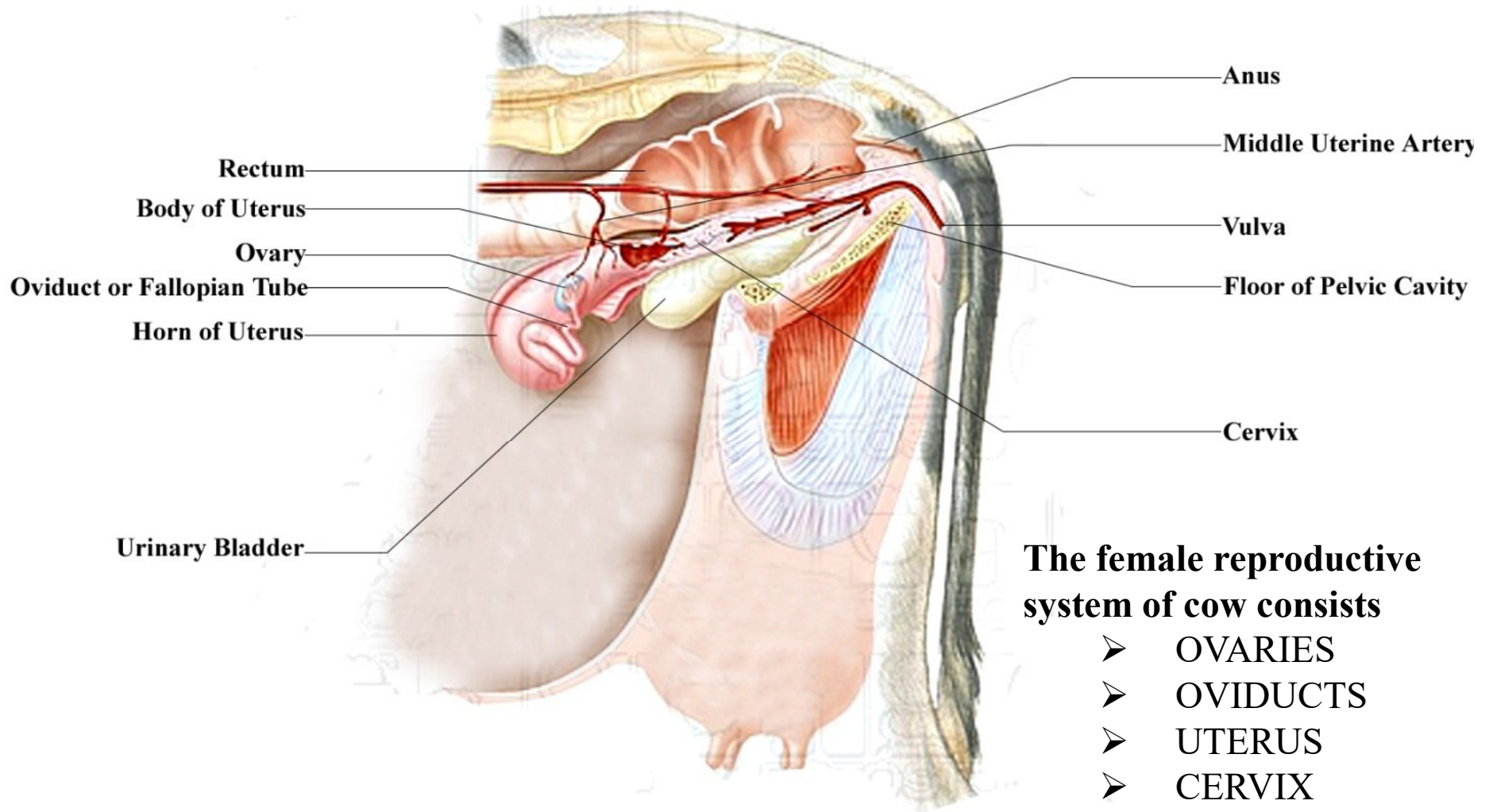


**ANATOMY  
OF  
FEMALE REPRODUCTIVE  
SYSTEM**



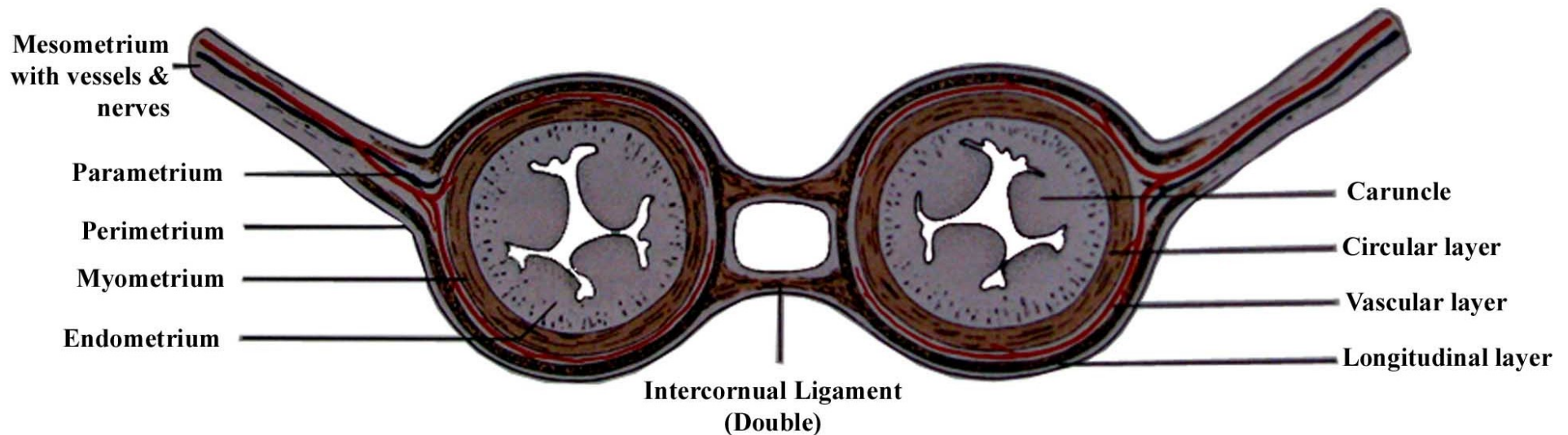
**Reproductive System of Cow**

**The female reproductive system of cow consists**

- OVARIES
- OVIDUCTS
- UTERUS
- CERVIX
- VAGINA
- VULVA

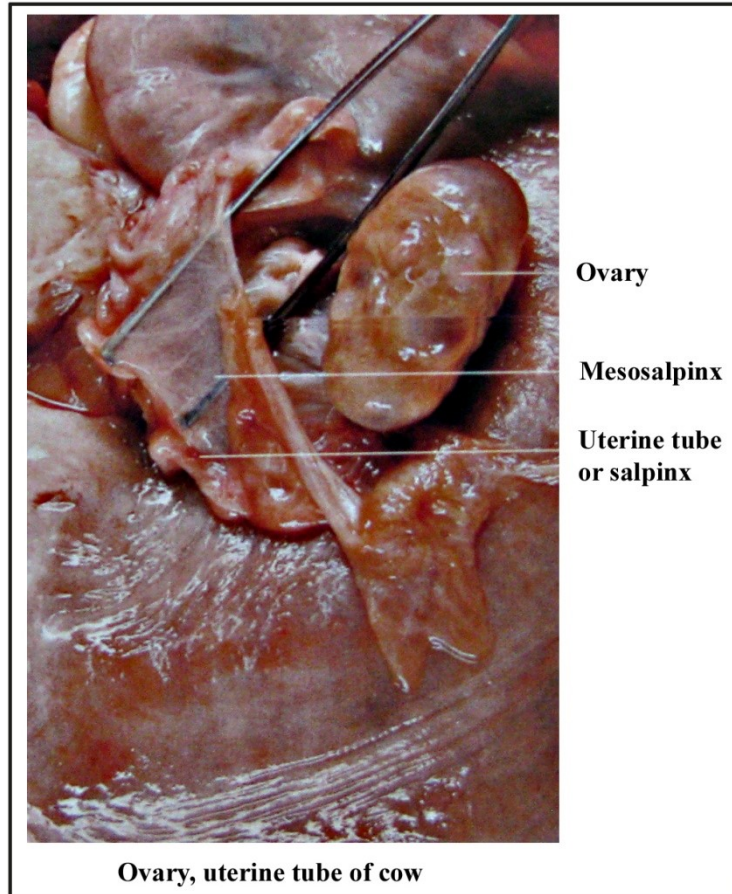
## Peritoneal Covering or Broad ligament of uterus :

- ❑ It is formed by the folds of the peritoneum which covers the ovary, oviduct and uterus.
- ❑ It attaches these structure to the lateral abdominal wall.
- ❑ The part of the broad ligament which attaches the ovary to lateral abdominal wall is known as **Mesovrium**.
- ❑ The part of the broad ligament which attaches the oviduct to lateral abdominal wall is known as **Mesosalpinx**.
- ❑ The part of the broad ligament which attaches the uterus to lateral abdominal wall is known as **Mesometrium**.



Uterine horns of cow. Dissected at the level of intercornual ligament

## OVARIES



❑ The **ovaries** are considered as the primary reproductive organs in the female because these produce the female gamete (the **ovum**) and the female sex hormones (estrogens and progestins).

❑ The cow, mare, and ewe normally one ovum is produced in each estrous cycle and usually giving birth to one young in each gestation period usually. Therefore, they are known as **monotocous** animals.

❑ Ovaries are two in number

❖ **LOCATION** : Situated a little above the middle of lateral margin of pelvic inlet  
Attached to the lateral abdominal wall by the anterior part of the *Broad Ligament* of uterus known as “**Mesovarium**”

❖ **SIZE** : The size of the ovary is highly variable from animal to animal and is also affected by the age.  
Normal size is 3.5x2.5x1.5cm

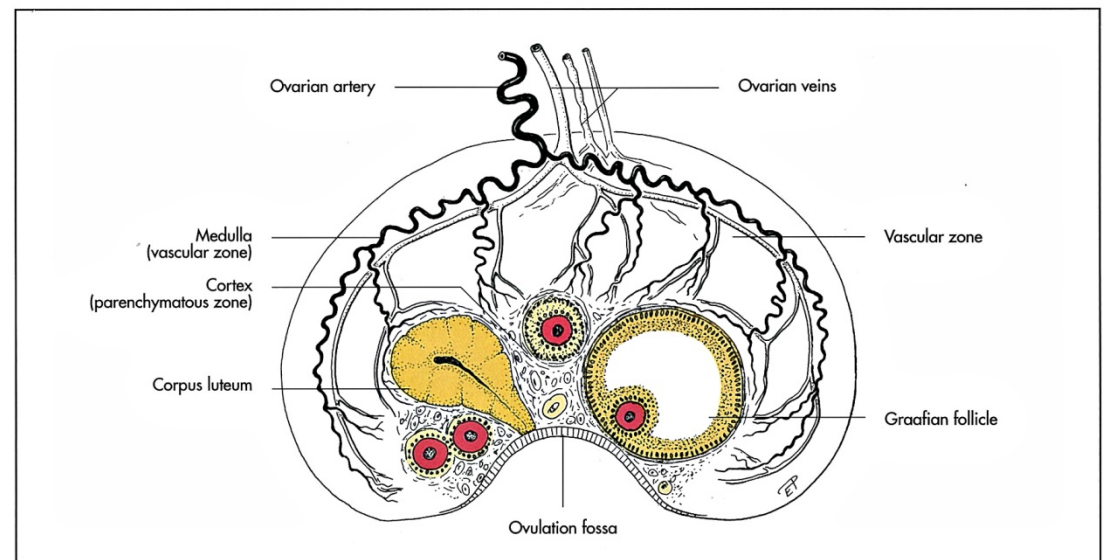
❖ **SHAPE** : Oval or Almond-shaped

❖ **Weight** : 15 to 20 Gms

## Species difference

### Ewe and Doe

- They resemble in general those of ox with few exceptions
- The ovaries are **almond** shaped
- **Mare Bean** shaped and much larger, 7 to 8 cm long, 3 to 4 cm thick, weighs 70 to 80 gm
- Situated in the sublumbar region under the 4<sup>th</sup> or 5<sup>th</sup> lumbar vertebra
- The notch on the free border leads into a depression the **ovulation fossa**, where ovulation takes place



Section of the ovary of the mare, schematic.

