

ラット大脳皮質内移植青斑核神経細胞に対する神経栄養因子

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雑誌名	平成5(1993)年度 科学研究費補助金 一般研究(C) 研究成果報告書概要
巻	1991 1993
ページ	2p.
発行年	1996-04-14
URL	http://doi.org/10.24517/00067444



1993 Fiscal Year Final Research Report Summary

Noradrenaline synthesis by embryonic locus coeruleus neurons transplanted in adult rat brain - Influence of neuronal lesions inflicted on recipient animals -

Research Project

Project/Area Number

03670414

Research Category

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

Allocation Type

Single-year Grants

Research Field

Neurology

Research Institution

Kanazawa University

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Project Period (FY)

1991 - 1993

Keywords

Locus coeruleus / Noradrenergic neurons / Transplantation / Cerebral cortex / Hippocampus / Neurotrophic factor

Research Abstract

Neuronal cell suspension containing noradrenergic locus coeruleus (LC) neurons was prepared from embryonic rat brain and was transplanted in adult rat brain. Meanwhile the transplanted neurons provide their product (s) to the recipient, their activities are also influenced by the condition of the recipient. It is supposed that lesions inflicted on the neuronal tissue result in the increase of neurotrophic factors in the surrounding neuronal tissue. Influences of recipient neuronal tissue exerted on the transplanted noradrenergic neurons were examined in either condition that the recipient had had any neuronal lesion or it had been intact when the neurons were transplanted.

Two series of experiments were designed according to the site of the transplantation and the sort of the lesion. In the first series, the embryonic neurons were transplanted in the frontal cortex, and the recipient animals received ipsilateral electrical LC lesion before (the pre-lesioned group) or after (the post-lesioned group) the transplantation. The LC lesion reduced the intrinsic NA content in the frontal cortex to about 20% of that of the normal animals. The NA content beyond this residual level were thought to be synthesized by the transplanted neurons. The amount of NA synthesized by the transplanted neurons was almost equivalent in the pre-lesioned group and in the post-lesioned group, suggesting that the preceding removal of intrinsic noradrenergic innervation in the site of transplantation exerted no trophic effect on the synthesis of NA by the transplanted neurons.

In the second series, the neurons were transplanted in the hippocampus, and the recipient animals received ipsilateral fimbria-fornix (FF) transection before (the pre-transected group) or after (the post-transected group) the transplantation. In this series, animals received the removal of the ipsilateral superior cervical ganglion 3 weeks prior to the beginning of the experiment in order to eliminate the ingrowth of peripheral sympathetic nerve fibers into the hippocampus following the FF transection. The FF is the rout of various afferent and efferent nerve fibers to and from the hippocampus, including the LC to hippocampal noradrenergic fibers. The NA content in the hippocampus decreased following the FF transection. The NA synthesized by the transplanted neurons was also calculated in this series. The amount of NA synthesized in the pre-transected group surpassed that in the post-lesioned group. The result indicated that the FF transection yielded the increase of trophic activity toward noradrenergic neurons in the hippocampus.

We concluded from the overall experiments that the elimination of the mono-component nervous system (LC noradrenergic projection) in the recipient animal could not stimulate the activity of the transplanted noradrenergic neurons, but the lesion extended over several components of afferent and efferent nerve fibers could do so.▲ Less

Research Products (2 results)

All Other

All Publications (2 results)

[Publications] 坂戸俊一: "実験的青斑核ノルアドレナリン(NA)神経細胞移植に及ぼす内因性NA神経除去の影響" 臨床神経学. 34. 385-387 (1994) ▼

[Publications] S.Sakato, Y.Sakashita, K.Sakajiri, K.Fukushima, and M.Takamori: "Noradrenaline synthesis by locus coeruleus neurons transplanted in rat frontal cortex -Influence of denervation of intrinsic noradrenergic projection-" Clin Neurol. 34 (in Japanese with English abstract). 385-387 (1994) ▼

URL: https://kaken.nii.ac.jp/report/KAKENHI-PROJECT-03670414/036704141993kenkyu_seika_hokoku_

Published: 1996-04-14