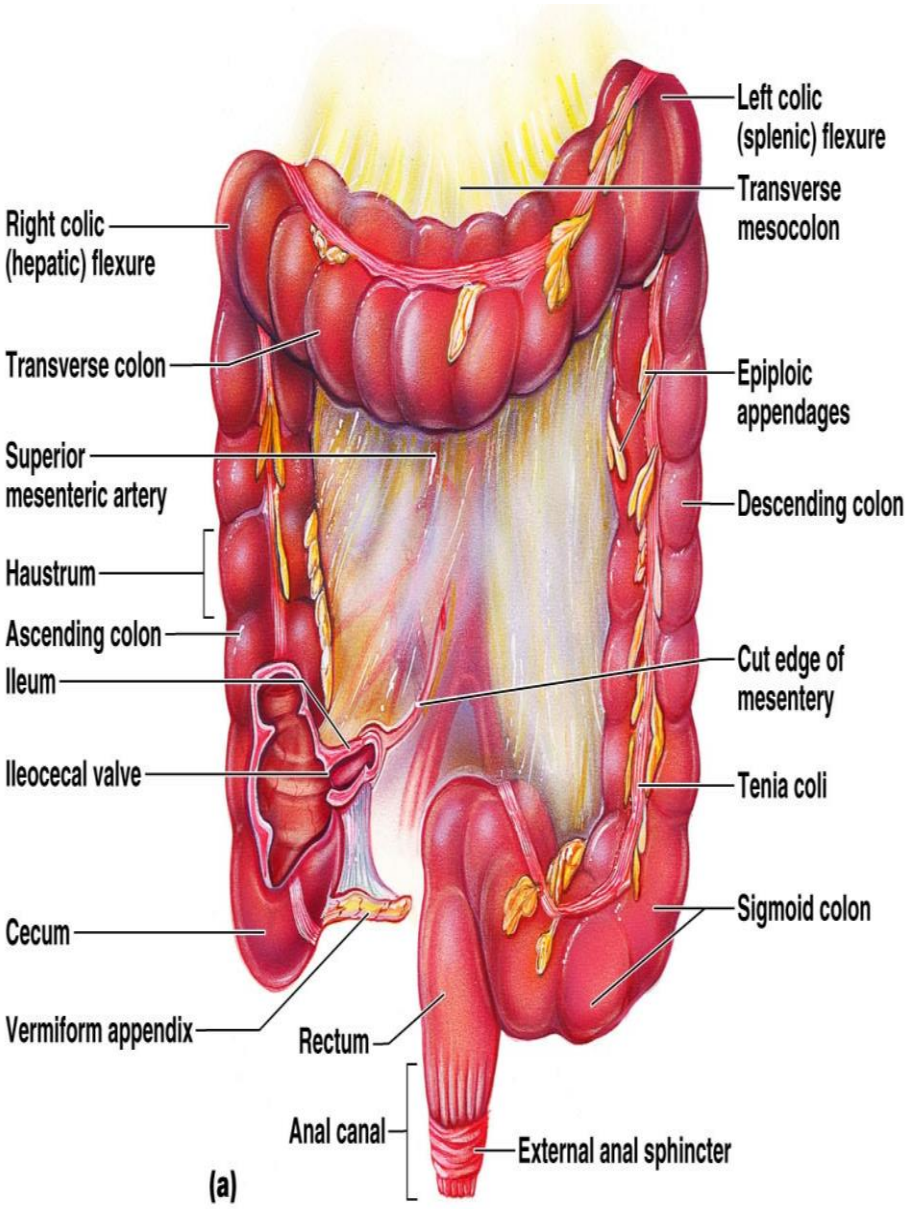
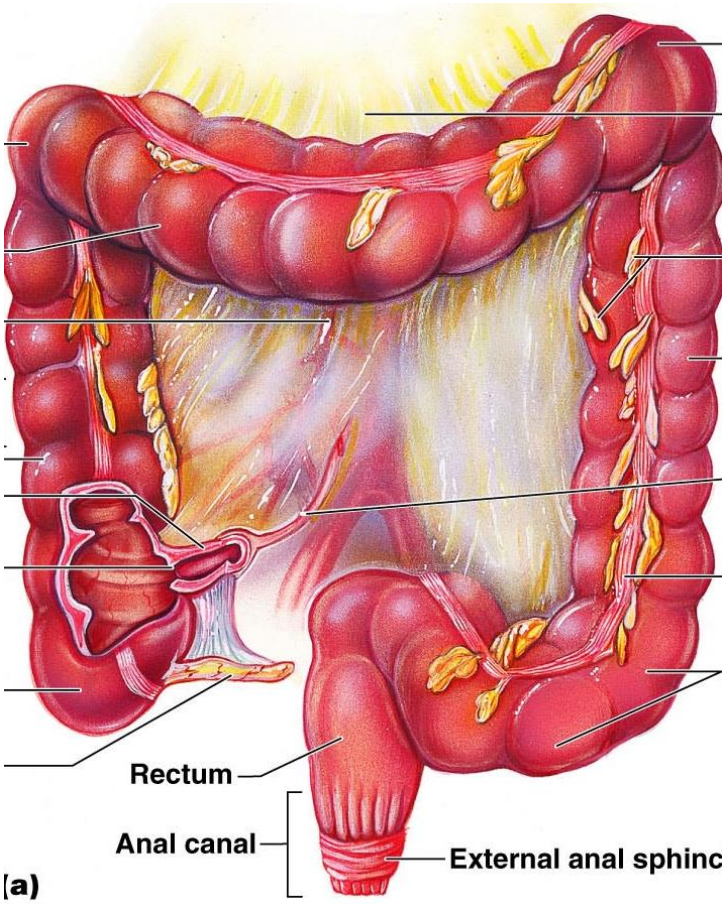
# The Large Intestine

- Starts at the ileocecal junction.
- Ends at the anus.
- Approximately 1.5m long.
- Consists of
  - Cecum
  - Colon
  - Rectum
  - Anal canal
- The ascending, descending colon, and rectum are fixed to the posterior wall of abdominal cavity.
- The cecum and appendix are completely peritoneal



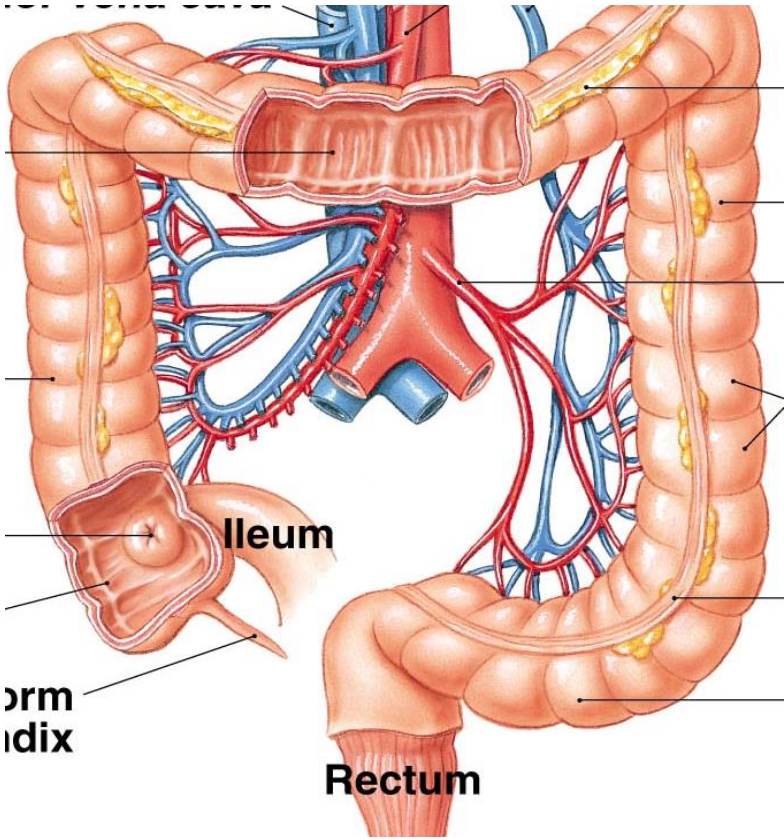
# The Large Intestine (Intestinum Crassum)

- The teniae coli : are three bands of longitudinal muscle on the surface of the large intestine.
- Remember, the large intestine does not have a continuous layer of longitudinal muscle - instead, it has teniae coli.
- These three bands meet at the appendix, which is the terminal portion of the cecum.
- Appendices epiploicae :
  - Bodies of fat enclosed by peritoneum, hanging from the teniae



# Structure of large intestine

- 4 layers
- Peritoneum – peritoneal layer – adventitia
- Longitudinal muscles modified into three bands called taeniae coli.
- These bands , surround the rectum completely and anal canal.
  The circular fibres of muscle are thickened to form the anal sphincter.
- Mucosa : contains mucous glands
  On the peritoneal surface fat containing peritoneal pouches called appendices epiploicae.

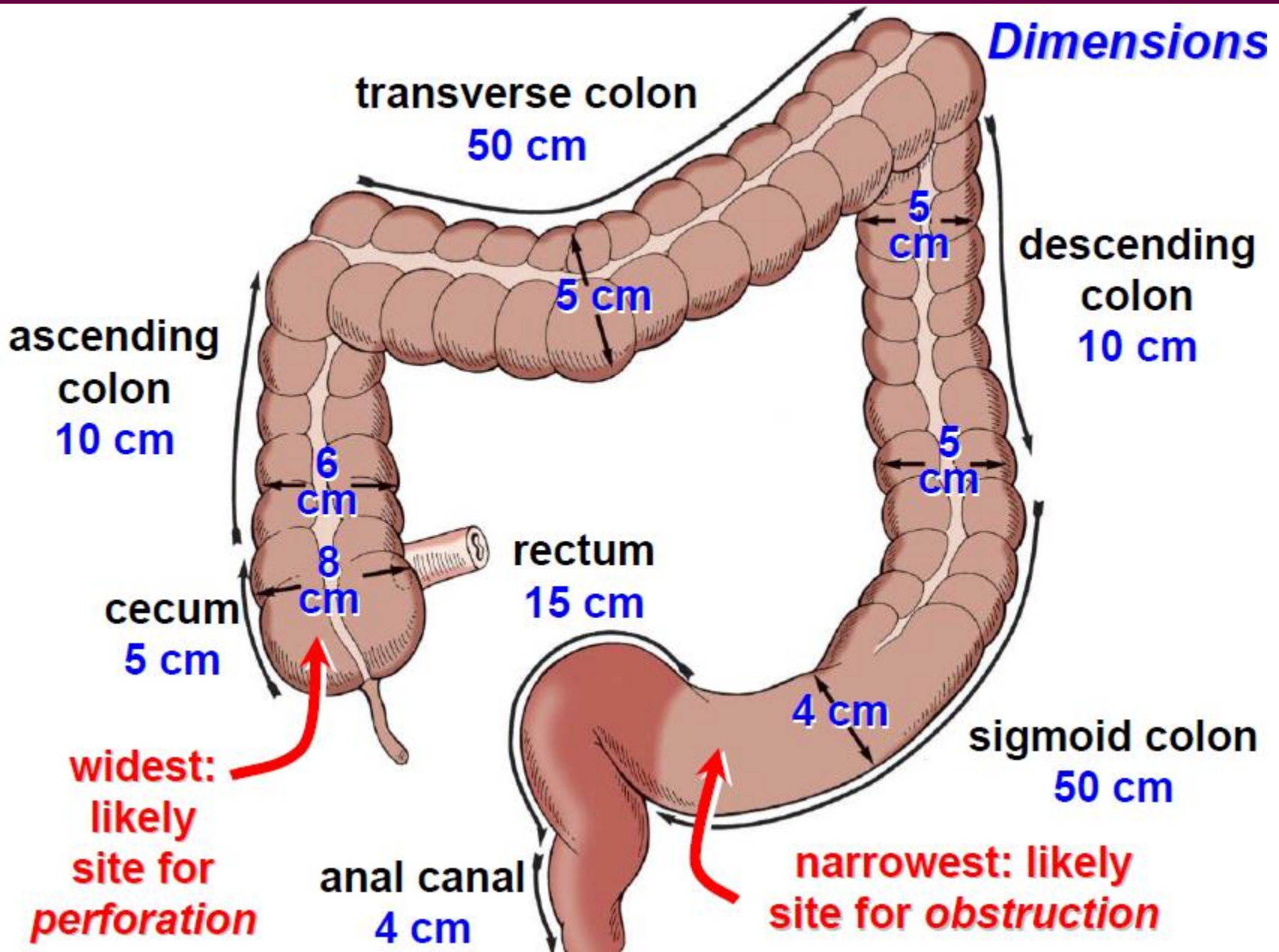


# LARGE INTESTINE

**PARTS:**

1. Cecum
2. Appendix
3. Ascending colon
4. Transverse colon
5. Descending colon
6. Sigmoid (pelvic) colon
7. Rectum
8. Anal canal
9. N.B.: **Parts of large intestine in abdomen:** from 1 to 5

# The Colon


Dimensions
transverse colon
50 cm
5 cm
5 cm
descending colon
10 cm
ascending colon
10 cm
6 cm
5 cm
8 cm
cecum
5 cm
rectum
15 cm
4 cm
sigmoid colon
50 cm
widest: likely site for perforation
anal canal
4 cm
narrowest: likely site for obstruction

# LARGE INTESTINE

## CHARACTERISTICS:

1. **Teniae coli:** 3 longitudinal muscle bands
2. **Sacculations (haustrations):** teniae coli are shorter than large intestine
3. **Appendices epiploicae:** short peritoneal fold filled with fat

- N.B.: characteristics are present in all large intestine EXCEPT: **in rectum & anal canal**

# LARGE INTESTINE

- **Embryological origin:**

1. **From midgut:** cecum, appendix, ascending colon, right 2/3 of transverse colon
2. **From hindgut:** left 1/3 of transverse colon, descending & sigmoid colon, rectum, upper half of anal canal

- **Peritoneal fold:**

1. **Appendix, transverse & sigmoid colon:** have mesentery
2. **Cecum:** completely covered by peritoneum, but has no mesentery
3. **Ascending & descending colon:** covered anteriorly & on the sides
4. **Rectum & anal canal:** discussed later

# LARGE INTESTINE

- **Arterial supply:**

1. **Midgut:** colic branches of **superior mesenteric**
2. **Hindgut: inferior mesenteric**

- **Lymphatic drainage:**

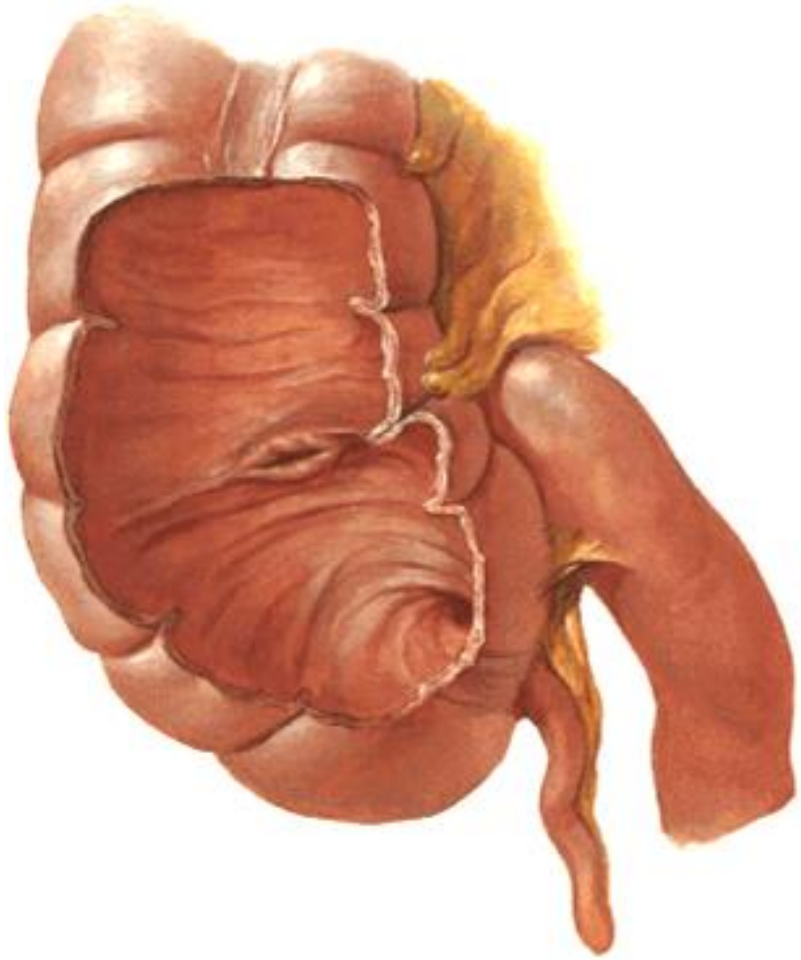
1. **Midgut: superior mesenteric** lymph nodes
2. **Hindgut: inferior mesenteric** lymph nodes

- **Nerve supply:**

1. **Superior mesenteric** plexus: sympathetic & parasympathetic (vagus)
2. **Inferior mesenteric** plexus: sympathetic & parasympathetic (pelvic splanchnic nerves)

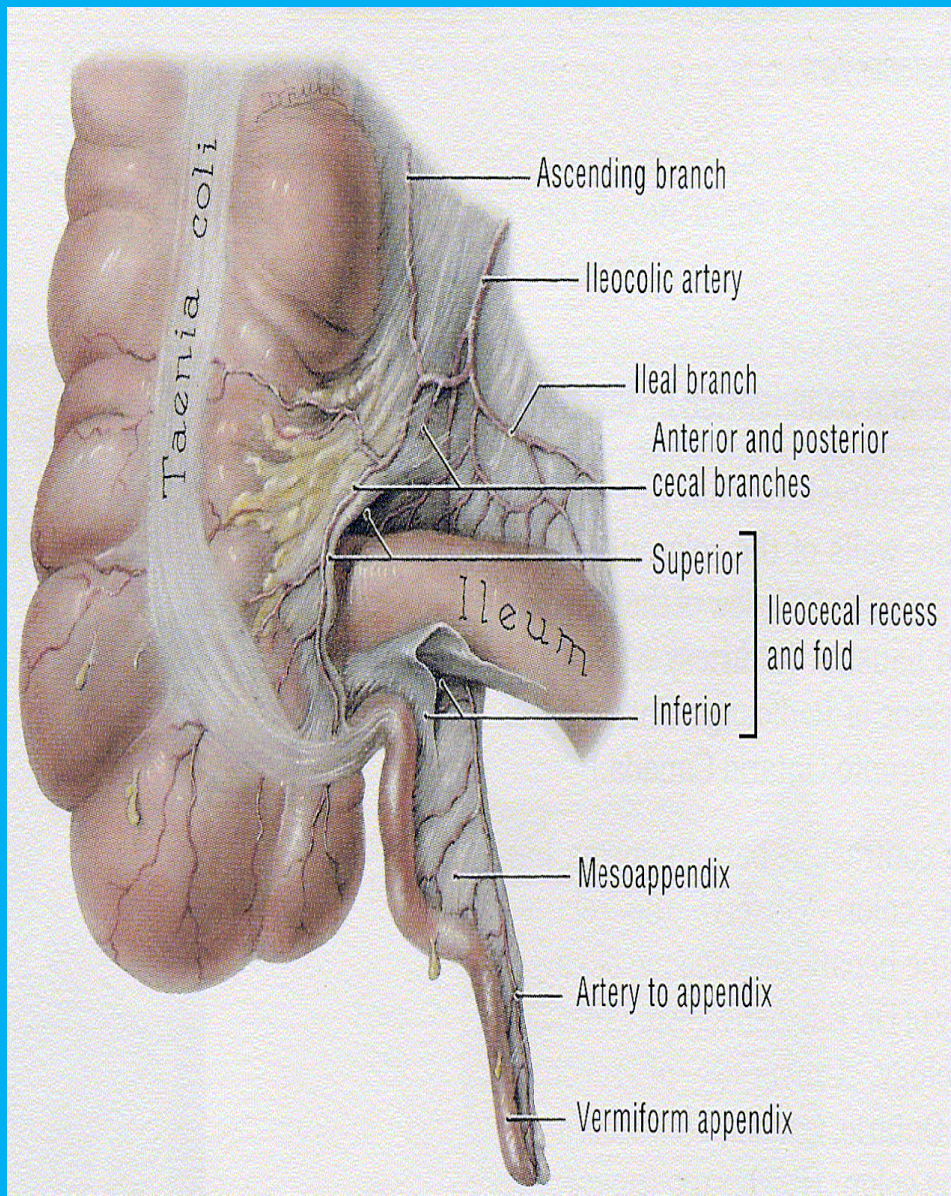
# Gross Anatomy of Large Intestine

- **Caecum**
  - Dilated portion
  - Blind end inferiorly
  - Continuous superiorly as the ascending colon
  - The terminal ileum opens into the large intestine just below the junction of the caecum and ascending colon
  - The opening is guarded by **ileocaecal valve.**
  - The blind end has appendix attached to it .

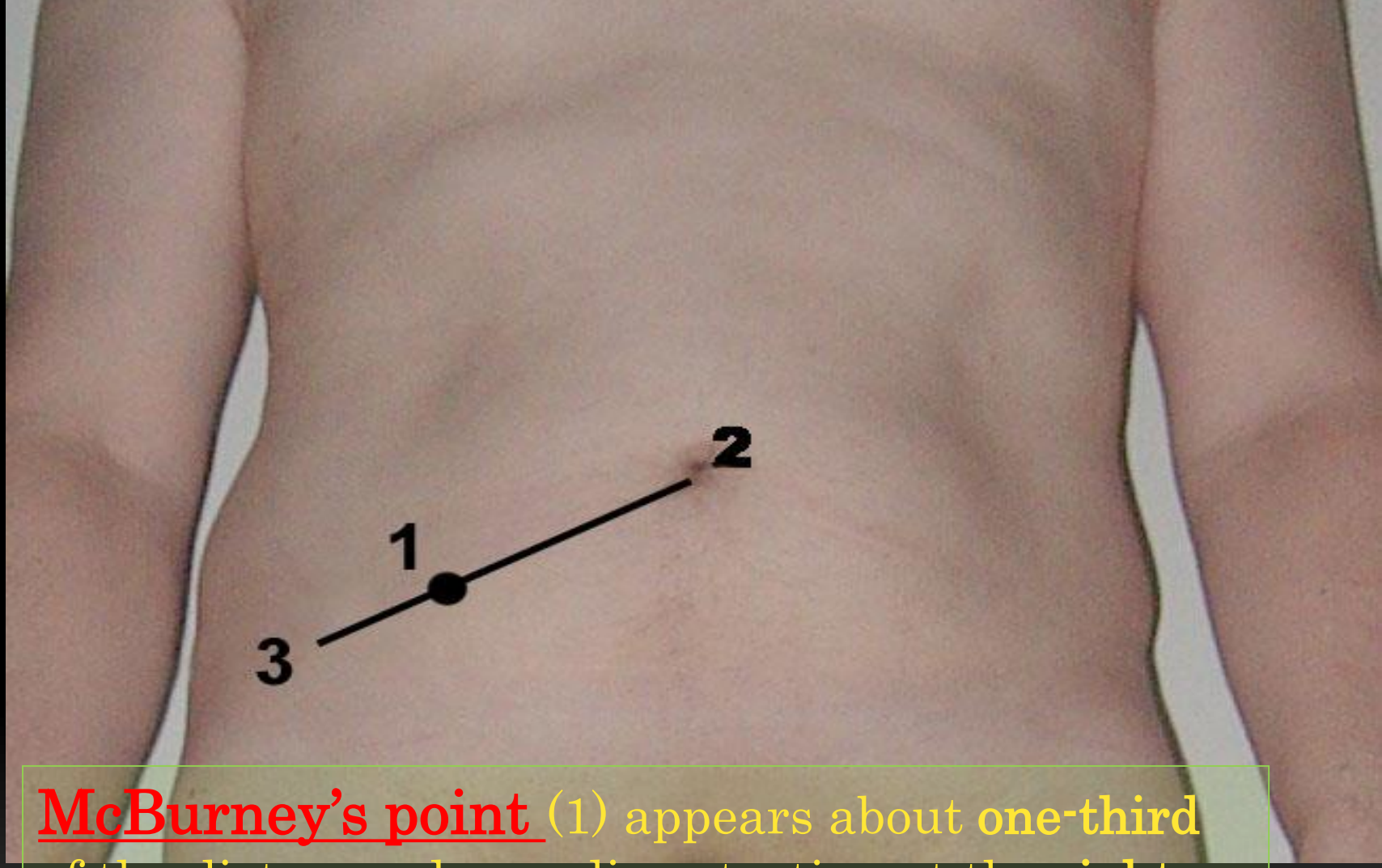


# APPENDIX

- Appendix is a blind intestinal diverticulum (6–10 cm) in length arises from the postero medial aspect of the caecum inferior to the ileocaecal junction origin where it arises from the site at which the three taeniae coli collect
- . The appendix has short Mesentery (The Meso–appendix).



# MCBURNEY'S POINT

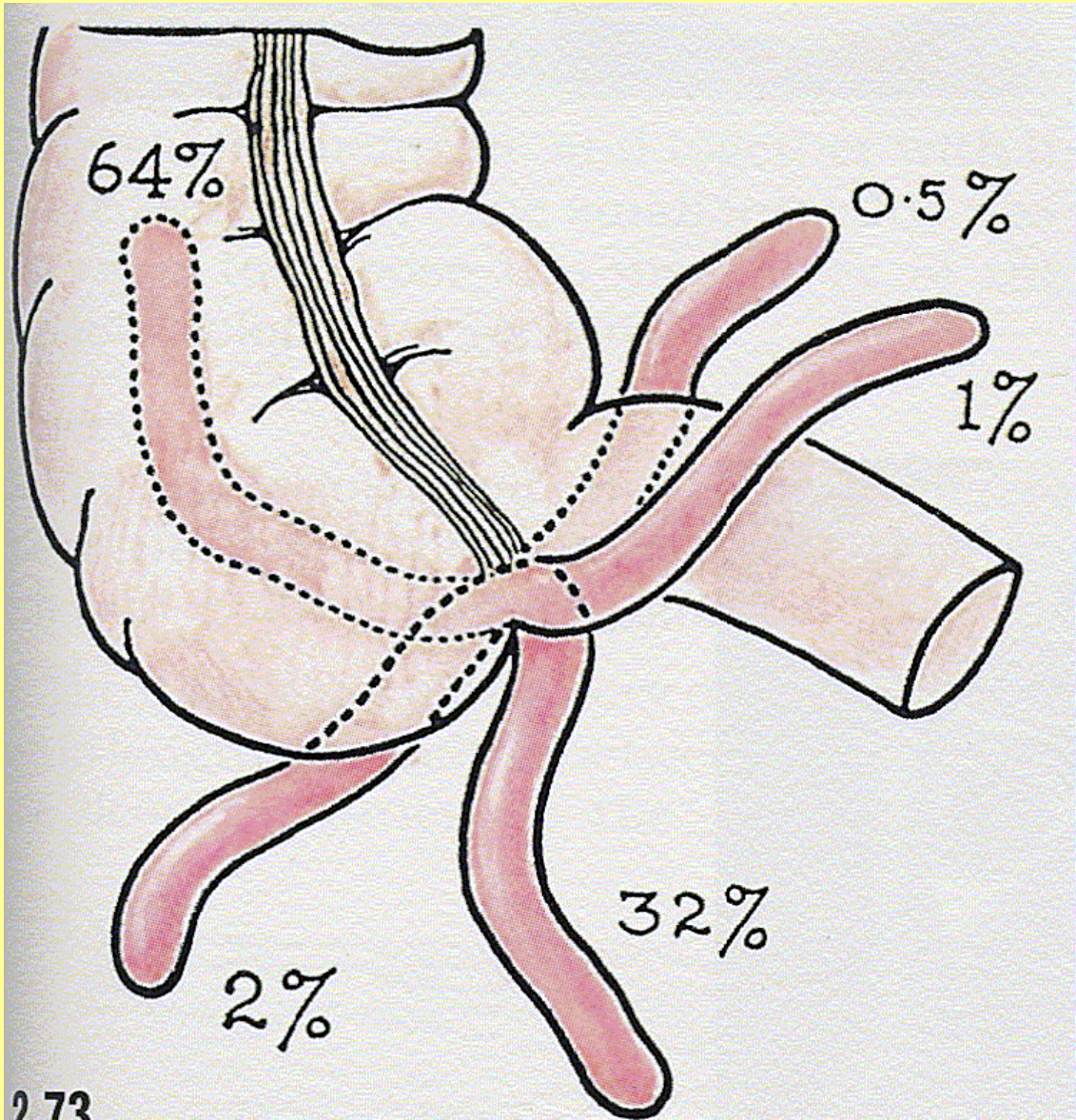


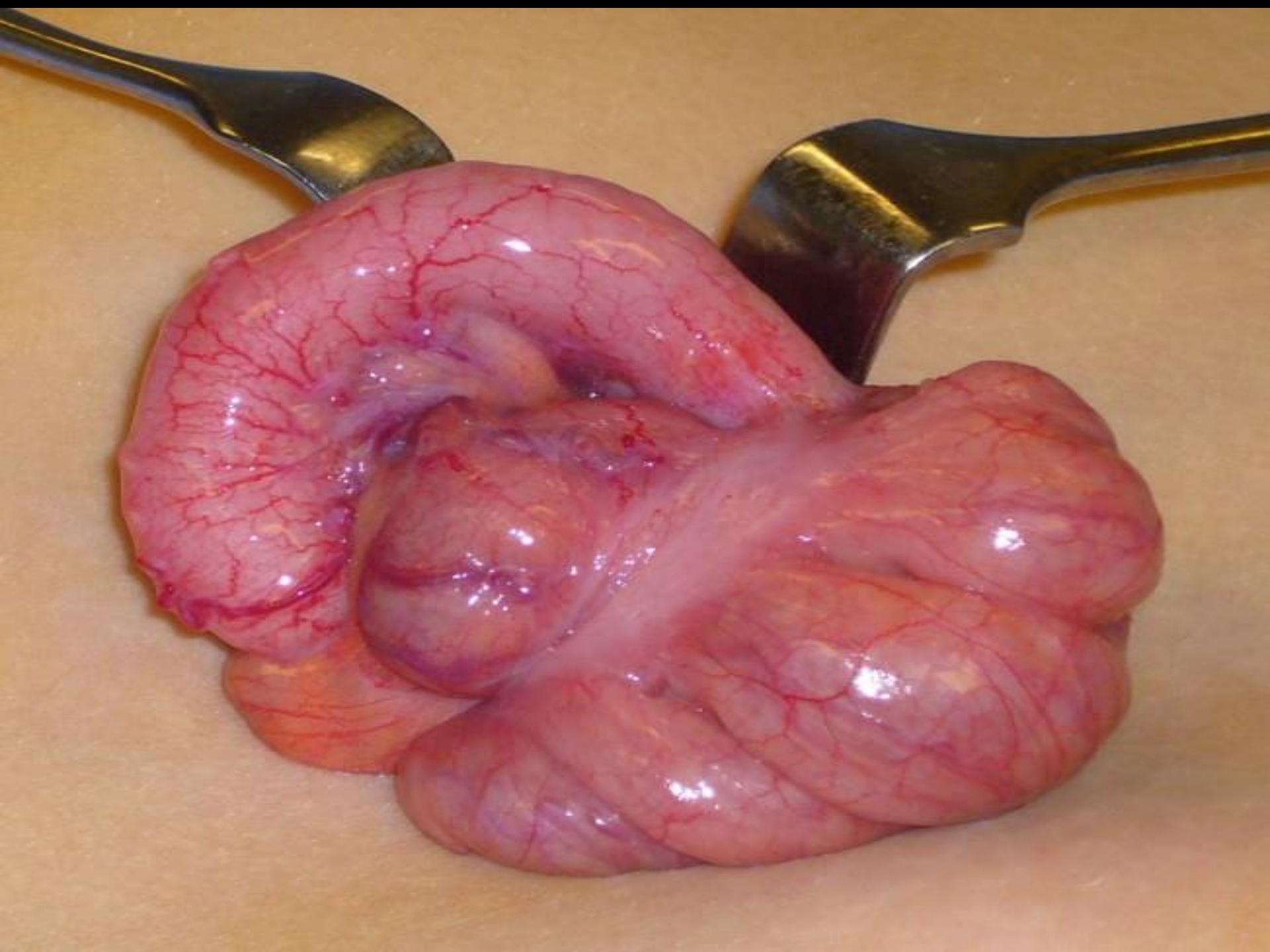

**McBurney's point** (1) appears about **one-third** of the distance along a line starting at the **right ASIS** (3) and ending at the **umbilicus** (2.

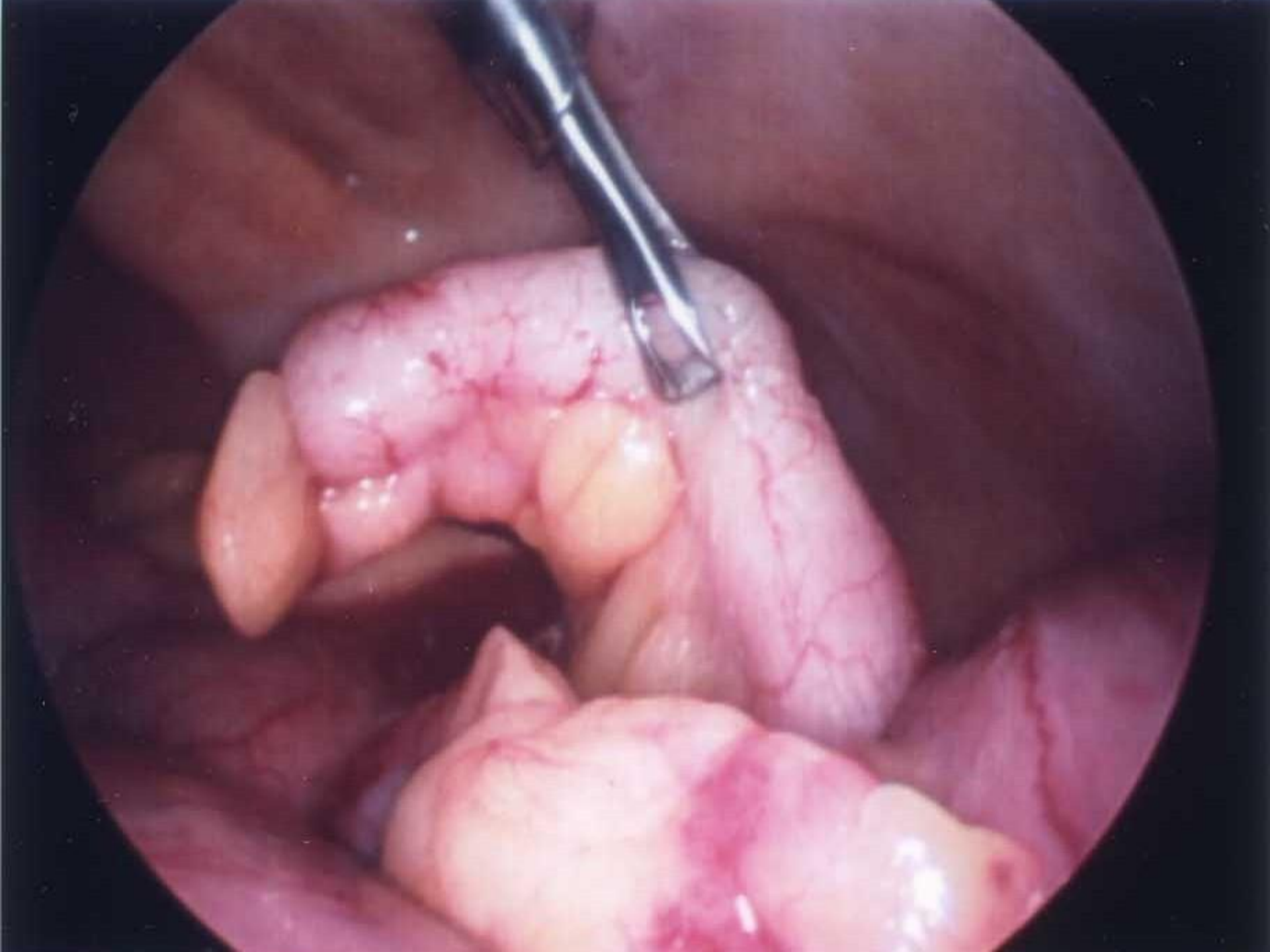
# APPENDIX

- **Positions: (from most to least common)**

1. **Retrocecal**: most common position
2. Pelvic
3. Subcecal
4. Preilieal
5. Postileal



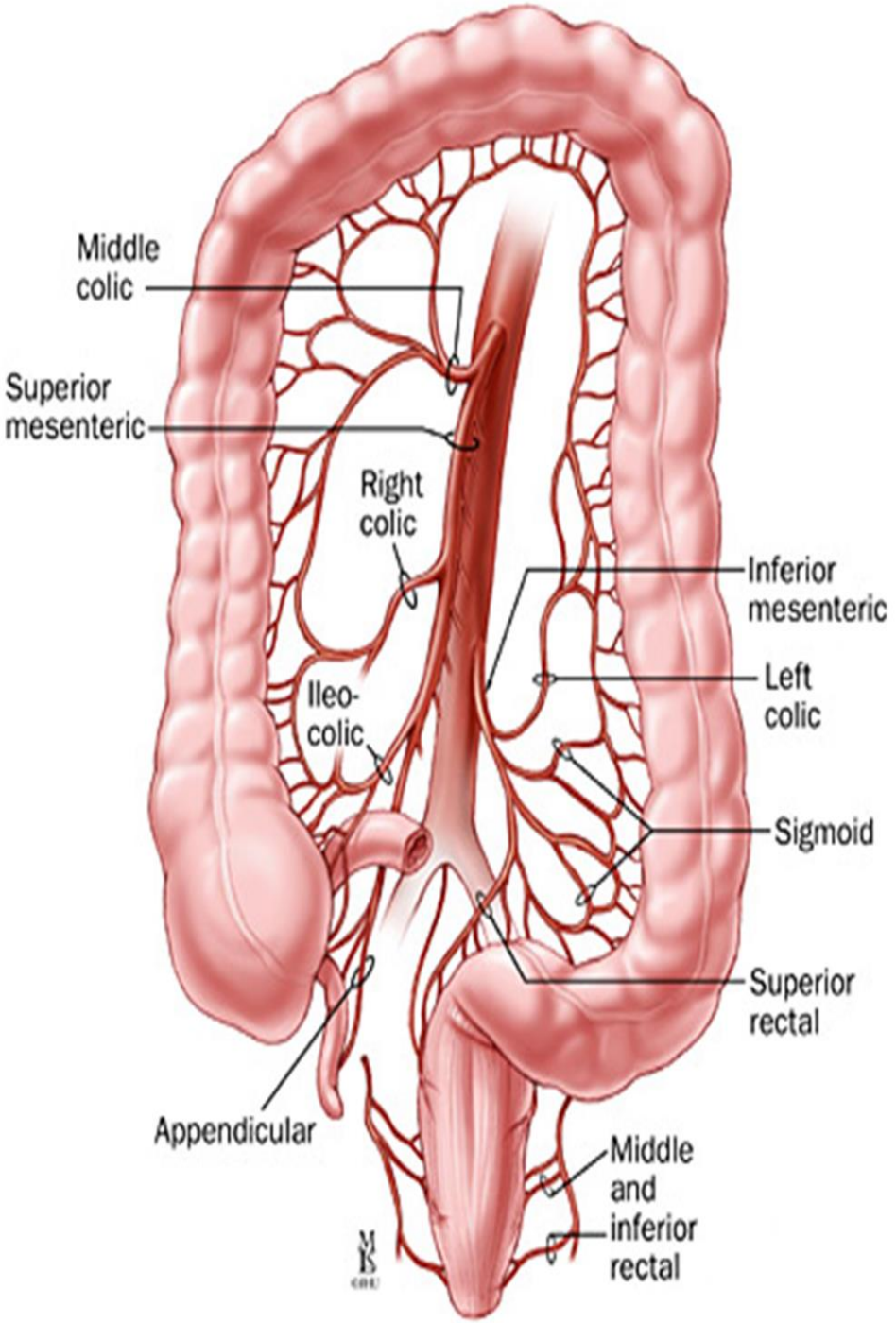




- **The blood supply** : by the **appendicular artery** ,which arises from the **ileocolic artery** ,which arises from the superior mesenteric artery ,**drain by ileocolic vein.**

☒ **The lymphatic** : pass to the LN in the mesoappendix and to the ileocolic LN along the ileocolic artery than to SM LN.

**Nerve** : The sympathetic nerve fibres originate in the **lower,thoracic** part of the spinal cord and the parasympathetic nerve fibres,from the **vagus nerve.**



# Gross Anatomy of Large Intestine

## Ascending colon

- Passes upwards from caecum to the level of the liver – turns to the left – **hepatic flexure** – becomes

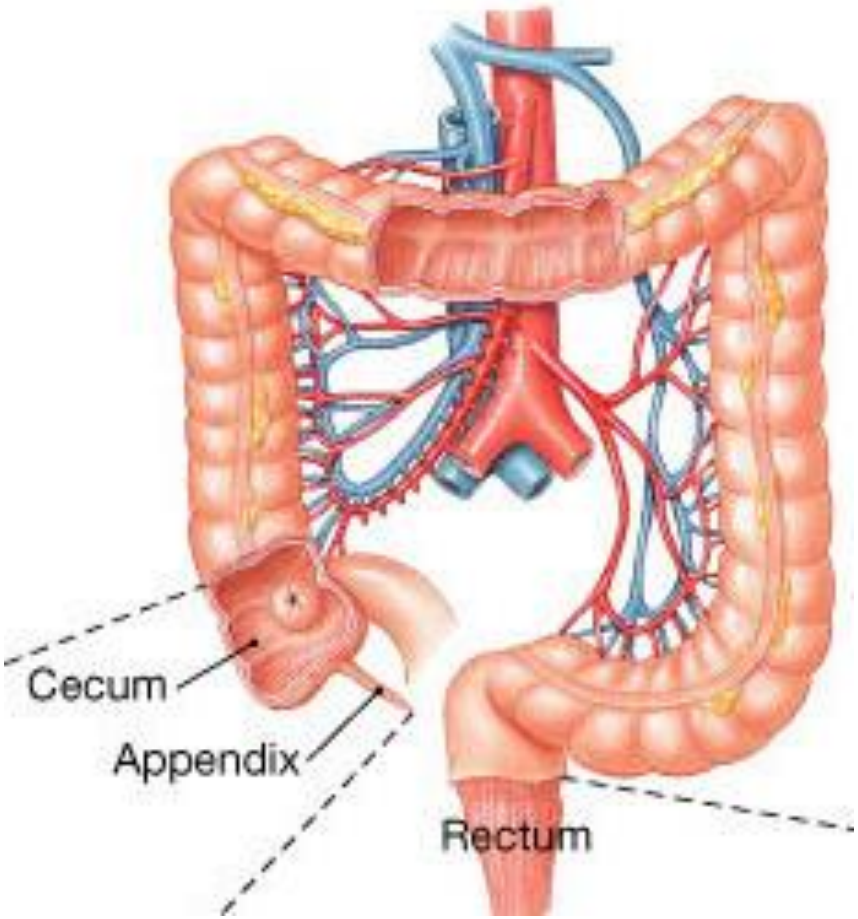
## Transverse colon

- A loop curved downwards across the abdomen upto spleen – turns downwards – **splenic flexure** – becomes

## Descending colon

- Passes down from splenic flexure situated on the left side of the abdomen.

- In the true pelvic cavity it is called **sigmoid** or **pelvic colon**



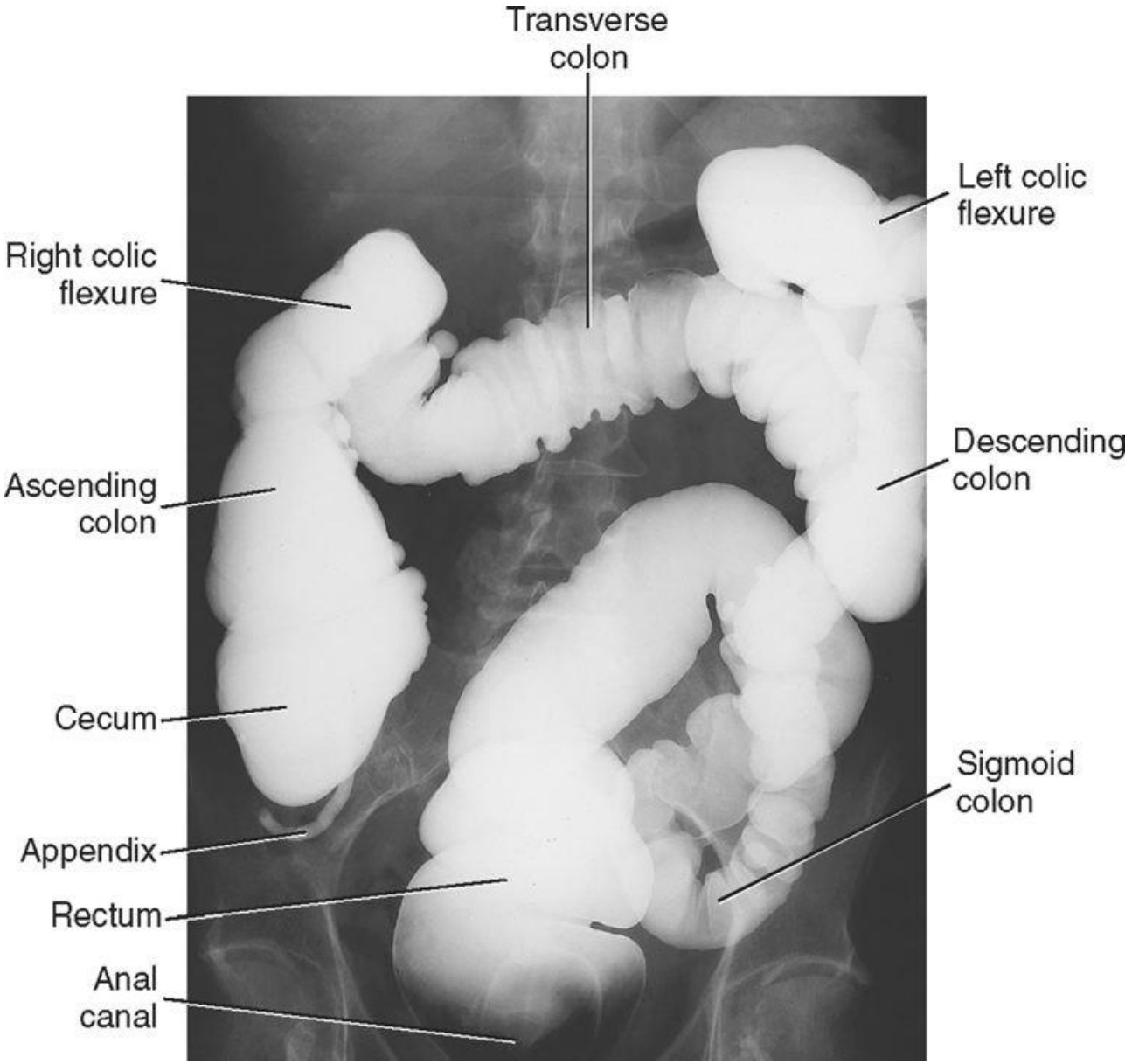
# CECUM, ASCENDING & DESCENDING COLON

- **POSTERIOR RELATIONS:**
- **Cecum:** psoas major, genitofemoral nerve, iliacus, lateral cutaneous nerve of thigh, femoral nerve
- **Ascending colon:** iliacus, lateral cutaneous nerve of thigh, quadratus lumborum, ilioinguial nerve, iliohypogastric nerve, iliac crest, origin of transversus abdominis from lumbar fascia
- **Descending colon: relations of cecum + relations of ascending colon + left kidney**

# RELATIONS OF TRANSVERSE COLON

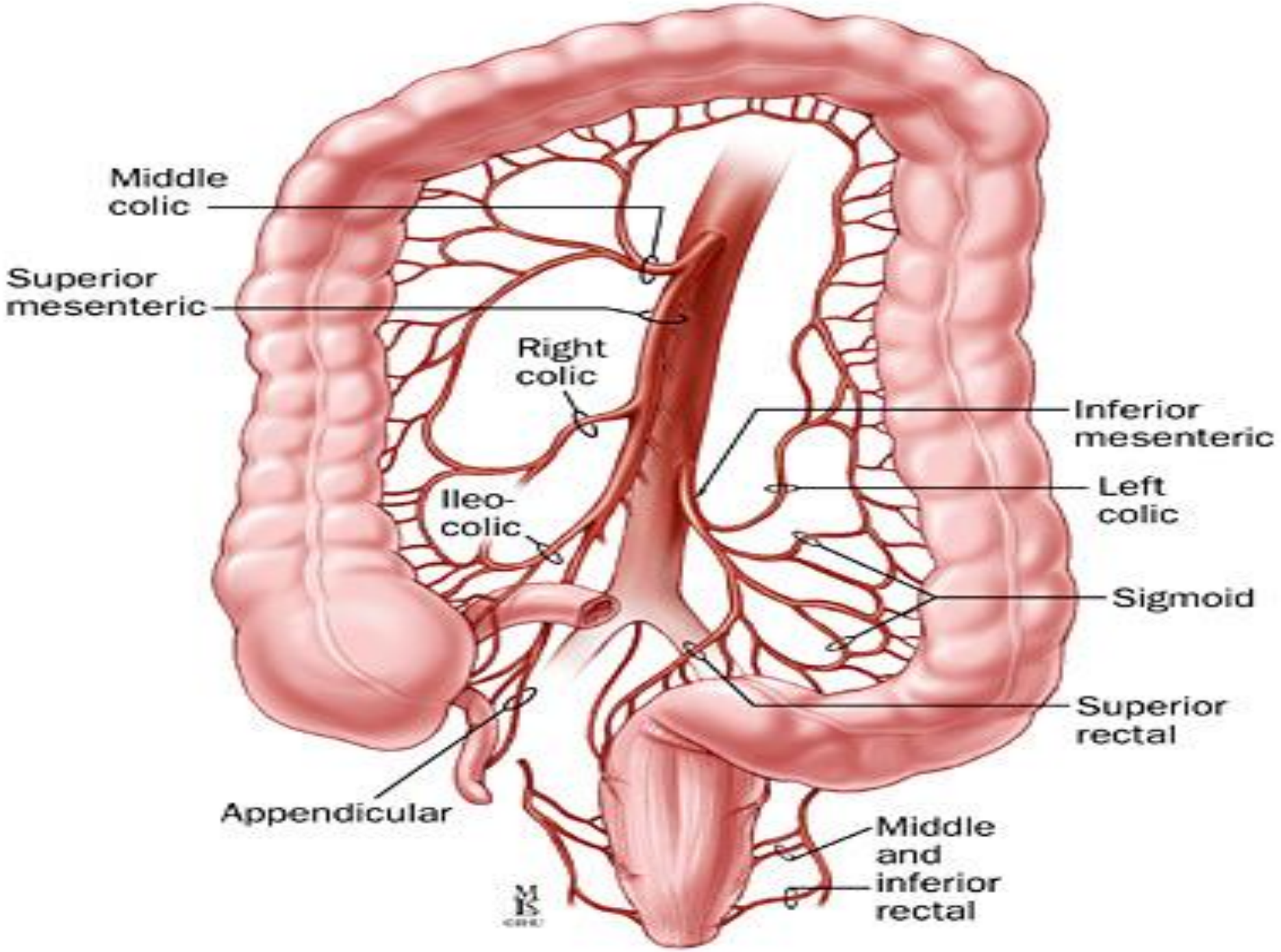
- **ANTERIOR:** greater omentum, anterior abdominal wall
- **POSTERIOR:** 2nd part of duodenum, head of pancreas, coils of small intestine
- **SUPERIOR:** liver, gall bladder, stomach
- **INFERIOR:** coils of small intestine

# The Large Intestine (Intestinum Crassum)



# Arterial Supply

- **SMA** -
  - Ileocolic artery (absent in up to 20% of people), terminal ileum and proximal ascending colon
  - Right colic artery - ascending colon
  - Middle colic artery - transverse colon
- **IMA** -
  - Left colic artery - descending colon
  - Sigmoidal branches - sigmoid colon
  - Superior rectal artery - proximal rectum
  - Communicate via the marginal artery of Drummond, complete in only 15 to 20% of people


Middle colic
Superior mesenteric
Right colic
Ileo-colic
Appendicular
Inferior mesenteric
Left colic
Sigmoid
Superior rectal
Middle and inferior rectal

# Veins, Lymphatics, and Innervation

## Veins

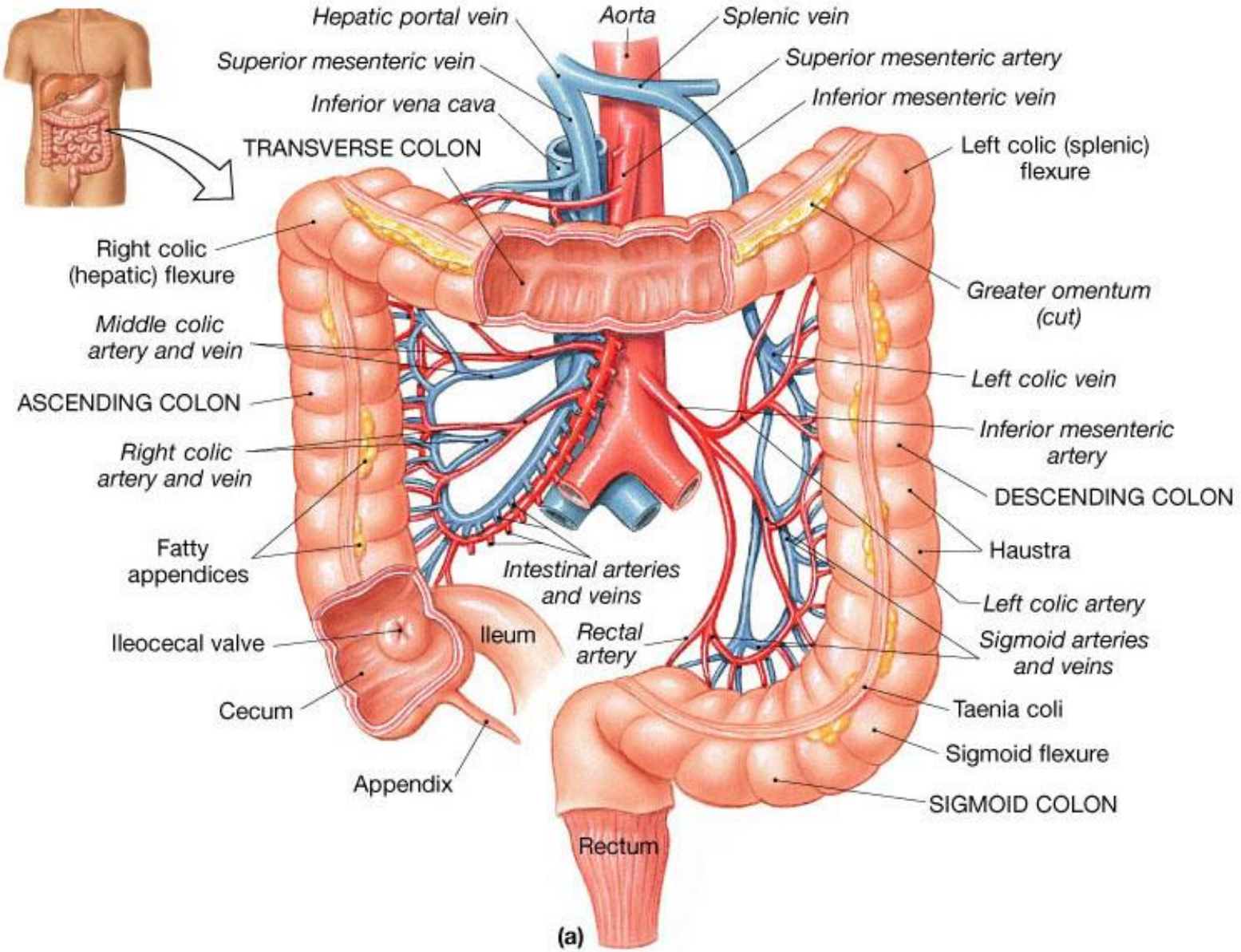
- Veins of the colon parallel their corresponding arteries (except IMV)
- Inferior mesenteric vein ascends in the retroperitoneal plane over the psoas muscle, posterior to the pancreas to join the splenic vein

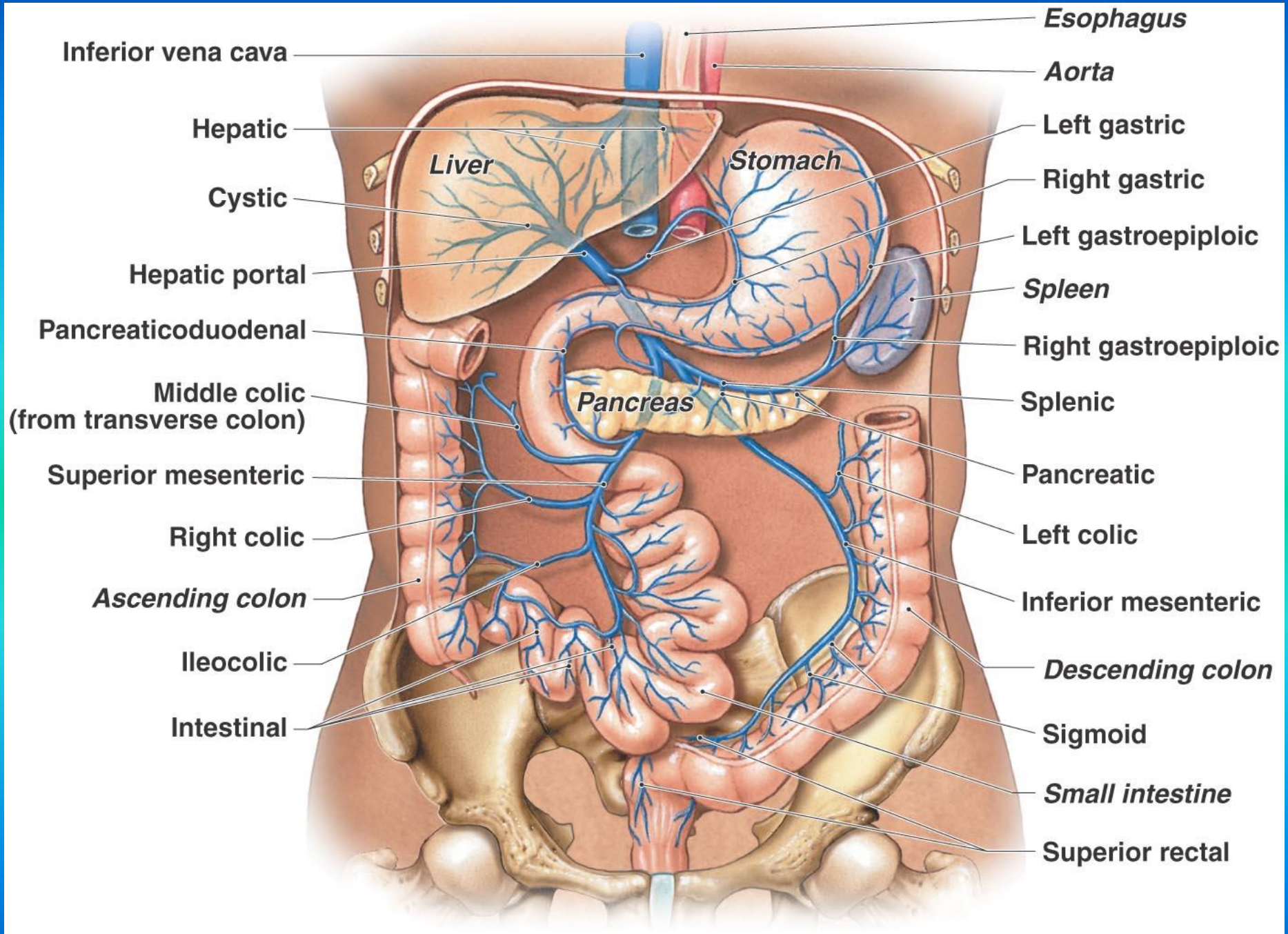
## Lymphatic Drainage

- Muscularis mucosa -> follow the regional arteries. Lymph nodes are found on the bowel wall (epicolic), along the inner margin of the bowel adjacent to the arterial arcades (paracolic), around the named mesenteric vessels (intermediate), and at the origin of the superior and inferior mesenteric arteries (main).

## Nerve Supply

- Sympathetic nerves arise from T6–T12 and L1–L3. Vagus nerve ->parasympathetic innervation to the right and transverse colon; parasympathetic nerves to the left colon arise from sacral nerves S2–S4 .


Hepatic portal vein
Aorta
Splenic vein
Superior mesenteric vein
Superior mesenteric artery
Inferior vena cava
Inferior mesenteric vein
TRANSVERSE COLON
Left colic (splenic) flexure
Right colic (hepatic) flexure
Greater omentum (cut)
Middle colic artery and vein
Left colic vein
ASCENDING COLON
Inferior mesenteric artery
Right colic artery and vein
DESCENDING COLON
Fatty appendices
Haustra
Intestinal arteries and veins
Left colic artery
Ileocecal valve
Ileum
Rectal artery
Sigmoid arteries and veins
Cecum
Taenia coli
Sigmoid flexure
Appendix
SIGMOID COLON
Rectum
(a)

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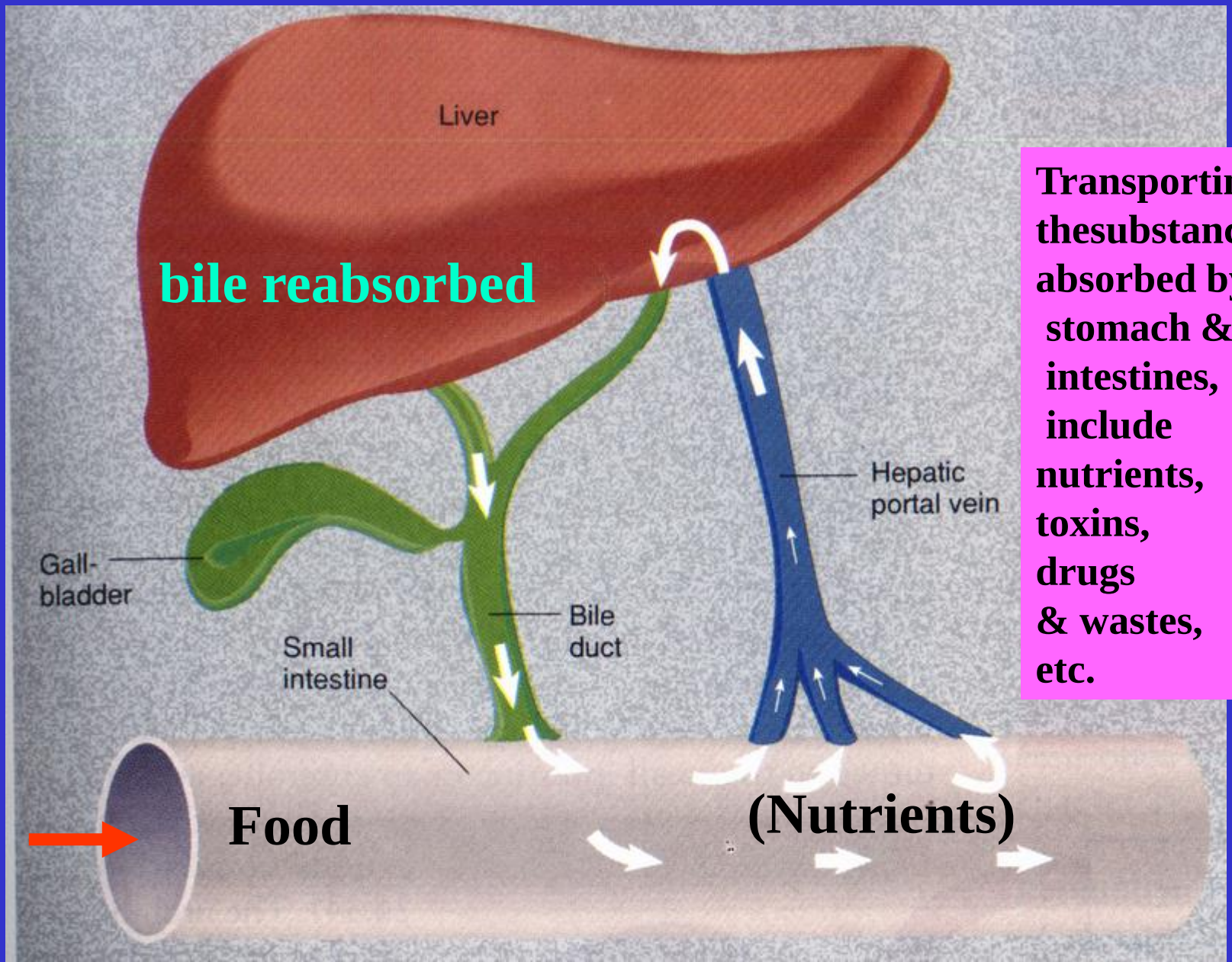
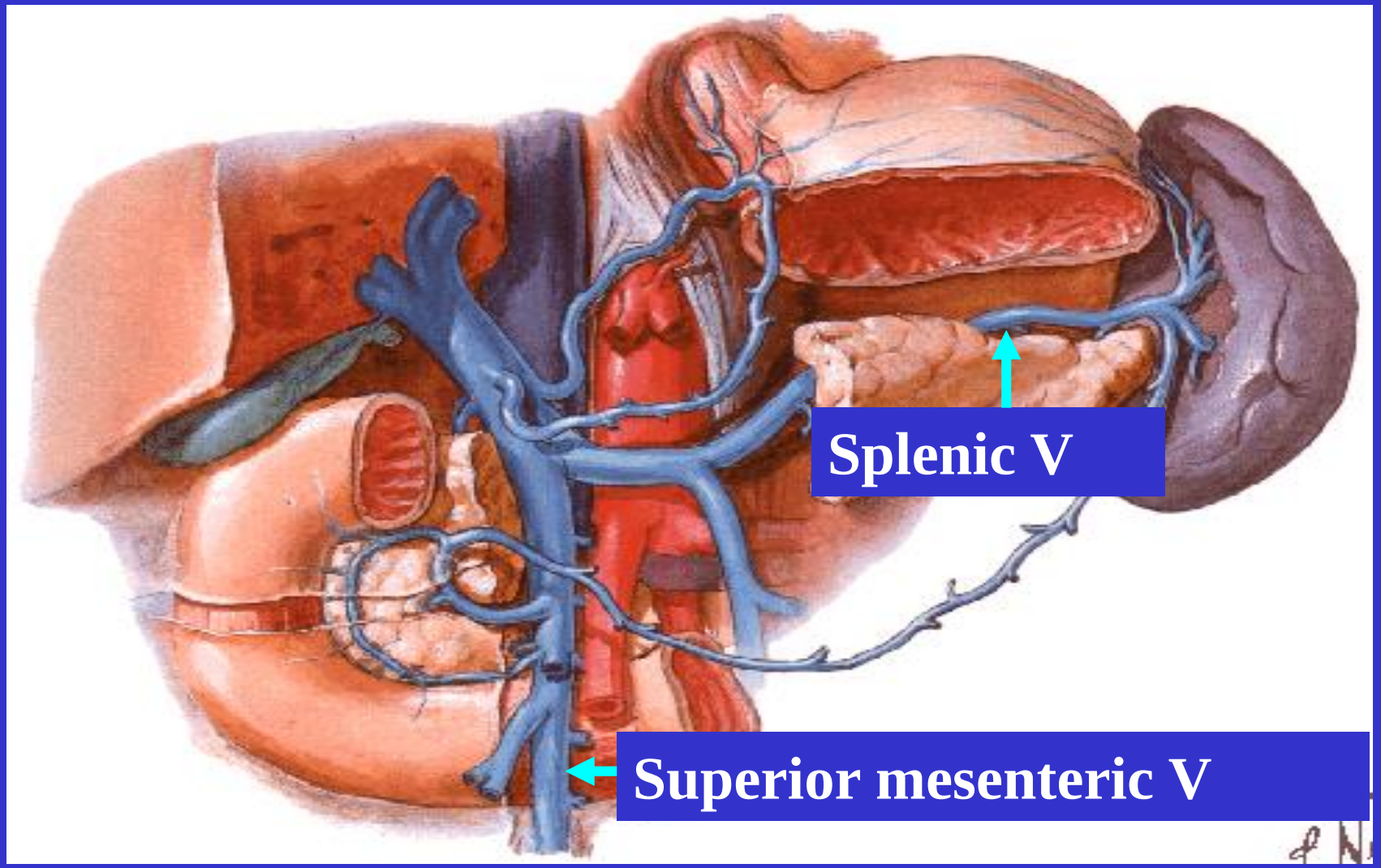
## 6. Characteristics of Hepatic Portal V




**Transporting thesubstances absorbed by stomach & intestines, include nutrients, toxins, drugs & wastes, etc.**

## ④ Hepatic Portal Vein

**1. Composition:** splenic V, superior mesenteric V (both union behind the head of pancreas)



## 4.Tributaries of Hepatic Portal Vein

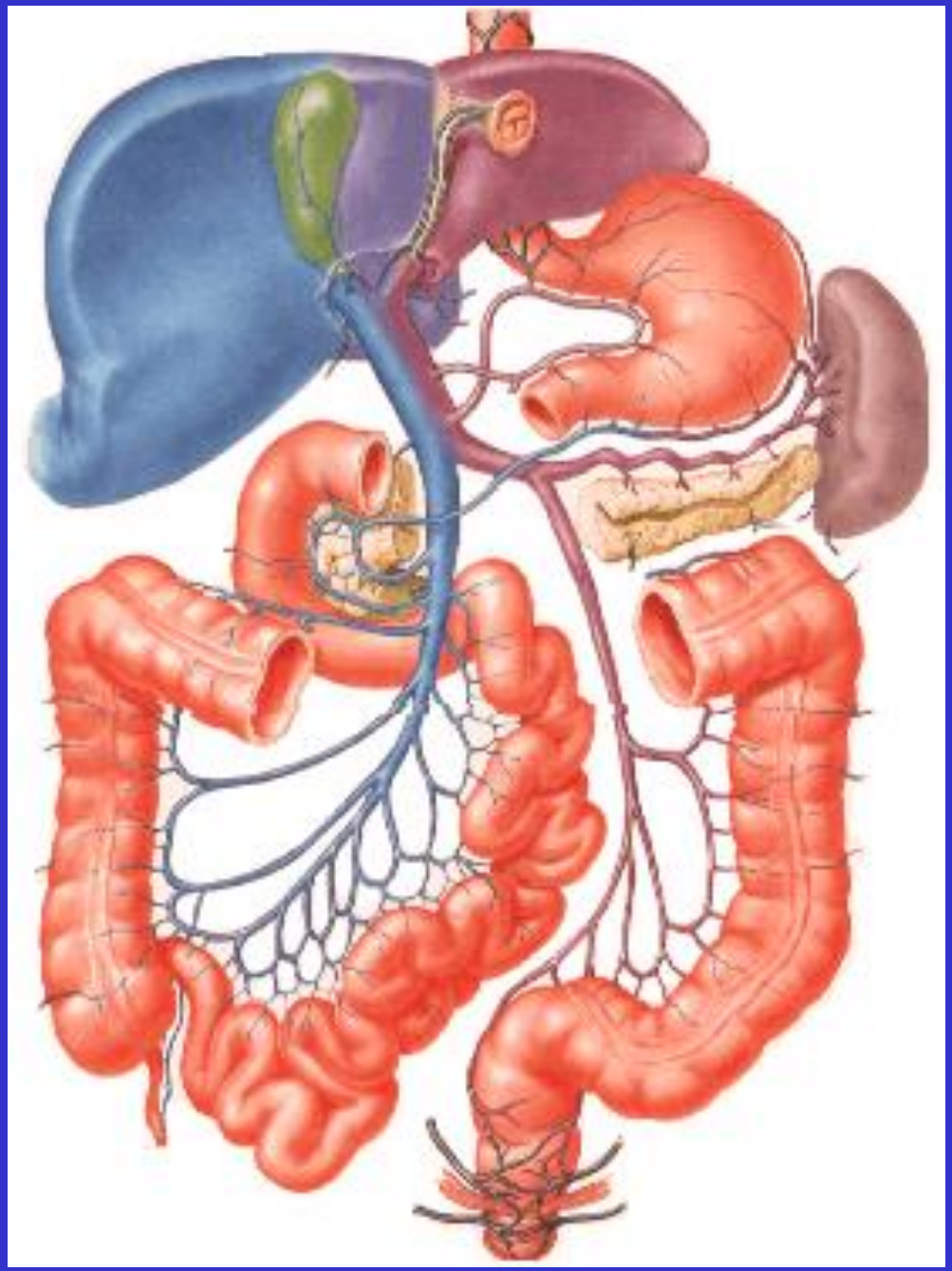
(1) Splenic V

(2) Superior mesenteric V

(3) Inferior mesenteric V

(4) Left gastric V

(5) Right gastric V



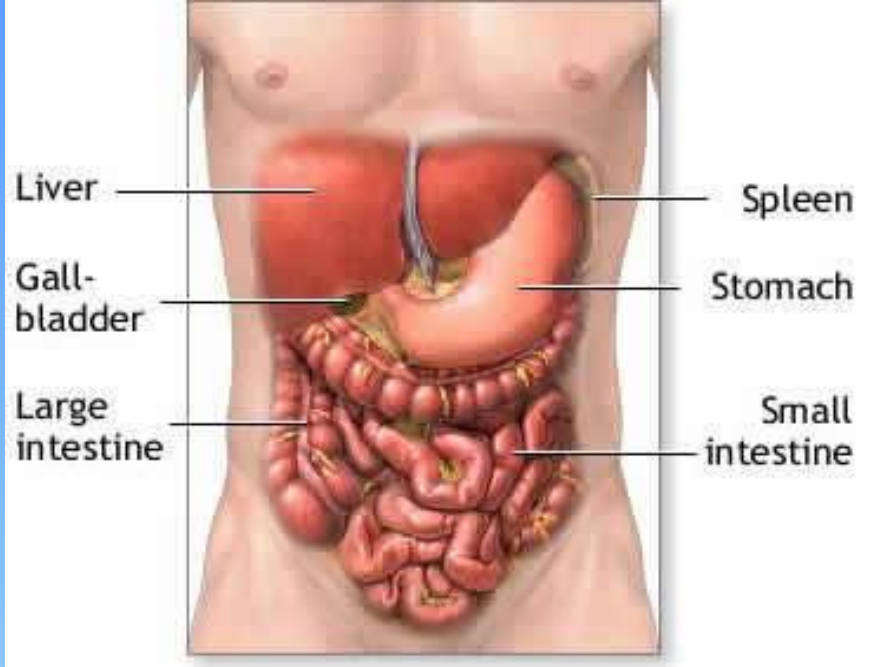
# Liver

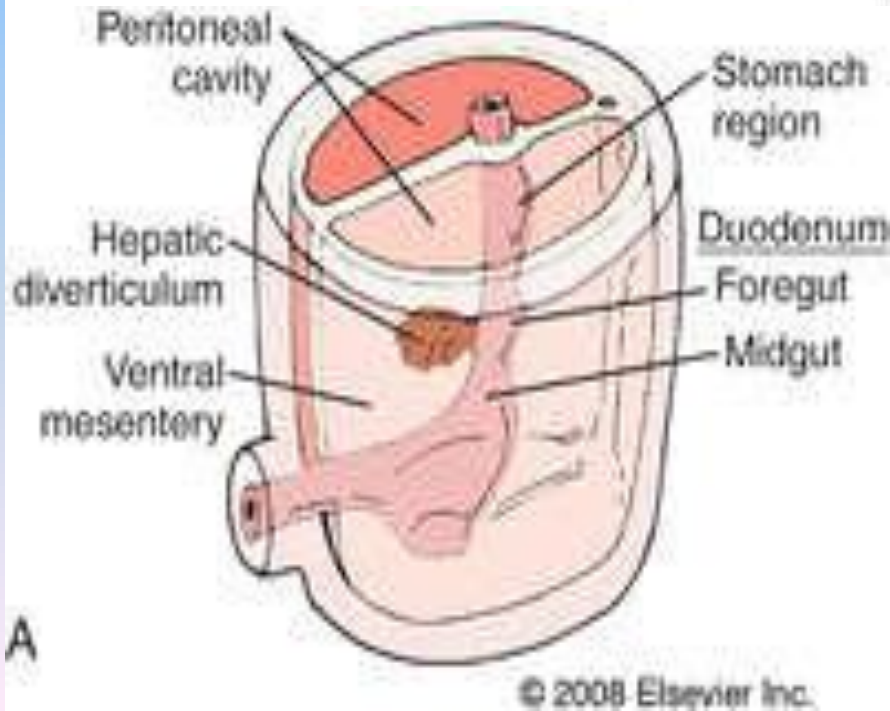
- Largest gland in the body (1.5 Kg)
- Under the diaphragm, within the rib cage in the upper right

quadrant of the abdomen

- **Function of the liver**

- **Secretion of bile & bile salt**
- **Metabolism of carbohydrate, fat and protein**
- **Formation of heparin & anticoagulant substances**
- **Detoxication**
- **Storage of glycogen and vitamins**
- **Activation of vita .D**



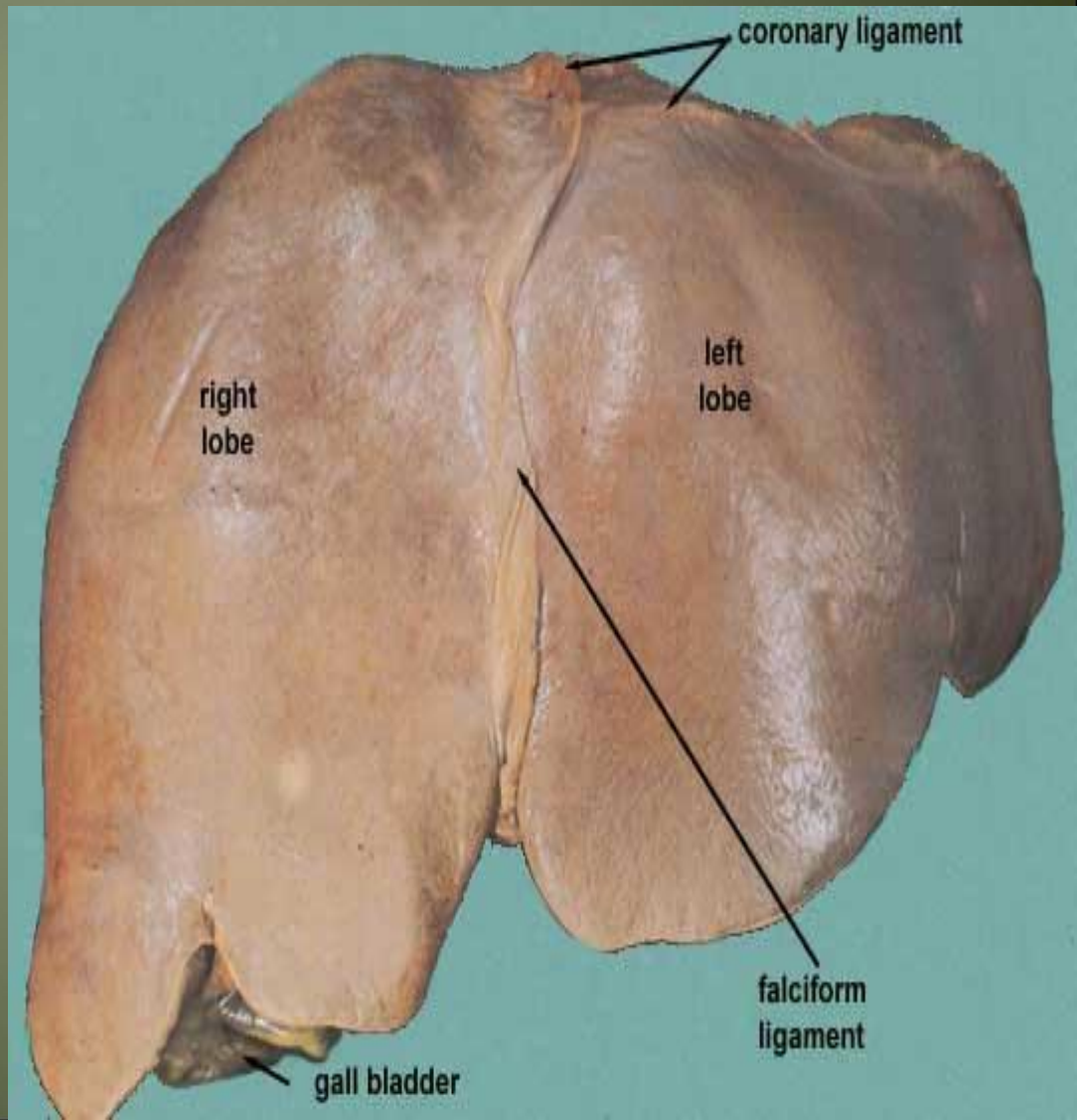



# Relations of the liver Anteriorly

- Diaphragm
- Rt & Lt pleura and lung
- Costal cartilage
- Xiphoid process
- Ant. abdominal wall

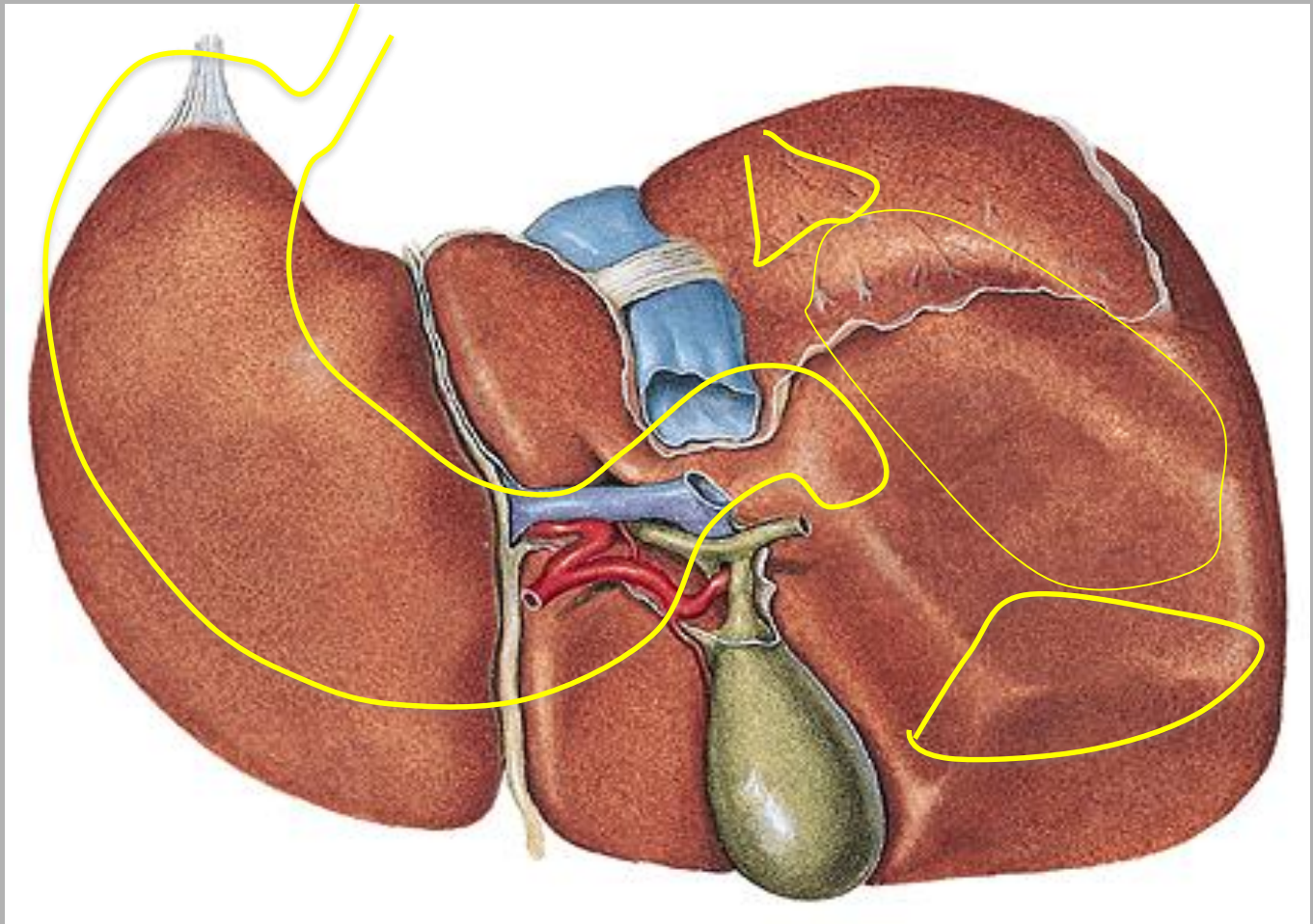
# Ant. View of the liver

- Right lobe
- Cut edge of the Falciform ligament left lobe
- Diverging cut edges of the superior part of the coronary ligament
- Fundus of the gall bladder

