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Technical Information about Sp-8-BnT-2'-O-Me-cAMPS

Selective activator of Epac2 which efficiently discriminates against PKA

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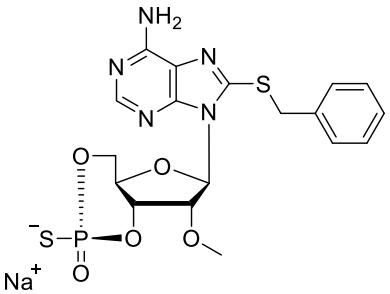

Abbreviation: **Sp-8-BnT-2'-O-Me-cAMPS**

Formula	CAS No.	Molecular Weight	UV	BIOLOG Cat.No.
$C_{18}H_{19}N_5O_5PS_2 \cdot Na$	[pending]	503.5	λ_{max} 283 nm / ε 17100 / pH 7	B 056

Name: 8- Benzylthio- 2'- O- methyladenosine- 3', 5'- cyclic monophosphorothioate, Sp- isomer / S-223

Legal information: The reagent is protected under patent EP 1511757 and foreign equivalents issued or licensed to BIOLOG Life Science Institute.

Description: Sp-8-BnT-2'-O-Me-cAMPS is an analogue of the natural signal molecule cyclic AMP in which the hydrogen in position 8 of the adenine nucleobase is replaced by the lipophilic benzylthio group and the ribose 2'-hydroxy group has been methylated. In addition, the axial one of the two exocyclic oxygen atoms in the cyclic phosphate moiety is modified by sulfur. The suffix "p" indicates that R/S nomenclature refers to phosphorus.

Properties: According to Schwede et al. (2015), Sp-8-BnT-2'-O-Me-cAMPS is the most potent 2'-substituted activator of the exchange proteins activated directly by cyclic AMP (Epac) isoform Epac2 that efficiently discriminates against Epac1 *in vitro* (AC_{50} Epac2 = 1.5 µM (1.8 µM for cAMP) and rel. k_{max} = 4.3 (1 for cAMP)). Since a free 2'-ribose hydroxy group in cAMP is essential for stimulation of protein kinase A (PKA), the 2'-O-methyl-substituted Sp-8-BnT-2'-O-Me-cAMPS is an extremely poor PKA activator and thus allows for specific activation of Epac2 over PKA.
However, in human osteosarcoma U2OS cell lines stably expressing Epac1 or Epac2, Sp-8-BnT-2'-O-Me-cAMPS does not induce Epac signalling at 100 µM, which may be due to inefficient cellular uptake in this biosystem (Schwede et al. 2015).

BIOLOG also offers the selective Epac2 agonist Sp-8-BnT-cAMPS (Cat. No. B 046), which has increased *in vitro* and *in vivo* potency compared to Sp-8-BnT-2'-O-Me-cAMPS, but slight potency to activate PKA. The well-established Epac agonist 8-pCPT-2'-O-Me-cAMP (Cat. No. C 041), which selectively activates Epac1 over Epac2 (*in vitro* AC_{50} Epac1 = 1.8 µM and rel. k_{max} = 3.3; *in vitro* AC_{50} Epac2 = 3.5 µM and rel. k_{max} = 0.8 (Schwede et al. 2015)), is available as well.

Specification: Lyophilized or crystallized sodium salt. The free acid or other salt forms are available upon request. Equal concentrations of Sp-8-BnT-2'-O-Me-cAMPS 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 98% (HPLC / UV / 283 nm). The product is not sterile and has not been tested for endotoxins.

Solubility: Sp-8-BnT-2'-O-Me-cAMPS is soluble in water (≥ 20.45 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: Sp-8-BnT-2'-O-Me-cAMPS has sufficient stability at room temperature and does not need special care during handling or shipment. Nevertheless, we recommend that the compound should be stored in the freezer, for longer storage periods preferably in freeze-dried form.

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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 these compounds 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 References for Sp-8-BnT-2'-O-Me-cAMPS:

Zummo, F.P.; Krishnanda, St.I.; Georgiou, M.; O'Harte, F.PM.; Parthasarathy, V.; Cullen, K.S.; Honkanen-Scott, M.; Shaw, J.AM.; Lovat, P.E.; Arden, C.; *Autophagy*, **18(4)**: 799 – 815 (2021): "Exendin-4 Stimulates Autophagy in Pancreatic β-cells via the RAPGEF/EPAC-Ca^{2+}-PPP3/calcineurin-TFEB Axis"

Schwede, F.; Bertinetti, D.; Langerijs, C.N.; Hadders, M.A.; Wienk, H.; Ellenbroek, J.H.; de Koning, E.J.; Bos, J.L.; Herberg, F.W.; Genieser, H.G.; Janssen, R.A.; Rehmann, H., *PLoS Biol.*, **13(1)**: e1002038 (2015): "Structure-guided Design of Selective Epac1 and Epac2 Agonists"

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