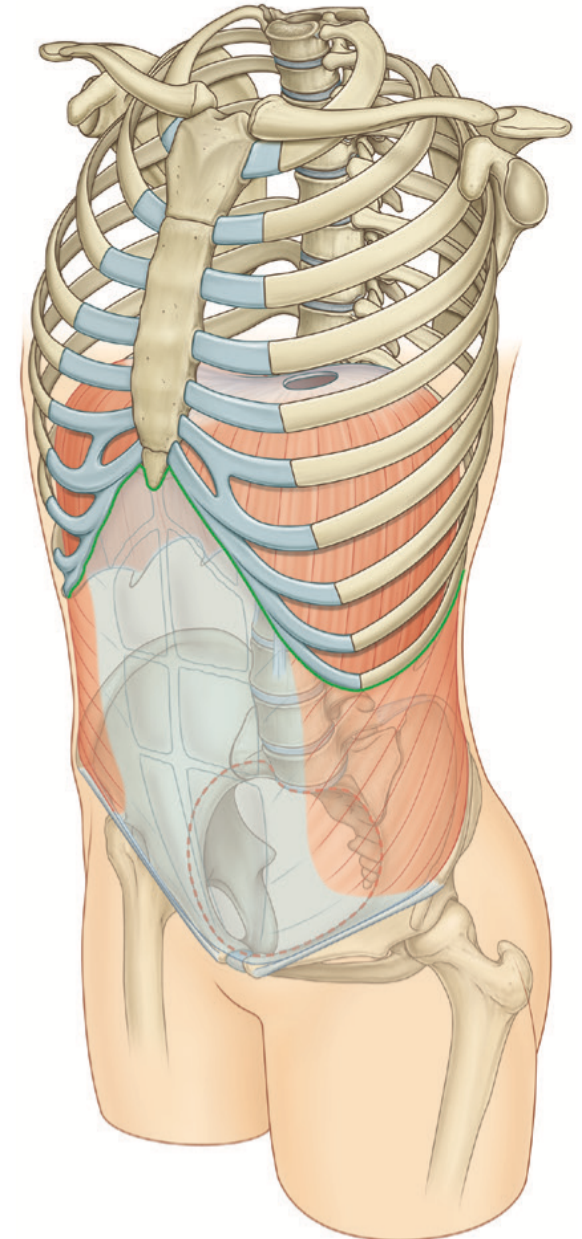
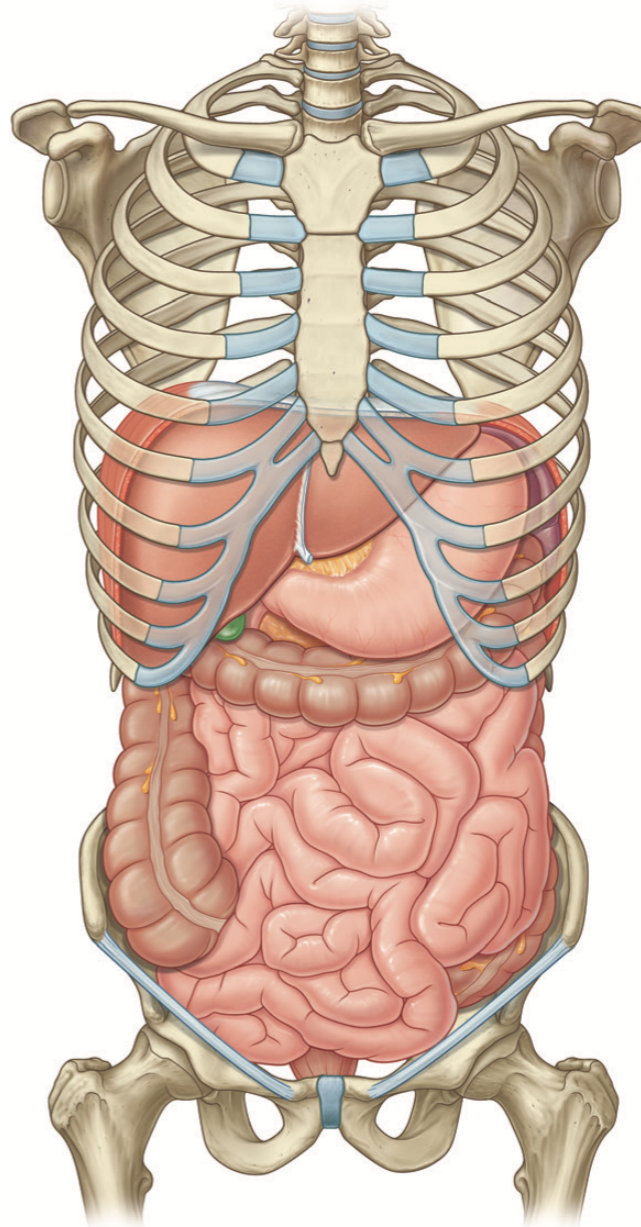


abdomen – abdominal cavity, wall, retroperitoneum

Prof. MUDr. Jiří Ferda, Ph.D.

abdomen

- ♦ **Continues to thorax**
- ♦ **Pelvis continues to abdomen**
- ♦ **Pelvic cavity**
 - ♦ Continues abdominal cavity
- ♦ **Cranial border - diaphragm**
- ♦ **Caudal border – pelvic inlet**
- ♦ **Ligamentum inguinale**
 - ♦ Abdominal wall – lower extremity
- ♦ **Abdominal wall**
- ♦ **Abdominal cavity**
- ♦ **Abdominal viscera**



viscera abdominalia

- ♦ *gastrointestinal*

- ♦ Abdominal esophagus

- ♦ stomach

- ♦ Small bowel

- ♦ Large bowel

- ♦ Liver

- ♦ Biliary system

- ♦ Pancreas

- ♦ Spleen

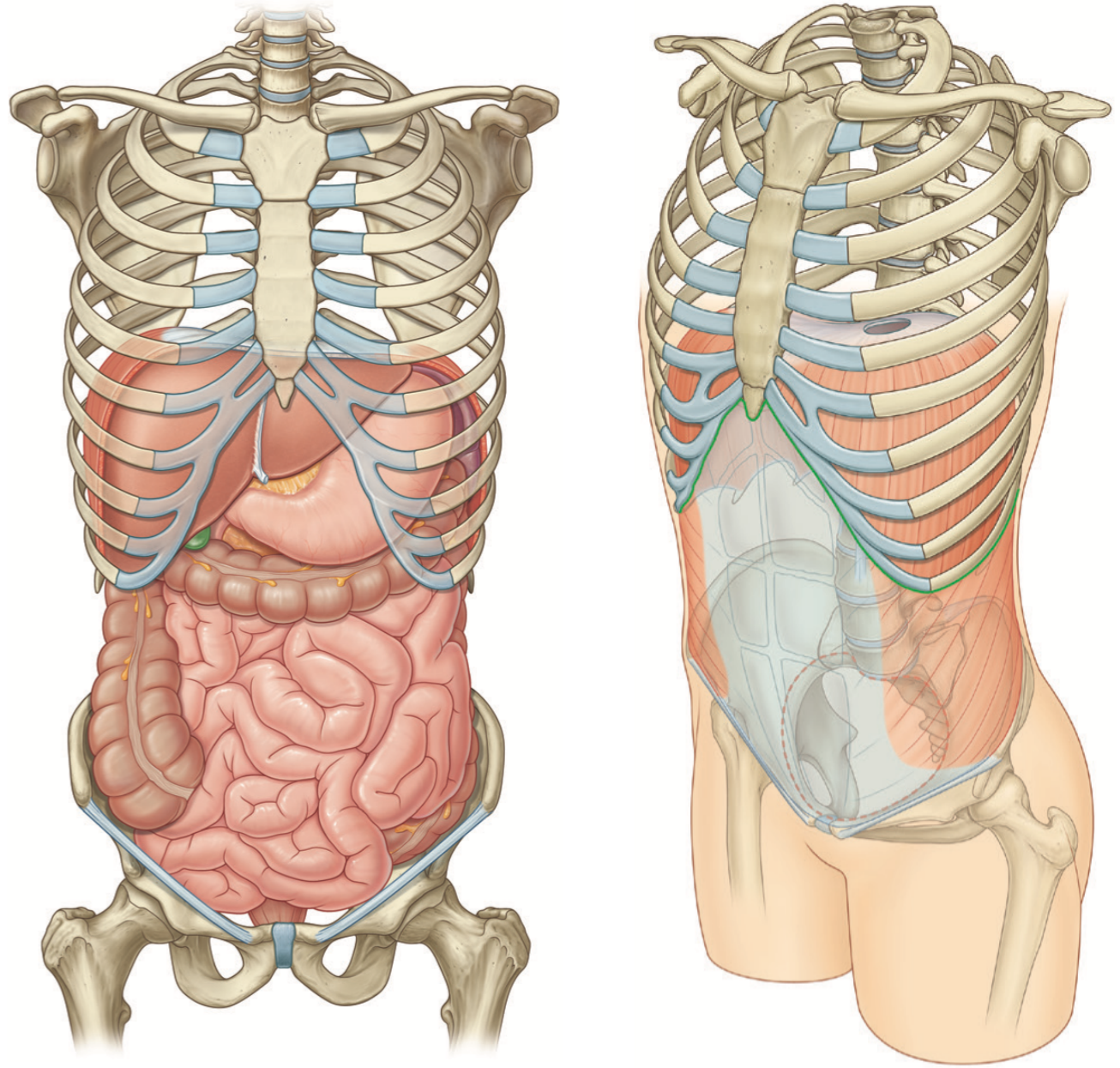
- ♦ *Urinary system*

- ♦ Kidneys

- ♦ Ureters

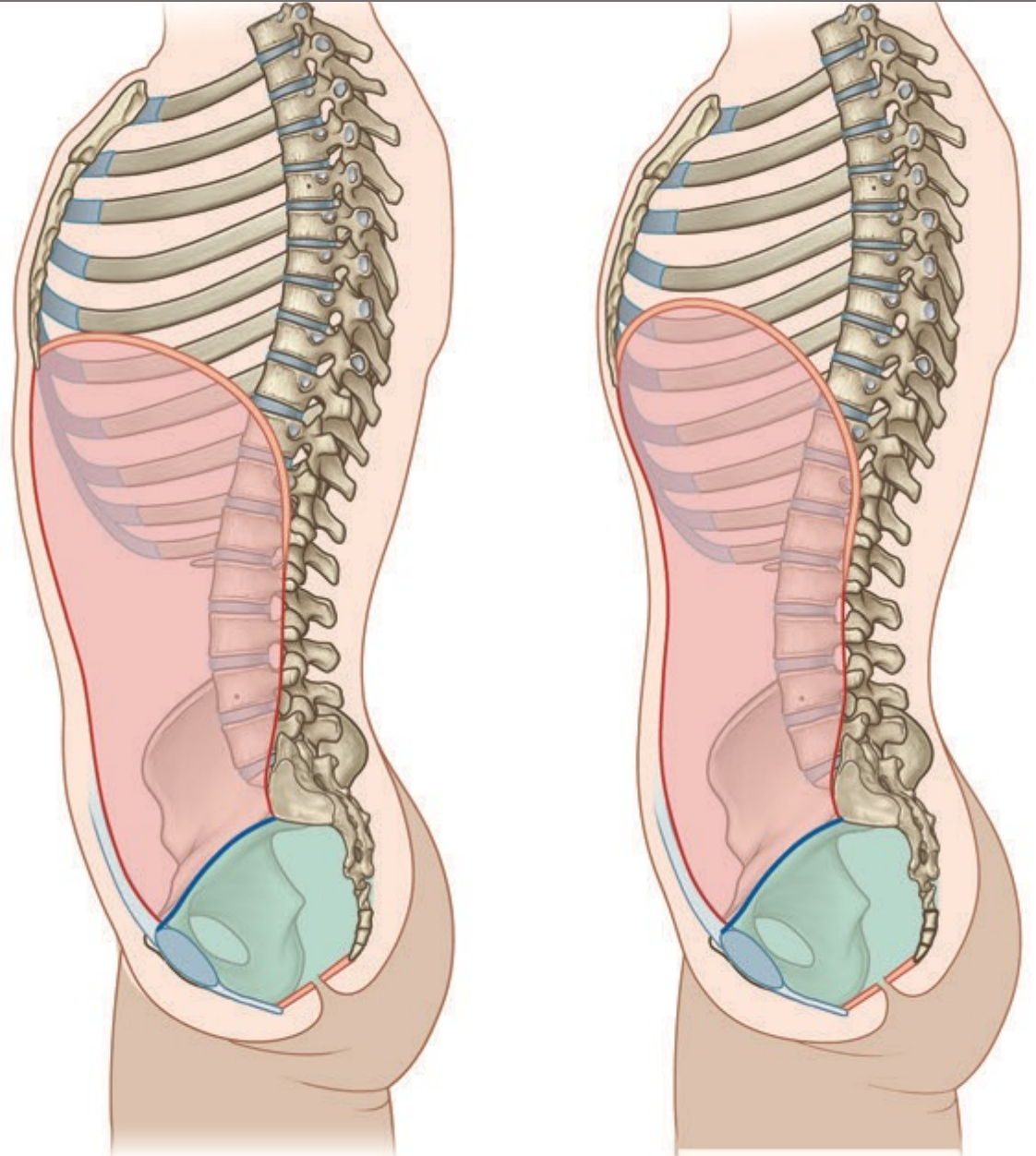
- ♦ Adrenal glands

- ♦ Vessels and nerves



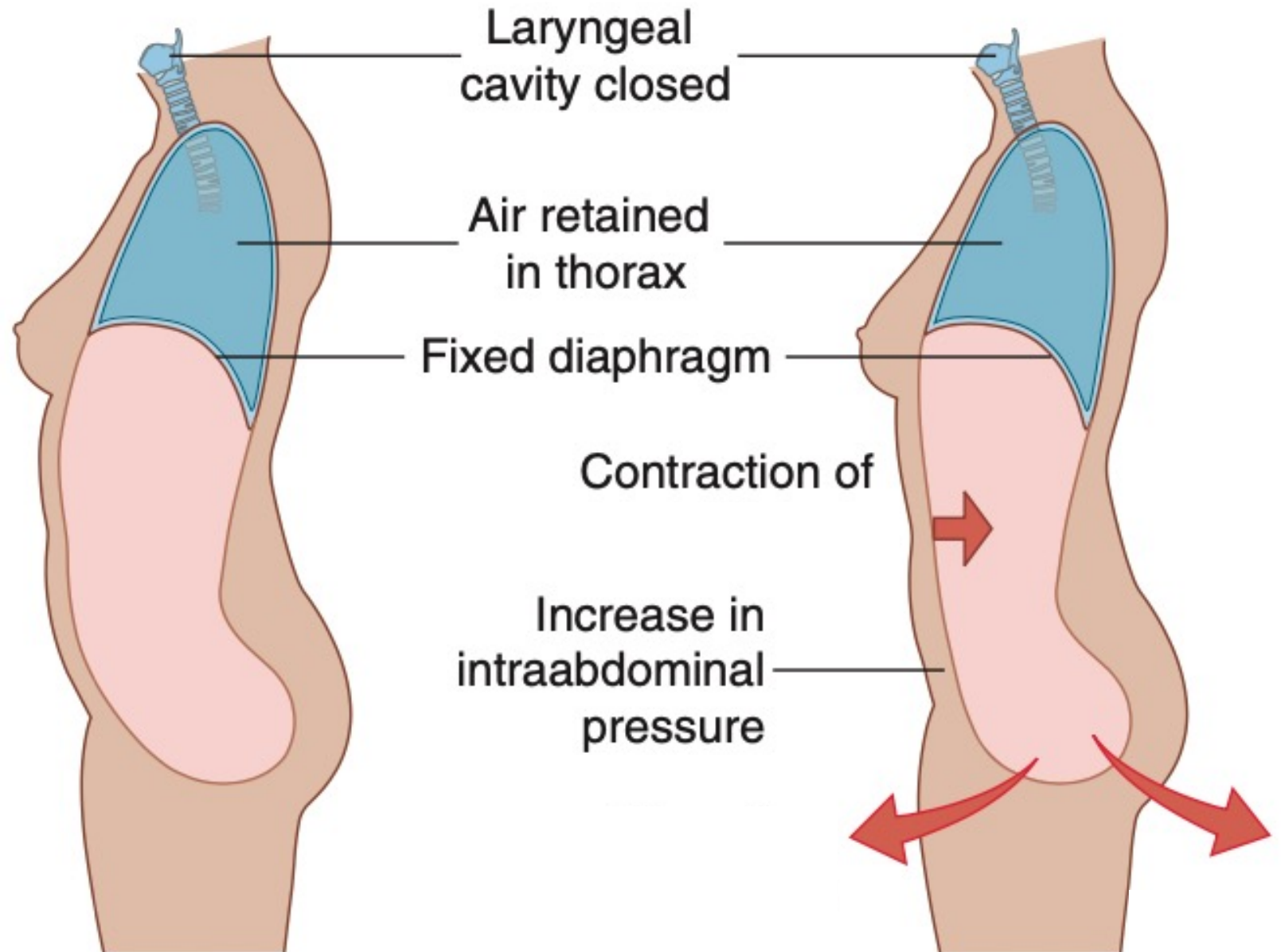
abdomen

🔴 Breathing function



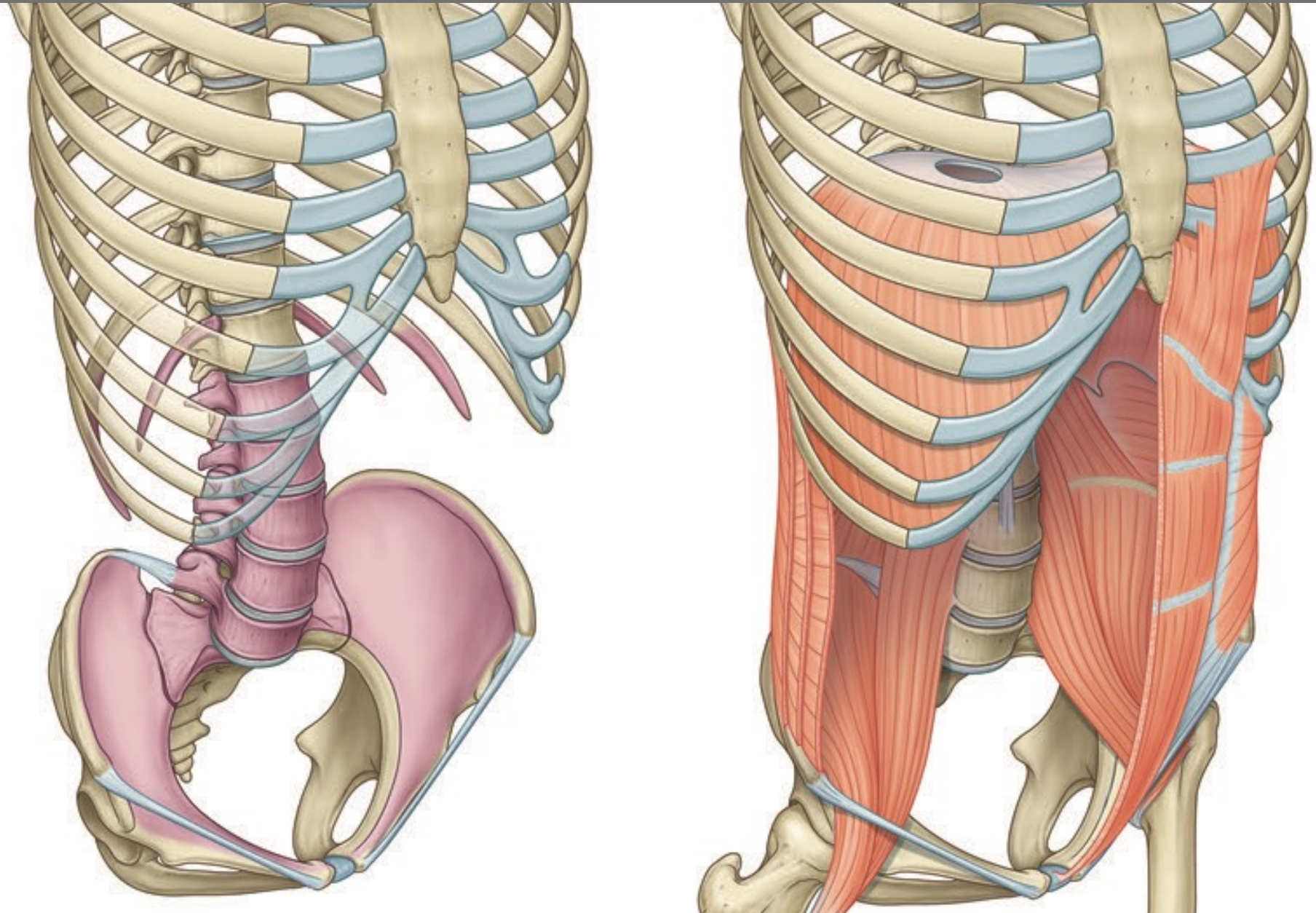
abdomen

- 💧 **Intraabdominal pressure**
- 💧 miction
- 💧 defecation
- 💧 deliverance



paries abdominalis

- 💧 Skin
- 💧 Bones
- 💧 Muscles
- 💧 Peritoneum



ossa et ligamenta

♦ Ossa

♦ Vertebrae lumborum

♦ Cartilaginee costales VII - X

♦ Costae fluctuantes

♦ *Costa XI*

♦ *Costa XII*

♦ Os sacrum

♦ Ossa pelvis

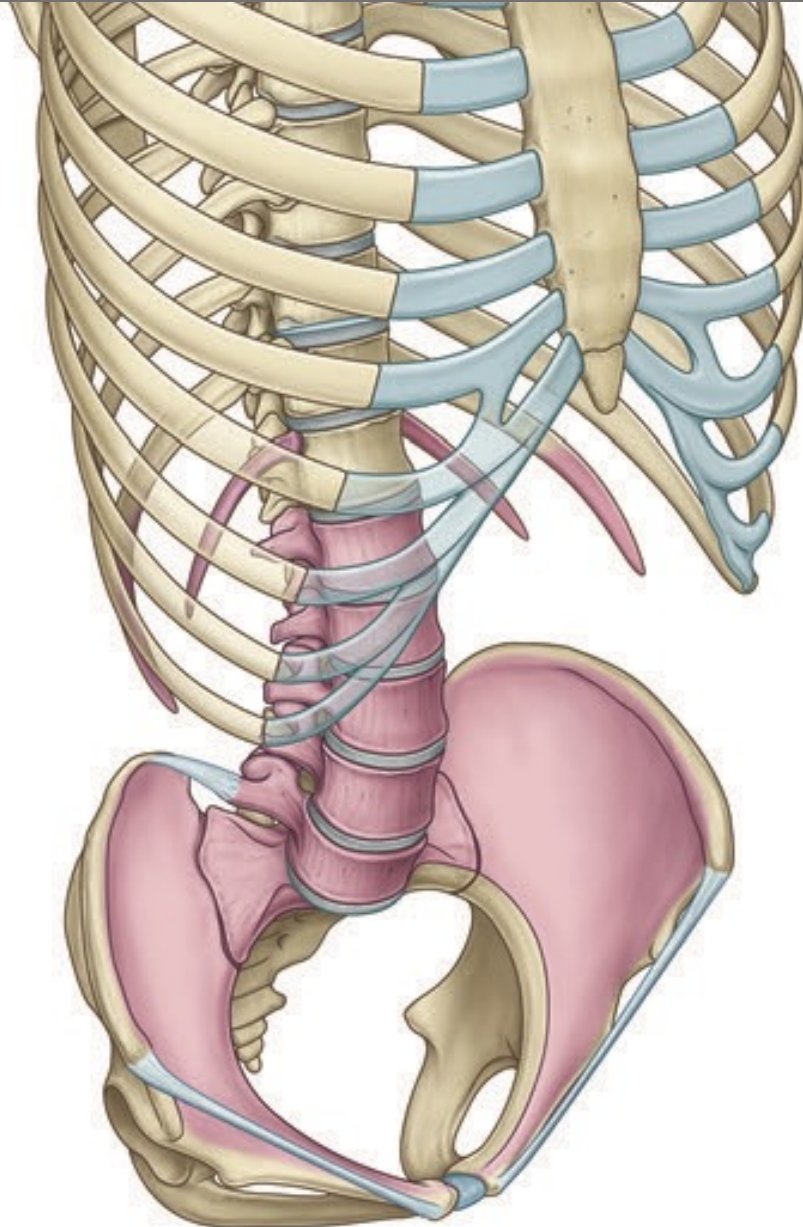
♦ *Os ilium*

♦ *Os pubis*

♦ Ligamenta

♦ Ligamentum iliolumbale

♦ Ligamentum inguinale



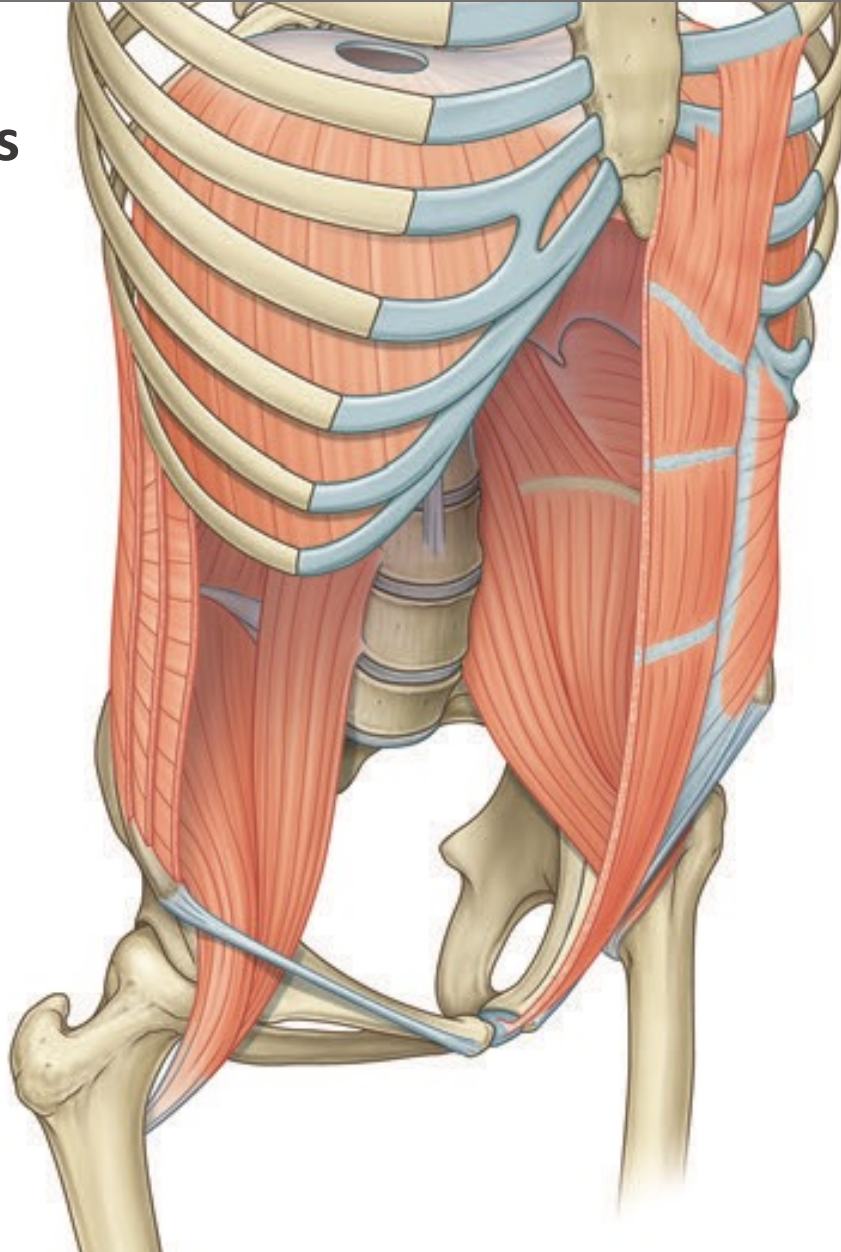
musculi

♦ anterolateral

- ♦ M. obliquus abdominis externus
- ♦ M. obliquus abdominis internus
- ♦ M. transversus abdominis
- ♦ M. rectus abdominis
- ♦ M. pyramidalis

