

神経系シャペロン様因子によるシナプス伝達制御機構

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A regulatory mechanism of synaptic transmission by a chaperone-like factor

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Allocation Type

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一般

Research Field

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Research Institution

Kanazawa University

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Research Abstract

The unc-18 gene contributes to the synaptic transmission. n-Sec-1, the mammalian UNC-18 homolog is believed to be associated with a synaptic plasma membrane protein prior to synaptic vesicle docking. If this were the case for the C.elegans UNC-18, the gene mutations would result in constitutive fusions of synaptic vesicles. However, the gene mutations result in the accumulation of synaptic vesicles and neurotransmitters. To

examine the conflicting observations, we analyzed the binding of wild-type and mutant UNC-18 to syntaxin.

UNC-18 is a hydrophilic, globular, and neutral protein with pI 6.95. In the Sf21 cells the protein is predominantly localized in the cytoplasm, indicating its intrinsic solubility. To investigate further the intracellular distribution of UNC-18, we isolated synaptic vesicles by the percoll gradient fractionation. UNC-18 was detected on synaptic vesicles by Western blotting. We cloned C.elegans cDNAs encoding the mammalian syntaxinA homolog (Ce syntaxin). We tested the binding of UNC-18 to GST-Ce syntaxin fusion protein. UNC-18 binds to the recombinant syntaxin in vitro with high affinity. These findings indicate that the protein is periplasmic associating with both synaptic and plasma membrane, although intrinsically soluble. In vesicle traffic UNC-18 may be regulator with plasma membrane through syntaxin. UNC-18 may cause a conformational change of syntaxin. Therefore the protein allows it to bind to synaptic vesicles.

To test hypotesis, we sequenced cDNAs of 15 unc-18 mutants. We found two missense mutations and the binding ability of mutant UNC-18 proteins to Ce syntaxin is being teted.

Research Products (9 results)

All Other

All Publications (9 results)

- [Publications] Toshihiro Sassa: "The Synaptic Protein UNC-18 is Phosphorylated by Protein kinase C." Neurochemi.Int.29. 543-552 (1996) ▼
- [Publications] Hisamitsu Ogawa: "Expression,Purification,and Characterization of Recombinant C.elegans UNC-18" Neurochemi.Int.29. 553-563 (1996) ▼
- [Publications] 細野 隆次: "センチュウにおける性決定の分子遺伝学" 科学. 66. 633-640 (1996) ▼
- [Publications] Hisamitsu Ogawa: "Functional Properties of the unc-64 Gene Encoding a Caenorhabditis elegans Syntaxin" J.Biol.Chem.273. 2192-2198 (1998) ▼
- [Publications] 細野 隆次: "ネオ生物学「線虫」 C.elegansニューロン" 共立出版, 153 (1997) ▼
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- [Publications] T.Sassa: "The synaptic protein UNC-18 is phosphorylated by protein kinase C." Neurochem.Int.29. 543-552 (1996) ▼
- [Publications] H.Ogawa: "Expression, purification, and characterization of recombinant C.elegans." Neurochem.Int.29. 553-563 (1996) ▼
- [Publications] H.Ogawa: "Functional properties of the unc-64 gene encoding a Caenorhabditis clgans syntaxin." J.Biol.Chem.273. 2192-2198 (1998) ▼

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