The Intraflagellar Transport Protein IFT27 promotes BBSome exit from cilia through the GTPase ARL6/BBS3

Citation

Published Version
doi:10.1186/2046-2530-4-S1-O18

Permanent link
http://nrs.harvard.edu/urn-3:HUL.InstRepos:21462092

Terms of Use
This article was downloaded from Harvard University’s DASH repository, and is made available under the terms and conditions applicable to Other Posted Material, as set forth at http://nrs.harvard.edu/urn-3:HUL.InstRepos:dash.current.terms-of-use#LAA

Share Your Story
The Harvard community has made this article openly available. Please share how this access benefits you. Submit a story.

Accessibility
ORAL PRESENTATION

The Intraflagellar Transport Protein IFT27 promotes BBSome exit from cilia through the GTPase ARL6/BBS3

G Liew1,2*, F Ye2, A Nager2, J Murphy3, J Lee2, M Aguiar3, D Breslow2, S Gygi3, M Nachury2

From Cilia 2014 - Second International Conference
Paris, France. 18-21 November 2014

Objective
To dissect the regulation of ciliary trafficking by small GTPases.

Methods

Results
Upon disengagement from the IFT-B complex, the IFT27/RabL4 subunit directly and specifically recognizes nucleotide-empty ARL6.

IFT27 stabilizes nucleotide-empty ARL6 against aggregation, supporting a role for IFT27 in promoting nucleotide exchange on ARL6.

Immunocytochemistry on IFT27-depleted cells reveals hyperaccumulation of ARL6 and BBSome in cilia.

Direct measurements of ciliary entry and exit rates show that IFT27 promotes BBSome exit out of cilia with no influence on entry, thus placing the site of IFT27 action within cilia.

While the BBSome is normally associated with IFT trains inside cilia, most of the BBSome is dissociated from IFT trains in IFT-depleted cells.

A putative BBSome cargo, the Hedgehog signaling intermediate GPR161, accumulates inside cilia of IFT27 and ARL6 knockout cells.

Conclusions
Our data suggest that upon disassembly of IFT/BBSome trains at the tip, the IFT27 subunit transiently detaches from the IFT complex to participate in GTP loading onto ARL6, which then triggers formation of a retrograde BBSome coat for trafficking of the BBSome and its associated cargoes out of cilia. In other words, the disassembly of an anterograde IFT/BBSome train produces the trigger for assembly of the future retrograde IFT/BBSome train.

Authors’ details
1Department of Biochemistry, Stanford University School of Medicine, Stanford, CA, USA. 2Department of Molecular and Cellular Physiology, Stanford University School of Medicine, Stanford, CA, USA. 3Department of Cell Biology, Harvard Medical School, Cambridge, MA, USA.

Published: 13 July 2015

doi:10.1186/2046-2530-4-S1-O18
Cite this article as: Liew et al. The Intraflagellar Transport Protein IFT27 promotes BBSome exit from cilia through the GTPase ARL6/BBS3. Cilia 2015 4(Suppl 1):O18.

Submit your next manuscript to BioMed Central and take full advantage of:
- Convenient online submission
- Thorough peer review
- No space constraints or color figure charges
- Immediate publication on acceptance
- Inclusion in PubMed, CAS, Scopus and Google Scholar
- Research which is freely available for redistribution

Submit your manuscript at www.biomedcentral.com/submit

© 2015 Liew et al. This is an Open Access article distributed under the terms of the Creative Commons Attribution License (http://creativecommons.org/licenses/by/4.0), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited. The Creative Commons Public Domain Dedication waiver (http://creativecommons.org/publicdomain/zero/1.0/) applies to the data made available in this article, unless otherwise stated.