[PA1-8] [04/21/2000 (Fri) 10:30 - 11:30 / [1st Fl, Bldg 3]]

The influences of magnetic fields on clonidine-induced sleep in two-day-old chicks

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It has been shown that magnetic fields (MFs) affect a variety of biological effects in animal brain. There have been few experiments on the effects of MFs on sleep. Therefore, we investigated whether MFs affect the sleep induced by clonidine, central α_2 adrenergic receptor agonist. clonidine produced dose-related increase the sleeping time and dose-related decrease onset time in two-day-old chicks. Exposure of MFs (5, 10, 20 gauss; for 3, 6, 9, 12hrs) to chicks significantly increased the clonidine-induced sleep time in intensity and exposure duration-dependent manners of MFs. To determine whether the $GABA_A$/benzodiazepine receptor system is involved in the decrease in clonidine sleep caused by activation of central α_2 adrenergic system, we examined in chicks the effects of the benzodiazepine receptor antagonist flumazenil (0.5mg, i.p.) and $GABA_A$ antagonist bicuculline (0.1mg, i.p.) on clonidine-induced sleep. Bicuculline and flumazenil inhibited the increase of clonidine-induced sleep by MFs. These results suggest that MFs can increase clonidine-induced sleep via GABA and benzodiazepine receptor system.

[PA1-9] [04/21/2000 (Fri) 10:30 - 11:30 / [1st Fl, Bldg 3]]

Facilitatory effect of cytisine on catecholamine secretion

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The present study was attempted to examine the characteristics of cytisine on catecholamine secretion in the isolated perfused rat adrenal gland and to clarify the mechanism of its action. Cytisine (5 to 20 mM) injected into an adrenal vein evoked a dose-dependent significant secretory response of catecholamines (CA) from the rat adrenal gland. However, upon the repeated injection of cytisine (10 mM) at 15 min intervals, CA secretion was rapidly decreased after third injection of histamine. CA release evoked by the continuous infusion of cytisine was also gradually reduced from 15 min after the initiation of cytisine infusion. Tachyphylaxis to releasing effects of CA evoked by cytisine was observed by the repeated administration. The cytisine-induced CA secretion was markedly inhibited by the pretreatment with chlorisondamine, nicardipine, TMB-8, and perfusion of Ca^{+2}-free Krebs solution, while was not affected by pirenzepine and diphenhydramine. Moreover, the CA secretion evoked by acetylcholine was greatly potentiated by the prior perfusion of cytisine (5 mM). Taken together, these experimental data suggest that cytisine causes CA secretion in a calcium-dependent fashion from the perfused rat adrenal gland through activation of neuronal nicotinic receptors located in adrenomedullary chromaffin cells. It also seems that cytisine-evoked catecholamine release is not relevant to activation of cholinergic muscarinic or histaminergic receptors.

[PA1-10] [04/21/2000 (Fri) 10:30 - 11:30 / [1st Fl, Bldg 3]]

Effects of DMSO (dimetyl sulfoxide) on degranulation and tyrosine phosphorylation of the FcεRI signaling components in RBL-2H3 cells

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DMSO, a non-polar solvent, is frequently used to dissolve the chemical compounds or natural products which are insoluble in water. However, DMSO provokes various unwanted activites such as the stimulation of cell proliferation. In studying the anti-allergic activities of natural compounds we isolated, the DMSO used to dissolve the natural compounds was found to possess some unwanted effects, it dose-dependently inhibited the antigen-stimulated degranulation of rat mast cells, RBL-2H3 cells. In accordance with this, we examined the effect of DMSO on the tyrosine phosphorylation of syk, PLCγ2, MAPK, and pyruvate kinase, the signal components of FcεRI (high affinity IgE receptor). At the concentration of 0.1 to 0.5%, DMSO did not have any effect on the tyrosine phosphorylation of Syk or PLCY2. Pyruvate kinase was tyrosine phosphorylated by DMSO at or above 0.1% and MAPK was also tyrosine phosphorylated at 0.5%.

[PA1-11] [04/21/2000 (Fri) 10:30 - 11:30 / [1st Fl, Bldg 3]]

The Effects of Magnetic Fields on Circadian Rhythm of Pain Threshold in Mice

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The aim of this study was to determine whether magnetic fields (MFs) participate in the circadian rhythm of pain threshold. Pain thresholds were evaluated with the hot plate test using mice. We found that circadian rhythm of pain threshold exists with the significant increase of pain threshold during nighttime. This circadian rhythm was masked not only under continuous lightness for 5 days but also under continuous darkness for 5 days. Circadian rhythm was exhibited under darkness with the MFs cycle (exposure to 15G for 12 hours, from 08:00h to 20:00h) for 5 days, as was observed in normal mice. However, the circadian rhythm was not exhibited under darkness with the reversed MF cycle (exposure to 15G for 12 hours, from 20:00h to 08:00h) for 5 days though pain threshold in the MF-exposed period of nighttime was slightly decreased. This study suggests that MFs participate in the circadian rhythm of pain threshold without environmental light.

[PA1-12] [04/21/2000 (Fri) 10:30 - 11:30 / [1st Fl, Bldg 3]]

Effect of Daidzein and Genistein on Immune Function in Mice

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High soy consumption leading to high exposures of soy isoflavones has been associated with a reduced risk of cancers at many sites. As part of a study focusing on the chemopreventive mechanisms, we have investigated the modulating effects of daidzein and genistein, a prominent and more bioavailable isoflavone in soy foods, on murine immune function. Daidzein (50mg/kg) or genistein administered p.o. once a ady for 7 days in BALB/c mice. Daidzein decreased the mitogen-stimulated proliferation of murine splenocytes, but genistein increased. Daidzein stimulated the secretion of interleukin-4, but inhibited the secretion of gamma-interferon and interleukin-2. Genistein stimulated the secretion of gamma-interferon, interleukin-2 and tumor necrosis factor-alpha, but inhibited the secretion of interleukin-4. Daidzein and genistein inhibited the production of nitric oxide and enhanced the phagocytic activity in peritoneal macrophages. These results suggest that cancer preventive effects of daidzein is partly concerned with the secretion of TH2 cells cytokine and the activation of phagocytosis, and genistein is partly concerned with the secretion of TH1 cells cytokine and tumor necrosis factor-alpha and the activation of phagocytosis.

[PA1-13] [04/21/2000 (Fri) 10:30 - 11:30 / [1st Fl, Bldg 3]]