

GSSE Anatomy

The retroperitoneum and the pelvis and perineum

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Eastern and Greater Southern Surgical Skills Network

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Tips and References

- Instant Anatomy: <https://www.instantanatomy.net/>
 - Recommend the Instant Anatomy Anthology app for iPhone
 - Video animations
 - Quick reference slides
 - Huge bank of True/False GSSE-style anatomy questions
- Teach Me Anatomy: <https://teachmeanatomy.info/>
 - Easy to use website
 - Clear, simple, blueprint-style diagrams
- Rohen's Color Atlas of Anatomy
 - Excellent photographic atlas of anatomical dissections
 - Most-realistic, very detailed
 - Used in the Spot-Test component of the GSSE

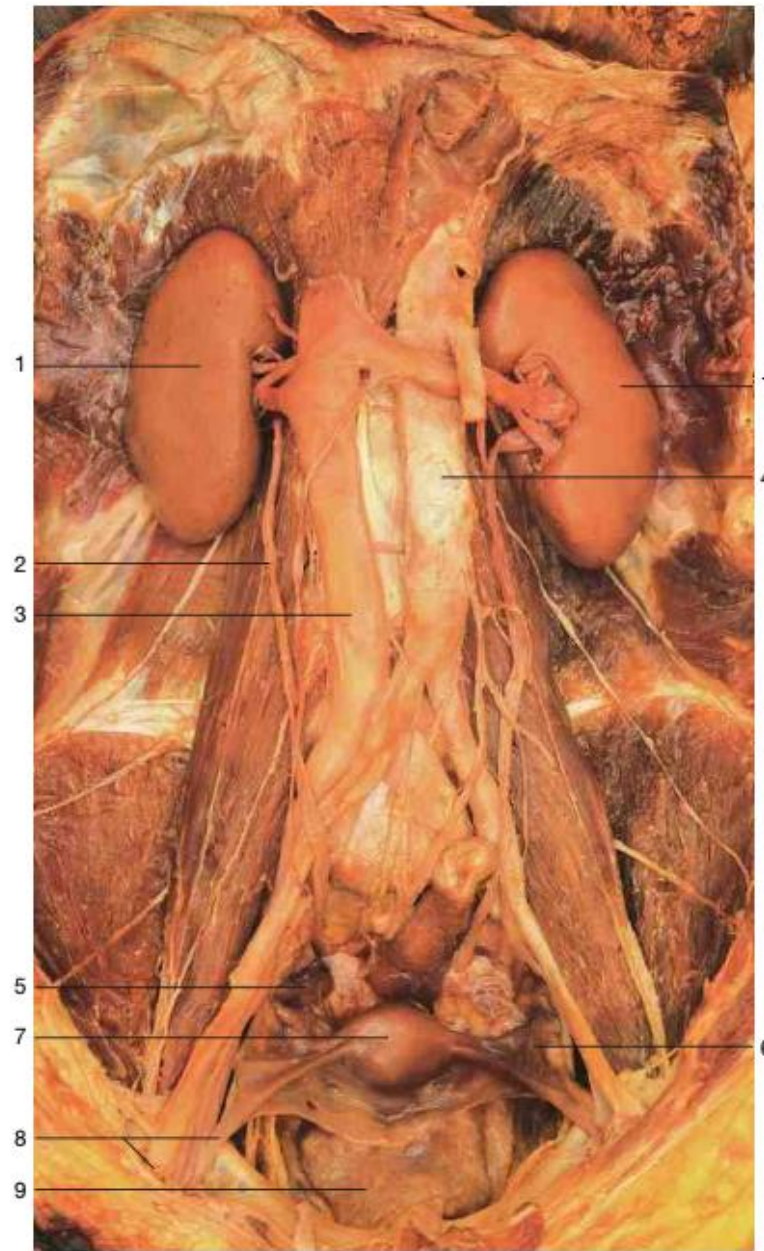
Tips:

- Detailed base knowledge as a foundation
- Then use Last's, The Bank, other sources of questions to reinforce detailed information (e.g. exact relations of organs)

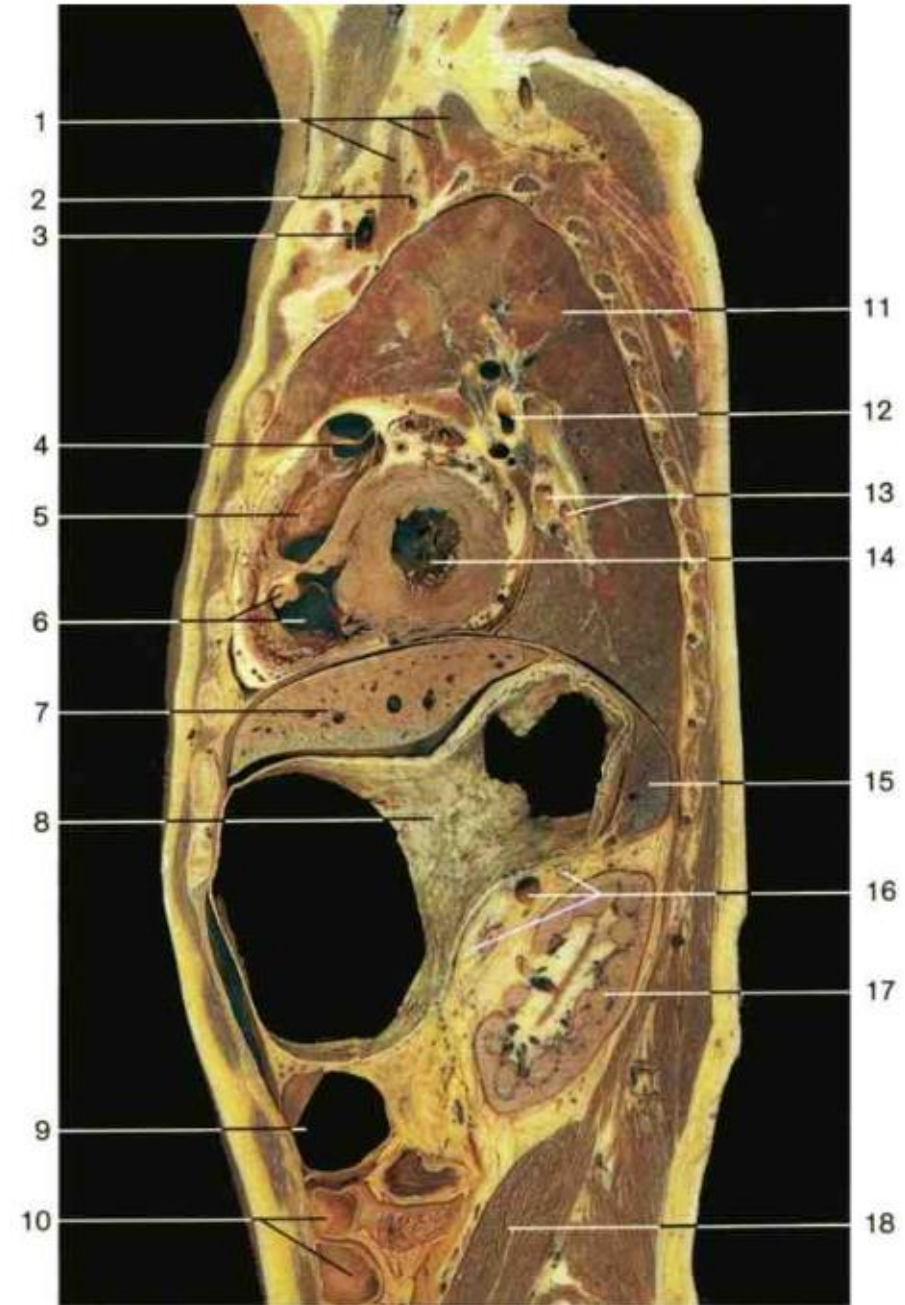
The Retroperitoneum, Pelvis and Perineum

1. The retroperitoneum in relation to the abdomen
2. Contents of the Retroperitoneum:
 - a. The Great Vessels
 - b. The Kidneys
 - c. The Urinary system
 - d. The Nervous system
 - a. The Lumbar Plexus
 - b. The Sacral Plexus
 - e. The posterior abdominal wall
3. The female urogenital system
 - a. Internal genital organs
 - I. Uterus and related structures
 - II. Arteries and lymph vessels
 - b. External genital organs
 - c. The urogenital diaphragm
4. The male urogenital system
 - a. External organs
 - b. Internal organs
 - I. Testis and epididymis
 - II. Accessory glands
 - III. Vessels of the Pelvic organs
 - c. The urogenital diaphragm and perineum
5. The Perineum

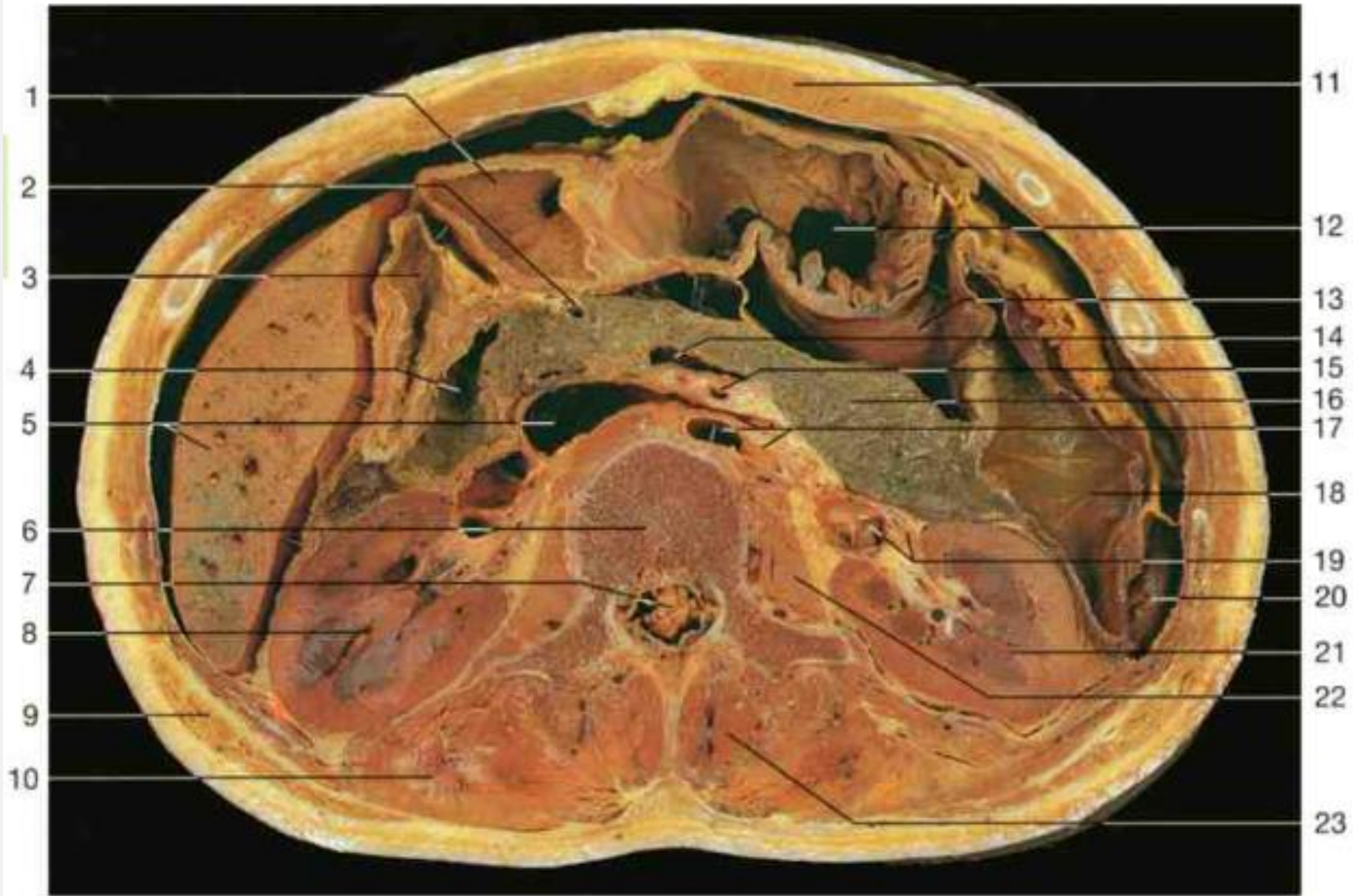
The retro-peritoneum



Retroperitoneal organs of the female (anterior aspect). View of the female pelvis showing uterus with uterine ligaments, ovary, and urinary bladder (from Lütjen-Drecoll, Rohen, Innenansichten des menschlichen Körpers, 2010).



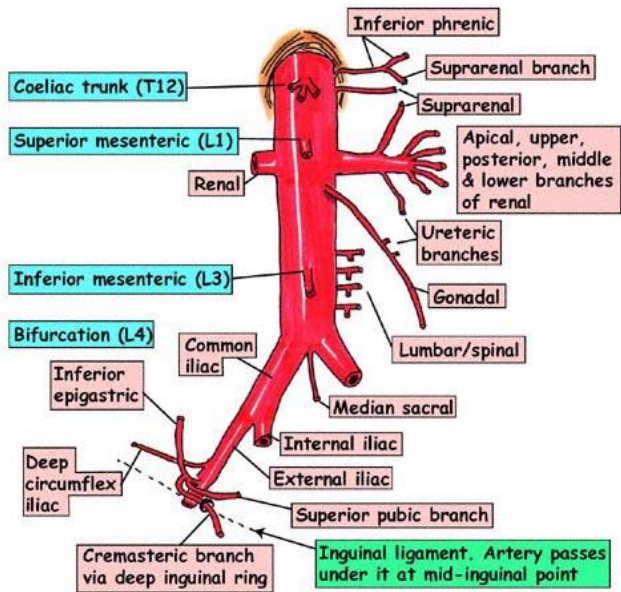
Parasagittal section through the thoracic and abdominal cavities at the level of the left kidney (5.5 cm left of median plane).



Horizontal section through the abdominal cavity at the level of the first lumbar vertebra (from below).

The Aorta and IVC

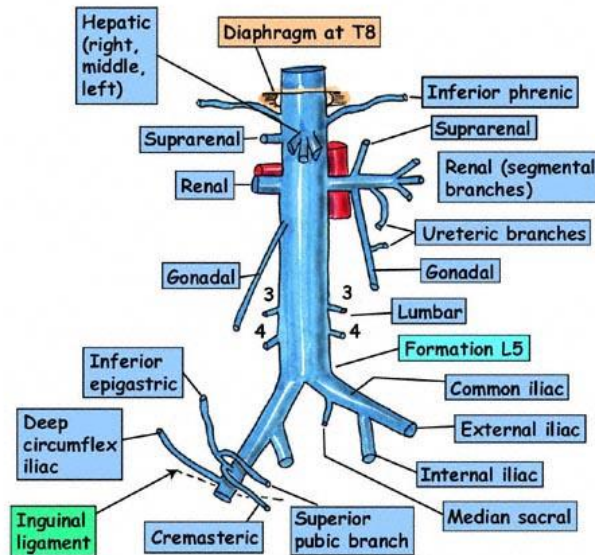
ABDOMINAL AORTA AND RIGHT EXTERNAL ILIAC ARTERY



Relations of aorta

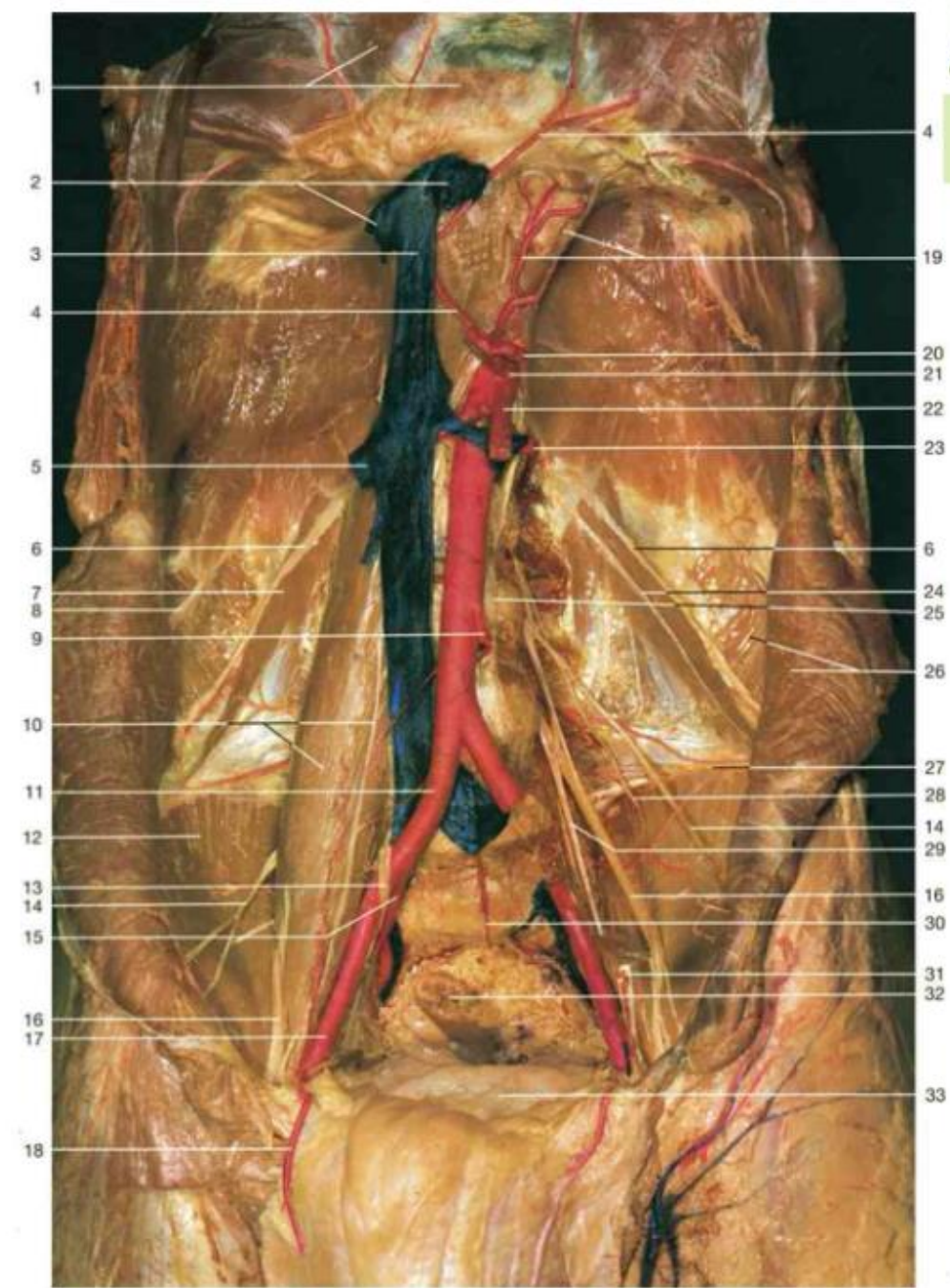
Left lateral: sympathetic chain. Right lateral: IVC, Cysterna chyli
 Both lateral: Azygos veins, para-aortic nodes, coeliac ganglia
 Anterior: Pancreas, splenic vein, left renal vein, 3rd part duodenum, mesentery, nodes, autonomic plexus, lesser sac, stomach, omentum, small bowel
 Posterior: T12-L4, left lumbar veins

INFERIOR VENA CAVA



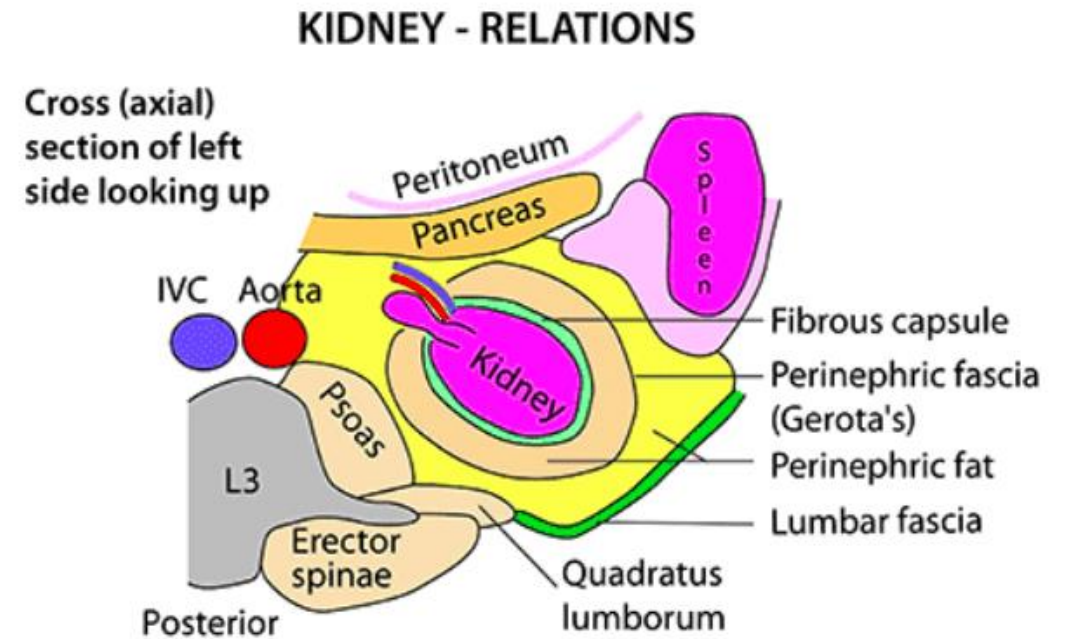
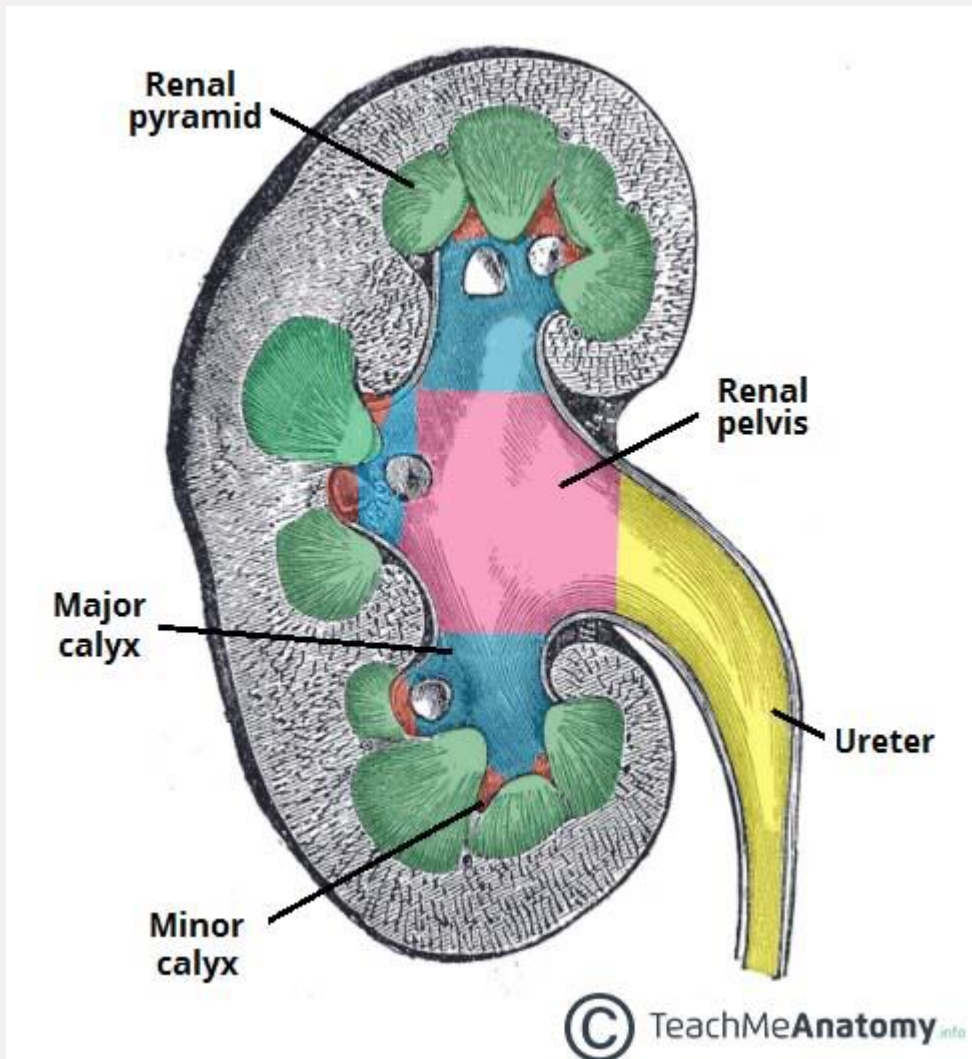
Relations of IVC

