

Genetic analysis of cholinergic neurons

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1992 Fiscal Year Final Research Report Summary

Genetic analysis of cholinergic neurons

Research Project

Project/Area Number

02808047

Research Category

Grant-in-Aid for General Scientific Research (C)

Allocation Type

Single-year Grants

Research Field

分子遺伝学・分子生理学

Research Institution

Kanazawa University

Principal Investigator

HOSONO Ryuji Kanazawa Univ.School of Med. Lecturer, 医学部, 講師 (40019617)

Project Period (FY)

1990 - 1992

Keywords

Acetylcholine / Cholinergic neuron / Caenorhabditis elegans / unc-18 / Tcl tagging / Trichlorfon resistance / Synaptic vesicle / Synaptic transmission

Research Abstract

Three years ago, we started our project entitled, "Genetic analysis of cholinergic neurons". We established the method for the screening of mutants showing abnormalities in cholinergic neurons. With this method we isolated several mutants and identified genes contributing to the mutants. Of these genes, we focused our work on genes functioning at the presynaptic terminals.

Seven such genes (unc-11, unc-13, unc-17, unc-18, unc-41, unc-63 and unc-64) were identified. We found the genes function in the regulatory pathway controlling acetylcholine levels. To investigate further these genes at the molecular level, we cloned the unc-18 gene, one of the seven genes. DNAs of the genomic and the cDNA clone were sequenced and the deduced amino acid sequence of the cDNA was determined. Comparison of the predicted amino acid sequence revealed has a role in the release of the neurotransmitters.

We cloned the cDNA into the expression vector, which permit to produce the unc-18 gene product and made antisera against the gene product. With the antisera we stained animals and found the gene product is specifically localized at motor neurons. These findings indicate that UNC-18 has a role in the axonal transport and influences acetylcholine flow in motor neurons.

Research Products (10 results)

All Other

All Publications (10 results)

- [Publications] Yasuko Kamiya: "Mutations in genes for acetylcholinesterase intensify lethality by acrylamide in *Caenorhabditis elegans*." *Neuroscience letters*. 145. 37-39 (1992) ▼
- [Publications] Ryuji Hosono: "The unc-18 gene encodes a novel protein affecting the kinetics of acetylcholine metabolism in the nematode *Caenorhabditis elegans*." *Journal of Neurochemistry*. 58(4). 1517-1525 (1992) ▼
- [Publications] Yasuko Kamiya: "Developmental and pharmacological studies of acetylcholinesterase-defective mutants of *Caenorhabditis elegans*." *Zoological Science*. 10. 43-51 (1993) ▼
- [Publications] Keiko Gengyo-Ando: "The *C.elegans* unc-18 gene encodes a protein expressed in motor neurons." ▼
- [Publications] 細野 隆次: "センチュウ *Caenorhabditis elegans* の有機リン酸感受性" *日本線虫研究会誌*. ▼
- [Publications] Ryuji Hosono, Yasuko Kamiya: "Additional Genes which Result in an Elevation of Acetylcholine Levels by Mutations in *C. elegans*." *Neurosci. I.* 128. 243-244 (1991) ▼
- [Publications] Ryuji Hosono, Siegfried Hekimi, Yasuko Kamiya, Toshihiro Sassa, Seishi Murakami, Kiyoji Nishiwaki, Johji Miwa, Akira Taketo and Kenichi Kodaira: "The Gene unc-18 Encodes a Novel Protein Affecting the Kinetics of Acetylcholine Metabolism in the Nematode *C. elegans*." *J. Neurochem.* 58. 1517-1525 (1992) ▼
- [Publications] Yasuko Kamiya, Shinichi Harada, Hiroshi Yamamoto and Ryuji Hosono: "Mutations in Genes for Acetylcholinesterase Intensify Lethality by Acrylamide in *Caenorhabditis elegans*" *Neurosci. Lett.* 145. 37-39 (1992) ▼
- [Publications] Y.KAMIYA, S.HARADA, S.OKOYAMA, H.YAMAMOTO and R.HOSONO: "Developmental and Pharmacological Studies of Acetylcholinesterase-Defective Mutants of *Caenorhabditis elegans*" *Zool. Sci.* 10. 43-51 (1993) ▼
- [Publications] Keiko Gengyo-Ando, Yasuko Kamiya, Ayanori Yamakawa, Ken-ichi Kodaira, Kiyoji Nishiwaki, Johji Miwa, Isao Hori and Ryuji Hosono: "*C. elegans* unc-18 Gene Encodes a Protein Expressed in Motor Neurons" ▼

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