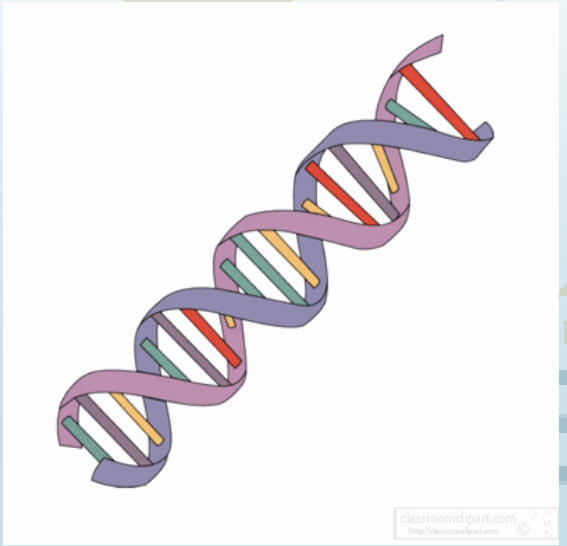
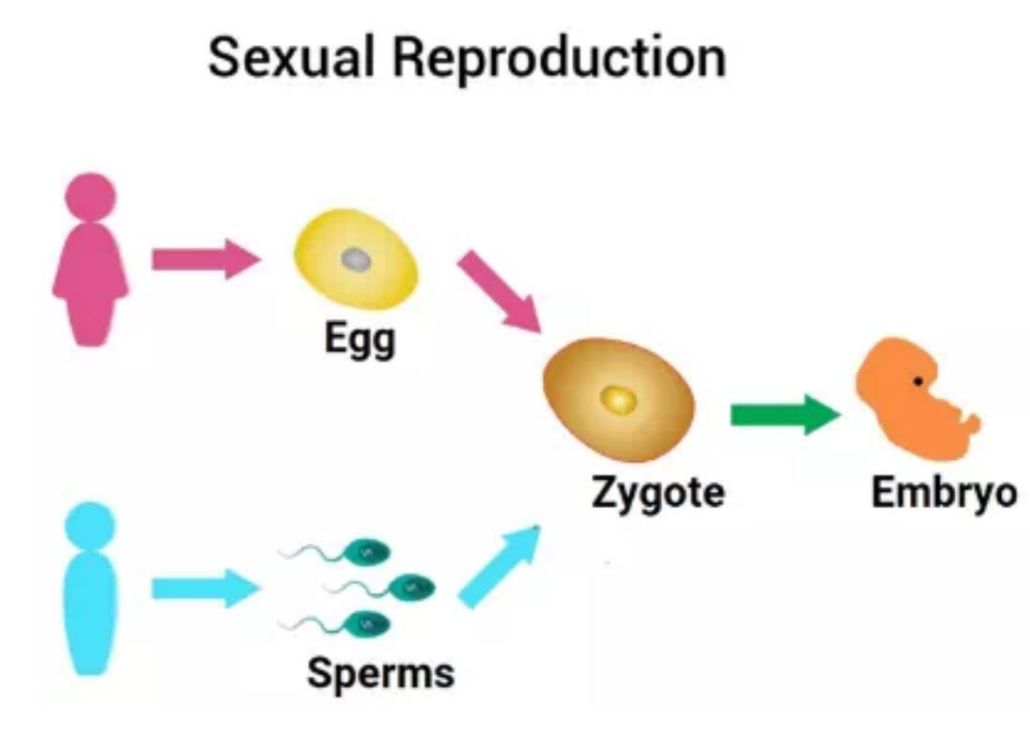
Part I

Reproduction and Genetics



Chapter 1

Basic Mechanisms of Sexual Reproduction



Chapter 1

Basic mechanisms of sexual reproduction

Reproduction is an essential biological function of all living organisms. Its major role is to ensure the continuity of the species.

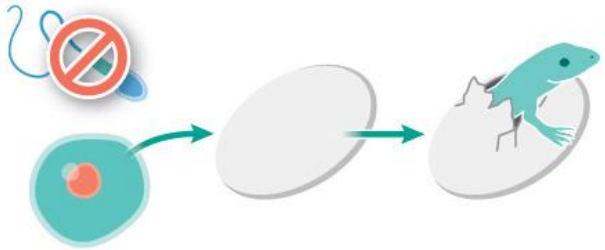
Some organisms reproduce asexually by amitotic cellular division. This type of reproduction gives rise to descendants that are identical to their parents. Other organisms reproduce sexually. Sexual reproduction involves specialized systems and complicated mechanisms, which promote genetic diversity among the members of a species.

TYPES OF ASEXUAL REPRODUCTION

Asexual reproduction involves the production of offspring by a single individual without contribution of genetic material from another individual.

