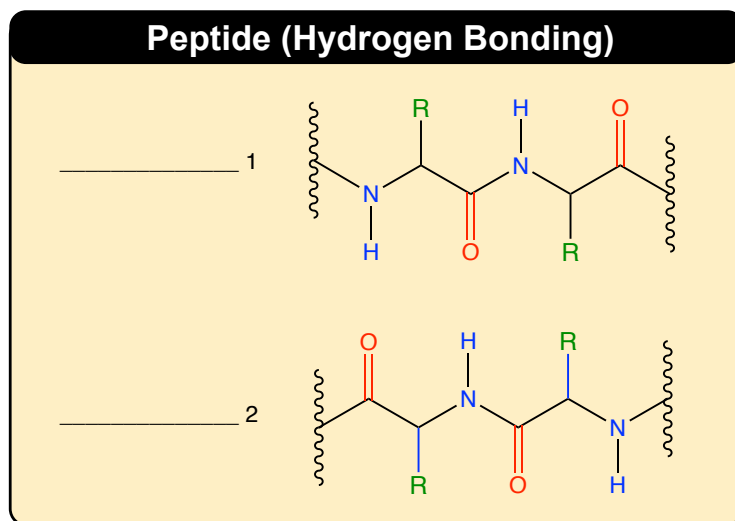


CONCEPT: SECONDARY PROTEIN STRUCTURE

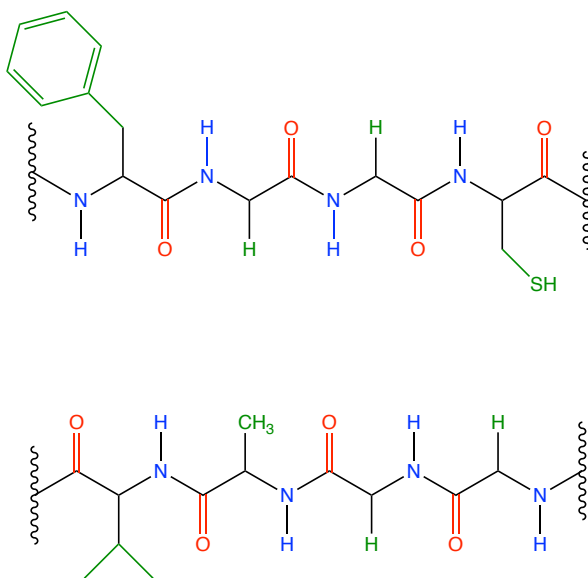
- The type of structure that results from _____ of the atoms in the backbone of a protein.
 - Involves the connection between the _____ of one peptide with the _____ of another.



EXAMPLE: Determine which of the following amino acid pairs could potentially perform hydrogen bonding between their respective R groups?

- a) Gly and Ser b) Asp and Glu c) Val and Leu d) Asp and Arg

PRACTICE: How many hydrogen bonding pairs are possible when the following two peptides interact?

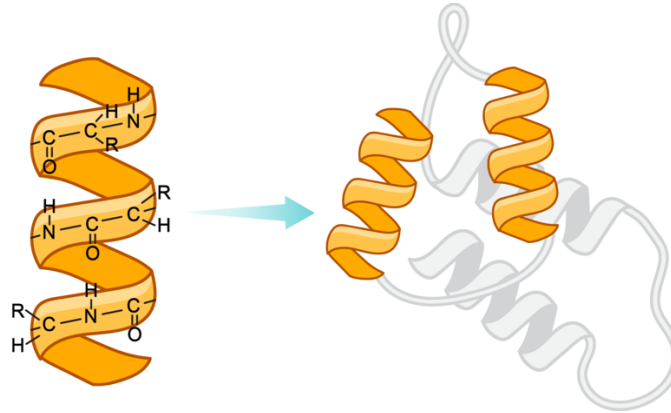
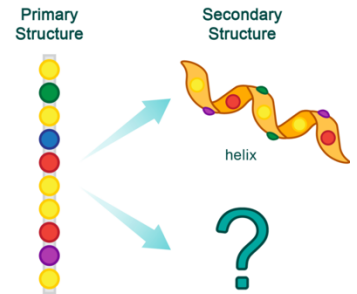


- a) 3 b) 5 c) 4 d) 6 e) 1

CONCEPT: SECONDARY PROTEIN STRUCTURE

Alpha-Helix

- Secondary structures give rise to 2 types of repeating patterns.
- The backbone of a single protein chain _____ into a spiral-like staircase.
 - Stabilized by _____-bonding between *distant* amino acids on the *same* chain.

