Classification (taxonomy) of life forms

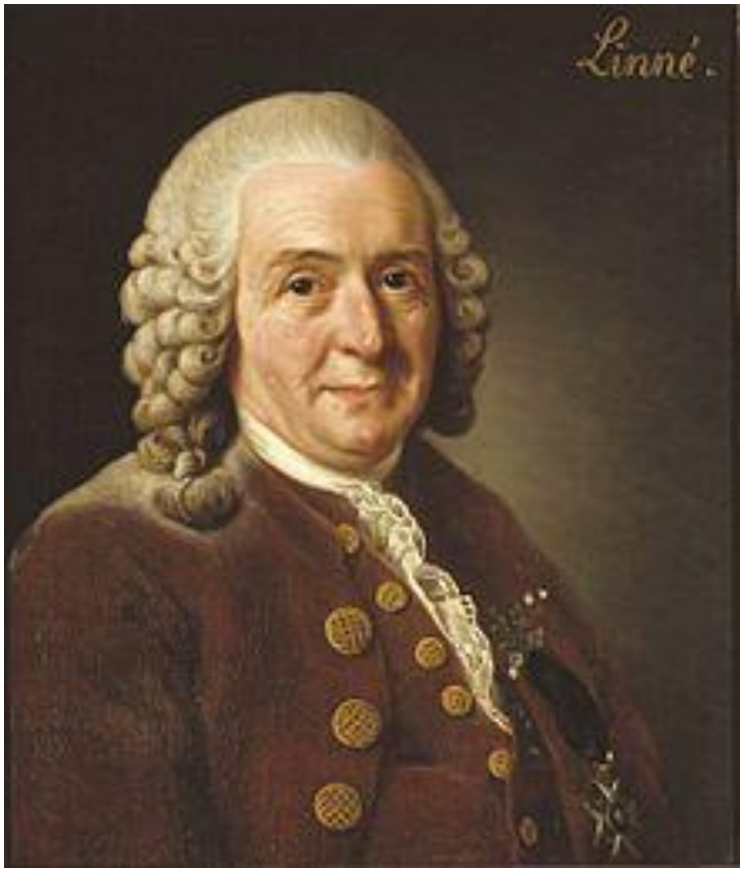
- In biology, taxonomy is the science of naming, defining and classifying groups of biological organisms on the basis of shared characteristics.

- Classification of organisms could be based on overall similarity, usually in morphology (organism form and structure) or other observable traits.
- Evolutionary taxonomy classifies organisms is based on phylogenetic relationship (shared descent) of organisms.
- Modern taxonomy relies on DNA sequence data

Species

- In biology, a species is the basic unit of classification and a taxonomic rank of an organism, as well as a unit of biodiversity.
- A species is often defined as the largest group of organisms in which any two individuals of the appropriate sexes or mating types can produce fertile offspring.

Carl Linnaeus (1707–1778)



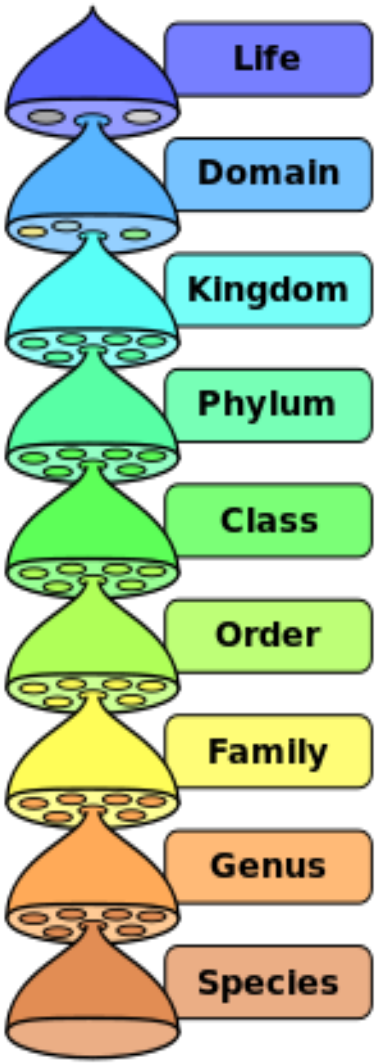
Created first modern taxonomic system

- In Linnean taxonomy species were placed in a ranked hierarchy.
- A group of similar *species* comprised *genus*, a group of similar genera comprised *family* a group of similar families – *order*, a group of similar orders – *class*, a group of classes – *philum* and a group of phila - *kingdom*

