C2 Ceramide

Cat. No.: HY-101180

CAS No.: 3102-57-6

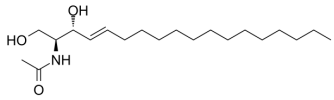
Molecular Formula: $C_{20}H_{39}NO_3$

Molecular Weight: 341.53

Target: Phosphatase; Mitochondrial Metabolism; Apoptosis; Autophagy

Pathway: Metabolic Enzyme/Protease; Apoptosis; Autophagy

Storage: -20°C, sealed storage, away from moisture
* In solvent : -80°C, 6 months; -20°C, 1 month (sealed storage, away from moisture)



SOLVENT & SOLUBILITY

In Vitro

DMSO : 20 mg/mL (58.56 mM; Need ultrasonic and warming)
Ethanol : 17 mg/mL (49.78 mM; Need ultrasonic and warming)

Preparing Stock Solutions

Solvent / Mass / Concentration	1 mg	5 mg	10 mg
1 mM	2.9280 mL	14.6400 mL	29.2800 mL
5 mM	0.5856 mL	2.9280 mL	5.8560 mL
10 mM	0.2928 mL	1.4640 mL	2.9280 mL

Please refer to the solubility information to select the appropriate solvent.

BIOLOGICAL ACTIVITY

Description

C2 Ceramide (Ceramide 2) is the main lipid of the stratum corneum and a protein phosphatase 1 (PP1) activator. C2 Ceramide activates PP2A and ceramide-activated protein phosphatase (CAPP). C2 Ceramide induces cells differentiation, autophagy and apoptosis, inhibits mitochondrial respiratory chain complex III. C2 Ceramide is also a skin conditioning agent that protects the epidermal barrier from water loss[1][2][3][4][5].

IC_{50} & Target

Protein phosphatase 1[2]
PP2A[4]
Ceramide-activated protein phosphatase (CAPP)[4]
Apoptosis[1]
Mitochondrial respiratory chain complex III[1]

In Vitro

C2 Ceramide (5 nM-200 μM; 24 hours; primary mouse osteoblasts) treatment (≤500 nM) promotes osteoblast viability, whilst concentrations ≥2 μM significantly reduces osteoblast viability in a dose- and time-dependent manner[1].
C2 Ceramide increases cytoplasmic histone-associated DNA fragments by 5.7- and 11.2-fold at 50 μM and 100 μM C2 Ceramide concentrations respectively in osteoblasts. At these higher concentrations, C2 Ceramide is a potent inducer of apoptosis in osteoblasts[1].

C2 Ceramide up-regulates mRNA expression of angiogenic genes in human dental pulp cells (HDPCs) and increases the migration and capillary tube formation of endothelial cells, whereas PP1 small interfering RNA shows opposite effects. Human dental pulp cells (HDPCs) increases levels of bone morphogenetic protein 2, phosphorylation of Smad 1/5/8, and mRNA expression of runt-related transcription factor 2 and osterix[2].

MCE has not independently confirmed the accuracy of these methods. They are for reference only.

Cell Viability Assay[1]

Cell Line:	Primary mouse osteoblasts
Concentration:	5 nM-200 μM
Incubation Time:	24 hours
Result:	Murine osteoblasts demonstrated a dose-dependent increase in their survival rate when exposed to low concentrations of 5-500 n M. Increasing concentrations of 20-200μM caused a dose-dependent decrease in mitochondrial succinate dehydrogenase activity and osteoblast survival.

In Vivo

The PP1 activator C2 Ceramide increases alkaline phosphatase activity, mineralizes nodule formation, and mRNA expression of dentin matrix protein 1 and dentin sialophosphoprotein. In contrast, knockdown by PP1 small interfering RNA inhibits odontoblastic differentiation[2].

MCE has not independently confirmed the accuracy of these methods. They are for reference only.

CUSTOMER VALIDATION

- Neuron. 2021 Aug 26;S0896-6273(21)00578-X.

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REFERENCES

[1]. P A Hill, et al. Ceramide-induced Cell Death/Survival in Murine Osteoblasts. J Endocrinol. 2010 Aug;206(2):225-33.

[2]. Ji-Youn Kim, et al. Role of Protein Phosphatase 1 in Angiogenesis and Odontoblastic Differentiation of Human Dental Pulp Cells. J Endod. 2017 Mar;43(3):417-424.

[3]. R T Dobrowsky, et al. Ceramide Stimulates a Cytosolic Protein Phosphatase. J Biol Chem. 1992 Mar 15;267(8):5048-51.

[4]. R T Dobrowsky, et al. Ceramide Activates Heterotrimeric Protein Phosphatase 2A. J Biol Chem. 1993 Jul 25;268(21):15523-30.

[5]. Maria Bernadete Riemma Pierre, et al. Influence of ceramide 2 on in vitro skin permeation and retention of 5-ALA and its ester derivatives, for Photodynamic Therapy. Brazilian Journal of Pharmaceutical Sciences. 2009, 45(1), 109-116.

[6]. Wenyuan Zhu, et al. C2-ceramide induces cell death and protective autophagy in head and neck squamous cell carcinoma cells. Int J Mol Sci. 2014 Feb 21;15(2):3336-55.

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