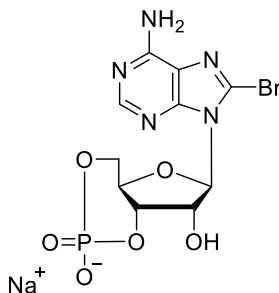


Technical Information about 8-Br-cAMP

Membrane-permeant activator of cAMP-dependent protein kinase type I & II and of Epac

Update: July 03, 2018 HJ



Abbreviation: 8-Br-cAMP

| Formula | CAS No. | Molecular Weight | UV | BIOLOG Cat. No. |
|--|--------------|------------------|--|-----------------|
| C ₁₀ H ₁₀ BrN ₅ O ₆ P·Na | [76939-46-3] | 430.1 | λ _{max} 264 nm / ε 17000 / pH 7 | B 007 |

Name: 8- Bromoadenosine- 3', 5'- cyclic monophosphate, cyclic 8- bromoadenosine- 3', 5'- monophosphate, 8- bromoadenosine- 3', 5'- monophosphate

Description: 8-Br-cAMP is an analogue of the natural signal molecule cyclic AMP in which the hydrogen in position 8 of the heterocyclic nucleobase is replaced by bromine.

Bulk Supply: 8-Br-cAMP can be offered in multigram quantities at extremely competitive prices. Please ask for a corresponding quotation.

Properties: 8-Br-cAMP is an activator of cAMP-dependent protein kinases and of the exchange protein activated by cyclic AMP (Epac). Due to the modification by bromine the compound is more lipophilic compared to cAMP and thus membrane-permeant in many biological systems. In contrast to common opinion, 8-Br-cAMP is not metabolically stable but is slowly metabolized by cyclic nucleotide-dependent phosphodiesterases. In case of long incubation periods the corresponding phosphorothioate-modified analogue Sp-8-Br-cAMPS (BIOLOG Cat. No. B 002) is recommended, in order to avoid metabolic side effects.

Specification: Lyophilized or crystallized sodium salt. The free acid or other salt forms of 8-Br-cAMP are available upon request. Equal concentrations of 8-Br-cAMP 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_{max}.

Purity: Typical analysis is better than 99% (HPLC / UV / 264 nm). Traces of fluorescent impurities inevitably formed during production have been removed by an additional purification step. The product is not sterile and has not been tested for endotoxins.

Stability and Storage: 8-Br-cAMP does not need special care during handling and shipment. Nevertheless, we recommend that the compound should be stored in the freezer, for longer storage periods preferably in freeze-dried form.

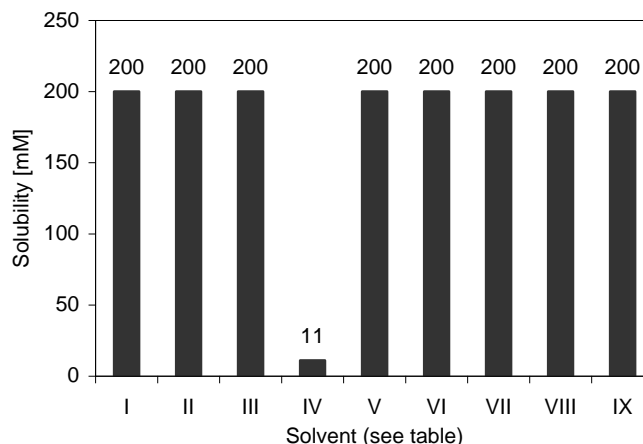
Toxicity and Safety: Since cyclic AMP has multiple tasks in every organism it is very likely that lipophilic cAMP analogues will interfere with many cell regulation processes *in vivo*. However, due to the rather small quantities to work with no health hazards have been reported. Nevertheless please 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!

