**Signaling**

**10.1: General Features of Signaling Pathways**

* Summarize the properties of a receptor.
  + Quantify ligand binding in terms of a dissociation constant. (calc. 10.1)
  + Recount the events in the two main types of signal transduction.
  + Describe the factors that limit signaling.

**Cell signaling (general features)**

**Receptor-ligand binding: *K*d**

***K*d = [R][L]/[R•L]**

**Bacterial quorum sensing**

**Limitations to cell signaling**

**10.2: G Protein Signaling Pathways**

* Describe signaling via G proteins-coupled receptors.
  + Recount the events of signaling via a G protein.
  + Summarize the roles of nucleotides in the signaling pathway.
  + Describe how a kinase is activated.
  + List the mechanisms that terminate the G protein signaling pathway.
  + Compare the adenylate cyclase pathway and the phosphoinositide pathway.
  + Explain how the same hormone can elicit different responses in different cells and how different hormones can elicit the same response in a cell.

**Receptor structure (b2-Adrenergic Receptor)**

**GPCR/G-protein interactions**

**G protein cycle**

**GPCR second messengers (cAMP)**

**Enzymatic targets of GPCR signaling (PKA)**

**GPCR signal reversal**

**GPCR desensitization (Arrestin)**

**Phosphoinositide signaling (α-Adrenergic Receptor)**

**Sphingolipid signaling**

**Calmodulin**

**10.3: Receptor Tyrosine Kinases**

* Describe the receptor tyrosine kinase signaling pathway.
  + Compare G protein-coupled receptors and receptor tyrosine kinases.
  + Distinguish the two mechanisms by which receptor tyrosine kinases activate target proteins.
  + Explain how kinases and transcription factors mediate cellular responses over different time scales.

**Receptor structure (insulin receptor)**

**Receptor activation**

**Ras activation/targets**

**Ras signaling**

**10.4: Lipid Hormone Signaling**

* Compare lipid signaling to other signal transduction pathways.
  + Recognize lipid hormones.
  + Describe how lipid hormones regulate gene expression.
  + Explain how eicosanoids differ from other signaling molecules.

**Lipid hormone structure**

**Cortisol/glucocorticoid receptor signaling**

**Eicosanoid signaling**

**COX inhibitors**