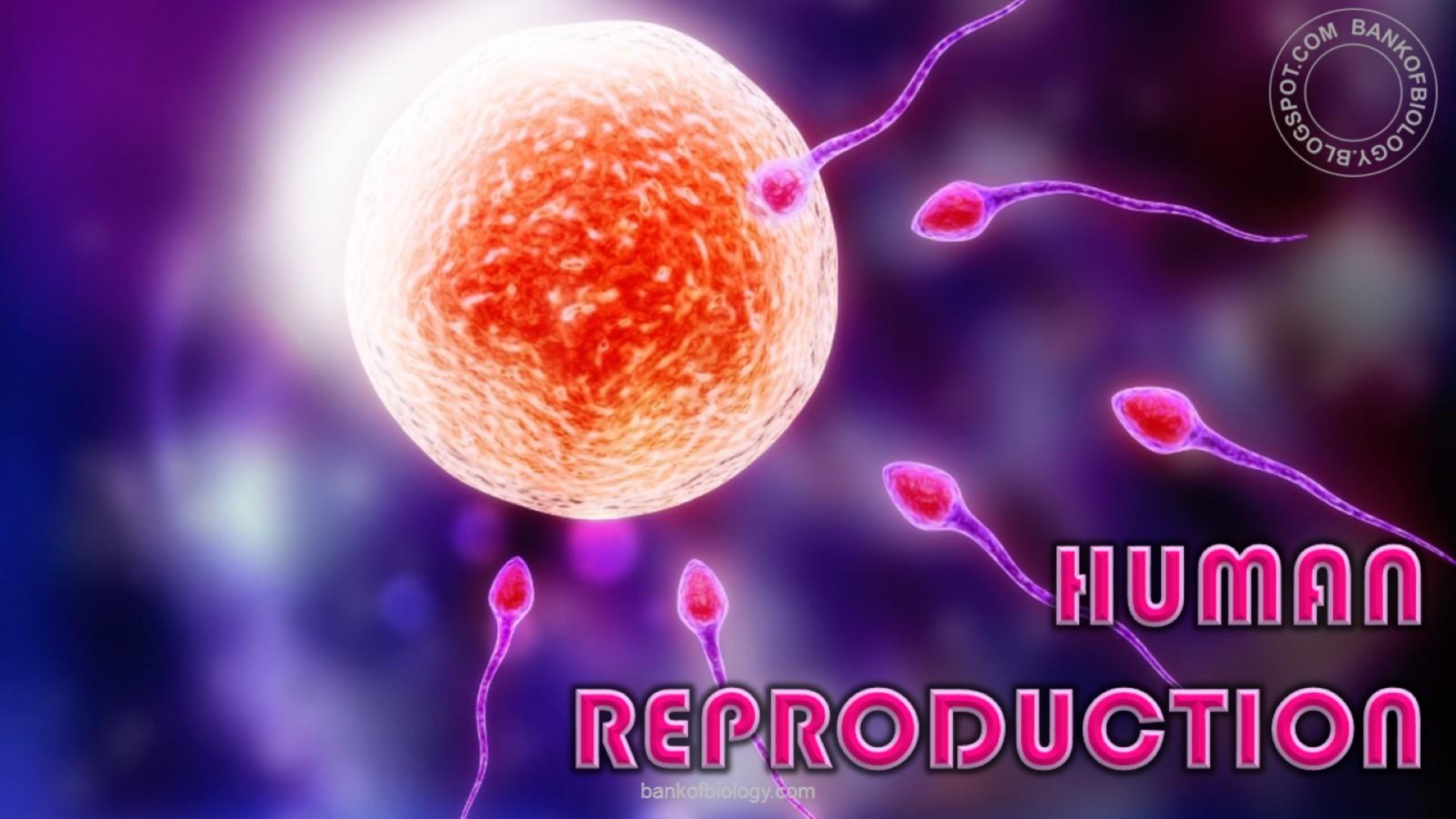
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HUMAN
REPRODUCTION
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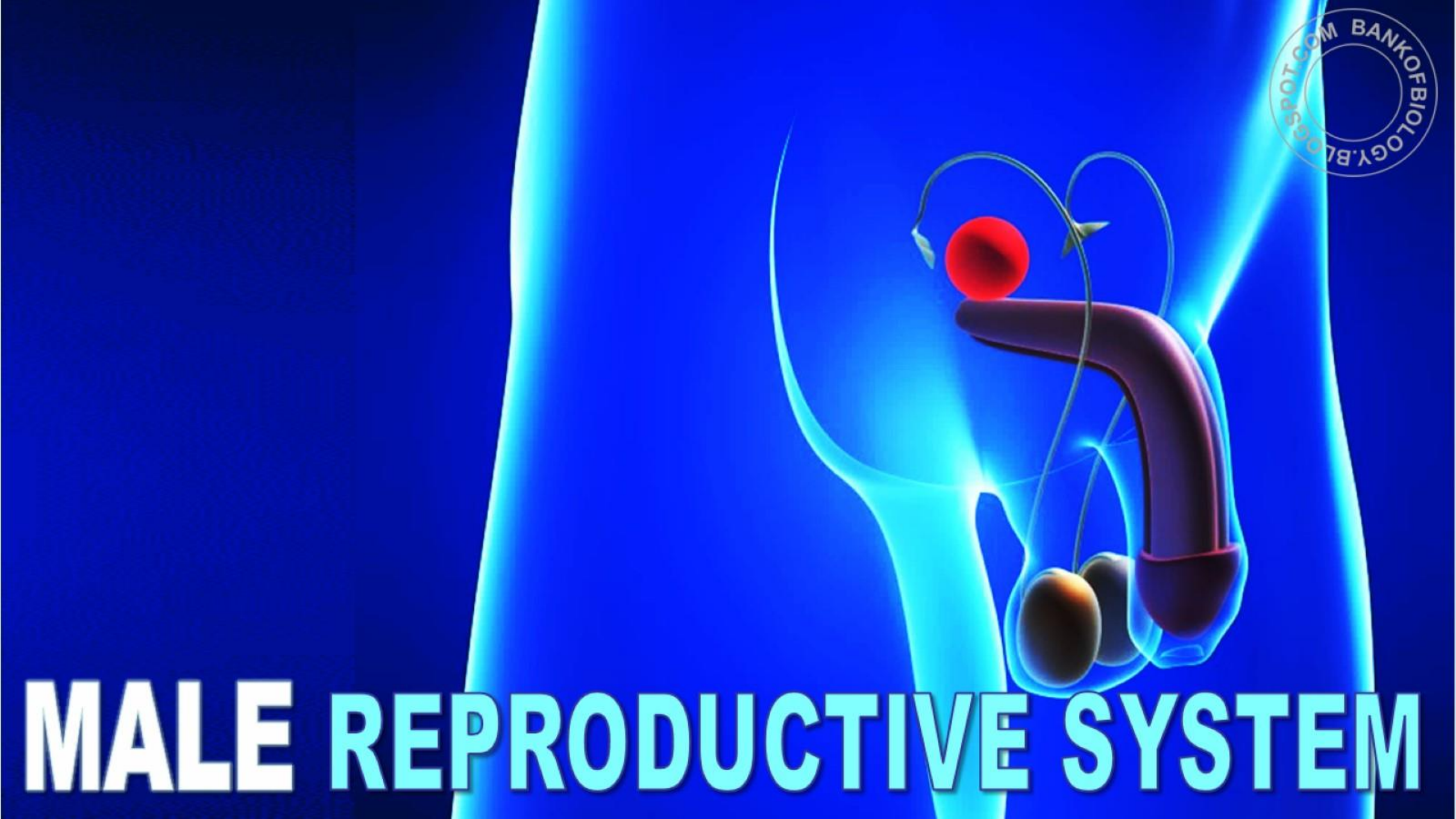
HUMAN REPRODUCTION

- Reproduction is the production of young ones by an organism.
- Humans are sexually reproducing and viviparous.

HUMAN REPRODUCTIVE SYSTEM

- MALE REPRODUCTIVE SYSTEM
- FEMALE REPRODUCTIVE SYSTEM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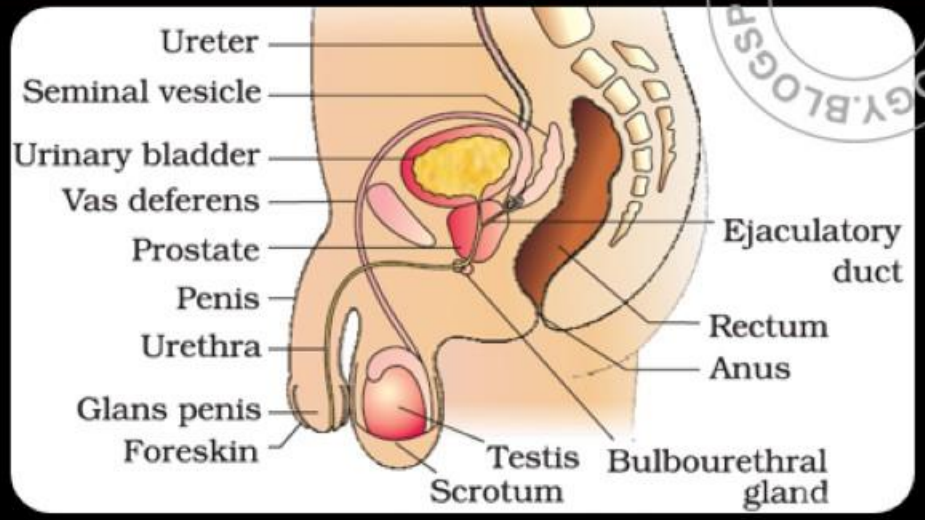
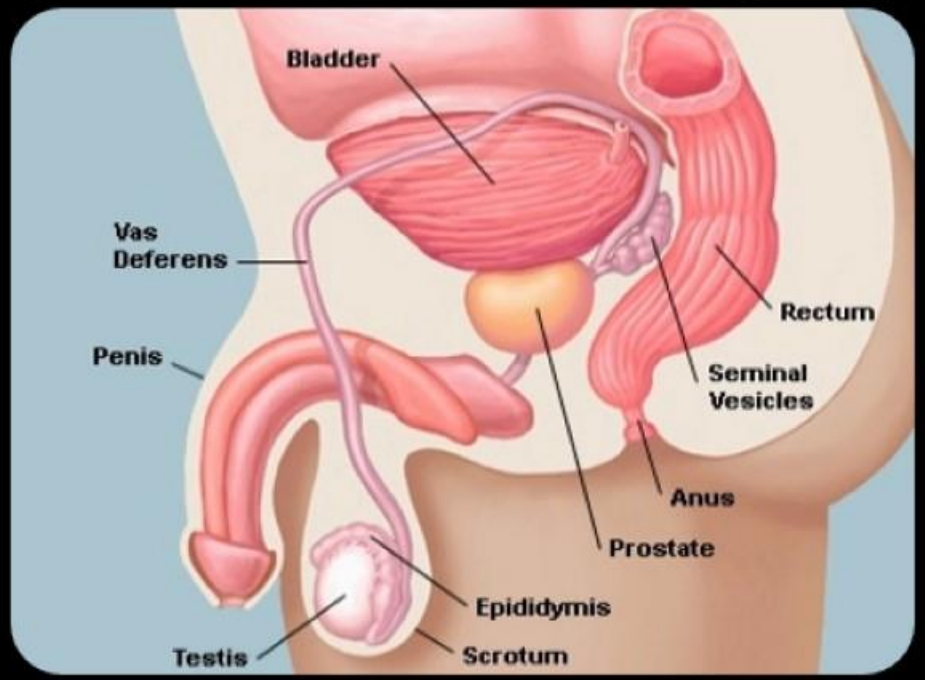
MALE REPRODUCTIVE SYSTEM

