

# Phylum Ciliophora

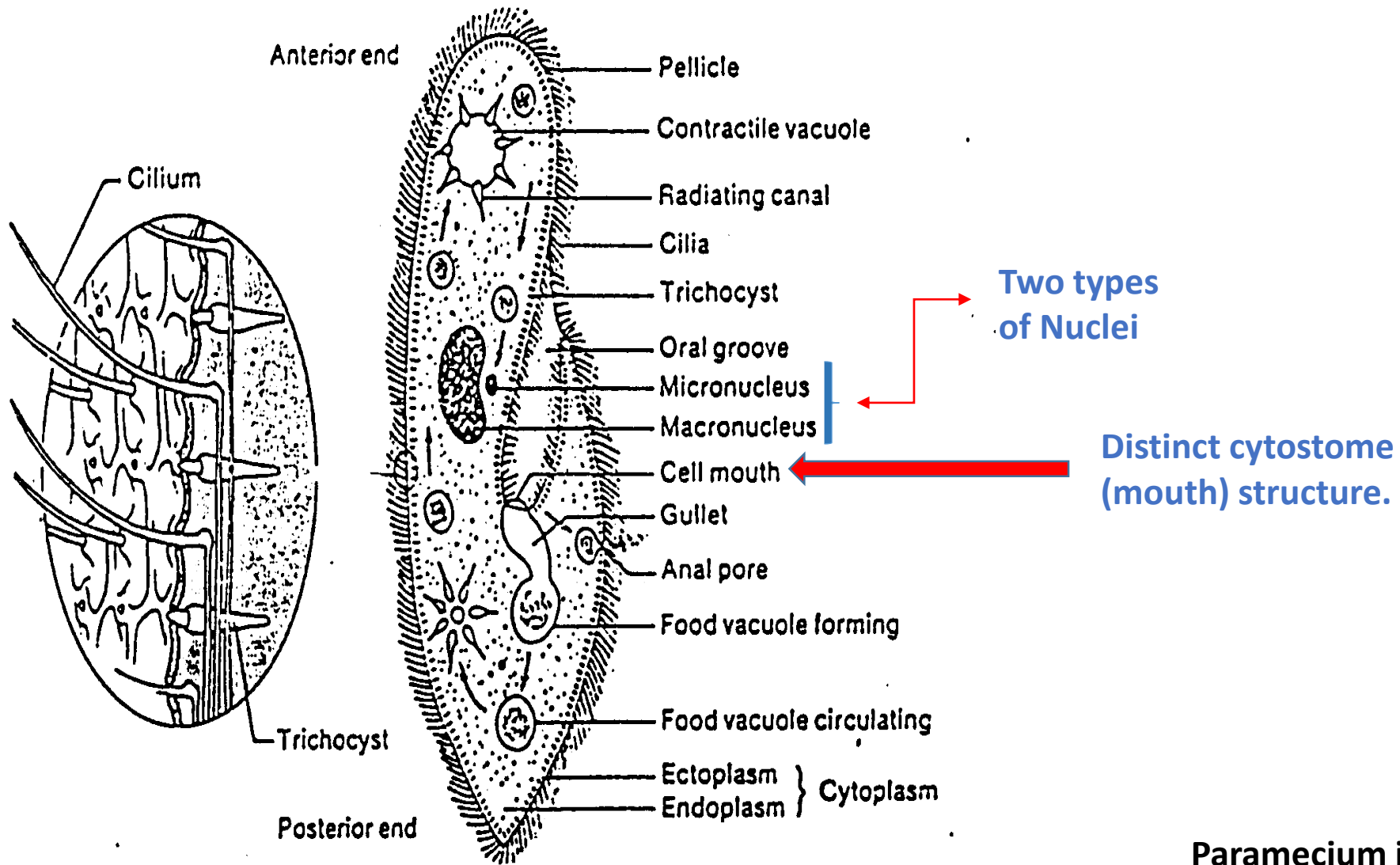
**Animal Diversity (Minor)**

**BS-I Biotechnology**



# Characteristics

- **Cilia** for locomotion and for the generation of feeding currents
- in water
- Relatively **rigid pellicle** and more or less fixed shape
- Distinct cytostome (mouth) structure
- **Dimorphic nuclei**, typically a larger macronucleus and one or more smaller micronuclei
- **Trichocysts** are pellicular structures primarily used for protection. They are rodlike or oval organelles oriented perpendicular to the plasma membrane.



Paramecium is a ciliate.

You must see at this point the difference between cilia and flagella.

# Locomotion

- Cilia are numerous, covering the body surface of a ciliate.
- All cilia move in a coordinated fashion.

PLEASE open the link below to see the movement of paramecium.

<https://www.youtube.com/watch?v=RyQfvxH425Q>

What is power stroke and recovery stroke in cilia movement?

<https://www.youtube.com/watch?v=vCm9pPEvARs>

# NUTRITION

- Some ciliates, such as *Paramecium*, have a **ciliated oral groove** along one side of the body (*see figure*).
- Cilia of the oral groove sweep small food particles toward the cytopharynx, where **a food vacuole** forms.
- When the food vacuole reaches an upper size limit, it breaks free and circulates through the endoplasm.
- Some free-living ciliates prey upon other protists or small animals.
- **Suctorians** are ciliates that live attached to their substrate. They possess tentacles whose secretions paralyze prey, often ciliates or amoebae.