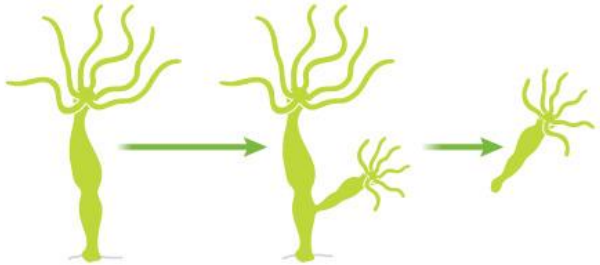
PARTHENOGENESIS

Reproduction from a female gamete without fertilization



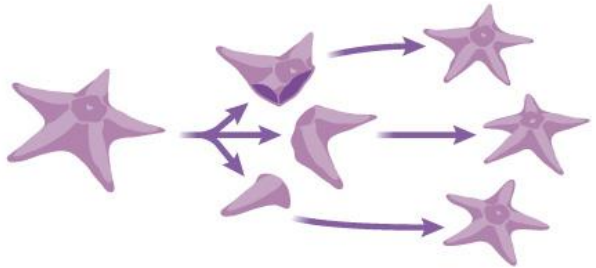
BUDDING

An offspring grows right out of the body of the parent.



FRAGMENTATION

A parent breaks into multiple pieces that develop into fully functioning individuals.



This chapter includes the following:

(Referring to the National textbook)

- Document 1: Male and Female Reproductive Systems
- Document 2: Diploid and Haploid Cells
- Document 3: Meiosis
- Document 4: Spermatogenesis
- Document 5: Oogenesis
- Document 6: Fertilization

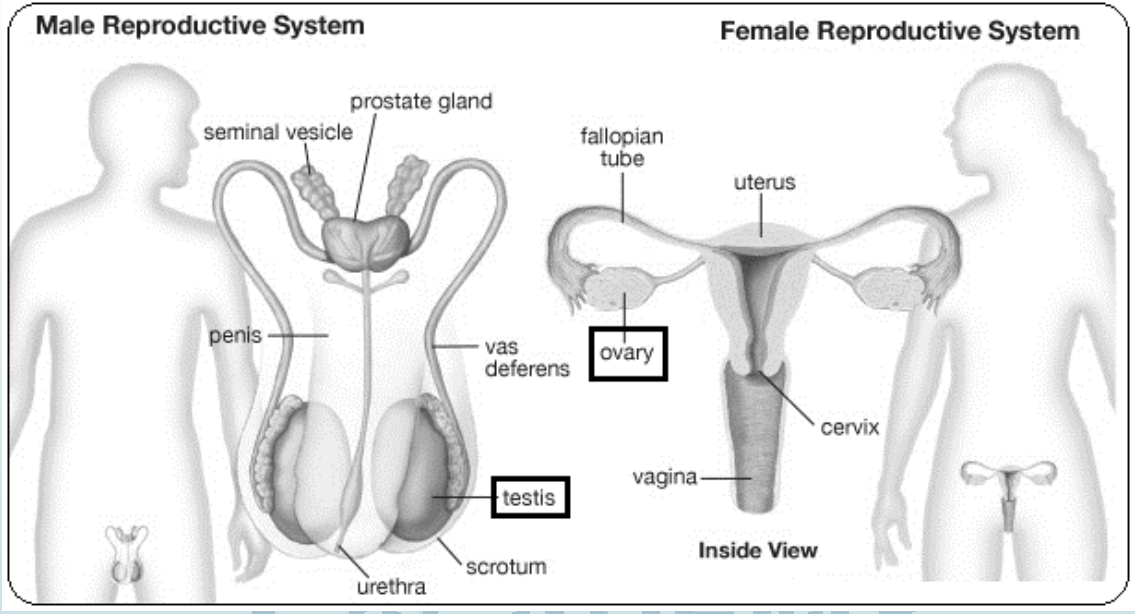
Document 1:

Male and Female Reproductive Systems

- Sexual reproduction:

Is the production of new off springs to ensure the continuity of species that involves two individuals of opposite sex (male and female) belonging to the same species.

- Sexual reproduction necessitates the presence of a male and female reproductive system.

