

بسم الله الرحمن الرحيم



course of **ANDROLOGY**

Contents:

1)

- A. FUNCTIONAL ANATOMY OF Male REPRODUCTIVE GENITALIA
- B. FORMS OF MALE INFERTILITY

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2)

- 1- Movie (film Mating behavior & Semen collection in Camel)

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INTRODUCTION

- ✦ Andrology means the study of reproductive diseases in any species
- ✦ Functional anatomy of male genitalia is a basic point to understand andrology
- ✦ The value of the bull is more than half of the herd in cattle breeding
- ✦ Selected bull which characterized with superior genetic constitution plays the major role in improving cattle breeding
- ✦ Superior bull can raise the economic value of the herd by more than 2% annually✦

ONTOGENESIS OF MALE GENITALIA (EMBRYOLOGY)

Indifferent stage with undifferentiated gonad and 2 sets of primitive ducts:

Wolffian (male)and **Mullerian** (female)

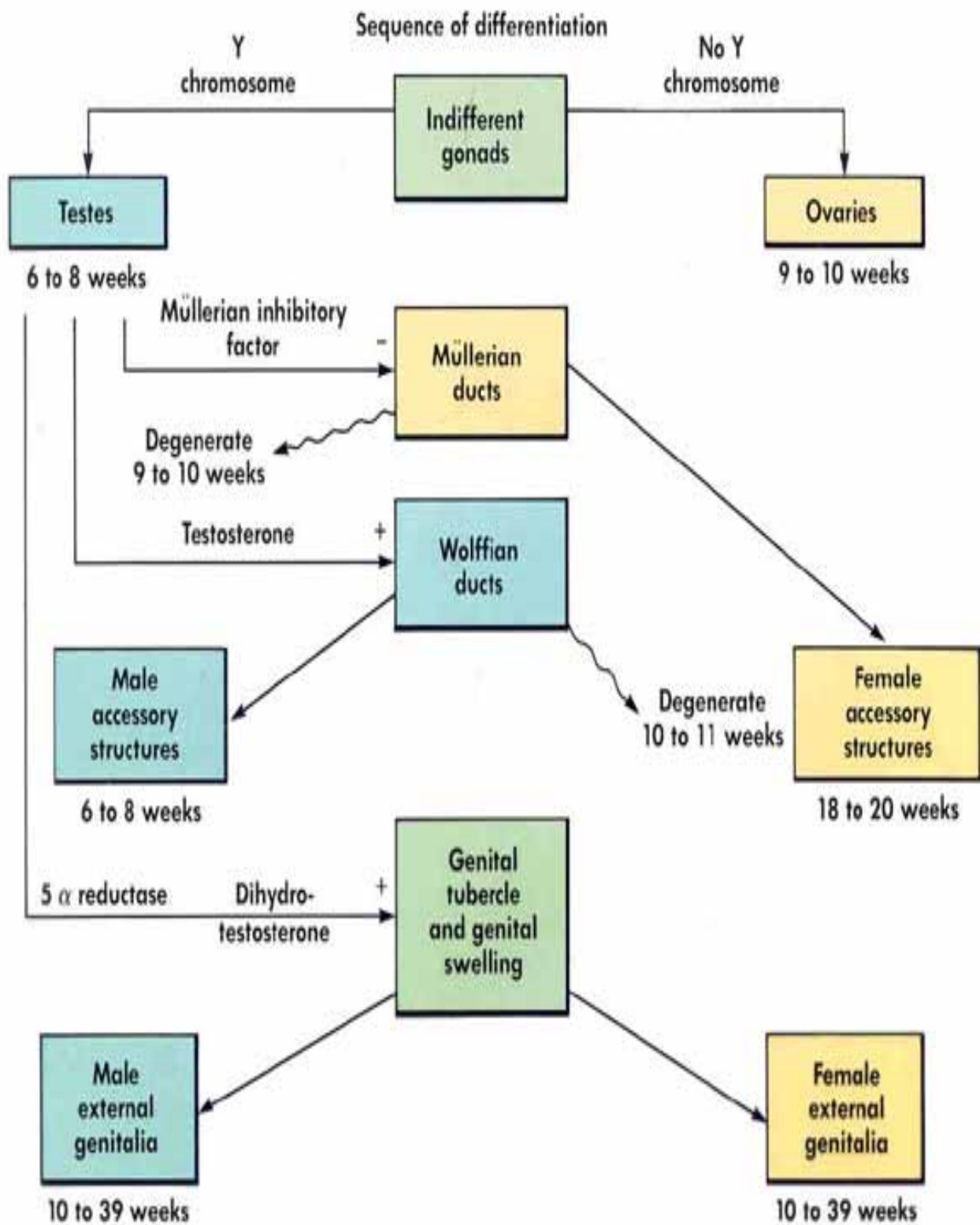
Indifferent Gonads :(Endoderm)

Consists of Medulla (secrets **medullarin** or male inducing growth factor) and Cortex (secrets **Cortexin** or female inducing growth factor)

- In male the indifferent gonad gives the **TESTIS**

Origin of the Reproductive Tract:

- ✦ **Mesonephric tubules** : Give 12-15 efferent ductules
- ✦ **Mesonephric Duct**: Gives epididymis, vas deferens, ampulla, seminal gland, excretory and ejaculatory ducts (At the colliculus seminalis in the pelvic urethra)
- ✦ **Urogenital Sinus** (Ectoderm): Gives pelvic urethra, Prostate and bulbo urethral glands
- ✦ **Genital Tubercle** (Ectoderm): External genitalia :Phallus or penis
- ✦ **Labioscrotal swelling (A Pouch of Skin Beneath Anus)** : (Ectoderm): Scrotum
- ✦ **Fold of skin before umbilicus**: Prepuce



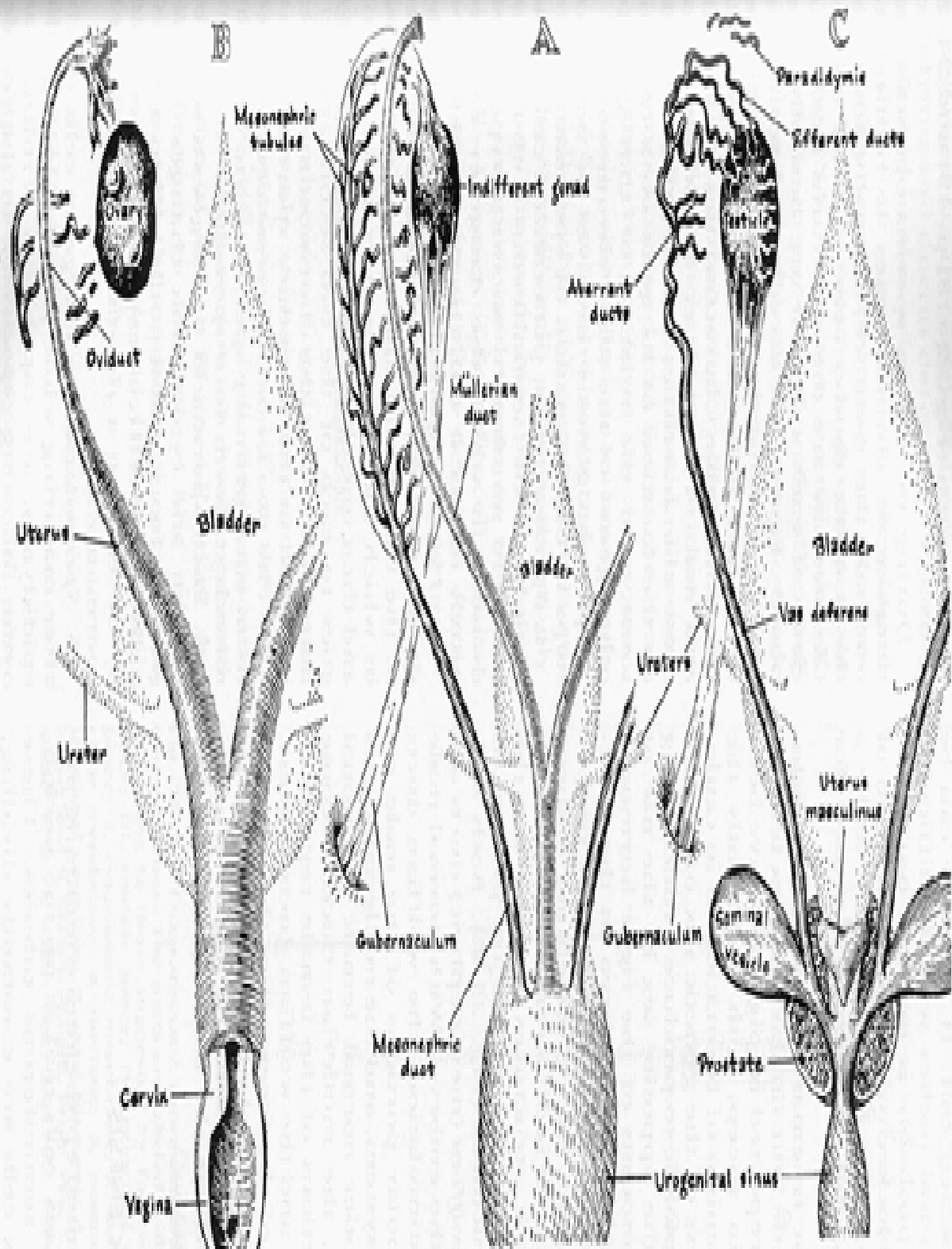


Fig. 25-4. The indifferent reproductive system (A), and its modification into the female (B) and male (C) reproductive systems. Note that in A, the duct systems of both sexes are present. In phenotypic males, Müller's duct disappears (except for the uterus masculinus); in females, the mesonephric duct disappears (except for oviductal appendages). Modified and redrawn from Blom and Christensen: *Skandinavisk Veterinærtidskrift*, 1947. In Nalbandov, A. V.: *Reproductive Physiology*. W. H. Freeman, 1964.

BULL SELECTION

- BULL PRODUCTION CENTERS
- **Phenotype**: What are the Animal?
- **Genotype**: What are the Animal ought to be?
- **Progeny**: What are the Animal expected to be ?
- **Superior BULLS**

AIM OF BULL SELECTION

- Improvements of Records for :
- **Milk** : Production, Composition fat, protein..etc , lactation period , milking duration, udder shape and size.....etc
- **Meat** : Birth weight, rate of gain, weaning weight, adult weight, carcass quality, marbling, deposition of fat, turnover of food...etc
- **Dual** :

PROGENY TEST

BULL SELECTION (PROGENY TEST)

- (According to Pedigree)
- A. I. To : 30 or 40 selected Heifers
- (FIRST RECORDS)
- A.I. To : 15 or 20 Daughters
- (SECOND RECORDS)
- +ve Progeny with Improvements in Records
- (This Test is the best and Takes 4 Years)

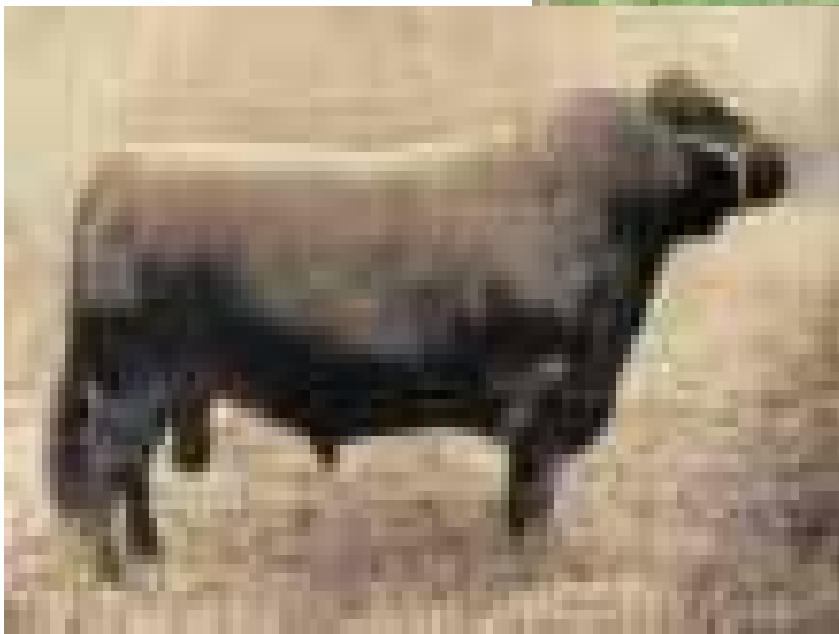
BULL SELECTION (SIBLING TEST)

- **FAMILY SELECTION**
- **(Brother and Sisters)**
- Multiple Ovulation Embryo Transfer
- **(MOET)** could identify very high genetic merit of both males and females
- Dairy sires could be genetically evaluated through full sibling families

