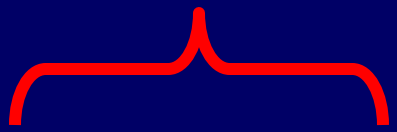
Urogenital system



Urinary System — **Excretion of fluid wastes**

Genital System — **Reproduction**

Urinary system

- Kidneys
- Ureters
- Urinary bladder
- Urethra

Male urethra

Internal urethral orifice

- Musculomembranous tube.

-Through which urine is discharged.

- It extends from the internal urethral orifice at the neck of the bladder to external urethral orifice at the end of the penis.

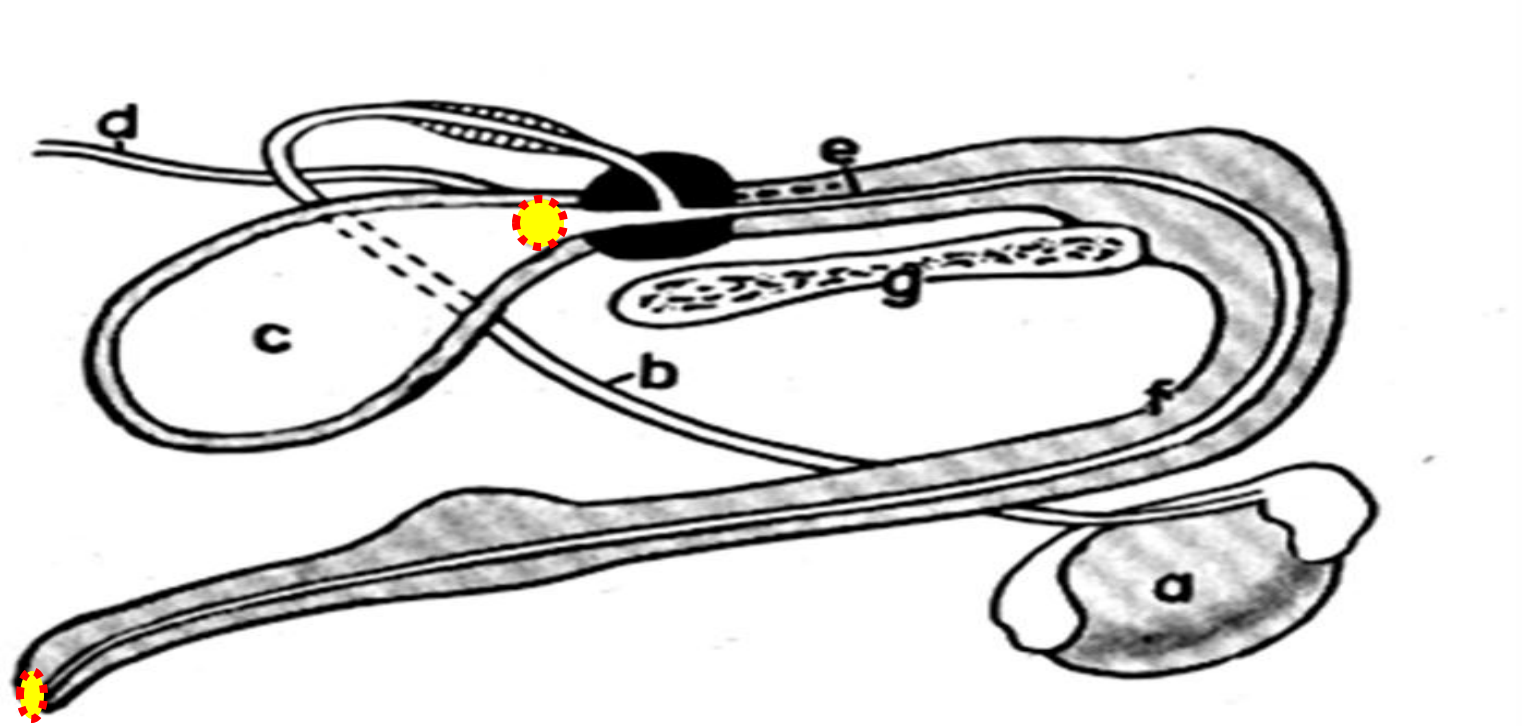


Fig. 448 (Dog)

Classification of urethra:

I- According to its content:

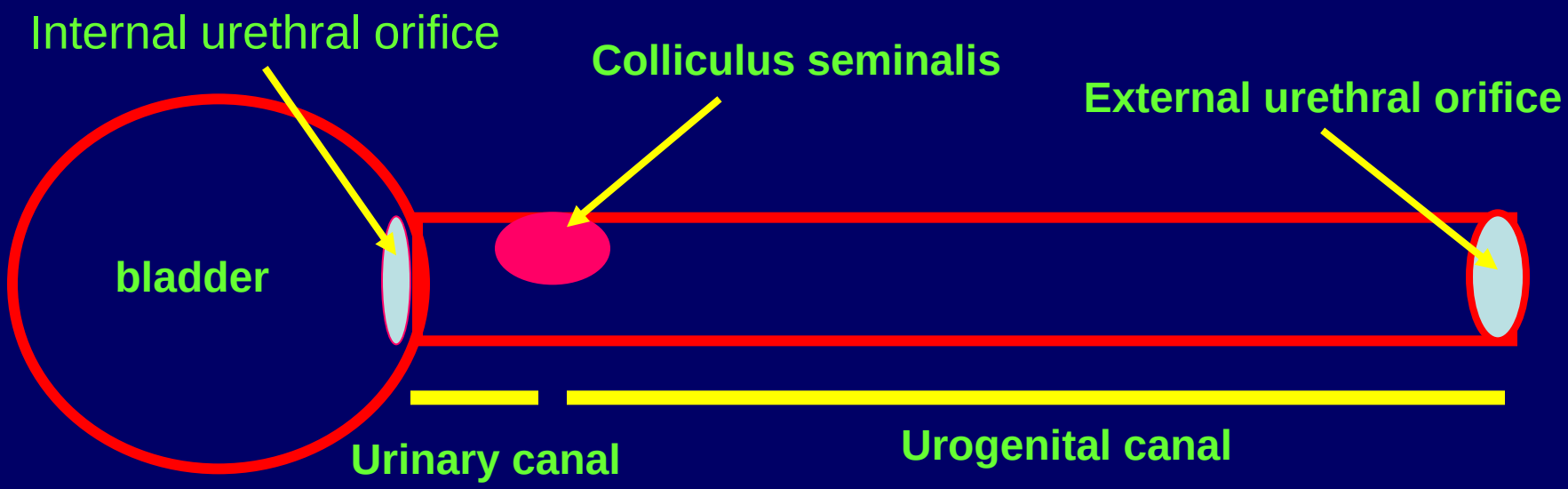
1) Urinary canal or proper urethra or preprostatic:

- extends from the neck of the bladder to colliculus seminalis. C.S. an internal prominence caudal to internal uretheral orifice in the dorsal wall of pelvic urethra.
- it convey only urine.

2) Urogenital canal :

- extends from C.S. to external urethral orifice

- it convey urine and semen



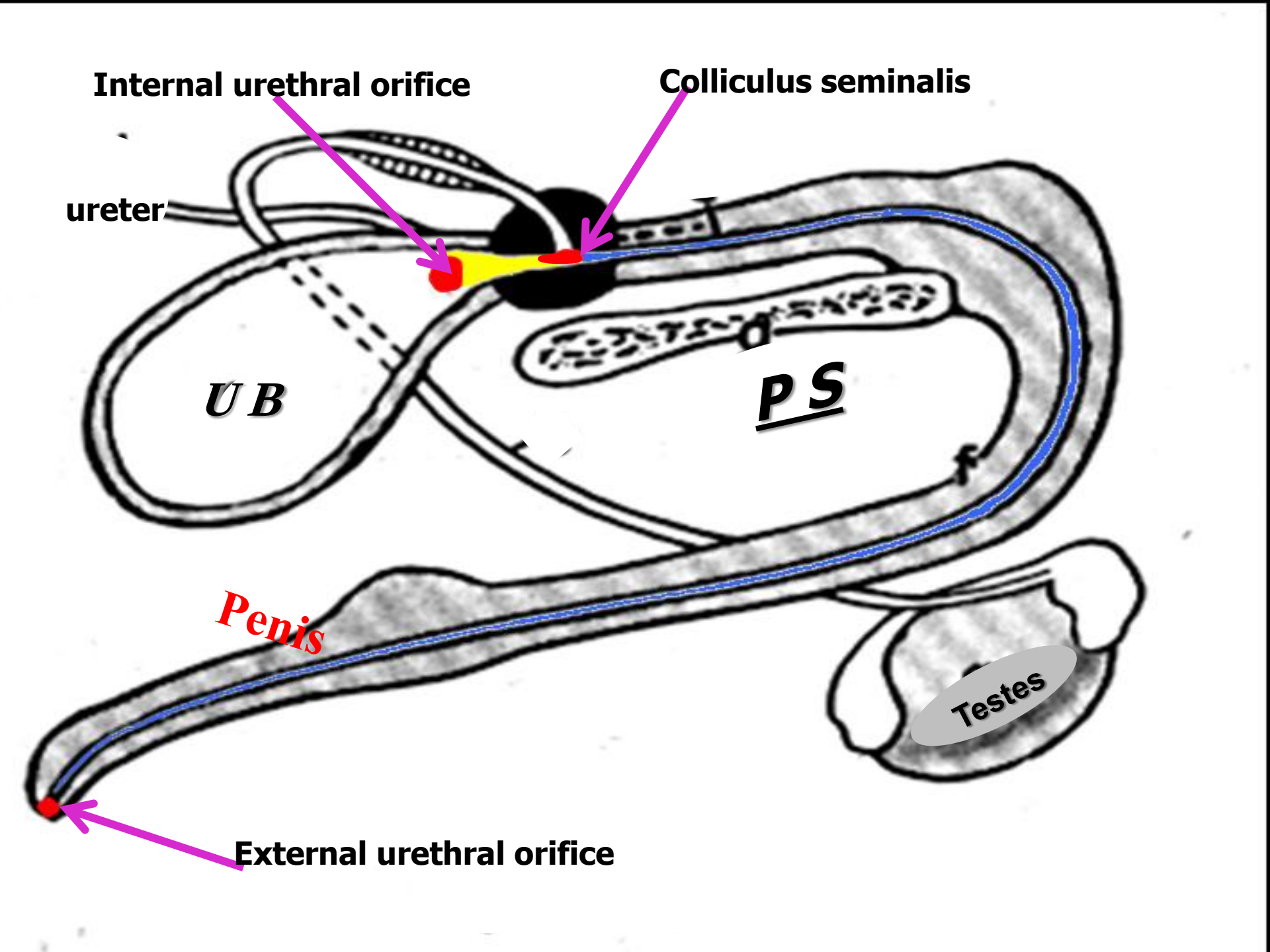
II- According to its position:

