**DMNP-EDTA, NP-EGTA**

*Non-Fluorescent Caged Ca$^{2+}$ photolabile chelator*

## Product Information

**Name:** DMNP-EDTA, AM ester  
Cell permeable  
1-(4,5-dimethoxy-2-nitrophenyl)-1,2-diaminoethane-N,N,N',N'-tetraacetic acid, tetra(acetoxymethyl ester) ; DMNPE, BNPE  
Also called called DM-Nitrophen., a trademark of Calbiochem-Novabiochem Corp.  
Kd for Ca$^{2+}$ increases from 5 nM to 3 mM upon photolysis.

**Catalog Number:** FP –M1437A, 1 mg

**Structure:**

![Structure of DMNP-EDTA, AM ester](image)

**Molecular Weight:** 761.66

**Specifications:**  
Appearance: Yellow oil  
HPLC Purity: >95%  
TLC (in 1:1 Hexane/Ethyl acetate): conform  
NMR (CDCl$_3$): conform to reference structure

**Soluble in:**  
DMSO, Methanol, DMF, CH$_3$CN and CHCl$_3$

**Excitation/Emission:** $\lambda_{exc}/\lambda_{em}$ (EtOH) = 332 nm/ N/A

**Extinction Coefficient:** 4 550 M$^{-1}$ cm$^{-1}$

**Storage:** -20°C (M). Protected from light and moisture.

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**Name:** DMNP-EDTA  
Cell impermeable

**Catalog Number:** FP –44506A, 5 mg

**Structure:**

![Structure of DMNP-EDTA](image)

**Molecular Weight:** 473.4

**Soluble in:**  
DMSO, Methanol, DMF and basic water

**Storage:** -20°C (M). Protected from light and moisture.
FT-M1473A
Name : DMNP-EDTA, tetrapotassium salt (caged calcium) Cell impermeable
Catalog Number : FP –OO5460, 5 mg
Structure : $C_{18}H_{19}K_4N_3O_{12}$
Molecular Weight : 626
Storage : -20°C (M). Protected from light and moisture.

Name : NP-EGTA, AM ester  *Cell permeable* O-NitroPhenyl EGTA TetraPotassium Salt.
Catalog Number : FP –M1433A, 1 mg
Also available as K salt # 52902A
Structure : $C_{32}H_{43}N_3O_{20}$
Molecular Weight : 789.7
Soluble in : DMSO, Methanol, DMF, $CH_3CN$ and CHCl$_3$
Storage : -20°C (M). Protected from light and moisture.

Introduction

• DMNP-EDTA
1-(4,5-dimethoxy-2-nitrophenyl)ethyl EDTA (DMNPE) is a caging group with long-wavelength absorption (absorption maximum ~355 nm), developed by Ellis-Davies and Kaplan [1988], Morad 1988. It absorbs 340–360 nm light very efficiently. We provide the salted acid form, and the AM ester to ease cell loading.

DMNP-EDTA is used to raise or lower the intracellular Ca$^{2+}$ concentration in cells, in order to study the resulting effects. It also can be used as an effective caged Mg$^{2+}$ source, with even faster photorelease of Mg$^{2+}$, and furthermore for photolytic release of other divalent cations such as Sr$^{2+}$, Ba$^{2+}$, Mn$^{2+}$, Co$^{2+}$ and Cd$^{2+}$.

Upon illumination, DMNP-EDTA's is cleaved and dissociation constant ($K_d$) for Ca$^{2+}$ increases from 5 nM to 3mM for the two iminodiacetic acid photolysis products (~600,000-fold lower than that of DMNP-EDTA). Using DMNP-EDTA complexed to Ca$^{2+}$, this results in a pulse of free Ca$^{2+}$. Using the AM form, Ca$^{2+}$ can be scavenged in cells upon photolysis. Additionally, DMNP-EDTA has significantly higher affinity for Mg$^{2+}$ ($K_d = 2.5$ µM) than does NP-EGTA ($K_d = 9$ mM), increasing after photolysis to $K_d$ for Mg$^{2+}$ to ~3 mM. Photorelease of Ca$^{2+}$ is rapid, occurring in <180 microseconds, with even faster photorelease of Mg$^{2+}$. EDTA prevents the potentially cytotoxic reaction between amines and the 2-nitrosobenzoyl photolytic by-products.

See use and limitation of DMNP-EDTA in the literature (reviews Ellis-Davies 2007, 2008).

Literature – DMNP-EDTA

– Girouard H. et al., Astrocytic endfoot Ca2+ and BK channels determine both arteriolar dilation and constriction, PNAS, 2010; 10.1073/pnas. 0914722107 Abstract
NP-EGTA AM

NP-EGTA AM is loaded in cells where intracellular esterases cleaves the AM group, preventing release from cells. It acts then as a chelator with a high selectivity for Ca\(^{2+}\). Upon UV illumination, its Kd raises from 80 nM to >1 mM (affinity decrease by 12 500-fold). It acts also as a high photochemical quantum yield ref (~0.2). Furthermore, NP-caged EGTA does not perturb physiological levels of Mg\(^{2+}\) (Kd for Mg\(^{2+}\) is 9 mM).

The NP-EGTA salt can be complexed with Ca\(^{2+}\) to generate a caged calcium complex that will rapidly deliver Ca\(^{2+}\) upon photolysis. The cell-permeant AM ester of NP-EGTA does not bind Ca\(^{2+}\) unless the AM esters are removed. It can potentially serve as a photolabile buffer in cells because, once converted to NP-EGTA by intracellular esterases, it will bind Ca\(^{2+}\) with high affinity until photolyzed with UV light. NP-EGTA has been used to measure the calcium buffering capacity of cells.

Related products

- Fluo-3 AM, FP-78932C
- Fluo-8 AM, CP7502
- TPEN (Tetrakis-(2-pyridylmethyl)ethylenediamine), FP-44736A
- Pluronic acid, FP-37361A
- Caged Ca: NP-EGTA, FP-52902A
- Trivalent lanthanide terbium (III), a luminescent analog of Ca\(^{2+}\) that can be used to study structure–function relationships in Ca\(^{2+}\)-binding proteins such as calmodulin, oncomodulin, lactalbumin and ATPases.
- Thapsigargin, a sesquiterpene lactone that promote releases Ca\(^{2+}\) from intracellular stores but does not directly affect plasma membrane Ca\(^{2+}\)-ATPases, Ins 1,4,5-P3 production or protein kinase C activity.

Ordering information

Catalog size quantities and prices may be found at http://www.interchim.com. Please inquire for higher quantities (availability, shipment conditions).

For any information, please ask: FluoProbes® / Interchim; Hotline: +33(0)4 70 03 73 06

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