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Modulatory effects of Punica granatum L juice against 2115 MHz (3G) radiation-induced reproductive toxicity in male Wistar rat

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Abstract

Advancements in telecommunication sector result in increasing exposure to electromagnetic (EM) radiation, which has been correlated with incidence of male infertility. Therefore, the present study focused on analyzing the consequence of EM radiation (2115 MHz) exposure on the reproductive system of male Wistar rats. Besides, the antioxidant

protective effect of *Punica granatum* juice was also evaluated. For experimental analysis, rats were divided into five groups (control, sham exposed, exposed, herbal plus exposed, and herbal only). Individual group consisted of 6 rats which were exposed to radiation for 45 days (2 h/day). The herbal-treated groups were given 1 ml of *Punica granatum* extract orally. Various parameters such as organ to body ratio, sperm count, motility, viability, and testis histopathology were studied. Furthermore, oxidative stress parameters and free radical generation were analyzed. The exposed group showed changes in sperm parameters along with decrease in seminiferous tubule diameter. On the contrary, herbal-exposed group showed enhanced sperm count, increased motility, and viability in comparison to exposed group. Histopathology studies also revealed the protective role of herbal juice. Significant alteration in oxidative parameters along with an enhanced free radical generation in exposed group and reduction in herbal groups was observed. The results thus indicate that continuous exposure to EM radiation can lead to oxidative stress which induces biochemical changes in rat sperms. However, *Punica granatum* extract has a protective role

against oxidative damage induced by EM radiation.

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Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

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Contributions

RG performed the experimental studies, designing of experiment, data analysis, and manuscript writing; EP drafted the manuscript; and JPN and EP contributed in data analysis and interpretation. RM and PR helped in experimental planning and manuscript finalization.

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Ethics declarations

Ethical approval

Animal studies performed in the study were approved as per Institutional Animal Ethics Committee (IAEC Code No. 15/2013)

Consent to participate

Not applicable

Consent to publish

Not applicable

Competing interest

The authors declare that they have no competing interest

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