

In the name of the most high

Introduction to Bioinformatics

Proteins

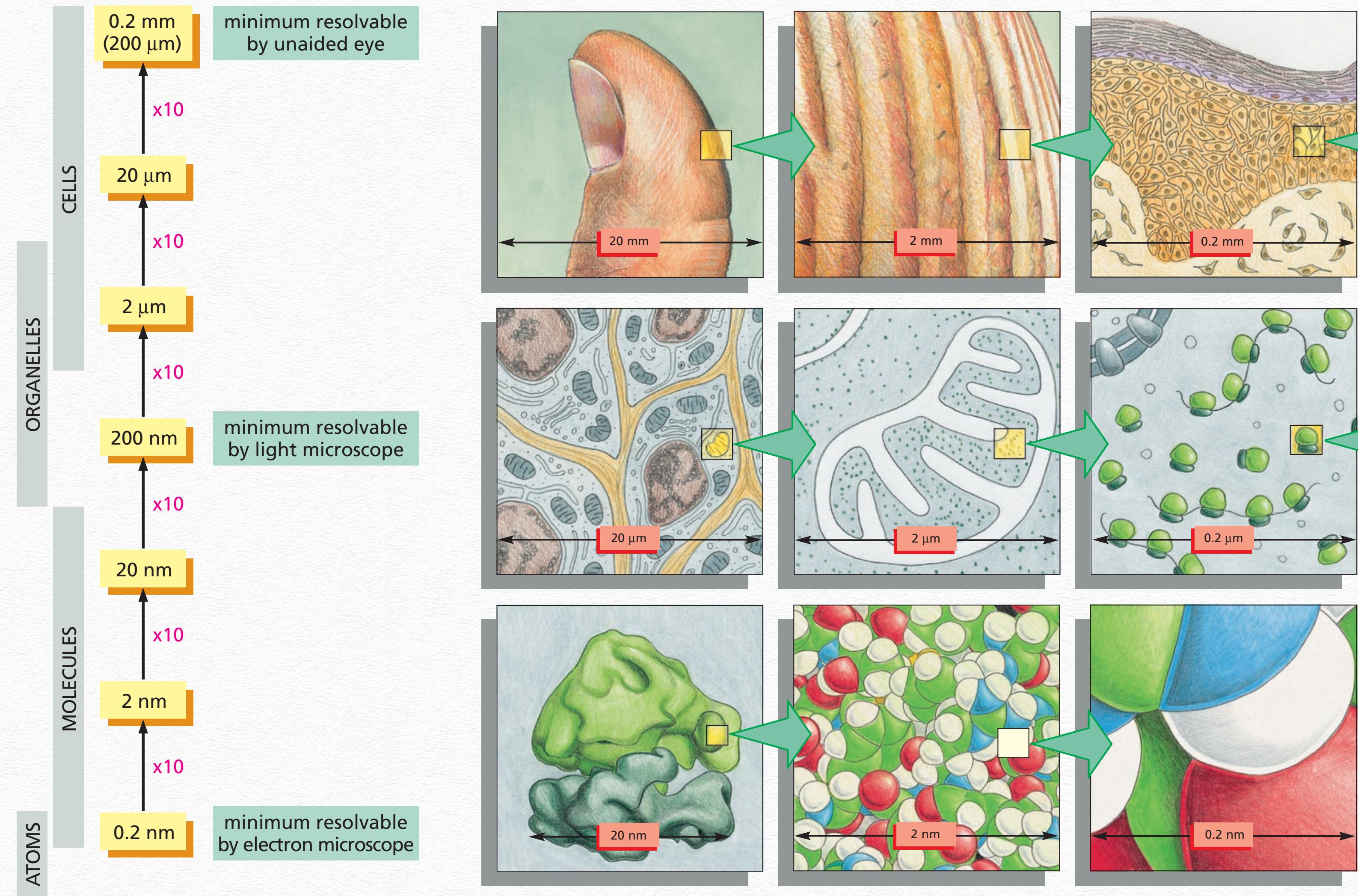
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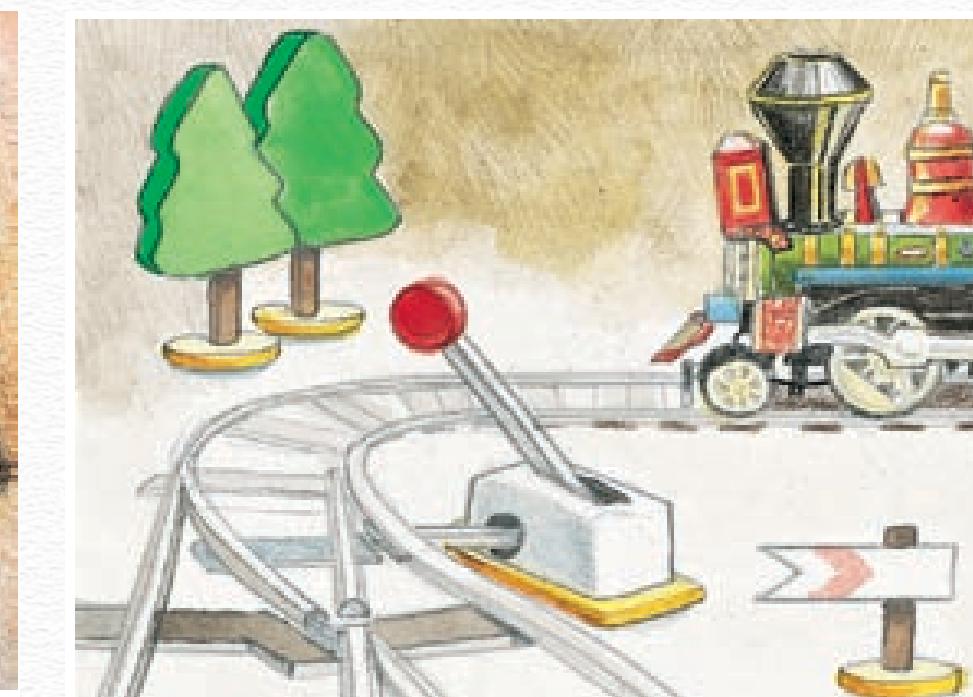
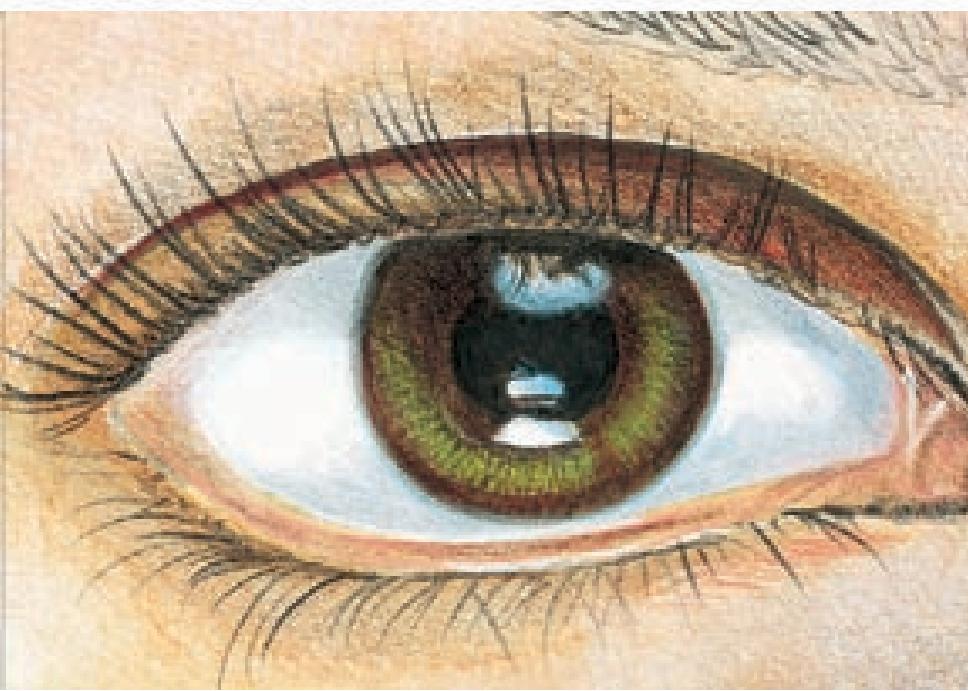
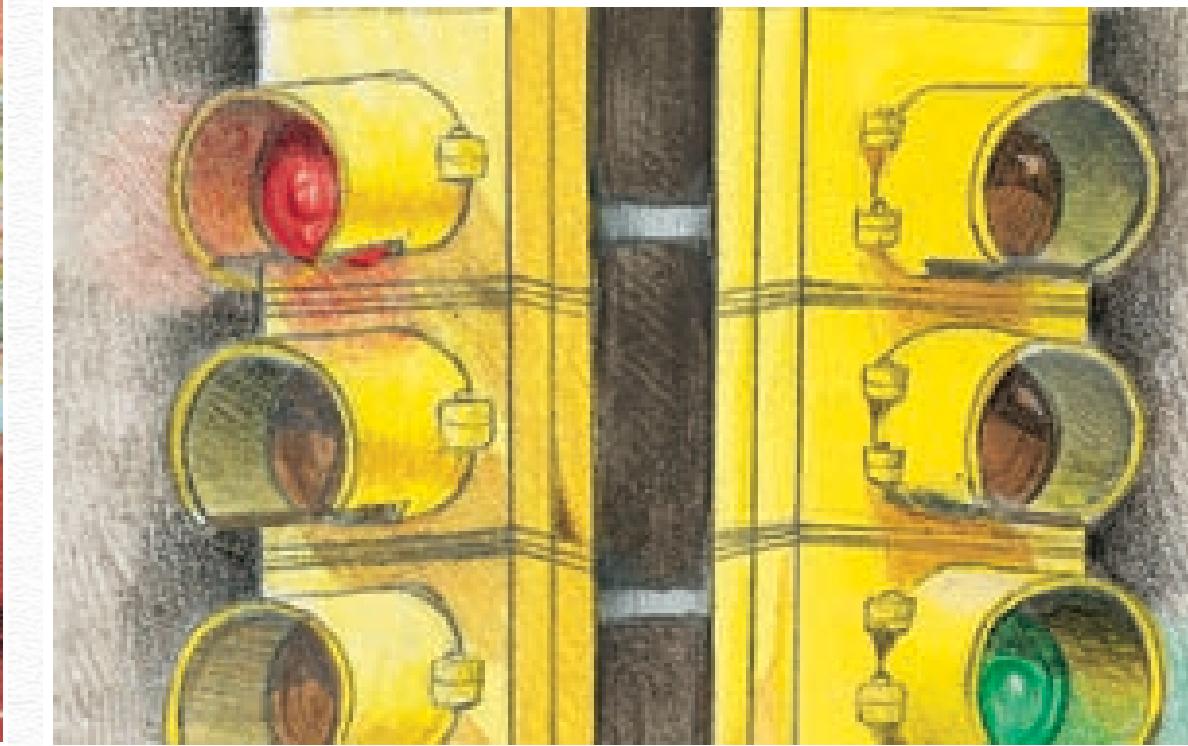
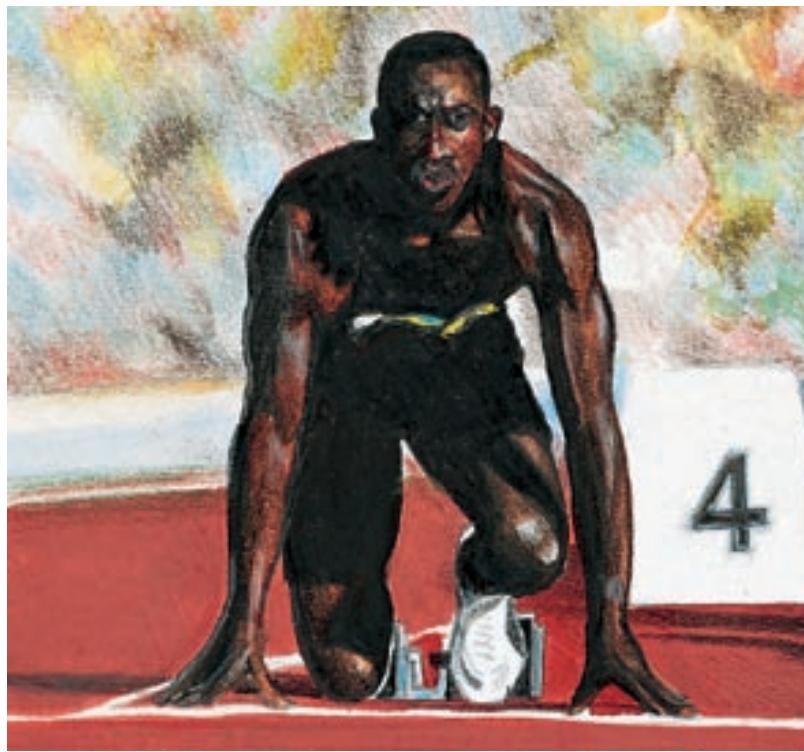
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What can we see?



