

CLASSIFICATION (TAXONOMY) OF LIVING THINGS

Week 3

CONTENT

1. Classification/Taxonomy of Living Things
2. Binomial System of Nomenclature
3. Classification and Evolution

Definition of Classification

To classify means to arrange or organize things into groups. Classification of living things involves placing living things that have certain important features in common into specific groups which distinguish them from other groups.

The largest group of organisms is the kingdom. The kingdom has the largest variety of organisms. The kingdoms are further split into a large number of smaller groups called '**phyla**' (**singular phylum**) for animals and 'division' for plants. All members of a phylum or division have certain features in common. Each phylum or division is broken down into **classes**. Classes are split into **orders**. Orders are split into **families**.

Families are split into **genera** (**singular genus**) and genera into species. The seven groups used in classification of living things in order of hierarchy are;

Kingdom
↓
Phylum (Animal) or
Division (Plant)
↓
Class
↓
Order
↓
Family
↓
Genus
↓
Species

The **species** is the basic (i.e. smallest) unit in biological classification. A species is a group of individuals which can interbreed to produce fertile offspring. Example, all human beings belong to one species and all monkeys belong to a different species, thus human beings and monkeys cannot interbreed.

Classification	Human	Dog	Lion
Kingdom	Animalia	Animalia	Animalia
Phylum	Chordata	Chordata	Chordata
Class	Mammalia	Mammalia	Mammalia
Order	Primate	Carnivora	Carnivora
Family	Hominidae	Canidae	Felidae
Genus	Homo	Canis	Panthera
Species	sapiens	familiaris	leo

Binomial System of Nomenclature

A Swiss scientist, Carl Von Linne (1707 – 1778) (**Latin – Carolus Linnaeus**) introduced the present system of classification of living things. He also introduced the binomial system of nomenclature in which an organism is given two names. The first name is the generic name and always begins with a capital letter while the second name is the specific name (species) and begins with a small letter. The generic name is common to all the species in a genus **e.g. *Equus caballus*** (horse), *Equus asinus* (the donkey), *Equus burchelli* (common Zebra) are different species of the same genus.

Examples of Scientific names of some organisms

- (i) Man – *Homo sapiens*
- (ii) Housefly – *Musca domestica*
- (iii) Maize – *Zea mays*
- (iv) Orange – *Citrus sinensis*
- (v) Pawpaw – *Carica papaya*

Classification and Evolution

As a result of advances in the field of science a five-kingdom system introduced by R.H Whittaker (1969) has been adopted by some biologists. Most biologist however, prefer to divide living things into prokaryotids (bacteria and blue-green algae) and eukaryotids (all other organisms) based on the complexity of cell structure and cell chemistry.

Prokaryotids – Monera: bacteria, blue-green algae

Eukaryotids – Protista: protozoa, unicellular algae

Fungi: yeasts inclusive

Plantae: multicellular plants and multicellular algae

Animalia: multicellular animals

The five kingdom classification is as follows;

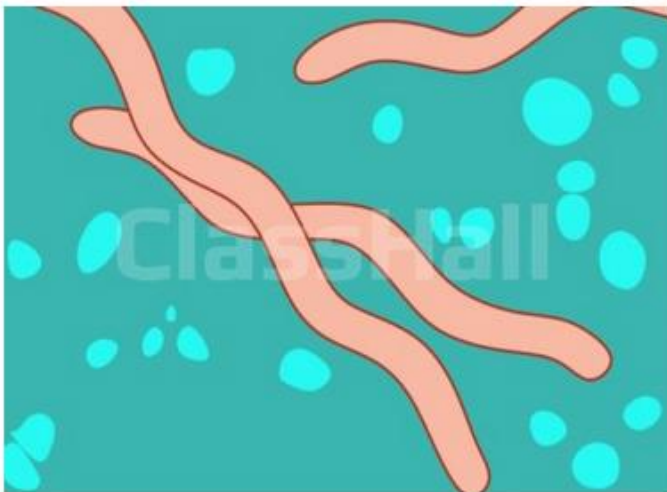
1. Kingdom Monera,
2. Kingdom Protista (Protoctista),
3. Kingdom Fungi,
4. Kingdom Plantae and
5. Kingdom animalia.

