

How do organisms Reproduce Ch-8

Reproduction – is process by which new individuals of same kind are produced from pre-existing organisms (parent)

Significance of Reproduction

- 1) It ensures continuity of life on earth (maintenance of species.)
- 2) For bringing about evolution by transmitting favourable characteristics of organisms from one generation to the next generation.
- 3) For increasing the population of species.

→ The basic event in reproduction - at the cellular level is the formation of a DNA copy

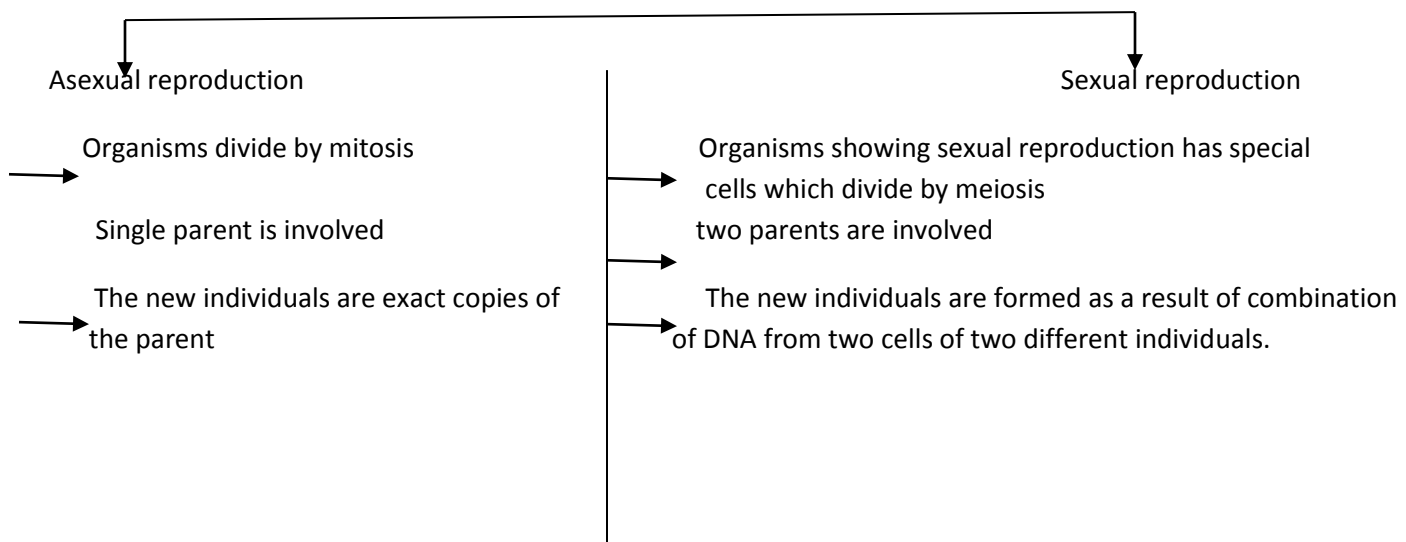
→ Nucleus of cell contains chromosomes which carry information for inheritance of characters from the parents

→ to the offsprings, in the form of DNA.

During the process, a new copy of existing DNA molecule is created to form new cells. The divisions could be



TYPES OF REPRODUCTION



→

They show very little variation

- The number of chromosome is same as
- the parent

They show considerable variation

- Gametes have half the no. of chromosomes then the
- parent cell.

Variation -

- 1) allows organisms to exist in diverse habitat
- 2) during unfavourable conditions showing variations are able to survive while rest of species may perish
- 3) It is useful for the formation of new species and for survival of species.

Characteristics of asexual Reproduction

- Single parent is involved.
- New individual is the exact copy of the parent (genetically identified)
- Only mitosis takes place
- No gametes are required

Asexual reproduction is seen in unicellular organism, some plants and lower multi cellular organisms like

Advantage of asexual reproduction

- Simple and fast process
- Large no. of organisms having desired characteristics can be obtained

Disadvantages of asexual reproduction

- Similar organisms are produced generation after generation. So, defects of parent are also inherited.
- No evolutionary change as no variations are produced.

Different methods of asexual reproduction are

- 1) Fission
- 2) Budding
- 3) Spore formation
- 4) fragmentation
- 5) Regeneration
- 6) Vegetative propagation
- 7) Tissue culture

Fission – Mode of asexual reproduction which involves the splitting up of the parent cell into daughter cells.

Binary

- The nucleus and cytoplasm divides
cytoplasm divides into two resulting

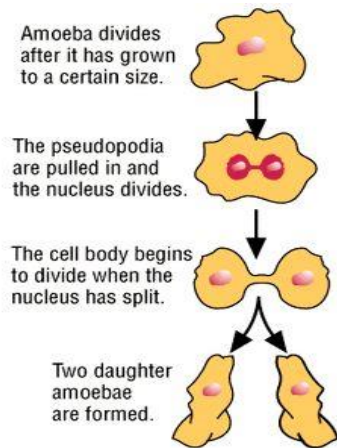
Multiple

- Nucleus divides into many daughter nuclei followed by
divisions of cytoplasm into corresponding no. of bits.

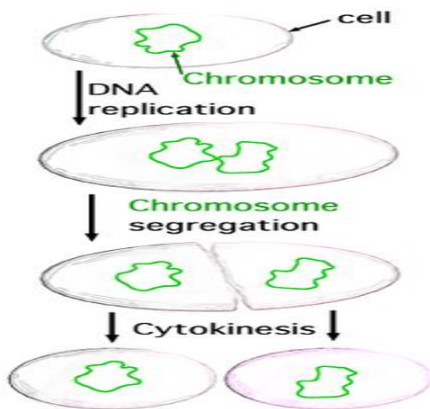
in formation of two daughter cells.

→ amoeba , bacteria

→ plasmodium

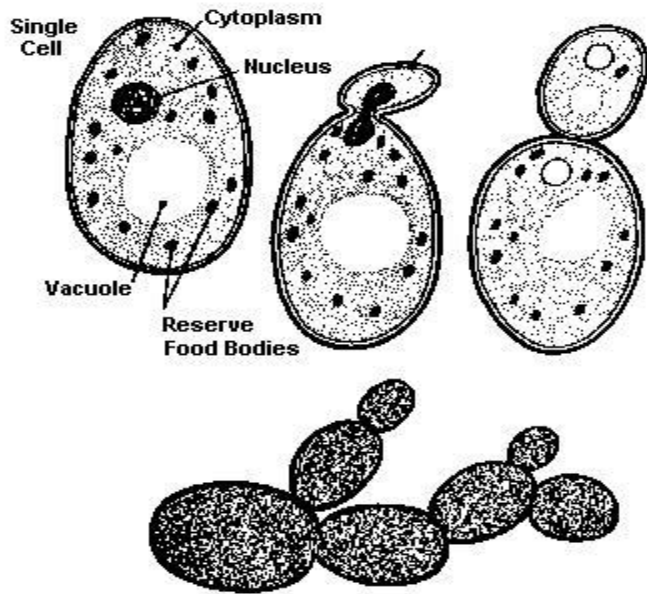


BINARY FISSION



Budding – A mode of asexual reproduction where a small out growth appears on parent cell called bud.

- budding takes place in unicellular organisms like yeast and multicellular organisms like hydra
- Nucleus divides into two and the buds develop into tiny individuals and when fully matured, they detach from the parent body and become new independent individuals.



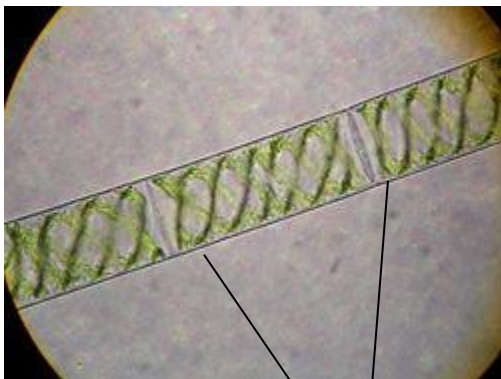
Budding in yeast

Fragmentation

→ Seen in some filamentous like spirogyra (green algae) breaks into pieces and each piece is capable