MALE REPRODUCTIVE SYSTEM

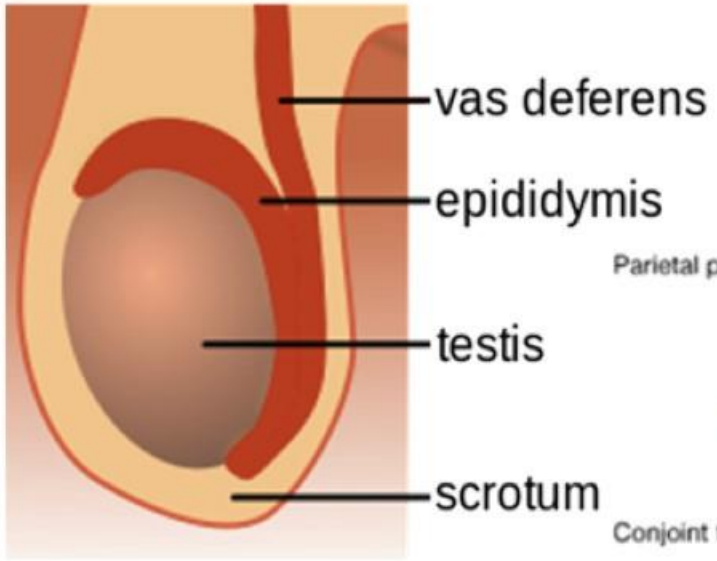
- **Male reproductive system**
  - **Paired testes**
  - **Accessory ducts**
    - Rete testis
    - Vasa efferentia
    - Epididymis
    - Vas deferens
  - **Accessory glands**
    - Prostate gland (1)
    - Seminal vesicles (2)
    - Cowper's (bulbo-urethral) glands (2)
  - **External genitalia (Penis)**

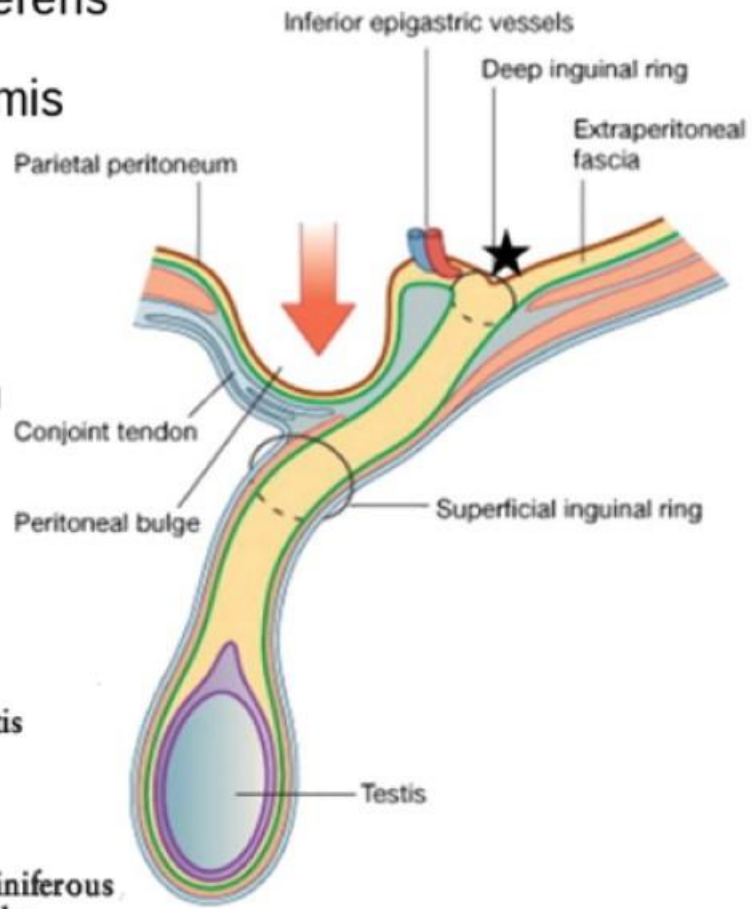


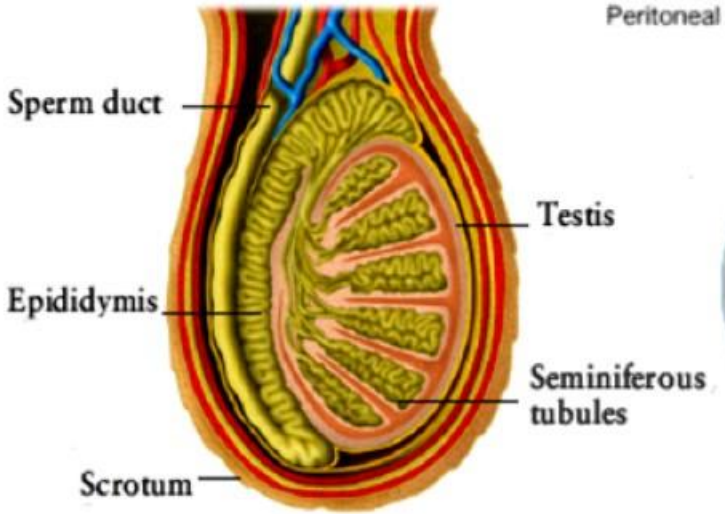


MALE REPRODUCTIVE SYSTEM

1. PAIRED TESTES





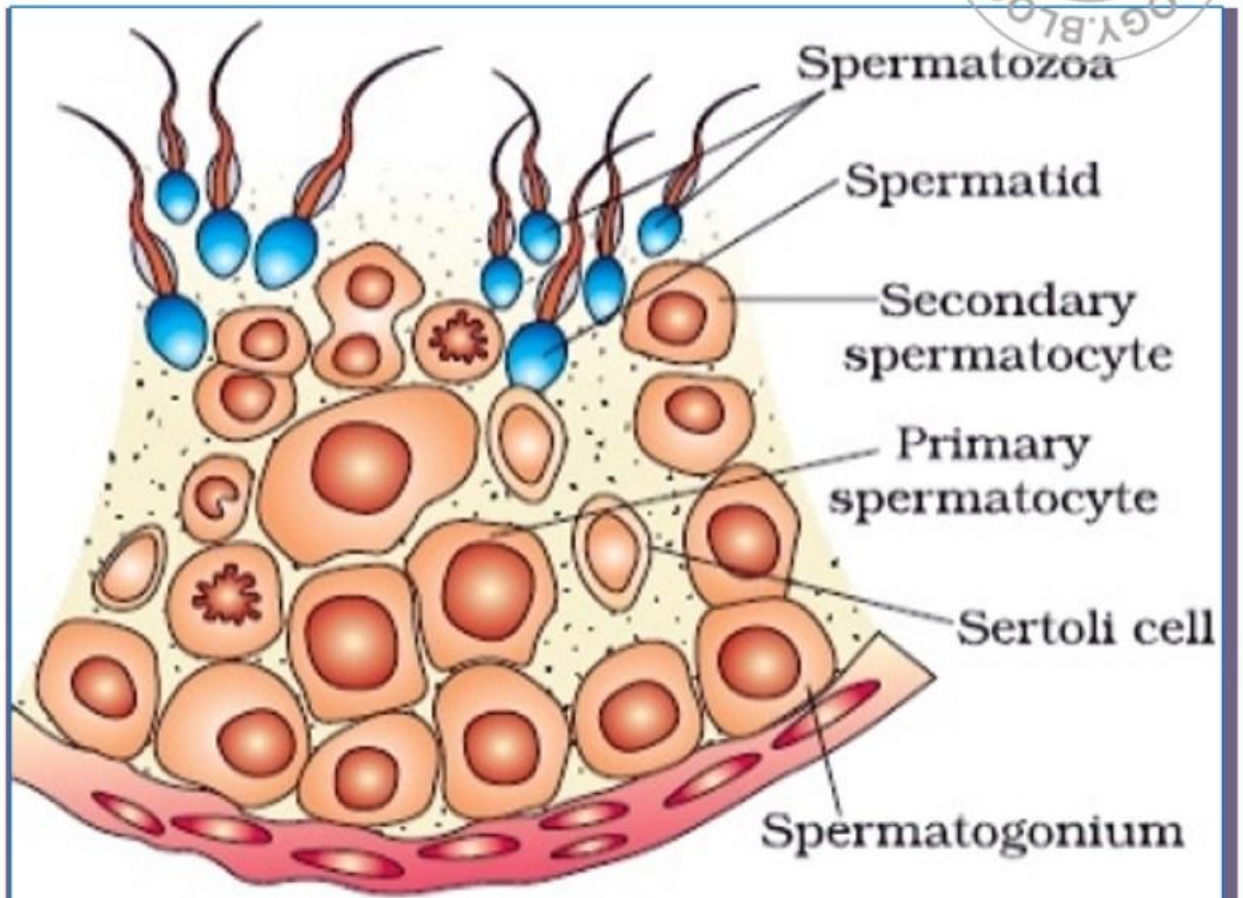


- **Primary sex organs** that produce **sperms & testosterone.**
- Testes are formed within abdomen.
- Soon after the birth or at the 8th month of pregnancy, they descent into the **scrotal sac (scrotum)** through **inguinal canal.**
- The **low temperature (2-2.5^0 C less than the body temperature)** of scrotum helps for proper functioning of testes and for **spermatogenesis.**

