ARFGAP, cargo, vSNARES and p24 proteins bind COPI vesicles at Golgi

Gillespie, ME., Rothfels, K.
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: 74

This document contains 1 reaction (see Table of Contents)

https://reactome.org
ARFGAP, cargo, vSNARES and p24 proteins bind COPI vesicles at Golgi

**Stable identifier:** R-HSA-6811417

**Type:** binding

**Compartments:** Golgi membrane

Binding and polymerization of coatamer is coordinated with the incorporation of cargo proteins and Golgi-targeting snares, as well as with recruitment of ARFGAP proteins (Letourneur et al, 1994; Nagahama et al, 1996; Bremser et al, 1999).

Typical cargo for COPI-mediated retrograde traffic includes the KDEL receptors, which bind and recycle ER-resident proteins, as well as other cycling proteins such as SURF4 that interacts with p24 proteins and contributes to Golgi maintenance (Cosson and Letourner, 1994; Ben-Tekaya et al, 2005; Majoul et al, 2001; Orci et al, 1997, Bremser et al, 1999; Presley et al, 1997; Mitrovic et al, 2008; reviewed in Beck et al, 2009).

Other protein components of the COPI vesicle include the p24 family of proteins, which serve diverse roles in the early secretory pathway (reviewed in Schuiki and Volchuk, 2012). Oligomeric p24 proteins interact with ADP-bound ARF and components of the COPI coat, contributing to coatamer recruitment and oligomerization (Gommel et al, 2001; Majoul et al, 2001; Bethune et al, 2006; Harter and Wieland, 1998; Langer et al, 2008; Reinhard et al, 1999). p24 proteins also act as cargo receptors for various proteins destined for packaging in COPI vesicles; these include GPI-anchored transmembrane proteins, WNT ligands and some G-protein coupled receptors, among others (Takida et al, 2008; Bonnon et al, 2010; Luo et al, 2011; Beuchling et al, 2011; Wang and Kazanietz, 2002; reviewed in Schuiki and Volchuk, 2012). p24 proteins also contribute to COPI coat disassembly by restricting ARF GTPase activity until cargo has been loaded (Goldberg, 2000; Lanoix et al, 2001).

ARFGAPs are recruited to the budding vesicle through direct interaction with active ARF, the cytoplasmic tails of cargo proteins and with components of the COPI coat (Goldberg, 2000; Majoul et al, 2001; Aoe et al, 1997; Kliouchnikov et al, 2009; Luo et al, 2009). Stimulation of ARF GTPase activity is coordinated with cargo recruitment to ensure that only cargo-loaded vesicles are produced (Goldberg, 2000; Luo et al, 2009).

Mammalian cells have 3 ARFGAPs that appear to be involved in COPI-mediated traffic, ARFGAP1,2 and 3 (Frigerio et al, 2007; Liu et al, 2001; Kahn et al, 2008). ARFGAP1 has a ALPS domain that recognizes membrane curvature and that is required for the GTPase stimulating activity of the protein, suggesting a
mechanism for coordinating ARF1-mediated GTP hydrolysis with vesicle formation (Bigay et al, 2003; Mesmin et al, 2007). ARFGAP 2 and 3 do not contain this motif, and their activity is dependent upon interaction with coatamer (Weimar et al 2008; Kliouchnikov et al, 2009; Luo et al, 2009).

**Literature references**


**Editions**

<table>
<thead>
<tr>
<th>Date</th>
<th>Action</th>
<th>Author</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015-11-09</td>
<td>Authored, Edited</td>
<td>Rothfels, K.</td>
</tr>
<tr>
<td>2016-02-02</td>
<td>Reviewed</td>
<td>Gillespie, ME.</td>
</tr>
</tbody>
</table>