MALE REPRODUCTIVE SYSTEM

OBJECTIVES

- By the end of the lecture, you should be able to:
- List the different components of the male reproductive system.
- Describe the anatomy of the primary and the secondary sex organs regarding: (location, function, structure, blood supply & lymphatic drainage).
- Describe the anatomy of the male external genital organs.

Components Of Male Reproductive System

I- Primary Sex Organ:

- Testis.

II- Reproductive Tract:

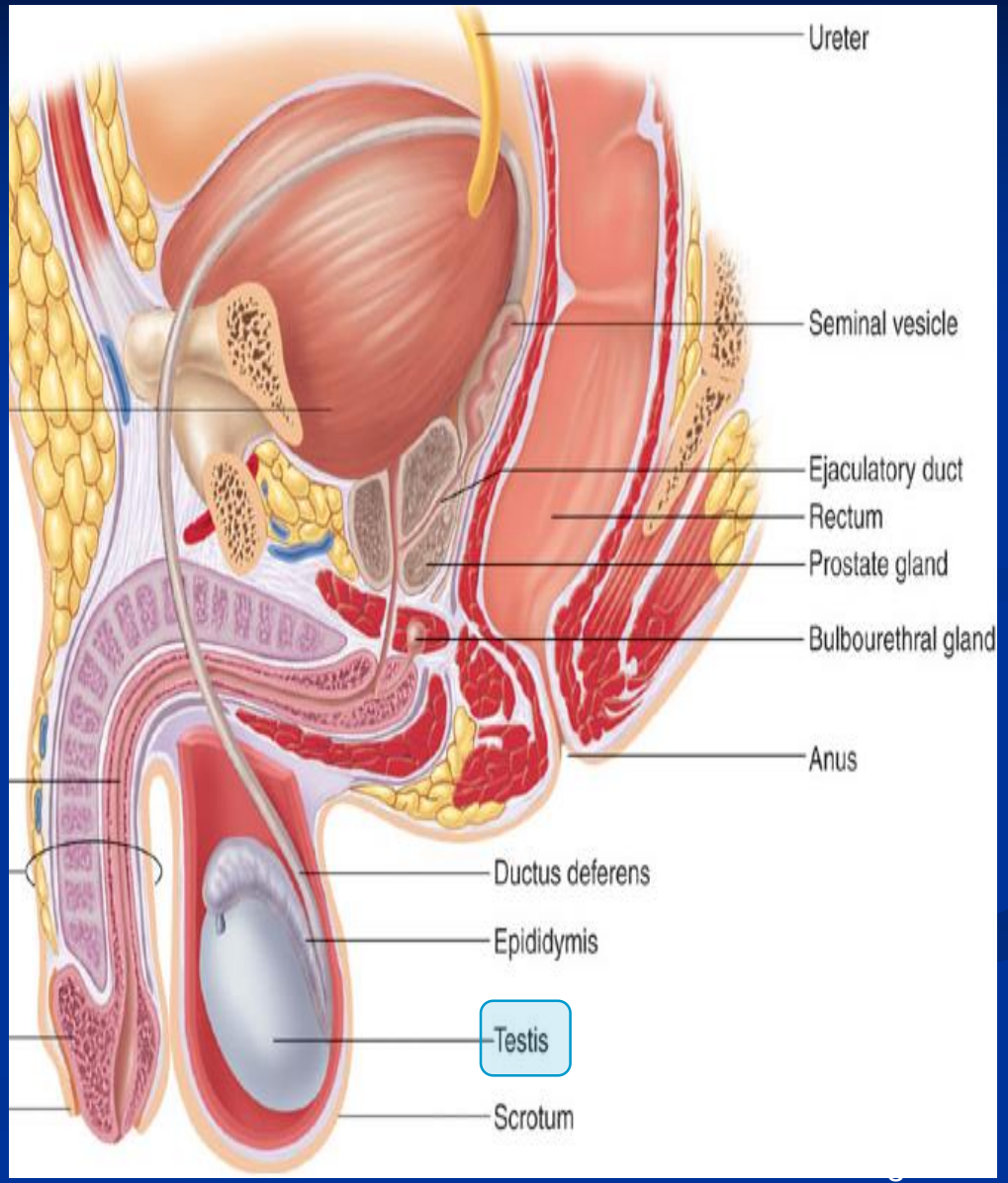
- Epididymis.
- Vas Deferens.
- Spermatic cord.

III- Accessory Sex Glands:

- Seminal vesicles.
- Prostate gland.
- Bulbourethral glands.

IV- External Genitalia:

- Penis

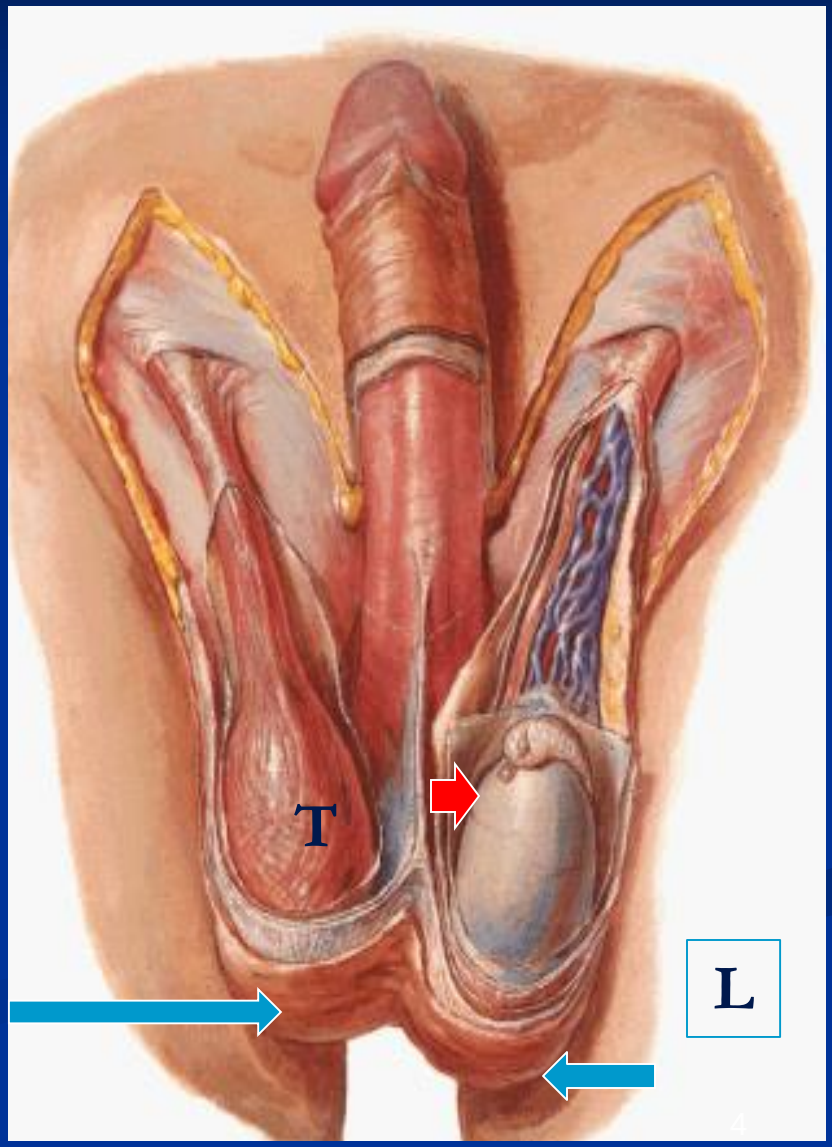


Scrotum

- **An out pouching of loose skin & superficial fascia.**

  The left scrotum is slightly lower than the right.

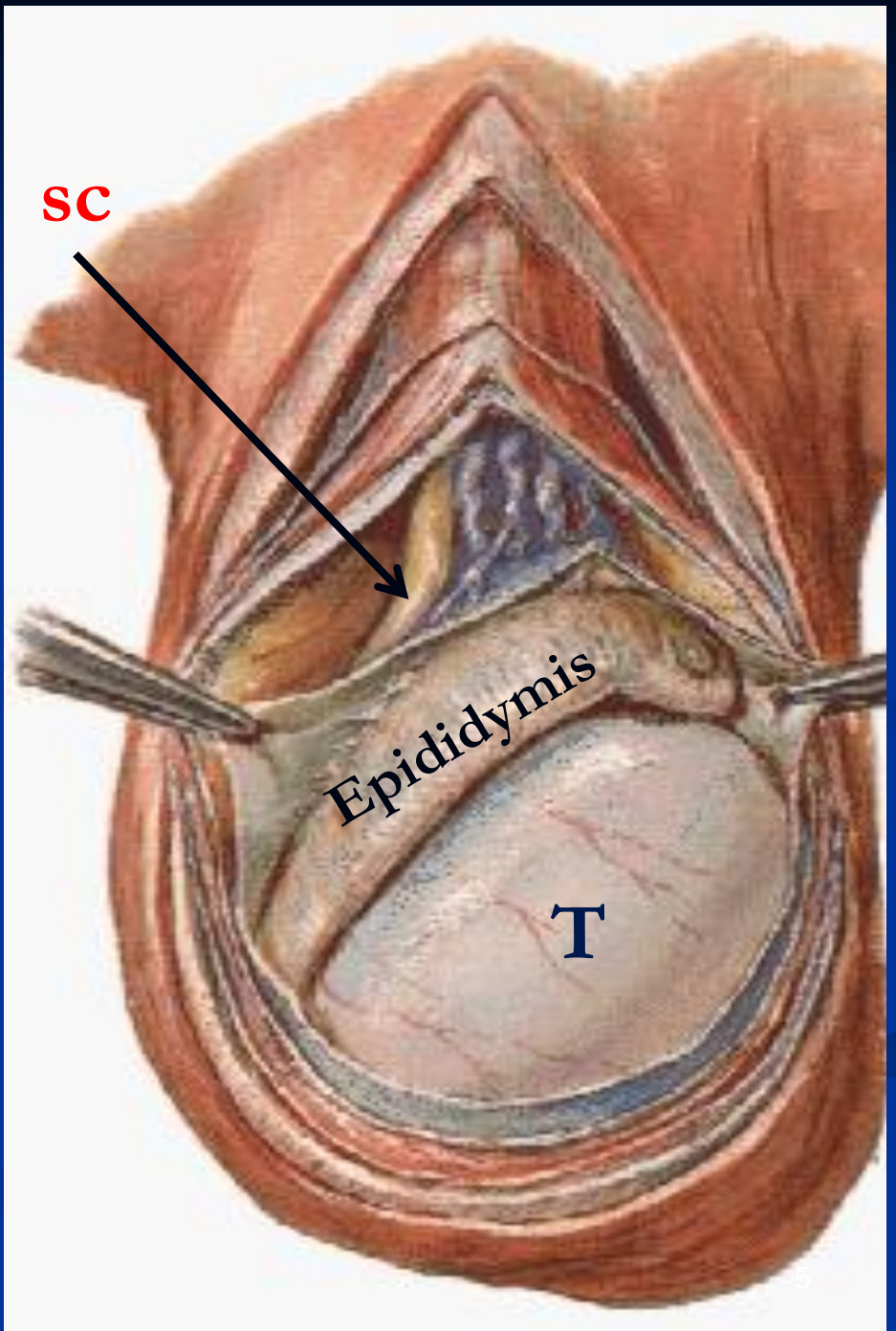
- **Functions:**
  - Houses and protects the testis.
  - Regulates testicular temperature (no superficial fat).
  - It has thin skin with sparse hairs and sweat glands.
  - **The Dartos** muscle lies within the superficial fascia and replaces Scarp's fascia of the anterior abdominal wall..



