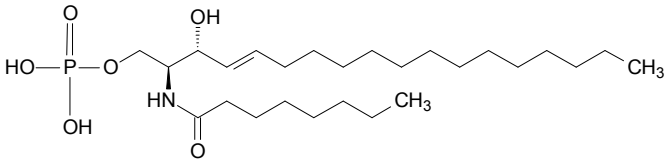
3050 Spruce Street, St. Louis, MO 63103 USA
Tel: (800) 521-8956 (314) 771-5765 Fax: (800) 325-5052 (314) 771-5757
email: techservice@sial.com sigma-aldrich.com

Product Information

D-*erythro*-Ceramide C8 1-Phosphate

Catalog Number **C8355**
Storage Temperature –20 °C



Product Description
Molecular Formula: $C_{26}H_{52}NO_6P$
Molecular Weight: 505.67

Ceramides comprise a group of cellular lipids characterized by a sphingoid base, most commonly sphingosine, linked to a fatty acid by means of an amide linkage. Ceramides are formed from the breakdown of sphingomyelin by sphingomyelinases with the concomitant release of phosphocholine.[1] Ceramides may be further metabolized to sphingosine and a free fatty acid by ceramidase.[2] Sphingosine and ceramides can also be phosphorylated at C_1 by intracellular sphingosine kinases. Alternatively, ceramides can be glycosylated at C_1 to form gangliosides and globosides. A ceramide can also be formed directly from sphingosine by the action of ceramide synthase or from sphinganine by sphinganine N-acyltransferase via an inactive dihydroceramide intermediate that is subsequently dehydrogenated by dihydroceramide desaturase.[3,4] The inactive saturated intermediate may be used as a negative control for the corresponding active ceramide.[5] The activity of dihydroceramide desaturase depends on the alkyl chain length of the sphingoid base (C_{18}>C_{12}>C_8) or of the ceramide fatty acid (C_8>C_{18}) and on the stereochemistry (the D-*erythro* isoform is ten times more active than the L-*threo* isoform).

Synthetic ceramides may form four stereoisomers, D-*erythro*, D-*threo*, L-*erythro*, and L-*threo*, of which only the D-*erythro*-ceramide occurs in nature. The sphingoid base usually contains an 18-carbon chain that is hydroxylated on C_1 and C_3, amidated on C_2, and has a single *trans* double bond linking C_4 and C_5. Synthetic ceramides having a *cis* double bond have been produced. Dihydroceramides have a saturated sphingoid base. Phytoceramides occur in yeast and have a saturated sphingoid base with a third hydroxyl group. Ceramides are further classified based on the chain length and saturation of the fatty acid moiety. Thus, ceramide C6 is hexanoic acid attached to sphingosine by an amide linkage.

Ceramides are generated in response to cellular stimulation by hormones, inflammatory cytokines, FAS ligands, and chemotherapeutic agents, and act as intracellular second messengers in these pathways.[6-8] In many cell types ceramides, like sphingosine, inhibit cell growth and proliferation, activate caspases, and induce DNA fragmentation and cell cycle arrest. Ceramides also block the nuclear translocation of Akt1.[9] In contrast, phosphoryated ceramides tend to stimulate DNA synthesis and cell division.[10,11] The development of synthetic, cell permeable ceramide and ceramide phosphate analogs has opened new avenues for studying the biological functions of the various ceramide isoforms.

D-*erythro*-ceramide C8 1-phosphate is cell permeable and stimulates DNA synthesis in cultured fibroblasts at 5 μM. This mitogenic activity is antagonized by cell permeable ceramidases.[11]

Preparation Instructions
D-*erythro*-ceramide C8 1-phosphate is soluble in DMSO at 15 mg/ml and in ethanol at 20 mg/ml.

Storage/Stability
Store the product tightly sealed at –20 °C.

References

1. Hannun, Y.A., et al., Enzymes of sphingolipid metabolism: from modular to integrative signaling. Biochemistry, **40**, 4893-4903 (2001).
2. Nikolova-Karakashian, M., and Merrill, A.H., Jr., Ceramidases. Methods Enzymol., **311**, 194-201 (2000).
3. Michel, C., et al., Characterization of ceramide synthesis. A dihydroceramide desaturase introduces the 4,5-*trans*-double bond of sphingosine at the level of dihydroceramide. J. Biol. Chem., **272**, 22432-22437 (1997).
4. Geeraert, L., et al., Conversion of dihydroceramide into ceramide: involvement of a desaturase. Biochem. J., **327**, 125-132 (1997).
5. Bielawska, A., et al., Selectivity of ceramide-mediated biology. Lack of activity of erythro-dihydroceramide. J. Biol. Chem., **268**, 26226-262232 (1993).
6. Sharma, K., The yins and yangs of ceramide. Cell Res., **9**, 1-10 (1999).
7. Hannun, Y.A., and Luberto, C., Ceramide in the eukaryotic stress response. Trends Cell. Biol., **2**, 73-80 (2000).
8. Perry, D.K., et al., The role of ceramide in cell signaling. Biochim. Biophys. Acta, **1436**, 233-243 (1998).
9. Salinas, M., et al., Inhibition of PKB/Akt1 by C2-ceramide involves activation of ceramide-activated protein phosphatase in PC12 cells. Mol. Cell Neurosci., **15**, 156-69 (2000).
10. Hinkovska-Galcheva, V.T., et al., The formation of ceramide-1-phosphate during neutrophil phagocytosis and its role in liposome fusion. J. Biol. Chem., **273**, 33203-33209 (1998).
11. Gomez-Munoz, A., et al., Short-chain ceramide-1-phosphates are novel stimulators of DNA synthesis and cell division: antagonism by cell-permeable ceramides. Mol. Pharmacol., **47**, 833-839 (1995).

KAA,AH,MAM 08/08-1