The Effect of High Frequency (27.11 and 2450 Mhz) Electromagnetic Fields on Immunity Modulation in Mice

Abstrak :

The classical problem in studies concerning the biological effects of high-frequency electromagnetic fields is the establishment of the relationship between physical characteristics of the fields and the magnitude of the effect. The first step in solving the problem is by the quantification of the relationship between properties of the exposure fields and the absorbed energy. Chronic stressor for individual may induce disorder of stress cell by high frequency electromagnetic field. The pathogenesis of the disorder is poorly understood. Lymphocyte cell has two types of immunity, i.e. innate and adaptive immunity. The high-frequency fields were applied to a transversal electromagnetic cell designed to allow microscopic observation of the lymphocytes and plasma cell during the presence of the high-frequency fields. This experimental research using separate sample pretest-posttest control group design was intended to explain such mechanism. This research used pathobiology paradigm with stress immunocompetent cell concept, and multivariate analysis design. With random assignment, a number of 84 Mus musculus Balb/C were divided into 12 groups (pretest 3 groups, control 3 groups, posttest P1 3 groups and posttest P2 3 groups). Samples were male mice of 3 - 4 months old, with the body weight of 28 - 32 grams. High frequency electromagnetic fields as stressor (with the frequencies of 27.11 and 2450 MHz, electromagnetic field intensity of 10 mT, 18 V/m) was exposed for 20, 25, and 30 days. The dependent variables were IFN-gamma, IL-10 producing lymphocytes and IgM, as well as IgG producing plasma cells. Result showed that stress lymphocytes and plasma cells, due to high frequency electromagnetic fields (27.11 and 2450 MHz) for 20, 25, and 30 days, decreased IFN-gamma-producing lymphocyte, IgG producing plasma cell, and increased IL-10 producing lymphocyte and IgM-producing plasma cells (p = 0.000). Based on discriminant model, it was observed that stress immunity modulation due to high frequency electromagnetic field for the frequency 27.11 and 2450 MHz showed no remarkable difference. In conclusion, at high frequency electromagnetic fields (27.11 and 2450 MHz), the adaptation of immunity modulation occurs and earlier fatigue of lymphocytes becomes potential.

Keyword :

high frequency electromagnetic fields, pathobiology, stress cell, immunity

Daftar Pustaka :

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