

Biological classification

BIOLOGY CLASS 11 CH 2

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Biological classification is the scientific procedure of arranging organisms in a hierarchical series of groups and sub-groups on the basis of their similarities and dissimilarities.

Living organisms need to be classified because of the following reasons

- (i) The study of one or two organisms is not sufficient to know the essential features of the group.
- (ii) All kinds of organisms do not occur in one locality.
- (iii) Classification helps in knowing the relationship among-different groups of organisms.
- (iv) It helps in knowing the evolutionary relationship between organisms.

Five Kingdom Classification System

This classification was proposed by RH Whittaker, in 1969. Before 1969, the classification systems for the living organisms have undergone several changes overtime.

He created fungi, as separate kingdom.

The main criteria for classification used by Whittaker

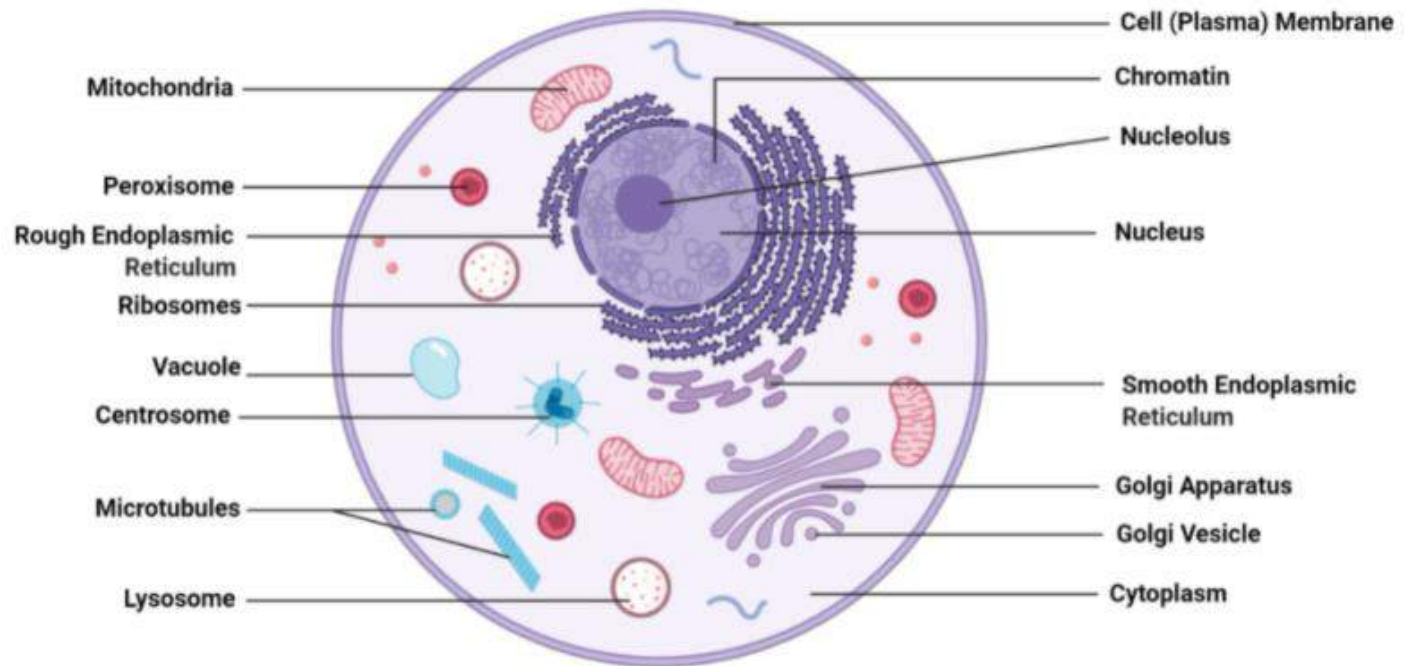
- (i) Cell structure (ii) Modes of nutrition
- (iii) Thallus organisation (iv) Reproduction
- (v) Phylogenetic relationships.

