

Relationships in phylogenetic classification is called a taxon. **Taxonomy is the study of these groups and their positions in a hierarchal order, where they are known as taxonomic ranks. These are based upon the evolutionary line of descent of the group members.**

A **domain** is the highest taxonomic rank and three are recognised: **Bacteria**, **Archaea** (group of prokaryotes) and **Eukarya**. —>

The Eukarya domain is divided into four kingdoms: Protocista, fungi, plantae, animalia. Within each kingdom the largest groups are known as phyla. The classification in a kingdom is in this order:

1. **Kingdom**
2. **Phylum**
3. **Class**
4. **Order**
5. **Family**
6. **Genus**
7. **Species**

Phylogeny:

The hierarchal order of taxonomic ranks is based upon the supposed evolutionary line of descent of the group members. This relationship between organisms is known as phylogeny. **The phylogeny of an organism reflects the evolutionary branch that led up to it. The phylogenetic relationships of different species are usually represented by a tree like diagram where the oldest species is at the base of the tree while the most recent ones are represented by the ends of the branches.**

Bacteria:

A group of single-celled prokaryotes with these features:

Absence of membrane bound organelles

Unicellular although cells may occur in chains or clusters

Ribosomes are smaller (70S) than in eukaryotic cells

Cell walls are present and made of murein.

Single loop of naked DNA made up of nucleic acids but no histones

Archaea:

A group of single-celled prokaryotes that were originally classified as bacteria which they resemble in appearance.

Their genes and protein synthesis are more similar to eukaryotes

Their membranes contain fatty acid chains attached to glycerol by ether linkages

No murein in cell walls

More complex form of RNA polymerase

Eukarya:

A group of organisms made up of one or more eukaryotic cells. Their features are:

Cells possess membrane bound organelles

Membranes containing fatty acid chains attached to glycerol by ester linkages

Not all cells with a cell wall but where they do they don't contain murein

Ribosomes are larger (80S) than in bacteria or archaea.

