

Andrology

Important terms

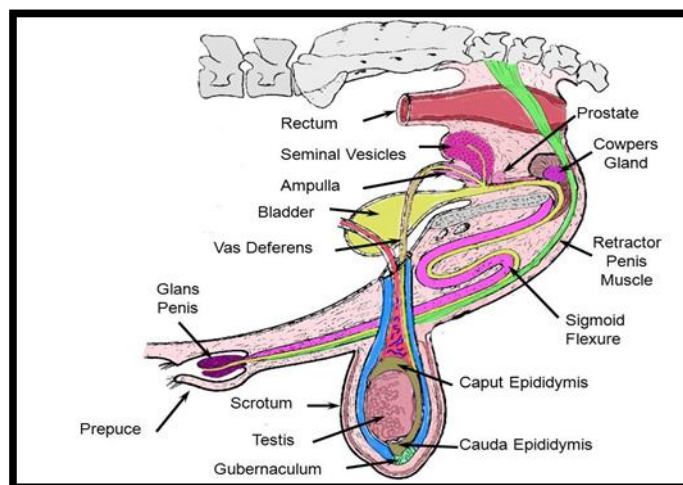
- **Andrology :**
It is the science which deals with male genital system, sexual behavior, and breeding performance.
- **Puberty :**
Age at which female genital system reach its complete function producing ova.
It is about 10 -12 months aged .
- **Fertility:**
Complete ability of male to reproduce in a normal and regular manner.
- **Infertility:**
Reduce ability of male to produce active motile spermatozoa and perform normal coitus necessary for deposition of semen in female genital tract.
- **Sterility:**
Permanent inability of male to produce motile, viable spermatozoa.
The number of complete gestation and includes the delivery of fetuses.
- **Sexual behavior:**
Mean different movement performed by male before, during, and just after copulation.
- **Libido:**
Sexual desire or sexual drive of male.



Functional Anatomy of Male Genital System

The male genital system composed of:

1. Primary (Glandular) part :
 - 2 testes & associated structures(scrotum & spermatic cord)
2. Secondary (Tubular) part :
 - efferent ductules .
 - epididymis .
 - vas deferens .
 - urethra .
3. Accessory genital glands :
 - seminal vesicle .
 - prostate gland.
 - bulbourethral gland .



Scrotum:

It composed of two lobed sacs (coetaneous pouch) contain both testes.

Position:

- Prerenal region (bet. Inguinal region and anus): as in dog, tom cat, boar and camel.
- Inguinal region (bet. Thigh of animal): as in stallion, bull, ram, buck.

Layers of scrotum:

- Skin.
- Tunica dartos.
- Scrotal fascia:
 - External spermatic fascia: from external oblique abdominal muscle.
 - Cremasteric muscle: from internal oblique abdominal muscle.
 - Internal spermatic fascia: from transverse abdominal muscle.
- Tunica vaginalis.

1) Skin:

- The most outer layer of scrotum.
- It is thin and elastic to facilitate shrinkage(wrinkling) for elongation and expansion.
- Contain large numbers of sweat gland for maintenance of proper testicular temperature (evaporation of sweat → heat transfer).
- Scrotum of bull, buffalo bull covered by thick tough of hair.

2) Tunica dartos:

- It is continuation of subcutaneous fascia and formed of s.m.f.
- It separate scrotum into two pouches each one contain one testis.
- The s.m.f. of tunica dartos can maintain sustained contraction.
 - During cold temperature: allow testes to be held close to the body (decrease surface area to prevent excessive loss of temperature).
 - During summer: tunica dartos relaxes and the surface area of scrotum increased to facilitate cooling.
- Development and maintenance of contractile activity of tunica dartos are under androgen control.

3) Scrotal fascia:

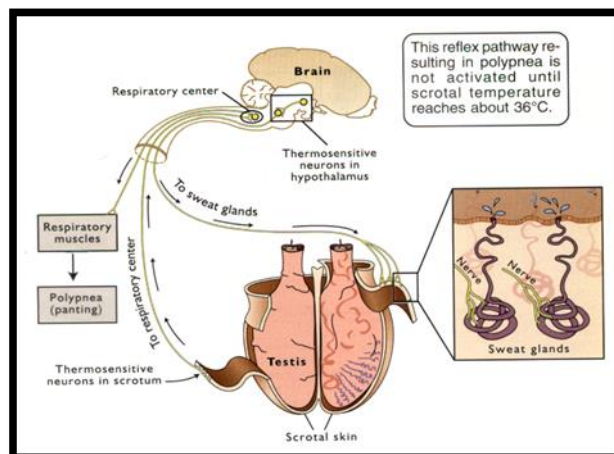
- It is elastic tissue lie below tunica dartos and outside parietal layer of tunica vaginalis.
- It has protective function and give rise the main mobility of testis within scrotum.

