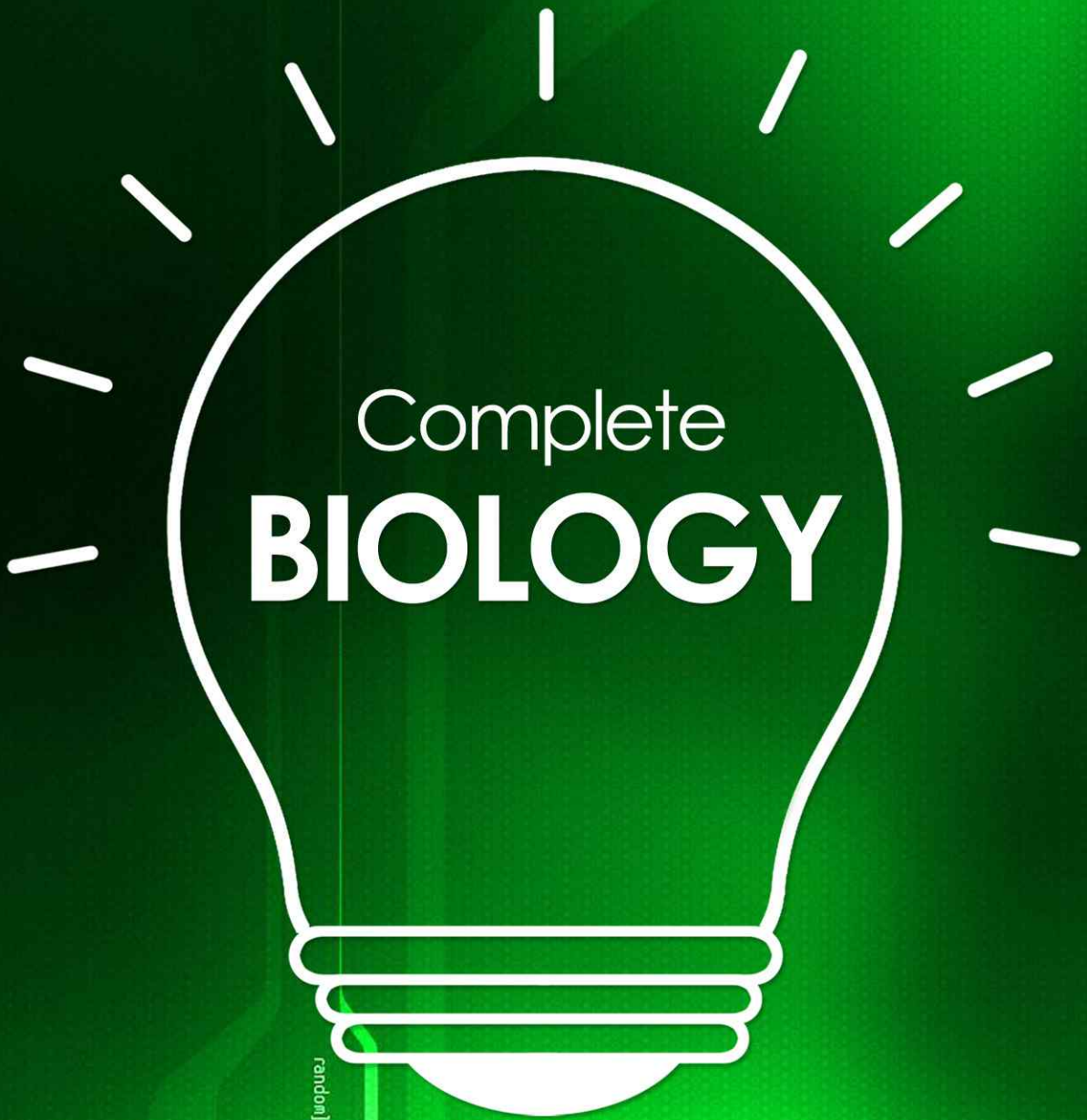
misostudy.com
smart learning



Complete BIOLOGY

NEET · CBSE eBOOKS

CLASS 11&12th

Learning Inquiry
8929 803 804

CLASS 11th

Biological Classification

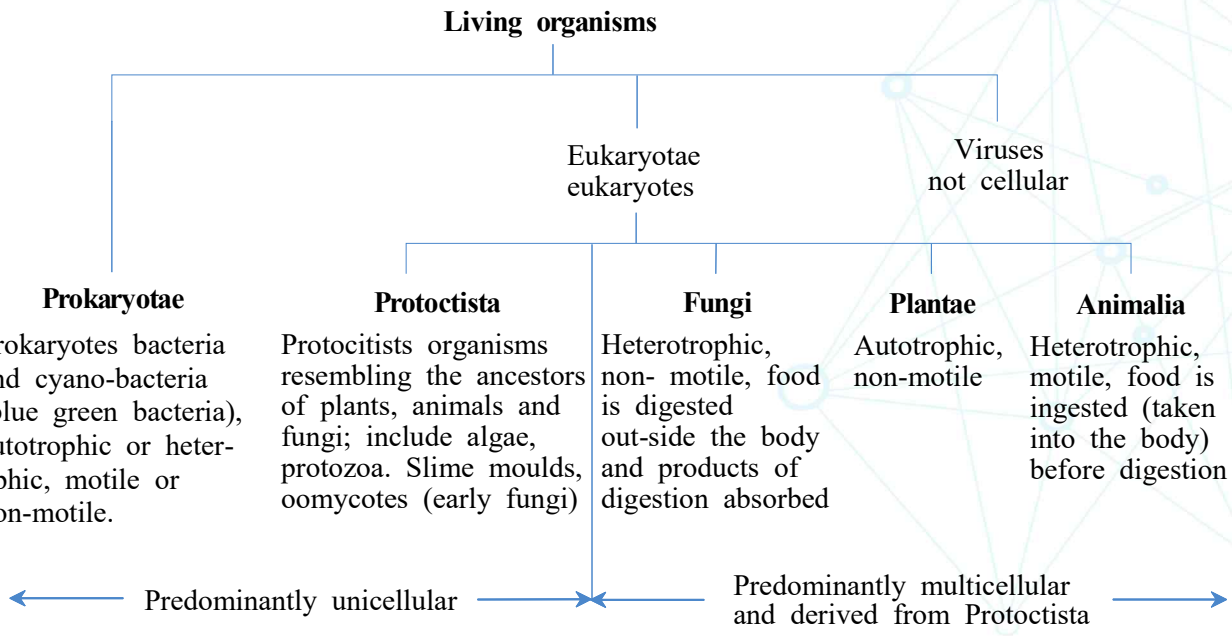
misostudy

01. Introduction

- So far, biologists have been able to describe and give names to about **1.7 million** types of organisms. Of these, **insects show maximum diversity with 7,50,000 species**.
- **The term 'Taxonomy'** was coined by A.P . de Candolie
  (i) **Artificial systems**: A system of classification based on one or two superficial characters chosen arbitrarily is called an artificial (or arbitrary or utilitarian) system of classification e.g. classification of plants into herbs, shrubs and tress (on the basis of habit).
  (ii) **Natural systems**: Such systems proposed by Bentham & Hooker take into account many comparable characters at time. The taxonomic position of a species indicates a lot of properties of the species. To a considerable extent, it may give an idea of the relatedness of a species to other groups of organisms.
  (iii) **Phylogenetic systems**: The evolutionary history of a group of organisms is called phylogeny. Ideally, a classification must reflect possible evolutionary relationships. Organisms belonging to same taxa are believed to have a common ancestor, and may be represented in the form of a family tree. The systems of classification proposed after Darwin's theory of natural selection are mostly claimed to be phylogenetic. In such a system, organism belonging to same taxa are believed to have a common ancestor and may be represented in the form of a family tree called **cladogram**.
