OXIDATIVE AND IMMUNE RESPONSE IN EXPERIMENTAL EXPOSURE TO ELECTROMAGNETIC FIELDS

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Introduction: Although the physical techniques for measuring the electromagnetic fields (EMF) are well developed, adequate characterization of the biological effects induced by EMF is subject of discussion yet. Many scientific studies have been devoted to assessing what health risks are associated with EMF exposure. Data from the recent experiments suggest that EMF are associated with the iron-mediated free radical generation, that can cause damage in the biologic molecules such as lipids, proteins and can profoundly affect cellular homeostasis.

Objective: The aim of this study was to show the effects of the chronic exposure to EMF on the immune and oxidative response.

Methods: *In vivo* experiment was carried out on 80 Wistar rats that were divided in 4 groups as follows: 1. Control-group, without exposure, sacrificed at 1 month; 2. Control-group, without exposure sacrificed at 3 months; 3. EMF' exposed group, sacrificed at 1 month; 4. EMF' exposed group, sacrificed at 3 months. The rats were exposed to EMF that covers a range of the frequencies between 140–160 MHz. The following parameters were assessed: a) 3HTdR incorporation test; b) IL-1 assay; c) TNF-assay; d) chemiluminiscence assay.

Results: The 3HTdR incorporation was decreased in the EMF' exposed groups, as compared with control groups, but with statistically significant difference (ssd) ($p > 0.01$) observed only in the third group. Increased values of the cytokines (IL-1 and TNF) were found in the 3rd and 4th group, with ssd for both of the cytokines ($p > 0.05$ for IL-1 and $p > 0.01$ for TNF). Chemiluminescence assay and lipid peroxides were parameters with increased values in the 3rd and 4th group, but ssd were found only in the forth - group. Our results point out an important increase of the oxidative response in the EMF-exposed groups, namely in the group sacrificed at 3 months. In the forth group, an important suppression of the immune response and increased activity of the cytokines was demonstrated.

Conclusions: Our results indicate an interaction between magnetic fields and immune and oxidative response, suggesting increased modifications in the group with EMF-prolonged exposure.