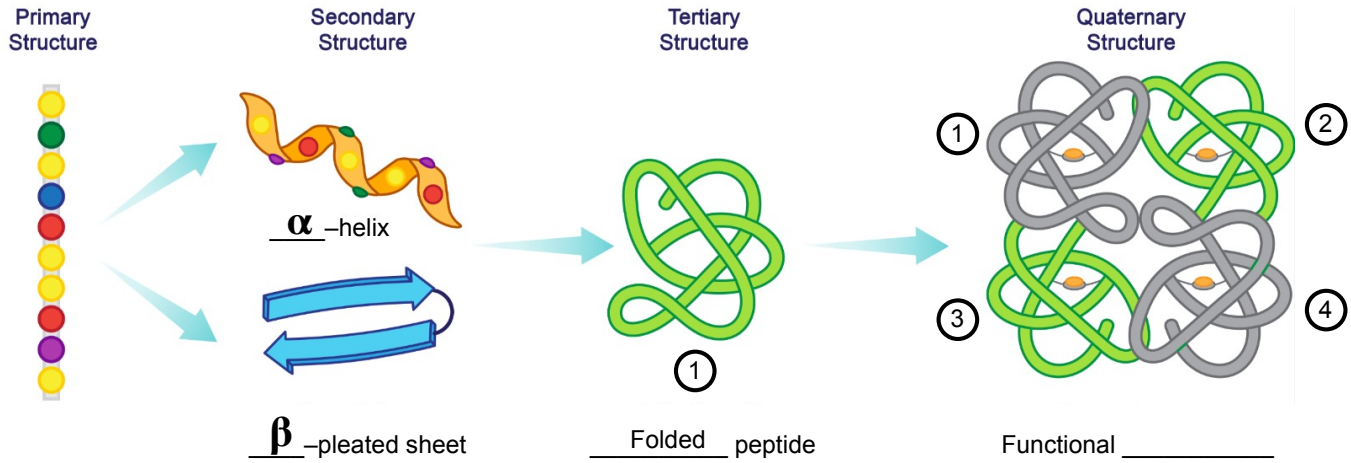
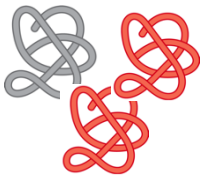
CONCEPT: QUATERNARY PROTEIN STRUCTURE

- The quaternary structure of a protein is its _____ level of complexity.
  - □ Results from the interactions between R side chains of _____ or more *subunits*.
  - □ **Subunit:** An individual polypeptide chain possessing a _____ structure.
  - □ **Multimeric Protein:** a fully _____ protein that possesses multiple subunits.
    - Dimer = _____ subunits
    - Trimer = _____subunits
    - Tetramer = _____ subunits



- **Prosthetic Group:** a _____ component that forms a part of the quaternary structure of a protein.

EXAMPLE: Which of the following is/are true for the protein structure of an E. Coli sample?



a) The quaternary structure is dimeric in nature and held together by non-covalent bonds.

b) The quaternary structure is tetrameric in nature and held together by covalent bonds.

c) The quaternary structure is monomeric in nature and held together by covalent bonds.

d) The quaternary structure is trimeric in nature and held together by non-covalent bonds.

PRACTICE: Hemoglobin represents a commonly discussed tetramer that contains an even number of α and β subunits. Which of the following statements is true?

a) Hemoglobin must contain with 4 α subunits and 4 β subunits.

b) Hemoglobin must contain with 2 α subunits and 2 β subunits.

c) Hemoglobin contains R groups that only covalently bind to produce a quaternary structure.

d) Hemoglobin represents a multimeric protein with identical subunits.

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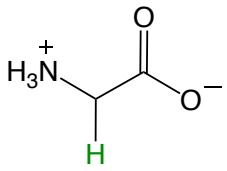
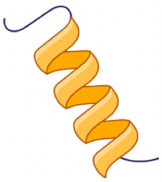
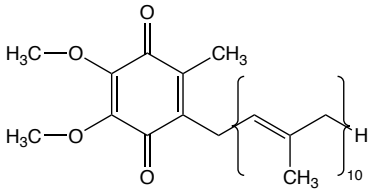
PRACTICE: Which of the following could be classified as a prosthetic group?

I. 

Glycine

II. Cu^{4+} Copper (IV) ion

III. 
α–helix

IV. 

Ubiquinone

a) I only b) I, III, IV c) II only d) II, IV e) None of the above

PRACTICE: Which of the following correctly orders the protein structural terms from lowest to highest complexity?

a) Peptide Bond < Primary structure < 2 subunits < Secondary structure < tetramer < Tertiary structure.

b) Primary structure < Peptide Bond < Secondary structure < 2 subunits < Tertiary Structure < tetramer.

c) Peptide Bond < Primary structure < Secondary structure < Tertiary structure < 2 subunits < tetramer.

d) Peptide Bond < Primary Structure < Secondary structure < 2 subunits < Tertiary structure < tetramer.