

## Histology part

### Slide 2

\*Section of the **Testes** at low magnification:

- We can see the Capsule "from outside" which called **tonica albuginea**
- Inside we see sections of **seminefrous tubules**( each testes is divided into 250 lobules, each lobule contain 1-3 seminefrous tubules which produce the sperms)

### Slide 3

At higher magnification we see the seminefrous tubules at different orientation

### Slide 4

\*Layers of testes:

- First layer (outside): visceral layer of **tonica vaginalis** (from peritoneum)
- Then: **tonica albugina** ; dense fibre tissue usually Avascular but in the inner layer we see blood vessels called (**tonica vasculosa**; part of tonica albugina)

### Slide 5

Seminefrous tubules, we can see nuclei of many cells but we can't differentiate between different types of cells

### Slide 6

At higher magnification, the dark line around the tubule is the **basement membrane**, any cells outside it called **peritubular cell**, these cells are able to secrete some of sertoli secretions

### Slides 7-10

\*Types of cells:

- Any cell near the basement membrane is **(S)spermatogonium**
- The second cell is **(S1) primary spermatocyte**; it characterized by the net of chromatin inside it, this cell undergo first mitotic division into **secondary spermatocyte**, which we can't recognize it in the section because it will undergo second mitotic division into **(S3)early spermatid** (rounded nucleus)
- Then the early spermatid undergo morphological changes and the nucleus becomes more acute this called **(S4) late spermatid**, and when we see these spermatides in the lumen we call it **spermatozoa(sperms)** , which immotile and reach the epididymis by "swimming" in the fluids produced by sertoli cells, and absorbed by the stereocilia "microvilli" of principle cells of epididymis.

(Remember:

Type A dark spermatogonia >> type A pale >> type B spermatogonia >> 1ry spermatocyte)

-We see **Sertoli cells(St)** , columnar cell with oval nucleus & prominent nucleolus, they are surrounded by germinal cells(1ry & 2ry spermatocytes) to nourish & protect them,

\*Functions of sertoli cell :

1-sertoli cell protect other cells by forming tight junction creating the Blood-Testes Barrier which protect all types of cells there except the spermatogonia because it's the only normal cell(46, single, 2n) , while primary spermatocyte (46,double,4n) and secondary spermatocyte( 23, double,2n) and late spermatid (32,single,1n) all are upnormal cells

2-allow the testosterone to cross and reach the spermatogenesis

3-under the effect of FSH it secrete stem cell factor, which induce mitosis in spermatogonia and prevent apoptosis

4-under the effect of FSH it secrete Activin, stimulate the spermatogonia to form the 1ry spermatocyte

5-stimulated by FSH to synthesize estradiol from testosterone (produced by leydig cells)

6-produce Androgen Binding Protein (ABP) which bind to testosterone and concentrate it to be used during spermatogenesis.

7-produce inhibin work as feedback inhibition

\*the interaction between leydig cells & sertoli cells( same explanation in handout 3 page 21).

\*before middle age, there is a balance between testosterone & estradiol, but after middle age and for unknown reason, estradiol increased, and up-regulate the dihydrotestosterone receptors which cause the enlargement of prostate.

\* The decline in testosterone levels with age cause symptoms like depression, "male climacteric", but we don't give them testosterone due to the fear of having carcinoma in the prostate.

\*carcinomas of the prostate grow from the periphery, while benign adenomas from the middle.

### **Slides 11-13**

Between the seminiferous tubules there are **interstitial cells(e.g leydig cells)** which produce testosterone , these are eosinophilic & under microscope looks similar to adrenal cortical cells that produce steroids ( rich in SER, contains lipid droplets).

We might see **peritubular cells**, which under stimulation of testosterone produce substances similar to sertoli cells .

We see also **blood vessels**, because like any endocrine tissue need to be hyper-vascularised in order to transmit the hormones.