Anterior: Bile duct, liver, opening of lesser sac, 1st/3rd parts of duodenum, head of pancreas, small bowel, right common iliac artery, root of mesentery, right gonadal artery, portal vein
 Posterior: Right renal artery, lumbar arteries, right crus of diaphragm, right suprarenal & its artery, bodies of L3,4,5, right psoas, right sympathetic chain, right coeliac ganglion
 Note: NO tributaries from gut



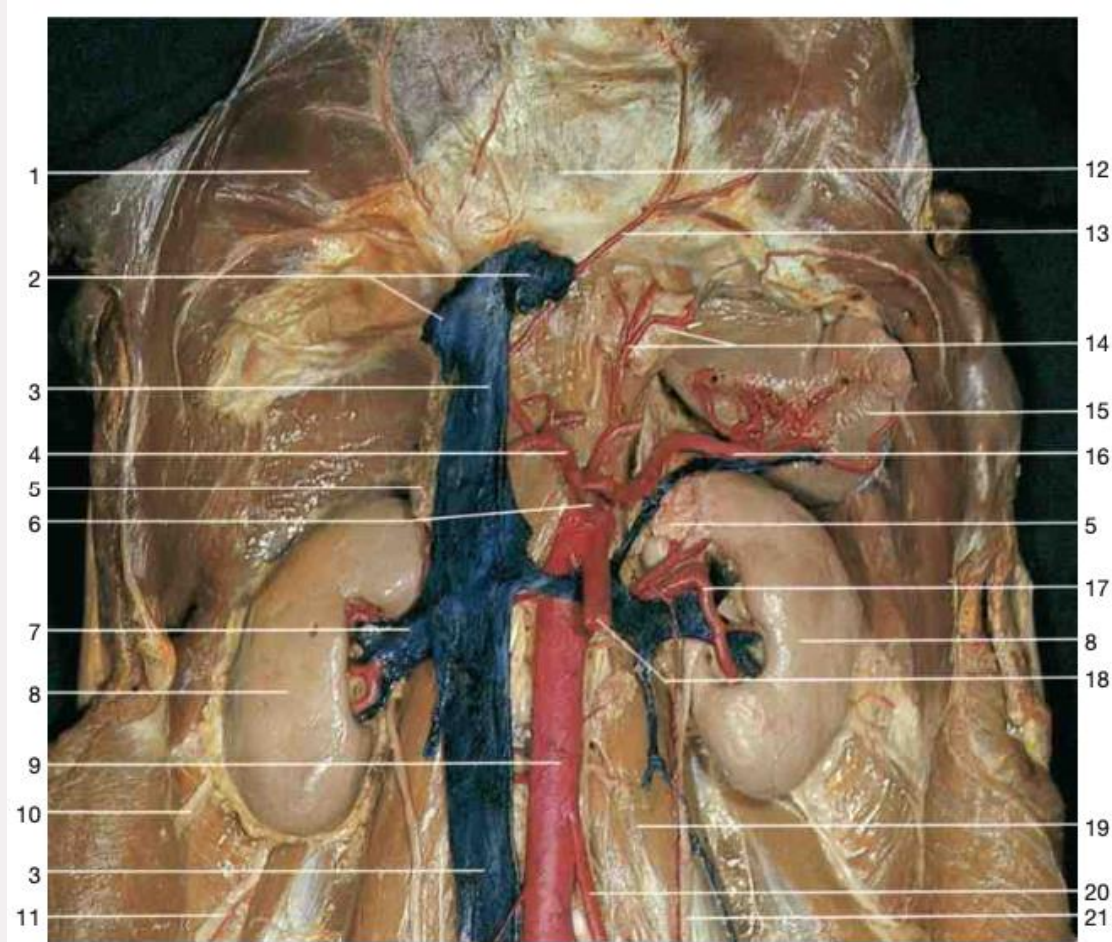
Vessels and nerves of posterior abdominal wall (anterior aspect). Part of the left psoas major muscle has been removed to display the lumbar plexus. Red = arteries; blue = veins.

The Kidneys



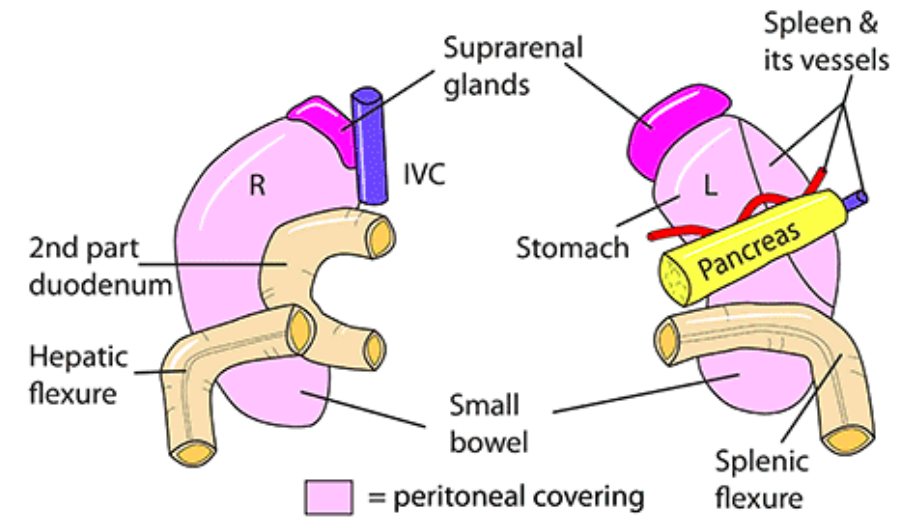
Note: The perinephric fascia is attached around the renal pelvis but is open inferiorly so that pus or extravasated urine can track down alongside the ureter.
Kidneys move 3-4cm on respiration

The Kidneys: Relation

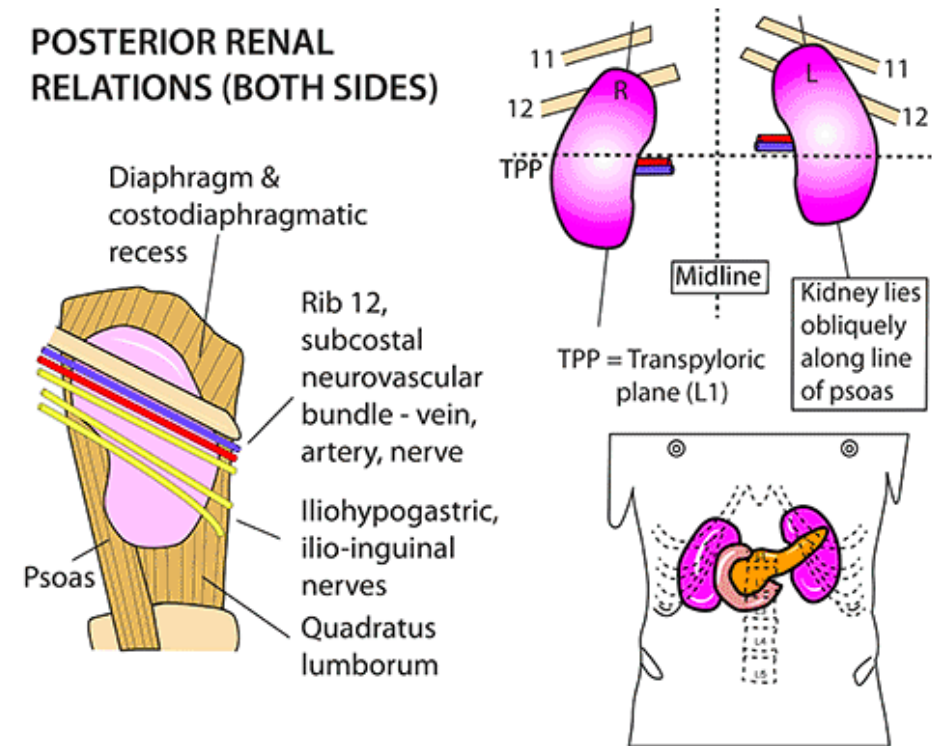


Retroperitoneal organs, kidneys, and suprarenal glands in situ (anterior aspect).
Red = arteries; blue = veins.

ANTERIOR RELATIONS OF KIDNEYS



POSTERIOR RENAL RELATIONS (BOTH SIDES)



The Urinary system

URETER

25cm long. From kidney to bladder

Posterior relations: Psoas, genitofemoral nerve, sacroiliac joint, common iliac artery bifurcation

Anterior relations: **Right-** Duodenum, right gonadal artery, right colic artery, ileal mesentery, superior mesenteric artery. **Left-** Left gonadal artery, left colic artery, sigmoid mesentery

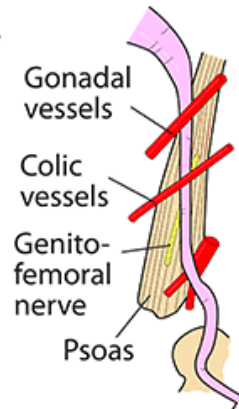
Passes under: Vas, uterine artery

Related to: Lateral fornix of vagina in females

Blood supply: Renal, gonadal, vesical. Smaller branches from aorta, common iliac & vaginal arteries

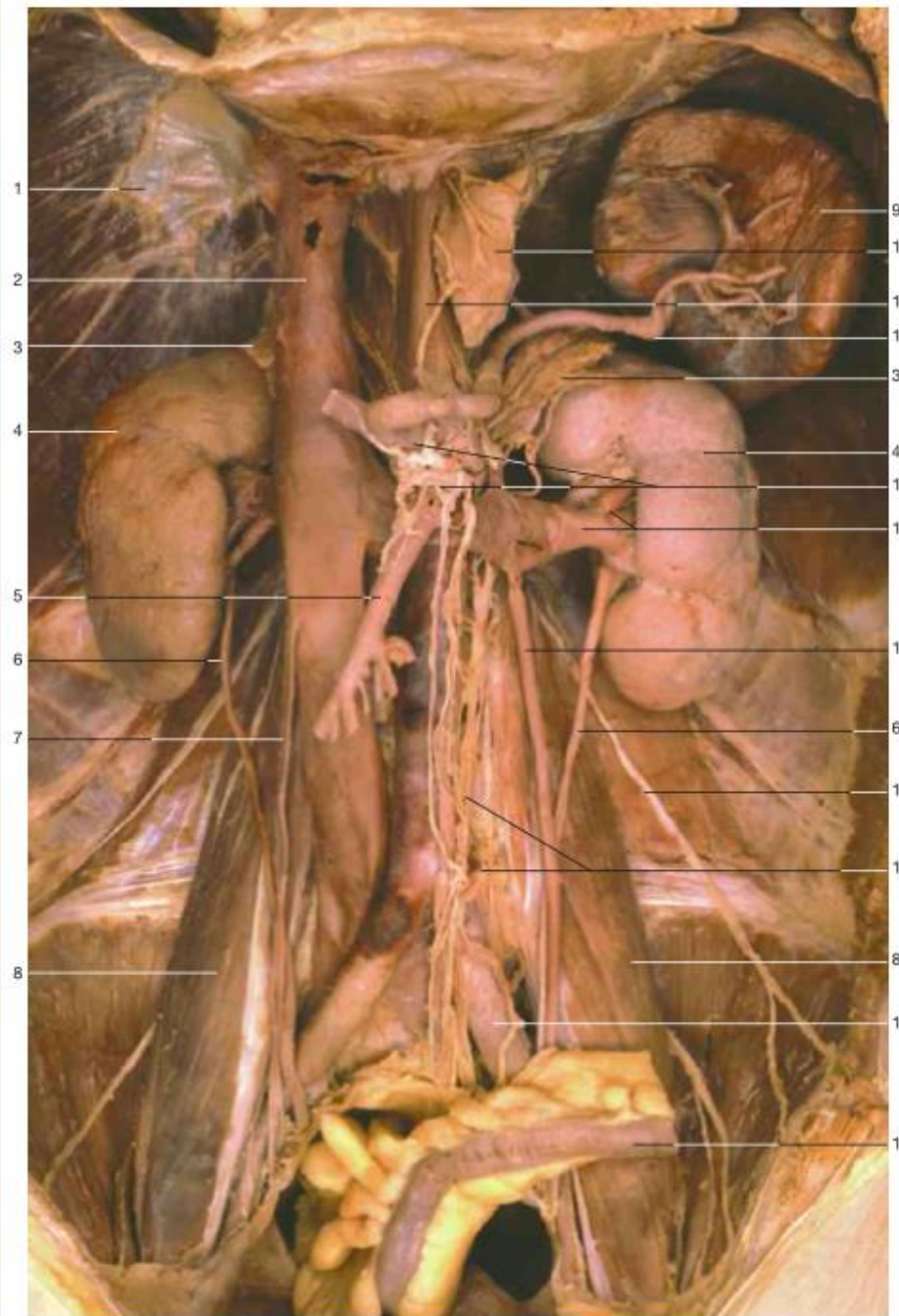
Nerves: General visceral afferents for pain & sympathetics probably for vasoconstriction only

Points of potential hold up: Pelviureteric junction, pelvic brim, ureterovesical junction

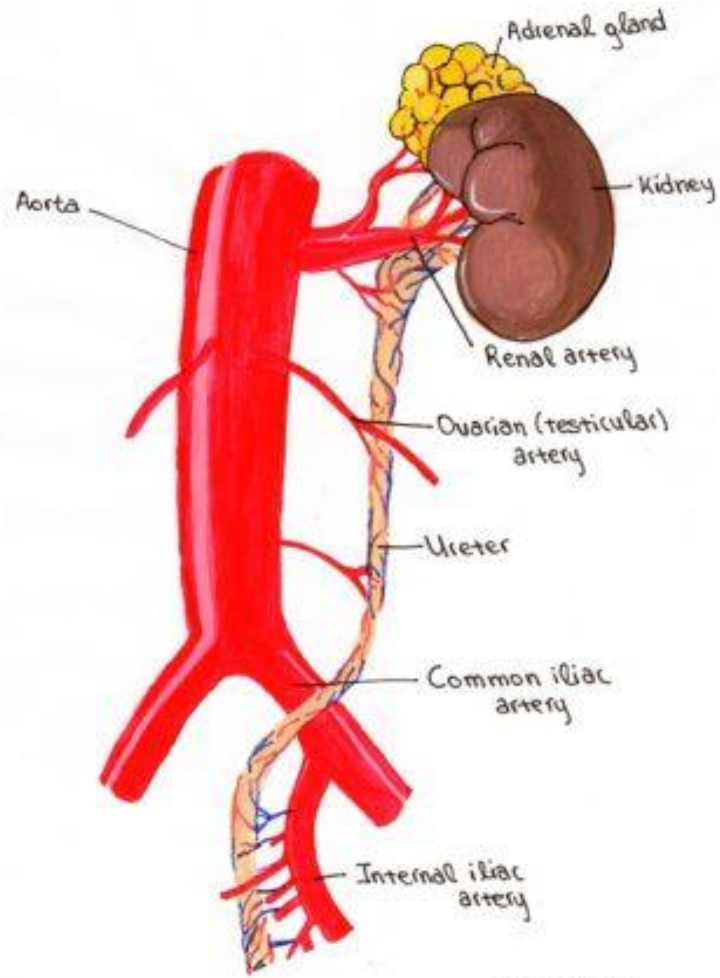


It is recognisable as it:

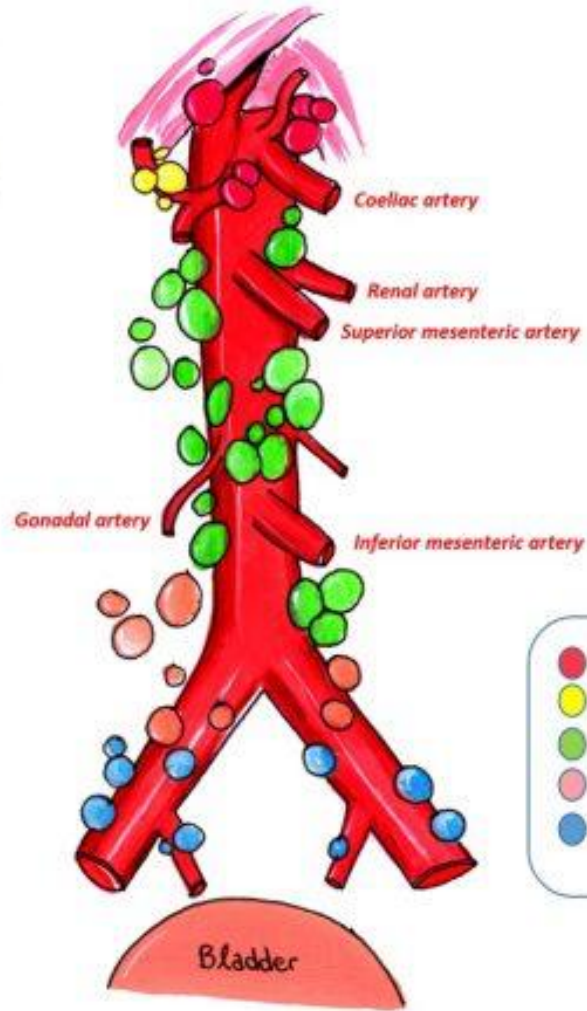
- Is the most superficial structure in the pelvis
- Shows peristalsis
- Sticks to the posterior surface of the peritoneum
- Passes around the pelvic brim to 1cm short of the ischial spine then swings medially.
- Enters the bladder at the level of the pubic tubercle on a plain abdominal X-ray
- Right ureter may be irritated by an inflamed appendix
- Pain is referred to loin, groin & tip of penis



Retroperitoneal organs, urinary system in situ (anterior aspect). The peritoneum has been removed. Note the autonomic plexus and ganglia at the abdominal aorta.