Solubility: Detailed information on the solubility of 8-Br-cAMP in water and various buffers are listed in the solubility chart below. Concentrations have been determined at ambient temperature and can be considered as minimum concentrations usually obtainable, however, slight batch-to-batch variations cannot be ruled out. 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 ₂ O | 200 |
| II | DMSO | 200 |
| III | DMF | 200 |
| IV | Ethanol 96% | 11 |
| V | Methanol | 200 |
| VI | PBS, pH 7.4 | 200 |
| VII | 100 mM Na ₂ HPO ₄ , pH 7.0 | 200 |
| VIII | 25 mM Hepes/NaOH, pH 7.2 | 200 |
| IX | 25 mM Tris/HCl, pH 7.4 | 200 |



Selected References for 8-Br-cAMP: Since 8-Br-cAMP is a well known biochemical tool, there exist numerous citations for almost every biosystem. The following papers give basic information e.g. concerning lipophilicity (Braumann et al. 1985), PDE-stability (Van Lookeren Campagne et al. 1991) and kinase specificity (Øgreid et al. 1989):

Jäger, R.; Russwurm, C.; Schwede, F.; Genieser, H.-G.; Koesling, D.; Russwurm, M., *J. Biol. Chem.*, **287**, 1210 - 1219 (2012): "Activation of PDE10 and PDE11 Phosphodiesterases"

Werner, K.; Schwede, F.; Genieser, H.-G.; Geiger, J.; Butt, E., *Naunyn Schmiedeberg's Arch. Pharmacol.*, **384**, 169 - 176 (2011): "Quantification of cAMP and cGMP Analogs in Intact Cells: Pitfalls in Enzyme Immunoassays for Cyclic Nucleotides"

Harmati, G.; Bányász, T.; Bárándi, L.; Szentandrassy, N.; Horváth, B.; Szabó, G.; Szentmiklósi, J.A.; Szenási, G.; Nánási, P.P.; Magyar, J. *Br. J. Pharmacol.*, **162**, 890 - 896 (2011): "Effect of Beta-Adrenoceptor Stimulation on Delayed Rectifier K⁺ Currents in Canine Ventricular Cardiomyocytes"

Eijkelkamp, N.; Wang, H.J.; Garza-Carbajal, A.; Willems, H.L.D.M.; Zwartkuis, F.J.; Wood, J.N.; Dantzer, R.; Kelley, K.W.; Heijnen, C.J.; Kavelaars, A., *J. Neurosci.*, **30**, 12806 - 12815 (2010): "Low Nociceptor GRK2 Prolongs Prostaglandin E-2 Hyperalgesia via Biased cAMP Signaling to epac/Rap1, Protein Kinase C Epsilon, and MEK/ERK"

Gaudy, A.M.; Clementi, A.H.; Campbell, J.S.; Smrcka, A.V.; Mooney, R.A., *J. Biol. Chem.*, **285**, 41356 - 41365 (2010): "Suppressor of Cytokine Signaling-3 is a Glucagon-Inducible Inhibitor of PKA Activity and Gluconeogenic Gene Expression in Hepatocytes"

Grandoch, M.; de Jesus, B.M.; Oude Weernink, P.A.; Weber, A.A.; Jakobs, K.H.; Schmidt, M., *Cell Signal*, **4**, 609 - 621 (2009): "B Cell Receptor-induced Growth Arrest and Apoptosis in WEHI-231 Immature B Lymphoma Cells Involve Cyclic AMP and Epac Proteins"

Voisin, P.; Bernard, M., *J. Neurochem.*, **110**, 318 - 327 (2009): "Cyclic AMP-dependent Activation of Rhodopsin Gene Transcription in Cultured Retinal Precursor Cells of Chicken Embryo"

Waidmann, O.; Pleli, T.; Dvorak, K.; Baehr, C.; Mondorf, U.; Plotz, G.; Biondi, R.M.; Zeuzem, S.; Piiper, A., *J. Biol. Chem.*, **284**, 32256 - 32263 (2009): "Inhibition of the Equilibrative Nucleoside Transporter 1 and Activation of A2A Adenosine Receptors by 8-(4-Chlorophenylthio)-modified cAMP Analogs and their Hydrolytic Products"

Lyle, K.S.; Raaijmakers, J.H.; Bruinsma, W.; Bos, J.L.; de Rooij, J., *Cell. Signal*, **20**, 1104 - 1116 (2008): "cAMP-induced Epac-Rap Activation Inhibits Epithelial Cell Migration by Modulating Focal Adhesion and Leading Edge Dynamics"

Broderick, K.E.; Zhang, T.; Rangaswami, H.; Zeng, Y.; Zhao, X.; Boss, G.R.; Pilz, R.B., *Mol. Endocrinol.*, **21**, 1148 - 1162 (2007): "Guanosine 3',5'-cyclic monophosphate (cGMP)/cGMP-dependent Protein Kinase Induce Interleukin-6 Transcription in Osteoblasts"

