Source: [[KBBiologyMasterIndex]]

1 | Bio-Molecules Quiz Review

#disorganized

1.1 | Paul's Review Sheet

… is here

1.1.1 | Carbohydrates

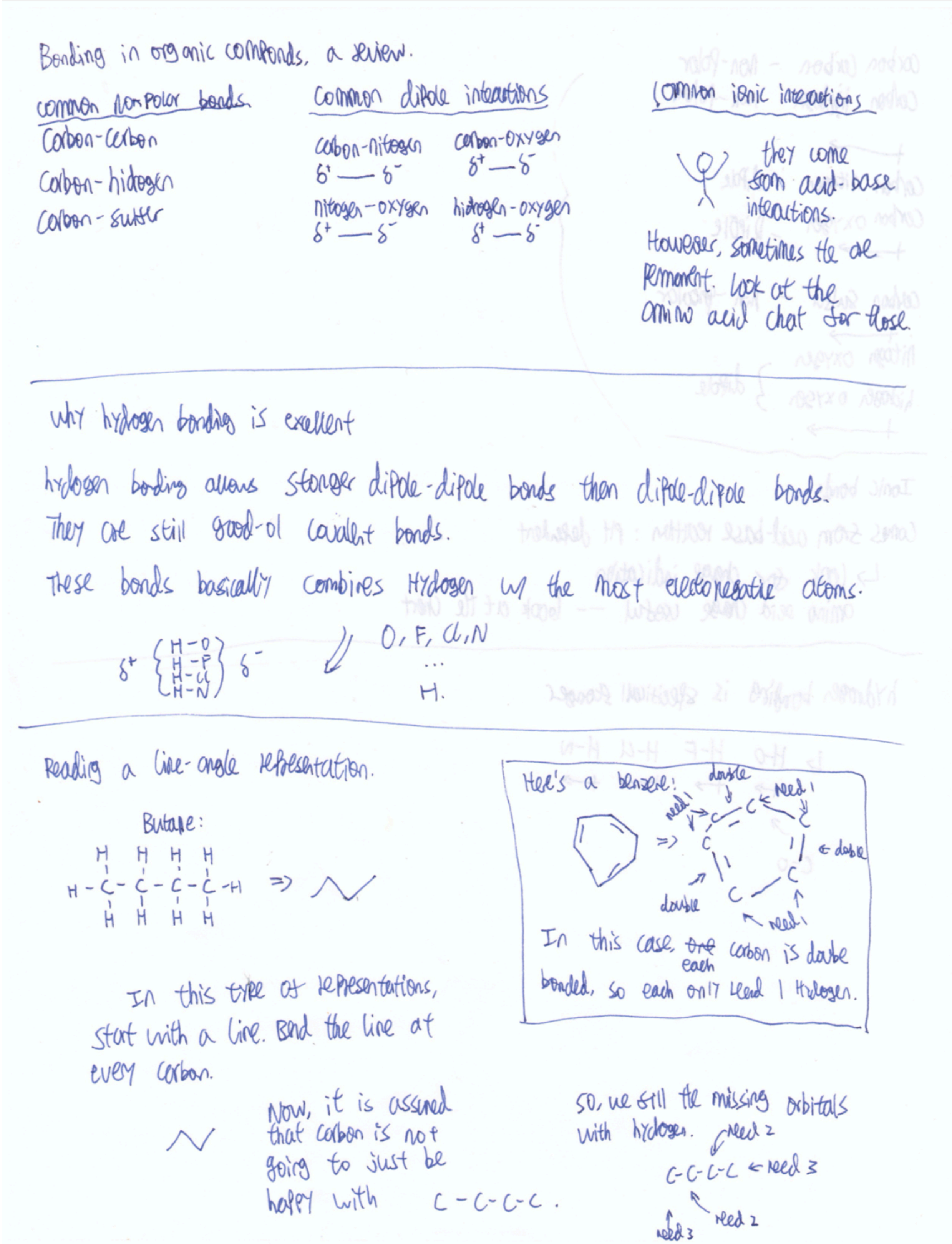
- Set 1, carbs. See Luke De's video + [[KBhBIO101Carbs]]
    - *Glucose vs. fructose* — both monosacharrides, one is a 6-carbon ring and one is a 5-carbon ring
    - *Mono vs. di. vs. polysaccharide* — carbohydrates made out of a single, double, and multiple monomer (single-unit) carbohydrates
    - *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
    - Polymers of tubulin protein that provides the main structure of eukarotic cells
- flagella and cilia
    -

1.2 | **Helpful review items**



Bonding in organic compounds, a review.

common non-polar bonds.
Carbon-Carbon
Carbon-hidogen
Carbon-sulfer

Common dipole interactions
carbon-nitrogen $\delta^+ - \delta^-$
carbon-oxygen $\delta^+ - \delta^-$
nitrogen-oxygen $\delta^+ - \delta^-$
hidrogen-oxygen $\delta^+ - \delta^-$

Common ionic interactions
they come from acid-base interactions.
However, sometimes they are permanent. Look at the amino acid chart for those.

why hydrogen bonding is excellent

hydrogen bonding allows stronger dipole-dipole bonds than dipole-dipole bonds. They are still good-ol covalent bonds.
These bonds basically combines Hydrogen w/ the most electronegative atoms.

$\delta^+ \left\{ \begin{matrix} H-O \\ H-F \\ H-Cl \\ H-N \end{matrix} \right\} \delta^-$　　O, F, Cl, N ... H.

Reading a line-angle representation.

Butane:

In this type of representations, start with a line. Bend the line at every carbon.

Now, it is assumed that carbon is not going to just be happy with C-C-C-C.

so, we fill the missing orbitals with hydrogen.
C-C-C-C
need 2, need 3, need 2, need 3

Here's a benzene!
double, need 1, double, need 1, double, need 1
In this case, ~~one~~ each carbon is double bonded, so each only need 1 hydrogen.

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