## Sow

- Ovaries are concealed in a peritoneal pouch called **ovarian bursa**.

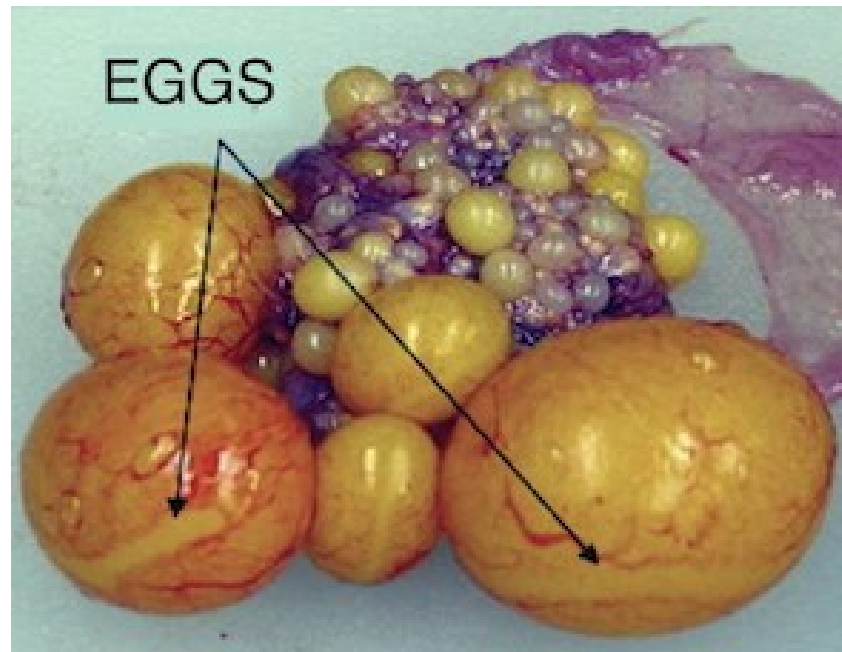
## Bitch

- Small, elongated, oval and flattened; average length 2 cm
- The two layers of the **ovarian bursa** continue to the cornu of the uterus consisting mesosalpinx and the ovarian ligament



## Hen

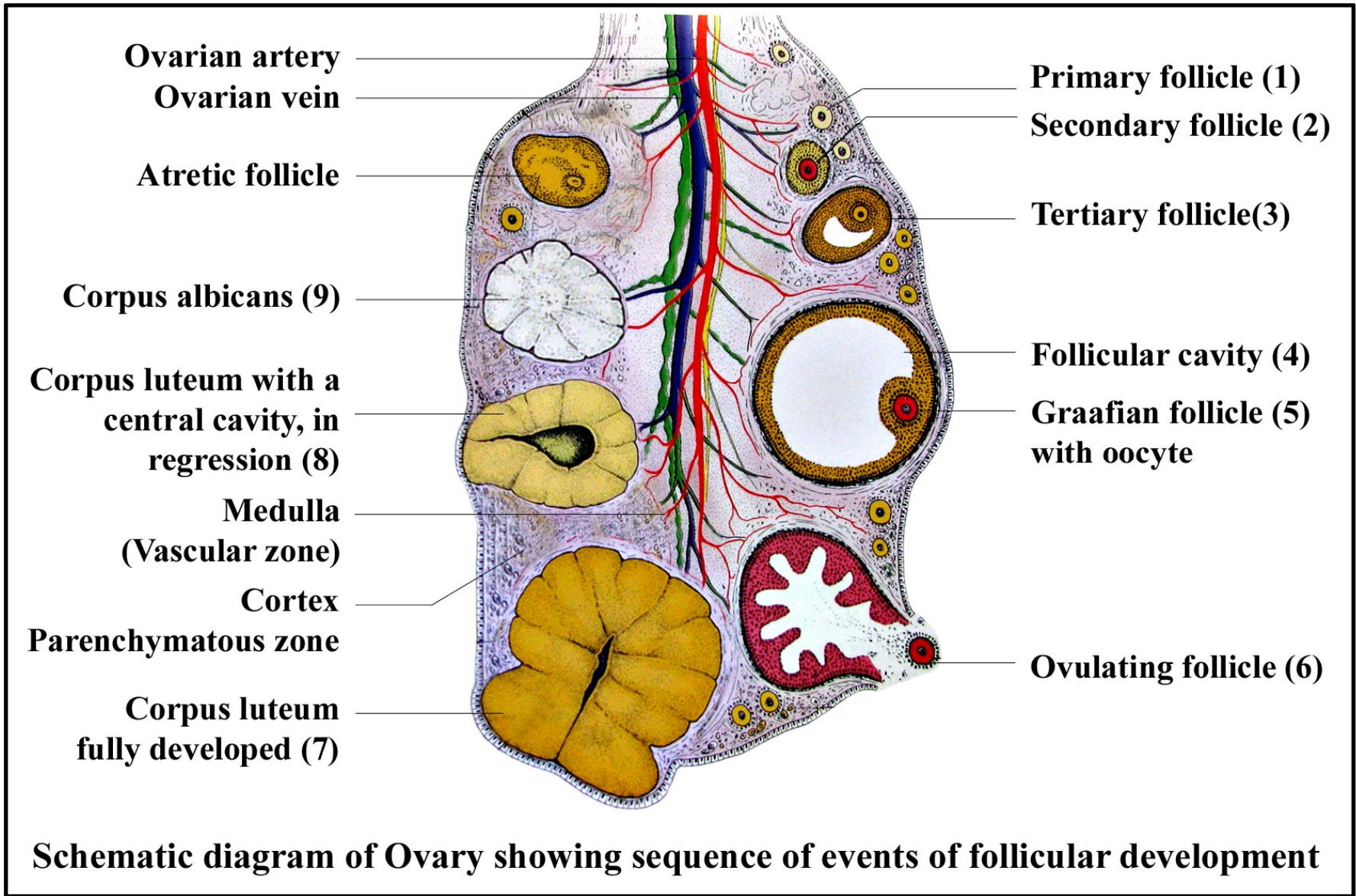
- **Only left ovary** is present since the right one is usually rudimentary
- It is in the form of **bunch of grapes** in mature stage



## OVARIAN FOLLICLES

- ✓ In the mature animals, ovarian follicles develop within the parenchymatous zone. **Each follicle contains a single ovum.**
- ✓ Based on the size of the oocyte and its degree of differentiation, the following stages of the development are recognized in ovarian follicle
  - **Primary follicle**
  - **Secondary follicle**
  - **Tertiary follicle**
  - **Graafian follicle**



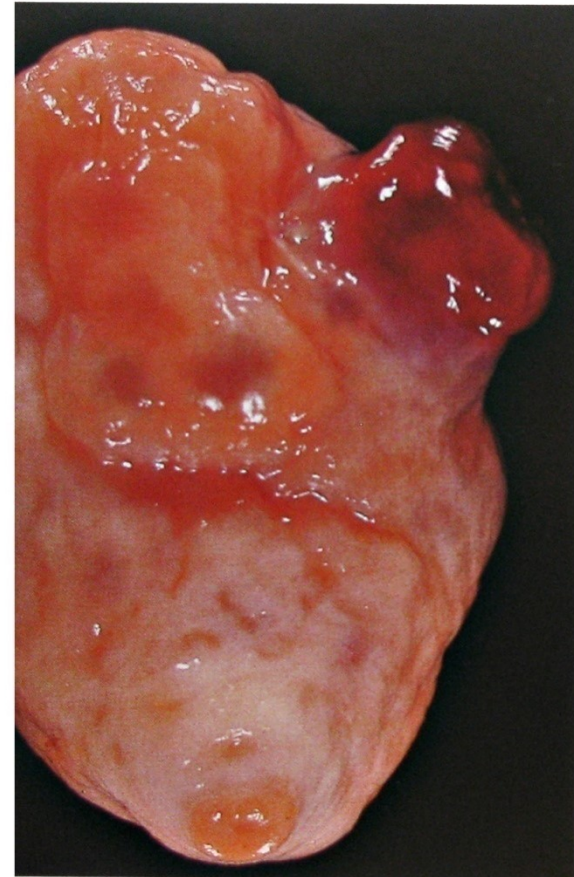


## **Corpus Haemorrhagicum:**

- ❑ After ovulation, the wall of the ruptured follicular cavity folds in. a slight haemorrhage occurs at the site of ovulation and fills the former follicular cavity, which is then referred to as Corpus haemorrhagicum.



