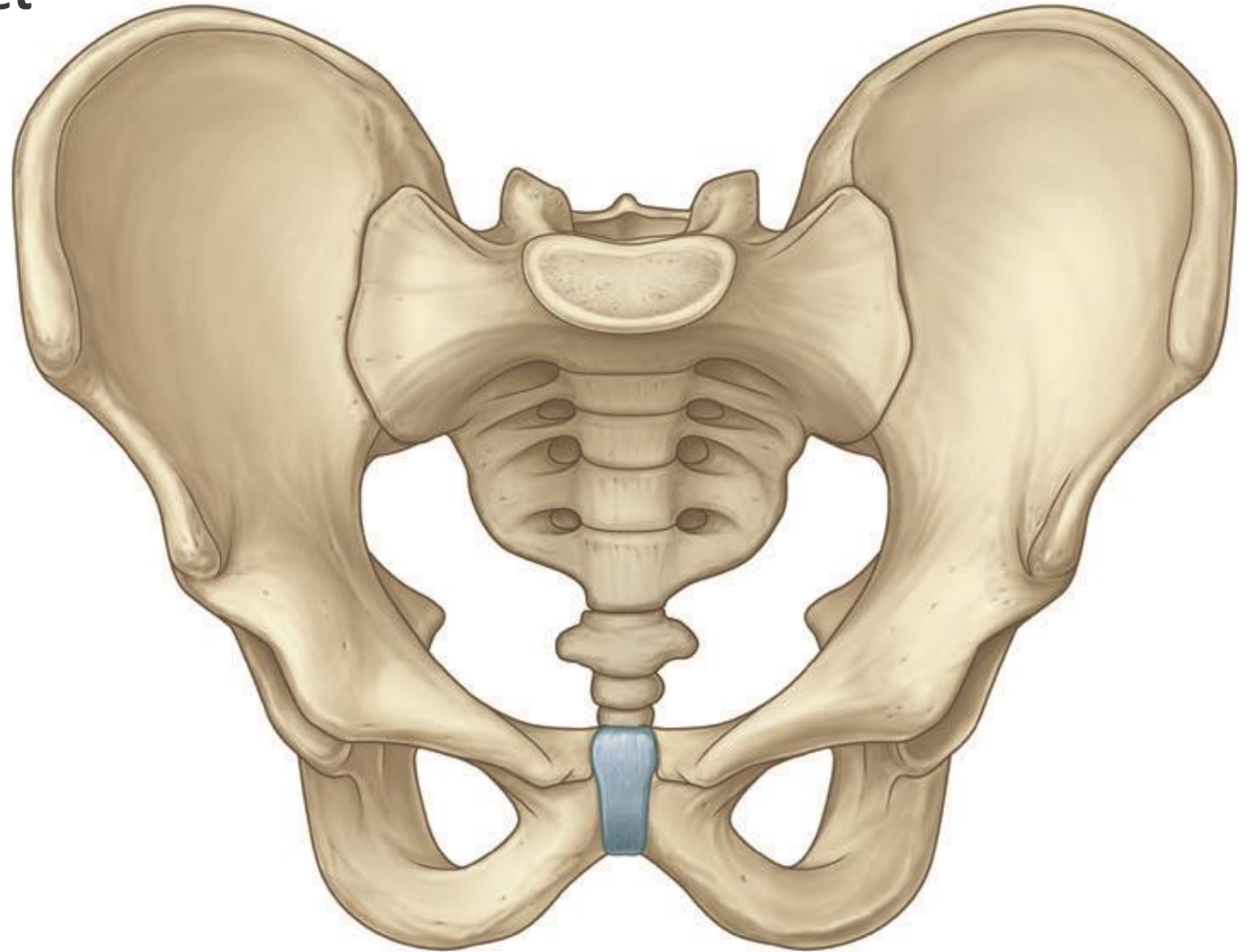


Pelvis, pelvic floor, genitalia

Prof. MUDr. Jiří Ferda, Ph.D.

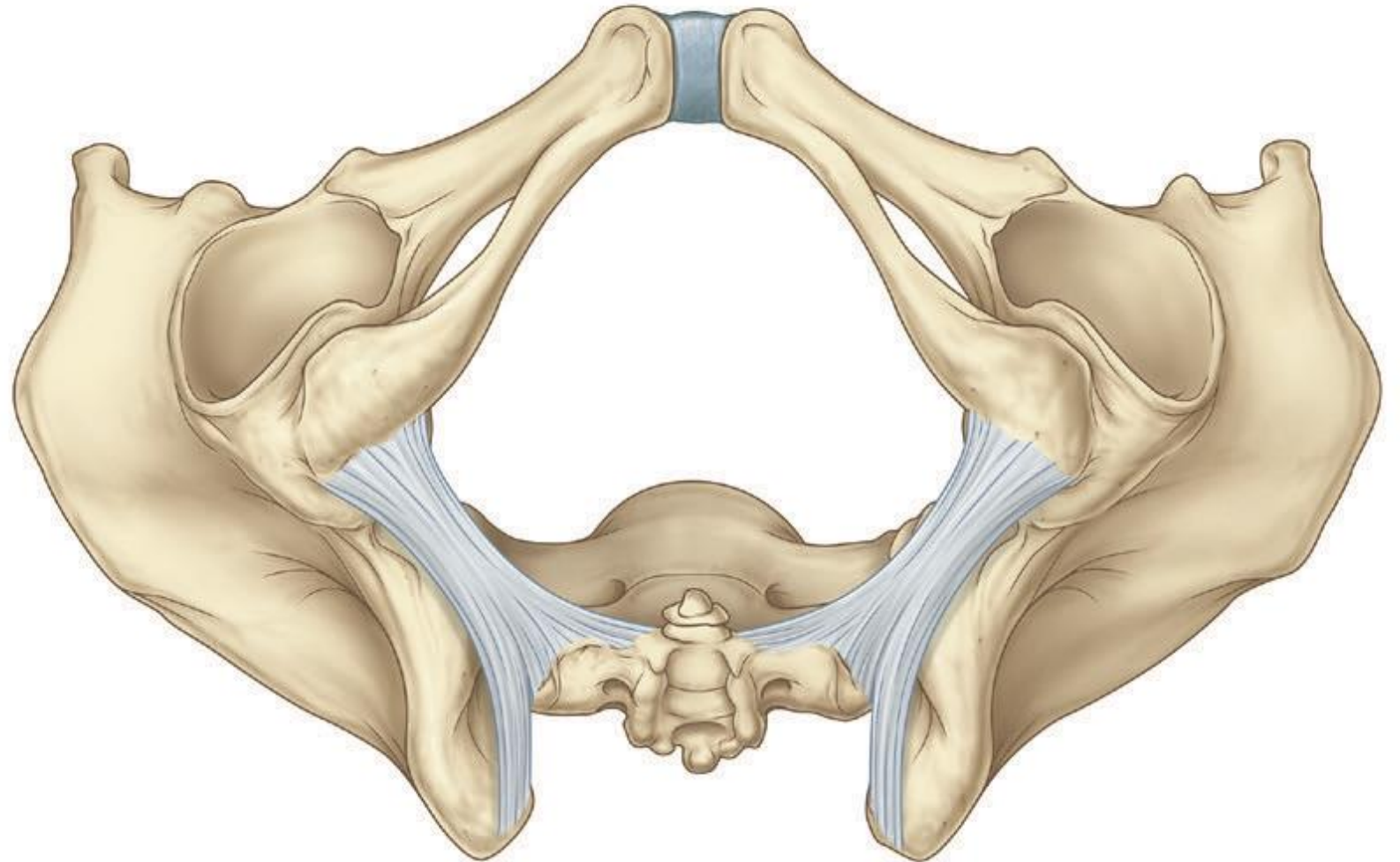
Bony pelvis

- ♦ Apertura pelvis superior /vstup/inlet
- ♦ Os sacrum - S1- promontorium
- ♦ Os ilium
- ♦ Os pubis
- ♦ Tuberculum pubicum
- ♦ Symphysis

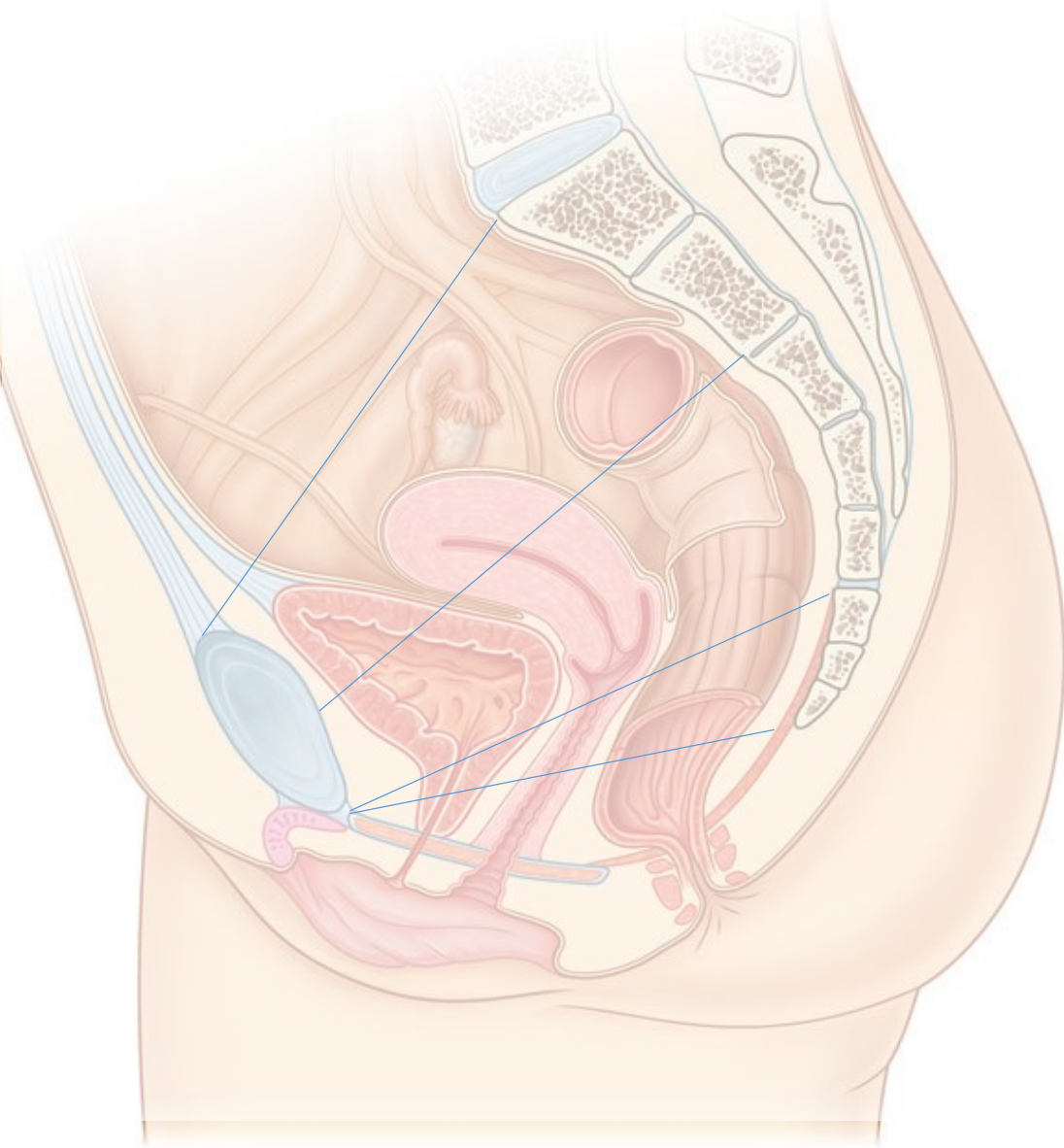


Bony pelvis

- ♦ Coccyx
- ♦ Ligamentum sacrotuberale
- ♦ Tuber ischiadicum
- ♦ Ramus ischiopubicus
- ♦ Symphysis

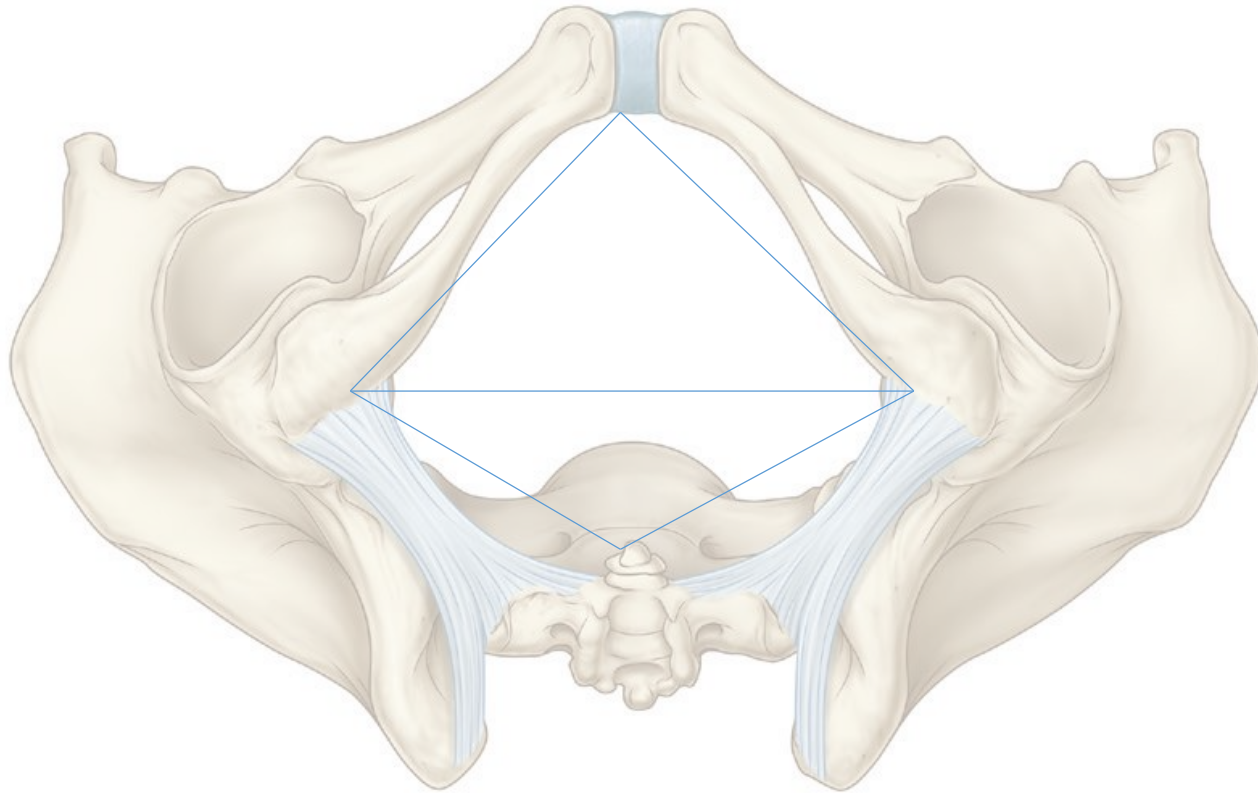


Bony pelvis



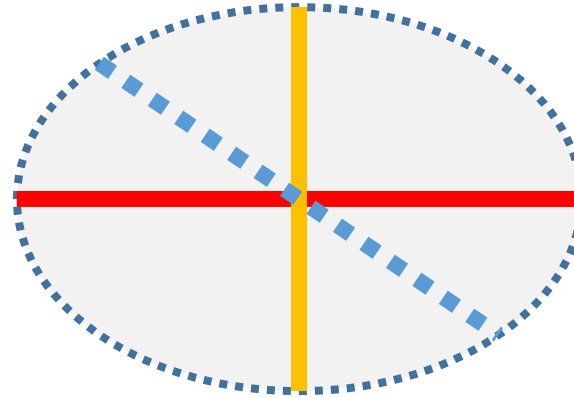
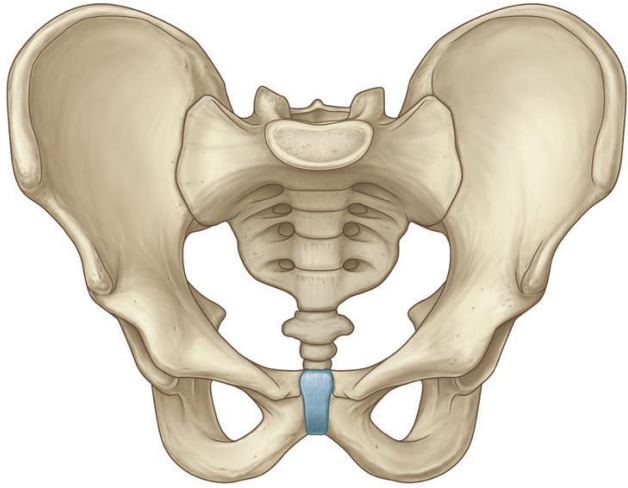
- ♦ Pelvic planes
- ♦ Apertura pelvis superior
 - ♦ promontorium - linea arcuata symphysis
- ♦ Amplitudo pelvis
 - ♦ S2/3 – middle of symphysis
- ♦ Angustia pelvis
 - ♦ S5/Co – lower rim of symphysis
- ♦ Apertura pelvis inferior
 - ♦ coccyx - tubera ischiadica – lower rim of symp
 - ♦ Two trigons

Bony pelvis



- ♦ Pelvic planes
- ♦ Apertura pelvis superior
 - ♦ promontorium - linea arcuata symphysis
- ♦ Amplitudo pelvis
 - ♦ S2/3 – middle of symphysis
- ♦ Angustia pelvis
 - ♦ S5/Co – lower rim of symphysis
- ♦ Apertura pelvis inferior
 - ♦ coccyx - tubera ischiadica – lower rim of symph
 - ♦ Two trigons

Bony pelvis



♦ Diameter obliqua dextra

♦ Diameter recta

♦ Diameter transversa

Apertura pelvis superior

Amplitudo pelvis

Angustia pelvis

Apertura pelvis inferior

diameter recta

11 cm

12,5 cm

11,5 cm

diameter obliqua

12 cm

13,5 cm

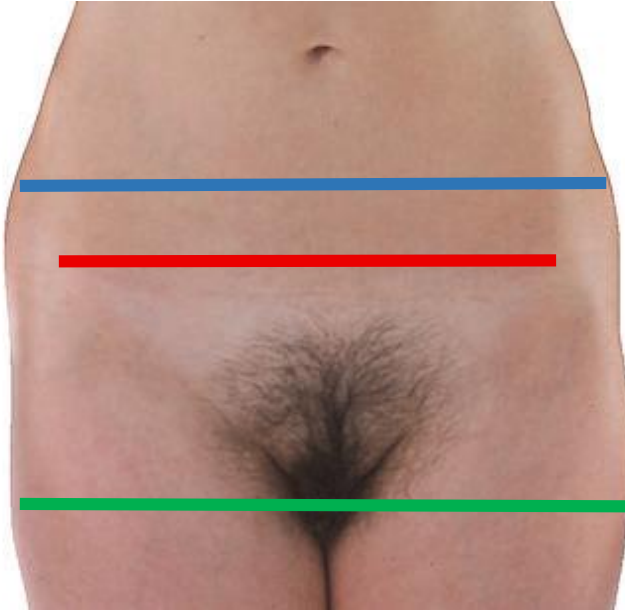
diameter transversa

13 cm

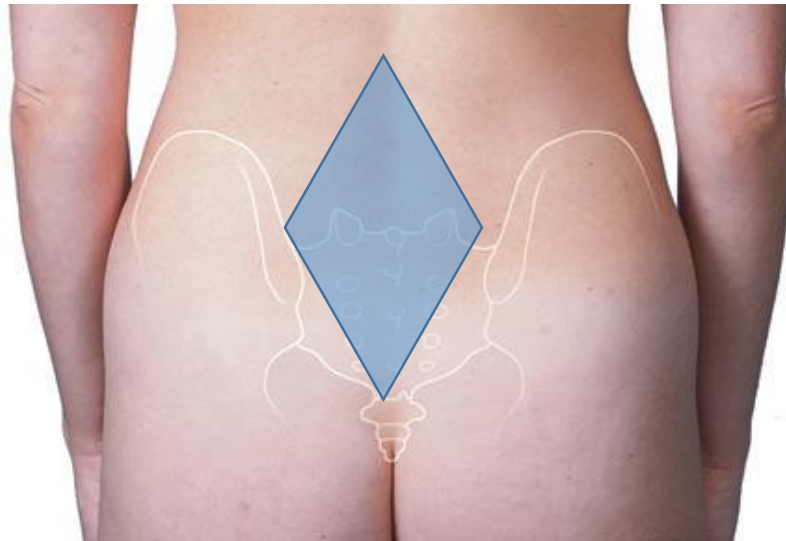
12,5 cm

♦ Rotation of the fetal head during deliverance

Bony pelvis



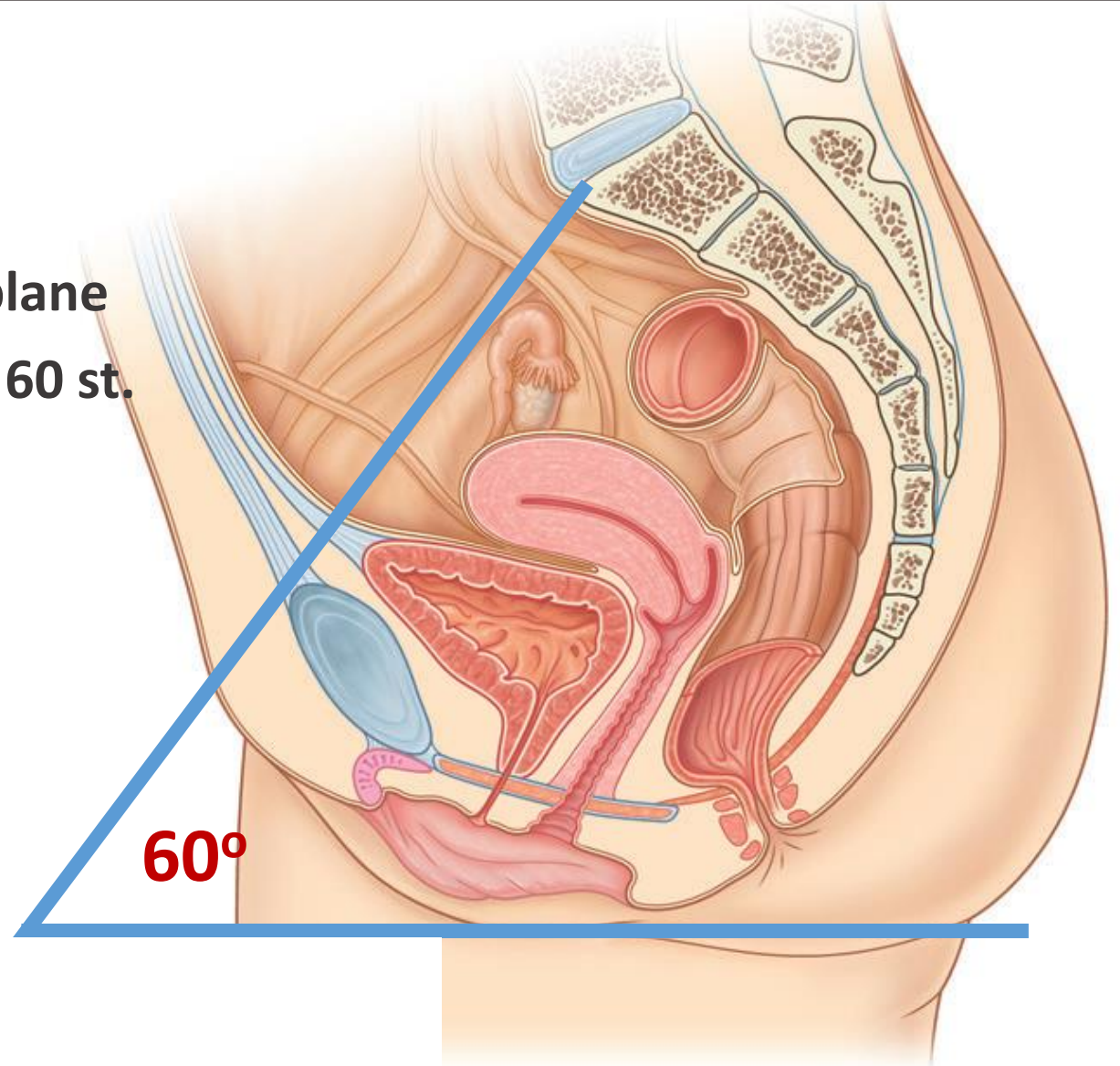
- ♦ **Distantia bispinalis** 26 cm
- ♦ **Distantia bicristalis** 29 cm
- ♦ **Distantia bitrochanterica** 31 cm
- ♦ **Conjugata externa** 20 cm (min 18 cm)
- ♦ **Processus spinosus L5 - symfýza**
- ♦ **Distantia Baudeloque**



- ♦ **Pelvimetr**
- ♦ **Proc. spinosus L5**
- ♦ *2. a 4. finger to spinae iliacae posteriores,*
- ♦ *3. finger shows a spine of L5*
- ♦ **Rhomboid – route of Michaelis**

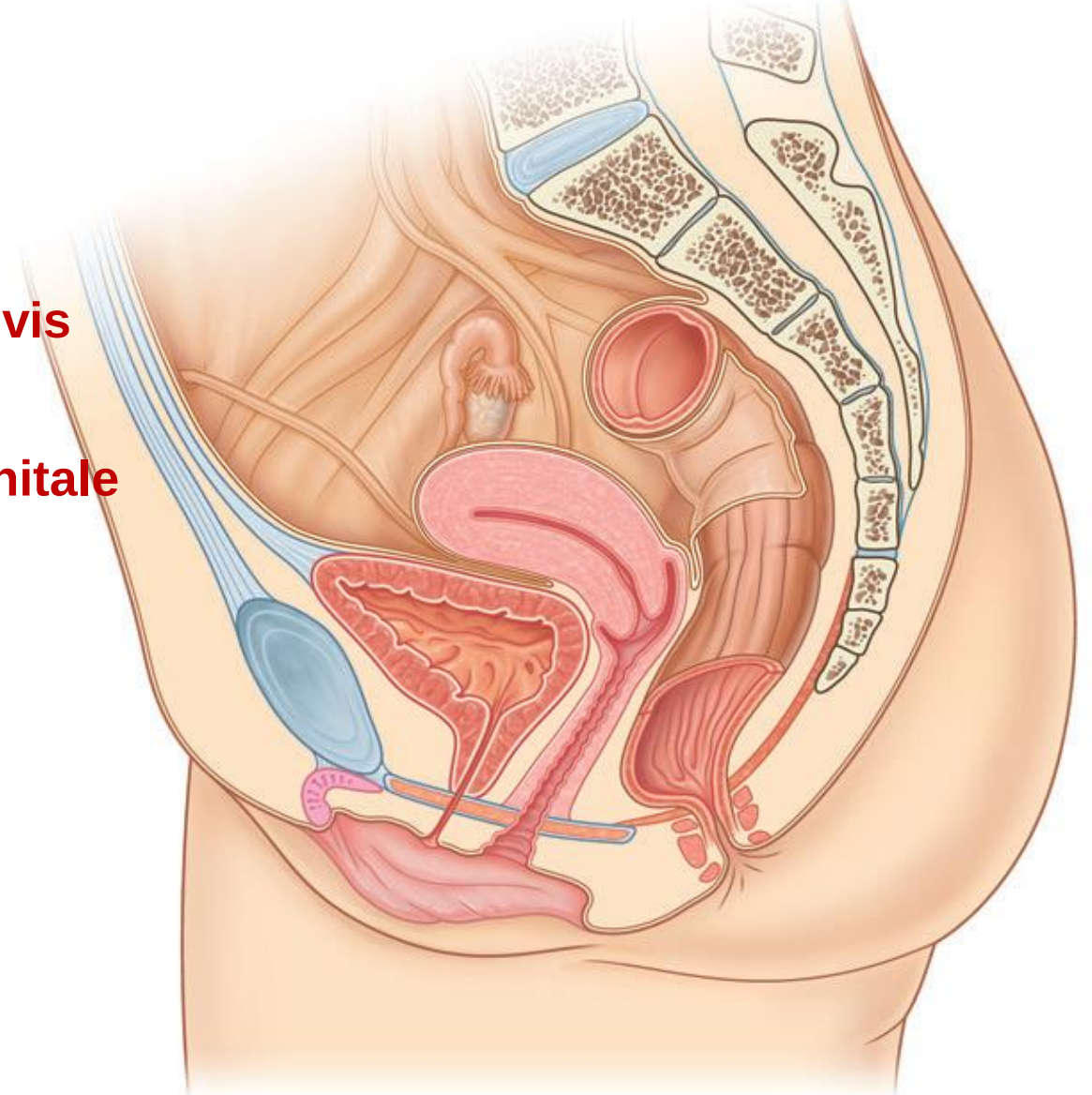
Bony pelvis

- ♦ Inclinatorio pelvis
- ♦ Spinae iliacae ant. et sup. In the same plane
- ♦ Entrance with horizontal plane - angle 60 st.



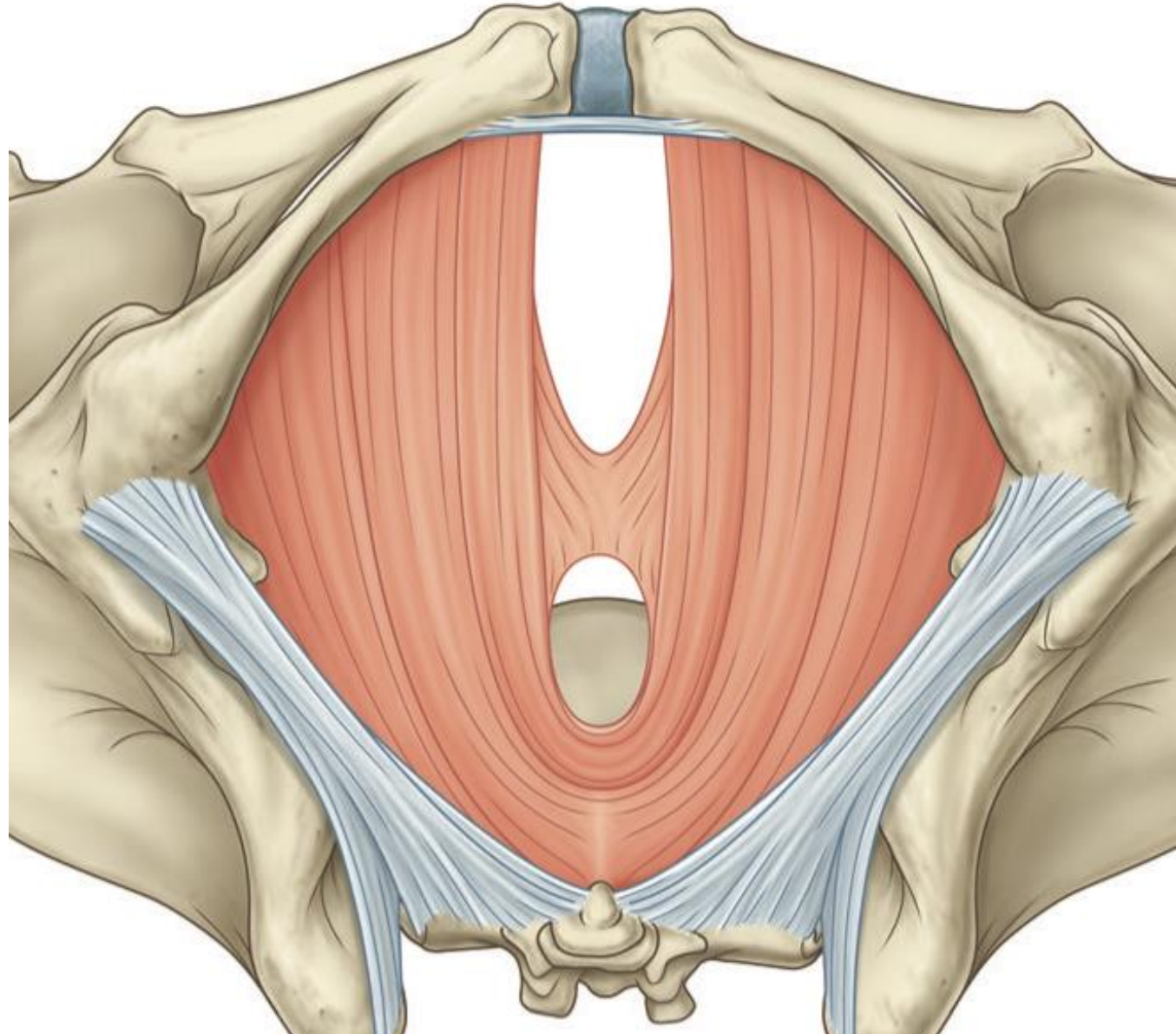
diaphragma pelvis

- ♦ **Tail muscles rudiments**
- ♦ M. sacrococcygeus ventralis
- ♦ M. coccygeus
- ♦ **The Owen pelvic floor muscle = diaphragma pelvis**
- ♦ M. levator ani
- ♦ **Urogenital floor muscles = diaphragma urogenitale**
 - ♦ Membrana perinei
- ♦ Hiatus urogenitalis
- ♦ Centrum tendineum perinei
- ♦ Hiatus analis



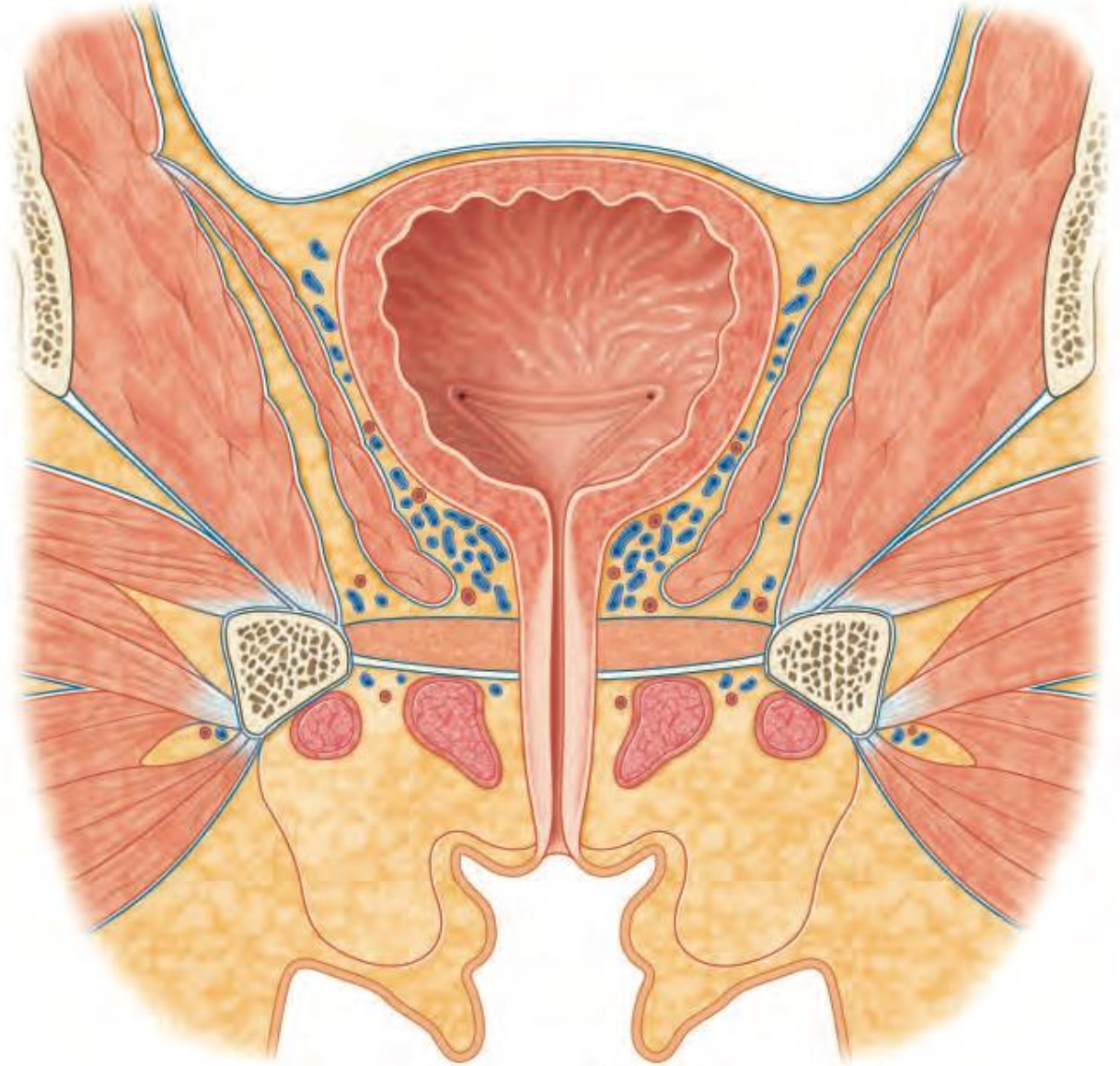
m. levator ani

- ♦ Main pelvic floor muscle
- ♦ Main supporting muscle of uterus
- ♦ Infundibular shape
- ♦ Centrum - anus
- ♦ M. pubococcygeus
 - ♦ Male - m. levator prostatae
 - ♦ Female - m. pubovaginalis
- ♦ M. puborectalis
- ♦ M. iliococcygeus
 - ♦ Origin at arcus tendineus m. levatoris ani
 - ♦ seu fasciae obturatorae