♦ dorsal

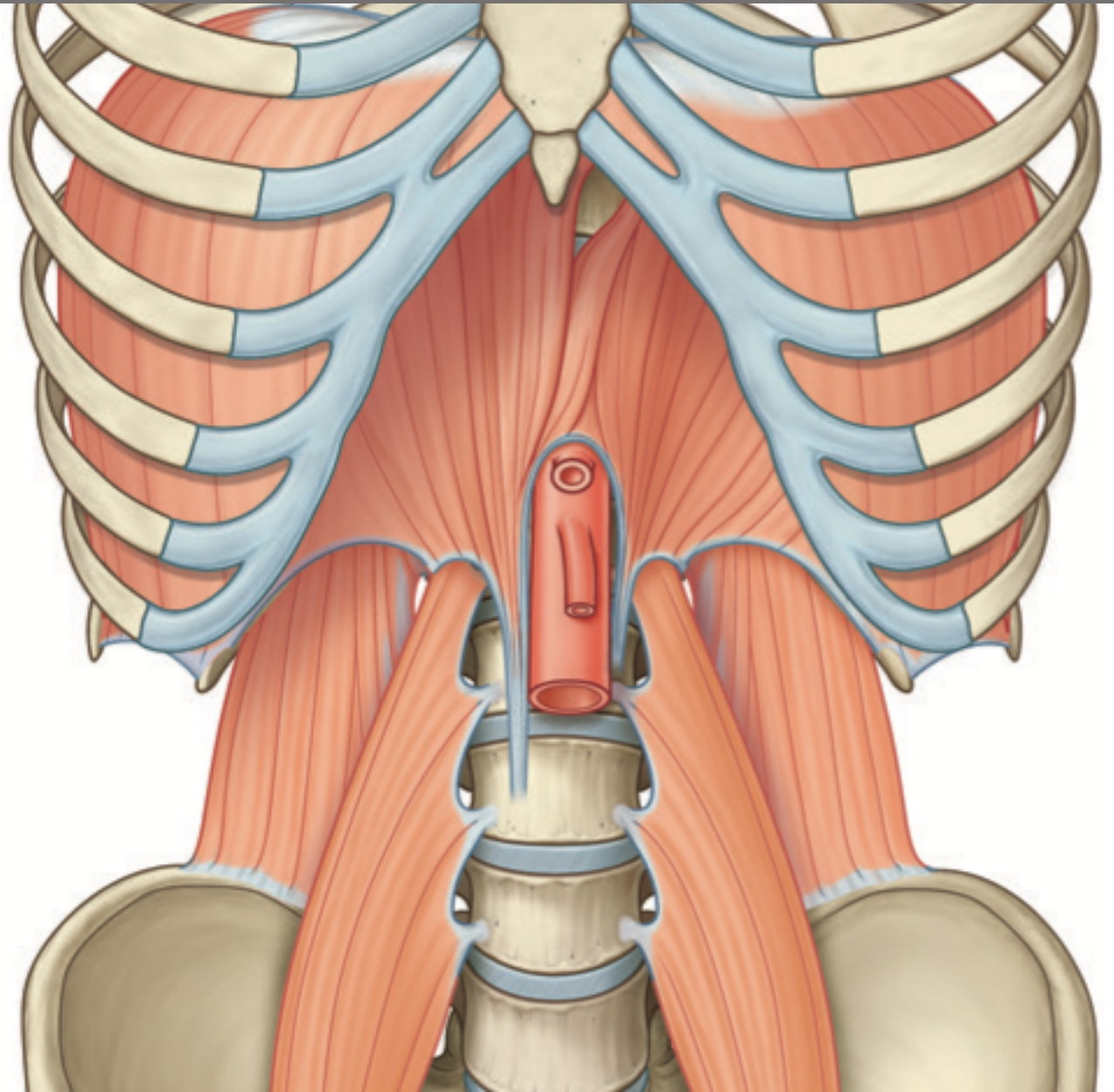
- ♦ M. quadratus lumborum
- ♦ M. psoas maior
- ♦ M. iliacus



apertura thoracica inferior

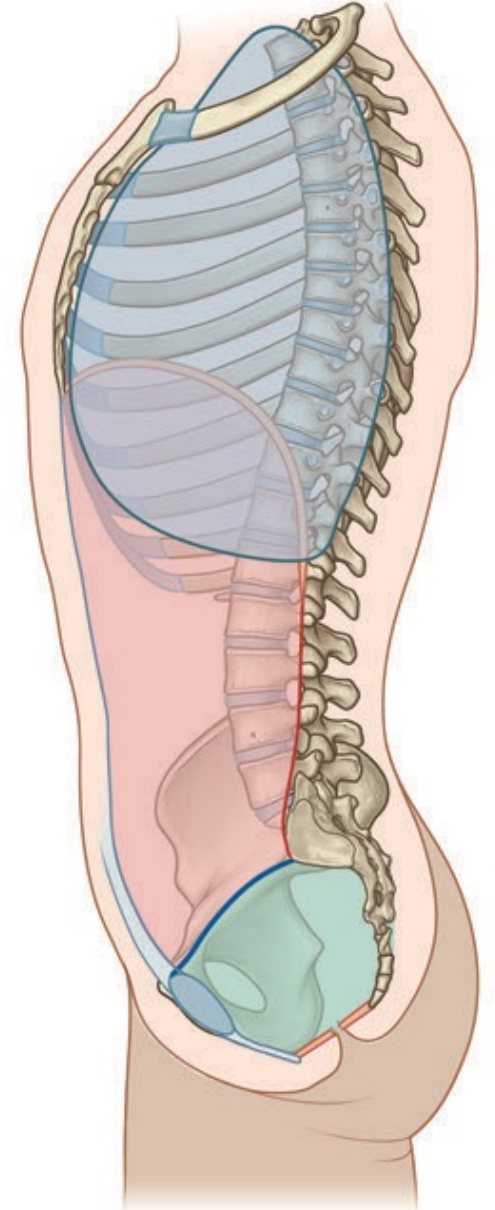
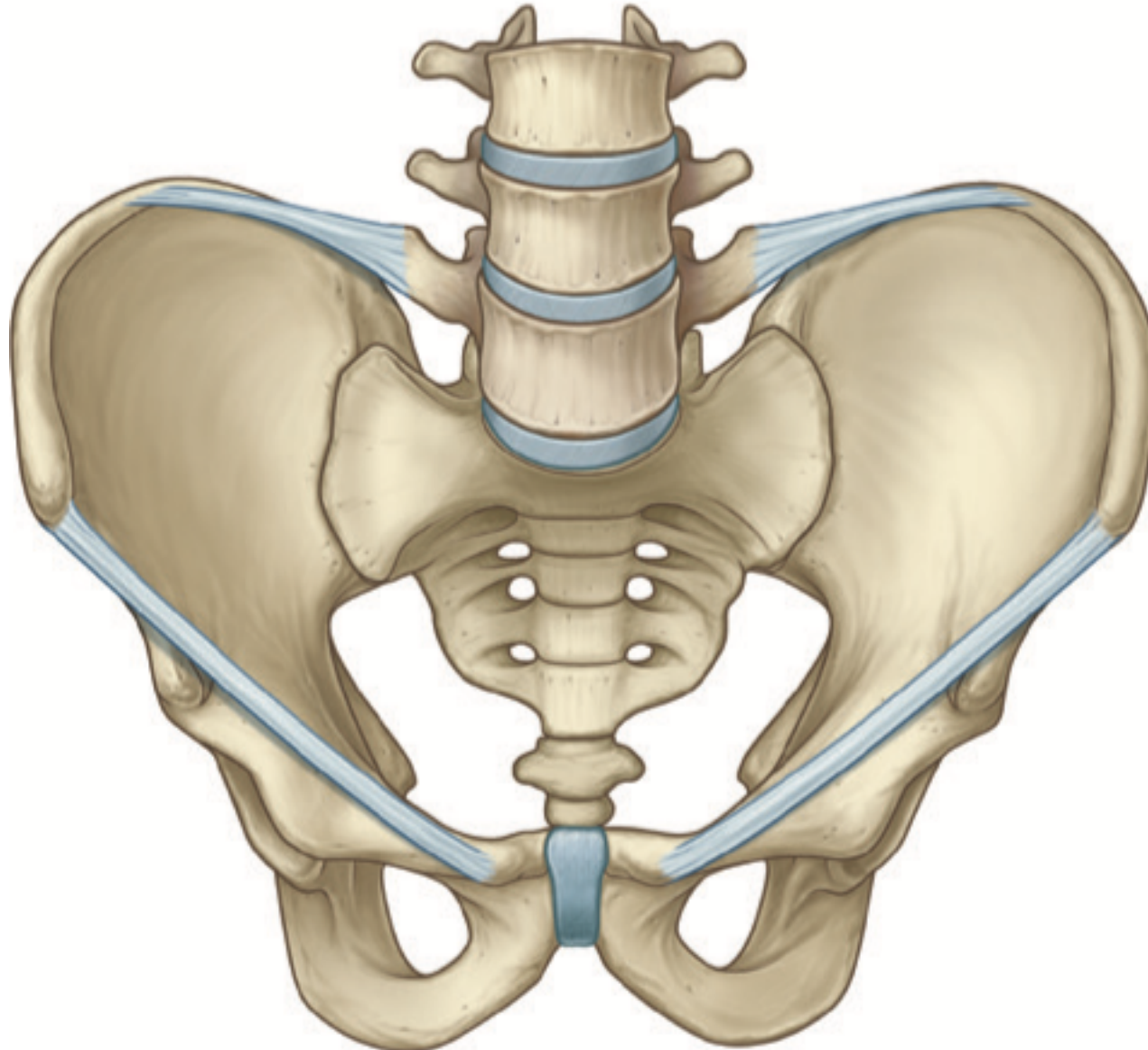
- 🔥 **Diaphragma**
 - 🔥 **Facies abdominalis**
- 🔥 **Crus diaphragmatis dextrum L3**
- 🔥 **Crus diaphragmatis sinistrum L2**
- 🔥 **Ligamentum arcuatum laterale**
- 🔥 **Ligamentum arcuatum mediale**

- 🔥 **Hiatus aorticus Th 12**
- 🔥 **Hiatus oesophagealis Th 11**
- 🔥 **Apertura venae cavae inferioris Th 10**



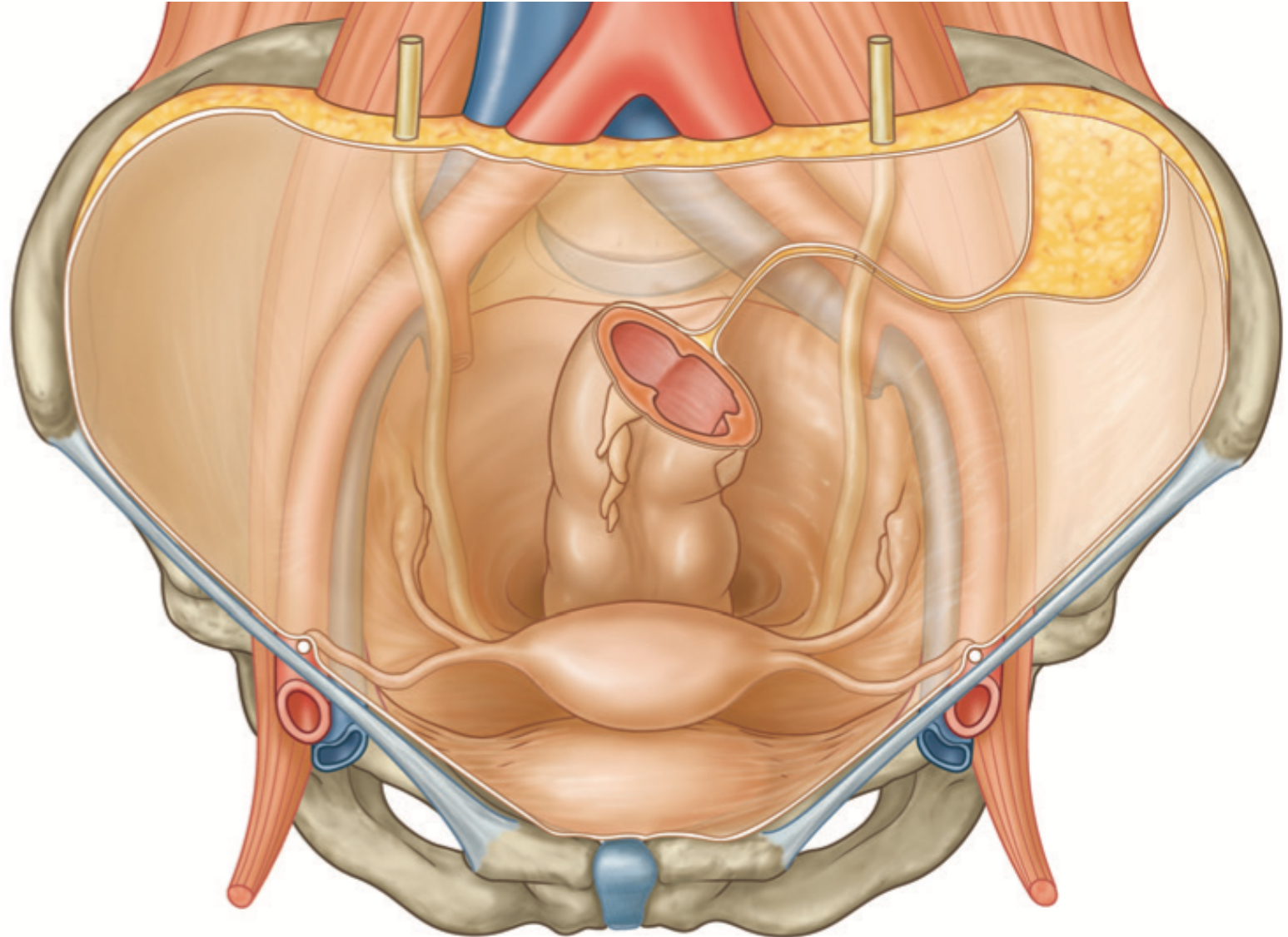
apertura pelvis

- ♦ Os sacrum – S1
- ♦ Os ilium
- ♦ Os pubis
- ♦ Symphysis pubis
- ♦ **cavitas pelvis**
- ♦ Vesica urinaria
- ♦ Uterus
- ♦ Ovaria
- ♦ Rectum



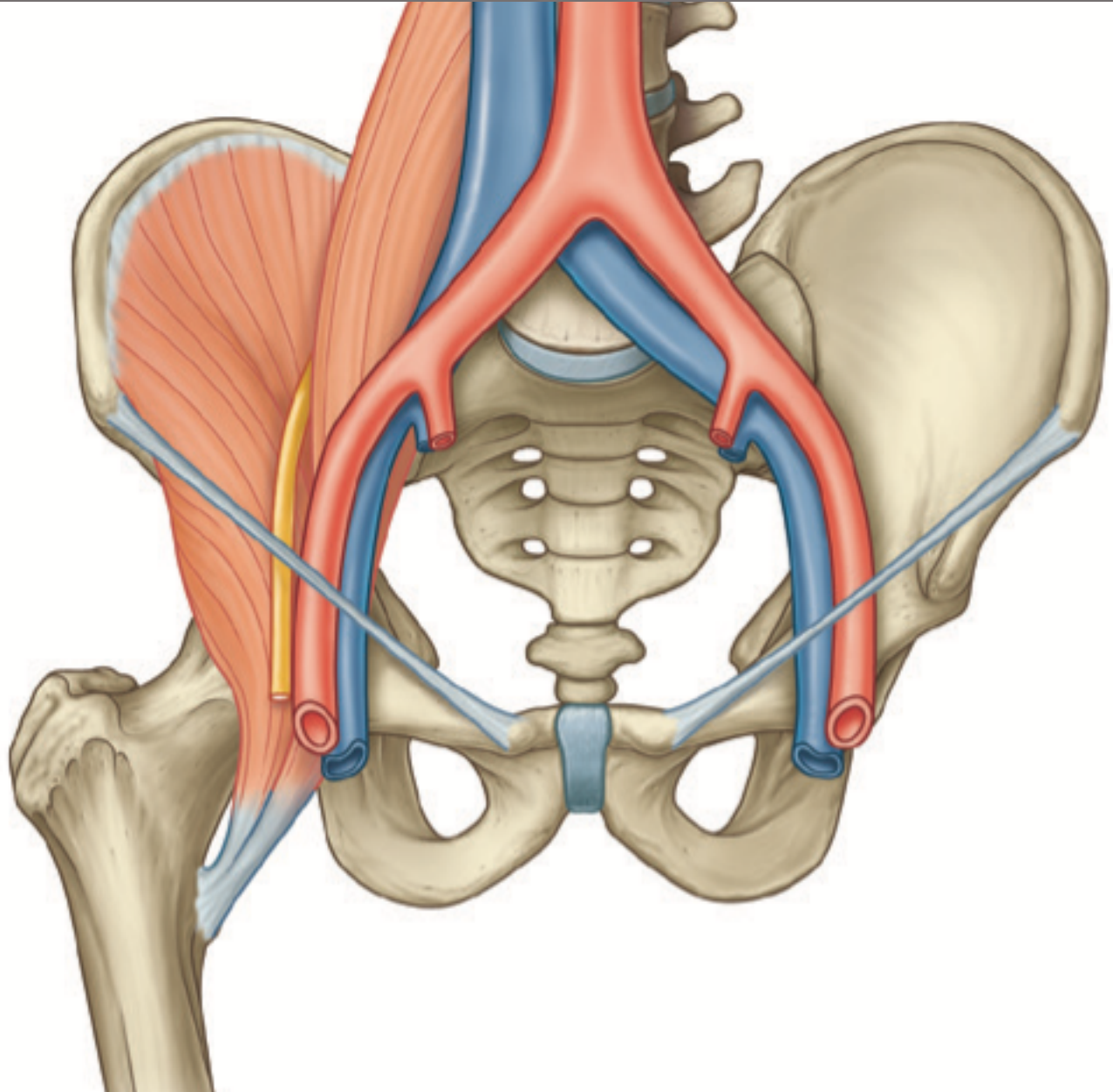
cavitas abdominalis et pelvis

- 💧 **Peritoneal lining continues to pelvis**
- 💧 Vesica urinaria
- 💧 Uterus
- 💧 Ovaria
- 💧 Rectum



