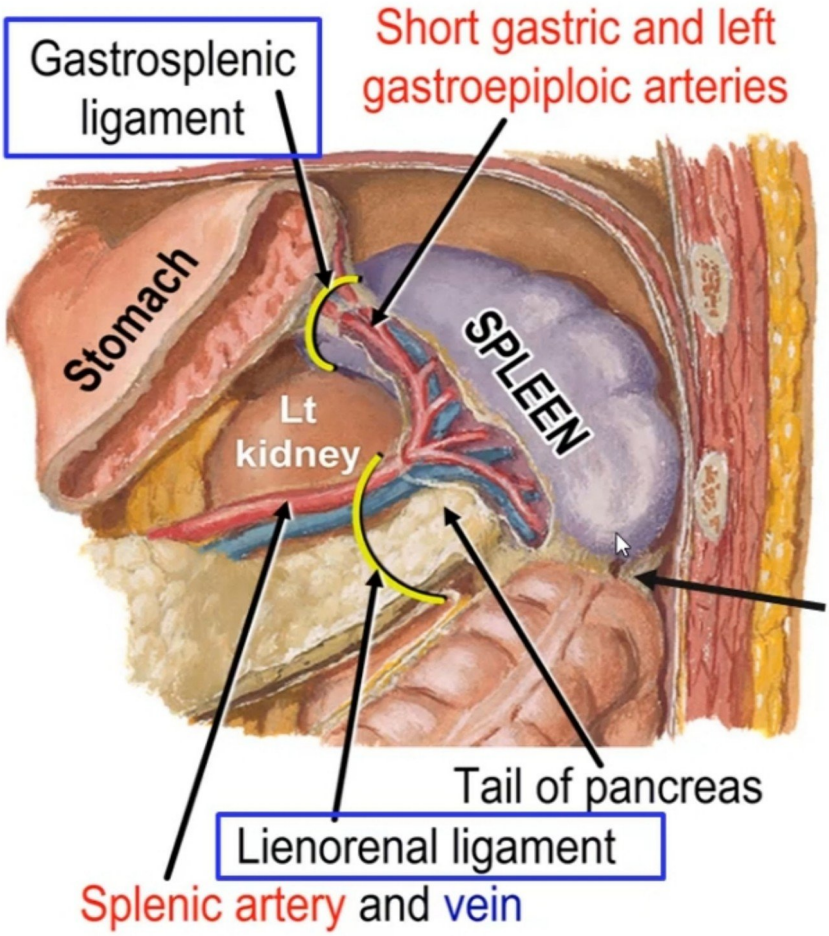
Subcostal Plane:
L3

Intercristal Plane:
L4

Intertubercular Plane:
L5

Lateral Vertical Plane:
Tip of the 9th costal cart





LIGAMENTS

Phrenico-Colic Ligament

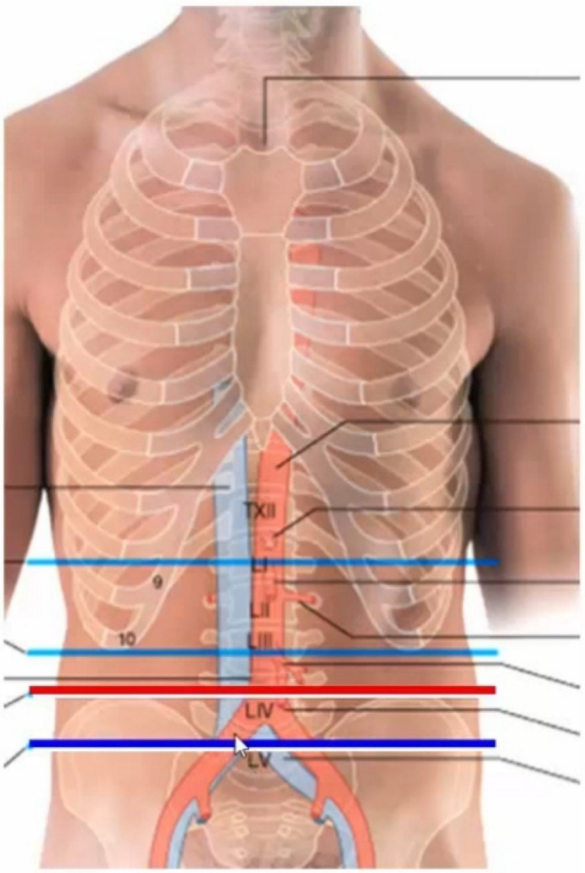
INTERCRISTAL PLANE

IDENTIFICATION

1. Level of L4
2. Between the highest points of the iliac crest

STRUCTURES AT THIS LEVEL

Bifurcation of the abdominal aorta



INTERTUBERCULAR PLANE

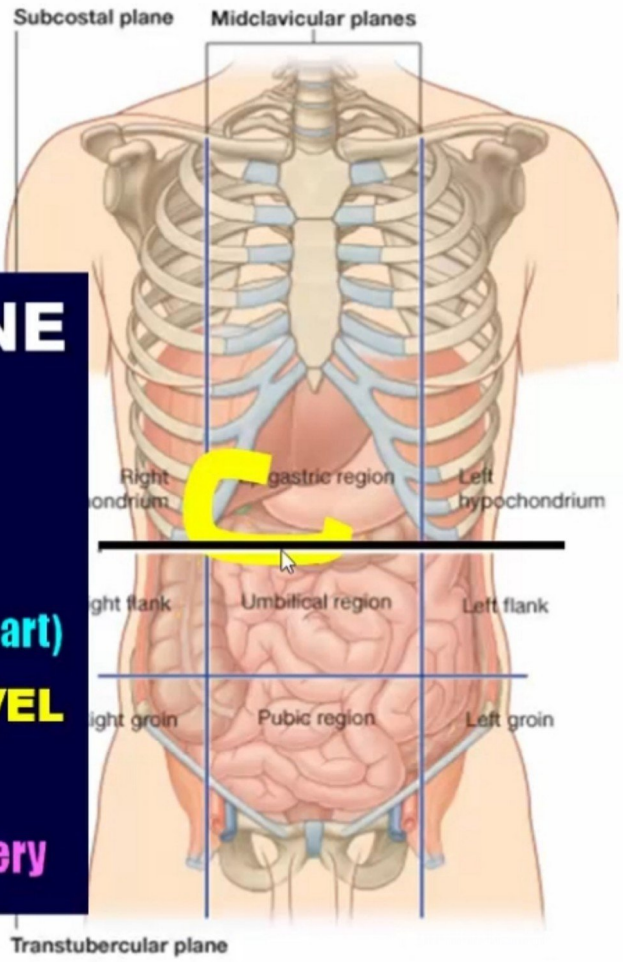
IDENTIFICATION

1. Level of L5
2. Between the tubercles of the iliac crest

STRUCTURES AT THIS LEVEL

Beginning of the inferior vena cava

IMPORTANT PLANES OF THE ABDOMEN



SUBCOSTAL PLANE

IDENTIFICATION

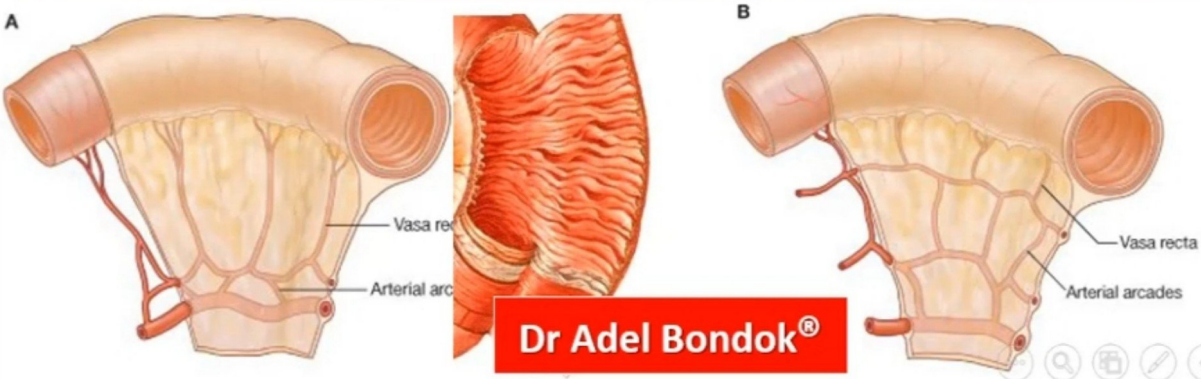
1. Level of L3
2. Between the lower points of the costal margin (blow the 10th cost cart)

STRUCTURES AT THIS LEVEL

1. 3rd part of the duodenum
2. Origin of the inf mesenteric artery

List 4 differences between Jejunum and Ileum

Jejunum	Ileum
Proximal 2/5 (40%) of the small intestine	Distal 3/5 (60%) of the small intestine
Wider lumen	Narrower lumen
Numerous mucous folds (thick wall)	Few mucous folds (thin wall)
No Peyer's patches	Peyer's patches



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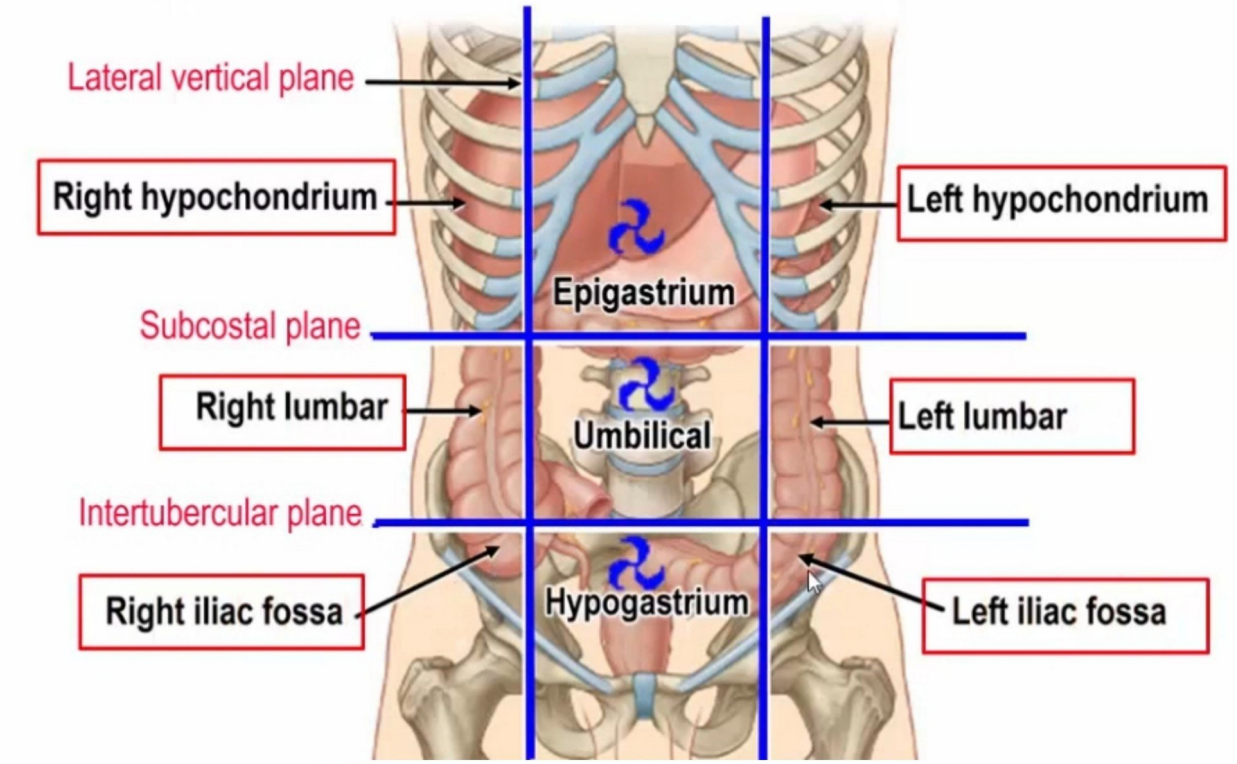
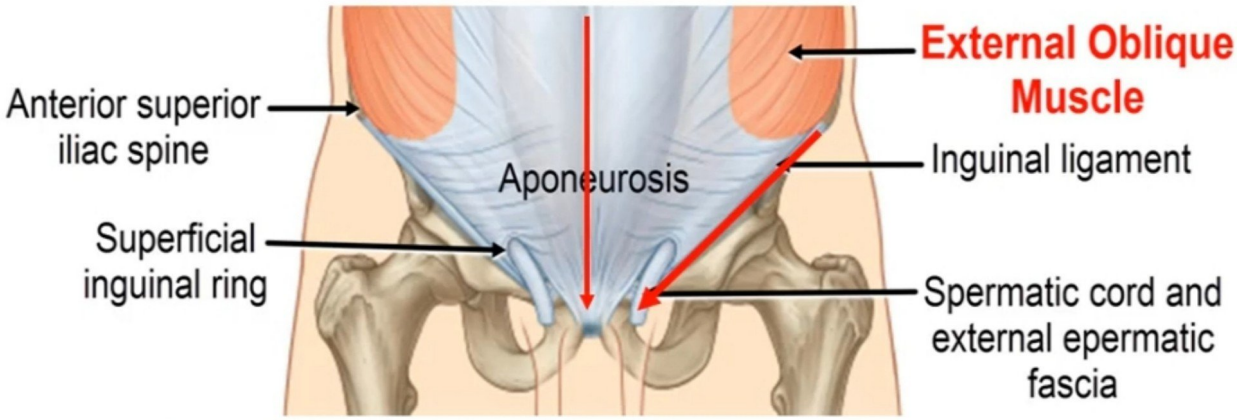
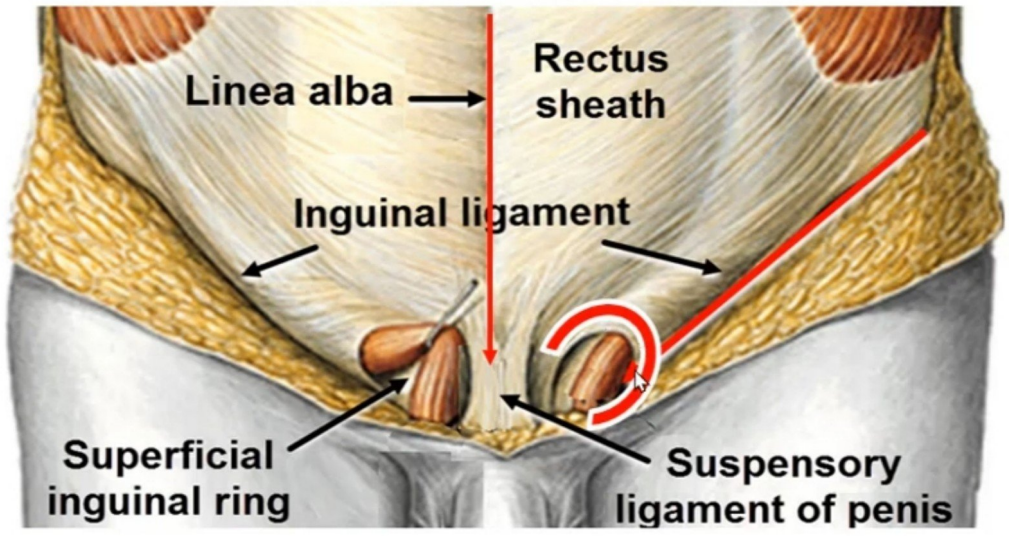
COMPARTMENTS OF THE ABDOMEN

The abdomen is **divided** into **9 Compartments** **by the** 2 Lateral vertical planes & the subcostal & intertubercular planes **:**

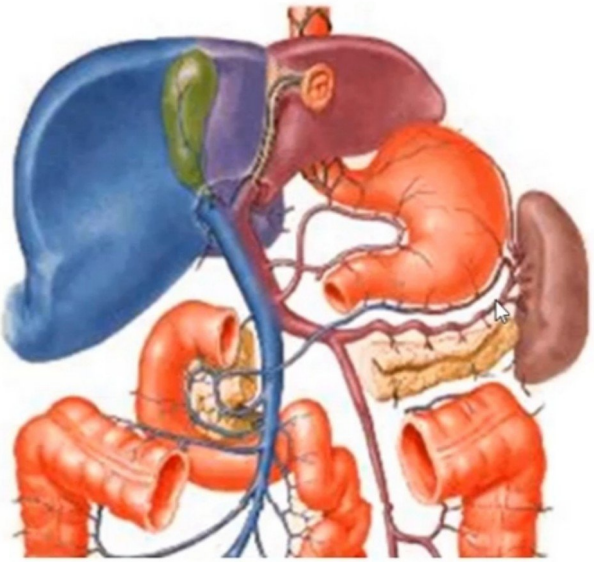


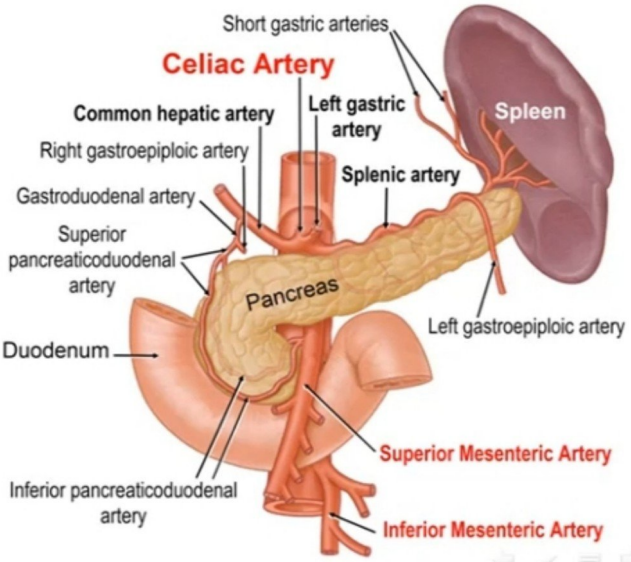




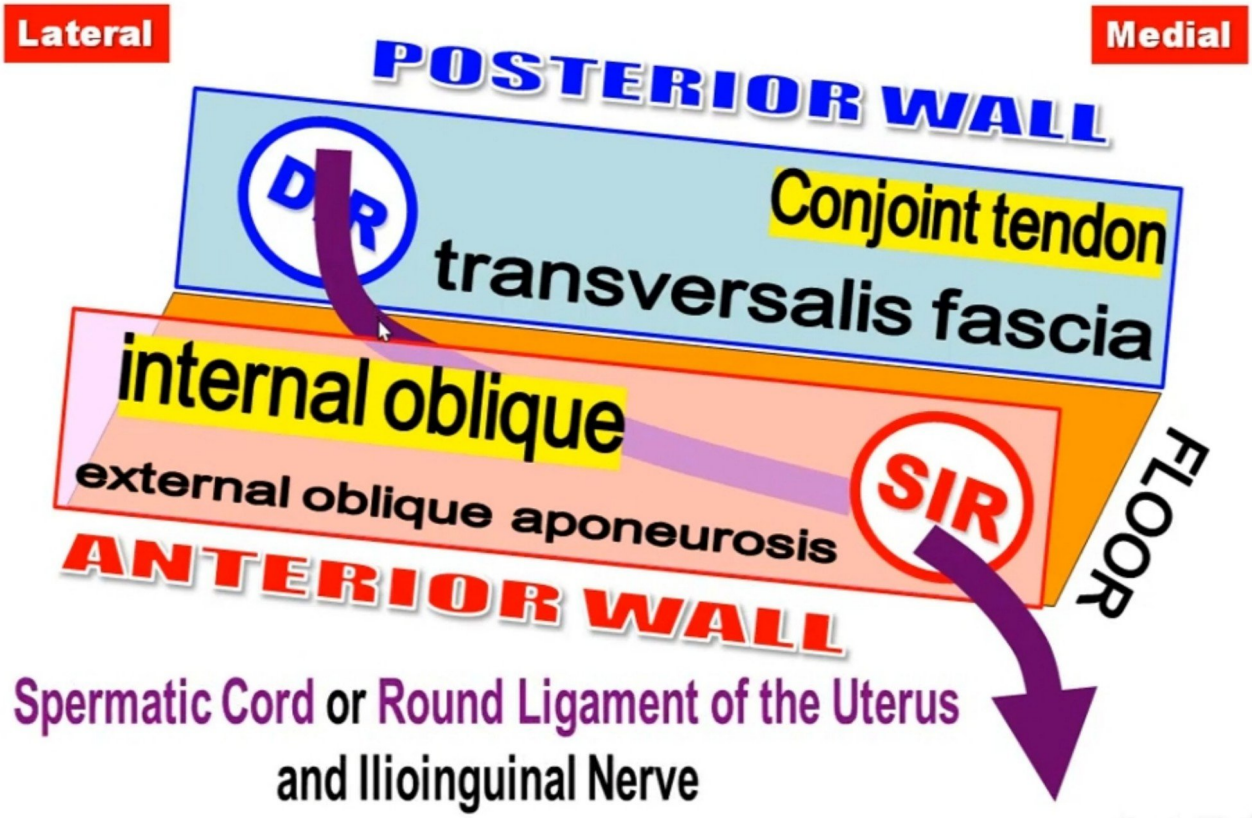
SPLENIC VESSELS

- **Splenic Artery:** from the celiac trunk
- **Splenic Vein:** joins the superior mesenteric vein to form the portal vein





WALLS & CONTENTS



Spermatic Cord or Round Ligament of the Uterus and Ilioinguinal Nerve

Rectus Abdominis

ORIGIN:

1. Symphysis pubis
2. Pubic crest

INSERTION:

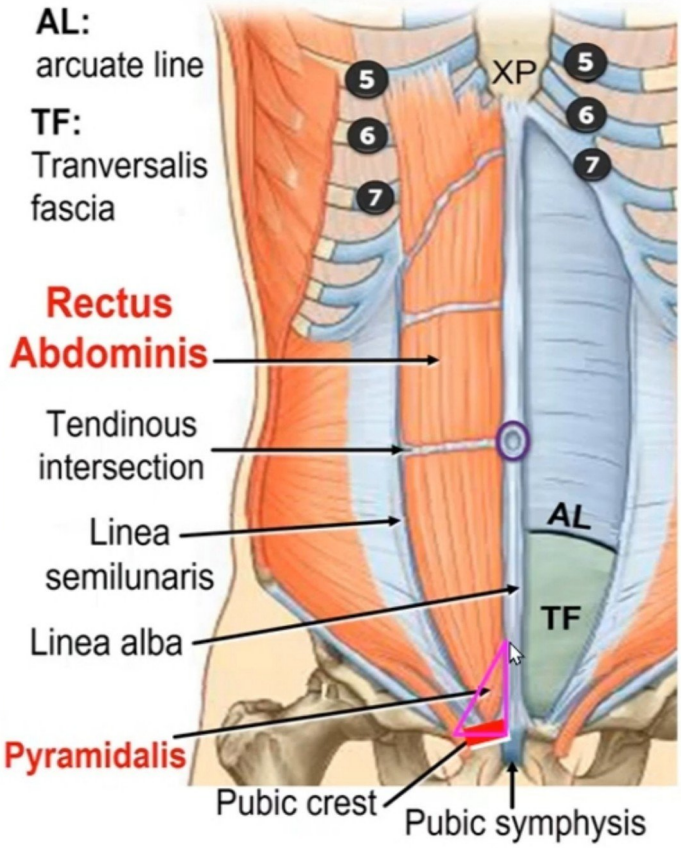
1. 5, 6, 7 costal cartilages
2. Xiphoid process

PYRAMIDALIS

Small triangular muscle that may be absent (7Ps)

Origin: pubic crest

Insertion: linea alba



INGUINAL LIGAMENT

ATTACHMENT

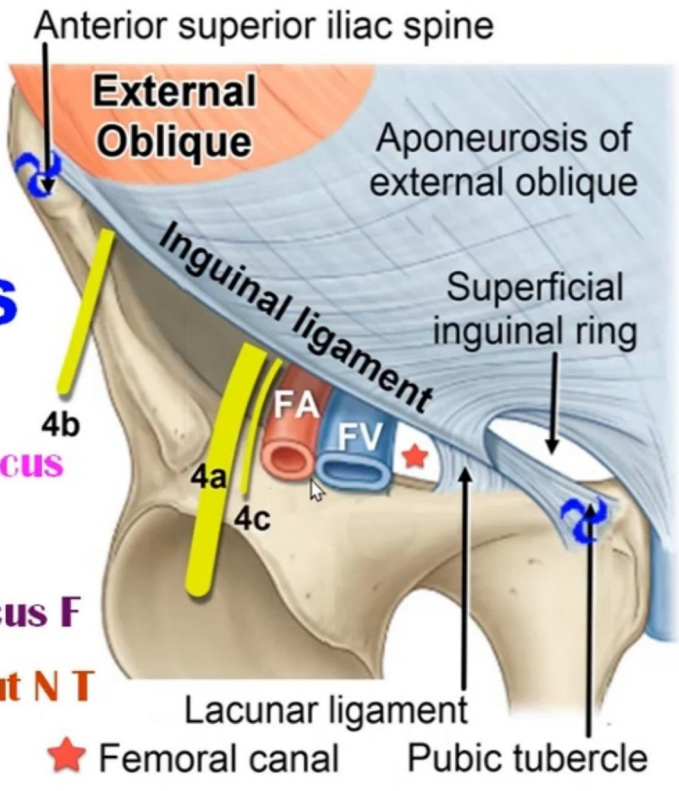
Lateral: ant sup iliac spine

Medial: Pubic tubercle

DEEP RELATIONS

Acts as retinaculum

1. **3 Muscles:** Pec, Ps & Iliacus
2. **2 Vessels:** FA & FV
3. **2 Fascia:** Transv F & Iliacus F
4. **3 Nerves:** GFN, FN, Lat cut N T
5. **Lymphatics**



STOMACH

Position and SA:

Shape & Divisions:

1. 2 Borders: Lesser & Greater Curvature
2. 2 Ends: Cardiac & Pyloric
3. 2 Surfaces: Anterior & Posterior

Peritoneal Covering:

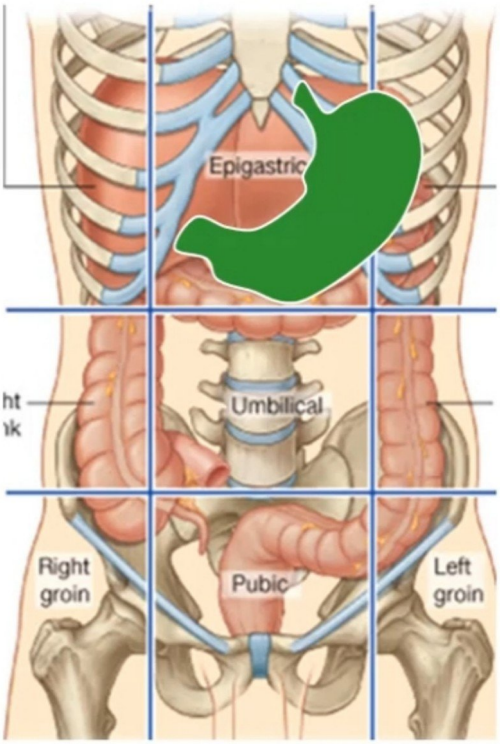
Relations:

Arterial Supply

Venous Drainage:

Nerve Supply:

Lymph Drainage



Which part of the GIT makes the intrinsic factor for vitamin B12 absorption?

The stomach

Where do you find Peyer's patches?

The ileum

What are Peyer's patches?

Aggregations of lymphoid tissue

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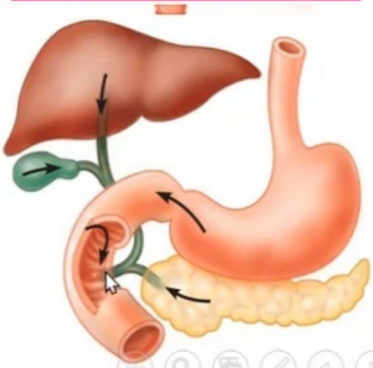
Where does the bile duct open?

The duodenum

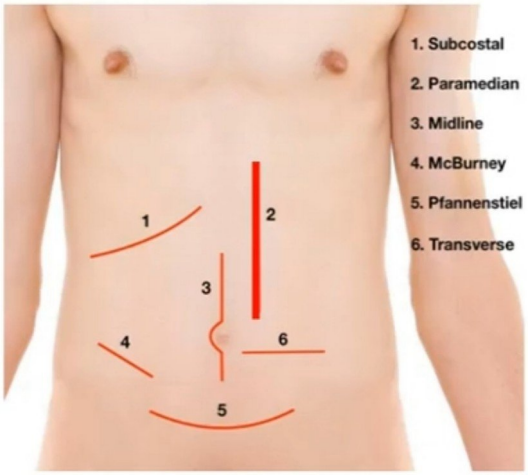
Where does the pancreatic duct open?

The duodenum

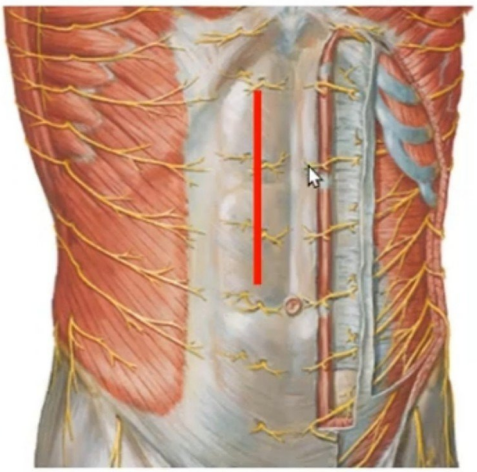


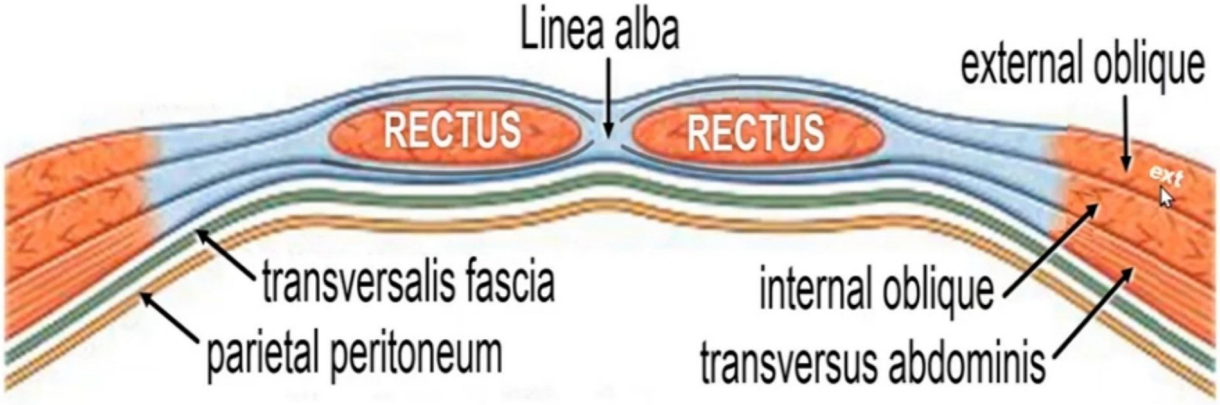
Clinical Note

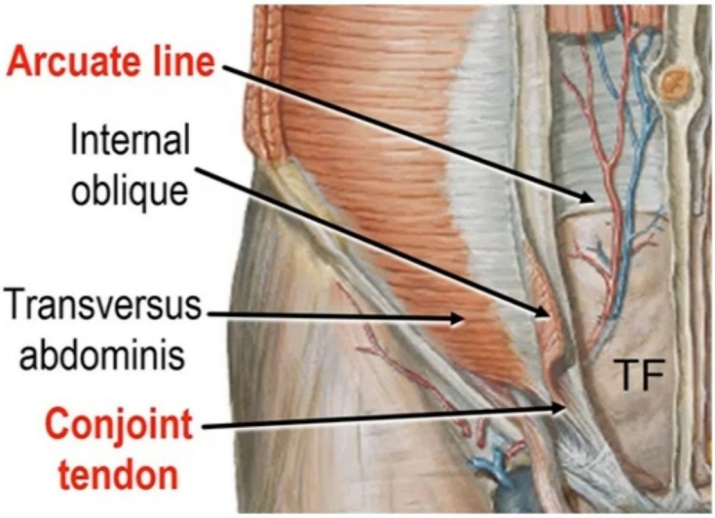
Paramedian Abdominal Incision

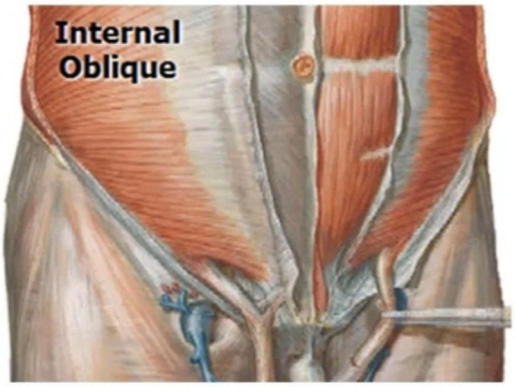


Because the nerves enter the rectus sheath from the lateral side, **after opening** the anterior wall of the rectus sheath **the rectus muscle should be retracted laterally** to avoid injury of the thoracic nerves





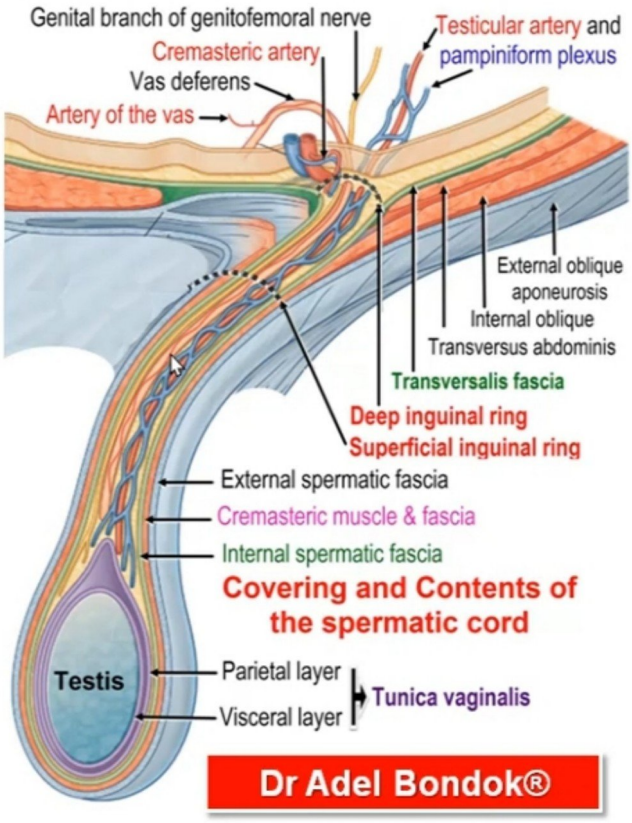


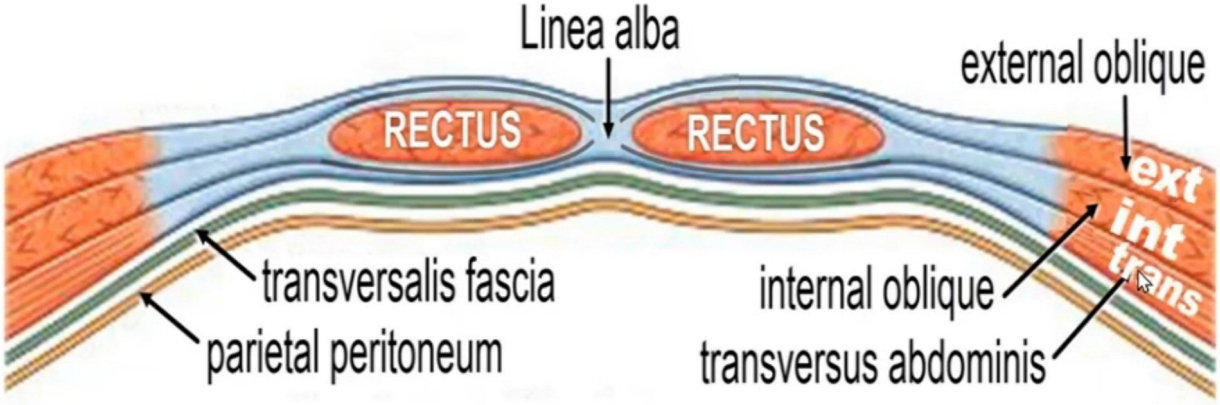


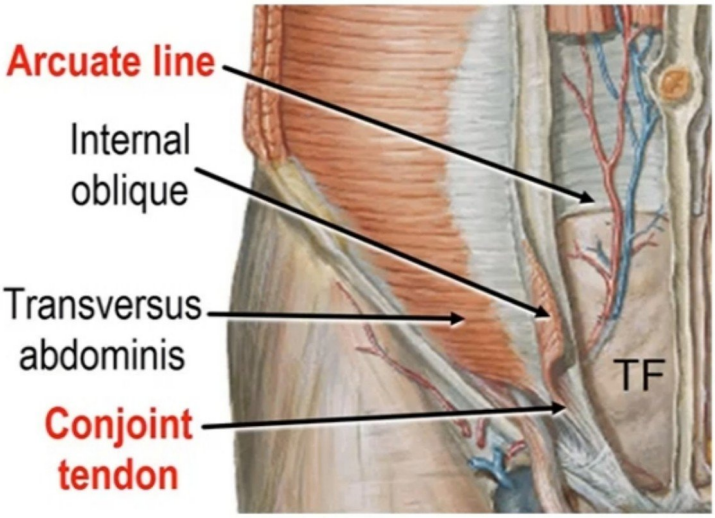
Spermatic Cord

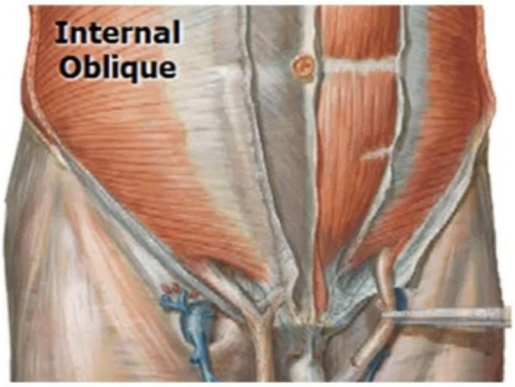
Objectives

- Formation
- Begins at
- Ends at
- Covering
- Contents









Covering of the Spermatic Cord

3 Layers

External spermatic fascia: outer layer

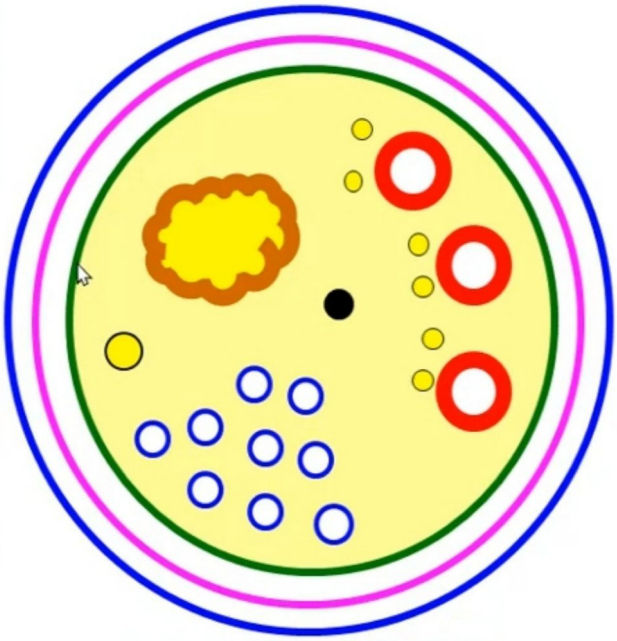
- External oblique aponeurosis

Cremasteric muscle & fascia: middle layer

- Internal oblique muscle

Internal spermatic fascia: inner layer

- Transversalis fascia



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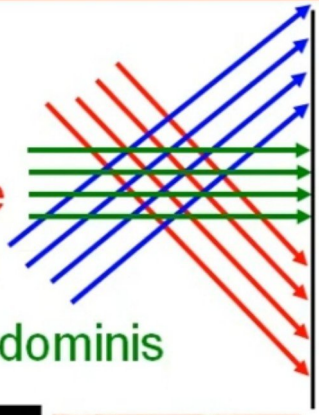
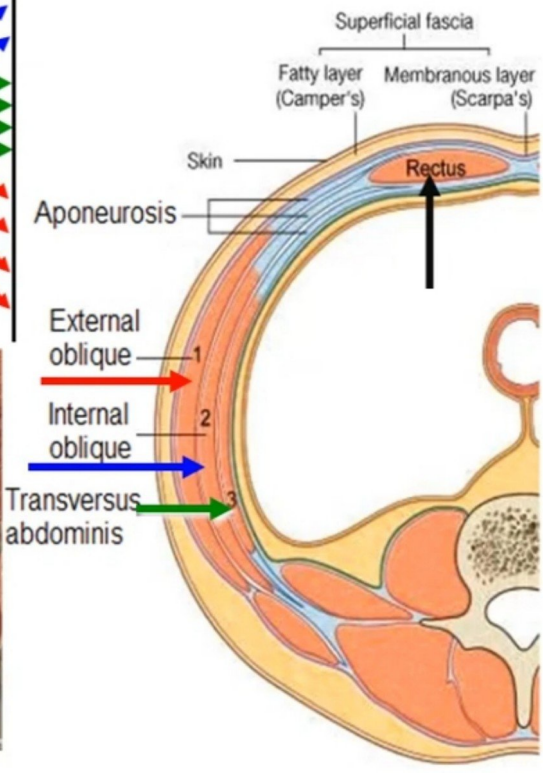
5 Anterior Abdominal Wall Muscles

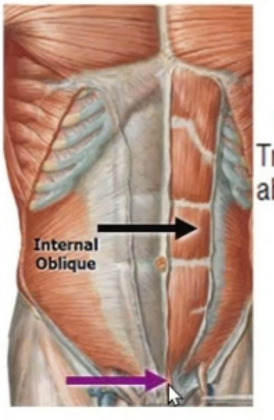
3 OBLIQUE:

1. External oblique
2. Internal oblique
3. Transversus abdominis





Direction of Fibers! Why?



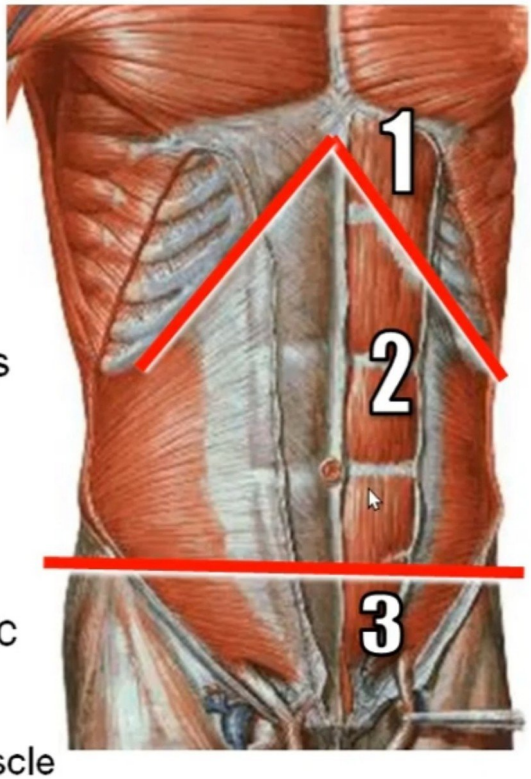
2 VERTICAL:

1. Rectus abdominis
2. Pyramidalis

RECTUS SHEATH

WALLS: 3 Levels

1. Above the costal margin
2. Costal margin to midpoint between umbilicus & symphysis pubis
3. Midpoint between umbilicus & symphysis pubis to symphysis pubis



CONTENTS:

2 Muscles: Rectus & Pyramidalis

2 Vessels: Sup epig & Inf epigastric

Nerves: Lower 6 thoracic nerves

The vessels & nerves lie behind the muscle

Spermatic Cord

Formation:

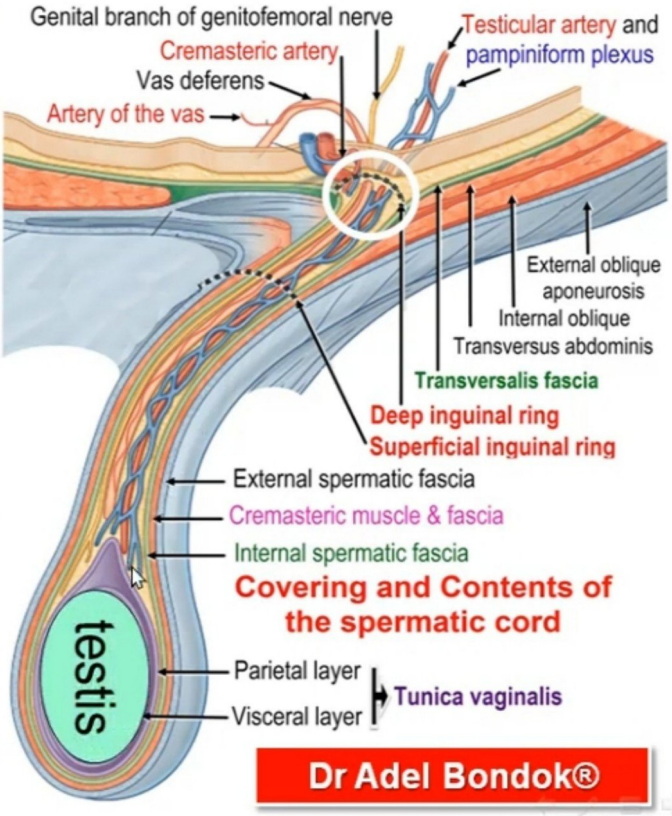
Formed by the structures which pass through the inguinal canal to the testis

Begins at the:

Deep inguinal ring

Ends at the:

Posterior border of the testis



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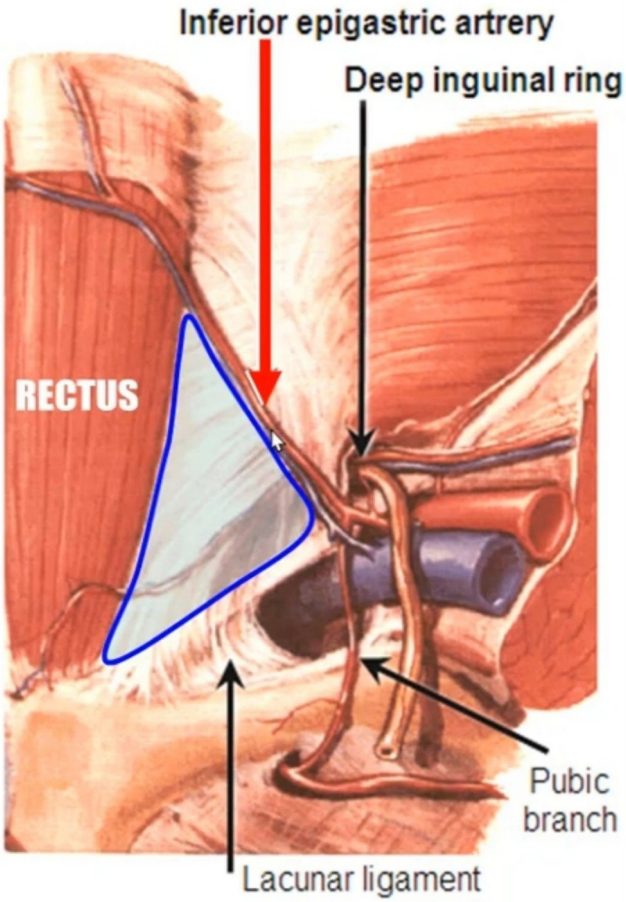
Inguinal Triangle

Boundaries:

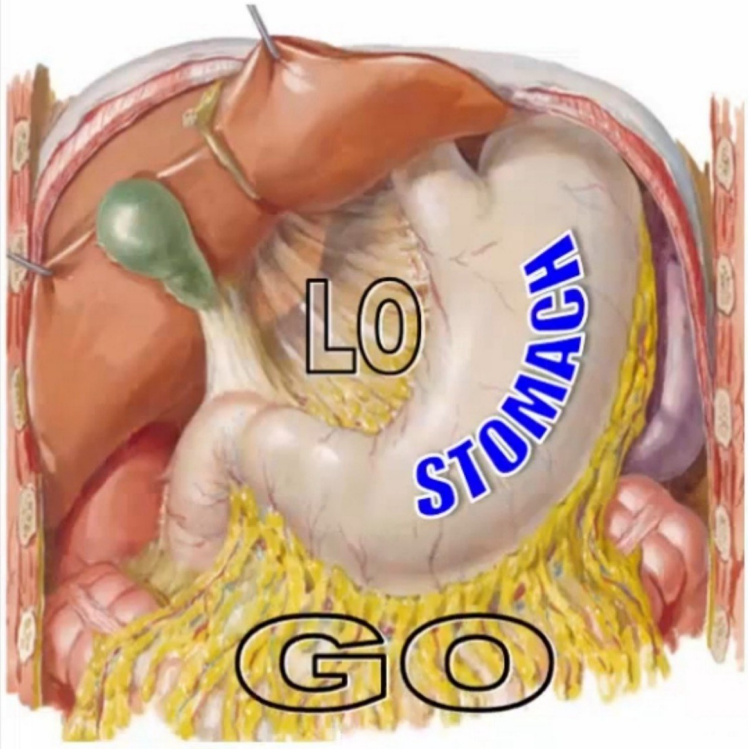
- **Medial:** rectus muscle
- **Lateral:** inf epigastric art
- **Base:** inguinal ligament

Clinical Importance:

- **It gives passage to the direct inguinal hernia**
- **The inferior epigastric artery** is lateral to the direct hernia



OMENTA



What is the length of the esophagus? 25 cm

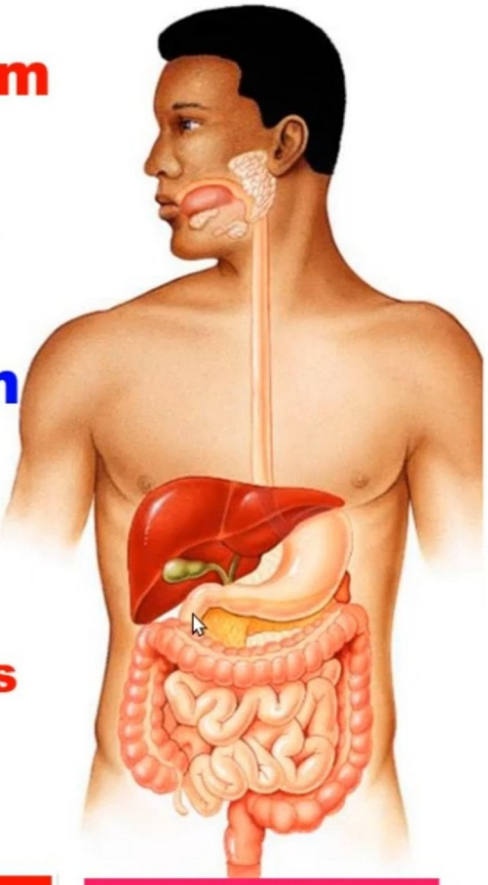
What is the length of the small intestine? 6 m

What is the length of the large intestine? 1.5 m

What are the 3 parts of the small intestine?

1. Duodenum **25 cm; 10 inches**
2. Jejunum **40%; about 2.5 m**
3. Ileum **60%; about 3.5 m**

What is the length of each part?



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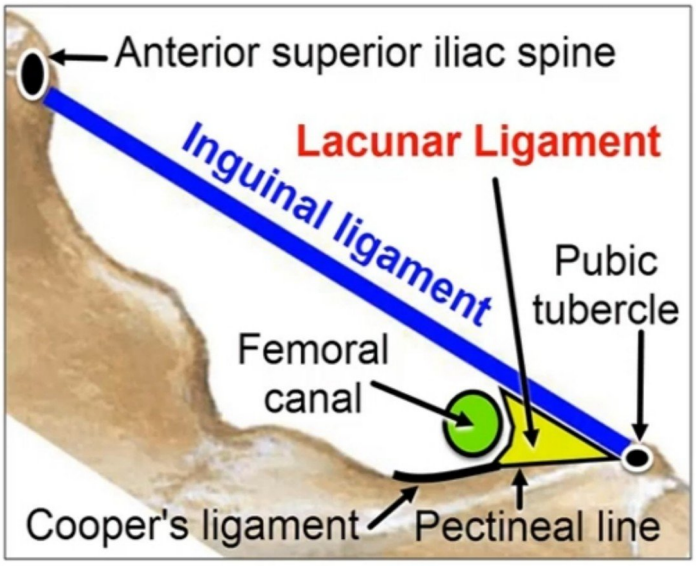
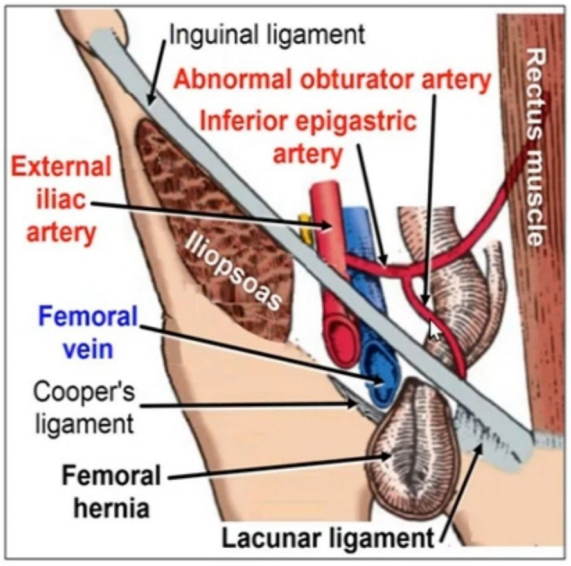




Lacunar Ligament

Cooper's Ligament
"Pecineal Ligament"

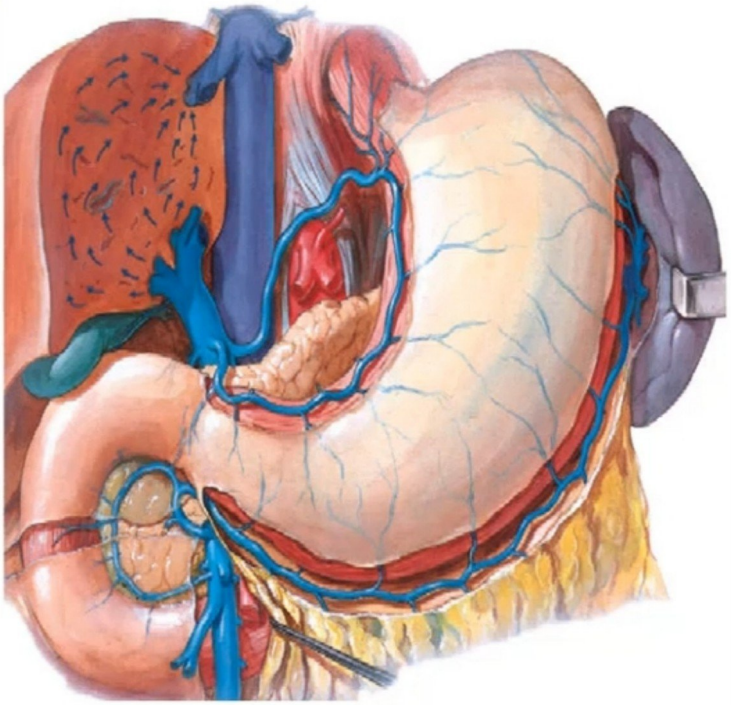
Abnormal obturator artery is related to lacunar ligament and femoral canal

VENOUS DRAINAGE OF THE STOMACH

Into Portal Circulation

Left & Right Gastric V: into portal vein

Left Gastroepiploic & Short Gastric Veins: into the splenic vein

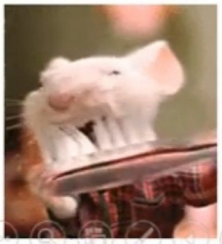


How many permanent teeth?

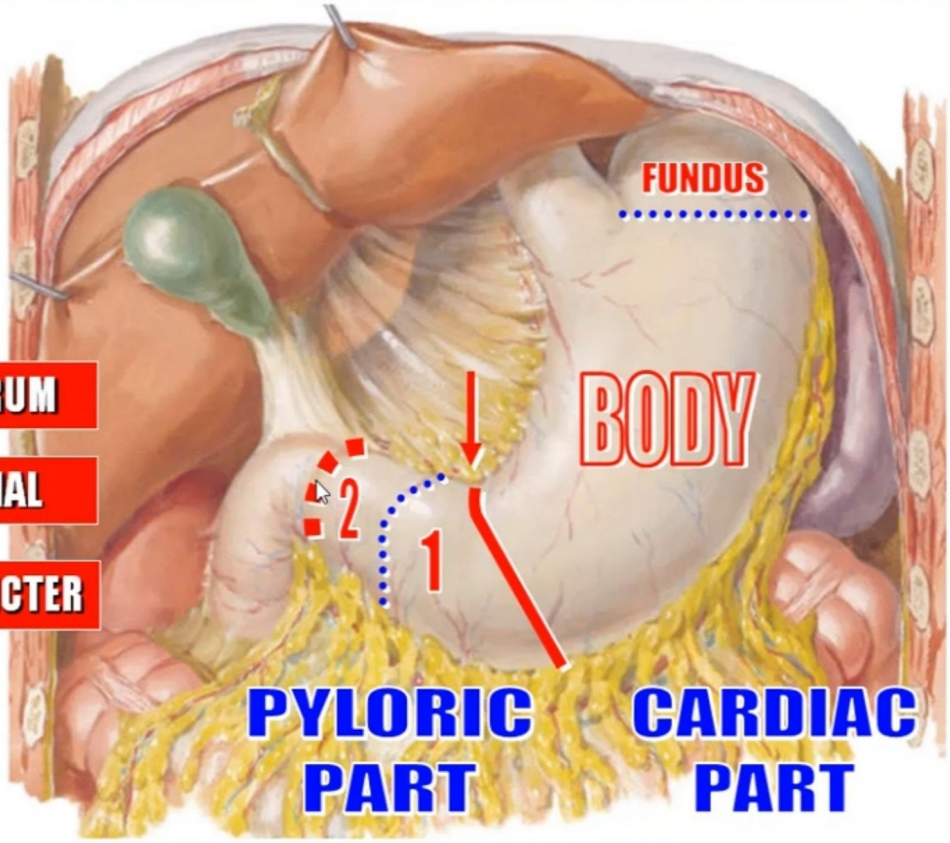
- Adult
- 32

How many deciduous teeth?

- Babies
- 20



DIVISIONS OF THE STOMACH



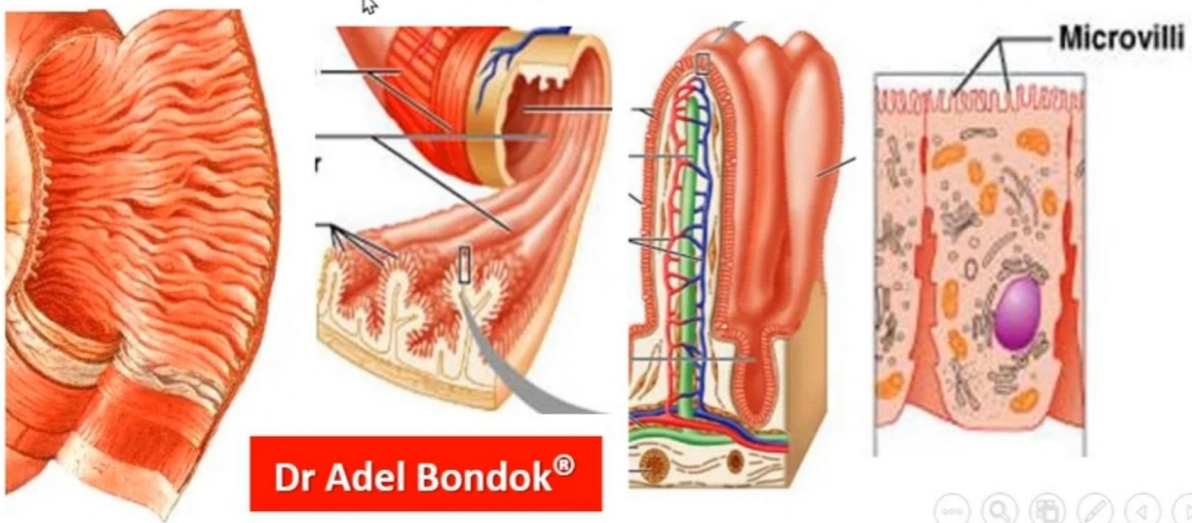
1. PYLORIC ANTRUM
2. PYLORIC CANAL
3. PYLORIC SPHINCTER

What is the main function of the small Intestine

Absorption

What are the structural modifications to increase absorption

1. The mucosa is **folded** (increase the surface area 3 folds)
2. The mucosa has **villi** (increase the surface area 10 folds)
3. The villi has **microvilli** (increase the surface area 20 folds)



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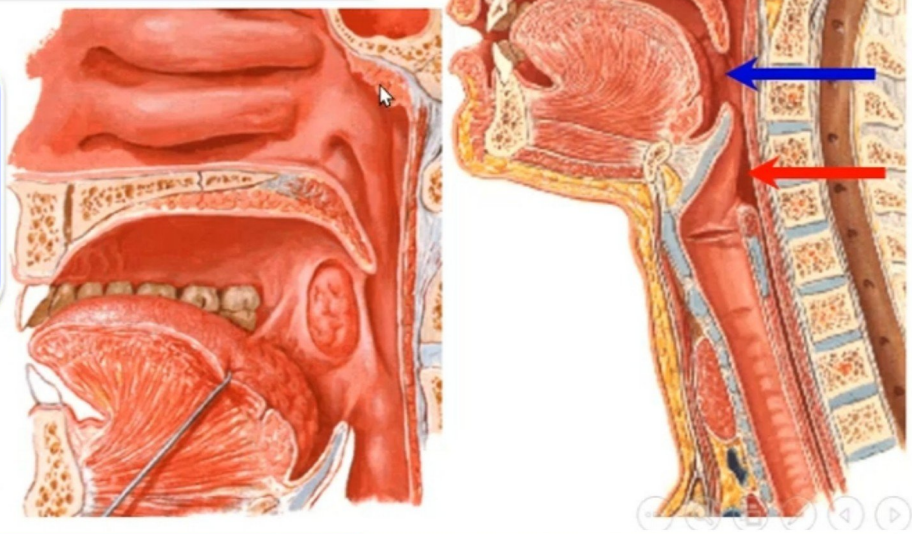
THE PHARYNX

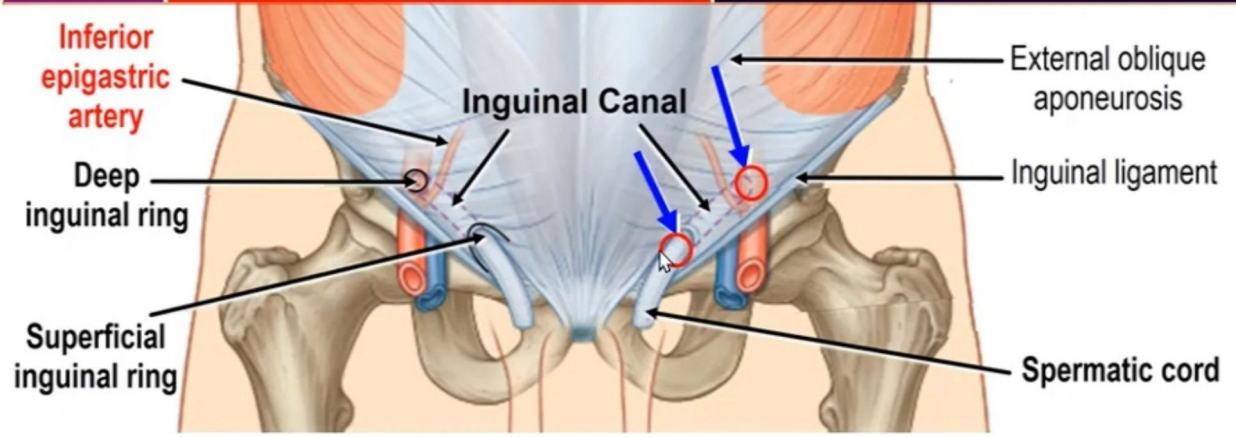
What are the 3 divisions of the pharynx?

