

Ministry of Higher Education  
& Scientific Research  
Al-Muthanna University  
Faculty of Pharmacy



وزارة التعليم العالي والبحث العلمي 1

جامعة المثنى

كلية الصيدلة

**First stage**

**Faculty of Pharmacy**

**Al-Muthanna University**

**Second semester of 2023-2024 academic years**

**Theory Histology**

**Lec. (6)**

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First stage / Faculty of Pharmacy / Al-Muthanna University / Theory Histology/ 18/4/2024

## ***The Male and Female Reproductive System***

The male reproductive system is composed of the ***testes, genital ducts, accessory glands,*** and ***penis.***

### ***STRUCTURE OF THE TESTES:***

The function of the testis is to produce spermatozoa and hormones.

#### ***A- capsule***

the testes is surrounded by a thick capsule of dense connective tissue, the ***tunica albuginea*** covers each testes & the ***tunica vasculosa*** (Tunica vaginalis) is a loose connective tissue layer that contain blood vessels & consist of outer parietal layer lining the scrotum & inner visceral layer, covering the tunica albuginea on the anterior & lateral sides of testis. The tunica albuginea is thickened on the posterior surface of the testis to form the ***mediastinum*** testis, each testes is dividing into approximately 250 pyramidal compartments called the ***testicular lobules*** by incomplete fibrous septa project from capsule. Each lobules is occupied by 1- 4 seminiferous tubules enmeshed in a web of loose connective tissue that is rich in blood and lymphatic vessels, nerves, and interstitial (Leydig) cells.

#### ***B-Seminiferous tubules:***

The each testicle has seminiferous tubules and at the termination of each tubules, the lumen continues in short segments known as ***straight tubules***, or ***tubuli recti.***

The seminiferous tubules are lined with a complex stratified epithelium called ***germinal*** or ***seminiferous epithelium(1)*** which surrounded by ***basal lamina(2)*** and ***tunica propria(3)*** a fibrous connective tissue enveloping the seminiferous tubules consists of several layers of fibroblasts. The inner most layer adhering to the basal lamina consists of flattened ***myoid cells***, which have characteristics of smooth muscle.

The epithelium consists of two types of cells; ***sertoli***, or ***supporting1*** cells and cells that constitute the ***spermatogenic cells2*** are stacked in 4-8 layers occupy the space between the basal lamina and the lumen of the tubule.

***Sertoli Cells*** are elongated pyramidal cells that partially envelop cells of the spermatogenic lineage. The bases of the sertoli cells adhere to the basal lamina, and their apical ends frequently extend into the lumen of the seminiferous tubule and form together ***blood testis barrier***

***Sertoli cells have several functions:***

- Support , protection , and nutritional*** regulation of the developing spermatozoa .
- Phagocytosis.***
- Secretion of androgen – binding protein , inhibin, activin*** & sertoli cells can convert testosterone to estradiol .
- Production, of the anti-mullerian hormone***

### Interstitial tissue :

The spaces between the seminiferous tubules in the testis are filled with accumulations of connective tissue & *interstitial* or *leydig cells* rounded or polygonal in shape has a central spherical nucleus occur singly or in clusters and eosinophilic cytoplasm rich in small lipid droplets and have the characteristics of steroid secreting cells .

These cells produce the male hormone testosterone is important for sexual differentiation during embryonic & fetal development & control of gonadotropin secretion & responsible for development of the secondary male sex characteristics.

### Intratesticular genital ducts:

It is consist of *tubuli recti* (straight tubules), *rete testis* and *ductuli efferentes*.

1. *tubuli recti*: At the end of each seminiferous tubules is lined only by *sertoli cells* , near the termination , the straight tubules narrow , and their lining changes to a *simple cuboidal epithelium*.

2. *rete testis*: is a highly anastomotic network of channels within *mediastinum* and lined with *cuboidal epithelium* have a single apical cilium & microvilli.

3. *the ductuli efferentes*: are lined by *non ciliated cuboidal* alternating with *columnar ciliated cells* surrounded by *dense c. t.* & thin layer of *circularly smooth muscle cells*.

