



Neuroprotective effect of melatonin and omega-3 on the hippocampus of rat that prenatally exposed to 900 mhz electromagnetic fields

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ABSTRACT

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In the present study it was aimed to analyse the effect of prenatal exposure to 900 MHz electromagnetic fields (EMF) on the number of pyramidal cells in the cornu ammonis (CA) of hippocampus of the 4-weeks old male rats by using the optical fractionator stereological technique. We used melatonin (N-aceyl-5-methoxytryptamine) and omega-3 (w3) for searching the neuroprotective effects against EMF exposure. Pregnant rats were randomly divided into seven groups (three pregnant rats for each group). These are EMF group, EMF+melatonin group (EMF+Mel), EMF+omega-3 group (EMF+w3), melatonin group (MEL), omega group (w3), sham group, and control group (Cont). Three of these groups that EMF, EMF+MEL, EMF+w3, were exposed to 900 MHz EMF for 60 min/day from the first to the last day of the gestation period in an exposure tube. The Cont, MEL and w3 groups were not placed into the tube nor were they exposed to EMF. The rats of Sham group were placed into the tube without exposure of EMF. At the end of 4 weeks, offspring were anesthetized then perfused with neutral formalin intracardially and brains were removed and histologically processed. Paraffin sections of the hippocampus were used for analysis. It was found that exposure of 900 MHz EMF significantly reduced the total pyramidal cell number in the CA of the EMF group as compared to others expect w3 group. In w3 group there was significant decrease in number of pyramidal cells according to our study results. It was observed that w3, without EMF exposure, shown toxic effects on pyramidal cell but there was opposite evidence suggesting that w3 has a protective role against EMF exposure in EMF+w3 group. Melatonin increased the pyramidal cell number in groups of MEL and EMF+MEL. This study shows some evidences for neuroprotective effects of melatonin on pyramidal cells. Finally in sham-exposed group, stress caused to increase in the number of pyramidal cells by induction of neurogenesis.

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