

## Ceramide turnover in GtoPdb v.2023.1

Anthony H. Futerman<sup>1</sup>

1. Weizmann Institute of Science, Israel

### Abstract

Ceramides are a family of sphingophospholipids synthesized in the endoplasmic reticulum, which mediate cell stress responses, including apoptosis, autophagy and senescence, Serine palmitoyltransferase generates [3-ketosphinganine](#), which is reduced to [dihydrosphingosine](#). N-Acylation allows the formation of dihydroceramides, which are subsequently reduced to form ceramides. Once synthesized, ceramides are trafficked from the ER to the Golgi bound to the ceramide transfer protein, CERT ([COL4A3BP](#), [Q9Y5P4](#)). Ceramide can be metabolized via multiple routes, ensuring tight regulation of its cellular levels. Addition of phosphocholine generates sphingomyelin while carbohydrate is added to form glucosyl- or galactosylceramides. Ceramidase re-forms sphingosine or sphinganine from ceramide or dihydroceramide. Phosphorylation of ceramide generates ceramide phosphate. The determination of accurate kinetic parameters for many of the enzymes in the sphingolipid metabolic pathway is complicated by the lipophilic nature of the substrates.

### Contents

This is a citation summary for Ceramide turnover in the [Guide to Pharmacology](#) database (GtoPdb). It exists purely as an adjunct to the database to facilitate the recognition of citations to and from the database by citation analyzers. Readers will almost certainly want to visit the relevant sections of the database which are given here under database links.

[GtoPdb](#) is an expert-driven guide to pharmacological targets and the substances that act on them. GtoPdb is a reference work which is most usefully represented as an on-line database. As in any publication this work should be appropriately cited, and the papers it cites should also be recognized. This document provides a citation for the relevant parts of the database, and also provides a reference list for the research cited by those parts. For further details see [4].

Please note that the database version for the citations given in GtoPdb are to the most recent preceding version in which the family or its subfamilies and targets were substantially changed. The links below are to the current version. If you need to consult the cited version, rather than the most recent version, please contact the GtoPdb curators.

### Database links

#### Ceramide turnover

<https://www.guidetopharmacology.org/GRAC/FamilyDisplayForward?familyId=767>

#### Serine palmitoyltransferase

<https://www.guidetopharmacology.org/GRAC/FamilyDisplayForward?familyId=788>

#### Enzymes

[SPT1\(serine palmitoyltransferase long chain base subunit 1\)](#)

<https://www.guidetopharmacology.org/GRAC/ObjectDisplayForward?objectId=2509>

SPT2(serine palmitoyltransferase long chain base subunit 2)

<https://www.guidetopharmacology.org/GRAC/ObjectDisplayForward?objectId=2510>

SPT3(serine palmitoyltransferase long chain base subunit 3)

<https://www.guidetopharmacology.org/GRAC/ObjectDisplayForward?objectId=2511>

SPTSSA(serine palmitoyltransferase small subunit A)

<https://www.guidetopharmacology.org/GRAC/ObjectDisplayForward?objectId=2512>

SPTSSB(serine palmitoyltransferase small subunit B)

<https://www.guidetopharmacology.org/GRAC/ObjectDisplayForward?objectId=2513>

3-ketodihydrosphingosine reductase

<https://www.guidetopharmacology.org/GRAC/FamilyDisplayForward?familyId=791>

Enzymes

3-ketodihydrosphingosine reductase

<https://www.guidetopharmacology.org/GRAC/ObjectDisplayForward?objectId=2463>

Ceramide synthase

<https://www.guidetopharmacology.org/GRAC/FamilyDisplayForward?familyId=789>

Enzymes

CERS1(ceramide synthase 1)

<https://www.guidetopharmacology.org/GRAC/ObjectDisplayForward?objectId=2474>

CERS2(ceramide synthase 2)

<https://www.guidetopharmacology.org/GRAC/ObjectDisplayForward?objectId=2475>

CERS3(ceramide synthase 3)

<https://www.guidetopharmacology.org/GRAC/ObjectDisplayForward?objectId=2476>

CERS4(ceramide synthase 4)

<https://www.guidetopharmacology.org/GRAC/ObjectDisplayForward?objectId=2477>

CERS5(ceramide synthase 5)

<https://www.guidetopharmacology.org/GRAC/ObjectDisplayForward?objectId=2478>

CERS6(ceramide synthase 6)

