

Unit 2: Cellular Organization and Processes

Section 2-3: Cell Communication

Book Reading: Chapter 11 pages 201-215

Two Kinds of Cell Signaling

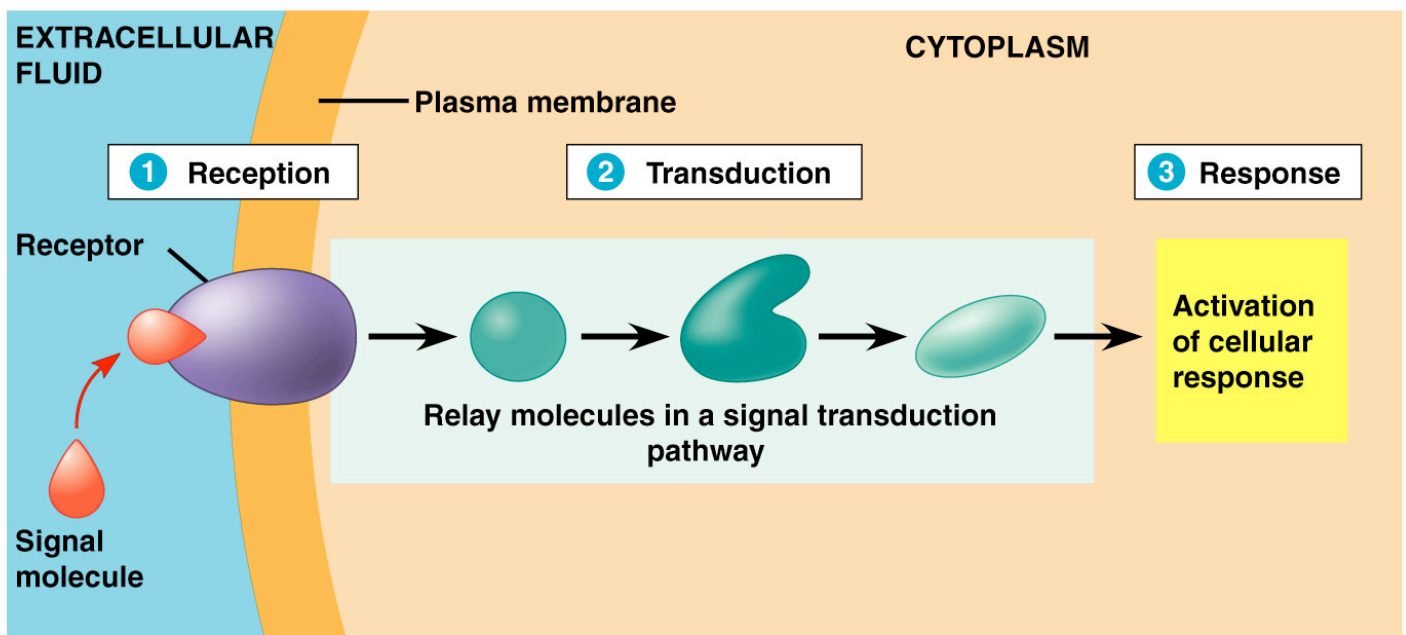
❖ Local Regulators

- *Where do they come from?*
- *what kinds of cells do they influence?*

❖ Hormones

- *What are they used for?*
- *What is another name for hormone signaling in animals?*

Overview: Three Stages of Cellular Signaling



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❖ Reception- *describe*

❖ Transduction- *describe*

- Can be single step, or a signal transduction pathway *describe*

❖ Response- *describe*

Reception

❖ General Process

- Signal molecule is complimentary in shape to the receptor
- Ligand- *define*
- Causes the receptor protein to undergo a change in shape causes a change in

❖ Intracellular Receptors

- Inside Cell-cytoplasm or nucleus
- Signal must be *what kind of molecule*
- Often receptor also carries out transduction
- All very similar in structure suggesting an evolutionary relationship
- Examples:

❖ Membrane Receptors

- Transmembrane proteins
- Transmit information from extracellular environment to intracellular environment by changing shape when ligand binds
- G-protein-linked receptor
 - Structure
 - *What portion spans the membrane?*
 - *Where does the signal bind?*
 - Function
 - *Summarize the four portions of the diagram here*
 -
 -
 -
 - Key Feature:
 - Where/When Used: embryonic development *and where else?*
 - Diseases: *what diseases are linked to g-proteins*

- Receptor Tyrosine Kinase
 - Kinase- general term for an enzyme that phosphorylates another protein
 - Structure
 - *Describe the structure*
 -
 -
 -
 - Function
 - *Summarize the four portions of the diagram here*
 -
 -
 -
 - When/Where used: *when/where are they used?*
 - Key Feature:
 - Diseases: *to what disease are these proteins linked*
- Ligand-Gated Ion Channel
 - Structure- *describe the structure*
 - Function
 - *Summarize the three portions of the diagram here*
 -
 -
 -
 - When/where used: nervous system signaling

Transduction

❖ Protein Phosphorylation and Dephosphorylation

- Protein kinase- *define*
 - *On what proteins do they act on*
 - *What two amino acids do they usually phosphorylate*
- Phosphorylation cascade- *define/describe*
- Protein phosphatases-
 - *What do they do?*
 - *What is this process called?*

❖ Secondary Messengers

- *Describe their structure and how they are able to move through the cell*
- cyclic AMP (cAMP)
 -
 -
 -
 -
 - Important pathway in the regulation of H₂O and salt balance in intestines
- Calcium Ions
 -
 -
 - Important pathway in muscle contraction

Response

- ❖ Enzyme Activation-
- ❖ Transcription factors-
- ❖ Fine Tuning of the Response
 - Signal Amplification
 - Specificity of Signaling
 -
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