[Bioconjugate Chem., 4, 134-138 (1993)] [Lab. of Molecular Biology]

Peroxidase-Linked Anti-Basic Fibroblast Growth Factor Monoclonal Antibody AB' Conjugates: Application for Two-Site Enzyme Immunoassay and Immunohistochemical Detection.

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After conjugating thiol groups of monoclonal Fab' fragments specific for basic fibroblast growth factor (bFGF) with maleimido-horseradish peroxidase, we developed a fluorometric enzyme immunoassay (EIA) method based on the sandwiching of the factor between anti-bFGF IgG-coated polystyrene beads and the conjugates, and also an immunohistochemical method for detection of the location of the factor. The discriminatory detection limit by the EIA was 30 pg/mL. The reproducibility of within- and between-assay was 6.07-9.18 % and 6.28-6.82 %, respectively, and the recovery of exogenous bFGF from serum was approximately 98 %. The curves generated by the concentrated fraction that eluted at the same position as standard bFGF by size-exclusion chromatography were parallel to the curve for standard bFGF. Positive immunohistochemical reactions were successfully detected by the conjugate in fibroblastic and endothelial cells, indicating that these conjugates provide a useful means for direct immunohistochemical detection of the factor.

[J. Neural Transm., 93, 37-46 (1993)] [Lab. of Molecular Biology]

Development of Plasticity of Brain Function with Repeated Trainings and Passage of Time after Basal Forebrain Lesions in Rats.

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Basal forebrain (BF) lesion-induced amnesia in rats is widely used as an animal model of Alzheimer's disease (AD). To study the plasticity of brain function in BF-lesioned rats, we examined the effects of repeated trainings and the passage of time after the lesion on learning ability 3 weeks and 3 months after BF-lesions with ibotenic acid, using an eight-arm radial maze and passive avoidance tasks, and measured choline acetyltransferase (ChAT) activity. Both time and re-training played important roles in the recovery of the ability to learn, as measured with the eight-arm radial maze task, but not the passive avoidance task. In contrast, ChAT activity in the frontal cortex, which was low 3 weeks after lesion, still low 3 months after lesion, even though the ability to learn had recovered. Recovery of the ability to learn can be attributed to undamaged cholinergic neurons, or to other neuronal systems, or to both. This animal model can be used to demonstrate the plasticity of brain function.

[Japan J. Pharmacol., 61, 141-144 (1993)] [Lab. of Molecular Biology]

Effects of Nerve Growth Factor (NGF) in Rats with Basal Forebrain Lesions.

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Effects of nerve growth factor (NGF) on the basal forebrain (BF) lesion-induced amnesia in rats were investigated. When NGF infusion was begun immediately after the formation of BF-lesion, NGF ameliorated amnesia in a water maze task and showed a tendency to increase choline acetyltransferase (CAT) activity in the fronto-parietal cortex. The amnesia and the decrease of CAT activity were not ameliorated when NGF infusion was begun 4 weeks after BF lesion formation. These observations suggest that NGF was influenced by the phase of neuronal damage.