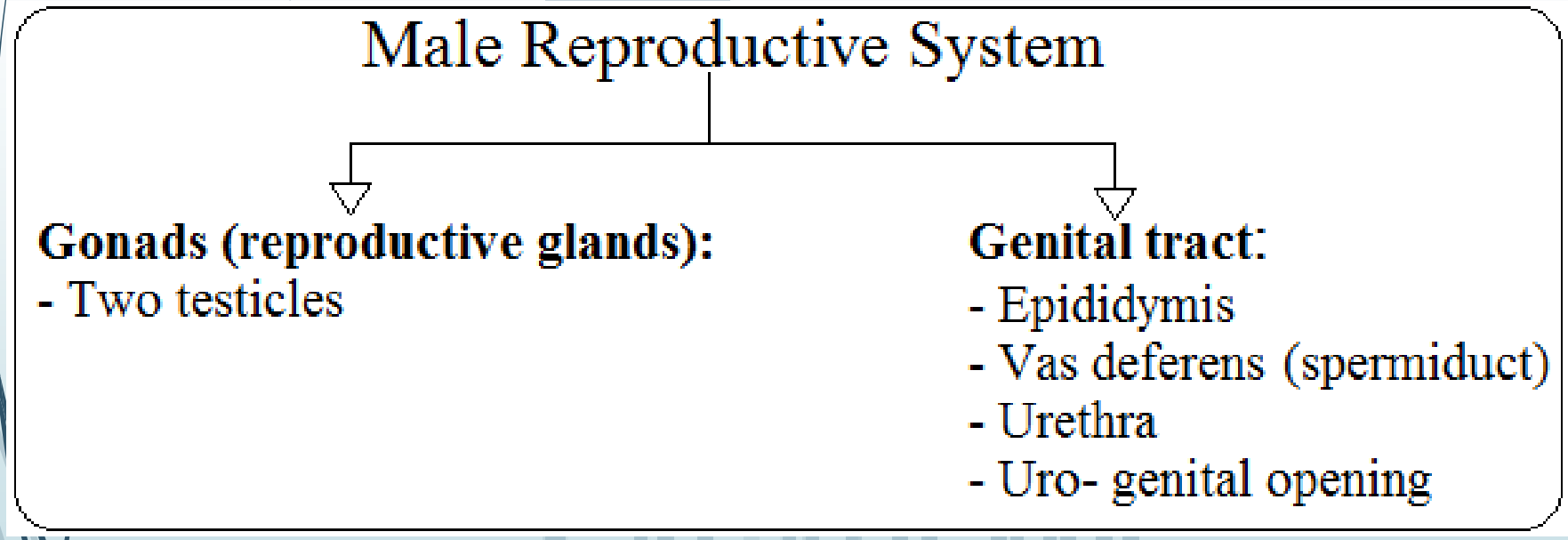


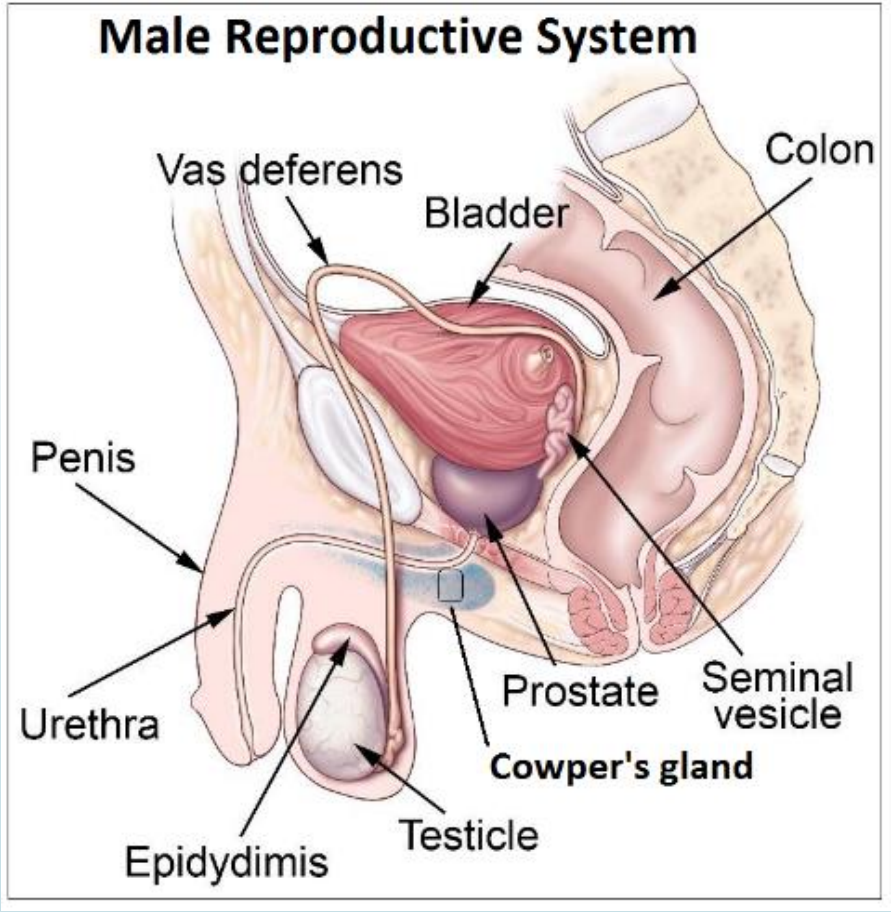
- How are these systems organized?

- What are the functions of the organs constituting them?

