

3-Methyladenine

PI3K Inhibitor - Autophagy Inhibitor

Catalog # tlr1-3ma

For research use only

Version # 14D14-MM

PRODUCT INFORMATION

Content:

- 50 mg 3-methyladenine

Storage and stability:

- 3-methyladenine is provided as a solid and shipped at room temperature. Store at room temperature. Solid product is stable 2 years at room temperature.
- 3-methyladenine resuspended in DMSO can be stored at -20°C for 3 months.
- 3-methyladenine resuspended in water should not be stored for more than 1 day.

DESCRIPTION

3-Methyladenine (3-MA) is an inhibitor of phosphatidylinositol 3-kinases (PI3K). PI3K plays an important role in many biological processes, including controlling the activation of mTOR, a key regulator of autophagy. 3-MA inhibits autophagy by blocking autophagosome formation via the inhibition of class III PI3K¹.

3-MA plays a dual role in autophagy. Prolonged treatment with 3-MA promotes autophagy under nutrient-rich conditions, whereas 3-MA inhibits starvation-induced autophagy¹. These results are attributed to differential effects on class I versus class III PI3K.

In addition to its role in autophagy, 3-MA has been implicated in cancer therapy². It has been revealed that 3-MA suppresses the invasion of highly metastatic cancer cells through the inhibition of class I and II PI3K³. Further studies demonstrated that 3-MA can induce caspase-dependent cell death that is independent of autophagy inhibition⁴.

CHEMICAL PROPERTIES

CAS number: 5142-23-4

Formula: C₆H₇N₅

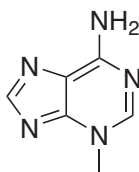
Molecular weight: 149.2

Solubility: DMSO or DMF (10 mg/ml), 95% ethanol or 1 N NaOH (30 mg/ml), water (see Methods)

Working concentration: 5 mM

Purity: >90% (HPLC)

Structure:



METHODS

Preparation of stock solution (50 mM / 7.5 mg/ml)

For cell culture assays, we recommend to resuspend 3-MA in water, as organic solvents, such as DMSO, DMF and ethanol display cytotoxicity. As 3-MA is unstable in aqueous solutions, we recommend freshly preparing stock solutions. This protocol can be scaled up or down as required.

- Weigh 5 mg of 3-MA.
- Add 670 µl pre-warmed sterile water. Heat to 55°C for 5 minutes.
- Mix by pipetting up and down. Use resuspended product immediately for your experiment. Do not store resuspended 3-MA for more than 1 day.

Note: Upon cooling 3-MA precipitates from solution.

PROTOCOLS (For reference only)

Cell Culture Assay²

Cell type: Mouse embryonic fibroblasts (MEFs)

Working concentration: 5 mM

Pre-Incubation time: 1-9 hours

Method: Cells were seeded on a coverglass slide chamber, and examined under a confocal microscope. The GFP-LC3 puncta in a single cell were manually counted under a confocal microscope. For each group, 50 cells were randomly selected for the average number of GFP-LC3 puncta/cell.

Animal Study⁵

Animal model: Adult male Sprague-Dawley rats

Dose: 400 nM

Administration: Intracerebral ventricular

Solubility: 30% propylene glycol, 5% Tween 80, 65% D5W, 30 mg/mL

1. Wu Y. *et al.*, 2010. Dual role of 3-methyladenine in modulation of autophagy via different temporal patterns of inhibition on class I and III phosphoinositide 3-kinase. *J Biol Chem.* 285(14):10850-61. 2. Cheong H *et al.*, 2012. Therapeutic targets in cancer cell metabolism and autophagy. *Nature Biotechnology* 30:671-678. 3. Ito S. *et al.*, 2007. 3-Methyladenine suppresses cell migration and invasion of HT1080 fibrosarcoma cells through inhibiting phosphoinositide 3-kinases independently of autophagy inhibition. *Int J Oncol* 31 261-268. 4. Hou H. *et al.*, 2012. Inhibitors of phosphatidylinositol 3'-kinases promote mitotic cell death in HeLa cells. *PLoS One.* 7(4):e35665. 5. Jing C. *et al.*, 2012. Autophagy activation is associated with neuroprotection against apoptosis via a mitochondrial pathway in a rat model of subarachnoid hemorrhage. *Neuroscience.* 213:144-53.

RELATED PRODUCTS

Product	Description	Catalog Code
Rapamycin	mTOR inhibitor	tlr1-rap
Bafilomycin A1	autophagy inhibitor	tlr1-baf
LY294002	PI3K inhibitor	tlr1-ly29
Wortmannin	PI3K inhibitor	tlr1-wtm

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