Characteristics used for classification

- In the beginning classification was based only on the physical appearance (morphology) of organism
- But several other tools exist as well
  - Anatomy
  - Cytology (cells)
  - Phytochemistry (organic compounds plants make for protection)
  - Chromosome number
  - Molecular differences (proteins and DNA sequences)
- Classifying organisms using molecular differences is called *molecular systematics*

Cladograms and classification

- *Cladistics* is a system of classification that groups taxa together according to the characteristics that have evolved most recently and is an example of natural classification
  - The concept of a common descent is crucial
- *Cladograms* are the diagrams that show the phylogeny of the clades being studied
  - Every cladogram drawn is a working hypothesis open for testing and falsification
  - A *node* is the place where speciation happened and where the common ancestor was found
  - A *sister group* is a group showing the closest relatives
  - An *outgroup* is a group that is less closely related to the others in the cladogram
- An organism with the fewest modifications of a particular DNA sequence will be the most anciently evolved and those with the most modifications in the same sequence will be the most recently evolved
  - The former have nodes at the earliest splits of the cladogram
- Clades can be of different size depending on what characteristic is being observed
  - It includes all organisms sharing the characteristic and the last known common ancestor
  - These organisms are said to form a *monophyletic group*
- Cladistics is cleaner than the Linnaean system
  - If an organism has feathers, is it automatically a bird?
    - In a Linnaean classification, birds occupy a class of their own