

Name of Technology	Brain microcirculation system	Medical Treatment and Welfare
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Key words	brain, function mapping, cerebral blood flow regulation, neural activity	

What kind of technology is this?

Outline

The signal sources for the brain function mapping in the functional MRI images and the positron emission tomography images have been investigated. The cerebral blood flow regulation has been also studied using various technologies.

【Outline】 In order to clarify the relationship between brain blood flow and neural activity, we have investigated the relationship between brain neural activity and blood flow with various methods in circulation physiology and brain function testes.

【Details】 In the functional MRI images (Fig. 1) and positron emission tomography (PET) images, the brain function mappings have been performed by detecting the quantitative changes such as blood flow. The direct relationship between the signals and neural activities, however, has not been fully elucidated yet. We proved quantitatively the relationship between the degree of the brain activity and the increase in blood flow (evoked cerebral blood flow), and also clarified that the evoked cerebral blood flow was paralleled with blood flow at rest and that the cerebral high oxygen partial pressure induces the excess supply of evoked cerebral blood flow. We have also clarified that various substances influence the regulation of evoked cerebral blood flow. We are now under the development of an experimental method to prove that cerebral blood flow is also regulated by a blood flow change at the capillary blood vessels (Fig. 2).



Fig.1 Functional MRI image

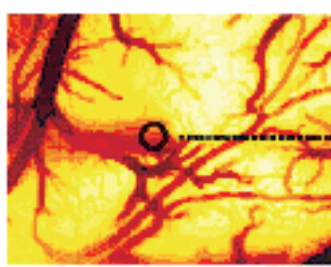
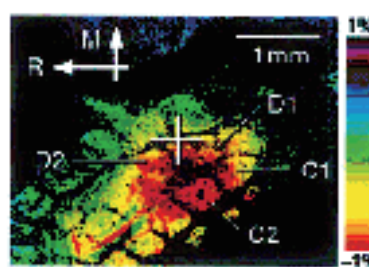


Fig.2 Change of oxygenated hemoglobin on the brain surface in rat



What are its applications?

- The elucidation of elaborate blood flow regulating mechanism in the brain is useful for the practical clinics.
- The technology also contributes to the construction of the efficient network in the information and communication fields.

Related patents

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