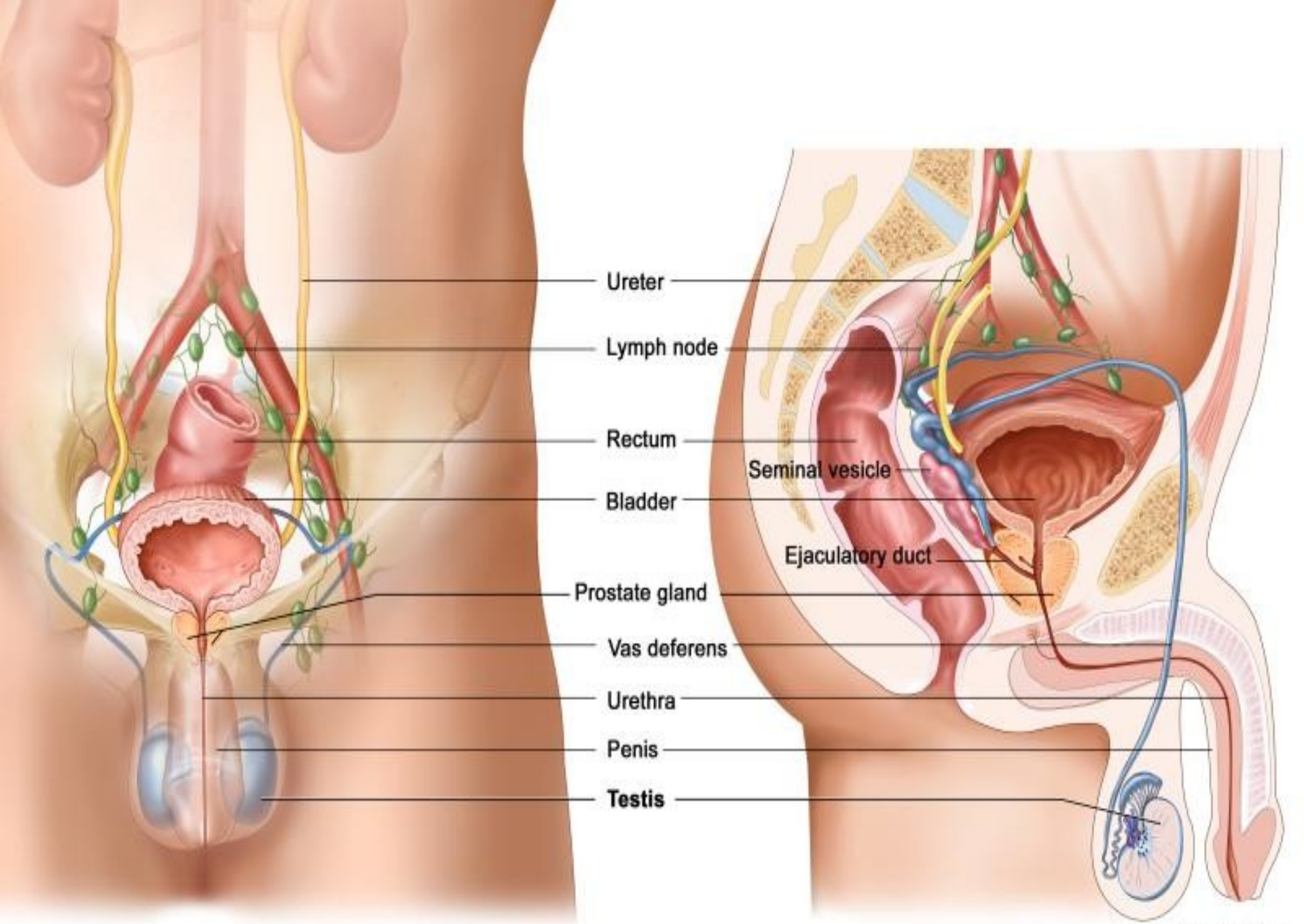
Male Reproductive System

Dr. Yared T.

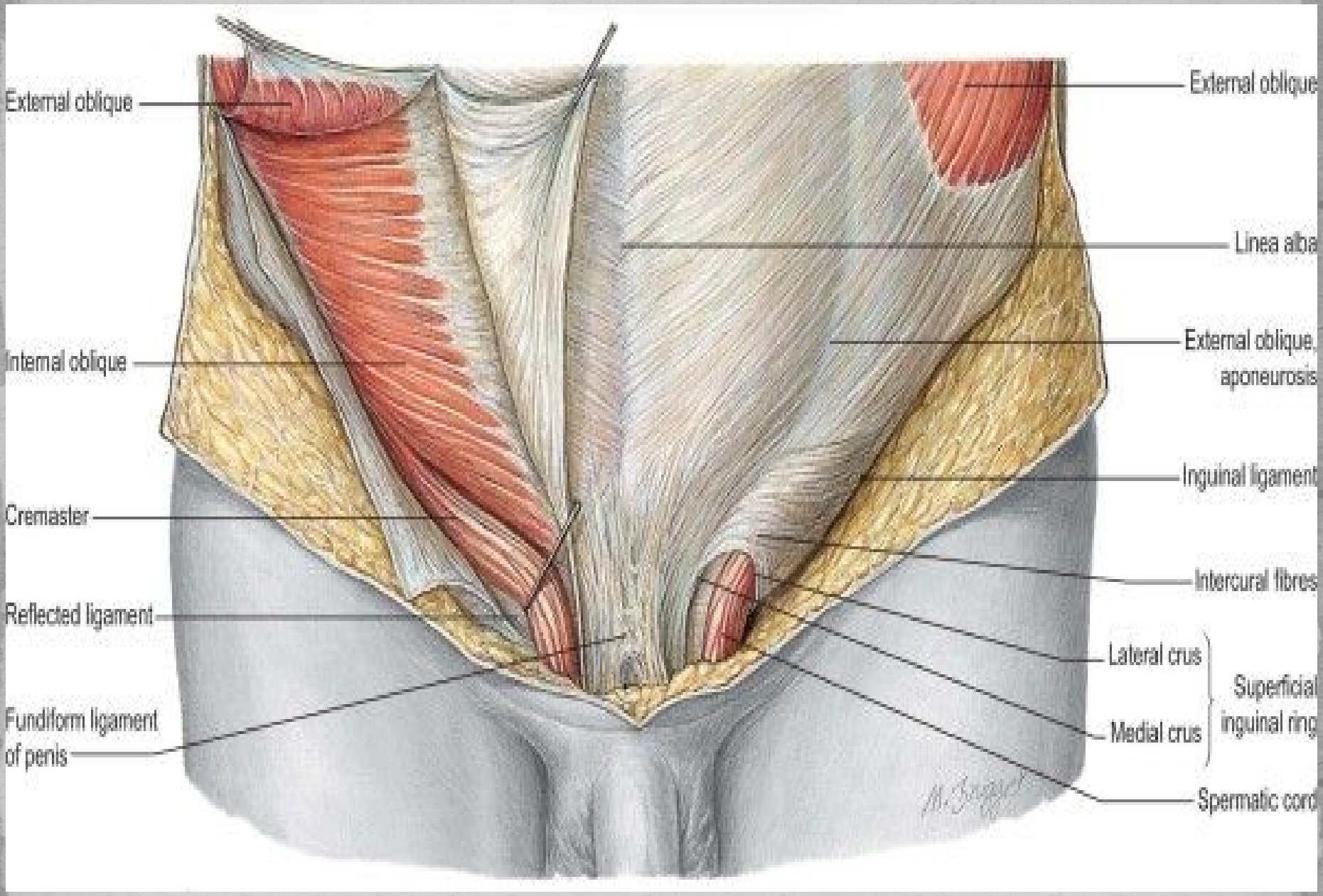
- The male reproductive system consists of the **spermatic cord** and **scrotum**, **testes** and **epididymes**, **vas deferens**, **prostate**, **seminal vesicles** and **penis**.



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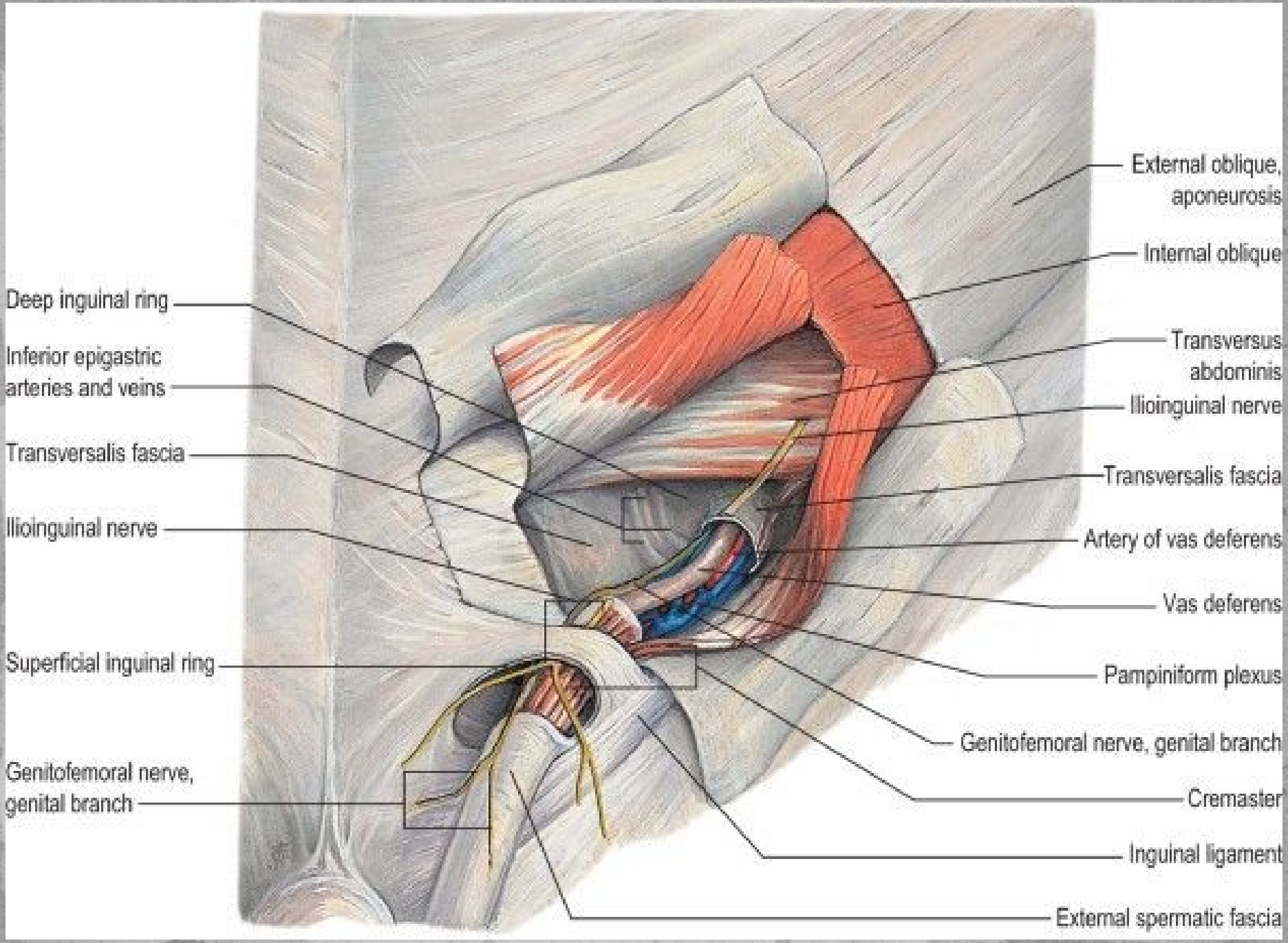
Spermatic Cord

