



FULL TEXT LINKS

[J Biomed Phys Eng](#). 2017 Mar 1;7(1):79-86. eCollection 2017 Mar.

Effect of Exposure to 900 MHz GSM Mobile Phone Radiofrequency Radiation on Estrogen Receptor Methylation Status in Colon Cells of Male Sprague Dawley Rats

P Mokarram ¹, M Sheikhi ², S M J Mortazavi ³, S Saeb ⁴, N Shokrpour ⁵

Affiliations

PMID: 28451581 PMCID: [PMC5401136](#)

Abstract

Background: Over the past several years, the rapidly increasing use of mobile phones has raised global concerns about the biological effects of exposure to radiofrequency (RF) radiation. Numerous studies have shown that exposure to electromagnetic fields (EMFs) can be associated with effects on the nervous, endocrine, immune, cardiovascular, hematopoietic and ocular systems. In spite of genetic diversity, the onset and progression of cancer can be controlled by epigenetic mechanisms such as gene promoter methylation. There are extensive studies on the epigenetic changes of the tumor suppressor genes as well as the identification of methylation biomarkers in colorectal cancer. Some studies have revealed that genetic changes can be induced by exposure to RF radiation. However, whether or not RF radiation is capable of inducing epigenetic alteration has not been clarified yet. To date, no study has been conducted on the effect of radiation on epigenetic alterations in colorectal cancer (CRC). Several studies have also shown that methylation of estrogen receptor α (ER α), MYOD, MGMT, SFRP2 and P16 play an important role in CRC. It can be hypothesized that RF exposure can be a reason for the high incidence of CRC in Iran. This study aimed to investigate whether epigenetic pattern of ER α is susceptible to RF radiation and if RF radiation can induce radioadaptive response as epigenetic changes after receiving the challenge dose (γ -ray).

Material and method: 40 male Sprague-Dawley rats were divided into 4 equal groups (Group I: exposure to RF radiation of a GSM cell phone for 4 hours and sacrificed after 24 hours; Group II: RF exposure for 4 hours, exposure to Co-60 gamma radiation (3 Gy) after 24 hours and sacrificed after 72 hrs; Group III: only 3Gy gamma radiation; Group 4: control group). DNA from colon tissues was extracted to evaluate the methylation status by methylation specific PCR.

Results: Our finding showed that exposure to GSM cell phone RF radiation was capable of altering the pattern of ER α gene methylation compared to that of non-exposed controls. Furthermore, no adaptive response phenomenon was induced in the pattern of ER α gene methylation after exposure to the challenging dose of Co-60 γ -rays.

Conclusion: It can be concluded that exposure to RF radiation emitted by GSM mobile phones can lead to epigenetic detrimental changes in ER α promoter methylation pattern.

Keywords: Colon Cancer; DNA Methylation; Microwave; Mobile Phone; Radiofrequency (RF).

[PubMed Disclaimer](#)

Figures

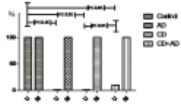


Figure1 Methylation Status in Different Groups

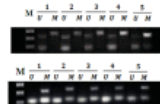


Figure2 Examples of MSP reactions for promoter...

LinkOut - more resources

Full Text Sources

[Europe PubMed Central](#)

[PubMed Central](#)

Research Materials

[NCI CPTC Antibody Characterization Program](#)

Miscellaneous

[NCI CPTAC Assay Portal](#)