Fasciae pelvis

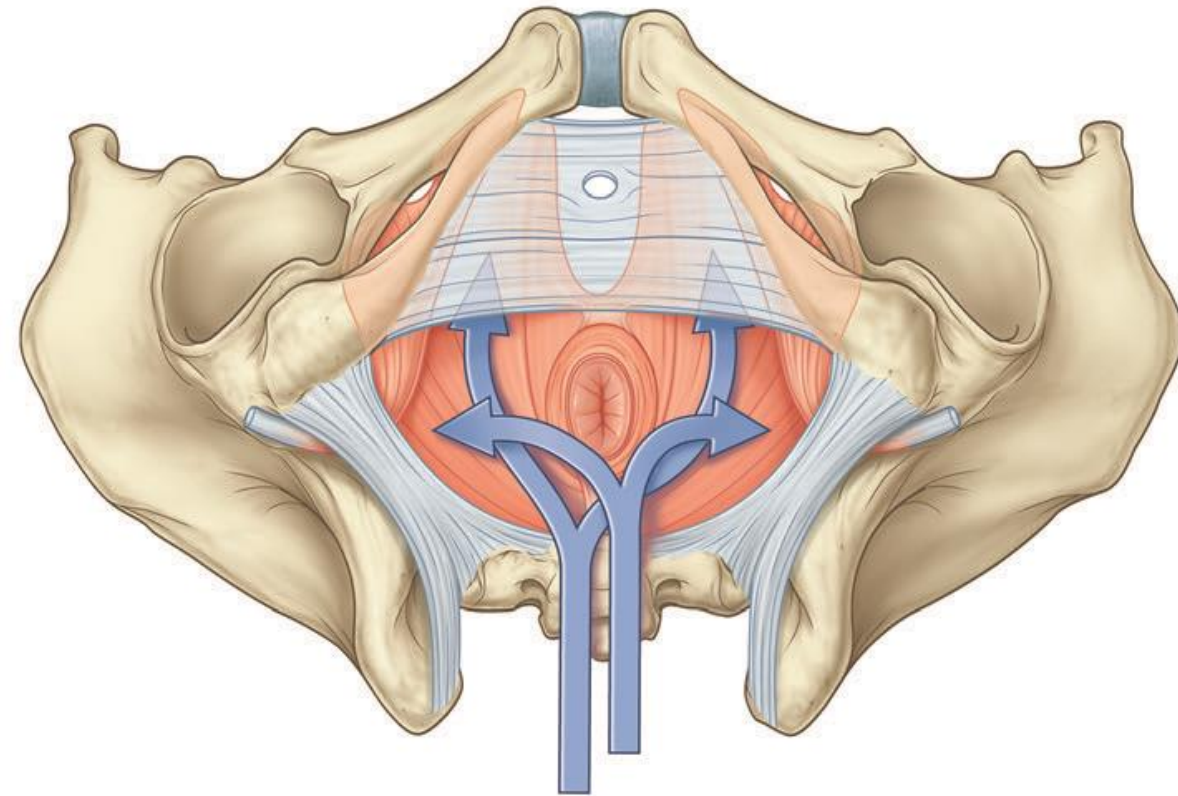
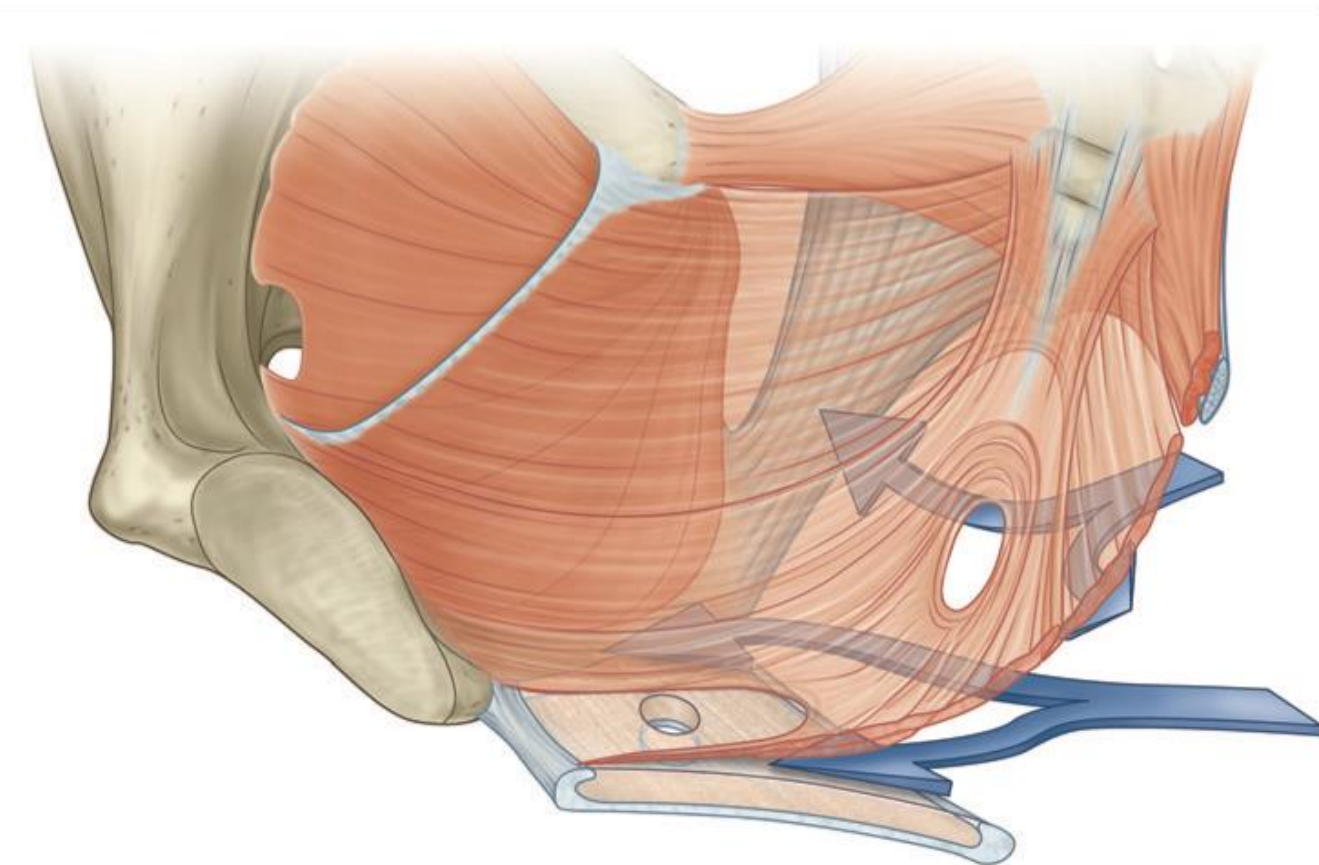
- ♦ **Arcus tendineus levatoris ani**
- ♦ **Fascia diaphragmatis pelvis superior**
 - ♦ *Follows to fascia pelvis parietalis*
 - ♦ *Organ covering- fascia pelvis visceralis*
- ♦ **Fascia diaphragmatis pelvis inferior**
- ♦ **Fascia obturatoria**
 - ♦ *In duplication - Canalis pudendalis Alcocki*
 - ♦ *N. pudendus et vasa pudenda int.*
- ♦ **Fossa ischioirectalis**
 - ♦ *Fossa between m. levator ani and m. obturatorius ir*
 - ♦ *Loose faty connective tissue - infection*
- ♦ **Recessus pubicus fossae ischioirectalis**
 - ♦ *Deiniated diaphragma urogenitale*
 - ♦ *Inside m. sphincter urethrae*
 - ♦ *Reaches symphysis*
- ♦ **Fascia perinei superficialis**
 - ♦ *Following of fascia abdominis subcutanea*



Fossa ischioirectalis

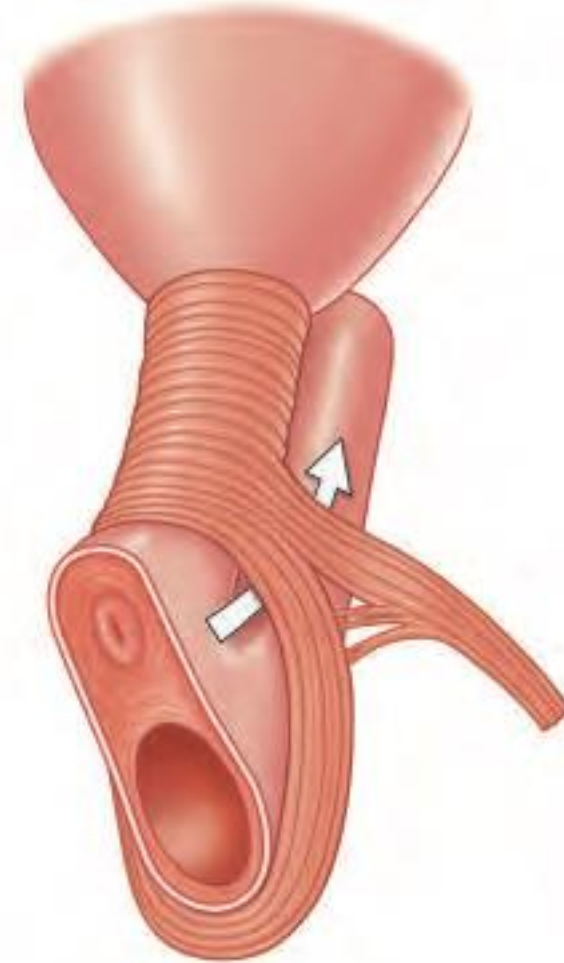
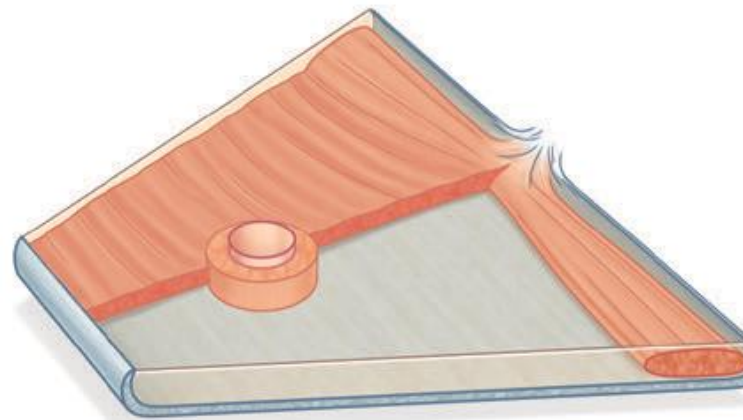
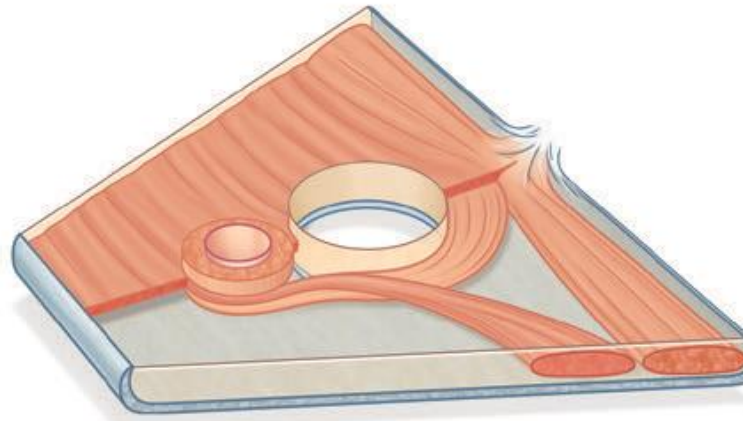
Fossa ischioirectalis

- ♦ Recessus pubicus fossae ischioirectalis – anterior recessus



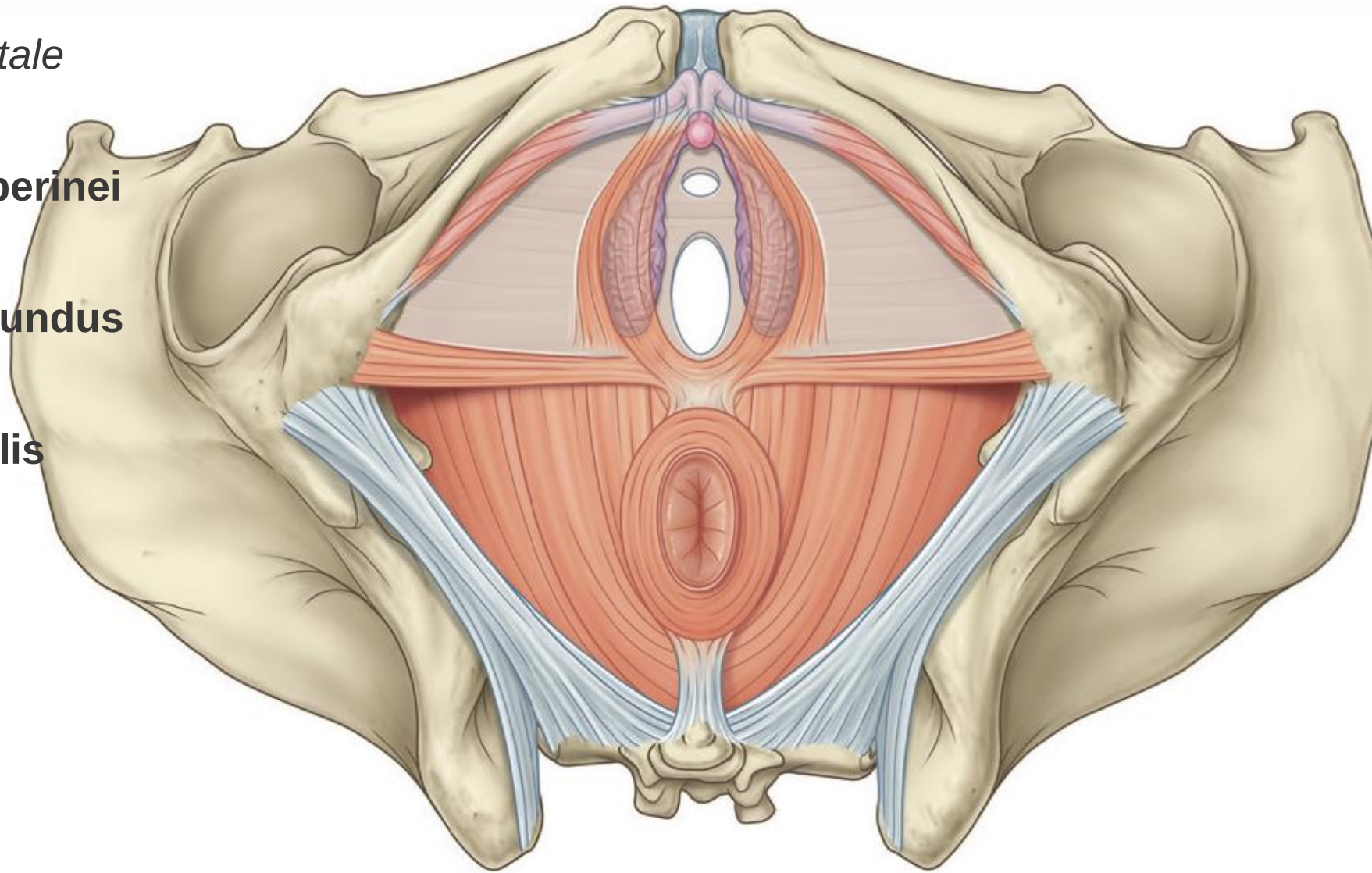
Membrana perinei

- ♦ *formerly diaphragma urogenitale*
- ♦ **Deep layer**
- ♦ Ligamentum transversum perinei
- ♦ M. sphincter urethrae
- ♦ M. transversus perinei profundus
- ♦ M. compressor urethrae
- ♦ M. sphincter urethrovaginalis
- ♦ **Superficial layer**
- ♦ *Regio analis*
- ♦ M. sphincter ani externus
- ♦ *Regio urogenitalis*
- ♦ M. ischiocavernosus
- ♦ M. bulbospongiosus
- ♦ M. transversus perinei superficialis - inconstant



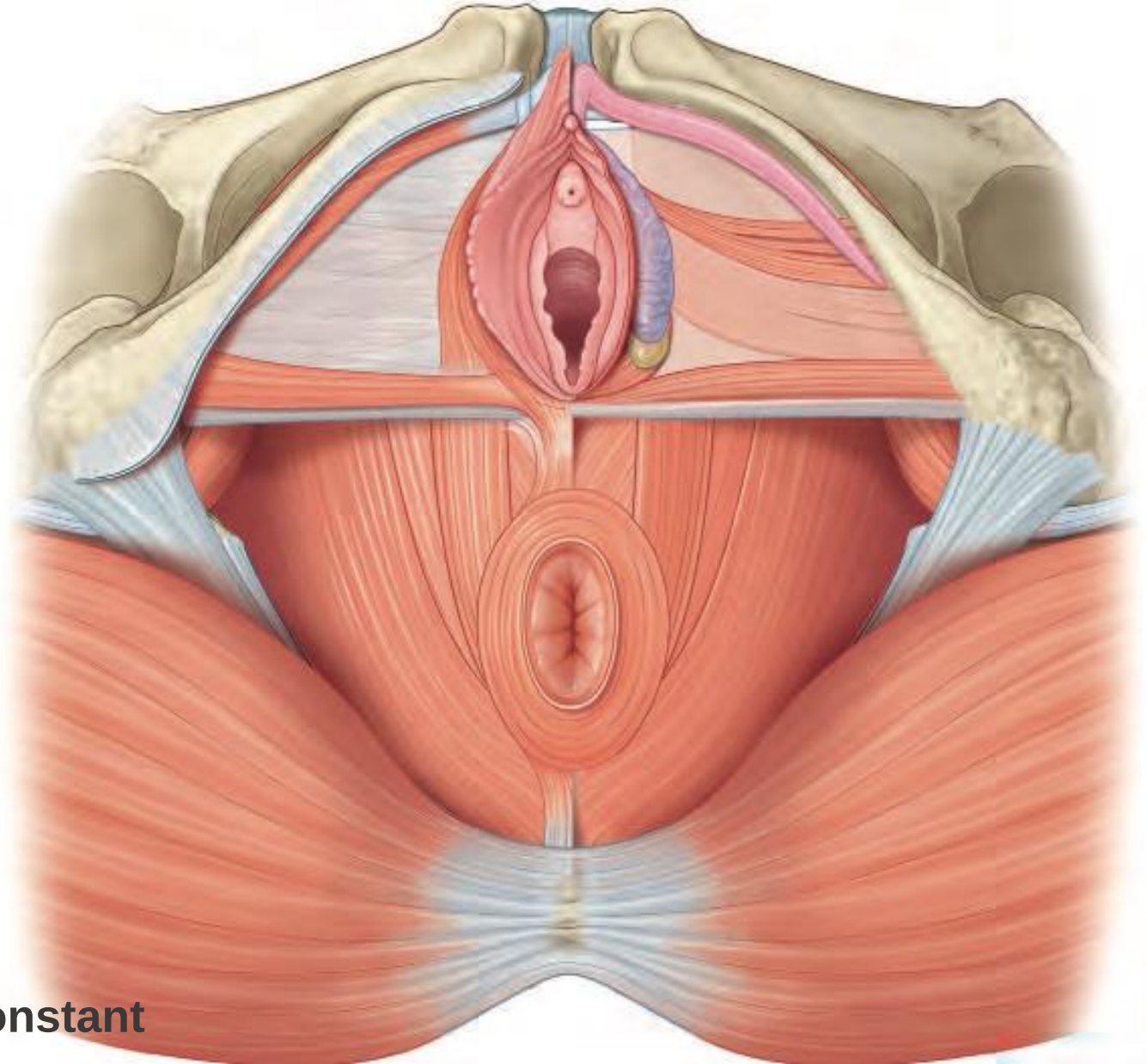
Membrana perinei

- ♦ *formerly diaphragma urogenitale*
- ♦ **Deep layer**
- ♦ Ligamentum transversum perinei
- ♦ M. sphincter urethrae
- ♦ M. transversus perinei profundus
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- ♦ *Regio analis*
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- ♦ M. transversus perinei superficialis - inconstant



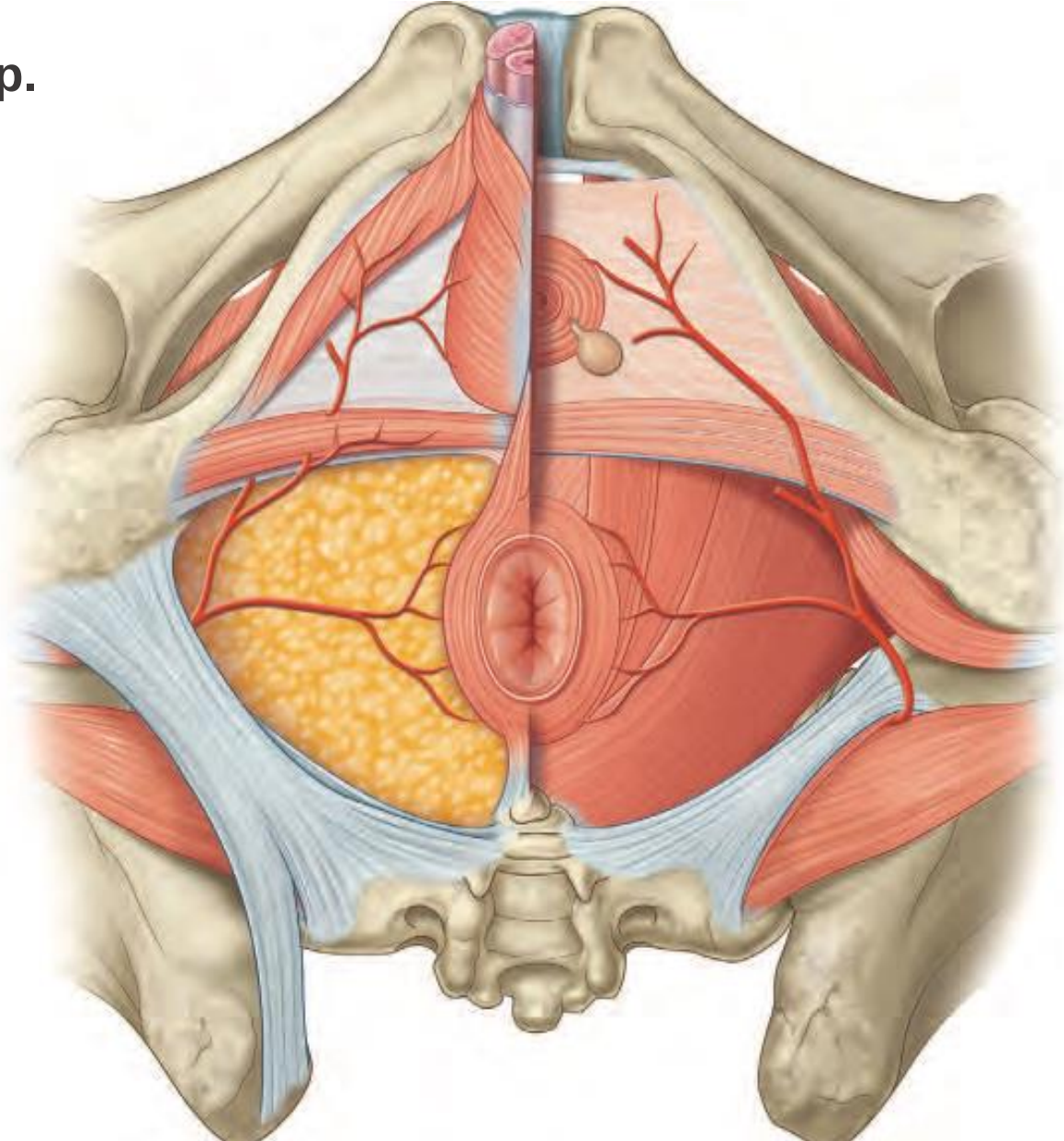
Membrana perinei

- ♦ *formerly diaphragma urogenitale*
- ♦ **Deep layer**
- ♦ Ligamentum transversum perinei
- ♦ M. sphincter urethrae
- ♦ M. transversus perinei profundus
- ♦ M. compressor urethrae
- ♦ M. sphincter urethrovaginalis
- ♦ **Superficial layer**
- ♦ *Regio analis*
- ♦ M. sphincter ani externus
- ♦ *Regio urogenitalis*
- ♦ M. ischiocavernosus
- ♦ M. bulbospongiosus
- ♦ M. transversus perinei superficialis - inconstant



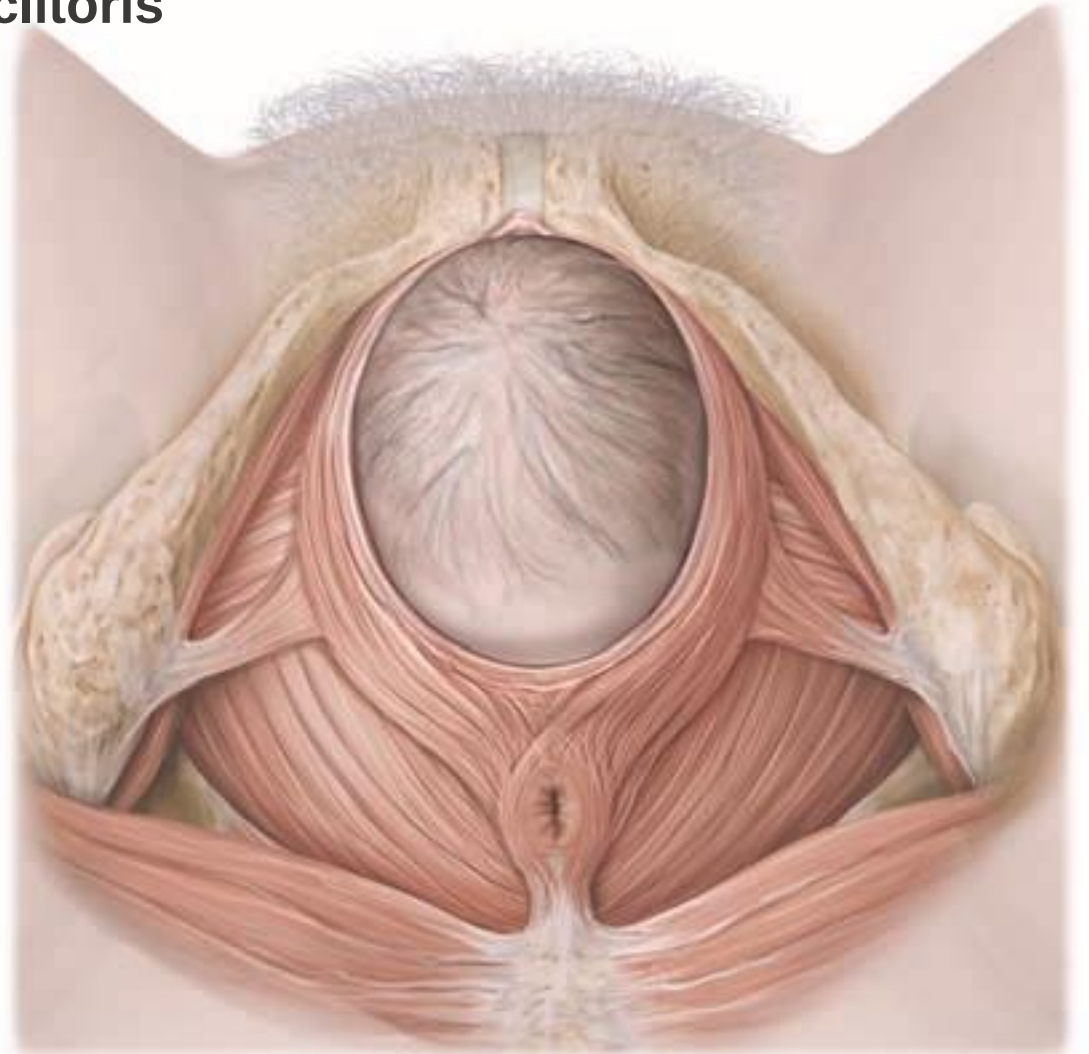
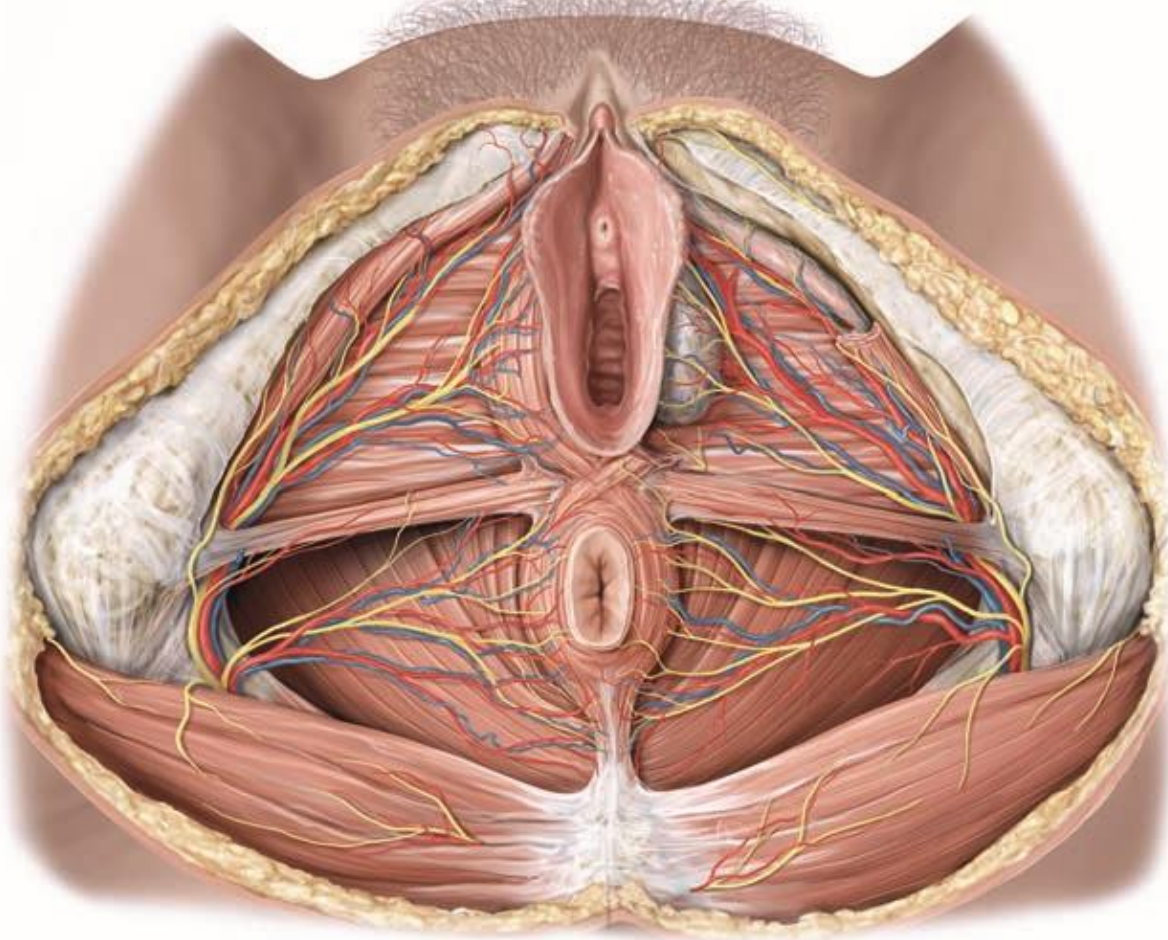
Vasa perinei

- ♦ *A. umbilicalis* – a. vesicae urinariea sup.
- ♦ *A. obturatoria*
- ♦ *A. vesicae uterinae inferior*
- ♦ *A. uterina*
- ♦ *A. rectalis media*
- ♦ *A. pudenda interna*
 - ♦ - *canalis pudendalis Alcocki*