How our body can do such wonderful things?

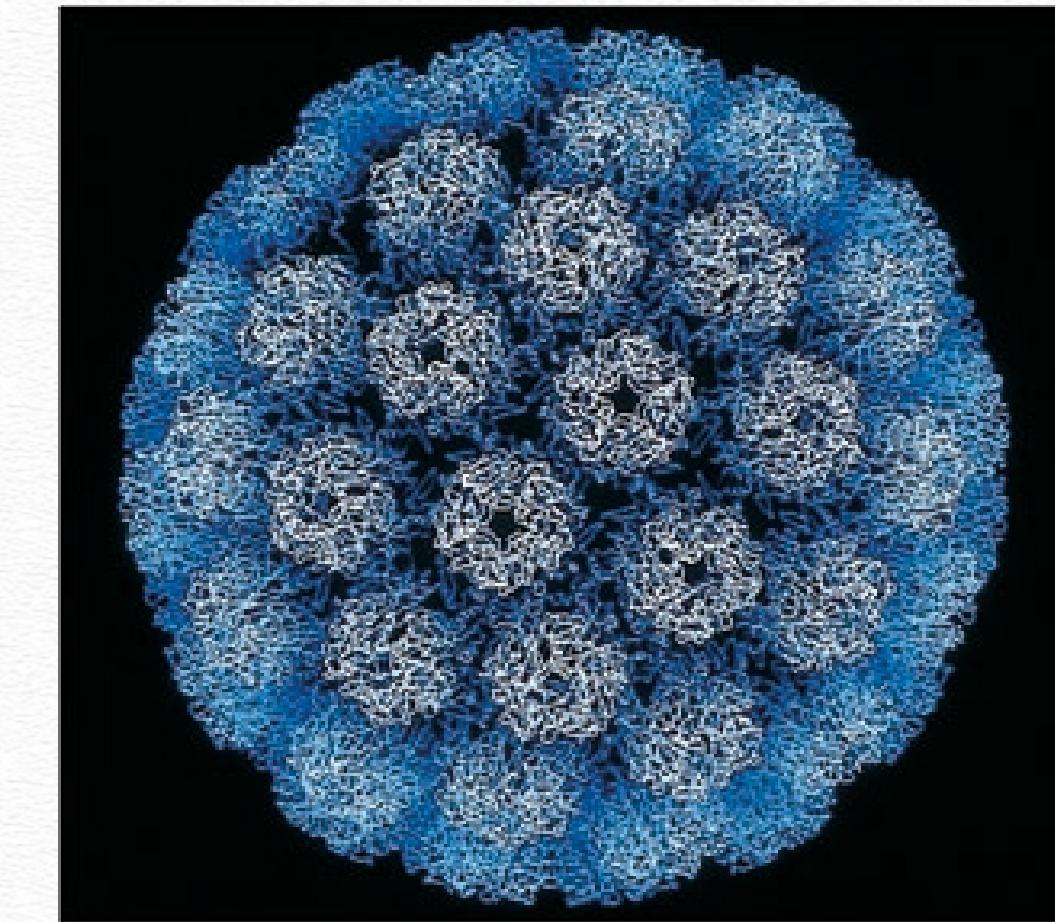
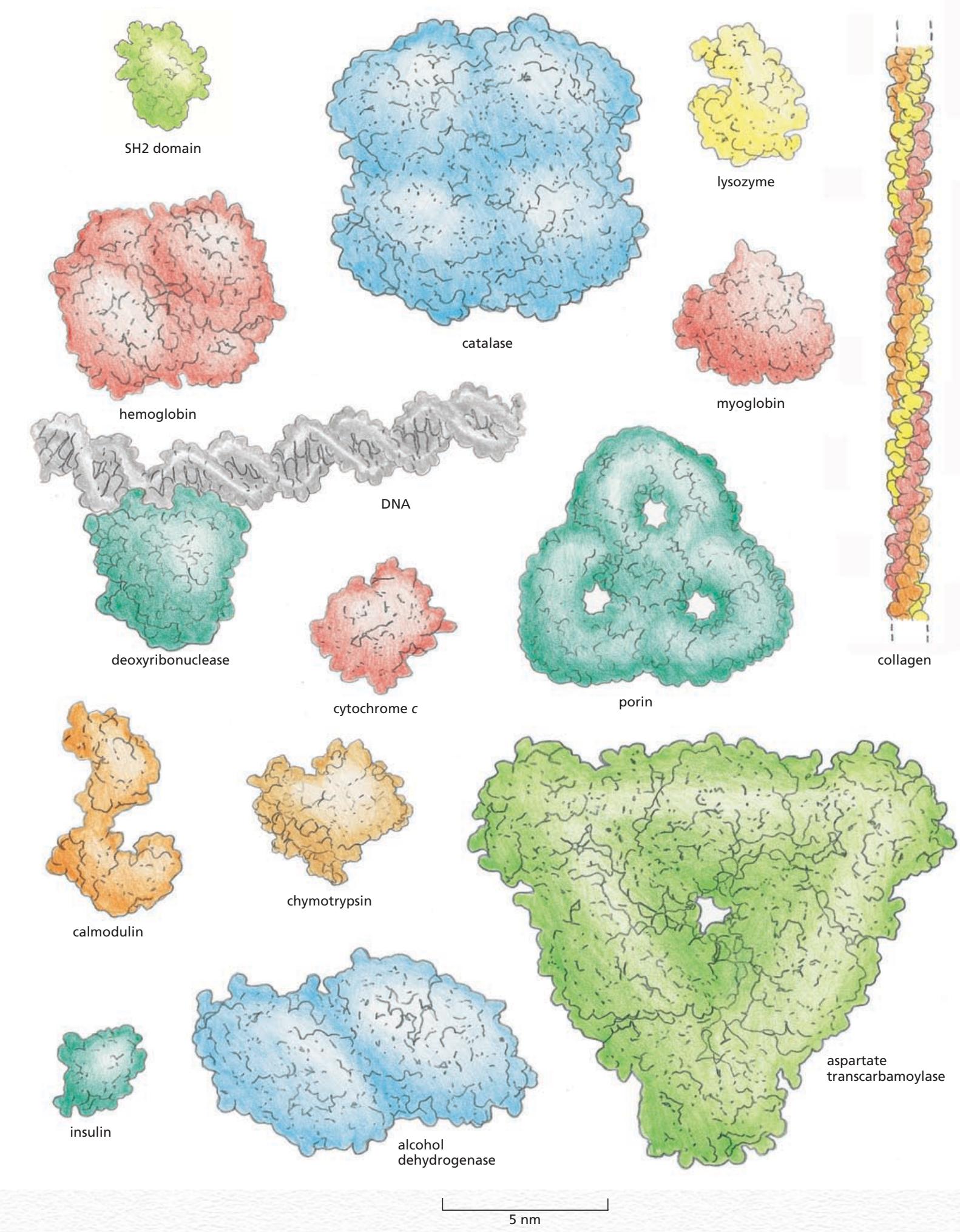


