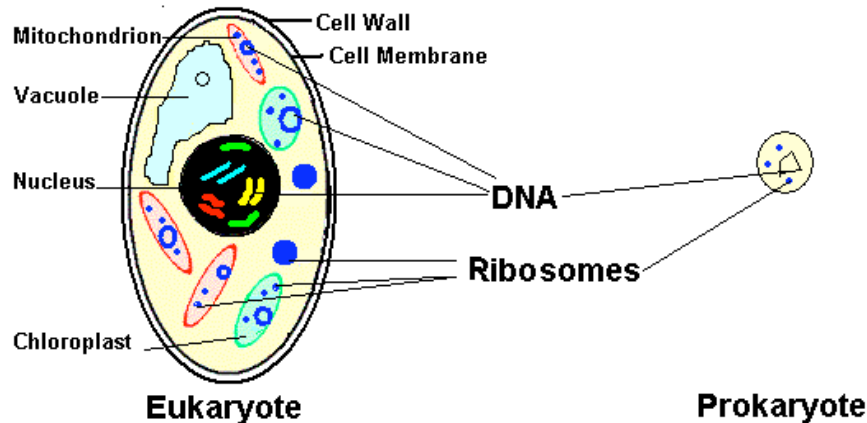


CH 260 BIOCHEMISTRY
CHEMICAL COMPOSITION OF CELLS



I. Cells (prokaryotes, eukaryotes)

A. Cells consist of a collection of simple and complex organic molecules, inorganic molecules, and ions. There are also organized clusters of these called supramolecular complexes. The majority of biomolecules are composed of only 6 chemical elements - C, H, O, N, S and P. Cells are mostly water by weight.

B. Prokaryotes - Small, single cell organisms lacking a membrane-bound nucleus and other subcellular compartments. Bacteria and blue-green algae are examples.

C. Eukaryotes - Cell or organism with membrane-bound nucleus and other well-developed subcellular compartments (organelles). Yeast, fungi, protozoans, plants and animals are eukaryotes.

II. Biochemical functional groups

A. Oxygen, Nitrogen: alcohol, amine

B. Carbonyl: aldehyde, ketone, carboxylic acid

C. Phosphoryl: phosphoester, phosphoanhydride

D. Rings: pyranose, furanose, purine, pyrimidine

E. Carbonyl-oxygen, carbonyl-nitrogen: ester, amide

III. Amino acids, peptides and proteins

A. Amino acids - have a chiral carbon bonded to H, a carboxyl group, an amino group, and one of 20 characteristic organic side groups

B. Peptides- small linear polymers of amino acids (<math>< \square 50</math>)

C. Proteins (Enzymes)- large linear polymers of amino acids

1. Primary, secondary, tertiary, quaternary structure

2. Structural, globular and membrane proteins

IV. Nucleotides and nucleic acids

A. Nucleotides have a purine or pyrimidine ring, ribose or 2-deoxyribose (furanose ring) and a phosphoester (with phosphoanhydrides)

B. Nucleic acids are linear polymers of ribo- or deoxyribonucleotides

V. Carbohydrates

A. Monosaccharides - polyhydroxyaldehydes or polyhydroxyketones with chiral carbons (found as furanose or pyranose rings)

B. Polysaccharides - polymers of monosaccharides (linear or branched)

VI. Lipids

A. Diverse structures which, in general, are nonpolar or amphiphilic

B. Examples - fatty acids, triacylglycerols, phosphatides, cholesterol