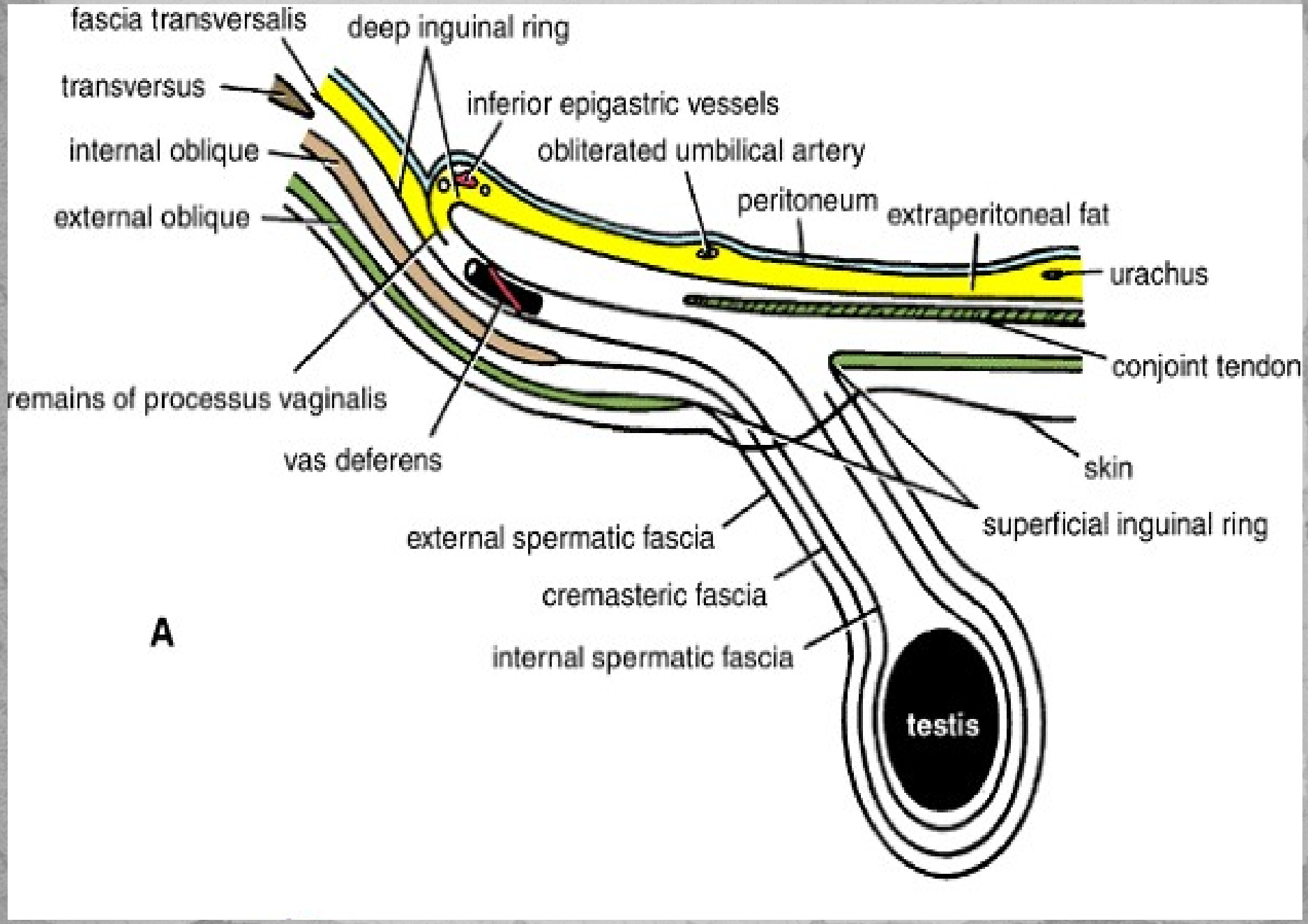
- The spermatic cord is a collection of structures that pass through the **inguinal canal** to the testis.
- Spermatic cord suspends the **testis** in the scrotum and It begins at the **deep inguinal ring** and ends at the testis.
- The **left** cord is a little longer than the right
- It is covered with three concentric layers of **fascia** derived from the layers of the anterior abdominal wall


External oblique
Internal oblique
Cremaster
Reflected ligament
Fundiform ligament of penis
External oblique
Linea alba
External oblique aponeurosis
Inguinal ligament
Intercural fibres
Lateral crus
Medial crus
Superficial inguinal ring
Spermatic cord

Contents of the Spermatic Cord

- Vas deferens
- Testicular artery
- Testicular veins
- Testicular lymph vessels
- Autonomic nerves
- Cremasteric artery
- Artery of the vas deferens
- Remains of the processus vaginalis
- Genital branch of the genitofemoral nerve,

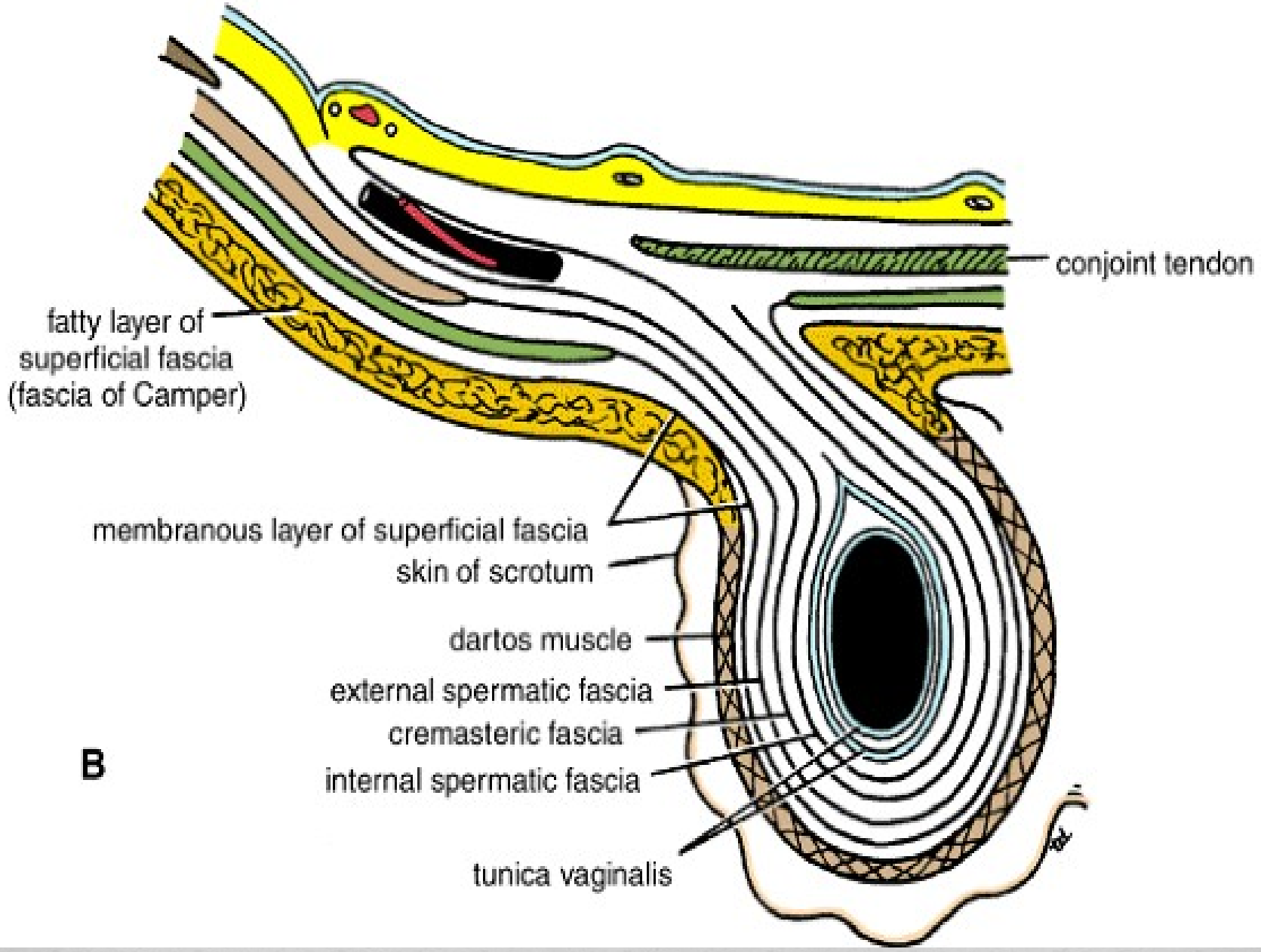

External oblique, aponeurosis
Internal oblique
Deep inguinal ring
Transversus abdominis
Inferior epigastric arteries and veins
Ilioinguinal nerve
Transversalis fascia
Transversalis fascia
Ilioinguinal nerve
Artery of vas deferens
Vas deferens
Superficial inguinal ring
Pampiniform plexus
Genitofemoral nerve, genital branch
Genitofemoral nerve, genital branch
Cremaster
Inguinal ligament
External spermatic fascia


fascia transversalis
deep inguinal ring
transversus
inferior epigastric vessels
internal oblique
obliterated umbilical artery
peritoneum
external oblique
extraperitoneal fat
urachus
conjoint tendon
remains of processus vaginalis
vas deferens
skin
superficial inguinal ring
external spermatic fascia
cremasteric fascia
A
internal spermatic fascia
testis

- The **coverings** of the spermatic cord are three concentric layers of fascia derived from the layers of the anterior abdominal wall.

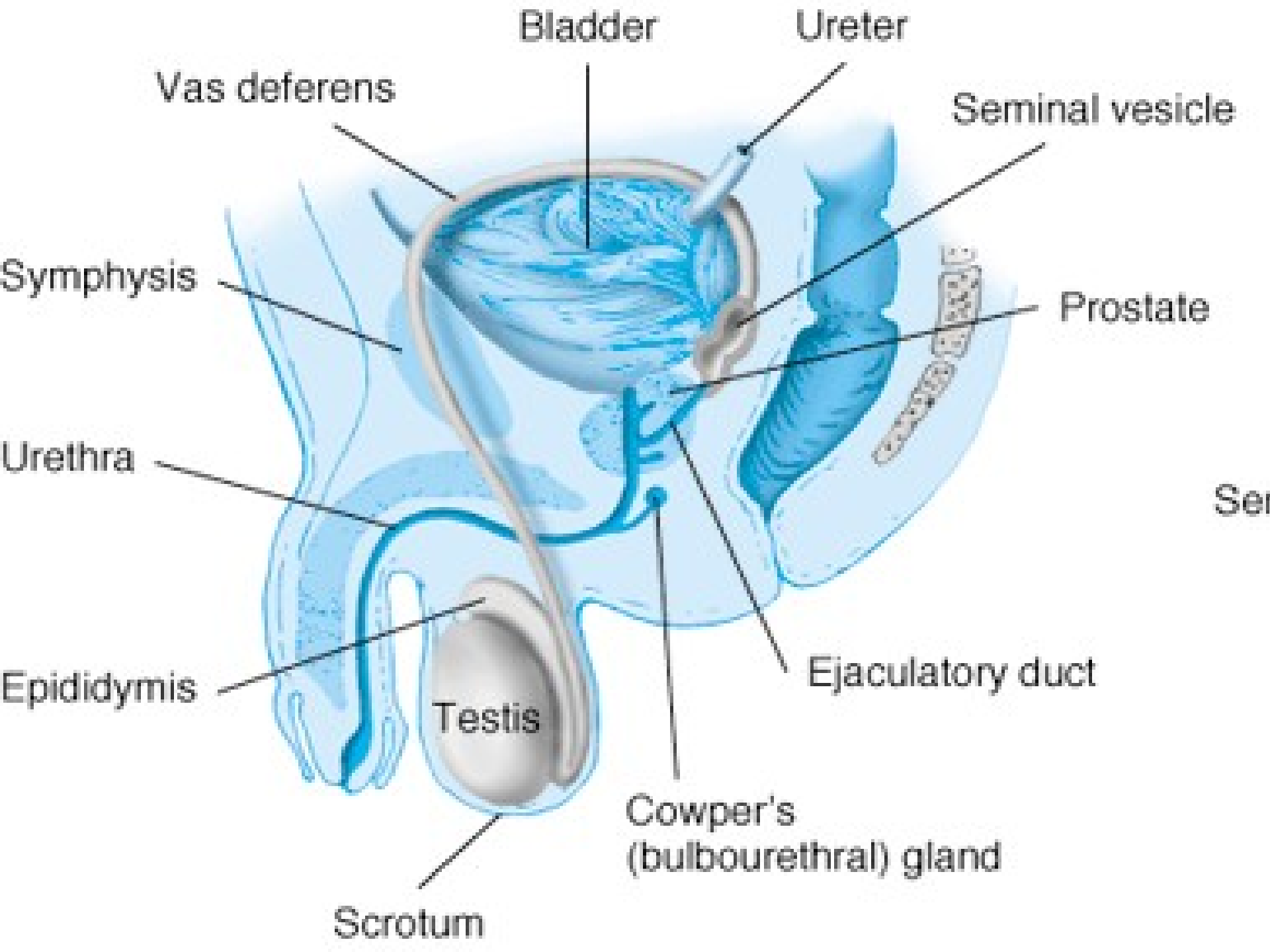
The layers (from outside to inwards) are

- **External spermatic fascia**
- **Cremasteric fascia**
- **Internal spermatic fascia**


conjoint tendon
fatty layer of
superficial fascia
(fascia of Camper)
membranous layer of superficial fascia
skin of scrotum
dartos muscle
external spermatic fascia
cremasteric fascia
internal spermatic fascia
tunica vaginalis
B