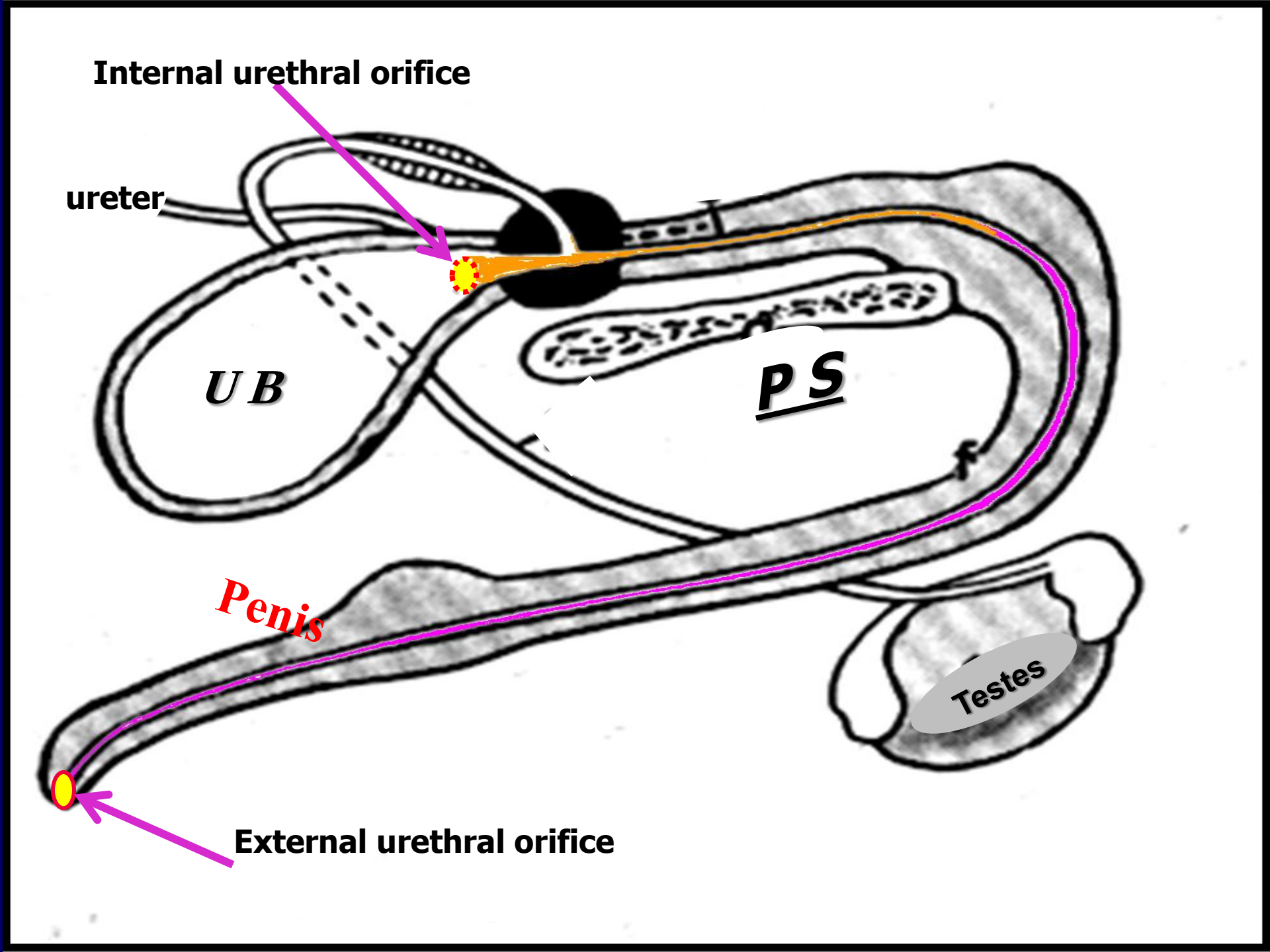
1) Pelvic urethra:

- extends from internal urethral orifice to ischial arch.
- It lie within pelvic cavity

2) Penile urethra (spongy):

- extends from ischial arch to external urethral orifice.
- It lie within penis


Internal urethral orifice
Colliculus seminalis
ureter
UB
PS
Penis
Testes
External urethral orifice


Internal urethral orifice
ureter
UB
PS
Penis
Testes
External urethral orifice

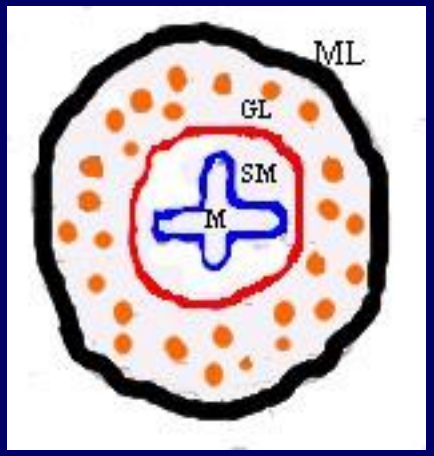
Structure of male urethra:

1-Mucous layer: lined by transitional epithelium

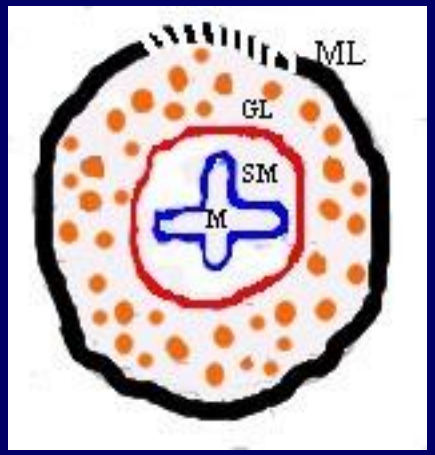
2-Submucous layer: consists of veins, forming vascular layer or cavernous of urethra

3-Glandular layer: contains prostatic tissue

4-Muscular layer: consists of thin inner and thick outer layer of s.m.f



Dog& goat



Sheep,pig,ox,horse

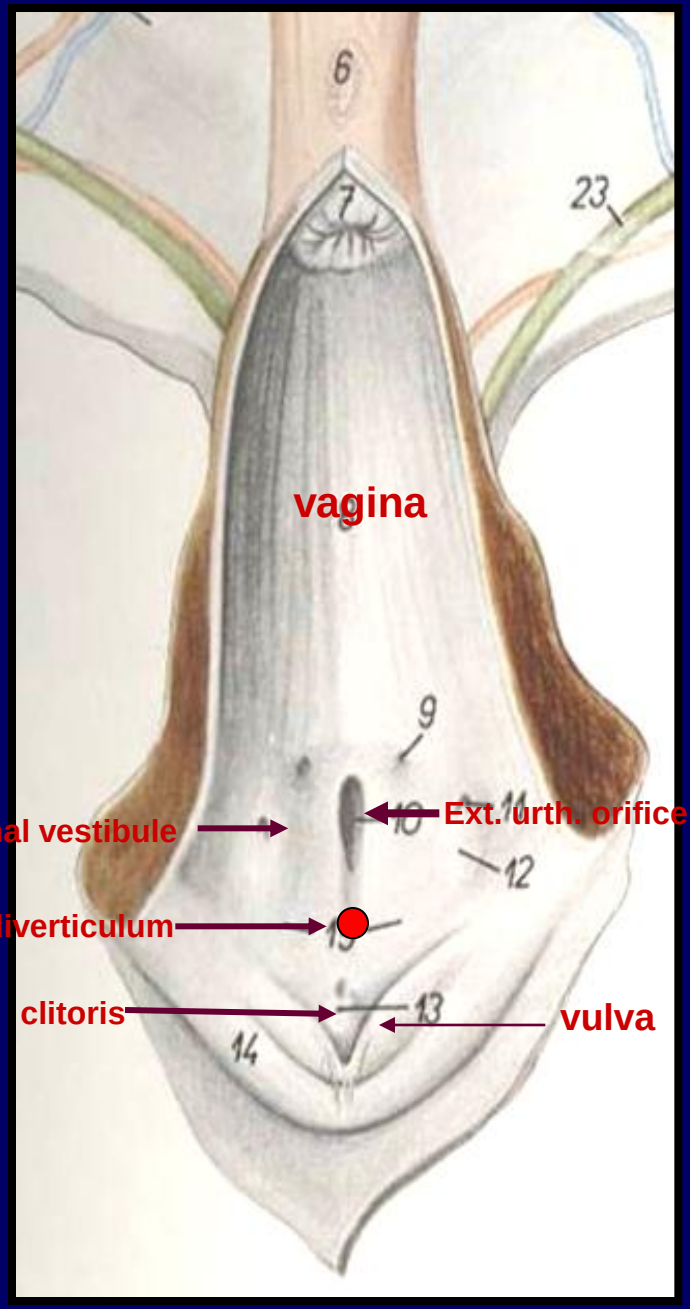
	Dog	Pig	Ox	Small ruminant	Horse
Urethral M.	Completely surrounds the pelvic urethra	Absent dorsally	Absent dorsally	Goat as dog Sheep as ox	Absent dorsally
Disseminate part of prostate	Present	Present	Present	Present	Absent
Colliculus seminalis	Elongated	rounded	Elongated	Elongated	Rounded
External urethral orifice	Apex of glans penis	At pointed free end of the penis	Apex of glans penis	Free end of the urethral process	Apex of the urethral process

Female urethra

= Acts only as urinary passage, called urinary canal.

=Extends from the internal urethral orifice at the neck of the U.B to the external urethral orifice between the vagina proper and vaginal vestibule.

= Is median in position & related dorsally to vagina and ventrally to pelvic symphysis.