Parent filament

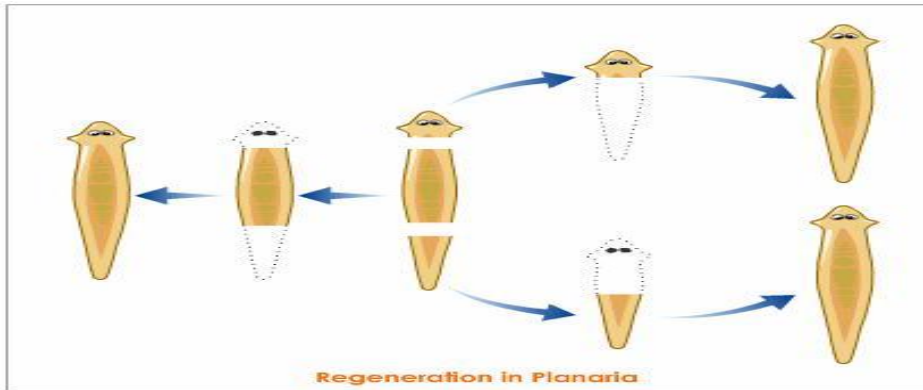


fragments

fragmentation is spirogyra

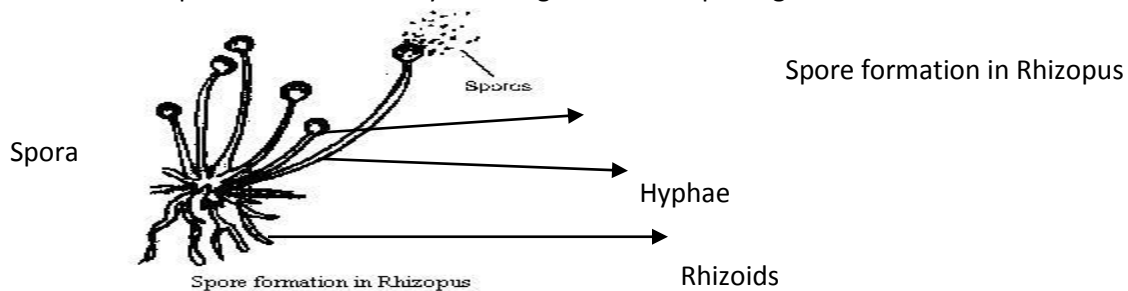
Regeneration

- It is the ability of an organism to regain or repair its lost parts
- The process can be carried out only by specialized cells which proliferate and divide to form large no. of cells. These cells later on differentiate to form different tissue. e.g. in sponges, planaria hydra.
- Organisms like star fish and lizards can regenerate their arms and tails respectively.



Spore formation

- Seen in fungi like Rhizopus, Mucor, Penicillium etc and ferns
- Body of the organisms is made up of thread-like structures called hyphae.
- Some of the hyphae grow erect and bear blob-like structures at their tips called sporangia
- Each sporangium contains no. of spores which are formed by the division of the nucleus, many times followed by division of cytoplasm.
- The nucleus with a bit of cytoplasm is called spores.
- The spores are liberated by breaking the wall of sporangium.



Vegetative Propagation

- Development of new plants from vegetative parts like roots, stem and leaves is called vegetative propagation.
- It can be done in two ways –

Natural Vegetative Propagation

- 1) From roots e.g. sweet potato
- 2) From stem e.g. sugarcane, potato
banana
- 3) From leaves e.g. Bryophyllum

Artificial Vegetative Propagation

E.g. – Grafting, layering, tissue culture

Advantages of Vegetative propagation

- 1) It is a fast method of propagation easier and less expensive
- 2) Seedless plants (grapes) and plants with non-viable seeds (banana) can be propagated by vegetative propagation.
- 3) genetically similar plants can be obtained
- 4) plants skip the risky seedling stage

Disadvantage of Vegetative Propagations

- 1) No genetic variations are seen.
- 2) Diseases or undesirable characters are also transferred from the parent to their offspring.
- 3) New character can not be introduced.

SEXUAL REPRODUCTION IN PLANTS

I. Characteristics

- 1) Two parents, are involved
- 2) Parents give rise to specialised cells called gametes.
- 3) Gametes fuse to form zygote
- 4) The new individuals are genetically different from parent i.e. they show variations.
- 5) It leads to the formation of new species and evolution.