Male Reproductive System

- Doc. a p.18

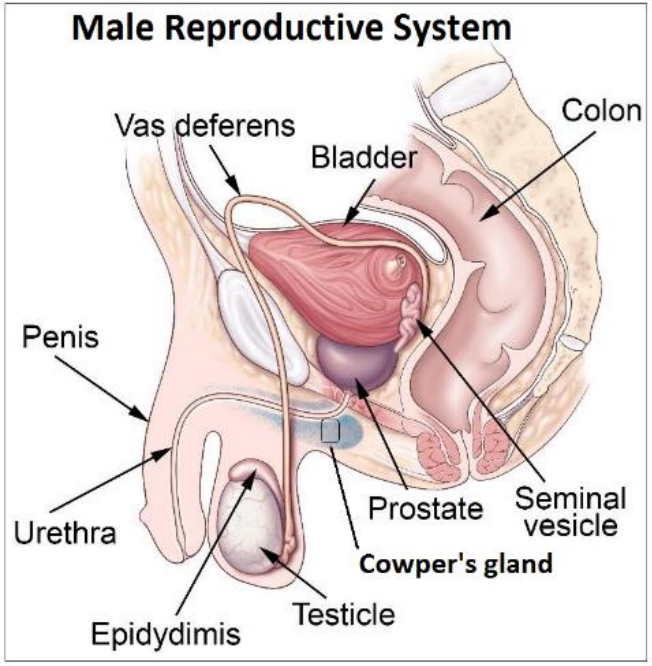



Male Reproductive System
Vas deferens
Bladder
Colon
Penis
Urethra
Prostate
Seminal vesicle
Cowper's gland
Epidydimis
Testicle

*Main functions of the organs of the male reproductive system:

Testicles or Testis:

- They are two in number.
- They are located outside the abdomen and enclosed in a pouch of skin known as the scrotum.
- Role: production of sperms (male reproductive cells or gametes) and testosterone (male sex hormone responsible for secondary sexual characteristics such as voice, body hair distribution ...)



➢ Epididymis (2):

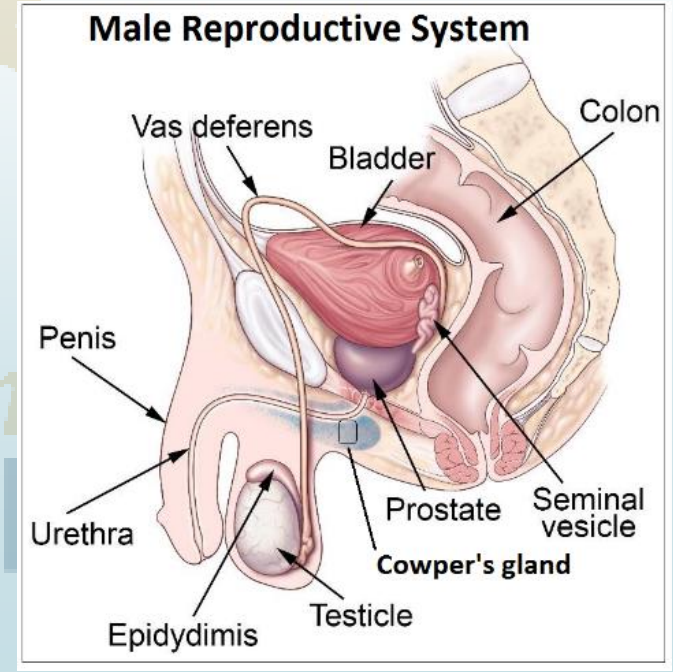
- It is a coiled tube located above each testicle.
- **Role:** It is the site of maturation and storage of the sperms.

➢ Accessory glands:

1- Seminal vesicles

2- Prostate

3- Cowper’s glands



- Role of Accessory glands:

- Production of seminal fluid which contains nutrients that ensures sperm survival and provide energy needed for sperm motility (movement).
- Semen is a whitish fluid that contains: seminal fluid (9/10 or 90 %) + sperms (1/10 or 10 %).
- Volume of the semen ejaculated from the penis is 3-4 ml, where every 1 ml contains ≈100 million sperms.

- **Vas deferens (sperm duct):**

Is a tube which conducts and stores sperms.