Abdomen-lower extremity interface

- ♦ **passing**
- ♦ Arteria iliaca externa
- ♦ Vena iliaca externa
- ♦ Vasa lymphatica
- ♦ Nervus femoralis
- ♦ M. psoas major
- ♦ M. iliacus
- ♦ **Inguinal ligament**



abdomen

- 🔥 **surface**

- 🔥 **quadrants**

- 🔥 **verticals**

- 🔥 *planum mediale*

- 🔥 *proc. xiphoideus – symphysis pubis*

- 🔥 **horizontals**

- 🔥 *planum transumbilicale*

- 🔥 *umbilicus*

- 🔥 **Nine segments**

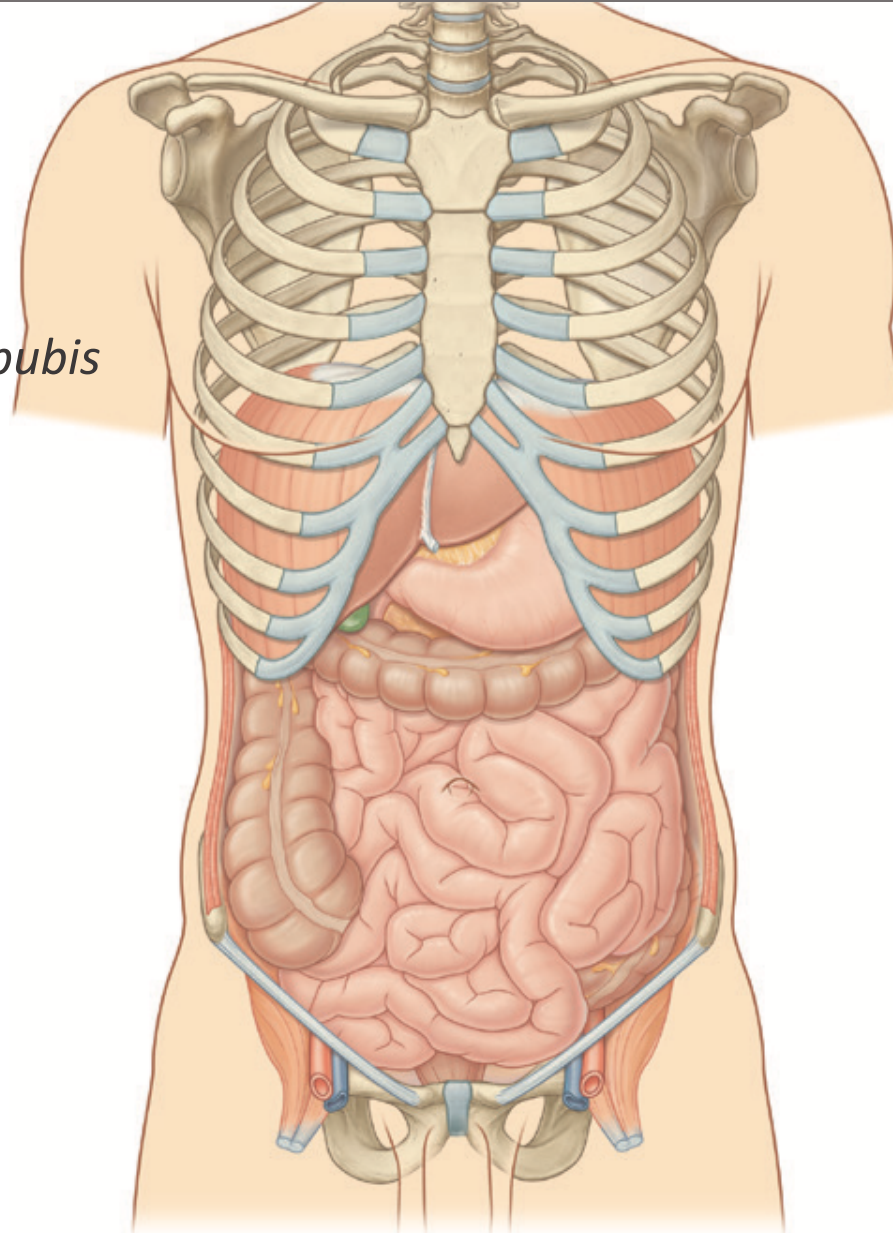
- 🔥 **verticals**

- 🔥 *Medioclavicular lines*

- 🔥 **horizontals**

- 🔥 *Planum subcostale*

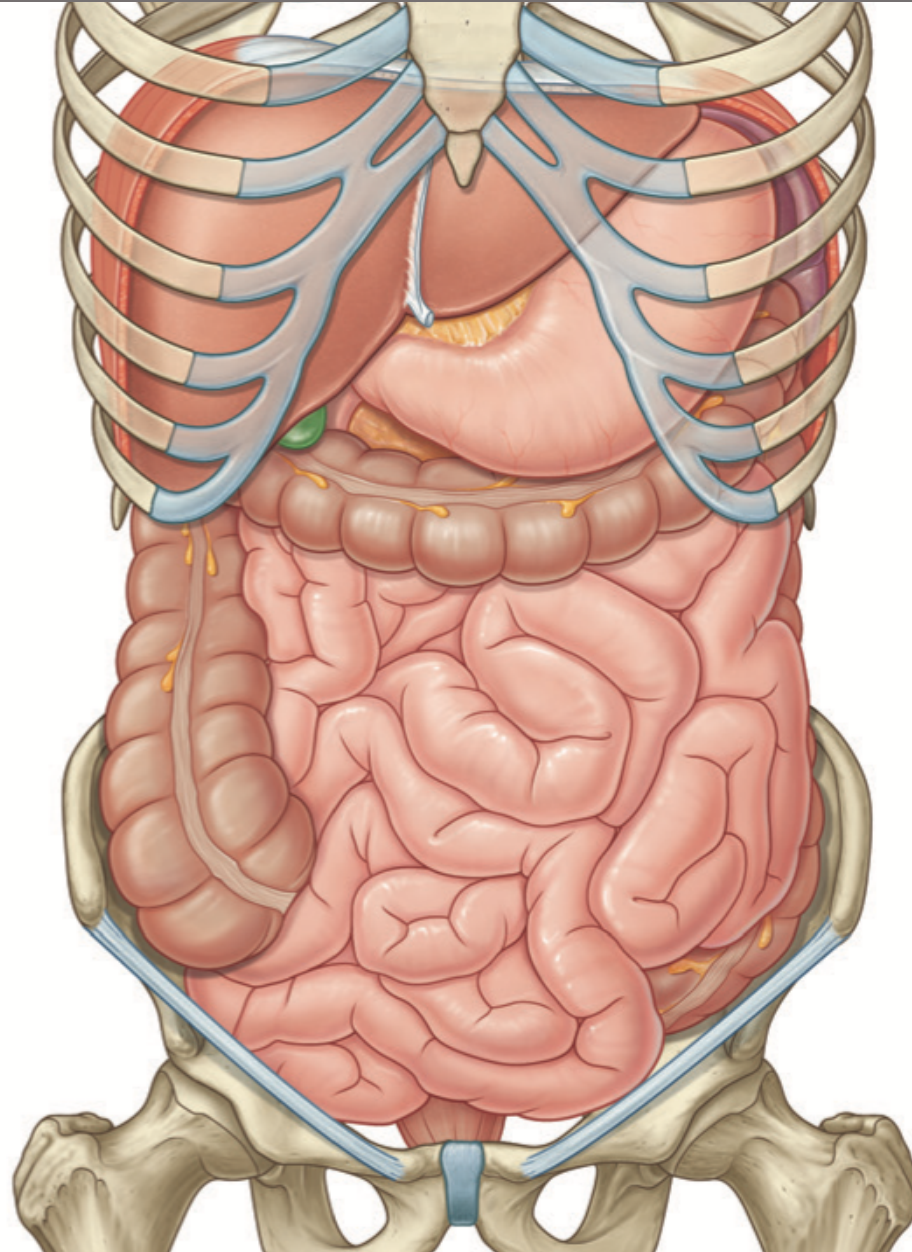
- 🔥 *Planum intertuberculare*



regiones

- ♦ *Hypochondrium*
- ♦ *Epigastrium*
- ♦ *Mesogastrium*
 - ♦ *reg umbilicalis*
- ♦ *Regio lateralis (flank)*
- ♦ *Hypogastrium – reg. pubica*
- ♦ *Inguina*

- ♦ *points*
 - ♦ *Murphy – ves. felea*
 - ♦ *Desjardins - pancreas*
 - ♦ *McBurney - appendix*
 - ♦ *Lanz – apex appendicis*

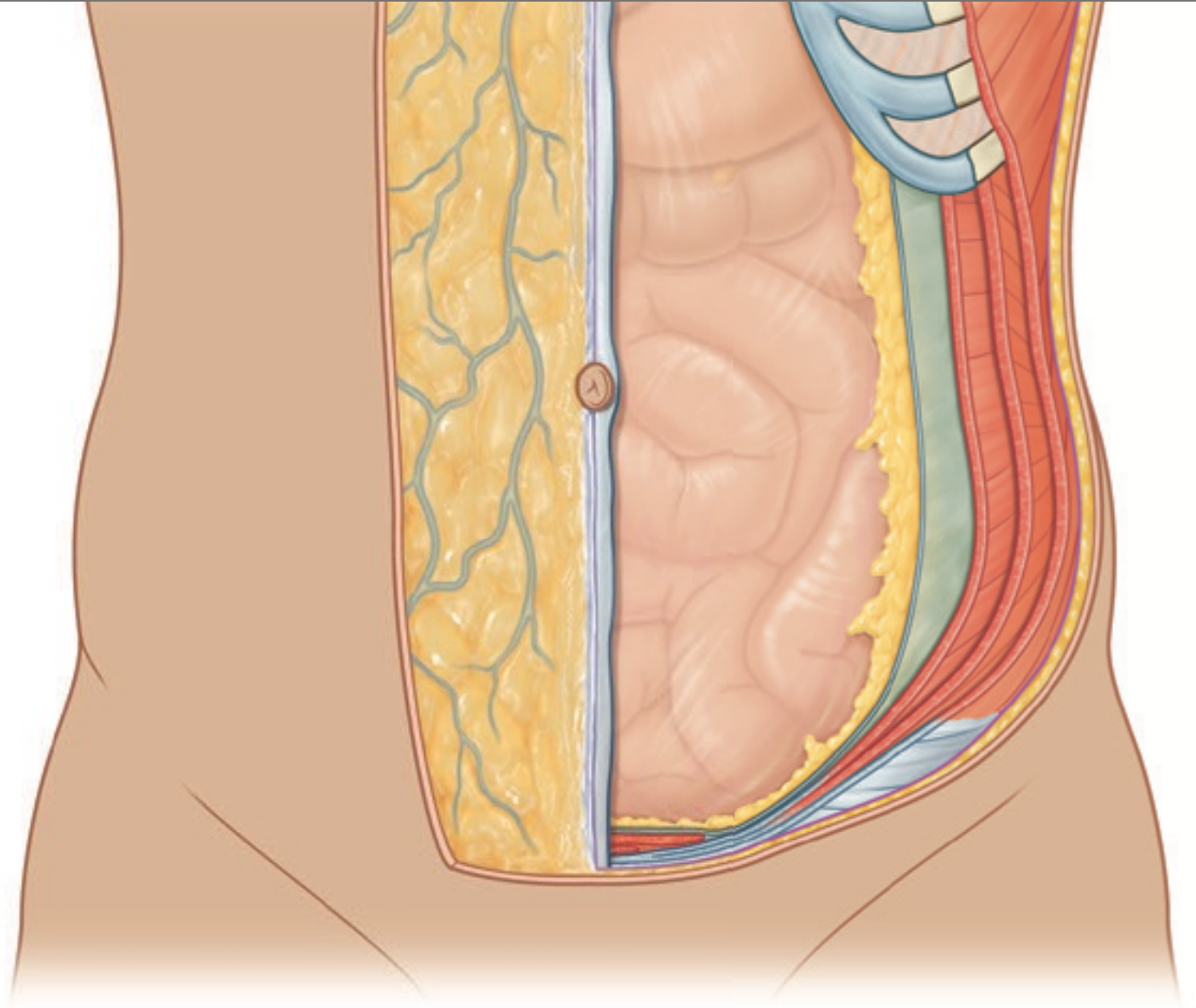


abdominal wall

- 🔥 **Processus xiphoideus**
- 🔥 **Cartilagines costarum**
- 🔥 **Symphysis**
- 🔥 **Ligamentum inguinale**
- 🔥 **Crista ilium**
- 🔥 **Vertebrae lumbales**

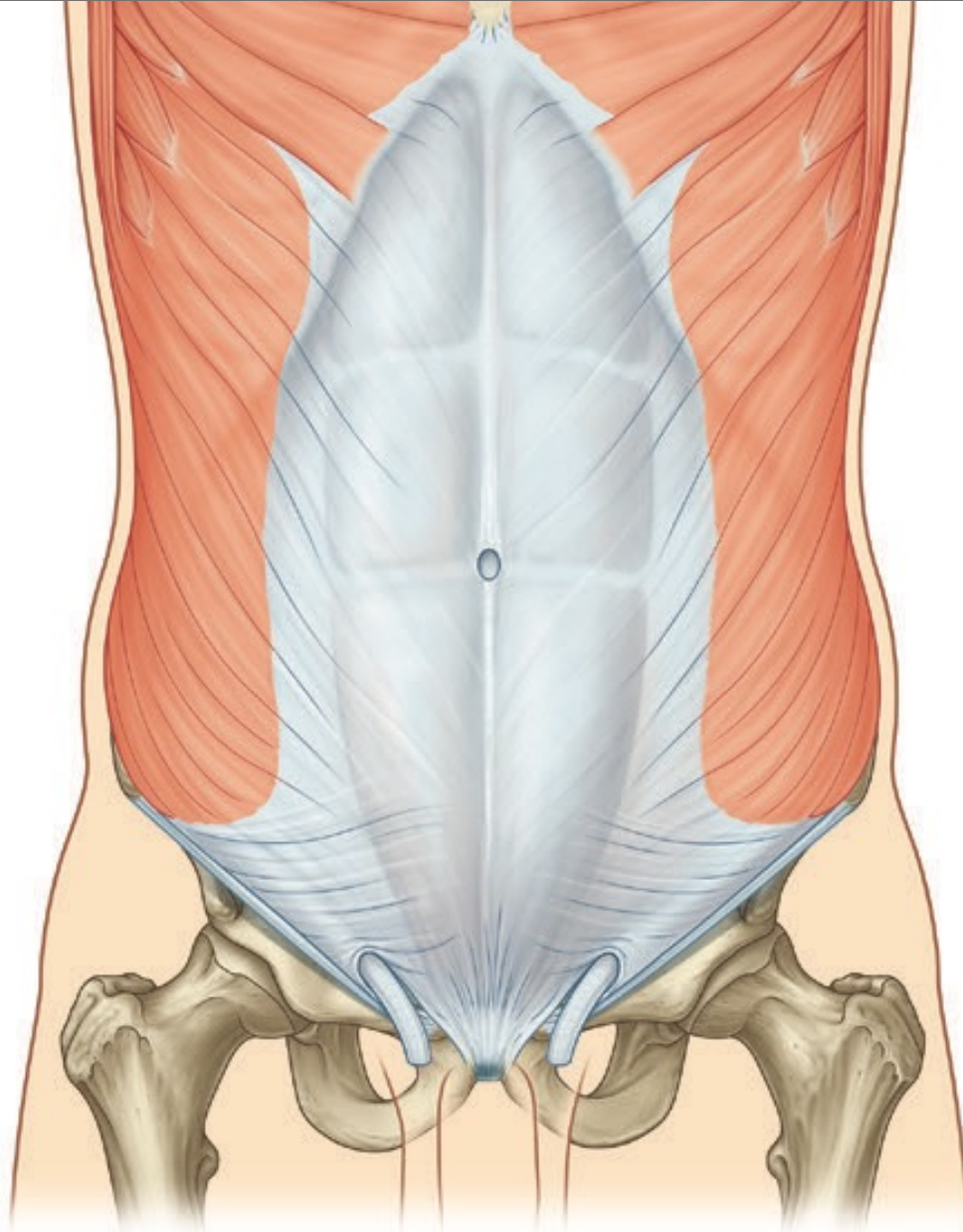
abdominal wall

- ♦ **Fascia superficialis**
- ♦ Subcutaneous fatty tissue
- ♦
- ♦ **Stratum superficiale (Camper)**
- ♦ Contains fat
- ♦ Follows as
 - ♦ Fascia dartos scroti
 - ♦ Fascia penis
- ♦ **Stratum profundum (Scarpa)**
- ♦ Thin membranous layer
 - ♦ Minimum of fat
- ♦ Continues as
 - ♦ fascia superficialis perinei (Colles)



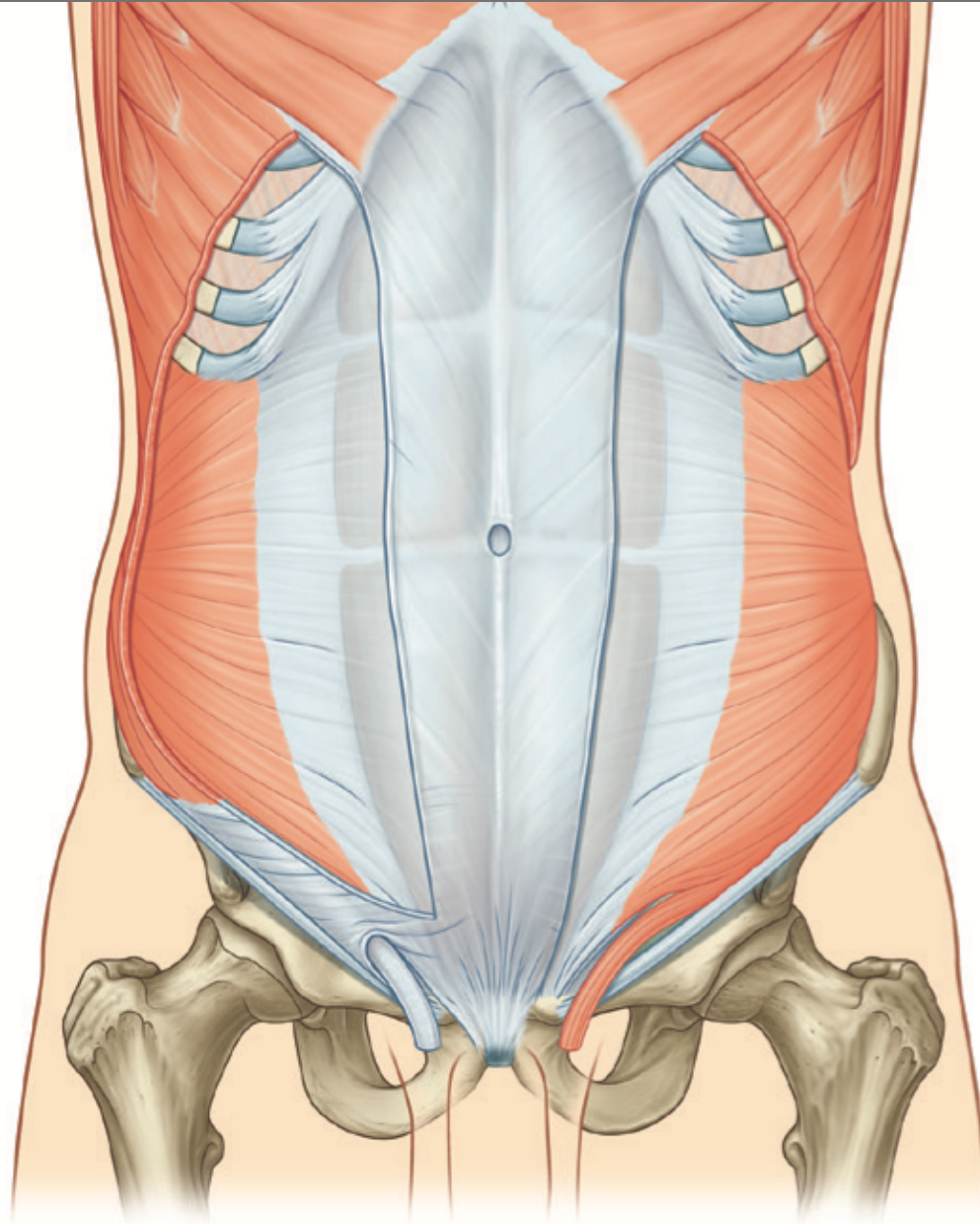
musculi

- ♦ anterolateral
- ♦ M. obliquus abdominis externus
- ♦ Linea alba
- ♦ Aponeurosis m. obliqui externi
- ♦ Ligamentum inguinale
- ♦ *M. obliquus abdominis internus*
- ♦ *M. transversus abdominis*
- ♦ *M. pyramidalis*
- ♦ *M. rectus abdominis*



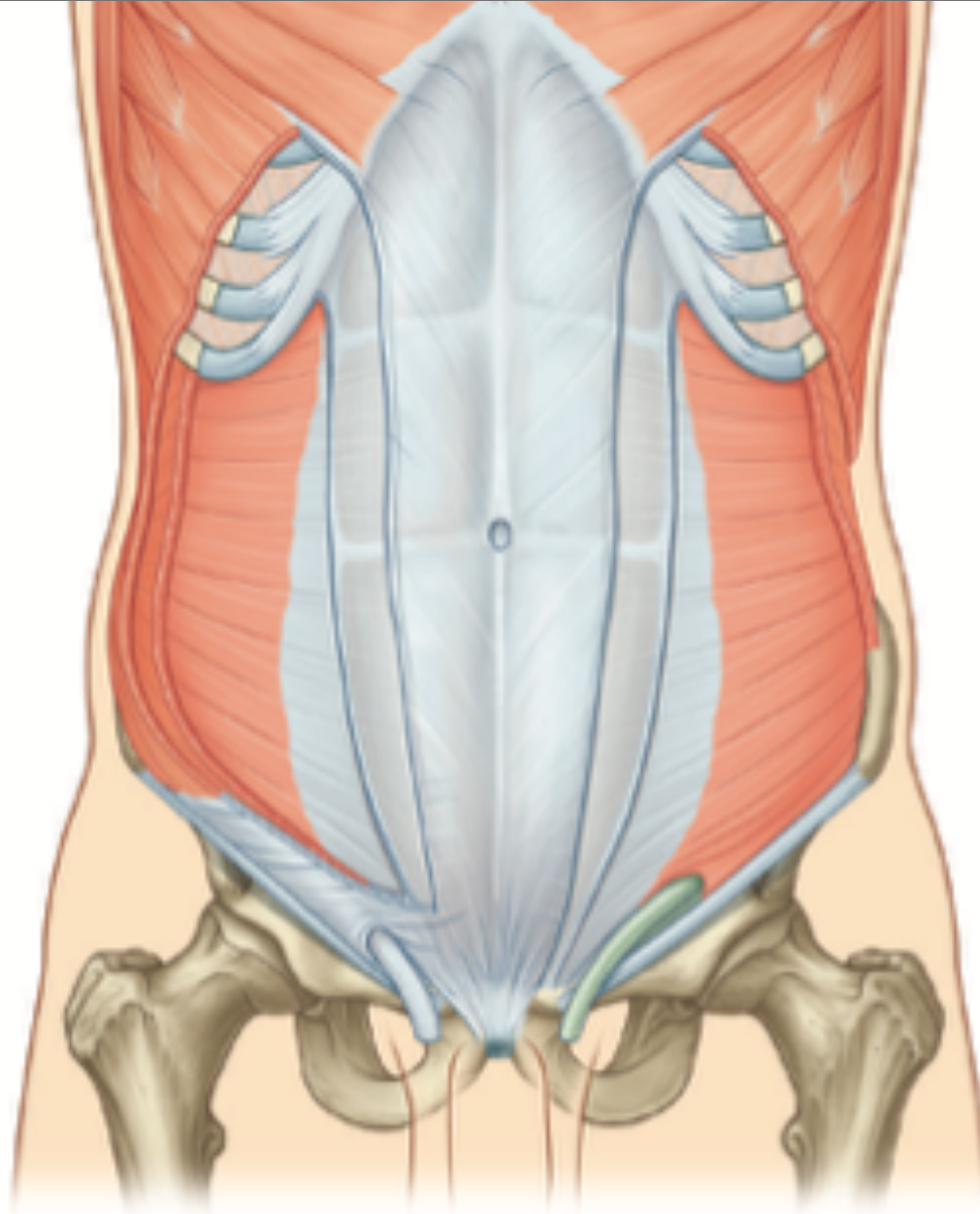
musculi

- ♦ **anterolateral**
- ♦ *M. obliquus abdominis externus*
- ♦ *Linea alba*
- ♦ *Aponeurosis m. obliqui externi*
- ♦ *Ligamentum inguinale*
- ♦ ***M. obliquus abdominis internus***
- ♦ *M. transversus abdominis*
- ♦ *M. pyramidalis*
- ♦ *M. rectus abdominis*



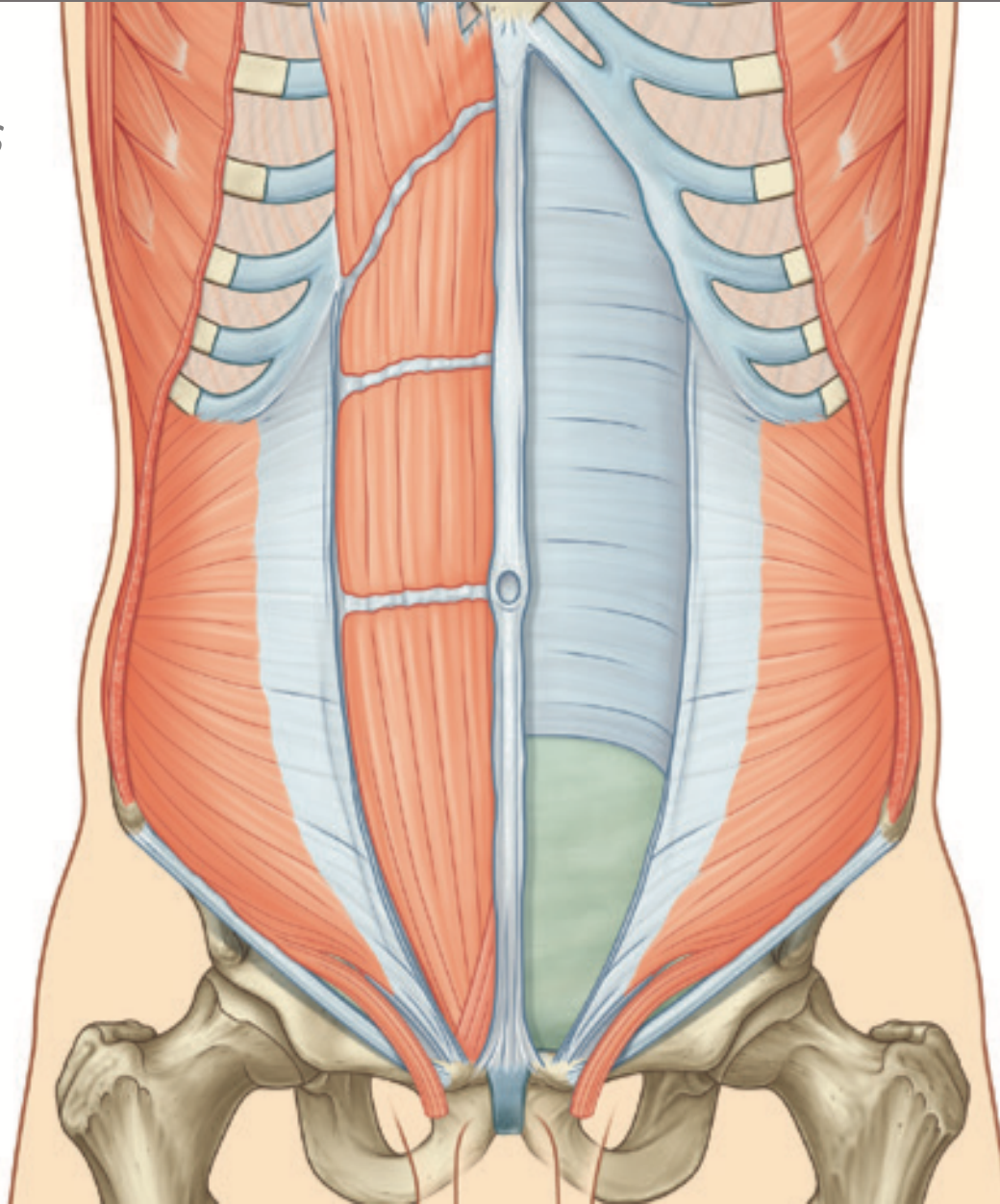
musculi

- ♦ **anterolateral**
- ♦ *M. obliquus abdominis externus*
- ♦ *Linea alba*
- ♦ *Aponeurosis m. obliqui externi*
- ♦ *Ligamentum inguinale*
- ♦ *M. obliquus abdominis internus*
- ♦ **M. transversus abdominis**
- ♦ *M. pyramidalis*
- ♦ *M. rectus abdominis*



