Small Molecules

Dipyridamole

Phosphodiesterase inhibitor

Catalog #100-1161

25 g

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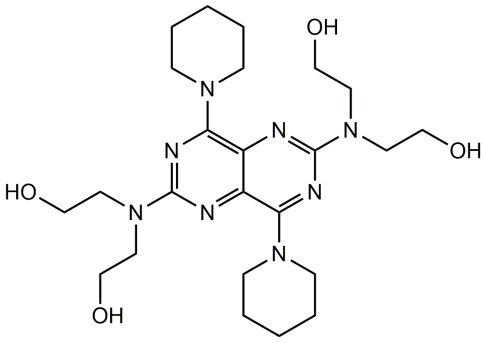
Product Description

Dipyridamole is a bi-directional nucleoside transport inhibitor that inhibits the phosphodiesterase (PDE) family of enzymes (PDE8 IC_{50} = 9 µM; Fisher et al.). PDE is an enzyme that breaks down cyclic adenosine monophosphate (cAMP) and cyclic guanosine monophosphate (cGMP), secondary messengers involved in a variety of signal transduction pathways (Harker & Kadatz). Dipyridamole also inhibits the uptake of adenosine in platelets, red blood cells, and endothelial cells, which can lead to an increase in extracellular concentration of adenosine and intracellular cAMP (Brown et al.).

Alternative Names:	NSC 515776; NSC 619103
CAS Number:	58-32-2
Chemical Formula:	$C_{24}H_{40}N_8O_4$
Molecular Weight:	504.6 g/mol
Purity:	≥ 98%
Chemical Name:	2,2',2",2"'-[(4,8-di-1-piperidinylpyrimido[5,4-d]pyrimidine-2,6-diyl)dinitrilo]tetrakis-ethanol
Structure:	



Properties

Physical Appearance:	A crystalline solid
Storage:	Product stable at -20°C as supplied. As a precaution, STEMCELL recommends storing all small molecules away from direct light. For long-term storage, store with a desiccant. Stable as supplied for 12 months from date of receipt.
Solubility:	• DMSO ≤ 55 mM • Absolute ethanol ≤ 9.9 mM For example, to prepare a 10 mM stock solution in DMSO, resuspend 100 mg in 20 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 or absolute ethanol concentration above 0.1% due to potential cell toxicity.

Published Applications

CANCER RESEARCH

· Induces apoptosis in acute myeloid leukemia (AML) cells by preventing statin-induced upregulation of 3-hydroxy-3-methylglutaryl coenzyme A reductase (HMGCR) through inhibition of sterol regulatory element binding protein 2 (SREBP2) cleavage (Pandyra & Penn).
· Reduces tumor growth and metastasis in breast cancer cells (4T1-Luc and MDA-MB-231T cells) by decreasing activated β-catenin, phospho-ERK1/2, and phospho-p65, and doubles the expression of IkBα (Spano et al.).
· Reduces cancer cell viability through impairment of autophagic flux (Chang et al.; Mello et al.; Thomé et al.).

References

Brown DG et al. (2015) A review of traditional and novel oral anticoagulant and antiplatelet therapy for dermatologists and dermatologic surgeons. J Am Acad Dermatol 72(3): 524–34.

Chang CY et al. (2022) Endoplasmic reticulum stress contributed to dipyridamole-induced impaired autophagic flux and glioma apoptosis. Int J Mol Sci 23(2): 579.

Fisher DA et al. (1998) Isolation and characterization of PDE8A, a novel human cAMP-specific phosphodiesterase. Biochem Biophys Res Commun 246(3): 570–7.

Harker LA & Kadatz RA. (1983) Mechanism of action of dipyridamole. Thromb Res 29: 39–46.

Mello P de A et al. (2014) Adenosine uptake is the major effector of extracellular ATP toxicity in human cervical cancer cells. Mol Biol Cell 25(19): 2905–18.

Pandyra A & Penn LZ. (2014) Targeting tumor cell metabolism via the mevalonate pathway: two hits are better than one. Mol Cell Oncol 1(4): e969133.

Spano D et al. (2013) Dipyridamole prevents triple-negative breast-cancer progression. Clin Exp Metastasis 30(1): 47–68.

Thomé MP et al. (2019) Dipyridamole impairs autophagic flux and exerts antiproliferative activity on prostate cancer cells. Exp Cell Res 382(1): 111456.

Related Small Molecules

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