

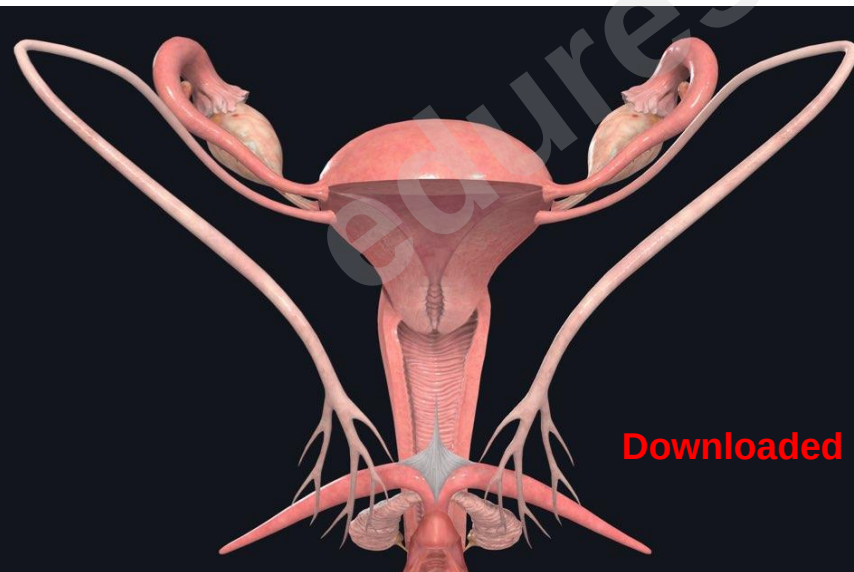
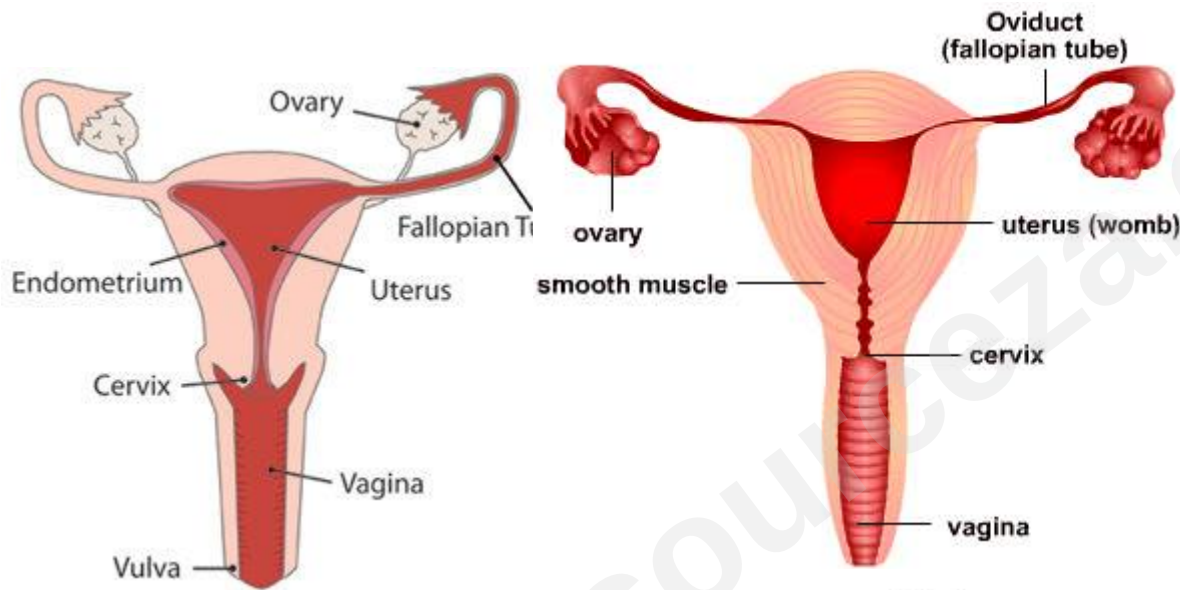


