days and exposed to stress for 5 days. They were stressed by immobilization for 30 minutes and electro-shock(5㎃/20 secs) for 5 minutes. At first, they were pretreated with Ginseng extract, diazepam and Pyroligneous liquid for 7 days, and followed by the treatments in combination with the exposure to stress for 5 days. We recorded stress related behavioral changes of experimental animals induced by over stress using Etho-vision system. Total activity, rearing, smelling activity, plus maze moved distance, and plus maze-open area duration decreased by stress were increased by treatment of Pyroligneous liquid. Freezing and burrowing activity, and plus maze-staying time in closed area increased by stress were decreased by treatment of Pyroligneous liquid. These results suggest that Pyroligneous liquid protect partially the living organism from stress attack in some case.

[PA1-20] [2003-10-10 14:00 - 17:30 / Grand Ballroom Pre-function]

C/EBPβ and Nrf2-Mediated GSTA2 Induction by α-Lipoic acid, an Insulin-Sensitizing Agent that has Antioxidant and Prooxidant Activities

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The protective adaptive response to electrophiles and reactive oxygen species is mediated by enhanced expression of phase II detoxifying genes including glutathione S-transferases. α-Lipoic acid, which exerts prooxidant or antioxidant activities, has been shown to activate the insulin signaling pathway and thus to induce insulin-like actions via PI3-kinase and Akt. Our previous studies have shown that PI3-kinase plays an essential role in Nrf2- or C/EBPβ-mediated glutathione S-transferase A2 (GSTA2) induction. This study investigated whether α-lipoic acid induces GSTA2 and, if so, what the role of C/EBPβ and Nrf2 in GSTA2 induction by α-lipoic acid. Western blot analyses showed that α-lipoic acid at the concentrations of 100 μM or above increased the GSTA2 protein levels in H4IIE cells at 12 h or later times. In α-lipoic acid (100 μM)-treated cells, the intensity of nuclear protein(s) binding to the consensus sequence of C/EBP (TTGCGCAA) increased and C/EBPβ translocated to the nucleus. Nuclear Nrf2-ARE complex was activated 30 min-1 h after treatment of cells with α-lipoic acid. α-Lipoic acid treatment increased luciferase reporter-gene activity in H4IIE cells transfected with the plasmid containing −1.65 kb flanking region of the GSTA2 gene. Deletion of either the C/EBP binding site or the ARE substantially abolished the reporter gene activity, indicating that activation of C/EBPβ and Nrf2 both contributed to GSTA2 induction by α-lipoic acid. Insulin enhanced the induction of GSTA2 by α-lipoic acid, which was accompanied by the increase in C/EBPβ binding to its DNA binding site. By contrast, the induction of GSTA2 by α-lipoic acid was attentuated by concomitant treatment of cells with N-acetylcysteine an antioxidant. These results demonstrated that α-lipoic acid induces GSTA2 via activation of both C/EBPβ and Nrf2 and that C/EBPβ and Nrf2 activation by α-lipoic acid may have resulted from the insulin signaling pathway and the prooxidant activity.

[PA1-21] [2003-10-10 14:00 - 17:30 / Grand Ballroom Pre-function]

Inhibitiory effect of green tea extract on Aβ-induced PC12 cell death

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Beta-amyloid peptide (Aβ) is considered to be responsible for the pathogenesis of the Alzheimer's disease. Several lines of evidence support that Aβ-amyloid-induced cytotoxicity is mediated through the generation of reactive oxygen species (ROS). Agents that are able to scavenge excess ROS may be useful as protecting or reducing agents for development or progress of AD. Green tea extract has been known to have antioxidant property. Our previous studies also demonstrate that green tea extract protected ischemia/reperfusion-induced brain injury by reduction of cell death through scavenging of oxidative damages of macromolecules. In this study, we have investigated the effects of green tea extract on Aβ-induced oxidative cell death in cultured cortical neurons and rat pheochromocytoma (PC12) cells. Cerebral cortical neurons and PC12 cells treated with Aβ (10,