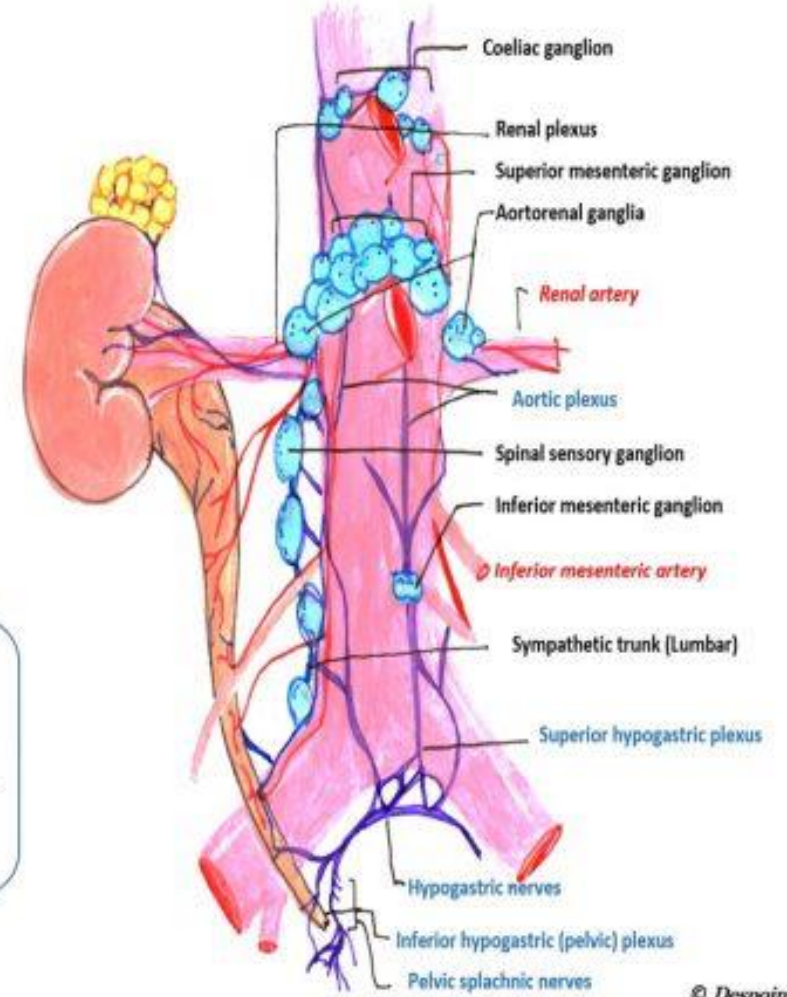


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- Coeliac nodes
- Hepatic nodes
- Lumbar nodes
- Common iliac nodes
- External & internal iliac nodes

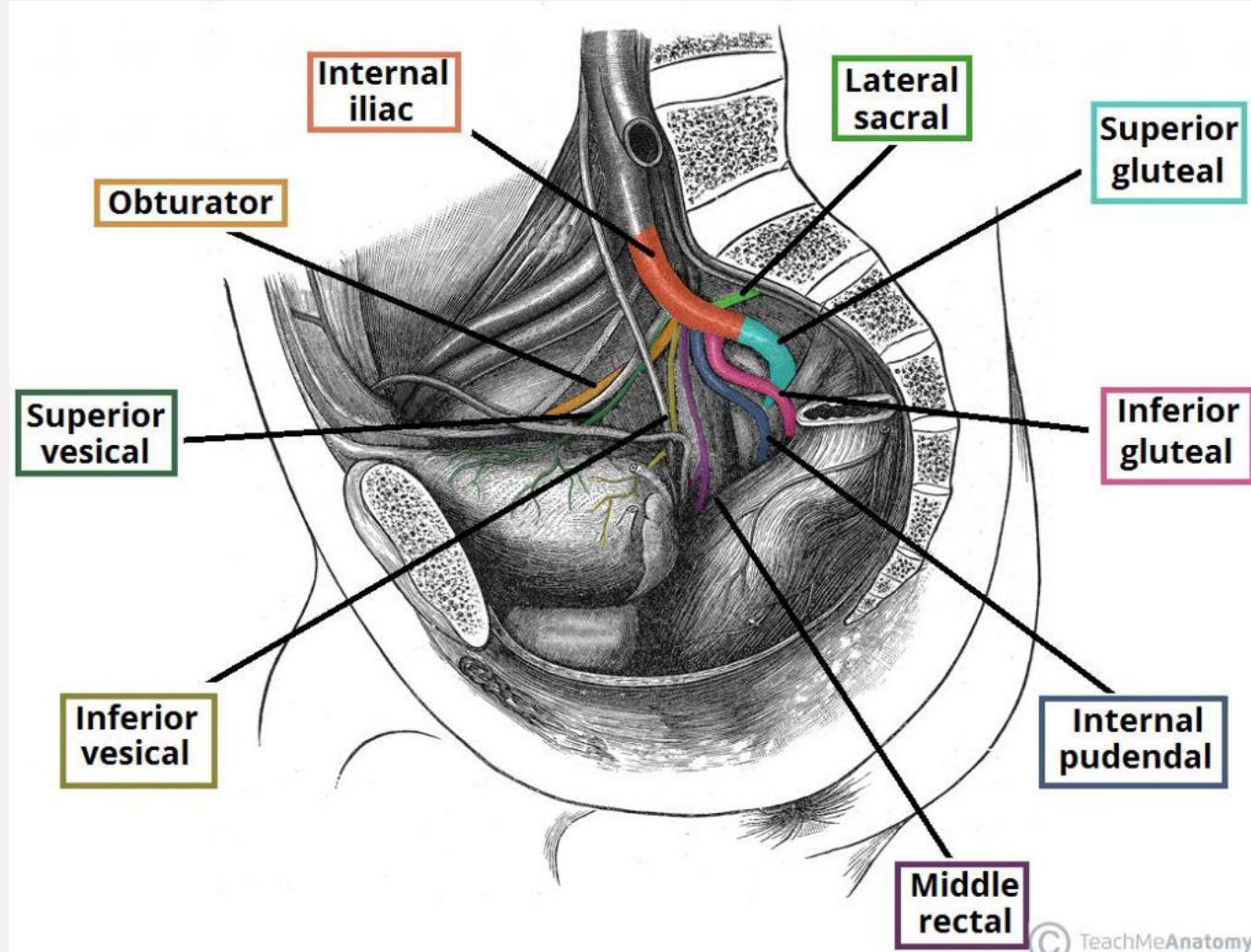
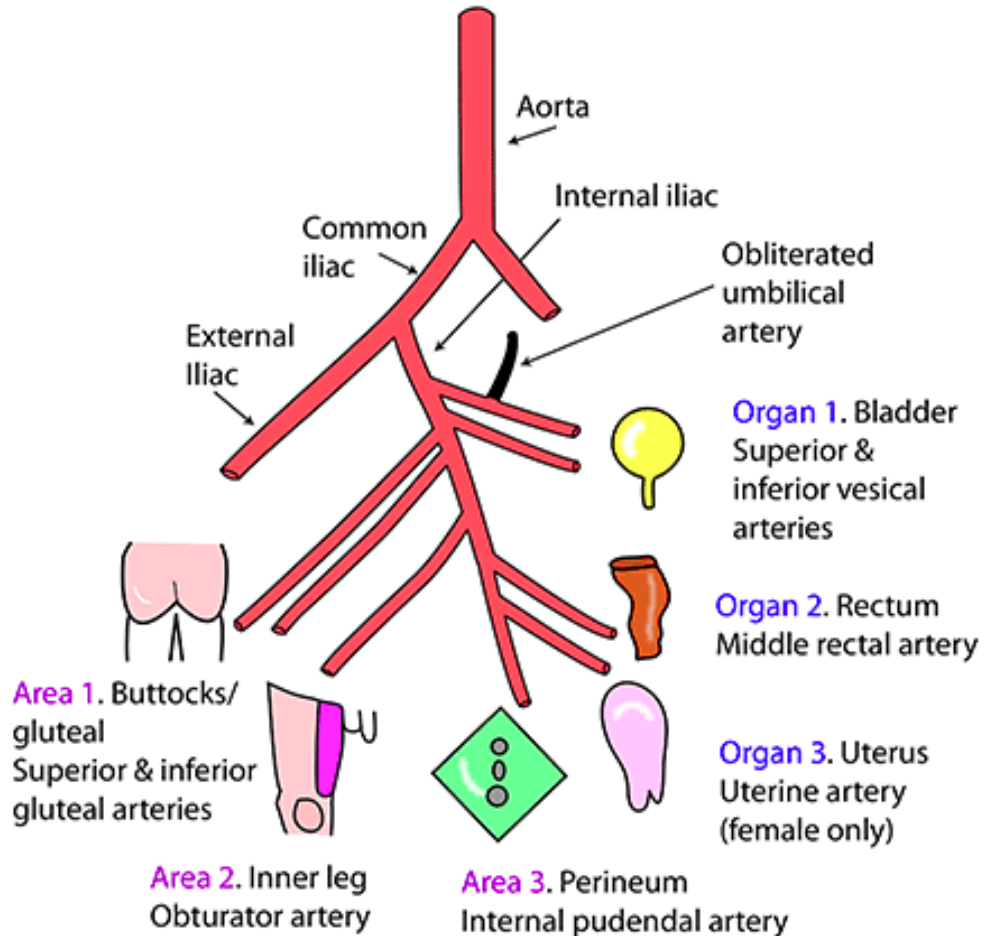
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Internal Iliac Artery and Branches

BRANCHES OF THE INTERNAL ILIAC ARTERY



The Posterior abdominal wall

POSTERIOR ABDOMINAL WALL

- 5 vertebrae
- Transverse process of L3 is largest
- Transverse process of L5 is conical

PSOAS MAJOR

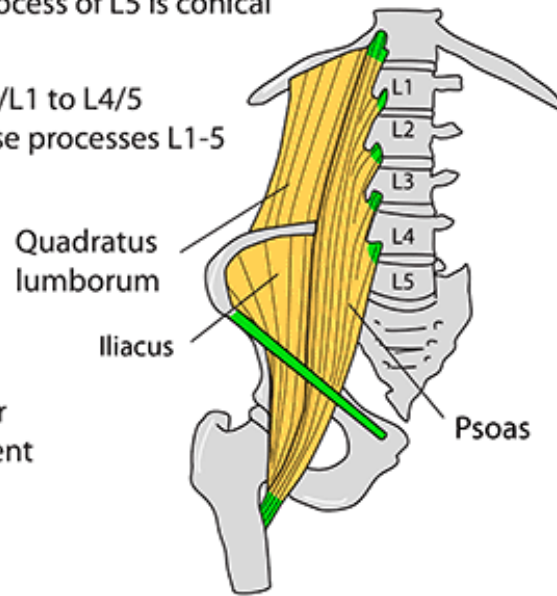
Origin: Intervertebral discs T12/L1 to L4/5
Bodies of L1-5, transverse processes L1-5
Inserts: Lesser trochanter
Nerve: L1,2,3
Action: Flexes hip

PSOAS MINOR (not shown)

Origin: Bodies T12,L1
Inserts: Fascia over psoas major
behind inguinal ligament
Nerve: L1
Action: Weak spine flexor

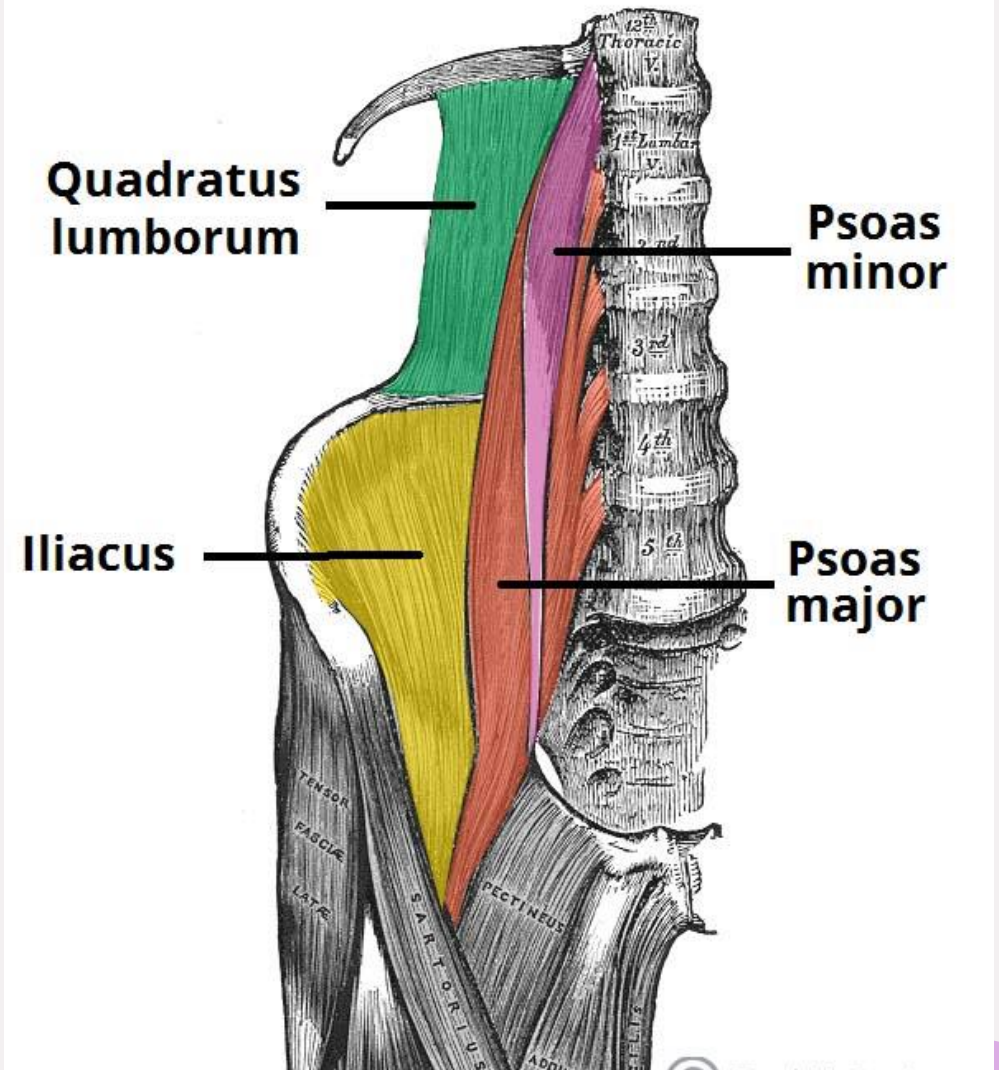
QUADRATUS LUMBORUM

Origin: Transverse process L5
Iliolumbar ligament &
posterior 1/3 iliac crest
Inserts: Medial 1/2 12th rib &
transverse process L1-4
Nerve: T12-L4
Action: Holds down 12th rib



ILIACUS

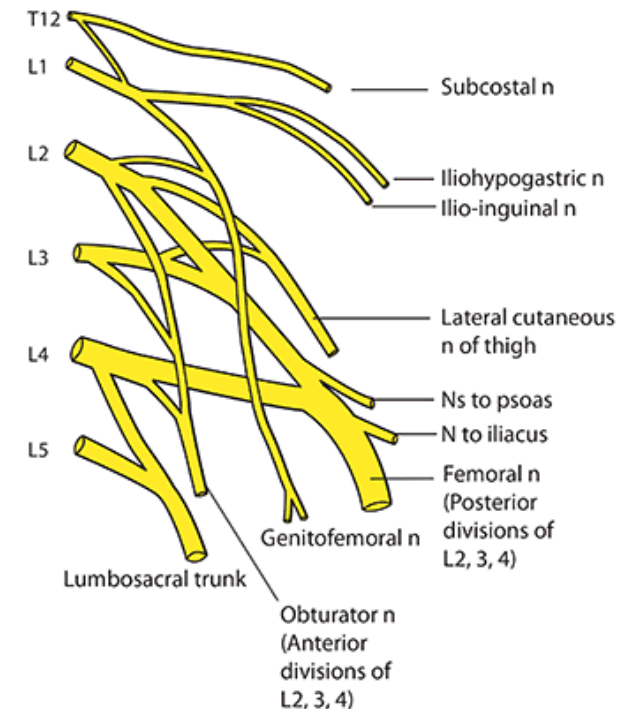
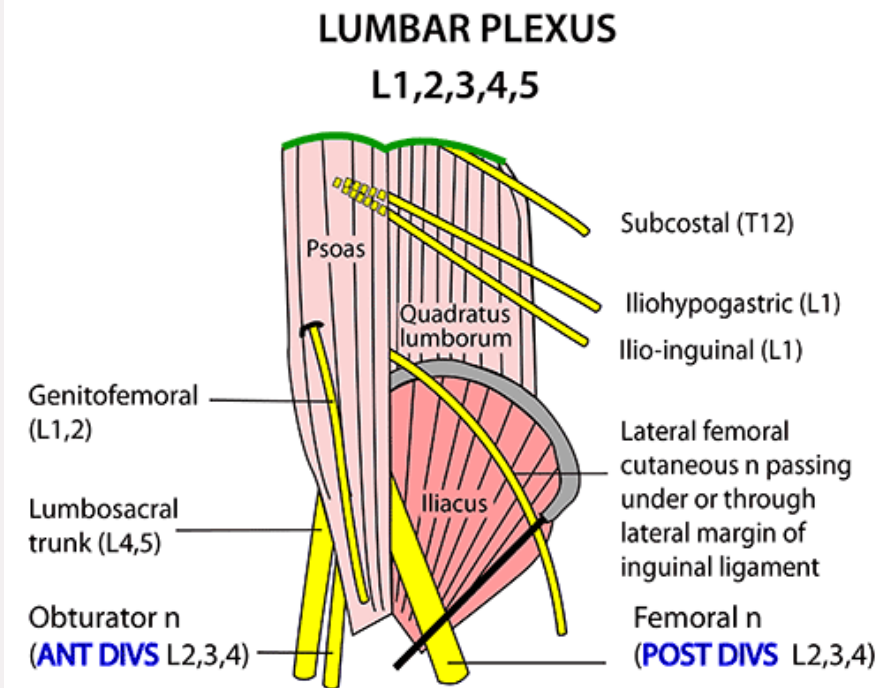
Origin: Hollow of iliac fossa
Inserts: Psoas tendon &
below lesser trochanter
Action: Flexes hip
Nerve: Femoral (L2,3,4)



The Lumbar Plexus

I, I Get Leftovers On Fridays

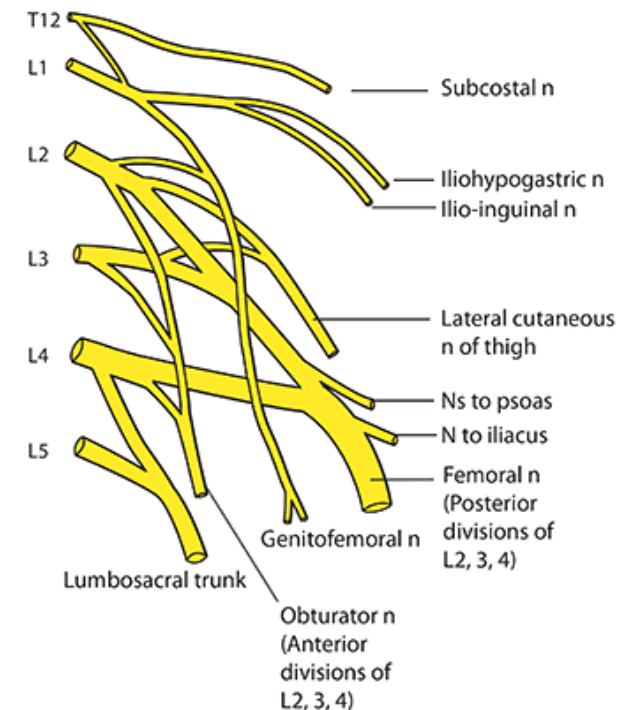
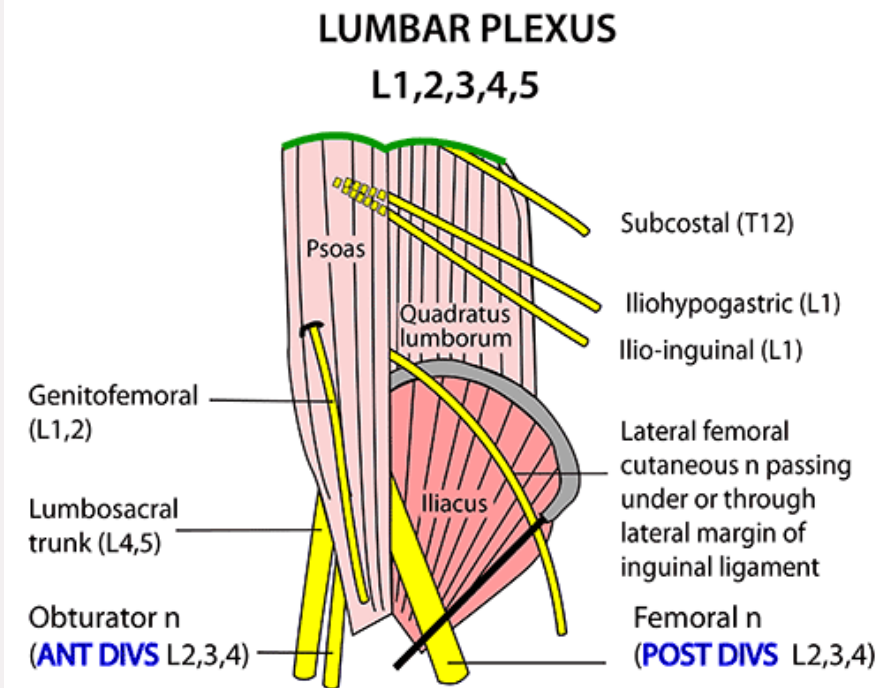
- **Iliohypogastric** (L1 with contributions from T12)
 - Motor: Internal oblique, transversus abdominus
 - Sensory: lateral gluteal and hypogastric region
- **Ilioinguinal** (L1)
 - Motor: Internal oblique and transversus abdominus
 - Sensory: superior antero-medial thigh
 - Males: root of the penis, anterior scrotum
 - Females: mons pubis and labia majora
- **Genitofemoral** (L1, L2)
 - Motor: Genital branch innervates the cremasteric muscle
 - Sensory: Genital – same distribution as ilioinguinal. Femoral – upper anterior thigh.



