PEX5S,L binds cargo proteins containing PTS1

Azevedo, JE., Fransen, M., May, B., Van Veldhoven, PP.
Introduction

Reactome is open-source, open access, manually curated and peer-reviewed pathway database. Pathway annotations are authored by expert biologists, in collaboration with Reactome editorial staff and cross-referenced to many bioinformatics databases. A system of evidence tracking ensures that all assertions are backed up by the primary literature. Reactome is used by clinicians, geneticists, genomics researchers, and molecular biologists to interpret the results of high-throughput experimental studies, by bioinformaticians seeking to develop novel algorithms for mining knowledge from genomic studies, and by systems biologists building predictive models of normal and disease variant pathways.

The development of Reactome is supported by grants from the US National Institutes of Health (P41 HG003751), University of Toronto (CFREF Medicine by Design), European Union (EU STRP, EMI-CD), and the European Molecular Biology Laboratory (EBI Industry program).

Literature references


Reactome database release: 83

This document contains 1 reaction (see Table of Contents)

https://reactome.org
PEX5S,L binds cargo proteins containing PTS1

Stable identifier: R-HSA-9033233

Type: binding

Compartments: cytosol

Inferred from: Pex5l binds Acox1 or Uox (Mus musculus)

It is unclear how the long isoform of PEX5 (PEX5L) and the short isoform of PEX5 (PEX5S) are generated. A current hypothesis suggests alternative mRNA splicing. Both isoforms can bind the peroxisome targeting signal 1 (PTS1) located at the C-terminus of most of the proteins that are targeted to the peroxisomal matrix (Dodt et al. 1995, Fransen et al. 1995, Wiemer et al. 1995, Gatto et al. 2000, Brocard et al. 2003, Gatto et al. 2003, Harper et al. 2003, Ghosh and Berg 2010, Freitas et al. 2011, Okumoto et al. 2011). PTS1 typically contains Ser-Lys-Leu (SKL) at the C-terminus but substantial variation in sequences and affinities for PEX5 are observed and upstream residues can modulate binding to PEX5 (Lametschwandtner et al. 1998, Ghosh and Berg 2010, reviewed in Brocard and Hartig 2006).

A minority of peroxisomal matrix proteins contain PTS2. While the PEX5S isoform binds proteins containing PTS1, the PEX5L isoform binds either proteins containing PTS1 or PEX7 bound to proteins containing PTS2 (Braverman et al. 1998). Some proteins appear to be imported as oligomers, however this is rather inefficient as PEX5 appears to have a preference for monomeric substrates (Otera and Fujiki 2012, Freitas et al. 2011, Freitas et al. 2015, also inferred from mouse homologs). Mutations in PEX5 cause defects in peroxisomal import and comprise complementation group 2 of peroxisomal biogenesis disorders (also called Zellweger spectrum disorders) (Dodt et al. 1995, Wiemer et al. 1995). A specific mutation affecting only the PEX5L isoform is the cause of rhizomelic chondrodysplasia punctate type 5 (Barøy et al. 2015).

Literature references


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<td>Authored, Edited</td>
<td>May, B.</td>
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<tr>
<td>2018-02-13</td>
<td>Reviewed</td>
<td>Van Veldhoven, PP., Fransen, M.</td>
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<td>2018-03-12</td>
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