Testes

- Paired almond-shape gonads that suspended in the scrotum by the spermatic cord.
- Its volume is about 20-25 ml.
- 4 - 5 cm long.
- Weigh (10.5 – 14 g.).
- Functions:
  - Spermatogenesis.
  - Hormone production:

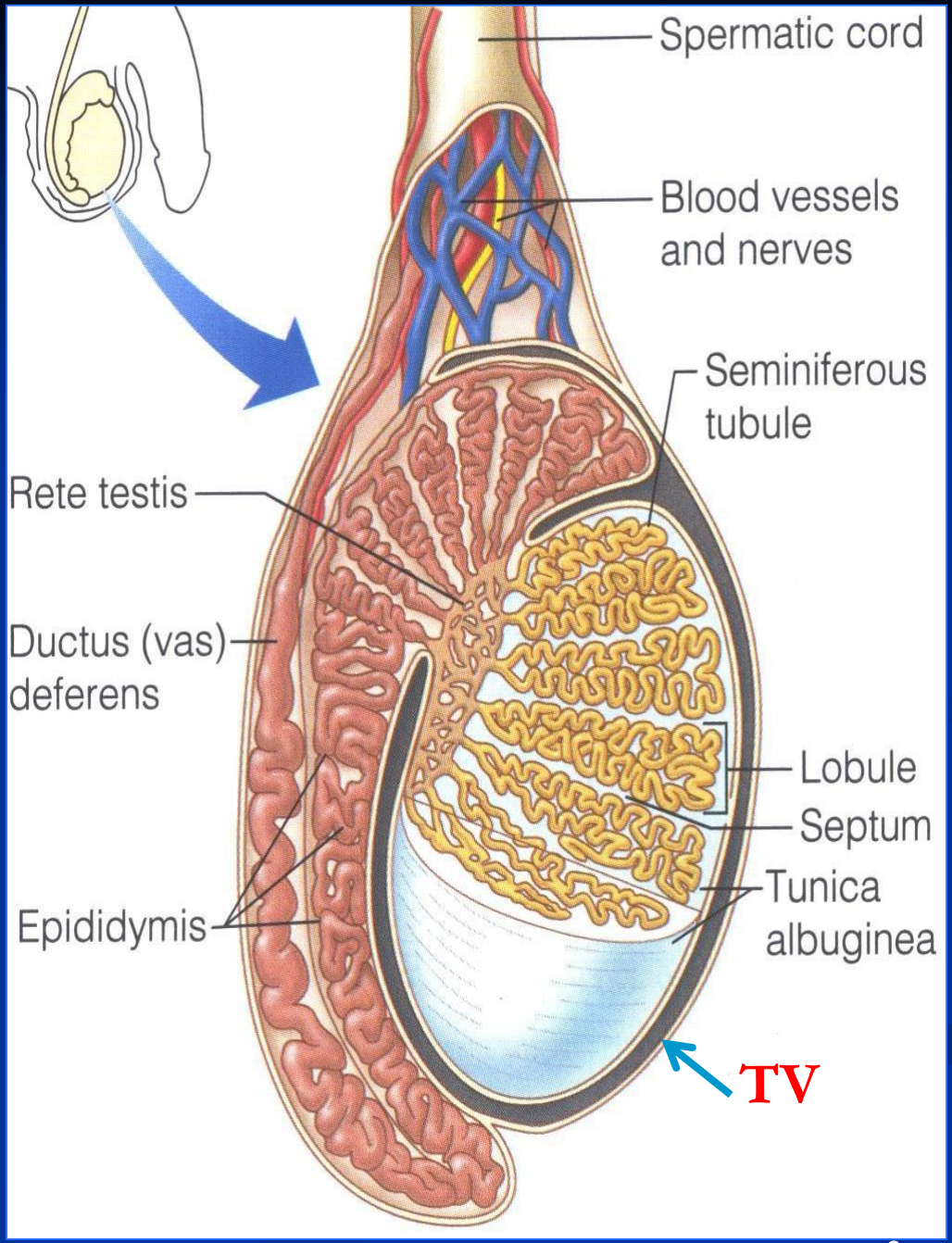
  (Androgens--testosterone).
  - Testis or Testicle (singular), Testes (plural).



Coverings Of The Testis

- **Tunica Vaginalis:**
- Peritoneal covering, formed of parietal and visceral layers.
- It surrounds testis & epididymis.
- It allows free movement of testis within the scrotum.
- **Tunica albuginea:**

It is a whitish fibrous capsule.

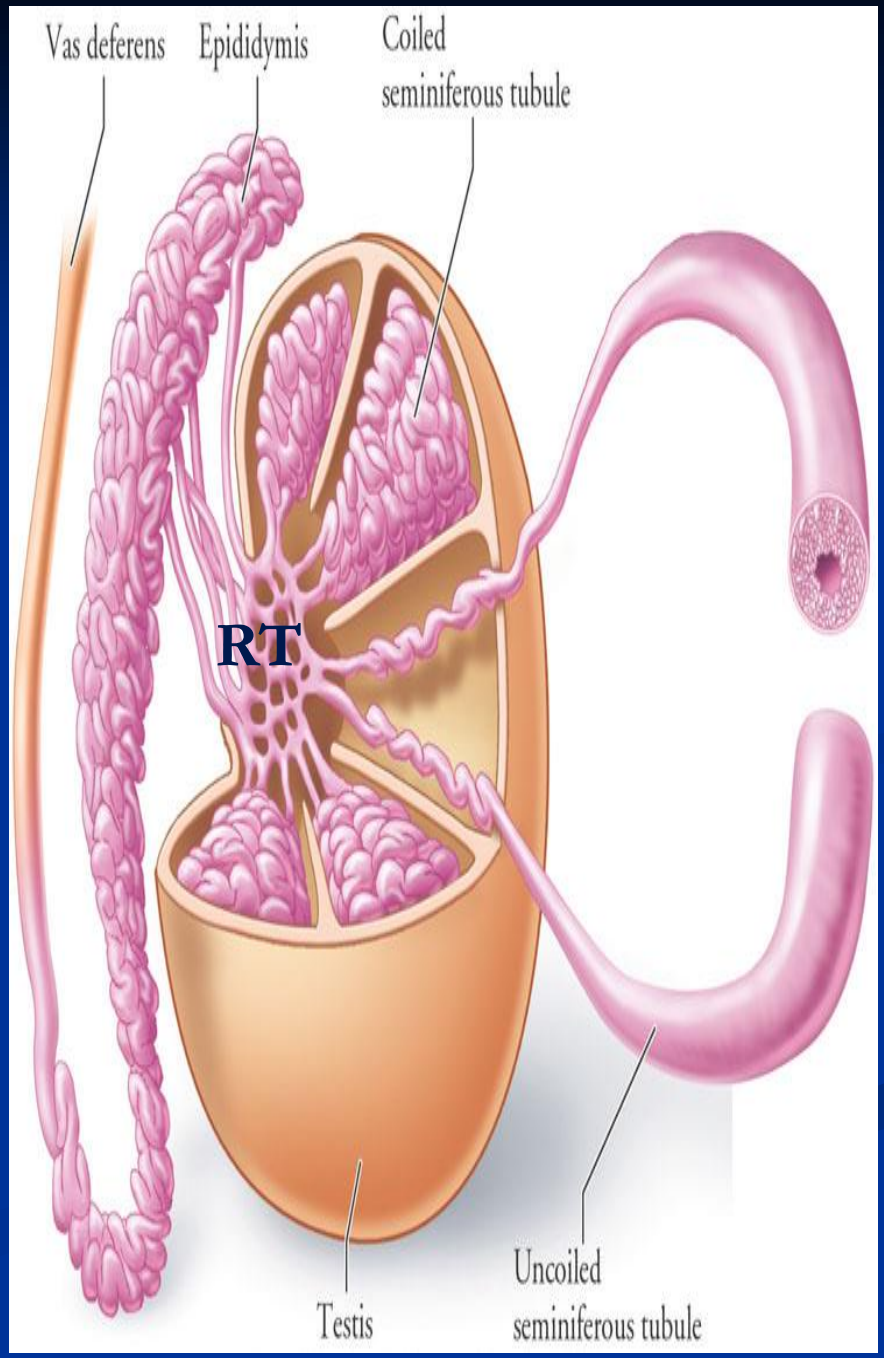


Internal Structure

Fibrous septae extend from the capsule, dividing the testis into (200-300) lobules (average 250).

Each lobule contains, (1-3) seminiferous tubules.

- Seminiferous tubules:
- (Each is a 60 cm coiled tubule).
- They are the site of spermatogenesis.
- They form the bulk of testicular tissue.
- In between the seminiferous tubules lies the Interstitial cells of Leydig which secret Testosterone.
- Rete testis:
- A network of tubules.
- It is the site of merging of the Seminiferous tubules.



Blood Supply

Testicular artery:

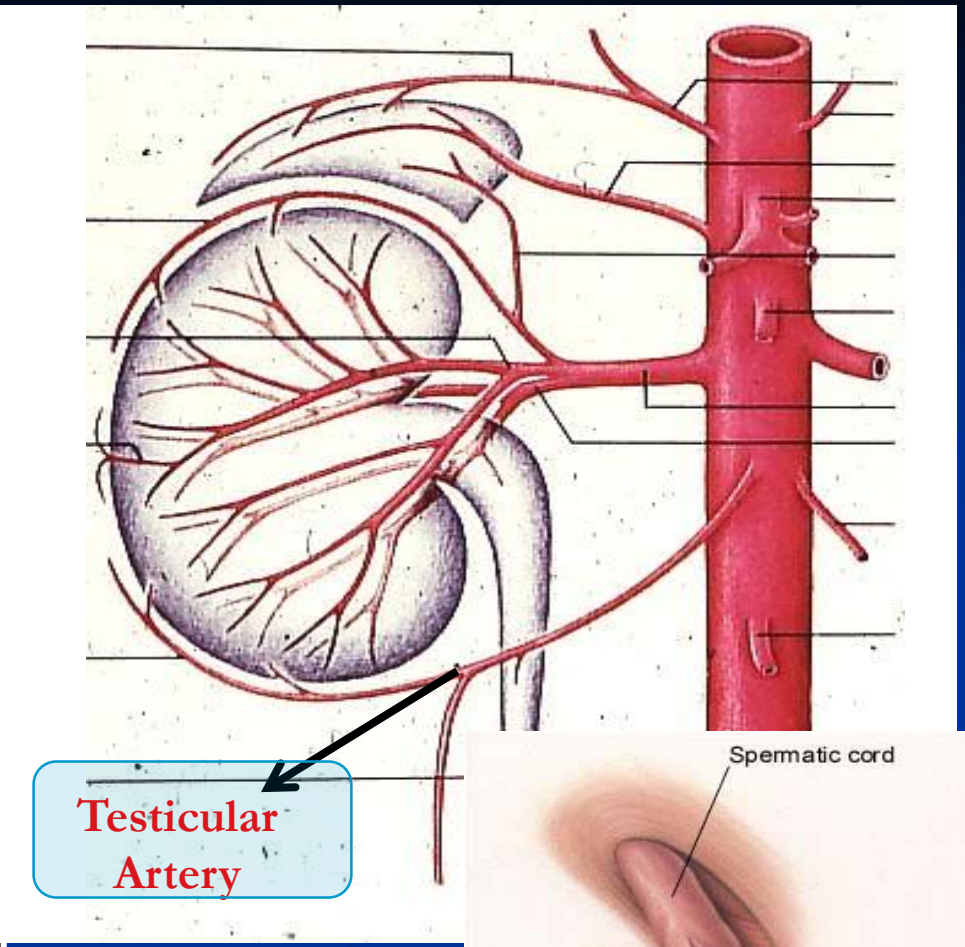
It arises from the abdominal aorta at the level of L 3.

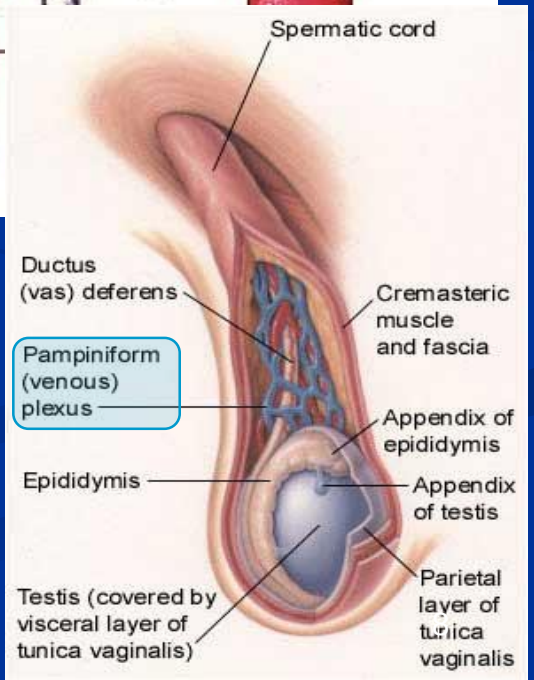
Venous drainage:

(Pampiniform plexus of veins).

About dozen of veins which forms a network within the spermatic cord.

- They become larger as they approached the inguinal canal to form the **Testicular vein.**
- **Right Vein drains into IVC.**
- **Left Vein drains into left renal vein.**





IMPORTANT!

Testicular Lymphatics:

Follow arteries and veins of the testis:

End in **Lumbar (par aortic) nodes.**

Scrotum, Penis and Prepuce:

Terminate in Superficial inguinal nodes.

