

MODULE 2

CHAPTER 8- HOW DO ORGANISMS REPRODUCE?

CLASS 10

SCIENCE

Key points:

Methods of asexual reproduction

1. fission
2. fragmentation
3. regeneration
4. spore formation

METHODS OF ASEQUAL REPRODUCTION

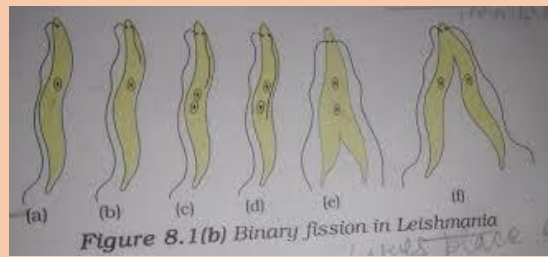
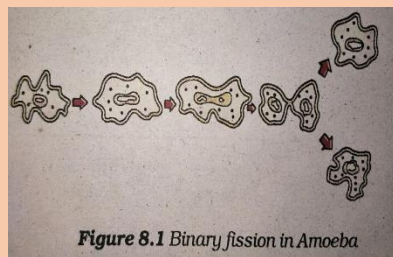
(ONLY SINGLE ORGANISM WILL GIVE RISE TO A NEW INDIVIDUAL)

1. FISSION: A fully grown parent organism divides into two or more daughter cells and it is of following two types:

a) BINARY FISSION: A fully grown parent divides into two daughter cells during favourable conditions. Eg: amoeba, paramecium, euglena etc. (refer to the diag below)

Binary fission in amoeba takes place in two steps

- a) Nucleus divides into two nuclei. b) cytoplasm divides and two daughter cells are formed.

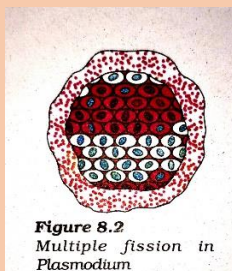


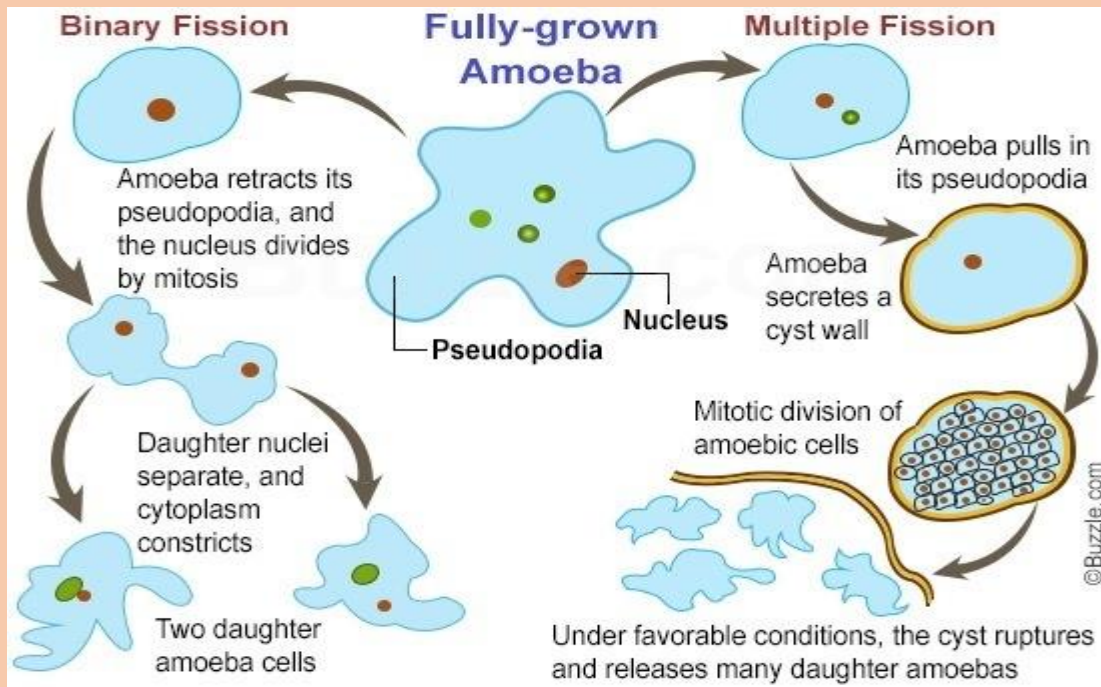
Note: 1. Plane of division does not matter in amoeba as it does not have a fixed shape.