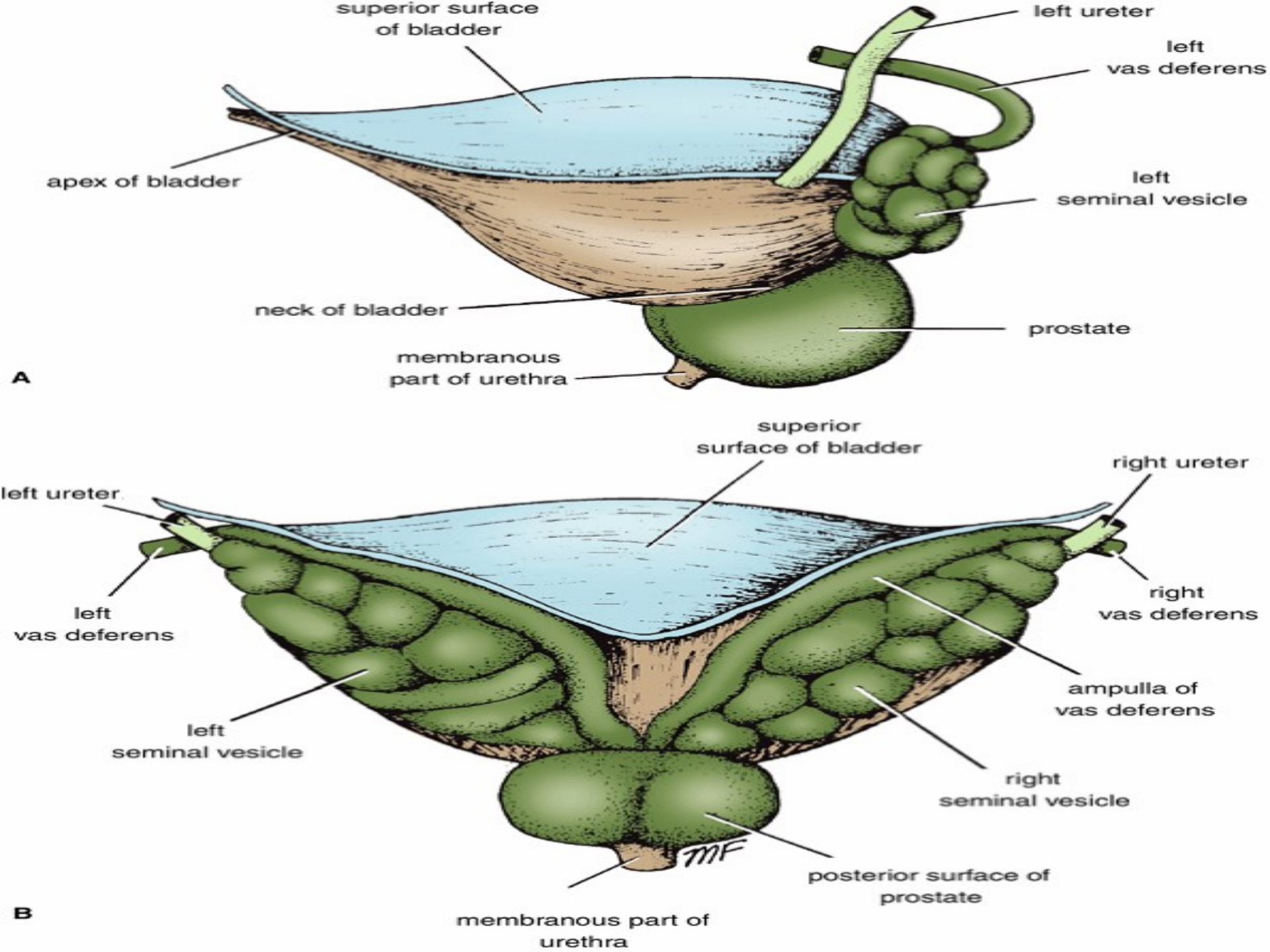
Vas deferens (ductus deferens)

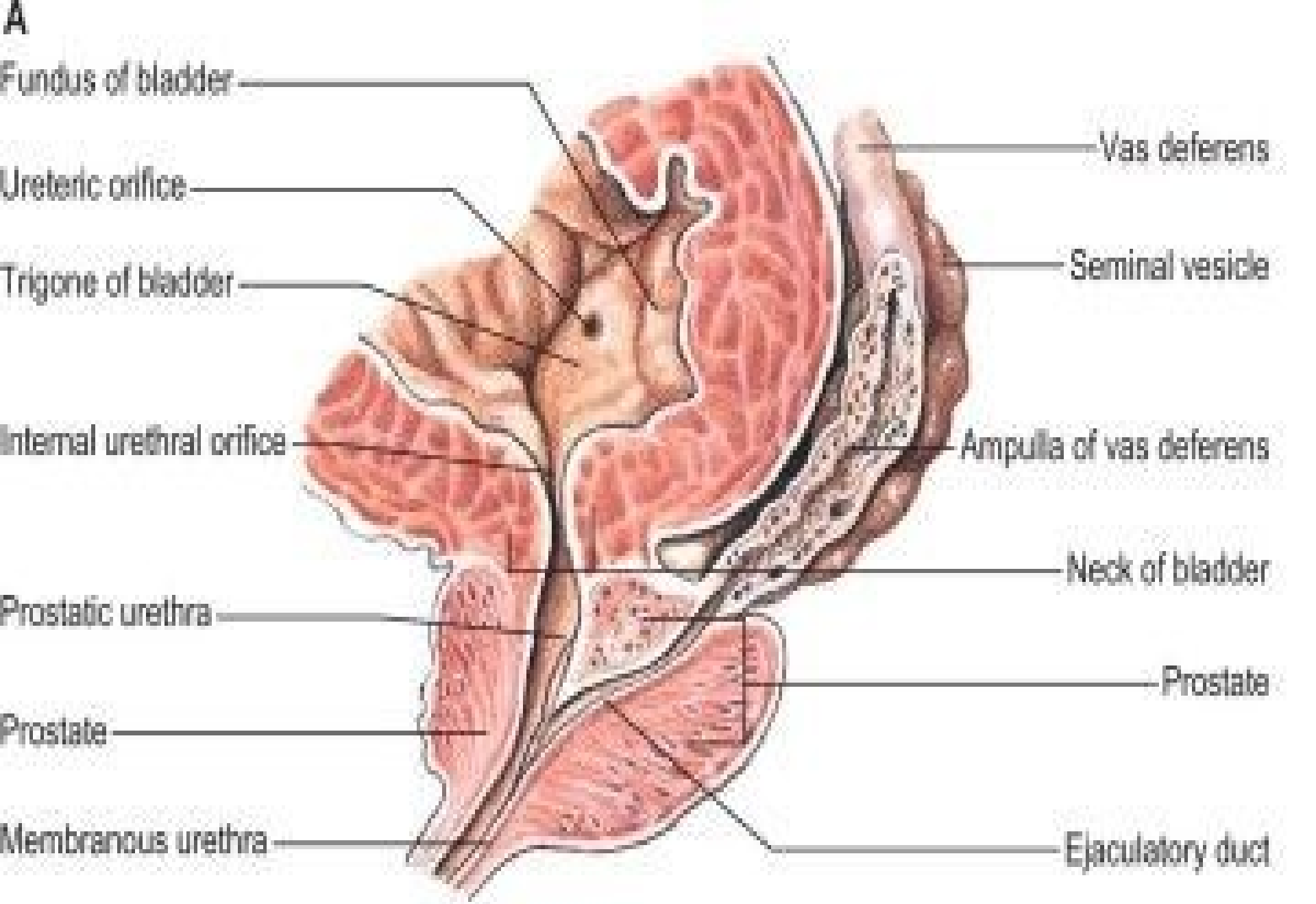
- The vas deferens is a **cordlike** structure that can be palpated between finger and thumb in the upper part of the **scrotum**.
- It is 45 cm long
- transports **spermatozoa** from the epididymis to the urethra.
- distal continuation of the epididymis
- From the superior pole of the **testis** it ascends in the posterior part of the **spermatic cord**, and traverses the inguinal canal.


Bladder
Ureter
Vas deferens
Seminal vesicle
Symphysis
Prostate
Urethra
Epididymis
Testis
Ejaculatory duct
Cowper's
(bulbourethral) gland
Scrotum

Seminal vesicles

- The seminal vesicles are **two lobulated** organs lying on the posterior surface of the bladder
- Seminal vesicle is about 5 cm long
- The upper pole is like a closed sac, the lower narrows to a straight duct which **joins** the vas deferens to form the **ejaculatory duct**.
- The anterior surface contacts the posterior aspect of the **bladder**
- The posterior surface is related to the rectum


superior surface of bladder
left ureter
left vas deferens
apex of bladder
left seminal vesicle
neck of bladder
prostate
membranous part of urethra
A
superior surface of bladder
right ureter
left ureter
left vas deferens
right vas deferens
ampulla of vas deferens
left seminal vesicle
right seminal vesicle
posterior surface of prostate
membranous part of urethra
B

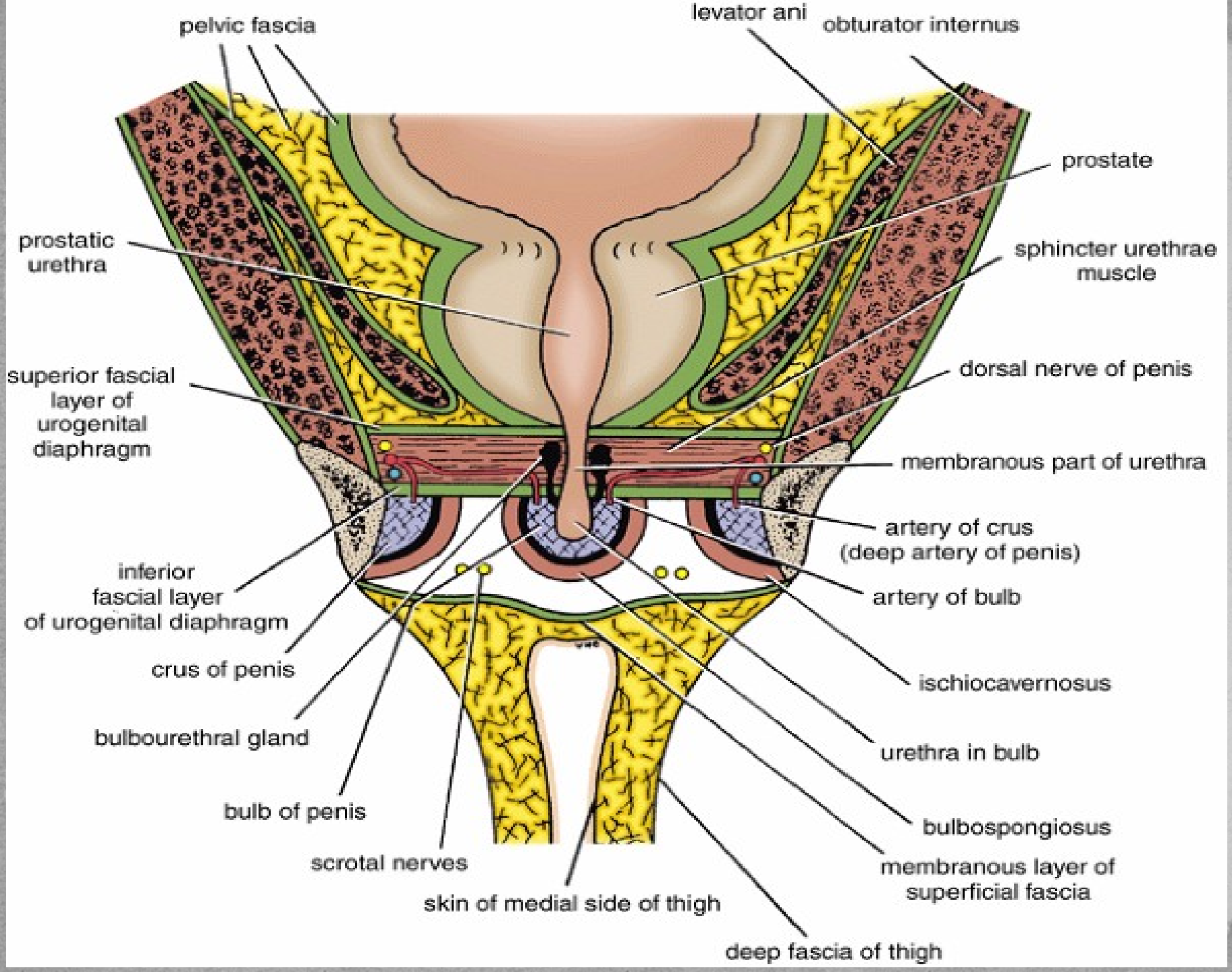

A
Fundus of bladder
Ureteric orifice
Trigone of bladder
Internal urethral orifice
Prostatic urethra
Prostate
Membranous urethra
Vas deferens
Seminal vesicle
Ampulla of vas deferens
Neck of bladder
Prostate
Ejaculatory duct

Ejaculatory ducts

- The two ejaculatory ducts are each less than **2.5 cm** long
- formed by the union of the **vas deferens** and the duct of the **seminal vesicle**.
- The ejaculatory ducts pierce the posterior surface of the **prostate** and open into the prostatic part of the **urethra**
- Their function is to drain the seminal fluid into the prostatic urethra.