Cremasteric reflex

Indication:
Evaluation of testicular pain in case of **(Testicular Torsion).**

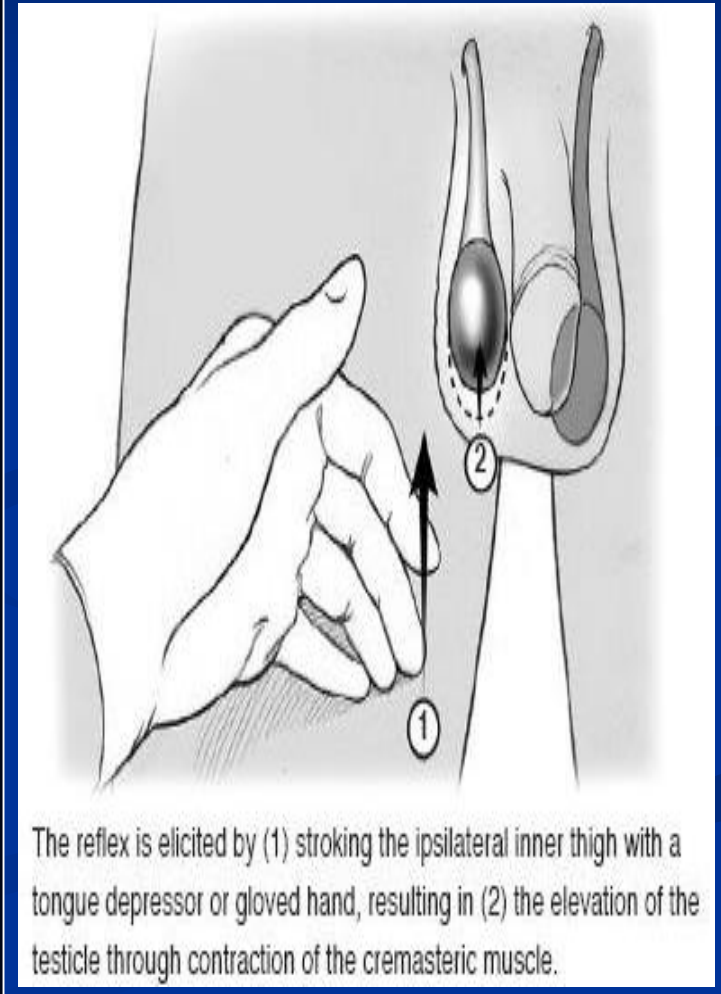
Technique:
Examiner strokes or pinches the skin in the upper medial thigh. It causes contraction of the cremasteric muscle.

OBSERVATION:
Rise of the Testicle on same side (normal).

Interpretation:
NORMAL: It is present with **Epididymitis.**
ABSENT: (no Testicle rise), Is Suggestive of **TESTICULAR TORSION.**
Also absent in 50% of boys under age **30 months.**
Do not use this test under age of 30 months.

Efficacy.
Test Sensitivity for **Testicular Torsion: 99%**
Assumes age over 30 months.

Nerve involved: Genitofemoral (GFN), (L 1, 2)
Sensory: Femoral branch of (**GFN**) & Ilioinguinal n.
Motor: Genital branch of (**GFN**).



The reflex is elicited by (1) stroking the ipsilateral inner thigh with a tongue depressor or gloved hand, resulting in (2) the elevation of the testicle through contraction of the cremasteric muscle.

Epididymis

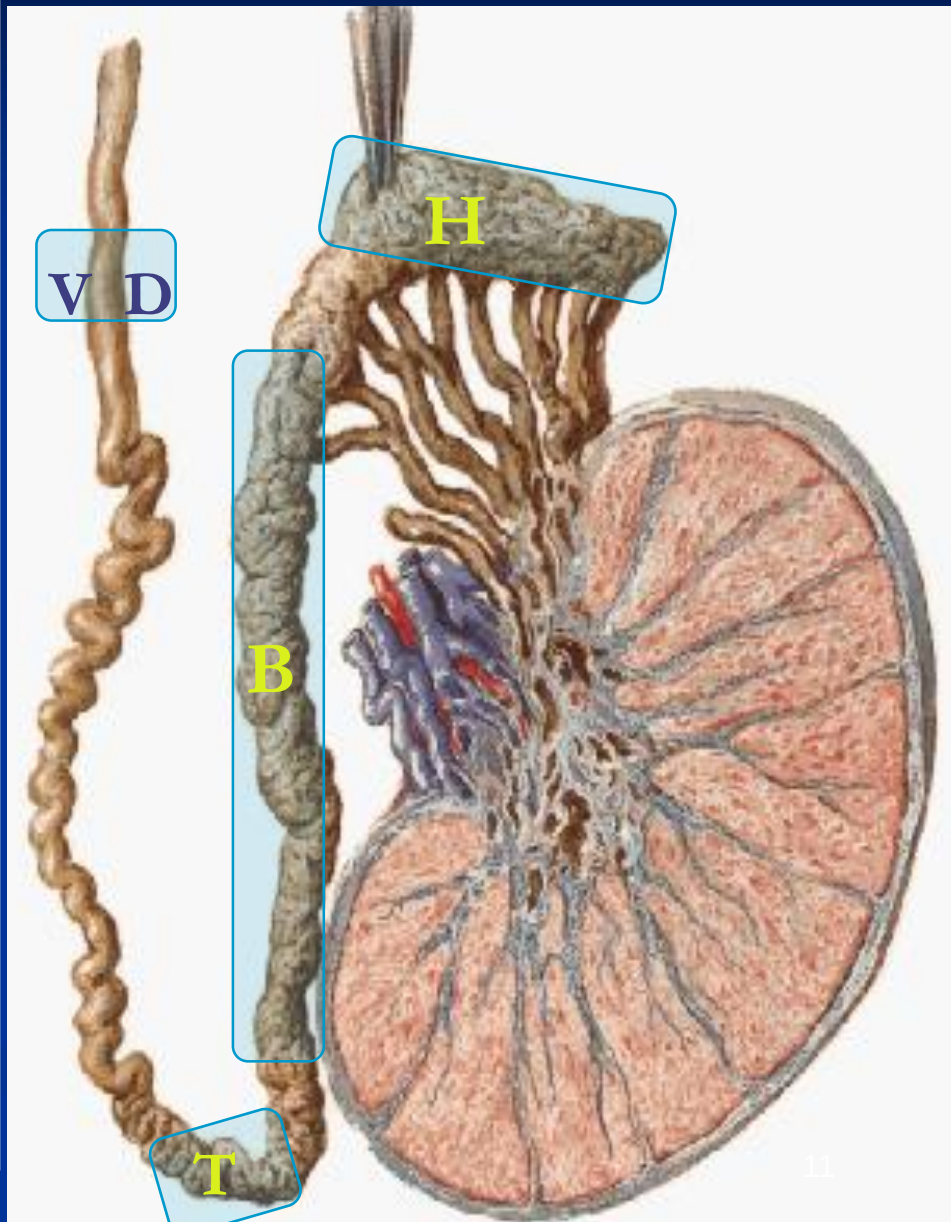
- It is a single coiled tubule.
- 6 Meters long.
- Located on the superior and posterior margins of the testis.
- It is divided into 3 parts:

Head, Body and Tail.

The Head receives efferent ductules from the testis (rete testis).

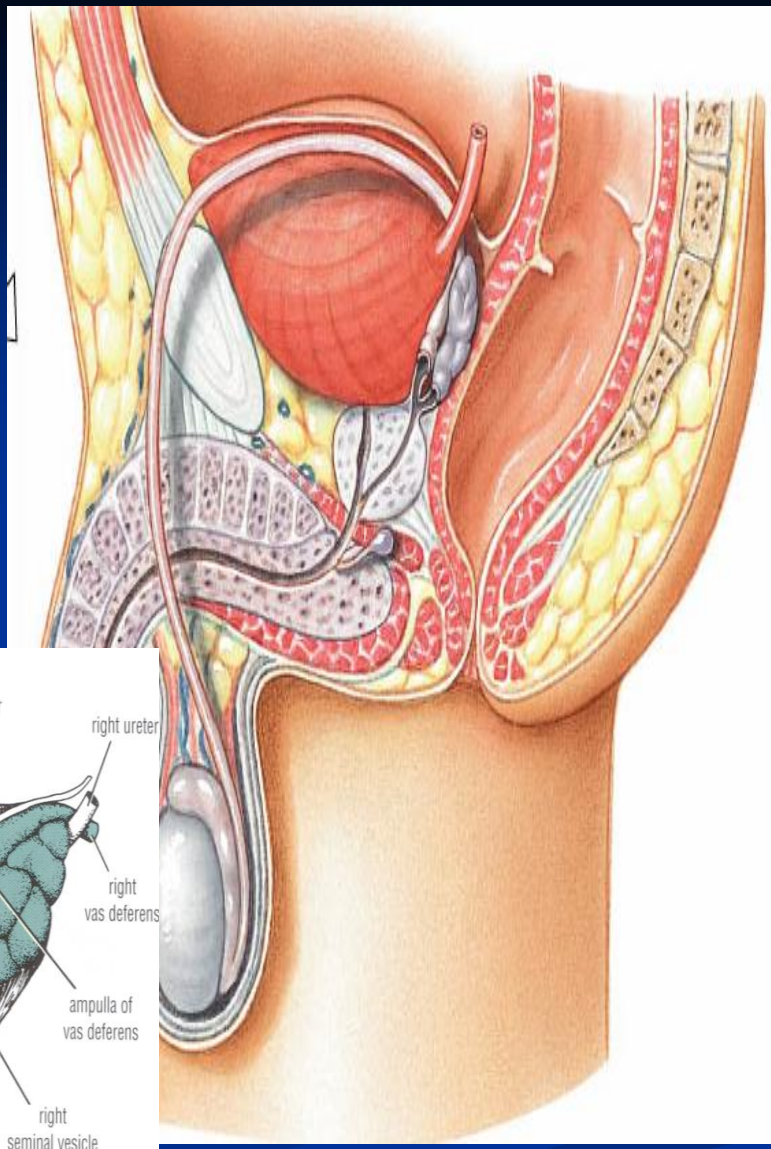
- The Tail is continuous with Vas Deferens.
- **Functions:**

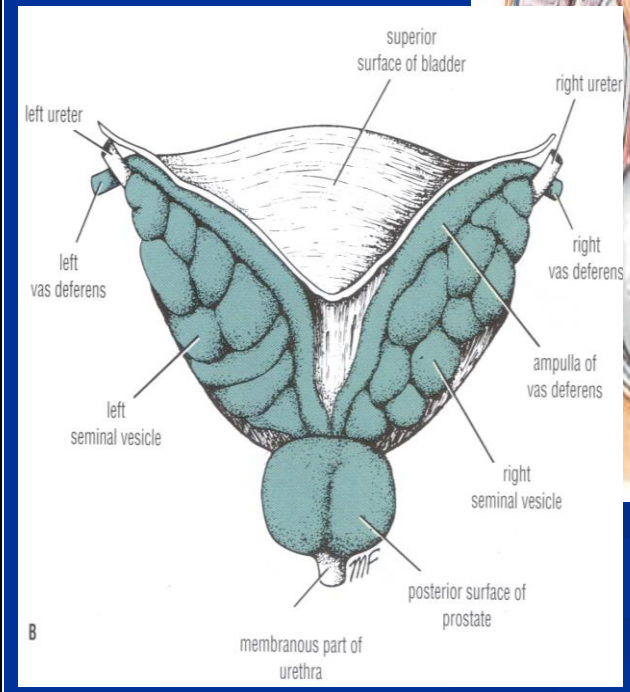
1. Secretes and absorbs the nourishing fluid.
2. Recycles damaged spermatozoa.
3. Stores spermatozoa up to 2 weeks to allow for physiological maturation of sperms.



Vas Deferens

- It is a muscular tube **45** cm long.
- Carries sperms from the epididymis to the pelvis.
- Passes through the inguinal canal as one of the contents of the spermatic cord .
- It crosses the lower end of the ureter.
- Its terminal part is dilated to form the ampulla of the vas deferens on the base of the urinary bladder.
- It joins the duct of the seminal vesicle to form ejaculatory duct which opens into the prostatic urethra.