HUMAN REPRODUCTION



BY:M.SAIDI



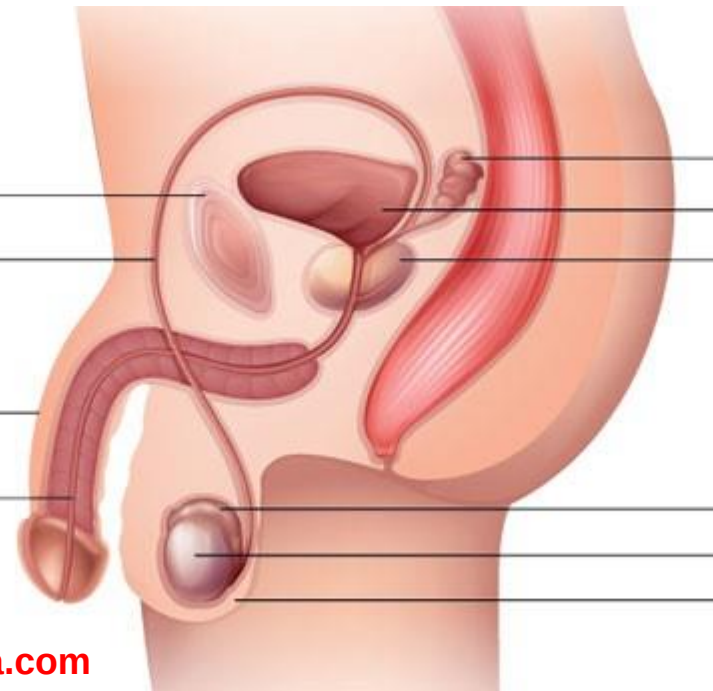


pubic bone

deferens

penis

urethra

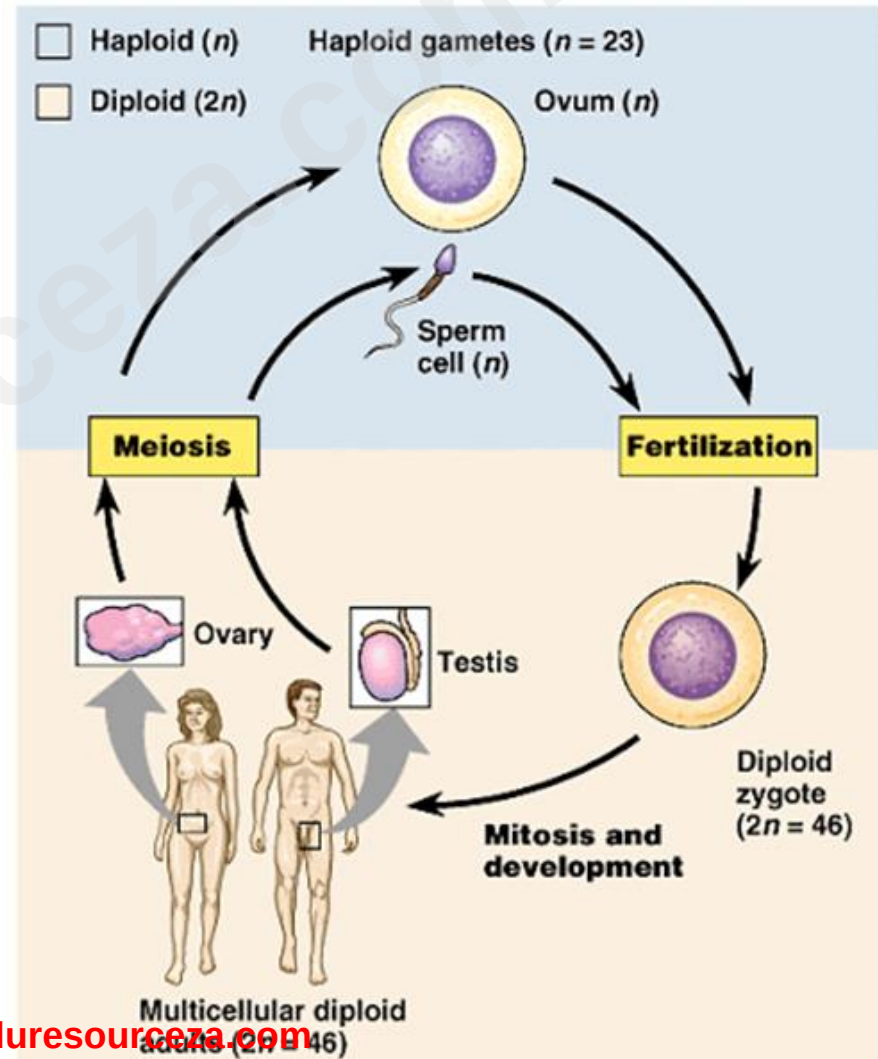


INTRODUCTION

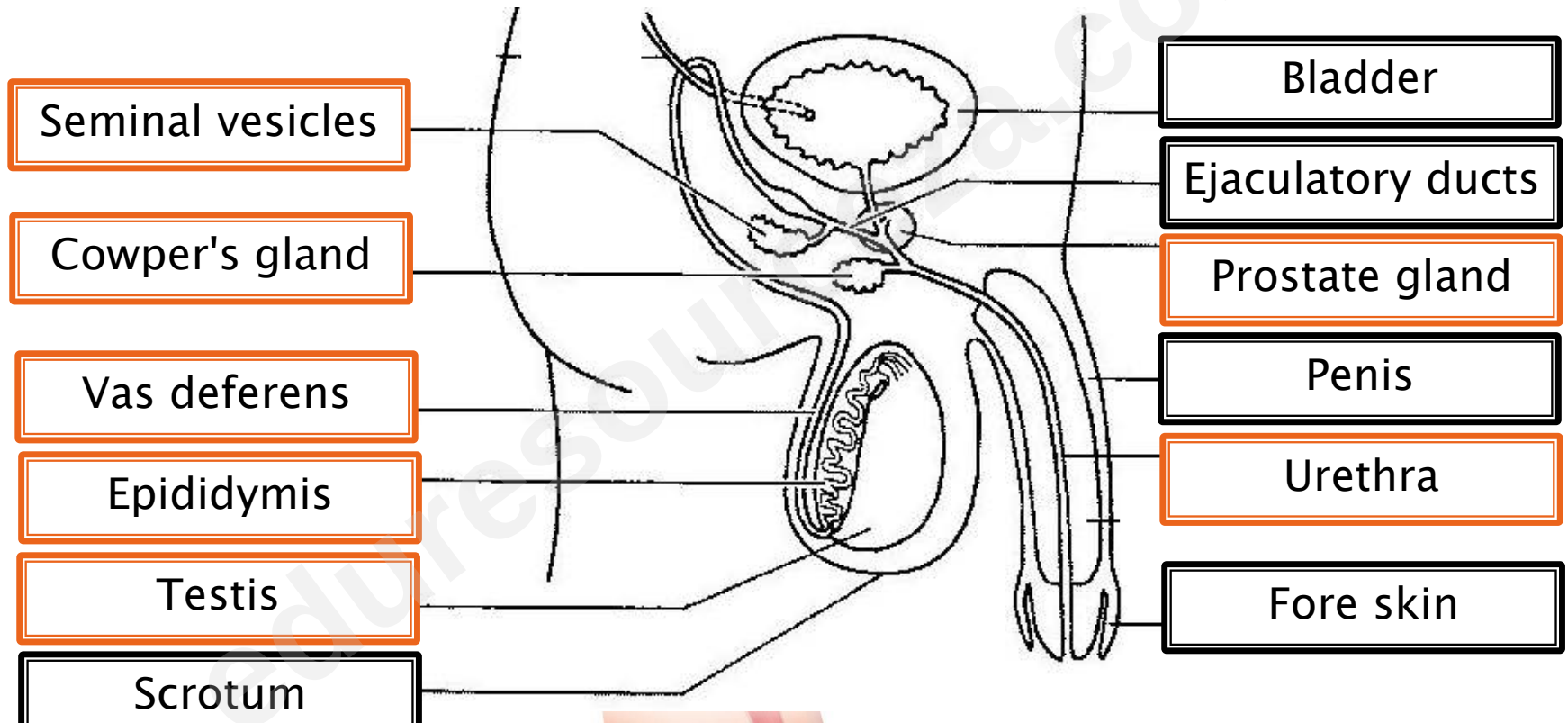
- ▶ In the **reproductive** process, a **male sperm** and a **female egg** provide the information required to produce **another human** being.
- ▶ **Conception** occurs when these cells join as the egg is **fertilized**.
- ▶ **Pregnancy begins** once the fertilized egg **implants** in the **uterus**.

outline of the human life cycle to show the role of meiosis, mitosis and fertilisation

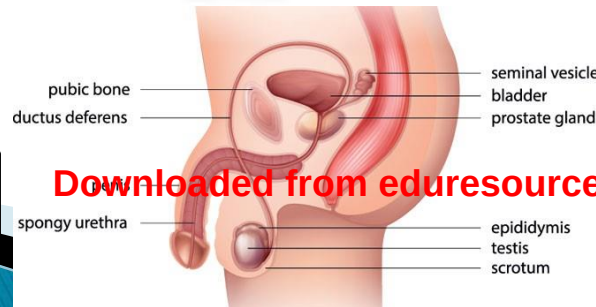
- ▶ The **human** body constantly develops and changes throughout the **human life cycle**, and food provides the fuel for those changes.



Structure of the male reproductive system



Clear view



Functions of the parts

Seminal vesicles: produces a **nutrient** rich fluid that provides **energy** for the sperm cells

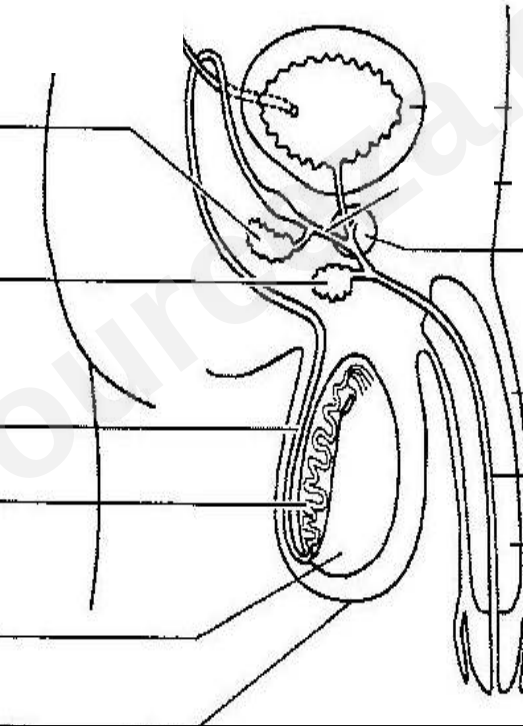
Cowper's gland: Produces **mucus** that **helps** with the **movement** of sperm cells

Vas deferens: **Transports sperm** from the epididymis to the urethra

Epididymis: **stores Sperm cells** and allow the mature.

Testis: **Produces sperm** cells and the hormone **testosterone**

Question: Why do testes hung outside the body?



Prostate gland: Produces an **alkaline fluid** that **neutralises** the **acids** produced in the vagina, which would kill sperm cells

Urethra: **Transports semen** and **urine** out of the body

Urethra: **Transports semen** and **urine** out of the body

Scrotum: Skin sac that **protects the testes** and holds the testes 'outside' the body, at a temperature that is 2°C below 37°C. **This is the best temperature for the production of sperm.**

FUNCTIONS OF TESTOSTERONE

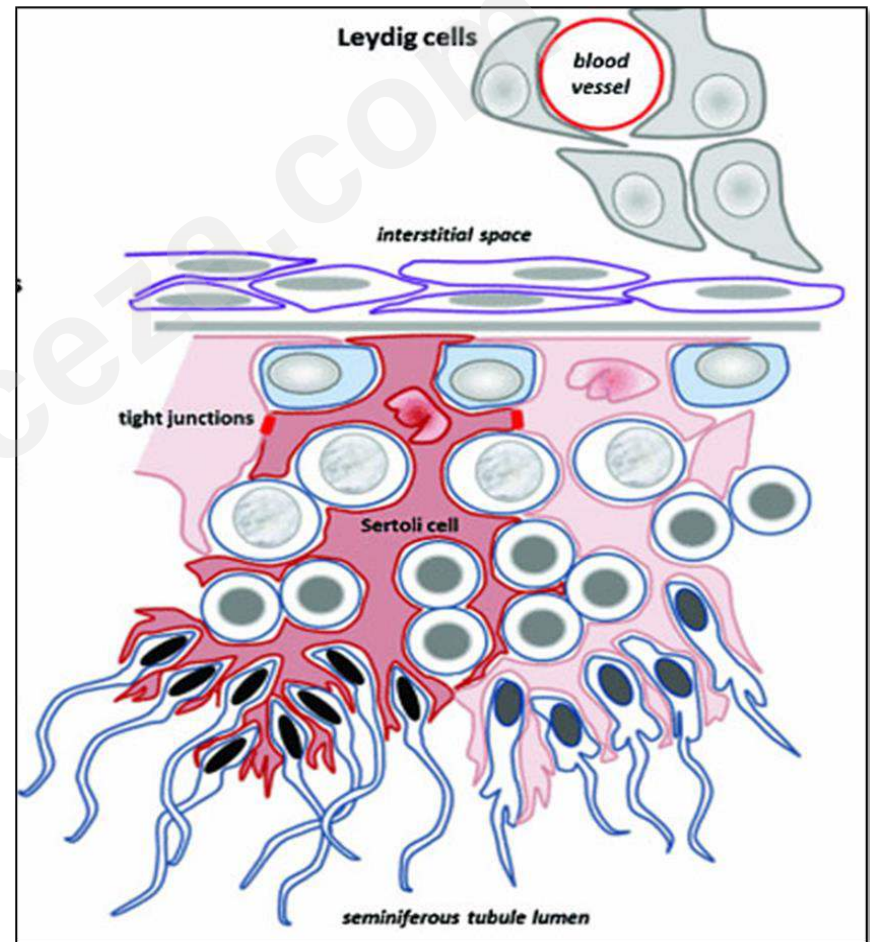
- ▶ 1. Development of male secondary sexual characteristics, such as beard, pubic hair, deep voice and a muscular body.
- ▶ 2. Stimulates the maturation of sperm cells.

Seminal vesicles, Prostate gland and Cowper's gland are called accessory glands

Structure of seminiferous tubes

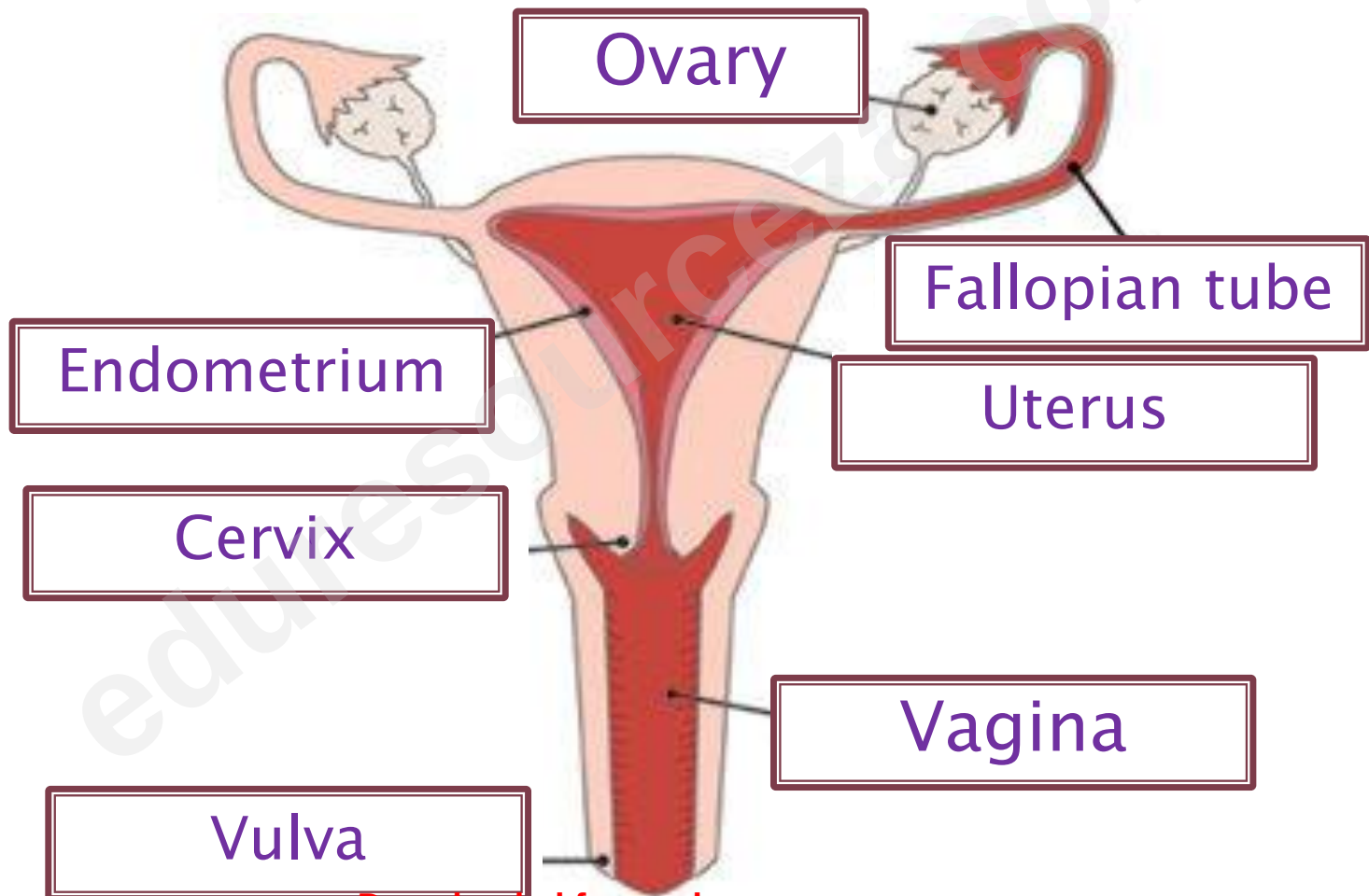
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- Cells of **Leydig**
 - Production of **Testosterone**
- **Sertoli** cells :–
 - Provides **nutrients** to developing sperms (spermatozoa)