<https://www.guidetopharmacology.org/GRAC/ObjectDisplayForward?objectId=2479>

Sphingolipid  $\Delta^4$ -desaturase

<https://www.guidetopharmacology.org/GRAC/FamilyDisplayForward?familyId=790>

Enzymes

delta 4-desaturase, sphingolipid 1

<https://www.guidetopharmacology.org/GRAC/ObjectDisplayForward?objectId=2484>

delta 4-desaturase, sphingolipid 2

<https://www.guidetopharmacology.org/GRAC/ObjectDisplayForward?objectId=2485>

Sphingomyelin synthase

<https://www.guidetopharmacology.org/GRAC/FamilyDisplayForward?familyId=774>

Introduction to Sphingomyelin synthase

<https://www.guidetopharmacology.org/GRAC/FamilyIntroductionForward?familyId=774>

Enzymes

sphingomyelin synthase 1

<https://www.guidetopharmacology.org/GRAC/ObjectDisplayForward?objectId=2520>

sphingomyelin synthase 2

<https://www.guidetopharmacology.org/GRAC/ObjectDisplayForward?objectId=2521>

sterile alpha motif domain containing 8

<https://www.guidetopharmacology.org/GRAC/ObjectDisplayForward?objectId=2525>

Sphingomyelin phosphodiesterase

<https://www.guidetopharmacology.org/GRAC/FamilyDisplayForward?familyId=773>

Enzymes

sphingomyelin phosphodiesterase 1

<https://www.guidetopharmacology.org/GRAC/ObjectDisplayForward?objectId=2514>

sphingomyelin phosphodiesterase 2

<https://www.guidetopharmacology.org/GRAC/ObjectDisplayForward?objectId=2515>

sphingomyelin phosphodiesterase 3

<https://www.guidetopharmacology.org/GRAC/ObjectDisplayForward?objectId=2516>

sphingomyelin phosphodiesterase 4

<https://www.guidetopharmacology.org/GRAC/ObjectDisplayForward?objectId=2517>

sphingomyelin phosphodiesterase acid-like 3A

<https://www.guidetopharmacology.org/GRAC/ObjectDisplayForward?objectId=2518>

sphingomyelin phosphodiesterase acid-like 3B

<https://www.guidetopharmacology.org/GRAC/ObjectDisplayForward?objectId=2519>

Neutral sphingomyelinase coupling factors

<https://www.guidetopharmacology.org/GRAC/FamilyDisplayForward?familyId=772>

Enzymes

embryonic ectoderm development

<https://www.guidetopharmacology.org/GRAC/ObjectDisplayForward?objectId=2487>

neutral sphingomyelinase activation associated factor

<https://www.guidetopharmacology.org/GRAC/ObjectDisplayForward?objectId=2495>

Ceramide glucosyltransferase

<https://www.guidetopharmacology.org/GRAC/FamilyDisplayForward?familyId=775>

Enzymes

UDP-glucose ceramide glucosyltransferase

<https://www.guidetopharmacology.org/GRAC/ObjectDisplayForward?objectId=2528>

Acid ceramidase

<https://www.guidetopharmacology.org/GRAC/FamilyDisplayForward?familyId=769>

Enzymes

N-acylsphingosine amidohydrolase 1

<https://www.guidetopharmacology.org/GRAC/ObjectDisplayForward?objectId=2491>

Neutral ceramidases

<https://www.guidetopharmacology.org/GRAC/FamilyDisplayForward?familyId=770>

Enzymes

N-acylsphingosine amidohydrolase 2

<https://www.guidetopharmacology.org/GRAC/ObjectDisplayForward?objectId=2492>

N-acylsphingosine amidohydrolase 2B

<https://www.guidetopharmacology.org/GRAC/ObjectDisplayForward?objectId=2493>

Alkaline ceramidases

<https://www.guidetopharmacology.org/GRAC/FamilyDisplayForward?familyId=768>

Enzymes

alkaline ceramidase 1

<https://www.guidetopharmacology.org/GRAC/ObjectDisplayForward?objectId=2468>

alkaline ceramidase 2

<https://www.guidetopharmacology.org/GRAC/ObjectDisplayForward?objectId=2469>

alkaline ceramidase 3

<https://www.guidetopharmacology.org/GRAC/ObjectDisplayForward?objectId=2470>

Ceramide kinase

<https://www.guidetopharmacology.org/GRAC/FamilyDisplayForward?familyId=771>

Enzymes

ceramide kinase

<https://www.guidetopharmacology.org/GRAC/ObjectDisplayForward?objectId=2473>

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