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The present study investigated the passive avoidance and spatial learning in the μ-opioid receptor gene knockout mice and wild type mice. In the step-through passive avoidance task, the μ-opioid receptor knockout mice did not differ from the wild type mice. In Morris water maze, however, the μ-opioid receptor knockout mice showed significant memory deficit compared to wild type mice. In the [^{3}H]pirenzepine autoradiographic binding for the muscarinic type 1 receptor, the [^{3}H]pirenzepine binding was selectively decreased in the dentate gyrus (10 %) of the hippocampus in μ-opioid receptor knockout mice compared to wild type. The acetylcholine level was reduced in the cortex of μ-opioid receptor knockout mice (22 %) compared to the control wild type mice. These results suggest that memory impairment in the μ-opioid receptor knockout mice may be related to the decrease of M1 receptor in dentate gyrus of the brain and reduction of acetylcholine level.
Therefore, these results suggest that lack of the μ-opioid receptor is accompanied with reduction of the cholinergic system, showing an impairment of spatial memory.

[PB3-8] [10/17/2002 (Thr) 13:30 - 16:30 / Hall C]

Microglial activation and tyrosine hydroxylase immunoreactivity in the substantia nigral region following transient focal ischemia in rats

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The temporal profiles of the changes of dopaminergic cell and microglial activation induced by transient cerebral ischemia was investigated in the substantia nigral region which lay outside ischemic areas of rat brain after middle cerebral artery occlusion (MCAO). Transient cerebral ischemia was induced by intraluminal occlusion of the right middle cerebral artery for 2 h and reperfusion was continued for 1, 2, 3, 7, 10, 14, 30, 60, and 120 days. Activated microglial cells were visualized with immunohistochemistry using OX-42 antibody. We also examined the ischemia-induced apoptotic cell death event in the substantia nigra (SN) at 1, 2, and 3 days. Activated microglial cells, as amoeboid morphology, visualized with OX-42 antibody were increased at 1 day and dramatically increased at 7 days postischemia. Activated microglia cells became reduced in the substantia nigra from 7 days later. At 2 and 4 months postischemia, the number of activated microglia cells were similar to those of 2 weeks after ischemia/reperfusion. These results suggest that microglial cells be rapidly activated and those activated forms be sustained at least for 1 week in the substantia nigra following transient focal cerebral ischemia induced by MCAO. The temporal profiles of the changes of dopaminergic cell identified with immunohistochemistry using tyrosine hydroxylase antibody are under study.

Poster Presentations - Field B4. Immunology

[PB4-1] [10/17/2002 (Thr) 13:30 - 16:30 / Hall C]

Immuno-modulator effect of Cefodizime in IL-6

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In recent studies on cefodizime, it may potentially have the capability of stimulating chemotactic activity of neutrophils and monocytes as well as the strong immuno-modulator. In turn, infection can result in a drastic change of mediators, which lead to initiate an immune response in an indirect way. With this backgrounds, we have studied to see if cefodizime can be a potential substance to induce an immunological function in dendritic cells and peritoneal macrophages.
In experimental process, dendritic cell and peritoneal macrophages were taken and mixed with 10㎍/㎖, 50㎍/㎖, 100㎍/㎖ cefodizime and 1㎍/㎖ IFN-γ10U/㎖+LPS. These mixtures were then incubated for 4, 8, 12, 24 hours to see if cytokines would be released in an analytical amount by assessing RT-PCR for IL-6 mRNA.
As a result, we have found that both may represent that both cells when treated with cefodizime can show an increase of cytokine. Accordingly, we can expect that cefodizime may induce the activation increase for macrophage, NK cell, CTL, B cell due to the increase of pro-inflammatory cytokine noted above.
From these results, we will be able to say that cefodizime may be a potential immuno-modulator rather than an antibiotics itself.

[PB4-2] [10/17/2002 (Thr) 13:30 - 16:30 / Hall C]

IL-12 Expression by Cefodizime As an Immuno-modulator

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Cefodizime has originally been developed for treating infections as antibiotics. However, according to some of recent studies, cefodizime, a third generation cephalosporin, may potentially have the capability of stimulating chemotactic activity of neutrophils and monocytes as well as the strong immuno-modulator. In this study, we studied to learn about the expressive effect of dentritic cells and macrophage. With this background, We have studied to see if cefodizime can be a potential substance inducing an immunological function in dendritic cells and peritoneal macrophages.
IL-12 activates NK cell and macrophage, and shows antiviral effect by excreting INF-γ. In vitro, total RNAs were extracted from murine dentritic cell at 4, 8, 12, 24hr after the application of 10, 50, 100㎍/㎖ of cefodizime without other stimulators. And we analyzed IL-12 mRNA using RT-PCR method. In conclusion, IL-12 mRNA was increased, and the results suggest that cefodizime activate TH1 cell induction, CTL differentiation as well as accelerating the increase of NK, LAK cell.

[PB4-3] [10/17/2002 (Thr) 13:30 - 16:30 / Hall C]

Tacrolimus and cyclosporine A inhibit both class I-restricted presentation pathway and class II-restricted presentation pathway of exogenous antigen.

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The main targets for the immunosuppressive calcineurin inhibitors, tacrolimus (FK-506) and cyclosporine A (CsA), have been considered to be activated T cells, but not antigen presenting cells (APCs). In the present study, we examined the effects of these drugs on the MHC-restricted presentation of exogenously added antigen, ovalbumin (OVA), in dendritic cells (DCs). Particulate form of OVA was efficiently captured, processed and presented on class I MHC molecules (cross-presentation) as well as on class II MHC molecules. Addition of tacrolimus and CsA, but not rafamycin, to cultures of DCs inhibited both the class I MHC-restricted presentation as well as the class II MHC-restricted presentation of exogenous OVA. Tacrolimus was much more effective in inhibiting both of the antigen presentation pathways than CsA. Inhibition of the exogenous OVA presentation by tacrolimus and CsA was not due to suppression of the expression of class I or class II MHC molecules on DCs. These results show that the immunosuppressive activity of tacrolimus and CsA is at least in part due to inhibition of antigen presenting function of professional APCs.

[PB4-4] [10/17/2002 (Thr) 13:30 - 16:30 / Hall C]

IL-1β Expression of Cefodizime on Dendritic cell and Macrophage