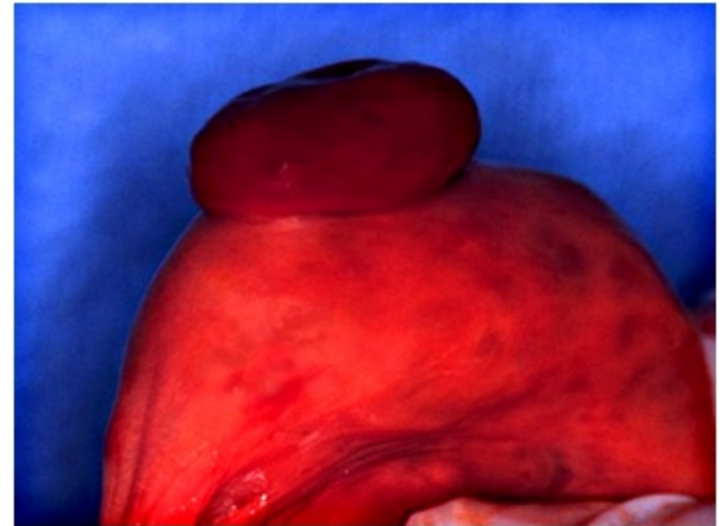
**Corpus Hemorrhagicum emerges from ovary and increases in size.**



**Corpus Hemorrhagicum of a cow after ovulation**

## **Corpus luteum :**

- ❑ As the blood is reabsorbed, the corpus hemorrhagicum is replaced by the corpus luteum.
- ❑ The corpus luteum is a solid, yellowish body which is involved in synthesis and secretion of progesterone.
- ❑ It is temporary endocrine gland, functioning for few days in non pregnant animal and few months in pregnant animals.
- ❑ **Corpus luteum spurium- for non-pregnant animal**
- ❑ **Corpus luteum verum- for pregnant animal**

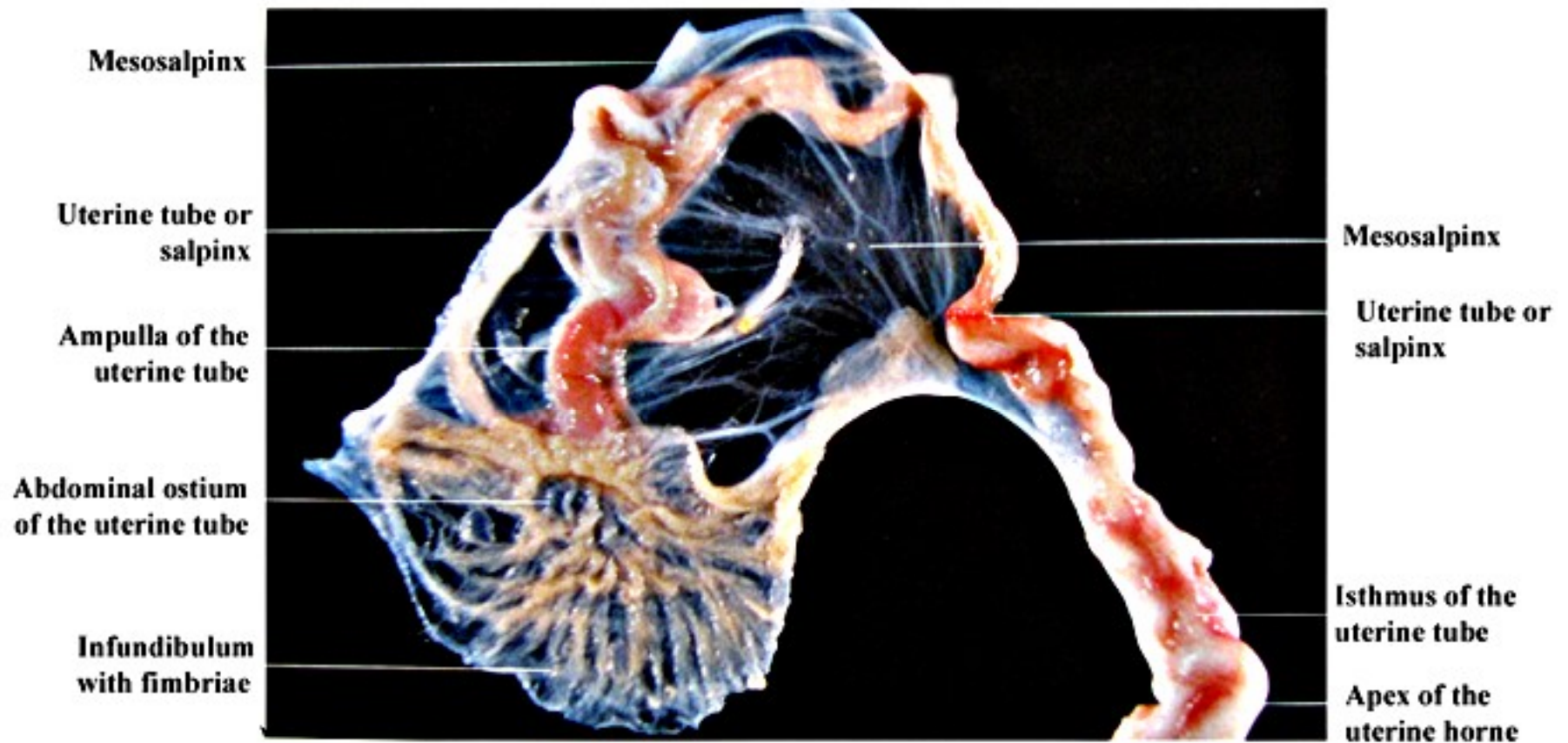


**Corpus Luteum with distinct  
mushroom crown and neck**

## **Oviduct or Uterine tube of Fallopian Tube or Salpinx**

- ❑ The oviducts are a pair of convoluted tubes extending from near the ovaries to and becoming continuous with the tips of the uterine horns.
- ❑ Their functions include transportation of ova and spermatozoa, In addition they are the site of fertilization and the early cell divisions of the embryo.
- ❑ Each tube is suspended by the **mesosalpinx**, which is the cranial part of the broad ligament of uterus.
- ❑ An oviduct, which is from 20 to 30 cm long for most farm species, is divided into three segments.
- ❑ The ovarian extremity of the uterine tube which receives the oocyte after ovulation, it is funnel shaped and is termed as the **Infundibulum**.
- ❑ The free edges of the **infundibulum** are bordered by numerous diverging processes, called **Fimbria**, which is in contact with the surface of ovary.
- ❑ In the center of the funnel there is a small opening, known as **abdominal ostium**.
- ❑ The abdominal ostium leads to the **ampulla**, where fertilization usually takes place. The oocyte remains in the ampulla for a few days.
- ❑ The third and distal part of the oviduct is the **isthmus** which joins the tip of the uterine horn at the utero-tubal junction.
- ❑ The uterine tube opens into the uterine horn through the **uterine ostium**

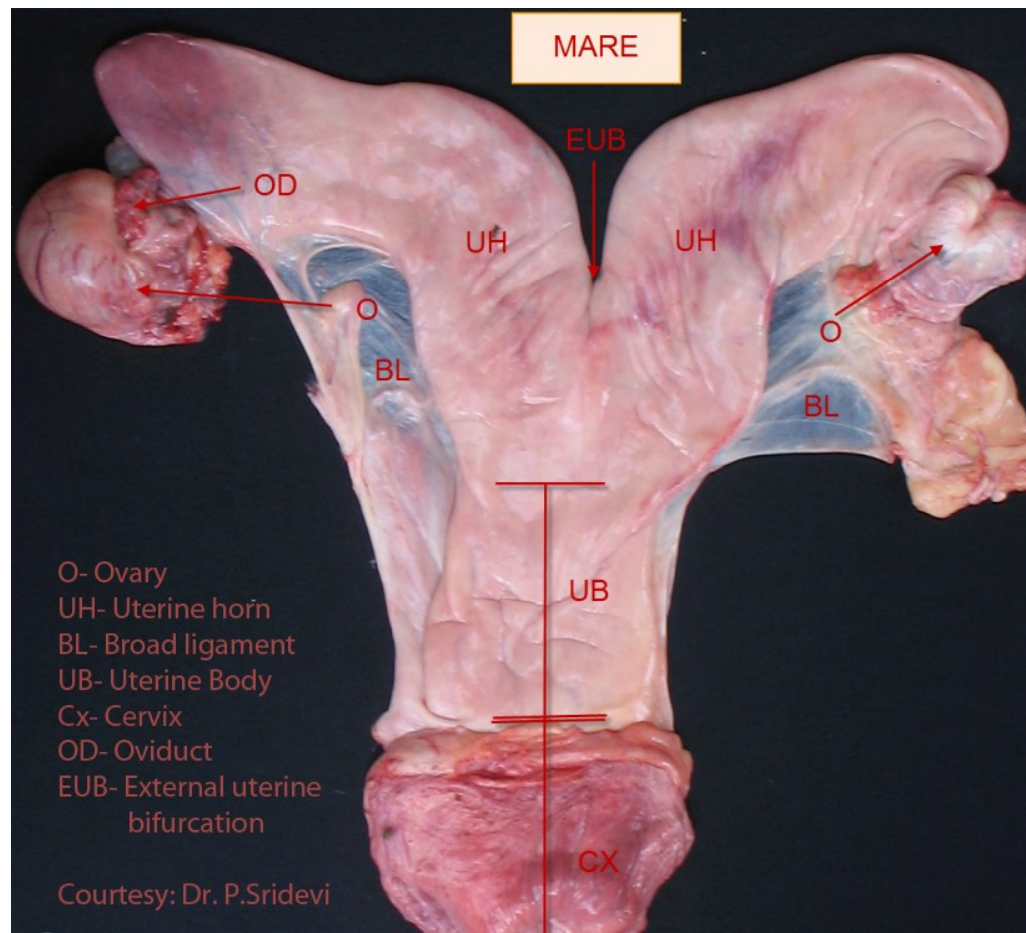


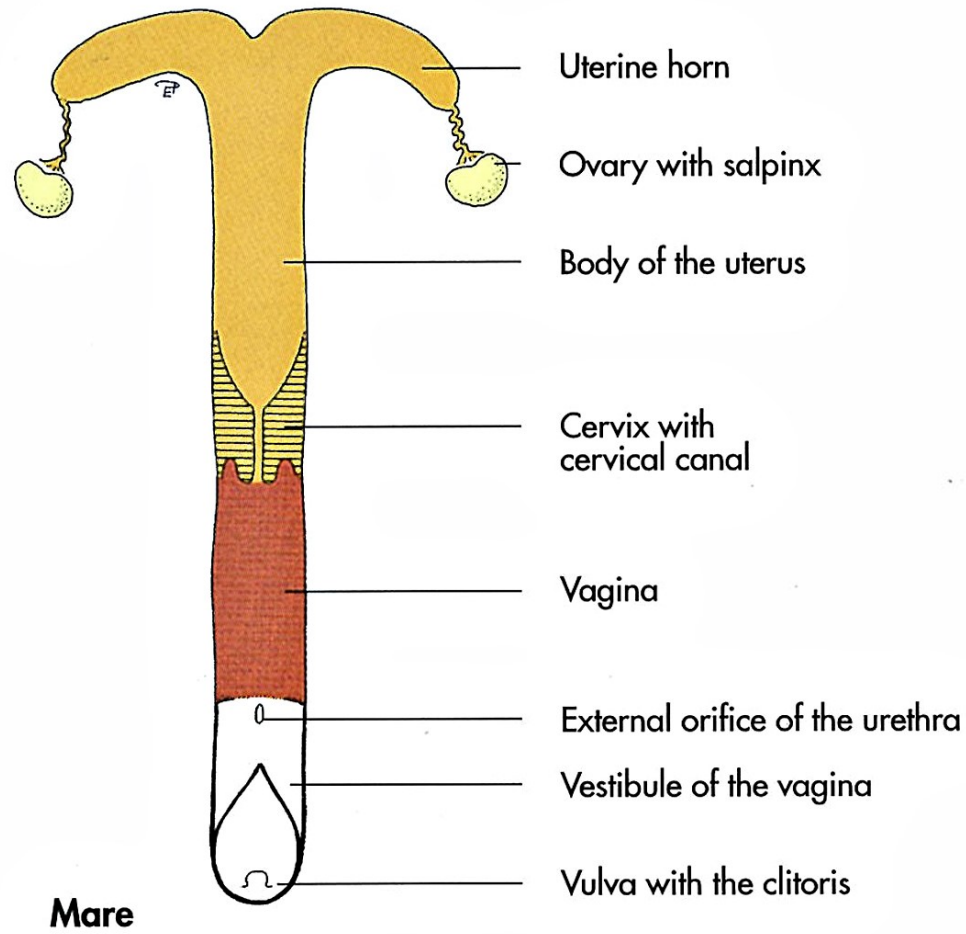


**Uterine tube of the cow**

## Mare

- 20 to 25 cm long but more flexuous
- The oviduct joins the uterine horn very abruptly