MALE REPRODUCTIVE SYSTEM

1. PAIRED TESTES

- Each testis is oval in shape.
- Length 4-5 cm, width: 2-3 cm.
- Each testis has about 250 testicular lobules.
- Each lobule contains 1-3 coiled seminiferous tubules.
- Seminiferous tubule is lined internally with spermatogenic cells (spermatogonia or male germ cells) & Sertoli cells (supporting cells).
- Sertoli cells give shape and nourishment to developing spermatogonia.

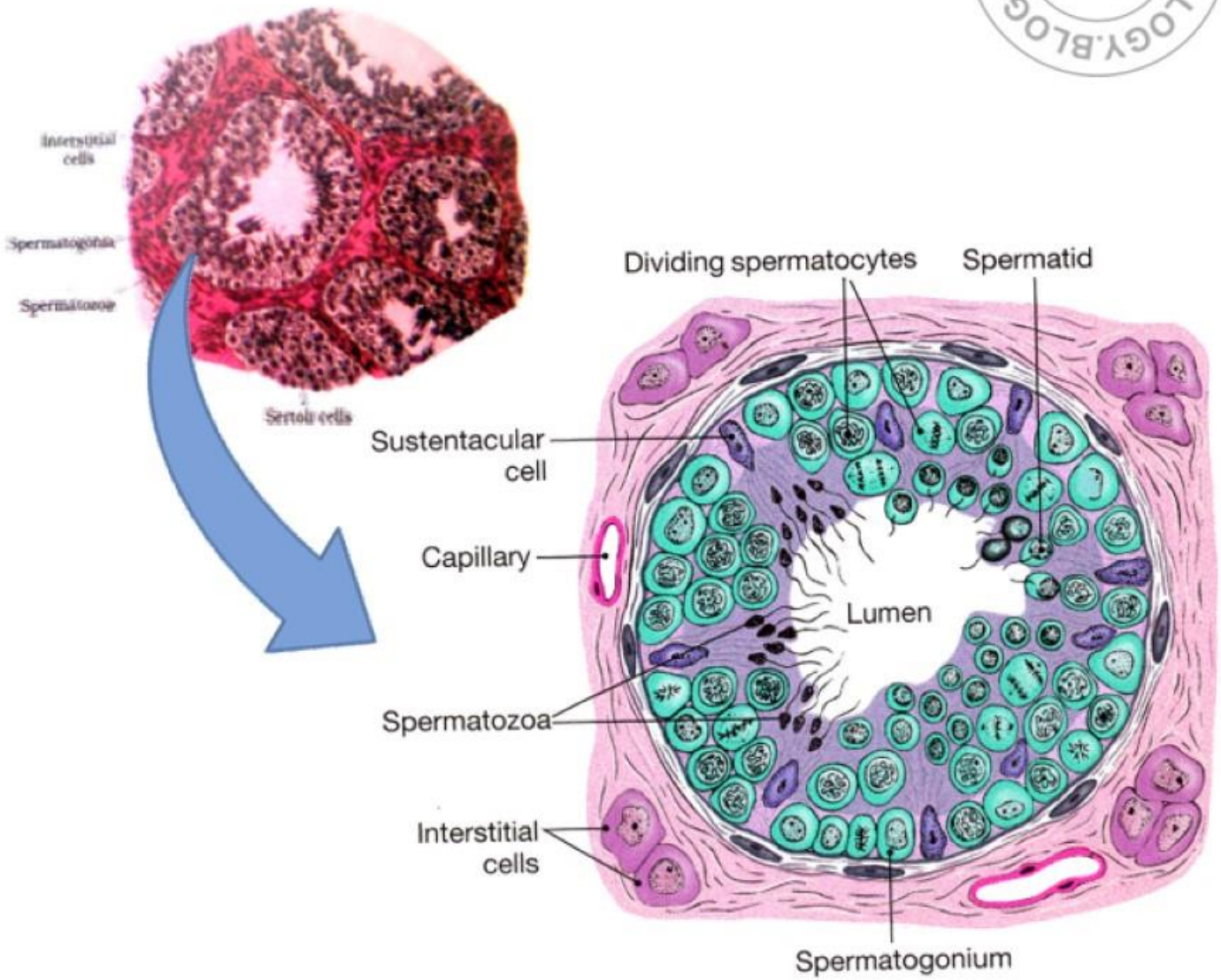


Diagrammatic sectional view of a seminiferous tubule (enlarged)

MALE REPRODUCTIVE SYSTEM

1. PAIRED TESTES

- The regions outside the seminiferous tubules (interstitial spaces) contain
  - Small blood vessels.
  - Interstitial cells or Leydig cells.
  - Immunologically competent cells.
- Leydig cells secrete testicular hormones (androgens).

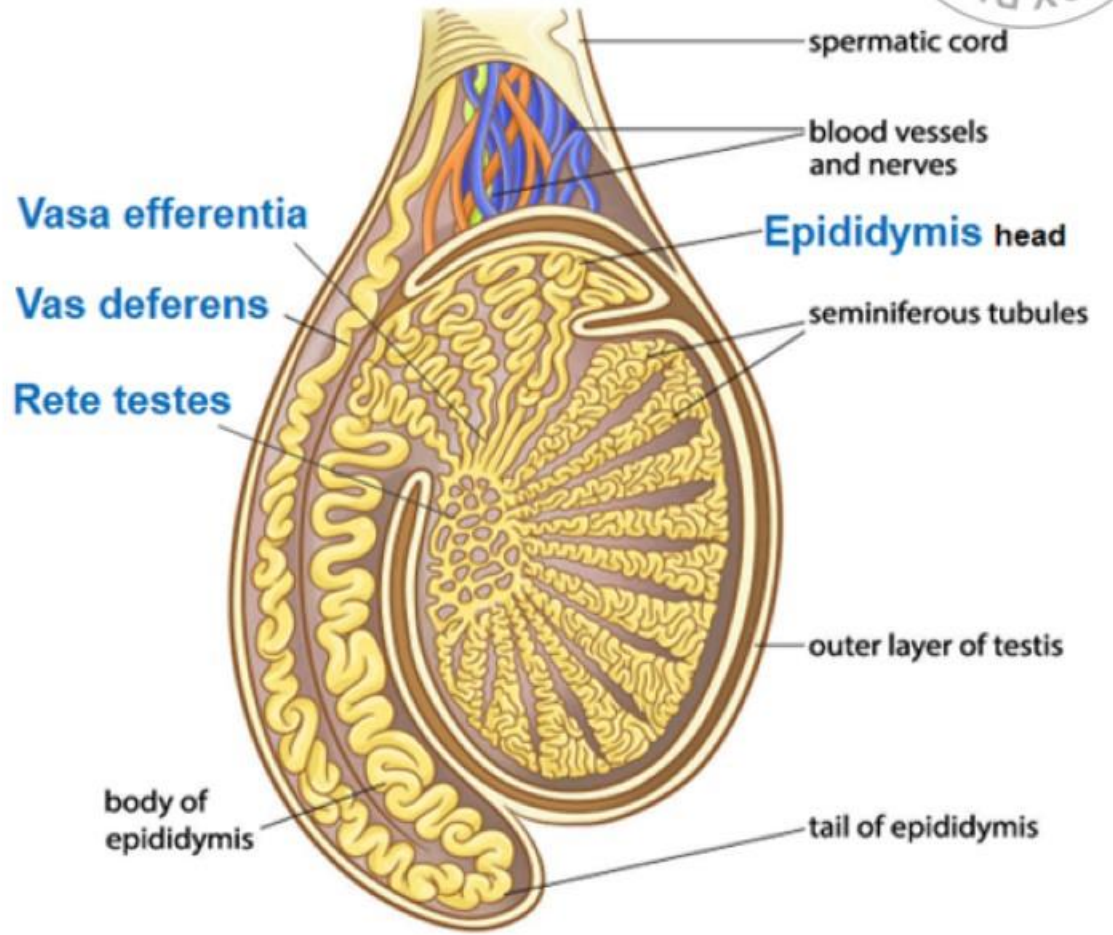


MALE REPRODUCTIVE SYSTEM

2. ACCESSORY DUCTS

Accessory ducts (Duct system)

- **Rete testis** (irregular cavities)
- **Vasa efferentia** (series of fine tubules)
- **Epididymis** (stores sperms temporarily)
- **Vas deferens**



