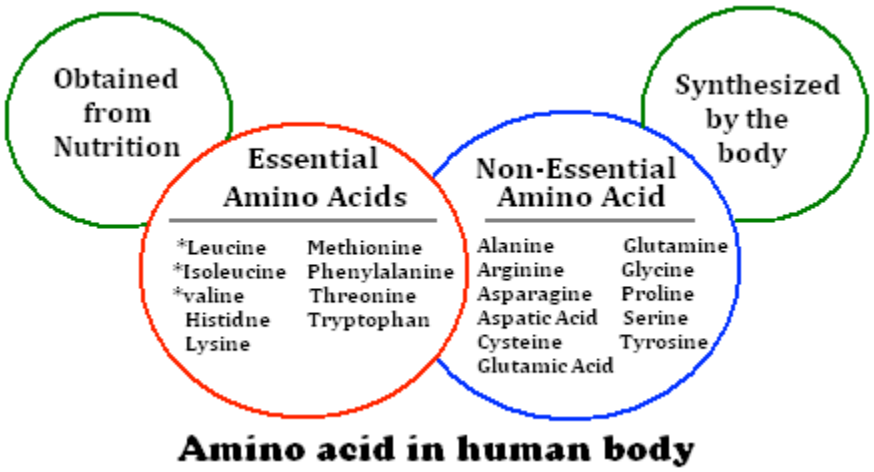
BASIC UNITS OF PROTEINS

Created by: Jostna Ransing

- Nutrients required for proper growth in all animals are called essential nutrients.
- There are six classes of essential nutrients such as water, carbohydrates, fats, proteins, minerals, and vitamins.

Proteins:

1. Proteins are organic compounds that contain carbon, hydrogen, oxygen, and nitrogen and sometimes iron, phosphorus, and sulfur.
2. A protein is a linear polymer built from about 20 different amino acids.
3. The type and the sequence of amino acids in a protein are specified by the DNA in the cell that produces them.
4. This sequence of amino acids is essential since it determines the overall structure and function of a protein.
5. A protein has several functions. It may serve as a structural material (e.g. keratin), as enzymes, as transporters (e.g. hemoglobin), as antibodies, or as regulators of gene expression.



Amino acid in human body

Structure of an Amino acid:

1. Amino acids share a basic structure, which consists of a central carbon atom, also known as the alpha (α) carbon, bonded to an amino group (NH2), a carboxyl group (COOH), and a hydrogen atom.
2. Every amino acid also has another atom or group of atoms bonded to the central atom, known as the R group, which determines the identity of the amino acid.

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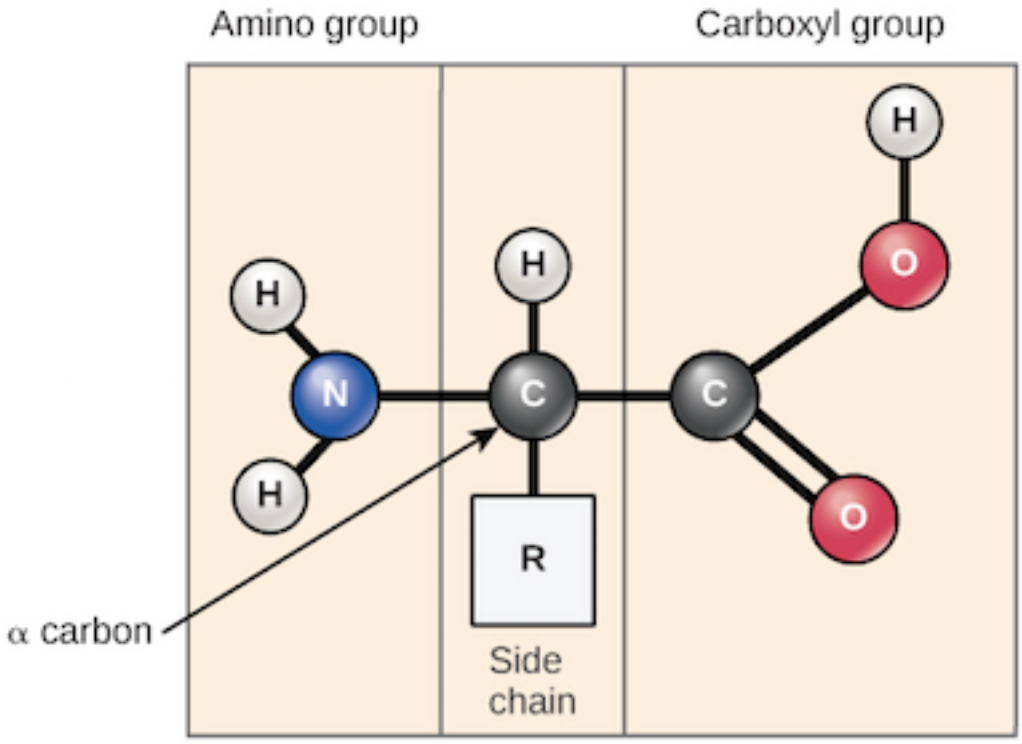
Structure of an Amino Acid