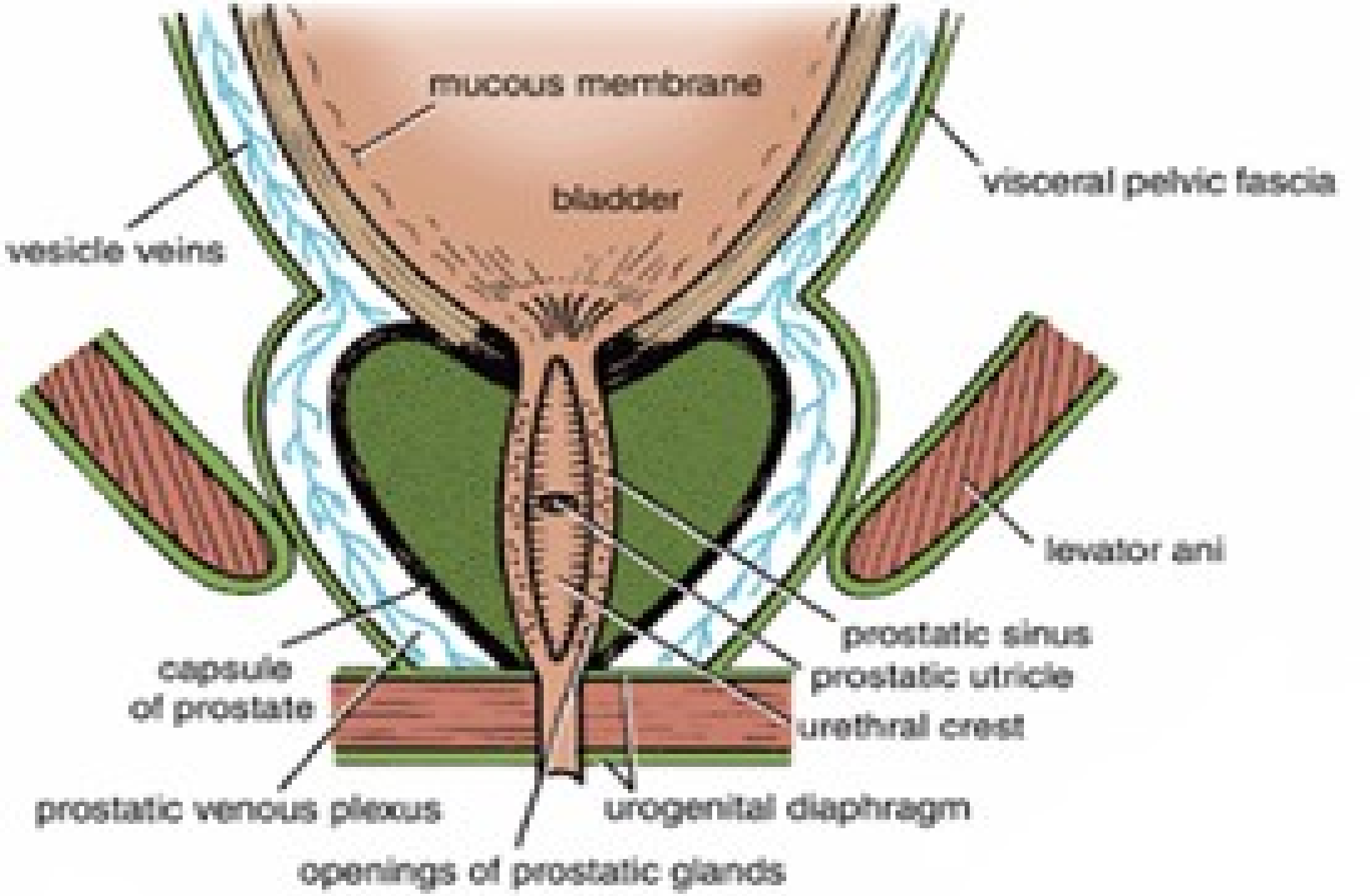
Bulbourethral glands

- The bulbourethral glands are two small glands that lie beneath the **sphincter urethrae muscle**.
- Their ducts pierce the **perineal membrane** (inferior fascial layer of the urogenital diaphragm) and enter the **penile** portion of the **urethra**.
- The secretion is poured into the urethra as a result of erotic stimulation.

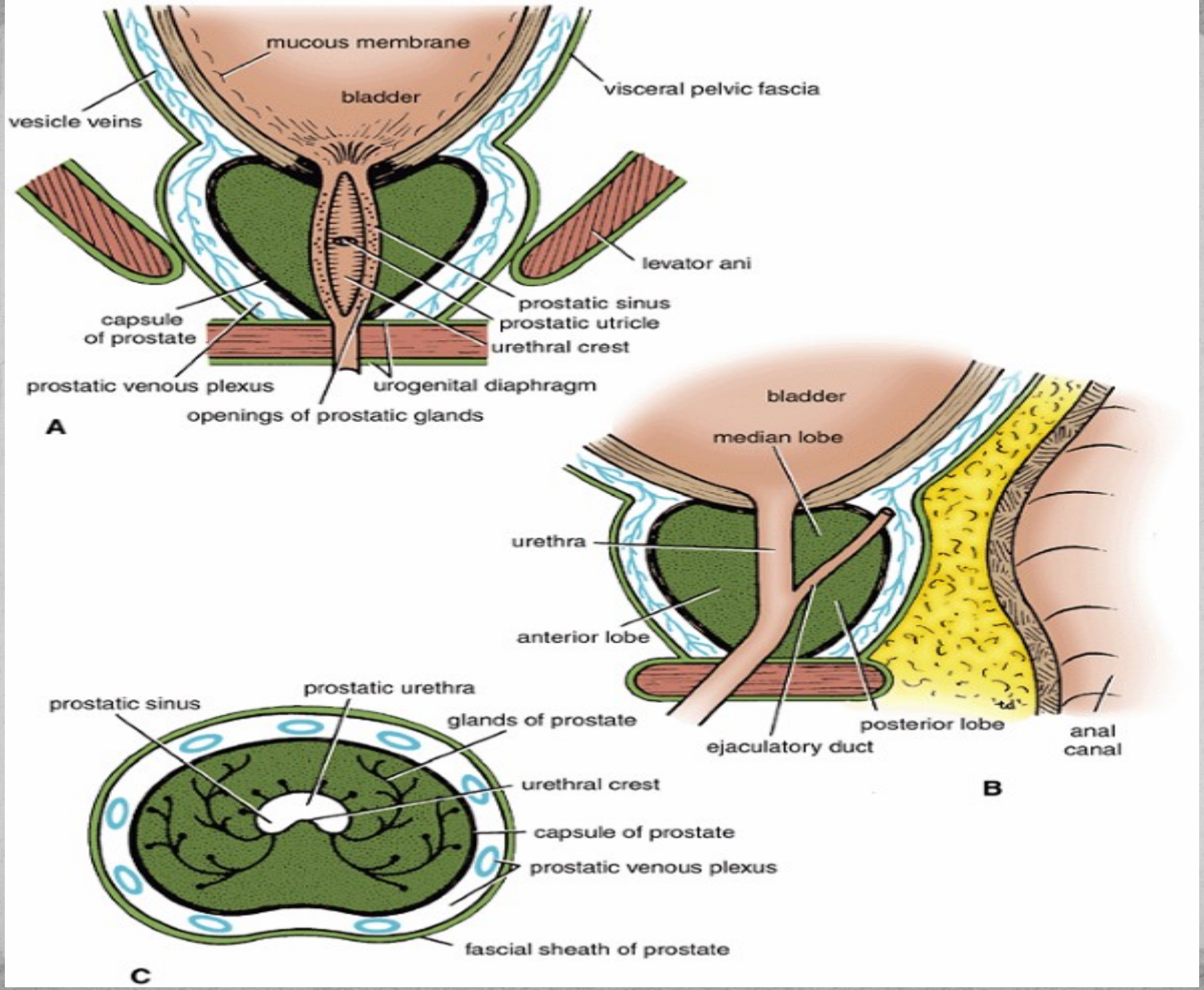

pelvic fascia
levator ani
obturator internus
prostate
prostatic urethra
sphincter urethrae muscle
superior fascial layer of urogenital diaphragm
dorsal nerve of penis
membranous part of urethra
artery of crus (deep artery of penis)
inferior fascial layer of urogenital diaphragm
artery of bulb
crus of penis
ischiocavernosus
bulbourethral gland
urethra in bulb
bulb of penis
bulbospongiosus
scrotal nerves
membranous layer of superficial fascia
skin of medial side of thigh
deep fascia of thigh

Prostate

- The prostate is a pyramidal **fibro muscular** gland which surrounds the prostatic urethra.
- It is about 3 cm long and lies between the neck of the **bladder** above and the **urogenital diaphragm** below
- It has no true fibrous capsule, but is enclosed by **visceral fascia** containing blood vessels & nerves.


mucous membrane
bladder
visceral pelvic fascia
vesicle veins
levator ani
prostatic sinus
prostatic utricle
capsule
of prostate
urethral crest
prostatic venous plexus
urogenital diaphragm
openings of prostatic glands

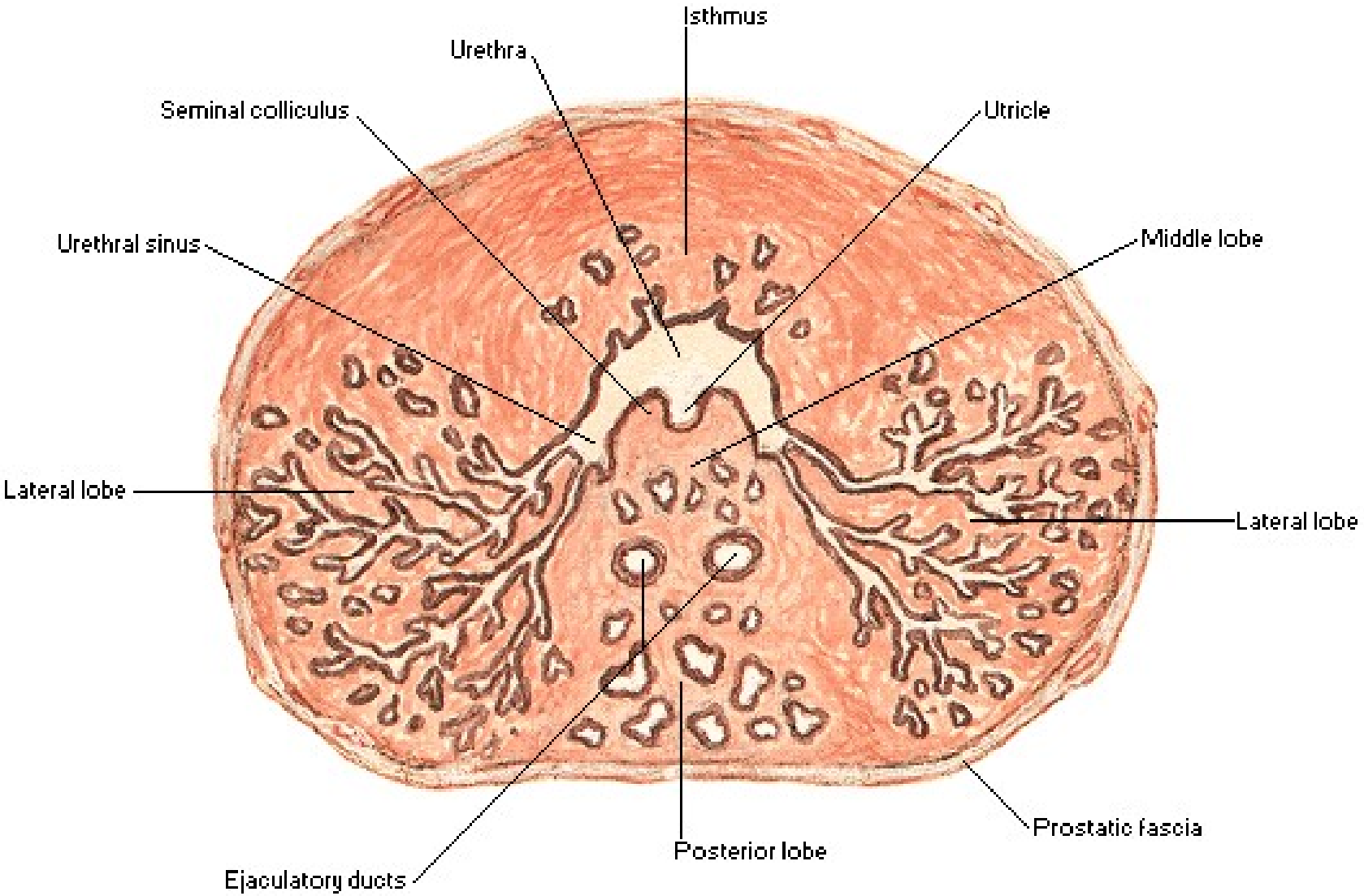
- The prostate is pyramidal in shape & has an
- Apex
- Base
- Four surfaces
- Five lobes


mucous membrane
bladder
vesicle veins
visceral pelvic fascia
levator ani
prostatic sinus
prostatic utricle
urethral crest
capsule of prostate
prostatic venous plexus
urogenital diaphragm
openings of prostatic glands
A
bladder
median lobe
urethra
anterior lobe
ejaculatory duct
posterior lobe
anal canal
B
prostatic sinus
prostatic urethra
glands of prostate
urethral crest
capsule of prostate
prostatic venous plexus
fascial sheath of prostate
C

- The numerous **glands** of the prostate are embedded in a mixture of **smooth muscle** and **connective tissue**, and their **ducts** open into the **prostatic urethra**.
- The prostate is incompletely divided into **five lobes** .
- The **anterior lobe** lies in front of the urethra and is devoid of glandular tissue.
- The **median** or **middle** lobe is the wedge of gland situated between the urethra and the ejaculatory ducts, rich in glands.