The Lumbar Plexus

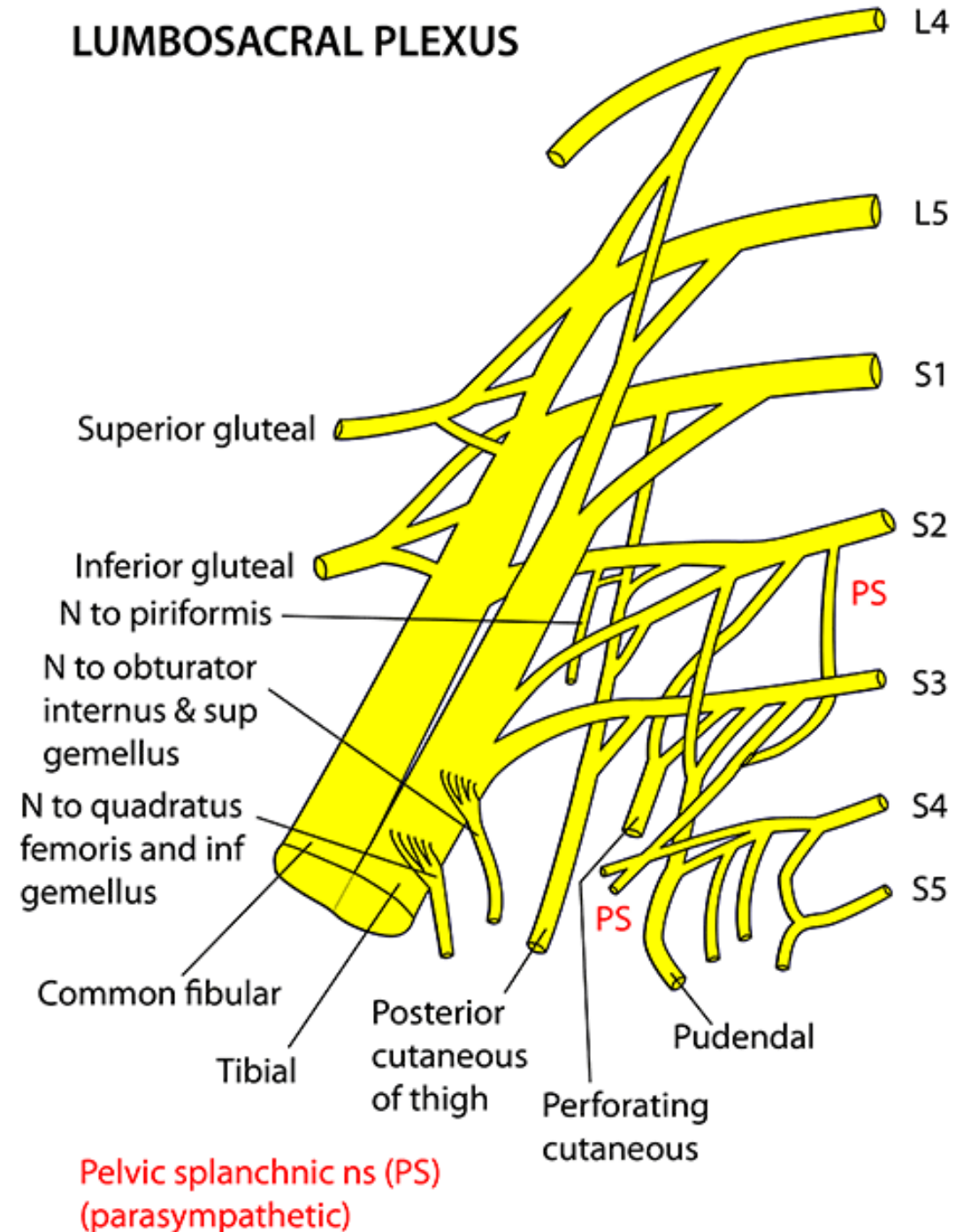
I, I Get Leftovers On Fridays

- **Lateral cutaneous nerve of the thigh (L2,L3)**
 - Motor: None
 - Sensory: Anterior and lateral thigh down to the knee
- **Obturator nerve (L2, L3, L4)**
 - Motor: Adductor group of the thigh (obturator externus, adductor longus, adductor brevis, adductor magnus, gracilis)
 - Sensory: Medial thigh
- **Femoral nerve (L2, L3, L4)**
 - Motor: Anterior muscles of the thigh (iliacus, pectineus, sartorius, quadriceps femoris)
 - Sensory: Anterior thigh, medial leg



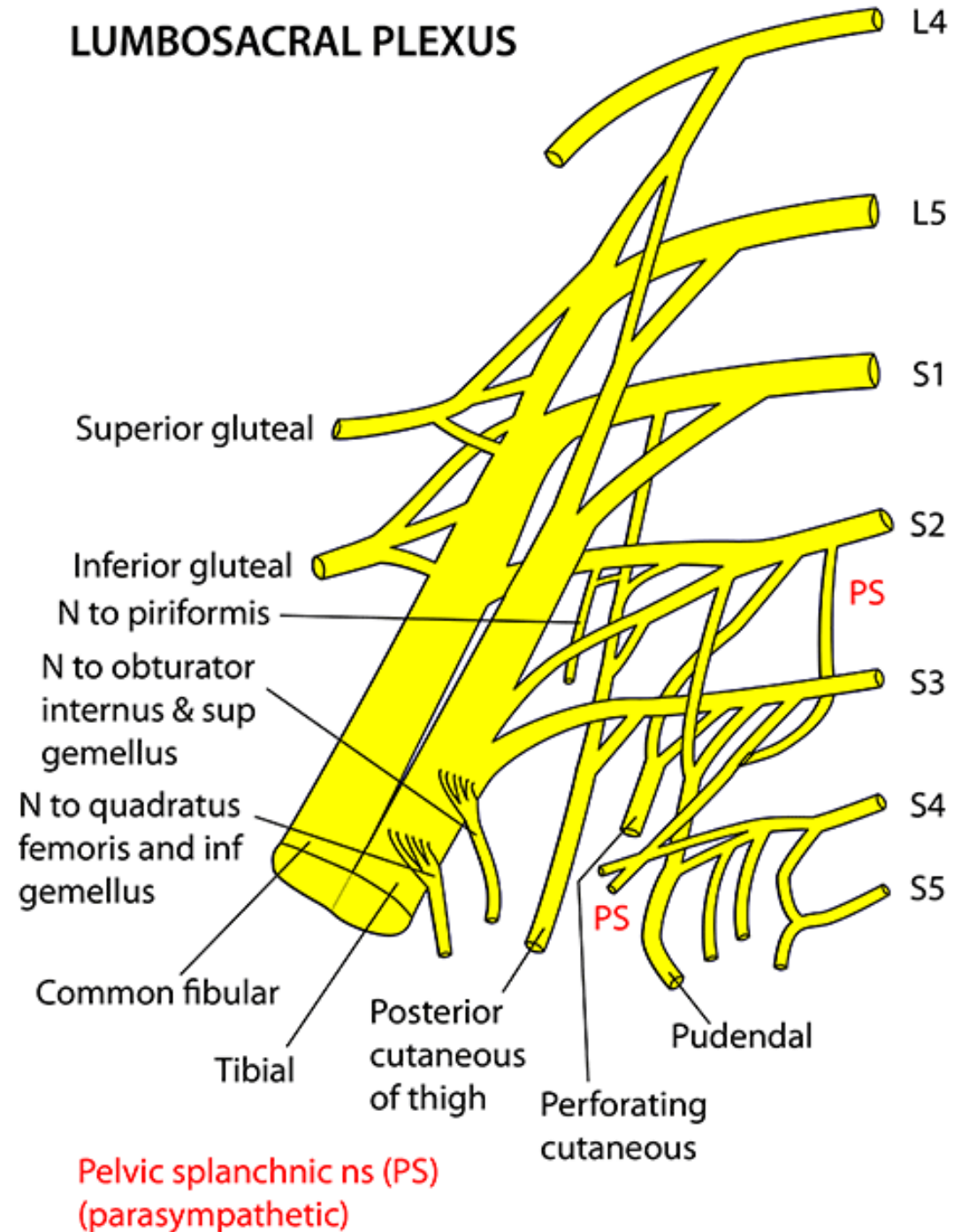
The Sacral Plexus

- Lies on the posterior wall of pelvis, deep to the vessels, covered by pelvic parietal fascia
- *Some Irish Sailor Pestors Polly'*
- **Superior Gluteal Nerve** (L4, L5, S1)
 - Motor: Gluteus minimus, gluteus medius, tensor fascia lata
 - Sensory: None
- **Inferior Gluteal Nerve** (L5, S1, S2)
 - Motor: Gluteus maximus
 - Sensory: None

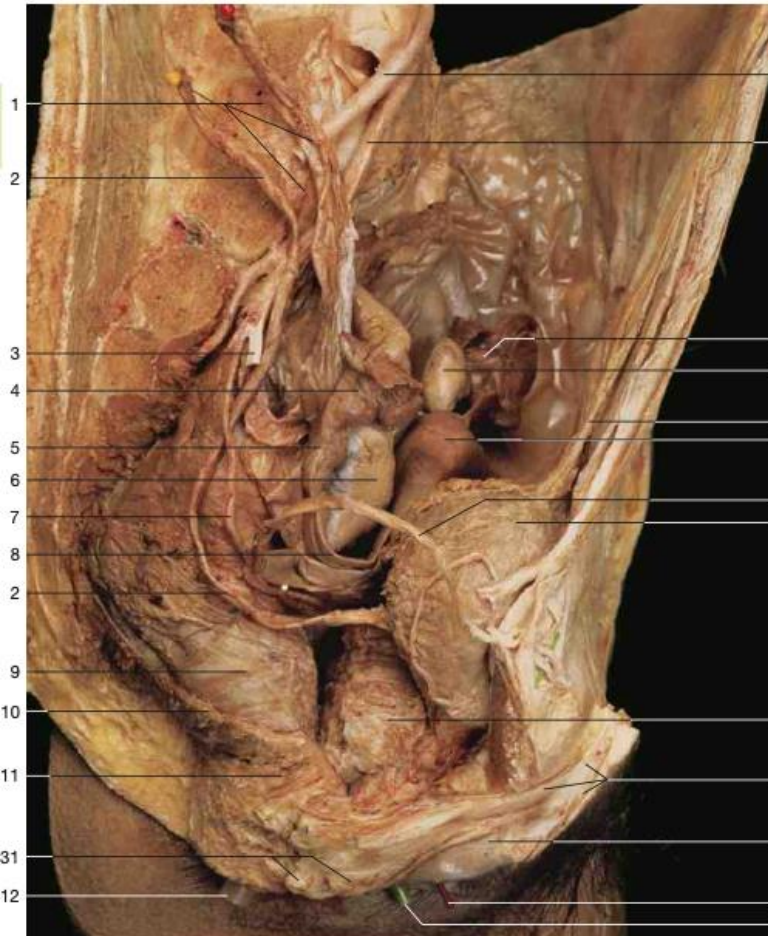


The Sacral Plexus

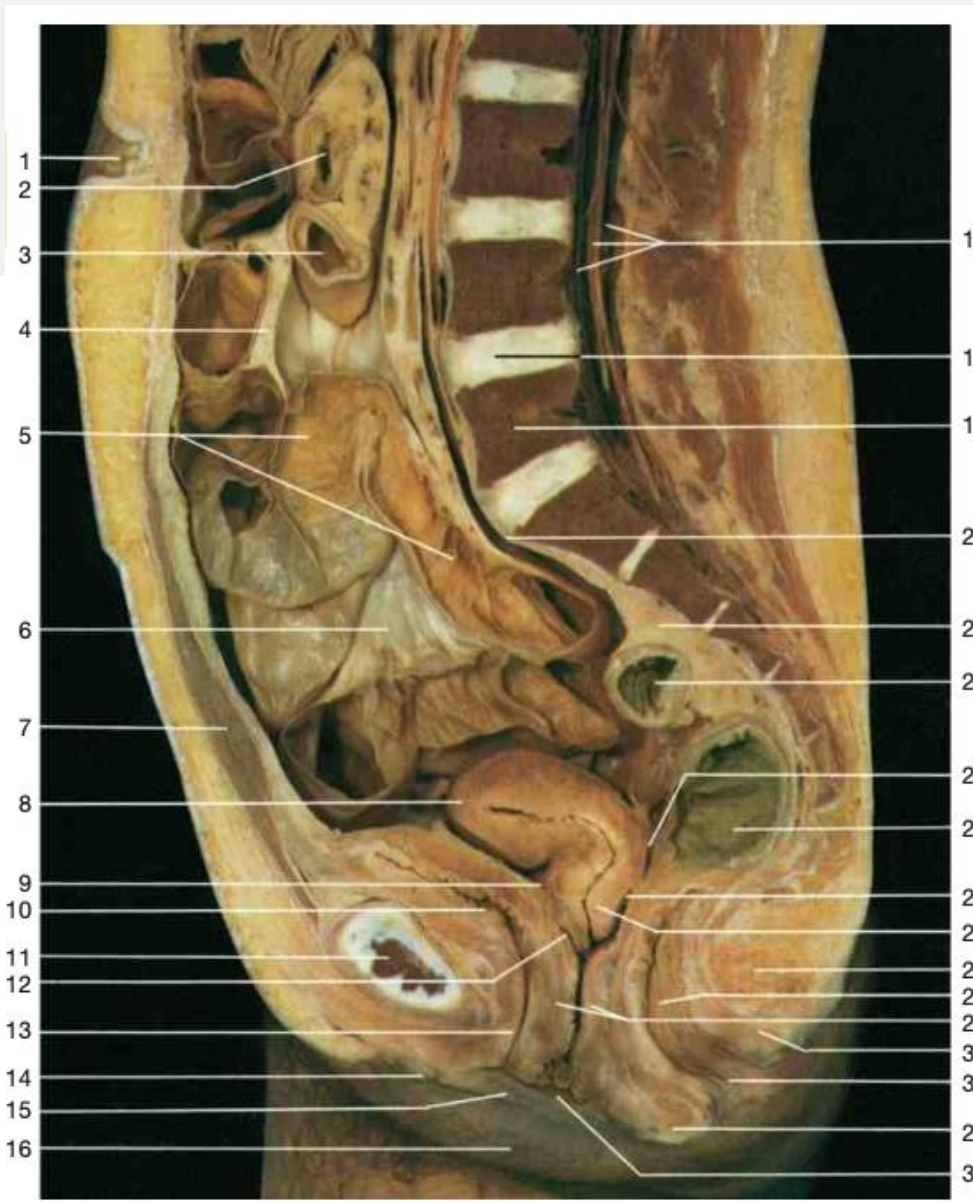
- *Some Irish Sailor Pestors Polly'*
- **Sciatic Nerve** (L4, L5, S1, S2, S3)
 - Motor:
 - Tibial: Posterior compartment of the, posterior leg and sole of the foot.
 - Common fibular: short head biceps fem. Anterior and lateral leg and extensor digitorum brevis.
 - Sensory:
 - Tibial
 - Common FibularNone
- **Posterior Femoral Cutaneous Nerve** (S1, S2, S3)
 - Motor: None
 - Sensory: posterior thigh and leg, the perineum
- **Pudendal Nerve** (S2, S3, S4)
 - Motor: skeletal muscles of the perineum, external urethral sphincter, externa anal sphincter, levator ani
 - Sensory: penis, clitoris, most of the perineum



Female Pelvis



- 1 Body of fifth lumbar vertebra, suspensory ligament of ovary, and sacral promontory
- 2 Ureter
- 3 Medial umbilical ligament (remnant of umbilical artery) (cut)
- 4 Infundibulum of uterine tube
- 5 Ampulla of uterine tube
- 6 Ovary
- 7 Uterine artery
- 8 Uterine tube
- 9 Rectum
- 10 Levator ani muscle (pelvic diaphragm – cut edge)
- 11 External anal sphincter muscle
- 12 Anus (probe)
- 13 Internal iliac artery
- 14 Remnant of urachus (median umbilical ligament)
- 15 Uterus
- 16 Round ligament of uterus
- 17 Urinary bladder
- 18 Vagina
- 19 Clitoris
- 20 Labium minus
- 21 External orifice of urethra (red probe)
- 22 Vaginal orifice (green probe)
- 23 Lateral umbilical ligament
- 24 Inferior epigastric artery
- 25 Obturator artery, vein, and nerve
- 26 External iliac artery
- 27 Recto-uterine pouch (of Douglas)
- 28 Recto-uterine fold
- 29 Vesico-uterine pouch
- 30 Suspensory ligament of ovary
- 31 Greater vestibular gland and bulb of the vestibule



Female urogenital system, midsagittal section through the trunk. The urinary bladder is empty, position and shape of the uterus are normal.

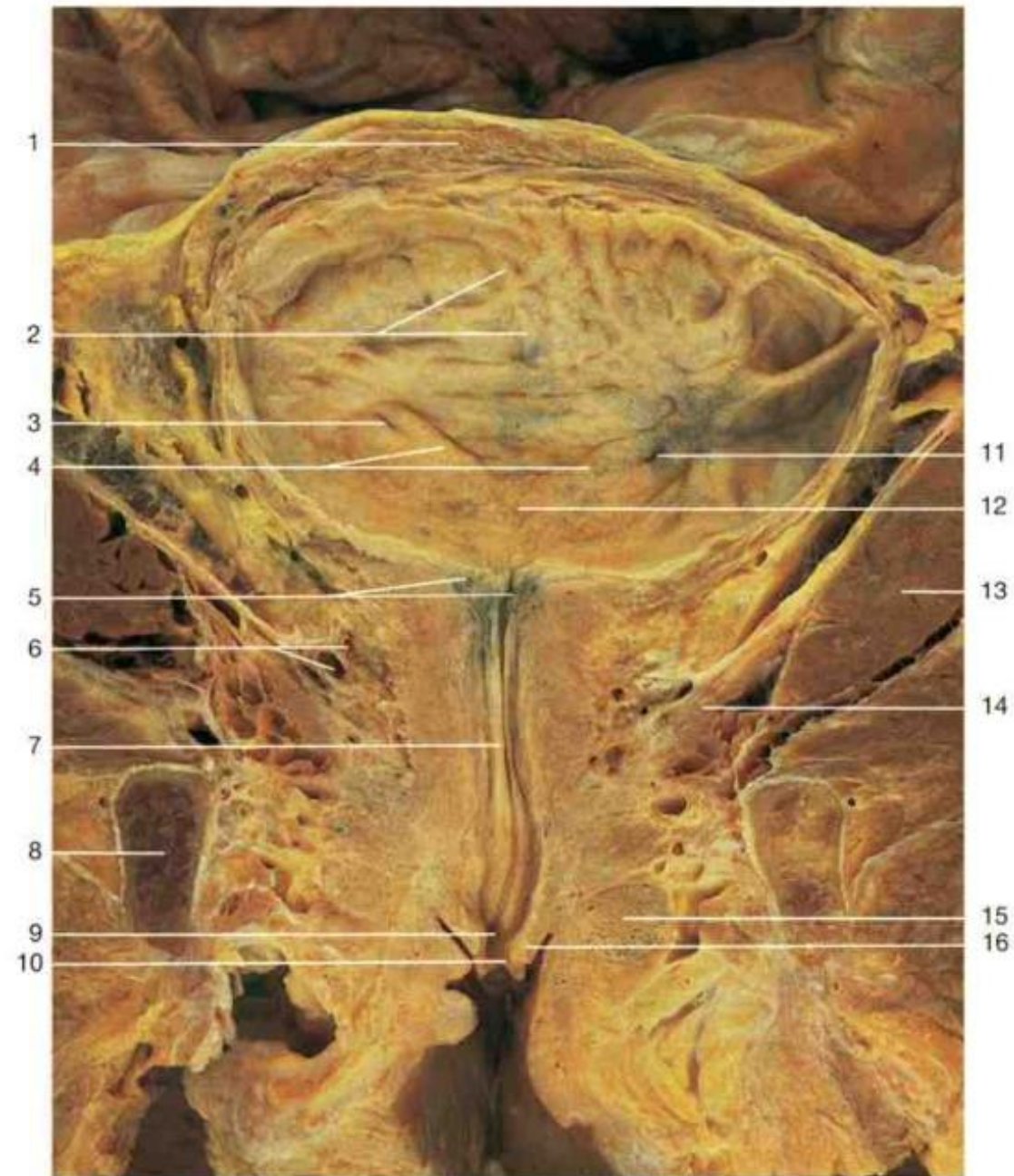
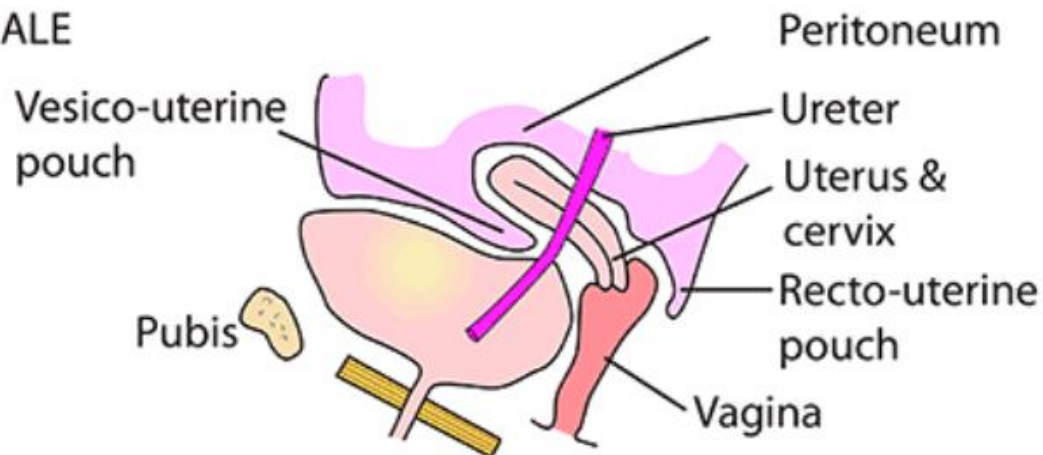
- 1 Umbilicus
- 2 Duodenum
- 3 Ascending part of duodenum
- 4 Root of mesentery
- 5 Small intestine
- 6 Mesentery
- 7 Rectus abdominis muscle
- 8 Uterus
- 9 Vesico-uterine pouch
- 10 Urinary bladder (collapsed)
- 11 Pubic symphysis
- 12 Anterior fornix of vagina
- 13 Urethra
- 14 Clitoris
- 15 Labium minus
- 16 Labium majus
- 17 Vertebral canal with cauda equina
- 18 Intervertebral disc
- 19 Body of fifth lumbar vertebra
- 20 Sacral promontory
- 21 Mesosigmoid
- 22 Sigmoid colon
- 23 Recto-uterine pouch (of Douglas)
- 24 Ampulla of rectum
- 25 Posterior fornix of vagina
- 26 Cervix of uterus
- 27 External anal sphincter muscle
- 28 Anal canal
- 29 Vagina
- 30 Internal anal sphincter muscle
- 31 Anus
- 32 Hymen
- 33 Left ureter
- 34 Peritoneum (cut edge)
- 35 Right ureter (divided)
- 36 Median umbilical fold with urachus
- 37 Infundibulum of uterine tube
- 38 Fimbriae of uterine tube
- 39 Ovary
- 40 Uterine tube (isthmus)
- 41 Round ligament of uterus

Pelvic cavity in the female, internal genital organs in situ (lateral aspect). Right half of the pelvis and sacrum have been removed.