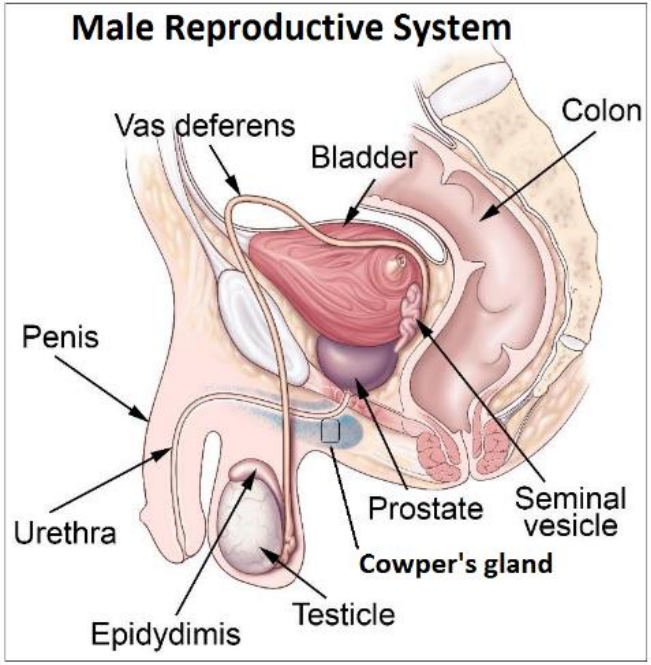
- **Urethra (uro-genital tube):**

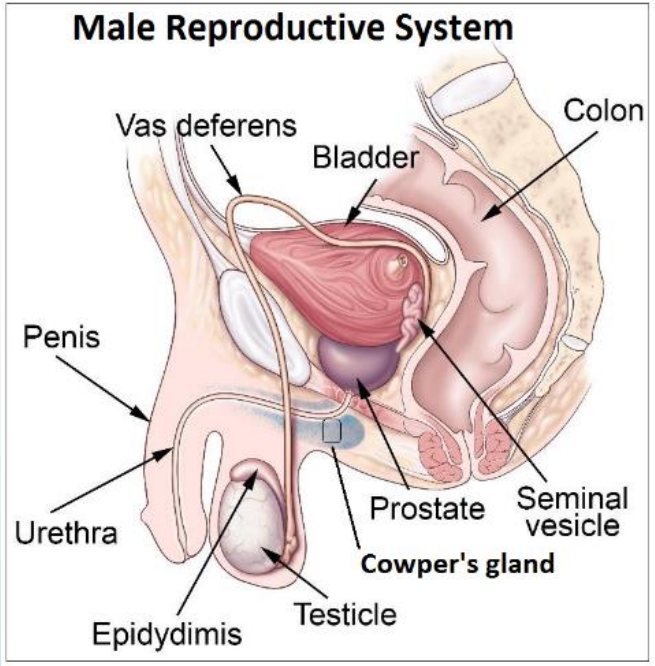
Is a tube through which semen or urine is conducted (carried) separately.

- **Uro- genital opening:**

Opening through which either semen or urine is released to the outside.

- **penis:** organ of copulation.





⇨ **Pathway of sperms inside the male reproductive system:**
testicels → epididymis → vas deferens (sperm duct) → utethra (uro-genital tube) → uro-genital opening.

