Revised: June 1, 2023

Product Information

DMNP-EDTA (Caged Calcium)

Product List

Cat. No.	Unit Size	Product	Molecular Weight
50050	5 mg	DMNP-EDTA (Caged Calcium)	626
50051-1mg	1 mg	DMNP-EDTA (Caged Calcium), AM Ester	762
50051-5mg	5 mg		

Storage and Handling

Store DMNP-EDTA at -20°C, protected from light. Stock solutions of DMNP-EDTA may be prepared in water or DMSO (see Solubility in Table 1). Aqueous solutions are stable for at least three months when stored at 4°C, protected from light.

Store DMNP-EDTA AM Ester at -20°C, desiccated and protected from light. Stock solutions of the AM ester may be prepared in DMSO (see Solubility in Table 1). We recommend using anhydrous DMSO for making stock solutions from AM ester solids. Both DMSO and AM ester should be warmed to room temperature before mixing. Dissolution can be kinetically slow, so allow sufficient time for the AM ester to dissolve. The DMSO stock solution can be stored tightly sealed at -20°C for at least 6 months and is stable to freeze/thaw cycles as long as it is protected from light and moisture. The stock solution should be warmed to room temperature each time before opening the vial to avoid condensation, which may hydrolyze the AM ester during storage.

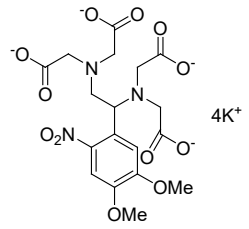

Figure 1. DMNP-EDTA (Caged Calcium).

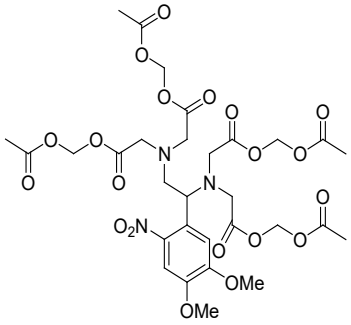

Figure 2. DMNP-EDTA (Caged Calcium), AM Ester.

Product Description

DMNP-EDTA (also known as DM-Nitrophen™) is a photolyzable calcium chelator that can be used to release a pulse of calcium when exposed to light (1). Upon photolysis, the K_d of DMNP-EDTA for calcium increases from 5 nM to 3 mM (2). DMNP-EDTA may also be useful for caged magnesium studies, with a K_d for magnesium of 2.5 uM.

DMNP-EDTA (Caged Calcium), AM Ester is the membrane-permeant form of DMNP-EDTA and thus can be loaded into cells via incubation, making it useful in live cell studies. Once inside the cell, intracellular esterases, found in almost all cell types, will hydrolyze the AM group. The resulting AM ester compound is then contained inside the cell and can accumulate.

Table 1. Chemical Properties

Product	Molecular Formula	Color and Form	Solubility
DMNP-EDTA (Caged Calcium)	$C_{18}H_{19}K_4N_3O_{12}$	Pale yellow solid	Water and DMSO
DMNP-EDTA (Caged Calcium), AM Ester	$C_{30}H_{39}N_3O_{20}$	Pale yellow semi-solid	DMSO

Protocol for Cell Loading

The following is an example protocol for loading cells with AM esters adapted from protocols for loading AM esters of calcium indicator dyes (3). You may need to optimize the buffer system or concentration of AM ester compound for your experimental system. The use of Pluronic® F-127 (see Related Products), a non-ionic detergent that facilitates AM ester solubilization, is optional.

1. Prepare a 1-5 mM stock solution of the AM ester using anhydrous DMSO.
2. Mix 1 uL 20% Pluronic® F-127 in DMSO with 1 uL of calcium indicator stock solution in DMSO.
3. Add 1 mL Krebs-Ringer-HEPES-glucose buffer (KRH-glc) containing 0.5% bovine serum albumin (BSA) to the tube containing Pluronic® and AM ester compound and mix well for a final concentration of 1-5 uM.

   Note: KRH-glc: 136 mM NaCl, 10 mM HEPES, 4.7 mM KCl, 1.25 mM $MgSO_4$, 1.25 mM $CaCl_2$, 25 mM glucose, pH 7.4.
4. Wash cells twice with KRH-glc + 0.5% BSA.
5. Add the AM ester solution from step 3 to cells and incubate 30 minutes, protected from light.
6. Rinse cells several times with KRH-glc + 0.5% BSA.

Additional Protocols

We have not tested or created additional validated protocols for this product in-house. However, this reagent is well-characterized and published in the literature. We recommend consulting the primary literature to find a protocol that will be suitable for your application.

References

1. Chem Rev 108,1603 (2008); 2. Nat Methods 4, 619 (2007); 3. A Practical Guide to the Study of Calcium in Living Cells, volume 40 (1994).

Calcium Indicator Dyes

Cat. No.	Product
50013... 50016	Fluo-3, AM Ester
50015	Fluo-3, AM Ester, 1 mM in Anhydrous DMSO
50010	Fluo-3, Pentaammonium Salt
50011	Fluo-3, Pentapotassium Salt
50012	Fluo-3, Pentasodium Salt
50018	Fluo-4, AM Ester
50019	Fluo-4, Pentapotassium Salt
50040	Indo-1, Pentaammonium Salt
50041	Indo-1, Pentapotassium Salt
50042	Indo-1, Pentasodium Salt
50043-50044	Indo-1, AM Ester
50029	Fura-2 AM Ester, 1 mM in Anhydrous DMSO
50033-50034	Fura-2 AM Ester
50035	Furaptra (Mag-Fura-2), Tetrapotassium Salt
50036	Furaptra (Mag-Fura-2), Tetrasodium Salt
50037-50039	Furaptra (Mag-Fura-2), AM Ester
50020	Rhod-2, Triammonium Salt
50021	Rhod-2, Tripotassium Salt
50022	Rhod-2, Trisodium Salt
50023-50025	Rhod-2, AM Ester
50026	Rhod-590, Tripotassium Salt

BAPTA Chelators

Cat. No.	Product
50000	BAPTA, AM Ester
50001	BAPTA, Tetracesium Salt
50005	5,5'-Difluoro BAPTA, AM Ester
50007	5',5'-Dimethyl BAPTA, AM Ester
50004	5',5'-Dibromo BAPTA, Tetrapotassium Salt
50009	5-Methyl-5'-nitro BAPTA, Tetrapotassium Salt
50017	5-Mononitro BAPTA, Tetrapotassium Salt

Related Products

Cat. No.	Product
90082	DMSO, Anhydrous
50027	Probenecid, Sodium Salt, Water Soluble
59000	Pluronic® F-127
59005	Pluronic® F-127, 10% in dH_2O
59004	Pluronic® F-127, 20% Solution in DMSO
59100	Calcium Calibration Buffer Kit
59001	A-23187, Free Acid
59006	4-Bromo A-23187, Free Acid
59007	Ionomycin, Calcium Salt
59002	EDC (EDAC)
41024-4L	Water, Ultrapure Molecular Biology Grade
22023	Paraformaldehyde, 4% in PBS, Ready-to-Use Fixative

Please visit our website at www.biotium.com for information on our life science research products, including environmentally friendly EvaGreen® qPCR master mixes, fluorescent CF® Dye antibody conjugates and reactive dyes, apoptosis reagents, fluorescent probes, and kits for cell biology research.