Name 2 structures in the nasopharynx

Name 1 structure in the oropharynx



	Superficial Inguinal Ring	Deep Inguinal Ring
Site	In the external oblique aponeurosis Above the pubic tubercle	In the transvrsalis fascia ½ inch above the midinguinal point
Margin	External spermatic fascia	Internal spermatic fascia
Transmit	Spermatic cord or Round ligament of uterus + ilioinguinal nerve	Spermatic cord or Round ligament of uterus



Contents of the Spermatic Cord

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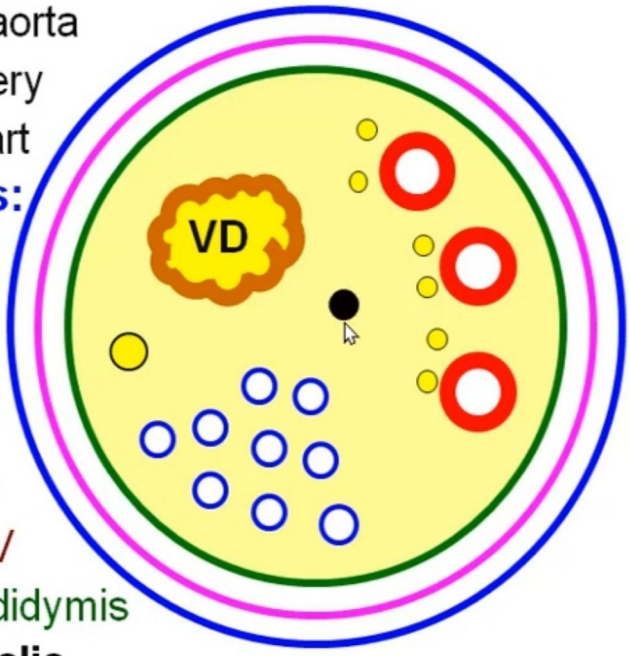
1. **Vas deferens**
2. **Three arteries:**
   - **a.** Testicular artery: from abd aorta
   - **b.** Artery of VD: inf vesical artery
   - **c.** Cremastric artery: inf epig art
3. **Pampiniform plexus of veins:**
   form the testicular vein:
   RT: ends in **Inf Vena Cava**
   LT: ends in **left renal vein**
4. **Nerves:**
   - **a**. Genital branch of GF nerve
   - **b.** Autonomic fibers around BV
5. **Lymphatics** from testis & Epididymis
6. Remains of **processus vaginalis**



IMPORTANT PLANES OF THE ABDOMEN

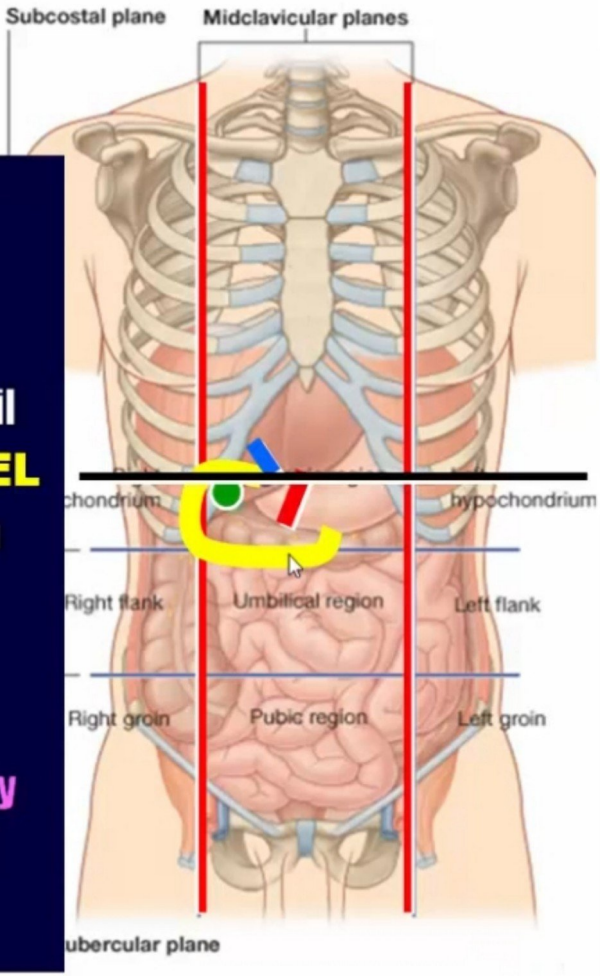
TRANSPYLORIC PLANE

IDENTIFICATION

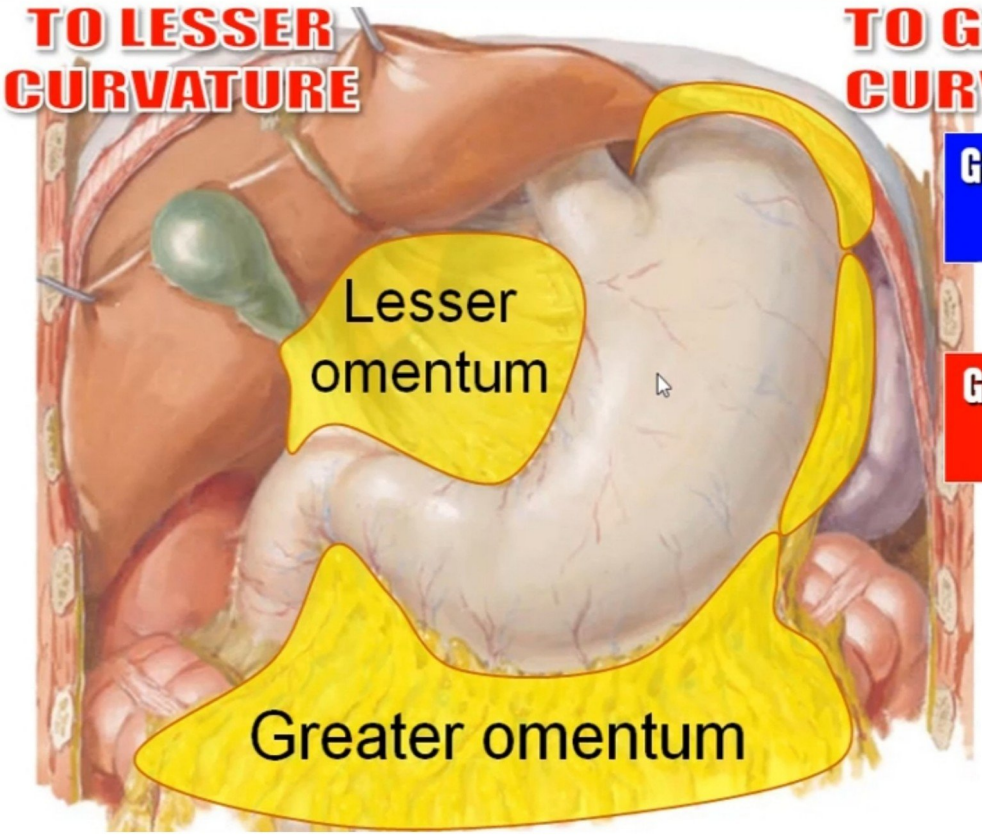
1. Level of lower border of L1
2. Between the tips of the 9th cost cartil

STRUCTURES AT THIS LEVEL

1. Pylorus & 1st part of the duodenum
3. Fundus of the gall bladder
4. Neck of the pancreas
5. Origin of the portal vein
6. Origin of the sup mesenteric artery
7. Hilum of the kidney
8. End of the spinal cord

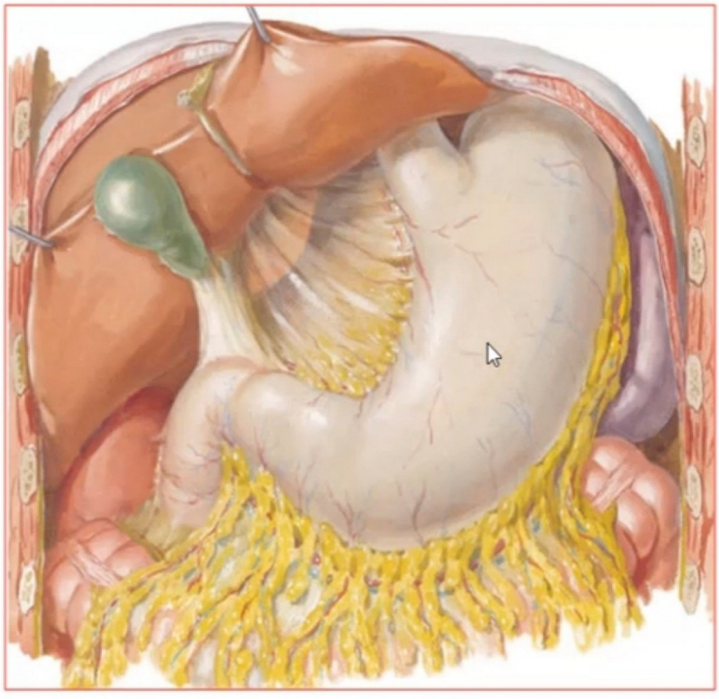


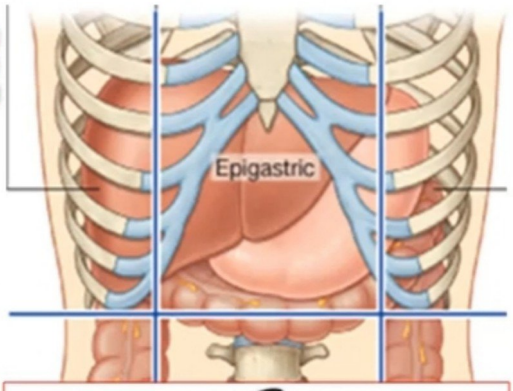
PERITONEAL COVERING & CONNECTIONS

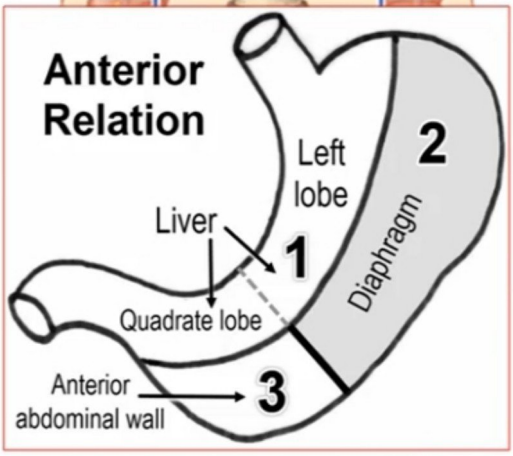


RELATIONS OF THE SURFACES

TO THE ANTERIOR SURFACE







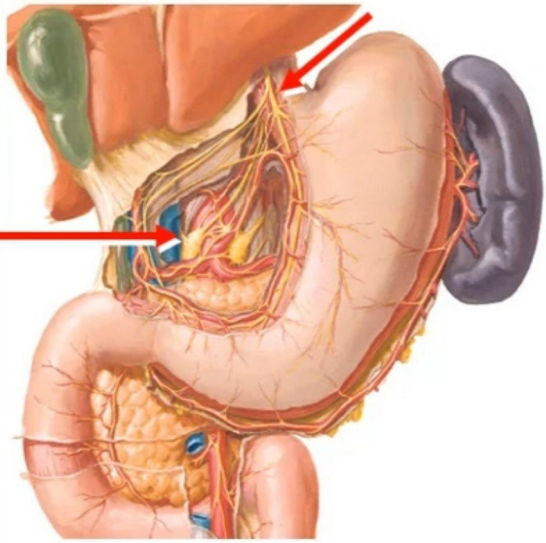
NERVE SUPPLY

1. SYMPATHETIC:

Celic plexus: celiac gaglia & greater splanchnic nerves

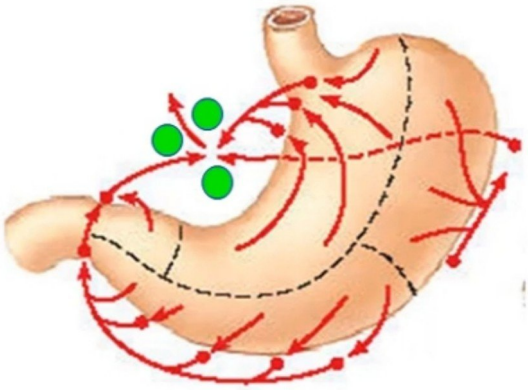
2. PARASYMPATHETIC:

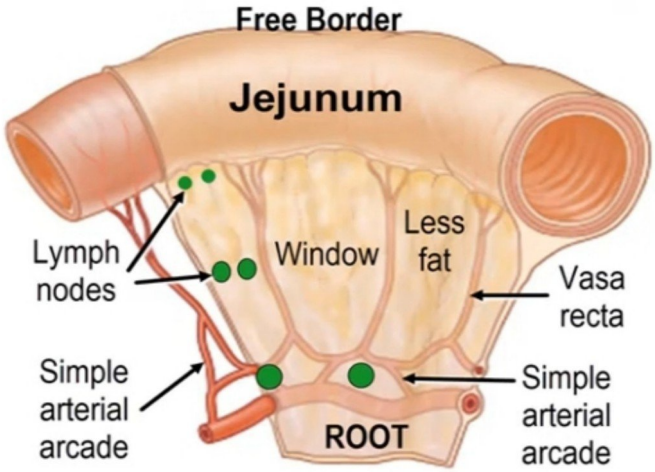
Anterior & posterior gastric nerves (Left vagus & Rt vagus)

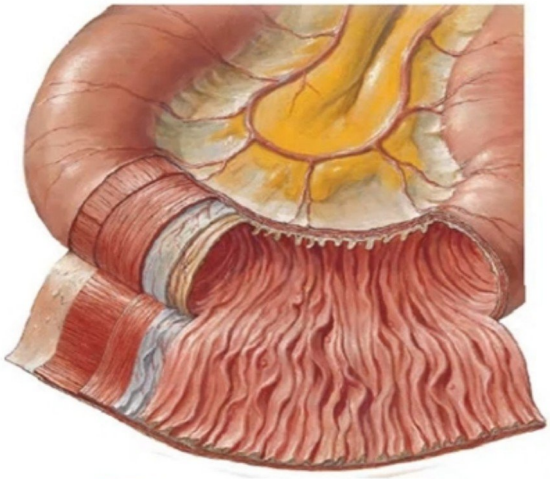


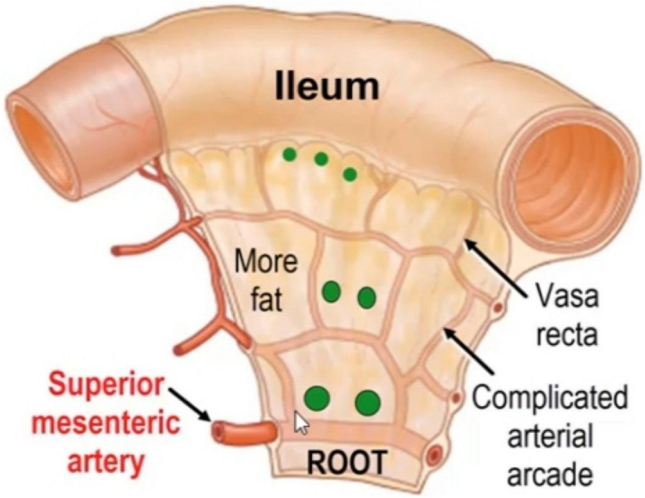
LYMPH DRAINAGE

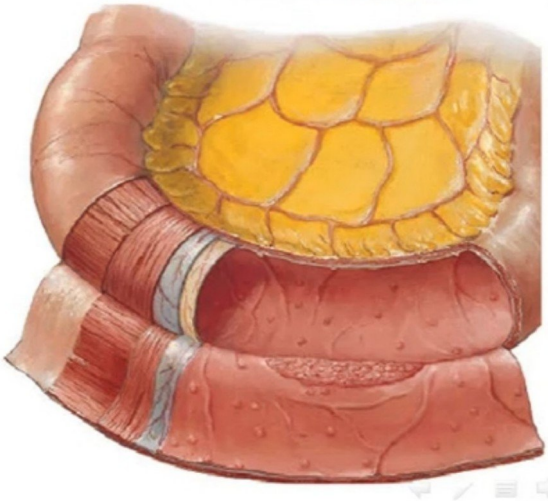
Follow the Arteries To the Celiac Lymph Nodes

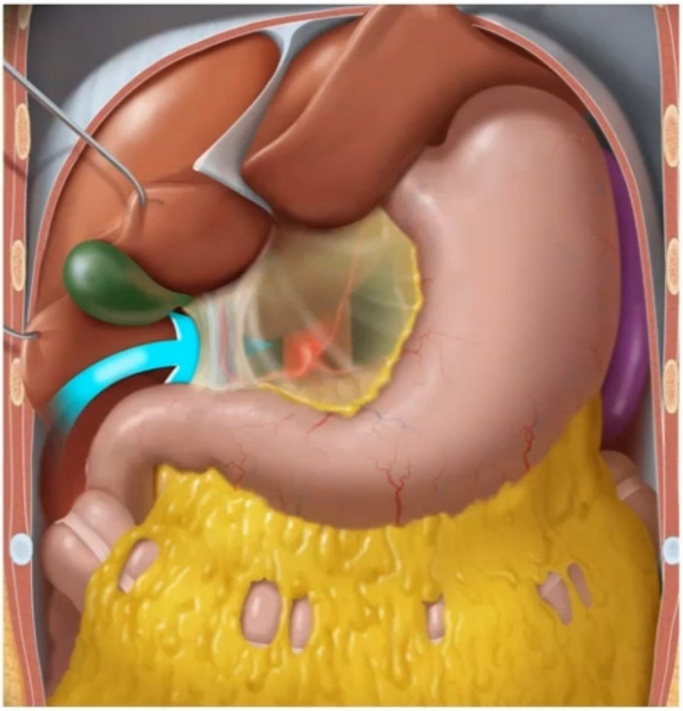


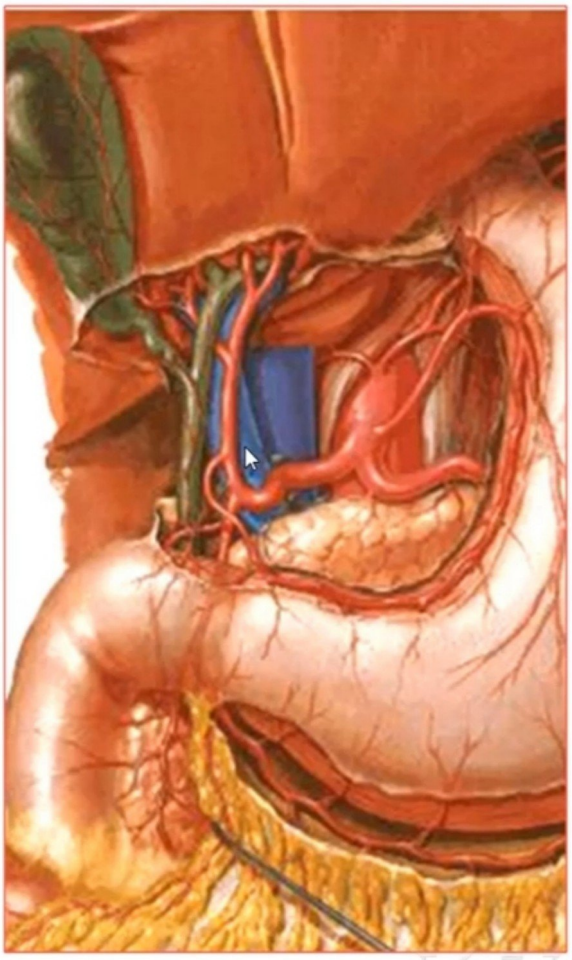












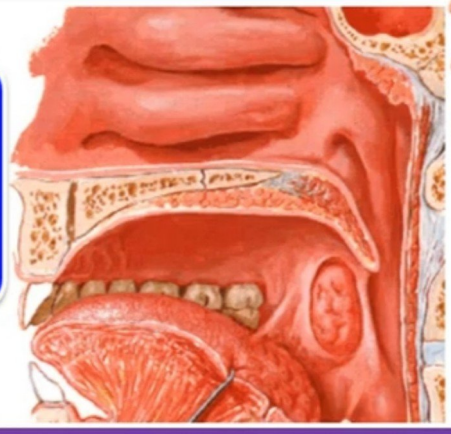
PRINCE, PRINCESS & BODY GUARD

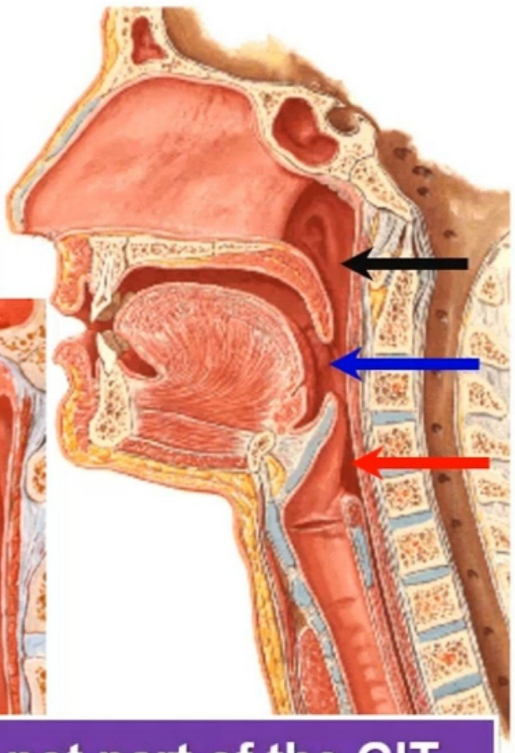
THE PHARYNX

What are the 3 divisions of the pharynx?

Name 2 structures in the nasopharynx

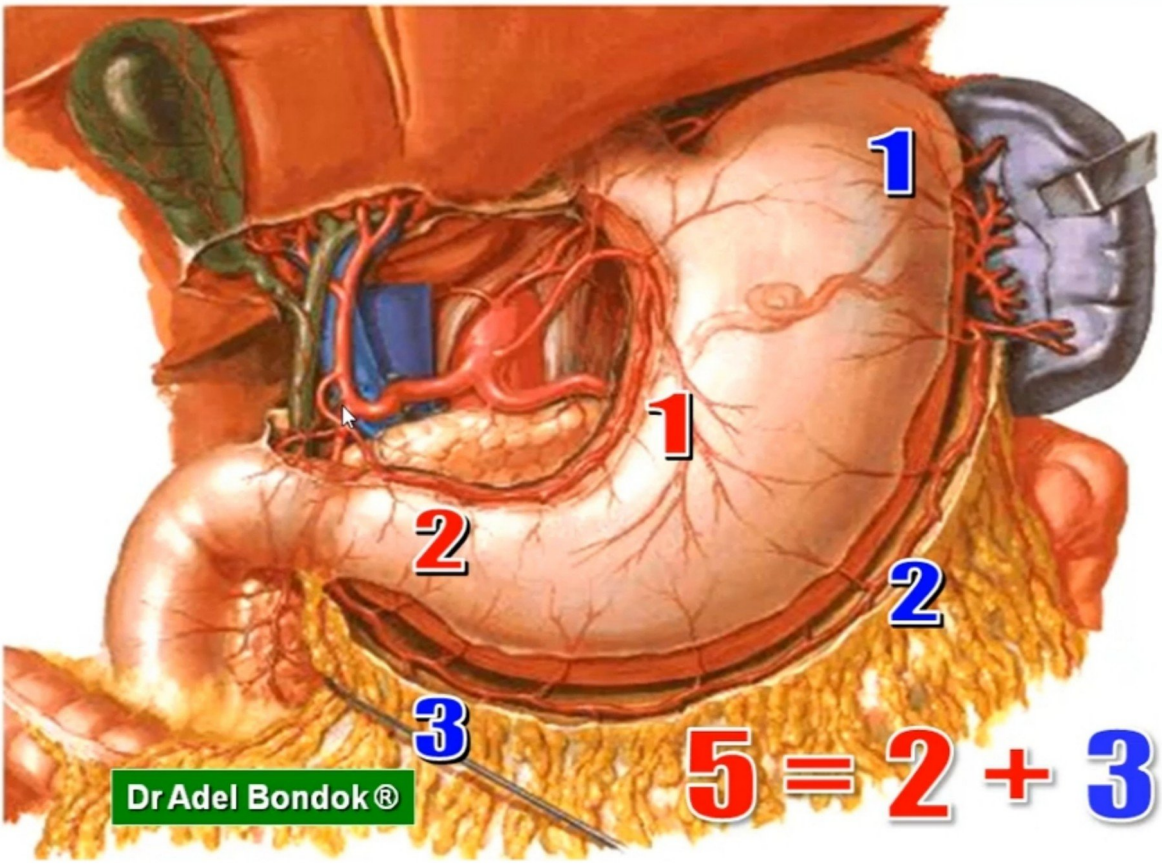
Name 1 structure in the oropharynx





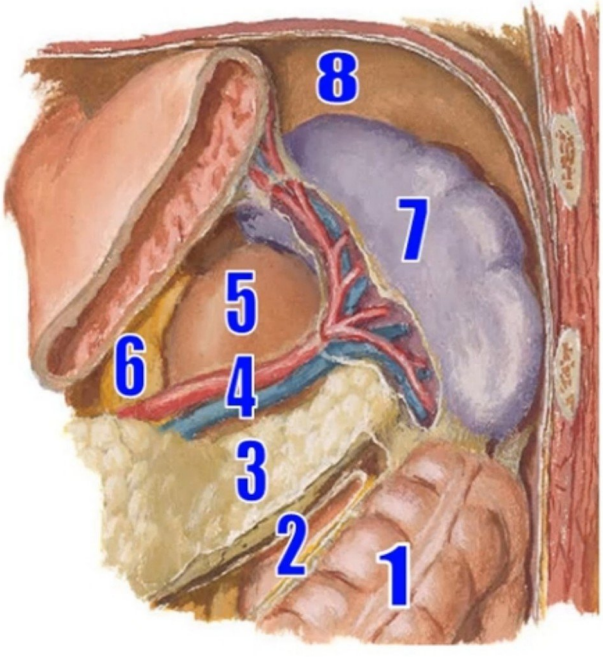
Which part of the pharynx is not part of the GIT

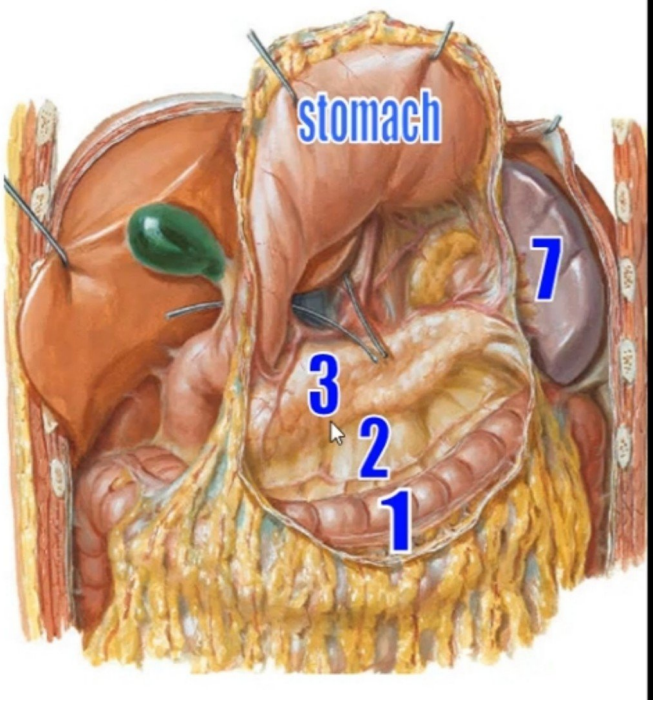
ARTERIAL SUPPLY OF THE STOMACH



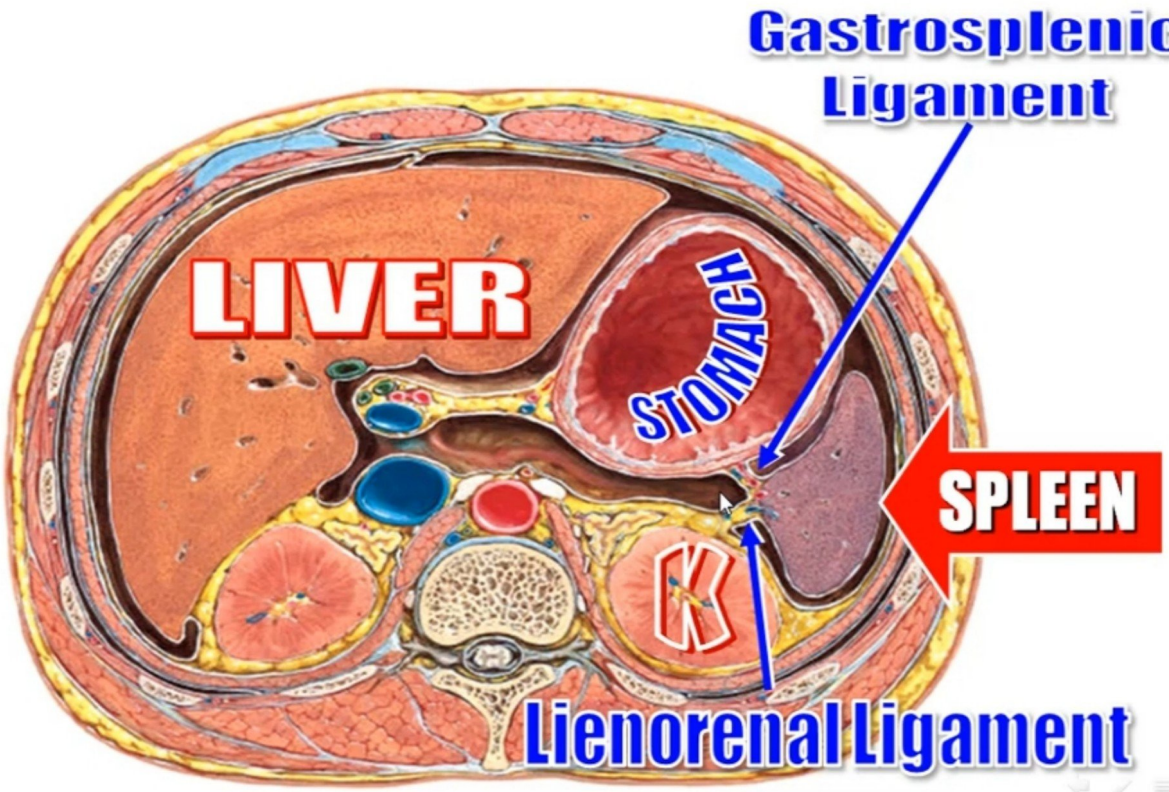
TO THE POSTERIOR SURFACE

STOMACH BED



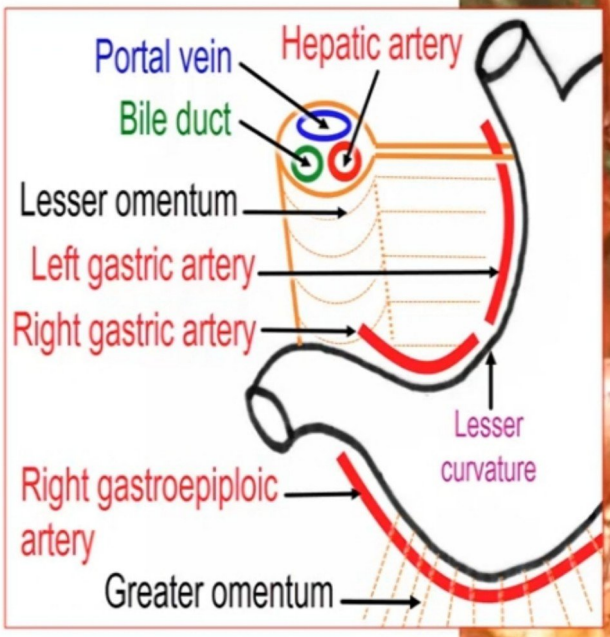


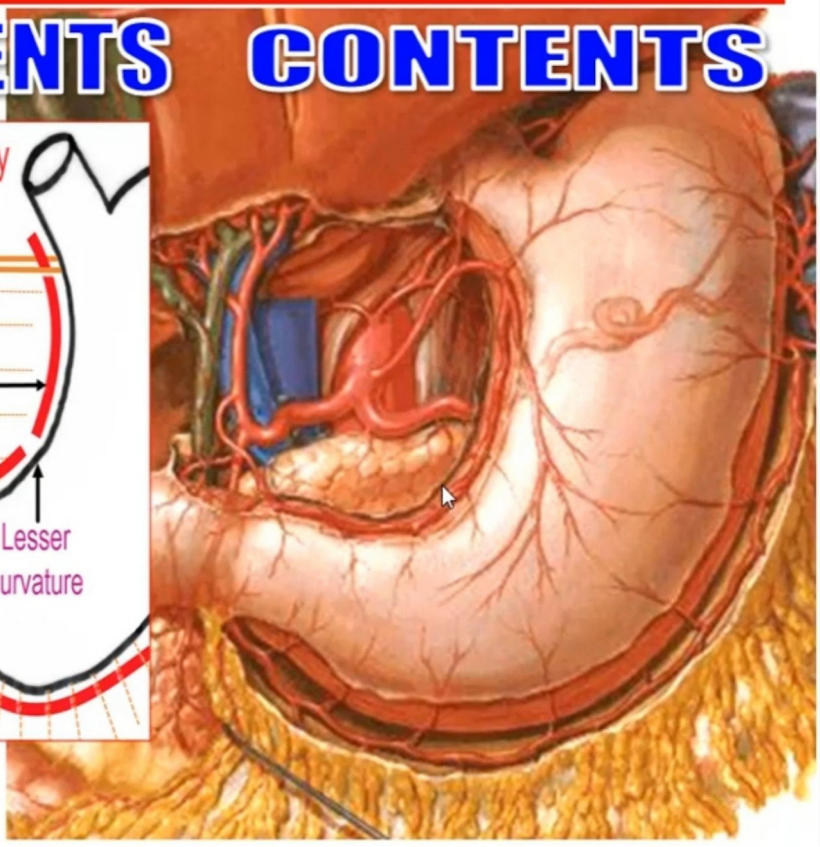
PERITONEAL COVERING



LESSER OMENTUM

ATTACHMENTS CONTENTS

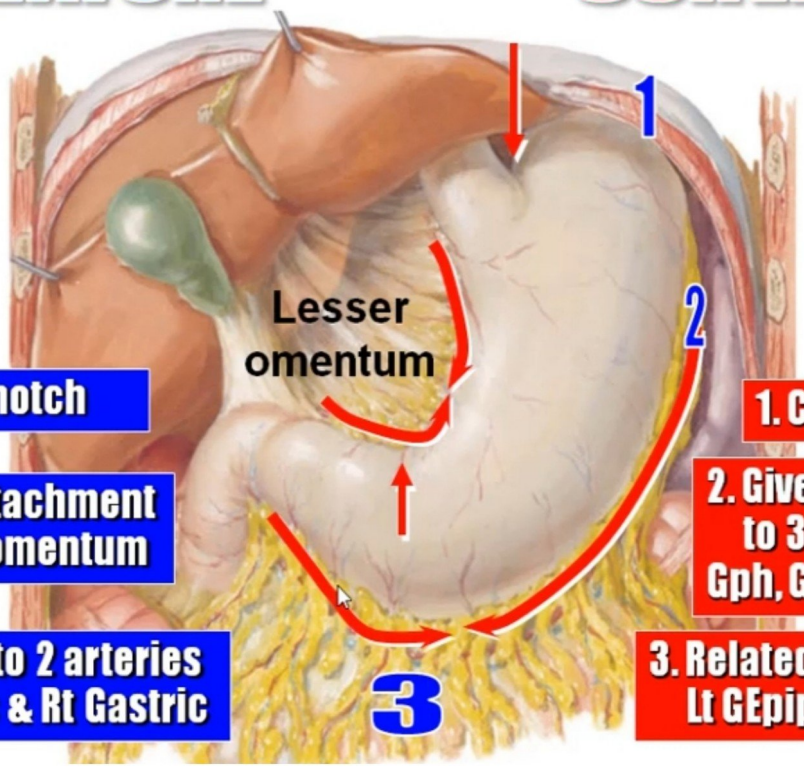




RELATIONS OF THE BORDERS

TO LESSER CURVATURE

TO GREATER CURVATURE



1. Angular notch

2. Gives attachment to lesser omentum

3. Related to 2 arteries Lt Gastric & Rt Gastric

1. Cardiac Notch

2. Gives attachment to 3 ligaments: Gph, Gsplenic & GO

3. Related to 2 arteries Lt GEpipl & Rt GEpipl

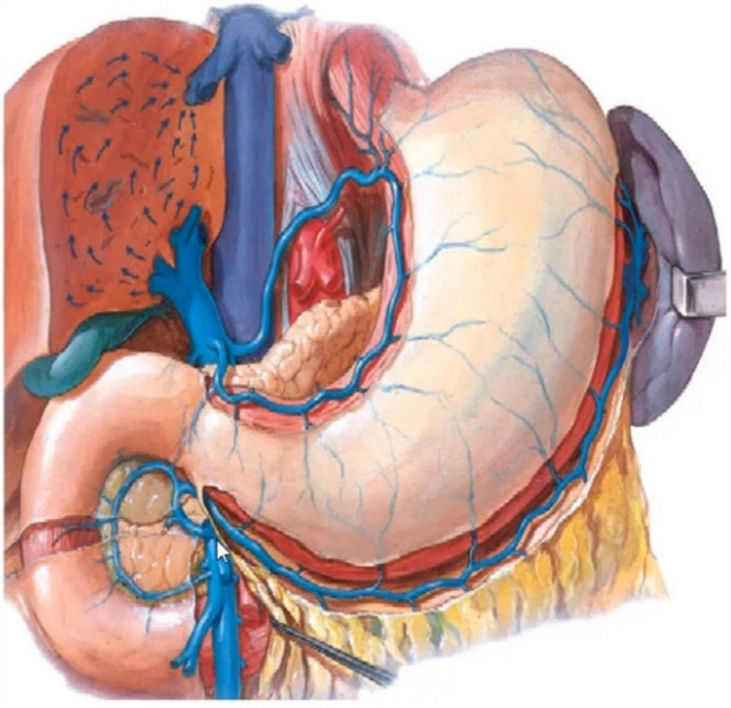
VENOUS DRAINAGE OF THE STOMACH

Into Portal Circulation

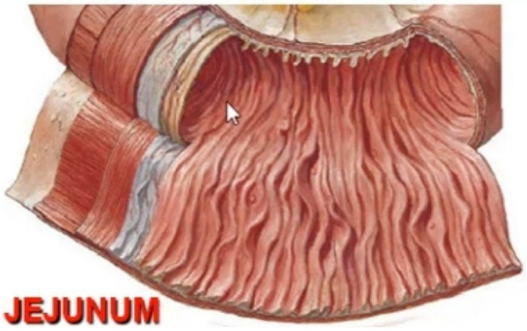
Left & Right Gastric V: into portal vein

Left Gastroepiploic & Short Gastric Veins: into the splenic vein

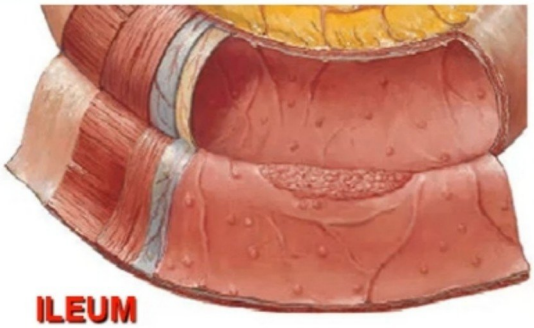
Right Gastroepiploic V: into the superior mesenteric vein



JEJUNUM	ILEUM
LENGTH: Upper 2/5 of the small intestine	**LENGTH:** Lower 3/5 of the small intestine
LOCATION: Lies above the umbilicus	**LOCATION:** Lies below the umbilicus
COLOR: Reddish Because it is more vascular	**COLOR:** Pale Because it is less vascular
WALL: Thick due to the presence of numerous muscous folds: Plicae circularis	**WALL:** Thin due to the presence of few or absent muscous folds

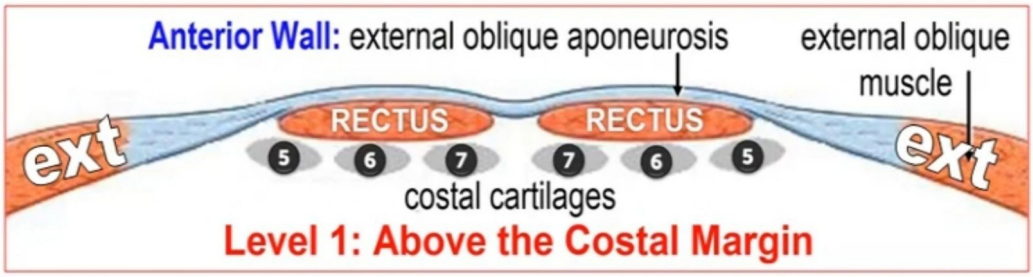


JEJUNUM



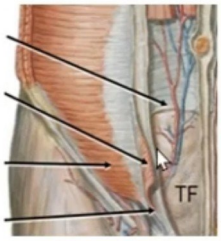
ILEUM

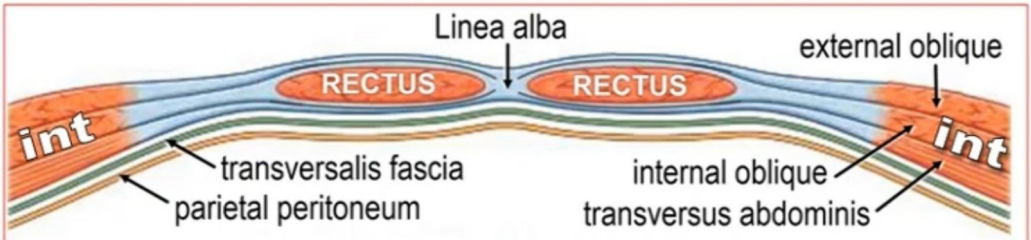
LEVEL 1
Above the costal margin



Level 1: Above the Costal Margin

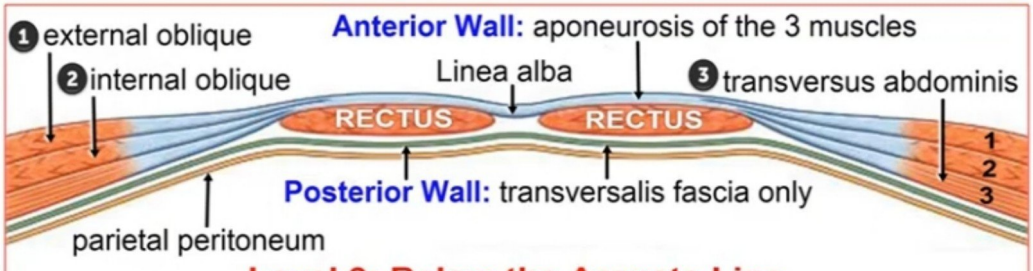
LEVEL 2
Above the arcuate line





Level 2: From Costal Margin to Midway Between Umbilicus and Symphysis Pubis

LEVEL 3
Below the arcuate line

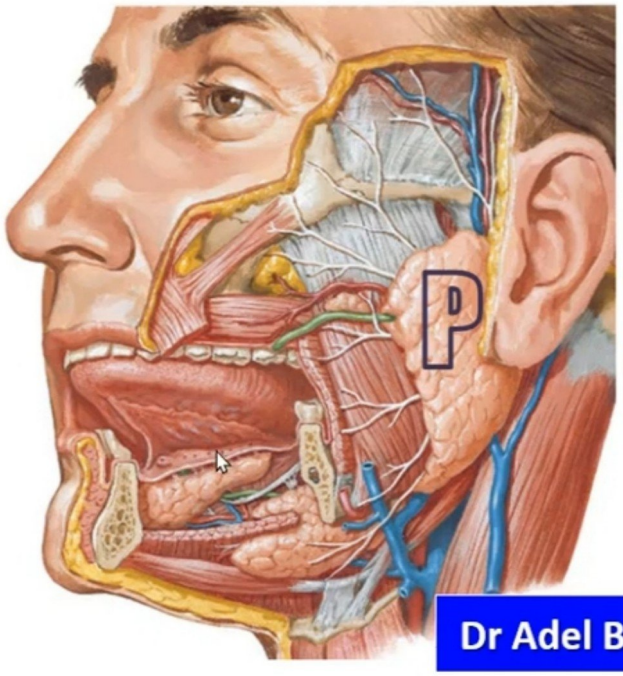


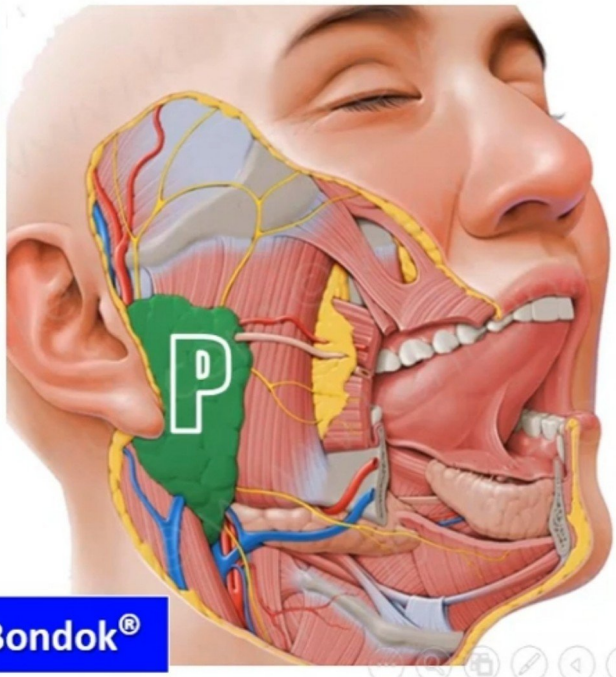
Level 3: Below the Arcuate Line

(Midway Between Umbilicus & Symphysis Pubis to Symphysis Pubis)

What is the largest salivary gland?

What are the salivary ducts which opens into the mouth cavity proper?





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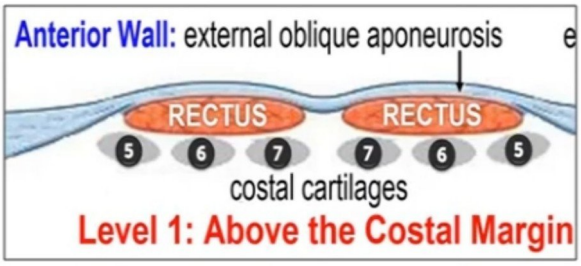
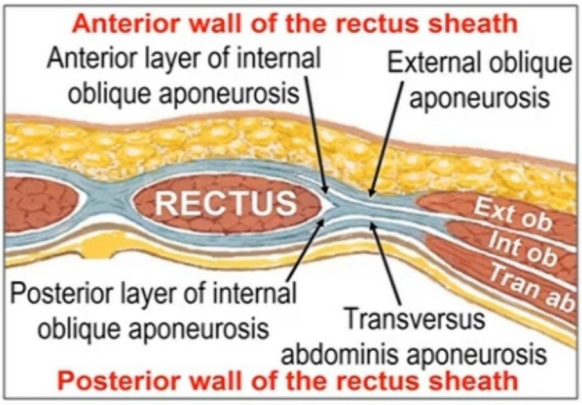
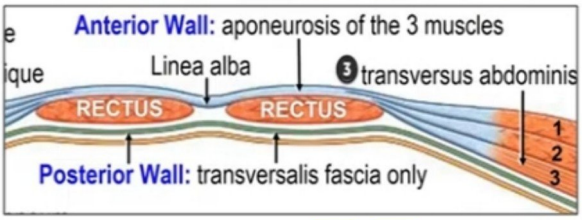
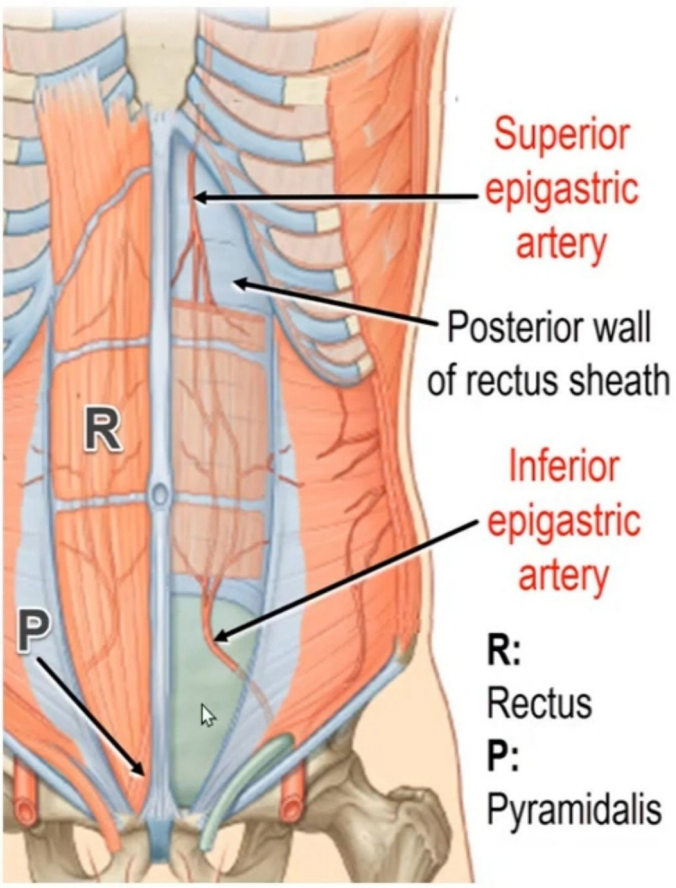




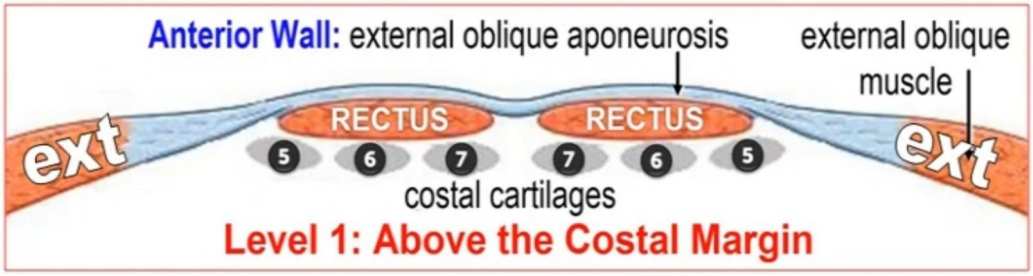


walls



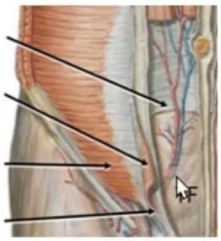
Contents

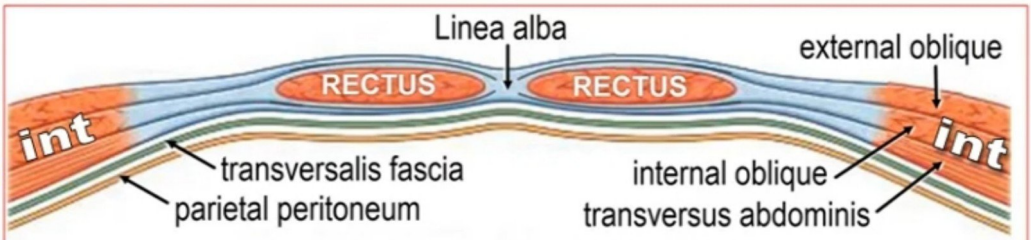
LEVEL 1
Above the costal margin



Level 1: Above the Costal Margin

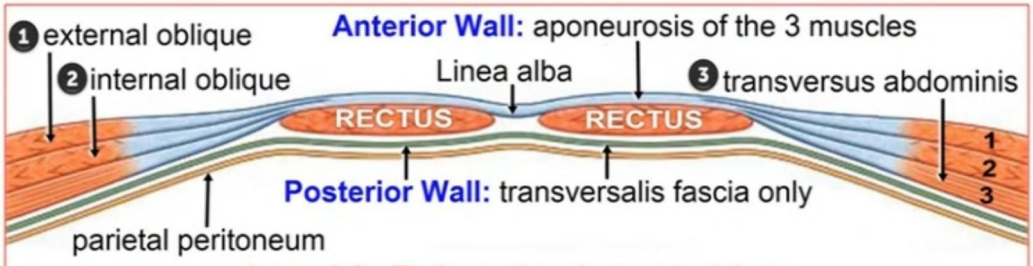
LEVEL 2
Above the arcuate line





Level 2: From Costal Margin to Midway Between Umbilicus and Symphysis Pubis

LEVEL 3
Below the arcuate line



Level 3: Below the Arcuate Line
(Midway Between Umbilicus & Symphysis Pubis to Symphysis Pubis)

SMALL INTESTINE

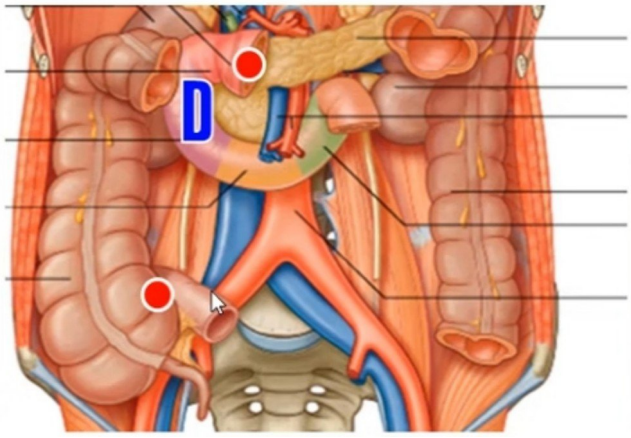
EXTENT: about 6 meters

From the pylorus

To the iliocecal junction

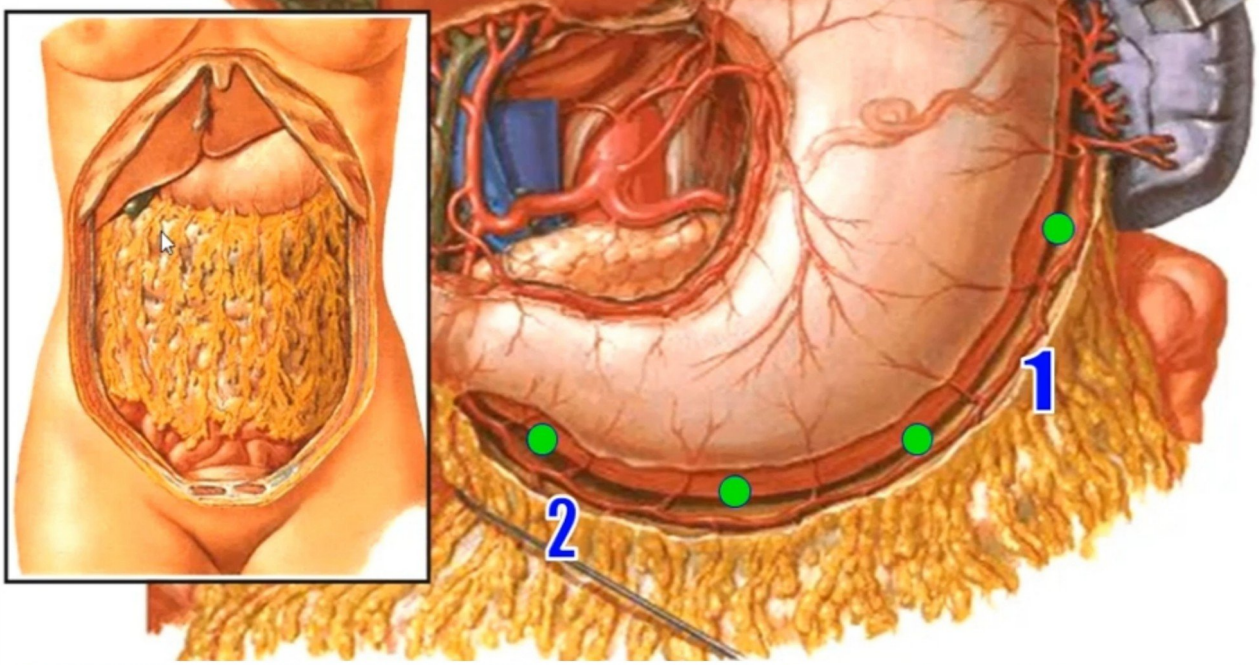
DIVISIONS:

1. **Duodenum:** 10 inches
2. **Jejunum:** upper 2/5
3. **Ileum:** lower 3/5



GREATER OMENTUM

ATTACHMENTS CONTENTS



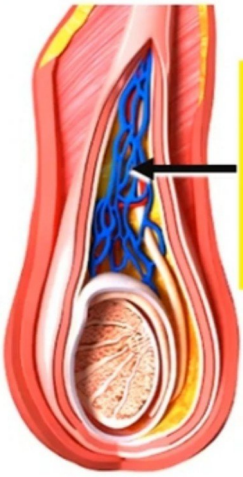
ACTION OF MUSCLES

1. **Oblique muscles:** lateral flexion & rotation of the trunk
2. **Rectus abdominis:** flexion of the trunk & stabilization of pelvis
3. **Pyramidalis:** stretches the linea alba
4. **Accessory muscles of respiration:**
   - **a.** They relax during inspiration
   - **b.** Assist in forced expiration (coughing & sneezing)
5. **Protect** the abdominal contents and keep them in position.
6. **Raise** the intra-abdominal pressure during defecation & labor

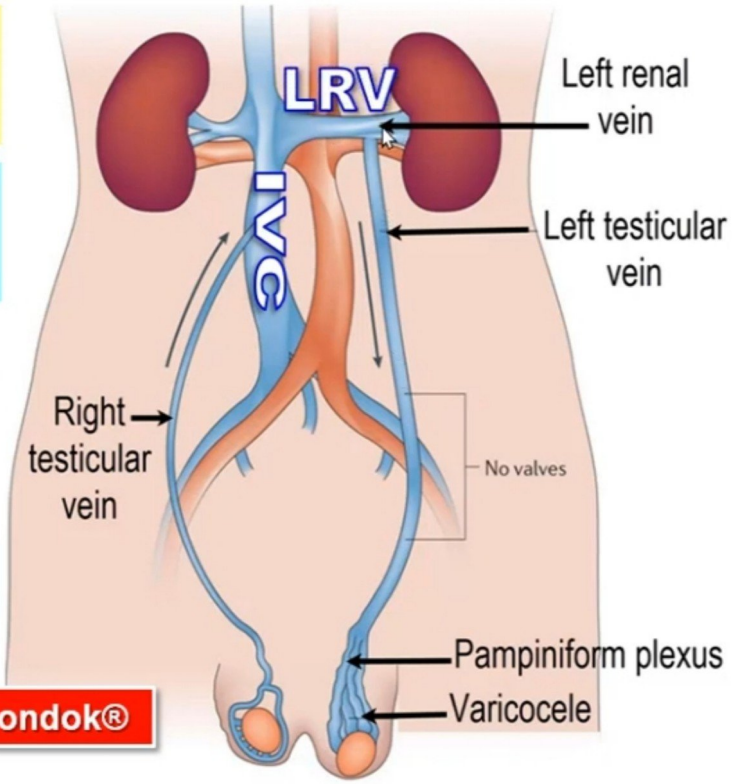
Testicular Vein

Right testicular vein:
➡ **inferior vena cava**

Left testicular vein:
➡ **left renal vein**



Arises from the pampiniform plexus



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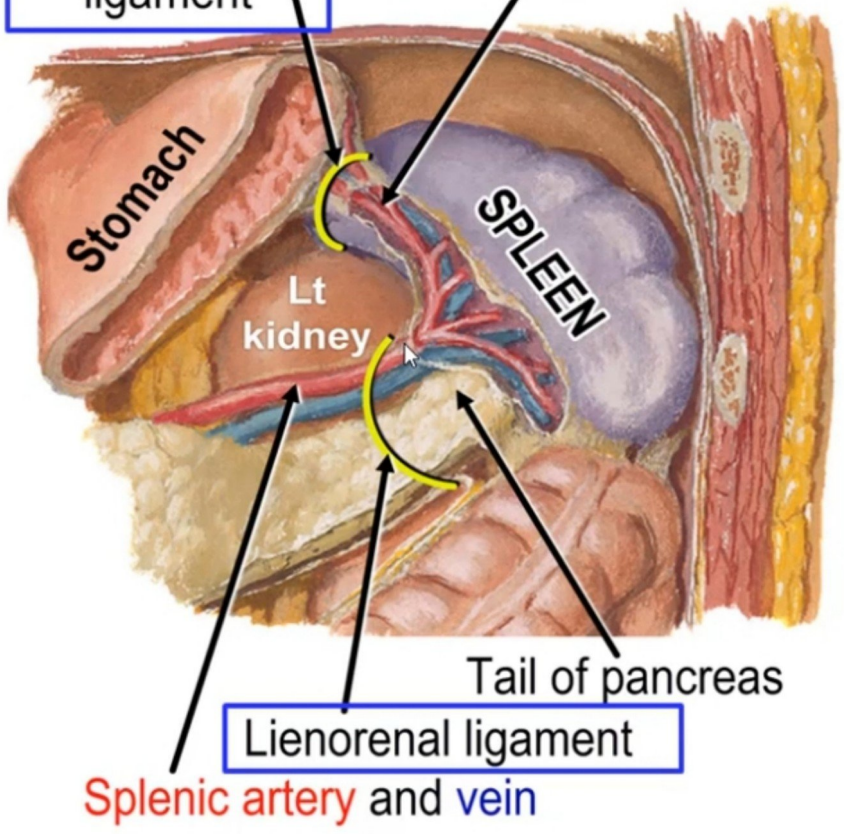


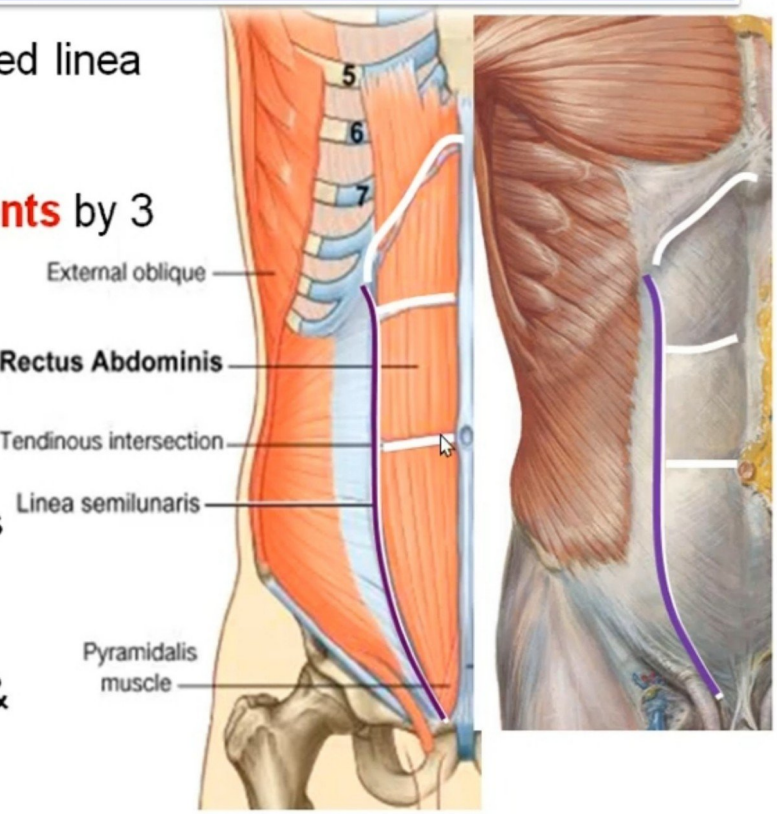
LIGAMENTS

Landmarks of Rectus Abdominis

1. Lateral Border: is called linea semilunaris

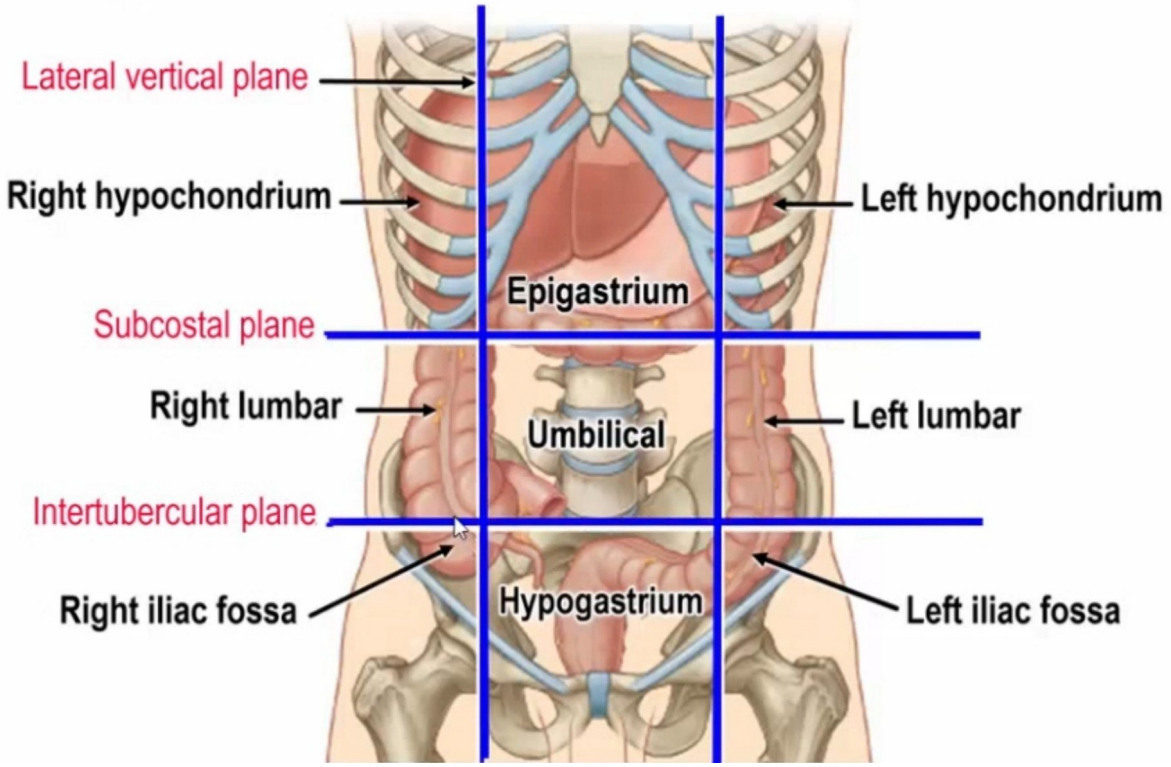
2. Divided into 4 segments by 3 tendinous intersections

