Endophilins recruit synaptojanins to the clathrin-coated pit

Antonescu, CN., Rothfels, K.

European Bioinformatics Institute, New York University Langone Medical Center, Ontario Institute for Cancer Research, Oregon Health and Science University.

The contents of this document may be freely copied and distributed in any media, provided the authors, plus the institutions, are credited, as stated under the terms of Creative Commons Attribution 4.0 International (CC BY 4.0) License. For more information see our license.

24/01/2021
**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: 75

This document contains 1 reaction (see Table of Contents)

[https://www.reactome.org](https://www.reactome.org)
Endophilins recruit synaptojanins to the clathrin-coated pit

Stable identifier: R-HSA-8868651

Type: binding

Compartments: plasma membrane

Synaptojanin (SYNJ) 1 and 2 are inositol-5-phosphatases that sequentially convert PI(4,5)P2 to PI(4)P and PI (Cremona et al 1999; reviewed in Billcliff and Lowe, 2014). Conversion of PI(4,5)P2 to PI(4)P and PI accompanies maturation of the clathrin-coated pit, and consistent with this, SYNJ proteins are recruited to the clathrin-coated pit through interactions with a number of endocytic proteins including ITSNs, EPS15, PACSIN proteins and endophilins, as well as with clathrin and AP-2 (Haffner et al, 1997; Cestra et al, 1999; Maire et al, 2004; Schuske et al, 2003; Verstreken et al, 2003; Modregger et al, 2000; Perera et al, 2006; Milesevic et al, 2011; reviewed in Dittman and Ryan, 2009). SYNJ1 exists in two isoforms, a longer 170 kDa isoform and a shorter 145 kDa isoform, with slightly different roles. The recruitment and activity of SYNJ1-145 appears to largely coincide with that of dynamin at later stages of vesicle formation, while the SYNJ1-170 isoform also plays earlier roles in stabilizing the growing clathrin-coated vesicle (Perera et al, 2006; Taylor et al, 2011; Antonescu et al, 2011). SYNJ-mediated hydrolysis of PI(4,5)P2 to PI(4)P is most efficient on highly curved, endophilin-coated tubules of the vesicle neck and contributes to dynamin-mediated membrane scission (Chang-Ileto et al, 2011; reviewed in Daumke et al, 2014; McMahon and Boucrot, 2011).

In addition to SYNJ1 and 2, other inositol-5-phosphatases are also recruited to the CCP at the time of scission. These include OCRL, which is recruited through interaction with clathrin as well as the RAB5 interactor APPL1 (Erdmann et al, 2007; Mao et al, 2009; Taylor et al, 2011; Nandez et al, 2014).

Literature references


<table>
<thead>
<tr>
<th>Editions</th>
<th>Reviewed</th>
<th>Author</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016-05-10</td>
<td>Reviewed</td>
<td>Antonescu, CN.</td>
</tr>
<tr>
<td>2016-05-11</td>
<td>Authored, Edited</td>
<td>Rothfels, K.</td>
</tr>
</tbody>
</table>