### **Slides 14+15**

**Epididymis**: highly convoluted tubule is characterized by its:

-Lumen which **full of sperms**

Lining: **pseudostartified columnar epithelium**

**Smooth muscles** outside (1 layer in the head, 2 layers in the body, 3 layers in the tail and continue as 3 layers to the vas deferens) when sympathetic stimulation reach these smooth muscles during ejaculation they contract and empty the sperms in the vas deferens, which in turn undergo peristalsis and empty in the ampulla then to the ejaculatory duct.

**Slides 16-19**

We can see 2 types of cells:

**1-basal cells**, with round nuclei & rest on basement membrane

**2-principle columnar cells**, with oval nuclei & possess microvilli or stereocilia on the apical surface which absorb the excess fluids

**Slide 20****Vas deferens:**

-Characterized by : very thick wall & narrow lumen

-The mucosa surrounding the lumen form longitudinal folds, and its **pseudostratified columnar epithelium**

-Outside the lamina propria there are **3 muscle layers**: inner longitudinal, middle circular and outer longitudinal, then we have the adventitia.

-The presence of these muscles reflect that during ejaculation, under sympathetic stimulation, the vas deferens undergo severe peristalsis to empty the sperms of epididymis into the urethra.

(Remember: vas deferens has a narrow lumen and **doesn't** store the sperms)

**Slides 21+22**

At higher magnification;

-We can see 2 types of cells : **columnar (oval nuclei)** & **basal (round nuclei)** together form pseudostratified columnar epithelium with microvilli or stereocilia, and different muscle layers

(Note that it is pseudostratified **Non-ciliated** columnar epithelium but has microvilli so it is pseudo-ciliated)

**Slide 23**

Section in the **Spermatic Cord:**

-The structure at the left has thick wall & narrow lumen so it is the vas deferens

-To the right we see sections at the **pampiniform plexus of veins**, although these are veins but they have thick walls, because they are subjected to high blood pressure esp. the left side where they give arise to testicular vein that drains into left renal vein.

**Slides 24+25**

At the left lower angle of the slide we can see parts of **cremasteric muscle**, note that the nucleus present peripherally >>skeletal muscle, and this muscle innervated by **genital part of genitofemoral nerve**, we can see section of this nerve in *slide 26*

(Remember that in addition to these contents in the spermatic cord, it also contains **lymphatics** which drain into the paraaortic lymph nodes. We can find **sac of hernia** inside the spermatic cord or its remnants called **prosessus vaginalis** anterior to the spermatic cord)

**\*Accessory genital glands**

(Prostate, seminal vesicle and bulbourethral)

***Slide 28***

Section of **prostatic urethra**:

Inside the middle part of prostate more anterior, lateral to it we can see **2 ejaculatory ducts**, one on each side.

***Slide 30-32***

We see **alveoli** of the glands in the parenchyma, and **fibromuscular C.T** in the stroma( collagen+ smooth muscles) that's why it is firm.

Note: the prostatic venous plexus lies between the true capsule and false capsule.

Benign tumours in the gland compress the outer part of the gland and form what so called surgical capsule.

***Slide 29***

-We see **peripheral prostate glands** ( large & branching) and they are endodermal in origin>> may form Adenocarcinoma.

{Peripheral means near to the capsule like in slide 30}

**-Inner glands (mucosal & submucosal)** are mesodermal in origin>> may form Adenoma (hyperplasia).

***Slide 33***

The pointed part is secretions inside the prostatic alveoli called **(prostatic concretions = prostatic salts = corpora amylacea)** we don't know their function, but they increase after the middle age and undergo calcification.

***Slides 34-36***

The lining epithelium is variable between low **cuboidal to pseudostriated columnar** depending on the availability of androgens, if present transform the cells from cuboidal to pseudostriated columnar.

The epithelium of prostate projects into the lumen forming **papillae**

The alveoli surrounded by **smooth muscles** (elongated nucleus)

(Remember that prostate secrete into the prostatic urethra at posterior wall there is prostatic crest and beside it prostatic sinuses)

Note: High levels of PSA enzyme in the blood is highly suggestive of carcinoma.

