The study of cellular regulation processes or enzyme mechanisms critically depends on techniques that rapidly cause the initiation of a biological response with minimal disruption of other cellular functions and components. A single, rapid pulse of laser light, for example, might trigger a process as long as the system is responsive to light. Photoswitches and phototriggers provide that capability through a rapid and efficient photochemical release of numerous substrates for a wide variety of dynamic biological studies.

With contributions by more than 30 expert researchers, this handbook covers diverse topics that range from chemistry to cell biology and from theory to application. In so doing, it deals with a broad spectrum 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-activated release of substrates that vary from small molecules such as neurotransmitter amino acids, second messengers, enzyme modulators and gene expression regulators to macromolecules such as proteins and oligonucleosides. Sections are also devoted to multiphoton phototriggers and the challenges of future applications of this technique.

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

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