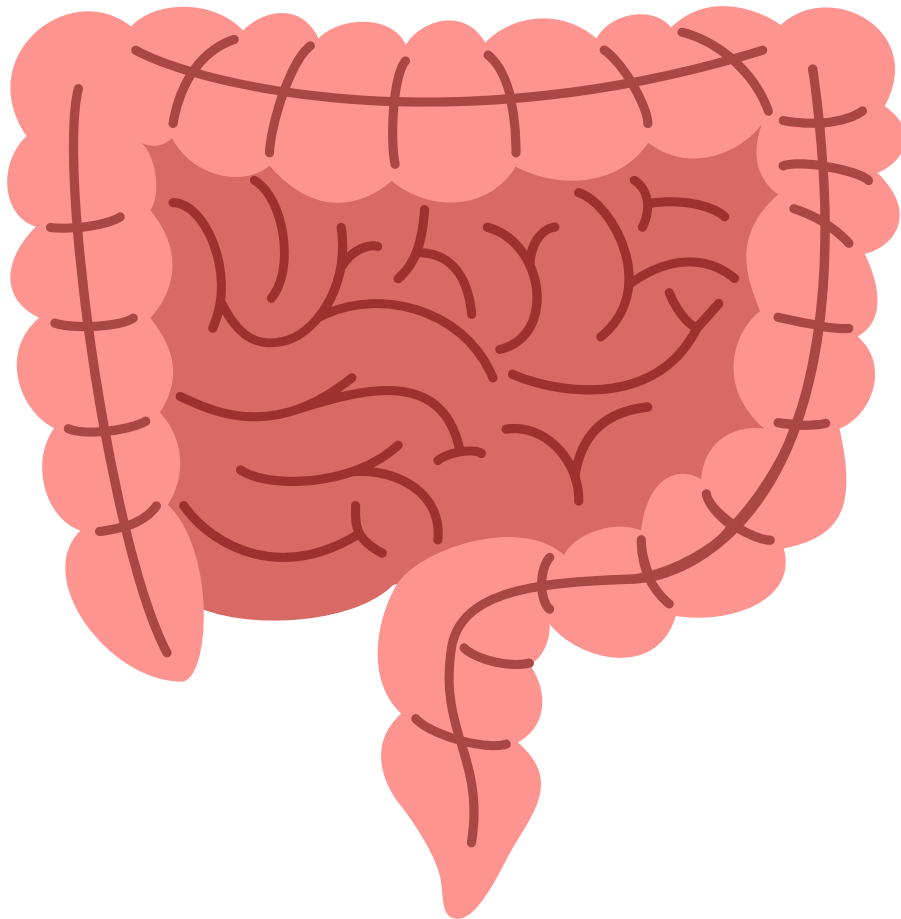




GIS Sheet no.6

Anatomy



Done by: Rahaf turab & Salsabeel aljawabrah

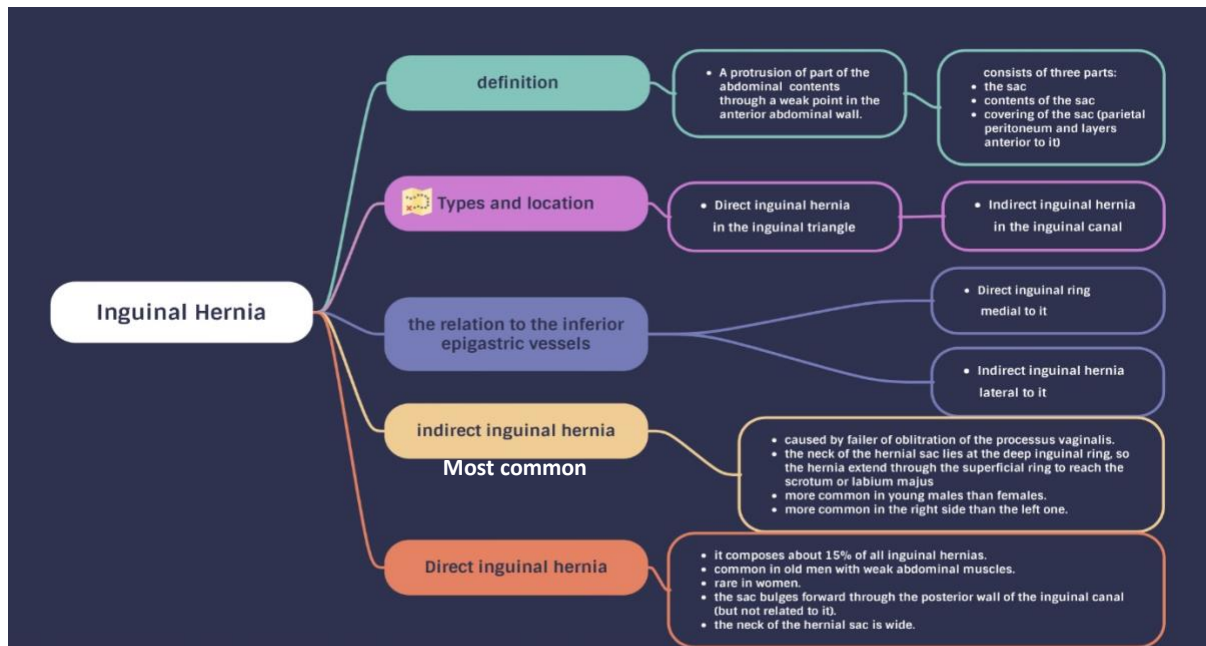
Correction: Rahaf turab & Salsabeel aljawabrah

Doctor: Mohammad almohtaseb

Inguinal Hernia

First we will make a quick revision about hernia:

- One of the weak points is the deep ring. So when the small intestine or a part of the great omentum enters it, it will also continue its way through the inguinal canal to reach the superficial inguinal ring. Sometimes it can reach the scrotum.



when the small intestine or the part of the great omentum enters the inguinal canal through the deep inguinal ring it will be close to the spermatic cord.

	Direct Inguinal Hernia	Indirect Inguinal Hernia
<i>Age</i>	Common in old	young
<i>Bilaterally</i>	Usually bilateral	If acquired: unilateral If congenital: bilateral
<i>Shape</i>	Hemispherical	Oval
<i>Reaches scrotum</i>	Never	Can reach the scrotum
<i>Direction of descent</i>	Forwards	Downwards/Forwards/Medially
<i>Reduction (how to get the hernia back to its place)</i>	Backwards	Upwards/Backwards/Laterally
<i>Relation to Inf.epigastric artery</i>	Medially	laterally
<i>Superficial ring test</i>	Feel impulse on the side of finger	Feel impulse on <u>the tip of finger</u>
<i>Deep ring test</i>	If pts coughs, hernia will reoccur after reduction	If pts coughs, hernia won't appear after reduction
<i>coverings</i>	1- Lateral to lateral	Skin, superficial fascia, external

umbilical ligament	spermatic fascia, cremasteric fascia, internal spermatic fascia
Forward direction	

Notes concerning the table above:

Superficial and Deep inguinal rings tests used to differentiate between direct and indirect Hernias:

⇒ Superficial Ring test:

When you reduce the Direct hernia backward (**toward the superficial inguinal ring**) you will feel the pulse of the inferior epigastric artery at the lateral side of your index.

But when you reduce the Indirect hernia upwards/backwards/laterally you will feel the pulse at the tip of your finger.

⇒ Deep Ring test:

This test is more specific, depends on the fact that indirect hernia pass through the deep ring while Direct hernia doesn't.