***Slide 37***

**Seminal vesicle**:highly convoluted tubule

Characterized by its mucosa which projects forming **crypts**

***Slide 38-39***

The lumens are continuous but when we take section the cavities appear as **honeycomb**

**Slide 40**

-**2 layers of smooth muscle**: inner circular & outer longitudinal  
Contract during ejaculation under sympathetic stimulation

(Remember that seminal vesicle secretions form 60% of semen fluids)  
(The secretion of seminal vesicle include fibrinogen, which will convert to fibrin and cause temporary clotting of the semen in the vagina, in order to allow the sperms to undergo capacitation before reaching the ovum)

**Slide 41-42**

-Note the **honeycomb appearance** of seminal vesicle  
The epithelium is pseudostratified columnar and it may be cuboidal

(Remember that during fetal life, the seminal vesicle need testosterone to develop, but for development of penis & scrotum & prostate they need dihydrotestosterone )

\*\*There is no section of bulbourethral

## Practical part



(1)

(1) acute subpubic angle>> It is male pelvis



(2)

(2) wide subpubic angle>> it is female pelvis

(3) **The neck of femur** is the most affected part by osteoporosis (most commonly postmenopausal) for unknown reason.



**\*\*Fracture to the neck of femur:**  
-the leg becomes laterally rotated  
-in the past this is an emergency and the surgeon must re-connect the head to the shaft; because the blood vessels that supply the head come through the neck, so cut of the blood supply >> necrosis of the head of femur.

-Nowadays, it is not emergency, and even after a week we can replace it with **a prosthesis**.

\*the importance of all these procedures is to protect the patient from the complications of immobility( e.g DVT).

(3)



(4)

**(4) IVU : intravenous urogram**

- intravenous stain circulate with blood until reaching the kidneys, so the white color reflect the stain mixed with urine
- #1 pelvic of ureter
- #2,3 major calices
- arrows > minor calices
- the ureter descends down anterior to the lumbar transverse processes( notice the spine & the pedicle)

**\*\*Ascending urogram**

- insert a catheter in the urethra and inject the stain.

**(5)****(5) IVU**

- This show **distended bladder**; after injecting the stain, we ask the patient to drink large amount of water so we get this distension
- this used to look for tumours in the bladder





(6)

(6) this is a male pelvis, and the **bladder is rised up by the prostate** under it, so this may reflect hypertrophy of the prostate.

- the black shadows in the image is due to gases in the colon.



(7)

(7) **kinking of ureter:**

- the commonest cause is the presence of accessory renal artery( from aorta to the lower or upper pole of the kidney)That press on the ureter
- here we don't cut the artery because it is segmental artery, but we cut the ureter and reconnect it in the proper place( ant. Or post. to the artery)
- this kinking doesn't block the ureter completely>> no back pressure or enlargement of the calices
- if the obstruction was complete>> back pressure with renal hypertrophy.



(8)

(8) In this IVU

- the ureter on the left is not obvious >>it is empty >> by peristalsis
- the other ureter is thick superiorly and thin inferiorly>> blocked by stone in the pelvic prim
- the thickening of ureter called " hydroueter"
- the back pressure causes enlargement of the kidney >>" hydronephretic kidney"
- most commonly by impacted stone
- here the kidney is still functioning; there is filtration because we still can see the stain in the ureter
- severe pain due to severe peristalsis
- the beginning & the end & near the pelvic prim is common sites for stone impaction
  
- the second cause of ureter blockage is carcinoma of the bladder
- the prostate hypertrophy don't block the ureter, it may cause retention and back pressure.



(9)

(9) normal IVU

- we can't see one of major calices and ureter>> empty by peristalsis

-the **bladder is pressed by the uterus**>> this is pregnant female, and this pressure causes frequency in pregnancy.

*The end*

*Good luck☺*

*Done by: Alaa Aladdasi*