Viruses

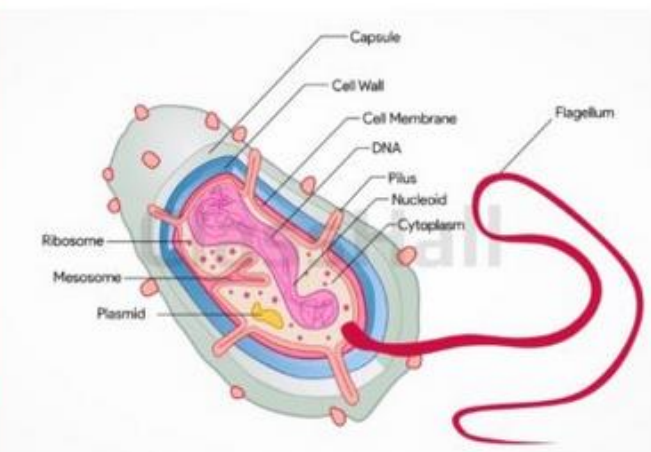
These are not cells. They are particles made up of DNA (deoxyribonucleic acid) or RNA (ribonucleic acid) surrounded by a protein coat. The genetic material is composed of a few genes that code for the proteins that form the coat and other proteins that help it reproduce. They are very harmful parasites that enter the cells of another organism (host) in order to multiply. They do not respond to antibiotics and are constantly changing into new strains.

A. Kingdom Monera

1. They are unicellular
 2. The cells are prokaryotic with no organized nucleus and no nuclear membrane, just a loop of DNA within the cytoplasm.
 3. They do not have complex chromosomes
 4. Cells have no mitochondria, endoplasmic reticulum and no chloroplasts.
 5. Cell wall does not contain cellulose but polysaccharides and amino acids
 6. No sexual reproduction.
 7. They may be autotrophic or heterotrophic
- Examples include bacteria and blue-green algae.



Helicobacter Pylori



Anatomy of a simple bacterium

B. Kingdom Protista

- (i) The organisms are eukaryotic and unicellular.
- (ii) Some are heterotrophic, some are autotrophic and some are both
- (iii) Reproduction is usually asexual by mitosis but some have sexual reproduction by fusion of gametes.
- (iv) Movement may be by cilia, flagella or may be amoeboid

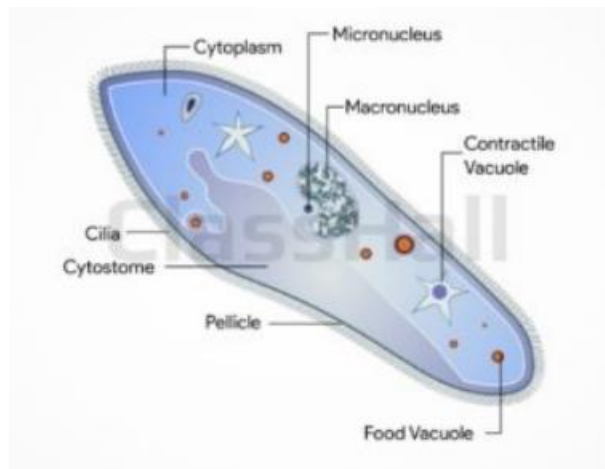
(v) The kingdom is divided into the following phyla;

(a). Phylum protozoa: Examples are Amoeba, Paramecium, Zooflagellates, Plasmodium, Trypanosoma

(b). Phylum Euglenophyta: Example Euglena

(c). Phylum Chrysophyta: Example diatoms

(d). Phylum Pyrrophyta: Example dinoflagellates



Paramecium



Amoeba engulfing Paramecium

C. Kingdom Fungi

(i) Some are unicellular e.g yeast, many are multicellular e.g rhizopus, mushroom and toadstools .

(ii) The body of a fungi is composed of threads/filaments each called a hypha.

(iii) All the hyphae of a single organism are collectively called a mycelium.

(iv) There are many nuclei in a cell.

(v) All fungi are heterotrophic – They lack chlorophyll. Some are saprophytic, some are parasitic and some are symbiotic.

(vi) Fungi together with bacteria are the principal decomposers in the biosphere

(vii) Fungi reproduce by asexual or sexual methods.

ASSIGNMENT

1. What is taxonomy?
2. Make a list of the hierarchy of groups used in classification of living things.
3. List the five kingdoms of classification of living things.
4. Give two characteristics each of organisms in each group mentioned above.
5. State two differences between prokaryotic and eukaryotic cells.