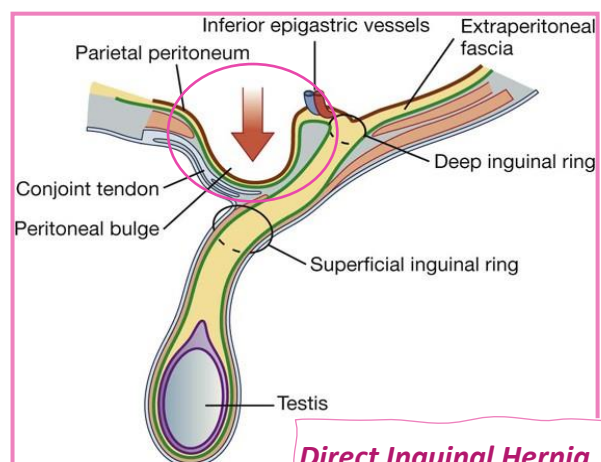
It is made by reduction of the hernia to the abdomen (the easiest way is to ask the patient himself to make the reduction because he is used to it).

After reduction of hernia put pressure using your finger on the deep ring to close it [*1 finger (thumb) above the pulse of femoral artery*], then ask the patient to cough, if hernia occurs again → this indicates that hernia originates from another opening and the pressure you exerted on deep ring is useless → Direct hernia.

If patient coughs and Hernia doesn't appear then → Indirect hernia.

Direct Hernia Route

The hernia sac passes directly through inguinal triangle and may disrupt the floor of the inguinal canal (pressure), but the bulg is forward in the triangle not related to the canal.

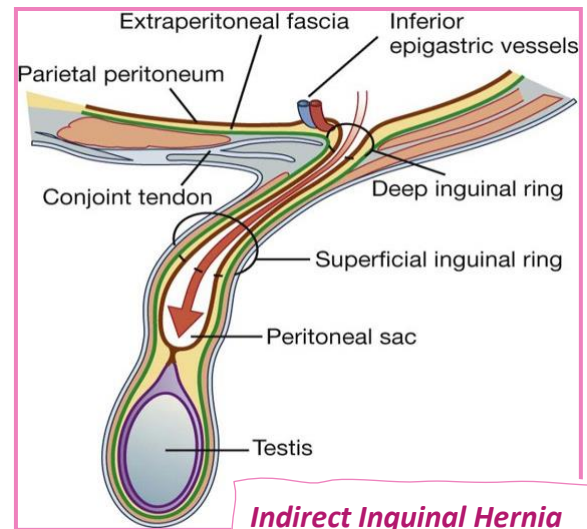


The red arrow illustrates the direction of Hernia

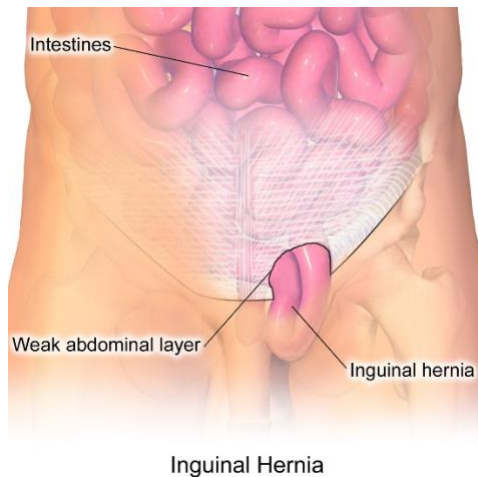
Indirect Hernia Route

The hernia sac passes outside the boundaries of Hesselbach's triangle (inguinal triangle) and follows the course of the spermatic cord.

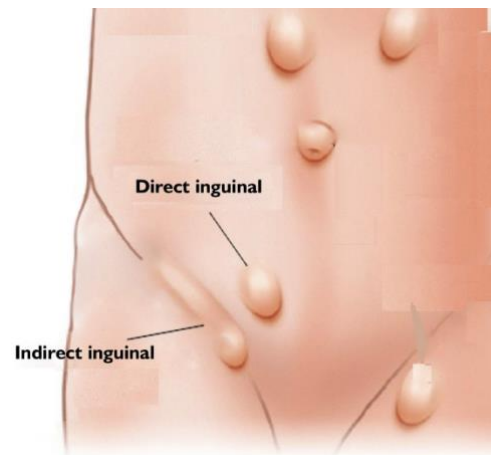
So it passes through the inguinal canal.



