

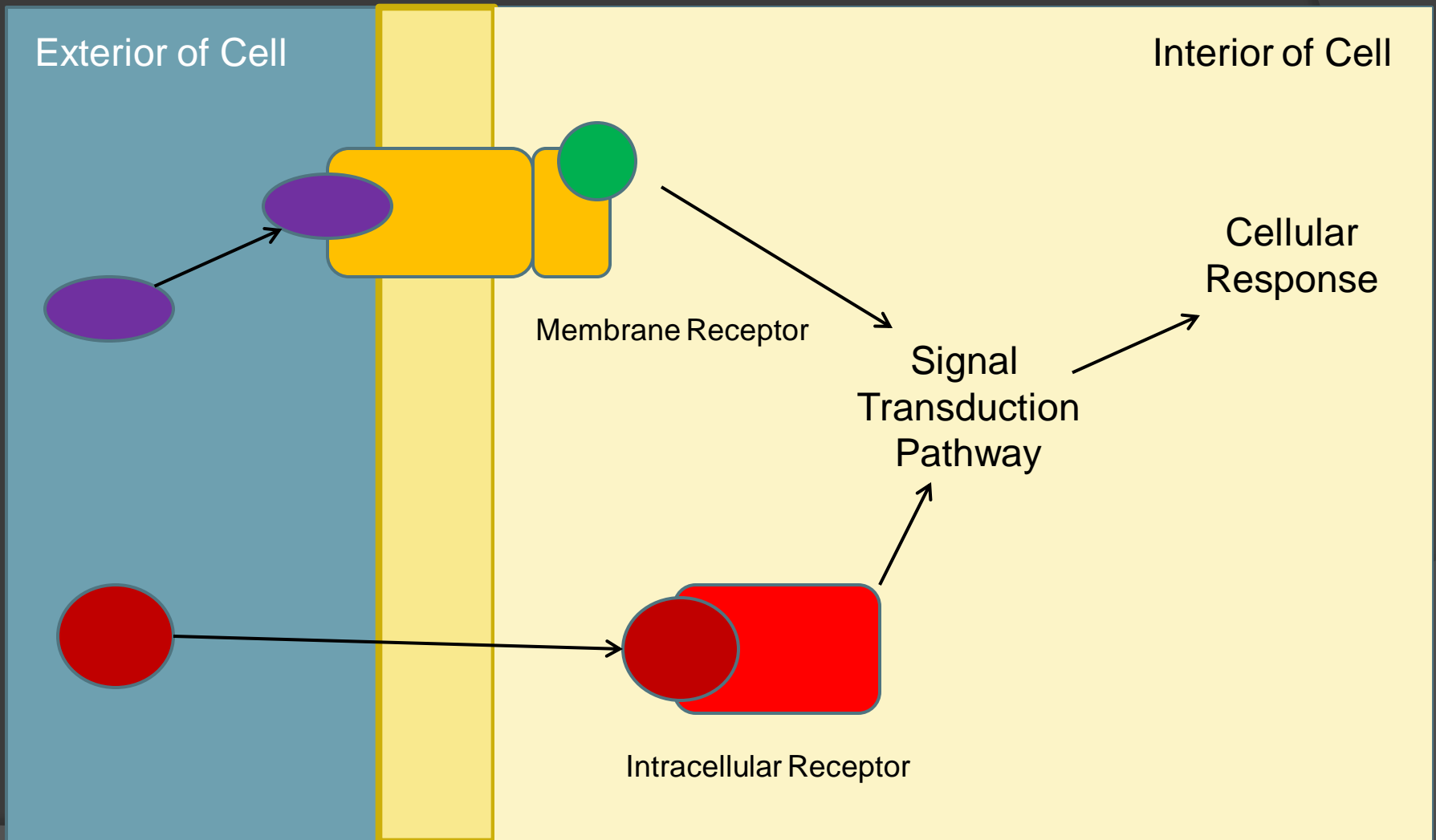
John Ireland

CELL TO CELL COMMUNICATION

Topics

- ① Overview of Signaling
- ① Cell Surface Receptor Types
- ① Intracellular Receptors
- ① Protein Kinase
 - Insulin Receptor
 - Protein Kinase Cascade
- ① G-Protein-Coupled Kinase
- ① Cell to Cell Connection

