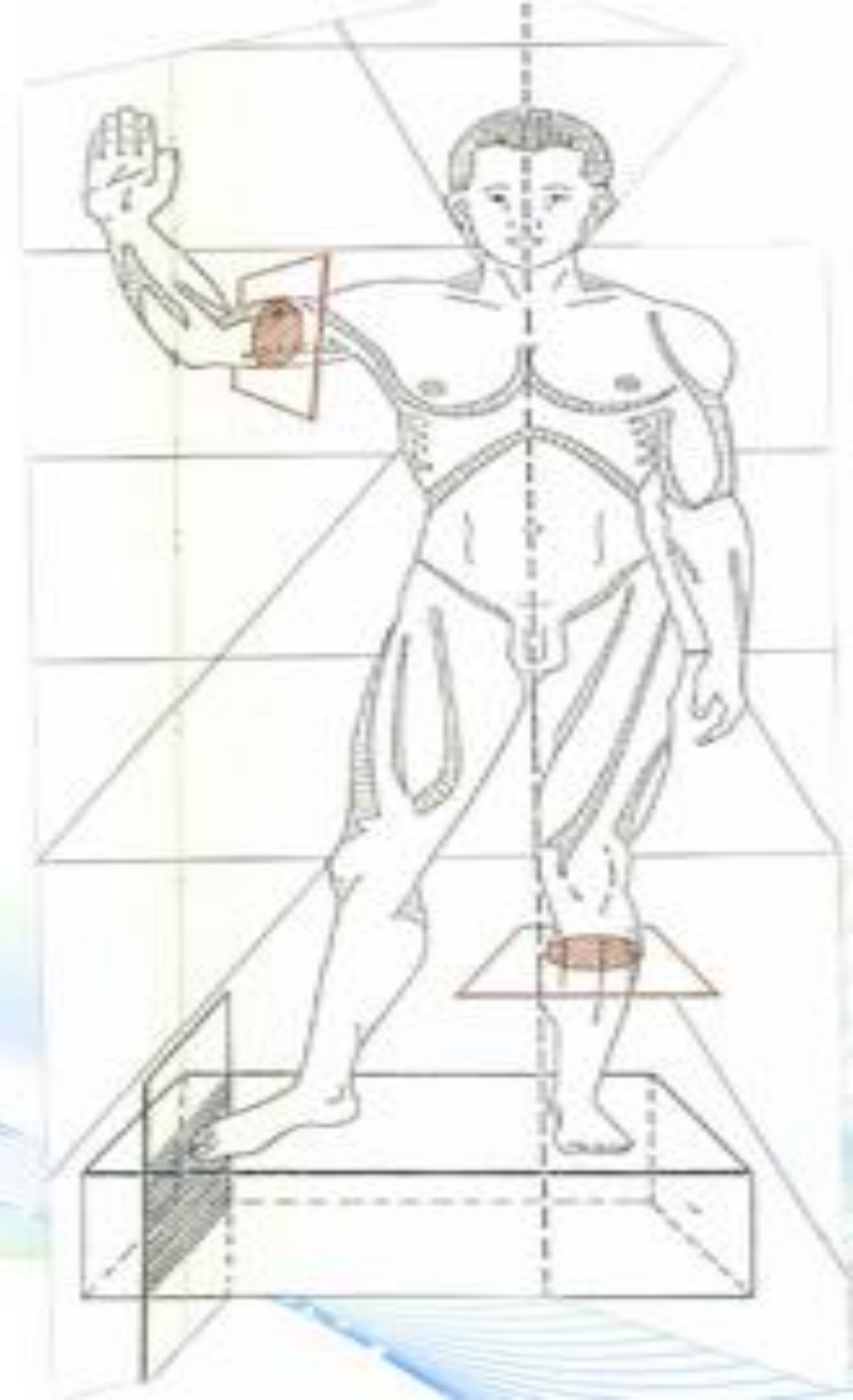


# ABDOMINAL CAVITY





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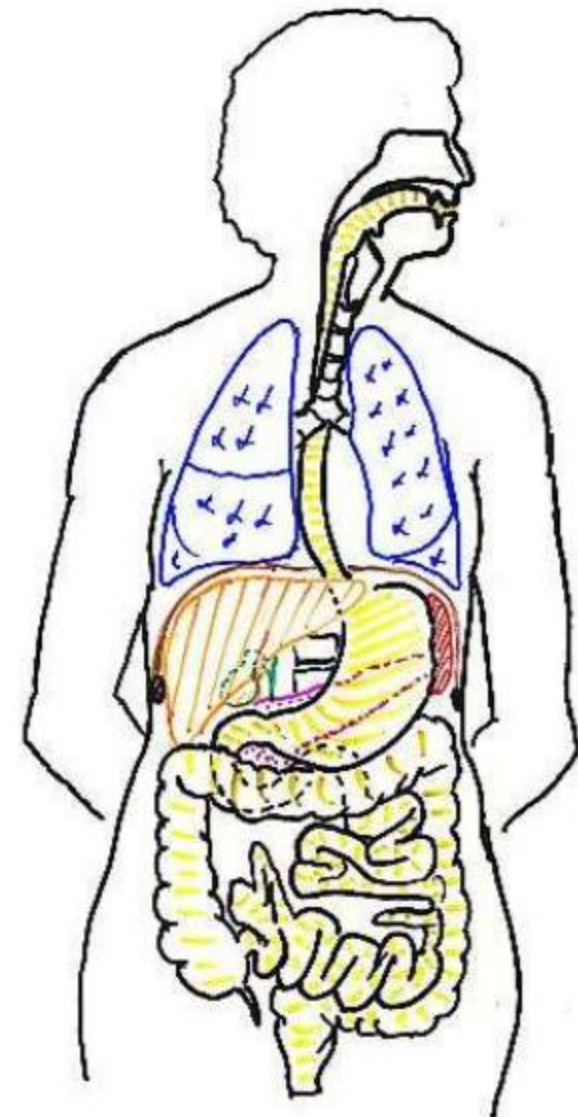
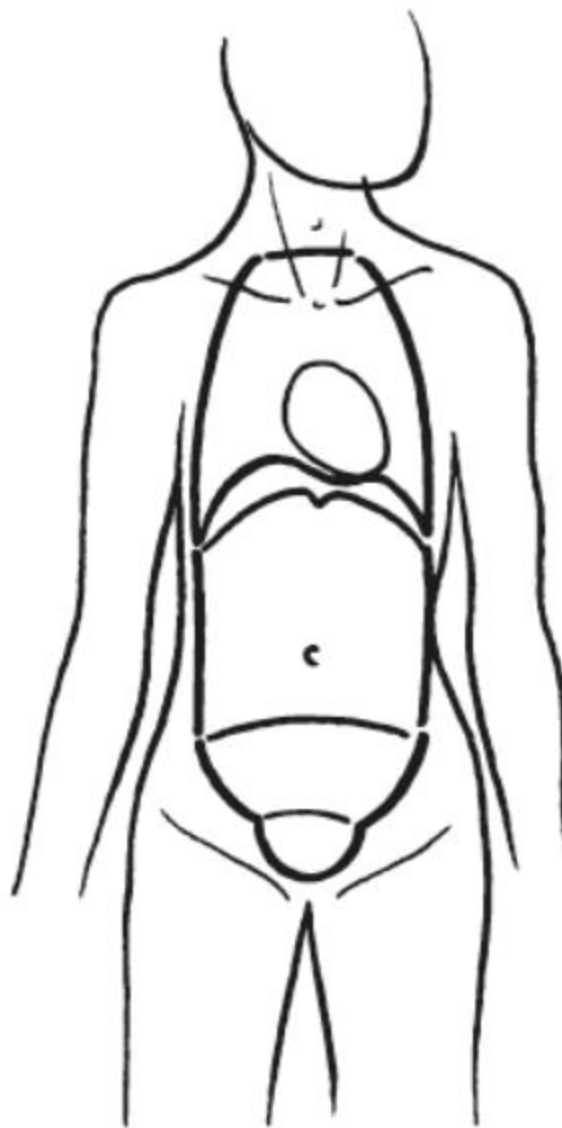
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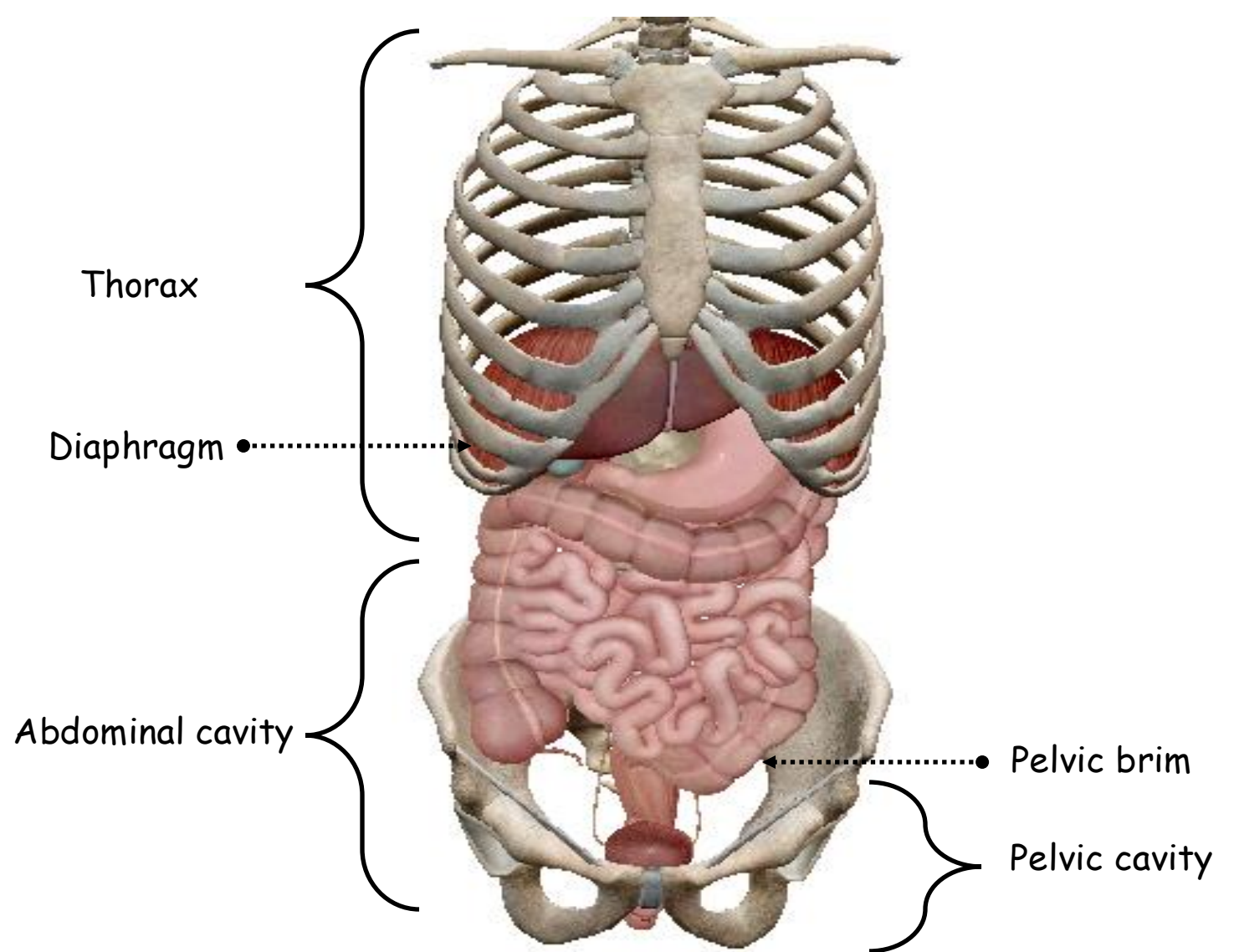
## VII. CONCLUSION





# I. INTRODUCTION

- Trunk: columnar cavity
- Divided by the thoracoabdominal diaphragm
- Above the diaphragm: thorax covered by the thoracic wall
- Below the diaphragm: abdominal cavity covered by the anterior and posterior abdominal walls
- Below the pelvic brim is the pelvic cavity
- The latter can be distinguished from the abdominal cavity proper
- Closed below by the pelvic diaphragm
- The abdominal cavity contains the digestive and urogenital viscera

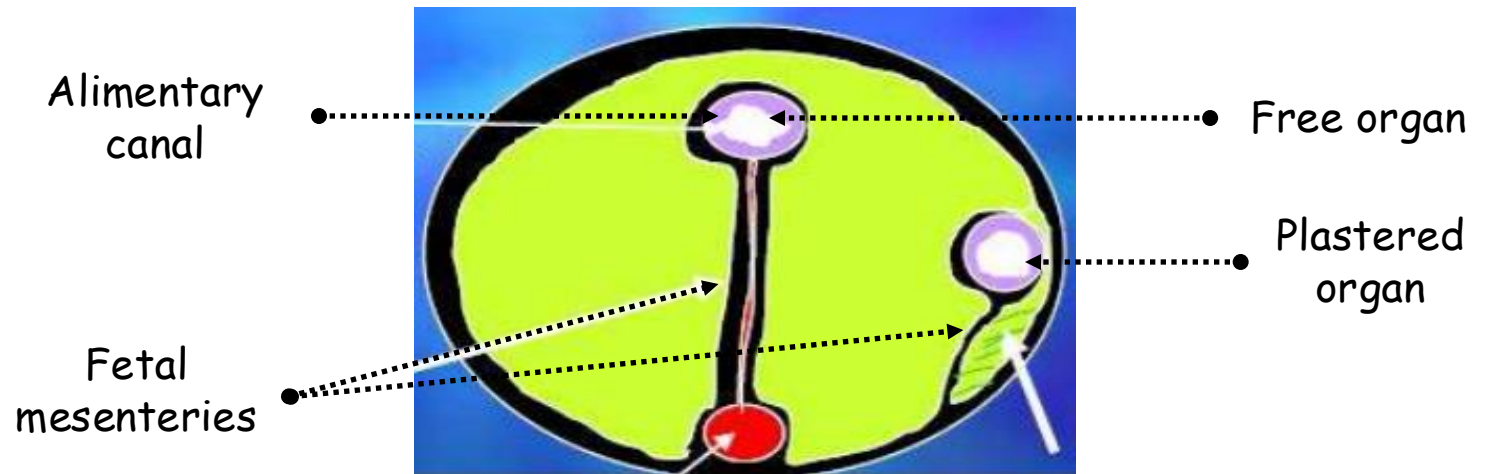


ANTERIOR VIEW OF THE TRUNK

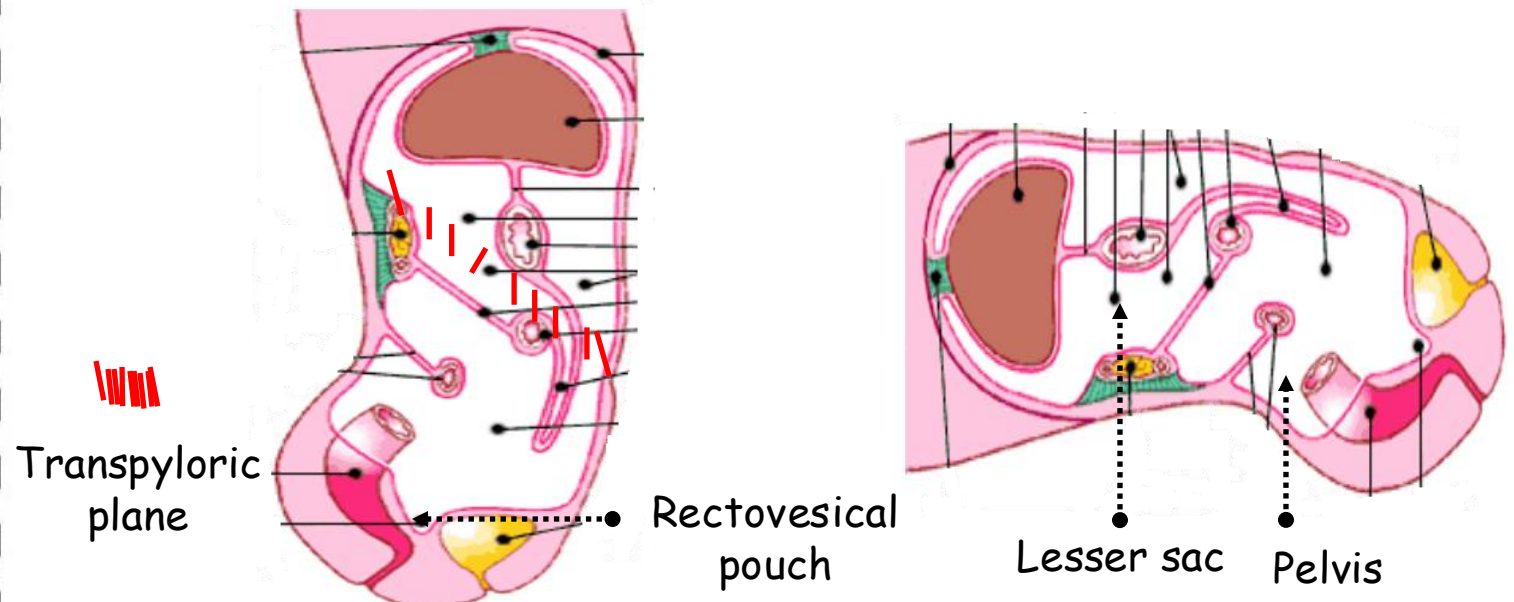


## II. GENERAL TOPOGRAPHY OF THE ABDOMEN

- Result of **fusion** of adjacent leaves of **fetal mesenteries** surrounding the **alimentary canal** and its derivatives
- **Uneven investment:**
  - **Free** organs
  - **Plastered** organs
- **Transpyloric plane**
- **Enclosed in men**
- Communicates with **uterine tubes** in **women**
- **Declining points:**
  - **Rectovesical** pouch in **men**
  - **Rectouterine** pouch in **women**
  - **Lesser sac**
  - **Pelvis**