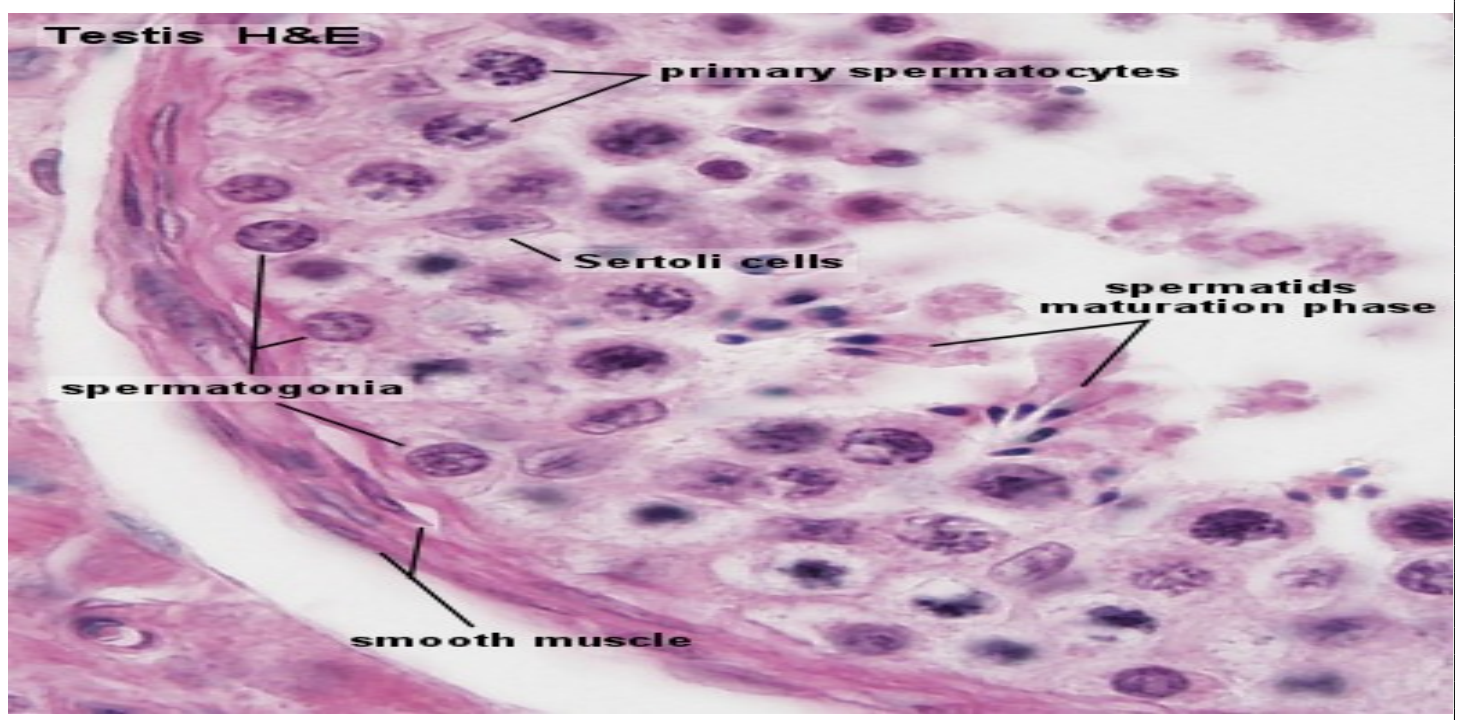
### Excretory genital ducts

These ducts are the *ductus epididymidis* , *ducts (vas) deferens* & the *urethra* .

1- *The ductus epididymidis*: lined by *pseudostratified columnar epithelium* has irregular microvilli called stereocili surrounded by smooth muscle cells whose contractions help to move the sperm a long the duct & *loose connective tissue*.

### 2- Vas deferens

*mucosa* has longitudinal folds , lined by *pseudostratified columnar epithelium* with *stereocilia* . *The lamina propria* is rich in elastic fibers , & the thick *muscular layer* consists of longitudinal inner & outer layers separated by a circular layer , & covered by *adventitia*



## ***The Female reproductive system***

It's consists of internal sex organs & external genital structures :

- The internal female reproductive organ are two ***ovaries*** , ***two uterine tubes ( oviducts )*** , ***uterus & vagina*** .