- The **posterior lobe** is situated behind the urethra and below the ejaculatory ducts and also contains glandular tissue.
- The **right** and **left lateral lobes** lie on either side of the urethra and are separated from one another by a shallow vertical groove on the posterior surface of the prostate, contain many glands.

Cross Section through Prostate



Vessels and nerves

Arteries

- Branches of the inferior vesical and middle **rectal arteries**.

Veins

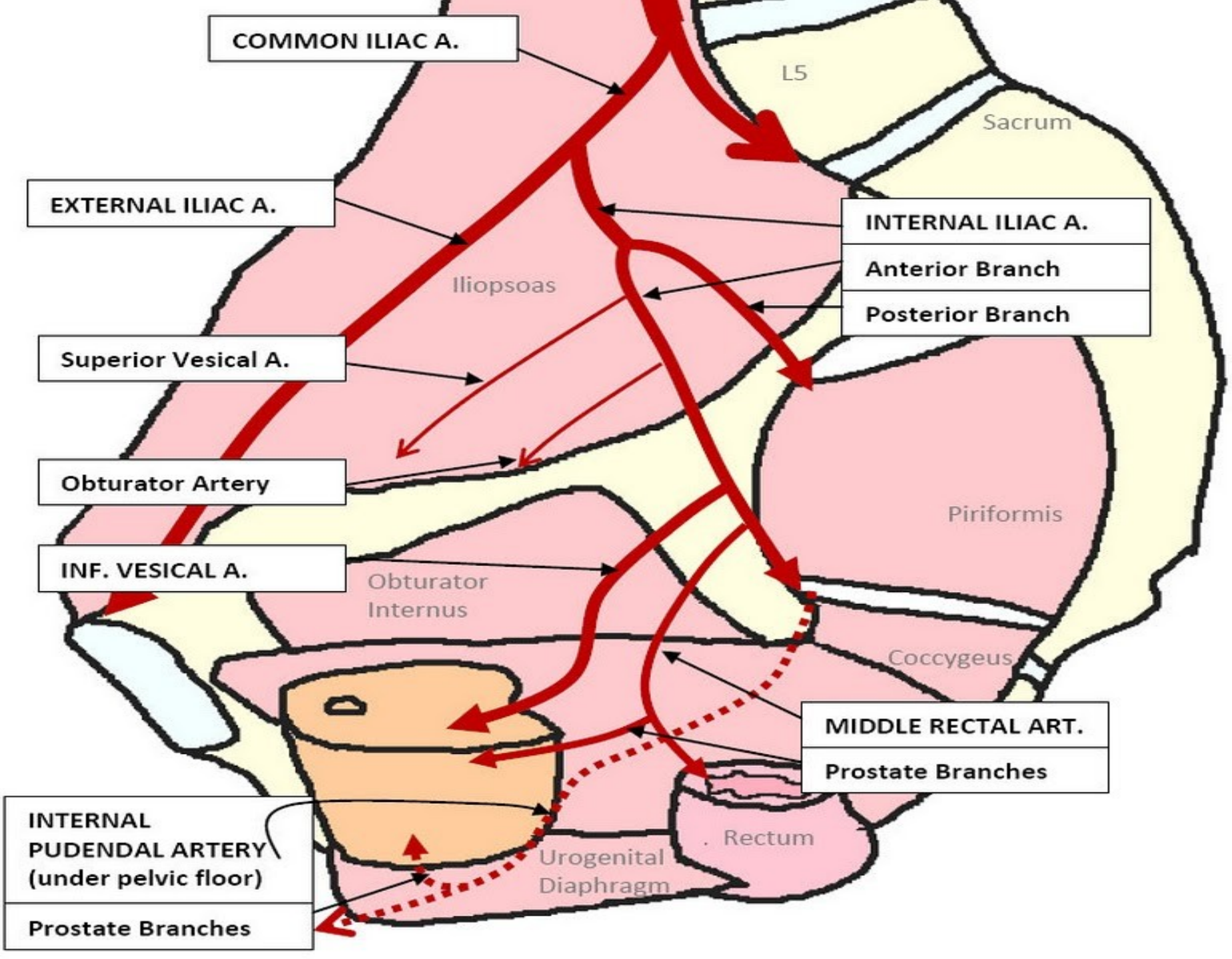
- The veins form the **prostatic venous plexus**
- The **prostatic plexus,** drains into the **internal iliac veins**.

Lymph Drainage

- **Internal iliac nodes.**

Nerve Supply

- Inferior **hypogastric plexuses**.
- The sympathetic nerves stimulate the smooth muscle of the prostate during **ejaculation**.

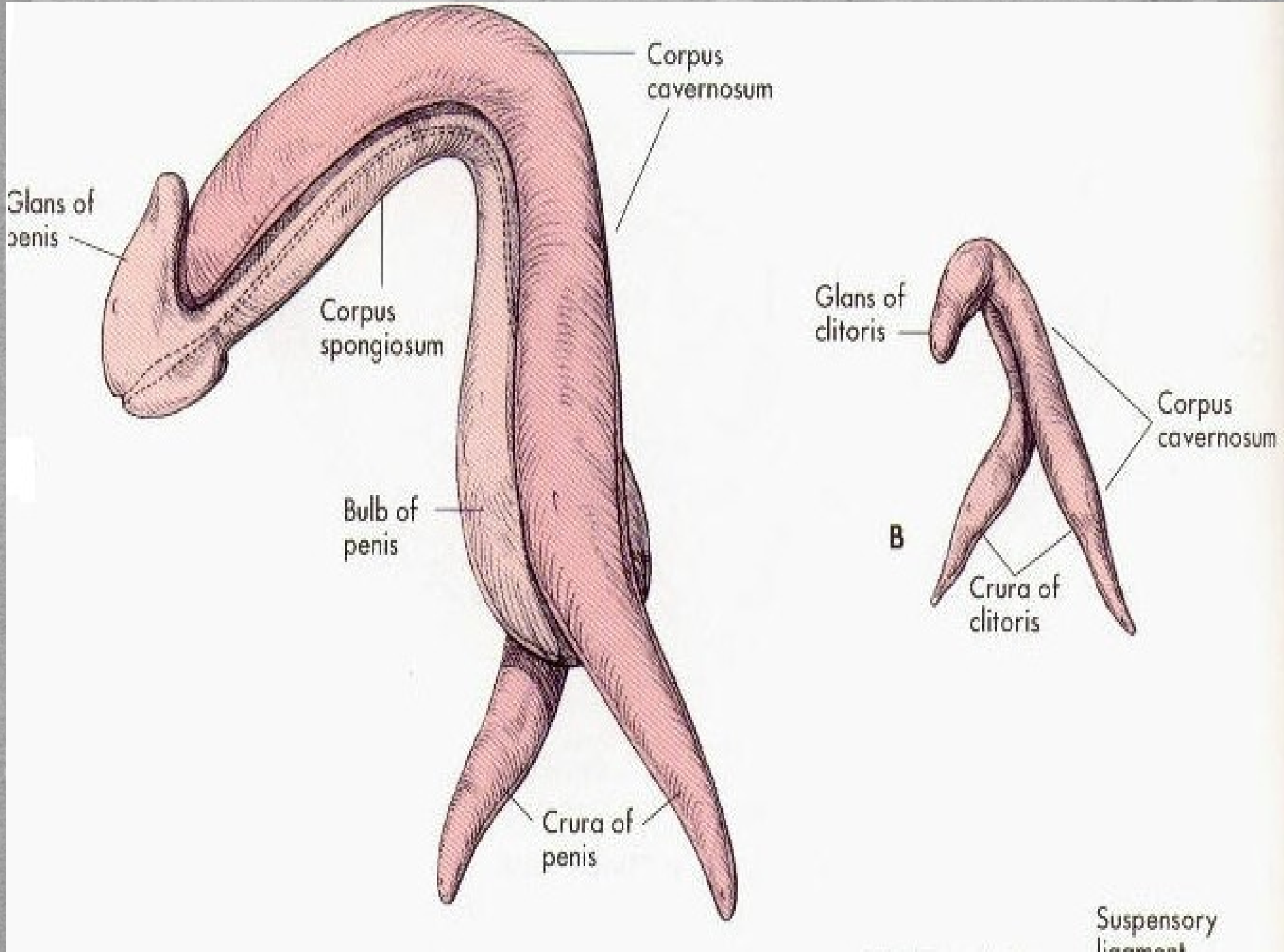

COMMON ILIAC A.
L5
Sacrum
EXTERNAL ILIAC A.
INTERNAL ILIAC A.
Anterior Branch
Posterior Branch
Iliopsoas
Superior Vesical A.
Obturator Artery
Piriformis
INF. VESICAL A.
Obturator
Internus
Coccygeus
MIDDLE RECTAL ART.
Prostate Branches
INTERNAL
PUDENDAL ARTERY
(under pelvic floor)
Rectum
Urogenital
Diaphragm
Prostate Branches

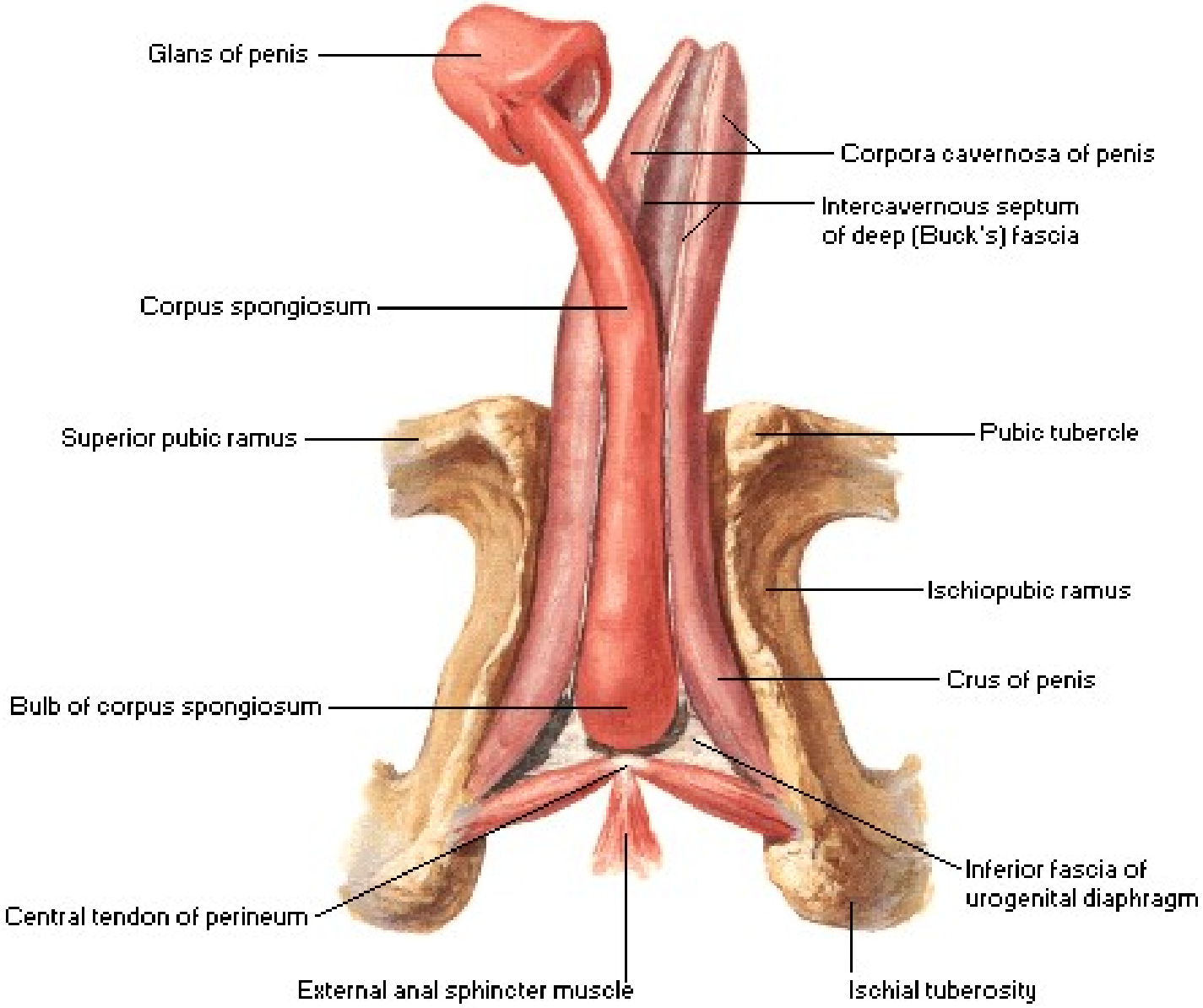
Penis

- Penis is the male external genitalia
- The penis has a fixed **root** and a **body** that hangs free

