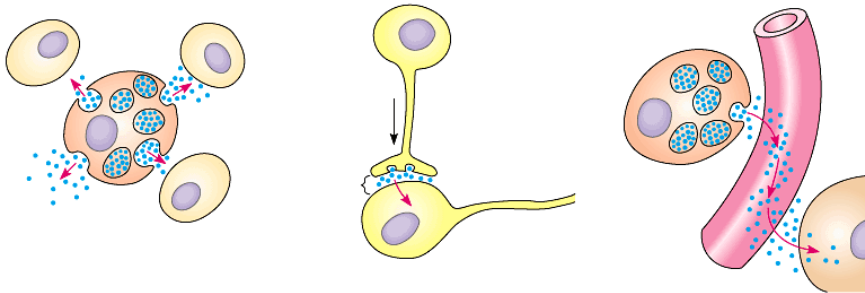


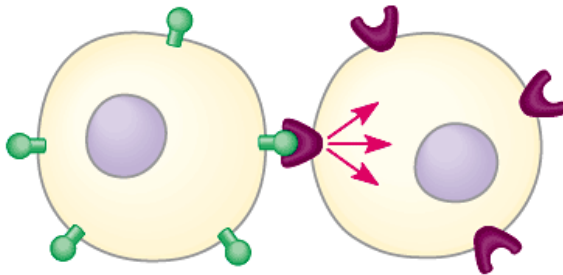
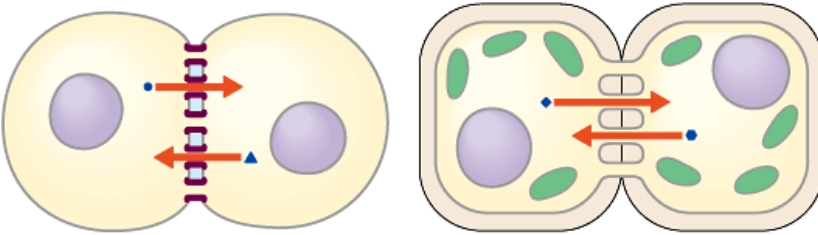
1. When did cell signaling evolve?
2. What is some of the evidence for that?
3. Define Signal Transduction pathway
4. Define the following
 - a. Local regulator
 - b. Hormone
 - c. Pheromones (you'll have to look this up in another chapter)
 - d. Local regulator
 - e. Paracrine signaling
 - f. Synaptic signaling
5. Using those terms, label the following diagram:



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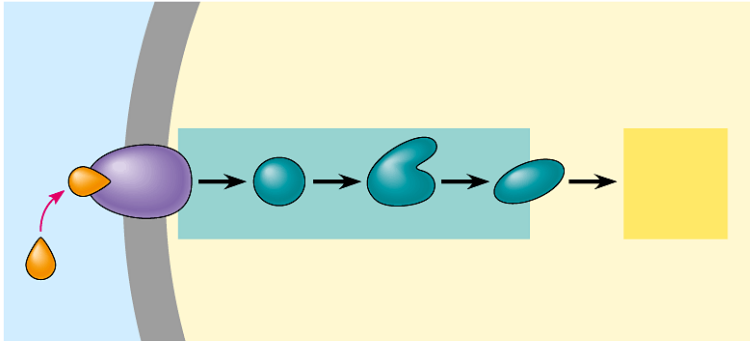
6. List and Explain the three stages of signaling.

7. How do the cell junctions affect the signaling systems.



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8. Label the following diagram with the stages of signaling.

