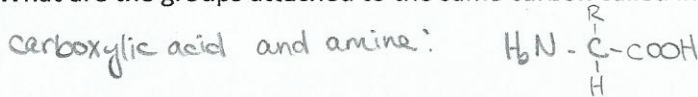


1. What are the groups attached to the same carbon called in an amino acid?



2. What is a zwitterion and how do they behave?

- a molecule with both positive and negative charge (has charge separation)
- behaves salts
- pH 7 → zwitterion

3. Amino acids link together to form peptides or proteins

4. Distinguish between the four classes of amino acids.

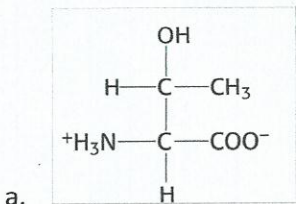
Non-polar nonpolar; either an alkyl, aromatic, or thioether
ex. R group is $-CH_2CH_3$

Polar polar, no charge; either $-OH$, $-SH$, or $-C(=O)NH_2$
ex. R group is $-CH_2OH$ alcohol thiol amide

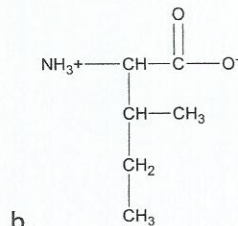
Basic polar; positive charge; either $-NH^+$, $-NH_2^+$, or $-NH_3^+$
ex. R group is $-CH_2NH_3^+$

Acidic polar; negative charge; has another COO^- (CO_2^-)
ex. R group is $-CH_2COO^-$

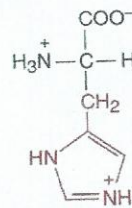
5. Identify each of the following as non-polar, polar, basic, or acidic.



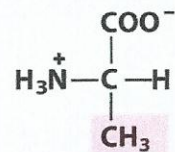
polar



nonpolar



basic



nonpolar

6. In nature, the D/L isomer is dominant.

1. T / (F) Met-Pro-Arg will have the same function as Pro-Arg-Met.

2. T / (F) The number of peptide bonds is always the same as the number of residues. *- this is true for cyclic but not linear*

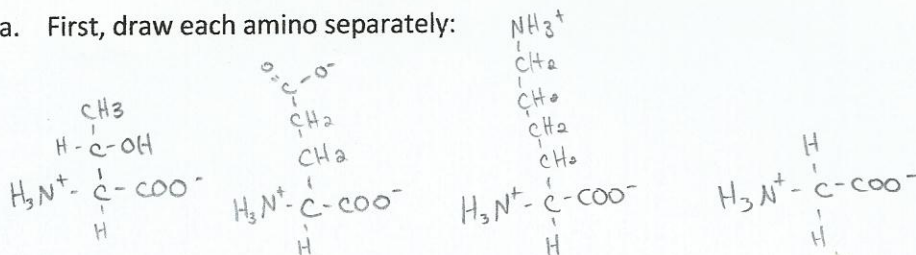
3. A peptide bond is a(n) amide linkage.

4. Write the four categories that peptides can be:

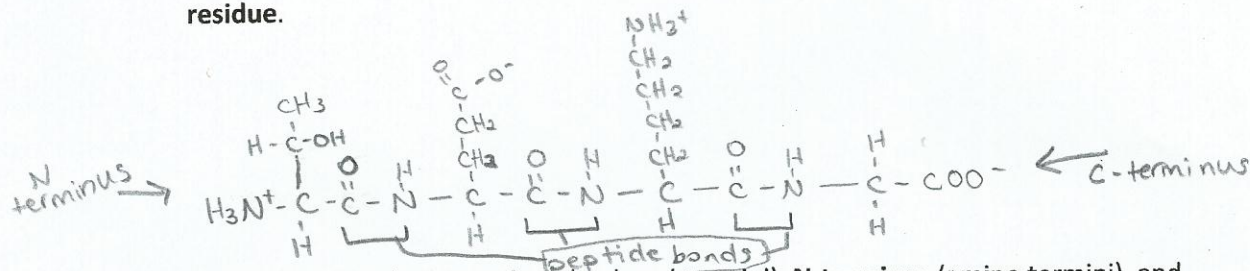
pain killers
toxins
sweeteners
hormones

5. Follow the steps below in forming a tetrapeptide of threonine, glutamic acid, lysine, and glycine.

a. First, draw each amino separately:



b. Next, combine the four with **peptide bonds** (remember, this is (C=O)-(NH)). Number each residue.



c. Draw arrows to the **C-terminus** (carboxyl termini), **N-terminus** (amino termini), and **peptide bonds**.

d. Write the three letter sequence. Thr-Glu-Lys-Gly

e. Write the one letter sequence. Y E K G

f. How many peptide bonds does this have? 3

6. Draw and name 2 primary amines, 2 secondary amines, and 2 tertiary amines with the formula $C_5H_{13}N$.