***1- Ovaries*** : The surface of ovaries is covered by ***the germinal epithelium*** which is a ***simple squamous to cuboidal epithelium*** & under the tunica albuginea which is a layer of dense connective tissue , which is responsible for the whitish color of the ovary .

- ***The ovary is composed of a cortex & a medulla*** :

□ ***Cortical region*** , found in the peripheral portion of the ovary underneath the tunica albuginea surrounding the medulla & contains the ***ovarian follicles*** ( structures that contain the oocyte ) are embedded in a richly cellular connective tissue (***stroma***) which is composed of ***fibroblasts & smooth muscle fibers*** around the follicles .

□ ***Medullary region*** , represent the most internal portion of the ovary contain a rich vascular bed within ***a loose connective tissue*** .

### ***Ovarian cortex*** :

The cortex houses ovarian follicles in various stages of development .

### ***Ovarian follicles*** :

#### ***1-primordial follicles***

#### ***2-Follicular growth***

#### ***3-secondary or antral follicles***

#### ***4-mature follicle (graafian follicle)***

### ***2- Oviducts or uterine tubes or Fallopian tubes***

***The wall of the uterine tube is composed of three layers .***

#### ***A- The mucosa***

1- The mucosa is composed of a ***simple columnar epithelium*** has of two kinds of cells:

- ***Ciliated cells*** The cilia beat toward the uterus, causing movement of the viscous liquid.

- ***Non ciliated, peg cells*** are secretory cells that produce the fluid that provides nutritive material for the ovum.

2- Lamina propria is a loose C.T.

***B- The muscularies*** composed of smooth m. disposed as an ***inner circular or spiral layer*** & an ***outer longitudinal layer***.

#### ***C- Serosa***

### ***3- Uterus*** : .

***The uterine wall is composed of three layers .***

***Endometrium*** lined by ***simple col. Epi. Cells*** .

***The C.T. of lamina propria*** contain ***glands*** that in deeper portions. The endometrium divided into two regions :-

**1- The basalis** is the deepest one, adjacent to the myometrium , it contains highly cellular lamina propria.

**2- The functionalis** is superficial layer contains more spongy and less cellular lamina propria & the glands, as well as the surface epithelium & the functionalis undergoes profound changes during the menstrual cycles .

### ***Myometrium***

It's the thickest tunic of the uterus , is composed of bundles of smooth muscle fibers separated by C.T. The bundles of smooth muscle form four poorly defined layers . The first & fourth layers are composed mainly of fibers disposed **longitudinally** & the middle layers contain the larger blood vessels .

- **During pregnancy** the myometrium undergo for great growth as a result of increase in number of smooth muscle cells (hyperplasia) & increase in cell size (hypertrophy) and the many smooth muscle cells actively synthesize collagen .

- **After pregnancy**, There is destruction of some smooth muscle cells , reduction in the size of others & enzymatic degradation of the collagen and the uterus is reduced in size almost to its pre pregnancy dimensions .

The uterus surrounded by **serosa** or **adventitia** .

### ***Uterine Cervix***

**The mucosa lined by simple col. Epi.**

**The lamina propria has dense connective tissue** & consists mainly of **smooth muscle fibers** & contain a mucous **cervical glands** frequently develop into **Nabothian cysts** filled with secretion.

**The cervical glands** proliferation & secrete a more viscous & abundant mucus during pregnancy prevent the passage of sperm as well as microorganism but the secretion become a watery without pregnancy to permit movement of spermatozoa .

### ***Vagina***

**The mucosa** lined by **stratified sq. epi.** & the cells may contain a small amount of **keratohyalin**.

**The lamina propria** composed of **loose C.T. devoid of glands & sensory nerve ending** .

**The muscular layer** has **longitudinal** bundles of smooth muscle & some **circular** bundles **adventitia** is a coat of **dense C.T.**