Topic: Classification I – Kingdoms Monera and Protista

Introduction to Classification

Classification in biology is called **taxonomy**.
It is the **scientific process of organizing living organisms into groups** based on their similarities and differences.
This helps biologists to:

- Identify organisms easily
- Study their relationships
- Understand evolution (how living things change over time)

The system commonly used today divides living organisms into **five major kingdoms**:

1. **Monera**
2. **Protista**
3. Fungi
4. Plantae
5. Animalia

Today's lesson focuses on the first two: **Monera** and **Protista**.

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1. Kingdom Monera

Definition:

Monera is the **simplest and oldest group of living organisms**.
They are **unicellular prokaryotes**, meaning they are made of one cell and **do not have a true nucleus**.

Characteristics of Monera:

Feature	**Details**
Cell type	Prokaryotic (no true nucleus, no membrane-bound organelles)
Number of cells	Unicellular (single-celled)

Feature	Details
Cell wall	Present, made of **peptidoglycan**
Mode of nutrition	Can be **autotrophic** (make their own food, e.g., Cyanobacteria) or **heterotrophic** (depend on others for food, e.g., most bacteria)
Reproduction	Mostly **asexual reproduction** by **binary fission** (one cell splits into two identical cells)
Habitat	Found everywhere: soil, water, air, inside living organisms, and even in extreme conditions like hot springs

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Examples of Monera:

1. **Bacteria**
    - *Escherichia coli* (E. coli) – found in the intestines
    - *Streptococcus* – causes sore throat
    - *Lactobacillus* – helps in making yogurt
2. **Cyanobacteria (Blue-green algae)**
    - *Anabaena*
    - *Nostoc*
    - *Oscillatoria*
      These are photosynthetic but still belong to Monera because they are prokaryotic.

Importance of Monera:

- **Decomposers**: Break down dead materials and recycle nutrients
- **Nitrogen fixation**: Some bacteria convert nitrogen in the air into forms plants can use
- **Food production**: Used in yogurt, cheese, vinegar production
- **Disease**: Some bacteria cause diseases (e.g., cholera, tuberculosis)

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2. Kingdom Protista

Definition:

Protista is made up of **simple eukaryotic organisms**.
They can be **unicellular or simple multicellular** organisms.
They have a **true nucleus** and other organelles.

Characteristics of Protista:

Feature	Details
Cell type	Eukaryotic (have a true nucleus and membrane-bound organelles)
Number of cells	Mostly unicellular, but some are simple multicellular
Mode of nutrition	Some are **autotrophic** (make their own food, like algae) and some are **heterotrophic** (feed on other organisms, like protozoa)
Movement	Many Protists can move using:

- **Pseudopodia** (false feet) e.g., Amoeba
- **Flagella** (tail-like structure) e.g., Euglena
- **Cilia** (tiny hairs) e.g., Paramecium |
  | **Reproduction** | Mostly **asexual**, some reproduce **sexually** |
  | **Habitat** | Mostly in water (ponds, rivers, oceans) or in moist environments |

Examples of Protista:

Protozoa (Animal-like Protists):

- **Amoeba** – moves with pseudopodia
- **Paramecium** – moves with cilia
- **Euglena** – has both plant and animal features (can photosynthesize and move with flagella)

Algae (Plant-like Protists):

- **Chlamydomonas** – unicellular green algae
- **Spirogyra** – simple multicellular algae

Importance of Protista:

- **Food chain**: Algae are primary producers in aquatic environments
- **Medical importance**: Some protozoans cause diseases (e.g., malaria by *Plasmodium*)
- **Scientific study**: Protozoans are used in research and teaching
- **Oxygen production**: Algae produce oxygen during photosynthesis

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3. Differences Between Monera and Protista

Monera	**Protista**
Prokaryotic (no true nucleus)	Eukaryotic (has a true nucleus)
Unicellular only	Mostly unicellular, some multicellular
No membrane-bound organelles	Has membrane-bound organelles
Cell wall usually present (except in some bacteria)	Some have cell walls (algae), others do not (protozoa)
Examples: Bacteria, Cyanobacteria	Examples: Amoeba, Euglena, Spirogyra

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Conclusion:

Kingdom Monera and Protista are essential to life on Earth.
Monera are the most **primitive organisms**, while Protista represent the **transition between simple and complex life forms**.

Understanding these kingdoms helps us learn about the diversity of life and how different organisms interact in nature.