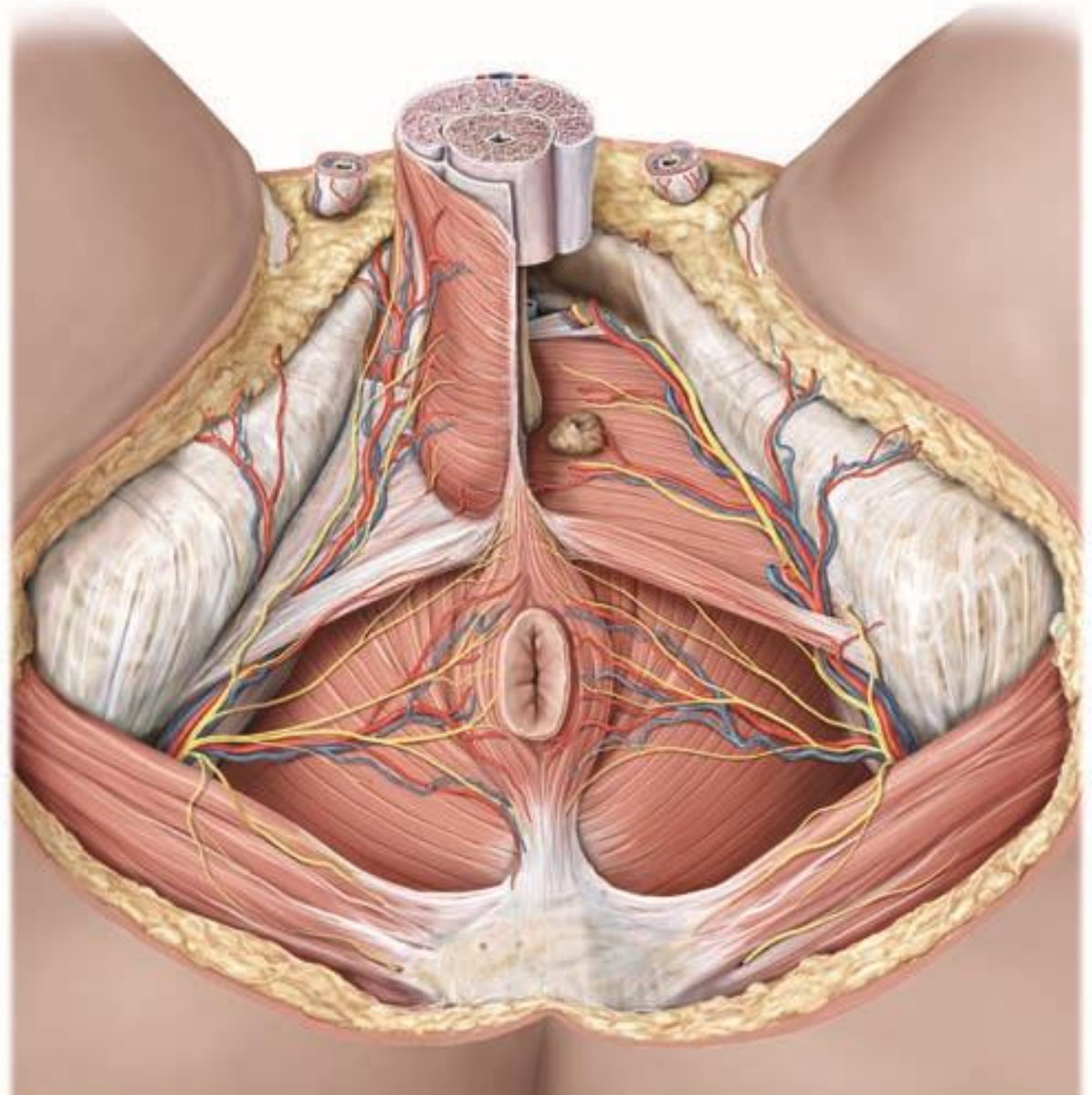
perineum femininum

- ♦ N. pudendus, vasa pudenda interna
- ♦ N. et vasa labiales posteriores, n. et vasa dorsalis clitoris
- ♦ N. et vasa rectales inferiores

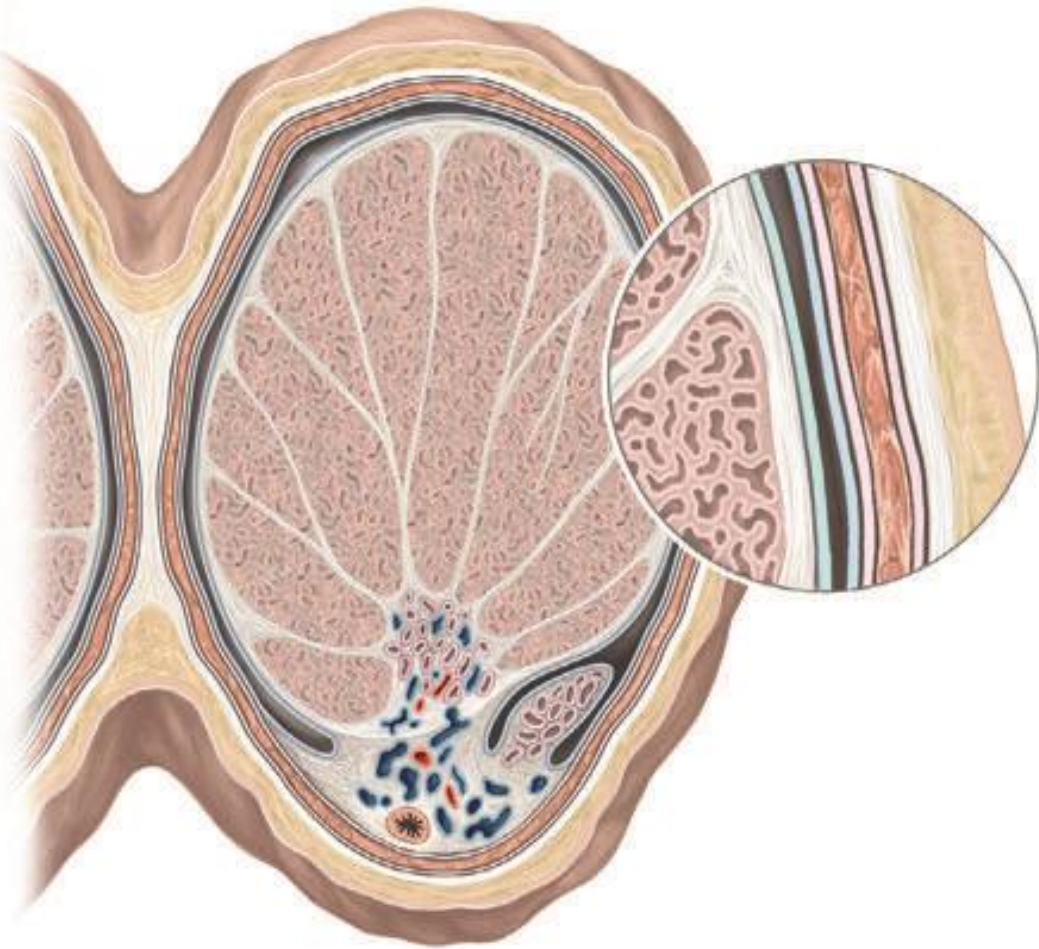


perineum masculinum

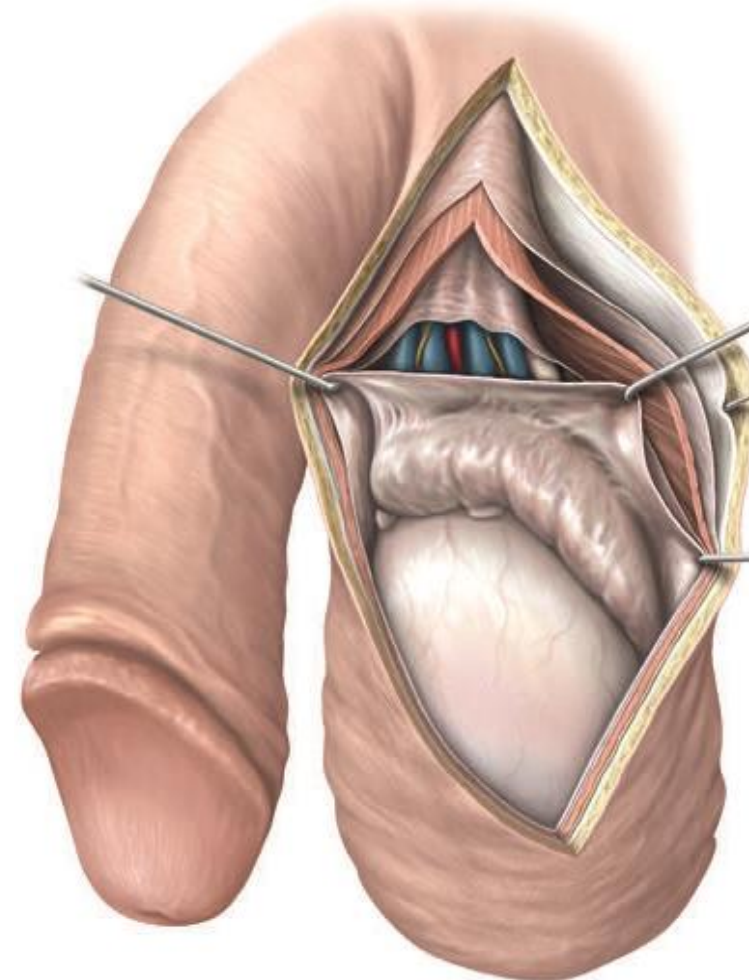
- ♦ N. pudendus, vasa pudenda interna
- ♦ N. et vasa dorsalis penis
- ♦ N. et vasa rectales inferiores



Scrotum, testis, epididymis



- Raphe scroti
- Septum scroti
- Tunica dartos
 - Fascia et musculus
- Fascia spermatica externa
- M. cremaster
 - + fascia cremasterica
- Fascia spermatica interna
- Tunica vaginalis
 - Lamina externa (parietalis)
 - CAVUM
 - Lamina interna (visceralis)
- Tunica albuginea testis



Scrotum et paries abdominis

♦ Scrotum

♦ Cutis

♦ Tunica dartos

♦ Fascia spermatica externa

♦ M. cremaster*

♦ Fascia spermatica interna

♦ Tunica vaginalis testis

♦ 31-35°C

♦ Paries abdominalis

♦ Cutis

♦ Mm. arectores pilorum

♦ Facia superficialis abdominis

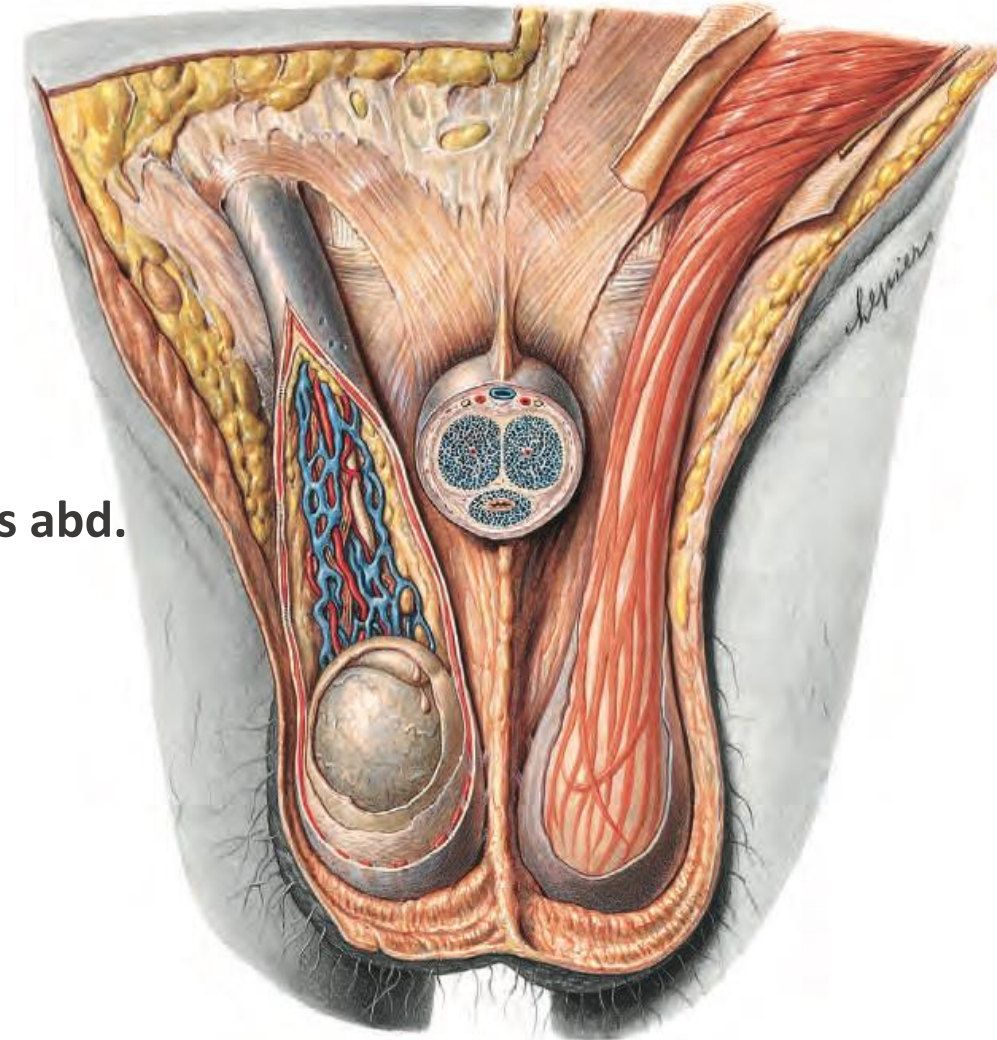
♦ M. obliquus int., m. transversus abd.

♦ Fascia endoabdominalis

♦ Peritoneum

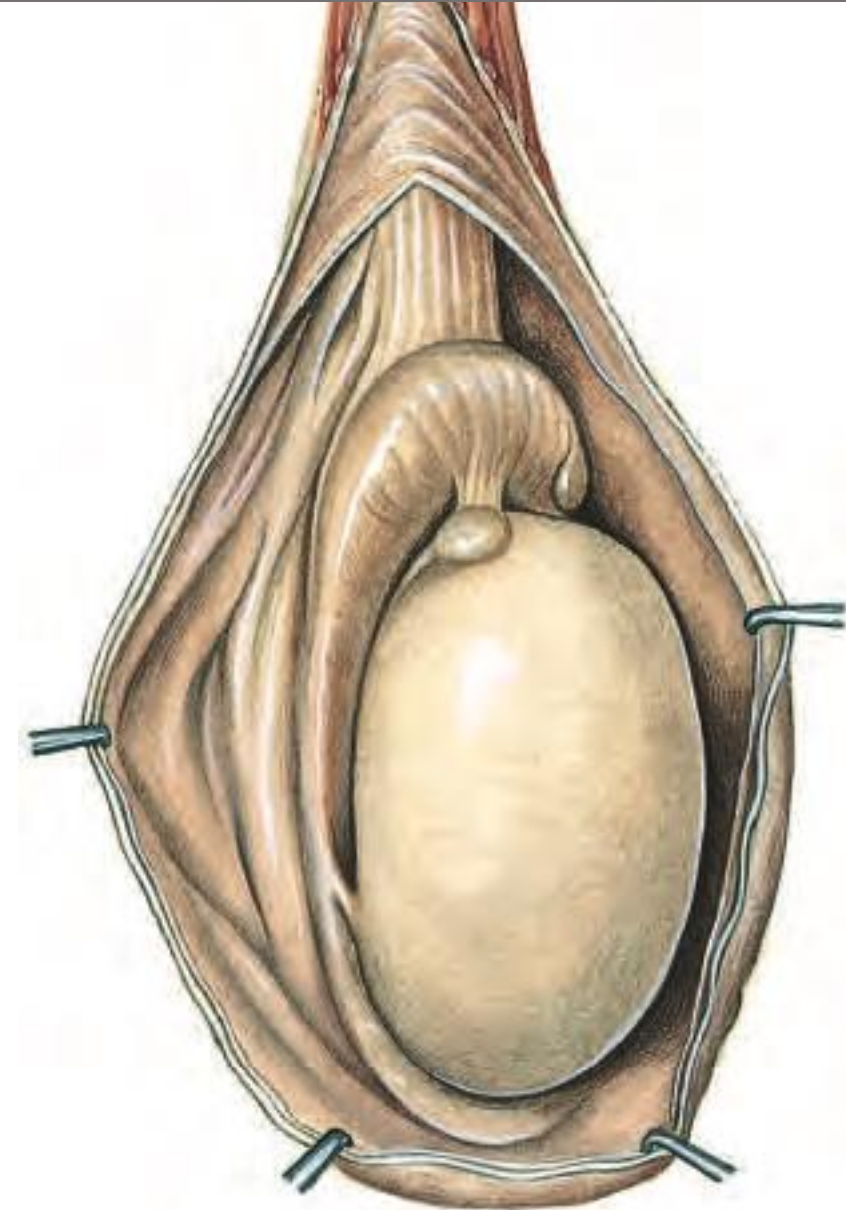
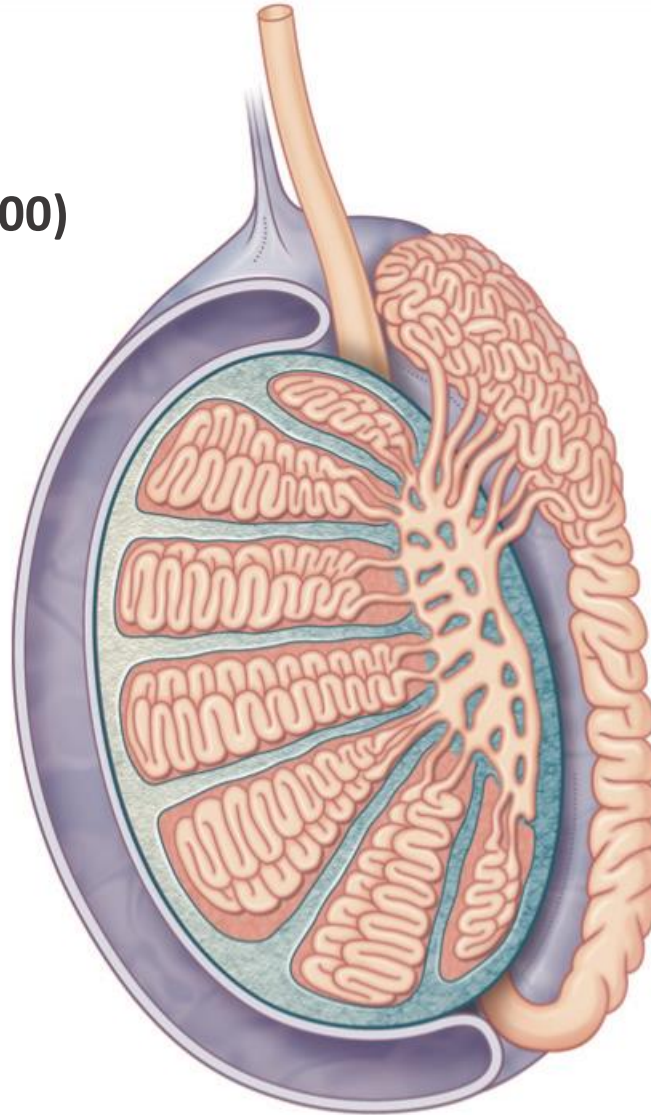
♦ 37°C

**reflexus cremastericus*



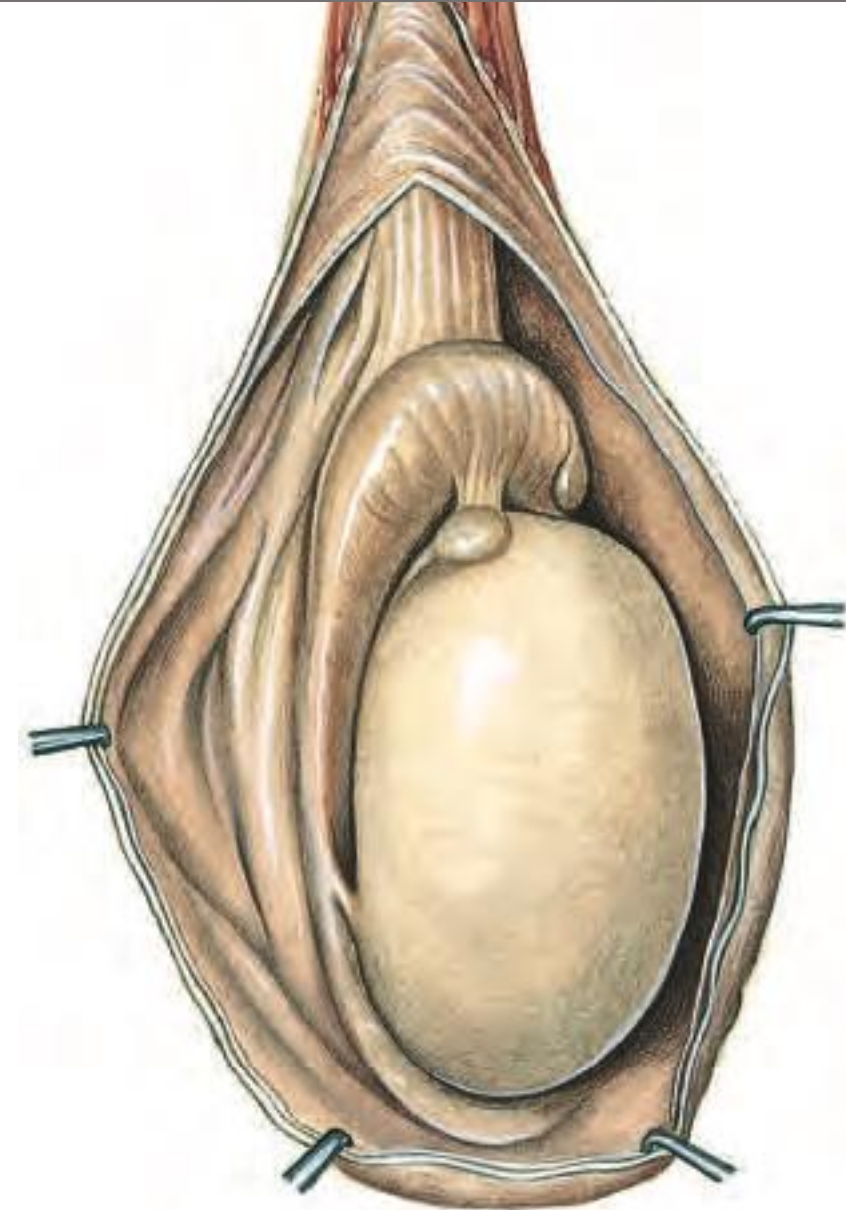
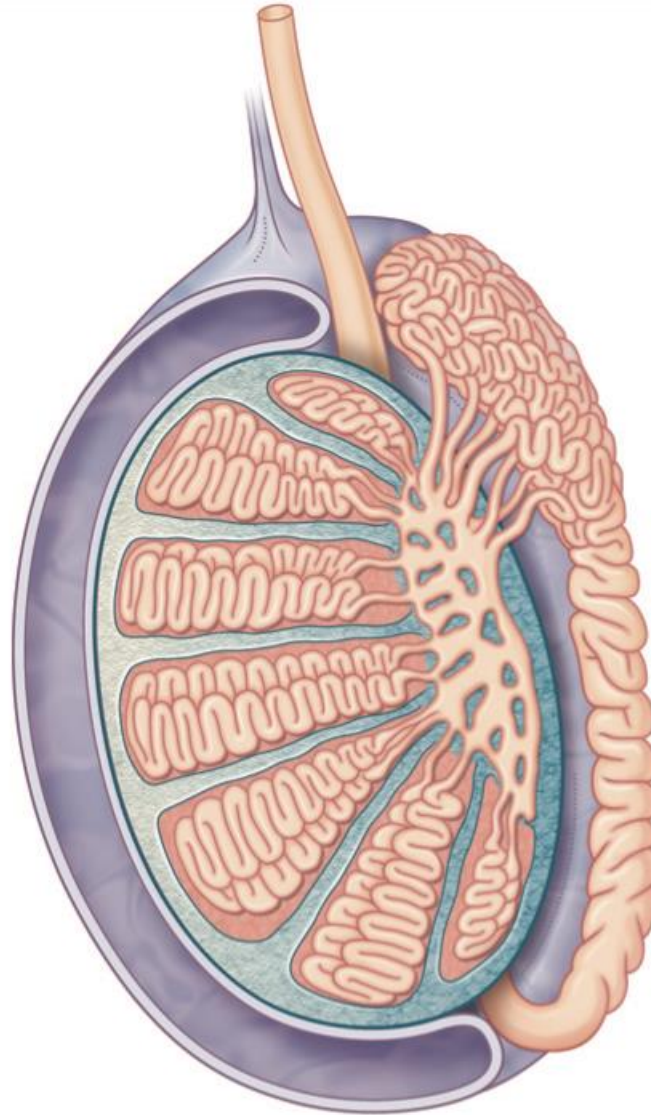
testis

- ♦ Tunica albuginea
- ♦ Lobuli testis
 - ♦ Tubuli seminiferi contorti (400-600)
 - ♦ Tubuli recti
- ♦ Septa testis
- ♦ Mediastinum testis
 - ♦ Rete testis
 - ♦ Ductuli efferentes testis



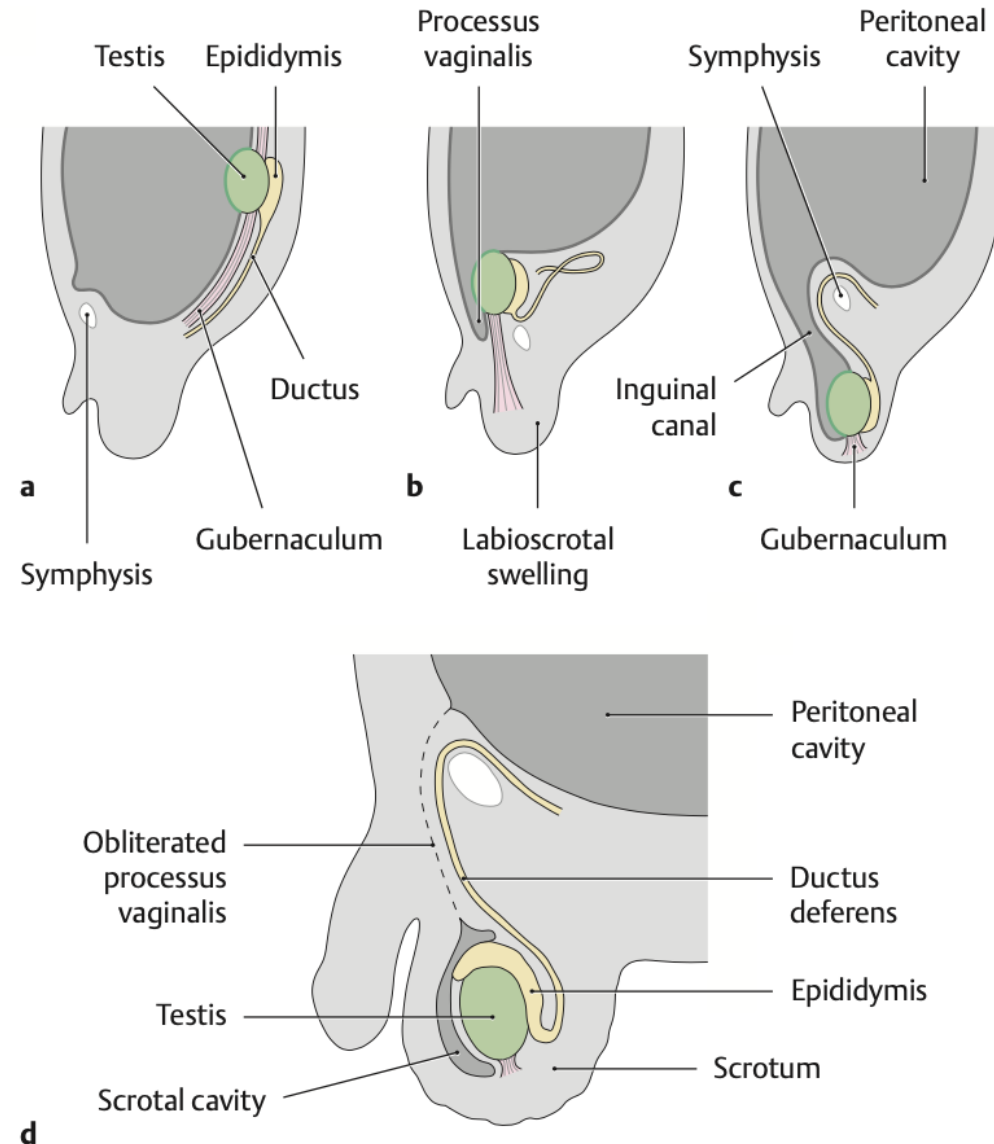
epididymis

- Ductuli efferentes
- Caput
- Corpus
- Cauda
- Ductus deferens



descensus testis

- Anulus inguinalis profundus
- Processus vaginalis peritonei
- Vertigium processus vaginalis
- Anorchismus
- Monorchismus
- Cryptorchismus



Funiculus spermaticus

- ♦ **Ductus deferens**

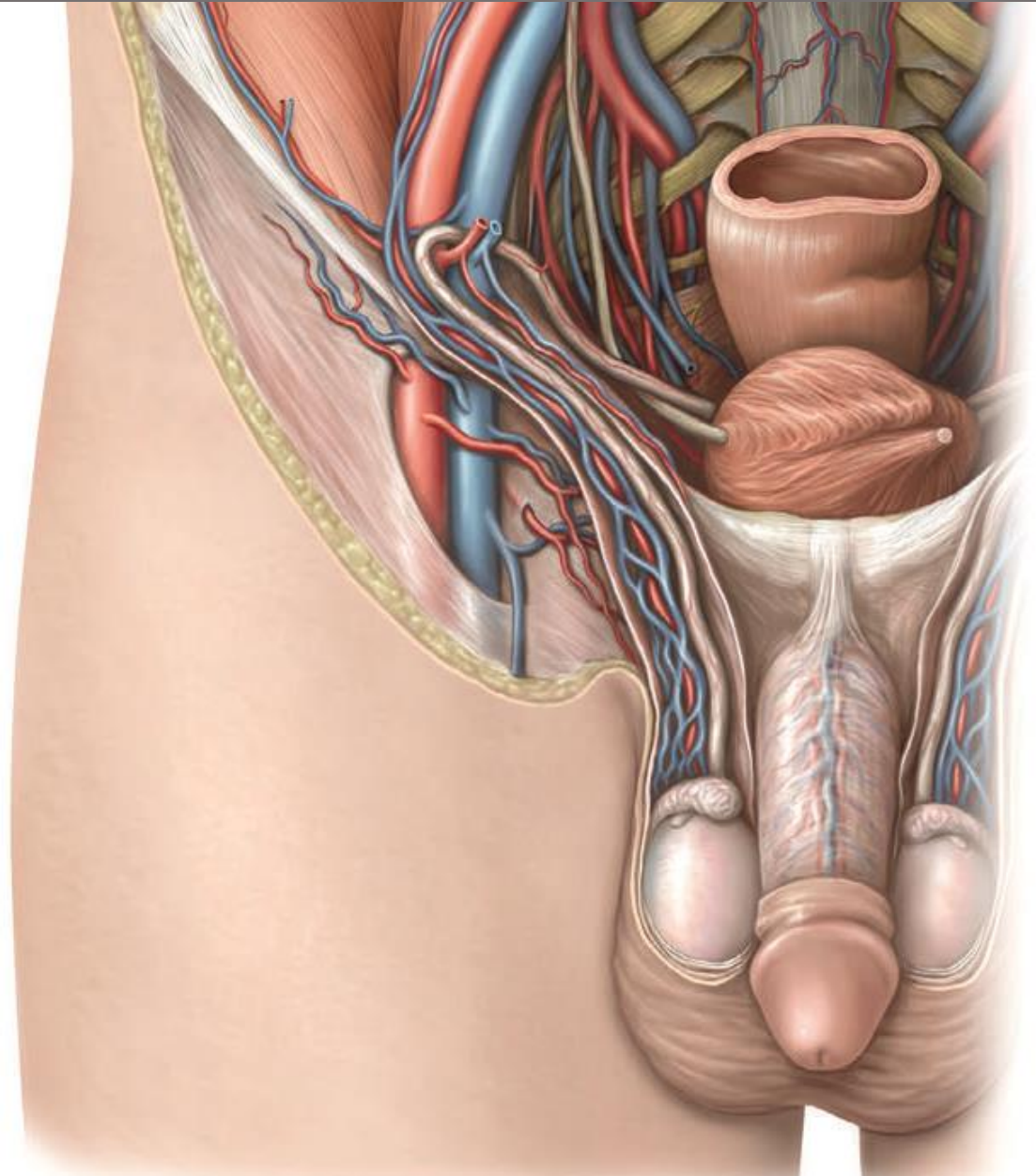
- ♦ *pars scrotalis*
- ♦ *pars inguinalis*
- ♦ *pars pelvica*

- ♦ **A. et. v. ductus deferentis**

- ♦ **A. testicularis**

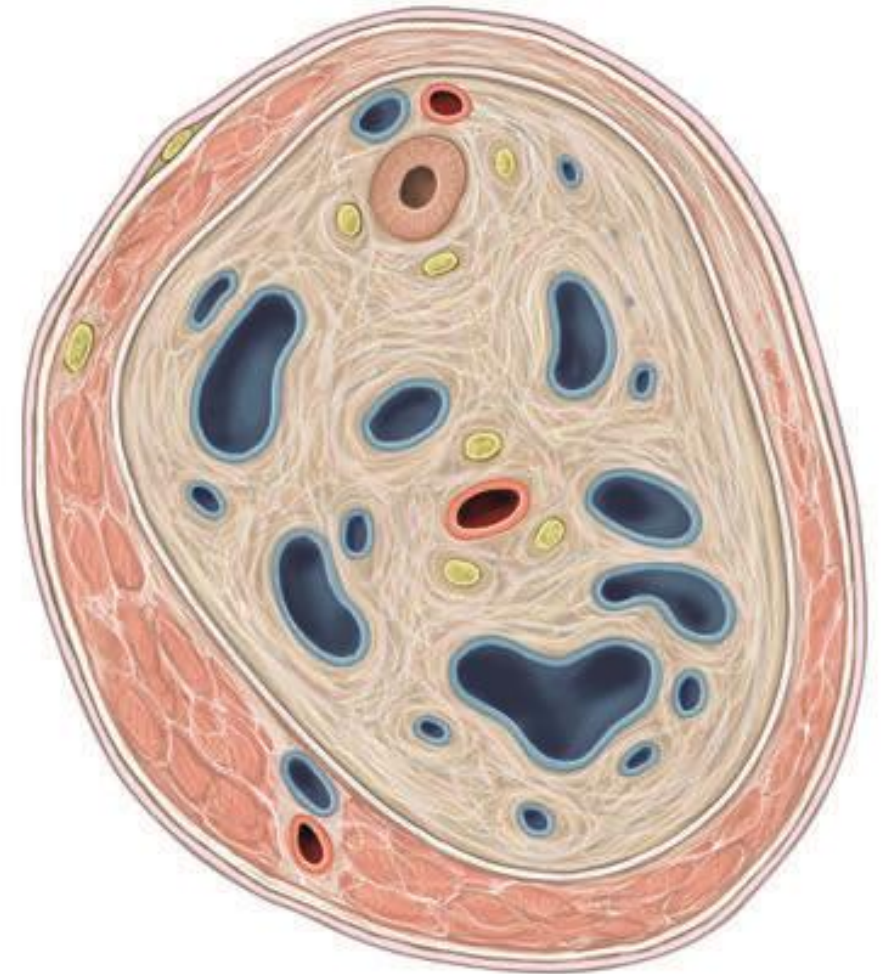
- ♦ **Plexus pampiniformis (v. testicularis)**

