

PROTEIN

protein

you have tens of thousands of proteins that have diverse jobs. proteins are the worker bees of your body. they take part in nearly every activity of an organism. proteins play a role in structural support (cartilage), transport (hemoglobin), hormones (insulin), immunity (your antibodies), movement (muscle proteins), and as enzymes that keep thousands of different chemical reactions running inside all cells.

the shape or structure of a protein is the key to understanding how it works. just as shape is important to a tool's function, the same is true for proteins. each of the thousands of different kinds of proteins in your body has its own unique shape.

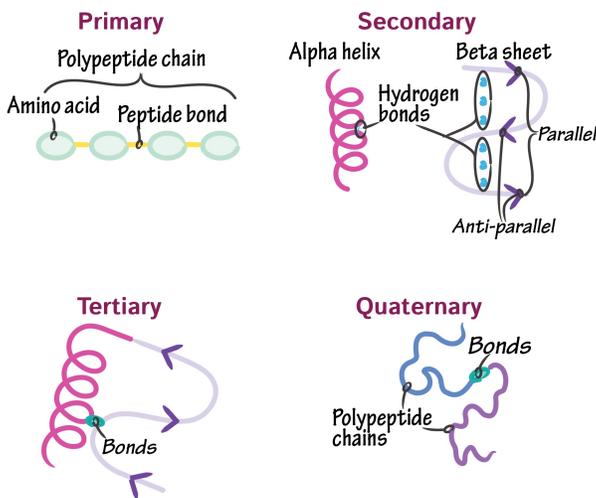
a common carbon backbone is found in all amino acids. this common backbone permits amino acids to be linked together in long chains. the chain of amino acids folds and twists to form a complex three-dimensional shape. the shape eventually taken by a chain of amino acids is directly tied to the side groups that protrude from the amino acid chain.

when describing the structure of proteins, biologists think about 4 distinct levels of protein structure. these 4 levels are known as primary, secondary, tertiary, and quaternary.

the primary level of protein structure is simply the linear sequence of amino acids that are strung together to make the protein chain. every protein has a unique amino acid sequence. a huge variety of proteins can be constructed from 20 different amino acids; amino acids have different properties. the properties of an individual amino acid lay in its side chain that branches off of the carbon backbone - the side chain can also be called the "R" group or radical group.

if one amino acid is out of order it can make the entire protein non-functioning. however some amino acids can be substituted for others w/o altering the function of a protein. (for example, if you change one word in the word "ship", it can produce a different w/ different meanings.) if the amino acid sequence is changed, most changes result in defective proteins but some do not.

CLASSES OF PROTEIN STRUCTURE



the primary structure of a protein is simply the list of amino acids in their proper order. if you look at many proteins, you will similarly notice certain common structural elements: an alpha helix and a beta sheet. an alpha helix is a region of a protein that is twisted into a tight spiral. the coils of the helix are held together by hydrogen bonds between nearby amino acids. other regions of a protein fold up like a paper fan. this type of structure is referred to as a beta sheet. the alpha helices and the beta sheets together comprise the secondary structure of a protein.