

(1) **Today**

Attendance

Review Syllabus

Sections 1.1 – 1.4
Foundations of Biochemistry

(3) **Second Class from Today**

Chap 2 Water and Its Role in Life

Next Class (2)

Sections 1.3 - 1.4: Foundations of
Biochemistry

Third Class from Today (4)

Chap 2 Water and Its Role in Life

Cellular Foundations

Section 1.1.1

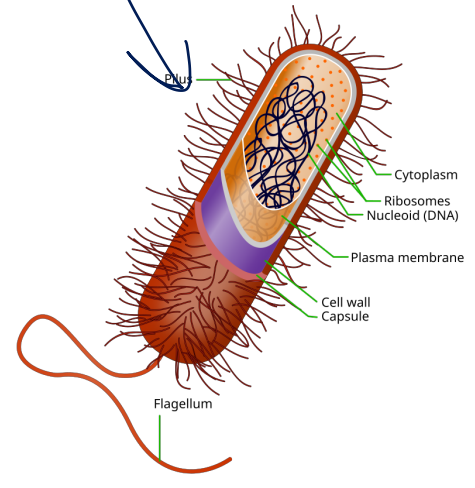
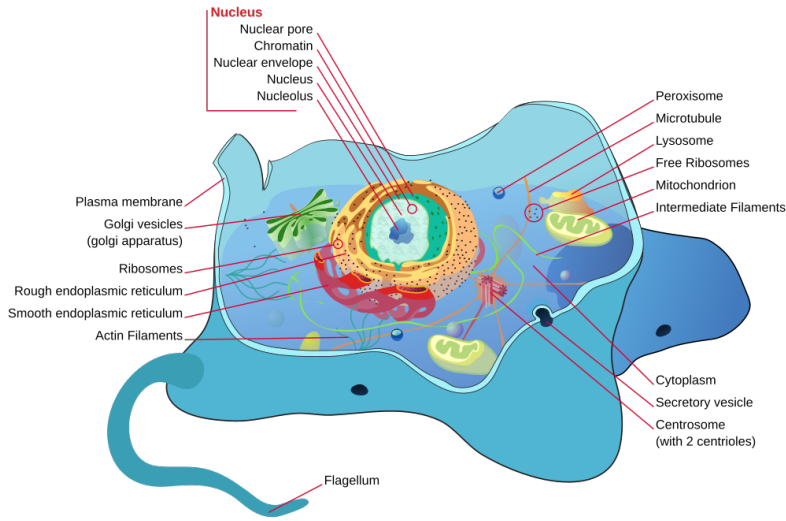
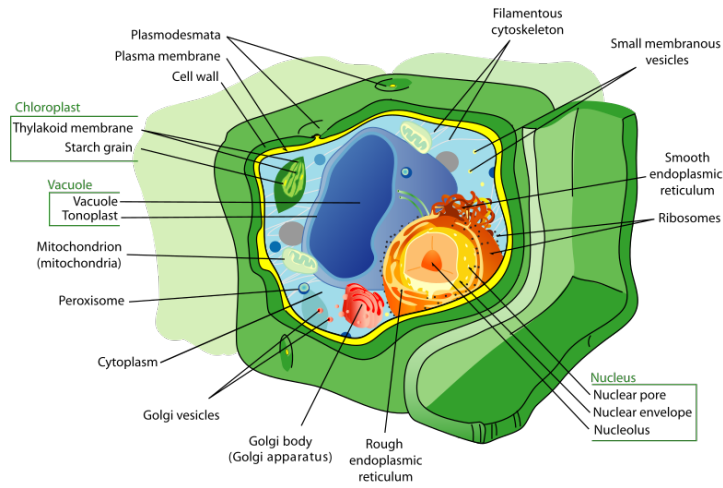
Eukaryotic

nucleus organelles

use the same kinds of biomolecules

Prokaryotic

no nucleus no membrane bound organelles



- [https://en.wikipedia.org/wiki/Cell_\(biology\)#/media/File:Plant_cell_structure-en.svg](https://en.wikipedia.org/wiki/Cell_(biology)#/media/File:Plant_cell_structure-en.svg)
- [https://en.wikipedia.org/wiki/Cell_\(biology\)#/media/File:Animal_cell_structure_en.svg](https://en.wikipedia.org/wiki/Cell_(biology)#/media/File:Animal_cell_structure_en.svg)
- https://en.wikipedia.org/wiki/Prokaryote#/media/File:Prokaryote_cell.svg

