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WESTERN BLOT ANALYSIS AND COMET ASSAY AS DETECTION METHODS IN THE EMF STUDIES

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Abstract:
Epidemiological studies have reported an association between exposure to EMFs and increased risk of cancerous diseases, albeit without dose-effect relationships. The validity of such findings can be corroborated only by demonstration of dose-dependent DNA-damaging effects of EMFs of human origin in vitro.
The purpose of our study was to provide evidence for a carcinogenic potential of EMFs on cultured human CEM-cells by Western Blot (WB) analysis and COMET assay.
In our study the cell cultures were exposed for 2, 3, 4,and 6 hours, using a normal mobile telephone through a TEM cell device from 0,6microWatts to 1.3milliWatts in 11 steps of increasing power density inside a cell culture incubator. First, the WB analysis have evidenced an unbalance between pro-apoptotic and pro-survival signals, in particular the exposure time till two hours induced a prevailing pro-survival gene expression activity (Bcl-2 and Ras), while the exposure time of 3, 4, and 6 hours induced prevailing pro-apoptotic gene activation (p53, pRb/p110,). In order to investigate the possible genotoxic activity of EMF, we performed the Comet Assay analysis. The basic principle of this technique is the migration of DNA in an agarose matrix under electroforesis conditions for the detection of DNA breaks and damage at alkali-sensitive sites in eukariotic cells. The preliminary results by Comet Assay have revealed DNA alteration in cells exposed for longer time and higher power, whereas no significant alteration was found for shorter time and lower power. A DNA microarray analysis is in progress in order to monitor the whole genome to have a better picture of the interactions among thousands of genes simultaneously.