- ♦ **Plexus testicularis (nervi autonom.)**

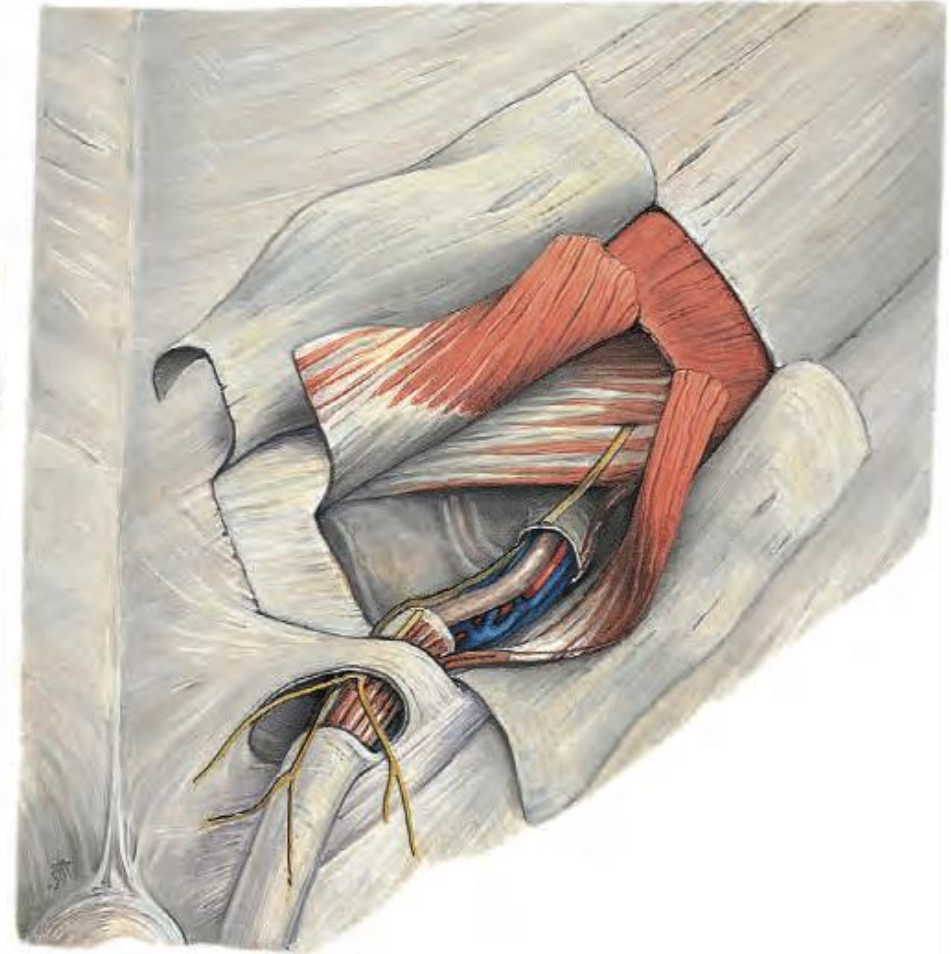
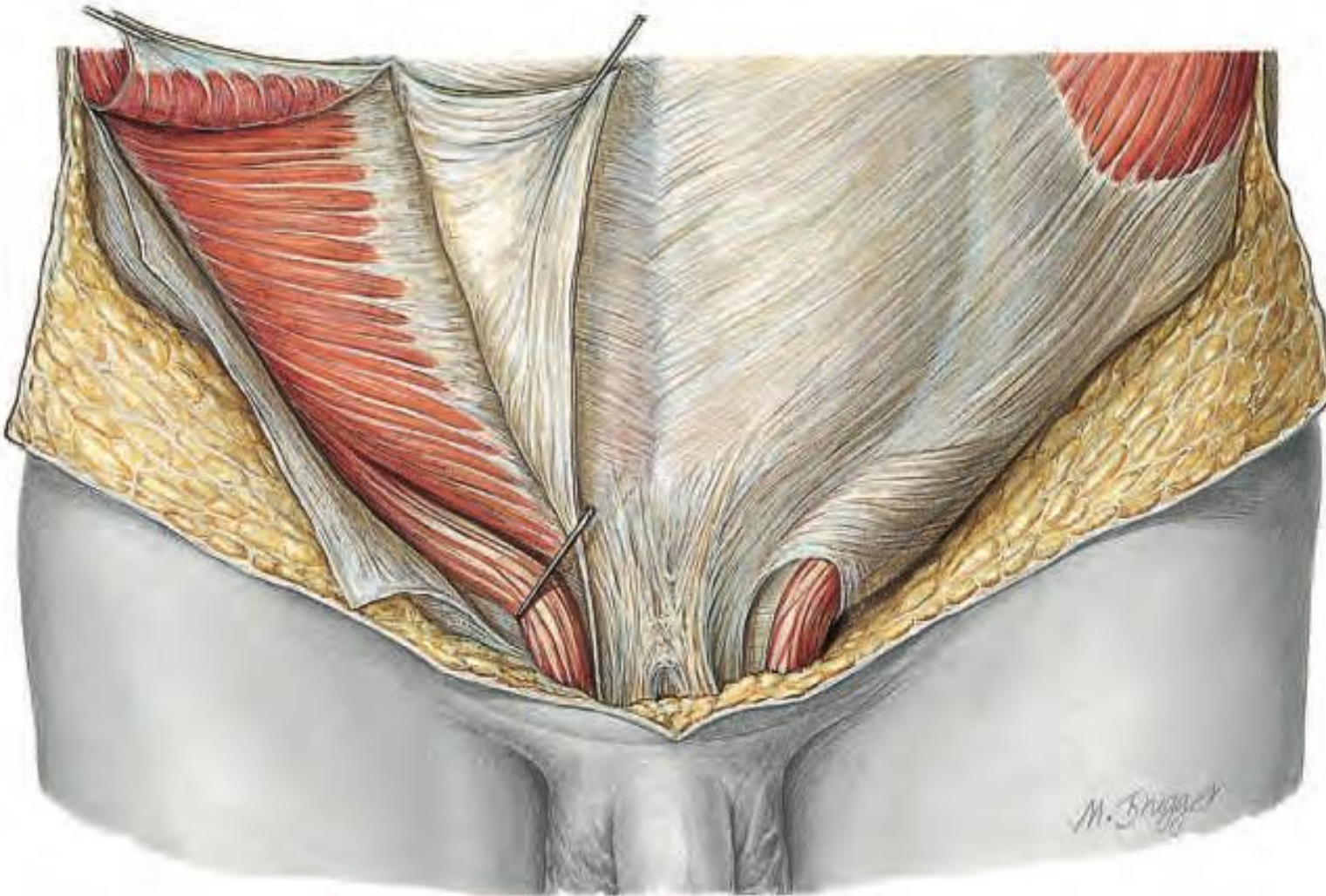


Funiculus spermaticus

- ♦ Ductus deferens
- ♦ A. et v. ductus deferentis
- ♦ A. testicularis
- ♦ Plexus pampiniformis (v. testicularis)
- ♦ Plexus testicularis (autonom.)
- ♦ Stroma
- ♦ Fascia spermatica interna
- ♦ M. cremaster
- ♦ A. et v. cremasterica
- ♦ R. genitalis m. genitofemoralis
- ♦ Fascia cremasterica
- ♦ Fascia spermatica externa



canalis inguinalis



Organa genitalia accesoria

- ♦ **Ductus deferens**

- ♦ *Ureter below ductus deferens*
- ♦ *Spojení s vývodem*

- ♦ **Glandula vesiculosa**

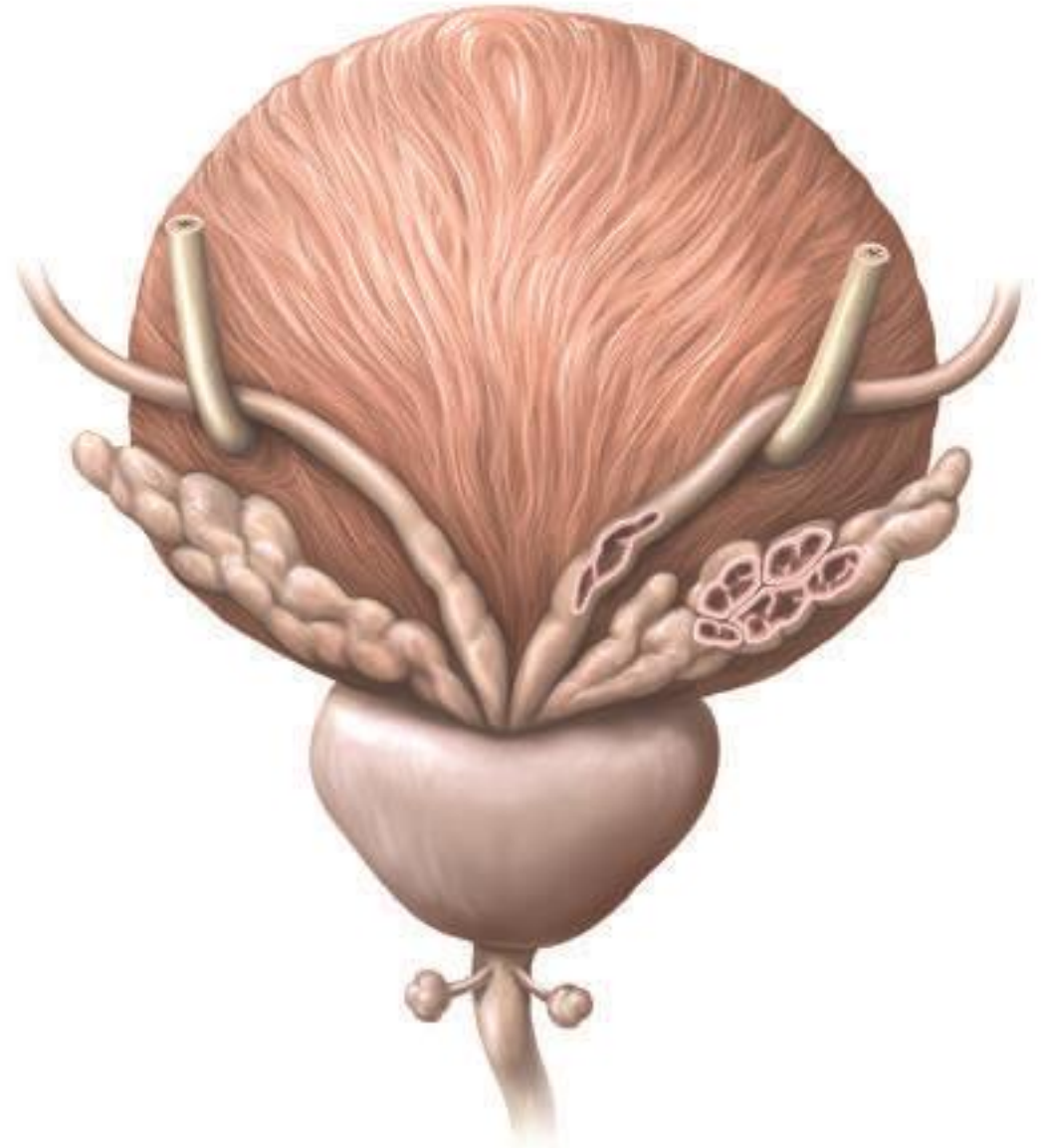
- ♦ **(vesicula seminalis)**
- ♦ *Ductus excretorius*

- ♦ **Ductus ejaculatorius**

- ♦ **Prostata**

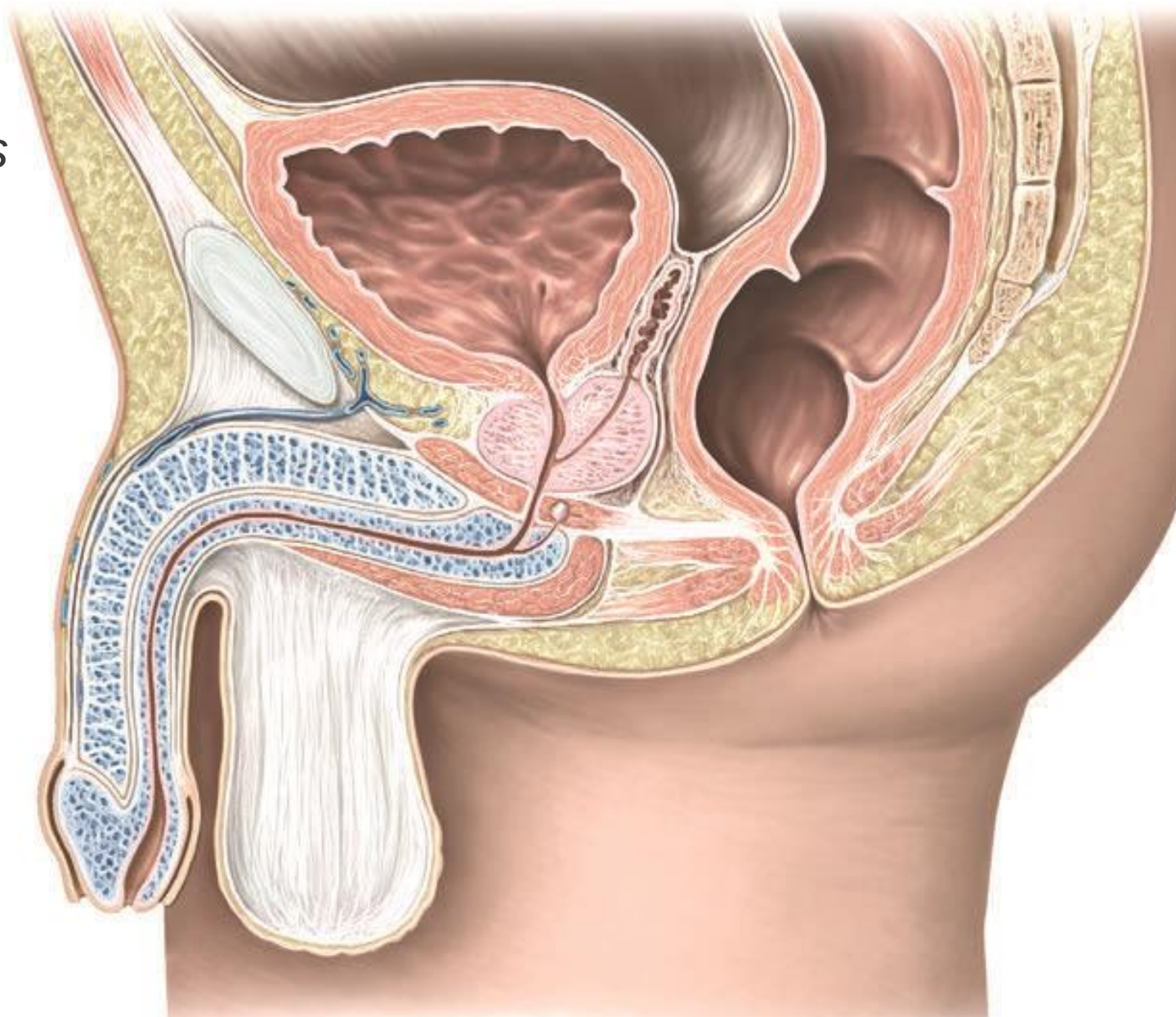
- ♦ **Ggl. Bulbourethrales**

- ♦ *Urethra*



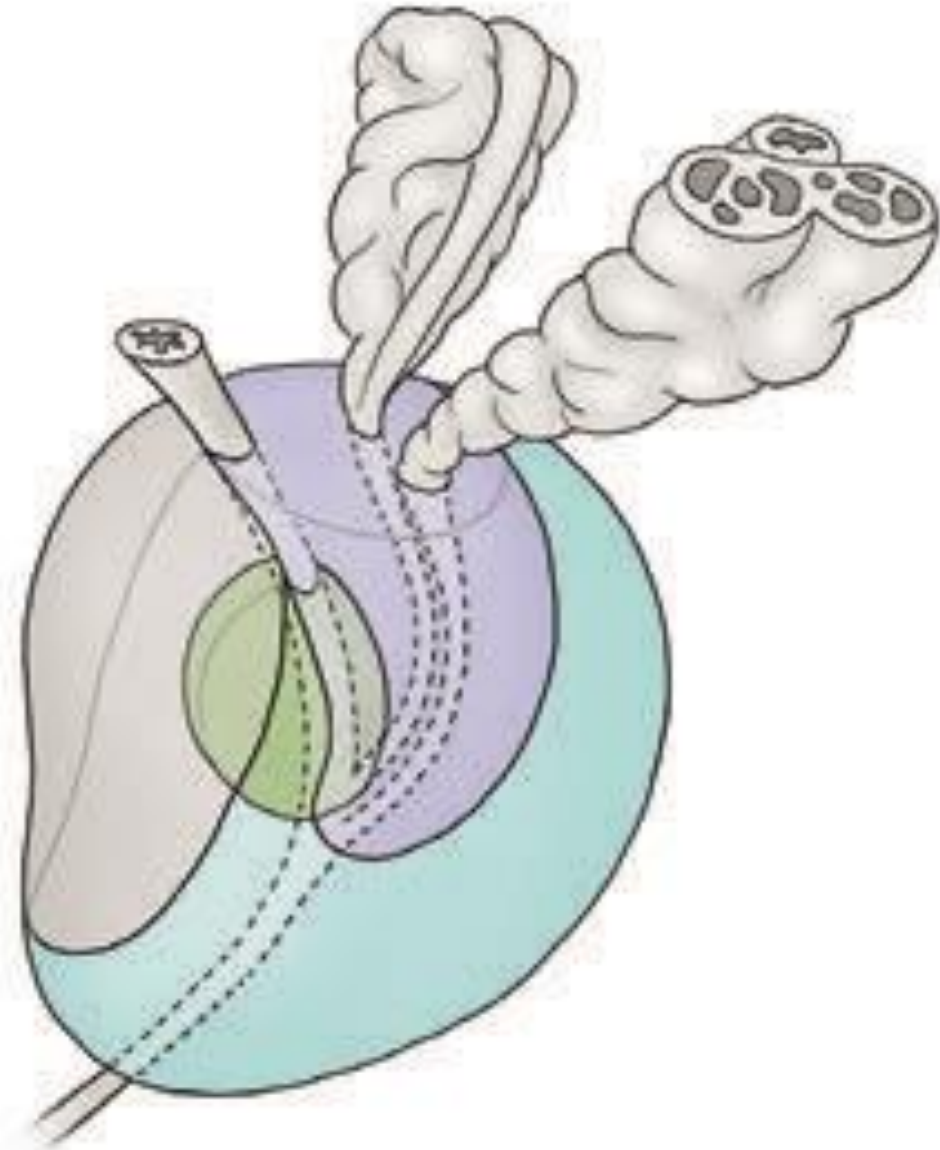
Organa genitalia accessoria

- ♦ **Ductus deferens**
 - ♦ *Ureter podbíhá ductus defferens*
 - ♦ *Spojení s vývodem*
- ♦ **Glandula vesiculosa**
 - ♦ **(vesicula seminalis)**
 - ♦ *Ductus excretorius*
- ♦ **Ductus ejaculatorius**
- ♦ **Prostata**
- ♦ **Ggl. Bulbourethrales**
- ♦ *Urethra*



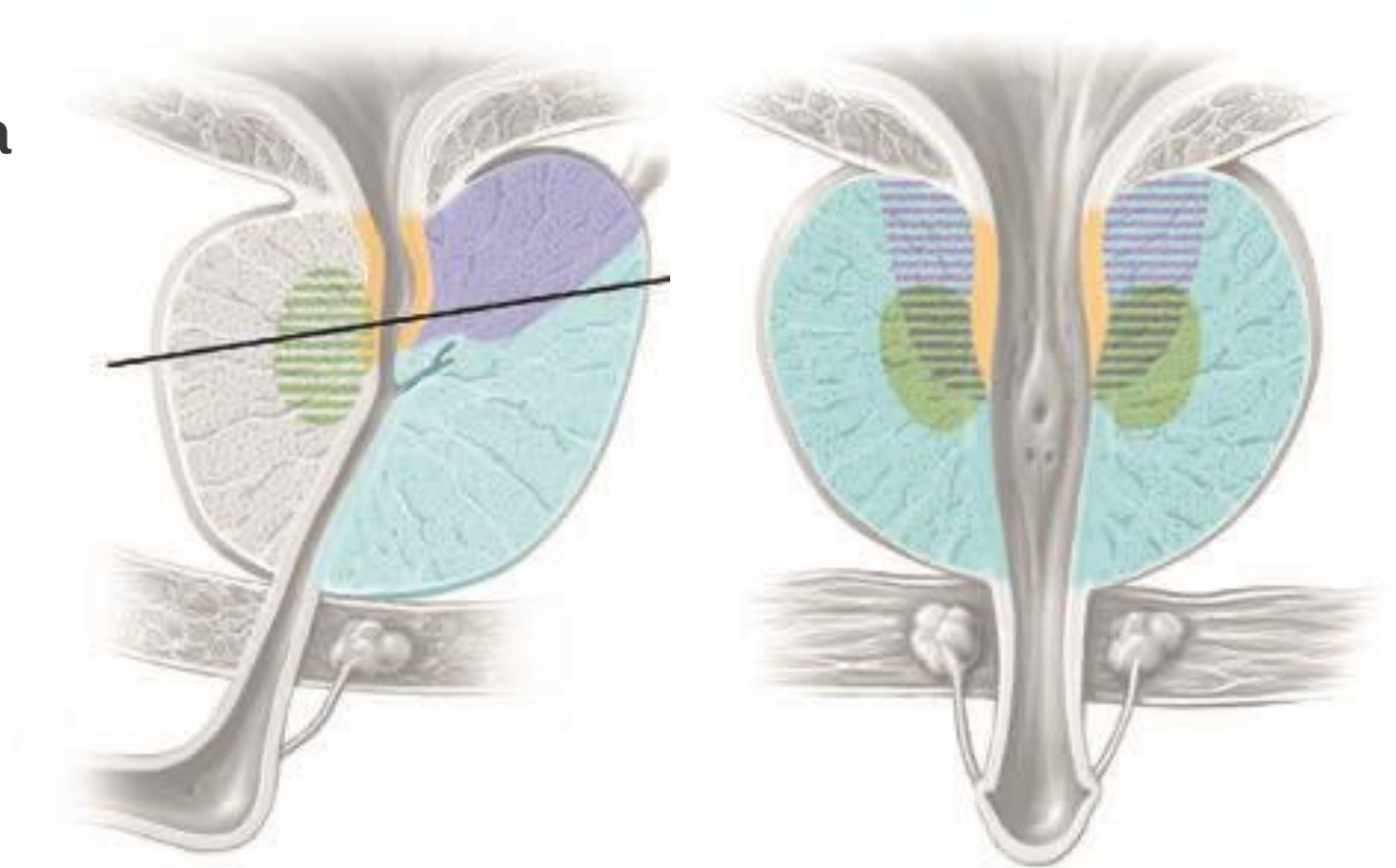
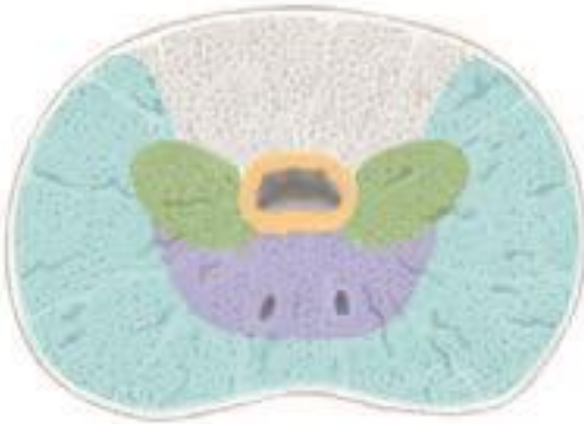
Prostata

- Peripheral zone
- Transitional zone
- Central zone
- Anterior fibromuscular stroma
- Periurethral zone
- Pseudocapsula



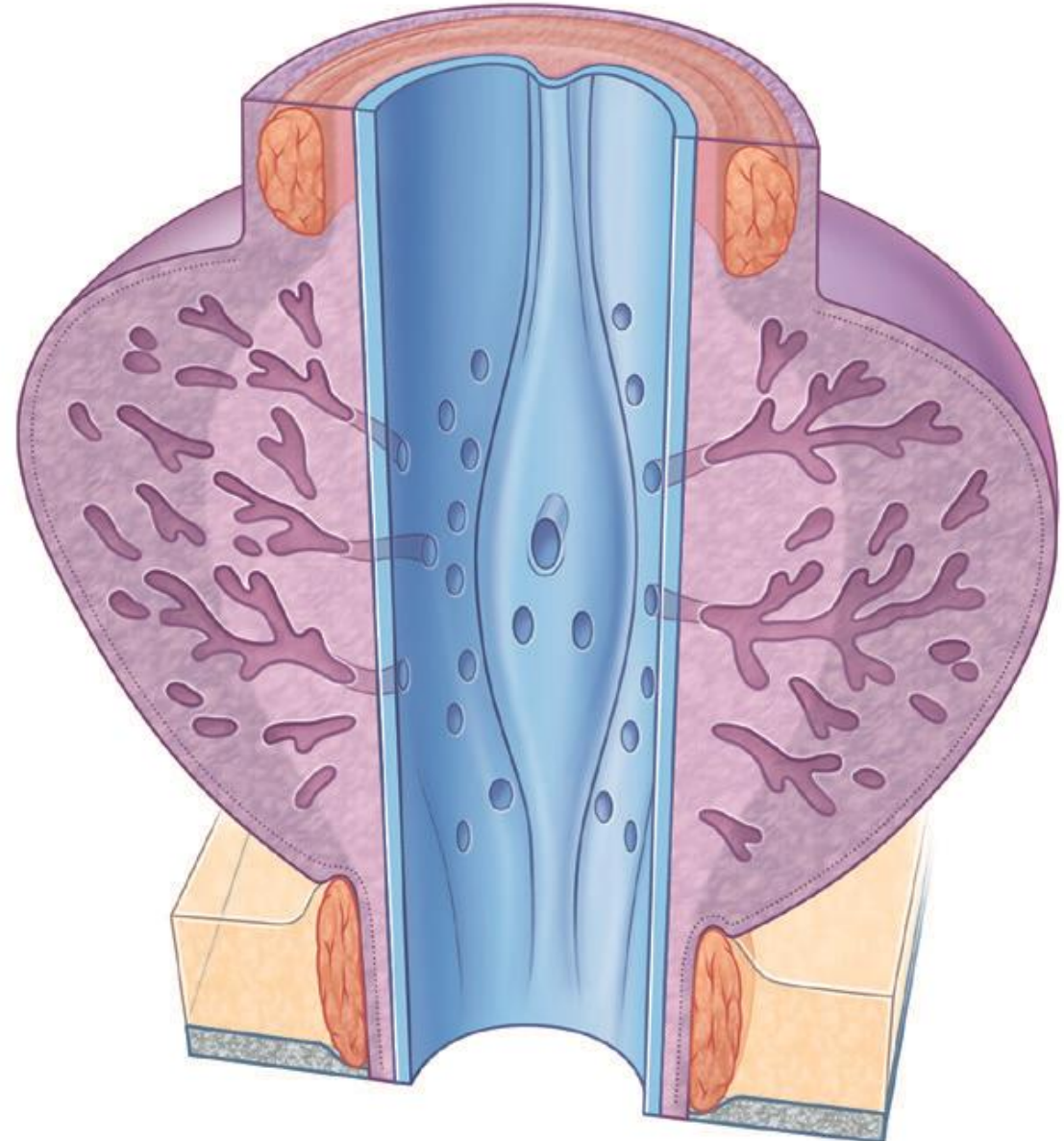
prostata

- Peripheral zone
- Transitional zone
- Central zone
- Anterior fibromuscular stroma
- Periurethral zone
- Pseudocapsula



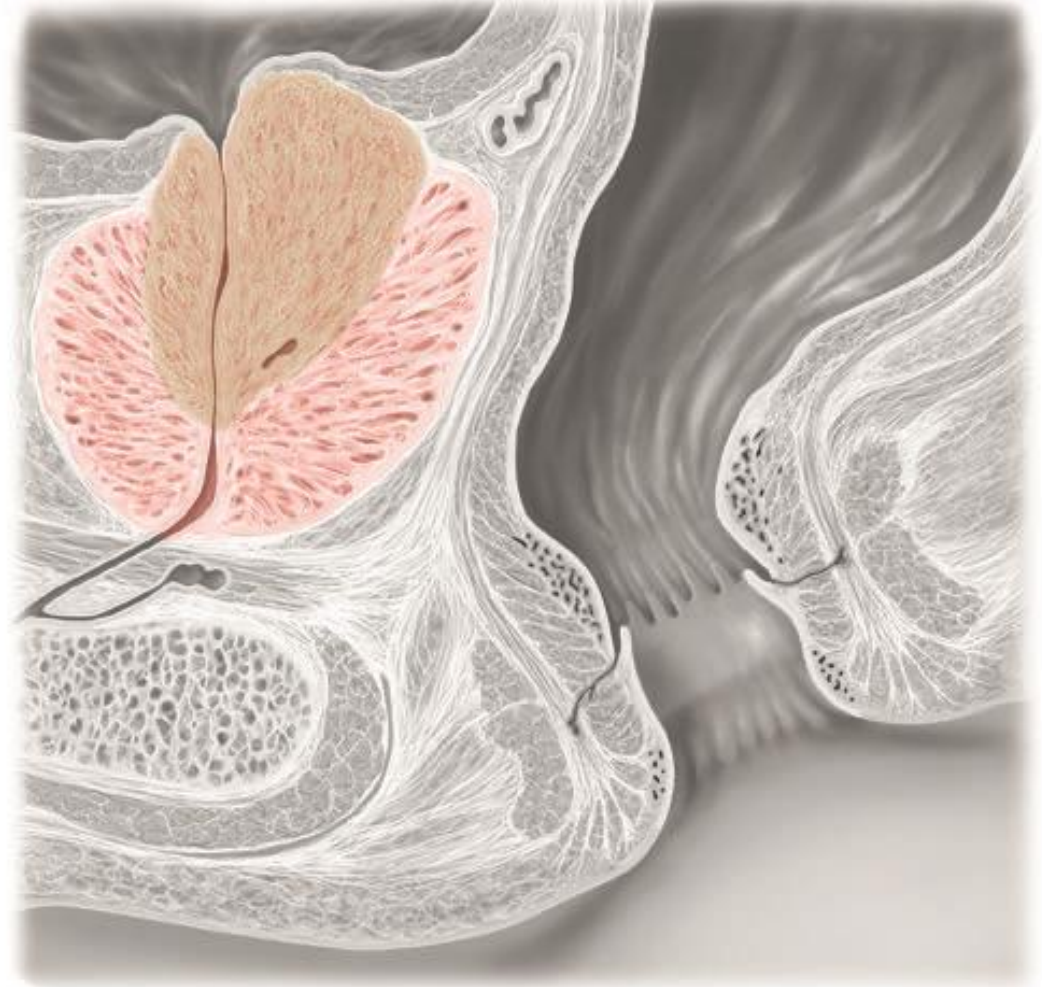
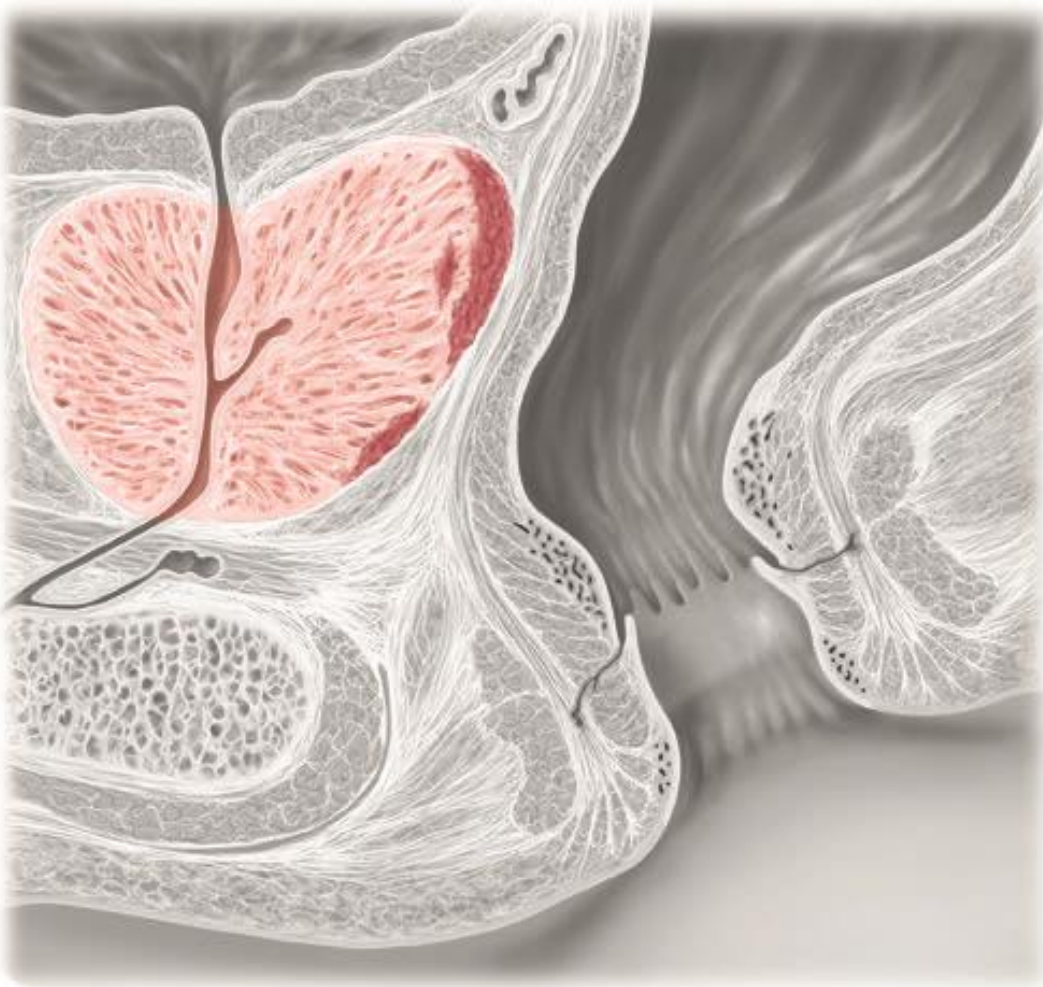
Prostata

- **Crista urethralis**
- **Colliculus seminalis**
- **Utriculus prostaticus**
 - Homologous to uterus
- **Ductus eiaculatorii (orificia)**
- **Ducti prostatici**



