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Technical Information about the Acetoxymethyl Ester of Uridine-3', 5'-cyclic monophosphate (cUMP-AM)

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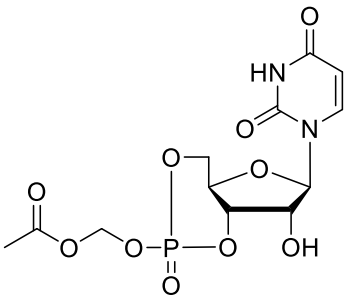

Abbreviation: **cUMP-AM**

Formula	CAS No.	Molecular Weight	UV	BIOLOG Cat. No.
$C_{12}H_{15}N_2O_{10}P$	[pending]	378.2	λ_{max} 260 nm / ε 10000 / pH 7	U 012

Name: Uridine- 3', 5'- cyclic monophosphate, acetoxymethyl ester

Description: cUMP-AM is an analogue of the potential second messenger cyclic UMP (Cat. No. U 001) in which the polar phosphate is masked by an acetoxymethyl group.

Properties: The acetoxymethyl group of cUMP-AM masks the charged polar phosphate and thus makes the molecule highly membrane-permeant. Inside the cell esterases release the polar cUMP which is trapped inside the cell and subsequently metabolized quickly, resulting in a pulse-type signal.
Phosphate tris(acetoxymethyl)ester, PO_4-AM_3 (Cat. No. P 030), is recommended as control reagent in cUMP-AM applications to test for side effects of enzymatically released acetic acid and formaldehyde, two metabolites with potential biological functions.

Specification: Lyophilized or crystallized solid. Please note that equal concentrations of cUMP-AM can appear very different in volume due to sensitivity of the lyophilized form to humidity. Micromolar quantities are determined by UV at λ_{max}.

Purity: Typical analysis is better than 95% (HPLC / UV / 260 nm) for the mixture of equatorial and axial isomers. The product is not sterile and has not been tested for endotoxins.

Solubility/Application: Due to its rather high lipophilicity, the solubility of cUMP-AM in water or buffers is limited. We suggest to use a small amount of anhydrous organic solvent such as anhydrous DMSO or DMF for preparation of 1 - 100 mM stock solutions, and to dilute with water or buffer down to the concentrations required. In some cases, especially at high concentrations (~1 mM), Pluronic® F-127 (Molecular Probes) can be useful to facilitate solubilization in water or physiological media. Please keep in mind that due to the high potency of cUMP-AM relatively low concentrations (1 nM - 100 µM) should be sufficient, and be sure to check for DMSO/DMF tolerance in your system. Since cUMP-AM is bioactivated by esterases, application to cell cultures should be performed without serum supplements (even heat-inactivated serum still contains active esterases!) in the media for at least 15 minutes. Otherwise, serum esterases may strongly reduce the cell-loading efficacy. Please rinse tube walls carefully and preferably use ultrasonic or vortex to achieve total and uniform mixing.

Stability and Storage: cUMP-AM is sufficiently stable to be shipped at ambient temperature, however, it should be stored in the freezer (-20°C necessary, -80°C recommended). Please note that aqueous solutions are rather labile and should be freshly prepared immediately before use. Stock solutions in anhydrous DMSO or DMF should be relatively stable when stored frozen at -20°C to -80°C.

Toxicity and Safety: Since cUMP could have multiple tasks in every organism, it is not unlikely that its analogues could interfere with many cell regulation processes *in vivo*. However, due to the rather small quantities to work with, no health hazards have been reported. Nevertheless please keep in mind, that the *in vivo* properties of this compound are not sufficiently characterized up to now. Avoid skin contact or ingestion and allow only trained personnel to handle the product.
Our products are designed, developed and sold for research purposes only! They are intended for *in vitro* and nonhuman *in vivo* laboratory applications. Any other use requires approval of health authorities.
Not for drug, household or related uses!

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Selected References for cUMP-AM:

Wolter, S.; Kloth, C.; Golombek, M.; Dittmar, F.; Försterling, L.; Seifert, R., Biochem. Pharmacol., 98, 119 – 131 (2015): " cCMP Causes Caspase-dependent Apotosis in Mouse Lymphoma Cell Lines"

Beckert, U.; Grundmann, M.; Wolter, S.; Schwede, F.; Rehmann, H.; Kaever, V.; Kostenis, E.; Seifert, R., *Biochem. Biophys. Res. Commun.*, **451**, 497 - 502 (2014): "cNMP-AMs Mimic and Dissect Bacterial Nucleotidyl Cyclase Toxin Effects"

Selected References for AM-modified cyclic nucleotides:

Kruppa, J.; Keely, S.; Schwede, F.; Schultz, C.; Barrett, K.E.; Jastorfff, B., *Bioorg. Med. Chem. Lett*., **7**, 945 - 948 (1997): "Bioactivatable Derivatives of 8-substituted cAMP Analogues"

Brustugun, O.T.; Mellgren, G.; Døskeland, S.O., Proc. 10th Protein Kinase Seminar, Lillehammer, Norway 1996, A 2: "Activation of Cyclic AMP Dependent Protein Kinase in Swiss 3T3 Fibroblasts Evokes a Triphasic Response"

Schultz, C.; Vajanaphanich, M.; Genieser, H.-G.; Jastorff, B.; Barrett, K.E.; Tsien, R.Y., *Mol. Pharmacol*., **46**, 702 - 708 (1994): "Membrane-permeant Derivatives of Cyclic AMP Optimized for High Potency, Prolonged Activity, or Rapid Reversibility"

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