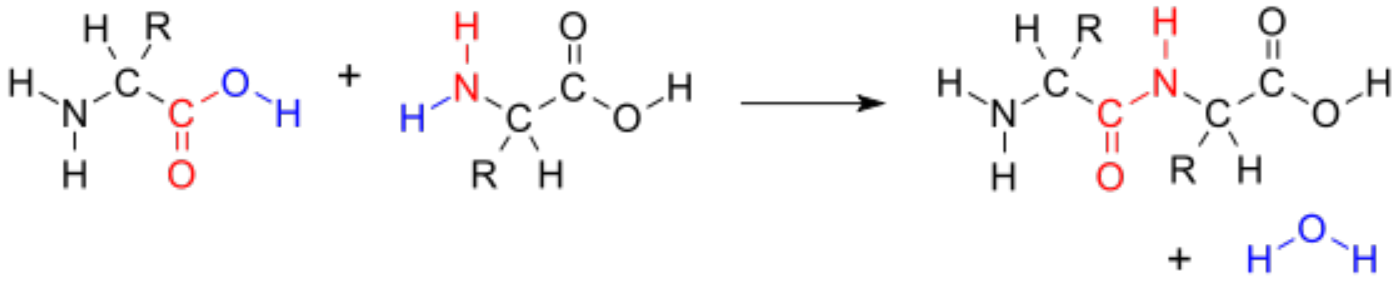
CONCEPT: PROPERTIES OF MACROMOLECULES

Macromolecule Polymerization

- **Linear polymerization** forms the structures of polysaccharides, nucleic acids, and proteins (NOT lipids!)
  - □ **Condensation reactions** form the _____ between **monomers** (subunits)
    - Monomer H + molecule OH group react and release water
    - Repetition of condensation reactions sequentially add monomers to the macromolecule's end
  - □ **Hydrolysis reactions** degrades long polymer chains through the addition of a water molecule
  - □ For proteins and amino acids, biological function depends on the specific sequence of subunits

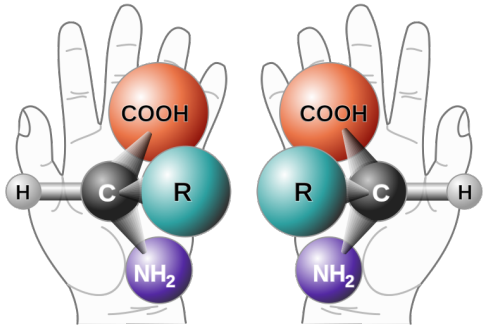
EXAMPLE: A condensation reaction connects amino acid monomers together and results in the loss of water



Stereoisomers

- Macromolecules can be created as **stereoisomers** (mirror images) due to an asymmetric carbon atom (chiral center)
  - □ **Stereoisomers** are two molecules with the same chemical formula, but with different physical structures
  - □ Come in _____ main forms: **D-** and **L-** forms
    - Amino acids, monosaccharides, nucleic acids and steroid lipids have stereoisomer forms
    - Certain biological functions only use one form (Proteins are only made up of L-amino acids)

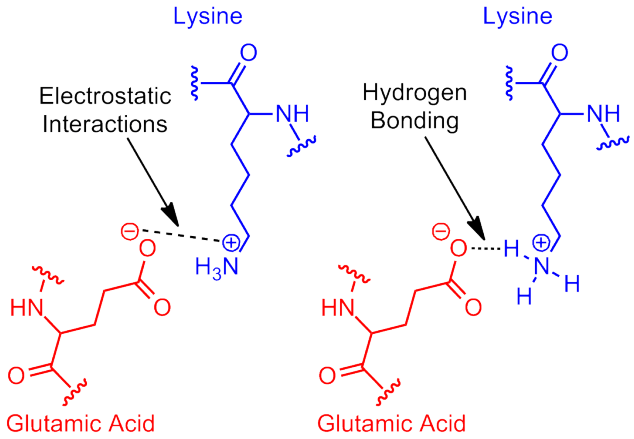
EXAMPLE: Two amino acids stereoisomers displayed on hands to show the D- (right) and L- (left) forms



Role of Noncovalent Bonds

- Noncovalent bonds are crucial for macromolecule formation and function
  - □ Although weak individually, the strength of noncovalent bonds is _____ (more bonds = stronger)
  - □ Macromolecule **conformation** depends on placement and formation of noncovalent bonds
    - Allows for a close and strong fit between two interacting molecules (Ex: multi-protein complexes)
    - Macromolecule **functional groups** are groups of atoms that act as a unit to provide unique properties

EXAMPLE: Two potential noncovalent bonds between lysine and glutamic acid



PRACTICE:

1. Which of the following is not a property of macromolecules?
   a. They are formed through linear polymerization of individual subunits
   b. They have the ability to form stereoisomers
   c. Noncovalent bonds allow for the formation of complex functions
   d. Covalent interactions allow for stable conformations of macromolecules

2. Which of the following reactions connects individual monomers together?
    a. Hydrolysis Reactions
    b. Condensation Reactions
    c. Glycolyic Reactions
    d. Monomeric Reactoins

3. True or False: Proteins are most often found in the D form.
    a. True
    b. False