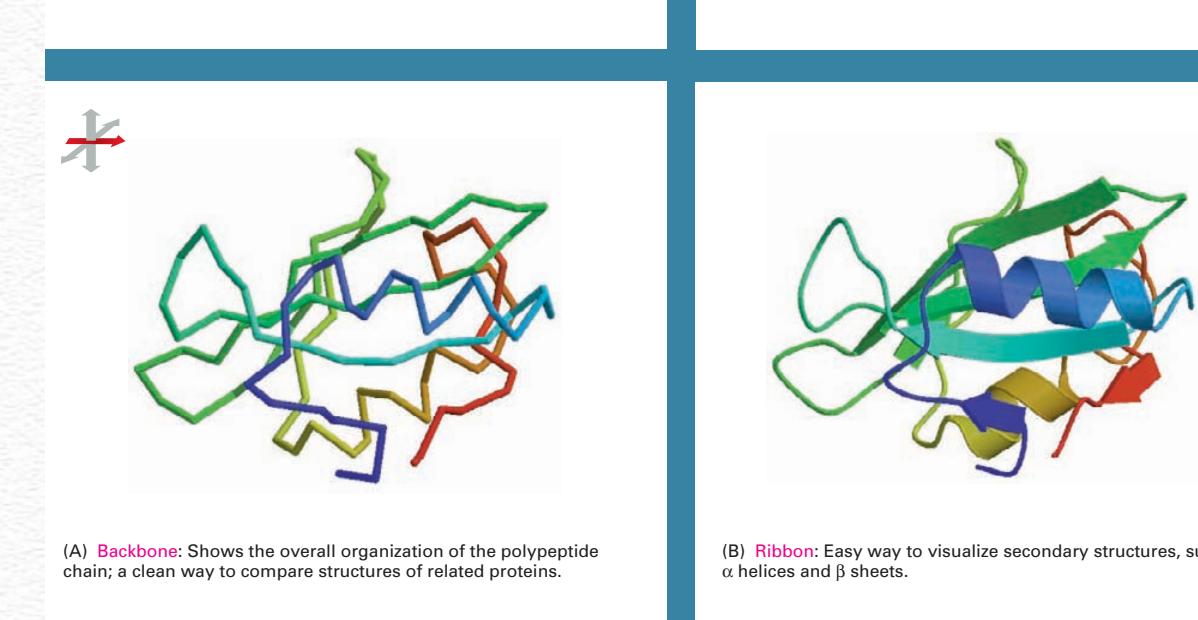
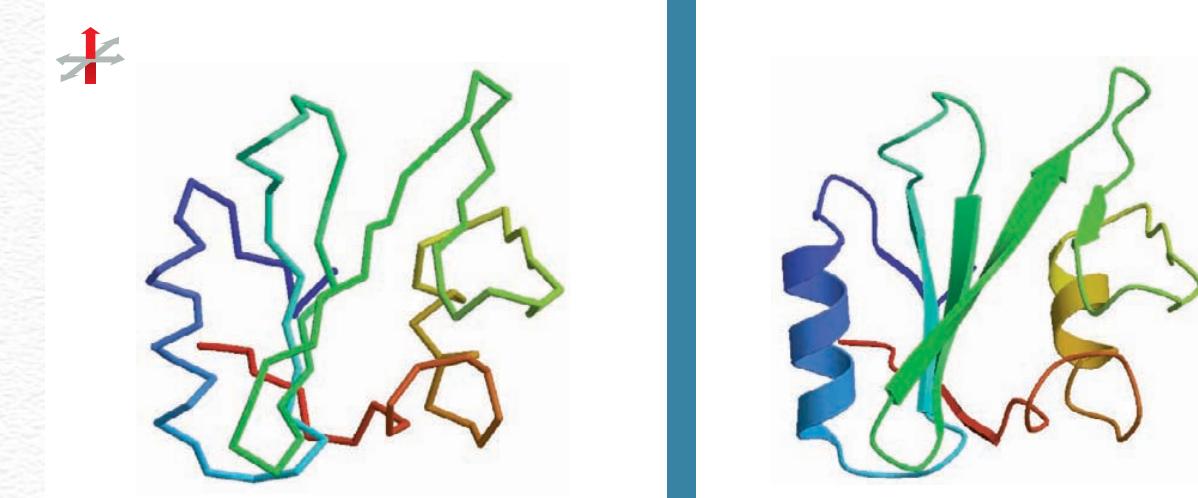
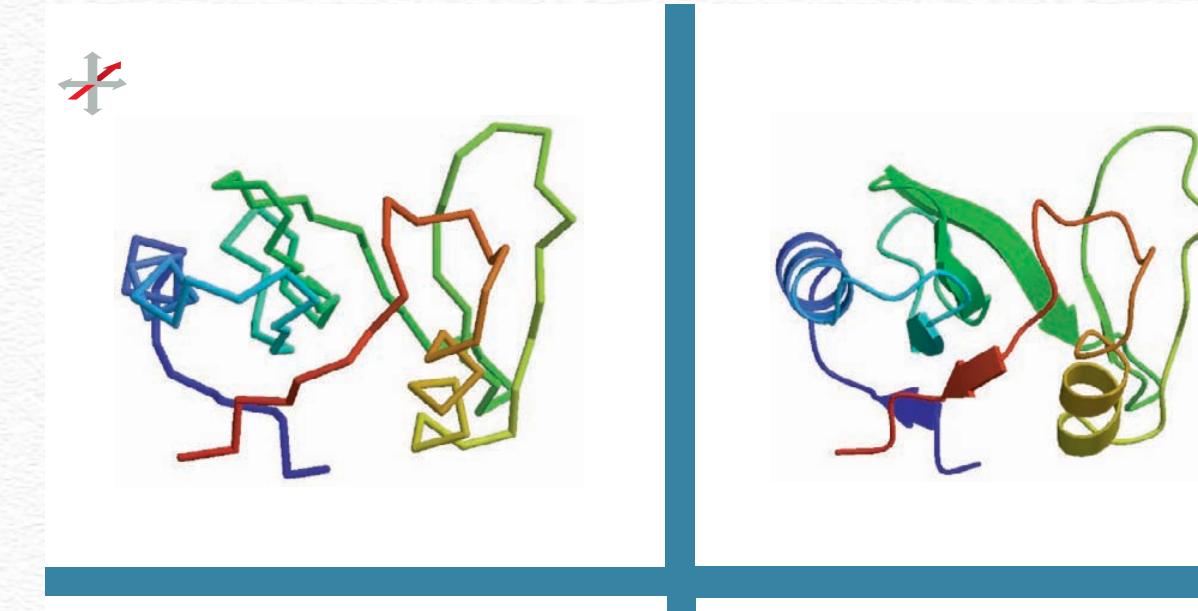
Proteins



<http://tower.life/wp-content/uploads/2016/06/protein700.jpg>

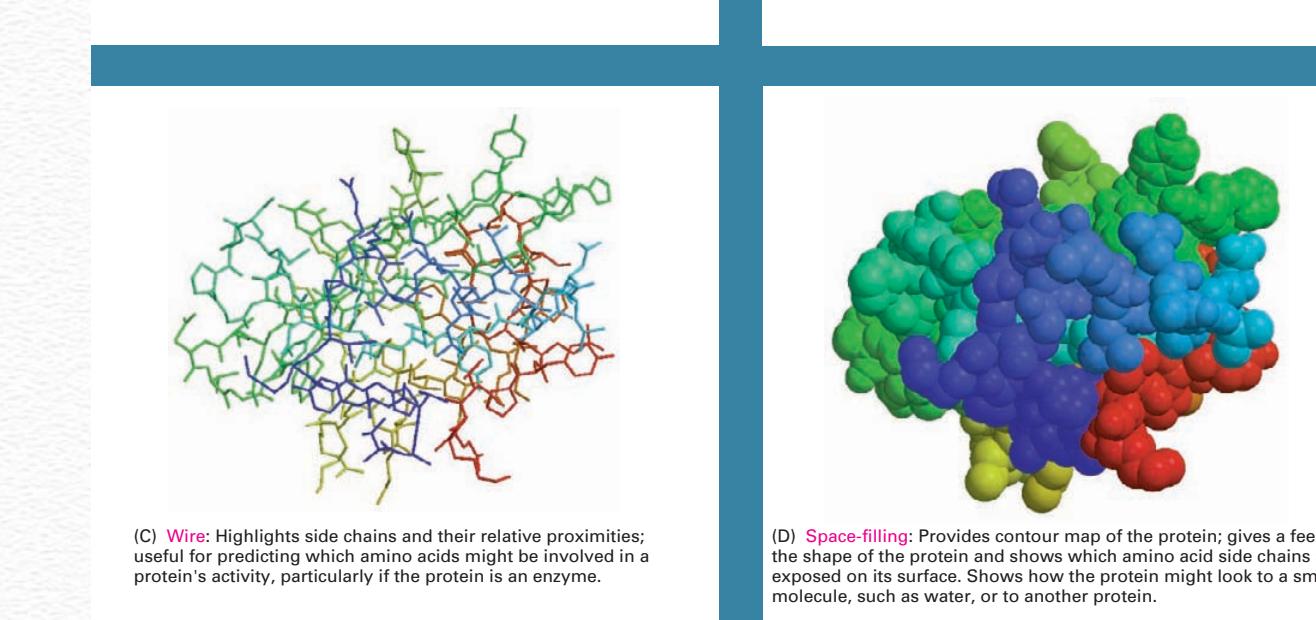
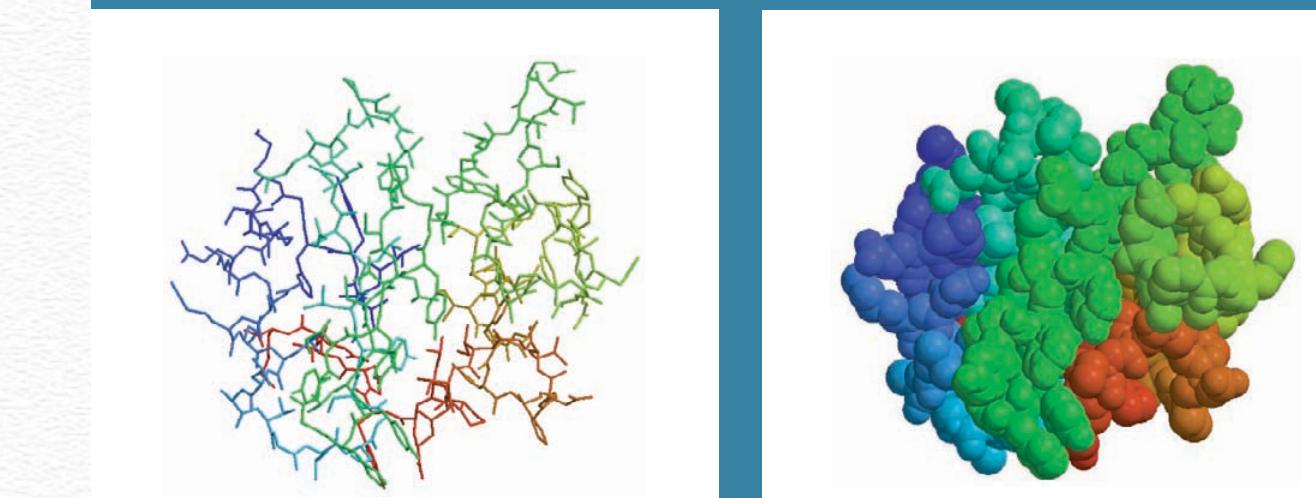
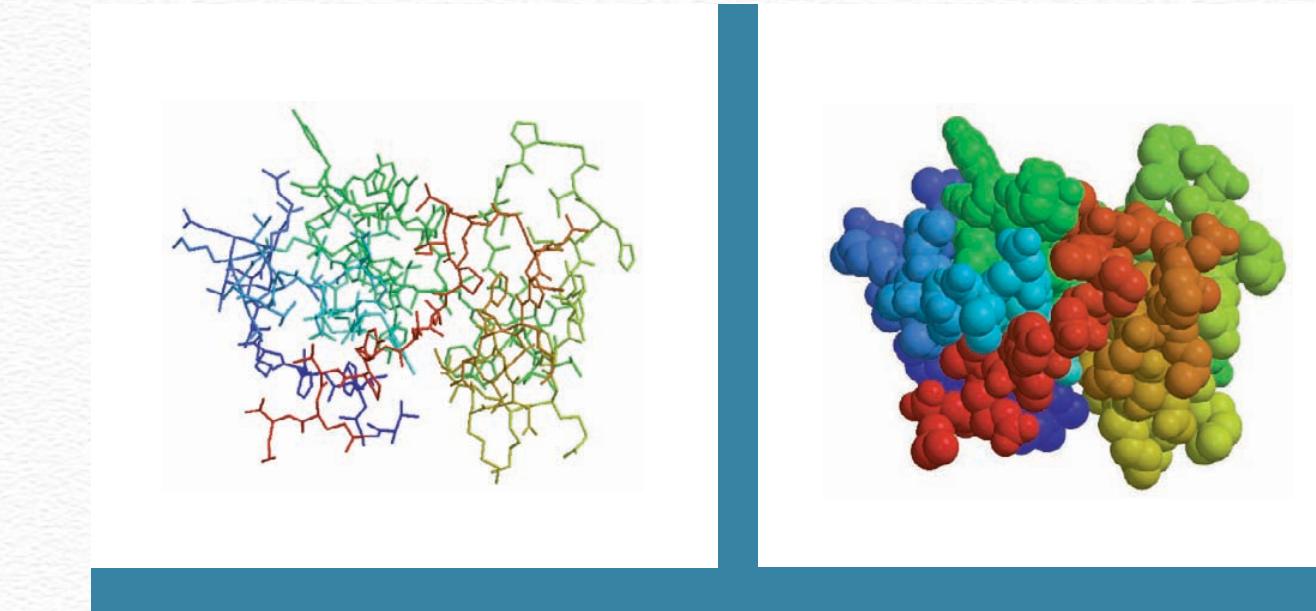
Shapes and Sizes





(A) **Backbone:** Shows the overall organization of the polypeptide chain; a clean way to compare structures of related proteins.

