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No mutation effect of 50 Hz sinusoidal magnetic field on beta catenin gene phosphorylation site in N-methyl-N-nitrosourea (MNU) induced colon tumor model

Metin Budak[1,2]*, Mahmut Alp Kılıç[3], Tunaya Kalkan[4] & Handan Tuncel[5]

[1]Department of Biophysics, Faculty of Medicine, Trakya University, Edirne, Turkey
[2]Mirko Tos Ear & Hearing Research Center, Trakya University, Edirne, Turkey
[3]Department of Biophysics, School of Medicine, Aydin Adnan Menderes University, Aydin, Turkey
[4]Department of Biophysics, Medical Faculty, Istanbul Aydin University, Istanbul, Turkey
[5]Department of Biophysics, Cerrahpasa Medical Faculty, Istanbul University Cerrahpasa, Istanbul, Turkey

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The dysregulation of beta-catenin, a key regulator of cadherin-mediated cell adhesion and crucial for embryonic development and adult tissue processes, has been implicated in various cancers, including colon cancer. Meanwhile, there have been longstanding concerns about the potential carcinogenic effects of magnetic fields. In this study, we investigated the possible relationship between beta-catenin dysfunction and 50 Hz sinusoidal magnetic fields (SMF) using an animal model of N-methyl-N-nitrosourea (MNU)-induced rat colon tumors. To assess beta-catenin phosphorylation, genomic DNA was extracted from 58 samples using a commercial extraction kit, and the target gene region corresponding to an important phosphorylation site of beta-catenin was amplified via polymerase chain reaction (PCR). The amplified samples were subsequently analyzed using the single-strand conformation polymorphism (SSCP) method to detect any differences between the experimental groups. Surprisingly, our results revealed no significant differences in beta-catenin gene phosphorylation sites among the groups. These findings suggest that 50 Hz SMF exposure may not directly impact beta-catenin dysfunction in the context of MNU-induced rat colon tumors. Implications of these results and avenues for further research are discussed.

Keywords: Colorectal cancer, Electromagnetic radiation, Single-strand conformation polymorphism (SSCP)