


Bio 115 Cells & Evolution of Life

The Basics of Life

Macromolecules



University of Idaho

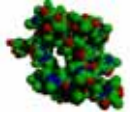
Start Audio Lecture!

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What are macromolecules?


- Formed from units called monomers
- Condensation reactions form polymers




Proteins



Nucleic acids



Carbohydrates



Lipids

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Synthesis of monomers

- Metabolic processes make monomers
- Some of the 12 key intermediates are precursors to macromolecule monomers

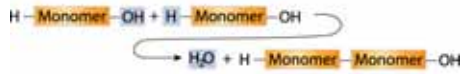
| | | |
|--------------------|---|---------------|
| G3P | ↔ | Carbohydrates |
| Pyruvate | ↔ | Proteins |
| Ribose 5-Phosphate | ↔ | Nucleic acids |
| Acetyl CoA | ↔ | Lipids |

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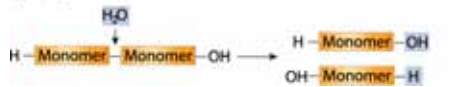
Formation of polymers

- Condensation reaction
 - Covalent bond forms - Water is produced
- Hydrolysis is the reverse reaction

Condensation



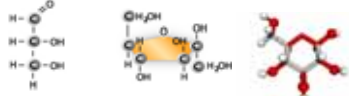
Hydrolysis



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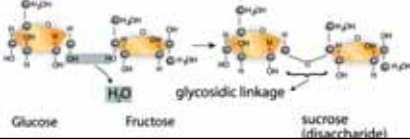
Formation of Carbohydrates

- Monomers are called monosaccharides



Glycerinaldehyde Fructose

- Glycosidic linkage

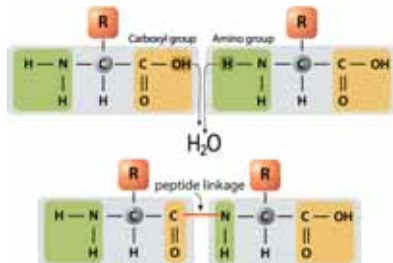


Glucose Fructose sucrose (disaccharide)

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Formation of Proteins

- Monomers are called amino acids
- Peptide linkage

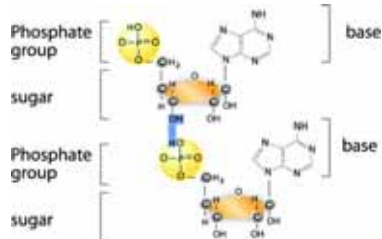


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Formation of Nucleic Acids (DNA and RNA)

- Monomers are called nucleotides
- Phosphodiester linkage

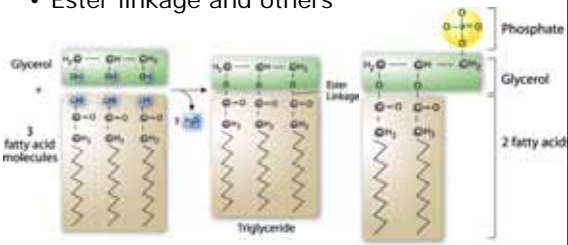


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Formation of lipids

- No standard monomer
- Ester linkage and others

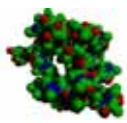


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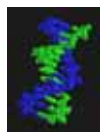


The common thread of macromolecules

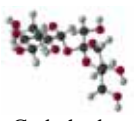
- Synthesis through condensation reactions
- Reverse reaction is hydrolysis



Proteins



Nucleic acids



Carbohydrates



Lipids

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