

Small Molecules

IBMX

cAMP pathway activator; Inhibits cyclic nucleotide phosphodiesterases

Catalog # 72762
72764

100 mg
500 mg



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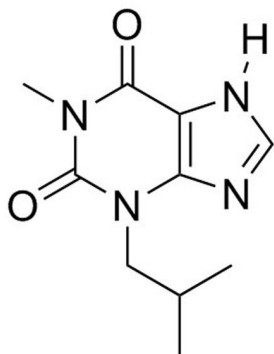
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Product Description

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 μ M 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: | $\geq 98\%$ |
| 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. For product expiry date, please contact techsupport@stemcell.com. |
| Solubility: | <ul style="list-style-type: none">· 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 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, insulin, and indomethacin 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 (MSCs; Tio et al.).
- Promotes the differentiation of rat neural progenitor cells (NPCs) 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* 97(7): 3702–3707.
- 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 U S A* 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.

Related Small Molecules

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