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Structure of the female reproductive system



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Functions of the parts

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Ovary : Produces egg cells, secretes progesterone and oestrogen

Fallopian tube: Connects the ovaries to the uterus, transports egg cells from the ovary; it is the site of fertilisation

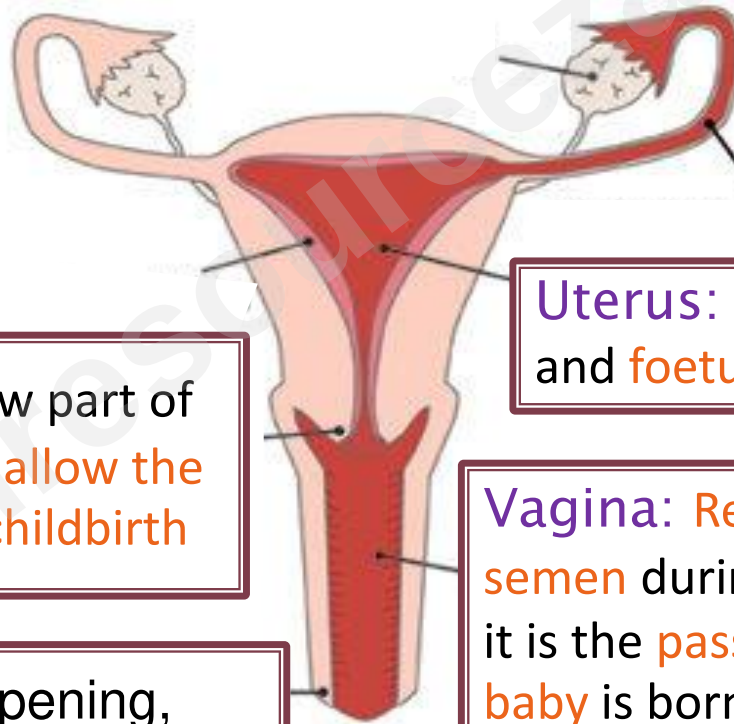
Endometrium: Inner lining of uterus; place where the embryo implants and the placenta forms

Cervix: Lower, narrow part of uterus. It stretches to allow the baby through during childbirth

Uterus: Carries the embryo and foetus during pregnancy

Vagina: Receives the penis and semen during sexual intercourse. it is the passage through which the baby is born (birth canal)

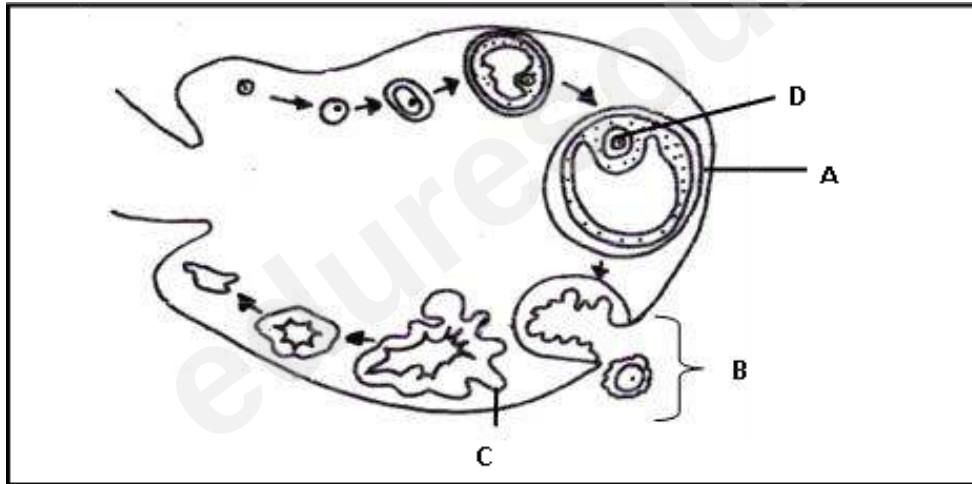
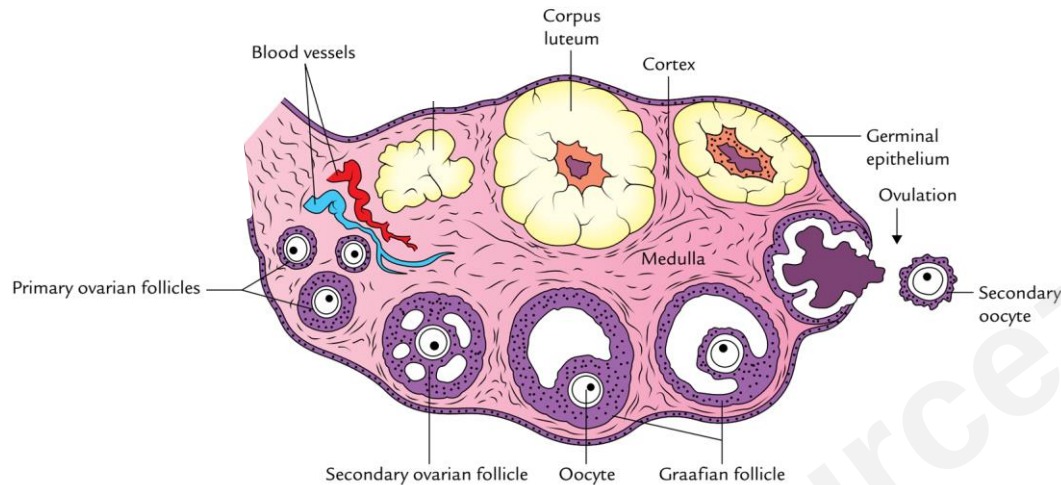
Vulva: external opening, allows penetration to occur



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STRUCTURE OF THE OVARY

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Female sex organs.
Found in lower part of abdominal cavity.
Made up of a covering called **germinal epithelium** with a large number of **follicles** in it. Germinal epithelium produces follicles. This produces **ova** during **Oogenesis**. Follicles secrete **oestrogen** and **progesterone**.

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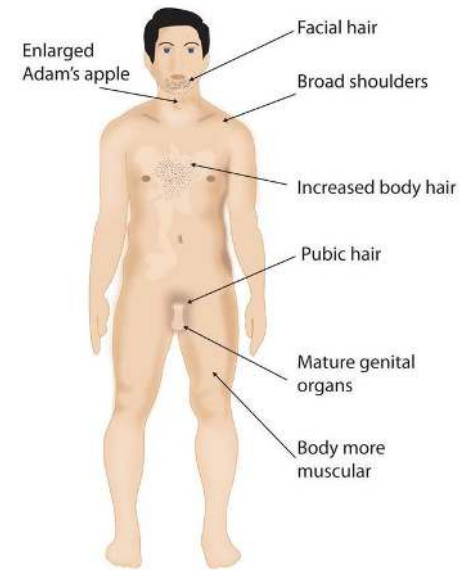
Puberty In males

- ▶ Puberty is the **period** in humans in which they experience **physical changes** in their bodies in order to be **capable of sexual reproduction**.

It's a period which indicates **sexual maturity**

- ▶ In **boys**, Stimulated by **testosterone**
- ▶ the first **puberty** change is the **enlargement** of the **scrotum and testes**.
As the testes and scrotum continue to grow, **the penis grows**. (sex organs)
- ▶ Growth of **pubic hair**, facial hair and body hair
- ▶ Development of **muscles** and deepening of

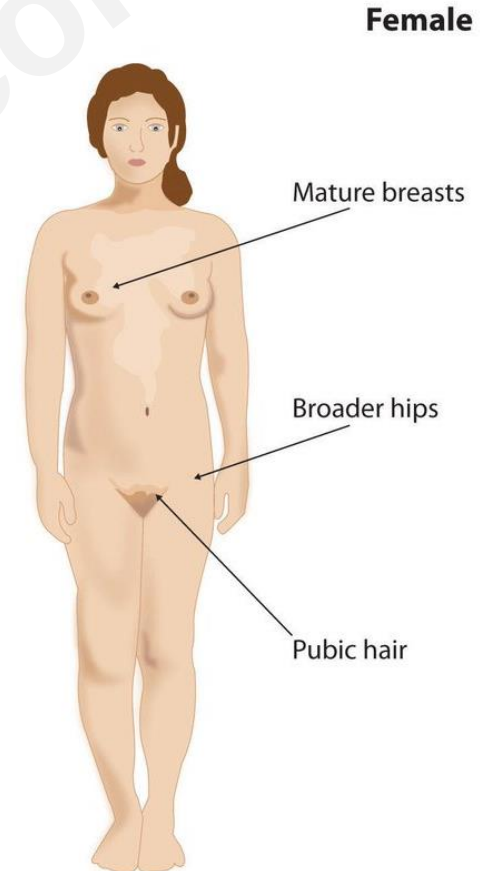
voice



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Puberty In females

- ▶ Main changes that occur under **oestrogen**
- ▶ Growth of female **sex organs**
- ▶ Start of the **menstrual cycle**
- ▶ production of **ova**
- ▶ Growth of **pubic hair**
- ▶ Growth and development of **breasts** and widening of **hips**