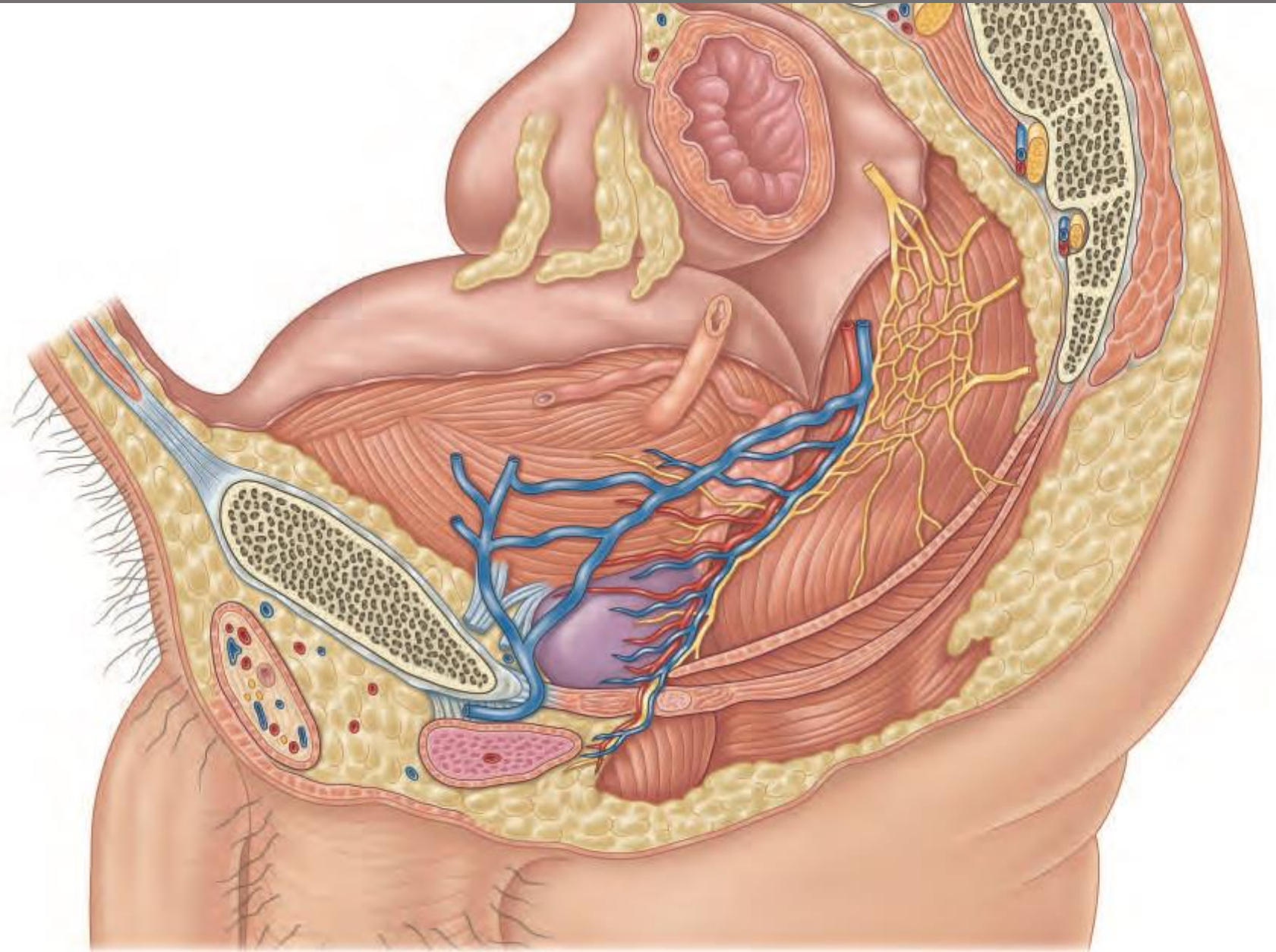
hypertrophy

- „middle lobe“
- Transitional zone



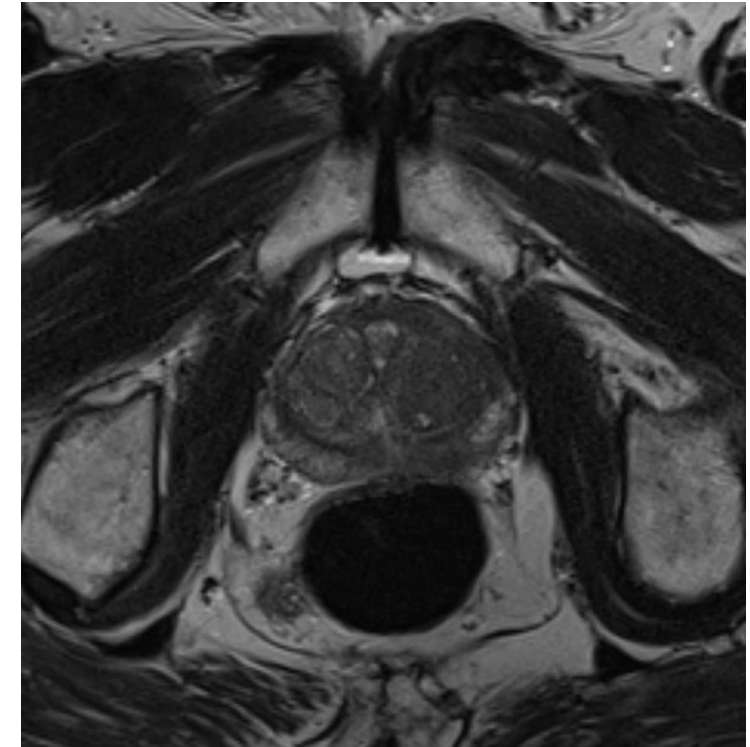
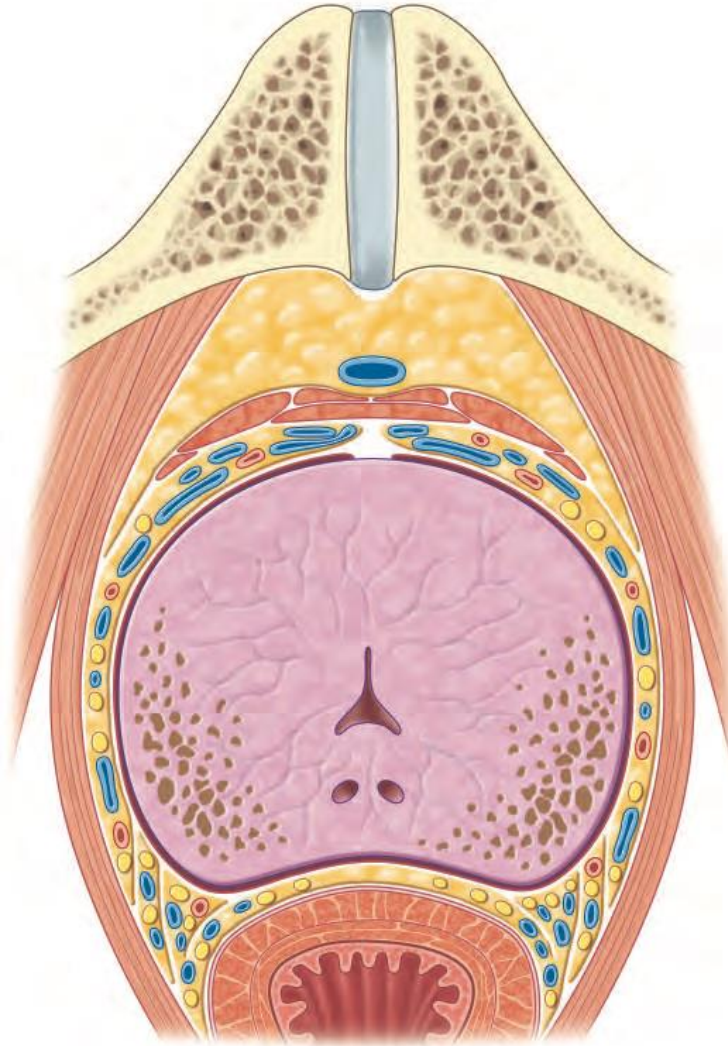
vasa et nervi prostatae

- ♦ Neurovascular bundle
- ♦ Prostata
- ♦ Rectum
- ♦ Vesica urinaria
- ♦ Penis



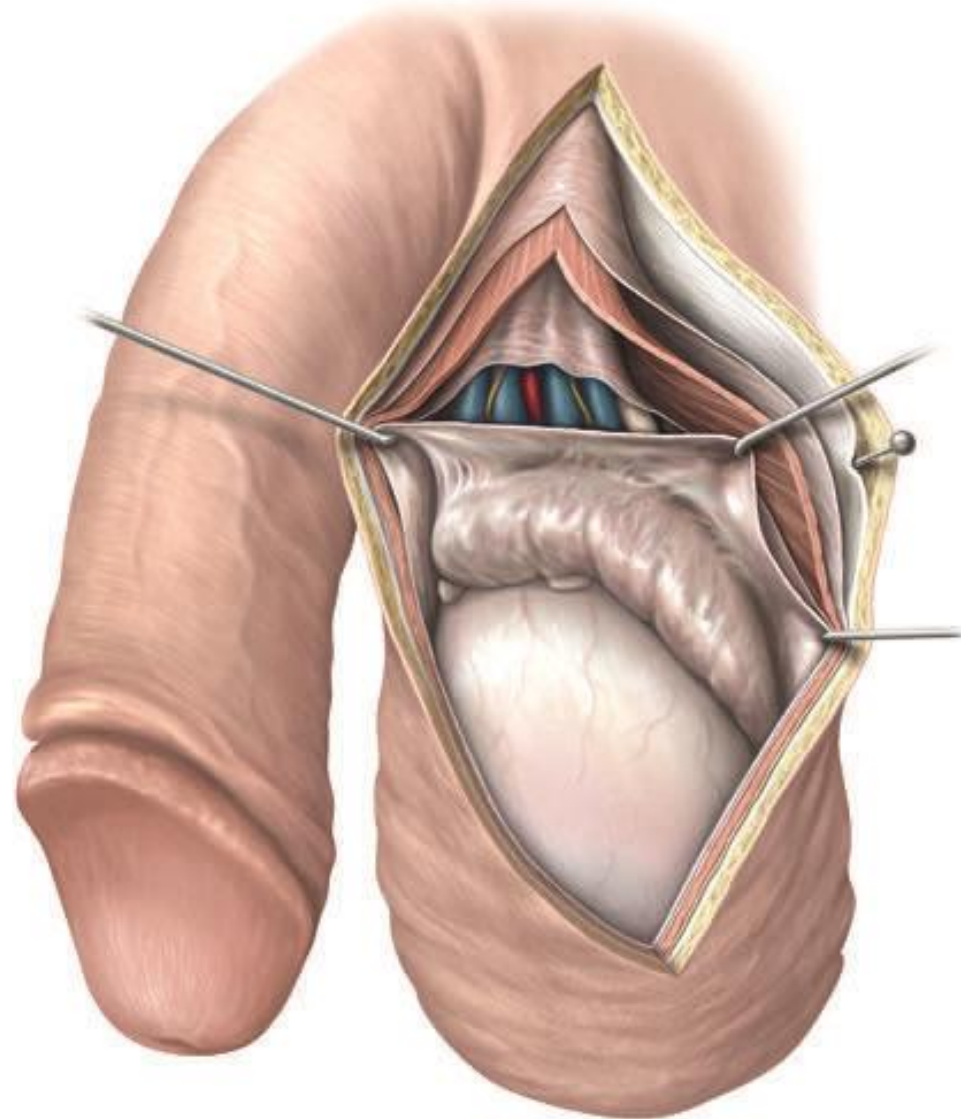
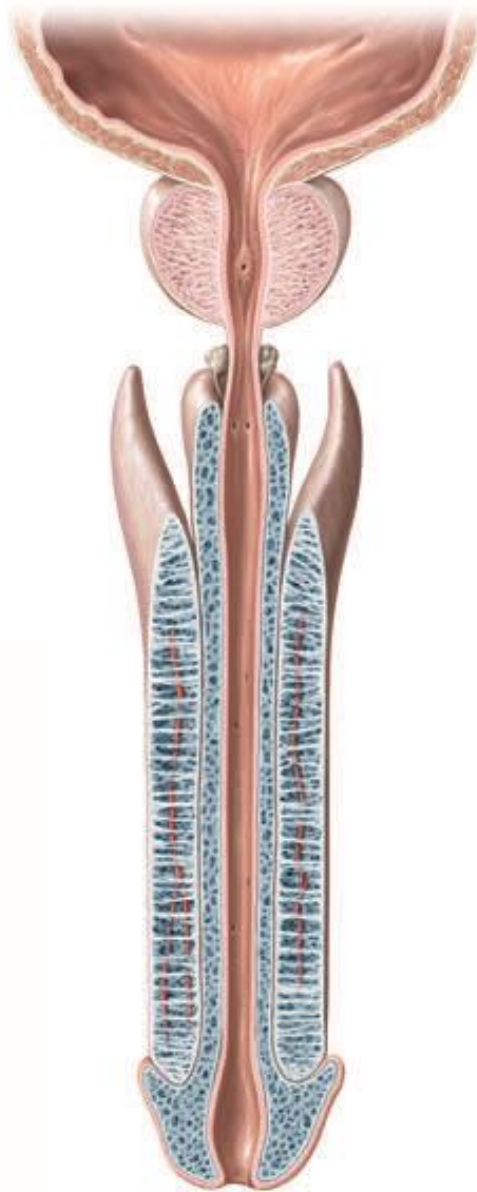
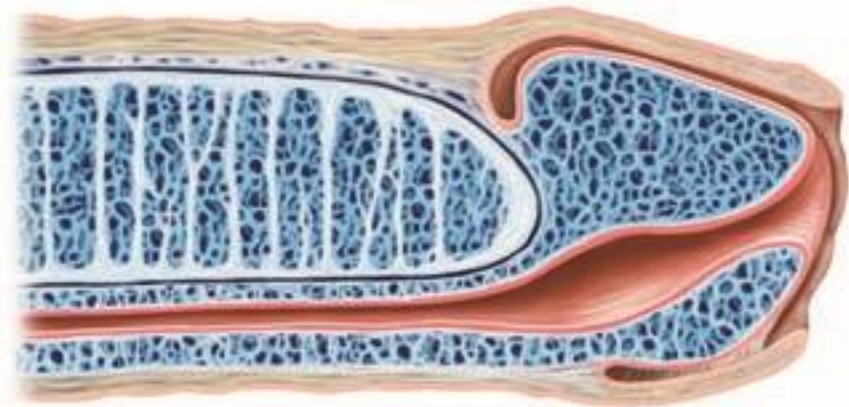
Topography of prostate

- M. levator ani
- Dorsal vascular complex
- Neurovascular bundle
- Pseudokapsula
 - *Prerectal fat*
 - *Fascia rectovesicalis Denonvilliers*
 - *Lateral rectal fascia*
 - *Lateral prostatic fascia*
 - *Parietal endopelvic fascia*



penis

- Preputium
- Glandulae preputiales
- Corpus spongiosum
- Glans
 - Fossa navicularis urethrae
- Bulbus
- Corpora cavernosa



penis

- ♦ **Corpus spongiosum – glans penis**

- ♦ Urethra
- ♦ Aa. urethrales

- ♦ **Corpora cavernosa**

- ♦ **Tunica albuginea corporis cavernosi**

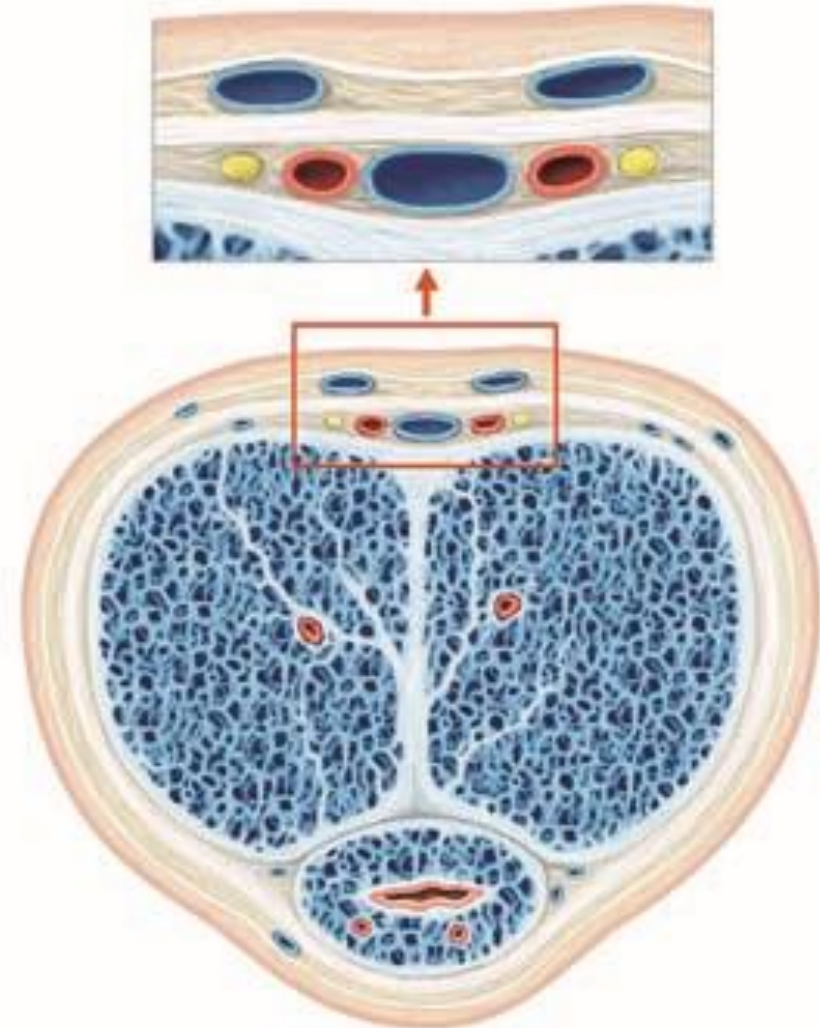
- ♦ **Arteria cavernosa**

- ♦ **Fascia penis profunda**

- ♦ *Arteria dorsalis penis*
- ♦ *Vena dorsalis penis*
- ♦ *Nervus dorsalis penis*

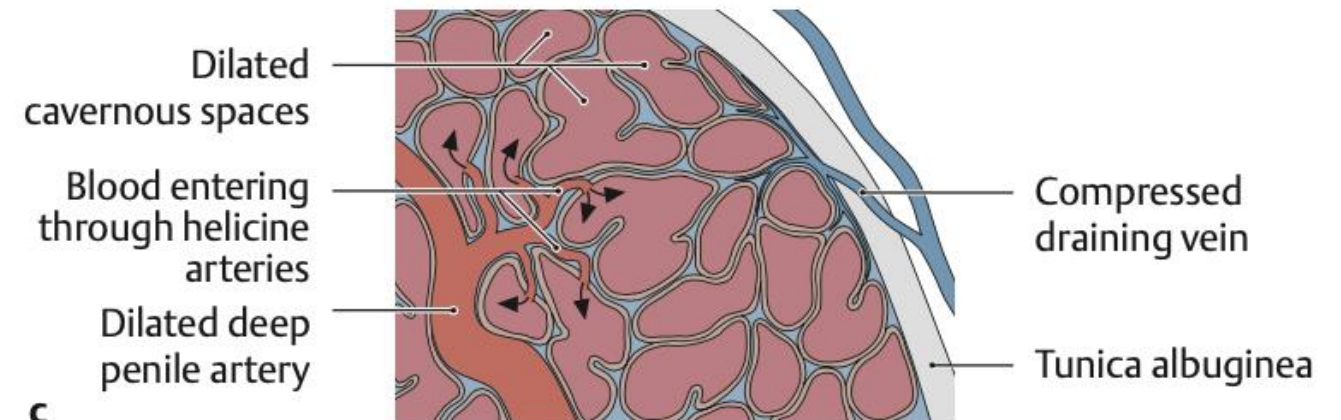
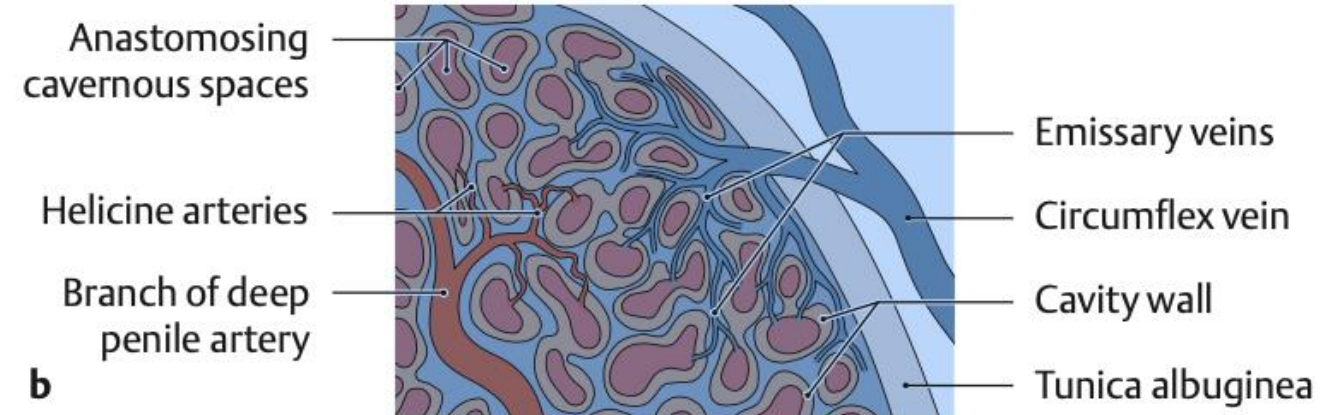
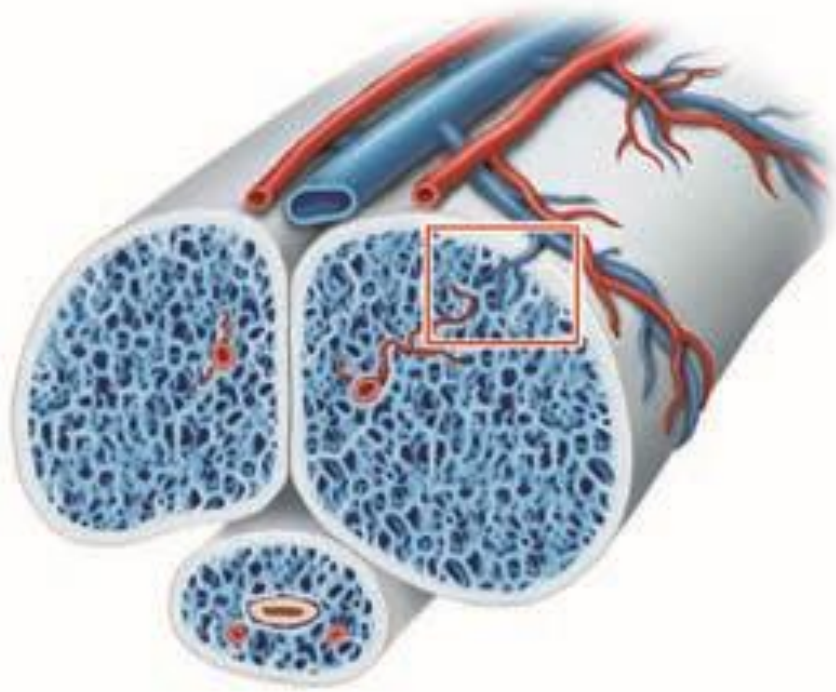
- ♦ **Fascia penis superficialis**

- ♦ *Vena dorsalis penis subcutanea*



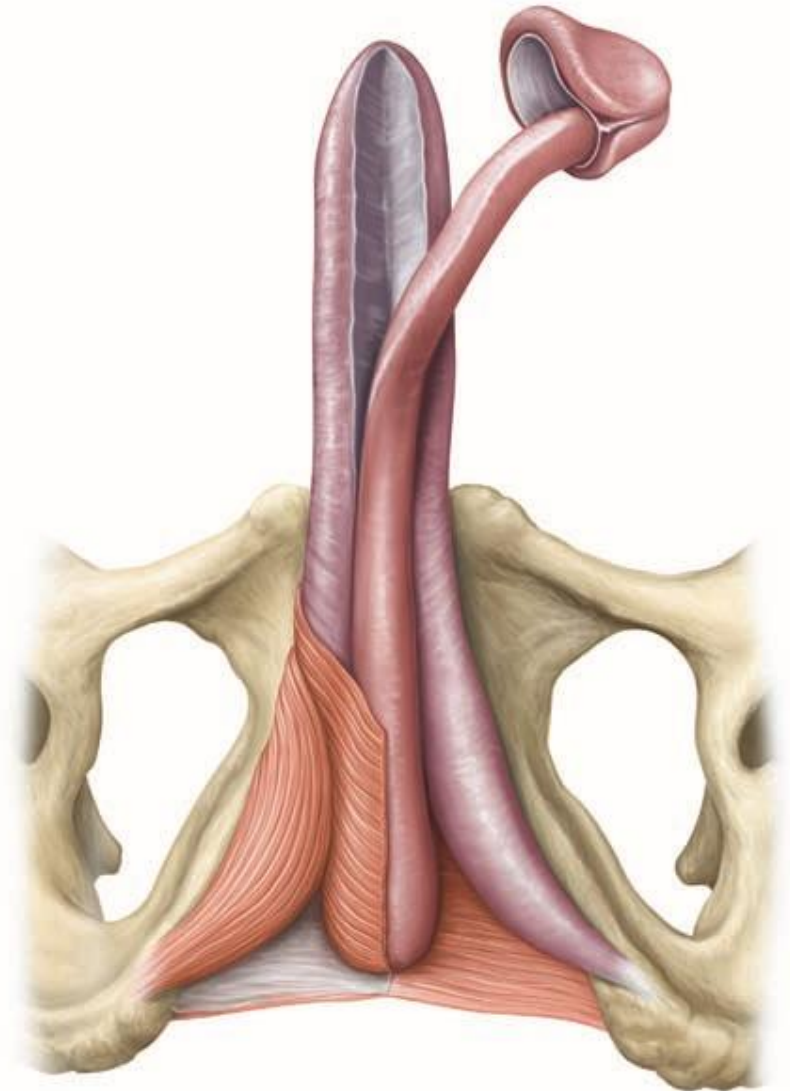
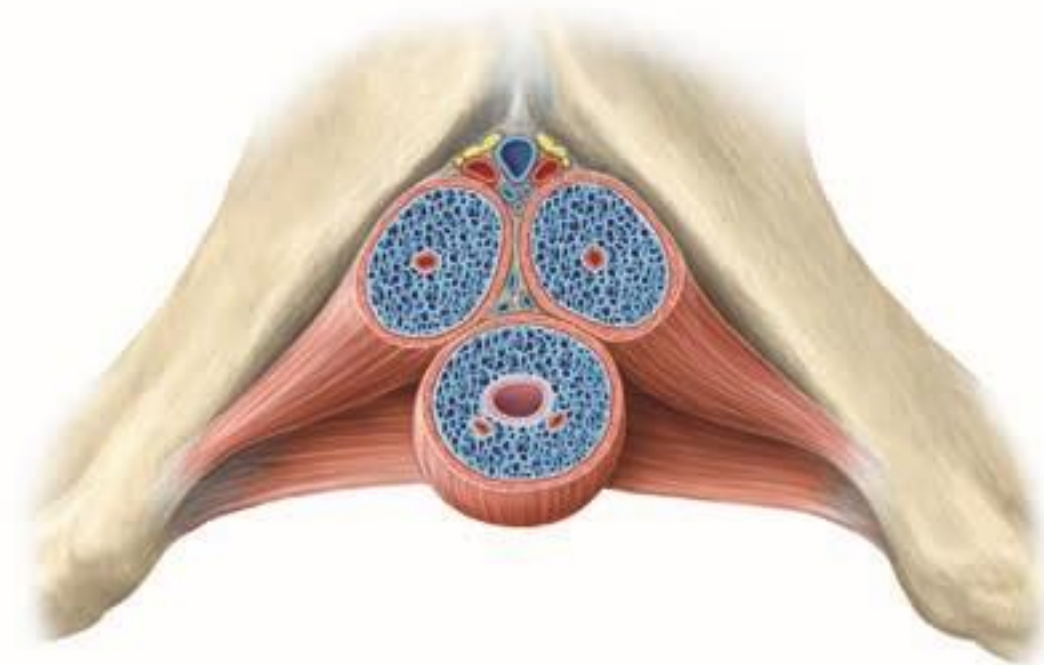
Anatome of erection

♦ A. cavernosa, ramus profundus – aa. helicinae



musculi penis

- ♦ Corpus cavernosum – crus penis – m. ischiocavernosus
- ♦ Corpus spongiosum – bulbus penis – m. bulbospongiosus
- ♦ Membrana urogenitalis – m. transversus perinei profundus

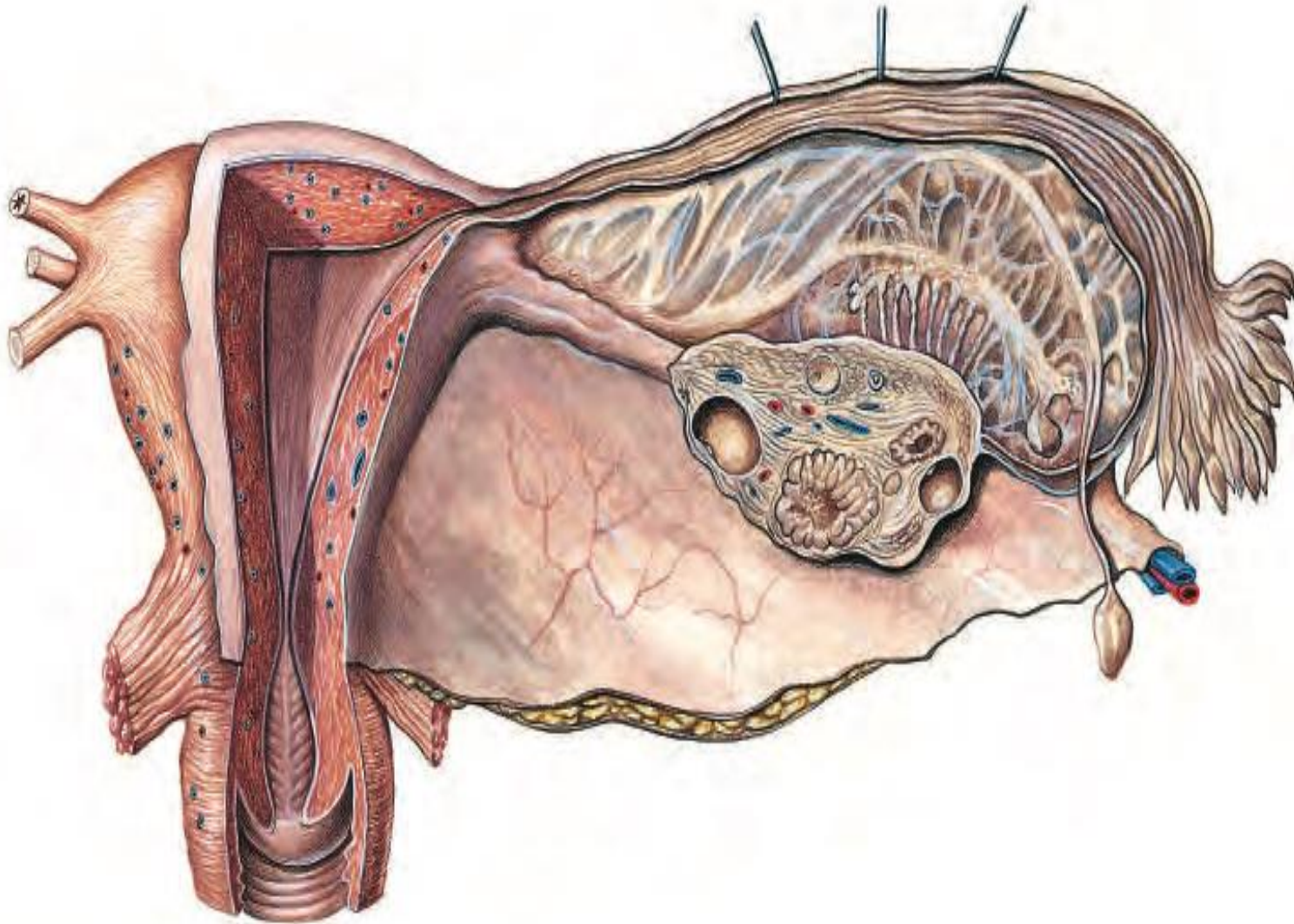


ovarium

- ♦ **Extremitas tubaria**
- ♦ **Extremitas uterina**
- ♦ **Margo liber**
- ♦ **Margo mesovaricus**
- ♦ **Ligamentum ovaricum proprium**
- ♦ **Ligamentum suspensorium**

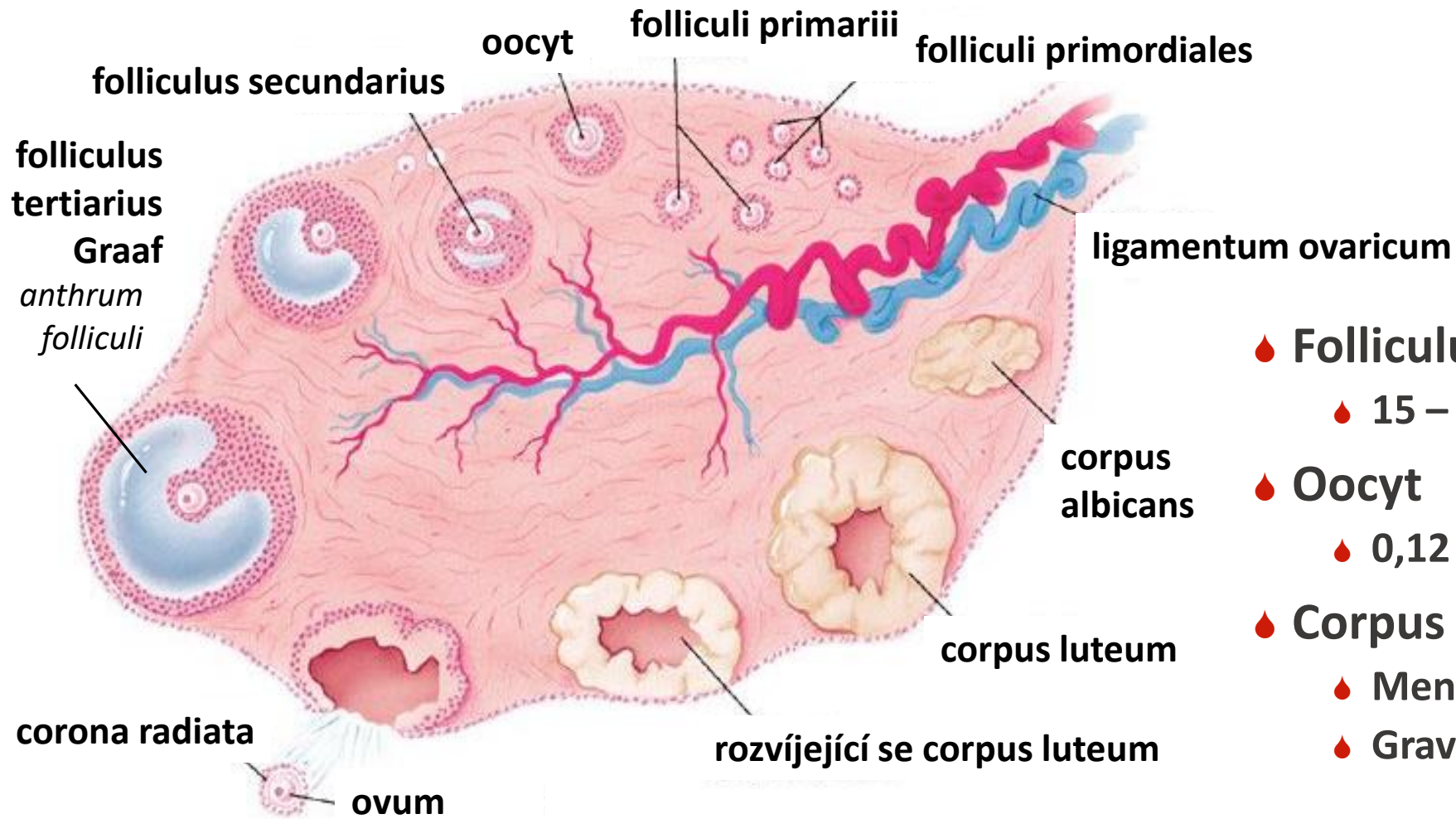


ovarium



- ♦ **Ovarium**
 - ♦ Almond shape
 - ♦ Long axis 3 cm
- ♦ **Tunica albuginea**
- ♦ **Cortex – sexual cells**
- ♦ **Medulla**
 - ♦ loose connective tissue and vessels
- ♦ **Mesovarium**
 - ♦ *Ligamentum latum uteri*
 - ♦ *Dorsální prodloužení*
- ♦ **Ligamentum suspensorium ovarii**
- ♦ **Ligamentum ovaricum proprium**
 - ♦ Resmnant of gubernaculum
- ♦ **Vasa ovarica**

ovarium



♦ Folliculus tertiarius (Graaf)

