

# 2: Cell Ultrastructure

## I. TWO TYPES OF CELLS AND THEIR FEATURES

	Prokaryotes	Eukaryotes
<b>Data</b>	less	more
<i>Visualizing prokaryotes is challenging due to their size; need to maintain in culture.</i>		
<b>Size</b>	1-10 $\mu\text{m}$	10-100 $\mu\text{m}$
<b>Organisms</b>	Domain Archaea Domain Bacteria	Domain Eukarya (plants, protists, fungi, animals)
<b>Energy Production</b>	Anaerobic Aerobic Fermentation	Mainly aerobic Fermentation
<i>Anaerobic respiration is not a fermentation but fermentation is an anaerobic process.</i>		
<b>Genetic Material</b>	Nucleoid/nuclear zone > 1 circular DNA DNA complexed w/few non-histone proteins.	True nucleus > 1 linear DNA DNA associated by histones.
<i>There are some bacterium species that may also show linear chromosomes. There are also proteins that are present in eukaryotes but those aren't histones.</i>		
<b>Organelles</b>	Not membrane-bound	Membrane bound
<i>Recent studies states that there are actually membrane-bound organelles in prokaryotes (mesosomes, magnetosomes, and chromatophores)</i>		
<b>Ribosomes</b>	70 S 3 RNA molecules 55 proteins	80 S trRNA molecules 78 proteins
<i>S = Svedberg's value (the higher the value, the denser the ribosomes)</i>		
<b>No. of Cells/Organisms</b>	Mainly unicellular Some colonial	Some unicellular Many multicellular
<b>Compartmentalization of Metabolic Fxns</b>	Not as extensive (not distinct)	Extensive (distinct)
<b>Cell Division</b>	Binary fission	Mitosis Meiosis
<i>Binary fission does not involve spindle fibers.</i>		
<b>Endocytosis and Exocytosis</b>	absent	Present (involve vesicles)

## II. THE THREE DOMAINS OF LIFE

- ◊ Bacteria, Archaea, Eukarya
- ◊ Proposed by Carl Woese
- ◊ Prokaryotes and Eukaryotes aren't taxonomic terms
- ◊ Classifying organisms based on 16S RNA
- ◊ has low mutation rate
- ◊ highly conserved
- ◊ common to all

*There are no two domains that are more related or more different to each other.*

# Dynamics Of Cell Ultrastructure

**K Payea**



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