Female Genitourinary system

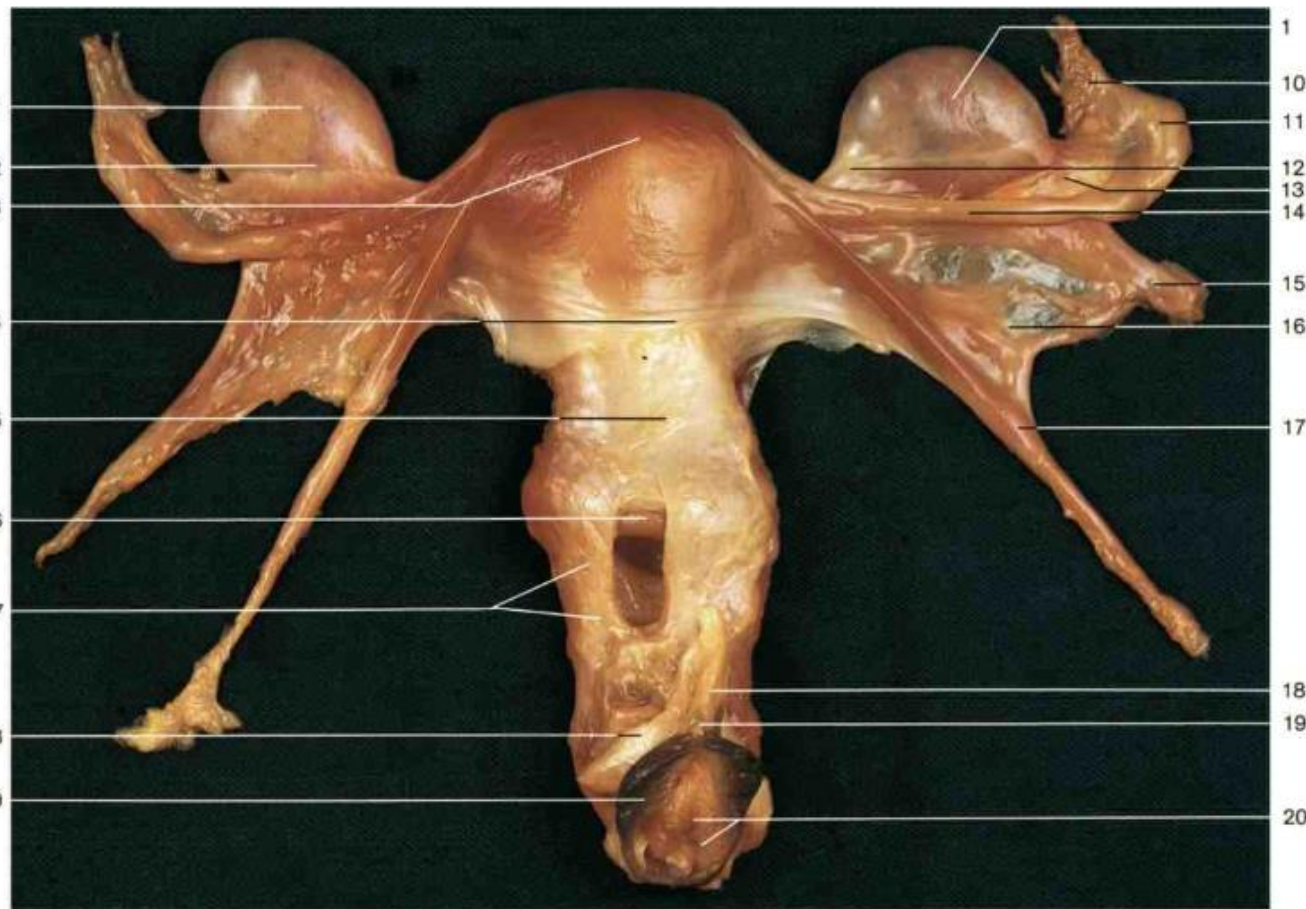
- 1 Muscular coat of urinary bladder
- 2 Folds of mucous membrane of urinary bladder
- 3 Right ureteric orifice
- 4 Interureteric fold
- 5 Internal urethral orifice
- 6 Vesico-uterine venous plexus
- 7 Urethra
- 8 Pubic bone (cut edge)
- 9 External urethral orifice
- 10 Vestibule of vagina
- 11 Left ureteric orifice
- 12 Trigone of bladder
- 13 Obturator internus muscle
- 14 Levator ani muscle
- 15 Bulb of the vestibule
- 16 Left labium minus
- 17 Psoas major muscle
- 18 Ampulla of rectum
- 19 Uterus
- 20 Urinary bladder
- 21 Promontory
- 22 Sigmoid colon
- 23 Uterine tube
- 24 Head of femur
- 25 Vagina

SAGITTAL VIEW OF FEMALE



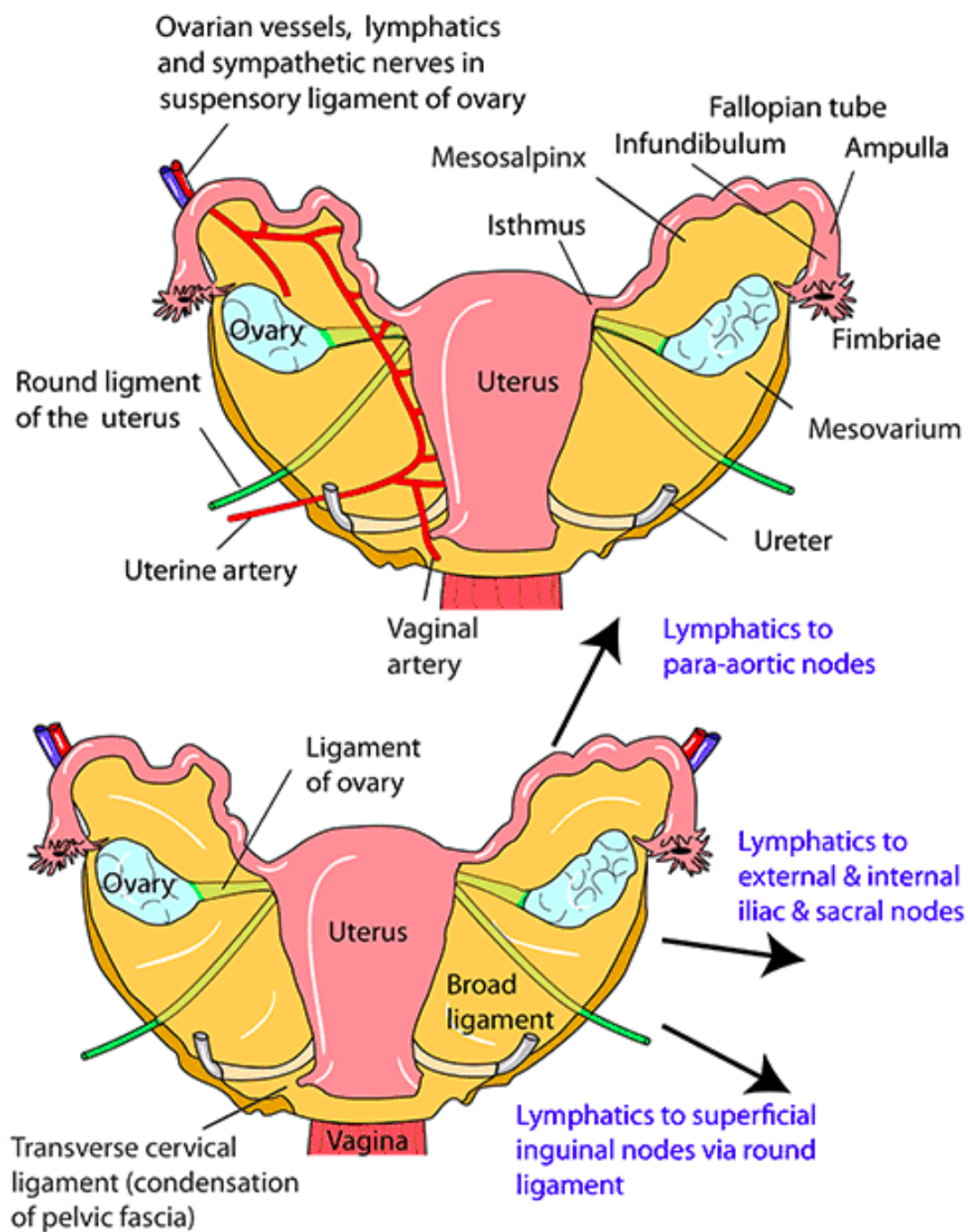
Coronal section through the female urinary bladder and urethra (anterior aspect).

Female: Internal pelvic organs

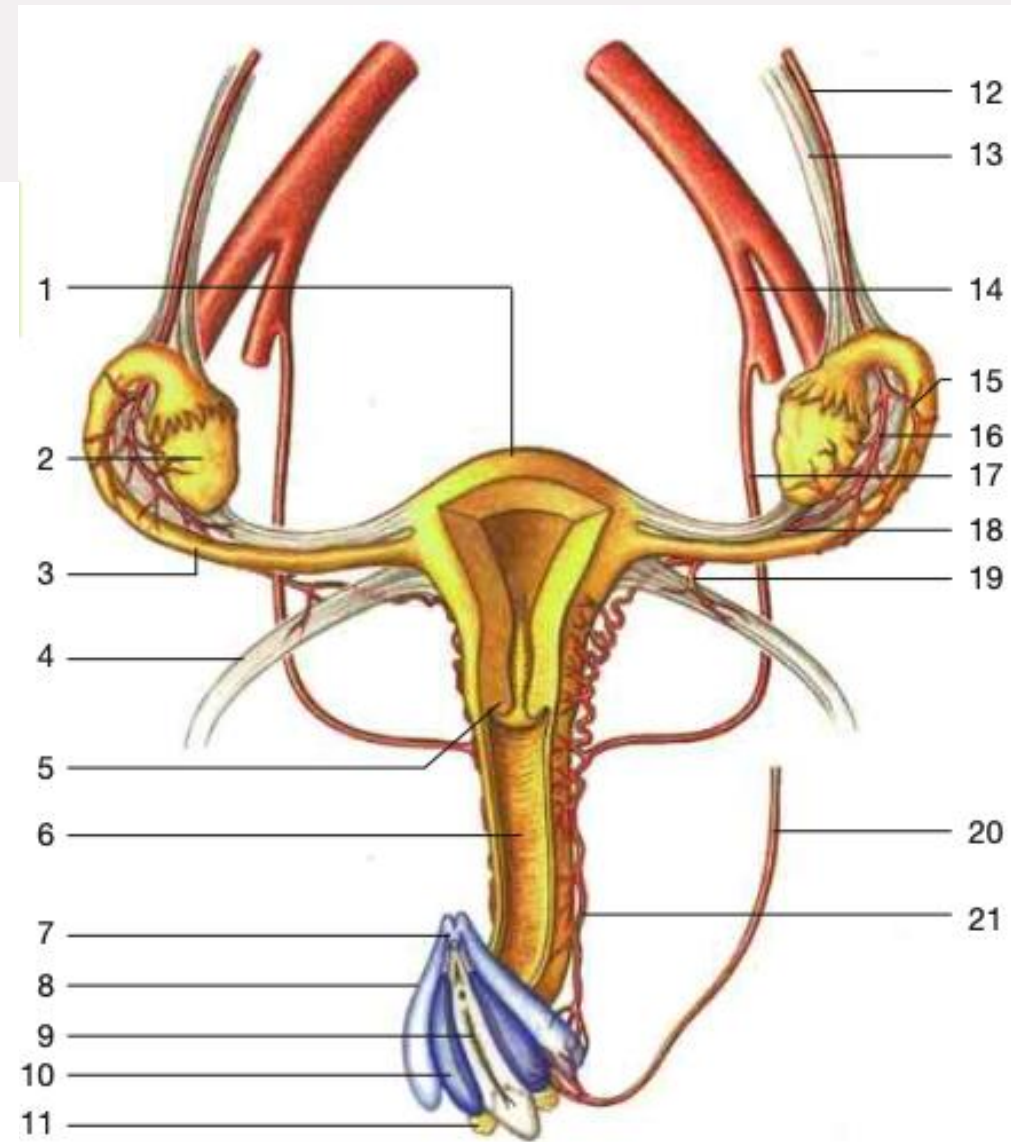
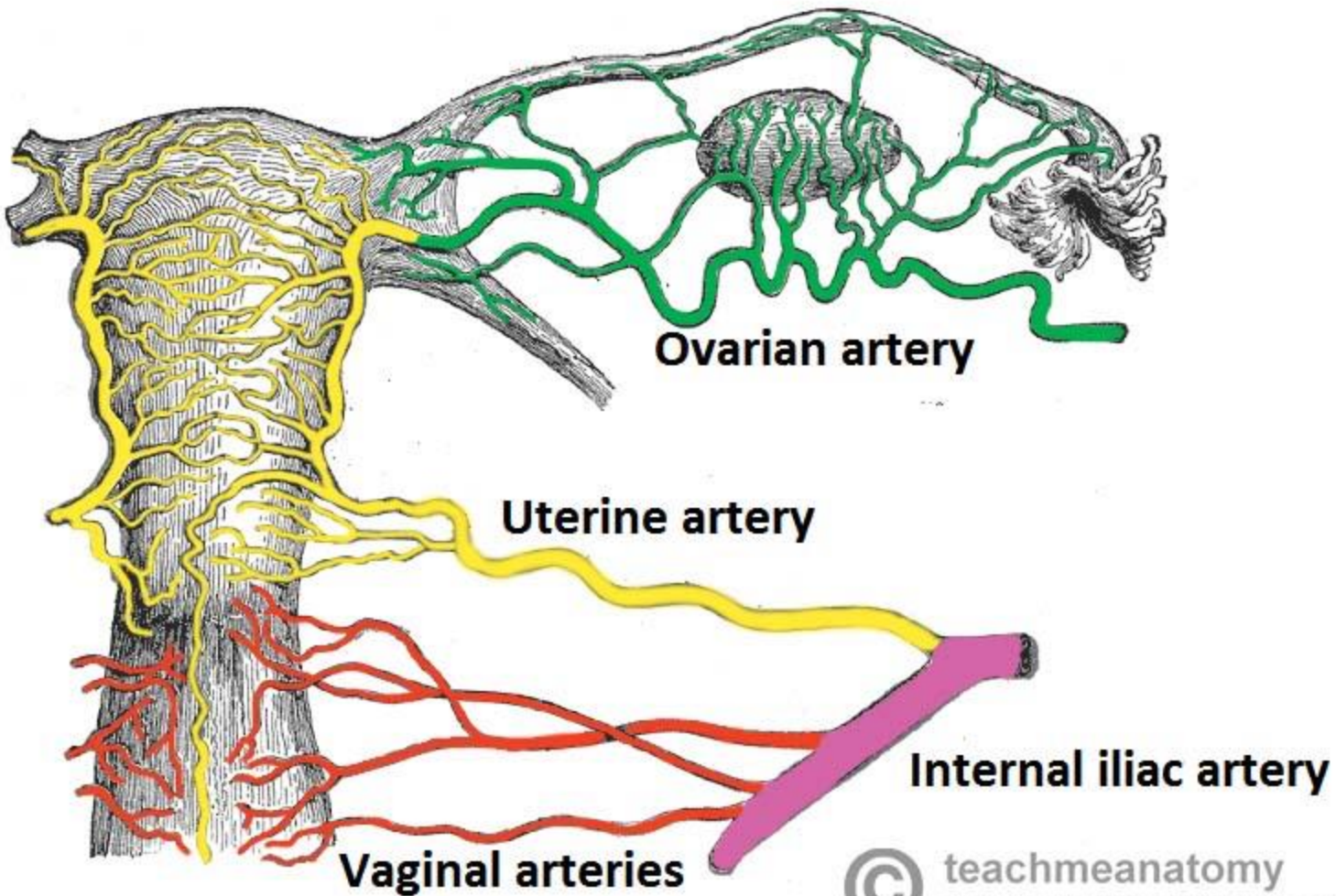


Female genital organs, isolated (anterior aspect). The anterior wall of the vagina has been opened to display the vaginal portion of the cervix.

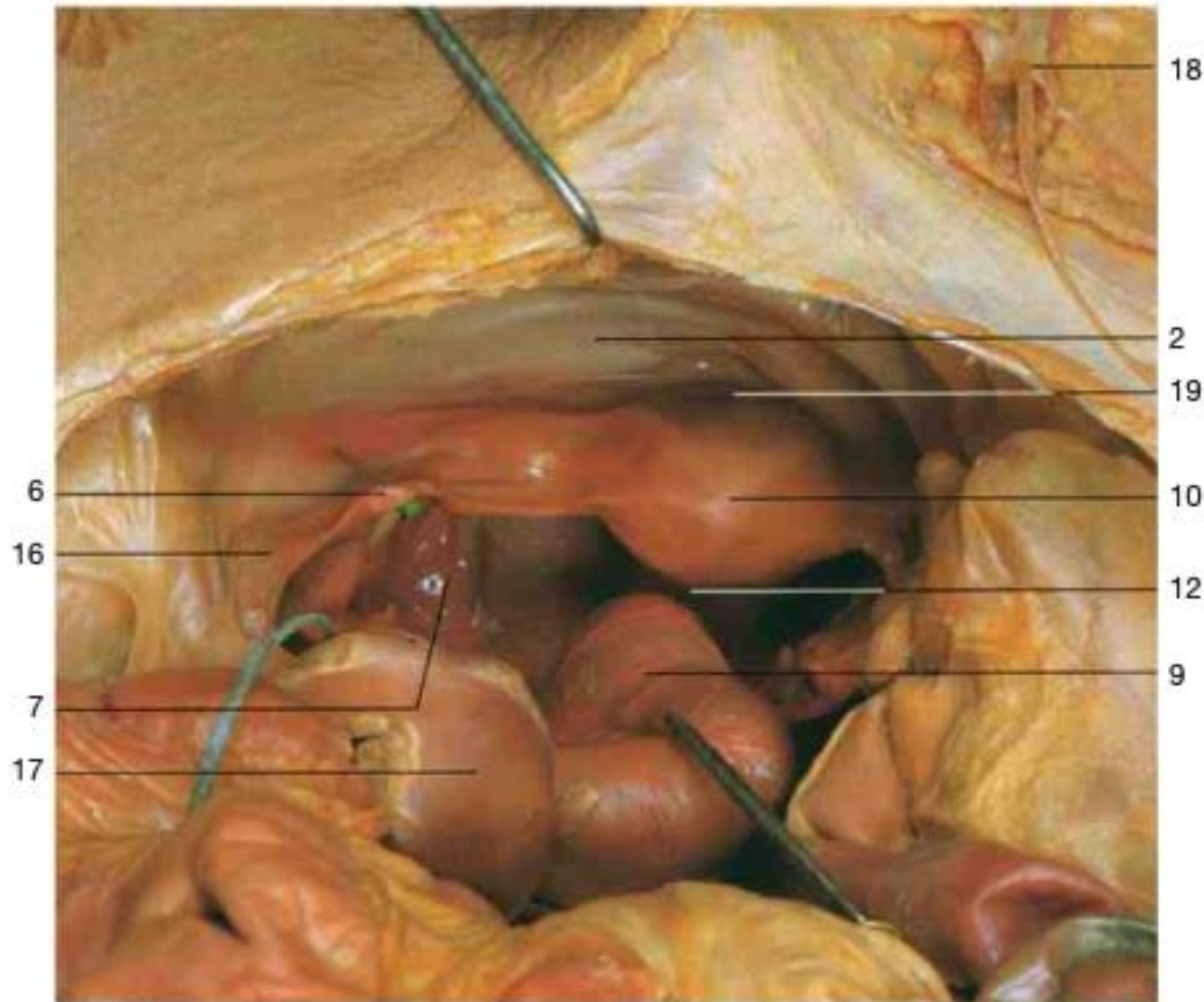
POSTERIOR ASPECT OF BROAD LIGAMENT



Arterial Supply



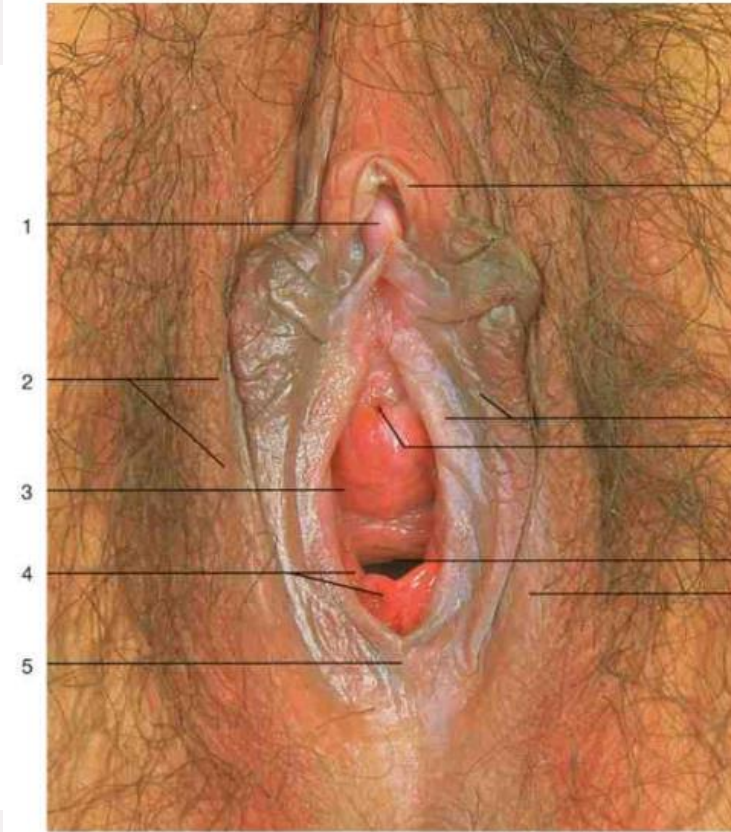
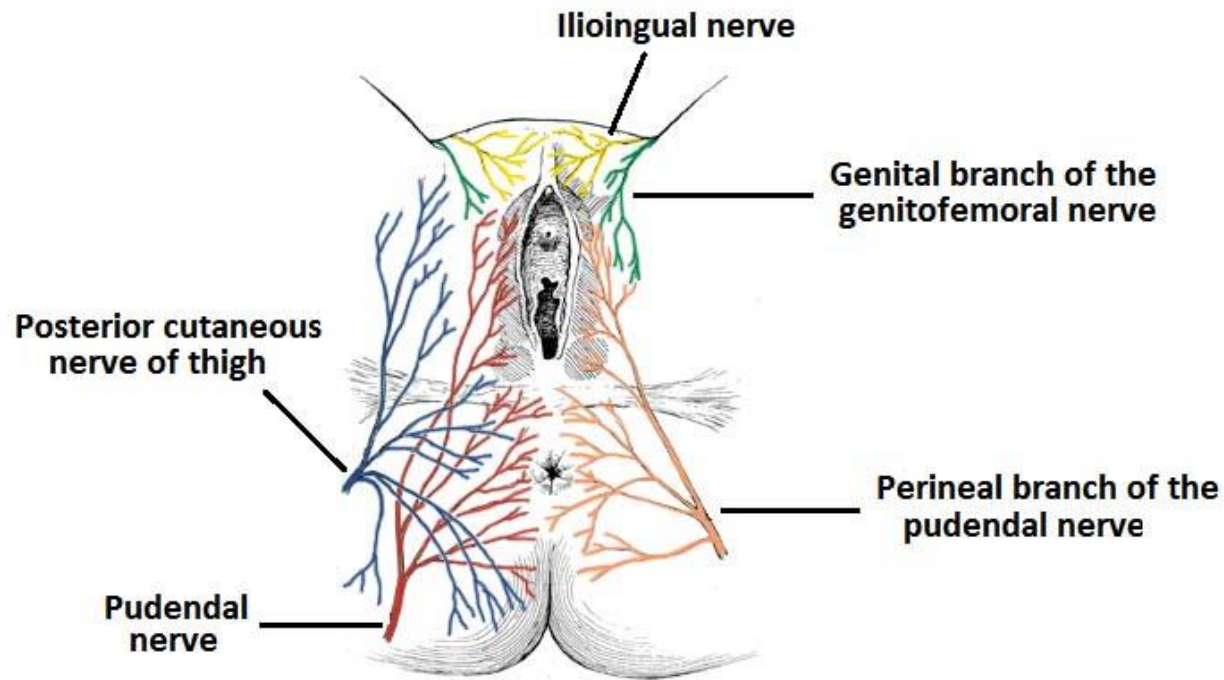
Arteries of female genital organs (schematic drawing).



