The study of enzyme mechanisms or fast cellular regulation processes, among others, critically depends on a technique that rapidly switches on the system under study, without being disruptive to the cells or their components. A pulse of laser light may be used as a trigger, but only if the system is responding to light. Therefore, numerous photoactivatable biomolecules have been developed to act as “photoswitches” for almost every biological system.

With contributions by more than 30 expert researchers, this handbook covers the whole spectrum from chemistry to cell biology and from theory to application. In so doing, it deals with a broad range of topics from the chemistry and biophysics of caged compounds to their application in time-resolved studies, comparing the properties of different caging groups. The authors describe in detail light-activation of proteins as well as nucleic acids, while a special section is devoted to multiphoton phototriggers. The whole is rounded off with a look at challenges for the future.

A must-have for every biochemist, biophysicist, organic and photochemist, as well as molecular and cell biologists developing and working with these novel methods.

Maurice Goeldner graduated from the Chemistry Department of the Université Louis Pasteur in Strasbourg where he received his PhD in 1972. During his thesis he was appointed as a researcher at the Centre National de la Recherche Scientifique. After postdoctoral studies in Kingston, Canada and the ETH in Zurich he moved back to Strasbourg, first to the Neurochemistry Department then to the Faculty of Pharmacy where he was appointed Professor of Organic Chemistry in 1983. In 1987 he spent a sabbatical at Berkeley University. He is presently head of the Laboratoire de Chimie Biologique at the Pharmacy Faculty in Strasbourg pursuing his research on biorganics chemistry. During his career he was awarded the Grammatikakis-Neumann prize and published over hundred articles. His main interest focuses on ligand-receptor interaction studies using photoinduced labeling methodology and more recently through engineered affinity labeling reactions. His interest in caged compounds addresses in particular the deciphering of enzymatic reactions using caged enzyme modulators.

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