♦ 15 – 20 mm

♦ Oocyt

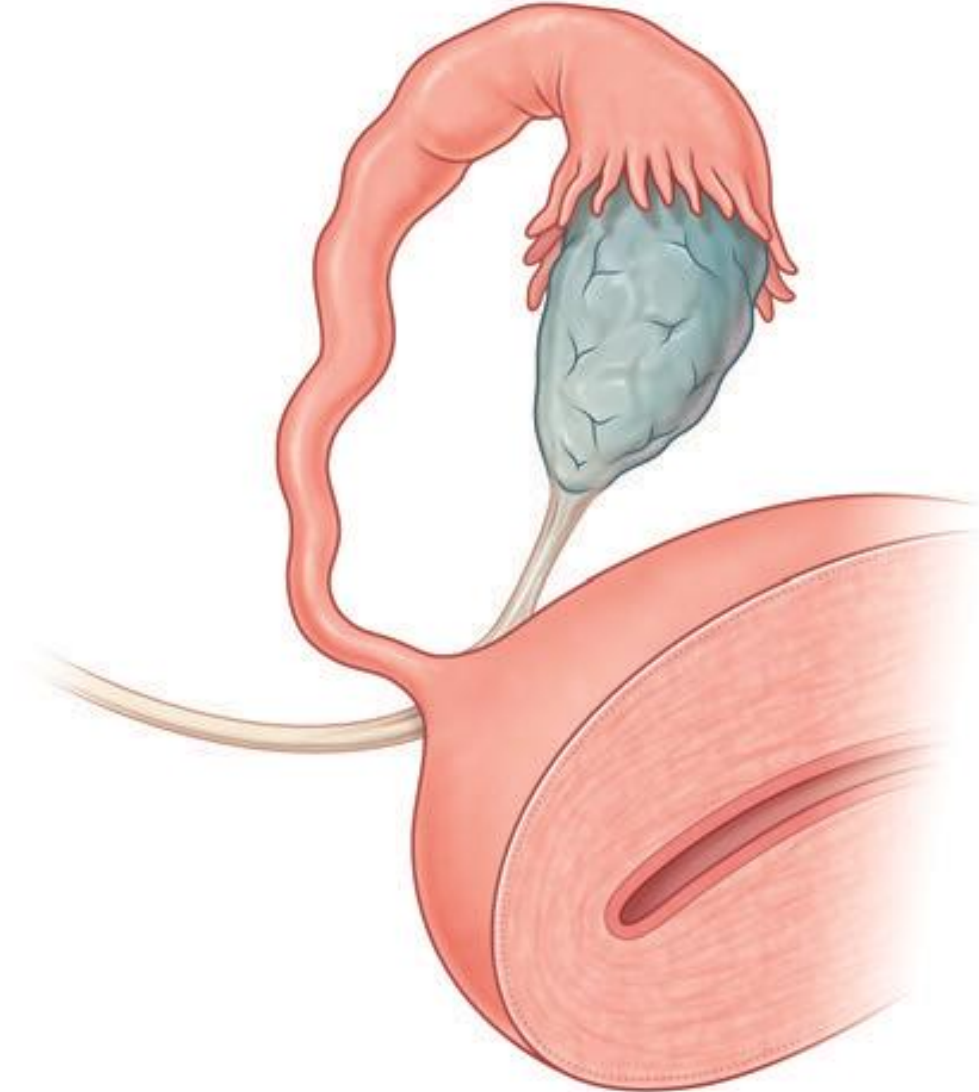
♦ 0,12 mm

♦ Corpus luteum

♦ Menstruationis – 10 - 12 d

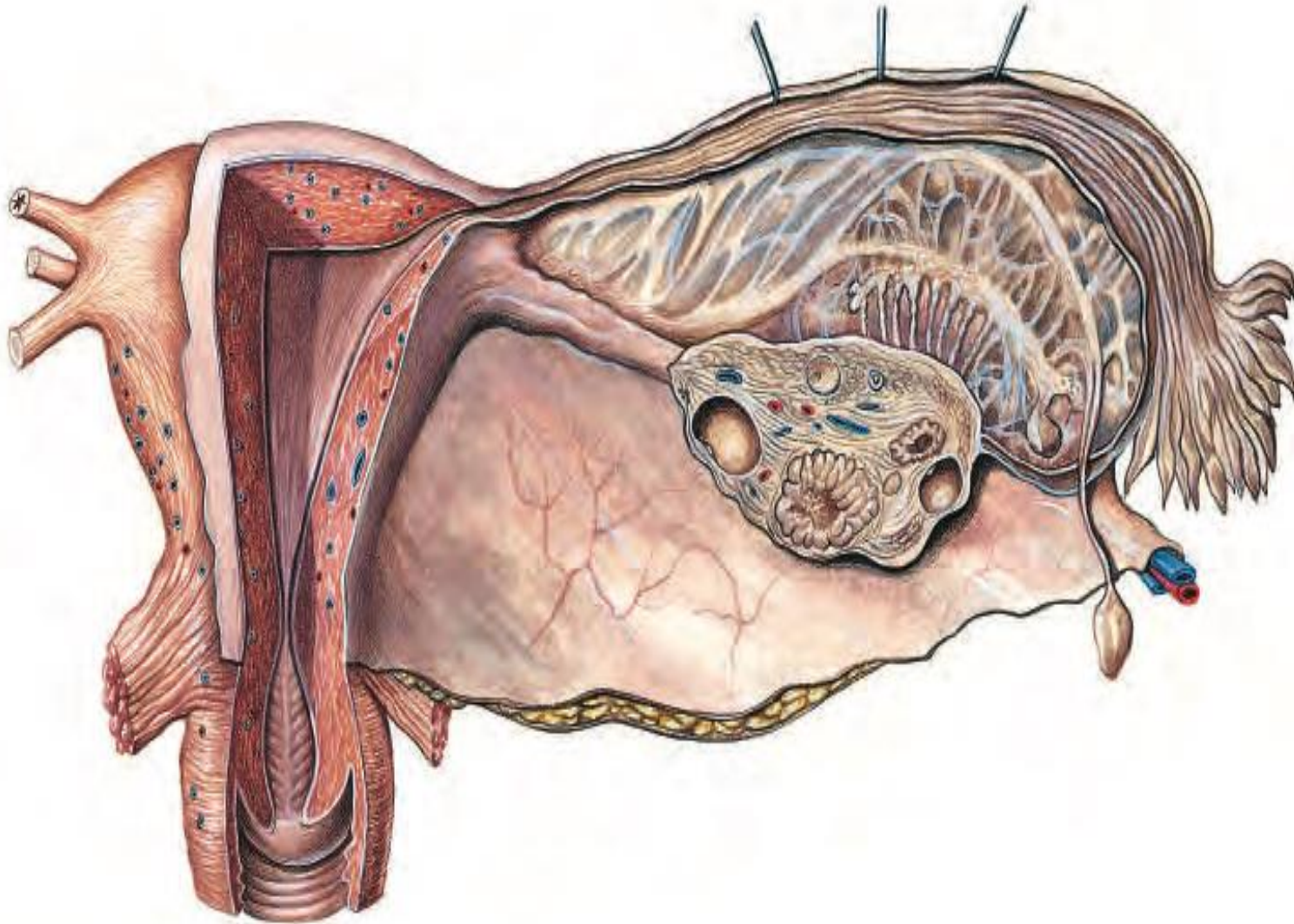
♦ Graviditatis – 3 - 4 m

Tuba uterina Falopii

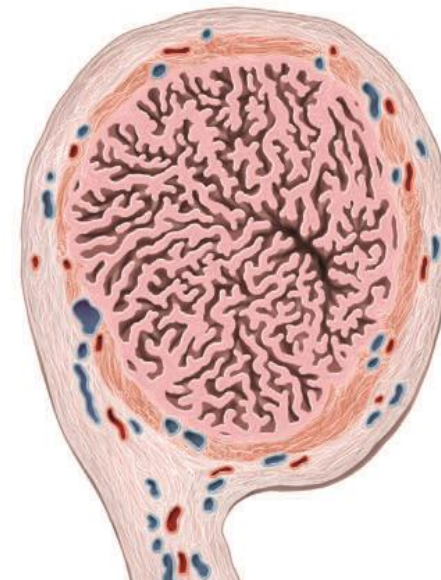


- ♦ Ostium abdominale
- ♦ Infundibulum
- ♦ Fimbriae
- ♦ Ampulla 10 mm / 5 cm
- ♦ Isthmus – 1 - 5 mm / 3 cm
- ♦ Pars intramuralis – 0,7 mm / 1 cm
- ♦ Ostium uterinum

Tuba uterina Falopii

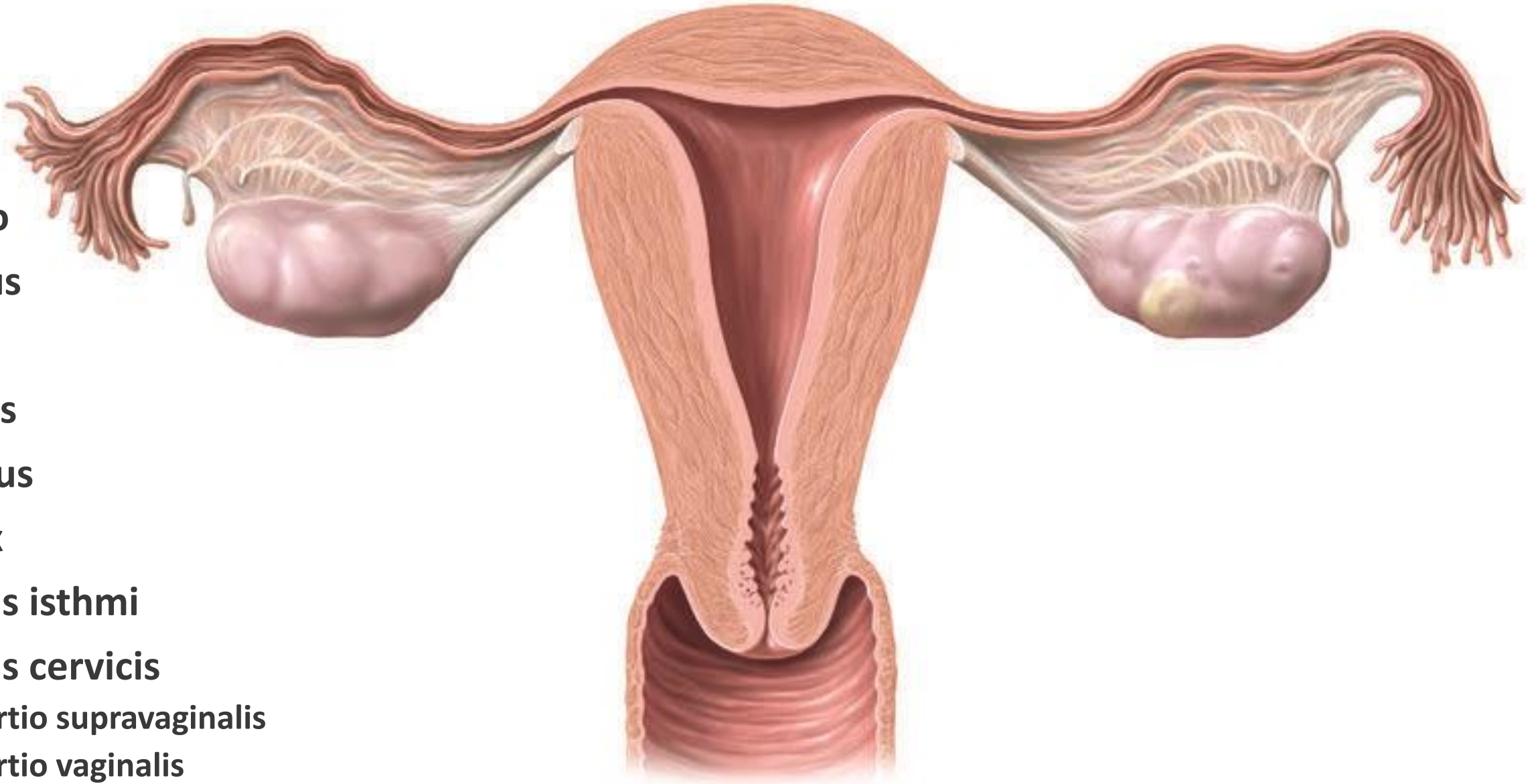


- ♦ **Tunica mucosa**
 - ♦ Cylindric ciliary epithelium
 - ♦ longitudinal folds
- ♦ **Tunica muscularis**
 - ♦ Inner circular or spiral
 - ♦ Outer longitudinal
- ♦ **Tunica serosa**

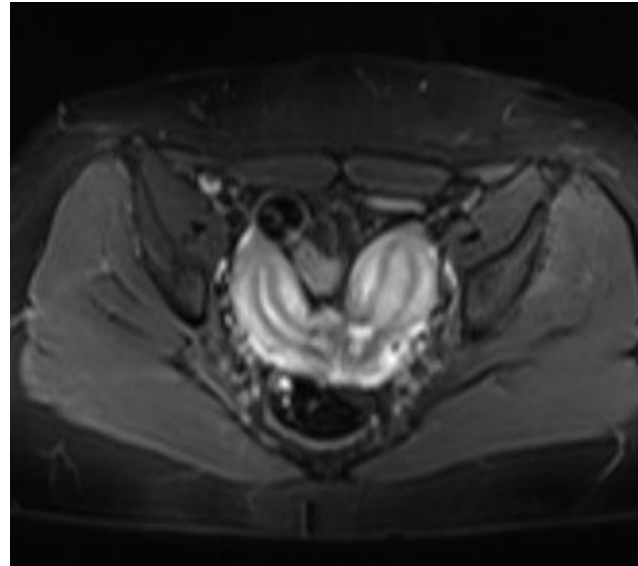
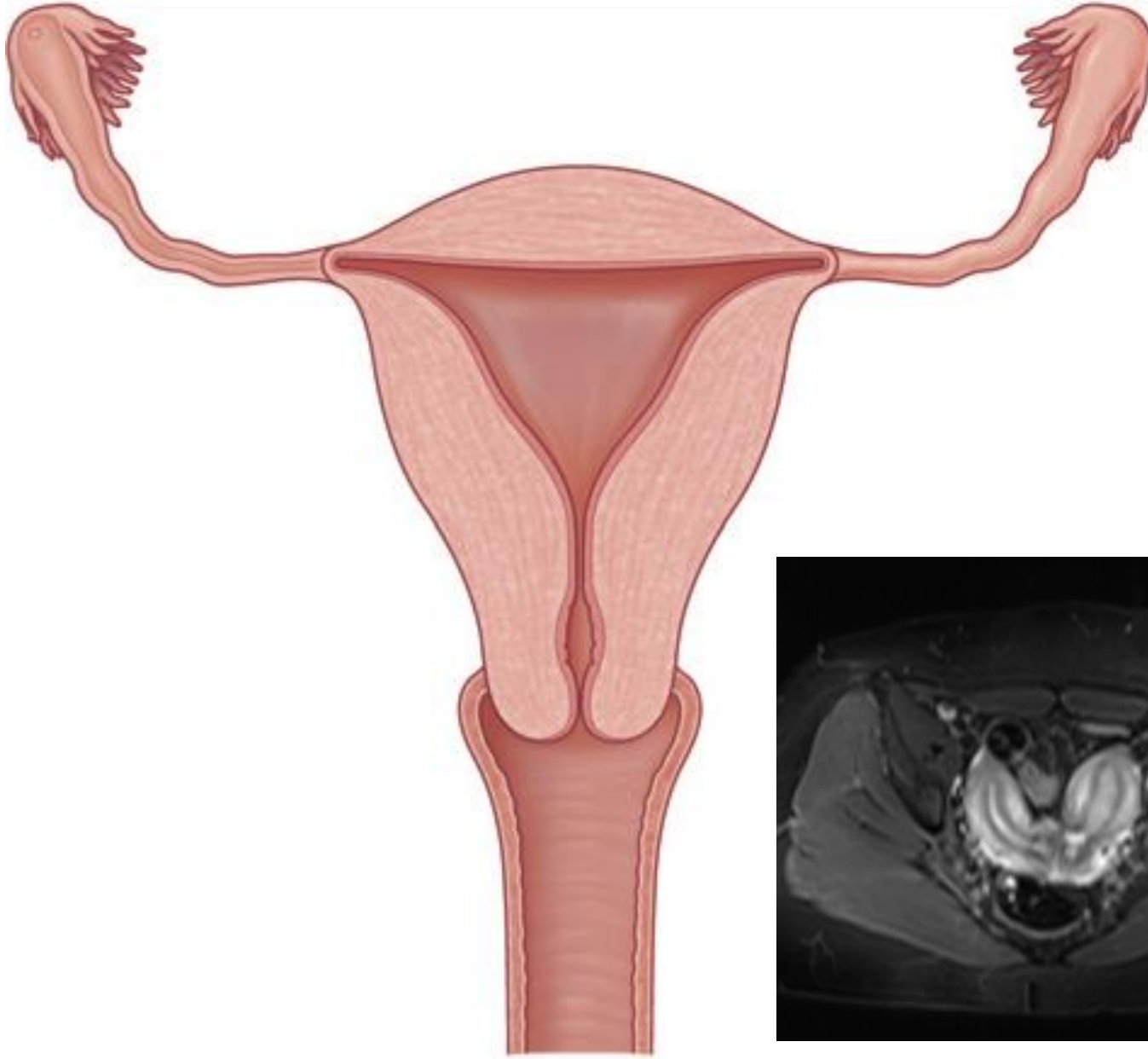


uterus

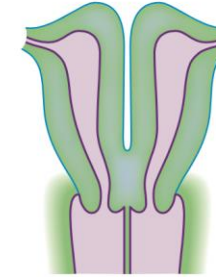
- Margo
- Fundus
- Cornu
- Corpus
- Isthmus
- Cervix
 - Portio supravaginalis
 - Portio vaginalis
- Canalis isthmi
- Canalis cervicis



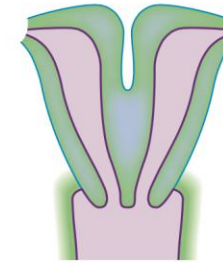
uterus



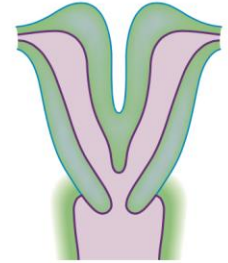
Partial or total failure of fusion of the terminal portion of the paramesonephric (Müllerian) ducts



Uterus didelphys
with double vagina

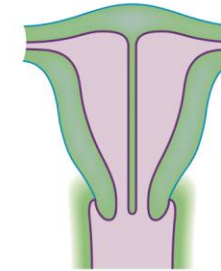


Bicervical uterus
bicornis

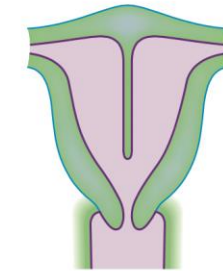


Unicervical uterus
bicornis

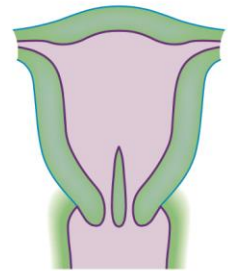
Failure of resorption of the uterovaginal septum after fusion of the paramesonephric (Müllerian) ducts



Completely
bilocular uterus

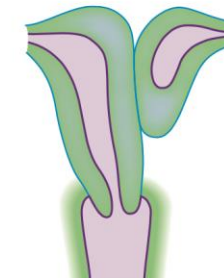


Bilocular
unicervical uterus

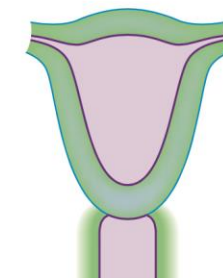


Bilocular
bicervical uterus

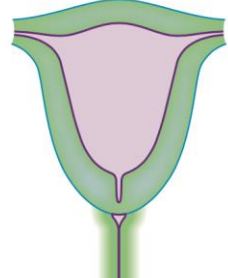
Partial or total atresia of the terminal portion of one or both paramesonephric (Müllerian) ducts



Unilateral atresia
uterus bicornis unicollis

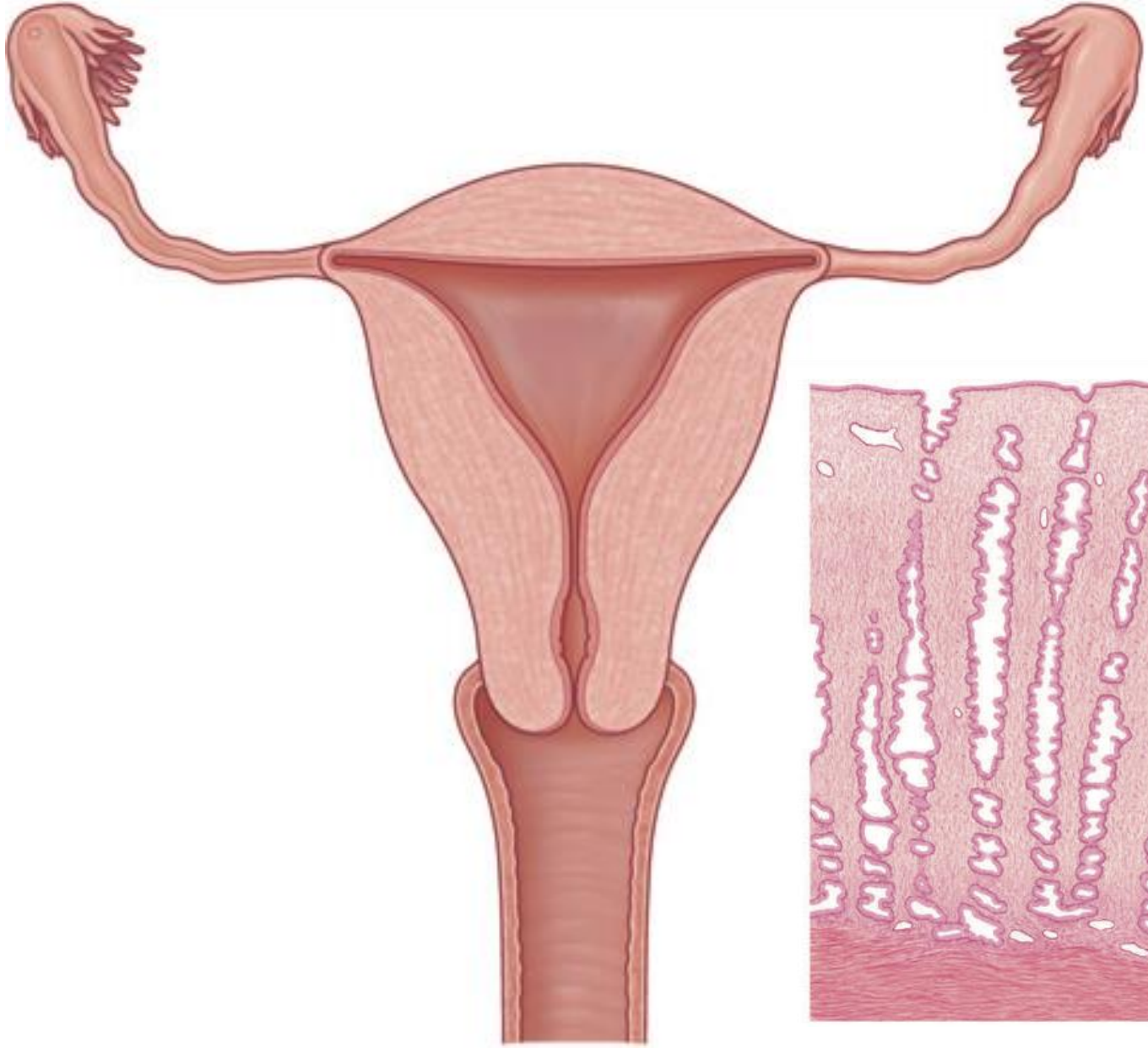


Partial bilateral atresia:
atresia of cervix



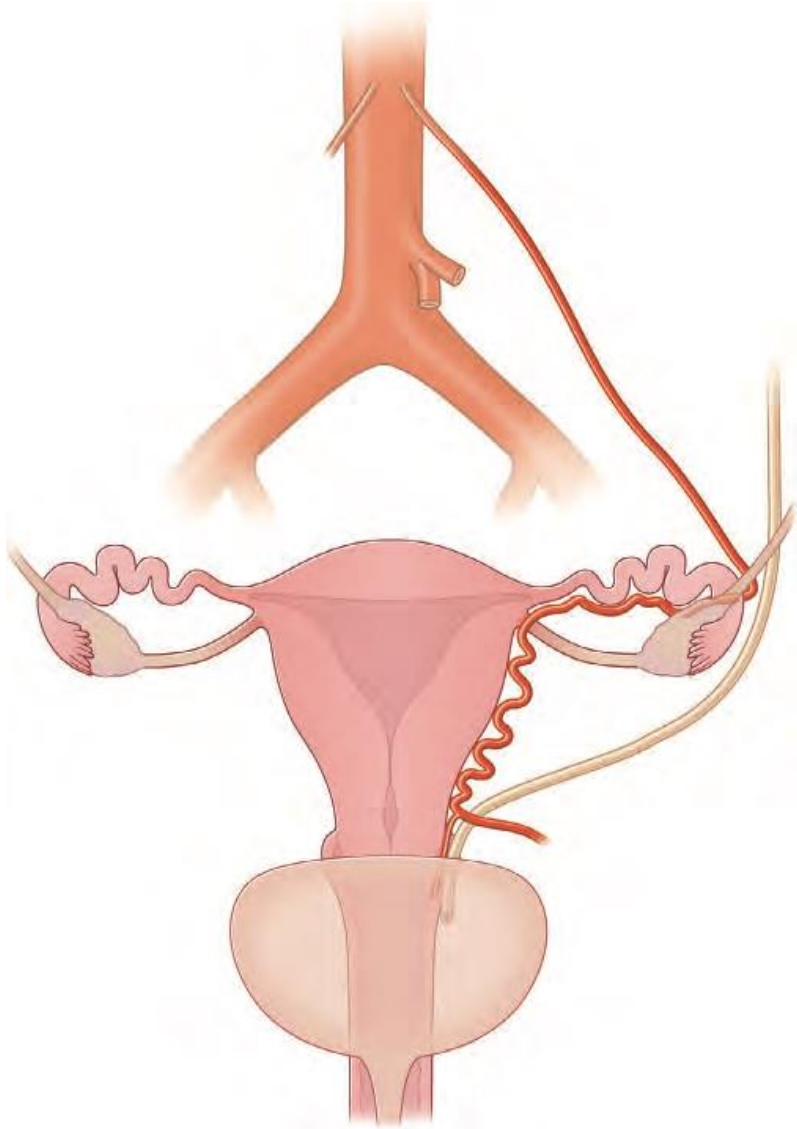
Partial bilateral atresia:
atresia of vagina

uterus



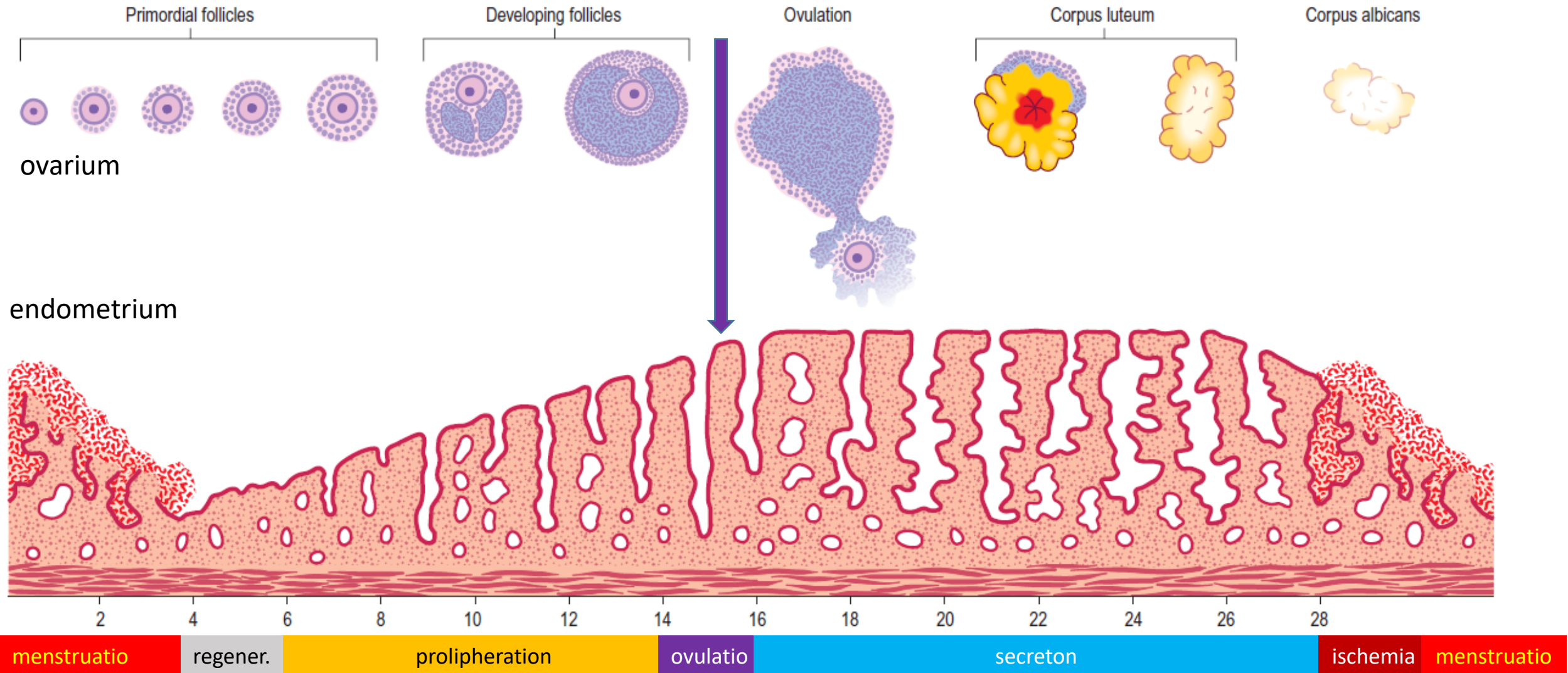
- ◆ Endometrium – no submucosal layer
- ◆ Myometrium
 - ◆ Vascular plexuses
 - ◆ Contraction during deliverance
- ◆ Parametrium
 - ◆ Along magins
 - ◆ Betwen anteroir and posterior sheeth
 - ◆ Liga latum
 - ◆ Connective tissue , ligaments
 - ◆ Hanging of uterus
- ◆ Perimetrium
 - ◆ Peritoneal coverage of uterus