1. At the Xiphoid process
2. At the umbilicus
3. Midway between XP & umbilicus



COMPARTMENTS OF THE ABDOMEN

The abdomen is **divided** into **9 Compartments by the** 2 Lateral vertical planes & the subcostal & intertubercular planes **:**



NERVE SUPPLY OF THE MUSCLES

1. **Rectus abdominis:**
   Lower 6 thoracic nerves

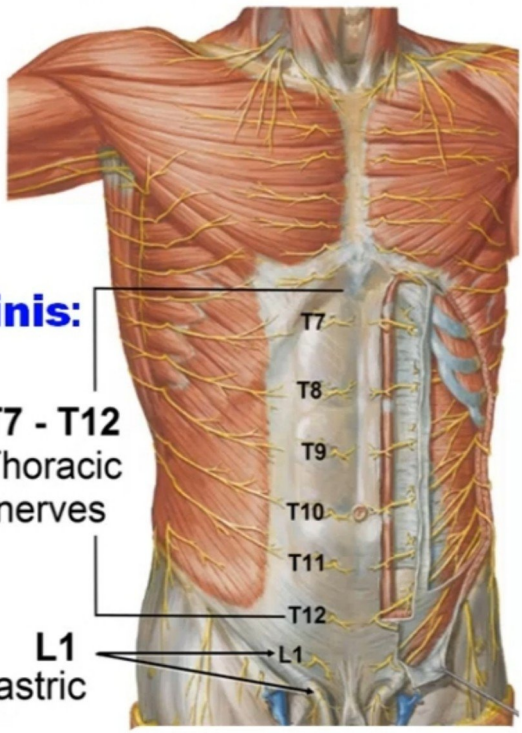
2. **External Oblique, internal oblique & transversus abdominis:**

   a. Lower 6 thoracic nerves.

   b. L1: Iliohypogastric and ilioinguinal nerves

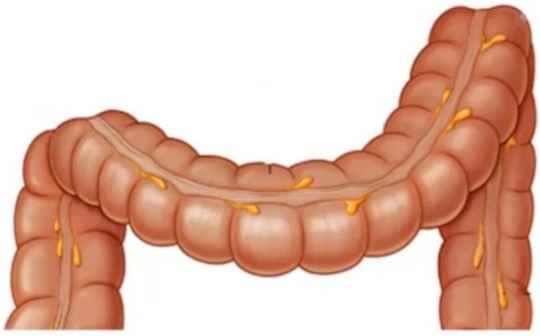
3. **Pyramidalis:** (T12) the subcostal nerve

Nerve Supply of the Anterior Abdominal Wall



List 5 differences between Large & Small Intestine

Large Intestine	Small Intestine
1.5 meters	**6 meters**
3 Taenia coli	**No** Taenia coli
Sacculations (Haustration)	**Smooth** wall
Epiploic appendages (fat-filled pouches)	**No** Epiploic appendages
No villi in the mucosa	**Villi in the mucosa**



Boundaries of the Abdominal Cavity

ROOF:

Abdominal diaphragm

FLOOR:

Pelvic diaphragm

ANTERIOR WALL

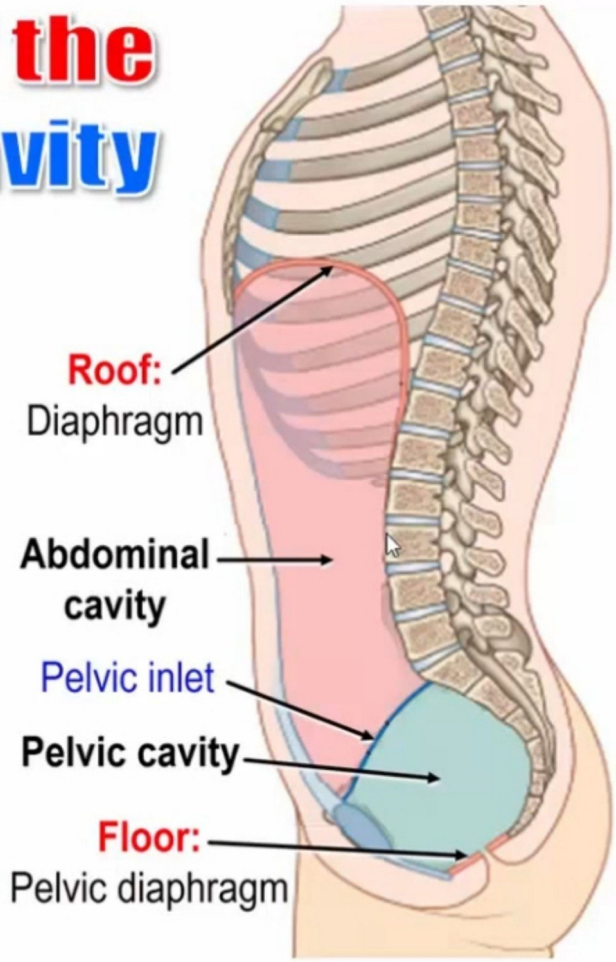
Rectus muscle & rectus sheath

POSTERIOR WALL

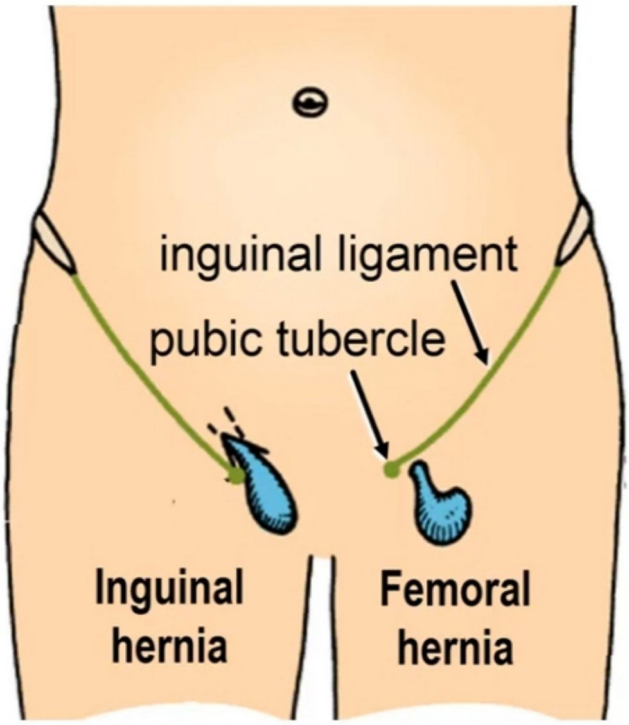
Posterior abdominal wall

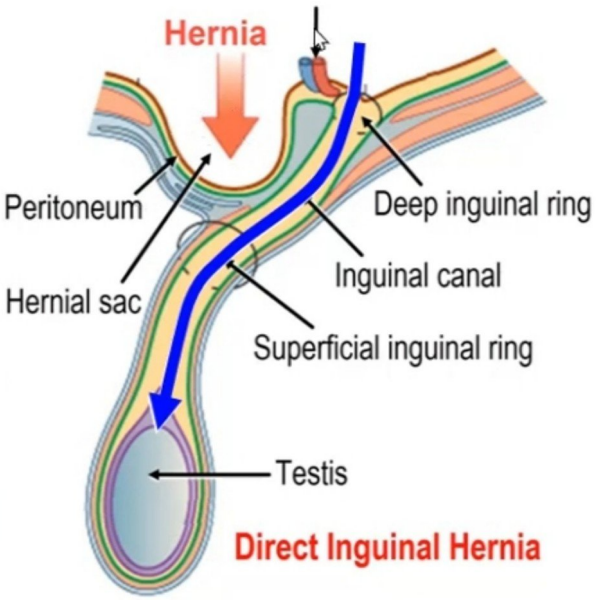
LATERAL WALL

Oblique muscles and transversus abdominis



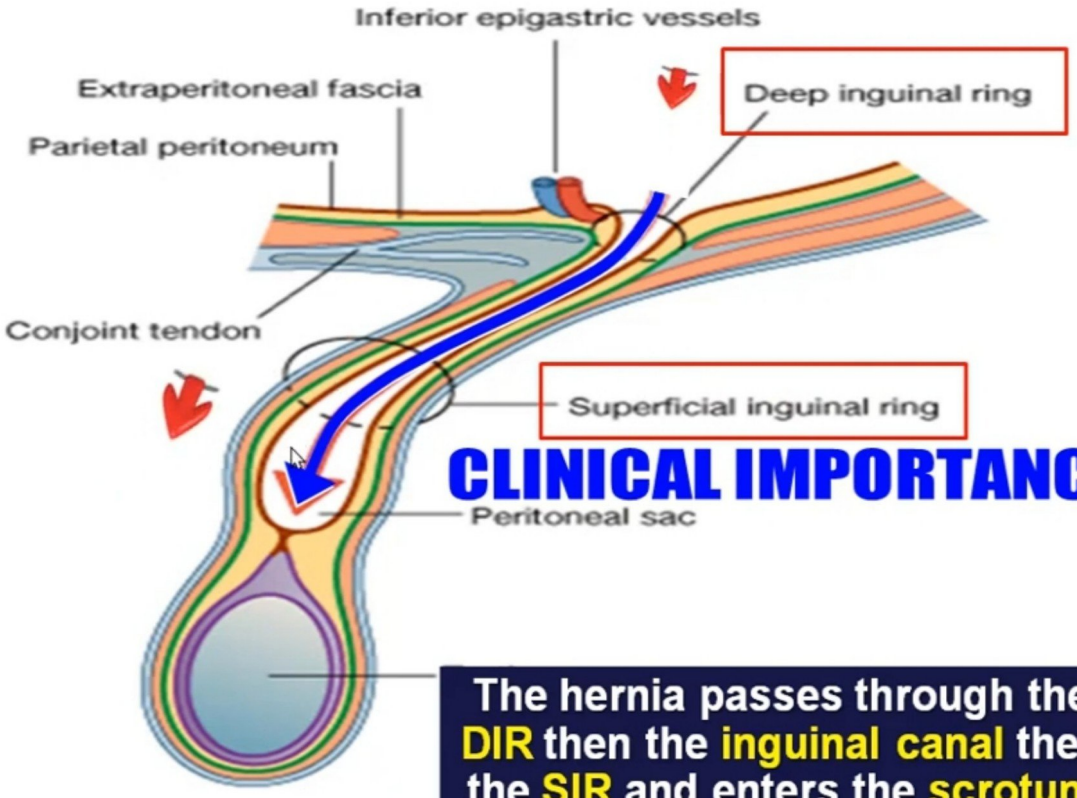
VISCERAL SURFACE





Inguinal Hernia and Femoral Hernia

Direct and Indirect Inguinal Hernia



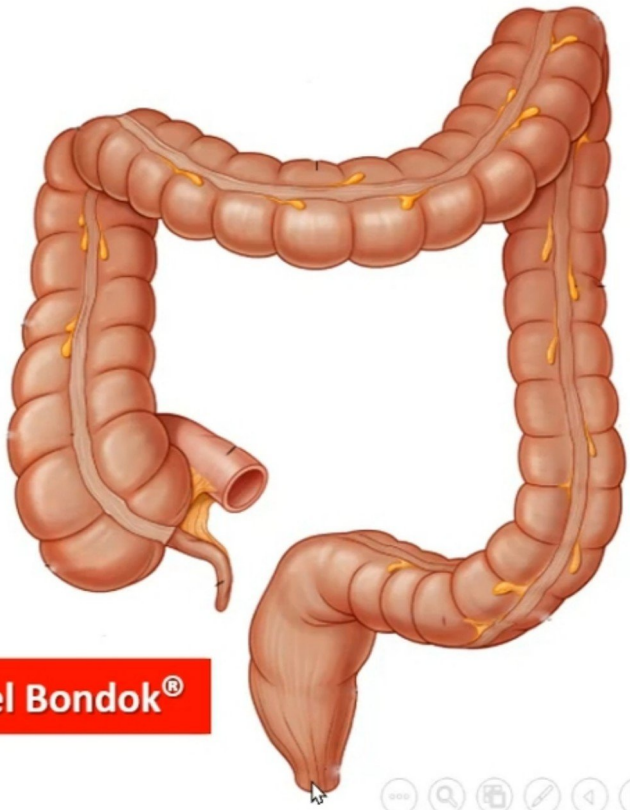
CLINICAL IMPORTANCE

The hernia passes through the DIR then the inguinal canal then the SIR and enters the scrotum

Gives Passage to the Oblique Inguinal Hernia

What are the parts of the large intestine?

1. Appendix
2. Cecum
3. Ascending colon
4. Transverse colon
5. Descending colon
6. Sigmoid colon
7. Rectum
8. Anal canal



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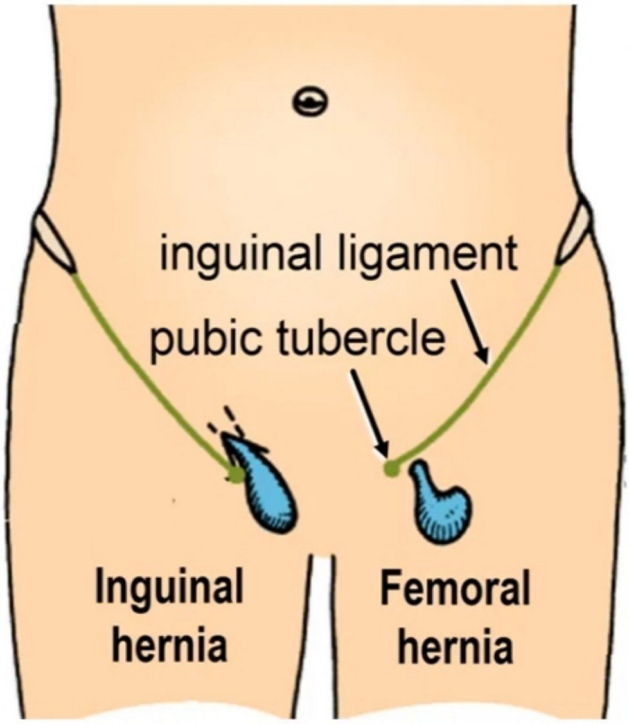
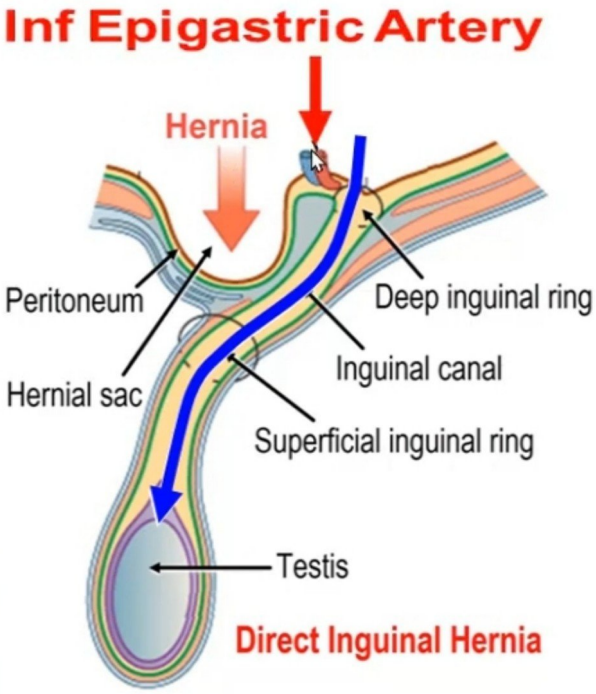




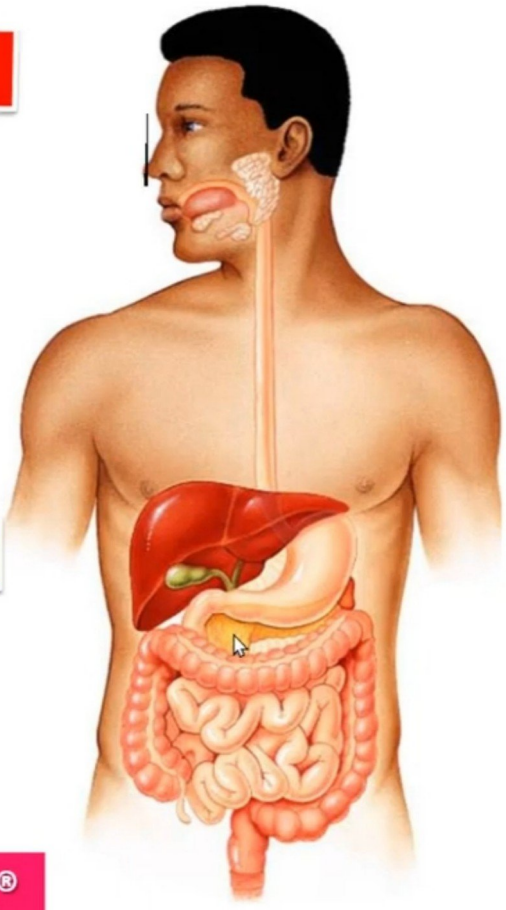
Inguinal Hernia and Femoral Hernia

Direct and Indirect Inguinal Hernia

What are the parts of the GIT?

1. Oral cavity
2. Pharynx
3. Esophagus
4. Stomach
5. Small intestine
6. Large intestine

6



What are the accessory organs?

1. Teeth
2. Tongue
3. Salivary glands
4. Liver
5. Gall bladder
6. Pancreas

6

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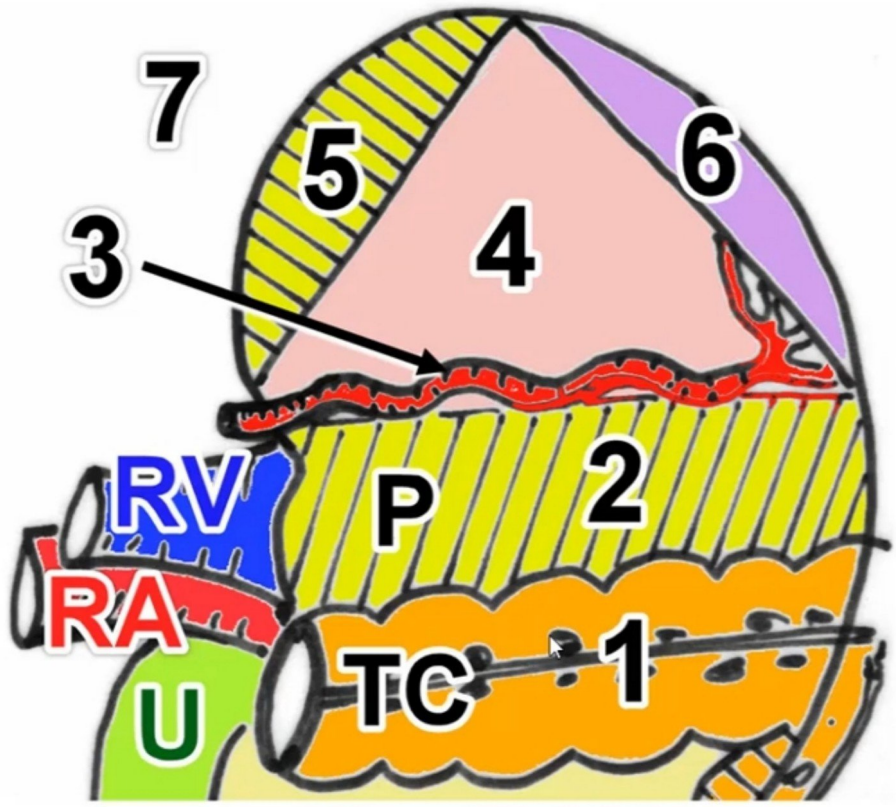
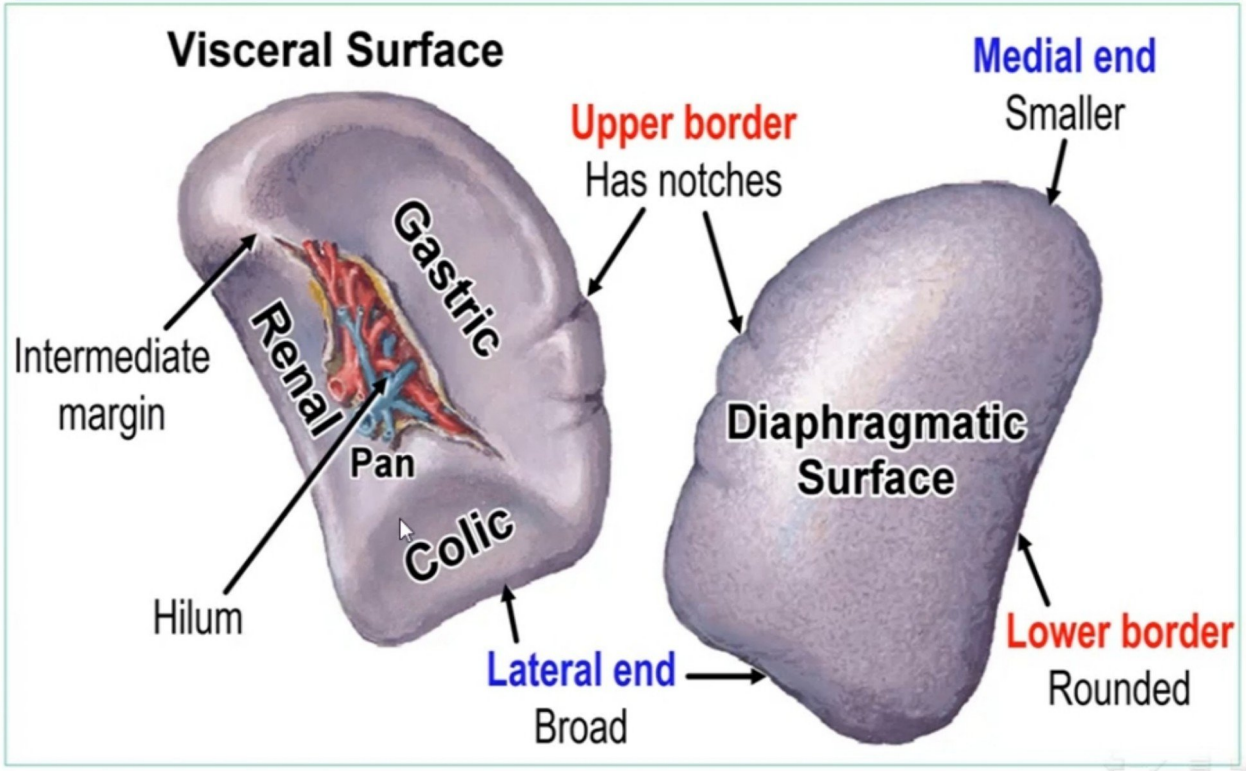
TO THE POSTERIOR SURFACE

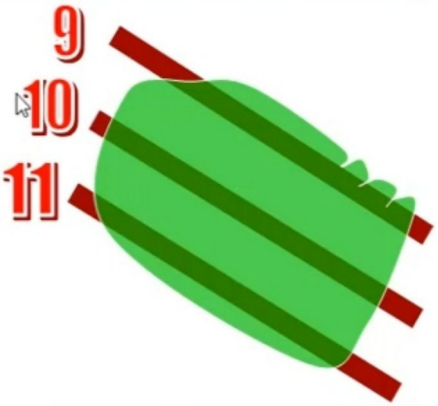


RELATIONS OF THE SPLEEN



SPLEEN

POSITION:



SURFACE ANATOMY:

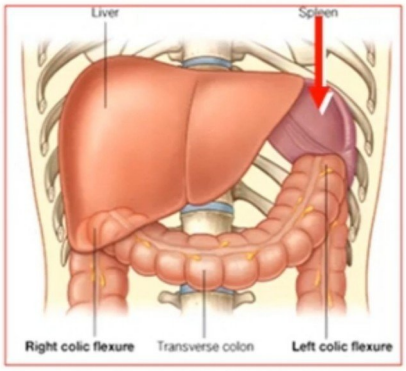
PERITONEAL COVERING:

RELATIONS:

ARTERIAL SUPPLY

VENOUS DRAINAGE:

LYMPH DRAINAGE



What are the parts of the stomach?

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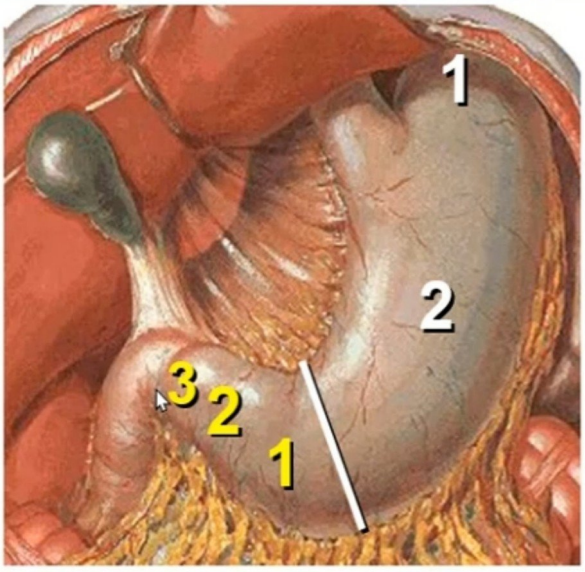


Pyloric Part

1. Pyloric antrum
2. Pyloric canal
3. Pyloric sphincter

Cardiac Part

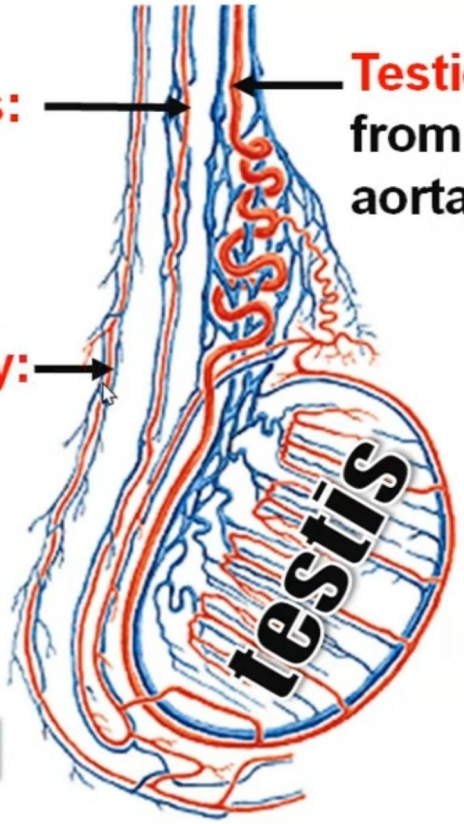
1. Fundus
2. Body

3 Arteries in the Spermatic Cord

Artery of the Vas: from the inferior vesical artery

Testicular artery: from the abdominal aorta

Cremastric artery: from the inferior epigastric artery



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MESENERY OF THE SMALL INTESTINE

SHAPE: fan-shaped

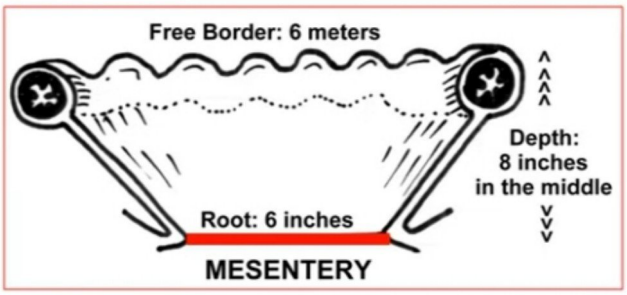
EXTENT:

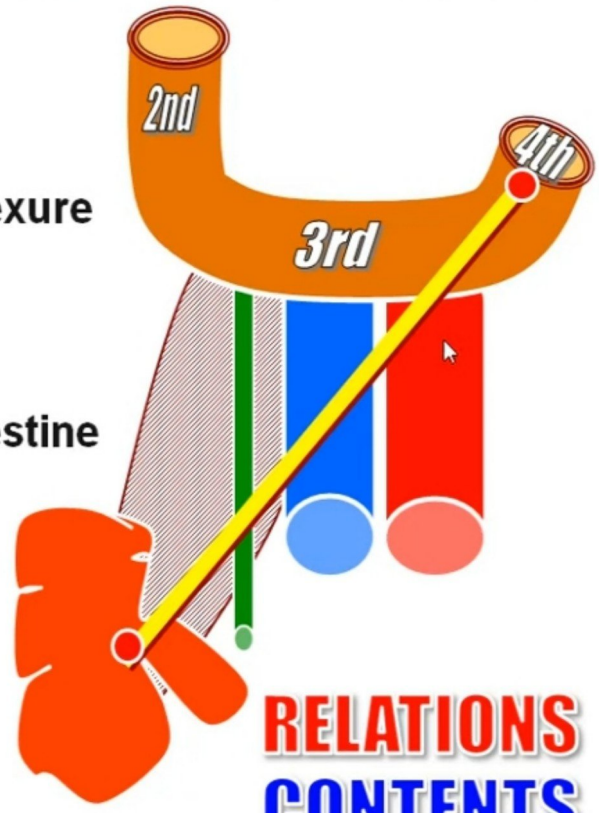
From the duodenojejunal flexure

To the iliocecal junction

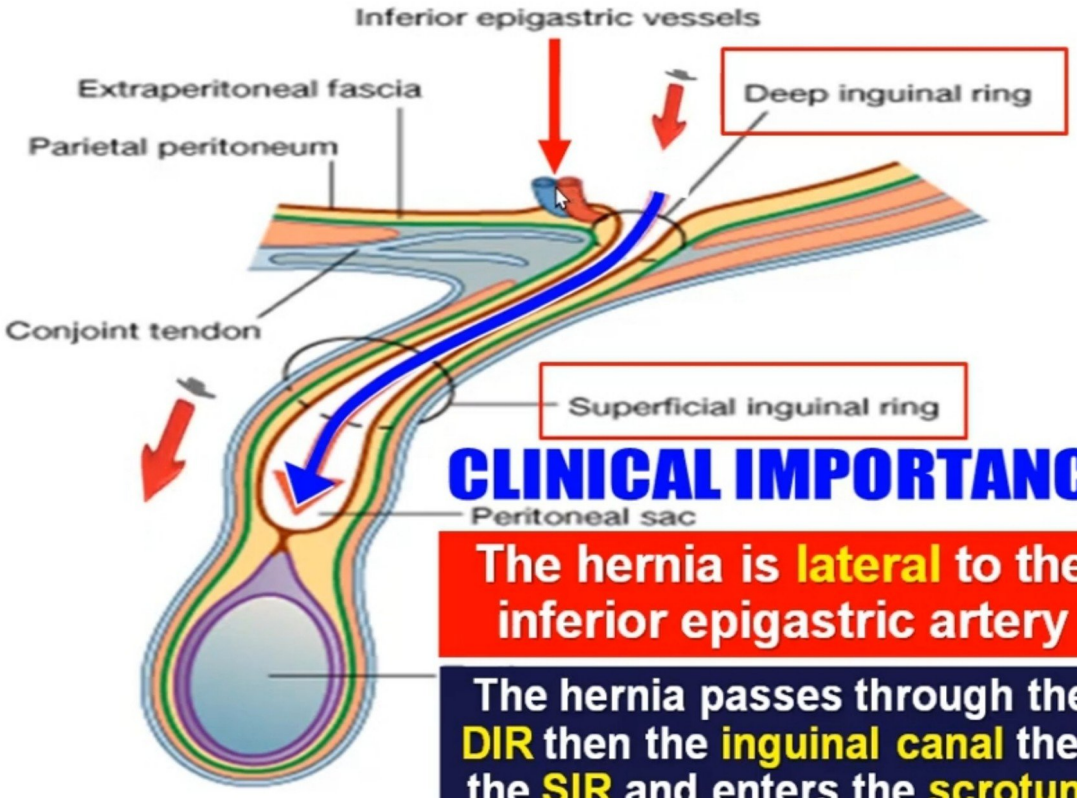
BORDERS:

1. **Free:** surrounds small intestine
2. **Attached:** called **ROOT**





RELATIONS
CONTENTS



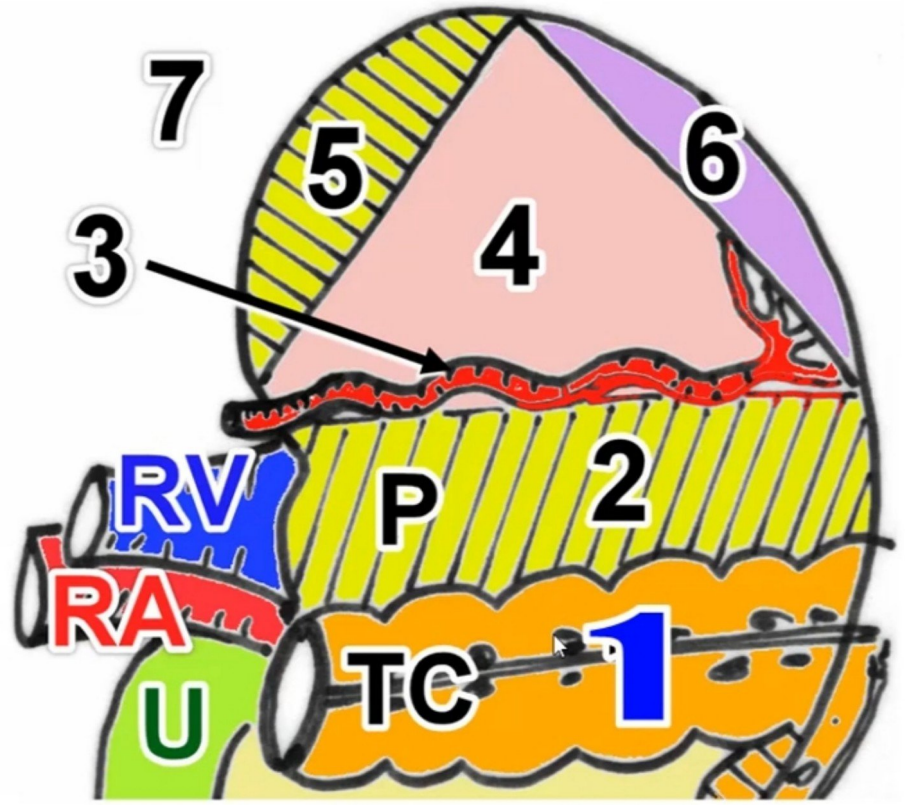
CLINICAL IMPORTANCE

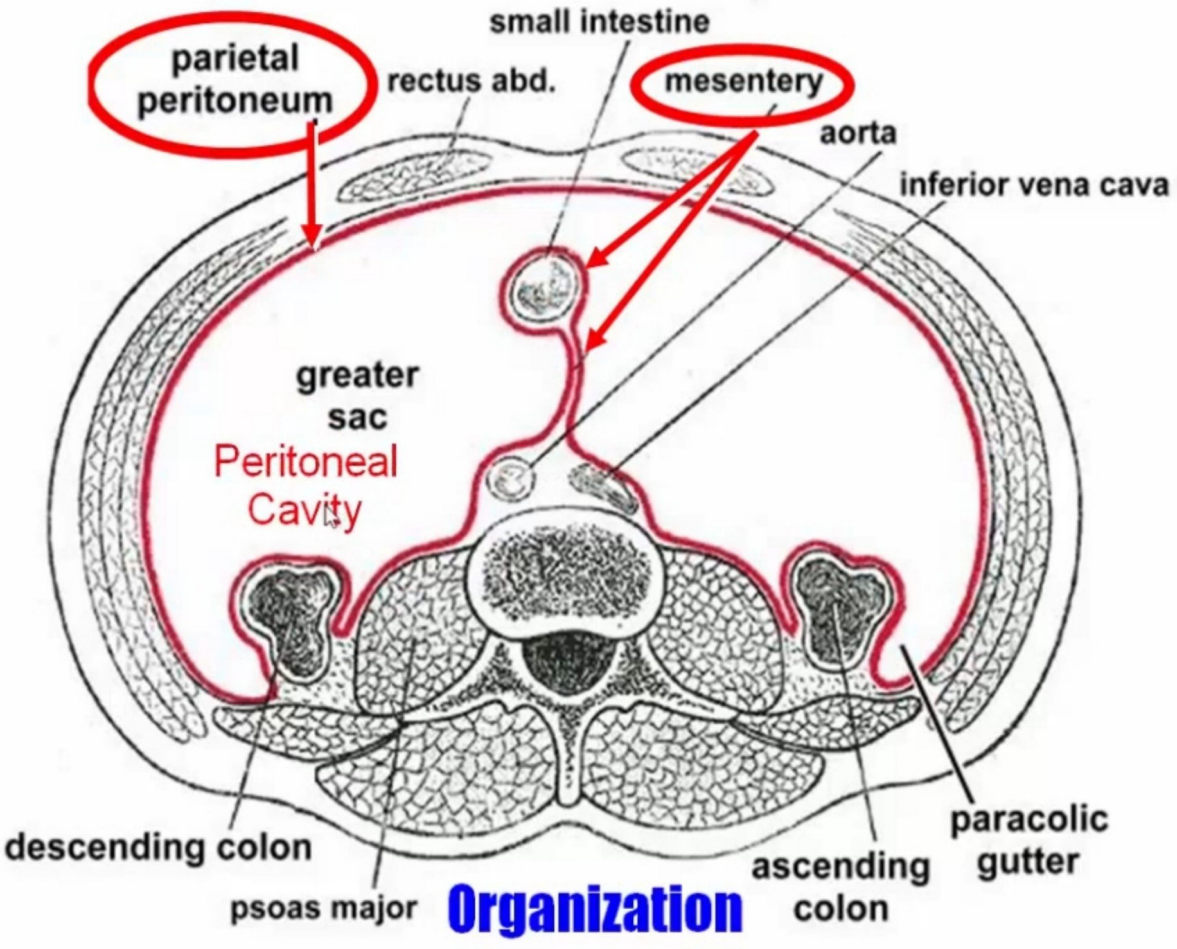
The hernia is lateral to the inferior epigastric artery

The hernia passes through the DIR then the inguinal canal then the SIR and enters the scrotum

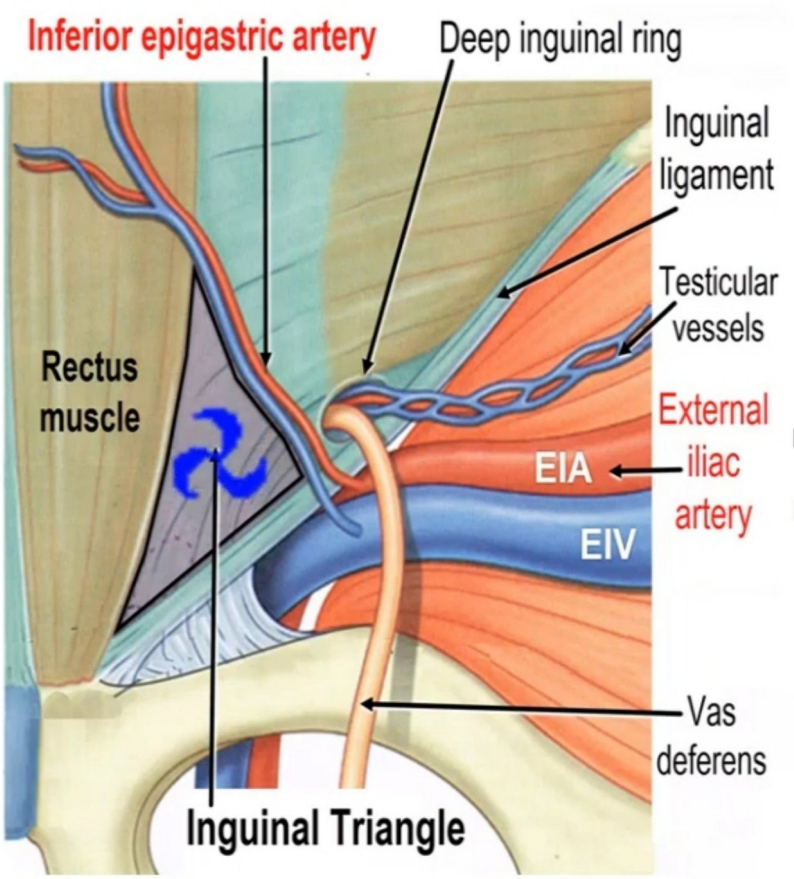
Gives Passage to the Oblique Inguinal Hernia

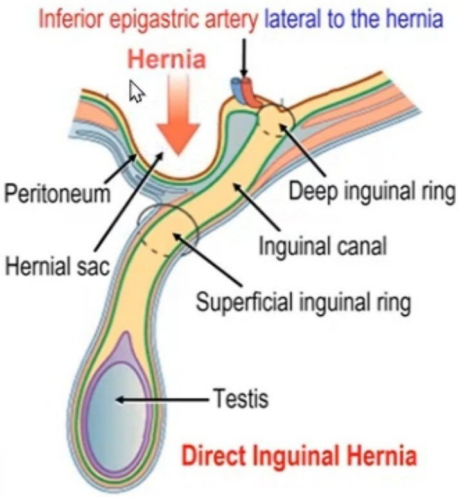
TO THE POSTERIOR SURFACE STOMACH BED



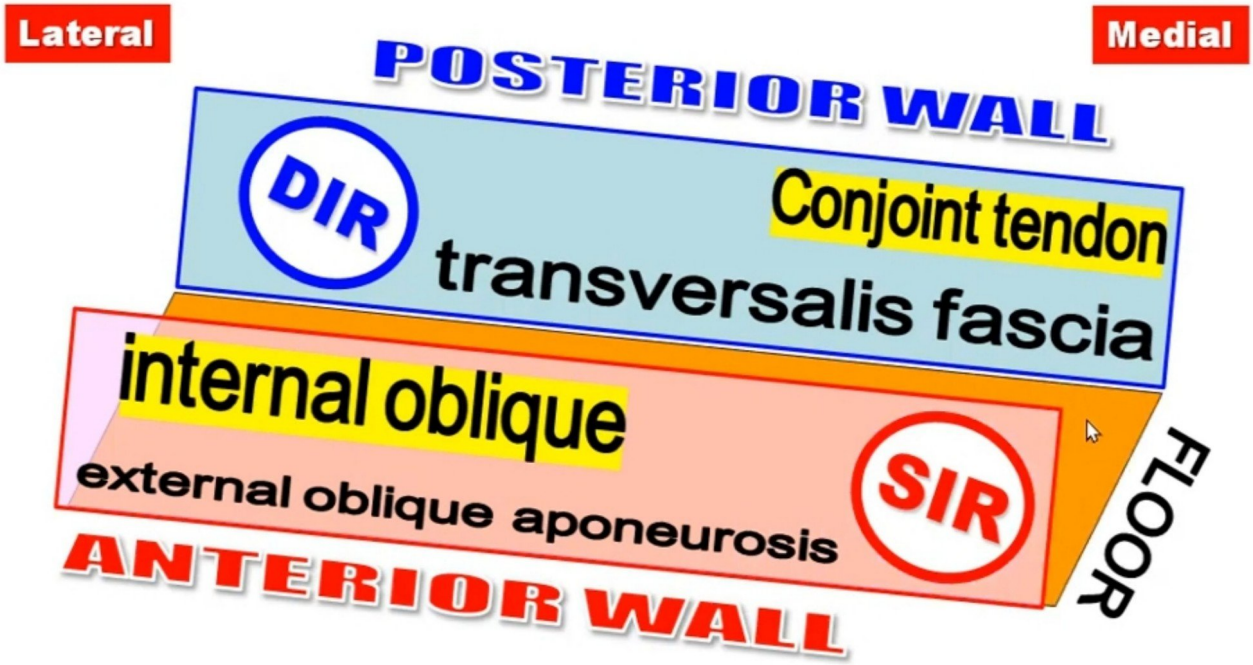


Organization





WALLS & CONTENTS



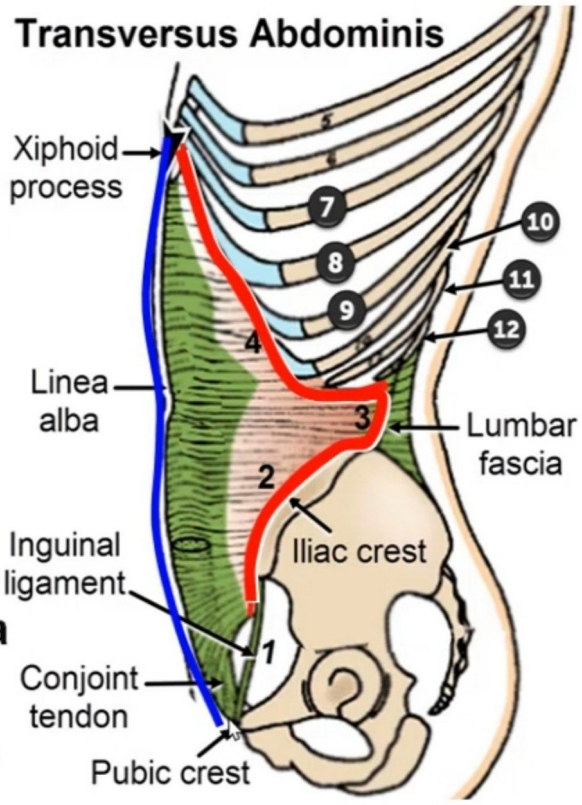
Transversus Abdominis

ORIGIN

1. Lateral 1/3 of the inguinal ligament.
2. Iliac crest (inner lip).
3. Lumbar fascia
4. Lower 6 costal cartilages

INSERTION

1. Xiphoid process & linea alba
2. Pubic crest & pectineal line through the conjoint tendon



PERITONEUM

Definition

Organization:

2 layers

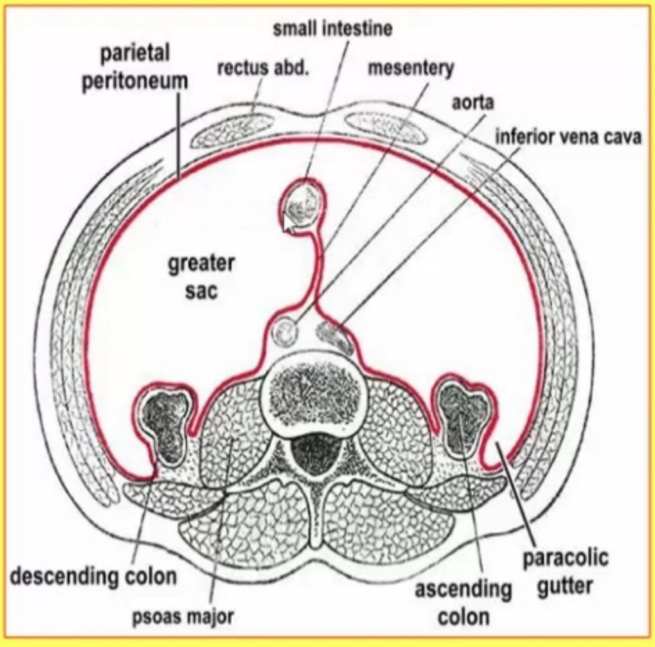
Peritoneal cavity

Peritoneal folds

Blood supply

Nerve supply

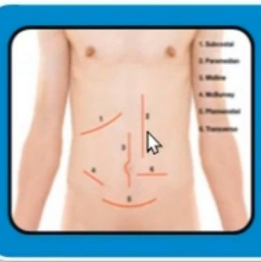
Function



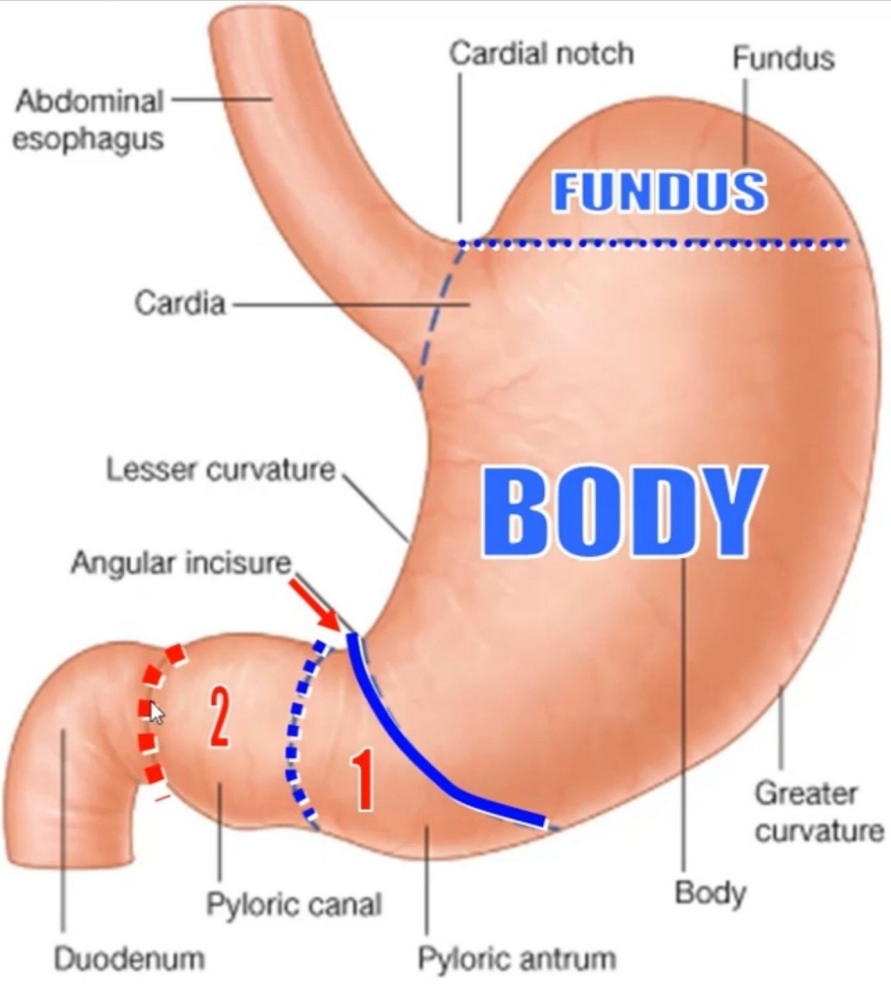
Rectus Sheath

Walls of the Rectus Sheath

Contents of the Rectus Sheath



Paramedian Abdominal Incision

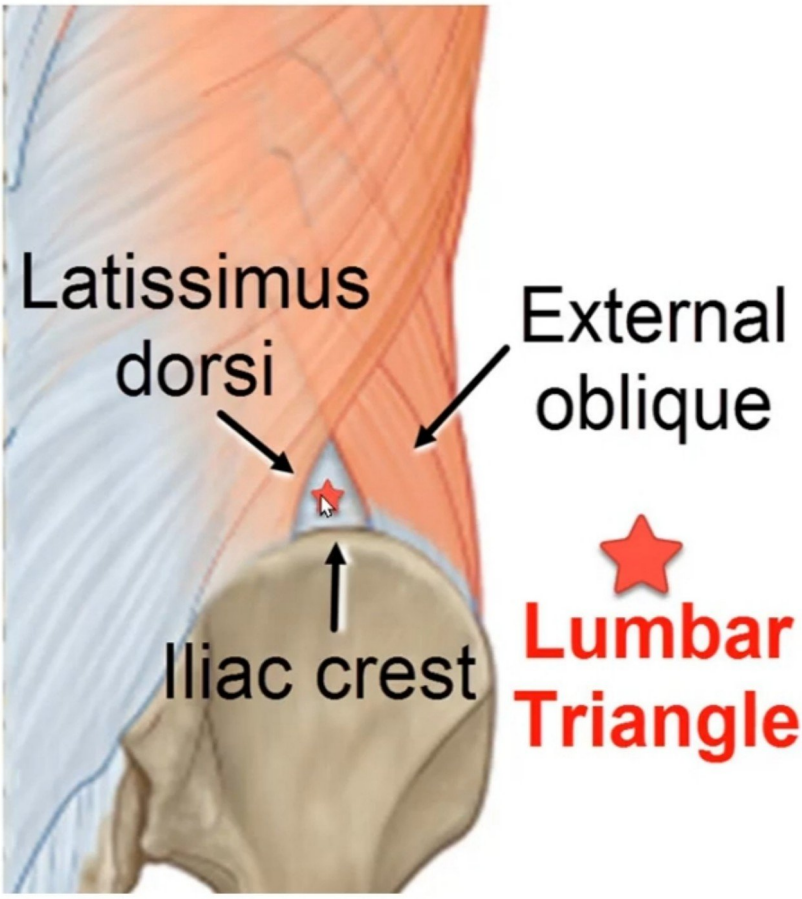


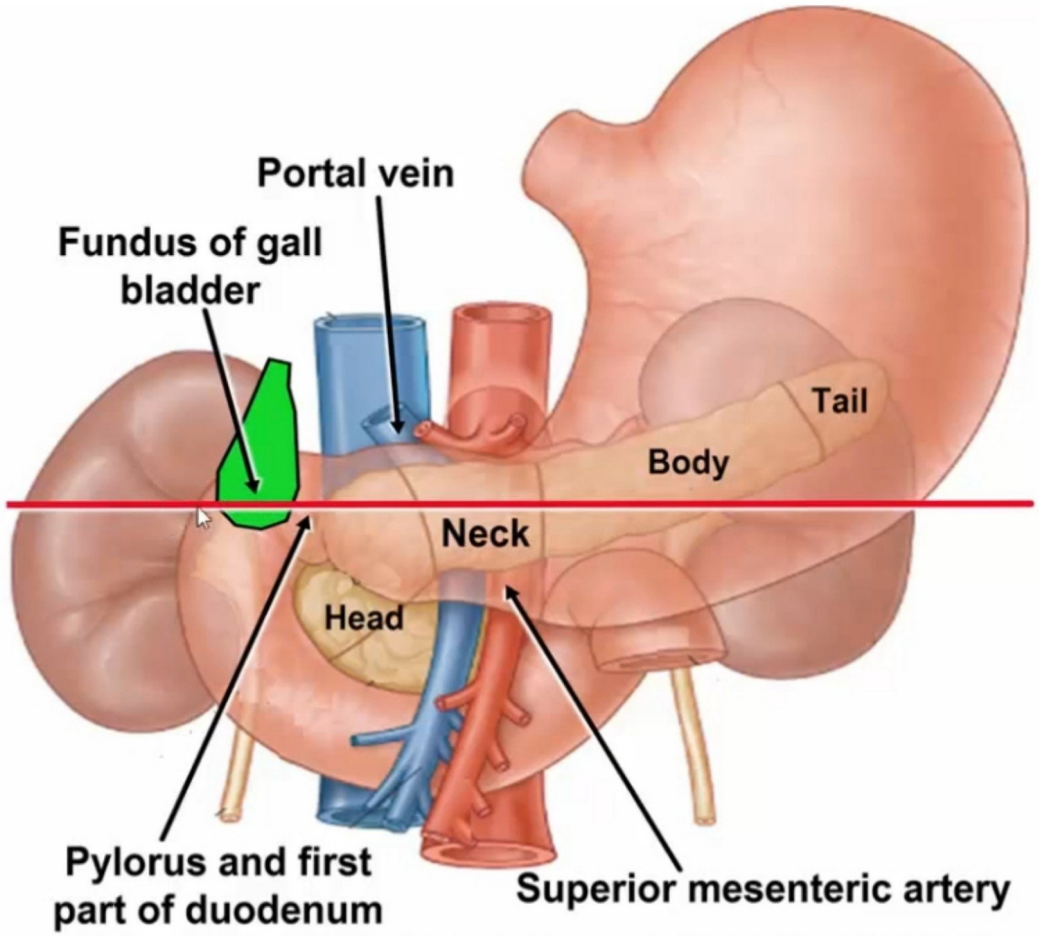
LUMBAR TRIANGLE

(boundaries)

CLINICAL IMPORTANCE

Lumbar hernia





Transpyloric Plane (lower border of L1)

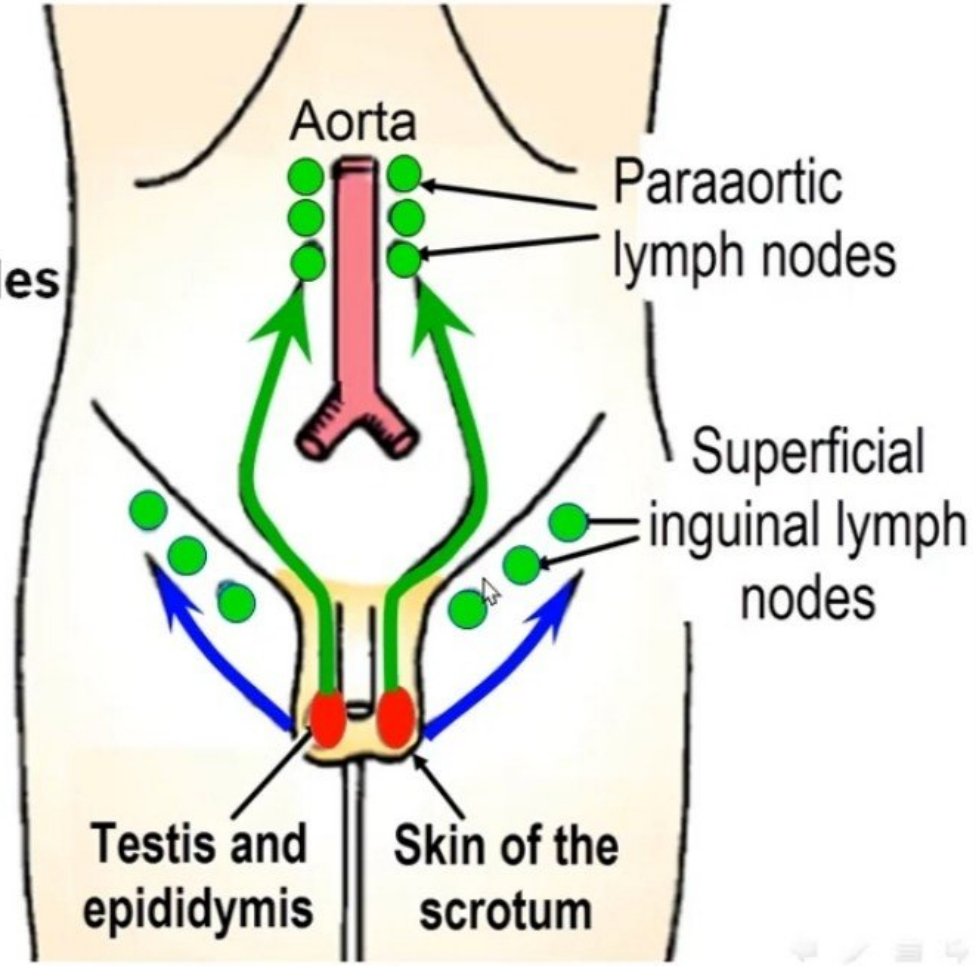
Lymphatics from the Testis & Scrotum

Testis:

Para-aortic lymph nodes

Scrotum:

Superficial inguinal lymph nodes



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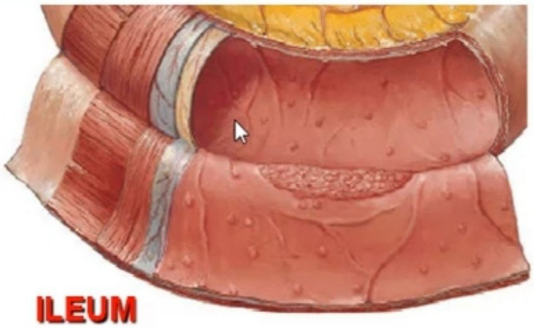
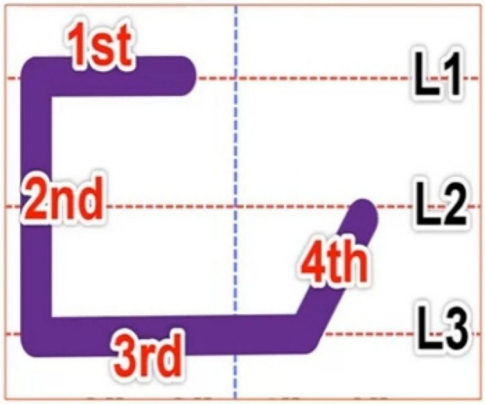
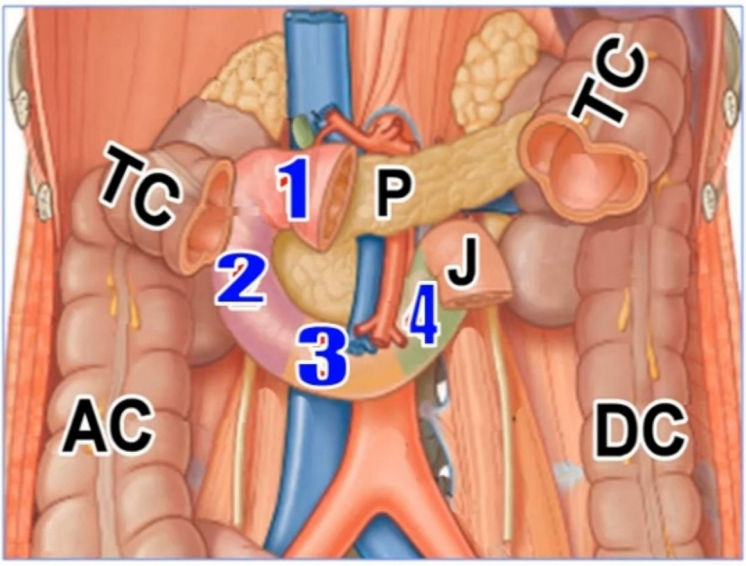
JEJUNUM	ILEUM
LENGTH: Upper 2/5 of the small intestine	**LENGTH:** Lower 3/5 of the small intestine
LOCATION: Lies above the umbilicus	**LOCATION:** Lies below the umbilicus
COLOR: Reddish Because it is more vascular	**COLOR:** Pale Because it is less vascular
WALL: Thick due to the presence of numerous muscous folds: Plicae circularis	**WALL:** Thin due to the presence of few or absent muscous folds





2"-3"-4"-1"



LENGHT: 2 inches
- **1st inch:** mobile & has LO & GO
- **2nd inch:** partially covered with perit