- Present system of classification is based on the combination of natural and phylogenetic studies.
- **Two kingdom system of classification of organisms**. Traditionally, all the organisms of the world used to be divided into two kingdoms – the animal kingdom (or animalia) and the plant kingdom (or plantae).
- **Three kingdom classification: E.H. Haeckel,** a German zoologist (1866) suggested that a third kingdom, **Protista**, be created to include th unicellular eukaryotic micro-organisms.
- **Five kingdom classification:** According to five-kingdom concept proposed by **Whittaker** (1969) the organisms are divided into five kingdom-**Monera**, **Prostista, Fungi, Plantae and Animalia**-on the basis of the following criteria.
- viruses do not fit neatly into any classification of living organisms because they have a very simple, non-cellular structure and cannot exist independently of other organisms.
- Carolus Linnaeus put forward classification based on similarities of structure and function (not habitat.) in this first book **Systema Naturae** (1737), he included the names, classification and brief description of plants and animals known to him.
- His another contribution is **Binomial system of nomenclature** published in his book **'Species plantarum'** (1753.)
- He is called as the " **father of taxonomy".**
- **Biological concept of species:** species is the fundamental unit of classification. A species is a group of organisms (1) which are closely related (structurally and functionally) sharing a common gene pool; (11) which can interbreed freely in nature and produce fertile off springs in a natural environment. This concept of species is called **biological concept.**