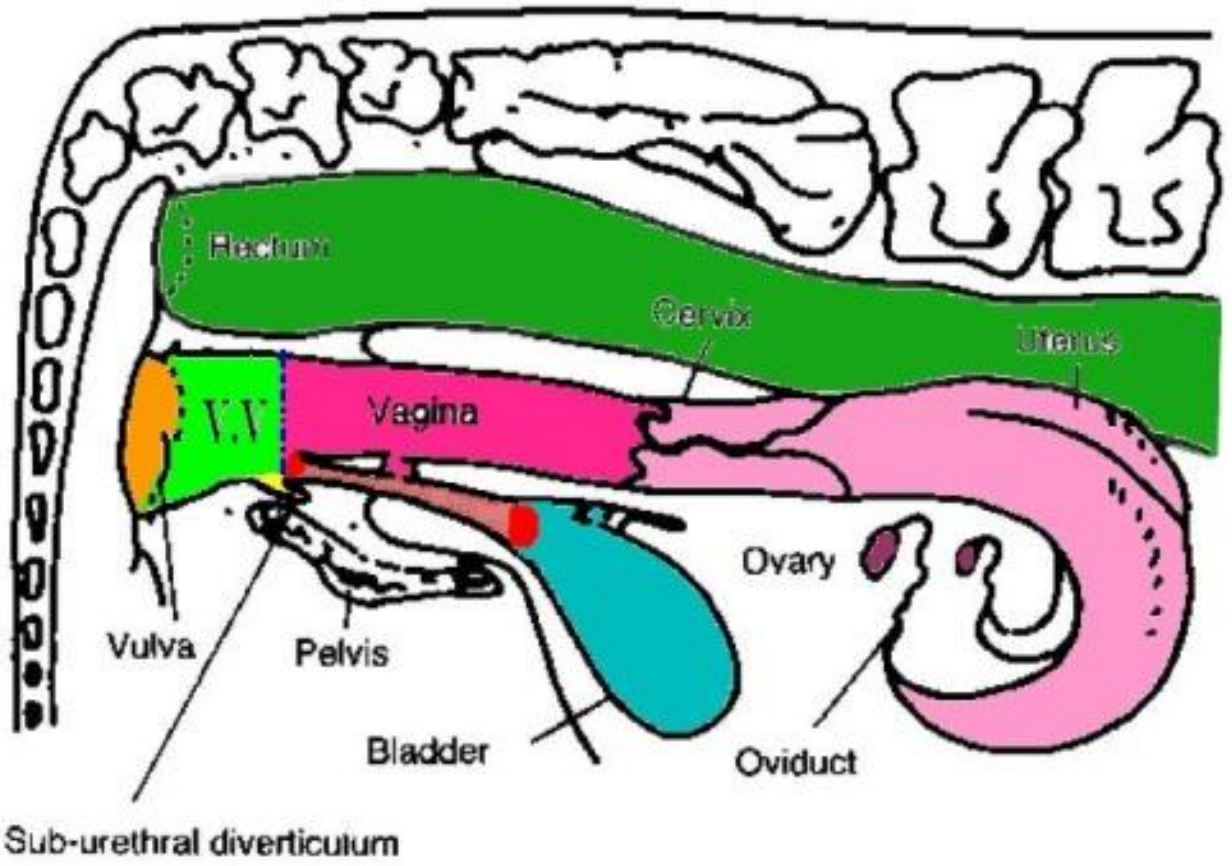


= Wall consists of 3 layers: muscular, cavernous and mucous lined by stratified squamous epithelium.

=In cow, sow and she-camel there is a small blind pouch (depression) caudoventral to the external urethral orifice, called suburethral diverticulum.

Reproduction - Female

- **Anatomy: Cow Tract Side View**



GENITAL SYSTEM

- Male Genital System
- Female genital System

Male Genital System

1- Testicles (testes)

2- Epididymis

3- Ductus deferentes (vas deferens)

- spermatic cord
- scrotum
- vaginal tunics

4- The penis

5- Accessory genital glands

6- The male urethra

The Testes

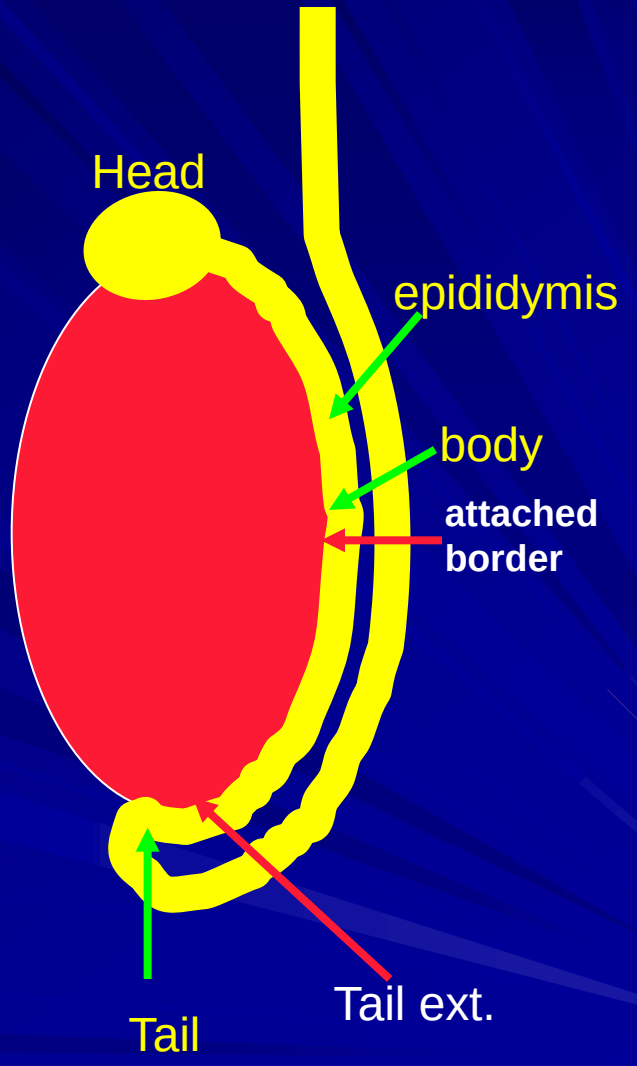
- Present in the scrotum.
- Suspended by spermatic cord.
- **Functions of testis:-**

A-Exocrine F.

-Production of sperms by Seminiferous tubules.

B-Endocrine F.

-Production of testosterone hormone by interstitial cells.



Position of the testis:-

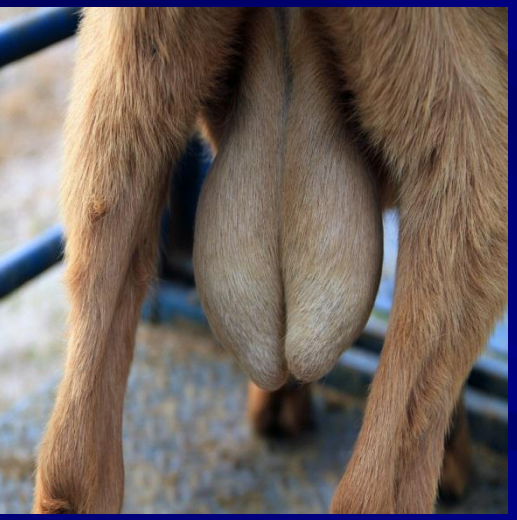
A- Intraabdominal: in few mammals as elephant

B- Extra abdominal: in domestic animals.

