Product Data Sheet

Product Name: Sphingomyelins
Cat. No.: GC18328

Chemical Properties

Cas. No.	383907-87-7		
SMILES	[R]C(N[C@@H](COP(OCC[N+](C)(C)C)([O-])=O)[C@H](O)/C=C/CCCCCCCCCCCCC)=O		
Formula	$C_{39}H_{79}N_2O_6P$ (for palmitoyl)	M.Wt	703
Solubility	Chloroform: Soluble,Ethanol: Warmed,Methanol: Soluble	Storage	Store at -20°C
General tips	For obtaining a higher solubility , please warm the tube at 37 ℃ and shake it in the ultrasonic bath for a while.Stock solution can be stored below -20℃ for several months.		
Shipping Condition	Evaluation sample solution : ship with blue ice All other available size: ship with RT , or blue ice upon request.		
Structure	Sphingomyelins		

Protocol

Cell experiment [1]:

Cell lines	HeLa cells
Preparation Method	HeLa cells were grown in minimum essential medium (MEM) with 10% (v/v) fetal bovine serum (FBS), 100μg/ml streptomycin, and 100U/ml penicillin at 37°C in 5% CO_2/atmosphere. HeLa cells were pretreated for 1h with different concentrations of Sphingomyelins (0,1 5, 10, 25, and 50μM) and were then further incubated at 37°C with 10nM VacA. After 24h, cells were evaluated by DIC microscopy or neutral red uptake assays. DIC images of cells stained with neutral red.

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Reaction Conditions	0,1 5, 10, 25, and 50μM; 1h
Applications	Sphingomyelins treatment significantly promoted VacA-mediated vacuolation in HeLa cells in a dose-dependent manner.

Animal experiment [2]:

Animal models	Female C57-BL/6J-Fue mice
Preparation Method	Female C57-BL/6J-Fue mice were housed singly in a standard environment with food and water ad libitum. Acute colitis was induced in C57-BL/6 mice with 2.0% DSS over 7 days. 8mg of Sphingomyelins (calculated as 0.2% of the total daily food intake) was resuspended in drinking water and applied by oral gavage for 7 days. Assessment of colonoscopy and histological score in mice.
Dosage form	8mg/day for 7 days; p.o.
Applications	Sphingomyelins treatment significantly aggravated the intestinal mucosal inflammation in mice with DSS-mediated colitis.

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References:
[1] Gupta V R, Patel H K, Kostolansky S S, et al. Sphingomyelin functions as a novel receptor for Helicobacter pylori VacA[J]. PLoS pathogens, 2008, 4(5): e1000073.
[2] Fischbeck A, Leucht K, Frey-Wagner I, et al. Sphingomyelin induces cathepsin D-mediated apoptosis in intestinal epithelial cells and increases inflammation in DSS colitis[J]. Gut, 2011, 60(1): 55-65.

Background

Sphingomyelins are a dominant sphingolipid in membranes of mammalian cells, and this lipid class is specifically enriched in the plasma membrane [1]. Sphingomyelins have a favorable interaction with cholesterol (and other sterols), regulating the distribution of cholesterol within the cell membrane and maintaining the cholesterol homeostasis [2]. Sphingomyelins have been widely used to regulate the lipid mobility of high-density lipoproteins (HDL) and the extracellular flow of cholesterol[3].

In vitro, Sphingomyelins treatment (50μM) for 1 hour significantly promoted the vacuolation in HeLa cells mediated by 10nM vacuolating cytotoxin (VacA)[4].

In vivo, Sphingomyelins treatment via oral administration at a dose of 8mg daily for 7 days aggravated the intestinal mucosal inflammation in a mouse model of colitis induced by dextran sulfate sodium (DSS), and impaired the intestinal mucosal function[5]. Oral administration of 0.05% Sphingomyelins in AIN76A diet for 45 weeks

significantly inhibited the progression of colon tumors induced by 1,2-dimethylhydrazine (DMH) in mice[6].

References:

[1] Slotte J P. Biological functions of sphingomyelins[J]. Progress in lipid research, 2013, 52(4): 424-437.
[2] Slotte J P, Ramstedt B. The functional role of sphingomyelin in cell membranes[J]. European journal of lipid science and technology, 2007, 109(10): 977-981.
[3] Martínez-Beamonte R, Lou-Bonafonte J M, Martínez-Gracia M V, et al. Sphingomyelin in high-density lipoproteins: structural role and biological function[J]. International journal of molecular sciences, 2013, 14(4): 7716-7741.
[4] Gupta V R, Patel H K, Kostolansky S S, et al. Sphingomyelin functions as a novel receptor for Helicobacter pylori VacA[J]. PLoS pathogens, 2008, 4(5): e1000073.
[5] Fischbeck A, Leucht K, Frey-Wagner I, et al. Sphingomyelin induces cathepsin D-mediated apoptosis in intestinal epithelial cells and increases inflammation in DSS colitis[J]. Gut, 2011, 60(1): 55-65.
[6] Lemonnier L A, Dillehay D L, Vespremi M J, et al. Sphingomyelin in the suppression of colon tumors: prevention versus intervention[J]. Archives of biochemistry and biophysics, 2003, 419(2): 129-138.