### SCHEMATIC OVERVIEW OF THE UNEVEN INVESTMENT OF VISCERA BY FETAL MESENTERIES

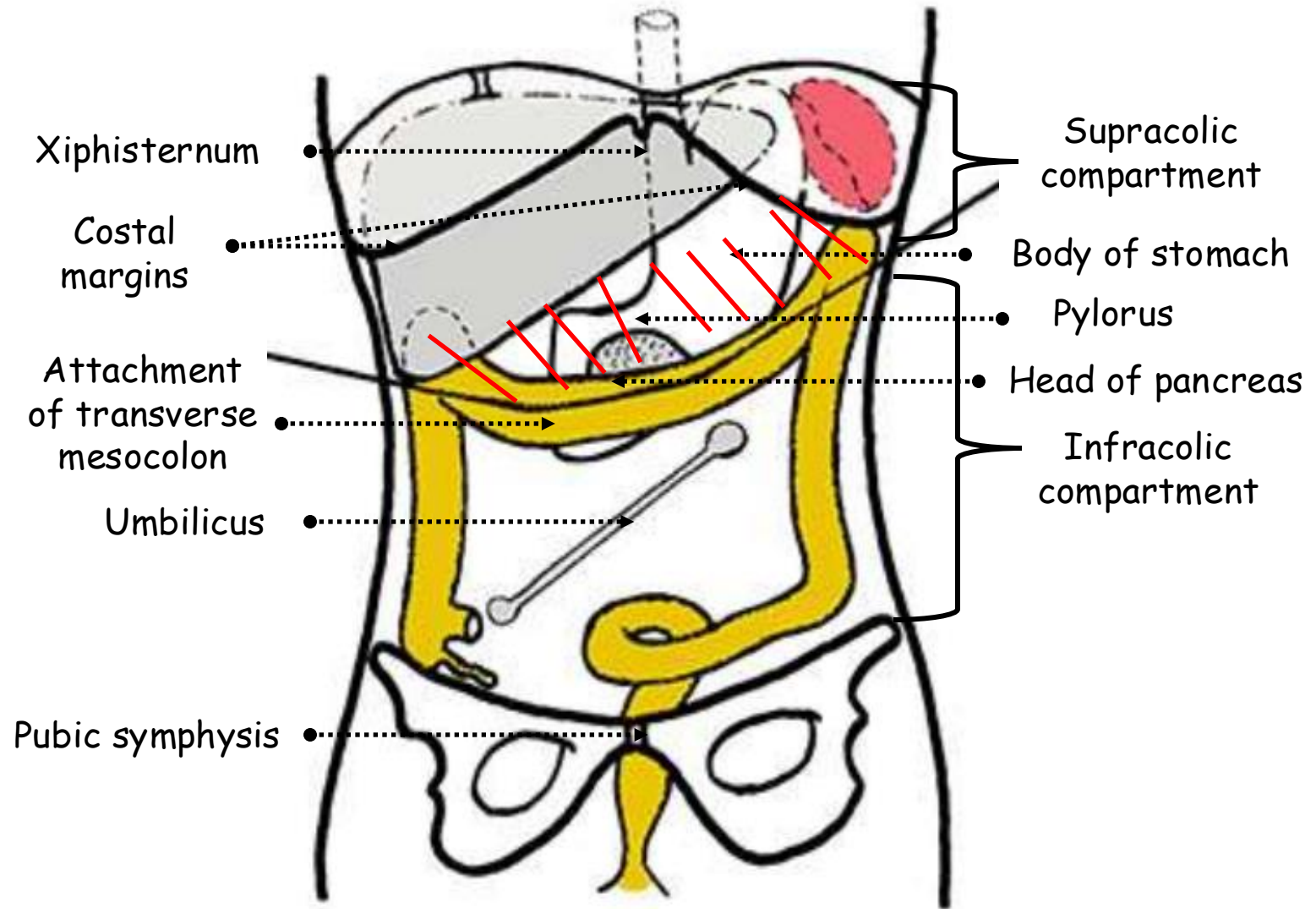


### SCHEMATIC SAGITTAL VIEW OF THE ABDOMINAL CAVITY STANDING UP AND LYING DOWN



## • Transpyloric plane:

- Between the jugular notch and the pubic symphysis
- Midway between the xiphisternum and the umbilicus
- About a handsbreadth below the xiphisternal joint
- Cuts each costal margin at the tip of the ninth costal cartilage
- Right: fundus of gall bladder
- Left: body of the stomach
- Lower border of L1 vertebra
- Pylorus over the front of the head of pancreas
- Passes just above the attachment of the transverse mesocolon
- Supracolic compartment
- Infracolic compartment



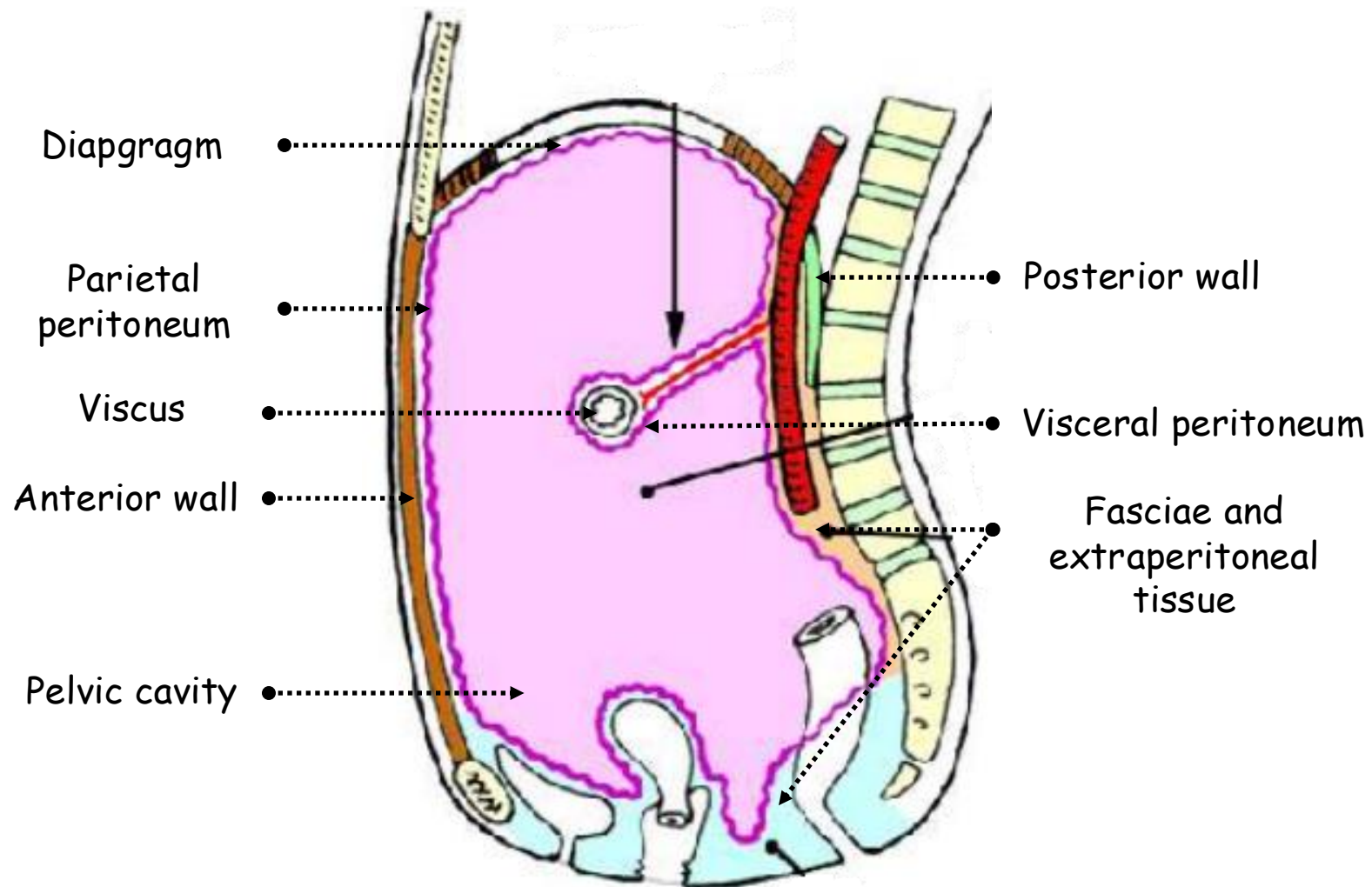
Transpyloric plane

SCHEMATIC ANTERIOR VIEW OF THE ABDOMINAL CAVITY  
SHOWING THE TRANSPYLORIC PLANE



### III. PERITONEUM

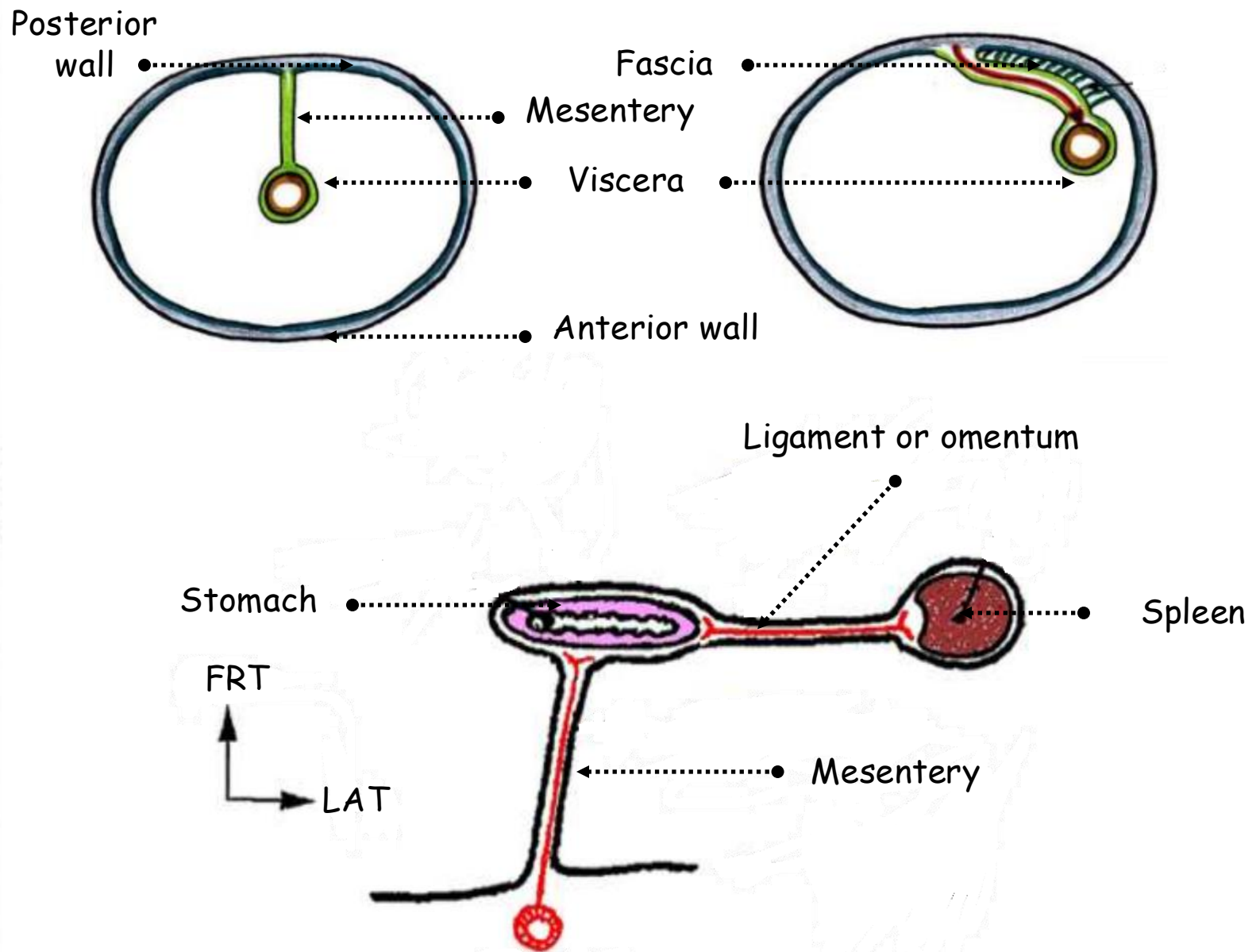
- Serous membrane which lines the abdominal cavity
- **Parietal peritoneum:**
  - Anterior and posterior walls
  - Under surface of diaphragm
  - Pelvic cavity
- **Visceral peritoneum:**
  - Partial or complete investment for viscera
  - Serous covering for viscera
- Single layer of flattened cells, mesothelium, overlying areolar tissue
- Fasciae: drape extraperitoneal tissue
- Firm anchorage of viscera undisturbed by the movements of contraction of the underlying muscles



**SCHEMATIC SAGITTAL SECTION OF THE ABDOMINAL CAVITY  
SHOWING THE PERITONEUM**



- **Peritoneal folds:**
  - Reflexions of peritoneum that connect viscera to the abdominal walls or to one another
  - Ligaments
  - Mesenteries
  - Omenta
- Small intestine: mesentery
- Transverse colon: transverse mesocolon
- Sigmoid colon: sigmoid mesocolon
- Appendix: mesoappendix

