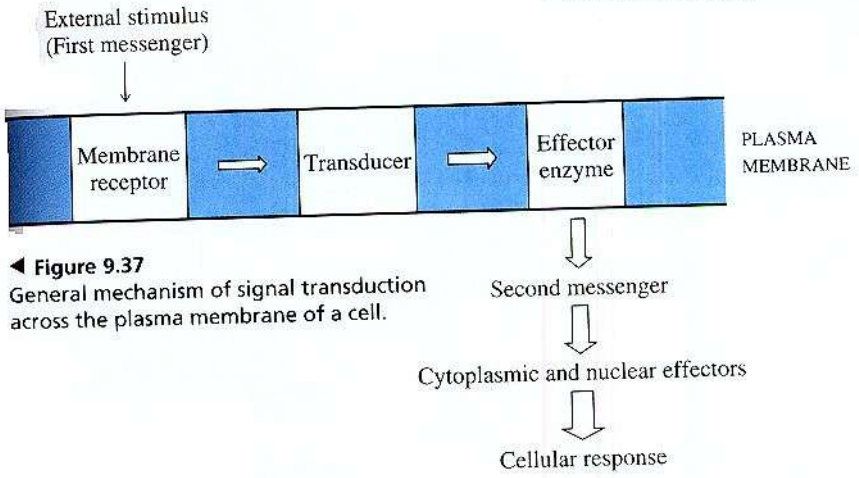
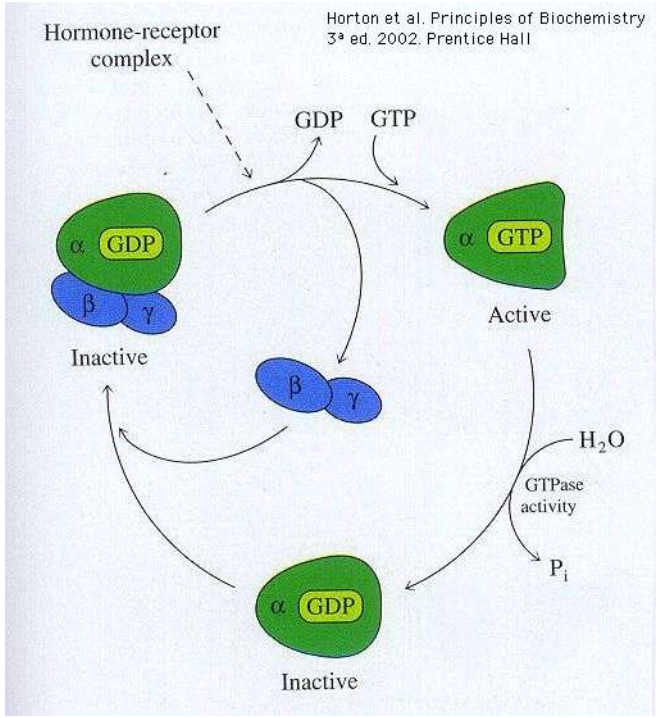
Horton et al. Principles of Biochemistry
3ª ed. 2002. Prentice Hall



◀ **Figure 9.37**
General mechanism of signal transduction across the plasma membrane of a cell.



