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The Male Reproductive System

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2. The genital ducts:

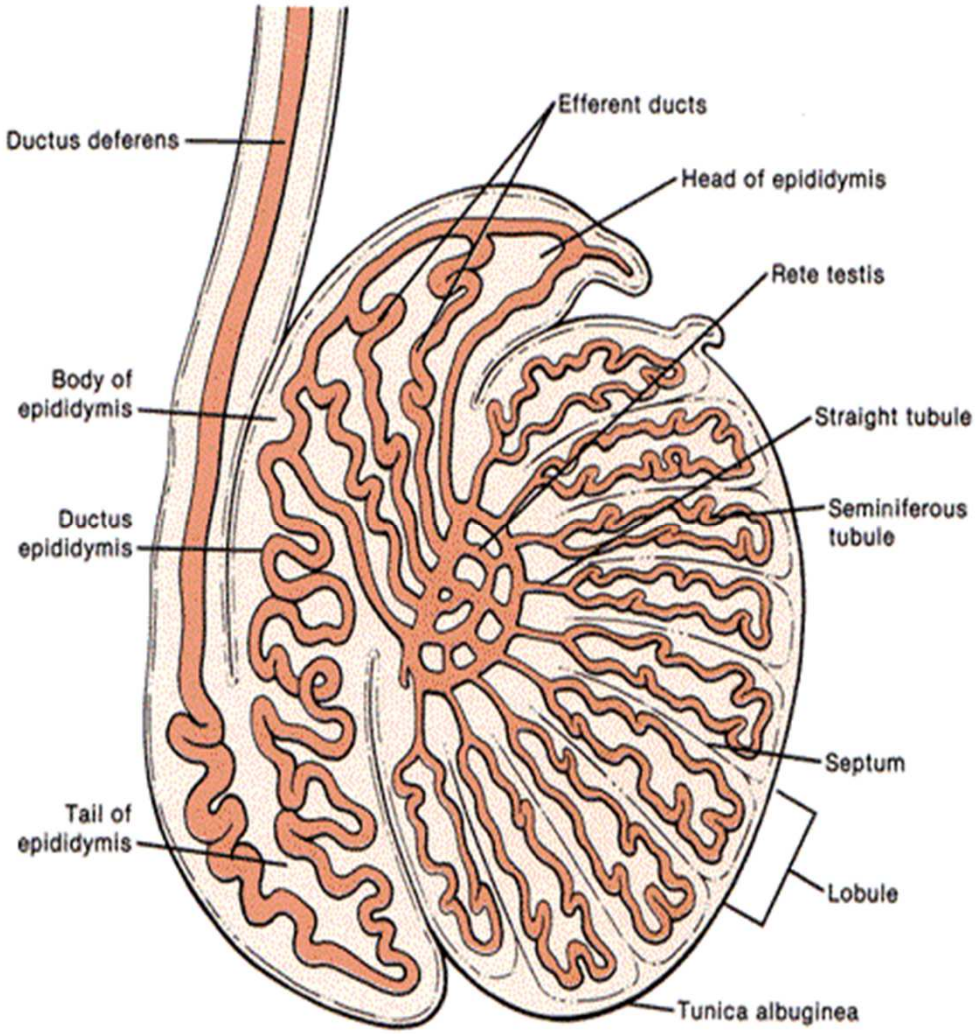
Divided into two types:

1.Intratesticular ducts:

- **A. Straight tubules**
- **B. Rete testis**
- **C. Efferent ductules**

2.Excretory genital ducts:

- **A. Epididymis**
- **B.Ductus (vas) deferens**
- **C. Urethra.**



1.The intratesticular ducts:

All of which carry the spermatozoa and liquid from the seminiferous tubules to the ducts of epididymis.

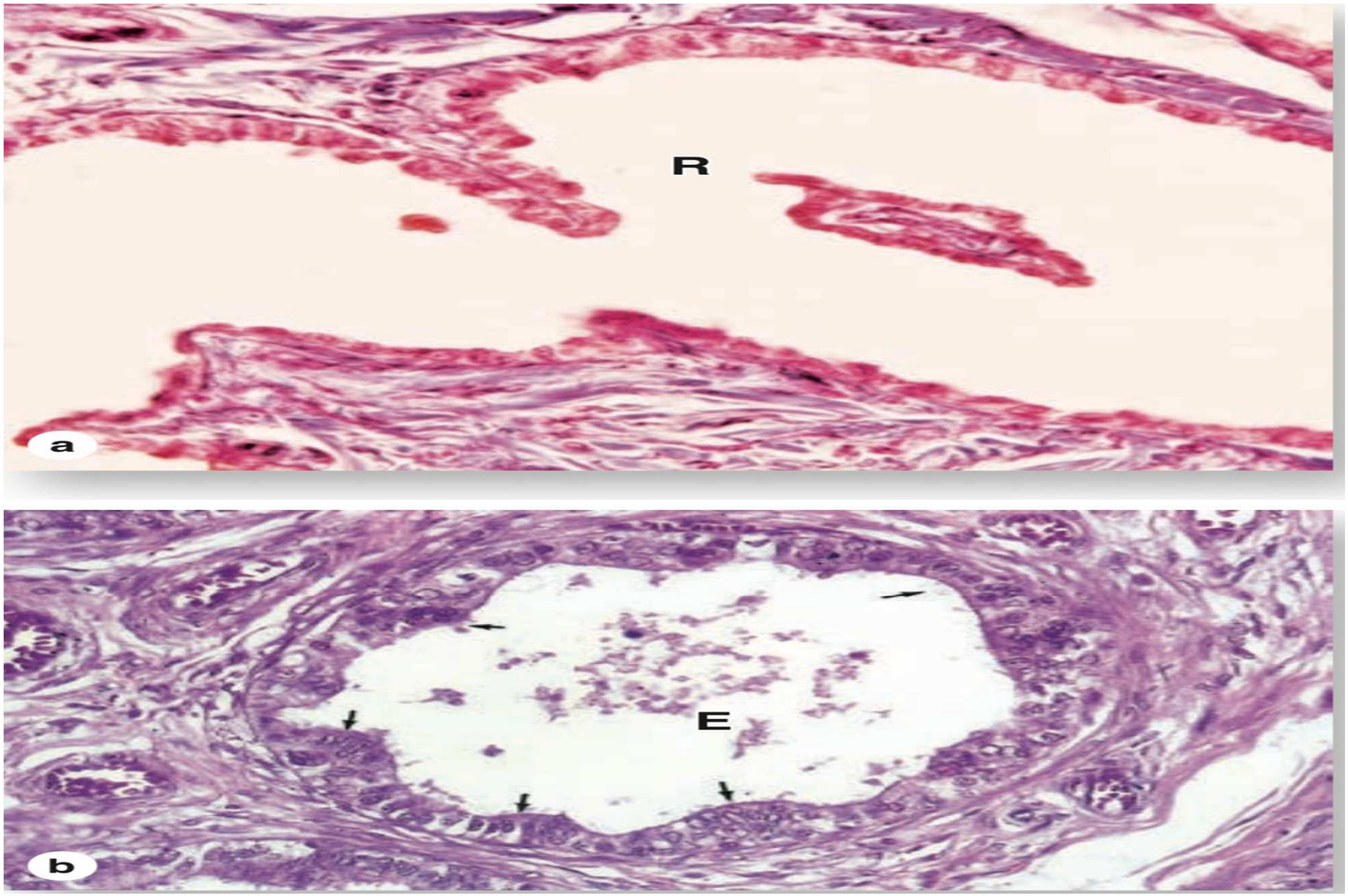
A . The loops of seminiferous tubules join the rete testis by short **straight tubules** , which are lined by only sertoli cells .