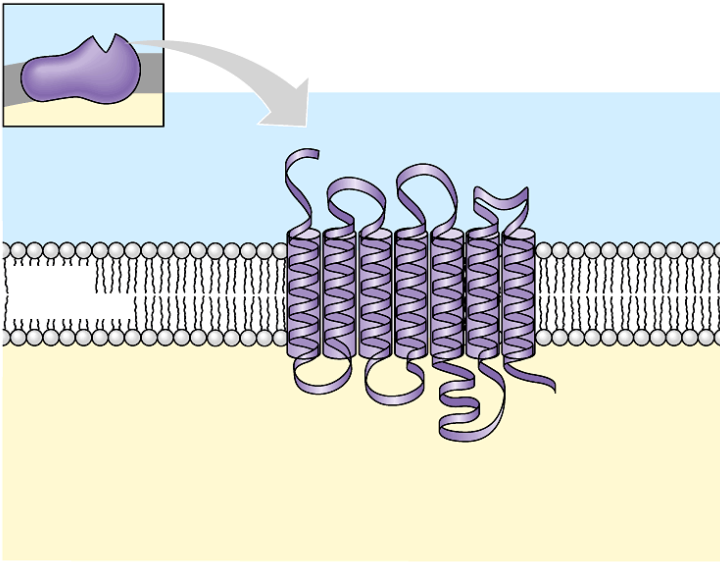


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9. Define Ligand

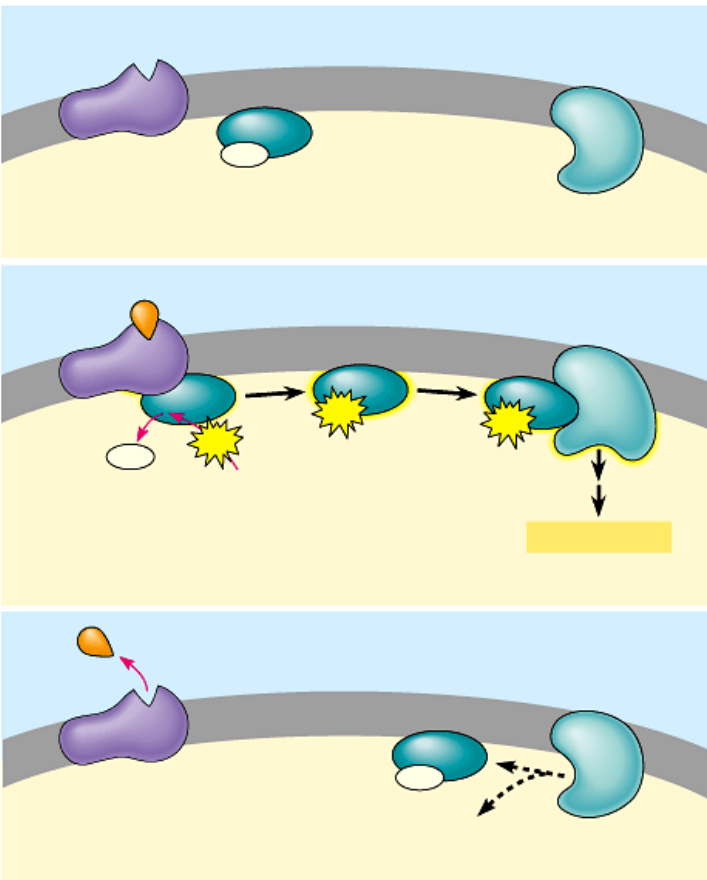
10. What is a G protein-linked receptor?

11. Label the following:



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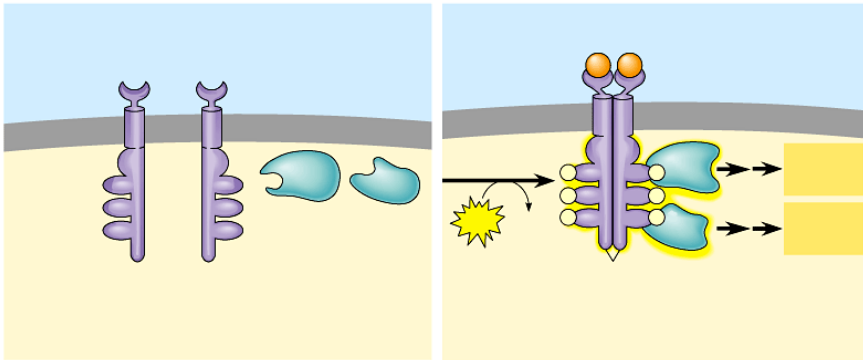
12. Label the following diagram of the functioning of a G protein linked receptor.