1-In the inguinal region ⇨ *in ruminants*

2-Prepupic region ⇨ *in equines*

2-In the perineal region ⇨ *in cat, dog, pig and camel .*

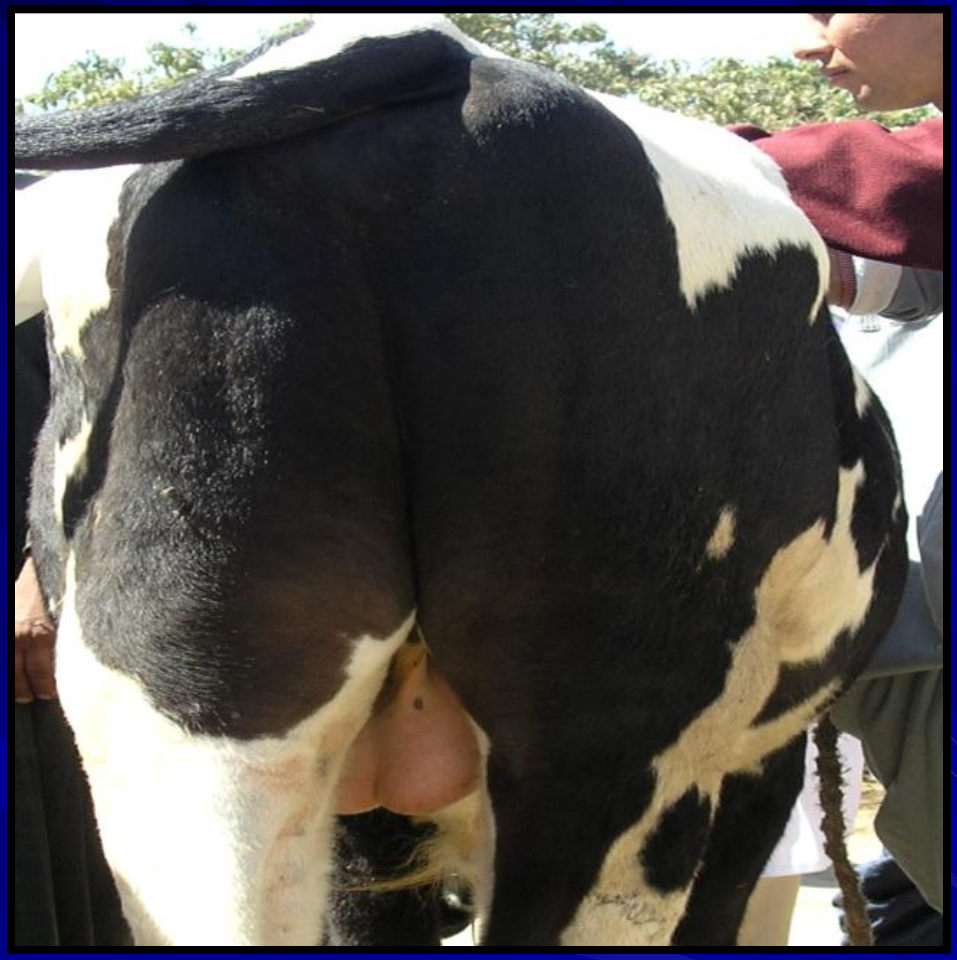


Billy goat

Boar

Camel

stallion



Bull

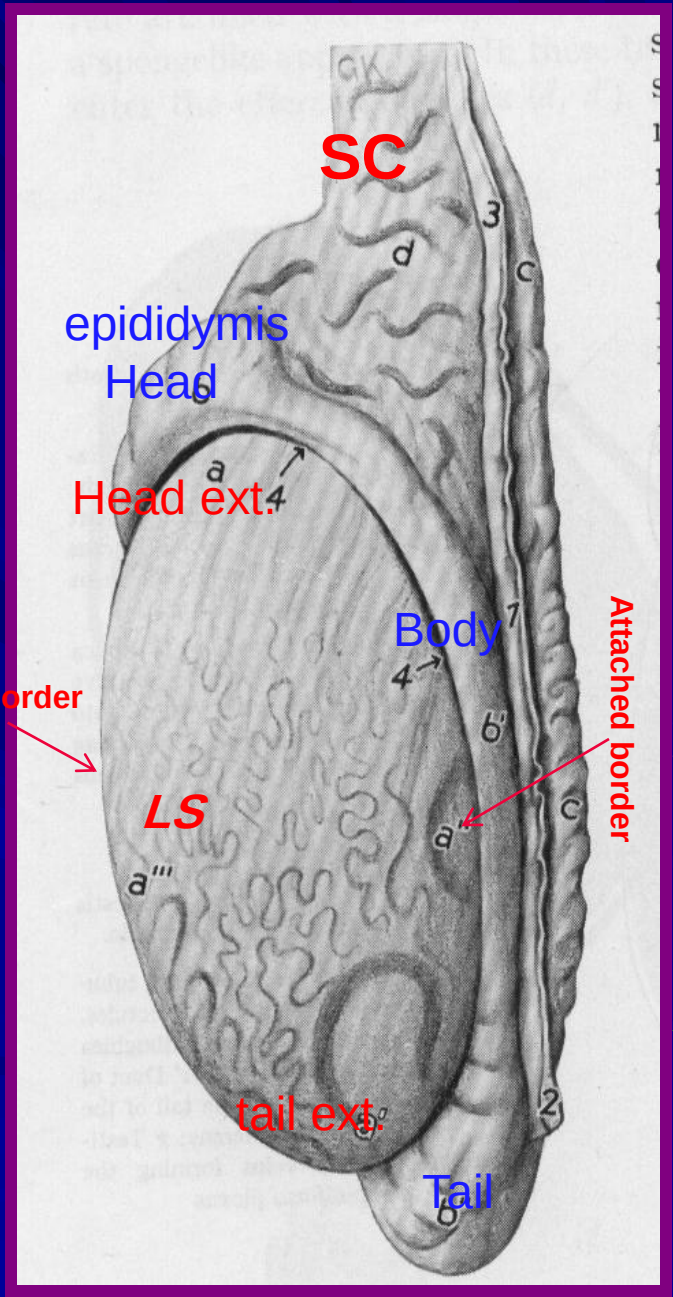
Anatomical description:-

* 2 surfaces (medial & lateral)

  Smooth and convex

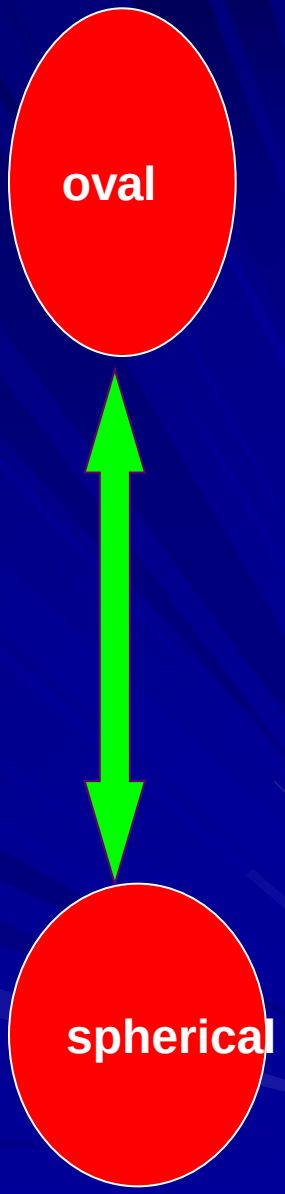
* 2 borders (free and attached or epididymal)

* 2 extremities (head and tail)



Shape, size & weight:-

- Testes are generally oval in shape.
- They vary in size and weight according to species:



A- They are relatively large:

In ram, billy goat and boar .

B- They are relatively small:

In canines, equines and ox.

C- They are subjected to seasonal variation :

camel

Structure of the testis:

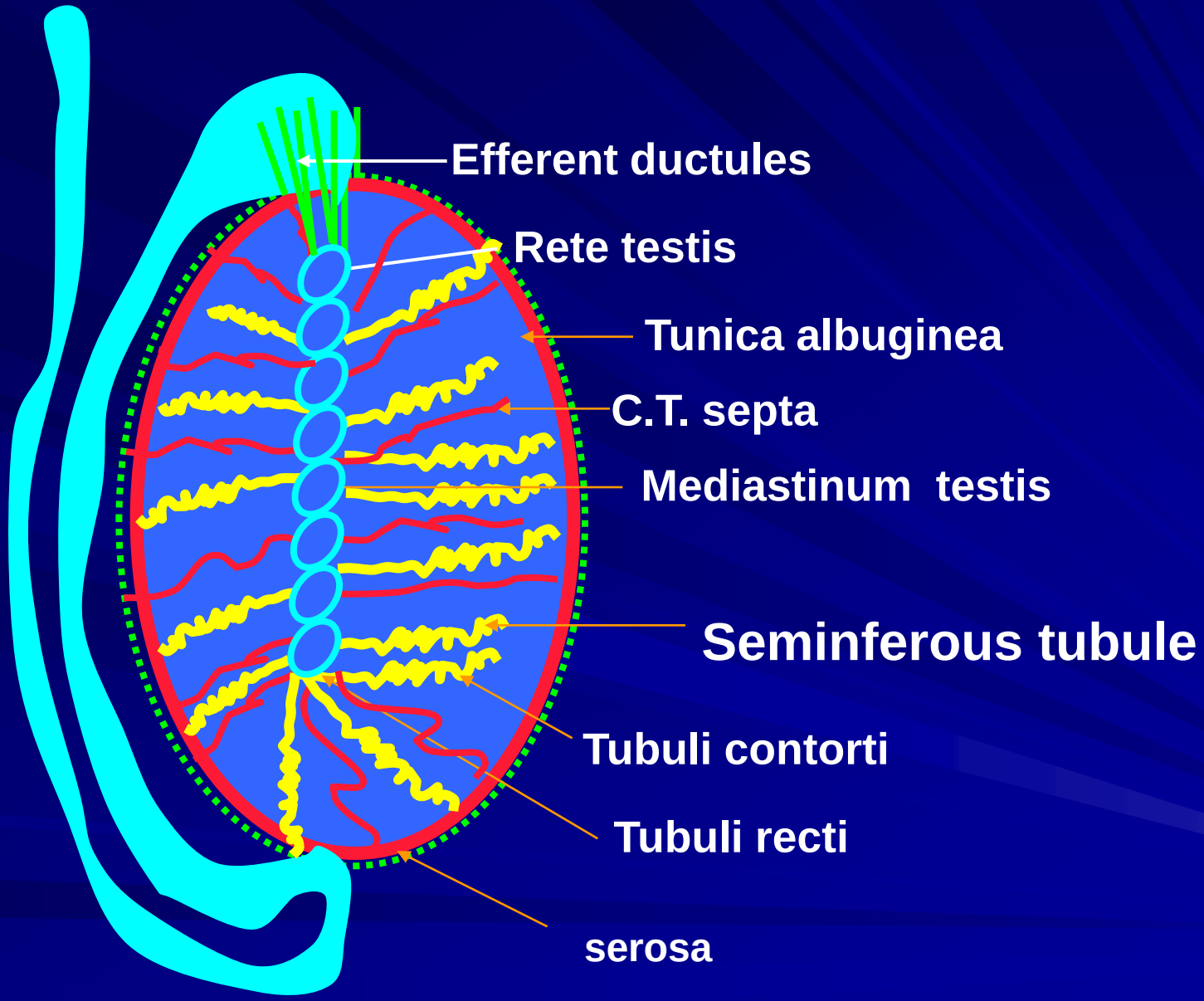
- The testis is covered by:
  1-Visceral layer of vaginal tunic
  2-Tunica albuginea (white coat)

The albuginea: is firm, fibrous capsule (not elastic) holds testis under pressure.

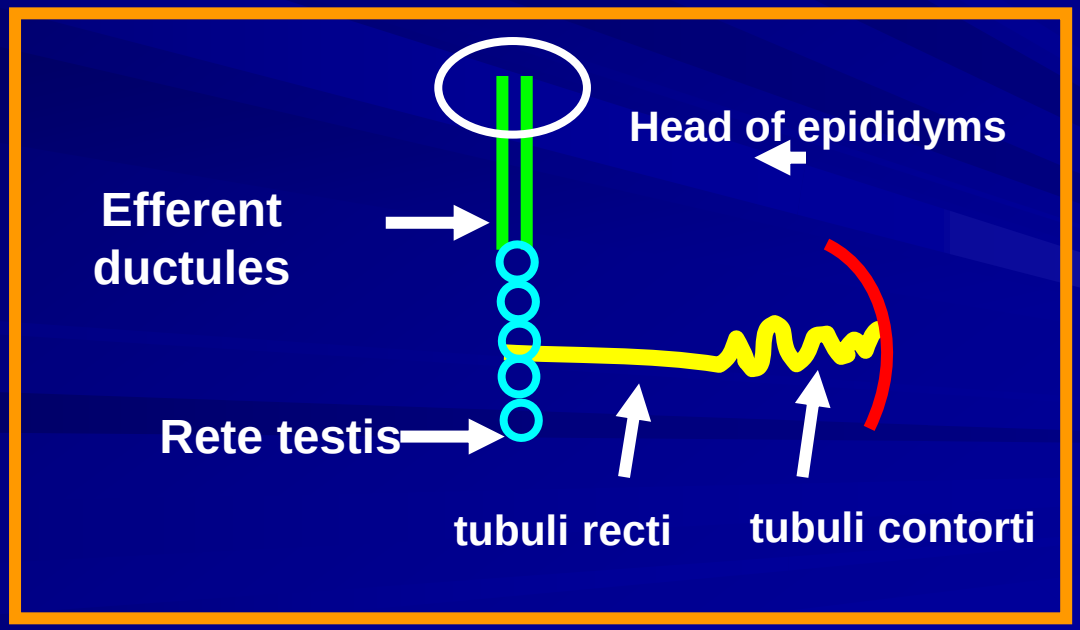
- C.T. septae extend from tunica albuginea into the interior of testis.