Root of the Penis

- made up of three masses of **erectile tissue** called as the **bulb** of the penis and the **right** and **left crura** of the penis .
- The **bulb** is situated in the **midline** and is attached to the undersurface of the **urogenital diaphragm**.
- It is traversed by the **urethra** and is covered on its outer surface by the **bulbospongiosus**


Corpus cavernosum
Glans of penis
Corpus spongiosum
Bulb of penis
Crura of penis
Glans of clitoris
Corpus cavernosum
B
Crura of clitoris
Suspensory


Glans of penis
Corpora cavernosa of penis
Intercavernous septum of deep (Buck's) fascia
Corpus spongiosum
Superior pubic ramus
Pubic tubercle
Ischiopubic ramus
Crus of penis
Bulb of corpus spongiosum
Inferior fascia of urogenital diaphragm
Central tendon of perineum
External anal sphincter muscle
Ischial tuberosity

Body of the penis

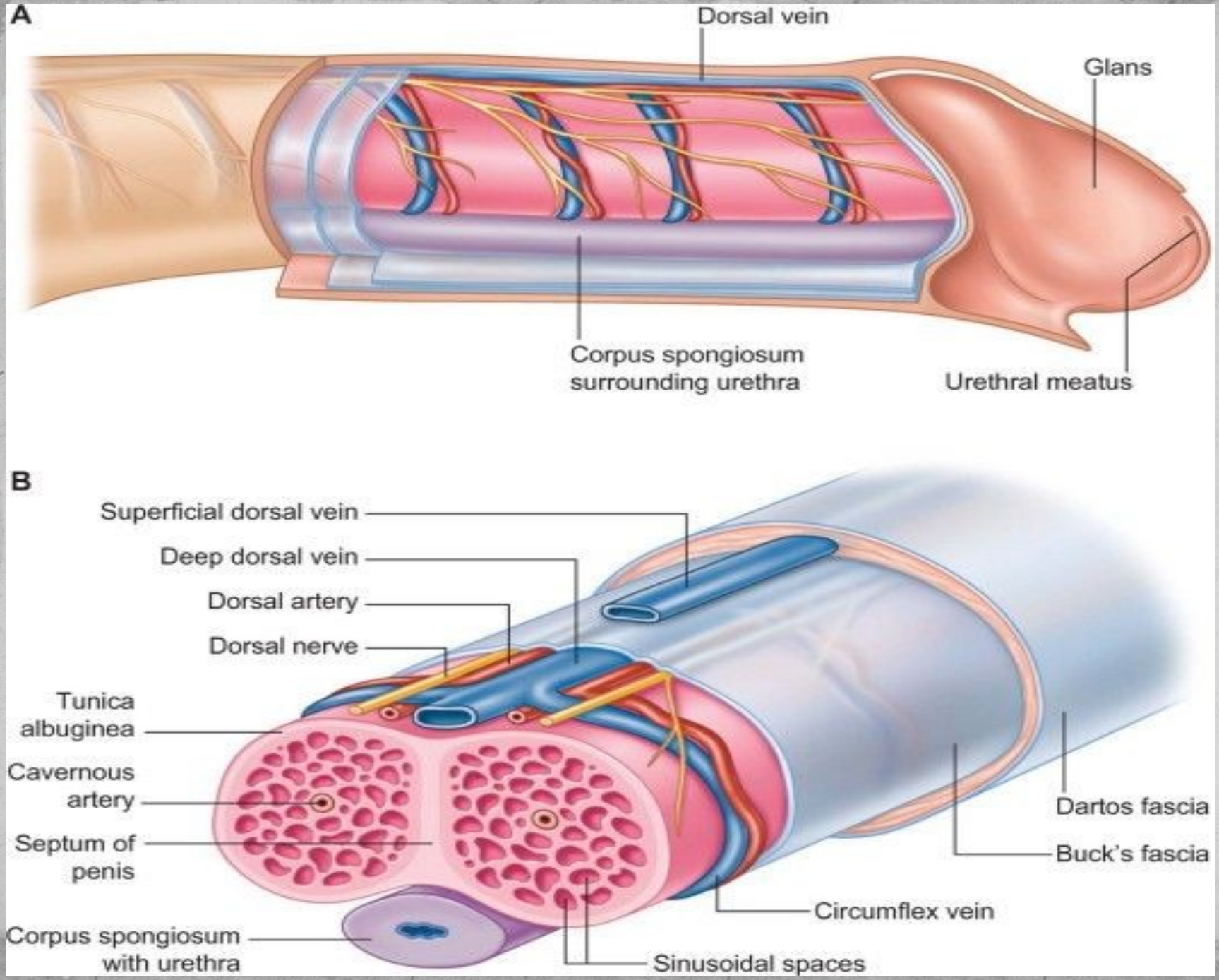
- composed of three cylinders of **erectile tissue**
- enclosed in a tubular sheath of fascia called as **Buck's fascia**.
- The erectile tissue is made up of two dorsally placed **corpora cavernosa** and a single **corpus spongiosum** applied to their ventral surface.

Corpora cavernosa

- Form **most** of the body of the penis.
- have a common fibrous envelope called the **tunica albuginea**
- separated from each other by a **median fibrous septum**

Corpus spongiosum

- traversed by the urethra
- It is cylindrical, and surrounded by a **tunica albuginea**
- Distally the corpus spongiosum is **expanded** & is called as the **glans** penis
- On the tip of the glans penis is the slitlike orifice of the urethra & is called the **external urethral meatus**.


A
Dorsal vein
Glans
Corpus spongiosum
surrounding urethra
Urethral meatus
B
Superficial dorsal vein
Deep dorsal vein
Dorsal artery
Dorsal nerve
Tunica
albuginea
Cavernous
artery
Septum of
penis
Corpus spongiosum
with urethra
Dartos fascia
Buck's fascia
Circumflex vein
Sinusoidal spaces

- The prepuce or **foreskin** is a fold of skin that covers the glans.
- It is connected to the glans just below the urethral orifice by a fold called the **frenulum**.

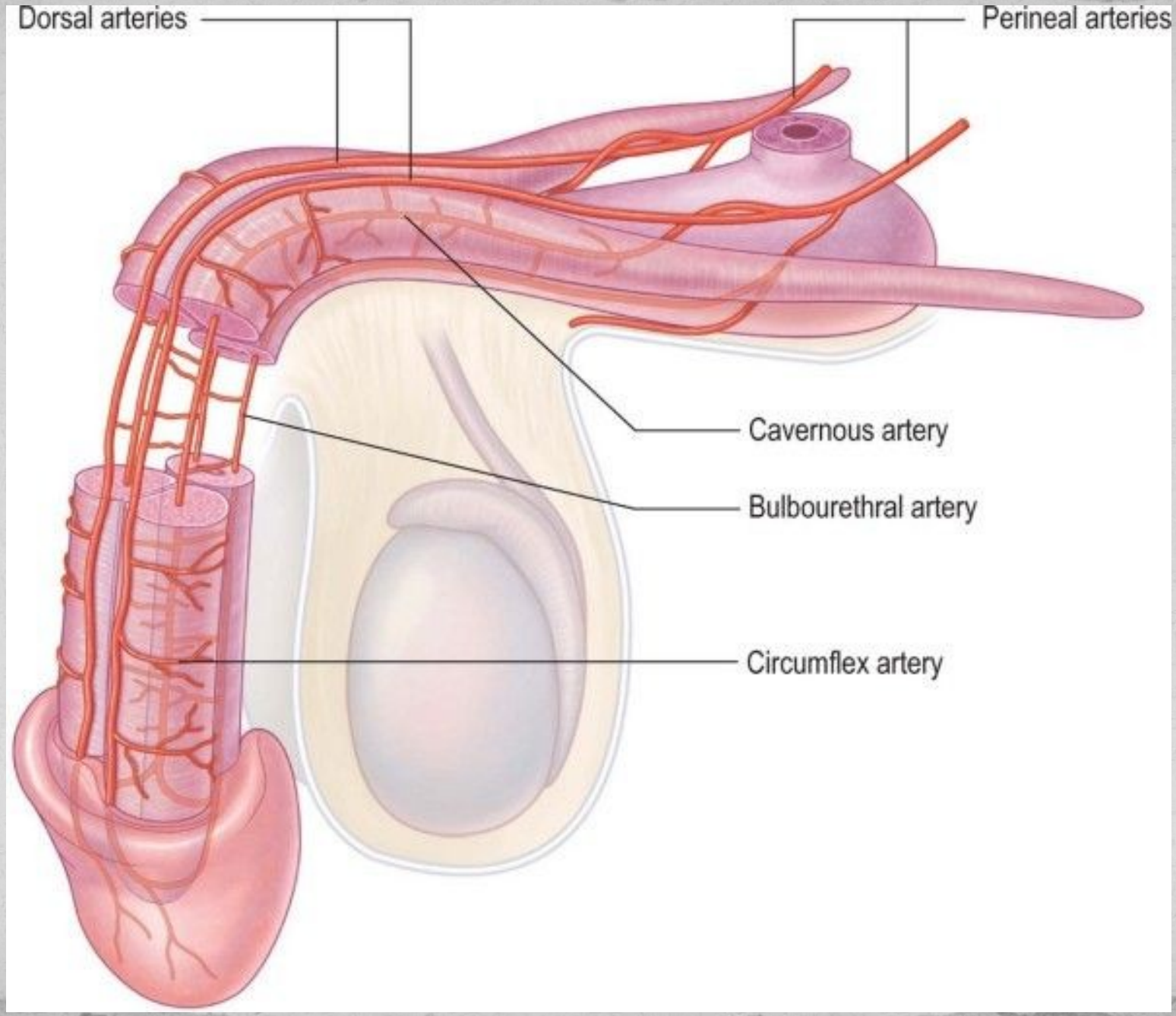
Vessels and nerves

Arteries

- The corpora cavernosa are supplied by the deep arteries of the penis
- The corpus spongiosum & bulbourethral glands are supplied by the artery of the bulb of the penis.
- In addition, there is the dorsal artery of the penis.
- All the above arteries are branches of the internal pudendal artery.

Veins

- The veins drain into the internal pudendal veins.