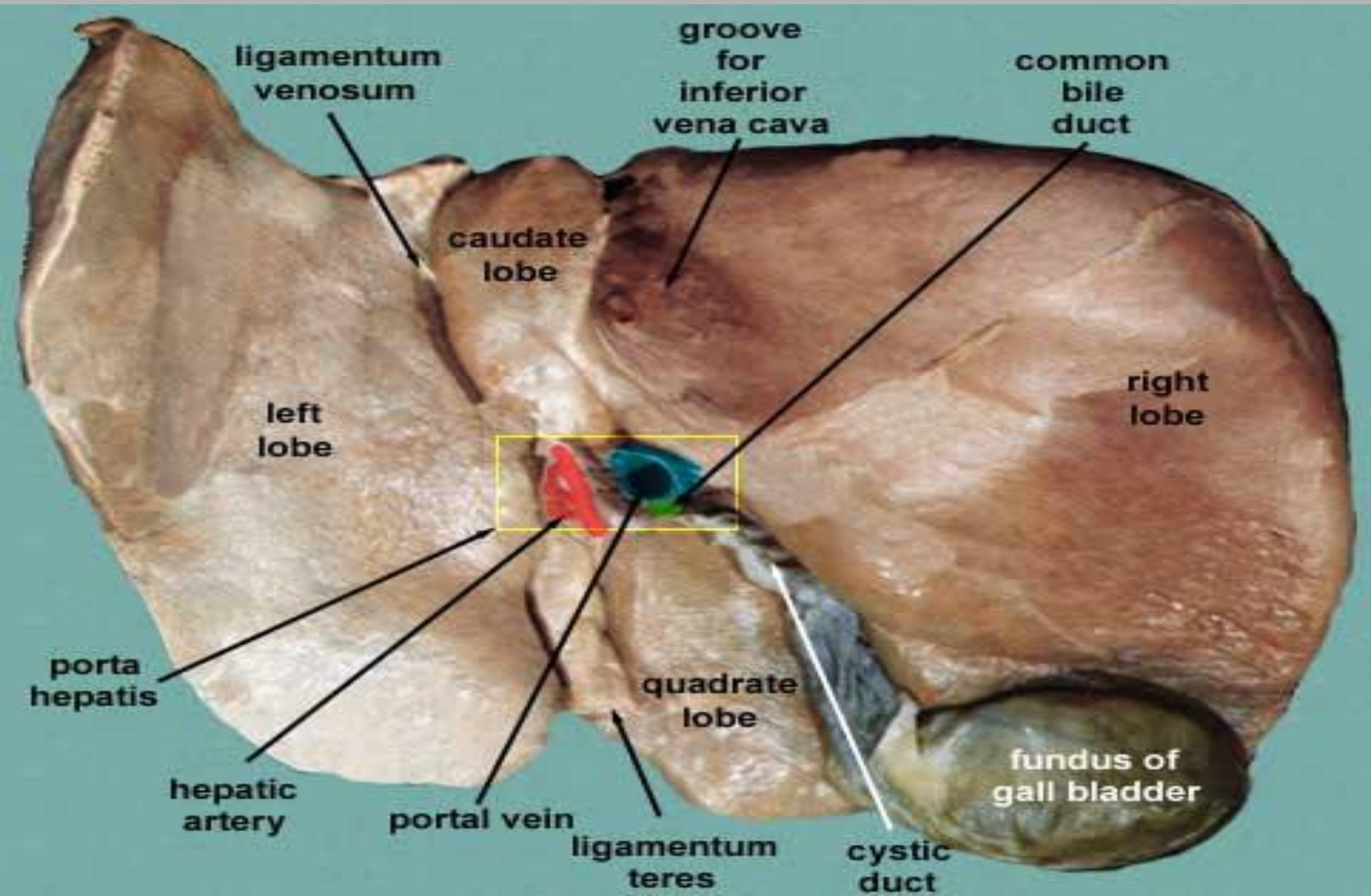


# Visceral surface of the liver

Porta hepatis – a central depression for the passage of the portal vein, hepatic artery and common bile duct
Anterior to this is the gallbladder fossa with the quadrate lobe to its left
Posteriorly the caudate lobe separates the porta from IVC
Several shallow impressions relate to the shape of adjacent organs



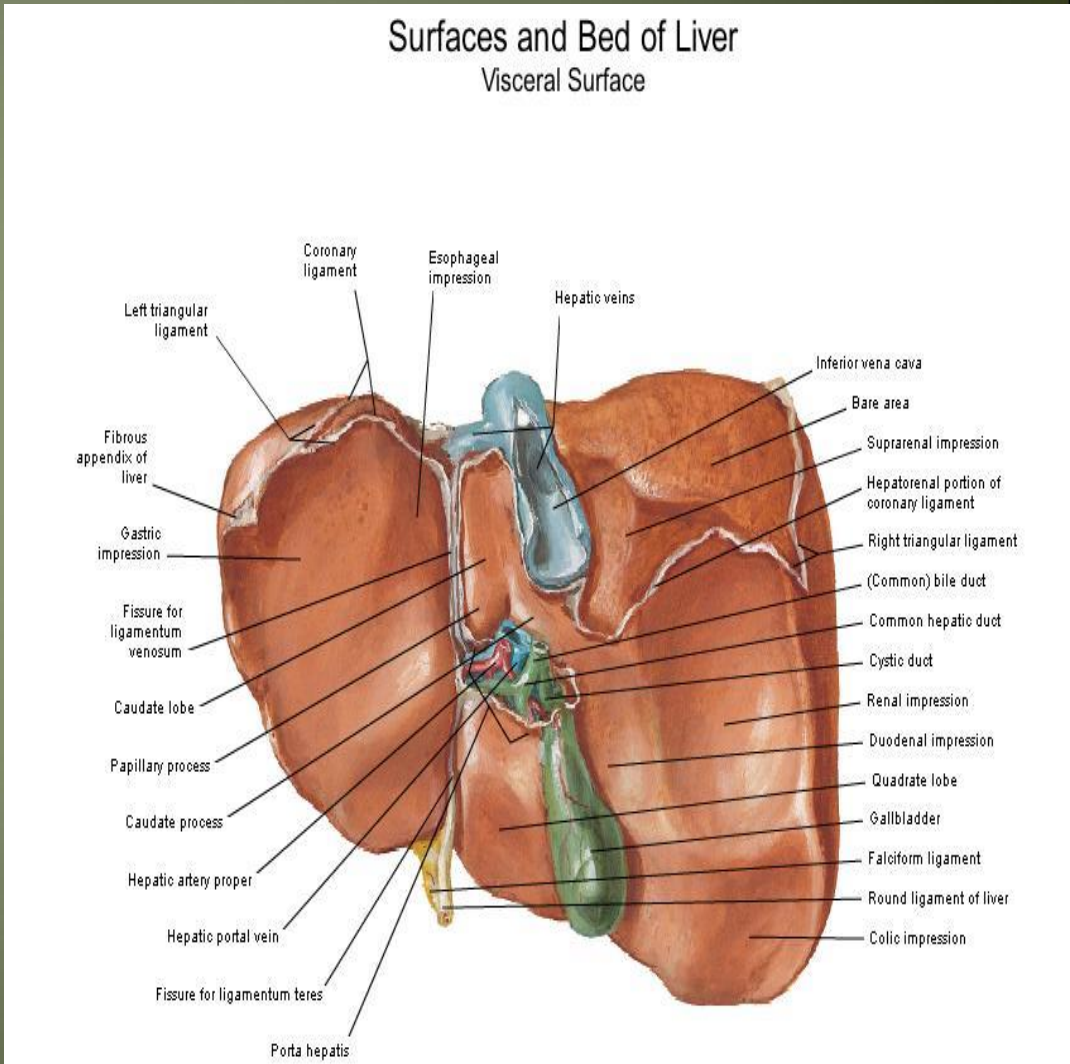
# Visceral surface of the liver

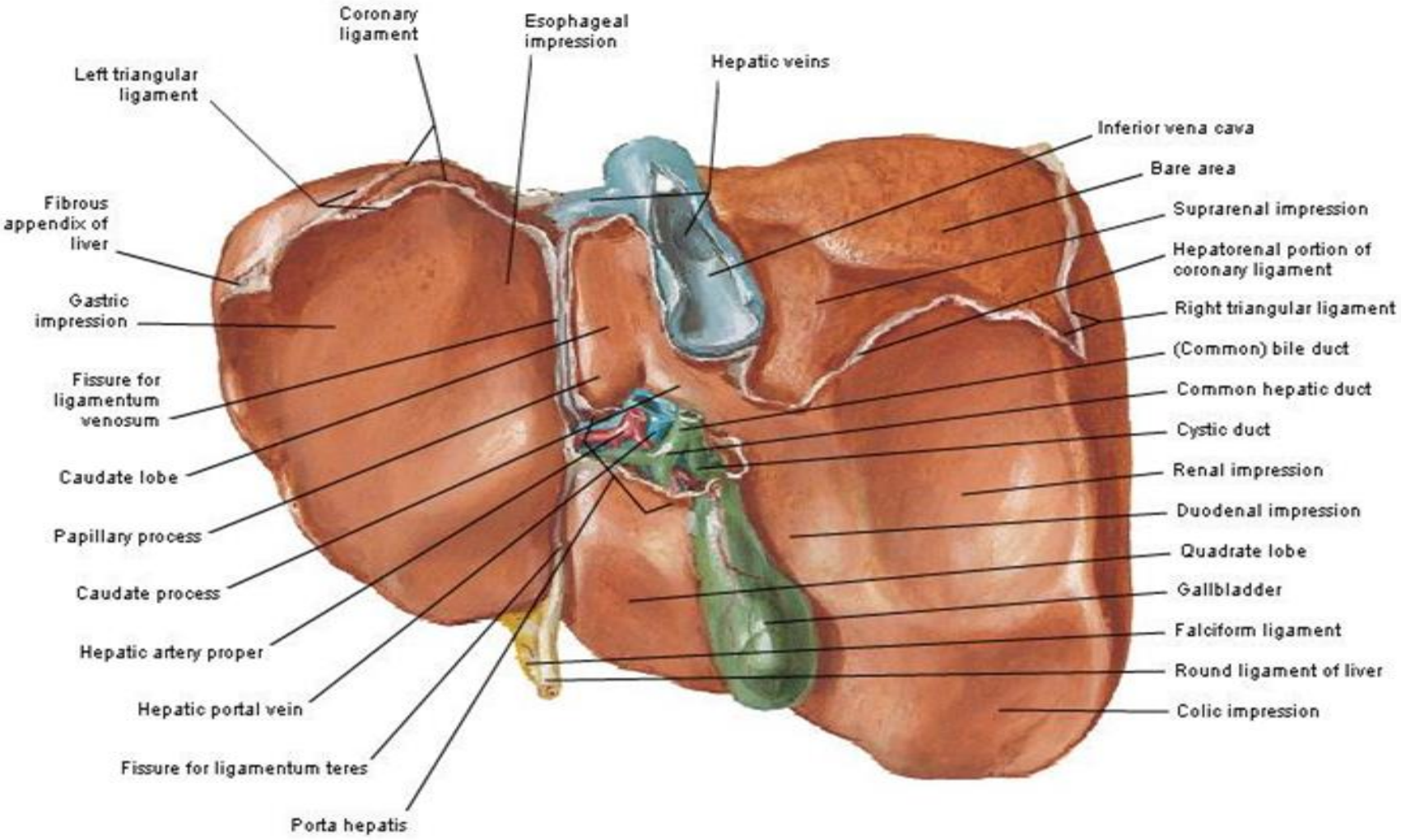


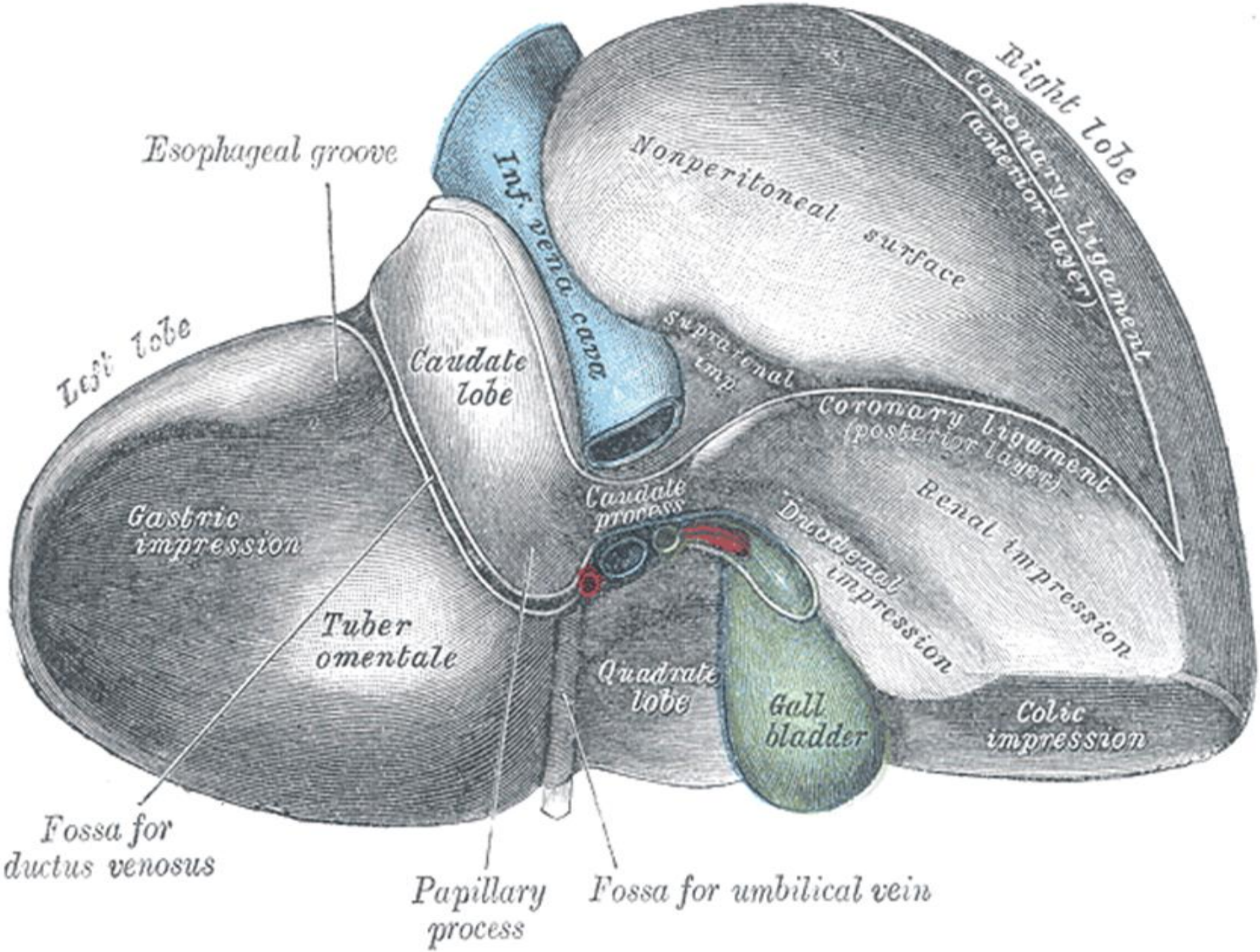
# Postero- infero surface= visceral surface

**Relations**

- I.V.C
- the esophagus
- the stomach
- the duodenum
- the right colic flexure
- the right kidney
- Rt. Suprarenal gland
- the gallbladder.
- Porta hepatic( bile duct,H.a.H.V)
- Fissure for lig. Venoosum & lesser omentum
- Tubular omentum
- Lig.teres




Coronary ligament
Esophageal impression
Hepatic veins
Left triangular ligament
Inferior vena cava
Bare area
Fibrous appendix of liver
Suprarenal impression
Hepatorenal portion of coronary ligament
Gastric impression
Right triangular ligament
(Common) bile duct
Fissure for ligamentum venosum
Common hepatic duct
Cystic duct
Caudate lobe
Renal impression
Duodenal impression
Papillary process
Quadrate lobe
Caudate process
Gallbladder
Falciform ligament
Hepatic artery proper
Round ligament of liver
Hepatic portal vein
Colic impression
Fissure for ligamentum teres
Porta hepatis

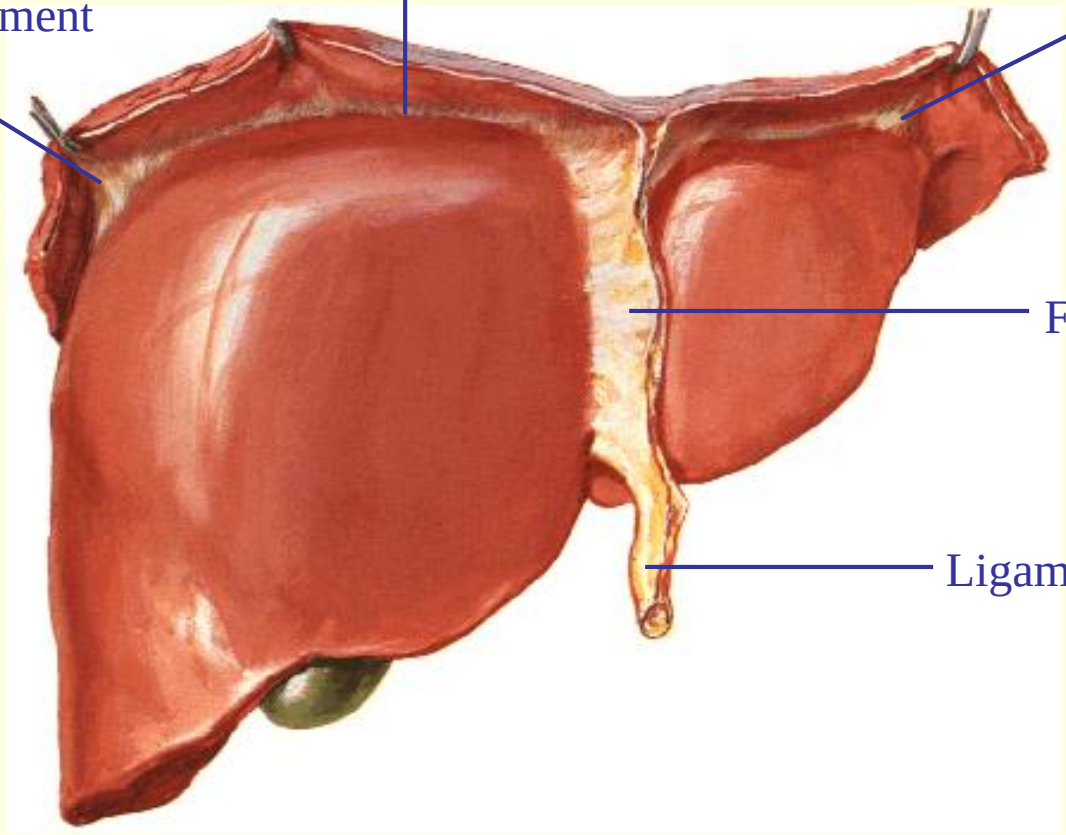

Esophageal groove
Inf. vena cava
Nonperitoneal surface
Right lobe
Coronary ligament (anterior layer)
Left lobe
Caudate lobe
Suprarenal impr.
Coronary ligament (posterior layer)
Caudate process
Renal impression
Duodenal impression
Gastric impression
Tuber omentale
Quadrate lobe
Gall bladder
Colic impression
Fossa for ductus venosus
Papillary process
Fossa for umbilical vein

# 1. The ligaments of the liver

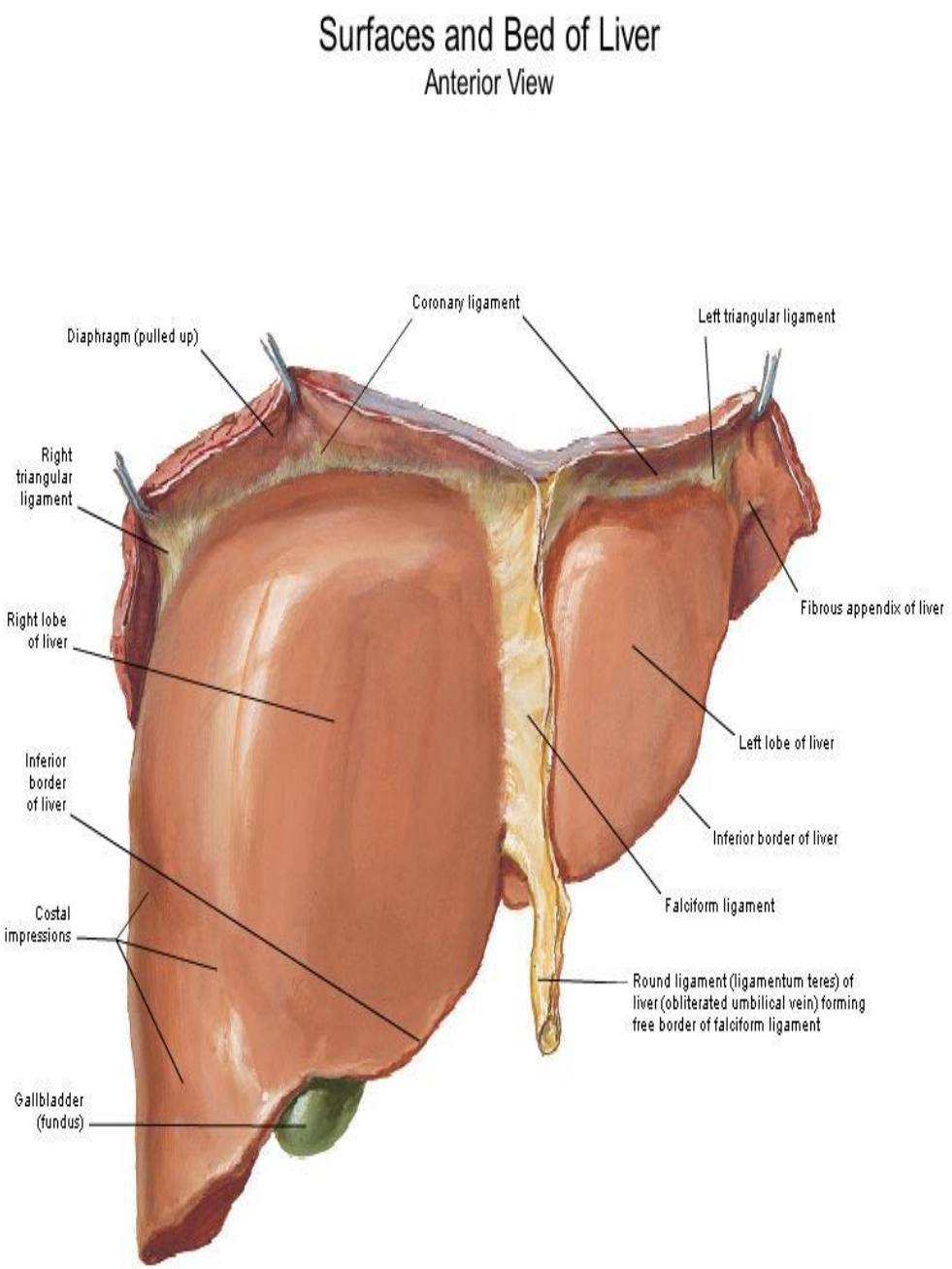
1- The **Falciform ligament of liver**
2- The **Ligamentum teres hepatis**
3- The **coronary ligament**
4- The **right triangular ligament**
5- The **left triangular ligament**
6- The **Hepatogastric ligament**
7- The **hepatoduonedenal ligament**
8- The Ligamentum Venoosum

# III) The ligaments

## 1. The ligments of the liver

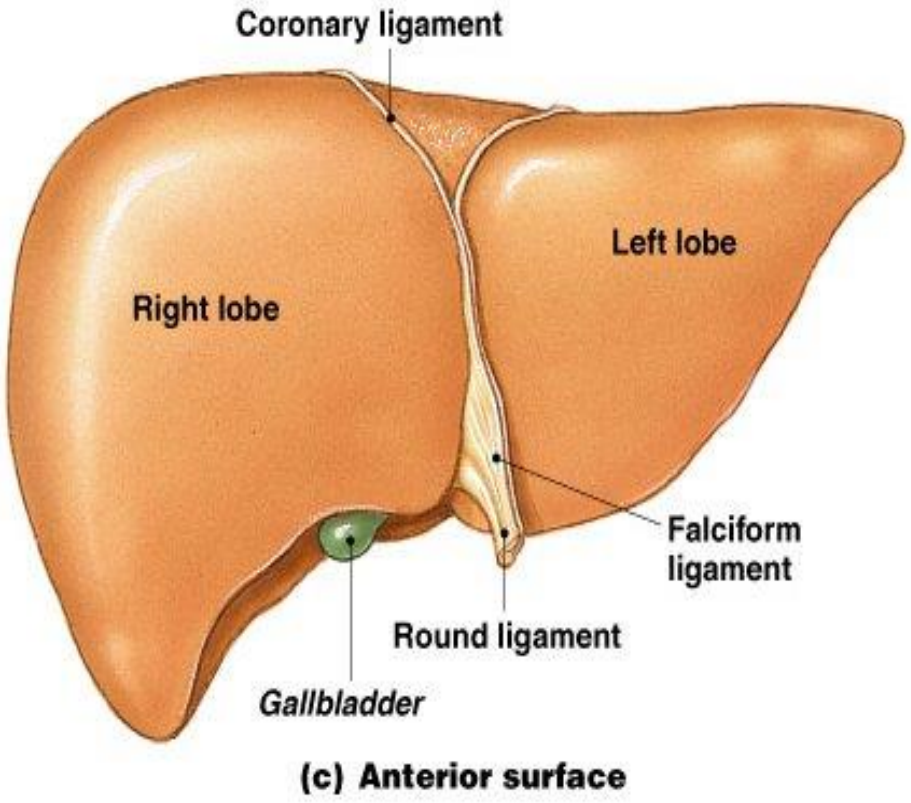


- **Falciform ligament of liver**
  - Consists of double peritoneal layer
  - Sickle shape
  - Extends from anterior abdominal wall (umbilicus) to liver
  - Free border of the ligament contains Ligamentum teres (obliterated umbilical vein)

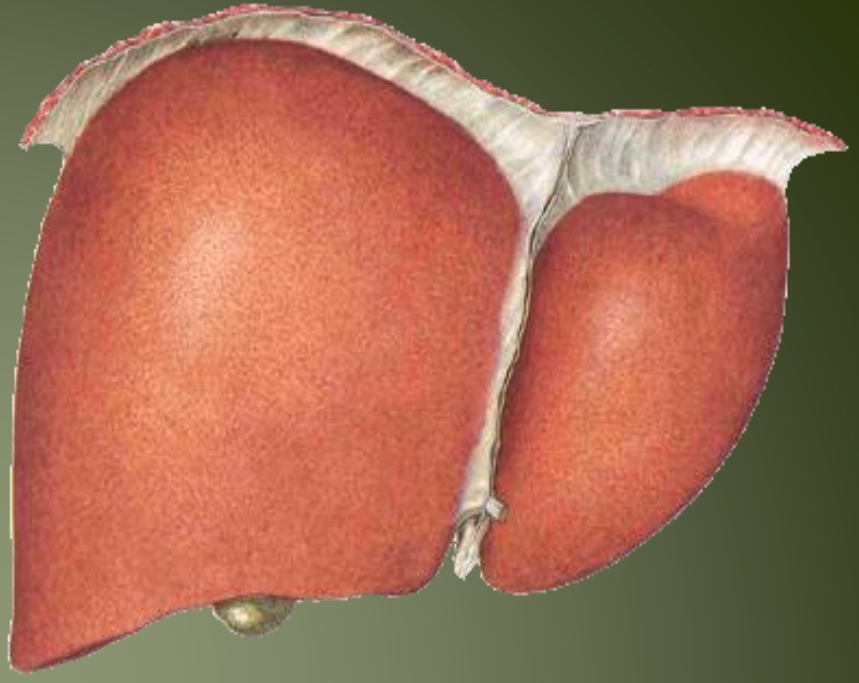


# Peritoneal folds related to the Liver

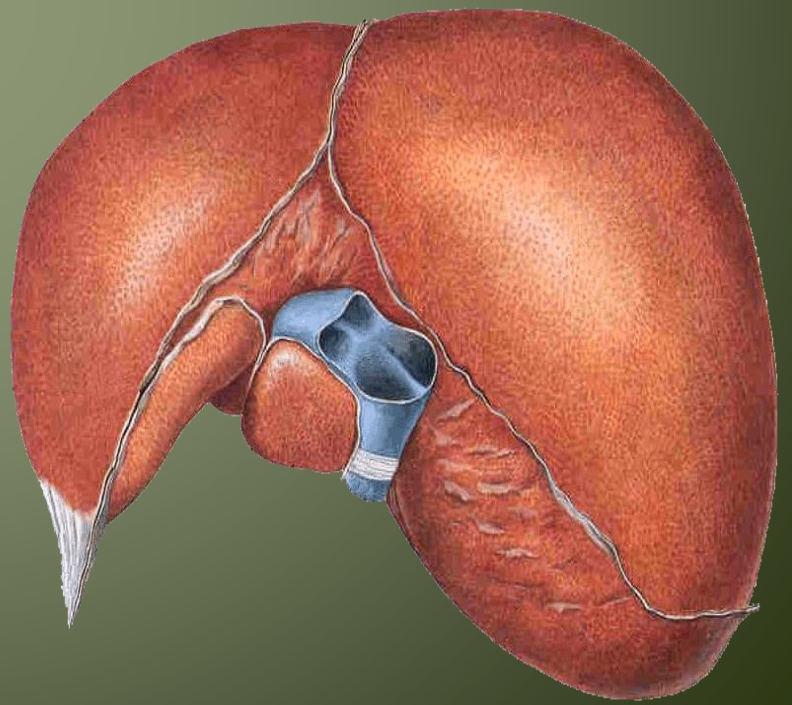
- The Falciform ligament:
  Passes from the parietal peritoneum on the anterior abdominal wall to the visceral peritoneum on the surface of the liver.
- The round ligament of the liver (ligamentum teres hepatis):
- Is the obliterated umbilical vein and it is found in the inferior free margin of the Falciform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



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



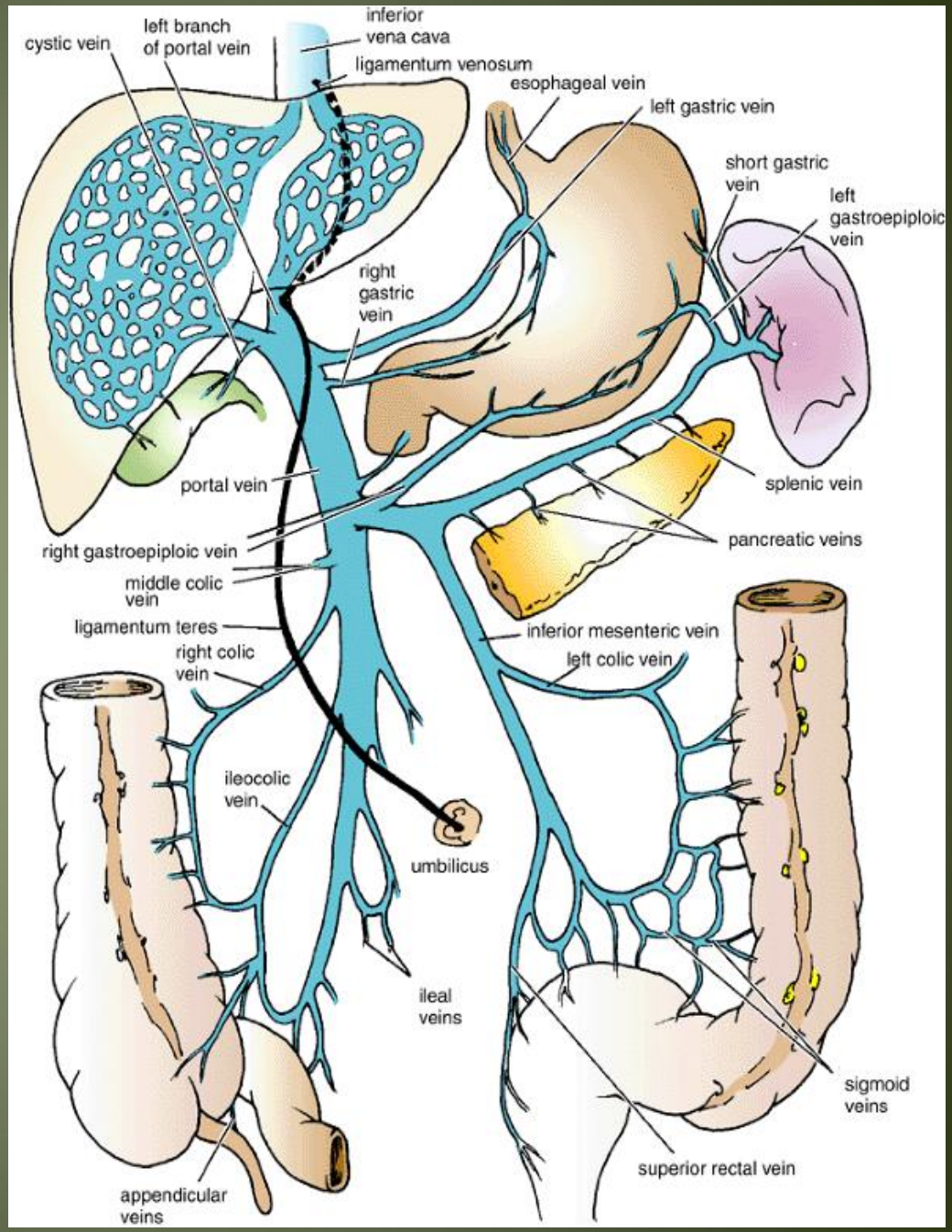
- **Left and right triangular ligaments** formed by left and right extremity of coronary ligament



# The Ligamentum Venoosum

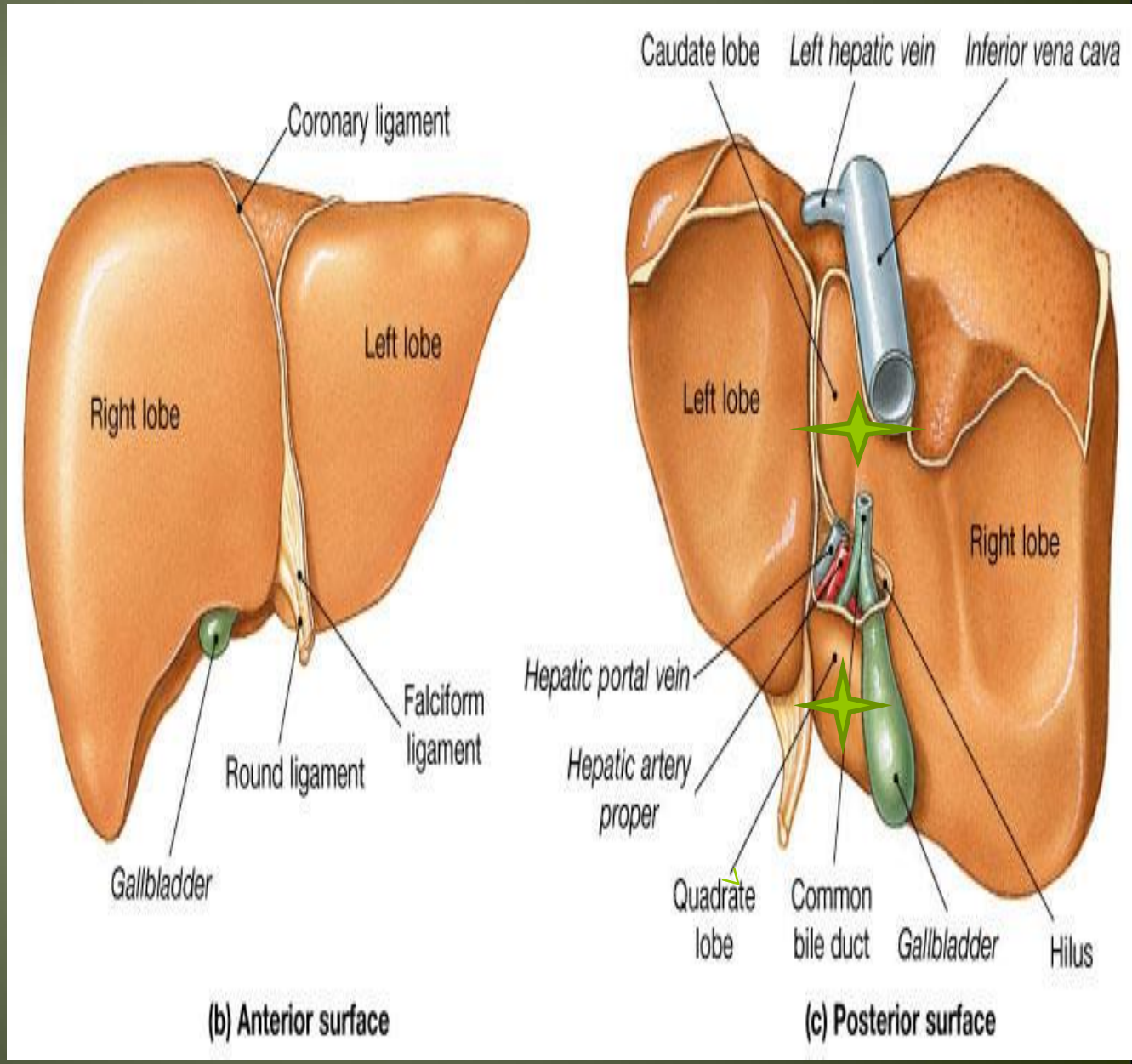
-Fibrous band that is the remains of the ductus venosus

- Is attached to the left branch of the portal vein and ascends in a fissure on the visceral surface of the liver to be attached above to the inferior vena cava



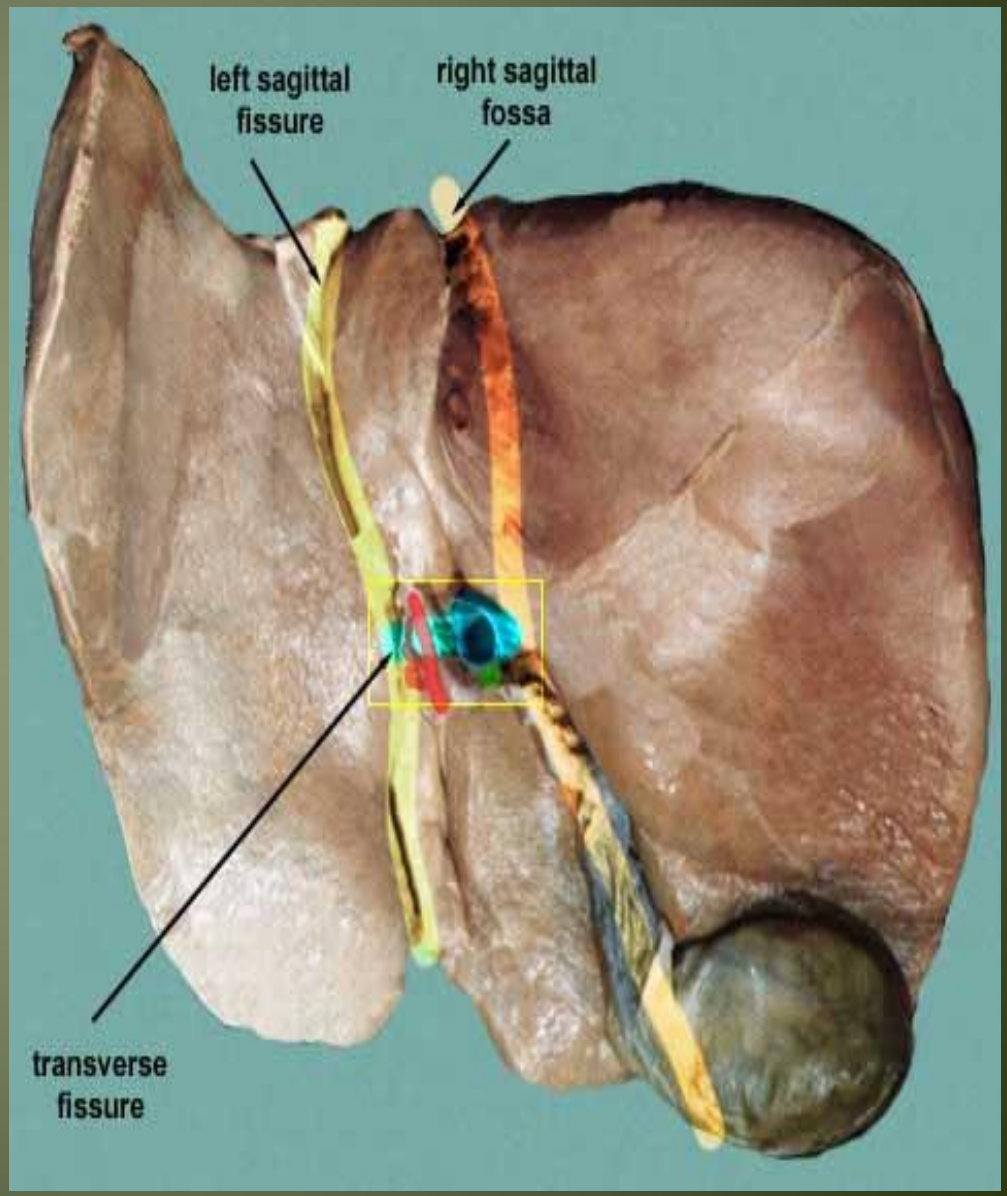
# Lobes of the liver

- Rt. Lobe
- Lt .lobe
- Quadrate lobe
- Caudate lobe



# Separation of the four lobes of the liver:

- Right sagittal fossa - groove for inferior vena cava and gall bladder
- left sagittal fissure - contains the Ligamentum Venoosum and round ligament of liver
- Transverse fissure (also porta hepatis) - bile ducts, portal vein, hepatic arteries

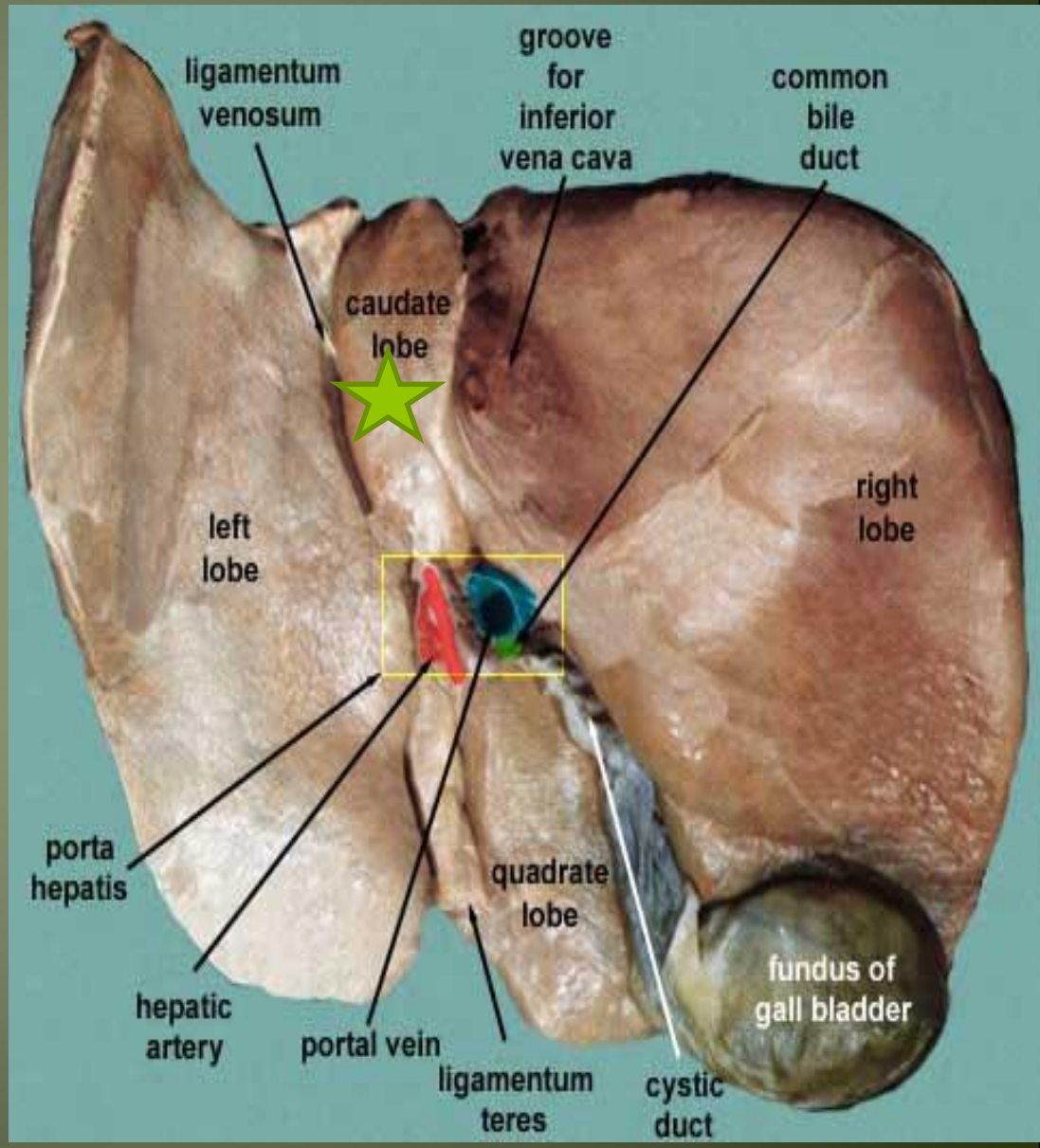


# Caudate Lobe

-present in the posterior surface from the Rt. Lobe

**Relations of caudate lobe**

- Inf. → the porta hepatis
- The right → the fossa for the inferior vena cava
- The left →the fossa for the lig.venosum.

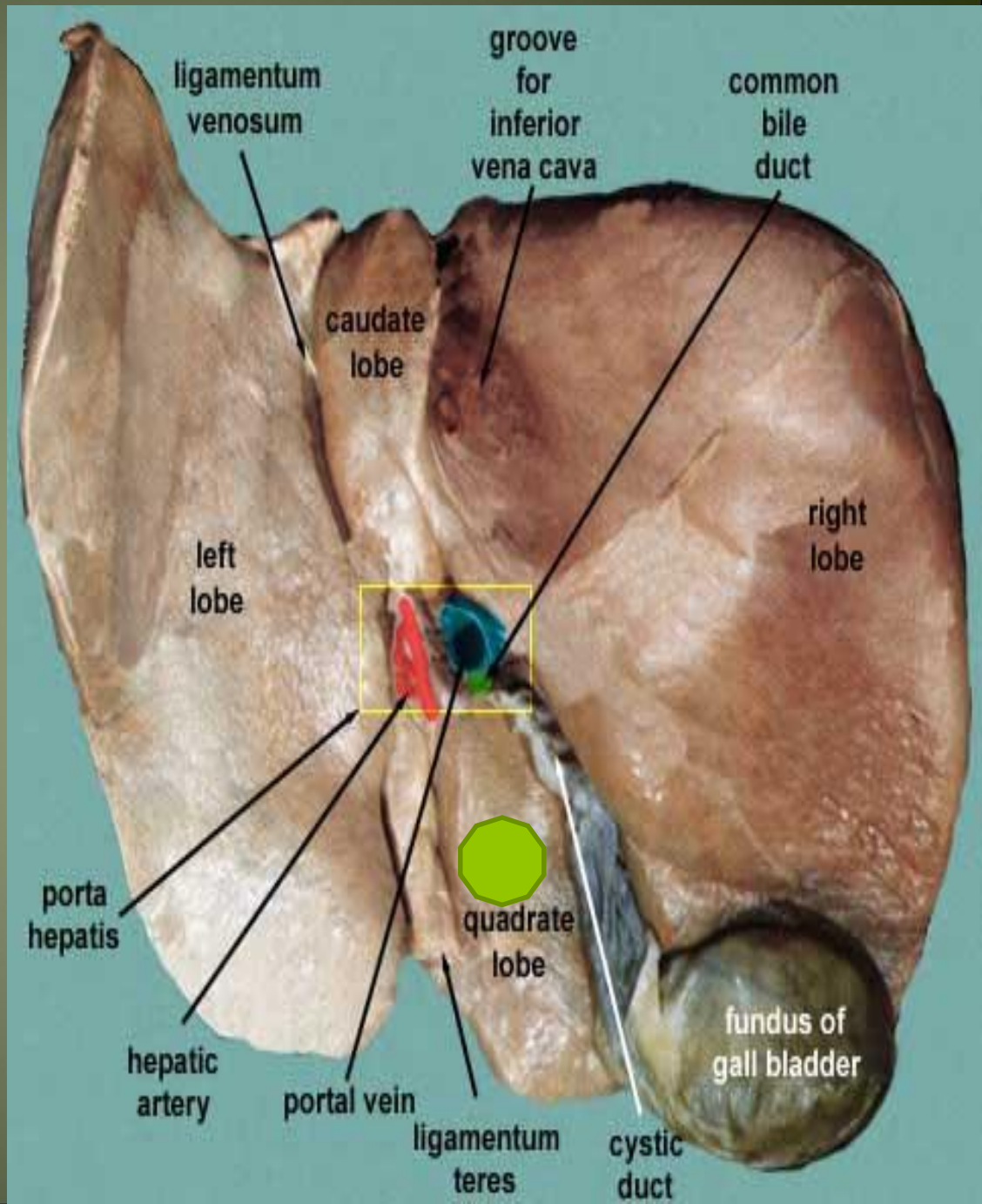


# Quadrate lobe

Present on the inferior surface from the Rt. Lobe

**Relation**

- **Ant.**→ anterior margin of the liver
- **Sup.**→ porta hepatis
- **Rt.** →fossa for the gallbladder
- **Lt**→ by the fossa for lig.teres



# Biliary tract anatomy

The left  hepatic duct drains 3 segmments of the left liver, and the right hepatic duct 4 segments of the right liver.  The right hepatic duct arises from the union of two main sectorial ducts: an anterior division draining segments 5 and 8 and a posterior division draining 6 and 7.

The caudate lobe (segment 1) has a variable drainage pattern, but in the majority (78%) drainage is into both main ducts.

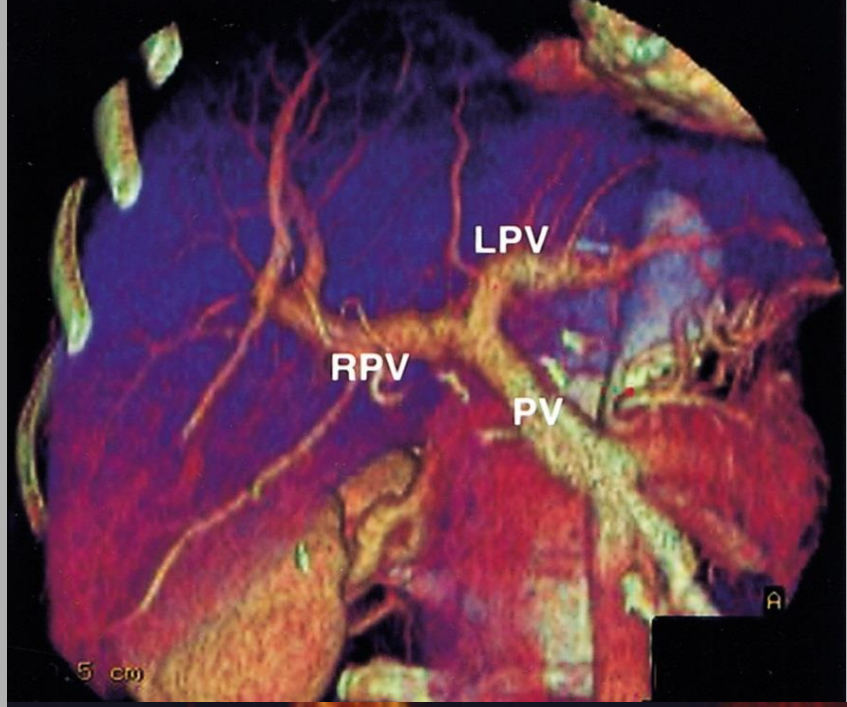
# Liver vascular supply

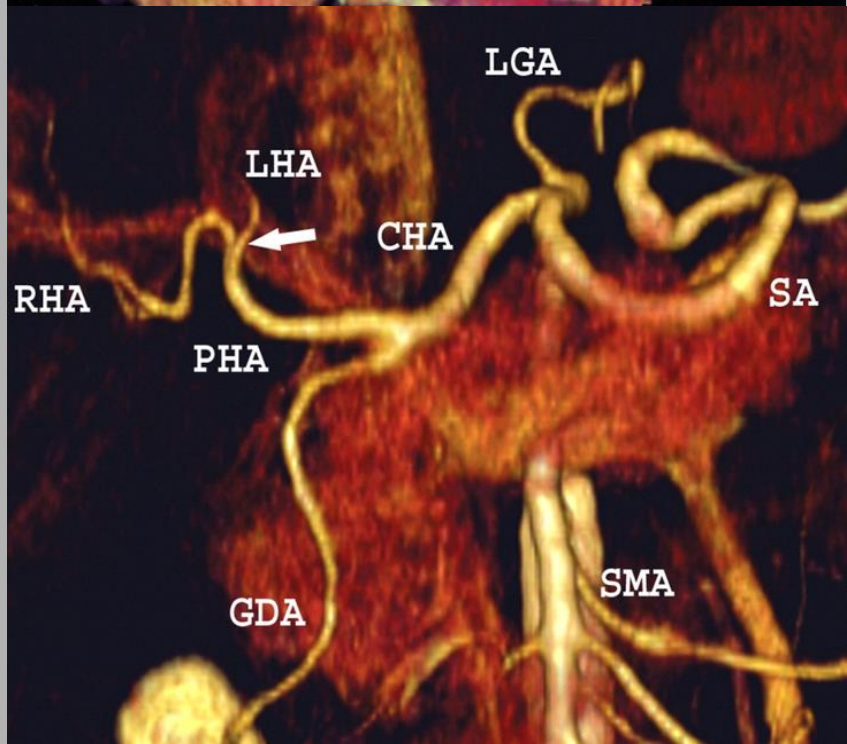
## 1- Portal supply:

The liver receives app. 2/3 of its blood supply from the portal vein.
Normally the superior mesenteric vein and splenic vein become confluent to form a single portal vein, which courses to the hepatic hilum and divides into the right end left branch.
Portal vein lenght – 6-7cm, diameter 6-13mm.

**2- Arterial supply** – hepatic artery proper 20- 30% of blood supply

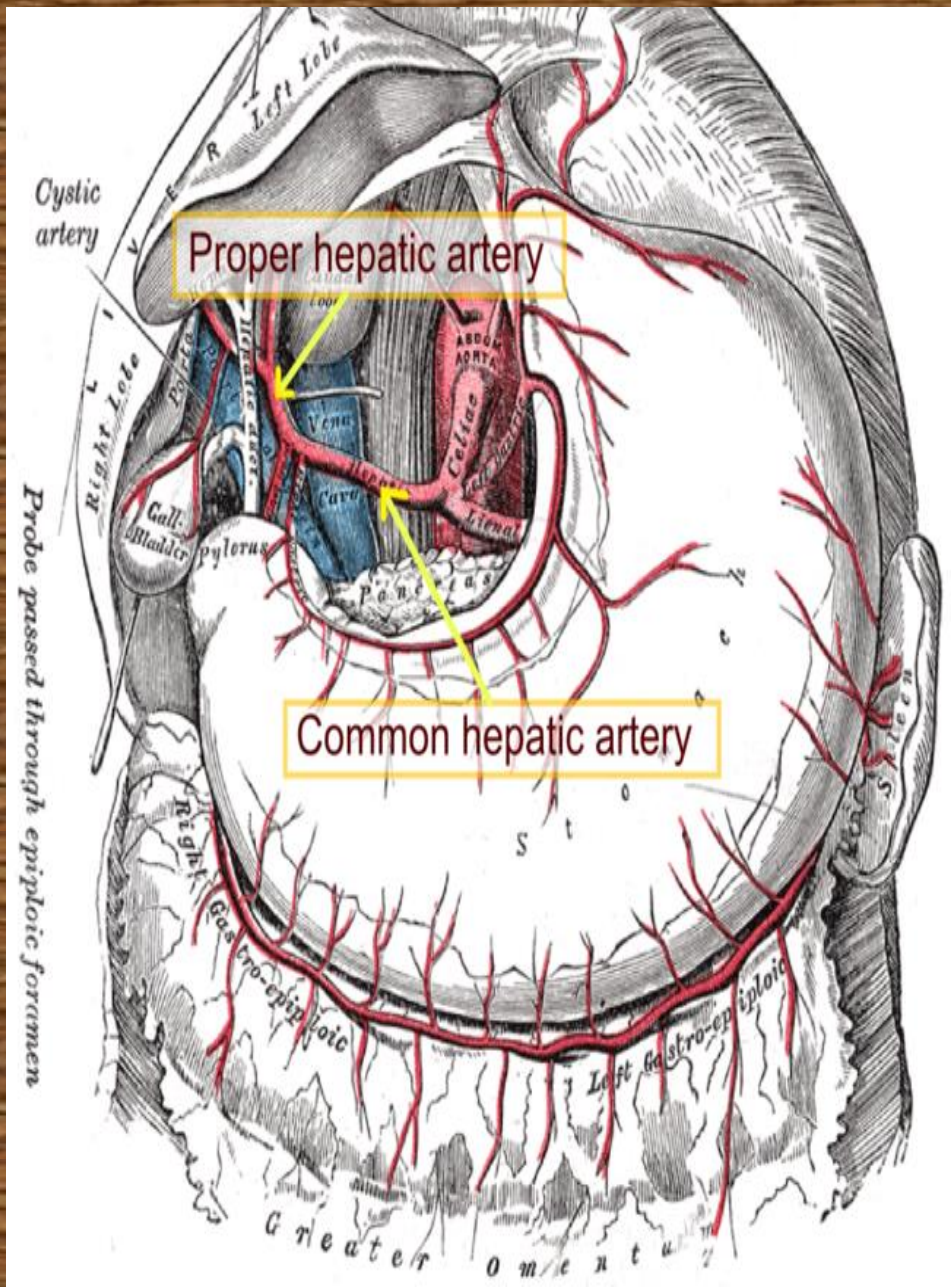
The usual arterial arrangement is for the common hepatic artery to arise as one of the three major branches of the coeliac trunk. After giving off the gastroduodenal artery , it continues as the main hepatic artery, which in turns divides into the right and left hepatic arteries.

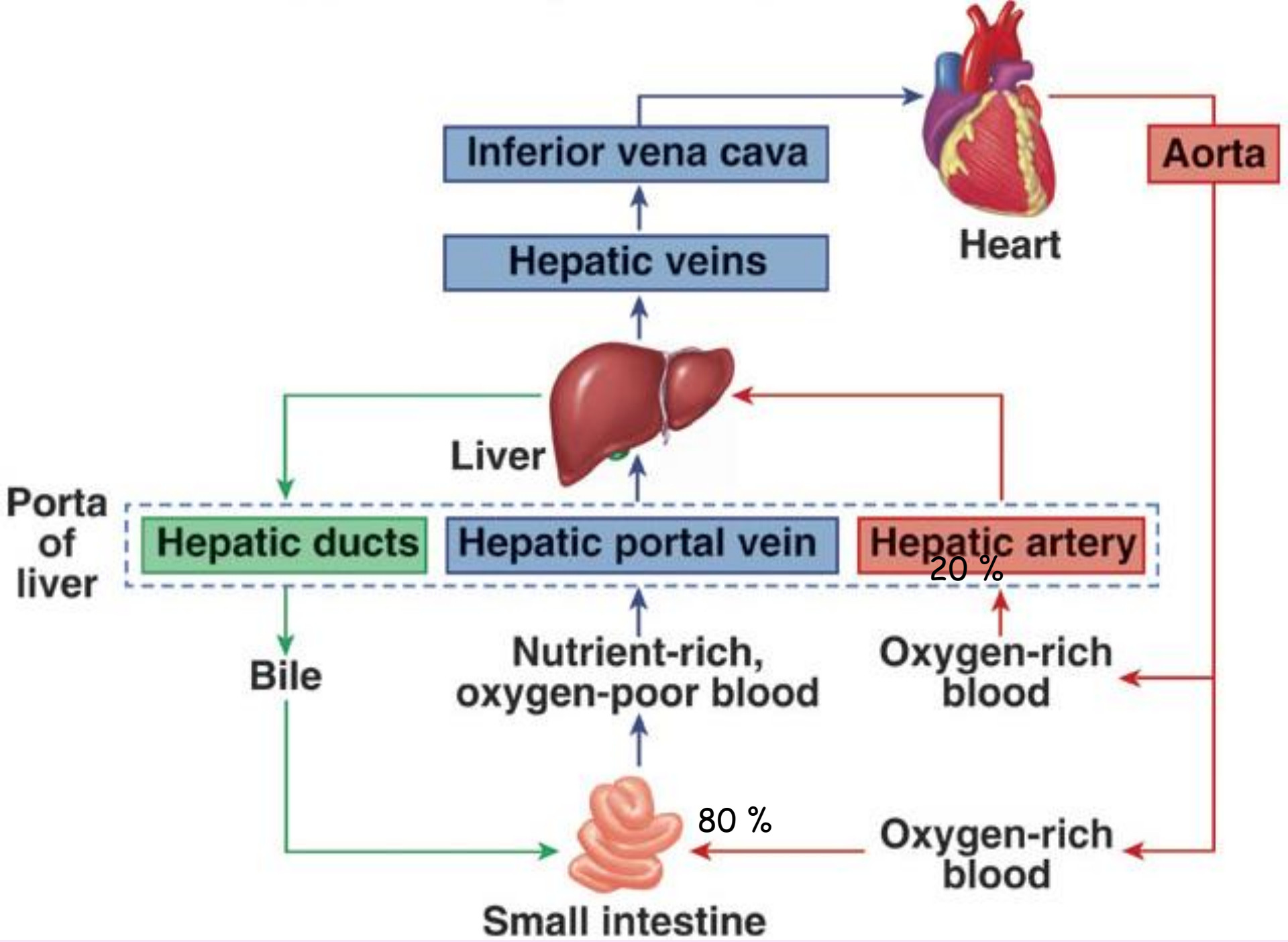


- Proper hepatic artery → The right and left hepatic arteries enter the porta hepatis.
- The right hepatic artery usually gives off the cystic artery, which runs to the neck of the gallbladder.
- Lamph : lamph nodes in hepatic porta , and to celiac nodes .
- Number of the lumph run from the bar area acros the diaphracm to lamphes nodes posterior mediastenom

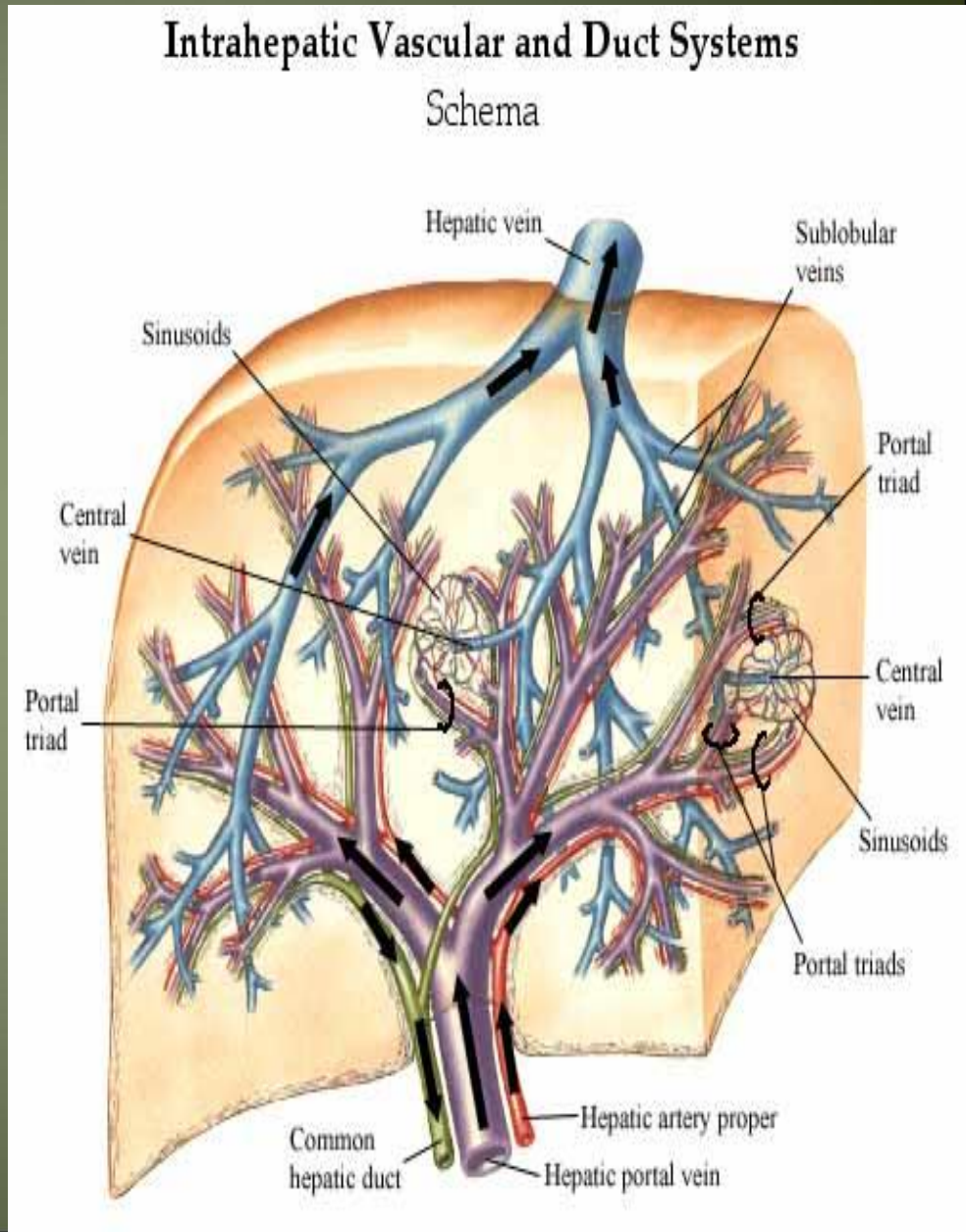
- Nerve: symp and para symp of the celiac plexus , branch to the liver ( ant vagus trunk)



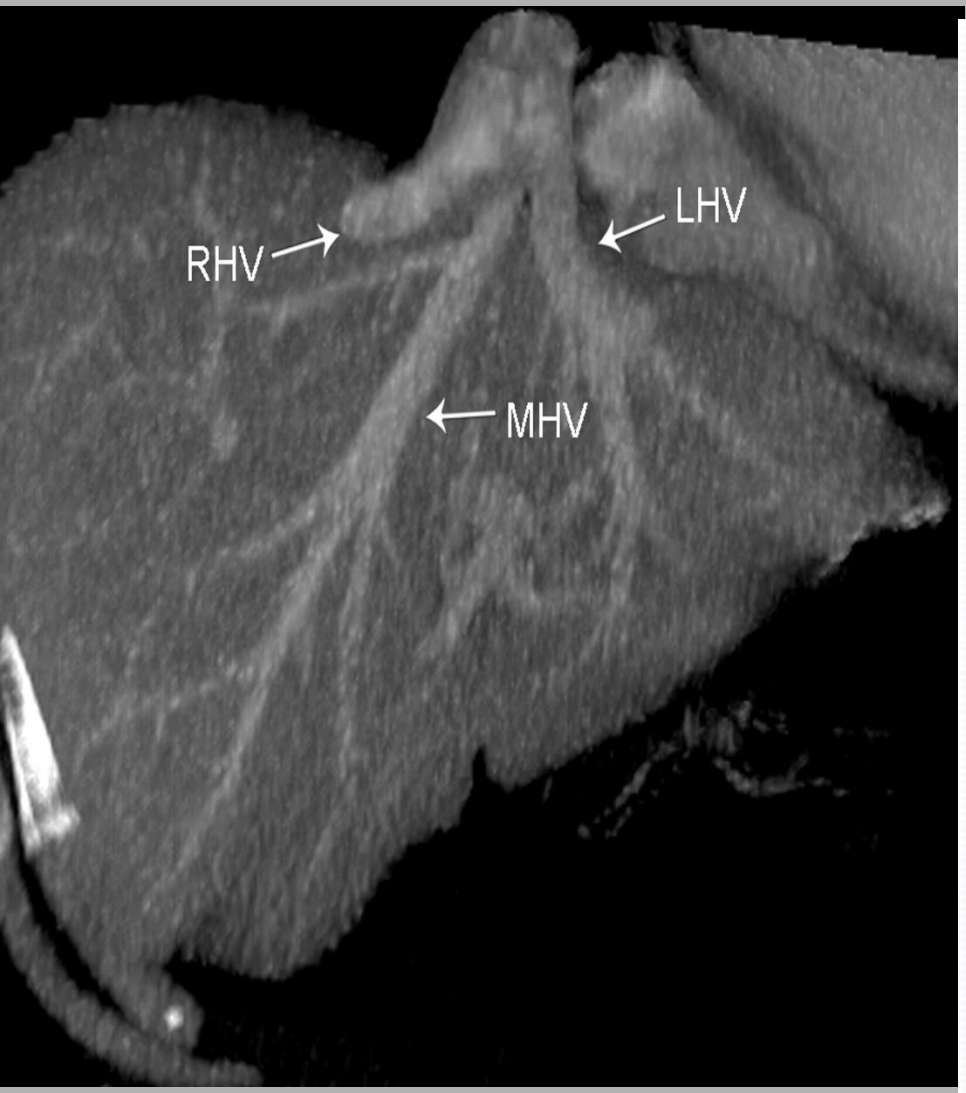

Inferior vena cava
Aorta
Heart
Hepatic veins
Liver
Porta of liver
Hepatic ducts
Hepatic portal vein
Hepatic artery
20 %
Bile
Nutrient-rich, oxygen-poor blood
Oxygen-rich blood
80 %
Oxygen-rich blood
Small intestine

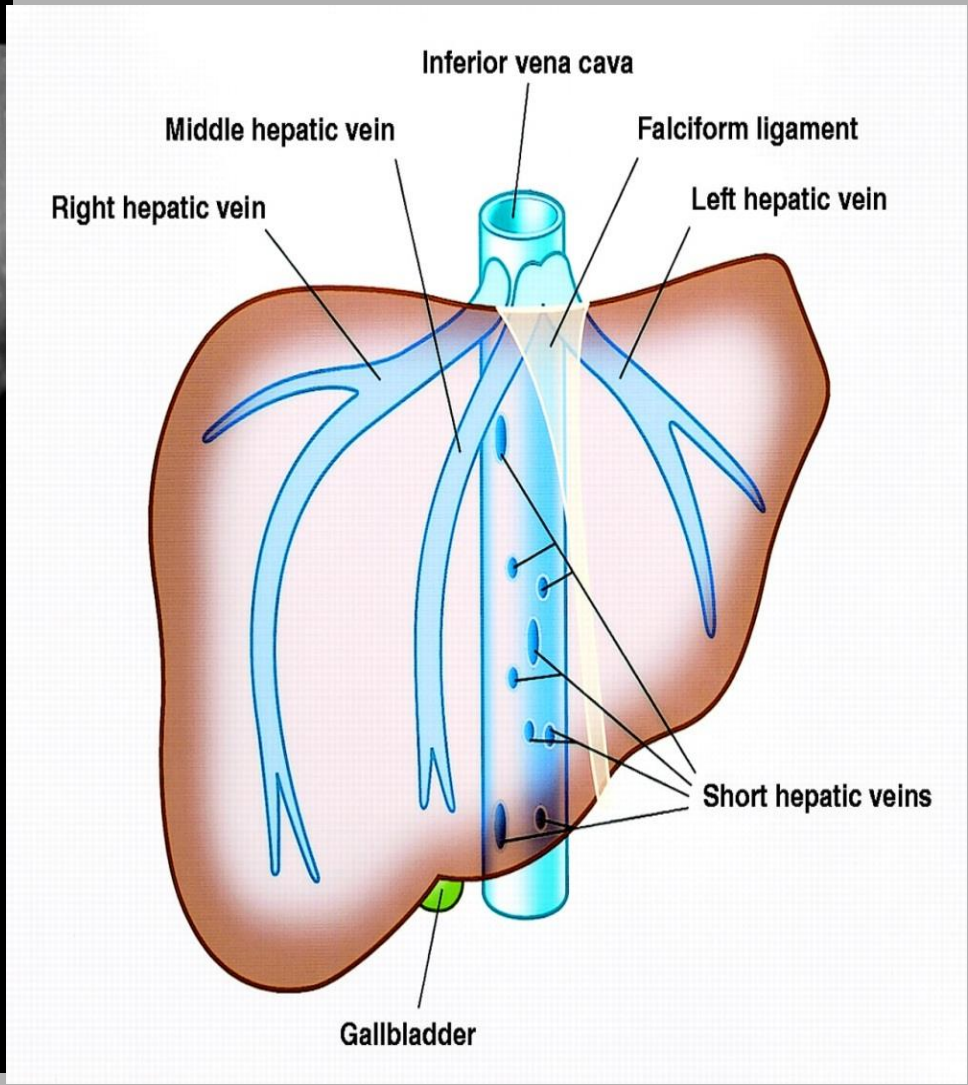
# Vein drainage of the liver

- The portal vein divides into right and left terminal branches that enter the porta hepatis behind the arteries.
- The hepatic veins (three or more) emerge from the posterior surface of the liver and drain into the inferior vena cava.

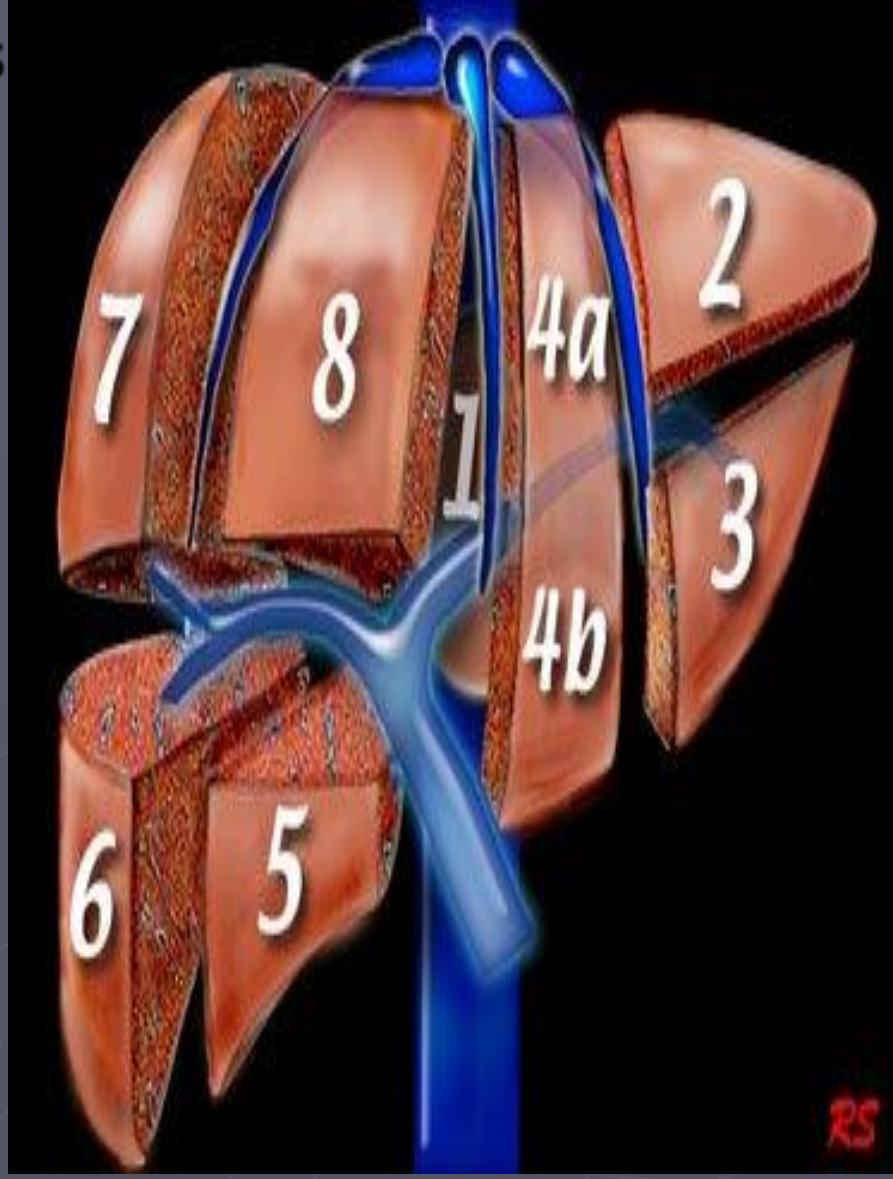


## Venous outflow – three major hepatic veins drain into the IVC



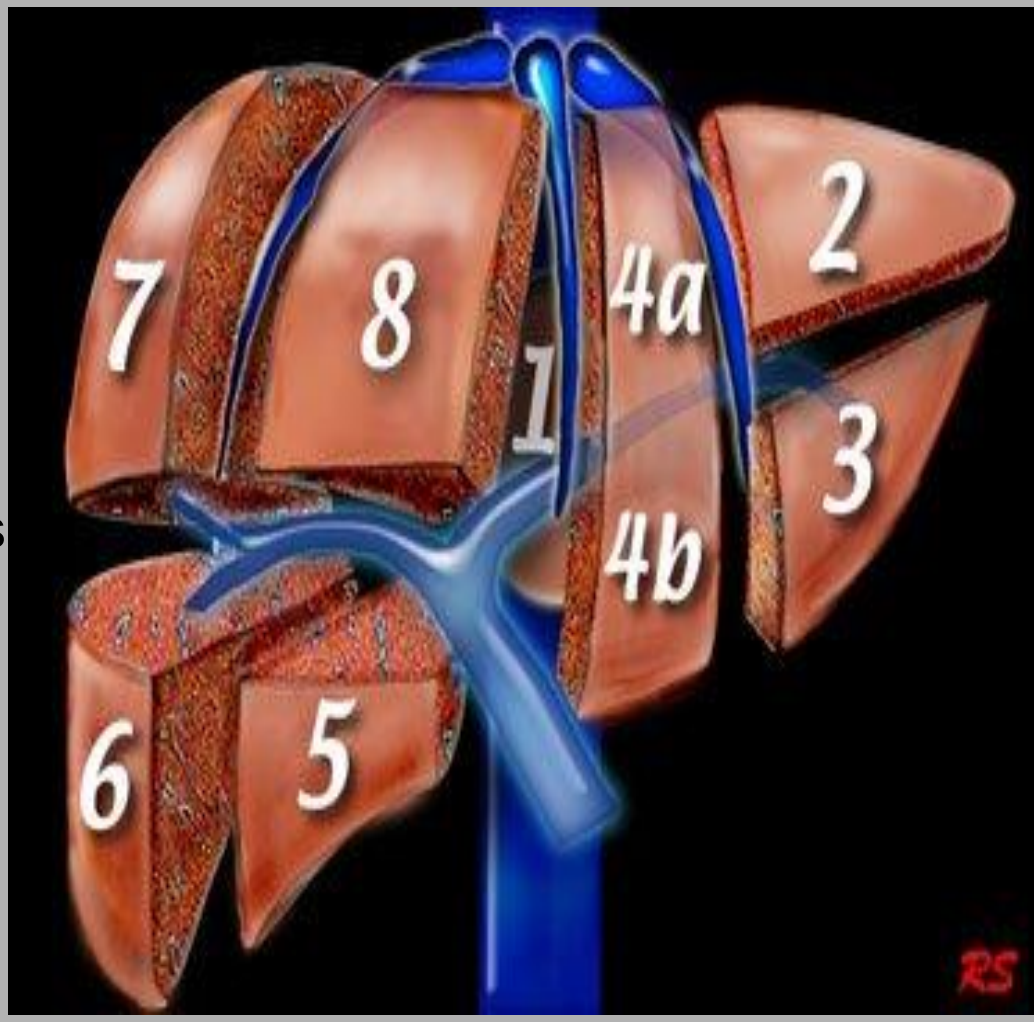
- **Right hepatic vein** divides the right lobe into anterior and posterior segments (segment 6& 7 usually not visulaized at the frontal view).
- **Middle hepatic vein** divides the liver into right and left lobes (or right and left hemiliver). This plane runs from the inferior vena cava to the gallbladder fossa (Cantlie's line)
- **Left hepatic vein** divides the left lobe into a medial and lateral part.
- **Portal vein** divides the liver into upper & lower segments.

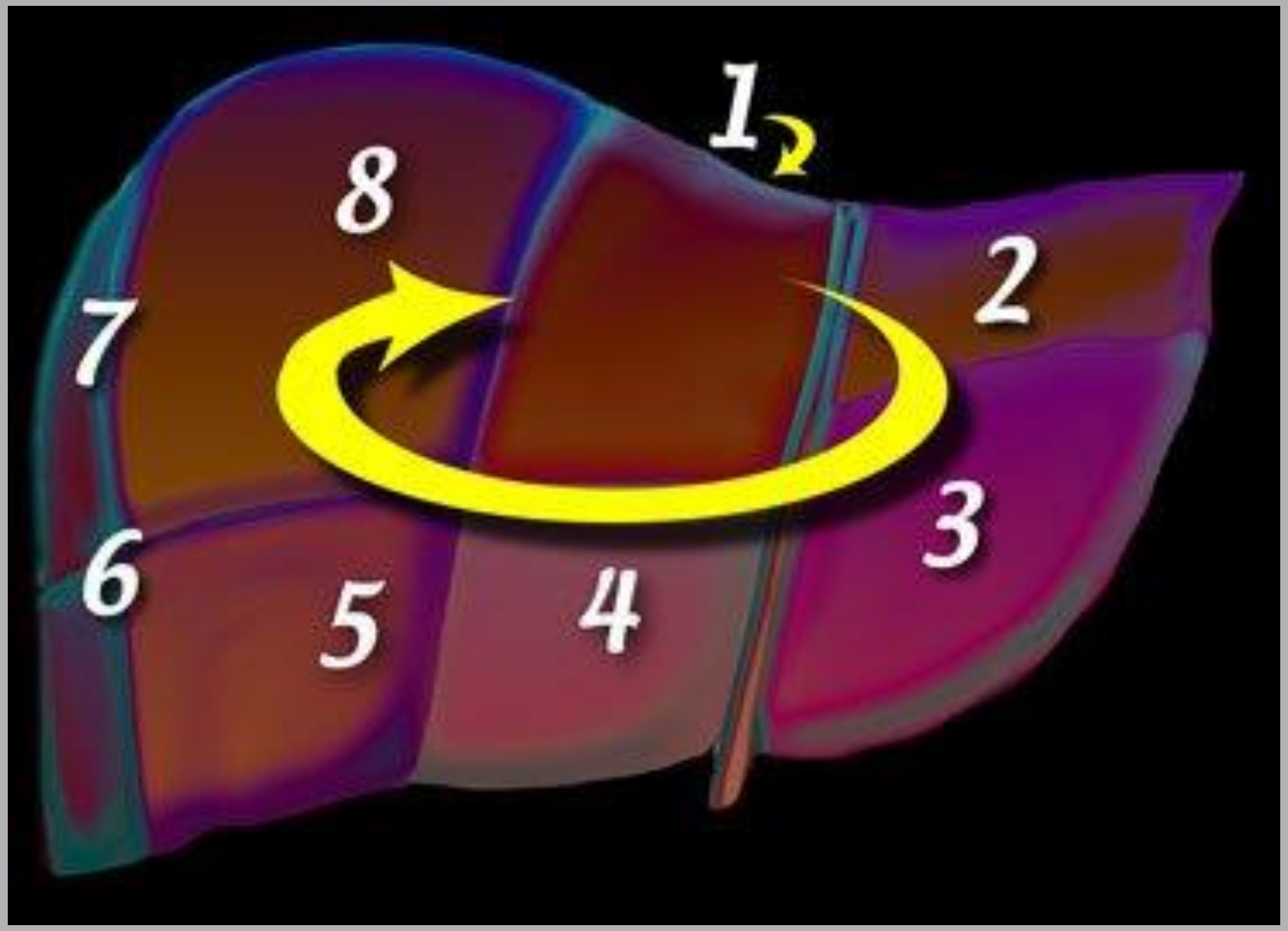


Couinaud divided the liver into a functional left and right liver by a main portal scissurae containing the middle hepatic vein. This is known as Cantlie's line.

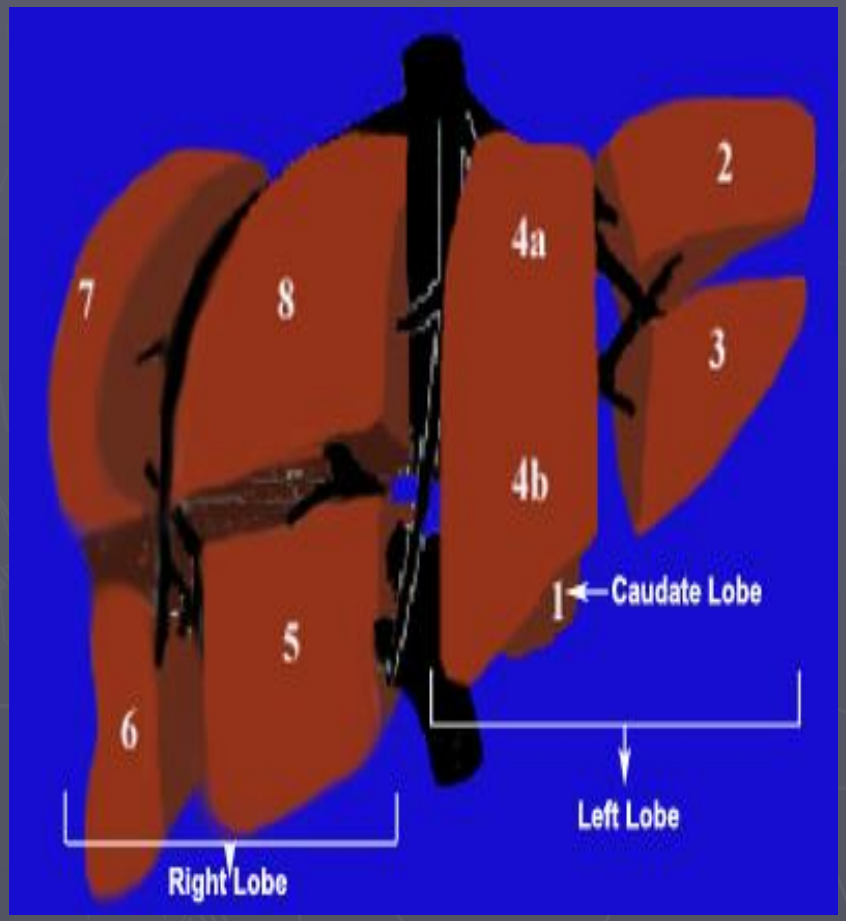
**Cantlie's line** runs from the middle of the gallbladder fossa anteriorly to the inferior **vena cava posteriorly**.

