

Structure of H₂O
hydrogen bonding
Dimer of H₂O



unit one guide

Biological molecules
proteins
nucleic acids

H₂O provides cushion, adhesion, surface tension, high specific heat, high heat of vaporization, excellent solvent, stable chemistry, universal solvent.

hydrogen bonds require lots of energy to change state of matter

CONDENSATION - when two molecules combine, hydrogen and hydroxyl ions, H₂O leaves, pH → more hydrogen.
Dissolution → attracted to same
Adhesion → attracted to other
Cohesion → hydrogen bonds
Hydrophilic → attracts water
Hydrophobic → repels water

C	H	N	O	P	S
Carbon	Hydrogen	Nitrogen	Oxygen	Phosphorus	Sulfur

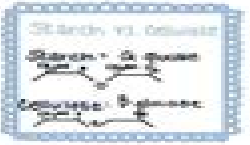
more hydrogen present → C⁻ bond, biological molecules, cell formation
 N⁺ bond positive, amino acids
 P⁻ bond nucleic acids + lipids
 → make up 98% of organisms



Condensation synthesis is the removal of an H₂O molecule to bond monomers. Hydrolysis is the addition of a water molecule to cleave a bond between monomers (amino acids, proteins).

Nucleic acid structure:

* the carbon sugar (deoxyribose/ribose), phosphate, nitrogenous base (A, T, C, G), exact copies of template.

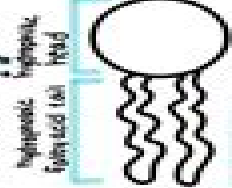


Proteins: specific order of amino acids. Primary structure.
 * R group interactions determine structure + function



membranes

* made up of phospholipids
 * create selectively permeable barrier
 * contain phospholipids, cholesterol, and proteins



LIPIDS

Phospholipid macromolecules

* differences in saturation determine structure and function.
 * Cells, sterols, phospholipids
 * Saturated → no double bonds
 * Unsaturated → has double bonds
 * Lipids: triglycerides, cholesterol, most of the membrane
 * Steroids: hormones, 4 fused carbon rings, cholesterol, maintaining flexibility, embedded into up cell membranes, polar region due to phosphorus and fatty acid



amino acids bond via a peptide bond (covalent) through dehydration synthesis
 * R group change can cause a hydrophobic protein, breaks the place of a hydrophilic protein

Amino Acids: have directionality.
 * linear chains, connected by covalent bonds
 * amino end and carboxyl end

PROTEIN STRUCTURE

Primary: sequence of amino acids, specific order determine protein shape.
Secondary: how folding of chain into alpha helix and beta sheet occurs.
Tertiary: 3-D shape, hydrogen bonds, disulfide link, ionic bonds, hydrophobic int.
Quaternary: interactions between multiple polypeptide chains

+ FUNCTION

* Enzymes → speeds up reaction rates in the cell
 * Cell structure → part of the cellular membrane
 * Communication between cells

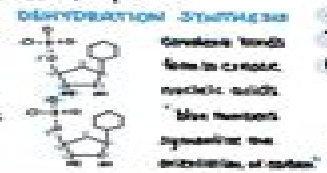
DENATURATION:

* the protein starts to lose its shape/structure when (bonds break)
 * Temperature change
 * pH of surrounding area
 * Salt concentration

NH₂ = Amino
 COOH = Carboxyl

NUCLEIC ACIDS

* add new nucleotides to the 3' end
 * base nitrogenous bases: purine + pyrimidine
 * pyrimidine is single ringed, purine is double
 * antiparallel double helix
 * 5' on phosphate end, 3' on hydroxyl end
 * both base and back have nitrogenous bases (purines) + sugar-phosphate backbone



ANTIPARALLEL



Chaperones:
 * protein molecules that assist protein folding

ALDOSE VS KETOSE

* contains aldehyde functional group

ALPHA VS BETA

* contains ketone functional group



ALPHA VS BETA

* all monomers are in the same orientation
 * Every glucose monomer is upside down from its neighbor

Ap Biology Chapter 12 Notes

Jan Sapp



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Biomacromolecules Mohamed Elzagheid,2024-12-30 The second edition of the Macromolecular Chemistry broadens into two areas biomacromolecules Volume 1 and polymers Volume 2 Biomacromolecules covers carbohydrates lipids proteins nucleic acids their classifications and properties The first chapter looks at the structural formulas and cyclic forms of monosaccharides as well as their synthesis and breakdown Cyclization enolization isomerization tautomerization mutarotation and epimerization are all briefly described Examples of disaccharides and polysaccharides are also presented The second chapter covers triglycerides steroids vitamins and their constituents The third chapter examines the primary structure of proteins including amino acid properties peptide bond formation and peptide synthesis It also addresses secondary tertiary and quaternary structures The book concludes with a chapter on nucleic acids which covers the chemistry of nucleosides and oligonucleotides as well as topics such as genetic code DNA secret code Polymerase Chain Reaction and DNA fingerprinting

What is Natural? Jan Sapp,2003 This detailed account of the ongoing destruction of coral reef communities crystallizes one of sciences most profound questions is there a balance of nature 13 illustrations

Game of Fear: A gripping psychological thriller Gledé Browne Kabongo,2016-02-24 Sometimes good girls do very bad things Academic overachiever and popular good girl Abbie Cooper is used to being in control and strives to keep it that way As senior year at her elite New England private school kicks off she s focused on one goal getting into the Ivy League But even good girls have dark secrets One morning Abbie discovers a cryptic note in her locker I know what you did hypocrite Justice will be served The Avenger Then a photo arrives in the mail It captures in great detail the explosive secret she s kept hidden from everyone the shocking blunder that could get her expelled from Saint Matthews Academy and keep her out of the Ivy League for good Determined to protect her future and the people she loves Abbie is drawn into a diabolical game of blackmail cyber spying and deception For 50 000 the mystery girl known as The Avenger assures Abbie that her secret will remain safe There s only one problem The Avenger may not exist at all So who s stalking Abbie with anonymous text messages that disappear after they ve been read Who s out to ruin her and why To uncover the horrifying truth Abbie must play the game all the way to its stunning conclusion Provided by publisher

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