Formation of gametes (gametogenesis)

- **Gametogenesis is the formation of gametes**
- During the process of **gametogenesis**, a **germ cell** undergoes **meiosis** to produce **haploid cells** that directly develop into **gametes**. Hence, in animals, meiosis is an integral part of **gametogenesis**.
- Its divided in two
 - Male gametes formed by **spermatogenesis**
 - Female gametes formed by **oogenesis**

Spermatogenesis:

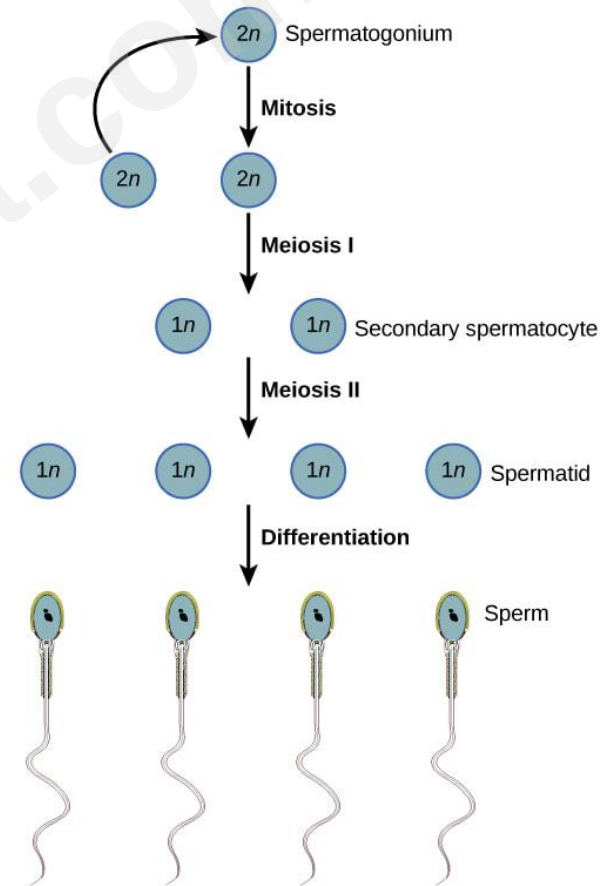
- **Spermatogenesis:** this is the formation of **sperms**
- **PROCESS OF SPERMATOGENESIS.**
 - Under the influence of **testosterone**
 - **diploid cells** in the seminiferous tubules of the testes
 - undergo **meiosis**
 - to form **haploid sperm** cells

Germinal epithelium undergoes meiosis

Producing 4 haploid spermatids

Mature to form a spermatozoon

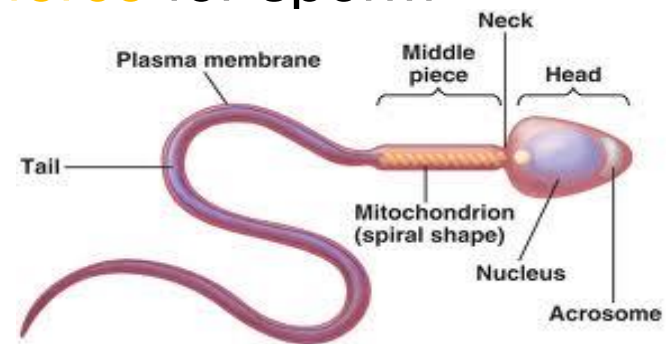
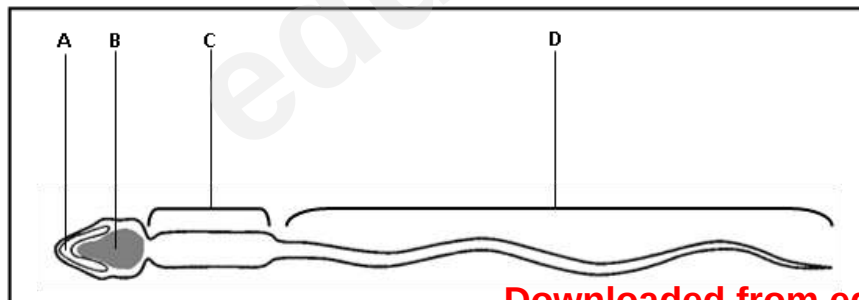
Each spermatozoon is made of a head, middle portion and a tail.



STRUCTURE OF A SPERM

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- ▶ The sperm cell is made up of:
- ▶ **1.Head** which contains **ACROSOME** that contains the **enzymes to digest** the membrane of **ovum** during fertilization
- ▶ The **NUCLEUS** which contain the **genetic material** for inheritance
- ▶ **2.Middle piece** with **MITOCHONDRIA** to provide **energy for sperm** movement
- ▶ **3. Tail** which provide **propulsion force** for sperm movement

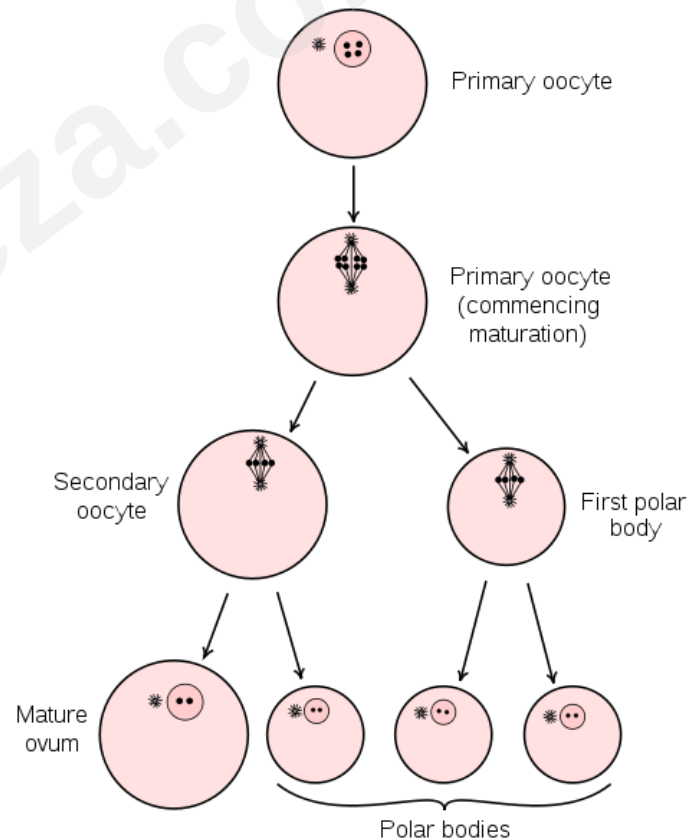


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OÖGENESIS:

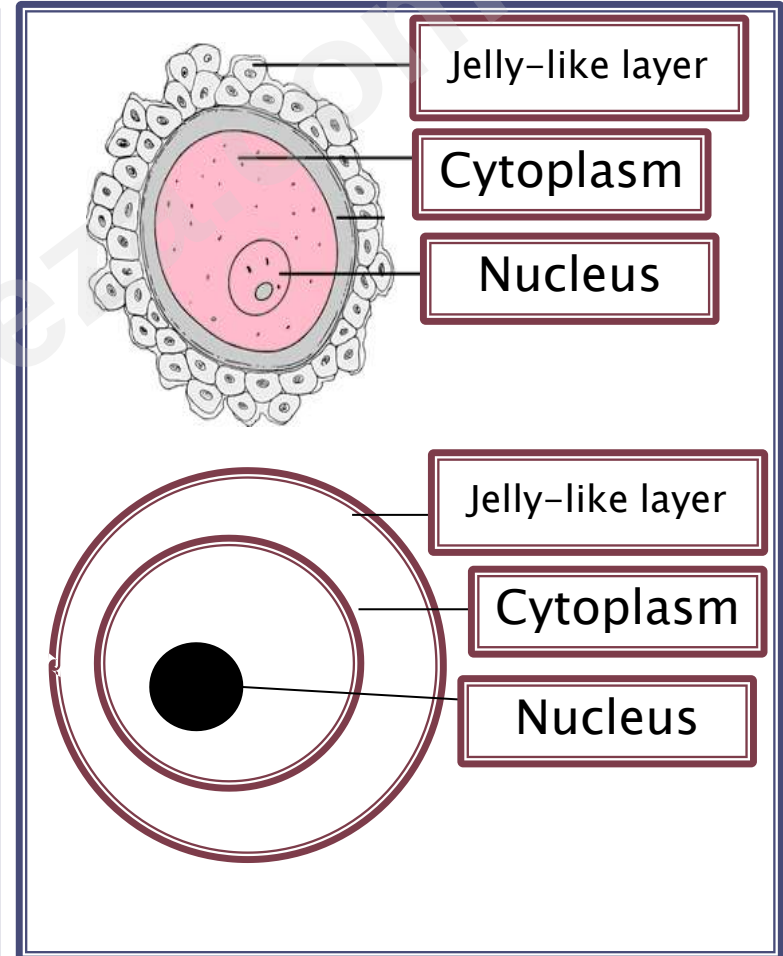
- ▶ **Oogenesis:** is the formation of ovum
- ▶ **PROCESS OF OÖGENESIS**
- ▶ Under the influence of **FSH**
- ▶ **diploid cells** in the ovary undergo **mitosis**
- ▶ to form numerous **follicles**
- ▶ **One cell** inside a follicle **enlarges** and undergoes **meiosis**
- ▶ Of the **four cells** that are produced, **only one**
- ▶ **survives** to form a mature, **haploid ovum**

One cell inside a follicle
↓
Meiosis
↓
4 haploid cells formed
↓
3 cells break up; one cell matures
↓
Mature ovum