II. Female Reproductive System

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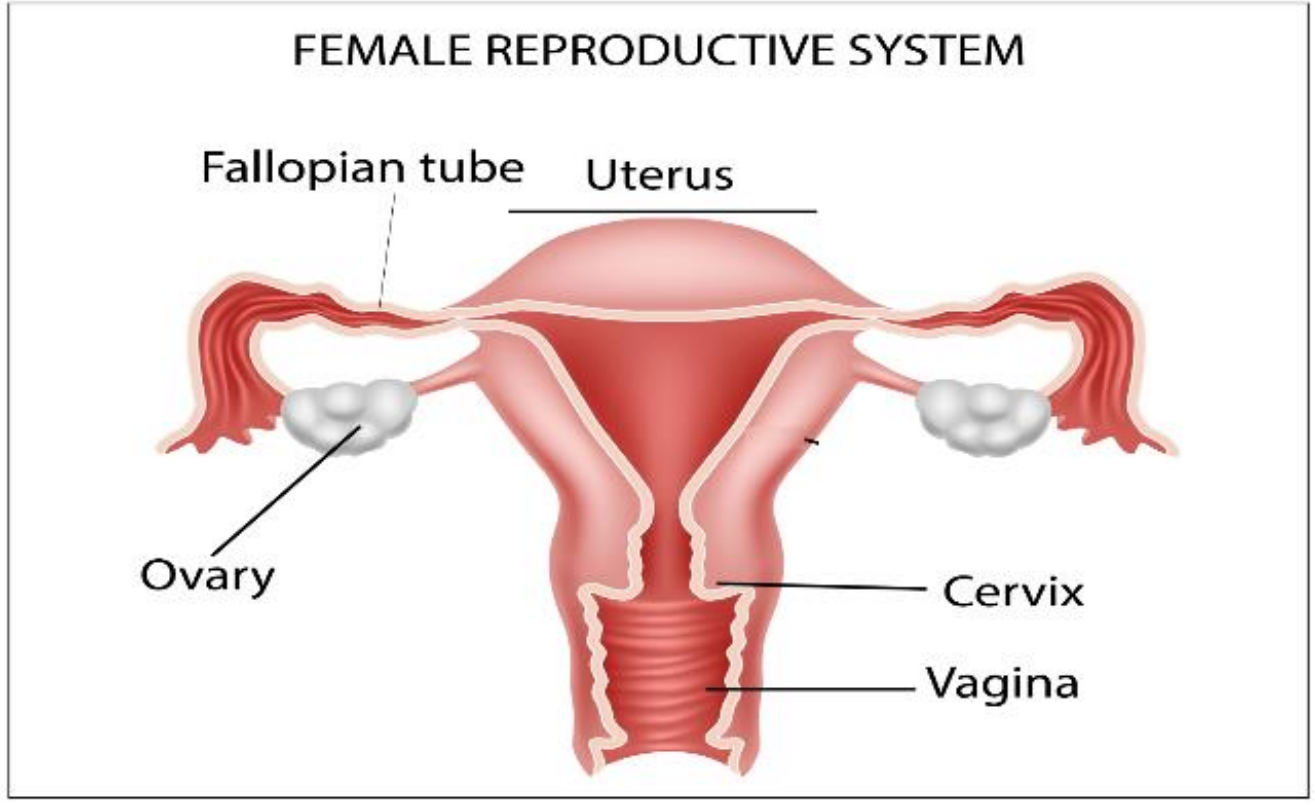
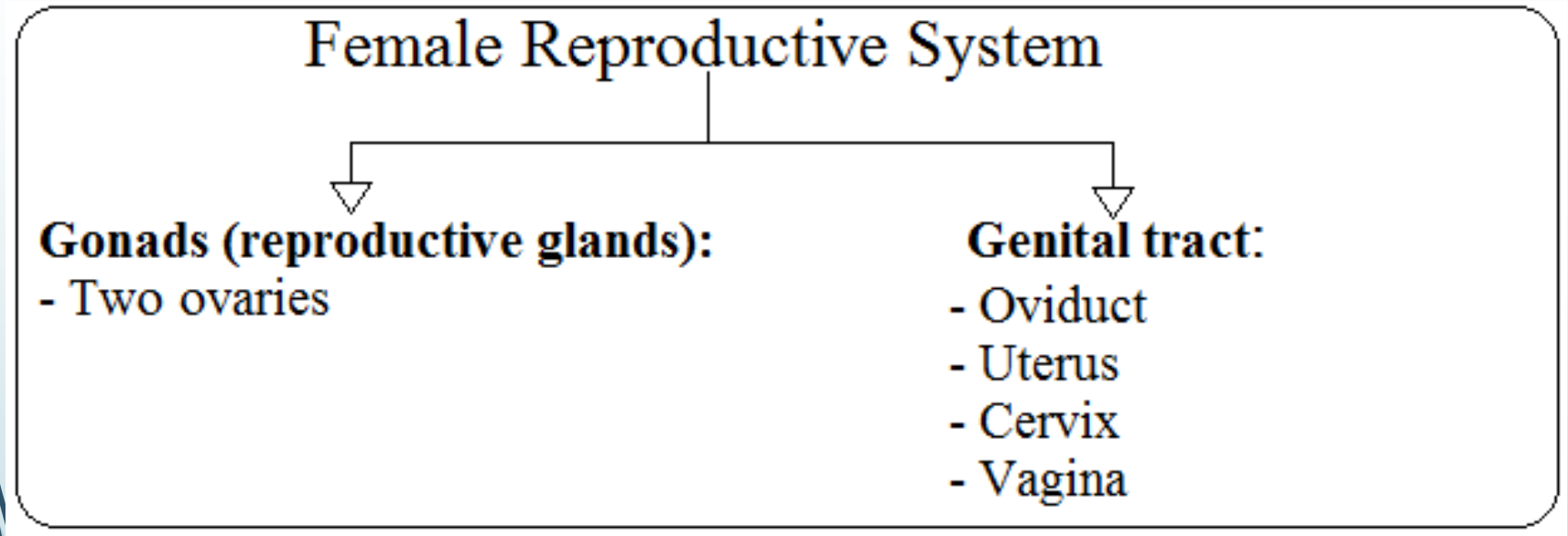
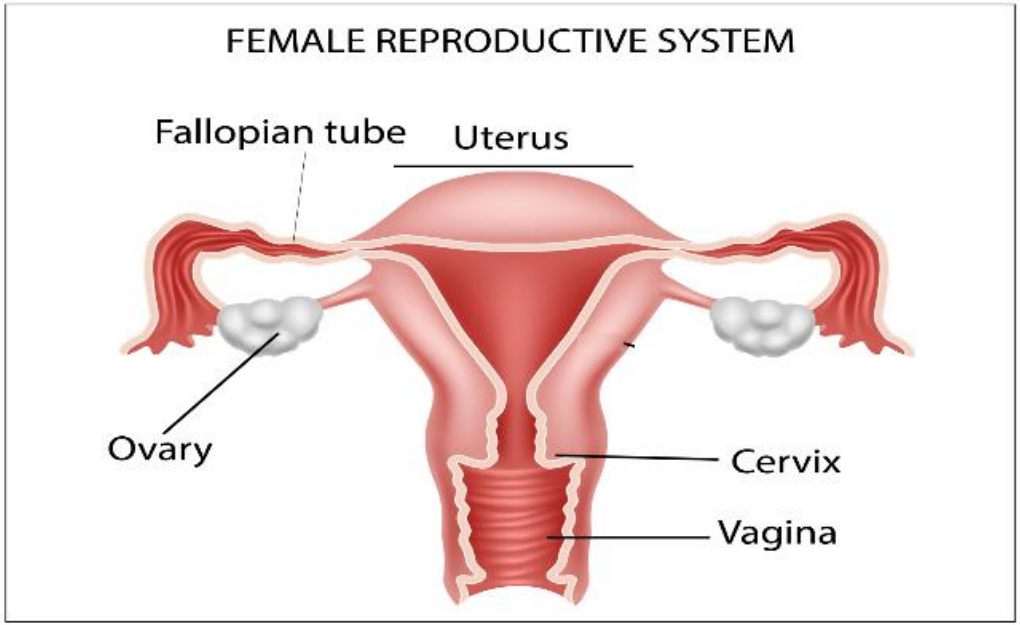