B . They empty into the **rete testis**, which is an interconnected network of channels lined by cuboidal epithelium and supported by connective tissue of the mediastinum.

C . The rete testis drains into about 20 **efferent ductules** lined by an unusual epithelium(alternating non ciliated cuboidal cells and taller ciliated cells) giving the scalloped appearance.

The non-ciliated cells absorb some sertoli secreted fluid, creating a fluid flow passively carrying the sperms away to the epididymis. Sperm movement is aided by a thin layer of smooth muscles in the efferent ductules wall.

Rete testis and Efferent ductule



A: Rete testis
B: Efferent ductule

2.Excretory ducts

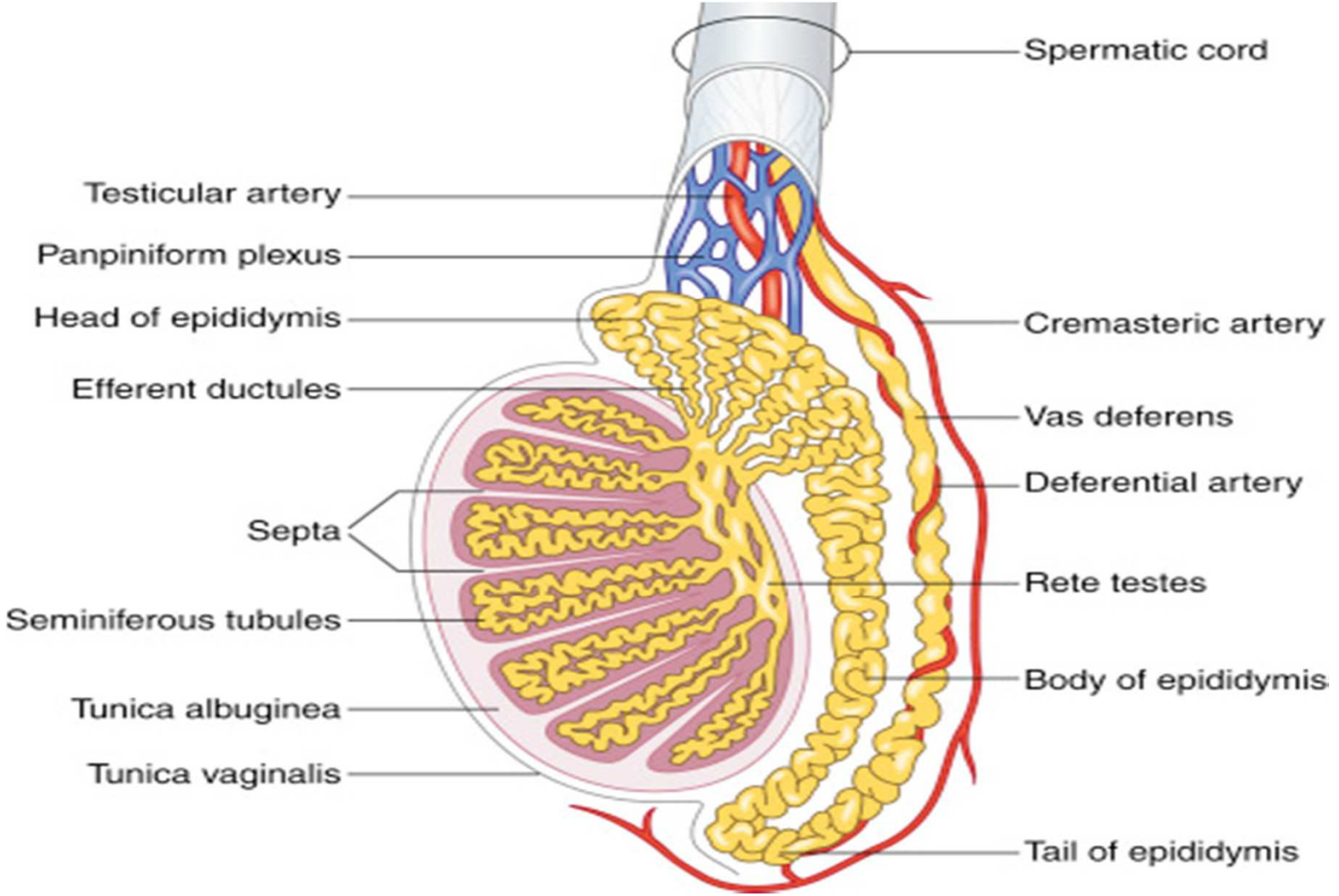
1.Epididymis:

. The long highly coiled duct of epididymis, surrounded by connective tissue, lies in the scrotum along the superior and posterior side of each testis.