- The septae unite to form mediastinum testis which is mass of c.T. contains numerous tubules (rere testis).
- The septae divide the testis into lobules.

- Each lobule contains small number of seminiferous tubules.


Efferent ductules
Rete testis
Tunica albuginea
C.T. septa
Mediastinum testis
Seminferous tubule
Tubuli contorti
Tubuli recti
serosa

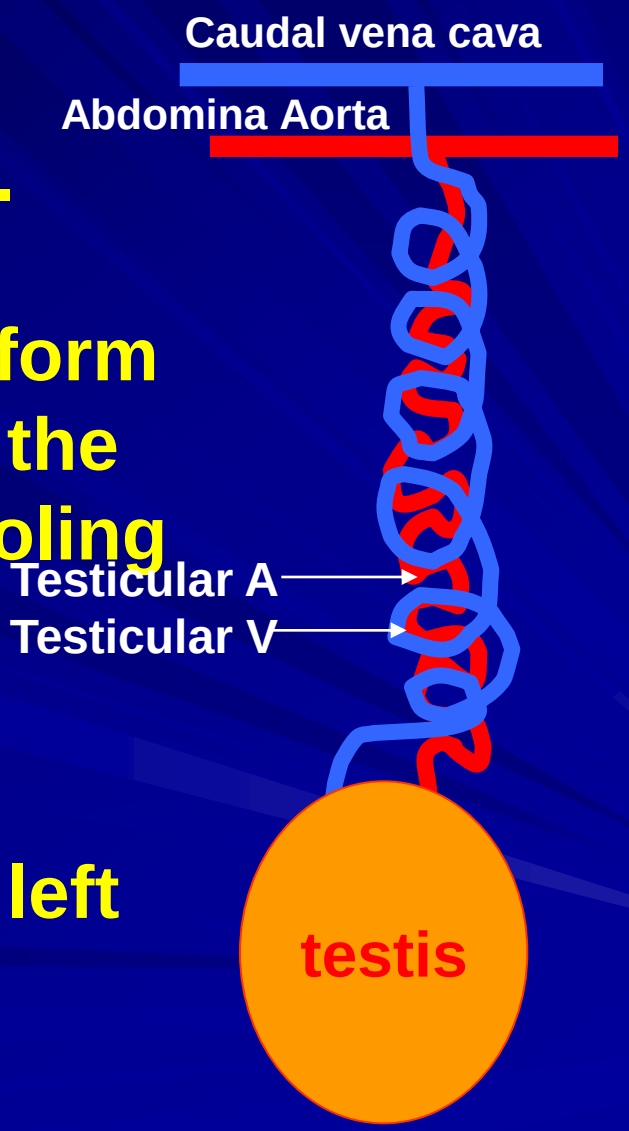
- **Each seminiferous tubule consists of:-**
  - **1-tortuous part (tubuli contorti).**
  - **2-straight part (tubuli recti).**
- **The straight parts connect with the rete testis.**
- **The rete tubules carry sperms toward the head extremity and they leave the testis through efferent ductules.**



Blood supply of the testis:

1- Testicular artery (coiled) originates from abdominal aorta.

2- Testicular vein forms pampiniform plexus surrounding the coils of the artery. Thus the vein helps in cooling the blood of the artery



• Testicular vein joins the caudal vena cava on the right side and left renal vein on the left side.

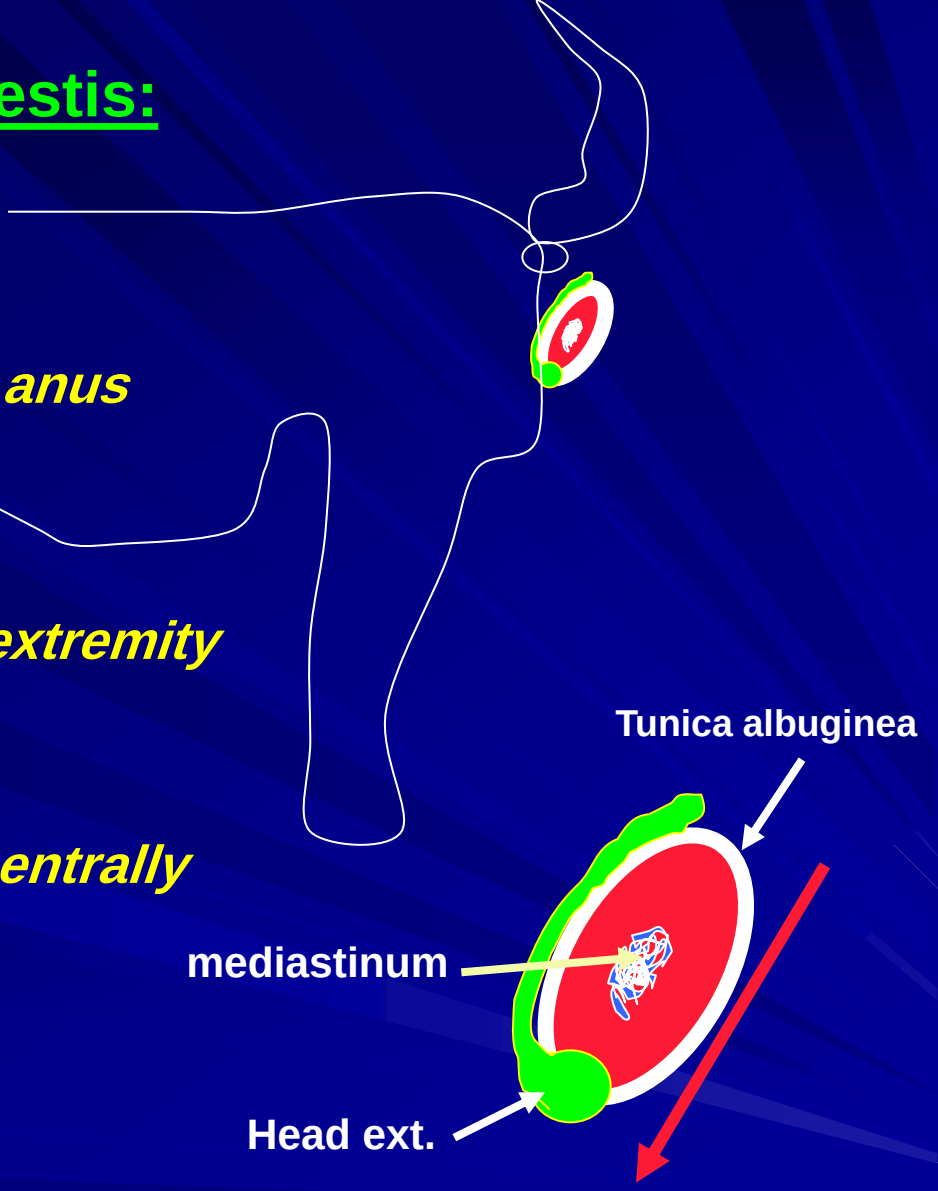
testis	Dog	Pig	Rum.	Horse	Camel
Postion	perineal R. close to the anus	In middle of perineal R.	inguinal region	prepupic region	perineal R. ,4-6 cm below anus
Shape	oval	elliptical	long oval in L.R. More spherical in S. R.	ovoid	ovoid
Size	relatively small	relatively large	R. small in L.R, R. large in S.R.	relatively small	subjected to seasonal varation
Weight	10-15 gm.	400 gm	250-300 in ox 200-300 in sheep, 145-150 in goat	150-300 gm	225 gm in breeding S. 60 gm in non breeding S.

testis	Dog	Pig	Rum.	Horse	Camel
Long axis	oblique	slightly oblique	vertical	horizontaL (longitudinal)	oblique
Head extremity	directed Cranio Ventrally	Cranio ventrally	dorsally	cranially	Cranio ventrally
Epididymal border	Craniodorsal	Cranio dorsal	Medial in L.R Caudomedial in billy goat Caudal in ram	dorsal	Cranio dorsal
Mediastinum testis	distinct axially	distinct axially	distinct axially	Present in head extremity	distinct axially
Tunica	Thick&	Elastic &	Elastic & no	Strong	Thick

Comparative features of the testis:

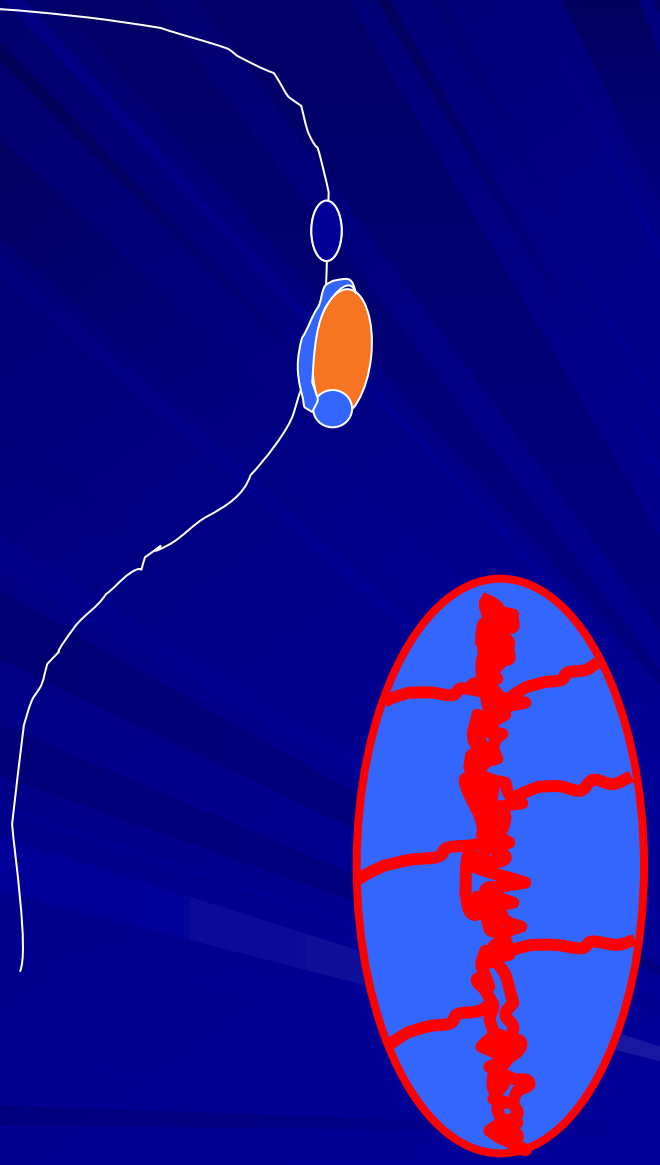
Canines:

- *In the perineal region close to the anus*
- *Oval in shape and relatively small*
- *Oblique in position and the head extremity points craino-ventrally.*
- *Mediastinum is well distinct and centrally located.*
- *Weight about 10-15 gm.*
- *Tunica albuginea is thick and inelastic.*



Swine:

- In the middle of the perineal region
- Elliptical in outlines & relatively large
- The tail ext. is close to the anus
- The epididymial border lies against the caudal thigh muscles
- The septa are distinct and the mediastinum is axially placed.
- Weight about 400 gm.
- Tunica albuginea is more elastic

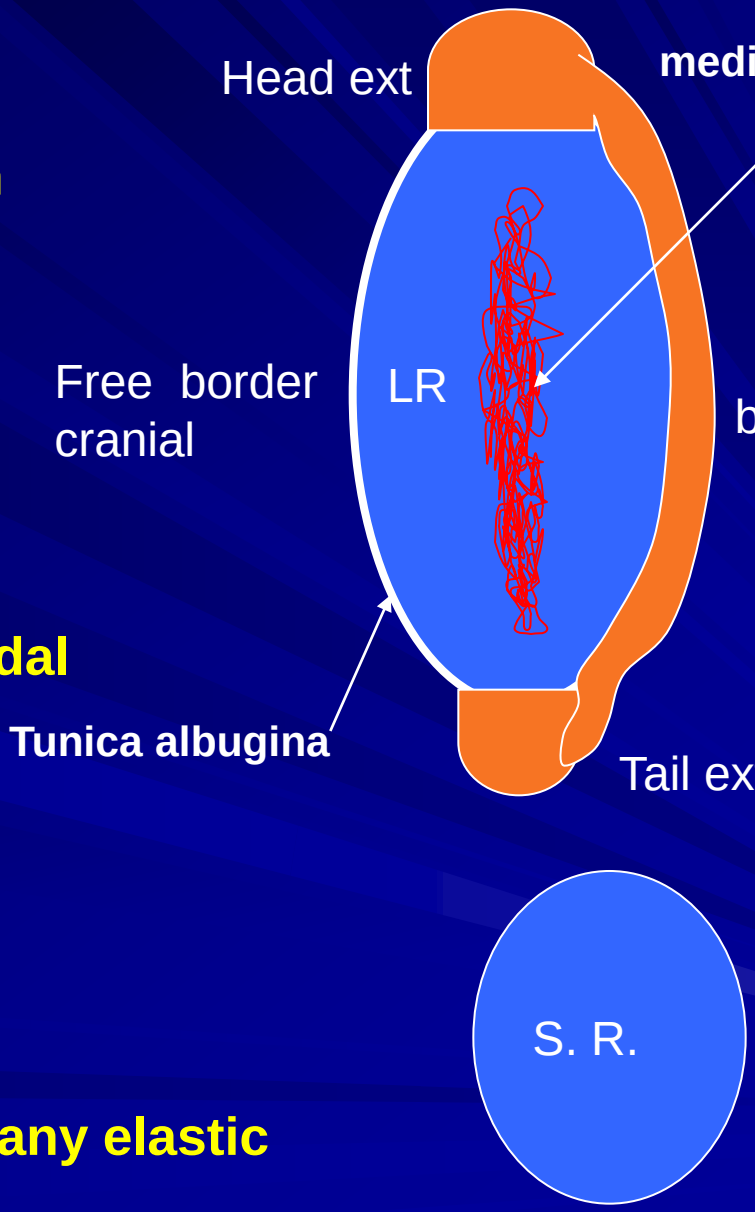


Ruminants:

- Situated in the inguinal region
- Long-oval in L. R.
- Spherical in S. R.
- Long axis is vertical
- Head ext. dorsally
- The epididymial border is caudal
- Mediastinum is well distinct
- Weight 250-300 gm in ox

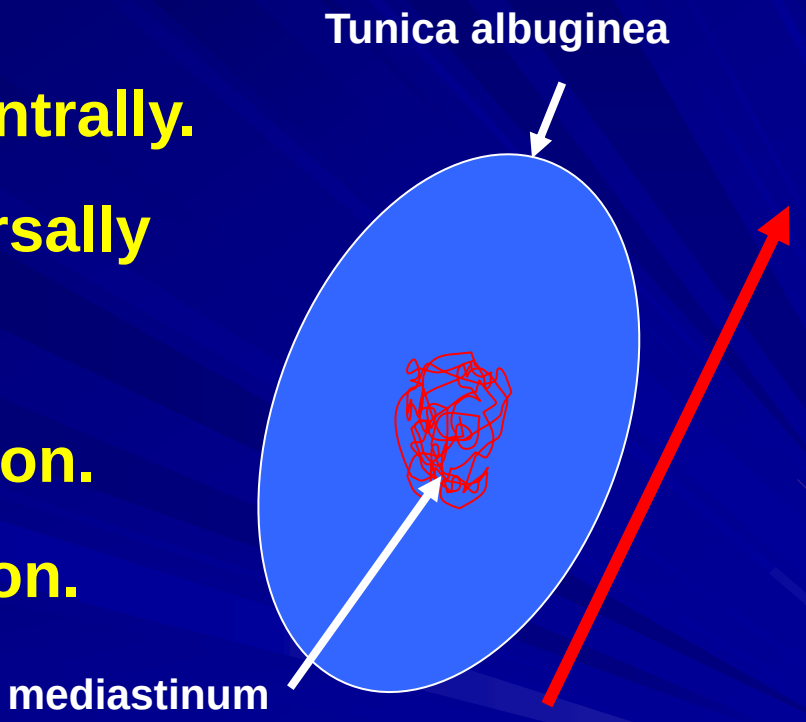
  200-300 gm in sheep

  145-150 gm in goat
- Tunica albugina is thin with many elastic fibers



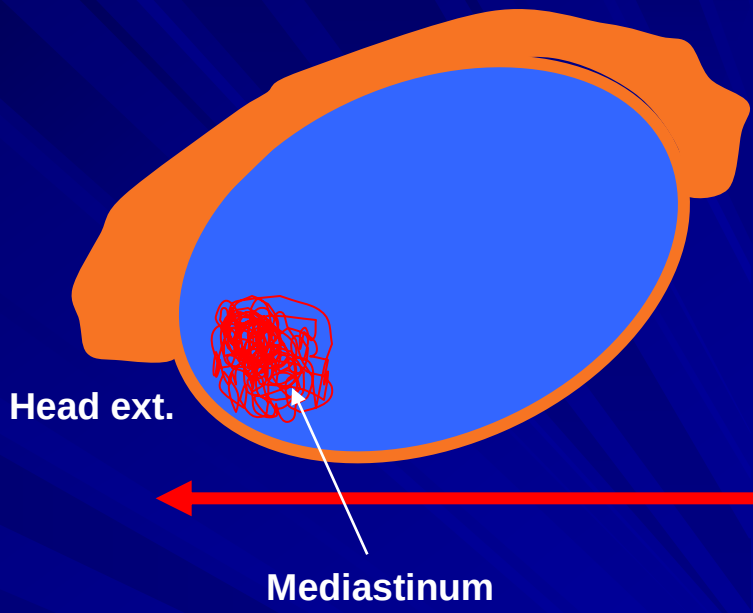
Camel:

- In perineal region, below the anus.
- Ovoid in form.
- Mediastinum is distinct and centrally.
- Long axis is oblique caudo-dorsally
- Weight:
  - 225 gm in the breeding season.
  - 60 gm in non breeding season.



Equines:

- Located in the repubic region.
- Ovoid in form.
- Long axis is nearly longitudinal.
- Head ext. cranially.
- Epididymial border dorsally.
- Mediastinum confined to head ext.
- Weight 150-300 gm
- Tunica albuginea is strong capsule (composed of dens fibrous C.T. and smooth muscle fibers).

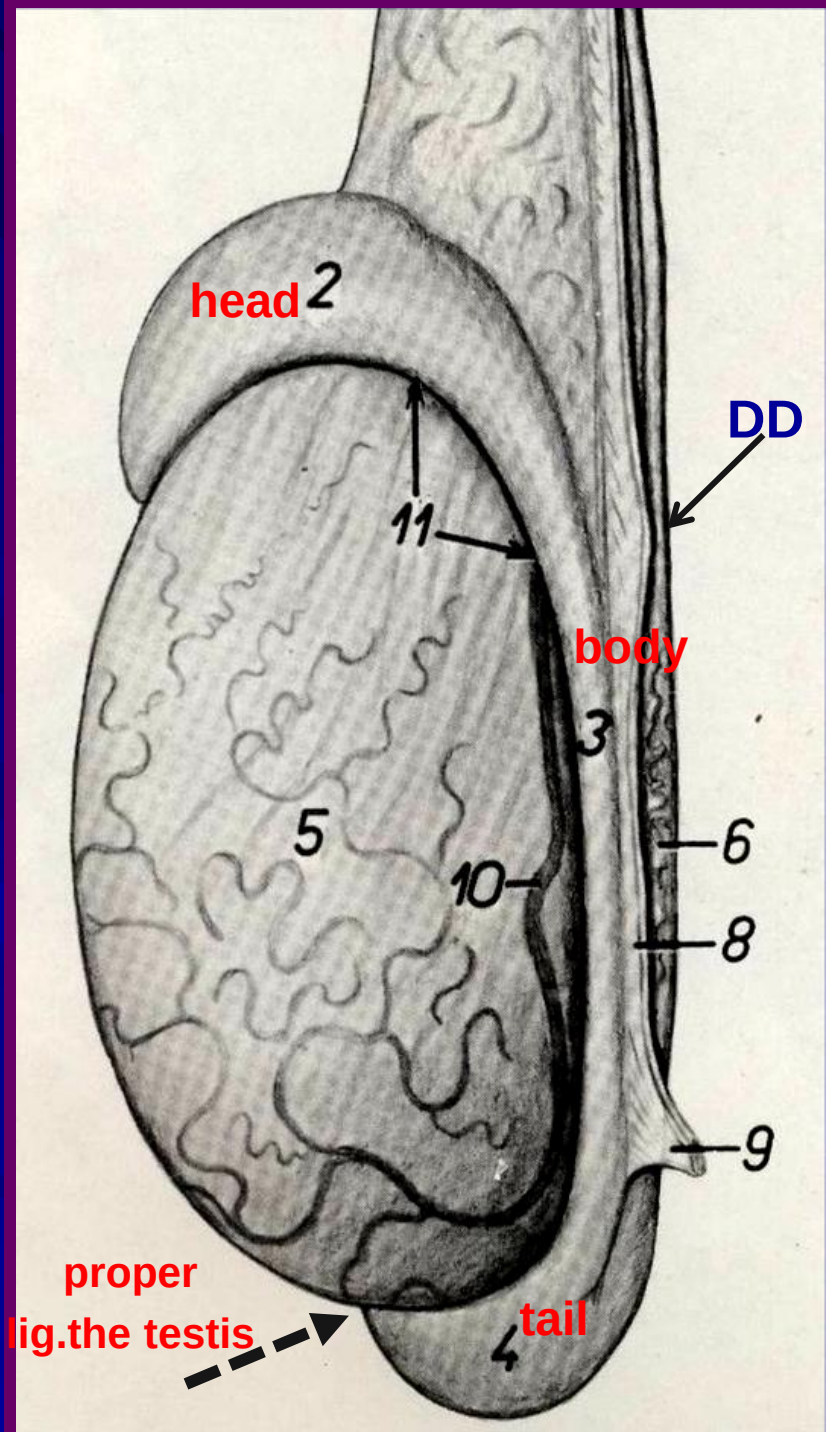


The Epididymis:

- It is very long highly tortuous canal.
- Attached to the testis along the epididymial border.

