Ch. 9: Fundamental Cellular Processes II

- Cell Communication: the activities of cells, tissues, & organ in diff. parts of a multicellular organism are coordinated by long-distance signals
- Steps of Cell-Cell Signaling: occurs in 4 steps
    - signal reception
    - signal processing
    - signal response
    - signal deactivation
- Receptor activation: signal binds to a receptor which is then activated
- Signal Transduction: signal is transmitted inside the cell by signal transduction pathway
- Response: cell responds (ex: activates an enzyme or turning on transcription of a gene)
- Termination: response is terminated so that new signals can be received
- Types of cell signaling:
    - Endocrine signaling: signal travels the circulatory system
    - Paracrine signaling: when cells are relatively close enough to signal (can diffuse over short space)
        - one cell releases the signal & the other accepts
    - Autocrine signaling: signal is sent from the same cell it goes to
        - usu. feedback to the cell to stop signaling (tells cell that signaling is not necessary, stop!)
    - Juxtacrine signaling: surface to surface contact b/t cells
- Hormones: an information carrying molecule that is secreted from a cell (the signaling molecules that are released)
    - it circulates in the body & acts on target cells far from the signaling cell
    - hormones may be soluble or insoluble in lipids
    - lipid soluble hormone: are free to cross the cell membrane through diffusion (primarily steroid hormones)
    - lipid insoluble hormone: are large or hydrophilic & don't cross the plasma membrane
        - bind to receptors on the cell surface
    - hormones & other cell-cell signals bind to signal receptors
- Signal Reception: ligand binds to receptors & conformational change occurs
    - Signal Receptors: proteins that change their shape or activity after binding to a signaling molecule
        - receptors are dynamic & may change in their sensitivity to particular hormones
        - receptors can be blocked
        - receptors for lipid soluble receptors are inside the cell (most signal receptors are located in the plasma membrane)
        - coordinate activities & are specific for the signaling molecule (ligand) they bind to