.It is 6 cm long , and include:

1. **Head** region : where the efferent ductules enter.
2. **Body**: where sperm undergo further subtle modifications.
3. **Tail**: where sperms are stored until ejaculation.

Epididymis

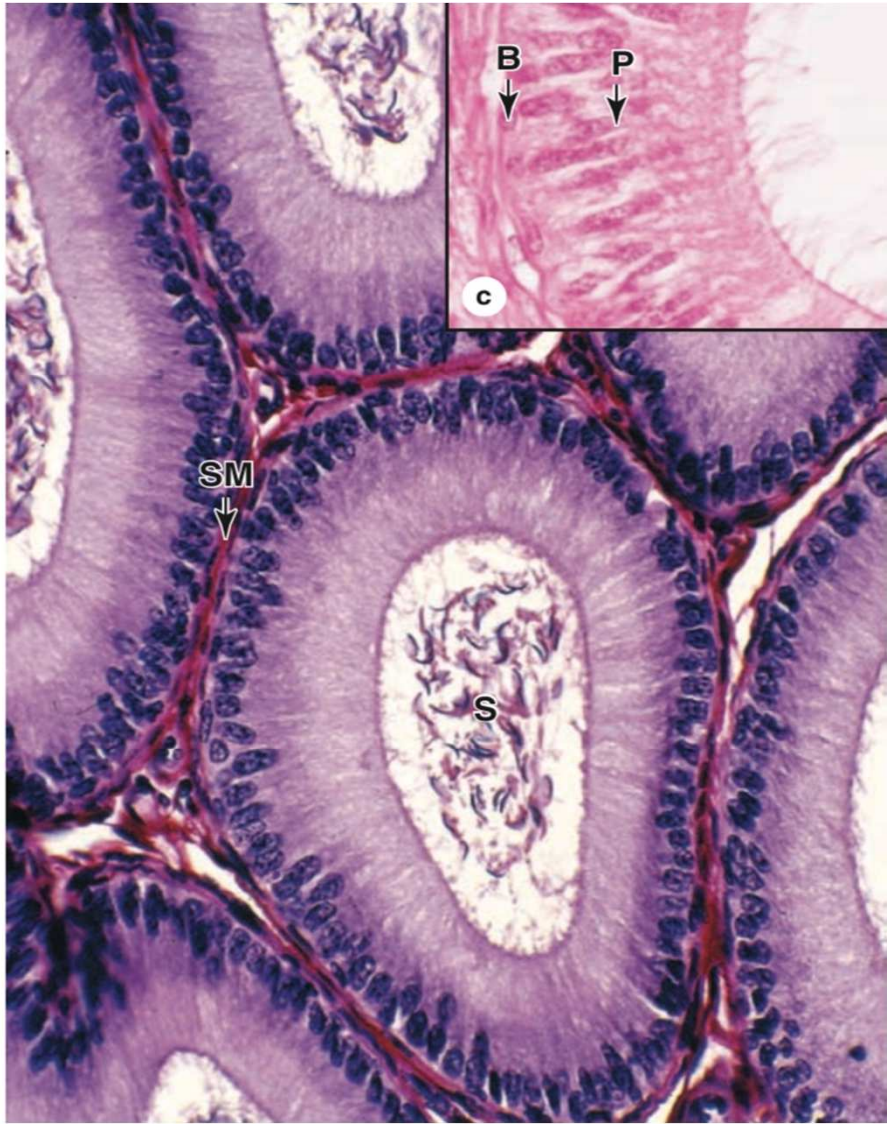

Spermatic cord
Testicular artery
Panpiniform plexus
Head of epididymis
Efferent ductules
Septa
Seminiferous tubules
Tunica albuginea
Tunica vaginalis
Cremasteric artery
Vas deferens
Deferential artery
Rete testes
Body of epididymis
Tail of epididymis

. The epididymal duct is lined by pseudostratified columnar epithelium, consist of columnar principle cells with characteristic long stereocilia and a small round stem cells.

.Passage of sperms through the ducts of epididymis takes **2-4 weeks** , during which the spermatozoa cell membranes bind and integrate many components secreted by the principle cells, without such modification fertilization can not occur.

.The epididymal duct is lined by thin circular smooth muscles in the tail region.

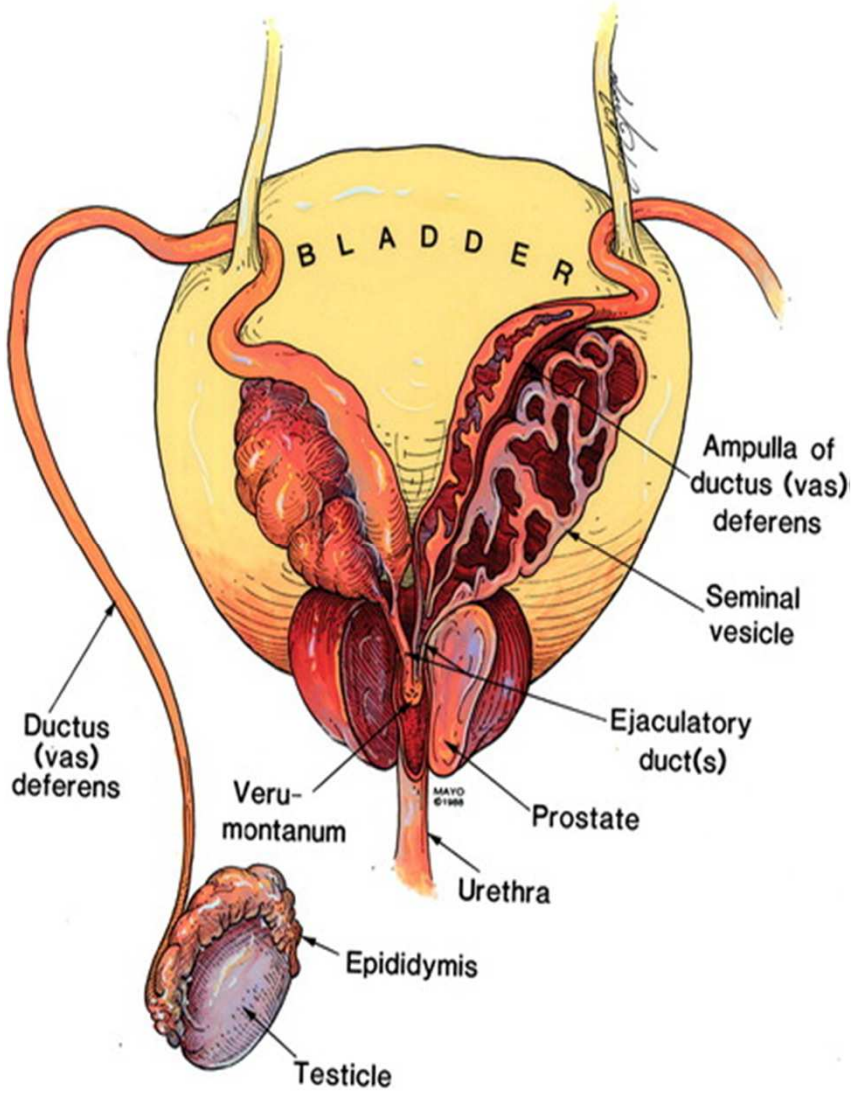
Epididymis



2.Ductus or vas deferens

.Each ductus is a long straight tube with a thick muscular wall and small lumen.

.It leaves the scrotum and pass toward the prostatic urethra where it empties.



.It carries the sperms by rapid peristalsis from the epididymis to the ejaculatory ducts.

.It forms part of the spermatic cord.

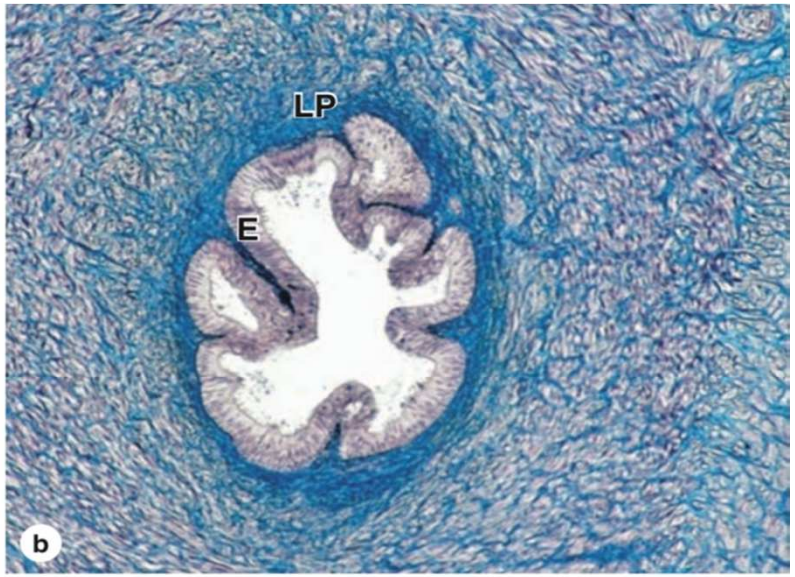
.Each ductus passes over the urinary bladder where it enlarge as the ampulla(thick and extensively folded epithelium).

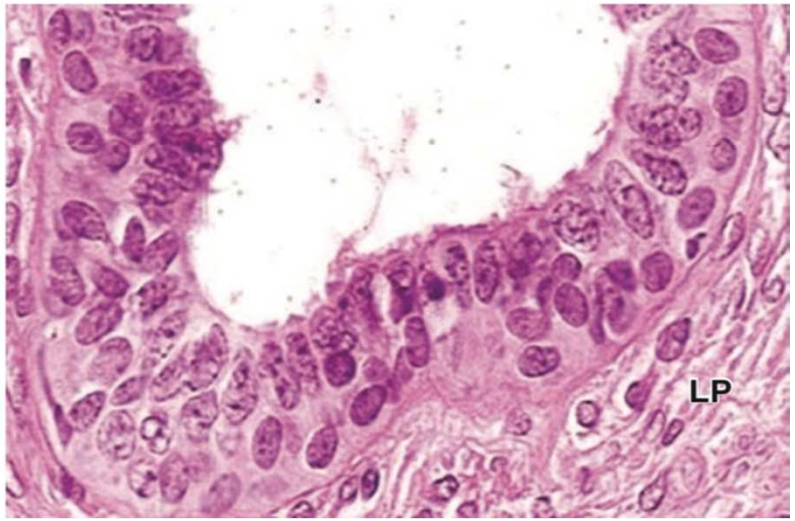
.Within the prostate gland the two ampullae merge with seminal vesicle ducts to form the ejaculatory duct, which opens into the prostatic urethra.

.Its mucosa is slightly folded longitudinally , the lamina propria contains many elastic fibers, the lining epithelium is pseudostratifeid with few stereocilia.

.The very thick muscularis consists of inner longitudinal and outer layers, with middle circular layer.

