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Nota di contenuto	Part I Light-Sensing Proteins -- 1 History and Perspectives of Light-Sensing Proteins (Hideki Kandori) -- 2 Biology of Light-Sensing Proteins in Plants and Microorganisms (Mineo Iseki and Tetsuo Takahashi) -- 3 Structure-Functional Analysis of Channelrhodopsins (Hideaki E. Kato, Ryuichiro Ishitani, and Osamu Nureki) -- 4 Photochemistry of Halorhodopsin (Takashi Kikukawa, Naoki Kamo, and Makoto Demura) -- 5 Molecular Mechanisms for Ion Transportation of Microbial Rhodopsins Studied by Light-Induced Difference FTIR Spectroscopy (Yuji Furutani) -- 6 Optogenetic Potentials of Diverse Animal Opsins (Akihisa Terakita, Takashi Nagata, Tomohiro Sugihara, and Mitsumasa Koyanagi) -- 7 Color Tuning in Retinylidene Proteins (Kota Katayama, Sivakumar Sekharan, and Yuki Sudo) -- Part II Optogenetics in Biological Systems -- 8 General Description: Future Prospects of Optogenetics (Hiromu Yawo, Ryo Egawa, Shoko Hososhima, and Lei Wen) -- 9 Optogenetic Manipulation and Probing

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## Sommario/riassunto

The subject of optogenetics is comprehensively covered in this book, including physical, chemical, and biological topics of light-sensing proteins and their application in biological systems, particularly in neuroscience and medicine and the related opto-electronics. Optogenetics is a new technology that combines genetics and optics. It enables one to manipulate or measure the function of identified cells or neurons in a tissue by light with an accuracy in the range of milliseconds, even in a freely moving animal. Optogenetics has already become a powerful tool for revealing the neural mechanisms underlying behavior and analyzing various physiological phenomena. It is also expected to become useful for treating neural dysfunctions such as Parkinson disease and for the development of a brain-machine interface. This book should be read by any scientist or student performing research in any way related to optogenetics. As a milestone publication on optogenetics, this book will serve as a compass for any researcher, from beginners to experts, to explore this uncharted world.

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