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Choline is an important membrane phospholipid constituent and a neurotransmitter precursor that is minimally synthesized in brain. The long-term maintenance of brain choline concentration is dependent on choline transport from plasma, which occurs via saturable transport system at the blood-brain barrier.In the present study, we examined to elucidate the characteristics of transport of cationic amines, especially choline which is one of cationic amines, to BBB using conditionally immortalized rat brain capillary endothelial cell line (TR-BBB) in vitro. The [$^3$H] choline in the TR-BBB was increased by time dependently but independent on Na ion concentration. The uptake of [$^3$H]choline is susceptible for inhibition by various organic cationic compounds including tetraethylammonium chloride (TEA), L-carnitine, betaine, and drugs of the treatment of Alzheimer's disease such as L-acetyl carnitine, donepezil hydrochloride (Aricept), tacrine, and antioxidant, N-tert-butyl-α-phenyl-nitrone (PBN). Also, hemicholinium-3 is strongly inhibited the uptake of [$^3$H]choline. The kinetic parameters for the saturable transport of choline were estimated to be the apparent Michaelis-Menten constant, Km, and the maximal velocity, Vmax. The choline transport in this cell line existed high-and low affinity systems .

[PB3-7] [ 04/18/2003 (Fri) 09:30 - 12:30 / Hall P ]

## Brain-to-blood efflux transport of taurine at the blood-brain barrier in rats

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The purpose of this study is to examine whether an brain to blood efflux system for taurine is present on the blood-brain barrier (BBB) or not and this efflux transport system is regulated by CNS cell damage with oxidative stress agent such as diethyl maleate (DEM) or tumor necrosis factor-α (TNF-α), by using the brain efflux index (BEI) method. The brain efflux index value is defined as the relative amount of test compound effluxed from cerebrum compared with that of a reference compound, [$^{14}$C]carboxyinulin, which has limited BBB permeability. [$^3$H]Taurine was microinjected into parietal cortex area 2 (Par2) of the rat brain, and was eliminated from the brain with an apparent elimination half-life of 57 min and an efflux transport rate of 1.22 $\times 10^{-2}$/min. This process was inhibited by taurine transport inhibitors, such as unlabeled taurine, β-alanine, betaine, nipecotic acid and GABA, significantly. In addition, the effect of DEM or TNF-α on [$^3$H] taurine efflux transport was investigated. [$^3$H]Taurine efflux transport was reduced by pre-treatment with DEM or TNF-α. In conclusion, the efflux pump for taurine at the BBB acts to reduce taurine concentration in the brain interstitial fluid and this process was carrier mediated and also, was regulated by oxidative cell damage.

[PB3-8] [ 04/18/2003 (Fri) 09:30 - 12:30 / Hall P ]

## 15-Deoxy-$PGJ_2$ Stimulates Neuronal Differentiation of Embryonic Midbrain Cells by Up-regulation of PPAR-gamma Activity via the JNK-dependent Pathway

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The effect of 15-deoxy-$PGJ_2$ on the differentiation of embryonic midbrain cells into dopaminergic neuronal cells, and the relationship between cell differentiation with activation of PPAR-γ and possible signal pathway were investigated. 15-Deoxy-$PGJ_2$ increased neurite extension, a typical characteristics of the differentiation of embryonic midbrain cells isolated from 12 day's rat embryos in a dose-dependent manner. The expression of differentiation markers; neurofilament and tyrosine hydroxylase was also increased by the treatment of 15-deoxy-$PGJ_2$. Consistent with the increasing effect on the cell differentiation, 15-deoxy-$PGJ_2$ increased the expression and transcriptional activity of PPAR-γ in the cultured embryonic midbrain cells. In addition, the expression of PPAR-γ and NeuN in the differentiated neuron of fetus (17 day) and adult rat brain was co-localized. Furthermore, treatment of PPAR-γ antagonist bisphenol A diglycidyl ether blocked 15-deoxy-$PGJ_2$-induced neuronal differentiation of embryonic midbrain cells and expression of PPAR-γ. 15-Deoxy-$PGJ_2$ (0.5 μM) increased the expression of JNK and p38 kinase but not ERK. In addition, in the presence of NGF (50 ng/ml), only the expression of JNK was further increased. Moreover, the pretreatment of specific p38 kinase inhibitor, PD98053 did not inhibit the activation of p38 kinase, but specific inhibitor of JNK, SP 600125 inhibited JNK activation. This inhibition correlated well with the inhibition of neurite extension and activation of PPAR-γ induced by 15-deoxy-$PGJ_2$. The present results therefore indicate that 15-deoxy-$PGJ_2$ stimulates differentiation of embryonic midbrain cells into dopaminergic neuronal cells, and its effect may be PPAR-γ and JNK signal pathway dependent.

## Poster Presentations - Field B4. Immunology

[PB4-1] [ 04/18/2003 (Fri) 09:30 - 12:30 / Hall P ]

### Proliferation of Splenocytes and Bone-marrow Cells by Phellinus linteus polysaccharide

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The effect of radio- and chemotherapy for cancer are excellent, but their toxicities to normal tissue and organ of the body is relatively strong, which leads secondary side effect to patients during therapies. Particularly, due to the response for bone marrow suppression such as agranulocytosis limits the therapy periods and dose of drugs, new drug development that reproduces lymphocytes has been focused. In line with this, we have come to select Phellinus linteus polysaccharide as an agent increasing the level of white blood cell and spleen cell and promoting CMI as well as humoral immunity. Phellinus linteus polysaccharide was scheduled to treat with PL-A (<20,000), PL-B(20,000 ~ 100,000), PL-C(>100,000) and negative control, CTX (cyclophosphamide). There are differences in their MW of polysaccharides, but all doses reproduced in dose-dependant manner. These results provided that Phellinus linteus polysaccharide can increase the process of hematopoietic response and promote and control the growth and differentiation of immune cells as well as reduction of side effect of CTX in over a studied concentration. In conclusion, Phellinus linteus polysaccharide can reduce cytotoxicity to hematopoietic system by anticancer agents, and be expected to be an excellent adjuvant agent when using radio- and chemotherapy.