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Original Article

Effects of ultra-wideband electromagnetic pulses on pre-neoplastic mammary epithelial cell proliferation

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Abstract

Abstract.

Electromagnetic ultra-wideband pulses (UWB) or nanopulses, are generated by a wide range of electronic devices used in communications and radar technology. However, the specific effects of nanopulse exposure on cell growth and function have not been extensively investigated. Here, studies have been conducted to determine the effects of prolonged exposure to non-ionizing, low to moderate intensity nanopulses on the growth of pre-neoplastic CL-S1 mammary epithelial cells *in vitro*. Cells were grown in culture and maintained in serum-free defined medium containing 10 ng/ml EGF and 10 μg/ml insulin as comitogens. Studies showed that 0.25–3.0 h exposure to nanopulses of 18 kV/m field intensity, 1 kHz repetition rate and 10 ns pulse width had no effect on CL-S1 cell growth or viability during the subsequent 72-h culture period. However, exposure to similar nanopulses for prolonged periods of time (4–6 h) resulted in a significant increase in cell proliferation, as compared to untreated controls. Additional studies showed

that nanopulse exposure enhanced CL-S1 cell growth when cells were maintained in media containing only EGF, but had no effect on cells maintained in defined media that were mitogen-free or containing only insulin. Studies also showed that the growth-promoting effects of nanopulse exposure were associated with a relatively large increase in intracellular levels of phospho-MEK1 (active) and phospho-ERK1/2 (active) in these cells. These findings demonstrate that prolonged exposure to moderate levels of UWB enhanced EGF-dependent mitogenesis, and that this growth-promoting effect appears to be mediated by enhanced activation of the mitogen-activated protein kinase (MAPK) signalling pathway in pre-neoplastic CL-S1 mammary epithelial cells.

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- Tripura Bojjawar, Madan Jalari, Eric Aamodt, Matthew F. Ware, Donald T. Haynie. (2006) Effect of electromagnetic nanopulses onC. elegans fertility. *Bioelectromagnetics* **27**:7, 515
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