Figure 11-1  *Essential Cell Biology* (© Garland Science 2010)
Figure 11-6  Essential Cell Biology (© Garland Science 2010)
Figure 11-7  Essential Cell Biology (© Garland Science 2010)
Figure 11-11  *Essential Cell Biology* (© Garland Science 2010)
Figure 11-12  Essential Cell Biology (© Garland Science 2010)
Figure 11-13  *Essential Cell Biology* (© Garland Science 2010)
Figure 11-14  Essential Cell Biology (© Garland Science 2010)
lateral diffusion

flexion rotation

flip-flop (rarely occurs)
Figure 11-17 Essential Cell Biology (© Garland Science 2010)
Figure 11-19  *Essential Cell Biology* (© Garland Science 2010)
α-helical Bundles
Example: Bacteriorhodopsin (PDB 1AP9)

β-Barrels
Example: Matrix Porin (PDB 1OMF, Subunit)
Figure 11-35  Essential Cell Biology (© Garland Science 2010)
Figure 11-31  Essential Cell Biology (© Garland Science 2010)
Figure 12-2 Essential Cell Biology (© Garland Science 2010)
Figure 12-12  *Essential Cell Biology* (© Garland Science 2010)
Figure 12-4  *Essential Cell Biology* (© Garland Science 2010)
Figure 12-21  Essential Cell Biology (© Garland Science 2010)
Figure 12-7  *Essential Cell Biology* (© Garland Science 2010)

(A) Electrochemical gradient when voltage and concentration gradients work in the same direction

(B) Electrochemical gradient when voltage and concentration gradients work in opposite directions
Figure 12-11  Essential Cell Biology (© Garland Science 2010)
Figure 12-15  *Essential Cell Biology* (© Garland Science 2010)
Figure 12-16  Essential Cell Biology (© Garland Science 2010)
(A) exact balance of charges on each side of the membrane
membrane potential = 0

(B) a few positive ions (red) cross the membrane from right to left, setting up a nonzero membrane potential
(A) $K^+$ channel closed, membrane potential = 0; more $K^+$ inside the cell than outside, but zero net charge on each side (positive and negative charges balanced exactly)

(B) $K^+$ channel open; $K^+$ moves out, leaving negative ions behind, and this charge distribution creates a membrane potential that balances the tendency of $K^+$ to move out
Figure 12-34  Essential Cell Biology (© Garland Science 2010)