Introduction to biochemistry

4 major classes of biomolecules

Eukaryotic cells / organelles

Amino acids
know all 20 (structure, full name, three letter name, one letter name, classification, special characteristics)
general structure
stereochemistry (D vs. L, enantiomers, chirality)
general rules for placement in protein synthesis
essential vs. non-essential

L-tryptophan

Monosodium glutamate (MSG)

Scurvy

Kwashiorkor

Phenylketonuria (PKU)

Round-Up (mechanism of action)

Buffers
$K_a, pK_a, \text{pH}, \text{pOH}$
strong vs. weak acids
Henderson-Hasselbalch equation and its use
maximum buffer capacity
polyprotic acids
ionization of amino acids
(net charge, $pI$)
physiological buffers
alkalosis/acidosis

Peptide bond – properties and drawing

Drawing peptides at various pHs

Calculating pI

Peptides in biological systems
Classification of proteins

Protein Functions

Non-covalent interaction of proteins (recognition)

Globular vs. fibrous proteins

Monomer vs. Oligomer

~ amino acid MW and ~ protein MW

Primary structure
sequencing
proteases
trypsin
chymotrypsin
Edman degradation (know what it’s for)

Cystic fibrosis

Sickle cell anemia

Secondary structure
$\alpha$-helix
$\beta$-sheet
loops or turns
motifs
hydrogen bonding

Tertiary structure

Quaternary structure

Anfinsen Experiment

Protein Folding