- 1 Median umbilical fold with urachus
- 2 Urinary bladder
- 3 Insertion of uterine tube at fundus of uterus
- 4 Round ligament of uterus
- 5 Ligament of ovary
- 6 Uterine tube (isthmus)
- 7 Ovary
- 8 Ampulla of uterine tube
- 9 Rectum
- 10 Uterus
- 11 Vagina
- 12 Recto-uterine pouch (of Douglas)
- 13 Fimbriae of uterine tube
- 14 Suspensory ligament of ovary
- 15 Right common iliac artery (covered by peritoneum)
- 16 Mesosalpinx
- 17 Sigmoid colon
- 18 Saphenous opening
- 19 Vesico-uterine pouch

Female internal genital organs. Pelvic cavity (seen from above).

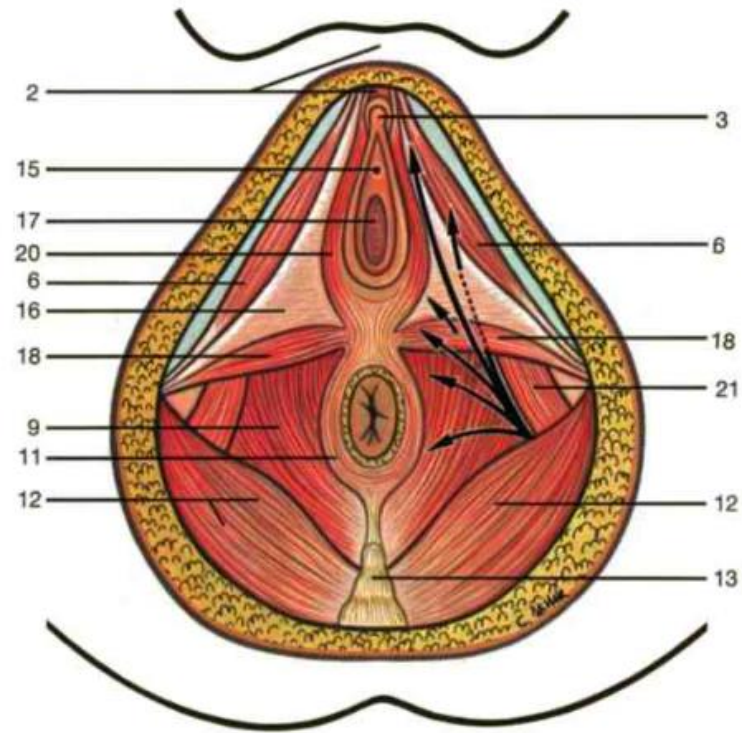
Female: External pelvic organs



- 1 Glans of clitoris
- 2 Labium majus
- 3 Vestibule of vagina
- 4 Hymen
- 5 Posterior labial commissure
- 6 Body of clitoris
- 7 Labium minus
- 8 External orifice of urethra
- 9 Vaginal orifice
- 10 Ureter
- 11 Adnexa of uterus
- 12 Prepuce of clitoris
- 13 Crus of clitoris
- 14 Greater vestibular glands
- 15 Anus and internal anal sphincter muscle
- 16 Median umbilical ligament containing urachus
- 17 Urinary bladder
- 18 Infundibulum of uterine tube
- 19 Ovary
- 20 Ampulla of uterine tube
- 21 Suspensory ligament of the ovary
- 22 Bulbospongiosus muscle and bulb of vestibule
- 23 Central tendon of perineum (perineal body)
- 24 External anal sphincter muscle

Female external genital organs (anterior aspect). Labia reflected.

Female: Urogenital diaphragm



Muscles of pelvic and urogenital diaphragms in the female (from below, schematic drawing).

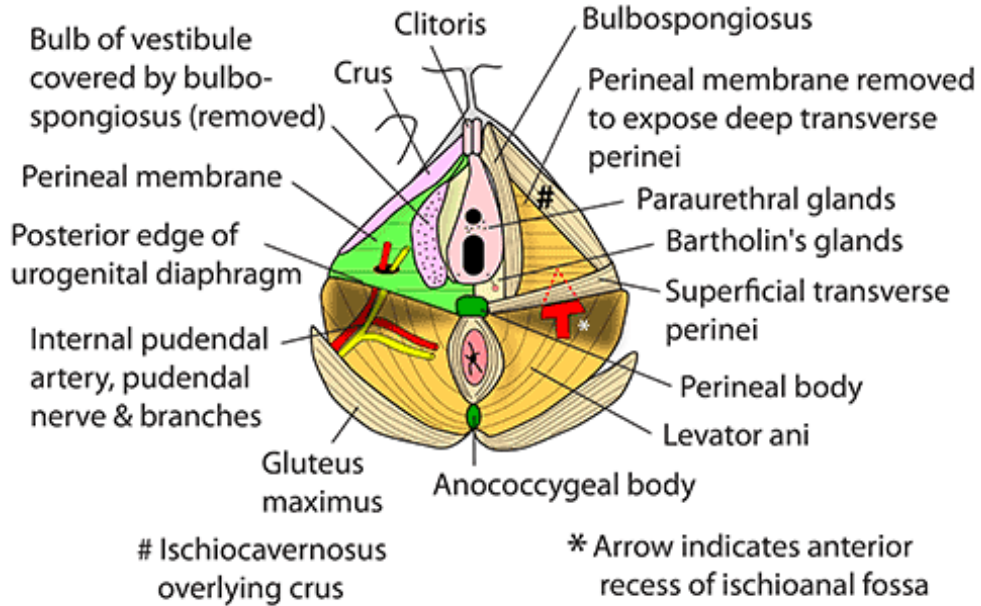
- 1 Fatty tissue encasing round ligament
- 2 Position of pubic symphysis
- 3 Clitoris
- 4 Labium minus
- 5 Bulb of vestibule
- 6 Ischiocavernosus muscle
- 7 Greater vestibular gland
- 8 Perineal branches of pudendal nerve
- 9 Levator ani muscle
- 10 Inferior rectal nerves
- 11 External anal sphincter muscle
- 12 Gluteus maximus muscle
- 13 Coccyx
- 14 Fatty tissue of mons pubis
- 15 External orifice of urethra
- 16 Urogenital diaphragm with fascia of deep transverse perineus muscle
- 17 Vaginal orifice
- 18 Superficial transverse perineal muscle
- 19 Anus
- 20 Bulbospongiosus muscle
- 21 Obturator internus muscle



Urogenital diaphragm and external genital organs in the female, superficial layer (from below).

FEMALE PERINEUM - GENERAL

- The perineum is that part of the trunk distal to the pelvic diaphragm
- 2 triangles lying at nearly a right angle to each other
 - Urogenital - covered in below with urogenital diaphragm
 - Anal - covered only with skin & fascia (+/- gluteus maximus)



Greater vestibular glands (Bartholin)

Round (<1cm) glands at 4 & 8 o'clock behind bulb. 2cm duct into posterolateral vaginal orifice. In superficial perineal pouch. Homologues of Cowper's glands in males. Cysts & infection possible

Paraurethral glands (Skene)

Mucous glands opening just inside urethra. Homologue of prostate

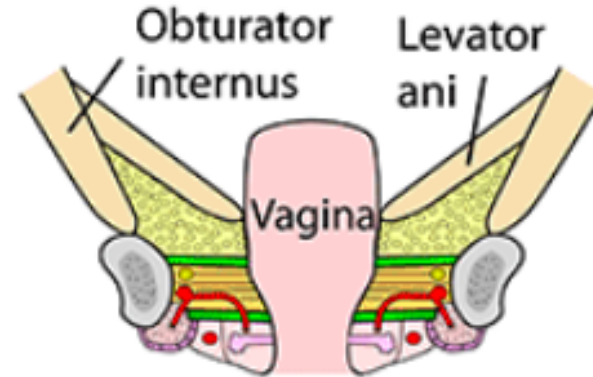
Lesser vestibular glands

Not shown. Multiple small mucous glands opening between vagina & urethra

Labia majora - joined back & front by anterior & posterior commissures. Round ligament of uterus ends anterior end of each.

labia minora give clitoral prepuce. **Clitoris** - 2 small corpora cavernosa. **Bulb** - spongy erectile tissue in labia minora

Female Perineum



Coronal section through urogenital diaphragm at level of vagina

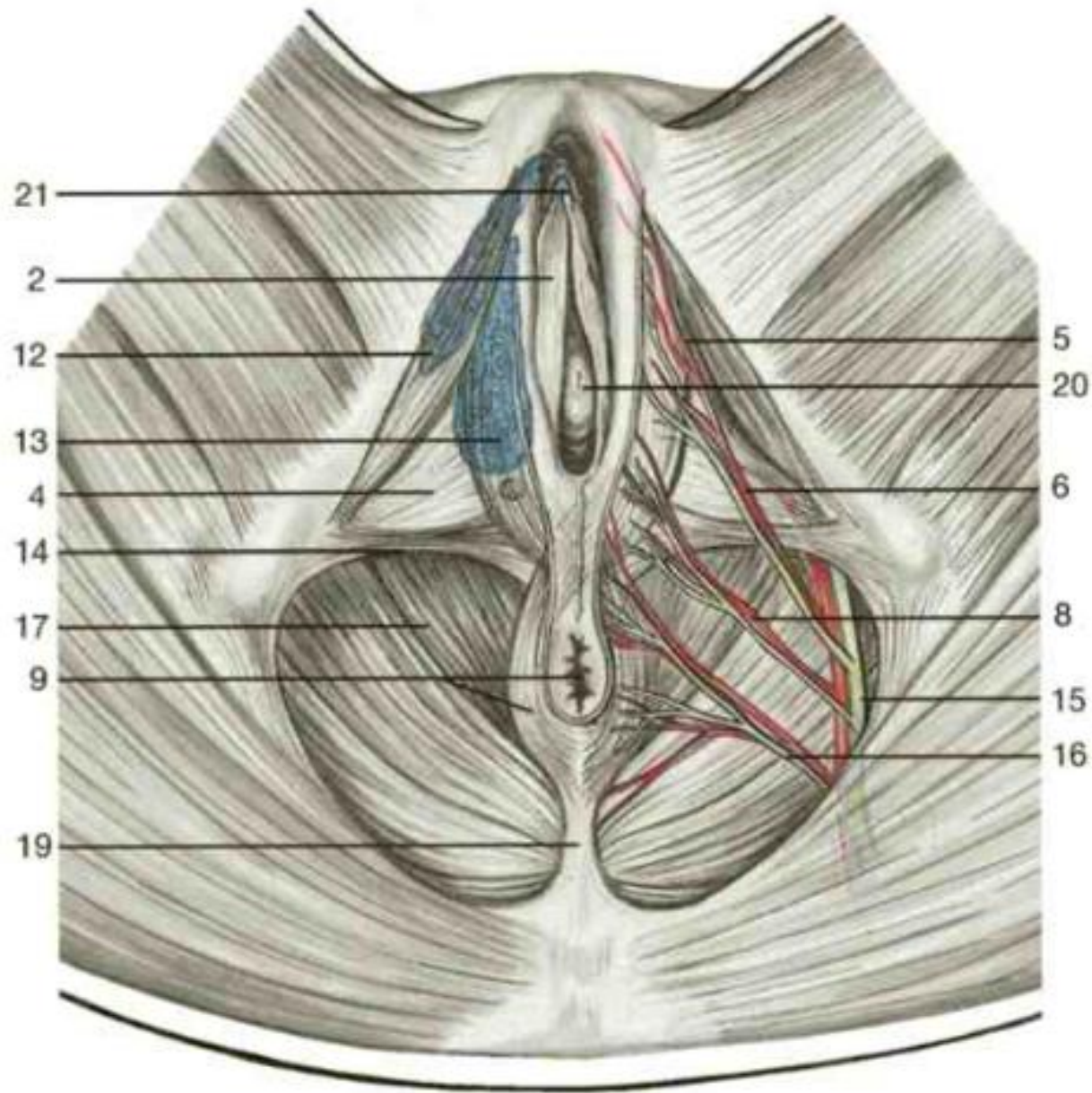
Deep perineal pouch (between perineal membrane below & superior fascia of urogenital diaphragm above)

- Vagina
- Urethra
- Sphincter
- Deep transverse perinei
- Dorsal nerve of clitoris
- Dorsal/deep clitoral arteries urethrae

Superficial perineal pouch

(everything below perineal membrane)

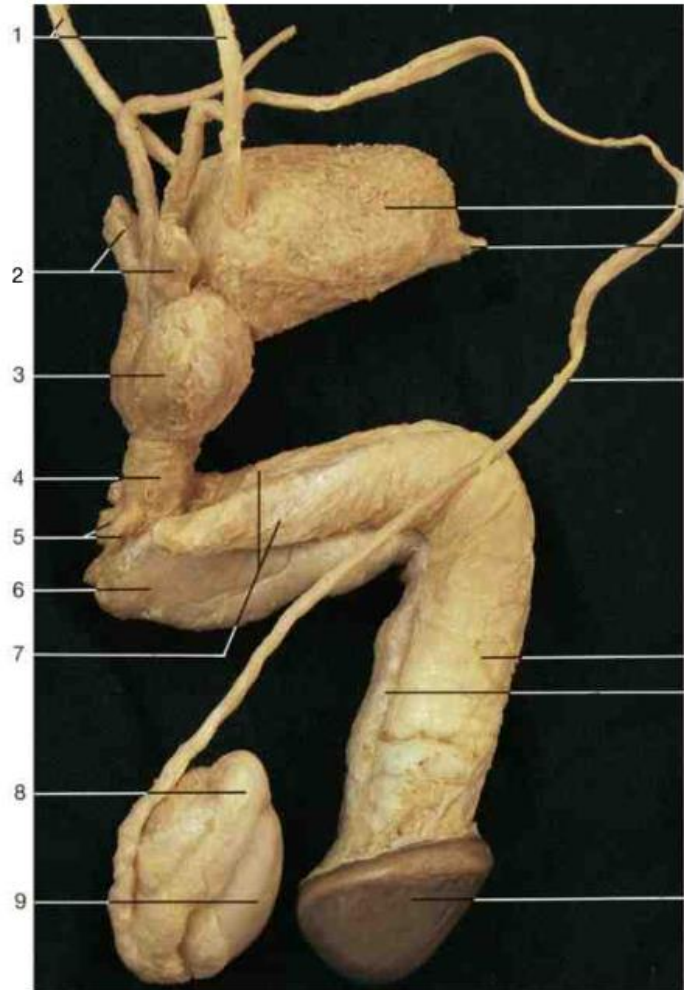
- 2 crura & ischiocavernosus
- Bulb & bulbospongiosus
- Superficial transverse perinei
- Perineal body
- Perineal artery/nerve/branches
- Vestibular glands



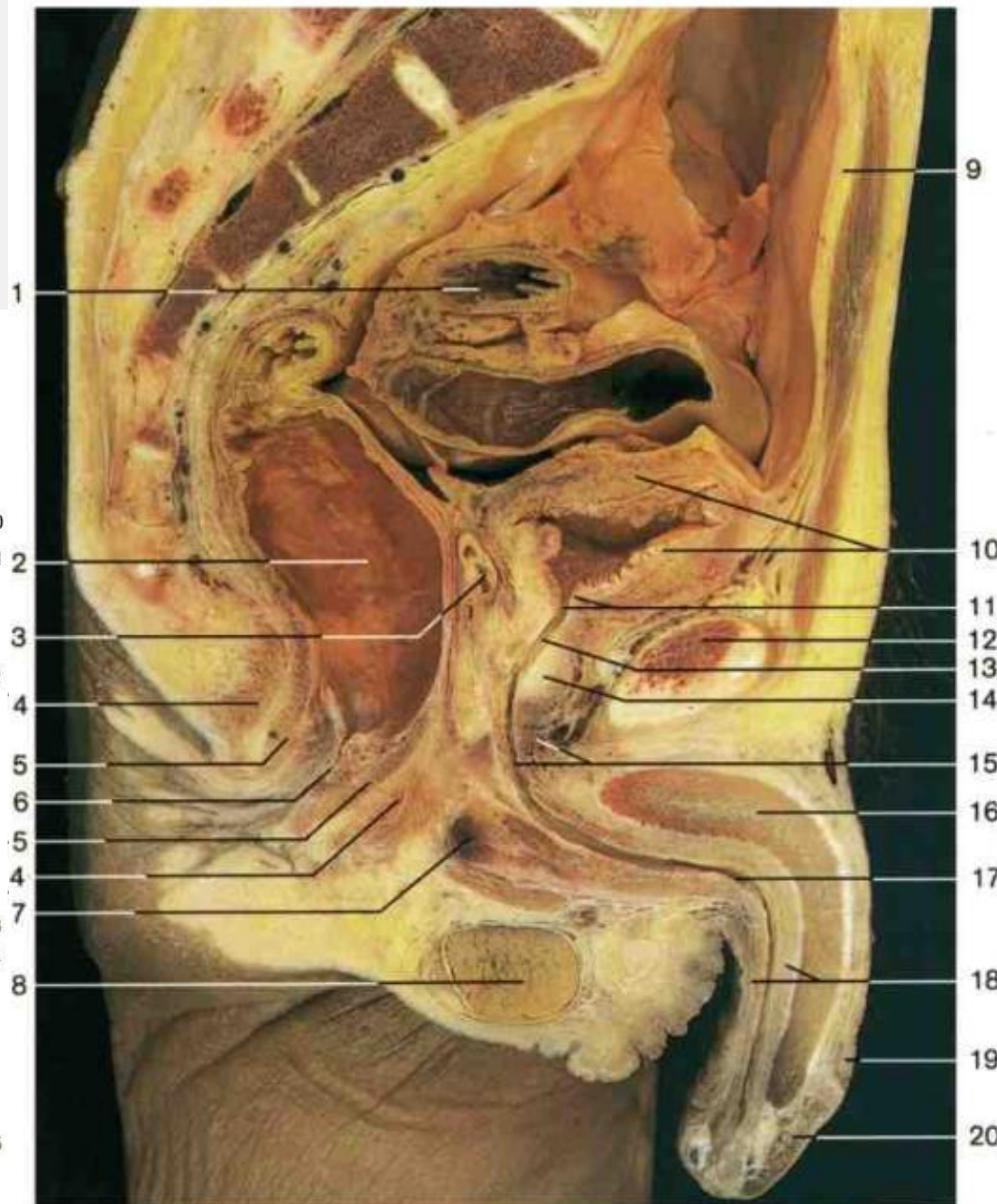
- 1 Prepuce of clitoris
- 2 Labium minus
- 3 Vaginal orifice
- 4 Deep transverse perineus muscle
- 5 Dorsal nerve of clitoris
- 6 Posterior labial nerves
- 7 Great adductor muscle
- 8 Perineal branches of pudendal nerve
- 9 Anus and external anal sphincter muscle
- 10 Inferior cluneal nerves
- 11 Mons pubis
- 12 Crus of clitoris with ischiocavernosus muscle
- 13 Bulb of vestibule
- 14 Superficial transverse perineus muscle
- 15 Pudendal nerve and internal pudendal artery
- 16 Inferior rectal nerves
- 17 Levator ani muscle
- 18 Gluteus maximus muscle
- 19 Anococcygeal ligament
- 20 External urethral orifice
- 21 Glans of clitoris

External female genital organs. Position of arteries and nerves; bulb of vestibule in blue (schematic drawing).

Male: GU System



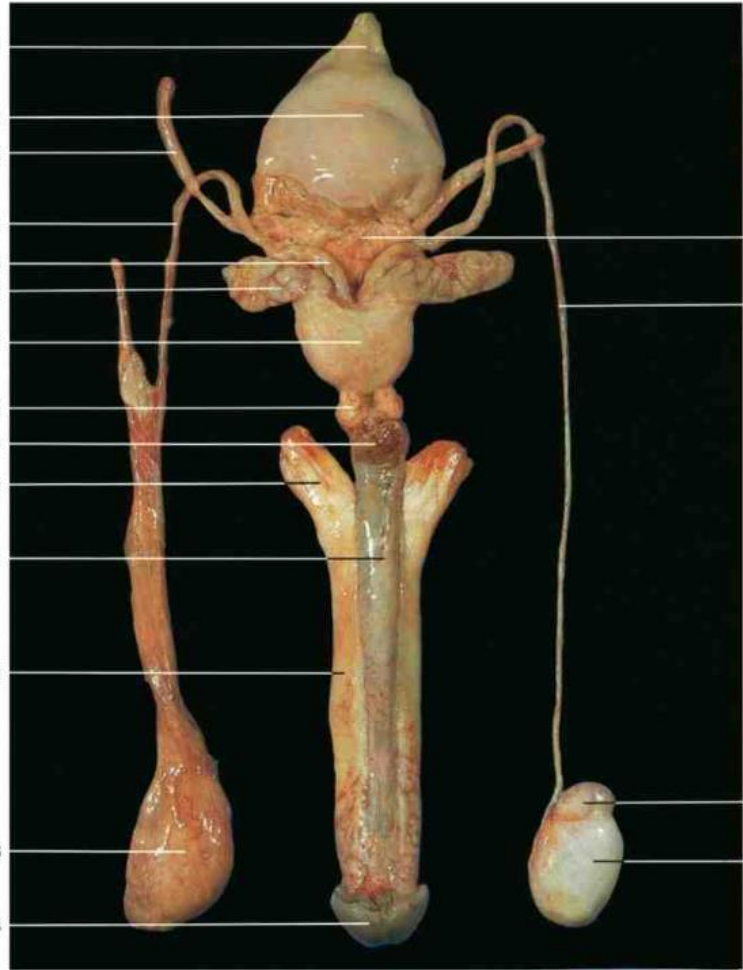
Male genital organs, isolated (right lateral aspect).