Indirect Inguinal Hernia



Inguinal Hernia



Scrotum

- The scrotum is a pocket contains testes and epididymis.
- From the epididymis starts the vas deferens (in the spermatic cord).

So, the scrotum is an outpouching of the lower part of anterior abdominal wall.

Contents: 1- Testis 2-Epididymis 3-lower end of spermatic cord and its contents



What covers the scrotum?????

As we mentioned before the scrotum wall has the following layers:

Skin → **Dartos** muscle and fascia -fatty- [this what causes wrinkling of scrotum and gives **colour** of skin due to presence of melanocytes → **Colle's** fascia → 3 layers that covers the spermaticcord, **External spermatic fascia**- from external oblique and superficial inguinal ring-, **cremasteric** muscle and fascia –from the inguinal canal from the internal oblique-, **Internal spermatic fascia** –from the transversalis fascia at the edges of deep ring-→ **Tunica Vaginalis** [parietal layer → Visceral layer]

Note: Superficial fascia is continuous with the fatty (dartos) and membranous (colle's) layers of the anterior abdominal .



So again the skin of the scrotum is wrinkled, originally it was a single pouch, **but** as a result of the lateral labioscrotal swellings from the both sides toward the midline to make septum → the one pouch become two pouches each one contains testes and epididymis.

The fat in the superficial fascia (exactly in dartos fascia) will be replaced by smooth muscle called dartos muscle.

Here, both layers of superficial fascia contribute to a median partition that crosses the scrotum and separates the testes from each other.

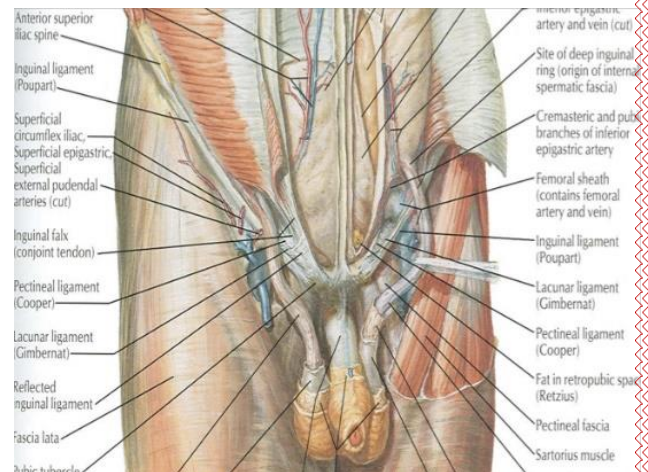
Note: A ridge in the midline indicates the line of fusion of the two lateral labioscrotal swellings.



The superficial fascia is innervated by sympathetic nerve fibers.

