

Diversity of cholinergic neurons in the human central nervous system

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2000 Fiscal Year Final Research Report Summary

Diversity of cholinergic neurons in the human central nervous system

Research Project

Project/Area Number

11670171

Research Category

Grant-in-Aid for Scientific Research (C)

Allocation Type

Single-year Grants

Section

一般

Research Field

Human pathology

Research Institution

Kanazawa University

Principal Investigator

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Research Abstract

Choline acetyltransferase (ChAT), an enzyme for biosynthesis of acetylcholine, and vesicular acetylcholine transporter (VAcHT), a molecule for the translocation of cytoplasmic acetylcholine into synaptic vesicles, are known to be good markers for cholinergic neurons. In order to investigate whether cholinergic neurons are diverse with relation to localization and function, immunohistochemical and in situ hybridization studies were performed on the human central nervous by using specific antibodies and RNA probes for human ChAT and VAcHT. In this study, an antibody to human recombinant VAcHT protein was developed, which was applicable to paraffin-embedded tissue sections. The distributions of ChAT mRNA, ChAT protein, VAcHT mRNA and VAcHT protein were similar, but not exactly the same in the human central nervous system. In addition, cholinergic projection neurons tended to express these molecules more than cholinergic local circuit neurons, which might be related to the different functional levels between the two types of cholinergic neurons. Southern blot analysis following reverse transcription- polymerase chain reaction revealed that the caudate nucleus contained two R-type mRNAs, but not N- or M-type mRNA. Our previous study demonstrated that in the human spinal cord M-type mRNA is much more abundant than R-type mRNA. These results suggest that transcription mechanisms of ChAT are different in cholinergic neurons between the caudate nucleus and spinal cord.

Research Products (6 results)

All Other
All Publications

- [Publications] Yoshio Oda: "Choline acetyltransferase : the structure, distribution and pathologic changes in the central nervous system."Pathol.Int.. 49. 921-937 (1999) ▼
- [Publications] Yoshio Oda and Isao Nakanishi: "Distribution of cholinergic neurons in the human central nervous system."Histol.Histopathol.. 15. 825-834 (2000) ▼
- [Publications] Youko Muroishi,Satomi Kasashima,Isao Nakanishi and Yoshio Oda : "Immunohistochemical and in situ hybridization studies of choline acetyltransferase in large motor neurons of the human spinal cord."Histol.Histopathol.. 15. 689-696 (2000) ▼
- [Publications] Yoshio Oda: "Choline acetyltransferase : the structure, distribution and pathologic changes in the central nervous system."Pathol.Int.. 49(11). 921-937 (1999) ▼
- [Publications] Yoshio Oda and Isao Nakanishi: "Distribution of cholinergic neurons in the human central nervous system."Histol.Histopathol.. 15(3). 825-834 (2000) ▼
- [Publications] Youko Muroishi, Satomi Kasashima, Isao Nakanishi and Yoshio Oda: "Immunohistochemical and in situ hybridization studies of choline acetyltransferase in large motor neurons of the human spinal cord."Histol.Histopathol.. 15(3). 689-696 (2000) ▼

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