Comparison of Five Kingdoms

Criteria	Kingdom				
	Monera	Protista	Fungi	Plantae	Animalia
Cell type	Prokaryotic	Eukaryotic	Eukaryotic	Eukaryotic	Eukaryotic
Level of organisation	Unicellular	Unicellular	Multicellular and unicellular	Tissue/organ	Tissue/organ/organ system
Cell wall	Present (made up of peptidoglycan and mucopeptides)	Present in some (made up of cellulose), absent in others	Present (made up of chitin or cellulose)	Present (made up of cellulose)	Absent
Nutrition	Autotrophic (Phototrophic, Chemoautotrophic) Heterotrophic (parasitic and saprophytic)	Autotrophic-Photosynthetic. Heterotrophic	Heterotrophic-parasitic or Saprophytic	Autotrophic (Photosynthetic)	Heterotrophic (Holozoic)
Motility	Motile or non-motile	Motile or non-motile	Non-motile	Mostly Non-motile	Mostly motile
Organisms	Archaeobacteria, Eubacteria, Cyanobacteria, Actinomycetes and Mycoplasma	Chrysophytes, Dinoflagellates, Euglenoids, Slime molds, <i>Amoeba</i> , <i>Plasmodium</i> , <i>Trypanosoma</i> , <i>Paramecium</i>	Yeast, Mushrooms and Molds	Algae, Bryophytes, Pteridophytes, Gymnosperms and Angiosperms	Sponges, Invertebrates and Vertebrates

S.No.	Prokaryotes	Eukaryotes
(i)	Most prokaryotes are unicellular.	Most eukaryotes are multicellular.
(ii)	The nucleus is poorly defined due to the absence of a nuclear membrane.	The nucleus is well defined and is surrounded by a nuclear membrane.
(iii)	Nucleolus is absent.	Nucleolus is present.
(iv)	Cell organelles such as plastids, mitochondria, golgi bodies, etc. are absent.	Cell organelles such as plastids, mitochondria, golgi bodies, etc. are present.
(v)	Bacteria and blue-green algae are prokaryotic cells.	Fungi, plant, and animal cells are eukaryotic cells.

Animal Cell Structure



Kingdom Monera

The kingdom-Monera includes all prokaryotes such as bacteria, mycoplasma, Actinomyces and cyanobacteria (blue-green algae).

They are simplest or most primitive, unicellular prokaryotes.

The cell wall contains peptidoglycan or murein (no cellulose) and the membrane bound cell organelles are not present.

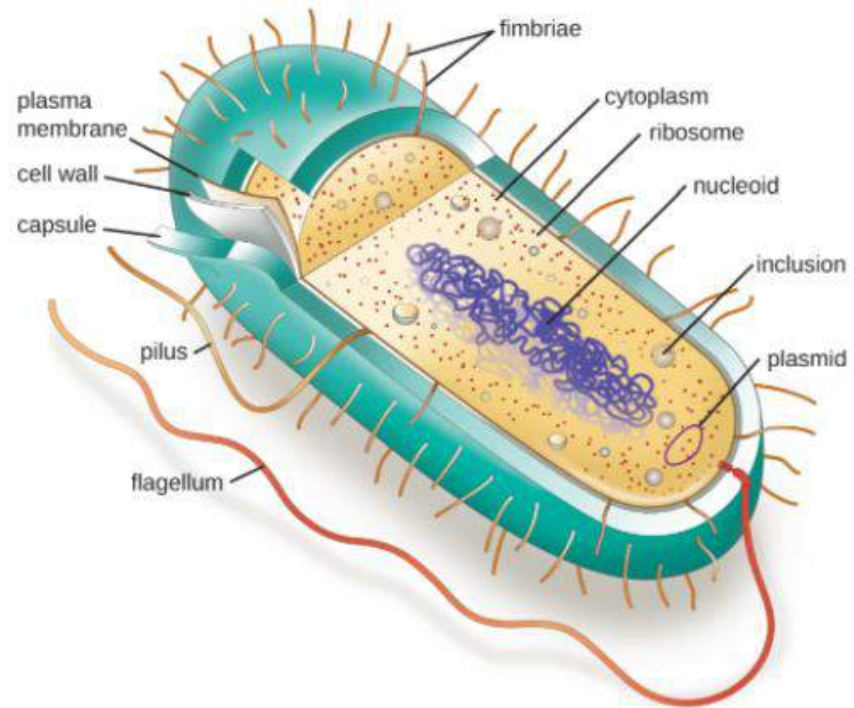
DNA is naked. It lies inside the cytoplasm in coiled form. This is called nucleoid.

The flagella, if present are single-stranded.

Reproduction is by asexual method. Gametes are not present.

Some of the monerans have the ability to fix-nitrogen into useful nitrates.