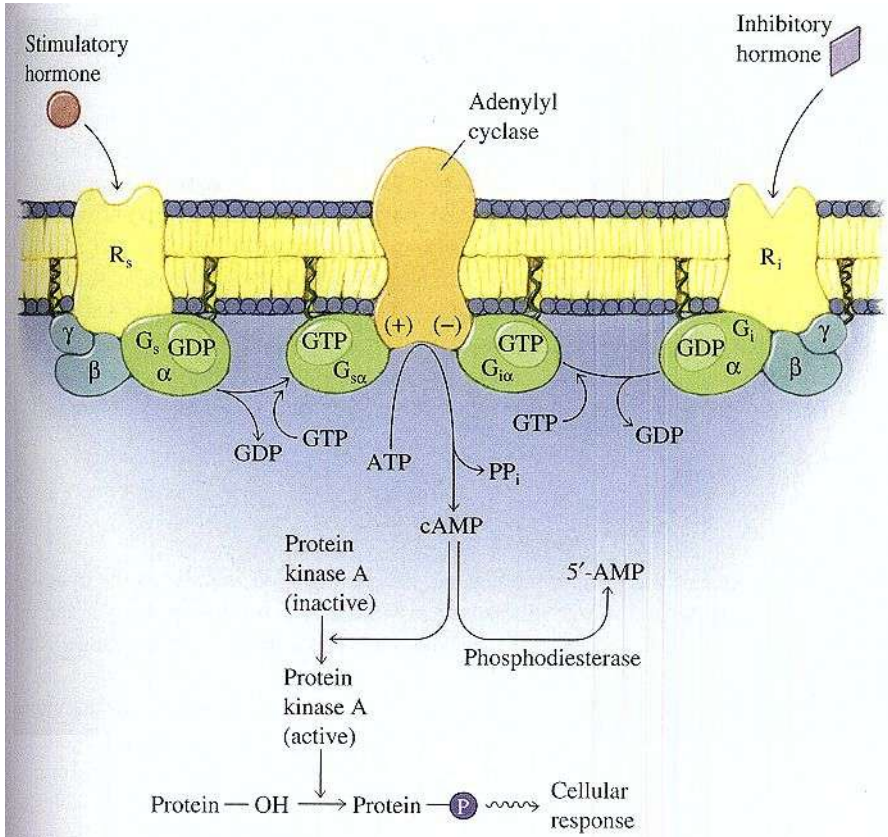


Figure 9.43 ▲
Summary of the adenylyl cyclase signaling pathway. Binding of a hormone to a stimulatory transmembrane receptor (R_s) leads to activation of the stimulatory G protein (G_s) on the inside of the membrane. Other hormones can bind to inhibitory receptors (R_i), which are coupled to adenylyl cyclase by the inhibitory G protein G_i. G_s activates the integral membrane enzyme adenylyl cyclase, whereas G_i inhibits it. cAMP activates protein kinase A, resulting in the phosphorylation of cellular proteins.

