

Part-2



Biology



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About the Tutorial

Biology is one of the disciplines of science under which, we study about the various aspects of living organisms. In its given premises, biology includes a wide range of topics such as physiology, morphology, anatomy, behavior, origin, distribution, etc.

Broadly, Biology is categorized as Zoology (i.e. study of Animalia Kingdom) and Botany (i.e. study of Plantae Kingdom).

Because of having wide range of topics, this tutorial is divided into two parts namely Biology Part 1 and Biology Part 2. Further, these two parts are divided into different chapters for an easy understanding.

Audience

This tutorial is designed exclusively for the students preparing for the different competitive exams including **civil services, banking, railway, eligibility test**, and all other competitive exams of such kind.

Prerequisites

This tutorial is partly based on **NCERT Biology** (class 8th to 10th) i.e. Part I and Part 2 is prepared from different reliable sources and represents largely the significant facts and figures vital for the competitive exams.

This tutorial starts with the basic concept of biology; however, prior experience of reading the NCERT science (Biology) books is recommended for the easy understanding.

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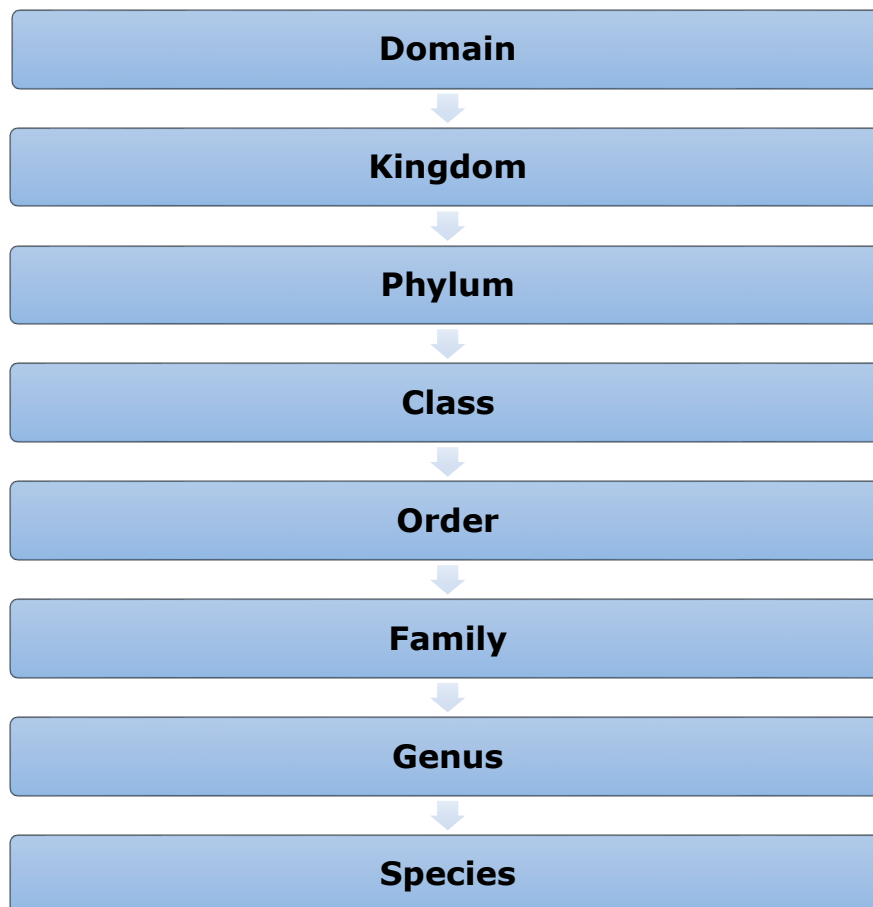
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1. CLASSIFICATION OF ORGANISMS

Introduction

- The technique of classifying organisms is known as **Taxonomy**.
- Taxonomy is made up of two words i.e. '**Taxis**,' which means '**arrangement**' and '**Nomos**,' which means '**method**.'
- The Swedish botanist Carolus (Carl) Linnaeus has developed the modern taxonomic system.
- Linnaeus has developed the following hierarchy of groups to explain the taxonomy:



- In this hierarchy, Domain is the highest order and the broadest category and Species is the lowest order category.