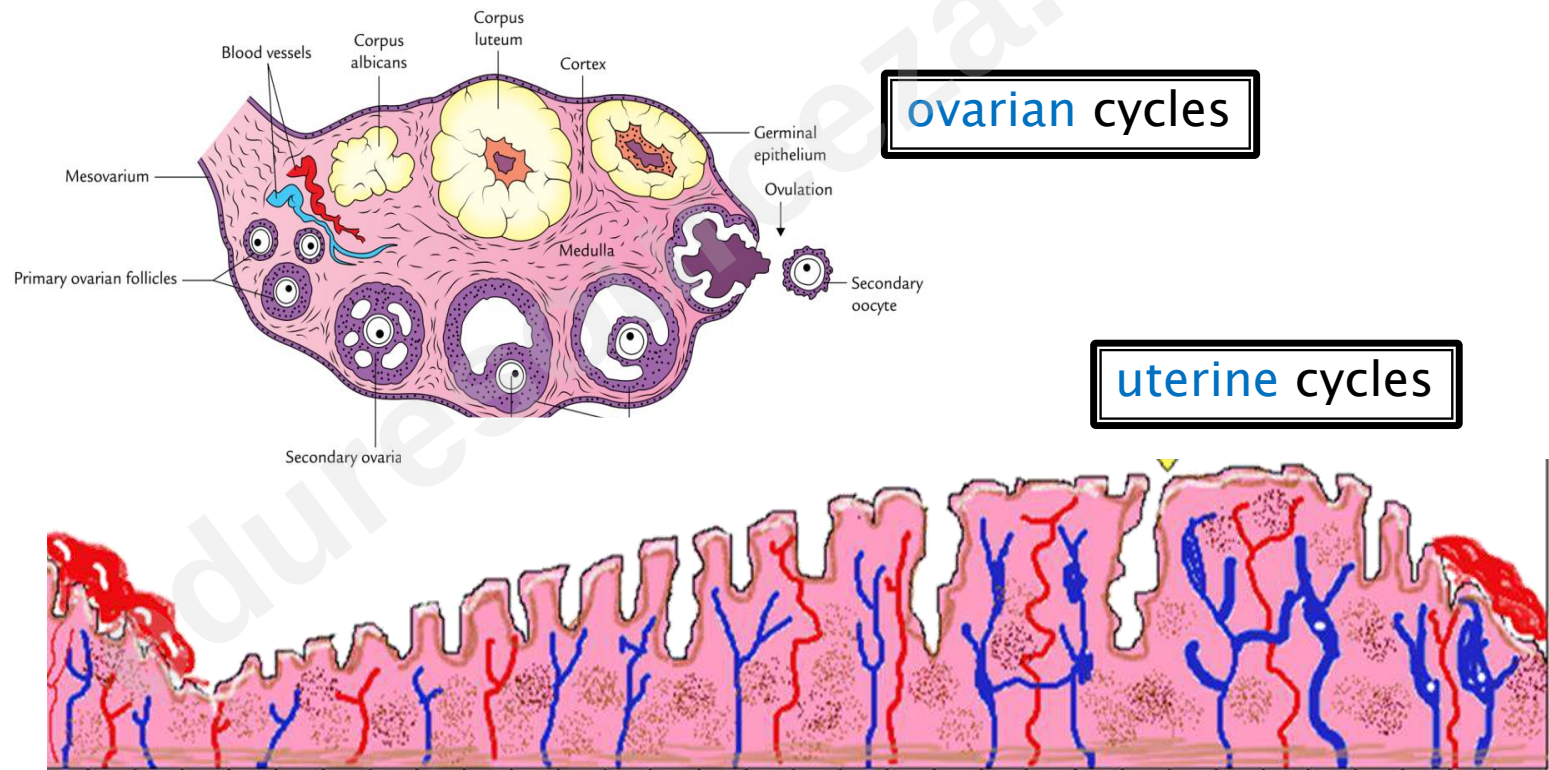
STRUCTURE OF AN OVUM

- ▶ Functions of the different parts of an ovum
- ▶ **layer of jelly-** the provide **protection**
- ▶ Haploid **nucleus-** contains **genetic material** for inheritance
- ▶ **cytoplasm-** its where **cells activities** takes place and also contains other parts of the cells



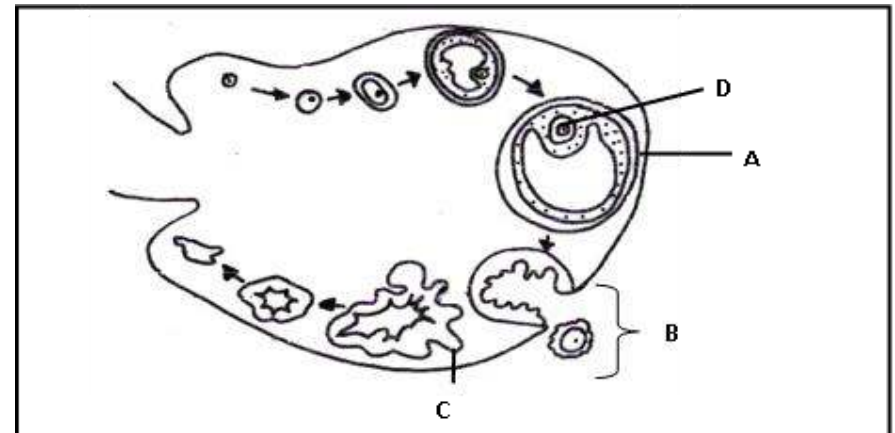
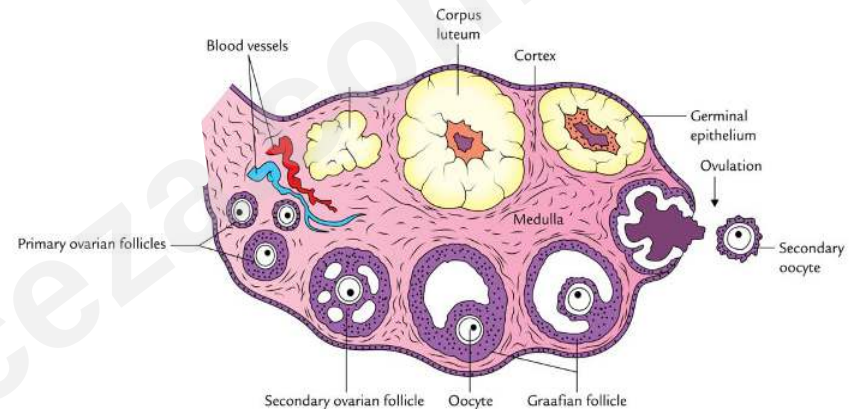
MENSTRUAL CYCLE:

- ▶ The menstrual cycle is divided into two
- ▶ the **uterine** and **ovarian** cycles



THE EVENTS IN THE OVARIAN CYCLE

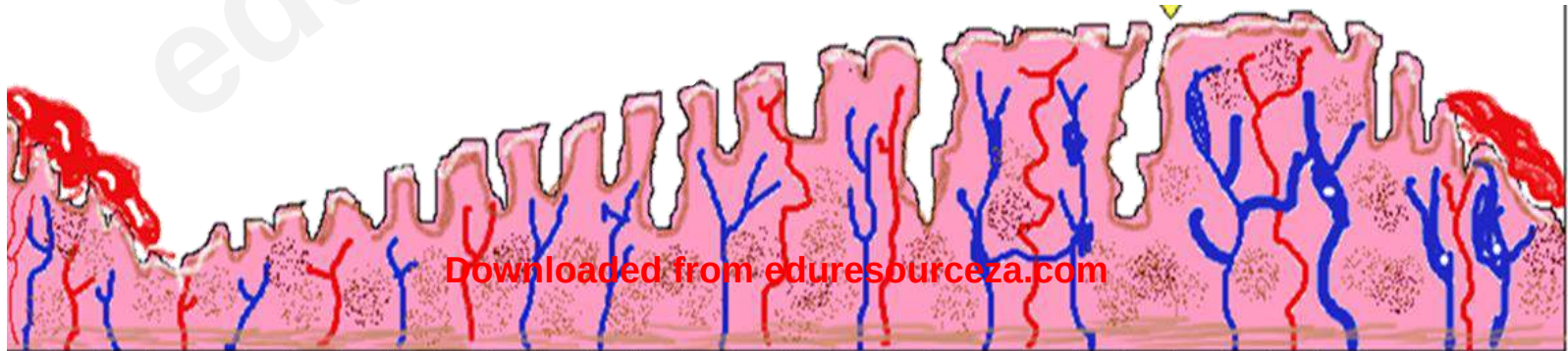
- ▶ These are events that occur **inside the ovary** only.
- ▶ Development of the **Graafian follicle** under the influence of **FSH**
- ▶ **Ovulation** and changing of empty graafian follicle to **corpus luteum** under the influence of **LH**



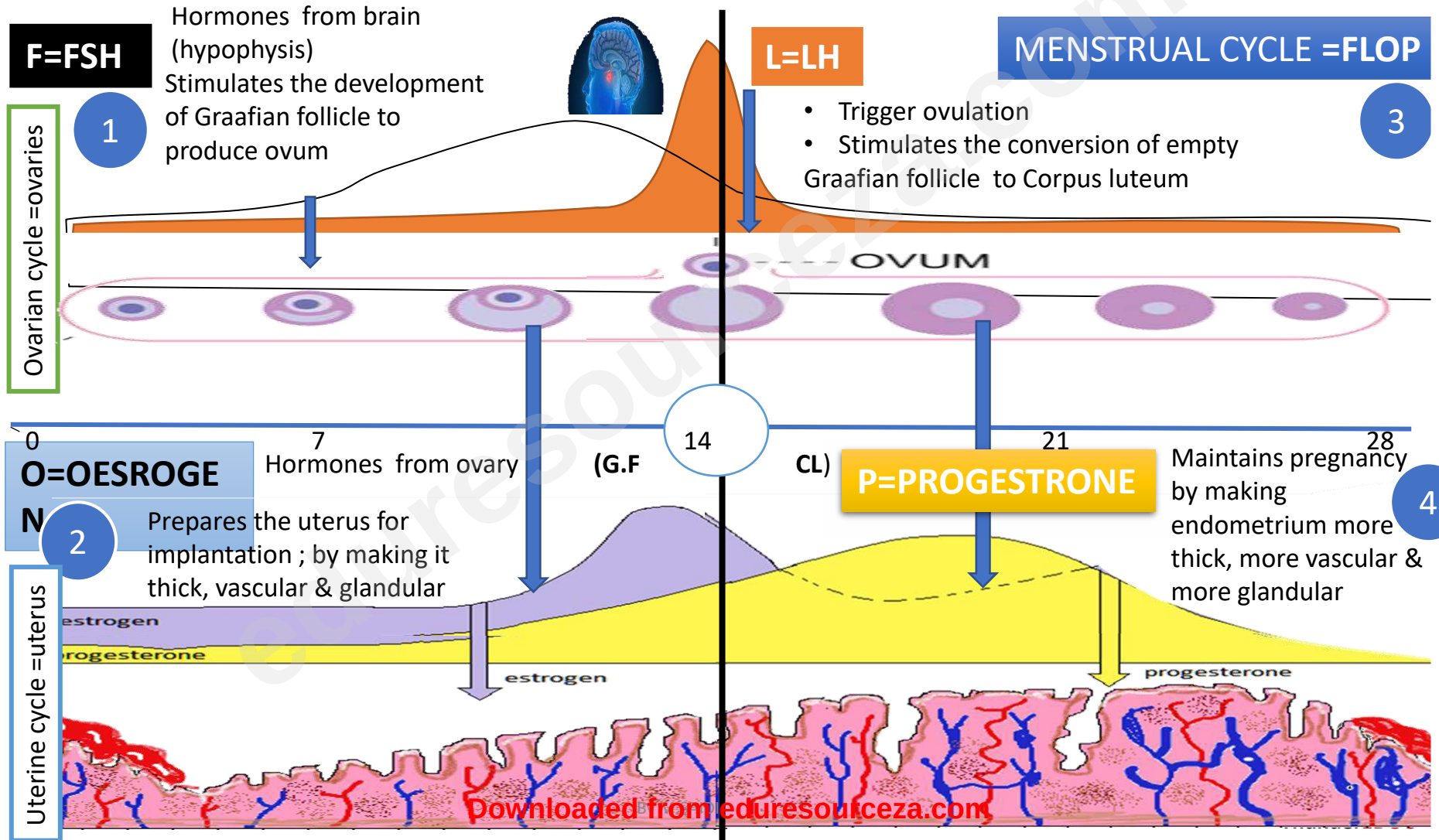
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THE EVENTS IN THE UTERINE CYCLE

