Biochemistry exam assignment

RE: h cells total membrane ERE: ribosome on surface – protein processing, transport, export SEER: synthesis of lipid molecules; stores Ca+ ions 3. Googol Apparatus: packaging & distribution of cell products to internal and external compartments 4. Nucleus: contains cells genome, chromatin fibers, DNA, histories, nuclear matrix 5. Nucleolus: RNA synthesis, ribosomal assembly & processing reactions for several types of RNA 6. Nuclear envelope: separate DNA replication and transcription processes from cytoplasm 7.

Lissome: digestive enzymes (acid hydroplanes) – degrade debris in cell by autopsy & play role in receptor mediated induction pathway; also involved in secretors processes 8. Mitochondria: aerobic metabolism; synthesis of TAP; meta of AAA, lipids, & iron & calcium homeostasis; regulators of apotheosis 9. Peroxides: oxidative enzymes; involved in degradation of fatty acids, sync of certain membrane lipids and degradation of Purina bases; most noted for generation & breakdown of toxic molecules – peroxides 10.

Cytokines: cell shape, cell movement, solid state biochemistry, signal trans 11. Ribosome: RNA/ protein complexes; biosynthesize of proteins Ill. Bimolecular a. Bimolecular: molecules synthesized by living organisms that are organic (carbon eased); living processes such as growth and dive involved thousands of chem. reactions in which vast quantities & varieties of vibrating and rotating molecules interact, collide, and rearrange into new molecules 1 .

About 75% of cells content by weight is water – all chem. IRS of BMW take place in H2O 2. 1% is ions and the rest is organic 3. Chemical properties of

organic molecules are determine by specific arrangements of atoms called functional groups; chemical IRS in a cell involve specific chem. bonds or functional groups b. Hydrocarbons: carbon & hydrogen containing molecules that are hydrophobic c. Hydrophilic – easily dissolve in H2O d.

Classes of Small Bimolecular Many of the compounds found in a cell are relatively small Some are used in the synthesis of larger polymers Some have special biological functions 1. Amino acids 2. Sugars 3. Lipids/fatty acids 4. Nucleotides Family Name Group structure Group Name Significance Alcohol R -OH Hydroxyl Polar – forms H bonds Allayed R-C= O Carbonyl Polar in some sugars Ketene R-C-R Acids R-C-OH Carbonyl Weakly acidic; Eng charge when donates a proton Amine R – NH Amino Weakly basic; + charge when accepts proton Amide R -C- NH Amide Polar – no charge

Athol Easily oxidized; can form bonds readily Ester R-C-O-R’ Ester Found in certain lipid molecules Alkaline RICH = CAR’ Double bond Imp structural components of many BMW (found in lipid mol) Small molecule Polymer General Function Amino acid Proteins Catalysts & structural elements Sugars Crabs Energy sources & structural elements Fatty acids N. A. Energy sources, structural elements of complex lipid mol Nucleotides DNA RNA Genetic info Protein synthesis e. Sugars or Crabs 1 .

Macroeconomics’s are bloody-mindedness or polyethylene’s Bloody-mindedness: a allayed group and many hydroxyl groups Polyethylene’s: a ketene group and many hydroxyl groups 2. Mind moons combine to form polymer called polysaccharides Functions: Provide energy thru oxidation Supply carbon for synthesis of cellular components Serve as energy reserve

Form part of structural elements of some cells and tissues Component of bimolecular such as nucleotides Form part of globetrotting and glycoside for intracellular interactions 3.

Com biologically important sugars Glucose (lodestone) Fructose (ketosis's) Ribose (lodestones) 2-didgeridoos (lodestones) f. Lipids Most heterogeneous class Insoluble in water; soluble in unpopular solvents 1. Types of lipids Waxes Glycoside Steroids Fat soluble vitamins 2. Functions Structural component of membranes Storage molecules for metabolic energy Thermal insulation and padding Regulation of metabolic activities Amino Acids 3. Fatty acids Saturated fatty acids: no C= C Unsaturated 1 or more C= C g.

Amino Acids 20 commonly occurring amino acids distinguished from one another by side chains India AAAS connected to one another forming proteins AAAS Joined by amide bond = peptide bond Peptide bonds: amide linkages that form in a type of necrophilia sub reaction in which amino group N of 1 AAA attacks carbonyl C in carbonyl group of another Classification: 0, 0, 0 according to location of amino group in reference to carbonyl group 0 AAA (most common): amino group attached to C atom immediately adjacent to carbonyl group 0 & 0 AAA 0 amino group attached to 2nd & 3rd C, respectively, from carbonyl group h.

A nitrogenous base & 5 carbon sugar and either 1, 2, or 3 phosphate group Nitrogenous bases: adenine & guanine – pureness; cytosine, thymine, racial – pyridine's 5 carbon sugar: ribose or didgeridoos Double helix forms due to complementary pairing; A AT & G 0 C Random- Acetic – COACH Hydrogen bond: force of attraction BTW a polarize H of one molecular group & the

electronegative O or N atoms of nearby aligned molecular groups Transcription: DNA double helix partially unwinds & RNA molecules are synthesized 1 .

