**Chapter Review**

**Chapter 15: The Plasma Membrane**

15.1

The fundamental structure of the plasma membrane is a phospholipid bilayer, which also contains glycolipids and cholesterol. Associated proteins are responsible for carrying out specific membrane functions. Membranes are viewed as fluid mosaics in which proteins are inserted into phospholipid bilayers. Although proteins are free to diffuse through the phospholipid bilayer, the mobility of many proteins is restricted and plasma membranes are composed of distinct domains. Plasma membranes of epithelial cells are divided into apical and basolateral domains with different functions. The mobility of plasma membrane proteins is also restricted by their associations with the cytoskeleton and discrete domains consisting of lipids and other proteins.

15.2

The passage of most biological molecules is mediated by carrier or channel proteins that allow polar and charged molecules to cross the plasma membrane without interacting with its hydrophobic interior. Ion channels mediate the rapid passage of selected ions across the plasma membrane. They are particularly well characterized in nerve and muscle cells, where they are responsible for the transmission of electric signals. Energy derived from ATP hydrolysis can drive the active transport of molecules against their electrochemical gradients. Ion gradients are also used as a source of energy to drive the active transport of other molecules.

15.3

Cells ingest large particles, such as bacteria and cell debris, by phagocytosis, which is driven by actin remodeling. Macromolecules are internalized by clathrin-mediated endocytosis, which provides a mechanism for the selective uptake of specific molecules into clathrin-coated vesicles. Clathrin-coated vesicles are transported to early endosomes, from which receptors are recycled to the plasma membrane and cargo is transported to late endosomes and lysosomes for degradation.