Holz, G.G.; Kang, G.; Harbeck, M.; Roe, M.W.; Chepurny, O.G., *J. Physiol. - London*, **577**, 5 - 15 (2006): "Cell Physiology of cAMP Sensor Epac"

Moll, D.; Prinz, A.; Gesellchen, F.; Drewianka, S.; Zimmermann, B.; Herberg, F.W., *J. Neural. Transm.*, **113**, 1015 - 1032 (2006): "Biomolecular Interaction Analysis in Functional Proteomics"

Meves, H., *Curr. Neuropharmacol.*, **4**, 41 - 57 (2006): "The Action of Prostaglandins in Ion Channels"

Makranz, C.; Cohen, G.; Reichert, F.; Kodama, T.; Rotshenker, S., *Glia*, **53**, 441 - 448 (2006): "cAMP Cascade (PKA, Epac, Adenylyl Cyclase, Gi, and Phosphodiesterases) Regulates Myelin Phagocytosis Mediated by Complement Receptor-3 and Scavenger Receptor-AI/II in Microglia and Macrophages"

Christensen, A.E.; Selheim, F.; de Rooij, J.; Dremier, S.; Schwede, F.; Dao, K.K.; Martinez, A.; Maenhaut, C.; Bos, J.L.; Genieser, H.-G.; Doeskeland, S.O., *J. Biol. Chem.*, **278**, 35394 - 35402 (2003): "cAMP Analog Mapping of Epac1 and cAMP-Kinase. Discriminating Analogs Demonstrate that Epac and cAMP-Kinase Act Synergistically to Promote PC-12 Cell Neurite Extension"

Lu, Z.; Kolodecik, T.R.; Karne, S.; Nyce, M.; Gorelick, F., *Am. J. Physiol. Gastrointest. Liver Physiol.*, **285**, G822 - G828 (2003): "Effect of Ligands that Increase cAMP on Caerulein-induced Zymogen Activation in Pancreatic Acini"

Wyatt, T.A.; Forget, M.A.; Sisson, J.H., *Am. J. Pathol.*, **163**, 1157 - 1166 (2003): "Ethanol stimulates Ciliary Beating by Dual Cyclic Nucleotide Kinase Activation in Bovine Bronchial Epithelial Cells"

Kroeber, S.; Meissl, H.; Maronde, E.; Korf, H.-W., *J. Neurochem.*, **74**, 2478 - 2489 (2000): "Analyses of Signal Transduction Cascades Reveal an Essential Role of Calcium Ions for the regulation of Melatonin Biosynthesis in the Light -Sensitive Pineal Organ of the Rainbow Trout (*Oncorhynchus Mykiss*)"

Sugita, S.; Baxter, D.A.; Byrne, J.H., *J. Neurosci.*, **17**, 7237 - 7244 (1997): "Modulation of a cAMP/Protein Kinase A Cascade by Protein Kinase C in Sensory Neurons of Aplysia"

Ogreid, D.; Ekanger, R.; Suva, R.H.; Miller, J.P.; Doeskeland, S.O., *Eur. J. Biochem.*, **181**, 19 - 31 (1989): "Comparison of the Two Classes of Binding Sites (A and B) of Type I and Type II Cyclic-AMP-dependent Protein Kinases Using Cyclic Nucleotide Analogs"

Van Lookeren Campagne, M.M.; Diaz, F.V.; Jastorff, B.; Kessin, R.H., *Cancer Res.*, **51**, 6100 - 6105 (1991): "8-Cl-cAMP Inhibits the Growth of Chinese Hamster Ovary and Molt-4 Cells Through its Adenosine Metabolite"

Braumann, T.; Jastorff, B.; *J. Chromatogr.*, **350**, 105 - 118 (1985): "Physicochemical Characterization of Cyclic Nucleotides by Reversed Phase High- Performance Liquid Chromatography. II. Quantitative Determination of Hydrophobicity"

Higashio, T.; Abe, M.; Miyazaki, M.; Yamamoto, K., *Experientia*, **36**, 234 - 236 (1979): "Renal Effects of 8-substituted Derivatives of Adenosine 3',5'-cyclic Monophosphate in Dogs"