Kingdom Monera: Bacteria Cell Structure

Kingdom-Protista

Kingdom—Protista includes all single-celled eukaryotes but, the boundries of this kingdom are not well defined.

It was first proposed by Ernst Haeckel (1866).

Physiologically kingdom-Protista acts as a connecting link between the kingdom-Monera and the complex multicellular kingdom-Fungi, Plantae and Animalia.

Kingdom-protista includes the following categories such as dinoflagellates, chrysophytes, euglenoids, slime moulds and protozoans.

The general characteristic features of kingdom-Protista are given below

(i) These are mostly aquatic organisms. Some protists also live in the bodies of animals as parasites.

(ii) The cells are eukaryotic. These contain membrane bound cell organelles like mitochondria, Golgi complex, endoplasmic reticulum, 80S ribosomes, etc.

(iii) Locomotion may either occur by Pseudopodia (Amoeba, Euglypha), Cilia (Parameciuni), Wriggling (sporozoans, non-flagellates) and Mucilage propulsion (some protists like diatoms).

Diatoms do not have any organelles for locomotion.

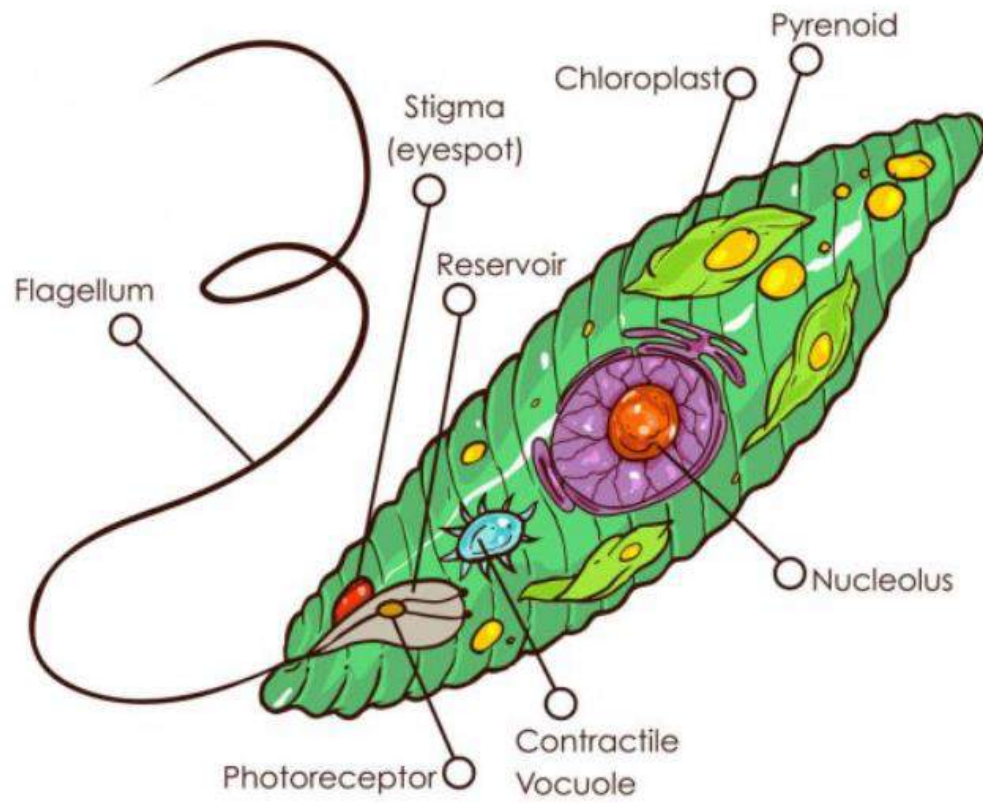
(iv) Protists shows various modes of nutrition such as

- (a) Photosynthetic (holophytic) Dinoflagellates, diatoms and euglenoids.
- (b) Halozoic (zootrophic) Protozoans like Amoeba and Paramecium.
- (c) Saprobiic (saprotrophic) In slime moulds.
- (d) Parasitic Trypanosoma, Giardia, Plasmodium, Entamoeba.

- (e) Mixotrophic In Euglena.
- (f) Symbiotic In zooflagellates like Trichonympha and Lophomonas.
- (g) Pinocytosis In Amoeba to absorb soluble organic substances.

(v) Most of the protists are aerobic. However, some protists that live at the bottom of aquatic habitats ,can respire anaerobically.

(vi) Protists reproduce asexually and sexually by a process involving cell fusion and zygote formation.



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