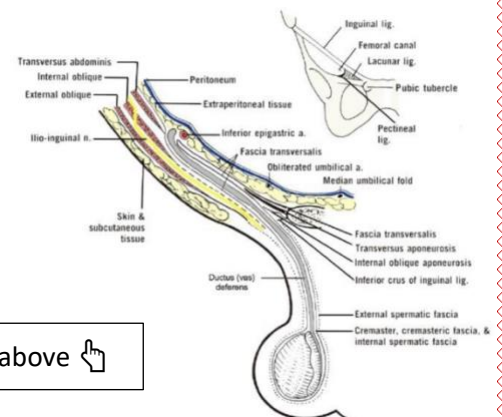
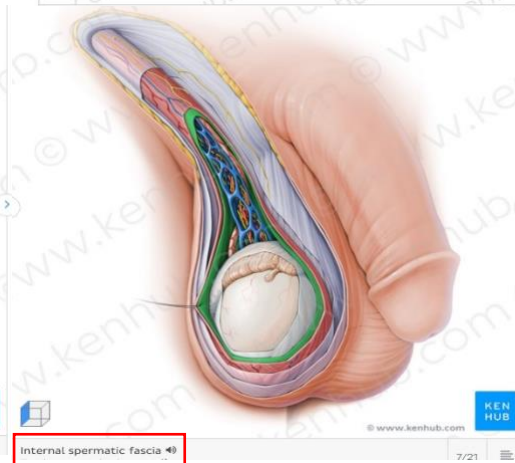
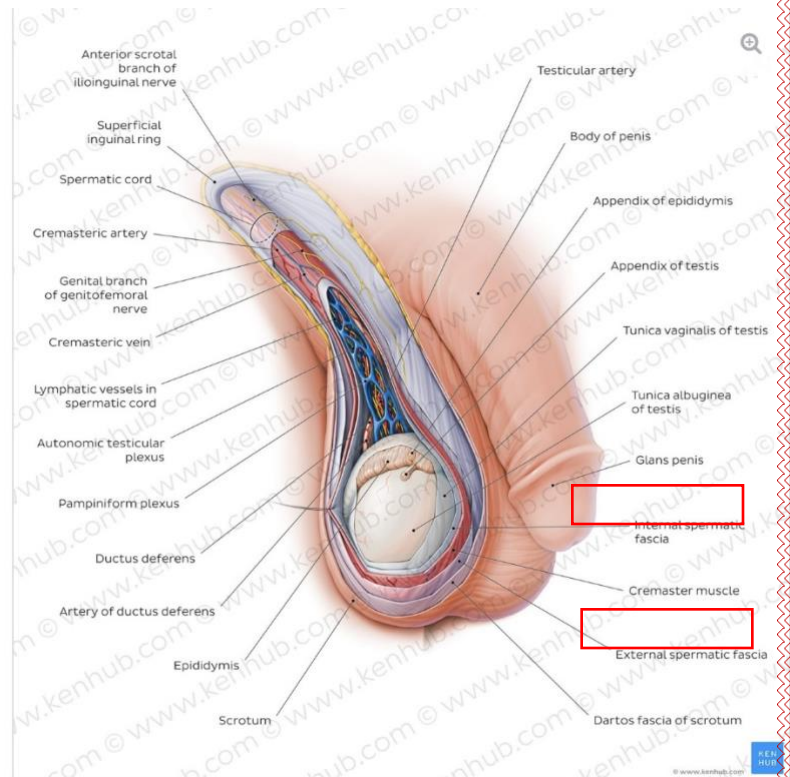


the penis is location above the symphysis pubis.



Spermatic fasciae

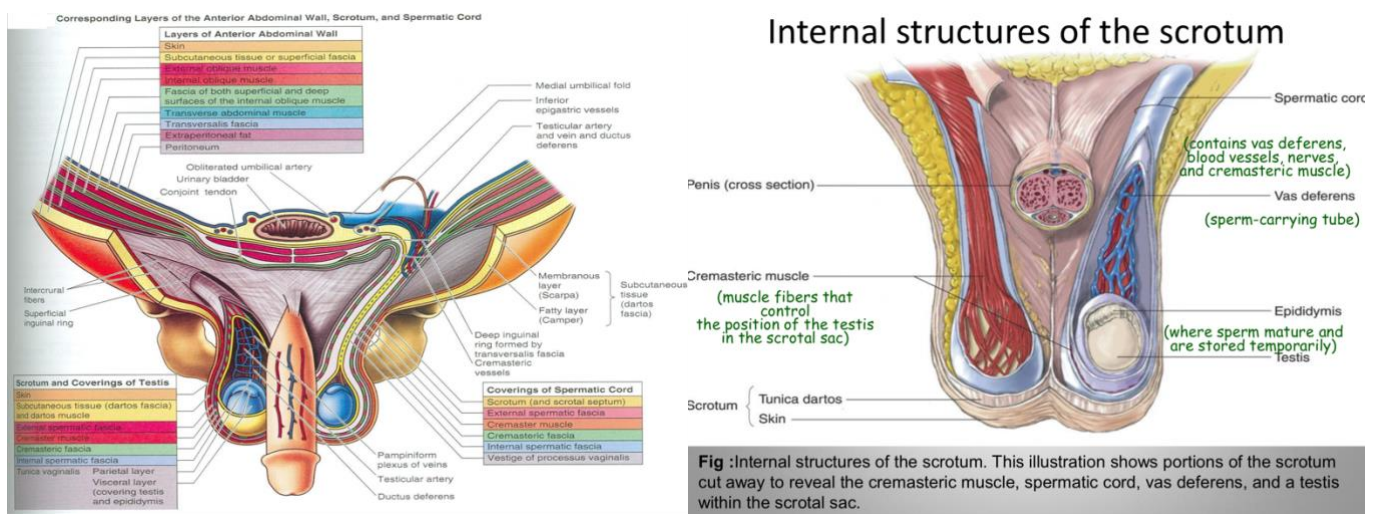
Lies beneath the superficial fascia.
Derived from three layers of anterior abdominal wall on each side.
Here are some pic 🤔



