TOPIC 5.3: CLASSIFICATION

Binomial Nomenclature

The binomial system of naming is a globally recognised classification scheme developed at a series of congresses

- It was first proposed by Carl Linnaeus in 1735

According to the binomial system, every organism has a two-part scientific name:

- Genus is written first and is capitalised (e.g. *Homo*)
- Species follows in lower case (e.g. *Homo sapiens*)

Hierarchy of Taxa

Taxonomy is the science of classifying organisms based on shared characteristics (or taxa)

- More taxa shared = more closely related organisms

Taxa	Animal	Plant	Hint:
Kingdom	Animalia	Plantae	**K**aty
Phylum	Chordata	Angiosperm	**P**erry
Class	Mammalia	Eudicotidae	**C**omes
Order	Primate	Ranunculales	**O**ver
Family	Hominidae	Ranunculacae	**F**or
Genus	*Homo*	*Ranunculus*	**G**rape
Species	*sapiens*	*acris*	**S**oda
Common	Human 	Buttercup 	

Domains of Life

All living organisms are classified into one of three domains:

- Eukarya (all eukaryotic organisms)
- Archaea (prokaryotic extremophiles)
- Eubacteria (common pathogenic bacteria)

Originally, the two prokaryotic domains (*Archaea* and *Eubacteria*) were considered part of a single kingdom (Monera)

- However, biochemical differences prompted a reclassification

	Eukarya	Archaea	Eubacteria
Histones	✓ Present	✓ Present	✗ Absent
Introns	✓ Present	✓ Present	✗ Absent
Nucleus	✓ Present	✗ Absent	✗ Absent
Ribosome	↑ 80S	↓ 70S	↓ 70S

Natural Classification

Natural classification involves grouping organisms according to common ancestry rather than by common characteristics

- This allows for species to be identified by their evolutionary pathways and enables the prediction of traits within a group

A disadvantage of natural classification is that taxonomists may need to reclassify groups if new phylogenetic evidence emerges

- Gorillas and chimps were included in a *Homininae* sub-family
- The figwort family was reclassified based on cladistics data

Dichotomous Keys

A dichotomous key involves sequentially dividing organisms into two categories until every organism is individually identified

Example of a Dichotomous Key:

1. Organism is asymmetrical ..... Porifera
   Organism is symmetrical ..... Go to Q2
2. Has radial symmetry ..... Cnidaria
   Has bilateral symmetry ..... Go to Q3
3. Has no separate anus ..... Platyhelmintha
   Has a separate anus ..... Go to Q4
4. Has visible body segmentation ..... Go to Q5
   Segmentation not clearly visible ..... Mollusca
5. Has an exoskeleton ..... Arthropoda
   Has no exoskeleton ..... Annelida

Diagrammatic Representation: