MALE REPRODUCTIVE SYSTEM

The male reproductive system consists of primary sex organs (testes) and secondary or accessory sex organs. The secondary organs consist of a series of genital ducts (ductules efferentes, epididymis, ductus deferens, ejaculatory ducts) and associated glands (seminal vesicles, prostate, bulbourourethral) terminating in the organ of copulation, the penis.

TESTIS

The testis is surrounded by a thick connective tissue capsule, the **tunica albuginea**. The bulk of the parenchyma is comprised of coiled **seminiferous tubules** with a small amount of **interstitial CT** containing **interstitial (Leydig) cells**. The interstitial (Leydig) cells contain **crystals of Reinke** which are of unknown significance. The main function of the interstitial cells is in producing male sex hormones (under the influence of interstitial cell stimulating hormone/LH).

The seminiferous tubules contain several cell types. **Sustantactular cells** (Sertoli cells; nurse cells) can be seen in the ducts with their large pale nuclei and prominent nucleoli. These are important in maturation of sperm and respond to FSH. There are multiple stages of sperm production: **spermatogonia, primary spermatocytes, spermatids, spermatozoa** (see the figure below). Of what does the **blood-testis barrier** consist?
Diagram of the formation of spermatozoa in the seminiferous tubules of the testes (spermatogenesis).

44 + X + Y  Testes (light microscope, ×500). (Modified after O. Bucher, 1973.)
RETE TESTIS AND EPIDIDYMIS

The rette testis is comprised of ducts at the testicular mediastinum, into which connect the seminiferous tubules to the epididymis. The lining epithelium of the epididymis is of the pseudostratified columnar type and consists of two distinct cell types: tall principal cells covered with stereocilia and smaller, basal cells that rest against the basal lamina. Stereocilium are large, elongated microvilli, and therefore contain a core of actin filaments. They are non-motile. The stroma of the epididymis is comprised of connective tissue, smooth muscles, and blood vessels. The epididymis is a site of maturation of spermatozoa that must remain in this site for some time before becoming motile.

DUCTUS DEFERENS (Vas deferens)

The ductus deferens is a thick-walled tube consisting of three concentric layers: mucosa, muscularis, and adventitia. The lumen of the organ is relatively small. The mucosa is composed of a pseudostratified columnar epithelium with stereocilia (similar to the epididymis) and a thin lamina propria rich in elastic fibers, which generally causes the mucosa to form longitudinal folds. The muscularis is very robust and consists of three layers of smooth muscle. The inner and outer layers have a longitudinal orientation, the intermediate layer circular. The adventitia is continuous with the CT of the spermatic cord.

PROSTATE GLAND

The prostate is a compound tubuloalveolar gland with a fibromuscular stroma. The secretory epithelium is usually of the simple columnar or pseudostratified columnar type. There are numerous intraluminal lamellated concretions (corpora amylacea), which are a characteristic feature of this gland in older males.
SEMINAL VESICLE

The seminal vesicle is a highly folded, tubular gland, which primarily secretes fructose (and other components) into the seminal fluid (energy for sperm). The pseudostratified columnar epithelium contains tall, nonciliated columnar cells and short, round “basal cells” that rest on the basal lamina. These cells are apparently stem cells. The tall columnar cells have an abundance of rough endoplasmic reticulum and large secretory vacuoles in the apical cytoplasm. There is an abundance of smooth muscle, arranged in two layers deep to the epithelium.

PENIS

The majority of the penis is comprised of a dense connective tissue capsule (the tunica albuginia) surrounding three cylinders of erectile tissue: the two corpora cavernosa and the single corpus spongiosum containing the penile urethra. The erectile tissues consist of endothelium-lined sunuses that can become engorged with blood. The dorsal portion of the outer connective tissue contains numerous blood vessels and nerves.
CHECK LIST

Understand the architecture of the testis, epididymis, vas deferens, prostate gland & penis. Know the structural/hormonal relationships of each organ.

TESTIS: Understand the arrangement of the seminiferous tubules. Define and identify:

- tunica albuginea
- mediastinum/rete testis
- head, body, tail of epididymis
- interstitial tissue
- seminiferous tubule
- ductuli efferentes
- ductus (vas) deferens
- Leydig (interstitial) cells

Know the morphology and stages of spermatogenesis, including the ploidy of each cell type. Define and identify:

- spermatogonia
- (secondary spermatocytes)
- late spermatids
- Sertoli (sustentacular cells)
- primary spermatocytes
- early spermatids
- spermatozoa
- blood-testis barrier

EPIDIDYMIS: Define and identify:

- pseudostratified principal cells with stereocilia
- basal cells

DUCTUS DEFERENS: Define and identify:

- pseudostratified columnar cells
- three muscle layers
- lamina propria with elastic fibers

PROSTATE: Recognize that the prostate is very glandular with a well-developed fibromuscular stroma. Look for lamellated concretions (corpora amylacea), a distinguishing characteristic of the prostate.

PENIS: Know the basis structure and relationship of the three cylinders of erectile tissue. Define and identify:

- tunica albuginea
- corpora cavernosa
- urethra
- glans penis
- corpus spongiosum