Ductus deferens



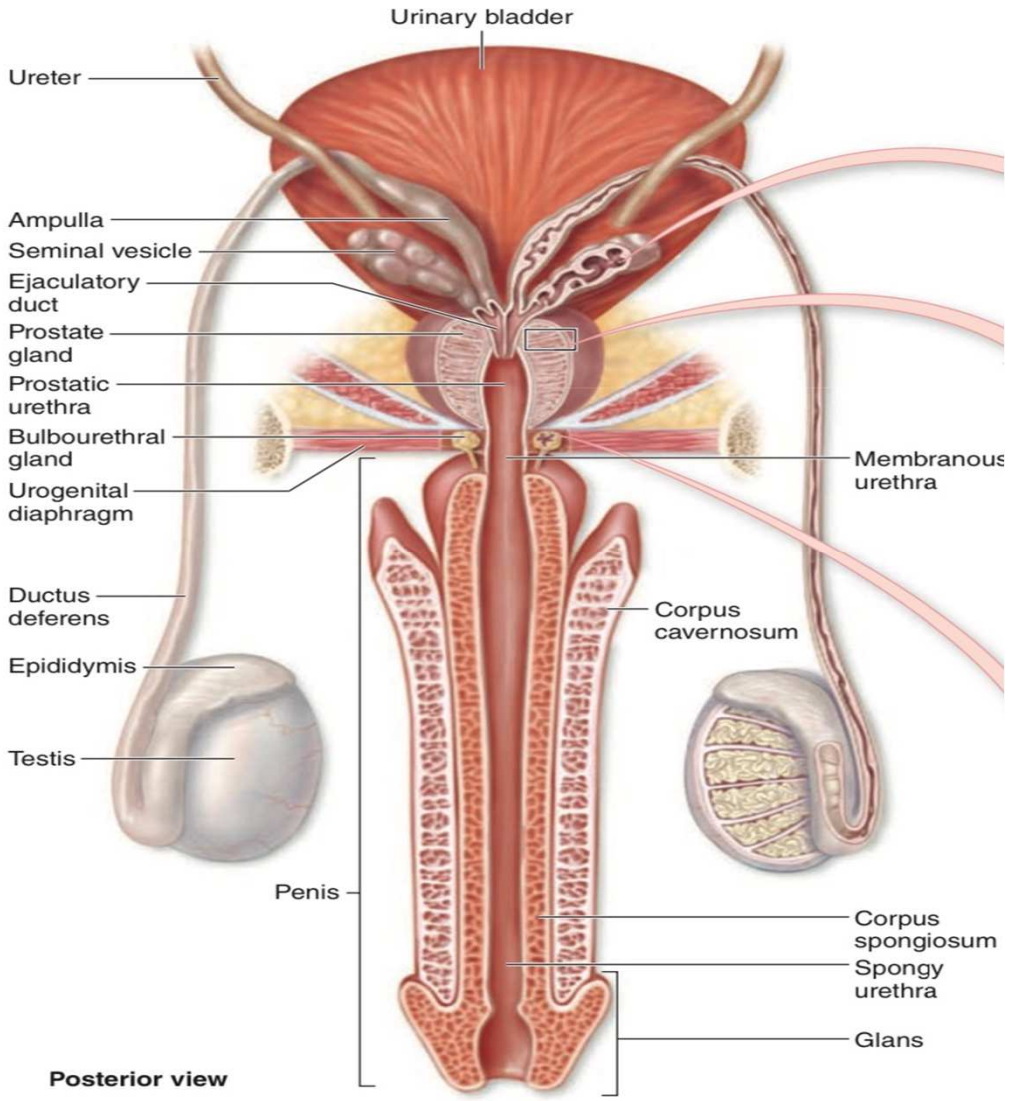


3.Accessory glands

.They produce **secretions** which become mixed with with sperms during ejaculation to produce semen and are essential for reproduction.

. They include:

1. **Seminal vesicles.**
2. **Prostate gland.**
3. **Bulbourethral glands.**



1. Seminal vesicles

.The two seminal vesicles are a highly tortuous tubes, each 15 cm long, enclosed by connective tissue capsule.

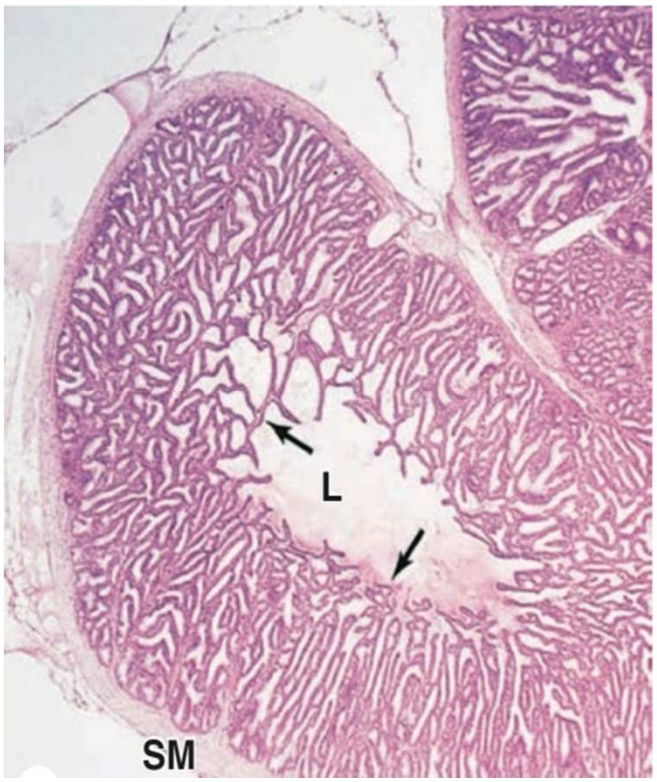
.The unusual mucosa display great number of thin complex folds, which fill much of the lumen.

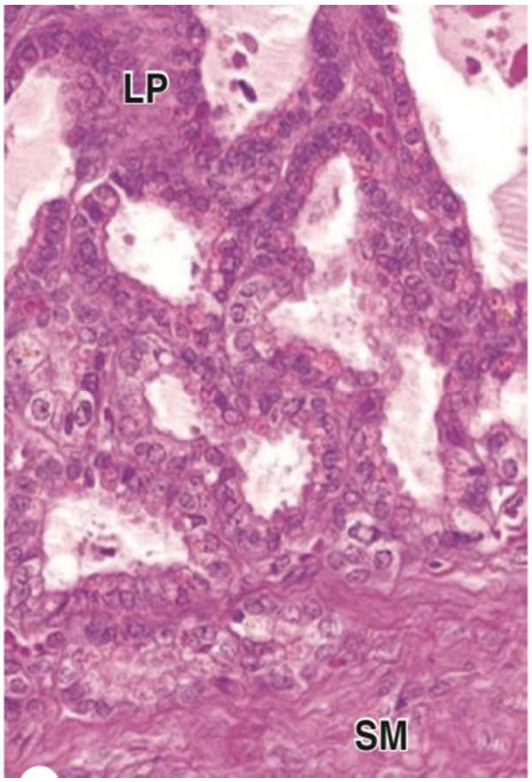
. The lining is simple or pseudostratified columnar epithelium rich in secretory granules.

The lamina propria contains elastic fibers and surrounded by smooth muscle layer(inner circular and outer longitudinal) , which empty the gland during ejaculation.

They secrete a viscous yellowish, testosterone dependent secretions that makes up to 70% of the ejaculate.

The component of the seminal secretions include (fructose, prostaglandins and fibrinogen).





2.Prostate gland

.It is a dense organ, measuring 2cm x 3 cm x 4 cm in size and it weighs 20 g ,it surround the urethra below the bladder.

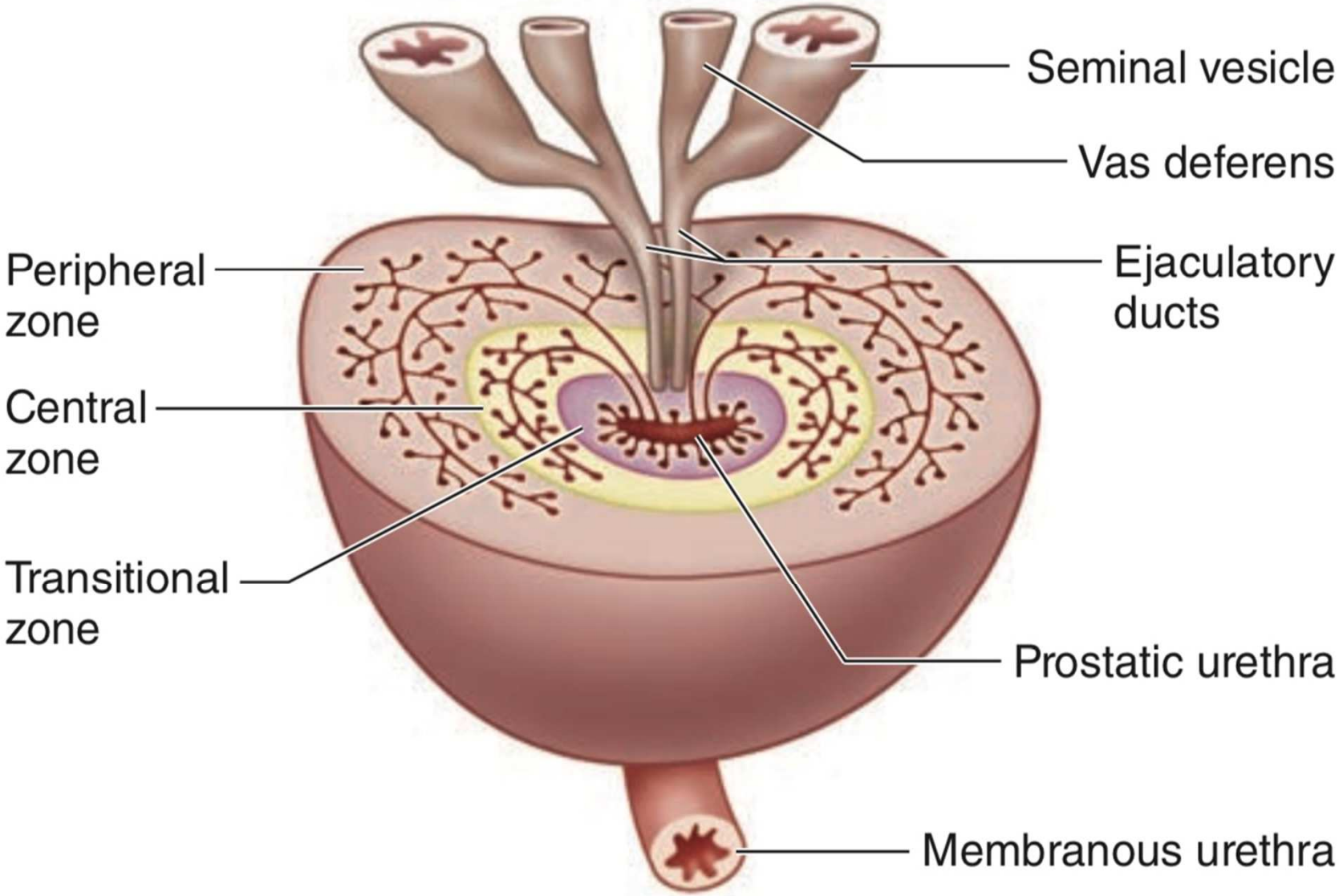
.It consists of collection of 30-50 tubuloacinar glands embedded in a dense fibromuscular stroma.

Ducts of the all the glands empty directly into the prostatic urethra , which runs through the center of the prostate.

