One of the action mechanisms for ginsenoside activity involves binding to intracellular steroid receptors that act as transcriptional factors in the nucleus. We have examined the possiblity that the components of Panax ginseng, ginsenoside (G)-Rb1, G-Rc, G-Re, G-Rf, G-Rh1, and G-Rh2, act by binding to the steroid hormone receptors, estrogen (ER), glucocorticoid receptor(GR), androgen receptor(AR), and retinoid receptor(RAR). Both G-Rb1 and G-Rh1 activated transcription of estrogen-responsive luciferase reporter gene in MCF-7 breast cancer cells and CV-1 kidney fibroblast cells transiently transfected with ERα or ERβ at 10 μM concentration. This activation was inhibited by specific estrogen antagonist, ICI 182, 780. We next examined whether G-Rb1 and G-Rh1 activate an endogenous estrogen-responsive gene. G-Rb1 and G-Rh1 increased the expression of estrogen-responsive gene, C-fos at the mRNA level in MCF-7 cells at 24 h of treatment as measured by quantitative reverse transcriptase-polymerase chain reaction. But screened none of the above ginsenosides including G-Rb1 and G-Rh1 did not activate glucocorticoid receptor, androgen, or retinoid receptor in CV-1 cells transiently transfected with steroid hormone receptors and hormone-responsive reporter plasmids. These data supported the specificity of G-Rb1 and G-Rh1 acting through the ER. Taken together, these results demonstrated that G-Rb1 and G-Rh1 are weak phytoestrogen acting via ER, not glucocorticoid receptor, androgen receptor, and retinoid receptor. This work was supported in part by grants from the Korean Ministry of health and elfare(HMP-00-O-21600-0009, YJL).

[PA1-51] [04/18/2002 (Thr) 14:00 - 17:00 / Hall E]

Effect of DIDS on Lead Transport into astrocytes

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We have previously reported some results which lead uptake into astrocytes increased time- and concentartion-dependently, and under different pH conditions, levels of lead uptake were greatly different. Divalent metal transporter 1(DMT 1) is not major route although it is involved in lead uptake into astrocyte. Levels of lead uptake at pH 7.4 were 10 times more higher than at pH 5.5.
In this study we investigated what kind of transport system mediate transport of lead into astrocytes. We did effects of inhibitors of anion exchange or H+ co-transport on lead uptake into astrocyte in different pH condition. We used 4,4'-diisothiocyanostilbene-2,2'-disulfonic acid, disodium salt(DIDS), Furosemide, Probenecid, Cyano-hydroxycinnamic acid(CHCA) and Niflumate as a inhibitor.
Immortalized human fetal astrocyte(SV-FHA) cells were cultured in medium containing Dulbecco's modified Eagle's medium and added with inhibitors 15 minutes before lead treatment. Lead uptake assay was done in incubation condition of pH 5.5 and 7.4.
Lead uptake into astrocytes increased time-, pH-, and concentartion-dependently, and was saturable. At pH 7.4 lead uptake was the highest level, and only DIDS inhibit lead uptake but others did not. At pH 5.5 DIDS increased lead uptake. Lead uptake was inhibited by DIDS in dose-dependent manner and done 75% in 100 μM of DIDS. We are investigating about the mechanism of inhibition of lead uptake induced by DIDS.

[PA1-52] [04/18/2002 (Thr) 14:00 - 17:00 / Hall E]

Effects of extremely low frequency magnetic field on generation of hydroxyl radical

