

Mechanism of regulation of selective intracellular protein sorting by the family of Adaptor (-like) protein complexes

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1999 Fiscal Year Final Research Report Summary

Mechanism of regulation of selective intracellular protein sorting by the family of Adaptor (-like) protein complexes

Research Project

Project/Area Number

10480155

Research Category

Grant-in-Aid for Scientific Research (B)

Allocation Type

Single-year Grants

Section

一般

Research Field

Structural biochemistry

Research Institution

Kanazawa University (1999)

Chiba University (1998)

Principal Investigator

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Project Period (FY)

1998 - 1999

Keywords

clathrin / AP complexes / tyrosine-based sorting signal / sorting signals / selective sorting / endocytosis / epithelial cells / cell polarity

Research Abstract

Selective sorting of membrane proteins in the post-Golgi secretory and endocytic pathways are largely regulated by sorting signals encoded within the cytoplasmic tails of sorted proteins. One of the sorting signals, the tyrosine-based sorting signal, works for selective intake of the sorted molecules into the clathrin-coated vesicles (CCV), by interacting with the μ subunits of AP complexes, a coat component of the CCV. AP complexes consist a protein family, and the tyrosine-based sorting signals are known to be involved in many intracellular sorting pathways including endocytosis and basolateral sorting. This raised the possibility that each μ chain specifically recognizes a subset of the tyrosine-based sorting signals to produce specificity and diversity of the sorting. We utilized a yeast 2-hybrid assay to show this is the case.

We cloned a new μ homologue, μ 1B, which is highly homologous to one of the ubiquitously expressed μ chains, μ 1A. In contrast to μ 1A, however, the expression of μ 1B is restricted to epithelial cells. Plasma membrane of epithelial cells are physically divided into two domains, apical and basolateral, and membrane proteins are sorted selectively to these two domains. By reconstituting the expression of μ 1B into an epithelial cell line lacking the μ 1B expression, we were able to show that μ 1B is involved in the selective sorting of membrane proteins to the basolateral plasma membrane in epithelial cells.

Research Products (10 results)

All	Other
All	Publications

- [Publications] Ohno, H., Poy G., Bonifacino, J.S.: "Cloning of the gene encoding the murine clathrin-associated adaptor medium chain $\mu 2$: gene organization, alternative splicing and chromosomal assignment"Gene. 210. 187-193 (1998) ▼

- [Publications] Ohno, H., Aguilar, R. C., Yeh, D., Taura, D., Saito, T., Bonifacino, J. S.: "The Medium Subunits of Clathrin Adaptor Complexes Recognize Distinct but Overlapping Sets of Tyrosine-based Sorting Signals"J. Biol. Chem.. 273. 25915-25912 (1998) ▼

- [Publications] Ohno, H., Tomemori, T., Nakatsu, F., Okazaki, Y., Aguilar, R. C., Foelsch, H., Mellman, I., Saito, T., Shirasawa, T., Bonifacino, J. S.: " $\mu 1B$: a novel adaptor medium chain expressed in polarized epithelial cells"FEBS Lett.. 449. 215-220 (1999) ▼

- [Publications] Folsch, H., Ohno, H., Bonifacino, J. S., Mellman, I.: "A novel clathrin adaptor complex mediates basolateral targeting in polarized epithelial cells"Cell. 99. 189-198 (1999) ▼

- [Publications] Nakatsu, F., Kadohira, T., Gilbert, D. J., Jenkins, N. A., Kakuda, H., Copeland, N. G., Saito, T., Ohno, H.: "Genomic structures and chromosomal mapping of the genes encoding clathrin-associated adaptor medium chains $\mu 1A$ (Ap1m1) and $\mu 1B$ (Ap1m2)"Cytogenet. Cell Genet.. 87. 53-58 (1999) ▼

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- [Publications] Ohno, H., Tomemori, T., Nakatsu, F., Okazaki, Y., Aguilar, R. C., Foelsch, H., Mellman, I., Saito, T., Shirasawa, T.: "Bonifacino, J. S. $\mu 1B$: a novel adaptor medium chain expressed in polarized epithelial cells."FEBS Lett.. 449. 215-220 (1999) ▼

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