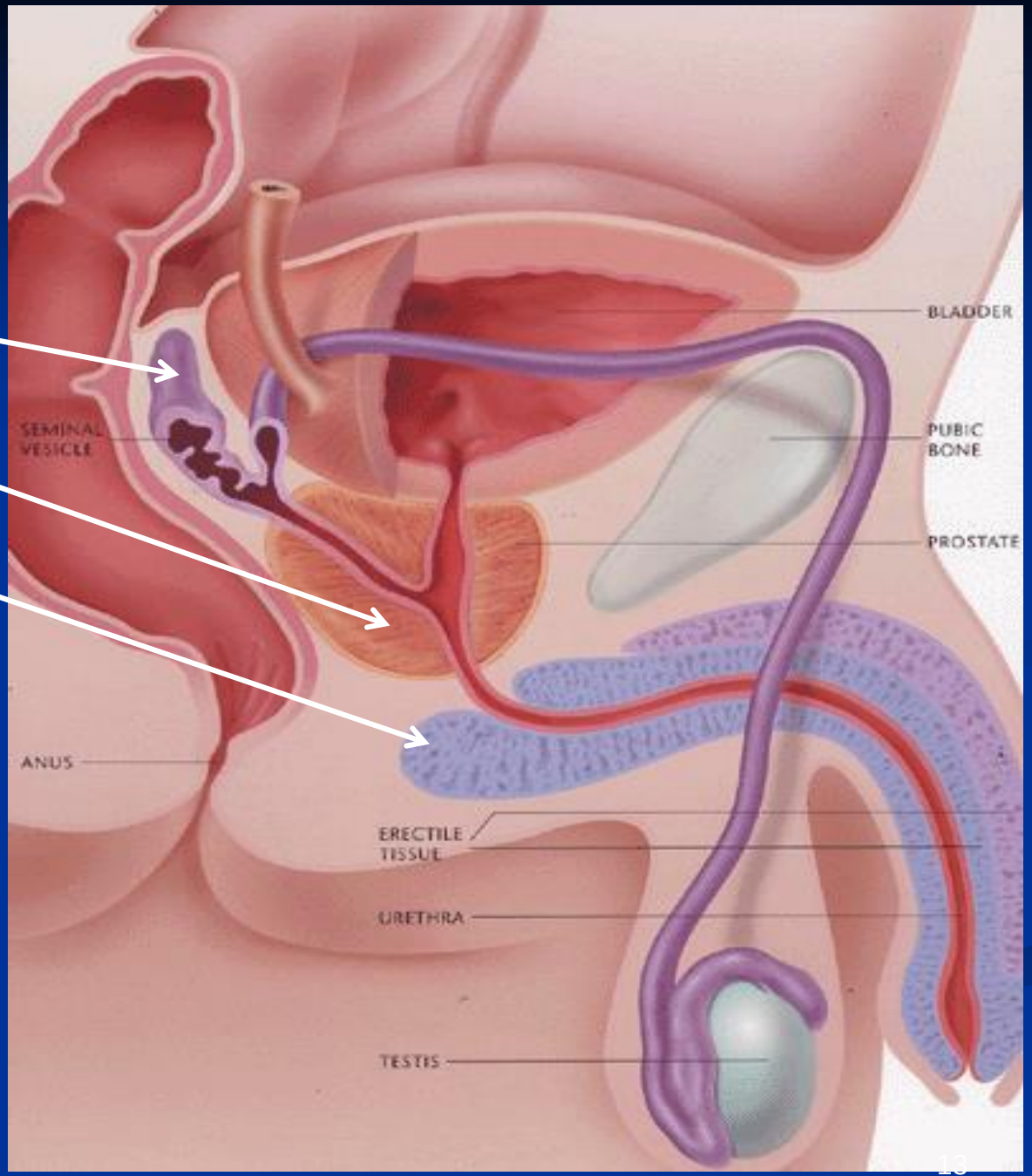




Accessory Glands

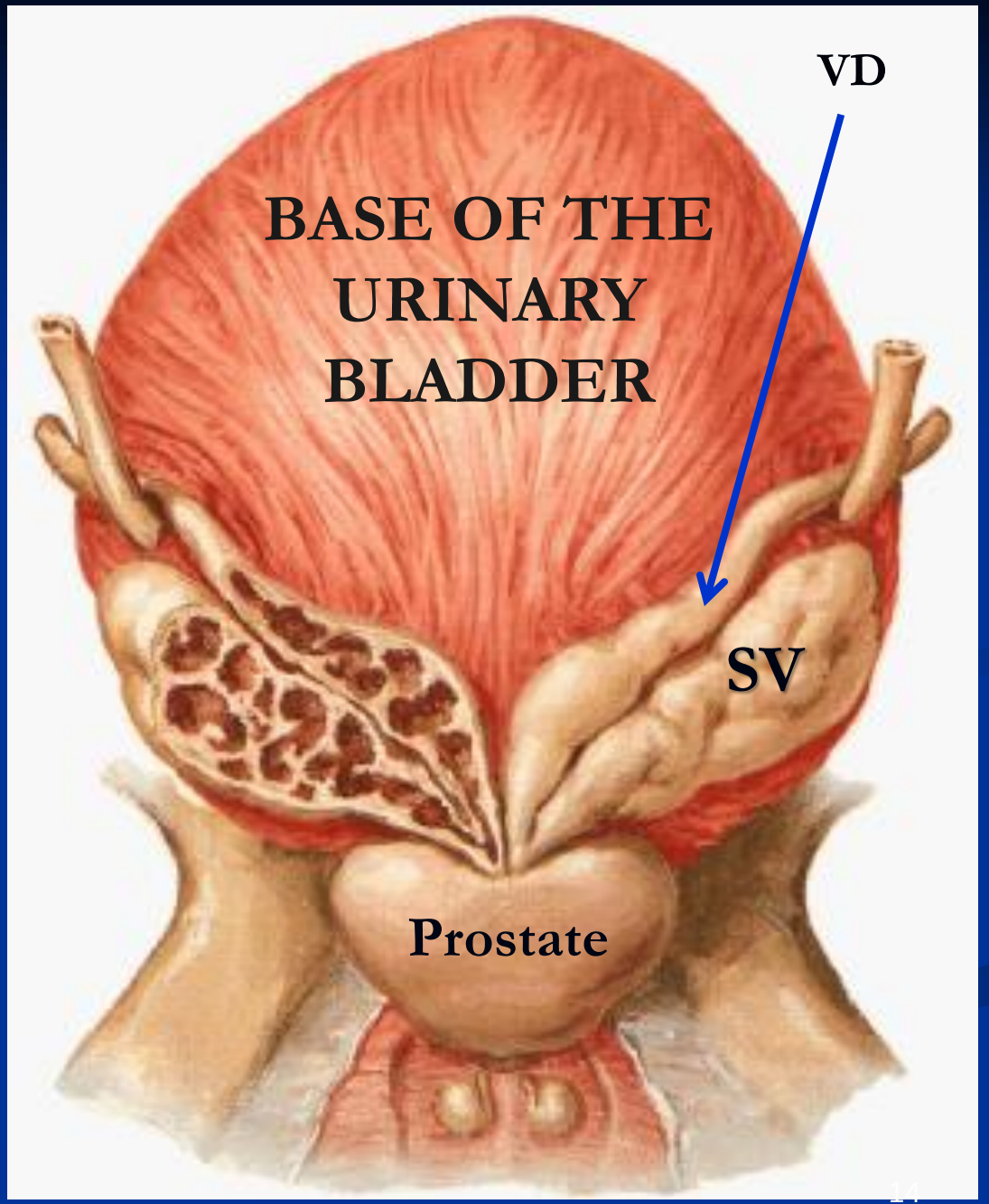
- Seminal vesicle.
- Prostate.
- Bulbourethral or Cooper's glands
- **Functions:**

1. Secretion of the seminal fluid.
2. Nourishing, activation of the sperms.
3. Protection of the sperms.



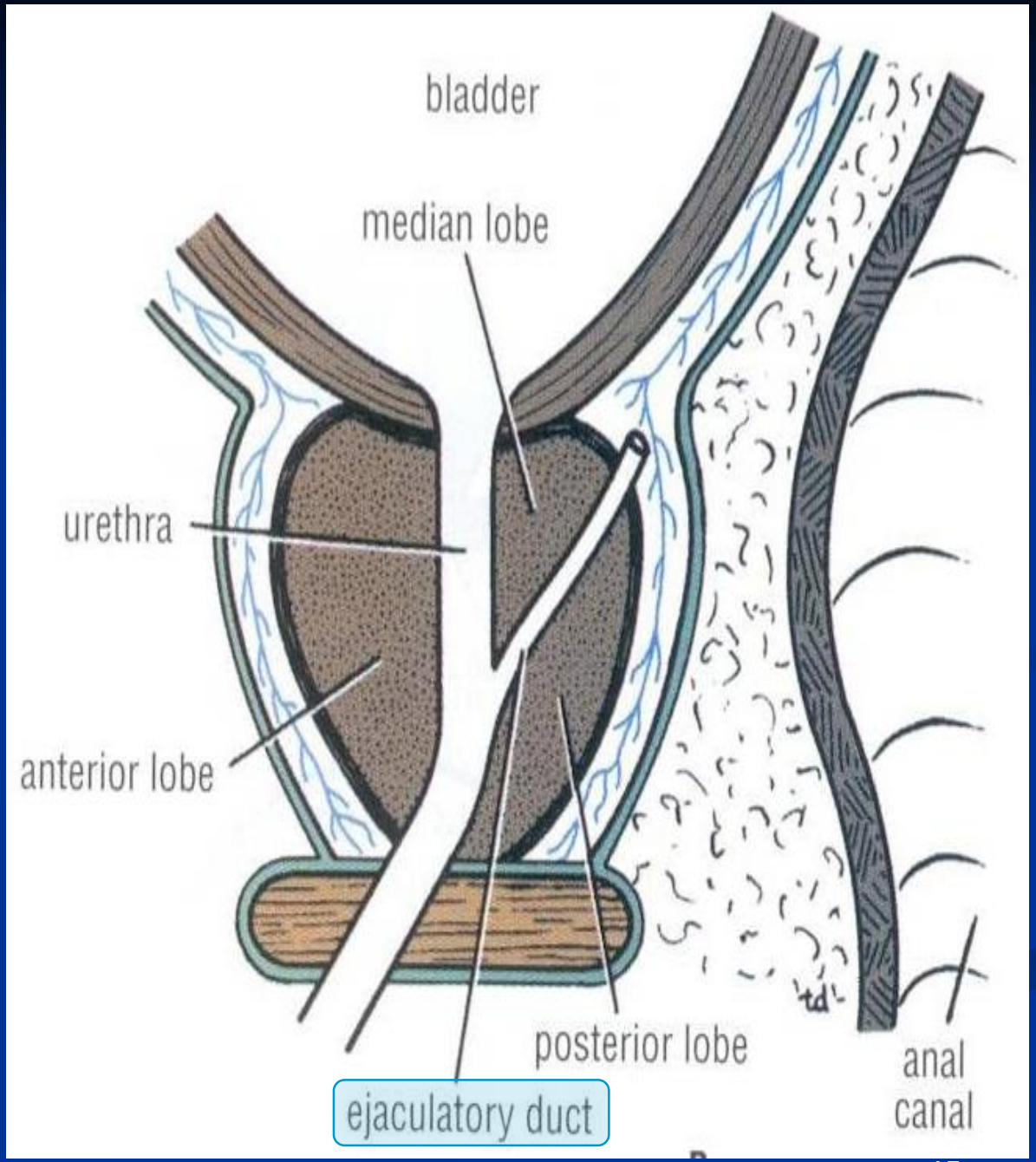
Seminal Vesicles

- Paired elongated glands (SV).
- Located posterior & inferior to the urinary bladder.
- Lies lateral to the vas deference.
- Secrete (60% of seminal fluid).



Ejaculatory Ducts

- Formed by the union of the lower end of the vas deferens and the duct of the seminal vesicle.
- Its length is about **2.5cm.**
- The 2 ejaculatory ducts open into the prostatic urethra on both sides of the seminal colliculus.
- They drain the seminal fluid into the prostatic urethra.



Prostate Gland

The Largest male accessory gland.

It is fibromuscular glandular tissue.

It is a walnut size gland.

It is located below the neck of bladder.

It is traversed by the prostatic urethra.

It secretes (20-30% of seminal fluid.)

Shape: Conical, It has:

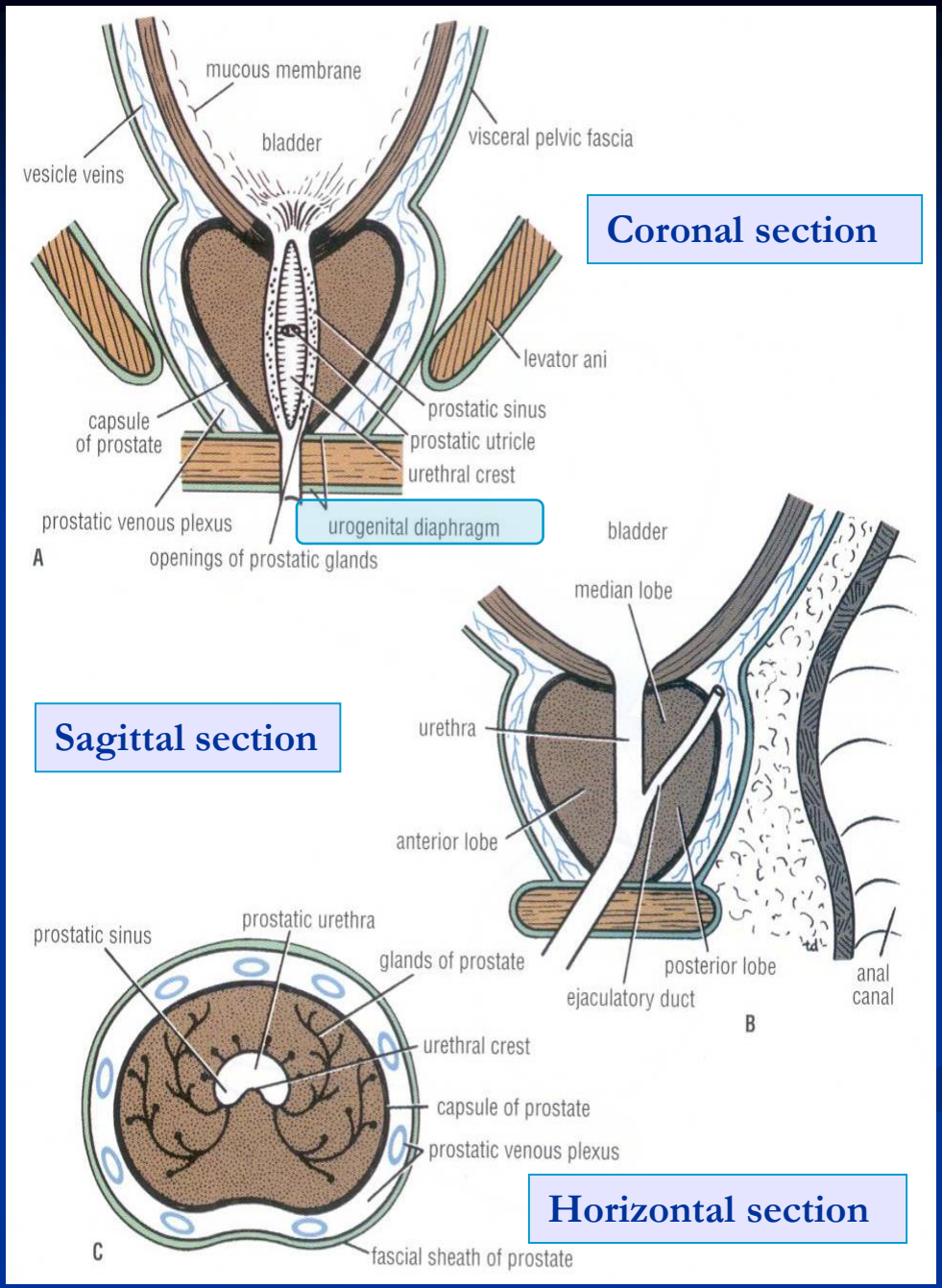
Base (Superior):

Attached to neck of urinary bladder.