- Further based on the difference between eukaryotes and prokaryotes (cells) 'Domains' classified into three broad categories namely:
 - **Archea** (Archeabacteria): It comprises the bacteria that live in extreme environments.
 - **Eubacteria**: It comprises the bacteria that found in everyday life.
 - **Eukaryote**: It comprises almost all the world's visible living things.
- The above given three domains are further categorized into **Five following Kingdoms**:



- Let's discuss each kingdom in brief:
 - **Monera**: It comprises the unicellular organisms, e.g. bacteria.
 - **Protista**: Similar to monera (unicellular), but more developed and complex. It contains nucleus.
 - **Plantae**: All plants from smallest (such as algae) to the largest (such as Pine, Eucalyptus trees, etc.) are studied under this kingdom.
 - **Fungi**: It is a group of eukaryotic organisms that comprises microorganisms such as yeasts, molds, and mushrooms. The organisms of this kingdom do not make their food, they are basically parasites.

- **Animalia:** It includes all the multicellular and eukaryotic organisms (of animal group). It is also known as **Metazoa**.

Binomial Nomenclature

- The naming culture (of different organisms) practiced uniformly across the world is known as binomial nomenclature.
- Binomial Nomenclature largely consists of two words – the first word beginning with a capital letter and known as genus (of the organism) and the second word begins with lower case letter and defines the species of the organism.
- Binomial Nomenclature must be written in italic and also known as scientific name.
- For example, the binomial nomenclature of human is - *Homo sapiens*; tiger - *Panthera tigris*, etc.

Eukaryotes & Prokaryotes

- Cells are fundamentally categorized by prokaryotes and eukaryotes.

Prokaryotes

- Prokaryotes are the smallest and simplest type of cells.
- Prokaryotes have no true nucleus and no membrane-bound organelles. E.g. Bacteria.
- Prokaryotes' Genome consists of single chromosome.
- Reproduction is asexual; basically mitosis type.

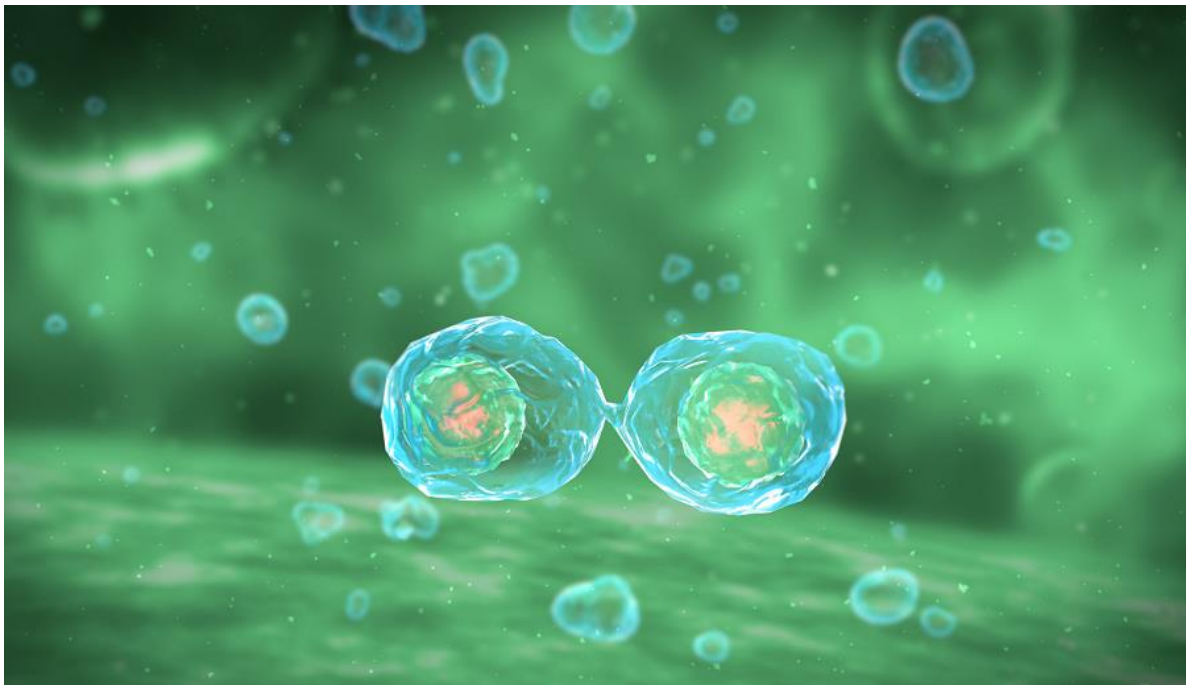
Eukaryotes

- Eukaryotes are complex in structure.
- Eukaryotes have nuclei and membrane-bound organelles.
- Eukaryotes' Genome consists of numerous chromosomes.
- Reproduction is sexual; by mitosis and meiosis.

2. CELL DIVISION

Introduction

- The process of division of parent cell into two or more daughter cells is known as cell division.
- In early 1880s, Flemming first observed the process of cell division.