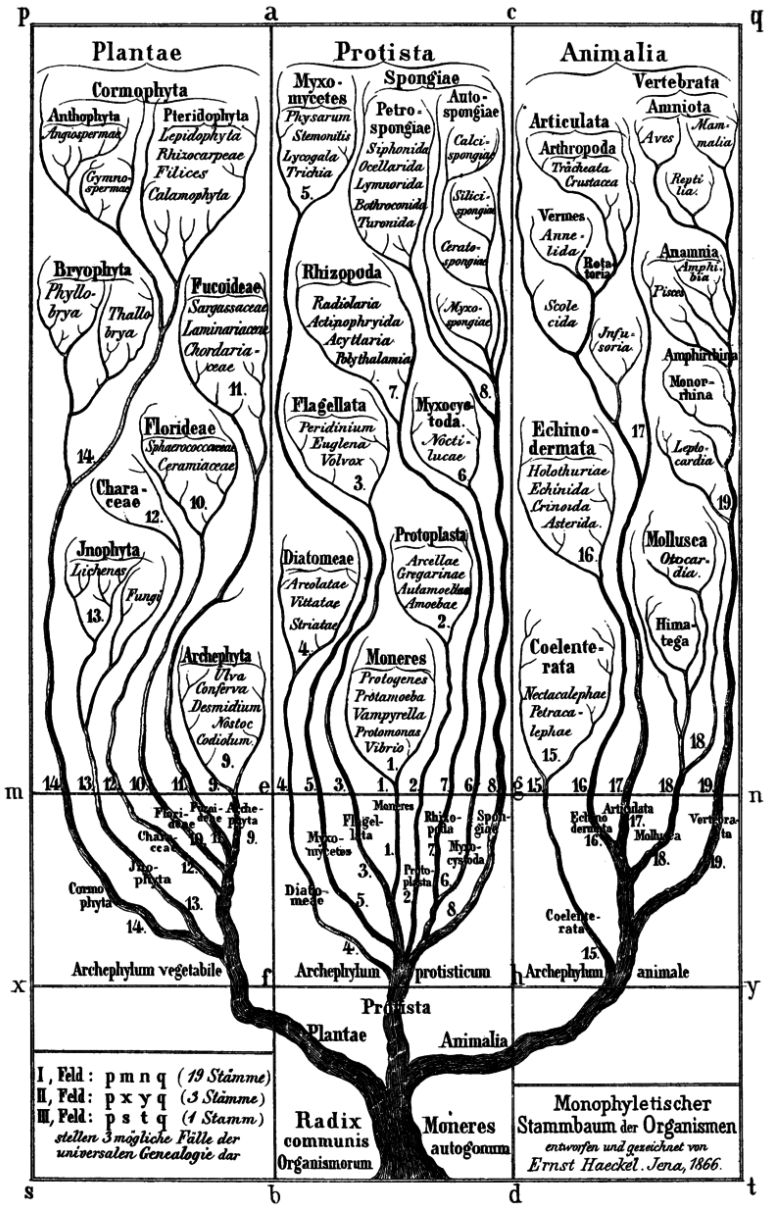
Carl Linnaeus divided all life forms into two kingdoms – Vegetabilia (plants) and Animalia (animals). Kingdoms were divided into phyla. Phyla were divided into classes… etc.

- **Carl Linnaeus, 1735 – 2 kingdoms - Vegetabilia and Animalia**
- **Ernst Haeckel, 1866 - 3 kingdoms – Protista, Plantae and Animalia**
- **Édouard Chatton, 1925- 2 empires – Procariota and Eucariota**
- **Carl Woese, 1990 – 3 domains – Bacteria, Archaea and Eucaria**

Modern taxonomic ranks



Phylogenetic tree suggested by Haeckel (1866)