- Portal vein – superior and inferior segments
- Right hepatic vein – anterior and posterior segments of RL (5,6,7,8)
- Middle hepatic vein – Cantlie's line
- Left hepatic vein – medial and lateral segments of LL (4,2,3)



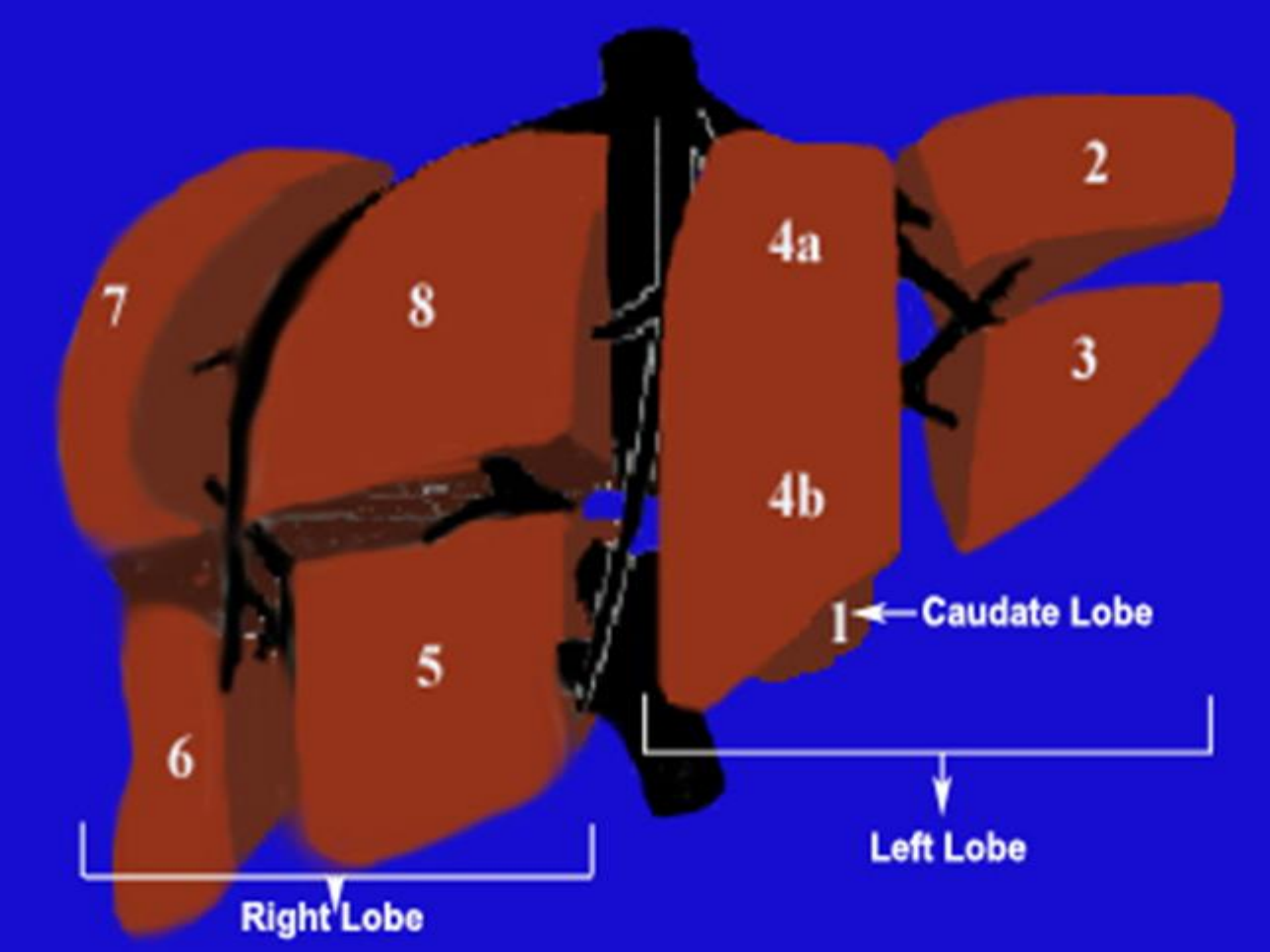


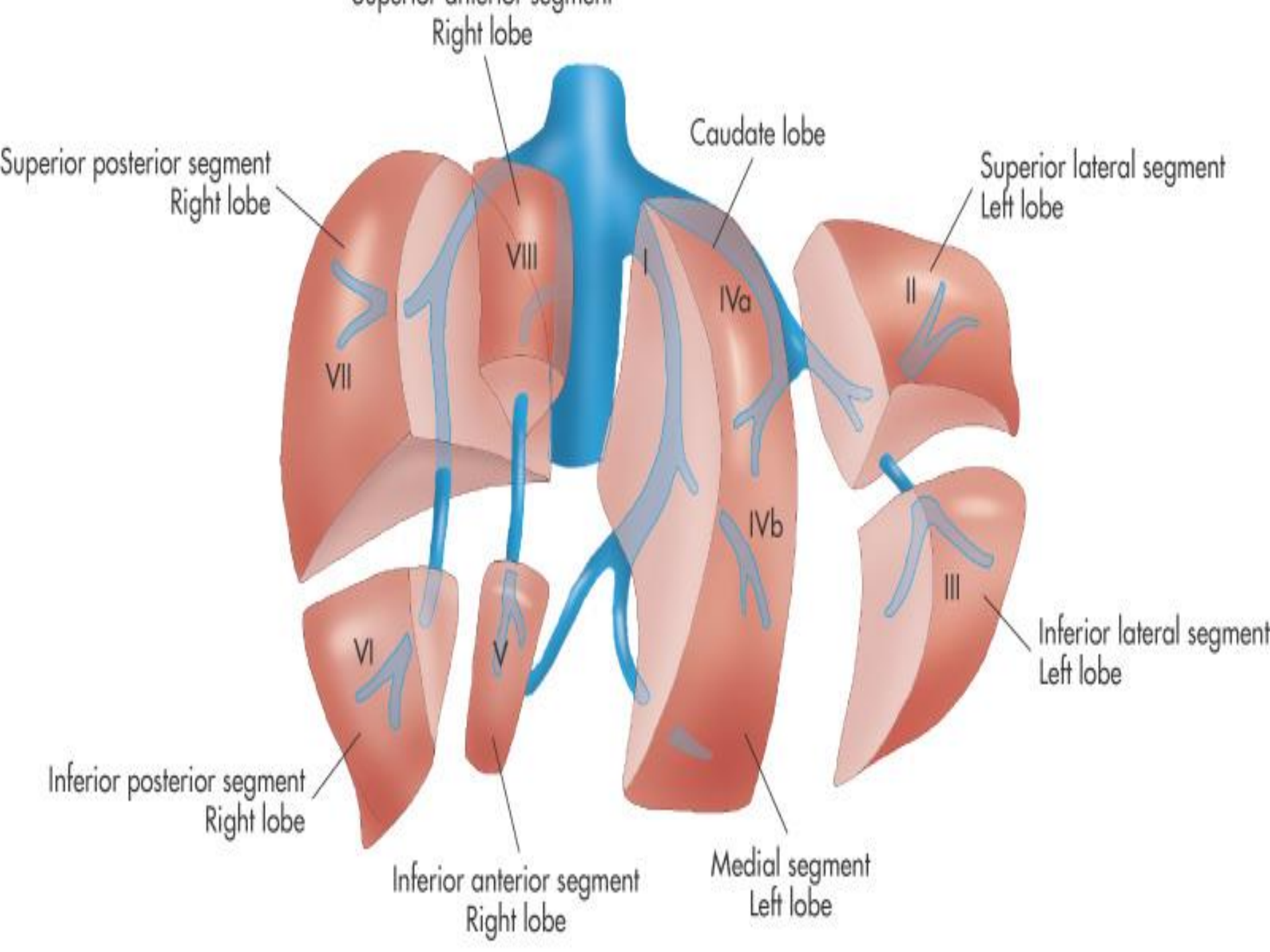

There are eight liver segments.
Segment 4 is sometimes divided into segment 4a and 4b according to Bismuth.
The numbering of the segments is in a clockwise manner (figure).
Segment 1 (caudate lobe) is located posteriorly. It is not visible on a frontal view.




- **Couinaud's numbering system:**

**1-Caudate Lobe (posteriorly)**
**2-Left Superior Lateral segment**
**3-Left Inferior Lateral segment**
**4a-Left Superior Medial segment**
**4b-Left Inferior Medial segment**
**5-Right Inferior Anterior segment**
**6-Right Inferior Postrior segment**
**7-Right Superior Postrior segment**
**8-Right Superior Anterior segment**


7
8
4a
2
3
4b
1
Caudate Lobe
5
6
Left Lobe
Right Lobe


Right lobe
Caudate lobe
Superior posterior segment
Right lobe
Superior lateral segment
Left lobe
VIII
I
IVa
II
VII
IVb
III
VI
V
Inferior lateral segment
Left lobe
Inferior posterior segment
Right lobe
Inferior anterior segment
Right lobe
Medial segment
Left lobe

Anatomical lobes

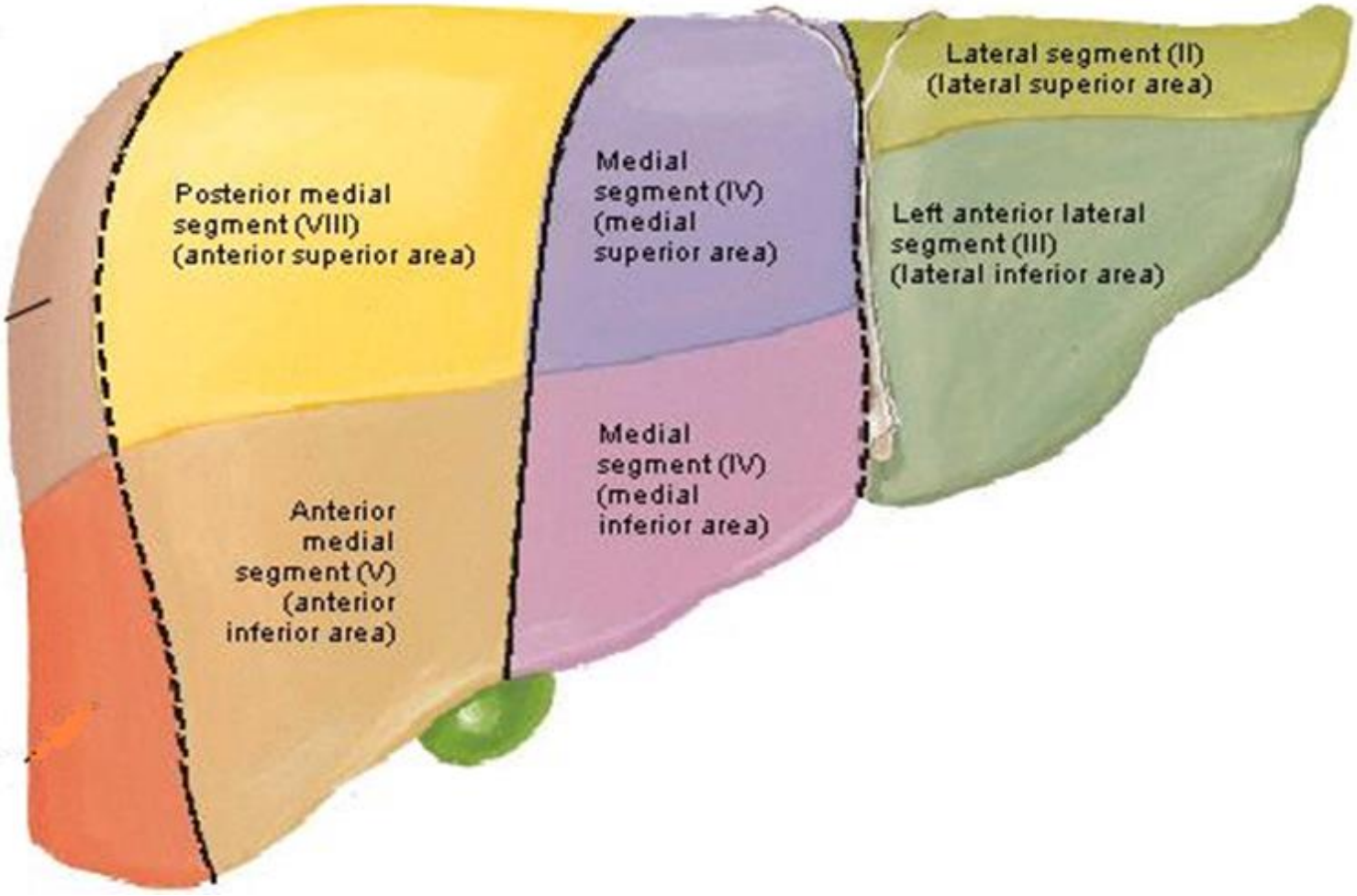
Right lobe

Left lobe

Functional segments

Right (part of) liver

Left (part of) liver



R
151
L
189

# Abdominal Aorta

- Extends from: T12. To L4
  - Aorta enters the abdomen through the aortic opening of the diaphragm
  - The opening lies in front of twelfth thoracic vertebra
  - It descends behind the peritoneum on the anterior surface of the bodies of the lumbar vertebrae
  - On its right side lies the inferior vena cava, the cisterna chyli and beginning of the azygos vein
  - On the left side lies the left sympathetic trunk
  - It divides into two common iliac arteries at the level of fourth lumbar vertebra
- Branches:

  Three unpaired anterior visceral branches.

  Three paired lateral visceral branches.

  Five paired lateral abdominal wall branches.

  Three terminal branches (one unpaired).

# Unpaired Anterior Visceral Branches

- Celiac trunk (artery):

1- Left gastric: To inferior esophagus, Travels in lesser omentum

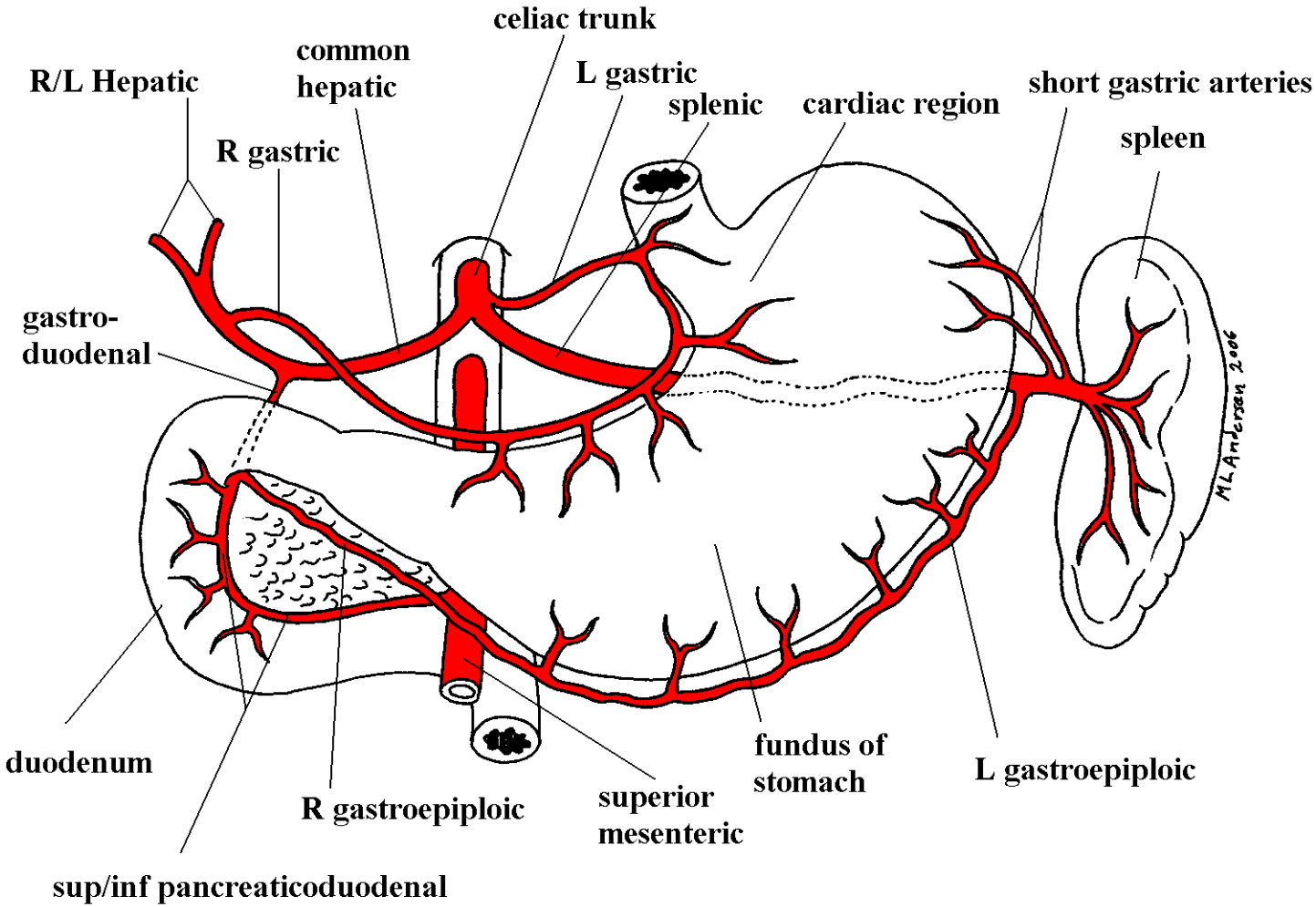
2- Splenic artery branches: Short gastric arteries (6). Left gastroepiploic artery, Splenic arteries (6).

3 - Hepatic branches: Right gastric Travels along lesser curvature of the stomach. Cystic artery.

- Gastroduodenal:

Right gastroepiploic

Superior pancreaticoduodenal


celiac trunk
common hepatic
R/L Hepatic
L gastric
splenic
cardiac region
short gastric arteries
spleen
R gastric
gastro-duodenal
ML Anderson 2006
duodenum
R gastroepiploic
superior mesenteric
fundus of stomach
L gastroepiploic
sup/inf pancreaticoduodenal

- Superior mesenteric artery:

  - Jejunal and ileal arteries.

  - Inferior pancreaticoduodenal artery:

  - Middle colic artery:

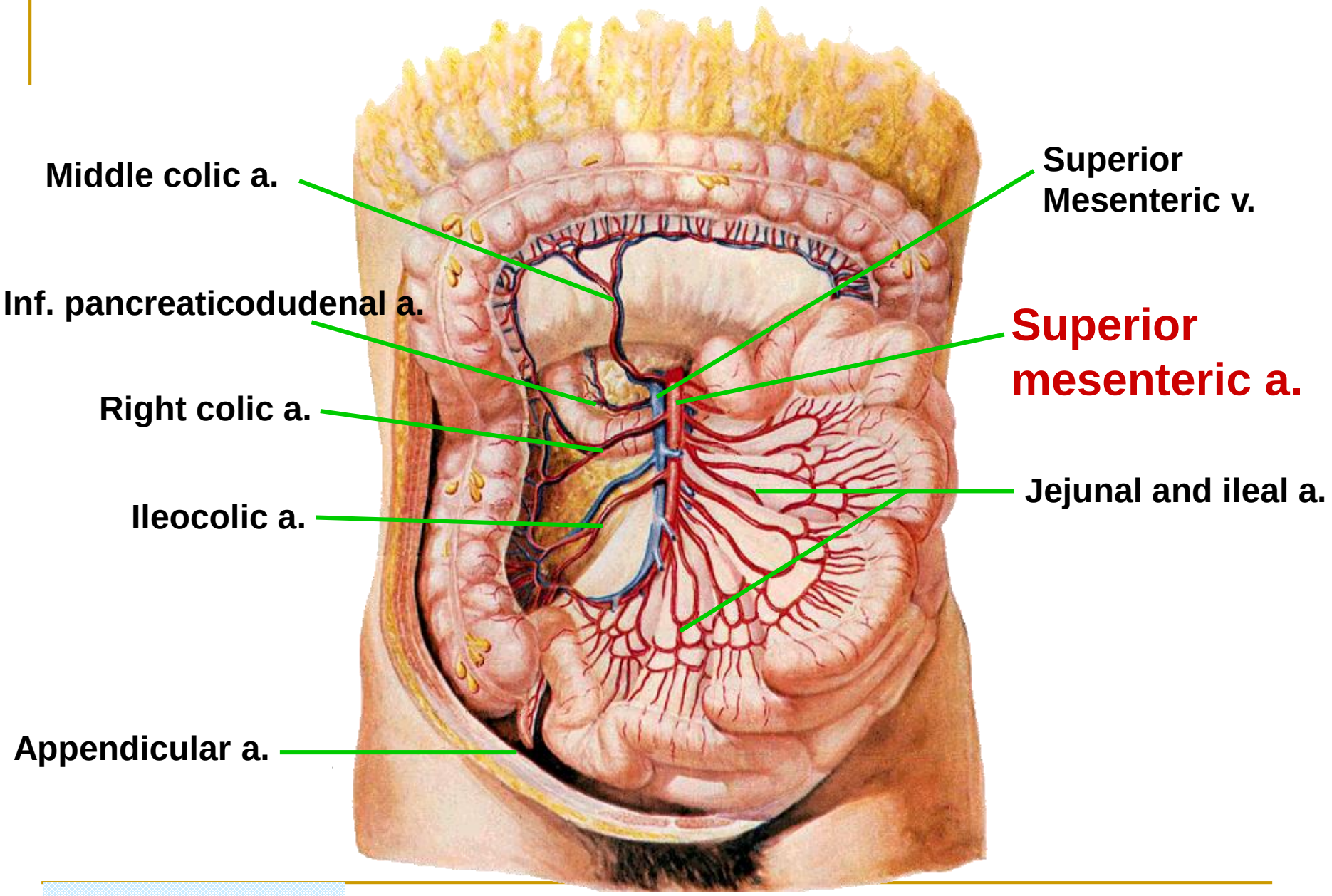
  -Right colic artery:Supplies ascending colon.

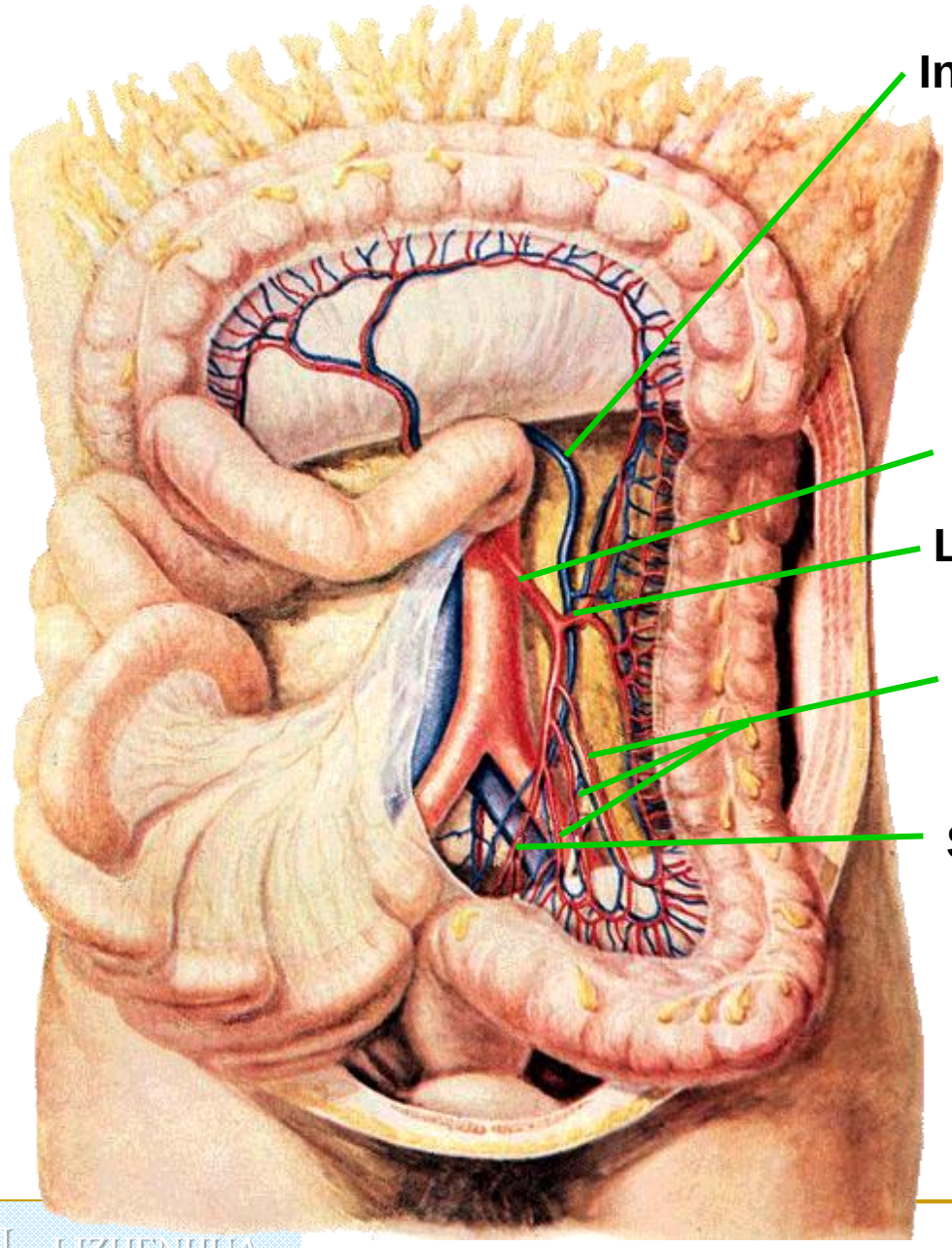
  - Ileocolic artery:Terminal branch. Supplies ileum, cecum and ascending colon. Appendicular artery.

- Inferior mesenteric artery:

  left colic artery ,Sigmoid arteries . Marginal artery

  Superior rectal artery: Terminal branch , Supplies proximal rectum.


Middle colic a.
Inf. pancreaticodudenal a.
Right colic a.
Ileocolic a.
Appendicular a.
Superior Mesenteric v.
Superior mesenteric a.
Jejunal and ileal a.

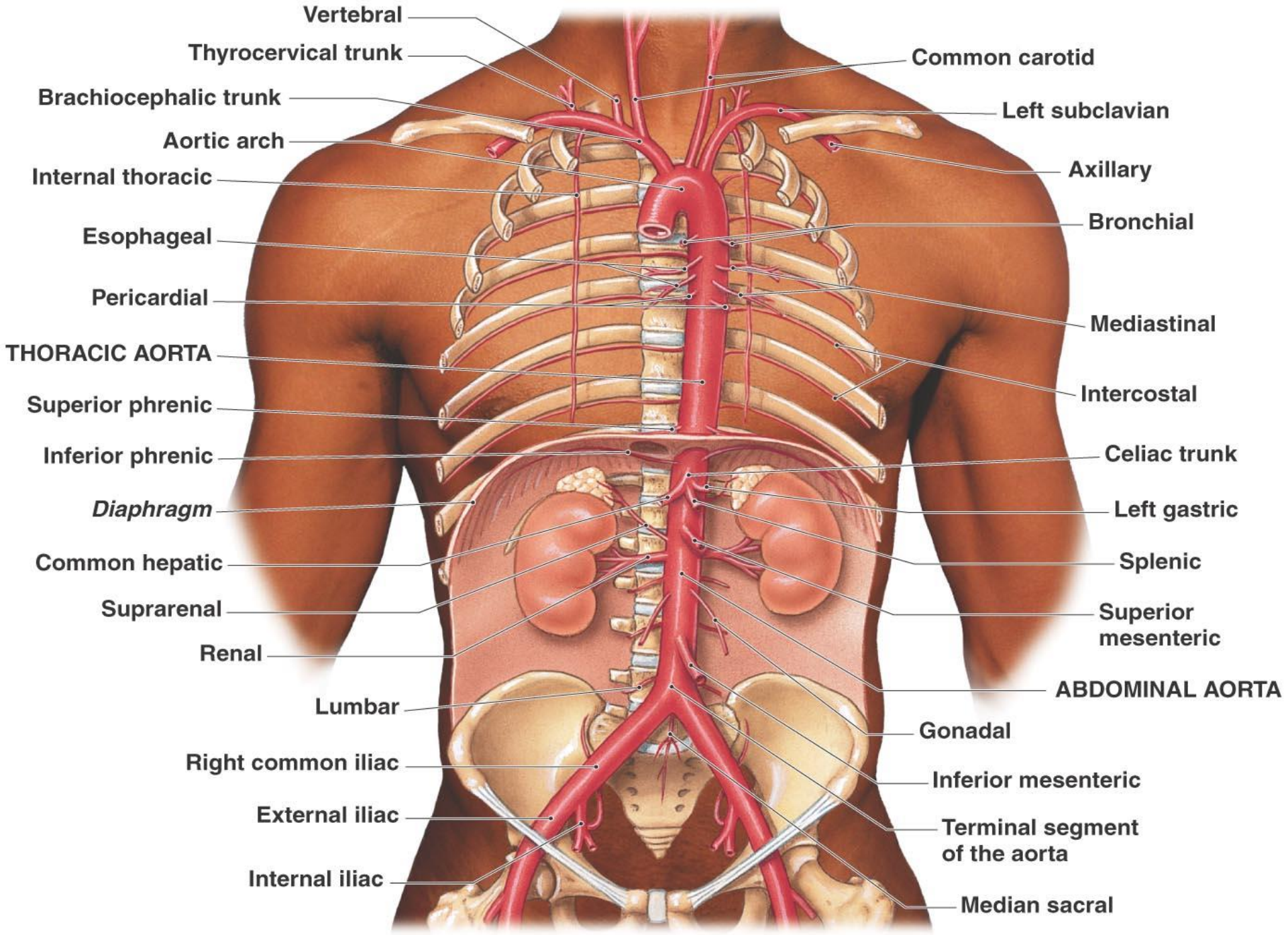

Inferior mesenteric v.
Inferior mesenteric a.
Left colic a.
Sigmoid a.
Superior rectal a.

## Paired Lateral Visceral Branches

- Suprarenal.
  Renal: Gives off five segmental arteries.
  Testicular or ovarian.
- Paired Lateral Abdominal Wall
- Inferior phrenic.
- Lumbar (4 pairs).

## Terminal Branches

- Common iliacs:
  External iliacs: Become femoral arteries distal to inguinal ligament.
  Inferior epigastrics, Deep circumflex iliacs
  Internal iliacs.
- Median sacral

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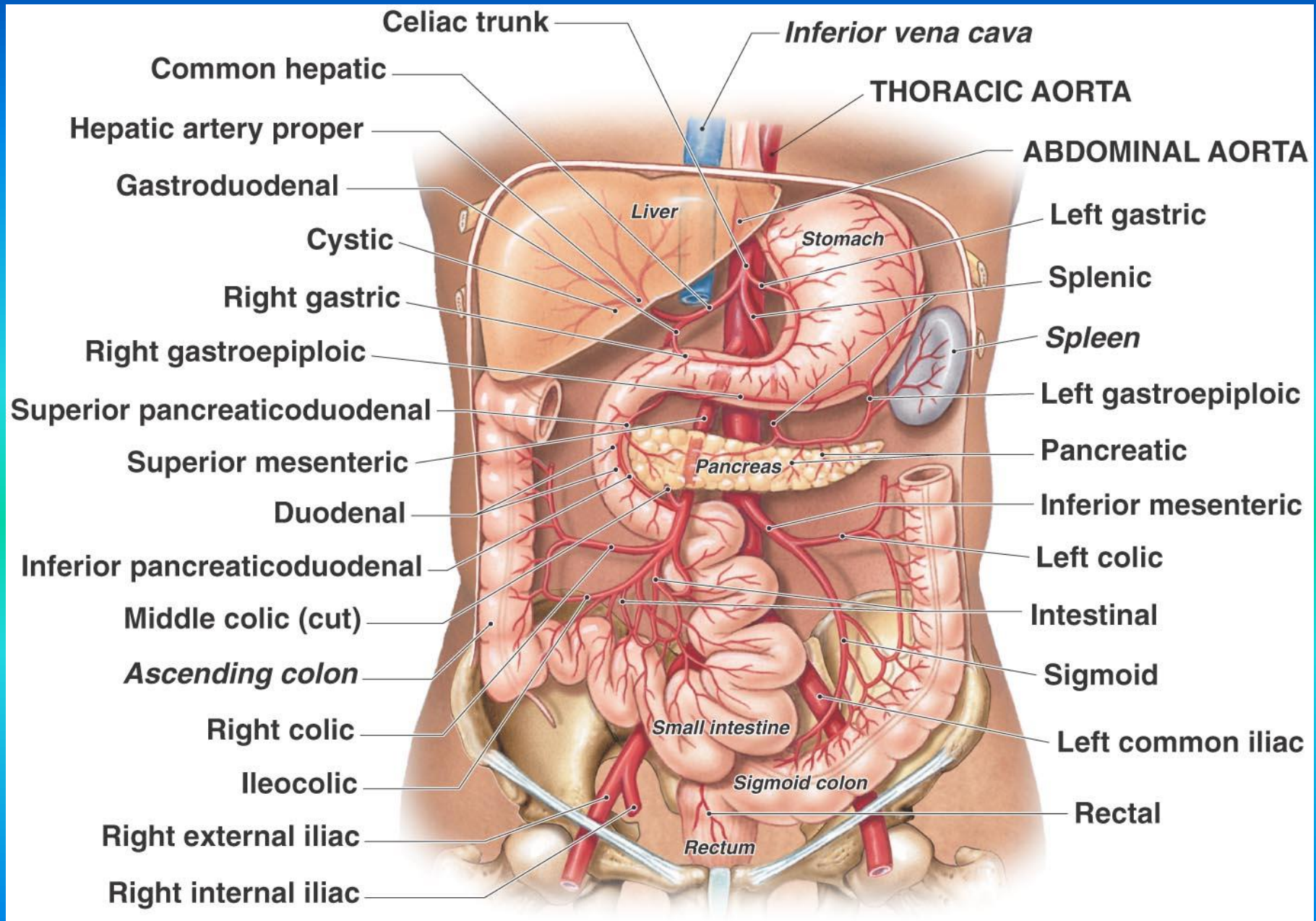


(a) Arteries supplying the abdominal organs (anterior view)

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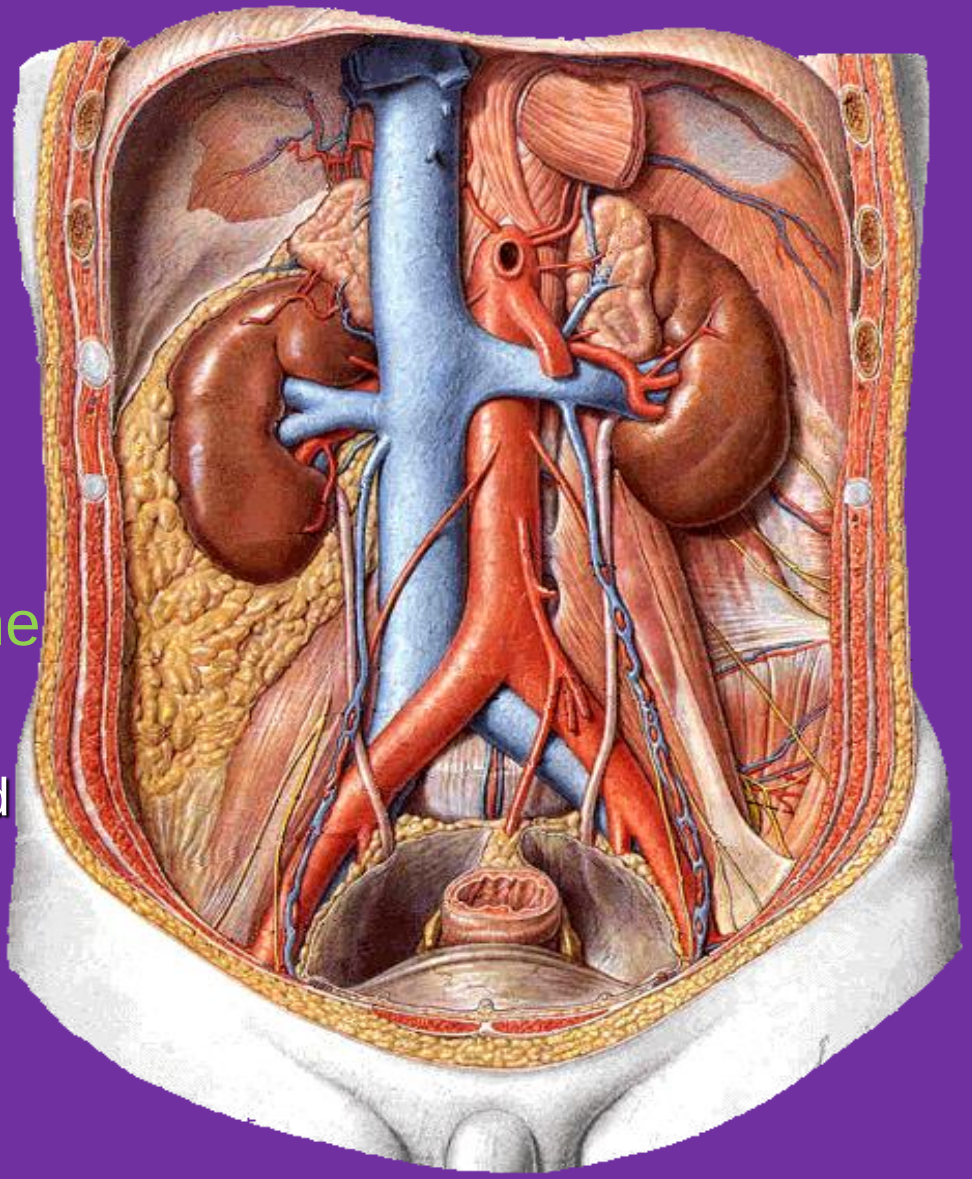
# Inferior vena cava

- Formed by union of two common iliac veins anterior and just to the right ofL4~L 5
- Ascends on the right side of aorta, pierces vena cava foramen of diaphragm at the level of T8, and drains into the right atrium
  - Right sympathetic trunk lies behind its right margin
  - Right ureter lies close to its right border



- Tributaries:

  Gonadal veins (testicular or ovarian): Dump into left renal vein on left).

  Renal veins.

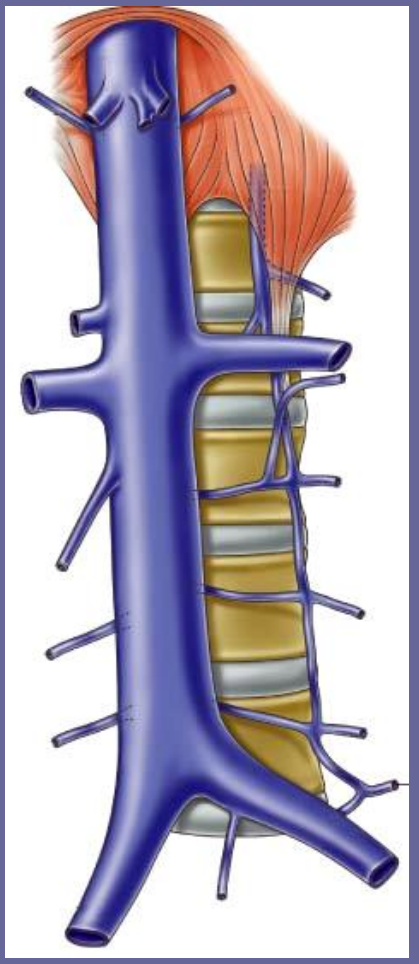
  Suprarenal veins: Dump into left renal vein on left.

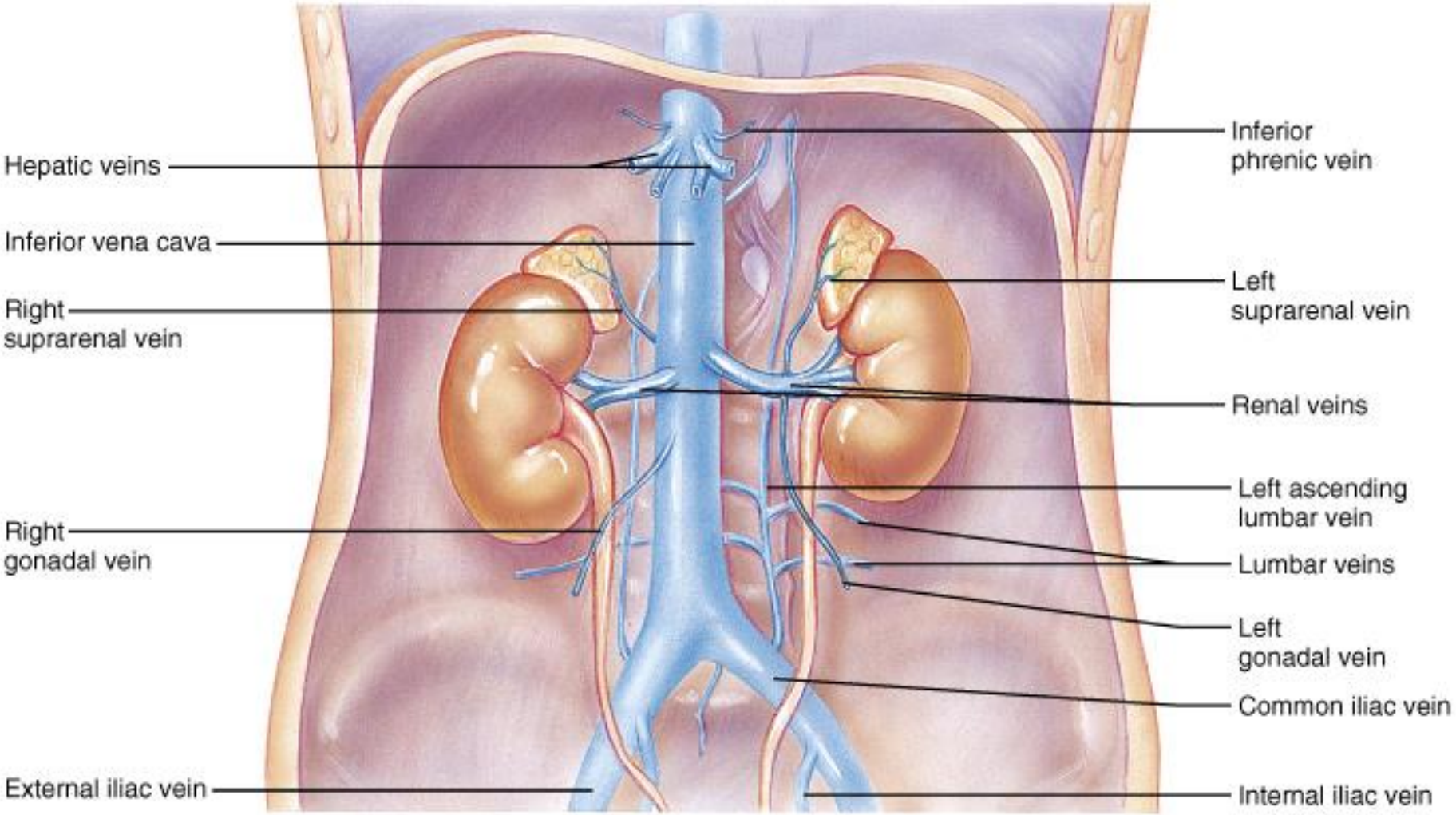
  - Inferior phrenic veins, and four lumbar veins
- Hepatic veins: Right, left, middle.
  - Three veins of origin: two common iliac veins and the median sacral vein

# Inferior vena cava

**Chief tributaries**

- **Parietal**
  - Paired inferior phrenic v.
  - paired lumbar v.  (four)
- **Visceral**
  - Right  and left renal veins
  - Right suprarenal vein (left drain into left renal vein)
  - Right testicular or ovarian v.  (left drain into left renal vein)
  - Hepatic veins : right, left and intermediate






**(b)**

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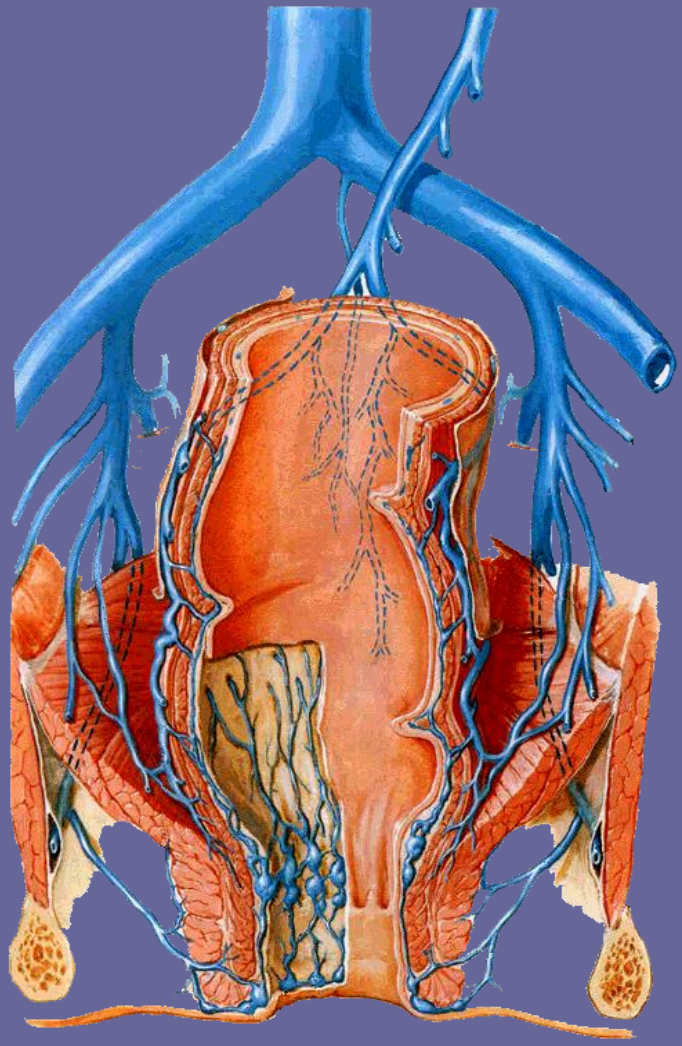
# Veins of pelvis

- **Internal iliac vein**
  - Parietal tributaries: accompany with arteries
  - Visceral tributaries
- **External iliac vein**– accompany the artery
- **Common iliac vein**– formed by union of internal and external iliac veins in front of sacroiliac joint, end upon L4~L5 by uniting each other to form inferior vena cava

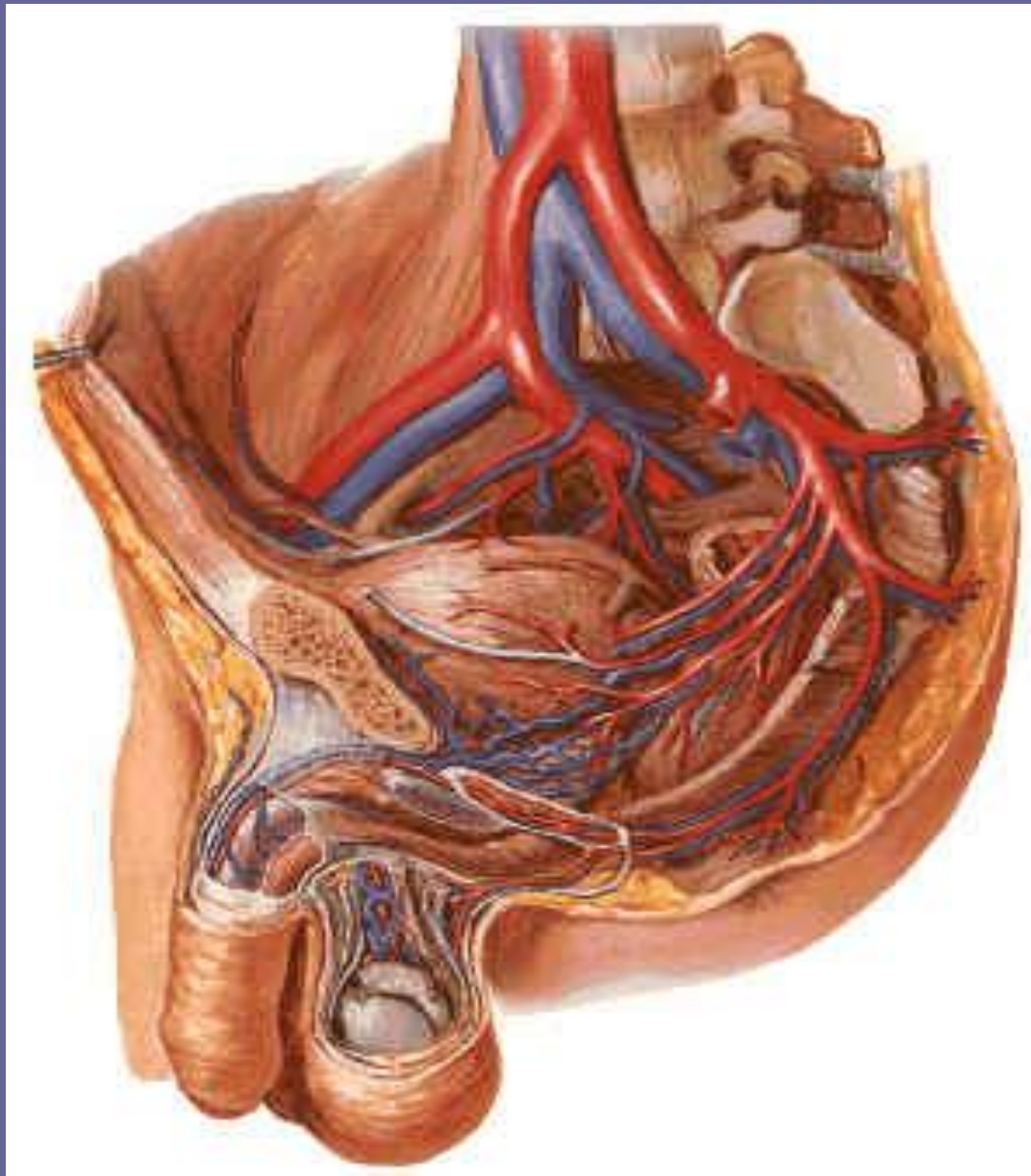


# Veins of the Pelvis

## Internal iliac vein

### A. Parietal Tributaries:

1. Superior gluteal v.
2. Inferior gluteal v.
3. Obturator v.
4. Lateral sacral v.



# Veins of the Pelvis

## B. Visceral Tributaries

**1. Rectal venous plexus**

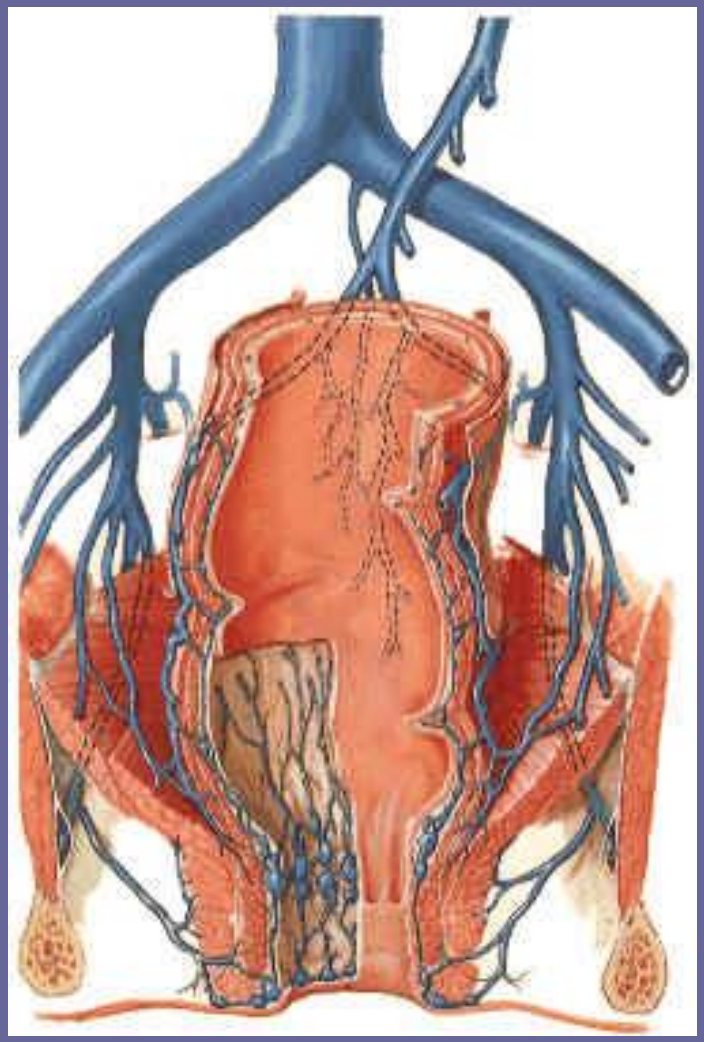
- →superior rectal vein→inferior mesenteric v.
  →inferior rectal vein→internal iliac v.
  →anal vein→internal pudendal v.

2. Vesical venous plexus →vesical v.

3. Uterine venous plexus →uterine v.

4. **Veins of perineum**

- **internal pudendal v.**



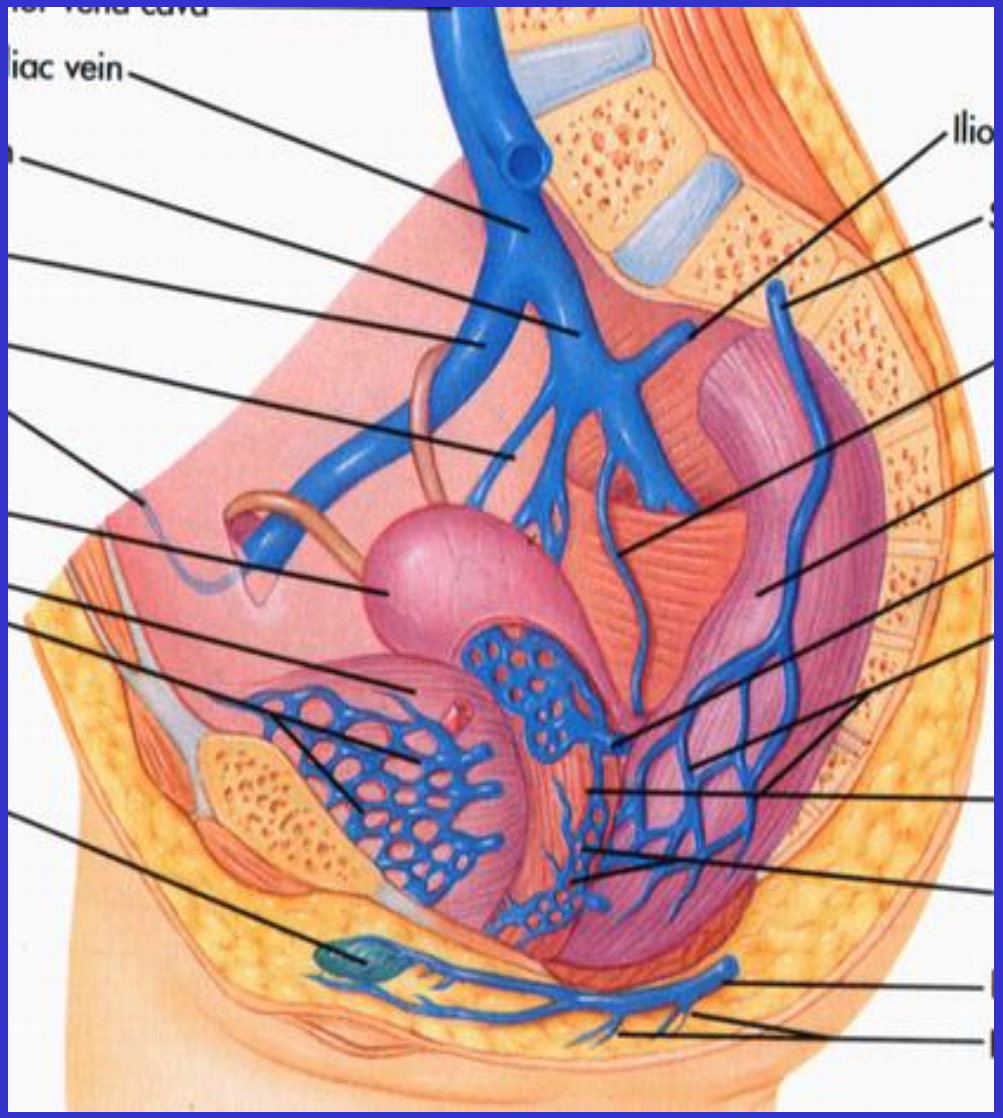
# Veins in Pelvis

**Internal iliac vein**

**The venous plexuses in the pelvis are:**

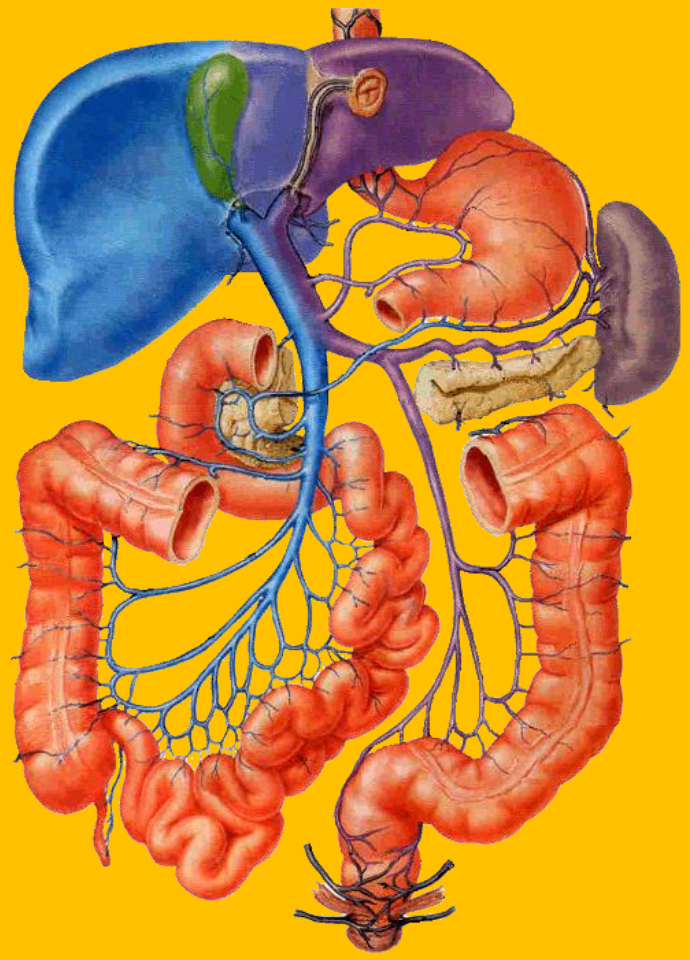
**1)Vesical venous plexus**
**2)Uterine venous plexus**
**3)Rectal venous plexus**

**All the plexuses lack valves to enable the blood to freely flow forward or backward (bi-directional flows).**



# Hepatic portal vein

- Formed behind the neck of pancreas by the union of superior mesenteric vein and splenic vein
- Ascends upwards and to the right, posterior to the first part of duodenum and then enters the lesser omentum to the porta hepatis, where it divides into right and left branches
- There are no functioning valves in hepatic portal system
- Drains blood from gastrointestinal tract from the lower end of oesophagus to the upper end of anal canal, pancreas, gall bladder, bile ducts and spleen



# Portal Vein

## Tributaries :

- Superior mesenteric vein:

  Middle colic vein (drains transverse colon).

  Right colic vein (drains ascending colon).

  Ileocolic vein (drains ileum, ileocecal junction, cecum, and ascending colon).

  Ileal vein (drains ileum).

  Right gastroepiploic vein (drains right aspect of greater curvature of stomach).

  Pancreaticoduodenal (drains duodenum and head of pancreas).

- Splenic vein:

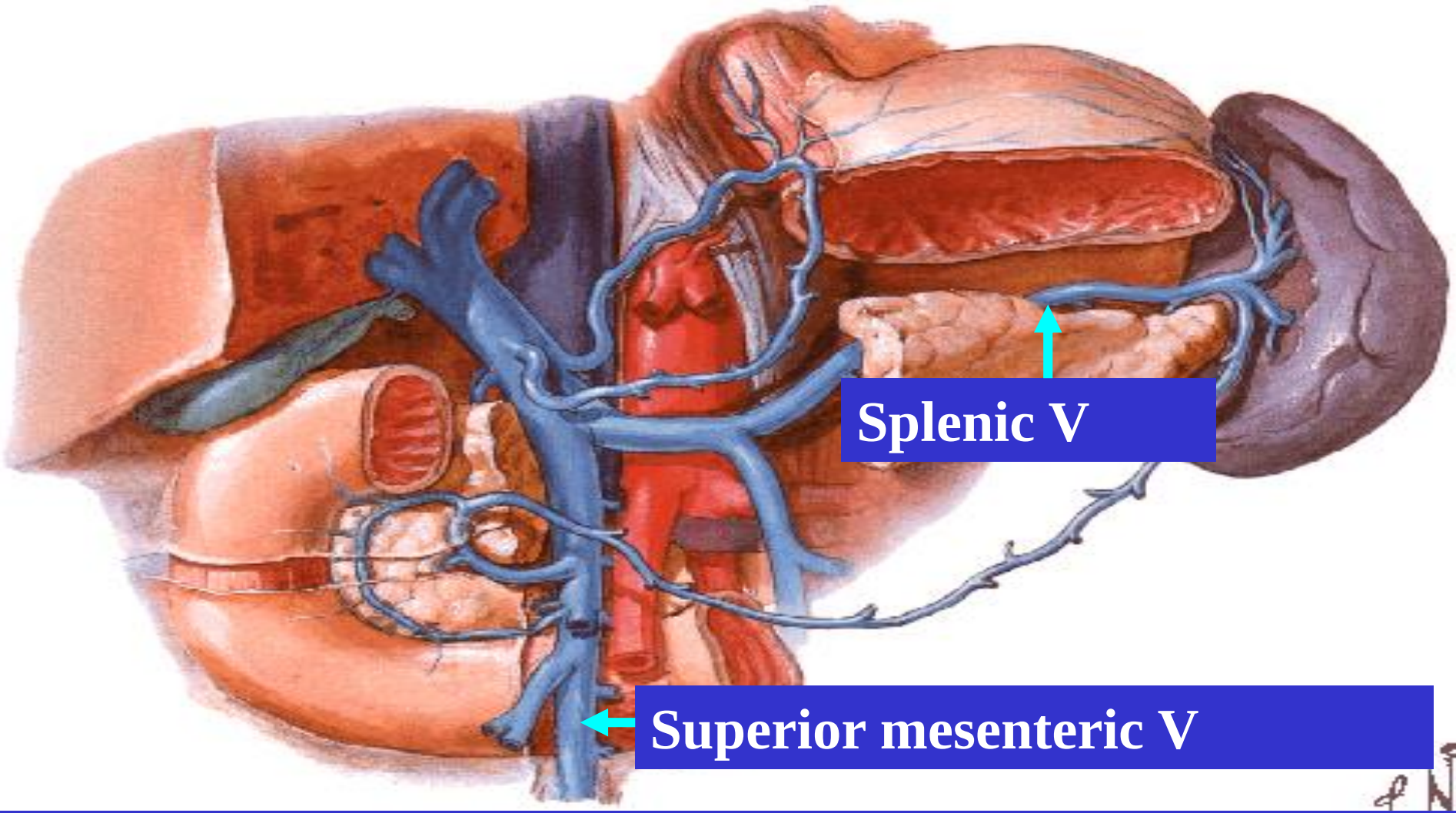
  Right gastric vein (lesser curvature of stomach).

  Left gastric vein (lesser curvature of stomach).

  Paraumbilical vein (umbilical region).

# Hepatic Portal

splenic V, superior mesenteric V
(both union behind the head of pancreas)



# 4.Tributaries of Hepatic Portal Vein

(1) Splenic V

(2) Superior mesenteric V

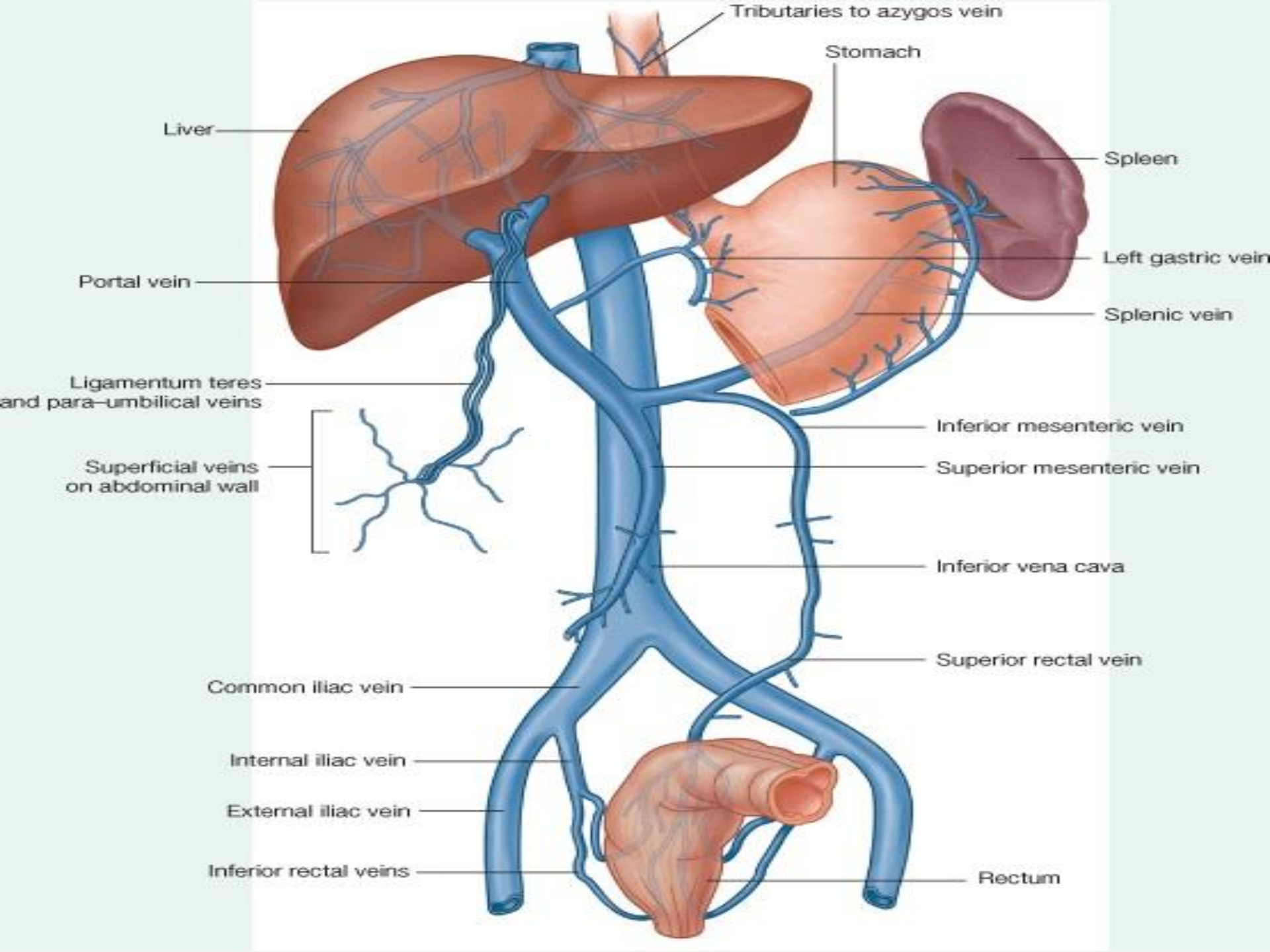
(3) Inferior mesenteric V

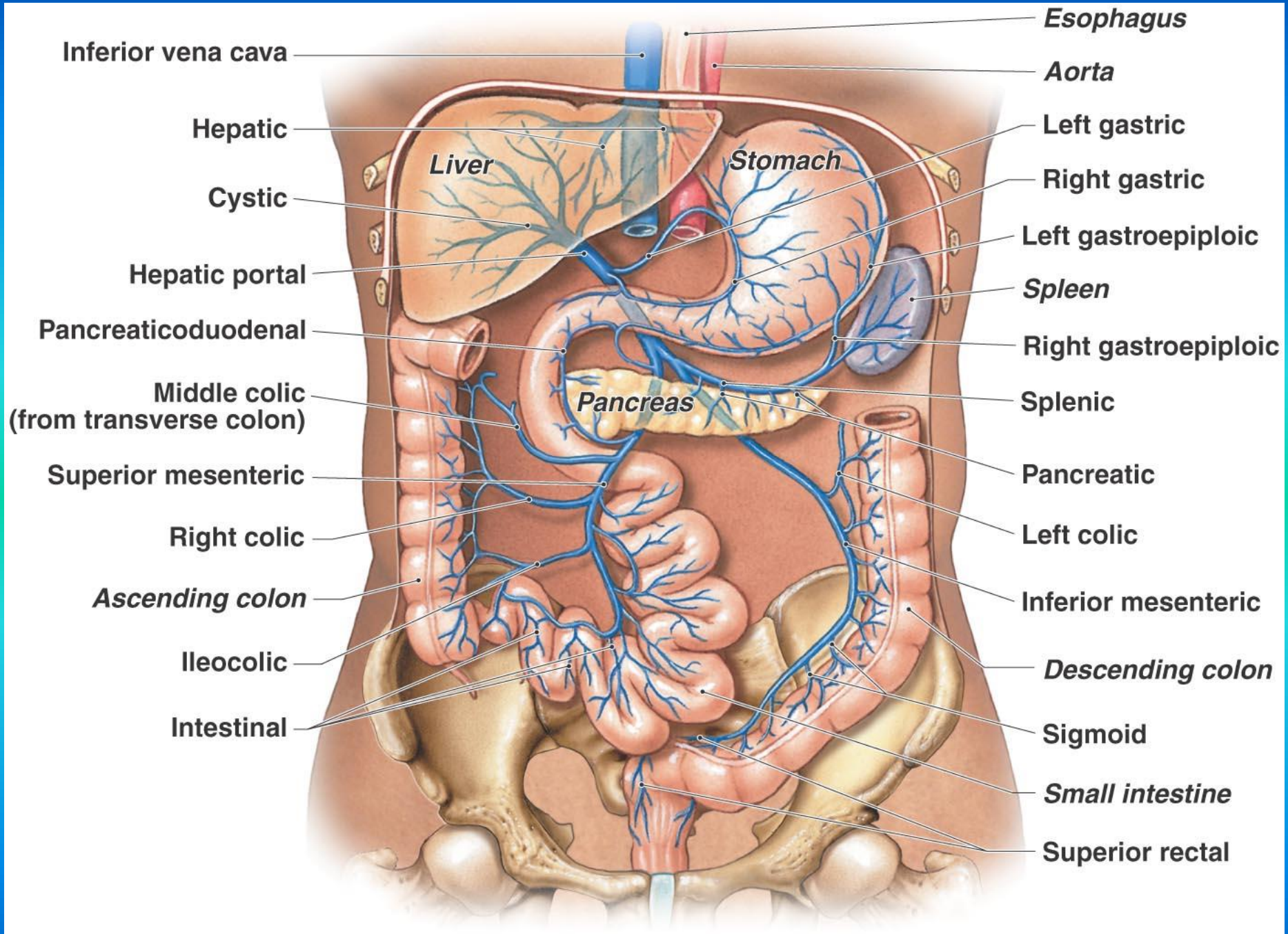
(4) Left gastric V

5- right gastric v

6. Cystic v.

7. Paraumbilical v.


Tributaries to azygos vein
Stomach
Liver
Spleen
Left gastric vein
Portal vein
Splenic vein
Ligamentum teres
and para–umbilical veins
Inferior mesenteric vein
Superficial veins
on abdominal wall
Superior mesenteric vein
Inferior vena cava
Superior rectal vein
Common iliac vein
Internal iliac vein
External iliac vein
Inferior rectal veins
Rectum

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# Portal-systemic anastomoses

## 1) Esophageal venous plexus

a. position: low part

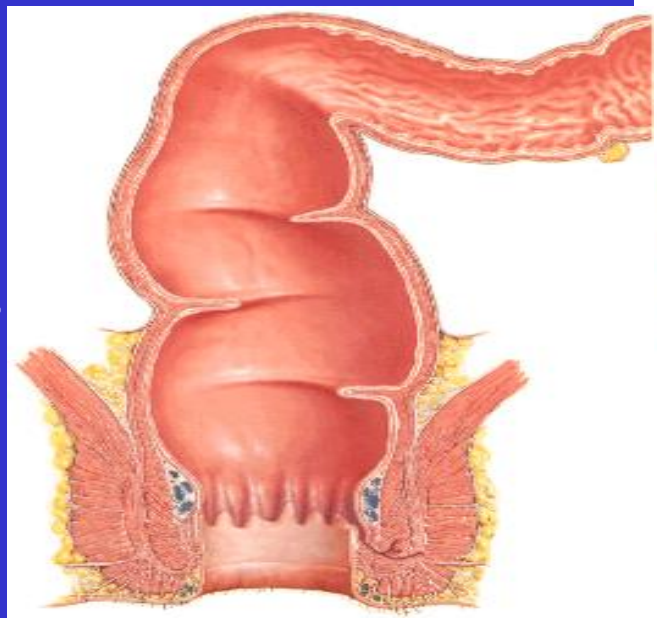
## 2) Rectal venous plexus

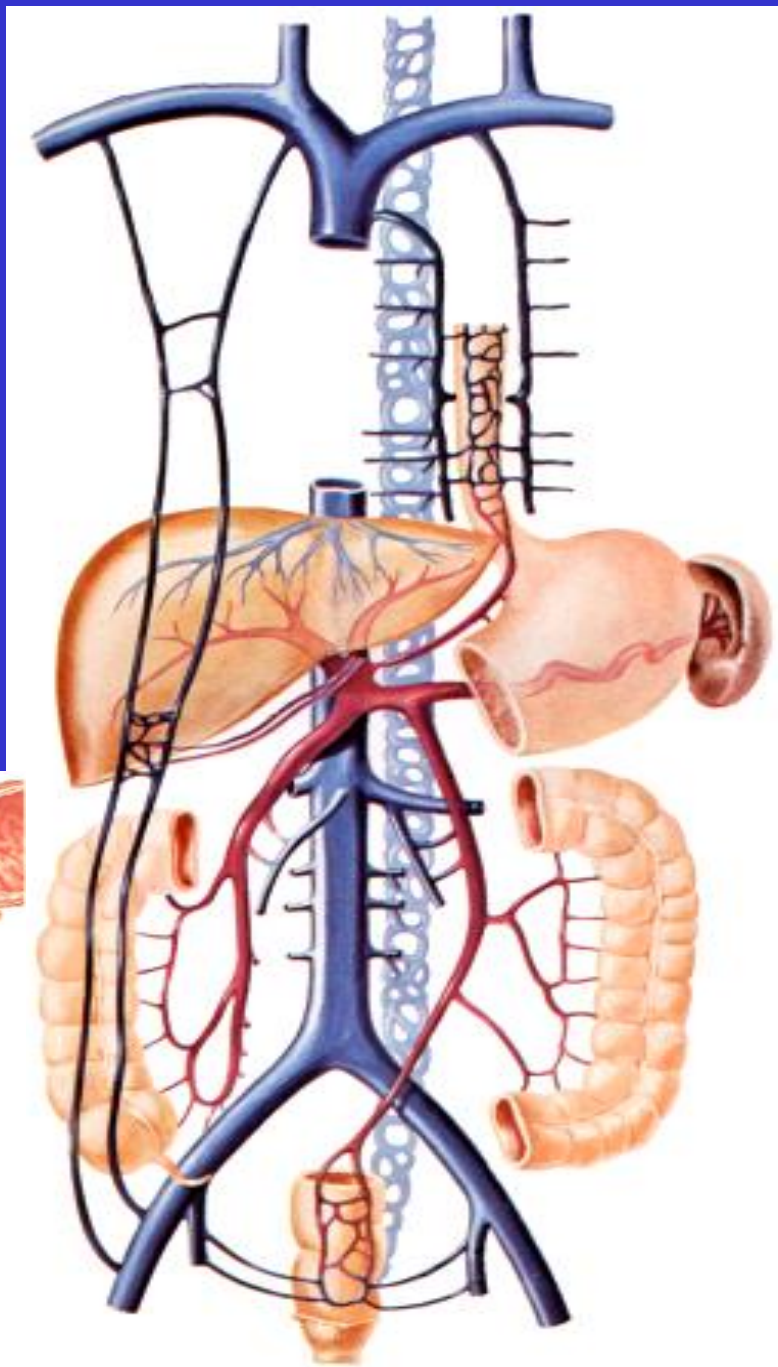
a. position: rectum

b. sigificance : hemorrhoids.