Uterus et vasa et ureter



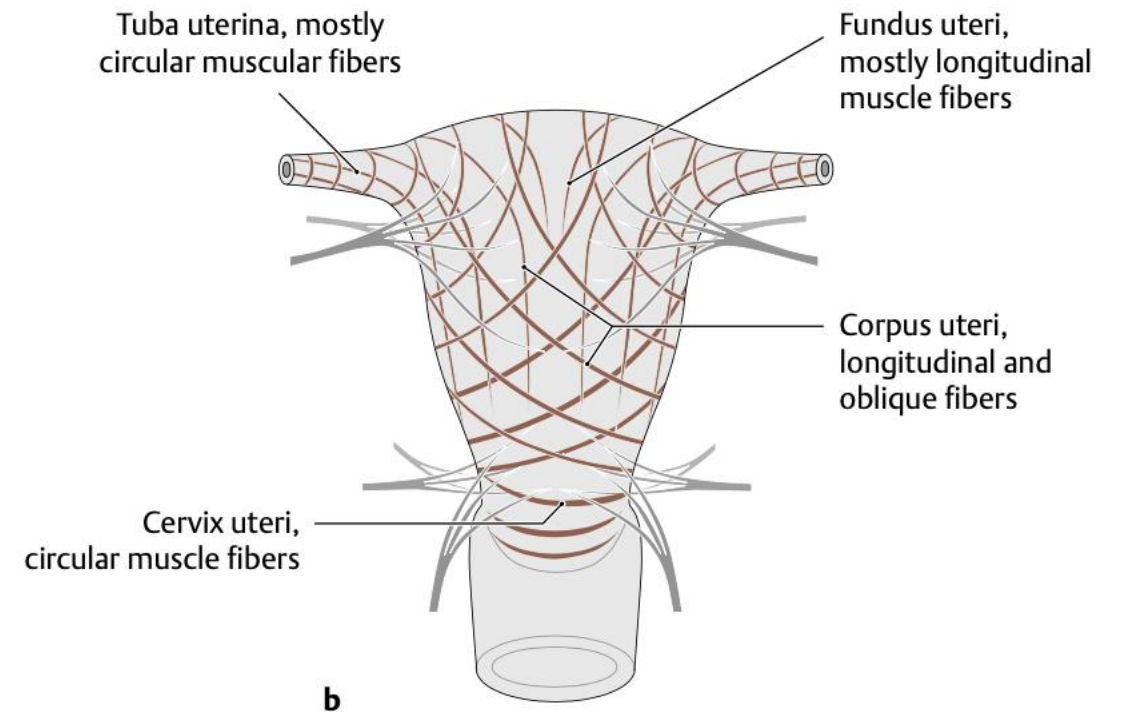
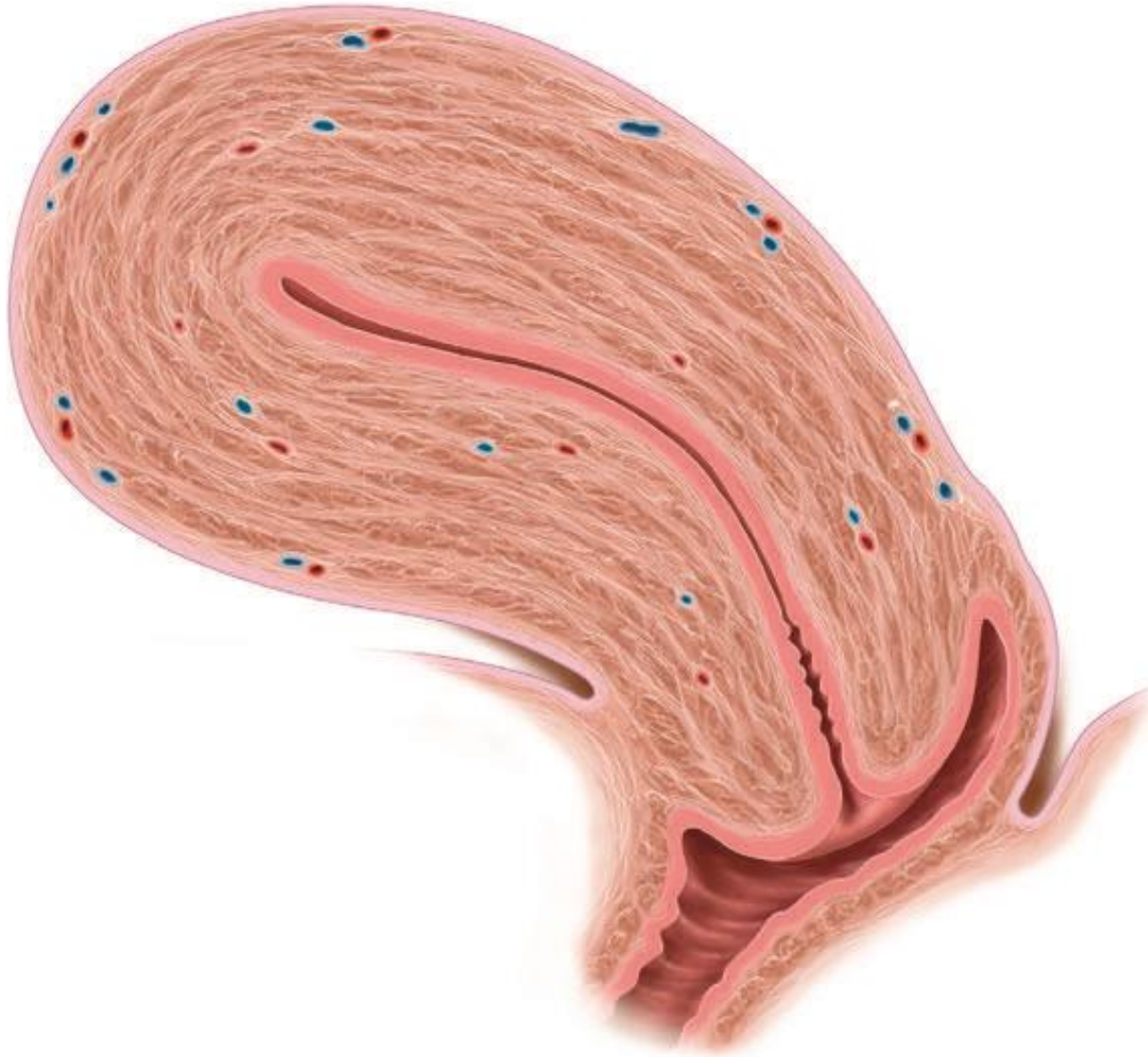
- ♦ A. uterina
- ♦ A. ovarica
- ♦ Ureteral injuries
- ♦ Dorsally from lig. suspensorium lies ureter
- ♦ **Gynecological surgeries**
- ♦ Distal ureter related to a. uterina
- ♦ Intramural part of ureter in mangette of vagina

ovarium - endometrium

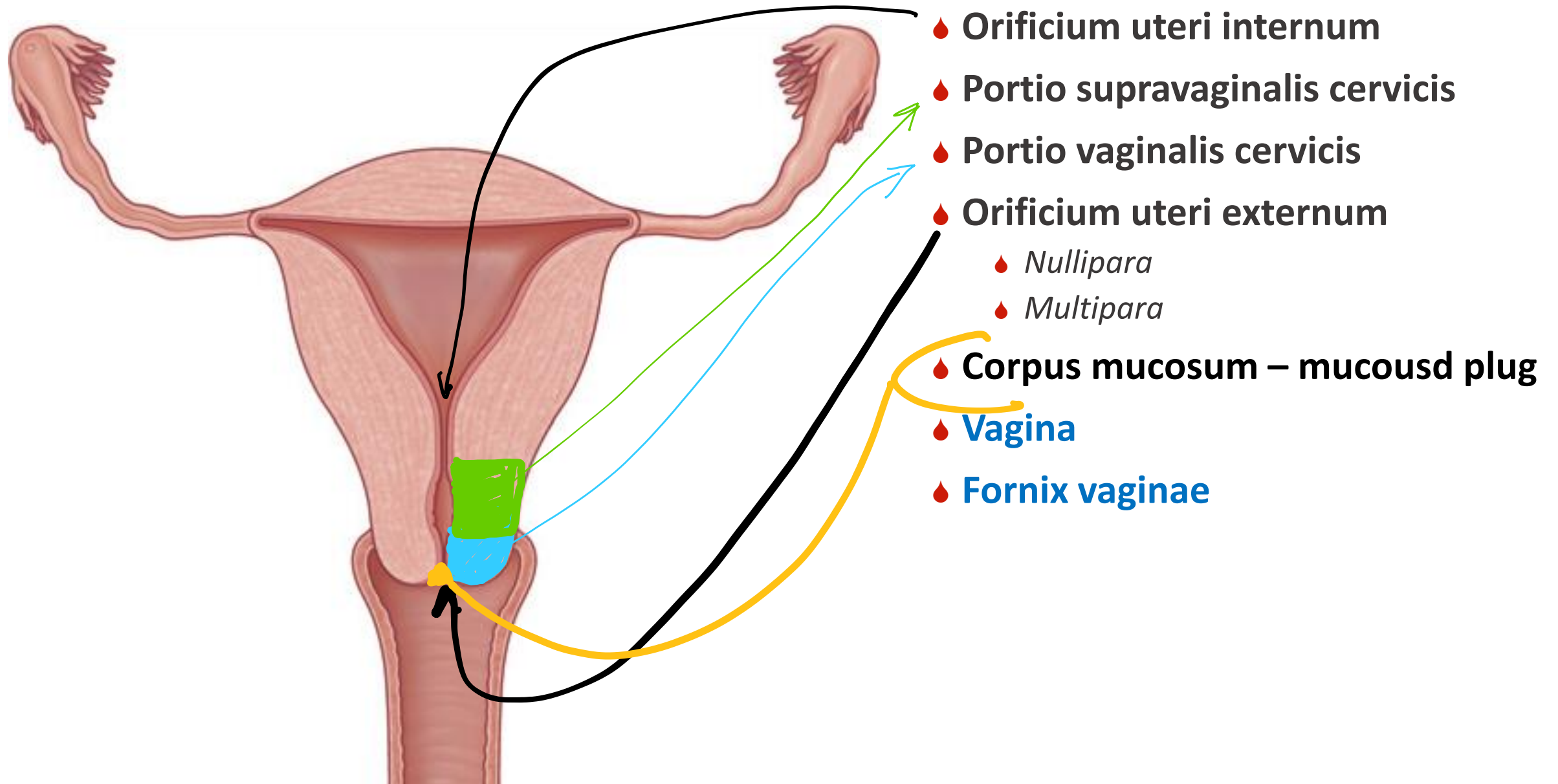


myometrium

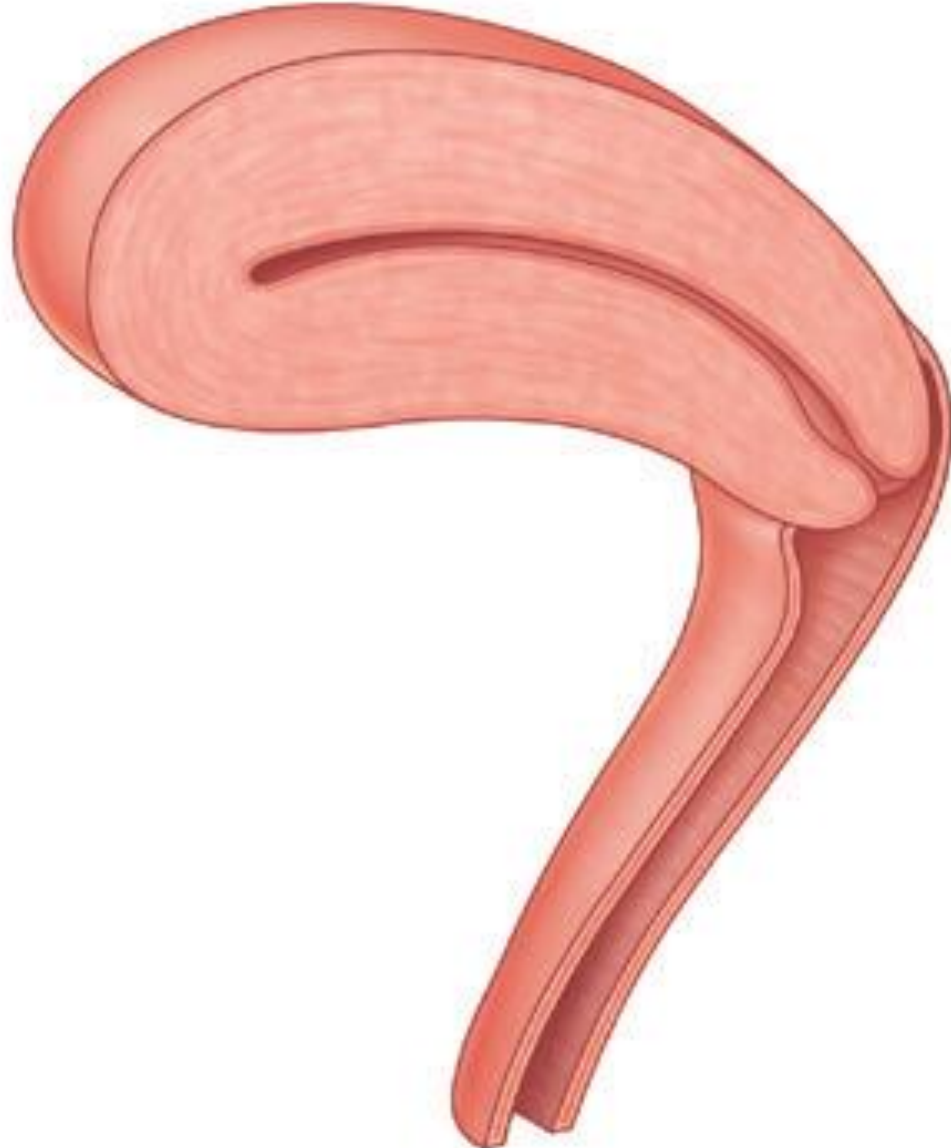
- 🔥 Spiral arrangement of bundles
- 🔥 Gravity - hypertrophy
- 🔥 Displacement of muscular pitches



Cervix uteri

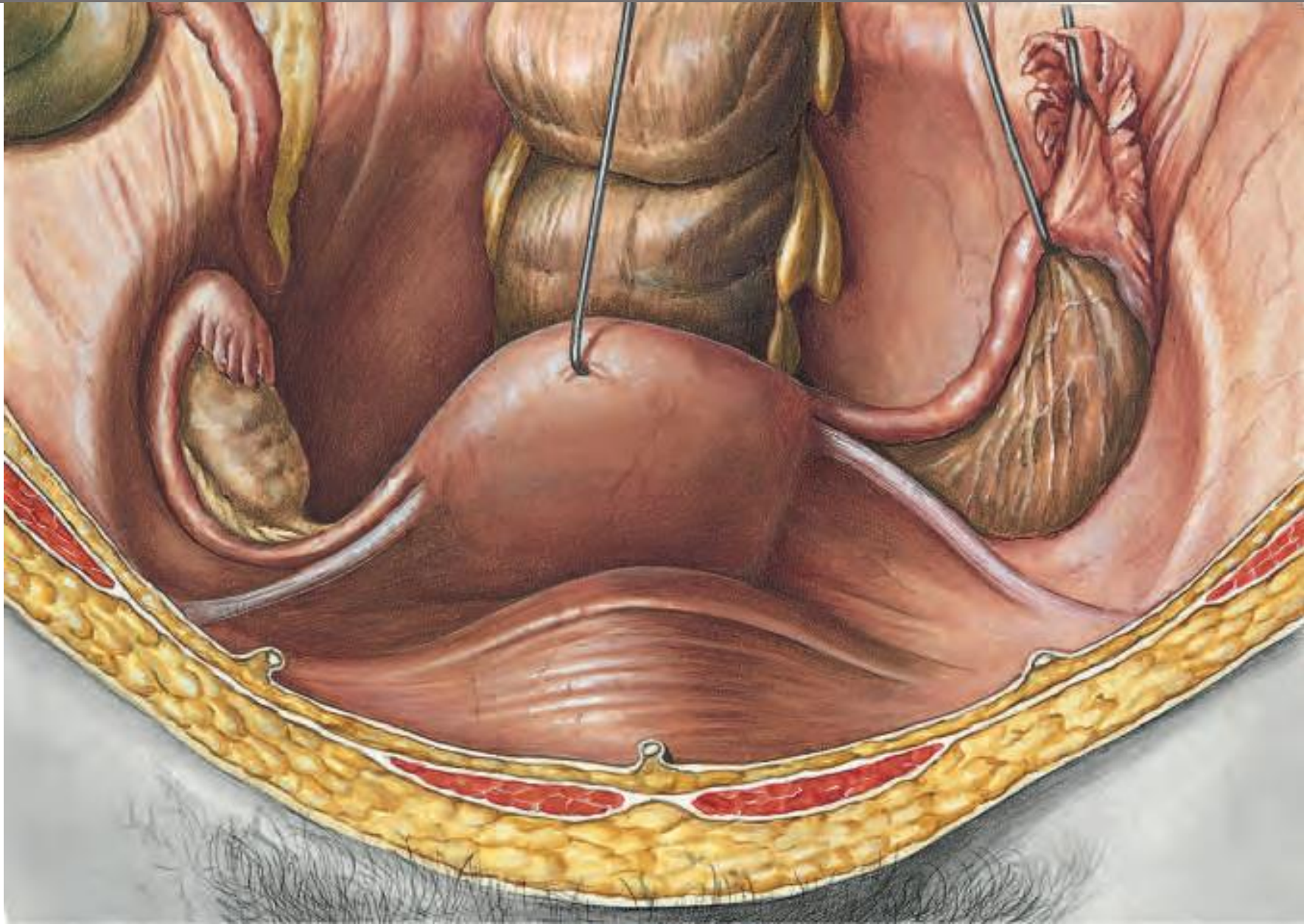


anteversio, anteflexio

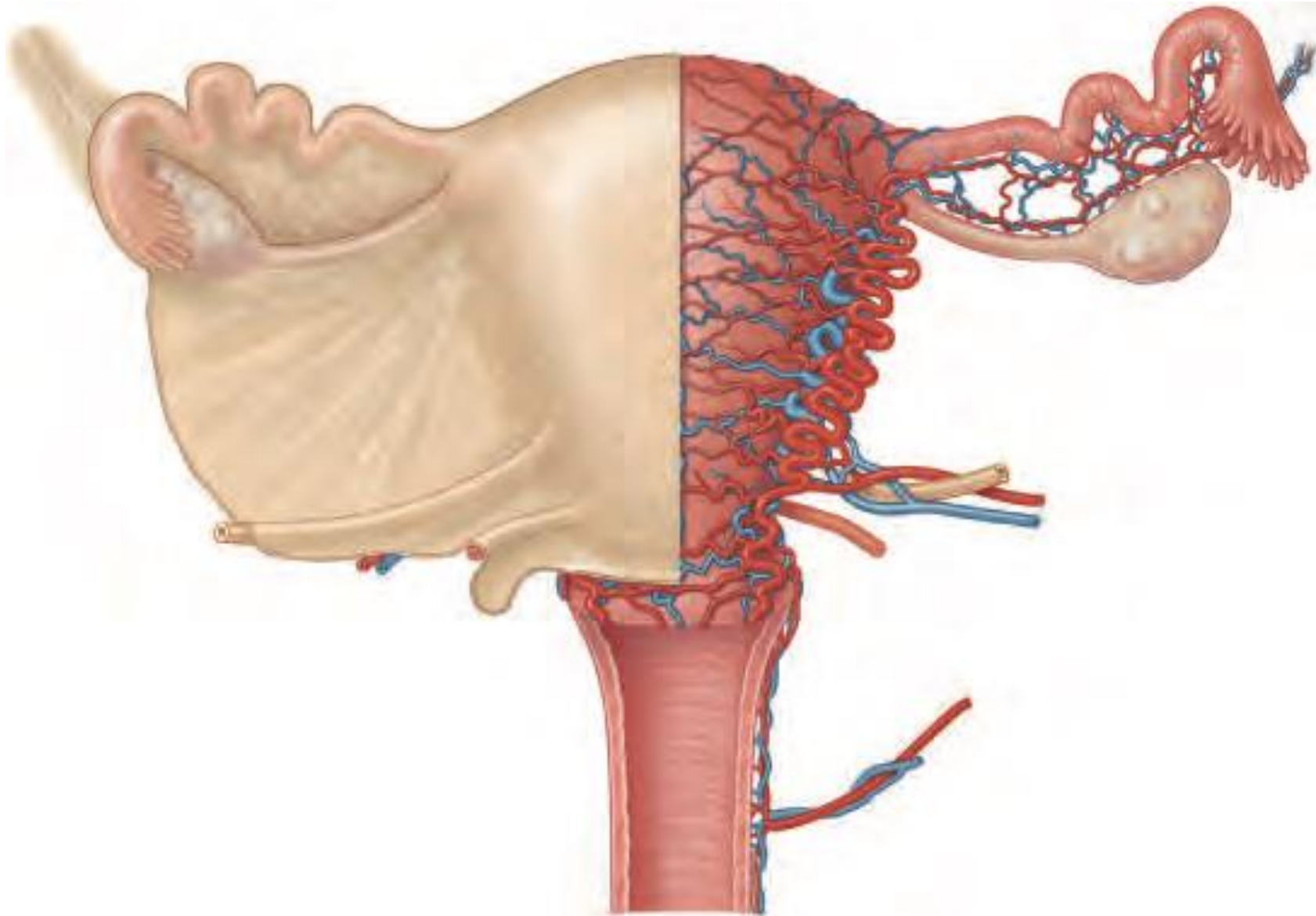


- ♦ Anteversioo anteflexion
- ♦ Uterus declined ventrally
- ♦ *Anteversio uteri cca 90°*
- ♦ *Anteflexio uteri 140 – 170°*
- ♦ *receptaculum seminis*
- ♦ Retroversion-flexion
- ♦ corpus dorsally
- ♦ conception

uterus, tubae et ovaria

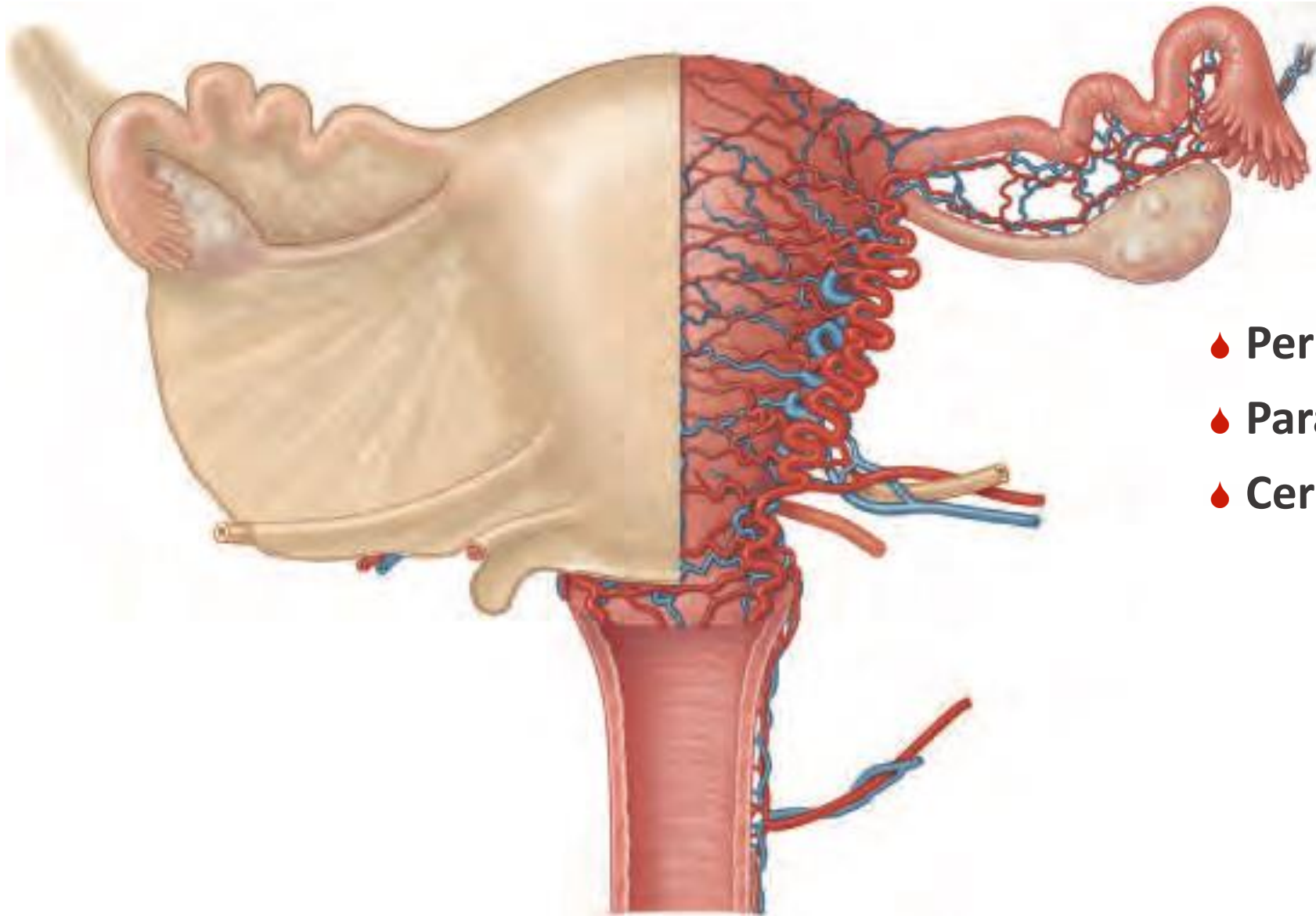


Ligamentum latum uteri



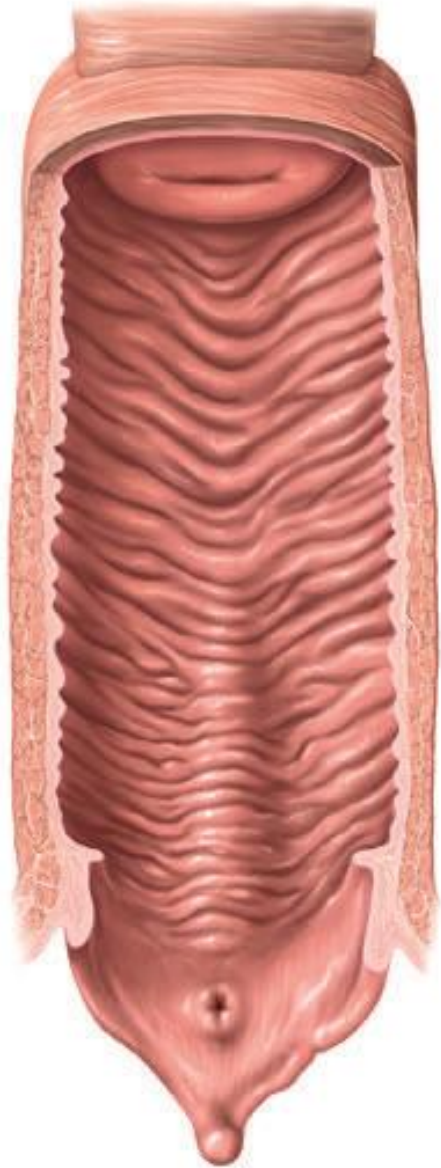
- ♦ **Peritoenal duplicature**
- ♦ **Frontal plane**
- ♦ **A. ovarica**
 - ♦ *Aorta abdominalis*
- ♦ **A. uterina**
 - ♦ *A. iliaca interna*
- ♦ **A. vaginalis**
 - ♦ *A. vesicalis superior*

perimetrium, parametrium



- ♦ Perimetrium - serose
- ♦ Parametrium – loose conn. tissue
- ♦ Cervical tumors spread

vagina



- length 8 cm
- width 2,5 - 3 cm
- Wall
 - Tela mucosa
 - Squamous epithelium nonceratinized
 - Rugae vaginales
 - Tela muscularis
 - Tela adventitia
 - Follows to paracolpium

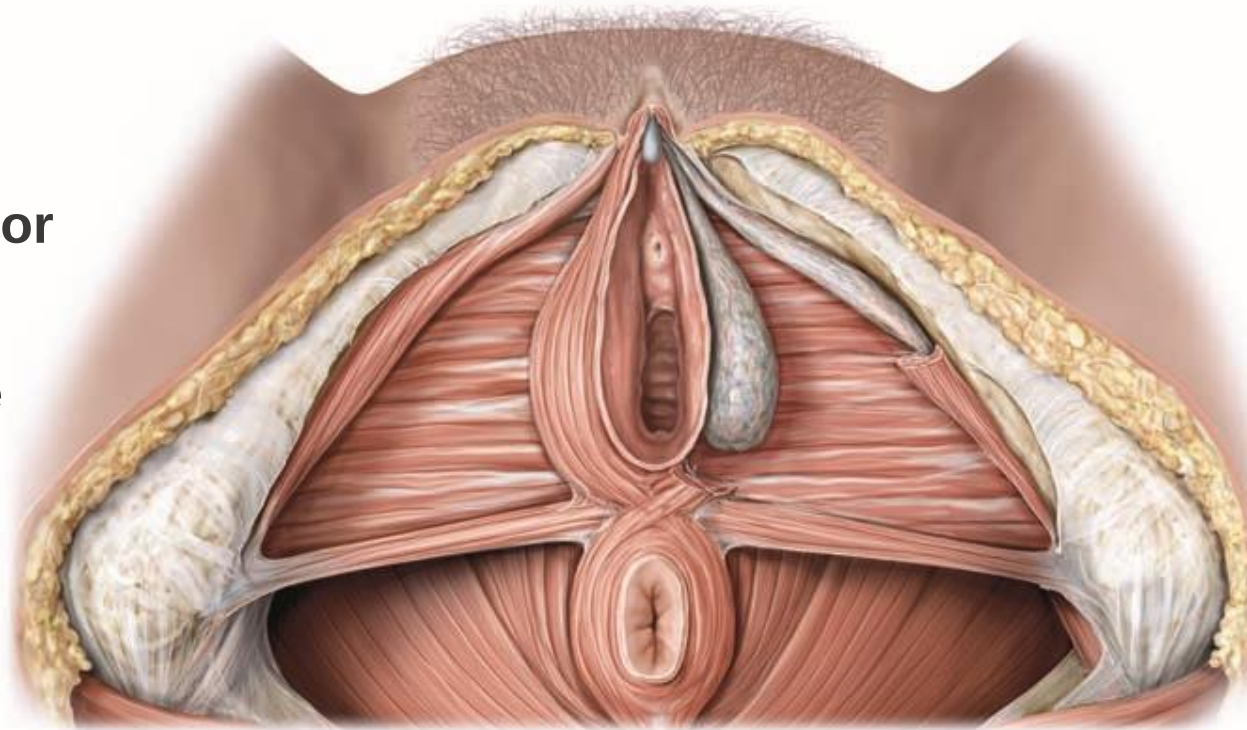
vagina



- ♦ Anterior dome
- ♦ Shallow
- ♦ Dorsal dome
- ♦ deeper
- ♦ Receptaculum seminis
- ♦ Hymen
 - ♦ **Virgo intactus**
 - ♦ Mucosal fold in the aditus
 - ♦ Incomplete closure
 - ♦ deffloration
 - ♦ Carunculae hymenales – after deliverance

vulva

- ♦ Labia majora
- ♦ Labia minora
- ♦ Comisura anterior et posterior
- ♦ Vestibulum
- ♦ Orificium externum urethrae
- ♦ Clitoris
 - ♦ Glans
 - ♦ Corpora cavernosa
 - ♦ Crura clitoridis
 - ♦ M. ischiocavernosus
- ♦ Bulbus vestibularis (corpus spongiosum)
- ♦ M. bulbospongiosus
- ♦ Glandula vestibularis Bartholini



hermafroditism

- 💧 **Torus genitalis**

- 💧 Labia majora
- 💧 Scrotum

- 💧 **Tuberculum genitale**

- 💧 Clitoris
- 💧 Penis

- 💧 *Hermaphroditos*

- 💧 *Mother Aphrodité, father Hermés*

- 💧 **Hermaphrodisimus verus**

- 💧 Both gonades

- 💧 **Pseudohermaphrodisimus**

- 💧 **Masculinus**

- 💧 Testes – outer genital of female

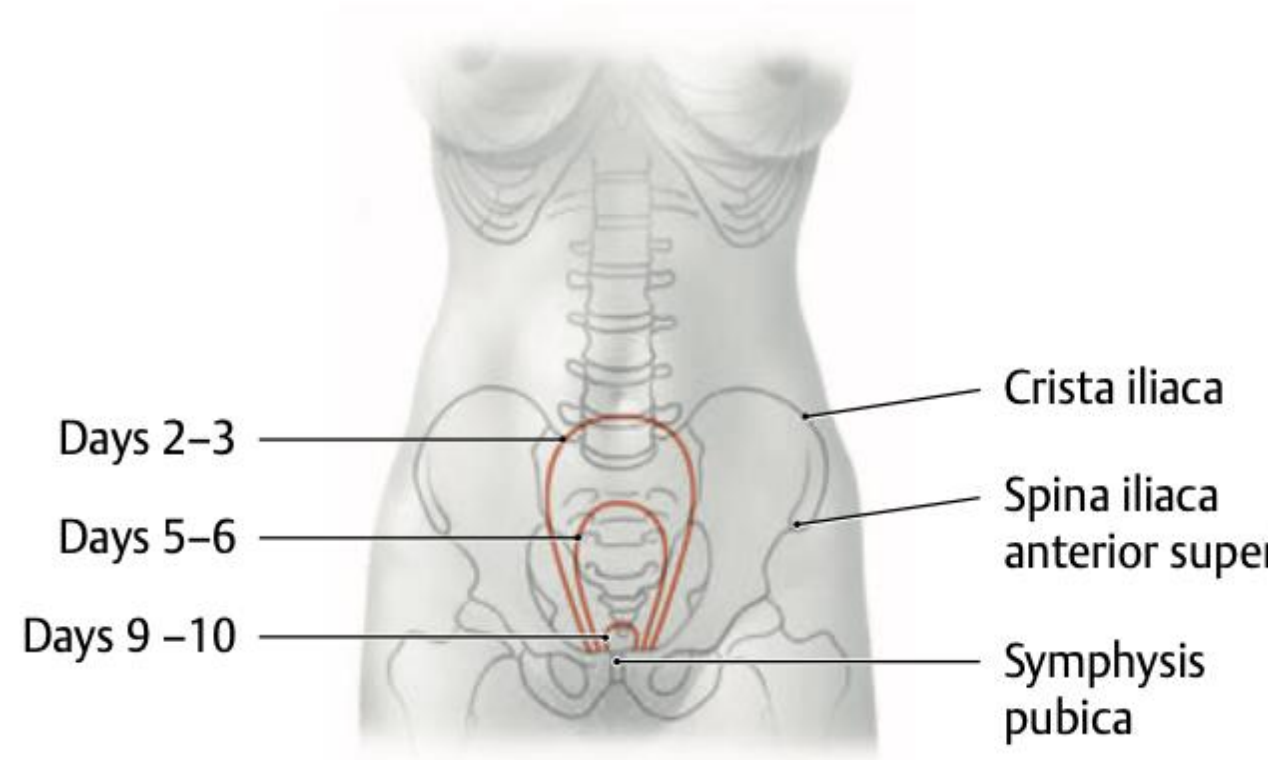
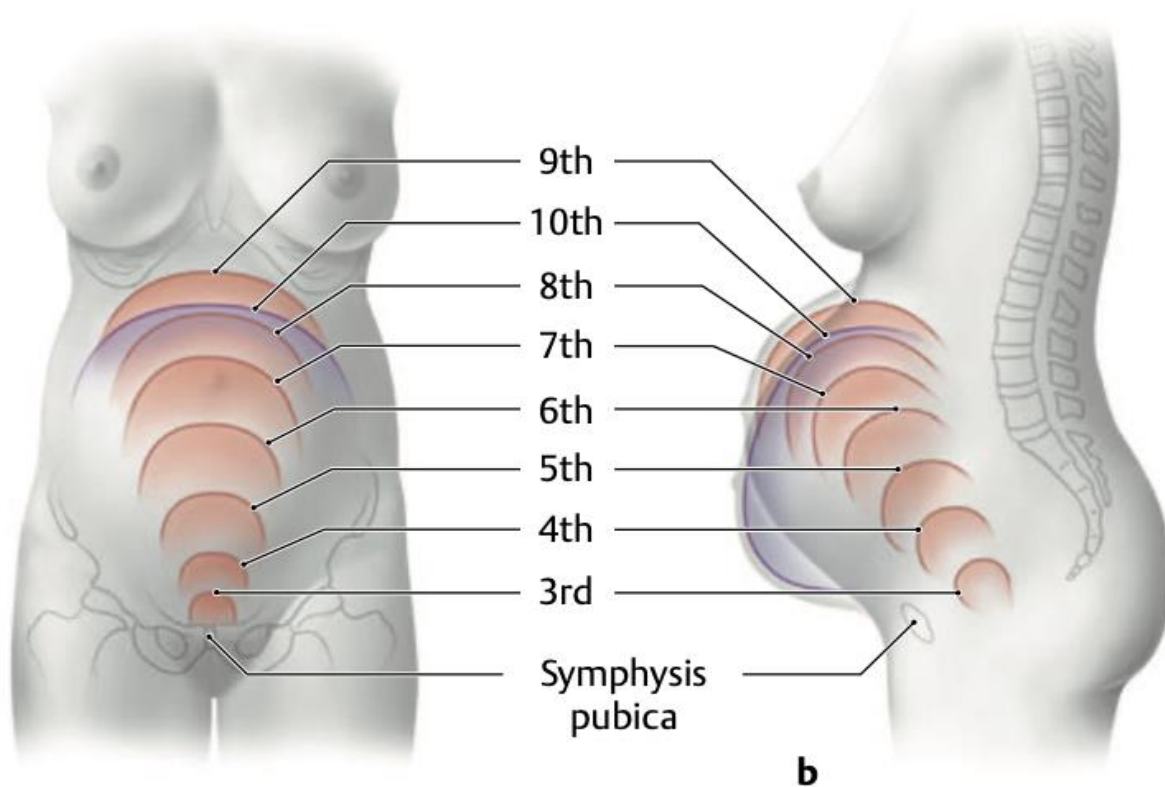
- 💧 **Femininus**