(B) **Ribbon:** Easy way to visualize secondary structures, such as α helices and β sheets.

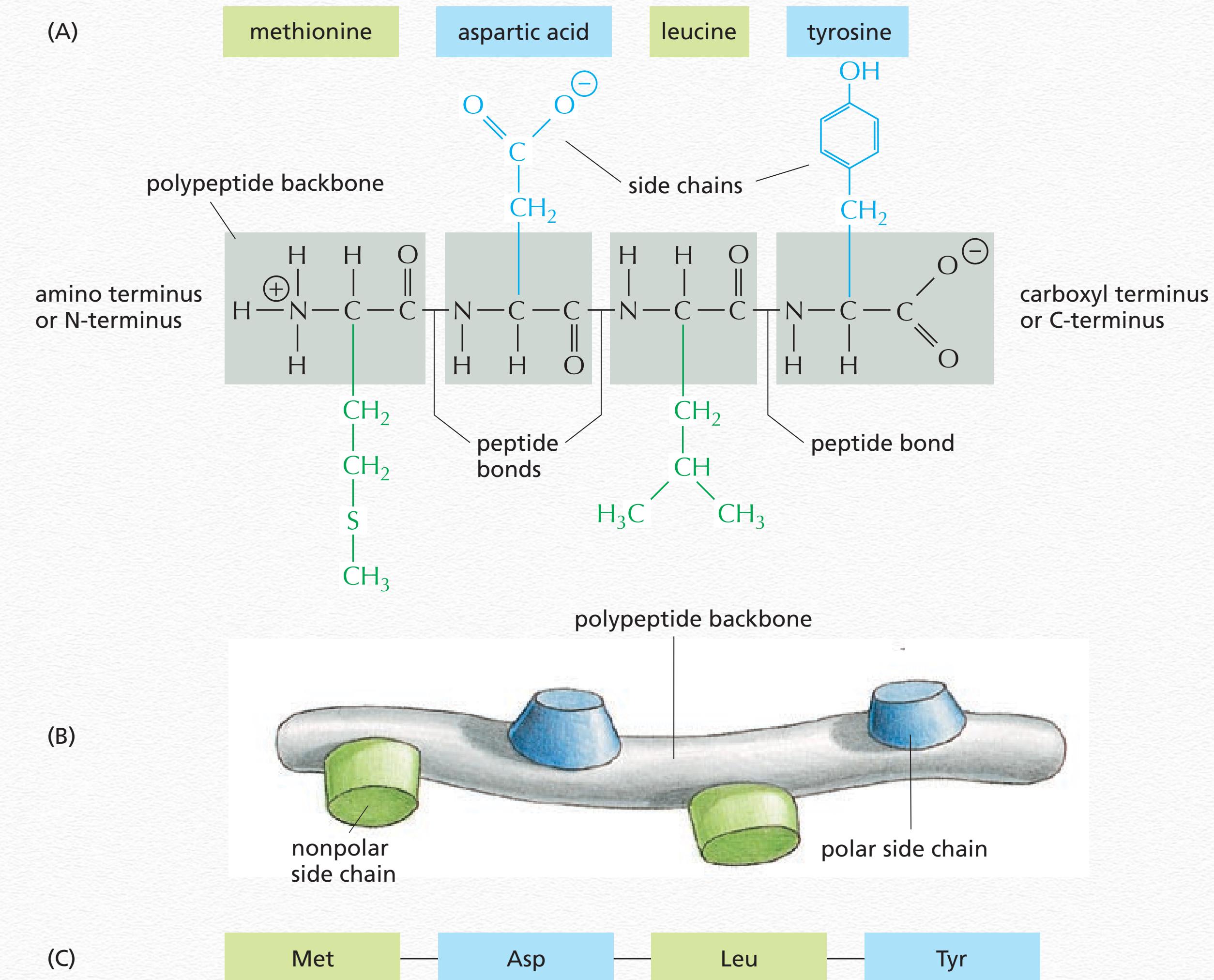


(C) **Wire:** Highlights side chains and their relative proximities; useful for predicting which amino acids might be involved in a protein's activity, particularly if the protein is an enzyme.

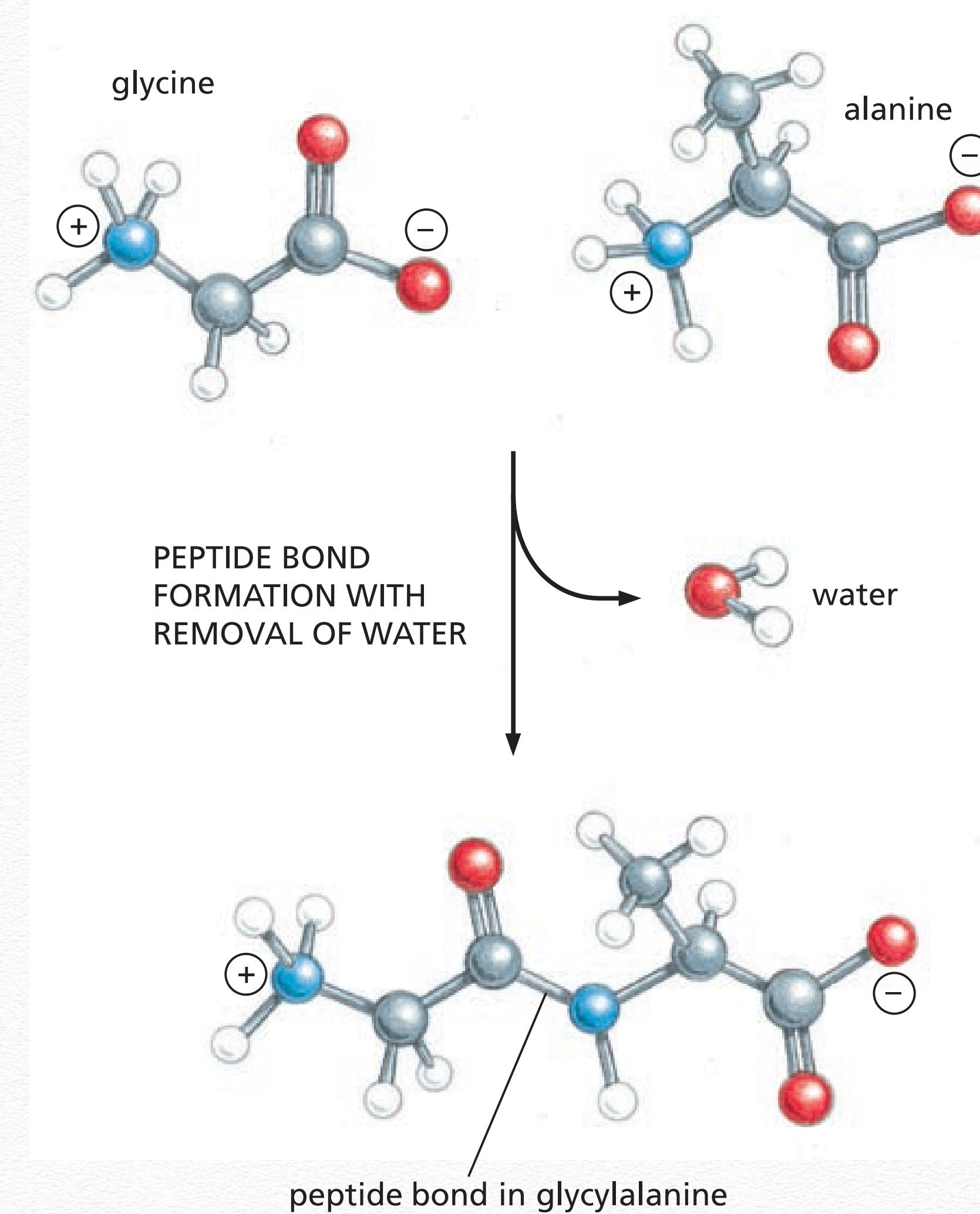
(D) **Space-filling:** Provides contour map of the protein; gives a feel for the shape of the protein and shows which amino acid side chains are exposed on its surface. Shows how the protein might look to a small molecule, such as water, or to another protein.

(Courtesy of David Lawson.)