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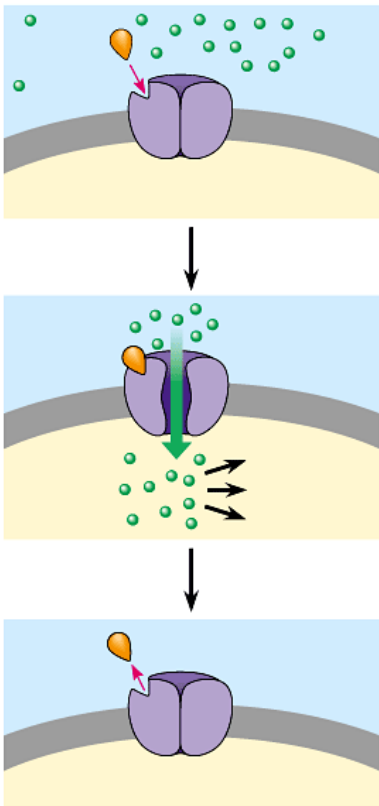
13. What is a kinase?

14. Label the diagram of the Tyrosine kinase receptor below.



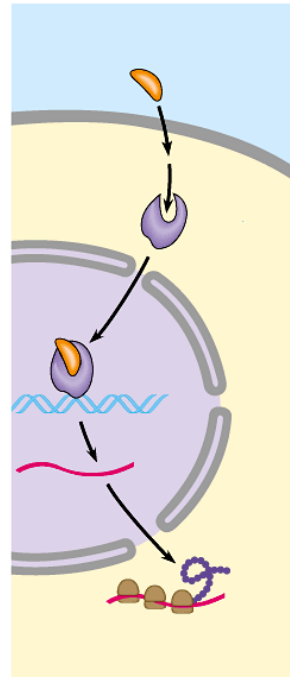
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15. Label and title the diagram below.



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16. Label the diagram below

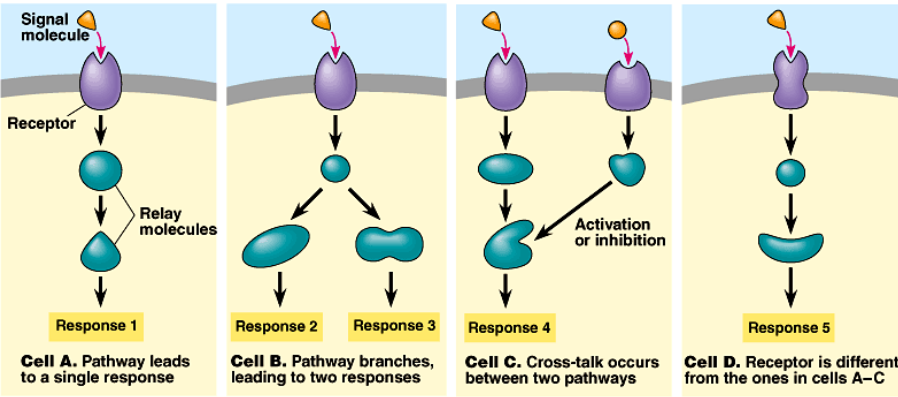


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16. The importance of the signal transduction pathway is important because of amplification. Explain what is meant by amplification.

(a) Signaling pathway	(b) Number of molecules activated
RECEPTION Binding of epinephrine to G-protein-linked receptor	1 molecule
TRANSDUCTION Inactive G protein → Active G protein	10^2 molecules
Inactive adenylyl cyclase → Active adenylyl cyclase	10^2 molecules
ATP → Cyclic AMP	10^4 molecules
Inactive protein kinase A → Active protein kinase A	10^4 molecules
Inactive phosphorylase kinase → Active phosphorylase kinase	10^5 molecules
Inactive glycogen phosphorylase → Active glycogen phosphorylase	10^6 molecules
RESPONSE Glycogen → Glucose-1-phosphate	10^8 molecules

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17. What is the significance of the diagram above?