- **Typological concept of species :** it is the most simple and widely held species concept, match the type as closely as of physical world. such a concept is said to be typological because it conceives of an ideal type of body for each species.
- **polytypic species :** Species have more than one ideal types according to their geographically isolated area.
- in asexually reproducing organisms also, physical resemblances and differences are used for delimiting species.
- **Binomial system of nomenclature: Carolus Linnaeus** is credited with the establishment of **binomial system** of nomenclature.
- According to this system, the name of a species is composed of two words in Latin. The first word is generic names (identifying genus) while the second word is specific name (identifying genus) while the second word is specific name (identifying species). The generic and specific names are followed by the name of the taxonomist who first described the species or gave it its present name.
- General principles of nomenclature were published in 1978 in the from of **international Code of Botanical nomenclature** (ICBN). in accordance with international Code of Botanical Nomenclature, the names of different categories must end it the standard endings **(suffixes)** given below:

Division	phyta
Sub division	phytina
Class	phyceae or opside or ae
Order	ales
Suborder	ineae
Family	acease
Sub family	oideae
Tribe	eae.



- **Hierarchy :** it is a series of different ranks placed in descending order. it was first given by **Linnaeus** who introduced five categories in the taxonomic hierarchy viz., class, order, genus, species and variety. Later on 3 more categories viz., kingdom, division or phylum and family were added and variety was discarded to make a hierarchy of 7 obligate categories viz., kingdom-(in plants) or phylum (in animals) class- order- family- genus-species.
- **New Systematics :** The terms was coined by **Julian Huxley** (1940) it aims at taking into consideration all the characteristics of organism gathered through different fields of science for systematics

02. Kingdom Monera

- Kingdom Monera includes the most ancient, the smallest, and most plentiful prokaryotes. This kingdom is also called Prokaryota.
- Terms prokaryota means before a nucleus.
- **Major characteristics of Moneras**
  (i) prokaryotic organisms.
  (ii) presence of rigid and definite cell wall.
  (iii) process of nutrition: autotrophic or heterotrophic.
  (iv) Ability to utilize food material in soluble form only.
  (v) Moneran cell does not contain an organised nucleus with distinct surrounding membrane. .
  (vi) Cytoplasm lack (sap) vacuoles.
  (vii) Cyclosis and streaming movement of cytoplasm absent.
  (viii) Ribosomes 70s (Subunit 30s & 50s)
  (ix) Multiply by Binary fission.
  (x) Single stranded flagella composed of protein *Flagellin*.

Classification of Moneras :
Eubacteria (True bacteria)
Archaebacteria (Ancient bacteria): These are further divided into many sub-groups. One of them is blue green algae of **Cyanobacteria.**

- **smallest bacterium** (0.15-0.3 μm) Dialister *Pneumosintes.*
  Beggiatoa mirabilis : **Largest bacterium** (16-45 μ in diameter and few m in length.
- The cell wall of most of the bacteria are made up of **peptidoglycan (murein or mucopeptide).** it is found only in prokaryotes. Backbone of peptidoglycan is composed of alternating unit of amino sugars **n-acetylgucosamine (NAG)** and **N-aeetymuramic acid (NAM)** joined together by **β,1-4 linkage.**
- Gram staining, produced by Christian Gram in 1884, divide bacteria into gram +ve. the and gram –ve The cell wall of these two bacteria differ in their chemical composition.