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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