

## Taxonomy and Classification

### 1. Define:

**Taxonomy** – Taxonomy may be defined as the science or study of the classification of organisms. It involves categorizing organisms based on their natural relationships, and also establishing criteria for determining which organisms go into which groups. It has changed significantly over time.

**Binomial nomenclature** – Binomial nomenclature is the naming system applied to living organisms (and extinct forms), assigning two names to each different organism type. These include the genus name (capitalized) and the species name or specific epithet (not capitalized) of the organism type being identified. This system provides each type of organism with a unique technical name that allows it to be recognized throughout the scientific community (world wide). It was developed by Carolus Linnaeus in 1735 but has undergone extensive and somewhat inconsistent modification since; a feature that can be frustrating to students.

**Psychrophile** - Organisms that grow best at cold temperatures (-5 to 20 degrees centigrade) are called psychrophiles (cold loving). For example, that scary stuff lurking at the back of the refrigerator.

**Photoheterotroph** - Organisms that obtain their energy from light and use preformed organic compounds for carbon can be nutritionally categorized as photoheterotrophs. Bacteria identified as *Rhodospirillum* can function as photoheterotrophs, as can some types of Archaea.

**Microaerophile** - Organisms that grows best in the presence of small amounts of oxygen (less than the amount normally found in air) are sometimes called microaerophiles.

2. Taxonomy/ Monera or Prokaryotae/ Since bacteria and archaea are now categorized in two separate domains, this kingdom no longer exists.
3. Genus/ species
4. Order
5. R.H. Whittaker/ Protista
6. Morphological
7. Chemoheterotrophs or chemoorganotrophs/ hypotrophs
8. Photoautotrophs
9. Parasites/ saprotrophs (Formerly called saprophytes, suggesting plant-like forms, but fungi are not plants.)
10. Chemoautotrophs (also called lithotrophs)

11. Respiratory
12. Facultatively anaerobic (facultatively aerobic)/ fermentative
13. Obligately anaerobic
14. Psychrophiles/ psychroduric
15. Hyperthermophiles or stearothermophiles/ thermoduric
16. In a technical sense,  $\text{pH} = -\log [\text{H}^+]$  or  $-\log$  of hydronium ion concentration present in the environment, however, in the case of culture media, we typically think of pH as a measure of the acidity or alkalinity present.
17. pH indicators
18. Halophile
19. Symbiotic/ pathogens
20. Enzymatic testing
21. Serological typing/ bacteriophages (viruses)
22. Antibodies/ bacteriophages (viruses)
23. Nucleic acids (DNA or in some cases RNA)
24. Cladistics/ phylogeny
25. Phylogeny
26. The human genome project was undertaken with the intent of determining the nucleotide sequences of all the genes included in the human genome. This project involved a tremendous amount of work, people working in multiple laboratories around the world, and was the greatest collaborative biological project ever undertaken. It was declared completed in 2003, but research continues, because genomes vary considerably and the project has medical applications.