Details are written above 🖱️

Tunica vaginalis:

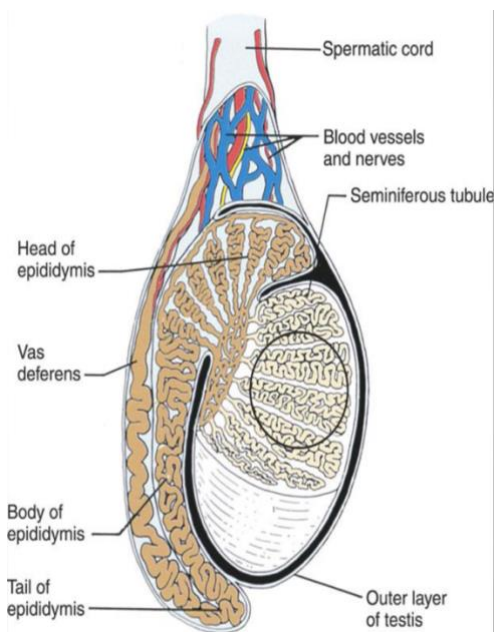
- Present within the spermatic fascia.
- It is the end of processus vaginalis when it reaches the testis, obliteration will take place to the processus vaginalis after birth, but at its end, the tunica vaginalis will cover All surfaces of testes except the posterior.
- The expansion of processus vaginalis will form two layers (parietal and visceral) of tunica vaginalis.
- Visceral layer is adhered to the testis.



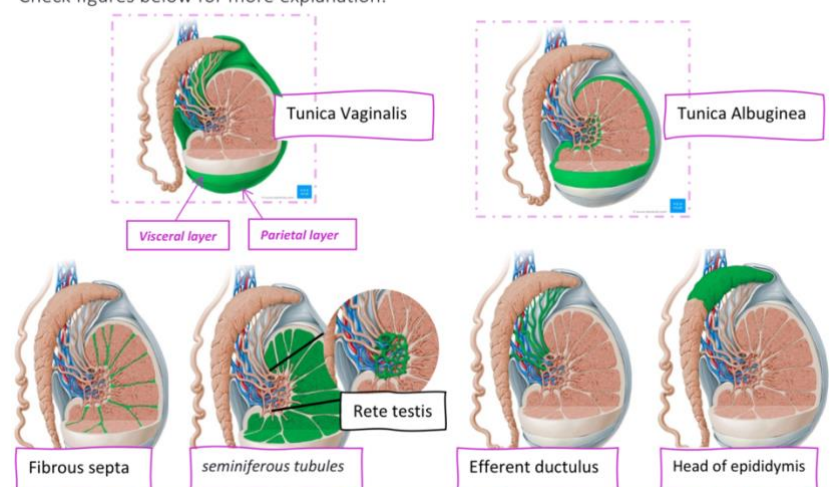
- Notice the testis, epididymis, the two layers of tunica vaginalis.
- The importance of testis is to produce the (spermatozoa), the sperms will be collected in the epididymis, from the tail of epididymis, the vas deferens (cord like structure) will emerge, the function of vas deferens is to transport the sperms from the epididymis to the seminal vesicle, and from the seminal vesicle to the prostatic urethra through the ejaculatory duct, and then to the penile urethra (the doctor didn't mention the membranous urethra here, but you know that sperms should pass through it also).
- Notice the cremasteric muscle which is important in pulling the testis upward when it contracts.