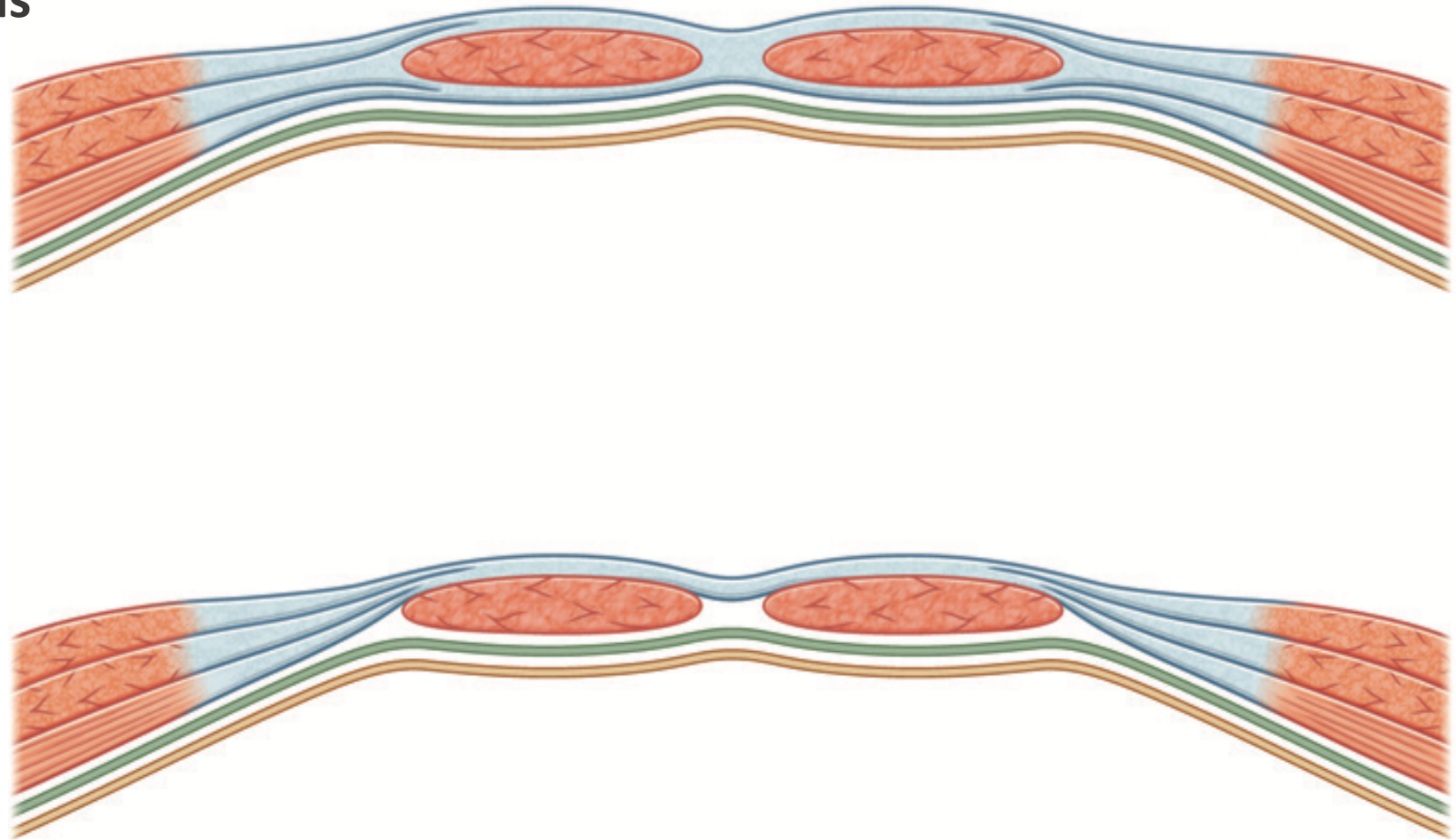
musculi

- ♦ anterolateral
- ♦ *M. obliquus abdominis externus*
- ♦ *Linea alba*
- ♦ *Aponeurosis*
- ♦ *Ligamentum inguinale*
- ♦ *M. obliquus abdominis internus*
- ♦ *M. transversus abdominis*
- ♦ *M. pyramidalis - rudiment*
- ♦ **M. rectus abdominis**
- ♦ Intersectiones tendineres
- ♦ **Vagina m. recti abdominis**
 - ♦ 3/4
- ♦ **Fascia transversalis**



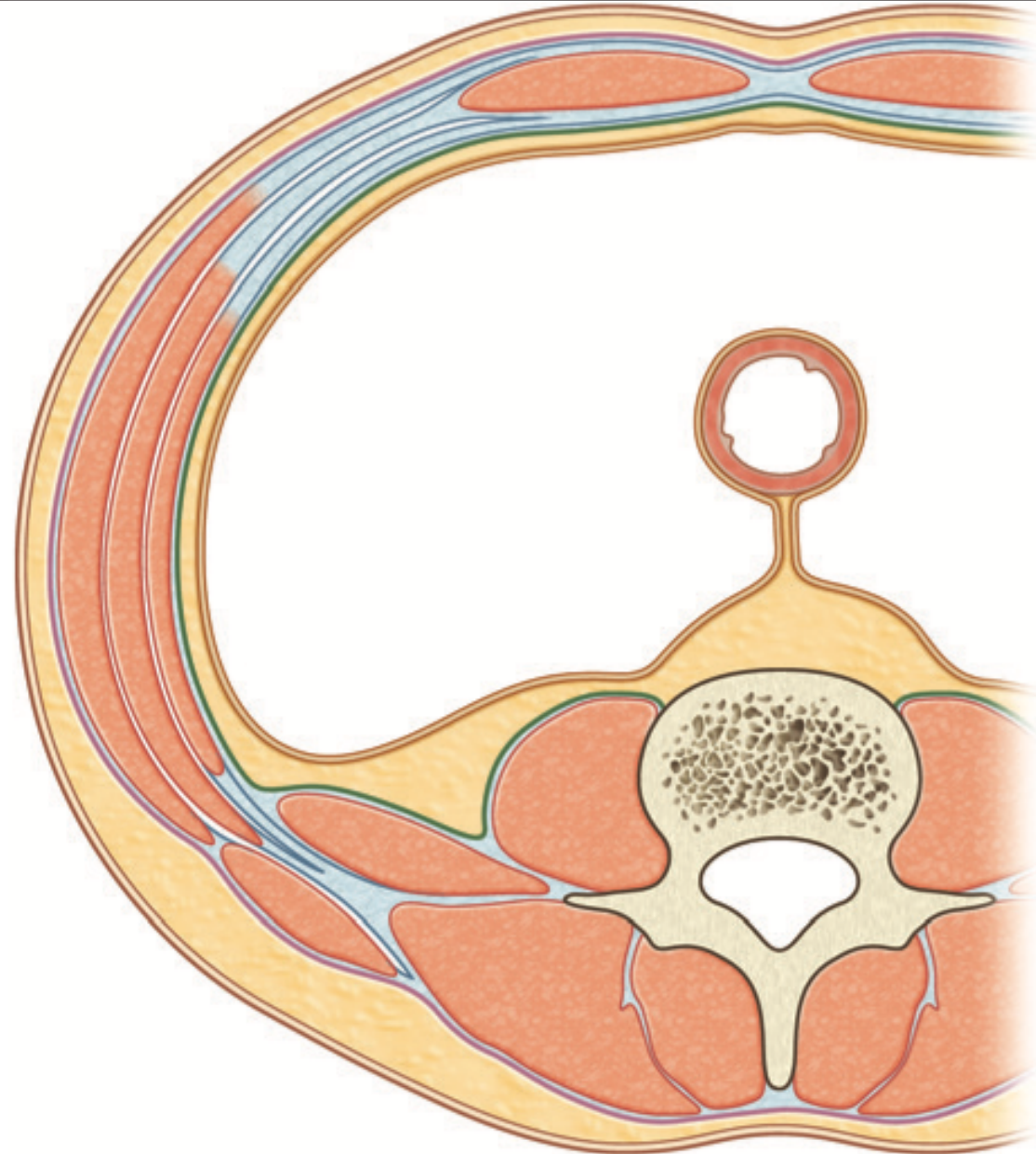
musculi

- 💧 M. obliquus abdominis externus
- 💧 M. obliquus abdominis internus
- 💧 M. transversus abdominis
- 💧 M. rectus abdominis
- 💧 **Aponeuroses**
- 💧 **Linea alba**
- 💧 **Vagina m. recti abdominis**
- 💧 **Fascia transversalis**
- 💧 **Peritoneum**



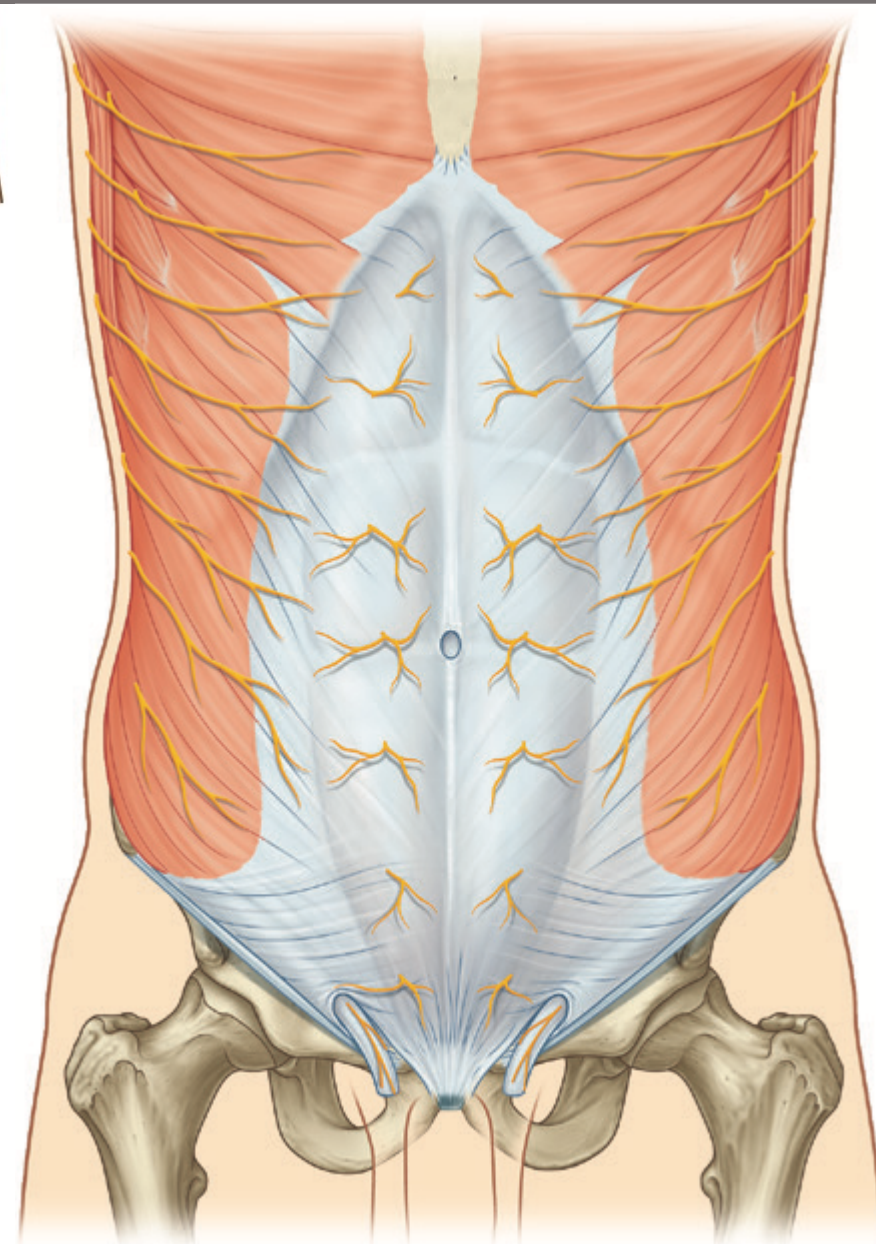
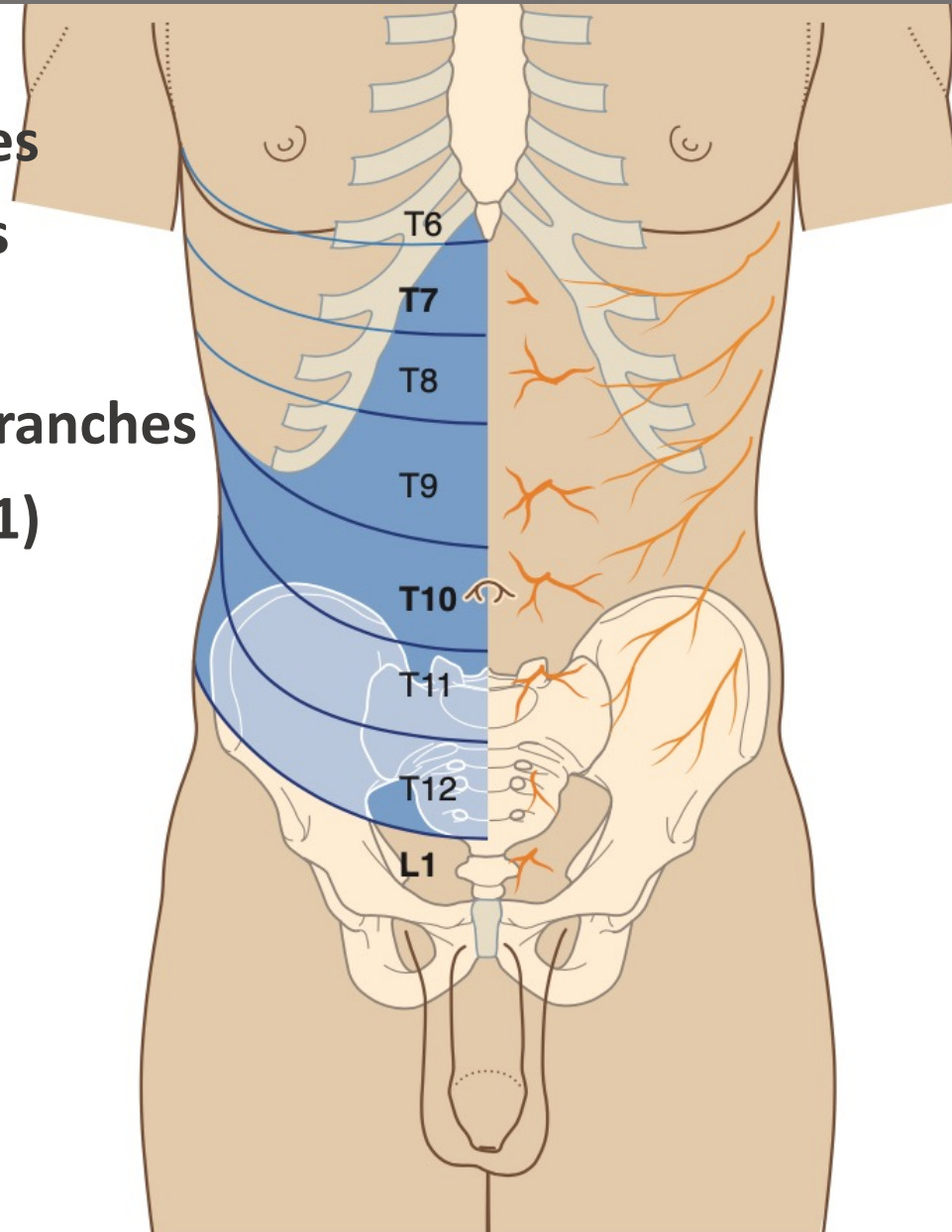
fascia extraperitonealis

- ♦ *Fascia superficialis*
 - ♦ *Camper, Scarpa*
- ♦ *Musculi et aponeuroses*
- ♦ *Fascia transversalis*
- ♦ **Fascia extraperitonealis**
- ♦ **Pars preperitonealis**
- ♦ **Pars retroperitonealis**
 - ♦ *Retroperitoneální viscera*
- ♦ *Peritoneum parietale*
- ♦ *Peritoneum viscerale*



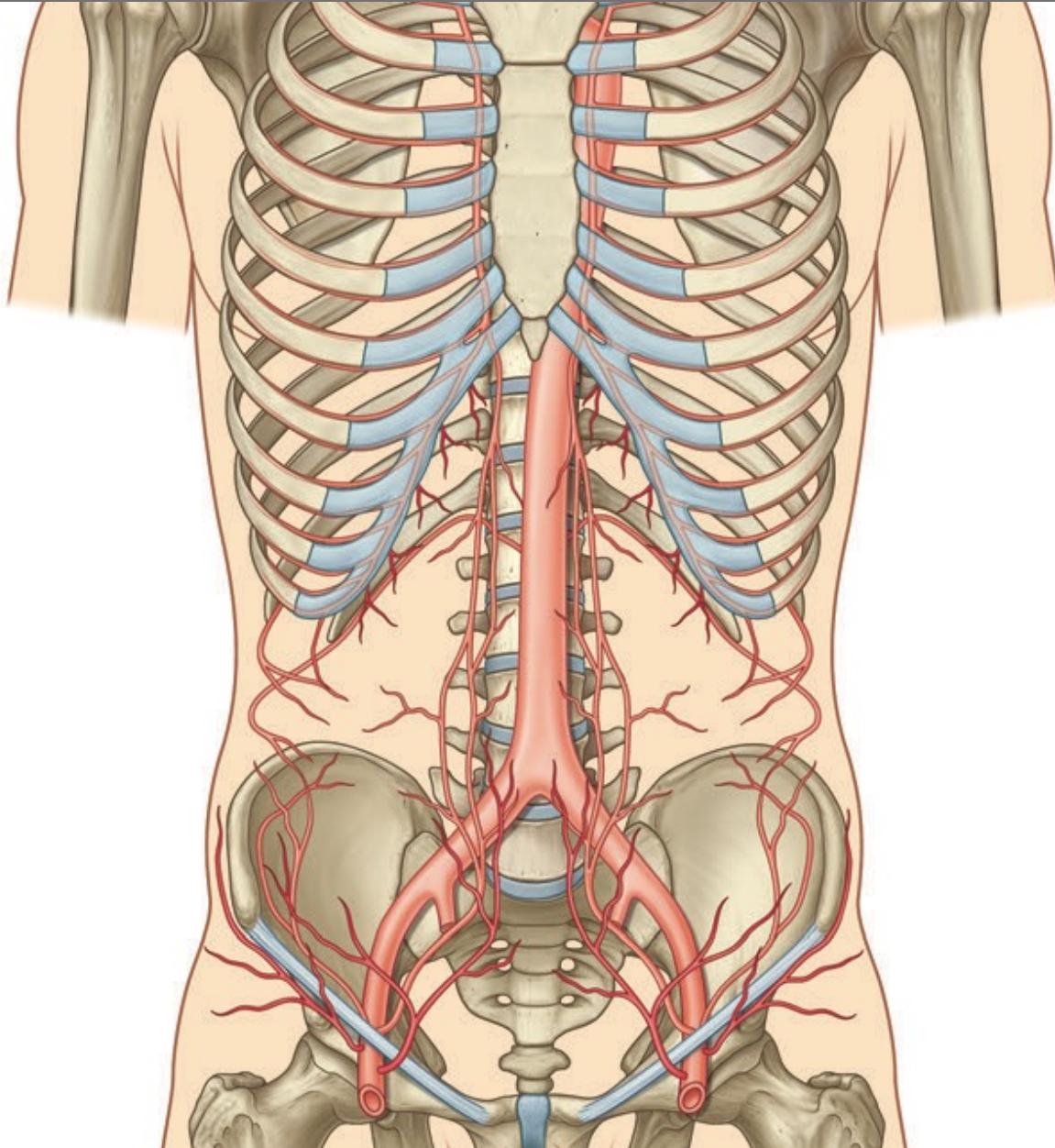
innervation

- ♦ **skin Th 12 – L1**
- ♦ Rami cutanei anteriores
- ♦ Rami cutanei laterales
- ♦ **muscles Th7-12, L1**
- ♦ Muscular segmental branches
- ♦ N. iliohypogastricus (L1)
- ♦ N. ilioinguinalis (L1)



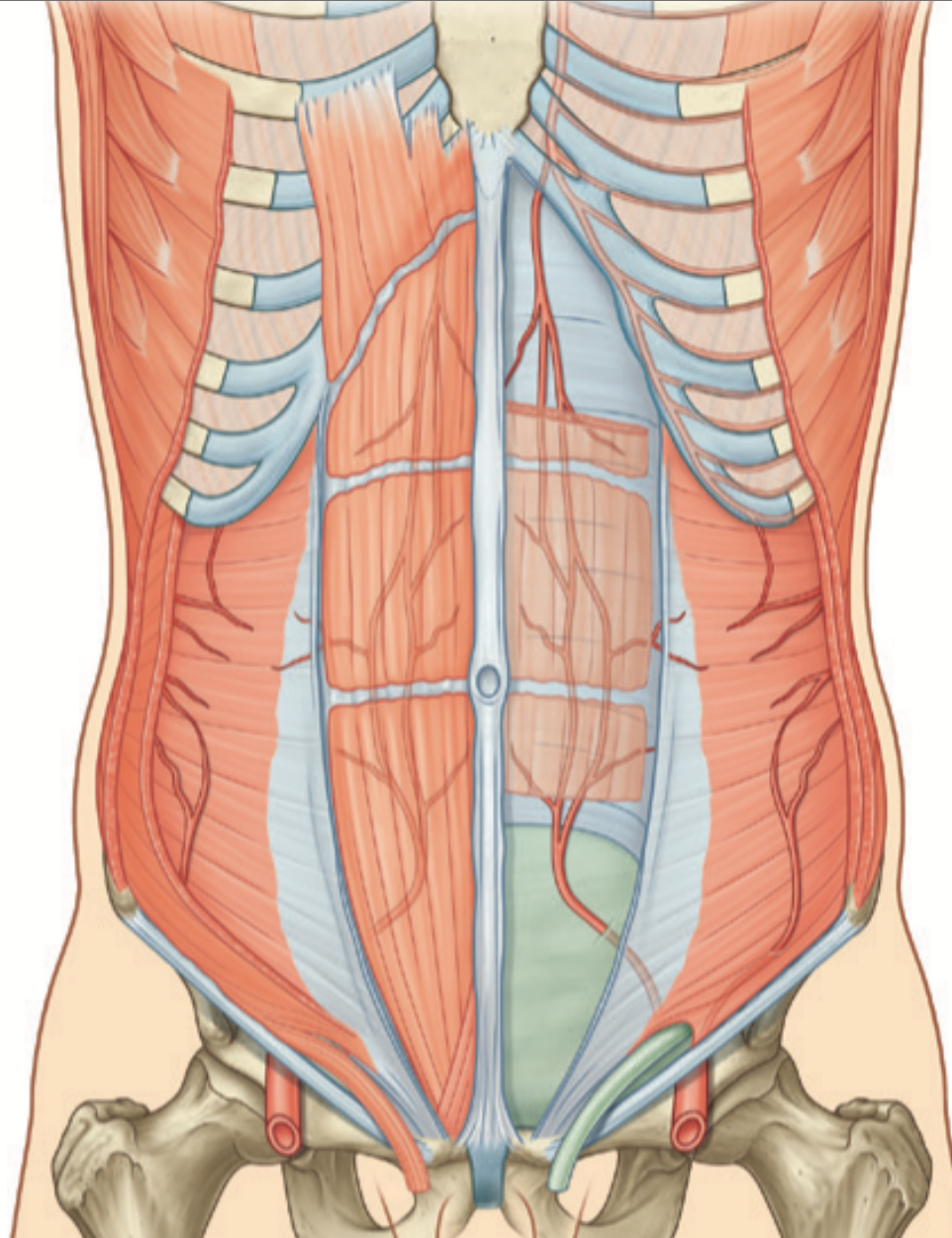
arteriae

- ♦ **A. musculophrenica**
- ♦ **A. epigastrica superior**
 - ♦ (a. thoracica interna)
- ♦ **Aa. intercostales, a. subcostalis**
- ♦ **A. epigastrica inferior**
- ♦ **A. circumflexa ilium profunda**
- ♦ **A. circumflexa ilium superficialis**
 - ♦ (a. iliaca interna)