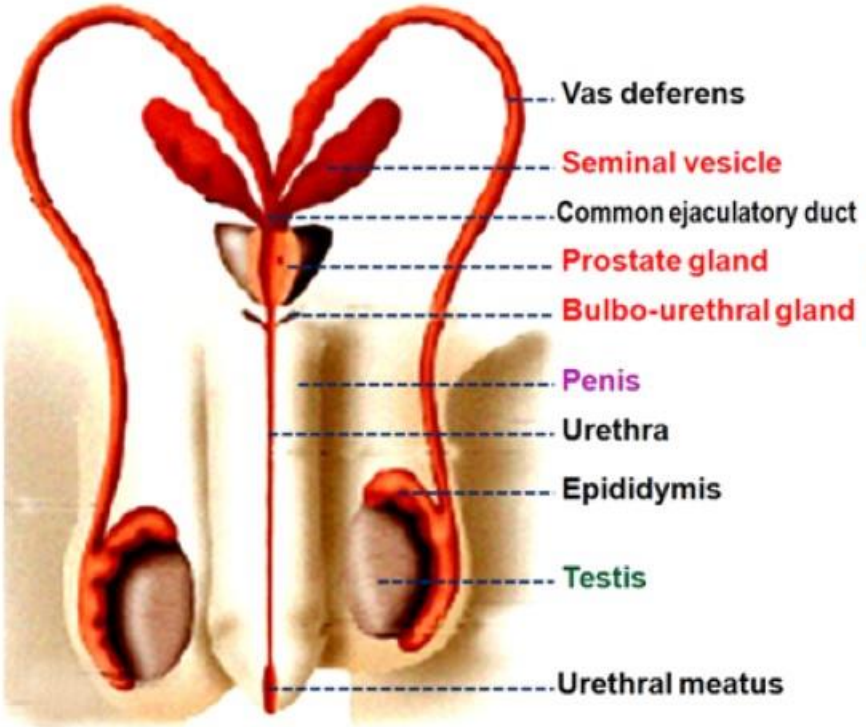
Vas deferens joins with a duct of seminal vesicle to form ***common-ejaculatory duct.***

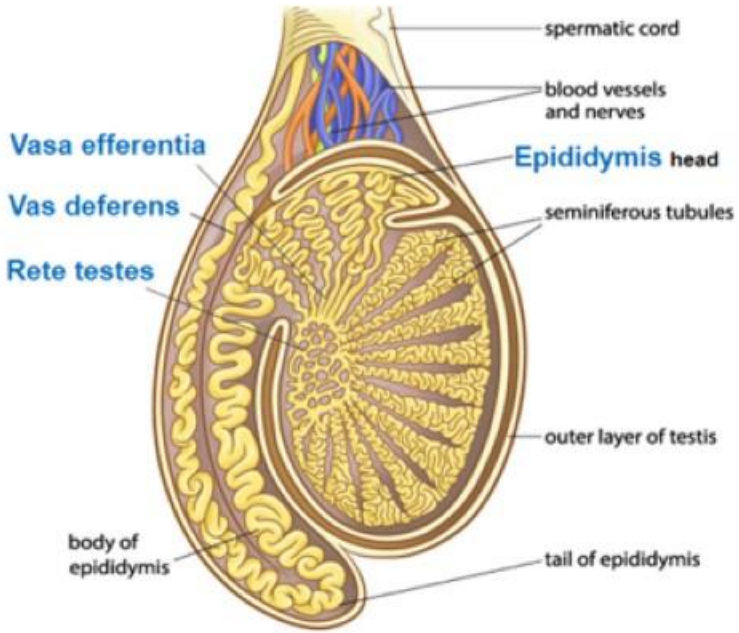
MALE REPRODUCTIVE SYSTEM

2. ACCESSORY DUCTS

Conduction of sperms through Accessory ducts

- Seminiferous tubules
- Rete testis
- Vasa efferentia
- Epididymis
- Vas deferens
- Common ejaculatory duct
- Urethra
- Urethral meatus





The urethra receives the ducts of prostate and Cowper's glands and passes through the penis.

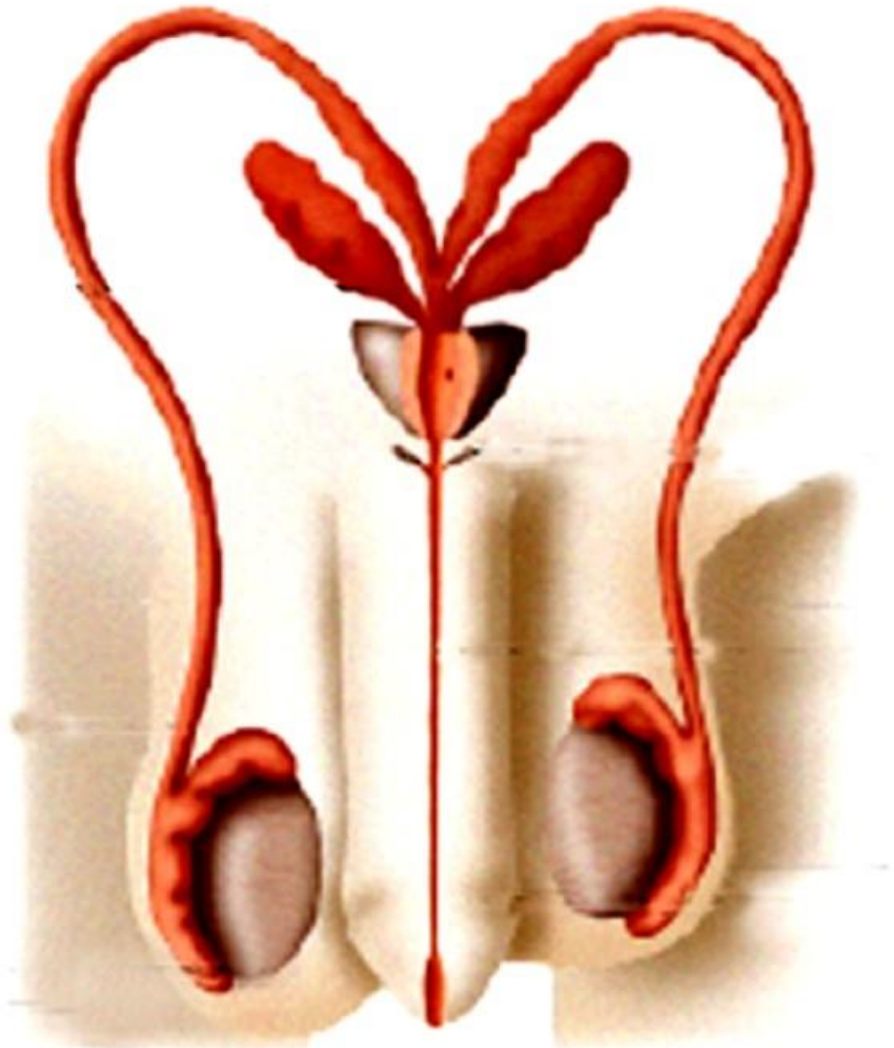
MALE REPRODUCTIVE SYSTEM

3. ACCESSORY GLANDS

- They include
  - A pair of seminal vesicles.
  - A prostate gland.
  - A pair of Cowper's (bulbo-urethral) glands.
- Their collective secretion is called seminal plasma. It is rich in fructose, Ca and enzymes.

Seminal plasma + Sperms → Semen

3. ACCESSORY GLANDS



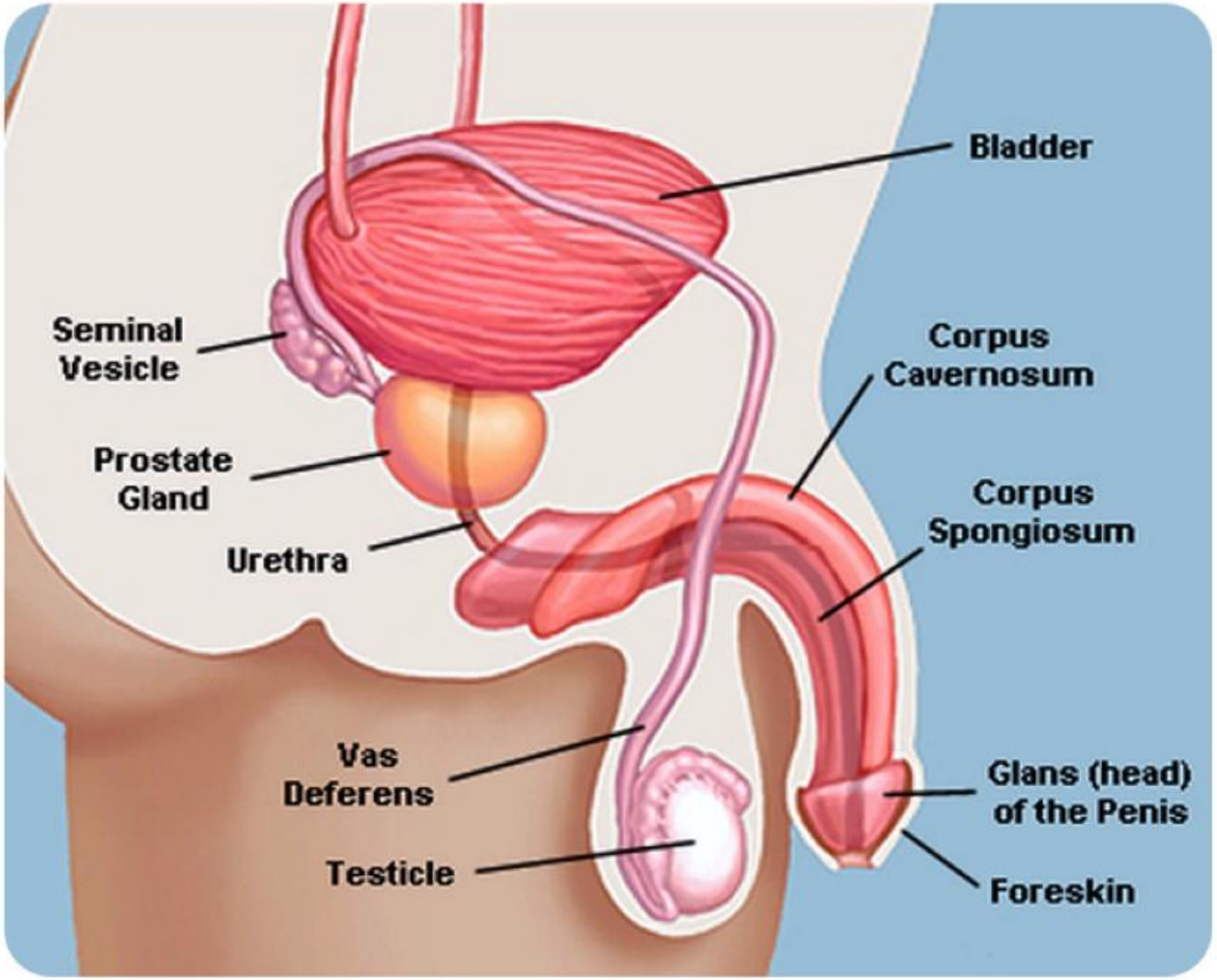
Functions of seminal plasma:

- Helps for transporting sperms.
- Supplies nutrients to sperms.
- Provides alkalinity to counteract acidity of uterus.
- Secretions of Cowper's glands lubricate the penis.