## 3)Periumbilical venous plexus

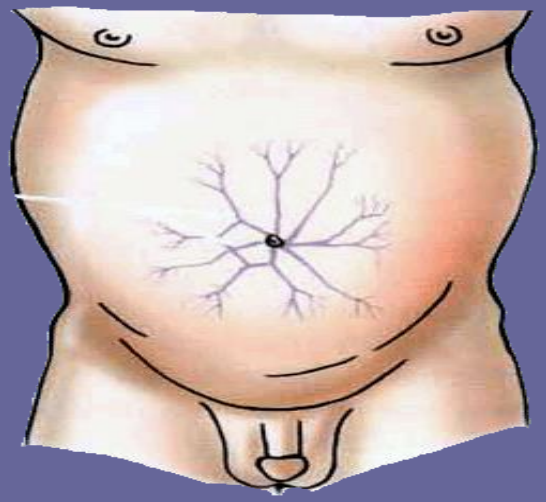
a. position: around umbilicus

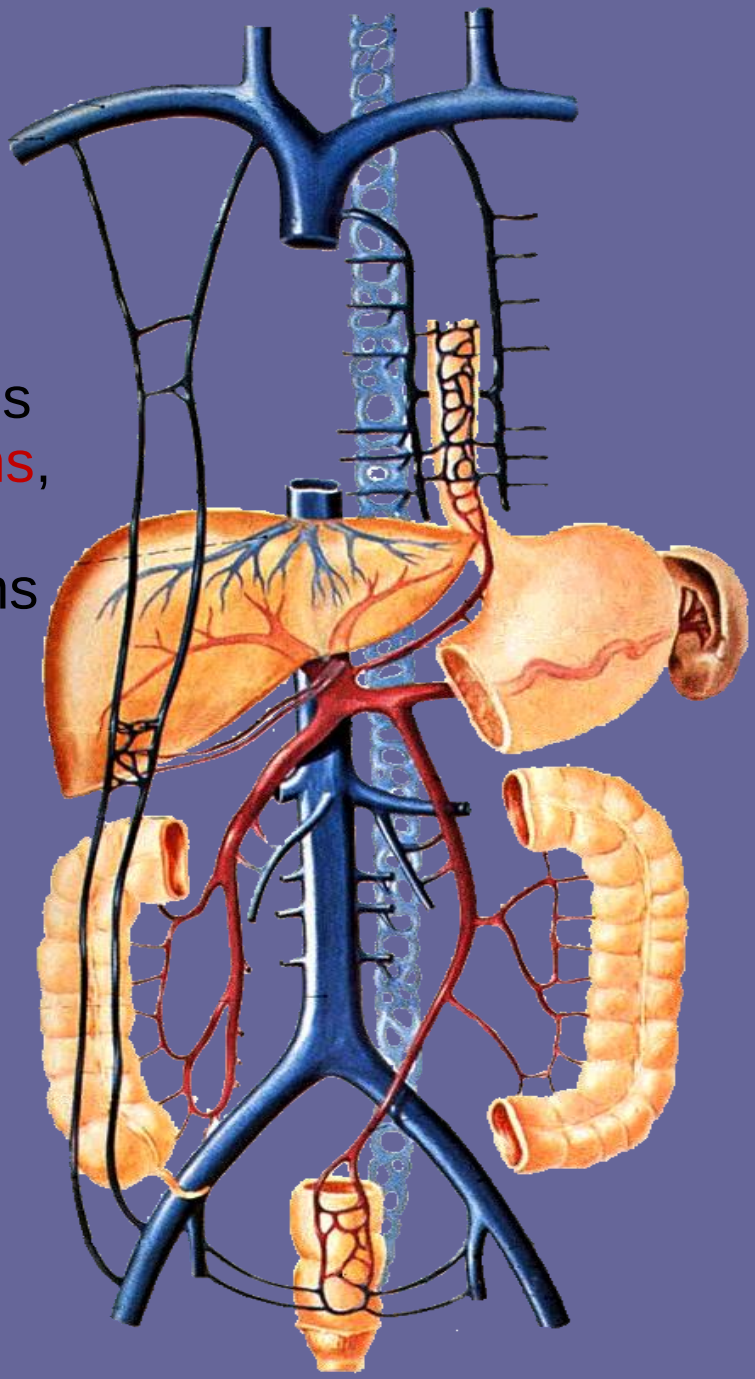




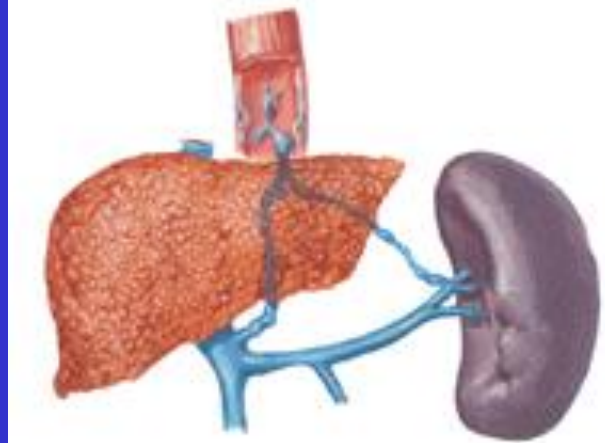
## 4. Portal-retroperitoneal anastomosis

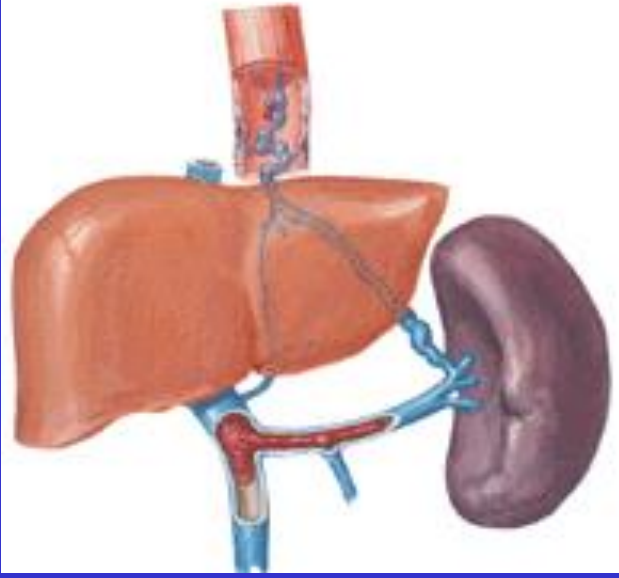
Between the retroperitoneal branches of the colic veins and the lumbar veins, pancreaticoduodenal veins with the renal veins, and the subcapsular veins of the liver with the phrenic veins

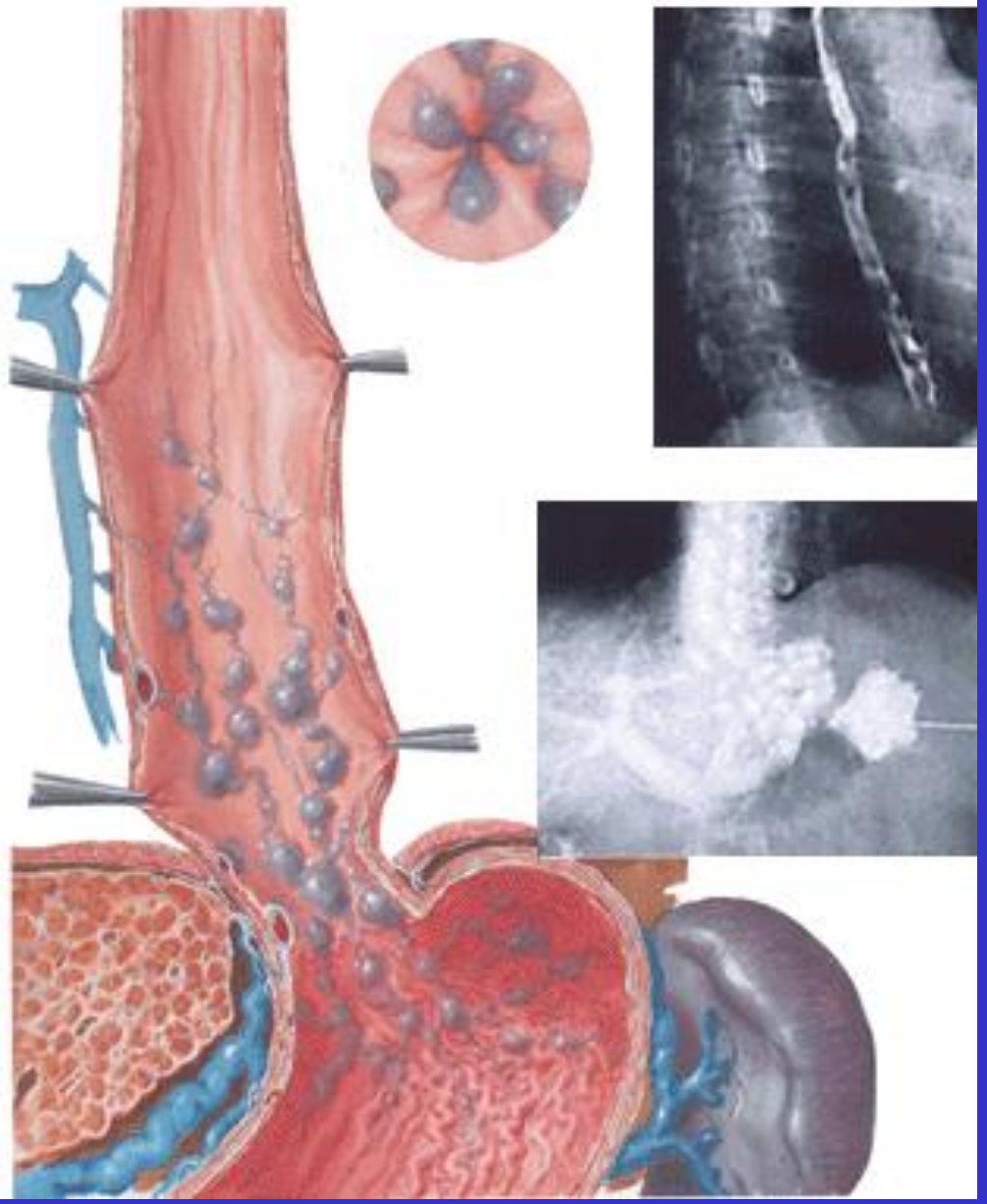




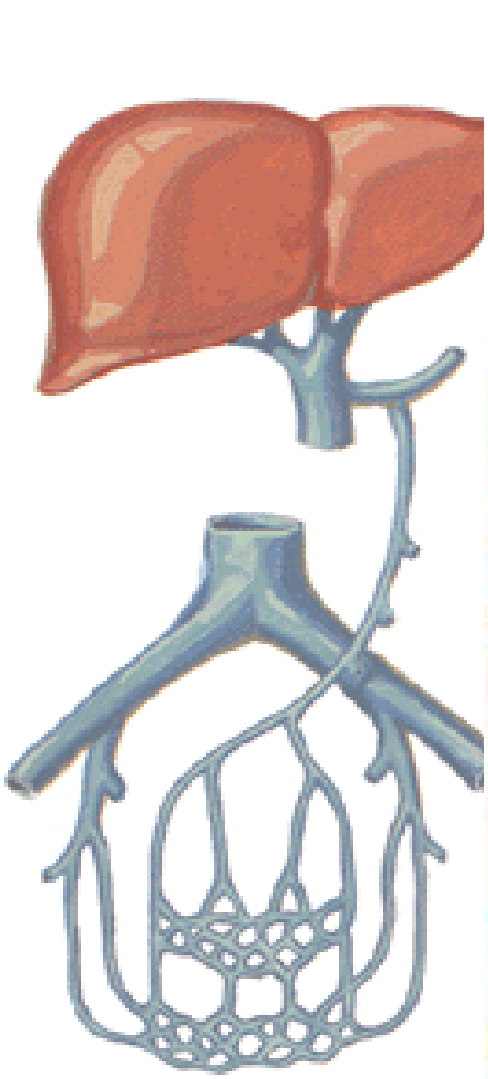
# Esophageal Varicosis

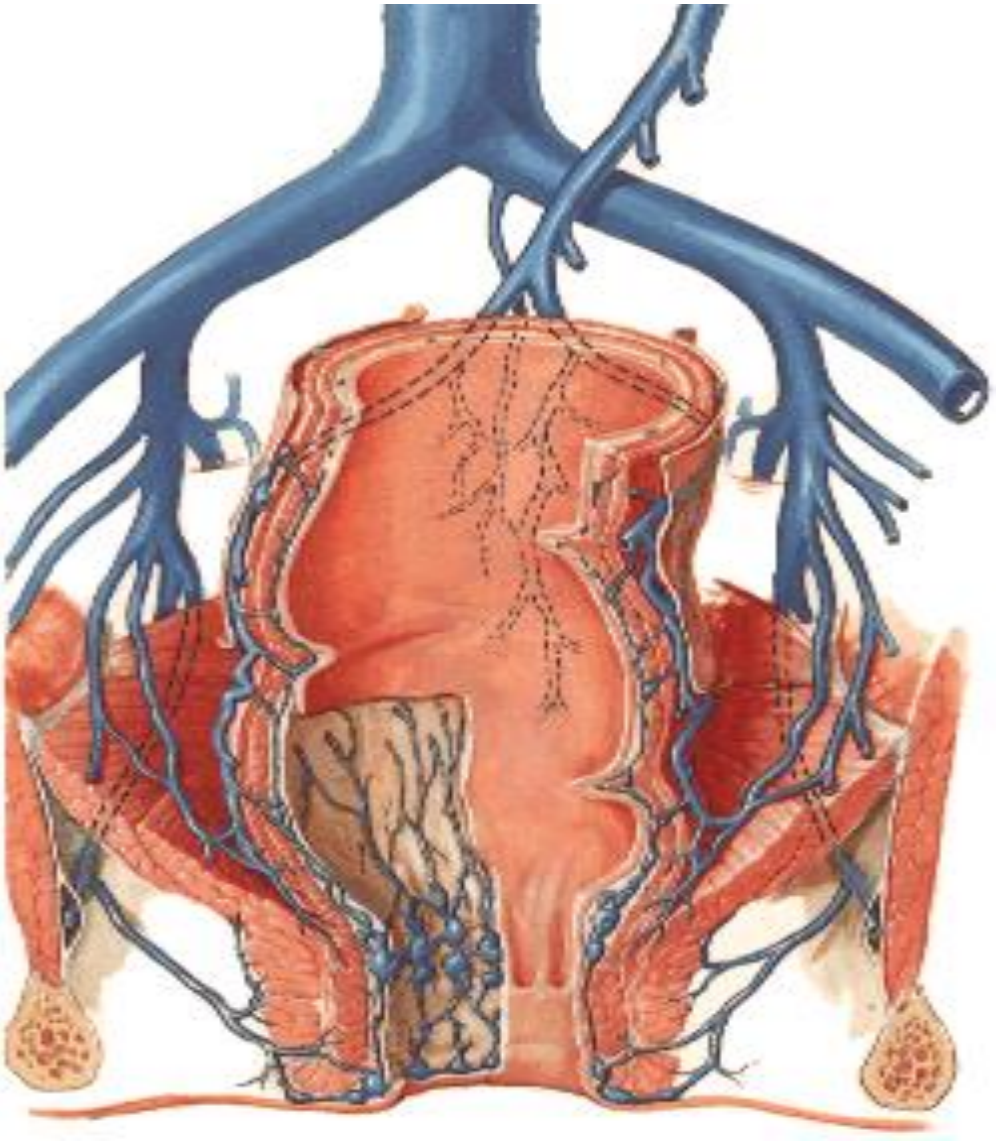


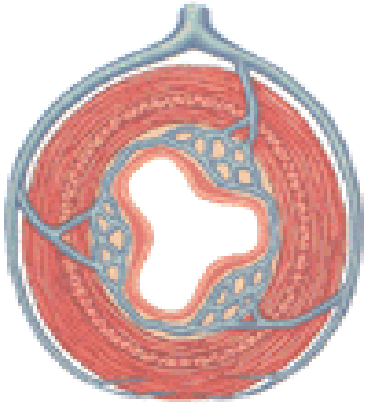


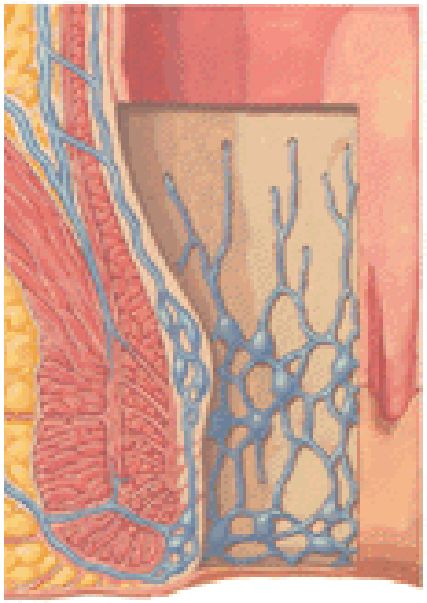


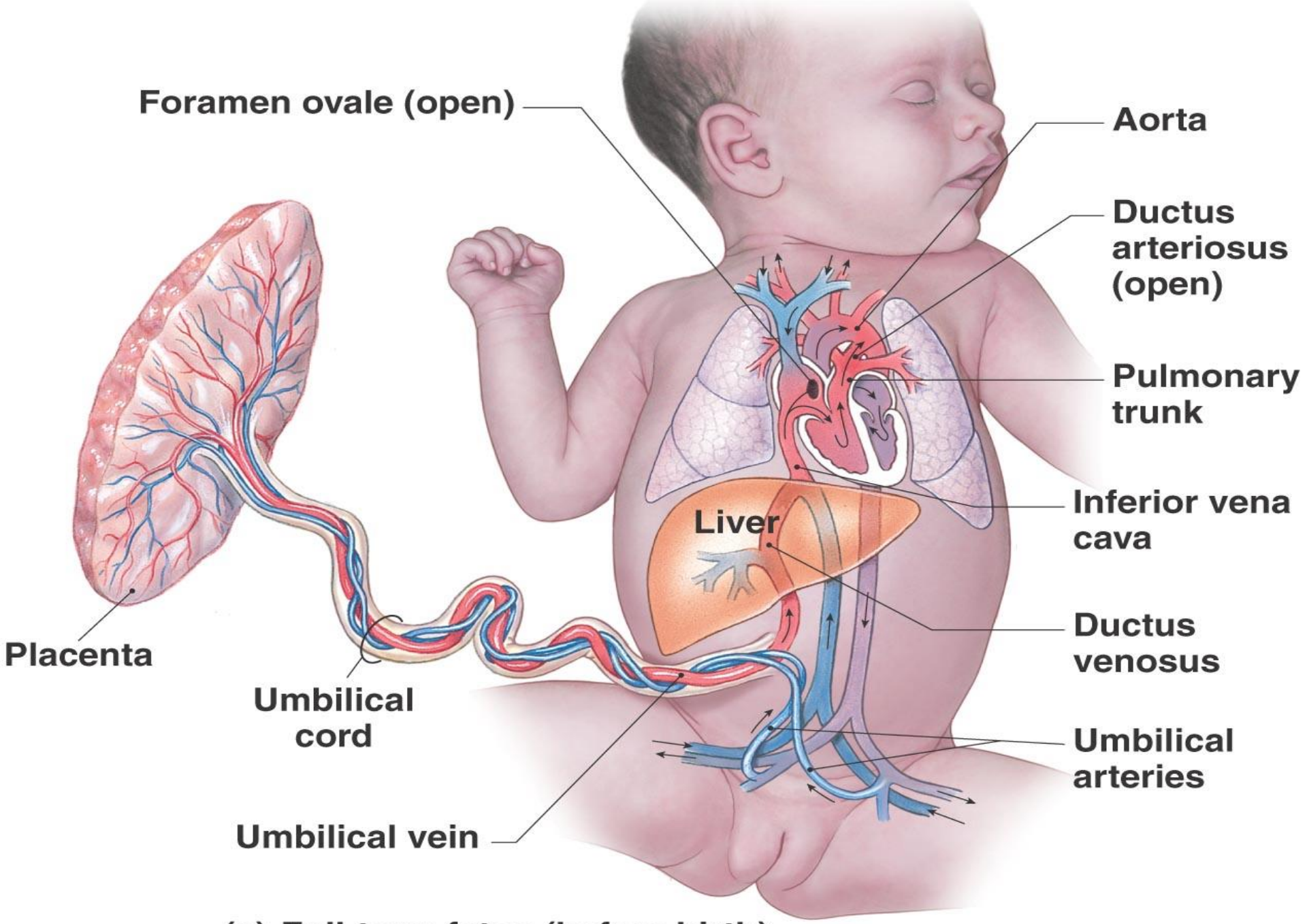
# Venous Drainage of Anal Canal












(a) Full-term fetus (before birth)

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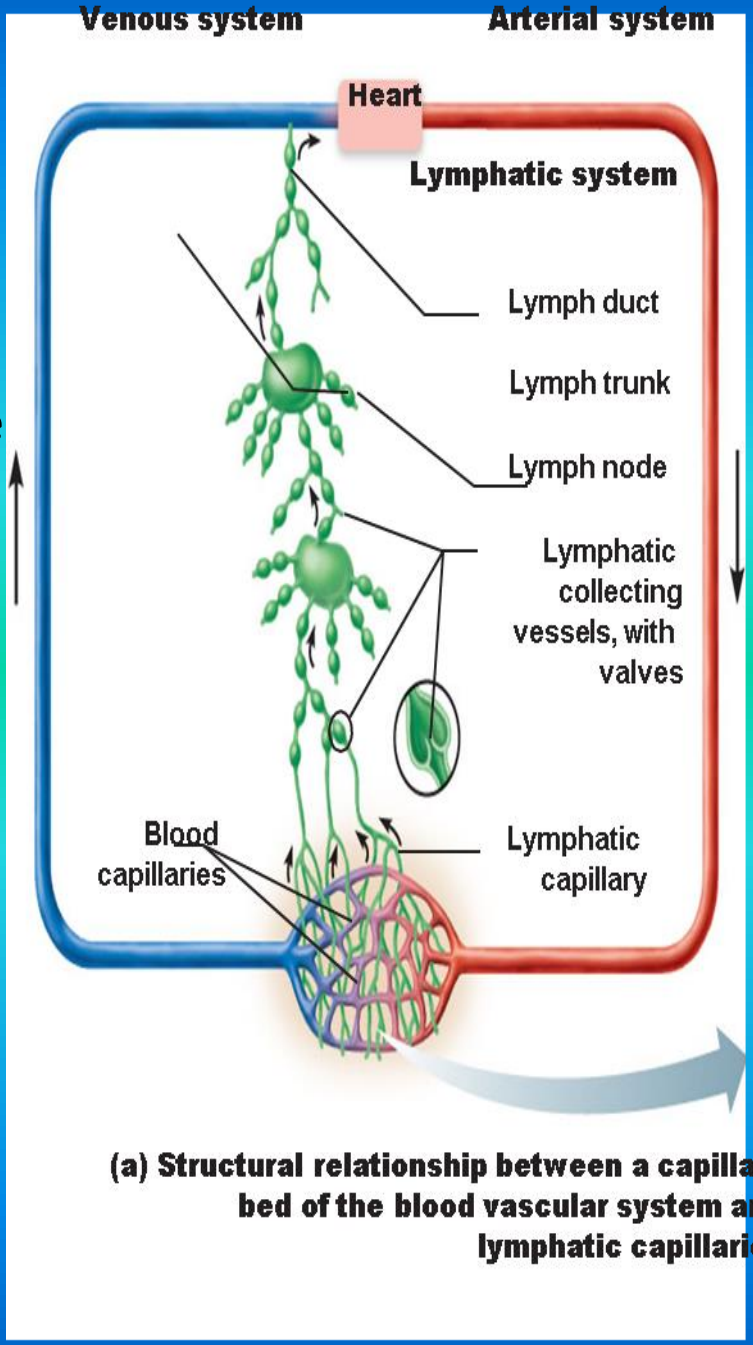
# The Lymphatic System

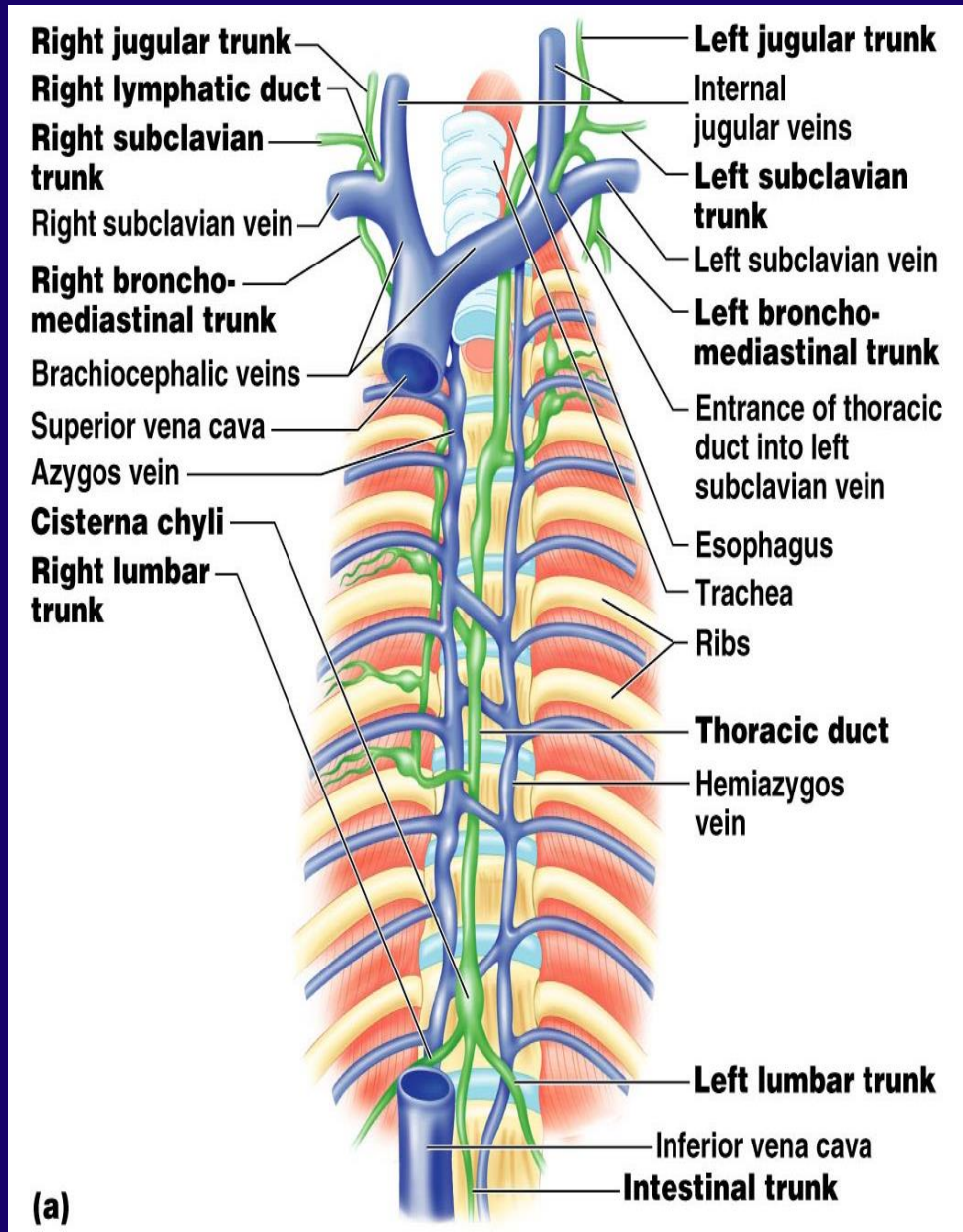
The lymphatic system consists of lymphatic vessels and various lymphatic tissues and organs

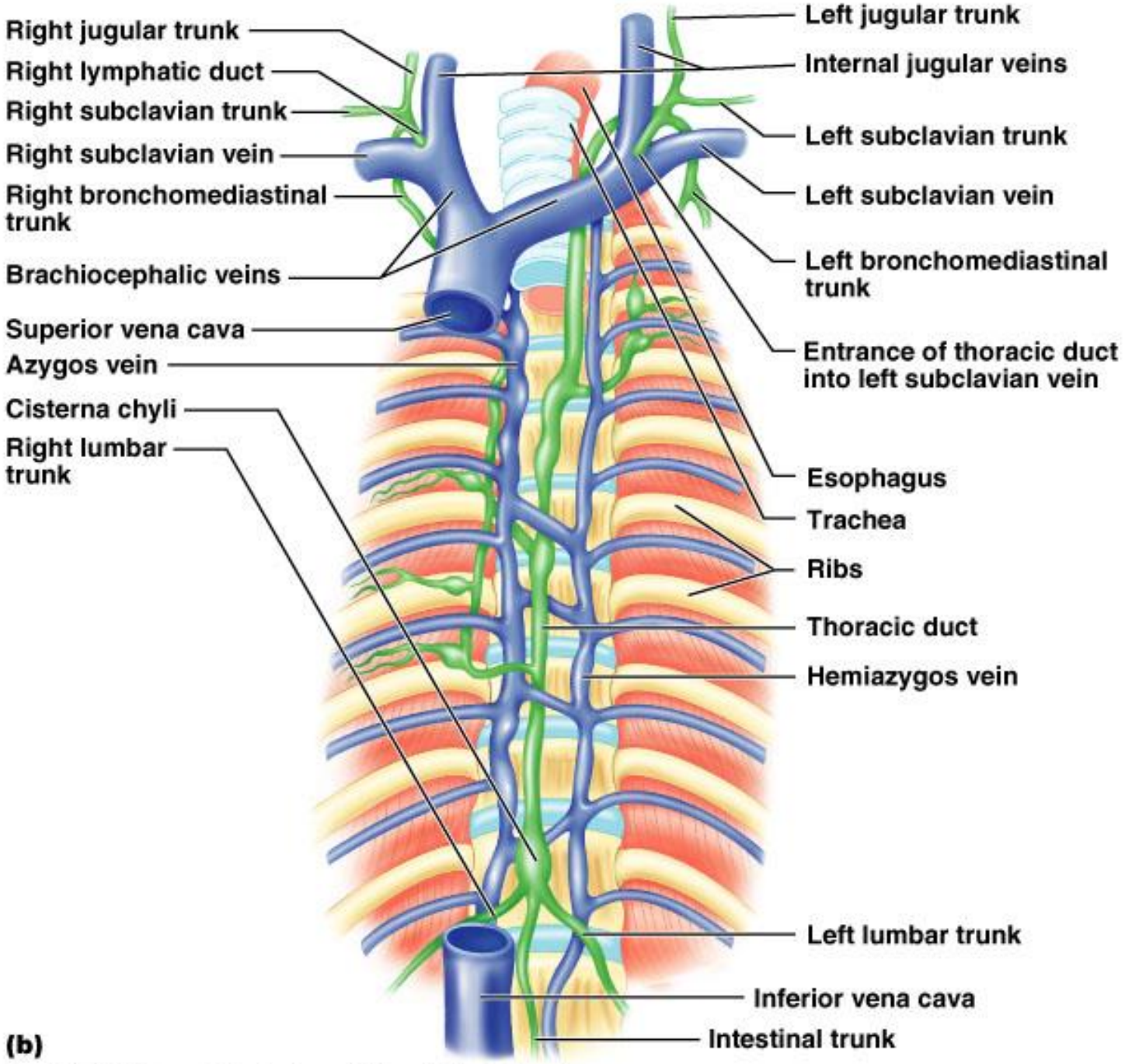
- Lymphatic vessels collect tissue fluid from loose connective tissue
  - Carry fluid to great veins in the neck
  - Fluid flows only toward the heart
- Functions of lymphatic vessels – collect excess tissue fluid and blood proteins
- **Lymph capillaries – s**mallest lymph vessels
  - First to receive lymph
- **Lymphatic collecting vessels – c**ollect from lymph capillaries
  - **Lymph nodes**



# Lymph Trunks

- Lymphatic collecting vessels converge
- Five major lymph trunks
  - **1 - Lumbar trunks**
    - Receives lymph from lower limbs
  - **2 - Intestinal trunk**
    - Receives chyle from digestive organs
  - **3 - Bronchomediastinal trunks**
    - Collects lymph from thoracic viscera
  - **4 - Subclavian trunks**
    - Receive lymph from upper limbs and thoracic wall
  - **5 - Jugular trunks**
    - Drain lymph from the head and neck



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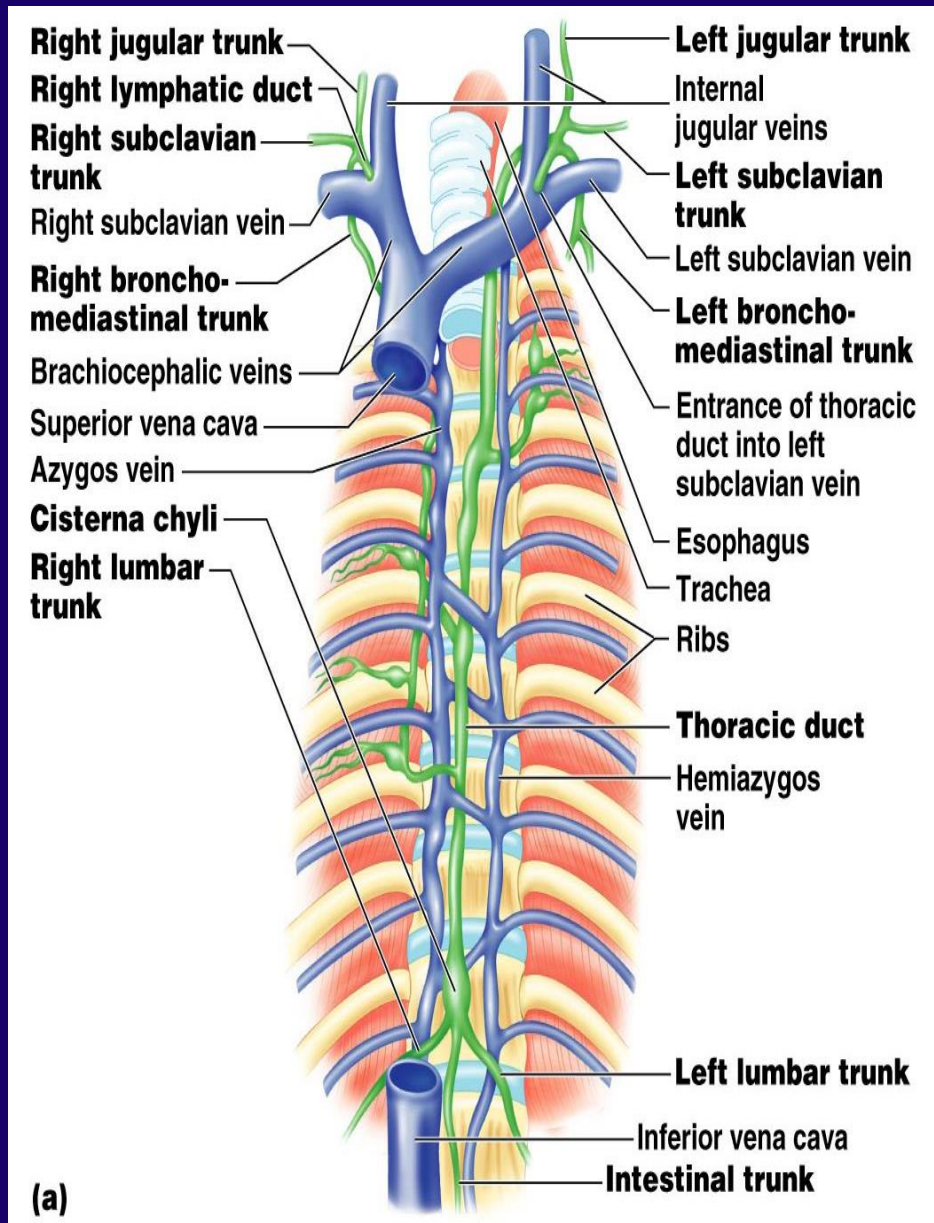
# Lymph Ducts

- **Cisterna chyli** - located at the union of lumbar and intestinal trunks
- On the right side of the oarta
- **Thoracic duct** - ascends along vertebral bodies
  - Empties into venous circulation
  - Junction of left internal jugular and left subclavian veins
  - Drains three quarters of the body
- **Right lymphatic duct** - empties into right internal jugular and subclavian veins

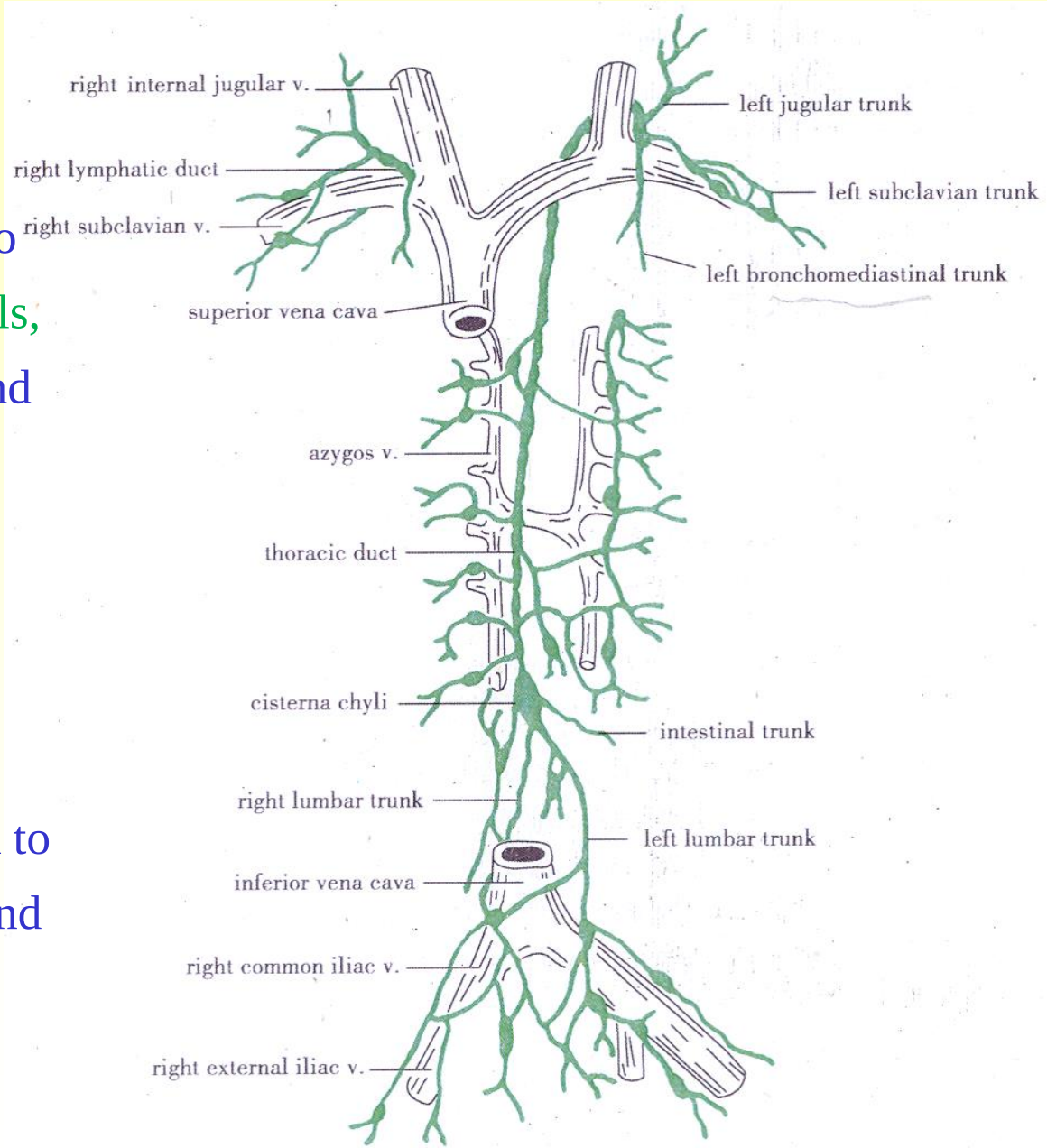


# lymphatic duct

The lymphatic capillaries join to form progressively larger vessels, until finally the thoracic duct and the right lymphatic duct

the thoracic duct return to left venous angle, and the right lymphatic duct return to right venous angle,

a few lymphatic vessels return to renal vein、superarenal vein and inferior vena cava.



# lymphatic duct

thoracic duct

left venous angle

thoracic duct

left jugular trunk : conveying lymph from the left side of the head and neck

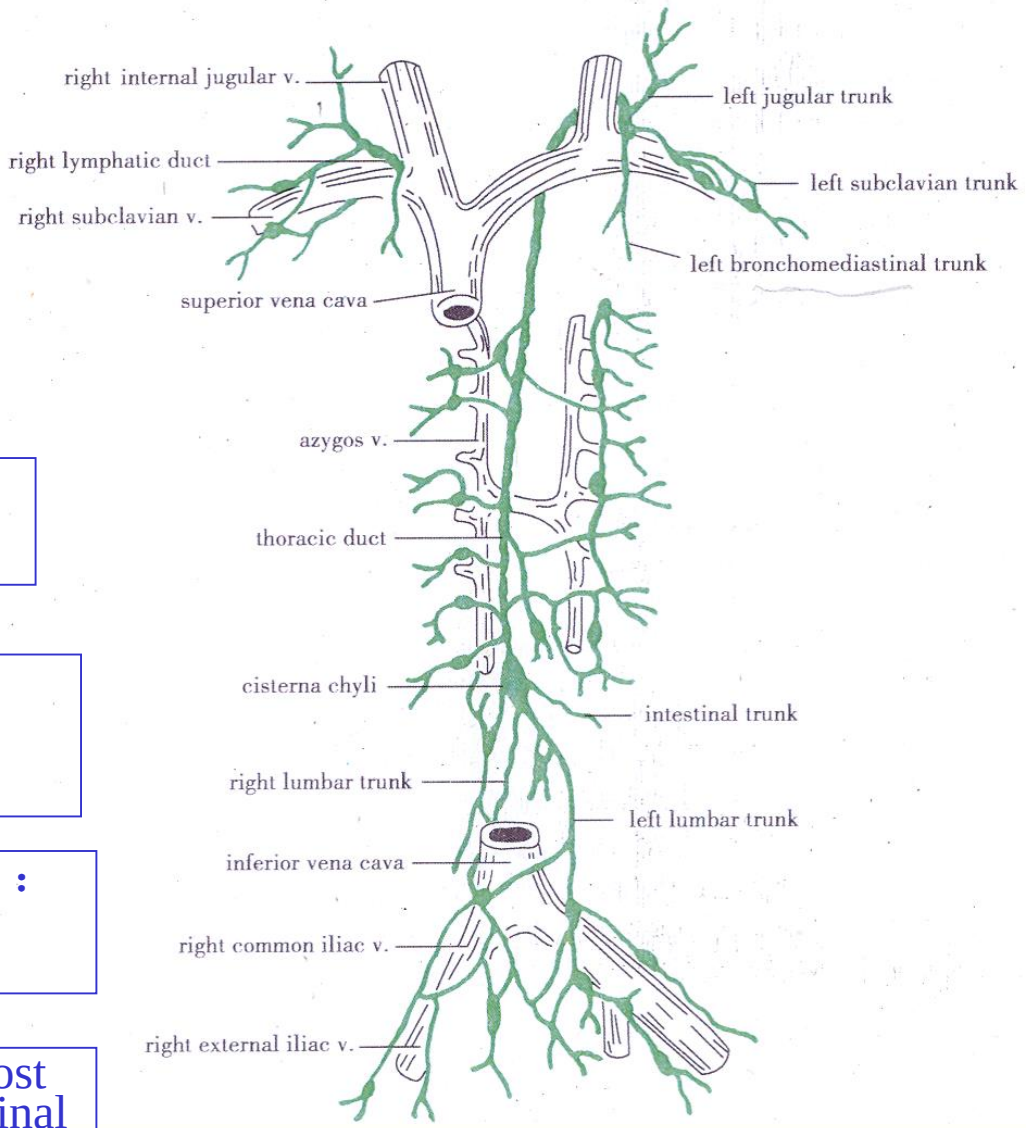
left subclavian trunk : draining lymph from the left upper limb and part of the thorax on the left side

left bronchomediastinal trunk : draining lymph from Left thoracic cavity

cisterna chyli

intestinal trunk, : draining most of the lymph from the abdominal part of the alimentary canal, liver, pancreas and spleen

left and right 1umbar trunks : conveying lymph from the lower limbs and the pelvic viscera

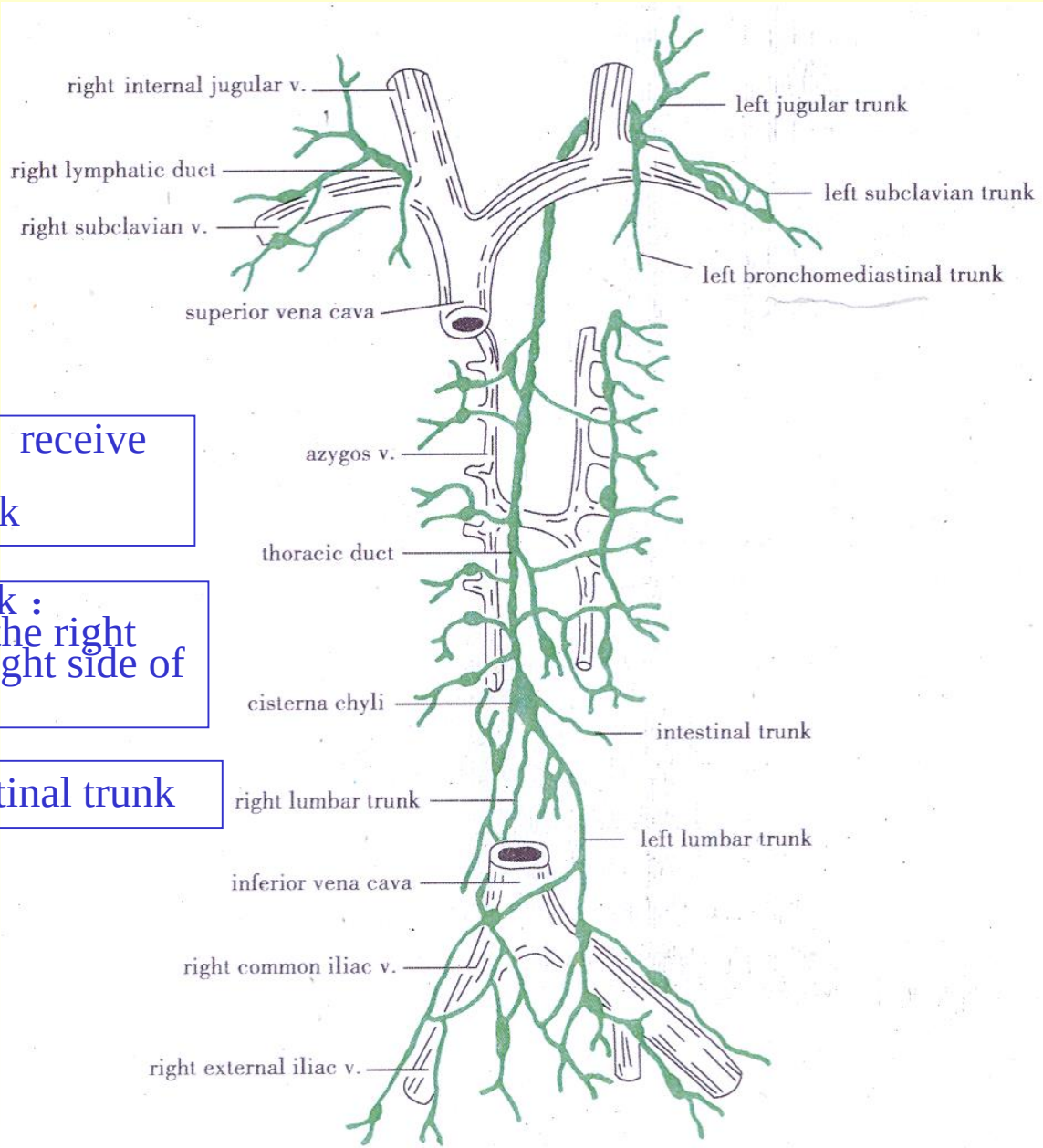


# right lymphatic duct

right venous angle

right lymphatic duct

- right jugular trunk： receive lymph from the right Side of head and neck
- right subclavian trunk： receive lymph from the right upper limb and the right side of the thorax
- right bronchomediastinal trunk

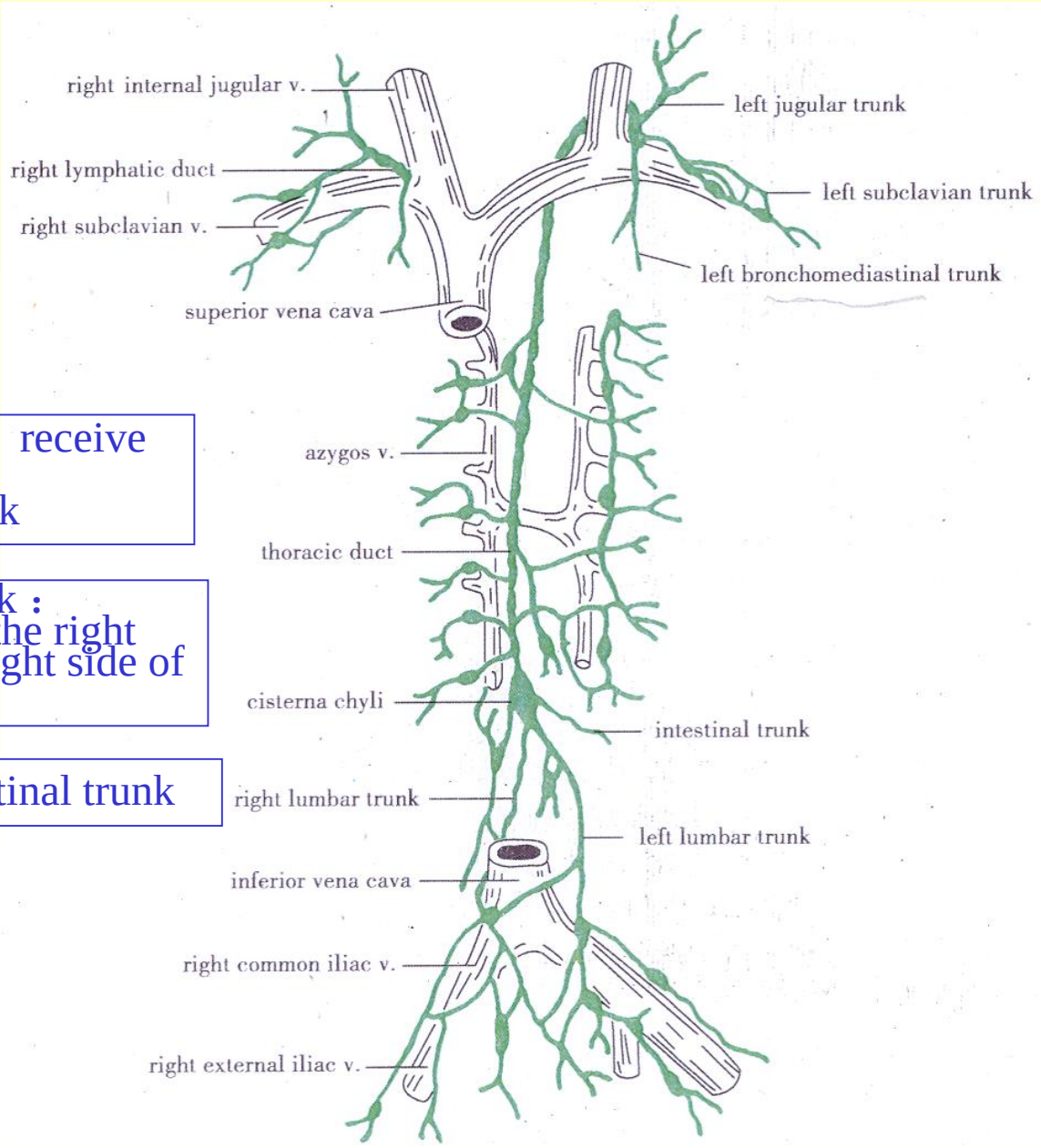


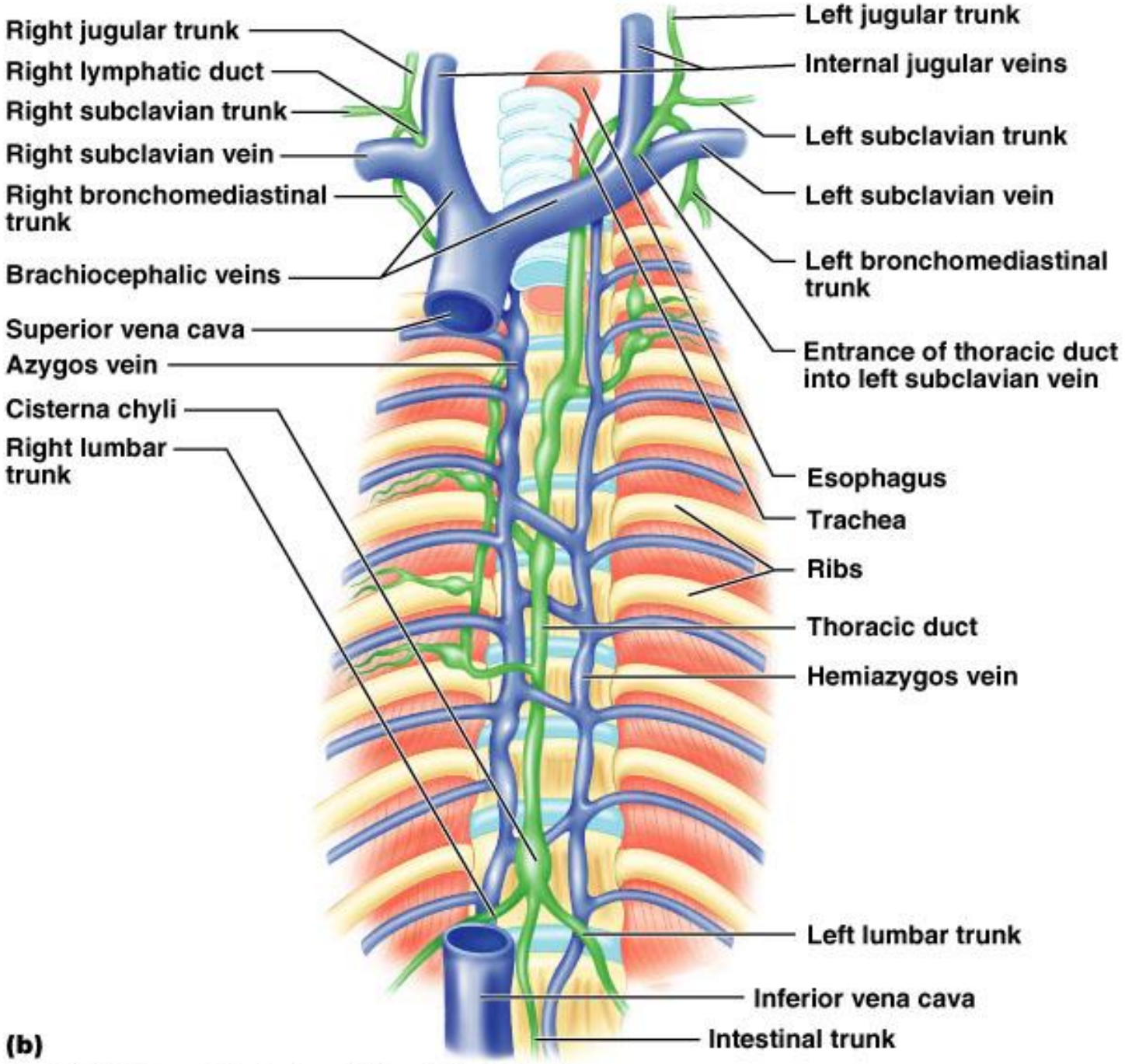
# right lymphatic duct

right venous angle

right lymphatic duct

- right jugular trunk： receive lymph from the right Side of head and neck
- right subclavian trunk： receive lymph from the right upper limb and the right side of the thorax
- right bronchomediastinal trunk



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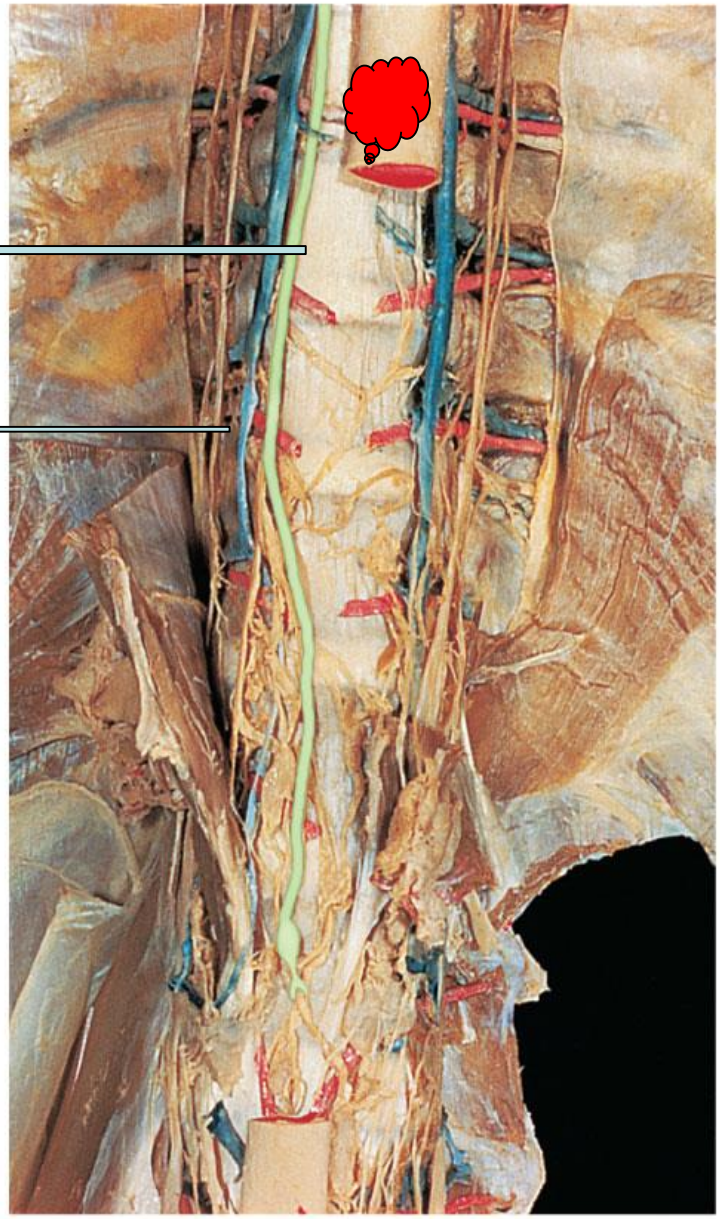
Thoracic duct

Azygos vein on vertebral bodiesc



# Sympathetic trunk

Sympathetic Trunk Ganglia -- Located on both sides of the vertebral column

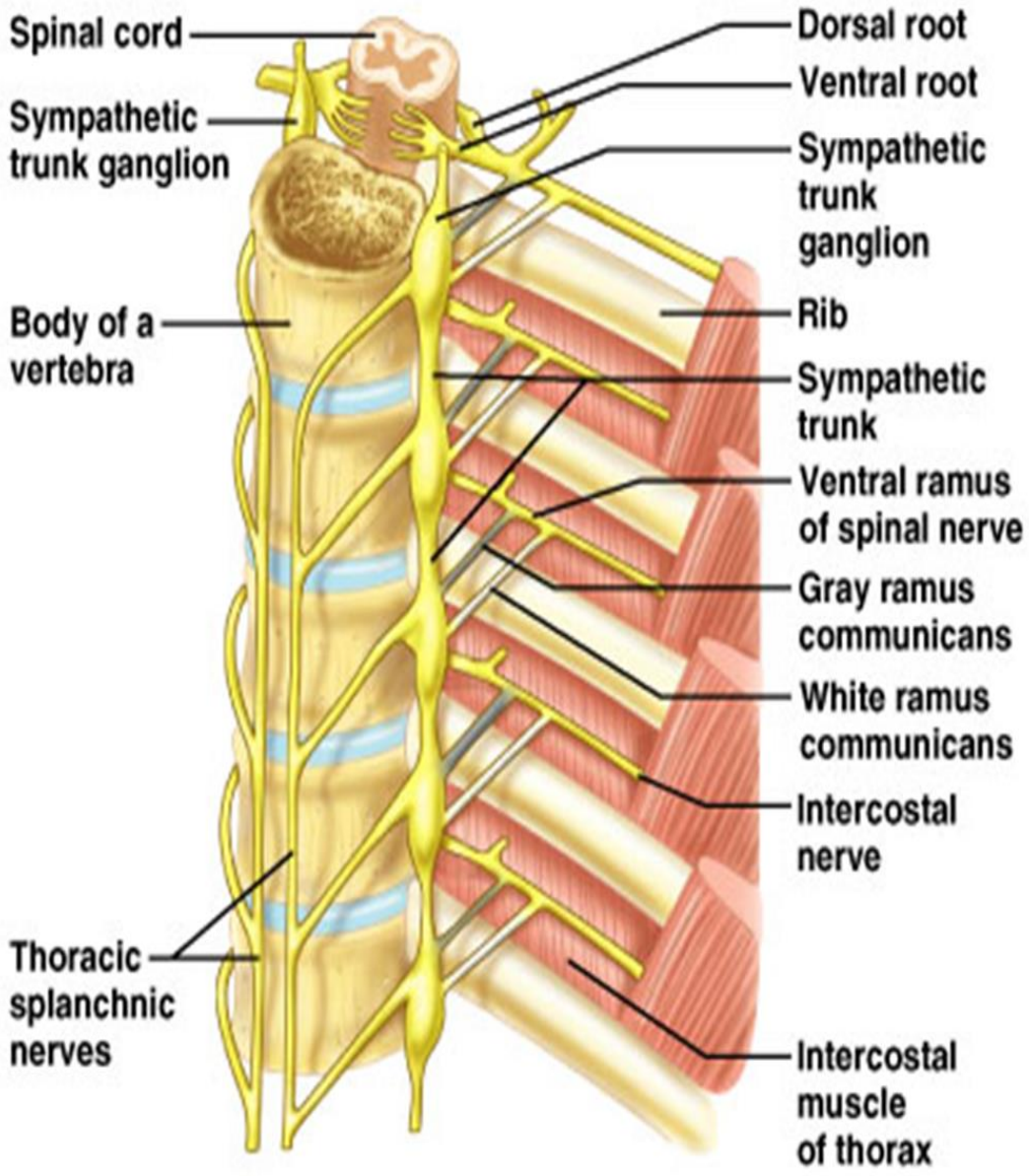
Joined to ventral rami by white and gray rami communicantes

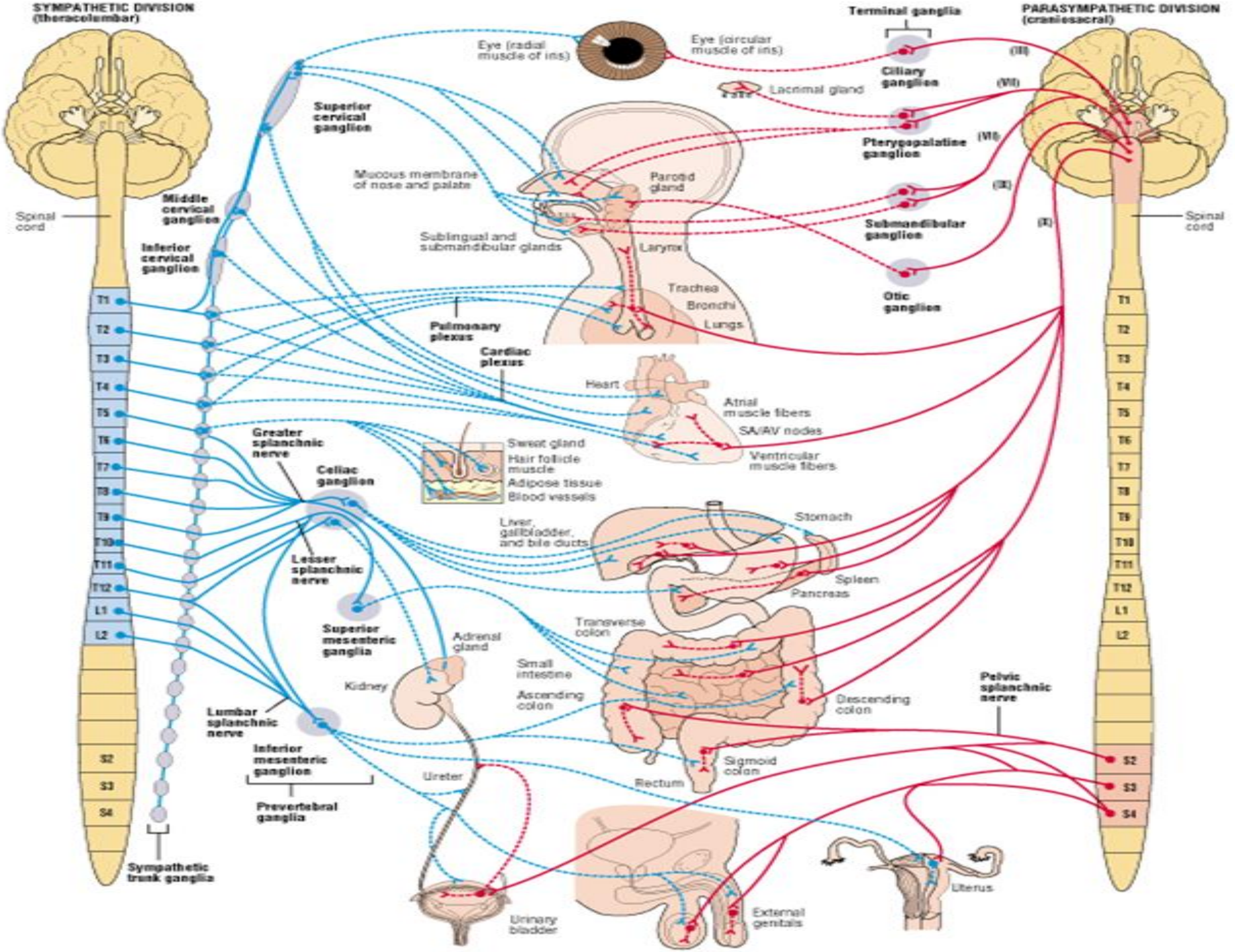
## Prevertebral Ganglia :

Occur only in abdomen and pelvis

Lie anterior to the vertebral column

**Main ganglia** : Celiac, superior mesenteric, inferior mesenteric, inferior hypogastric ganglia

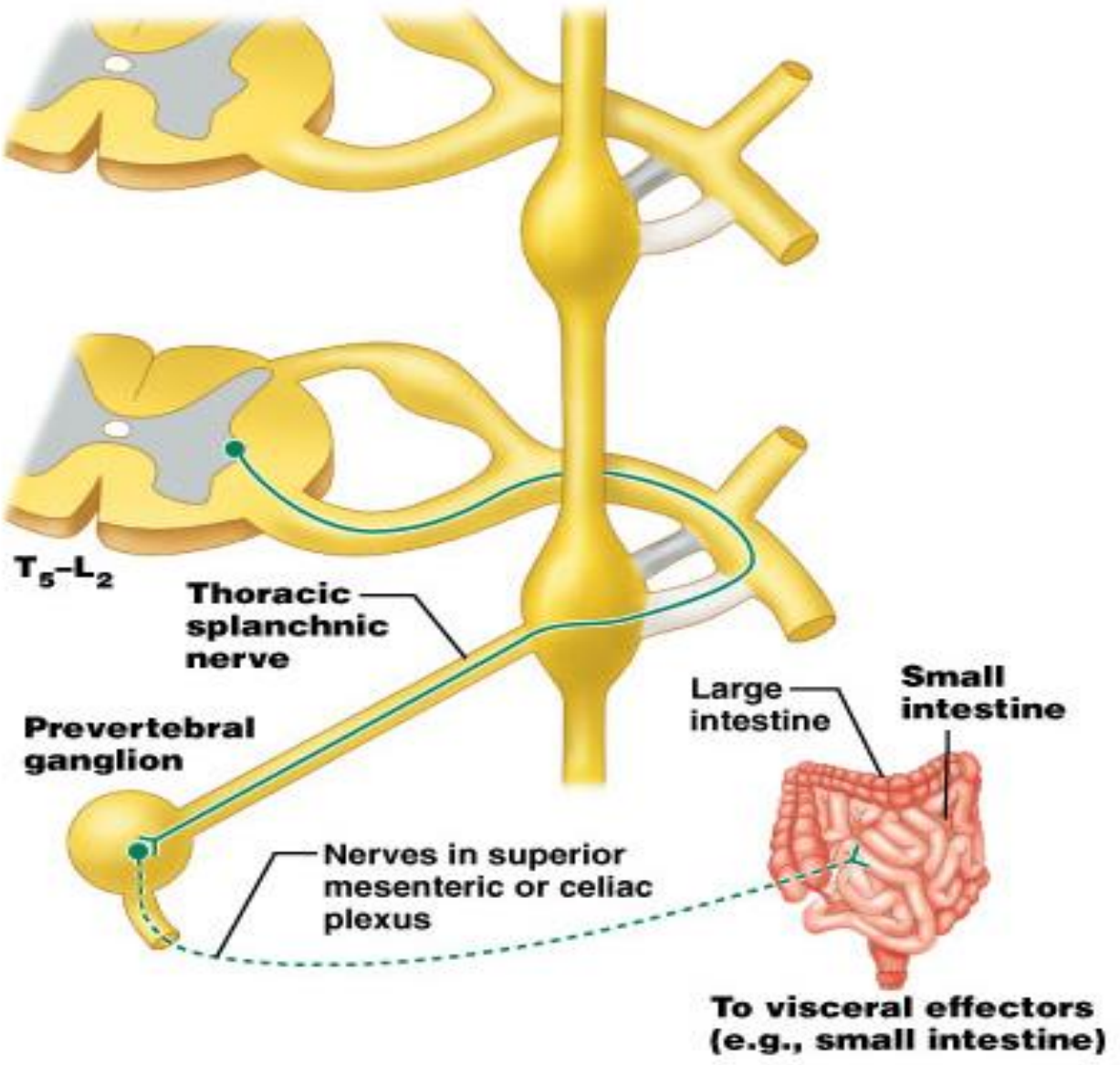



SYMPATHETIC DIVISION
(thoracolumbar)
PARASYMPATHETIC DIVISION
(craniosacral)
Terminal ganglia
Eye (radial muscle of iris)
Eye (circular muscle of iris)
Ciliary ganglion
(III)
Lacrimal gland
(VII)
Superior cervical ganglion
Pterygopalatine ganglion
(VII)
Mucous membrane of nose and palate
Parotid gland
(IX)
Middle cervical ganglion
Submandibular ganglion
Spinal cord
Sublingual and submandibular glands
Larynx
Inferior cervical ganglion
Otic ganglion
Trachea
Bronchi
Lungs
Pulmonary plexus
Cardiac plexus
Heart
Atrial muscle fibers
SA/AV nodes
Ventricular muscle fibers
Sweat gland
Hair follicle muscle
Adipose tissue
Blood vessels
Greater splanchnic nerve
Celiac ganglion
Stomach
Liver, gallbladder, and bile ducts
Spleen
Pancreas
Lesser splanchnic nerve
Superior mesenteric ganglia
Transverse colon
Adrenal gland
Small intestine
Kidney
Ascending colon
Descending colon
Pelvic splanchnic nerve
Lumbar splanchnic nerve
Inferior mesenteric ganglion
Sigmoid colon
Ureter
Rectum
Prevertebral ganglia
Sympathetic trunk ganglia
Urinary bladder
External genitals
Uterus
T1
T2
T3
T4
T5
T6
T7
T8
T9
T10
T11
T12
L1
L2
S2
S3
S4

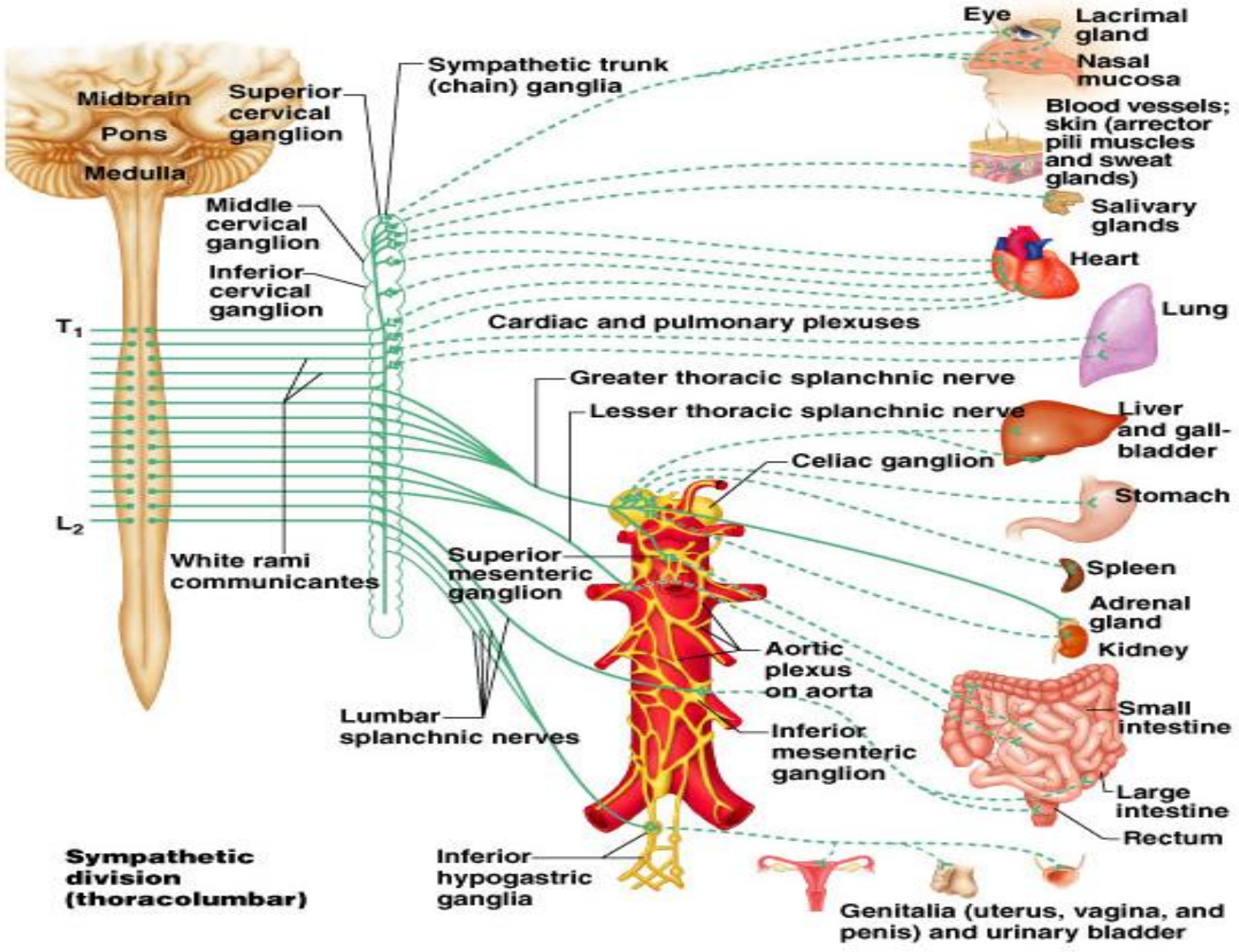
# Splanchnic Nerves

- Some sympathetic preganglionic axons pass through the sympathetic trunk  without terminating in it. Beyond the trunk they form nerves called splanchnic nerves which extend to prevertebral ganglia.
- T5-T9 or T10- Greater splanchnic nerve.(serves: stomach, spleen, liver, kidneys, and small intestines)
- T10-T11- Lesser splanchnic nerve. (serves: blood vessels of small intestine and proximal colon)
- L1-L4- Lumbar splanchnic nerve. Terminate in the inferior mesenteric ganglion

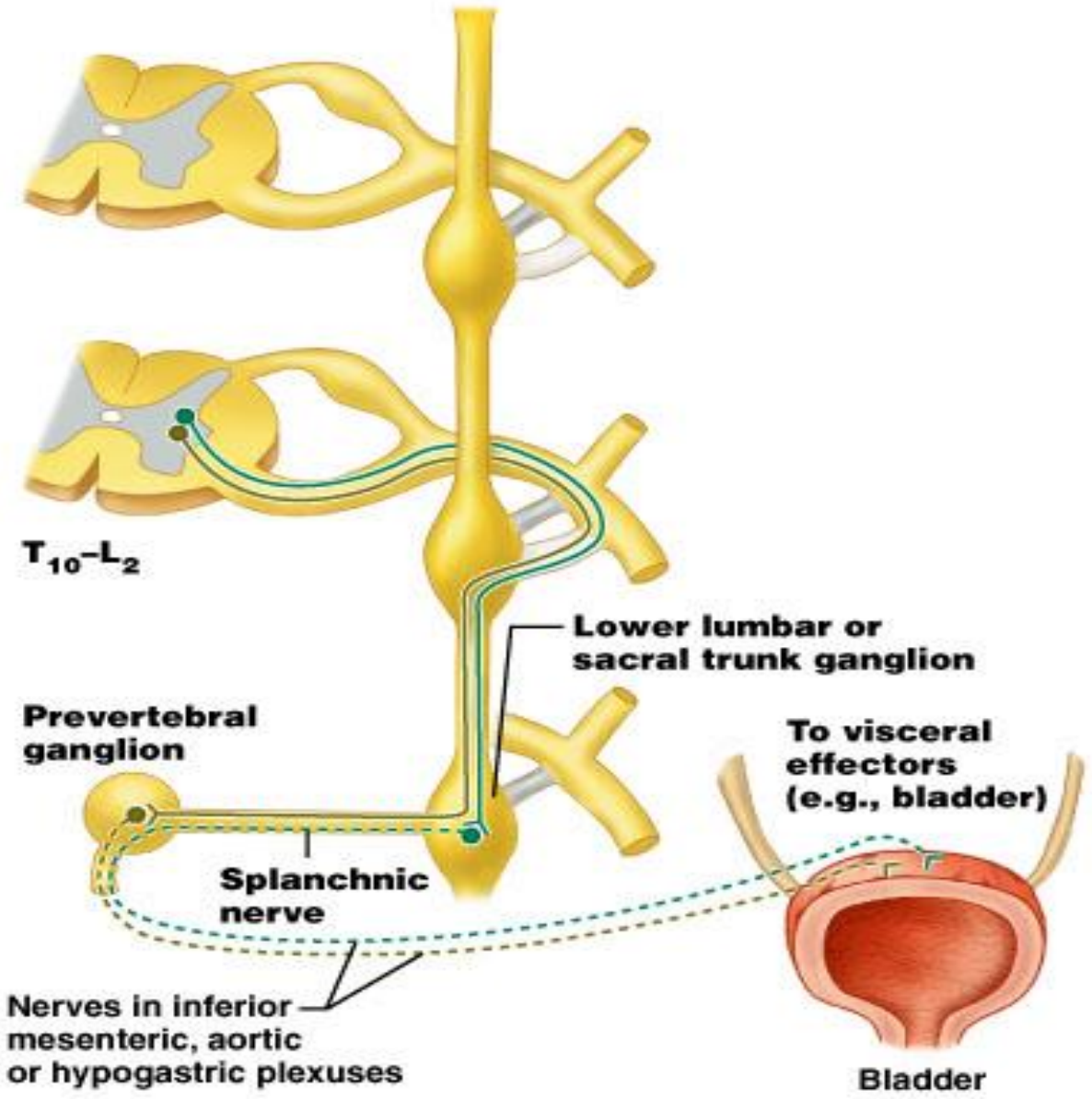
# Sympathetic Pathways to the Abdominal Organs

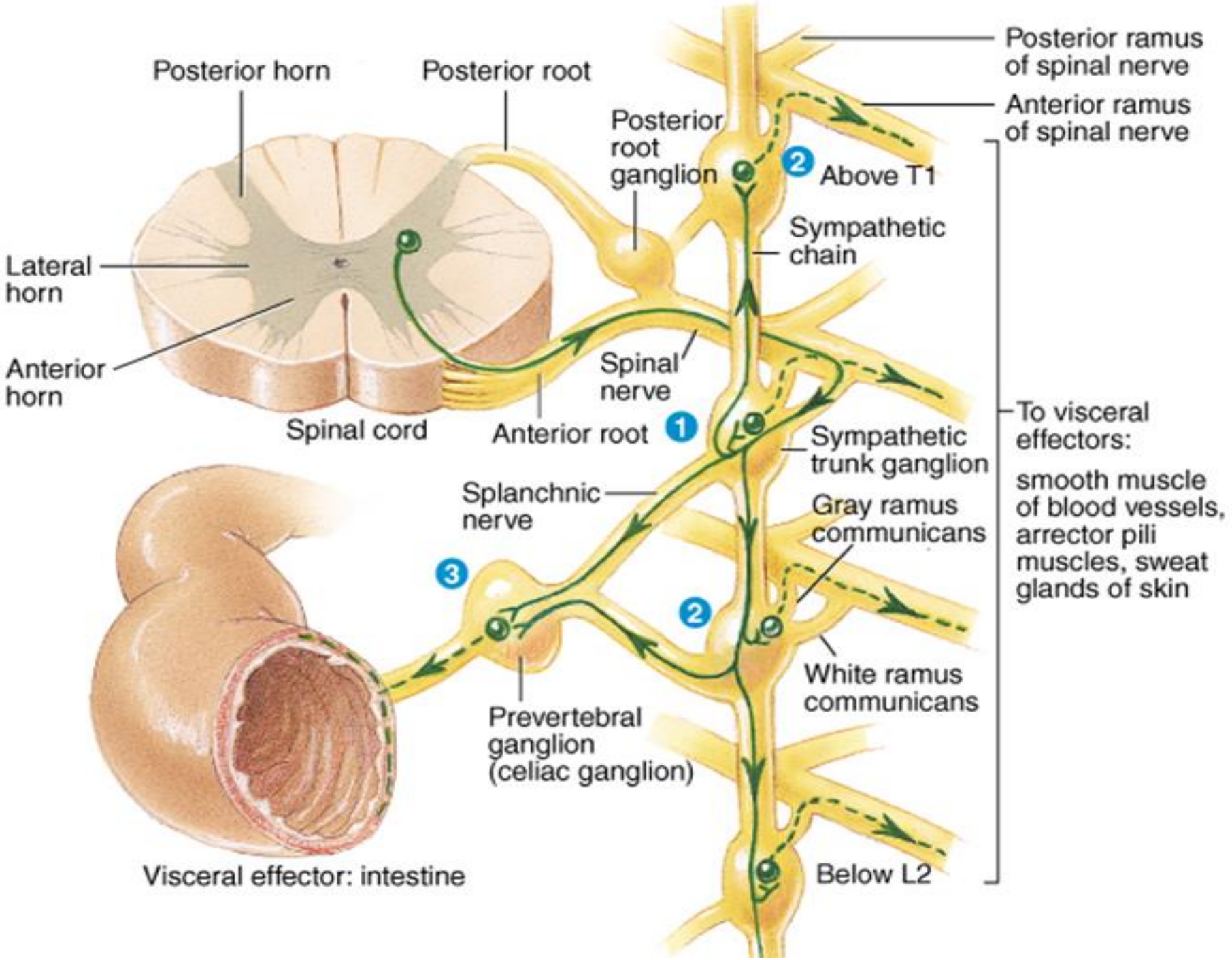


# Sympathetic Division of the ANS



# Sympathetic Pathways to the Pelvic Organs




Posterior horn
Posterior root
Posterior ramus of spinal nerve
Anterior ramus of spinal nerve
Posterior root ganglion
2
Above T1
Sympathetic chain
Lateral horn
Anterior horn
Spinal nerve
Spinal cord
Anterior root
1
Sympathetic trunk ganglion
To visceral effectors:
smooth muscle of blood vessels, arrector pili muscles, sweat glands of skin
Splanchnic nerve
Gray ramus communicans
3
2
White ramus communicans
Prevertebral ganglion (celiac ganglion)
Visceral effector: intestine
Below L2

# Sacral Parasympathetic

- Consists of S2-S4.
- Innervates organs of the pelvis and lower abdomen
- form Pelvic splanchnic nerves

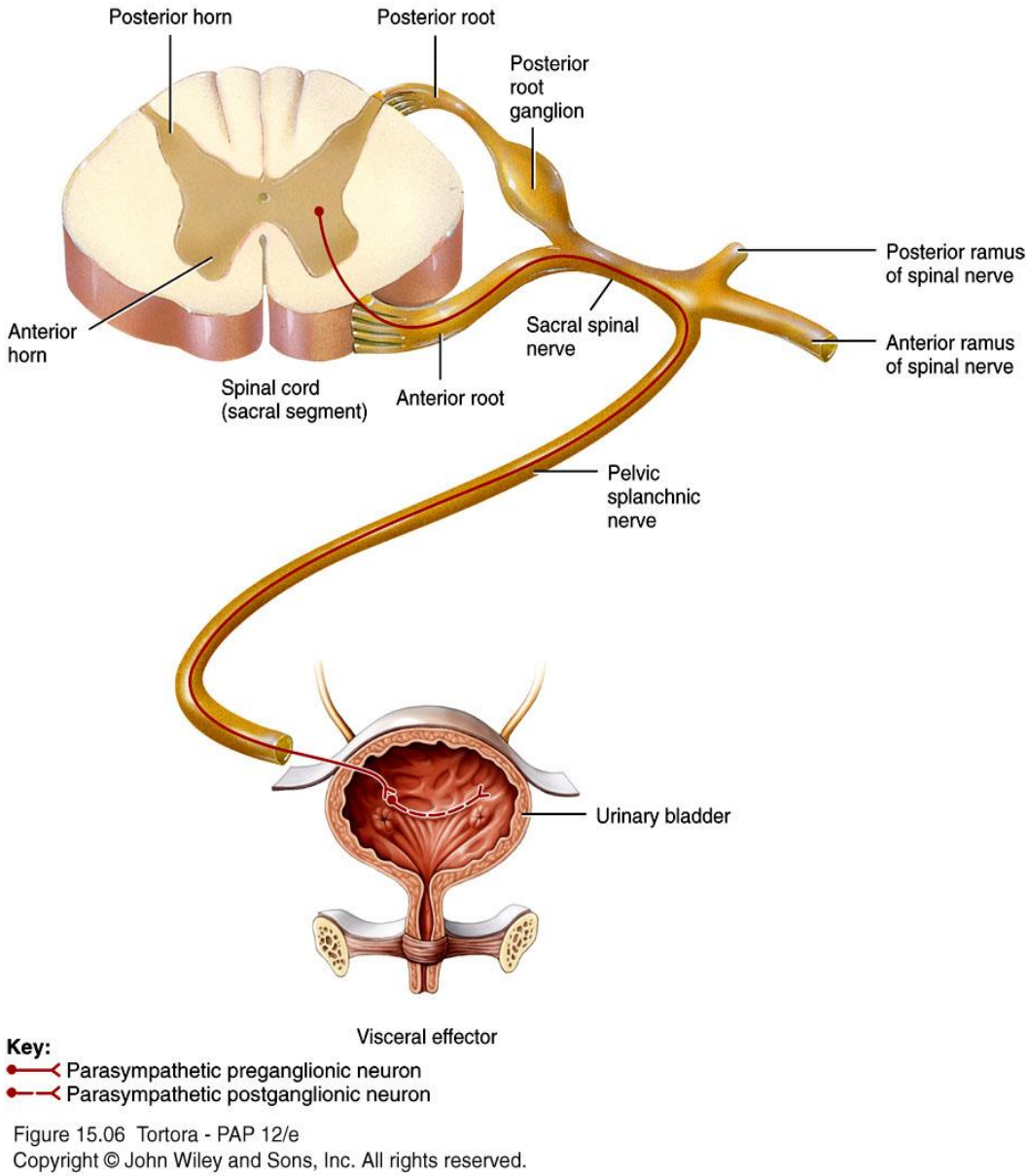



Figure 15.06 Tortora - PAP 12/e

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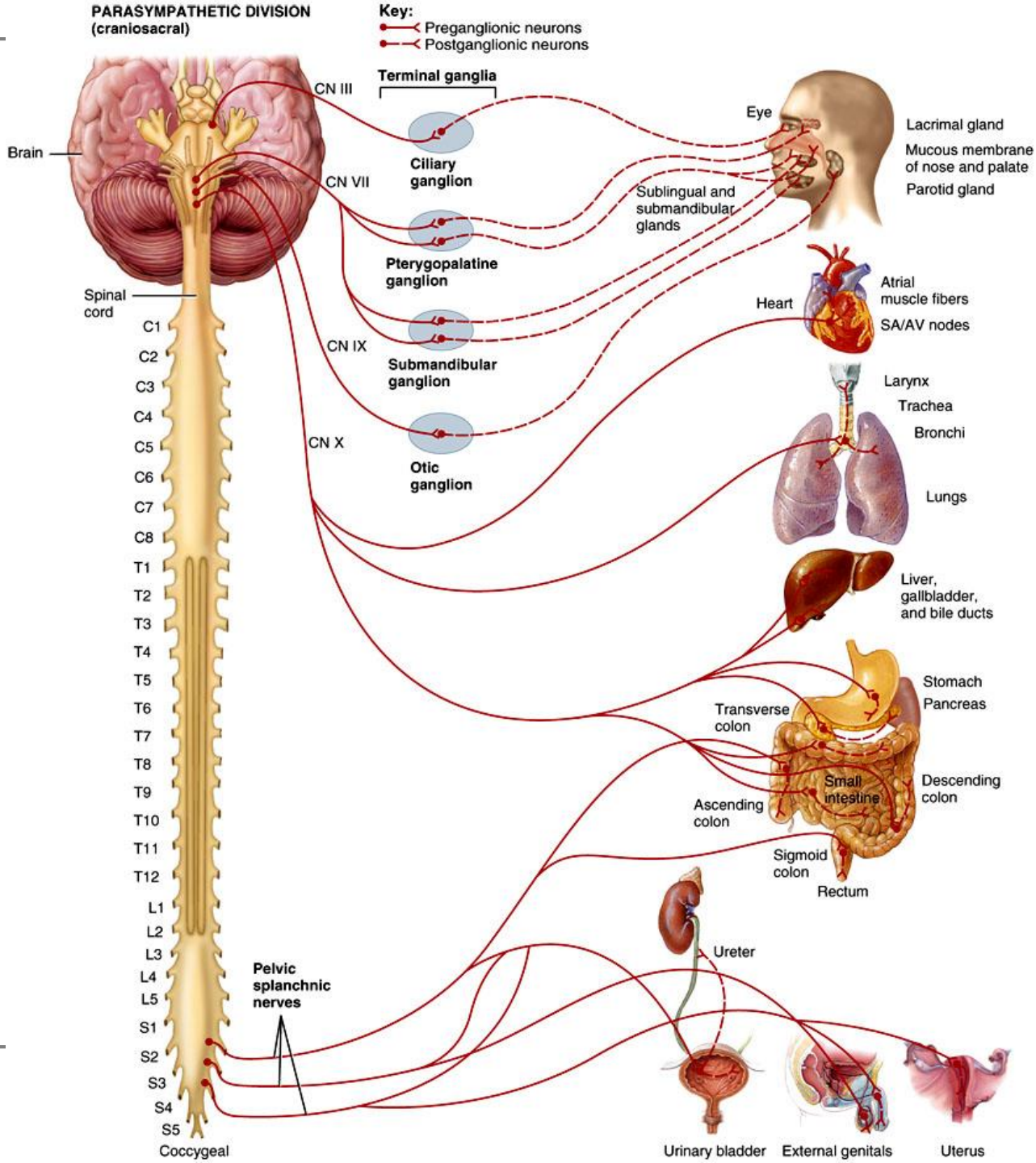
# Structure of the Parasympathetic Division



**1. Which one of the following organs is attached to the lesser omentum ?**

a. Pancreas.

b. Spleen.

c. Liver.

d. Transverse colon.

**2. Which structure does contribute in the anterior wall of the omental bursa ?**

a.Transverse colon.

b.Lesser omentum.

c.Transverse mesocolon.

d. pancreas.

**3. Which structure is belonged to the posterior boundary of epiploic foramen ?**

a.Portal vien.

b.Inferior vena cava.

c.Hepatic artery.

d.Common bile duct.