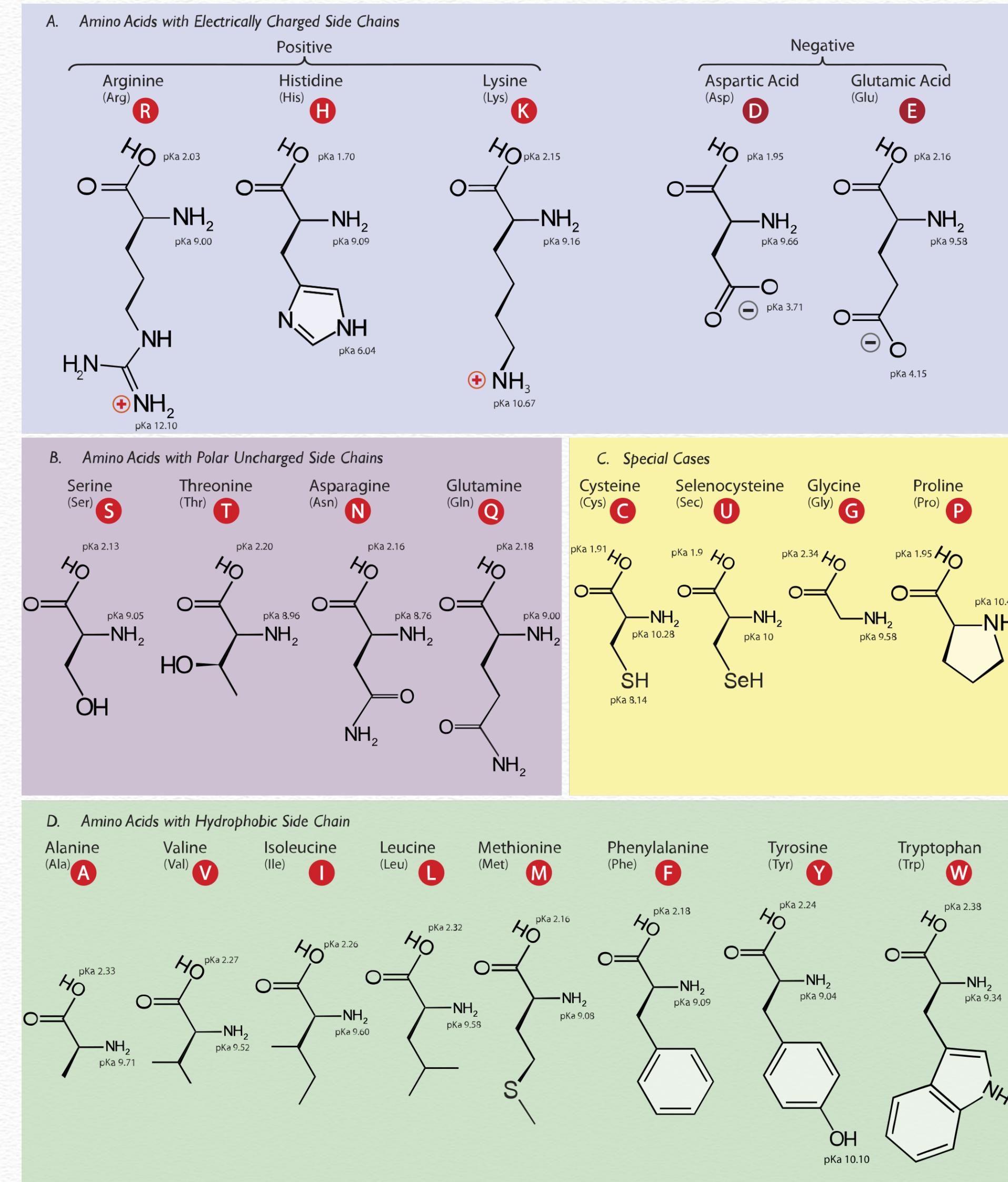
Protein Structure



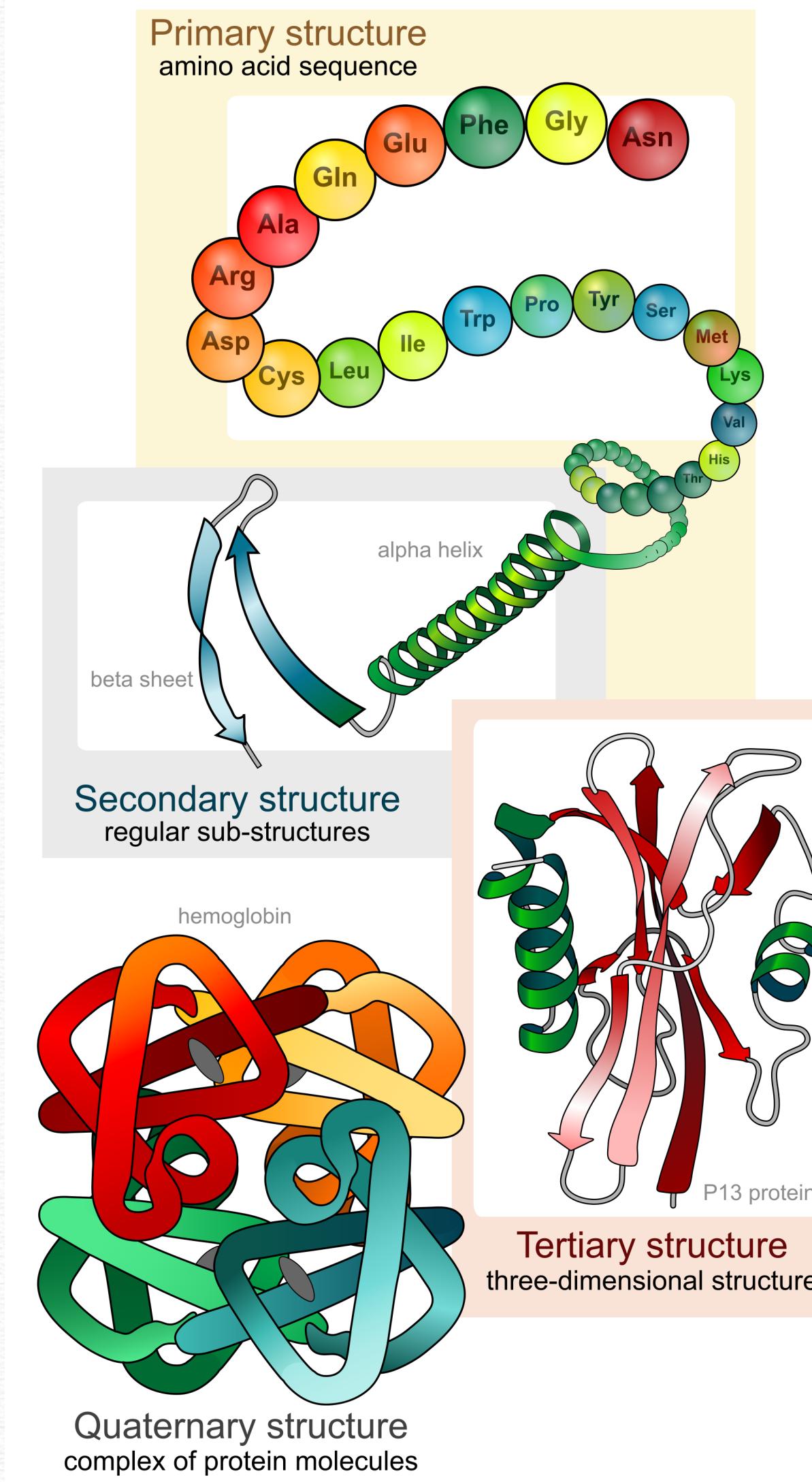
Peptide Formation



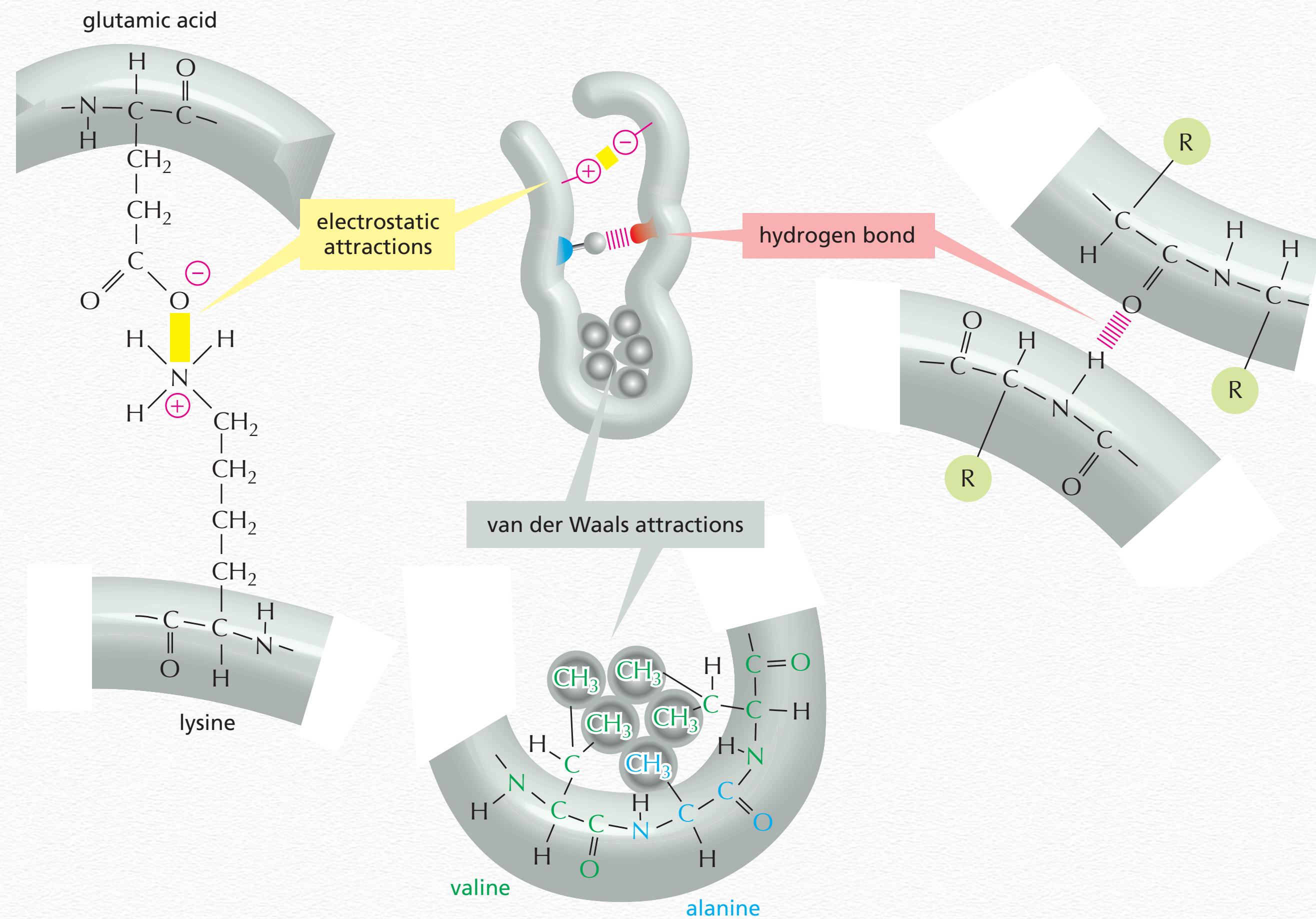