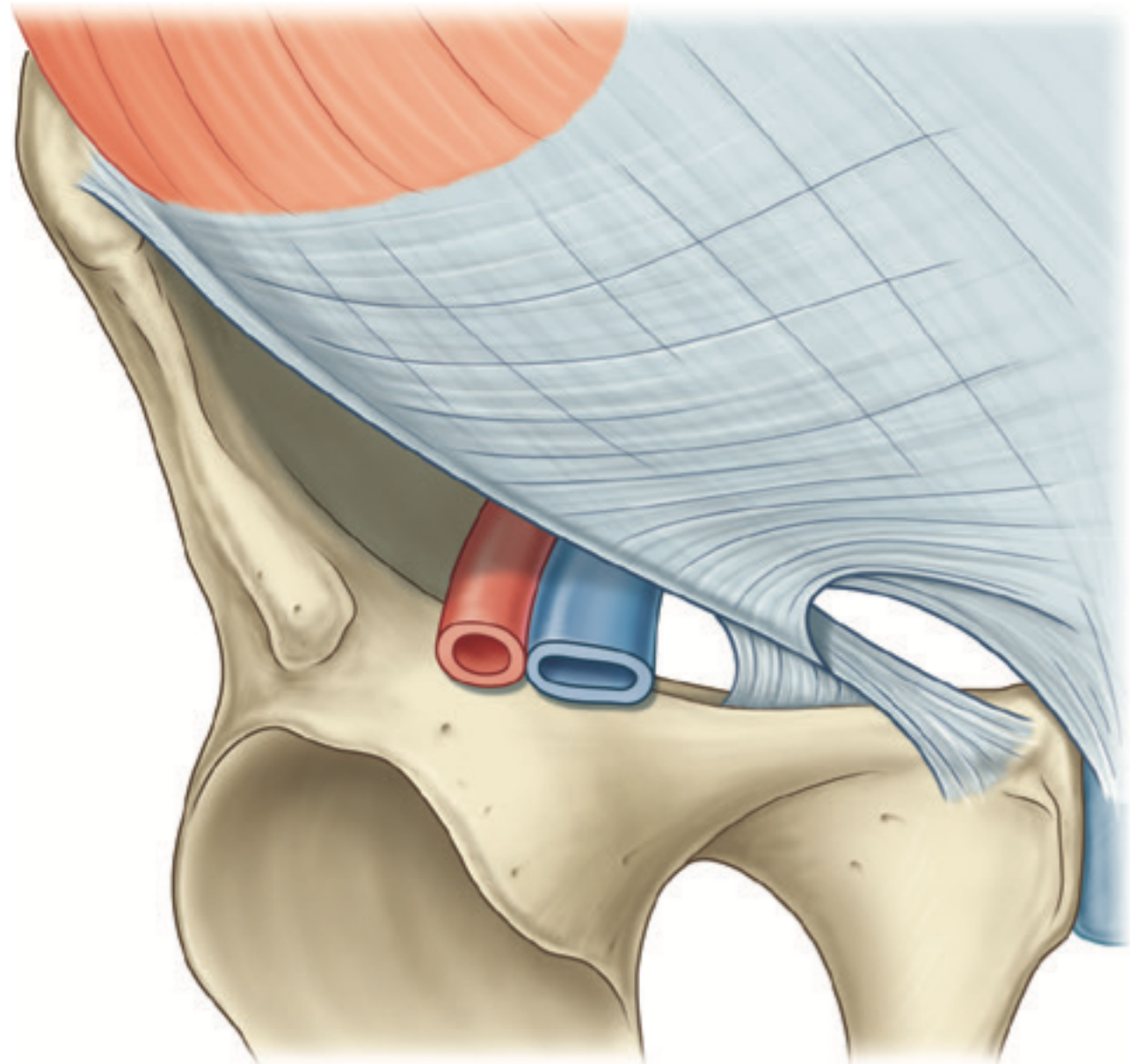
arteriae

- ♦ **A. musculophrenica**
- ♦ **A. epigastrica superior**
 - ♦ (a. thoracica interna)
- ♦ **Aa. intercostales, a. subcostalis**
- ♦ **A. epigastrica inferior**
- ♦ **A. circumflexa ilium profunda**
- ♦ **A. circumflexa ilium superficialis**
 - ♦ (a. iliaca interna)



regio inguinalis

- ♦ **Ligamentum inguinale**
 - ♦ Spina iliaca anterior superior
 - ♦ Pecten pubis
- ♦ **Ligamentum lacunare**
- ♦ **Lacuna vasorum**
- ♦ **Lacuna musculorum**
- ♦ **Anulus inguinalis externus**
 - ♦ Crus mediale
 - ♦ Crus laterale



Canalis inguinalis

- ♦ **Anulus internus**

- ♦ *Fascia spermatica interna*

- ♦ **Paries posterior**

- ♦ *Falx inguinalis (eng. conjoint tendon)*

- ♦ **Paries anterior**

- ♦ *Fascia cremasterica (m. cremaster)*

- ♦ **Paries superior**

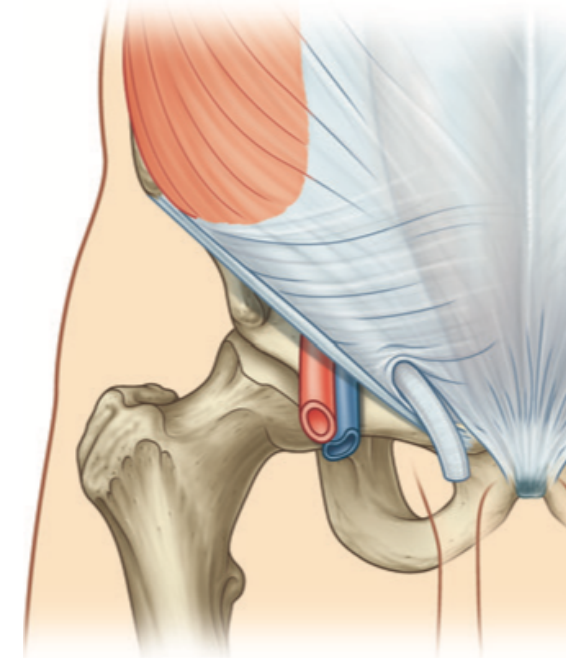
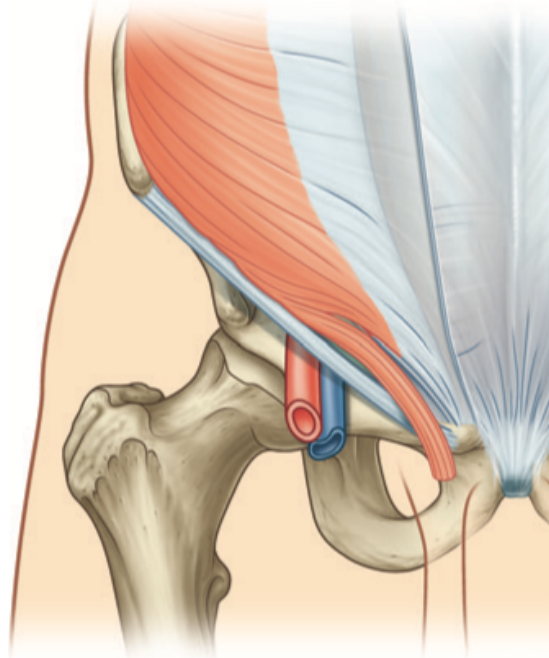
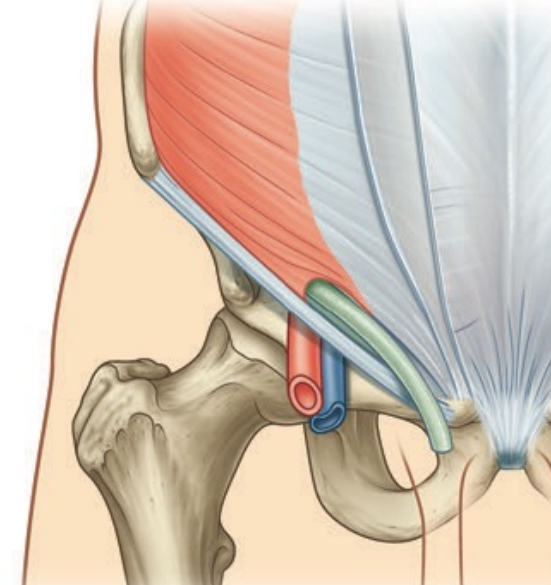
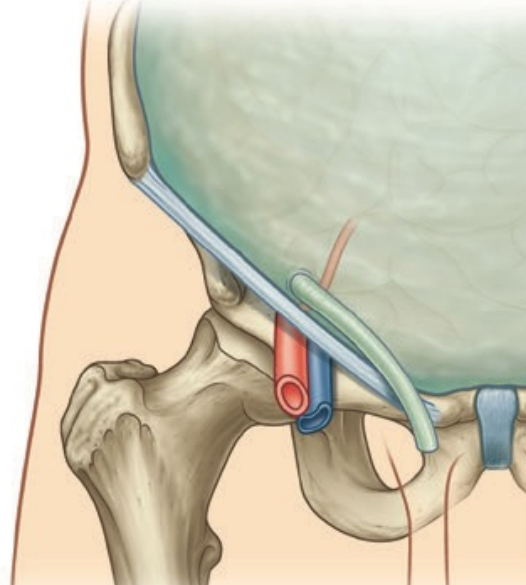
- ♦ **M. transversus abdominis**
- ♦ **M. obliquus internus abdominis**

- ♦ **Paries inferior**

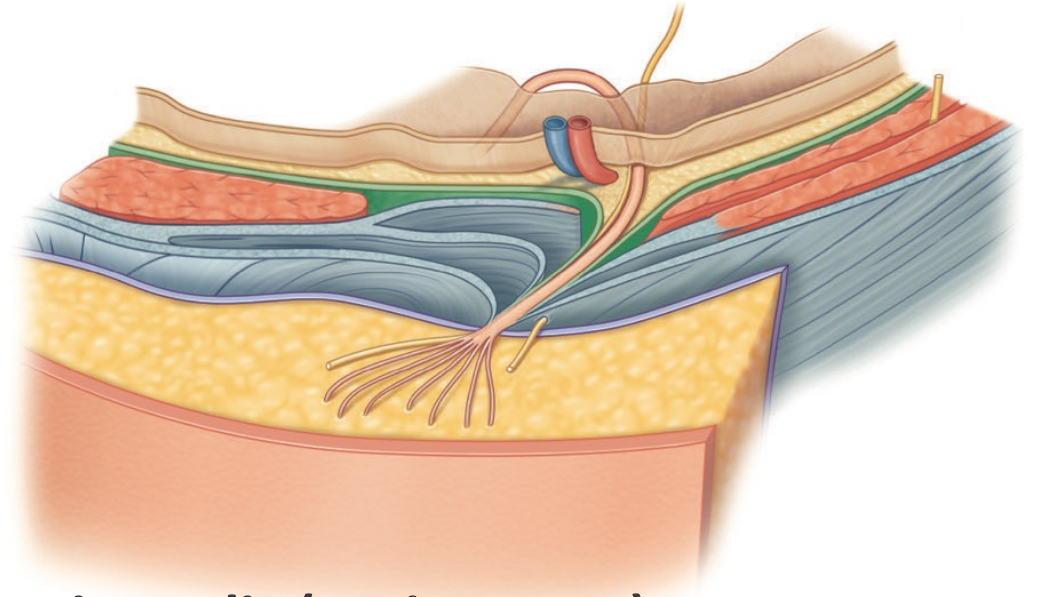
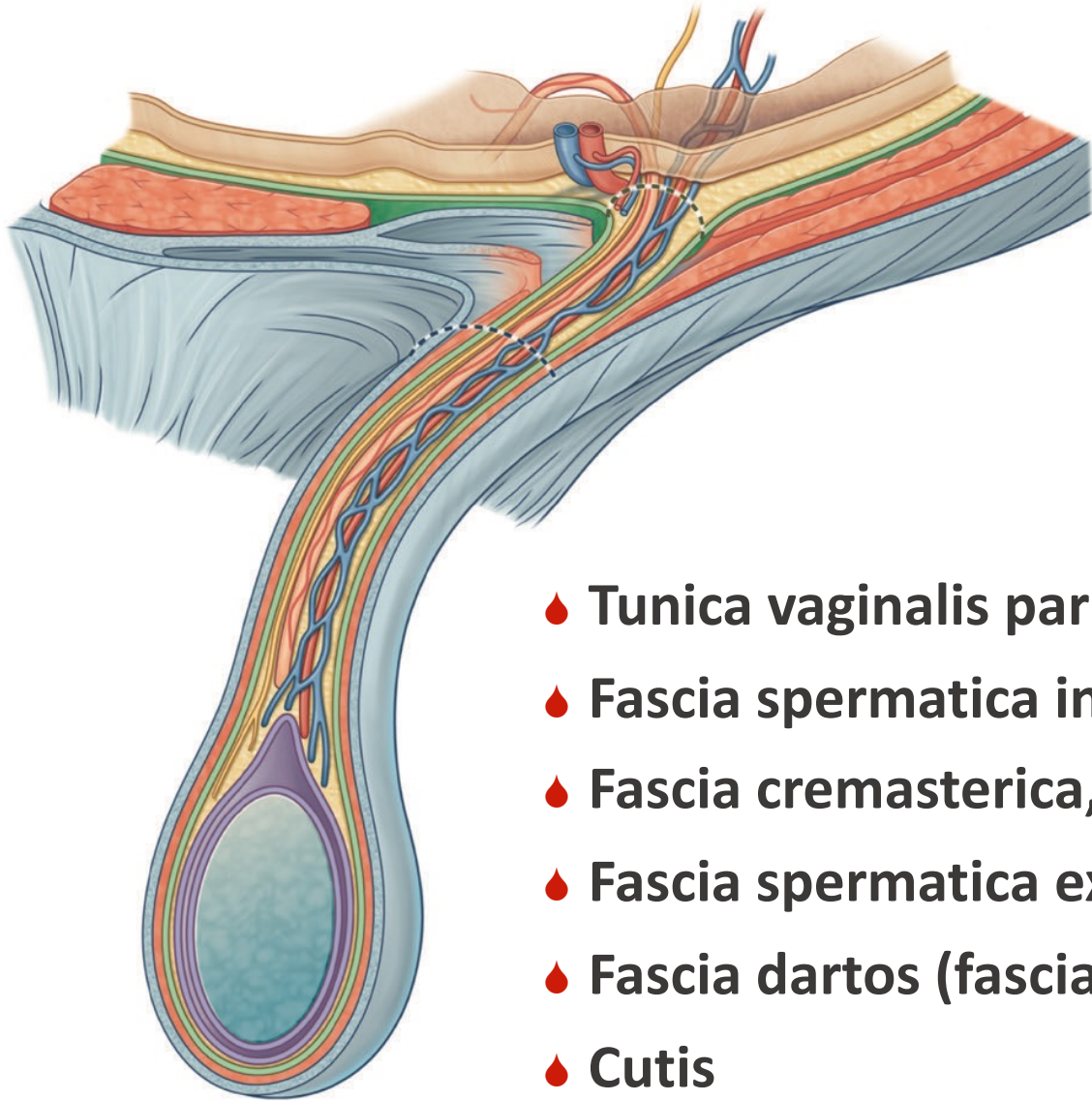
- ♦ **Ligamentum inguinale**

- ♦ **Anulus externus**

- ♦ **Crus mediale, crus laterale**
- ♦ *Fascia spermatica externa*



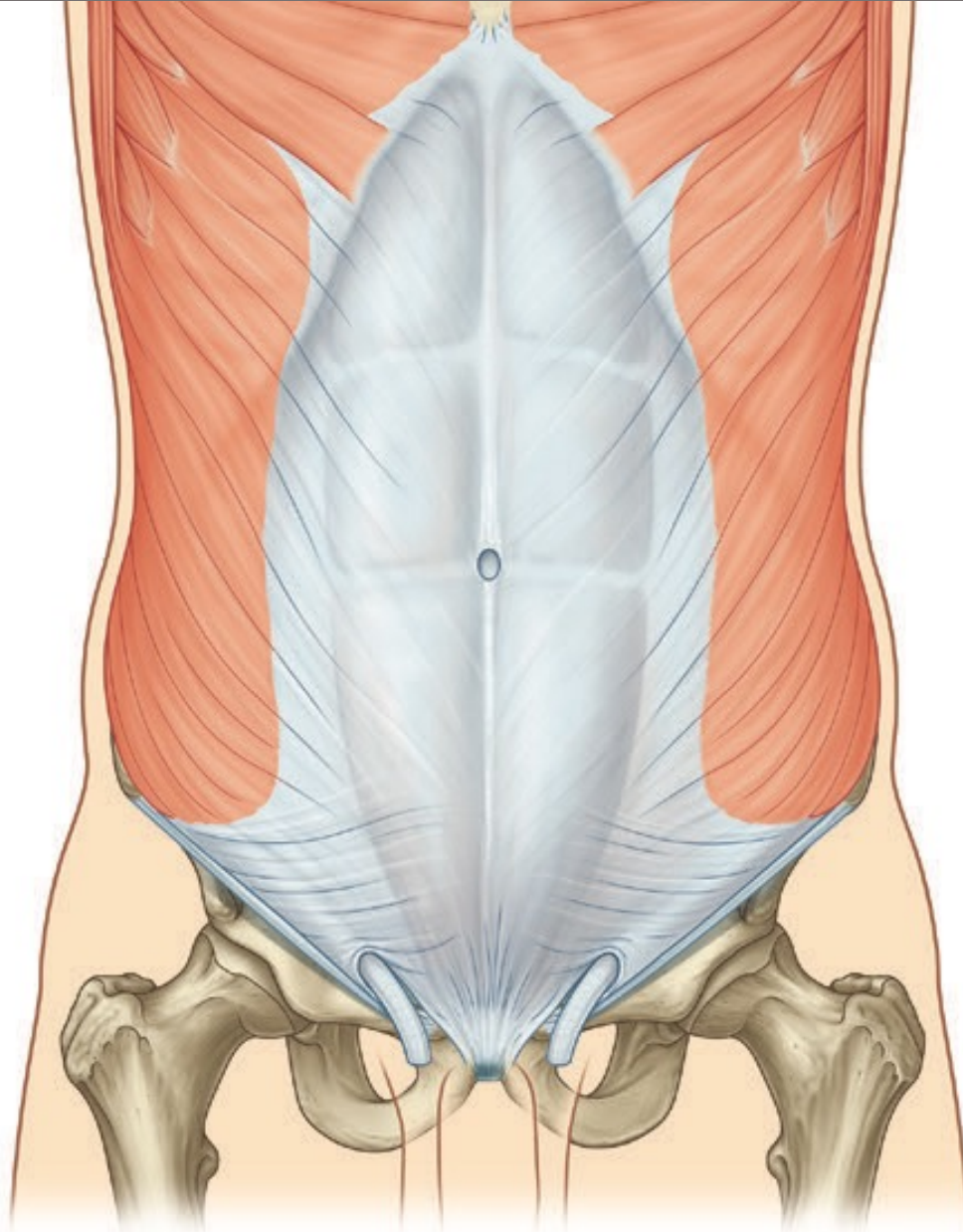
canalis inguinalis et scrotum



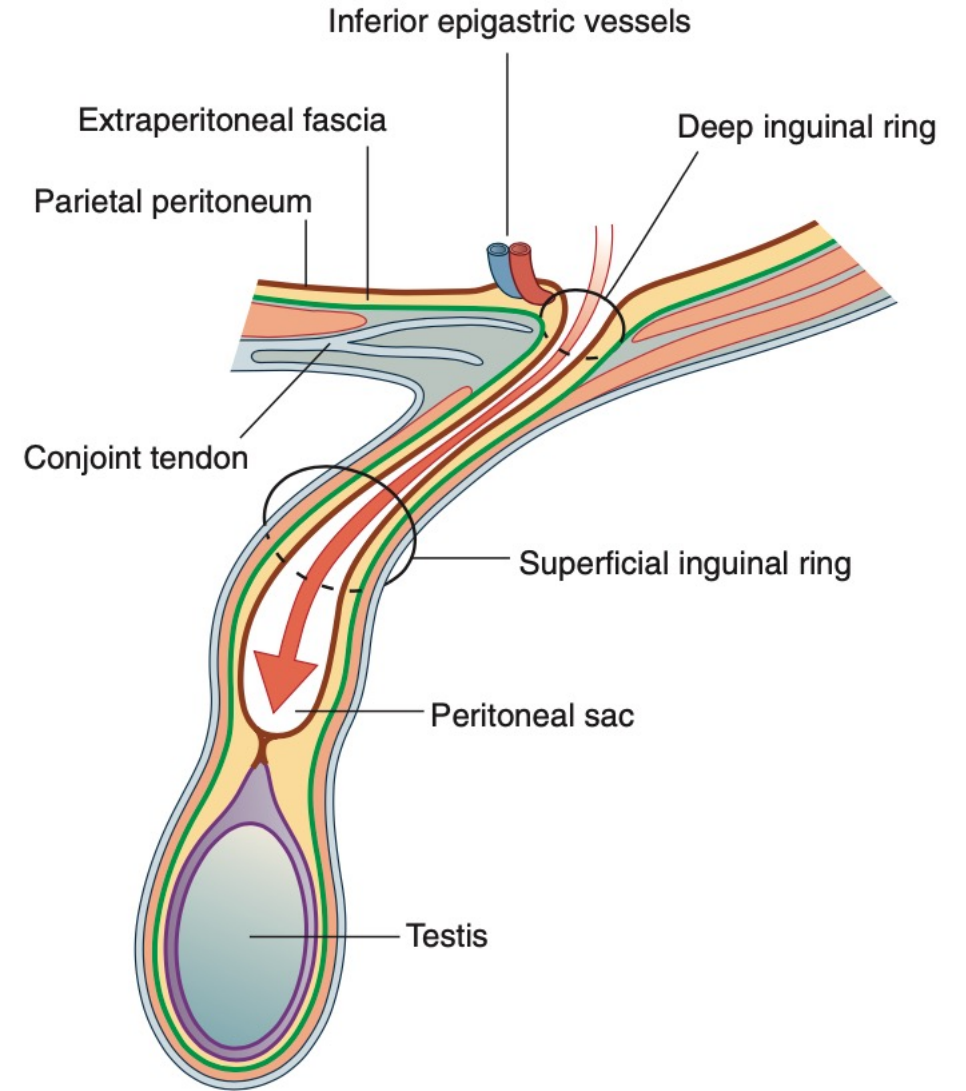
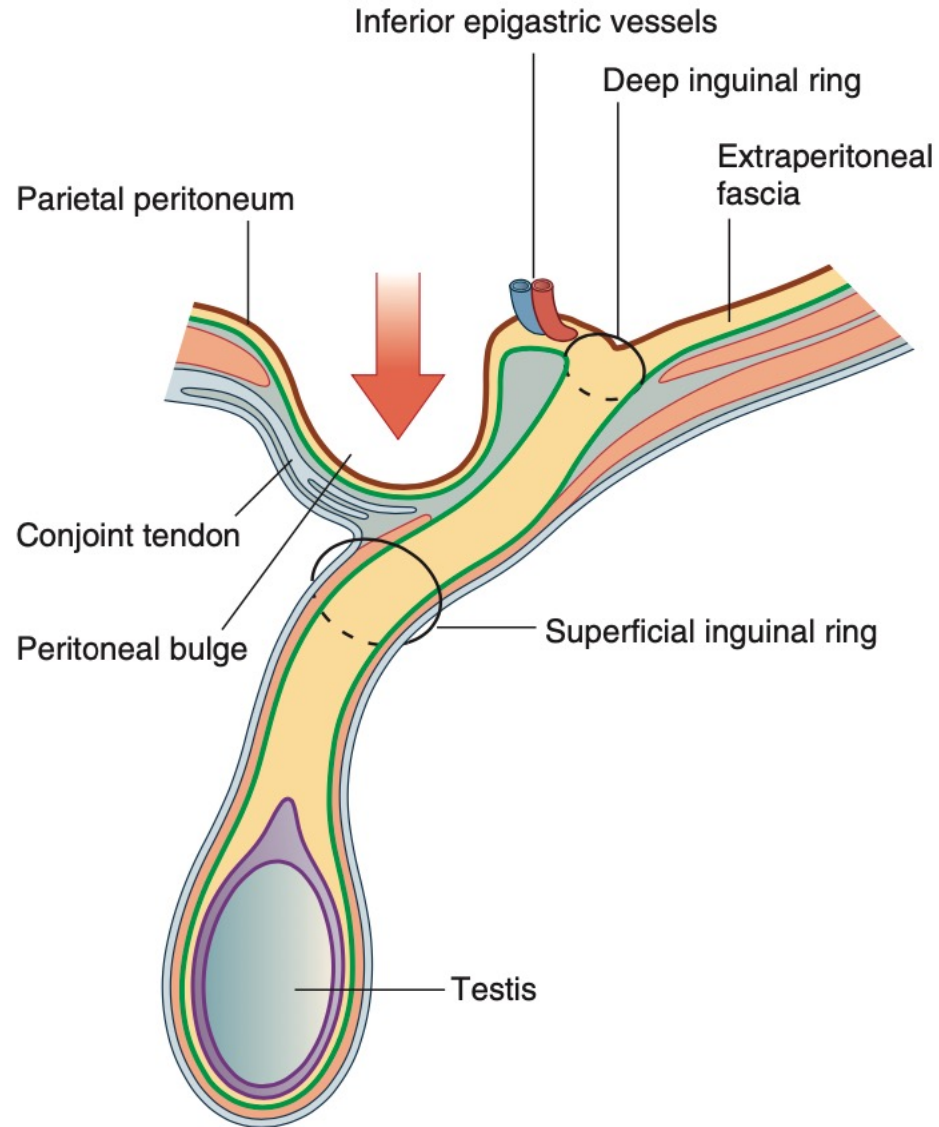
- ♦ Tunica vaginalis parietalis et visceralis (peritoneum)
- ♦ Fascia spermatica interna (fascia transversalis)
- ♦ Fascia cremasterica, m. cremaster (m. obliquus internus abdominis)
- ♦ Fascia spermatica externa (aponeurosis m. obliqui externi abdominis)
- ♦ Fascia dartos (fascia superficialis)
- ♦ Cutis

