CLASS X/ BIOLOGY
REPRODUCTION

Date : 13/07/2020 **TEACHER :SASWATI BASAK**

Reproduction is the process by which organism produce new individuals to continue their race.

On the basis of different modes of reproduction it is classified into two types:

1.Asexual Reproduction
2.Sexual Reproduction

ASEXUAL REPRODUCTION

The production of offspring by a single parent without the formation of gamete is called Asexual Reproduction

MODES OF ASEXUAL REPRODUCTION

Different modes of asexual reproduction are:

1. Fission
2. Budding
3. Regeneration
4. Spore Formation
5. Fragmentation
6. Vegetative Propagation

1. FISSION

Organism like protozoa and bacteria split into identical halves during cells division to form new organism. This is called fission.

Fission is of two types:

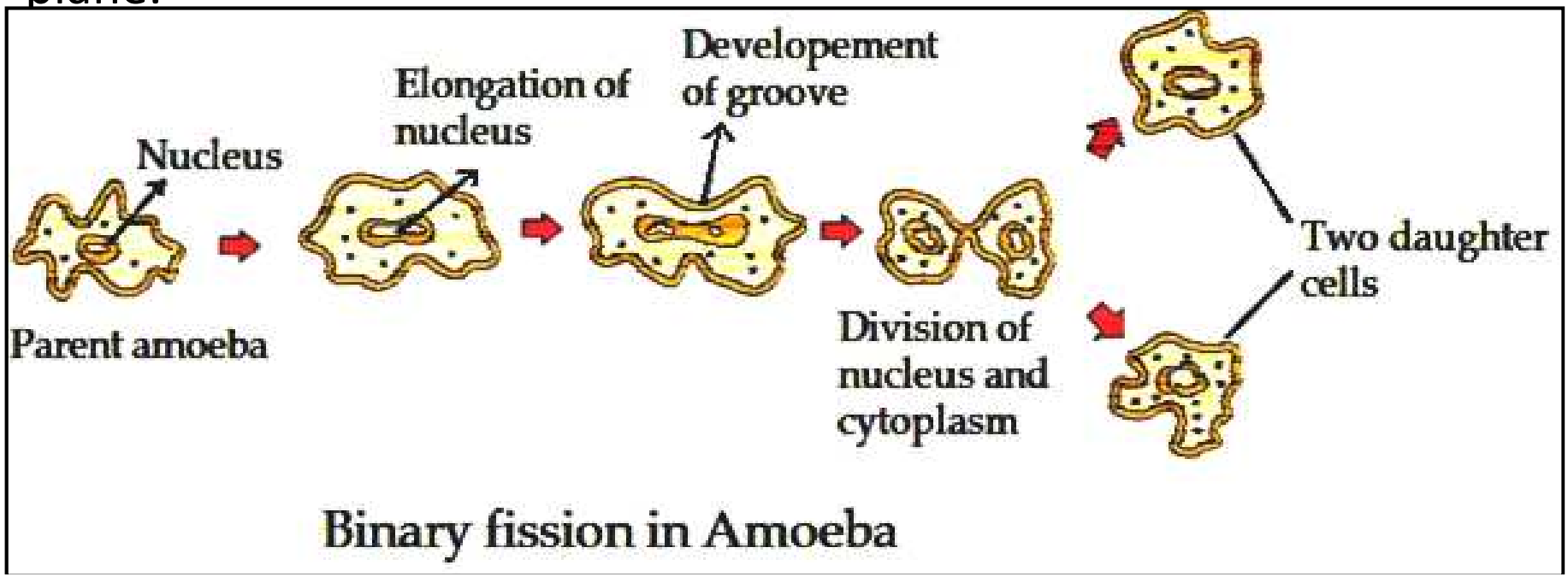
i) Binary Fission

ii) Multiple Fission

i) BINARY FISSION

In this process an organism divides into two equal sized individuals. The nucleus divides by the process of mitosis in two and its followed by division of cytoplasm, thus resulting in two identical individuals. Now division of nucleus are known karyokinesis and division of cell cytoplasm is known as cytokinesis.

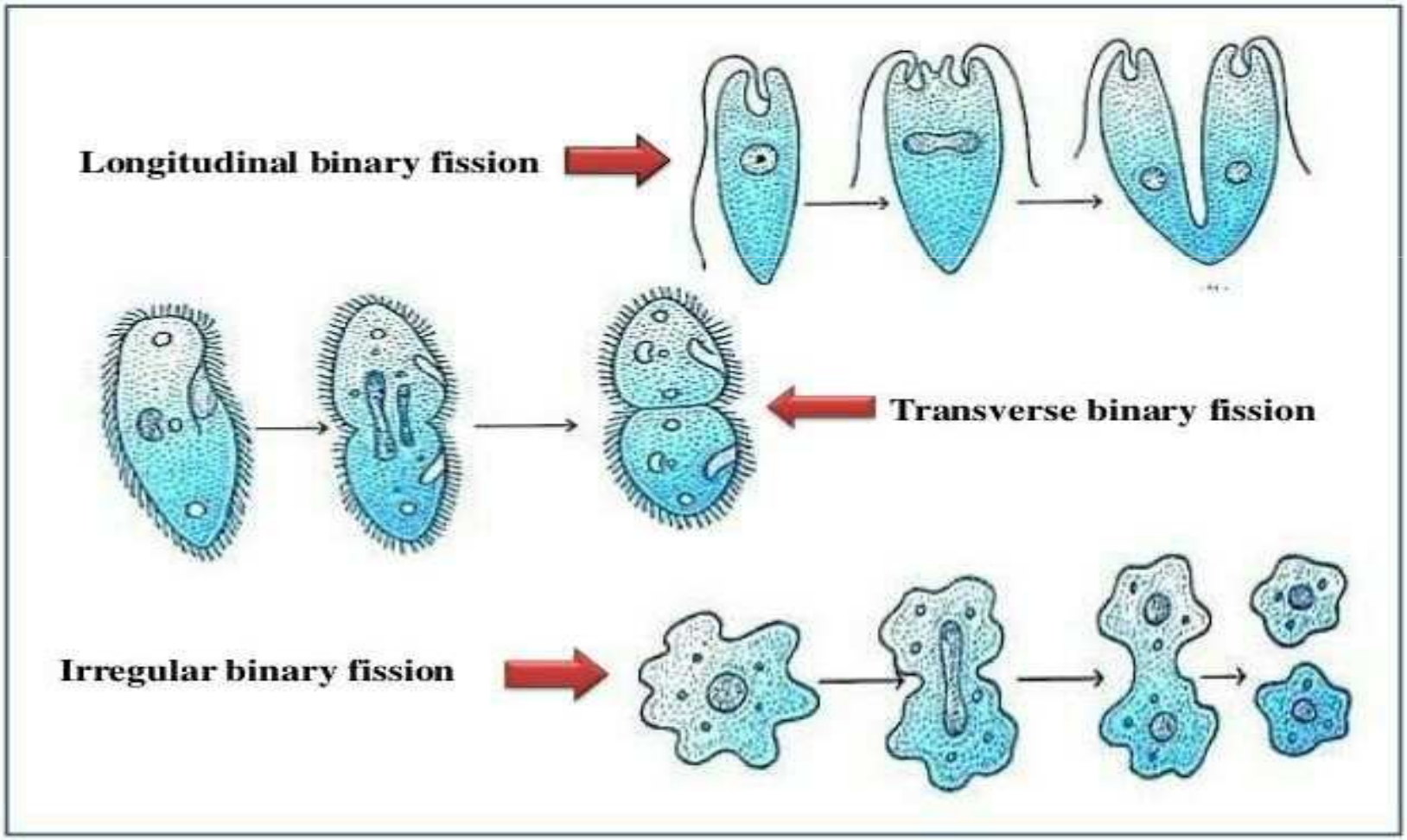
In case of Ameoba, Paramecium fission takes place in transverse plane and in case to Euglena fission takes place in longitudinal plane.