Amino Acids



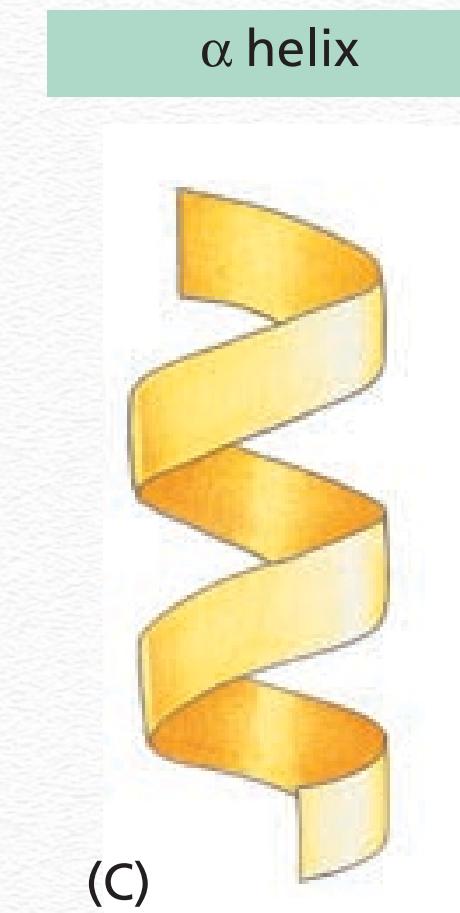
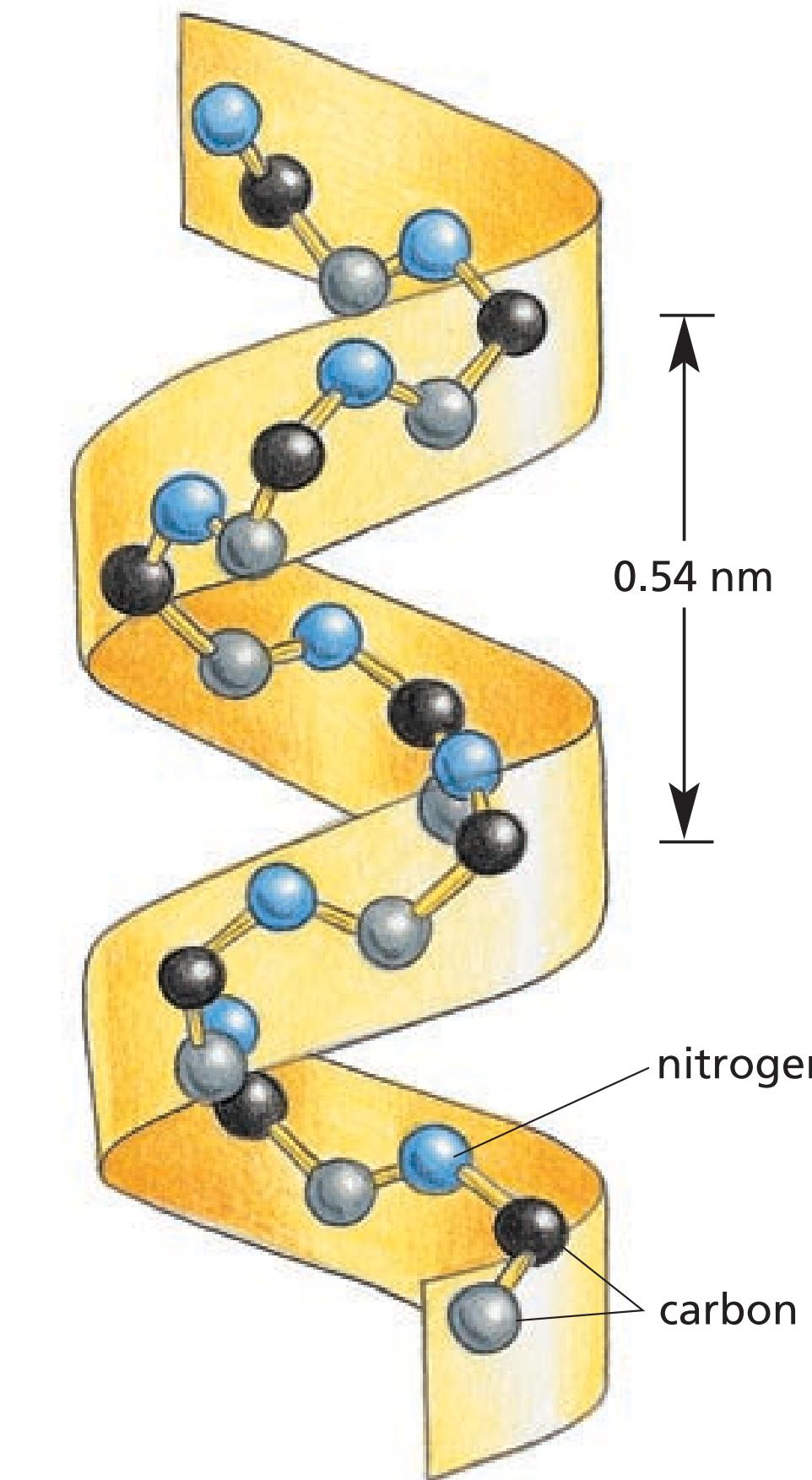
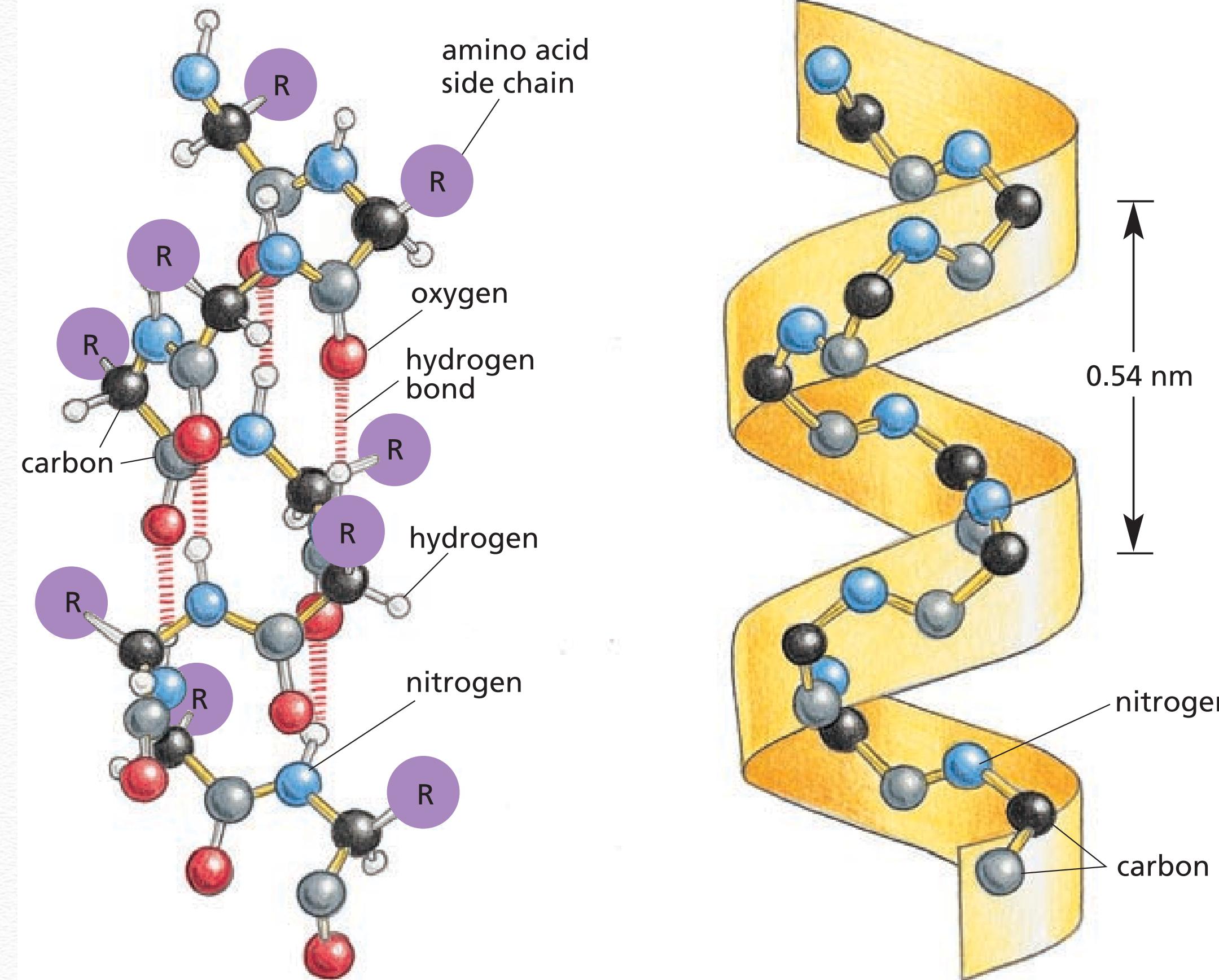
Protein Structures