- ▶ Oestrogen stimulates the endometrium to become thicker and develop more blood vessels (vascular) and glands (glandular).
- ▶ Under the influence of progesterone, the endometrium to become even thicker and to develop more blood vessels and glands, ready to receive the embryo
- ▶ if the level of progesterone drops , Lining breaks down and is released (menstruation)



Hormonal control of the menstrual cycle



SUMMARY

Day 1–7

- Ovaries: New follicles develop and secrete oestrogen
- Uterus: Lining breaks down and is released (menstruation)
- **Day 8–13**
- Ovaries: Mature Graafian follicle develops and then moves to edge of the ovary
- It secretes oestrogen.
- Uterus: Oestrogen stimulates the endometrium to become thicker and develop more blood vessels and glands

• Day 14

- Ovaries: Graafian follicle bursts to release an egg cell. The process is called ovulation

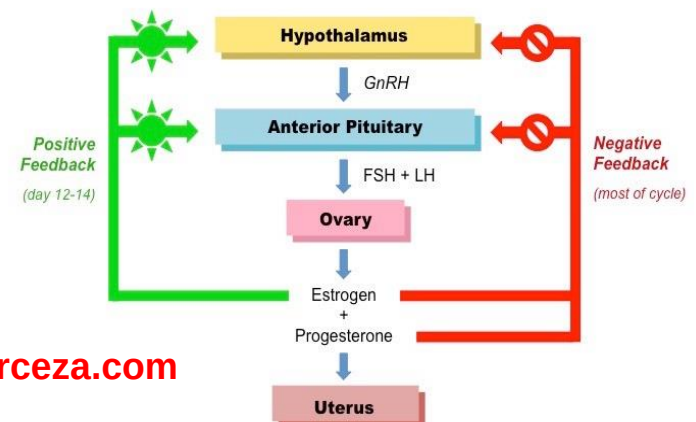
• Day 15–22

- Ovaries: The Graafian follicle becomes a corpus luteum that secretes progesterone
- Uterus: Progesterone stimulates the endometrium to become even more thicker and to develop more blood vessels and glands,
- ready to receive the embryo if an egg cell is fertilised.

- **Day 23–28**
- Ovaries:
- ***If fertilization does not take place:***
- The corpus luteum **shrinks**
- stopping secreting **progesterone** (levels of progesterone drop)
- Endometrium **shrink**
- Accompanied by **bleeding**
- ***If fertilisation takes place:***
- The corpus luteum remains **active** in the ovary
- and continues to **secrete progesterone**
- **No** more follicles develop in the ovaries
- **No** menstruation takes place

Negative feedback mechanism

- ▶ Oestrogen inhibits **FSH**.
- ▶ The follicle becomes the corpus luteum
- ▶ and this produces **oestrogen** and **progesterone**
- ▶ which **inhibit FSH** and LH **production** by the pituitary.
- ▶ This is an example of **negative feedback** .
- ▶ **Progesterone maintains** the uterus lining (the thickness of the uterus wall).



COPULATION AND FERTILIZATION

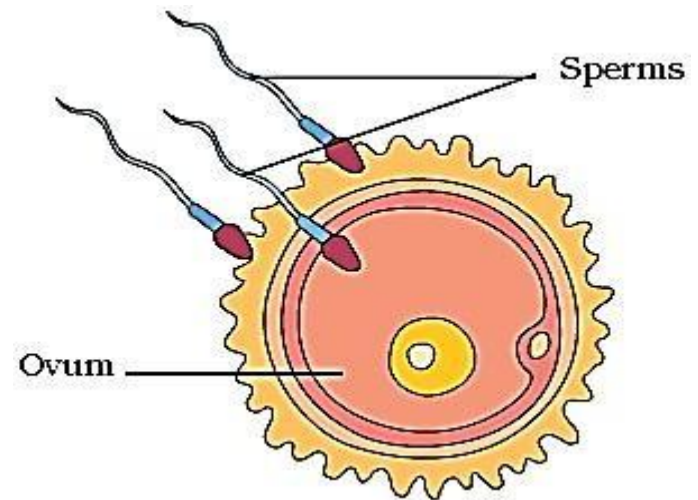
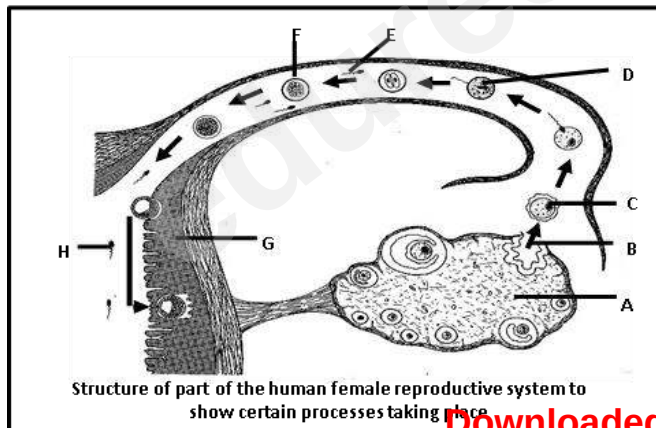
- ▶ **COPULATION:** Is sexual activity typically involving the insertion and thrusting of the penis into the vagina for sexual pleasure/reproduction purposes.



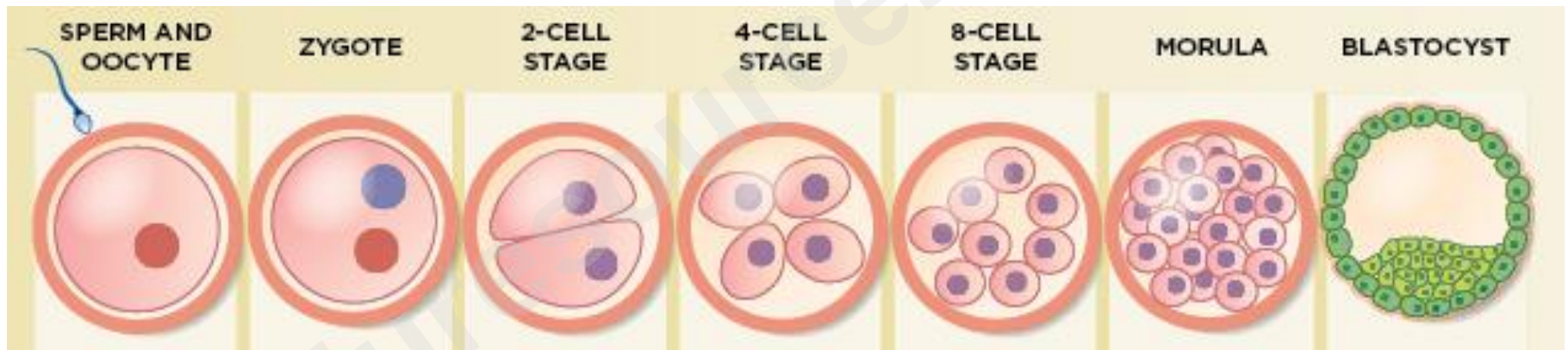
- ▶ **FERTILIZATION** is when the haploid nucleus of sperm fuses with haploid nucleus of ovum to form a diploid zygote

PROCESS OF FERTILISATION

- ▶ After ovulation, a **haploid sperm** cell produces the **enzymes** from the **acrosome** which **digests** the cell membrane of the ovum and then sperm cell then **penetrates** the **haploid ovum**.
- ▶ The **nuclei** of the ovum and sperm **fuse** to form a **diploid zygote**.