Binary fission in Amoeba

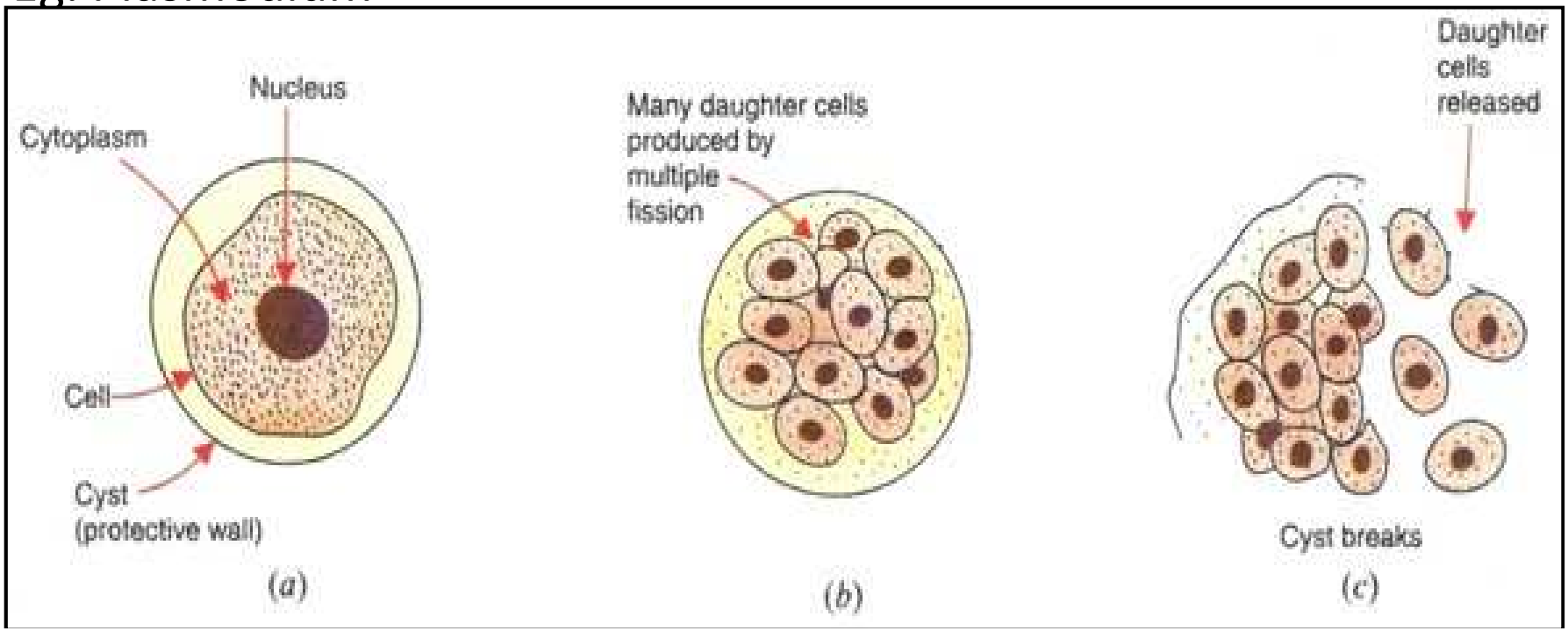
Binary fission in paramecium is **transverse** binary **fission** as the constriction occurs transversely**.**

Euglena divide longitudinally, beginning at the front end of the cell, with the duplication of flagellar processes, gullet and stigma.



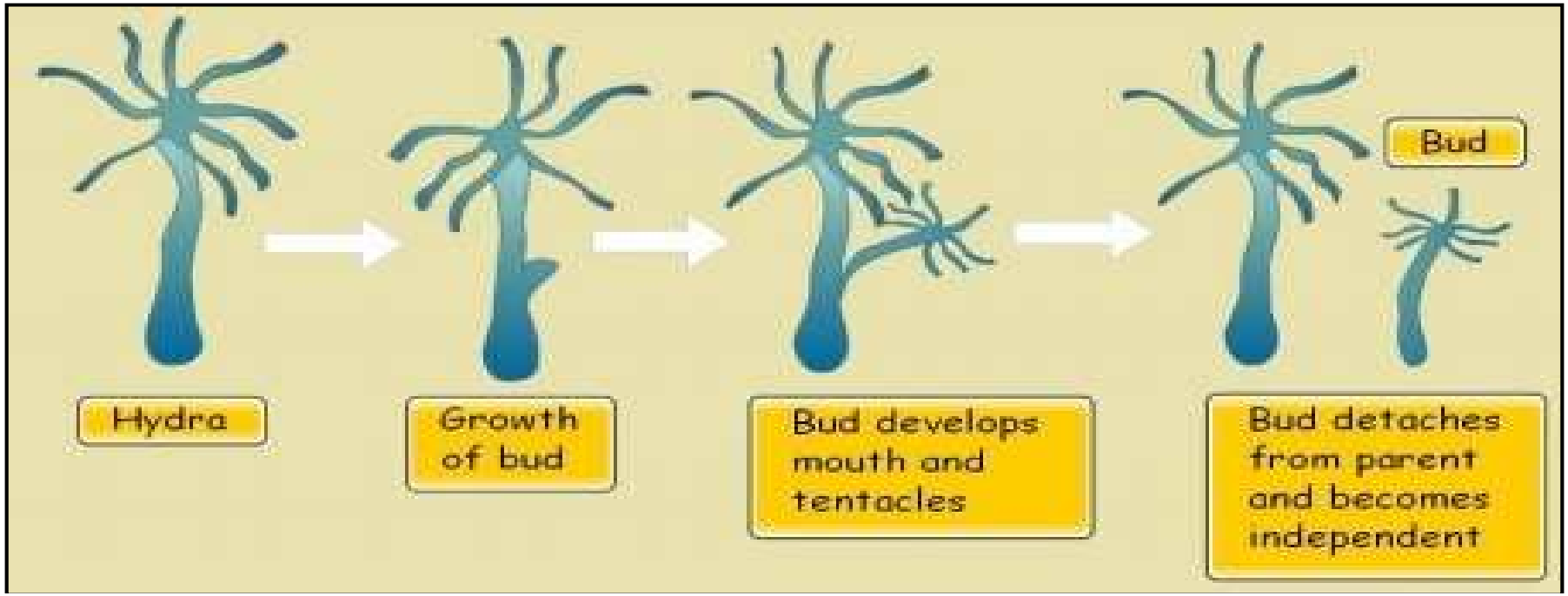
ii) Multiple Fission

Multiple fissions is the simultaneous division of the parent body in many daughter individuals. In this fission the nucleus of the organ divides repeatedly to form a number of equal sized daughter nuclei and each daughter nucleus breaks away together with a small portion of the cytoplasm. The splitting process is called schizogony and a cells that does it is called schizont. Eg. Plasmodium

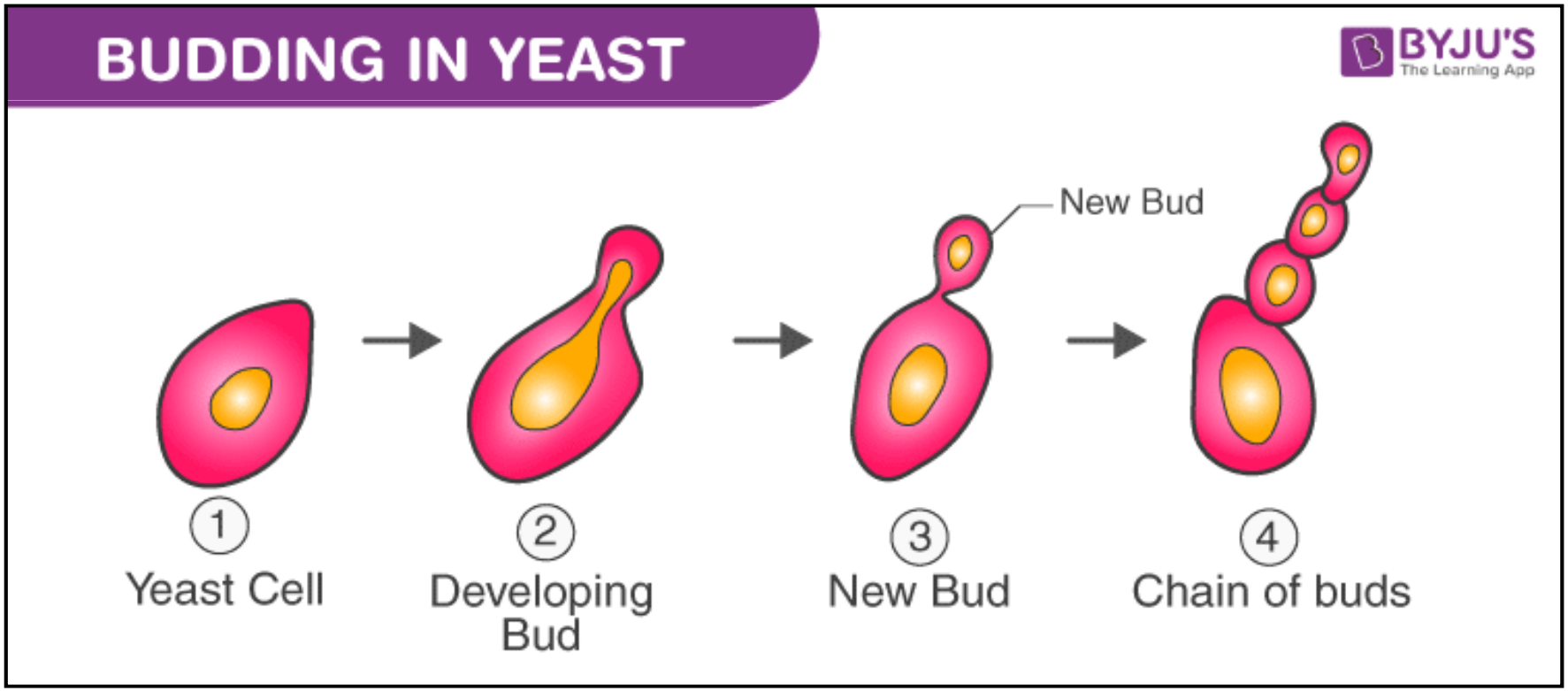


2. BUDDING

In Hydra: Body wall repeatedly divide and form a bulge or outgrowth. These cells later differentiate into appropriate structures. The bud increases in size and develops mouth. It is surrounded by tentacles at its free end. Then the bud grow fully to detaches itself for the parent body and gradually become an adult.



