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Technical Information about Dibutyryl-cyclic GMP

Potent membrane-permeant activator of cGMP-dependent protein kinases

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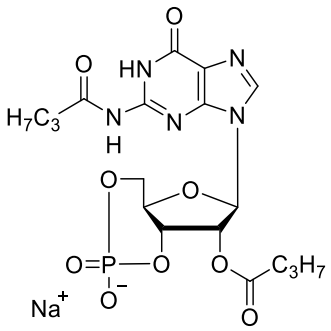

Abbreviation: **DB-cGMP**

Formula	CAS No.	Molecular Weight	UV	BIOLOG Cat. No.
$C_{18}H_{23}N_5O_9P \cdot Na$	[51116-00-8]	507.4	λ_{max} 256 nm / ε 16700 / pH 7	D 010

Name: N^2, 2'- O- Dibutyrylguanosine- 3', 5'- cyclic monophosphate (DB-cGMP, Bt_2 cGMP)

Description: DB-cGMP is an analogue of the natural signal molecule cyclic GMP in which both, the amino group in position 2 of the nucleobase and the ribose 2'-hydroxyl group are modified with a butyrate moiety.

Properties:

- **Activator of protein kinase G,**
- **increased metabolic stability towards cyclic nucleotide-responsive phosphodiesterases,**
- **high lipophilicity and good membrane permeability while still soluble in aqueous solvents.**

DB-cGMP is one of the most often used cyclic GMP analogues in cell biology. However, it has certain properties which lead to very different results depending on the conditions of the experiment and on the type of biological system used. In contrast to general opinion, DB-cGMP itself does not activate cGMP-dependent protein kinases (PKG), unless the 2'-O-butyryl group, which blocks an essential molecular interaction for binding to the regulatory subunits of PKG, is split off by esterases to yield the kinase-active N^2-monobutyryl cGMP. Unfortunately, the butyrate released can have its own effects and sometimes will interfere with the assay. Therefore, it is necessary to run control experiments with sodium butyrate or tributyrin. For these reasons and others, BIOLOG cannot really recommend DB-cGMP and suggests to use superior cyclic GMP agonists such as 8-pCPT-cGMP (Cat. No. C 009).

Specification: Crystallized or lyophilized sodium salt. Other salt forms of DB-cGMP are available upon request. Equal concentrations of DB-cGMP 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. Micro molar quantities are determined by UV at λ_{max}.

Purity: Typical analysis is better than 97% (HPLC / UV / 256 nm). The product is not sterile and has not been tested for endotoxins.

Stability and Storage: DBcGMP is relatively stable when stored dry and frozen. Stock solutions should be used up soon and lyophilized and frozen for longer storage periods.

Toxicity and Safety: Since cyclic GMP has multiple tasks in every organism, it is very likely that lipophilic cGMP analogues will 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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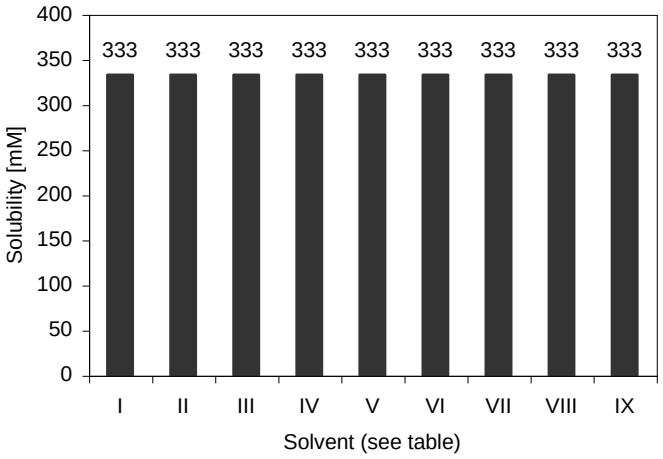
Solubility: Detailed information on the solubility of DB-cGMP in water and various buffers are listed in the solubility chart below. Concentrations have been tested at ambient temperature and can be considered as minimum concentrations usually obtainable. When opening the tube please make sure that no substance is lost within the cap. Please rinse tube walls carefully and preferably use ultrasonic or vortex to achieve total and uniform mixing.

No.	Solvent	Solubility [mM]
I	H_2O	333
II	DMSO	333
III	DMF	333
IV	Ethanol 96%	330
V	Methanol	333
VI	PBS, pH 7.4	333
VII	100 mM Na_2HPO_4, pH 7.0	333
VIII	25 mM Hepes/NaOH, pH 7.2	333
IX	25 mMTris/HCl, pH 7.4	333



Selected References for DB-cGMP:

There have been numerous papers published with DB-cGMP and it is impossible to list them all.
For an extended and updated reference list on the side effects of butyrate, please visit our website (http://www.biolog..de/technical-info/dbcamp-butyrate-pitfalls/).

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