

LSC 503 - Cell Signaling

1. Environmental cues (Signaling molecules)- Peptide hormones, steroid hormones, prostaglandins.
2. Autocrine, paracrine and endocrine signaling, cellular communication in plants (plasmodesmata) and animals (connexin proteins).
3. Receptor-ligand, definition, purification of receptors, reconstitution of receptors, synthetic analogues of epinephrine receptors - (agonists/antagonists).
4. Difference between steroid hormone receptors and cell membrane receptors.
5. G-protein coupled receptors activation (adrenergic receptors), in vision and olfaction acetylcholine esterase receptors, growth factor receptors- mechanisms of their activation.
6. Signaling pathways involved in cell survival, cell proliferation and cell death.
7. Signaling mechanisms in glycogenolysis, immune signaling pathways, secondary messengers, Calcium-Calmodulin signaling pathways.
8. Third messenger- c-fos as an example.
9. Mechanism of steroid hormone receptor activation.
10. Protein phosphorylation, mechanisms in cellulose signaling, methods to study phosphorylation of proteins *in vitro* and *in vivo*.

Suggested Readings

1. Genes and Signals – by Mark Ptashne and Alexander Gann, CSHL Press
2. A Genetic Switch – by Mark Ptashne, CSHL Press
3. Gene Regulation – by David S Latchman, Chapman & Hall
4. Genes Benjamin - by Lewin Prentice, Hall
5. Molecular Cell Biology – by Lodish, H. et al., W. H. Freeman
6. Biochemistry and Molecular Biology of Plants - by Buchanan et al., ASPB Pub.
7. Molecular Biology of The Cell - by B. Alberts, A. Johnson, J. Lewis, M. Raff, K. Roberts, P. Walter, Garland Science