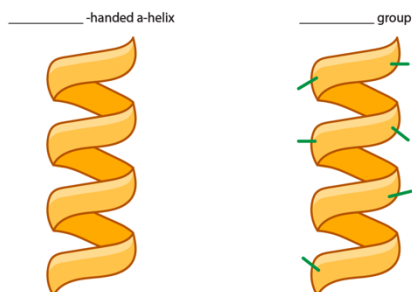


EXAMPLE: Determine which of the following statements represents a 2° structure for a protein.

- Creation of peptide bonds.
- The attractive force between the H atom of a peptide bond and the O atom of a peptide bond.
- Amide bond formation in the creation of an amino acid chain.
- Ionic bond formation between the R side chains of alanine and valine.

Alpha Helix Spiral Shape

- The spiral-like staircase adopts a right-handed (_____) shape.
 - The hydrogen bonds lie _____ the helix and the amino acid **R** groups lie _____ the helix because of spacing.



- The hydrogen bonding of the amide hydrogen with the carbonyl oxygen happens _____ residues further on the helix.
 - The result is every _____ turn of the helix contains on average _____ residues

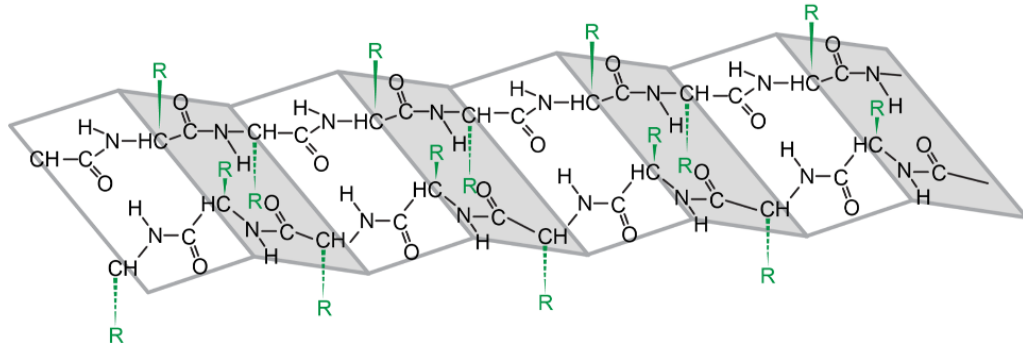
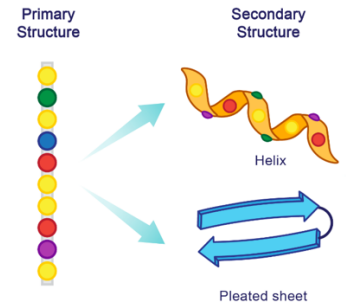
EXAMPLE: What is the maximum number of turns for an alpha helix that contains 72 residues?

- 15 turns
- 18 turns
- 72 turns
- 20 turns
- 6 turns

CONCEPT: SECONDARY PROTEIN STRUCTURE

Beta-Pleated Sheet

- Secondary structure consisting of _____ or more β -strands oriented side by side.
 - Named “pleated” because of their _____ - _____ structure.
 - **R** side chains extend _____ or _____ to the β -sheet.



EXAMPLE: Which of the following statements is true of β -sheets?

- a) Interchanging between an α -helix and a β -sheet is a key feature of a primary structure.
- b) Their interior is characterized by hydrogen bonding between amide hydrogens and carbonyl oxygens.
- c) Their interior is characterized by R side chains interactions.
- d) The R side chains extend inward to ensure greater packing of the peptides.

PRACTICE: Which of the following statements is true in regard to the peptide strand shown?

- a) The β -sheet defines the primary structure of the peptide strand.
- b) The C-Terminal end possesses an α -helix.
- c) Along with its α -helix counterpart, the β -sheet is mainly stabilized by backbone hydrogen bonds.
- d) The α -helix and the β -sheet are connected together through an ionic bond.