PERFORMANCE TEST

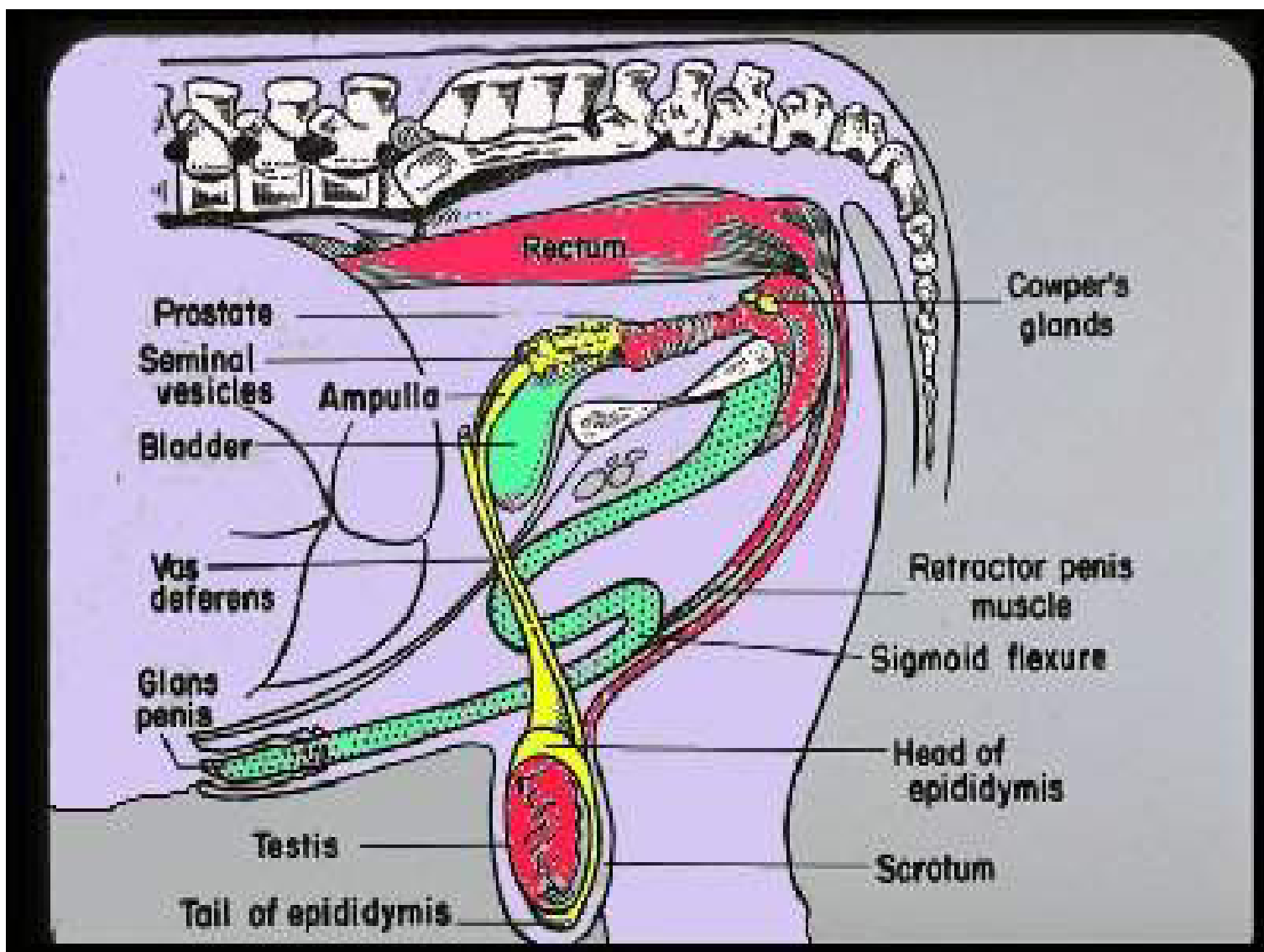
- (Phynotype selection)
- Bulls Selected according to their Pedigree at 6 month of age.
- Then, Reared in a Group under the Same Level of Nutrition and Management for 400 Days.
- Bull selected according to the best live body weight gain.





BULL

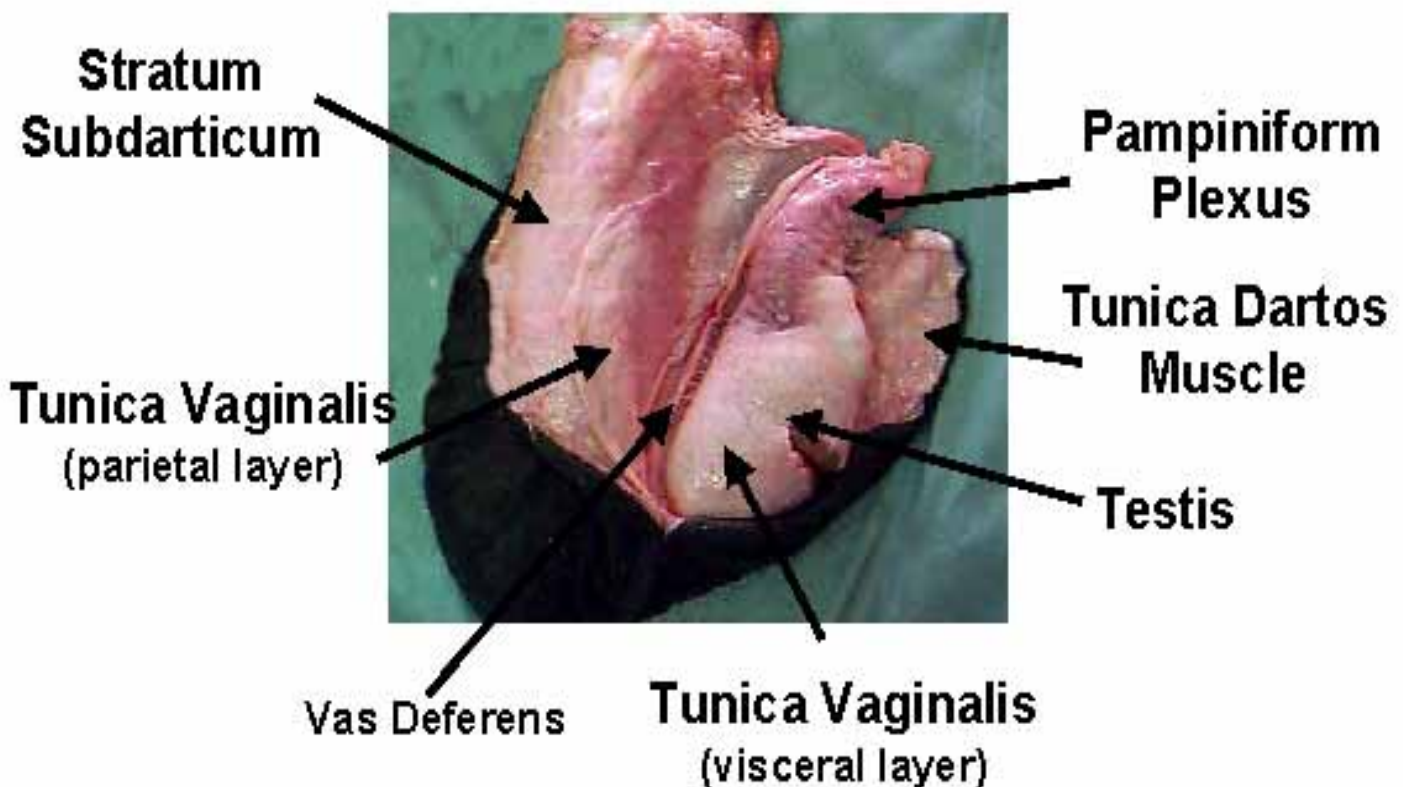
- **Reproductive Genitalia :**
 - Scrotum
 - Testes
 - Epididymes
 - Vas Deferens Ampullae
 - Seminal Glands
 - Prostate Gland
 - Bulbourethral Glands
 - Copulatory Organ and Prepuce



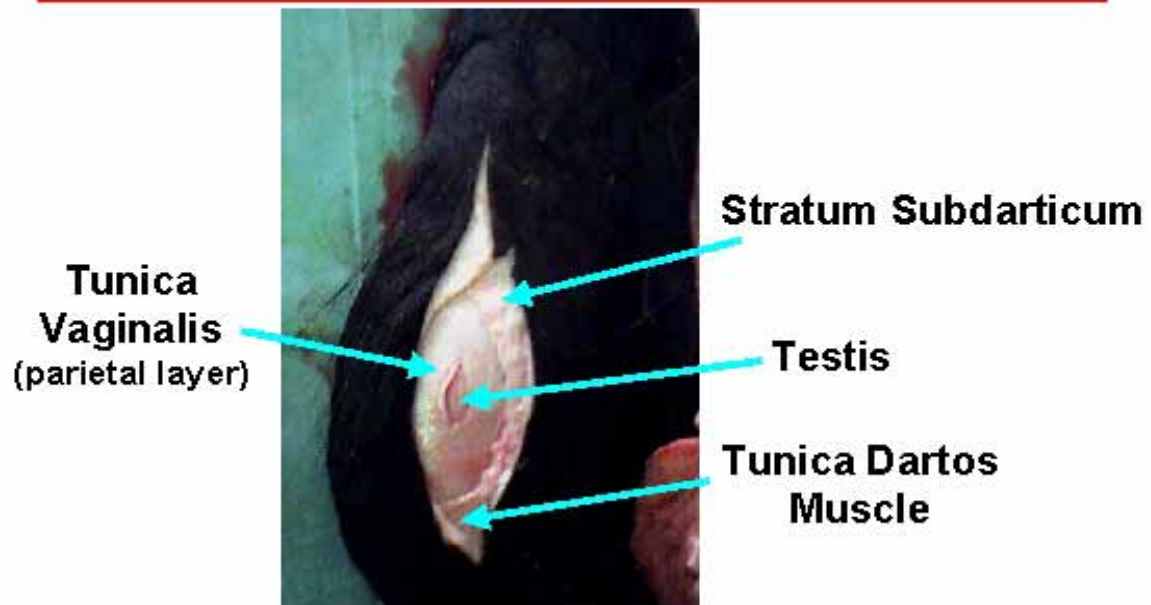
Scrotum:

- Skin and Tunica Dartos with many smooth muscle fibers :
(Thermoregulatory)
- Scrotal Fascia with many elastic fibers, :
C. (Movability and Protective)
- External Cremasteric muscles, from internal oblique abdominal muscle to parietal layer of tunica vaginalis :
D. (Raising and Protection)
- Parietal and Visceral layers of tunica vaginalis with serous cavum vaginalis:
E. (Modulating the condition of testes)