Dorsal arteries
Perineal arteries
Cavernous artery
Bulbourethral artery
Circumflex artery

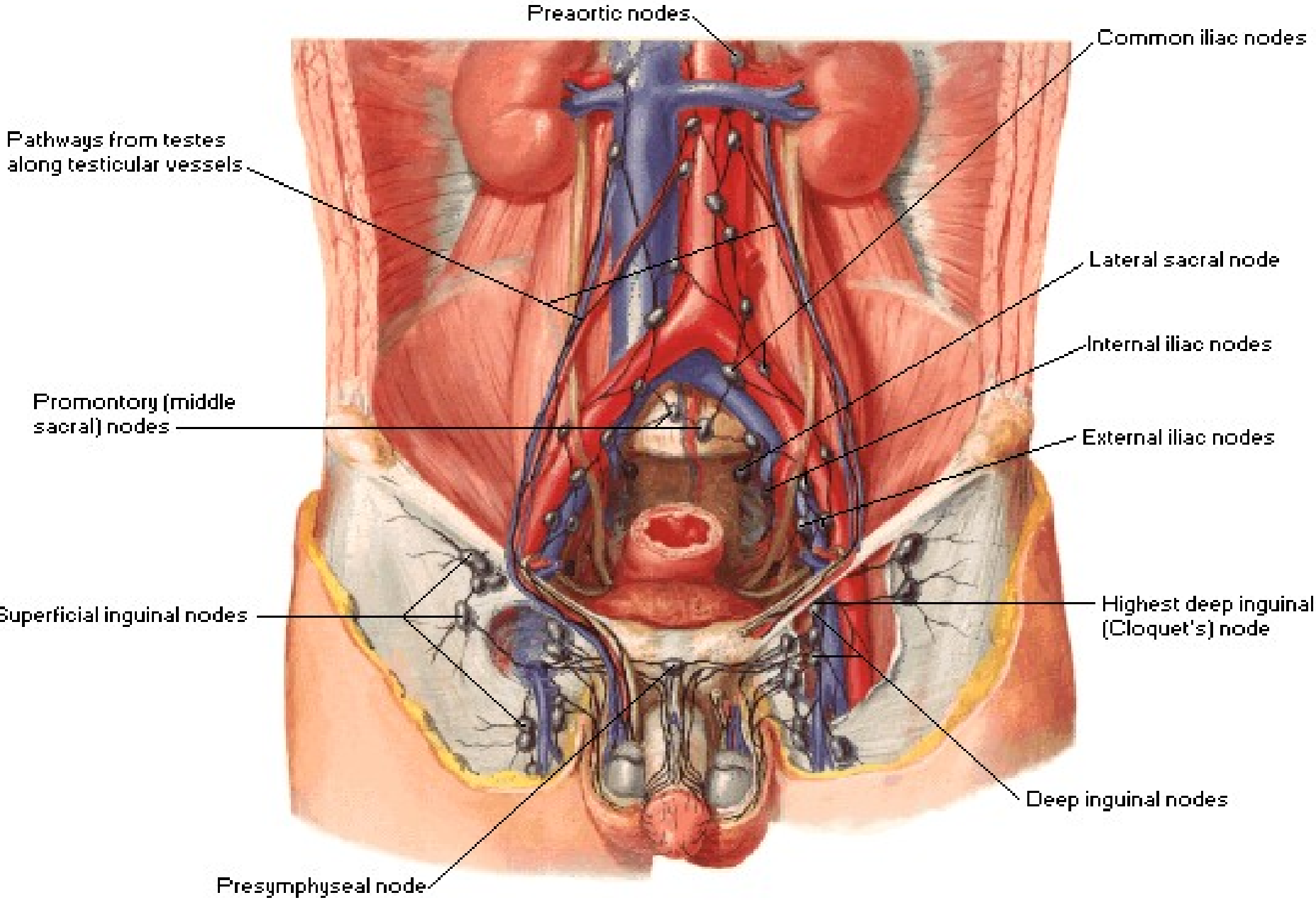
Lymph Drainage

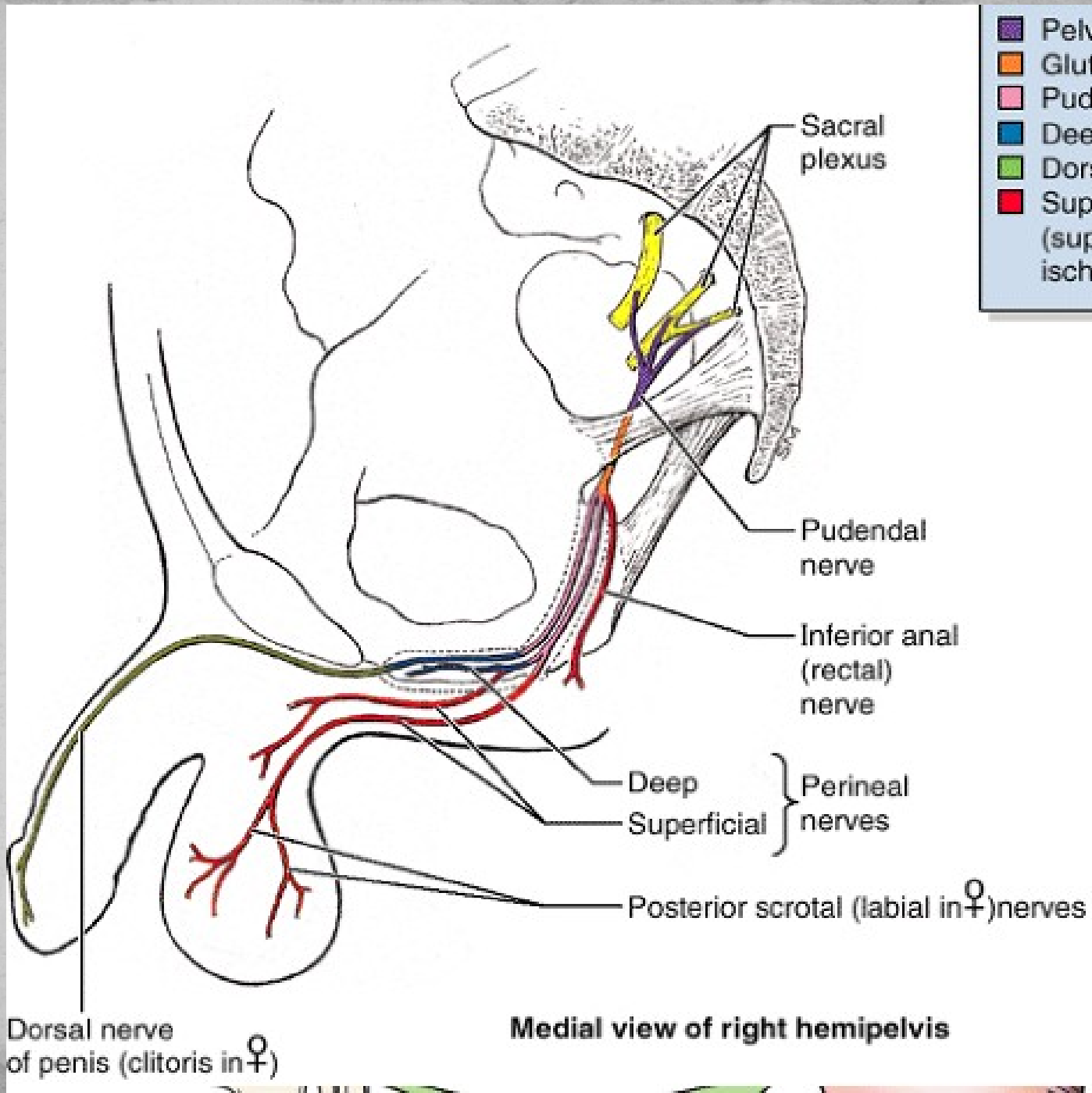
- The skin of the penis is drained into the medial group of superficial inguinal nodes.
- The deep structures of the penis are drained into the internal iliac nodes.

Nerve Supply

- The nerve supply is from the pudendal nerve and the pelvic plexuses.

Male


Preaortic nodes
Common iliac nodes
Pathways from testes along testicular vessels
Lateral sacral node
Internal iliac nodes
Promontory (middle sacral) nodes
External iliac nodes
Superficial inguinal nodes
Highest deep inguinal (Cloquet's) node
Deep inguinal nodes
Presymphyseal node

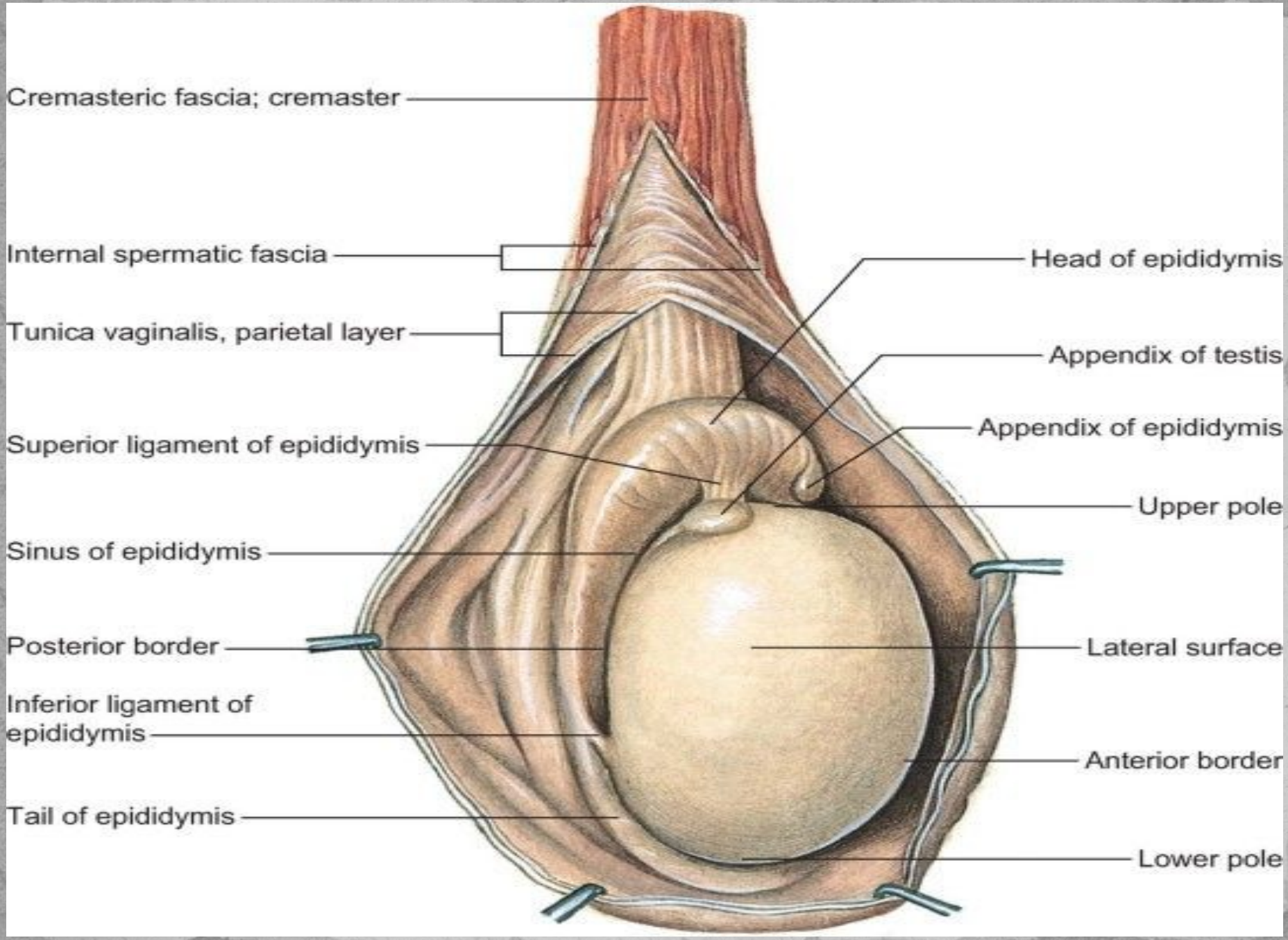


Medial view of right hemipelvis

Testes

- The testes are the primary **reproductive** organs or gonads in the male.
- They are oval in shape, reproductive and endocrine organs responsible for **sperm production** and **testosterone** production.
- They are suspended in the scrotum by **spermatic cords**.
- Average testicular dimensions are 4–5 cm in length, 2.5 cm in breadth and 3 cm in anteroposterior diameter
- The average weight of testis is **10g**.

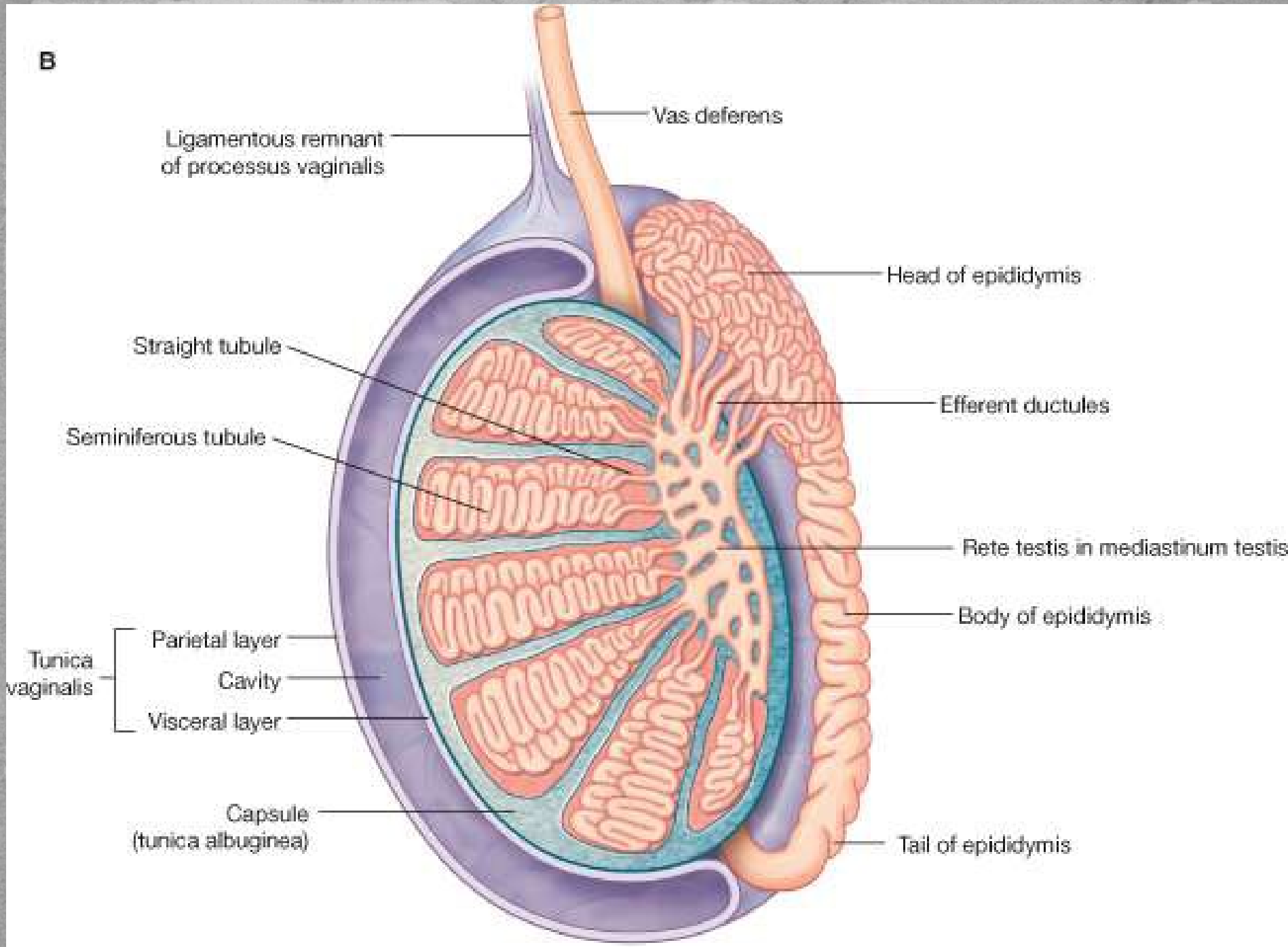
- The **left** testis usually lies little lower than the right testis.
- Each testis consist of
- **Two poles** – upper pole & lower pole
- **Two borders** – anterior & posterior borders
- **Two surfaces** – medial & lateral surfaces


