Source: [KBBiologyMasterIndex]

1 | Bio-Molecules Quiz Review

#disorganized

1.1 | Paul's Review Sheet

… is here

1.1.1 | Carbohydrates

- Set 1, carbs. See Luke De's video + [KBhBIO101Carbs]
  - *Glucose vs. fructose* — both monosacharrides, one is a 6-carbon ring and one is a 5-carbon ring
  - *Mono vs. di. vs. polysaccharide* — carbohydrates made out of a single, double, and multiple monomer (single-unit) carbohydrates
  - *Starch vs. glycogen vs. cellulose* — lots of alpha glucose in less branches, lots of alpha glucose in more branches, lots of beta glucose in organized lattice respectively.
    - Starch — plant food reserve
    - Glycogen — animal energy reserve
    - Cellulose — cell wall in plants
- Set 2, lipids. See Luke De's video + [KBhBIO101Lipids]
  - *Triglyceride vs. fatty acid vs. phosophilid* see [KBhBIO101StructuresofCarbs]
    - Glycerol => a fatty acid
    - Triglyceride => three of 'em above
    - Phospholipid => two fatty acid + phosphate head
  - *Saturated vs unsaturated fatty acids* see also [KBhBIO101StructuresofCarbs]
    - Saturated Fats => no double bonds in the carbon chain of fatty acids — think! butter
    - Unsaturated Fats => double bonds in the carbon chain of fatty acids — think! olive oil
- Identify functional groups
  - Amino acid groups — see [KBhBIO101AminoAcids]
    - carboxyl — O=C-R-OH
    - carboxylic acid — H-O-C=O (left side of backbone)
    - carbonyl — C=O — part of carboxyl
    - amide — RC(=O)NR′R″ (frequently shown in side chains of amino acids — see Amine)
    - amino/amine — H3N+ (right side of backbone)
    - hydroxyl — OH group. Need I say more?
    - ester — take a carboxylic acid and replace the hydrogen with a R-O group #ASK
    - ether — R-O-R structure. Commonly shown as as an alcohol group (H-O-C) as part of the carboxyl
- Monomers vs Polymers [KBhBIO101StructuresofCarbs]
  - Monomer — single molecule (such as a monosacchride) that could be chained together to make polymers
  - Polymers — complex molecues built from monomers
  - Building polymers — dehydration reaction — taking out water molecules
  - Destructing polymers — hydration reaction — adding in water molecules

1.1.2 | **Cell Structures**

- Prokaryotic vs. Eukaryotic
  - Prokaryotic cells — often in single-cellular cells, has a cell wall, and contained in capsules
  - Eukaryotic cells — in multicellular cell elements, contains a plasma membranes and nucleus
- Compare and contrast a typical animal cell with a typical plant cell. Be able to label diagrams of each. (See… problem set 1)
  - Animal Cell
    - No cell wall
    - No chloroplast
    - Has Cytoplasm
    - Has Ribosomes
    - Has Mitochondria
    - No plastids — organelle pigments
    - Has Cilla — Hair-like items on the outer surface
  - Plant Cell
    - Has cell wall
    - Has chloroplast — photosynthesis
    - Has cytoplasm
    - Has Ribosomes
    - Has Mitochondria
    - Has plastics — organelle pigments
    - Mostly has no Cilla
- Endosymbiotic theory
  - Endosymbiotic theory states that organelles within our current eukaryotic cells — the mitochondria and chloroplasts — are originally prokaryotic cells in their own right. This is because they divide independently through binary fission, and also contains circular DNA that is independent of the main cell itself.
- Organizing organelles based on membranes #ASK
  - Membranous organelles — possess own plasma => regulates own macromolecure consumption, hormones, etc. Perhaps original prokarotic cells
    - Endoplasmic reticulum => forms the network of transferring proteins and other elements
    - Golgi body/Gioli apparatus => packs, sorts, and modifies proteins and other elements throughout the cell
  - Non-membranous organelles — does not posess own plasma => mostly part of the cytoskeleton of a cell
    - Ribosomes => protein synthesizer in the cell
    - Centrosome => forms flangella, cilla, and handles cells divisions
    - Lysomoes => digesting large nutrients and changing them to what cells could process and work on energy metabolism
    - Mitochrondria => store ATP and extract energy from ATP
    - Vacuoles => storing water, nutrients, waste
    - Plastids => creates colours displayed in the chromoplasts
- Cell Components. Basicall all of these exist only in Eukareotic cells
  - chloroplast and mitochondria
    - Chloroplast — found in plants + does photosynthesis
    - Mitochondria — found in animals + store ATP and extract energy from ATP
  - cell wall and plasma membrane