Cell Signaling Overview



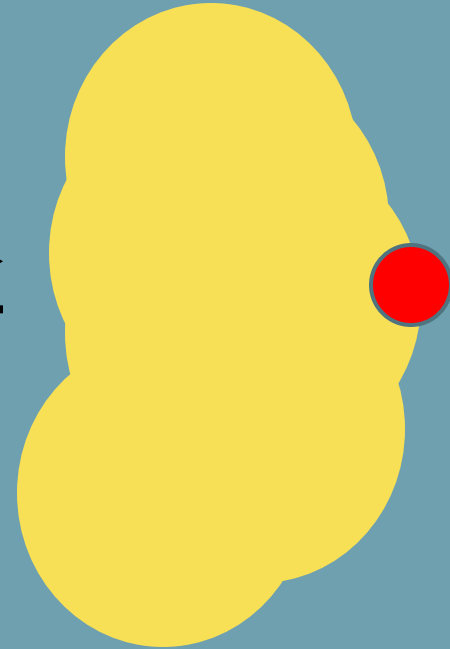
Types of Cell Signaling

- Direct Contact
- Paracrine Signaling
- Endocrine Signaling
- Synaptic Signaling

Phosphorylation



Unactivated Protein



Activated Protein

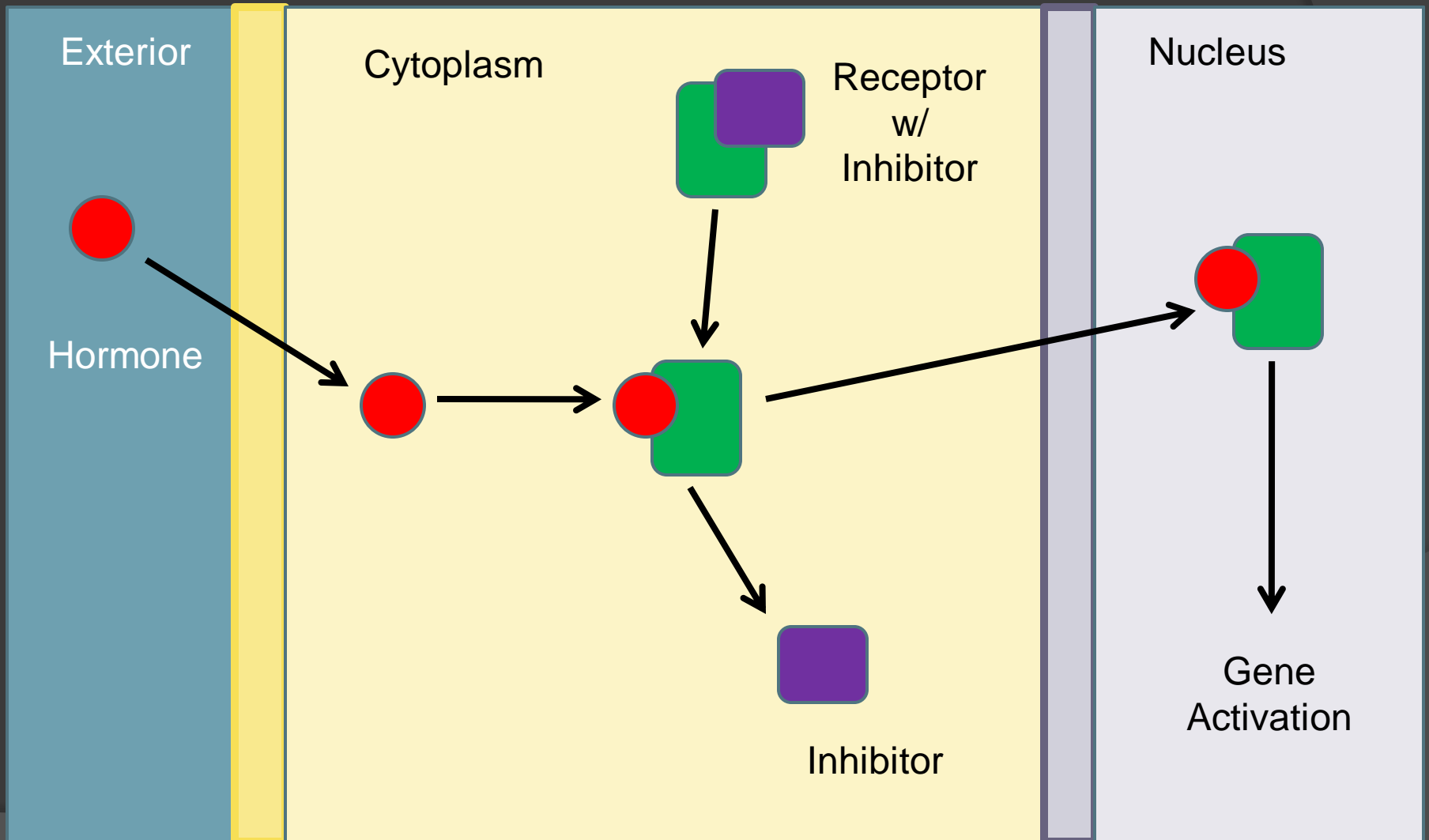
Phosphorylation

- ⦿ Protein Kinases add a phosphate group to an amino acid
 - Serine/Threonine
 - Tyrosine
- ⦿ Phosphorylation activates the protein
- ⦿ Phosphatases remove phosphate groups
- ⦿ Dephosphorylation inactivates protein

Receptor Types

- ⦿ Intracellular Receptor
- ⦿ Cell Surface Receptor
 - Chemically Gated Ion Channels
 - Enzymatic Receptors
 - G Protein-Coupled Receptors

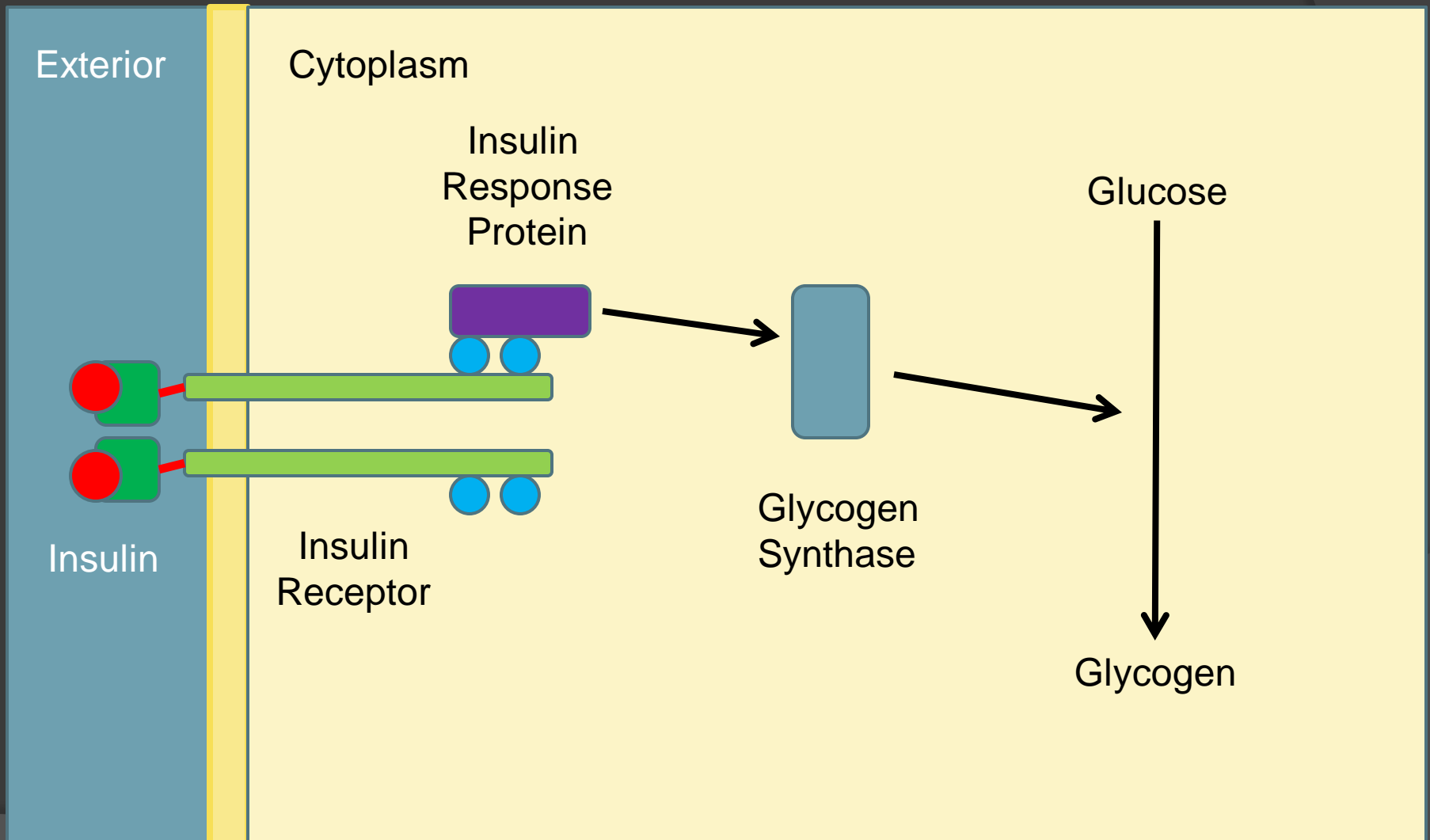
Intracellular Receptors



Intracellular Receptors

- ⦿ Triggered by Hydrophobic Ligands (i.e. Hormones)
- ⦿ Complex Proteins with Many Domains
 - Signal Binding Domain
 - DNA-Binding Site
 - Coactivator Domains
- ⦿ Blocked by an inhibitor till binding of signal
- ⦿ Other Intracellular Receptors act as Enzymes