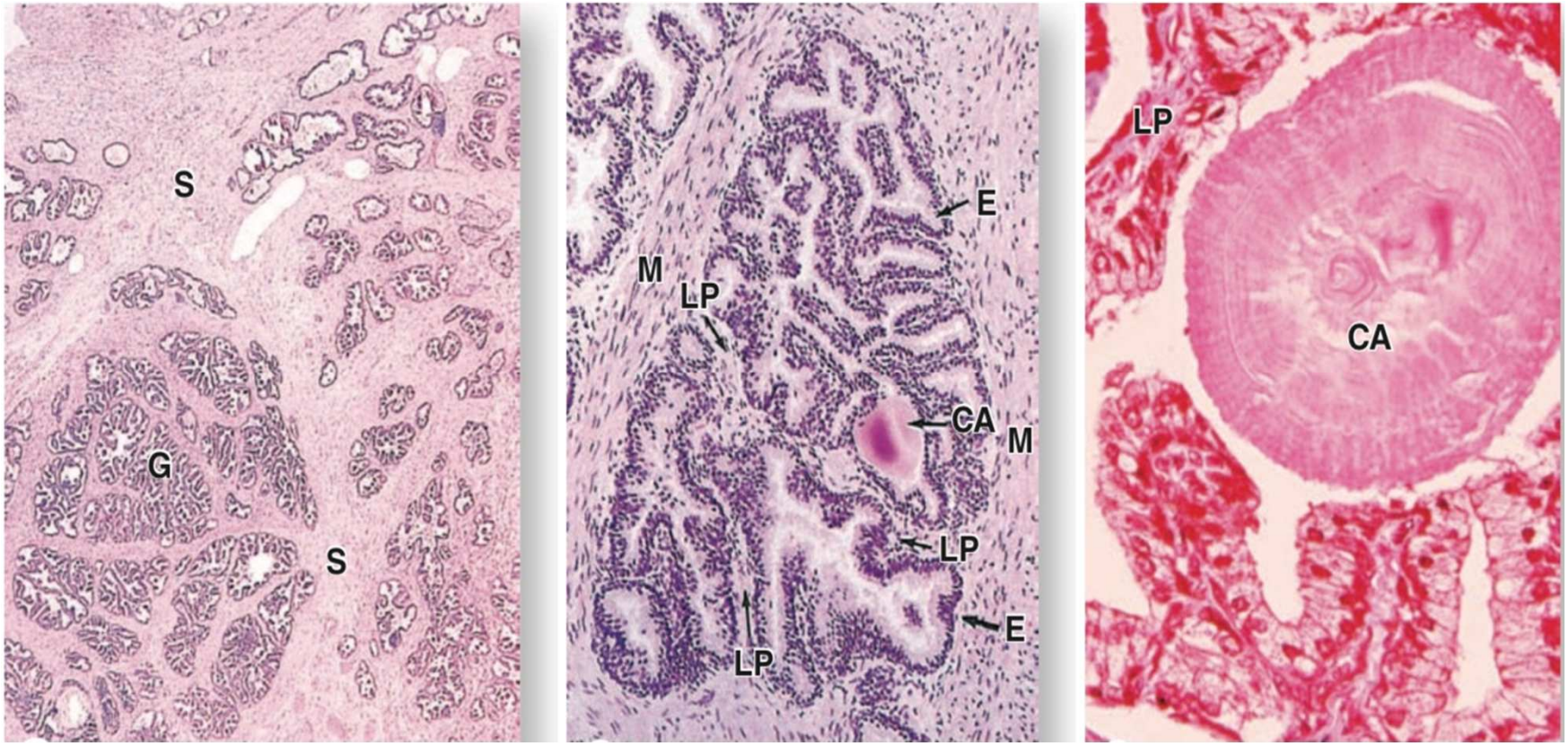
The glands are arranged into 3 major zones:

1. Transition zone(5%) .
2.Central zone (25%) .
3.Periphral zone (70%).

Organization of the prostate gland



The glands are lined by simple or peudostratified columnar epithelium and produce fluid that contains complex mixture (exosomes , enzymes , glycoproteins and prostaglandin) that are stored until ejaculation.



An important product is the prostatic specific antigen (**PSA**), which helps liquefy the semen. Small amount of PSA leak into vasculature , elevated abnormal circulating PSA typically indicate carcinoma or inflammation.

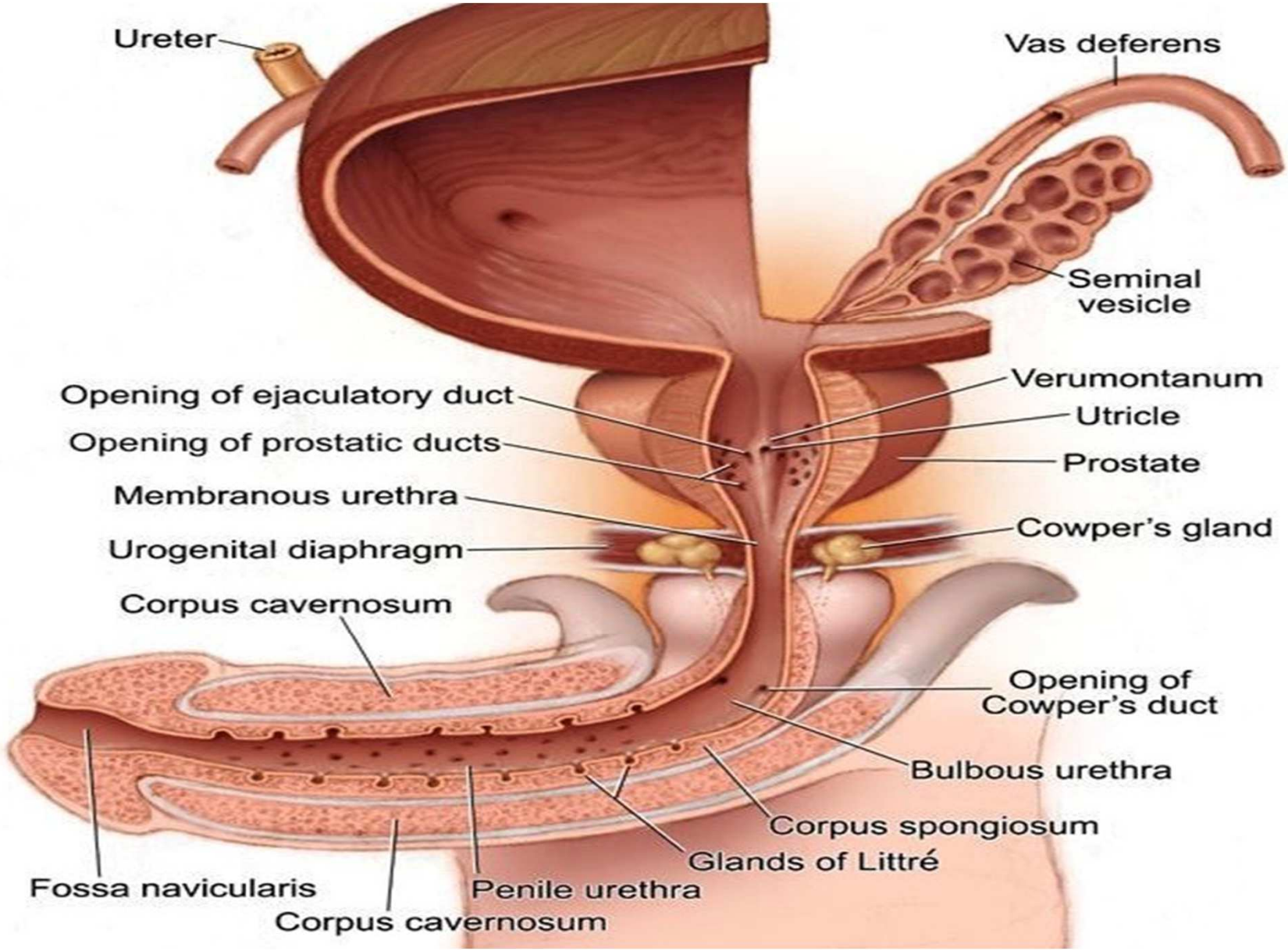
Corpora amylacea are small spherical secretions that are often partially calcified, are normally present in the lumen of the prostatic glands.
The prostate is surrounded by fibroelastic capsule, from which a septa extend and divide the gland into distinct lobes.