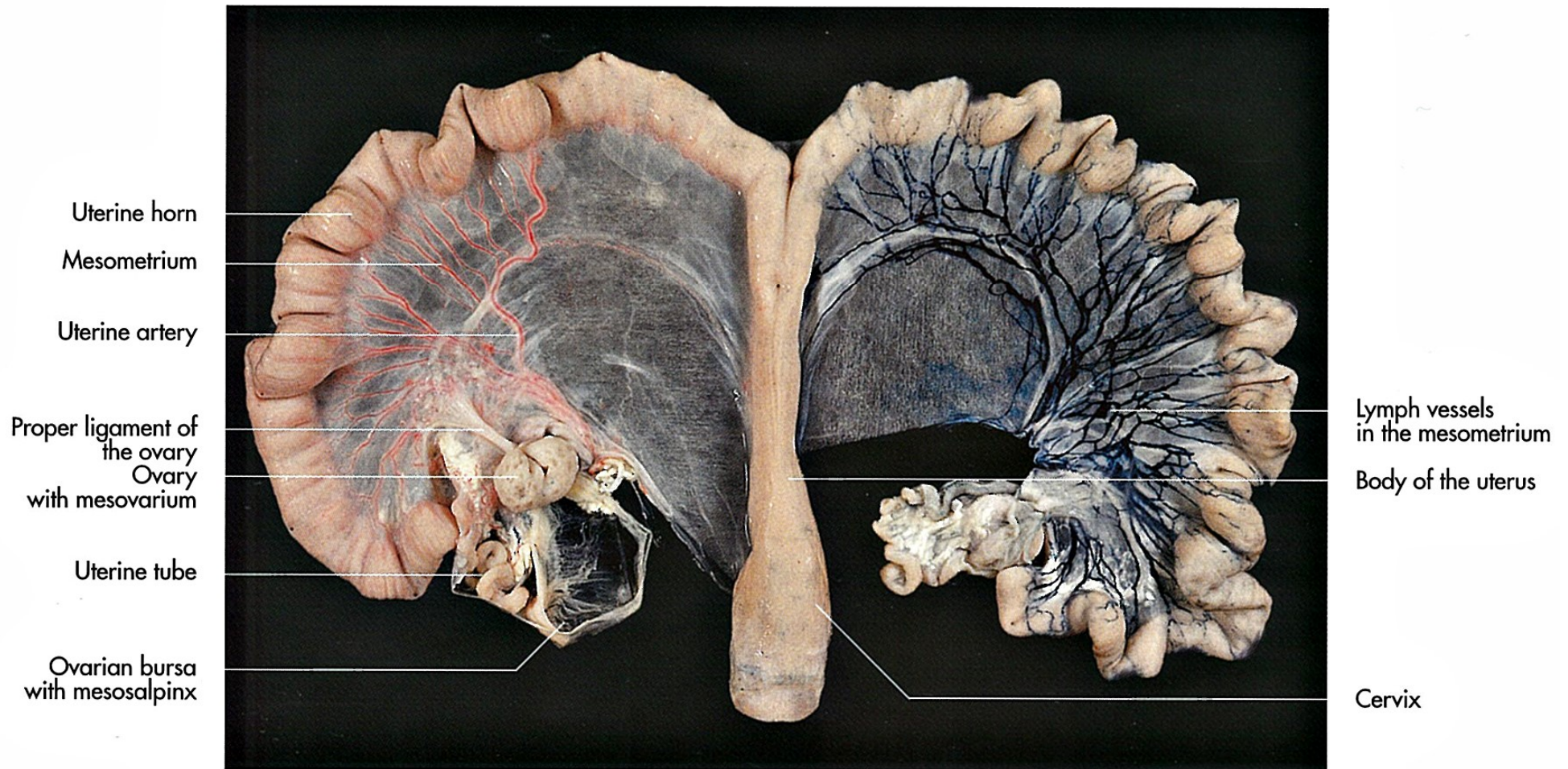






## Sow

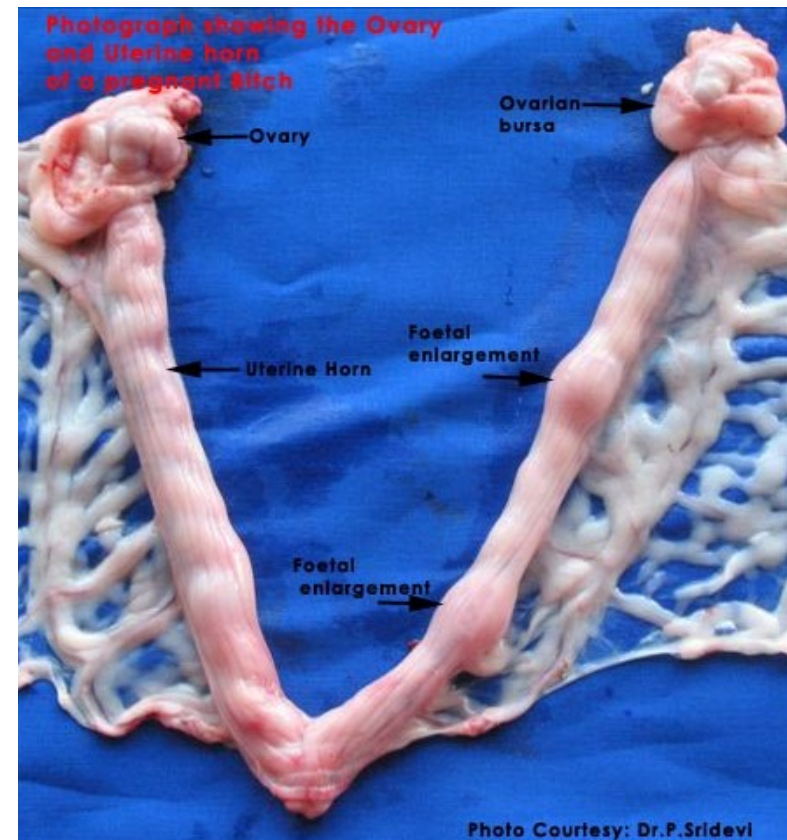
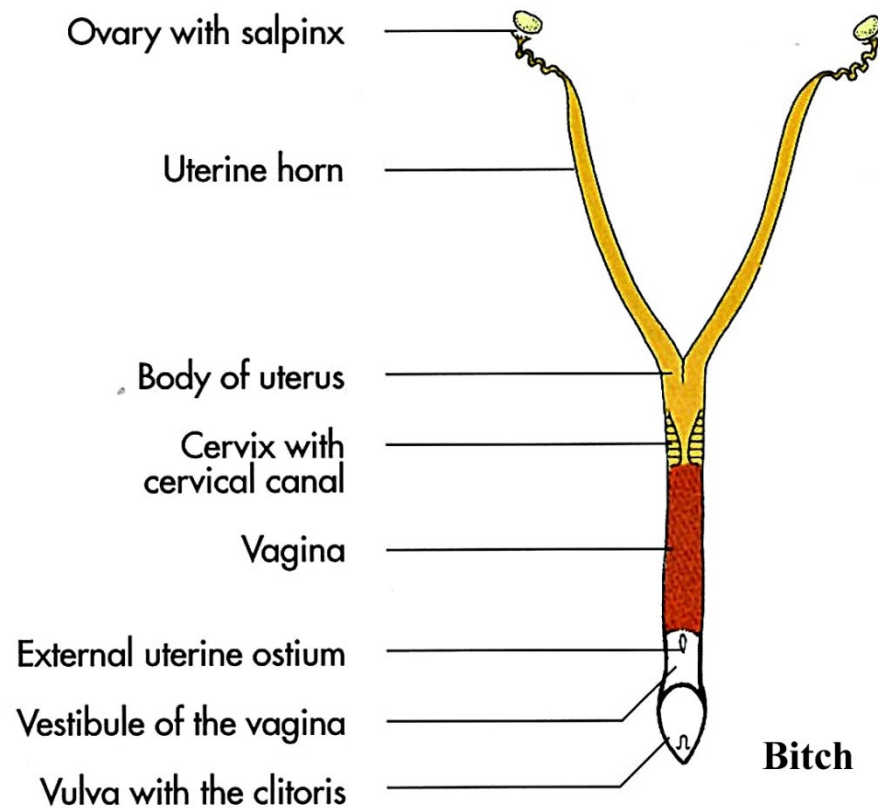
- Less flexuous
- The fimbriated end has a large abdominal opening



Uterus of a sow after injection of the arteries (on the left, in red) and lymph vessels (on the right, in black)