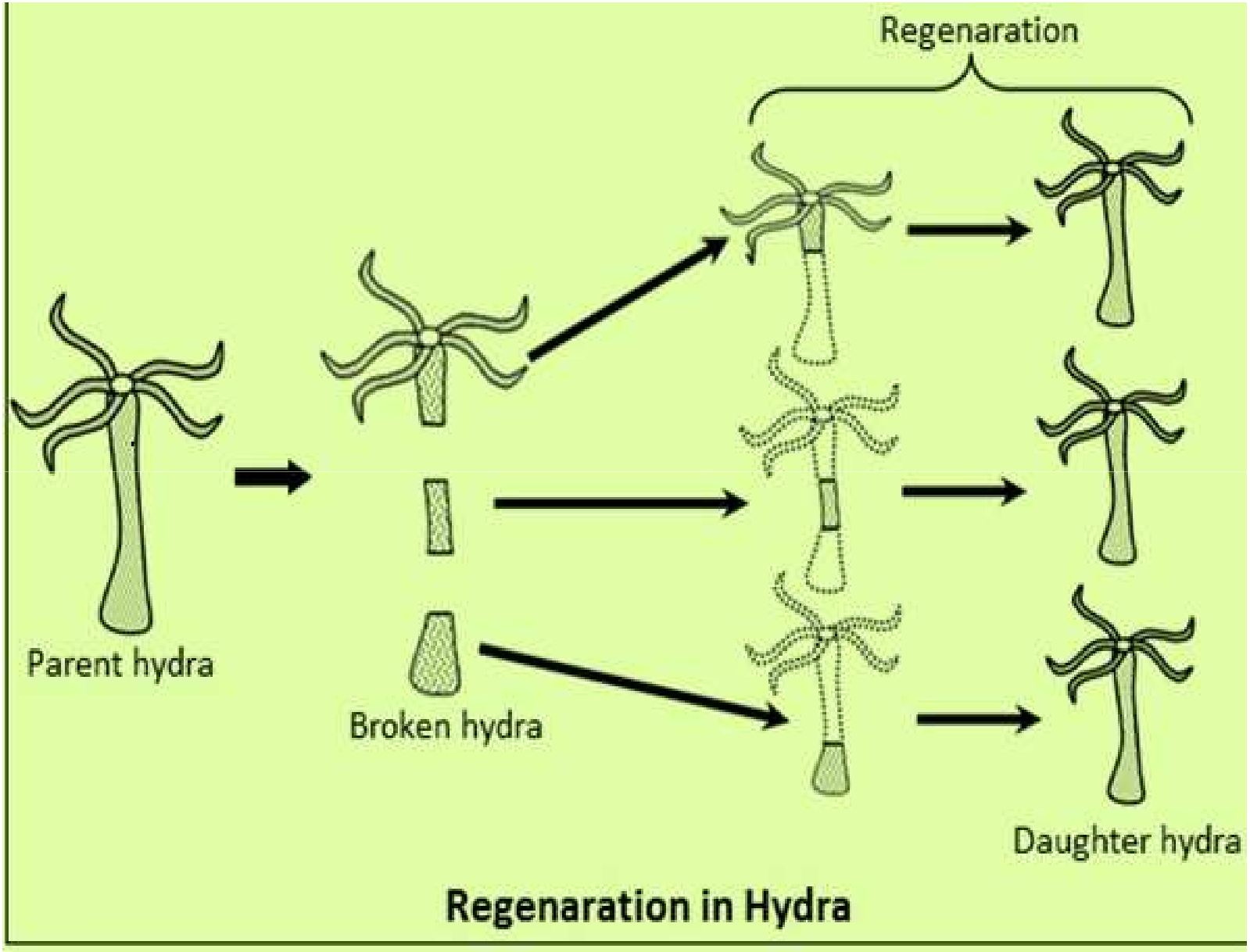
In Yeast: In case of yeast cells a small bud is formed on the parent cell. The nucleus of the parent cell splits into a daughter nucleus and migrates into the daughter cell. The bud then continues to grow and forms many buds, thus forming chain of yeast cells until it separates from the parent cell, forming a new cell.



3. REGENERATION

When the body of an organism is cut or broken into two or more pieces each body piece in reconstitute itself into a new and complete individuals. Regeneration is sense in Planaria and Hydra. When they are cut longitudinally each part develops into a new head and turn into a complete organism.

It is also the ability of an organism to replace its damaged or lost part.


