

Extremely Low Frequency Magnetic Field Therapy as a Novel Therapeutic Method for Tissue Regeneration and Wound Healing

Alireza Madjid Ansari ¹

1. Department of Biotechnology, Pasteur Institute of Iran, Head of Integrative Oncology Department, BCRC, Tehran, Iran

Corresponding Author: Alireza Madjid Ansari, E-mail: ansari@pasteur.ac.ir

ABSTRACT

There are vast various resources of extremely low frequency magnetic fields in the environment of human beings such as power lines, mobile phones, earth, etc. During the last decade, being exposed to these natural and artificial resources of extremely low frequency (ELF) magnetic fields has become unavoidable for human beings. Owing to concerns due to possible effects of extremely low frequency magnetic fields (ELF-MF) on human health, many studies have been conducted to clarify if ELF-MF can induce alterations in biological processes. ELF-MF could induce the delay of cell cycle progression while it can make changes in squamous cell morphology and increase the rate of filling cellular gaps in culture flask. Also, it has been showed that ELF-MF influences anti oxidative enzyme activities and increases lipid peroxidation. Beyond these cellular and molecular facts, interest in electromagnetic field (EMF) treatments has increased rapidly in recent years due to its advantages over other treatments for tissue healing and infection. Benefits include low-cost, ready availability, ease of localized application, few if any side-effects, and indefinite shelf life. Immunological studies show that low-intensity EMF can interact with cells and tissues, providing a large number of anti-inflammatory and wound healing applications. The effect of EMF on the immune system in phagocytic cells alone has attracted attention because of the role that extremely low-frequency electromagnetic field (ELF-EMF) plays in decreasing the growth rate of bacteria. With today's antibiotic-resistant bacteria, medicine is in need of a mechanism to aid in the control of inflammatory response, greatly benefitting the fields of disease pathology, tissue engineering and regenerative medicine. Pulsed electromagnetic-field stimulation has been investigated as a therapy for wound healing following results that PEMFs can promote healing by potentially increasing collagen synthesis, angiogenesis, and bacteriostasis. Despite these, controversies regarding effects of ELF-MF are still rife.