

Chapter 2 : Biological Classification

Biology Notes | Class 11



EVOLUTION OF BIOLOGICAL CLASSIFICATION

Early times

Early use-based grouping: food, shelter and clothing - practical, not scientific.

Ancient Greece
(c. 350 BCE)

Aristotle: plants grouped as herbs, shrubs and trees; animals grouped by red blood versus no red blood, using simple morphology.

18th century
(1758 CE)

Linnaeus: TWO KINGDOMS - Plantae and Animalia.

EARLY TWO-KINGDOM VIEW



PLANTAE



ANIMALIA

UNRESOLVED ORGANISMS



Bacteria and
Cyanobacteria



Fungi



Unicellular
eukaryotes

Two-kingdom limitations

- did not separate prokaryotes from eukaryotes
- unicellular from multicellular organisms
- photosynthetic algae from fungi
- absorptive fungi from photosynthetic plants
- many organisms fitted neither kingdom well

Expanded evidence

cell structure | cell wall | body organisation | nutrition | habitat | reproduction | evolutionary relationships

new evidence



revised relationships



changing classification systems

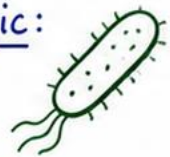
★ Classification is a scientific model that changes when evidence and evolutionary understanding improve. ★

WHITTAKER'S FIVE-KINGDOM FRAMEWORK

- R. H. Whittaker (1969): Monera | Protista | Fungi | Plantae | Animalia.
- Criteria: cell structure, body organisation, nutrition, reproduction and phylogenetic relationships.

	MONERA	PROTISTA	FUNGI	PLANTAE	ANIMALIA
CELL TYPE	prokaryotic	eukaryotic	eukaryotic	eukaryotic	eukaryotic
CELL WALL	peptidoglycan in most Bacteria; different or absent in Archaea	present in some	chitin + glucans	mainly cellulose	absent
NUCLEAR ENVELOPE	absent	present	present	present	present
BODY ORGANISATION	unicellular / colonial	mostly unicellular / colonial	mostly filamentous; yeasts unicellular	multicellular tissues / organs	multicellular tissues / organs / systems
NUTRITION	photoautotrophic, chemoautotrophic or heterotrophic	photosynthetic, heterotrophic or mixotrophic	absorptive heterotrophs	mainly photosynthetic	ingestive heterotrophs

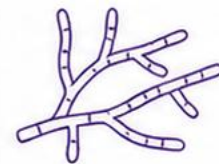
Placement logic:



prokaryotes → Monera



unicellular eukaryotes → Protista



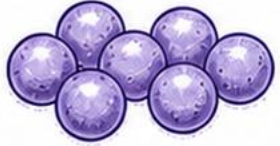
chitin-walled absorptive heterotrophs → Fungi

★ Historical NCERT framework. Modern cellular domains are Bacteria, Archaea and Eukarya; Monera combined the first two, and Protista is not one natural clade.

KINGDOM MONERA: BACTERIAL DIVERSITY

- MONERA is the historical NCERT kingdom combining Bacteria and Archaea.
- Bacteria are abundant and occur in soil, water, snow, deserts, hot springs, deep oceans and on or within hosts.

Bacterial shapes



coccus (cocci) - spherical



bacillus (bacilli) - rod



vibrio (vibrios) - comma-shaped



spirillum (spirilla) - spiral

HABITATS



soil



water



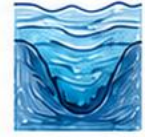
snow



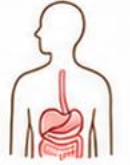
deserts



hot springs



deep oceans

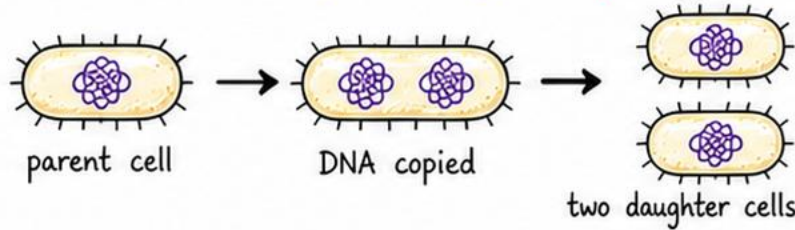


on or within hosts

photoautotrophs | chemoautotrophs | heterotrophs

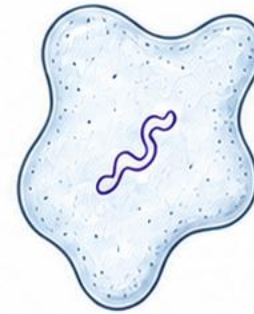
REPRODUCTION & GENETIC VARIATION

- Most bacteria reproduce by **binary fission**.



- **Horizontal DNA transfer** exchanges genes; it is not reproduction that increases cell number.
- Some bacteria form resistant **endospores** in adverse conditions - survival, not multiplication.

Mycoplasma



Mycoplasma: no cell wall, flexible/pleomorphic, among the smallest self-replicating cells; some species are plant or animal pathogens.

ARCHAEA & EUBACTERIA

ARCHAEA

(older term: archaeobacteria):
distinct cell envelopes and
membranes.

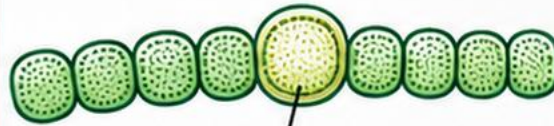
- Halophiles - high salt
- Thermoacidophiles -
hot acidic habitats
- Methanogens - oxygen-free
habitats and ruminant gut
- Methanogens release methane;
their activity contributes to
biogas production from dung.
- Not all Archaea live in
extreme habitats.

EUBACTERIA

= true bacteria; most have a rigid peptidoglycan wall;
motile forms may have flagella.

1. CYANOBACTERIA

- chlorophyll a
- unicellular, colonial
or filamentous
- freshwater, marine
or terrestrial
- often gelatinous sheath
- some form blooms
- heterocysts fix
atmospheric N_2 in
Nostoc and Anabaena.



HETEROCYST

2. CHEMOSYNTHETIC BACTERIA

- oxidise inorganic
compounds such as
ammonia, nitrite, sulfur
and iron compounds →
energy for ATP and
carbon fixation
- important in nutrient
cycles.

3. HETEROTROPHS

- decomposers

Helpful

- curd
- antibiotics
- legume-root nitrogen
fixation

Harmful

- cholera
- typhoid
- tetanus
- citrus canker

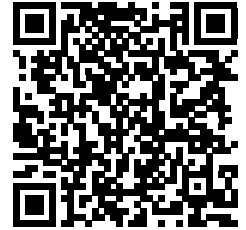


FREE PREVIEW

[Click here to visit our website](#)

SCHOOL NOTES & NCERT SOLUTIONS

Complete notes and
NCERT solutions are
available on
FirstHope app only.



[Scan or click here](#)

Click here to get the app

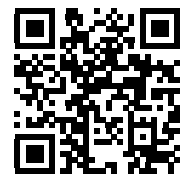


Available on Google Play

JOIN THE FIRSTHOPE COMMUNITY

Join our Telegram channel

Click here to join Telegram



[Scan or click here](#)

@FirstHope_CBSE_Notes

Instagram

@firsthope.school

[Click here to follow >](#)

YouTube channel

@firsthope.school

[Click here to watch >](#)

FirstHope website

firsthope.co.in

[Click here to visit our website >](#)

CBSE / Class 9 / Class 10 / Class 11 / Class 12

Preview notes and NCERT solutions. Full PDFs in the FirstHope app.