Mechanism of sexual reproduction

- * Multicellular organisms have specialized organs which are involved in the process of reproduction.
- * These organs produce specialized cells called gametes. The male gamete is smaller and motile.
- * Female gamete bigger in size and non-motile and stores food.
- * The male and female gametes fuse to form zygote (single cell structure). This process of fusion of gamete is called fertilization.
- * Zygote undergoes repeated mitosis to form an embryo.

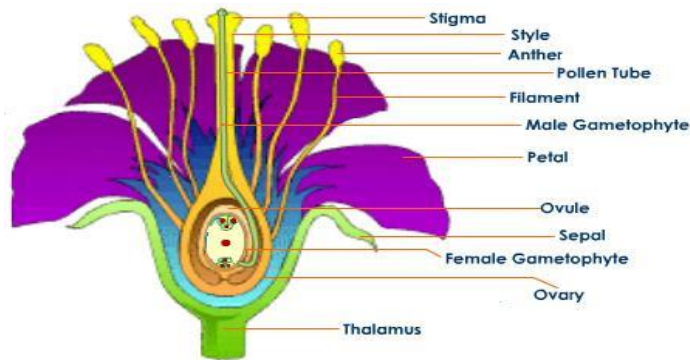
Structure of flower

→ Flower is the reproductive part of the plant. It consists of 4 parts arranged in concentric circles are whole

- 1) Sepals (Calyx) – It forms the outer most part which is green in colour and perform photosynthesis.
- 2) Petals (Corolla) – They form the second whorl of a flower. They are brightly coloured to attract insects for pollination.

- 3) Stamen (Androeceium) – It is male reproductive part of flower. Each stamen consists of fililament with an anther bag at its tip. Anther contains the pollen grains which contains male gamete. Each pollen grain contains two male gamete
- 4) Pitil / Carpel (Gynomecium) – It is the female reproductive part of flower. It consist of sticky tip called stigma, a long tube called style and a swollen base called ovary. Ovary contains the ovules. The female gamete (egg) is present inside the ovule.

Longitudinal section of flower -



Differentiate between

Unisexual flower

The flower which contains either stamen or carpel is unisexual

→ Date , Papaya

Bisexual flower

The flower contains both stamen or carpel is bisexual

→ Pea, Sunflower

Pollination – Transfer of pollen grains from anther to stigma of a flower is called pollination.

Agents – Wind, Water, insects / birds, Bats

Types of Pollination

Self pollination

- 1) Transfer of pollen grain from anther to stigma of same flower of plant

Cross Pollination

- 1) Transfer of pollen grain from anther to stigma between different plants of same kind

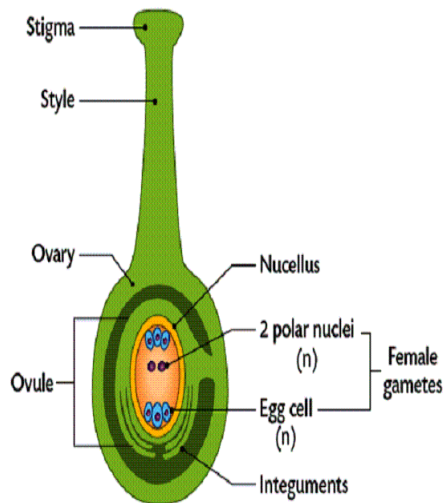
Q. What are the changes that occurs in a flower after pollination?

- 1) When the pollen grains are deposited on a suitable stigma a tube is formed into the style.
- 2) The pollen tube travels down the entire length of the style and reaches the ovary.

- 3) Each pollen grain contains two male gametes inside the pollen grain one of the male gamete fuses with one of the egg present in ovule to form zygote. This process is called fertilization or syngamy.
- 4) The other male gamete fuses with polar nuclei to form endosperm. This process is known as triple fusion. Hence two of the fusions take place simultaneously such a fertilization is known as double fertilization.

Post fertilization changes in a flower

- 1) After fertilization zygote divides several times to form an embryo within ovule.
- 2) Sepals, petals, stamen, style and stigma **wither away**.
- 3) Ovary become large in size and develop into seed.
- 4) Ovules develops a tough coat and develop into seed.
- 5) Embryo is the future baby plant.
- 6) During germination under appropriate condition, the embryo develops into a seedling plants.



