



Department of biology



Department of Biology

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((Plant groups))

Stage (2)

((Eighth lecture))

Dinoflagellate (Rotating algae)

By

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Dinoflagellate (Rotating algae)

Microorganisms' unicellular eukaryotes Characterized by its long, sinuous shape, these algae live in fresh and surface waters, and play an important role in the ecosystem as a food source for small animals and improving water quality.





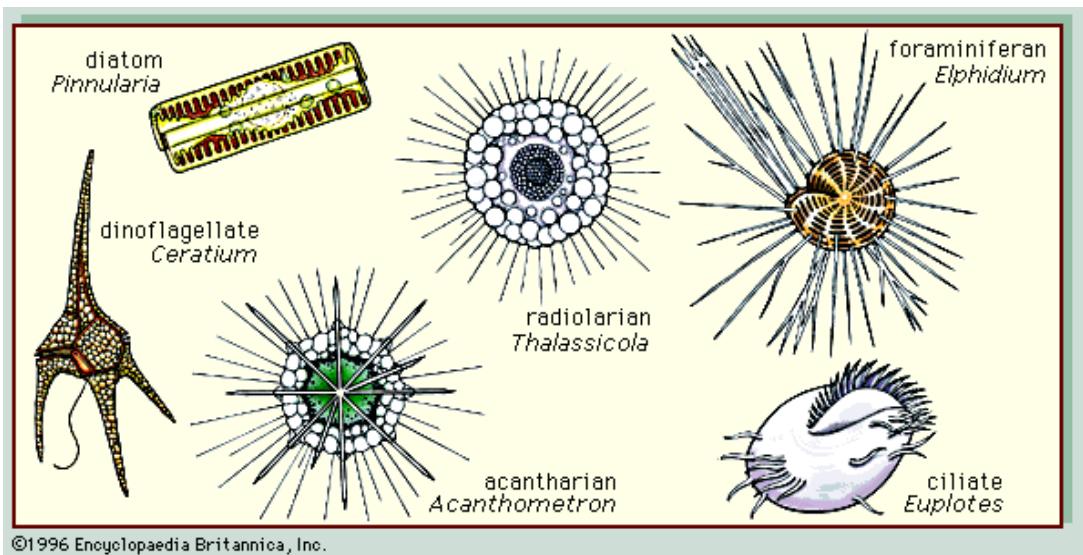
General characteristics

- 1-** Unicellular biflagellate organisms, important components of fresh, salty and brackish water. There are species of them that live in sand, snow and inside the bodies of some types of protozoa and animals, and some of them exist only in the form of fossils.
- 2-** Nutrients in the form of starch (in species that live in fresh water) or in the form of oils (in marine species), and some of the rotating algae lack plastids, so these species are saprophytic.
- 3-** Plastids are yellowish-green or yellowish-brown in color and the dominant representative pigments are Chlorophyll a and b and β -carotene and some types of xanthophylls and the pigment Peridinin, which is a pigment specific to rotating algae.
- 4-** The nucleus is large in size and is characterized by its chromosomes remaining dense continuously and can be seen thus at any stage of its life.
- 5-** The cells have bilateral symmetry or are asymmetrical but are not radially symmetrical.



6- The cells are biflagellate, and these flagella are different in structure and method of movement.

7- The protoplast is surrounded by a cellulose wall that is homogeneous or composed of a number of clear plates, and a small number of species are naked and these plates are arranged in a specific manner and are called the armored shield.



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❖ Rotating algae contain organelles called (Pusule) , which are vacuoles in the form of sacs or branched tubes surrounded by a membrane that do not have the ability to contract as in contractile vacuoles, and their function is not known specifically, but it is believed that they are related to or help in the processes of excretion and entry into the cell.



Cellular structure

The cell is either naked and surrounded by periblast or may be surrounded by a cellulose wall in the form of plates which may contain patterns or horns. The arrangement, number and shapes of these plates are among the taxonomic characteristics of the genera and these genera are called Armored Dinoflagellates.

Most unicellular genera contain a transverse groove Cingulum on the surface of the cell that wraps around it and divides it into two parts, an upper part called Epicon and a lower part called Hypocon.

The cell has two flagella that arise in the transverse groove area, one of which is a ribbon that wraps around the transverse groove and moves in an undulating motion inside the groove and the other is smooth and long and extends behind the cell.

The cell contains a large single nucleus, the plastid is of different shapes, single or multiple, and contains bundles of photosynthesis Thylakoids on three discs, the plastid



may contain or lack starch centers. Food is stored in the form of starch or oil granules.

Reproduction

1- Vegetative reproduction:-

It is done by dividing the cells into two halves, and it is done by the process of fertilization, and then each section grows into an adult alga, and this type of division occurs in the genera that do not contain a wall. As for the genera that have a cover, the division is preceded by the fall of the parental cover and the division occurs and then a new cover arises for each part resulting from the division, or the parental cover may split into two halves. Each nucleus cell retains a part of the parental cover after division and then begins to form the other lost part again. In some genera of rotating algae The protoplast divides while still inside the mother cell wall into two naked protoplasts that do not form a cell wall. They are not separated until they are freed from the mother cell wall.

2- Asexual reproduction:-

A. It is done by the formation of swimming spores (in most non-motile forms, where the protoplast divides to form



4-8 naked spores that move through an opening in the wall of the mother cell or by Wall decomposition path.

- B.** By forming non-swimming spores instead of swimming spores, and these non-swimming spores are spherical, polygonal or crescent-shaped.
- C.** Some rotifers may be autospores.

3 - Sexual reproduction: -

Sexual reproduction has been observed in a few species of rotifers. Mating is of the isogamous, heterogamous, or amoeboid type. The gametes are either heterogamous or homothallic. The gametes fuse together to form the fertilized egg (zygote), which surrounds itself with a thick wall and is motile for 12-13 days, after which it enters a resting phase during which meiosis occurs and a single zygote emerges from the thick wall of the fertilized egg.

Dinoflagellates