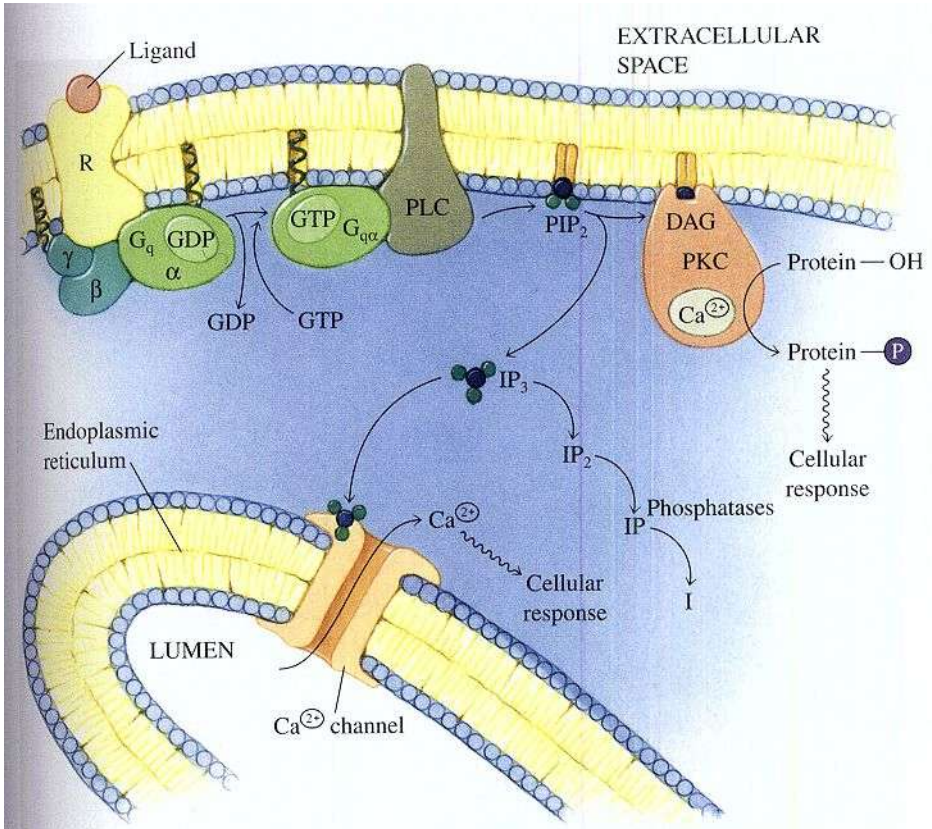


Figure 9.46 ▲
Inositol-phospholipid signaling pathway. Binding of a ligand to its transmembrane receptor (R) activates the G protein G_q. This in turn stimulates a specific membrane-bound phospholipase C (PLC), which catalyzes hydrolysis of the phospholipid PIP_2 in the inner leaflet of the plasma membrane. The resulting second messengers, IP_3 and diacylglycerol (DAG), are responsible for carrying the signal to the interior of the cell. IP_3 diffuses to the endoplasmic reticulum, where it binds to and opens a Ca^{2+} channel in the membrane, releasing stored Ca^{2+}. Diacylglycerol remains in the plasma membrane, where it—along with Ca^{2+}—activates the enzyme protein kinase C (PKC).

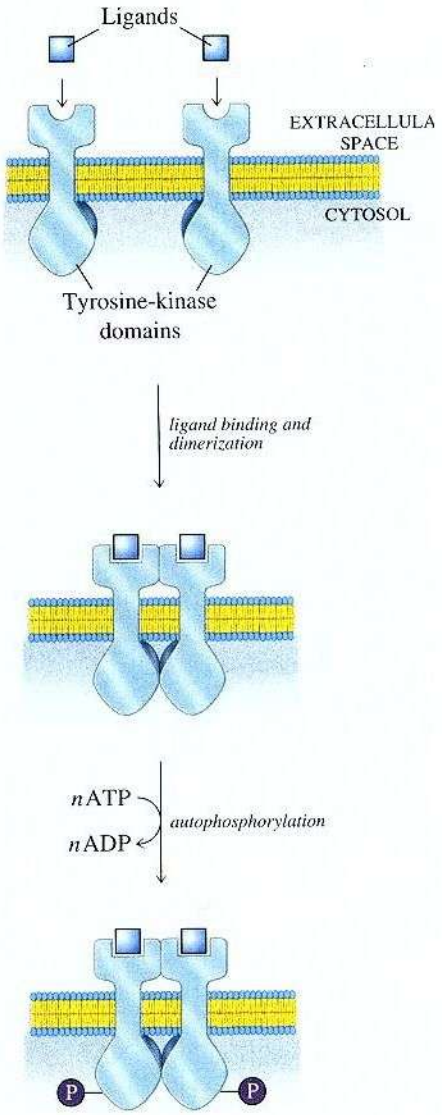
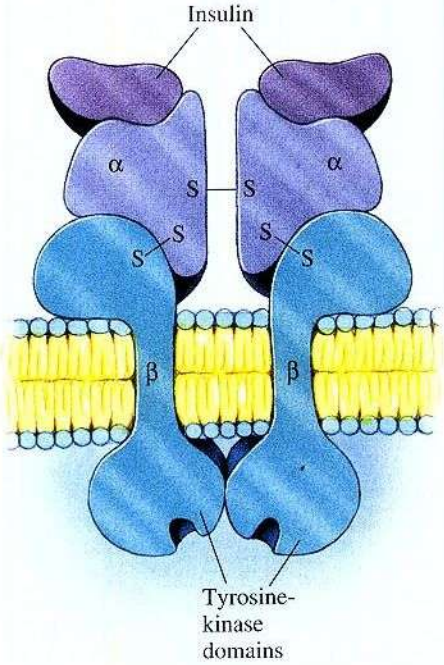


Figure 9.47 ▲
Activation of receptor tyrosine kinases. Activation occurs as a result of ligand-induced receptor dimerization. Each kinase domain catalyzes phosphorylation of its partner. The phosphorylated dimer can catalyze phosphorylation of various target proteins.



▲ Figure 9.48
Insulin receptor. Two extracellular α chains, each with an insulin-binding site, are linked to two transmembrane β chains, each with a cytosolic tyrosine kinase domain. Following insulin binding to the α chains, the tyrosine kinase domain of each β chain catalyzes autophosphorylation of tyrosine residues in the adjacent kinase domain. The tyrosine kinase domains also catalyze the phosphorylation of proteins called insulin-receptor substrates (IRSs).