Germination of pollen type on stigma

Reproduction in Animals : In case of animals, there are separate male and female organism in a species. The males are distinguished from females on the basis of reproductive system.

- 1) The reproductive organs (Gonads) which produce gametes.

2) Organs which deliver the germ cells and provide nutrition to them.

The reproductive organs are not developed at the time of the birth of the child. As growth and reproduction both

the life processes, need a lot of energy, so they cannot go on simultaneously at a fast speed. At a certain age majority of resources are directed towards growth of the body.

3) After a general age, the rate of general body growth slows down and reproductive organs begins to mature.

This period during adolescence is called Puberty.

Puberty – It is the age when re-productive organs start functioning after attaining sexual maturity. It is around

10 – 12 years in females and 13-14 years in male.

Function of Gonads in Human (male and females)

1) The male gonads are called testis and female gonads are called ovaries.

2) They perform two basic functions

i) Production of gametes

a) In males the gametes are called sperms. They are small in size and motile.

b) In female, the gametes are called egg. They are big in size and non-motile.

2) Secretion of hormone

a) Male gonads are called testis produce testosterone and female gonads called ovaries produce progesterone and estrogen.

Role of Reproductive hormones

1) They regulate the gamete formation.

2) They maintain the structure and function of accessory sex organs (Organ that help in delivery of the gametes to site of fertilization).

3) They lead to the development of the secondary sexual characters.

Secondary Sexual Characters

In Males

In female

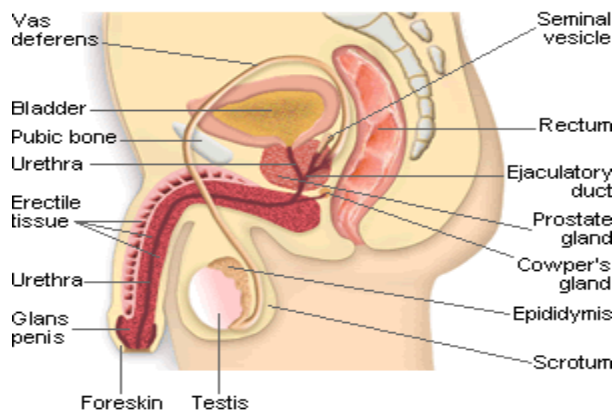
- 1) Deepening of voice
- 2) Broadening of chest and shoulder.
- 3) Oil glands become active.
- 4) Growth of hair (on body, facial hair, pubic hair)

- 1) Development of mammary glands
- 2) Appearance of general body hair and pubic hair.
- 3) Activation of oil glands.
- 4) High pitched voice

Male Reproductive System

It comprises of –

- 1) Testis – paired structures which are present in scrotal sac outside the abdominal cavity where the temperature is $2^{\circ} - 3^{\circ}\text{C}$ less than body temperature which is ideal for sperm production.
- 2) Epididymus – Stores sperms
- 3) Vas Deferens – It carries the sperm from the epididymus towards the exterior.
- 4) Seminal Vesicle and prostate Gland. These glands provide secretions which provide.
 - (i) Fluid medium for easy movement of sperms.
 - (ii) Provide nutrition to the sperms these secretions are drained into urethra.
- 5) Urethra – The vas deferens combines with the urinary duct to form a common passage for sperm and urine. This common passage is called urethra.
- 6) Penis – Urethra runs through a muscular organ.