Male urogenital system, midsagittal section through the pelvis.

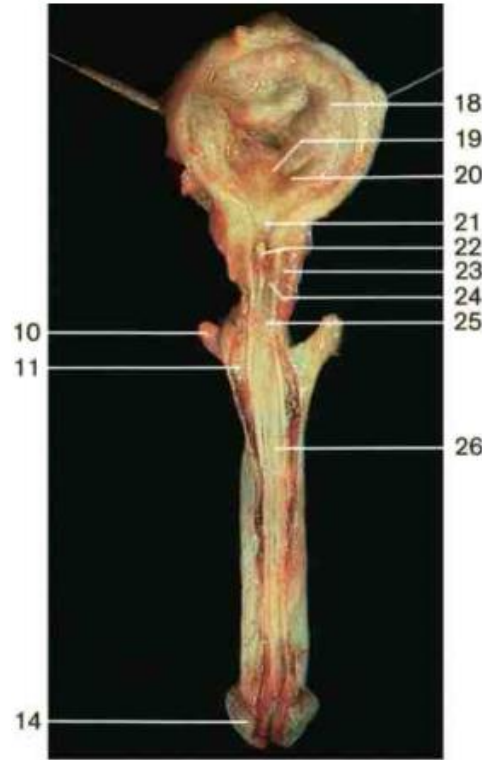
- 1 Sigmoid colon
- 2 Ampulla of rectum
- 3 Ampulla of ductus deferens
- 4 External anal sphincter muscle
- 5 Internal anal sphincter muscle
- 6 Anal canal
- 7 Bulb of penis
- 8 Testis (cut surface)
- 9 Median umbilical ligament
- 10 Urinary bladder
- 11 Internal urethral orifice and sphincter
- 12 Pubic symphysis
- 13 Prostatic part of urethra
- 14 Prostate gland
- 15 Membranous part of urethra and external urethral sphincter
- 16 Corpus cavernosum of penis
- 17 Spongy urethra
- 18 Corpus spongiosum of penis
- 19 Foreskin or prepuce
- 20 Glans penis
- 21 Kidney
- 22 Renal pelvis
- 23 Abdominal part of ureter
- 24 Pelvic part of ureter
- 25 Seminal vesicle
- 26 Ejaculatory duct
- 27 Bulbo-urethral or Cowper's gland
- 28 Ductus deferens
- 29 Epididymis
- 30 Umbilicus
- 31 Trigone of bladder and ureteric orifice
- 32 Navicular fossa of urethra
- 33 External urethral orifice
- 34 Testis

Male: Penis

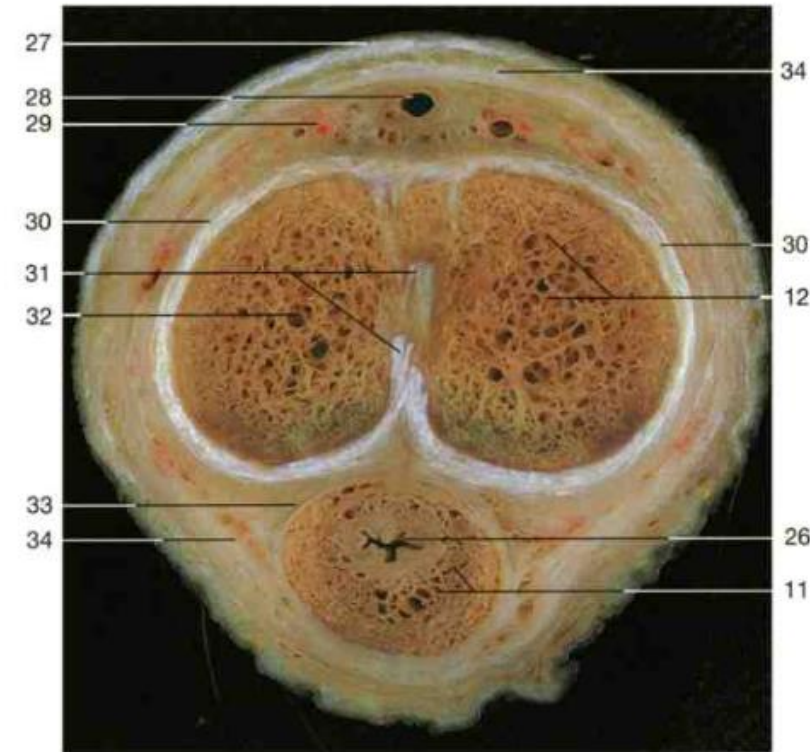


Male genital organs, isolated (posterior aspect).

- 1 Apex of urinary bladder with urachus
- 2 Urinary bladder
- 3 Ureter
- 4 Ductus deferens
- 5 Ampulla of ductus deferens
- 6 Seminal vesicle
- 7 Prostate
- 8 Bulbo-urethral or Cowper's gland
- 9 Bulb of penis
- 10 Crus penis
- 11 Corpus spongiosum of penis
- 12 Corpus cavernosum of penis
- 13 Testis and epididymis with coverings
- 14 Glans penis
- 15 Fundus of bladder
- 16 Head of epididymis
- 17 Testis
- 18 Mucous membrane of bladder
- 19 Trigone of bladder
- 20 Ureteric orifice
- 21 Internal urethral orifice
- 22 Seminal colliculus
- 23 Prostate
- 24 Prostatic urethra
- 25 Membranous urethra
- 26 Spongy (penile) urethra
- 27 Skin of penis
- 28 Deep dorsal vein of penis (unpaired)
- 29 Dorsal artery of penis (paired)
- 30 Tunica albuginea of corpora cavernosa
- 31 Septum of penis
- 32 Deep artery of penis
- 33 Tunica albuginea of corpus spongiosum
- 34 Deep fascia of penis

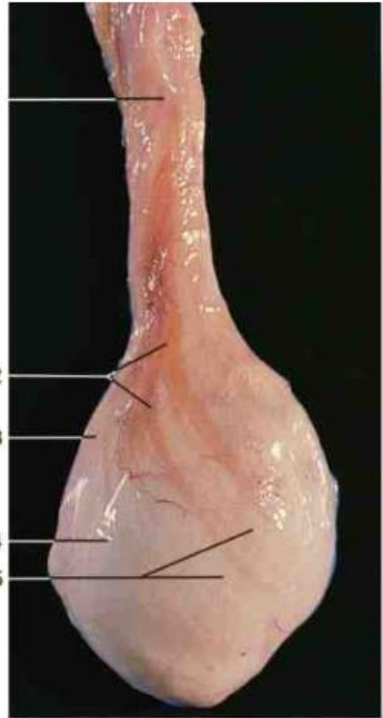


Urinary bladder, urethra, and penis (anterior aspect, opened longitudinally).



Cross section of penis (inferior aspect).

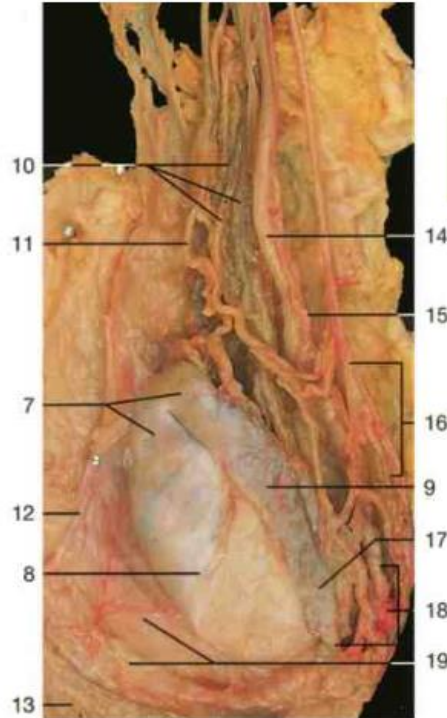
Male: Testis and Epididymus



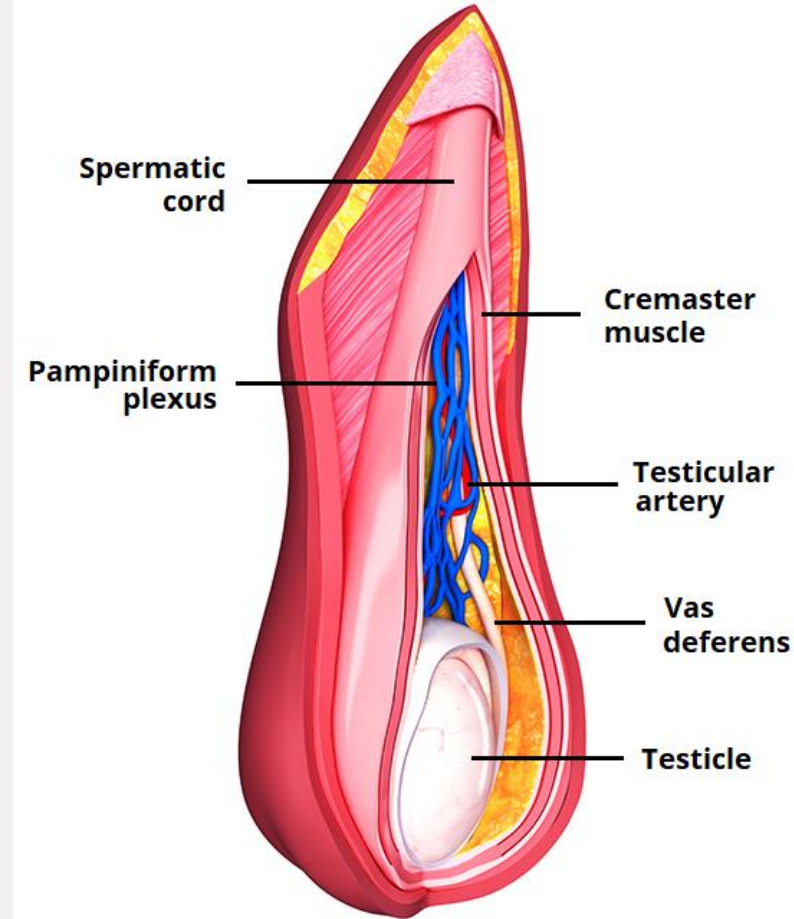
Testis and epididymis with investing layers (lateral aspect).



Testis and epididymis (lateral aspect). The tunica vaginalis has been opened.



Testis, epididymis, and spermatic cord (left side, posterolateral aspect). Dissection of spermatic cord and ductus deferens.

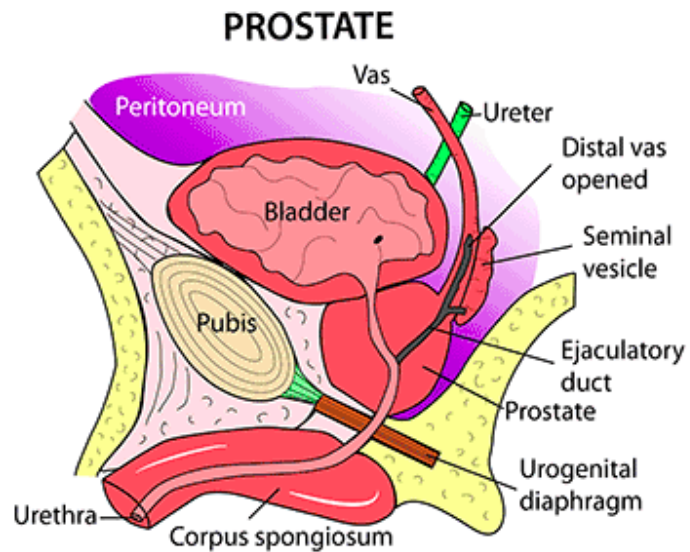


- 1 Spermatic cord covered with cremasteric fascia
- 2 Cremaster muscle
- 3 Position of epididymis
- 4 Internal spermatic fascia
- 5 Position of testis
- 6 Internal spermatic fascia with adjacent investing layers of testis (cut surface)
- 7 Head of epididymis

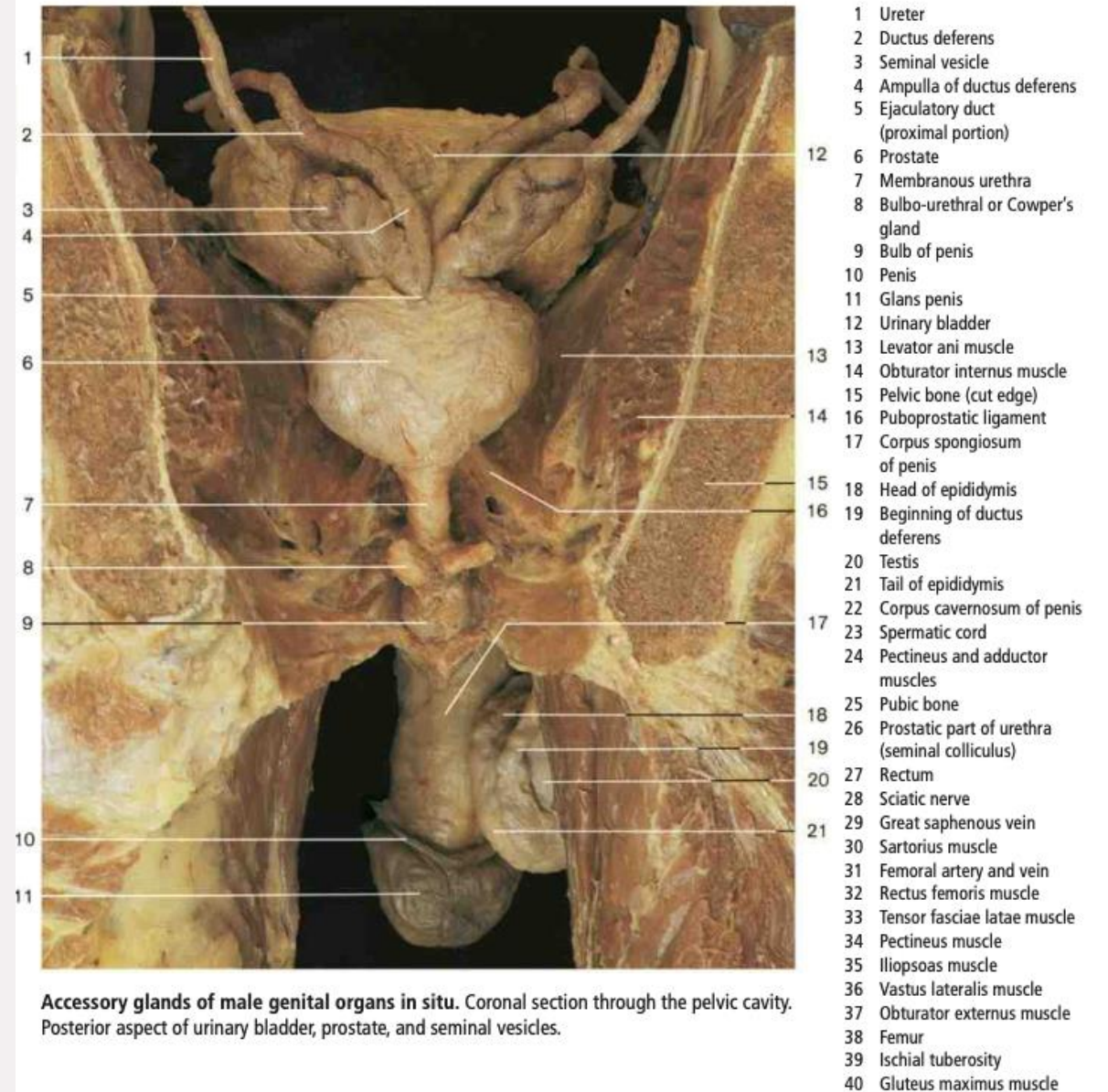
- 8 Testis with tunica vaginalis (visceral layer)
- 9 Body of epididymis
- 10 Pampiniform venous plexus (anterior veins)
- 11 Testicular artery
- 12 Tunica vaginalis (parietal layer, cut edge)
- 13 Skin and dartos muscle (reflected)
- 14 Ductus deferens

- 15 Artery of ductus deferens
- 16 Posterior veins of pampiniform plexus
- 17 Tail of epididymis
- 18 Transition of epididymal duct to ductus deferens and venous plexus
- 19 Parietal layer of tunica vaginalis
- 20 Appendix of epididymis
- 21 Appendix of testis
- 22 Gubernaculum testis

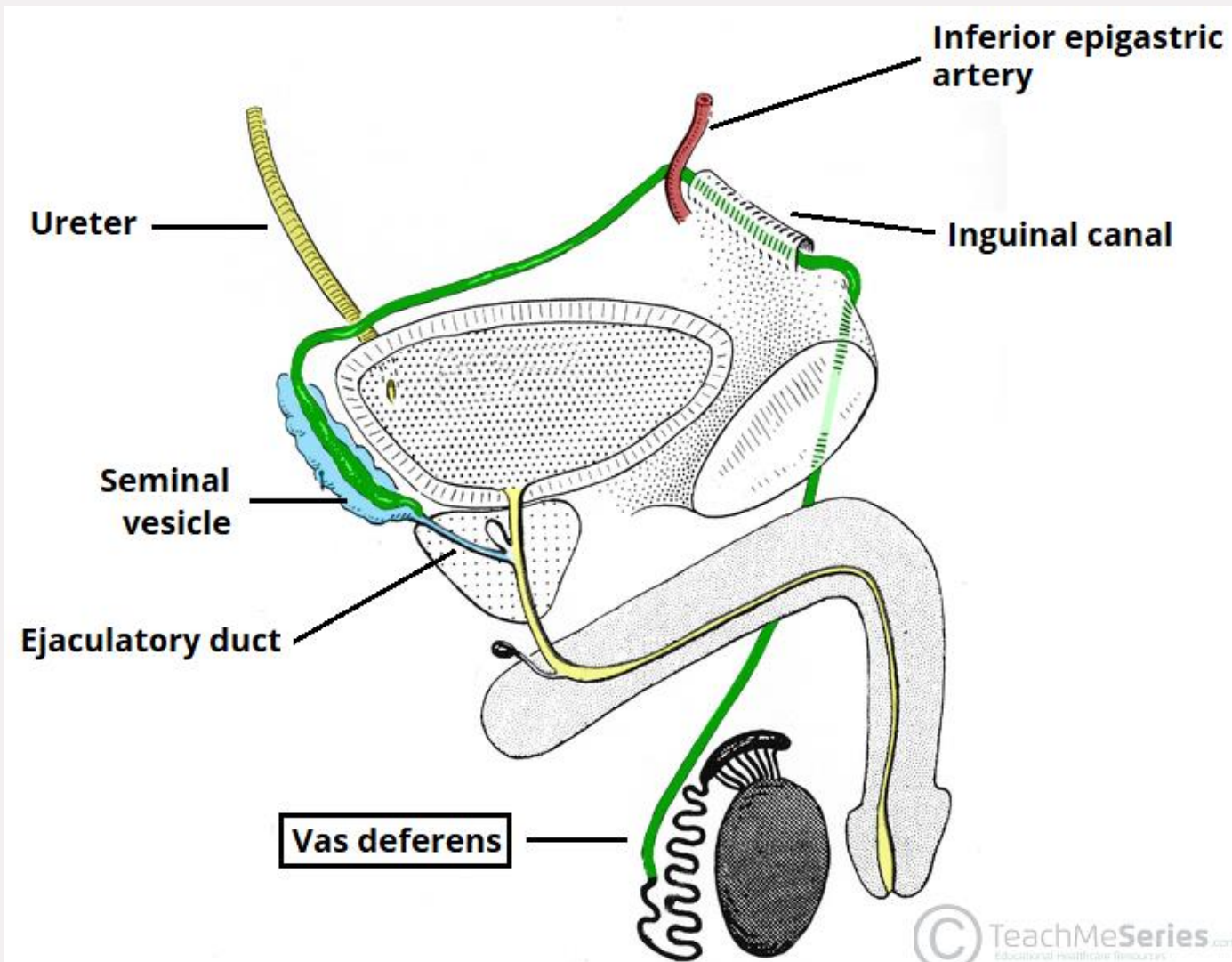
Male: Accessory glands



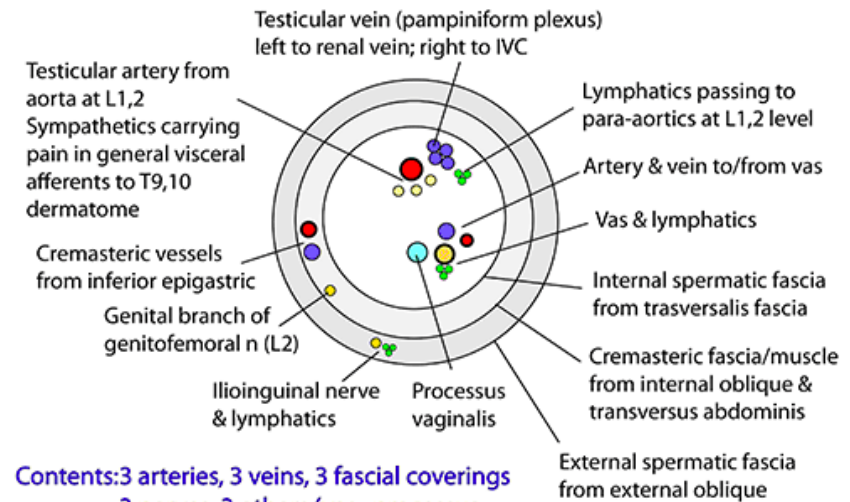
- Pyramidal shape with posterior groove
- Size of chestnut (2 x 3 x 4cm)
- Sits on UG diaphragm
- Intrinsic urethral mechanism around it and urethra runs through it
- Gives nutrients for sperm and is 30% ejaculate volume
- Ejaculatory ducts & prostatic utricle (paramesonephric remnant) open onto verumontanum in floor of prostatic urethra
- True & false capsules
- Veins: Preprostatic plexus - valveless (to vertebral plexuses)
- Arteries: Inferior vesical, middle rectal, internal pudendal
- Nerves: Sympathetic for ejaculation & smooth muscle contraction
Parasympathetic for erection & secretomotor of acini



