

## Levels of Classification

- Linnaean System of Classification
  - Carol Linnaeus
  - Based on similar structures
  - Latin names
  - Started with 2 kingdoms but expanded to 5 kingdoms
    - Animals, plants, fungi, Protocista, and monera
  - Kingdom, phylum, class, order, family, genus, species
- Rules for Scientific Names
  - Each name consists of two parts
    - Italicized
  - Genus is always capitalized while species is not
  - The genus can be abbreviated
  - Example:
    - *Escherichia coli* (E. coli)
    - Escherichia = genus, coli = species
    - Named after discoverer; coli indicates it is present in the colon
- Defining Species for Prokaryotes
  - Collection of bacterial strains sharing stable properties
    - Very vague, can be confusing
  - Pure culture = growth of a single species or strain in the lab
  - Strain = genetically different cells within a species
    - Analogy: Bacterial species are like dogs in general while bacterial strains are like breeds of dogs
  - Clone = population of cells that come from a single cell
  - Colony = collection of cells on a solid medium that come from one cell
- Strain Names
  - *Escherichia coli* O157: H7
    - *Escherichia coli* = species name
    - O157:H7 = strain designation
    - O = LPS O-antigen
    - 157 = antigen number
    - H = flagellin
    - 7 = antigen number
- Division of Bacteria and Archaea
  - Carl Woese
    - Compared DNA between species
    - Examined rRNA genes
      - Why rRNA?

- o* Molecular chronometer
  - o* All cells have rRNA genes, they don't change quickly, and if they do change, the changes aren't lethal
- Changed phylogenetics
  - Study of evolutionary history of organisms
- Created 3 domains: bacteria, archaea, and eukarya