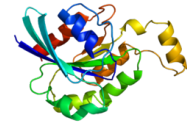




Chem 331 Biochemistry

Protein Structure

Learning Objectives, Study Guides
and Practice Questions



Chapter 6

Learning Objectives

- Relate the two general classes of proteins to their respective structure and function
- Discriminate between the four levels of protein structure in terms of the "focus-level", bonds and roles each part of the amino acid/peptide backbone/aa side group plays in the structure
- Understand the primary amino acid sequence and why it is important
- Know the post-translational modifications which give proteins greater diversity – in chemical terms
- Summarize the main terms associated with primary structure including homology
- Analyze the peptide bond and how it impacts the predicted secondary structure – do not memorize bond angles but apply your understanding of the bond to how the two rotational angles impact structure
- Infer the limitation and use of the Ramachandran plot
- Describe the features of the peptide backbone that stabilizes and creates alpha helices and beta-pleated sheets.
- Evaluate how some amino acids can alter the structure (stabilize or disrupt) secondary structures and some of the smaller features like beta turns.
- Describe both random coil and intrinsically unstructured domains
- Know the polarity and structural elements of secondary structure – include the impact of side groups and their relative location
- Compare the various specialty structures for their biochemical structural elements (keratin, silk, collagen...)
- Relate the change in function in collagen when primary acid, enzyme or enzyme co-factor is altered.
- Understand the thermodynamic forces and the process by which fold and maintain tertiary structure
- Comprehend the basic manner by which proteins interact to form quaternary structure

Study Notes from Dr P: *The content for this chapter is more than just structural levels of proteins. There are several points that illustrate how factors influence the shape and therefore function of a protein (MECHANISM). Don't lose sight of that as you go through the notes and the book. I particularly like how the book authors present the structure of secondary structure and the thermodynamic reasons for protein folding. There is a lot of information on the folding tendencies and patterns that we only touched on in class; including connections between beta strands and the intrinsically unstructured domains of proteins. Don't worry so much about the many figures illustrating some of the structural details. When you start to study the special structures, don't forget those are included for two reasons. First is they are interesting examples of special structure-functional relationships. Second they illustrate some of the principles of secondary and tertiary structure. If you only focus on a description of collagen and the disease but don't focus on the MECHANISM – the amino acid sequence and why that sequence is biochemically important, you will not be detailed enough in your understanding.*

Pages: 128-131, 133-142, 146-151, 155-163, 169-172

Chapter Questions 1, 4, 6, 10, 12 16, 19, 23, 24, 29