Regenaration
Parent hydra
Broken hydra
Daughter hydra
Regenaration in Hydra

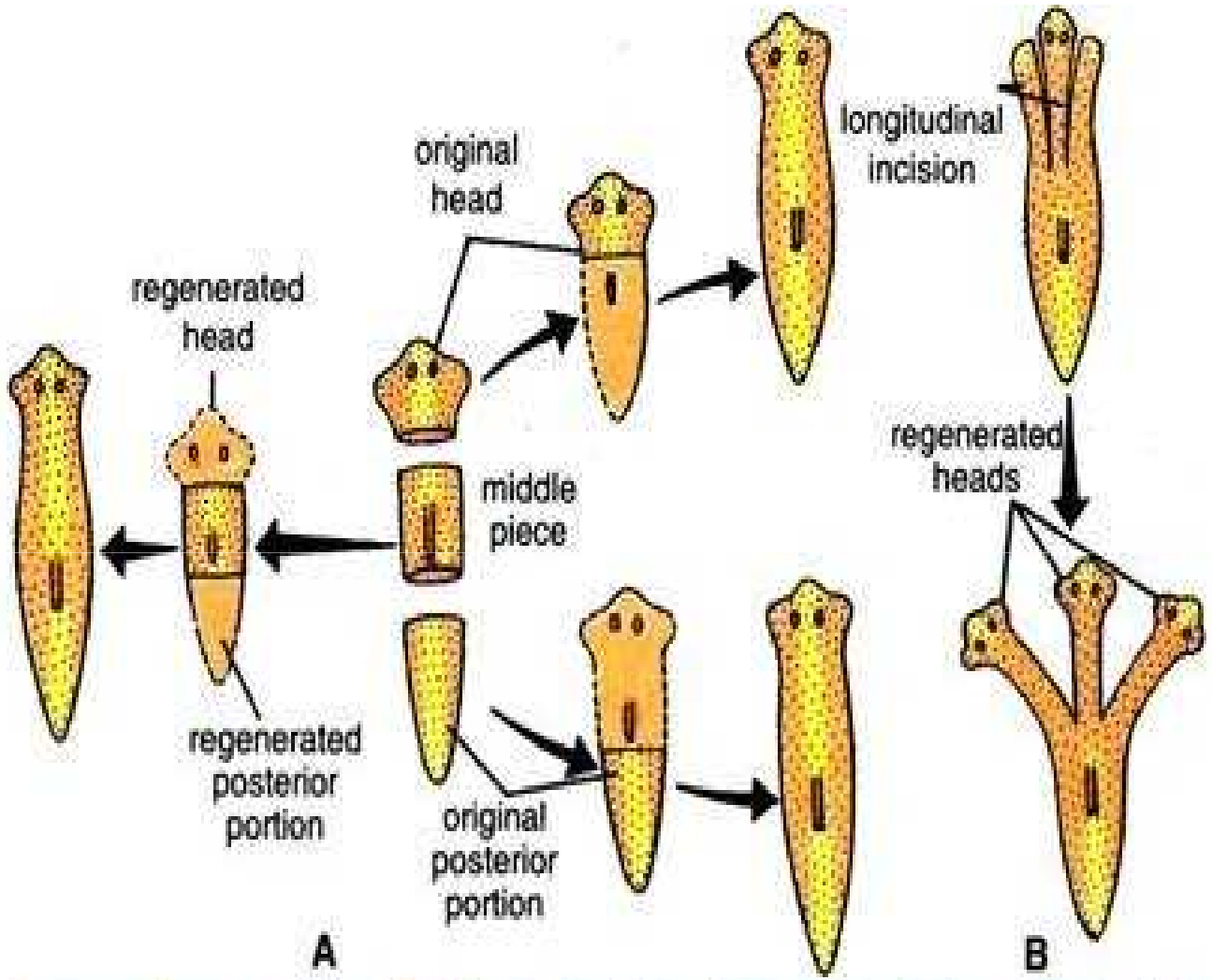


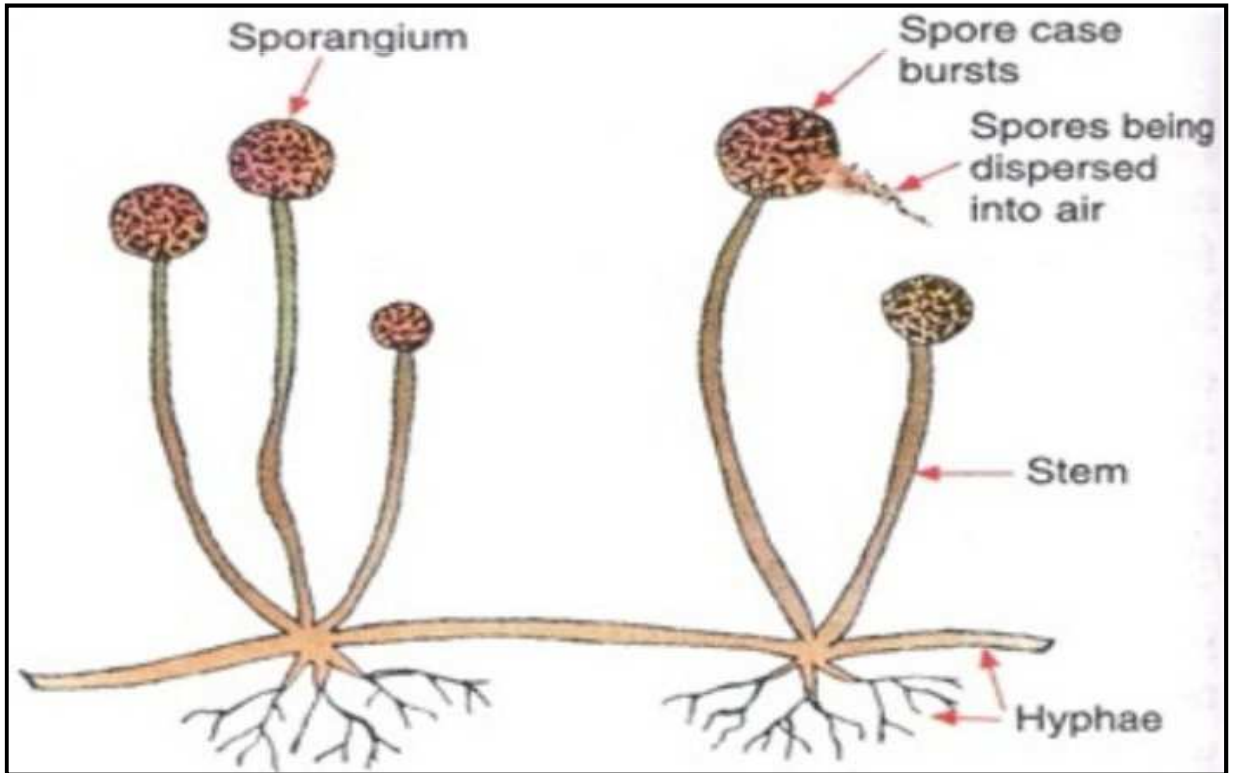
Fig. 39.17. *Dugesia*. Regeneration. A—Three individuals regenerate from an individual cut into three parts; B—Formation of a heteromorph with three heads.

Losing its tail

Regaining its lost tail

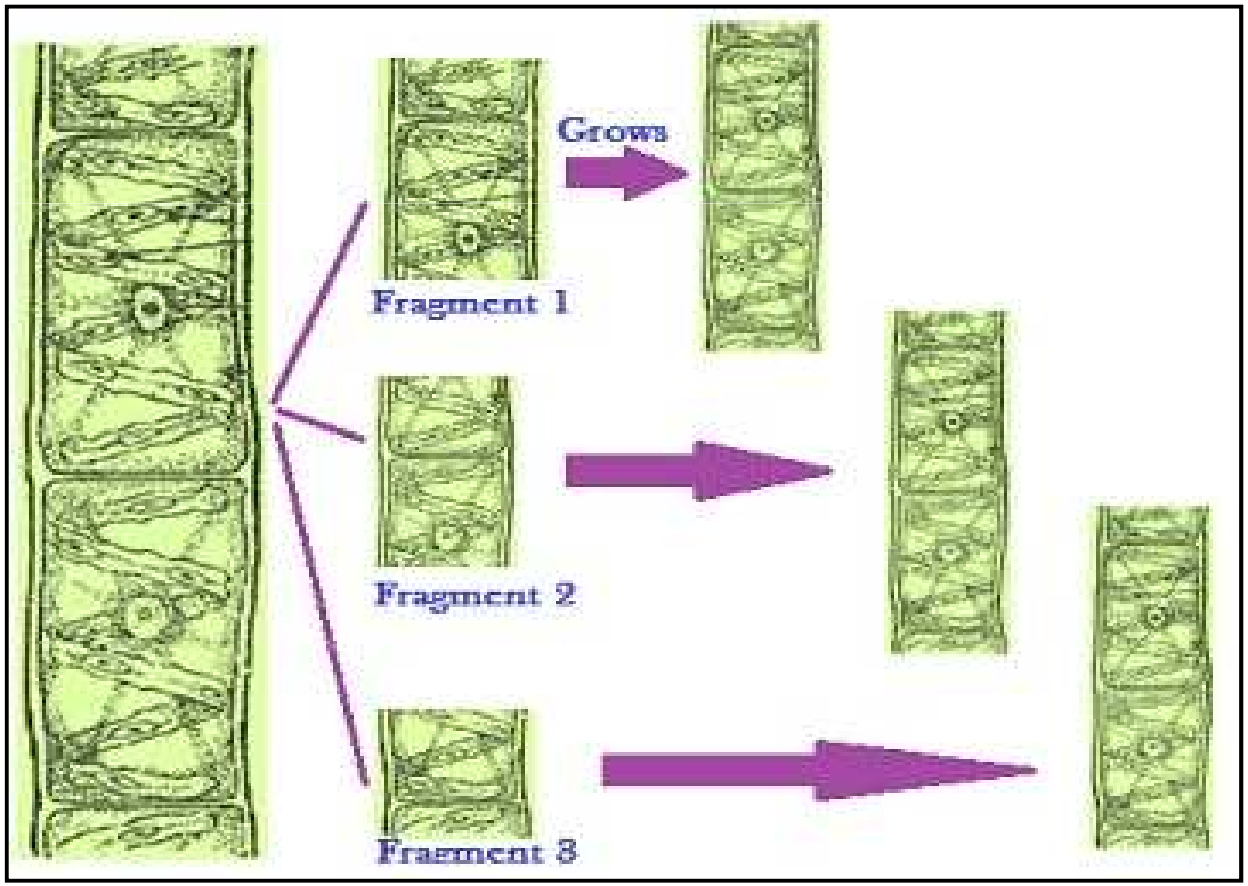
4. SPORE FORMATION

Spore are unicelluar bodies formed by cells division by parent organism. After detaching from the parent, if conditions are suitable, they germinate directly or indirectly into a new individual. It is found in fungi for eg. Mucor, Rhizopus, Penicillum



5. FRAGMENTATION

The body of an organism on maturing simple breaks up into smaller fragments. Each fragments grow into new individuals. Eg. Spirogyra



