

Molecular and Cellular Signaling

A small number of signaling pathways, no more than a dozen or so, form a control layer that is responsible for all signaling in and between cells of the human body. The signaling proteins belonging to the control layer determine what kinds of cells are made during development and how they function during adult life. Malfunctions in the proteins belonging to the control layer are responsible for a host of human diseases ranging from neurological disorders to cancers. Most drugs target components in the control layer, and difficulties in drug design are intimately related to the architecture of the control layer.

Molecular and Cellular Signaling provides an introduction to molecular and cellular signaling in biological systems with an emphasis on the underlying physical principles. The text is aimed at upper-level undergraduate students, graduate students, and individuals in medicine and pharmacology interested in broadening their understanding of how cells regulate and coordinate their core activities and how diseases arise when these regulatory systems malfunction, as well as those in chemistry, physics, and computer science interested in pursuing careers in biological and medical physics, bioinformatics, and systems biology.

To that end, the book includes background information and review sections, and chapters on signaling in the immune, endocrine (hormonal), and nervous systems. It has chapters on cancer, apoptosis, and gene regulation, and contains chapters on bacteria and viruses. In those chapters not specifically devoted to pathogens, connections between diseases, drugs, and signaling are made. Each chapter also features a problem set to facilitate further discussion and understanding.

About the Author:

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ISSN 1618-7210

ISBN 0-387-22130-1