س١- أي الأغلفة التي تغلف الجوف البطني الحوضي :

A– Pleural  B ® - Peritoneal  C– Pericardial  D- Synovial

س٢- طبقة الغشاء البريتواني التي تغلف جوف البطن هي :

A- Pleural  B- Visceral  C- ® Parietal  D– Mucous

- 

س٣- يقسم الجوف الأمامي إلى مستويين :

A - العمود الفقري  B–القلب  C- المنصف  D- ® الحجاب الحاجز  E– الحجاب الحوضي

- س4- الروافد الحشوية للوريد الأجوف السفلي كل ما يلي ما عدا :
- A– الوريد الكلوي  B- الوريد المبيضي الأيمن  C– الوريد الكظري الأيمن  D– الأوردة الكبدية®  E– الوريد الحجابي السفلي
- 
- س٥– في الصهريج الكيلوسي كل ما يلي صحيح ما عدا :
- A- يتلقى الجذع المعوي  B- يتلقى الجذع القطني الأيمن
  C– يقع في مستوى تحت الحجاب الحاجز  D– ® يتوضع على الجانب الأيسر للأبهر
- 
- س٦- يشارك في حدود جيب موريسون كل ما يلي ما عدا :
- A– الفص الكبدي الأيمن  B- ® جدار البطن الأمامي  C– الكلية اليمنى  D– الإنثناء القولوني الأيمن

# PERINEUM

## العجِان

هو الجزء مابين الدبر وأصل القضيب

أعجنة وعجن

Perineum,perinea

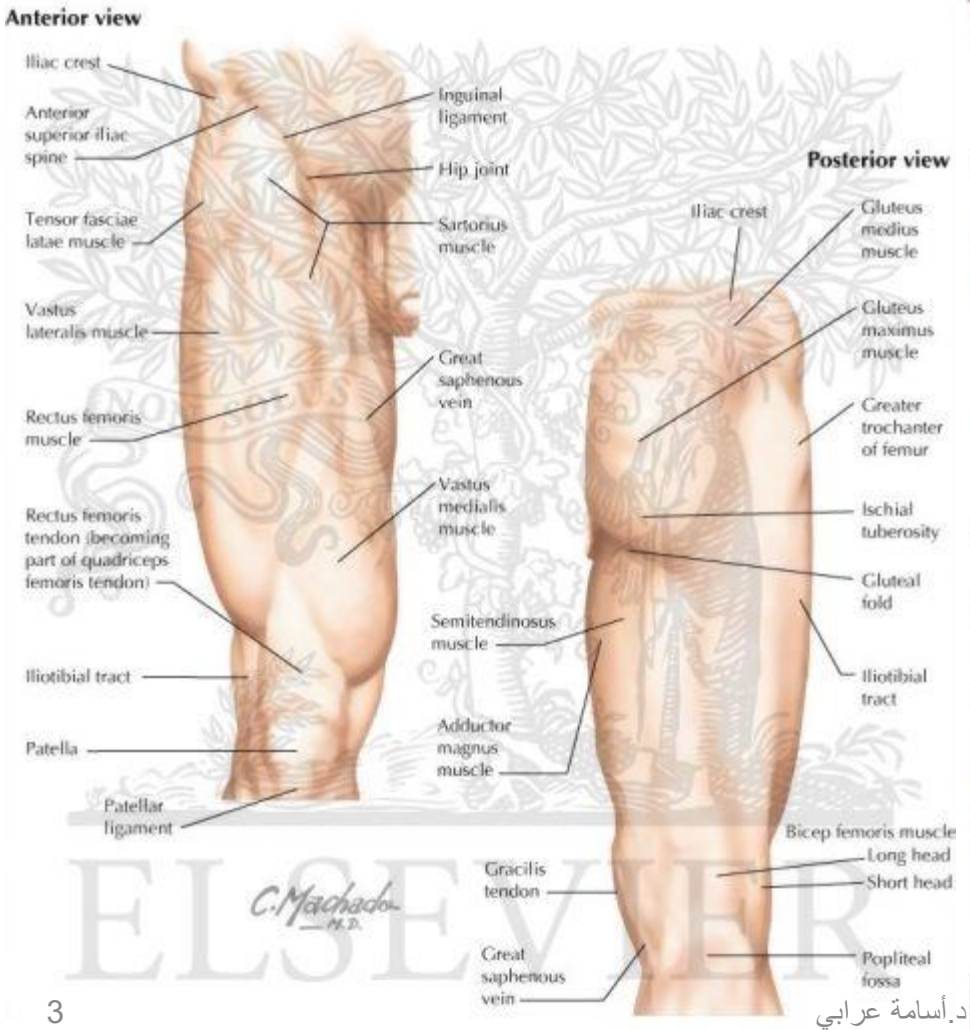
perination(Latin)

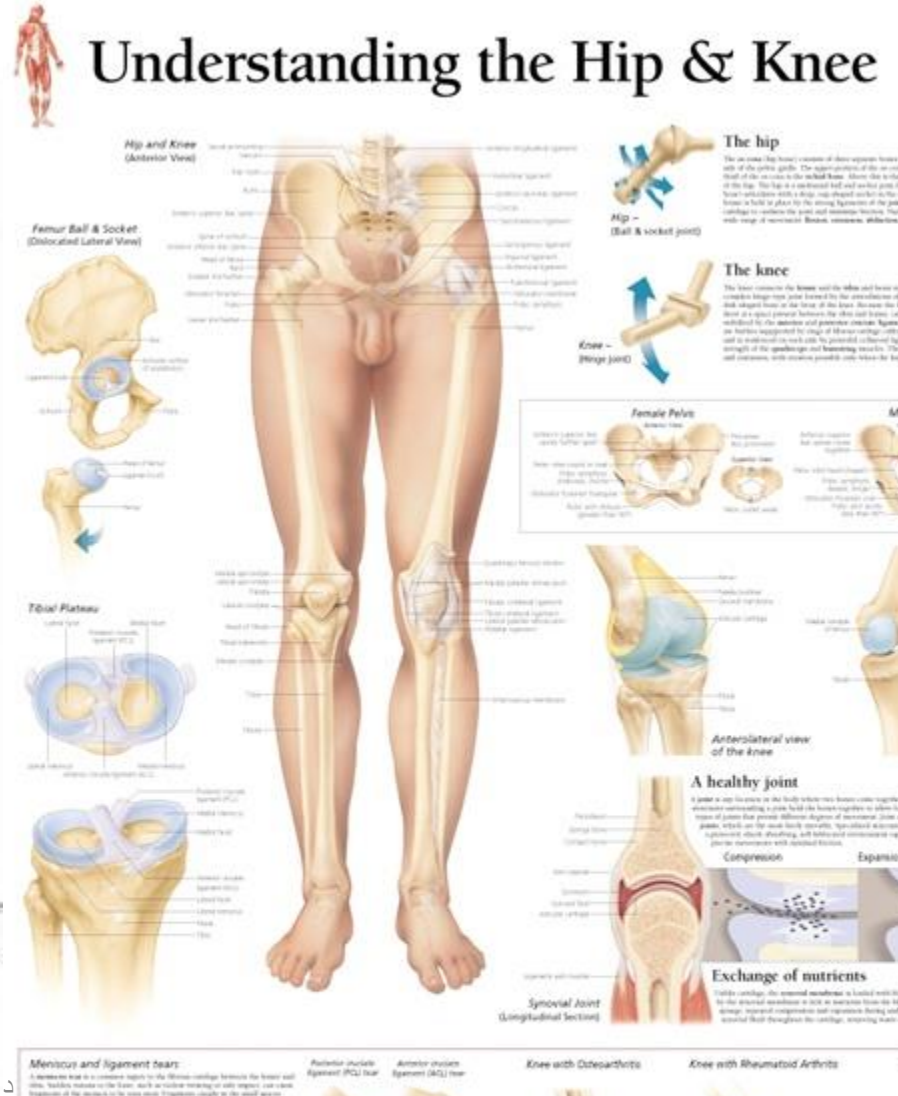
peri+inan(Greek):to empty out

1st use:15th century

- **Perineum**
- **Narrow region between superior medial**
- **aspects of thigh**

**القسم السفلي من الحوض الوقع بين الفخذين,في الوضعية التشريحية تشكل منطقة ضيقة بين القسمين العلويين لوجهي الفخذين الإنسيين**

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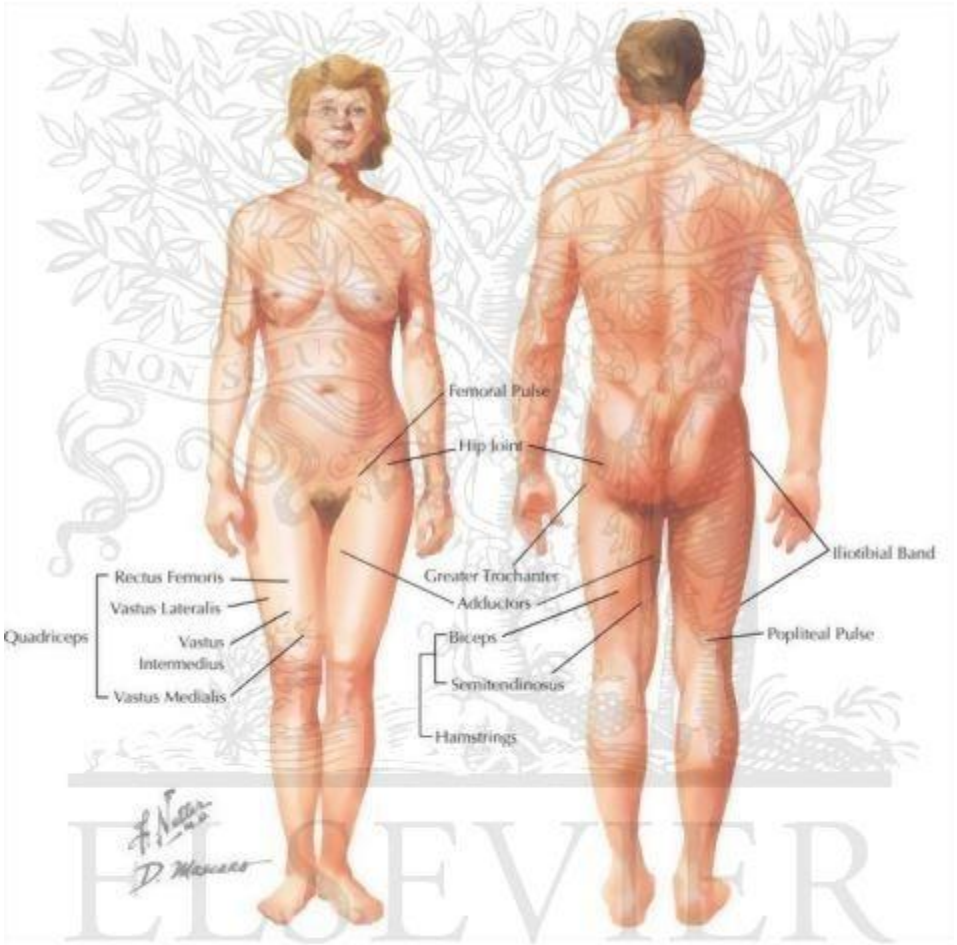


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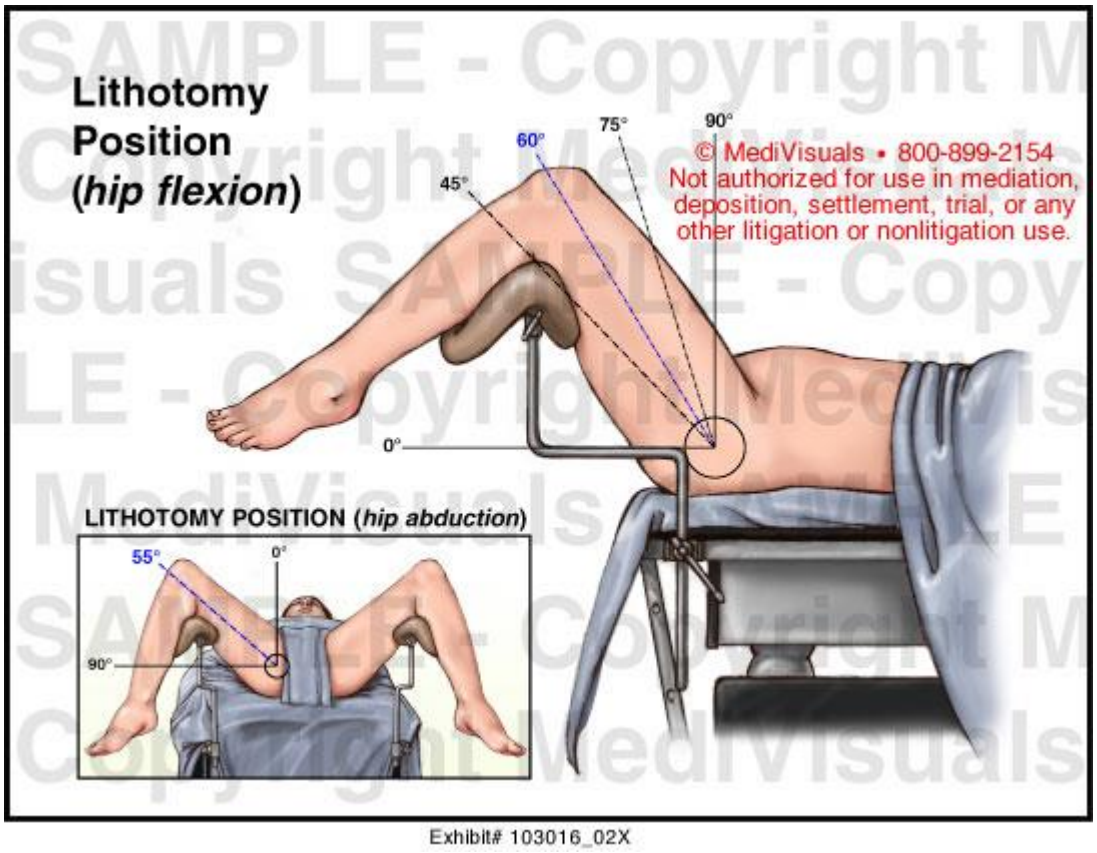
# With lower limbs abducted in lithotomy position



Exhibit# 103016_02X

أما في الإستلقاء الظهري مع عطف الفخذين وتبعديهما وهذا ما يدعى بالوضعية العجانية أووضعية بضع المثانة lithotomy positionفيأخذ العجان شكلا معيّن

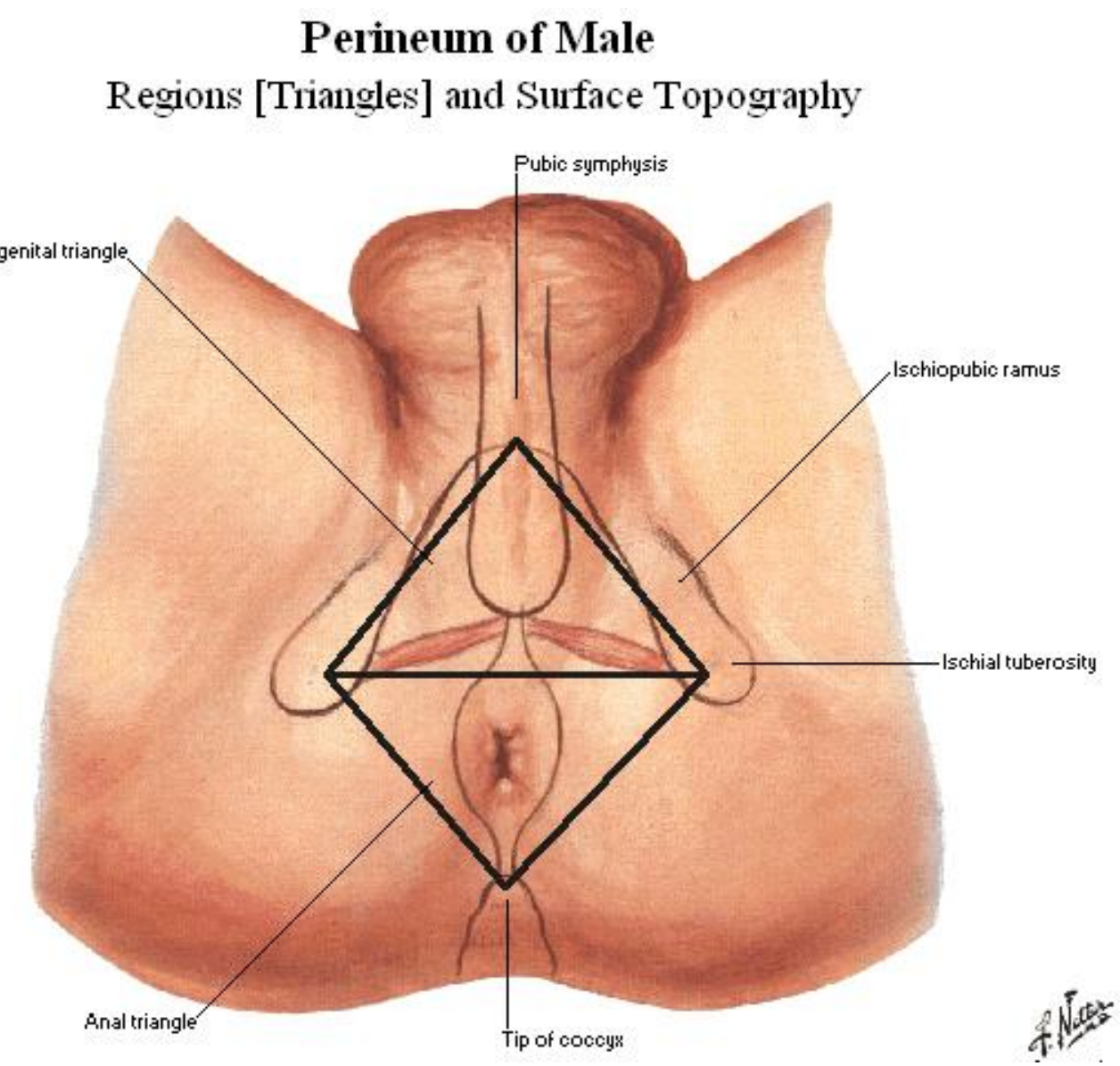
رأسه الأمامي ارتفاق العانة ورأسه الخلفي نهاية العصعص ورأساه الجانبيان هما الحدبتين الوركيتين

حدوده أو أضلاعه:من الأمام والوحشي (الضعلين الأماميين)الشعبتين الوركيتين العانيتين

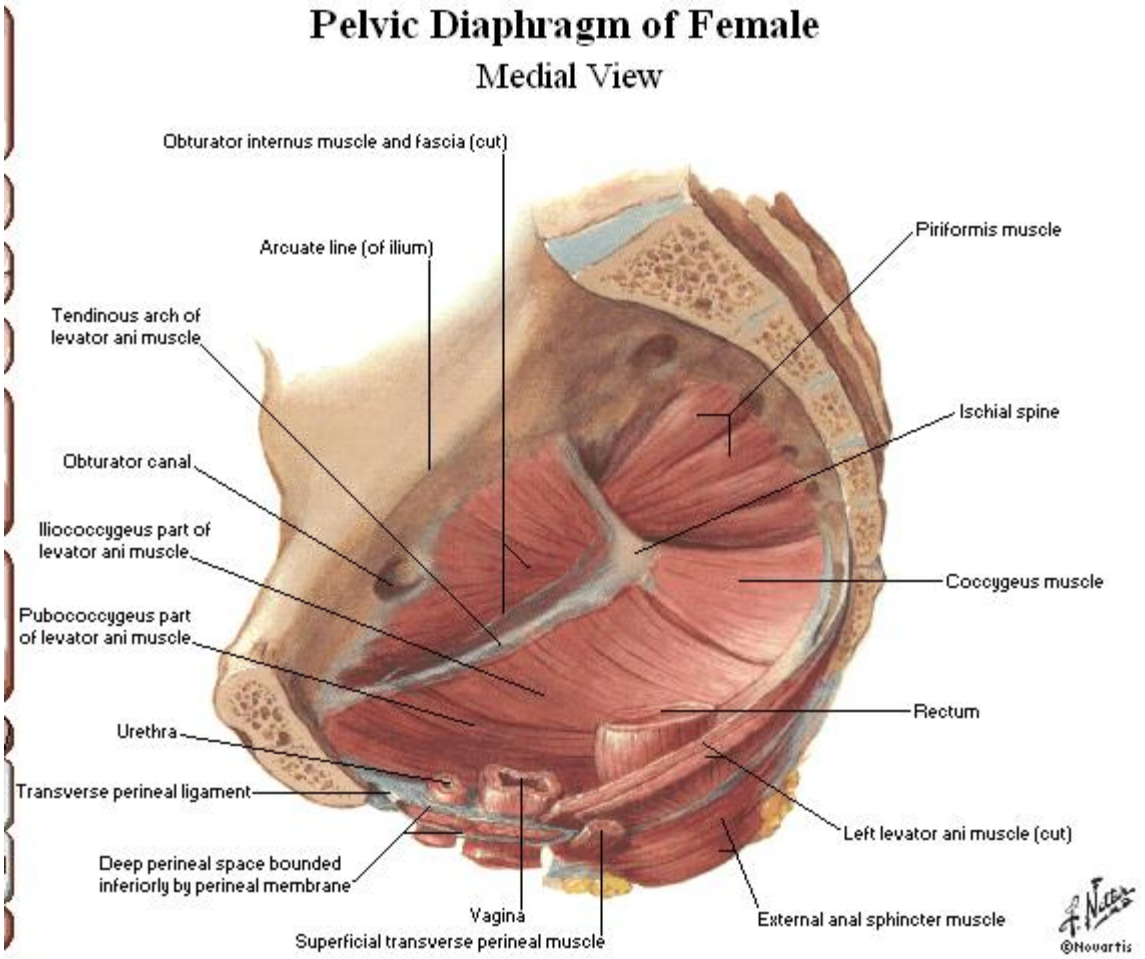
,ومن الخلف والوحشي(الضلعين الخلفيين) الرباطين العجزيين الحدبيين

و من الأعلى الحجاب الحوضي(المؤلف من رافعتي الشرج والعصعصيتان ولفافاتهما) ومن الأسفل الجلد واللفافة السطحية

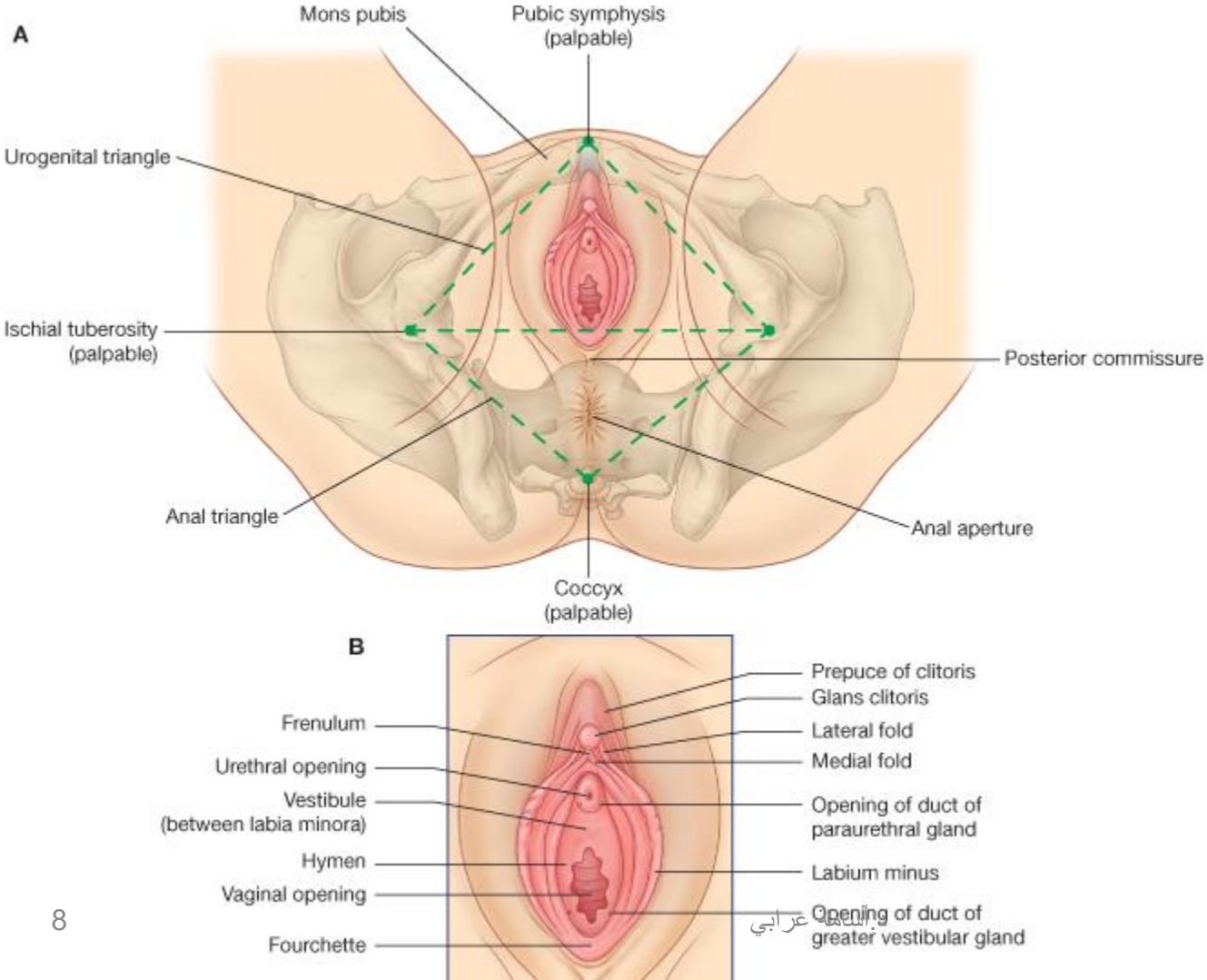
يقسم العجان بخط وهمي(قطر المعين) مار بين الحدبتين الوركيتين إلى مثلثين أمامي ويدعى المثلث البولي التناسلي وخلفي ويدعى المثلث الشرجي



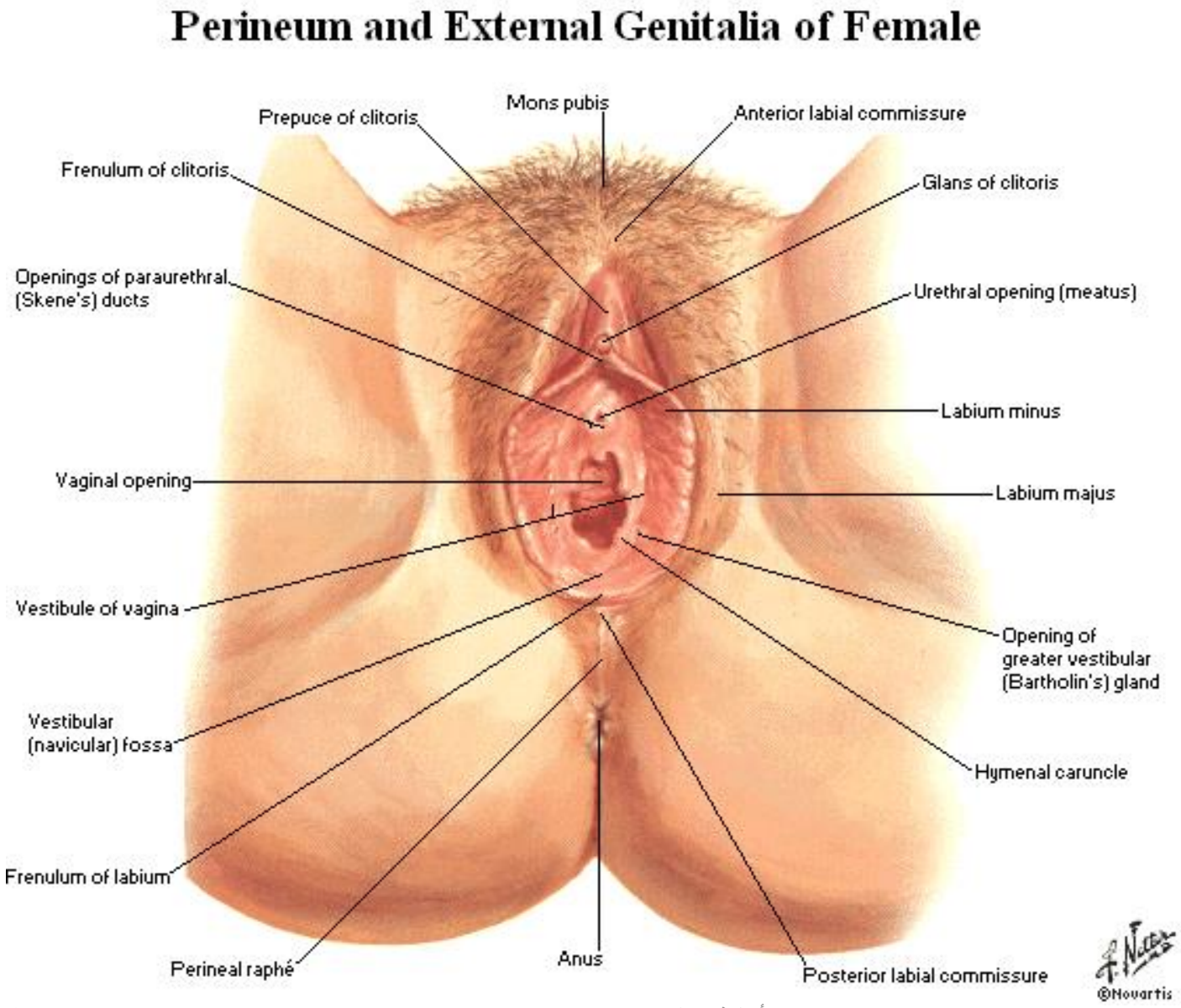
# الحجاب الحوضي



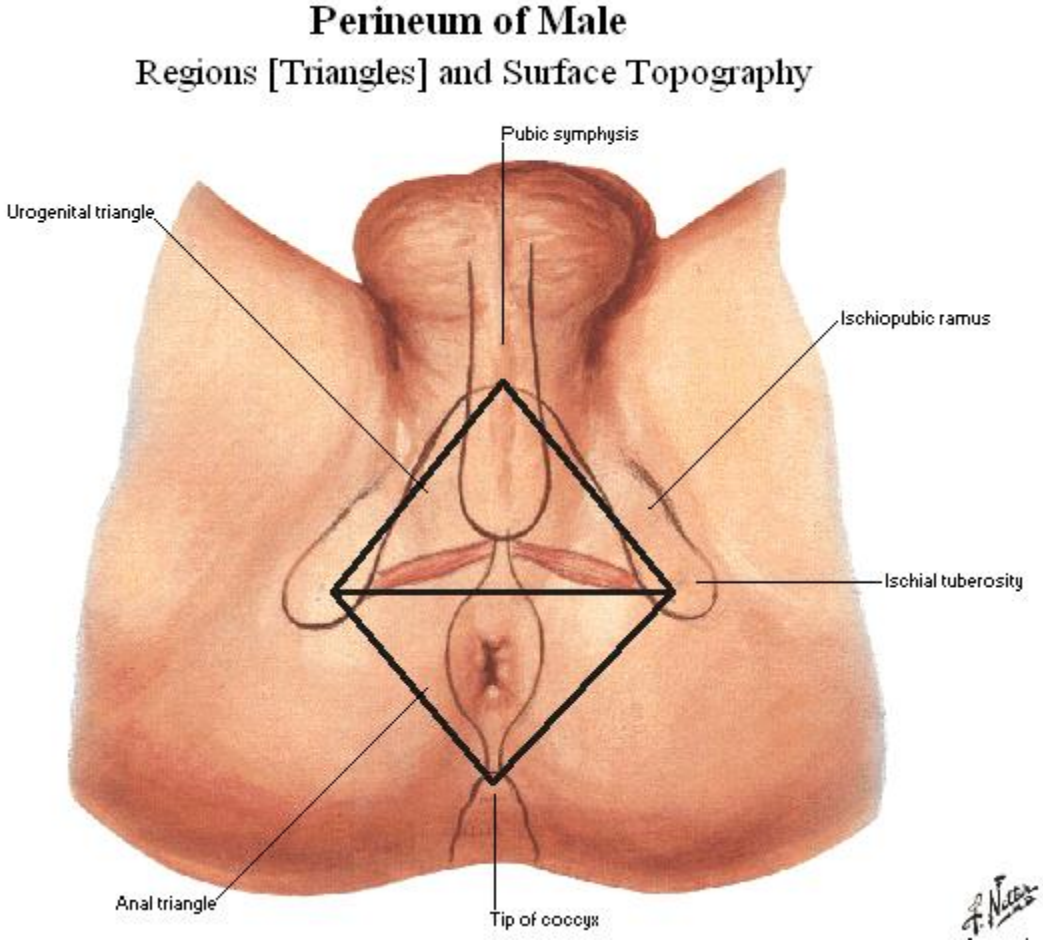
# Superficial Perineum Female



# Superficial Perineum Female

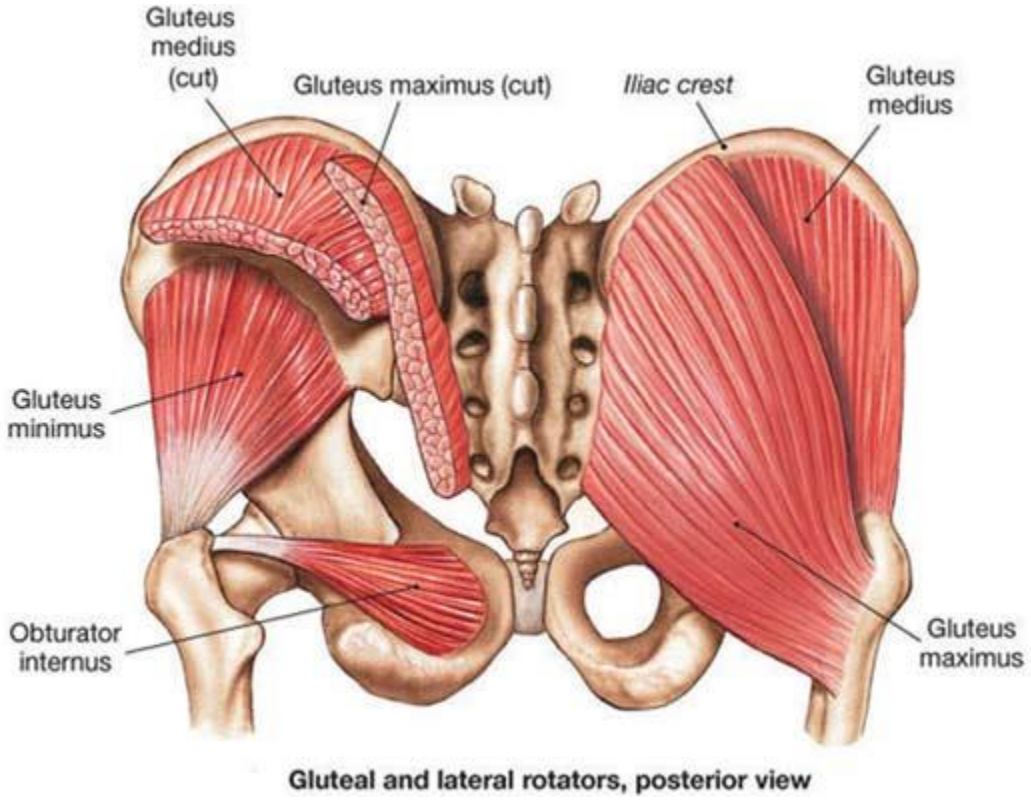


# التشريح السطحي:العصعص:خلف الشرج بـ 2سم



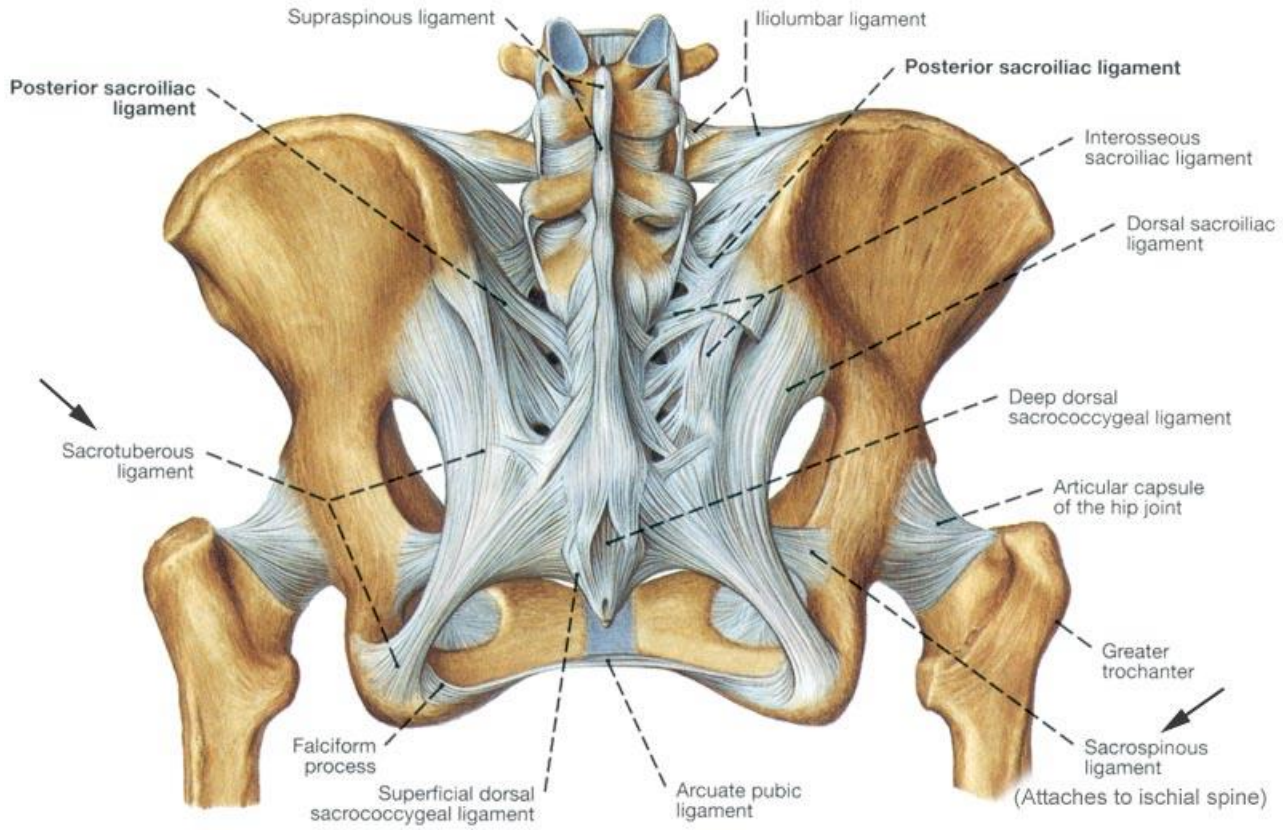
Nuchal region
Trapezius
Triceps brachii
Biceps brachii
Vertebra prominens ($C_7$)
Deltoid
Teres major
Lateral border of scapula
Inferior angle of scapula
Latissimus dorsi
Median furrow
Medial border of scapula
Latissimus dorsi
External oblique
Erector spinae
Iliac crest
Iliac crest
Level of $L_4$ spinous process
Gluteus medius
Sacrum
Placement of coccyx
Gluteus maximus
Gluteal cleft
Gluteal fold
Hamstrings

# الحدبة الوركية:بالوقوف تغطى بالإليوية العظمى



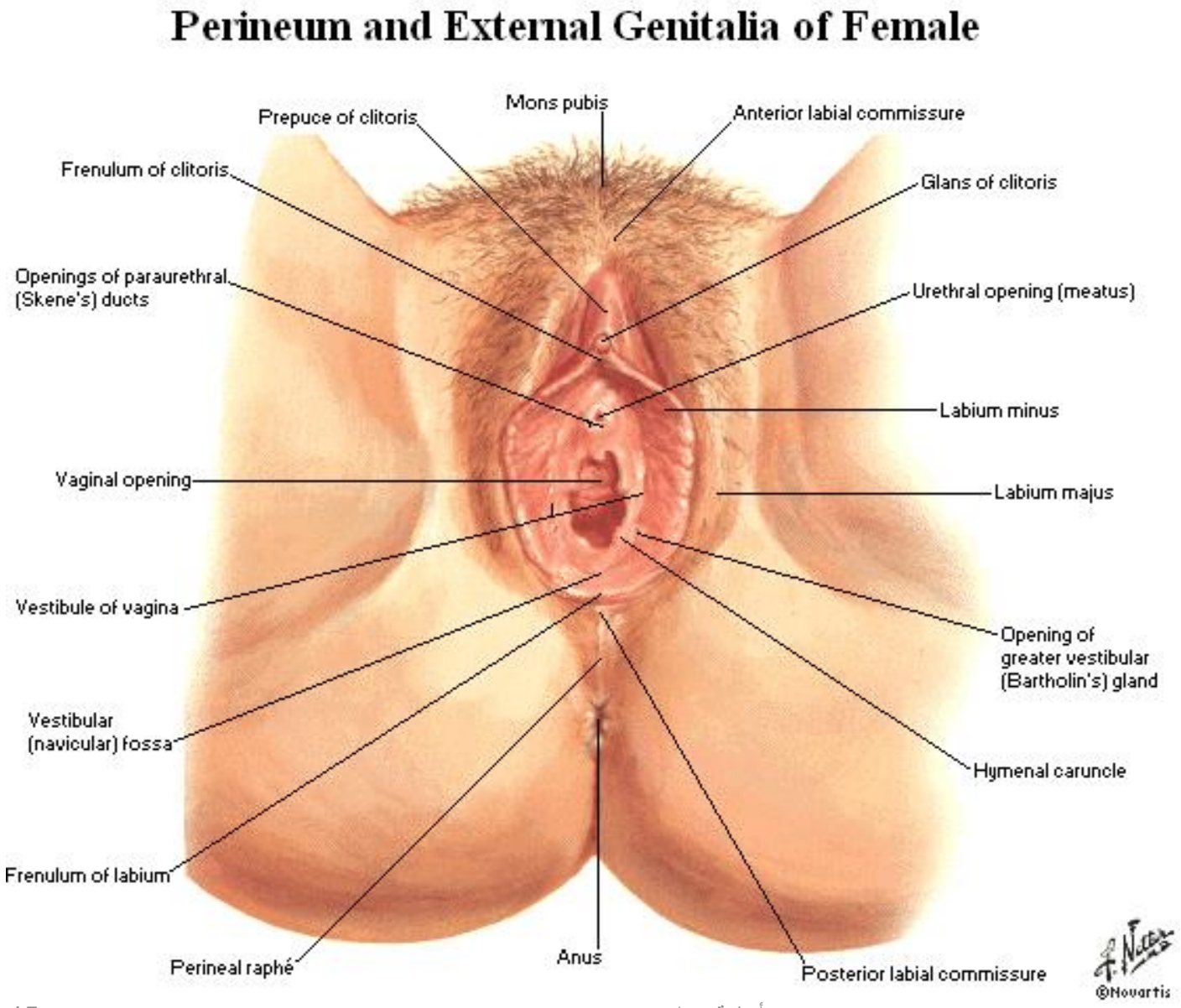

Gluteal and lateral rotators, posterior view

# Pelvis and Ligaments, Rear View, Female



**الحدبة الوركية بالجلوس تنكشف من تحت الحافة السفلية للإليوية العظمى وتدعم ثقل الجسم(ويجلس الإنسان على حدبتيه الوركيتين)**

# Superficial Perineum Female



# Female External Genitalia

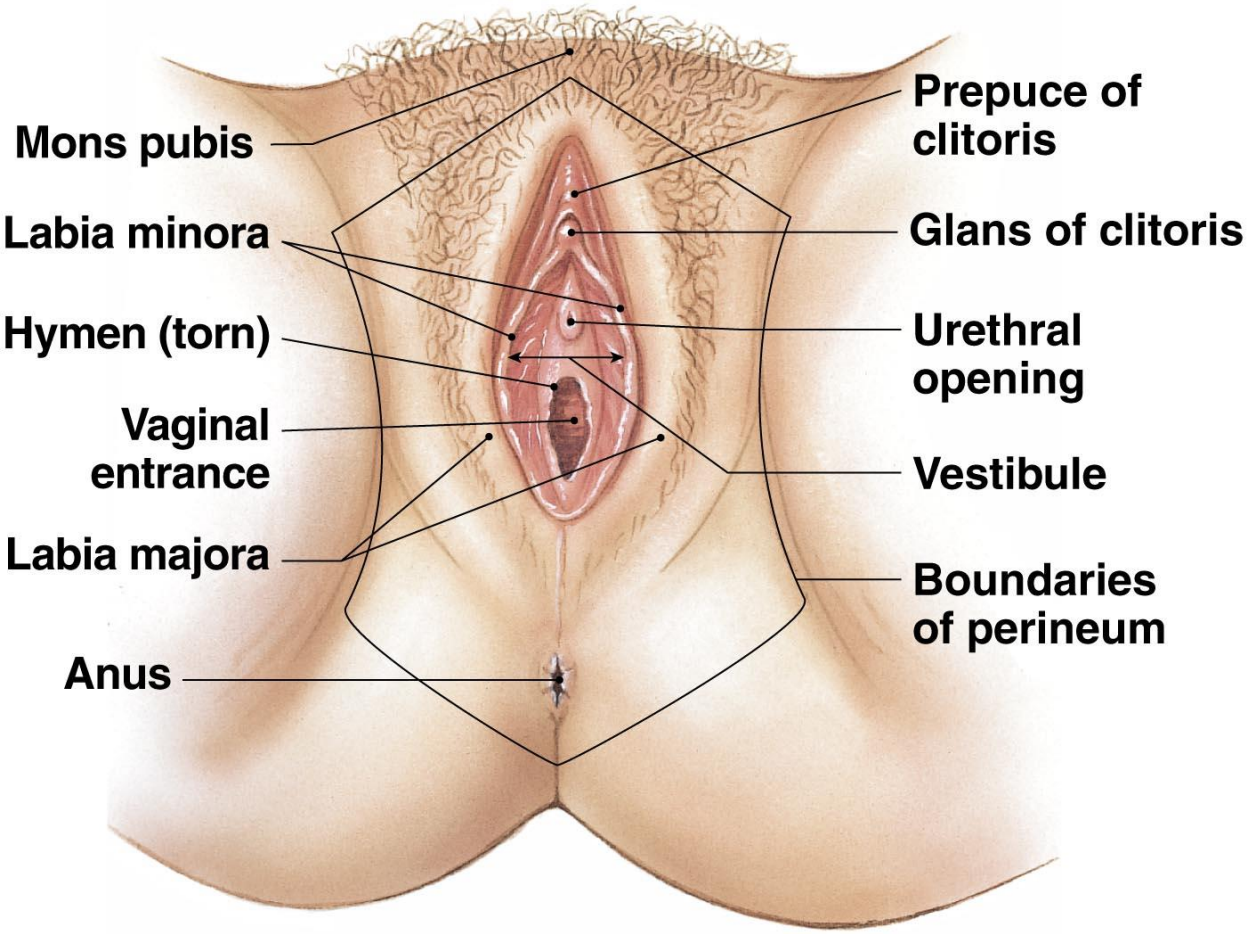
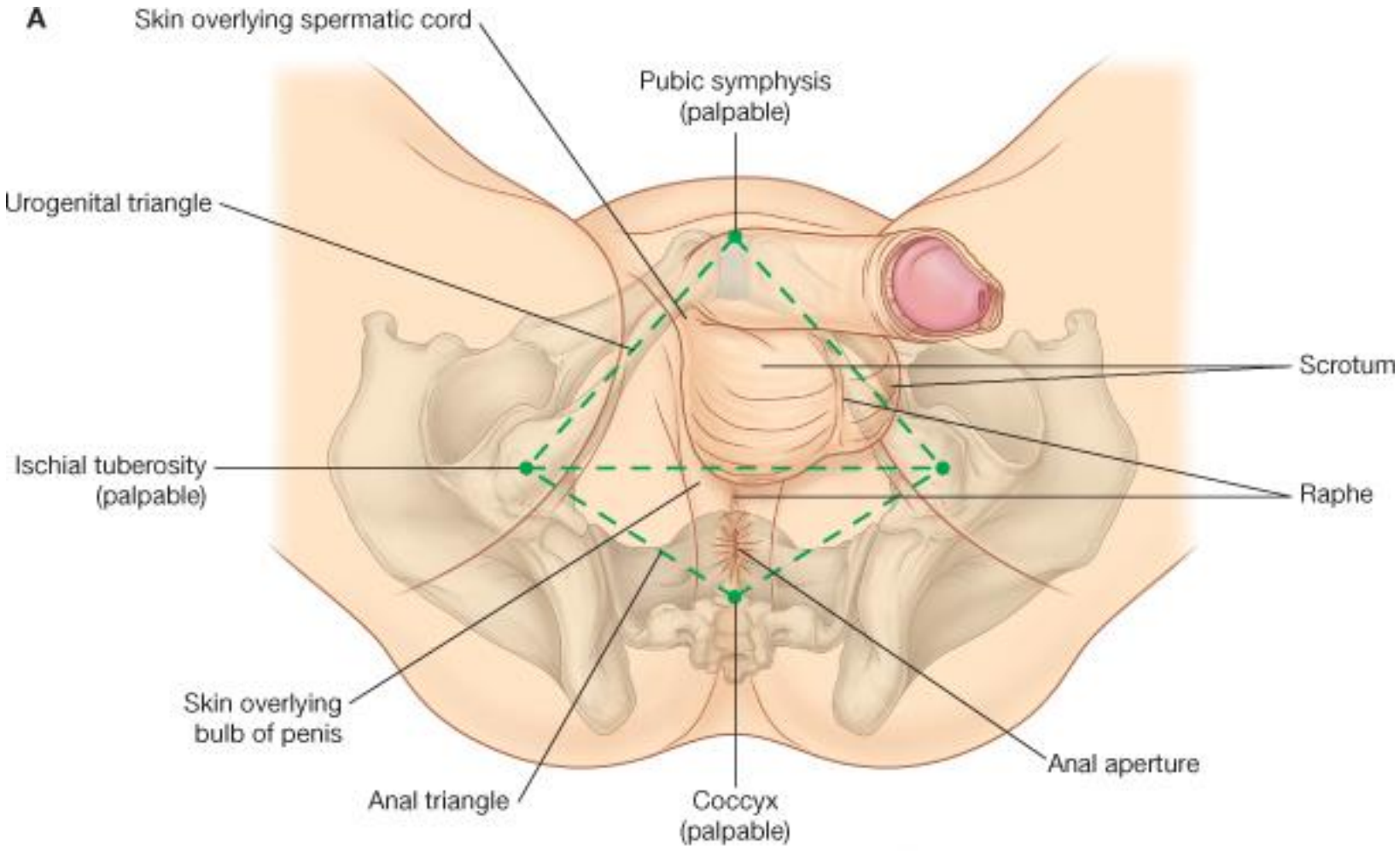



Figure 19-12

# Superficial Perineum Male



# اللفافة العجانية السطحية,لفافة كولـي

- اللفافة السطحية لجدار البطن الأمامي:
- سطحية دهنية(لفافة كامبر):سميكة وتزداد سماكتها عند البدينين,تعبر الرباط الإربي لتتمادى مع لفافة الفخذ السطحية,كما تمر فوق القضيب والسطح الخارجي للحبل المنوي لتصل للصفن وتساهم في تشكيل العضلة السلخ
- غشائية عميقة(لفافة سكاربا)
- تتواصل الدهنية مع النسيج الشحمي لبقية الجسم:الصدر,الفخذين,العجان(الإسكية المستقيمية)

The **superficial layer** (*fascia of Camper*) is thick, areolar in texture, and contains in its meshes a varying quantity of adipose tissue. Below, it passes over the inguinal ligament, and is continuous with the superficial fascia of the thigh. In the male, Camper's fascia is continued over the penis and outer surface of the spermatic cord to the scrotum, where it helps to form the dartos. As it passes to the scrotum it changes its characteristics, becoming thin, destitute of adipose tissue, and of a pale reddish color, and in the scrotum it acquires some involuntary muscular fibers. From the scrotum it may be traced backward into continuity with the superficial fascia of the perineum. In the female, Camper's fascia is continued from the abdomen into the labia majora.

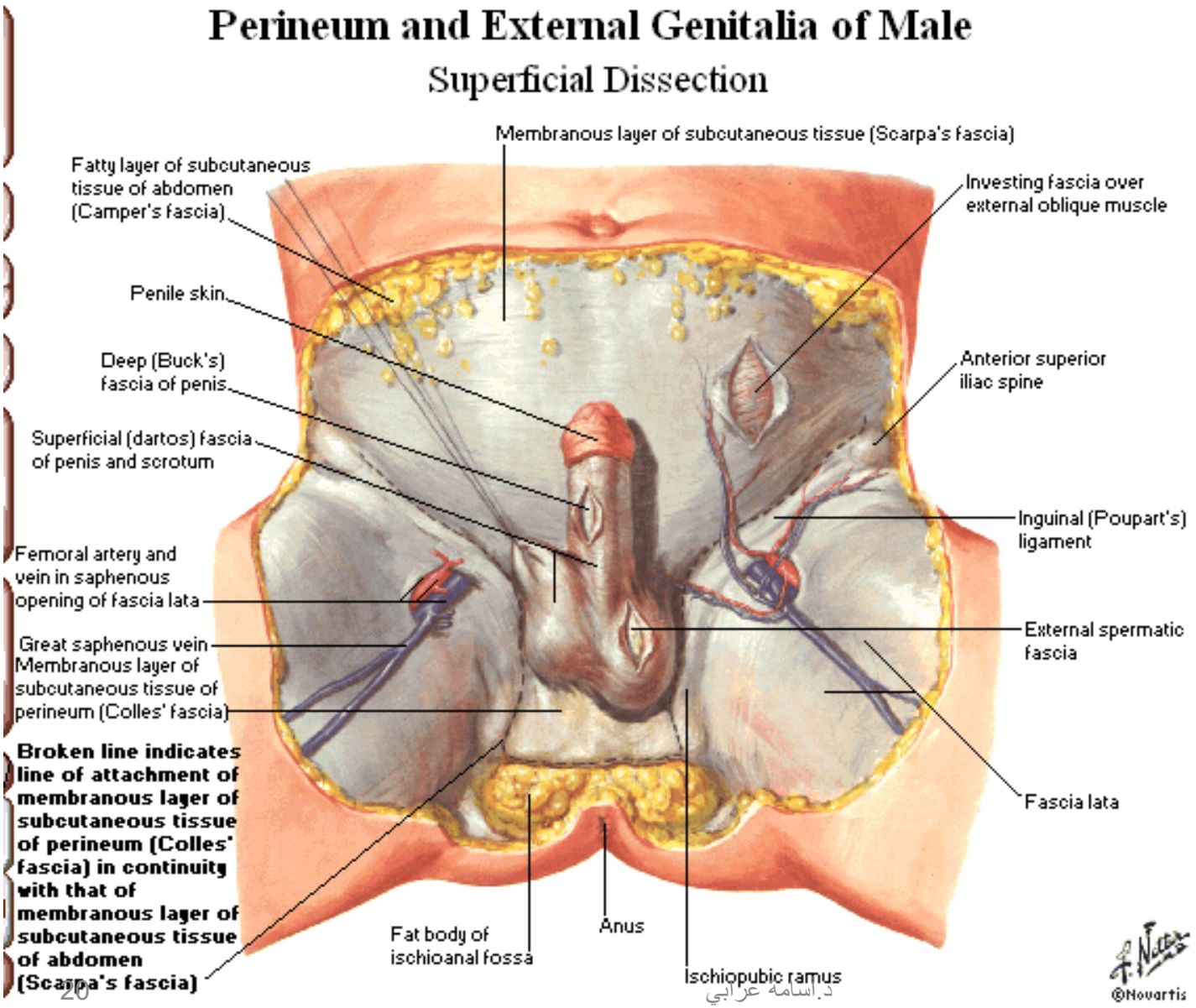
إن الطبقة الغشائية رقيقة وتضمحل في الجانبين والأعلى، حيث تتواصل مستمرة مع اللفافة السطحية للظهر والصدر على التوالي. تسير الطبقة الغشائية في الأسفل فوق مقدمة الفخذ، حيث تندمج مع اللفافة العميقة تحت الرباط الأربي بعرض إصبع واحدة. أما في الأسفل وعلى الخط المتوسط فلا ترتكز الطبقة الغشائية للفافة على العانة ولكنها تشكل غمداً أنبوبياً للقضيب (أو البظر)، وفي العجان في الأسفل تدخل جدار الصفن (أو الشفر الكبير)، ومن هناك تسير لترتكز في كل جانب على هوامش القوس العانية. أما خلفياً فتلتحم مع الجسم العجاني والهامش الخلفي للغشاء العجاني

في الصفن توجد الطبقة الدهنية للفافة السطحية على شكل طبقة رقيقة من عضلات ملساء هي **العضلة السلخ dartos muscle**، وتستمر الطبقة الغشائية كطبقة منفصلة. غالباً ما يشير السريريون إلى الطبقة الدهنية من اللفافة السطحية بلفافة **كامبر fascia of camper**، وإلى الطبقة الغشائية المتوضعة فوق الجدار البطن الأمامي **بلفافة سكاربا**


د.أسامة عرابي

أما الغشائية فهي رقيقة وتضمحل في الجانبين حيث تتمادى مع اللفافة السطحية للظهر,كما تضمحل في الأعلى لتتمادى مع اللفافة السطحية للصدر,أما في الأسفل فتعبر الرباط الإربي لتنزل للفخذ وتندمج مع لفافته السطحية

# Superficial Perineum Male





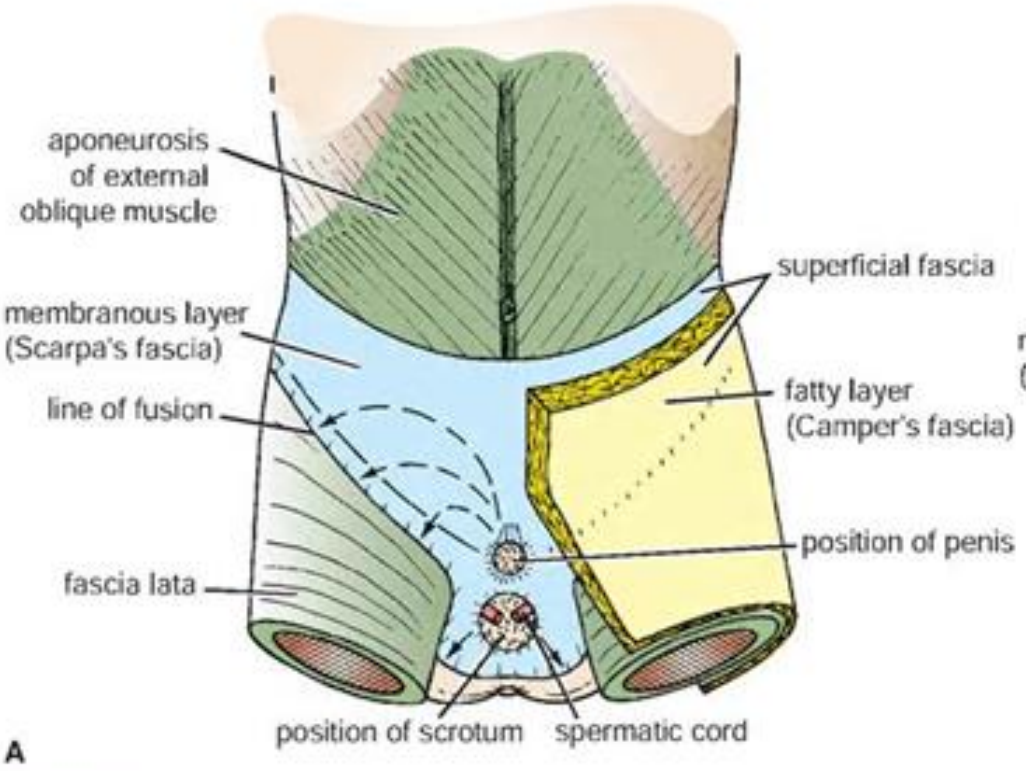
د.اسامة عرابي

In the scrotum, the fatty layer of the superficial fascia is represented as a thin layer of smooth muscle, the **dartos muscle.** The membranous layer of the superficial fascia persists as a separate layer.

## Deep Fascia

The deep fascia in the anterior abdominal wall is merely a thin layer of connective tissue covering the muscles; it lies immediately deep to the membranous layer of superficial fascia.

three broad thin sheets that are aponeurotic in front; exterior to interior they are the external oblique, int oblique, and transversus (Fig. 4.2). On either side o midline anteriorly is, in addition, a wide vertical cle, the rectus abdominis (Fig. 4.3). As the aponeu of the three sheets pass forward, they enclose the r abdominis to form the rectus sheath. The lower pa the rectus sheath might contain a small muscle calle pyramidalis.



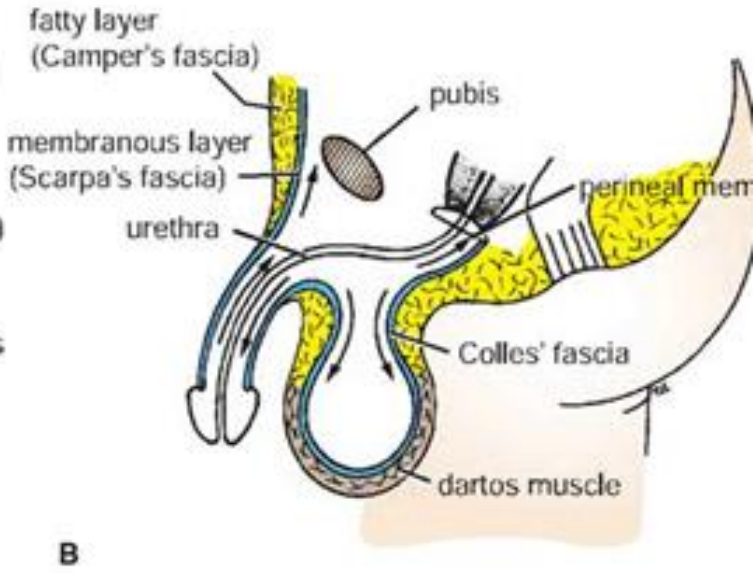
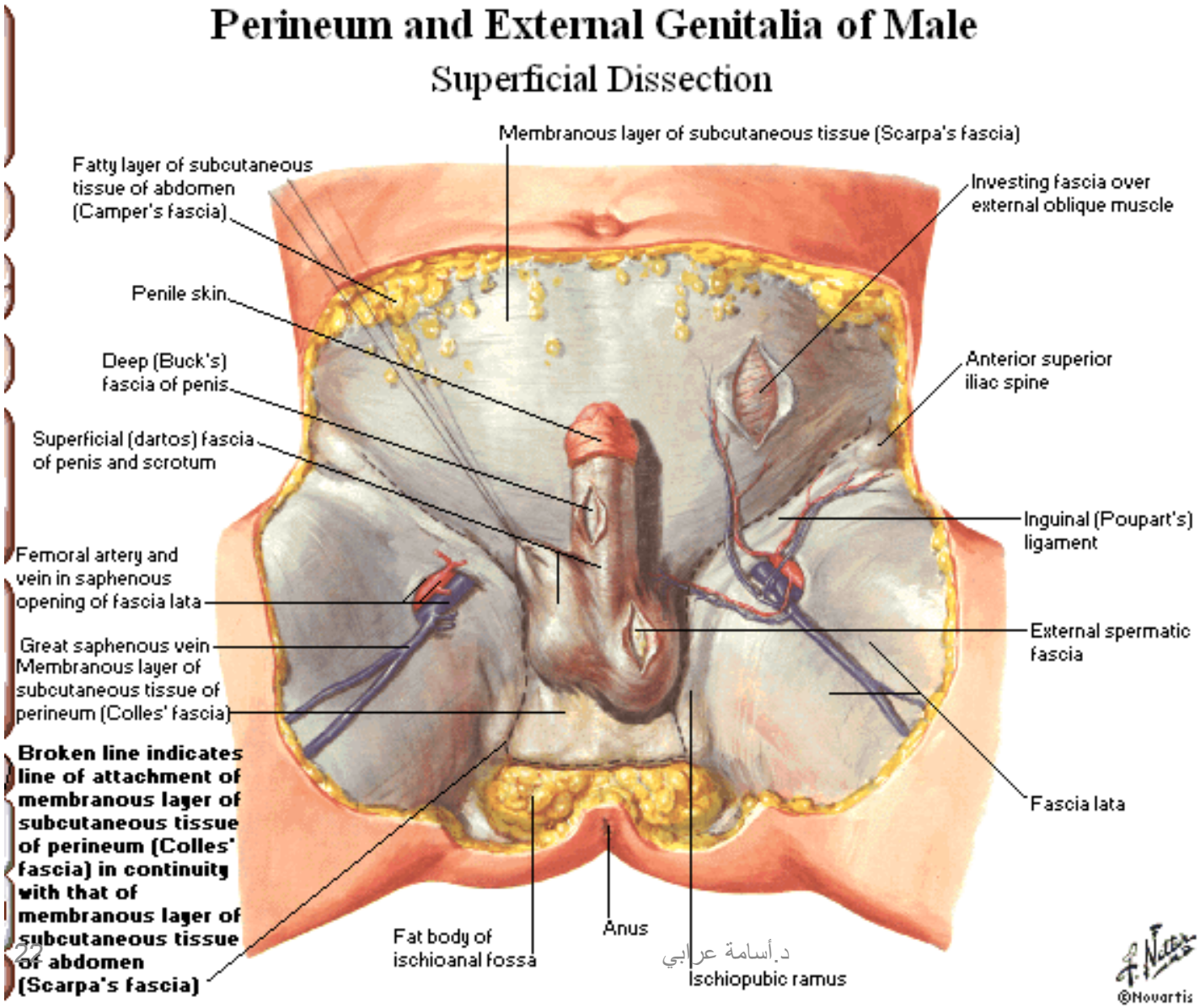




**FIGURE 4.1** **A.** Arrangement of the fatty layer and the membranous layer of the superficial fascia in the lower part of the anterior abdominal wall. Note the line of fusion between the membranous layer and the deep fascia of the thigh (fascia **B.** Note the attachment of the membranous layer to the posterior margin of the perineal membrane. Arrows indicate pat


د.اسامة عرابي

وإلى الطبقة الغشائية في العجان(والصفن) بلفافة كولي





د.أسامة عرابي

لفافة كولي تلتحم
جانبيا مع الجسم
العجاني والحافة
الخلفية للغشاء
العجاني

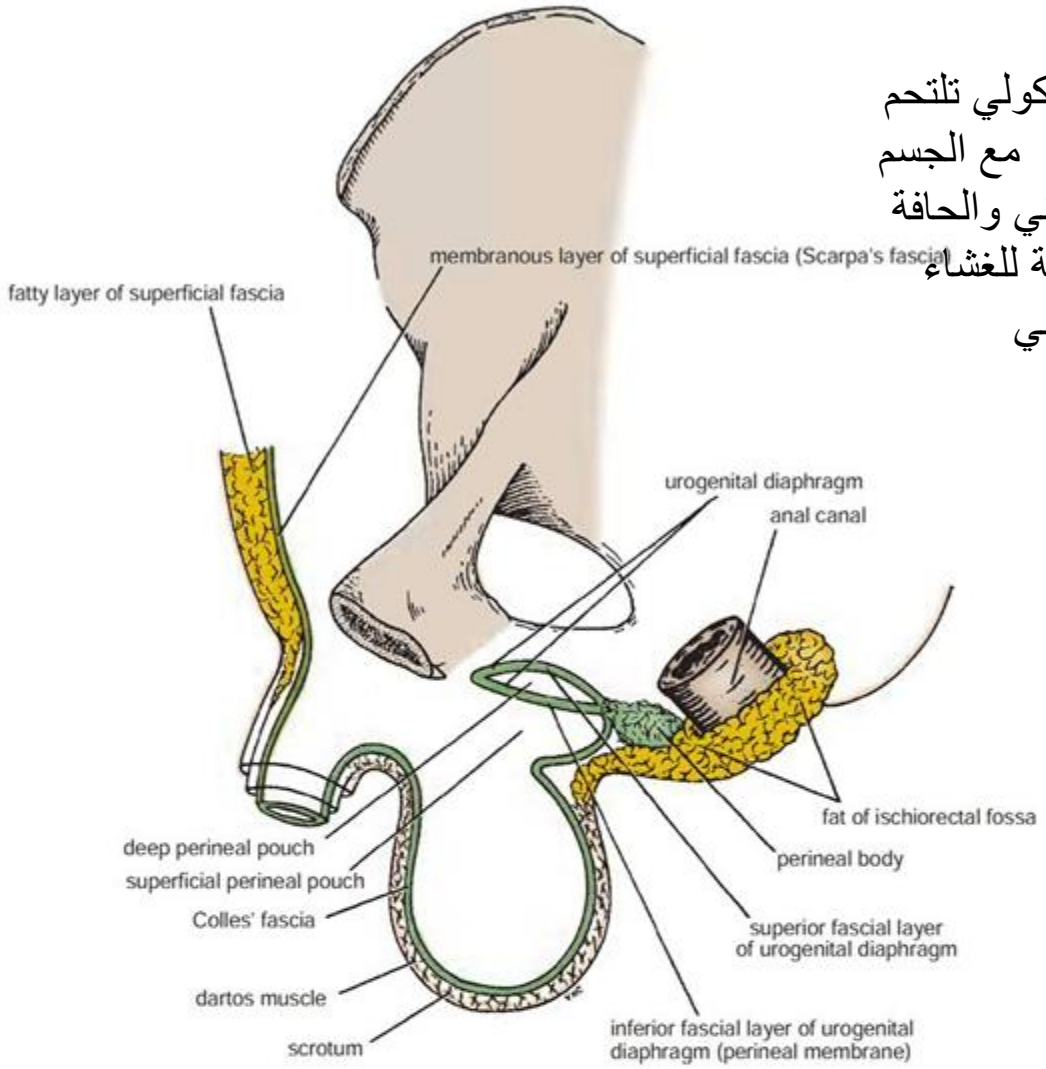



**FIGURE 8.12** Arrangement of the superficial fascia in the urogenital triangle. Note the superficial and deep perineal pouches.

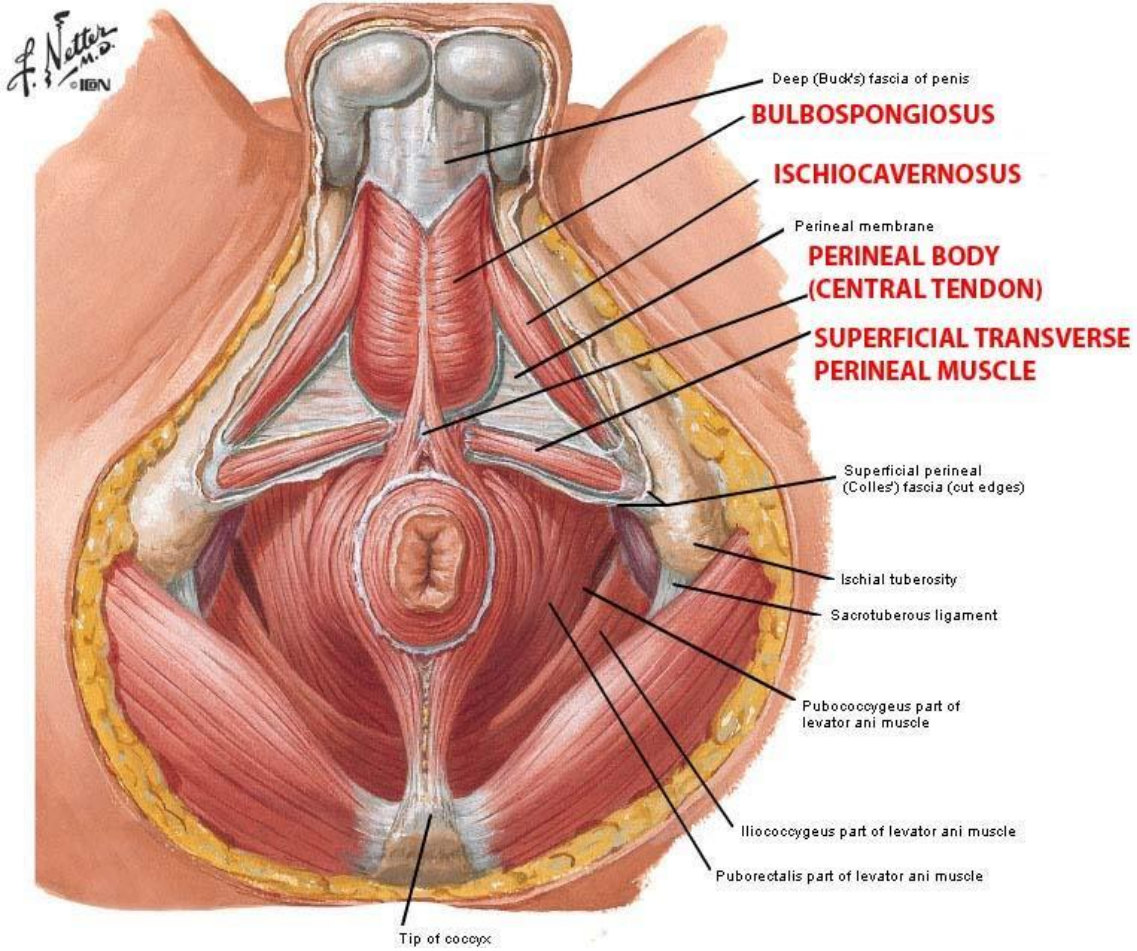


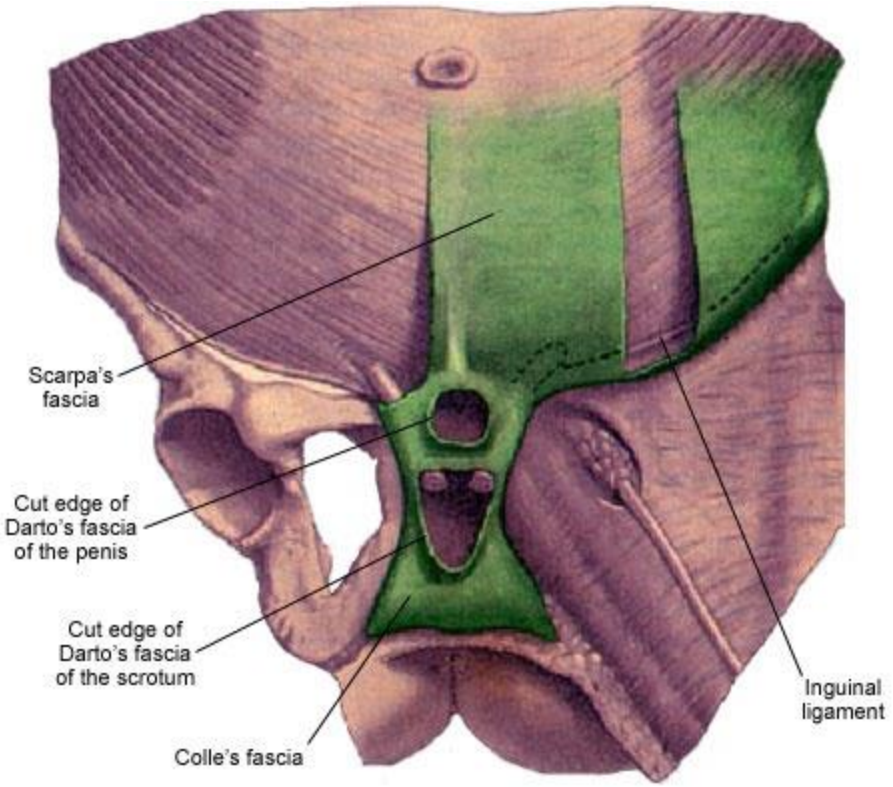


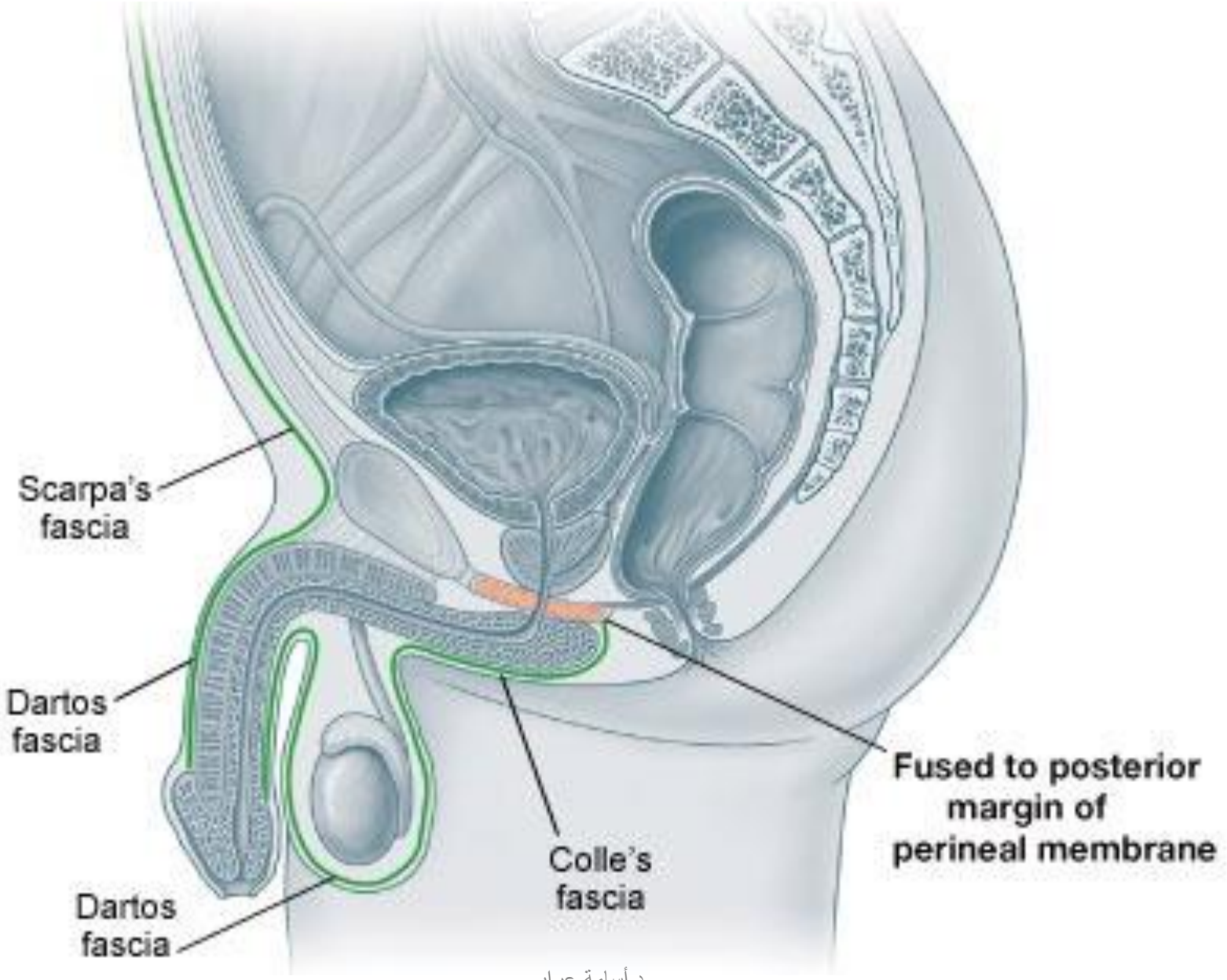
superficial and deep layers of fascia is known as the **deep**

**crura of the penis** (Figs. 8.13, 8.16, and 8.17). The bulb is

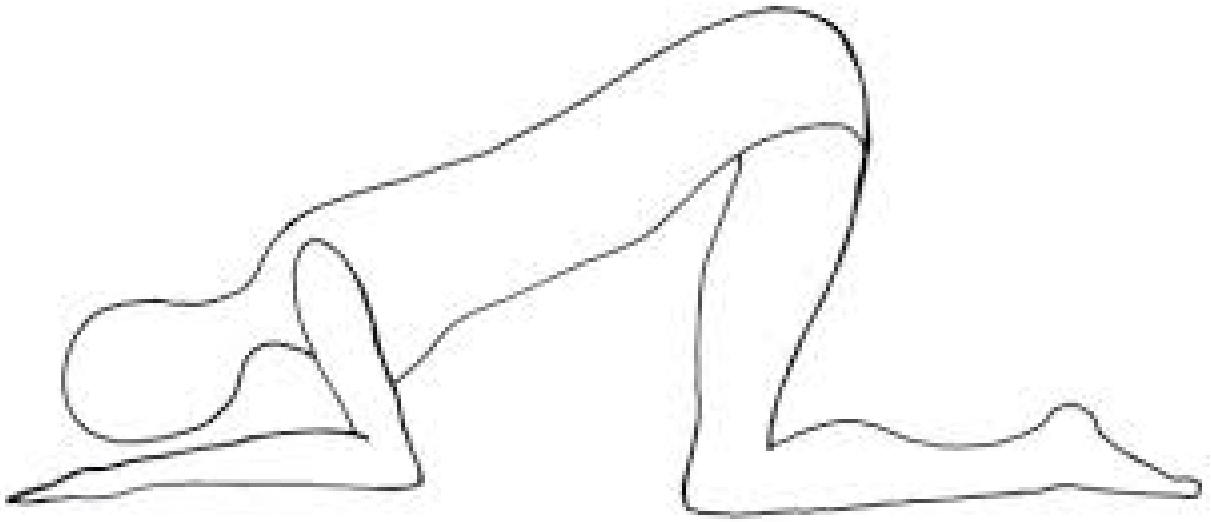
# لفافة كولي


Deep (Buck's) fascia of penis
BULBOSPONGIOSUS
ISCHIOCAVERNOSUS
Perineal membrane
PERINEAL BODY
(CENTRAL TENDON)
SUPERFICIAL TRANSVERSE
PERINEAL MUSCLE
Superficial perineal
(Colles') fascia (cut edges)
Ischial tuberosity
Sacrotuberous ligament
Pubococcygeus part of
levator ani muscle
Iliococcygeus part of levator ani muscle
Puborectalis part of levator ani muscle
Tip of coccyx


Scarpa's fascia
Cut edge of Darto's fascia of the penis
Cut edge of Darto's fascia of the scrotum
Colle's fascia
Inguinal ligament


Scarpa's fascia
Dartos fascia
Dartos fascia
Colle's fascia
Fused to posterior margin of perineal membrane

# Knee  elbow position



Right Lateral Recumbent

Supine

Left Lateral Recumbent

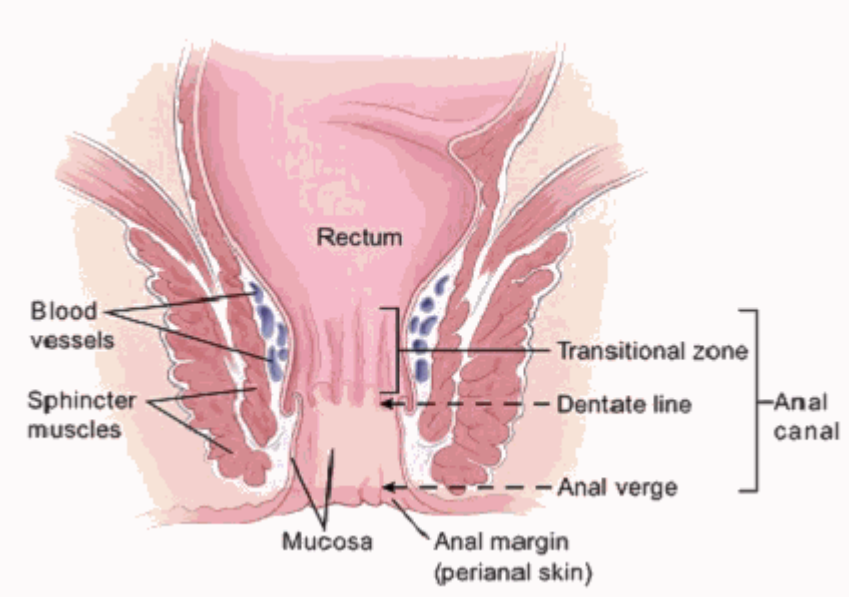
Prone

# محتويات المثلث الشرجي:
# الشرج والقناة الشرجية
# المعصرتين الظاهرة والباطنة
# الحفرة الإسكية المستقيمية

- **Contents of Anal Triangle**
- Anal canal and anus
- External and internal anal sphincters

Ischiorectal fossa •

الشرج:فوهة الشرج الخط الشرجي الجلدي.حافة(حتار)Vergeالشرج
وهي تمثل نهاية الأنبوب الهضمي,ويكون النسيج الظهاري الأعلى من هذا الخط بلون بني محمر ومغضنا بفعل المعصرة الظاهرة



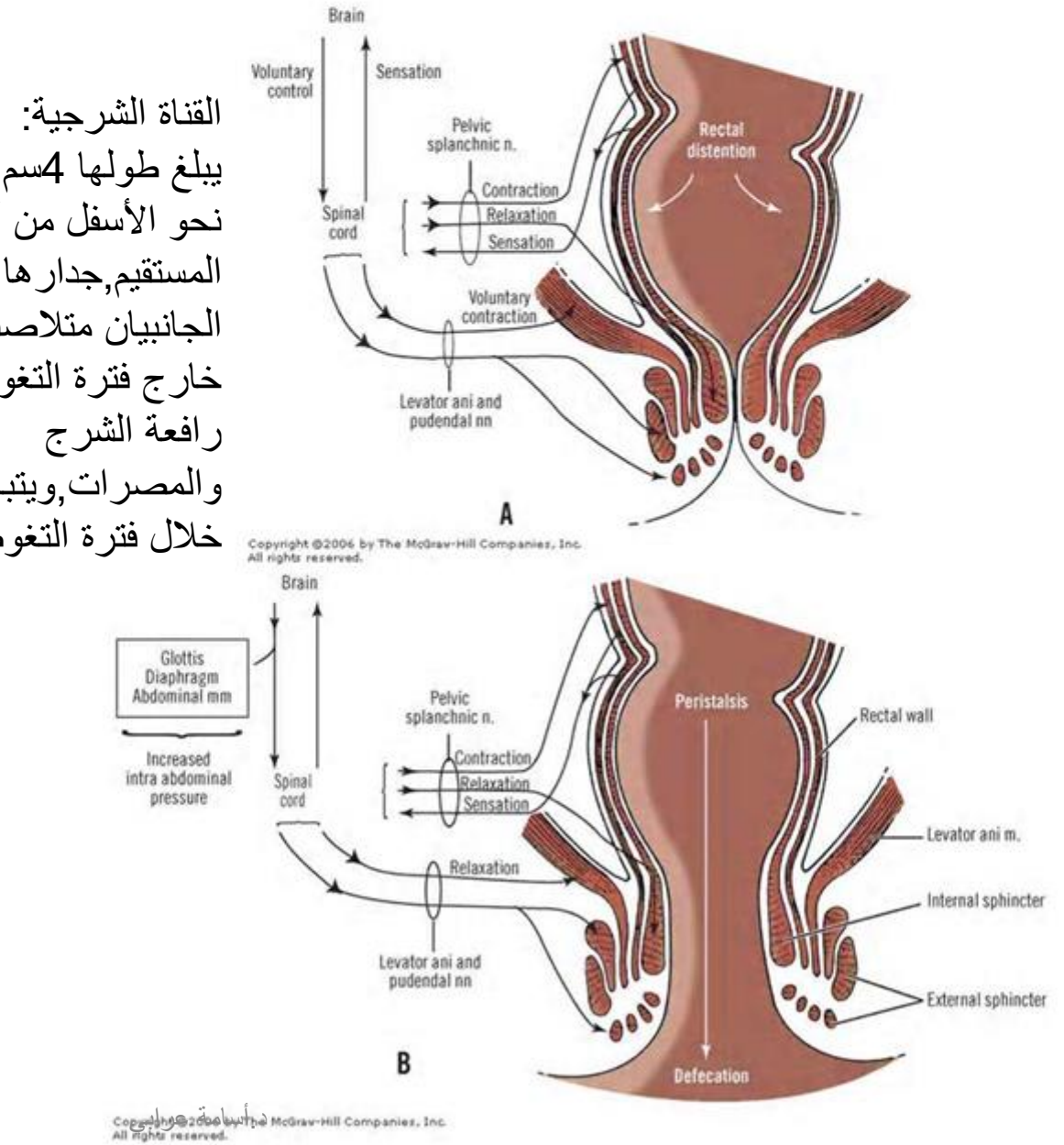
**Anal Canal Location and Description**

**The anal canal is about 1.5 in. (4 cm) long and passes anus .Except during defecation, its lateral walls are kept in apposition by the levatores ani muscles and the anal sphincters.**

القناة الشرجية:
يبلغ طولها 4سم,تسير نحو الأسفل من أنبورة المستقيم,جدارها الجانبيان متلاصقان خارج فترة التغوط بفعل رافعة الشرج والمصرات,ويتباعدان خلال فترة التغوط

Distention of the rectum is the initial stimulus for defecation. Distention (Fig. 18-50A), with a rise in pressure, acting on mural receptors, produc
contraction of the rectal musculature. At the same time, the internal sphincter relaxes. This portion of the process is mediated by the intrinsic ne
with no contribution from extrinsic nerves.