## Bitch

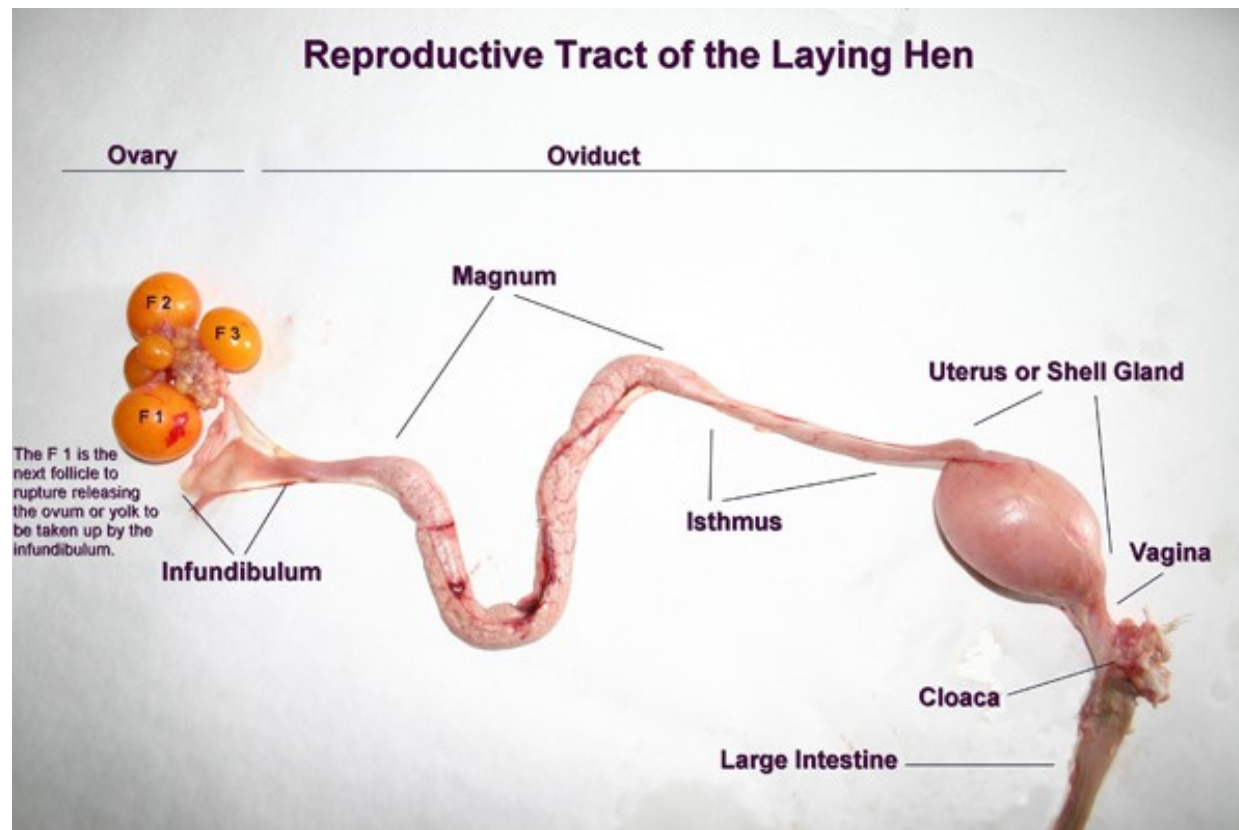
- Small and slightly flexuous
- Its abdominal opening is large and uterine opening small





## Hen

- Only the **left oviduct** is developed. It is dilatable, convoluted tube about 80 cm in length in the laying hen, and extends backwards against the dorsal part of the left body wall in relation to the ilium and ischium
- It is suspended between two layers of a fold of peritoneum, which forms the membranous dorsal and ventral ligaments of the oviduct



- The oviduct may be divided into five parts

## Infundibulum

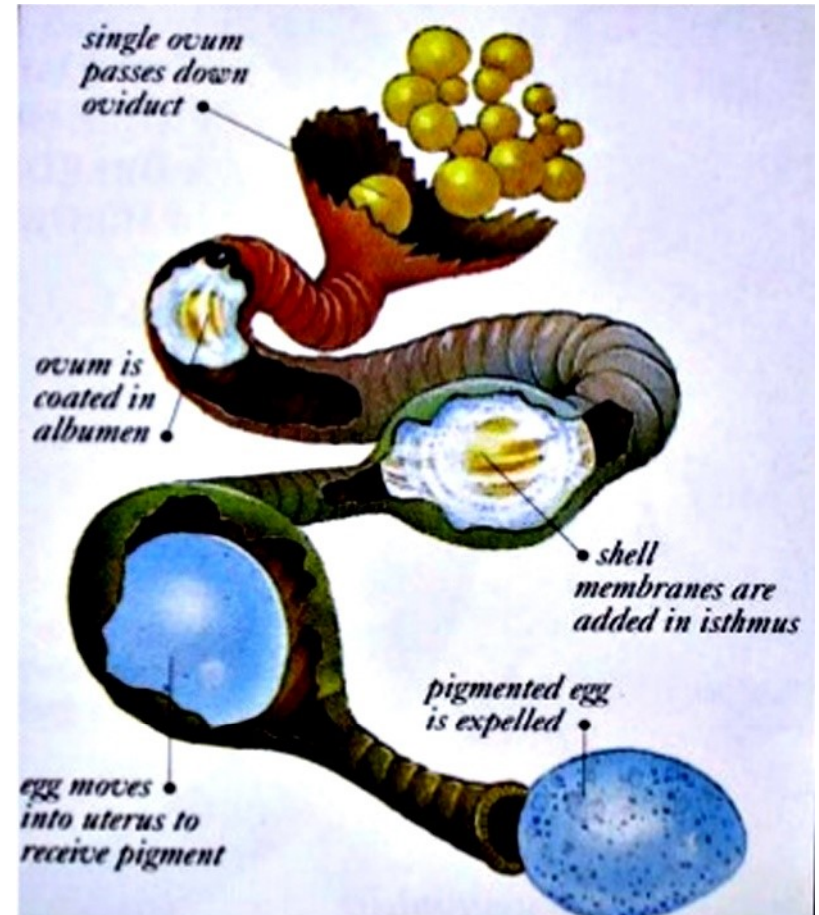
- It is funnel-shaped structure, 2.3 cm long. Its function is to grasp the ovum as it is released from the ovary

## Magnum

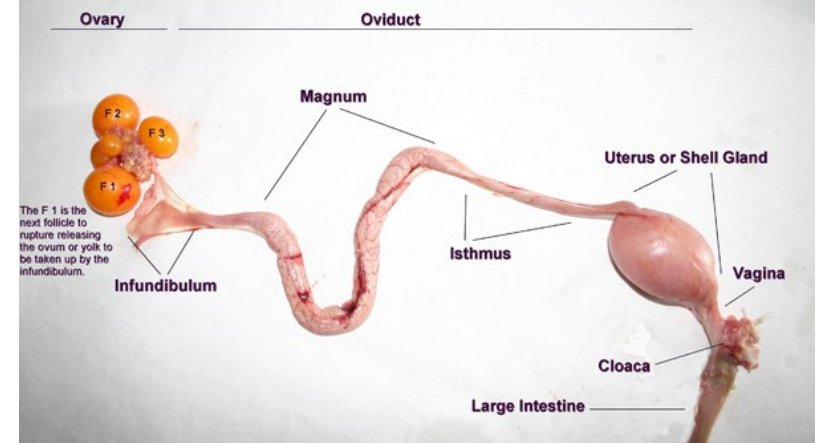
- It forms the major part of the duct, about 40 cm long and is remarkable for the thickness of the walls
- It secretes about 40 percent of the albumin of the egg

## Isthmus

- It is about 12 cm long connects the magnum with a thinner walled uterus
- its lumen is narrow and secretes the shell membrane and some albumin



Reproductive Tract of the Laying Hen

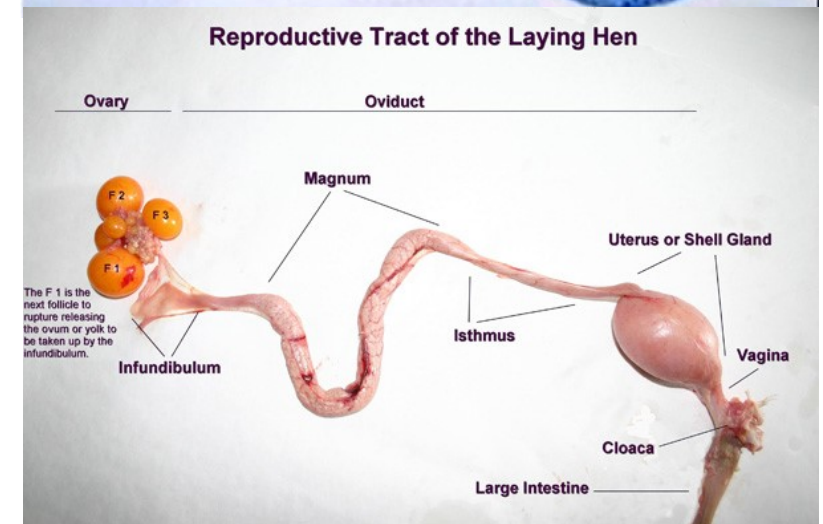
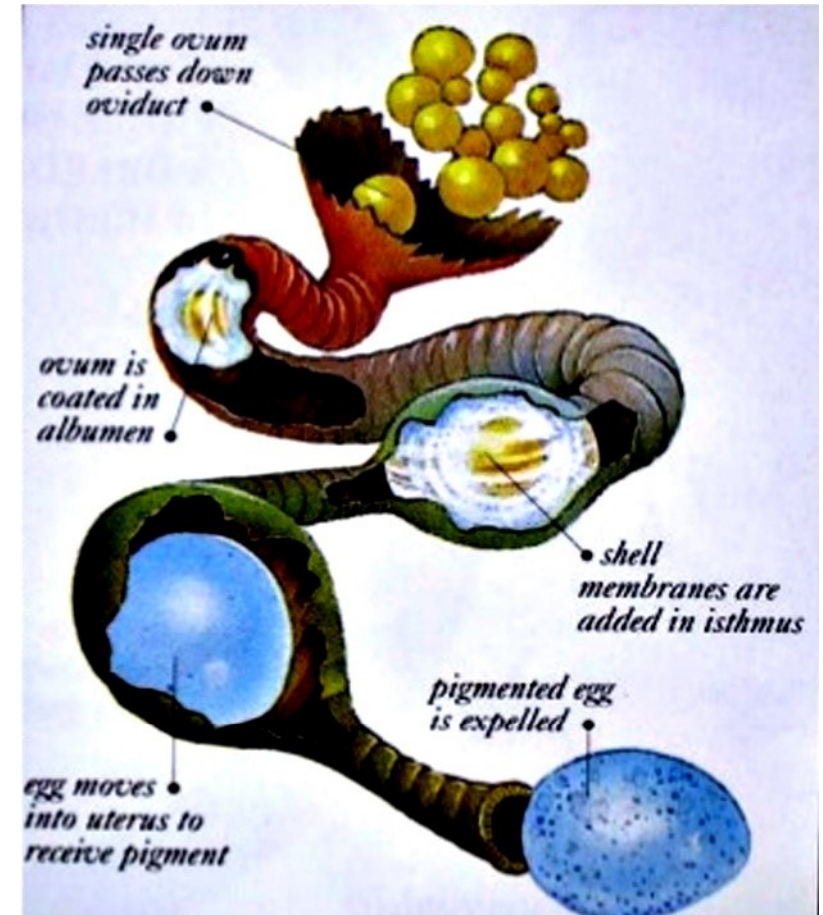


## Uterus

- The thin walled or “shell gland” is wide and about 12 cm long.
- The function is to secrete about 40% of total egg albumin, formation the calcareous shell and to certain extent the pigment formation

## Vagina

- It is 12 cm long. Its walls are very muscular
- The outer shell cuticle and pigment are formed in this part
- It terminates in the cloacae