# GENETIC CONTROL AND REPRODUCTION

Ciliates have two kinds of nuclei:

- A large, polyploid **macronucleus** regulates daily metabolic activities. It is not involved in reproduction. (**Important**)
- One or more smaller **micronuclei** are the genetic reserve of the cell. Involved in reproduction.

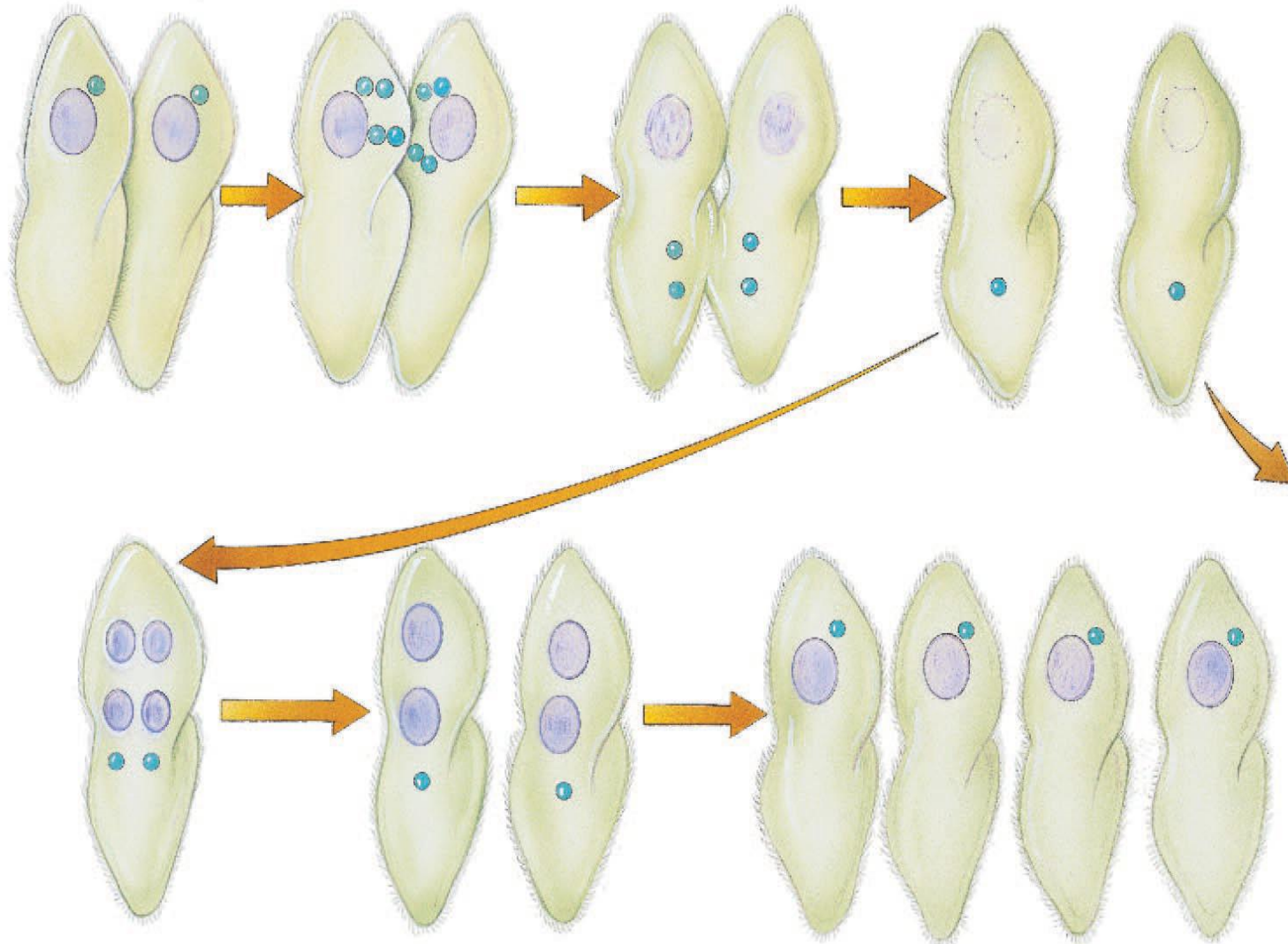
## ***Asexual Reproduction:***

- transverse binary fission
- budding.

## ***Sexual Reproduction:***

Conjugation

# CONJUGATION



The partners involved are called **conjugants**.

## Conjugation in *Paramecium*.

- (a) Random contact brings individuals of opposite mating types together.
- (b) Meiosis results in four haploid pronuclei.
- (c) Three pronuclei and the macronucleus degenerate. Mitosis and mutual exchange of pronuclei is followed by fusion of pronuclei.
- (d–f) Conjugants separate. Nuclear divisions that restore nuclear characteristics of the species follow. Cytoplasmic divisions may accompany these events.

# SYMBIOTIC CILIATES

- Most ciliates are free living; however, some are commensalistic or mutualistic, and a few are parasitic.
- ***Balantidium coli*** (parasitic ciliate) → lives in the large intestines of humans, pigs, and other mammals.
- At times, it is a ciliary feeder; at other times, it produces proteolytic enzymes that digest host epithelium, causing a flask-shaped ulcer. (Its pathology resembles that of *Entamoeba histolytica*.) *B. coli* is passed from one host to another in cysts that form as feces begin to dehydrate in the large intestine. (Spread through fecal contamination of food and water).



Thank you