

Enzymatic Alteration of Rat Brain Chronically Exposed to Low Level Microwave Radiation

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There has been a growing concern among the public regarding the potential human health hazard of exposure to microwave radiation by these appliances. These radiations affect certain growth related enzymes. They are (i) protein kinase C (PKC), a key enzyme involved in the transduction of signals conveyed from membrane receptors to the intra-cellular region of action of hormones, growth factors and cytokines (ii) ornithine decarboxylase (ODC), a rate-limiting enzyme in the polyamine biosynthesis.

Present work describes the effect of low level microwave radiation on calcium dependent protein kinase activity (PKC) and ornithine decarboxylase activity on developing rat brain. Thirty days old Wistar rats were exposed 2 h/day for 35 days at different frequencies. Exposure was carried out in a specially designed anechoic chamber.

After the exposure the whole brain, hippocampus, and hypothalamus tissue were dissected out and used for estimation of PKC and ODC. Radio labeled P^{32} ATP and C^{14} Ornithine were used for estimation of PKC and ODC activity respectively.

A statistically significant decrease in PKC activity was observed in exposed group as compared to their control counterpart. It is notable that activity on 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 membrane bound enzyme such as PKC and ODC, which are associated with the cell proliferation and differentiation. It is suggested that the alteration in these enzymes may affect the behavioral pattern as well as learning and memory functions in developing rat.