Testis:

- ❖ Testis are firm, mobile organs within the scrotum, 2 in number separated by a septum formed by superficial fascia (Dartos muscle and Colle's fascia). Left testis usually lies at a lower level than the right testis, and it descends earlier also, the upper part of the gland is tilted forward.
- ❖ Following the visceral layer of Tunica Vaginalis and deep to it, the testis are surrounded by a tough fibrous **capsule** Tunica Albuginea
→ It sends a series of fibrous septa dividing the interior of the testis into lobules → In each lobule, there are 1-3 coiled seminiferous tubules (it has the cells that secret the sperms.... Spermarogonia, primary and secondary spermatocytes) → Tubules open into a network of channels called the rete testis → Small efferent ductulus connect the rete testis to the head of the epididymis.
- ❖ The function of epididymis is storage and maturation of sperms, maturation needs from 10 to 14 days to become mature.
- ❖ From epididymis, the sperms are transported to the seminal vesicle which is located posteriorly to the urinary bladder.



Check figures below for more explanation:

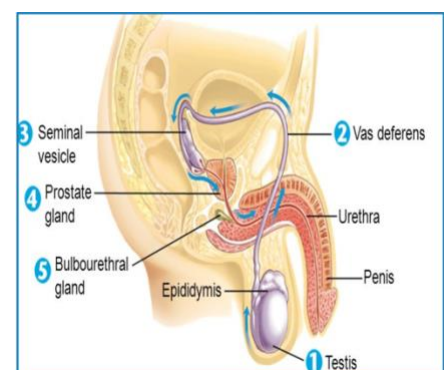


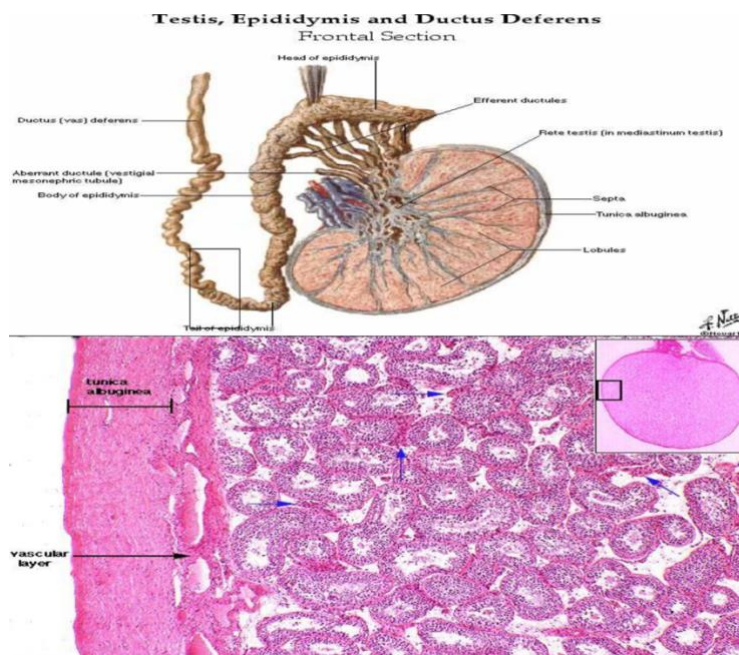
Structures inside the testes:

1. Seminiferous tubules: Thin, highly coiled structures where sperm production occurs.
2. Interstitial cells (cells of Leydig): Major source of androgens [Male hormones such as testosterone] located between seminiferous tubules.
3. Epididymis: Site of sperm maturation (10-14 days), It has a head, body, and tail where vas deferens begins.
4. Vas deferens: carries mature sperms. It starts from tail of epididymis and ends in urethra (seminal vesicle). And travels through the spermatic cord.