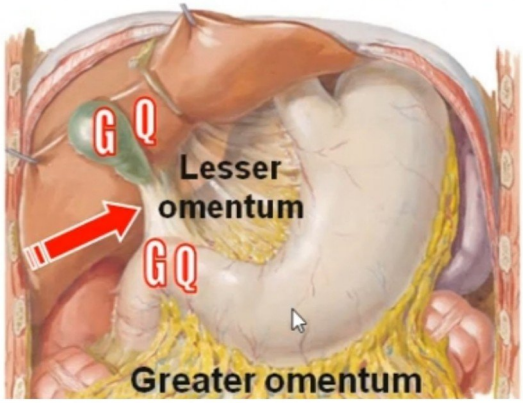
RELATIONS: opposite L1

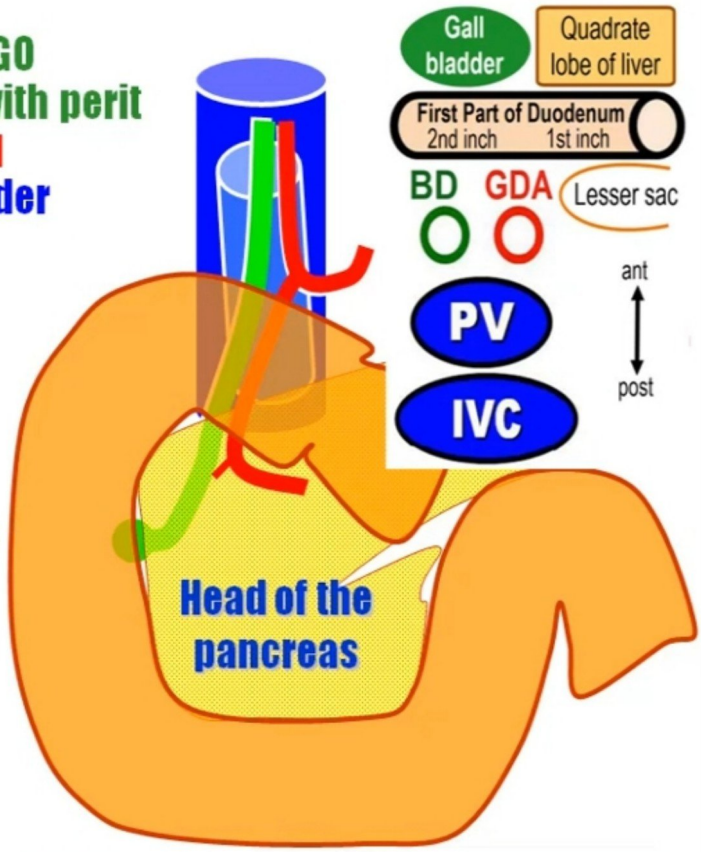
Anteior: QL of liver & Gall bladder

Posterior:
1. Bile duct
2. Gastroduodenal artery
3. Portal vein
4. Inferior vena cava

Superior: epiploic foramen

Inferior: Head of the pancreas





FIRST PART

LENGHT: 3 inches

covered anteriorly and to the right with peritoneum except area crossed by T colon

RELATIONS: from L1 – L3

Anteior: 3
1. **Upper:** Right lobe of the iver
2. **Middle:** Transverse colon
3. **Lower:** Small intestine

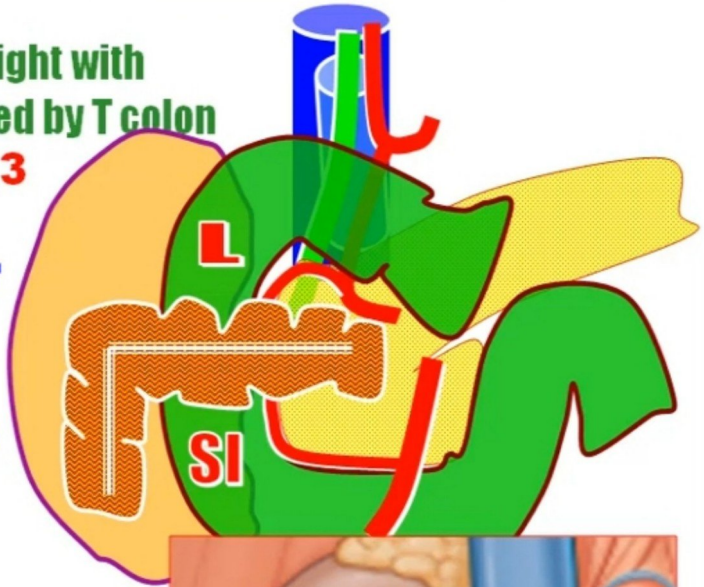
Posterior: hilum of Rt kidney and right psoas muscle

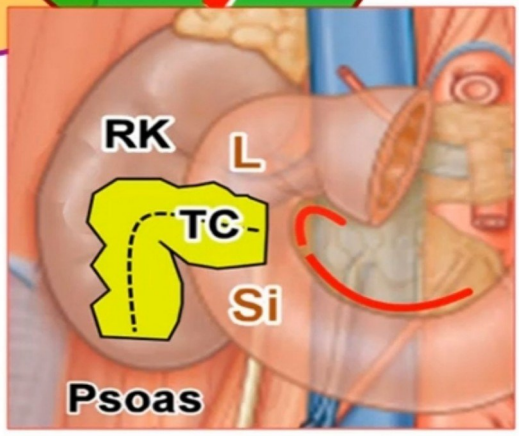
Medial:
1. Head of the pancreas
2. Pancreaticoduodenal vessels

Lateral: Rt colic flexure

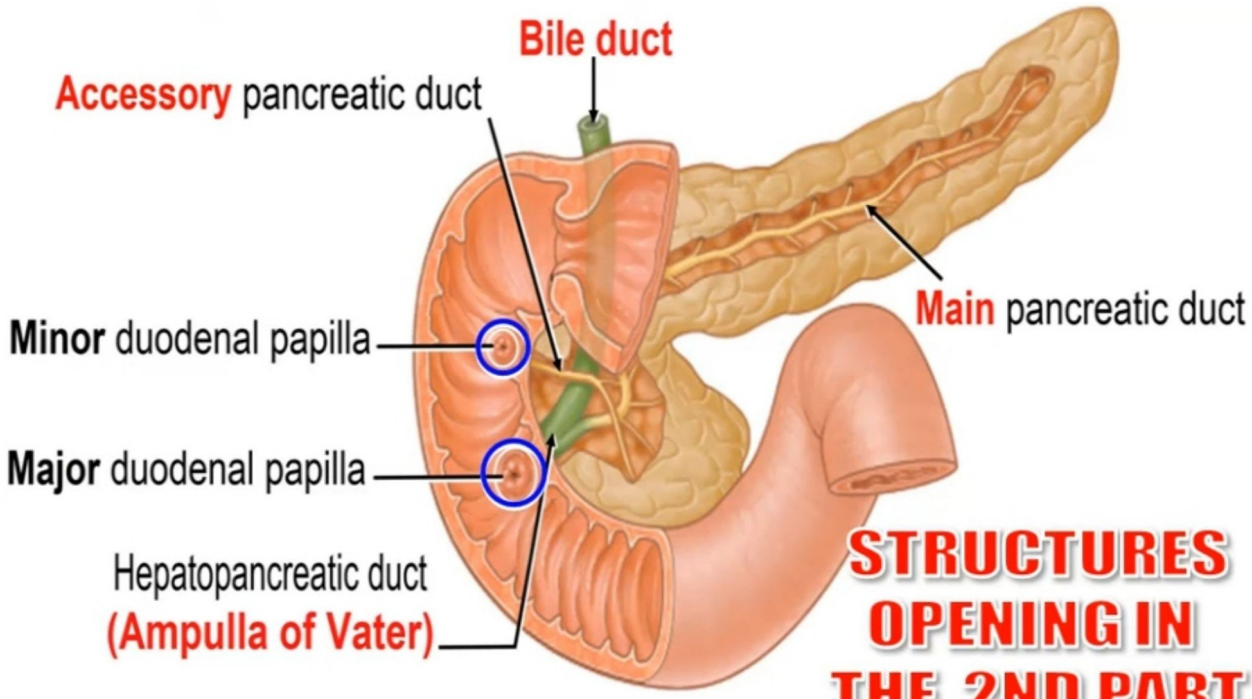
STRUCTURES OPENING IN 2nd PART:

Common bile duct & 2 pancratic ducts





SECOND PART



STRUCTURES OPENING IN THE 2ND PART

1. **Major Duodenal Papilla**: in the middle of the 2nd part
   Formed by opening of bile duct and the main pancreatic duct
2. **Minor Duodenal Papilla:** 1 inch above the major.
   Formed by the opening of the accessory pancreatic duct

3RD PART OF THE DUODENUM

LENGHT: 4 inches

Partially covered with peritoneum

RELATIONS: opposite L3

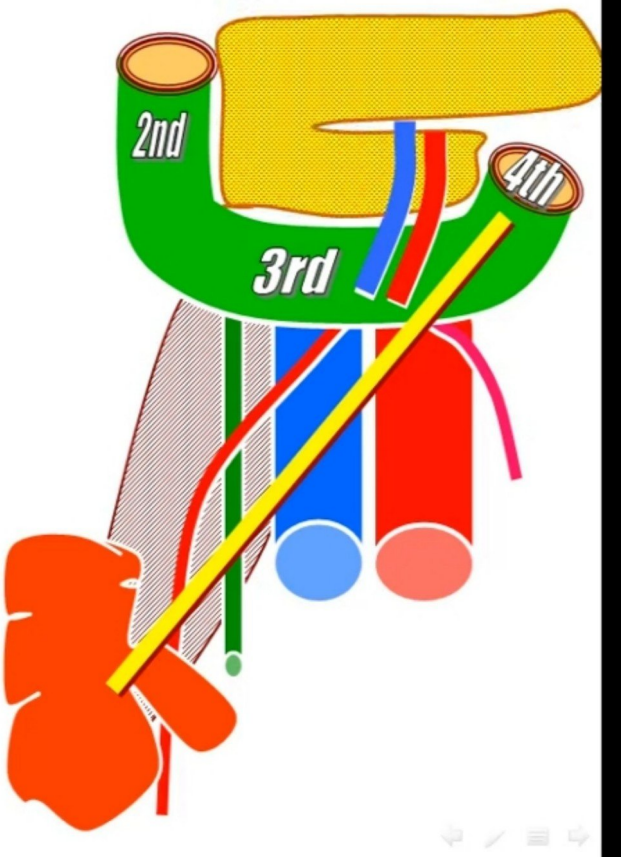
Anteior: 3

1. Root of the mesentery
2. Superior mesenteric vessels
3. Small intestine

Posterior: 3 + 3

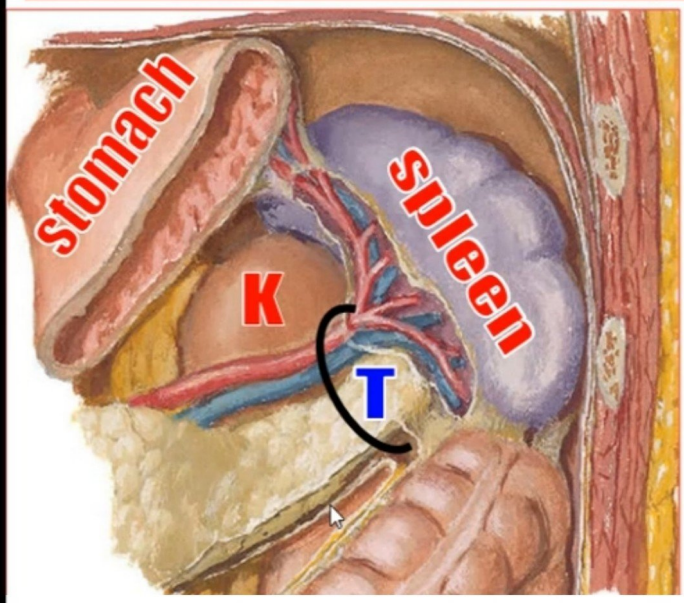
1. Aorta + inf mesenteric artery
2. Inf Vena Cava + Rt gonadal art
3. Rt Psoas muscle + Rt Ureter

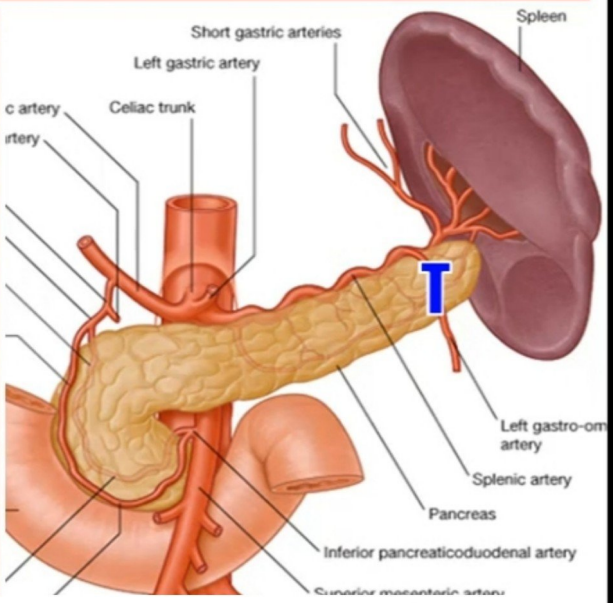
Superior: Head of the pancreas



TAIL OF THE PANCREAS

1. Passes through the lienorenal ligament
2. Related to the visceral surface of the spleen below the lateral end of the hilum

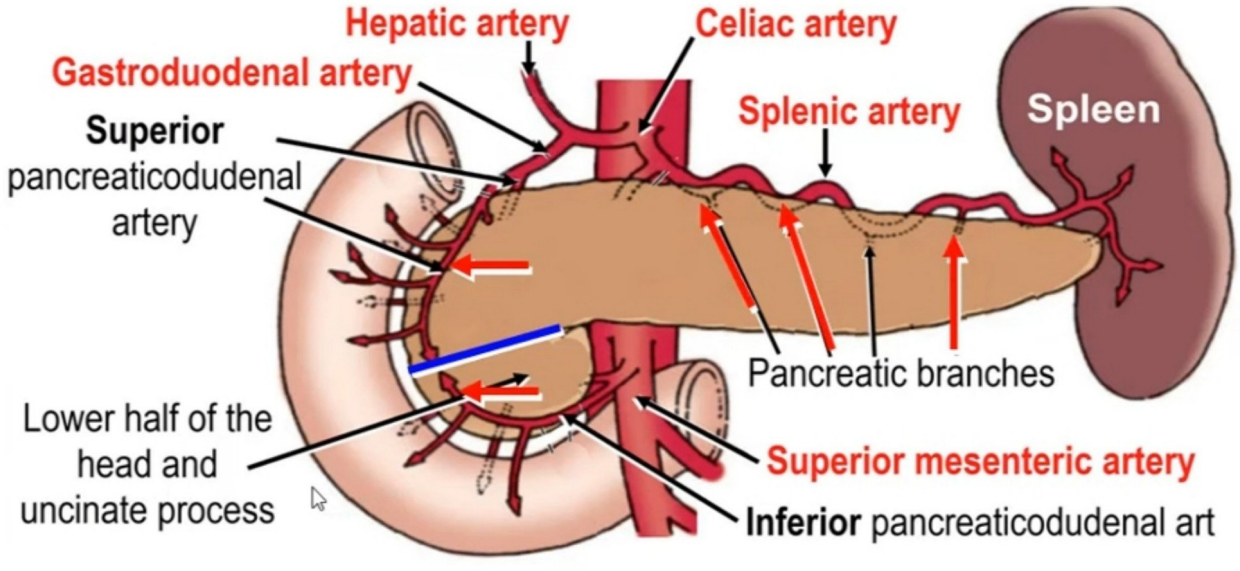




ARTERIAL SUPPLY

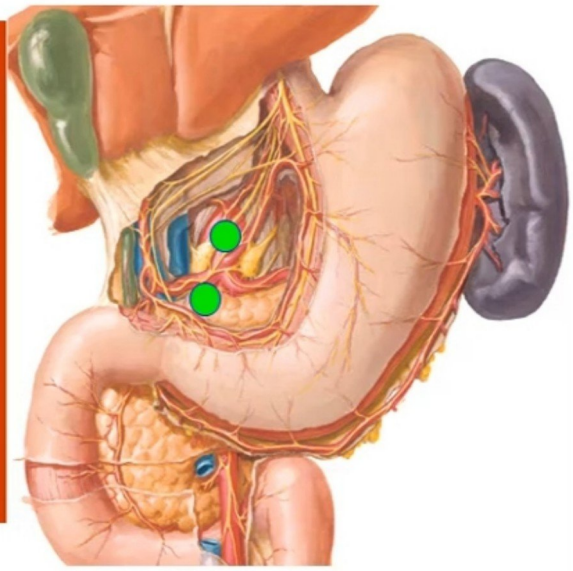
By celiac artery except the lower ½ of the head & the uncinate process:

1. **Superior pancreaticoduodenal artery: upper ½ of the head**
2. **Inferior pancreaticoduodenal artery: lower ½ of the head & the uncinate process**
3. **Pancreatic branches of the splenic artery: neck, body & tail**



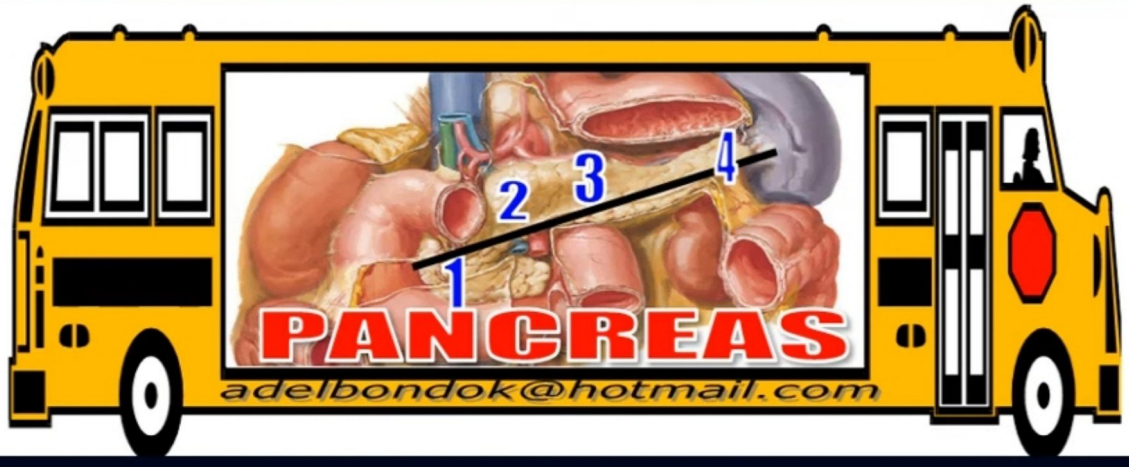
NERVE SUPPLY

1. **Upper Half:** celiac plexus
2. **Lower half:** superior mesenteric plexus



LYMPH DRAINAGE

1. **Upper Half:** celiac lymph nodes
2. **Lower half:** superior mesenteric lymph nodes



POSITION:

FROM: the concavity of the duodenum in the epigastrium
TO: the hilum of the spleen in the left hypochondrium

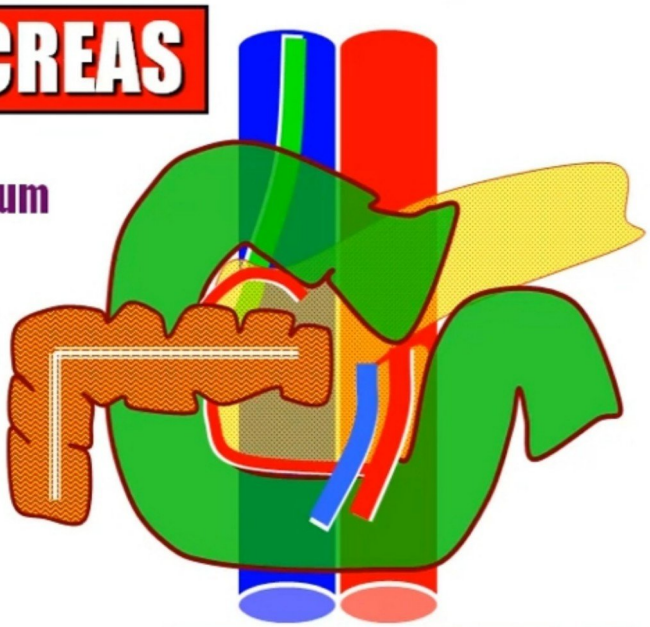
PARTS: 4: Head, Neck, Body & Tail

RELATIONS:

Arterial Supply, Nerve Supply & Lymph Drainage

Pancreatic Ducts: main P duct and accessory P duct

HEAD OF THE PANCREAS



POSITION

1. In the concavity of the duodenum
2. Has uncinate process

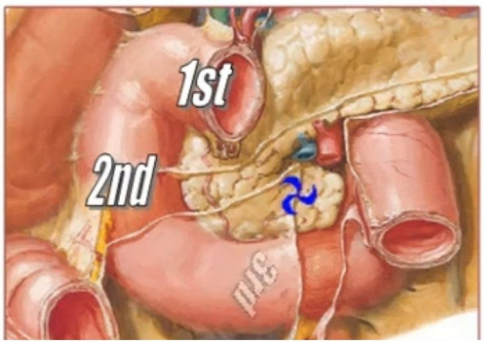
RELATIONS

ANTERIOR:

1. Transverse colon
3. Sup mesenteric ves ant to UP

POSTERIOR:

1. Bile duct
2. Inferior vena cava
3. Aorta behind the uncinate process



LATERAL:

1. 2nd part of the duodenum
2. Sup & inf pancreaticoduodenal vessels

SUPERIOR: 1st part of the duodenum

INFERIOR: 3rd part of the duodenum

NECK OF THE PANCREAS

POSITION: it is the part in front of 2 structures

1. Origin of the portal vein
2. Origin of the superior mesenteric artery

RELATIONS

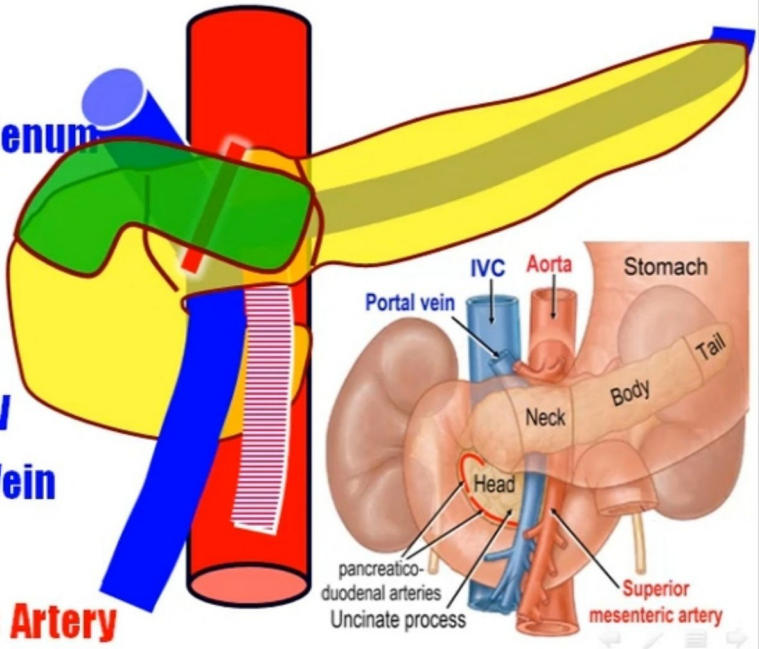
ANTERIOR:

Lesser sac + 1st inch of duodenum

Gastroduodenal artery

POSTERIOR: 3V + 2A

1. Termination of Splenic V
2. Termination of Sup Mes V
3. Beginning of the Portal Vein
3. Aorta
3. Origin of Sup Mesenteric Artery

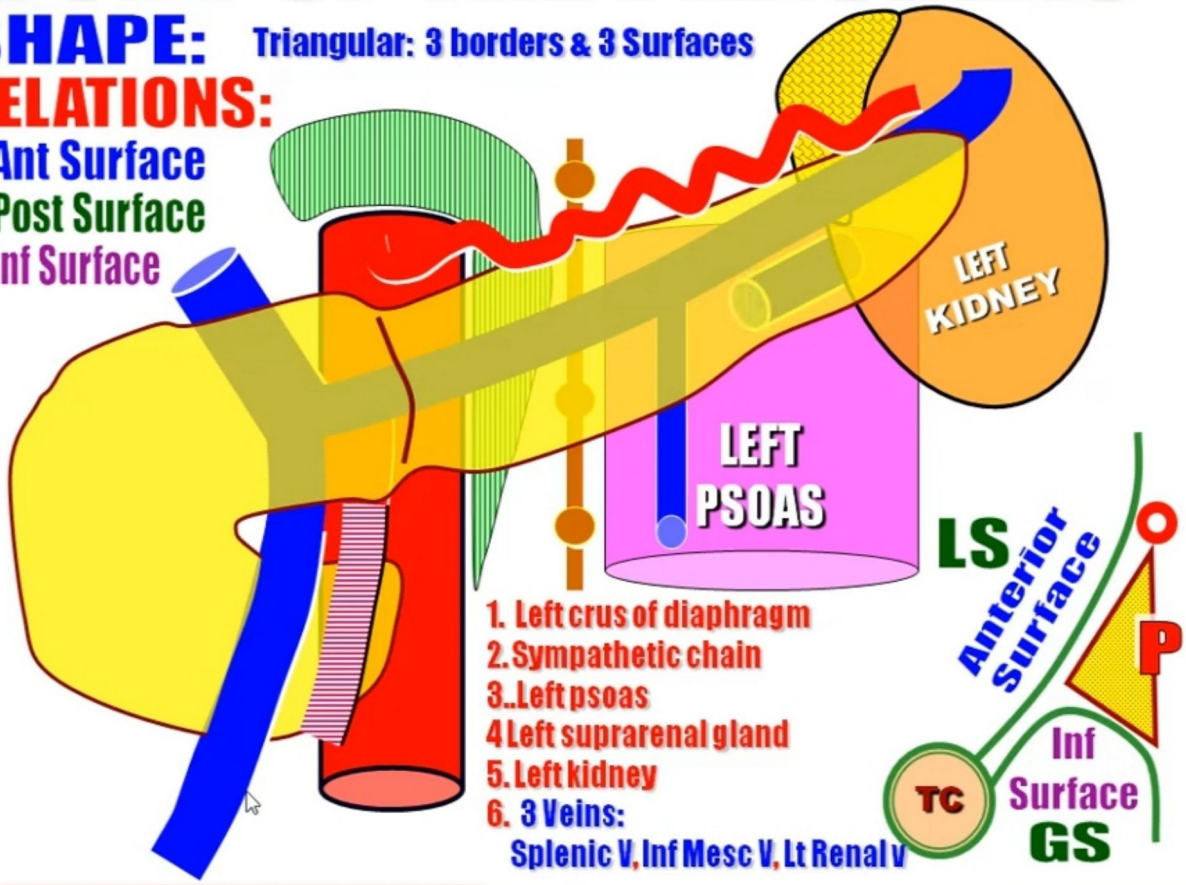


BODY OF THE PANCREAS

SHAPE: Triangular: 3 borders & 3 Surfaces

RELATIONS:

1. Ant Surface
2. Post Surface
3. Inf Surface



ANTERIOR SURFACE

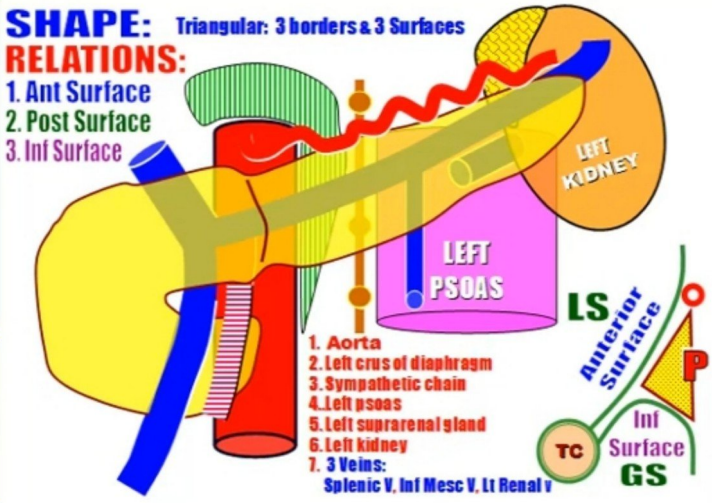
1. Stomach & Lesser sac
2. Splenic artery along the upper border
3. Transverse mesocolon along the anterior border

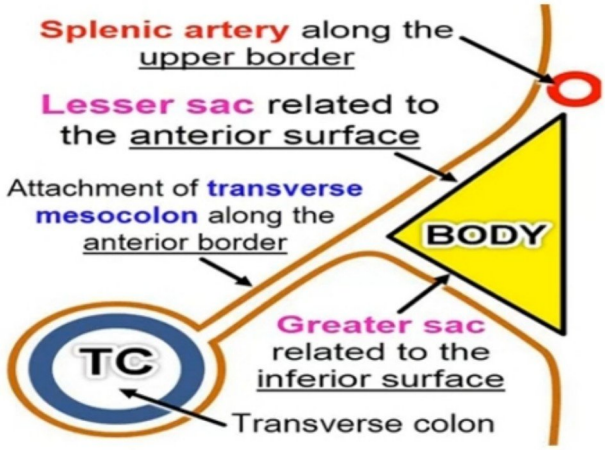
INFERIOR SURFACE

1. Greater sac
2. Small intestine: jejunum

POSTERIOR SURFACE

1. Left crus of diaphragm
2. Left sympathetic chain
3. Left psoas
4. Left suprarenal gland
5. Left kidney
6. 3 Veins: Splenic V, Inferior mesenteric V & Lt Renal v





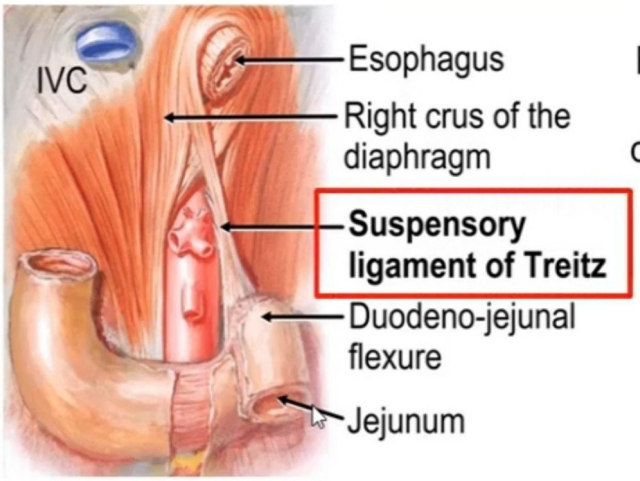
4th PART OF THE DUODENUM

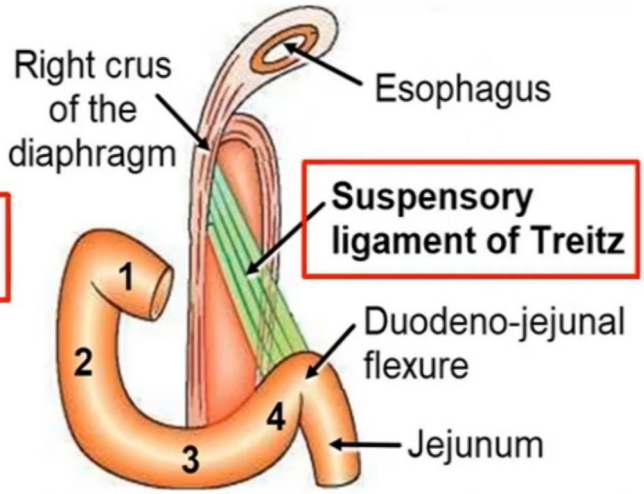
LENGHT: 1 inch

Partially covered with peritoneum

The Duodeno-Jejunal Flexure

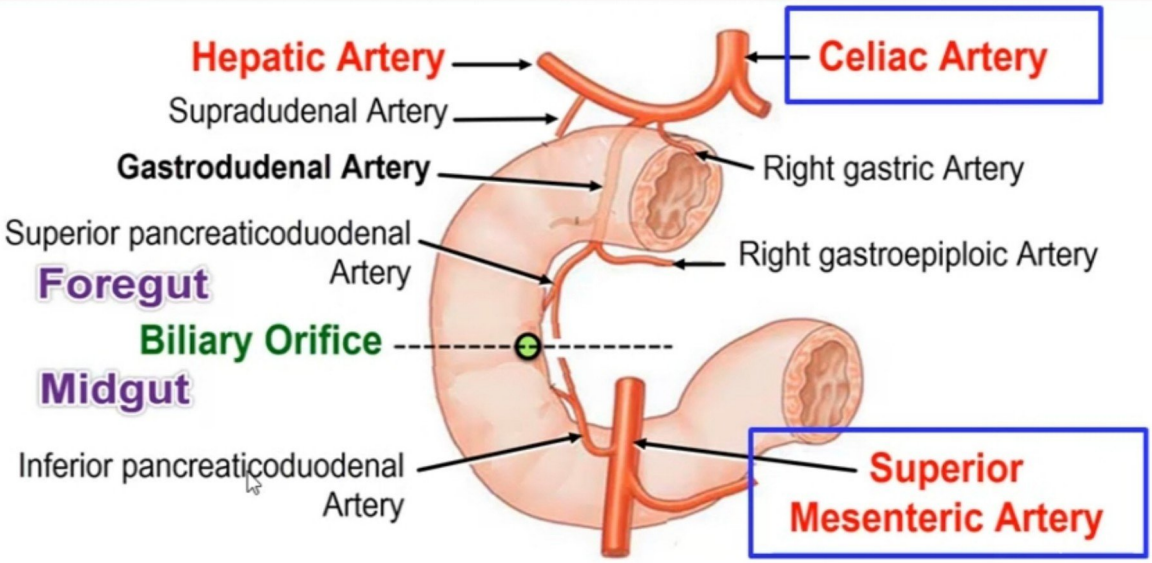
is connected to the right crus of the diaphragm by the suspensory ligament of Treitz





ARTERIAL SUPPLY

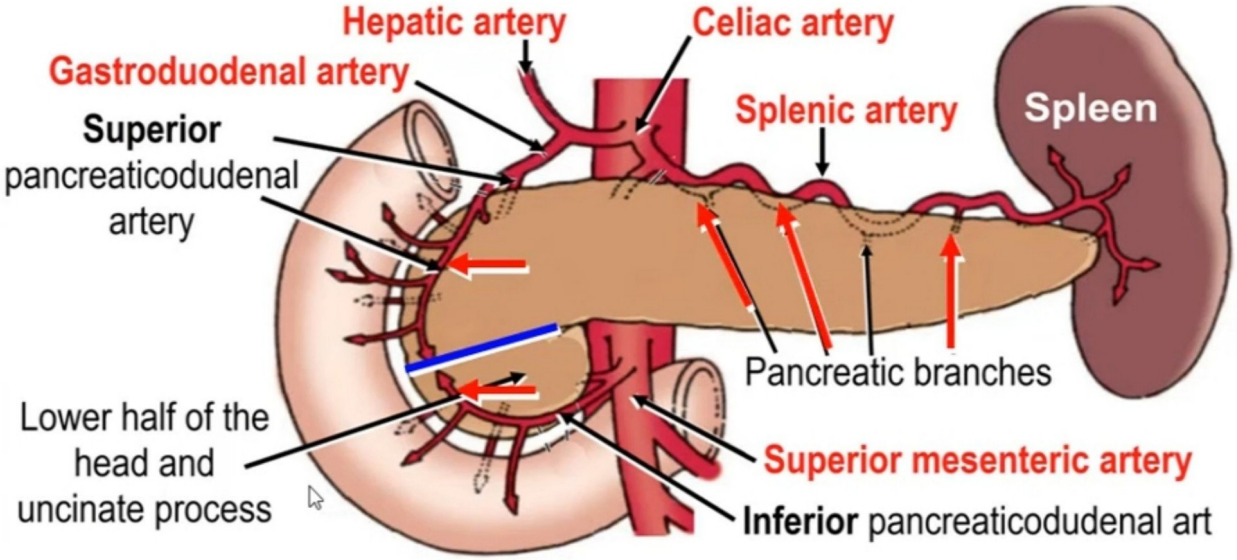
1. **Upper 1/2: celiac artery**
   - a. Right gastric artery
   - b. Right gastroepiploic artery
   - c. Supraduodenal artery
   - d. Superior pancreaticoduodenal
2. **Lower 1/2: Sup mes artery**
   - Inferior pancreaticoduodenal art



ARTERIAL SUPPLY

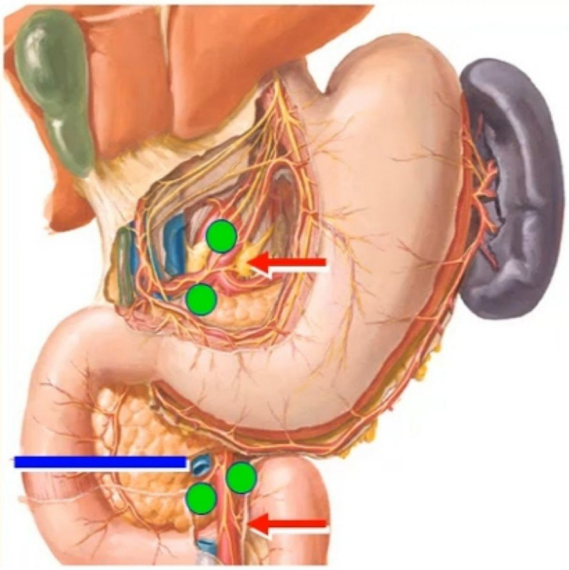
By celiac artery except the lower ½ of the head & the uncinate process:

1. **Superior pancreaticoduodenal artery: upper ½ of the head**
2. **Inferior pancreaticoduodenal artery: lower ½ of the head & the uncinate process**
3. **Pancreatic branches of the splenic artery: neck, body & tail**



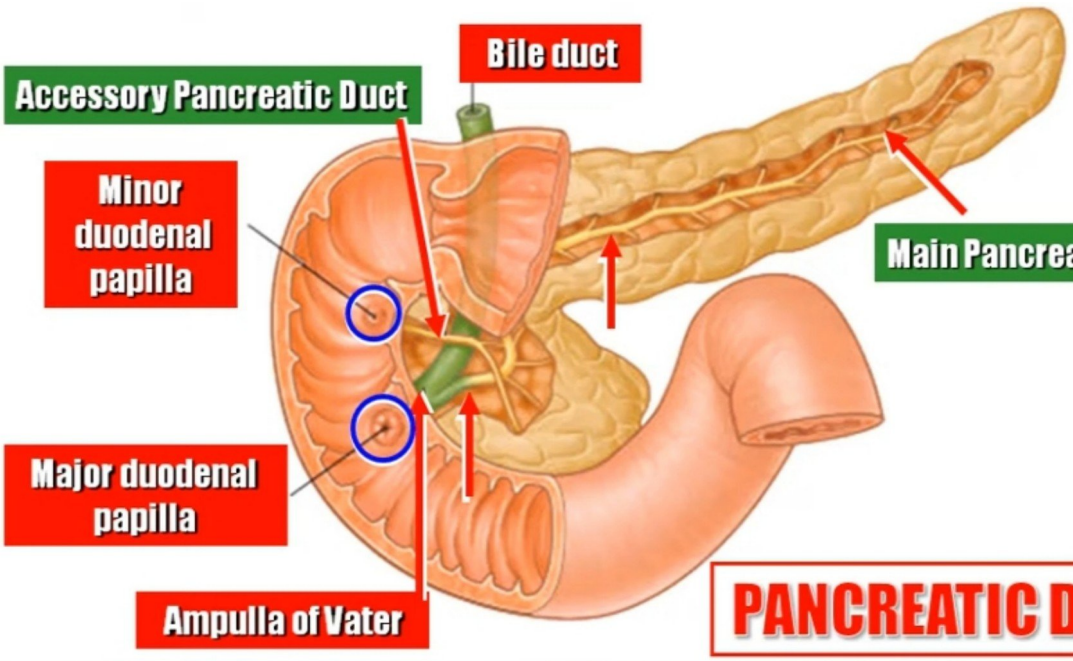
NERVE SUPPLY

1. **Celiac plexus: all except the lower ½ of the head & the uncinate process**
2. **Superior mesenteric plexus: lower ½ of the head & the uncinate process**



LYMPH DRAINAGE

1. **Upper ½ of the head, Neck, Body & Tail: celiac lymph nodes**
2. **Lower ½ of the head & Uncinate Process: superior mesenteric lymph nodes**



PANCREATIC DUCTS

1. Main Pancreatic Duct:

Fuses with the bile duct to form ampulla of Vater which opens in major duodenal papilla in the middle of the posteromedial surface of the 2nd part of the duodenum

2. Accessory Pancreatic Duct:

Arises in the head and opens in the minor duodenal papilla 1" above the main duct

ARTERIAL SUPPLY OF THE GUT

Foregut: Celiac Trunk

Midgut: Superior Mesenteric Art

Hindgut: Inferior Mesenteric Art

FOREGUT

CELIAC ARTERY

MIDEGUT

SUPERIOR MESENTERIC

HINDGUT

INFERIOR MESENTERIC

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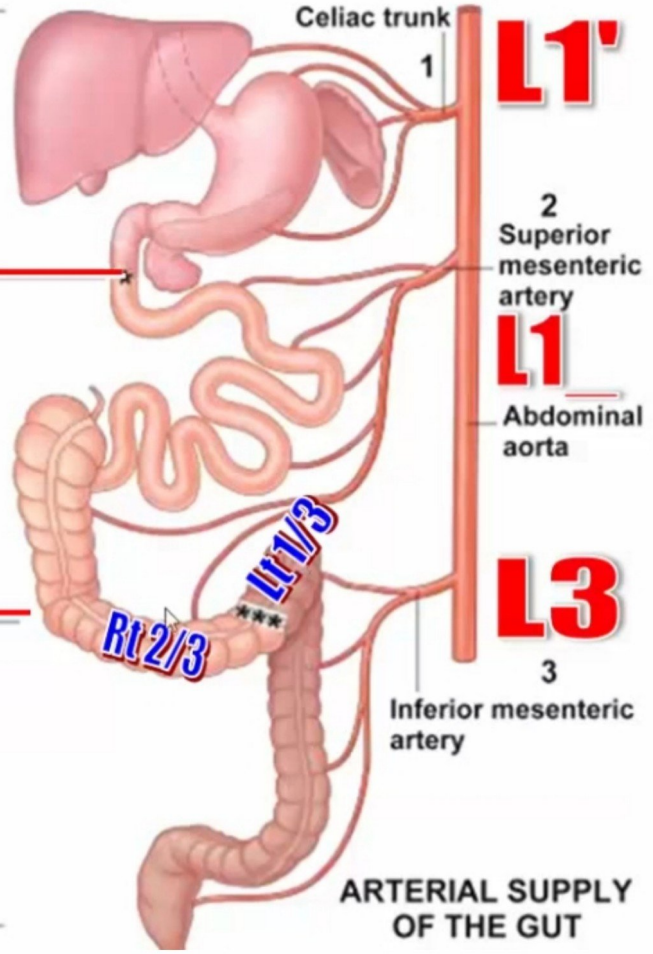


CELIAC TRUNK

ORIGIN

COURSE

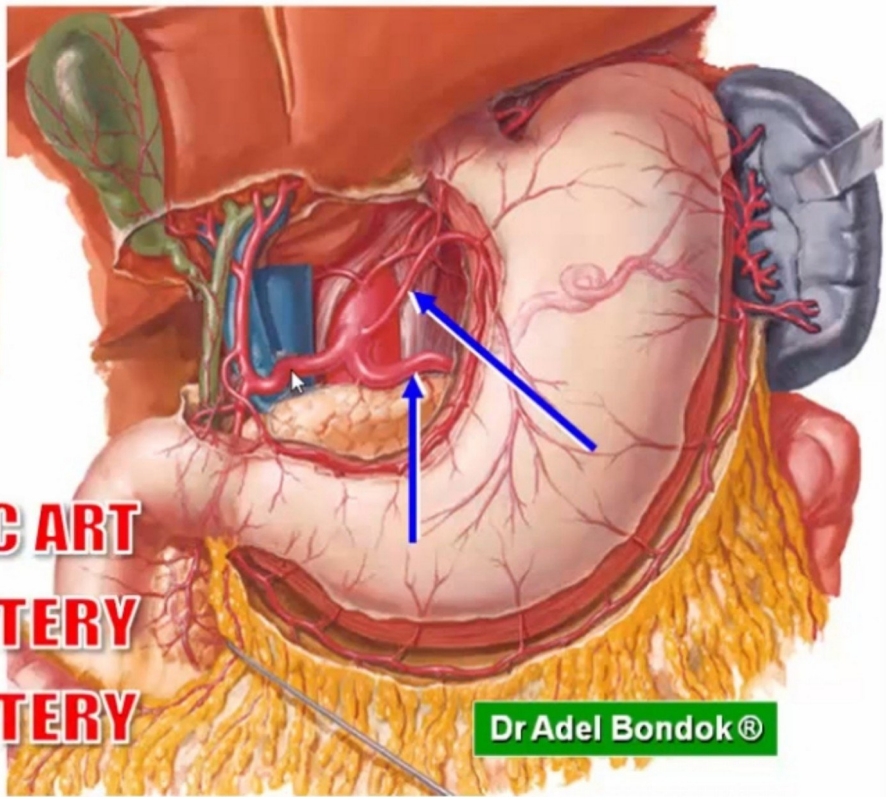
BRANCHES

3

LEFT GASTRIC ART

SPLENIC ARTERY

HEPATIC ARTERY



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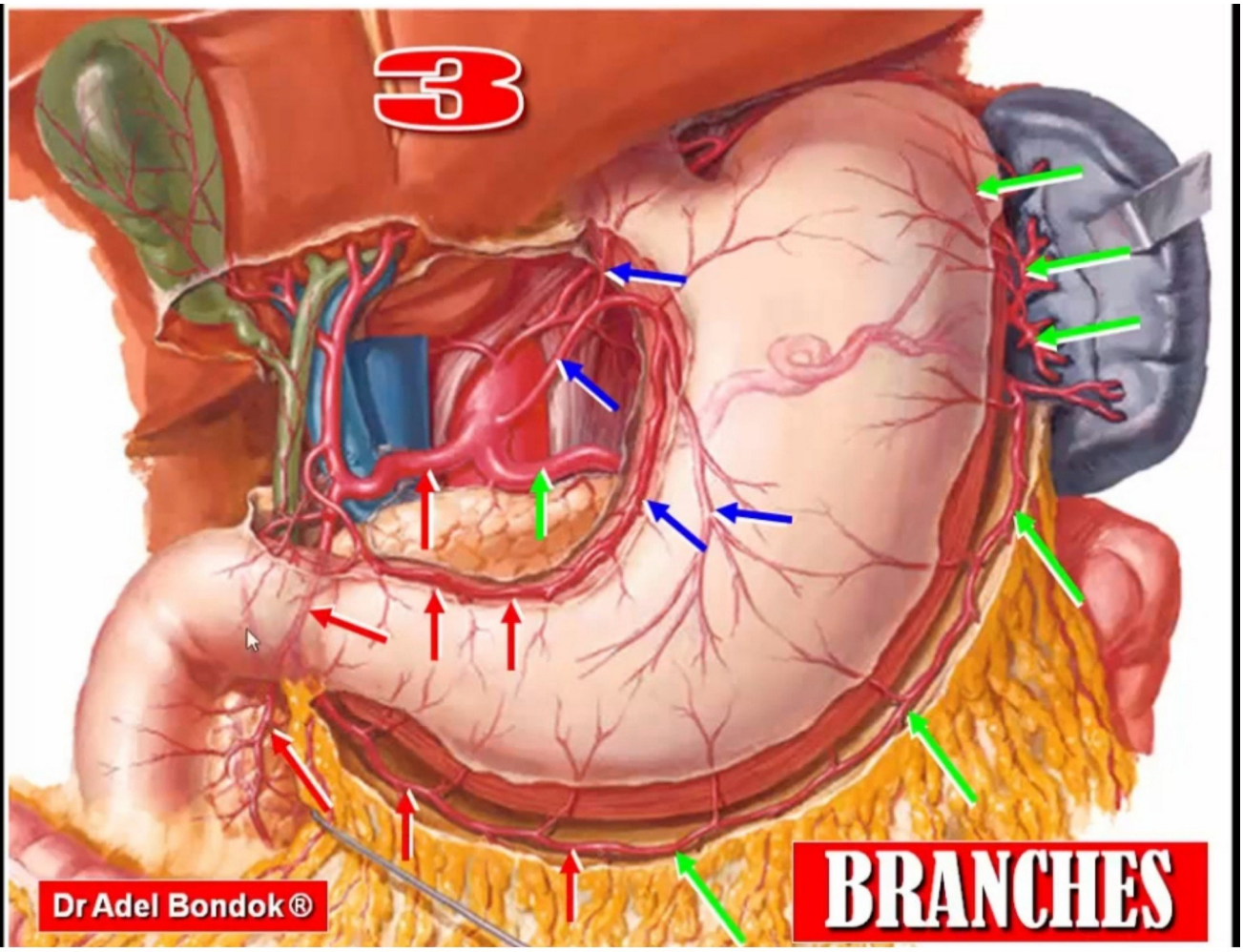
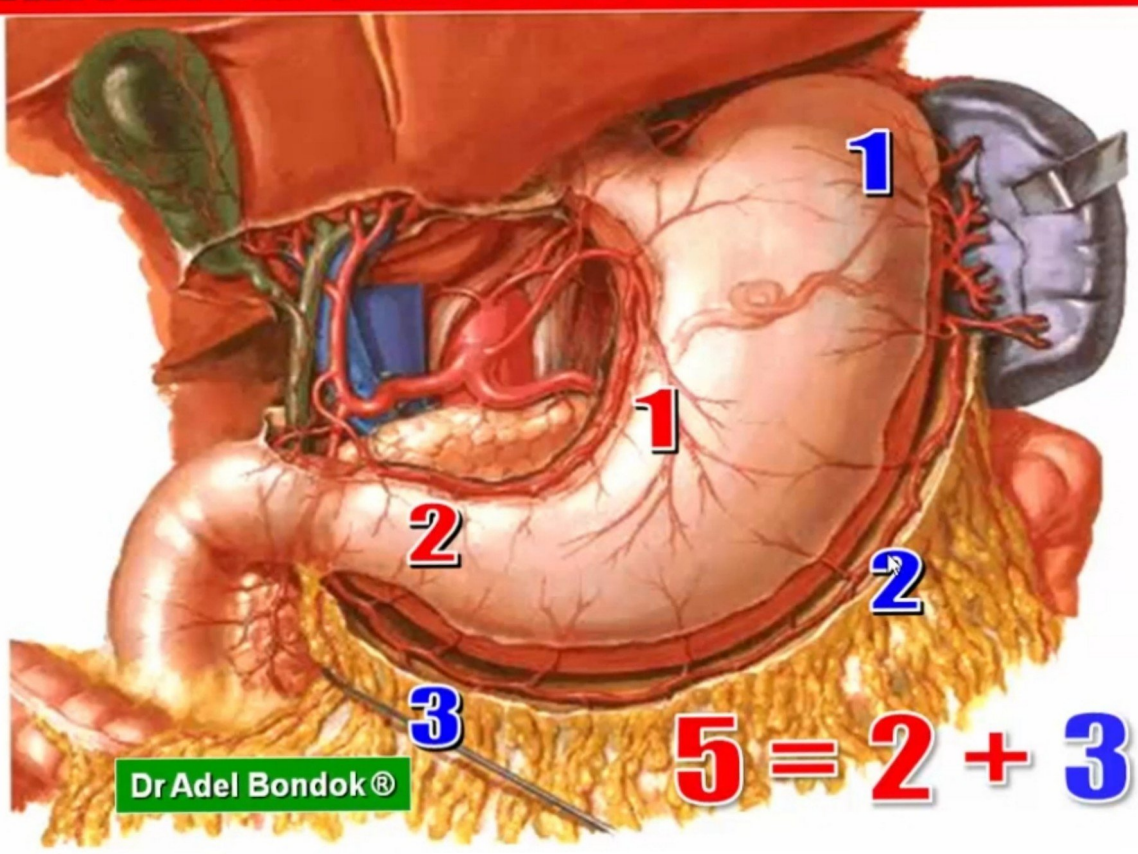


CELIAC ARTERY

- **Left Gastric Artery**
  - Esophageal
  - Gastric
- **Splenic Artery**
  - Pancreatic
  - Splenic
  - Short gastric
  - Left gastroepiploic
- **Hepatic Artery**
  - Right gastric
  - Gastroduodenal
  - Supraduodenal
  - 2 Hepatic art
  - Cystic artery

ARTERIAL SUPPLY OF THE STOMACH



SUPERIOR MESENTERIC ARTERY

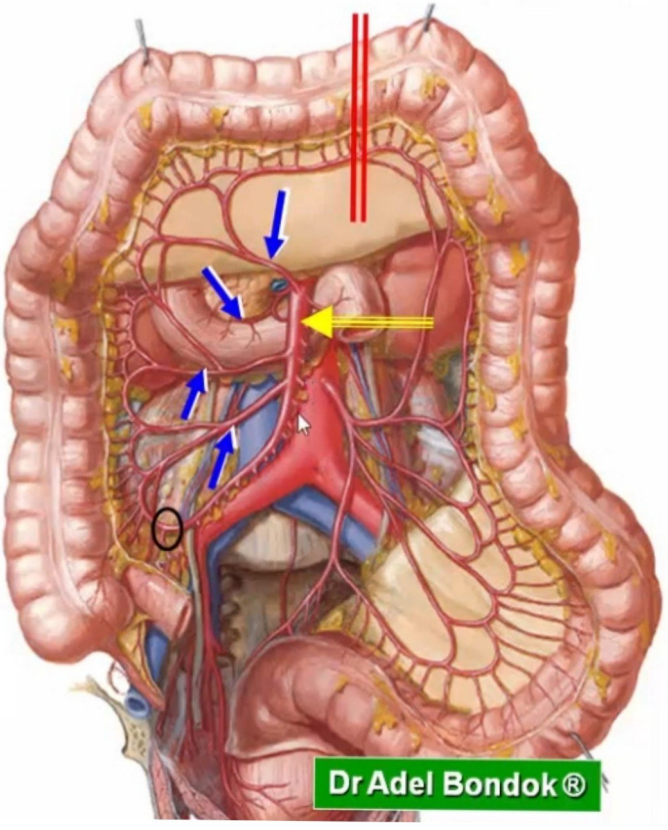
ORIGIN

COURSE

TERMINATION

BRANCHES 5

- Inf pancreaticoduodenal
- Middle colic Artery
- Right Colic Artery
- Ileocolic Artery
- Jejunal & Ileal Branches



INFERIOR MESENTERIC ARTERY

ORIGIN

COURSE

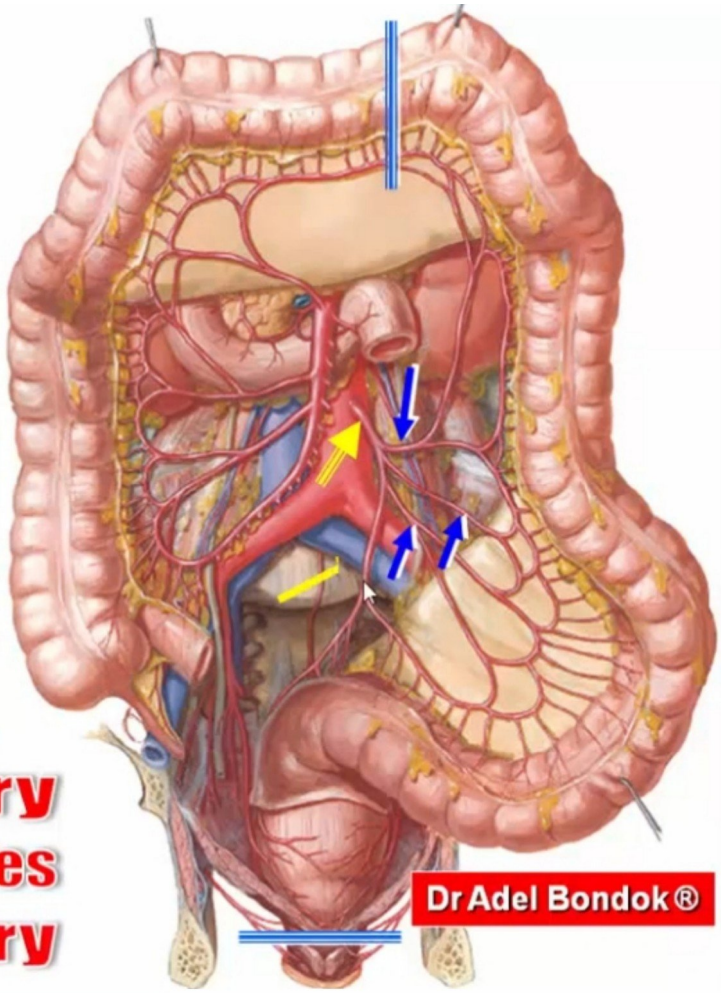
TERMINATION

BRANCHES 3

Left Colic Artery

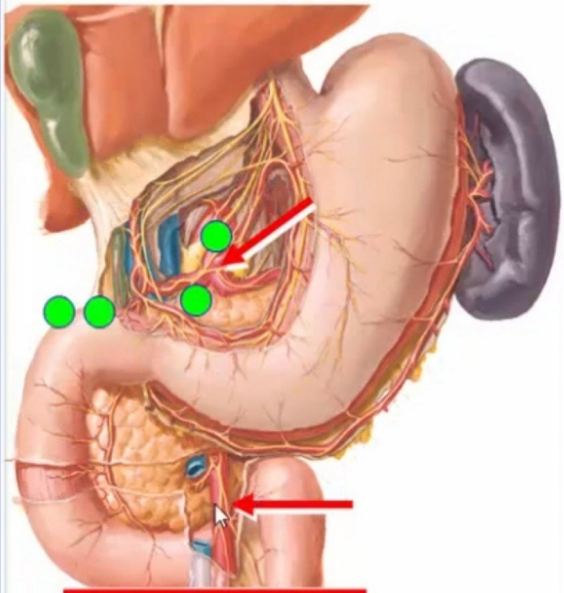
2 - 4 Sigmoid Arteries

Sup Rectal Artery



ARTERIAL SUPPLY OF THE DUODENUM

1. **Upper 1/2: celiac artery**
   - a. Right gastric artery
   - b. Right gastroepiploic artery
   - c. Supraduodenal artery
   - d. Superior pancreaticoduodenal
2. **Lower 1/2: Sup mes artery**
   - Inferior pancreaticoduodenal art



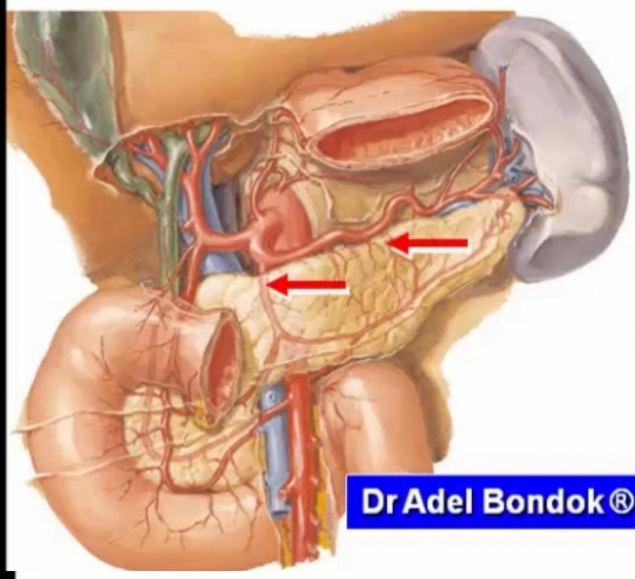
LYMPH DRAINAGE

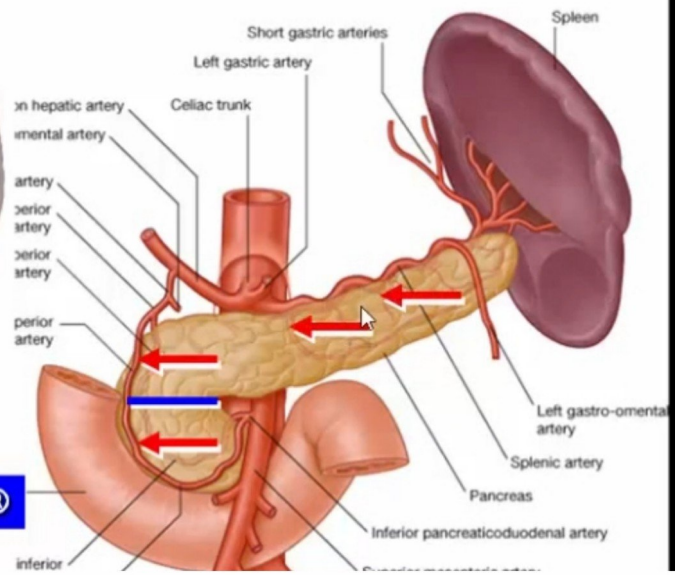
1. **Upper Half:** celiac lymph nodes
2. **Lower half:** superior mesenteric lymph nodes

ARTERIAL SUPPLY OF THE PANCREAS

By celiac artery except the lower ½ of the head & the uncinate process:

1. **Superior pancreaticoduodenal artery:** upper ½ of the head
2. **Inferior pancreaticoduodenal artery:** lower ½ of the head & the uncinate process
3. **Pancreatic branches of the splenic artery:** neck, body & tail

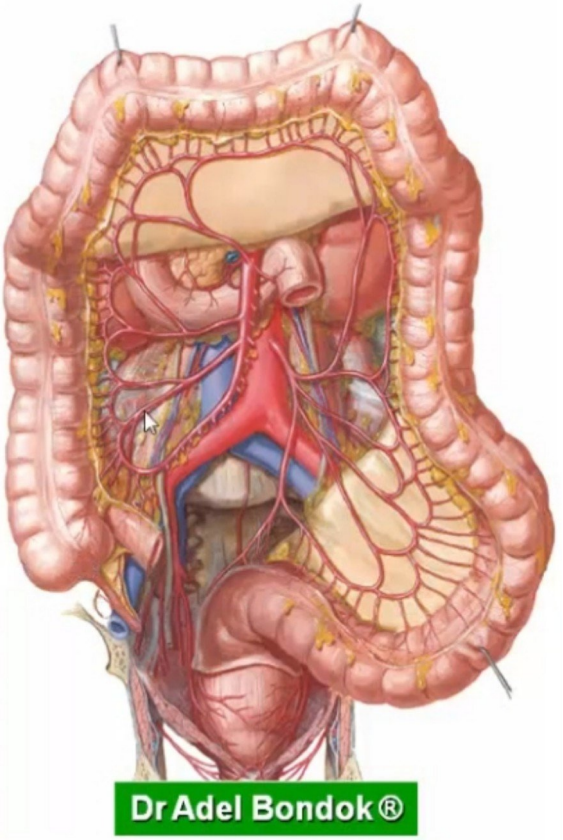




ARTERIAL SUPPLY OF THE LARGE INTESTINE

1. **Superior Mesenteric Artery:**
   Cecum, appendix, ascending colon & Rt 2/3 of transverse colon
2. **Inferior Mesenteric Artery:**
   Left 1/3 of transverse colon, descending & sigmoid colon, rectum & upper part of anal canal

1. **Cecum:** anterior & posterior cecal arteries from the ileocolic artery
2. **Appendix:** appendicular artery from the ileocolic artery
3. **Ascending Colon:** ileocolic and right colic arteries from the superior mesenteric artery



ARTERIAL SUPPLY OF THE LARGE INTESTINE

4. Transverse Colon:

a. **Right 2/3:** middle colic artery from the **sup mesenteric artery**

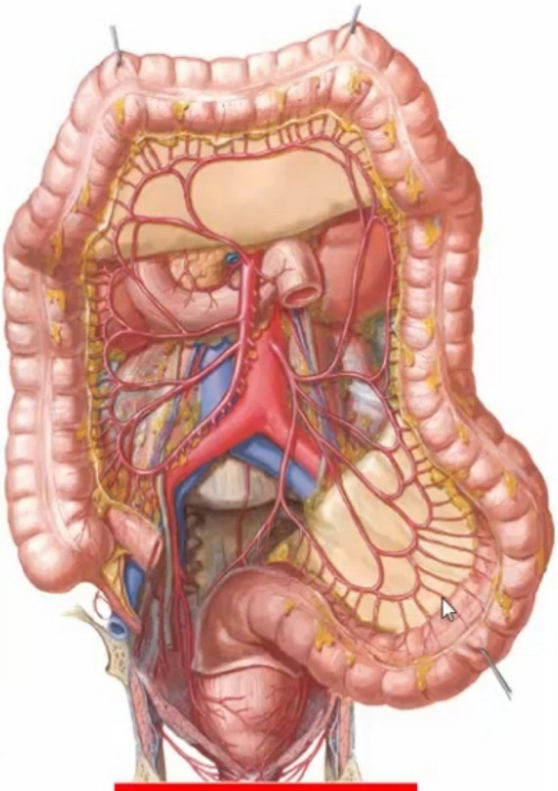
b. **Left 1/3:** left colic artery from the **inferior mesenteric artery**