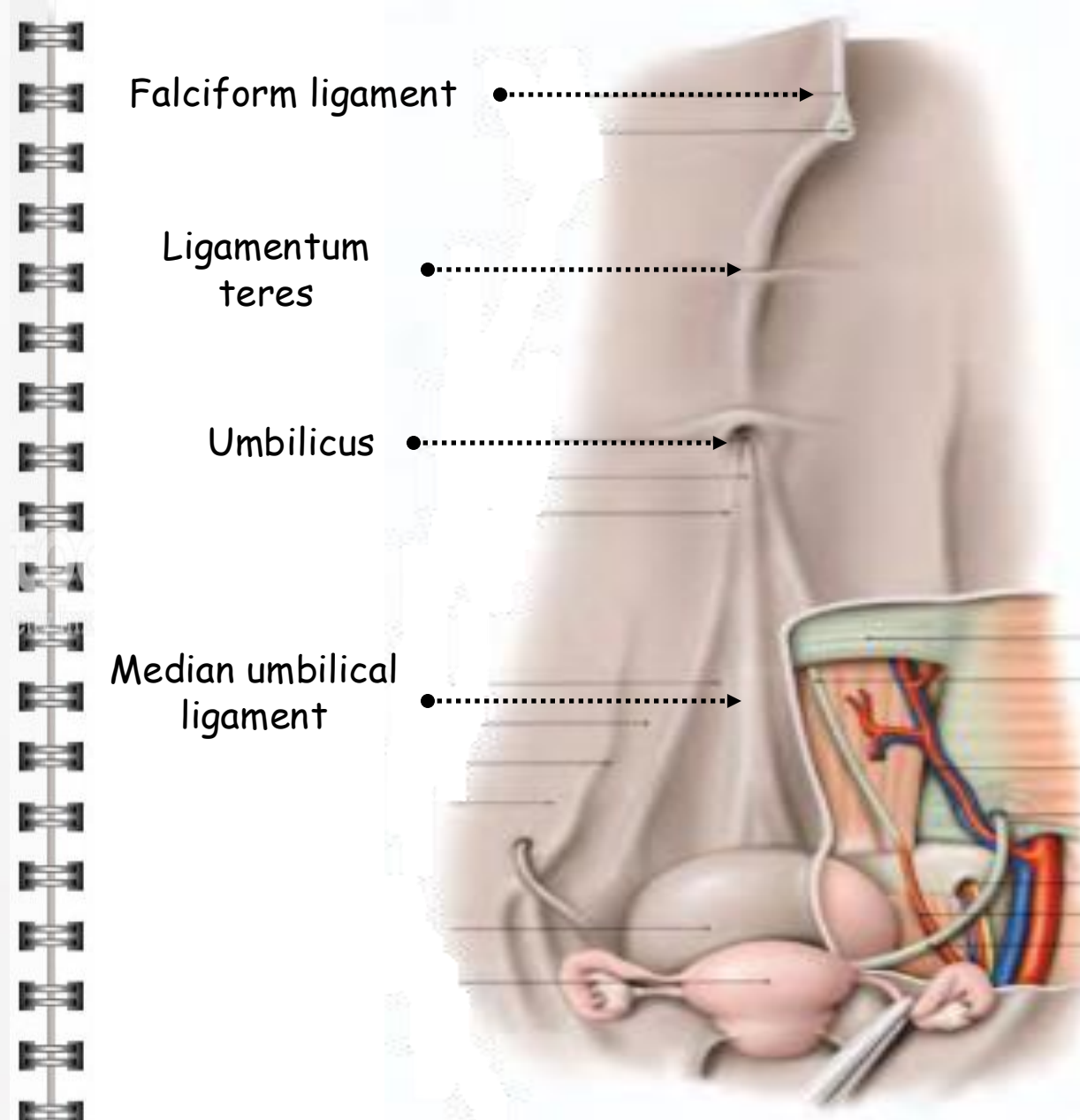


**SCHEMATIC HORIZONTAL SECTIONS OF THE ABDOMINAL CAVITY SHOWING PERITONEAL FOLDS**



## A. LIGAMENTS

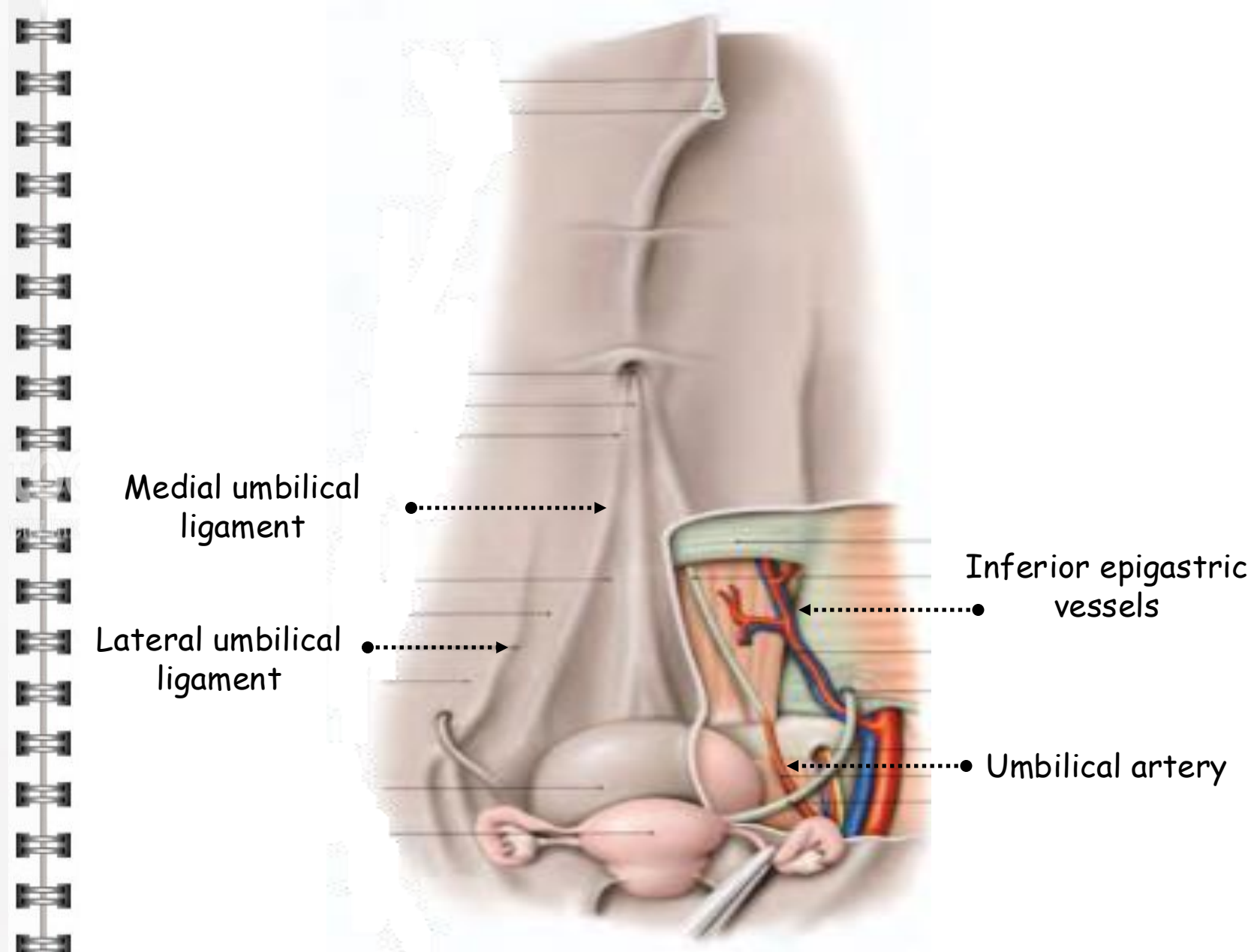
- **Posterior surface of the anterior abdominal wall:**
  - 6 folds
  - 1 above and 5 below the umbilicus
- **Falciform ligament:**
  - Passes upwards from the umbilicus behind the linea alba towards the xiphisternum
  - Contains in its posterior and slightly crescentic free margin the ligamentum teres
- **Median umbilical ligament:** urachus



POSTERIOR VIEW OF THE PARIETAL PERITONEUM OF THE ANTERIOR ABDOMINAL WALL



- **2 medial umbilical ligaments:**
  - On each side of the median umbilical ligament
  - Remains of obliterated umbilical arteries
- **2 lateral umbilical ligaments:**
  - Further laterally
  - Inferior epigastric vessels
  - Not as far as umbilicus



POSTERIOR VIEW OF THE PARIETAL PERITONEUM OF THE ANTERIOR ABDOMINAL WALL

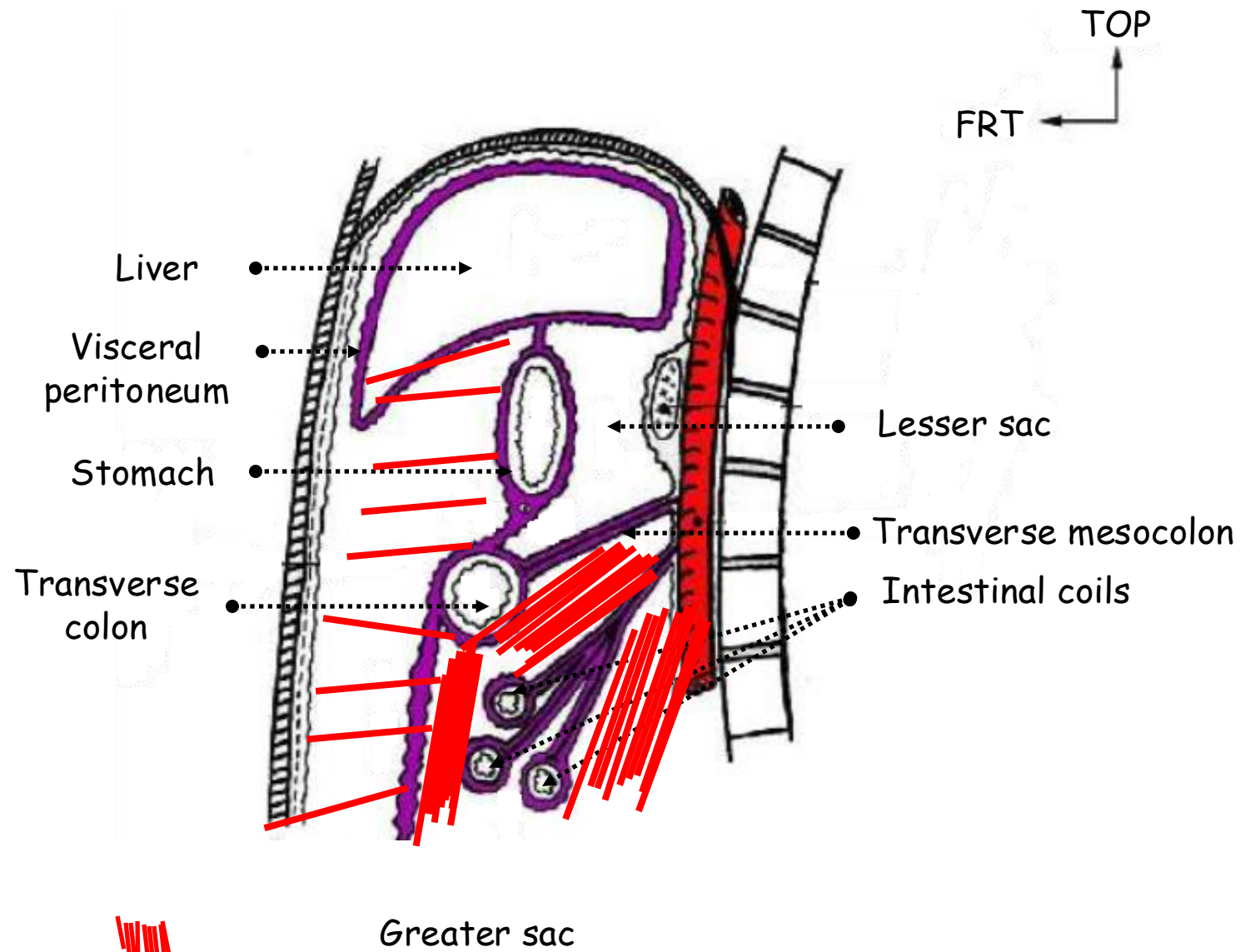


## B. SACS

- **Peritoneal cavity:**

-Potential space containing only a few millilitres of tissue fluid which lubricates adjacent surfaces

-Greater sac

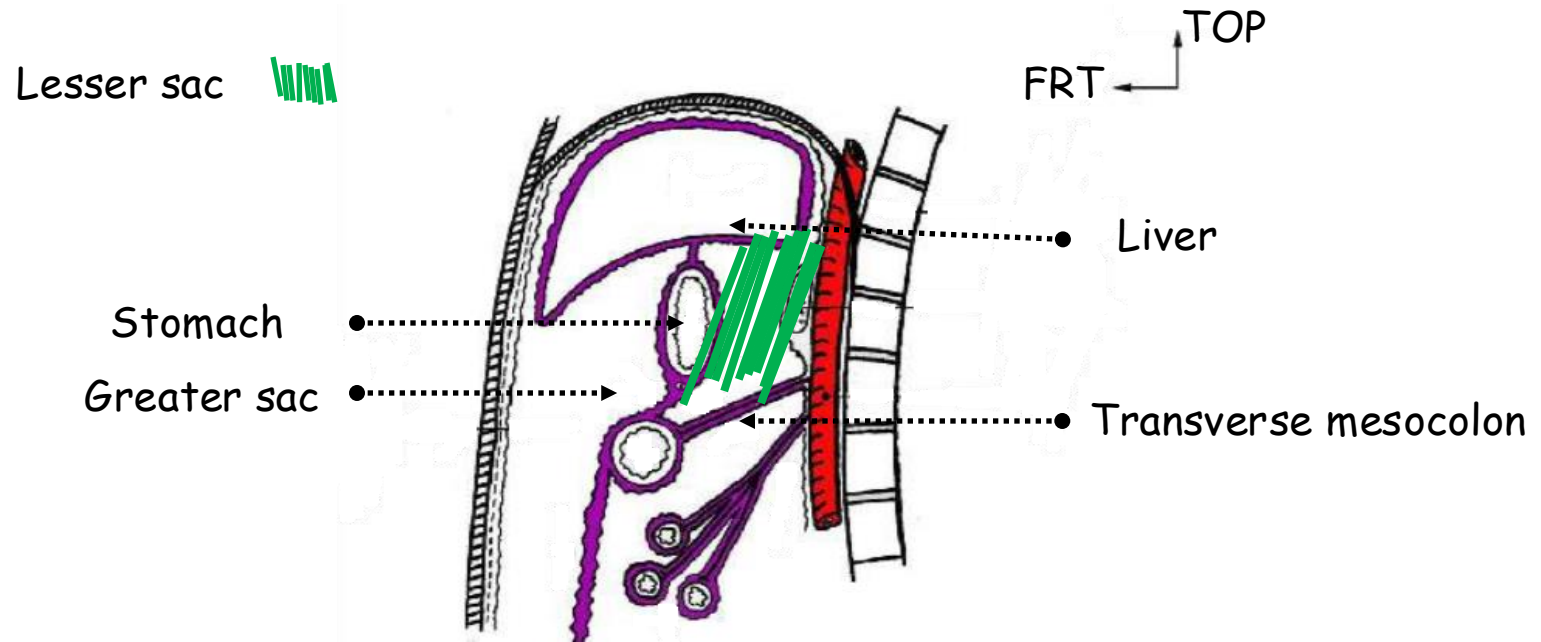


## SCHEMATIC SAGITTAL SECTION OF THE ABDOMINAL CAVITY SHOWING THE GREATER AND LESSER SACS

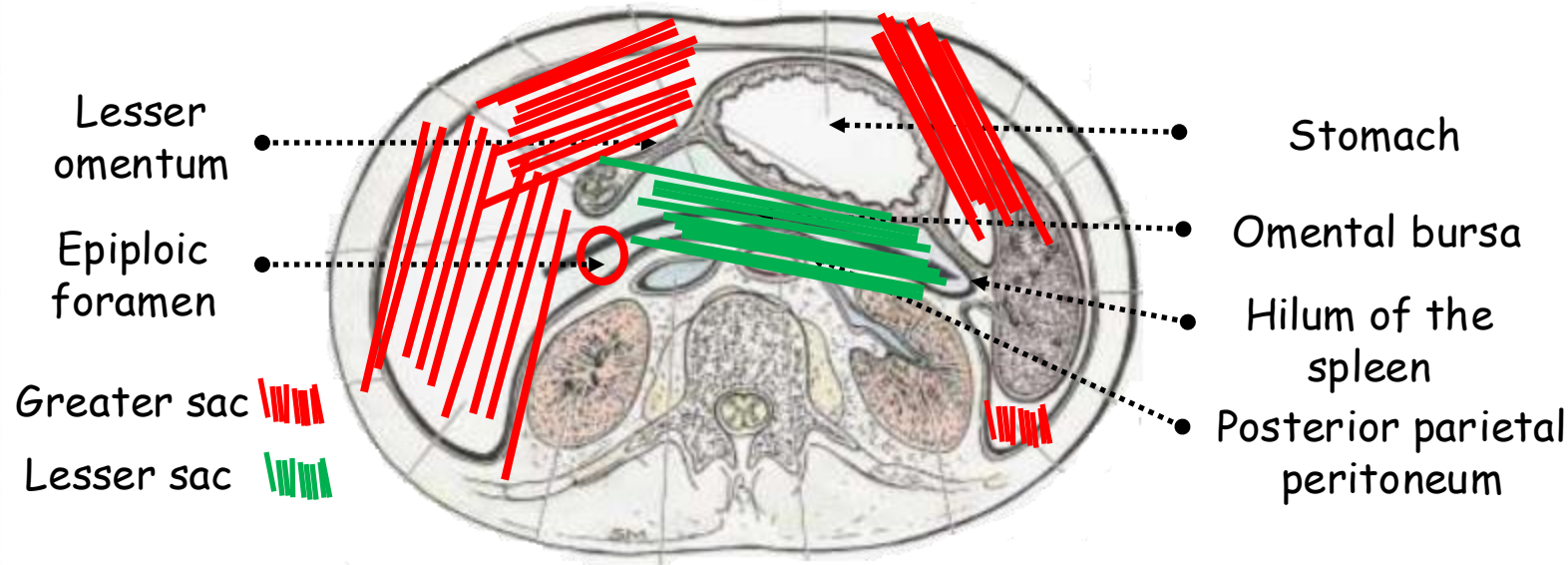


## • Lesser sac:

- Omental bursa
- Diverticulum behind the stomach
- Provides a slippery surface for the posterior surface of the stomach
- Opens into the greater sac through the epiploic foramen
- Anterior wall: lesser omentum and stomach
- Posterior wall: peritoneum of the posterior wall
- Left edge: hilum of the spleen
- Right edge: epiploic foramen
- Roof: peritoneum covering the caudate lobe of the liver
- Floor: transverse mesocolon