4) **Tunica vaginalis:**

- It is extension of peritoneum.
- Consists of:
 - Thin visceral serous membrane which contain testes and epididymis.
 - Parietal fibrous layer close to scrotal fascia.
- In-between two layers there is serous cavity (vaginal cavity) which contain serous fluid to facilitate movement of testis within scrotum.

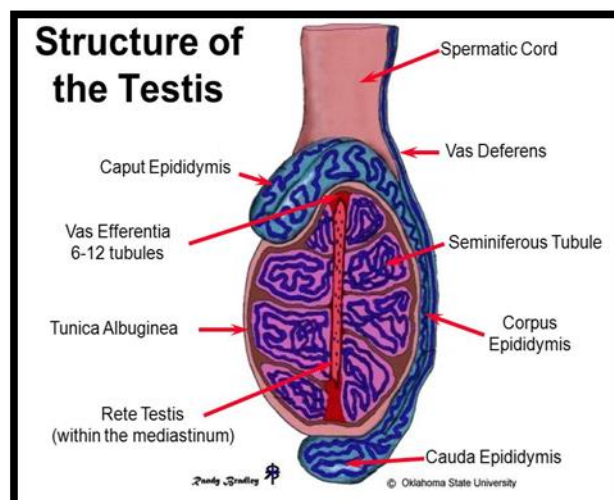
Function of scrotum:

1. Protection of testes.
2. Thermoregulatory mechanism.
 - ↑ Temp (36°C) → impulses to sweat glands
 - Sweat glands – evaporative cooling
 - relaxation of tunica dartos & cremaster muscle .



The testes:

- Location of the testicles is outside abdominal cavity which essential for normal sperm formation, which occurs only at 2 – 6 degrees below body temperature.
- One or both testicles occasionally fail to descend into the scrotum during embryological development and are retained in the body cavity. This condition is known as *chryptorchidism*. Hormone production by chryptorchid males is near normal and the male develops and behaves like a normal male, but will generally be subfertile. This condition is genetically inherited, therefore such males should not be used for breeding.
- The testes covered by tunica albugenia and tunica vaginalis (visceral layer).



- **Orientation of testes:**

Species	Orientation
Bull	Vertical
Ram	Vertical
Boar	Oblique
Stallion	Horizontal
Dog	Oblique

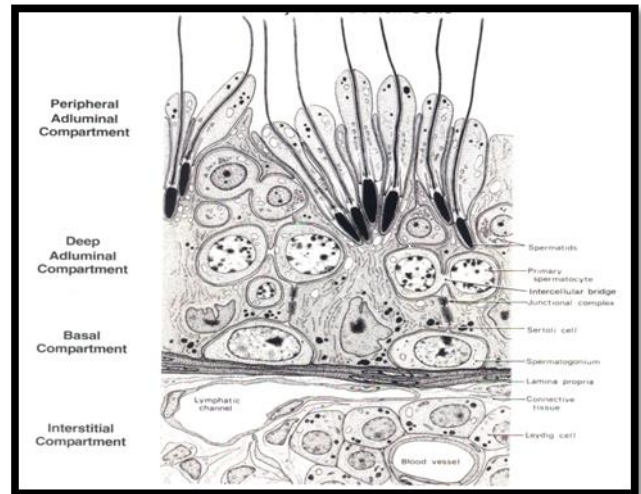
- **Position of testes:**

- *Prerenal (between inguinal region & anus):* Dog, Cat, Boar, Camel.
- *Inguinal (between two thigh of animal):* Stallion, Bull, Ram, Buck.

- **Seminiferous tubules**

- ☒ Consists of two parts:
 - Loops – tubulus contortus
 - Straight (rectus) – joins rete