3.Bulbourethral gland(Cowper's gland):

the paired glands are small(3-5 mm) in size and located at the urogenital diaphragm. They empty into the penile urethra.

Each gland has several lobules with tubuloacinar secretary units lined by mucous secreting simple columnar epithelium and surrounded by smooth muscle cells.

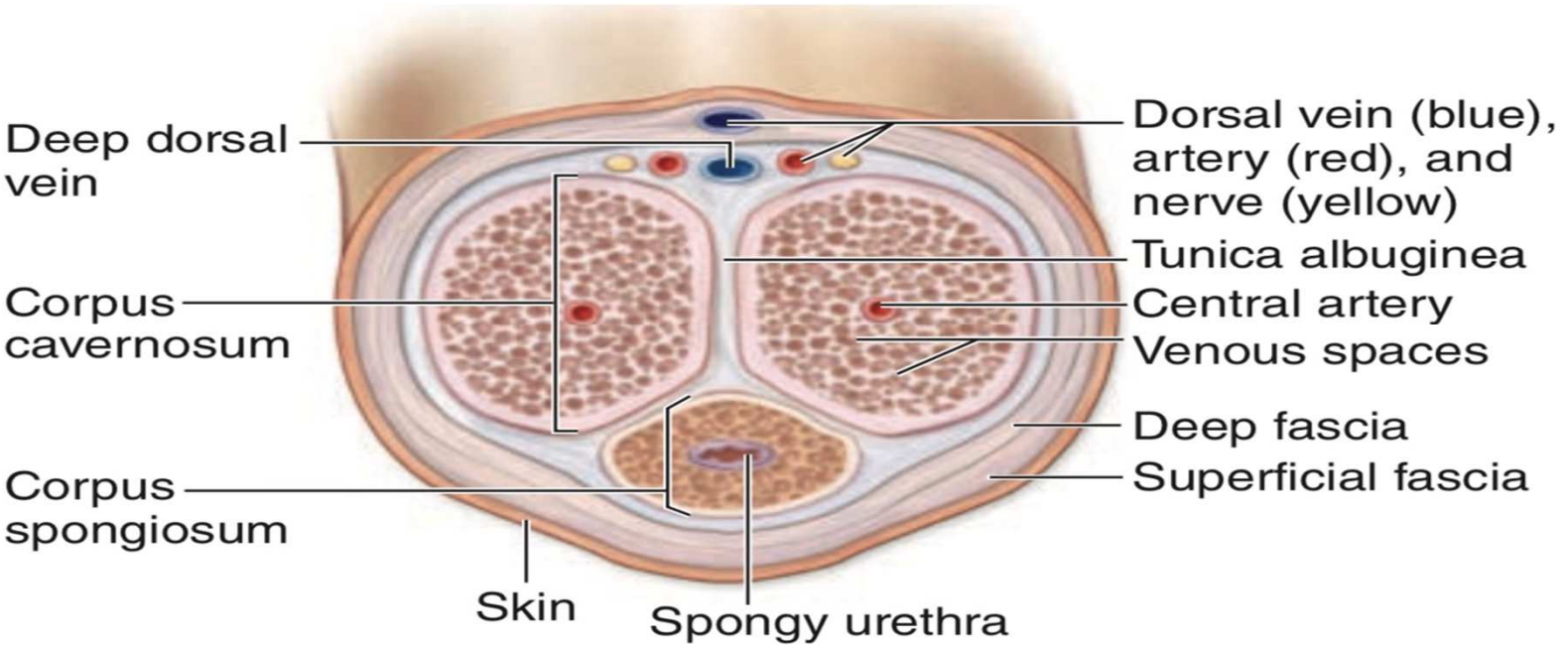
Their secretion coat and lubricate the urethra in preparation of sperm passage.


Ureter
Vas deferens
Seminal vesicle
Opening of ejaculatory duct
Opening of prostatic ducts
Membranous urethra
Urogenital diaphragm
Corpus cavernosum
Verumontanum
Utricle
Prostate
Cowper's gland
Opening of Cowper's duct
Bulbous urethra
Corpus spongiosum
Glands of Littré
Penile urethra
Fossa navicularis
Corpus cavernosum

4. The penis:

.The penis consists of three cylindrical masses of erectile tissue, plus the penile urethra, surrounded by skin.

Two erectile masses - corpora cavernosa - are dorsal. the ventral - corpus spongiosum -surrounds the urethra, and expand at its end forming the glans.



. The **penile urethra** is lined by pseudostratified columnar epithelium which becomes stratified squamous epithelium in the glans continuous with that of the epidermis covering the glans surface.

.Mucous secreting glands are lining the penile urethra.

The corpora cavernosa are surrounded by dense fibroelastic layer , the tunica albuginea.

. The erectile tissue consists of many **venous cavernous spaces** lined by endothelium and separated by smooth muscles and connective tissue.

. Penile erection involves blood filling of the cavernous spaces in the 3 erectile masses.