

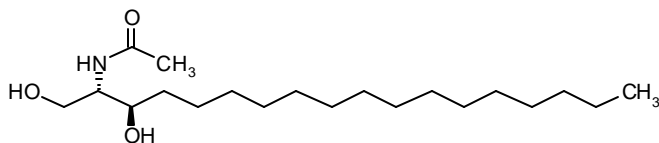
## Product Information

### C2 DIHYDROCERAMIDE

Product Number **C 7980**

Storage Temperature  $-20\text{ }^{\circ}\text{C}$

Synonyms: N-Acetyl-*D-erythro*-sphinganine



#### Product Description

Molecular Formula:  $\text{C}_{20}\text{H}_{41}\text{NO}_3$

Molecular Weight: 343.56

Supplied as a white solid

Purity: 98% (TLC)

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.<sup>1</sup> Ceramide may be further metabolized to sphingosine and a free fatty acid by ceramidase.<sup>2</sup> Sphingosine and ceramide can also be phosphorylated at  $\text{C}_1$  by intracellular sphingosine kinases. Alternatively ceramide can be glycosylated at  $\text{C}_1$  to form gangliosides and globosides. 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.<sup>3,4</sup> The saturated intermediates are inactive forms and may be used as negative controls for the corresponding active form of ceramide.<sup>5</sup> The activity of dihydroceramide desaturase depends on the alkyl chain length of the sphingoid base ( $\text{C}_{18} > \text{C}_{12} > \text{C}_8$ ) or of the ceramide fatty acid ( $\text{C}_8 > \text{C}_{18}$ ) 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 *D-erythro*-ceramide occurs in nature. The sphingoid base usually comprises an 18-carbon chain that is hydroxylated on  $\text{C}_1$  and  $\text{C}_3$ , amidated on  $\text{C}_2$ , and has a single *trans* double bond linking  $\text{C}_4$  and  $\text{C}_5$ . 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, C6 ceramide 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.<sup>6-8</sup> 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.<sup>9</sup> In contrast, phosphorylated ceramides tend to stimulate DNA synthesis and cell division.<sup>10,11</sup> 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.

C2 dihydroceramide is hydrogenated at  $\text{C}_4$  and  $\text{C}_5$ . It is biologically inactive *in vitro* and *in vivo* and is used as a negative control in studies of the activity C2 ceramide.<sup>5</sup>

#### Storage/Stability

Store at  $-20\text{ }^{\circ}\text{C}$  tightly sealed for up to 12 months.

#### Preparation Instruction

C2-dihydroceramide is soluble in ethanol at 5 mg/ml and in DMSO at 5 mg/ml. When using DMSO, dissolve product in hot DMSO, then cool to RT.

## References

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