

Functionality of natural killer cells from end-stage cancer patients exposed to coherent electromagnetic fields.

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Abstract

The main objective of our study is to investigate whether an enhancement of the immune system in end-stage cancer patients is achieved by exposure to coherent electromagnetic fields. For this reason, 15 end-stage cancer patients were exposed at low intensity, coherent electromagnetic fields at radiofrequencies ranging from 600 kHz-729 Hz, for 8 h/day, 6 days/week for 4 weeks. NKs number and cytotoxicity of NK T-lymphocytes versus K562 cancer cell line were estimated by flow cytometry, before and after exposure. Data showed that the exposure of the end-stage cancer patients to the coherent electromagnetic fields resulted in a significant increase of the number and the cytotoxicity of the NK T-lymphocytes against cancer cells, in all patients. Exposure to coherent EMFs at radiofrequencies increases the number and cytotoxicity of NK T-lymphocytes, which may contribute to the improvement of cancer patients' status.

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2. Effects of low intensity static electromagnetic radiofrequency fields on leiomyosarcoma and smooth muscle cell lines.

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Abstract

In this study we investigated the effects of low intensity static radiofrequency electromagnetic field (EMF) causing no thermal effects, on leiomyosarcoma cells (LSC), isolated from tumors of fifteen Wistar rats induced via a 3,4-benzopyrene injection. Electromagnetic resonance frequencies measurements and exposure of cells to static EMF were performed by a device called multi channel dynamic exciter 100 V1 (MCDE). The LSC were exposed to electromagnetic resonance radiofrequencies (ERF) between 10 kHz to 120 kHz, for 45 min. During a 24h period, after the exposure of the LSC to

ERF, there was no inhibition of cells proliferation. In contrast, at the end of a 48 h incubation period, LSC proliferation dramatically decreased by more than 98% ($P < 0.001$). At that time, the survived LSC were only 2% of the total cell population exposed to ERF, and under the same culture conditions showed significant decrease of proliferation. These cells were exposed once again to ERF for 45 min (totally 4 sessions of exposure, of 45 min duration each) and tested using a flow cytometer. Experiments as above were repeated five times. It was found that 45% of these double exposed to ERF, LSC (EMF cells) were apoptotic and only a small percentage 2%, underwent mitosis. In order to determinate their metastatic potential, these EMF cells were also counted and tested by an aggregometer for their ability to aggregate platelets and found to maintain this ability, since they showed no difference in platelet aggregation ability compared to the LSC not exposed to ERF (control cells). In conclusion, exposure of LSC to specific ERF, decreases their proliferation rate and induces cell apoptosis. Also, the LSC that survived after exposed to ERF, had a lower proliferation rate compared to the LSC controls ($P < 0.05$) but did not loose their potential for metastases (platelet aggregation ability). The non-malignant SMC were not affected by the EMF exposure ($P < 0.4$). The specific ERF generated from the MCDE electronic device, used in this study, is safe for humans and animals, according to the international safety standards.

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