

Carnitine palmitoyltransferases in GtoPdb v.2025.3

Núria Casals¹ and Rosalía Rodríguez¹

1. Universitat Internacional de Catalunya, Spain

Abstract

The CPT1 enzymes convert long chain (greater than ~C12) acyl-CoA molecules to acylcarnitine derivatives to facilitate their transport from the cytosol into the mitochondrial matrix via the carnitine/acylcarnitine carrier (CACT; SLC25A20). The acylcarnitines are converted back to acyl-CoA by CPT2 to support the fatty acid oxidation (FAO) cycle in the mitochondria. CPT1s are allosterically inhibited by malonyl-CoA.

Contents

This is a citation summary for Carnitine palmitoyltransferases 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 [1].

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

Carnitine palmitoyltransferases

<https://www.guidetopharmacology.org/GRAC/FamilyDisplayForward?familyId=1089>

Enzymes

[carnitine palmitoyltransferase 1A](#)

<https://www.guidetopharmacology.org/GRAC/ObjectDisplayForward?objectId=3249>

[carnitine palmitoyltransferase 1B](#)

<https://www.guidetopharmacology.org/GRAC/ObjectDisplayForward?objectId=3250>

[carnitine palmitoyltransferase 1C](#)

<https://www.guidetopharmacology.org/GRAC/ObjectDisplayForward?objectId=3251>

[carnitine palmitoyltransferase 2](#)

<https://www.guidetopharmacology.org/GRAC/ObjectDisplayForward?objectId=3252>

References

1. Buneman P, Christie G, Davies JA, Dimitrellou R, Harding SD, Pawson AJ, Sharman JL and Wu Y. (2020) Why data citation isn't working, and what to do about it *Database* **2020** [PMID:32367113]
2. Ceccarelli SM, Chomienne O, Gubler M and Arduini A. (2011) Carnitine palmitoyltransferase (CPT) modulators: a medicinal chemistry perspective on 35 years of research. *J Med Chem* **54**: 3109-52 [PMID:21504156]
3. Giannessi F, Pessotto P, Tassoni E, Chiodi P, Conti R, De Angelis F, Dell'Uomo N, Catini R, Deias R and Tinti MO *et al.* (2003) Discovery of a Long-Chain Carbamoyl Aminocarnitine Derivative, a

Reversible Carnitine Palmitoyltransferase Inhibitor with Antiketotic and Antidiabetic Activity
Journal of Medicinal Chemistry **46**: 303–309

4. Rodríguez-Rodríguez R, Baena M, Zagmutt S, Paraiso WK, Reguera AC, Fadó R and Casals N. (2025) International Union of Basic and Clinical Pharmacology: Fundamental Insights and Clinical Relevance Regarding the Carnitine Palmitoyltransferase Family of Enzymes *Pharm Rev*
5. Rufer AC, Lomize A, Benz J, Chomienne O, Thoma R and Hennig M. (2007) Carnitine palmitoyltransferase 2: analysis of membrane association and complex structure with a substrate analog. *FEBS Lett* **581**: 3247–52 [[PMID:17585909](#)]
6. Rufer AC, Thoma R, Benz J, Stihle M, Gsell B, De Roo E, Banner DW, Mueller F, Chomienne O and Hennig M. (2006) The crystal structure of carnitine palmitoyltransferase 2 and implications for diabetes treatment. *Structure* **14**: 713–23 [[PMID:16615913](#)]
7. Zammit VA. (1999) The malonyl-CoA-long-chain acyl-CoA axis in the maintenance of mammalian cell function. *Biochem J* **343 Pt 3**: 505–15 [[PMID:10527927](#)]