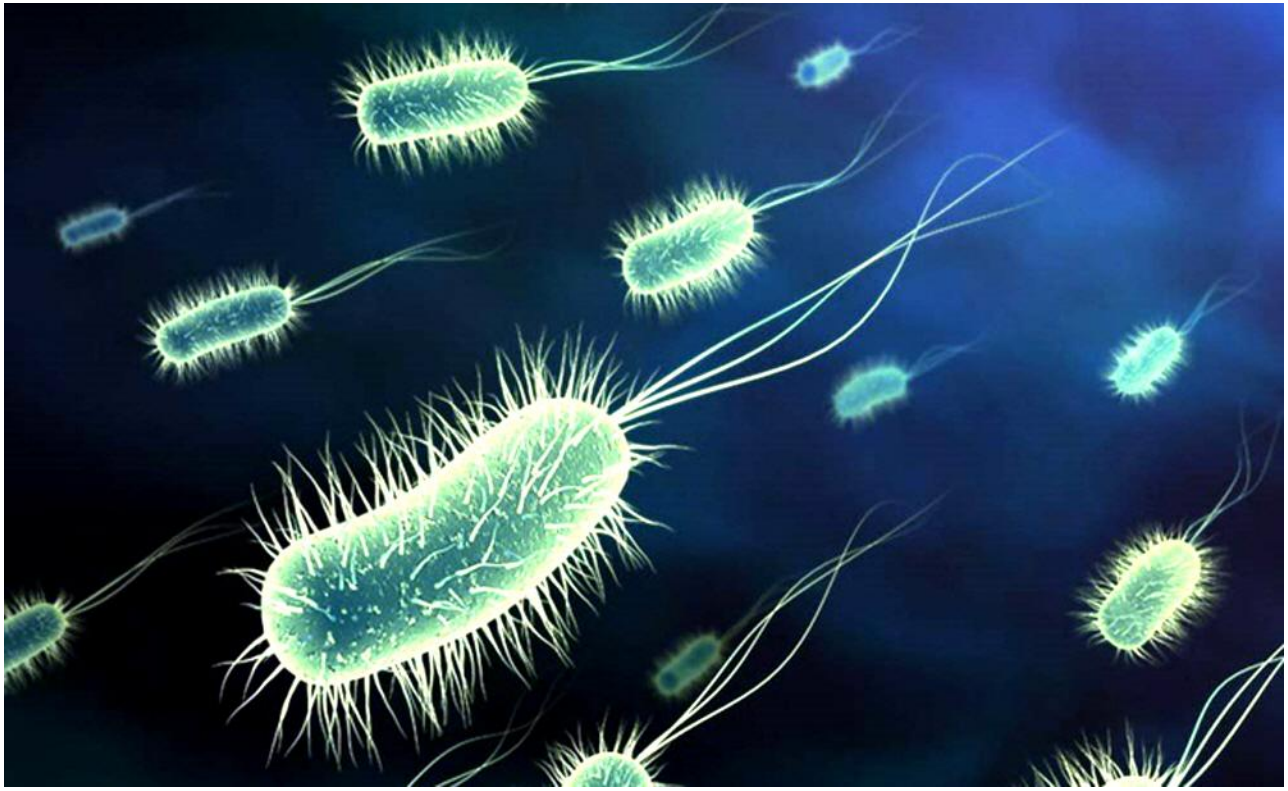


Prokaryotes and Eukaryotes

- **A prokaryote** (procaryote) is a unicellular organism that lacks a membrane-bound nucleus (karyon), mitochondria, or any other membrane-bound organelle.
- **A eukaryote** (eucaryote) is any organism whose cells have a cell nucleus and other organelles enclosed within membranes. Eukaryotic organisms may be unicellular or multicellular. Only eukaryotes form multicellular organisms consisting of many kinds of tissue made up of different cell types.
- The difference between prokaryotes and eukaryotes is not just morphological. They also differ fundamentally in the ways their genes are organized and regulated.