Apex (Inferior), rests on the Urogenital diaphragm.

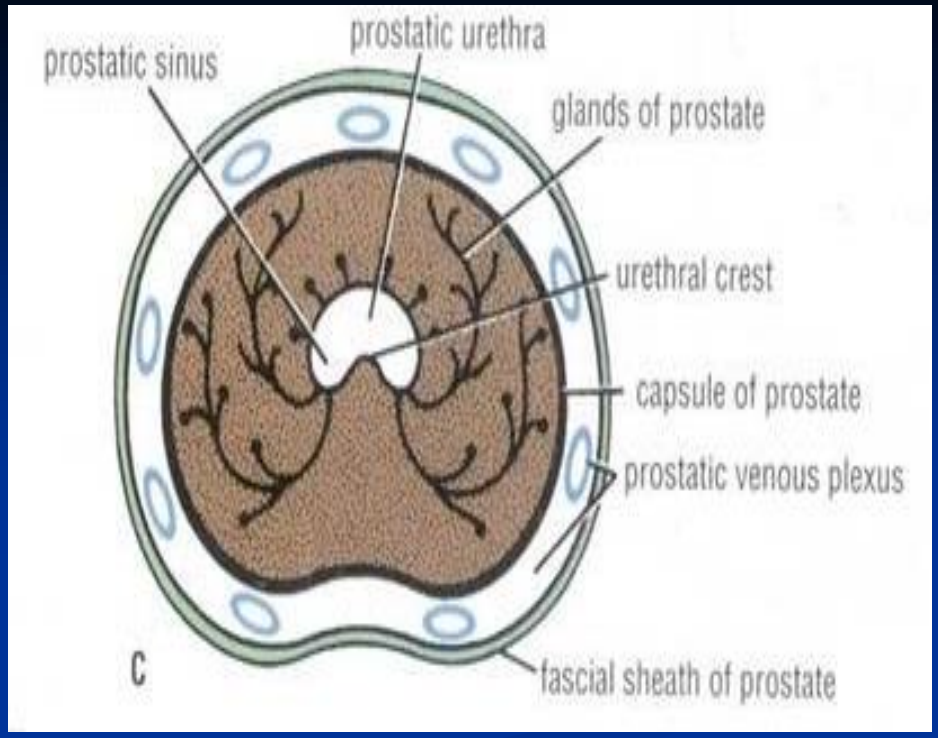
Four Surfaces: Anterior, posterior and 2 lateral (Right & Left) surfaces.

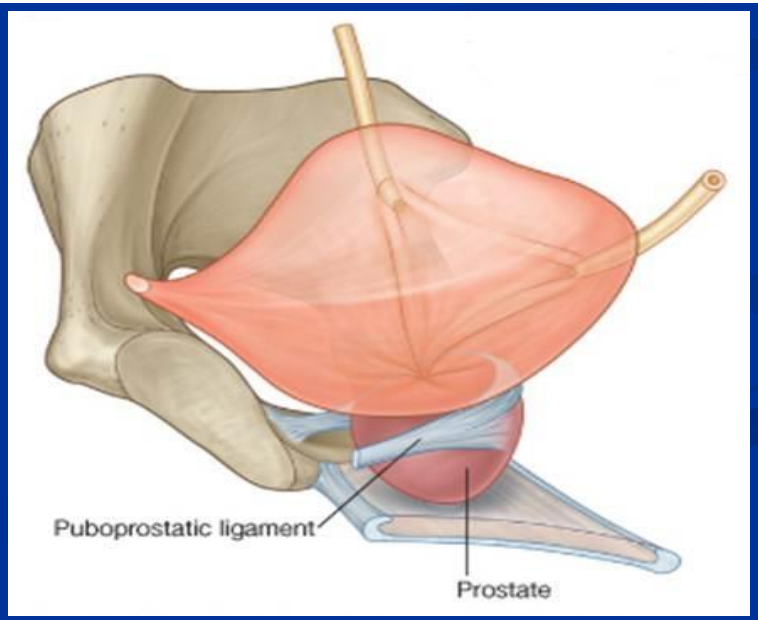
- It secretes enzymes which has the following functions:
  - Aid in activating sperm motility.
  - Mucus degradation.
  - Neutralize the acidity of female reproductive tract (Alkaline fluid).



Capsule

- Internally, it has a dense fibrous capsule (prostatic capsule), which is surrounded from outside by a fibrous prostatic sheath.
- The later is continuous with the puboprostatic part of the levator ani muscle, (levator prostate).
- In between the prostatic capsule and the prostatic facial sheath lies the prostatic venous plexus.





Relations

Anterior:

Symphysis pubis (SP).

Superior:

Neck of the bladder.

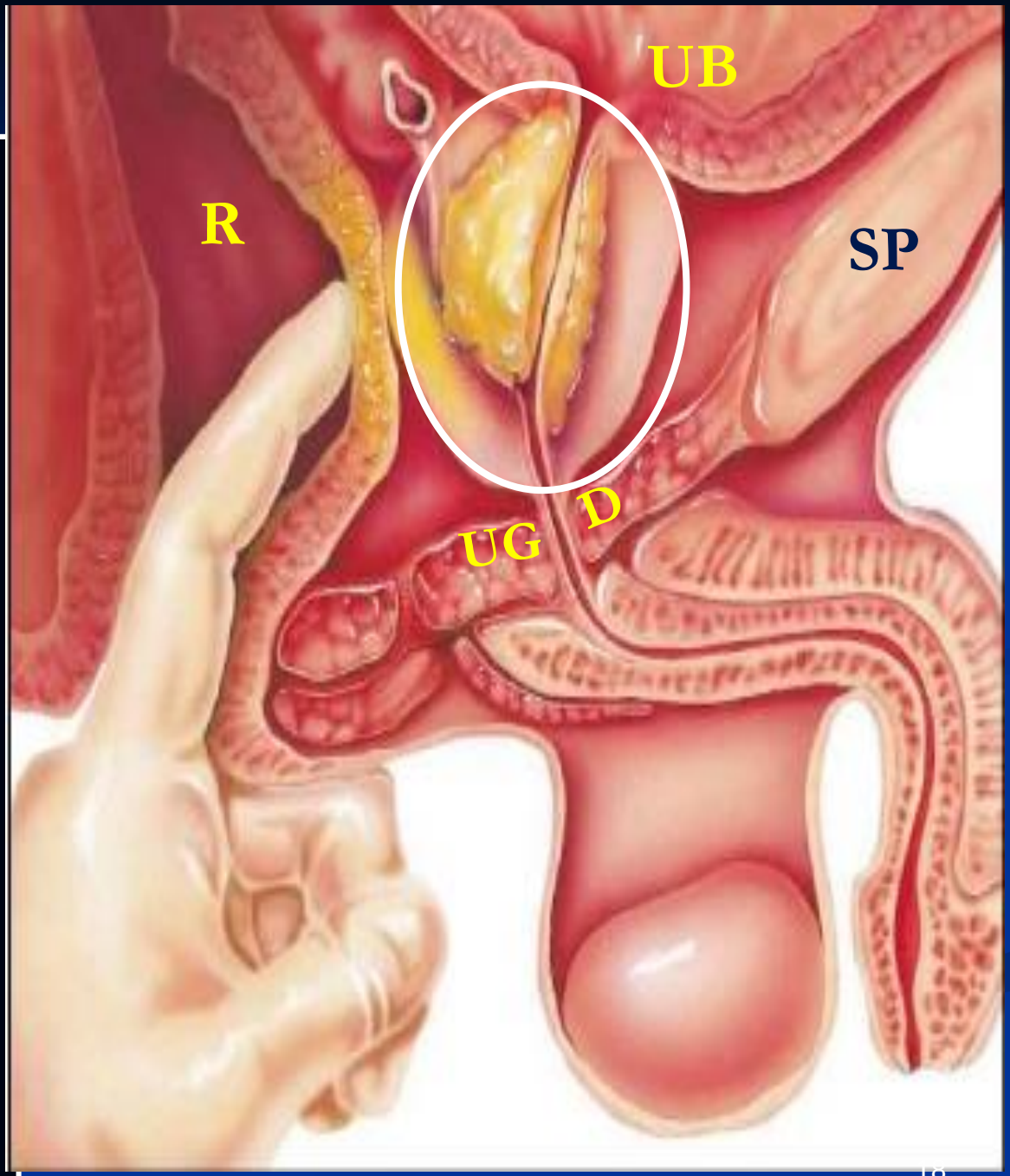
Posterior:

Rectum ® (important for PR examination)

Inferior:

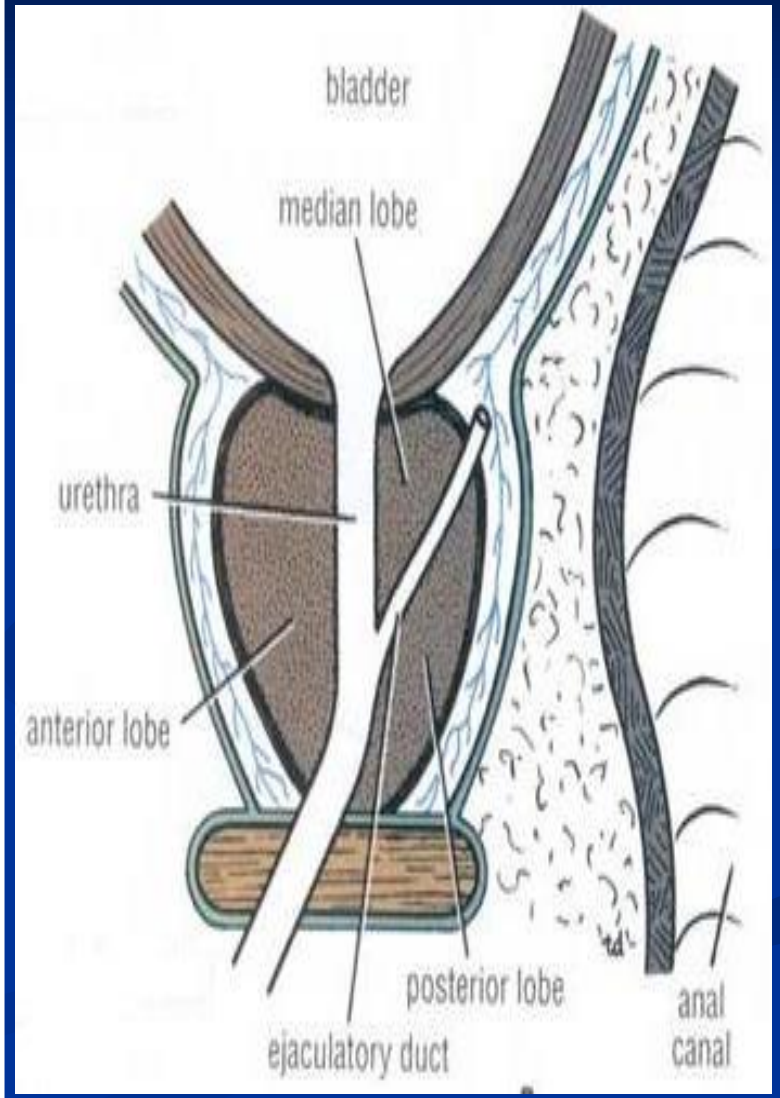
Urogenital diaphragm, (UGD).

Lateral: Medial margins of levator ani muscles (levator prostate).



Lobes

- **Anatomically**
- It is divided into **5** lobes according to their relation to the urethra:
- **Anterior lobe, (isthmus)**:
- Lies anterior to the urethra.
- It is fibromuscular.
- **Posterior lobe:**
- Posterior to the urethra and inferior to the ejaculatory ducts.
- **Two lateral lobes:**
- On each side of the urethra.
- **Middle (median):**
- Between the urethra and ejaculatory ducts & closely related to neck of urinary bladder.
- Usually it projects into lumen of the bladder distorting the internal urethral sphincter, after the age of **40** years.
- The median & the 2 lateral lobes are rich in glandular tissue.