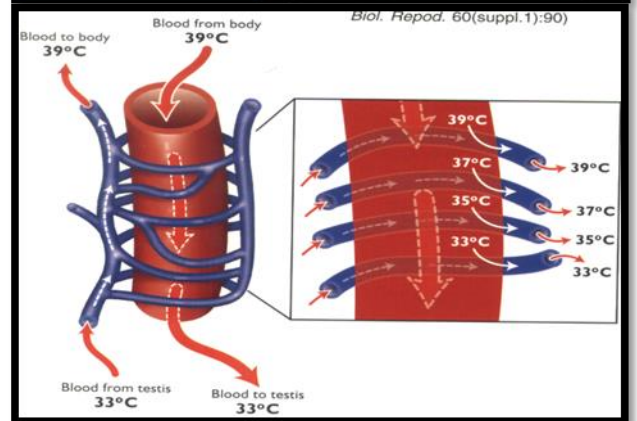
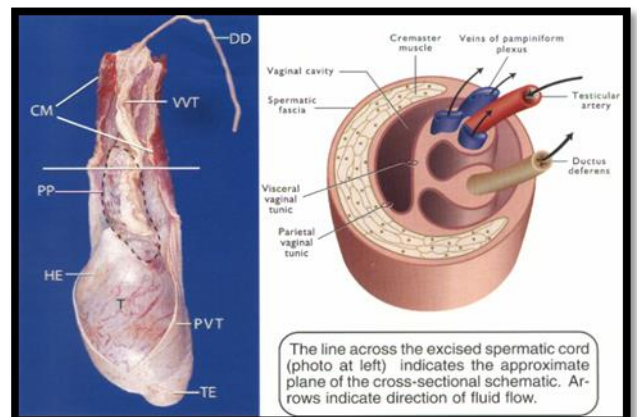
- **Sertoli cells**
 - ✓ Many receptors
 - ✓ Produce:
 - ABP (adrogen binding protein -transports testosterone)
 - Inhibin – suppresses FSH
 - Estrogen .
 - Mullerian - inhibiting factor .



- **Function of testes:**
 1. Sperm production (spermatogenesis)
 2. Hormone production :
 - Androgen
 - Inhibin
 - Androgen-binding protein
 - Estrogen
 - Mullarien – inhibiting factor.

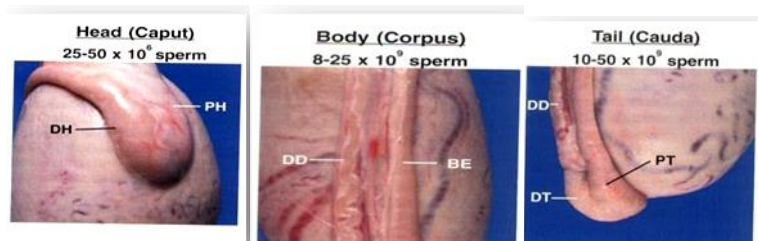
Spermatic cord

- It is extended through inguinal ring to its attachment on dorsal pole of the testis.
- It suspend testis in scrotum .
- Divided into 2 parts :
 - o vascular part :
 - pampiniform plexus (artery , vein intertwining) →counter current heat exchange
 - Testicular lymphatic vessels
 - Testicular nerve plexus .
 - o Avacular part :
 - Vas deference .
 - Cremastic muscle:
 - ✓ It is primary muscle supporting testes.
 - ✓ It aid in control of testicular temperature (by elevation or down of testes) and facilitate blood movement in pampiniform plexus.



Epididymus:

- The epididymis is a compact, flat, elongated structure closely attached to one side of the testicle.
- It is divided into three regions :
 - Head (caput)
 - Body (corpus)
 - Tail (cauda)
- Highly coiled
 - 30-60 m
- Smooth m.
 - Contractions



Function of Epididymis:

1. The transport of the developing sperm cells from the testicle to the *vas deferens* .
2. The concentration of the sperm by absorption of surplus fluids .
3. The maturation of the developing spermatozoa .
4. The storage of viable sperm cells in the epididymis tail. If sexual activity is slowed, resorption of sperm cells from the epididymis tail occurs.

Vas deferens

- The vas deferens, also known as ductus deferens.
- emerges from the tail of the epididymis as a straight tubule and passes as part of the spermatic cord through the *inguinal ring* into the body cavity.
- Spermatozoa are transported further along the reproductive tract to the pelvic region through the vas deferens by contraction of the smooth muscle tissue surrounding this tubule during ejaculation.
- Ampulla secret fructose & citric acid for nutrition of sperm present .

Urethra

- The two vas deferens eventually unite into a single tube .
- The urethra, which is the channel passing through the penis.
- The urethra in the male serves as a common passageway for semen from the reproductive tract and urine from the urinary tract.
- Divided into :
 - Pelvic urethra :extend from neck of bladder till ischial arch .
 - Extra pelvic urethra : - bulbar urethra : at ischial arch
- penile urethra : within penis .

Thermoregulatory mechanism:

- Begin after puberty under effect of testosterone.
- It aided by:
 - ✓ Pampiniform plexus.
 - ✓ Cremastric muscle.
 - ✓ Scrotum.
- During summer
- During cold temperature