2. Paramecium also undergoes binary fission but transversally.

3. In Leishmania (which causes kala azar) there is a whip like structure at one end of the cell and hence binary fission occurs in definite orientation in relation to this structure. (longitudinal binary fission)

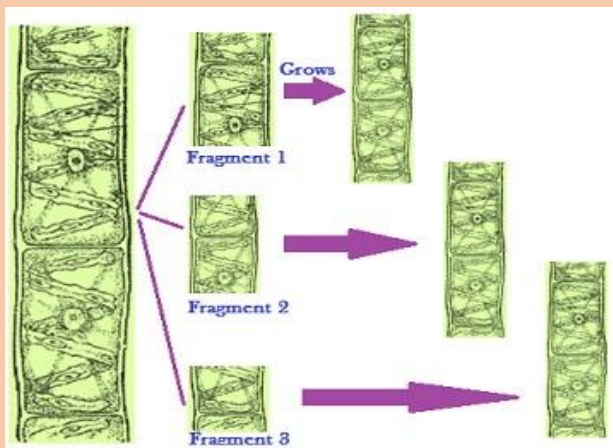
MULTIPLE FISSION: In this type of fission parental body divides into many cells during unfavourable conditions. Plasmodium, amoeba etc. In this a protective resistant cyst is formed. Inside the cyst nucleus divides repeatedly to form several daughter nuclei. Each nucleus gets surrounded by a small amount of cytoplasm. When favourable conditions return the cyst, wall ruptures and daughter cells are released which feed grow and repeat the process. (refer to the diagram of multiple fission in plasmodium which causes malaria)





NOTE: Amoeba can also undergo multiple fission under unfavourable conditions.

1. **Fragmentation:** Parental body breaks into two or more small pieces(fragments) either by wave action or death and decay of older parts. Eg: Spirogyra, flatworms etc.



Given above is the diagram of fragmentation of spirogyra. It simply breaks up into smaller pieces upon maturation. These pieces or fragments can grow into new individuals. Though it is multicellular it has a simple body design. Hence after fragmentation it can divide cell by cell and can grow into a complete new organism

This is not true for all multicellular organisms because:

1. Multicellular organisms are not simply random collection of cells.
2. Specialised cells are organised as tissues and tissues are organised into organs.
3. These organs are placed at definite location in the body.
4. In this highly organised structures cell by cell division is not possible and hence they use more complex methods of reproduction.

3. **Regeneration:** In this mode following events can take place:

- a) repair of damaged cells or tissues
- b) replacement of broken body parts
- c) reconstruction of the whole organism from a small fragment.

Eg: Hydra, Planaria etc.

Regeneration is carried out by specialised cells(undifferentiated) which proliferate to make large number of cells and later on different cells undergo differentiation to form various cell types and tissues. These changes take place in an ordered sequence called development.