5. Descending Colon:

left colic and sigmoid branches from the inferior mesenteric art

6. Sigmoid Colon:

Sigmoid branches from the inferior mesenteric artery



VENOUS DRAINAGE: same

LYMPH DRAINAGE: same

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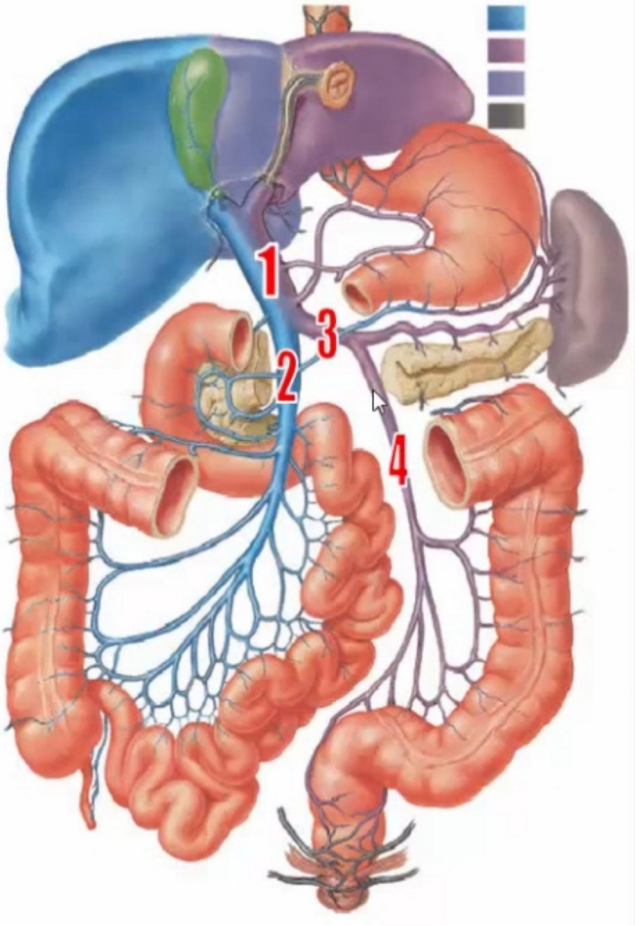
PORTAL VENOUS SYSTEM

FORMATION

1. Portal Vein
2. Superior Mesenteric Vein
3. Splenic Vein
4. Inferior Mesenteric Vein



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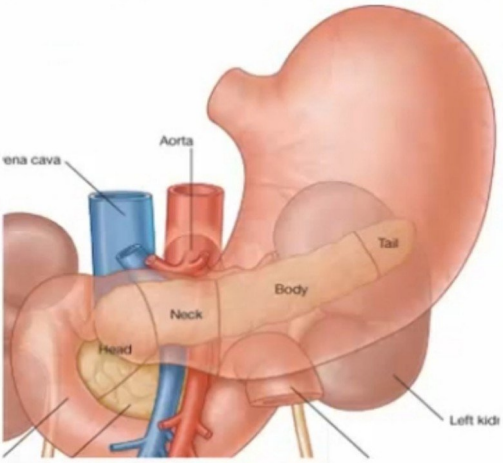
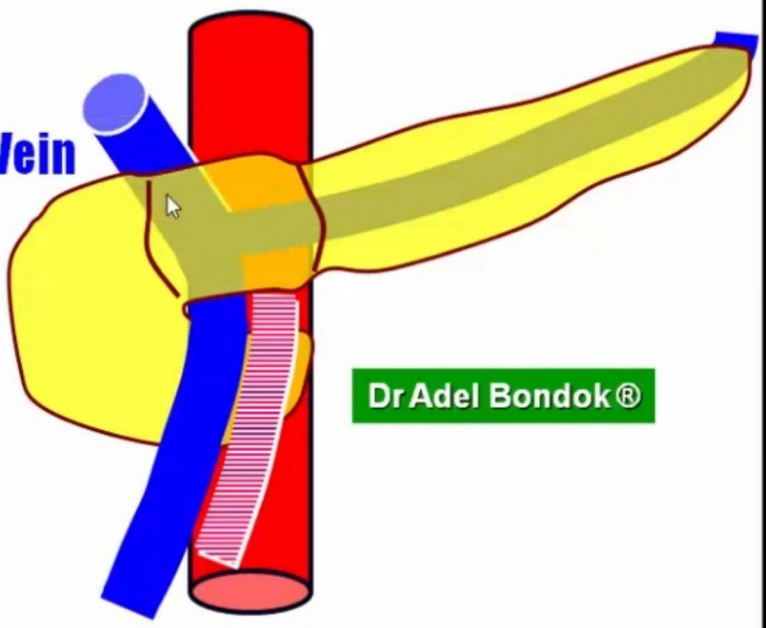
ORIGIN OF THE PORTAL VEIN

Behind the neck of the pancreas

Union of the:

1. Splenic Vein
2. Superior Mesenteric Vein





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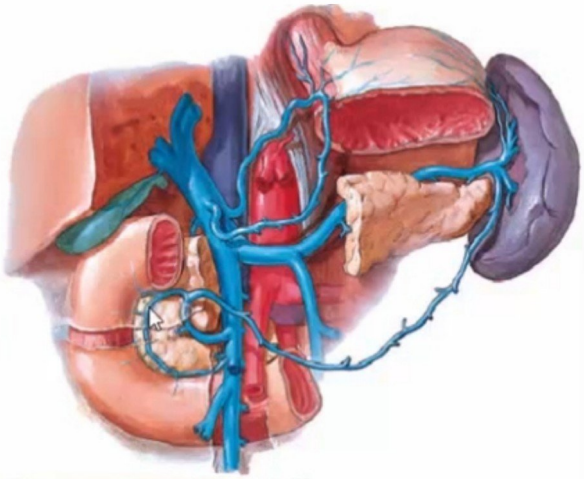
PORTAL VEIN

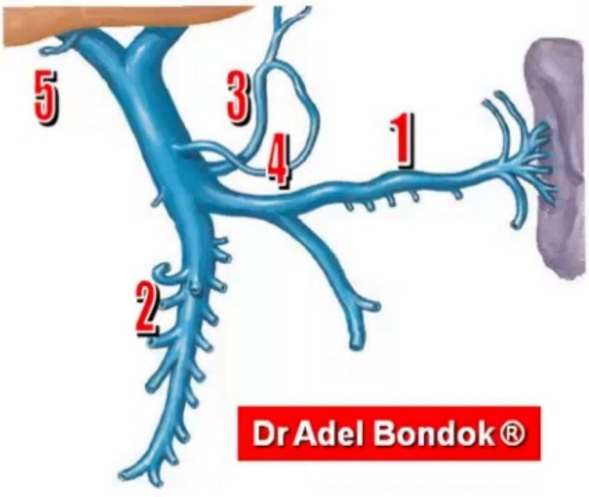
ORIGIN

TERMINATION

TRIBUTARIES 6

1. Splenic Vein
2. Superior Mesenteric Vein
3. Left Gastric Vein
4. Right Gastric Vein
5. Cystic vein: join the right branch
6. Paraumbilical veins: join the left branch





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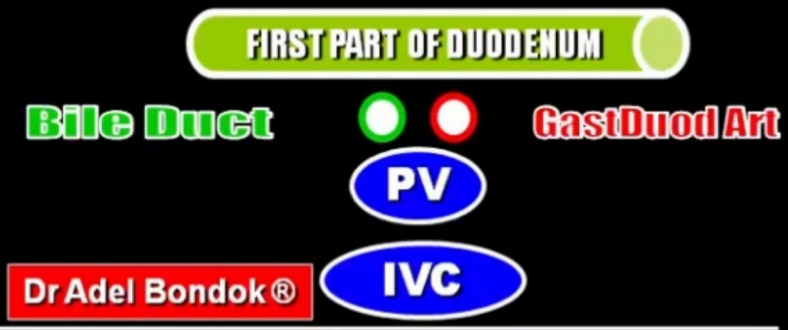
COURSE OF THE PORTAL VEIN

1. BEHIND THE 1ST PART OF THE DUODENUM



2. IN THE FREE MARGIN OF THE LESSER OMENTUM

3. AT THE PORTA HEPATIS

D 2 Hepatic Ducts
A 2 Hepatic Arteries
V 2 Branches of PV

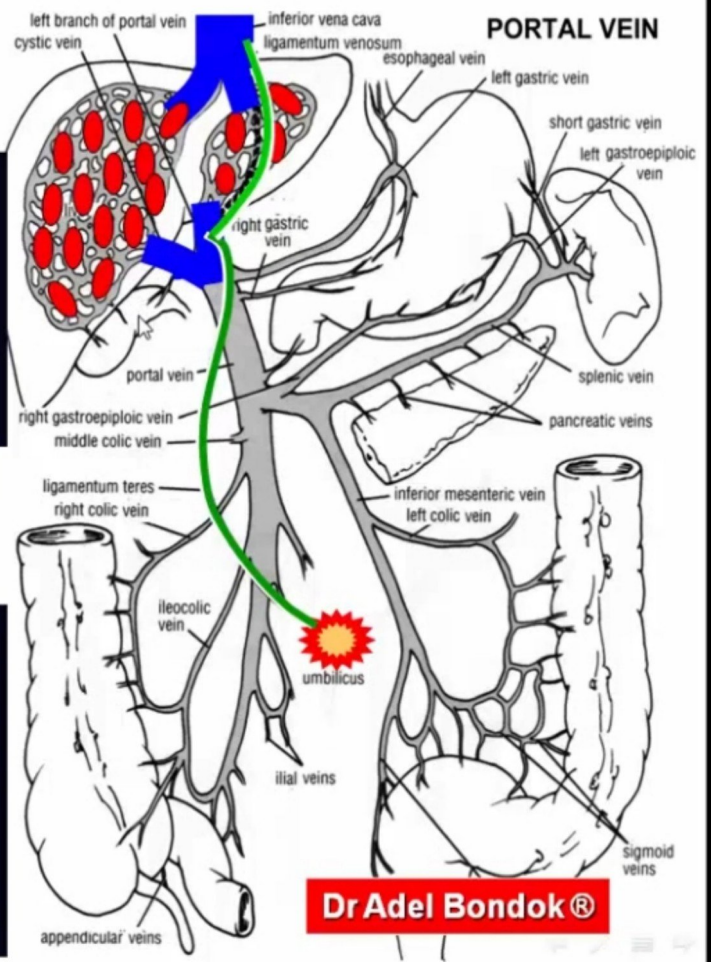
TERMINATION OF THE PORTAL VEIN

Divide into 2 branches
- → Liver sinusoids
- → 2 hepatic veins
- → inferior vena cava

CONNECTIONS OF THE PORTAL VEIN

Left Branch:
1. With the umbilicus
2. With the inferior vena C

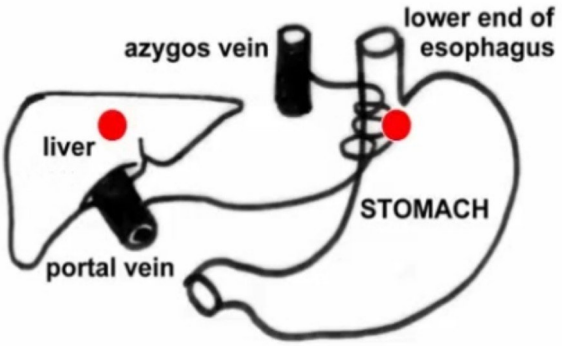
Right Branch:
With the gall bladder

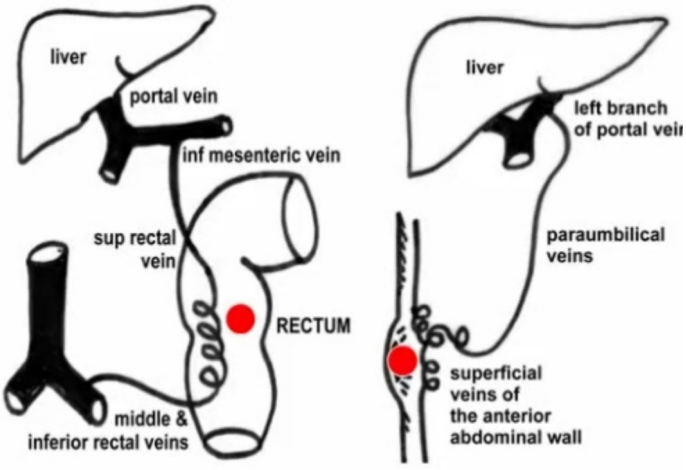


PORTAL-SYSTEMIC ANASTOMOSIS

SITES

1. Lower end of esophagus
2. Lower end of the rectum
3. Around the umbilicus
4. Liver sinusoids
5. Bare area of the liver
6. Retroperitoneal





CLINICAL IMPORTANCE

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Anastomosis Dilate in Portal Hypertension

Esophageal Varices

Caput Medusae

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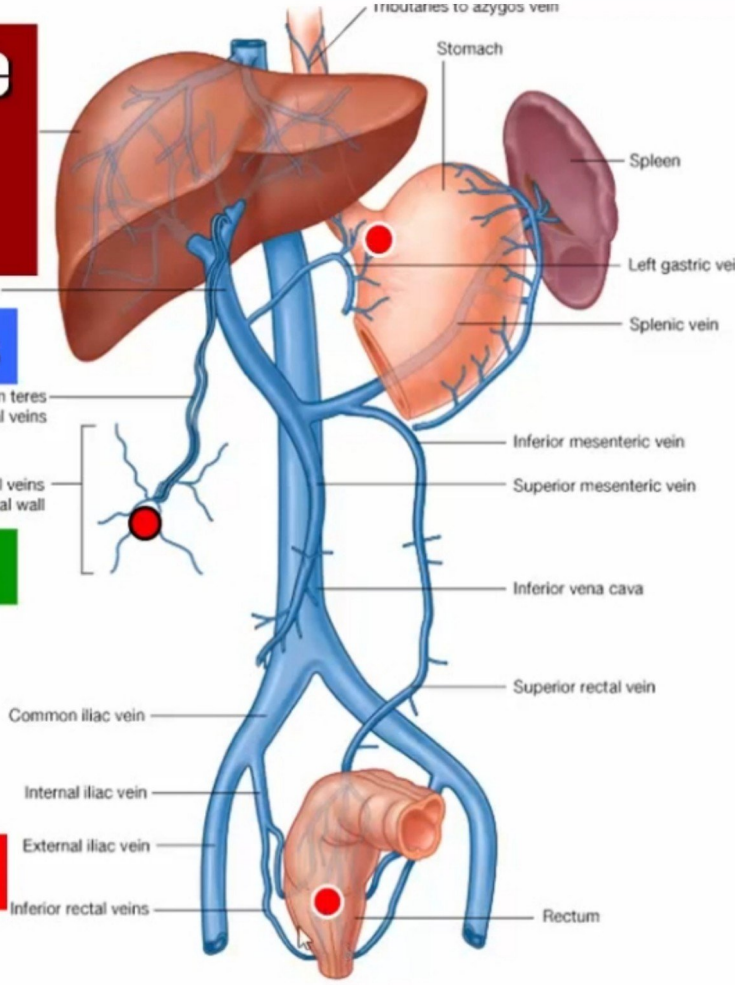
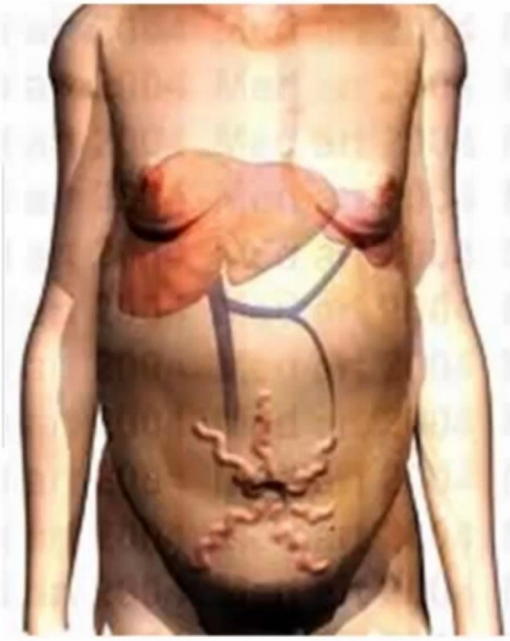
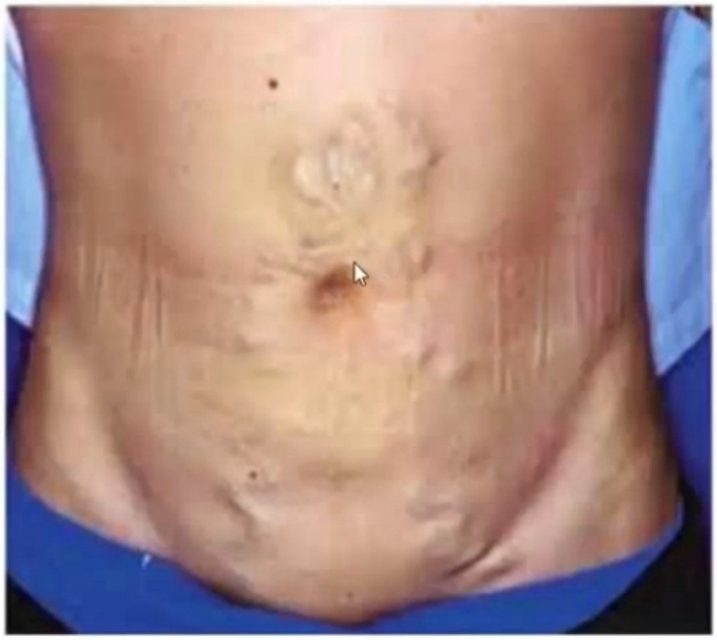
Piles (Hemorrhoids)



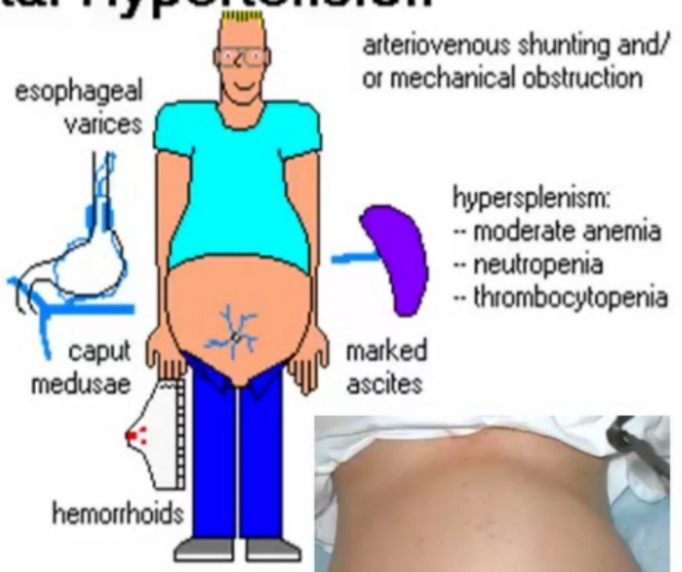


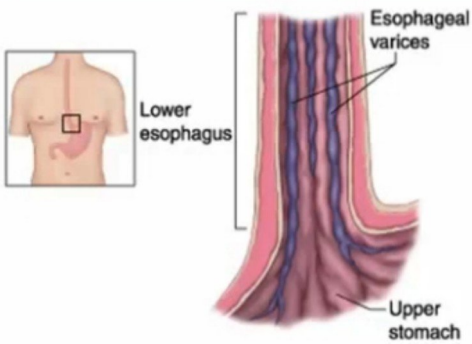


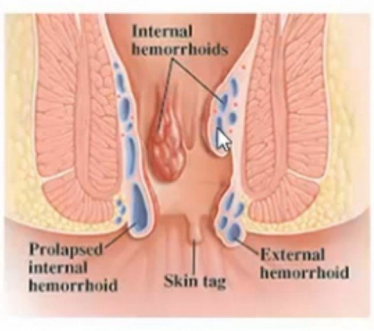
Caput Medusae

Portal Hypertension

1. Ascites
2. Splenomegaly
3. Esophageal varices
4. Caput medusae
5. Hemorrhoids







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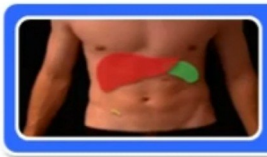
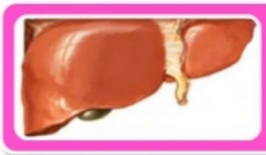
OBJECTIVES



Position



Lobes and Fissures

Peritoneal covering

Relations

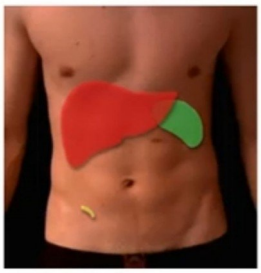
BS, NS & LD & Fixation

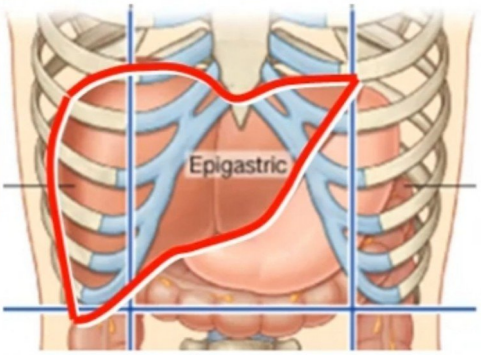
LIVER

Position: right hypochondrium & epigastrium

Lobes: BY 3 fissures

1. **Anatomical:** Rt & Lt
2. **Functional:** Rt & Lt
3. **Segmental** Division: 8





Fissures:

Peritoneal Covering:

Ligaments: Peritoneal & Vascular

Surfaces:

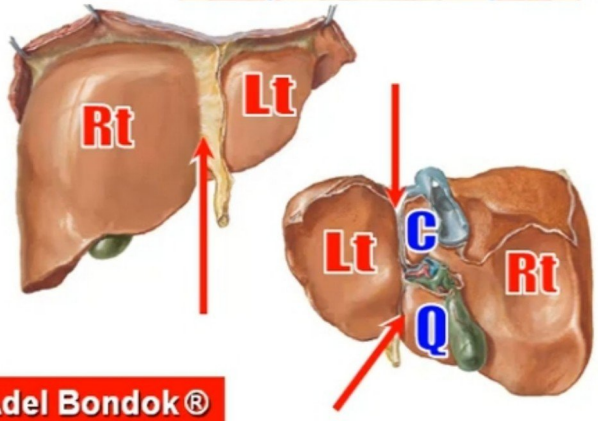
Superior, Ant, Post & Inferior

Blood Supply: In & Out

Nerve Supply:

Lymph Drainage

Fixation



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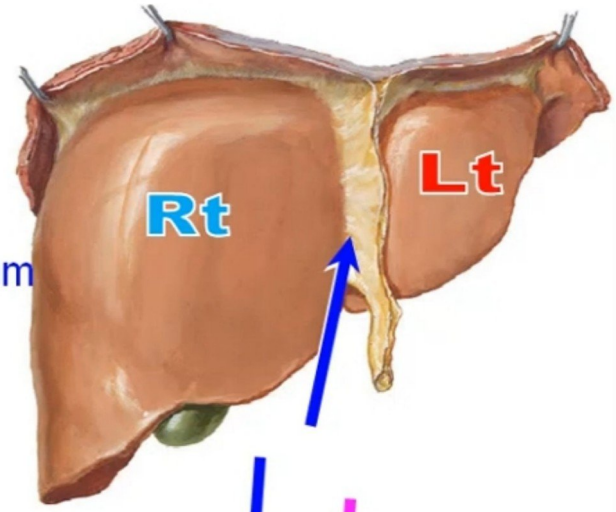
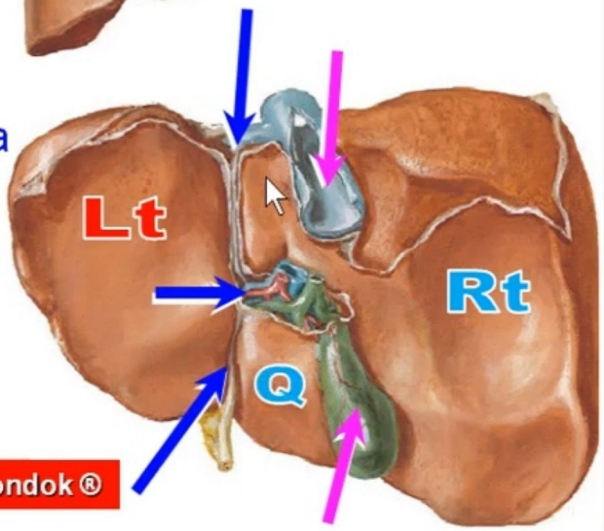
FISSURES

1. Fissure for Falciform Ligament
2. Fissure for Ligamentum Teres
3. Fissure for Ligamentum Venosum
4. Porta Hepatis



FOSSAE

1. Fossa for the Gall Bladder
2. Fossa for the Inferior Vena Cava

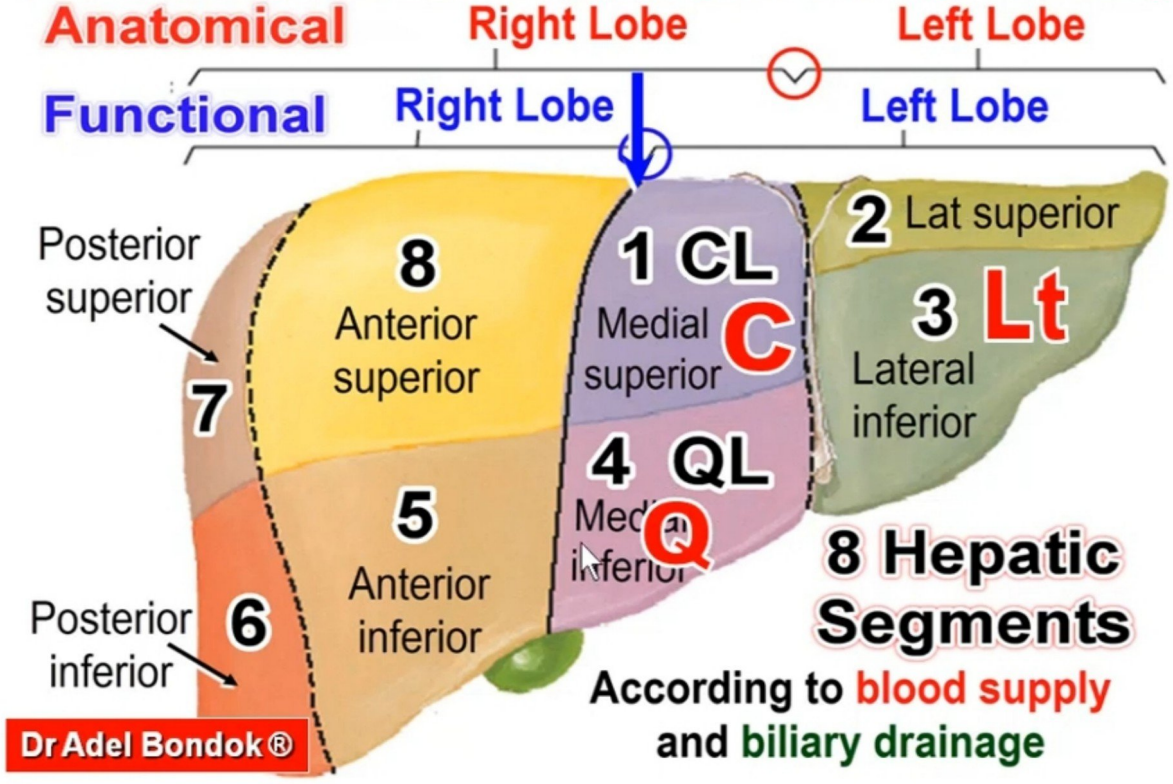


ANATOMICAL LOBES

1. **Left Lobe**
2. **Right Lobe:**
   a. **Quadrate Lobe**
   b. **Caudate Lobe**

FUNCTIONAL DIVISIONS

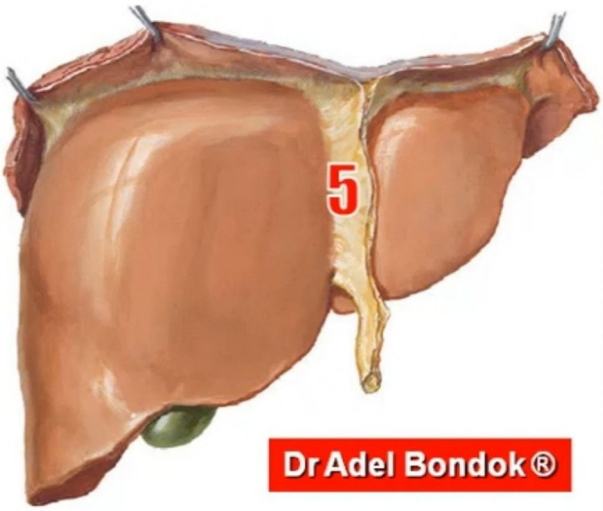
According to Blood Supply & Biliary Drainage



8 Hepatic Segments

According to blood supply and biliary drainage

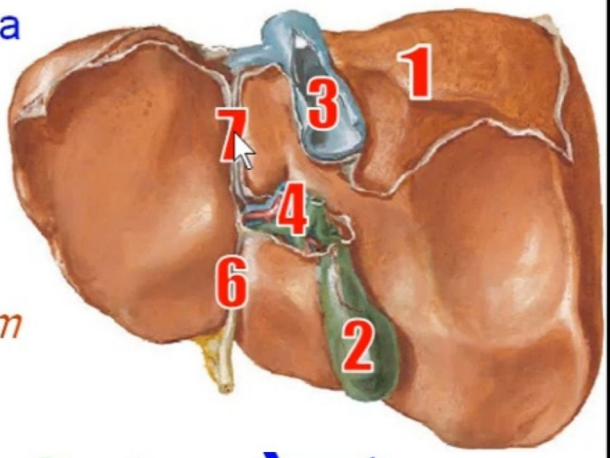
PERITONEAL COVERING



Completely Covered

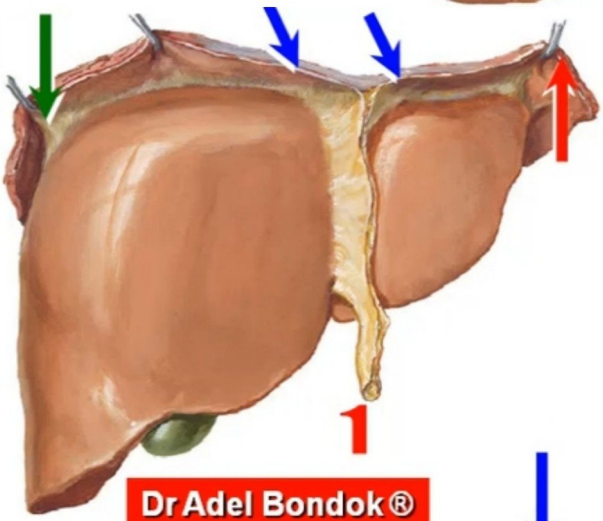
Except 7 Bare Areas:

1. Bare area on the post surface
2. Fossa for the Gall Bladder
3. Groove for the Inferior Vena Cava
4. Porta Hepatis
5. *Fissure for Falciform Ligament*
6. *Fissure for Ligamentum Teres*
7. *Fissure for Ligamentum Venosum*



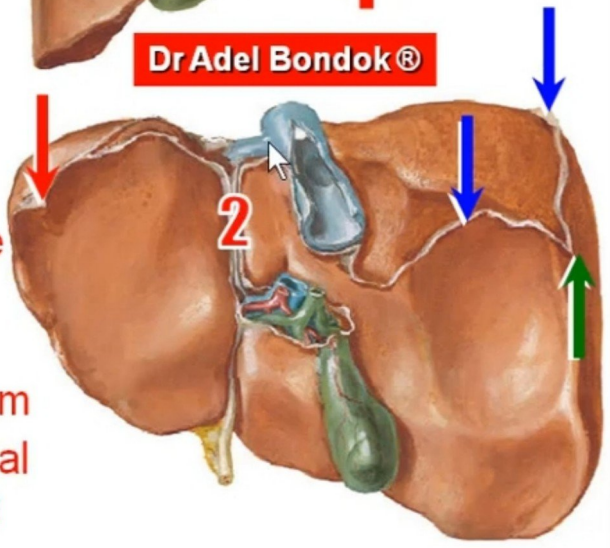
LIGAMENTS OF THE LIVER

PERITONEAL LIGAMENTS



1. Lesser Omentum
2. Falciform Ligament
3. Coronary Ligament
4. Left Triangular Ligament
5. Right Triangular Ligament

VASCULAR LIGAMENTS



1. Ligamentum Teres:

Oblitrated left umbilical vein

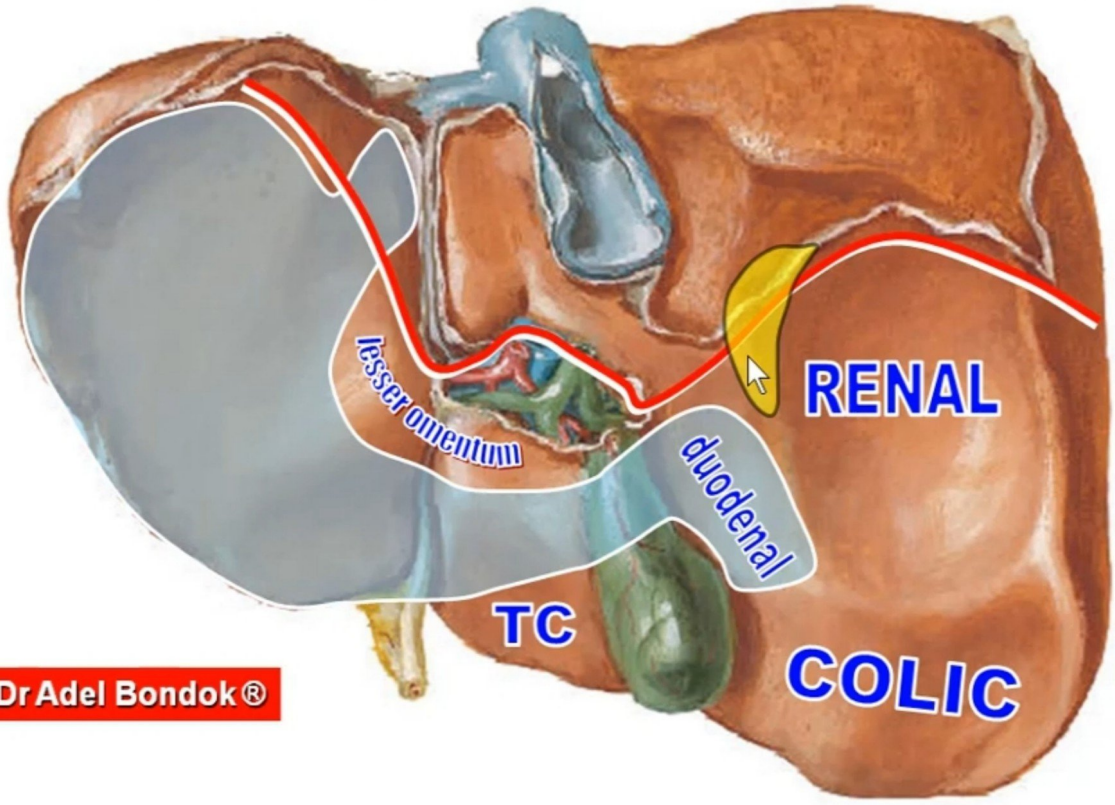
Connect the umbilicus with the left branch of the portal vein

2. Ligamentum Venosum:

Oblitrated ligamentum venosum

Connect left branch of the portal vein with the inferior vena cava

INFERIOR SURFACE



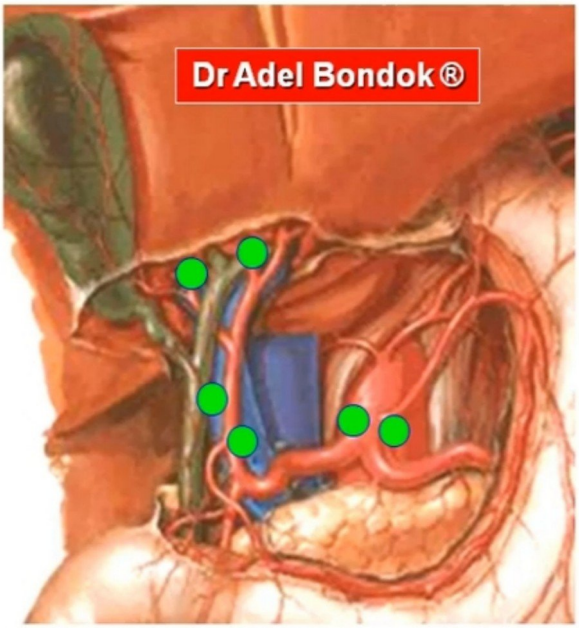
BLOOD SUPPLY

DOUBLE BLOOD SUPPLY FROM:

1. **Hepatic Artery: 30%**
   Carries oxygenated blood
2. **Portal Vein: 70%**
   Carries venous blood rich in products of digestion

VENOUS DRAINAGE:

2 Hepatic veins end in the IVC



NERVE SUPPLY

1. Sympathetic: Celiac plexus
2. Parasympathetic: Left vagus
3. Sensory to the capsule: Right Phrenic nerve

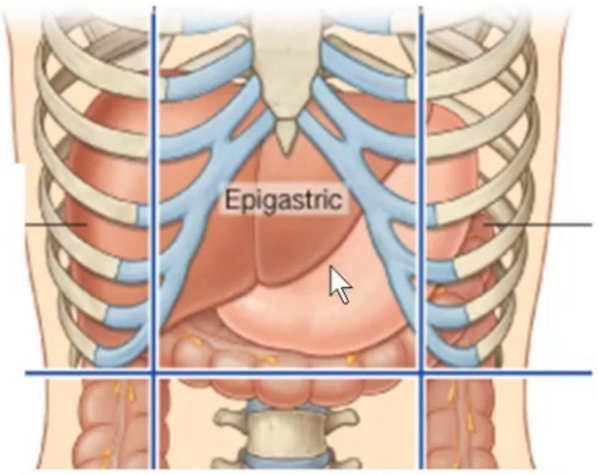
LYMPH DRAINAGE

1. Lymph nodes at Porta Hepatis: hepatic & Celiac lymph nodes
2. Mediastinal Lymph nodes

SUPERIOR SURFACE

Diaphragm Separates It From:

1. Heart and Pericardium
2. Base of the Lung and Pleura



ANTERIOR SURFACE

1. Anterior abdominal wall
2. Costal margin
3. Diaphragm

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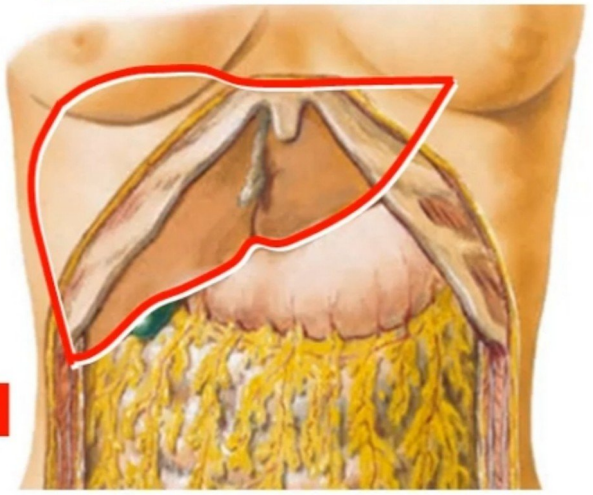
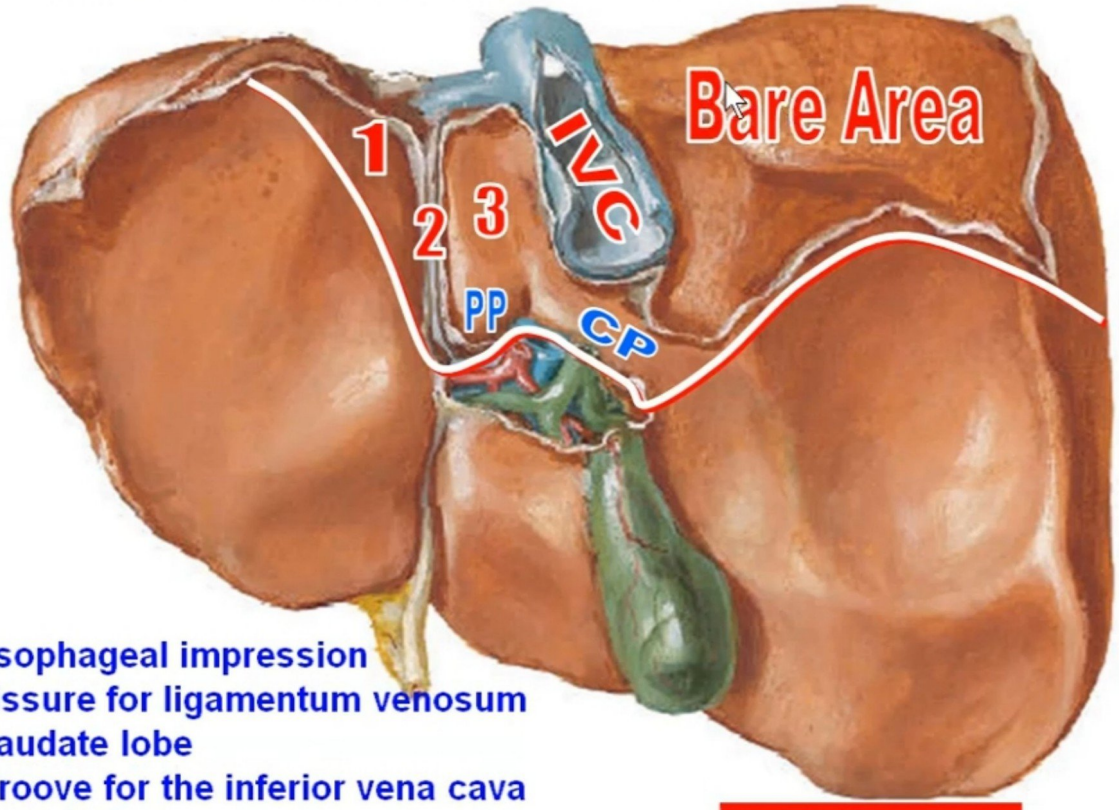


POSTERIOR SURFACE



1. Esophageal impression
2. Fissure for ligamentum venosum
3. Caudate lobe
4. Groove for the inferior vena cava
5. Bare area

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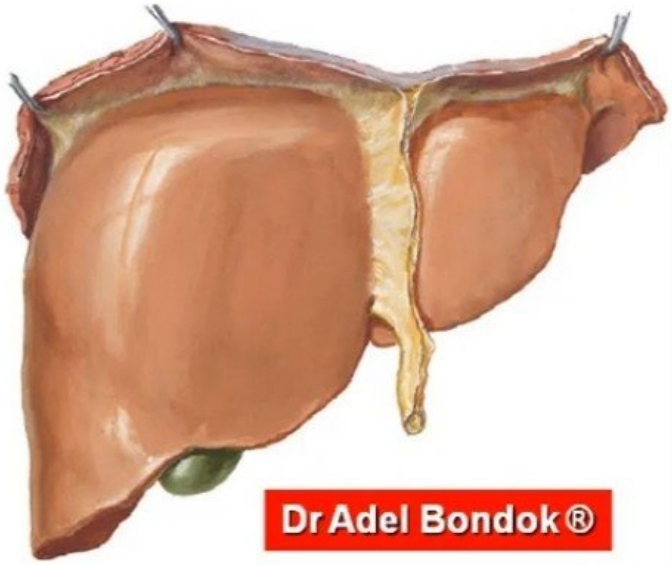
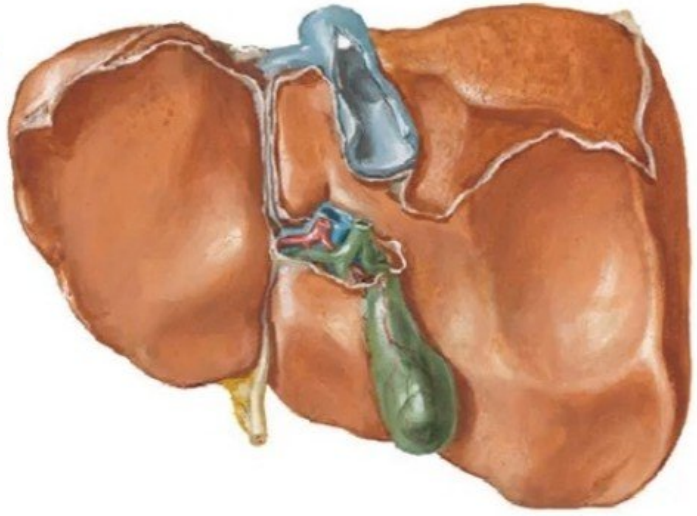
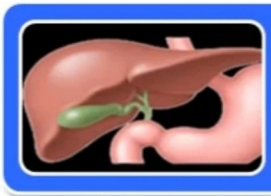
FIXATION OF THE LIVER

1. **Hepatic Veins:** fix it to IVC
2. **Attachment of Ligaments:**
   - a. **Lesser Omentum:** fix the liver to the stomach
   - b. **Falciform Ligament:** fix the liver to the anterior abdominal wall and diaphragm
   - c. **Coronary Ligament:** fix the liver to the diaphragm
   - e. **Rt & Lt Triangular Ligaments:** fix the liver to the diaphragm & prevent titling of the liver
3. **The surrounding viscera**
4. **Intra-abdominal pressure**

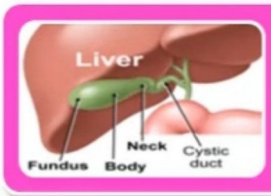




Biliary System

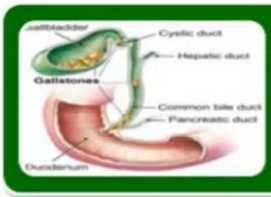


Formation



Gallbladder

Duct System



Bile Duct

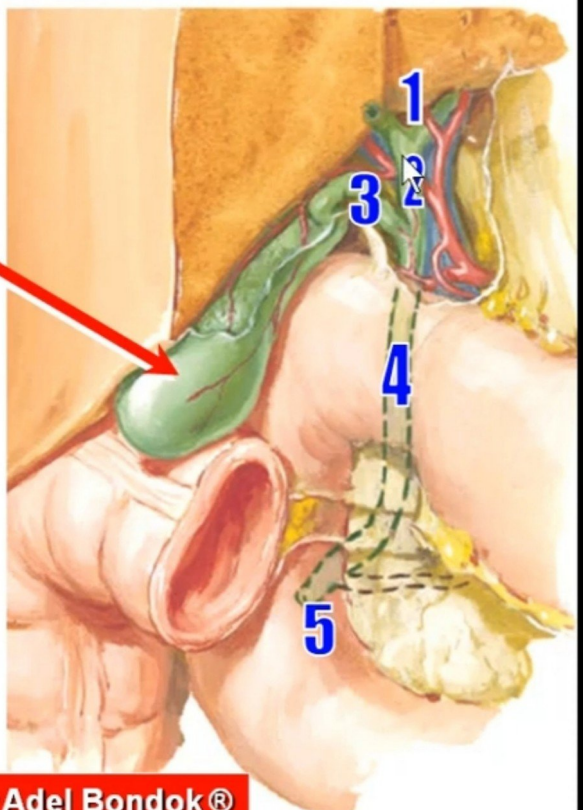
FORMATION

A. Gall Bladder

B. Duct System:

extrahepatic biliary passages

1. **Right & Left Hepatic Ducts**
2. **Common Hepatic Duct:** 1.5”
3. **Cystic Duct:** 1.5”
4. **Common Bile Duct:** 3”
5. **Hepatopancreatic Duct:**
   Ampulla of Vater



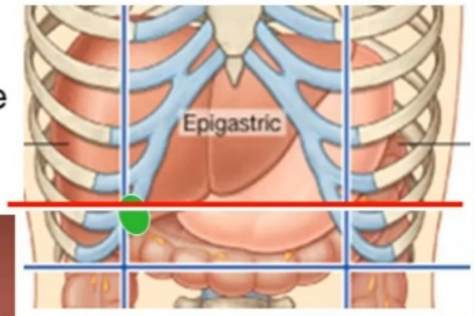
GALL BLADDER

Position: gall bladder fossa on the inferior surface of the liver

Fixed to the Liver By:

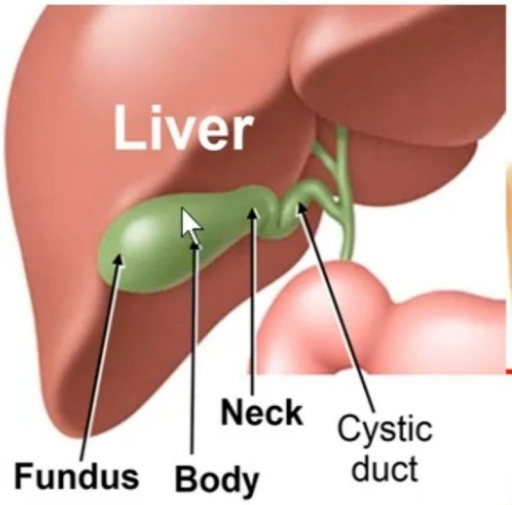
Small veins & art, peritoneum & areolar tissue

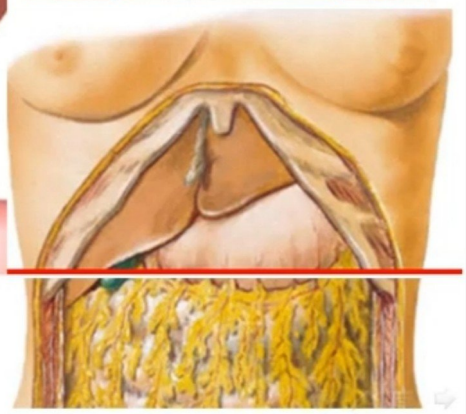
Surface Anatomy:



Divisions:

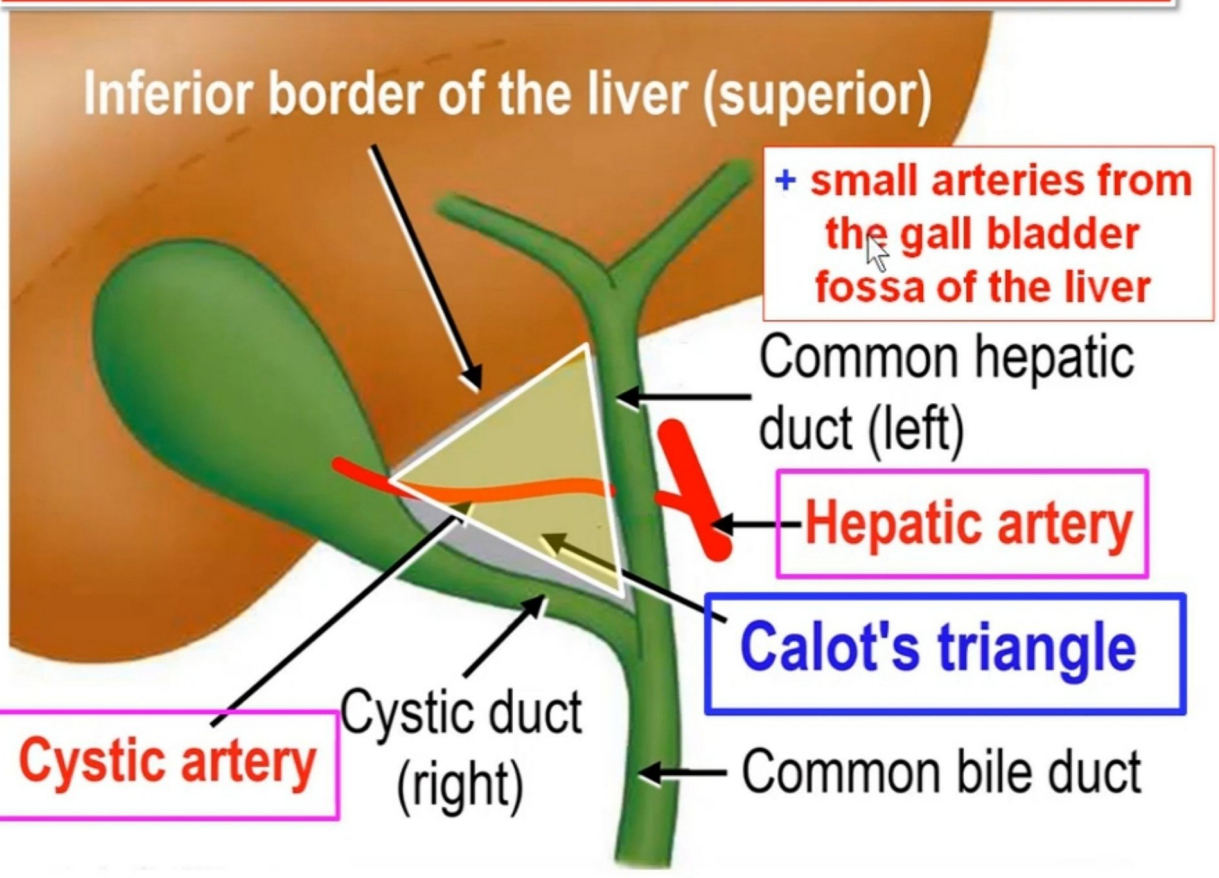
1. Fundus
2. Body
3. Neck





Peritoneal Covering:

ARTERIAL SUPPLY



Venous Drainage

- Cystic vein ➡ right branch of portal vein

Lymph Drainage

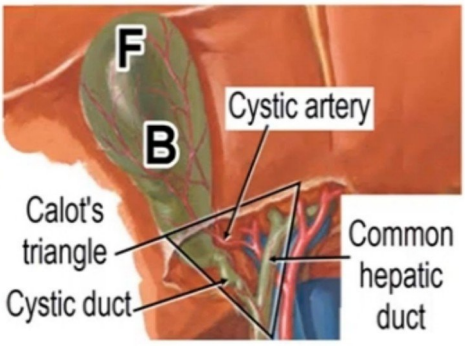
- Celiac lymph nodes

Nerve Supply

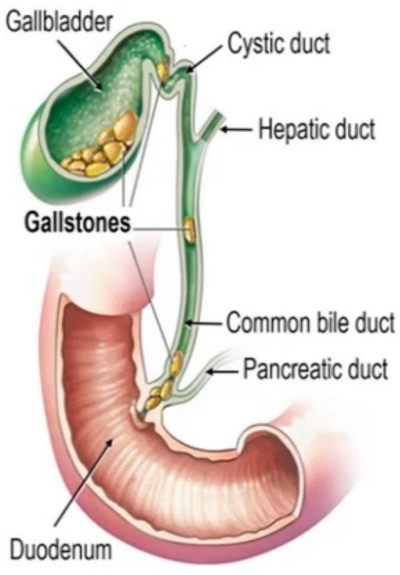
- **Sensory:** right phrenic n
- **Symp:** Celiac plexus (GSN)
- **Parasymp:** Left vagus (AGN)

Clinical Note

Variation in cystic artery



Anomalies of the ducts



Gallstones & Cholecystitis

Referred pain to rt shoulder, rt hypochondrium & epigastrium

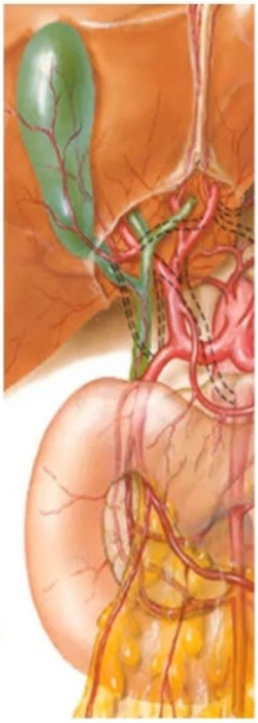
BILE DUCT

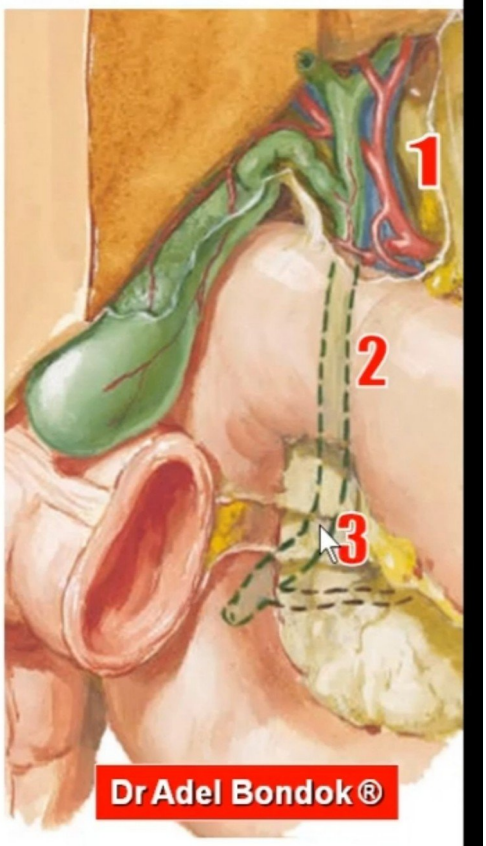
Length: 3 inches

Formation

Termination

Course: 3 Parts





FIRST INCH:

In the free margin of the lesser omentum

SECOND INCH:

Behind the first part of the duodenum

THIRD INCH:

Behind head of the pancreas

COURSE OF THE BILE DUCT

1ST INCH

Supraduodenal

In the free margin of lesser omentum

2ND INCH

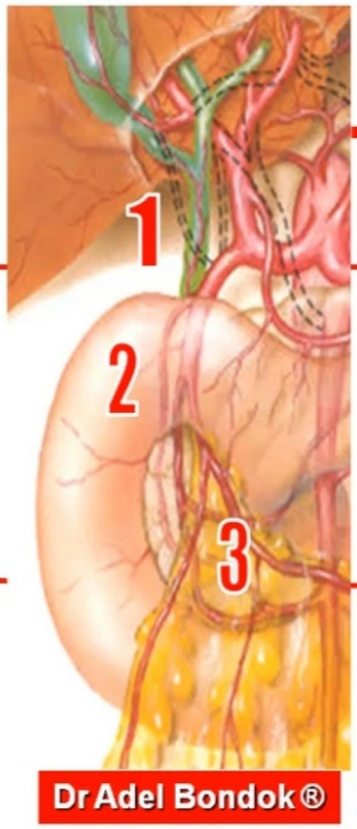
Retroduodenal

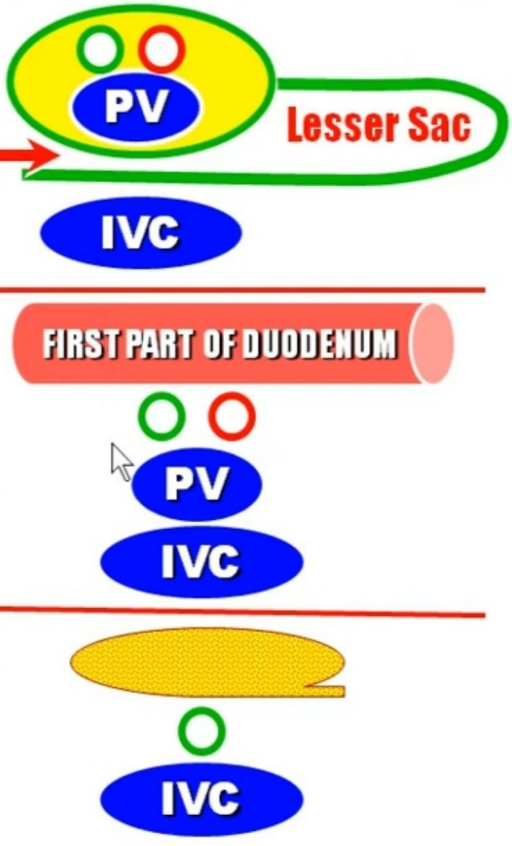
Behind the first part of duodenum

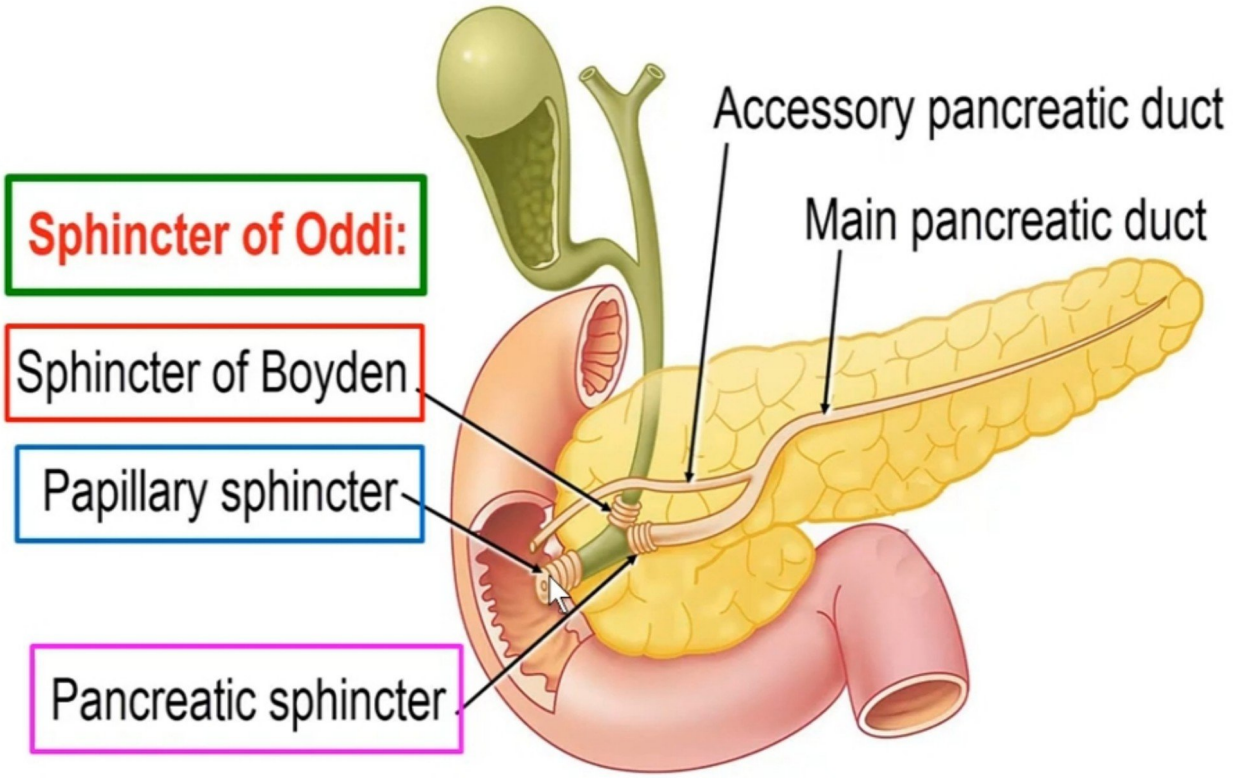
3RD INCH

Infraduodenal

Behind head of the pancreas







ABDOMINAL AORTA

ORIGIN

TERMINATION

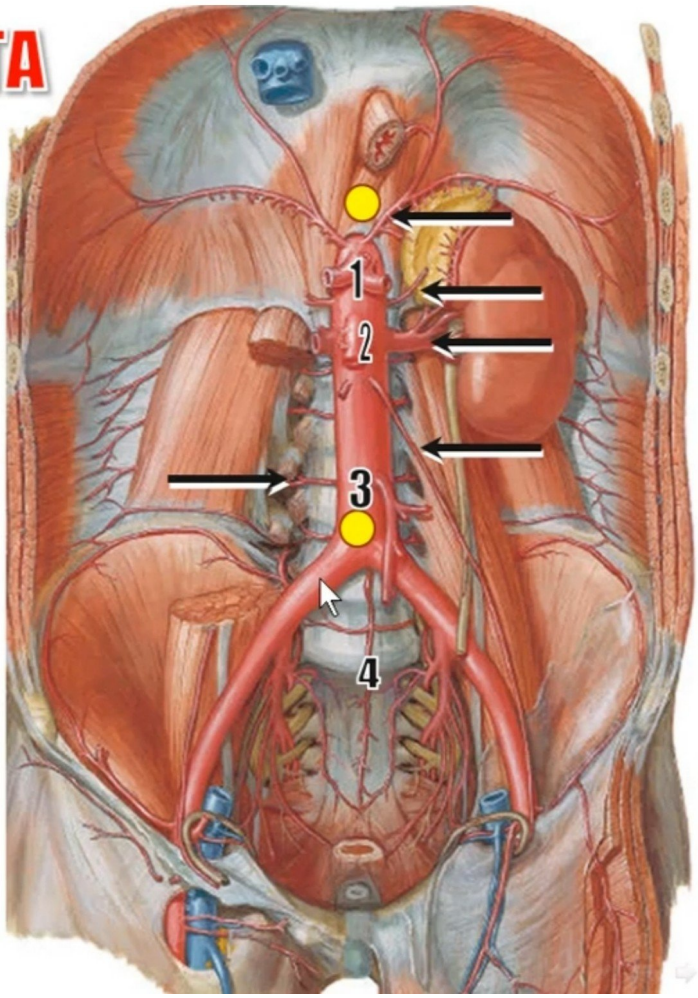
BRANCHES

SINGLE:

1. Celiac artery: 'L1
2. Superior mesenteric art: L1_
3. Inferior mesenteric art: L3
4. Median sacral artery: L4

PAIRED:

1. Inferior phrenic arteries: 'L1
2. Middle suprarenal arts: L1_
3. Renal arteries: L2
4. Testicular or Ovarian art: L2
5. 4 Lumbar arteries
6. Common iliac arteries



Branches

VENTRAL BRANCHES:

1. Inferior phrenic arteries: 'L1
2. Celiac artery: 'L1
3. Superior mesenteric art: L1_
4. Testicular or Ovarian art: L2
5. Inferior mesenteric art: L3

DORSAL BRANCHES

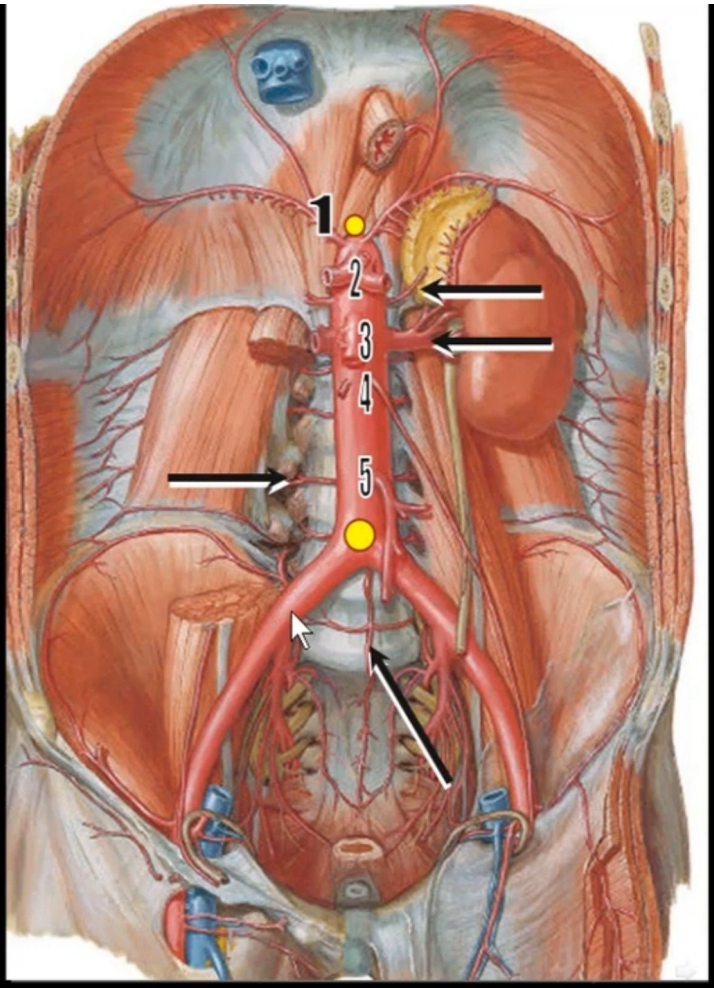
1. Median sacral artery: L4
2. 4 Lumbar arteries

LATERAL BRANCHES:

1. Middle suprarenal arts: L1_
2. Renal arteries: L2

TERMINAL BRANCHES:

Common iliac arteries



BRANCHES FROM ABOVE DOWNWARD

UPPER BORDER OF L1

1. Inferior phrenic arteries
2. Celiac artery

LOWER BORDER OF L1

3. Middle suprarenal arteries
4. Superior mesenteric artery

2nd LUMBAR: L2

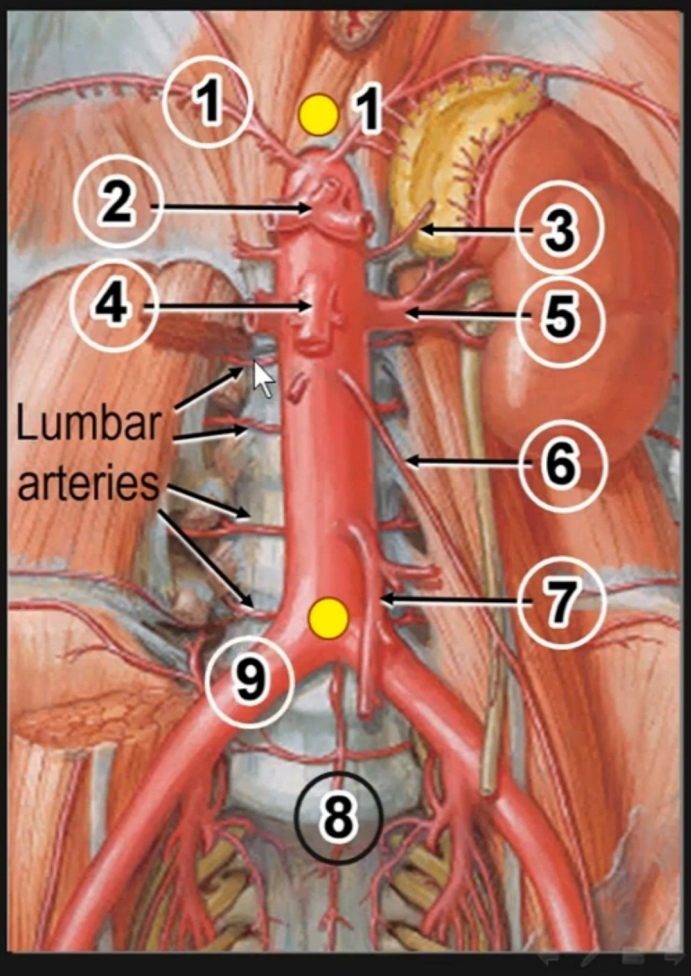
5. Renal arteries
6. Testicular or Ovarian art

3RD LUMBAR: L3

7. Inferior mesenteric artery

4TH LUMBAR: L4

8. Median sacral artery
9. Common iliac arteries



INFERIOR VENA CAVA

ORIGIN:

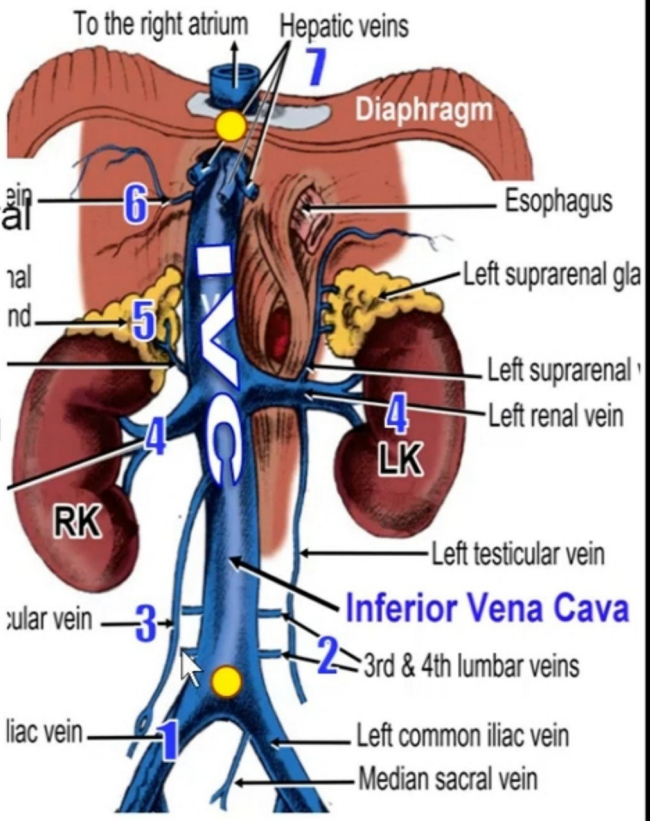
Union of **2 common iliac veins** opposite **L5**

TERMINATION:

Opposite **T8** by piercing the central tendon to **end in** Rt atrium

TRIBUTARIES:

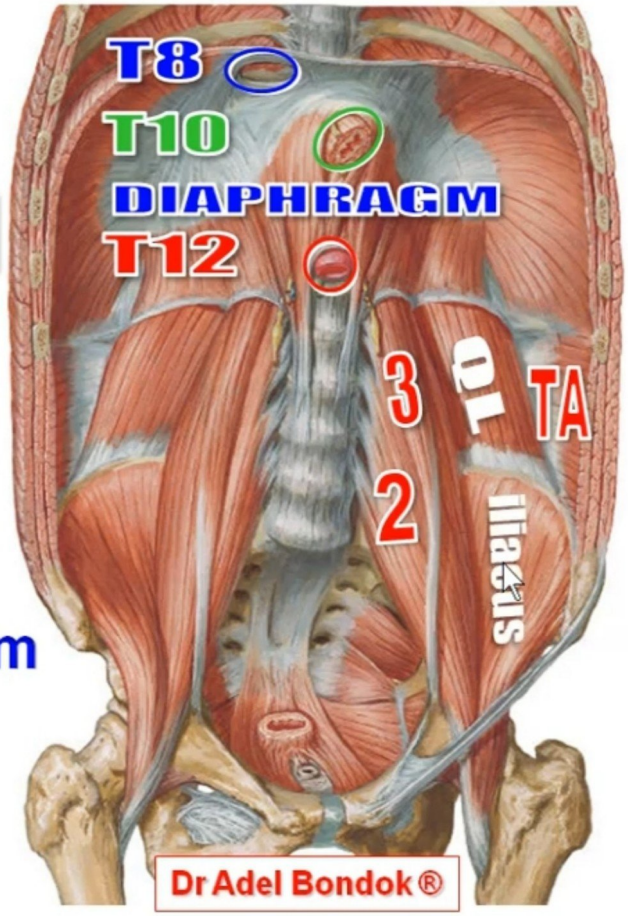
1. **2** common iliac veins
2. 3rd & 4th lumbar veins. 1st & 2nd form ascending lumbar vein
3. **RIGHT** gonadal vein
4. 2 renal veins
5. **RIGHT** suprarenal vein
6. Phrenic veins
7. 2 hepatic veins



Muscles of the Posterior Abdominal Wall

1. Diaphragm
2. Psoas major
3. Psoas minor
4. Quadratus lumborum
5. Transversus abd

Iliacus in the iliac fossa



Diaphragm

Origin: 3

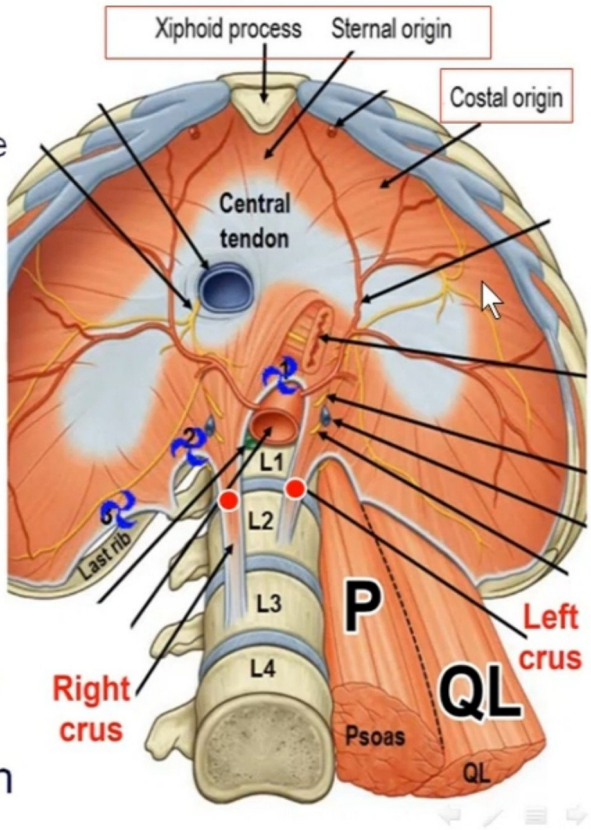
1. **Sternal:** back of xiphoid process
2. **Costal:** lower 6 costal cartilages
3. **Vertebral:**
   - **a. 2 crurae:**
     - **Right crus:** upper 3 lumbar vertebrae
     - **Left crus:** upper 2 lumbar vertebrae
   - **b. 3 arcuate ligaments:**
     - **Median:** between the 2 crurae
     - **Medial:** between each crus and L1 transverse process
     - **Lateral:** between L1 transverse process and last rib

Insertion: central tendon

Nerve Supply:

1. **Motor:** phrenic nerve (C3, 4, 5)
2. **Sensory:** phrenic nerve to central part. Lower 5 intercostal to peripheral part.

Action: Main muscle of inspiration



PSOAS MAJOR

ORIGIN:

1. **Transverse processes of all lumbar vertebrae**
2. **Intervertebral discs**
3. **Tendinous arches over the lumbar vessels**

INSERTION:

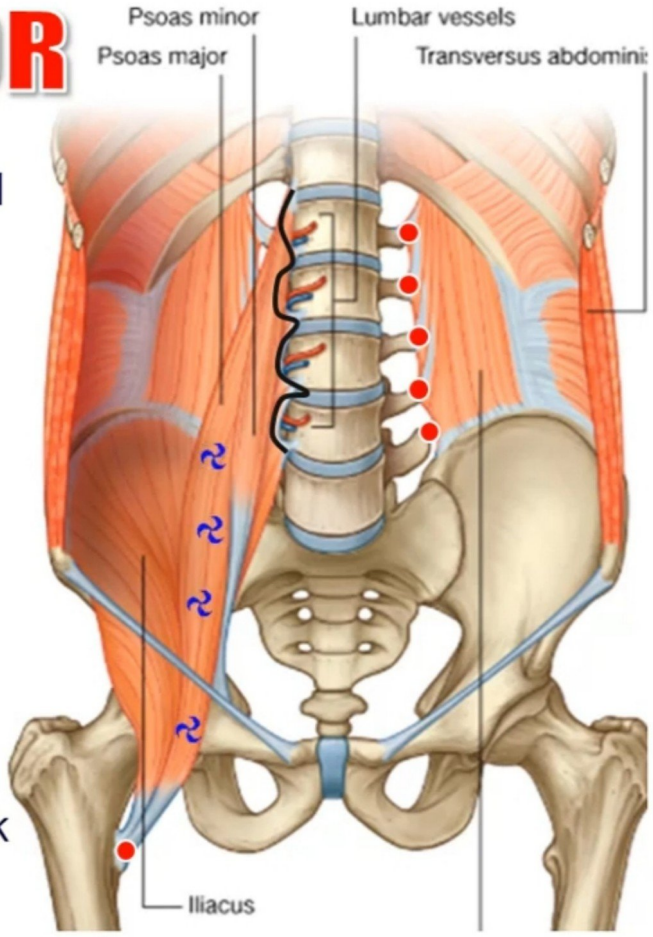
Lesser trochanter

NERVE SUPPLY:

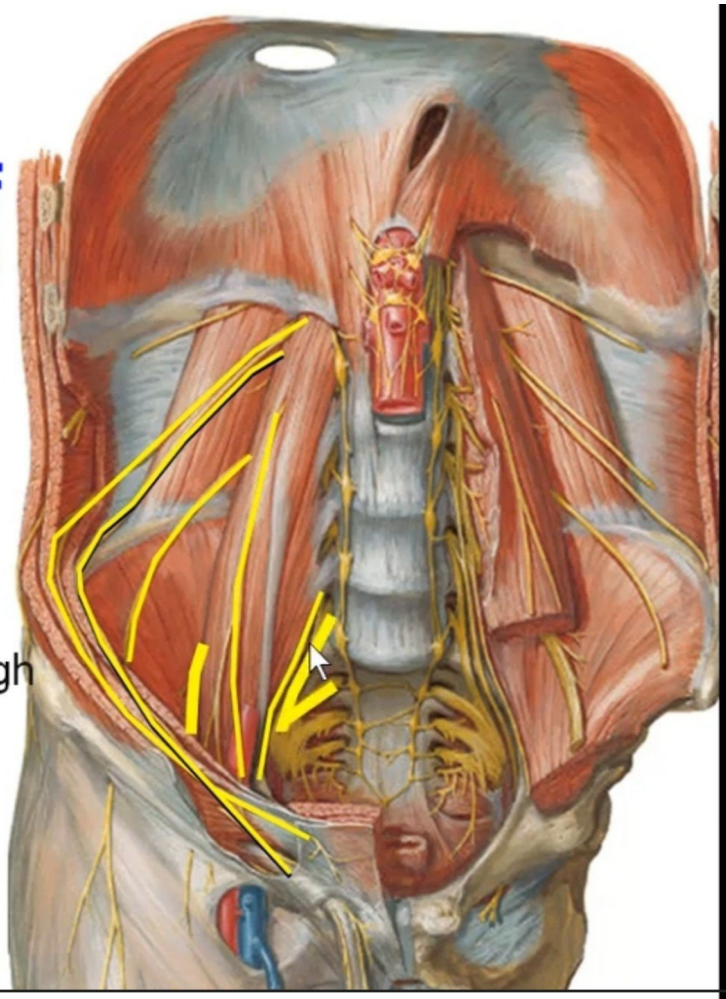
Lumbar plexus: L2, 3, 4

ACTION:

1. **Main flexor** of the hip joint
2. **Together:** flexion of the trunk
3. **Alone:** Lateral flexion of the trunk



RELATION OF THE PSOAS MAJOR TO THE BRANCHES OF THE LUMBAR PLEXUS



ANTERIOR:

Genitofemoral nerve

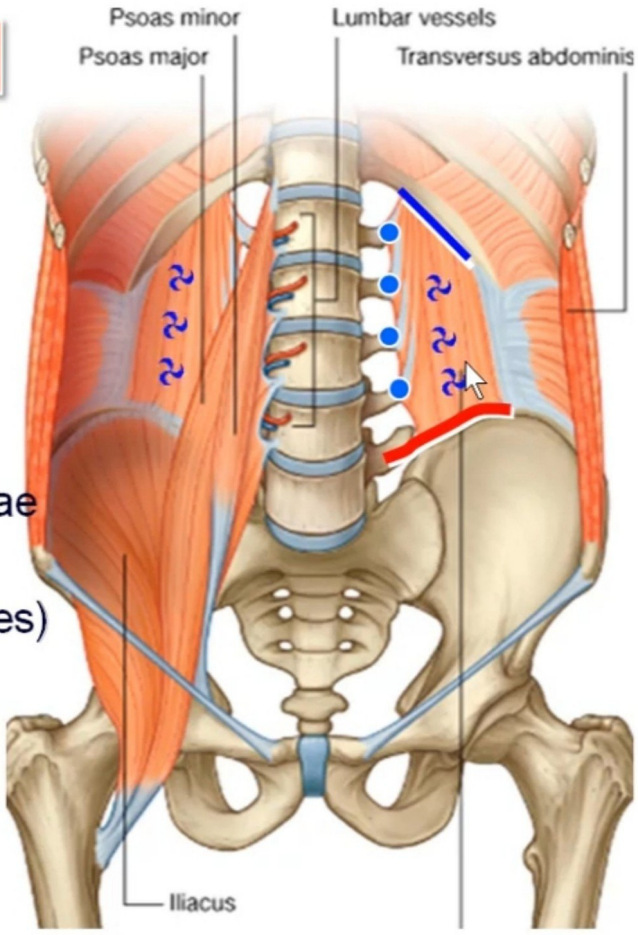
LATERAL:

1. Iliohypogastric nerve
2. Ilioinguinal nerve
3. Lat cutan nerve of the thigh
4. Femoral nerve

MEDIAL:

1. Obturator nerve
2. Lumbosacral trunk

QUADRATUS LUMBORUM



ORIGIN:

1. Iliolumbar ligament
2. Inner lip of the iliac crest

INSERTION:

1. Lower border of the last rib
2. tips of transverse processes of the upper 4 lumbar vertebrae

NERVE SUPPLY:

L1, 2, 3, 4 (upper 4 lumbar nerves)

ACTION:

1. Together:

Extension of the trunk

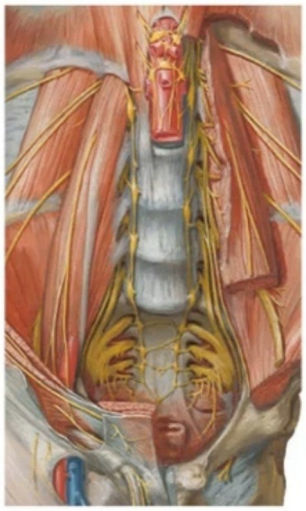
2. Alone:

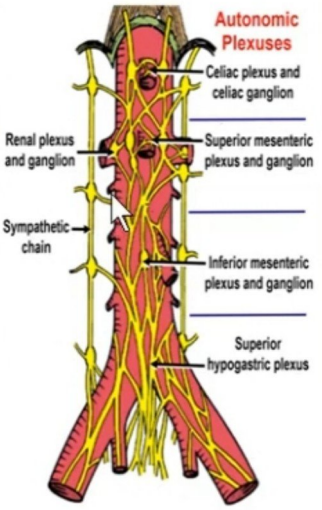
Lateral flexion of the trunk

Nerves on the Posterior Abdominal Wall

Lumbar Plexus

Autonomic Nerves





- Sympathetic
- Parasympathetic
- Aut Plexuses

LUMBAR PLEXUS

LOCATION:
Inside the psoas major

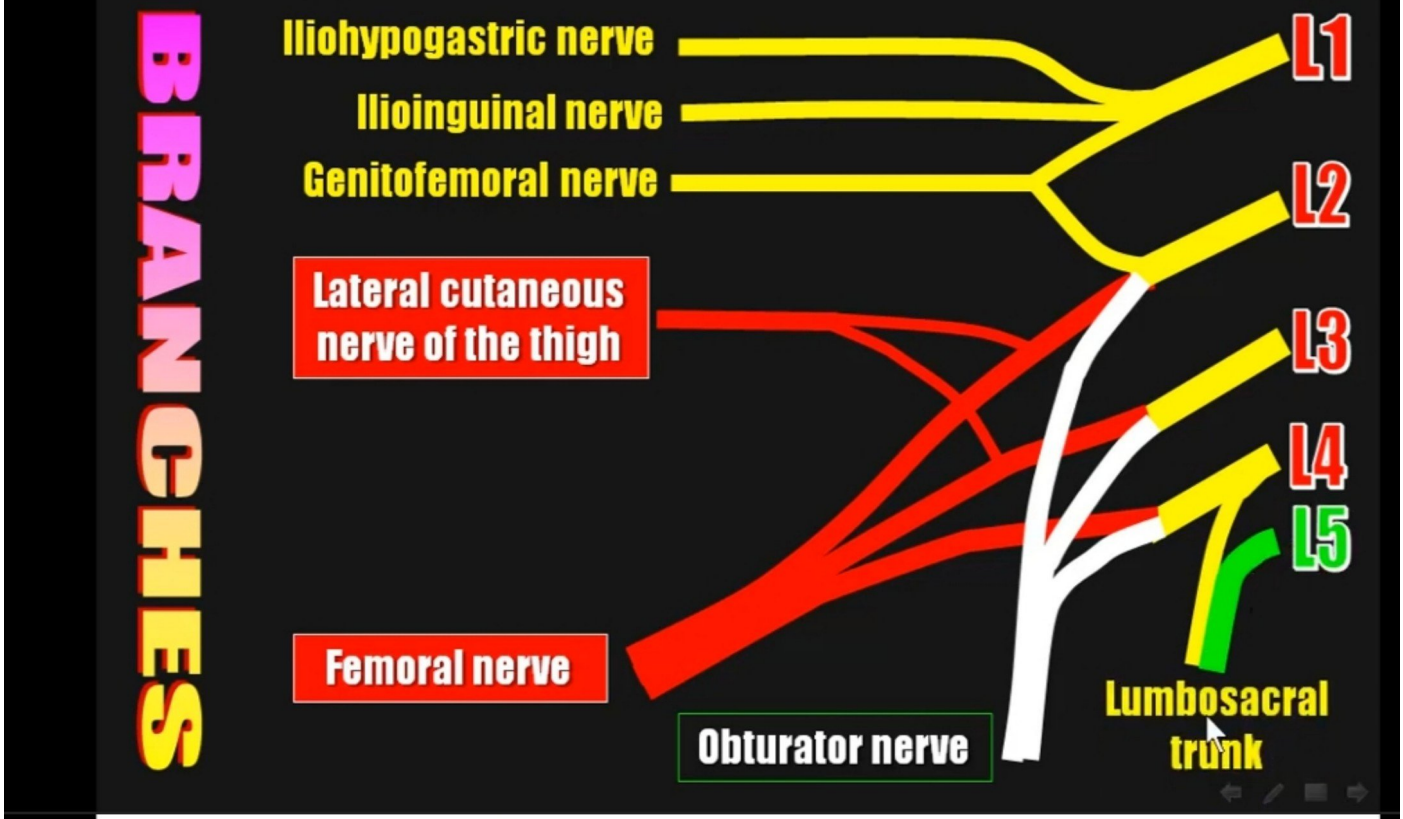
FORMATION:
Ventral rami of upper 4 lumbar nerves

BRANCHES:

MUSCULAR:
1. Psoas minor: L1
2. Psoas major: L2, 3, 4
3. Quadratus lumborum: All 1, 2, 3, 4

6 NAMED BRANCHES:
1. Iliohypogastric: L1
2. Ilioinguinal: L1
3. Genitofemoral: L1, 2
4. Lat cut nerve of the thigh: L2, 3
5. Femoral nerve: post div of L2, 3, 4
6. Obturator nerve: ant div of L2, 3, 4

ARRANGEMENT OF THE LUMBAR PLEXUS



Relation of the Psoas Major to the Branches of the Lumbar Plexus

ANTERIOR:

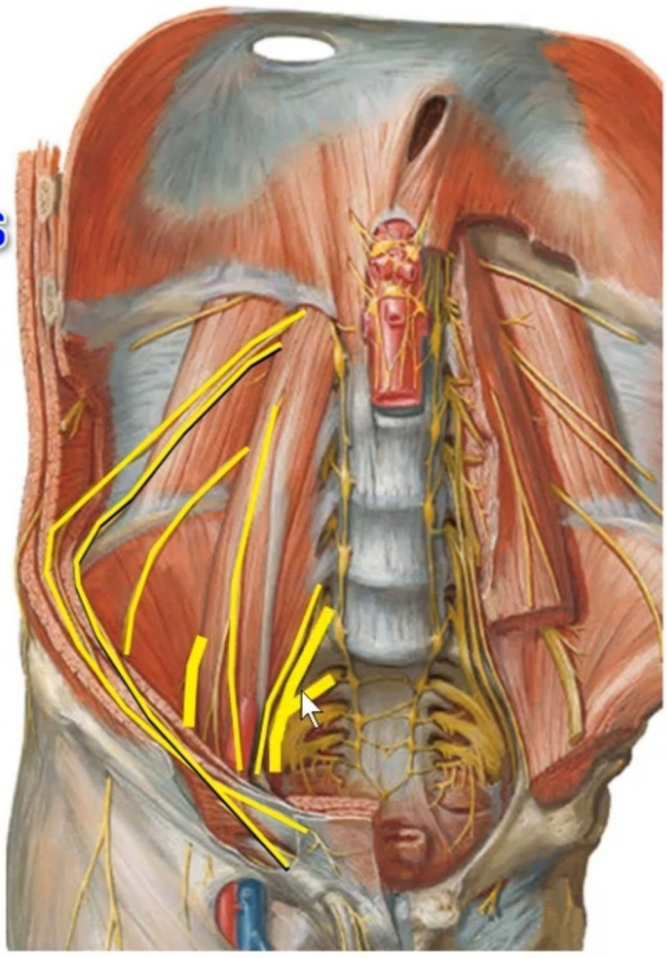
Genitofemoral nerve

LATERAL:

1. Iliohypogastric nerve
2. Ilioinguinal nerve
3. Lat cutan nerve of the thigh
4. Femoral nerve

MEDIAL:

1. Obturator nerve
2. Lumbosacral trunk



Autonomic Innervation of the Abdominal Viscera

Sympathetic: 4

- Greater Spl N: to foregut
  From T5 – T9 ganglia
- Lesser Spl N: to Midgut
  From T9 & T10 ganglia
- Lowest Spl N: to Kidney
  From T12 ganglion
- Lumbar Spl N: to Hindgut
  From L1 & L2 ganglia

Parasympathetic

- **Vagus:** To foregut and midgut via celiac & superior mesenterc plexus
- **PSN (S2, 3, 4):** To hindgut & ureter via inf mesenteric & hypogastric plexus

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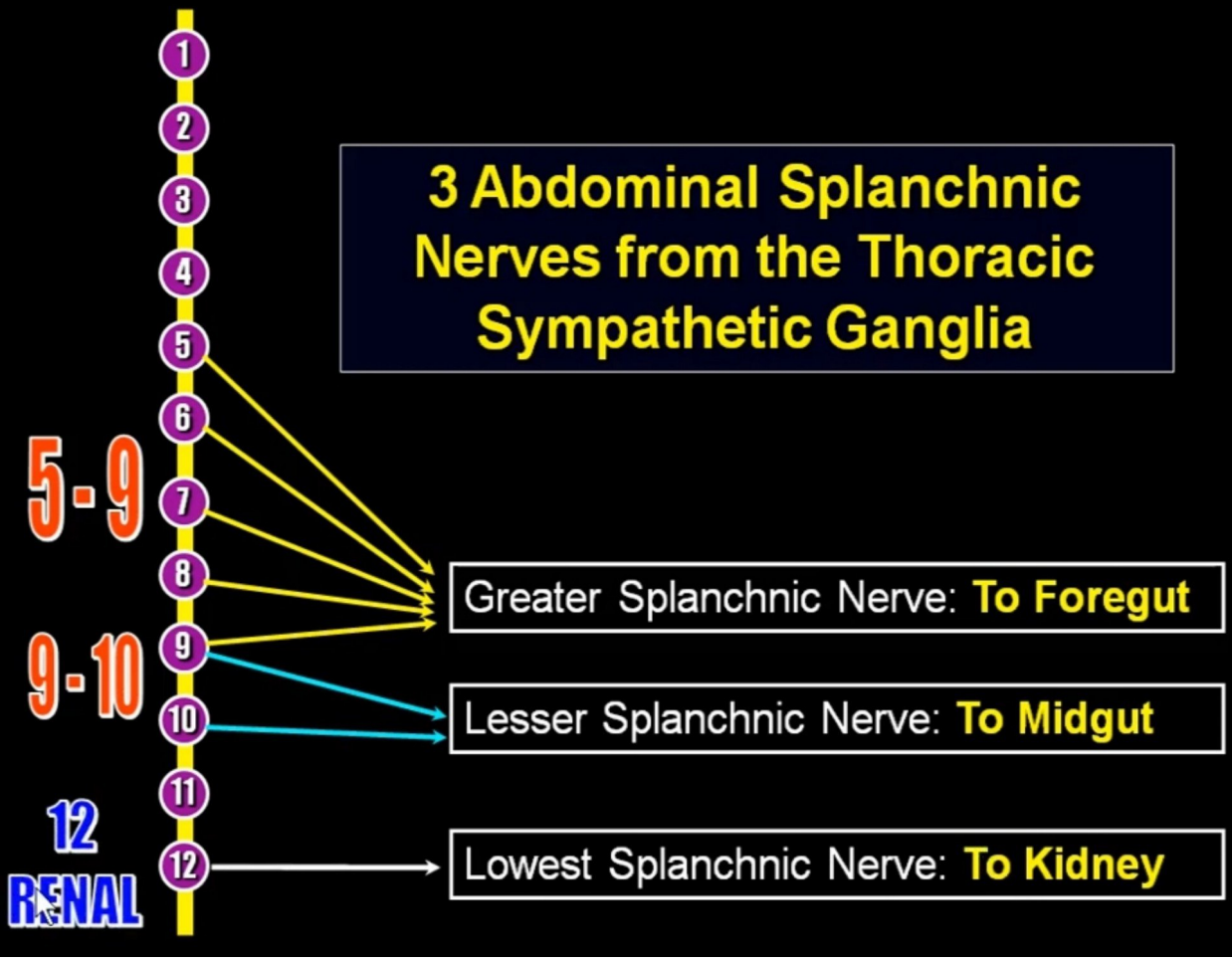
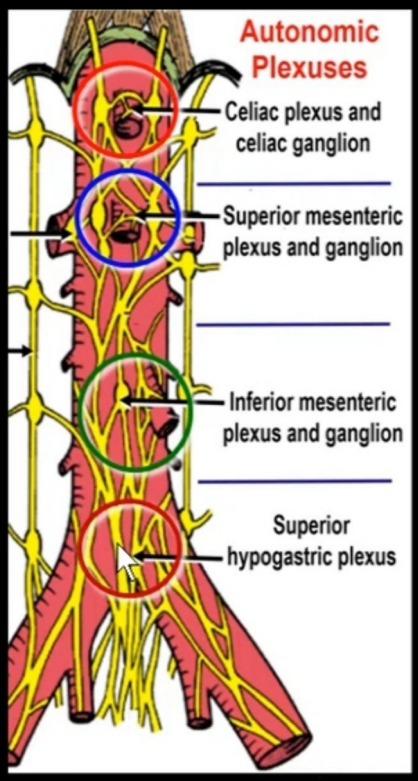


Autonomic Plexuses

Celiac Plexus	• Around celiac artery • Greater splanchnic nerve and celiac ganglion
Superior Mesenteric plexus	• Around sup mesenteric art • Lesser splanchnic nerve & sup mesenteric ganglion
Inferior Mesenteric Plexus	• Around inf mesenteric art • Lumbar splanchnic nerves & inf mesenteric ganglion
Superior Hypogastric Plexus	• At bifurcation of the aorta • It is continuation of inferior mesenteric plexus



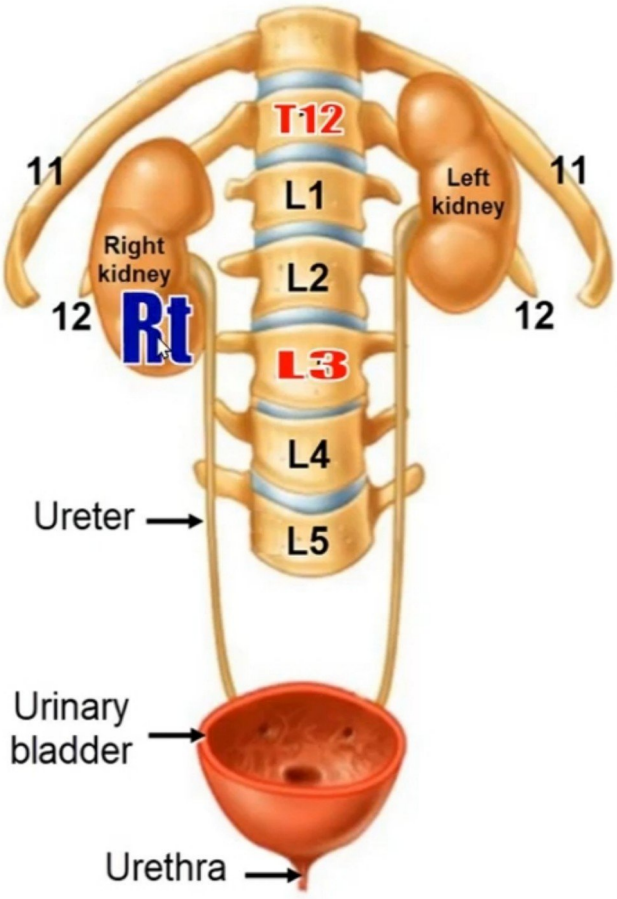
KIDNEY

OBJECTIVES

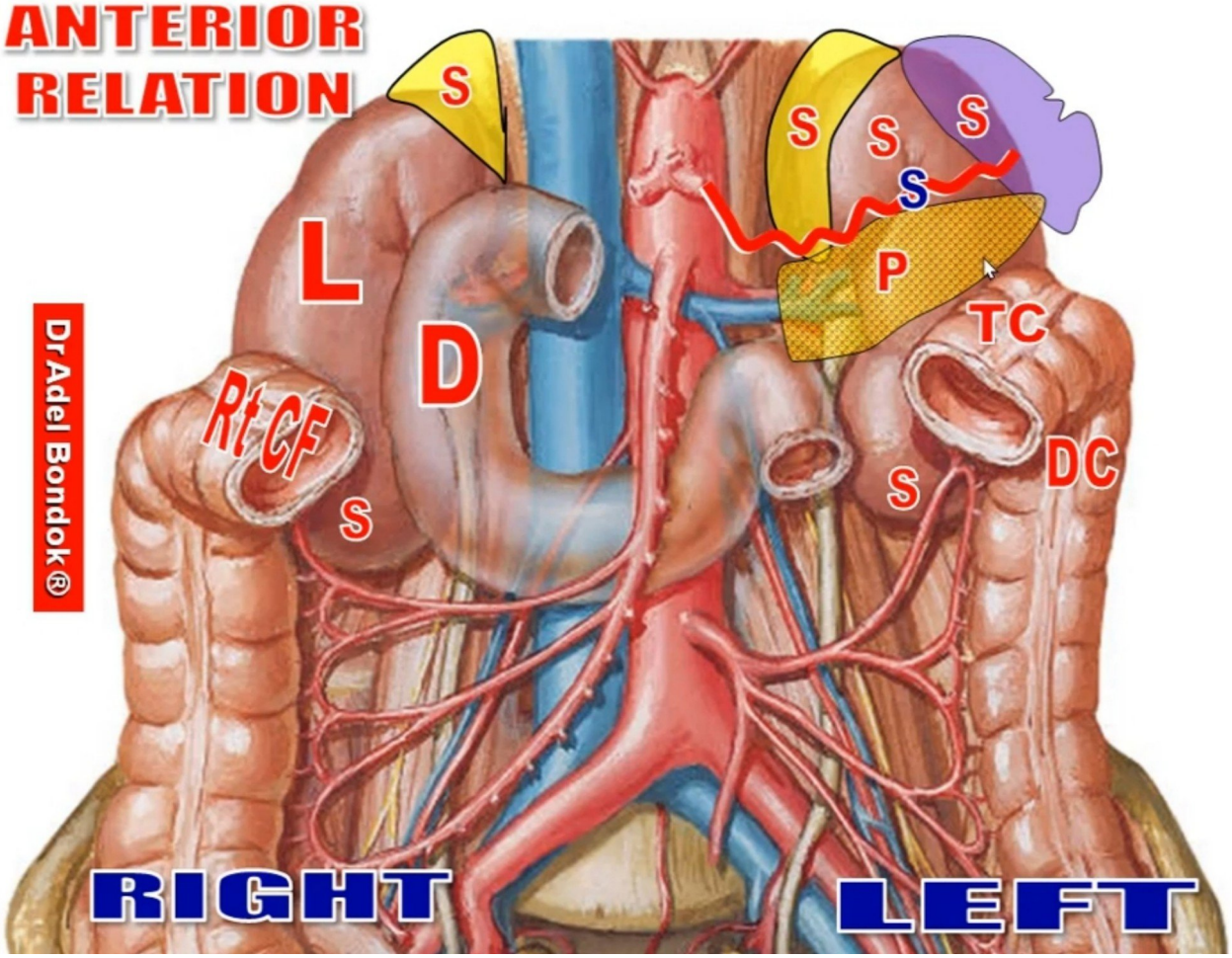
- Position
- Anterior & Posterior Relation
- Peritoneal Covering
- Capsule & Internal Structure
- Renal Vessels
- Some Anomaies of the Kidney

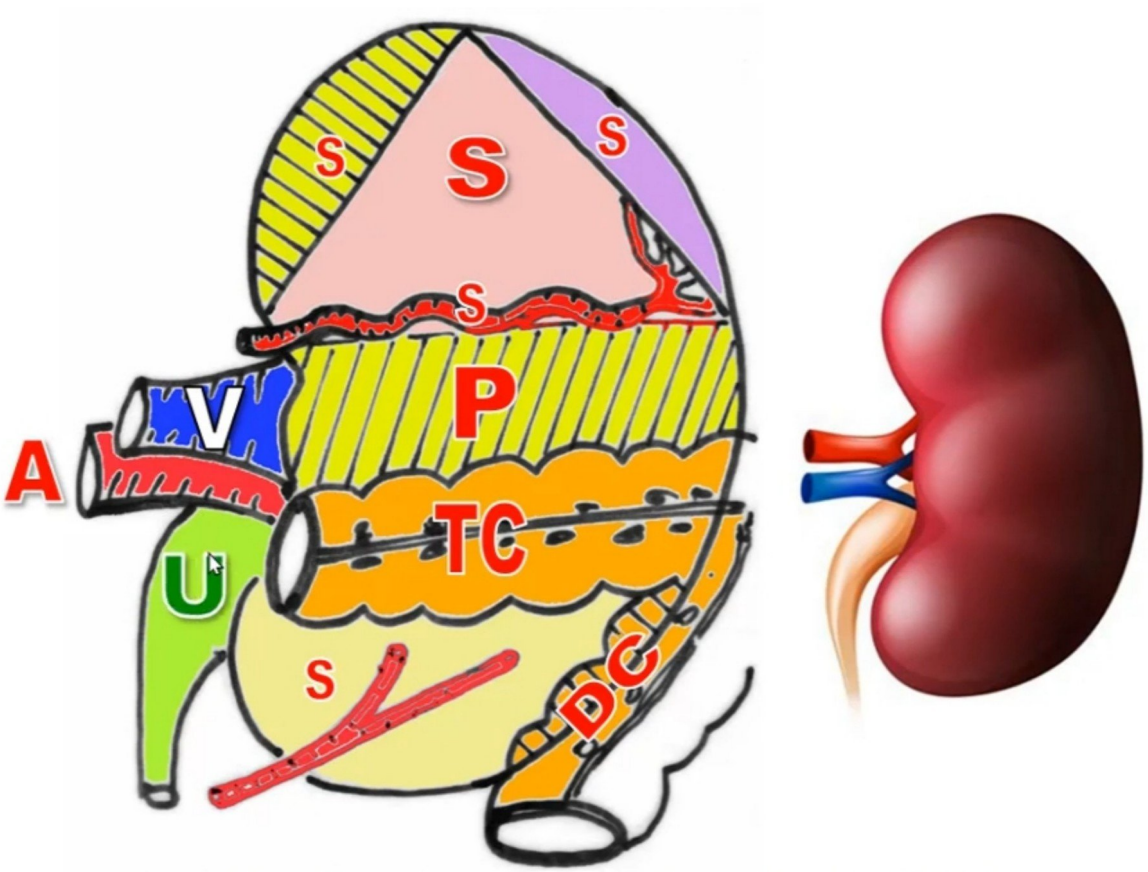
Position of the KIDNEY

1. On each side of the vertebral column
2. Behind the peritoneum
3. Extends from T12 to L3
4. The right kidney is lower than the left by ½"

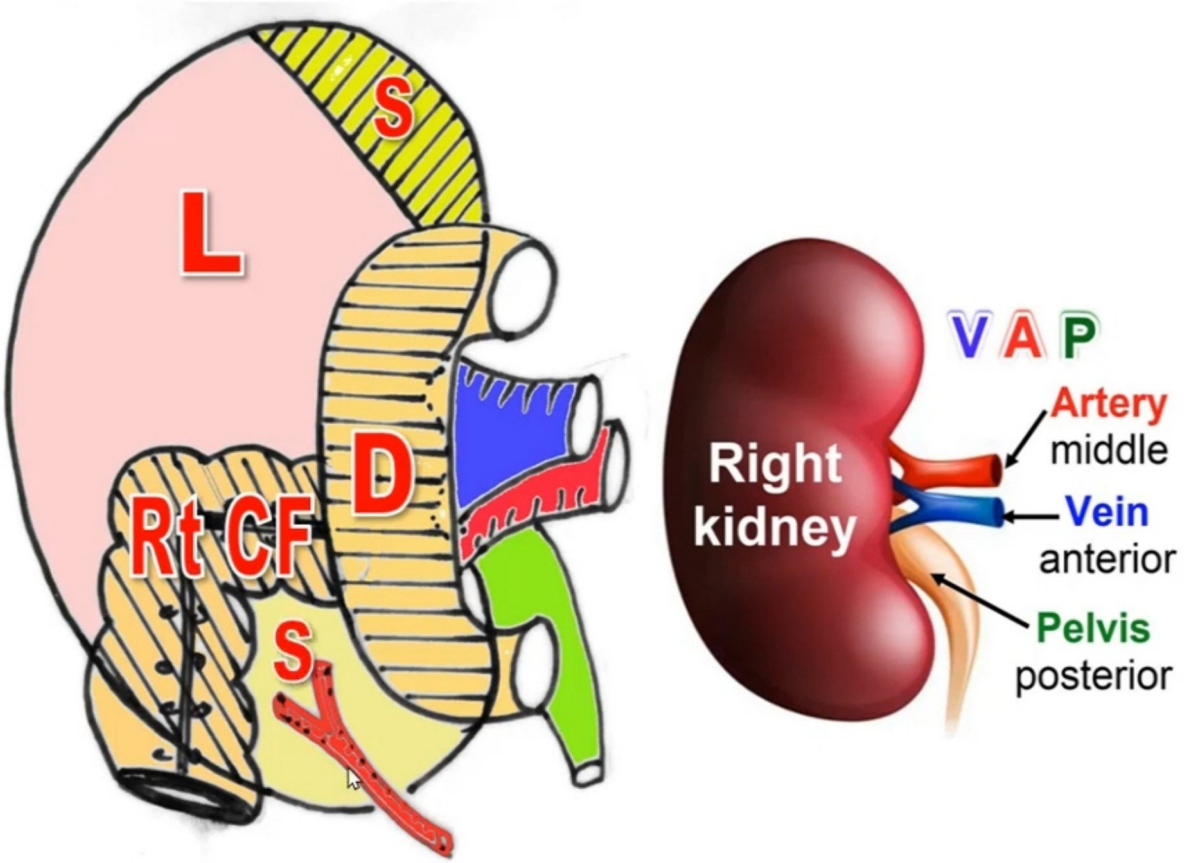


ANTERIOR RELATION



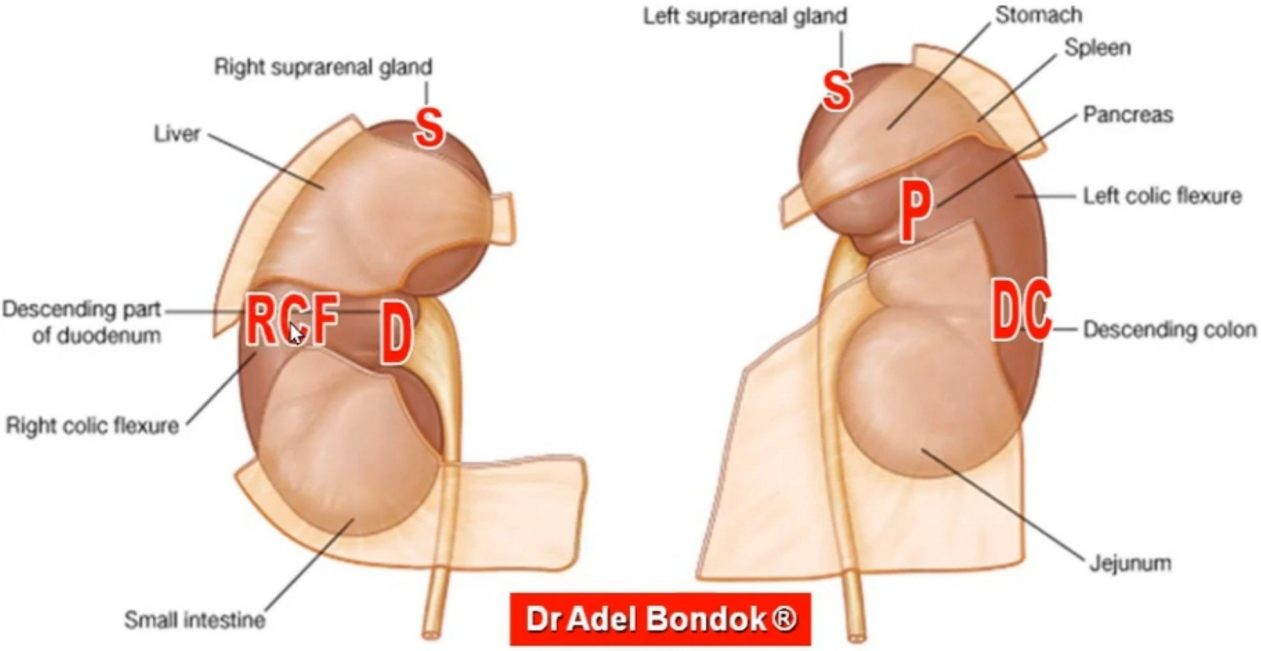


Anterior Relations of the Left Kidney



Anterior Relations of the Right Kidney

BARE AREAS



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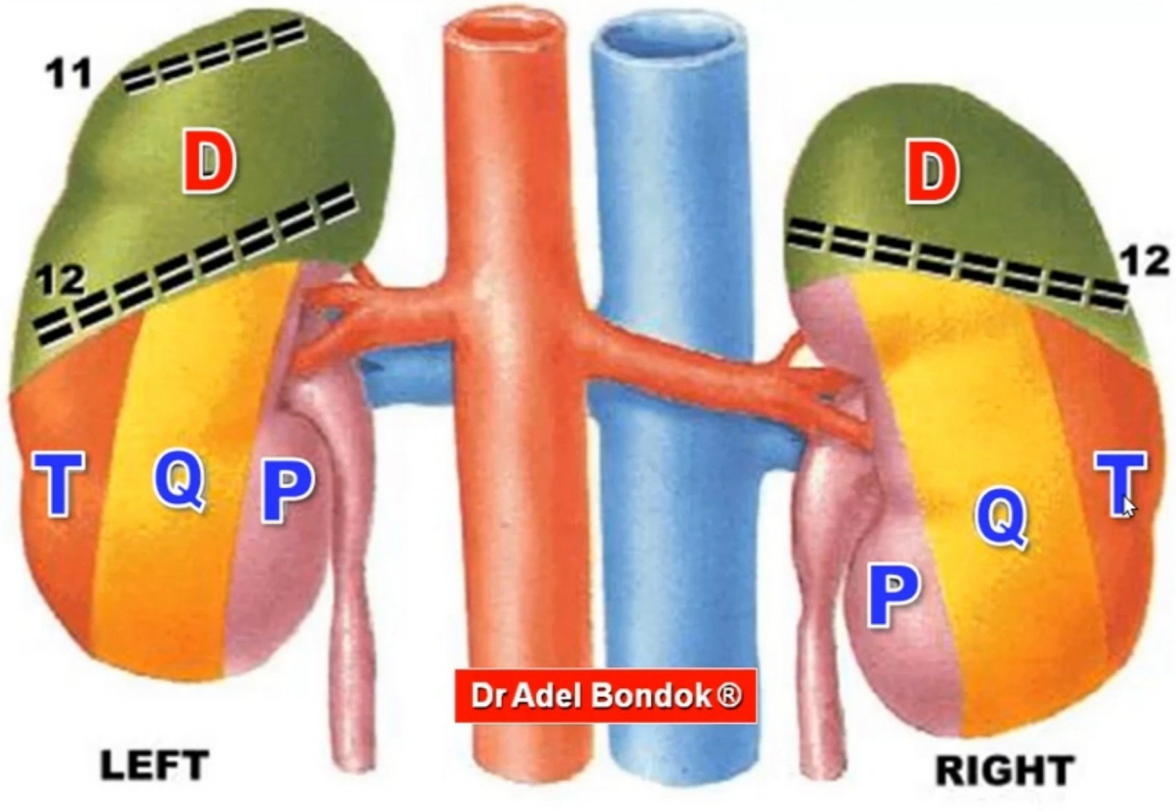
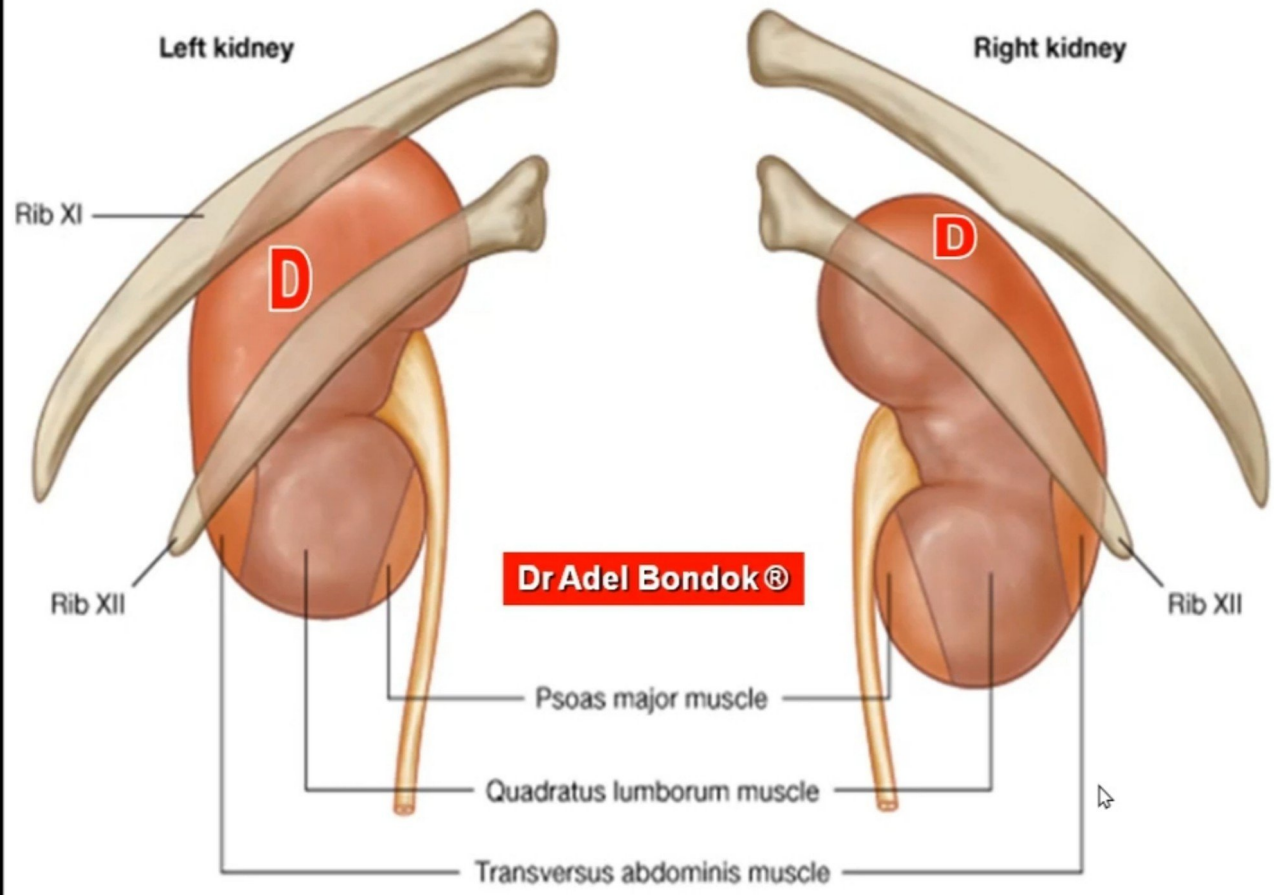
POSTERIOR RELATION





Covering of the Kidney

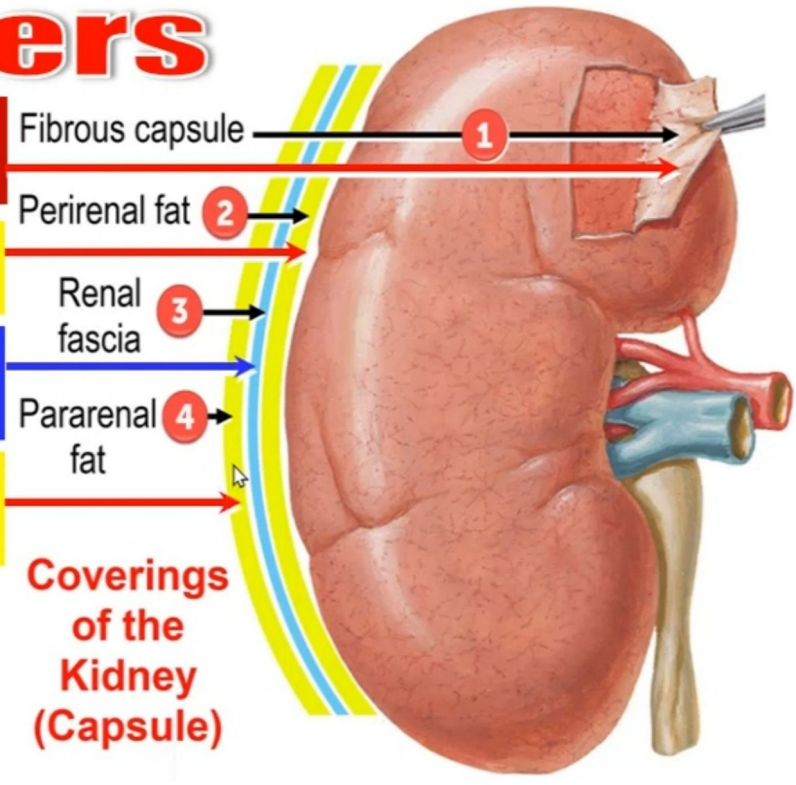
4 Layers

Fibrous capsule

Perirenal Fat

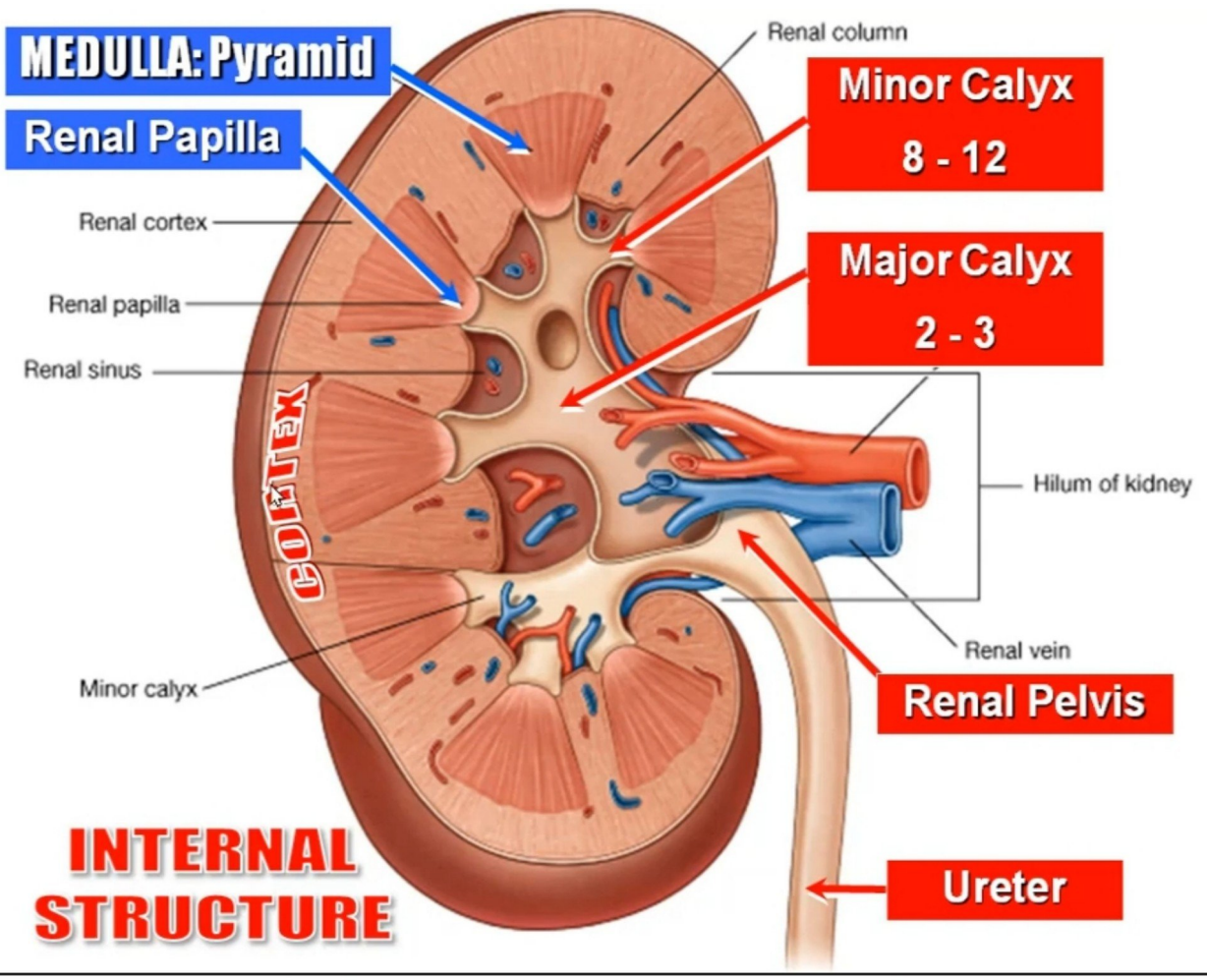
Renal Fascia

Pararenal Fat



4 F

Coverings of the Kidney (Capsule)



RENAL ARTERIES

ORIGIN:

From the abdominal aorta opposite L2

TERMINATION:

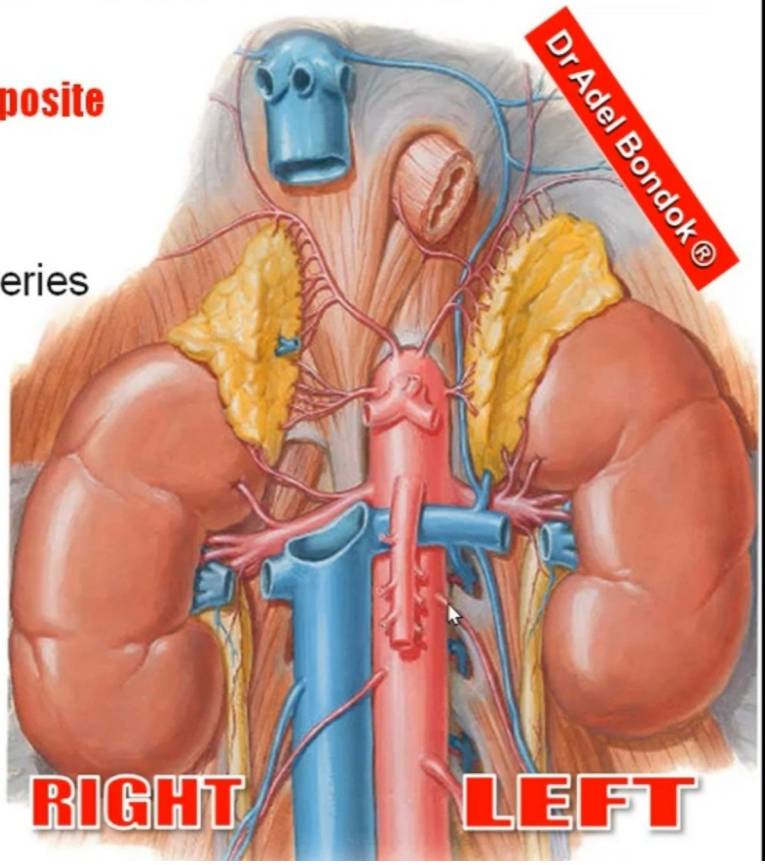
Divide into 5 segmental arteries

COURSE:

- Behind the renal vein
- In front of renal pelvis
- The right is longer as it crosses the midline

BRANCHES:

1. Inferior suprarenal artery
2. Ureteric branches
3. May give gonadal artery



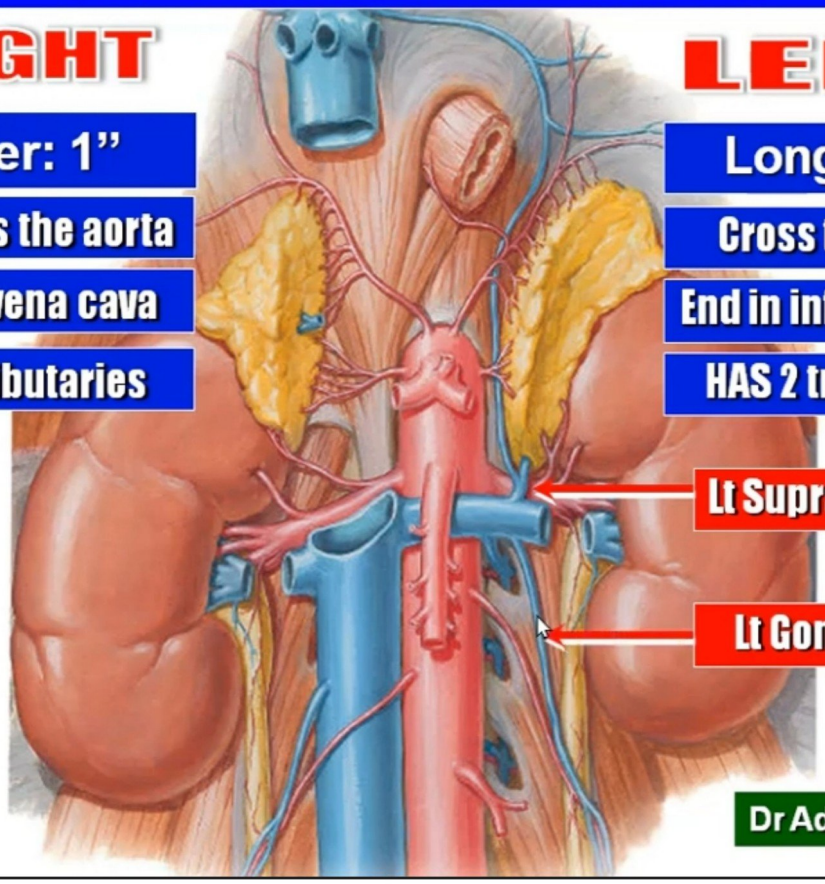
RENAL VEINS

RIGHT

- Shorter: 1”
- Never cross the aorta
- End in inf vena cava
- HAS NO tributaries

LEFT

- Longer: 3”
- Cross the aorta
- End in inf vena cava
- HAS 2 tributaries



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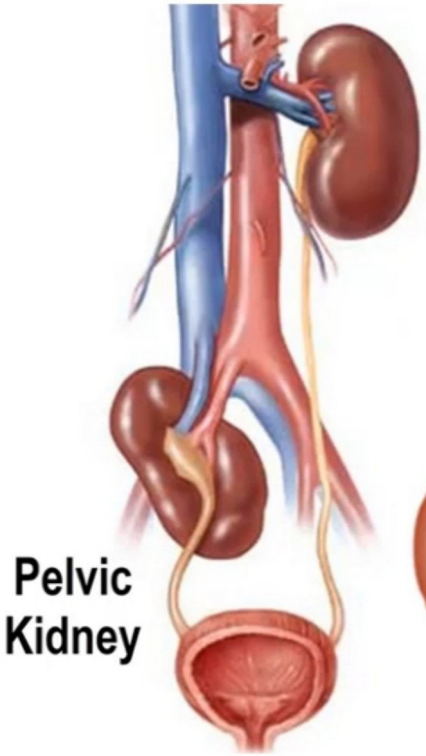
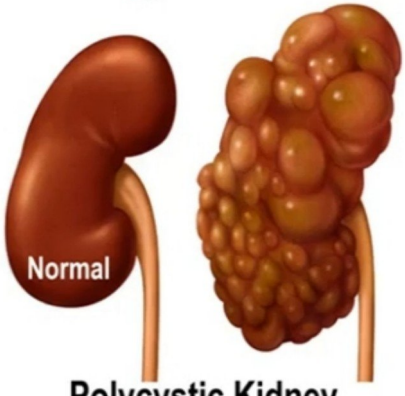
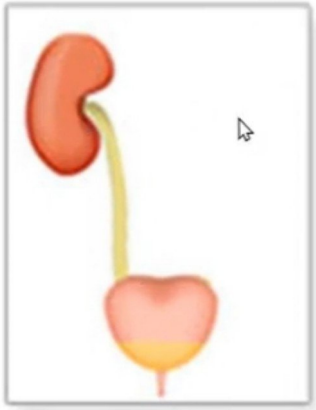
Some Kidney Anomalies







A person has only one kidney

3 Parts or Divisions

1. Cervical Part:

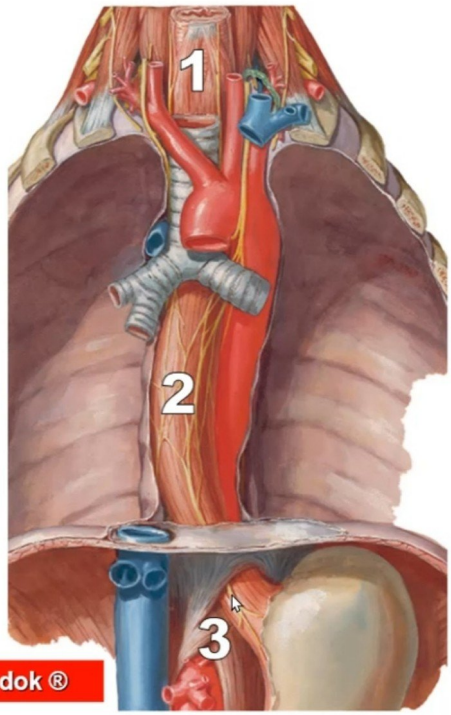
In the neck

2. Thoracic Part:

In the superior and posterior mediastinum

3. Abdominal Part:

In the abdomen



Landmarks (Relations)

1. In the neck:

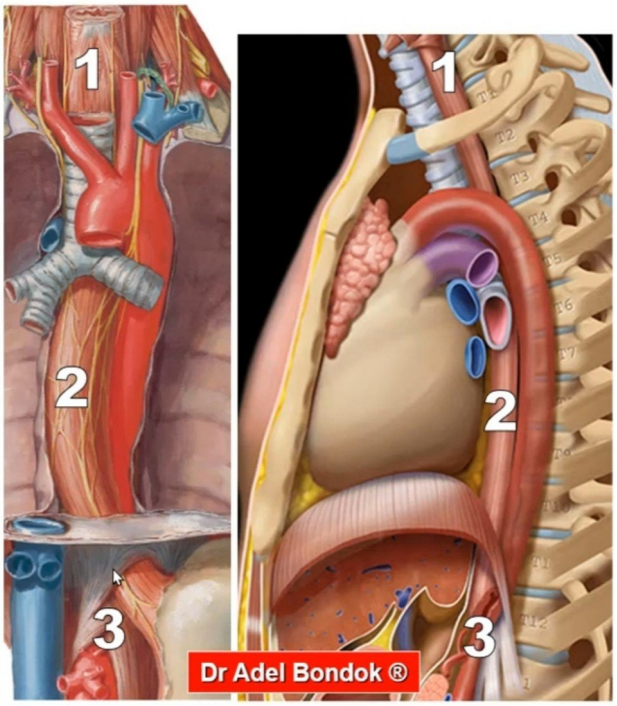
It lies behind the trachea and the recurrent laryngeal nerves

2. In the thorax: it lies

- **in the** superior & posterior mediastinum.
- **Behind** the left atrium & oblique sinus.
- **In front of** the descending aorta, thoracic duct and azygos vein.
- It is **crossed by** the left main bronchus.
- **Passes through** the esophageal hiatus in the diaphragm opposite T10.

