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EXPLORE THE ANGIOGENESIS OF AUTOLOGOUS TRANSPLANTED BRAIN TISSUES IN RABBITS

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Objective: This study intends to discuss about the methodology of rabbit's brain tissue transplantation, including the way of operation and the law of microcirculatory formation.

Methods: 20 male Japanese white rabbits (1.2~1.3 kg) were chosen for an intracerebral transplantation test, which were anaesthetized by 3% pentobarbital sodium in vein before receiving an intracerebral transplantation operation. A window was opened on their parietal bone and the cortical brain tissues on the symmetrical areas on the left and right side of the rabbits' parietal cortex areas were exchanged and transplanted. Gentamycin sulfate was injected each day to resist infection. Ten and twenty days later, an observation was made as to the survival of the transplanted area and host brain tissue. A microcirculation color camera system was used to analyze the pictures of angiogenesis. With regard to the survival of transplanted brain tissues, their changes in micromorphology were observed. Besides, pathological sections were also prepared to determine their surviving conditions on a cell level.

Result:

- (1) Surgical operation has contributed to a satisfactory morphological anastomosis between transplanted brain tissues and host brain tissues.
- (2) Analysis of the pathological sections of the transplanted brain tissues showed traces of surviving neural cell.

Conclusions: Under the given conditions, transplanted brain tissues can maintain neuron's survival, and can be nourished by angiogenesis and characteristic microcirculation connections with host brain tissues.

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HO-2/CO system protects against metabolic disorders following acute cerebral ischemia

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Although it has been known that brain generates carbon monoxide (CO) via heme oxygenase (HO) catalyzed reactions, physiologic roles of CO in the central nervous system remain elusive. Previous study showed that HO-2 generates CO in an O₂-dependent manner. By acting as an acute O₂ sensor within the neurovascular unit, HO-2 contributes to the maintenance of cerebral ATP levels against acute global hypoxia (Morikawa *et al.*, PNAS, 109, 1293-1298). In this study, we examined if the deletion of HO-2 exacerbates cerebral metabolism upon acute focal brain ischemia. We compared contents of 87 metabolites extracted from contralateral- and ipsilateral hemispheres after a left middle cerebral artery occlusion (MCAO) between wild-type- and HO-2-null mice. With hierarchical clustering analysis, we found that, in ipsilateral hemispheres, there was no obvious difference in patterns of metabolic alteration between wild-type- and HO-2-null mice. On the other hand, in the contralateral hemispheres, we found the clusters showed striking difference in patterns of metabolic alteration between two groups during MCAO. Such a cluster included high energy phosphonucleotides; e.g., ATP, UTP and CTP. These data indicate that nucleotide degradation after MCAO is more severe in the HO-2-null mice than that in wild-type mice. Furthermore, our results indicate that HO-2 contributes to the improvement of metabolic disorders during cerebral ischemia in contralateral hemisphere rather than in ipsilateral hemisphere. This is the first report showing the potency of HO-2/CO system to diminish the remote metabolic insults of acute focal cerebral ischemia.