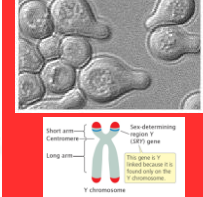
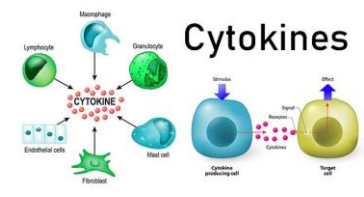


4.3 Signal Transduction

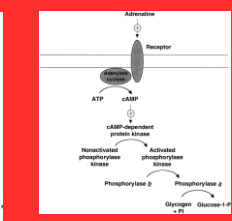
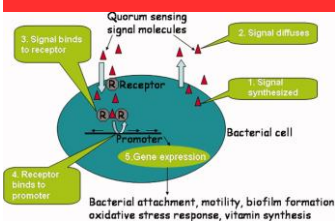


ENDURING UNDERSTANDING

IST-3 Cells communicate by generating, transmitting, receiving, and responding to chemical signals.

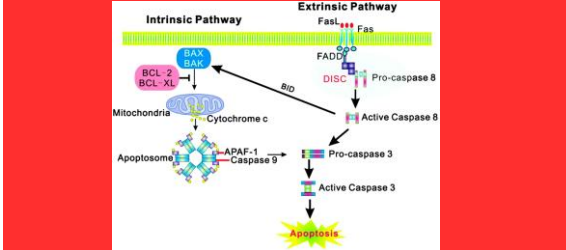
IST-3.E Describe the role of the environment in eliciting a cellular response.

- Signal transduction pathways influence how the cell responds to its environment.
 - In single-celled organisms, signal transduction pathways influence how the cell responds to its environment (quorum sensing)
 - Epinephrine stimulation of glycogen breakdown in mammals



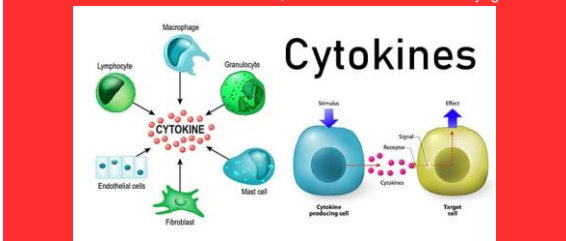
IST-3.F Describe the different types of cellular responses elicited by a signal transduction pathway.

- Signal transduction may result in changes in gene expression and cell function, which may alter phenotype or result in programmed cell death (apoptosis).



IST-3.F Describe the different types of cellular responses elicited by a signal transduction pathway.

- Cytokines
 - Class of signaling proteins that regulate gene expression for cell replication and division.
 - Used in cellular communication, immune function and embryogenesis



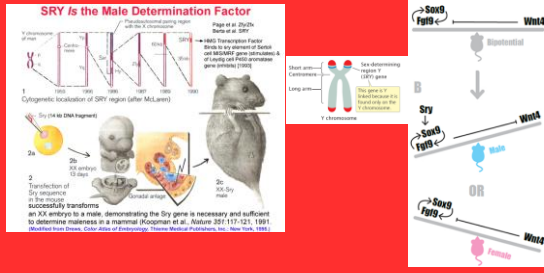
IST-3.F Describe the different types of cellular responses elicited by a signal transduction pathway.

- Mating pheromones in yeast trigger mating gene expression.

1. Yeast "a" and "alpha" cells encounter mating pheromones of the opposite cell type
2. They induce genes necessary for mating, arrest the cell cycle in G1, alter cell surface and nuclear determinants
3. Undergo morphological elongation into pear shapes, termed "shmooing"
4. Alterations prepare the yeast cells for mating and fusion to form stable diploids.

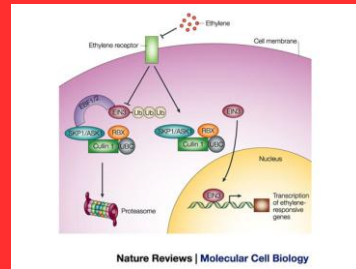
IST-3.F Describe the different types of cellular responses elicited by a signal transduction pathway.

- Expression of the SRY gene triggers the male sexual development pathway in animals.



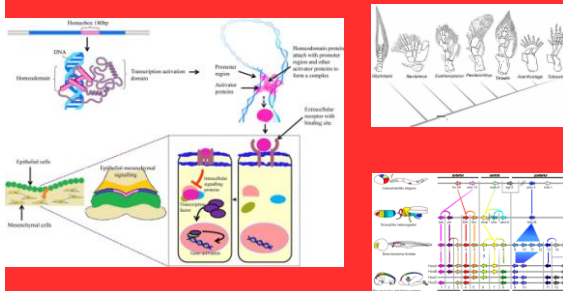
IST-3.F Describe the different types of cellular responses elicited by a signal transduction pathway.

- Ethylene levels cause changes in the production of different enzymes, allowing fruits to ripen.



IST-3.F Describe the different types of cellular responses elicited by a signal transduction pathway.

- HOX genes affect early development.



IST-3.F Describe the different types of cellular responses elicited by a signal transduction pathway.

- Gibberellin induces seed germination.

