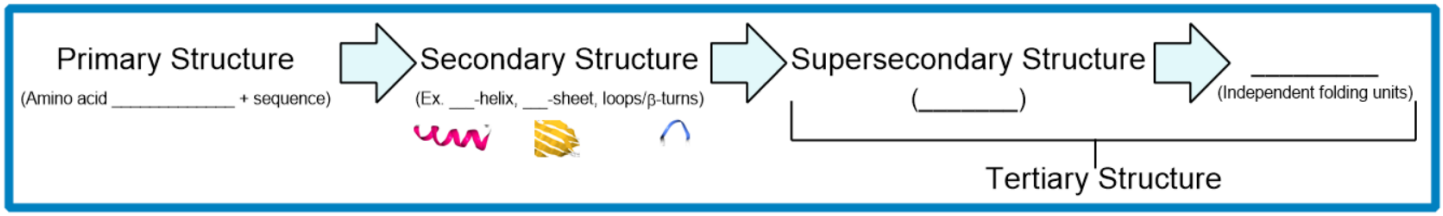
CONCEPT: PROTEIN MOTIFS AND DOMAINS

●*Tertiary protein structure* includes the distribution of α-helices, β strands & turns/loops to make _____ & _____.



Protein Motifs

●*Motifs* (or *supersecondary structures*): specific *patterns* & _____ of α-helices, β strands, & turns/loops.

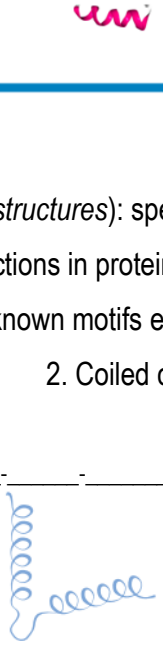
□ Have different functions in proteins including providing _____ & creating _____ sites.

●Several _____ of known motifs exist but some examples include:

1. Helix-loop-helix 2. Coiled coil 3. βαβ 4. Hairpin

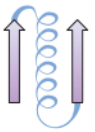
EXAMPLE: Motifs.

1. _____-_____-_____

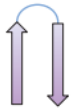


2. _____ _____

3. _____



4. _____



PRACTICE: Which of the following colored regions in the images below is not an example of a supersecondary structure?

a) Greek key.

b) β-meander.

c) βαβ unit.

d) Type I β-turn

e) Helix-loop-helix

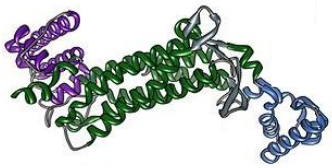
Protein Domains

●_____: combinations of motifs that *independently* fold from the rest of the protein & could have discrete functions.

□ Domains are an extension to a peptide's _____ & are *not* to be confused with *subunits*.

●Proteins are often _____ according to the structures & functional characteristics of their domains.

EXAMPLE: Circle the 3 most obvious domains in the figure.



PRACTICE: Which of the following statements concerning a Cas9 endonuclease's protein domains is true?

a) They are a form of its secondary structure.
b) They have only been found in eukaryotic proteins.
c) All its domains consist of separate polypeptide subunits.
d) They retain their shape when separated from the protein.

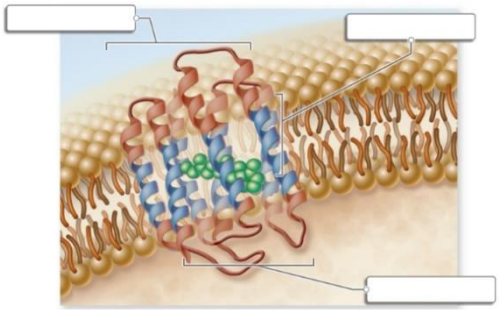
CONCEPT: PROTEIN MOTIFS AND DOMAINS

PRACTICE: Which of the following is true concerning the motifs and domains of proteins?

a) Many domains make up a motif.
b) Every polypeptide chain is limited to one domain.
c) Separate proteins with similar domains are likely to have a similar function.
d) All domains of a protein have the same function.

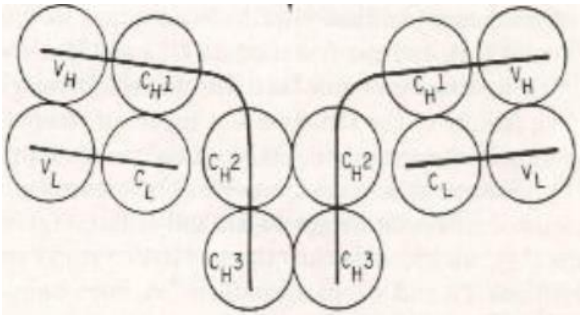
PRACTICE: Appropriately label the domains of the membrane embedded protein in the figure below.

a) Transmembrane domain.
b) Cytoplasmic domain.
c) Extracellular domain.



PRACTICE: The structure of an immunoglobulin G (antibody) molecule is shown schematically below. The black solid lines depict individual polypeptides and so there are four polypeptides in the quaternary structure of this molecule. Each of the spheres represents a stretch of about 100 amino acids folded independently of the rest of the polypeptide and performs a specific function in the molecule. Therefore, each sphere was given its own individual name (VH, CH1, CH2, etc.). Without knowing any additional details, you can predict that there must be TWELVE _____ in this molecule.

a) α-helices.
b) Domains.
c) Subunits.
d) Motifs.



PRACTICE: What is the main difference between an endonuclease's domains and its subunits?

a) Its domains are composed mostly of the α-helix, while subunits contain both α-helices and β-sheets.
b) Its subunits are separate polypeptide chains, while its domains constitute a part of a polypeptide chain.
c) Its domains do not have secondary structure, whereas its subunits have do.
d) Its domains are stabilized by hydrogen bonds, while its subunits are stabilized by disulfide bonds.