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Acute exposure to GSM 900-MHz electromagnetic fields induces glial reactivity and biochemical modifications in the rat brain.

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The worldwide proliferation of mobile phones raises the question of the effects of 900-MHz electromagnetic fields (EMF) on the brain. Using a head-only exposure device in the rat, we showed that a 15-min exposure to 900-MHz pulsed microwaves at a high brain-averaged power of 6 W/kg induced a strong glial reaction in the brain. This effect, which suggests neuronal damage, was particularly pronounced in the striatum. Moreover, we observed significant and immediate effects on the Kd and Bmax values of N-methyl-D-aspartate (NMDA) and GABA(A) receptors as well as on dopamine transporters. Decrease of the amount of NMDA receptors at the postsynaptic membrane is also reported. Although we showed that the rat general locomotor behavior was not significantly altered on the short term, our results provide the first evidence for rapid cellular and molecular alterations in the rat brain after an acute exposure to high power GSM (Global System for Mobile communication) 900-MHz microwaves.

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[Effect of 900 MHz electromagnetic fields on the expression of GABA receptor of cerebral cortical neurons in postnatal rats]

[Article in Chinese]

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OBJECTIVE: To investigate the effects of 900 MHz microwave electromagnetic fields (EMF) on the expression of neurotransmitter GABA receptor of cerebral cortical neurons in postnatal rats.

METHODS: Neurons were exposed to 900 MHz continuous microwave EMF (SAR = 1.15 - 3.22mW/g) for 2 hours per day in 6 consecutive days and for 12 hours at one time. GABA receptor was chosen to be the biological end.

RESULTS: Significant changes had been observed in exposed neurons in the expression of GABA receptor. ($P < 0.01$) .

CONCLUSION: The expression of GABA receptor of neurons were significantly regulated by 900 MHz microwave, and a power "window" effect was observed in the exposed neurons.

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J Comp Physiol A Neuroethol Sens Neural Behav Physiol. 2008 Dec 9. [Epub ahead of print]

Study of GABA(A) receptors on the sleep-like behavior in Coturnix japonica (Temminck Schlegel, 1849) (Galliformes: Aves).

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The present study was carried out to investigate the influence of GABA(A) signaling on sleep-like behaviors through systemic administration of bicuculline and picrotoxin (GABA(A) antagonists) and thiopental (an allosterical modulator). A thiopental (20 mg/kg) injection increased the eye closure frequency compared to the control group. The birds quickly became sleepy with a low frequency of early behavioral stages, such as rapid oral movement (ROM), feather ruffling and blinking. A bicuculline administration (1 and 4 mg/kg) did not modify the frequency of feather ruffling, ROM, eye closure or blinking responses. A lower dose of picrotoxin (2 mg/kg) stimulated an active awakening status, while an intermediate dose (4 mg/kg) elicited a moderate awakening status, which was associated with an increase in the frequency of ROM, blinking and eye closure. At the higher dose (8 mg/kg), the birds exhibited thermoregulatory-like behaviors and convulsions immediately after the injection. Interestingly, picrotoxin (4 mg/kg) intensified the eye closures when given in combination with thiopental (20 mg/kg). Both barbiturate and picrotoxin-induced sleep-like responses have the same behavioral neuropharmacological properties, conceivably because they are correlated with action at an identical site on the GABA(A) receptor.