

## SLC66 Lysosomal amino acid transporters in GtoPdb v.2023.1

Gergely Gyimesi<sup>1</sup> and Matthias A. Hediger<sup>1</sup>

1. Universität Bern, Switzerland

### Abstract

This is a family of 5 evolutionarily related proteins. Their structural similarities suggest that they are transporters. Biochemical evidence supports transporter activity for SLC66A1 (LAAT1) and SLC66A4 (CTNS; Cystinosin), primarily exporting amino acids from the lysosome to the cytoplasm. The functions of the 3 remaining members of the family are undetermined.

### Contents

This is a citation summary for SLC66 Lysosomal amino acid transporters 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 [2].

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

#### SLC66 Lysosomal amino acid transporters

<https://www.guidetopharmacology.org/GRAC/FamilyDisplayForward?familyId=1048>

#### Transporters

[solute carrier family 66 member 1](#)

<https://www.guidetopharmacology.org/GRAC/ObjectDisplayForward?objectId=3160>

[solute carrier family 66 member 2](#)

<https://www.guidetopharmacology.org/GRAC/ObjectDisplayForward?objectId=3161>

[solute carrier family 66 member 3](#)

<https://www.guidetopharmacology.org/GRAC/ObjectDisplayForward?objectId=3162>

[cystinosin, lysosomal cystine transporter](#)

<https://www.guidetopharmacology.org/GRAC/ObjectDisplayForward?objectId=3163>

[mannose-P-dolichol utilization defect 1](#)

<https://www.guidetopharmacology.org/GRAC/ObjectDisplayForward?objectId=3164>

## References

1. Amick J, Tharkeshwar AK, Talaia G and Ferguson SM. (2020) PQLC2 recruits the C9orf72 complex to lysosomes in response to cationic amino acid starvation. *J Cell Biol* **219** [PMID:31851326]
2. 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]
3. Elmonem MA, Veys KR, Soliman NA, van Dyck M, van den Heuvel LP and Levtschenko E. (2016) Cystinosis: a review. *Orphanet J Rare Dis* **11**: 47 [PMID:27102039]
4. Jézégou A, Llinares E, Anne C, Kieffer-Jaquinod S, O'Regan S, Aupetit J, Chabli A, Sagné C, Debacker C and Chadeaux-Vekemans B *et al.*. (2012) Heptahelical protein PQLC2 is a lysosomal cationic amino acid exporter underlying the action of cysteamine in cystinosis therapy. *Proc Natl Acad Sci U S A* **109**: E3434-43 [PMID:23169667]
5. Kalatzis V, Cherqui S, Antignac C and Gasnier B. (2001) Cystinosin, the protein defective in cystinosis, is a H(+)-driven lysosomal cystine transporter. *EMBO J* **20**: 5940-9 [PMID:11689434]
6. Kranz C, Denecke J, Lehrman MA, Ray S, Kienz P, Kreissel G, Sagi D, Peter-Katalinic J, Freeze HH and Schmid T *et al.*. (2001) A mutation in the human MPDU1 gene causes congenital disorder of glycosylation type If (CDG-If). *J Clin Invest* **108**: 1613-9 [PMID:11733556]
7. Leray X, Conti R, Li Y, Debacker C, Castelli F, Fenaille F, Zdebik AA, Pusch M and Gasnier B. (2021) Arginine-selective modulation of the lysosomal transporter PQLC2 through a gate-tuning mechanism. *Proc Natl Acad Sci U S A* **118** [PMID:34344826]
8. Liu B, Du H, Rutkowski R, Gartner A and Wang X. (2012) LAAT-1 is the lysosomal lysine/arginine transporter that maintains amino acid homeostasis. *Science* **337**: 351-4 [PMID:22822152]
9. Ruivo R, Bellenchi GC, Chen X, Zifarelli G, Sagné C, Debacker C, Pusch M, Supplisson S and Gasnier B. (2012) Mechanism of proton/substrate coupling in the heptahelical lysosomal transporter cystinosin. *Proc Natl Acad Sci U S A* **109**: E210-7 [PMID:22232659]
10. Schenk B, Imbach T, Frank CG, Grubenmann CE, Raymond GV, Hurvitz H, Korn-Lubetzki I, Revel-Vik S, Raas-Rotschild A and Luder AS *et al.*. (2001) MPDU1 mutations underlie a novel human congenital disorder of glycosylation, designated type If. *J Clin Invest* **108**: 1687-95 [PMID:11733564]
11. Talaia G, Amick J and Ferguson SM. (2021) Receptor-like role for PQLC2 amino acid transporter in the lysosomal sensing of cationic amino acids. *Proc Natl Acad Sci U S A* **118** [PMID:33597295]
12. Town M, Jean G, Cherqui S, Attard M, Forestier L, Whitmore SA, Callen DF, Gribouval O, Broyer M and Bates GP *et al.*. (1998) A novel gene encoding an integral membrane protein is mutated in nephropathic cystinosis. *Nat Genet* **18**: 319-24 [PMID:9537412]