Classification of Amino Acids:

- Common amino acids can be placed in five basic groups depending on their R substituents:

1. Nonpolar, aliphatic (7)
2. Aromatic (3)
3. Polar, uncharged (5)
4. Positively charged (3)
5. Negatively charged (2)

- The properties of the side chain determine an amino acid's chemical behavior (that is, whether it is considered acidic, basic, polar, or nonpolar).
- For example, amino acids such as valine and leucine are nonpolar and hydrophobic, while amino acids like serine and glutamine have hydrophilic side chains and are polar.
- Some amino acids, such as lysine and arginine, have side chains that are positively charged at physiological pH and are considered basic amino acids. (Histidine is sometimes put in this group too, although it is mostly deprotonated at physiological pH.)

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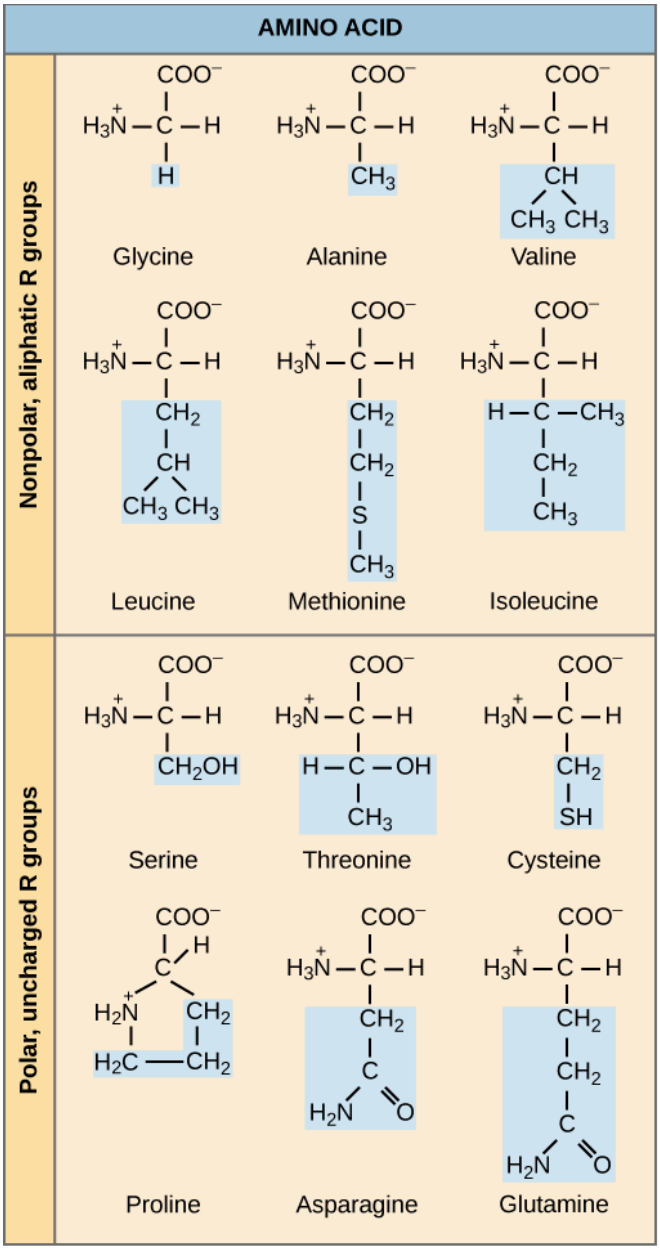
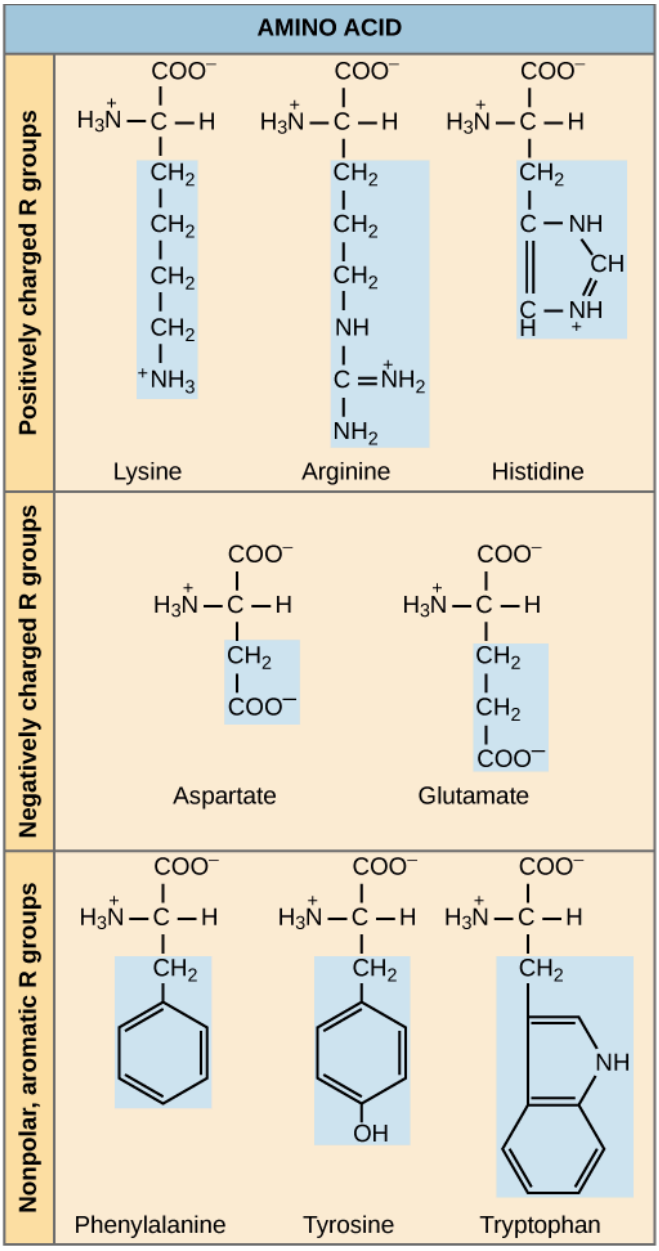
- Aspartate and glutamate, on the other hand, are negatively charged at physiological pH and are considered acidic.

Classification of Amino Acids





References:

The following resources were referenced in the creation of this handout: The Biology Online Dictionary, Tutor Vista's page on Amino Acids, Khan Academy's page on Proteins and Amino Acids.