

Chem 452 - Lecture 10

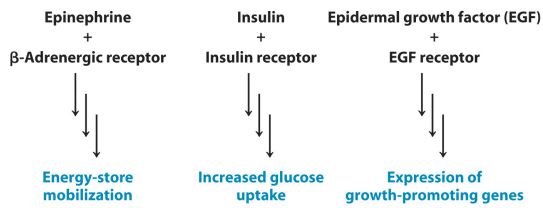
Signal Transduction & Sensory Systems

Part 1

Question of the Day: How is the coffee you drank this morning related to a second messenger?

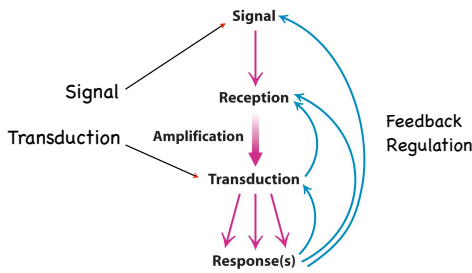
Introduction

+ Signal transduction involves the changing of a cell's metabolism or gene expression in response to an external stimulus.



Introduction

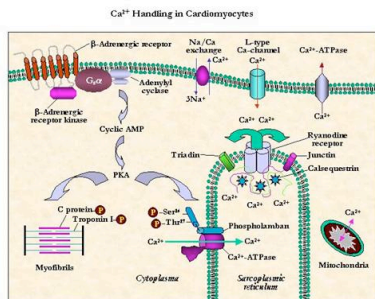
+ All three examples will present common themes



Introduction

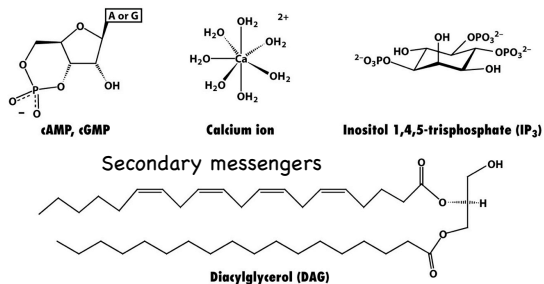
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1. Release
2. Recept messen
3. Deliver interio messer
4. Activati



Introduction

+ All three examples will present common themes

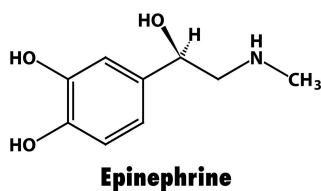


Secondary messengers

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G-Protein Receptors

+ The receptors for epinephrine (β -adrenergic receptors) provide an example for a class of receptors called G-proteins.

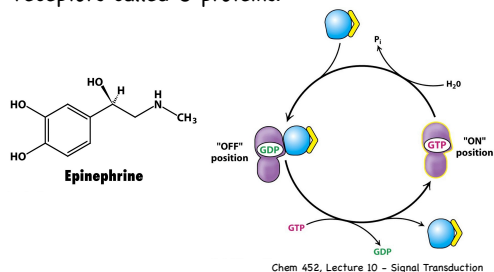


Epinephrine

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G-Protein Receptors

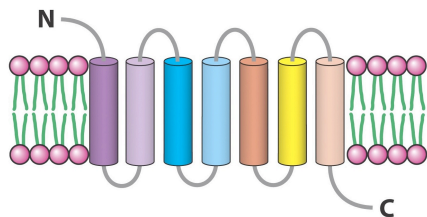
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G-Protein Receptors

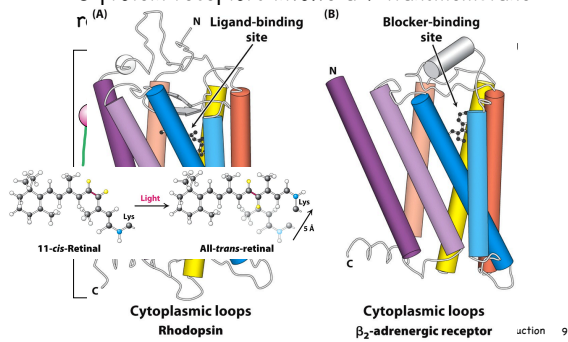
+ G-protein receptors involve a 7-transmembrane receptor (7TM) protein.



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G-Protein Receptors

• G-protein receptors involve a 7-transmembrane



G-Protein Receptors

• G-protein receptors involve a 7-transmembrane receptor (7TM) protein.

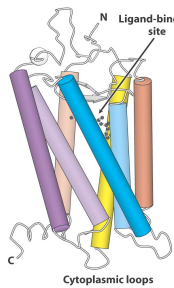


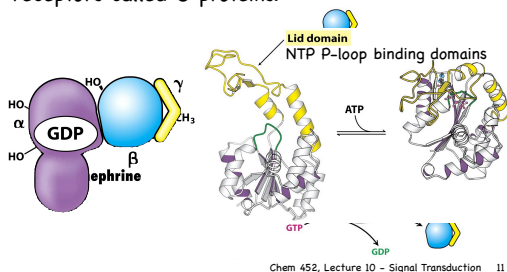
TABLE 14.1 Biological functions mediated by 7TM receptors

- Hormone action
- Hormone secretion
- Neurotransmission
- Chemotaxis
- Exocytosis
- Control of blood pressure
- Embryogenesis
- Cell growth and differentiation
- Development
- Smell
- Taste
- Vision
- Viral infection

Source: After J. S. Gutkind, *J. Biol. Chem.* 273(1998): 1839-1842.

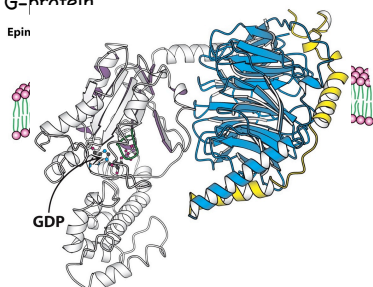
G-Protein Receptors

• The receptors for epinephrine (β -adrenergic receptors) provide an example for a class of receptors called G-proteins.



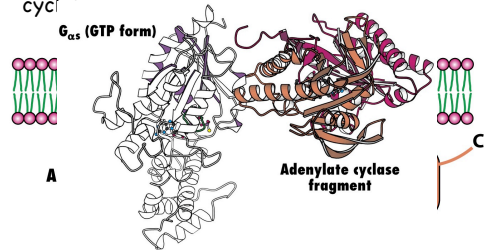
G-Protein Receptors

• Ligand Binding to the 7TM receptor activates the G-protein



G-Protein Receptors

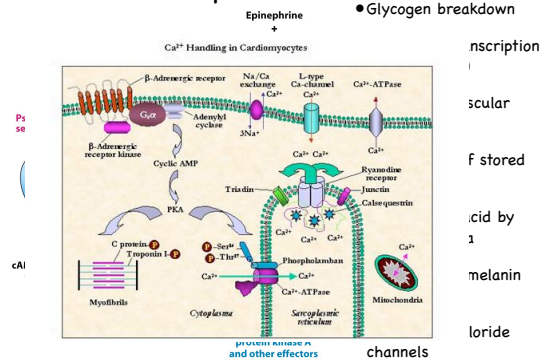
- The activated G-protein ($G_{\alpha s}$) goes on to activate the membrane bound enzyme adenylate cyclase



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G-Protein Receptors

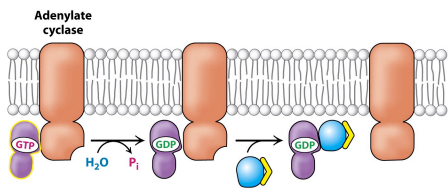
- Glycogen breakdown



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G-Protein Receptors

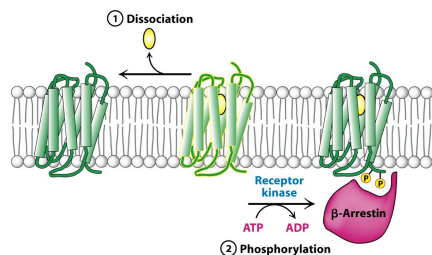
- Hydrolysis of GTP to GDP resets the activated G-protein.



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G-Protein Receptors

- Resetting the receptor.



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Next up

+ Lecture 10, Signal Transduction (cont'd). (Chapter 14)