Secretions of epididymis, vas deferens, seminal vesicle & prostate help for maturation and motility of sperms.

MALE REPRODUCTIVE SYSTEM

4. PENIS (EXTERNAL GENITALIA)



- It is a copulatory organ.
- It is made up of special erectile spongy tissues.
- When spongy tissue is filled with blood, the penis erects. It facilitates insemination.
- The cone-shaped tip of the penis is called glans penis. It is covered by prepuce (foreskin).

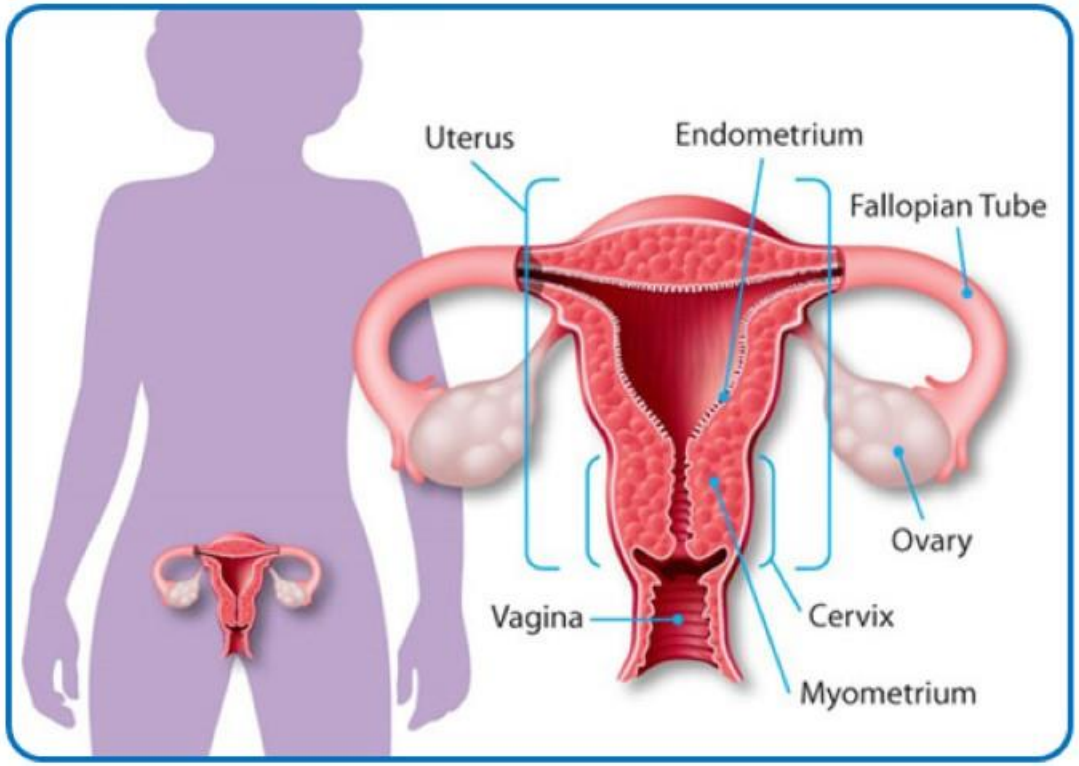
FEMALE REPRODUCTIVE SYSTEM

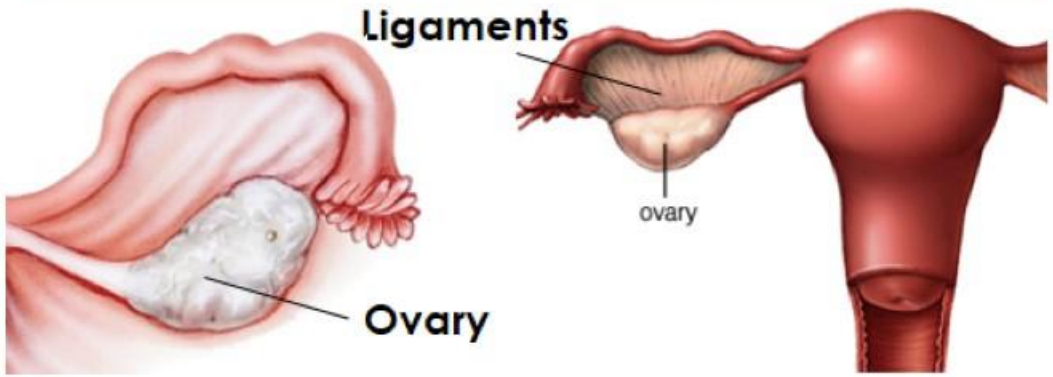
FEMALE REPRODUCTIVE HEALTH

- Female reproductive system
  - Paired ovaries
  - Accessory ducts
    - Oviducts (Fallopian tube)-2
    - Uterus
    - Vagina
  - External genitalia
    - Mons pubis
    - Vestibule
    - Hymen
    - Clitoris

FEMALE REPRODUCTIVE SYSTEM

1. PAIRED OVARIES

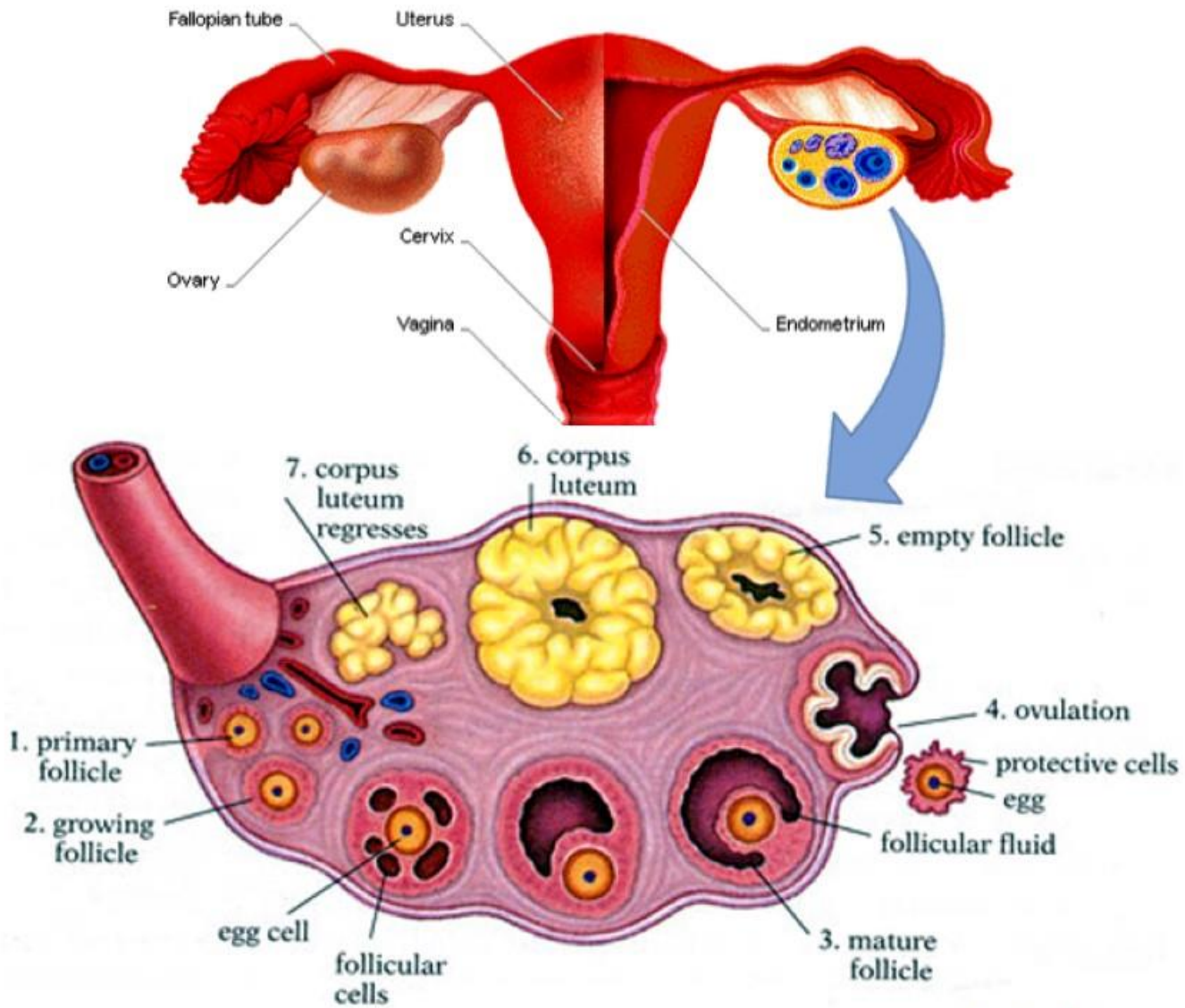




- Primary sex organs which produce ova (female gamete) & steroid ovarian hormones (estrogen & progesterone).
- Each ovary is about 2-4 cm in length.
- They are located on both side of the lower abdomen and connected to the pelvic wall and uterus by ligaments.

