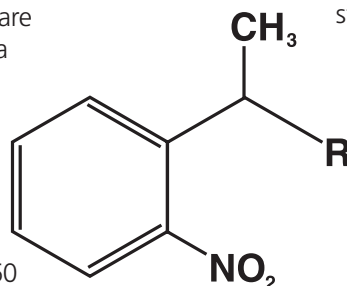


Caged Compounds

Photolabile “caged compounds” are inert precursors of biologically active molecules that are modified chemically by the attachment of a photolabile “cage.” The chemical caging also imparts greater membrane permeability to the parent compounds. Alternatively, they can be loaded into cells by microinjection or by permeabilization techniques. The active parent molecule can then be released from its cage by irradiation with pulses of light of approximately 360 nm. The use of short pulses of light produces light- and quantity-specific jumps in concentration. Associated physiological responses resulting from the release of the biologically active molecule can thus be studied in a much shorter time frame (milliseconds) than was previously possible.



The advantages of this technique are clearly demonstrated with Caged InsP_3 and Caged ATP.¹⁻⁵ Goldman, et al. used Caged ATP to examine the effects of ATP on the relaxation of muscle fibers. The use of Caged ATP eliminated the resolution limitation inherent in diffusion techniques.

CALBIOCHEM[®] provides a varied collection of caged compounds for your research needs. We offer many of our caged compounds in convenient sets for less waste in your experiments. These sets are highlighted in the tables below. Please call our Technical Service Department or your local sales office for more information.

CAGED NUCLEOTIDES

CALBIOCHEM's caged nucleotides are useful for studying the mechanism of action of second messengers, activation of protein kinases, and as probes for studying regulatory proteins and the bioenergetics of muscle contraction.

Product	Cat. No.	Molecular Weight	Solubility	Absorption Maximum (nm)	Excitation Coefficient ($\text{M}^{-1}\text{cm}^{-1}$)	Size
Caged cAMP	116810	478.4	DMSO	260	19,000	10 x 500 μg 5 mg
Caged ATP, Disodium Salt	119127	700.3	H_2O	260	19,000	10 x 500 μg 5 mg
Caged cGMP	370657	494.4	DMSO	255	16,900	5 mg
Caged GTP, Disodium Salt	371710	716.3	H_2O	254	16,900	10 x 500 μg 5 mg

INOSITOL PHOSPHATES

These compounds are important in the elucidation of the interactions of $\text{Ins}(1,4,5)\text{P}_3$ with its intracellular receptor and its effects on Ca^{2+} release and activation of protein kinases. The photolytic cleavage of Caged GPIP_2 causes sustained $\text{Ins}(1,4,5)\text{P}_3$ -dependent Ca^{2+} signaling. The release of GPIP_2 produces an enduring activation consistent with the continuous activation of intracellular $\text{Ins}(1,4,5)\text{P}_3$ receptors.⁶

Product	Cat. No.	Molecular Weight	Solubility	Absorption Maximum (nm)	Excitation Coefficient ($\text{M}^{-1}\text{cm}^{-1}$)	Size
Caged $\text{Ins}(1,4,5)\text{P}_3$, Trisodium Salt	407135	635.2	H_2O	265	4,240	10 μg 10 x 10 μg 100 μg
Caged GPIP_2 , Trisodium Salt	407133	709.3	H_2O	—	—	10 μg 100 μg

CAGED CALCIUM CHELATORS

Most caged chelators, used to control the concentration of Ca²⁺ in the cell, are based on the photochemistry of the o-nitrobenzyl group.⁷ The photolysis of this group alters the affinity of these agents for Ca²⁺. NITR 5, NITR 7, and DM-NITROPHEN™ are photolabile calcium chelators whose binding affinity for calcium is decreased by irradiation with light.⁸ NITR 5/AM, the cell-permeable acetoxymethyl ester of NITR 5, is used for loading the chelator into cells. It is designed for use with cells that are very small or otherwise not amenable to microinjection.

Product	Cat. No.	Molecular Weight	Solubility	Absorption Maximum (nm)	Excitation Coefficient (M ⁻¹ cm ⁻¹)	Size
NITR 5	482477	773.5	H ₂ O	369	4500	10 x 500 µg 5 mg
NITR 5/AM	482478	973.9	DMSO	—	—	10 x 500 µg 5 mg
NITR 7, Tetrasodium Salt	482486	813.6	H ₂ O	369	4500	5 mg
DM-NITROPHEN™ Reagent, Tetrasodium Salt	317210	561.3	H ₂ O	345	4200	10 x 500 µg 5 mg

CAGED NEUROTRANSMITTERS

Neurotransmission is a rapid phenomenon and the measurement of action potentials is generally performed in a timeframe of milliseconds or less. Caged neurotransmitters are excellent tools to study the kinetics of receptor binding and the mechanisms involved in channel opening and other post-synaptic events. Caged amino acids are photolabile derivatives of the parent amino acids that are biologically inactive until photolyzed.

Product	Cat. No.	Molecular Weight	Solubility	Absorption Maximum (nm)	Excitation Coefficient (M ⁻¹ cm ⁻¹)	Size
Caged Aspartic Acid*	189110	348.2	H ₂ O	347	6000	5 mg
Caged Glutamic Acid*	351015	362.3	H ₂ O	347	5700	5 mg
Caged Glycine*	357125	290.2	H ₂ O	345	5700	5 mg
Caged GABA (Caged γ-Aminobutyric Acid)*	130132	318.3	H ₂ O	347	5400	5 mg

*These caged compounds are sold under license of U.S. Patent Application 937,622 from the Medical Research Council, London, U.K.

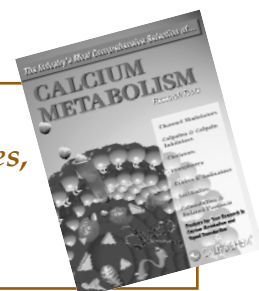
References

- Kaplan, J.H., et al. 1978. *Biochemistry* **17**, 1929.
- Goldman, Y.E., et al. 1982. *Nature* **300**, 701.
- Hibberd, M.G., and Trentham, D.R. 1986. *Annu. Rev. Biophys. Chem.* **15**, 119.
- Walker, J.W., et al. 1987. *Nature* **327**, 249.
- Somlyo, A.V., et al. 1987. *Prog. Clin. Biol. Res.* **245**, 27.
- Bird, G. St. V., et al. 1992. *J. Biol. Chem.* **267**, 17722.
- Gurney, A.M. 1991. In: *Cellular Neurobiology: A Practical Approach* (Chad, J., and Wheal, H., eds.) p. 153, IRL Press, Oxford.
- Adams, S.R., and Tsien, R.Y. 1993. *Annu. Rev. Physiol.* **55**, 755.

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