Blood Supply & Lymph Drainage

Arterial Supply:

Inferior vesical artery from IIA.

Prostatic venous plexus:

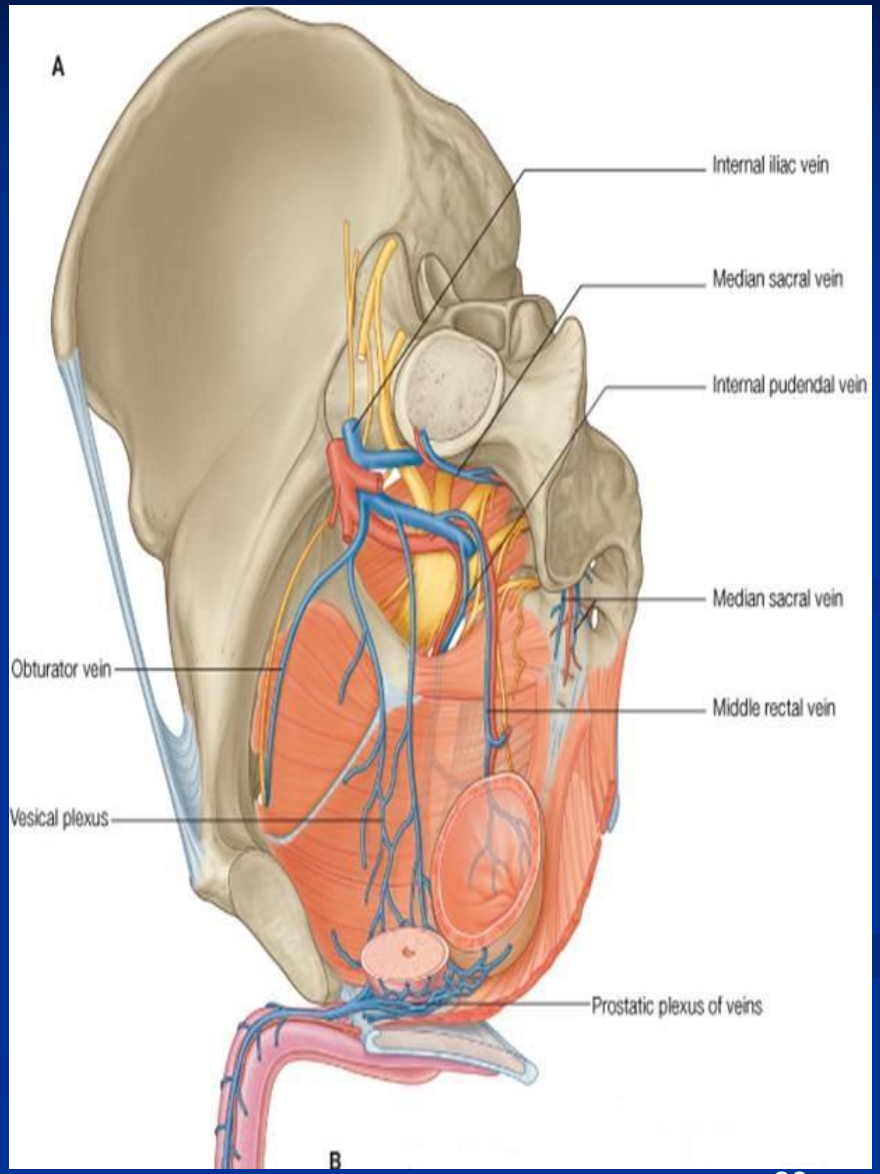
Lies between the prostatic fibrous capsule and the prostatic sheath.

It drains into the **internal iliac veins**.

It is continuous superiorly with the vesical venous plexus of the urinary bladder and posteriorly to the internal vertebral venous plexus. **Importance?**

Lymph drainage:

Internal iliac lymph nodes.



Hypertrophy of the Prostate

- **Benign**
- Common after middle age.
- An enlarged prostate projects into the urinary bladder and **distorts** the prostatic urethra.
- The middle lobe often enlarges and obstructs the internal urethral orifice, this leads to **Nocturia, Dysuria, Frequency and Urgency.**
- **Malignant, (Prostatic carcinoma):**

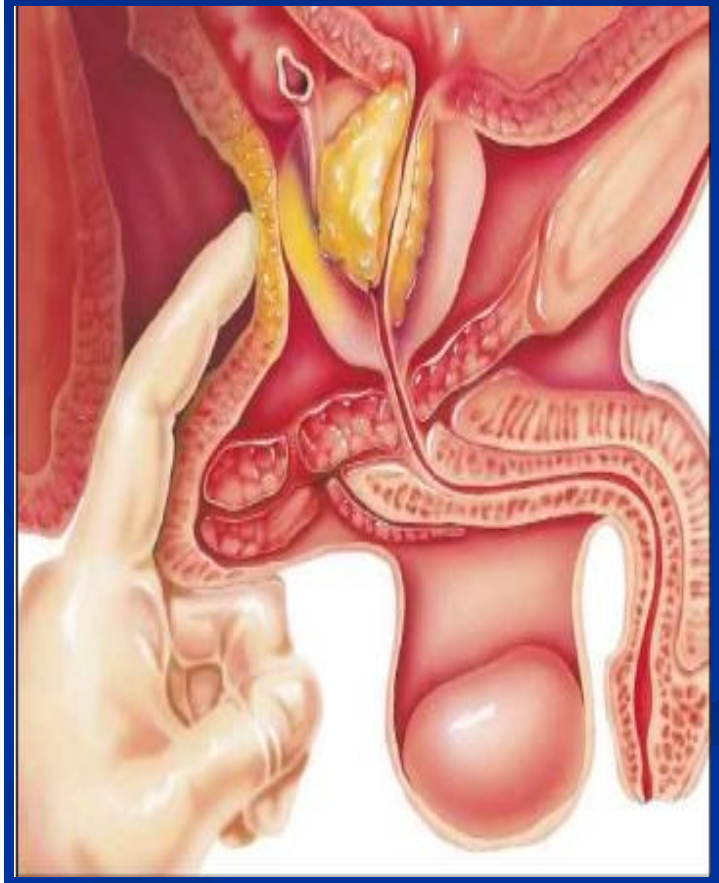
It is common after the age of 55.

The malignant prostate is felt hard & irregular in Per- rectal examination (PR).

The malignant cells metastasize first to internal iliac & sacral lymph nodes (lymphatic spread).

Later to distant nodes , bone & brain through (IVVP) –(venous spread).

It can cause obstruction to urine flow because of its close relationship to the prostatic urethra.



Prostatic Urethra

Structures seen on the posterior wall of the prostatic urethra:

Urethral crest:

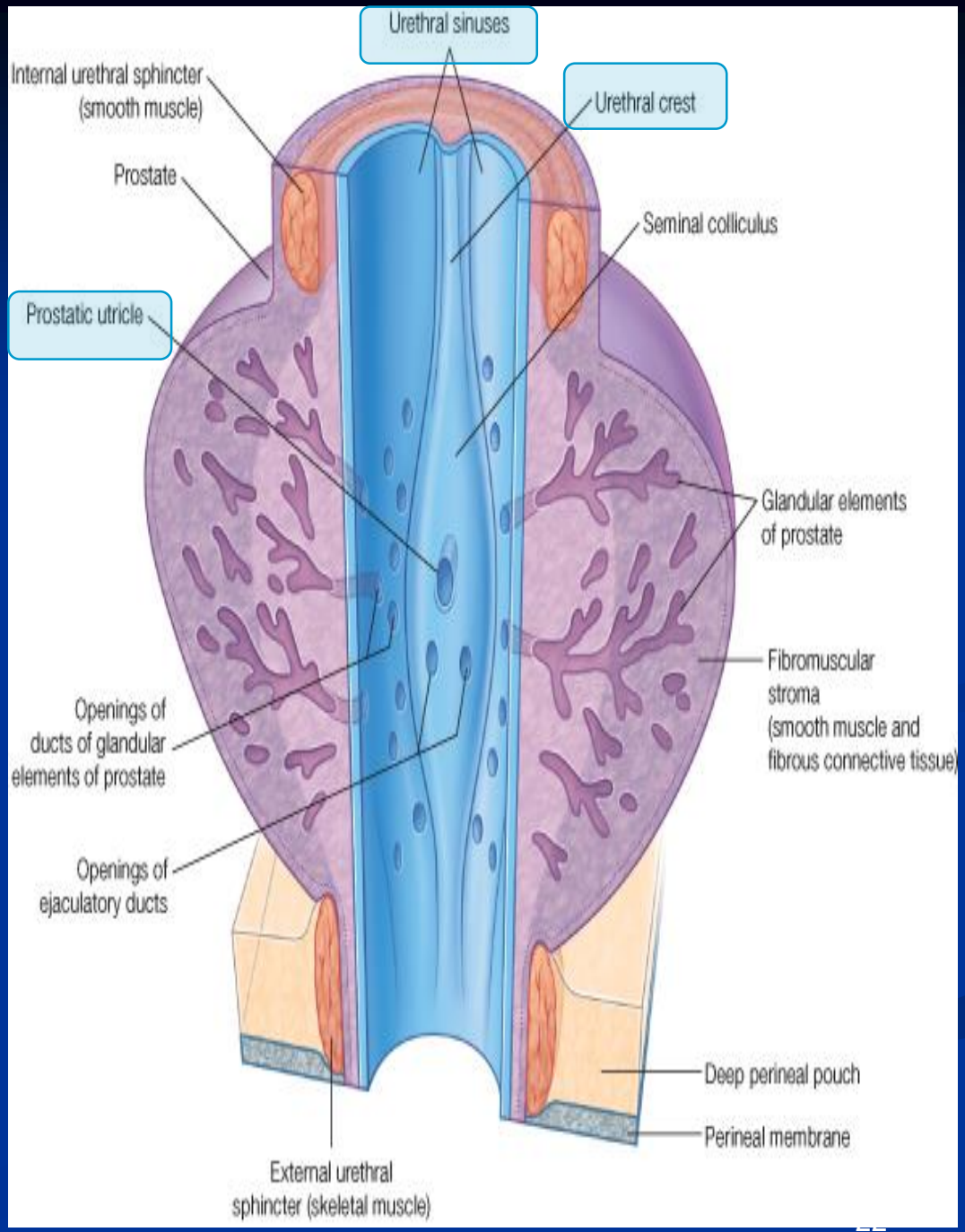
- A longitudinal elevated ridge.

Prostatic sinus:

- A groove on each side of the crest.
- **The prostatic gland opens into the prostatic sinus.**

Prostatic utricle :

- A depression on the summit of the urethral crest.
- The ejaculatory ducts open on the sides of the utricle.
- **Seminal colliculus:** a rounded eminence that opens into the prostatic utricle.

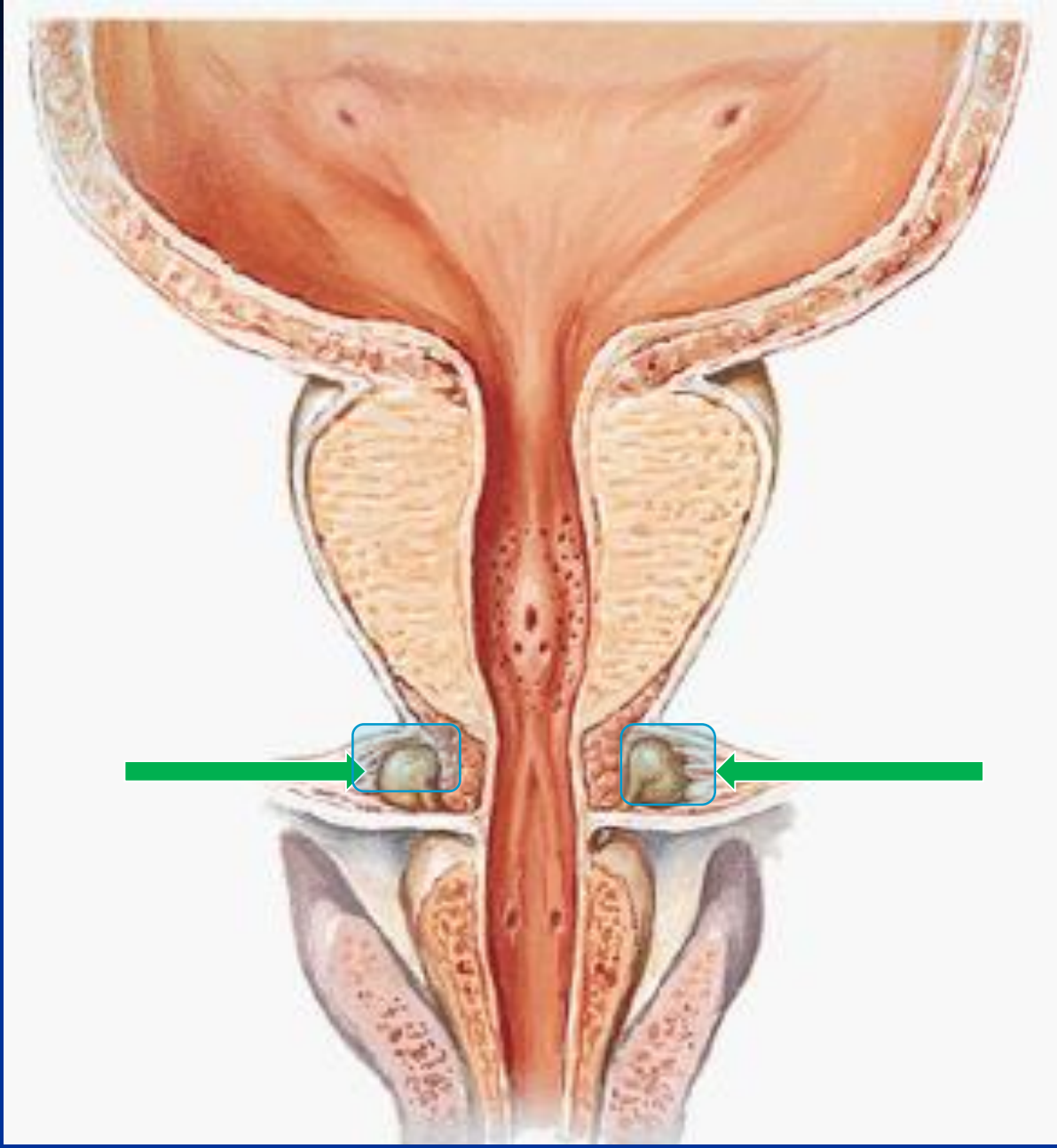


Bulbourethral or Cooper's Gland

- Small paired glands.
- Located at the base of the penis.
- Secrete alkaline mucus for:

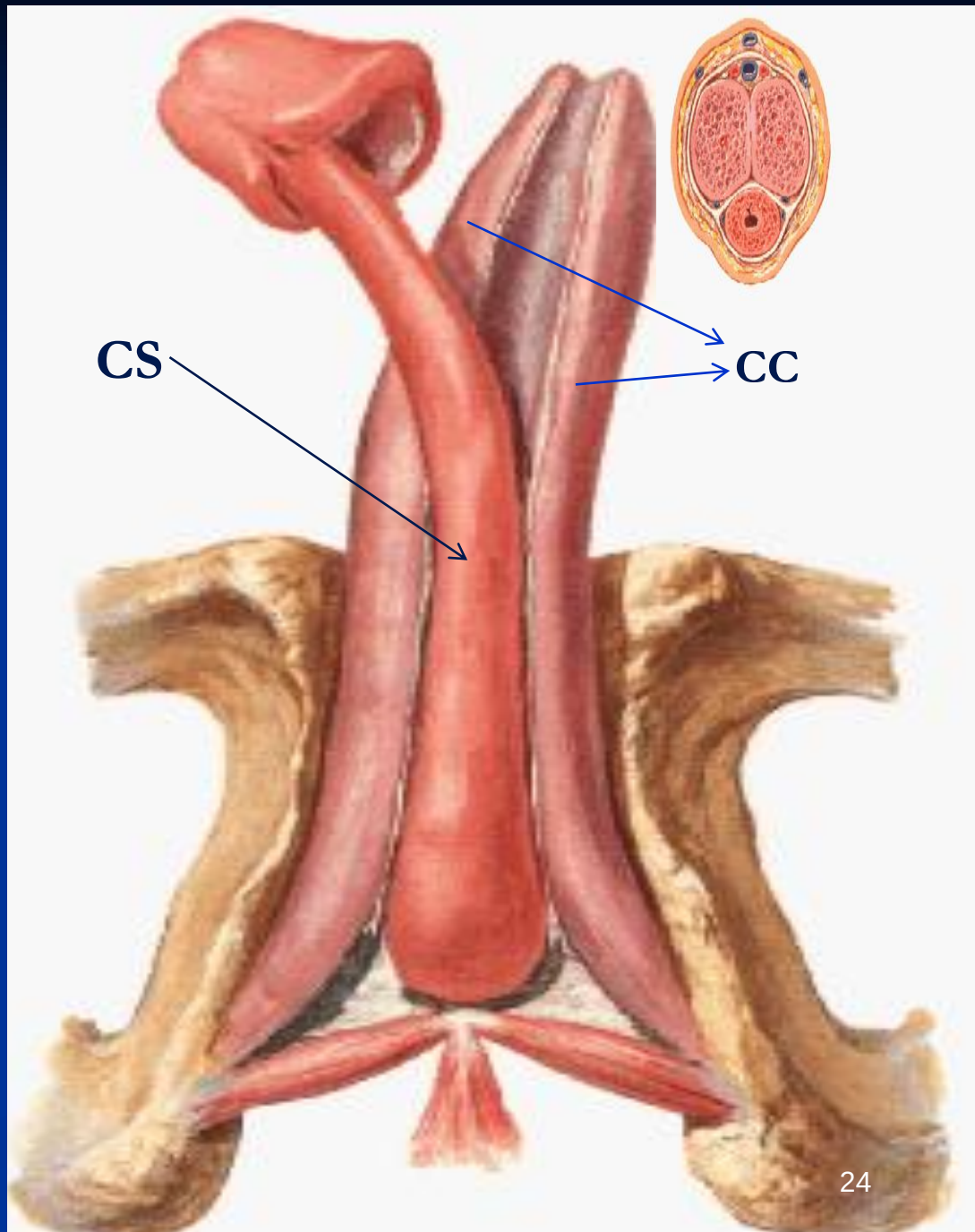
  Neutralization of urinary acids &

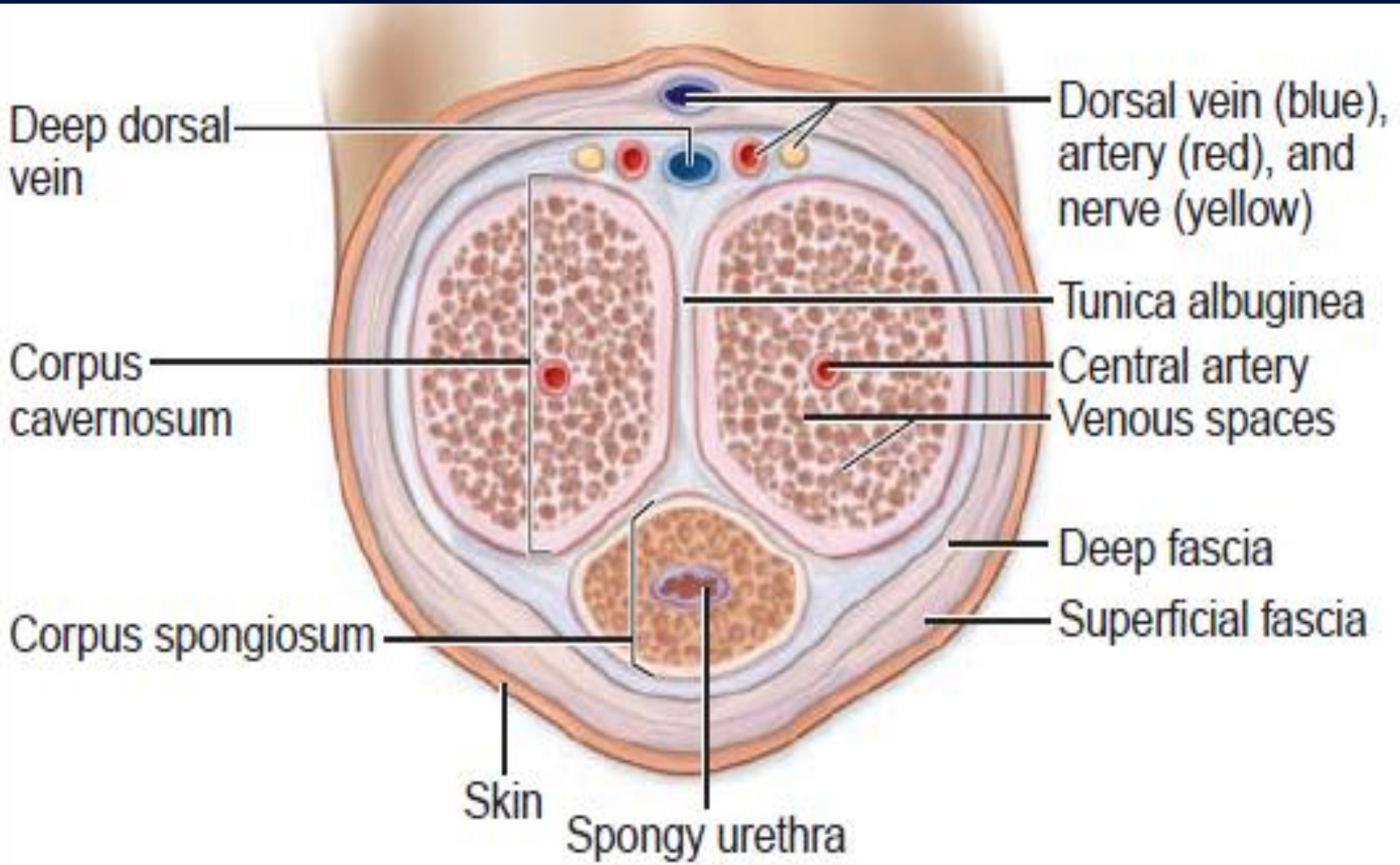
  - Lubrication.



Penis

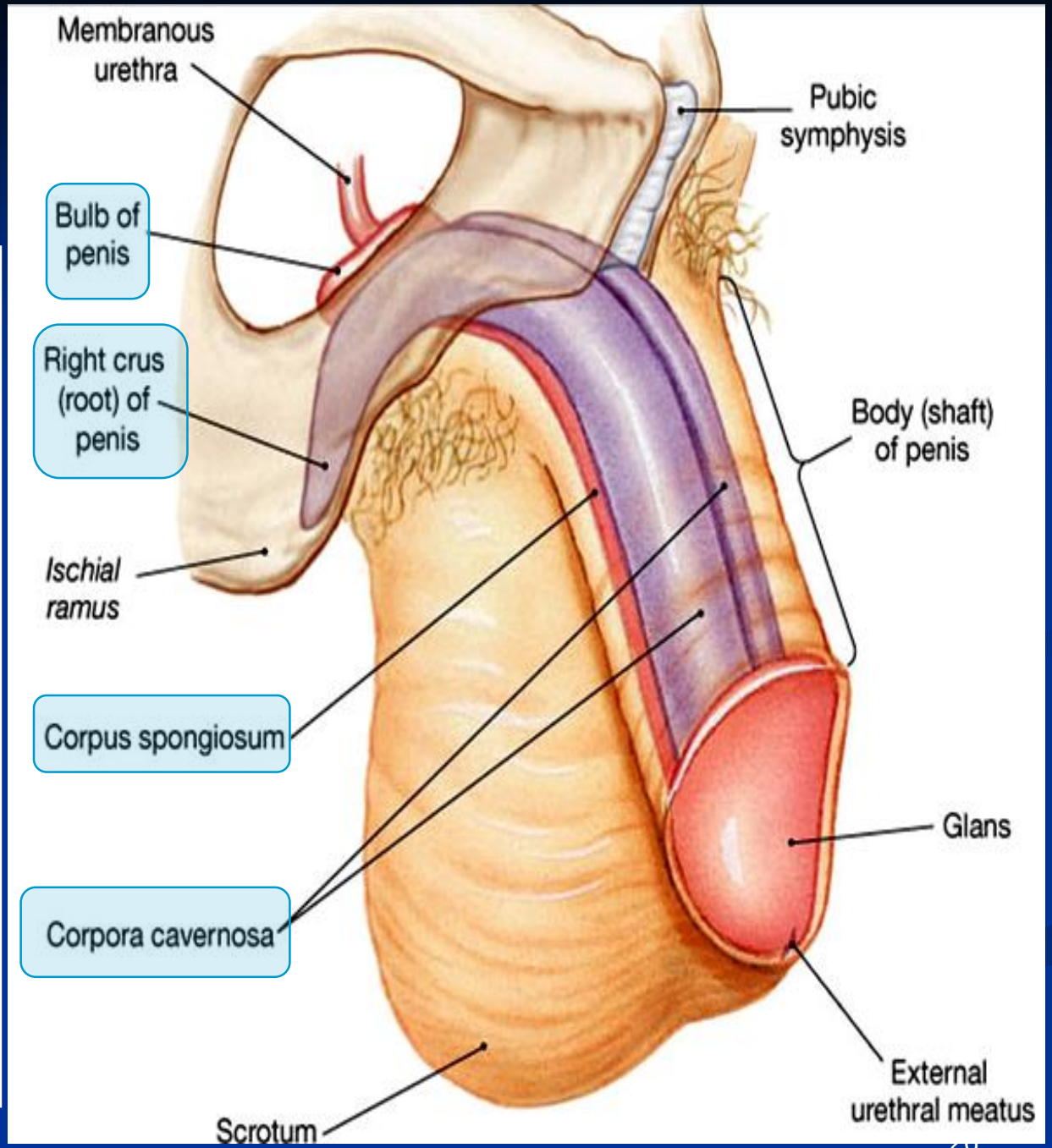
- A Copulatory & Excretory organ.
- **Excretory:**
- Penile urethra transmits urine & seminal fluid.
- **Copulatory:**
- Has (3) cylindrical masses of erectile tissue
  - Two **Corpora Cavernosa**
  - One **Corpus Spongiosum**