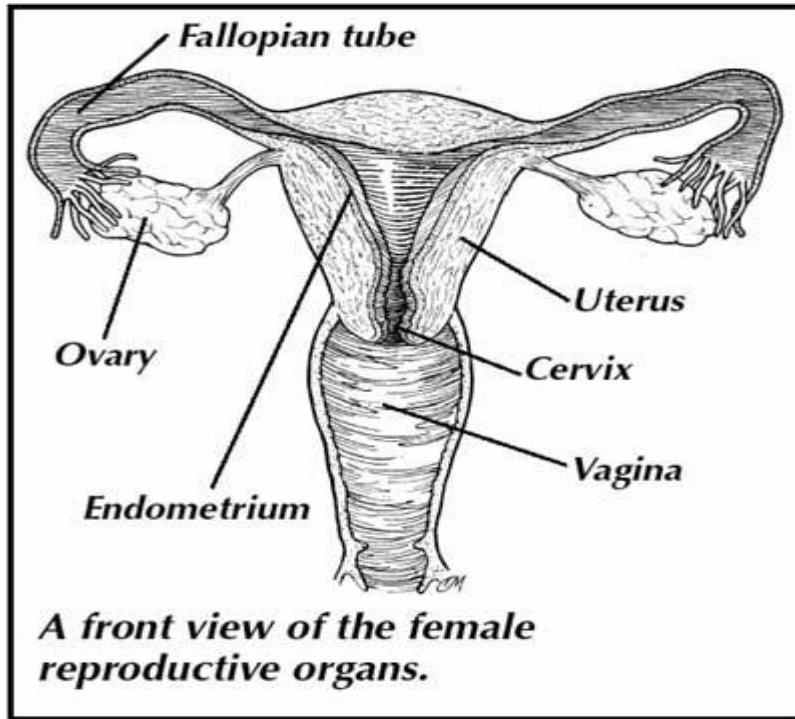
Human Female Reproductive system

It consists of -

- 1) A pair of ovaries – Present in abdominal cavity. They produce ova/egg cell at the time of birth of a girl. The ovaries already contain thousands of immature eggs. On reaching puberty the eggs start maturing and one egg is released every month by ovaries.
- 2) Fallopian tube- The eggs are carried from the ovaries to thin tube called fallopian duct or oviduct. It is the site of fertilization.

- 3) Uterus – The two fallopian tubes unite to form a muscular bag like structure called uterus. The development of embryo occurs inside uterus.
- 4) Vagina (Birth Canal) – It is muscular tube which runs to exterior. Sperms enter through vagina.

Human – Female Reproductive System



What is menstrual Cycle?

- The female reproductive system passes through a regular monthly sequence of events called menstrual cycle.
- These events are controlled by hormones produced by ovaries and pituitary.
- The human female produce one mature egg each month from the onset of puberty. If not fertilized , this egg remains alive for a day and start degenerating.
- Thickening of lining of uterus and formation of large no. of blood vessels in uterus is a waste.
- The lining slowly breaks down and is removed through the vagina along with the degenerated egg and the blood vessels in the form of blood and mucus. This is called as menstrual flow and this event takes place every month and it lasts for 2-3 days.

Fertilization → The process of fusion of gametes (sperm and ova) to form zygote is called fertilization.

Sexually Transmitted Disease

The disease which get transmitted from an infected person to healthy person during sexual contact.

These are 3 types of STD'S

Bacterial

Gonorrhoea

Syphilis

Viral

AIDS

Protozoan

Trichomoniasis

What are contraceptives ?

The various measures adopted by human male and female to prevent the birth of young one are called contraceptives or birth control measures.

- Condoms
- Diaphragms and Cervical caps (by o+)
- Chemicals
- Tubectomy/ Vasectomy
- Intra Uetrine Contraceptive Devices

Need for the use of Contraceptives

- 1) To restrict the family size
- 2) To put a appropriate gap between 2 children in a family.
- 3) To control population size.
- 4) To prevent STD's.

The various contraceptives measures used by human are -

- Barrier Method
- Chemical Method
- Surgical Method

I. Barrier Method

- 1) These are physical devices and by males and females. These prevent fusion of gametes or fertilization.
for e.g. – Condom (by male) and dia phragms and cervical caps (used by females)

II. Chemical Methods- There are two types

Hormonal Preparations

Taken orally to prevent the release of egg from ovary

Chemicals

They kill the sperms when they enter the vagina (used by females)

III. Surgical Methods (Non – reversible)

Vasectomy

It is the process of removal of a piece of vas deferens in males. The sperms are not able to reach to the exterior.

Tubectomy

It is the process of removal of a piece of fallopian tube in females. Eggs are not able to reach down to the uterus.

Intra Uterine Contraceptive Devices

(I U C D S)

These are inserted in the uterus and prevent the implantation of embryo in the uterus for e.g. Copper T