Female Reproductive System
Gonads (reproductive glands):
- Two ovaries
Genital tract:
- Oviduct
- Uterus
- Cervix
- Vagina

*Main functions of the organs of the female reproductive system:

- Ovaries:

- They are two in number, located inside the abdomen of the female.
- Role: production of oocytes (female reproductive cells or gametes) and female sex hormones (estrogen and progesterone) that are responsible for female secondary sexual characteristics such as voice, distribution of body hair and fat....
- Starting from puberty, each month one of the ovaries will release an oocyte (oocyte II) into the oviduct, this is called ovulation.

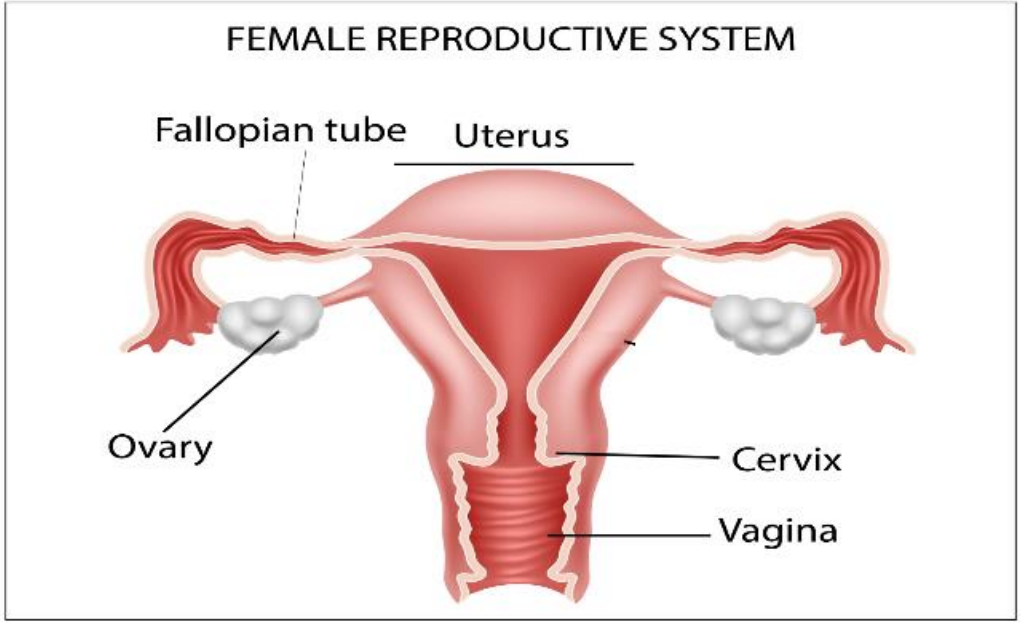


- Oviducts (fallopian tube):

- **Role:** Reception of released oocyte at day of ovulation and site of fertilization.
- First part of fallopian tube is called pavilion.

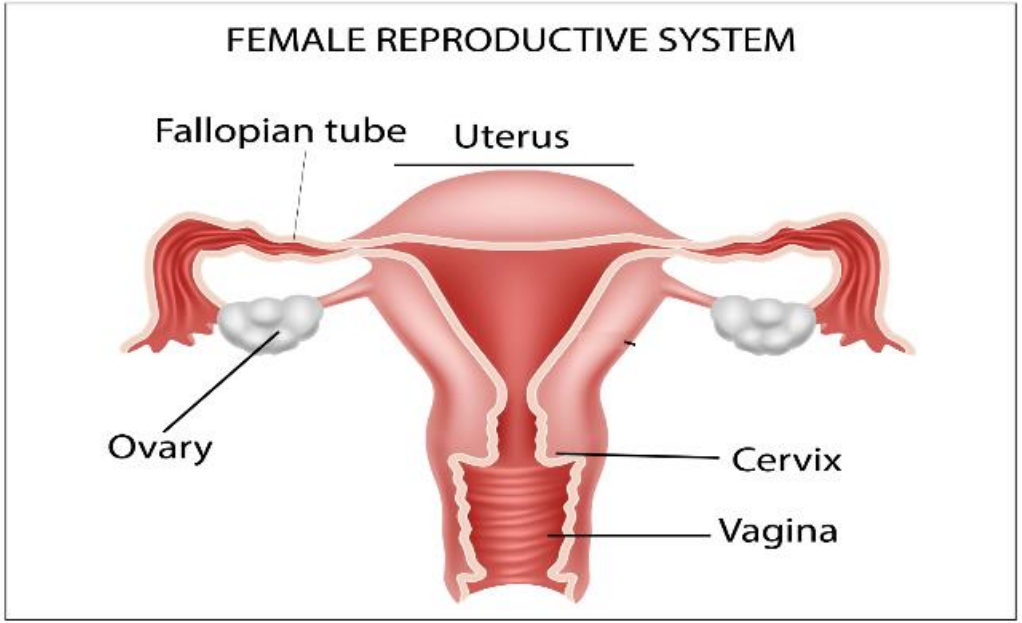
- Uterus:

Role: Site of implantation and development of the embryo.