- Following are the three types of cell division:
 - **Amitosis**
 - **Mitosis &**
 - **Meiosis**
- Let's discuss each of them in brief:

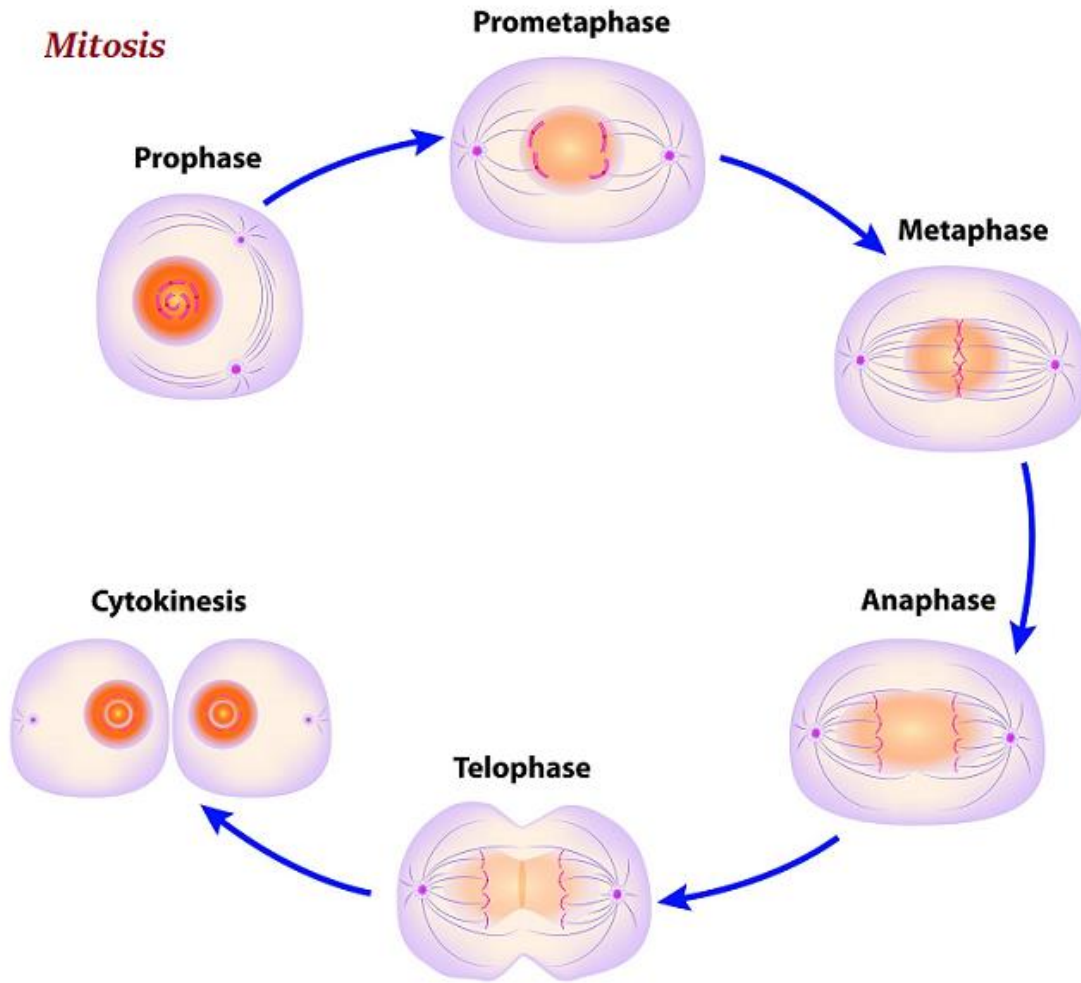
Amitosis

- Parent cell gets divided into two parts, and each of them grows as a new complete organism.

- Amitosis can be seen in less developed organisms. E.g. bacteria
- Amitosis is also known as binary fission.
- There is no stage of division, cell directly gets divided into two new organisms.

Mitosis

- The process of division of parent cell into two new identical cells is known as mitosis.
- In both the new cells, the number of chromosomes remain same.
- Mitosis (cell division) occurs only in eukaryotic cells.
- In mitosis, the division of the nucleus is preceded by the **S stage** (i.e. interphase - during this phase, the DNA is replicated).
- After the interphase, the cytokinesis process begins, which divides the cytoplasm, cell organelles, and cell membrane into two new cells.
- The process of mitosis is divided into the following stages:
 - **Prophase**
 - **Prometaphase**
 - **Metaphase**
 - **Anaphase**
 - **Telophase**
- The stages of mitosis are described in the following image:



- Let's discuss each of them in brief.

End of ebook preview

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