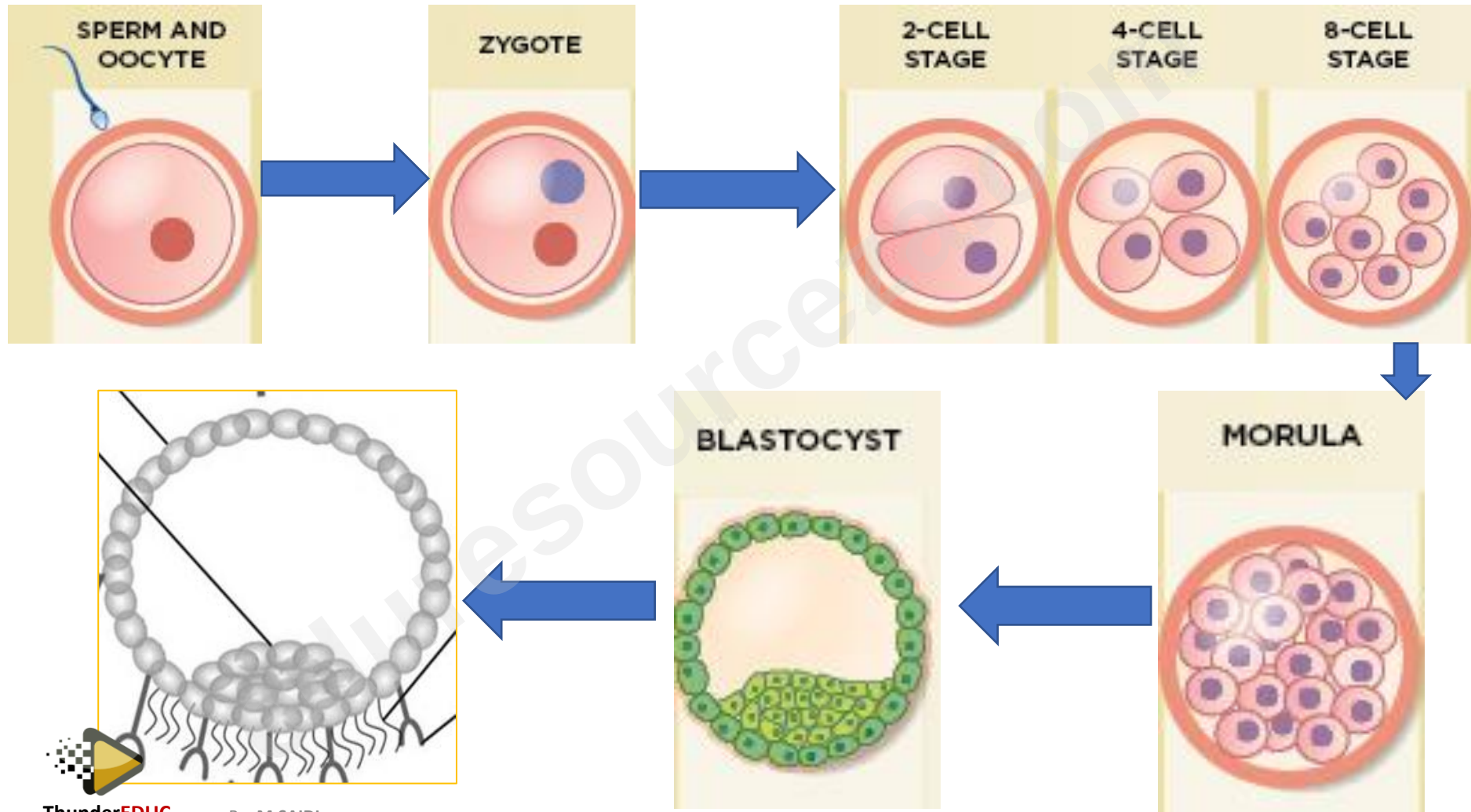
DEVELOPMENT OF A ZYGOTE UNTIL IMPLANTATION



By: M.SAIDI

Grade 12 life sciences

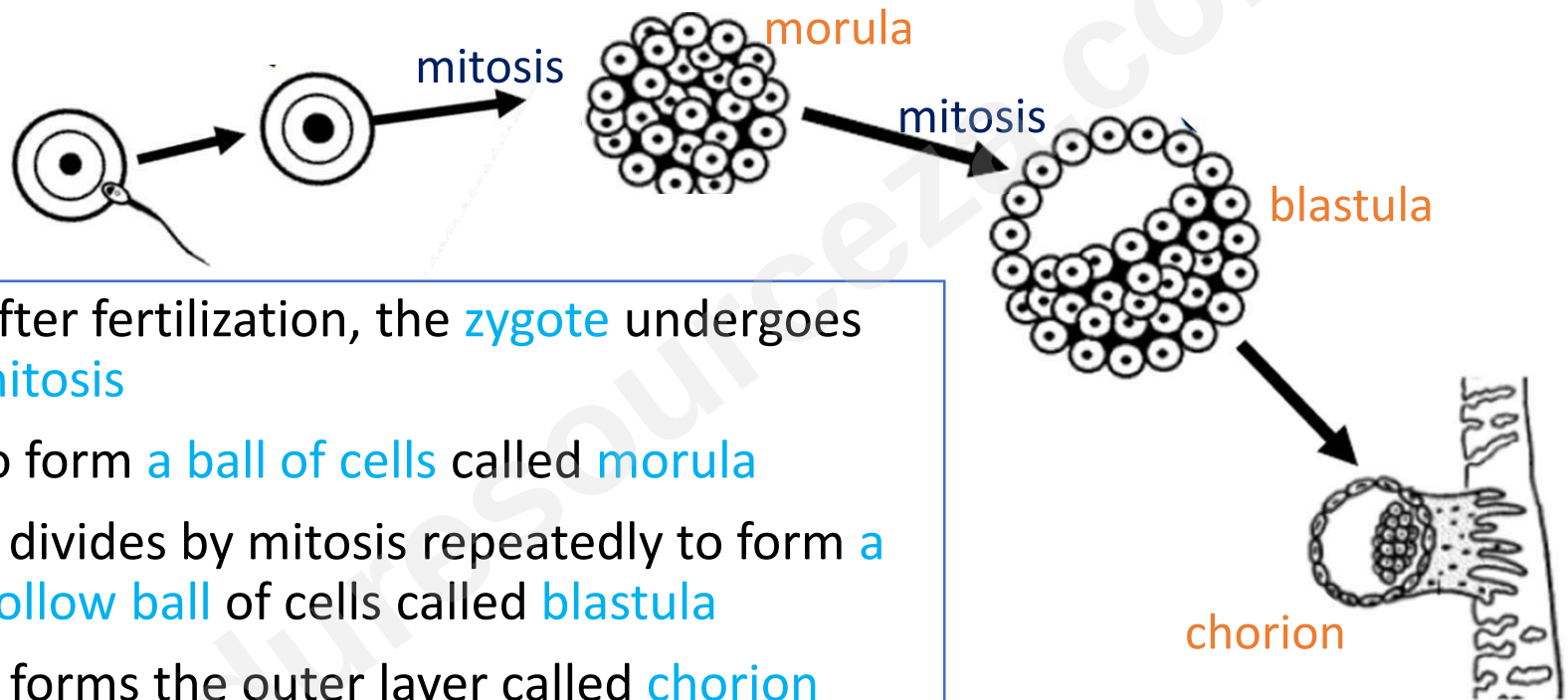




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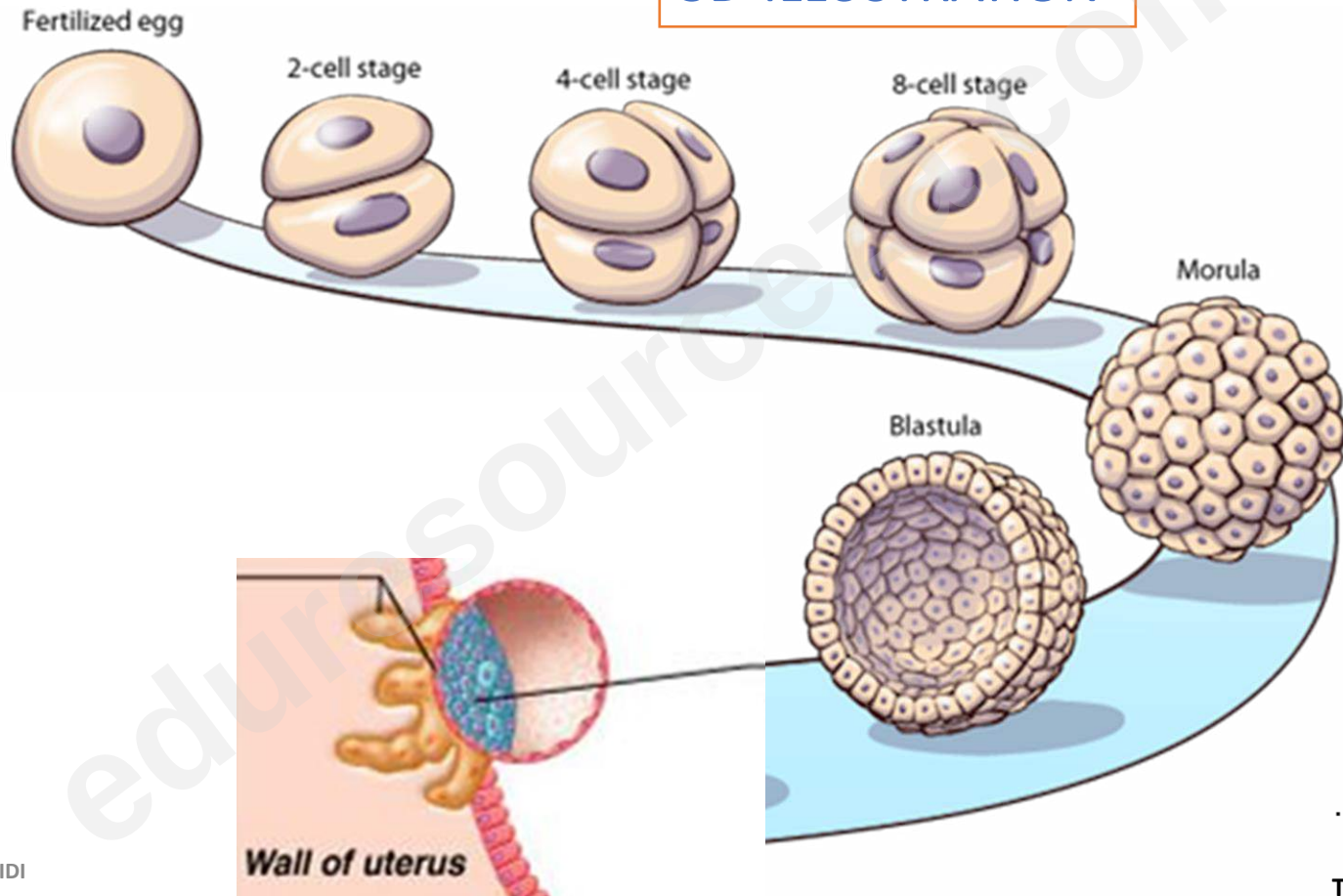
How do we write in exams **(most important)**



- After fertilization, the **zygote** undergoes **mitosis**
- to form **a ball of cells** called **morula**
- it divides by mitosis repeatedly to form **a hollow ball** of cells called **blastula**
- It forms the outer layer called **chorion**
- which form finger-like projects called **chorionic villi** for **implantation**

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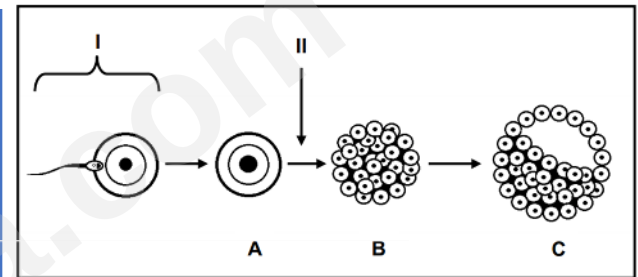
3D-ILLUSTRATION



