

17.3 domains and kingdoms

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domains:

- bacteria, archaea, Eukarya
- Classified based on cell type and structure

kingdoms:

- bacteria, archaea, plantae, animalia, fungi, Protista
- Classified based on cell type, structure, nutrition.

Old system of classification: no domains and five domains, until they discovered archaea

Domain Bacteria

- **Prokaryotes** (don't have a true nucleus)
- Cell walls contain **peptidoglycan**
- Most **heterotrophs** some **autotrophs**
- Some **aerobic**, need oxygen to survive, and some **anaerobic** that die in the presence of oxygen
- **Diverse group** that can survive in many different environments

Domain Archaea

- **More ancient than bacteria**, **more closely related to eukaryotes**
- Cell walls **don't contain** peptidoglycan, they have some of the **same proteins** that eukaryotes have
- Most **heterotrophic**, some **autotrophic**
- Sometimes called **extremophiles**: because they live in some of the most extreme environments, including hot springs, salty lakes, and thermal vents
- Diverse in shape and nutrition requirements

Viruses- an exception:

- A virus is a nucleic acid surrounded by a protein coat.
- They are not cells and they do not have cells. they are nonliving so they are not placed in the classification system
- They reproduce, contain genetic material, and perform basic functions such as invading a host cell.

Domain Eukarya

Cells have a membrane-bound nucleus

1. Kingdom Protista

- Can be unicellular, colonial, or multicellular
- Don't have organs

Types of protists:

- o **Algae** (plantlike): autotrophs, perform photosynthesis [like kelp]
- o **Protozoans** (animal-like): heterotrophs [like amoeba]
- o **Funguslike**: slime molds and mildews
- o **Euglenoids**: have both **animal-like** and **plantlike** traits, usually grouped with plantlike protist, because they have chloroplasts and can photosynthesize

2. Kingdom Fungi

- Most multicellular some unicellular
- Absorb nutrients
- heterotrophic
- Lack motility- the ability to move-
- Cell walls contain **chitin**, provides structural support
- Consists of threadlike filaments called **hyphae**. its responsible for growth, reproduction, and feeding.
- Some are **parasites**-grow and feed on other organisms
- Others are **saprobies**- get their nutrition from dead or decaying organic material
- fungi **secrete** (disseminate) **digestive enzymes** into their food sources then absorb digested materials directly into their cells
- **Lichens**- Fungi that have a mutual relationship with algae, they get their food from algae that live among their hyphae

3. Kingdom Plantae

- **Multicellular**
- Cell walls made of cellulose
- Most **autotrophic**, contain chloroplasts (used for photosynthesis) but a few are **heterotrophic** (like parasitic dodders that extract their food from host plants **through suckers**)
- Cells **organized into tissues**, many have organs like roots, stems, and leaves
- **Lack motility**, Some have reproductive cells that have flagella which propel them through water

4. Kingdom Animalia

- Heterotrophic, multicellular
- No cell walls
- Cells organized into tissues, tissues into organs, organs into complex organ systems.
- live in the water, on land, and in the air.
- Most motile, although some like coral lack motility.

Table 3		Kingdom Characteristics				
		Concepts in Motion Interactive Table				
Domain	Bacteria	Archaea	Eukarya			
Kingdom	Bacteria	Archaea	Protista	Fungi	Plantae	Animalia
Example	 SEM Magnification: 5500X	 TEM Magnification: 25,000X	 LM Magnification: 150X			
Cell type	Prokaryote		Eukaryote			
Cell walls	Cell walls with peptidoglycan	Cell walls without peptidoglycan	Cell walls with cellulose in some	Cell walls with chitin	Cell walls with cellulose	No cell walls
Number of cells	Unicellular		Unicellular and multicellular	Most multicellular	Multicellular	
Nutrition	Autotroph or heterotroph		Heterotroph	Autotroph	Heterotroph	