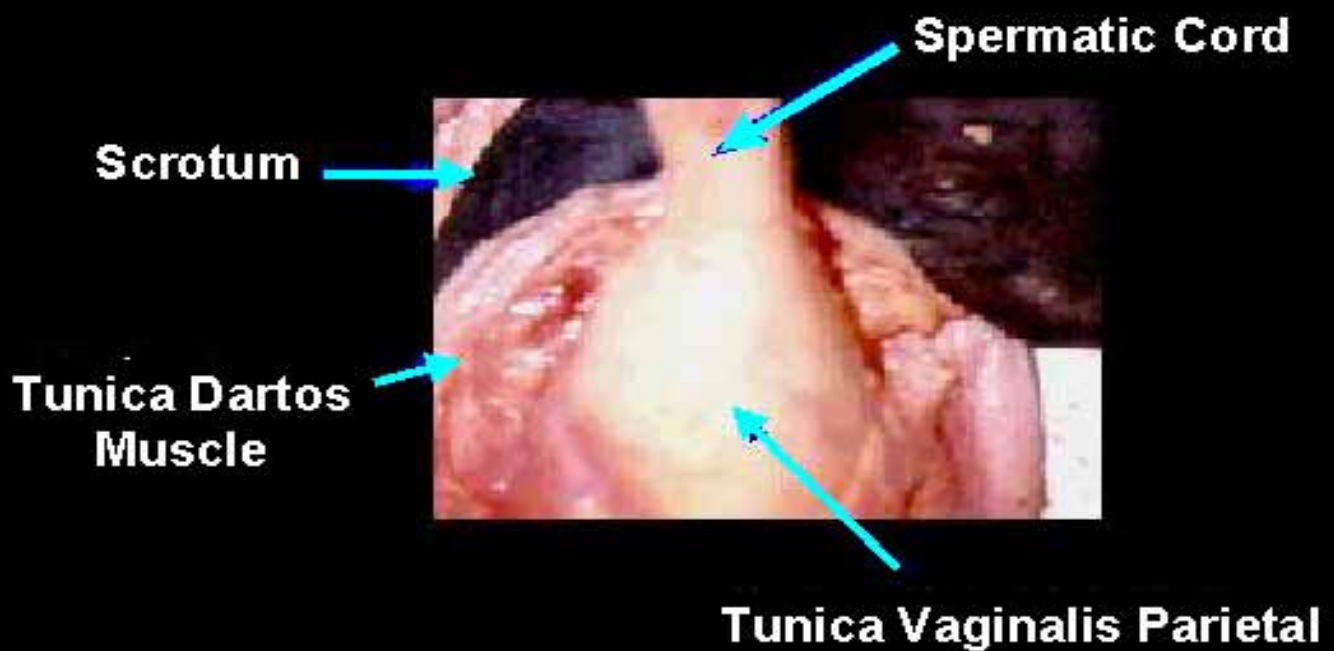
Scrotal Layers



Scrotum

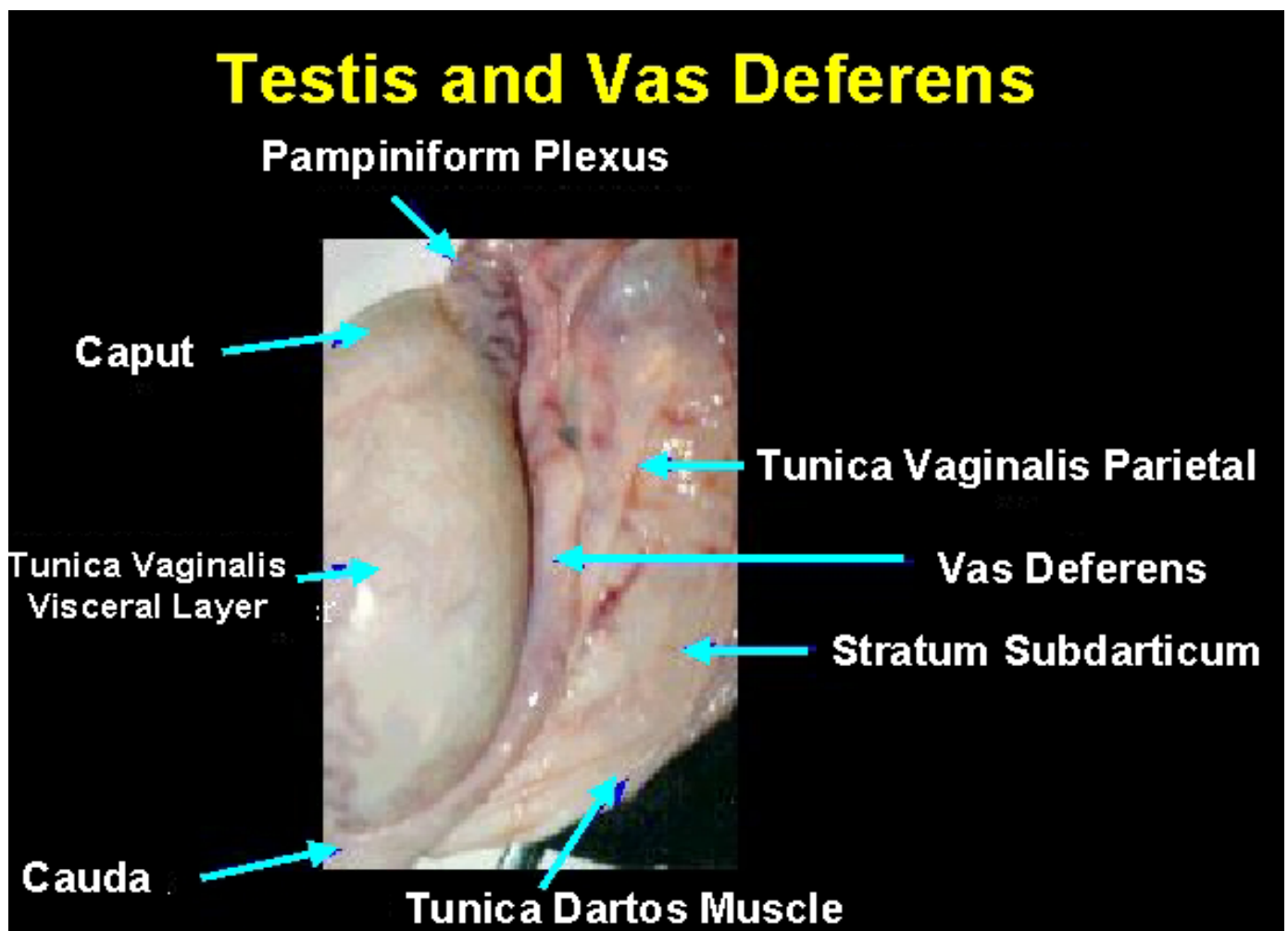


Spermatic Cord and Scrotum

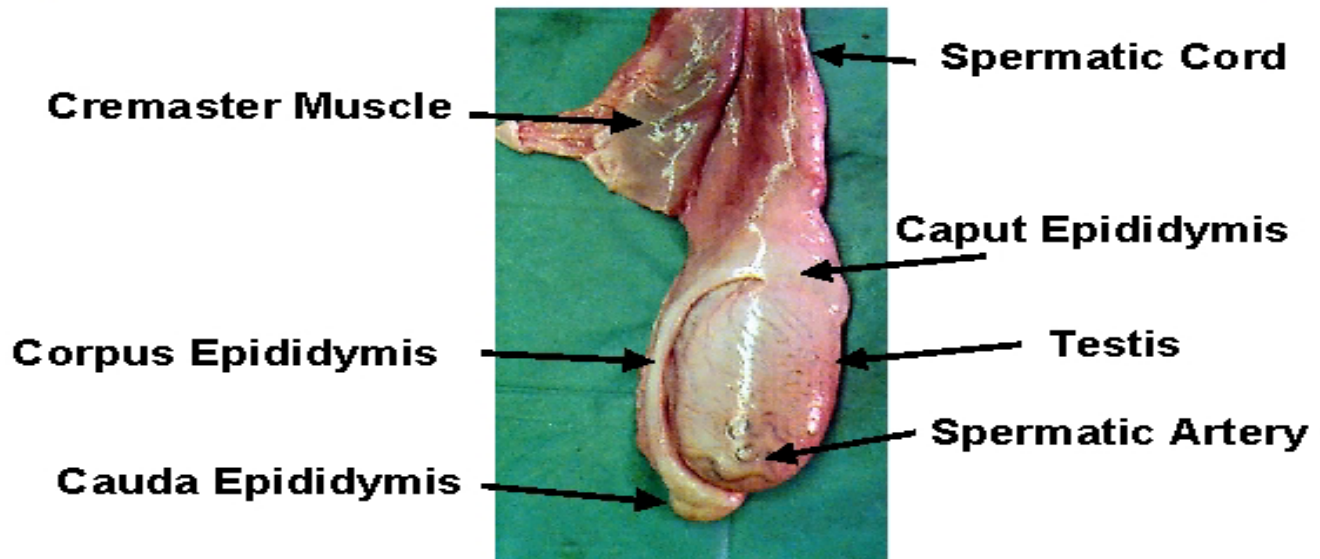


Testes

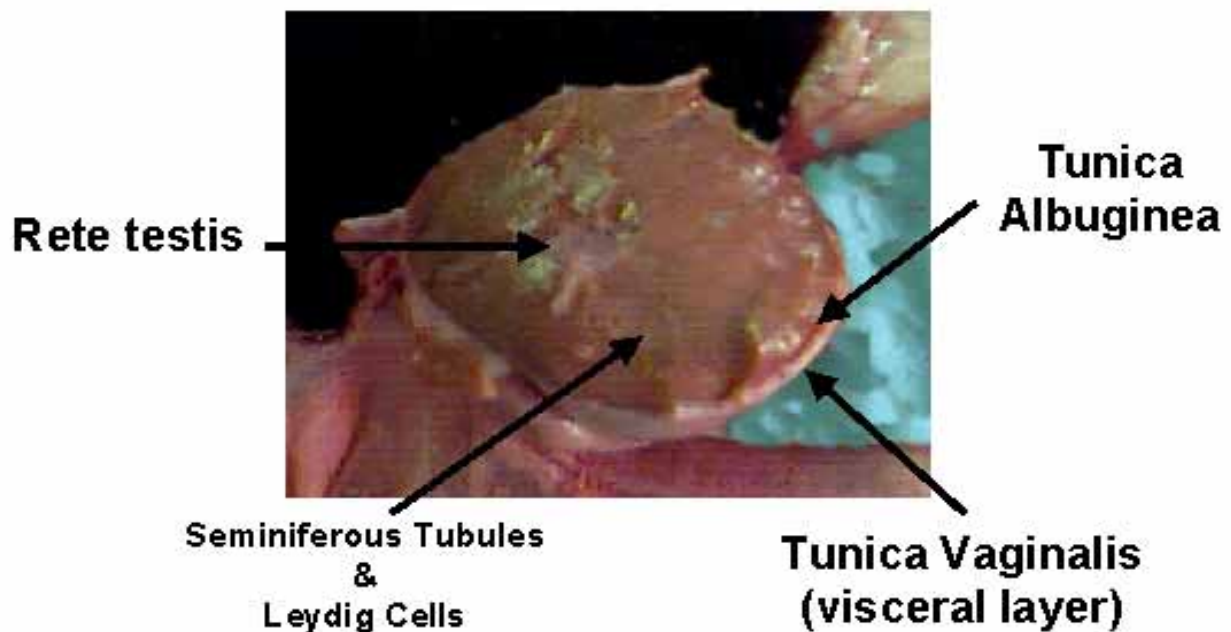
- Located vertically within scrotum
- Ovoid in shape with 3 dimensions :
F. Length, Breadth and Thickness
- Its volume = $L \times B \times Th \times 0.52 \text{ c.cm}$
- Turgid in consistency
- Their size correlated with age, body weight , sperm production, hormones released, epididymal size and functions of other genitalia



Testis & Spermatic Cord

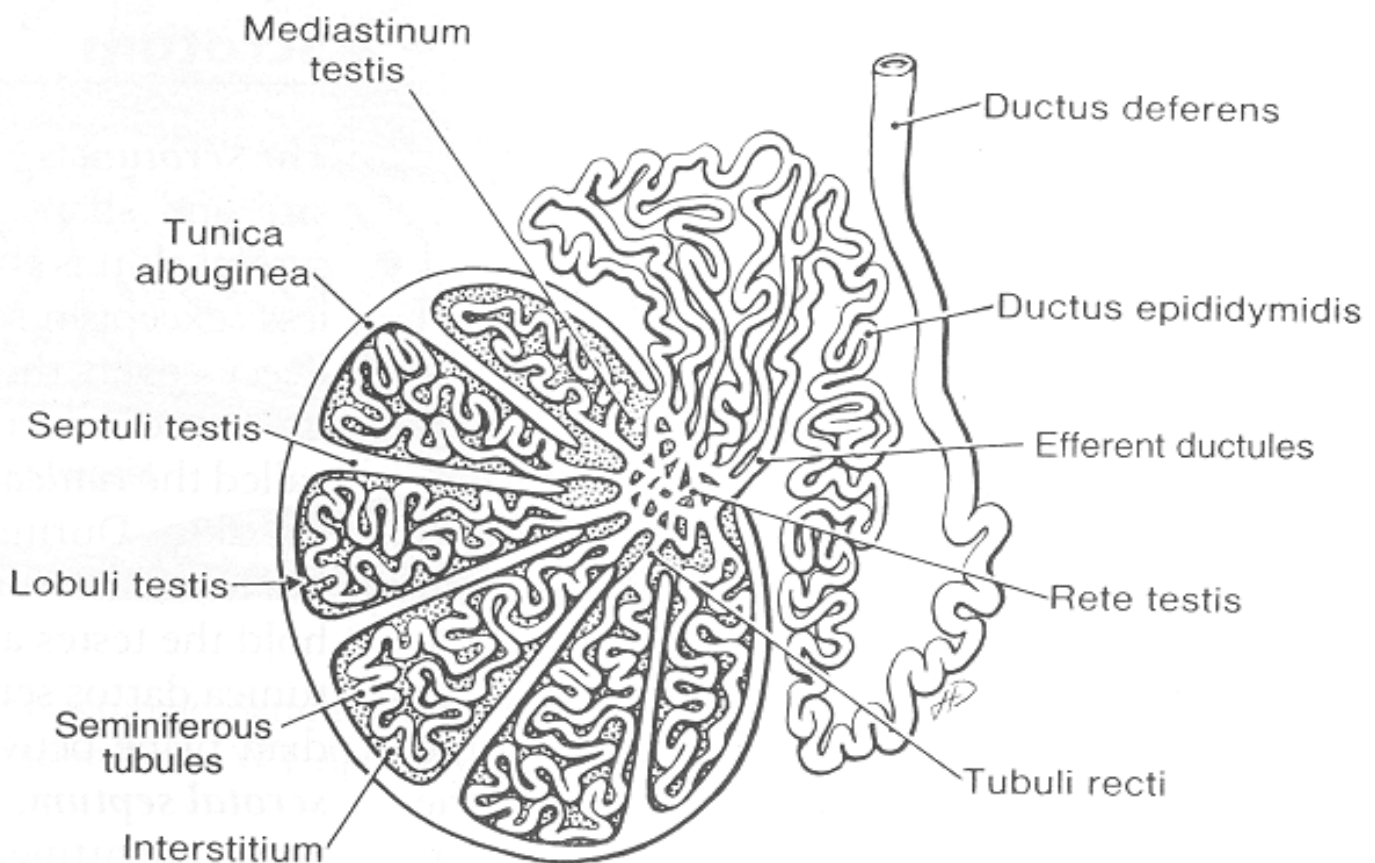


Testis



Structures of the Testes

- Covered completely with dense fibrous connective tissue capsule (Tunica Albuginea), send branching trabiculae inside the testis to divide its structures into many lobes and lobules. It connects finally the mediastinum testis
- About 80 % of testis is occluded with the long tortuous seminiferous tubules (about 3 km length in bull) .The rest portions consist of interstitial or Leydig cells , connective tissue, blood and lymph vessels ,nerve cells and fibroblasts



Function of the Testis

A.Sperm production within S.T. after puberty (Spermatogenesis) :

* Spermatocytogenesis :

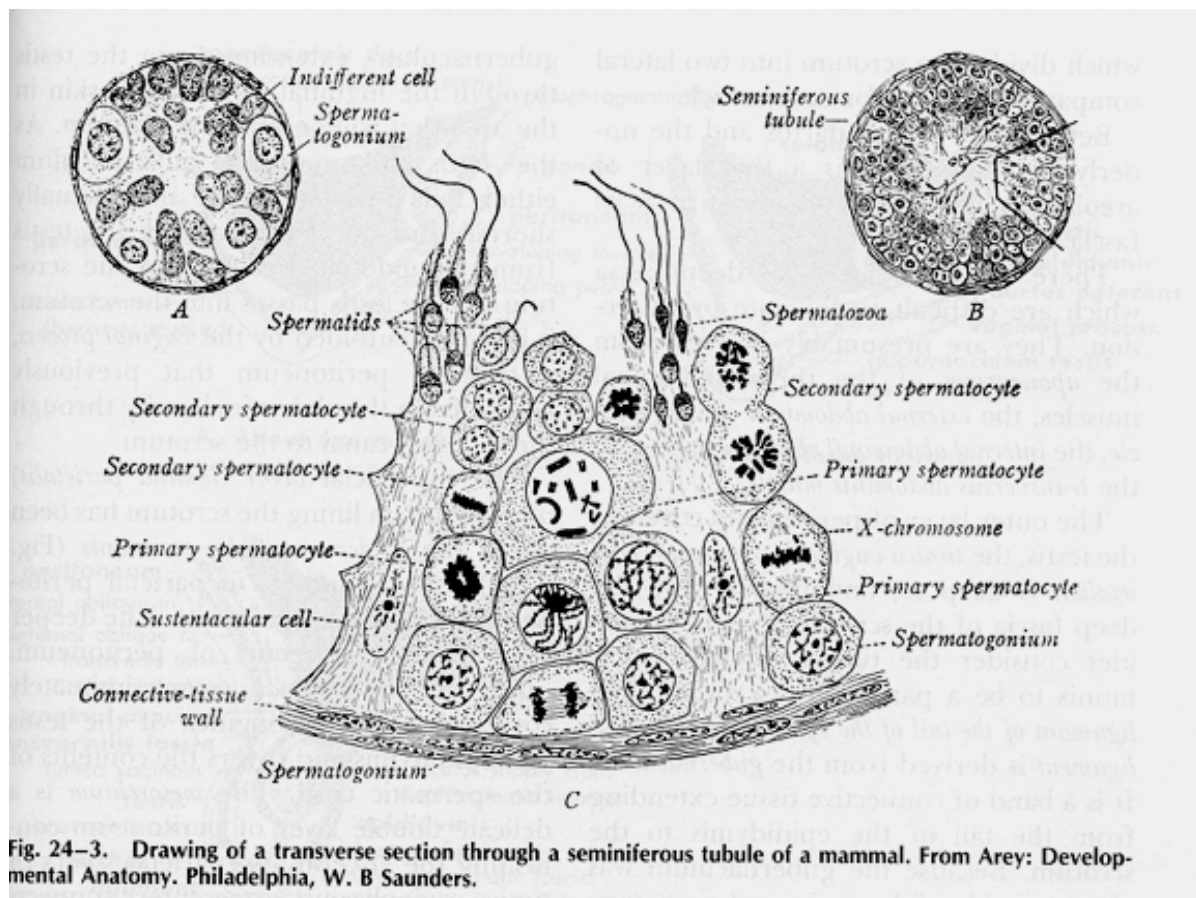
Primary and secondary spermatogonia:

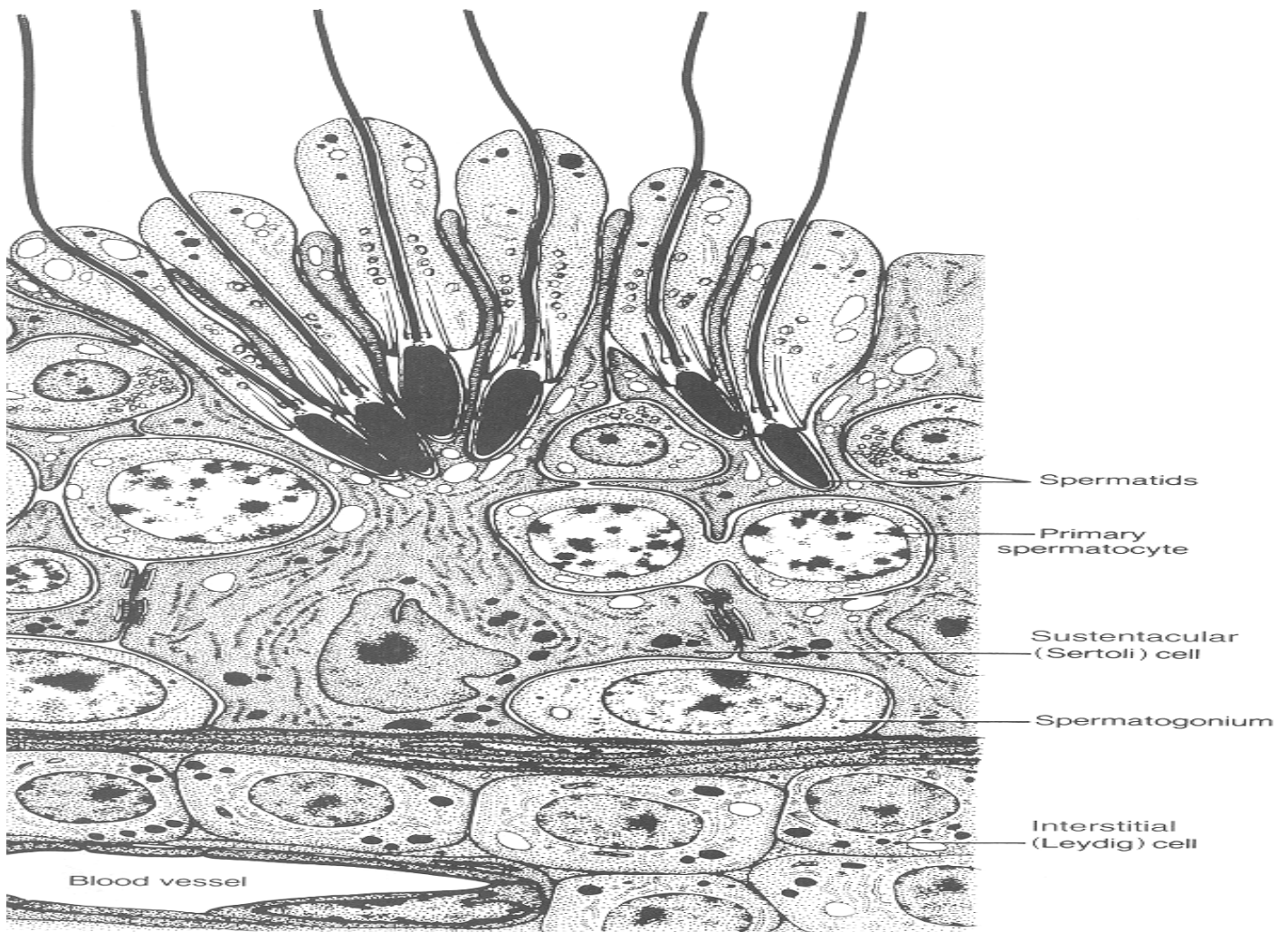
At the basement membrane (2n chromosomes)

Primary spermatocytes :Forms one or two layers and arise from mitosis of secondary spermatogonia

Secondary spermatocytes :Smaller in size, rarely seen due to their rapid divisions. Arise from meiosis of the primary spermatocytes with (1n) chromosomes .

Spermatids : Arise from meiotic division of the secondary spermatocytes and located centrally





* Spermiogenesis

- **It is the metamorphosis of spermatids to spermatozoa**
:Round spermatid to elongated spermatid then sperm
- **Golgi phase**
 - golgi apparatus produces the acrosome which migrates to one end of nucleus
 - centrioles migrate to the other end of nucleus and form the tail
- **cap phase**
 - acrosome forms a distinct cap over nucleus
 - golgi moves away from nucleus
 - primitive flagellum forms

Acrosomal phase

Acrosome continues to spread around nucleus

to cover the anterior half of the nucleus Mitochondria : Migrate toward posterior portion and cluster to cover flagellum or tail

The spermatid is now called a spermatozoa: consists of head, neck, middle piece and main tail piece

Spermiation : Occurs at the end of spermiogenesis . It is the release of sperm from sertoli cells towards the center of s.t.

Sertoli cell phagocytizes the remaining cytoplasm of the spermatozoa before spermiation.

Only a small amount of cytoplasm is left on the neck of the sperm and it is called the cytoplasmic droplet

Seminiferous Epithelium cycles:

Spermatogenesis occurred in waves within the seminiferous tubules It is important to understand that some portion of the seminiferous tubule is always releasing sperm and don't clog the pathway .The seminiferous epithelial cycles varied between animals and control the rate of sperm productionIts length varied between 12.2 day in ram to 13.5 day in bull and 8.6 day in boar

Duration of spermatogenesis are :

54 day bull, 49 day ram and 35 day boar

Transit of sperm from efferent ductules to ejaculate are : 10-12 day bull and ram, 15 day stallion, dog and boar

Function of Testis

B. Hormone Production

✦**Androgen:** Secreted from Leydig cells or Interstitial cells under the effect of LH gonadotropin from the anterior pituitary and regulate its release through –ve feed back mechanism

*Growth and function of male genitalia especially the accessory glands

*Stimulates the secondary male sexual characteristics especially the sex desire and masculinity

Inhibin :

- Secreted from Sertoli cells and control the release of FSH through a –ve feed back mechanism
- It is non steroidal peptide
- * Androgen –binding protein:
 - Secreted from Sertoli cells and control the release of LH
 - Enhances spermatogenesis and the separation of the glans penis from the prepuce in young males
 - Stimulates the function of other genitalia as androgen

EPIDIDYMIS

✚ Consists anatomically from :

- * Head (CAPUT)
- * Body (CORPUS)
- * Tail (CAUDA)

Located the upper , posterior and lower portions of the testis

Consists histologically from :

- * Single tortuous duct , 33 meter long with lumen increased markedly towards the cauda.
- * Its epithelium is pseudostratified ciliated columnar with many smooth muscle fibers and elastic C.T. with fibrous C.T. stroma

Function

- ✚ Sperm transport : (10-12 Days)
- ✚ Sperm storage : Mainly in the tail (up to 60 days motile and fertile)
- ✚ Sperm maturation : Release of protoplasmic droplet from sperm
- ✚ Sperm absorption : In prolonged sexual rest
- ✚ Secretes glyceryl-phosphorylcholine which metabolized by sperm in female genitalia for gaining more energy during capacitation



Vas Deferens and Ampulla

- ✚ Cord like structure from end of ductus epididymis to ejaculatory duct at Culiculus Seminalis in the anterior portion of pelvic urethra dorsal to the neck of the urinary bladder
- ✚ Its Ampulla has a large size branched lumen surrounded with glandular structures (secrete fructose and citric acid)
- ✚ It is 10-13 cm long and 1 cm diameter. It can be palpated rectally

Function :

- ✦ Transport sperm at the time of ejaculation
- ✦ Partial reservoir in the ampulla
- ✦ Nutritive to stored sperm
- ✦ Sperm stayed alive motile and fertile for 3 days then lose its fertilizing capacity
- ✦ May absorb dead sperm
- ✦ May contain large number of sperm equal to an ejaculate

ACCESSORY GLANDS

Seminal Glands :

- ✦ Two compact lobulated glands lateral to the ureters on the pelvic floor
- ✦ Measure 10-15 cm Length, 3-4 cm Breadth and 1-2 cm Thickness. They can be palpated rectally with a tense firm consistency
- ✦ Each has a main excretory duct with tree-like branching anteriorly and excretory duct posteriorly at the colliculus seminalis beside the ejaculatory duct

Function

- ✦ Secrete main volume of seminal plasma (>50%) which act as a vehicle to sperm activity
- ✦ Secrete fructose, for energy to sperm
- ✦ Secrete citric acid as buffer to sperm
- ✦ Secrete potassium and sodium ion to control the equilibrium of osmotic pressure
- ✦ Secrete Flavin which give yellow coloration to normal ejaculate in few bulls

Prostate Gland :

- ✦ Consists of :
 - Pars Externa (body, palpated rectally)
 - Pars Interna (Disseminate, encircled completely with the urethral muscle)
 - It is the major part, extends along the pelvic urethra and open with many ducts into the urethra

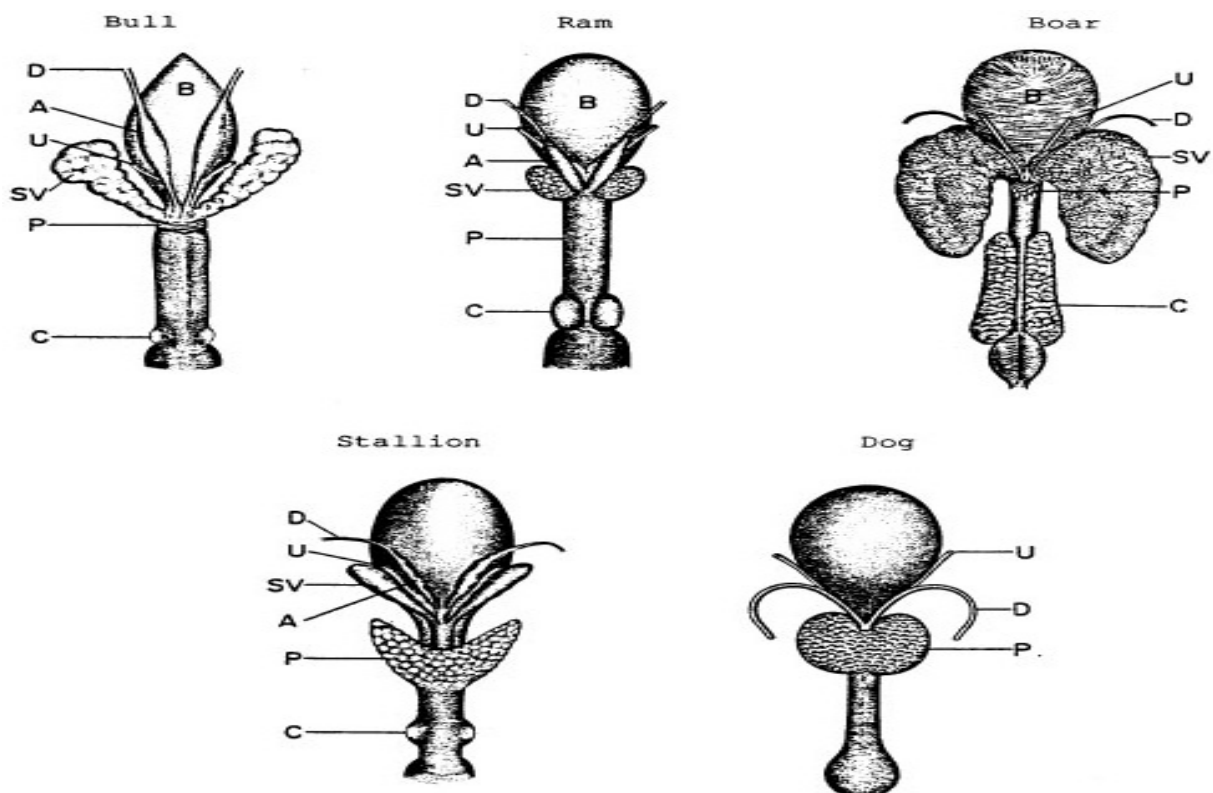
-It is covered externally with dense fibrous connective tissue with many trabeculae and surrounded with many cavernous spaces

Function :

- ✦ Secrete large amount of minerals that regulate the buffering system of seminal plasma
- ✦ Secrete amino acids and other elements for sperm nutrition
- ✦ It is alkaline in reaction to neutralise the acidic sperm coming from the cauda epididymes
- ✦ Participate as a vehicle media for sperm with the seminal glands

Bulbo Urethral Glands

- ✦ Two Cowper`s glands on pelvic urethra close to ischial arch and covered completely with bulbo-cavernosus muscle
- ✦ Oval in shape, can`t palpated clinically ,2-3 cm length and 1-2 cm thick.
- ✦ Each has a single excretory duct at the posterior end of pelvic urethra
- ✦ Its viscid secretion clean and neutralize the extra pelvic urethra



COPULATORY ORGAN (PENIS)