herniae

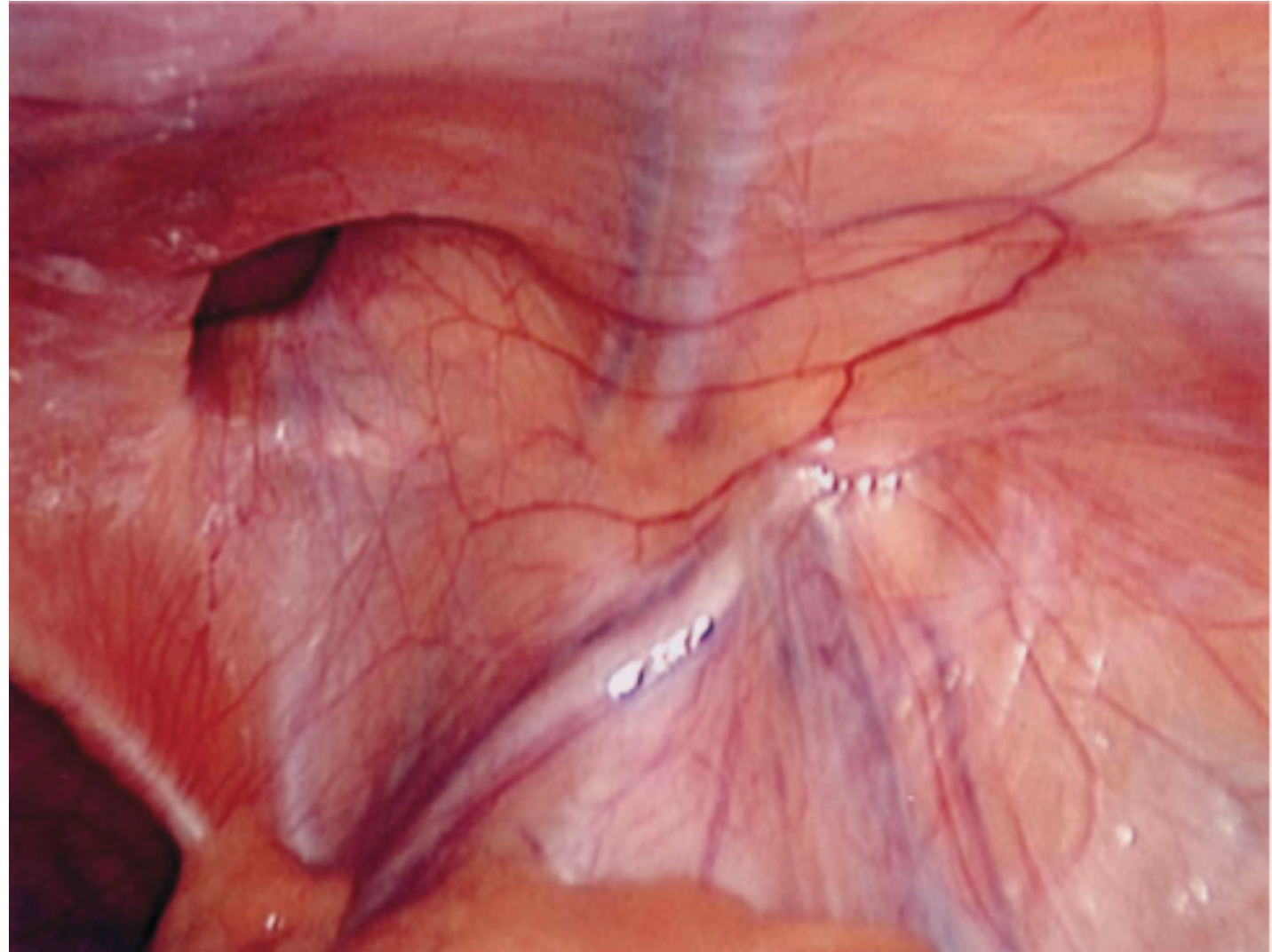
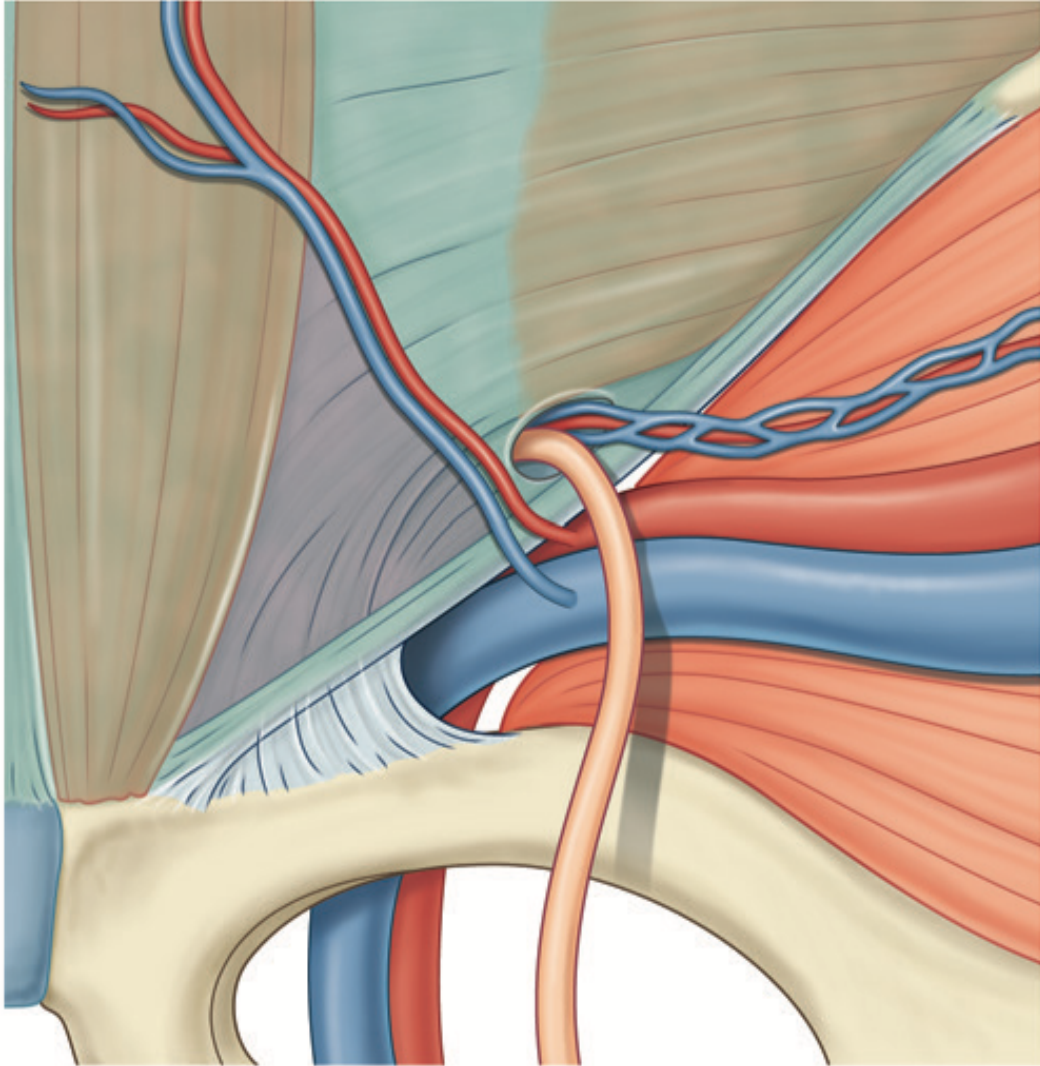
- Umbilicalis
- Supraumbilicalis
- Inguinalis directa
- Inguinalis indirecta
- Femoralis
- Obturatoria
- Intermuscularis (Spiegelii)
- In cicatricem



Hernia inguinalis directa, indirecta

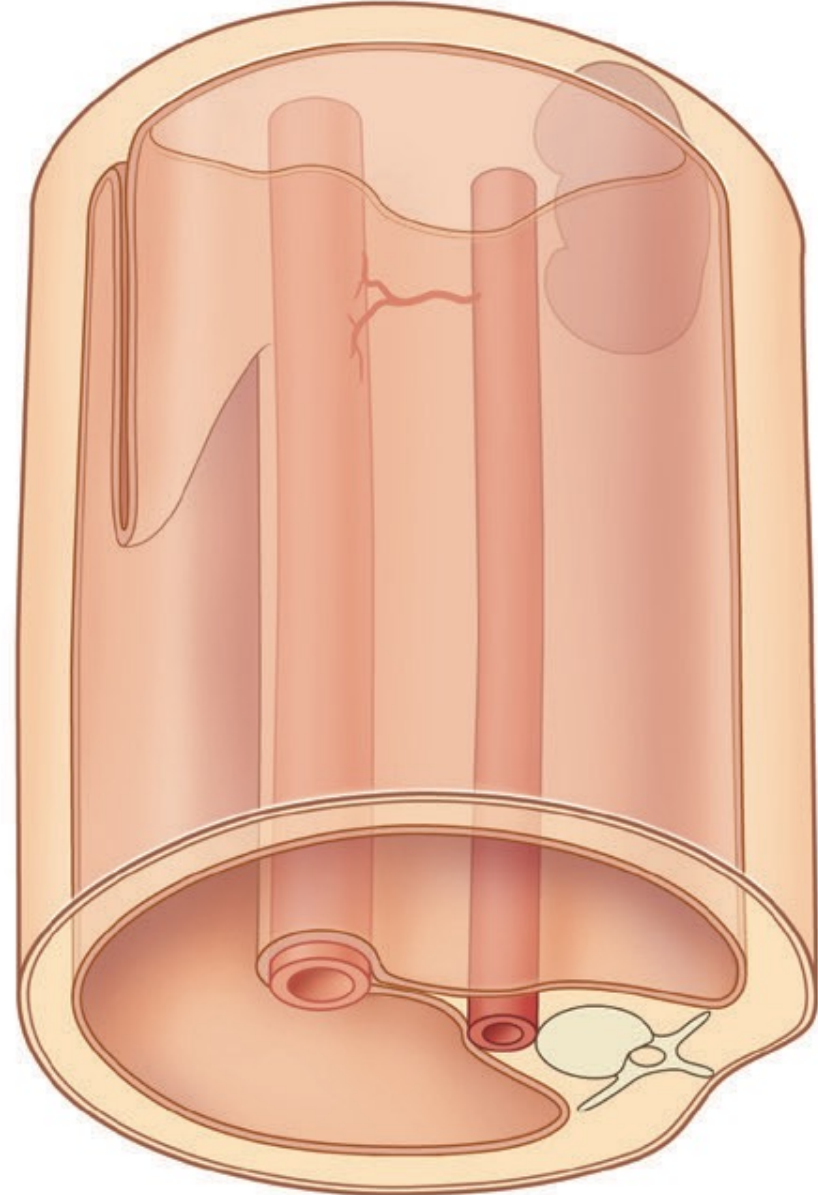


trigonum inguinale



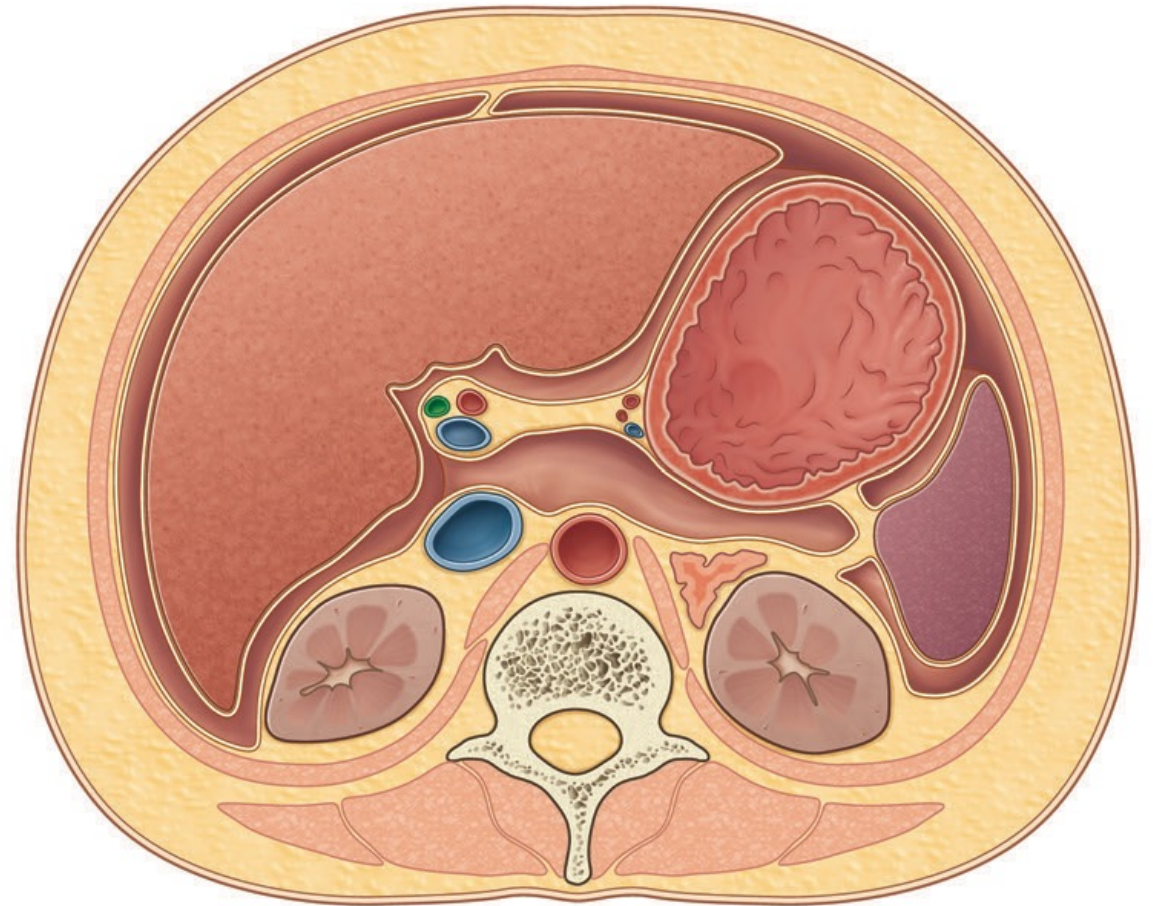
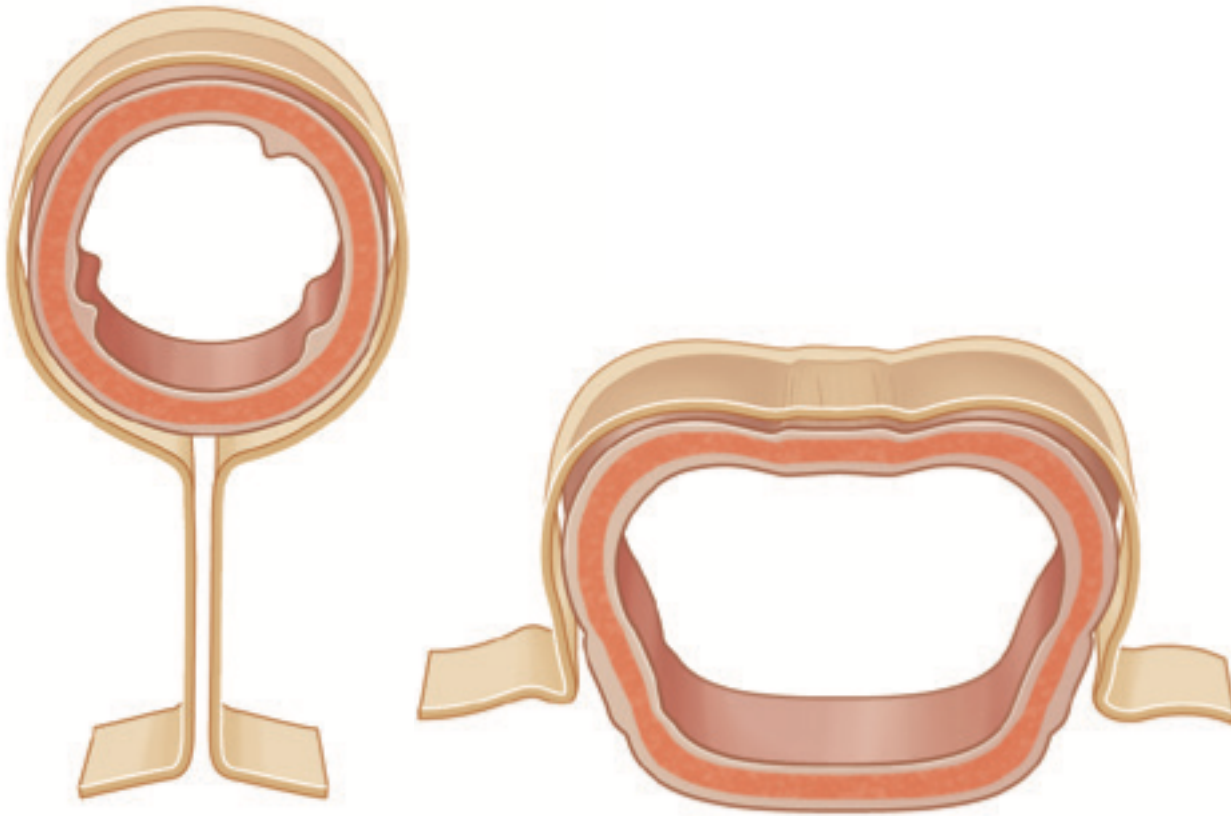
cavitas abdominalis

- ♦ Lining - peritoneum
- ♦ Cavitas peritonealis
- ♦ *Spatium retroperitoneale* - **retroperitoneum**
- ♦ **Peritoneum**
 - ♦ Silíle layer – mesothelia
 - ♦ Supporting connective tissue
- ♦ *Peritoneum visceralis*
- ♦ *Peritoneum parietalis*
- ♦ **hangings - mesenterium**
 - ♦ Mesenterium ventrale
 - ♦ Mesenterium dorsale



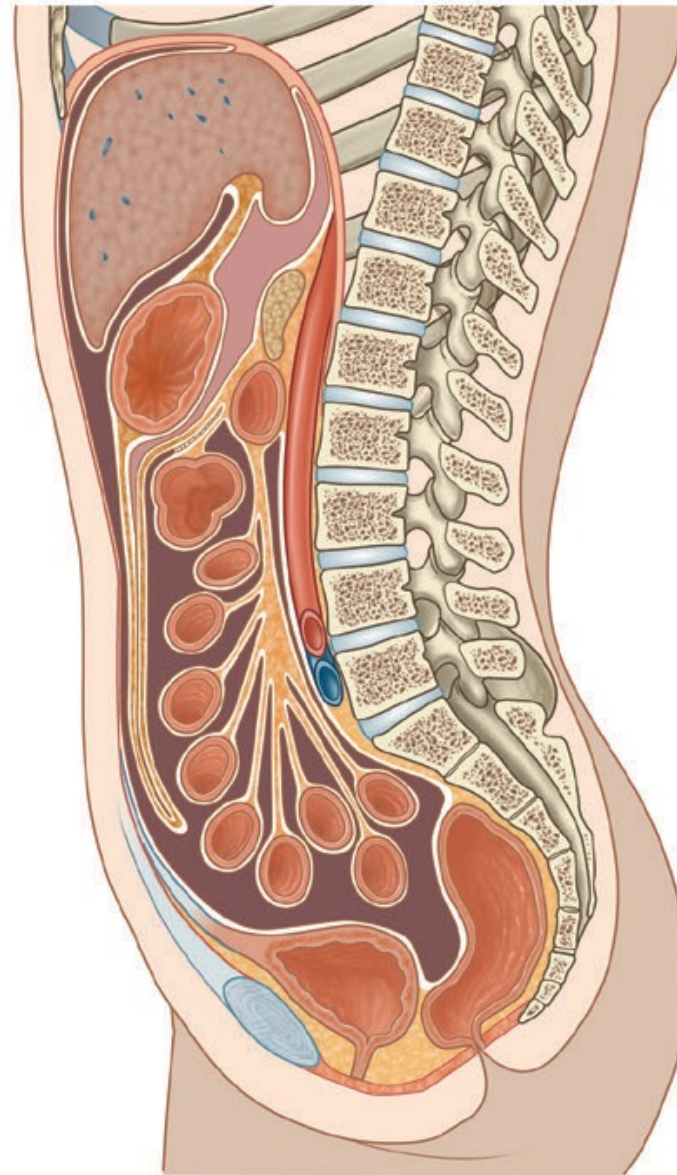
organs

- ♦ intraperitoneal
- ♦ Secondary retroperitoneal
- ♦ Primary retroperitoneal

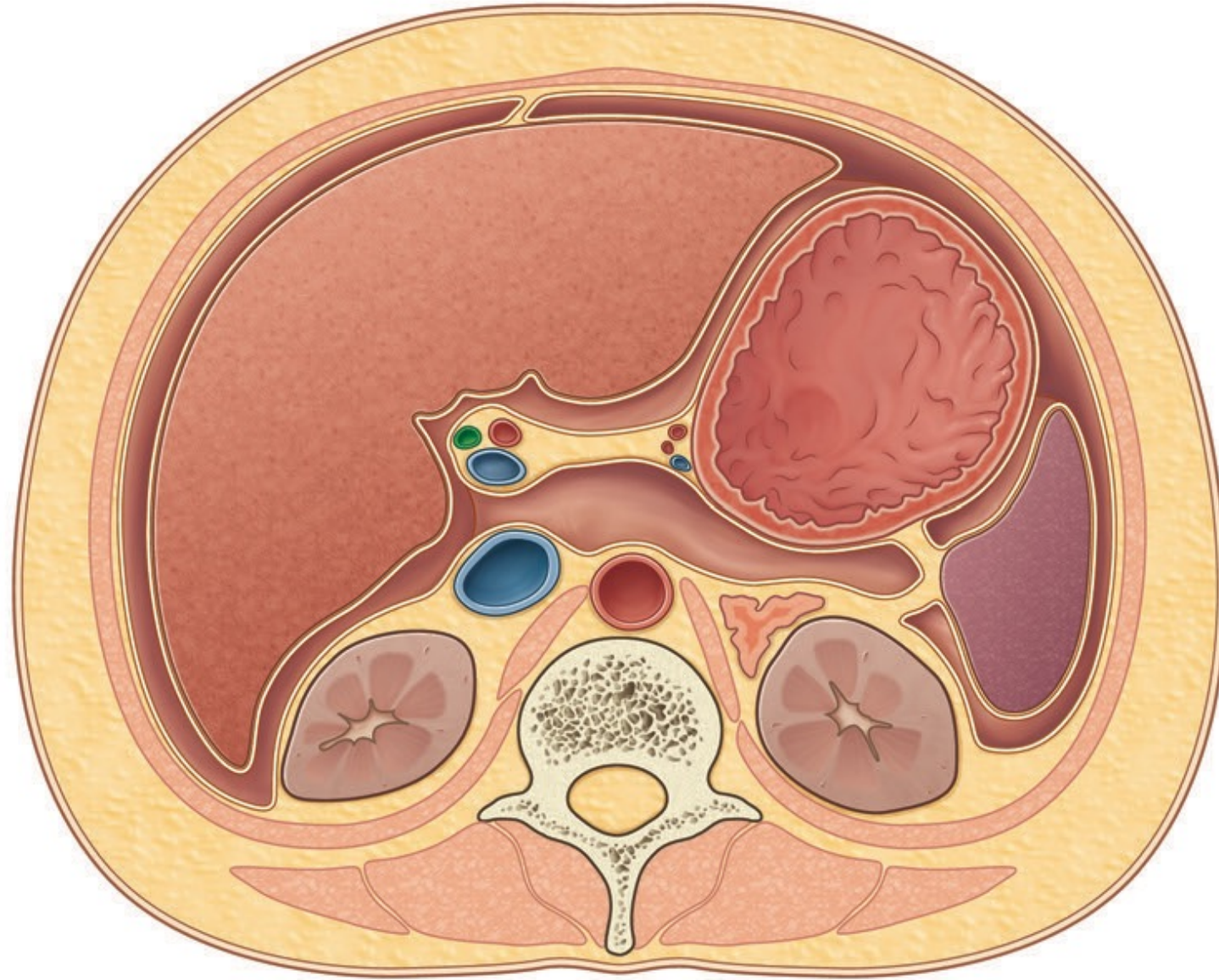


cavitas peritonealis

- ♦ Peritoneum
- ♦ Peritoneal spaces
- ♦ Supramesocolic
 - ♦ Subdiafragmatic
 - ♦ Subhepatic
 - ♦ Hepatorenal (Morrisoni)
 - ♦ Bursa omentalis – foramen Winslowi
- ♦ Inframesocolic
 - ♦ Paracolic
 - ♦ Lateral, medial
 - ♦ Inter-loop
 - ♦ Cavum rectovesicale (Douglasii)

