Mechanisms for regulation of intracellular protein sorting mediated by the adaptor protein (AP) complex family

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2001 Fiscal Year Final Research Report Summary

Mechanisms for regulation of intracellular protein sorting mediated by the adaptor protein (AP) complex family

Research Project

Project/Area Number
12480178
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
Principal Investigator
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Project Period (FY)
2000 - 2001
Keywords
epithelial cells / selective sorting / µ1B / pliovirus receptor / axis of cell division / µ3B / seizure

Research Abstract

Plasma membrane (PM) of epithelial cells is physically divided by the tight junction into apical and basolateral domains, and distinct subsets of membrane proteins are expressed on the two domains. We cloned a new μ homologue, μ IB, which is expressed exclusively in epithelial cells. AP-1B, containing μ 1B, mediates selective sorting of newly synthesized proteins to the basolateral PM. There are two isoforms for poliovirus receptor (PVR), α and δ . We have found that PVR α interacts with μ IB and expressed basolaterally, whereas PVR δ is not recognized by μ 1B and randomly expressed on both PM domains. We also found that μ 1B- deficient epithelial cells divide randomly, causing multi-layer morphology instead of monolayer characteristic to epithelial cells. In order to investigate the roles of μ IB in organisms, we established ES cell lines for making μ 1B knockout mice.

We also established mice lacking µ3B, a subunit of the neuron-specific AP -3B complex. µ3B KO mice suffer from epileptic seizure. In these mice, KCl-stimulated release of GABA, an inhibitory neurotransmitter, from hippocampal slices decreased to one-half of that of wild-type mice, suggesting that break down in inhibitory synaptic transmission cause the seizure.

Research Products (12 results)

	All		Other
Α	AII P	Public	ations
[Publications] Aguilar, R.C.: "Signal-binding specificity of the µ4 subunit of the adaptor protein complex, AP-4"J. Biol. Chem. 276. 13145-13152 (2001)			~
[Publications] Ohka, S.: "Basolateral sorting of human poliovirus receptoro involves an interaction with the µ1B subunit of the clathrin adaptor complex in polari epithelial cells"Biochem. Biophys. Res. Commun. 278. 941-948 (2001)	zed		~
[Publications] Blum stein, J.: "The neuronal form of AP-3 is required for synaptic vesicle formation from endosomes"J. Neurosci 21. 8034-8042 (2001)			~
[Publications] Uekita, T.: "Cytoplasmic tail dependent intemalizastion of membrane-type 1 matrix metalloproteinase (MTI-MMP) is important for its invation-pror activity"J. Cell Biol 155. 1345-1356 (2001)	motir	ng	~
[Publications] Eskelinen, EL.: "The polarized epithelia specific m1B-adaptin complements u1A-deficiency in fibroblasts"EMBO report. (in press).			~
[Publications] Sugimoto, H.: "Differential recongition of tyrosine-based basolateral signals by the AP-1B subunit µ1B in polarized epithelial cells"Mol. Biol. Cell. (i	in pre	ess).	~
[Publications] Aguilar, R. C.: "Signal-binding specificity of the μ 4 subunit of the adaptor protein complex, AP-4"J. Biol. Chem 276. 13145-13152 (2001)			~
[Publications] Ohka,S: "Basolateral sorting of human poliovirus receptor a involves an interaction with the µIB subunit of the clathrin adaptor complex in polarize cells"Biochem. Biophys. Res. Commun 287. 941-948 (2001)	ed ep	oitheli	al 🗸
[Publications] Blumstein, J.: "The neuronal form of AP-3 is required for synaptic vesicle formation from endosomes"J. Neurosci 21. 8034-8042 (2001)			~
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[Publications] Sugimoto. H.: "Differential recognition of tyrosine-based basolateral signals by the AP-1B subunit µIB in polarized epithelial cells"Mol. Biol. Cell. in	pres	is.	~

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