Chi-Square

((O-E)^2)/E

Degrees of Freedom: n-1 (number of variants -1)

Critical Values: 95% certainty (0.05)

if the number is higher than the critical value, REJECT the null hypothesis

Surface Tension

measure of how difficult to stretch/break the surface

interface H bonds with molecules on surface and below the surface

causes water to bead

Water is the Solvent of Life

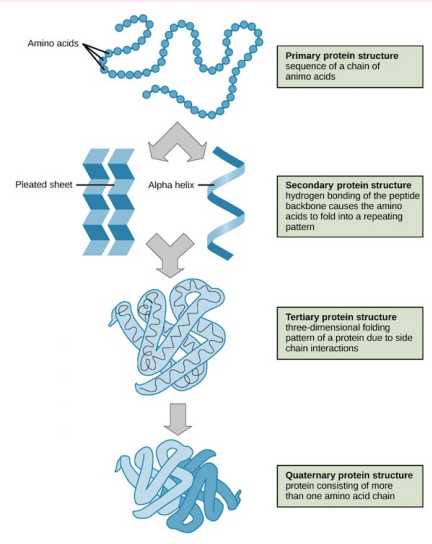
solution: homogeneous mixture of two or more substances

solvent: dissolving agent

solute: substance that is dissolved

aqueous solution: water is solvent

Protein Structure



Nucleic Acids - Structure

Monomer - Nucleotide:	DNA:	RNA:
sugar (ribose, deoxyribose)	deoxy ribose	ribose
nitrogen base (pyrimidine (C,T,U and one ring) and purine (A,G and two rings)	A, T, G, C	A, U, G, C
phosphate	double strand	single strand

Properties of Water

cohesive behavior

resists changes in temperature

expands when it freezes

versatile solvent

polar, covalent

H+ and O-

Lipids Structure

diverse non-polar, hydrophobic molecules (insoluble)

hydrocarbons

glycerol and fatty acids

Secondary Structure

coils and folds

result of hydrogen bonding

only atoms in backbone are involved

α helix and β pleated sheets

Primary Structure

unique sequence of amino acids

DNA -> RNA -> protein

Lysozyme (129 amino acids, inherited)

Peptide Bonds

carbonyl adjacent to amino

formed by dehydration

N-terminus (amino group)

C-terminus (carboxyl group)

formed by dehydration

Hydrophobic vs. Hydrophilic

Hydrophobic:	Hydrophilic:
do not have affinity to water	has affinity for water
non-ionic, non-polar repel water	even if substance does not dissolve (cotton)

Hydrogen Bonding

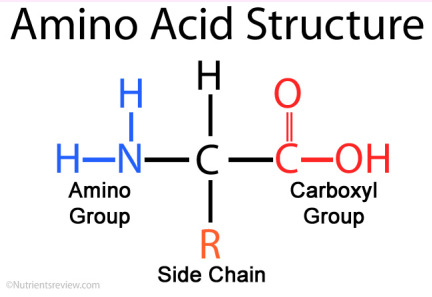
absorb heat to break

release heat to form

Acids and Bases

Acids:	Bases:
increase the hydrogen ion concentration of a solution	reduces hydrogen ion concentration
lower pH	higher pH

Amino Acid Structure



Density

ice floats: hydrogen bonds make water less dense in solid state

water is densest at -4 C

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Tertiary Structure

interactions of side chains (R groups)

hydrophobic interactions

disulfide bridges

hydrogen bonds

ionic bonds

Quaternary Structure

overall protein structure

aggregation of two or more polypeptide chains

protein conformation (interactions responsible for 2' and 3', physical and chemical conditions)

denaturation: unfolding of protein structure

Cohesion

cohesion held together by hydrogen bonds

plants: upward water transport

adhesion: water to other types of molecules (plant wall)

Saturated fat vs. Unsaturated fat

Saturated fat:	Unsaturated fat:
no double bonds	double bonds
max number of hydrogens	tail kinks at double bond
solid at room temp	liquid at room temp
animal fats (bacon, grease, lard, butter)	plant fats (corn, peanut, olive oil)

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Published 17th May, 2020.
Last updated 17th May, 2020.

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