FEMALE REPRODUCTIVE SYSTEM

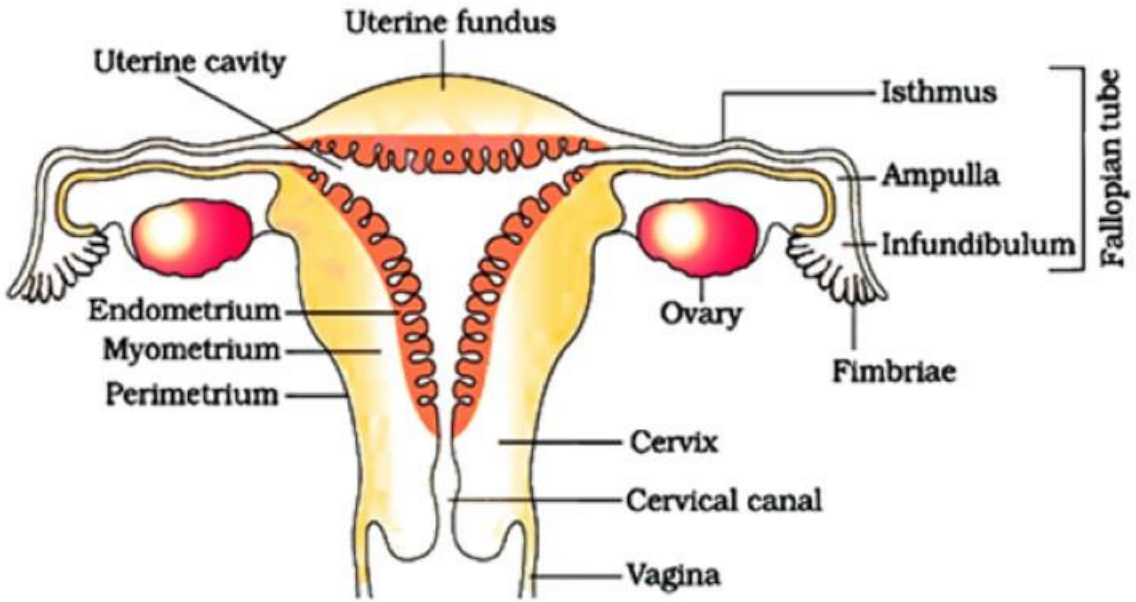
1. PAIRED OVARIES



- Each ovary is covered by a thin epithelium which encloses the ovarian stroma.
- The stroma has outer cortex and inner medulla.
- Ovary contains groups of cells (Ovarian or Graafian follicles).
- Each follicle carries a centrally placed ovum.

FEMALE REPRODUCTIVE SYSTEM

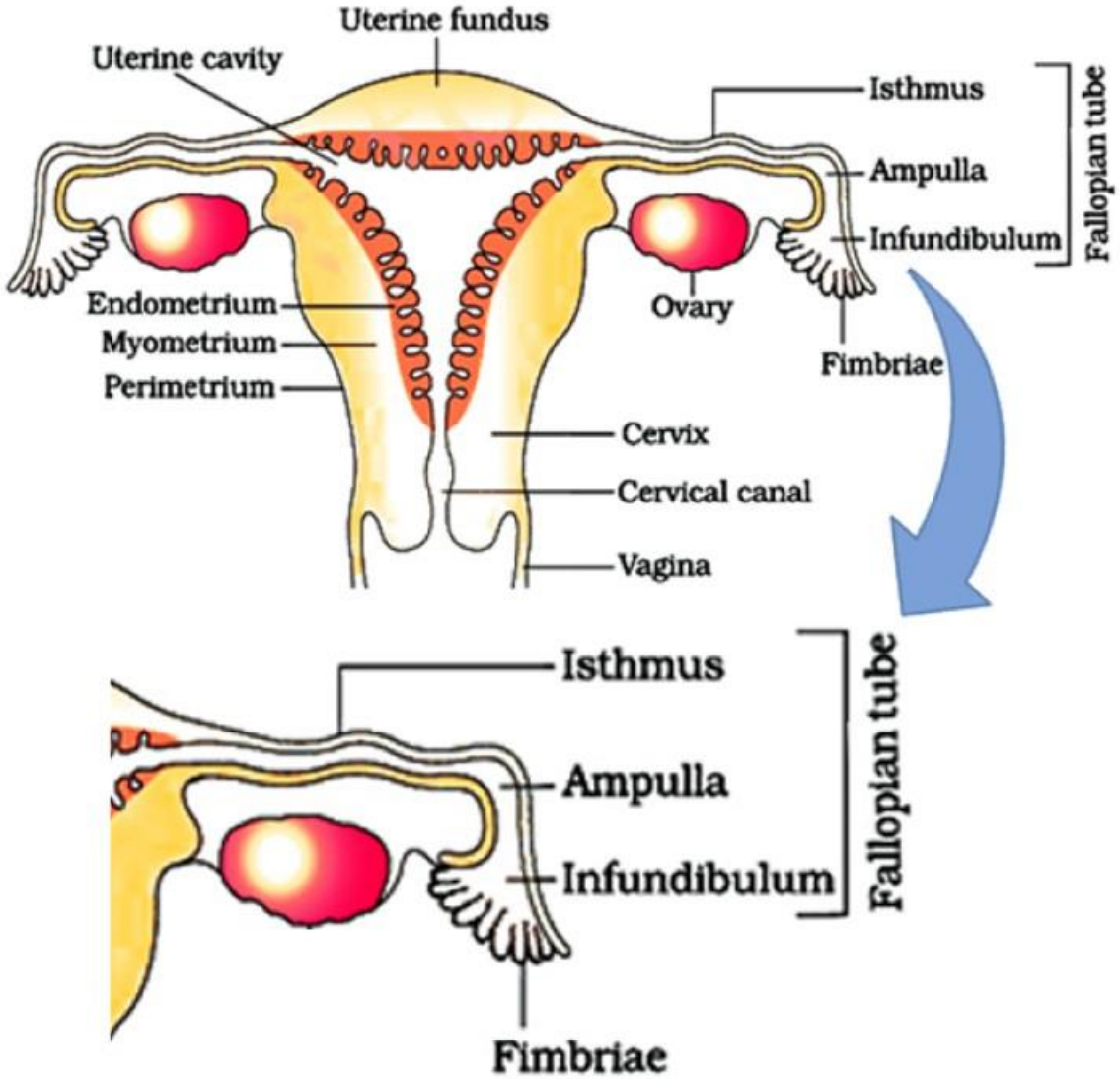
2. ACCESSORY DUCTS (DUCT SYSTEM)



- ACCESSORY DUCTS
  - 2 OVIDUCTS (FALLOPIAN TUBES)
  - UTERUS (WOMB)
  - VAGINA

FEMALE REPRODUCTIVE SYSTEM

2. ACCESSORY DUCTS (DUCT SYSTEM)

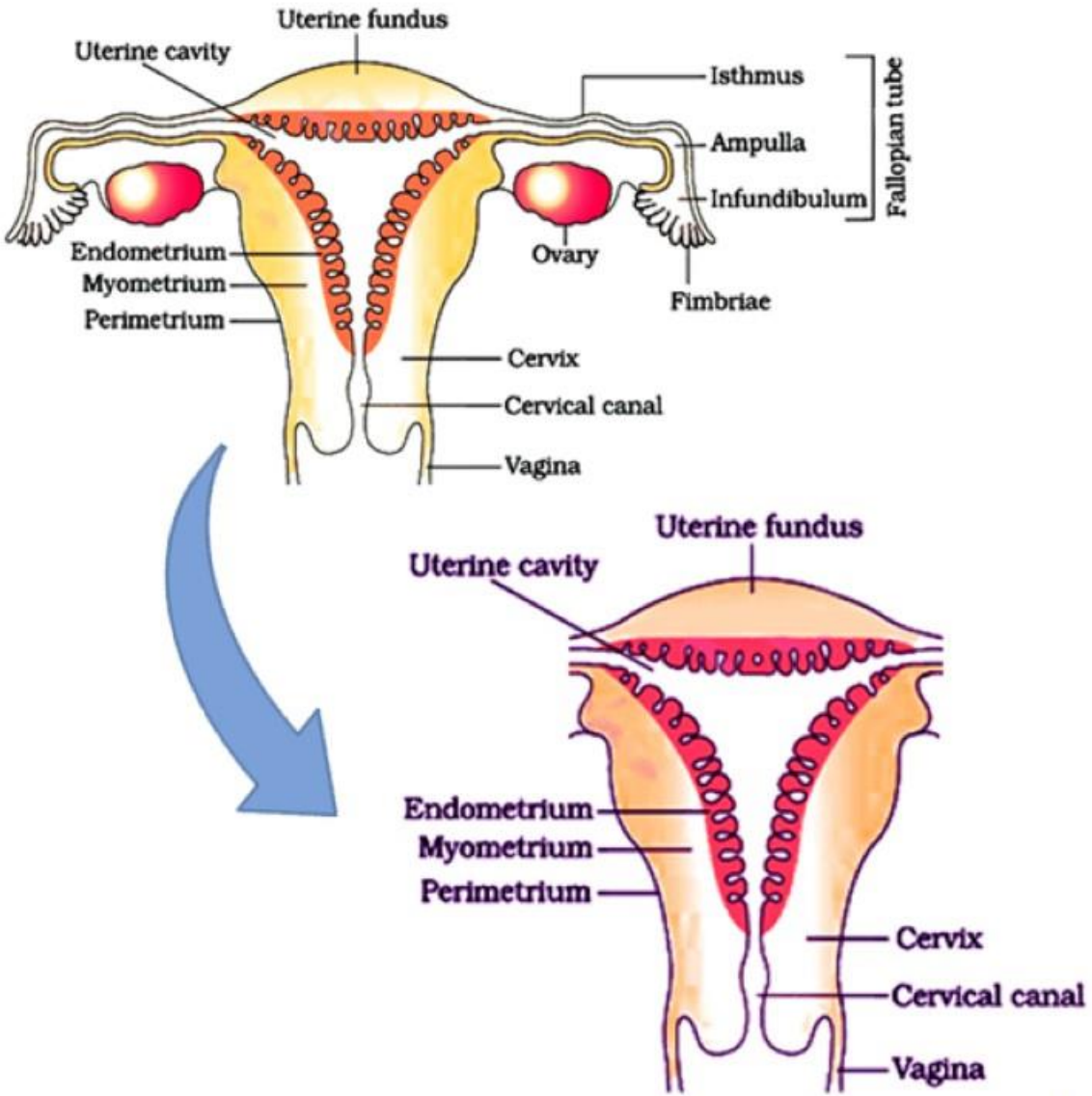


A. Oviducts (Fallopian tubes)

- Each oviduct is 10-12 cm long.
- It has 3 parts: Infundibulum, Ampulla & Isthmus.
  - Infundibulum: Funnel-shaped opening with many finger-like fimbriae. It helps to collect the ovum.
  - Ampulla: Wider part.
  - Isthmus: Narrow part. It joins the uterus.
- The ciliated epithelium lined the lumen of oviduct drives the ovum towards the uterus.

