Protein Targeting with Small Molecules

Chemical biology aims to elucidate biological processes and phenomena by using techniques and methods that originate from chemistry. The development and use of small-molecule ligands to perturb protein function is a core technique at the heart of chemical biology research. Successful targeting of proteins with small molecules requires the use of a variety of complementary techniques, which range from synthetic organic chemistry to biochemical and biological screening methods, the identification and confirmation of targets by means of biophysical and cell-biological techniques, and fully fledged biological investigations. The book edited by Hiroyuki Osada, one of the foremost chemical biologists of today, aims to cover this enormously wide field by 12 complementary reviews written by experts in their individual areas of research.

After an introductory chapter, four reviews deal with target identification and profiling by various biophysical methods, and by methods such as affinity isolation, proteomics approaches, small-molecule arrays, and phage-display techniques. A later chapter also discusses the use of yeast as an organism that is genetically readily tractable for chemical genetics and chemical genomics. The book's coverage of the technology also includes a chapter about the development of fluorescent probes and a review of the development of small-molecule ligands and inhibitors. Applications of chemical probes in the study of nuclear receptors and processes related to cell motility are highlighted in two separate chapters, which are complemented by an excursion into the chemical biology of cell-surface oligosaccharides.

The book ends with an overview of successful cases of target identification using bioactive small molecules. Taken together, the book provides a broad-ranging overview of numerous techniques, approaches, and methods that are applied in small-molecule ligand design, synthesis, and screening, the identification and validation of targets, as well as applications in selected fields.

In view of the wide range of topics covered, it has, of course, not been possible to treat individual methods and techniques in depth in a book of fewer than 300 A5 pages. Instead, the main strength of the book lies in providing an overview of the field. Thus, in reading the chapters the reader is made aware of the variety of chemical, biophysical, biochemical, and biological techniques that are typically applied in chemical biology research based on small molecules. Consequently, this is not really a textbook that would be suitable as an introduction to the field. Rather, it makes good reading for the trained researcher who is eager to learn about the tricks of the trade, possibly with a desire to become acquainted with or to enter the field.

The individual chapters vary in length and in depth of coverage of the topics, and some are more of the nature of educational or literature-update material, or even have personal review character. Given the fact that the chapters are written by a diverse group of authors, this is not unexpected. However, it does require that the reader should work proactively with the book, digging into the current literature or consulting textbooks of, for example, biophysics or cell biology rather than merely being entertained. This compendium of review articles does not make easy and uncomplicated reading, for example on a business trip, but it is the starting point for a very rewarding concentrated reading exercise, complemented, for example, by reading original papers chosen from the many literature references. As such, I strongly recommend the book to researchers with advanced training in chemistry, biophysics, biochemistry, or biology who have a desire to broaden their research into neighboring disciplines and are ready to become chemical biologists.

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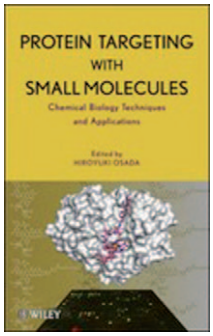

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Fullerene Polymers

Owing to their peculiar electronic properties, fullerene derivatives are attractive building blocks for polymer chemistry. The theoretical importance and potential applications of fullerene has resulted in numerous fullerene polymers having been developed to enhance, for example, its solubility and processability. Written by an outstanding team of experts from interdisciplinary areas of research, this book is based on a new classification of the different types of fullerene polymers according to their chemical structures. It covers all aspects, from different classes, to their synthesis and applications in material science.

Chapter 1 by Giacalone, Martin, and Wudl constitutes an overview of the field, including a classification of the different polyfullerenes.

Main-chain and side-chain fullerene polymers are the subject of Chapter 2 by Giacalone and Martin. They summarize results which demonstrate that fullerenes may be introduced into the main