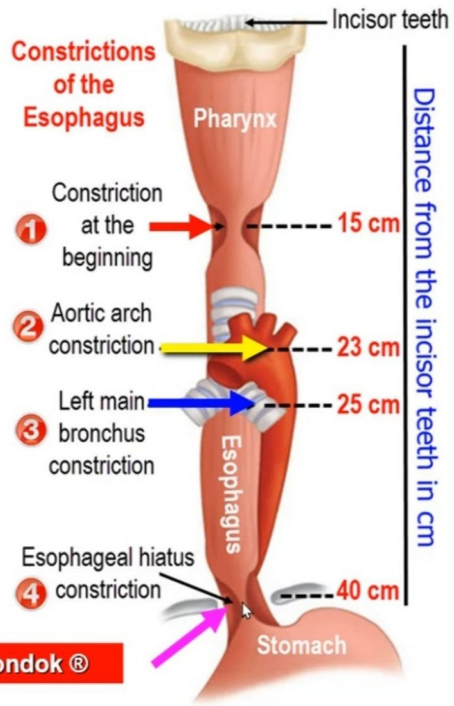
3. In the abdomen:

Behind the left lobe of the liver



4 Constrictions of the Esophagus

1. **At the beginning:**
   15 cm from the incisors
2. **Opposite the aortic arch:**
   23 cm from the incisors
3. **Opposite the left bronchus:**
   25 cm from the incisors
4. **At the Esophageal hiatus (diaphragm):**
   40 cm from the incisors



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Arterial Supply of the Esophagus:

1. **In the neck:** inferior thyroid arteries
2. **In the thorax:** descending thoracic aorta
3. **In the abdomen:** left gastric artery

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Venous Drainage of the Esophagus:

1. **In the neck:** inferior thyroid veins ➡ left brachiocephalic vein
2. **In the thorax:** azygos and hemiazygos veins
3. **In the abdomen:** left gastric vein ➡ portal circulation

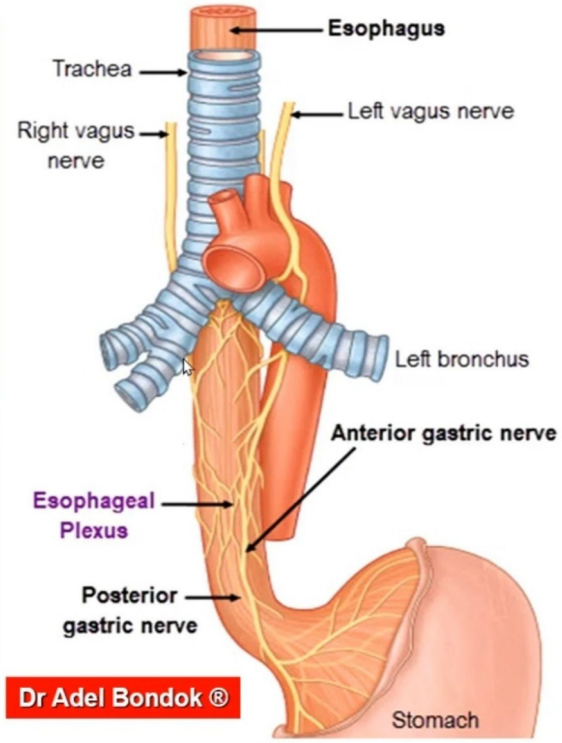
Nerve Supply of the Esophagus:

Esophageal Plexus formed by:

1. **Two vagus nerves:** forming the anterior and posterior gastric nerves.
2. **Sympathetic:** from 1- 5 thoracic ganglia and from the greater splanchnic nerve (5 – 9 ganglia)

Lymph Drainage of the Esophagus:

1. **In the neck:** deep cervical lymph nodes
2. **In the thorax:** mediastinal lymph nodes
3. **In the abdomen:** celiac lymph nodes



Large Intestine

- Parts: Their Length & Position
- Difference From the Small Intestine
- Peritoneal Covering
- Blood Supply: Arterial & Venous
- Nerve Supply
- Lymph Drainage
- Radiological Examination
- Targeted Topics on Each Part

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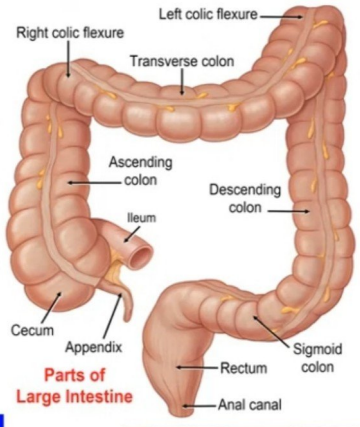

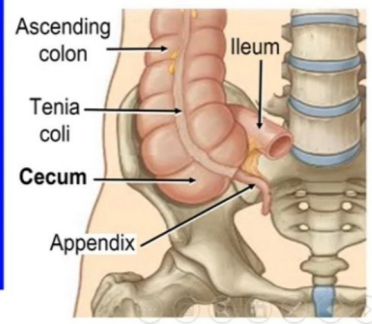

What are the parts of the large intestine?

1. **Cecum**
2. **Vermiform appendix**
3. **Ascending colon**
4. **Transverse colon**
5. **Descending colon**
6. **Sigmoid colon**
7. **Rectum**
8. **Anal canal**

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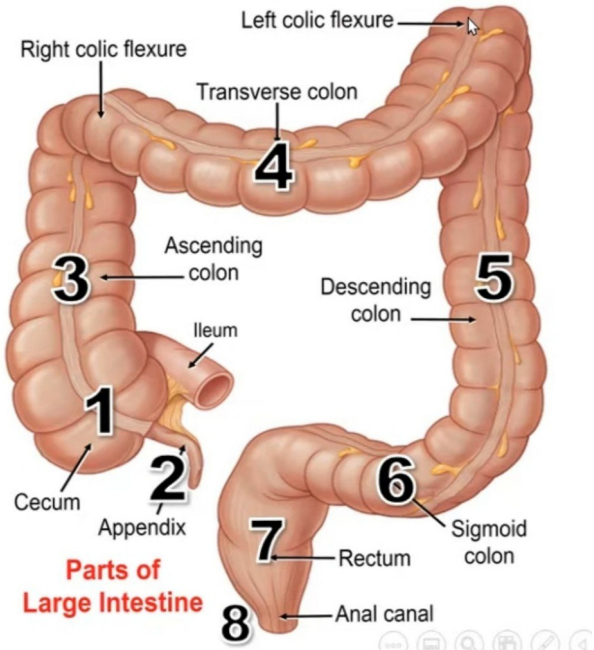
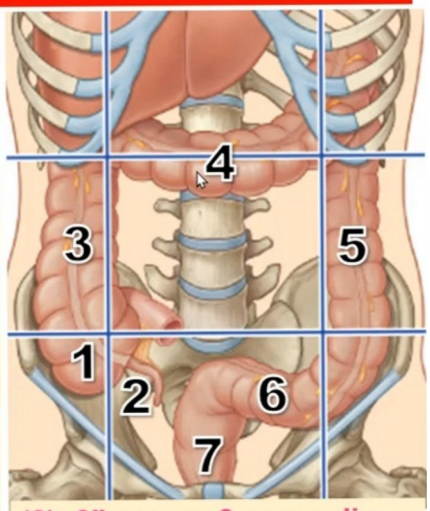


Parts of Large Intestine

Length & Position of Each Part

Part	Length	Position
Cecum	3 inches	Right iliac fossa
Appendix	3 inches	Right iliac fossa (65% retrocecal)
Ascending C	5 inches	**From** right iliac fossa **to** right hypochondrium (in right lumbar)
Transverse C	15 inches	**From** right hypochondrium **to** left hypochondrium
Descending C	10 inches	From left hypochondrium to left pelvic brim (in the left lumbar)
Sigmoid C	10 inches	**Begins at** the pelvic brim and **becomes** the rectum at the level of the 3rd sacral vertebra
Rectum	5 inches	Posterior part of the pelvis
Anal canal	1.5 inches	Perineum (anal triangle)



(2): 3" cecum & appendix
(2): 5" AC & rectum
(2): 10" DC & SC
(1): 15" TC

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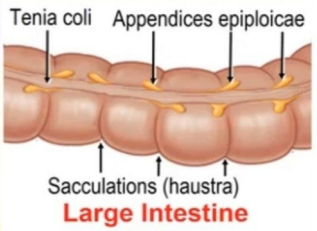
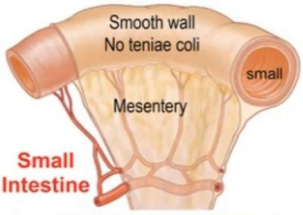
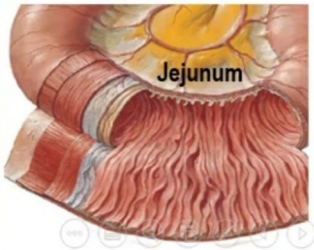
List Differences between Large & Small Intestine

Large Intestine	Small Intestine
1.5 meters & large diameter	**6 meters & small diameter**
3 Teniae coli: 3 longitudinal muscle bands	**No Teniae coli:** continuous muscle layer
The wall is sacculated	**The wall is smooth**
Epiploic appendages peritoneal pouches filled with fat	**No** Epiploic appendages
3 Parts have mesocolon: transverse colon, sigmoid colon & appendix	**Has mesentery** except the duodenum
Transverse & sigmoid colon are **mobile** Ascending & descending c are **fixed.**	**Small intestine is mobile except the duodenum**
No mucous folds	**Has folds called plicae circulares**
No lymphoid follicles Dr Adel Bondok®	**Lymphoid follicles in the ileum called Peyer's patches**







What are the Teniae Coli?

- They are **3 bands** formed by the **longitudinal muscle layer**.
- They are **absent in** the **appendix** and **rectum**. They **meet at the base** of the appendix.
- **In the ascending and descending colon**: there are 1 anterior and 2 posterior.
- **In the transverse colon:** there are 2 anterior and 1 posterior.

- **Diverticulosis: herniation of the mucous membrane** of the large intestine through the circular muscle layer between the teniae coli. The **common site** is the sigmoid colon.

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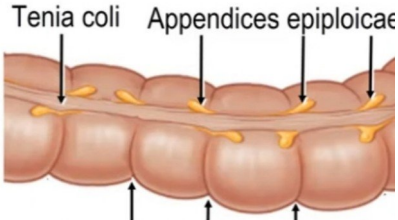
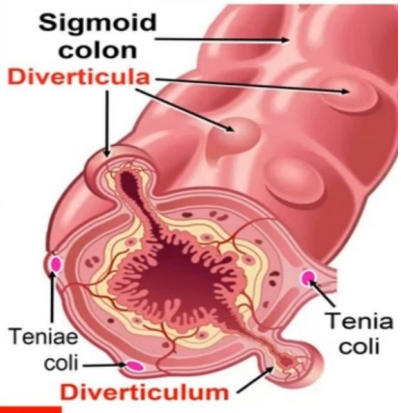




Peritoneal Covering

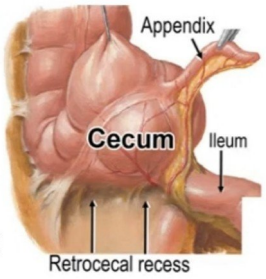
Cecum:
Completely covered. Therefore, **mobile**

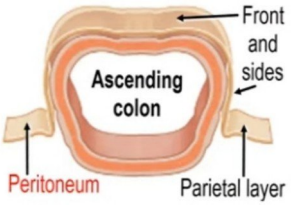
Appendix:
Completely covered & has **mesoappendix**

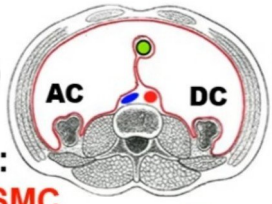
Ascending & Descending Colon:
Front & Sides. Therefore, **not mobile.**
Each has **2 paracolic gutters** (med & lat)

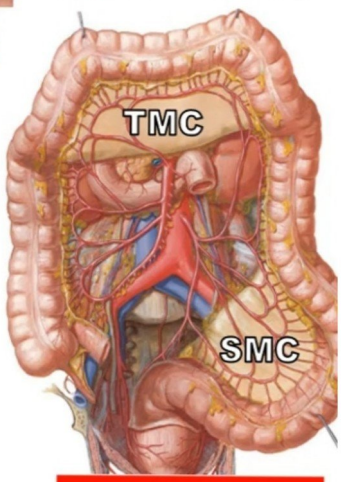
Transverse & Sigmoid Colon:
Completely covered & have **mesocolon:**
transverse & sigmoid mesocolon **TMC** & **SMC**

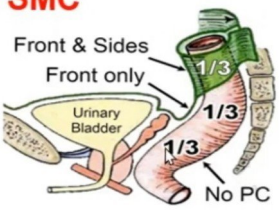
Rectum:
Upper 1/3: front and sides
Middle 1/3: front only
Lower 1/3: no peritoneal covering











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Arterial Supply of the Large Intestine: 2

1. Superior Mesenteric Artery:

Midgut: Cecum, appendix, ascending colon & right 2/3 of the transverse colon.

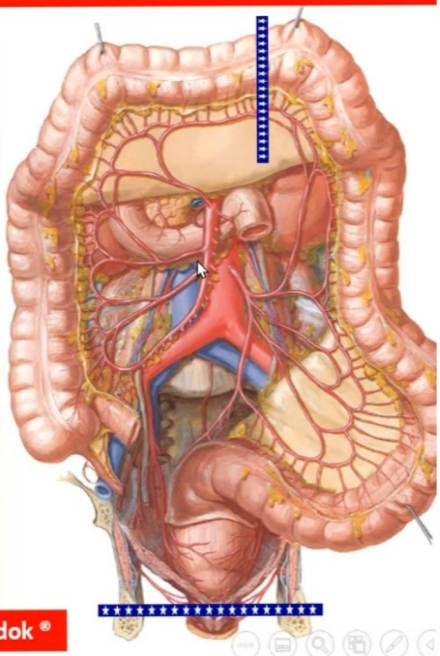
2. Inferior Mesenteric Artery:

Hindgut: Left 1/3 of transverse colon, descending & sigmoid colon, rectum & upper part of anal canal

Cecum: **anterior & posterior cecal arteries** from the ileocolic artery (superior mesenteric artery)

Appendix: **appendicular artery** from the ileocolic artery (superior mesenteric artery)

Ascending Colon: **ileocolic & right colic arteries** from the superior mesenteric artery



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Arterial Supply of the Large Intestine cont

4. Transverse Colon:

- **a. Right 2/3:** middle colic artery from the **superior mesenteric artery**
- **b. Left 1/3:** left colic artery from the **inferior mesenteric artery**

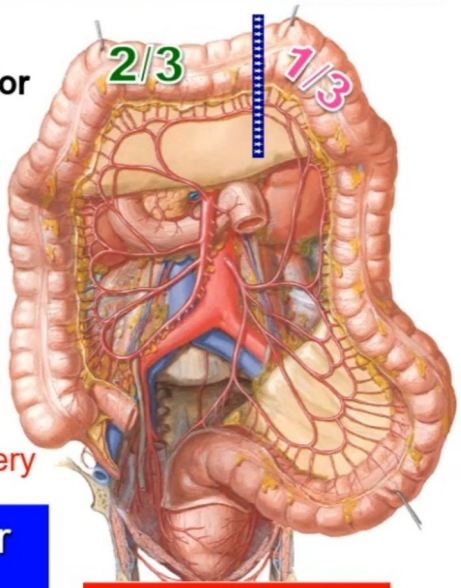
5. Descending Colon:

Left colic artery and sigmoid branches from the inferior mesenteric art

6. Sigmoid Colon:

Sigmoid branches from the inferior mesenteric artery

Venous Drainage: Superior & inferior mesenteric veins to the portal vein



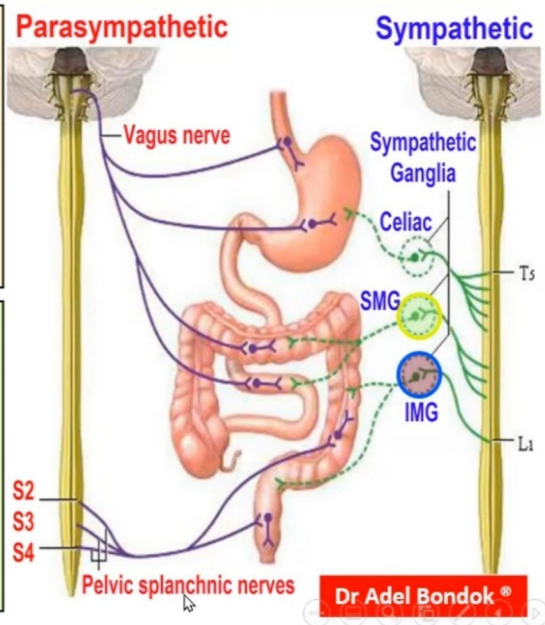
Nerve Supply of the Large Intestine

Midgut: Cecum, Appendix, Ascending Colon and Rt 2/3 of the Transverse Colon

1. **Sympathetic:** superior mesenteric plexus (by the lesser splanchnic nerve)
2. **Parasympathetic:** Vagus nerve

Hindgut: Descending Colon, Sigmoid Colon, Rectum & Upper part of the Anal Canal

1. **Sympathetic:** inferior mesenteric plexus (by the lumbar splanchnic nerves)
2. **Parasympathetic:** pelvic splanchnic nerves S2, 3, 4



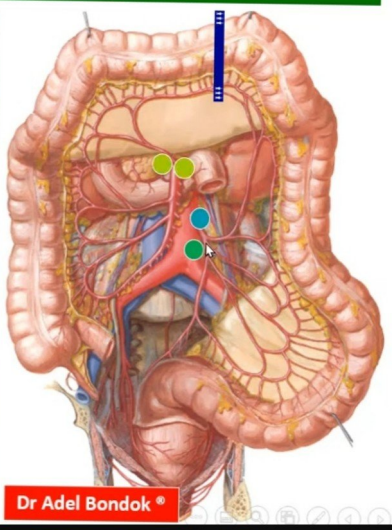
Lymph Drainage of Large Intestine

Midgut: Cecum, Appendix, Ascending Colon and Rt 2/3 of the Transverse Colon

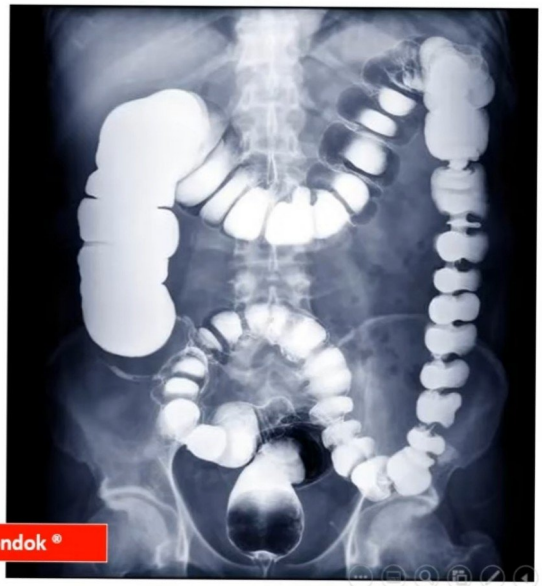
Superior Mesenteric Lymph Nodes

Hindgut: Left 1/3 of the Transverse Colon, Descending Colon, Sigmoid Colon, Rectum & Upper part of the Anal Canal

Inferior Mesenteric Lymph Nodes



Radiological Examination: Barium Enema



The Cecum

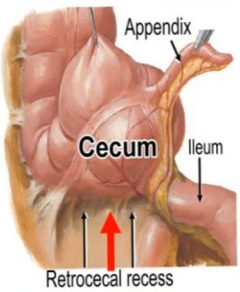
Peritoneal Covering:

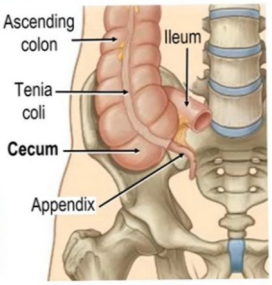
Completely covered with peritoneum, mobile.

It has 3 peritoneal recesses:

1. **Retrocecal recess:** may contain the appendix
2. **Superior ileocecal recess:** above the ileum
3. **Inferior ileocecal recess:** below the ileum

Clinically: they are sites of strangulation of the intestine.





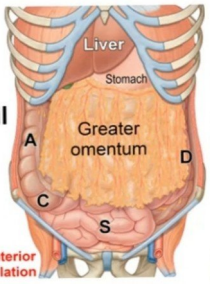
Relations:

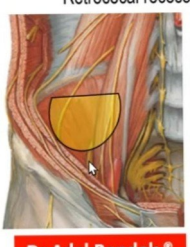
Anterior:

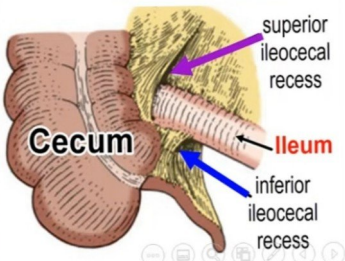
1. Anterior abdominal wall
2. Greater omentum
3. Small intestine

Posterior:

1. Iliacus muscle
2. Psoas major muscle
3. Femoral nerve between the 2 muscles







Internal Appearance of the Cecum:

Has 2 openings in the posteromedial wall:

1. **Ileum:** has ileocecal valve
2. **Appendix:** 1 inch below the ileocecal opening

Blood Supply of the Cecum:

Arterial Supply:

Anterior and posterior cecal arteries from the ileocolic artery from the superior mesenteric artery

Venous Drainage:

Anterior and posterior cecal veins drain into the superior mesenteric vein

Lymph Drainage of the Cecum:

Superior mesenteric lymph nodes

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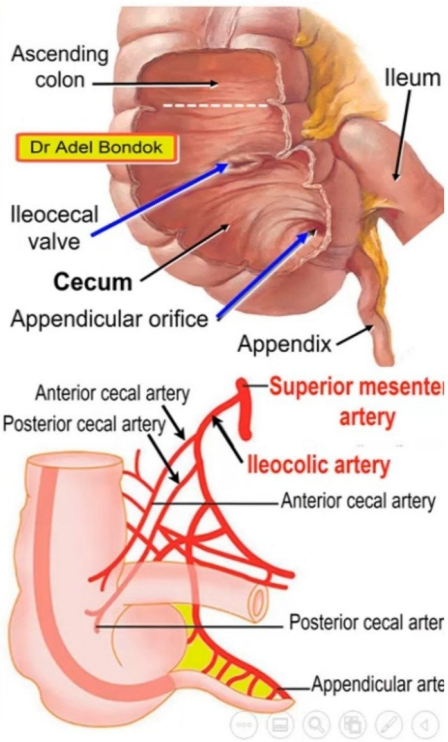
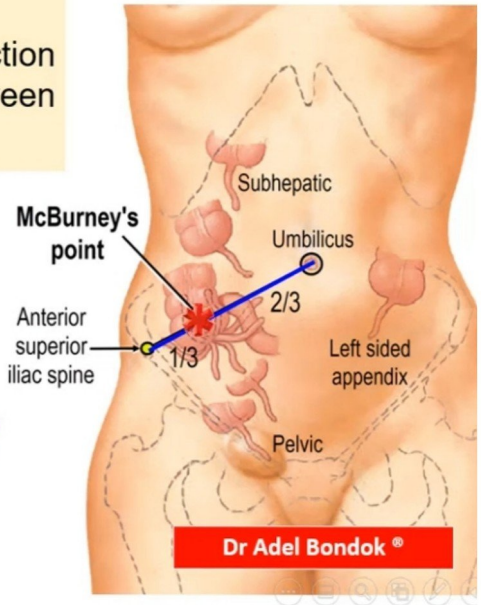


The Vermiform Appendix

Surface Anatomy: McBurney's Point

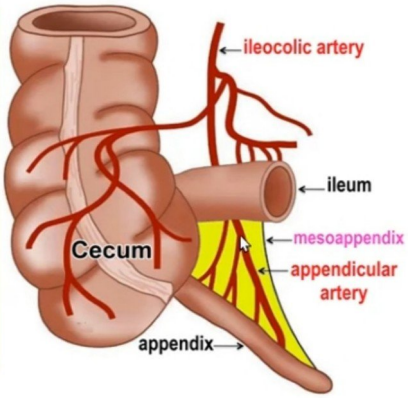
The base of the appendix lies opposite the Junction between the **medial 2/3** & **lateral 1/3** of a line between the umbilicus & right anterior superior iliac spine



Peritoneal Covering

Completely covered.

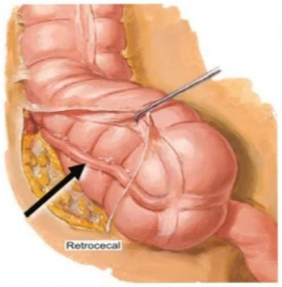
It has mesoappendix which **contains** the appendicular artery from the ileocolic artery

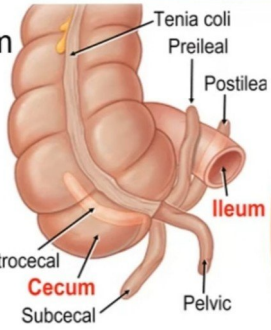


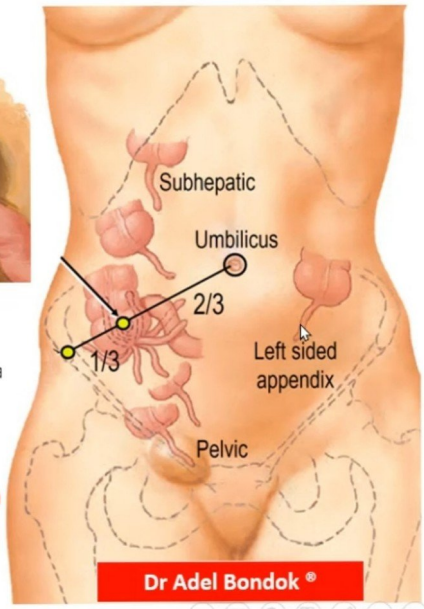
Variable Position of the Appendix

The base lies in the right iliac fossa.
The position of the tip is variable:

1. **Retrocecal:** 65%. Behind the cecum in the retrocecal recess. **It is the commonest**
2. **Pelvic:** 30%. it may be mistaken as rupture ovarian cyst in the female
3. **Paracecal:** 2%. Lat side of the cecum
4. **Subcecal:** 1.5%. Below the cecum.
5. **Preileal:** 1%. anterior to the ileum
6. **Postileal:** 0.5%. Behind the ileum
7. **Subhepatic:** below the liver
8. **Left sided:** due to abnormal rotation of the gut.







Ascending Colon

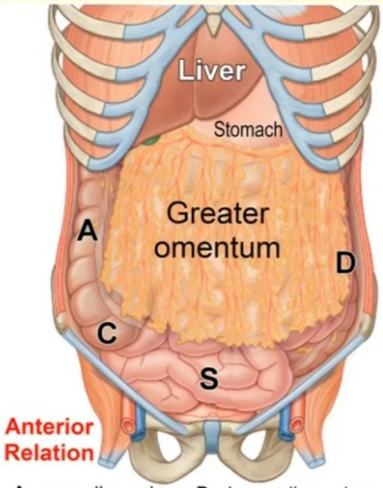
Relations:

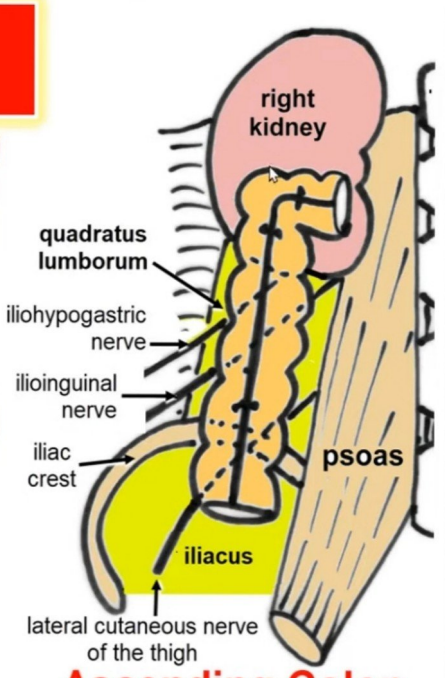
Anteior to AC & DC:

1. Anterior abdominl wall
2. Greater omentum
3. Small intestine

Posterior:

1. Iliacus muscle
2. Iliac crest
3. Quadratus lumborum separated by 2 nerves:
   a. Iliohypogastric nerve
   b. Ilioinguinal nerve
4. Right kidney





Descending Colon

Posterior Relation:

1. Left kidney
2. Quadratus lumborum
3. 2 nerves:
   a. Iliohypogastric nerve
   b. Ilioinguinal nerve
4. Iliac crest
5. Iliacus muscle
6. Lateral cutaneous nerve of the thigh
7. Femoral nerve
8. Left psoas and External iliac vessels

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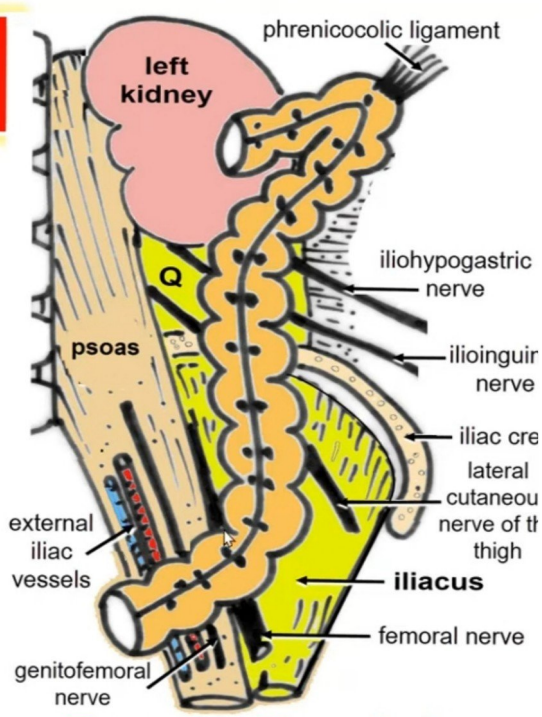
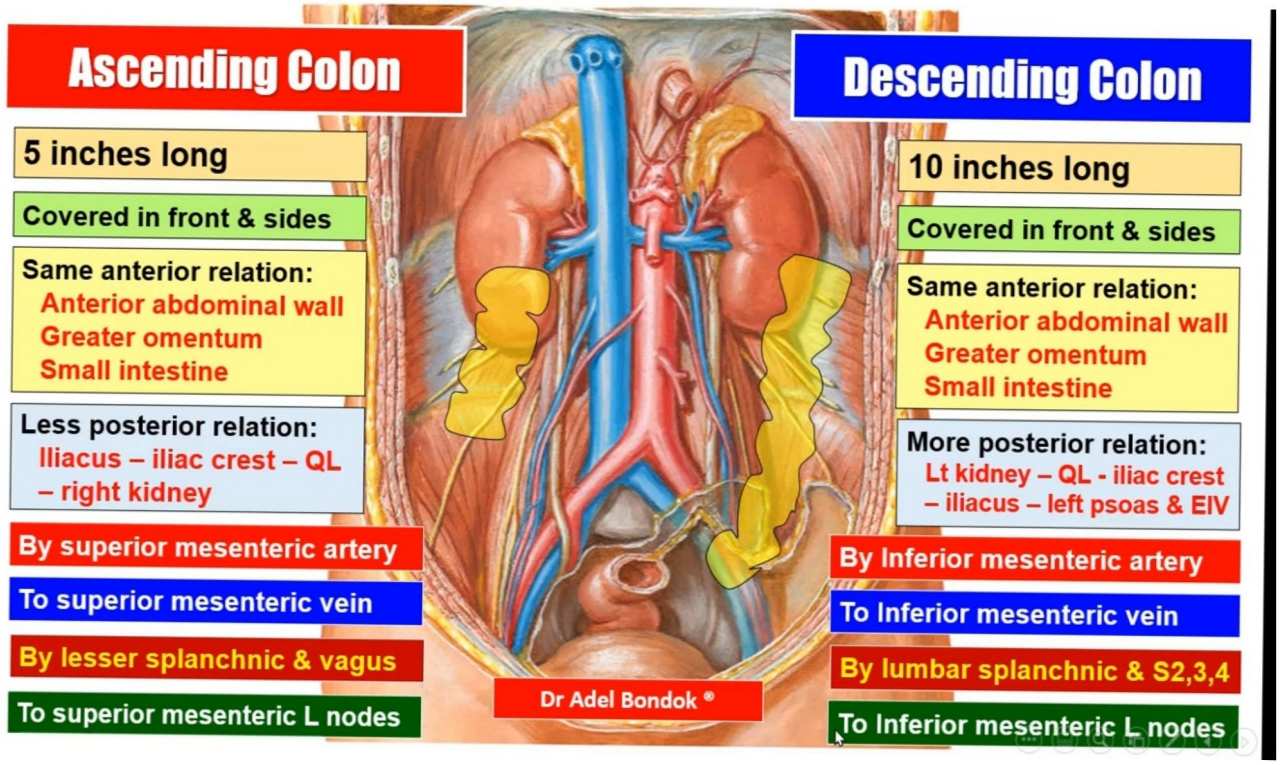


Descending Colon



Transverse Colon

Extension:

Begins at the right colic flexure in the right hypochondrium below the liver

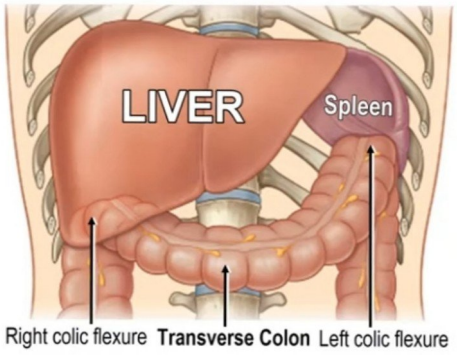
Ends at the left colic flexure in the left hypochondrium below the spleen.

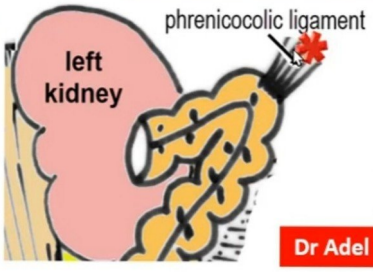
Peritoneal Covering:

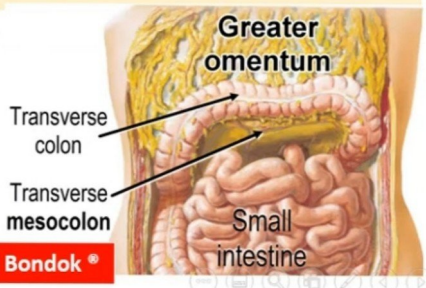
Completely covered except the 1st 2 inches are adherent to the duodenum & pancreas.

It has transverse mesocolon containing the middle colic vessels.

The left colic flexure is suspended to the diaphragm by the phrenicocolic ligament.

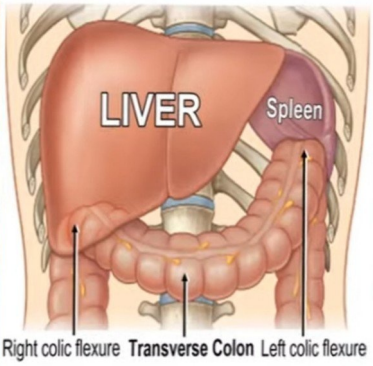






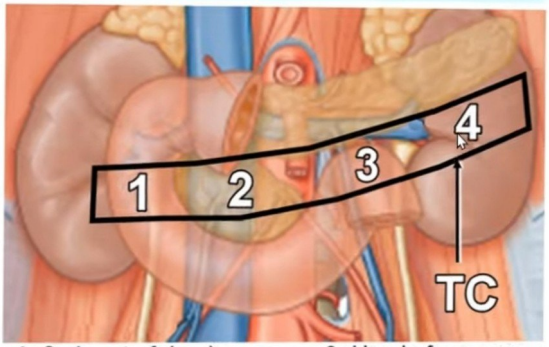
Anterior Relations of the TC:

1. Anterior abdominal wall
2. Greater omentum
3. Lesser sac
4. Liver above the right colic flexure
5. Spleen above the left colic flexure



Posterior Relations of the TC:

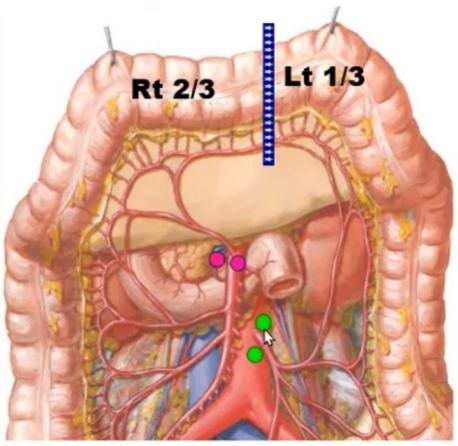
1. Second part of the duodenum
2. Head of the pancreas
3. Small intestine
4. Left kidney



1: 2nd part of duodenum **2:** Head of pancreas
3: Small intestine (jejunum) **4:** Left kidney

Arterial Supply of the Transverse Colon:

1. **Right 2/3:** Superior Mesenteric Artery
2. **Left 1/3:** Inferior Mesenteric Artery



Nerve Supply of the Transverse Colon:

Right 2/3:

Sympathetic: Superior mesenteric plexus (lesser splanchnic nerve)

Parasympathetic: vagus nerve

Left 1/3:

Sympathetic: inferior mesenteric plexus (lumbar splanchnic nerves).

Parasympathetic: Pelvic splanchnic ner (S2, 3, 4)

Lymph Drainage of the Transverse Colon:

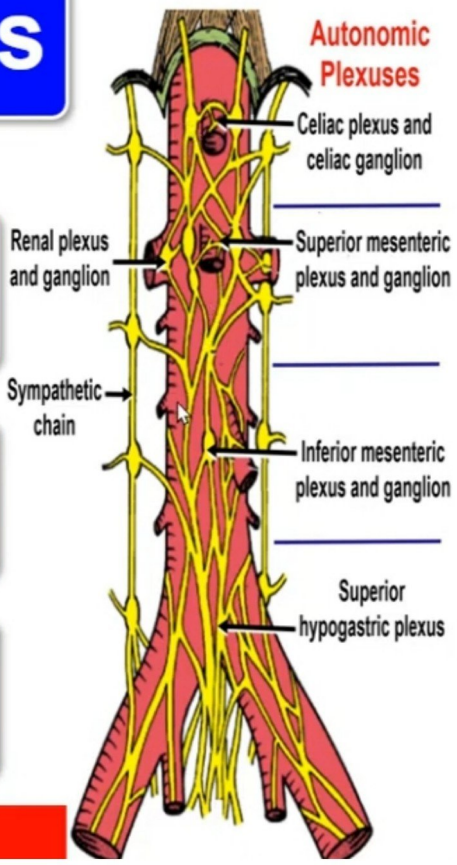
1. **Right 2/3:** Superior mesenteric lymph nodes
2. **Left 1/3:** Inferior mesenteric lymph nodes

Autonomic Nerves

Sympathetic

Parasympathetic

Form Plexuses



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Autonomic Innervation of the Abdominal Viscera

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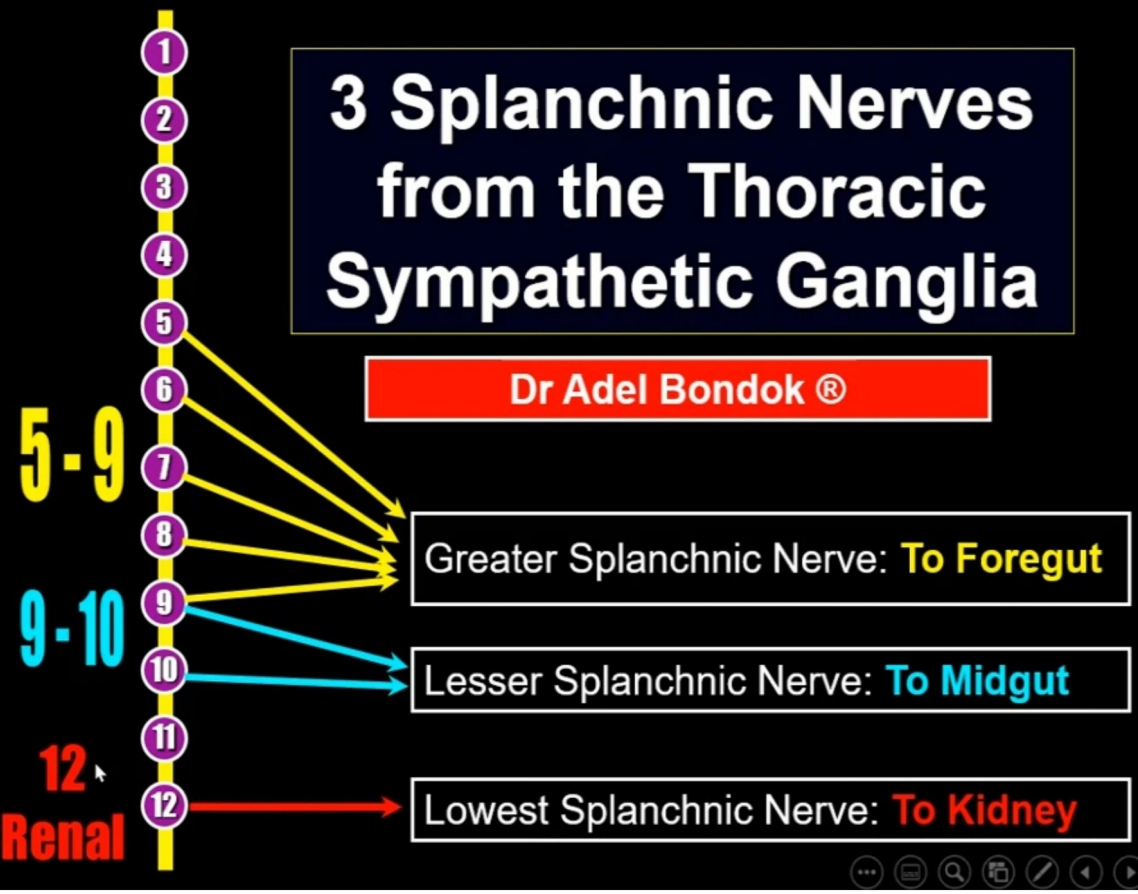
Sympathetic: 4

- **Greater Spl N:** to **foregut**
  From T5 – T9 ganglia
- **Lesser Spl N:** to **Midgut**
  From T9 & T10 ganglia
- **Lowest Spl N:** to **Kidney**
  From T12 ganglion
- **Lumbar Spl N:** to **Hindgut**
  From L1 & L2 ganglia

Parasympathetic: 2

- **Vagus:** supplies foregut and midgut via celiac & superior mesenterc plexus
- **PSN (S2, 3, 4):** To hindgut & ureter via inf mesenteric & hypogastric plexus



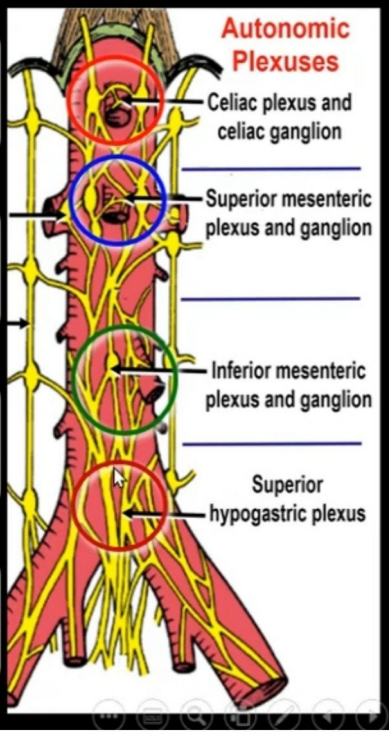
4 Autonomic Plexuses

Celiac Plexus
- Around celiac artery
- Greater splanchnic nerve and celiac ganglion

Superior Mesenteric plexus
- Around sup mesenteric art
- Lesser splanchnic nerve & sup mesenteric ganglion

Inferior Mesenteric Plexus
- Around inf mesenteric art
- Lumbar splanchnic nerves & inferior mesenteric ganglion

Superior Hypogastric Plexus
- At bifurcation of the aorta
- It is continuation of the inferior mesenteric plexus



Lymphatic Drainage of the Abdomen

1. Skin of the abdominal wall
2. Deep structures of the wall
3. Scrotum
4. Testis
5. Abdominal organs

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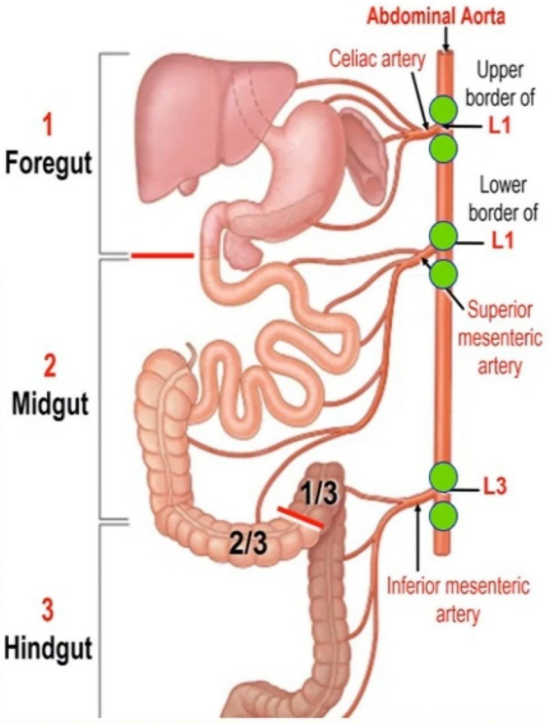
Lymphatic Drainage of the Abdominal Organs

Rule: Lymphatics run along the arteries of the gut to:

1. **Foregut** ➡ Celiac lymph nodes
2. **Midgut** ➡ Superior mesenteric lymph nodes
3. **Hindgut** ➡ Inferior mesenteric lymph nodes



Efferents ➡ form intestinal lymph trunk ➡ ends in the cisterna chyli

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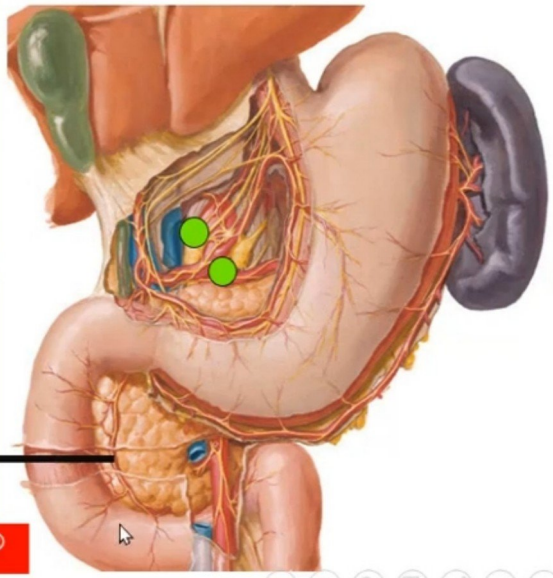
Lymphatic Drainage of the Duodenum

Rule: Lymphatics run along the arteries to:

1. Upper part above the biliary orifice: along branches of the celiac artery to celiac lymph nodes
2. Lower part below the biliary orifice: along the inferior pancreaticoduodenal artery to superior mesenteric lymph nodes



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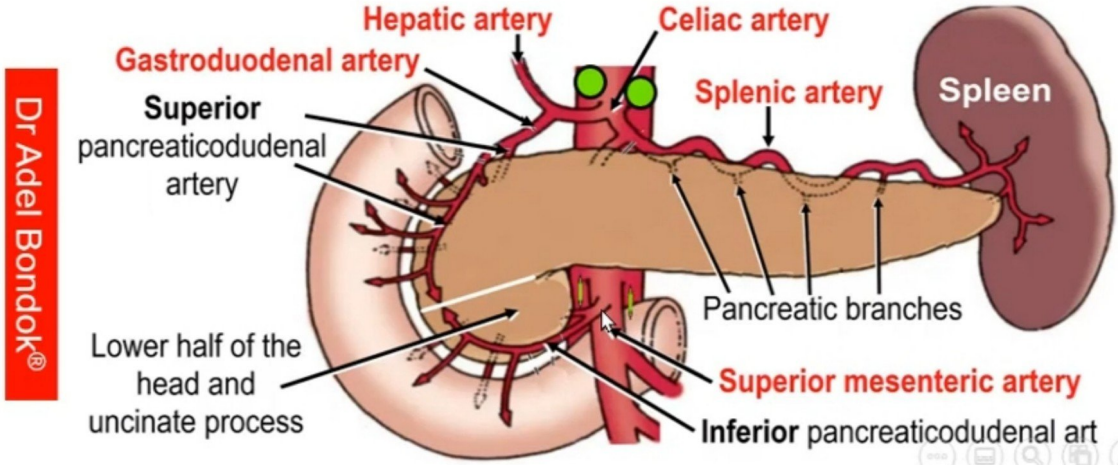
Lymphatic Drainage of the Pancreas

Rule: Lymphatics run along the arteries to:

1. Upper part of the head, neck, body & tail: along branches of celiac artery to celiac lymph nodes

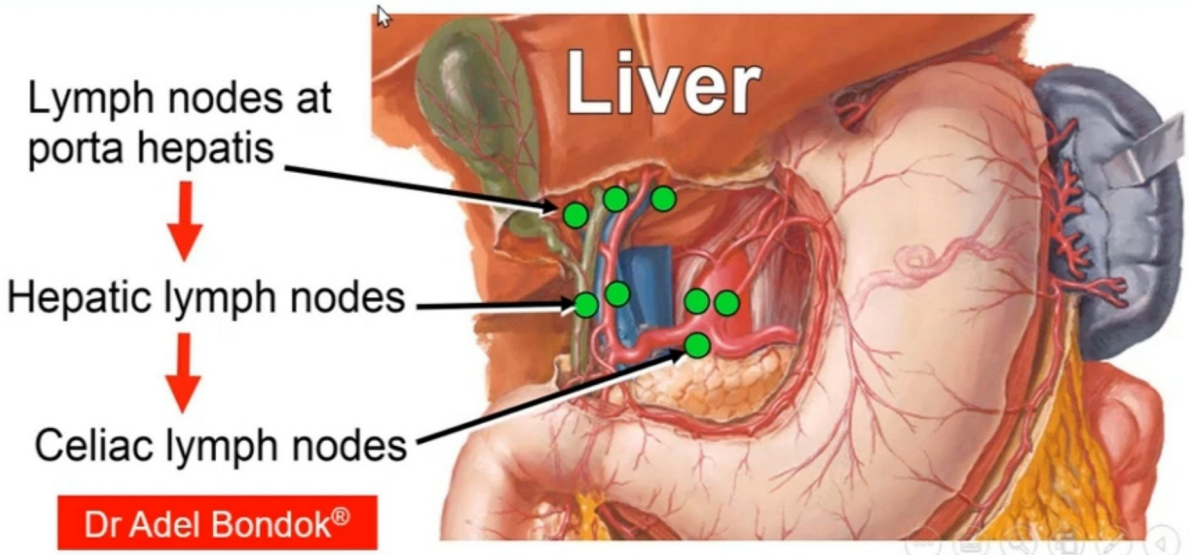
2. Lower part of the head: along inferior pancreatico-duodenal artery to superior mesenteric lymph nodes



Lymphatic Drainage of the Liver

Lymph nodes at the porta hepatis ➡ hepatic lymph nodes along the hepatic artery ➡ celiac lymph nodes

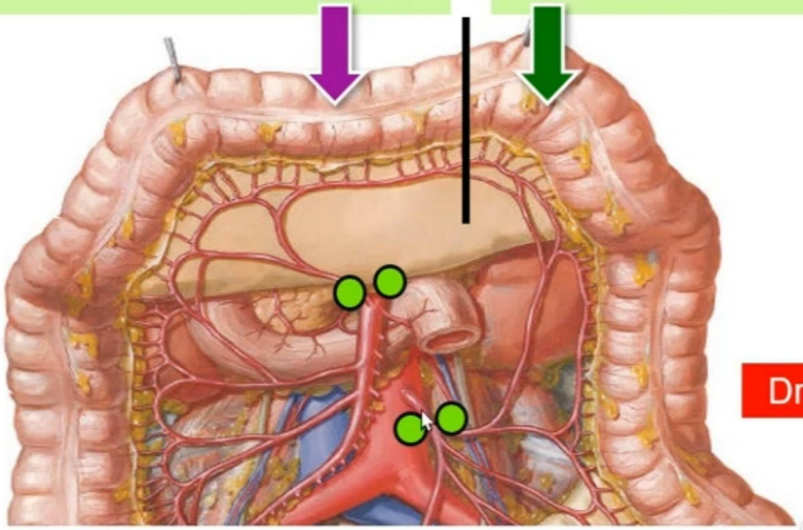
The upper surface ➡ mediastinal lymph nodes



Lymphatic Drainage of the Transverse Colon

Rule: Lymphatics run along the arteries to:

1. Right 2/3: along middle colic artery to superior mesenteric lymph nodes
2. Left third: along left colic artery to the inferior mesenteric lymph nodes



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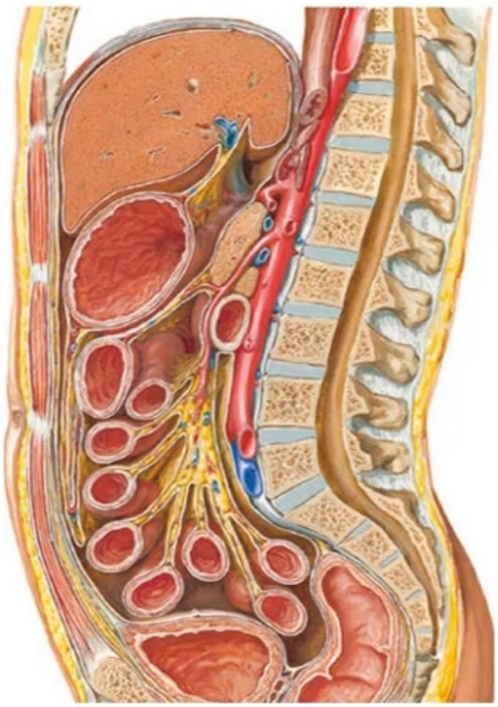
The Peritoneum

- Definition
- Organization: 2 layers
- Peritoneal Folds
- Function
- Blood & Nerve Supply
- Peritoneal Cavity
- Peritoneal Recesses



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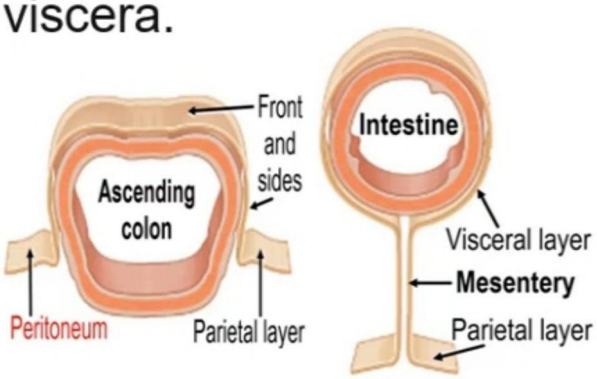
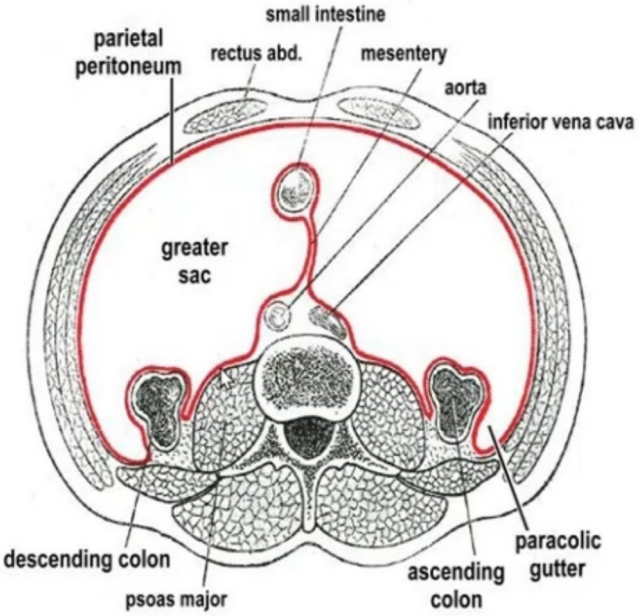
PERITONEUM

Definition:

It is a **serous membrane** lining the abdominal wall and surrounding the viscera.





