

## 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

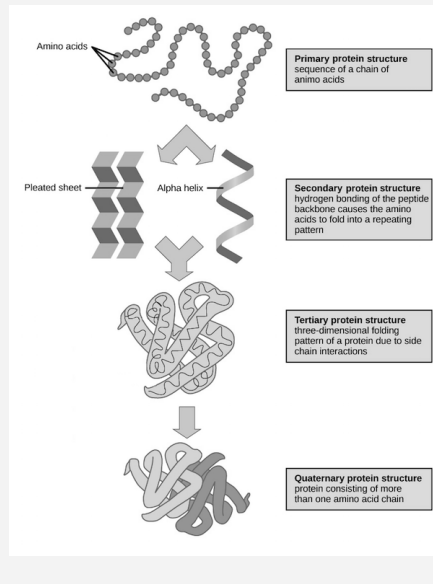
solute: substance that is dissolved

aqueous solution: water is solvent

## Nucleic Acids - Structure

Monomer - Nucleotide:	DNA:	RNA:
sugar (ribose, deoxyribose)	deoxyribose	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

## Protein Structure



## Properties of Water

cohesive behavior

resists changes in temperature

expands when it freezes

versatile solvent

polar, covalent

H+ and O-

## Hydrogen Bonding

absorb heat to break

release heat to form

## 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)

## Peptide Bonds

carbonyl adjacent to amino

formed by dehydration

N-terminus (amino group)

C-terminus (carboxyl group)

formed by dehydration

## Primary Structure

unique sequence of amino acids

DNA -> RNA -> protein

Lysozyme (129 amino acids, inherited)

## Secondary Structure

coils and folds

result of hydrogen bonding

only atoms in backbone are involved

$\alpha$  helix and  $\beta$  pleated sheets

## Lipids Structure

diverse non-polar, hydrophobic molecules (insoluble)

hydrocarbons

glycerol and fatty acids

## Cohesion

cohesion held together by hydrogen bonds

plants: upward water transport

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

## Density

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

water is densest at -4 C

## Acids and Bases

Acids:

increase the hydrogen ion concentration of a solution

lower pH

Bases:

reduces hydrogen ion concentration

higher pH

## Saturated fat vs. Unsaturated fat

Saturated fat:

no double bonds

max number of hydrogens

solid at room temp

animal fats (bacon, grease, lard, butter)

Unsaturated fat:

double bonds

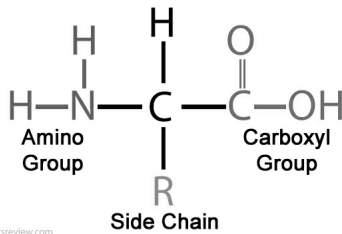
tail kinks at double bond

liquid at room temp

plant fats (corn, peanut, olive oil)

## Amino Acid Structure

### Amino Acid Structure



## 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



By **julescrisfulla**

[cheatography.com/julescrisfulla/](https://cheatography.com/julescrisfulla/)

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