

SLC27 family of fatty acid transporters (version 2019.4) in the IUPHAR/BPS Guide to Pharmacology Database

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Abstract

Fatty acid transporter proteins (FATPs) are a family (SLC27) of six transporters (FATP1-6). They have at least one, and possibly six [4, 11], transmembrane segments, and are predicted on the basis of structural similarities to form dimers. SLC27 members have several structural domains: integral membrane associated domain, peripheral membrane associated domain, FATP signature, intracellular AMP binding motif, dimerization domain, lipocalin motif, and an ER localization domain (identified in FATP4 only) [2, 8, 9]. These transporters are unusual in that they appear to express intrinsic very long-chain acyl-CoA synthetase (EC 6.2.1.-, EC 6.2.1.7) enzyme activity. Within the cell, these transporters may associate with plasma and peroxisomal membranes. FATP1-4 and -6 transport long- and very long-chain fatty acids, while FATP5 transports long-chain fatty acids as well as bile acids [7, 11].

Contents

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Database links

[SLC27 family of fatty acid transporters](#)

<http://www.guidetopharmacology.org/GRAC/FamilyDisplayForward?familyId=214>

Transporters

[FATP1 \(Fatty acid transport protein 1\)](#)

<http://www.guidetopharmacology.org/GRAC/ObjectDisplayForward?objectId=1108>
FATP2(Fatty acid transport protein 2)
<http://www.guidetopharmacology.org/GRAC/ObjectDisplayForward?objectId=1109>
FATP3(Fatty acid transport protein 3)
<http://www.guidetopharmacology.org/GRAC/ObjectDisplayForward?objectId=1110>
FATP4(Fatty acid transport protein 4)
<http://www.guidetopharmacology.org/GRAC/ObjectDisplayForward?objectId=1111>
FATP5(Fatty acid transport protein 5)
<http://www.guidetopharmacology.org/GRAC/ObjectDisplayForward?objectId=1112>
FATP6(Fatty acid transport protein 6)
<http://www.guidetopharmacology.org/GRAC/ObjectDisplayForward?objectId=1113>

References

1. Blackburn C, Guan B, Brown J, Cullis C, Condon SM, Jenkins TJ, Peluso S, Ye Y, Gimeno RE and Punreddy S *et al.*. (2006) Identification and characterization of 4-aryl-3,4-dihydropyrimidin-2(1H)-ones as inhibitors of the fatty acid transporter FATP4. *Bioorg. Med. Chem. Lett.* **16**: 3504-9 [PMID:16644217]
2. Faergeman NJ, DiRusso CC, Elberger A, Knudsen J and Black PN. (1997) Disruption of the *Saccharomyces cerevisiae* homologue to the murine fatty acid transport protein impairs uptake and growth on long-chain fatty acids. *J. Biol. Chem.* **272**: 8531-8 [PMID:9079682]
3. Gimeno RE, Ortegon AM, Patel S, Punreddy S, Ge P, Sun Y, Lodish HF and Stahl A. (2003) Characterization of a heart-specific fatty acid transport protein. *J. Biol. Chem.* **278**: 16039-44 [PMID:12556534]
4. Lewis SE, Listenberger LL, Ory DS and Schaffer JE. (2001) Membrane topology of the murine fatty acid transport protein 1. *J. Biol. Chem.* **276**: 37042-50 [PMID:11470793]
5. Li H, Black PN, Chokshi A, Sandoval-Alvarez A, Vatsyayan R, Sealls W and DiRusso CC. (2008) High-throughput screening for fatty acid uptake inhibitors in humanized yeast identifies atypical antipsychotic drugs that cause dyslipidemias. *J. Lipid Res.* **49**: 230-44 [PMID:17928635]
6. Matsufuji T, Ikeda M, Naito A, Hirouchi M, Kanda S, Izumi M, Harada J and Shinozuka T. (2013) Arylpiperazines as fatty acid transport protein 1 (FATP1) inhibitors with improved potency and pharmacokinetic properties. *Bioorg. Med. Chem. Lett.* **23**: 2560-5 [PMID:23528296]
7. Mihalik SJ, Steinberg SJ, Pei Z, Park J, Kim DG, Heinzer AK, Dacremont G, Wanders RJ, Cuebas DA and Smith KD *et al.*. (2002) Participation of two members of the very long-chain acyl-CoA synthetase family in bile acid synthesis and recycling. *J. Biol. Chem.* **277**: 24771-9 [PMID:11980911]
8. Milger K, Herrmann T, Becker C, Gotthardt D, Zickwolf J, Ehehalt R, Watkins PA, Stremmel W and Füllekrug J. (2006) Cellular uptake of fatty acids driven by the ER-localized acyl-CoA synthetase FATP4. *J. Cell. Sci.* **119**: 4678-88 [PMID:17062637]
9. Ordovás L, Roy R, Zaragoza P and Rodellar C. (2006) Structural and functional characterization of the bovine solute carrier family 27 member 1 (SLC27A1) gene. *Cytogenet. Genome Res.* **115**: 115-22 [PMID:17065791]
10. Sandoval A, Chokshi A, Jesch ED, Black PN and DiRusso CC. (2010) Identification and characterization of small compound inhibitors of human FATP2. *Biochem. Pharmacol.* **79**: 990-9 [PMID:19913517]
11. Schaffer JE and Lodish HF. (1994) Expression cloning and characterization of a novel adipocyte long chain fatty acid transport protein. *Cell* **79**: 427-36 [PMID:7954810]
12. Stahl A, Hirsch DJ, Gimeno RE, Punreddy S, Ge P, Watson N, Patel S, Kotler M, Raimondi A and Tartaglia LA *et al.*. (1999) Identification of the major intestinal fatty acid transport protein. *Mol. Cell* **4**: 299-308 [PMID:10518211]
13. Zhou W, Madrid P, Fluit A, Stahl A and Xie XS. (2010) Development and validation of a high-throughput screening assay for human long-chain fatty acid transport proteins 4 and 5. *J Biomol Screen* **15**: 488-97 [PMID:20448275]