    - Cell Wall — found in plants => surround the cell: hard
    - Plasma membrane — found in animals => surround the cell: soft [KBhBIO101Lipids]
  - rough endoplasmic reticulum (ER) and smooth ER
    - Rough ER — covered by ribosomes and folds [KBhBIO101Proteins]
    - Smooth ER — not covered by ribosomes and makes [KBhBIO101Lipids]
  - cytosol, cytoplasm and cytoskeleton
    - Cytosol => liquid found inside cells; the "cytoplasm" floats within it
    - Cytoplasm => all the stuff within the cell
    - Cytoskeleton => complex network of proteins + fibres that organize the rest of the cell
  - nucleus and nucleolus
    - nucleus => centre of the cell, stores DNA
    - nucleolus => largest part of the nucleous that makes ribosomes
  - lysosomes and food vacuoles
    - Lysosomes => vesticles that contains enzymes that breaks down biomolecules
    - Food Vacoules => vesticels that stores food and other resources
  - cytoskeleton and microtubules
    - Cytoskeleton => complex network of proteins + fibres that organize the rest of the cell
    - Microtubulues => Polymers of tubulin protein that provides the main structure of eukarotic cells
  - flagella and cilia
    - Flagella => a bacteria's tail — allow them to move and also act as an sensory organ. longer than a cilla, and moves in sinosoidial pattern.
    - Cilium => a cell's "hair" — provides sensory and communications functions. Motil cilla could move about to "grab" things, and non-motile cilla can't move. more abundant that the flagella, and moves in circular pattern if they do move, and moves in circular pattern if they do move
  - Ribosomes and Golgi apparatus
    - Ribosomes => synthesizes proteins
    - Golgi apparatus => packs, modifying, and moving proteins

1.1.3 | Plasma Membrane Structure + transport

- Lipid structure and substructures: [KBhBIO101Lipids]
- Functions of cell membrane
  - Phosophilid structures [KBhBIO101StructuresOfLipids]
  - Transmembrane proteins KbhBIO101CellTransport
  - Hydrophobic + hydrophillic parts of a phosophilid [KBhBIO101StructuresOfLipids] + [KBhBIO101FluidMosaic]
- Passive + active transport KbhBIO101CellTransport
- Cell transport process
  - Simple diffusion (#ASK same thing as passive transport + osmosis)=> non-polar molecules needed "fall in"
  - Facilitated diffusion => specific polar molecules go along the gradient to get into the cell through transporter proteins
  - Phagocytosis => take a piece of the membrane with you to form a vesticle to introduce large solid elements, recycling the membrane after done — "cell eating"
  - Pinocytosis => take a piece of the membrane with you to form a vesticle to introduce large area of the "outside" in — fluid and solid and all, recycling the membrane after done — "cell drinking"
  - Endocytosis => Phagocytosis + Pinocytosis
  - Extocytosis => opposite of endocytosis

- Defining…
    - Isotonic => inside and outside have the same level of “osmolarity”: probablility for osmosis to happen through a semipermiable membrane
    - Hypertonic => inside has less osmolarity than the outside: water/other elems will flow out of the cell
    - Hypotonic => outside has less osmolarity than the inside: water/other elems will flow into the cell

1.1.4 | Proteins Structures and Function

- Overall structure, monomers/building blocks, functions, and examples of proteins => [KBhBIO101Proteins]
- “peptide” => a chain of amino-acids
- Polymerization via dehydration
    - Take two amino acids, take the H-O out of the alcahol, take the H out of the Amine. Fill the hole with the other one
- Protein structure
    - Primary structure, secondary structure => [KBhBIO101Proteins]
    - Amino acids, N & C terminus => [KBhBIO101AminoAcids]