CLASS X/ BIOLOGY
REPRODUCTION /
VEGETATIVE PROPAGATION

Date : 12/08/2020 **TEACHER :SASWATI BASAK**

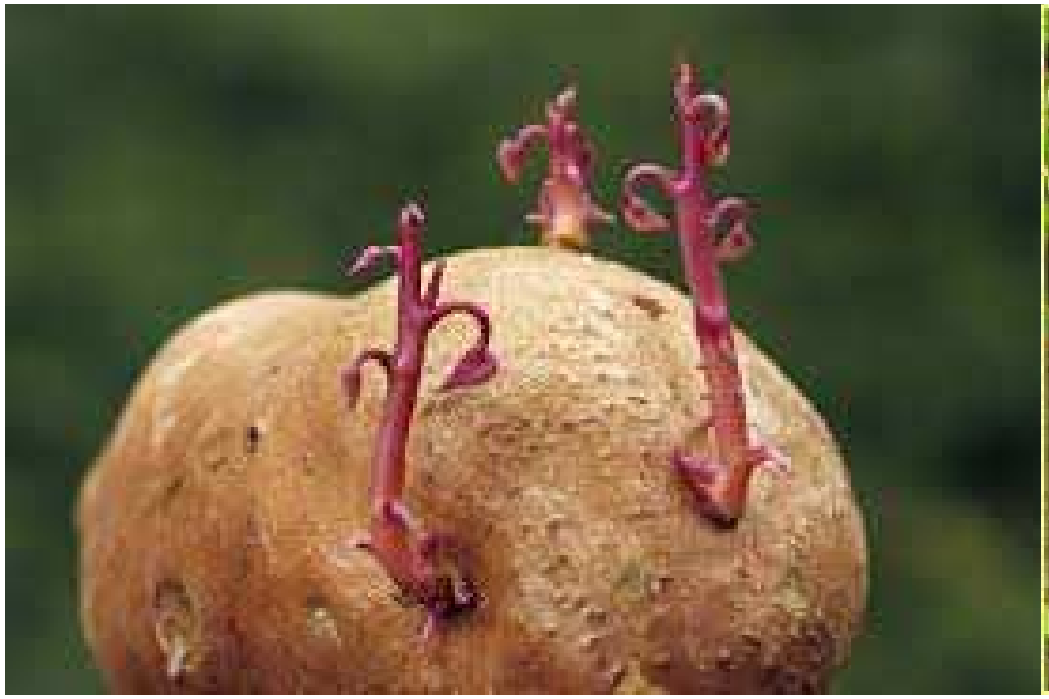
VEGETATIVE PROPAGATION

i) Natural Vegetative Propagation: Various plant part such as root , stem, leaf are modified for vegetative propagation.

Vegetative Propagation by Stem: Stem of certain plant are modified into bulbs e.g. onion, garlic, tuber e.g. potato, rhizomes e.g. ginger which have apical and axillary buds. In axillary buds new plant are formed.

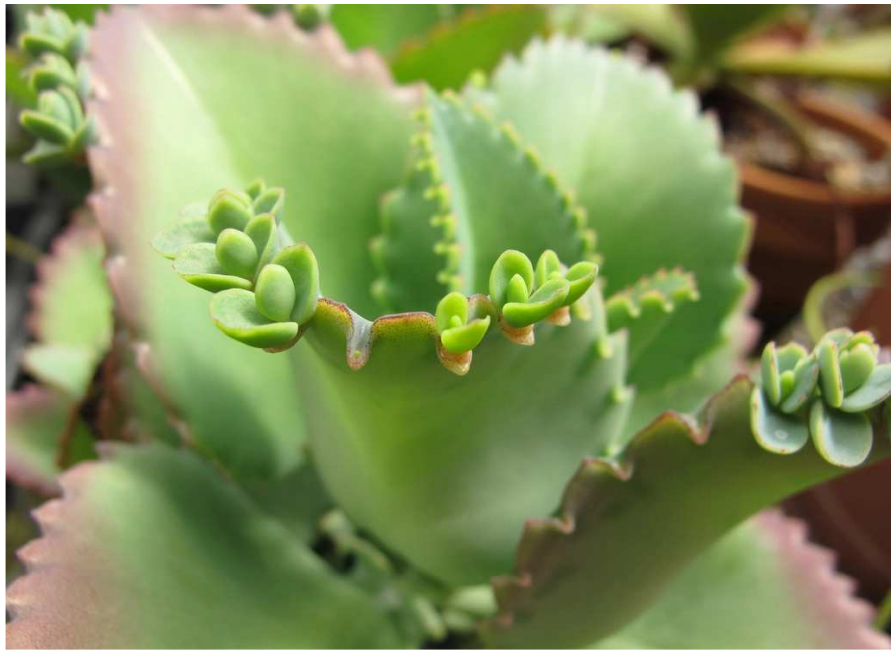
Vegetative Propagation by Roots: Sweet potato, carrot, radish when sown in soil develop new plants.

Vegetative Propagation by Leaves: Leaves of Bryophyllum having plantlet along the leaf margin when grown in soil develop into new plants.



Vegetative Propagation by Stem

Vegetative Propagation by Roots



Vegetative Propagation by Leaves

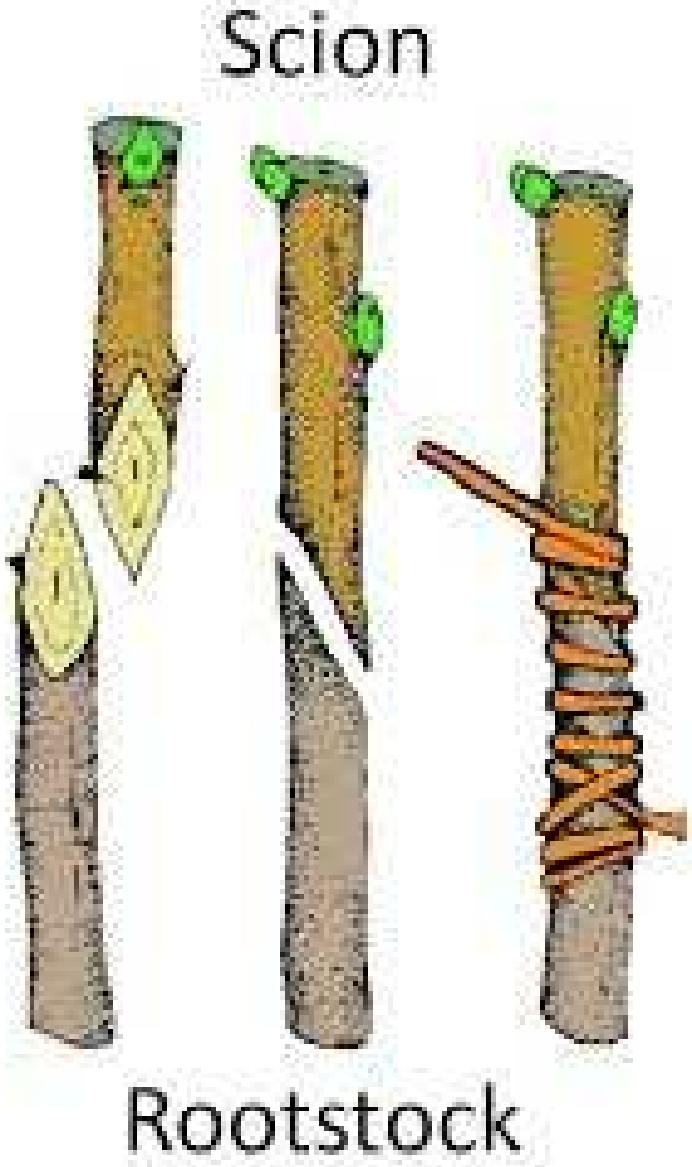
VEGETATIVE PROPAGATION

ii) Artificial Vegetative Propagation: It includes cutting, grafting, layering, tissue culture.

a) Cutting: If cutting of stem, root or leaf of certain plant are grown in soil under suitable condition they develop into new plants. E.g. China rose, Rose, Drum stick, sugarcane etc.

VEGETATIVE PROPAGATION

b) Grafting: By joining parts of different plants a new plant variety produced. The stem of the rooted plant is called stock. Stem cutting from a superior quality is called scion. Both stock an scion stems are cut obliquely and then placed over one another so that cambium of both touch each other. The two pieces are then held together by rubber tubing or tape. After a month cambium of the two fuse with each other and new vascular tissue develop. E.g. Apple, Mango, Pear.


Scion
Rootstock

VEGETATIVE PROPAGATION

c) Layering: In layering roots are induced on the stem. When roots develop the part of stem in detached from the parent plant and grown in the soil. Layering is of two types:

- **Mound Layering:** A lower branch of the rooted plant is bent and buried into the moist soil. The tip of the branch should remain above the ground. In a few days the portion under the soil develop roots. It is now cut off from the parent plant and grown in the soil as a new plant. E.g. Grapevine, Jasmine.

VEGETATIVE PROPAGATION

- **Air Layering:** This method is used in plant cannot be bent and buried into the moist soil. The stem is girdled and it is covered with moist cotton and enclosed in a polythene bag. After few days roots emerge from this region and branches cut off from the parent plant. It can now be planted in the soil. E.g. Crotons.