Function :-

- Storage , maturation and transportation of sperms.



Parts of epididymis :

It consists of:

1-Head: consists of number of efferent ductules (15-20) which unite to form epididymal duct that continues with D.D. at tail of epididymis.

2- Body: extends along the epididymal border of the testis. Testicular bursa (opens laterally) is formed between them.

3-Tail: is the caudal (distal) spherical part of epididymis.

It is fixed by two ligaments into :

A-The tail extremity of testis by proper ligament of testis.

B-The parietal layer of vaginal tunic by ligament of the tail of the epididymis.

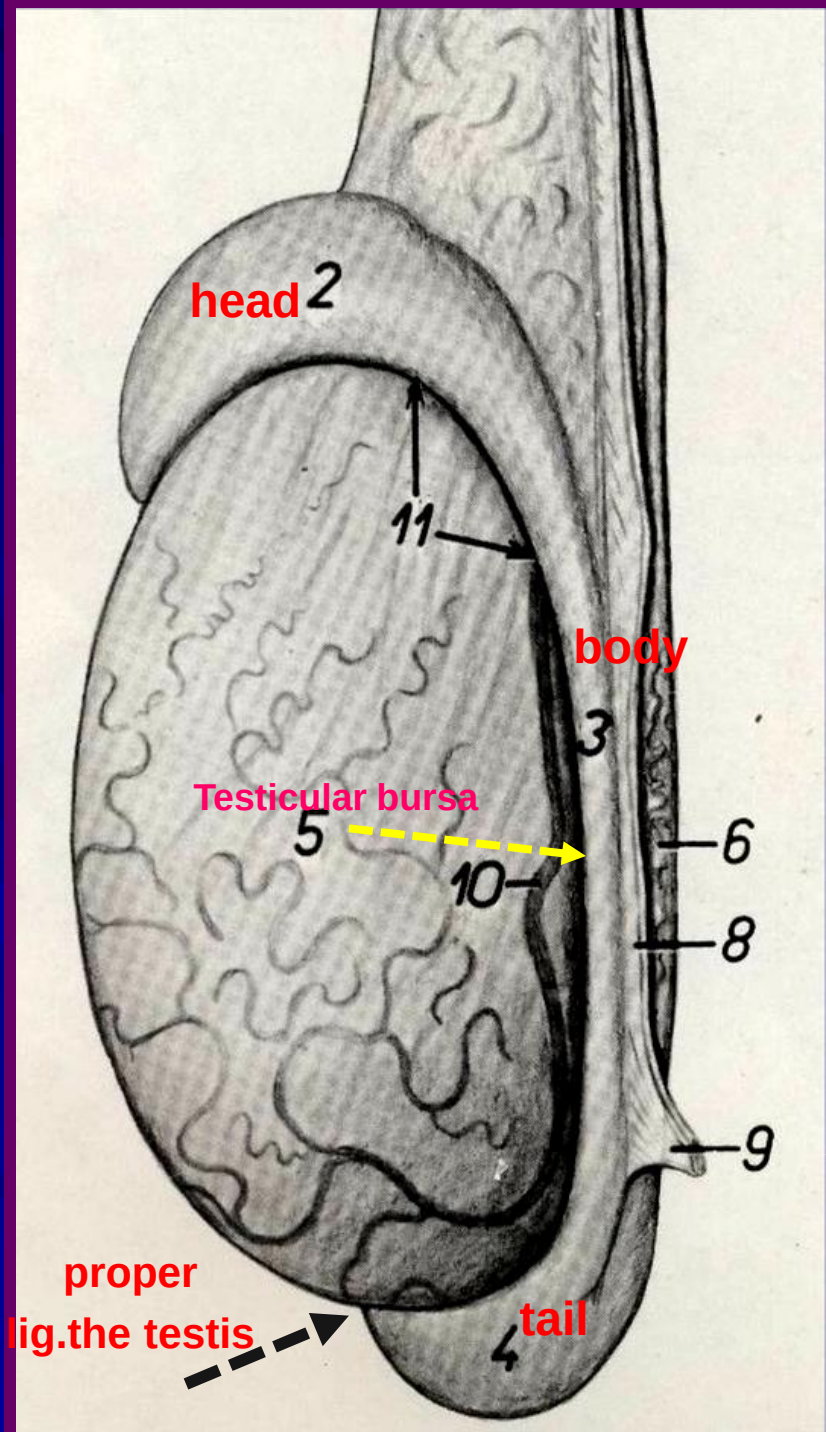
Fixation of epididymis :

a) **Head →**

is fixed to head of testis by efferent ductules

a) **Tail →**

is fixed by 2 ligaments as mentioned before.

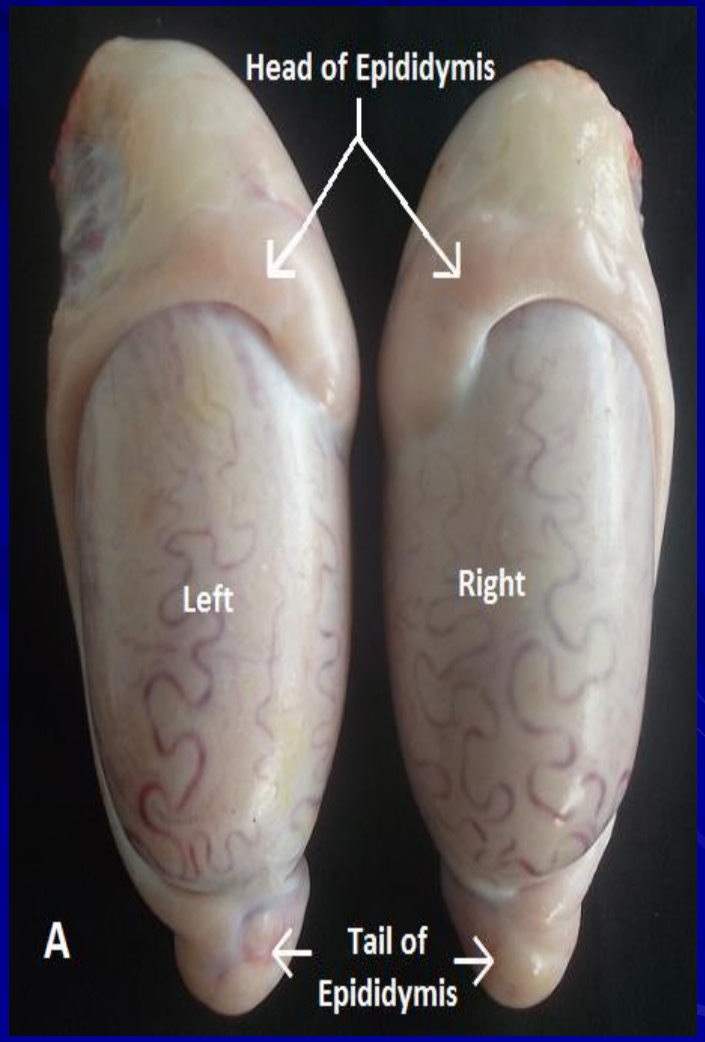


Length of epididymis :-

It has very long tortous canal extends from 2 meters in cat to 75 meters in horse .

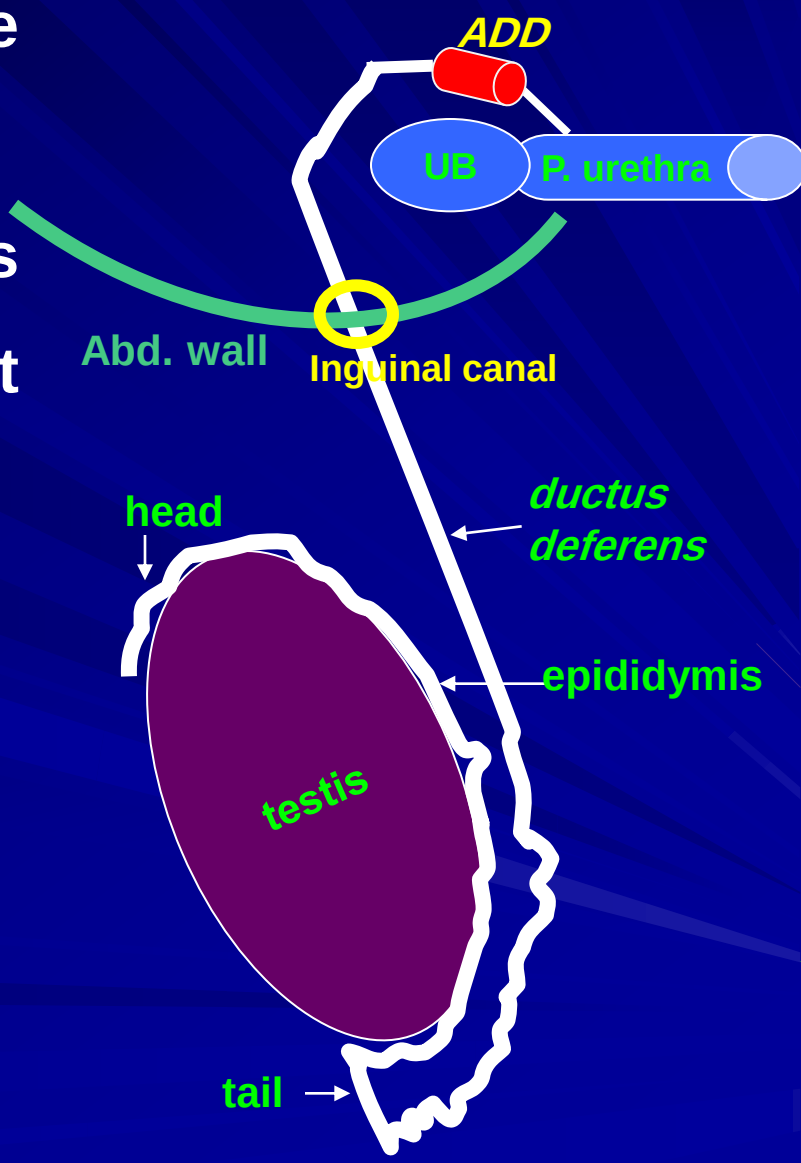
Epididymis in ruminants:

- Its head forms a cap-like structure, which extends down the cranial border of testis to about 1/4 of its length.
- Its tail is rounded & directed slightly caudally. It can be easily palpated through the scrotum.