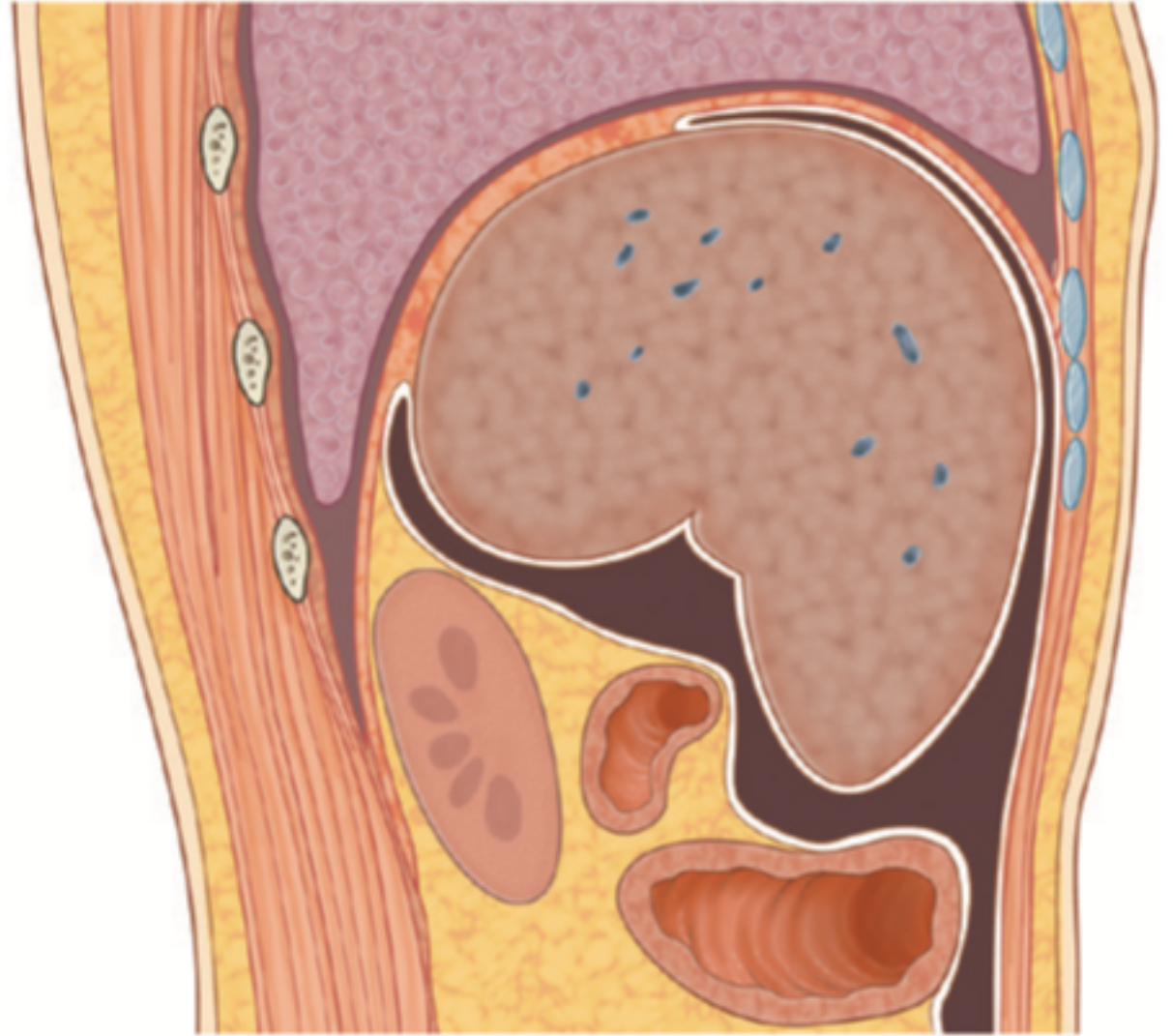


Supramesocolic spaces



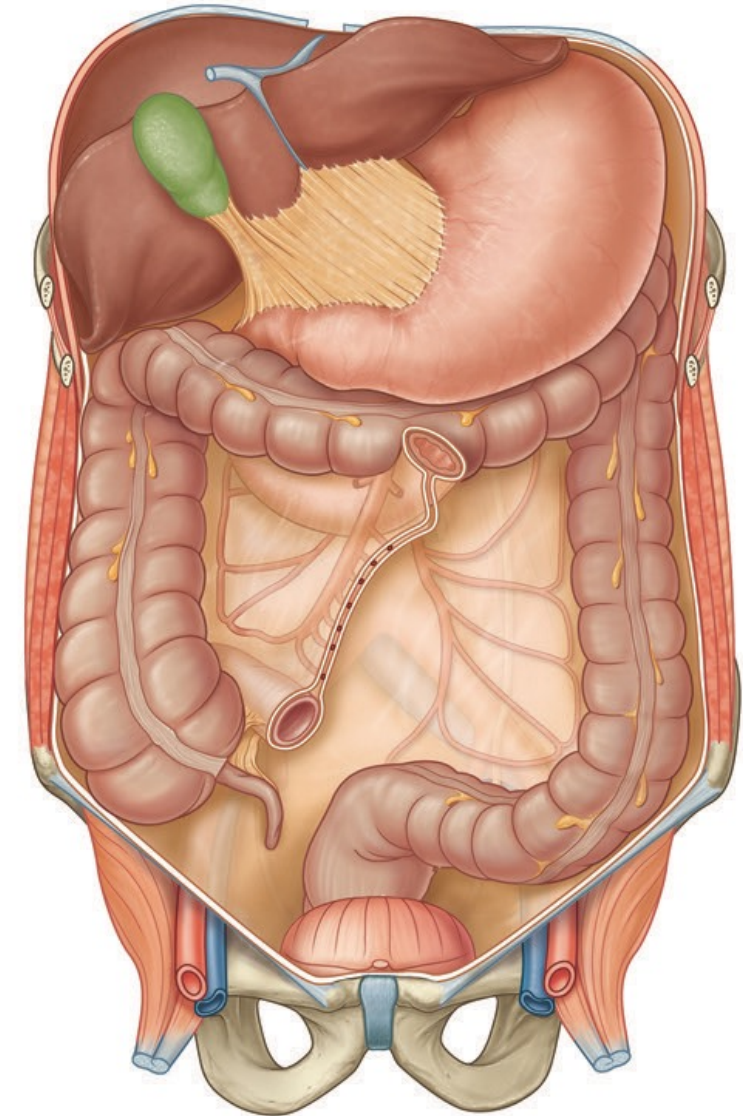
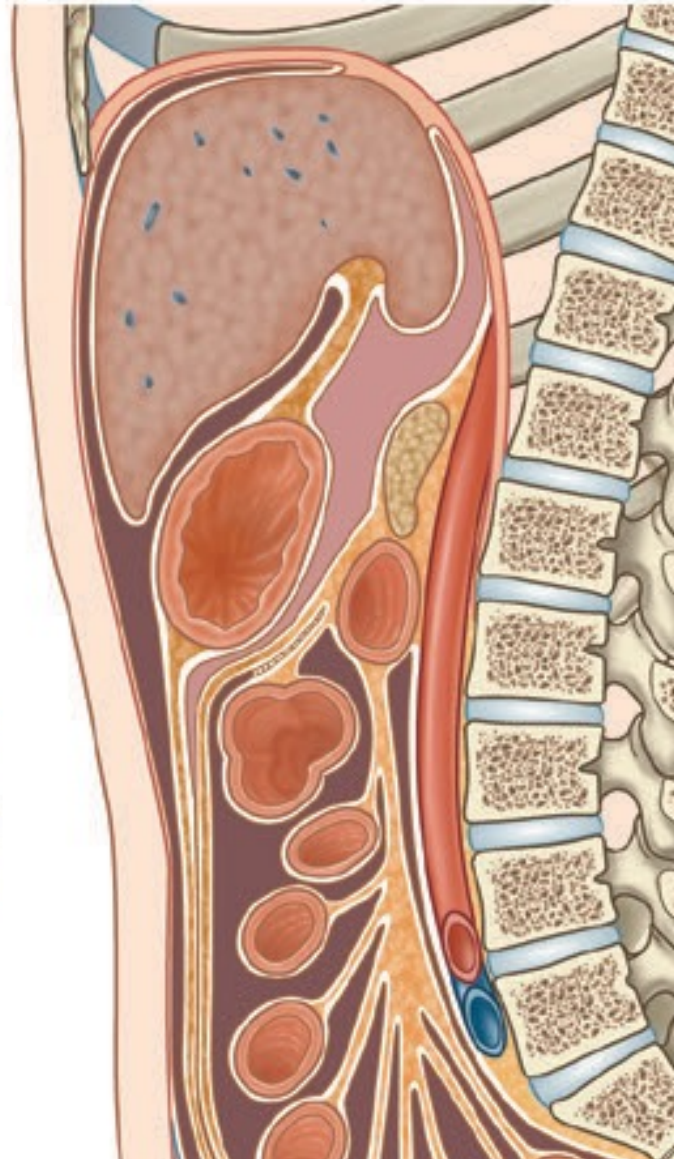
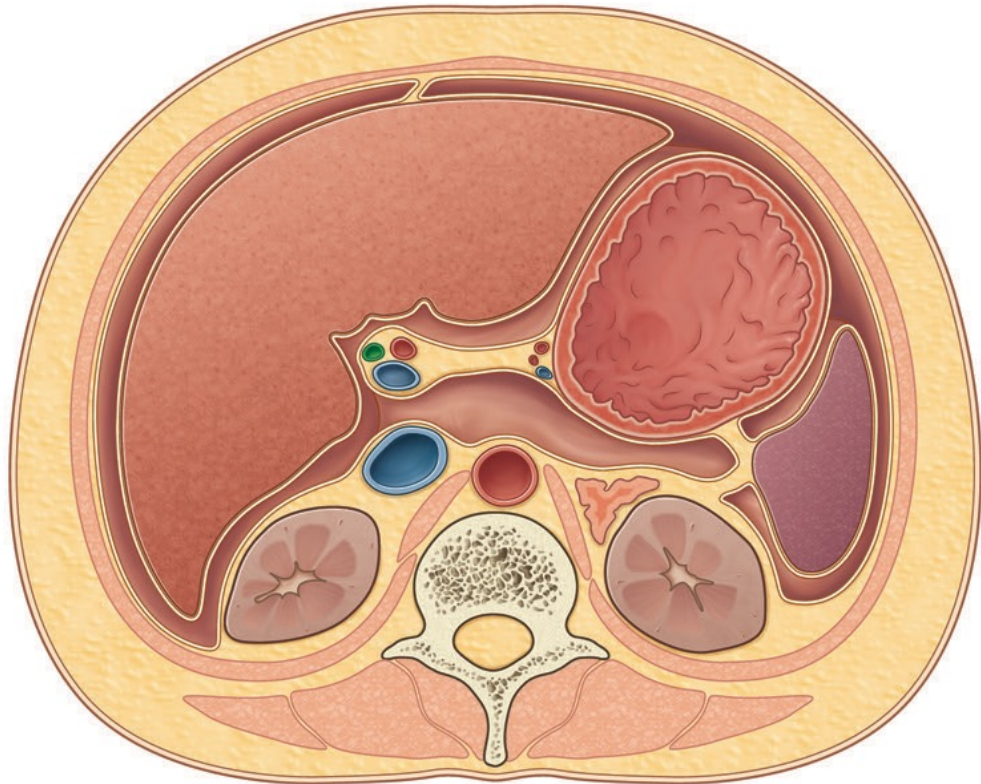
Soaces around liver

- 🔴 Recessus subdiaphragmaticus
- 🔴 Recessus hepatorenalis (Morissoni)



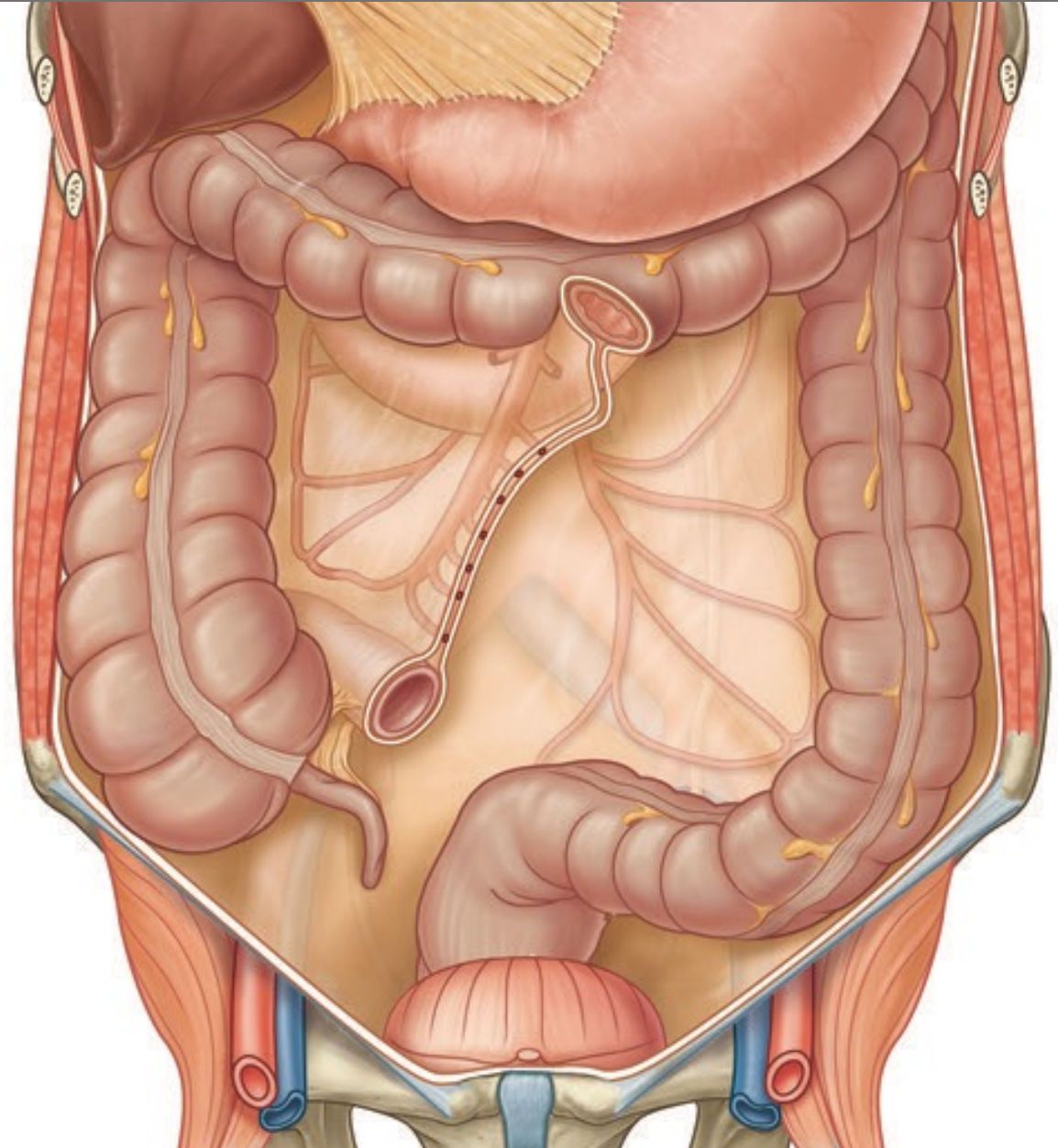
Bursa omentalis

- ♦ enter - foramen omentale /epiploicum – Vinslovi - ligg. hepatoduodenale, hepatorenale, duodenorenale
- ♦ Anterior wall
 - ♦ omentum minus
 - ♦ ligamentum gastrocolicum
 - ♦ omentum majus
- ♦ Recessus superior, inferior, splenicus



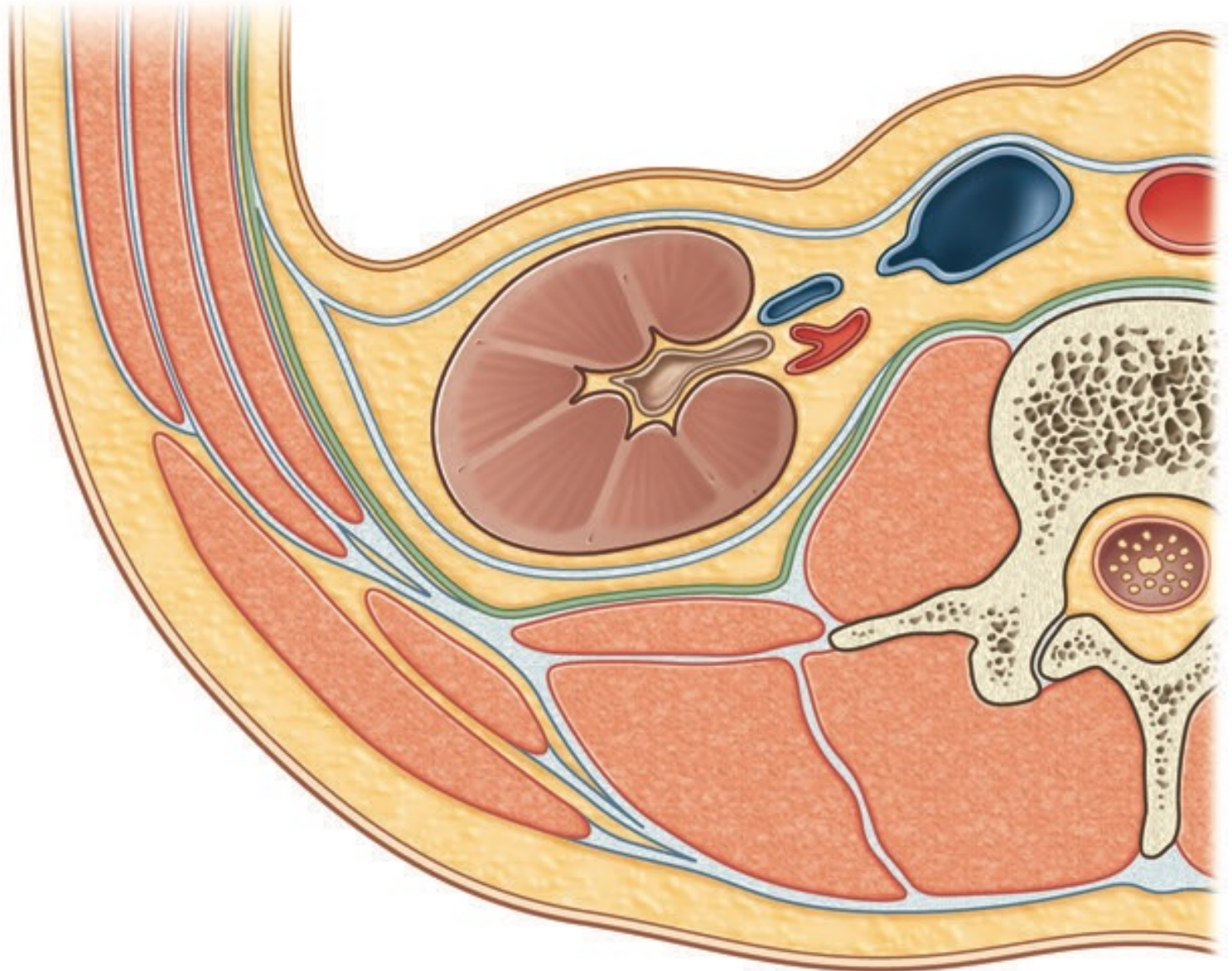
Inframezokolic spaces

- ♦ Omentum majus
- ♦ Mesocolon transversum
- ♦ Mesenterium
- ♦ **Right field**
 - ♦ A. et v. mesenterica superior
- ♦ **Left field**
 - ♦ A. et v. mesenterica inferior
 - ♦ Aorta
 - ♦ Ganglion mesentericum inferius
 - ♦ Plexus hypogastricus superior
- ♦ Lateral parakolic spaces
- ♦ **Spread of infections and tumors**



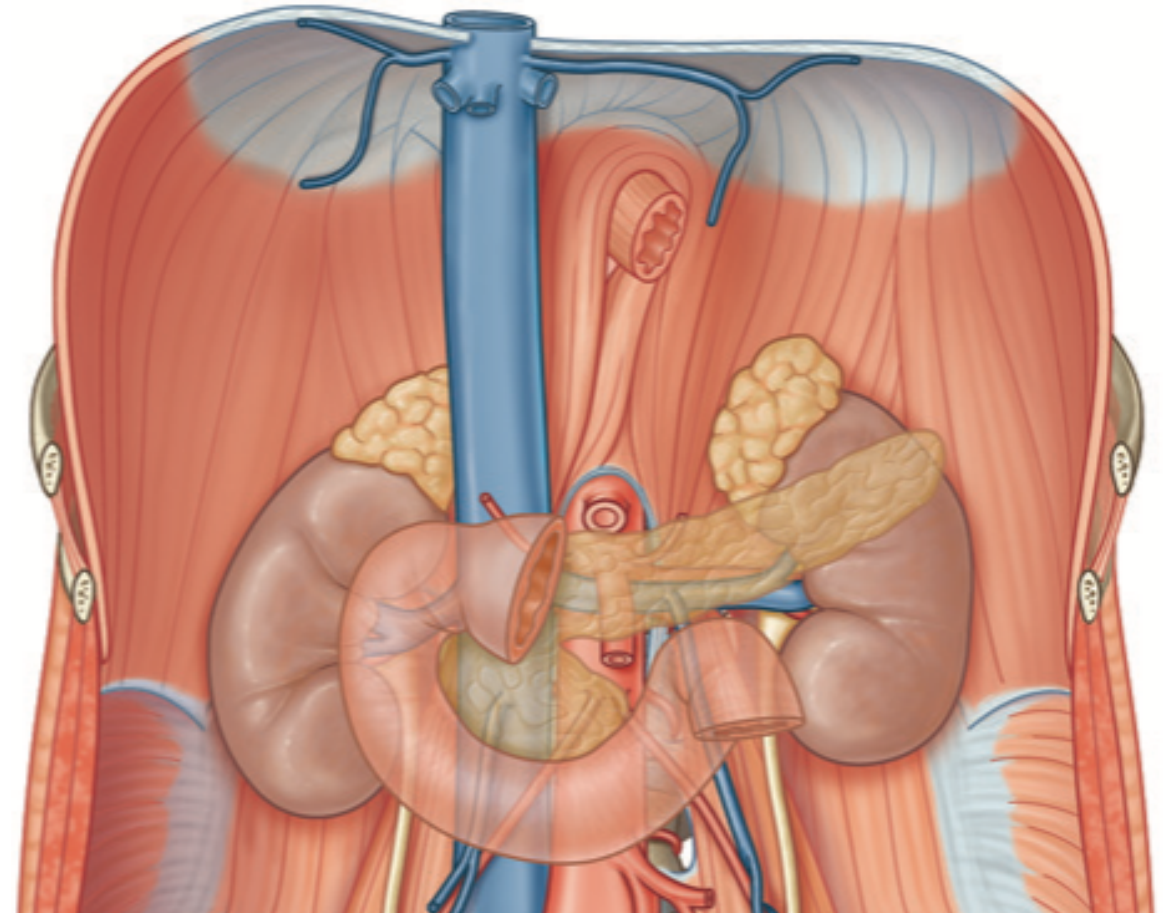
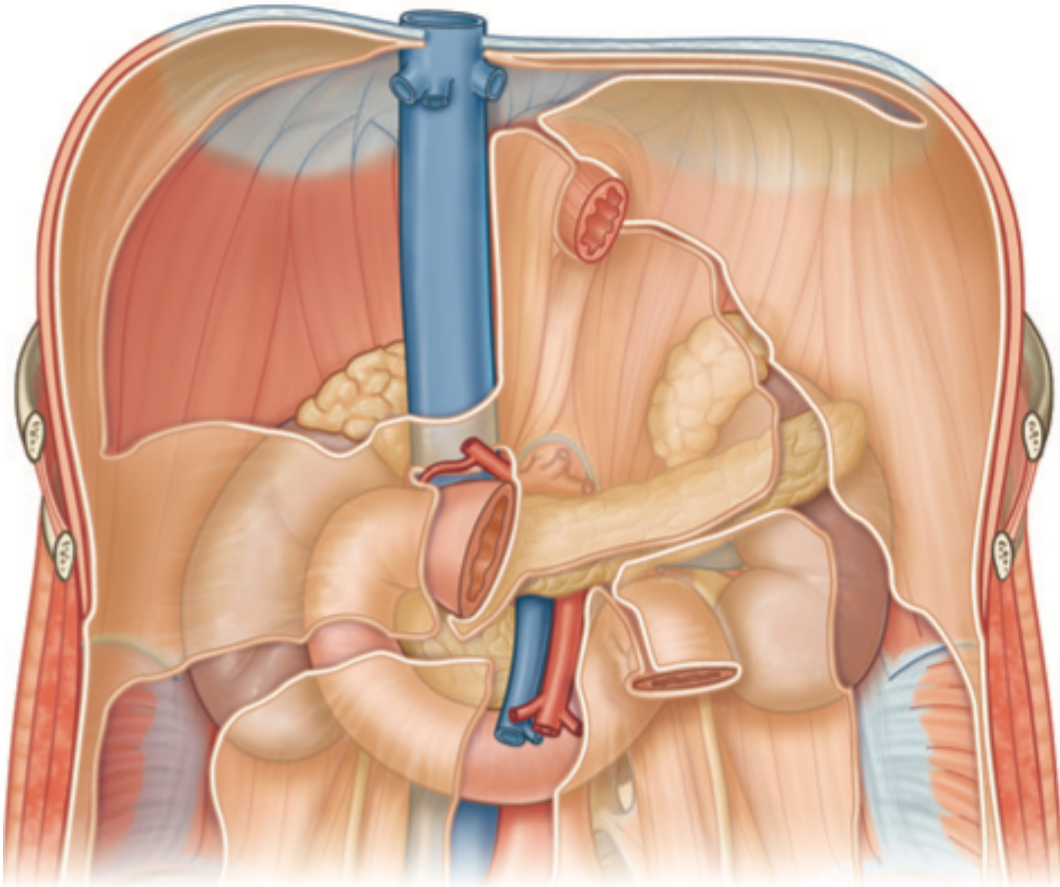
retroperitoneum