SCHEMATIC SAGITTAL SECTION OF THE ABDOMINAL CAVITY  
SHOWING THE GREATER AND LESSER SACS



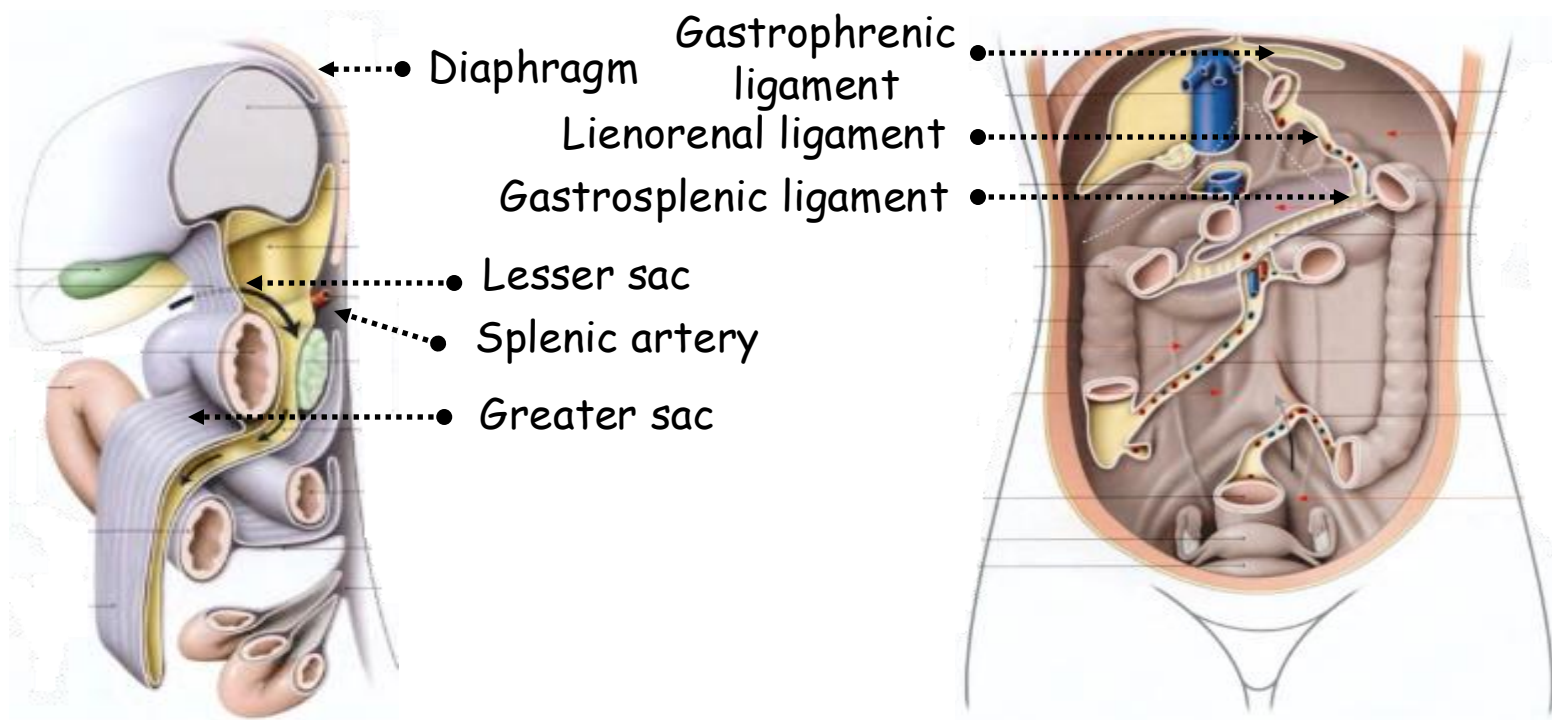
HORIZONTAL SECTION OF THE ABDOMINAL CAVITY



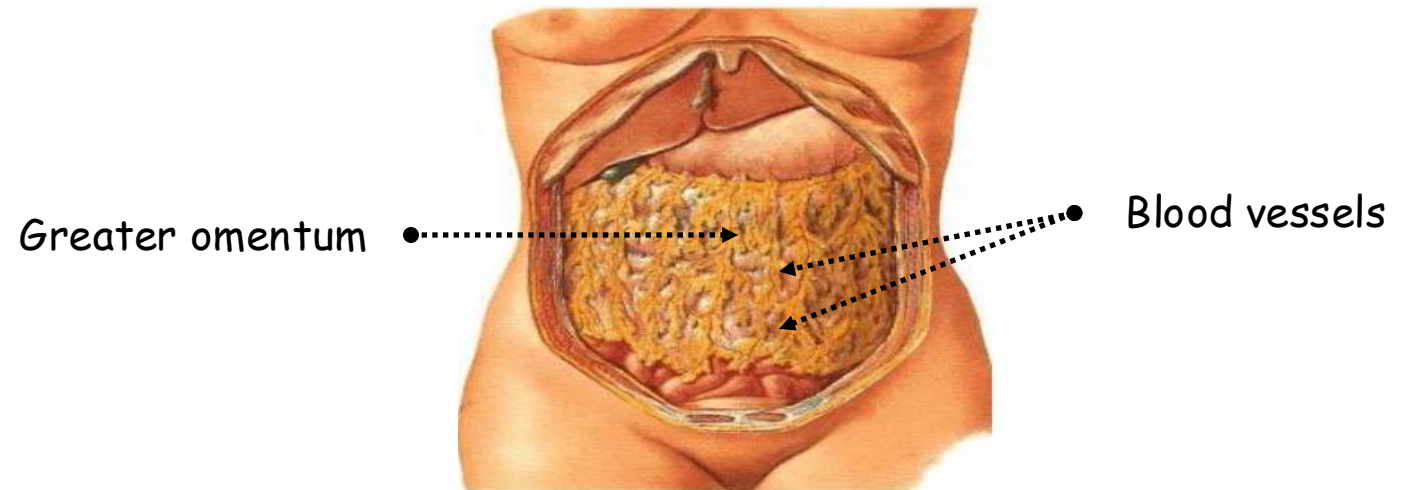
## C. OMENTA

### • **Greater omentum:**

- Most obvious peritoneal structure
- Vascular apron
- Translucent or filled with fat
- Two closely-applied layers of peritoneum enclosing blood vessels and lymphatics
- Posterior layer: in the lesser sac
- Anterior layer: in the greater sac
- Reach the hilum of the spleen forming the gastrosplenic and lienorenal ligaments
- Reach the diaphragm forming the gastrophrenic ligament
- Gastrocolic omentum: immediately below the stomach



SAGITTAL AND FRONTAL VIEWS OF THE ABDOMINAL CAVITY  
SHOWING THE GREATER OMENTUM (FROM KAMINA)

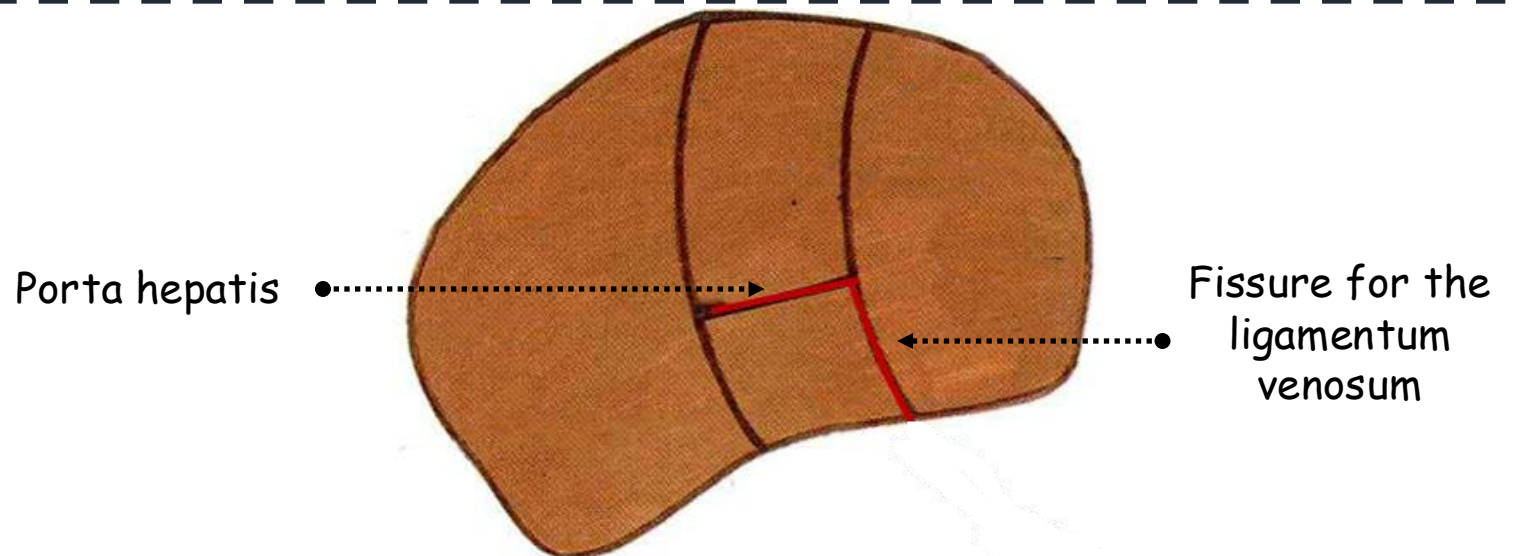
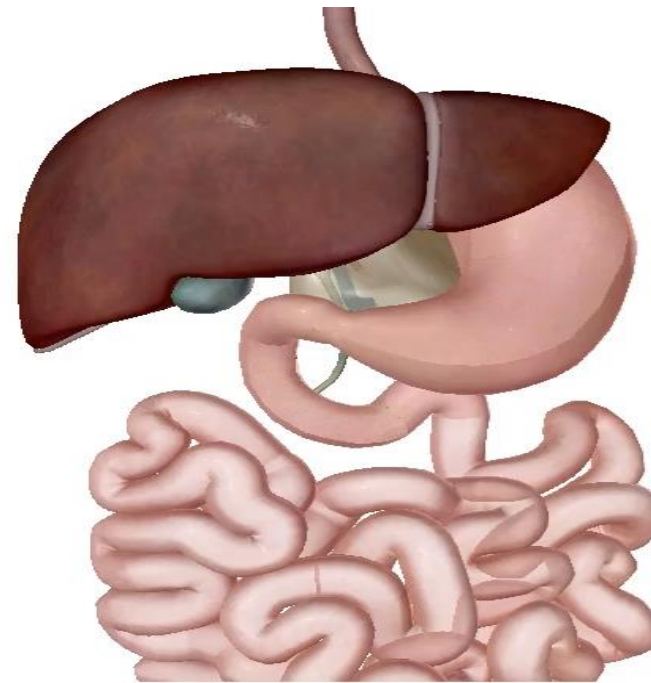


ANTERIOR VIEW OF THE ABDOMINAL CAVITY



## • Lesser omentum:

- Two layers of peritoneum that extend between the liver and the upper border of the lesser curvature of stomach
- Gastrohepatic omentum
- Attachment to the stomach: extends from the right side of the abdominal oesophagus and along the lesser curvature to the first inch of the duodenum
- Liver attachment: L-shaped to the fissure for the ligamentum venosum and the porta hepatis
- Right free margin: continuity of peritoneum of greater and lesser sacs
- Epiploic foramen

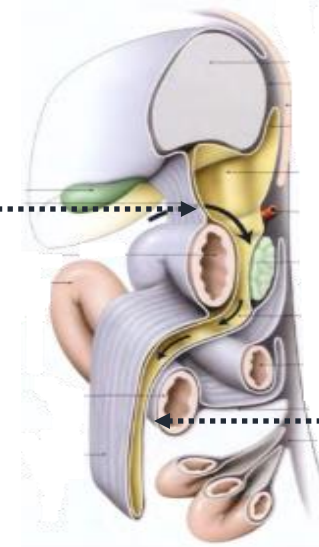


INFERIOR VIEW OF THE LIVER SHOWING THE L-SHAPED LIVER ATTACHMENT OF LESSER OMENTUM



- Continuous with the greater omentum downwards over the stomach
- Surrounds the liver as coronary, falciform and triangular ligaments
- Reaches the diaphragm

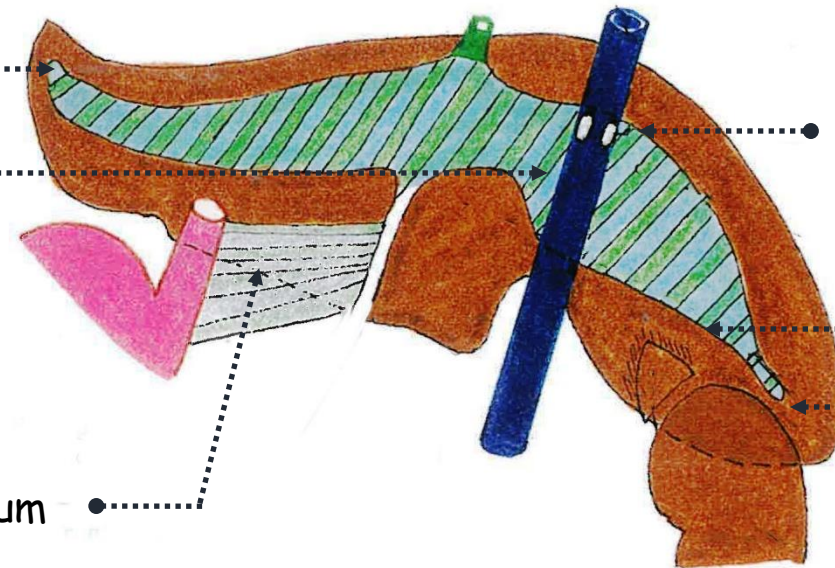
Lesser omentum



Greater omentum

SAGITTAL VIEW OF THE ABDOMINAL CAVITY SHOWING THE GREATER OMENTUM (FROM KAMINA)

Left  
triangular  
ligament  
Coronary  
ligament



Upper layer

Lower layer

Right  
triangular  
ligament

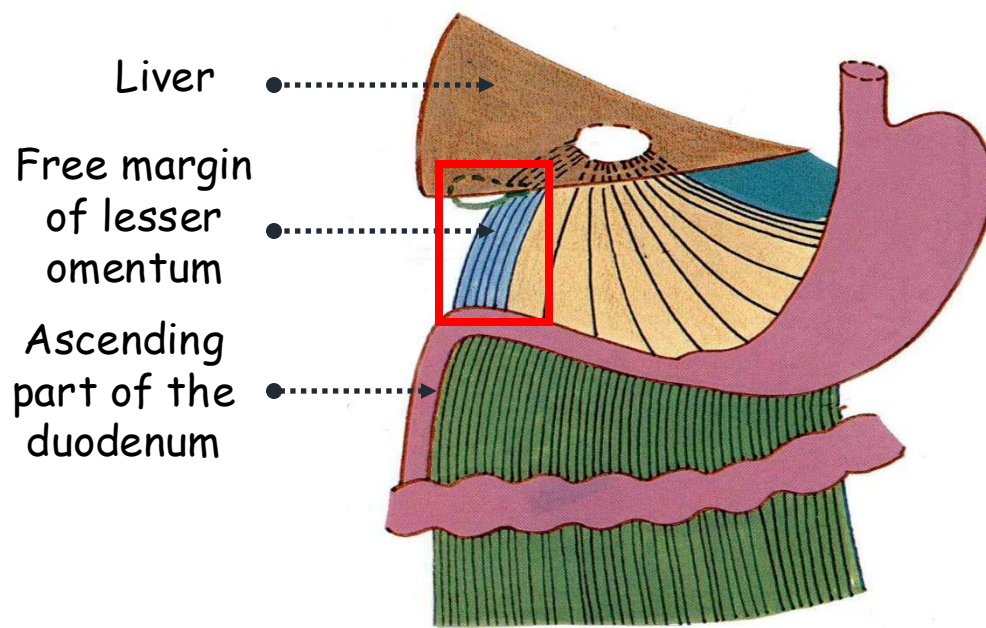
Lesser omentum

POSTERIOR VIEW OF THE LIVER

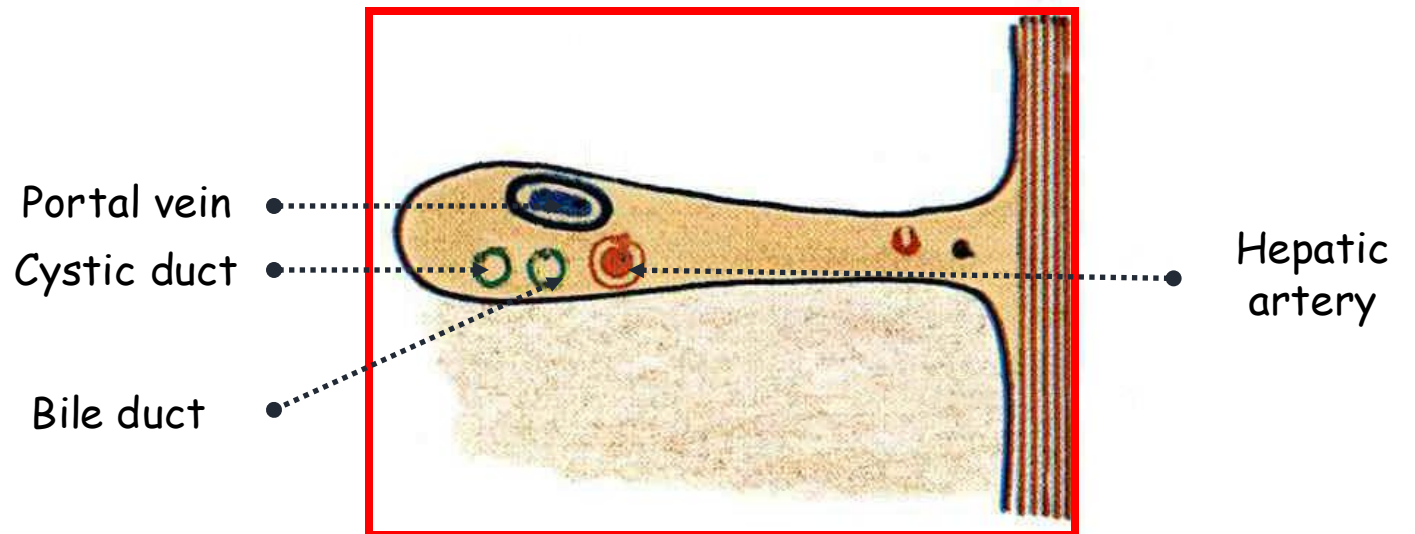


- **Epiploic foramen (of Winslow):**

- Aditus to the lesser sac
- Vertical slit
- Height: 2.5 cm
- Upper boundary: caudate process of the liver
- Lower boundary: ascending part of the duodenum
- Posterior boundary: inferior vena cava
- Anterior boundary: right free margin of lesser omentum containing the hepatic pedicle