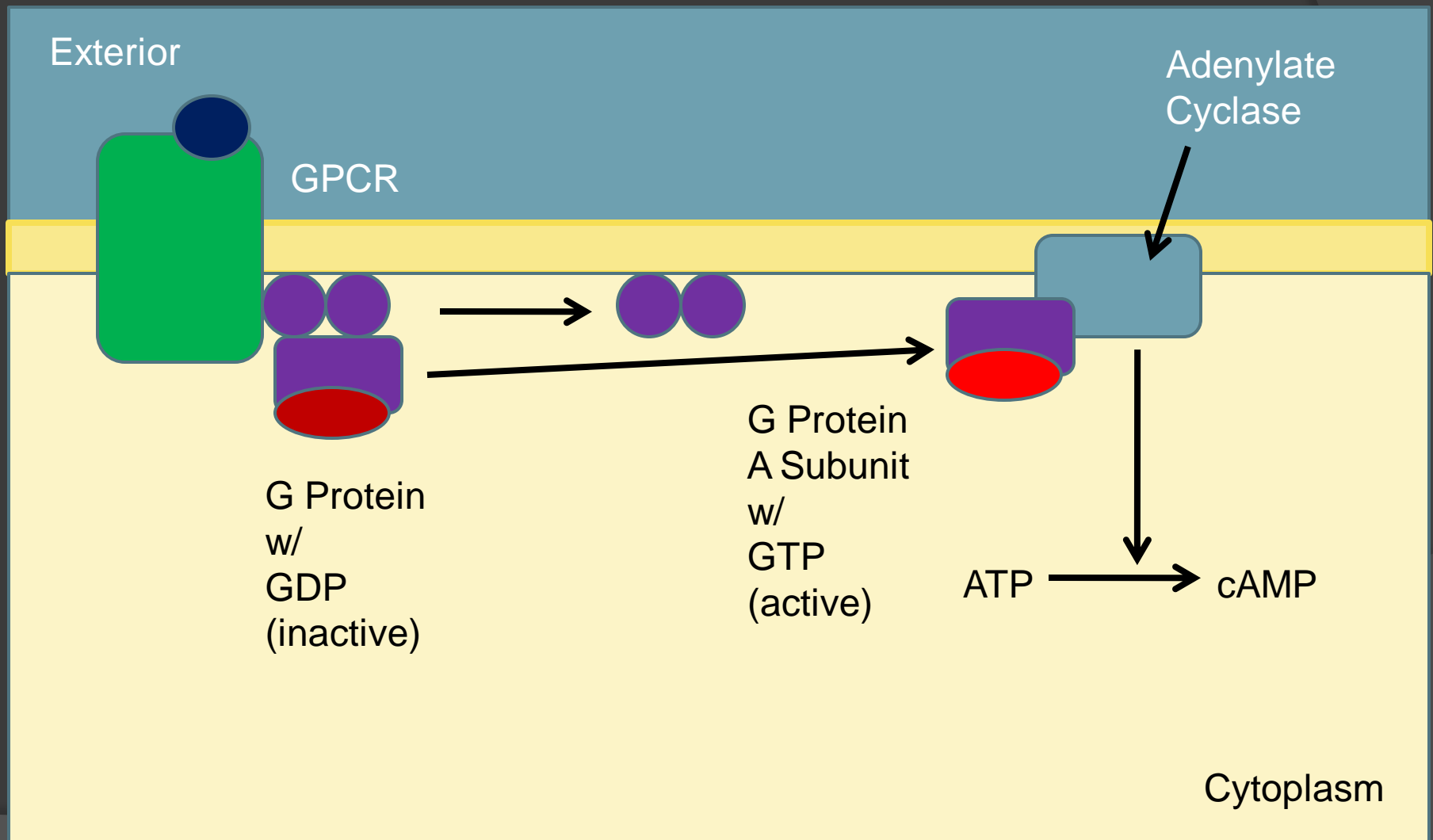
Protein Kinase – Insulin Rc



Protein Kinases

- Binding of external ligand activates phosphorylation of internal domain
- Phosphorylation activates adapter protein
- Adapter protein can activate cellular response
- Signal can be amplified through a cascade

G Protein-Coupled Receptors cAMP Signaling Pathway



Cell to Cell Connection

- Surface Marker
- Tight Junctions
- Anchoring Junctions (Desmosomes)
- Communicating Junctions (Gap Junction)
- Communicating Junctions (Plasmodesmata)