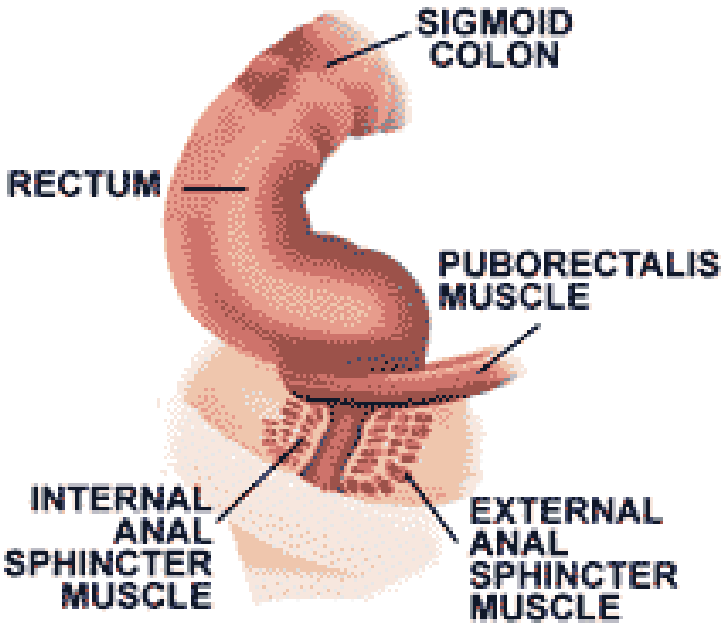
**Fig. 18-50.**

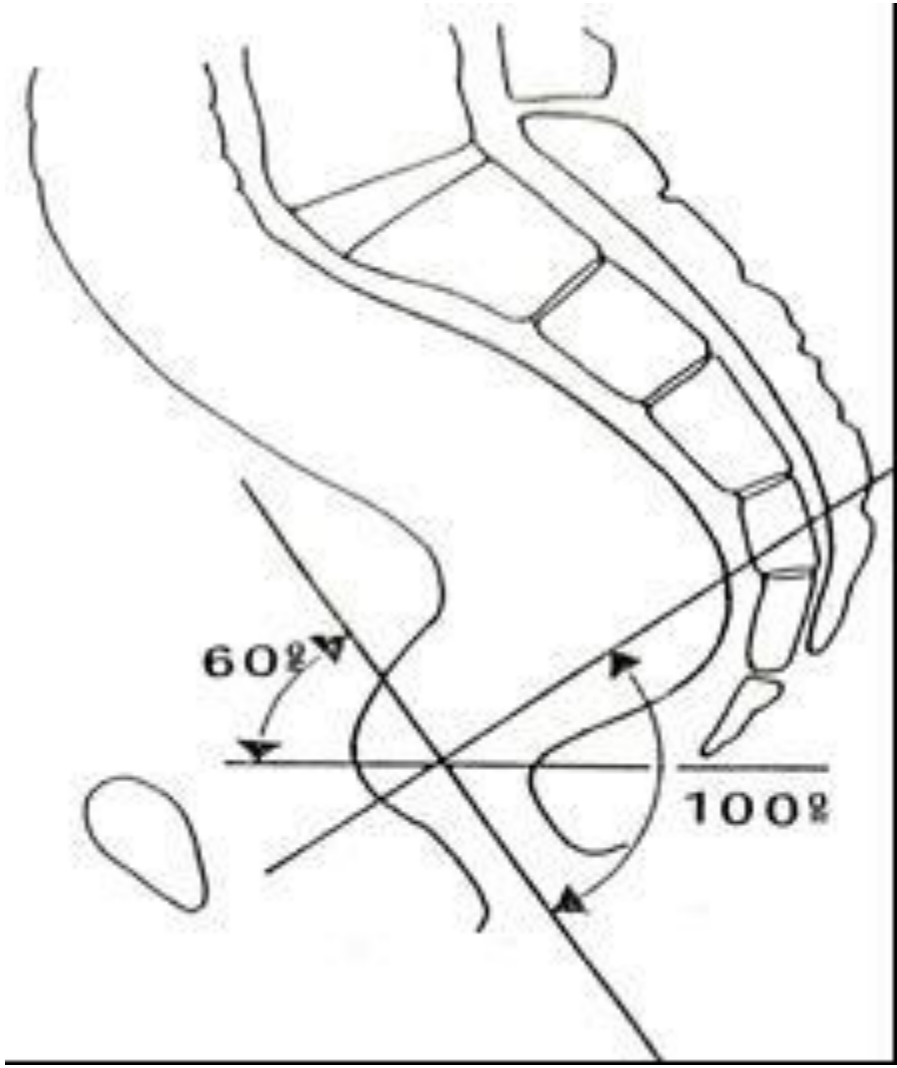



Neural pathways involved in defecation. **A,** Rectal distension initiates relaxation of the internal sphincter and effective voluntary closure by the external sphi

**القناة الشرجية هي القسم النهائي من الأنبوب الهضمي يبلغ طولها 4سم تميل نحو الخلف مشكلة زاوية مقدارها 60 درجة مئوية عن المستوى الأفقي,تبدأ حيث ينتهي المستقيم حيث تشكل معه من الخلف زاوية يبلغ مقدارها100 درجة عن المستوى الأفقي وتساهم هذه الزاوية باستمساك البراز,كما تشكل الألياف العانية المستقيمية من العضلة الرافعة للشرج وشاحا يرتكز في الأمام على عظمي العانة ويسير حول الموصل بين المستقيم والقناة الشرجية ويسحبهما نحو الأمام مشكلا الزاوية الحادة (60 درجة)المذكورة أعلاه.**

## Anatomy of the Rectum and Anal Canal

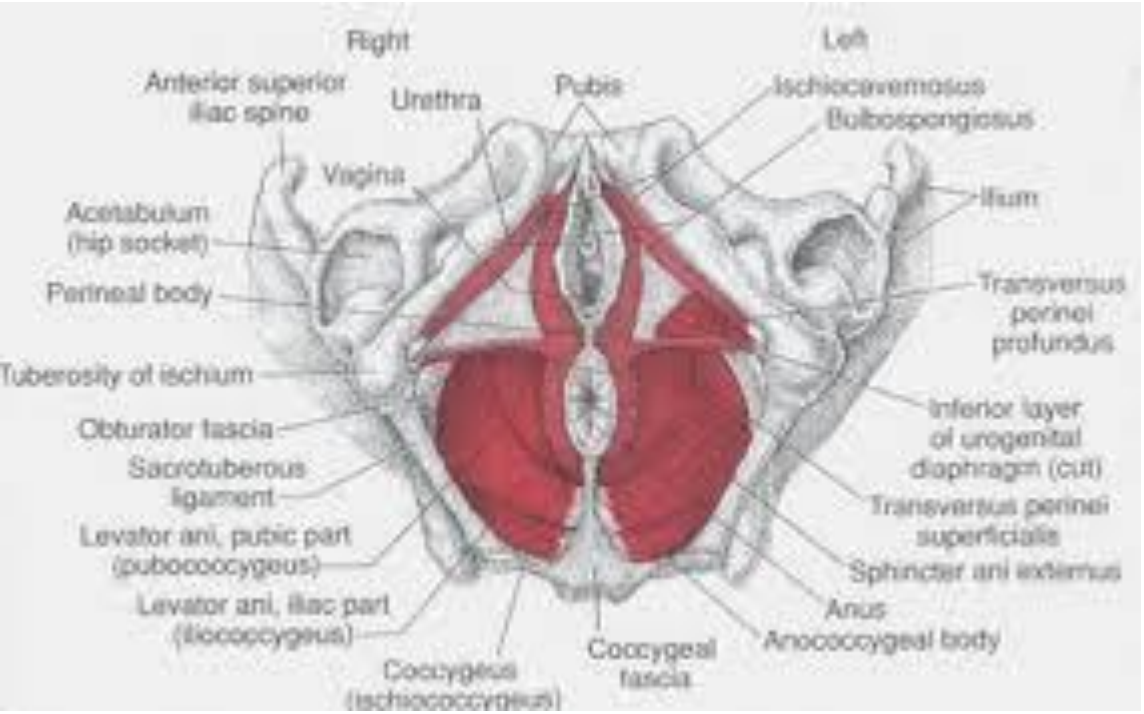


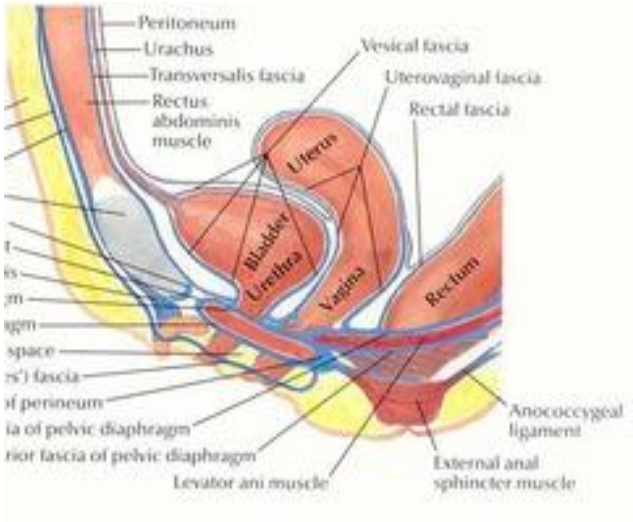



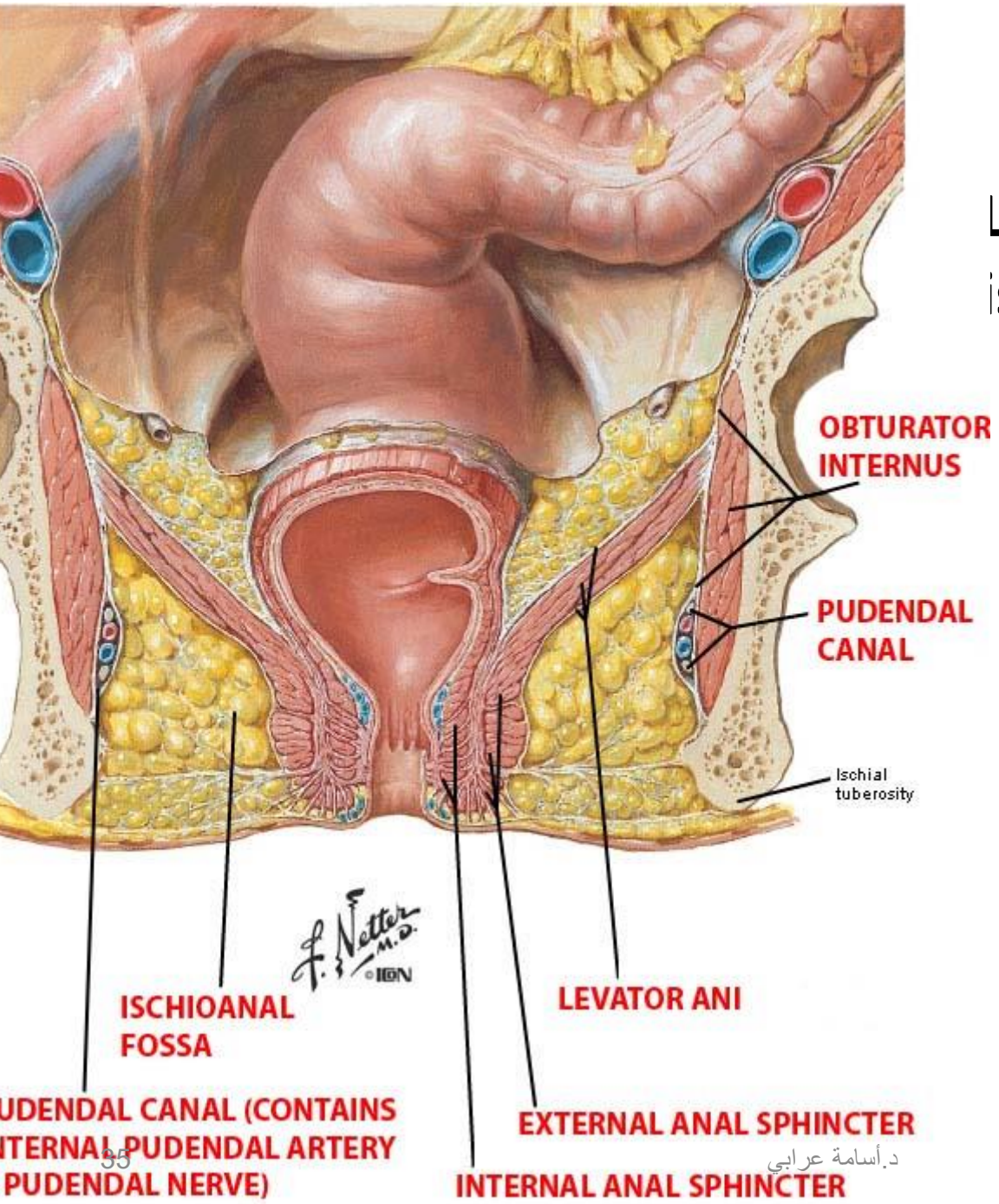
**Relations**

**المجاورات:**

**Posteriorly: The anococcygeal من الخلف الجسم الشرجي العصعصي body, وهو كتلة من نسيج لفي يتوضع بين قناة الشرج والعصعص which is a mass of fibrous tissue lying between the anal canal and the coccyx**



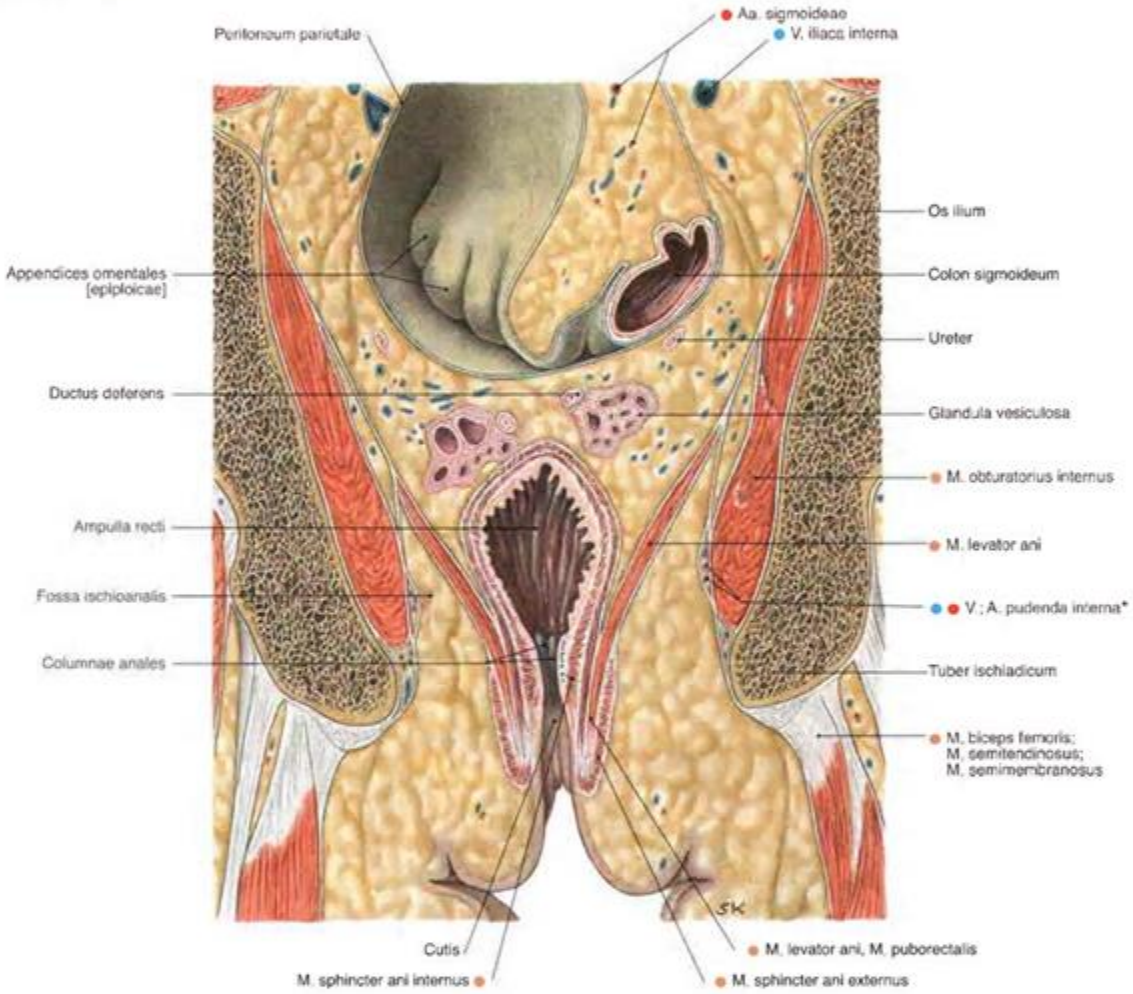





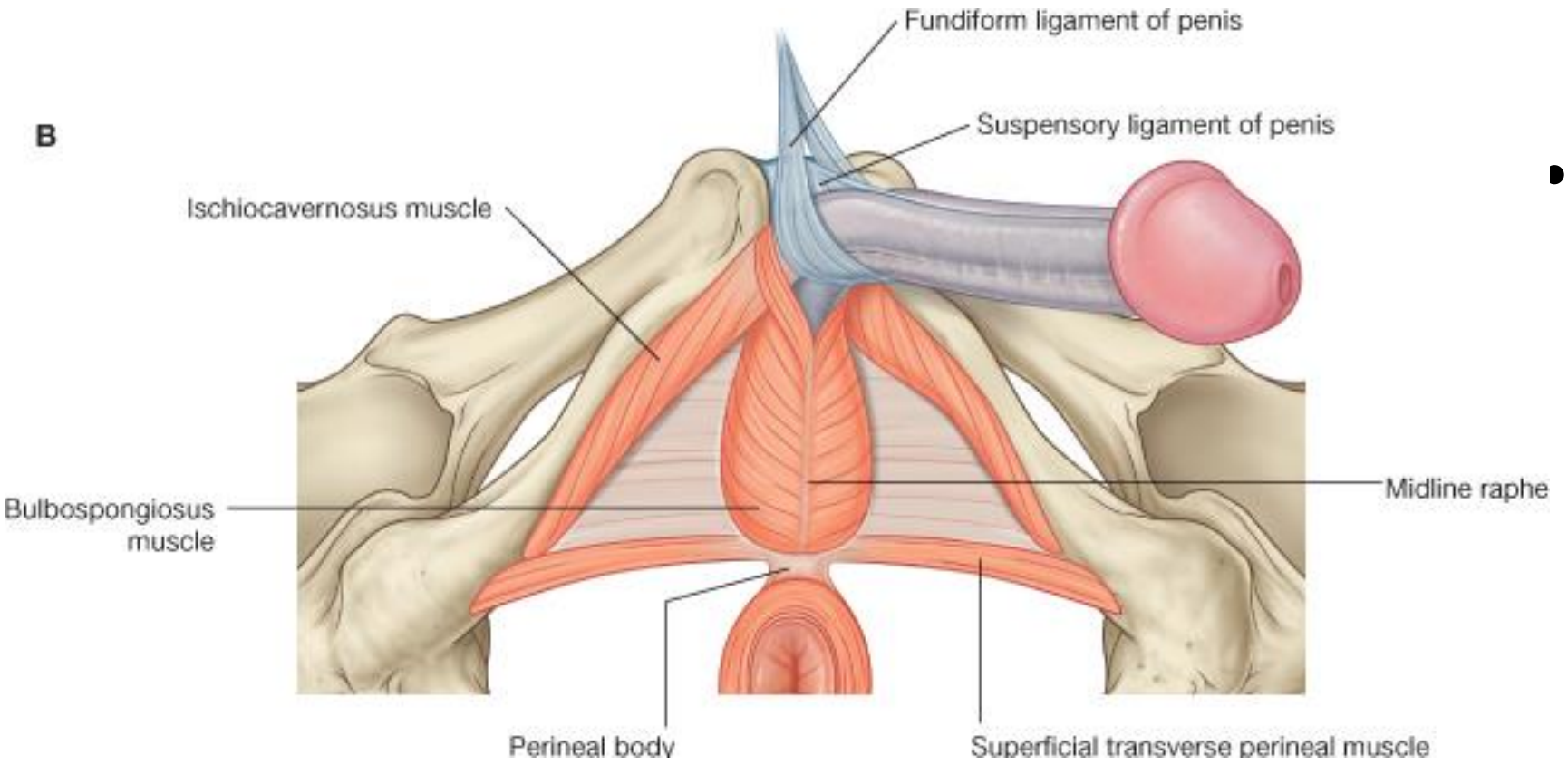

**Laterally: The fat-filled ischiorectal fossae .**

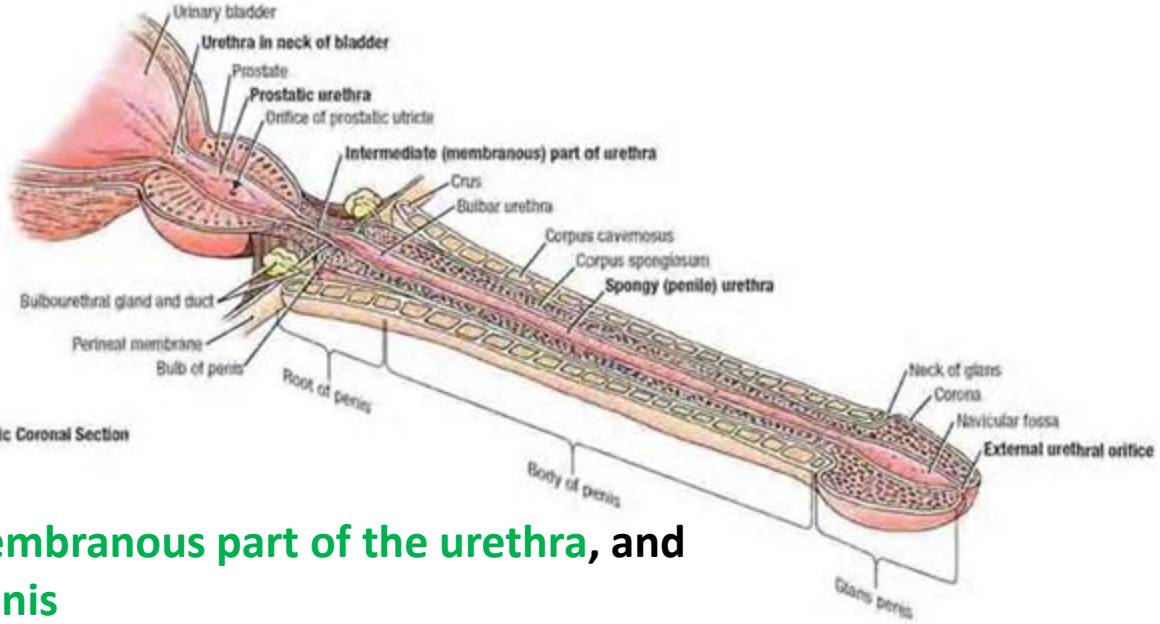
**من الوحشي:شحم الحفرة الإسكية المستقيمية**

*Male pelvis, oblique frontal section*

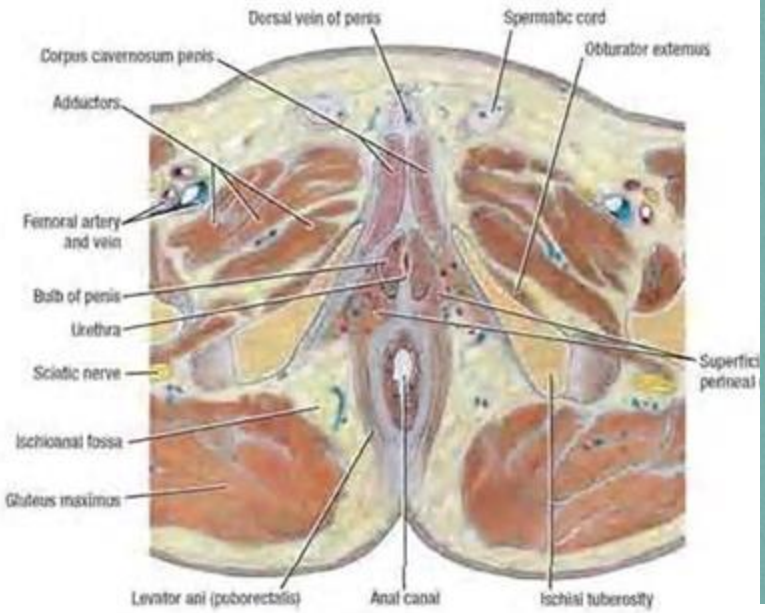


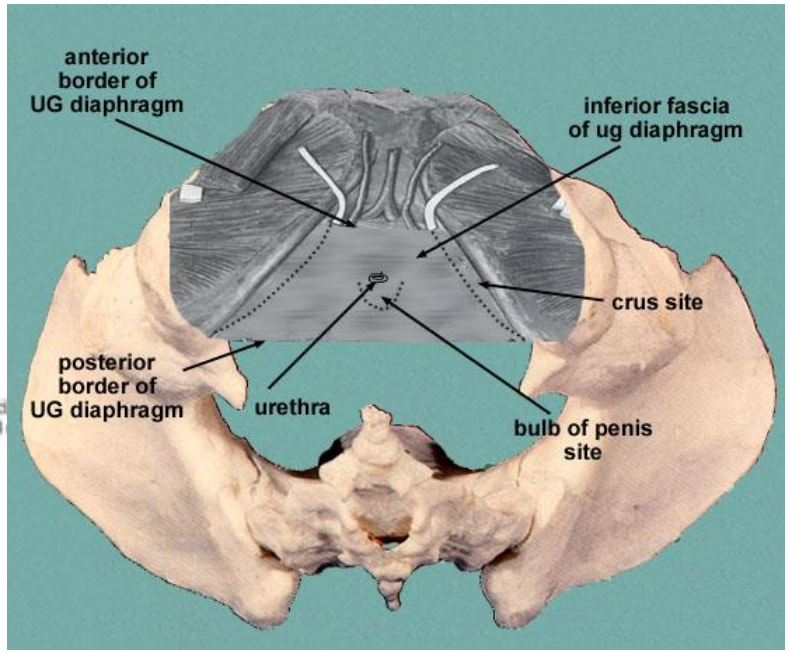
من الأمام عند الذكور:الجسم العجاني وهوكتلة صغيرة من نسيج ليفي ترتكزإلى مركز الهامش الخلفي من الحجاب البولي التناسلي( ارتكاز للمصرة الظاهرة والبصلية الإسفنجية والعجانيتان المستعرضتان السطحيتان) ,الحجاب البولي التناسلي



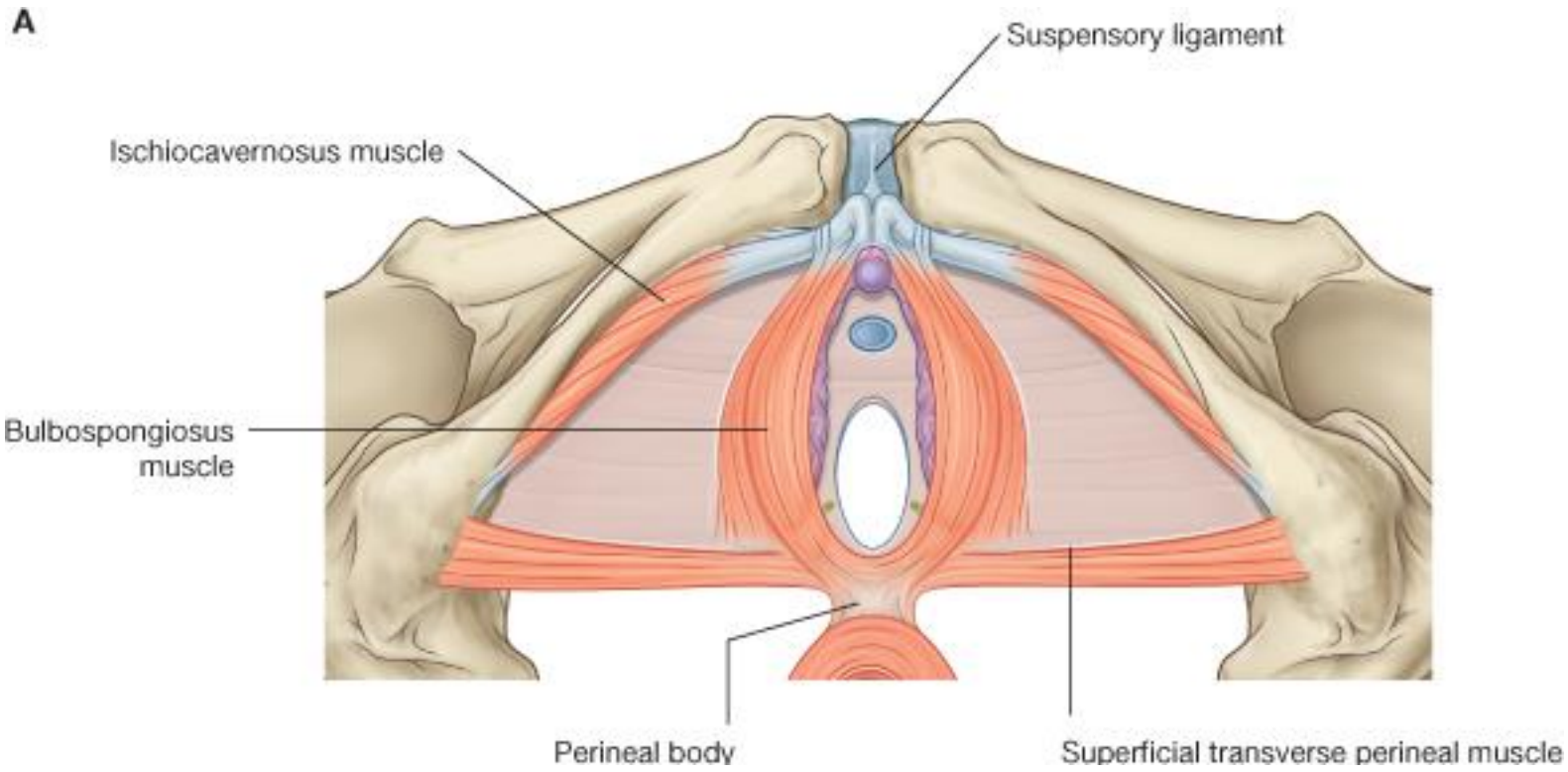



**anteriorly:the membranous part of the urethra, and the bulb of the penis**

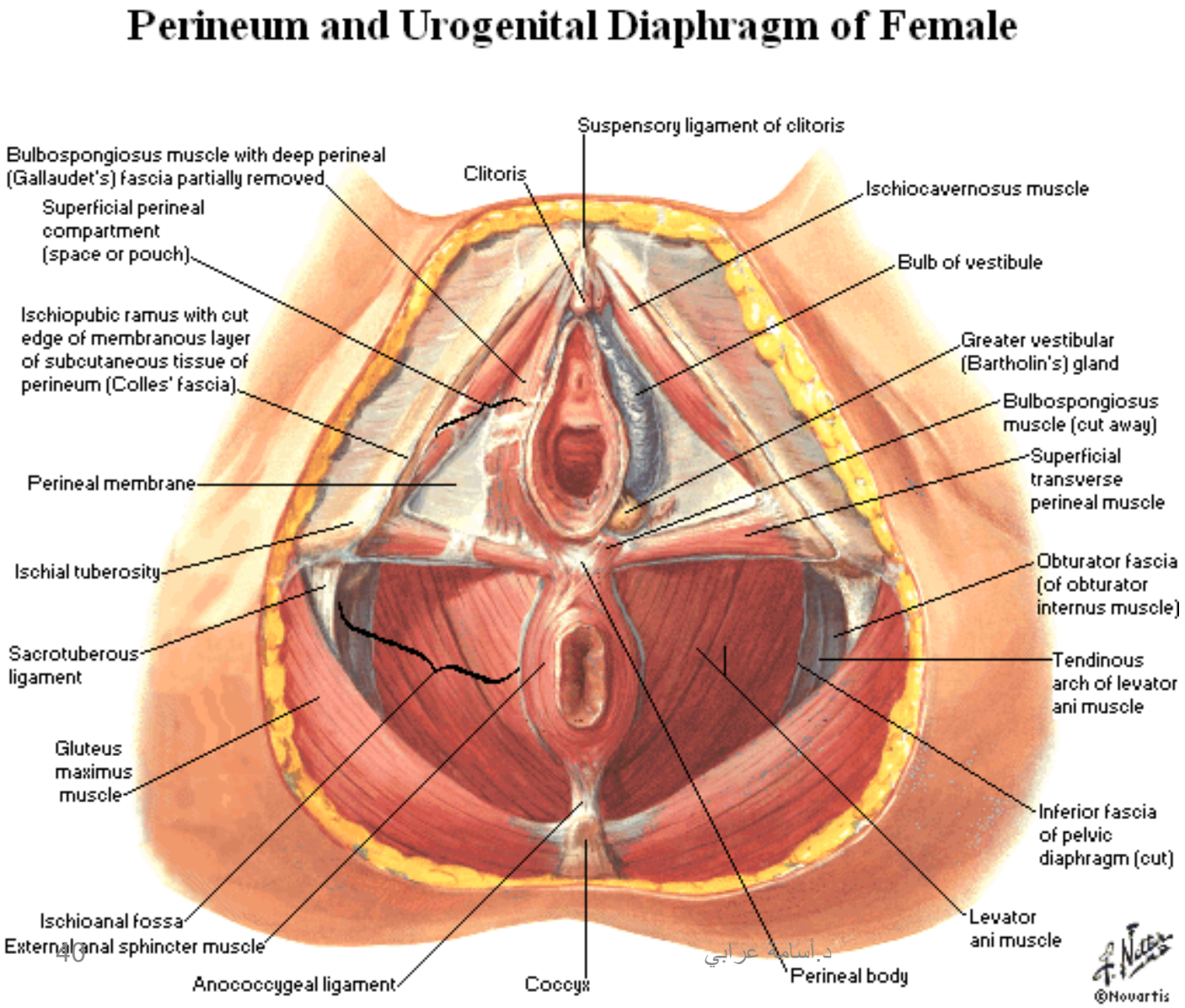


عند الإناث:الجسم العجاني والحجاب البولي التناسلي والقسم السفلي من المهبل
In the female, the perineal body, the urogenital diaphragm, and the lower part of the vagina

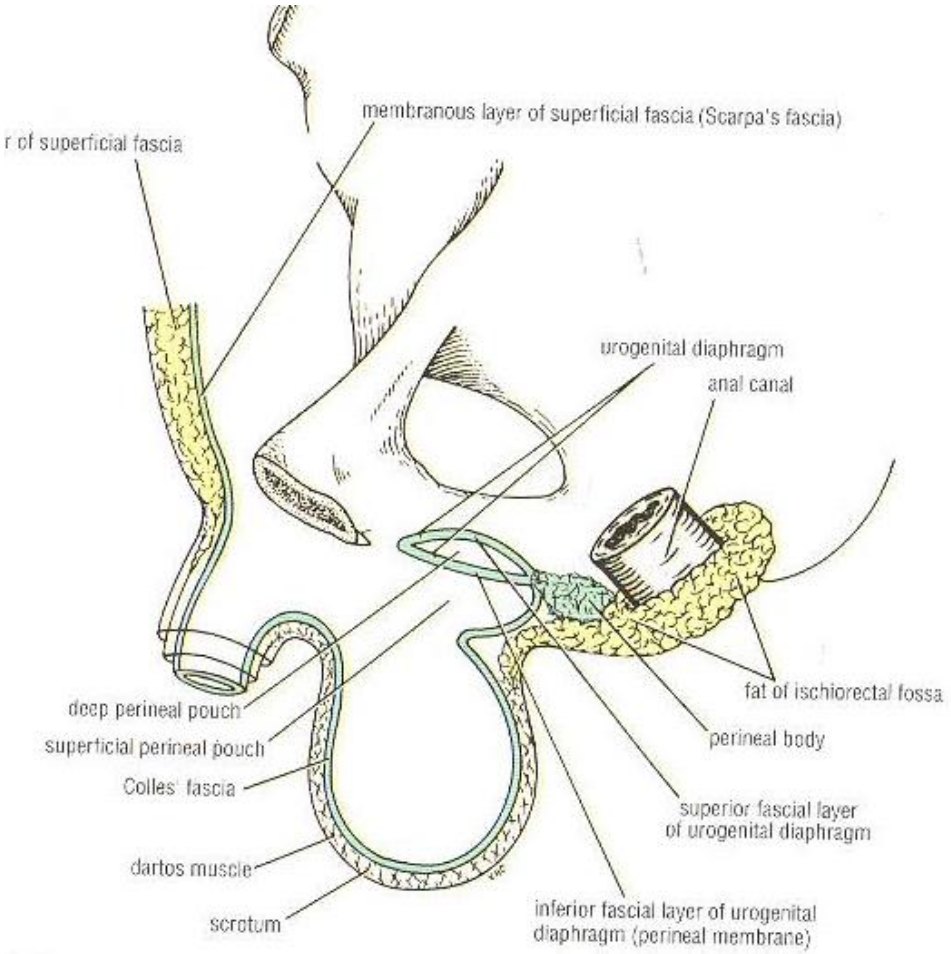


# Muscles - Female





د.أسامة عرابي

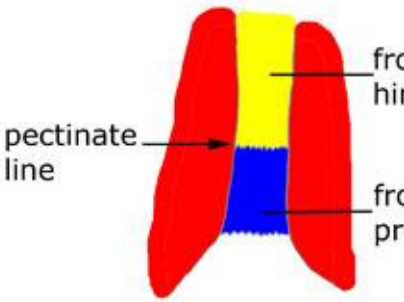

membranous layer of superficial fascia (Scarpa's fascia)
r of superficial fascia
urogenital diaphragm
anal canal
fat of ischiorectal fossa
perineal body
deep perineal pouch
superficial perineal pouch
Colles' fascia
superior fascial layer
of urogenital diaphragm
dartos muscle
scrotum
inferior fascial layer of urogenital
diaphragm (perineal membrane)

**بنية القناة الشرجية:**
**تتألف القناة الشرجية من طبقتين داخلية(غشاء مخاطي)وخارجية عضلية.**
**الغشاء المخاطي:**
**يُبطَن النصف العلوي للقناة الشرجية بظهارة أسطوانية هي استمرار لظهارة المستقيم,تتثنى("تتزمزم") هذه الظهارة الى طيات عمودية عددها 8-12عمودا تدعى الأعمدة الشرجية تحصر بينها في الأسفل جيوب تتلاقى فيما بينها عند نهاياتها السفلية بواسطة طيات هلالية تدعى دساماتvalve الشرج وهي بقايا غشاء الشرج الأولي,يشكل تتالي الدسامات حلقة متواصلة تدعى بالخط المسنن dentate line.في قعر كل دسام حفرة تدعى خبيئةcrypt ينفتح فيها قنوات لغدد ضامرة تدعى بالغدد الشرجية (تنشأ معظم الإنتانات الشرجية منها)والتي يتوضع جسمها في الطبقة العضلية.**

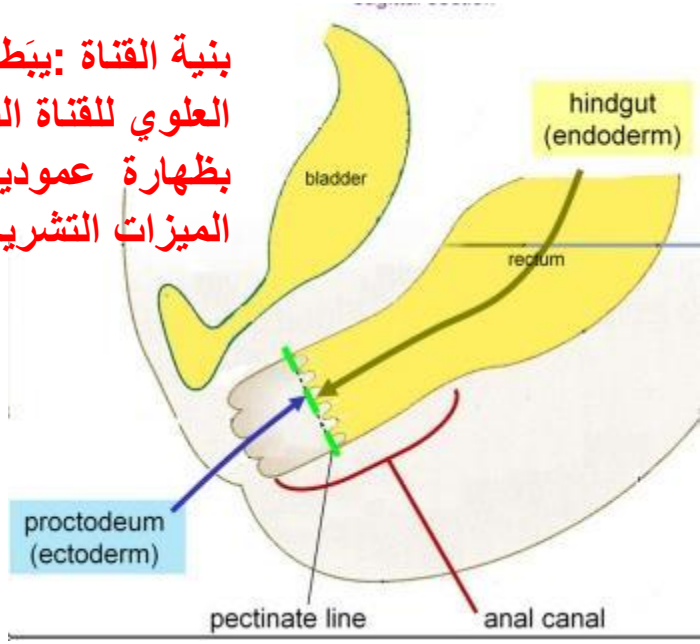
## Structure

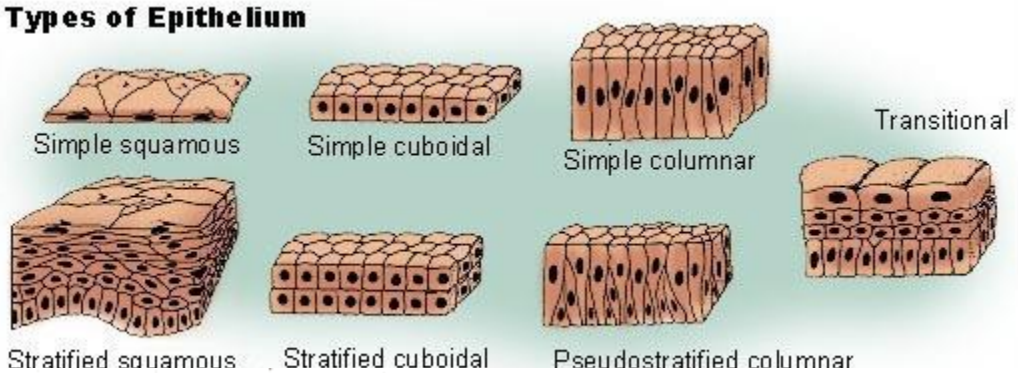
**The mucous membrane of the upper half of the anal canal is derived from hindgut entoderm .It has the following important anatomic features:**

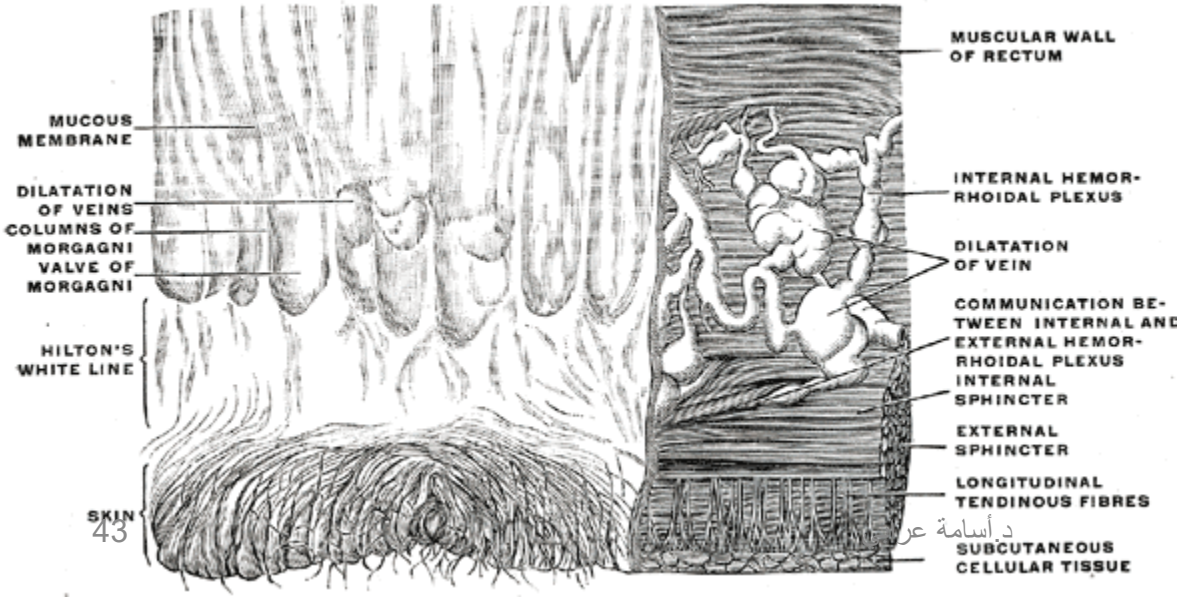
**It is lined by columnar epithelium.**




**بنية القناة :يبَطن النصف العلوي للقناة الشرجية بظهارة عمودية ويمتلك الميزات التشريحية التالية:**





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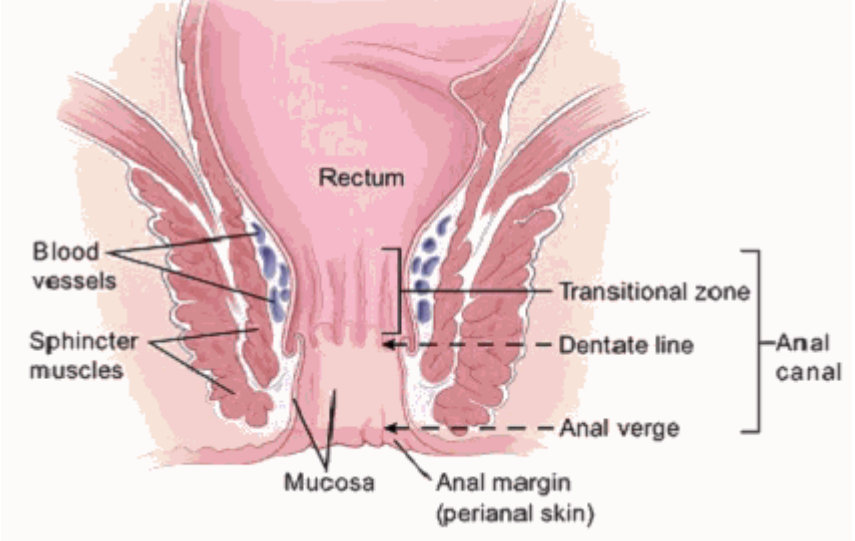
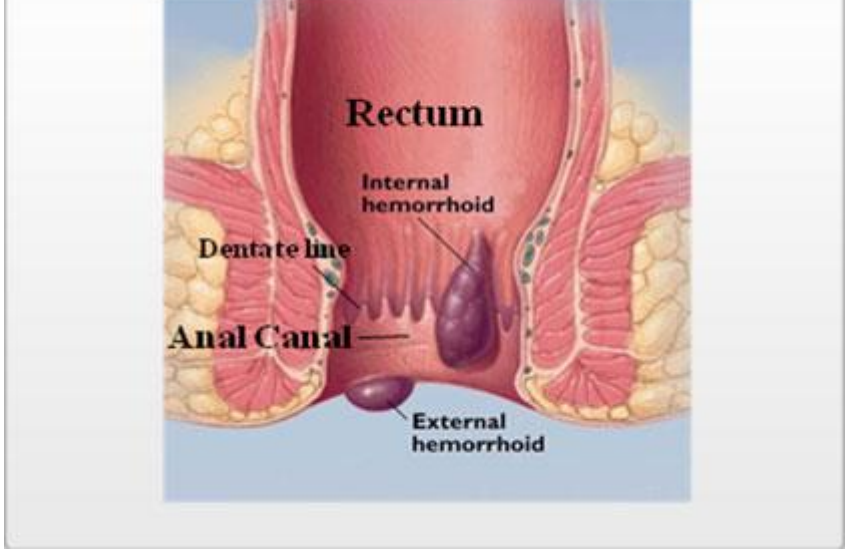
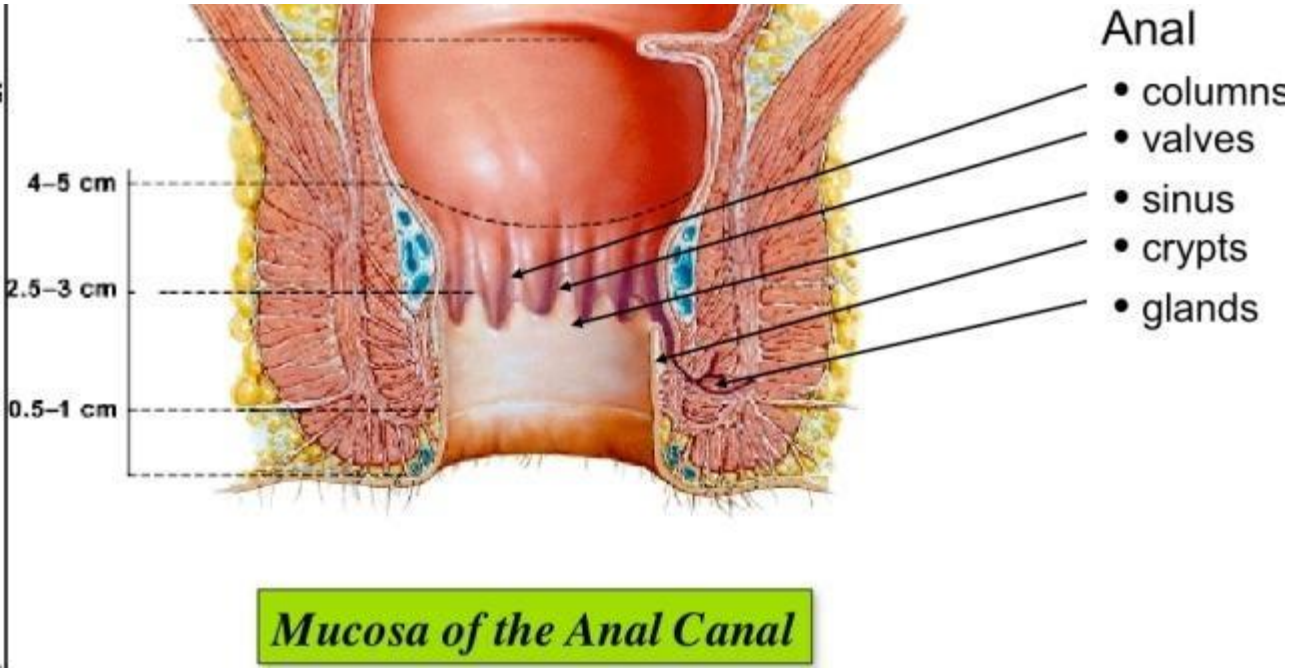


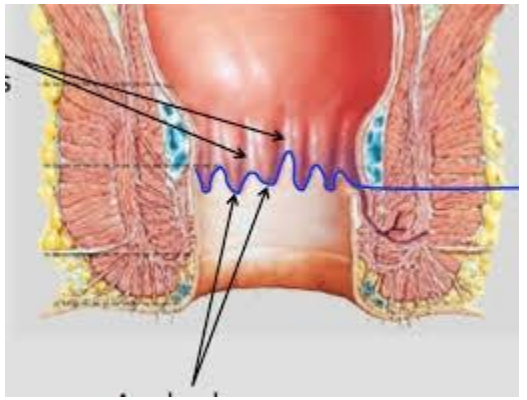




- الخَطُّ المُمَشَّط (الخَطُّ الشَّرجِيُّ الجِلْدِيُّ)أوالخَطُّ المُسَنَّن:هو الخط الذي يفصل بين النصف العلوي والسفلي يقع على مستوى الدسامات الشرجية فاصلا بين الظهارتين الإسطوانية والمطبقة
- The Pectinate Line (also known as the Dentate or Mucocutaneous Line) is a clinically important landmark due to the fact that it is visible and approximates the level of certain anatomic changes that will be discussed below. It lies at the inferiormost level of the anal columns and indicates the junction of the superior part of the anal canal (derived from the embryonic hindgut:ectoderm) and the inferior part (derived from the embryonic proctodeum:endoderm). It is this difference in embryonic origin which gives rise to differing arterial, venous, and nervous connections (above and below this line)

غدد,خَبيئَة [ج:خَبايا] (بنية تشريحية نسيجية)

**The majority of anorectal suppurative disease results from infections of the anal glands (cryptoglandular infection) found in the intersphincteric plane. Their ducts traverse the internal sphincter and empty into the anal crypts at the level of the dentate line. Infection of an anal gland results in the formation of an abscess that enlarges and spreads along one of several planes in the perianal and perirectal spaces. T**



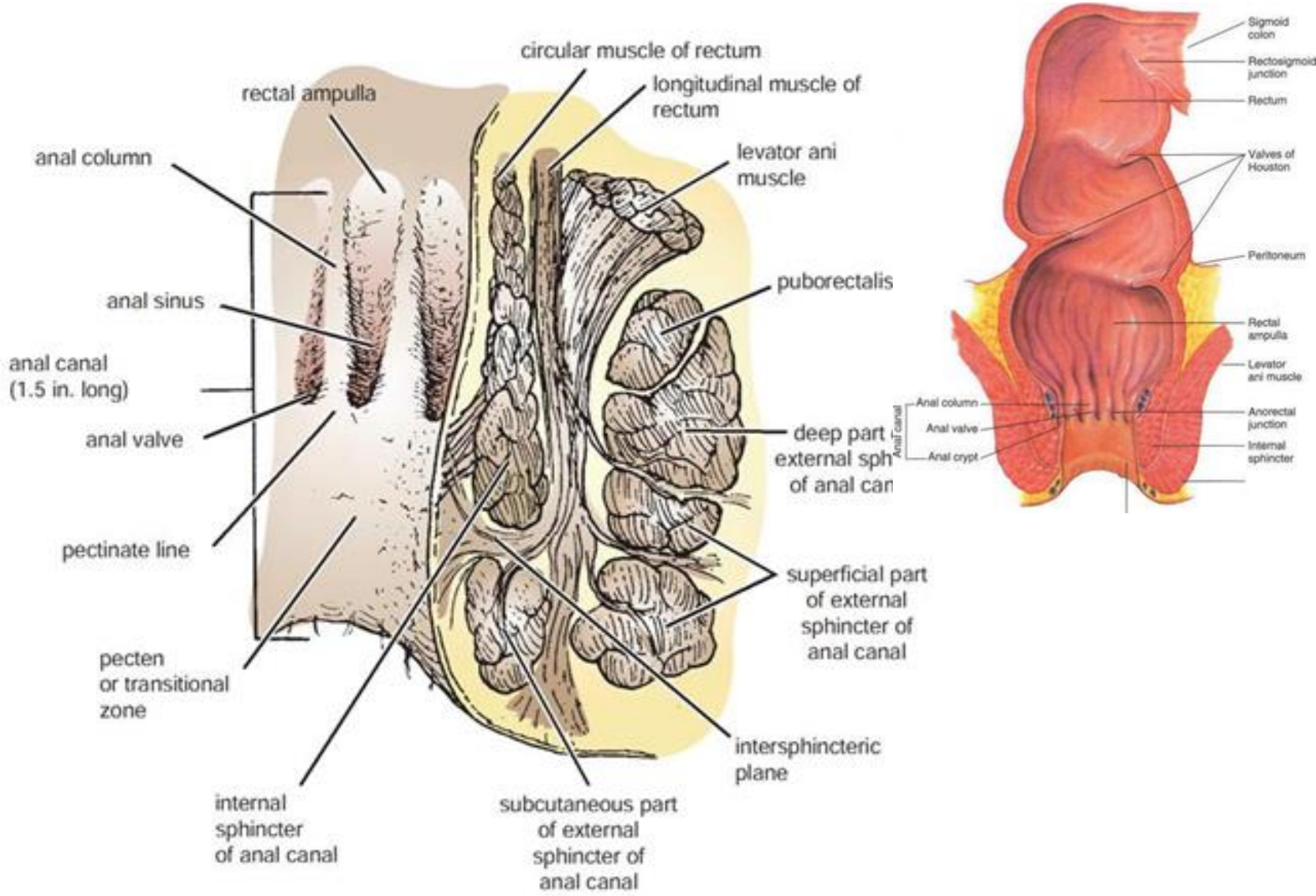
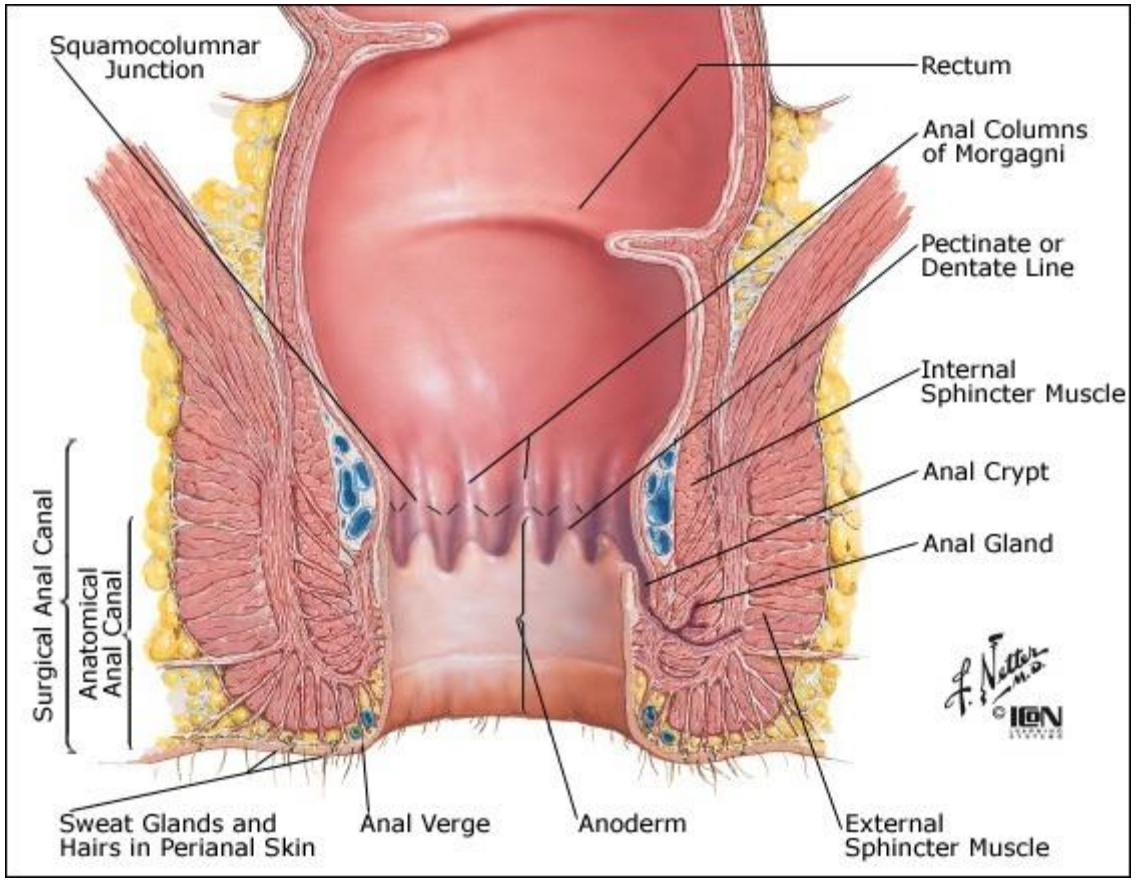
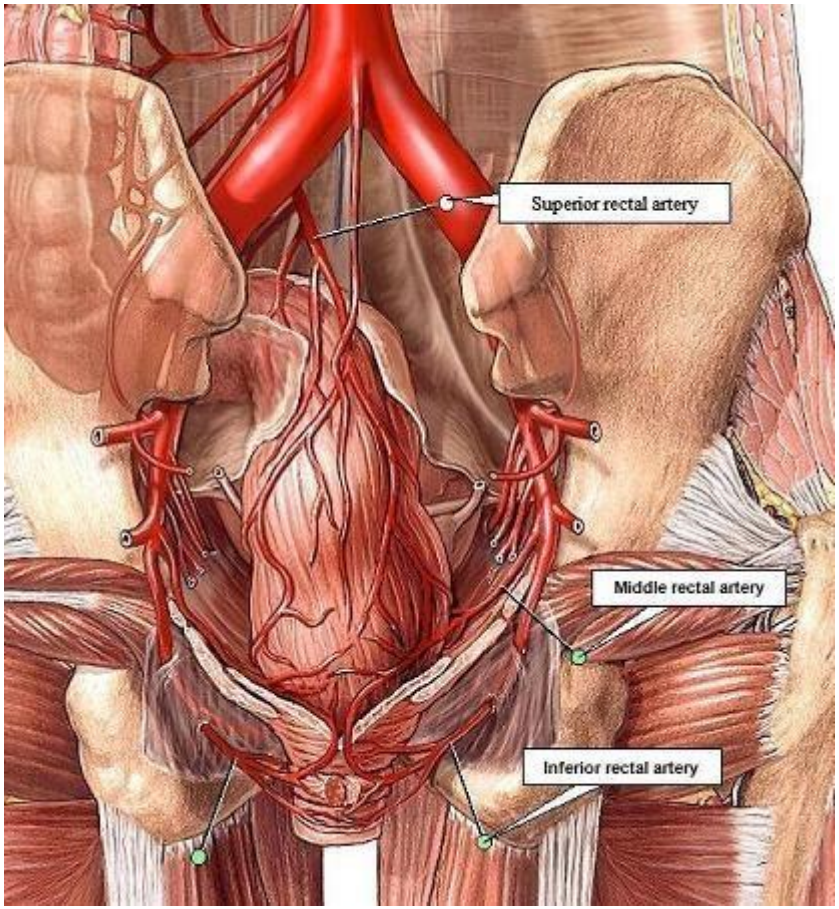


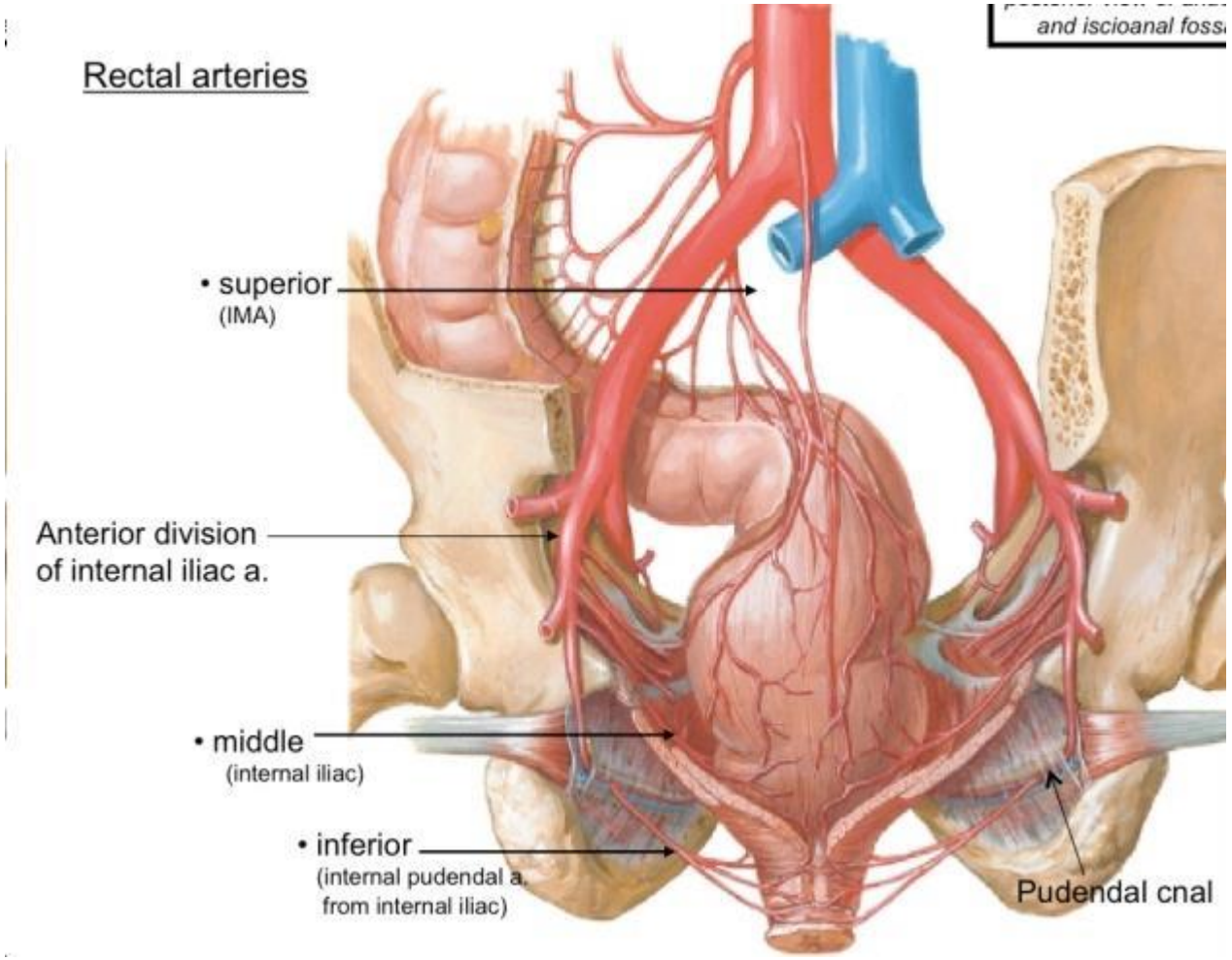

**FIGURE 8.7** Coronal section of the anal canal showing the detailed anatomy of the mucous membrane and the arrangement of the internal and external anal sphincters. Note that the terms "pectinate line" (the line at the level of the anal valves) and "pecten" (the transitional zone between the skin and the mucous membrane) are sometimes used by clinicians.


Squamocolumnar Junction
Rectum
Anal Columns of Morgagni
Pectinate or Dentate Line
Internal Sphincter Muscle
Anal Crypt
Anal Gland
Surgical Anal Canal
Anatomical Anal Canal
Sweat Glands and Hairs in Perianal Skin
Anal Verge
Anoderm
External Sphincter Muscle

The arterial supply is that of the hindgut—namely, the تتروى من المستقيمي العلوي

superior rectal artery, a branch of the inferior mesenteric artery .




Rectal arteries
• superior
(IMA)
Anterior division
of internal iliac a.
• middle
(internal iliac)
• inferior
(internal pudendal a.
from internal iliac)
Pudendal cnal

وينزح دورانها الوريدي(ضفيرة باسورية باطنة) للمستقيمي العلوي بشكل رئيسي The nous drainage is mainly y the superior rectal vein, a ributary of the inferior esenteric vein, and the portal vein

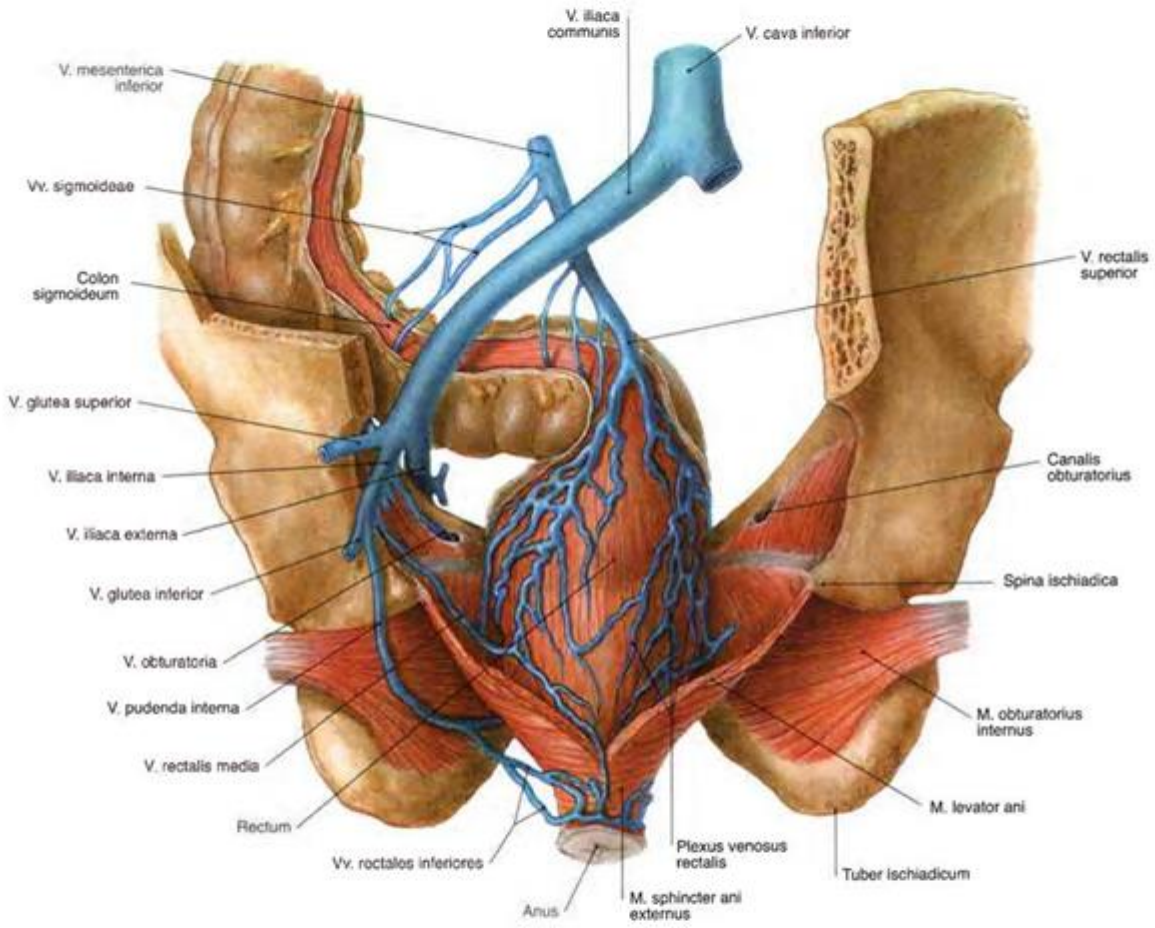



**Fig. 1148** Rectal veins, Vv. rectales; diagram with parts of the pelvis and the pelvic diaphragm; dorsal view.
There are numerous connections between the veins draining into the hepatic portal vein (superior rectal vein) and those draining into the inferior vena cava (middle and inferior rectal veins). They form

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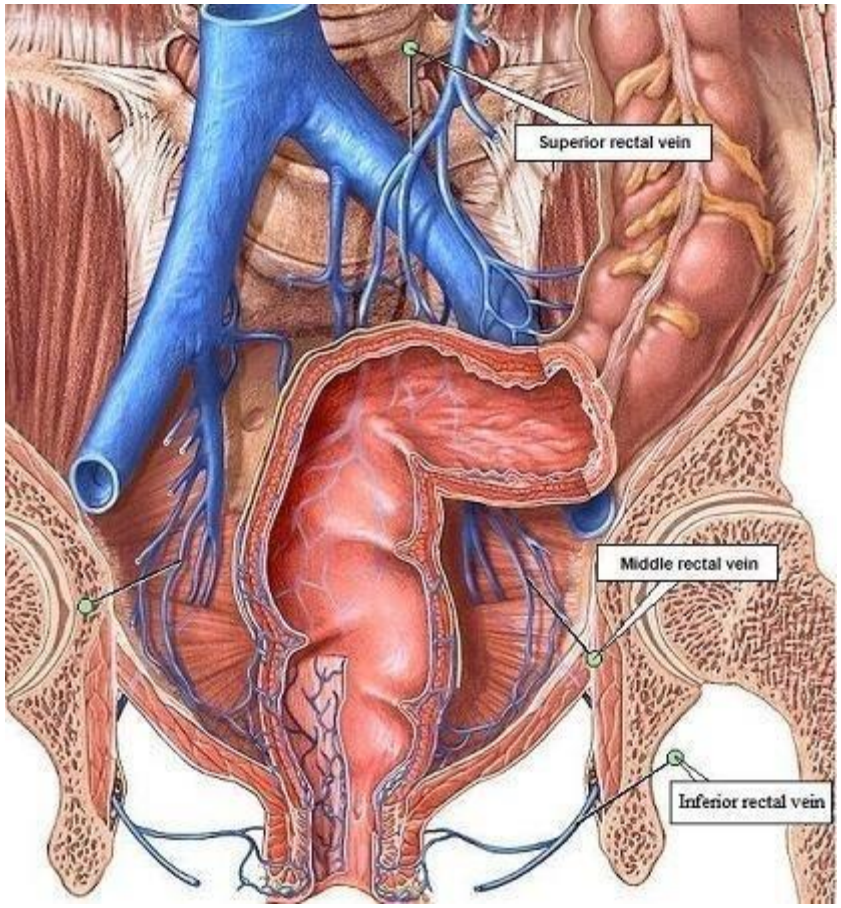
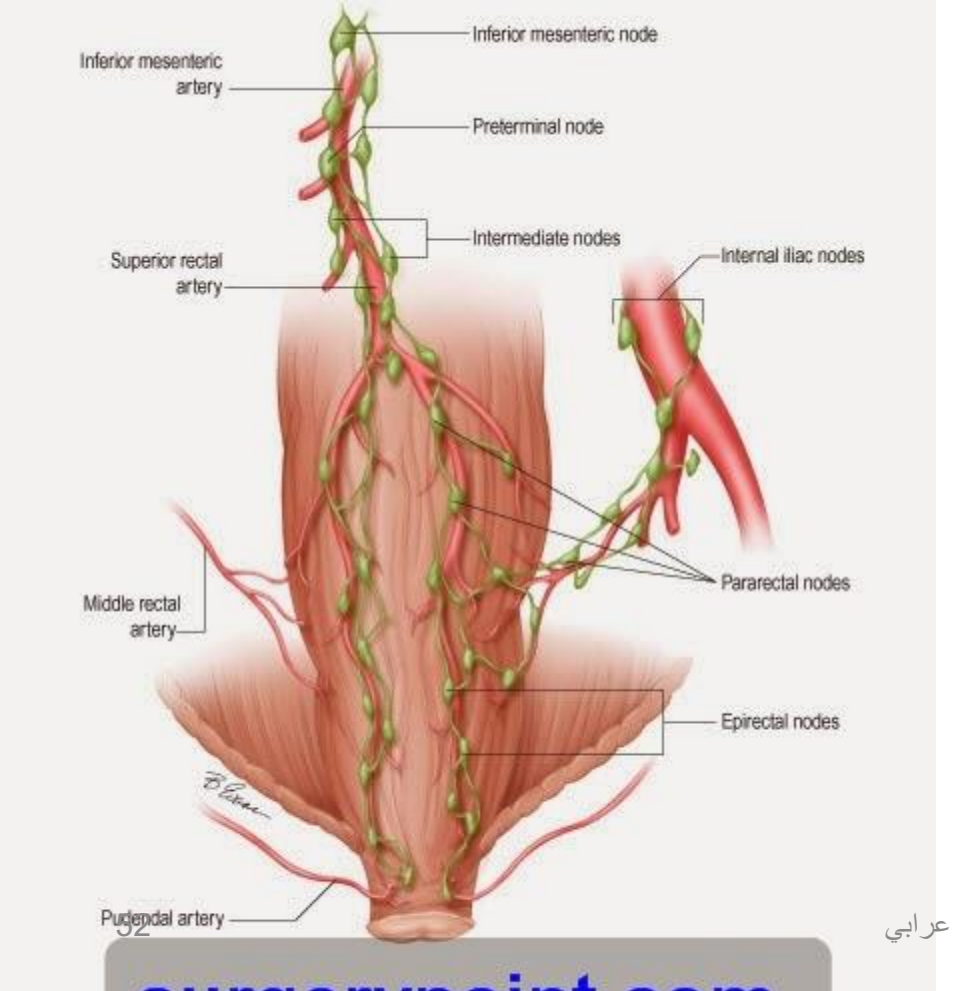
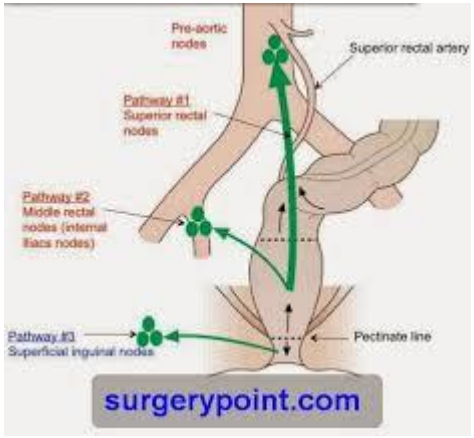
د.أسامة عرابي


Superior rectal vein
Middle rectal vein
Inferior rectal vein

وينزح لمفها إلى العقد جنيب المستقيم فالمساريقية السفلية

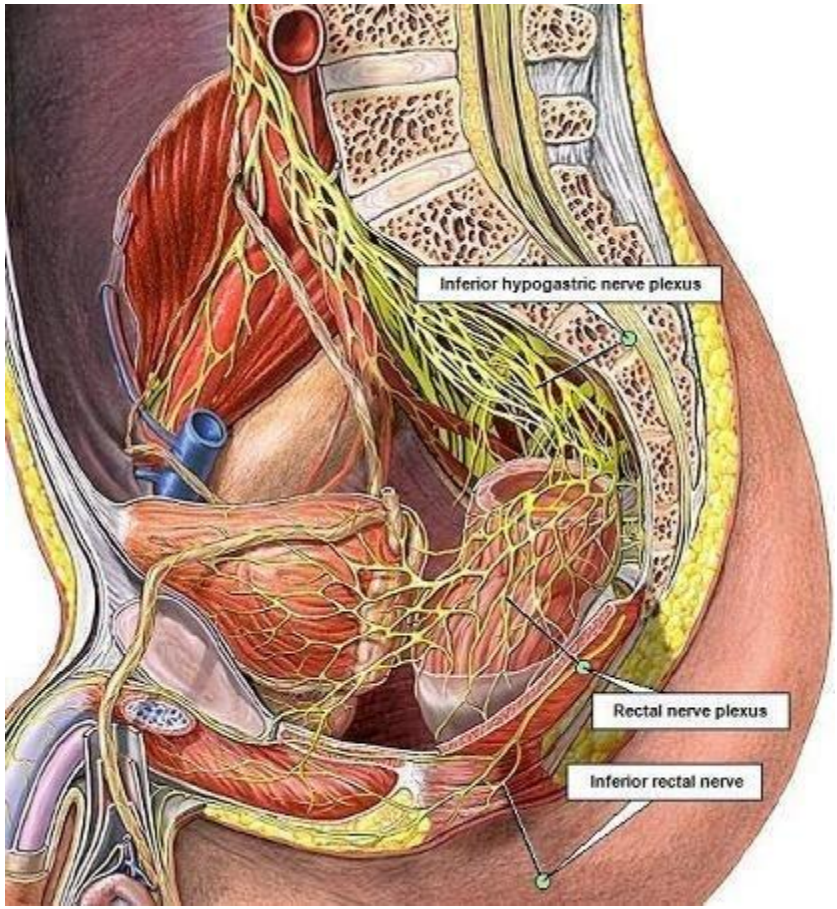
**The lymphatic drainage is mainly upward along the superior rectal artery to the pararectal nodes and then eventually to the inferior mesenteric nodes**



وتتعصب من الضفيرة الخثلية السفلية(نفس تعصيب المستقيم :تعصيب مستقل)وبالتالي فهي حساسة للتمطط فقط

**The nerve supply is the same as that for the rectal mucosa and is derived from the autonomic hypogastric plexuses.**
**It is sensitive only to stretch**



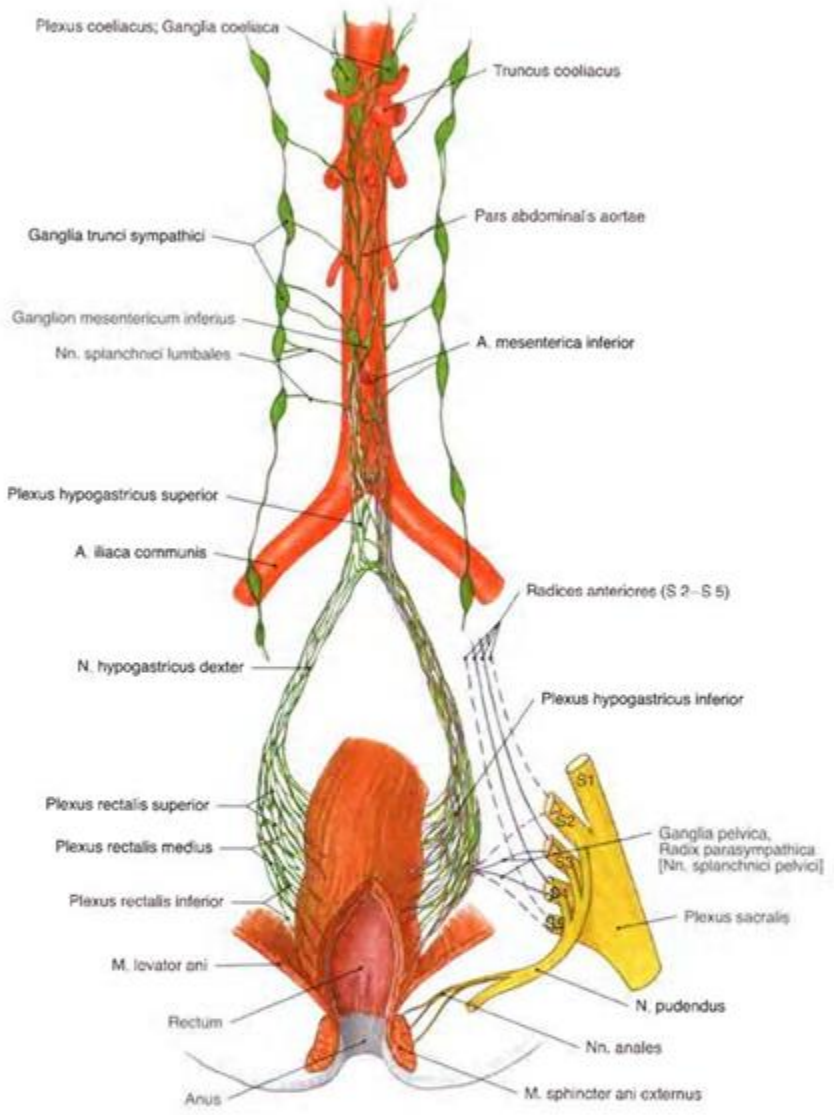
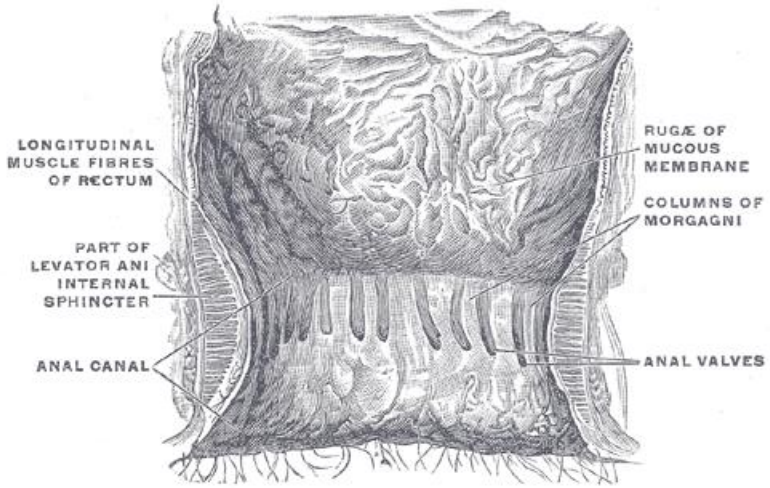


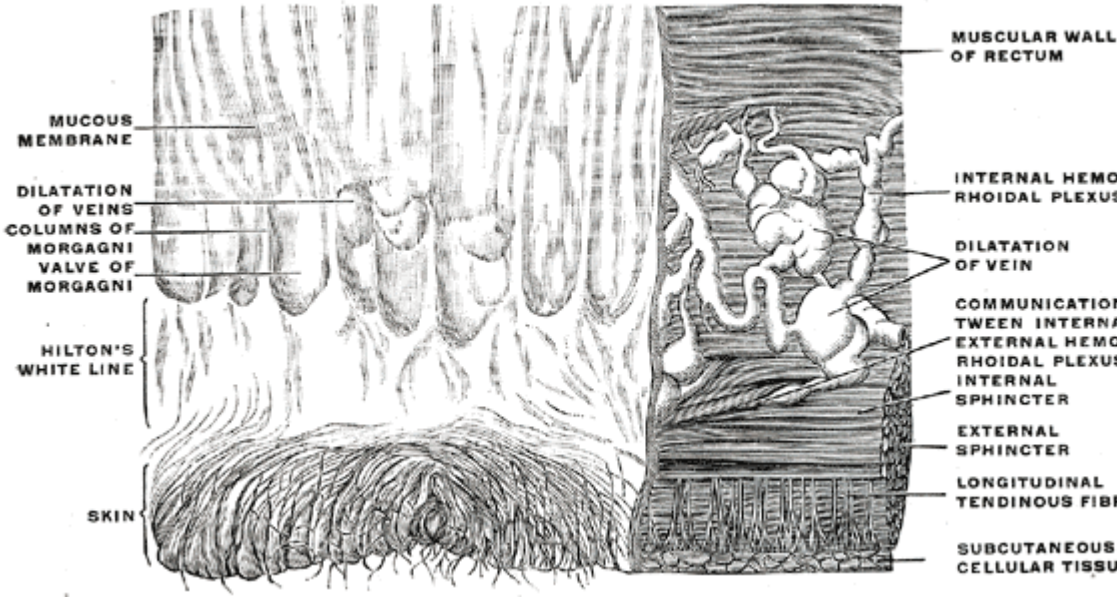

**Fig. 1149** Rectum, Rectum;

is derived from ectoderm of the proctodeum. It has the following important features: ,

**النصف السفلي للقناة الشرجية:يبطنه بشرة حرشفية مطبقة تندمج تدريجيا مع البشرة حول الشرج ولاتوجد أعمدة يختلف نوع هذه البشرة حسب مستواها(فوق أو تحت خط هيلتون):**

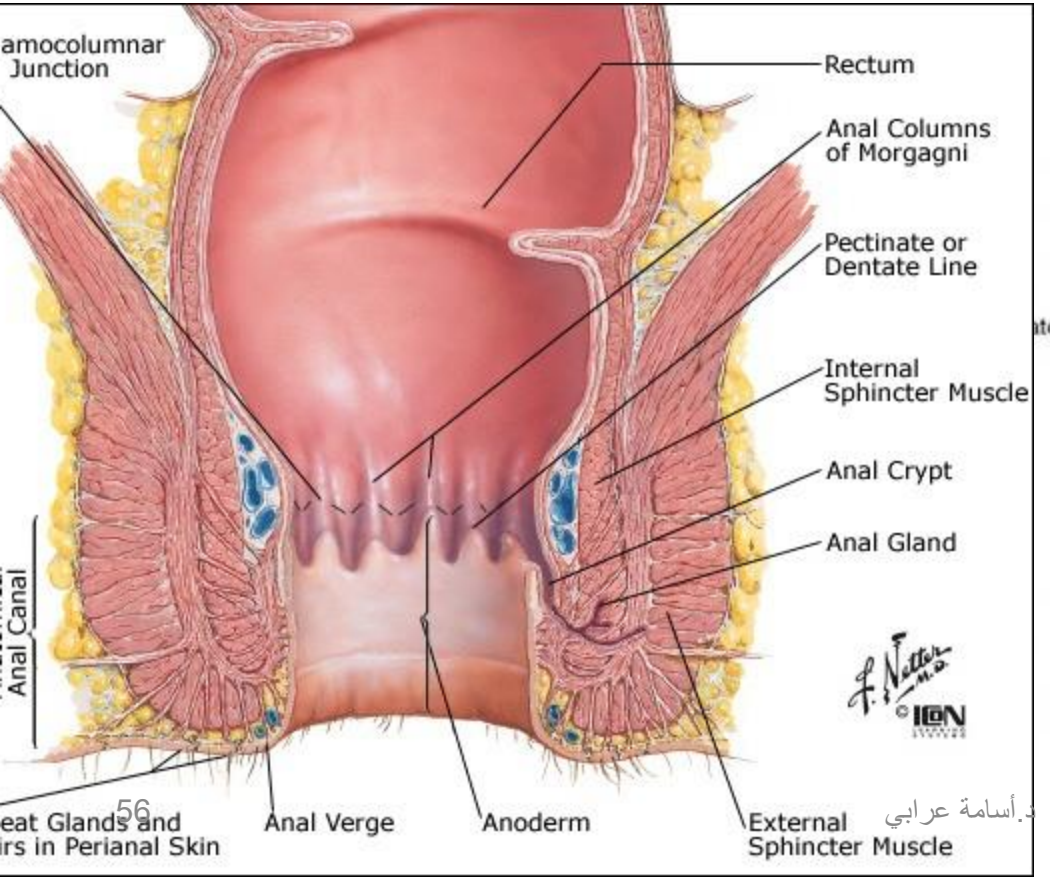
It is lined by stratified squamous epithelium, which gradually merges at the anus with the perianal epidermis

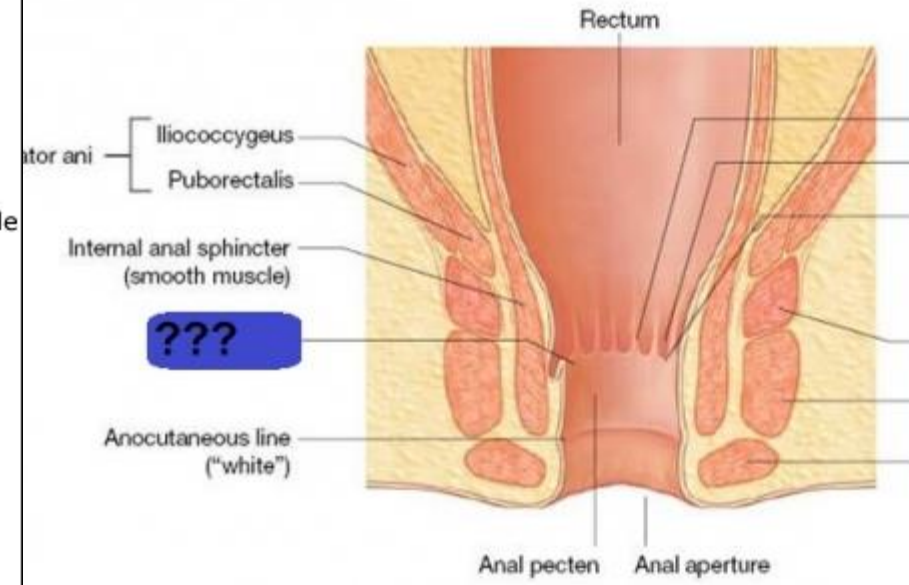


**It is thrown into vertical folds called anal columns, which are joined together at their lower ends by small semilunar folds called anal valves (remains of proctodeal membrane)**

**تحت الخط المسنن يوجد في الغشاء المبطن للقناة الشرجية خط يدعى الخط الأبيض لهيلتون , في المنطقة أعلى ذلك الخط تبطن القناة الشرجية بنسيج ظهاري حرشفي مطبق غير متقرن ولايحوي ملحقات جلدية,أما تحته فنسيج ظهاري حرشفي مطبق متقرن حاوي على ملحقات جلدية ويندمج مع جلد الشرج.**





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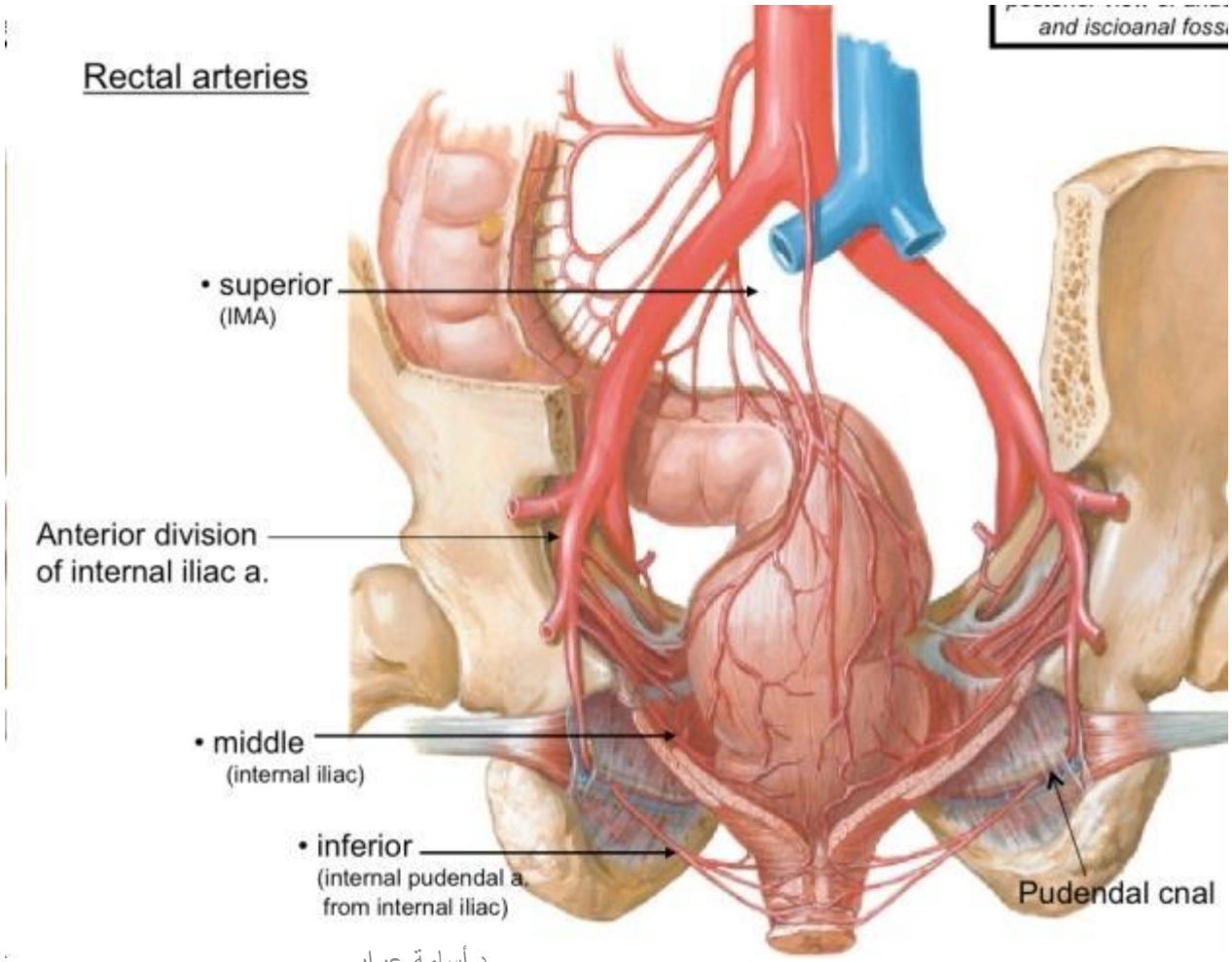
There are no anal columns .

