



Low level microwave radiation: Enzymatic, morphological and DNA alteration in rat.

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Microwave may induce changes in growth related enzymes and DNA. The present investigation is aimed to study the DNA strand break and protein kinase C (PKC) activity, a key enzyme involved in the transduction of signals from membrane receptors to the intra-cellular region, growth factors, cytokines and ornithine decarboxylase (ODC).

Thirty days old male Wistar rats were exposed 2 h/day for 35 days at different microwave frequencies. Exposure was carried out in a specially designed anechoic chamber. After the exposure the whole brain, hippocampus, and hypothalamus tissue and testis were dissected out and used for estimation of DNA strand breaks, calcium ion efflux, PKC and ODC activity. Radio labeled ^{32}P ATP and ^{14}C Ornithine were used for estimation of PKC and ODC activity respectively. DNA damage was performed by single cell gel electrophoresis [1].

A significant decrease in PKC activity was observed in exposed group as compared to their control counterpart. It is noted that activity of hippocampus showed a significant decline as compared to hypothalamus and the rest of the brain. On the other hand a statistically significant increase in the ODC activity was observed. It is inferred that prolonged exposure to these radiation causes significant alteration in the brain tissue, suggesting a transductive coupling to the cytoplasm. These results indicate a possibility that this type of radiation may also affect DNA damage as well as growth related enzymes such as PKC and ODC, which are associated with the cell proliferation and differentiation [2]. Morphological changes were observed in the exposed group rat as compared to the control rat. It is observed that the effects are significantly different in full brain and hypothalamus but not in the rest of the tissue (total brain-hypothalamus). It is suggested that the alteration in these enzymes may affect the behavioral pattern as well as learning and memory functions in developing rat.

References

- [1] R. Paulraj, J. Behari Single strand DNA breaks in rat brain cells exposed to microwave radiation, *Mut Res.* vol. 596 pp76–80, 2006
- [2] T.G. O'brien, L.C. Megosh,, G.Gilliard, S.A. Peralta, Ornithine decarboxylase overexpression is a sufficient condition for tumor promotion in mouse skin. *Cancer Res.* 1987, 57, pp. 2630–2637 1987.