ANTERIOR VIEW OF THE ABDOMEN





## D. COMPARTMENTS

### 1. Supracolic compartment:

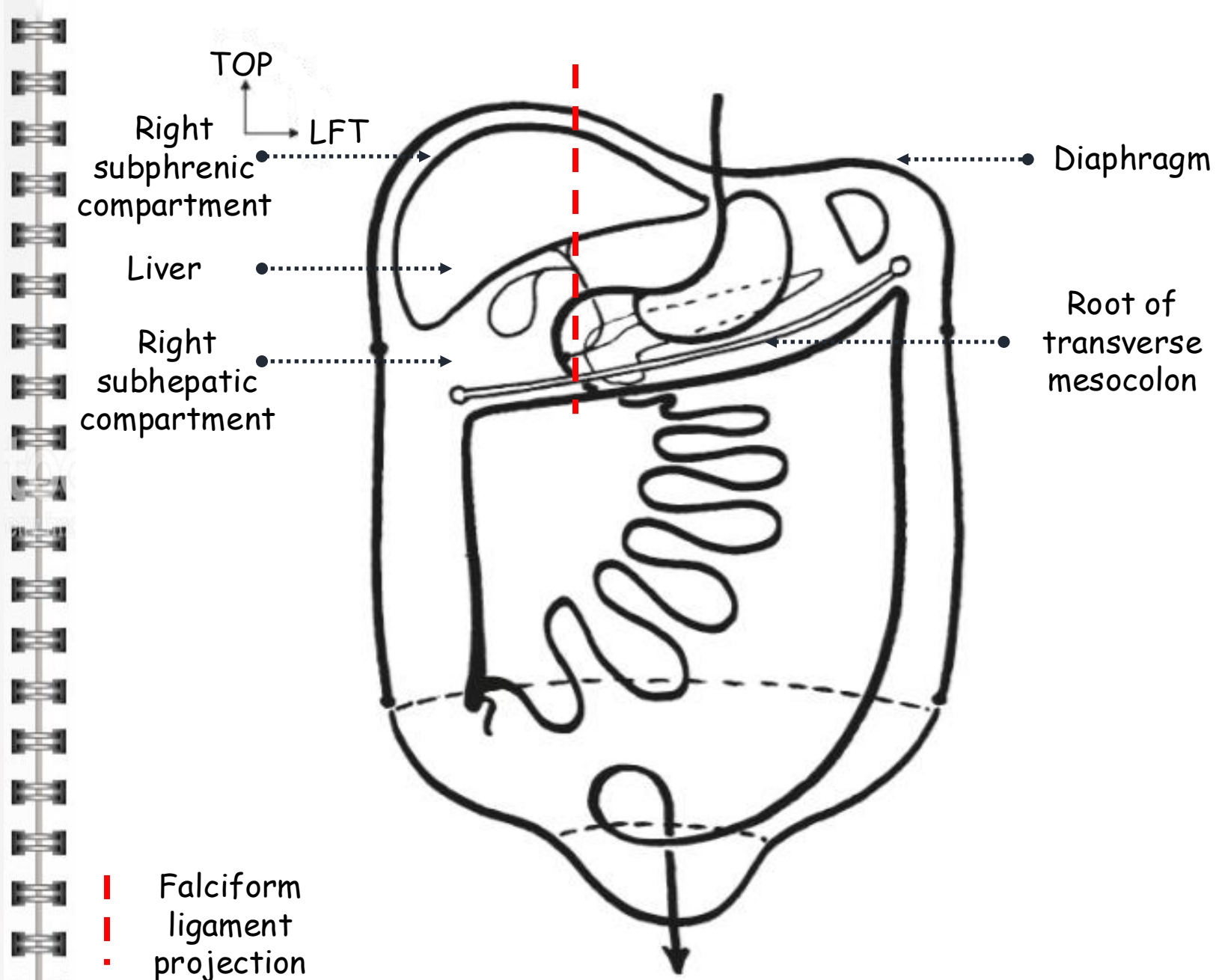
- Defined by the attachments of the liver to the diaphragm and abdominal wall

### • Right subphrenic compartment:

- Above the liver
- To the right of falciform ligament
- Above the upper layer of coronary ligament

### • Right subhepatic compartment:

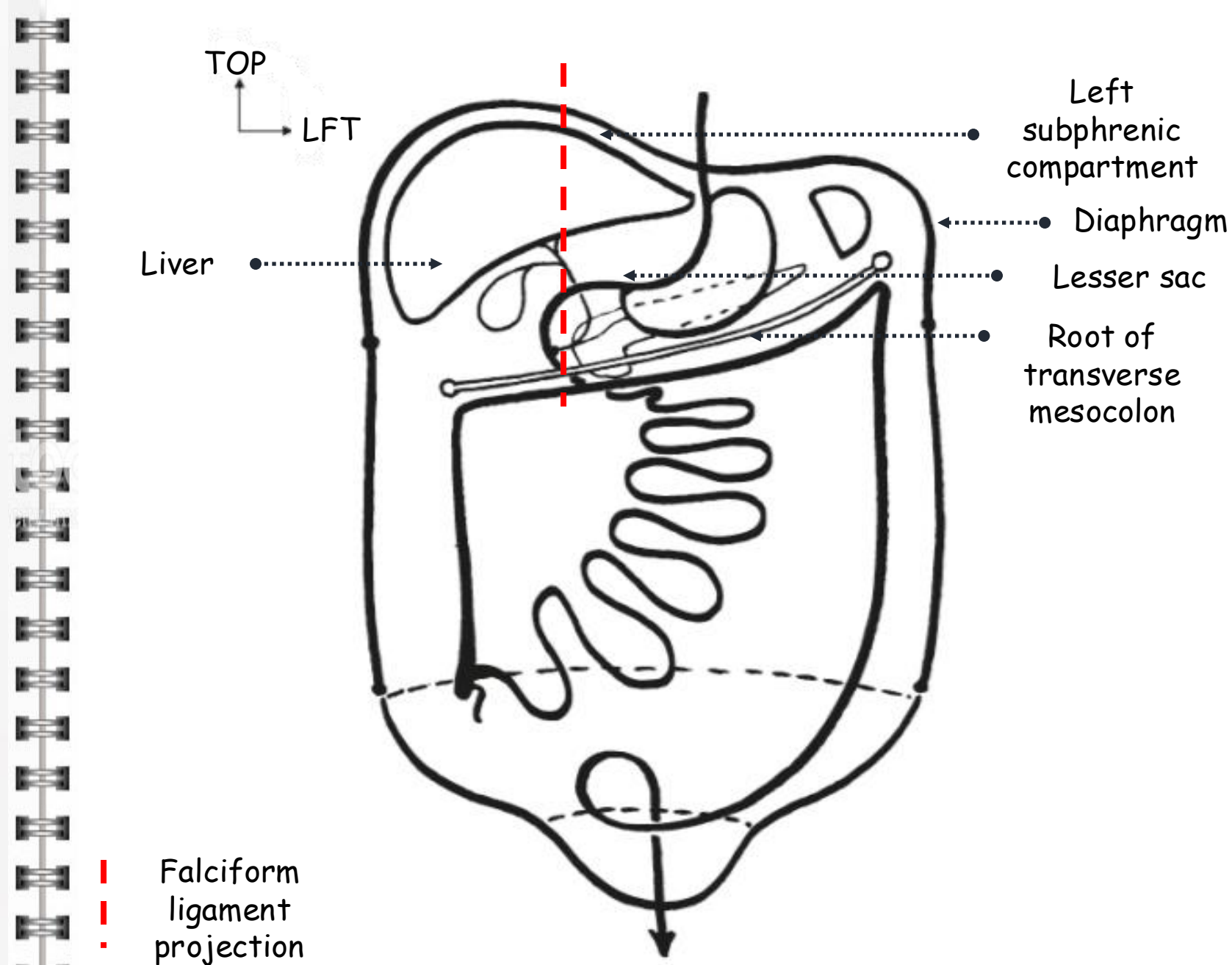
- Below the liver
- To the right of falciform ligament
- Below the lower layer of coronary ligament and right kidney
- Hepatorenal pouch of Morison



*SCHEMATIC ANTERIOR VIEW OF THE ABDOMINAL CAVITY*



- **Left subphrenic compartment:**
  - Above the liver
  - To the left of falciform ligament
  - Above the left triangular ligament
- **Left subhepatic compartment:**
  - Lesser sac



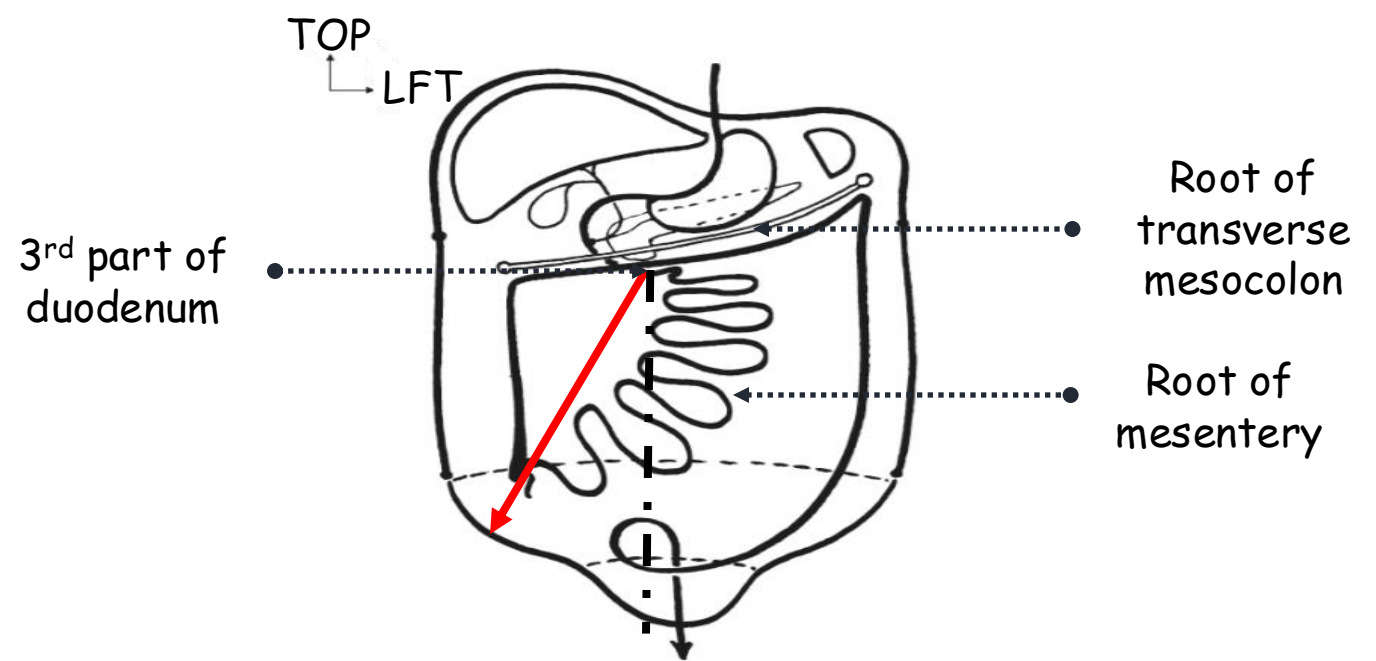
**SCHEMATIC ANTERIOR VIEW OF THE ABDOMINAL CAVITY**



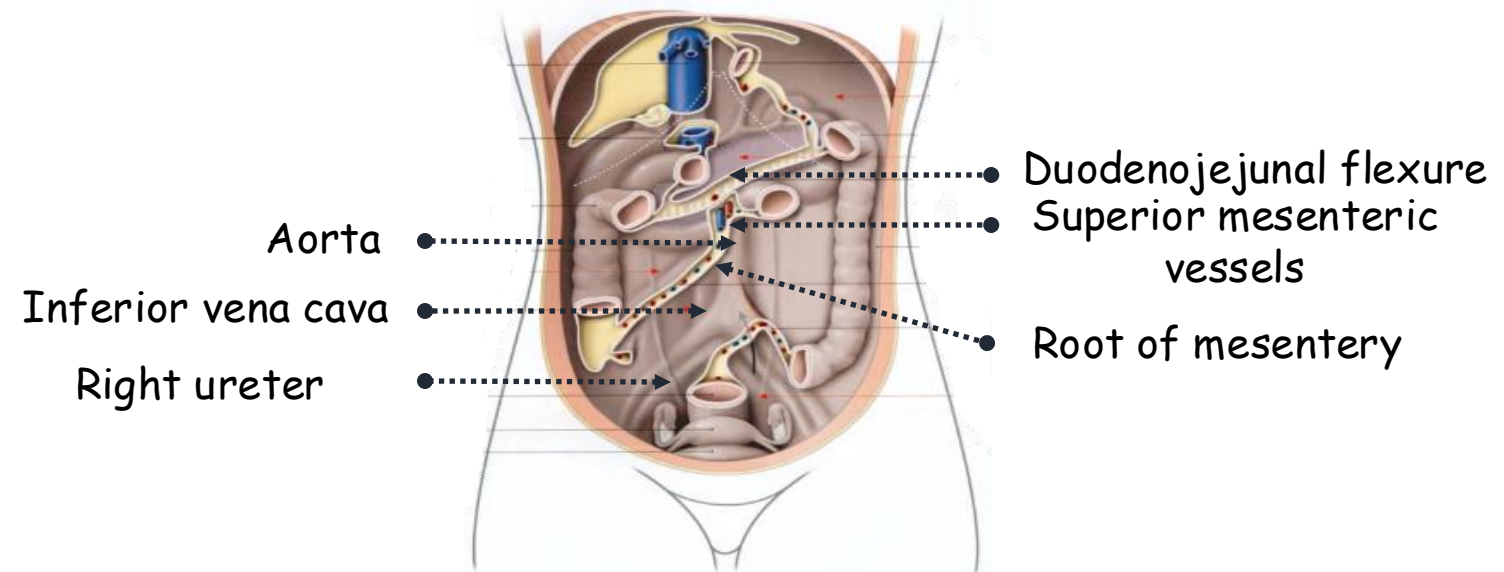
## 2. Infracolic compartment:

### • **Root of mesentery:**

- Passes down from left to right at an angle of about  $45^\circ$
- Begins on the left at the duodenojejunal junction
- Crosses the third part of the duodenum where the superior mesenteric vessels enter between its two layers
- Continues downwards across the aorta, inferior vena cava, right psoas muscle and ureter to the right iliac fossa
- Length: 15 cm
- Depth: 15 cm
- Numerous Pacinian corpuscles