The arterial supply is the inferior rectal artery, a branch of the internal pudendal artery.

تتروى من المستقيمي السفلي فرع الفرجي الباطن فرع الحرقفي الباطن.



Veins of the rectum

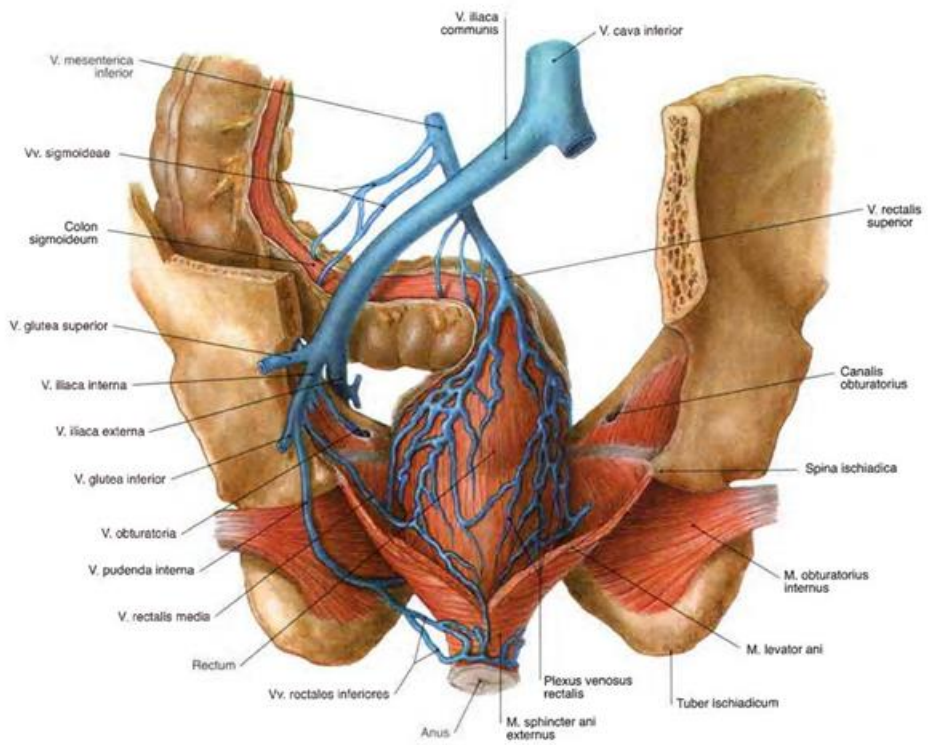



**Fig. 1148** Rectal veins, Vv. rectales; diagram with parts of the pelvis and the pelvic diaphragm; dorsal view.
There are numerous connections between the veins draining into the hepatic portal vein (superior rectal vein) and those draining into the inferior vena

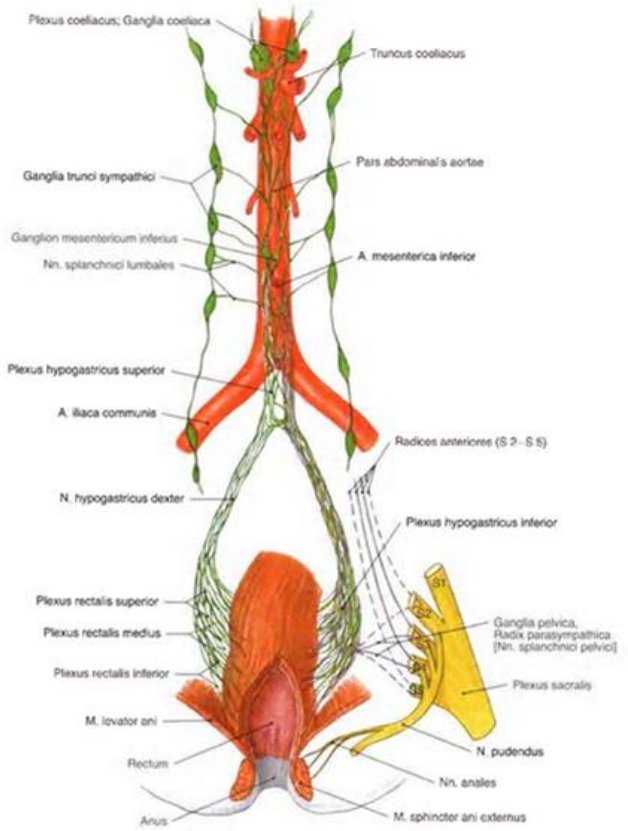
→ 1077, 1078

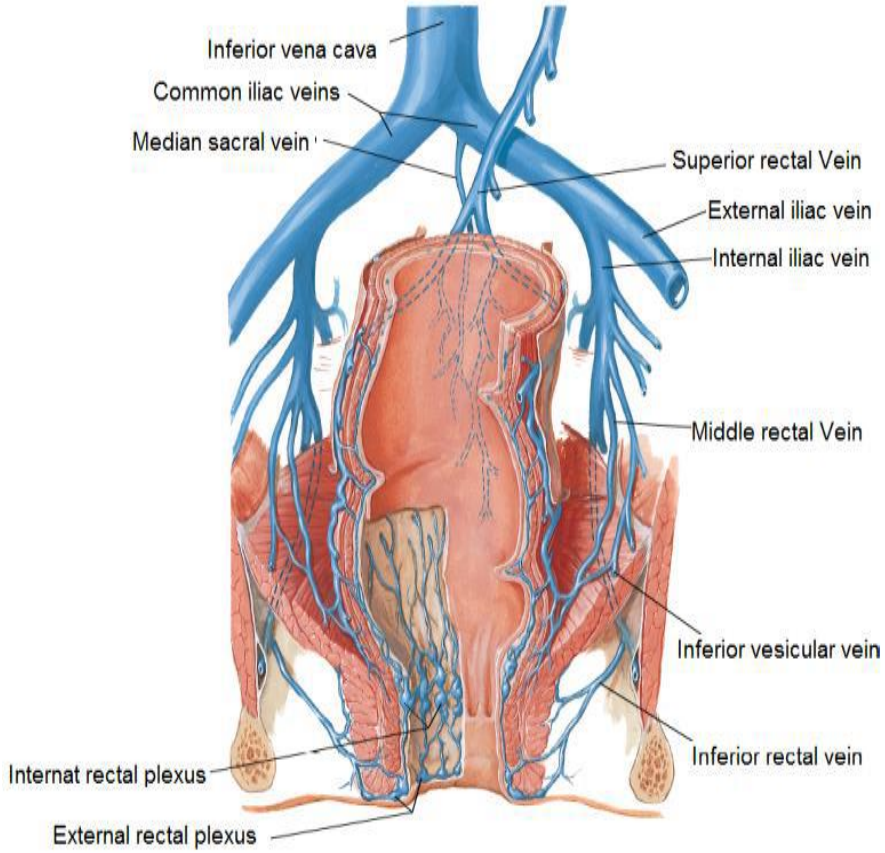
النزح الوريدي
(ضفيرة باسورية
ظاهرة)يتم عبر
المستقيمي
السفلي الذي
يصب في الفرجي
الباطن فالحرقفي
الباطن

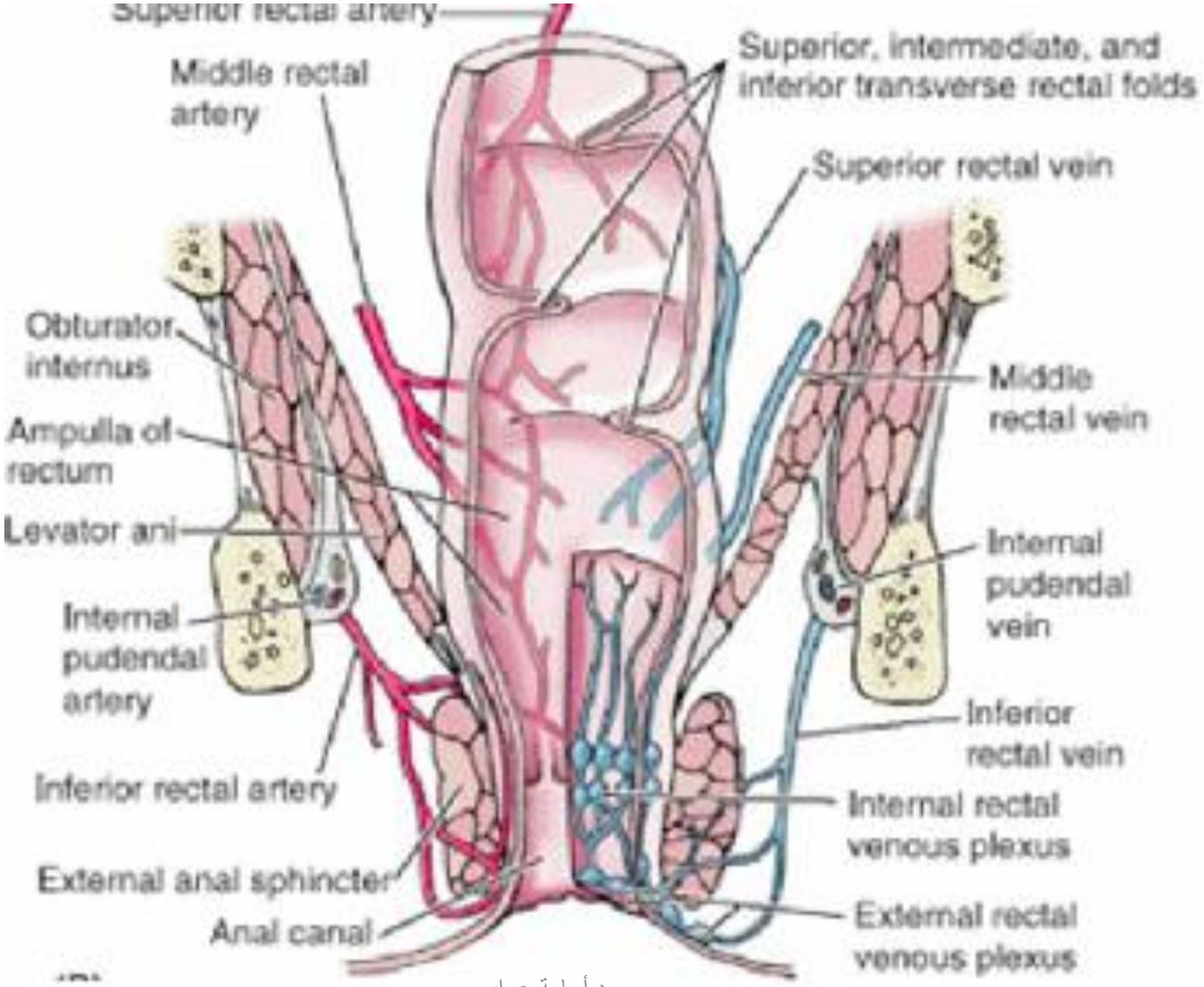
The venous drainage is by the inferior rectal vein, a tributary of the internal pudendal vein, which drains into the internal iliac vein

ولاننسى أن هناك مفاغرات تتم تحت مخاطية الشرج بين روافد الوريدين المستقيمين العلوي والسفلي مما يعني تفاغرا بابيا جهازيا.

أما التعصيب فيأتي من المستقيمي السفلي(الشرجي السفلي)فرع الفرجي,وهوتعصيب جسدي يجعله حساسا للألم والحرارة واللمس والضغط.




Superior rectal artery
Middle rectal artery
Superior, intermediate, and inferior transverse rectal folds
Superior rectal vein
Obturator internus
Ampulla of rectum
Levator ani
Internal pudendal artery
Inferior rectal artery
External anal sphincter
Anal canal
Middle rectal vein
Internal pudendal vein
Inferior rectal vein
Internal rectal venous plexus
External rectal venous plexus

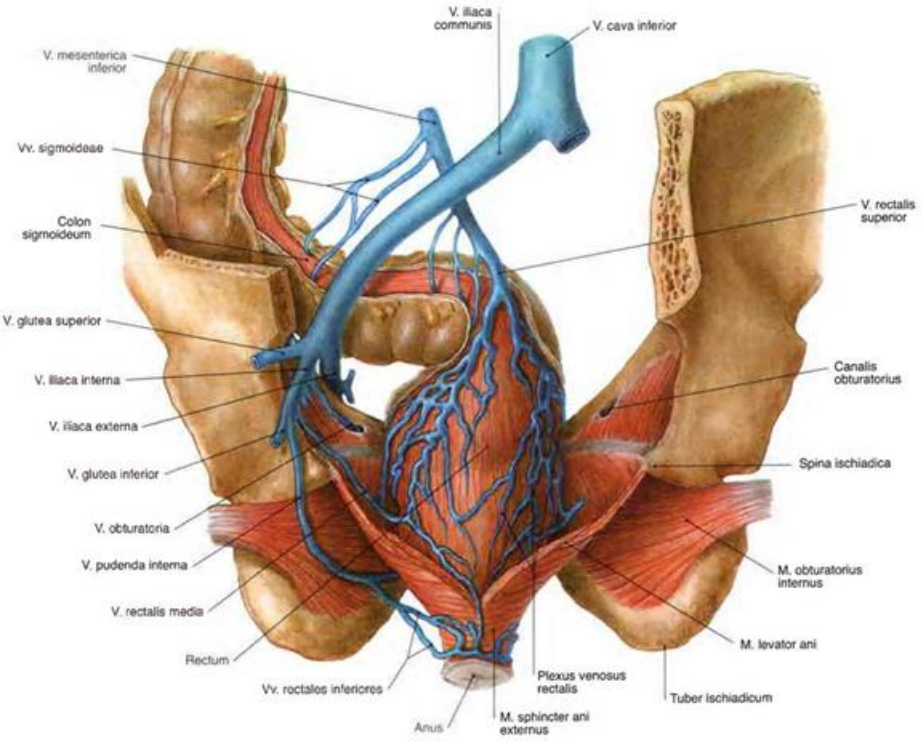
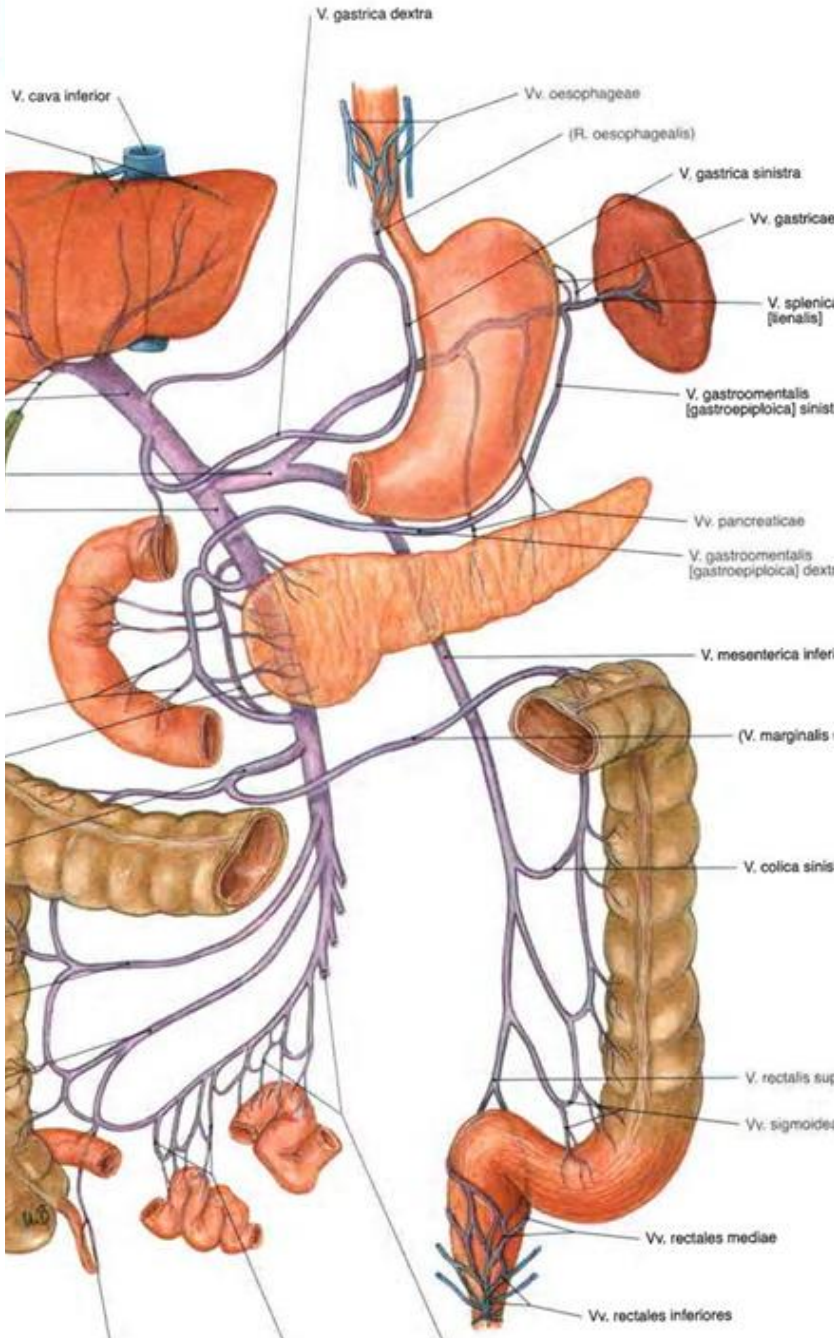
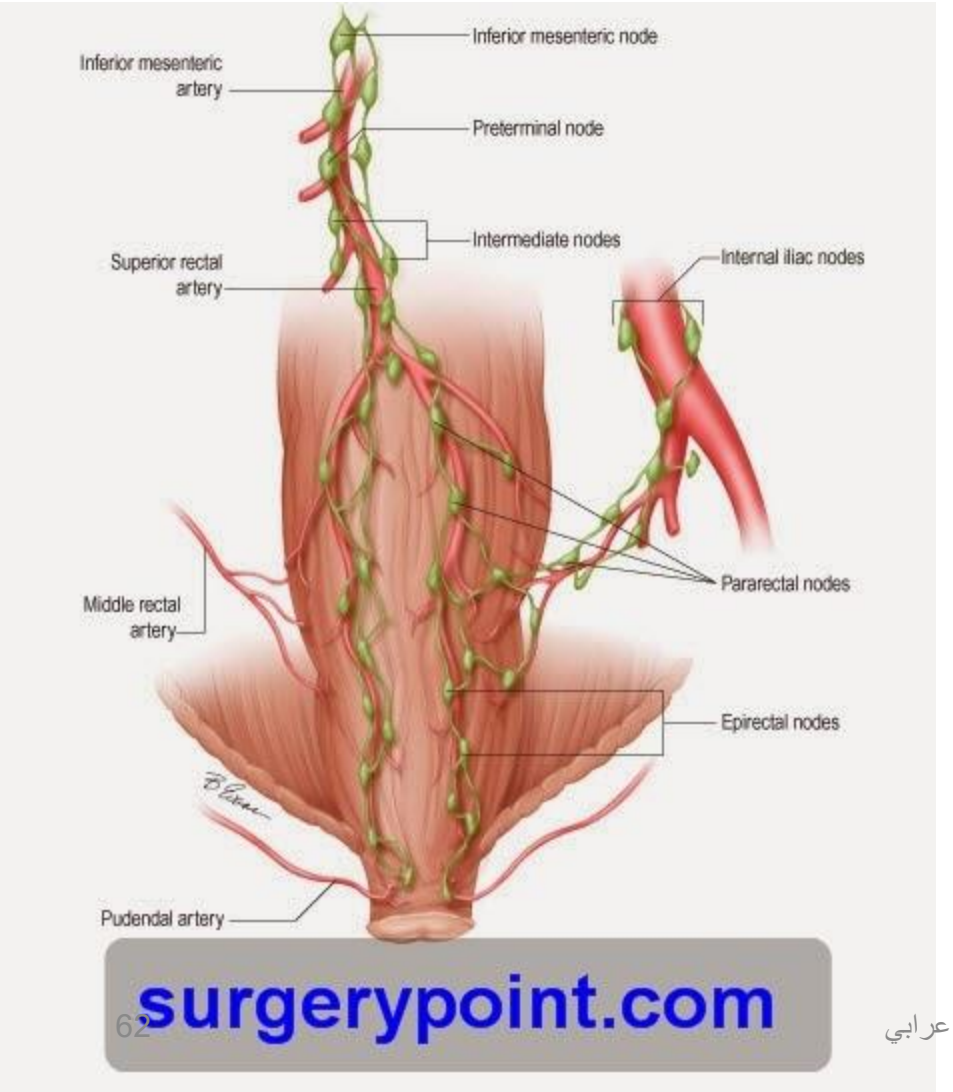


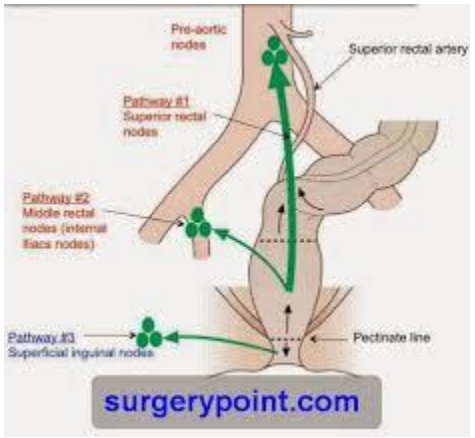

**Fig. 1148** Rectal veins, Vv. rectales; diagram with parts of the pelvis and the pelvic diaphragm; dorsal view.
There are numerous connections between the veins draining into the hepatic portal vein (superior rectal vein) and those draining into the inferior vena

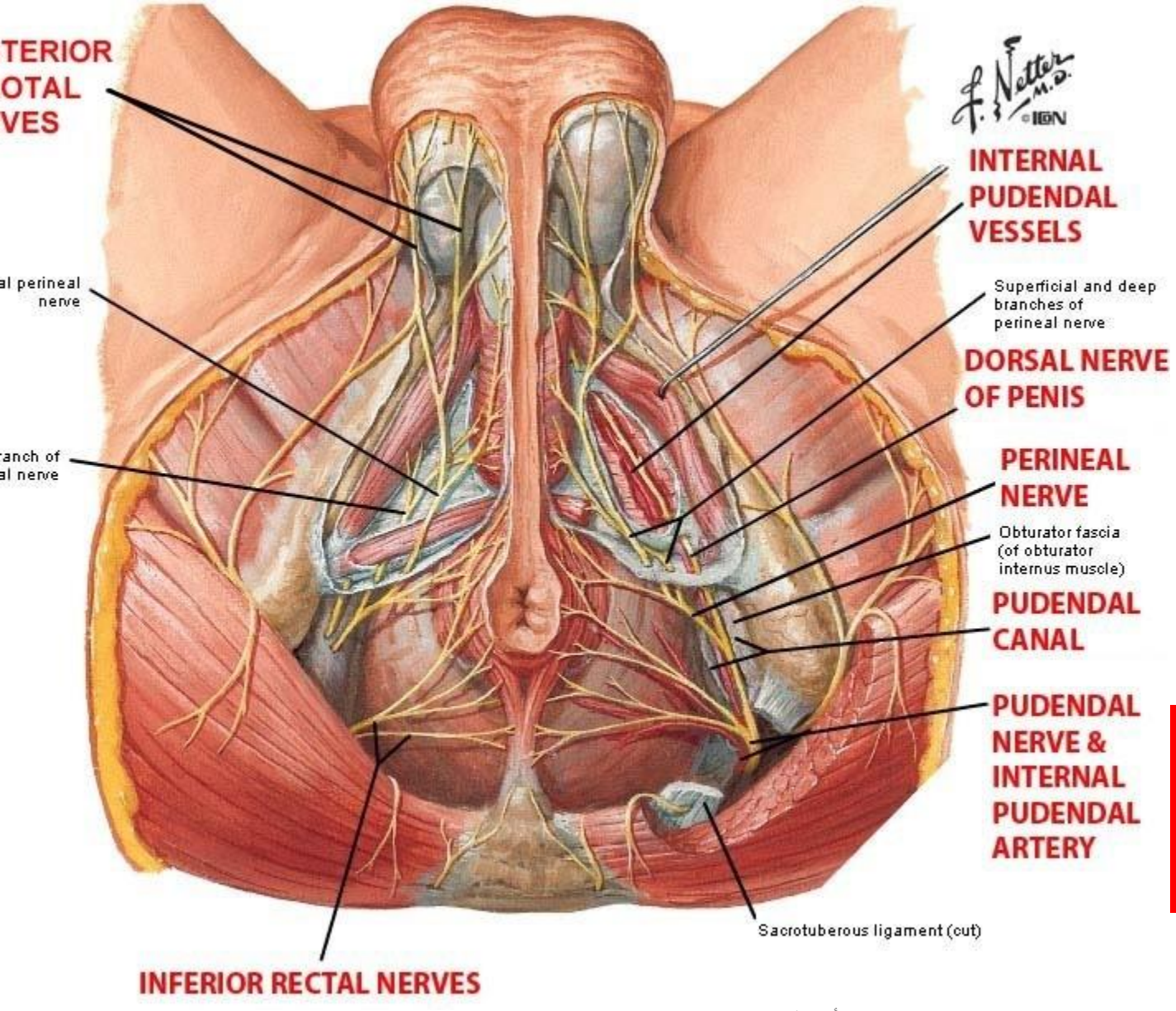
→ 1077, 1078



The lymph drainage is downward to the medial group of superficial inguinal nodes النزح اللمفي نحو المجموعة الإنسية من العقد الحرقفية الظاهرة






The nerve supply is from the somatic inferior rectal nerve; it is thus sensitive to pain, temperature, touch, and pressure

تتعصب من المستقيمي السفلي(تعصيب جسدي)فهي حساسة للألم والحرارة والضغط واللمس

# الغلالة العضلية للقناة الشرجية

**طبقة خارجية طولانية وطبقة دائرية داخلية من العضلات الملس:تمادي من المستقيم**

**المصرات الشرجية:**

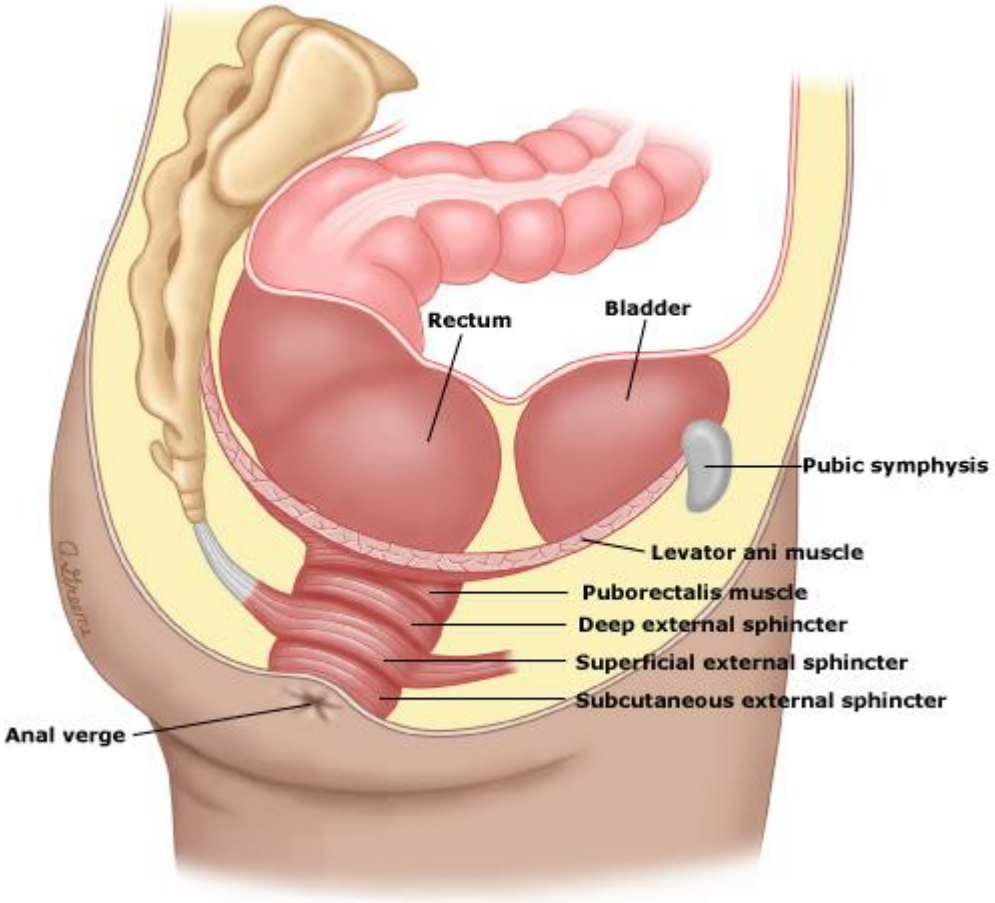
**1.باطنة:تثخن العضلات الملس الدائرية.**

**2.ظاهرة:تحيط بالباطنة وهي عضلة مخططة إرادية ولها 3 أقسام:**

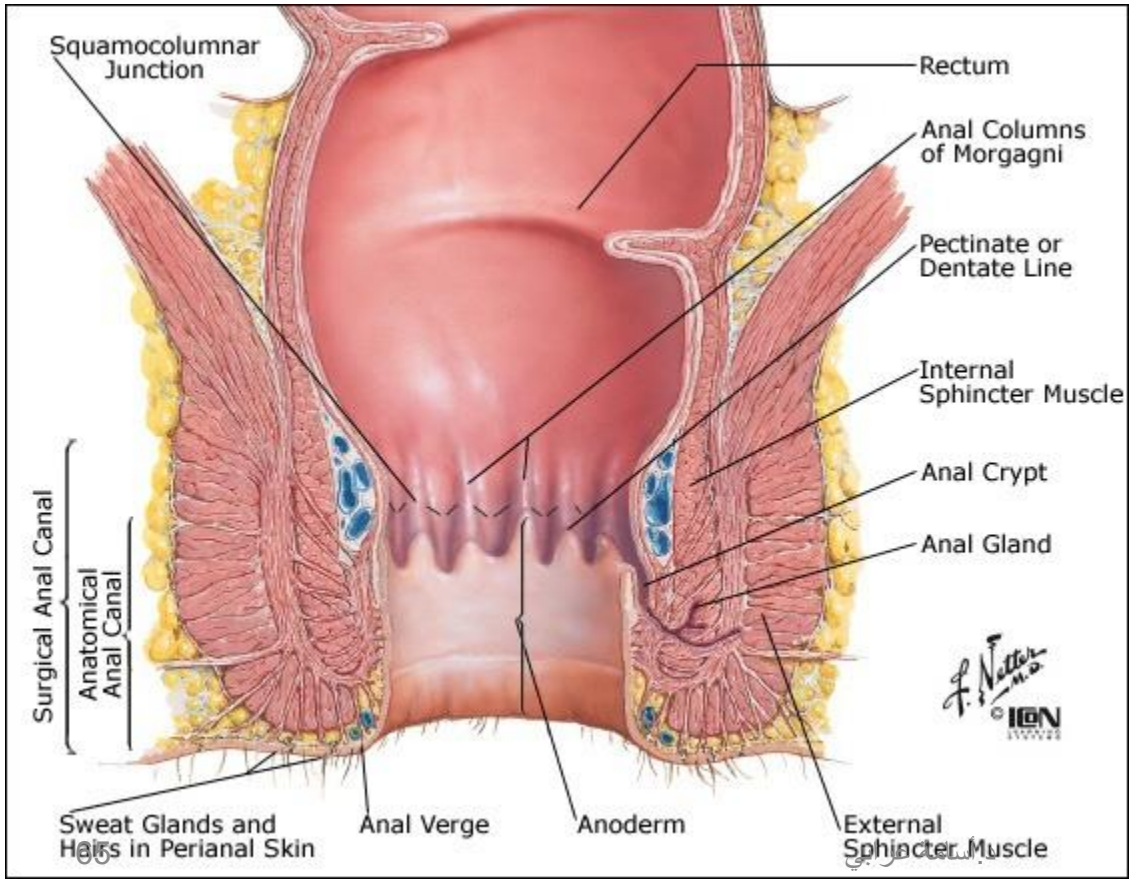
**أ:تحت الجلد: تحيط بالنهاية السفلية للقناة الشرجية وليس لها ارتكاز عظمي.**

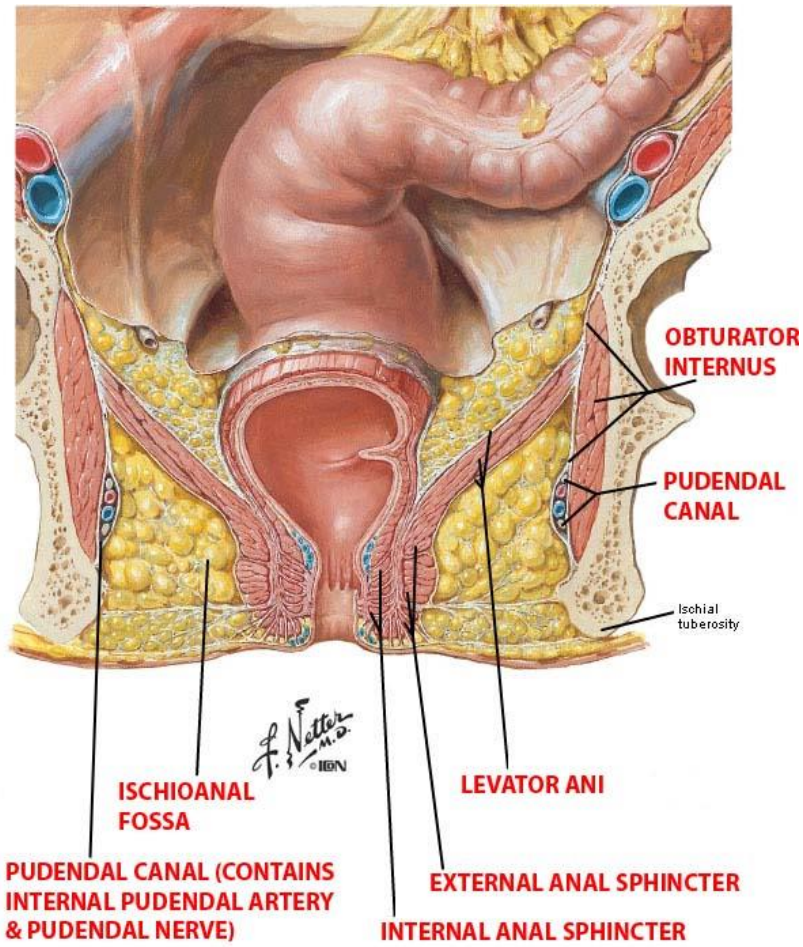
**ب:الجزء السطحي: وترتكز على العصعص و الجسم العجاني(لاتحيط بها بشكل كامل).**

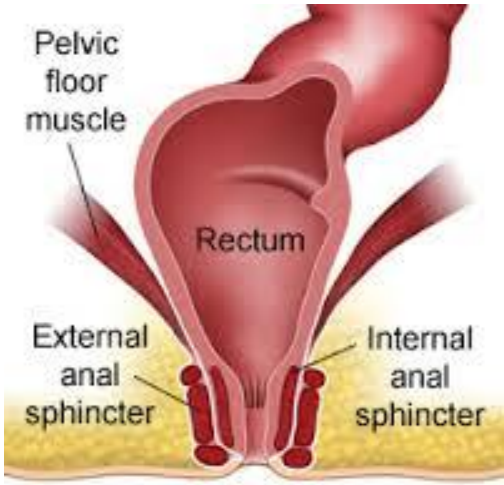
**جـ:الجزء العميق: تحيط بالنهاية العلوية للقناة الشرجية وليس لها ارتكاز عظمي**



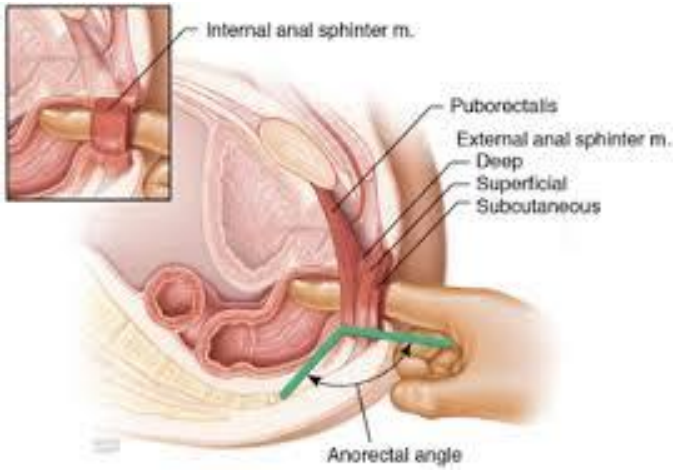
- تتواصل العضلة الملساء الطولانية للقناة الشرجية في الأعلى مع مثيلتها في المستقيم,وتشكل غلالة متواصلة حول القناة الشرجية وتهبط في الحيز بين المصرتين الظاهرة والباطنة,ترتكز بعض الألياف على الغشاء المخاطي للقناة الشرجية,في حين تسير ألياف أخرى جانبيا إلى الحفرة الإسكية المستقيمية أو ترتكز على الجلد حول الشرج




OBTURATOR INTERNUS
PUDENDAL CANAL
Ischial tuberosity
F. Netter M.D.
©IGN
ISCHIOANAL FOSSA
LEVATOR ANI
PUDENDAL CANAL (CONTAINS INTERNAL PUDENDAL ARTERY & PUDENDAL NERVE)
EXTERNAL ANAL SPHINCTER
INTERNAL ANAL SPHINCTER



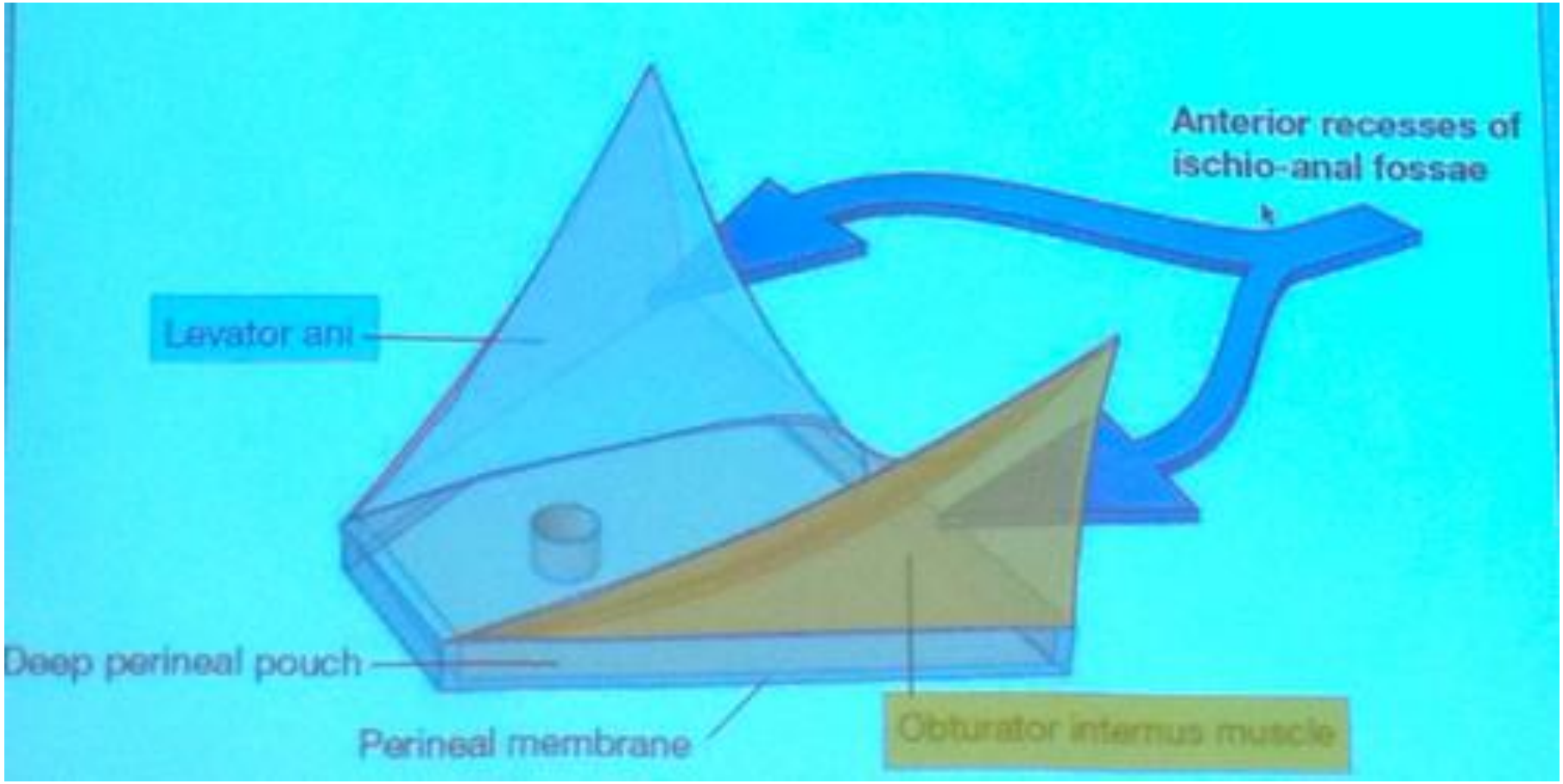

**يشكل الإندماج بين المصرة الباطنة والجزء العميق للمصرة الظاهرة مع العانتين المستقيميتين حلقة واضحة تدعى بالحلقة الشرجية المستقيمية التي يمكن جسها بالفحص الشرجي.**



**– يتم التغوط على أربع مراحل : (1) تحرك كتلي للبراز نحو مجل المستقيم ,(2) زوال منعكس التثبيط الشرجي المستقيمي حيث أن تمدد المستقيم يسبب استرخاء لا إرادي في المصرة الباطنة , (3) زيادة الضغط داخل البطن (4) استرخاء إرادي في المصرة الظاهرة والعضلة العانية المستقيمية .**

**– الاستمساك : يحتاج إلى وجود سعة طبيعية وإحساس طبيعي عند المنطقة الانتقالية فوق الخط المسنن مع سلامة الوظيفة العانية المستقيمية للبراز الصلب ، ووظيفة المصرة الظاهرة و الباطنة, تحافظ العضلة العانية المستقيمية على الزاوية الشرجية المستقيمية ويؤدي تقلصها إلى منع مرور البراز الصلب .**

# الحفرتان الإسكيتان المستقيميتان
# اسفينيتان تقعان على جانبي القناة الشرجية

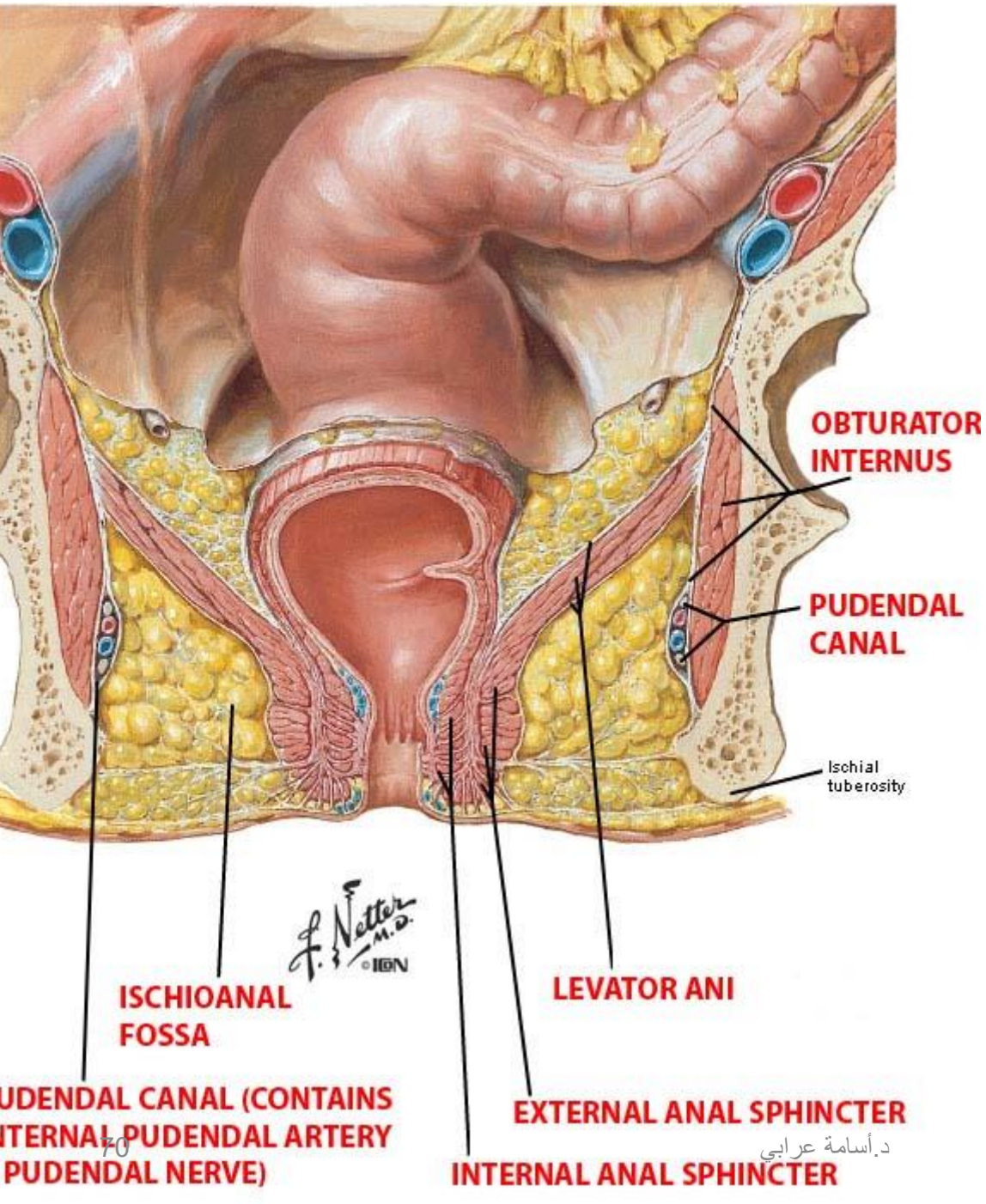


قاعدة:سطحية:جلد

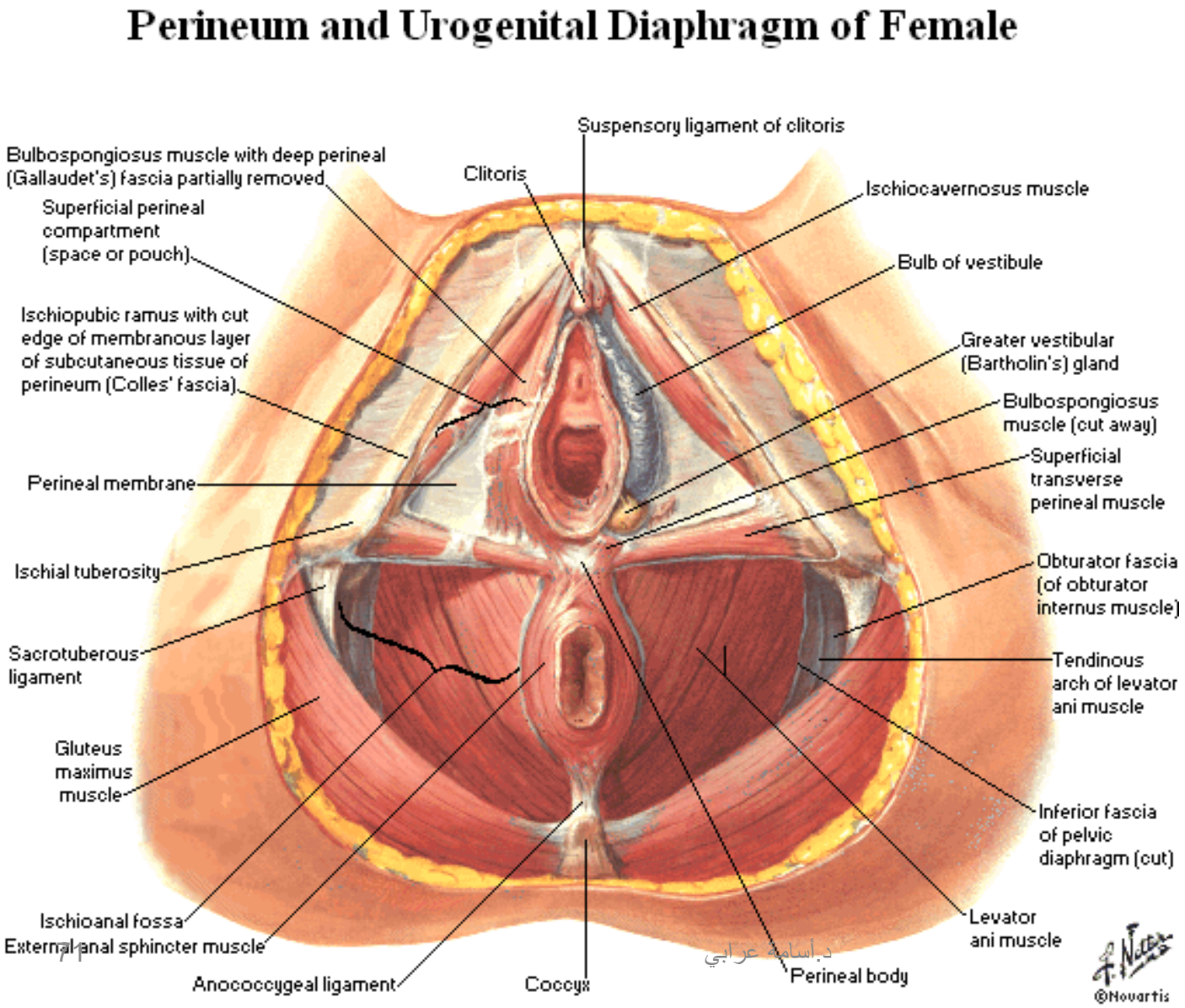
جدار أنسي:رافعة الشرج والقناة الشرجية(دعم وتمدد القناة الشرجية)

جدار وحشي:ج س من المسدة الباطنة ولفافتها

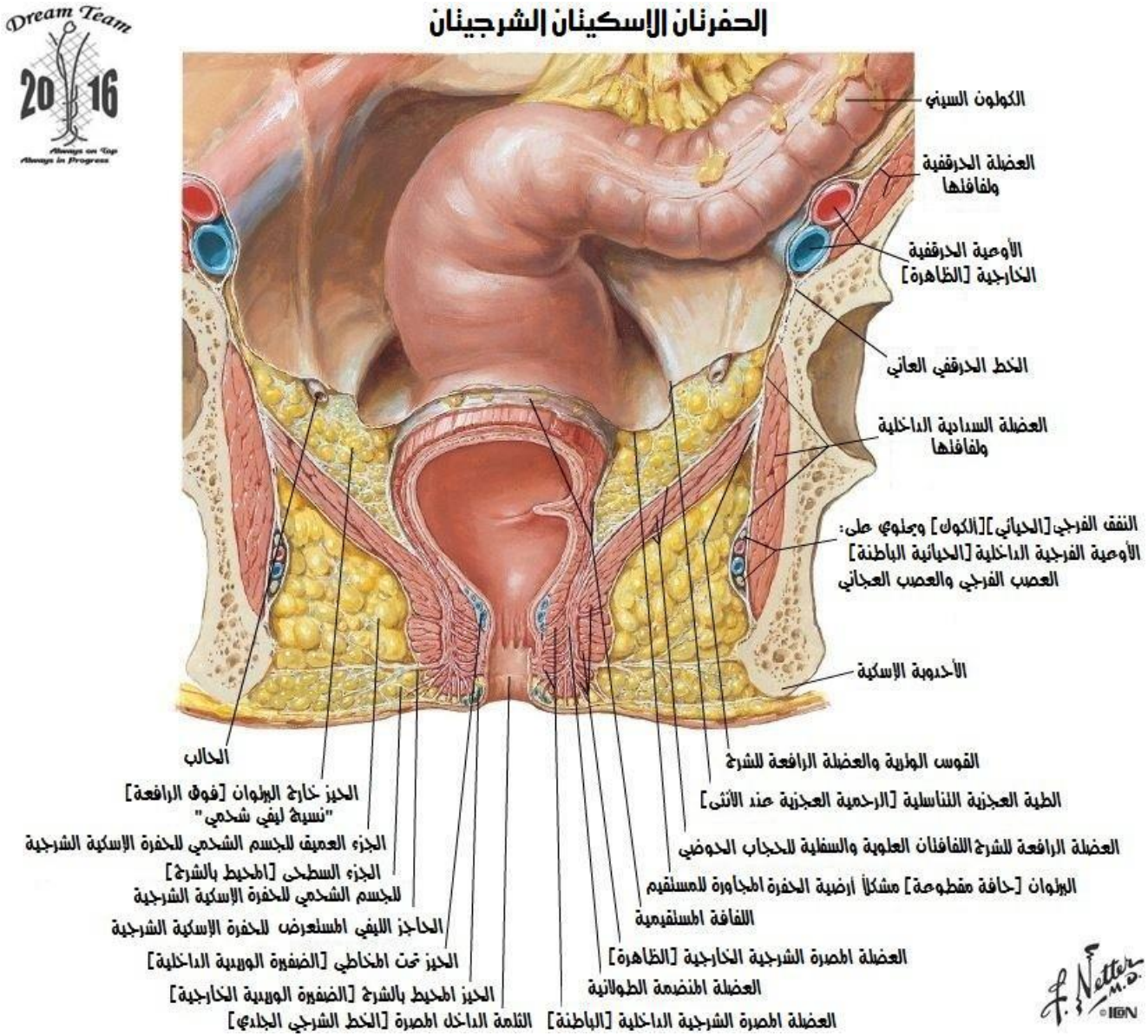
حافة:الموصل بين الجدارين



# Muscles - Female

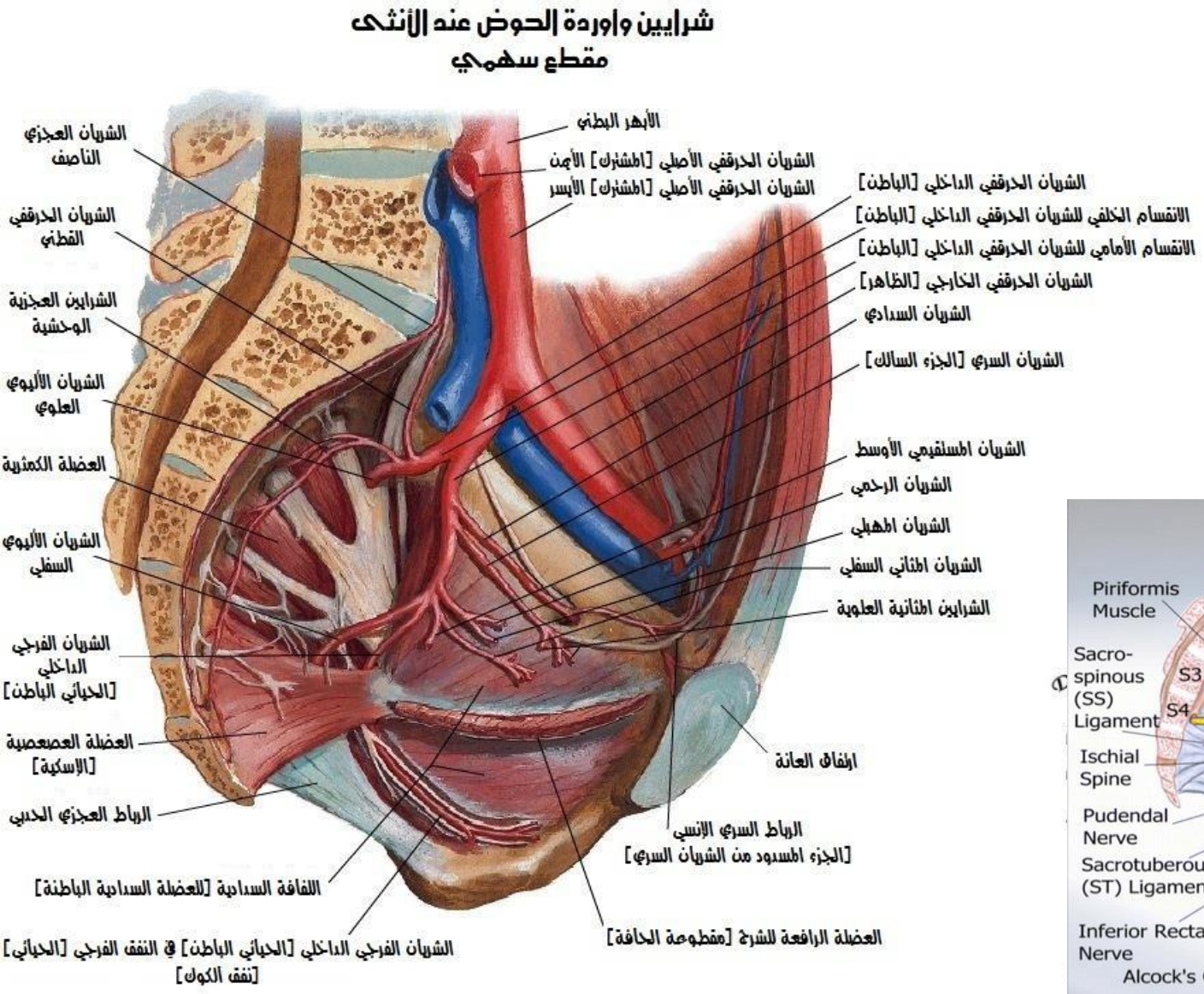


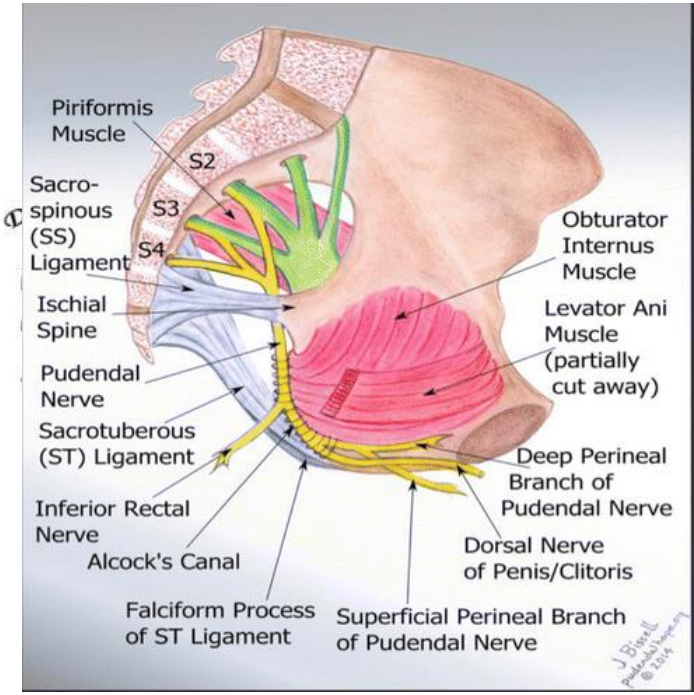

د.أسامة عرابي

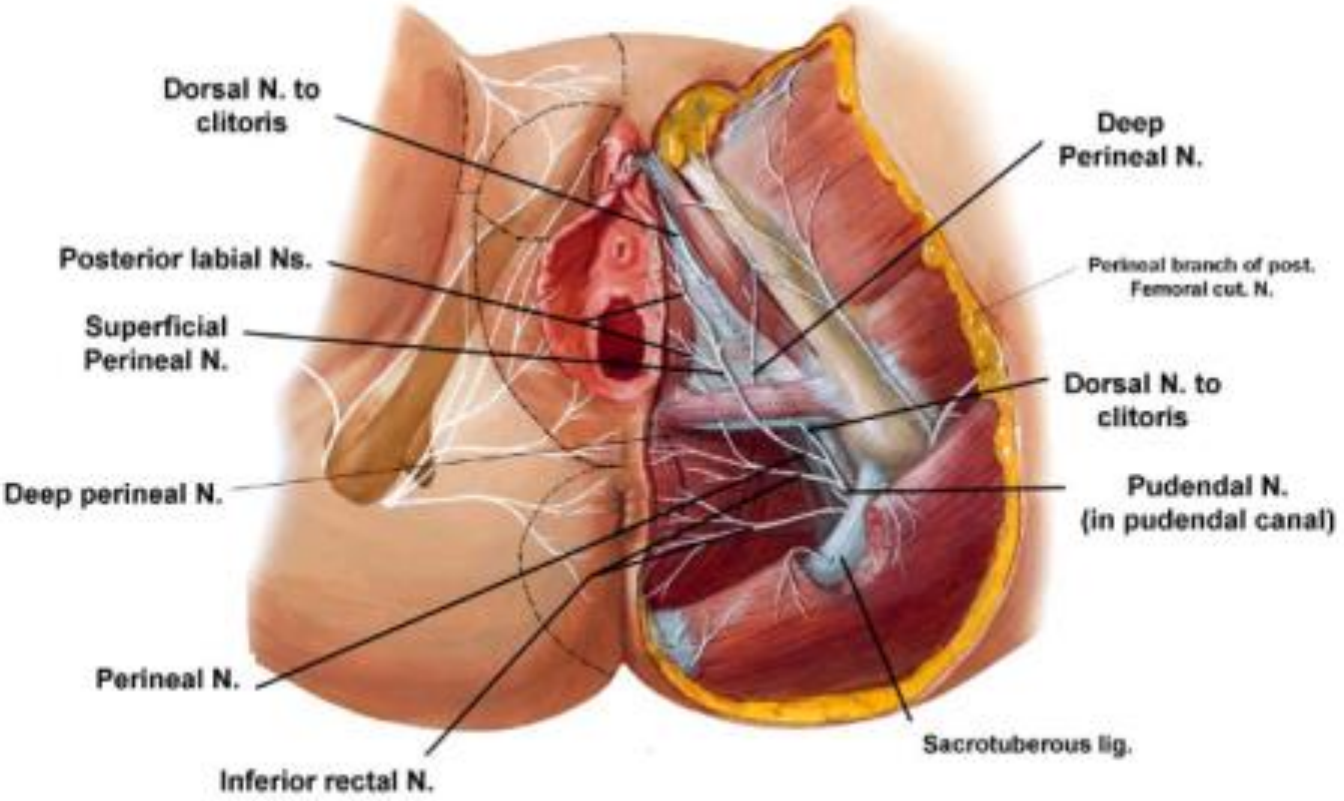



**محتويات الحفرة الإسكية المستقيمية:يملأها نسيج شحمي....**

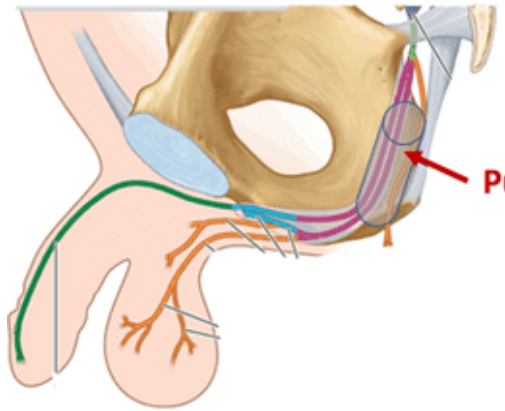
و تحوي في جدارها الوحشي العصب الفرجي والأوعية الفرجية الباطنة داخل ممر ضمن لفافة المسدة الباطنة يدعى بالقناة الفرجية)



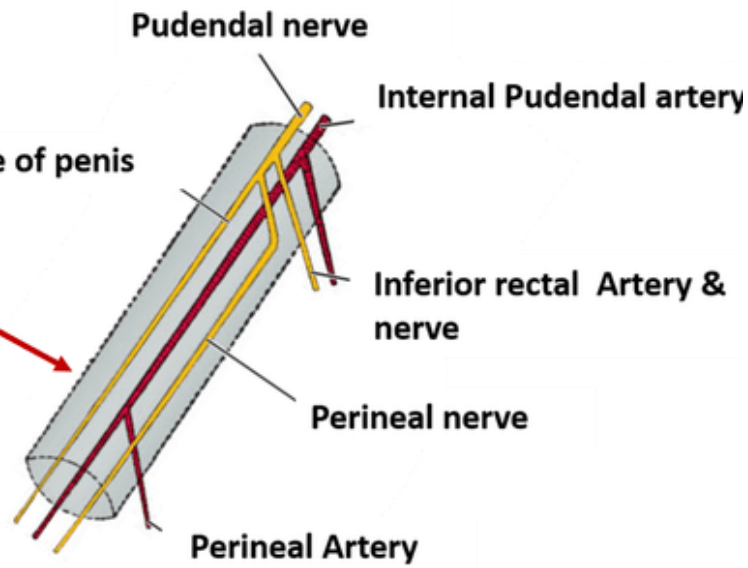



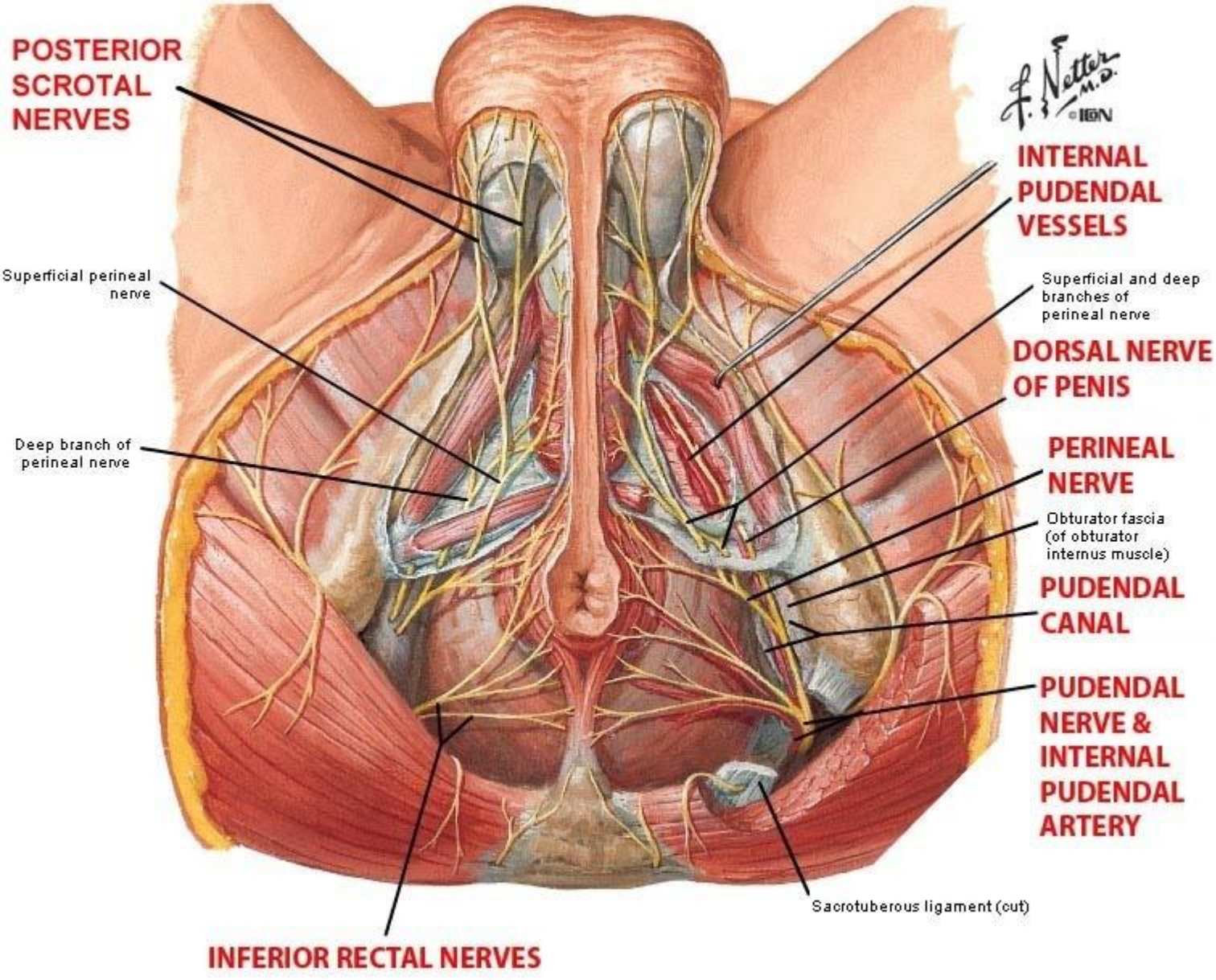



Netter 493



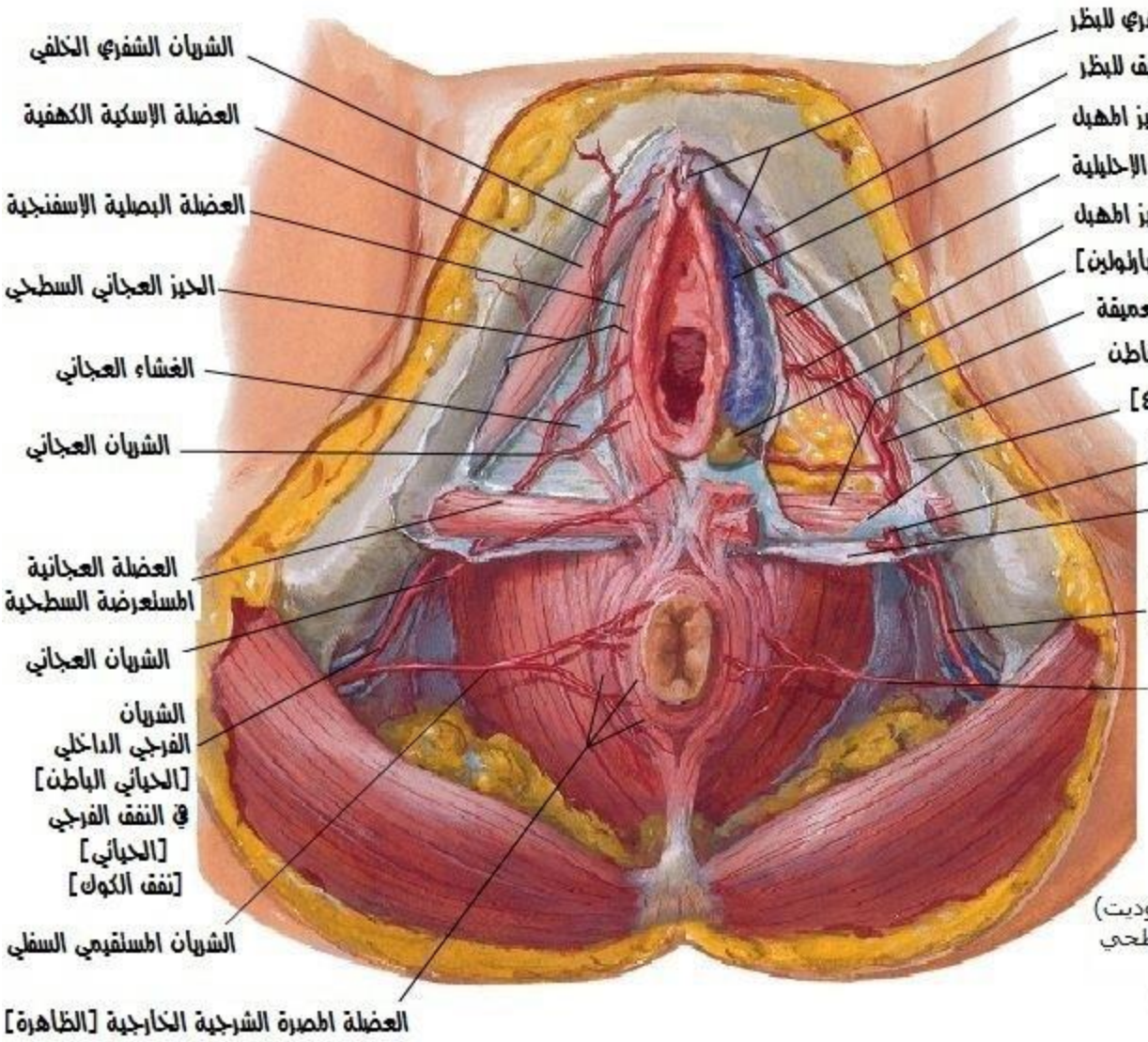
Pudendal Canal



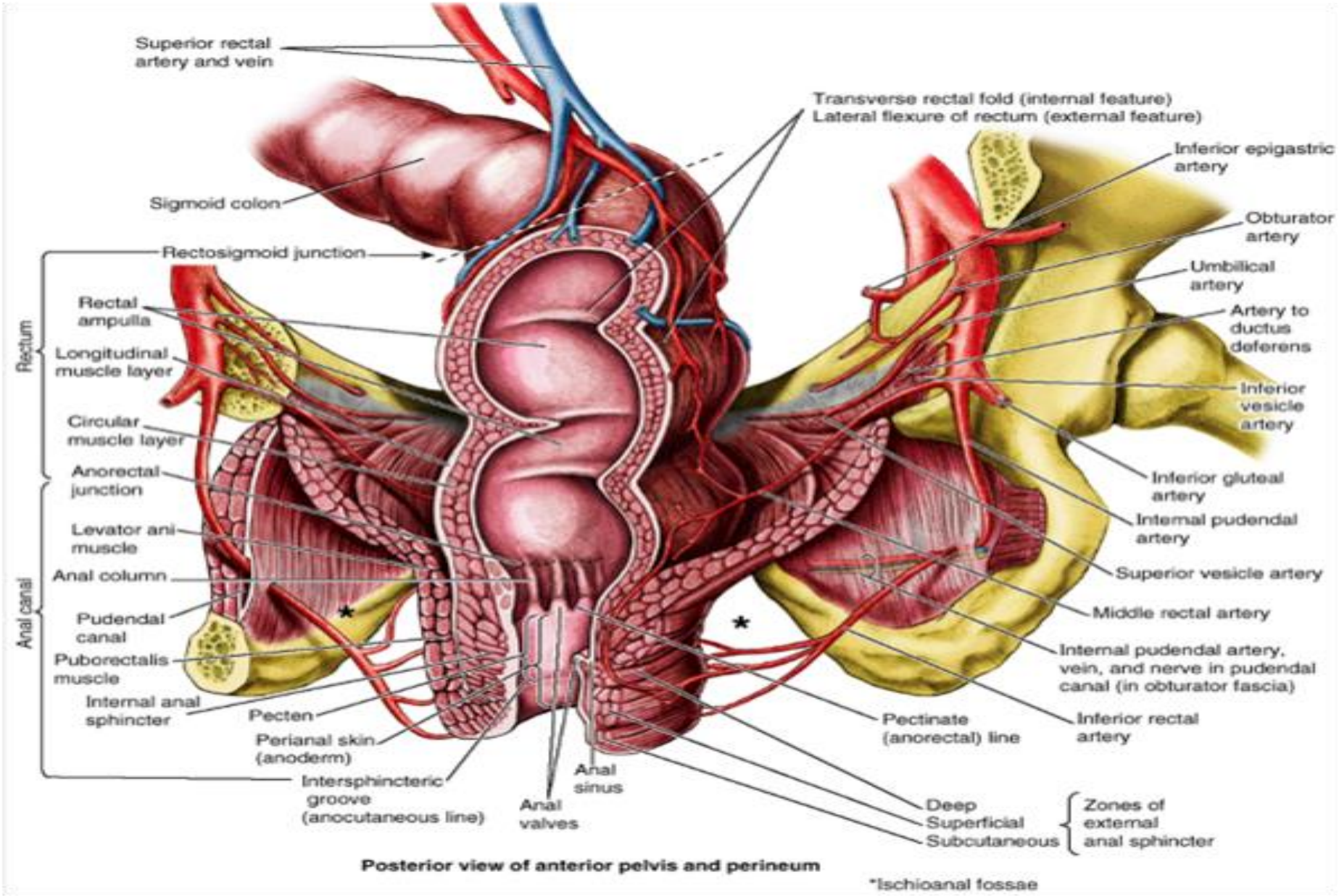



كما يمر عبرها قاصدين القناة الشرجية:الأوعية والعصب المستقيمي السفلي(شعبة العجاني)

# شرايين واوردة العجان عند الأنثى




ملاحظة:
اللفافة العجانية العميقة (المغلّفة أو غالوديت) مُزالة عن العضلات والحيّز العجاني السطحي


Superior rectal artery and vein
Transverse rectal fold (internal feature)
Lateral flexure of rectum (external feature)
Inferior epigastric artery
Sigmoid colon
Obturator artery
Rectosigmoid junction
Umbilical artery
Rectum
Rectal ampulla
Artery to ductus deferens
Longitudinal muscle layer
Inferior vesicle artery
Circular muscle layer
Anorectal junction
Inferior gluteal artery
Internal pudendal artery
Levator ani muscle
Anal canal
Anal column
Superior vesicle artery
Middle rectal artery
Pudendal canal
Internal pudendal artery, vein, and nerve in pudendal canal (in obturator fascia)
Puborectalis muscle
Internal anal sphincter
Pecten
Pectinate (anorectal) line
Inferior rectal artery
Perianal skin (anoderm)
Anal sinus
Intersphincteric groove (anocutaneous line)
Anal valves
Deep
Superficial
Subcutaneous
Zones of external anal sphincter
Posterior view of anterior pelvis and perineum
*Ischioanal fossae

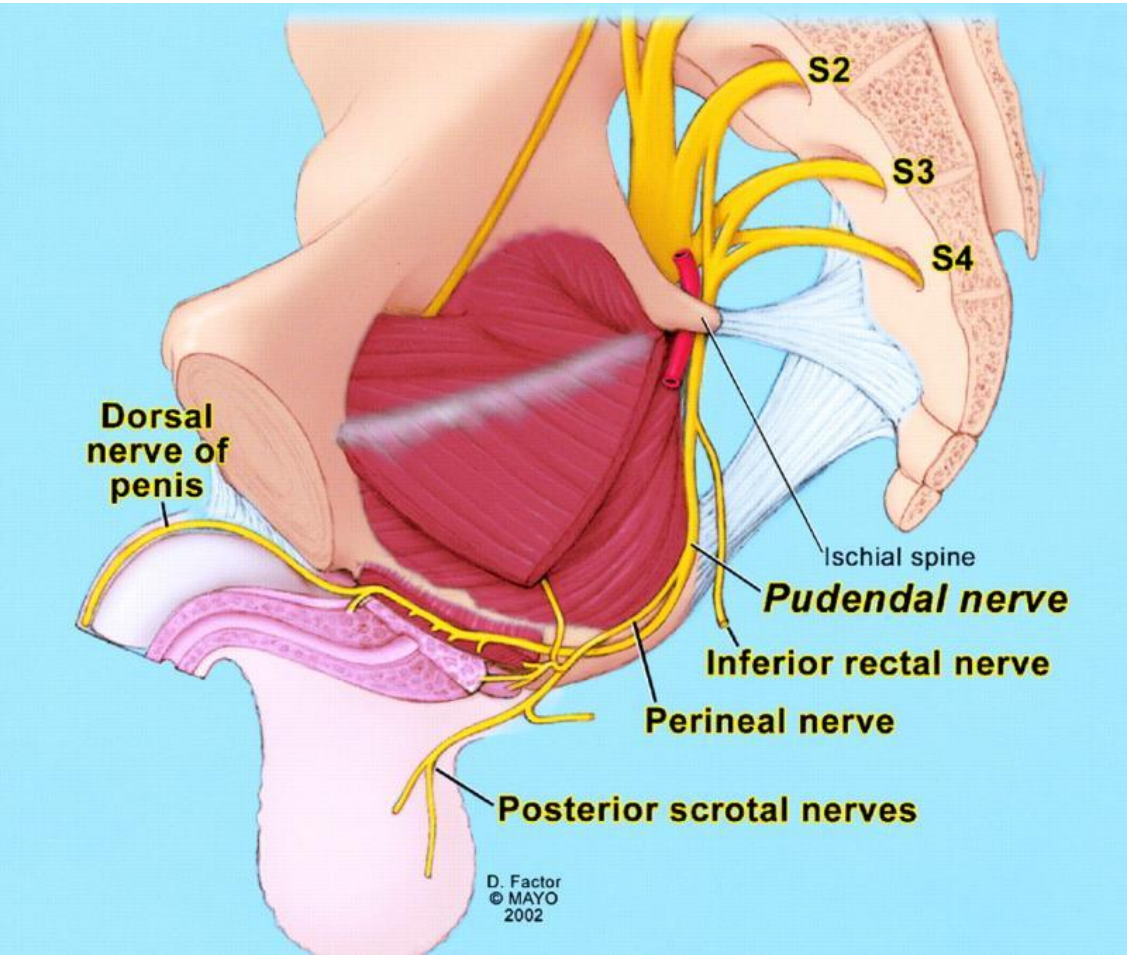
العصب الفرجي:فرع من الضفيرة العجزية(ع4,3,2),يغادر جوف الحوض عبر الثقبة الوركية الكبيرة ليسير في الناحية الإليوية ثم يعبر شوك الإسك ليدخل إلى العجان عبر الثقبة الوركية الصغيرة ثم يسير نحو الأمام عبر القناة الفرجية ويعطي داخلها فرعا جانبيا هو المستقيمي السفلي ثم يتابع مسيره ليتفرع أيضا ضمن القناة لفرعيه الإنتهائيين :العجاني والظهراني للقضيب.