1.2 | **Helpful review items**

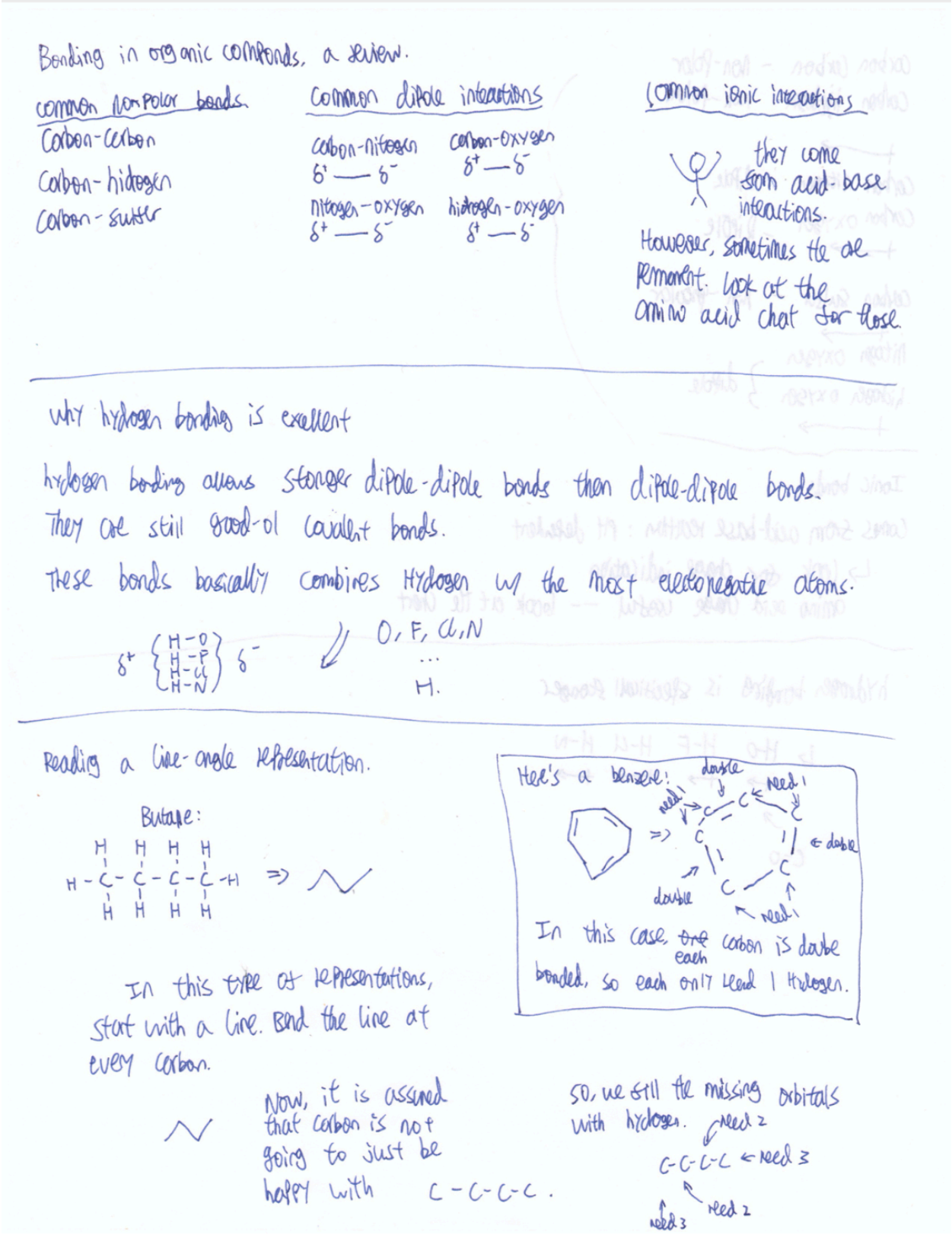

Figure 1: Screen Shot 2020-10-09 at 11.58.55 AM.png