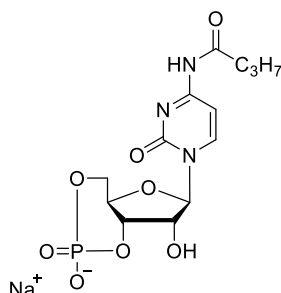


## Technical Information about 4-MB-cCMP

Update: June 07, 2024 ss



**Abbreviation:** 4-MB-cCMP

Formula	CAS No.	Molecular Weight	UV	BIOLOG Cat.No.
C <sub>13</sub> H <sub>17</sub> N <sub>3</sub> O <sub>8</sub> P·Na	[pending]	397.3	λ <sub>max</sub> 248 nm / ε 16400 / pH 7	M 075

**Name:** N<sup>4</sup>- Monobutyrylcytidine- 3', 5'- cyclic monophosphate, sodium salt

**Description:** 4-MB-cCMP is an analogue of the natural signal molecule cyclic CMP in which one of the hydrogen atoms of the amino group in position 4 of the pyrimidine nucleobase is replaced by a butyrate group.

**Properties:** 4-MB-cCMP is an analogue of the putative second messenger nucleotide cCMP (BIOLOG Cat. No. C 001) and main cellular metabolite of DB-cCMP (BIOLOG Cat. No. D 075), generated by unspecific esterases attacking the 2'-O-butyryl group of DB-cCMP. 4-MB-cCMP was found to be a low-potency partial activator of PKG Iα both *in vitro* and *in vivo*. It was also reported to display full and moderate activation of PKA RIα and PKA RIIα *in vitro*, while showing no evidence for PKA activation *in vivo* (Wolter et al. 2014).

**Specification:** Lyophilized or crystallized sodium salt. The free acid or other salt forms are available upon request. Equal concentrations of 4-MB-cCMP can appear very different in volume due to sensitivity of the lyophilized form to humidity. The compound can even contract to small volume droplets. Normally the product is located in the conical bottom of the tube. Micromolar quantities are determined by UV at λ<sub>max</sub>.

**Purity:** Typical analysis is better than 97% (HPLC / UV / 248 nm). The product is not sterile and has not been tested for endotoxins.

**Solubility:** 4-MB-cCMP is soluble in water (≥ 12 mM, limits have not been determined). Please rinse tube walls carefully and preferably use ultrasonic or vortex to achieve total and uniform mixing. When opening the tube please make sure that no substance is lost within the cap.

**Stability and Storage:** 4-MB-cCMP is chemically rather stable. Nevertheless, we recommend that the compound should be stored in the freezer, for longer storage periods preferably in freeze-dried form.

**Toxicity and Safety:** Since cCMP could have multiple tasks in every organism it is not unlikely that it 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!**

### Selected Reference for 4-MB-cCMP:

Wolter S., Dove S., Golombek M., Schwede F., Seifert R., *Naunyn-Schmiedeberg's Arch. Pharmacol.*, **387**, 1163 - 1175 (2014): "N<sup>4</sup>-monobutyryl-cCMP Activates PKA RIα and PKA RIIα more Potently and with Higher Efficacy than PKG Iα *in Vitro* but not *in Vivo*"

### Selected References for the Related Compound DB-cCMP (BIOLOG Cat. No. D 075):

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

Desch, M.; Schinner, E.; Kees, F.; Hofmann, F.; Seifert, R.; Schlossmann, J., *FEBS Lett.*, **584**, 3979 - 3984 (2010): "Cyclic Cytidine 3',5'-monophosphate (cCMP) Signals via cGMP Kinase I"

Haji Hosseini Baghdad Abadi, R., *Anal. Biochem.*, **312**, 91 - 100 (2003): "Nucleotide Profile of Mouse Liver: Response to 2'-O-Dibutyryl cytidene 3',5'-cyclic monophosphate"

Ervens, J.; Seifert, R., *Biochem. Biophys. Res. Commun.*, **174**, 258 - 267 (1991): "Differential Modulation by N<sup>4</sup>,2'-O-Dibutyryl Cytidine 3':5'-cyclic Monophosphate of Neutrophil Activation"

Yanagida, M.; Gohda, E.; Yamamoto, I., *Neurosci. Lett.*, **114**, 323 - 328 (1990): "Dibutyrylcytidine 3',5'-cyclic monophosphate Stimulates Neurite Outgrowth in Rat Pheochromocytoma PC12"

**Selected References for the Parent Compound cCMP (BIOLoG Cat. No. C 001):**

Tal, N.; Morehouse, B.R.; Millman, A.; Stokar-Avihail, A.; Avraham, C.; Fedorenko, T.; Yirmiya, E.; Herbst, E.; Brandis, A.; Mehlman, T.; Oppenheimer-Shaanan, Y.; Keszei, A.F.A.; Shao, S.; Amitai, G.; Kranzusch, P.J.; Sorek, R., *Cell*, **184**, 5728 - 5739 (2021): "Cyclic CMP and Cyclic UMP Mediate Bacterial Immunity Against Phages"

Bähre, H.; Hartwig, C.; Munder, A.; Wolter, S.; Stelzer, T.; Schirmer, B.; Beckert, U.; Frank, D.W.; Tümmler, B.; Kaefer, V.; Seifert, R., *Biochem. Biophys. Res. Commun.*, **460**, 909 - 914 (2015): "cCMP and cUMP Occur *in Vivo*"

Beste, K.Y.; Spangler, C.M.; Burhenne, H.; Koch, K.-W.; Shen, Y.; Tang, W.; Kaefer, V.; Seifert, R., *PLoS ONE*, **8**, e70223 (2013): "Nucleotidyl Cyclase Activity of Particulate Guanylyl Cyclase A: Comparison with Particulate Guanylyl Cyclases E and F, Soluble Guanylyl Cyclase and Bacterial Adenylyl Cyclases Cyaa and Edema Factor"