FEMALE REPRODUCTIVE SYSTEM

2. ACCESSORY DUCTS (DUCT SYSTEM)

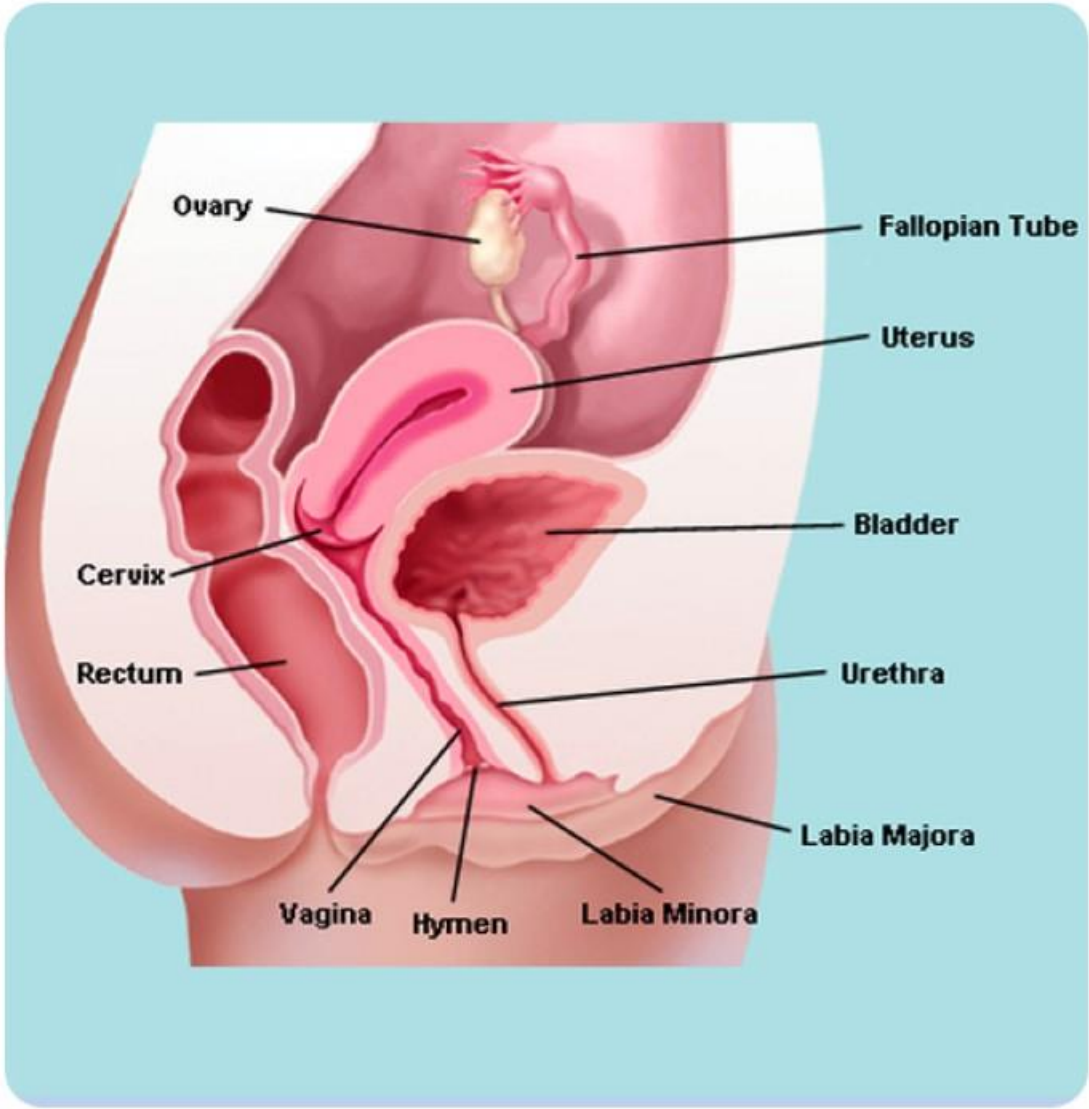


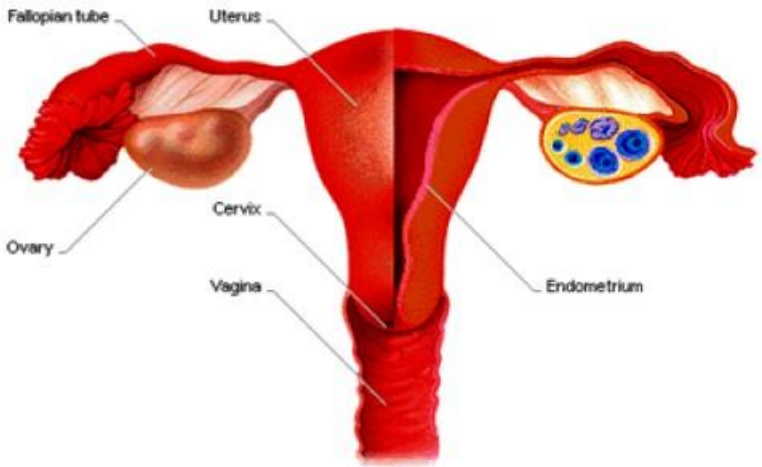
B. Uterus (womb)

- It is inverted pear shaped.
- It is supported by ligaments attached to the pelvic wall.
- Uterus has 3 parts: Upper fundus, middle body and terminal cervix.
- Cervix opens to vagina.
- The uterine wall has 3 layers:
  - Perimetrium: External thin membrane.
  - Myometrium: Middle thick layer of smooth muscle.
  - Endometrium: Inner glandular & vascular.

FEMALE REPRODUCTIVE SYSTEM

2. ACCESSORY DUCTS (DUCT SYSTEM)



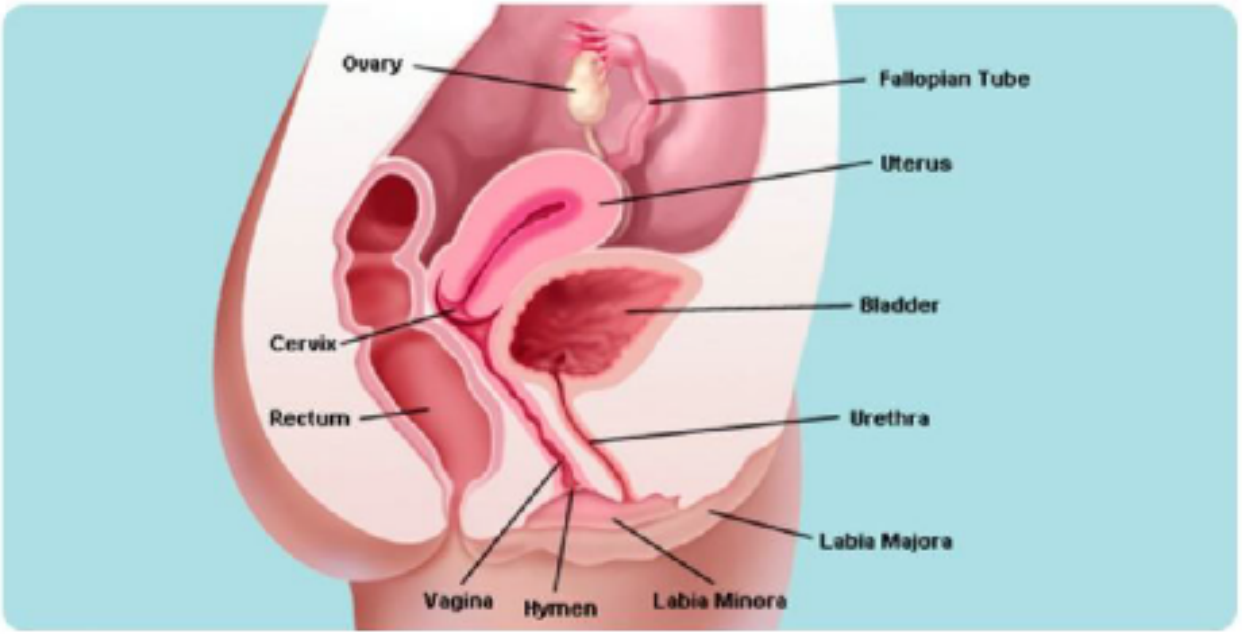


C. Vagina

- It opens to exterior between urethra and anus.
- The lumen of vagina is lined by a glycogen-rich mucous membrane consisting of sensitive papillae and Bartholin's glands.
- The secretions of Bartholin's glands lubricate penis during sexual act.

FEMALE REPRODUCTIVE SYSTEM

3. EXTERNAL GENITALIA (VULVA/PUDENDUM)



- Consist of Mons pubis, vestibule, hymen & clitoris.