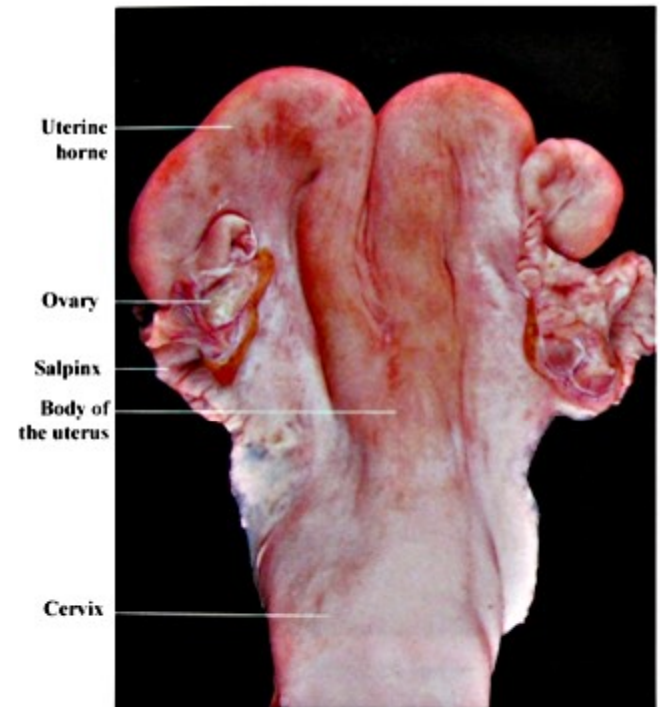


## Uterus

- ❑ The uterus extends from the utero-tubal junctions to the cervix.
- ❑ In cow, the overall length 50 to 55 cm.
- ❑ The uterus is a musculo – membranous sac continuous with oviduct in front and vagina behind.
- ❑ It lies almost entirely in the abdominal cavity in adult and attached to the upper part of the flank by two extensive peritoneal folds known as broad ligaments of the uterus.
- ❑ The uterus is divided in two parts
  - Horns
  - Body

### Horn :

- ✓ They are two in number – right and left.
- ✓ Each horn is spiral muscular tube tapered cranially to join the oviduct.
- ✓ They are broad caudally and unite together to form the body of the uterus.



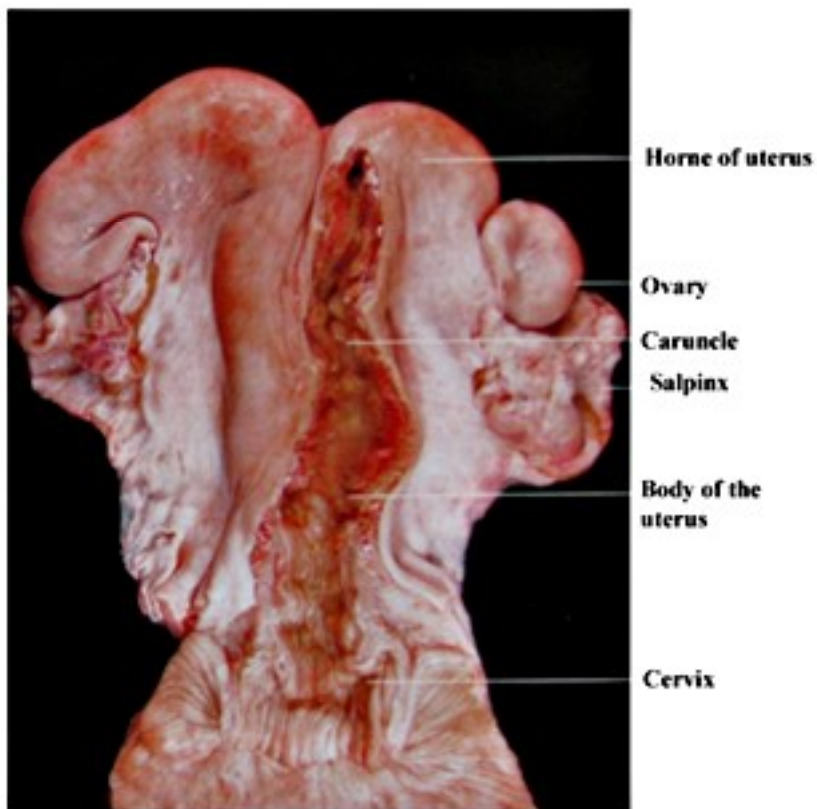
Uterus, ovaries and uterine tubes of cow



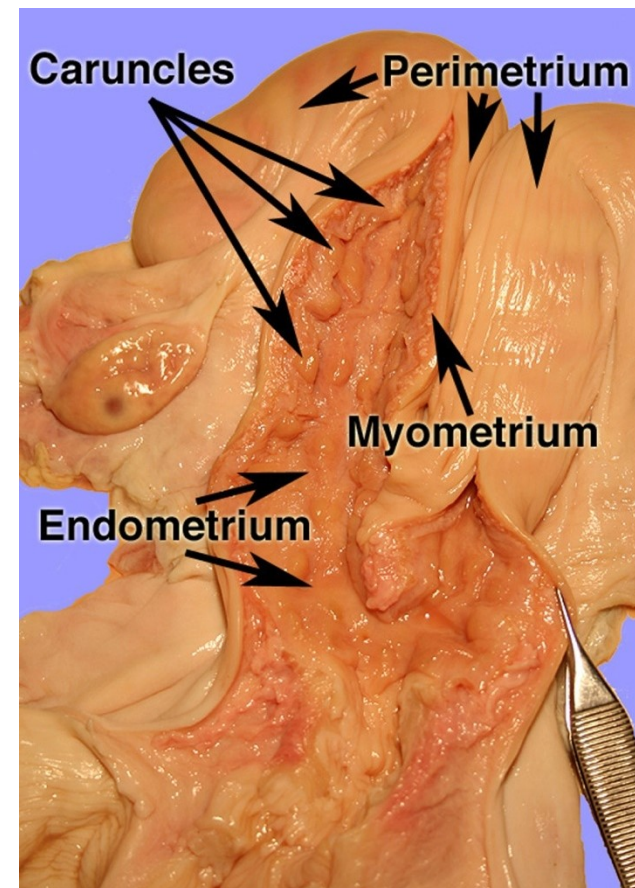


## Body :

- ✓ The body is very small
- ✓ It is dorso-ventrally flat tube and is related to the rectum above and bladder below and laterally with the broad ligaments.

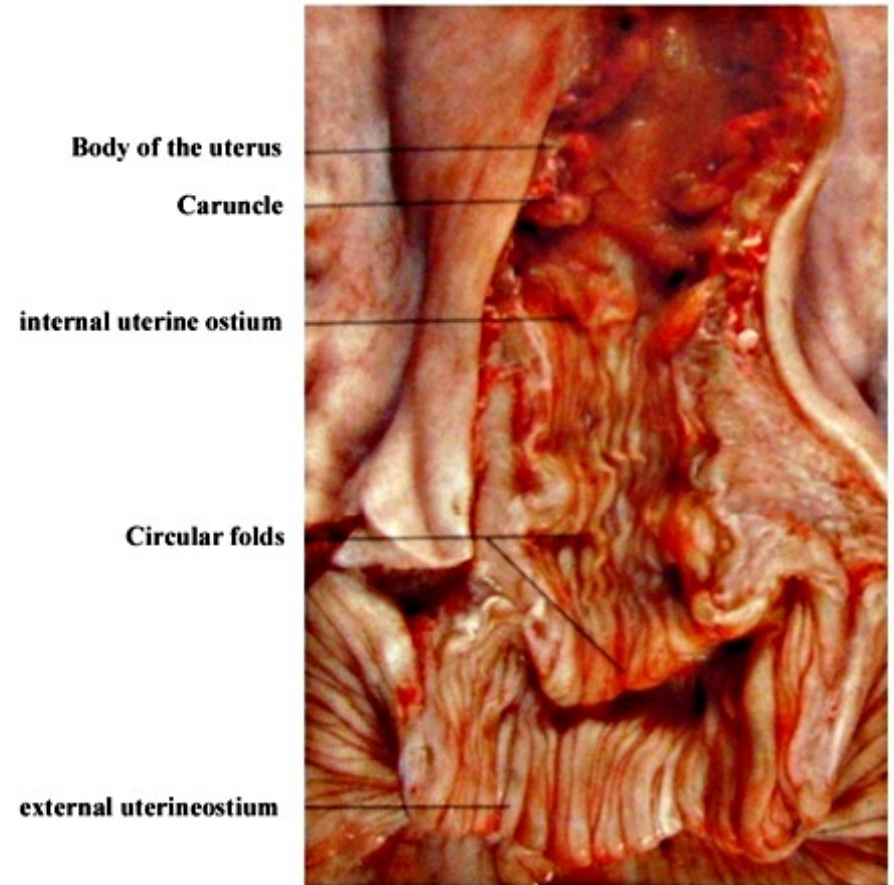


Uterus, ovaries and uterine tubes of a cow (uterus opened)