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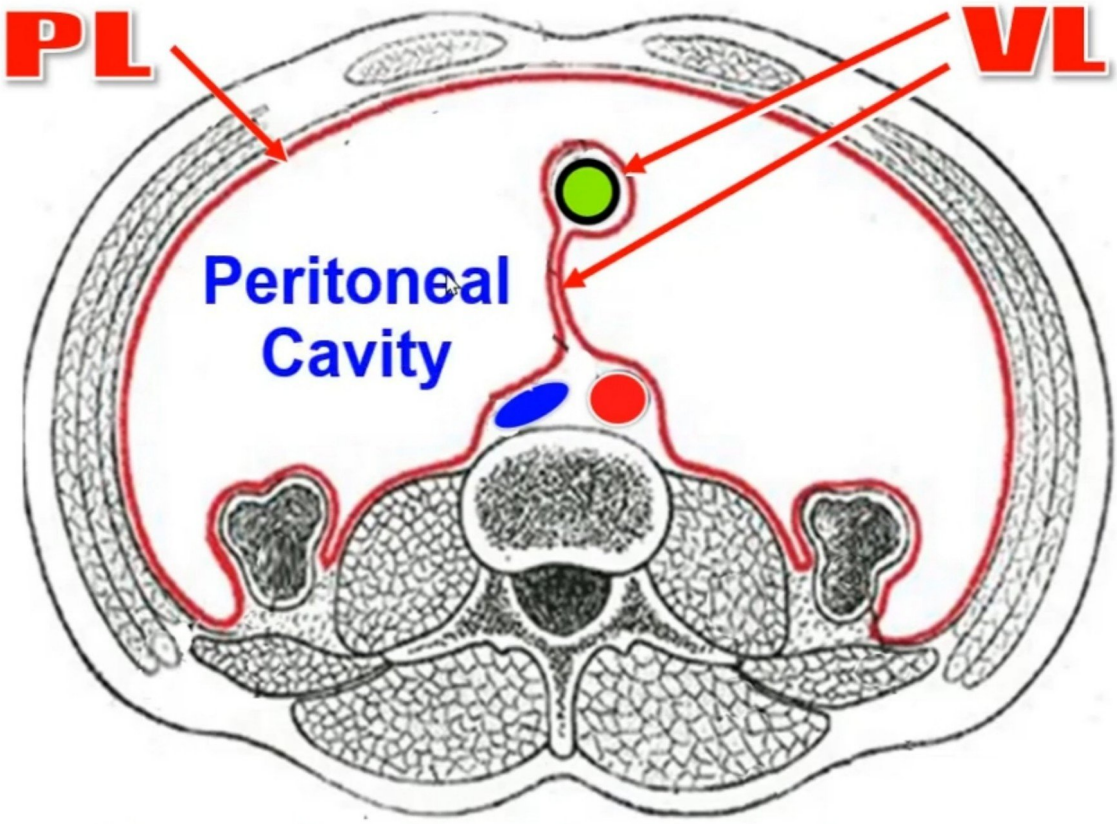
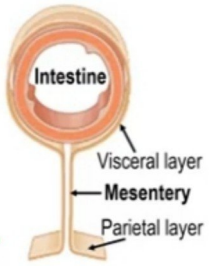


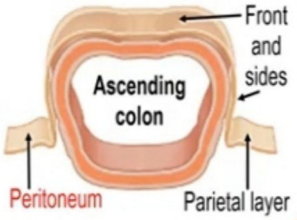
Organization of the Peritoneum

PERITONEAL FOLDS

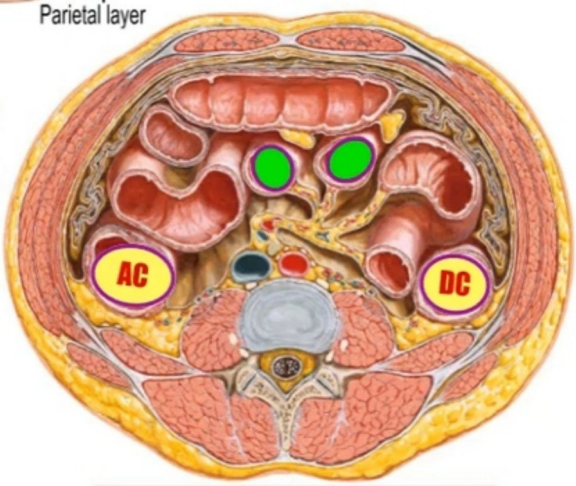
FORMATION:



NAMES:



1. **Omentum:** stomach
   - **a.** Greater omentum
   - **b.** Lesser omentum
2. **Mesentery:** small intestine
3. **Mesocolon:** large intestine
4. **Ligaments:** liver & spleen
   - **a.** Falciform ligament
   - **b.** Coronary & triangular lig.
   - **c.** Gastrosplenic ligament
   - **d.** Lienorenal ligament



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5 Peritoneal Recesses

These are peritoneal spaces surronding some organs.

1	• Lesser Sac (Omental Bursa)
2	• 4 Paracolic Gutters (2 Rt & 2 Lt)
3	• 3 Duodenal Fossae
4	• 3 Cecal Recesses
5	• 4 Subphrenic Spaces (2 ant & 2 post)

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BOUNDARIES

LESSER SAC

Anterior Wall: 4

1. Caudate lobe of liver
2. Lesser omentum
3. Stomach
4. Ant 2 layers of greater omentum

Posterior Wall: 4

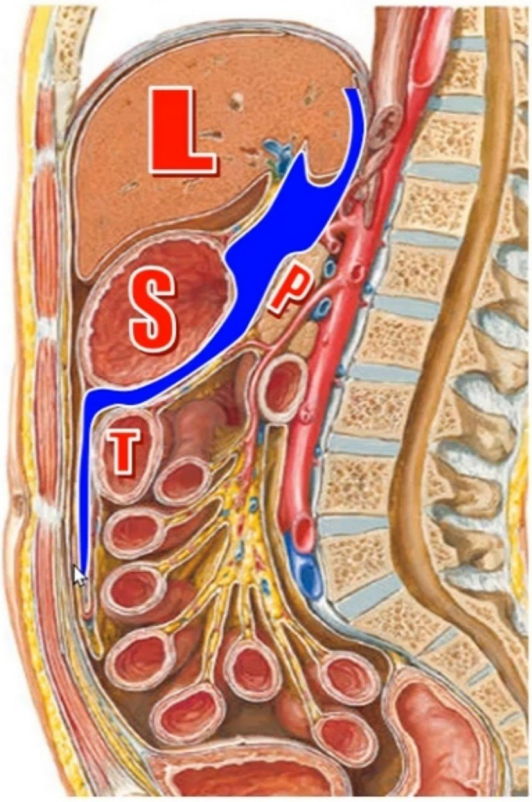
1. Post 2 layers of greater omentum
2. Transverse colon
3. Transverse mesocolon
4. Peritoneum covering stomach bed

Roof:

Peritoneum lining the diaphragm

Floor:

Fusin of the anterior 2 layers & post 2 layers of the greater omentum



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BOUNDARIES OF THE LESSER SAC

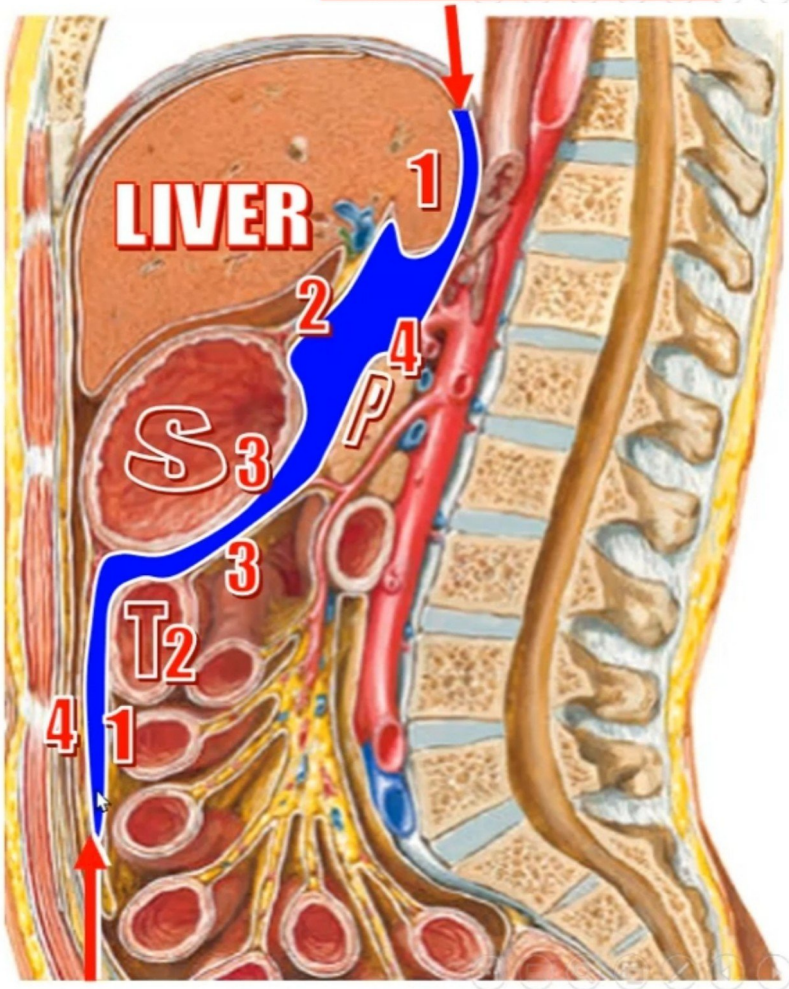
ANTERIOR WALL

POSTERIOR WALL

ROOF

FLOOR

3 Recesses



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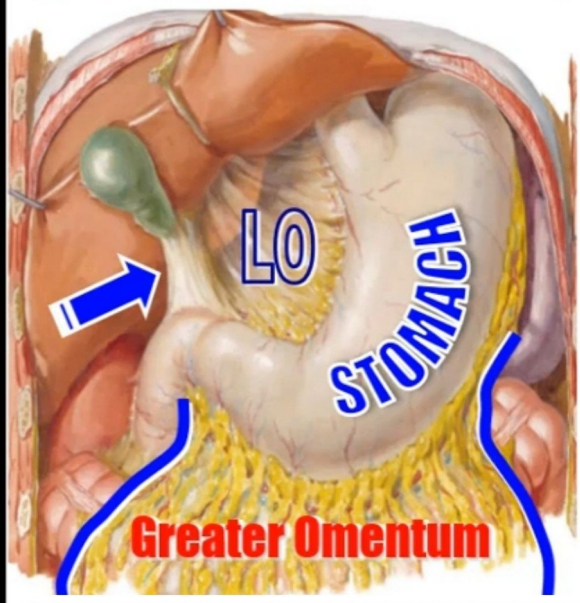
BOUNDARIES OF THE LESSER SAC

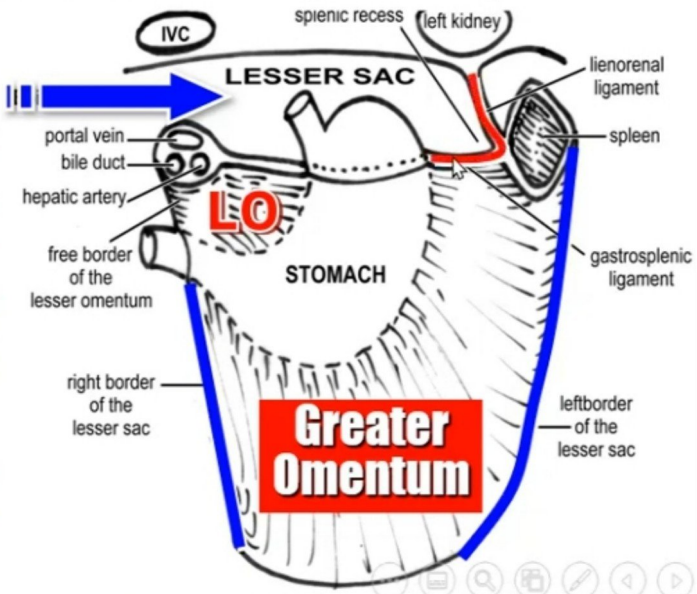
Right Border:

1. **Right border** of the greater omentum
2. **Epiploic foramen** (opening of the lesser sac)

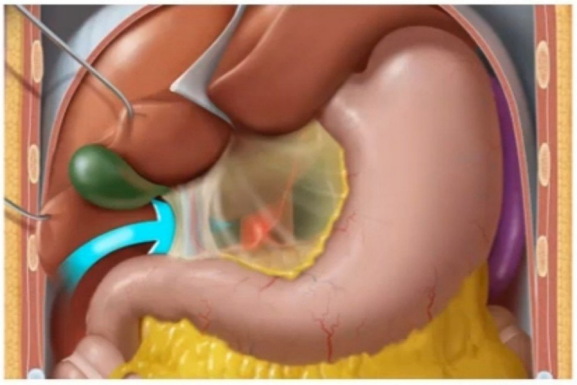
Left Border:

1. **Left border** of the greater omentum
2. **Hilum of the spleen:** angle between GS Lig & LR Ligamnt





Epiploic Foramen of Winslow



Boundaries

Anteriorly:

Free margin of the lesser omentum **containing:**

1. **Bile duct:** ant & to the right
2. **Hepatic art:** ant & to the left
3. **Portal vein:** behind both

Posteriorly:

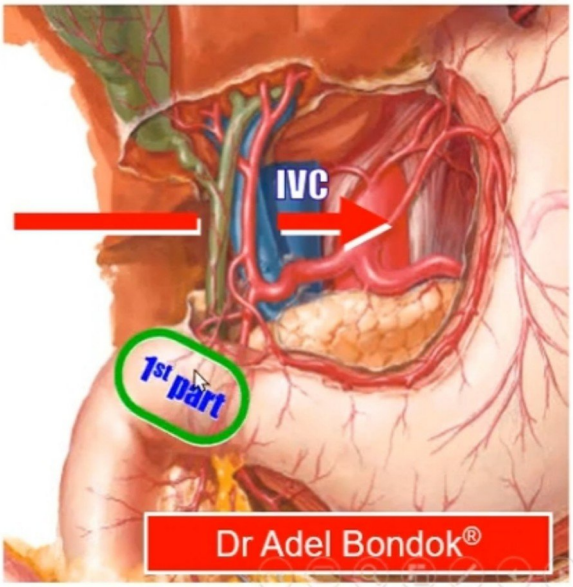
Inferior vena cava

Superiorly:

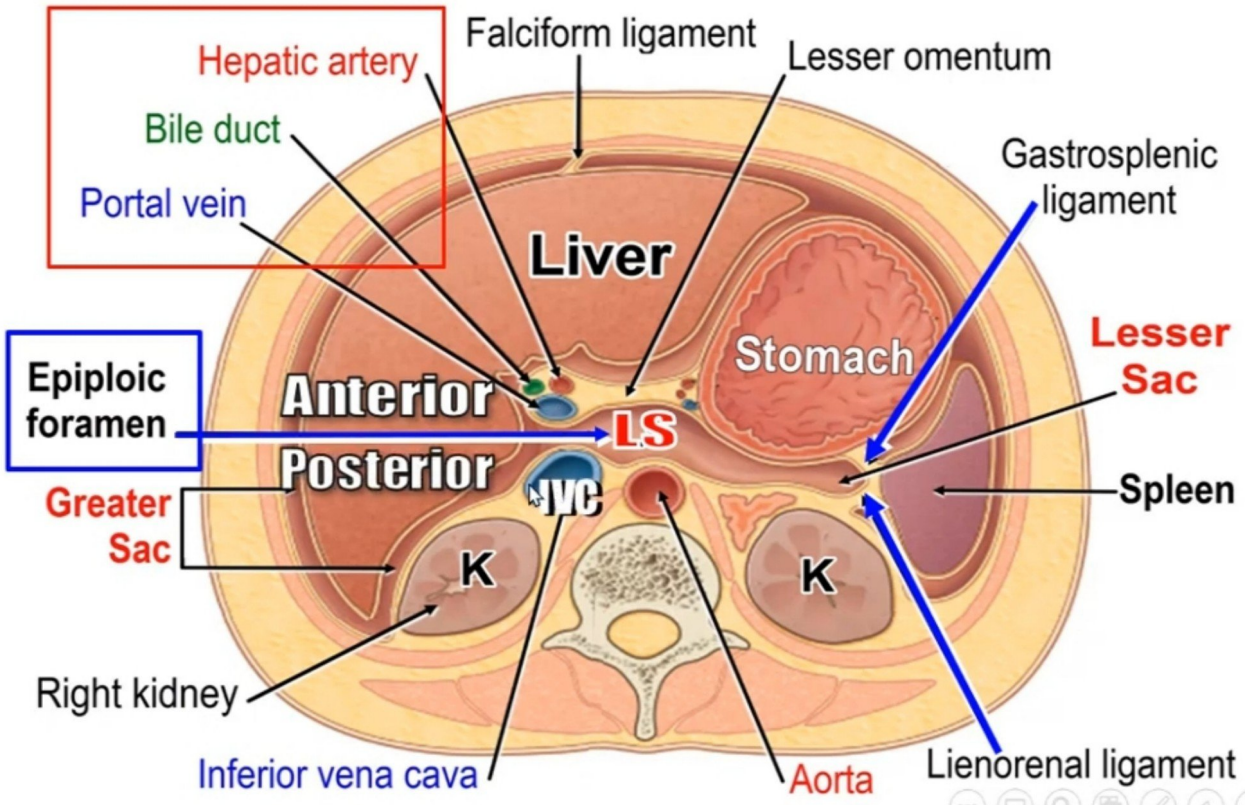
Caudate process of caudate lobe of the liver

Inferiorly:

1st part of the duodenum

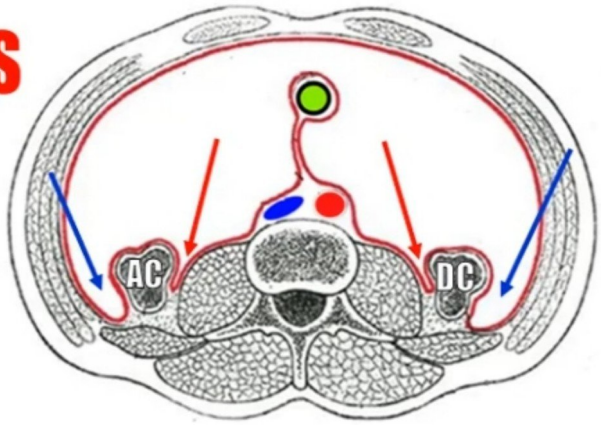


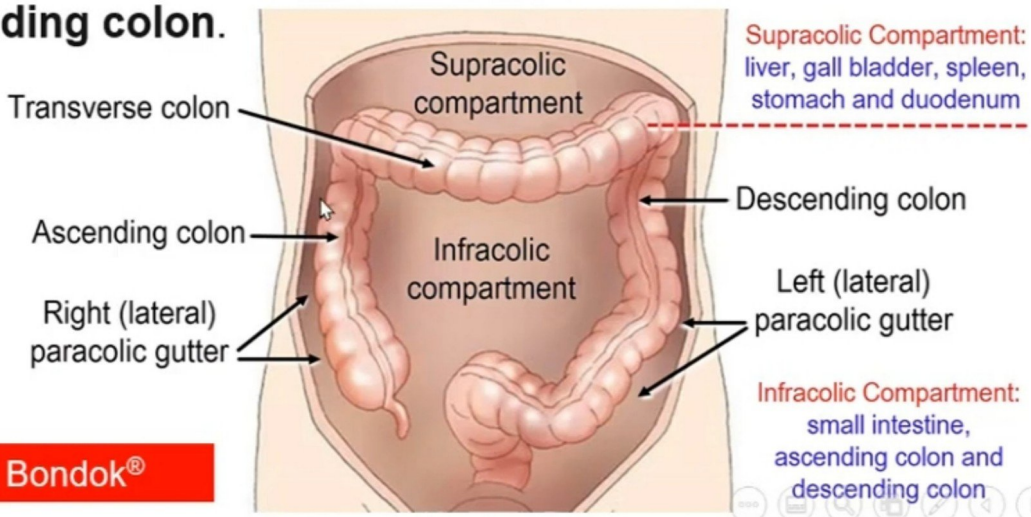
Epiploic Foramen of Winslow



4 Paracolic Gutters

1. 2 Right: **medial** and **lateral**. On each side of the **ascending colon**.
2. 2 Left: **medial** and **lateral**. On each side of the **descending colon**.





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3 Cecal Recesses

1. **Superior** ileocecal recess (above the ileum).
2. **Inferior** ileocecal recess (below the ileum).
3. **Retrocecal recess:** usually contains the appendix

Clinical importance: are sites of **internal hernia**, which can lead to **strangulation**.

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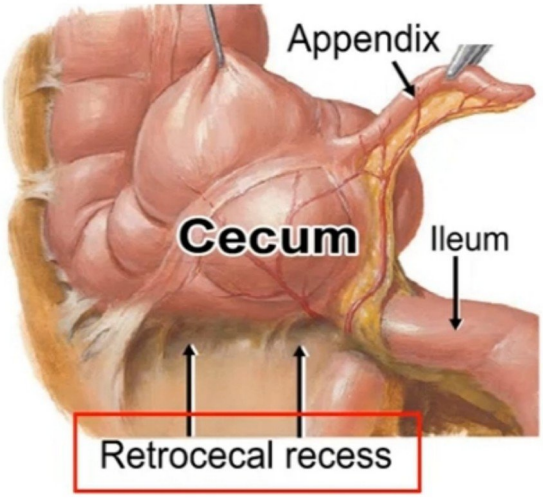

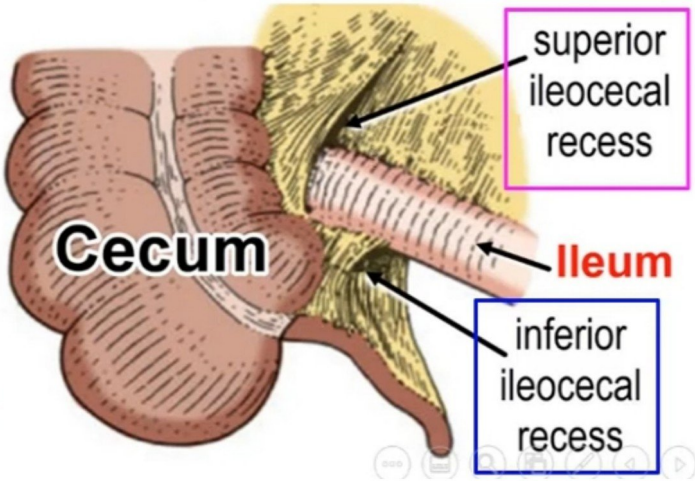

3 Duodenal Fossae

They are peritoneal **spaces** surrounding the **4th part** of the **duodenum:**

1. **Superior** duodenal fossa
2. **Inferior** duodenal fossa
3. **Paraduodenal** (left) fossa related to inf mesenteric v

Clinical importance:

coils of small intestine may enter any **recess** and form **internal hernia** which can lead to **strangulation**.

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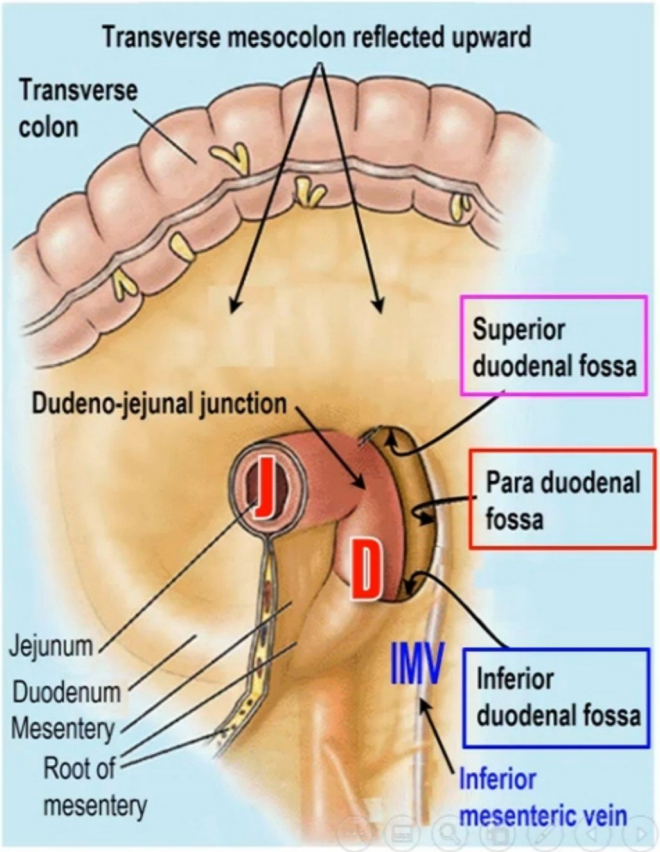


4 Subphrenic Spaces

The **subphrenic spaces** are potential spaces between the diaphragm & liver.

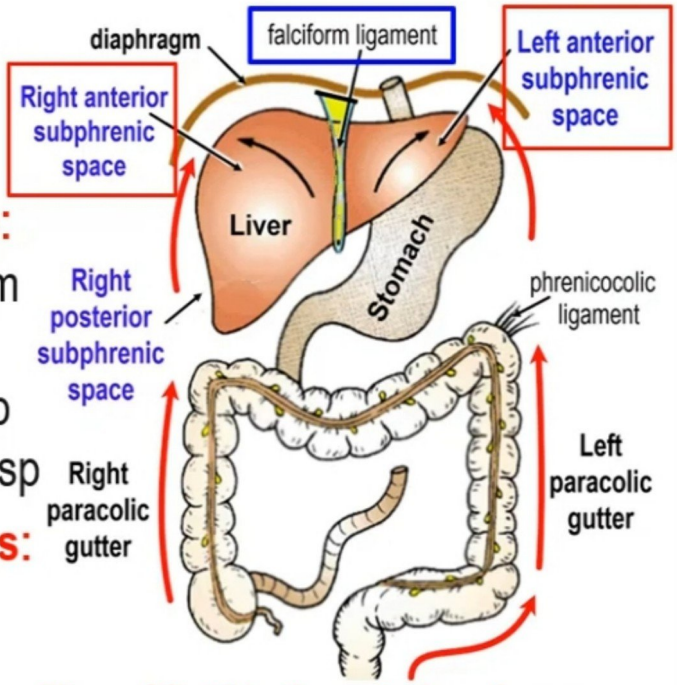
2 Anterior subphrenic spaces:

are **separated by** the falciform ligament of the liver:

1. **Left** anterior subphrenic sp
2. **Right** anterior subphrenic sp

2 Posterior subphrenic spaces:

1. **Left posterior:**
   is the lesser sac
2. **Right posterior:**
   hepatorenal space (recess)



Flow of fluid to the subphrenic spaces

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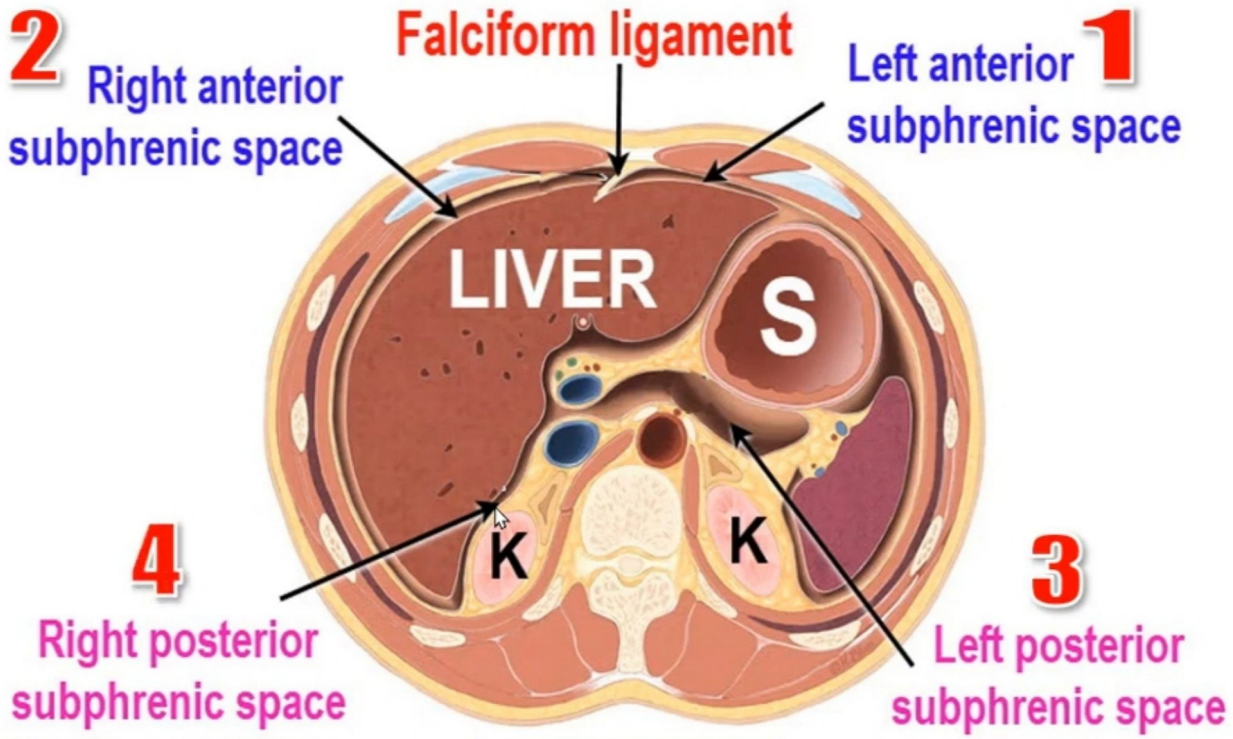

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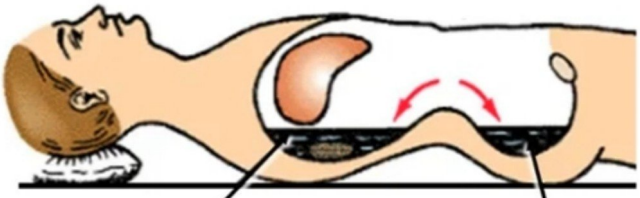
4 Subphrenic Spaces

Subphrenic Abscess

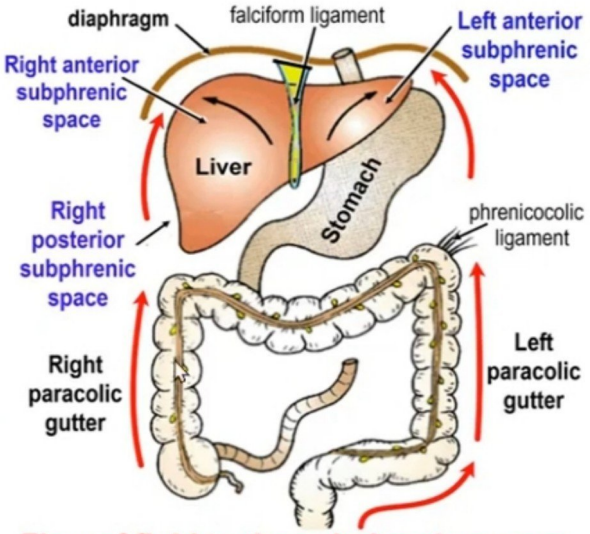
Subphrenic abscess is accumulation of pus in the subphrenic space between the diaphragm and liver.

It is more common on the **right side due to** increased frequency of appendicitis & perforated duodenal ulcer.

Pus ascends through the right paracolic gutter to the subphrenic space.



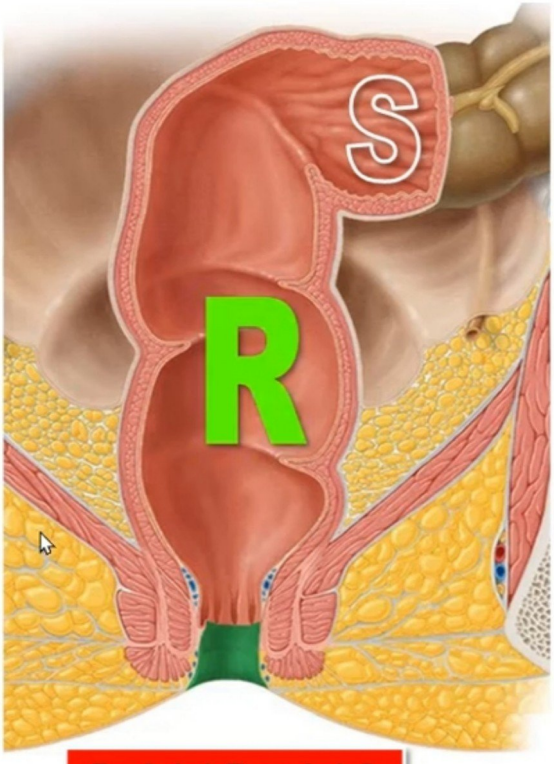
First fluid collection in the peritoneal cavity in the supine position



Flow of fluid to the subphrenic spaces

The Rectum

- Length & Position
- Extent
- Flexures & Valves
- Peritoneal Covering
- Relations
- Blood / N Supply
- Lymph Drainage



Dr Adel Bondok®

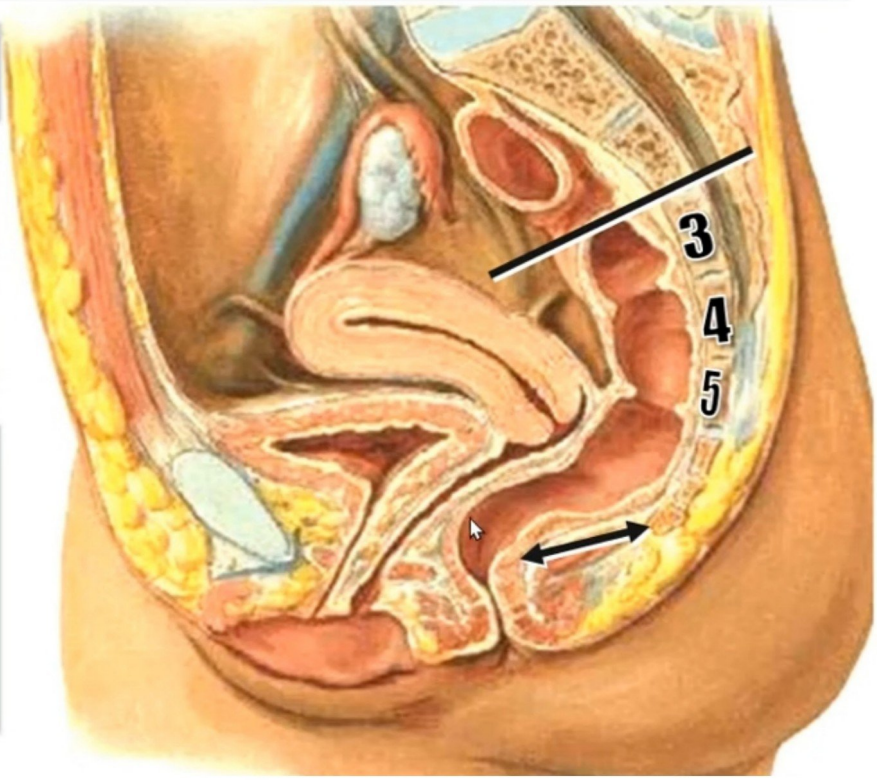
RECTUM

LENGTH

POSITION

EXTENT

FLEXURES:
2 Ant-Post F
3 Lateral F

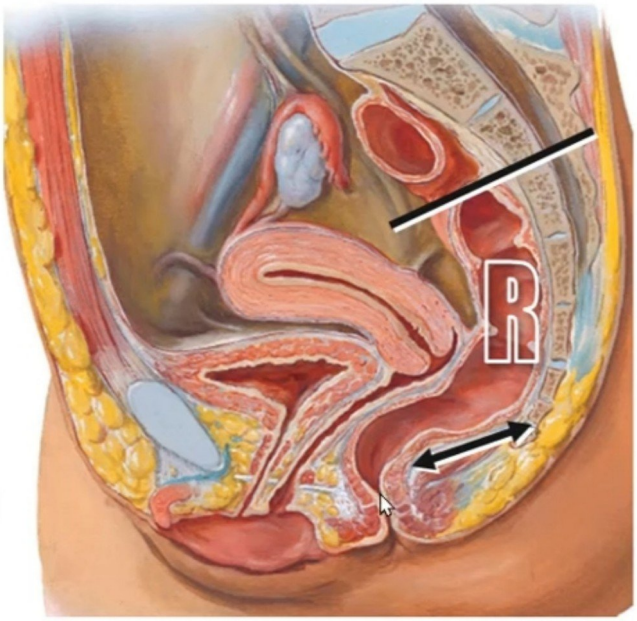


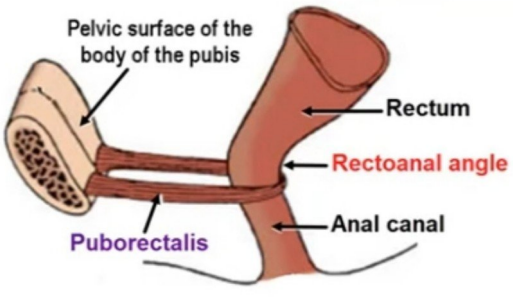
Length: 5 inches

Position: lower & posterior part of the pelvis

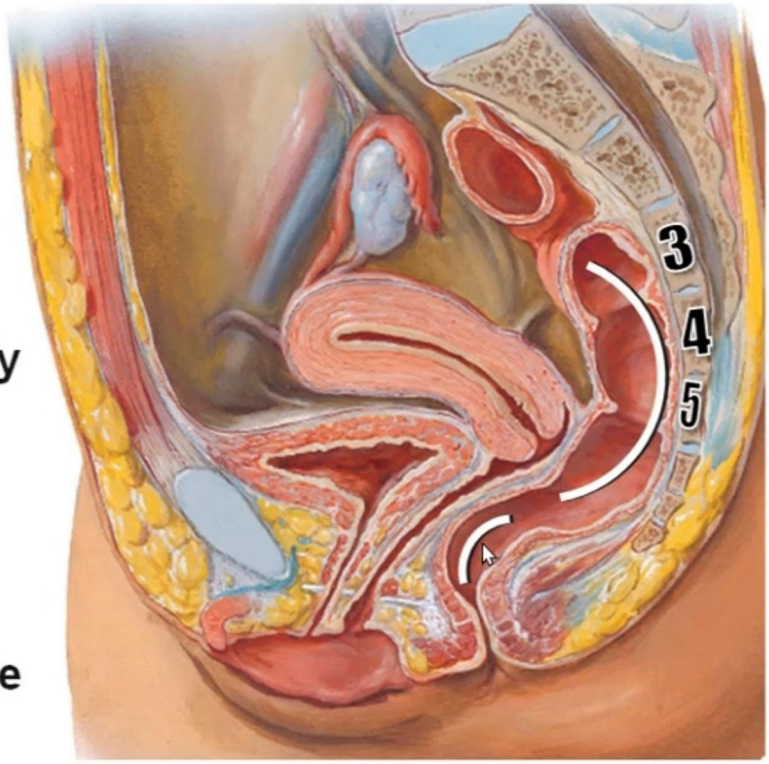
Extent:

1. **Begins** opposite the 3rd piece of sacrum as the continuation of the sigmoid colon
2. **Ends** at the rectoanal angle
   - 1" below & in front of the tip of the coccyx
   - Continues as the anal canal





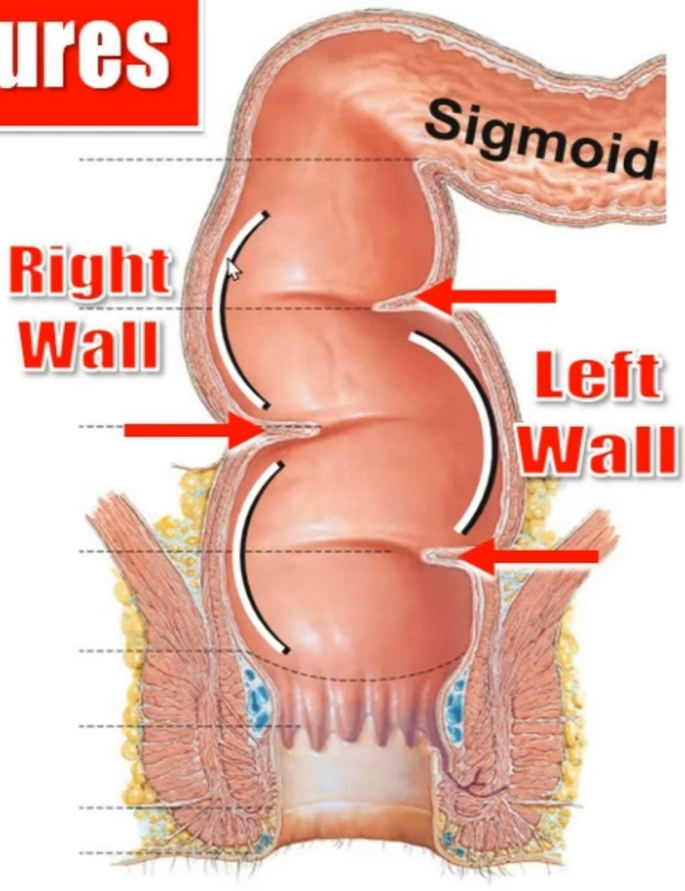
2 Anteroposterior Flexures



a. Sacral Flexure:
concave forward.
Follows the concavity of the sacrum

b. Perineal Flexure:
concave backward.
At the rectoanal angle

3 Lateral Flexures



a. Upper & Lower:
concave to the left

b. Middle:
concave to the right

Opposite each concavity there is a rectal valve:

1. Superior rectal valve
2. Middle rectal valve
3. Inferior rectal valve

3 Lateral Flexures

a. Upper & Lower:
concave to the left

b. Middle:
concave to the right

Opposite each concavity there is a rectal valve:

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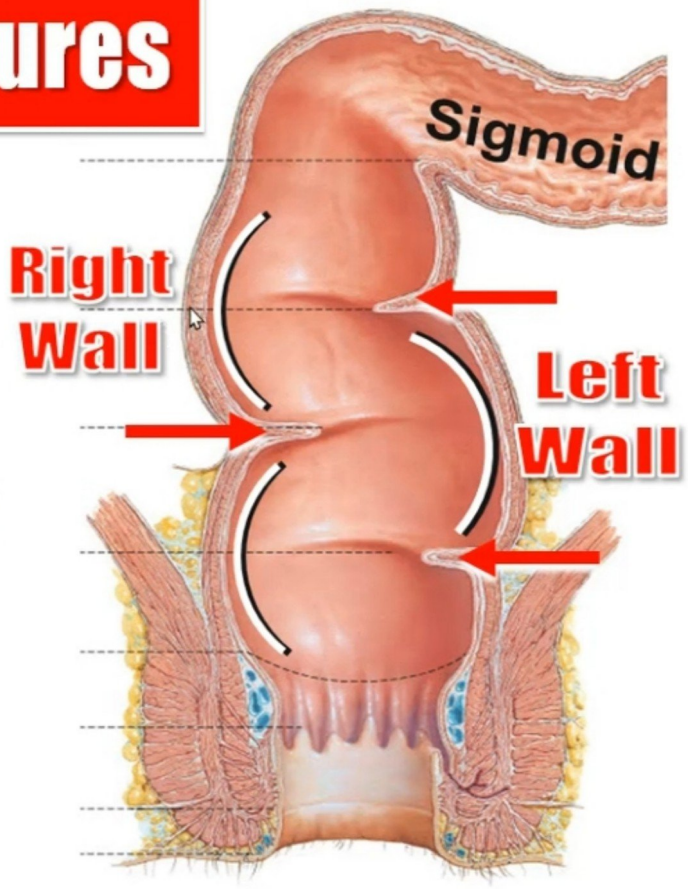
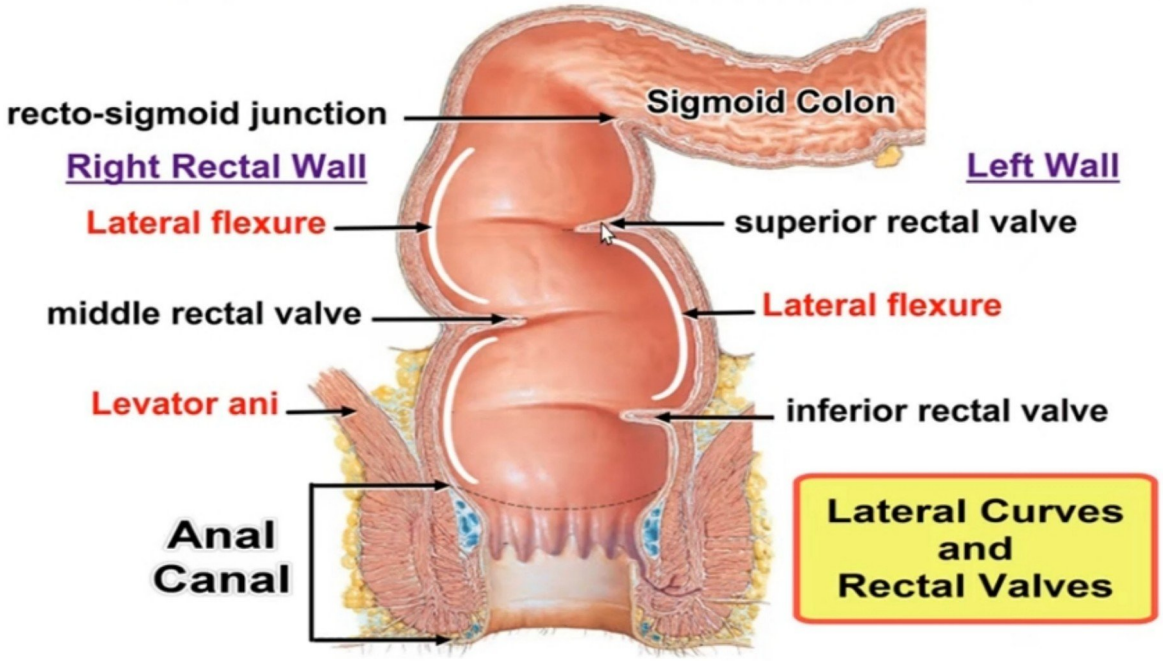


Importance of the Rectal Valves:

1. They support the feces as they descend in the rectum
2. In sigmoidoscopy, be aware of the 3 rectal valves:
   2 in the left rectal wall and one on the right rectal wall.



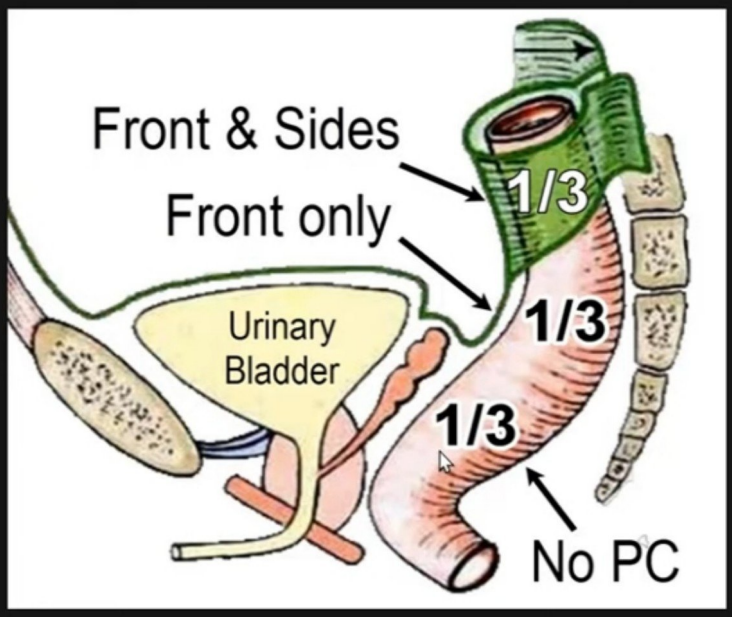
PERITONEAL COVERING

Upper 1/3 — R

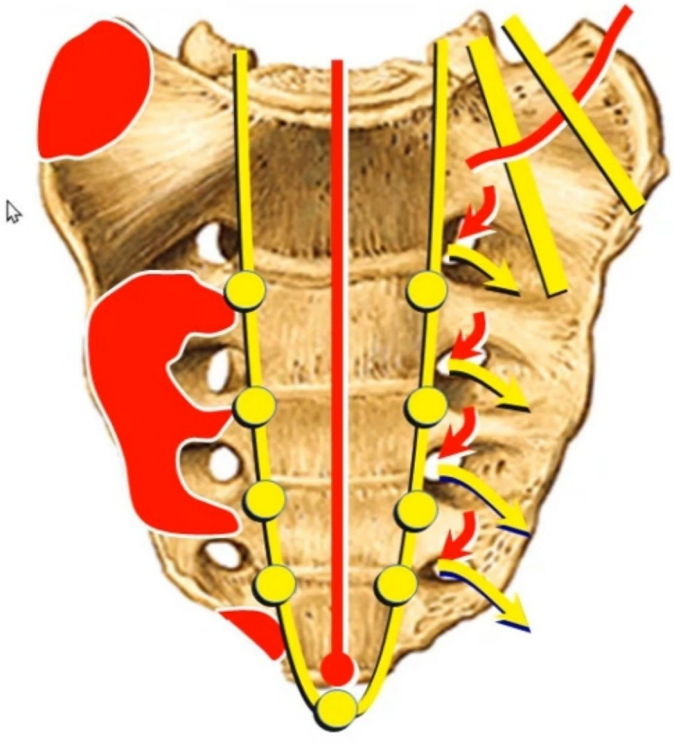
Middle 1/3 — R

XXX

Lower 1/3 — R



Posterior Relation



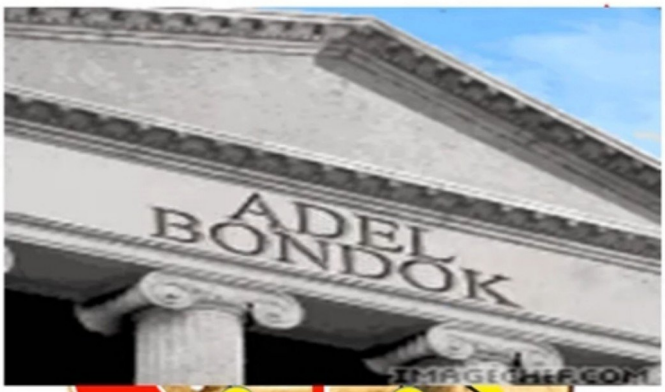
Posterior Relation

3 in the MIDLINE:
1. Lower part of scarum
2. Coccyx
3. Anococcygeal body

3 MUSCLES:
1. Piriformis
2. Coccygeus
3. Levator ani

3 VESSELS:
1. Median sacral
2. Lateral sacral
3. Superior rectal

3 NERVES:
1. Lower sacral nerves
2. Coocygeal nerve
3. Sympathetic chain



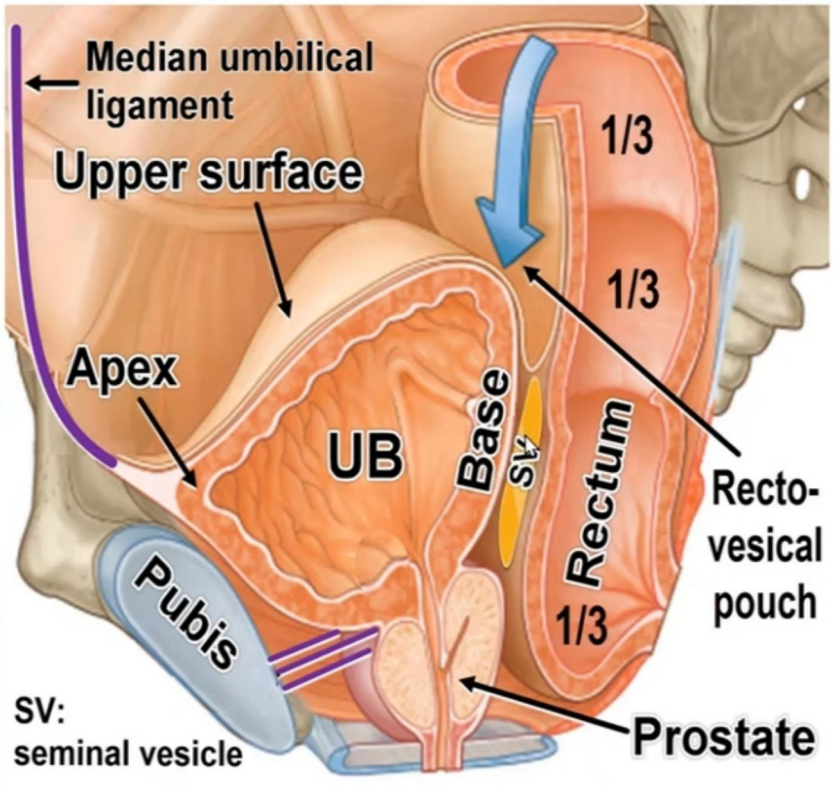
Anterior Relation In Male

UPPER 2/3

Recto-vesical pouch containing small intestine & sigmoid colon

LOWER 1/3

Base of the urinary bladder, seminal vesicles & prostate



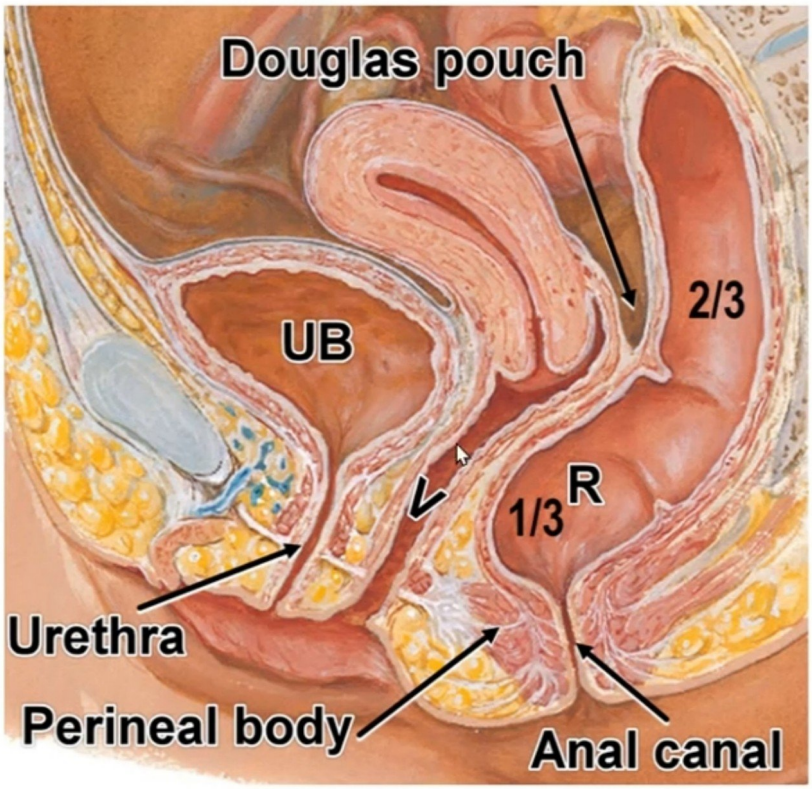
Anterior Relation In Female

UPPER 2/3

Recto-uterine pouch (Douglas) containing small intestine and sigmoid colon

LOWER 1/3

Vagina



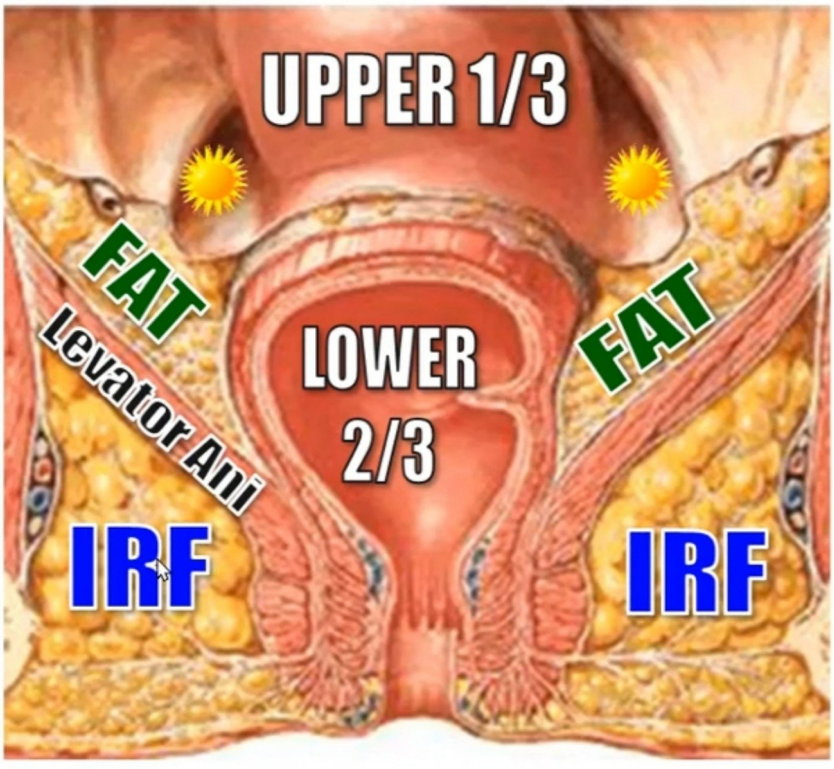
Lateral Relation

UPPER 1/3

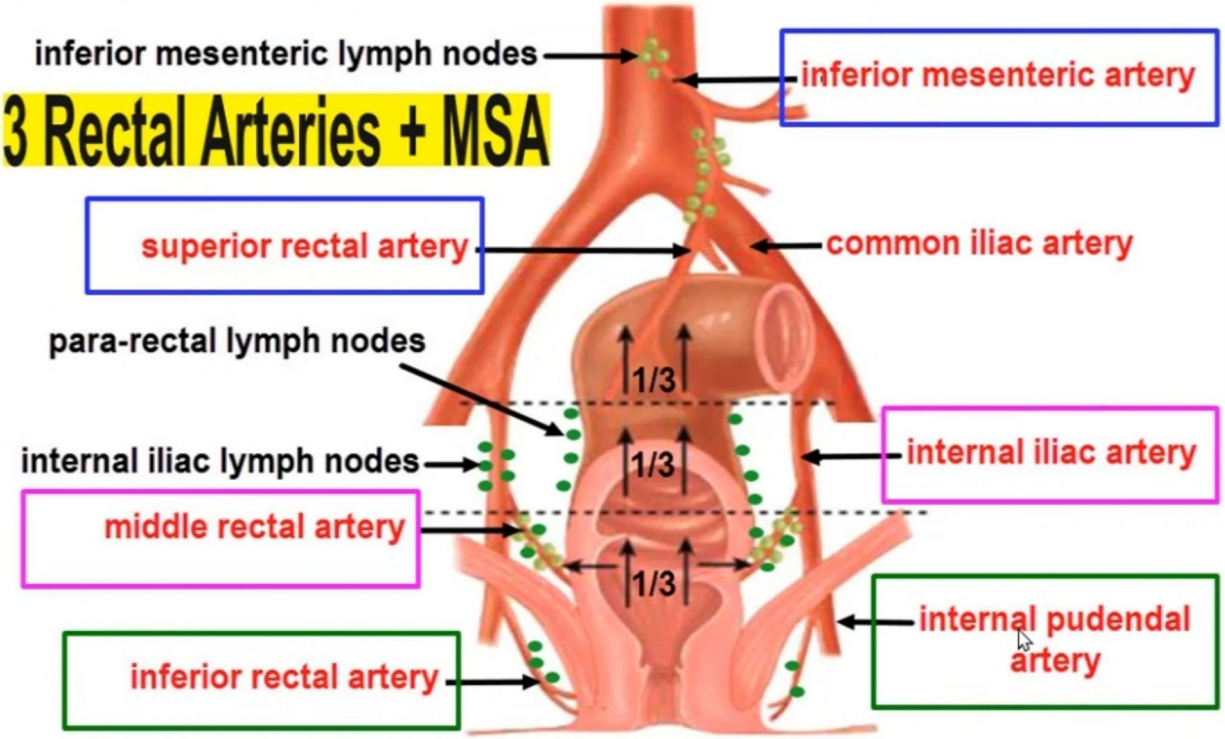
Pararectal fossa

LOWER 2/3

Fat over levator ani and ischiorectal fossa



Blood Supply: 4 Art & 4 V



Superior Rectal Artery

Continuation of inferior mesenteric a
It is the **main artery** of the rectum.
It **supplies** the mucous membrane

Middle Rectal Artery

From the ant div of the internal iliac a
It **supplies mainly** the muscle layer

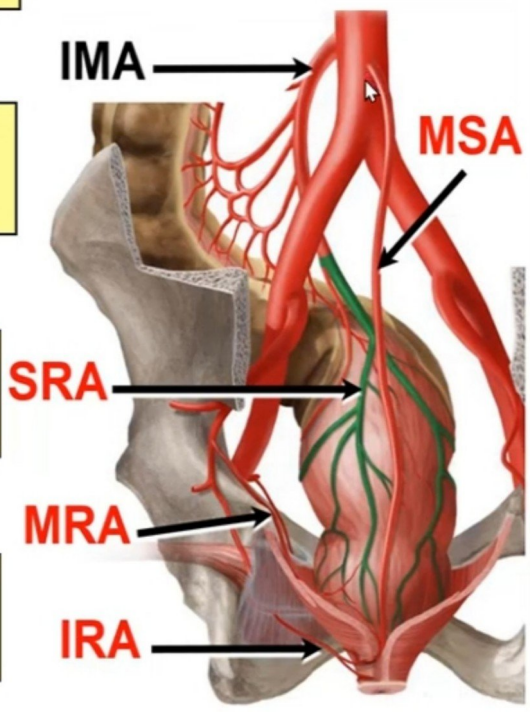
Inferior Rectal Artery

From the internal pudendal artery
Supplies the lower end & anal canal

Median Sacral Artery

From the back of the aorta.
Supplies the posterior wall.

4 Arteries



Nerve Supply of the Rectum

By the pelvic plexus
(inferior hypogastric plexus)
on each side of the rectum

Sympathetic Fibers:

From the lumbar splanchnic nerves (**L1 & L2**) through the superior hypogastric plexus

Parasympathetic Fibers:

From the pelvic splanchnic nerves (**S2, 3 & 4**)

LYMPH DRAINAGE

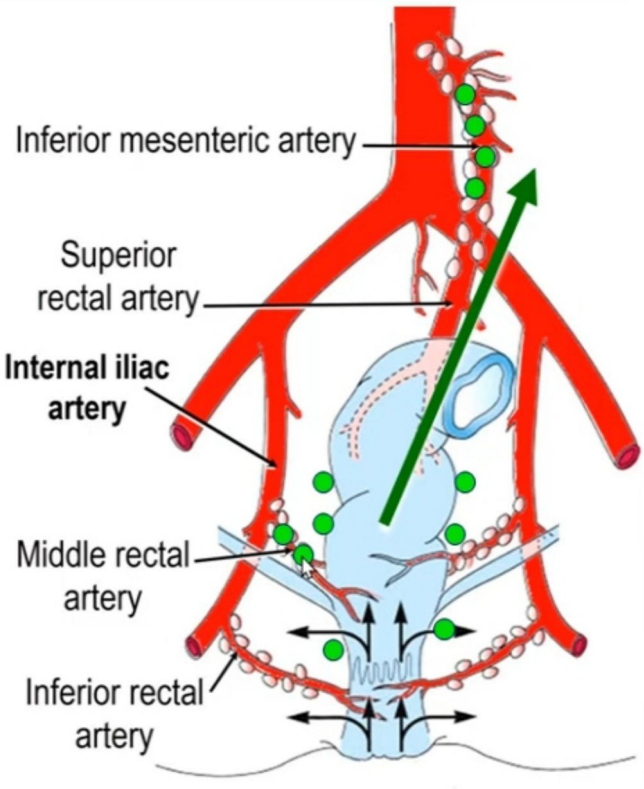
To the Pararectal Lymph Nodes

UPPER 2/3:

Along the superior rectal artery to the inferior mesenteric lymph nodes

LOWER 1/3:

Along the middle & inferior rectal arteries to the internal iliac lymph nodes



Rectal Cancer

Rectal cancer spreads along 3 routs:

- **Early route:** along lymphatics to the inferior mesenteric and internal iliac lymph nodes
- **Late route:** along the inferior mesenteric vein to the liver
- **Direct route:** to the surrounding organs

URETER

OBJECTIVES

- Length and Origin
- Course
- Posterior & Anterior Relation
- Arterial Supply & Nerve Supply
- Constrictions
- Lymph Drainage & X-Ray Appearance

Dr Adel Bondok ®