Procaryote - bacterium

Procaryote - bacterium



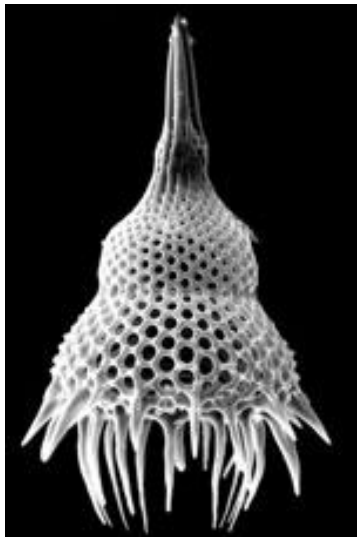
Procaryote - cyanobacterium

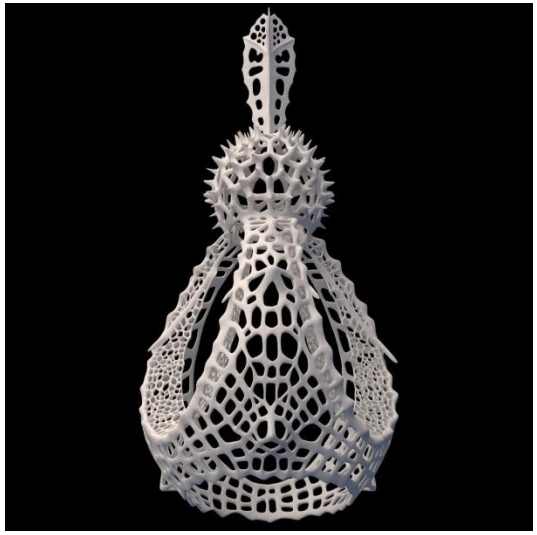
Procaryote - cyanobacterium

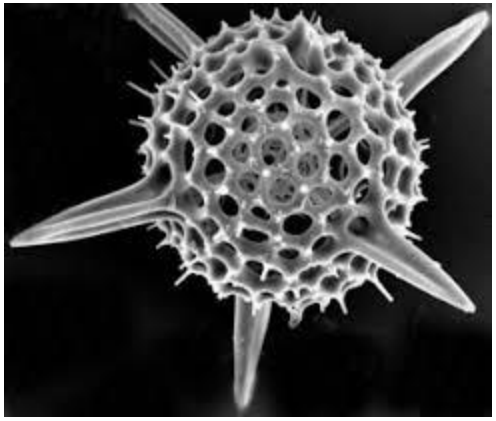
Eucaryote - amoeba

Eucariote - infusorium

Eucariote - radiolaria

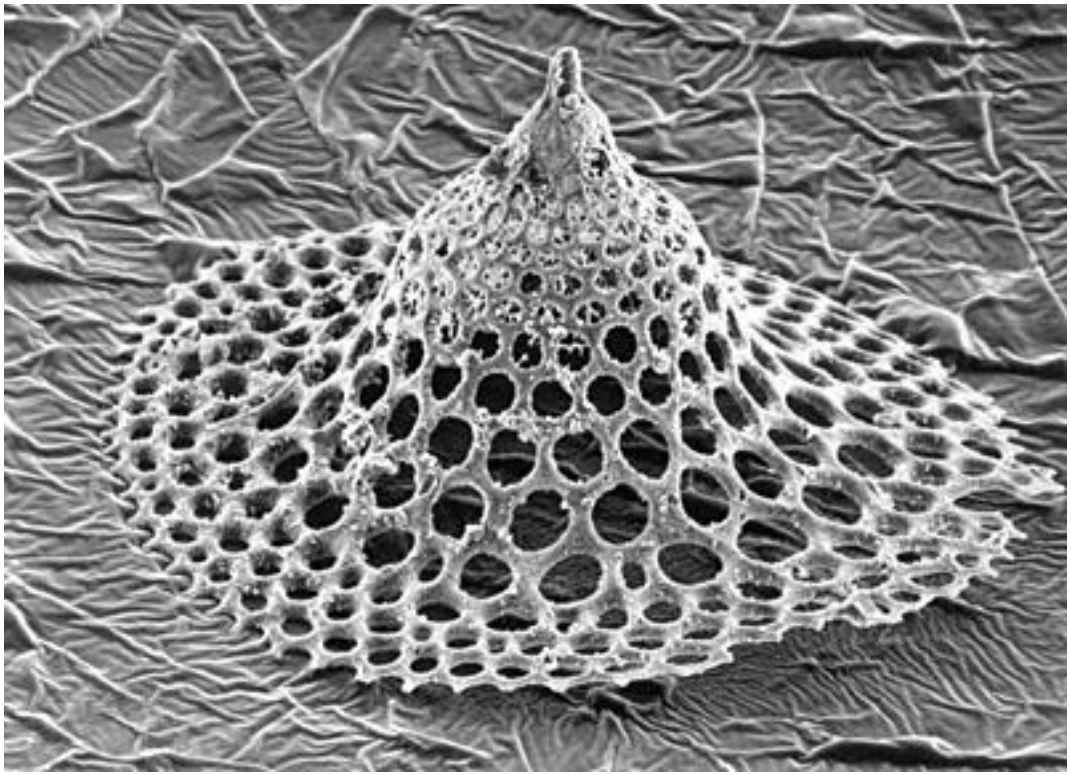






Fossil radiolarian

(over 70 million years old)



Homework.

Organism	Human	Zebrafish	Fruit fly
Domain			
Kingdom			
Philum			
Class			
Order			
Family			
Genus	Homo	Danio	Drosophila
Species	H. Sapiens	D. Rerio	D. Melanogaster