Functions Nucleic acid components Commence components Energy source Allegoric control of enzyme activity Forms genetic codes for a protein ‘ V. Biochemical Reactions a. Metabolism: the total of all chemical reactions in a cell 1. Functions of metabolism Acquisition & utilization of energy Synthesis of molecules needed for cell structure and functioning Removal of waste reduces 2. 2 types of metabolic pathways: Anabolic & catabolic 3. Energy transfer pathways: capture energy & transform it into forms that organisms can use to drive bimolecular processes 4.

Signal transduction pathways: allows cells to receive and respond to signals from their environment; Consists of 3 phases: reception, transduction, and response b. Necrophilia substitution: 1 atom or group is sub for another 1. Nucleoli: attacking species; anions (- charged) or neutral species possessing non bonding electron pairs 2. Electrophoresis: deficient in electron density & easily attacked by nucleoli 3. Hydrolysis reactions: nucleoli sub IRS in which O of water mol serves as nucleoli; electroplate usually carbonyl C of ester, amide or anhydride molecule containing 2 carbonyl groups linked through oxygen atom c.

Elimination reactions: double bond formed when atoms in a mol are removed d. Addition reactions: 2 molecules combine to form single product; Hydration is most common (when H2O + alkaline = alcohol) e. Commiseration reactions: atoms or groups undergo intermolecular shifts (most common

BTW Aledo’s & ketosis sugars) f. Oxidation-reduction reactions: when there is a transfer of electrons from a nor (reducing agent) to an electron receptor (oxidize agent) When reducing agent donates electrons 0 oxidized When oxidize agents accept electrons 0 reduced Chapter 3: Water – The Medium of Life a.

The most abundant biomedical b. 60-75% of most cells by weight c. Most nucleic acids, proteins, crabs, and other biological compounds are designed to function in aqueous envy d. Polar – unequal distribution of electrons in a bond e. Dipoles – molecules in which charge is separated; a difference in charge BTW atoms in a molecule resulting from unsymmetrical orientation of polar bonds f. Covalent bonds – electron sharing g. Nonchalant interactions: usually electrostatic – they occur BTW + nucleus of 1 atom & Eng electron clouds of another nearby atom (ionic, van deer walls, & H bonds) II.

Structure of Water a. One atom O & 2 of H b. Bent structure c. Distribution of charge w/’ the molecule is asymmetrical (electron dif BTW O & H) d. Water is polar Ill. Thermal properties of water a. Unusually high boiling (100 C) & melting (O C) points which makes it liquid over a wide range of temps b. High specific heat- 1 calla deg C takes relatively large mat of energy to cause change in temp c. High heat of vaporization – 100 cal/g; takes relatively large mat of heat to evaporate water d.

Unusual properties BC it is able to form network of H bonds with 4 other water molecules e. Mind H bonds are relatively weak, but network of H bonds requires energy to disrupt f. To change from solid liquid 0 gas significant amount of energy is required to break these H bonds Nitrogen, Oxygen, &

Fluorine can do H bonds ‘ V. Solvent properties of Water a. “ Like dissolves like” b. Polar compounds more soluble in polar solvent & unpopular compounds more soluble in unpopular solvent c. Polar compounds -soluble in water . Non polar – insoluble in water e.

Amphibian compounds: (has both polar and unpopular groups) form micelles in water. The polar head group are in contact with the water molecules while the unpopular tail region aggregate on inside away from water f. Salvation spheres – shells of water molecules that cluster around + & I ions V. Non-covalent bonding – imp in determining structure & function of Bums a. Hydrogen Bonds: attractive forces BTW H atom (covalently bonded to highly EN atom) & another highly EN atom; weaker than ionic & covalent bonds but stronger than most NC bonds Water can form a network f H bonds b.

Electrostatic interactions: BTW oppositely charged atoms or groups (polar or ions); imp in determining 3-D structure & function of proteins (ionic/salt bridges) Salt bridge: electrostatic interaction in proteins BTW ionic groups of opposite charge c. Van deer Wall forces: Relatively weak transient electrostatic interactions that occur BTW permanent and/or induced dipoles Dipole- Dipole interactions: into BTW molecules containing EN atoms (permanent dipoles); strongest; ex. H bonds Dipoles – induced dipole interactions: BTW permanent dipole and transient dipole that it induced in nearby molecule.

Weaker than d-d but stronger than induced-induced Induced dipole- induced dipole interactions: BTW a transient dipole and a transient dipole that it induces. Often called London dispersion forces and are the weakest

Hydrophobic interactions: Weak non-directional interactions responsible for the clustering or aggregation of unpopular groups in an aqueous environment Unpopular compounds associate into droplets BC H bonding in the water are stronger forming a cage like structure around them and the unpopular molecules are expelled These interactions are responsible for structure of membranes and stability of proteins VI.