Mound Layering

Air Layering

VEGETATIVE PROPAGATION

d) Tissue Culture: In this method plants cells or tissue are cultured on a sterilized medium containing necessary nutrients and hormones. The culturing of cells or tissues results in the formation an undifferentiated mass of cells called callus which is then transferred to another medium for differentiation of plantlets. The plantlets then transplanted to separate spots or nursery beds and allow to grow for a definite period of time. The matured plant are then transplanted in the fields. E.g. Chrysanthemum, Orchids


wevitro.com

Advantages of Artificial Vegetative Propagation

1. The new plants produced by this process are the exact replica of the parent plants.
2. Fruit trees produced from cutting or grafting start growing rapidly and bear fruits earlier than the plant produced from seeds.
3. The plants grown by vegetative propagation usually needs less attention

Sexual Reproduction in Flowering Plants

In flowers Androecium bearing anthers are the male reproductive parts. Pollen grains are the male gametes. Gynoecium bearing ovary are the female reproductive parts. Eggs are the female gametes.

Sexual reproduction in plants takes place in the following steps:

i) Pollen grains from anther stick to the stigma of carpel.

ii) Pollen grains form pollen tubes to reach the ovule.

iii) Pollen grains fertilise the egg in ovules. These fertilised egg cells grow inside the ovules and become seeds.

iv) The seeds produced new offsprings on germination under suitable conditions of availability of water, temperature, air, light.

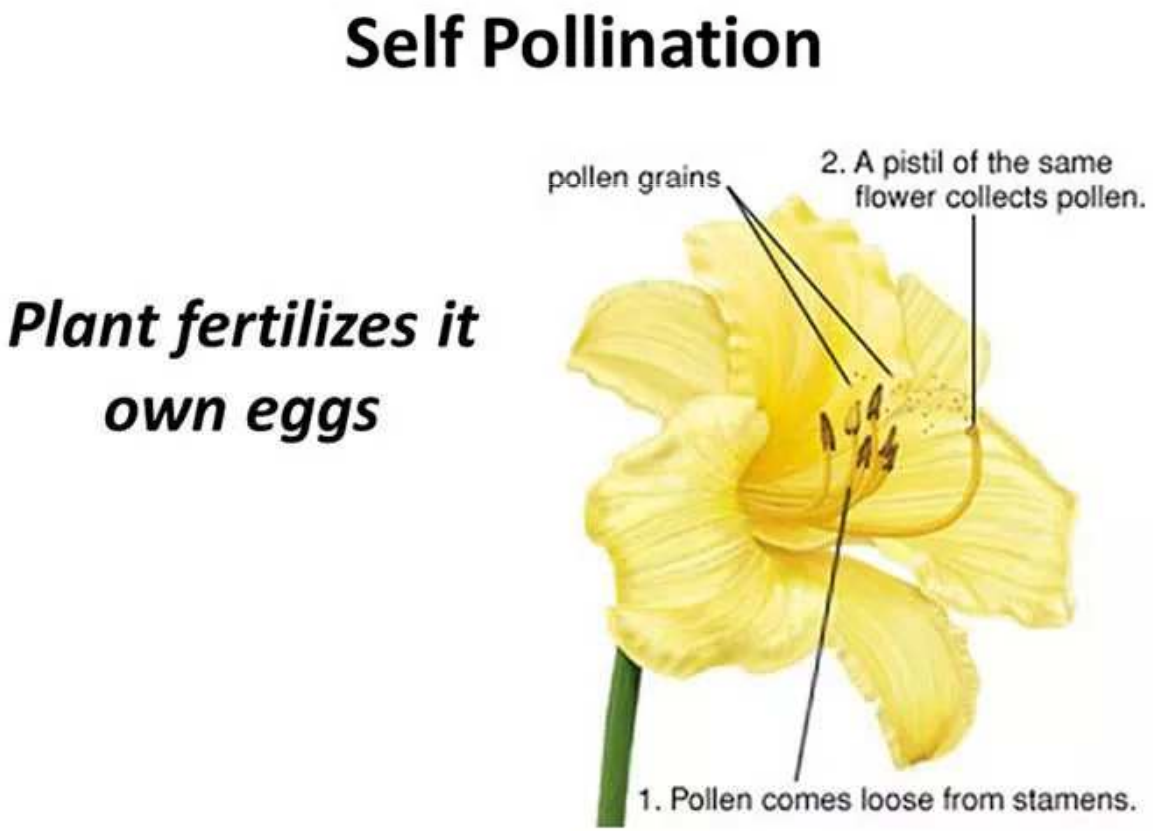
POLLINATION

Pollination is of two types:

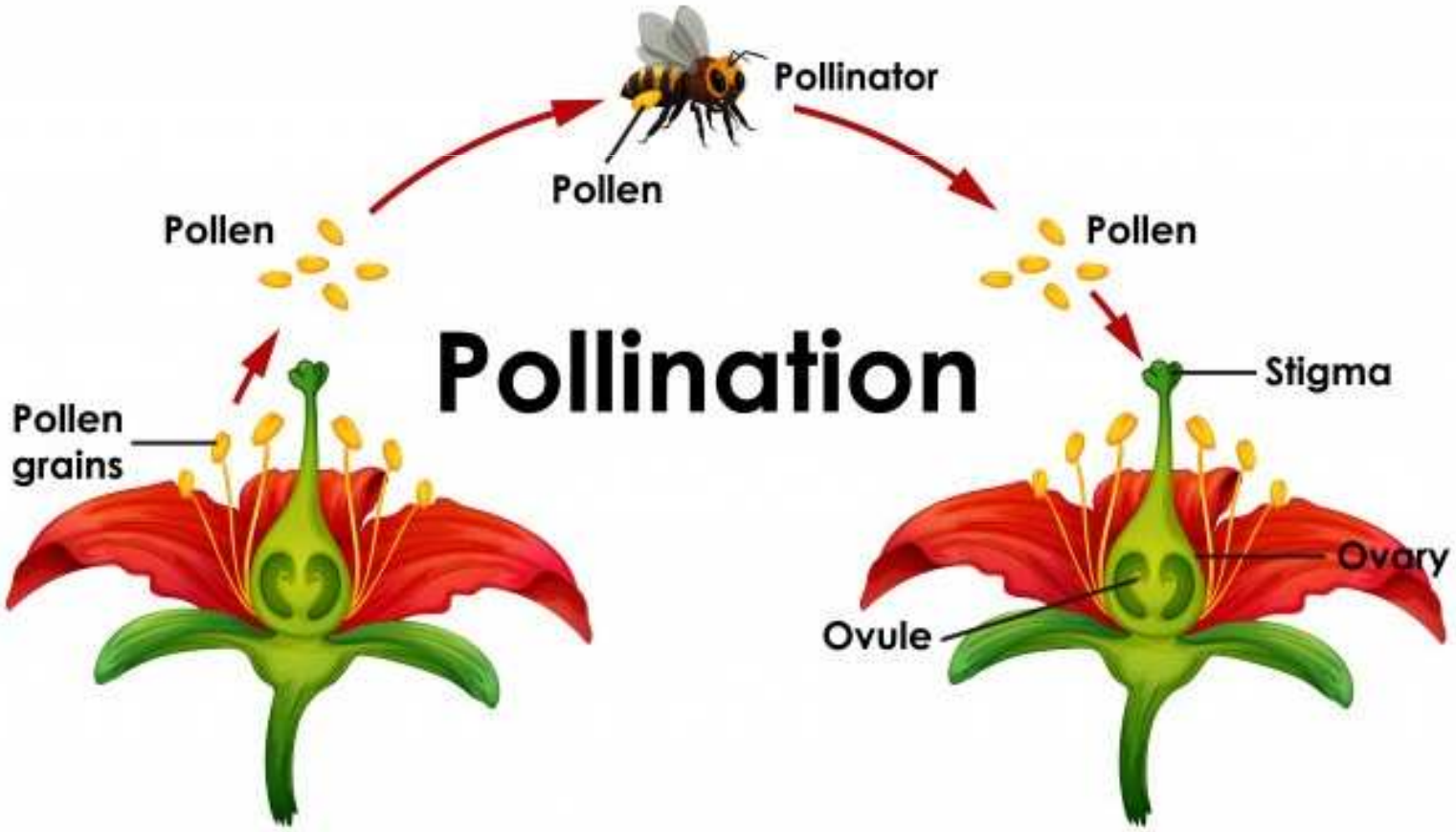
i) **Self Pollination**

ii) **Cross Pollination**

Self Pollination: Self pollination is the transfer of pollen grains from the anther to the stigma of the same flower. E.g. Rice, Wheat, Pea.



Cross Pollination: In this type of pollination the pollen grains from the anther one flower a transfer to the stigma of flower of another plant.



FERTILISATION IN PLANTS

❖ Pollination results in the deposition of related pollen grains over the receptive stigma of the carpel.