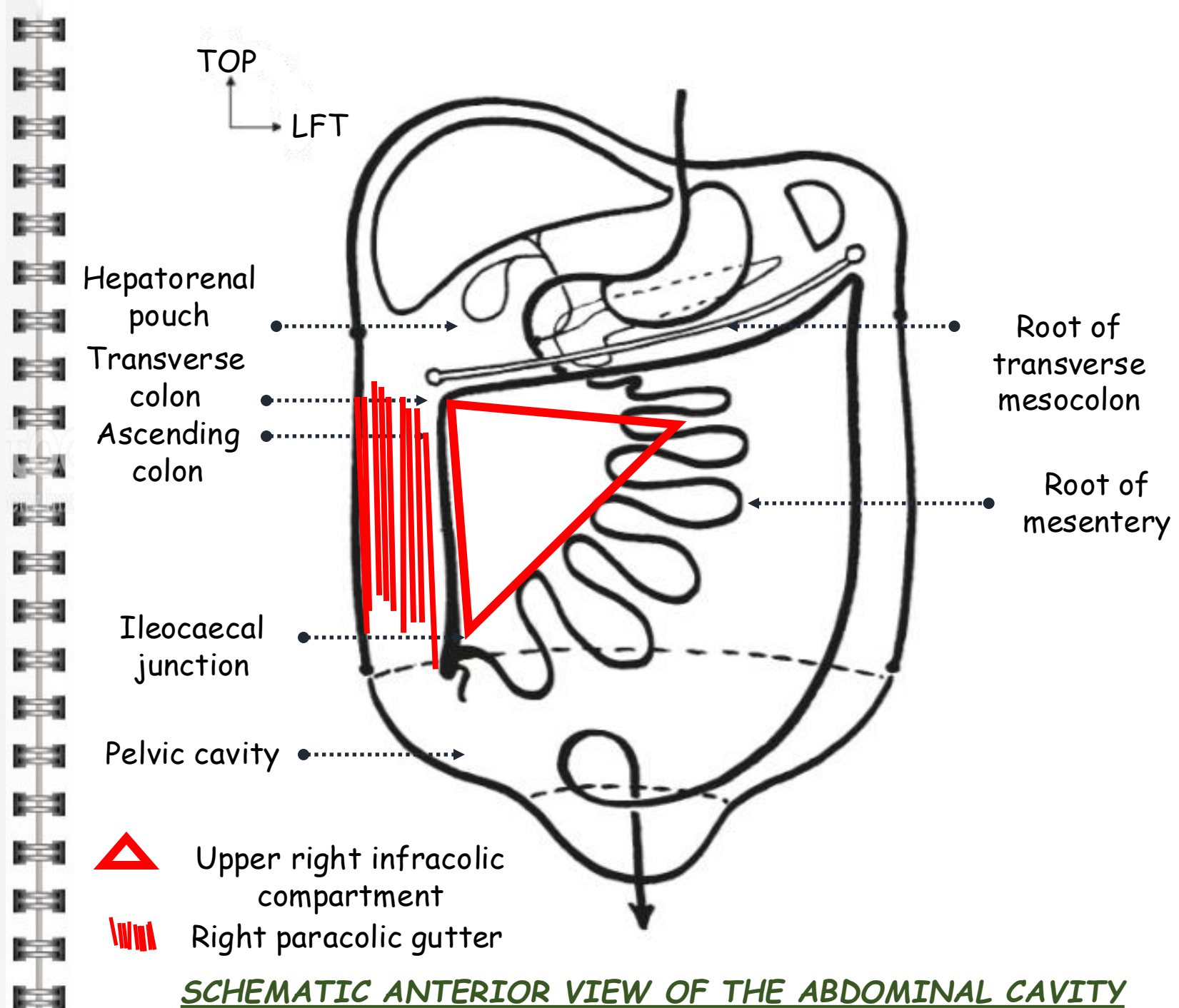
**SCHEMATIC ANTERIOR VIEW OF THE ABDOMINAL CAVITY**



**ANTERIOR VIEW OF THE ABDOMINAL CAVITY WITHOUT VISCERA (FROM KAMINA)**



- **Upper right infracolic compartment:**
  - Floor: triangular area of peritoneum of posterior wall
  - Above and to the right of the root of mesentery
  - Lower apex: ileocaecal junction
  - Right side: ascending colon
  - Upper base: transverse mesocolon
  - Communication with the pelvic cavity over the lower ileum
- **Right paracolic gutter:**
  - Lateral to the ascending colon
  - Continues downwards the hepatorenal pouch
  - Prolonged by the pelvic cavity



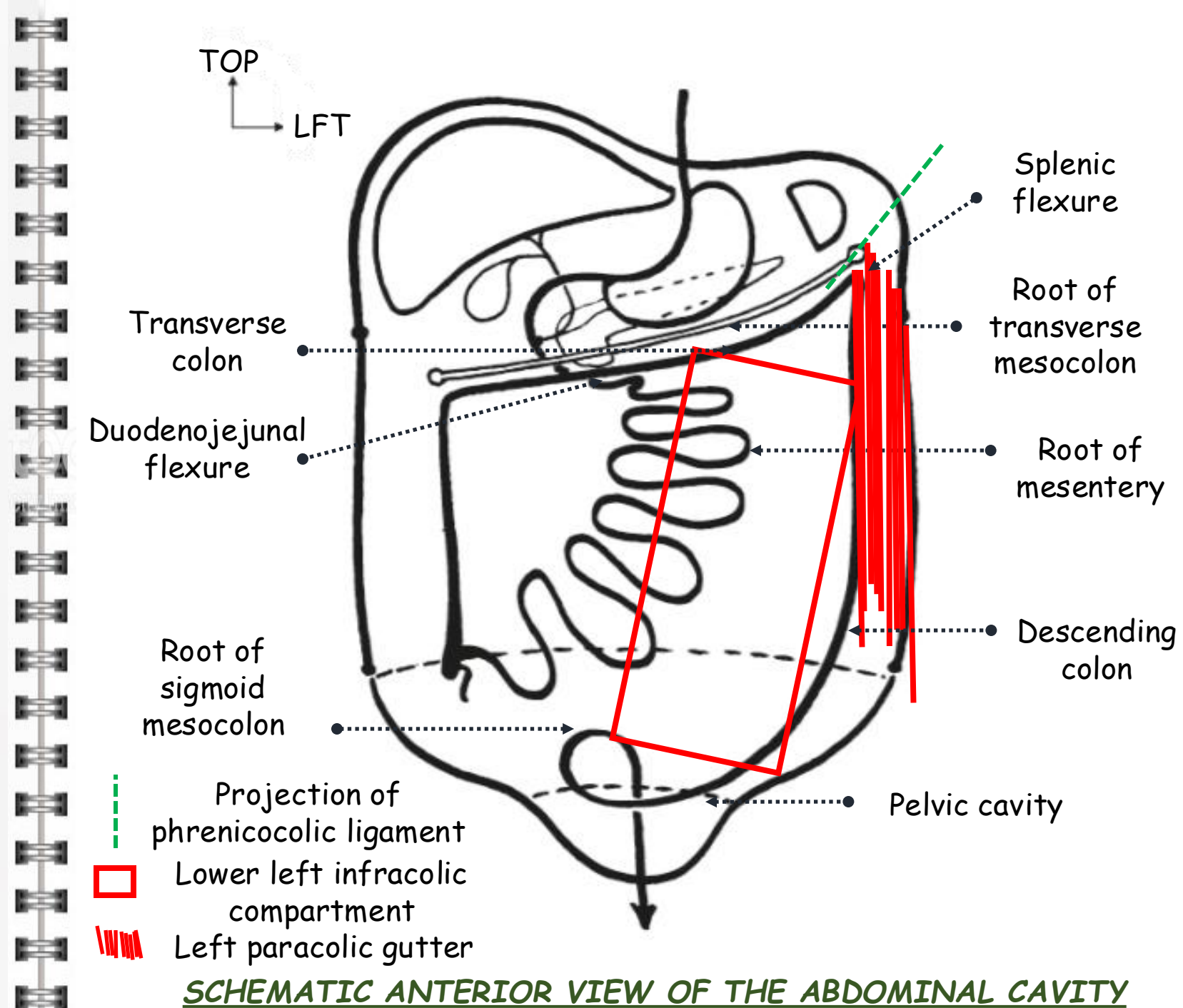


- **Lower left infracolic compartment:**

- Larger
- Quadrilateral in shape
- Widens below
- Smooth communication with the pelvic cavity
- Upper edge: transverse mesocolon between duodenojejunal flexure and splenic flexure of colon
- Shallowest floor in the midline

- **Left paracolic gutter:**

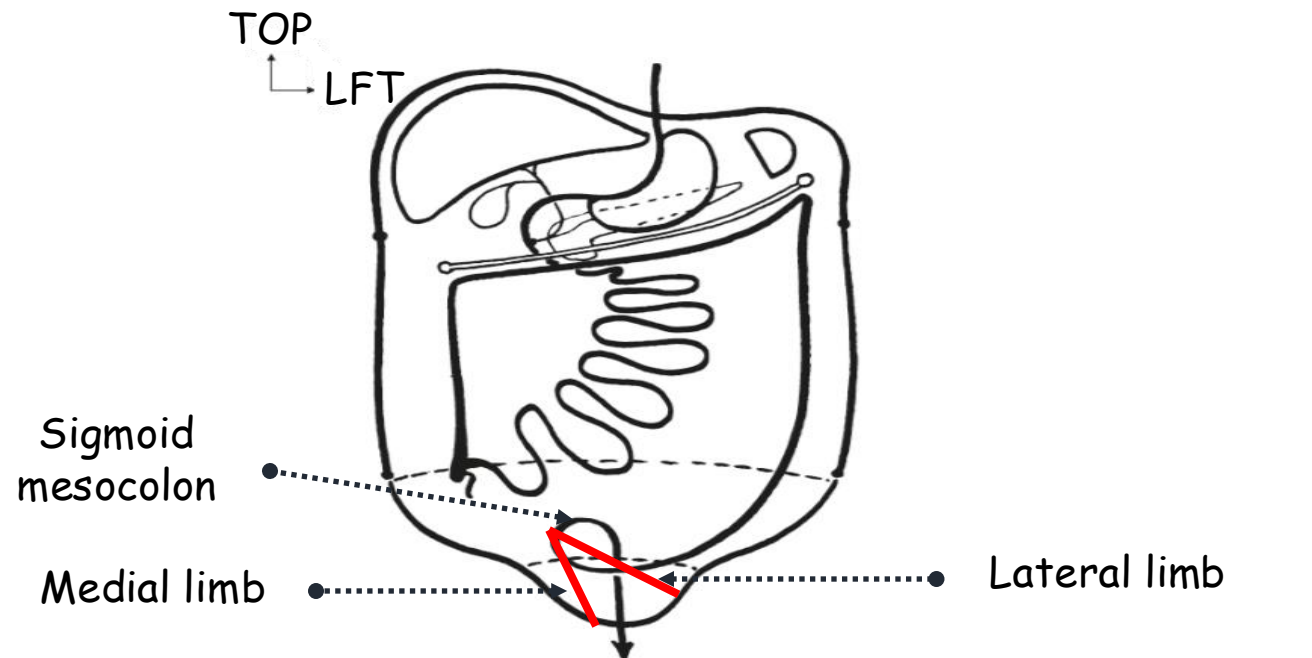
- Lateral to the descending colon
- Limited above by the phrenicocolic ligament
- Prolonged by the pelvic cavity to the left of the left edge of the root of sigmoid mesocolon



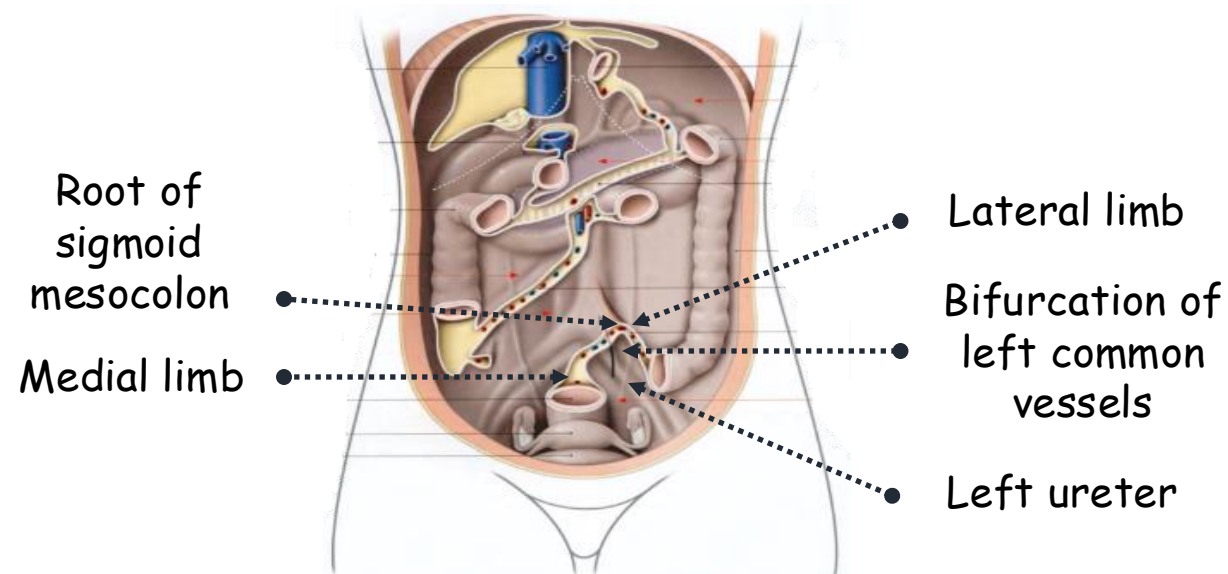


- **Root of sigmoid mesocolon:**

- A-shaped
- At the bifurcation of the left common vessels on the pelvic brim over the left sacroiliac joint
- Lateral limb: passes forwards along the pelvic brim over the external iliac vessels halfway to the inguinal ligament
- Medial limb: slopes down into the hollow of the sacrum, where it reaches the midline in front of S3 vertebra at the commencement of the rectum
- Left ureter



**SCHEMATIC ANTERIOR VIEW OF THE ABDOMINAL CAVITY**



**ANTERIOR VIEW OF THE ABDOMINAL CAVITY WITHOUT VISCERA (FROM KAMINA)**



## E. NERVE SUPPLY

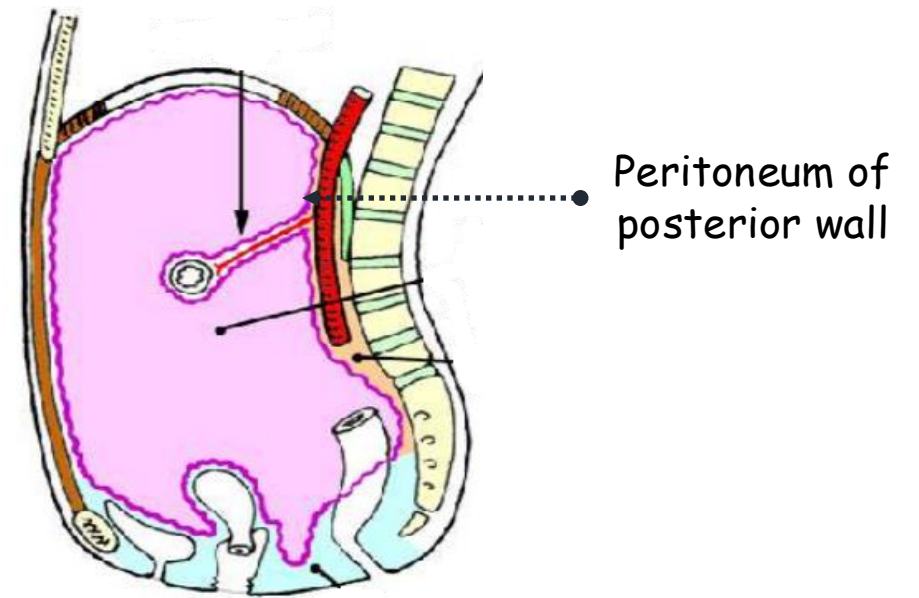
- Segmental
- Spinal nerves of overlying muscles
- Pelvic peritoneum: obturator nerve
- Visceral peritoneum: no afferent supply



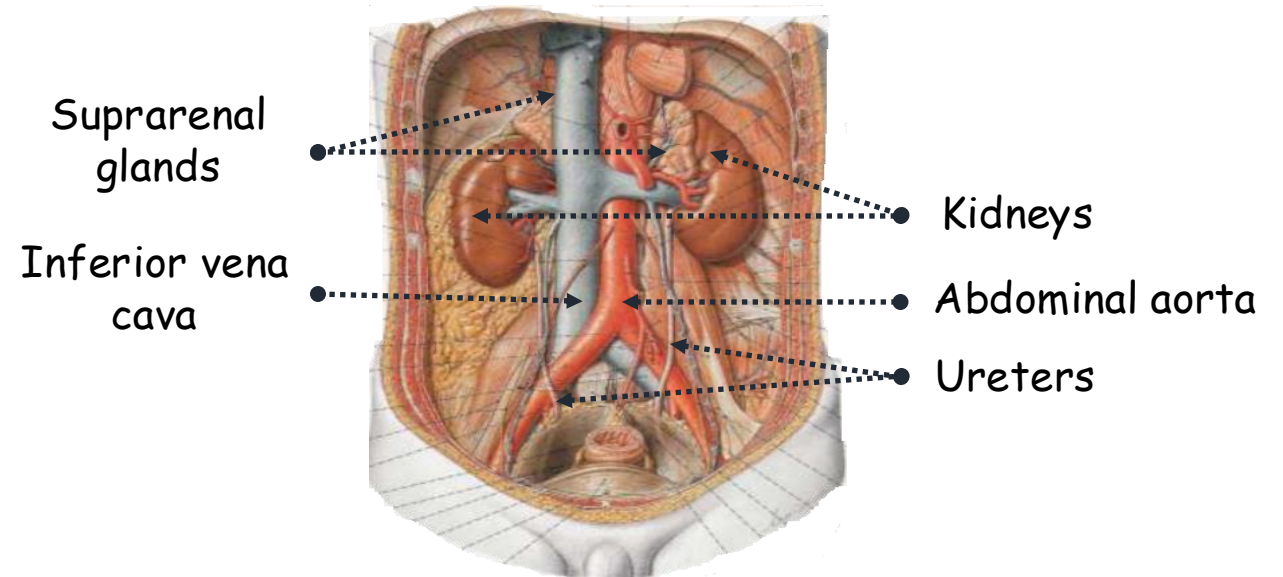


#### IV. RETROPERITONEAL SPACE

- Behind the peritoneum of posterior wall
- Abdominal aorta
- Inferior vena cava
- Cysterna chili
- Sympathetic trunk
- Pancreas
- Most of duodenum
- Kidneys
- Ureters
- Suprarenal glands



