

Product Information

3-Isobutyl-1-methylxanthine

BioUltra

Catalog Number **I7018**

CAS RN 28822-58-4

Synonyms: IBMX, 1-Methyl-3-isobutylxanthine, 3,7-Dihydro-1-methyl-3-(2-methylpropyl)-1H-purine-2,6-dione, 3-Isobutyl-1-methyl-2,6(1H,3H)-purinedione

Molecular Formula: C₁₀H₁₄N₄O₂

Molecular Weight: 222.2

Product Description

Methylxanthines such as caffeine and theophylline inhibit adenosine 3',5'-cyclic monophosphate phosphodiesterase (cAMP PDE).¹ 3-Isobutyl-1-methylxanthine (IBMX) has been shown to be a potent inhibitor of cAMP PDE, significantly more effective than theophylline.²⁻⁶ IBMX inhibits cyclic nucleotide PDE with subsequent inhibition of cyclic nucleotide hydrolysis, which results in accumulation of cyclic AMP and guanosine 3',5'-cyclic monophosphate.^{7,8} In a study of cyclic AMP and insulin release by islets of Langerhans, IBMX at 1 mM caused a marked increase in the intracellular concentration of cyclic AMP in the presence of glucose.⁴

Caffeine and theophylline stimulate lipolysis in fat cells. IBMX was 20-fold more effective than theophylline, used at 0.05 mM.³ IBMX has been shown to promote the conversion of fibroblast cells into adipose cells.⁹ As a PDE inhibitor, IBMX was shown to inhibit the growth of carcinoma cells both *in vivo* and *in vitro* in mice.¹⁰

Various publications have cited use of this specific IBMX product in different systems, such as:

- Differentiation of cultured 3T3-L1 pre-adipocytes¹¹
- Isolating germinal vesical-stage oocytes¹²
- Germinal vesicle transfer studies, in the micromanipulation medium¹³

Trace elemental analyses have been performed on the BioUltra 3-Isobutyl-1-methylxanthine. The Certificate of Analysis (CofA) provides lot-specific results. BioUltra 3-Isobutyl-1-methylxanthine is for applications which require tight control of elemental content.

Precautions and Disclaimer

For R&D use only. Not for drug, household, or other uses.

Preparation Instructions

IBMX is soluble in different organic solvents, as follows:

- Warm methanol at 50 mg/mL
- Ethanol at 10 mg/mL. Dissolves at 25 mg/mL only with sonication.¹⁴
- Various publications report preparation in DMSO at 50 mg/mL¹³ and at 110 mg/mL.¹⁵

A 10 mM aqueous solution can be prepared by warming in a boiling water bath.¹⁶

Storage/Stability

One publication reports storage of IBMX solutions in ethanol at 0.125 mg/mL at 4 °C for at least three months.¹⁴ Aqueous solutions can be frozen in aliquots, then thawed for use by heating in a boiling water bath. These aliquots are stable for several months.¹⁶ Solutions in DMSO may be stored at -20 °C.¹⁵

References

1. Chasin, M, and Harris, D.N., *Adv. Cyclic Nucleotide Res.*, **7**, 225-228 (1976).
2. *Data for Biochemical Research*, 3rd ed. (Dawson, R.M.C. et al., eds.). Oxford University Press (Oxford, UK), pp. 326-327 (1986).
3. Beavo, J.A. et al., *Mol. Pharmacol.*, **6(6)**, 597-603 (1970).
4. Montague, W., and Cook, J.R., *Biochem. J.*, **122(1)**, 115-120 (1971).
5. Peytremann, A. et al., *Endocrinology*, **92(2)**, 525-530 (1973).
6. Ashcroft, S.J.H. et al., *FEBS Lett.*, **20(3)**, 263-266 (1972).
7. Klotz, U. et al., *Naunyn-Schmiedebergs Archives Pharmacol.*, **296(2)**, 187-190 (1977).
8. Spaulding, S.W. and Burrow, G.N., *Biochem. Biophys. Res. Commun.*, **59(1)**, 386-391 (1974).
9. Russell, T.R., *Proc. Natl. Acad. Sci. USA*, **76(9)**, 4451-4454 (1979).
10. Janik, P. et al., *Cancer Res.*, **40(6)**, 1950-1954 (1980).
11. Ishibashi, K. et al., "Effect of Trans Fatty Acid on Insulin Responsiveness and Fatty Acid Composition of Lipid Species of 3T3-L1 Adipocytes", in *Adipose Tissue* (L. Szablewski, ed.). Intechopen, DOI: 10.5772/intechopen.76646 (May 30, 2018).

12. Gassler, J. *et al.*, *Methods Cell Biol.*, **144**, 389-407 (2018).
13. Liu, L., and Keefe, D.L., *Methods Mol. Biol.*, **371**, 191-207 (2007).
14. Schwertner, H.A. *et al.*, *Anal. Chem.*, **48(13)**, 1875-1878 (1976).
15. Eckel, J., *The Cellular Secretome and Organelle Crosstalk*. Academic Press/Elsevier, p. 167 (2018).
16. Salomon, Y., *Methods Enzymol.*, **195**, 22-28 (1991).

GCY,CKV,SM 05/20-1