

PATTERN OF SOCIAL BEHAVIOUR IN RATS EXPOSED TO CHRONIC ELF MAGNETIC FIELD

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It has been reported that the cell membranes are the main targets for the extremely low frequency magnetic field (ELF-MF) and they exert their effects by alteration in its characteristics, neurotransmitter/neuromodulator release, receptor ligand binding and ionic fluxes. One of the well-known effects is an alteration in the release of the neuromodulator, opioid. Incidentally, opioids modulate pain and are reported by various workers as either reduced, or increased or not affected. This controversy is probably because of two important factors i) different types of noxious stimuli mediate their responses at different levels of neuraxis utilizing partly different sets of neurotransmitters/receptors and, ii) opioids have been shown to produce both excitatory and inhibitory effects involving in part differential effects on Ca^{2+} and K^{+} channels. Reduction in the concentration of opioid has excitatory effect while increase in concentration has inhibitory effect. Therefore, it is important to identify the factors leading to the former or latter situation. Moreover, stress and stress-induced analgesia are also opioid mediated. Therefore, the responses to noxious stimuli, stress and its alleviation by sucrose in chronic MF exposed rats were studied systematically. Their impact on social, aggressive, learning and memory behaviours were also studied. The results suggest that the responses to phasic and tonic noxious stimuli of various types indicate a progressive analgesia in pari-pasu with the exposure (2h/day of 17.9 μT) duration from 1 to 24 weeks. The response to repeated unexpected and unpredictable stressful stimuli was distinct in these rats as compared to the controls. It involved a heightened emotional reaction to the same stimuli. The impact on the threshold of aggression was marked leading to an escape or avoidance reaction rather than an attack encounter. The learning was incomplete with deficits in the memory of the obnoxious stimuli. The results of the study suggest a distinct change in the behaviour of the rats exposed to chronic, intermittent magnetic fields. This is reflected in the social behaviour, stress induced threshold of aggression, learning and memory.