SCHEMATIC SAGITTAL SECTION OF THE ABDOMINAL CAVITY  
SHOWING THE PERITONEUM



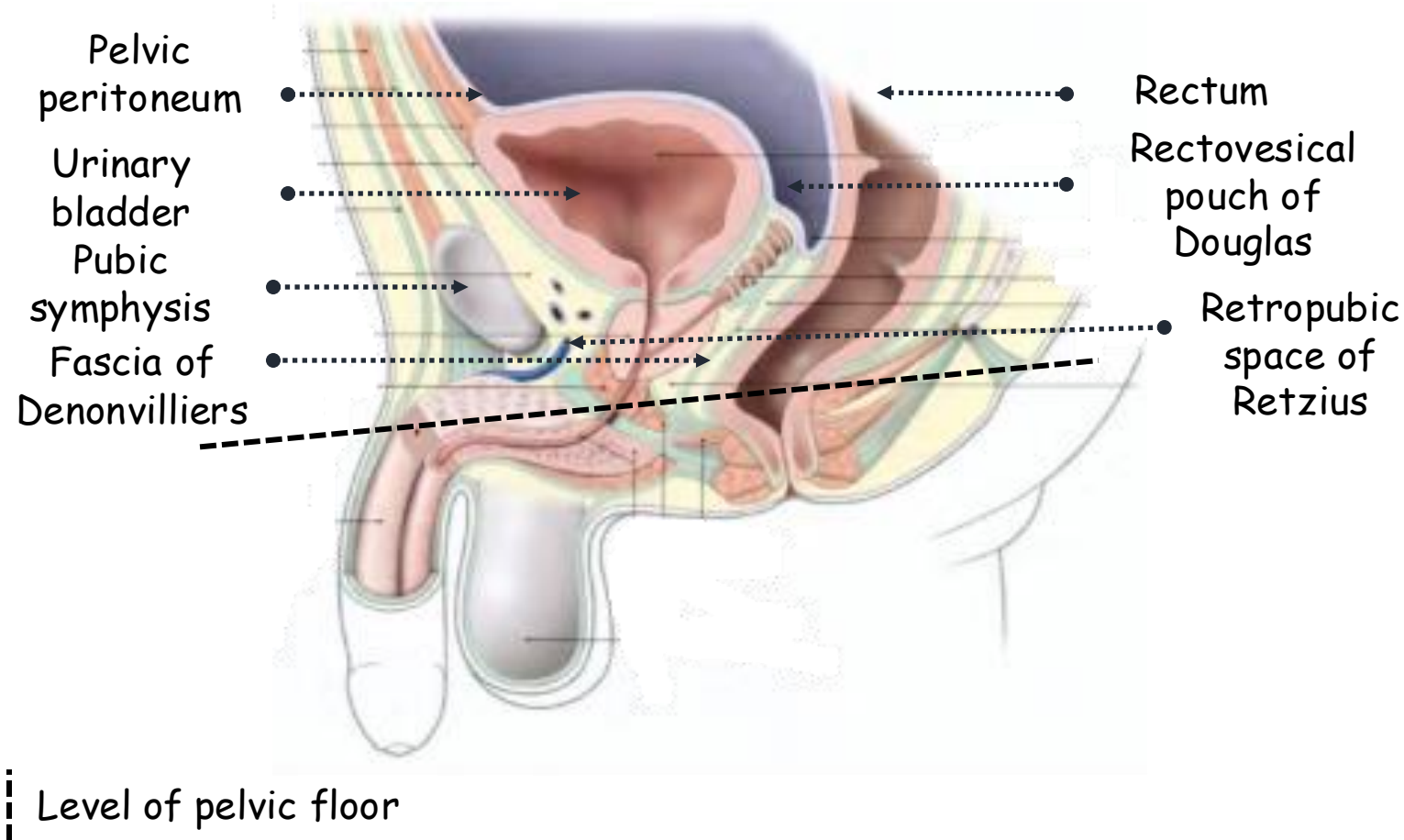
ANTERIOR VIEW OF THE RETROPERITONEAL SPACE



## V. PELVIC PERITONEUM

### A. IN THE MALE

- Does not reach the pelvic floor
- **Forwards:** descends in the midline little below the upper margin of the **pubic symphysis** only when the bladder is empty and **roofs in the retropubic space of Retzius**
- From the **back of the bladder:** descends in a fold before ascending over the rectum and the hollow of the sacrum, the **rectovesical pouch**, above the fascia of Denonvilliers
- Laterally: continuous sheet to the side wall of the pelvis at the pelvic brim

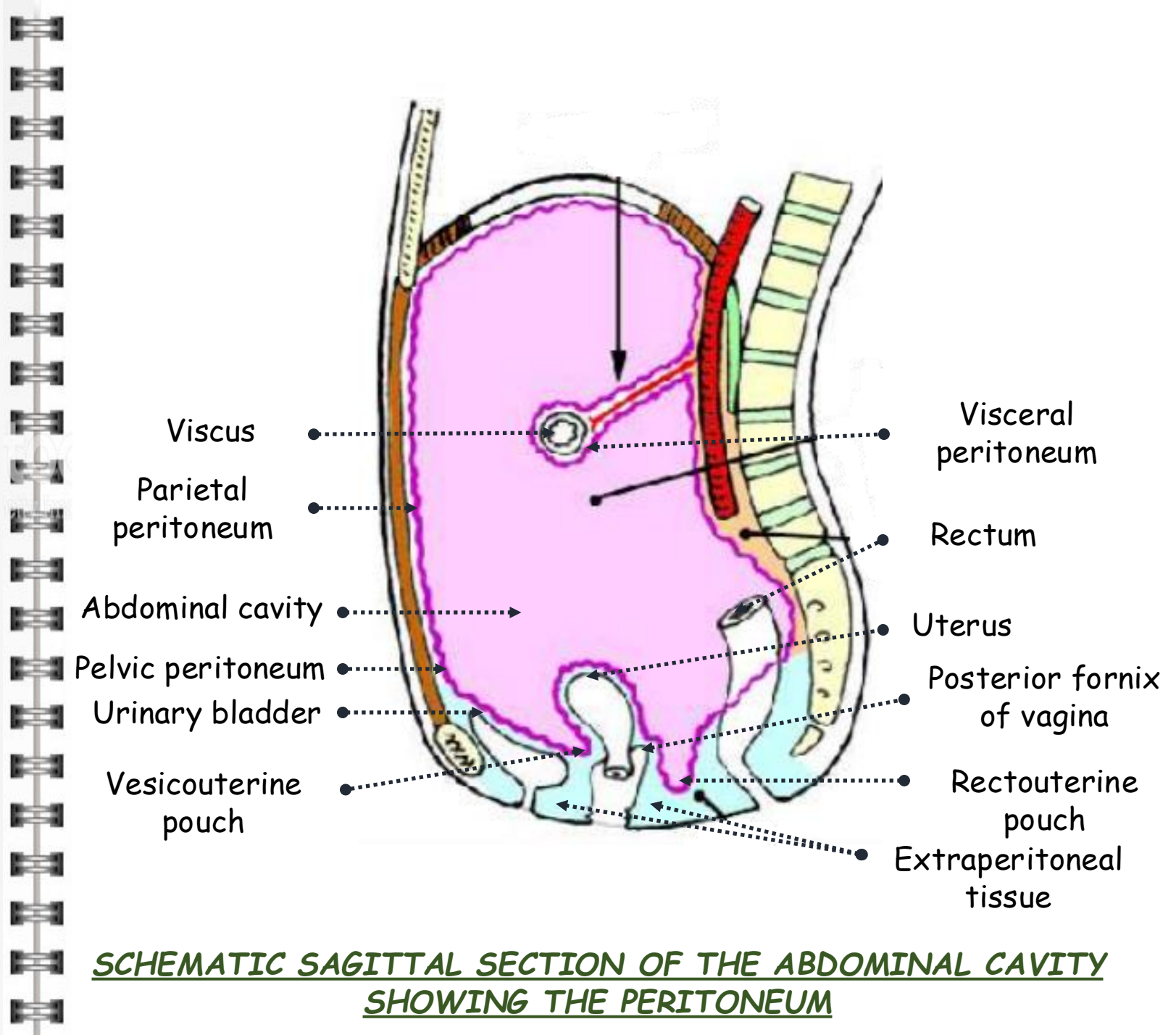


SAGITTAL SECTION OF THE MALE PELVIC CAVITY SHOWING PELVIC PERITONEUM (FROM KAMINA)



## B. IN THE FEMALE

- Similar to that in the male
- Presence of the uterus and the broad ligaments
- From the back of the bladder: ascends over the front of the uterus making the vesicouterine pouch between the two viscera
- Firmly attached to the back of the uterus and to the posterior fornix of the vagina whence it is reflected up over the rectum and sacrum making the rectouterine pouch of Douglas
- Laterally: broad ligament





## VI. PELVIC CAVITY

### A. BONY PELVIS

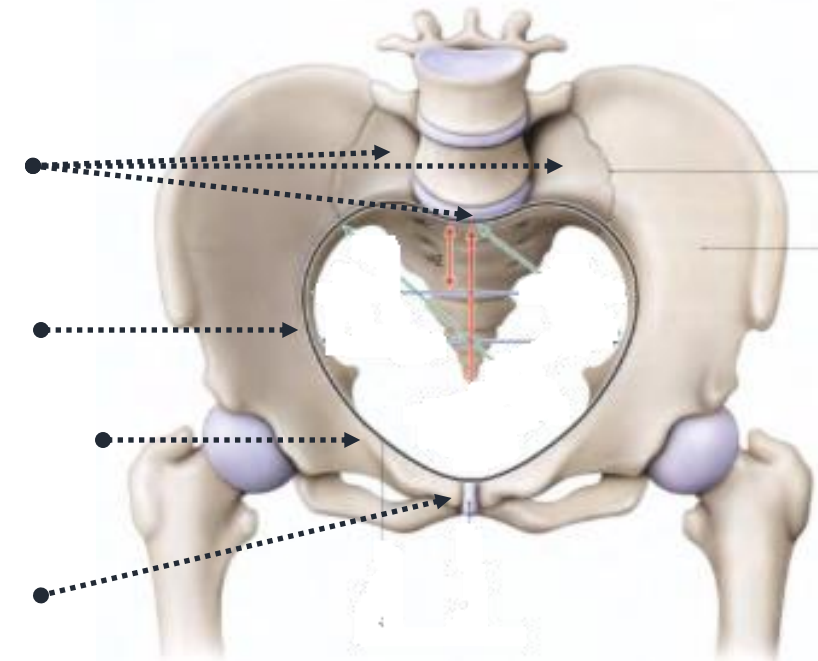
- **Pelvic brim:**
  - From front to back
  - Pubic crest
  - Pectineal lines of pubis
  - Arcuate lines of ilium
  - Ala and promontory of the sacrum
  - Oblique plane lying at  $60^\circ$  with the horizontal
  - Sex differences
- **Male bony pelvis:**
  - Acute subpubic angle
  - Heart-shaped outline
- **Female bony pelvis:**
  - Broader
  - Wide subpubic angle
  - Transversely oval outline

Ala and  
promontory  
of sacrum

Arcuate  
line

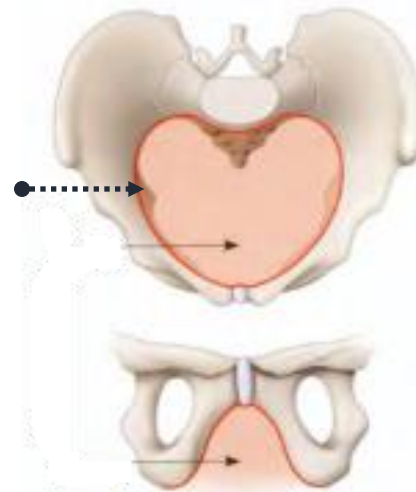
Pectineal  
line

Pubic  
crest

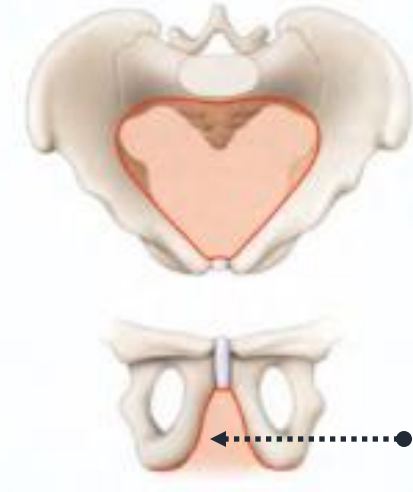


ANTERIOR VIEW OF THE BONY PELVIS (FROM KAMINA)

Outline  
of  
pelvis



ANTERIOR VIEW OF FEMALE  
BONY PELVIS (FROM KAMINA)



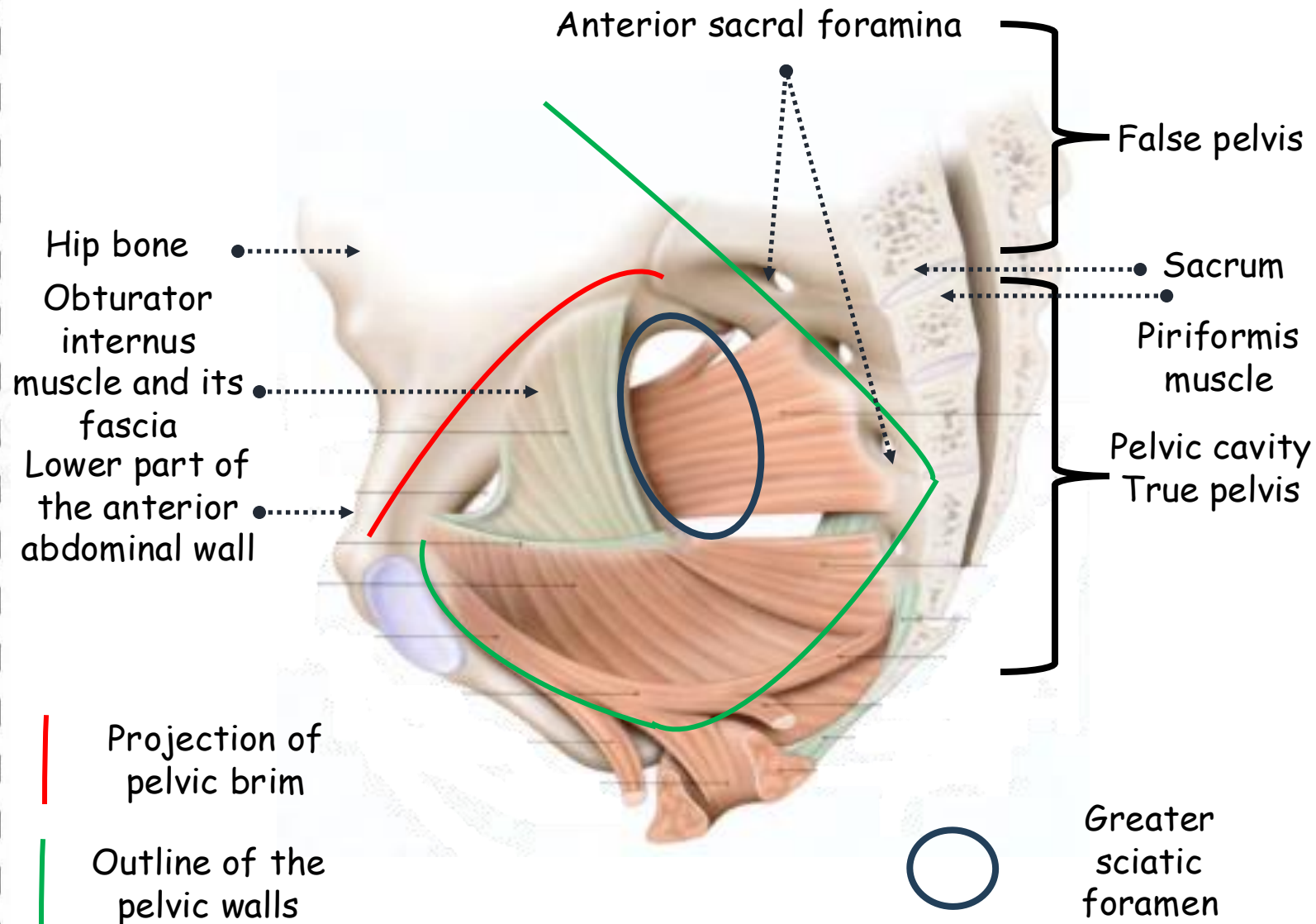
Subpubic  
angle

ANTERIOR VIEW OF MALE  
BONY PELVIS (FROM KAMINA)



## B. PELVIC WALLS

- Pudding basin but with much of the front wall missing
- Deficiency made good by the lower part of the anterior abdominal wall
- Pelvic brim divides the false pelvis above the brim from the true pelvis or pelvic cavity below
- Side wall: hip bone clad with obturator internus and its fascia
- Posterior wall: curved sacrum with piriformis
- **Piriformis muscle:**
  - Arises from the middle three pieces of its own half of the sacrum and the adjoining lateral mass
  - Extends medially between the anterior sacral foramina
  - Runs transversely to the greater sciatic foramen