- 💧 Ovaria – outer genital of female

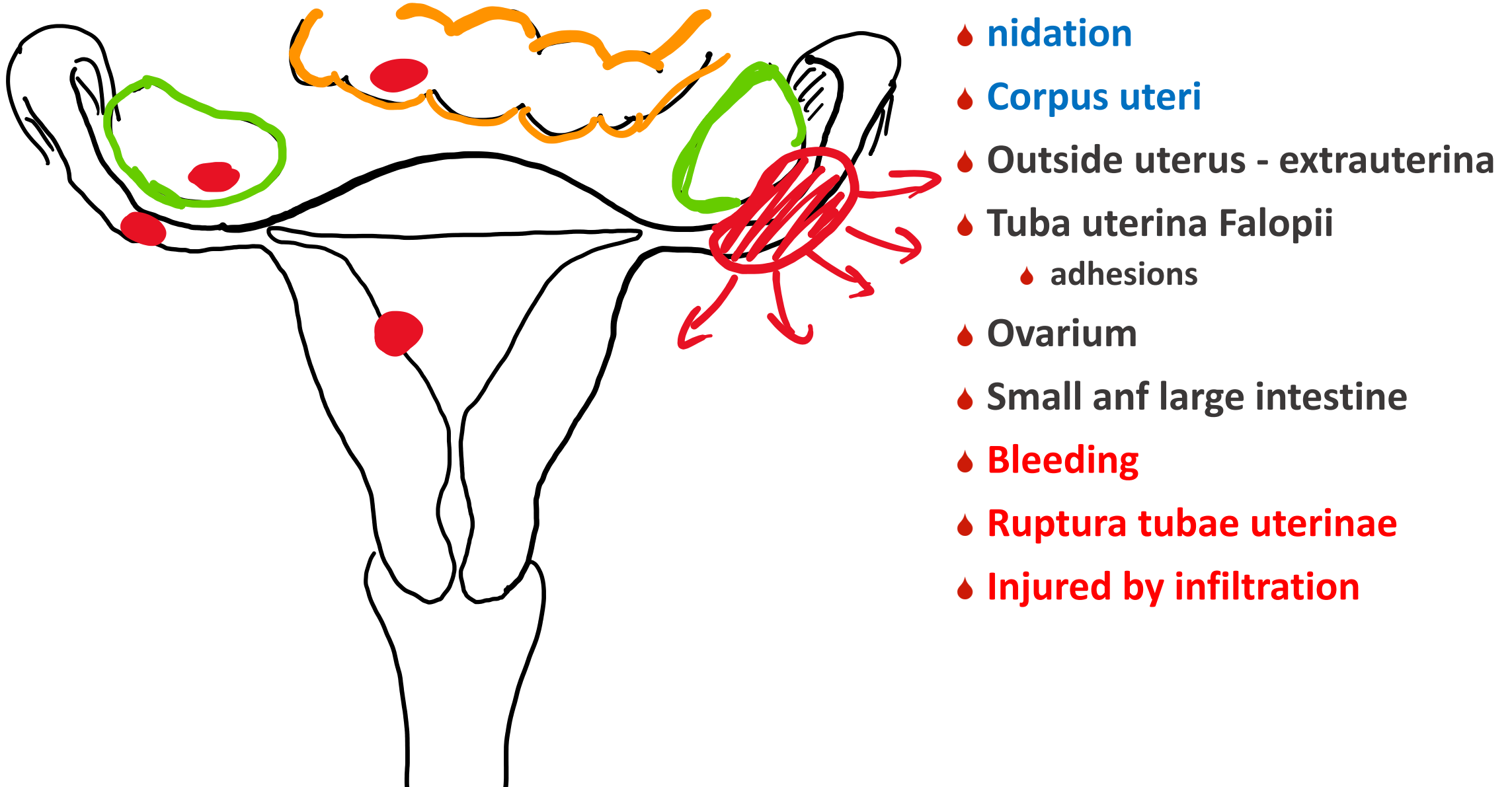
graviditas

• Expansion

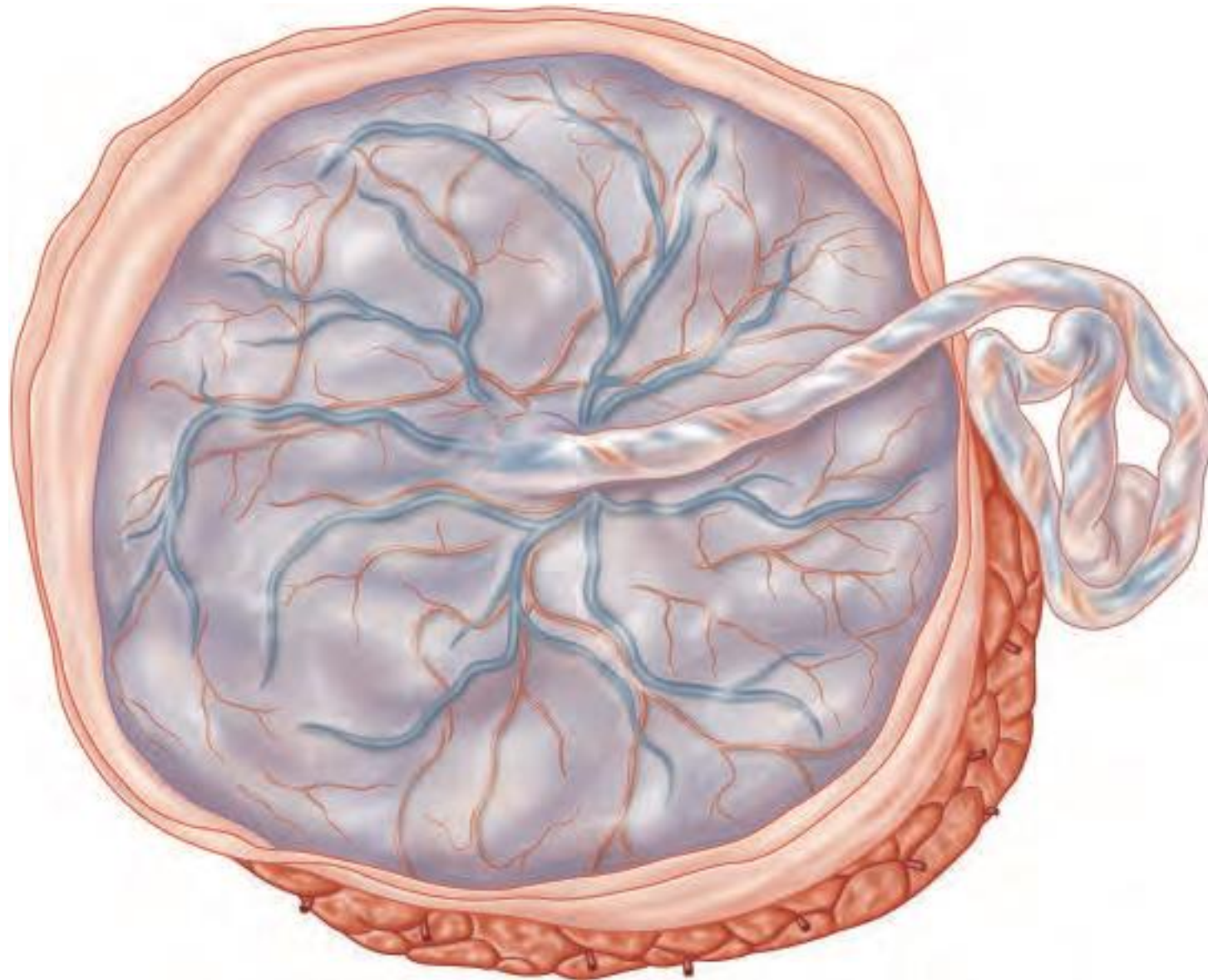
• Recoil



graviditas extrauterina



placenta

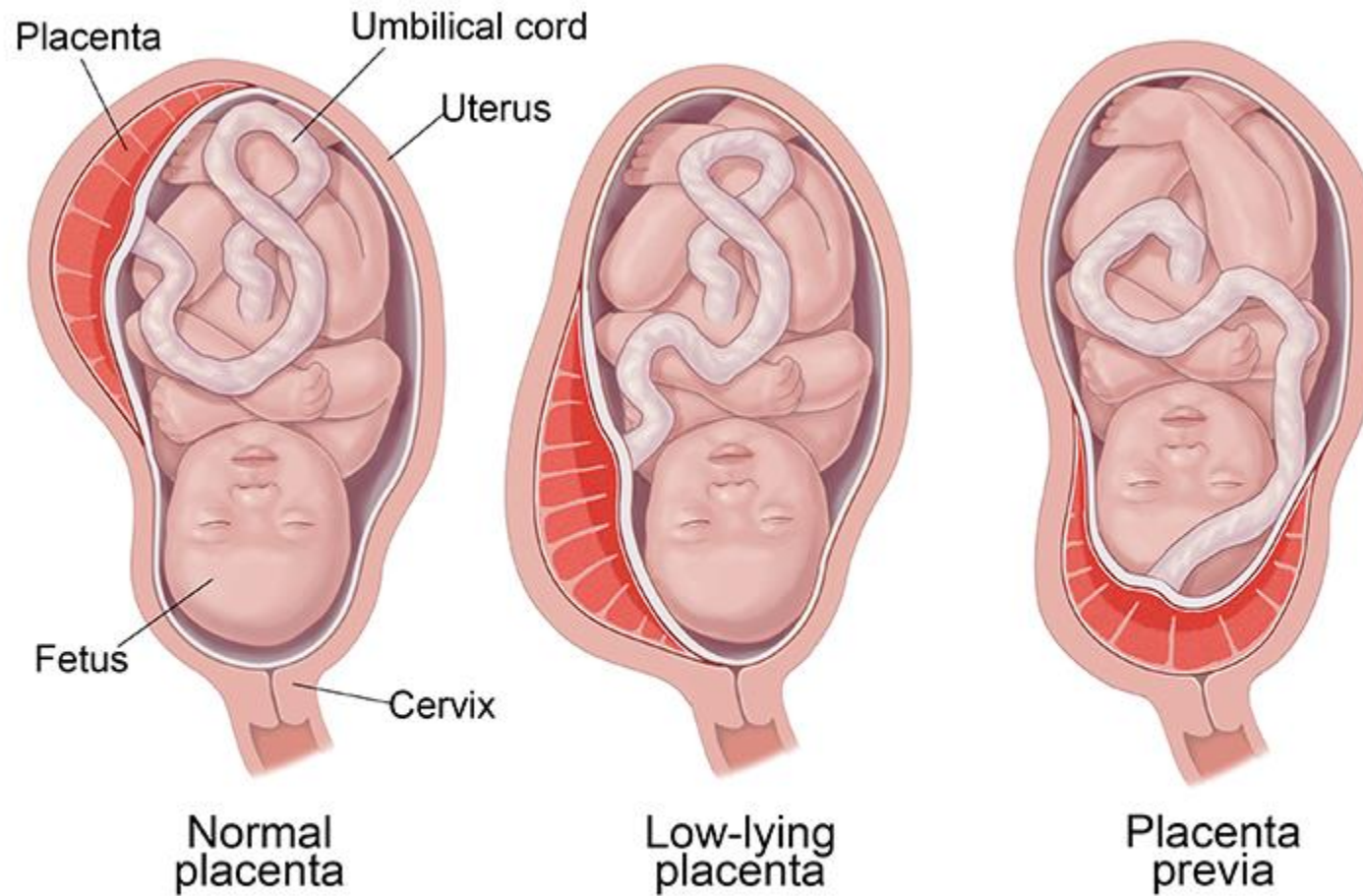


♦ V. umbilicalis

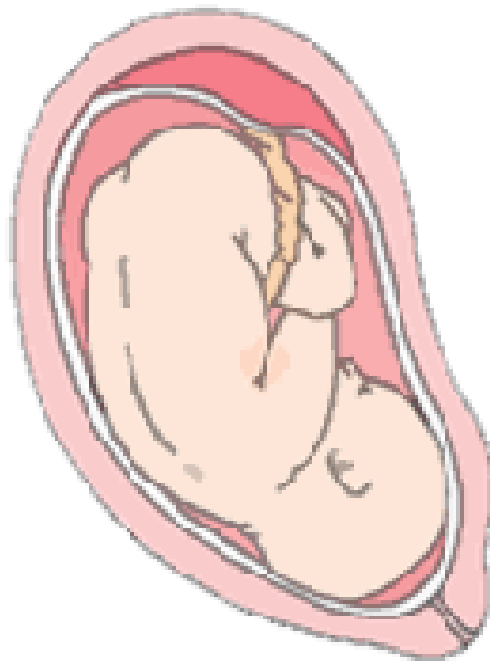
♦ Aa. umbilicales

♦ Villi

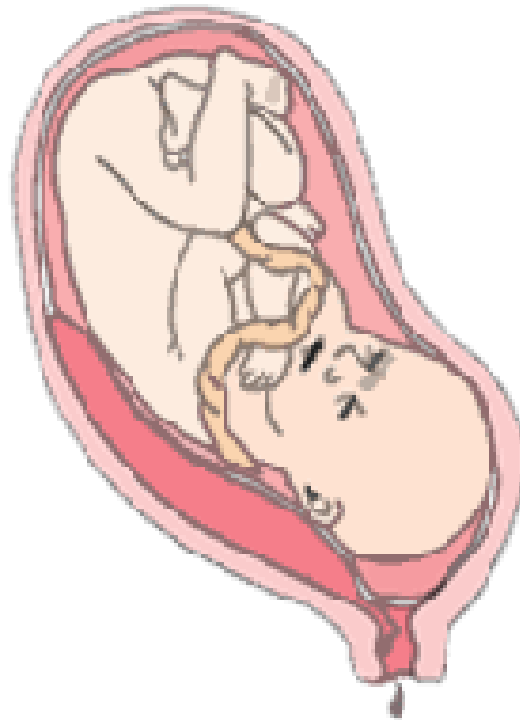
Position of placenta



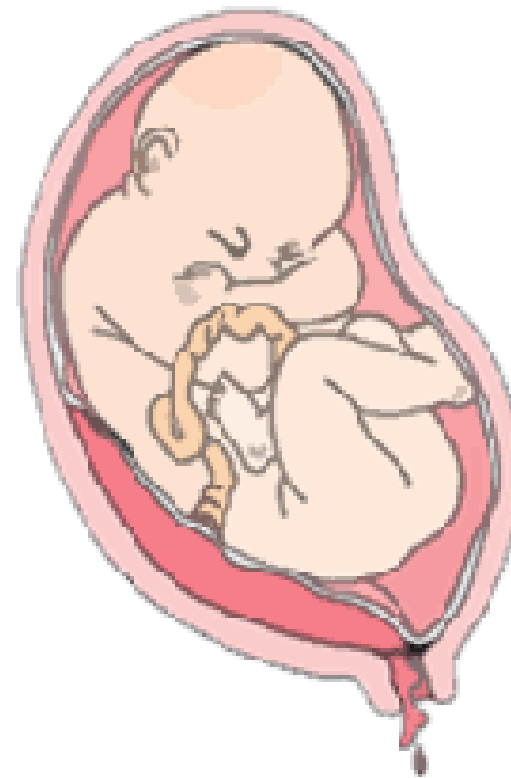
Placenta previa



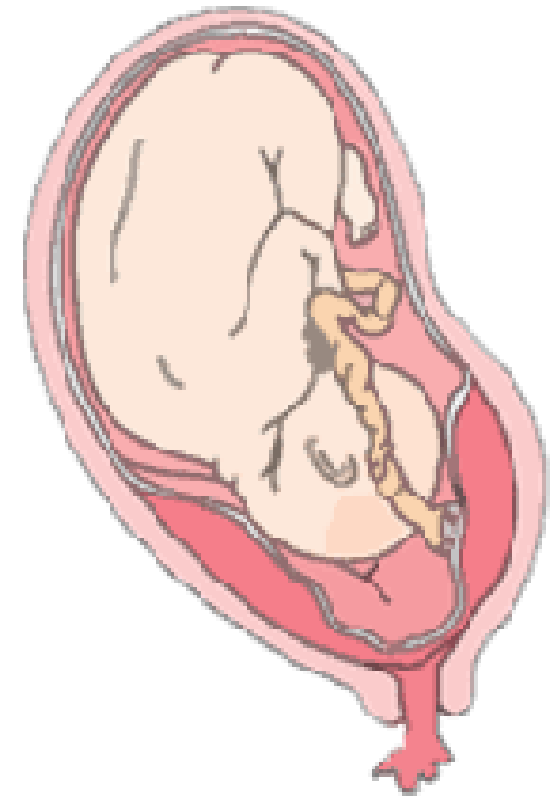
**NORMAL
PLACENTA**



**LOW
IMPLANTATION**



**PARTIAL
PLACENTA PREVIA**



**TOTAL
PLACENTA PREVIA**

Fetus in utero

Face



Brow



Breech



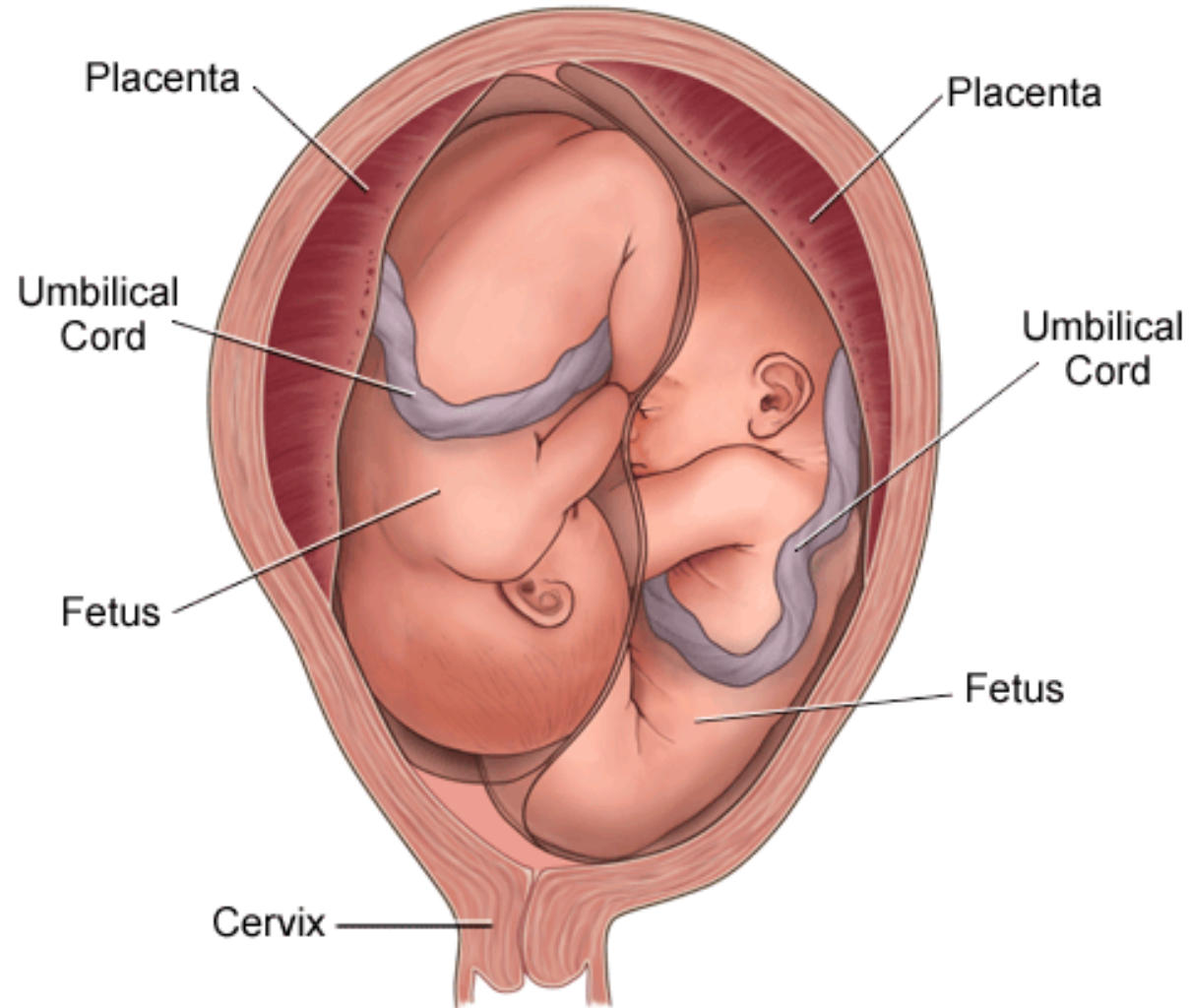
Shoulder



Abnormal Presentations

Gemini

Twin Pregnancy: Head Down / Head Up





zygota

dělení zygoty

1 – 3 dny

4 – 7 dní

7 – 14 dní

> 14 dní

amnion

chorion

placenta

bichoriální biamniální
(se spojenou placentou)

monochoriální biamniální

monochoriální monoamniální

srostlá ("siamská")



bichoriální biamniální
(s oddělenou placentou)



monochoriální monoamniální
(s rozdělenou pupeční šňůrou)

Arteriae pelvis

- ♦ **A. iliaca communis**

- ♦ **A. iliaca externa**

- ♦ **A. iliaca interna**

- ♦ **Truncus posterior**

- ♦ *A. iliolumbalis*

- ♦ *A. glutaesa superior*

- ♦ *A. sacralis lateralis*

- ♦ **Truncus anterior**

- ♦ **Dorsální větve**

- ♦ *A. uterina (f)*

- ♦ *A. vesicalis inferior*

- ♦ *A. vafiginalis (f) + rectalis media*

- ♦ *A. pudenda*

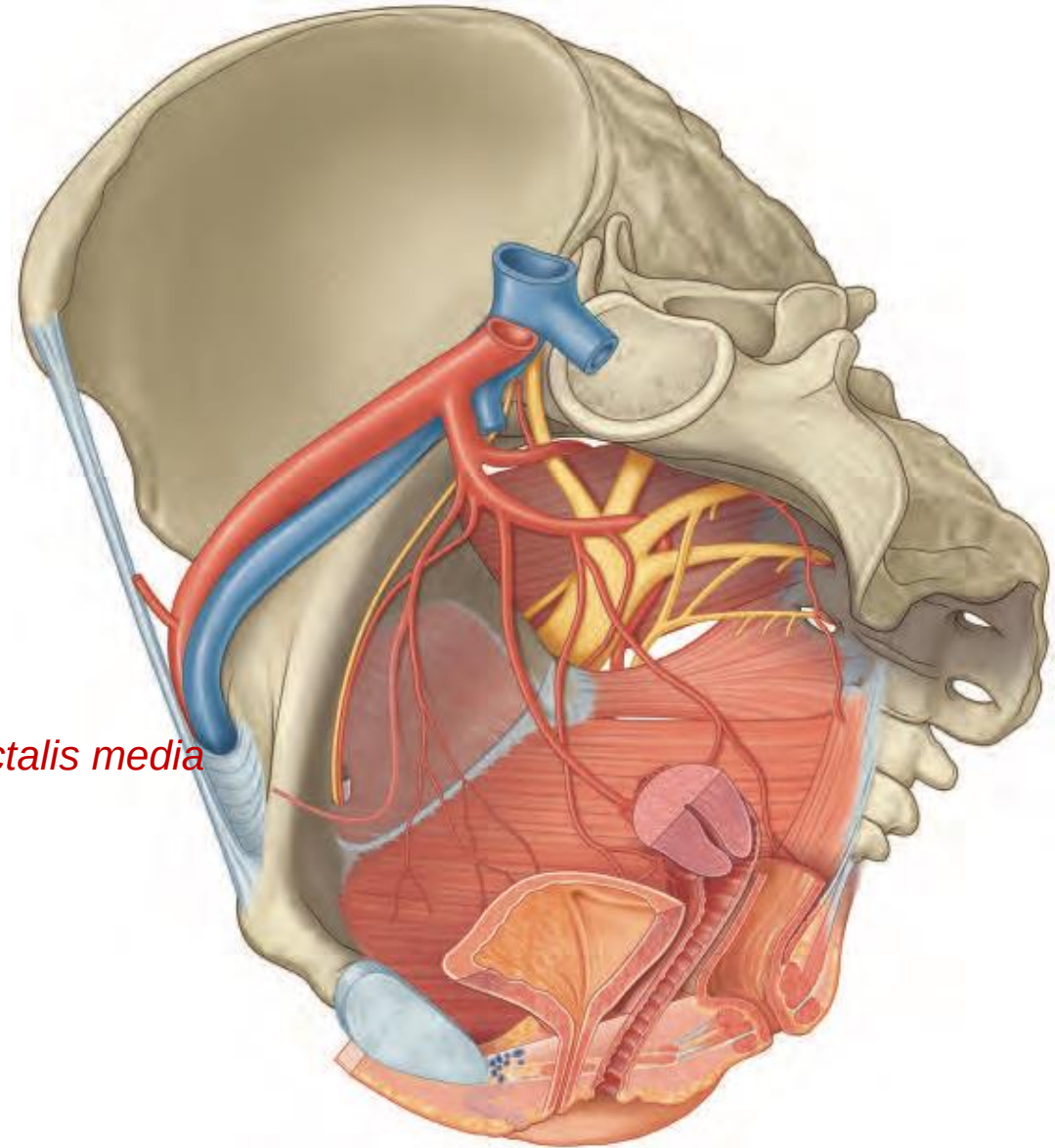
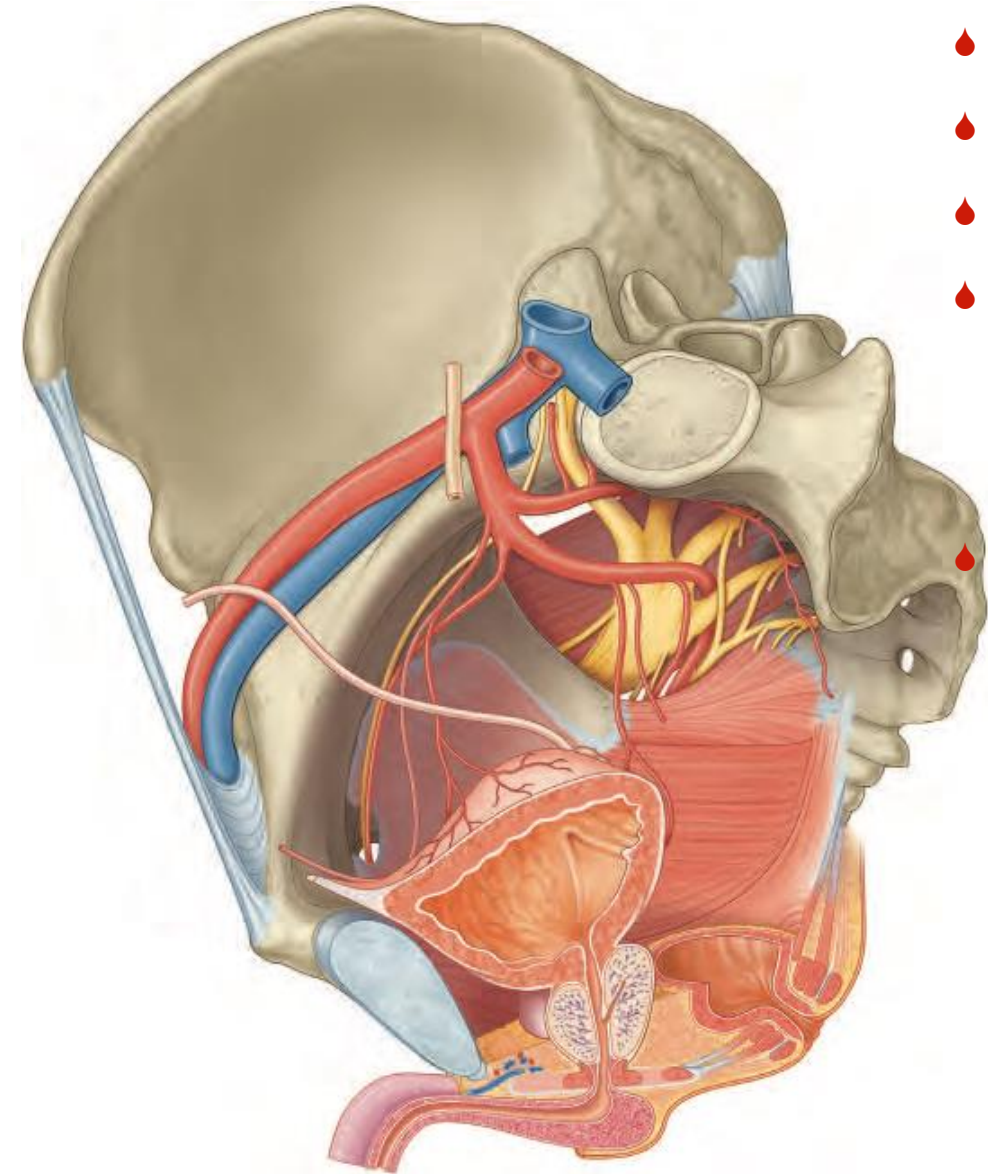
- ♦ *A. glutaesa inferior*

- ♦ **Ventrální větve**

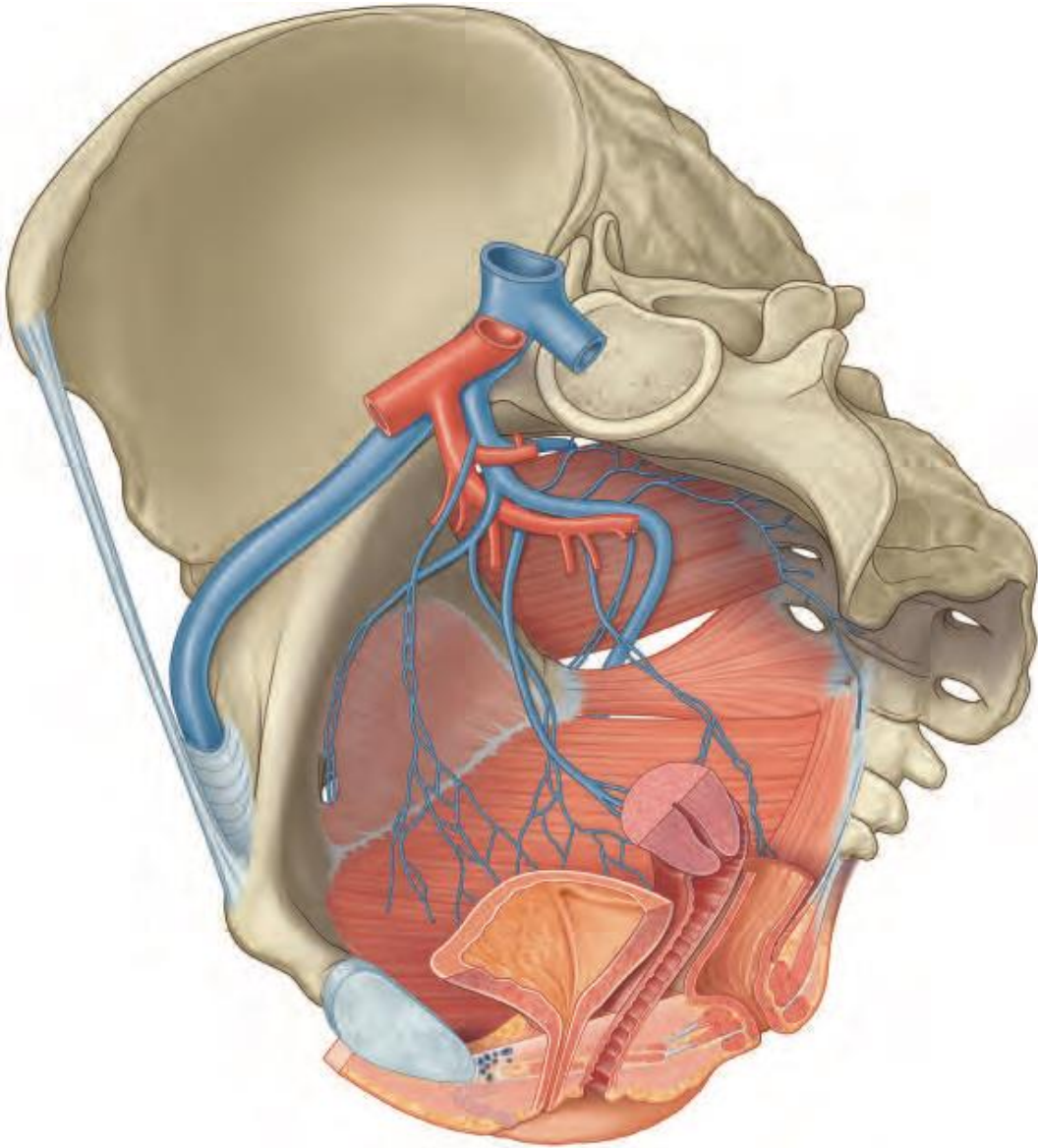
- ♦ *A. vesicalis superior*

- ♦ *A. umbilicalis (oblit.)*

- ♦ *A. obturatoria*

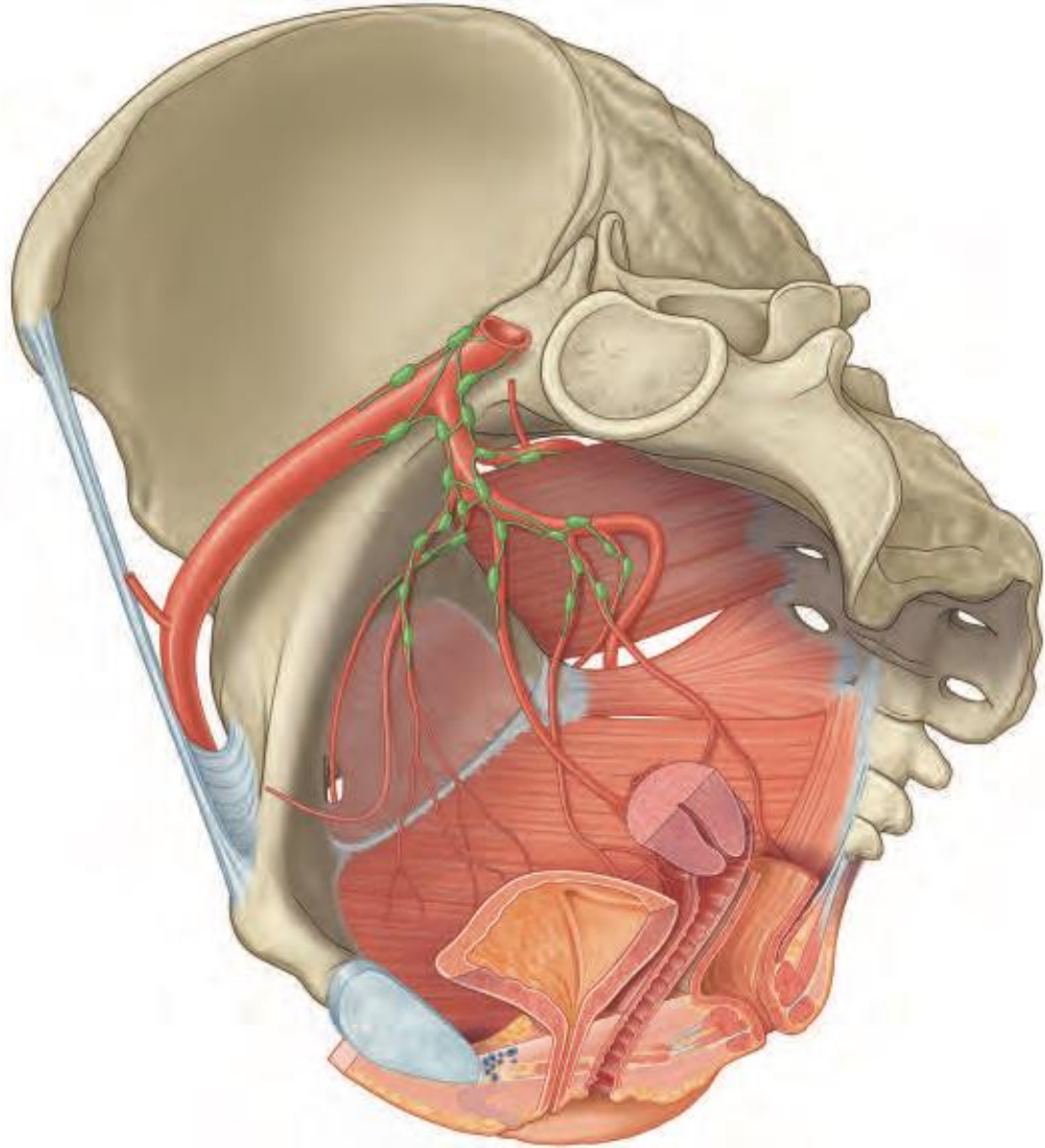


Venae pelvis



- ♦ V. iliaca communis
- ♦ V. iliaca externa
- ♦ V. iliaca interna
- ♦ V. glutea superior
- ♦ V. sacralis lateralis
- ♦ V. vesicalis superior
- ♦ V. obturatoria
- ♦ V. uterina
- ♦ V. rectalis media
- ♦ V. pudenda

Nodi lymphatici



- ♦ Iliaci externi
- ♦ Iliaci interni
- ♦ Vecicales superiores
- ♦ Obtruratores
- ♦ Rectales medii
- ♦ Vaginales

- ♦ Nodi inguinales

Pelvis, pelvic floor, genitalia

Prof. MUDr. Jiří Ferda, Ph.D.