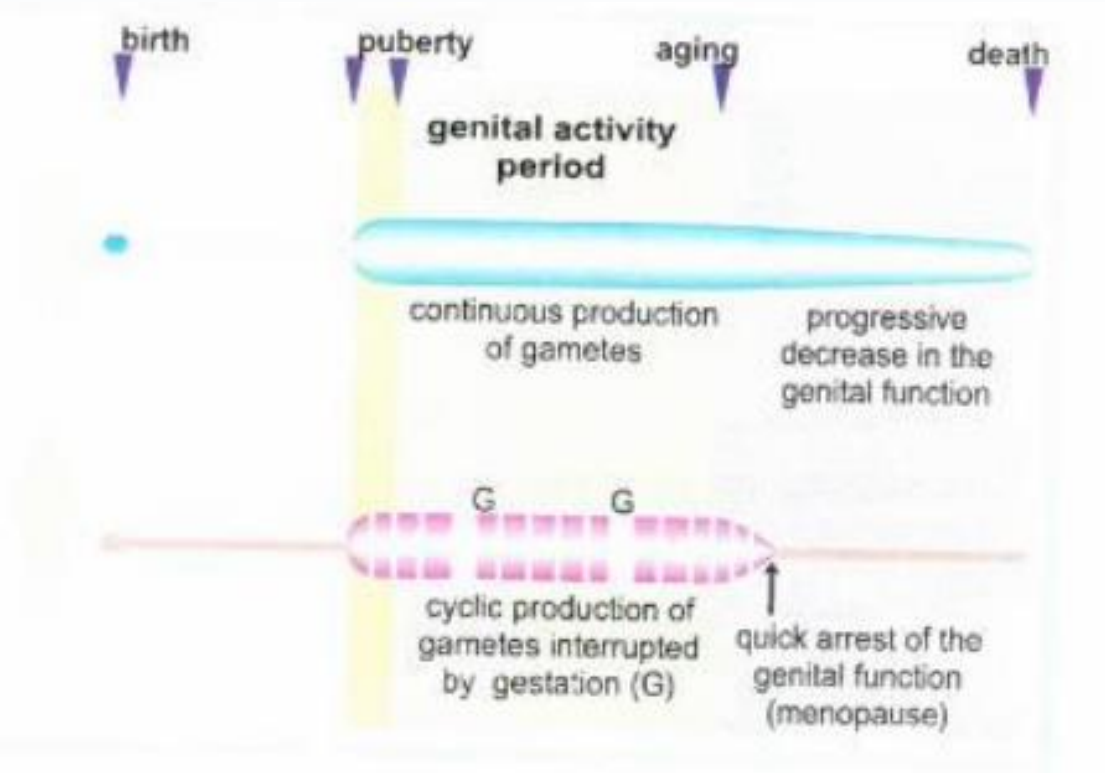
- **Cervix:**
  It is the part that connects the uterus to the vagina.
- **Vagina:**

It is the organ of copulation; it contains mucus glands that secrete mucus substance.



III. Activity of the male and Female Reproductive Systems:

- Doc. f p.19
- **In males**, starting from puberty, there is a continuous production of sperms till death, but it decreases with age.
- **In females,** starting from puberty there is a discontinuous cyclic (once a month) production of oocytes, but it is interrupted during gestation (pregnancy), and stops completely at menopause where the ovaries become depleted of oocytes.



Probing the documents

1. Construct a comparative table of the following male and female reproductive organs: gonads, genital ducts and copulatory organs.
2. Indicate the spermatozoa pathway through the male reproductive tract, from their production site to their ejaculation.
3. Why do spermatozoa need a seminal fluid?
4. Determine the mode of action of both male and female reproductive systems ***(Doc.f)***.

1- Title: Comparative table of the male and female reproductive systems

	Female reproductive system	**Male reproductive system**
gonads	ovaries	testes
Genital ducts	Fallopian tubes	Epididymides, vasa deferentia, urethra
Copulatory organ	Vagina	penis

2- Tests ➡ epididymides ➡ vasa deferentia ➡ uro-genital tube ➡ uro-genital opening

3- The seminal fluid contains fructose and other nutrients that ensure the survival and the motility of sperm cell.

4- In both, male and female there is no reproductive activity from birth to puberty. The male reproductive system starts its activity at puberty and continues till death. This activity is continuous but it progressively decreases starting in old age. While the female reproductive system starts its activity at puberty and continues-till menopause. Its activity is cyclic, and interrupted by pregnancy and it is stopped at menopause.