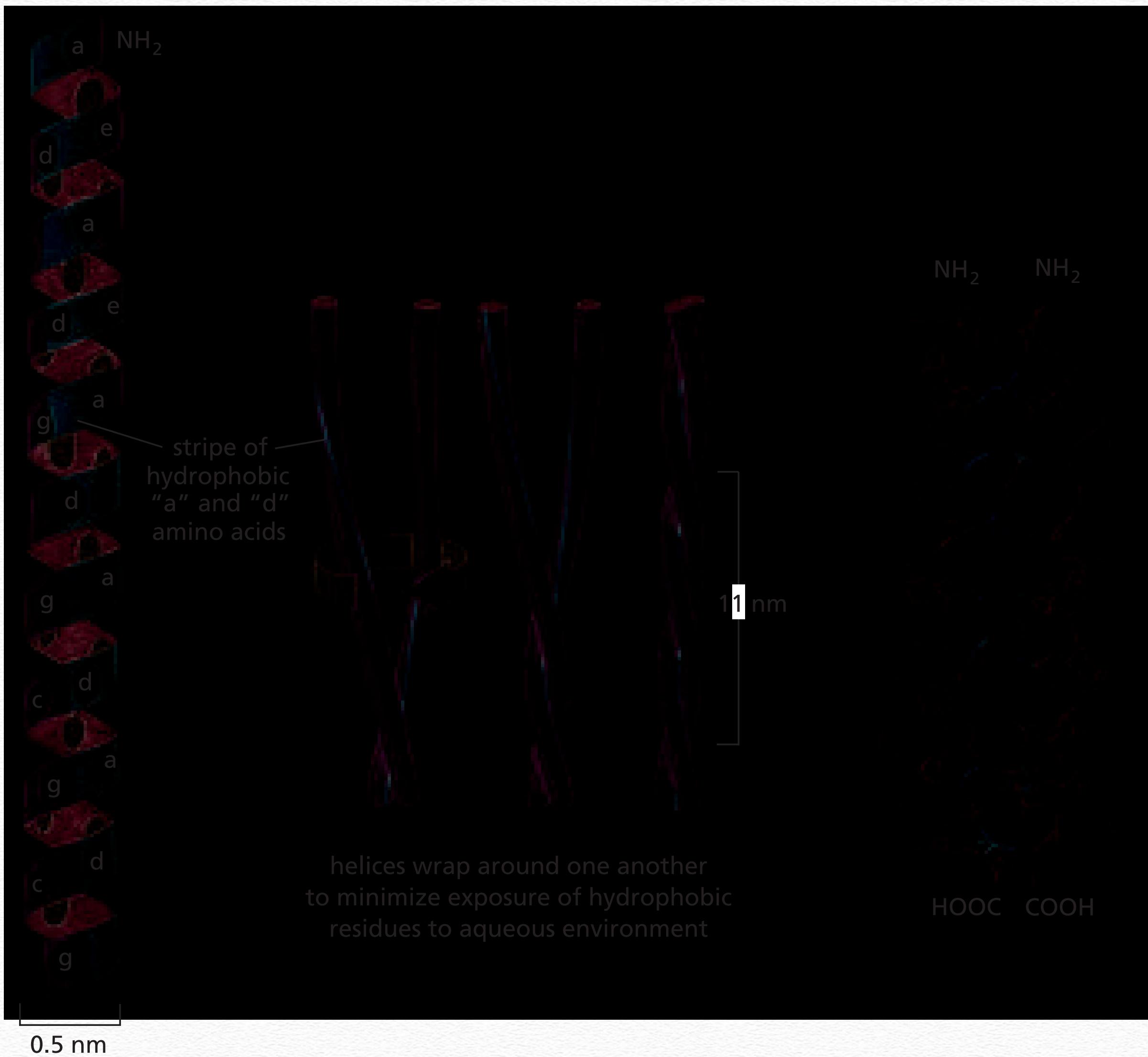
Non-covalent Bonds



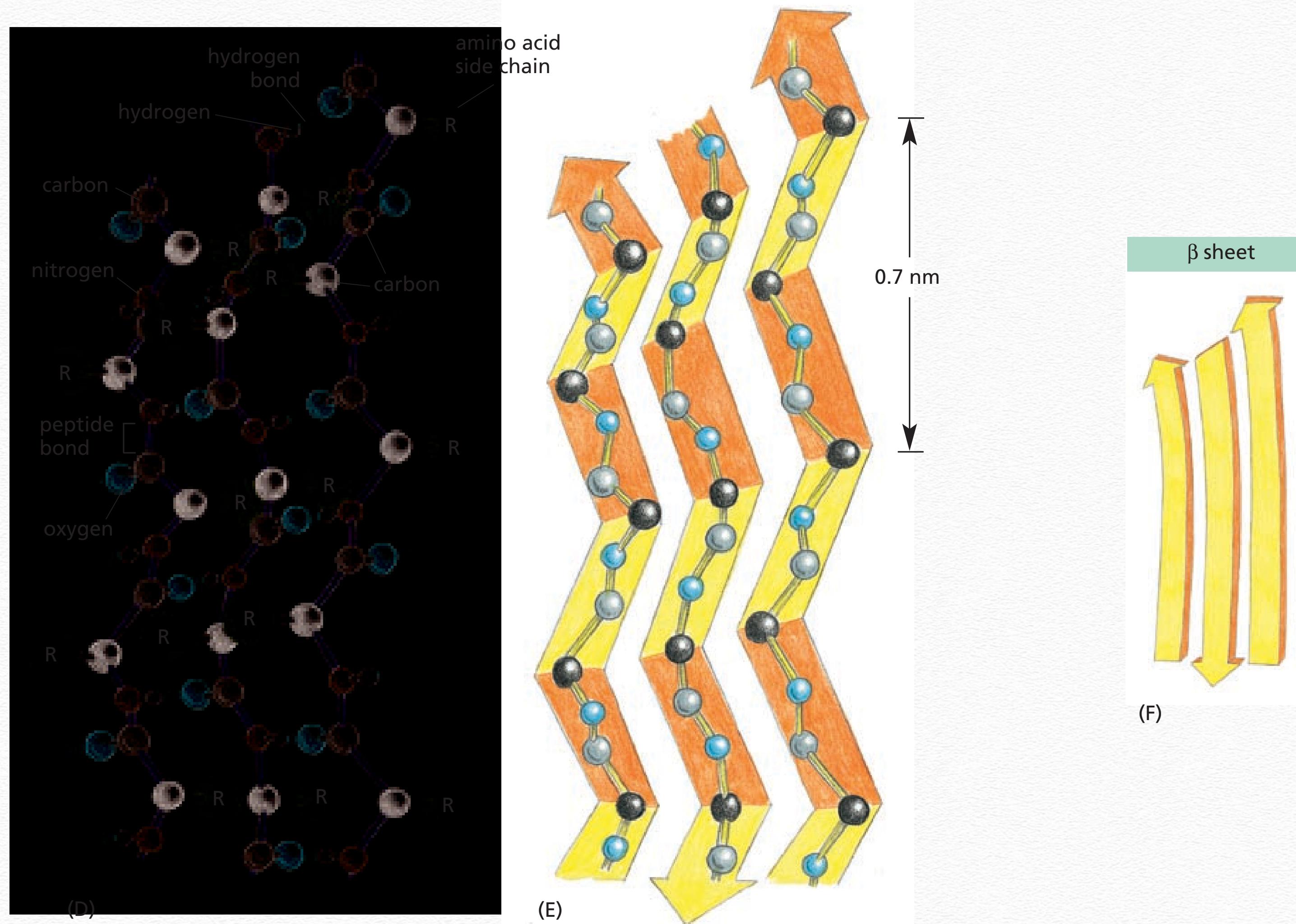
α -Helix



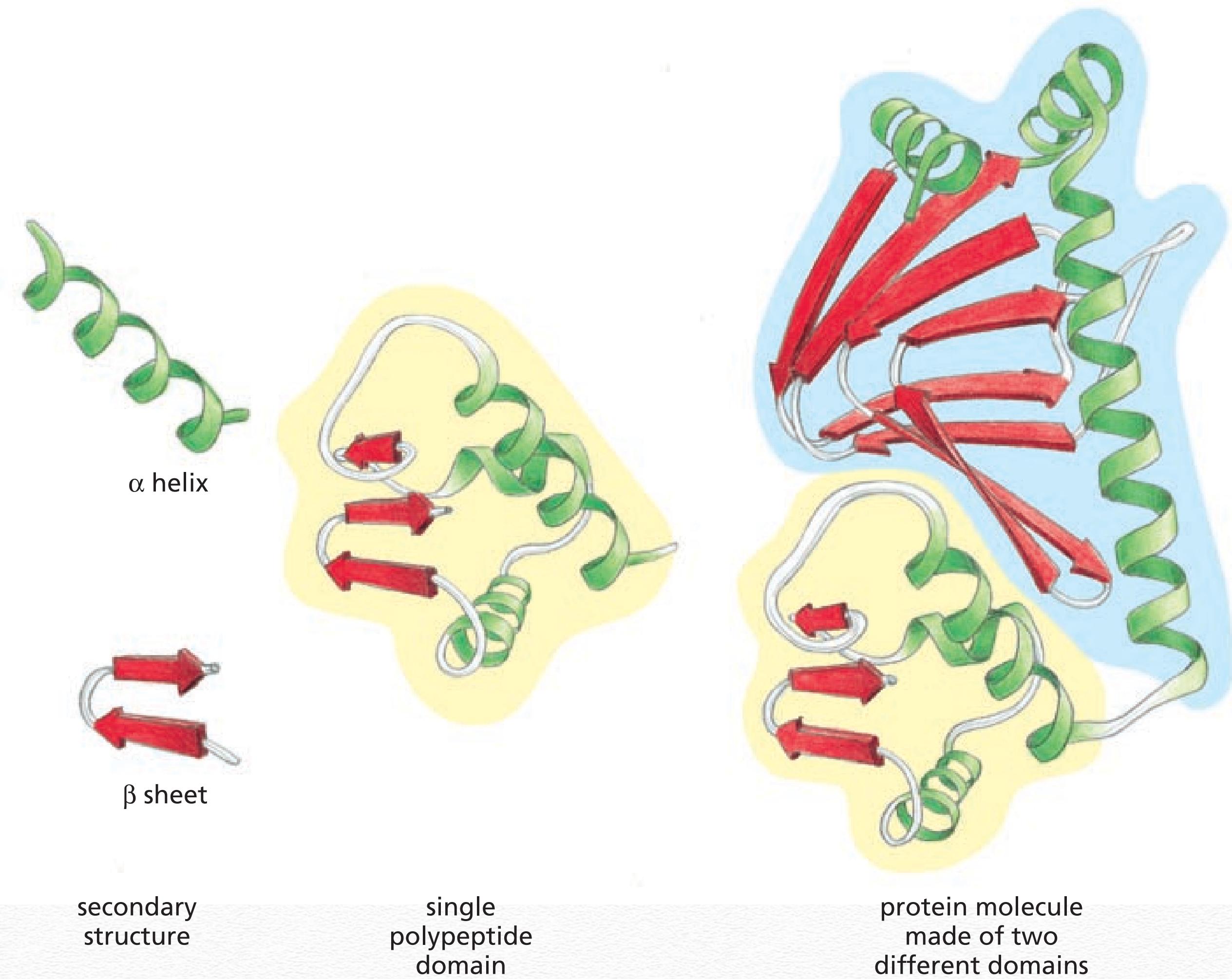
Coiled-coil Helices



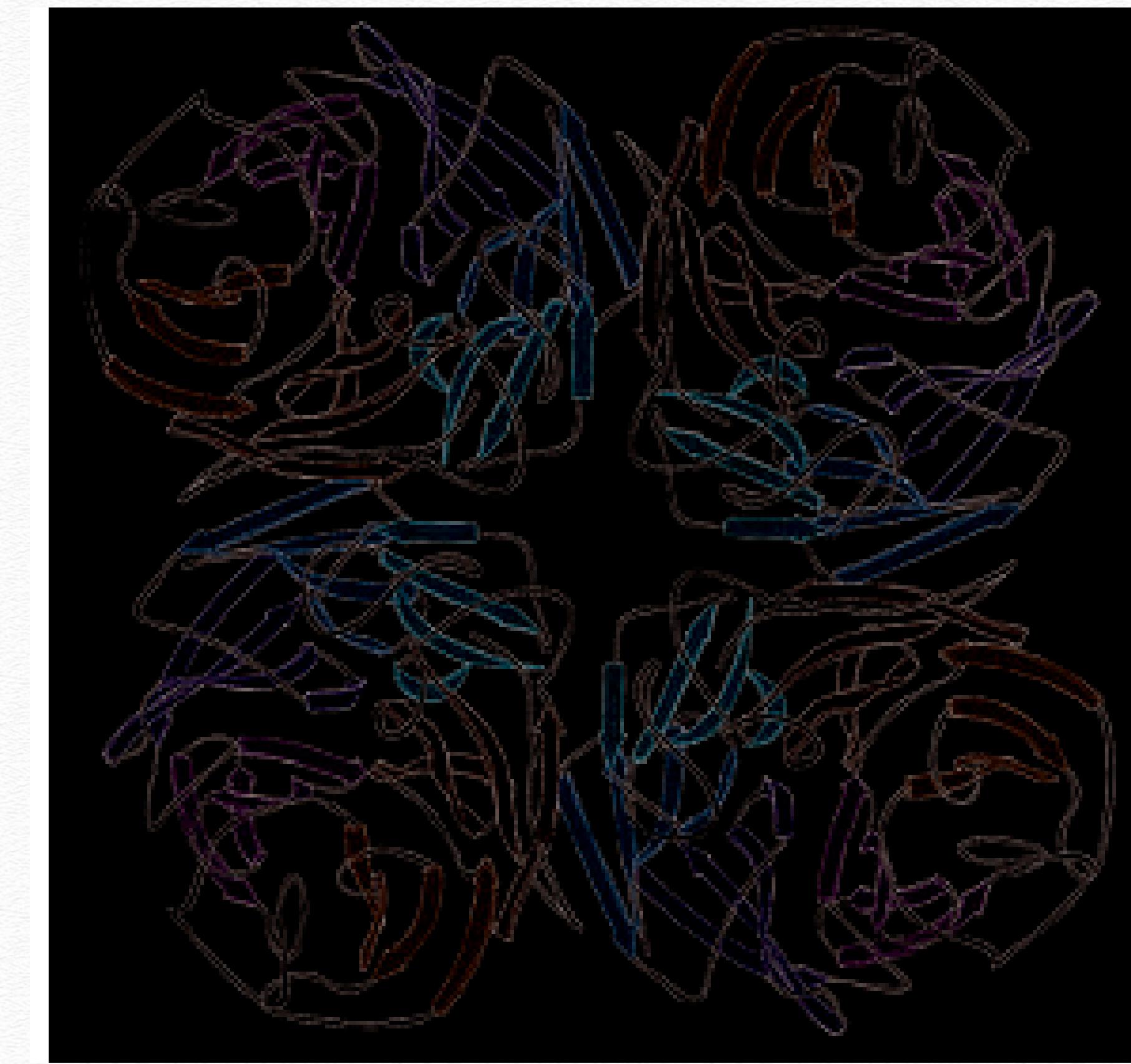
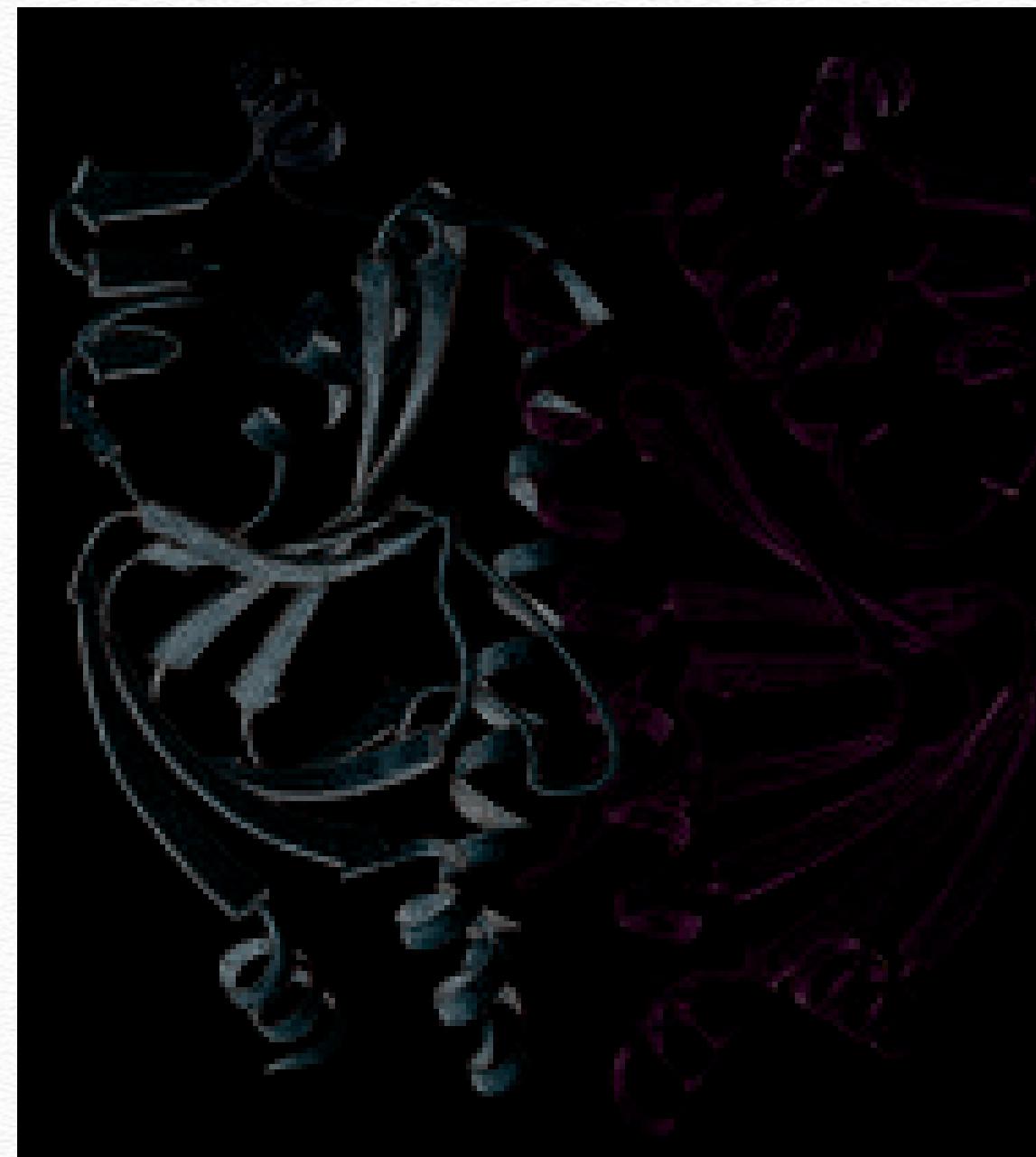
β -Sheet