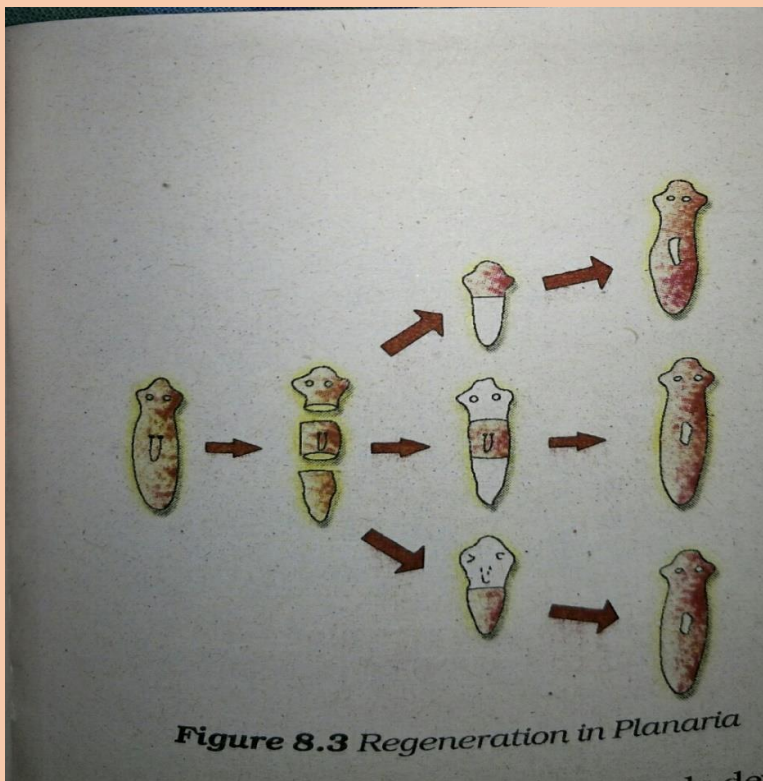
Note: 1 Regeneration is found in almost all the animal groups from the protozoans to the mammals. But the degree of regeneration varies in them. This power is more in lower animal groups like coelenterates, planarians etc. It is because these have simple body organisation with less specialisation and differentiation so have more number of undifferentiated cells which help in regeneration.

Note:2. Regeneration is not the same as reproduction since most of the organisms would not depend on being cut to be able to reproduce. But in lower organisms it can be considered as a method of asexual reproduction since in the process of recovery of broken body parts a complete new organism is created.

OTHER EXAMPLES OF REGENERATION

Breaking off of tail of house lizard.

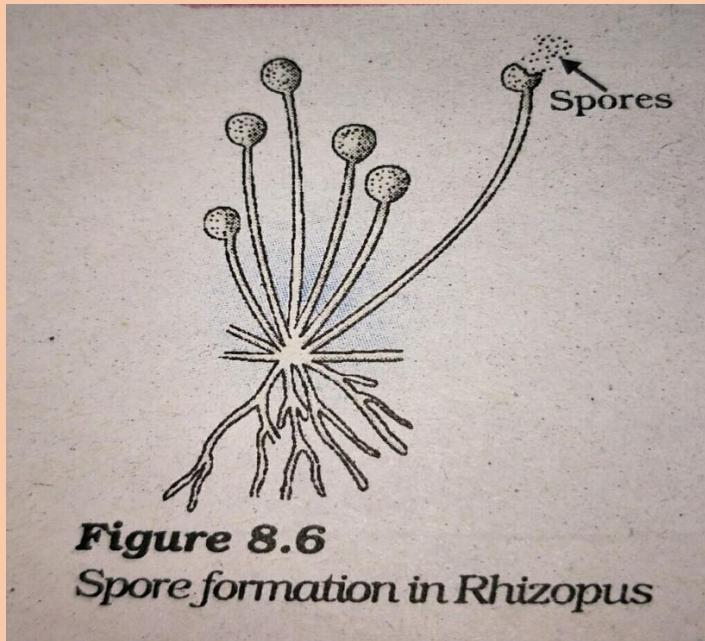
A starfish can regenerate upto four arms.



4. Spore Formation

- i).Spores are asexual reproductive units covered by thick walls that protects them until they come into contact with moist surface where they can germinate.
- ii) Spores are produced by fungi, some bacteria, ferns and mosses.

- iii) In fungi the thread like structures that develop on bread are hyphae.(can be seen through magnifying lens)
- iv) The tiny blob like structure (spherical structure on the top of long thread like structure is sporangium.
- v) spores are produced inside sporangia



Reference: NCERT book class 10

Diagrams from internet