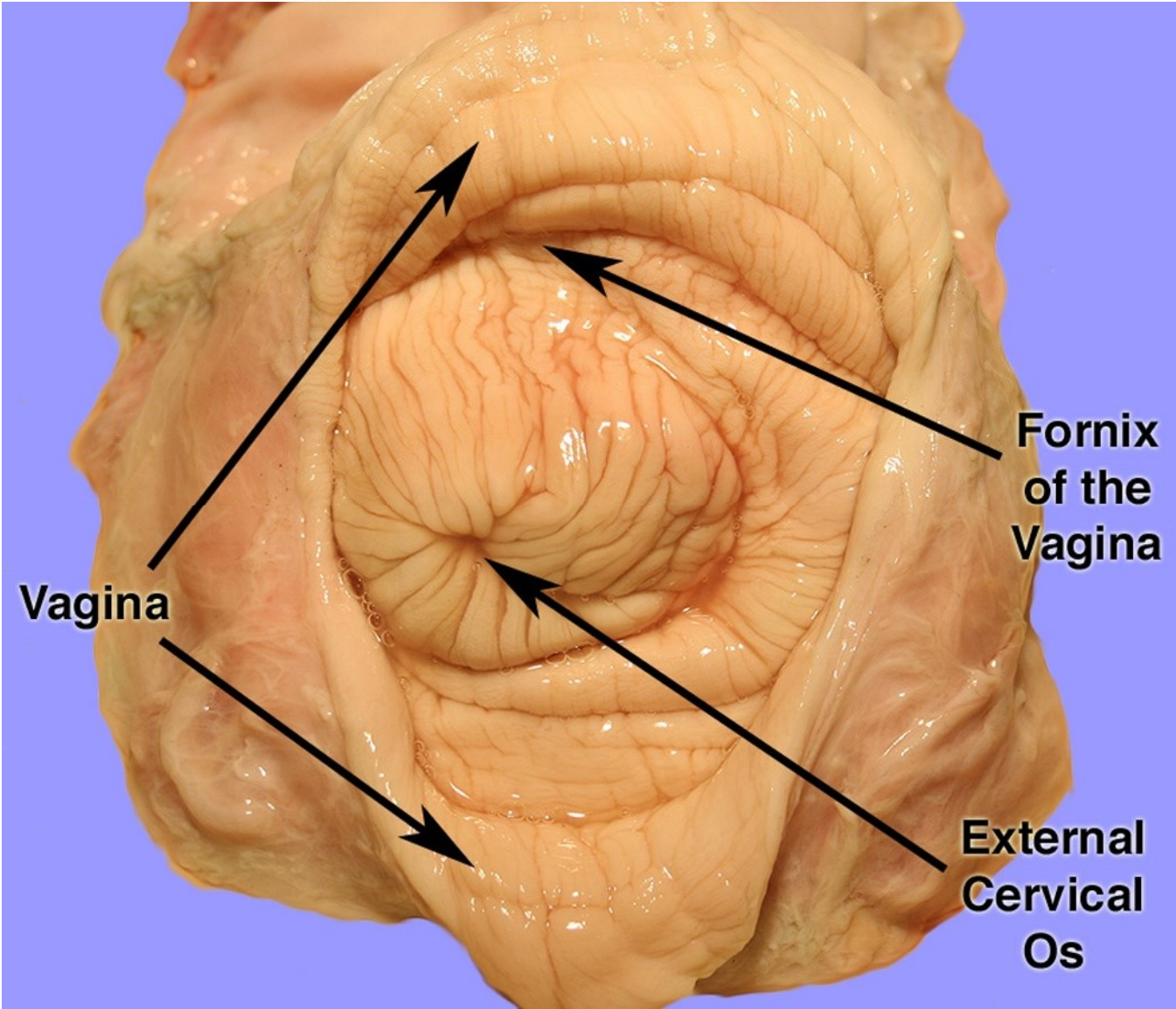


## Cervix :

- ✓ It is thick-walled and elastic.
- ✓ The anterior end being continuous with the body of the uterus while the posterior end protrudes into the vagina.
- ✓ The space of the vagina around posterior projected part of the cervix is known as **fornix**.
- ✓ The external opening of the cervix in the vagina is known as external Os
- ✓ In cow approximate length of cervix is 10 cm.
- ✓ It contains a canal, which is the opening into uterus.
- ✓ The primary function of the cervix is to prevent microbial contamination of the uterus; however, it also may serve as a sperm reservoir after mating.
- ✓ The cervical canals in the cow, have transverse interlocking ridges known as **annular rings** that help seal the uterus from contaminants.



Uterine cervix of a cow





## Species difference

### Ewe and Doe

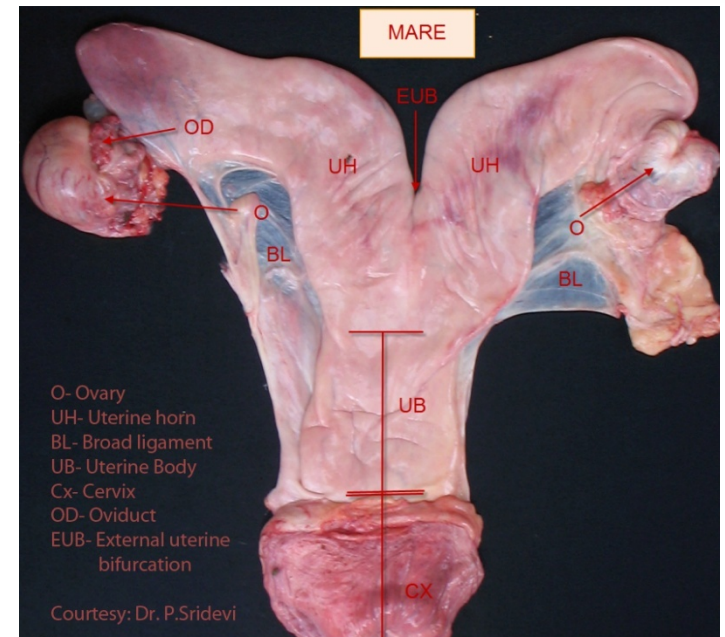
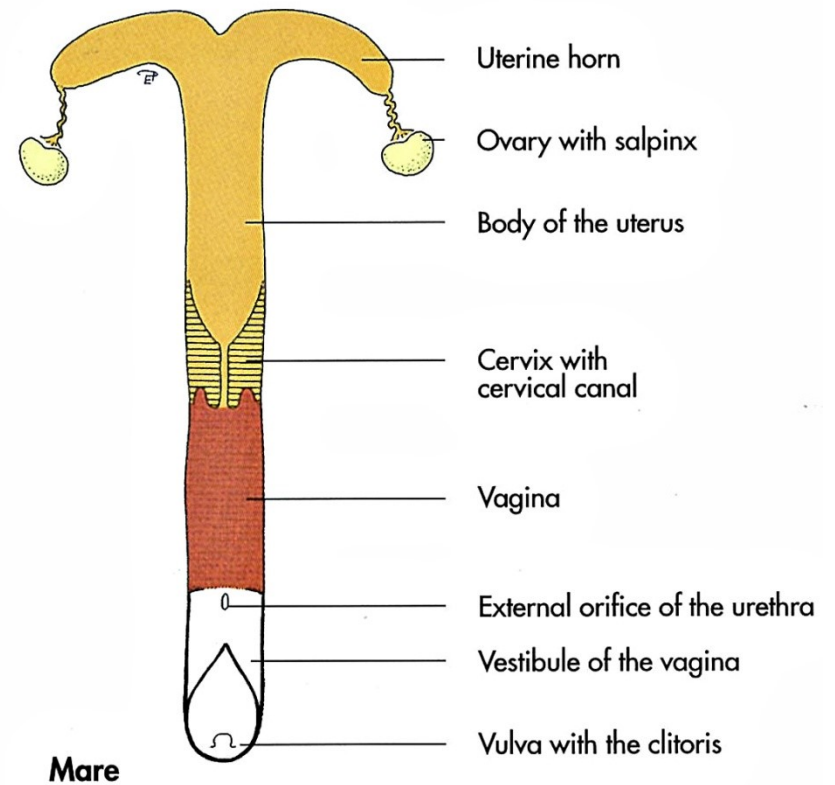
- The uterus resembles that of the cow.
- The cotyledons are much smaller than those of the cow

### Sow

- The fornix is absent

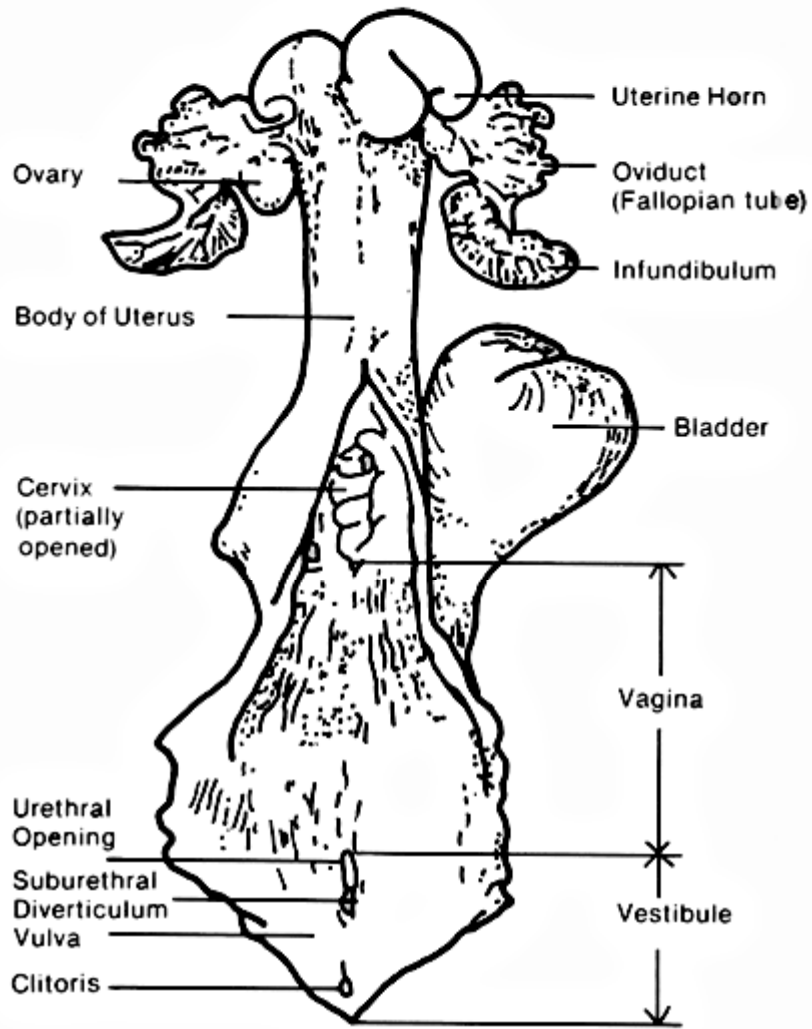
### Bitch

- Cotyledons are absent also in mare.

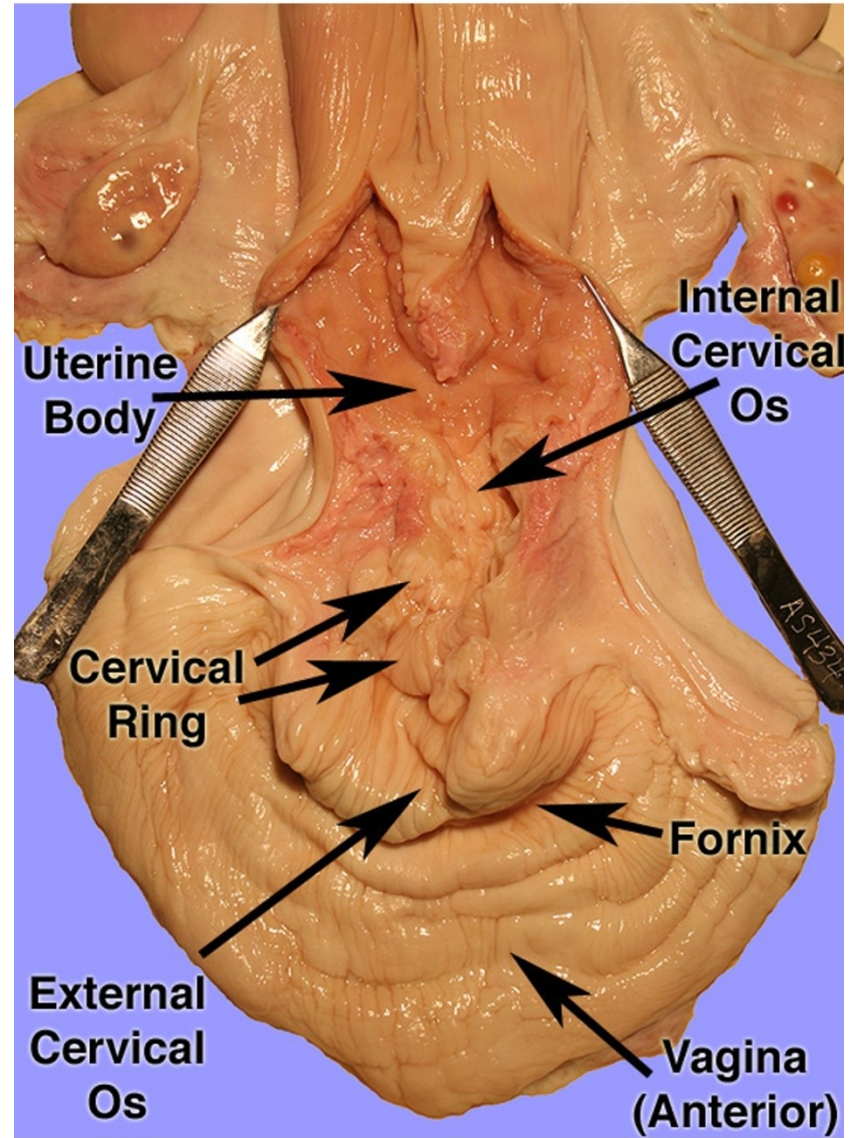


## Vagina :

- ❑ The vagina constitutes the cranial part of the female copulatory organ.
- ❑ The vagina is tubular in shape, thin-walled and quite elastic.
- ❑ It is approx. 25 to 30 cm in length in the cow.
- ❑ In the cow semen is deposited into the anterior end of the vagina, near the opening to the cervix, during natural mating.
- ❑ These epithelial cells of the mucosa become cornify under the influence of estrogens.
- ❑ This layer of cornified cells at the time of estrus may serve as a lubricating or protective mechanism, which prevents abrasions during copulation.
- ❑ In the ventral wall of the vagina, between the muscular and mucous coats, there are two ducts along with the length of the tube called as **canals of Gartner**.
- ❑ Vaginal smears can be used as an aid in detecting estrus, but are most useful in laboratory animals.



Genital System of Cow



## **Ewe and Doe**

- It is three or four inches long.

## **Mare**

- Shorter in length 15 to 20 cm It is less capacious
- Vaginal wall is thinner, **canals of Gartner is generally absent**

## **Sow**

- It is small in caliber, about 4-5 inches and medium size

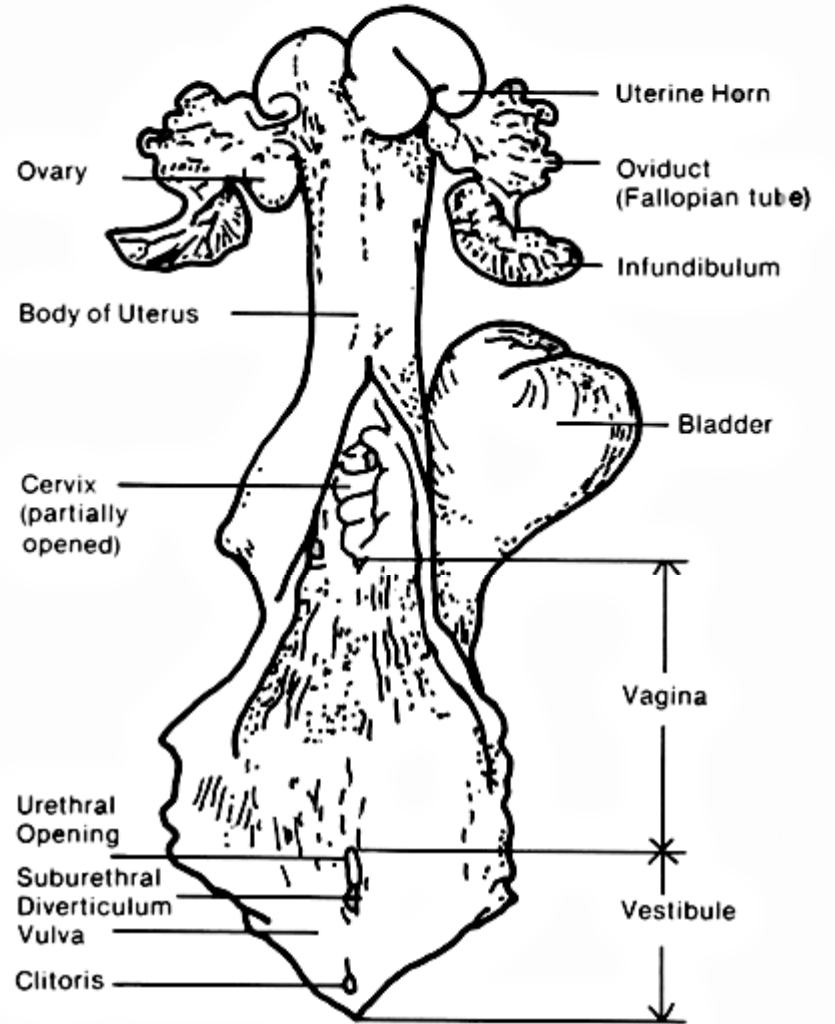
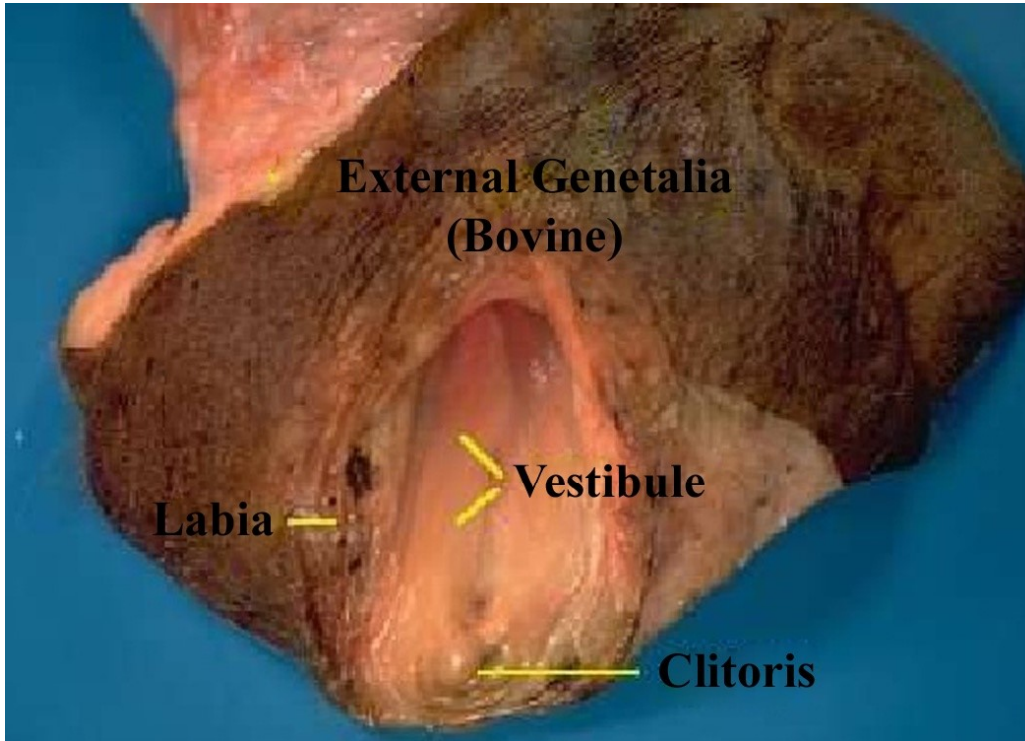
## **Bitch**

- It is relatively long and narrow
- The mucous -membrane forms **longitudinal folds**



## **Vulva :**

- ❑ The vulva, or external genitalia, consists of the vestibule and the labia.
- ❑ The **vestibule** is that portion of the female duct system that is common to both the reproductive and urinary systems. It's length is 10 to 12 cm in cow.
- ❑ The vestibule joins the vagina at the external urethral orifice.
- ❑ A **hymen** (ridge) at that point is well defined in the ewe and mare, but less prominent in the cow.
- ❑ The labia consist of the **labia minora**, inner folds or lips of the vulva, and **labia majora**, outer folds or lips of the vulva.
- ❑ The **labia minora** are homologous to the prepuce (sheath) in the male and are not prominent in farm animals.
- ❑ The **labia majora**, homologous to the scrotum in the male, are that portion of the female system, which are visible externally.
- ❑ The **clitoris**, homologous to the glans penis in the male, is located ventrally and about one cm inside the labia. It contains erectile tissue and is well supplied with sensory nerves. It is erect during estrus.

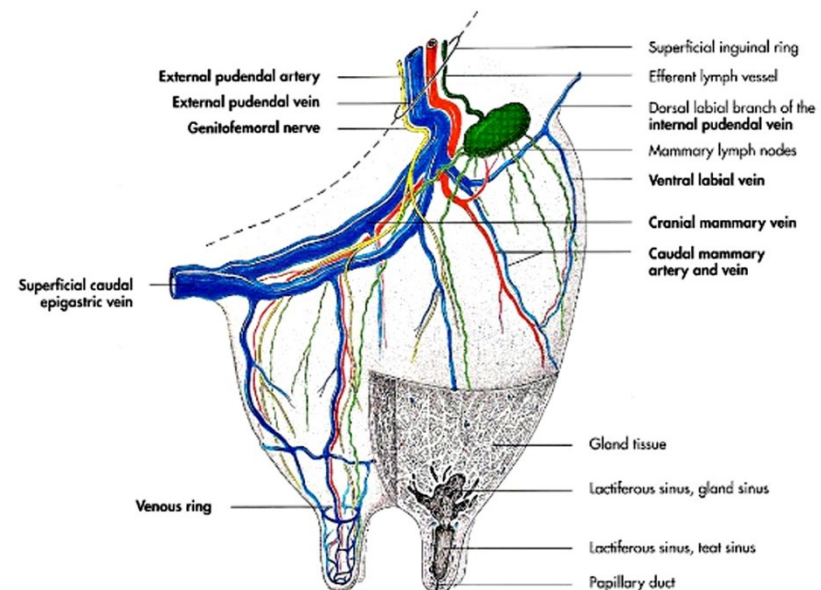


**Genital System of Cow**

## MAMMARY GLAND - COW

- These are modified cutaneous gland associated functionally with the genital organs
- Popularly known as “*Udder*”.
- **Four in number** and two on the either side of the median line
- They extend from caudal part of the abdomen to the floor of the pelvis and lie between the thighs
- Each gland is flattened from above downwards and presents a *base* and an *apex and two lateral faces*

### MAMMARY GLAND



## **Ewe and Doe**

- They are **two in number** and relatively large

## **Mare**

- There are **only two glands**, which are not divided into quarters smaller than those of the cow, each gland has a single teat and the apex presents two openings close together

## **Sow**

- They are usually **ten or twelve** in number and are arranged in two rows as in the bitch

## **Bitch**

- The glands are **10 in number** arranged in two series of five each as pectoral, abdominal and inguinal
- The apex of each teat has 6-10 openings on it





**THANKS**