Small Molecules

IBMX

cAMP pathway activator; Inhibits cyclic nucleotide phosphodiesterases

Catalog #	72762	100 mg
	72764	500 mg

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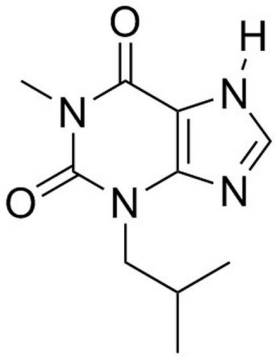
Product Description

IBMX is a widely used non-specific inhibitor of cyclic adenosine monophosphate (cAMP) and cyclic guanosine monophosphate (cGMP) phosphodiesterases (PDEs; IC_{50} = 19, 50, 18, 13, 32, 7, and 50 µM for PDE1, PDE2, PDE3, PDE4, PDE5, PDE7, and PDE11, respectively). PDE8A, PDE8B, and PDE9 are insensitive to IBMX (Fawcett et al.). By inhibiting PDEs, IBMX increases cellular cAMP and cGMP levels, activating cyclic-nucleotide-regulated protein kinases. Methylxanthines, including IBMX, caffeine, and theophylline, bind adenosine receptors, typically antagonizing the suppressive effects of natural agonists (Snyder et al.).

Molecular Name:	IBMX
Alternative Names:	1-Methyl-3-Isobutylxanthine; Isobutylmethylxanthin; Isobutyl methylxanthine; NSC 165960
CAS Number:	28822-58-4
Chemical Formula:	$C_{10}H_{14}N_4O_2$
Molecular Weight:	222.3 g/mol
Purity:	≥ 98%
Chemical Name:	3,7-dihydro-3-isobutyl-1-methyl-1H-purine-2,6-dione
Structure:	

Properties

Physical Appearance:	A crystalline solid
Storage:	Product stable at -20°C as supplied. Protect from prolonged exposure to light. Stable as supplied for 12 months from date of receipt.
Solubility:	· Absolute ethanol ≤ 20 mM · DMSO ≤ 40 mM For example, to prepare a 10 mM stock solution in DMSO, resuspend 10 mg in 4.5 mL of DMSO. Prepare stock solution fresh before use. Information regarding stability of small molecules in solution has rarely been reported, however, as a general guide we recommend storage in DMSO at -20°C. Aliquot into working volumes to avoid repeated freeze-thaw cycles. The effect of storage of stock solution on compound performance should be tested for each application. Compound has low solubility in aqueous media. For use as a cell culture supplement, stock solution should be diluted into culture medium immediately before use. Avoid final DMSO concentration above 0.1% due to potential cell toxicity.

Published Applications

DIFFERENTIATION
· Used in combination with fibroblast growth factor (FGF) 1, dopamine, 12-O-tetradecanoylphorbol-13-acetate (TPA), and Forskolin (Catalog #72112) to induce expression of the dopaminergic neuron marker tyrosine hydroxylase in neurons derived from the human NT2 cell line (Iacovitti et al.).
· Used in combination with Dexamethasone (Catalog #72092), insulin, and Indomethacin (Catalog #73942) for in vitro induction of adipogenic differentiation of unrestricted somatic stem cells (USSCs), a CD45-negative population of stem cells isolated from human cord blood (Kögler et al.; Pittenger et al.).
· Induces neural differentiation from human umbilical cord blood-derived mesenchymal stem cells (Tio et al.).
· Promotes the differentiation of rat neural progenitor cells into functional neurons in vitro (Lepski et al.).

References

Fawcett L et al. (2000) Molecular cloning and characterization of a distinct human phosphodiesterase gene family: PDE11A. Proc Natl Acad Sci USA 97(7): 3702–7.
Iacovitti L et al. (2001) Differentiation of human dopamine neurons from an embryonic carcinomal stem cell line. Brain Res 912(1): 99–104.
Kögler G et al. (2004) A new human somatic stem cell from placental cord blood with intrinsic pluripotent differentiation potential. J Exp Med 200(2): 123–35.
Lepski G et al. (2013) cAMP promotes the differentiation of neural progenitor cells in vitro via modulation of voltage-gated calcium channels. Front Cell Neurosci 7: 155.
Pittenger MF et al. (1999) Multilineage potential of adult human mesenchymal stem cells. Science 284(5411): 143–7.
Snyder SH et al. (1981) Adenosine receptors and behavioral actions of methylxanthines. Proc Natl Acad Sci USA 78(5): 3260–4.
Tio M et al. (2010) Roles of db-cAMP, IBMX and RA in aspects of neural differentiation of cord blood derived mesenchymal-like stem cells. PLoS One 5(2): e9398.

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This product is hazardous. Please refer to the Safety Data Sheet (SDS).