- ✦ Fibroelastic, cylindrical, 80 cm total length, with 2 short crura at the eschial arch each covered with ischiocavernosus muscle.
- ✦ It tapers anteriorly to form the glans penis (8-10 cm) and galea glandis (3-4 cm)
- ✦ The galea glandis contains sensory nerve ✦ In non erected condition the penis form the sigmoid flexure. No increase in length at erection, only stretching the **S** shape ✦ Two retractor penis muscles attached the penis at the end **S** of shape
- ✦ Penis consists of 2 corpora cavernosa penis dorsally and one corpus cavernosa urethra ventrally

Structures of Penis :

- ✦ The dens fibrous C.T. capsule of the penis sends many trabeculae to divide its interior structures to many lobes and lobules with many cavernous or blood spaces in between surrounded with elastic tissue
- ✦ External pudendal and obturator arteries supply the penis with the dorsal and deep arteries respectively
- ✦ The blood drained through the dorsal vein

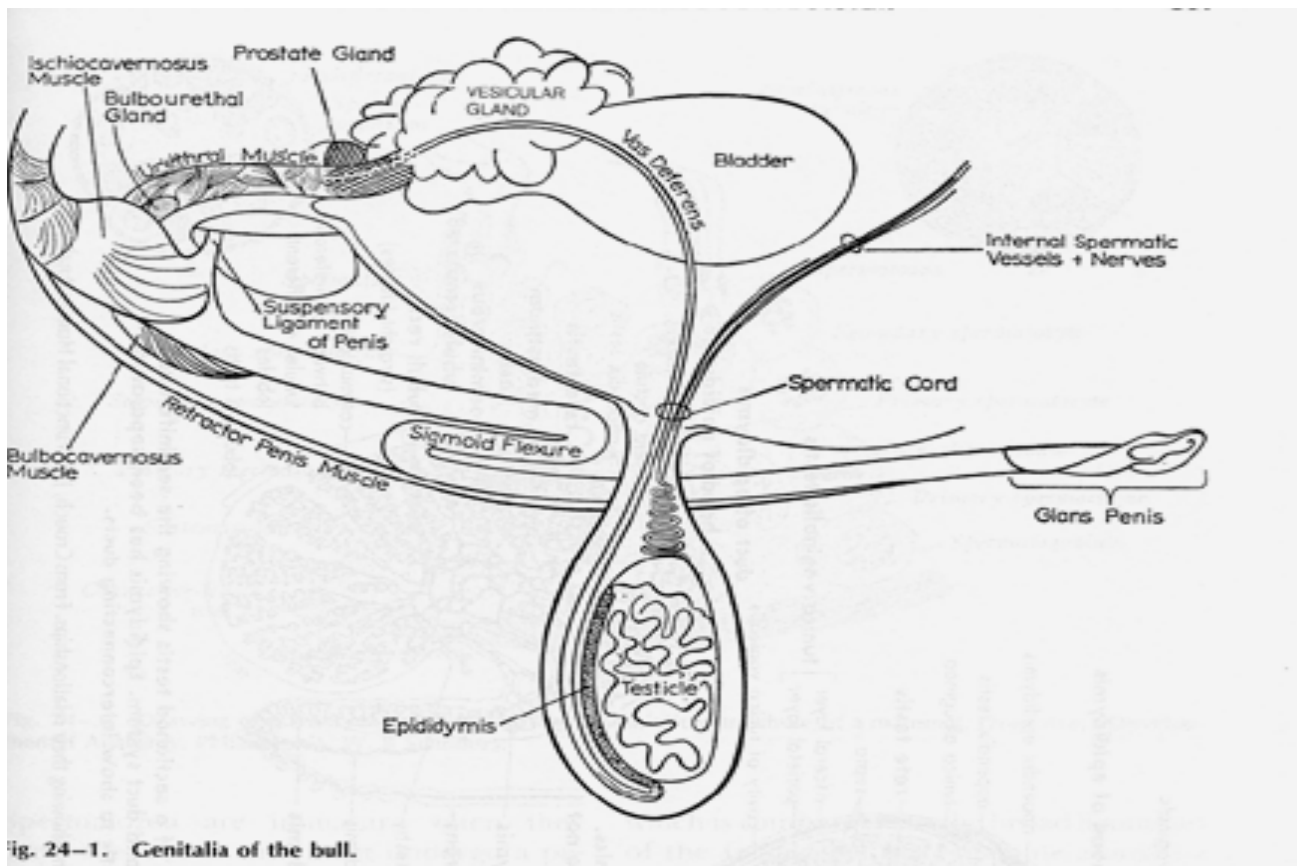
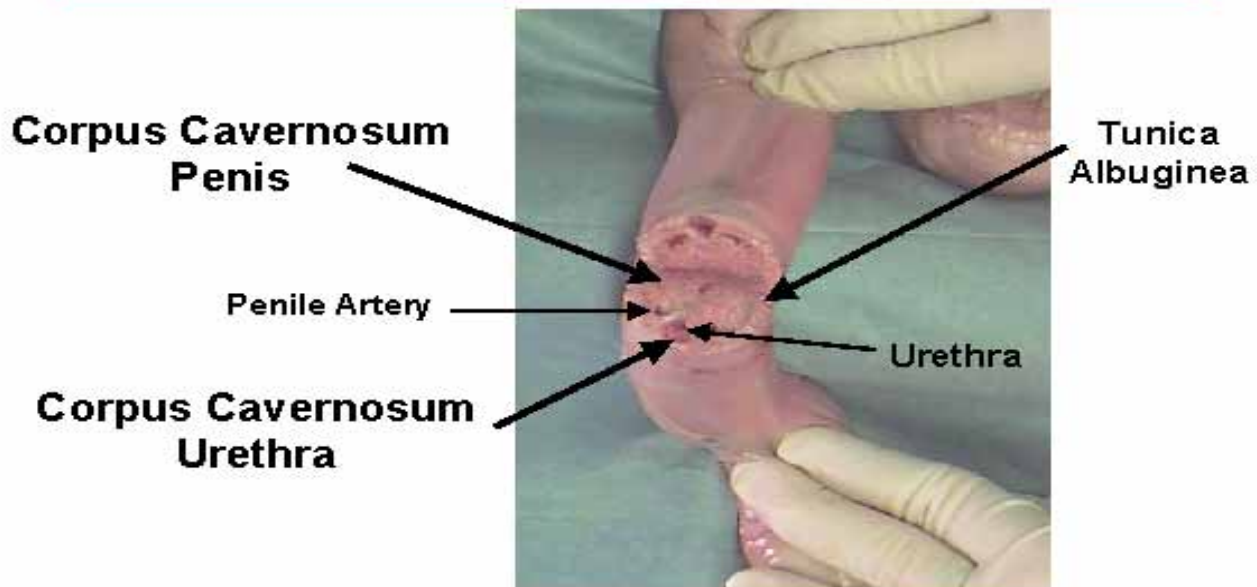
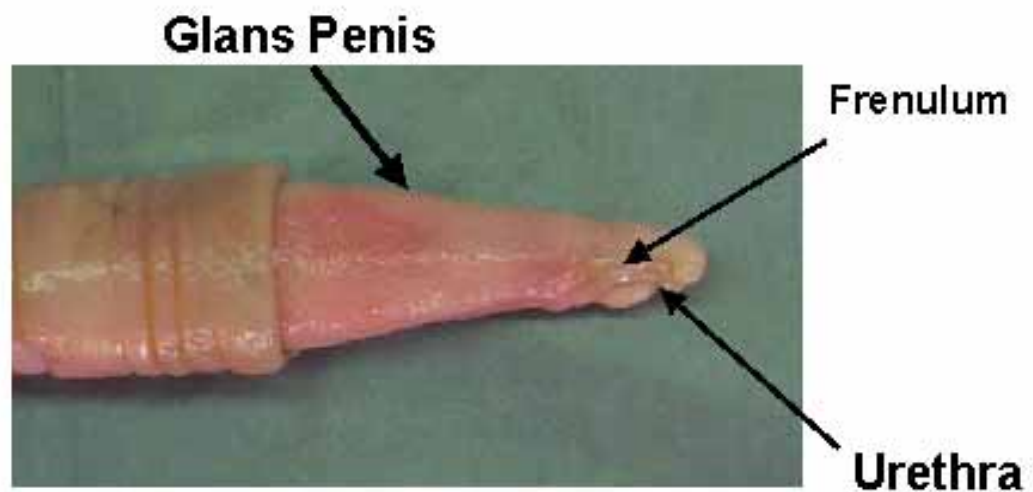


Fig. 24-1. Genitalia of the bull.

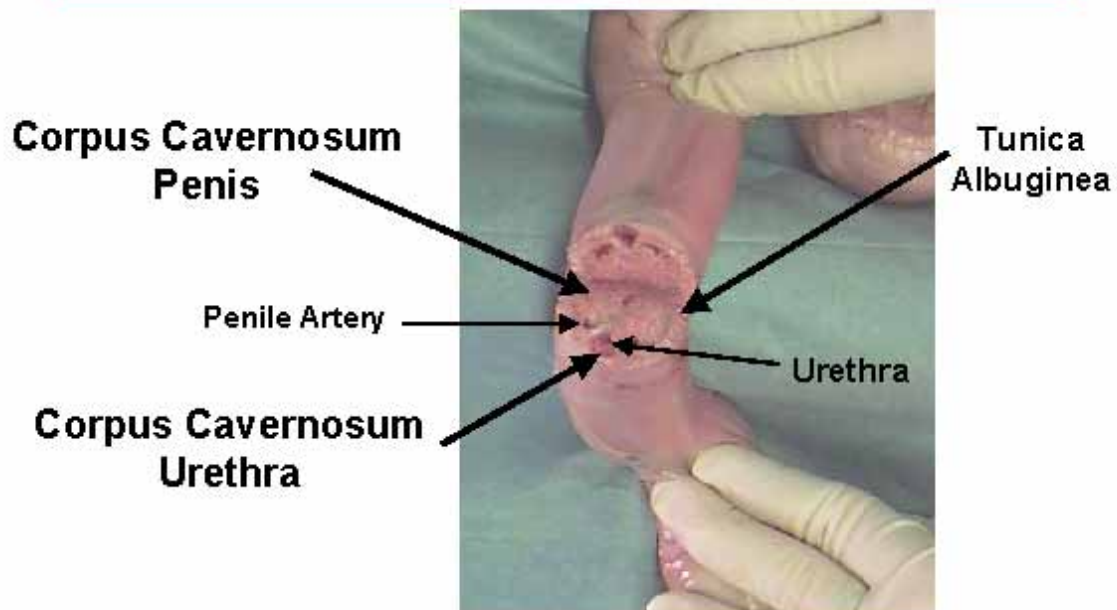
Crossection of Penis



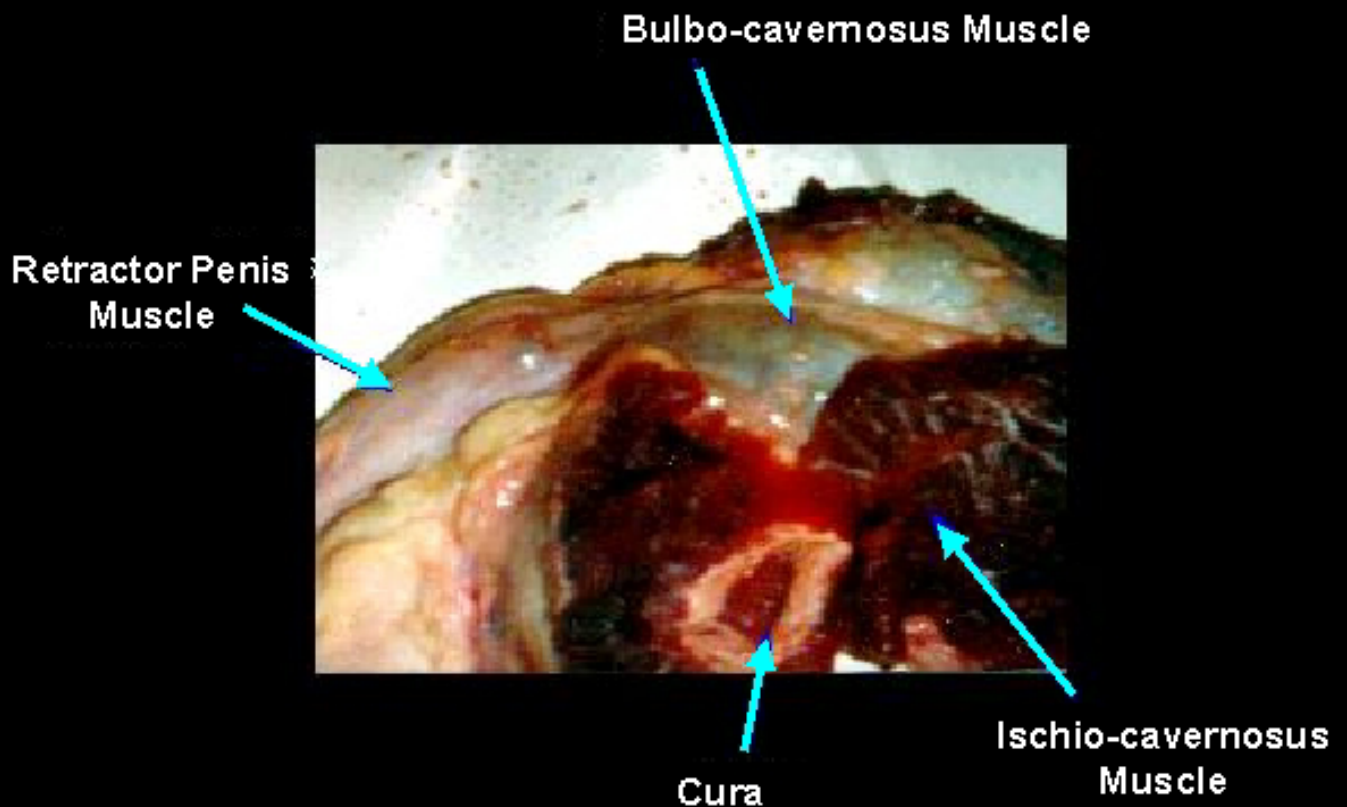
Glans Penis



Crosssection of Penis



Muscles of Reproductive Tract



Mechanism of Erection :

- ✦ Sexual excitement through sight, smell, touch, hearing, licking.
- ✦ Stimulation of nervi eregentis (Vasodilatation to blood spaces or cavernous tissue)
- ✦ Contraction of erector muscles at root of penis (2 ischiocavernosus and one bulbocavernosus muscles)
- ✦ Relaxation of retractor penis muscle with relaxation of sigmoid flexure and protrusion of penis

Mechanism of erection (Continue)

- ✦ Continuous inflow of blood with decreased out flow lead to full erection and hardness without increase in size due to strong fibrous C.T. (tunica albuginea) encircling the penis
 - ✦ The few cavernous tissue of the penis lead to rapid onset of erection with relatively with relatively few amount of blood
 - ✦ Erection and copulation controlled with parasympathatic nerve fibers
 - ✦ 2-3 minutes are required for erection and copulation in bulls ✦
- Desire, erection, mounting and ejaculation are the steps for sexual behaviour of normal bull



Mechanism of Ejaculation

- ✦ When glans penis get contact with vulva and vestibulum ,during copulation, reflex ejaculatory thrust occurs with semen deposits in the dorsal fornix of the anterior vagina
- ✦ Impulses arise at the sensory nerves of galea glandis transmitted by the internal pudic nerve to the lumbosacral plexus of the spinal cord at the lumbo-sacral section
- ✦ Ejaculation controlled through sympathetic nerve from 2nd to 5th lumbar spinal nerve
- ✦ It happened at end of penile thrust ,so the term ejaculatory thrust in bull, buffalo, ram and buck

Prepuce

- ✦ It is a tubular integument covers the free portion of penis (30-40 cm long)
- ✦ It has a preputial orifice with long tough hair and supported by the protractor muscles for closure
- ✦ It has a stratified squamous epithelium which thrown itself into longitudinal folds with deep invagination and deep tubular glands that secrete Smegma which modulate the condition of prepuce
- ✦ Its main function is to protect the Penis

URETHRA

- ✦ It is a urogenital duct extends from the orifice of urinary bladder to the tip of galea glandis
- ✦ It conducts urine at urination and semen at ejaculation to the outside
- ✦ It is divided into:

(I) Pelvic urethra : Fleshy and extends from neck of bladder to the level of excretory ducts of B.U.Glands

* It contains the pars disseminata of the prostate interiorly and the crescent shape urethral muscle exteriorly

* It has festooned lumen and many cavernous spaces and surrounded by dense fibrous C.T.

URETHRA

- ✦ (II) Extra pelvic urethra :

A. Bulbar portion :

Extends between the orifices of the B.U.Glands to the point where the crura of penis conjoined. It is covered dorsally by bulbocavernosus muscle

B. Penile portion:

It extends till the tip of glans penis

The urethra is lined with transitional epithelium with many longitudinal folds

Its lumen decreased gradually towards the tip of glans penis and this leads to the strong emission of the ejaculate outside the body

FORMS OF MALE INFERTILITY

- * Reduced to lack of sex desire
- * Inability to copulate (Impotentia Coeundi)
 - * Inability to fertilize or Postcoital infertility (Impotentia Generandi)

A. REDUCED TO LACK OF SEXUAL DESIRE

The male may show little or no interest for mounting the female even if she is in estrus

It is characterized by symptoms ranging from slight sluggishness or to repeat coitus except after long intervals to complete disinterest to mount the female

Species variations should be considered as heavy breed and buffalo are normally lazy than native breed or Friesian

Natural Mating of Bull



CAUSES FOR LACK OF SEXUAL DESIRE

- Hereditary
- Endocrine dysfunction :
 - LH, Testosterone, Thyroxine

Nutritional Disturbance: Over and Under Feeding, deficiency of Ca, P, cobalt, Vitamins A, E, D

- **Sexual Exhaustion** : Over use above average rate which is 2-3 times per week
- **Sexual Experience** : Especially with young

Systemic Diseases : Pneumonia, enteritis, severe parasitic infestation, severe weakness and others

Psychological Factors : Previous accident, slippery or trauma at time of mating, incompatibility between male and female, diseased or dirty teaser or female

Management and Environmental Factors :

Hot condition, high altitude, damp atmosphere, isolated bull, crowded places

DIAGNOSIS AND TREATMENT

- **Clinical history**
- **Clinical examination**
- **Measure degrees of sex drive as follow :**
 - No interest (Abnormal)
 - Little interest (Abnormal)
 - Some interest with hesitation (Questionable)
 - Good with moderate mount
 - Good with quick and good mount
 - Eager : Excellent desire and strong rapid mount
 - Uncontrolled (Dangerous extremely strong) Abnormal

TREATMENT

- According to the original causes :

- **Hereditary and endocrine causes** :

Discard from breeding or try the following:

- § **Testosterone** : 100-200 mg inj. every 3-4 days
- § **L.H. Chorionic gonadotrophin** : 5000-10000 IU every 2-3 days
- § **Iodinated casein** : 1 g /100 lb body weight daily for 2 weeks, mixed with some bran
- § **Yohimbin** : One tablet dissolved in water, daily for weeks

§ **Strychnin** : 100-250 mg orally id divided daily dose for 3-4 days before mounting

Treatment continue:

- Correct ration with exercise in over feeding. Add protein, mineral and vitamins in under feeding
- Sexual rest 2-3 month in exhausted or psychologically affected bulls
- Training for young growing bulls for mounting young females
- Medical treatment for diseased bulls
- Keep bulls under good hygienic condition of management

B. INABILITY TO COPULATE IMPOTANTIA COEUNDI

- **The bull has normal desire but unable to perform coitus**
- **I. Affections of locomotor systems :**
 - -Inflammation of iliosacral, hip stifle,and other joints.
 - -Fracture of limber or thoracic vertebrae and or other bones or joints.
 - -Diseases of hooves
 - -Dislocation of joints
 - -Spasm of muscles
 - -Rupture of gastrocnemius muscle

Diagnosis and Treatment :

Rest for the animal and follow the line of treatment mentioned in surgery books according to the diagnostic causes

II. AFFECTIONS OF COPULATORY SYSTEM

Phimosis

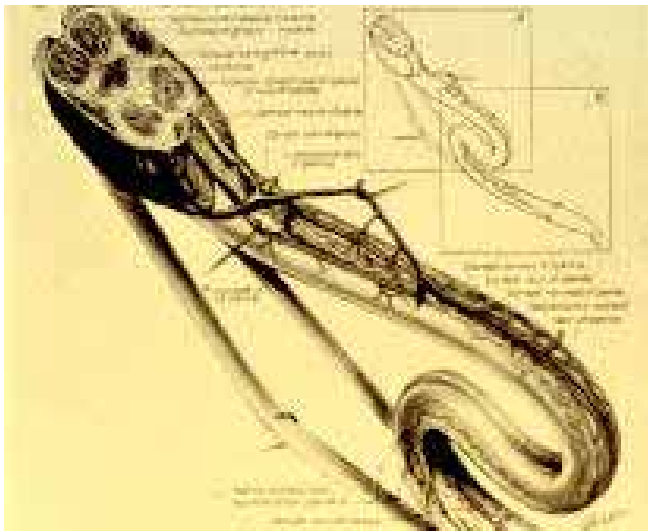
- Inability to protrude the penis

Causes:

- - Underdevelopment of sigmoid flexure
- -Adhesions between penis and prepuce
- -Spasm of retractor penis muscle
- -Stenoses of preputial orifice
- -Persistent frenulum
- -Psychological factors

■ - Fibropapilloma on the glans penis

Persistent Frenulum



Short retractor penis muscle



Surgical cut of persistent Frenulum

Treatment:

Discard bull with hereditary causes

- Warm antiseptic solutions (1/1000 acriflavin, entozoon) and oily antibiotic suspensions to separate pathological adhesions
- Surgical widening of the narrow preputial orifice

- Transect of the frenulum
- Sexual rest in psychologically affected bulls

Paraphimosis

- Inability to withdrawn the penis

Causes

- -Stenosis of preputial orifice
- - Paralysis of retractor penis muscle
- - Fibropapilloma of the glans penis
- - Transect of retractor penis muscle in
- - case of previus phimosis

Symptoms

- Protruded penis inflamed with pathological exudates and area of necrosis and ulcerations
- Penis swollen with purulent discharge and very painful to the bull
- Affected bull may loose appetite
- Affected penis is dirty with many bacterial activities

Prognosis

- Bad and animal needs rapid handling and suitable treatment

Treatment :

Epidural anesthesia

- - Plenty worm antiseptic solution to wash
- penis and remove all necrotic tissue and
- abnormal discharge
- - Surgical widening of preputial orifice
- - Replace the penis inside prepuce after
- removing the fibropapilloma if present
- - Repeat washing ever 1-2 days till curing
- with warm mild antiseptic solution and
- oily antibiotic suspension

Balanitis and Posthitis

- Inflammation of glans penis and prepuce
- BALANO-POSTHITIS
- It is dangerous affection and leads to adhesions

Causes:

- -Trauma
- - Overheated Artificial Vagina
- - Bacterial infection from faeces, dust or dirties when get entrance into prepuce
- Balano-posthitis with prolapsed prepuce



Symptoms and Diagnosis

- In acute cases, painful swelling and oedema
- - Mucopurulent discharges may encrusted around the preputial orifice
- - The surface of the glans penis and prepuce were congested, inflamed with petechial hemorrhage, vesicles, ulcers and areas of necrosis
- - In chronic cases, adhesions arise with bad sequellae
- -Tuberculous infections lead to granulomatous bleeding lesions

Prognosis and Treatment

- Prognosis : Depends on the severity of infections and the correct handling

Treatment includes :

- - Rest for the animals
- - Epidural anaesthesia before washing with mild antiseptic solution and oily

suspension or antibiotic ointments

- - Preputial sheath wash with such medicaments for 3-4 days or till curing
- Zinc oxide ointment can be used

Broken or Ruptured Penis

- It induces haematoma of penis

Causes :

- Accidental misplacement of penis into the A.V.
- Young active untrained bulls who mount larger female with thrust in a blind point
- Strong kicking or trauma of the erected penis



Broken penis with haematoma



Broken Penis



Ruptured Penis

Symptoms

Sudden swelling at the site of rupture

with large haematoma in front of scrotum

- Animal has short steps with severe pain and arching back

Treatment

Wait till haematoma clotted after 3-4 days

Epidural anaesthesia and remove the clotted blood after skin incision

Freed penis from surrounding blood and debris then wash with antiseptics and apply antibiotics

Suture the penis and prepuce separately with cat gut, then suture the skin with silk

Keep the animal apart from herd with daily introduction of antibiotic ointments through the preputial orifice

Abnormalities in Shape of Penis

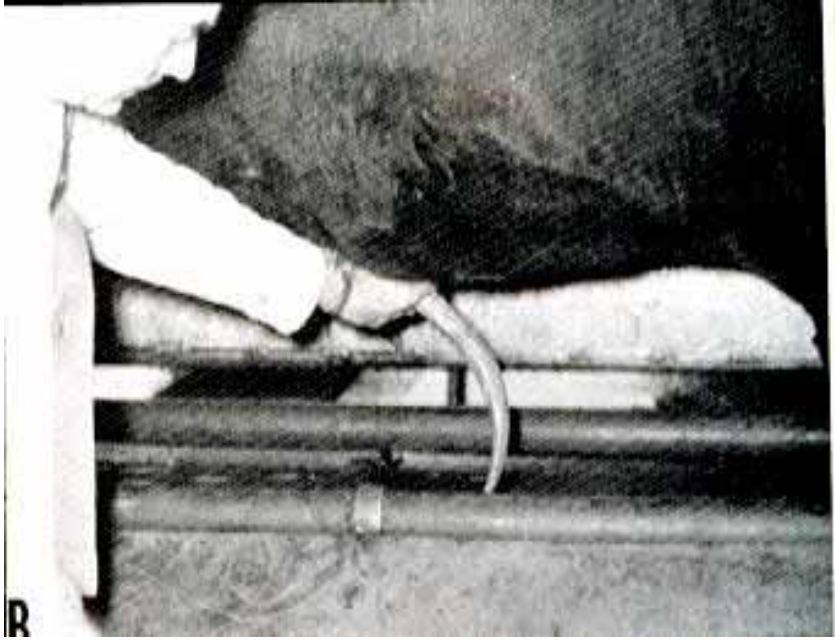
Congenital in origin and affect the free portion of the penis

- The penis may be curved, twisted, cup-shaped or spiral
- Discard animal from breeding or used it as a teaser. It is impossible for such animals to perform natural introduction of penis into the Vagina
- Surgical interference with deviation only

Twisted Penis



Curved Penis



Tumours of the Penis

Fibropapilloma :

- Pedunculated or
- Diffused around the galea glandis

Treatment:

Can be removed surgically under epidural anaesthesia and under complete aseptic condition

Tumours of the Penis

Fibropapilloma :

- Pedunculated or
- Diffused around the galea glandis

Treatment:

Can be removed surgically under epidural anaesthesia and under complete aseptic condition

Fibropapilloma



Large Fibropapilloma



III. Affections of Scrotum

These include Dermatitis, Hernia, and acute orchitis and epididymitis and acute funiculitis.

Pain arises from these affections during copulation leads to inability to complete the act of coitus

Dermatitis

Inflammation of the scrotum from parasitic, fungal with further bacterial infection

There is hyperemia accompanied with moistening, exudates, irritation and pain

Scrotum thickened, rough and may lose its thermoregulatory function

Treatment

- Scraping, then antibiotic ointment
- - Zinc sulfate ointment can be applied
- - Gentian violet 2%
- - Spray parasites with Gamatox or DDT or any other suitable drug to kill and repel external parasites

Scrotal hernia

- Induced Pressure atrophy or degeneration of the testis (Impotentia Generandi)
- Induce pain from the pressure on the herniated viscera in the inguinal canal (Impotentia Coeundi)

Dangerous to the male and required rapid surgical handling

IV General Affections of the Animal Body

These includes :

- Urinary calculi, abscess of liver, kidney, traumatic pericarditis, gastritis, inflammation of accessory glands and peritoneum.

