

# Photobiology

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photobiology the science of light and life begins with basic principles and the physics of light and continues with

general photobiological research methods such as generation of light measurement of light and action spectroscopy in an interdisciplinary way it then treats how organisms tune their pigments and structures to the wavelength components of light and how light is registered by organisms then follow various examples of photobiological phenomena the design of the compound eye in relation to the properties of light phototoxicity photobiology of the human skin and of vitamin d photomorphogenesis photoperiodism the setting of the biological clock by light and bioluminescence a final chapter is devoted to teaching experiments and demonstrations in photobiology this book encompasses topics from a diverse array of traditional disciplines physics biochemistry medicine zoology botany microbiology etc and makes different aspects of photobiology accessible to experts in all these areas as well as to the novice

photobiology is an interdisciplinary science which has undergone a dramatic development in the past few years this comprehensive new textbook brings together all the information required by workers and students in the field from the atomic to the organismal level the initial chapters comprise a comprehensive introduction to the terminology and include a detailed description of the photochemical reactions involved the main part of the book covers all the classical photochemical topics and whilst not trying to be encyclopedic in coverage does present numerous relevant examples by bringing together the wide breadth of knowledge involved in the understanding of photobiology this book will be of immense use to all those involved

photobiology integrates a wide variety of scientific disciplines as more people become aware of the many ways light interacts with chemical and biological systems the need for a concise treatment of photobiology has become more critical kohen et al have written just such a book intended both as a textbook and as a reference the authors begin by providing a brief description of the nature of light how it affects matter and the means and methods of measuring it a major section of the book is devoted to how light influences living systems including discussions of photosynthesis bioluminescence regulatory mechanisms and visual transduction of light the last half of the book is devoted to the biomedical aspects of light including photoimmunology photoallergic reactions and other forms of light sensitivity the optical properties of skin and various ways that light can be used in therapy treatments useful to photobiologists as a

comprehensive overview this book should also appeal to biomedical researchers and advanced students of photobiology

the first edition of the science of photobiology was published in 1977 and was the first textbook to cover all of the major areas of photobiology the science of photobiology is currently divided into 14 subspecialty areas by the american society for photobiology in this edition however the topics of phototechnology and spectroscopy have been com bined in a new chapter entitled photophysics the other subspecialty areas remain the same i e photochemistry photosensitization uv radiation effects environmental photobiology photomedicine circadian rhythms extraretinal photoreception vision photomorphogenesis photomovement photosynthesis and bioluminescence this book has been written as a textbook to introduce the science of photobiology to advanced undergraduate and graduate students the chapters are written to provide a broad overview of each topic they are designed to contain the amount of information that might be presented in a one to two hour general lecture the references are not meant to be exhaustive but key references are included to give students an entry into the literature frequently a more recent reference that reviews the literature will be cited rather than the first paper by the author making the original discovery the chapters are not meant to be a repository of facts for research workers in the field but rather are concerned with demon strating the importance of each specialty area of photobiology and documenting its relevance to current and or future problems of man

photobiology is an important area of biological research since a very large number of living processes are either dependent on or governed by light that we receive from the sun among various subjects photosynthesis is one of the most important and thus a popular topic in both molecular and organismic biology and one which has made a considerable impact throughout the world since almost all life on earth depends upon it as a source of food fuel and oxygen however for growth of plants light is equally essential and research on photomorphogenesis has revealed exciting new developments with the application of newer molecular biological approaches the present book brings together and integrates various aspects of photosynthesis biology of pigments light regulation of chloroplast development nuclear and chloroplast gene expression light signal transduction other photomorphogenetic processes

and some photoecological aspects under one cover the chapters cover biochemical and molecular discussions of most of the above topics in a comprehensive manner and include a wide range of hot topics that are currently under investigation in the field of photobiology of cyanobacteria algae and plants the authors of this book are selected international authorities in their fields from usa europe australia and asia the book is designed primarily to be used as a text book by graduates and post graduates it is however also intended to be a resource book for new researchers in plant photobiology several introductory chapters are designed as suitable reading for undergraduate courses in integrative and molecular biology biochemistry and biophysics

the photobiology of higher plants offers a comprehensive balanced coverage of both photosynthesis including physiology and global aspects and photomorphogenesis in plants an accessible student friendly approach to the subject is taken providing the reader with a useful historical perspective and showing how this fascinating subject has evolved all aspects of plant biochemistry and plant physiology are included with the fundamentals of the subject rigorously covered each chapter includes numerous references to provide a useful starting point for those wishing to learn more about the subject provides combined coverage of both photosynthesis and photomorphogenesis in plants includes an extensive glossary designed to provide easy access to key aimed at students in botany plant science agriculture and forestry a useful reference for postgraduates and researchers working in the field

it is not always the case that the subject of a scientific book and its relevance to everyday life are so timely photobiology and its sister subject radiobiology are now a must for understanding the environment we live in and the impact light ultraviolet light and radiation have on all aspects of our life photobiology is a true interdisciplinary field photobiology research plays a direct role in diverse fields and a glance at the topics of the symposia covered in this book by over 100 articles shows the breadth and depth of knowledge acquired in fundamental research and its impact on the major issues and applied problems the world is facing half a century of photobiology research brought about an understanding of the importance of light to life both as a necessary source of energy and growth as well as its possible dangers research in photochemistry and photobiology led to the discoveries of cellular repair mechanisms of uv induced damages to dna and this led to understanding of the effects of hazardous environmental chemicals and

mutagenicity and to the development of genetic engineering this topic was given due emphasis in several symposia and chapters in this book

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