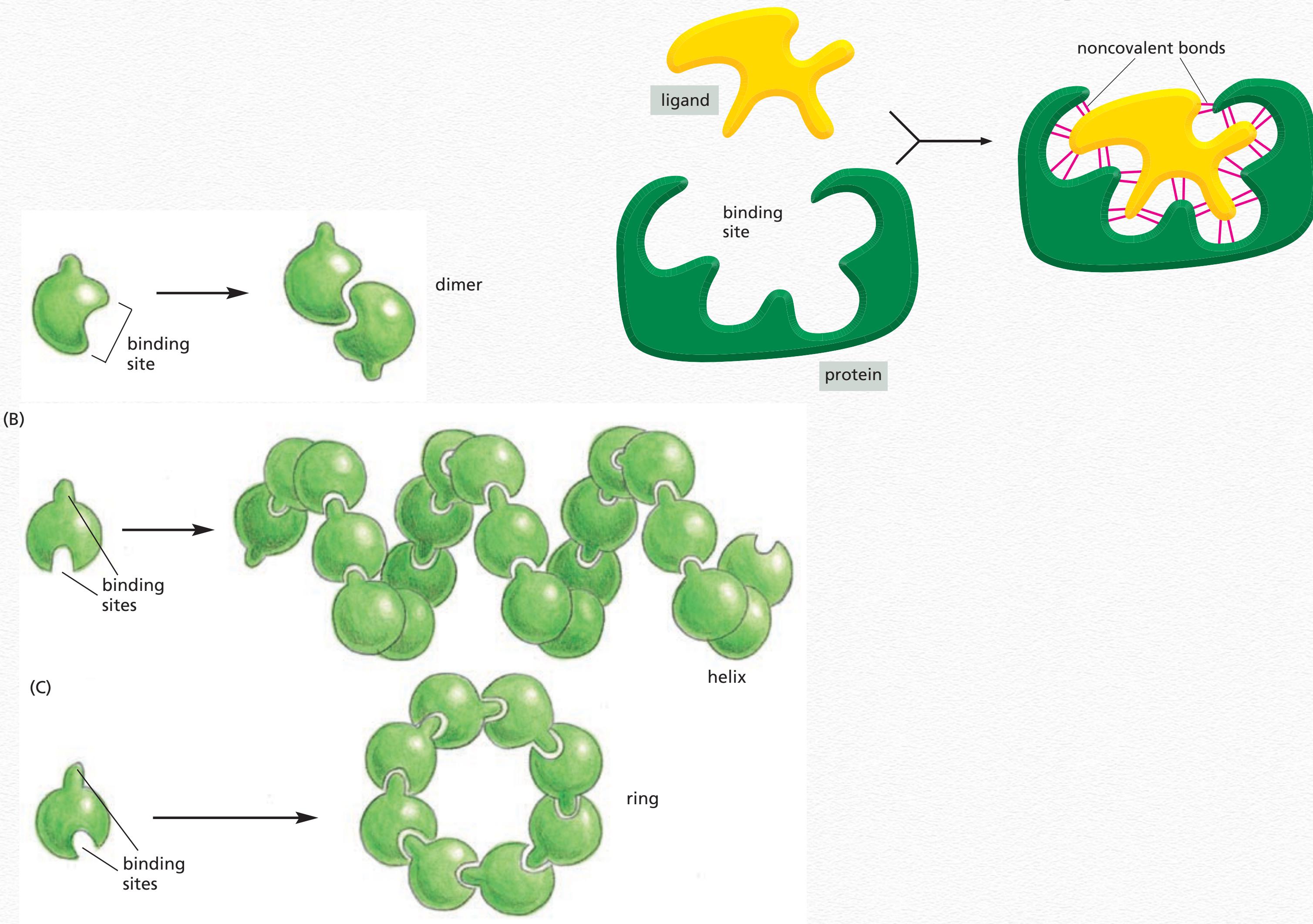
Different Structures



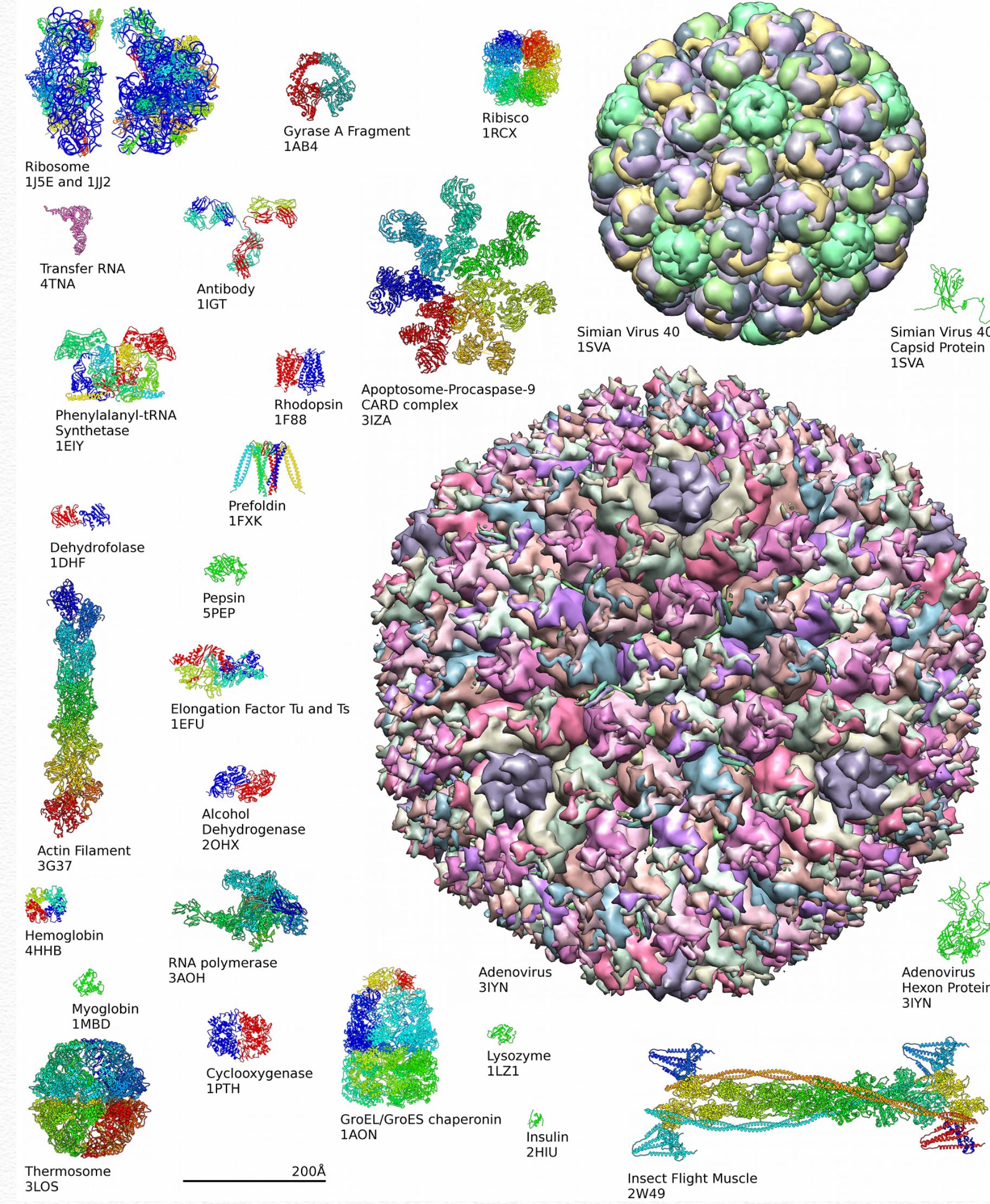
Repeated Units



Protein Binding



Many Different Shapes



Proteins go On and Off