- ♦ Fascia transversa
- ♦ Fascia renalis
- ♦ Peritoneum parietale
- ♦ lateral
 - ♦ Adrenal glands
 - ♦ Kidneys
 - ♦ Ureters
- ♦ medial
 - ♦ Pancreas
 - ♦ Duodenum
 - ♦ Aorta
 - ♦ V. cava inferior
 - ♦ Vv. lumbales
 - ♦ Truncus sympatikus
 - ♦ Ganglia
 - ♦ Plexus aorticus

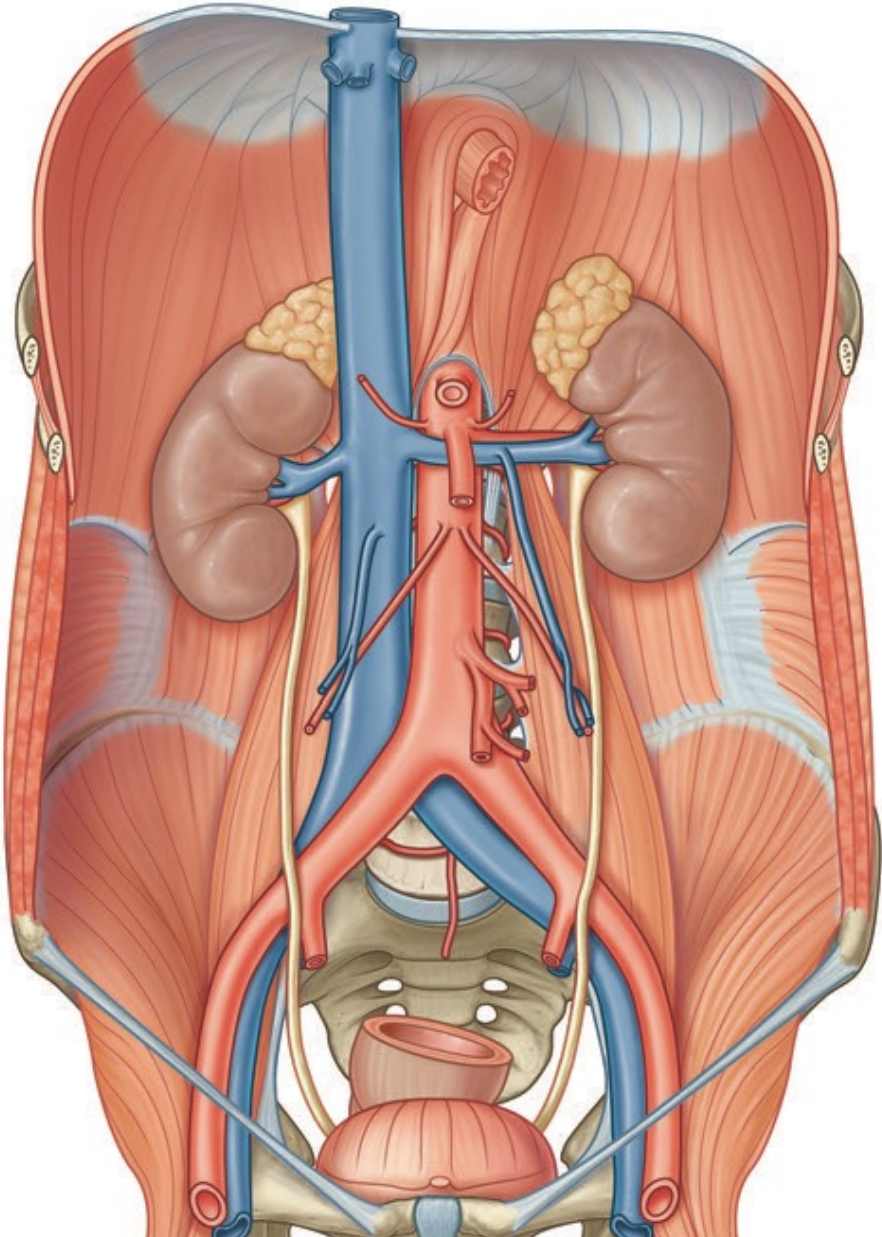


Secondary retroperitoneal organs

- ♦ Pancreas
- ♦ Duodenum
- ♦ Parts of colon asc. and desc.



arteriae



♦ **Aorta abdominalis**

♦ Truncus coeliacus

♦ A. mesenterica superior

♦ A. mesenterica inferior

♦ A. renalis

♦ A. adrenalis (sup., inf.)

♦ A. testicularis/ovarica

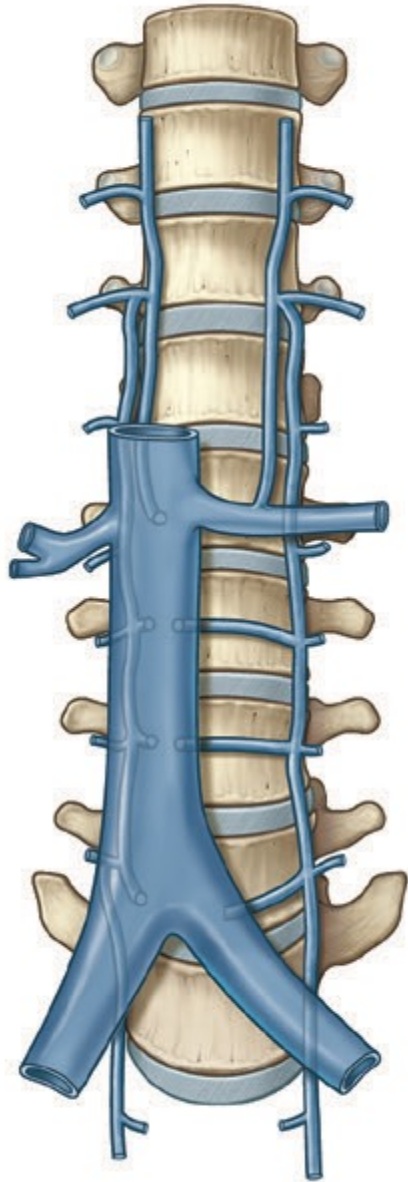
♦ A. phrenica inferior

♦ A. subcostalis

♦ A. lumbales

♦ A. iliolumbalis

venae



♦ **Vena cava inferior**

♦ V. renalis

♦ V. adrenalis (sup., inf.)

♦ V. testicularis/ovarica

♦ V. phrenica inferior

♦ **V. lumbalis ascendens**

♦ **Vena azygos/hemiazygos**

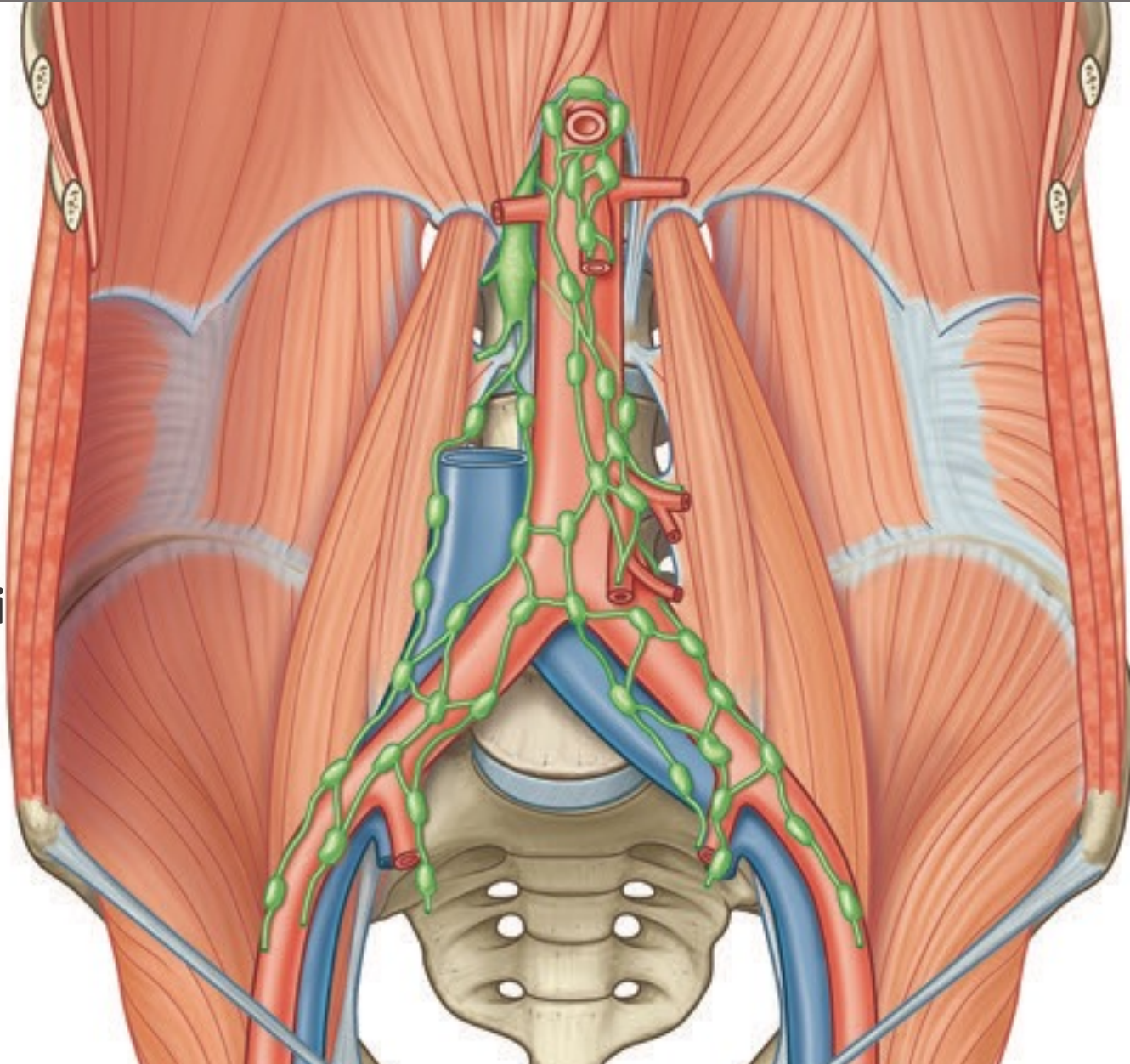
♦ V. subcostalis

♦ Vv. lumbales

♦ V. iliolumbalis

nod lymphatici

- Nodi coeliaci
- Nodi mesenterici superiores
- Nodi mesenterici inferiores
- Nodi paraaortales
- Nodi aortales laterales sin.
- Nodi preaortales
- Nodi aortales laterales dextri
 - „interaortocaval“
- Nodi paracavales
- Nodi iliaci communes
- Cisterna chyli



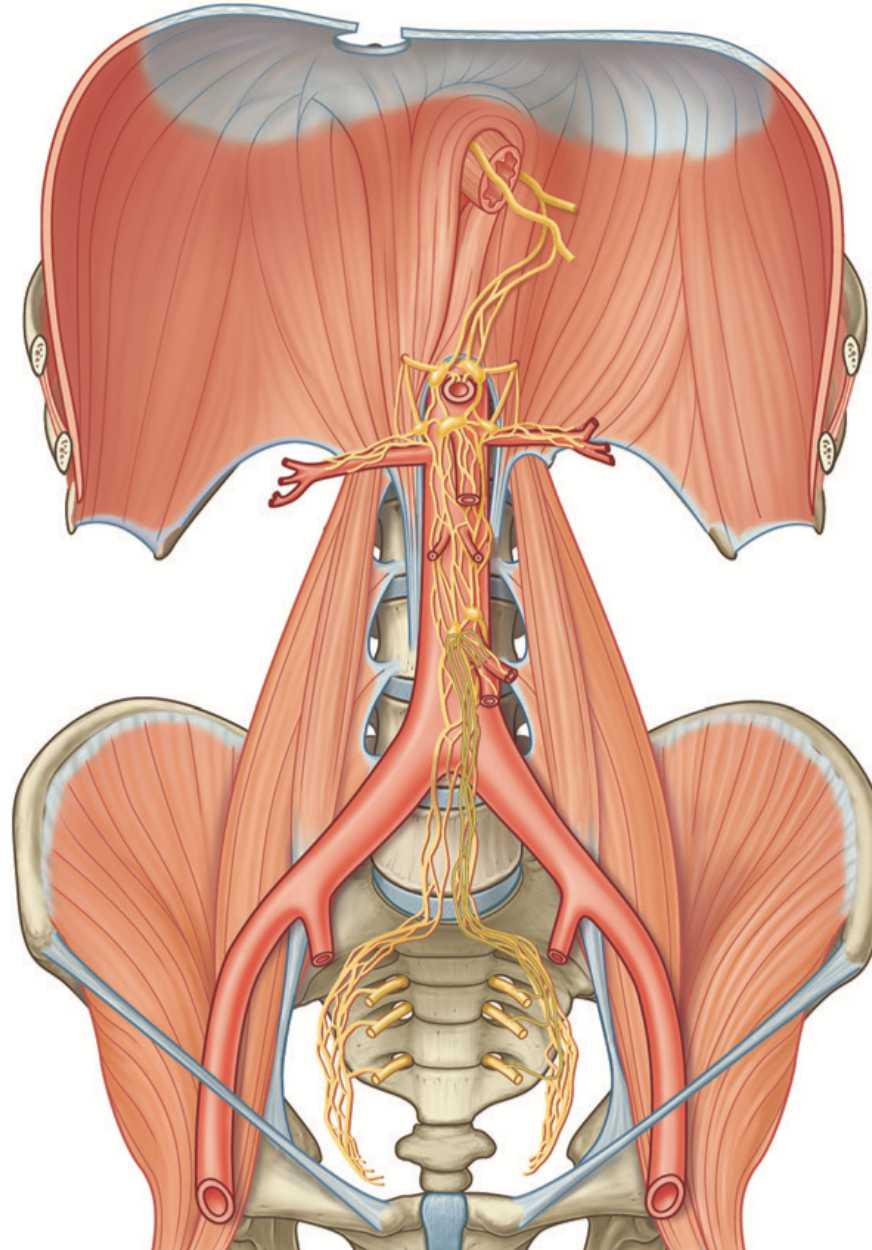
sympaticus

♦ Truncus sympatikus - ganglia

- ♦ Thoracica 5 – 12
- ♦ Lumbalia 4
- ♦ Sacralia 4 – 5
- ♦ Impar

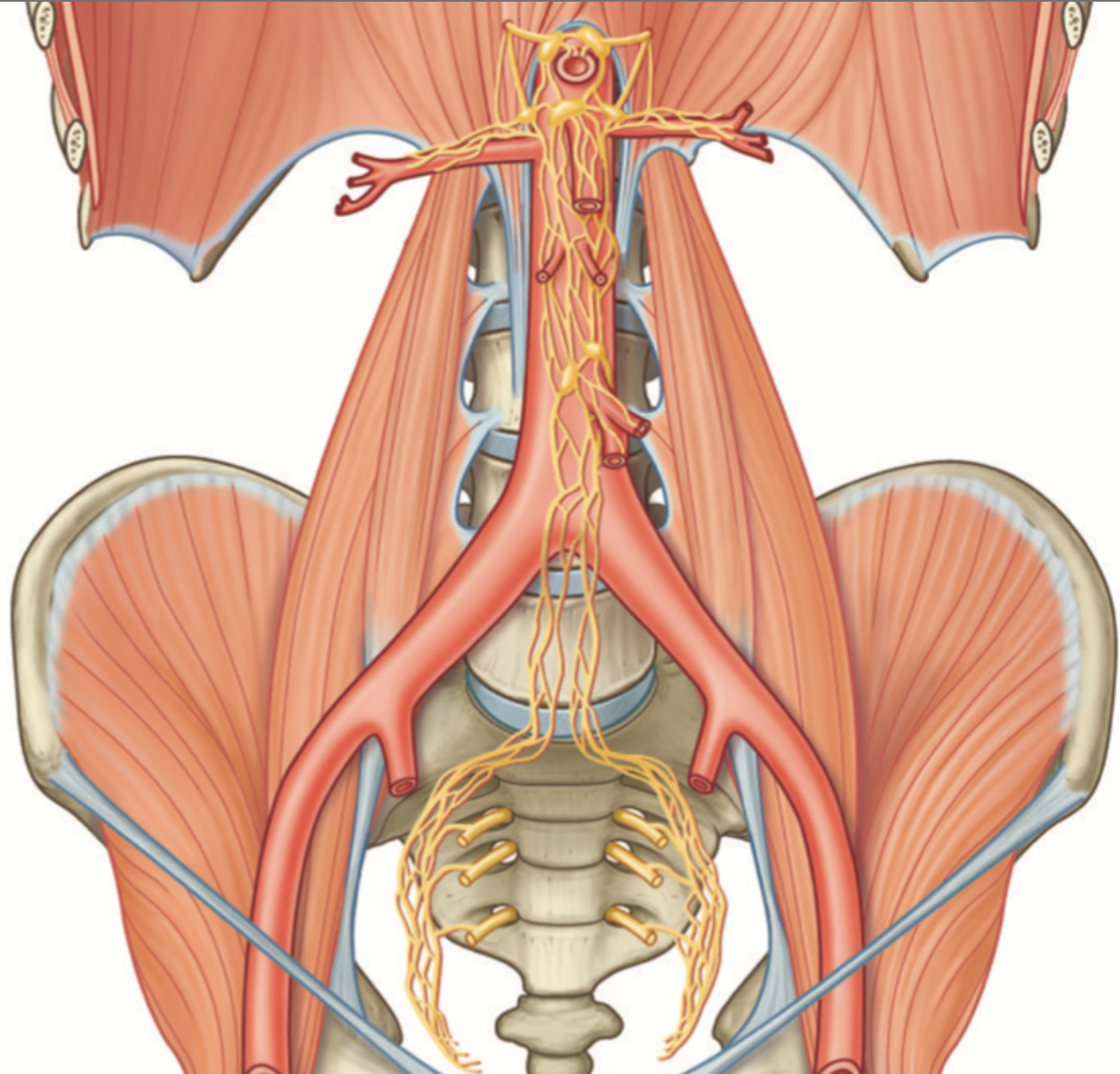
♦ Nervi splanchnici

- ♦ N. splanchnicus major (Th 5 – 9)
 - ♦ Ganglion coeliacum
- ♦ N. splanchnicus minor (Th10 – 11)
 - ♦ Ganglion aorticorenale
- ♦ N. splanchnicus minimus (Th 12)
 - ♦ Plexus renalis
- ♦ Nn. splanchnici lumbales
 - ♦ superior (L1+2), inferior (L3, 4)
- ♦ Nn. splanchnici sacrales, pelvici



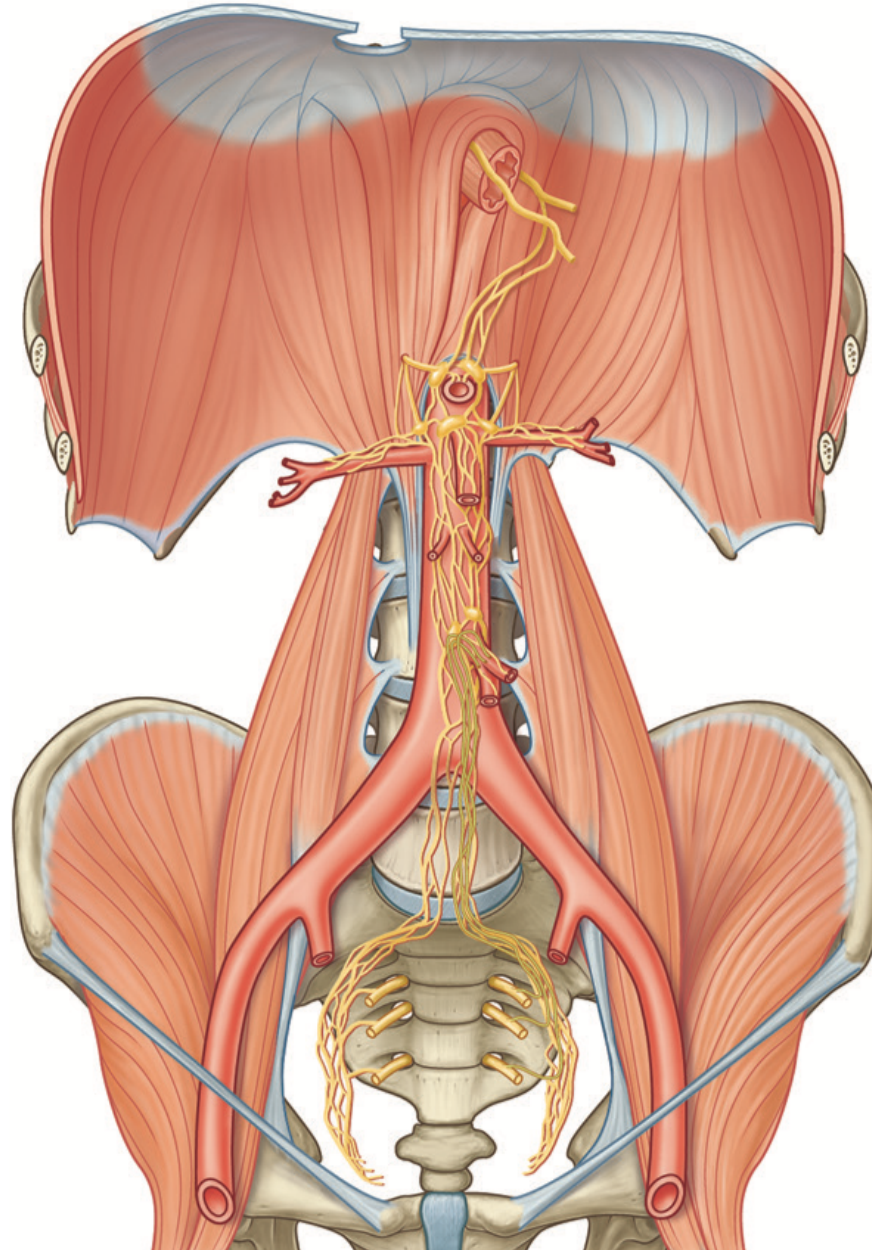
plexus praevertebralis

- ◆ Plexus coeliacus
- ◆ Plexus renalis
- ◆ Plexus aorticus
- ◆ Plexus hypogastricus superior
- ◆ Nervus hypogastricus
- ◆ Plexus hypogastricus inferior



parasympathetic

- 🔥 Nervus vagus (N. X)
- 🔥 Truncus vagalis anterior
- 🔥 Truncus vagalis posterior
- 🔥 Ganglia sacralia S2 – 4
- 🔥 Nervi splanchnici (+ sympathetic)



abdomen – cavity, wall, retroperitoneum

Prof. MUDr. Jiří Ferda, Ph.D.