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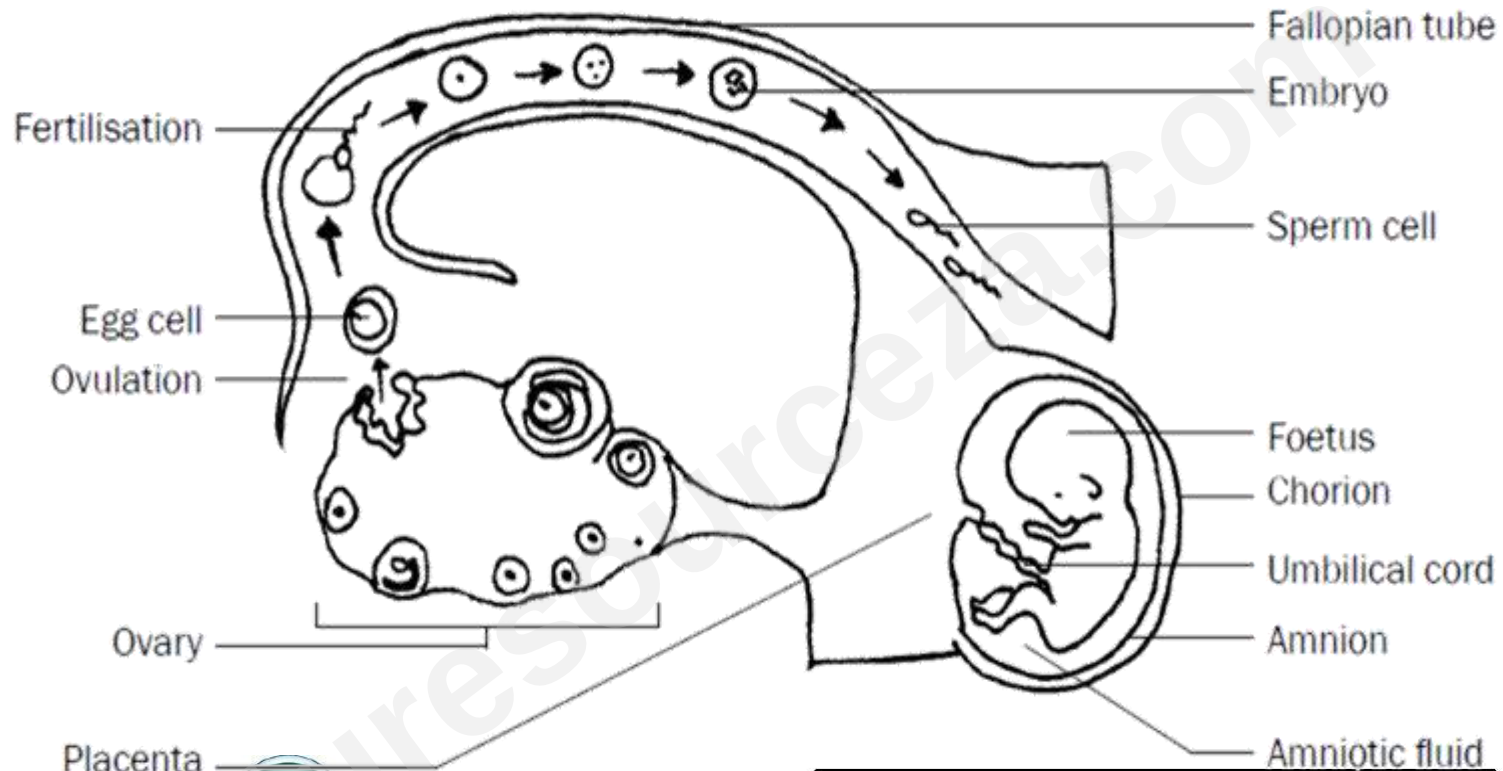
Question to try

1.4. The diagram below represents a sequence of events that may take place inside the human female reproductive system.



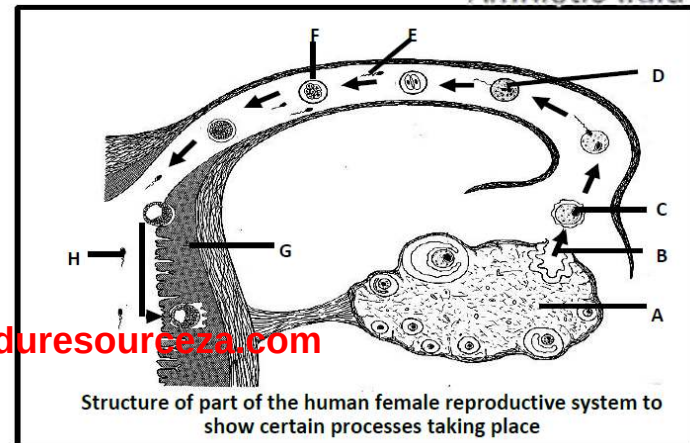
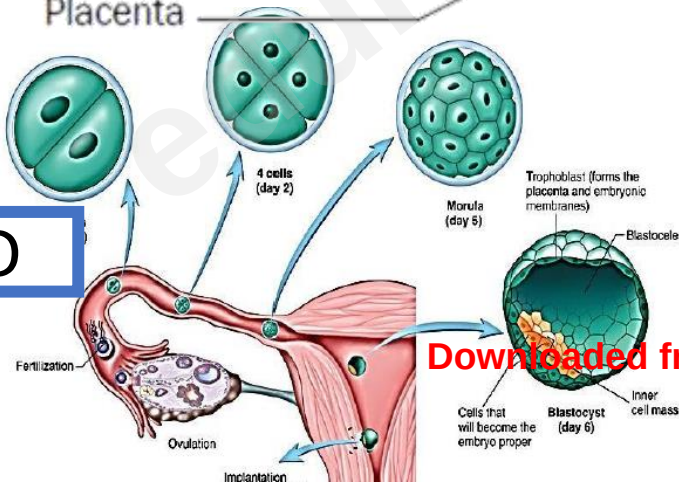
- 1.4.1 Identify the process taking place at I in the diagram above. (1)
- 1.4.2 State the type of cell division that takes place at II in the diagram above. (1)
- 1.4.3 Name TWO functional extra-embryonic membranes that are produced by structure C. (2)
- 1.4.4 Identify the stage of development indicated by:
- (a) A (1)
 - (b) B (1)
 - (c) C (1)
- 1.4.5 Name the part of the female reproductive system where the events in the diagram above usually take place. (1)

OVULATION TO EMBRYO DEVELOPMENT



Placenta

3-D



Structure of part of the human female reproductive system to show certain processes taking place

Qns

DEFINITION OF IMPLANTATION

- ▶ **IMPLANTATION:** The attachment of the fertilized egg to the uterine lining.
- ▶ The embryo, moving as a blastocyst through a uterus, makes contact with the uterine wall and remains attached to it until birth.

The role of oestrogen and progesterone in maintaining pregnancy

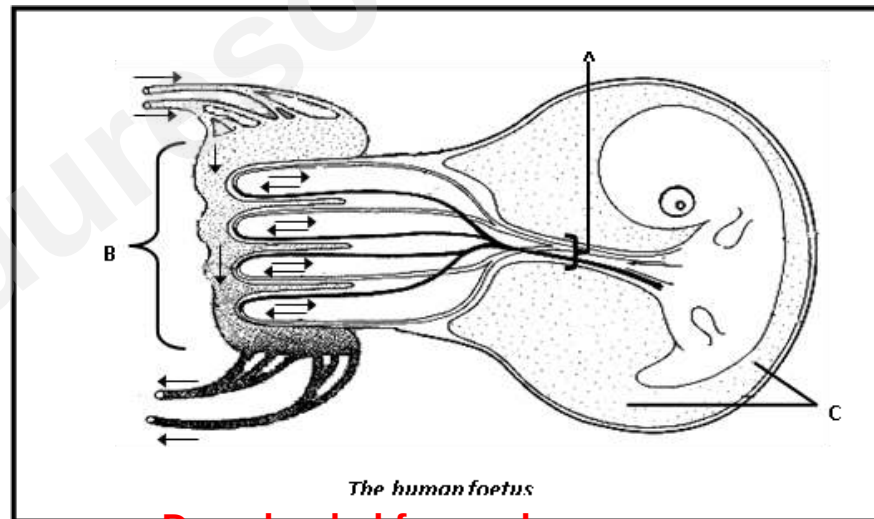
- ▶ **Oestrogen** and **progesterone** are the chief **pregnancy** hormones.
- ▶ A woman will produce more **oestrogen** during one **pregnancy** than throughout her entire life when not **pregnant**.
- ▶ The increase in **estrogen** during **pregnancy** enables the uterus and placenta to **improve vascularization** (the formation of blood vessels)
- ▶ Progesterone, will maintain what oestrogen has built (**maintaining the pregnancy**).

FUNCTIONS OF THE FOLLOWING PARTS:

- ▶ **CHORION:** to protect and nurture the embryo.
- ▶ The chorionic fluid protects the embryo from shock.
- ▶ **CHORIONIC VILLI:** allow the exchange of **nutrients**, oxygen and waste products with the mother.
- ▶ **AMNION/ AMNIOTIC FLUID:**
- ▶ Has thin, transparent fluid in which the embryo is suspended.
- ▶ providing a cushion **against mechanical injury**.
- ▶ Prevents **dehydration** of the baby.
- ▶ Keeps the **temperature** almost constant.
- ▶ Allow the developing baby to **move** in the womb.
- ▶ **Placenta:** provides oxygen and **nutrients** to your growing baby and removes waste products from your baby's blood.

Umbilical cord (including umbilical artery and umbilical vein)

- **Umbilical cord** It contains a **vein**, which carries oxygenated, nutrient-rich blood to the fetus,
- and **arteries** that carry deoxygenated, nutrient-depleted blood away.



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OTHER FUNCTIONS OF PLACENTA

- ▶ 1. **Nutrition:** Nutrients diffuse from the maternal blood to the foetus
- ▶ 2. **protection;** The placenta acts as a barrier or filter for certain harmful pathogens and chemicals eg HIV and alcohol.
- ▶ 3. **Gaseous exchange,** Oxygen and carbon dioxide are exchanged between maternal and foetal blood
- ▶ 4. **excretion,** Nitrogenous wastes are carried away from the foetus by maternal blood
- ▶ 5. **endocrine function;** After two months the placenta takes over the secretion of progesterone and oestrogen to maintain the endometrial lining.

GENETICS

NEXT CLASS

TOGETHER WE CAN MAKE SOUTH AFRICA SHINE

EACH STEP AHEAD
MAKES A DIFFERENCE

BY M.SAIDI

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