Cellular Foundations

Section 1.1.1

Catabolic - breaking down biomolecules -- often (not always) do
Anabolic - building up biomolecules release energy

Cells regulate concentrations of ions inside the cell

Average Concentrations (mM)¹

Ion	Cellular	Extracellular
Na ⁺	140	5
K ⁺	12	140
Cl ⁻	4	15
Ca ²⁺	0.001	2

Cells regulate concentrations by transporting species in and out of the cell

pH is regulated

H⁺ concentration in mitochondria

lower than the surrounding cell

pH is lower inside a lysosome as compared to surrounding cell
 [H⁺] is higher inside the lysosome

H⁺ concentration in lysosome

breaking down ... digesting molecules in the cell

¹ [https://bio.libretexts.org/Bookshelves/Biochemistry/Fundamentals_of_Biochemistry_\(Jakubowski_and_Flatt\)/01:_Unit_I_-_Structure_and_Catalysis/01:_The_Foundations_of_Biochemistry/1.01:_Cellular_Foundations](https://bio.libretexts.org/Bookshelves/Biochemistry/Fundamentals_of_Biochemistry_(Jakubowski_and_Flatt)/01:_Unit_I_-_Structure_and_Catalysis/01:_The_Foundations_of_Biochemistry/1.01:_Cellular_Foundations)

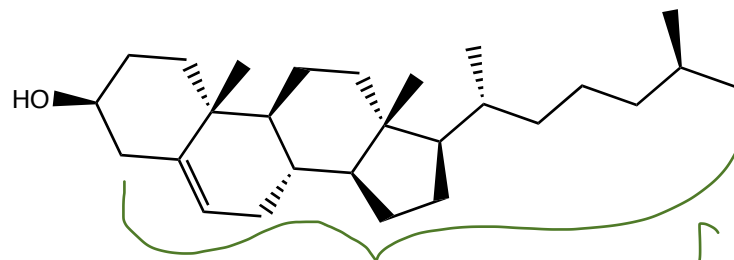
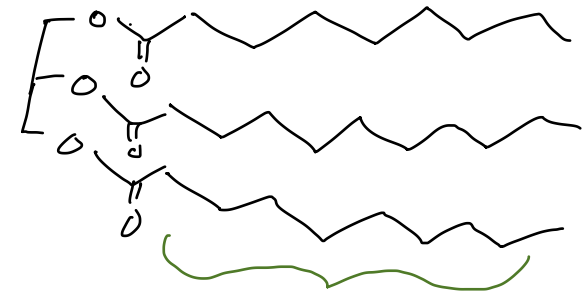
Local Concentrations are high

“Cells are so crowded that the space between larger molecules like proteins is typically smaller than that of a single protein.”⁴

Cell Components form substructures based on phase transitions

lipids forming droplets in aqueous media

cholesterol rafts forming in lipids with saturated side chains



interacts with nonpolar region of lipids

non-polar region of cholesterol

⁴ [https://bio.libretexts.org/Bookshelves/Biochemistry/Fundamentals_of_Biochemistry_\(Jakubowski_and_Flatt\)/01:_Unit_I_-_Structure_and_Catalysis/01:_The_Foundations_of_Biochemistry/1.01:_Cellular_Foundations](https://bio.libretexts.org/Bookshelves/Biochemistry/Fundamentals_of_Biochemistry_(Jakubowski_and_Flatt)/01:_Unit_I_-_Structure_and_Catalysis/01:_The_Foundations_of_Biochemistry/1.01:_Cellular_Foundations)