

PLANT CELL SIGNALLING (PBT-904) Credit Hours 3(3-0)

Educational Objectives:

This course is an intensive course to introduce the underlying cell signaling pathways and their mediators covering mammalian cells, plants and microbes. The final goal of this course aims to provide an overall knowledge regarding the diversity and significance of cell signaling events in response to various stimuli and physiological conditions.

Course Outcomes:

Students will be able to gain an understanding of various players in the cellular signaling, how the cells respond to various signals and the mechanisms involved in various responses to particular stimuli. They will be able to understand how different pathogens evade cellular mechanisms involving intercellular signaling pathways resulting in the activation of cellular defense mechanisms.

Course Contents:

- Structure/function of plant cell membranes, membrane receptors and signal transduction chains.
- Plant gene regulation
 - Gene regulation factors (endogenous and exogenous factors)
- Gene induction by different stimuli
- Gibberellins and cytokinin signalling,
- Newly discovered systems (brassinosteroids, jasmonates),
- Signaling with pathogens,
- light perception and signal transduction,
- Temperature sensing/heat shock, touch
- Movement in plants and long-distance electrical sensing.
- Practical skills focus on handling of plant cell fractions.

Recommended Books:

1. Molecular Biology of the Cell by Bruce Albert and Dennis Bray. Garland Publishing Inc, New York and London.

2. Handbook of Cell Signaling Vol 1-3, by Ralph Bradshaw, and Edward Dennis.
3. Cell Signalling, by John T. Hancock, 2nd ed. Oxford University Press.
4. Apoptosis, Cell Signaling, and Human Diseases: Molecular Mechanisms, Volume 2 by Rakesh Srivastava.
5. Cell Signaling and Growth Factors in Development: From Molecules to Organogenesis by Klaus Unsicker (Editor), Kerstin Krieglstein.
6. Signal Transduction by Bastien D. Gomperts.

The Biochemistry of Cell Signalling by Ernst J. M. Helmreich.