Ductus deferens:

- It extends between tail of the epididymis and pelvic urethra.
- It is a tortuous duct at its beginning and becomes straight gradually.



Course of D.D:

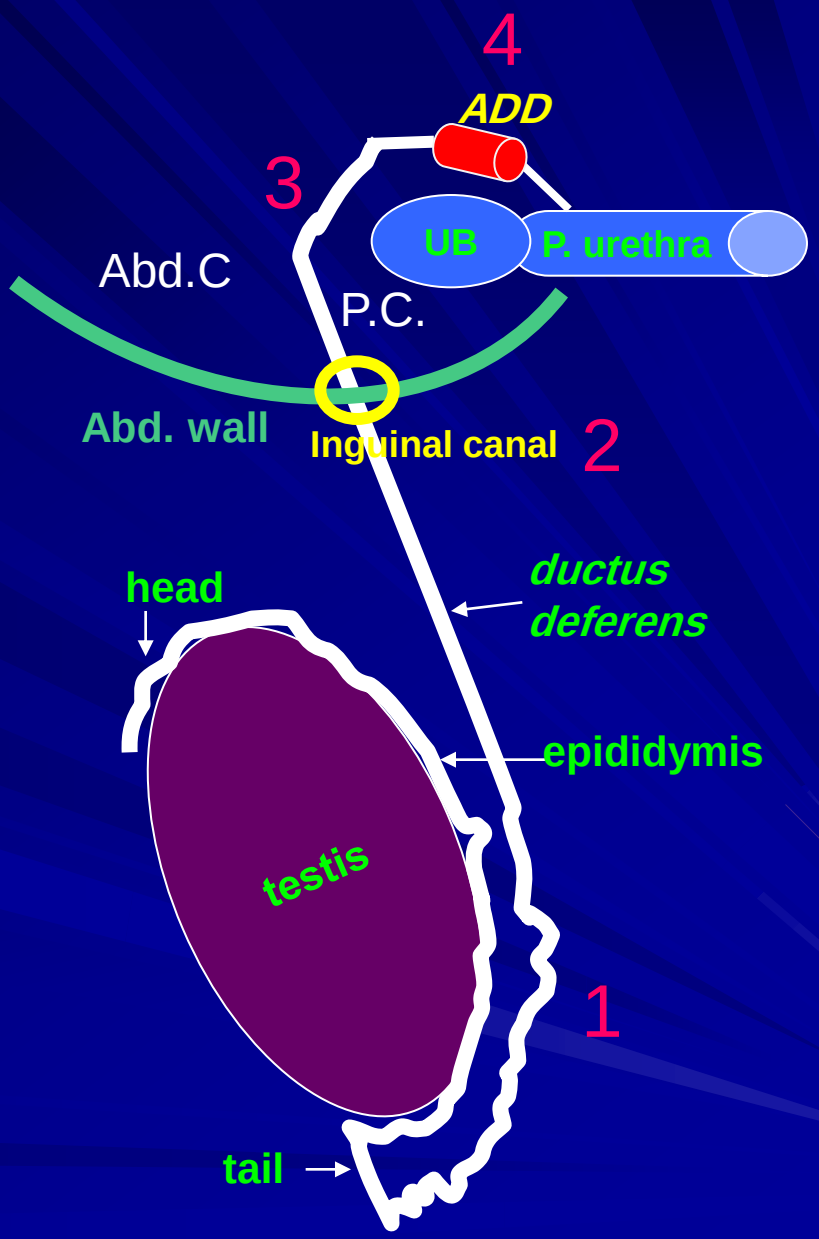
1.It extends along the testis medial to epididymis

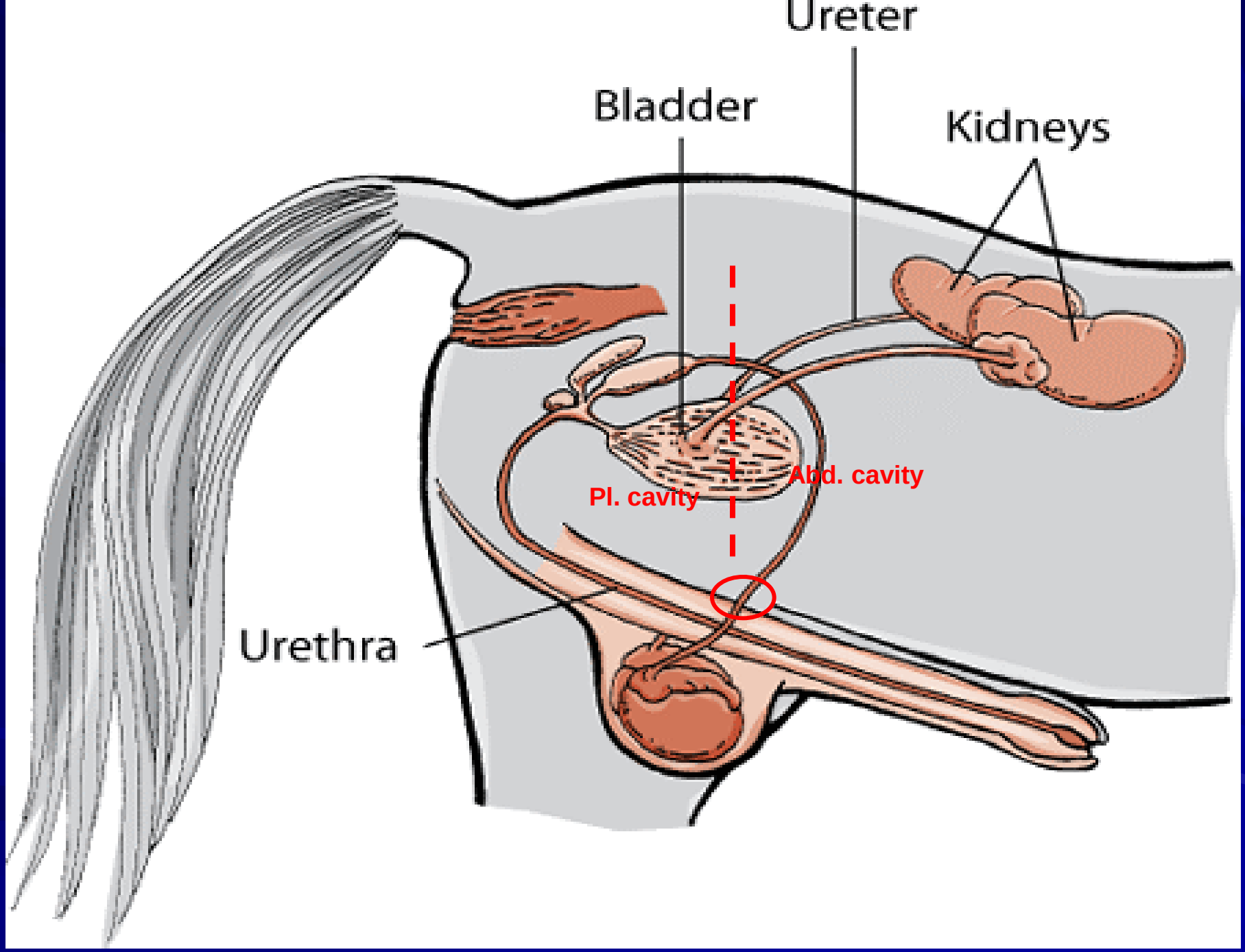
2.Then passes through inguinal canal as component of the spermatic cord.

It is located at the medial side of the spermatic cord.

3-Then enters the abdominal cavity through vaginal ring and turns caudally toward the pelvic inlet.

4- In the pelvic cavity the two ducts enter the genital fold, where they converge toward the pelvic urethra .




Ureter
Bladder
Kidneys
Pl. cavity
Abd. cavity
Urethra

Termination of ductus deferens

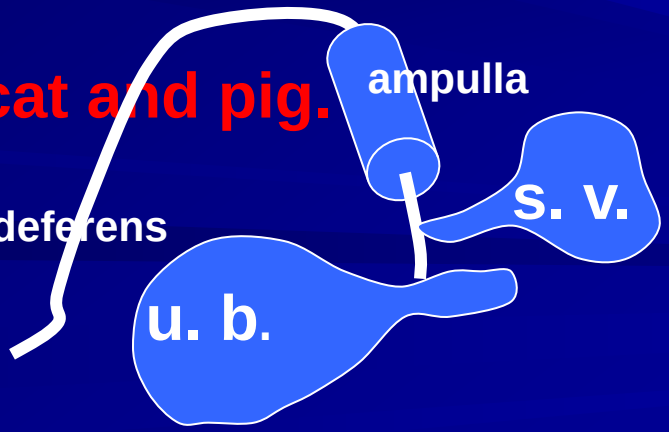
•Near the end its wall thickens to form ampulla ductus deferens

Ampulla is:

= well developed in equines and ruminants.

= poorly developed in dog and camel

= absent in cat and pig.



1-In equines and ruminants: the duct of the ampulla unites with duct of vesicular gland →ejaculatory duct → opens in colliculus seminalis.

2- In pig: the ductus deferens and the excretory duct of vesicular gland open separately.

3- In dog: there is No vesicular gland so that the ductus deferens enters the pelvic urethra alone.