❖One pollen tube grows from pollen grain into the stigma passes through the style and then moves towards the ovarian cavity.

❖ Two non motile male gametes are formed inside the tube during its growth through the style.

❖ After reaching the ovary pollen tubes enter the ovule through the micropyle.

❖ The tip of the tube finally pierces the egg apparatus end of the embryo sac.

❖After penetration the tip of pollen tube ruptures releasing two male gametes into the embryosac.

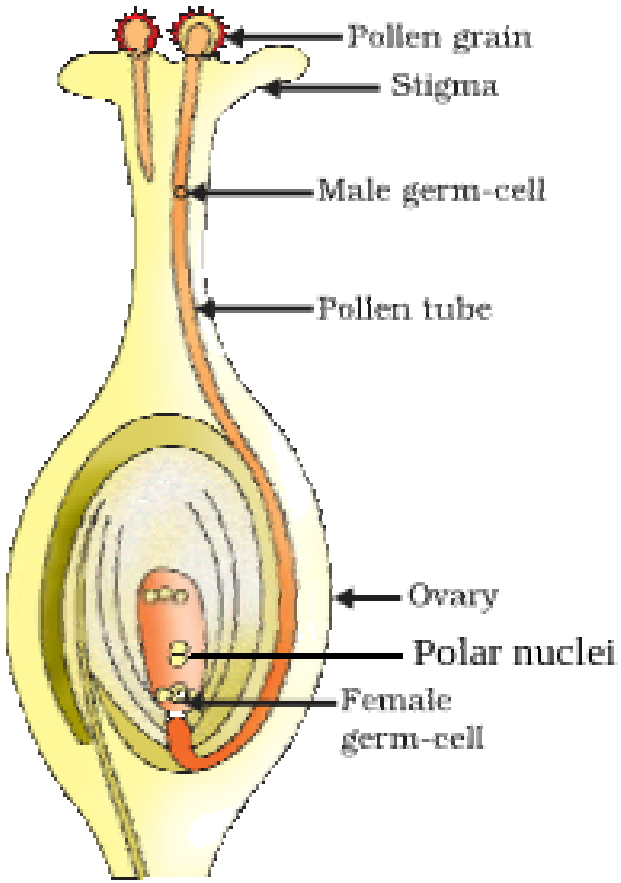
❖ During the act of fertilisation one male gamete fuses with the egg to form the diploid zygote. This process is called syngamy.

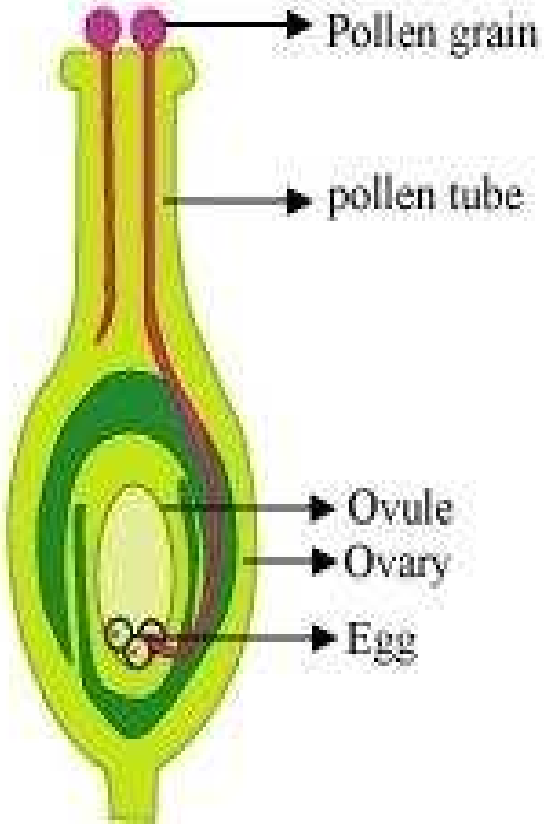
❖ The diploid zygote finally develops into embryo.

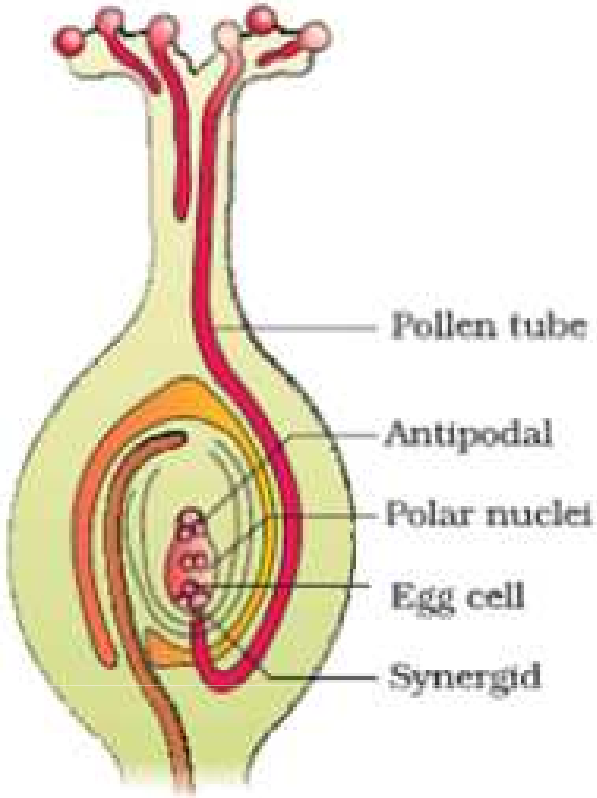
❖ The other male gamete fuses with the two polar nuclei to form the triploid primary endosperm nucleus. This process is called triple fusion.

❖ This mechanism involving two act of fertilisation in an embryosac is called double fertilisation.

❖ After fertilisation zygote develops into embryo, ovule develops into seed and ovary develops into fruit.







Longitudinal section of a flower showing growth of pollen tube

CLASS X/ BIOLOGY

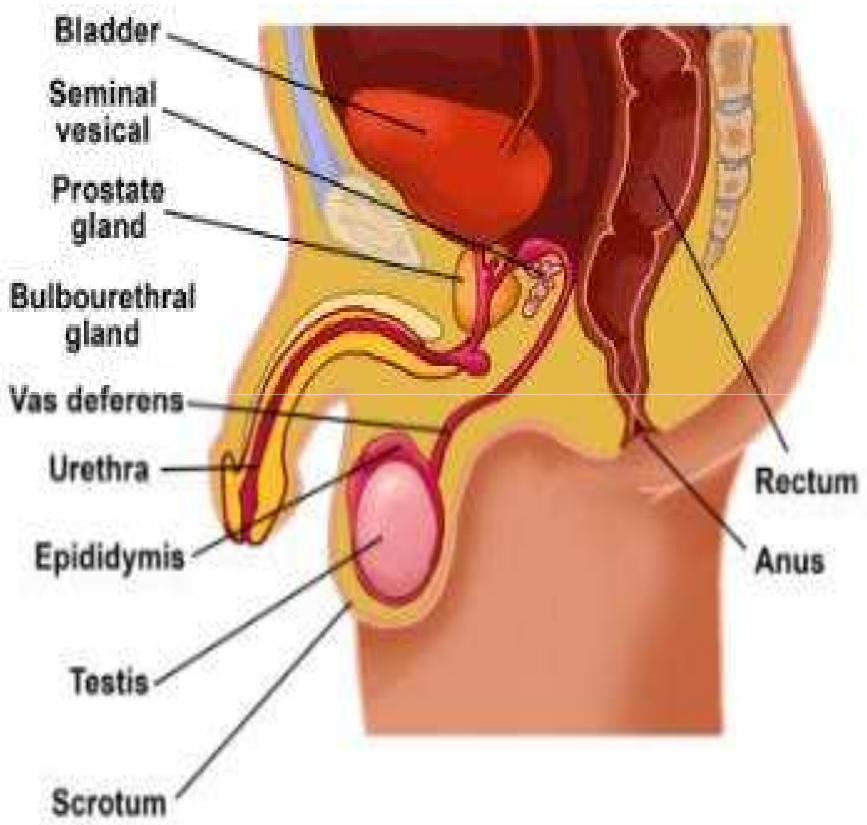
MALE REPRODUCTIVE SYSTEM

Date : 14/08/2020 **TEACHER :SASWATI BASAK**

MALE REPRODUCTIVE SYSTEM OF HUMANS

Human male reproductive system consists following organ:

1. Testes
2. Scrotum
3. Vas Deferens
4. Urethra
5. Penis



TESTES

Human male possesses two testes which lying outside the abdominal cavity. The two testes are the sits where male gametes i.e. sperm are produced. The testes also produce male sex hormone testosterone.

