formation of protein quaternary structures could be disrupted by compounds that interfere with the ability of the specified proteins to interact with each other. Since the expression and utilization of both DNA and RNA depend on interactions with a variety of proteins, blocking the interaction of key proteins with DNA and RNA could provide significant therapeutic benefit.

Designing compounds capable of disrupting macromolecular interactions has, however, proved challenging. Unlike small molecules that generally bind in small, specific areas of a target protein, the interaction between two (or more) macromolecules can occur over wide surface areas of the macromolecules in question. The ability to understand the nature of these interactions continues to advance as additional structural data are acquired and computer models advance. Also, binding interactions that lead to the formation of macromolecular complexes (e.g., hydrogen bonds, hydrophobic interactions, etc.) are the same as those considered for designing compounds that interact with historically important targets described earlier in this chapter. As such, information gleaned from the design of small molecule can be reapplied to the identification of compounds that interfere with or augment the formation of superstructures that support various biological functions. Protein therapeutics may also have a significant role to play in this emerging area. The importance of these targets is likely to grow in the future as our understanding of macromolecular interactions improves.

QUESTIONS

1. Provide the general function of the six major classes of enzymes.
   - **a.** Oxidoreductases
   - **b.** Transferases
   - **c.** Hydrolases
   - **d.** Lyases
   - **e.** Isomerases
   - **f.** Ligases
2. Define the following non-covalent interactions.
   - **a.** Hydrophobic interactions
   - **b.** Electrostatic/salt bridge
   - **c.** Hydrogen bond
   - **d.** π-stacking
   - **e.** π-cation interactions
3. Name three methods of enzyme inhibition and define each.
4. What are the three key structural features of G protein-coupled receptors (GPCRs)?
5. What are the two major signaling pathways for GPCRs?