Male: Spermatic Cord and Vas



SPERMATIC CORD
(Cross section just beyond external inguinal ring)



Contents: 3 arteries, 3 veins, 3 fascial coverings
3 nerves, 3 others (vas, processus vaginalis, lymphatics)

VIA THE DEEP INGUINAL RING

- Vas
- Artery to vas (inferior vesical)
- Testicular artery (aorta)
- Cremasteric artery (inferior epigastric)
- Cremasteric vein (inferior epigastric)
- Testicular vein (IVC/left renal)
- Obliterated processus vaginalis
- Lymphatics
- Sympathetics
- Genital branch of genitofemoral n (L2)
Supplies motor to cremaster, sensory to fascia, tunica, scrotal skin, round ligament & labia majus

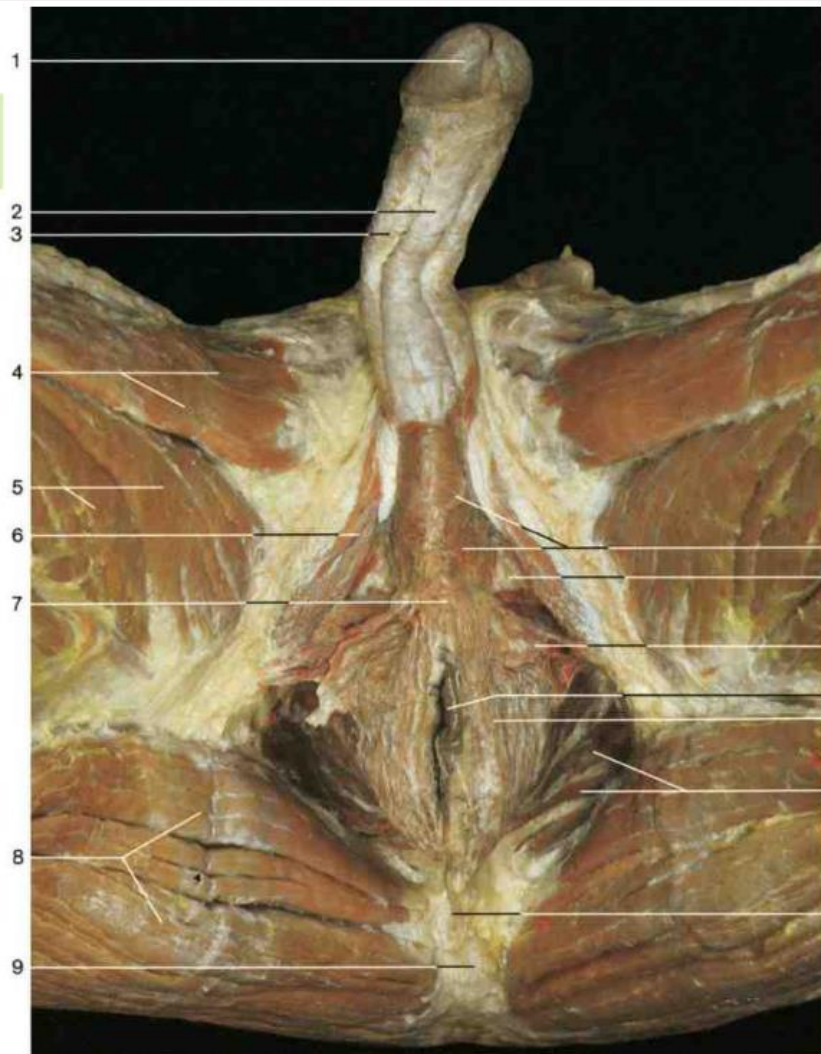
IN CANAL

- All these **plus**
- Internal spermatic fascia
- Cremasteric fascia
- Cremaster muscle
- Ilio-inguinal nerve

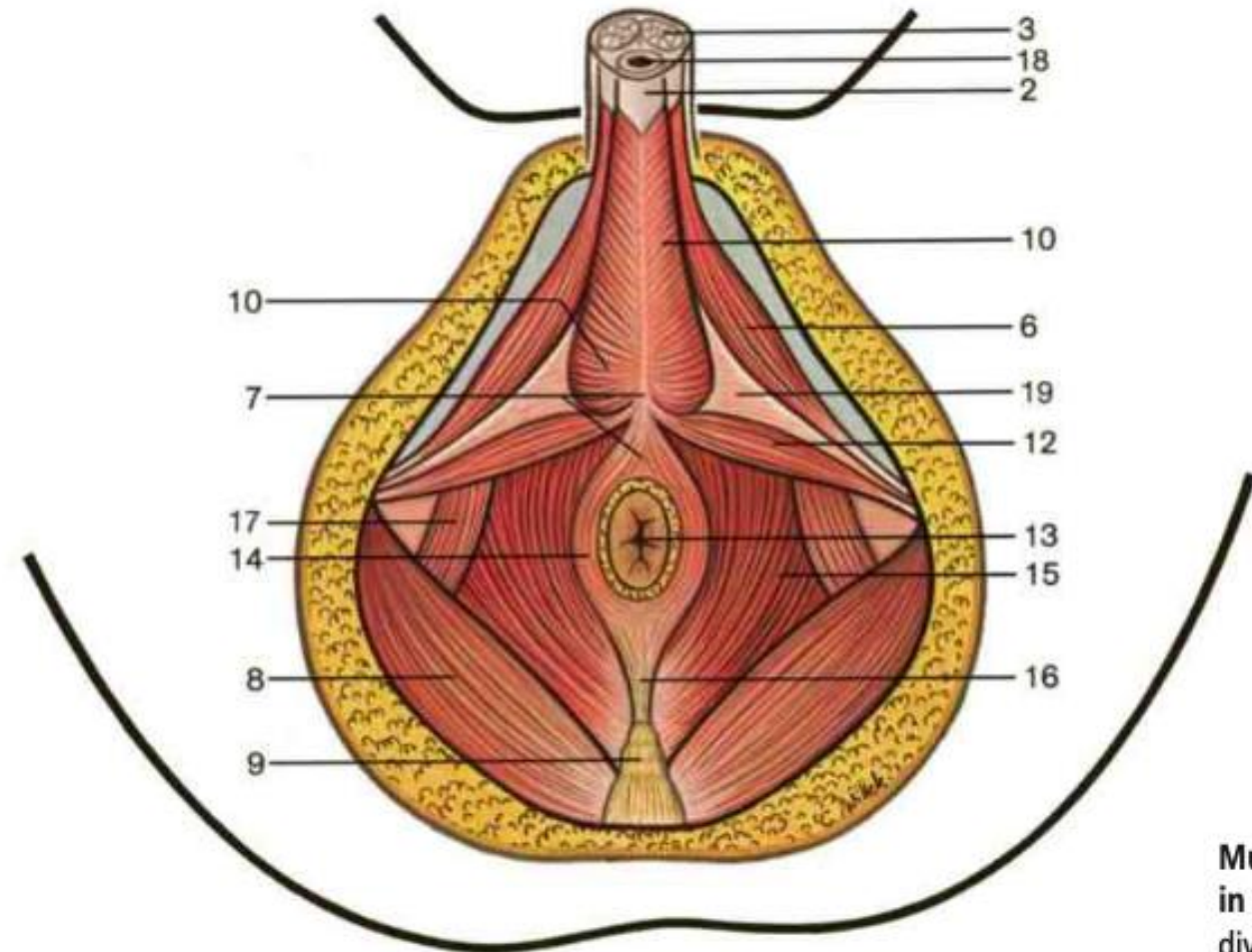
OUTSIDE SUPERFICIAL RING

- All these **plus**
- External spermatic fascia from external oblique

Male: Pelvic Diaphragm



- 1 Glans penis
- 2 Corpus spongiosum of penis
- 3 Corpus cavernosum of penis
- 4 Gracilis muscle
- 5 Adductor muscles
- 6 Ischiocavernosus muscle overlying crus of penis
- 7 Perineal body
- 8 Gluteus maximus muscle
- 9 Coccyx
- 10 Bulbospongiosus muscle
- 11 Deep transverse perineus muscle covered by inferior fascia of urogenital diaphragm
- 12 Superficial transverse perineus muscle
- 13 Anus
- 14 External anal sphincter muscle
- 15 Levator ani muscle
- 16 Anococcygeal ligament
- 17 Obturator internus muscle
- 18 Urethra
- 19 Deep transverse perineus muscle



Muscles in the pelvic diaphragm

Muscles of urogenital and pelvic diaphragms in the male (from below).

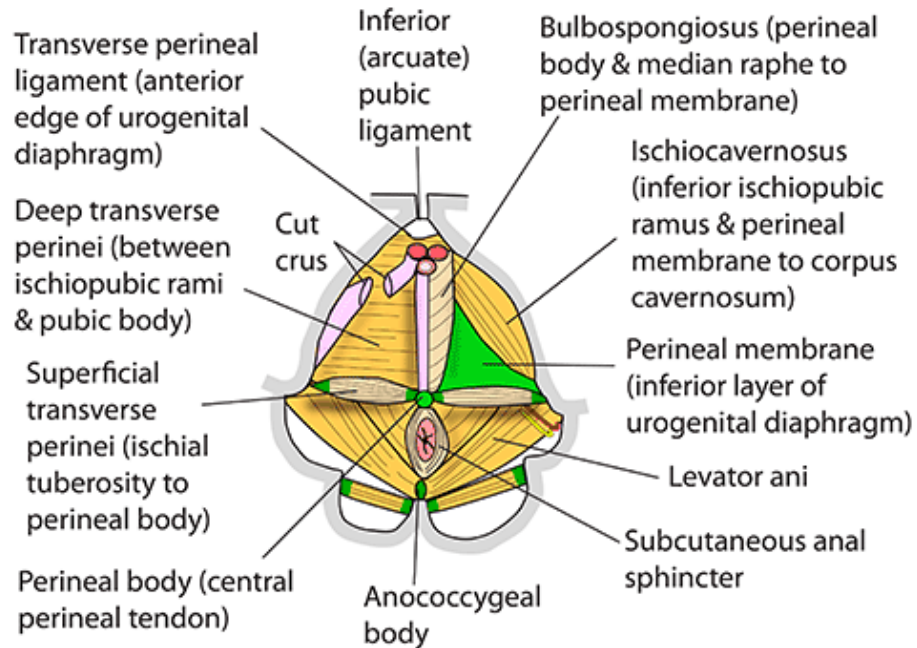
Male Perineum

MALE PERINEUM

The perineum is that part of the trunk distal to the pelvic diaphragm
2 triangles lying at nearly a right angle to each other

Urogenital - covered in below with urogenital diaphragm

Anal - covered only with skin & fascia (+/- gluteus maximus)

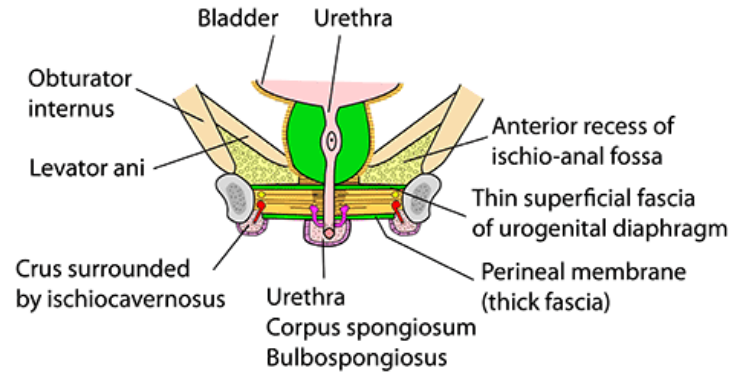


For anterior recess of ischioanal fossa, see female perineum

MALE PERINEUM - DEEP PERINEAL POUCH

Deep perineal pouch (between perineal membrane below & superior fascia of urogenital diaphragm above). Contains:

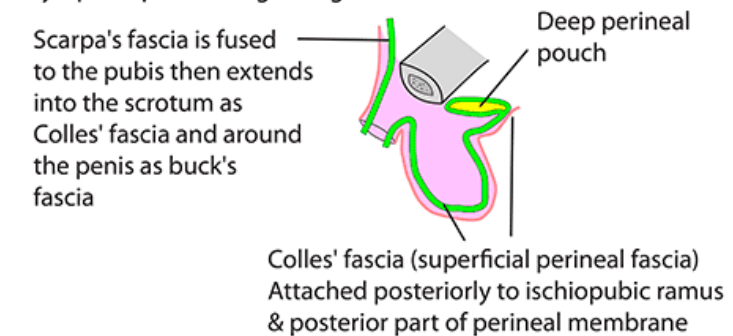
- Membranous urethra
- Deep transverse perinei
- Sphincter urethrae (external sphincter)
- Bulbourethral glands (Cowper's). They drain into urethra below the perineal membrane
- Internal pudendal vessels
- Dorsal nerve of penis
- Note that the external sphincter has striated muscle extensions around lower prostatic urethra, above the urogenital diaphragm that are called the **intrinsic urethral mechanism**

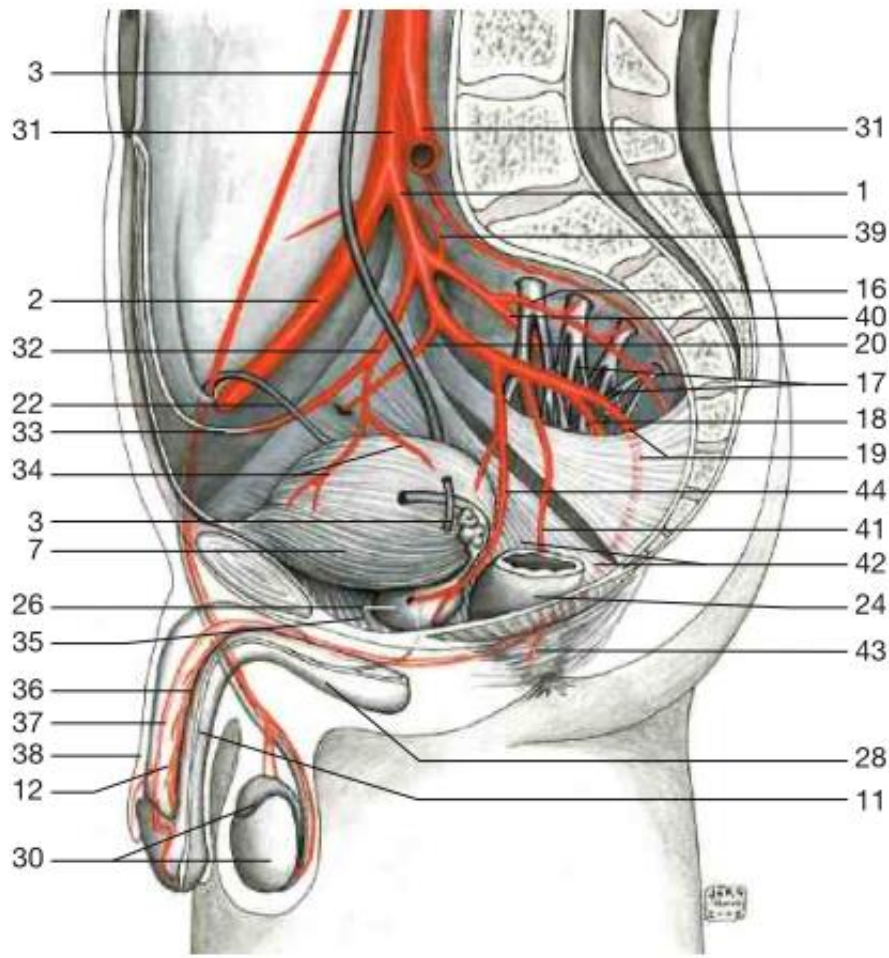


Coronal section through urogenital diaphragm at level of the prostate

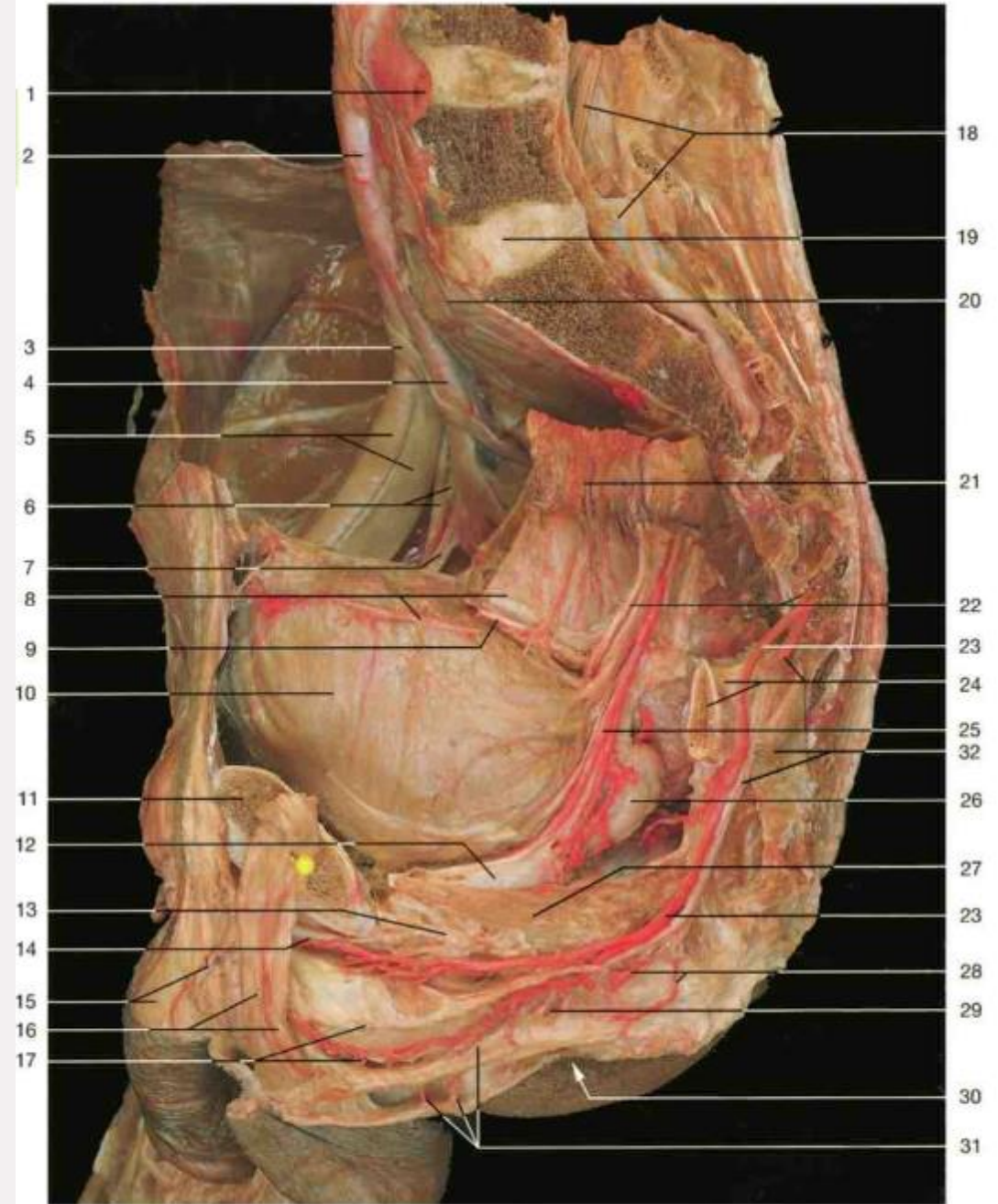
MALE PERINEUM SUPERFICIAL PERINEAL POUCH

- All perineal structures below the perineal membrane are in the superficial perineal pouch
- 2 crura & 2 ischiocavernosus muscles over them
- Urethra; bulb & corpus spongiosum around it
- Bulbospongiosus muscle
- Superficial transverse perinei muscles
- Perineal body
- Perineal branches of internal pudendal artery
- Pudendal nerve & branches
- Colles fascia
- Ducts of Cowper's glands
- Deep & superficial external pudendal arteries
- Spermatic cords, testes, penis
- Dartos muscle (panniculus carnosus)
- Branches of ilio-inguinal and genitofemoral nerves
- Scrotal blood supply: Deep/superficial external pudendal, branches of internal pudendal. Veins to external pudendal
- Nerves to scrotum: Anterior 1/3 - ilio-inguinal, posterior 2/3 - posterior scrotal branches of perineal & perineal branches of posterior femoral cutaneous nerve
- Lymph: superficial inguinal glands





- | | |
|---|---|
| 2 Right common iliac artery | 19 Intervertebral disc between fifth lumbar vertebra and sacrum |
| 3 Right ureter | 20 Sacral promontory |
| 4 Right internal iliac artery | 21 Mesosigmoid |
| 5 Right external iliac artery and vein | 22 Left ureter |
| 6 Right obturator artery and nerve | 23 Left internal pudendal artery |
| 7 Umbilical artery | 24 Ischial spine (cut), sacrospinal ligament, inferior gluteal artery |
| 8 Sigmoid and superior vesical artery | 25 Left inferior vesical artery |
| 9 Left ductus deferens | 26 Seminal vesicle |
| 10 Urinary bladder | 27 Levator ani muscle |
| 11 Pubic bone (cut) | 28 Branches of inferior rectal artery |
| 12 Prostate | 29 Perineal artery |
| 13 Vesicoprostatic venous plexus | 30 Anus |
| 14 Deep dorsal vein of penis and dorsal artery of penis | 31 Posterior scrotal branches |
| 15 Penis and superficial dorsal vein | 32 Pudendal nerve and sacrotuberous ligament |
| 16 Spermatic cord and testicular artery | |
| 17 Bulb of penis and deep artery of penis | |



Pelvic cavity in the male (right half of parasagittal section). The arteries have been injected with red resin. The parietal layer of peritoneum has been removed. The urinary bladder is filled to a great extent.