SCROTUM

The scrotum is a pouch of skin that hangs between the legs it is differed internally into right and left scrotum sacs by a muscular partition. The two testes lie in respective scrotal sacs. The scrotum act as thermoregulator and provides an optimal temperature for the formation of sperm. The sperm develop at a temperature 1-3°C lower than the normal temperature. The life of sperm is greatly reduced if the temperature is higher. During winter, when temperature falls the scrotums shrinks to bring the testes close to body to get warmth. During summer, when temperature rises the scrotum become relaxed to lose heat.

VAS DEFERENS

This a straight tube about the 40 cm long which carries the sperms to the seminal vesicles. Sperm are stored temporarily in the seminal vesicles where mucus and a watery alkaline fluid containing the sugar fructose mix with the sperms.

URETHRA

It is about 20cm long tube that arises from the urinary bladder to carry urine. It runs through the penis and opens to the outside through male genital pore. The contains of two seminal vesicles sperms from vas deferens also join the urethra. Thus urethra carries urine from bladder as well as sperm from the vasa deferentia through the penis.

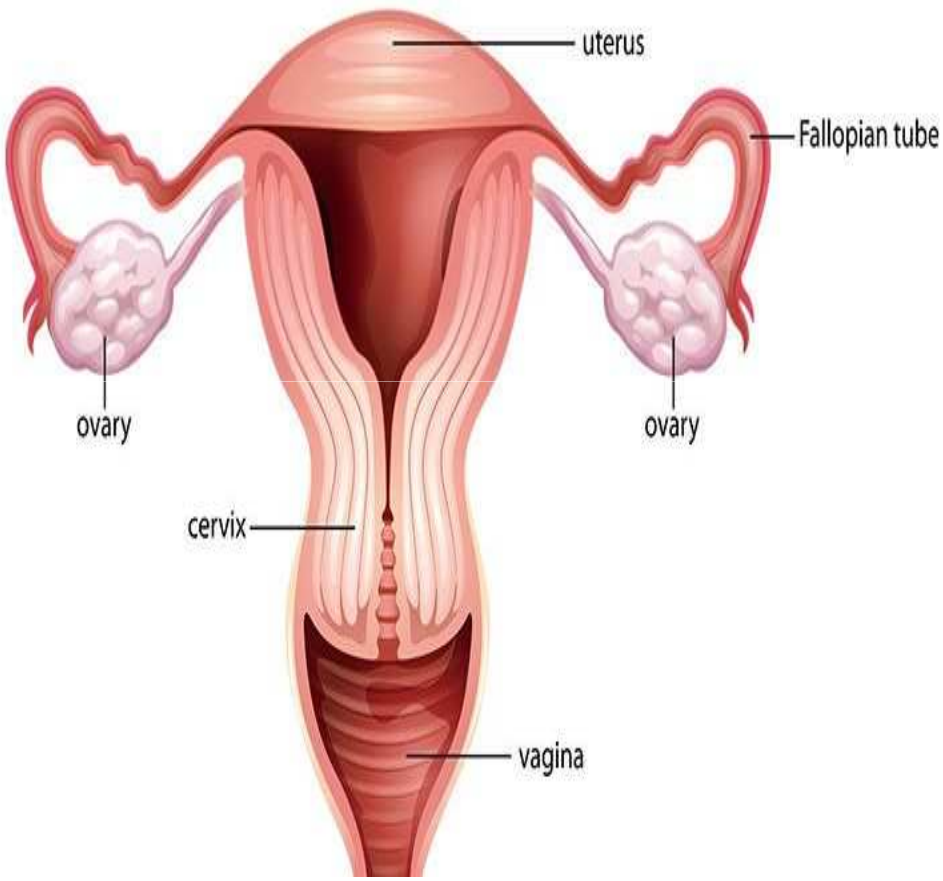
PENIS

Penis is a long thick muscular organ made up of mostly erectile tissue. The tip of penis is a soft which is cover by a lose retractable fold of skin, called foreskin. At the time of sexual excitement, the erectile tissue get filled with blood causing the penis to become erect. It is inserted to the vagina of the female where sperm are ejaculated. In human males there is only one opening for the urine and sperms to pass out of body.

FEMALE REPRODUCTIVE SYSTEM OF HUMANS

Human female reproductive system consists following organ:

1. **Ovaries**
2. **Fallopian tubes (Oviducts)**
3. **Uterus**
4. **Vagina**



OVARIES

Each human female contain two almond shaped ovaries located in the lower part of the abdominal cavity near the kidney. Each ovary connected by the ligament to the uterus. The ovaries perform dual function –

a) Production of female gametes (egg or ova)

b) Secretion of female sex hormone (estrogen and progesterone)

Each ovaries is composed of ovarian follicles. Each follicles contains a large ovum surrounded by many layers of follicle cells. The production of ova starts at the age of puberty. Usually one ovum is produced every month during the fertile years of a woman. After menopause the ovary become small and lose follicle

FALLOPIAN TUBE (OVIDUCT)

Fallopian tube is about 10-12cm long muscular tube which carries egg from the ovary to the uterus and also provides the appropriate environment for its fertilisation. The funnel- shaped opening end each fallopian tube lies near the posterior ends of each ovary. The other ends of long convoluted tubes open into the uterus.

UTERUS

Uterus is a large inverted pear-shaped, muscular structure that lies behind the bladder. When fertilisation take place the embryo gets attached to the wall of uterus and grows there until birth.

VAGINA

This is a muscular tube 7-10 cm long whose wall contain elastic tissue. It is well adopted to receive the male penis during copulation. The vagina also called birth cannel as it allows passage of the baby at the time of child birth. In human females the urinary opening and vaginal are separate.

Reproductive Health

- Reproductive Health is a state of complete physical, mental and social well-being in all aspects of reproduction. People should have adequate knowledge on the following:
  Knowledge of reproductive processes & organs
  Care of mother & child

Family planning is necessary to limit this huge increase in population.
Overpopulation can give rise to serious problems like lack of food, employment and education which in turn would affect the economy and also the survival of population.

Family Planning

- Some people give birth to a child every year; others end up with 10-11 children. It is very important to understand the disadvantages of overpopulation and proactively act to control the same. Following points can ensure that the population does not increase beyond limit:
- Control the number of children in a family to one/two depending upon the family's income
- No differentiation between male & female child. Some people end up giving birth to 6-7 daughters just to get a son.
- Proper age gap between children must be maintained, so that enough care is provided to the first child even before the second one arrives.
- Parents should plan a baby at their right age. If parents are too old in the 40s , they themselves become too old to take care of kids. Similarly parents as young as 19- 20 years old couples are too young to manage kids.

- **METHODS OF CONTRACEPTION:**
- There are different methods of contraception, including:
- long-acting reversible contraception, such as the implant or intra uterine device (IUD)
- hormonal contraception, such the pill or the Depo Provera injection
- barrier methods, such as condoms
- emergency contraception
- fertility awareness
- permanent contraception, such as vasectomy and tubal ligation.

Emergency contraception can be used to prevent pregnancy if:

- you haven't used protection
- your normal contraception fails e.g. condom splits
- you have missed more than one contraceptive pill
- you have been vomiting or had diarrhoea while on the pill
- you have missed your injection
- you have been forced to have sex without contraception.

- Fertility awareness is learning the signs of fertility in your menstrual cycle to help you plan or avoid a pregnancy.

The various methods of contraception (preventing pregnancy in woman) are:

- Barrier methods,
- Chemical methods,
- use of Loop of Copper-T,
- Surgical methods.

  i) In the barrier methods of preventing pregnancy, the physical devices such as condoms and diaphragm (or cap) are used. Condoms are used by males (by putting them as a covering on the penis). Diaphragm (or cap) is used by females (by putting it in the vagina to cover the cervix). Condom as well as diaphram prevent the sperms from meeting the ovum (or egg) by acting as a barrier between them.

- ii) In the chemical methods of preventing pregnancy, the females use oral pills. The oral pills contain hormones which stop the ovaries from releasing ovum (or eggs) into the oviduct.
  iii) The loop or copper-T are also very effective in preventing pregnancy. A loop or copper-T is placed inside the uterus by a doctor or a trained nurse. The loop or copper -T are called intra-uterine contraceptive device (IUCD).

- iv) Surgical methods of birth control are available for males as well as females. In males, a small portion of the sperm duct (or vas deferens) is removed by surgical operation and both the cut ends are ligated (or tied) properly. This prevents the sperms from coming out. The surgical procedure carried out in males is called 'vasectomy'. In females, a small portion of the oviducts is removed by surgical operations and the cut ends are ligated (or tied). This prevents the ovum (or egg) from entering into the oviducts. The surgical procedure carried out in females is called tubectomy.