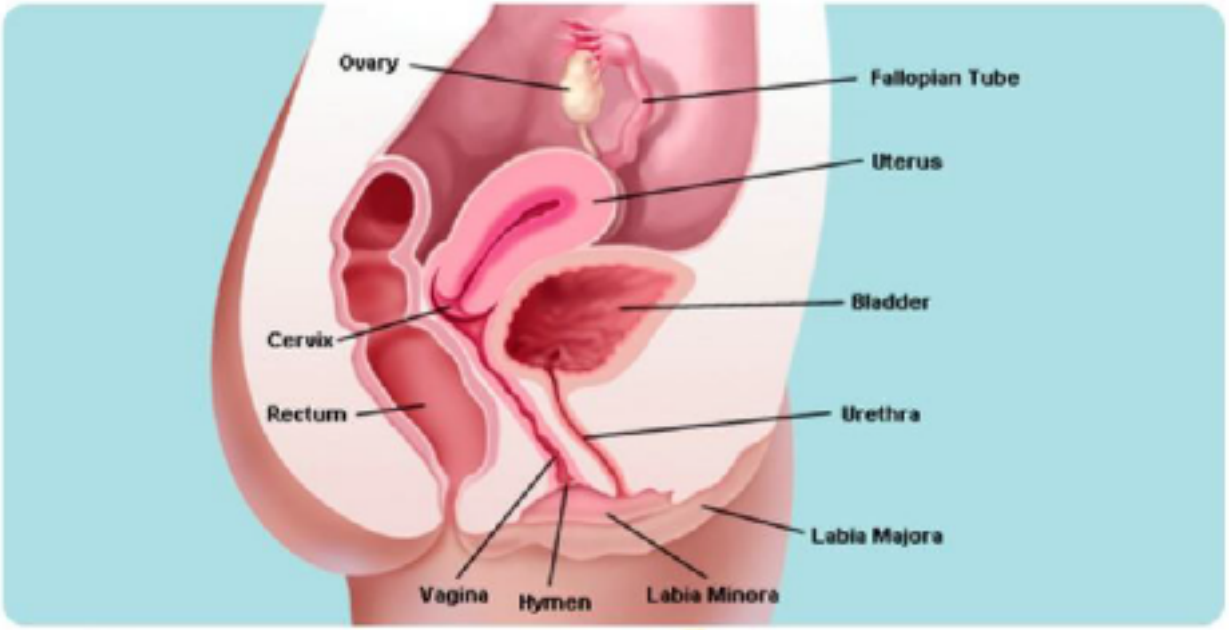
A. Mons pubis

- A cushion of fatty tissue covered by pubic hair.

B. Vestibule

- A median channel. It includes
  - Labia majora: Large, fleshy, fatty and hairy outer folds. Surrounds vaginal opening.
  - Labia minora: Small, thin and hairless inner folds.

3. EXTERNAL GENITALIA (VULVA/PUDENDUM)



C. Hymen (Maiden head)

- A membrane which partially cover the vaginal opening. It is often torn during the first coitus.

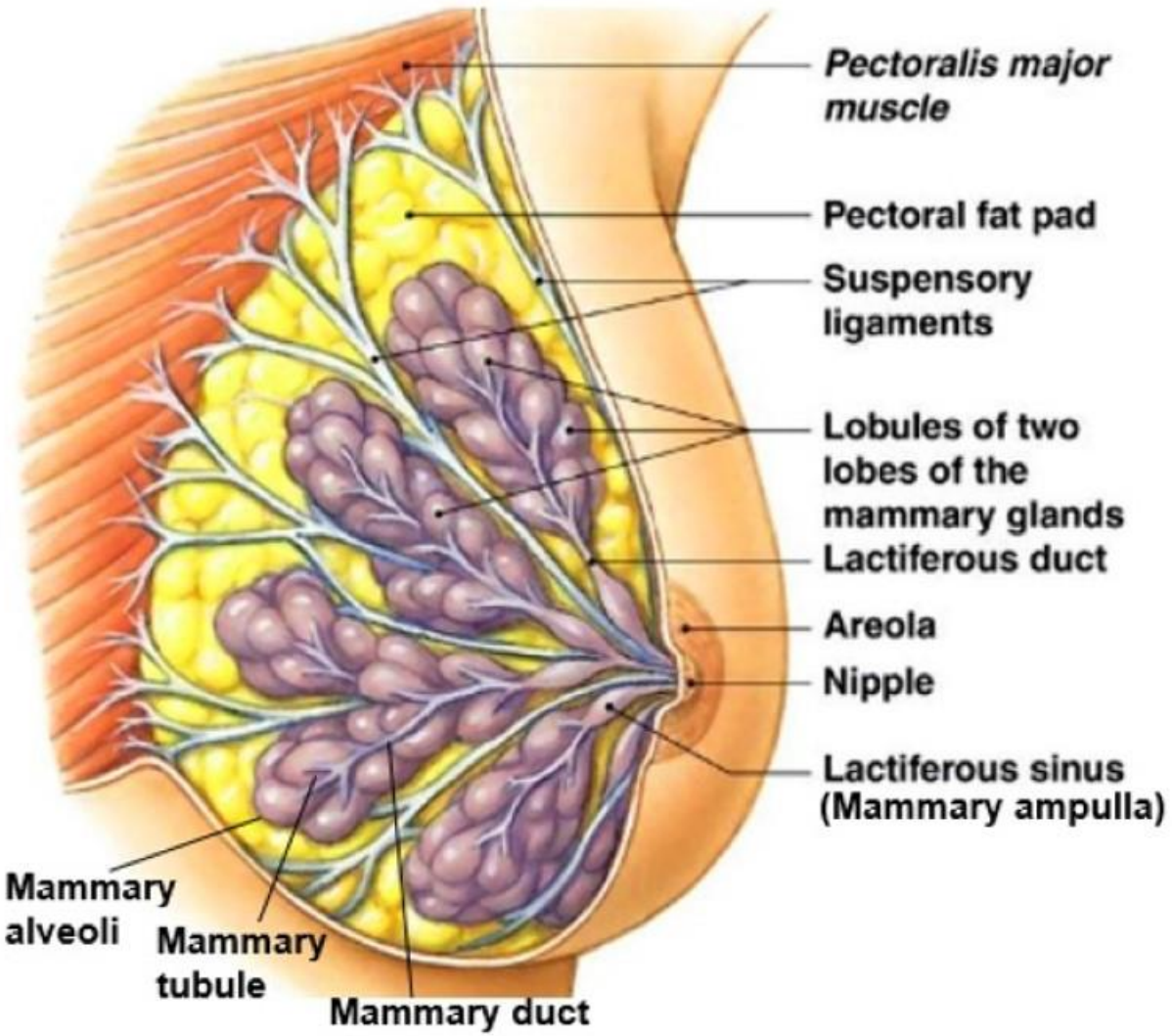
Hymen may also be broken by a sudden fall or jolt, insertion of a vaginal tampon, active participation in some sports items etc. In some women, hymen persists even after coitus. So the hymen is not a reliable indicator of virginity.

D. Clitoris

- A highly sensitive organ lying just in front of the urethral opening.

FEMALE REPRODUCTIVE SYSTEM

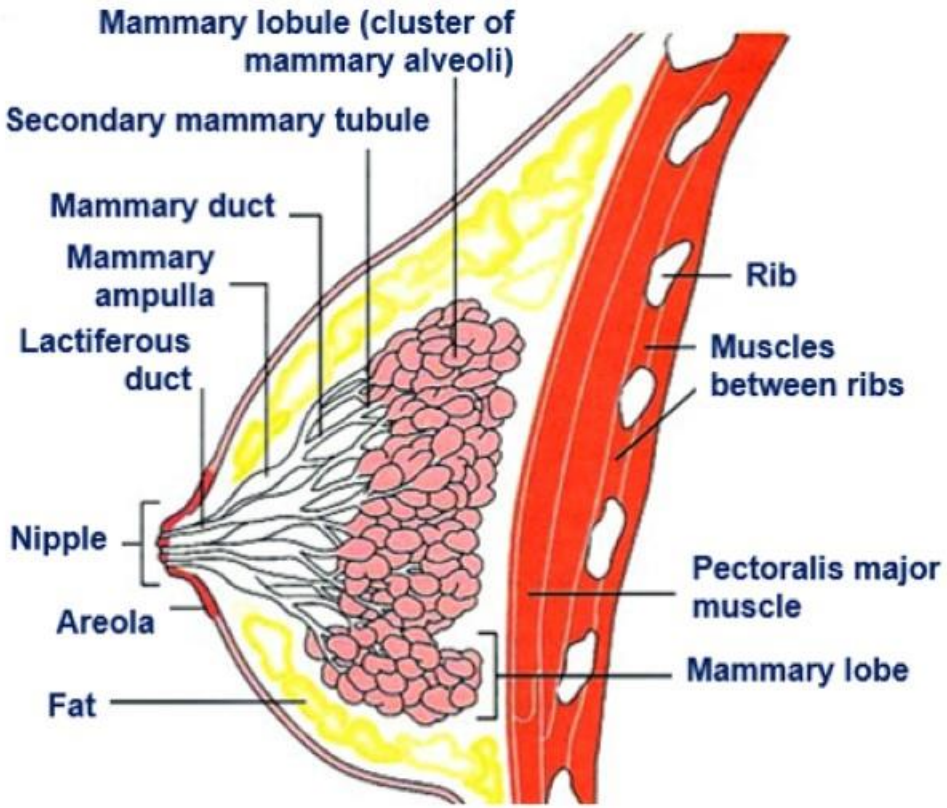
MAMMARY GLANDS (BREASTS)



- A pair of mammary glands contains glandular tissue & fat.
- Glandular tissue of each breast has 15-20 mammary lobes containing clusters of cells (mammary alveoli).
- The cells of alveoli secrete milk. It is stored in the cavities (lumen) of alveoli.

FEMALE REPRODUCTIVE SYSTEM

MAMMARY GLANDS (BREASTS)



- The alveoli open into mammary tubules.
- The tubules of each lobe join to form a mammary duct.
- Several mammary ducts join to form a wider mammary ampulla which is connected to lactiferous duct through which milk is sucked out.

Sequence of milk conduction

Mammary alveoli → Mammary tubule → Mammary duct → Mammary ampulla → Lactiferous duct