Differentiation of human mature stem cells under the influence super low frequency electromagnetic fields

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Many attempts have been made to use electromagnetic fields for diagnostic and therapeutic purposes. One of the most impressive examples is Luc Montagnier, a Nobel laureate in medicine, who decoded an electromagnetic signal from a cell, probably generated by DNA involved in an infectious process. The ability to make a diagnosis based on the identification of such signals opens up new perspectives in medicine. Another excellent approach is to use a special magnetic signal, in tune with the frequencies of ion cyclotron resonance, to generate ion resonance currents in the cell, to improve its metabolism and cell functionality in various tissues and, above all, in various areas of cell life. Thus, studies were carried out in Rome to develop new therapeutic protocols,

This study is currently in the preclinical stage. The application of this technology for the differentiation of tumor cells is very interesting.in vivo. This approach has been very successfully used by the Russian group in Pushchino (2009), which treated ascites for Ehrlich tumor in mice, the international group at Albama University (2011), which treated hepatocarcinoma in humans with impressive results, and Novacure, a medical high-tech company, which received approval FDA for the application of this technique in people with brain tumors. Despite the successes achieved in the US, we believe that the Russian and Italian ICR-based approach may be more promising.

Target: modulation of cardiac stem cell (CSC) differentiation with minimal manipulation is one of the main challenges in the clinical application of cell therapy for heart failure. CSCs obtained from myocardial biopsy and grown as cardiosphere CSps and cardiosphere-derived cells of CDCs can be introduced into the myocardium and partially restored. In this publication, we adhere to the hypothesis that irradiation of such cells with an ultra-low-frequency electromagnetic field corresponding to the ion cyclotron resonance frequency of Ca 2+ can trigger cell differentiation into a cardiospecific phenotype.

Methods and results

A significant increase in the expression of cardiac markers was found 5 days after Ca2 + ICR irradiation in both CSpsCDCs, as evidence of transcription, translation and phenotypic Ca 2+ level mobilization from the cell was recorded and confirmed by compartment analysis in a fluorescent assay.

Conclusion

The results obtained suggest that ultra-low-frequency electromagnetic fields tuned to Ca2 + ICR can be used to stimulate cells to specifically differentiate into adult cardiac progenitor cells without pharmacological or genetic manipulation and can be used for therapeutic purposes.

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