Pain raised from these lesions during copulation could prevent the complete act of coitus.

Treatment : According to the original causes

C. REDUCED TO LACK OF FERTILIZATION (POST COITAL INFERTILITY) (IMPOTANTIA GENERANDI)

The bull has normal desire and normal mounting but there is disturbance in the expected fertilizing rate

A. Impotentia Generandi with apparent Normal Semen :

1- Coital Infection

This includes Trichomoniasis and Cambylobacteriosis and as well other bacteria which transmitted with semen during mount (Coryn- Srtept- Staph-..etc)

2- Genetic Abnormalities

Low DNA, acrosomal defects, chromosomal abberations and abnormal interior structure of sperm

3- Lethal Factors

- Inherited abnormalities on the gene
- Male and females are responsible
- Affects the life of animal during gestation or at birth .
- Many systems are involved :
 - Alemintary tract – Skeletal - Nervous
 - and - Circulatory

New born has different forms of anomalies:

Double head, conjoined twin, extra digits, chistosoma reflexum, anasarca, unrecognised legs, cleft palat, ankylosis, bull dog calf, general oedemaetc.

B. IMPOTANTIA GENERANDI WITH ABNORMAL SEMEN

■ Affections of Testes

Hereditary

1. Chryptorchidism

- It is incomplete descent of test in scrotum
- It is either unilateral or bilateral.
- -Chryptorchid testis is sterile with no sperm production but hormones are not affected
- -It is located in any place, from abdomen to level of external inguinal ring without lodging the scrotum
- -It may locate the lower perineal region or alongside the penis or may be hanged horizontally at the external inguinal ring

Chryptorchid Testes from Slaughtered Bull



Causes, Diagnosis, Prognosis and treatment

- Hereditary in nature
- Clinical palpation of the scrotum or rectal palpation
- Prognosis bad and discard animal from breeding

2. Testicular aplasia

- It is complete absence of one or both testes due to genital abnormalities
- -The animal is sterile and with feminine nature in case of bilateral affection
- Diagnosis through palpation of scrotum
- And discard animal from breeding

Unilateral Testicular Aplasia



3. Testicular Hypoplasia

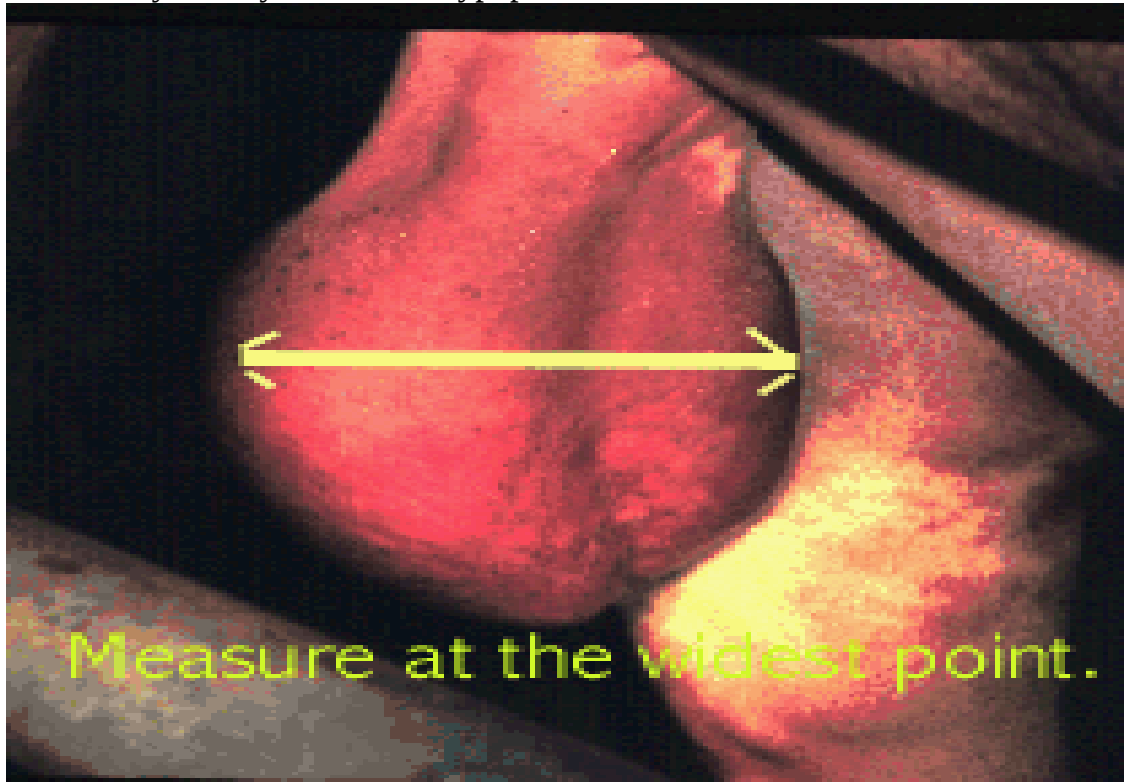
- Congenital underdevelopment of the testis usually the left and rarely bilateral
- It is expected at puberty and on
- Hypoplastic testis is smaller in size with smaller epididymis and smaller spermatic cord than normal
- The seminiferous tubules are mostly affected and occasionally the interstitial or Leydig cells
- Fertility is much lower than expected with the advance of age

Symptoms :

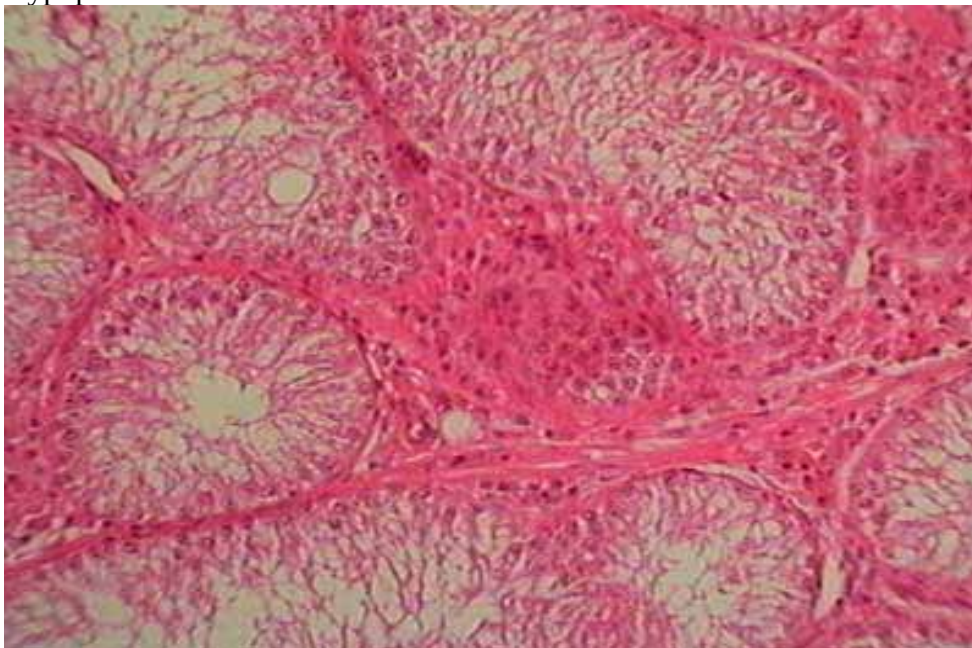
A. First Extreme Form

- Testes are perfectly sterile and markedly smaller with small sized epididymis , spermatic cord and scrotum in bilateral cases. Consistency firmer than normal
- Ejaculates watery and without sperm, but giant cell may be present
- Histologically, s.t. smaller in size with small lumen, lined with undifferentiated cells and without spermatogenesis
- Peritubular C.T. appeared abundant

Scrotal Asymmetry Unilateral Hypoplasia



Hypoplastic Testis



In unilateral affection

- There is marked asymmetry in the shape of scrotum and testicular size
- The semen picture depends upon the condition of the other testis , but marked reduction in sperm count is obvious after the first ejaculate

B. Second Intermediate Form

About 2/3 of the testis is hypoplastic, while the rest portion is with variable degrees of spermatogenesis and sperm production

The bull still sterile with limited fertility and odd or giant sperm appeared in the ejaculates

Semen may contain less than 10,000 sperm /c. mm (normal concentration is one million)

In unilateral affection

- As in the first extreme form but less distinct

C. Third Least Severe Form

About 1/3 of the testis is hypoplastic and the testis appeared slightly less than normal in size and consistency

The sperm count may be 0.2-0.3 million/c. mm and the expected progress in fertility with age subsides in affected animals

In unilateral affection

Slight asymmetry in the shape of scrotum and the sperm count appeared within normal standard in the first few ejaculates

Diagnosis, Prognosis and Treatment

- Diagnosis from symptoms and histological appearance of testis biopsy
- Prognosis bad
- Discard animal from breeding

Acquired Affections of Testes

1. Testicular Degeneration

It is a necrobiotic changes occurring in s. t. begins in the spermatids then proceed to the spermatogonia due to causes affecting the thermoregulatory mechanism of the testis mainly or due to toxins

Causes

- Diseases characterized by long fever
- Toxins in ration (Aflatoxines and others)
- Avitaminosis and nutritional disorders
- Scrotal hernia
- Unilateral orchitis
- Cryptorchidism
- High environmental temperature
- Hard adhesions between testis and scrotum

Degrees of Testicular Degeneration

A. First Light Form

There is reduction in the fertility rate

Testes are apparently normal in size and consistency

Ejaculates are apparently normal but sperm abnormalities reached 25 %

(Normal semen with 12 %) mainly primary origin

Histologically, affected s. t. has necrosed spermatids with no further sperm development . Other s. t. may be normal

B. Second Intermediate Form

- There is considerable reduction in fertility
- Low number of sperm in ejaculates with high number of abnormal sperm (about 30 %)
- Low motility and livability percentages for sperm
- Histologically, affected s. t. has hydropic degeneration and vaculation of cytoplasm in the spermatogenic cells from the lumen till the spermatocysts

C. Third Severe Form

- There is complete loss of fertility
- Testes are smaller in size with firm consistency
- Number of sperm markedly reduced with 40 % abnormalities
- Low rates for sperm motility and alive sperm and semen tend to be watery and alkaline
- Histologically, most of s. t. are affected with degenerative changes till spermatogonia with many giant cells

Diagnosis

- from breeding history
- history of repeat breeder from naturally or inseminated females
- Semen picture
- Testicular biopsy for histopathology

Prognosis

Good for the first form only

Treatment

Sexual rest and treat the original causes



2-Orchitis

It is either acute or chronic inflammation of the testis, usually unilateral and rarely bilateral

1. Acute Orchitis

Causes :

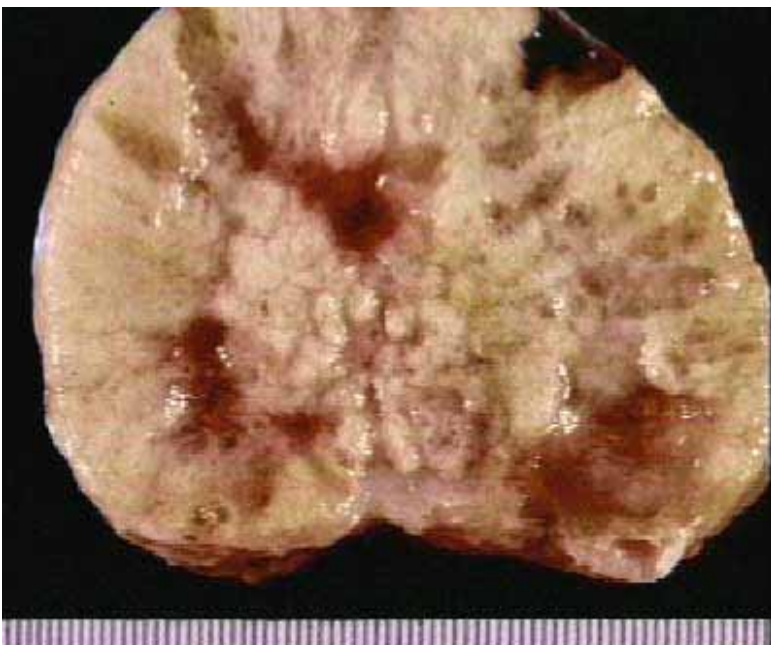
Trauma, wounds and infected injuries
Brucella or other pyogenic organisms

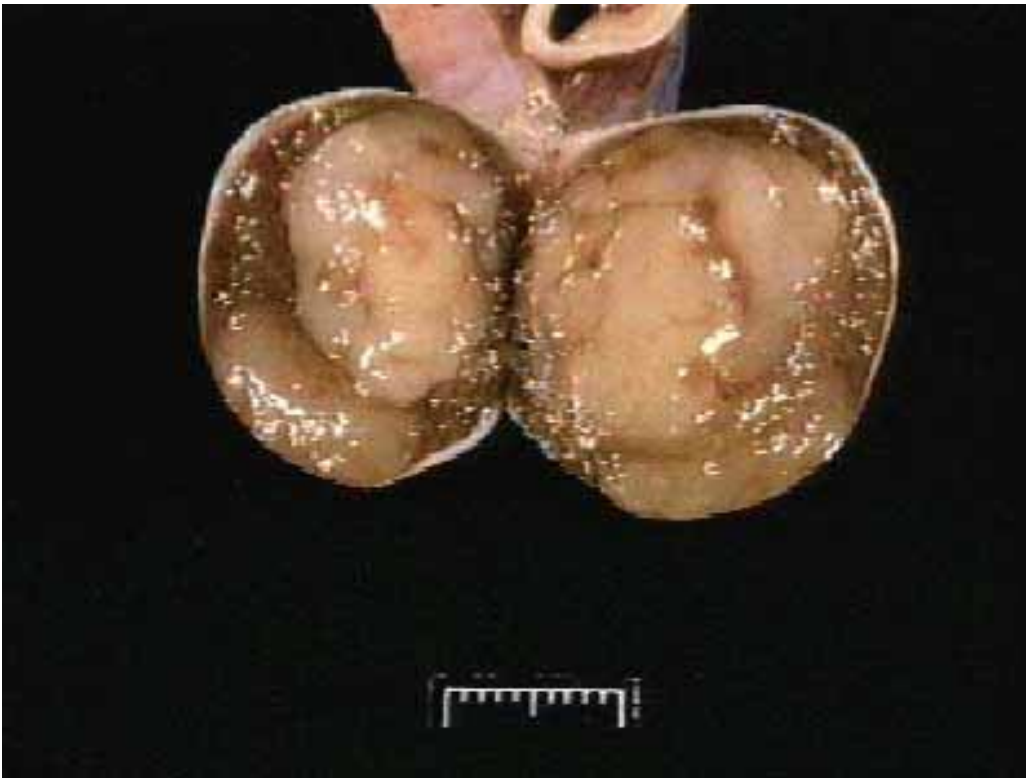
Symptoms:

- Fever with general health disturbances
- Swelling, pain, asymmetry and redness of scrotum
- Semen is deteriorated and infected with the causative bacteria

Different forms of chronic orchitis in Bulls







Diagnosis :

- From symptoms
- Agglutination test for brucella and reacted animal should be slaughtered
- Bacteriological examination of semen

Treatment:

- Sexual rest
- Try injection of systematic antibiotics and novalgine
- Local application of cold douches , astringent, iodine paint to reduce pain
- Unilateral castration to protect other sound testis

2.Chronic Orchitis

- Follow acute orchitis by about 2 weeks
- General health disturbances disappeared
- Affected testis became less painful either atrophied or enlarged with abscess formation and scrotal asymmetry
- Adhered to surrounding scrotum and felt firmer in consistency
- Affected testes lost their functions and affected with fibroses
- Remove affected testis and discard animal from breeding if the other testes degenerated

3. Testicular Fibrosis

- It follows chronic degeneration or orchitis
- Affected testis is smaller, firmer and Usually adhered to scrotum which becomes smaller and asymmetry
- Animal with bilateral fibrosis is sterile

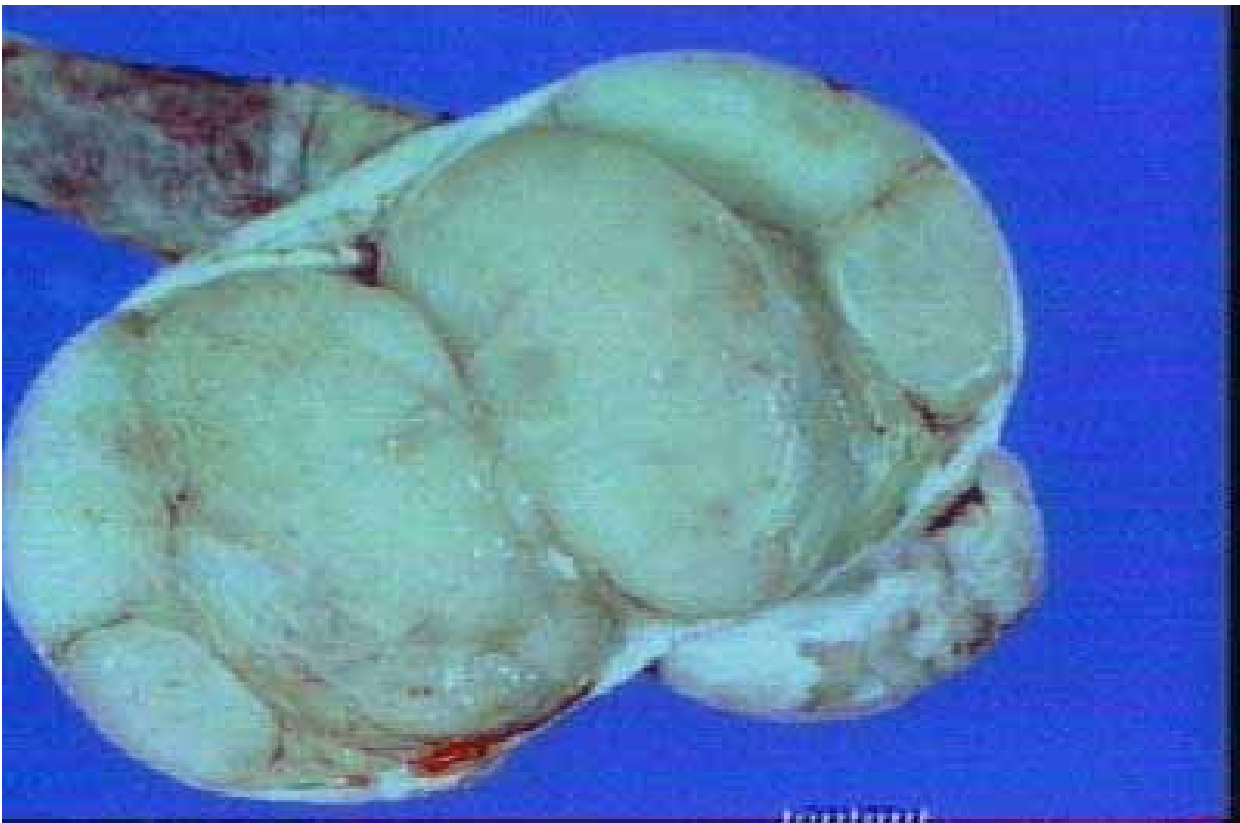
4. Testicular tumours

Rare and included : teratoma, dermoid cyst, seminoma, Interstitial Cell adenoma and sertoli cell tumours

Increase in size of testis with deformity in shape and asymmetry of scrotum

In malegnat type discard bull from breeding or unilateral castration

Seminoma and Sertoli cell tumours



5. Testicular calcification

- Rare and of non infectious causes
- Occurred in highly fertile bull when kept for long time in sexual rest
- It may follow slight degeneration or as a metabolic disorder within the s.t. when calcium carbonate deposited around long standing dead spermatozoa.

- Fertility can be disturbed when area of calcification is distributed in both testes
- Calcified testis is stony in consistency and may be larger in size and both testes were usually affected

Affections of epididymes

Hereditary Abnormalities

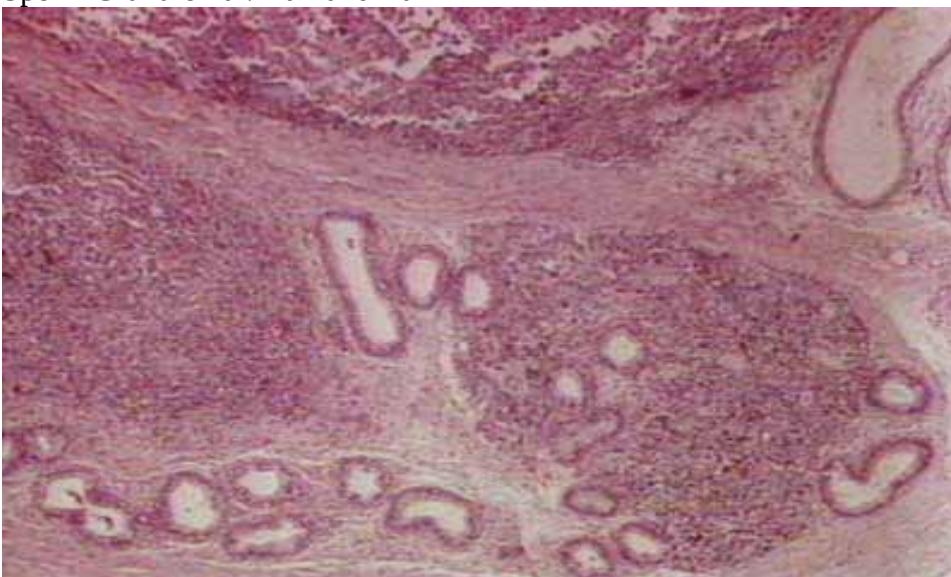
- **Aplasia** : Partial and Complete
- **Underdevelopment** of duct convolution
- **Cyst** : Retention cyst
- Spermatocele** (Abberent ductules)
- Sperm Granuloma** (Paradidymis)

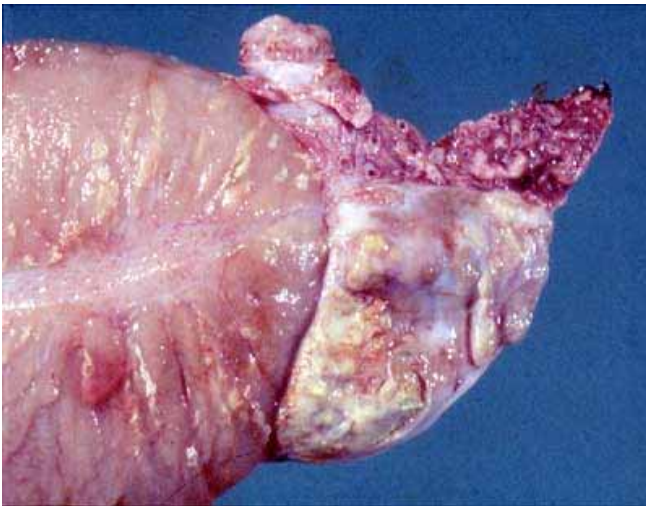
Discard animal from breeding

Spermatocelel



Sperm Granuloma : Bull and Ram



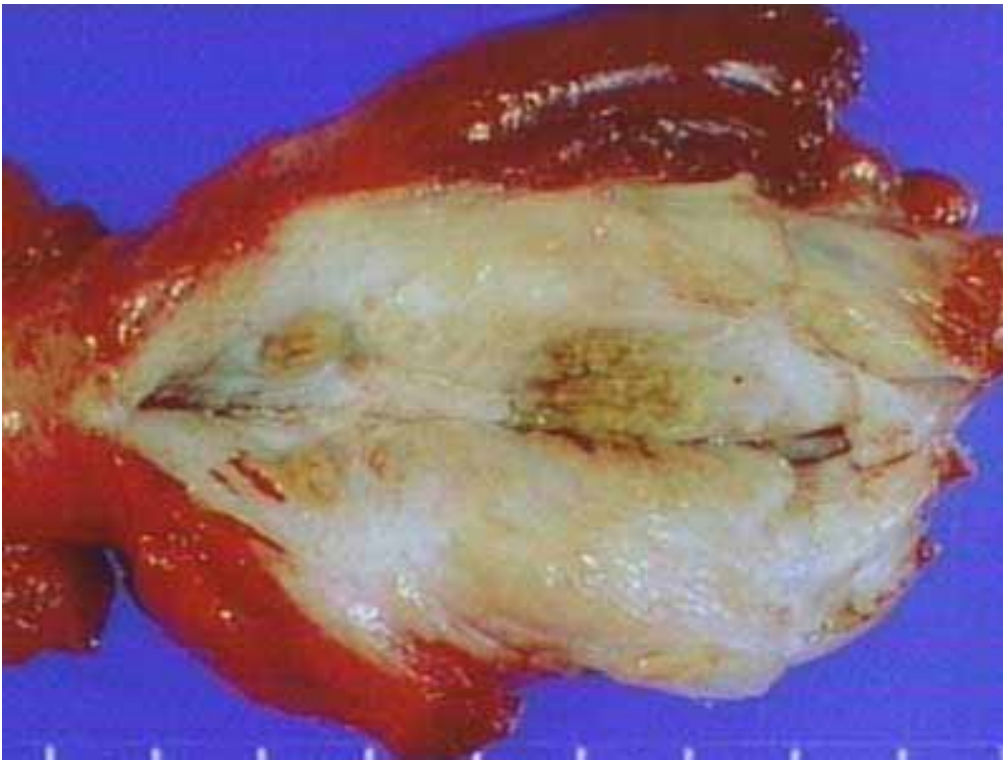


Acquired Affections:

- Epididymitis : Acute and Chronic
- Always associated with orchitis
- Causes ,symptoms and diagnosis are nearly similar to orchitis
- Sometimes the inflammation begins in the epididymis and extends to the testis and the reverse is true in some others cases

Abnormalities and Affections of Spermatic Cord and Scrotal portion of Vas Deferens

- **Funiculitis : (Scirrhus Cord)** It is an inflammation of the spermatic cord
- It is always associated with infected castration
- The spermatic cord correlated with testicular and epididymal size .
- Decreased in diameter with hypoplasia and atrophy of testes.
- Increased in size with testicular abscess, tumors calcification and others



Abnormalities and Affections of Seminal Glands

- **Hereditary:** Aplasia and Hypoplasia
- **Acquired :**

Semino-vesiculitis :

Acute and Chronic

Causes :

- Brucella, Pseudomonas aerogenosa, corynebacterium pyogenes, staph. Strept. These lead to acute inflam.
- Mycobactrium tuberculosis start by chronic inflam. from beginning

Symptoms

- Similar to acute and chronic orchitis
- The gland is tender and very painful in palpation
- Fistula may arise between seminal gland and rectum
- Peritonitis may occur with bad sequellae
- Semen is deteriorated with pus and bacteria as well many dead spermatozoa
- The gland is swollen with faint lobulations and tender with palpation
- Abscess and atrophy may follow the inflammation

Diagnosis:

- From symptoms

- Laboratory diagnosis for semen collected under aseptic condition for bacteriological study
- Agglutination test for brucella infection
- Tuberculin test for TB infection

Treatment

- Systemic antibiotic treatment and analgesics
- Discard animal infected with brucella or TB through slaughter

Abnormalities and Affections of Prostate Gland

- **Utricle of the prostate:** Hereditary abnormalities affecting the pars disseminata of the prostate gland in which remnant of Mullerian ducts are present
- **Hyperplasia :** Rarely observed
- **Inflammation :** Rarely observed
- **Atrophy :** Rarely observed but can accompany bilateral castration or severe affections of both testes due to lack of testosterone hormone

Abnormalities and Affections of Bulbo Urethral Glands

- Rarely occurred due to their location and their complete covering with the bulbocavernosus muscle
- Sometimes pyaemic infection may accompany general pyaemia of the animal