Cremasteric fascia; cremaster
Internal spermatic fascia
Tunica vaginalis, parietal layer
Superior ligament of epididymis
Sinus of epididymis
Posterior border
Inferior ligament of epididymis
Tail of epididymis
Head of epididymis
Appendix of testis
Appendix of epididymis
Upper pole
Lateral surface
Anterior border
Lower pole

Covering of testis

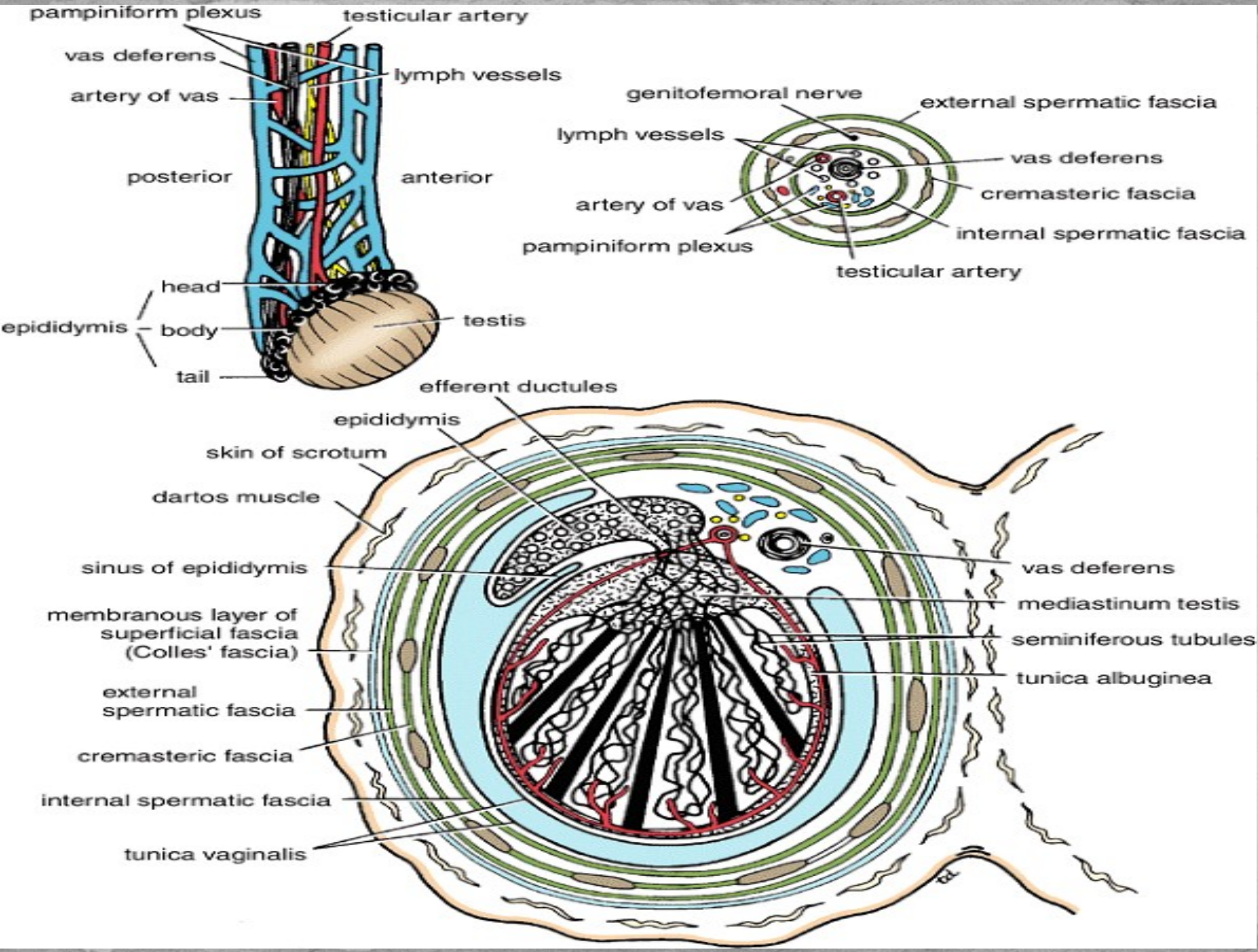
The testis is covered by **three coats**, which are, from outside inwards,

- **Tunica vaginalis:** has two layers- a parietal layer & a visceral layer
- **Tunica albuginea:** a thick fibrous tissue covering
- **Tunica vasculosa:** vascular layer


B
Vas deferens
Ligamentous remnant of processus vaginalis
Head of epididymis
Straight tubule
Efferent ductules
Seminiferous tubule
Rete testis in mediastinum testis
Body of epididymis
Tunica vaginalis
Parietal layer
Cavity
Visceral layer
Capsule (tunica albuginea)
Tail of epididymis

Epididymis

- The epididymis is a firm structure lying **posterior** to the testis
- with the **vas deferens** lying on its medial side.
- It has **three parts**:
- **Head**,
- **Body**, and
- **Tail**.
- Laterally, a distinct groove lies between the testis and the epididymis called the **sinus of the epididymis**


pampiniform plexus
testicular artery
vas deferens
lymph vessels
artery of vas
posterior
anterior
head
epididymis
body
testis
tail
genitofemoral nerve
external spermatic fascia
lymph vessels
vas deferens
cremasteric fascia
artery of vas
internal spermatic fascia
pampiniform plexus
testicular artery
efferent ductules
epididymis
skin of scrotum
dartos muscle
sinus of epididymis
membranous layer of superficial fascia (Colles' fascia)
external spermatic fascia
cremasteric fascia
internal spermatic fascia
tunica vaginalis
vas deferens
mediastinum testis
seminiferous tubules
tunica albuginea

Vessels and nerves

Arteries

- Testicular arteries, branch of abdominal aorta

Veins

- The testicular veins emerge from the testis and the epididymis as a venous network, the **pampiniform plexus**.
- This becomes reduced to a single vein as it ascends through the inguinal canal.
- The right testicular vein drains into the inferior vena cava, and the left vein joins the left renal vein.

Lymph Drainage

- The lymph vessels ascend in the spermatic cord
- end in the lymph nodes on the side of the aorta (lumbar or para-aortic)

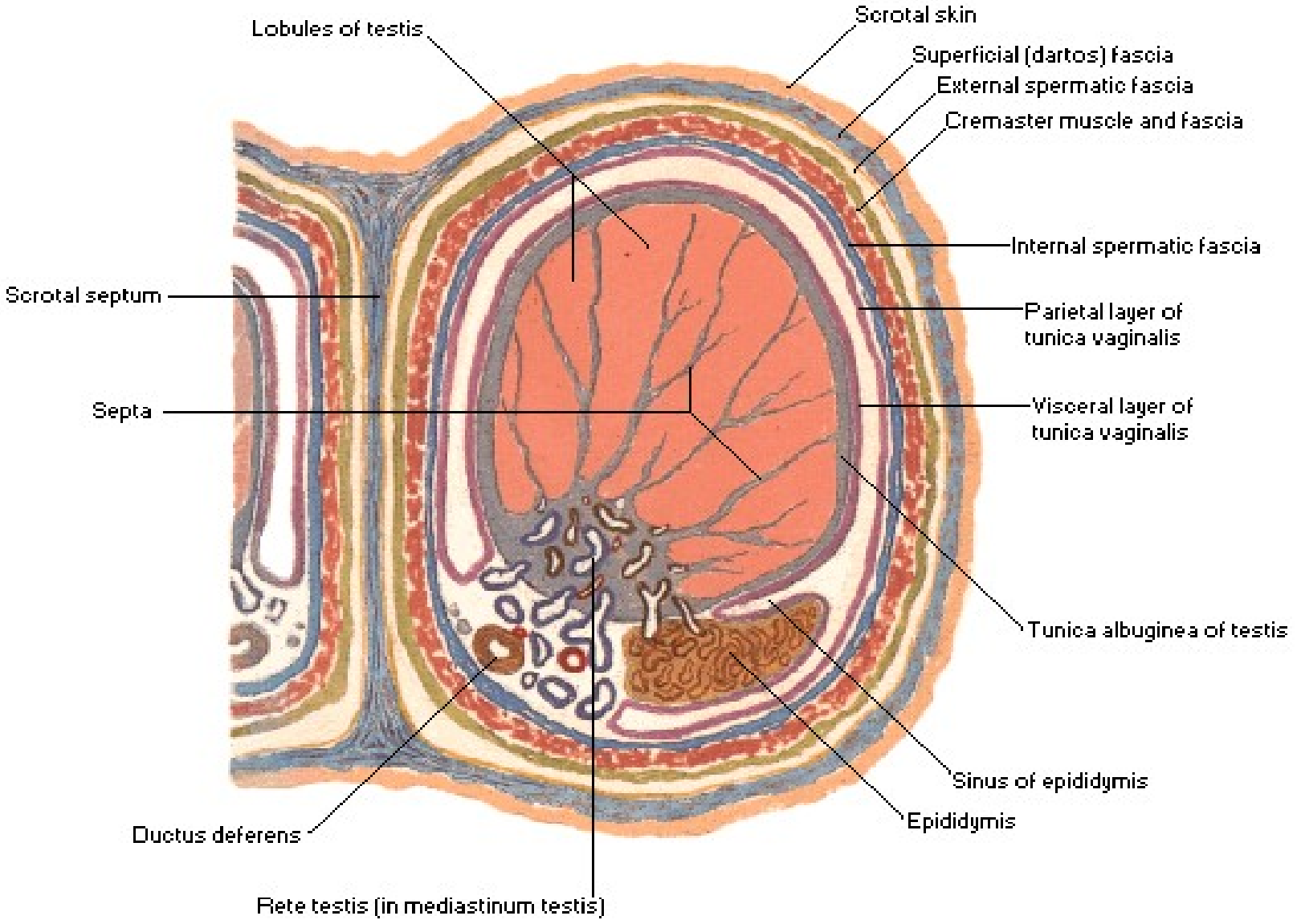
Scrotum

- The scrotum is a **cutaneous fibromuscular sac**
- **containing** the testes and lower parts of the spermatic cords
- hangs below the **pubic symphysis** between the anteromedial aspects of the thighs.

It consists of

- Skin
- Dartos muscle and
- External spermatic,
- Cremasteric and
- Internal spermatic fasciae.
- Tunica vaginalis

Cross Section



Vessels and nerves

Arteries

- external pudendal branches of the femoral artery
- scrotal branches of the internal pudendal artery
- cremasteric branch from the inferior epigastric artery

Veins

- external pudental vein, scrotal vein & cremasteric vein.

Lymph

- From the skin and fascia, including the tunica vaginalis, drains into the **superficial inguinal lymph nodes**

Nerves

- ilioinguinal nerve
- genital branch of the genitofemoral nerve
- two posterior scrotal branches of the perineal nerve
- perineal branch of the posterior femoral cutaneous nerve.

Thank You!