Sperms pathway:

- A. Seminiferous tubules produce spermatozoa.
- B. collected in Rete testis.
- C. Efferent ductulus.
- D. Epididymis (for maturation).
- E. Vas deferens 45cm: passing through the inguinal canal to the deep ring then the vas deferens enters the pelvis.
- F. Seminal vesicle when contracts, it pulls down the sperms through the ejaculatory duct.
- G. Right and left ejaculatory duct between the vas deferens and seminal vesicles and opens in the prostatic urethra.
- H. Prostatic urethra.
- I. Membranous urethra.
- J. Penile urethra and then outside the body.





Notice the seminiferous tubules that produce the spermatozoa and collect them in the lumen then these spermatozoa are collected in the rete testis then epididymis then to the vas and so on...

Blood supply and venous drainage of testes:

- I. **Blood supply** → Testicular artery [on each side], branch of abdominal aorta [L2].
- II. **Venous drainage** → Pampiniform plexus → Testicular vein, right side drains into Inferior Vena Cava, while left side drains into left Renal Vein.

Nerve supply:

- I. **Testes** → Sympathetic fibers around Testicular Artery [Vasomotor/sensory]
- II. **Scrotum** → Same **sympathetic fibers** to testes. In addition to **ilioinguinal nerve**[L1] and **genital branch of genitofemoral nerve** [which also supplies cremasteric muscle].

Lymphatic Drainage:

- I. **Testes**: Drainage follows **testicular arteries** and ends in the lymph nodes on the sides of the aorta at level L1 (**para-aortic nodes**).
- II. **Scrotum + skin**: Lymph drains into the **inguinal lymph nodes** in the **femoral triangle**.

Clinical Note:

If there's a tumor in the testes → Enlargement will be seen in Para-Aortic Lymph Nodes

If the tumor was in the skin of scrotum → Enlargement of Inguinal Lymph nodes in femoral triangle.

Varicocele

- The veins of the pampiniform plexus elongated & dilated - Lt side more commonvenous pressure is higher
- Common in young & adult
- Vasectomy> Infertility
- Processus vaginalis Upper partobliterated just before birth (if this didn't happen, it causes congenital indirect inguinal hernia).
- Lower part.....Tunica vaginalis
- Congenital anomalies of processus vaginalis

1- persist....indirect inguinal hernia

2- Narrowed (narrowing in the middle)....congenital hydrocele (fluids around the testis) between the two layers of tunica vaginalis, the scrotum will be swelled, and it will have a transparent appearance under light). The hydrocele may be between the two layers of tunica vaginalis or encysted in a small part of the processus vaginalis pathway (cyst filled with fluids).

The causes: 1. Inflammation 2. Idiopathic 3. Congenital

Tapping a hydrocele Structures we will cross by the needle (skin, dartos, colle's, spermatic fascia 3 layers, tunica vaginalis parietal layer just) traversed by cannula.

3- Obliterated upper & lower part ... encysted hydrocele of the cord

Congenital abnormalities of the testes:

1- Cryptorchidism

Incomplete descent of the testis, although it travels down the normal pathway. it may be found in the:

A) abdominal cavity B) inguinal canal C) superficial inguinal ring D) upper part of the scrotum

2- Maldescent

Testes travel down an **abnormal pathway**; it may be found in the:

A) superficial fascia B) the root of the penis C) perineum D) the thigh.

It is *more serious than* Cryptorchidism requiring an immediate operation. If the testis remains in an abnormal position beyond 6 years, this will impair the production of testosterone.

