



CHAPTER – 7

How Do Organisms Reproduce

The production of new organisms from the existing organisms of the same species is known as reproduction.

MODES OF REPRODUCTION USED BY SINGLE ORGANISMS

FISSION

Many single-celled organisms like protozoa and bacteria just split (or break) into two identical halves during cell division, leading to the creation of new organisms. This is called fission.

fission is the process of reproduction in unicellular organisms such as protozoa (like Amoeba, Paramecium, Leishmania, etc.) and many bacteria. In the process of fission, a unicellular organism splits (or divides) to form two (or more) new organisms.

Fission is of two types :

binary fission

multiple fission

depending on whether the parent organism splits to form two new organisms or more than two organisms.

organisms such as Amoeba, the splitting of the two cells during division can take place in any plane.

some unicellular organisms show somewhat more organisation of their bodies, such as is seen in Leishmania (which cause kala-azar), which have a whip-like structure at one end of the cell. In such organisms, binary fission occurs in a definite orientation in relation to these structures. Other single-celled organisms, such as the

malarial parasite, Plasmodium, divide into many daughter cells simultaneously by multiple fission.

FRAGMENTATION

The breaking up of the body of a simple multicellular organism into two (or more) pieces on maturing, each of which subsequently grows to form a complete new organism, is called fragmentation.

Example

Spirogyra, simply breaks up into smaller pieces upon maturation. These pieces or fragments grow into new individuals.

The breaking up of the body of an organism in fragmentation to form new organisms occurs naturally (on its own) when the parent organism matures.

Fragmentation is an asexual method of reproduction. The reproduction by fragmentation method can occur in simple multicellular plants as well as animals.

the main difference between fission and fragmentation is that in fission, a unicellular organism breaks up to form two (or more) daughter organisms, whereas in fragmentation, a multicellular organism breaks up to form two (or more) daughter organisms.

REGENERATION

Many fully differentiated organisms have the ability to give rise to new individual organisms from their body parts. That is, if the individual is somehow cut or broken up into

many pieces, many of these pieces grow into separate individuals

Regeneration is carried out by specialised cells. These cells proliferate and make large numbers of cells. From this mass of cells, different cells undergo changes to become various cell types and tissues. These changes take place in an organised sequence referred to as development.

For example

simple animals like Hydra and Planaria can be cut into any number of pieces and each piece grows into a complete organism

BUDDING

Budding is an asexual method of reproduction. In budding, a small part of the body of the parent organism grows out as a 'bud' which then detaches and becomes a new organism.

Example

In Hydra, a bud develops as an outgrowth due to repeated cell division at one specific site . These buds develop into tiny individuals and when fully mature, detach from the parent body and become new independent individuals.

VEGETATIVE PROPAGATION

Vegetative propagation is an asexual method of reproduction. The reproduction by vegetative propagation occurs only in plants. In vegetative propagation, new

plants are obtained from the parts of old plants (like stems, roots and leaves), without the help of any reproductive organs.

This property of vegetative propagation is used in methods such as layering or grafting to grow many plants like sugarcane, roses, or grapes for agricultural purposes. Plants raised by vegetative propagation can bear flowers and fruits earlier than those produced from seeds. Such methods also make possible the propagation of plants such as banana, orange, rose and jasmine that have lost the capacity to produce seeds.

SPORE FORMATION

Spore formation is the asexual method of reproduction. The reproduction by spore formation takes place in plants. In spore formation, the parent plant produces hundreds of microscopic reproductive units called 'spores'. When the spore case of the plant bursts, then the spores spread into air. When these air-borne spores land on food (or soil) under favourable conditions (like damp and warm conditions), they germinate and produce new plants.

The common bread mould is a fungus plant whose scientific name is *Rhizopus*. The common bread mould (or *Rhizopus fungus*) reproduces by the method of spore formation

SEXUAL REPRODUCTION

Sexual reproduction takes place by the combination of special reproductive cells called 'sex cells'.

the cells involved in sexual reproduction are called gametes. Gametes are of two types : male gametes and female gametes. In sexual reproduction, a male gamete fuses with a female gamete to form a new cell called 'zygote'. This zygote then grows and develops into a new organism in due course of time.

