

# PRODUCT DATA SHEET

## N-*omega*-CD3-Octadecanoyl-phytosphingosine

**Catalog number:** 2210

**Synonyms:** N-C18:0-CD<sub>3</sub>-Phytoceramide; N-Stearoyl-CD<sub>3</sub>-phytosphingosine

**Source:** semisynthetic, yeast (*Pichia ciferri*)

**Solubility:** chloroform, DMF, DMSO

**CAS number:** 1354806-91-9

**Molecular Formula:** C<sub>36</sub>H<sub>70</sub>D<sub>3</sub>NO<sub>4</sub>

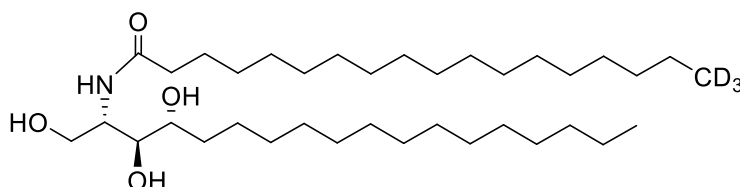
**Molecular Weight:** 587

**Storage:** -20°C

**Purity:** TLC, HPLC >98%; identity confirmed by MS

**TLC System:** chloroform/methanol (90:10)

**Appearance:** solid



### Application Notes:

This product is a well-defined ceramide containing a deuterated stearic acid acylated to the sphingosine base making it an ideal stable isotope-labeled standard for lipidomic studies using mass spectrometry. Stable isotope-labeled tracers are ideal for studies involving the metabolism and various metabolites of a lipid and can be used for the quantitative evaluation of major lipid pathways.<sup>1</sup> Lipidomics has shown great success in the use of deuterium labeled compounds in identifying and quantifying individual molecular species by the use of tandem mass spectrometry.<sup>2</sup>

Phytosphingosine is a long-chain sphingoid base having important cellular functions such as signaling, cytoskeletal structure, cellular cycle, and heat stress response. It is found largely in mammals, plants, and yeast. Phytosphingosine has seen much use in cosmetics due to its effects on the skin such as reducing inflammation by inhibiting the expression of the allergic cytokines IL-4 and TNF- $\alpha$  and the activation of the transcription factors NF- $\kappa$ B and c-jun in histamine-stimulated skin tissues.<sup>3</sup> Phytosphingosine can lead to apoptosis via two distinct pathways and has been investigated as a possible cancer therapeutic treatment.<sup>4</sup> Phytoceramides (fatty acid acylated to Phytosphingosine) are distributed at the microvillous membrane of the epithelial cells of the small intestine. Crypt cells and the adjacent epithelial cells produce phytosphingoglycolipids in much greater quantities than more differentiated epithelial cells.<sup>5</sup> The kidney and skin also contain phytosphingoglycolipids although in much lower concentrations than in the small intestine. Phytoceramides form part of the water barrier lipids of the skin.

### Selected References:

1. Magkos, F. and Mittendorfer, B., "Stable isotope-labeled tracers for the investigation of fatty acid and triglyceride metabolism in humans in vivo" *Clin Lipidol.* Vol. 4 pp. 215–230, 2009
2. Byun, H. and Bittman, R. Selective deuterium labeling of the sphingoid backbone: facile syntheses of 3,4, 5-trideuterio-D-*erythro*-sphingosine and 3-deuterio-D-*erythro*-sphingomyelin" *Chem Phys Lipids*, Vol. 163(8) pp. 809-813, 2010
3. K. Ryu et al. "Anti-scratching Behavioral Effects of N-Stearoylphytosphingosine and 4-Hydroxysphinganine in Mice" *Lipids*, Vol. 45 pp. 615-618, 2010
4. M. Park et al. "Suppression of Extracellular Signal-related Kinase and Activation of p38 MAPK Are Two Critical Events Leading to Caspase-8- and Mitochondria-mediated Cell Death in Phytosphingosine-treated Human Cancer Cells" *Journal of Biological Chemistry*, Vol. 278, pp. 50624-50634, 2003
5. F. Omae et al. "DES2 protein is responsible for phytoceramide biosynthesis in the mouse small intestine" *Journal of Biochemistry*, vol. 379 pp. 687-695, 2004

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