INTERNAL SAGITTAL VIEW OF THE PELVIC CAVITY SHOWING THE PELVIC WALL (FROM KAMINA)

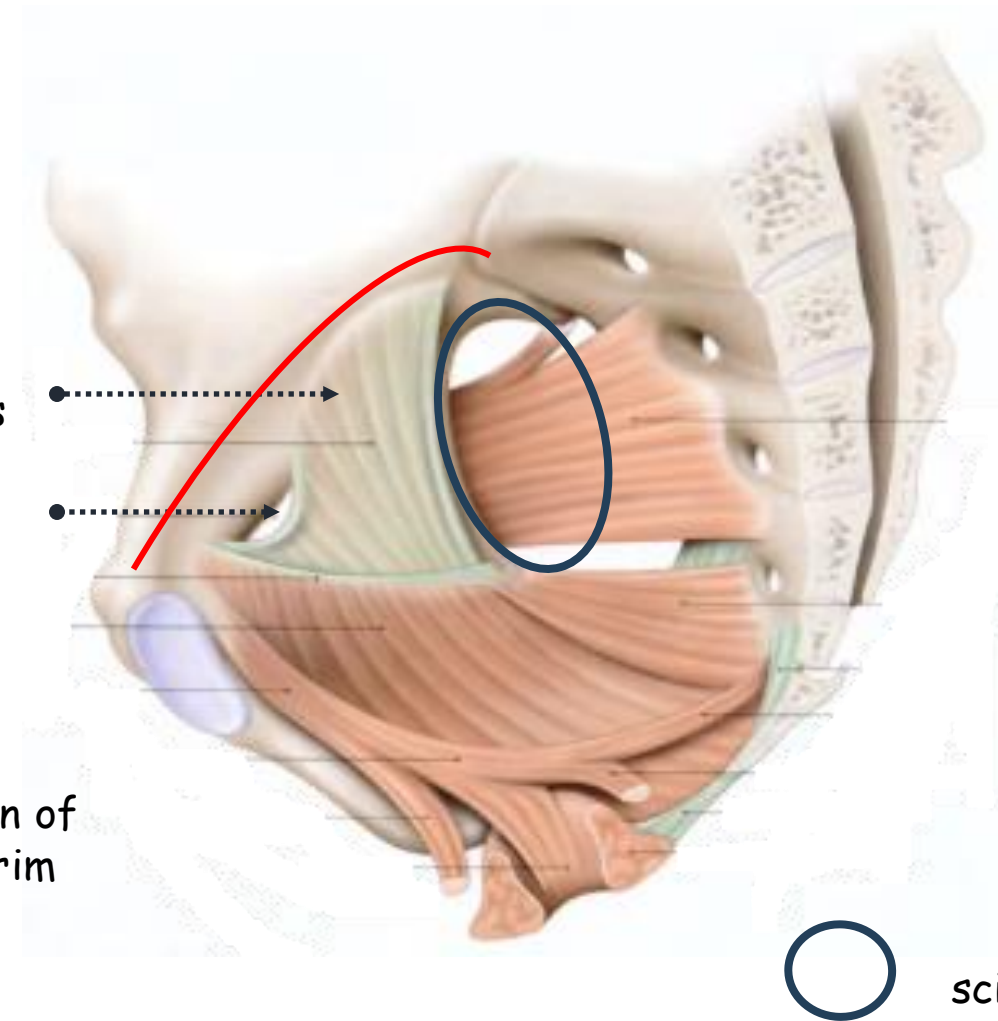


- **Obturator foramen:** contains the obturator membrane with a gap above that converts the obturator notch into a canal for the obturator nerve and vessels
- **Obturator internus muscle:**
  - Arises from the whole membrane and from the bony margins of the foramen
  - Extends posteriorly as high as the pelvic brim and across the flat surface of the ischium to the margin of the greater sciatic notch and on the ischial tuberosity to the falciform ridge
  - Converges fan-wise towards the lesser sciatic notch
  - The tendon takes a right-angled turn to pass into the buttock on the lesser sciatic notch

Obturator internus muscle and its fascia  
Obturator canal

Projection of pelvic brim

Greater sciatic notch

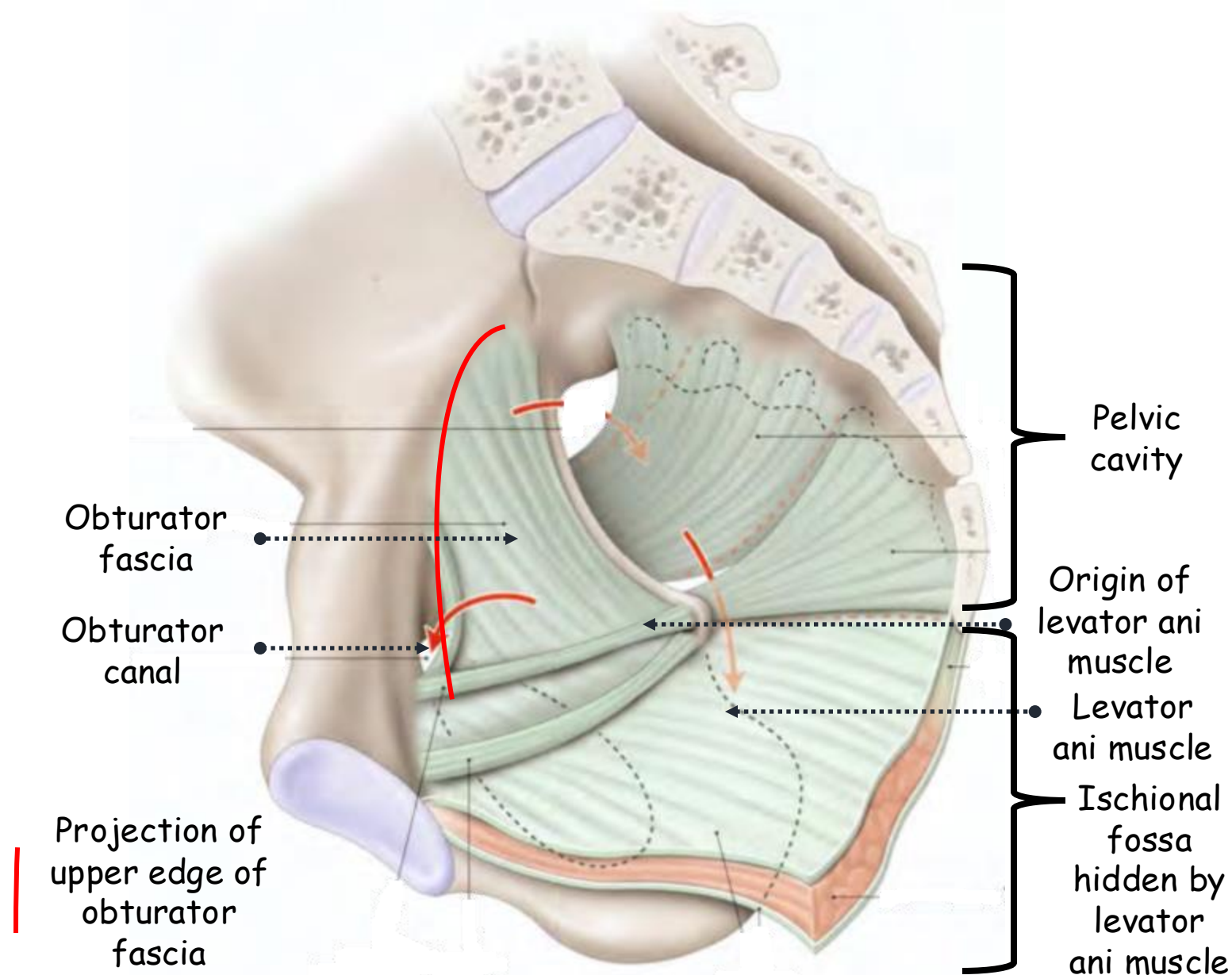


INTERNAL SAGITTAL VIEW OF THE PELVIC CAVITY SHOWING THE PELVIC WALL (FROM KAMINA)



## • Obturator fascia:

- Below the line that slopes downwards along the side wall of the pelvis until anteriorly it lies below the obturator canal
- Down to the falciform edge of the sacrotuberous ligament on the ischial tuberosity
- Origin of levator ani
- Pelvic cavity above
- Ischioanal fossa below
- Do not confuse obturator membrane and fascia

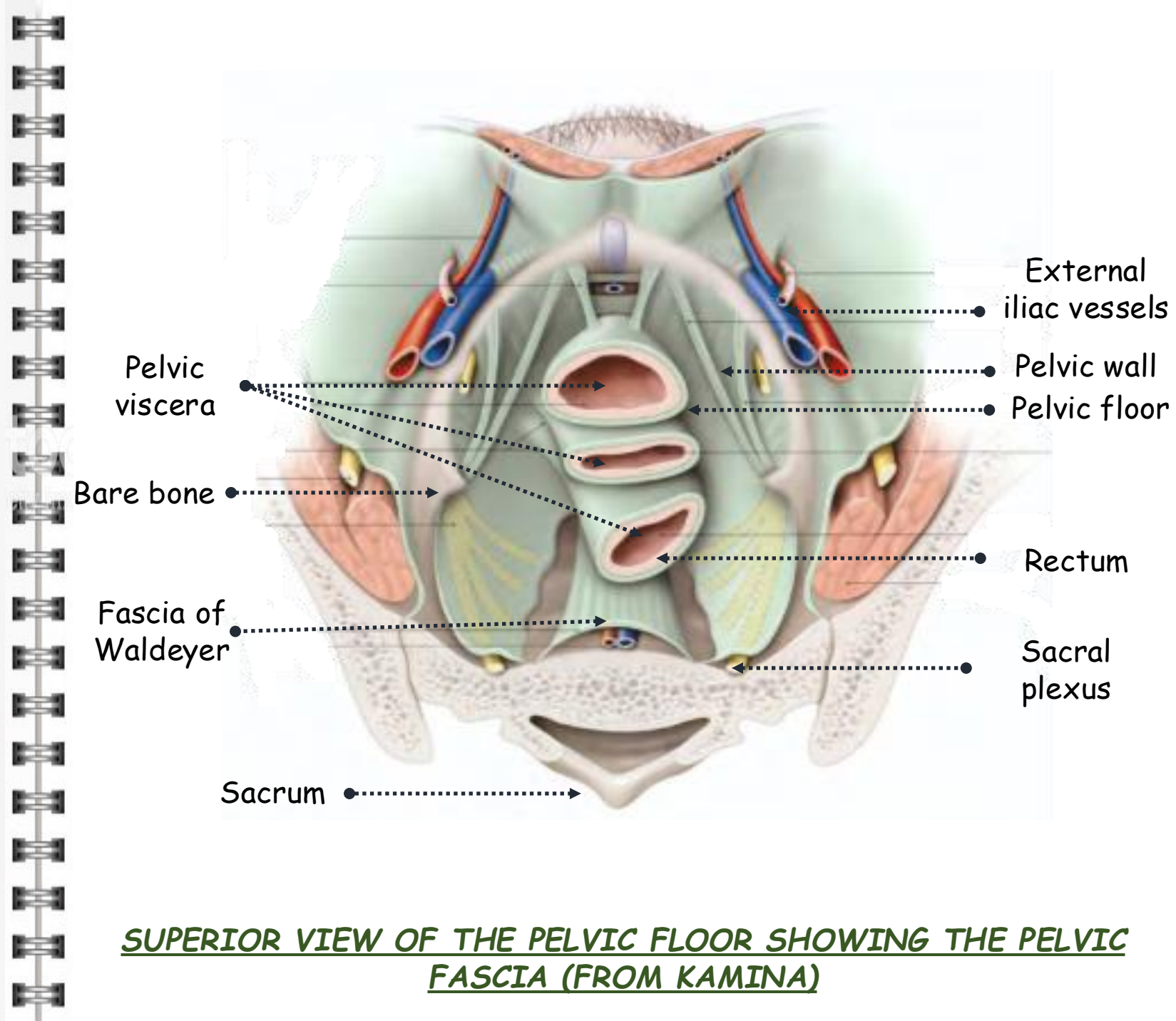


**INTERNAL SAGITTAL VIEW OF THE PELVIC CAVITY SHOWING THE PELVIC WALL (FROM KAMINA)**



### C. PELVIC FASCIA

- Pelvic wall, pelvic floor and pelvic viscera
- Over **non-expansile** parts the fascia is a **strong** membrane while over **expansile** or **mobile** parts no membrane exists, consists of **loose areolar tissue**
- Fascia does **not** extend **over bare bone**
- **Exception:** fascia of **Waldeyer** sweeps downwards from its attachment in the **hollow of the sacrum** to the **ampulla of the rectum**
- **Fascia of the pelvic wall:**
  - **Strong** membrane which covers the muscles obturator internus and piriformis and is firmly attached to the periosteum at their margins
  - **Nerves** lie **external** to the fascia of the pelvic wall, **vessels** **internal** to it

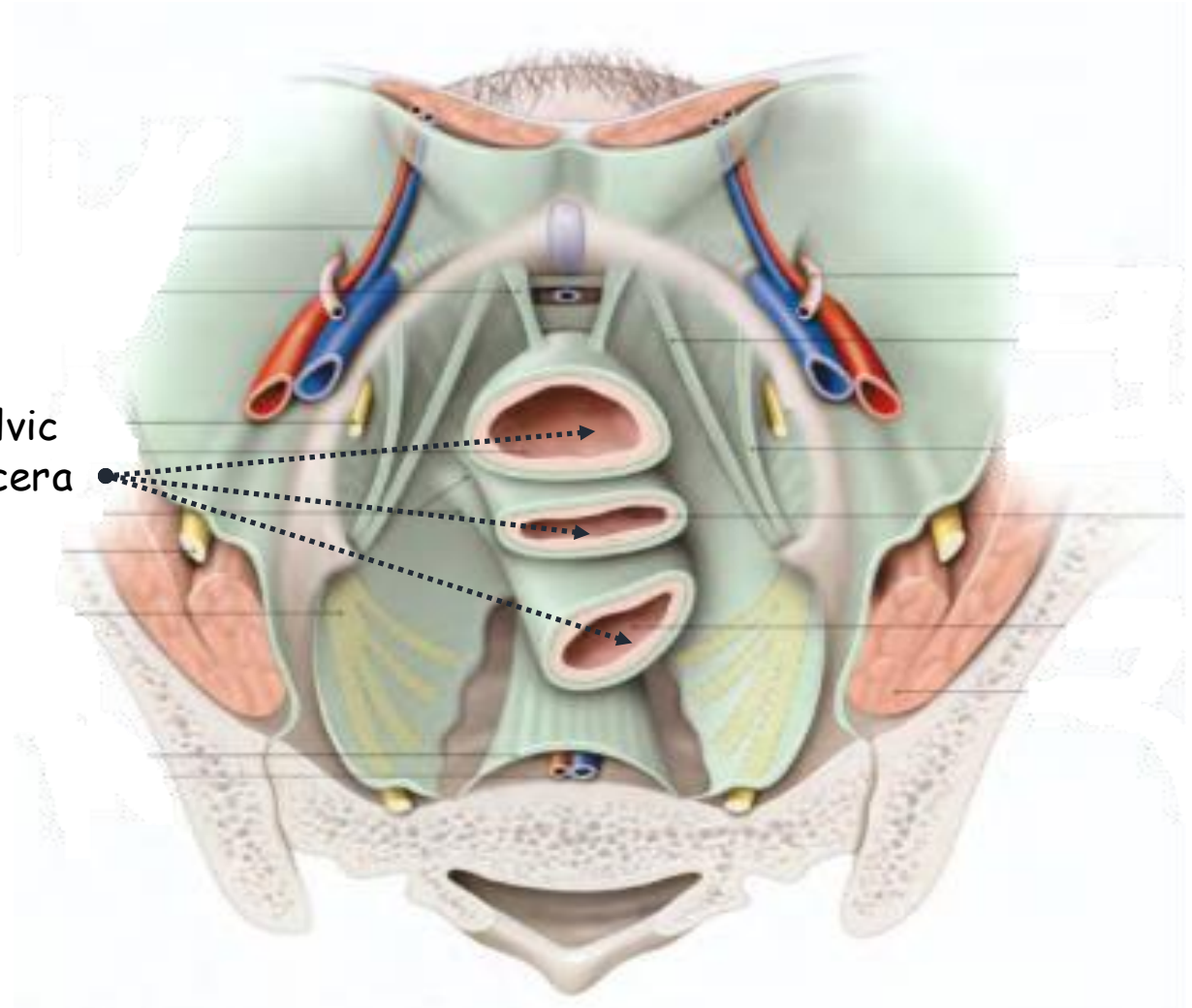


**SUPERIOR VIEW OF THE PELVIC FLOOR SHOWING THE PELVIC FASCIA (FROM KAMINA)**



- **Fascia of the pelvic viscera:**
  - Loose or dense according to the distensibility of the viscus

Pelvic  
viscera



**SUPERIOR VIEW OF THE PELVIC FLOOR SHOWING THE PELVIC FASCIA  
(FROM KAMINA)**



## V. CONCLUSION

- From the thoracoabdominal diaphragm to the pelvic diaphragm
- Compartments and regions
- Surgical interest







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