



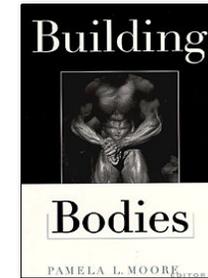
Structure & Function of Large Biological Molecules

“One block at a time”



Large Molecules of Life

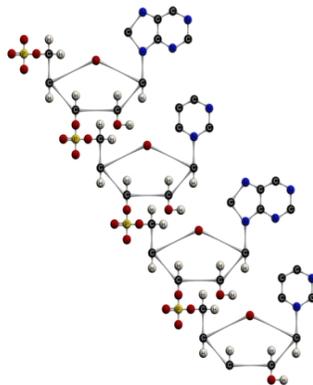
- Involve smaller organic molecules joining together to form larger molecules
 - ◆ 4 major classes of large biomolecules:
 1. carbohydrates
 2. lipids
 3. proteins
 4. nucleic acids
- Carbohydrates, proteins, and nucleic acids are so large, they are referred to as macromolecules
 - ◆ These three are polymers as you will soon learn.



AP Biology

Macromolecules are Polymers

- Polymers (Greek *polys* = many and *meris* = part) are long molecules built by linking similar building blocks repeatedly to form a chain.
 - ◆ monomers
 - Generic term for the building blocks
 - Repeated small units
 - ◆ Polymers involve covalent bonds
 - ◆ A large variety of polymers can be built from a small set of monomers



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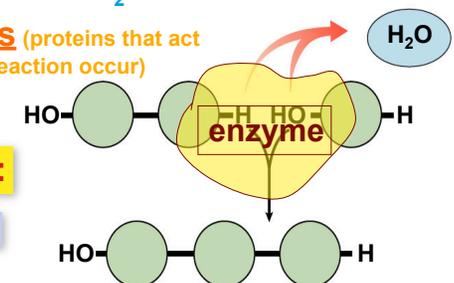
How to build a polymer

- Synthesis
 - ◆ joins monomers covalently by “taking” H₂O out
 - one monomer donates OH
 - other monomer donates H
 - ◆ together these form H₂O
 - ◆ requires enzymes (proteins that act as catalysts, helping the reaction occur)
 - ◆ requires energy



Dehydration synthesis:

A Type of Condensation reaction



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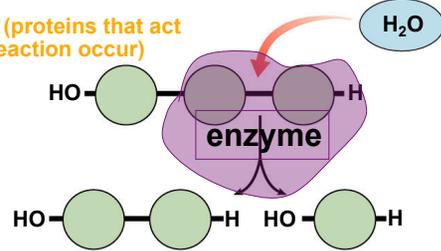
Breaking down a polymer



Hydrolysis (from Greek *hydro* = water and *lysis* = break)

- ◆ use H_2O to breakdown polymers
 - reverse of dehydration synthesis
 - cleaves off one monomer at a time
 - H_2O is split into H and OH
 - ◆ H & OH attach to adjacent monomers after the covalent bond holding the monomers together is broken
- ◆ requires **enzymes** (proteins that act as catalysts, helping the reaction occur)
- ◆ releases **energy**

Hydrolysis



Ex: Digestion. Enzymes break down polymers that are too big to be absorbed into the blood stream