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It has been reported that extremely low frequency magnetic field (ELF-MF) produced increase of lipid peroxidation in vivo. In this study, we examined the effect of ELF-MF on generation of hydroxyl free radical in vitro. Hydroxyl radical is produced by incubation of FeCl3 and H2O2 in Tris-buffer solution. The generation of hydroxyl radical during sham or exposure to ELF-MF was examined by measuring salicylic acid hydroxylation adducts, 2,3-dihydroxylebnzoic acid (DHBA) and 2,5-DHBA using HPLC-electrochemica detector system. Exposure conditions were changed in time (15 min, 30 min) and intensity of ELF-MF exposure (50 V, 100 V, 150V) to find the dependence on them of hydroxyl radical generation. The production of hydroxyl radical was elevated in 15 min exposure to 50 V, 100 V but not 150 V ELF-MF. The increased hydroxyl radical concentration, however, was also found in 30 min exposure to 150 V ELF-MF. Comparing the generation of hydroxyl radical relevant to ELF-MF exposure time, the significant increase of

hydroxyl radical resulted from 150V ELF-MF exposure. These results indicate that ELF-MF exposure may accelerate the in vitro reaction of hydroxyl radical generation. This study, however, was conducted in so simple in vitro system, that we failed to conclude the authentic in vivo effects of ELF-MF on free radicals. Therefore, we should study further with more complex system similar to in vivo environment to confirm the biological influences of ELF-MF on free radical generation.

[PA1-53] [04/18/2002 (Thr) 14:00 - 17:00 / Hall E]

Extremely low frequency magnetic field induces hyperalgesia in mice by acting on nitric oxide synthesis through Ca++-channel.

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The exposure to extremely low frequency magnetic field (ELF-MF, 60 Hz) has been shown to affect pain threshold and nitric oxide (NO) synthesis. The aim of present study was to investigate the relation of hyperalgesia and NO synthesis modulated by ELF-MF in central nervous system (CNS). We evaluated the pain thresholds using hot plate test and NO concentration in CNS after mice were exposed to sham or 20 G ELF-MF (60Hz) for 48 hours. The exposure to ELF-MF induced hyperalgesia, which was inhibited by non-selective NOS inhibitor, L-NNA, suggesting that NO was involved in ELF-MF induced hyperalgesia. These ELF-MF effects were blocked by calcium channel blocker, nimodipine, but not by NMDA receptor antagonist, MK-801. Both of them are known to block the influx of Ca++ essential in activating the constitutive nitric oxide synthase in CNS. ELF-MF exposure to mice also increased NOx level in brain and spinal cord, in which this elevation of NOx by ELF-MF was attenuated by nimodpine and L-NNA treatment. These results indicate that the exposure of ELF-MF may produce the hyperalgesia by acting on nitric oxide synthesis through Ca++-channel.

[PA1-54] [04/18/2002 (Thr) 14:00 - 17:00 / Hall E]

Enhanced levels of thiobarbituric-acid-reactive substances in rat's brain exposed to extremely low frequency magnetic field

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To investigate whether extremely low frequency magnetic field (ELF-MF) may change the level of lipid peroxides in brain tissue, we evaluated concentration of the thiobarbituric-acid-reactive substances (TBARS) after rats were exposed to ELF-MF. Furthermore, we correlated the TBARS with endogenous antioxidant systems such as reduced and oxidized glutathione (GSH and GSSG), superoxide dismuatase (SOD) and glutathione peroxidase (GPx). Rats were fed ad libitum in sham or ELF-MF (60 Hz, 5, 10 or 20 G) environment for 3 or 5 days. After exposure, rats were decapitated in anesthesia and brains were immediately isolated into four regions (cortex, cerebellum, thalamus and striatum). TBARS level was significantly increased by 20 G ELF-MF in all brain regions though weaker ELF-MF (5 or 10 G) did not elevate TBARS. Non-enzymatic antioxidant system, GSH and/or GSSG, was shown to decrease in significant (cortex and cerebellum) or moderate (striatum and thalamus) level in ELF-MF exposure group. 20 G ELF-MF did not alter the activity of SOD and GPx acting as antioxidant enzyme in living cells. These results show that higher ELF-MF may lead to enhanced lipid peroxidation in living animals through impeding non-enzymatic antioxidant system. However, considering complex antioxidant systems, we should conduct more detailed experiments to attain to conclusion.

[PA1-55] [04/18/2002 (Thr) 14:00 - 17:00 / Hall E]

The influence of the extremely low frequency magnetic field on bicuculline-induced seizures in rodents.

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