Deep dorsal vein
Dorsal vein (blue), artery (red), and nerve (yellow)
Tunica albuginea
Corpus cavernosum
Central artery
Venous spaces
Deep fascia
Superficial fascia
Corpus spongiosum
Skin
Spongy urethra

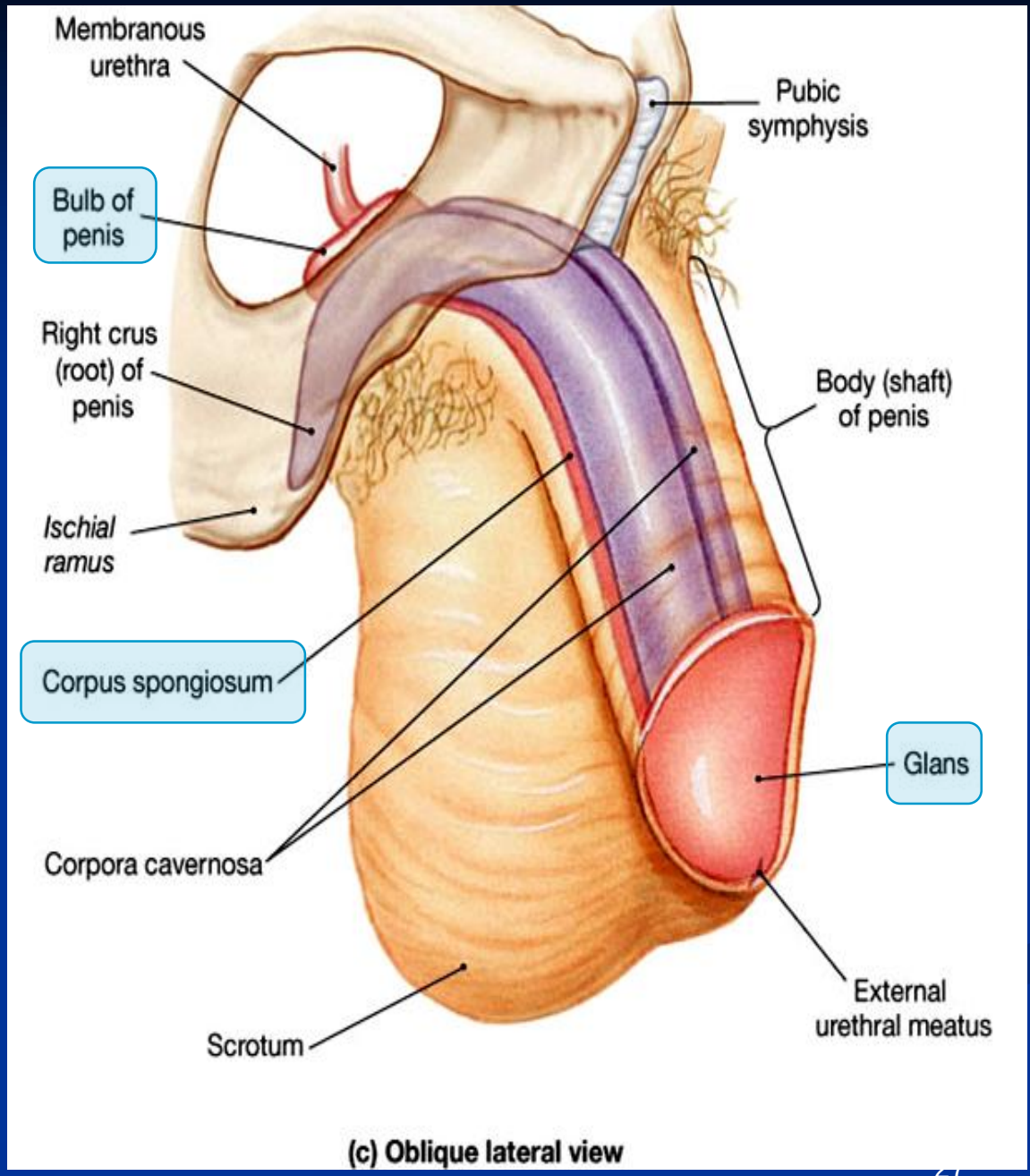
Corpora Cavernosa

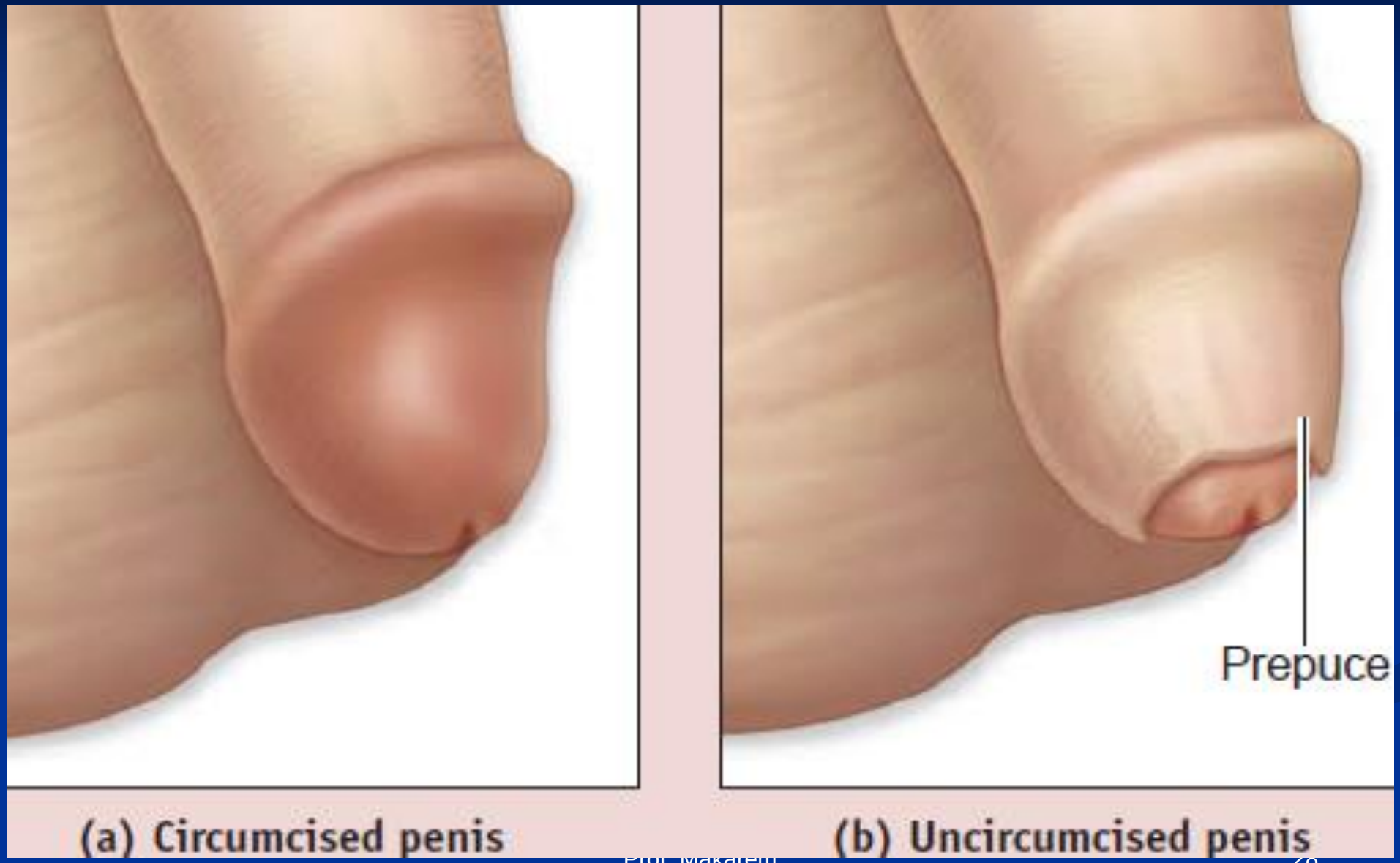
- Two superior (right & left) masses of (**Primary erectile tissue**).
- They Provide the majority of rigidity & length of penis.
- Their posterior expansions, forms the 2 **Crurae** (anchor" tissue) against pelvic bone.

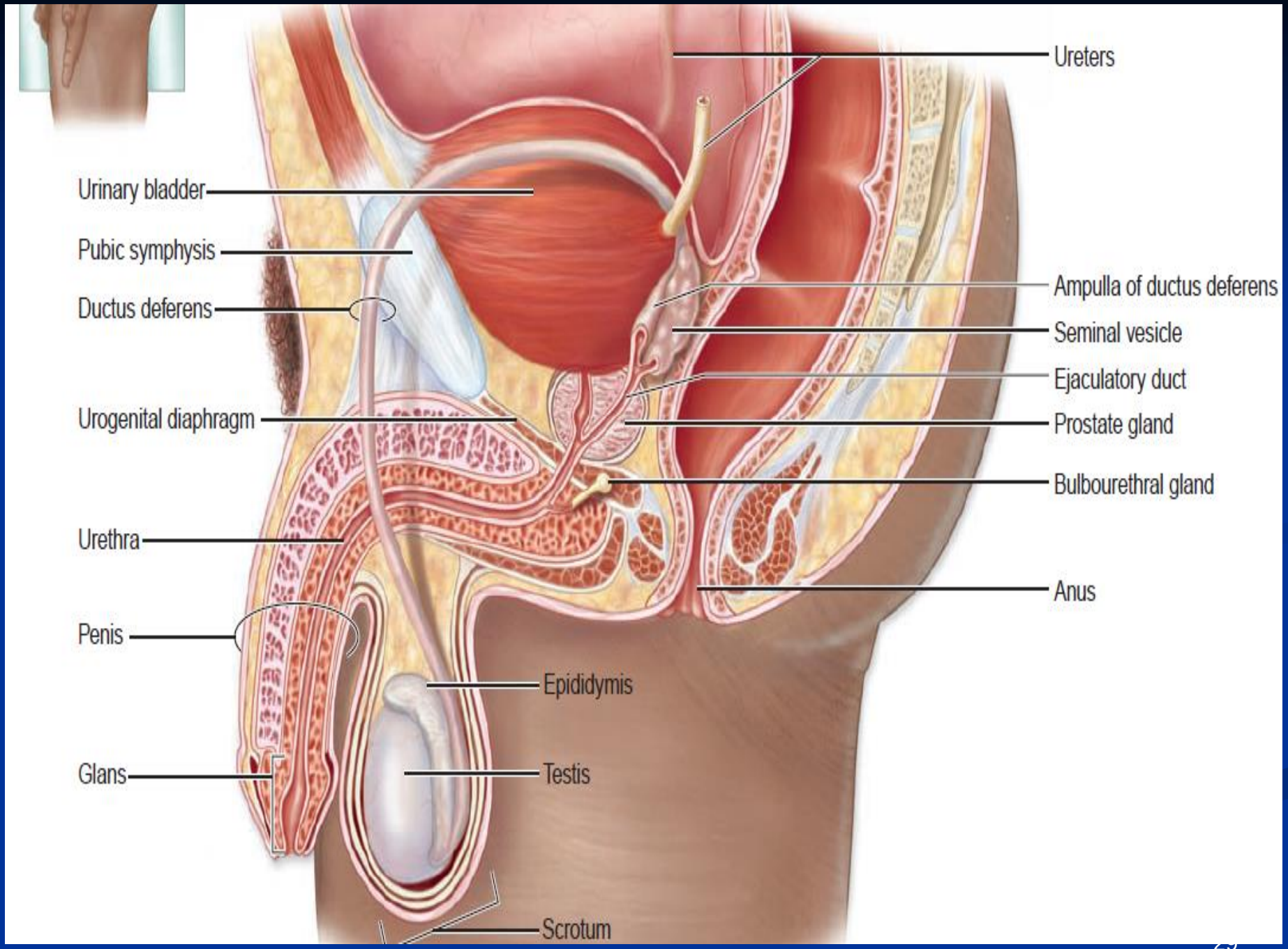


Corpus Spongiosum

- The single inferior mass (Secondary erectile tissue)
- It is traversed by the penile urethra.
- Its Anterior expansion forms the Glans penis.
- Its posterior expansion forms the bulb of the penis.
- **Prepuce or foreskin:**
- Fold of skin covering glans penis (before circumcision)




Prepuce
(a) Circumcised penis
(b) Uncircumcised penis


Ureters
Urinary bladder
Pubic symphysis
Ductus deferens
Ampulla of ductus deferens
Seminal vesicle
Ejaculatory duct
Urogenital diaphragm
Prostate gland
Bulbourethral gland
Urethra
Anus
Penis
Epididymis
Glans
Testis
Scrotum