SEXUAL REPRODUCTION IN FLOWERING PLANTS

the different parts of a flower – sepals, petals, stamens and pistil. Stamens and pistil are the reproductive parts of a flower which contain the germ-cells.

The flower may be unisexual (papaya, watermelon) when it contains either stamens or pistil or bisexual (Hibiscus, mustard) when it contains both stamens and pistil.

Stamen is the male reproductive part and it produces pollen grains that are yellowish in colour. You must have seen this yellowish powder that often sticks to our hands if we touch the stamen of a flower. Pistil is present in the centre of a flower and is the female reproductive part.

It is made of three parts. The swollen bottom part is the ovary, middle elongated part is the style and the terminal part which may be sticky is the stigma. The ovary contains ovules and each ovule has an egg cell. The male germ-cell produced by pollen grain fuses with the female gamete present in the ovule. This fusion of the germ-cells or fertilisation gives us the zygote which is capable of growing into a new plant.

the pollen needs to be transferred from the stamen to the stigma. If this transfer of pollen occurs in the same flower, it is referred to as self-pollination. On the other hand, if

the pollen is transferred from one flower to another, it is known as crosspollination. This transfer of pollen from one flower to another is achieved by agents like wind, water or animals

After the pollen lands on a suitable stigma, it has to reach the female germ-cells which are in the ovary.

After fertilisation, the zygote divides several times to form an embryo within the ovule. The ovule develops a tough coat and is gradually converted into a seed. The ovary grows rapidly and ripens to form a fruit. Meanwhile, the petals, sepals, stamens, style and stigma may shrivel and fall off.

. The seed contains the future plant or embryo which develops into a seedling under appropriate conditions. This process is known as germination

Human Reproductive System

THE MALE REPRODUCTIVE SYSTEM

The male reproductive system consists of portions which produce the germ-cells and other portions that deliver the germ-cells to the site of fertilisation.

The formation of germ-cells or sperms takes place in the testes. These are located outside the abdominal cavity in scrotum because sperm formation requires a lower temperature than the normal body temperature. In addition to regulating the formation of sperms, testosterone brings about changes in appearance seen in boys at the time of puberty.

The sperms formed are delivered through the vas deferens which unites with a tube coming from the urinary bladder. The urethra thus forms a common passage for both the sperms and urine. Along the path of the vas deferens, glands like the prostate and the seminal vesicles add their secretions so that the sperms are now in a fluid which makes their transport easier and this fluid also provides nutrition. The sperms are tiny bodies that consist of mainly genetic material and a long tail that helps them to move towards the female germ-cell

THE FEMALE REPRODUCTIVE SYSTEM

The female germ-cells or eggs are made in the ovaries. They are also responsible for the production of some hormones.

the ovaries already contain thousands of immature eggs. On reaching puberty, some of these start maturing. One egg is produced every month by one of the ovaries. The egg is carried from the ovary to the womb through a thin oviduct or fallopian tube. The two oviducts unite into an elastic bag-like structure known as the uterus. The uterus opens into the vagina through the cervix.

The sperms enter through the vaginal passage during sexual intercourse. They travel upwards and reach the oviduct where they may encounter the egg. The fertilised egg (zygote) starts dividing and form a ball of cells or embryo. The embryo is implanted in the lining of the uterus where they continue to grow and develop organs to become foetus.

The embryo gets nutrition from the mother's blood with the help of a special tissue called placenta. This is a disc which is embedded in the uterine wall. It contains villi on the embryo's side of the tissue. On the mother's side are blood spaces, which surround the villi. This provides a large surface area for glucose and oxygen to pass from the mother to the embryo. The developing embryo will also generate waste substances which can be removed by transferring them into the mother's blood through the placenta. The development of the child inside the mother's body takes approximately nine months. The child is born as a result of rhythmic contractions of the muscles in the uterus.

Menstruation

If the egg is not fertilised, it lives for about one day. Since the ovary releases one egg every month, the uterus also prepares itself every month to receive a fertilised egg. Thus its lining becomes thick and spongy. This would be required for nourishing the embryo if fertilisation had taken place. Now, however, this lining is not needed any longer. So, the lining slowly breaks and comes out through the vagina as blood and mucous. This cycle takes place roughly every month and is known as menstruation. It usually lasts for about two to eight days