فروع العصب الفرجي:

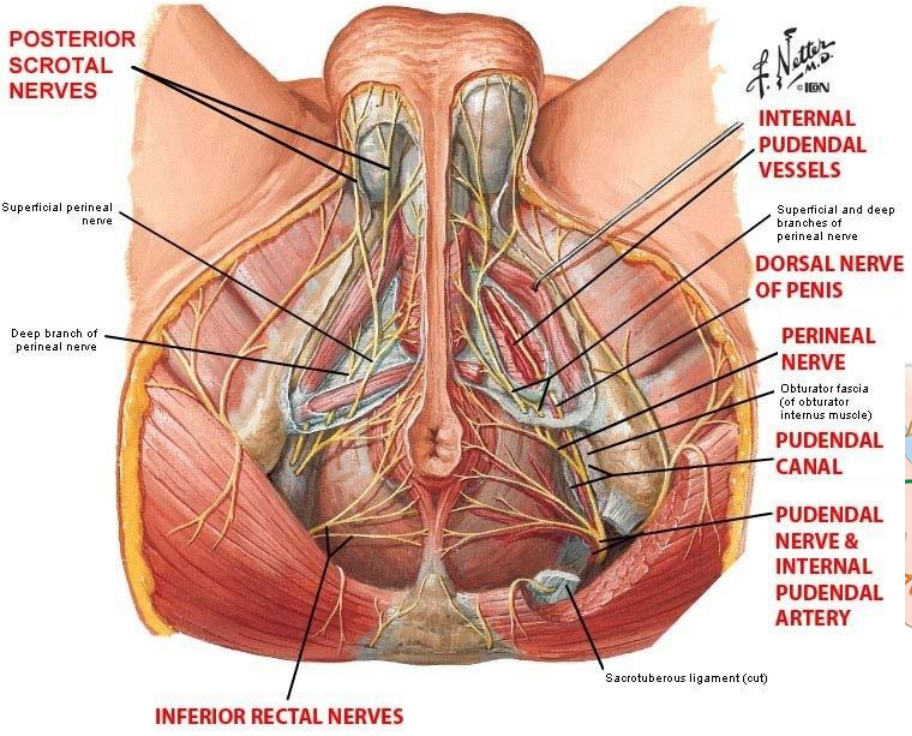
1.المستقيمي السفلي:يسير في الإنسي مرافقا الأوعية ليعصب المصرة الظاهرة والغشاء المخاطي للنصف السفلي من القناة الشرجية(كما مر معنا)والجلد حول الشرج.

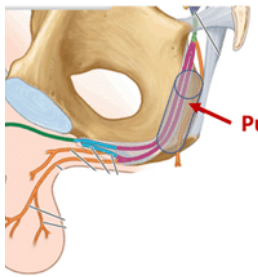
2. العَصَبُ الظَّهْرانِيُّ للقَضِيب(أو للبظر عند النساء).

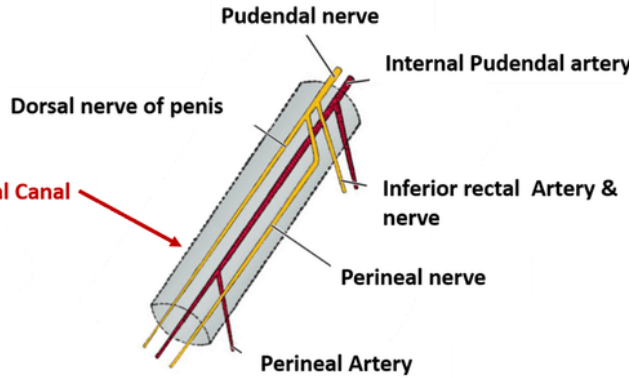
3.العصب العجاني:يعصب عضلات المثلث البولي التناسلي (التي سيرد ذكرها لاحقا)وجلد السطح الخلفي للصفن(أو الشفر الكبير)

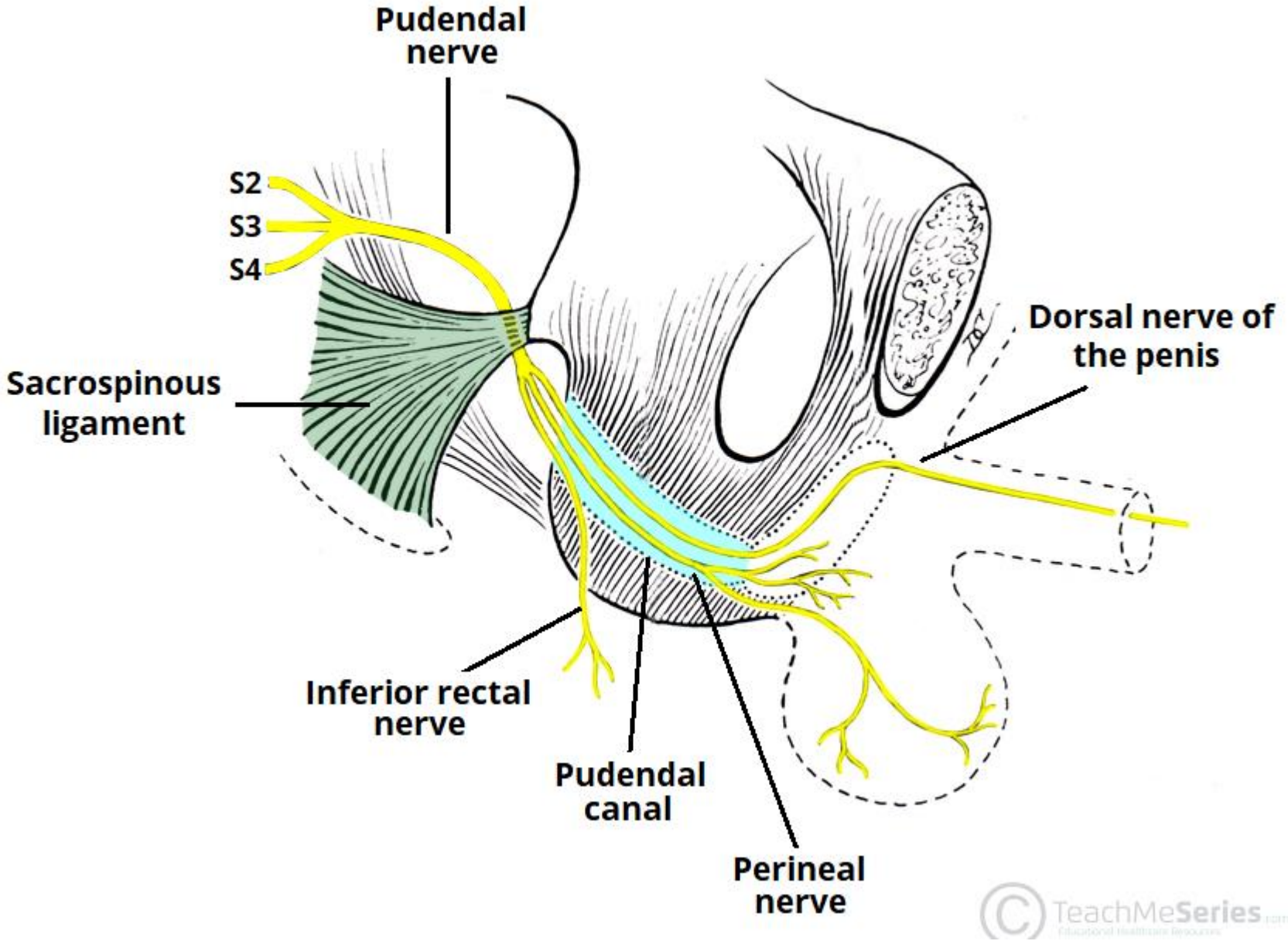


العصب العجاني:يتوضع تحت الشريان الفرجي الباطن ويرافق الشريان العجاني وينقسم لـ :1-سطحية حسية هما الفرعان الصفنيان (أو الشفريان) الخلفيان.2-عميقة وهي فروع عضلية.يثقب الأول الغشاء العجاني ليسير في القسم الوحشي للمثلث البولي التناسلي مرافقا الفروع الصفنية الخلفية للشريان العجاني ويتوزع في جلد الصفن متداخلا مع الفرع العجاني للفخذي الجلدي الخلفي,أما الفروع العضلية فتعصب العضلات:العجانية السطحية,البصلية الكهفية,الإسكية الكهفية,معصرة الإحليل,يعطي عصب البصلية الكهفية شعبة تثقبها لتعصب البصلة و مخاطية الإحليل البصلي

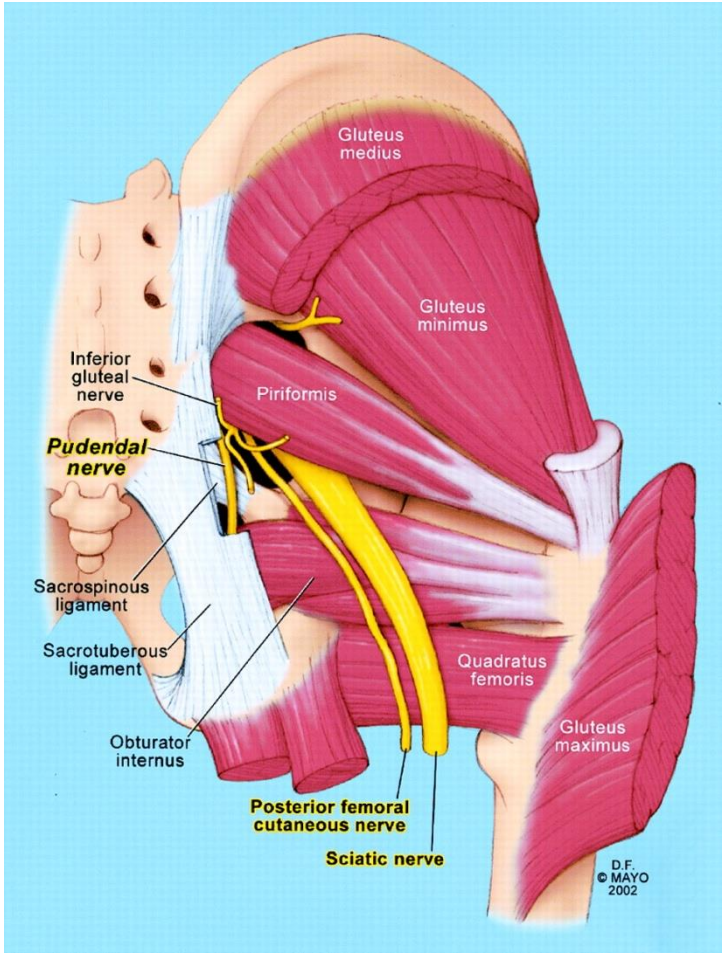


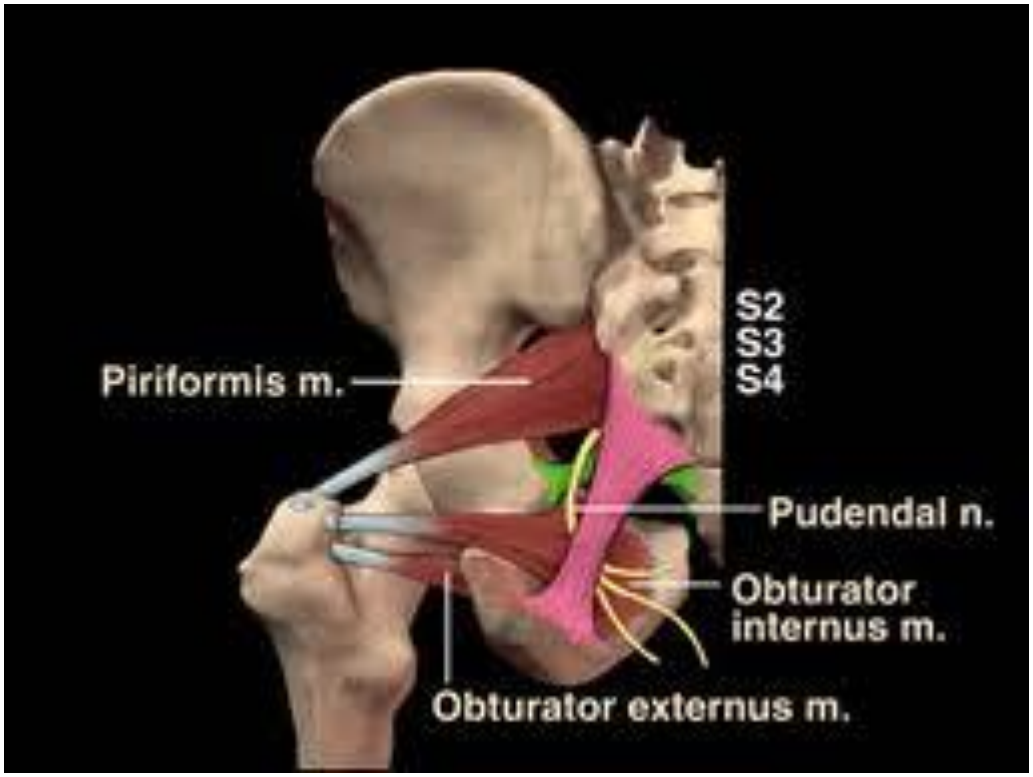



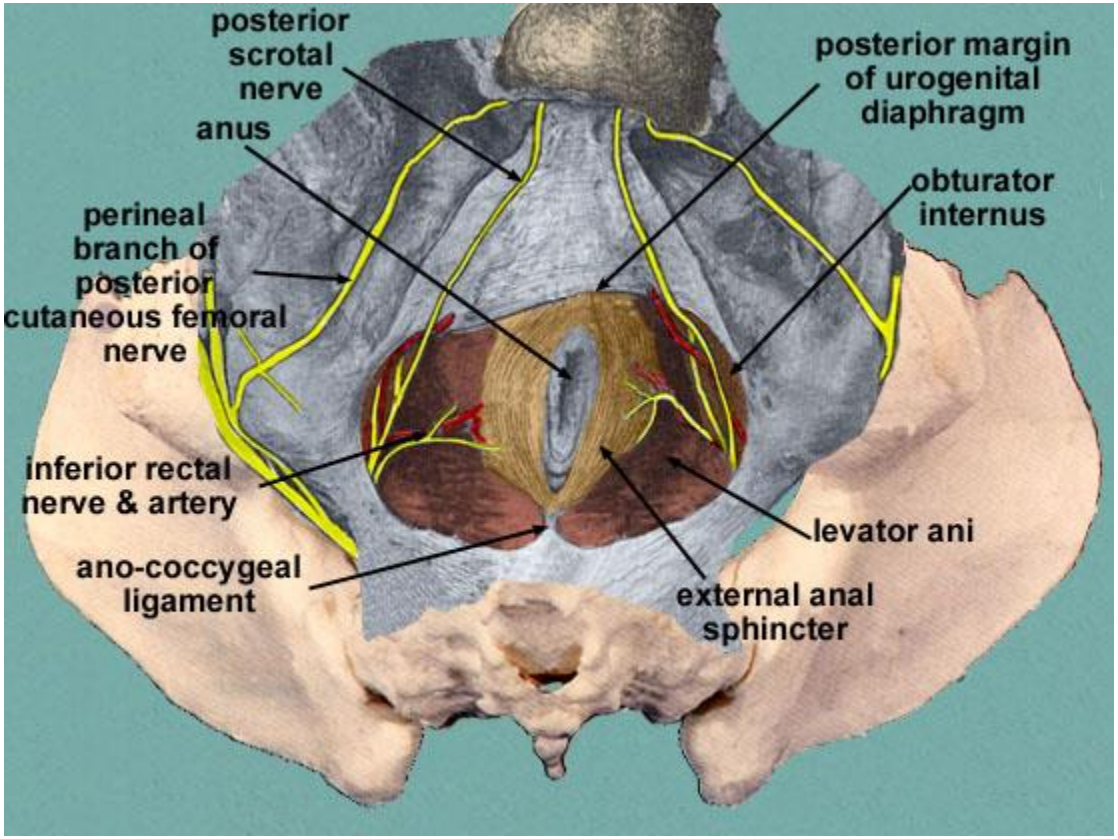

Pudendal nerve
S2
S3
S4
Sacrospinous ligament
Dorsal nerve of the penis
Inferior rectal nerve
Pudendal canal
Perineal nerve
TeachMeSeries.com

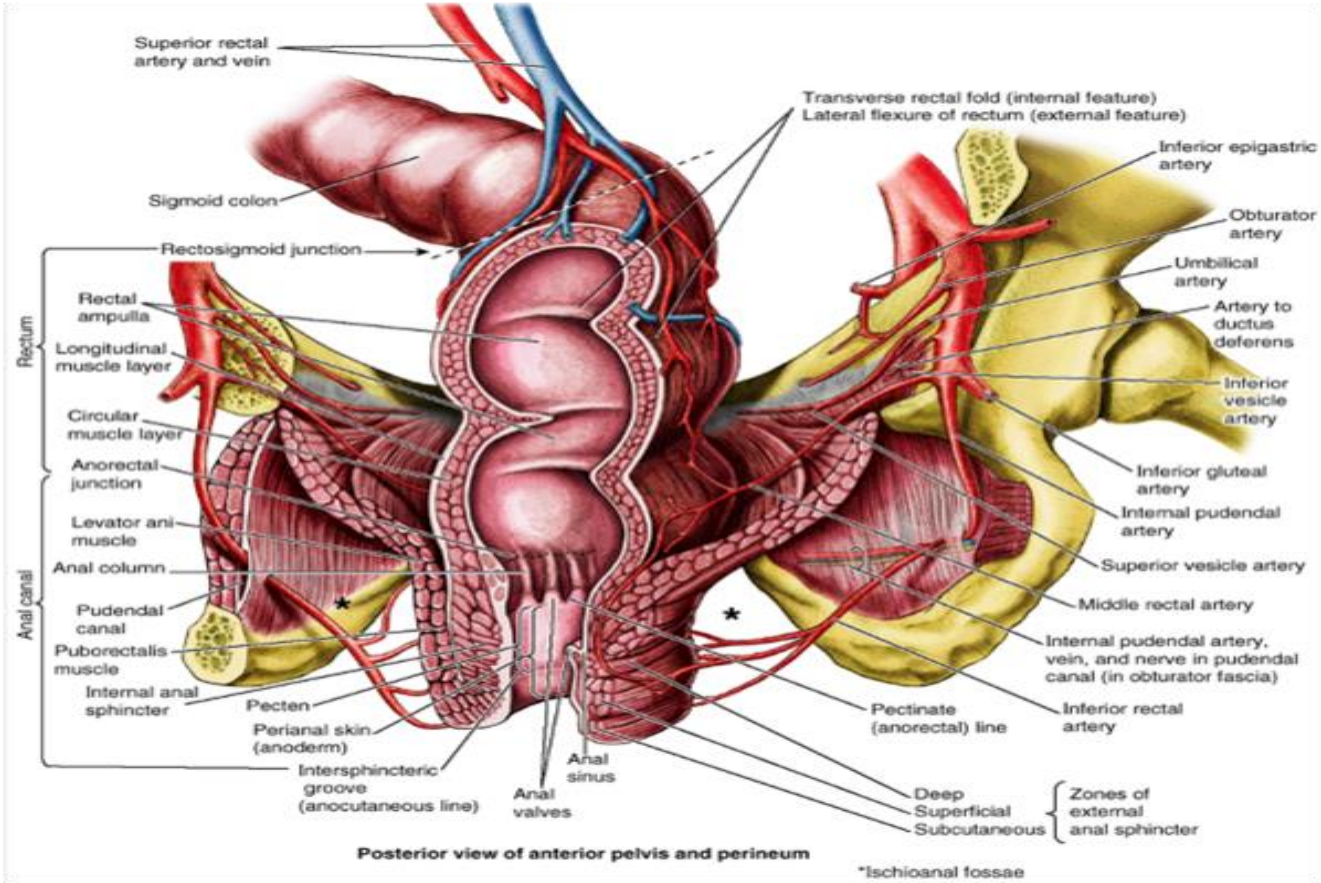
# الإليوية


Gluteus medius
Gluteus minimus
Piriformis
Inferior gluteal nerve
Pudendal nerve
Sacrospinous ligament
Sacrotuberous ligament
Obturator internus
Quadratus femoris
Gluteus maximus
Posterior femoral cutaneous nerve
Sciatic nerve
D.F.
© MAYO
2002

# من ثقبة إلى ثقبة




posterior scrotal nerve
anus
perineal branch of posterior cutaneous femoral nerve
inferior rectal nerve & artery
ano-coccygeal ligament
posterior margin of urogenital diaphragm
obturator internus
levator ani
external anal sphincter


Superior rectal artery and vein
Transverse rectal fold (internal feature)
Lateral flexure of rectum (external feature)
Inferior epigastric artery
Sigmoid colon
Obturator artery
Rectosigmoid junction
Umbilical artery
Rectal ampulla
Artery to ductus deferens
Rectum
Longitudinal muscle layer
Inferior vesicle artery
Circular muscle layer
Anorectal junction
Inferior gluteal artery
Internal pudendal artery
Levator ani muscle
Anal column
Superior vesicle artery
Anal canal
Middle rectal artery
Pudendal canal
Internal pudendal artery, vein, and nerve in pudendal canal (in obturator fascia)
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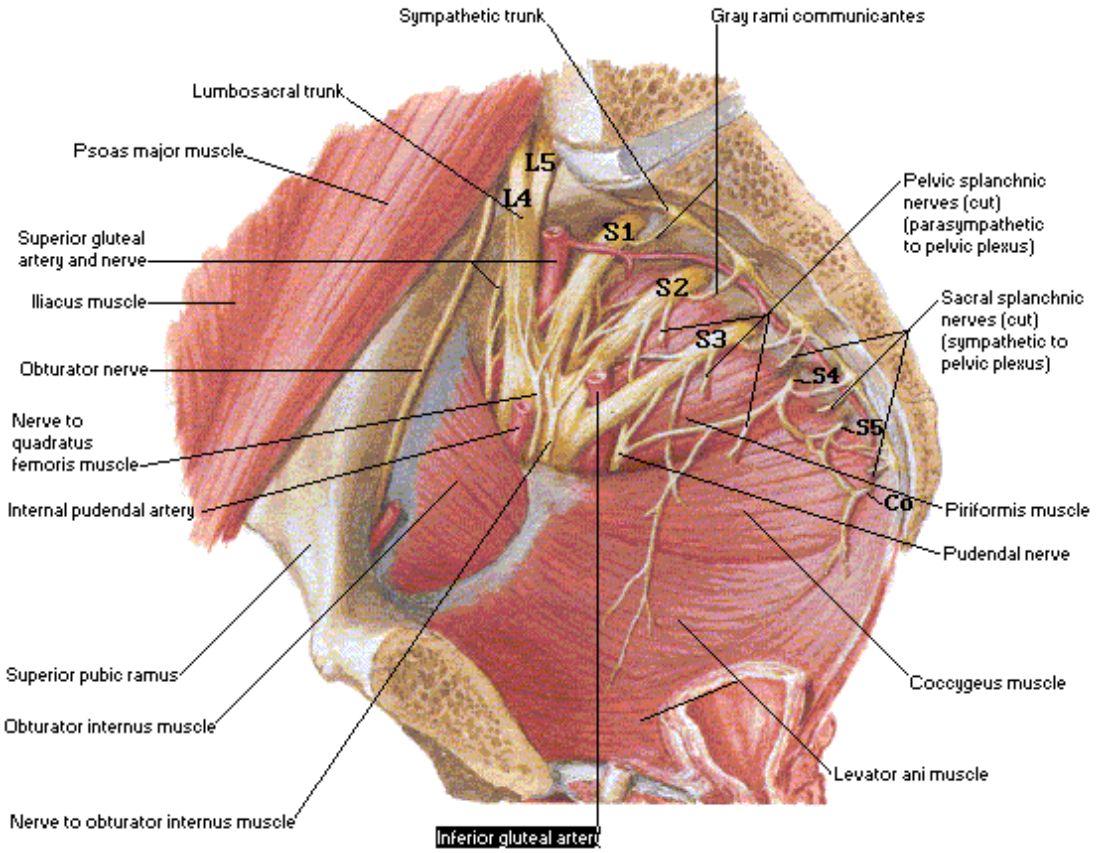
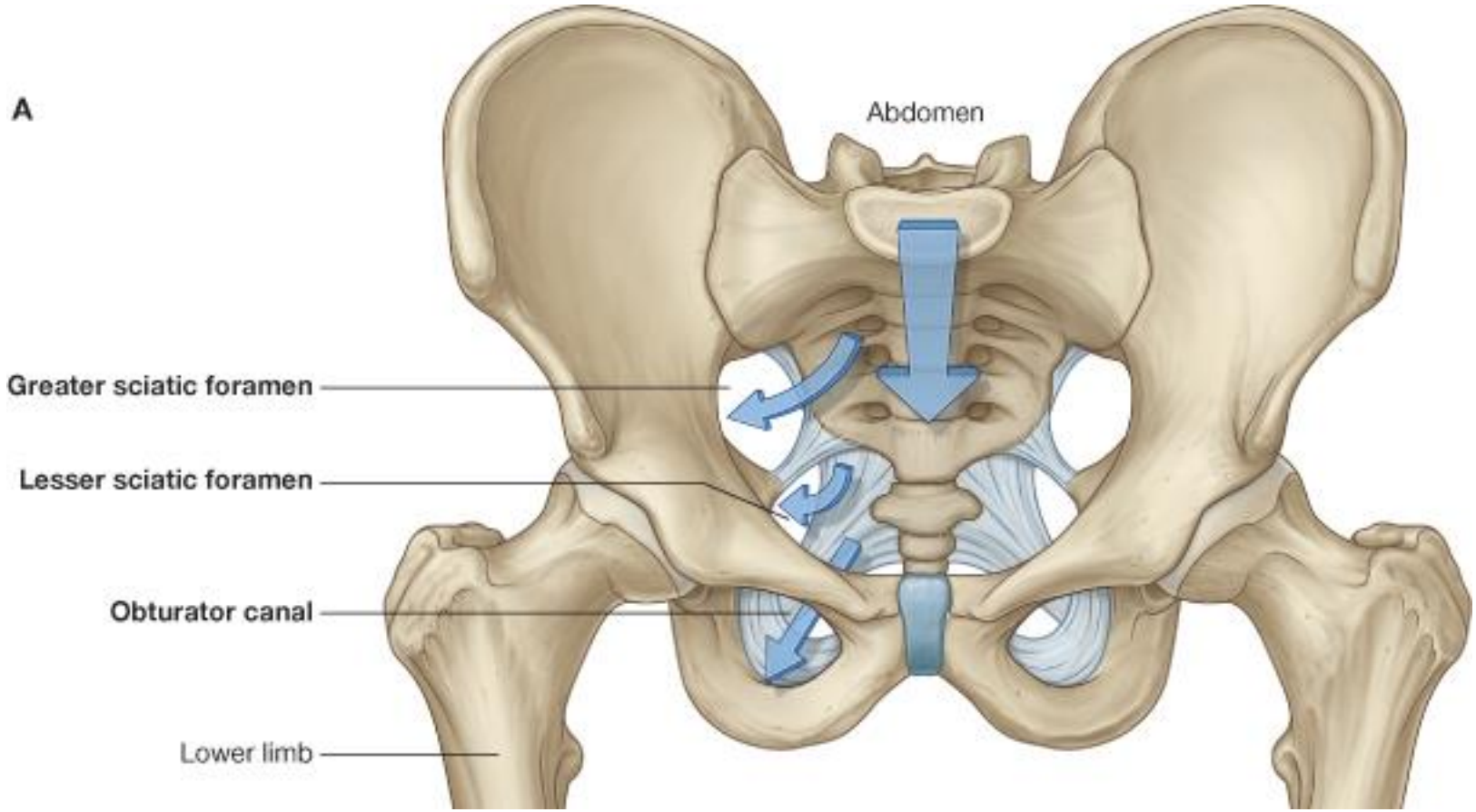
Pecten
Pectinate (anorectal) line
Inferior rectal artery
Perianal skin (anoderm)
Anal sinus
Intersphincteric groove (anocutaneous line)
Anal valves
Deep
Superficial
Subcutaneous
Zones of external anal sphincter
Posterior view of anterior pelvis and perineum
*Ischioanal fossae

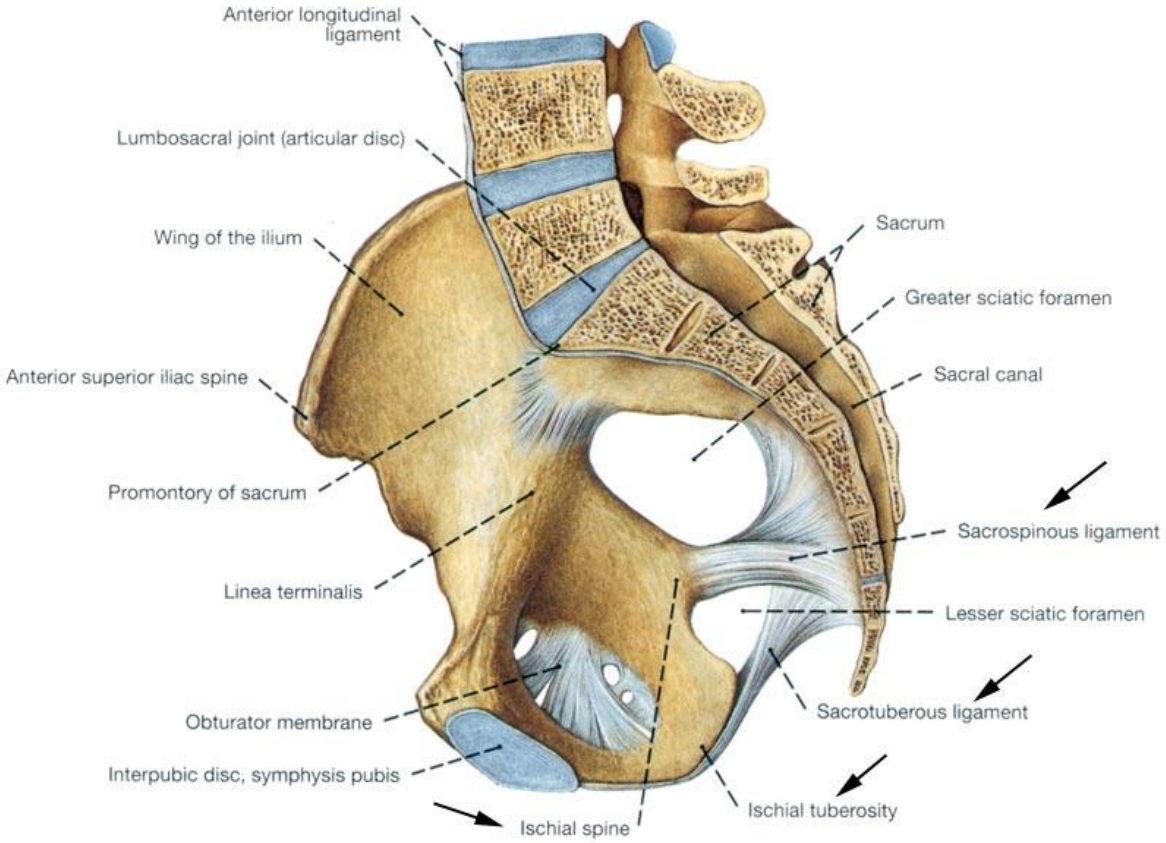
# Sacral and Coccygeal Plexuses in Situ



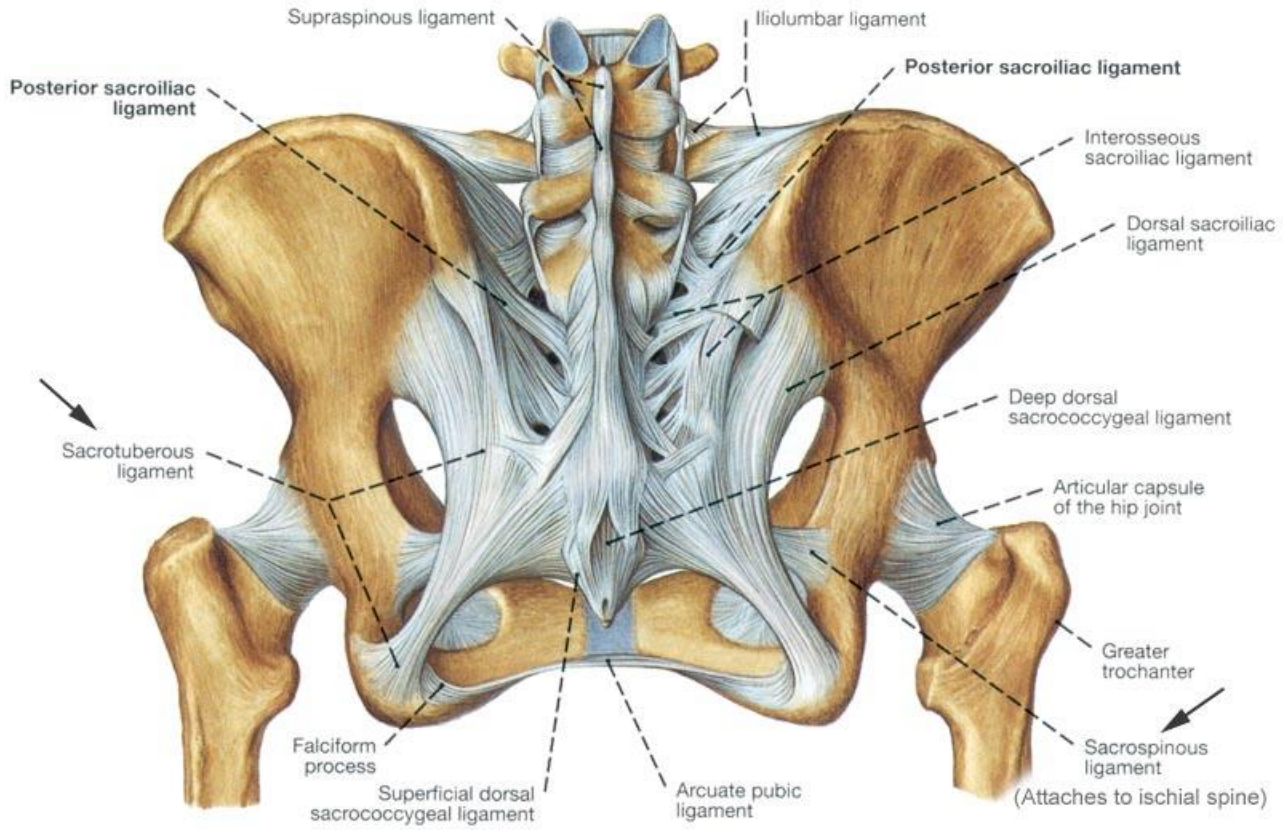
# Superior Apeture

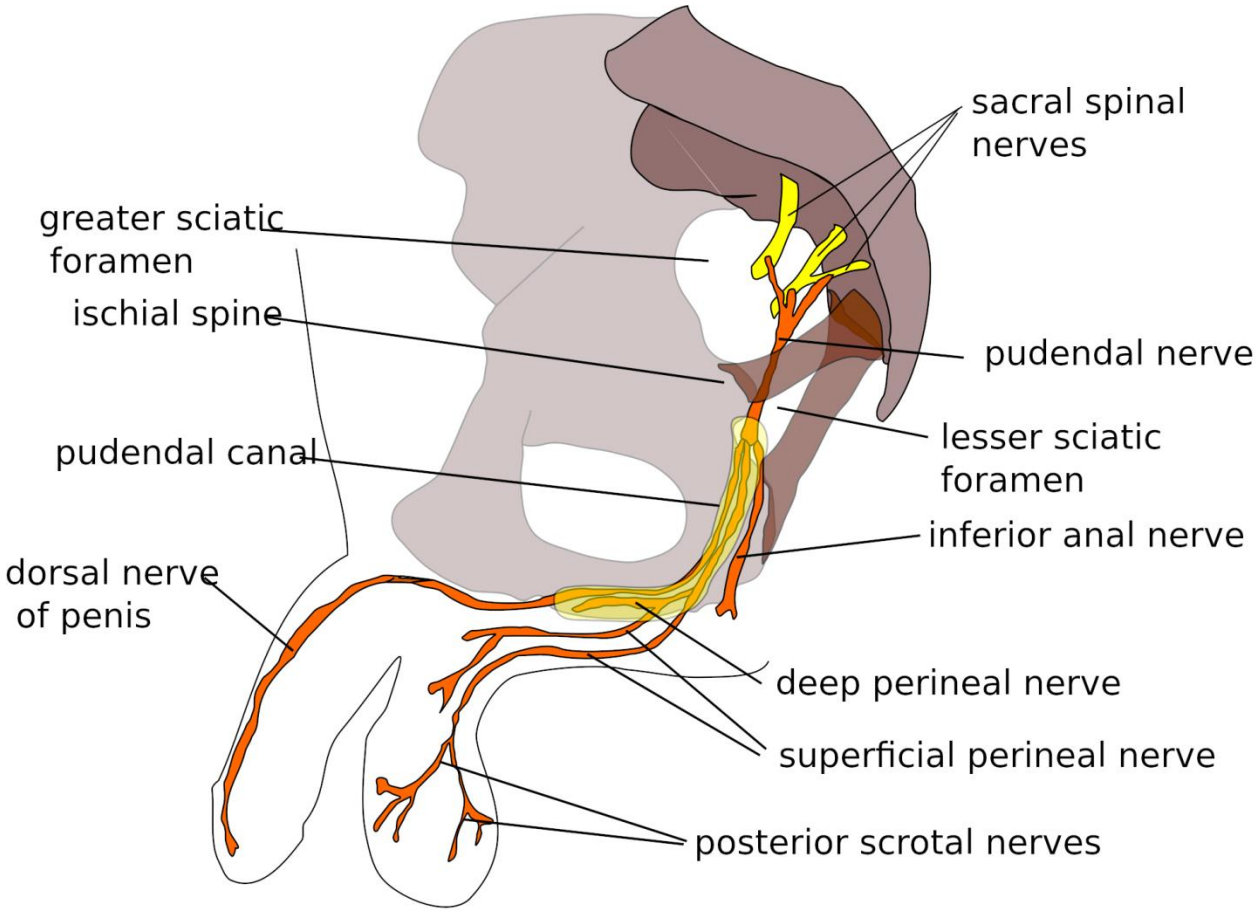


# Pelvis and Ligaments, Vertical Cross Section, Female

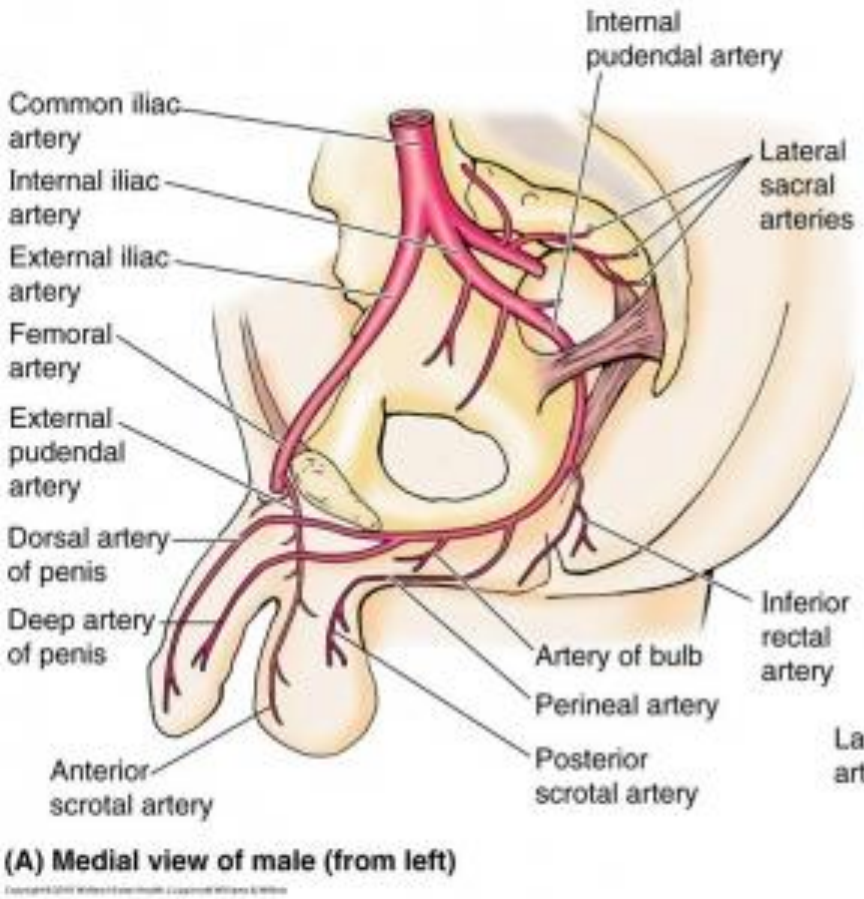


# Pelvis and Ligaments, Rear View, Female

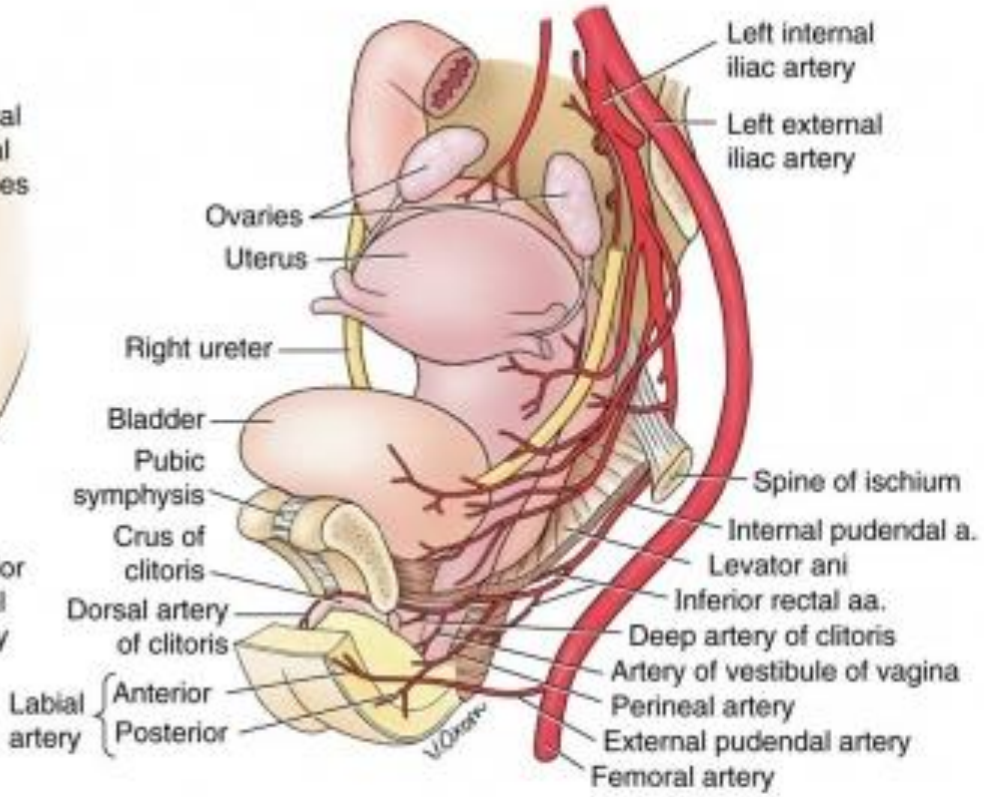



sacral spinal nerves
greater sciatic foramen
ischial spine
pudendal nerve
pudendal canal
lesser sciatic foramen
inferior anal nerve
dorsal nerve of penis
deep perineal nerve
superficial perineal nerve
posterior scrotal nerves

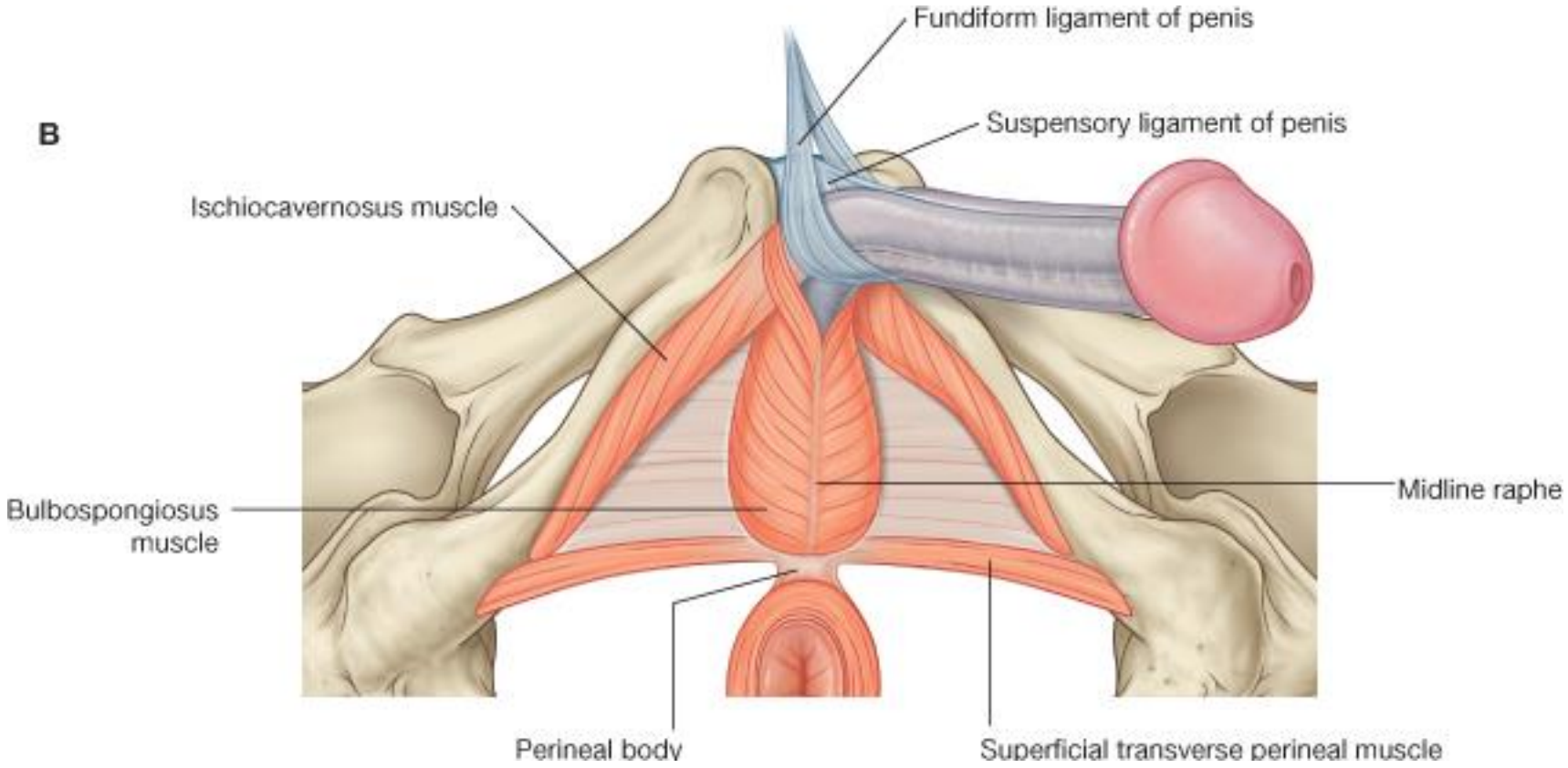
# فروع الشريان الفرجي الباطن
# المستقيمي السفلي,ظهري للقضيب, العميق للقضيب,بصلة القضيب,,العجاني,صفني خ

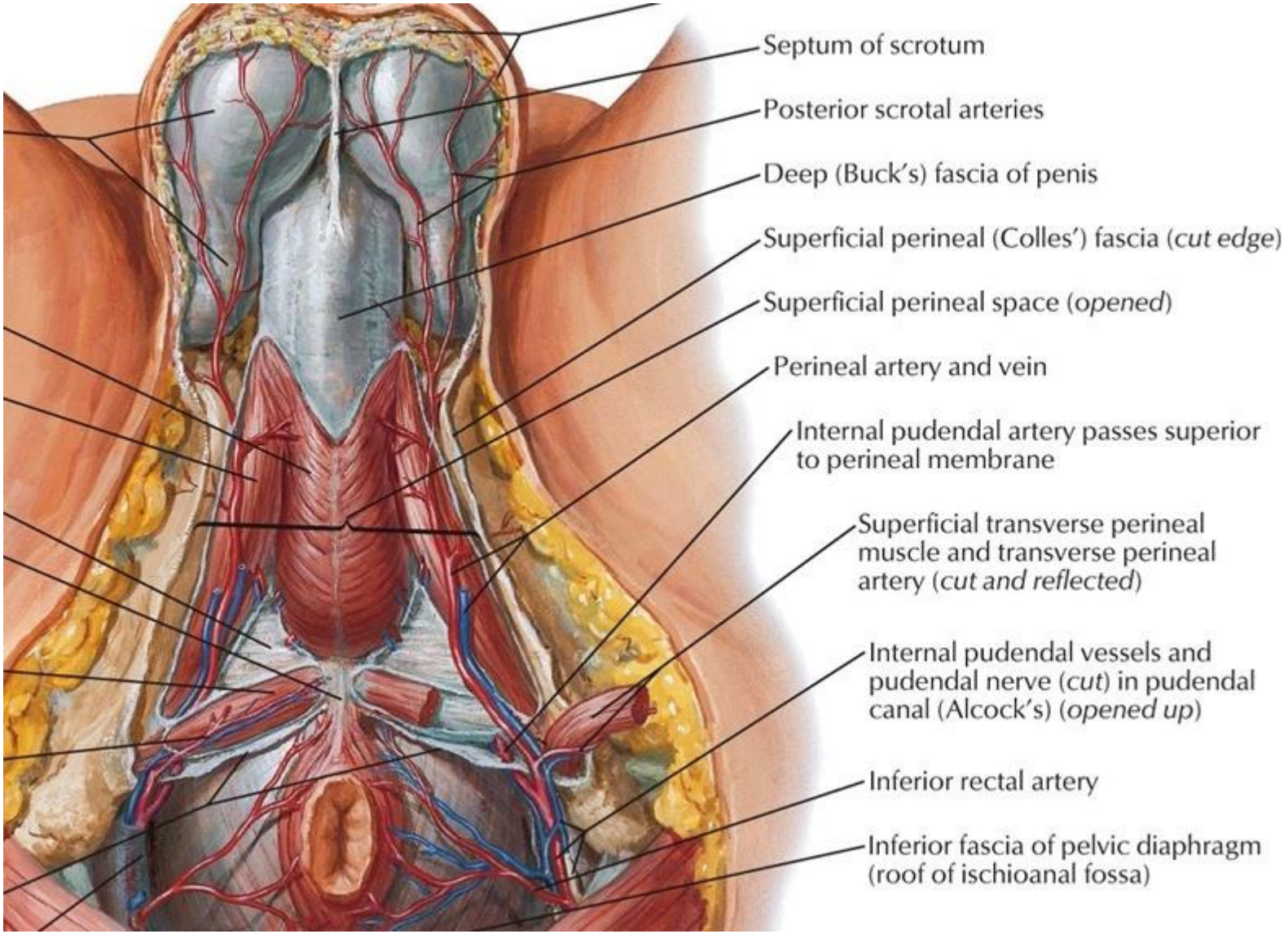



(A) Medial view of male (from left)

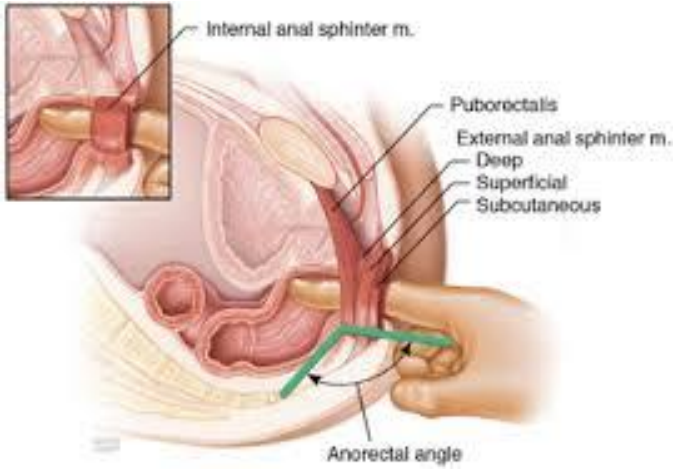



(B) Left anterolateral view of female


B
Fundiform ligament of penis
Suspensory ligament of penis
Ischiocavernosus muscle
Bulbospongiosus muscle
Midline raphe
Perineal body
Superficial transverse perineal muscle


Septum of scrotum
Posterior scrotal arteries
Deep (Buck's) fascia of penis
Superficial perineal (Colles') fascia (*cut edge*)
Superficial perineal space (*opened*)
Perineal artery and vein
Internal pudendal artery passes superior to perineal membrane
Superficial transverse perineal muscle and transverse perineal artery (*cut and reflected*)
Internal pudendal vessels and pudendal nerve (*cut*) in pudendal canal (Alcock's) (*opened up*)
Inferior rectal artery
Inferior fascia of pelvic diaphragm (roof of ischioanal fossa)

**المس الشرجي:يتم أثناء الفحص السريري بإدخال سبابة الفاحص عبر الشرج وفيه نتحرى مقوية المصرات الشرجية وكشف الأورام أو السليلات وضخامة والموثة,وتحري الرتج المستقيمي المثاني,والمستقيمي الرحمي**



# بعض آفات الشرج الشائعة

**البواسير**

**هي ثنية(حلمة) من الغشاء المخاطي وتحت المخاطي تحتوي على روافد وريدية متوسعة وفرع شرياني إنتهائي .**

**وهي آفة كثيرة الشيوع ,ويقدر أن نصف البشر فوق الخمسين لديهم بواسير.**

**تصنف البواسير حسب توضعها إلى بواسير باطنة وأخرى ظاهرة:**

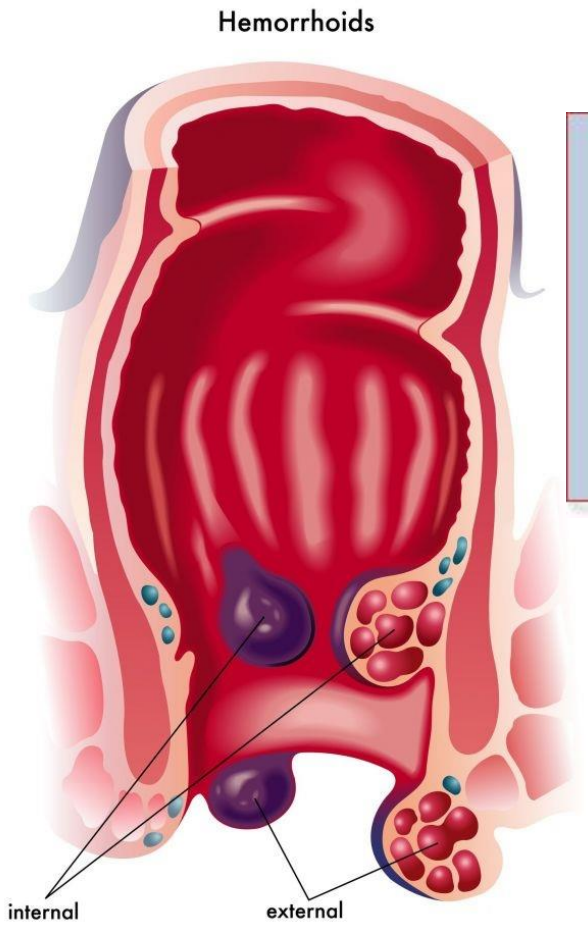
**البواسير الباطنة:تتوضع فوق الخط المسنن وروافدها الوريدية تصب في الوريد المستقيمي العلوي وشريانها فرع من الشريان المستقيمي العلوي,تتوضع عادة عند الساعة3 و7 و11 بالوضعية العجانية(وضعية بضع المثانة lithotomy position) وتصنف سريريا إلى أربع درجات:**

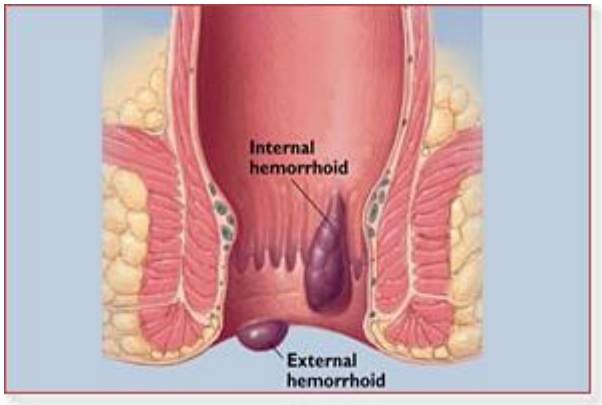
**الدرجة الأولى:محصورة ضمن القناة الشرجية.**

**الدرجة الثانية:تنسدل خارج القناة الشرجية أثناء التغوط ثم تعود تلقائيا.**

**الدرجة الثالثة:تنسدل خارج القناة الشرجية أثناء التغوط ولاتعود إلا بالرد اليدوي.**

**الدرجة الرابعة:منسدلة دوما.**


Hemorrhoids
internal
external


Internal hemorrhoid
External hemorrhoid

The distal end of the hindgut terminates as a blind sac of entoderm called the **cloaca** (see Fig. 7.8). The cloaca lies in contact with a shallow ectodermal depression called the **proctodeum.** The apposed layers of ectoderm and entoderm form the **cloacal membrane,** which separates the cavity of the hindgut from the surface (see Fig. 7.8). The cloaca becomes divided into anterior and posterior parts by the **urorectal septum;** the posterior part of the cloaca is called the **anorectal canal.** The anorectal canal forms the rectum and the upper half of the anal canal. The lining and that of the inferior half of the anal canal is formed from the ectoderm of the proctodeum (see Fig. 7.8). The sphincters of the anal canal are formed from the surrounding mesenchyme. The posterior part of the cloacal membrane breaks down so that the gut opens onto the surface of the embryo.

**Imperforate Anus**

About 1 child in 4000 is born with imperforate anus caused by an imperfect fusion of the entodermal cloaca with the proctodeum.

## Superficial Fascia

The superficial fascia of the urogenital triangle can be divided into a fatty layer and a membranous layer.

The **fatty layer** (fascia of Camper) is continuous with the fat of the ischiorectal fossa (Fig. 8.12) and the superficial fascia of the thighs. In the scrotum, the fat is replaced by smooth muscle, the **dartos muscle.** The dartos muscle contracts in response to cold and reduces the surface area of the scrotal skin (see testicular temperature and fertility, page 131).

The **membranous layer** (Colles' fascia) is attached posteriorly to the posterior border of the urogenital diaphragm (see Fig. 8.12) and laterally to the margins of the

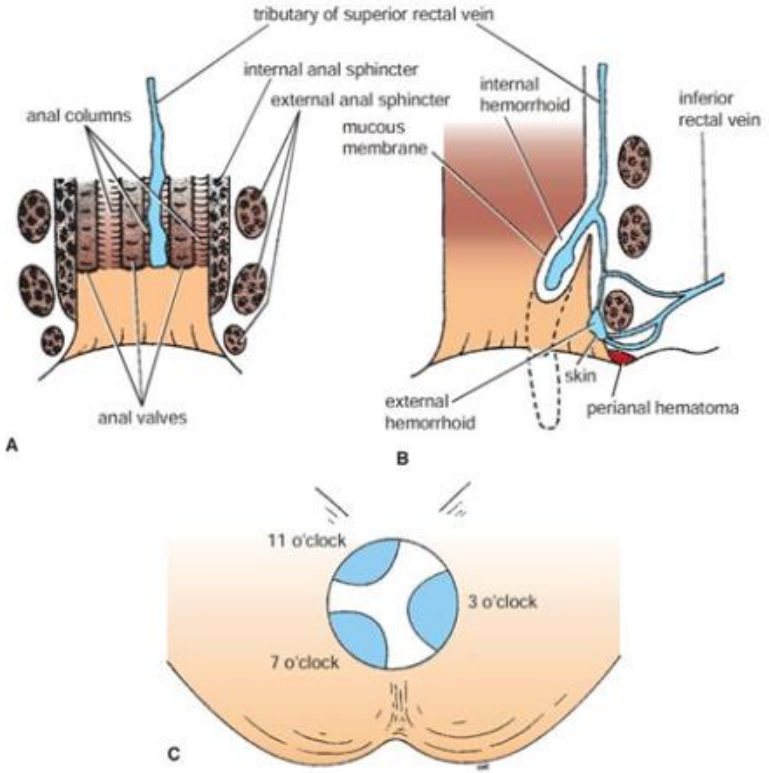
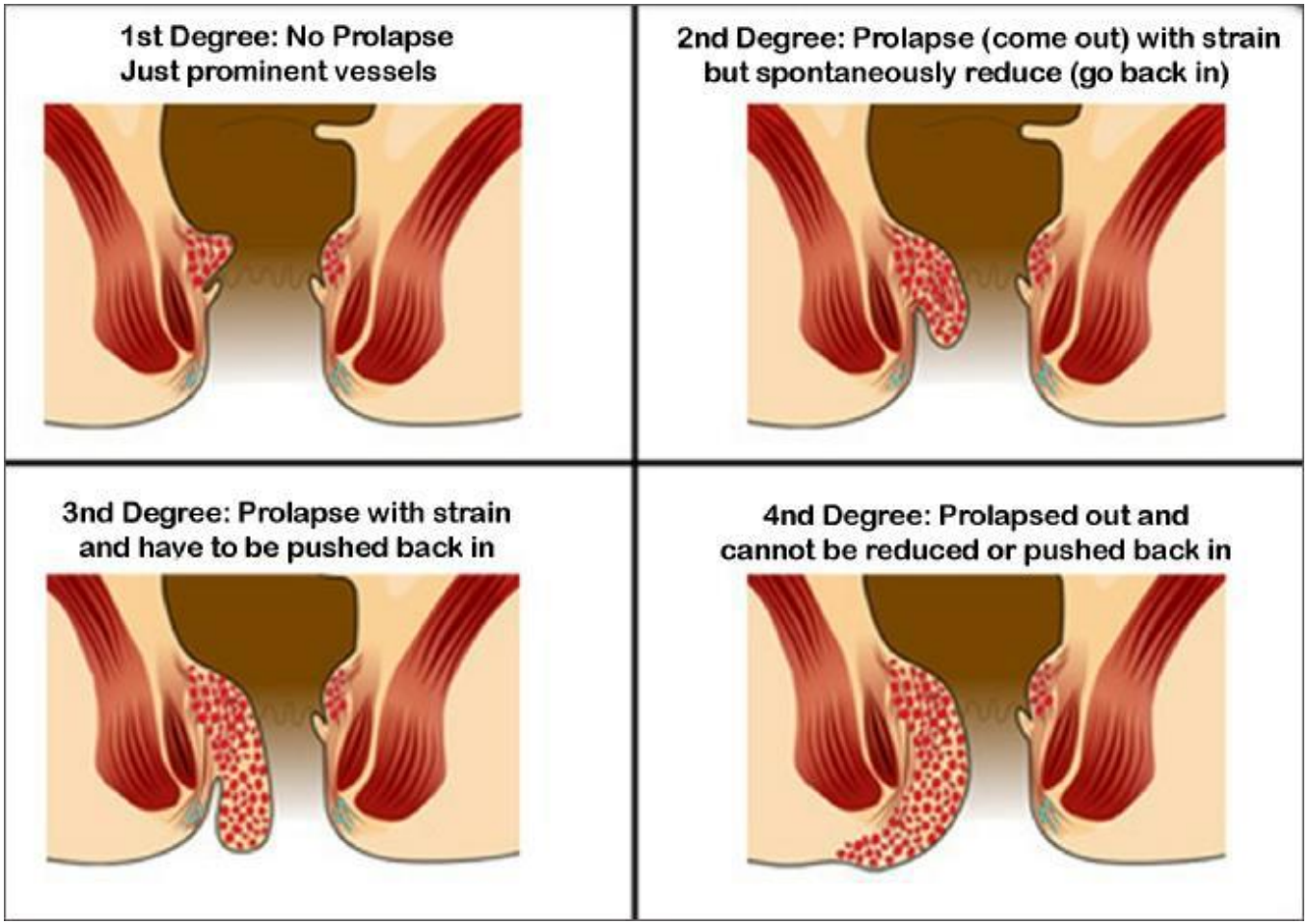



**FIGURE 8.9** **A.** Normal tributary of the superior rectal vein within the anal column. **B.** Varicosed tributary of the superior rectal vein forming the internal hemorrhoid. Dotted lines indicate degrees of severity of condition. **C.** Positions of three internal hemorrhoids as seen through a proctoscope with the patient in the lithotomy position.


1st Degree: No Prolapse
Just prominent vessels
2nd Degree: Prolapse (come out) with strain
but spontaneously reduce (go back in)
3nd Degree: Prolapse with strain
and have to be pushed back in
4nd Degree: Prolapsed out and
cannot be reduced or pushed back in

**البواسير الظاهرة:تتوضع تحت الخط المسنن وروافدها الوريدية تسير على حافة الشرج وتصب في الوريد المستقيمي السفلي,تتغطى بالغشاء المخاطي للنصف السفلي للقناة الشرجية أوالجلد,ومن الشائع ترافقها مع بواسير باطنة.**

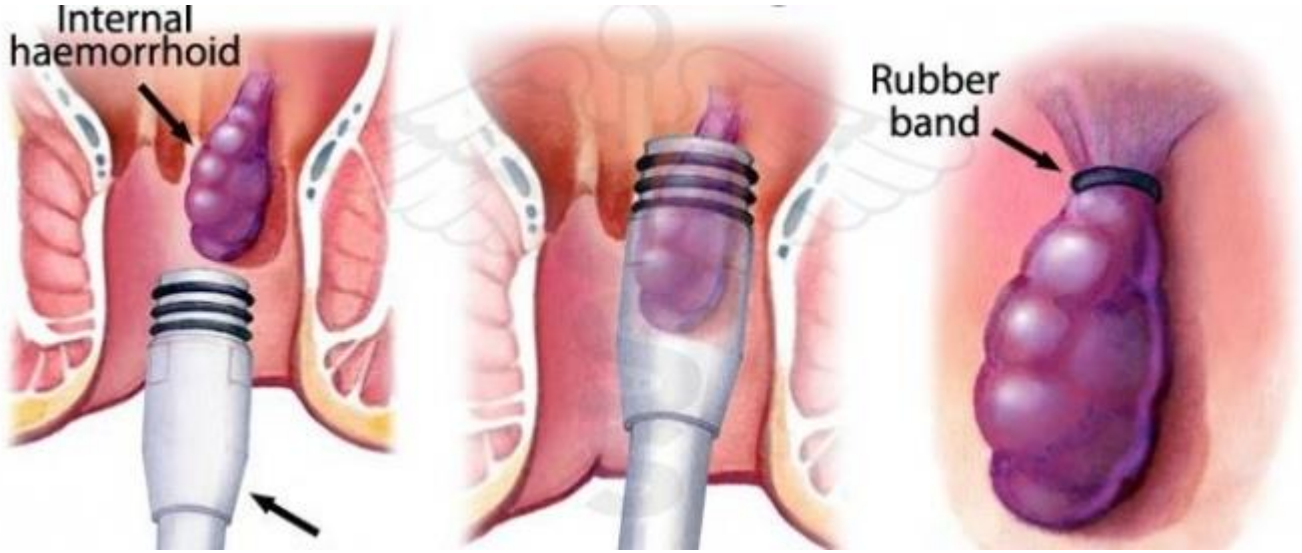
**العلاج:**

**يجب معالجة السبب إذا كان موجودا,ويختلف العلاج حسب درجة البواسير.**

**أولا:العلاج الدوائي:**

**ثانيا:علاجات أخرى:**

**1.الربط بالشريط المطاطيrubber band ligation**



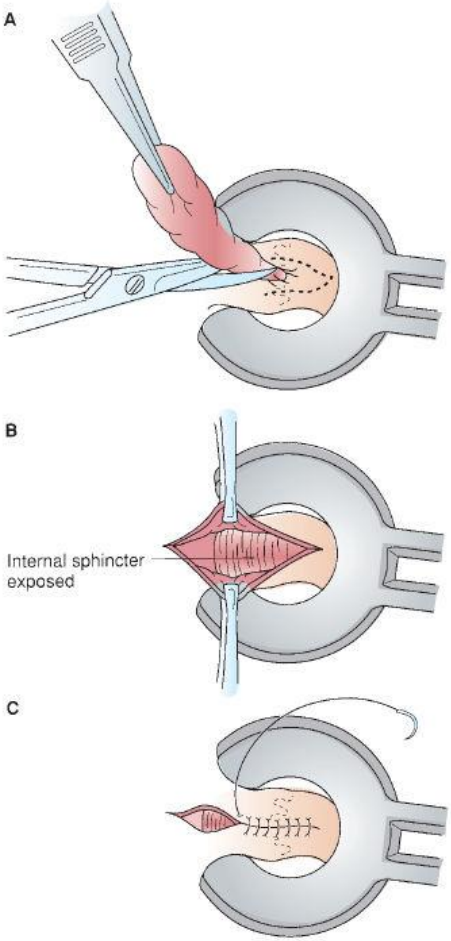
## التخثير الضوئي بالأشعة تحت الحمراء Infrared Photocoagulation.

.المُعالَجَةُ بالتَّصْلِيبsclerotherapy

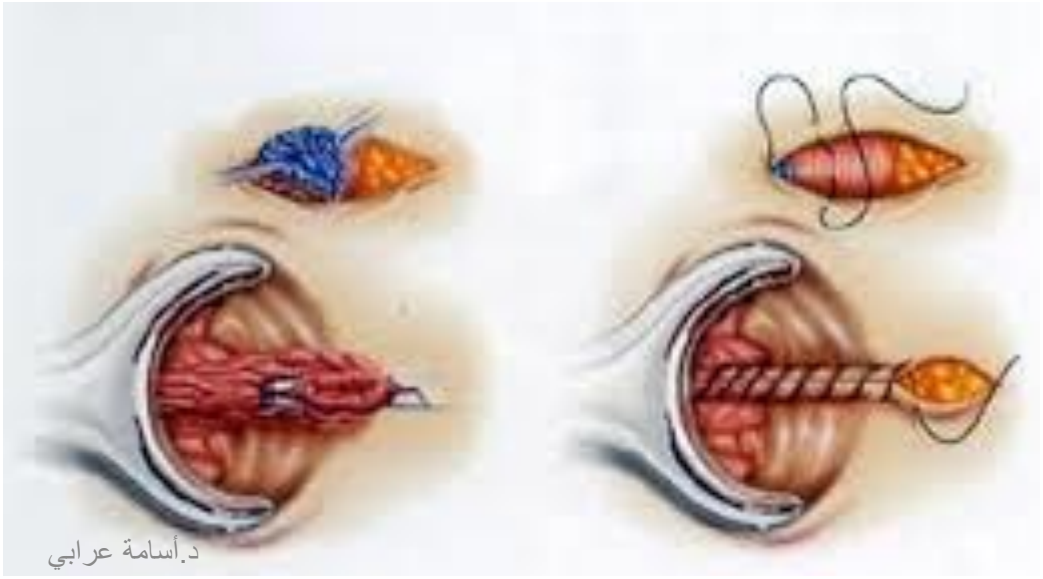
4.المعالجة بالتبريدcryotherapy:بتطبيق الآزوت السائل على الحلمة

ثانيا:العلاج الجراحي:لبواسير الدرجة الرابعة ولبواسير الدرجة الثالثة الكبيرة أو التي لم تستجب للعلاج المحافظ ,كما تجرى الجراحة للبواسير المختلطة كنزف غزيرأو اختناق,أو خثرة(في البواسير الظاهرة),وهناك عدة وسائل:

# الجراحة التقليدية.



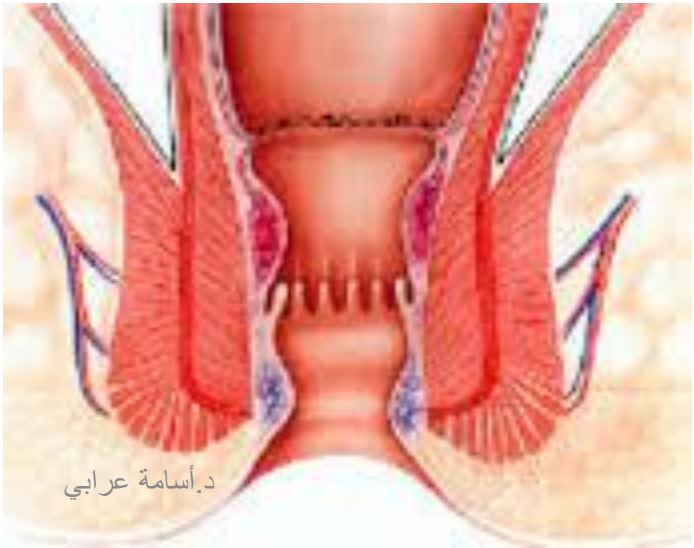
# Hemorrhoidectomy





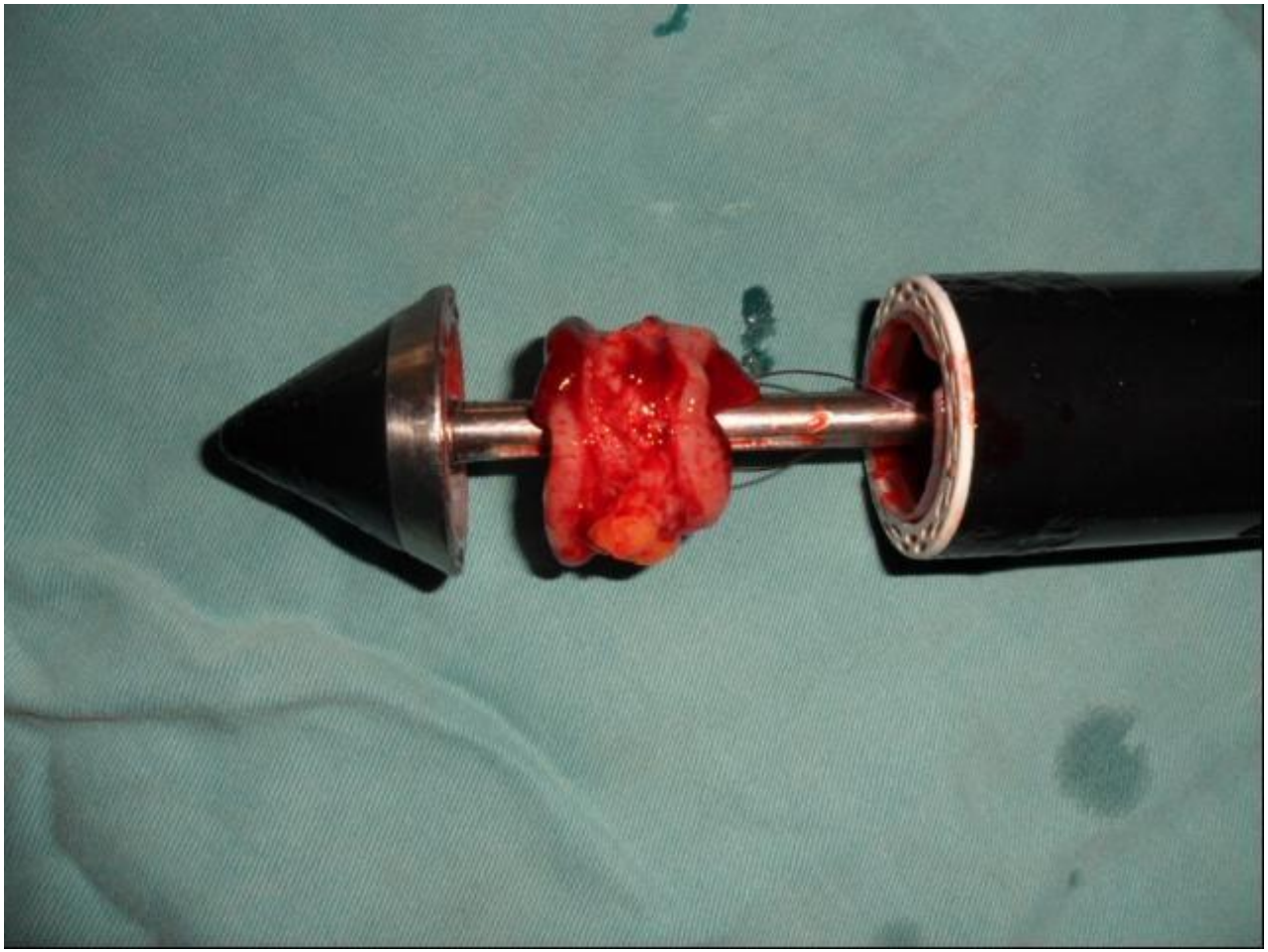
د.أسامة عرابي

# 2.الجراحة بـ المُـَرزِز Stapler



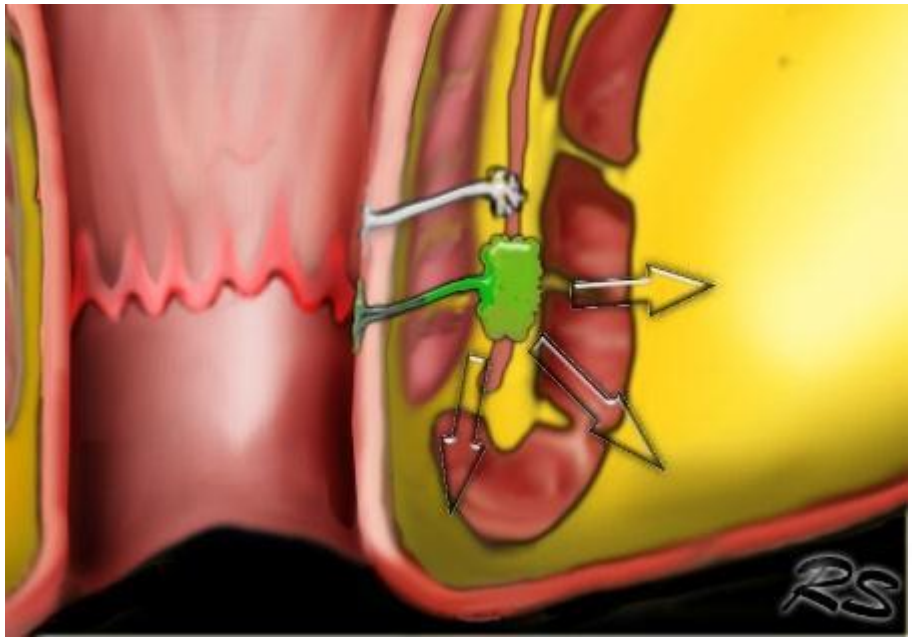


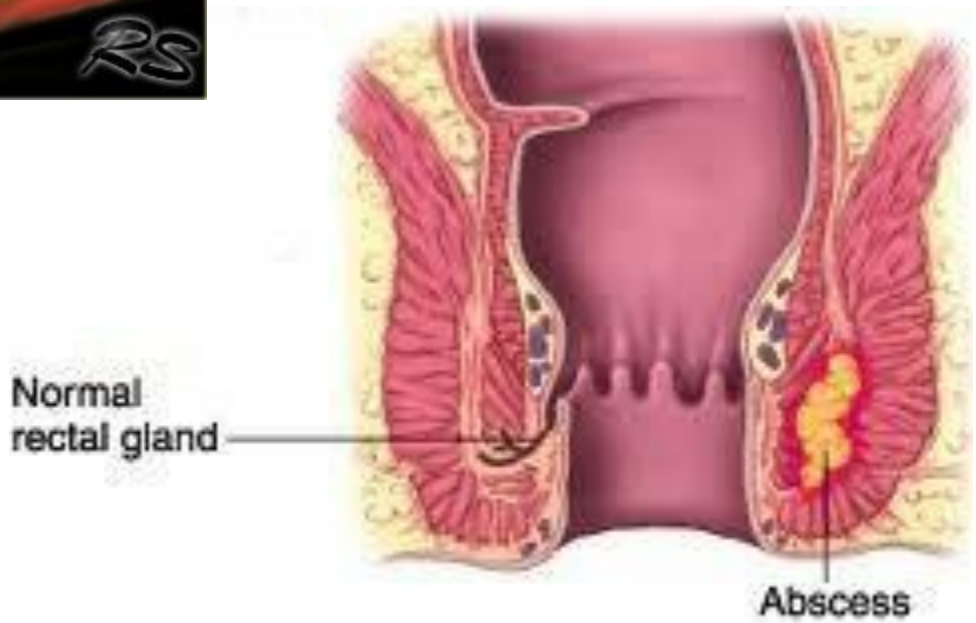
د.أسامة عرابي

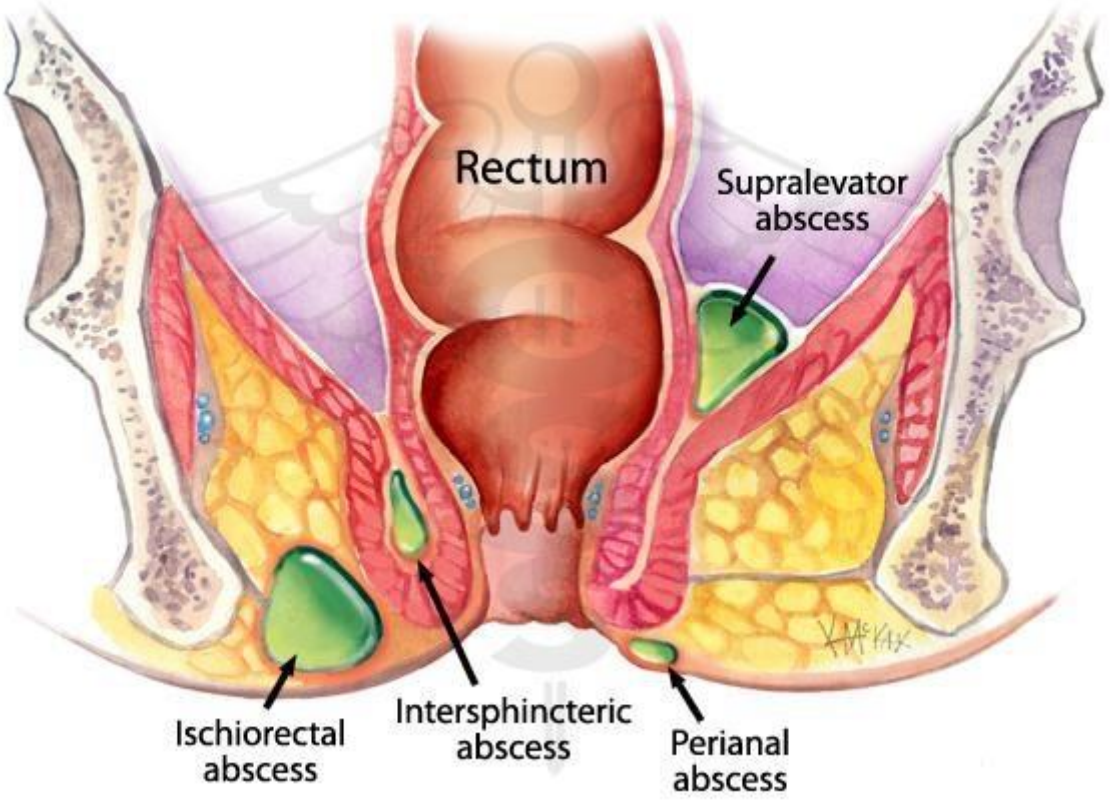


**الشق الشرجي**
**قرحة متطاولة في الغشاء المخاطي للقناة الشرجية,**
**العلاج:**
**أولا:العلاج المحافظ أو غير الجراحي:**
**للشق الحديث(حاد)والذي لم يمضي على حدوثه شهر:**
**ثانيا:العلاج الجراحي:**
**للشق المزمن(مضى على حدوثه أكثر من شهر**

- **الإنتانات حول الشرج:**
- **1.الخراج حول الشرج:**
- **تنشأ الإنتانات في القناة الشرجية غالبا في الغدد الشرجية, يتطور الإنتان إلى خراج الإختلاطات: التنوسر ويحصل في نصف الحالات.**
- **العلاج:الشق الجراحي.ويجب ألا نننتظر علامة التموج فهي غالبا علامة متأخرة هنا.**




Normal
rectal gland
Abscess


Rectum
Supralevator abscess
Ischiorectal abscess
Intersphincteric abscess
Perianal abscess

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- .النواسير حول الشرج:وهي من اختلاطات الخراجات وعلاجها جراحي
- الناسور بشكل عام هو مجرى بين سطحين بشروبين,له فتحة بدئية حيث نشأ وفتحة ثانوية حيث يصب