



3G and 4G mobile phone radiation effects on brain and sperm cells of Wistar rat

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The ever increasing electromagnetic radiation in the environment emitted from different gadgets particularly, mobile phone communication system which causes a concern among the general public concerning potential health hazards. Acute, sub-chronic and chronic exposure to these radiations may induce various alteration in growth related enzymes, antioxidative enzymes and in DNA. Hence the present investigation is aimed to study the effect of these radiation on various biochemical, biophysical and morphological parameters. Biochemical assays such as catalase, glutathione peroxidase, super oxide dismutase, level of inflammatory cytokines corticosterone and hippocampus dependent memory etc. were performed. DNA strand breaks and morphological alteration in rat exposed to different frequencies of microwave radiation were performed.

Wistar rats (male) were exposed to different duration such as acute (8h) and chronic (2 h/day for 30-45 days) at different frequencies starting from 1800 MHz, 2100 MHz and 2.45 GHz at low power density. Exposure was carried out in a specially designed anechoic chamber. After the exposure rats were sacrificed and whole brain, hippocampus and testis were dissected out and used for various biochemical and morphological assays [1,2].

Significant changes in the level of pro-inflammatory cytokines, hypothalamic pituitary adrenal axis (HPA) activity and oxidative stress in hippocampus of exposed rats. However there is no significant impairment in hippocampus dependent contextual memory. It is noted that the activity of hippocampus showed a significant decline as compared to hypothalamus and the rest of the brain. In additions a significant alteration in anti-oxidative enzymes, such as catalase, glutathione peroxidase, super oxide dismutase, was observed in rats exposed to above mentioned radiation as compared to control groups. It is clear from the present study that prolonged exposure to these radiations may cause significant alteration in different organs of rat, suggesting a transductive coupling to the cytoplasm. These results indicate a possibility that these type of radiations may also affect DNA damage, induce oxidative stress mediated activity in antioxidative system. It is also observed that an alteration in sperm parameters such as sperm count, viability, morphology, membrane integrity in the head and the tail of sperm(fig 1) [3].

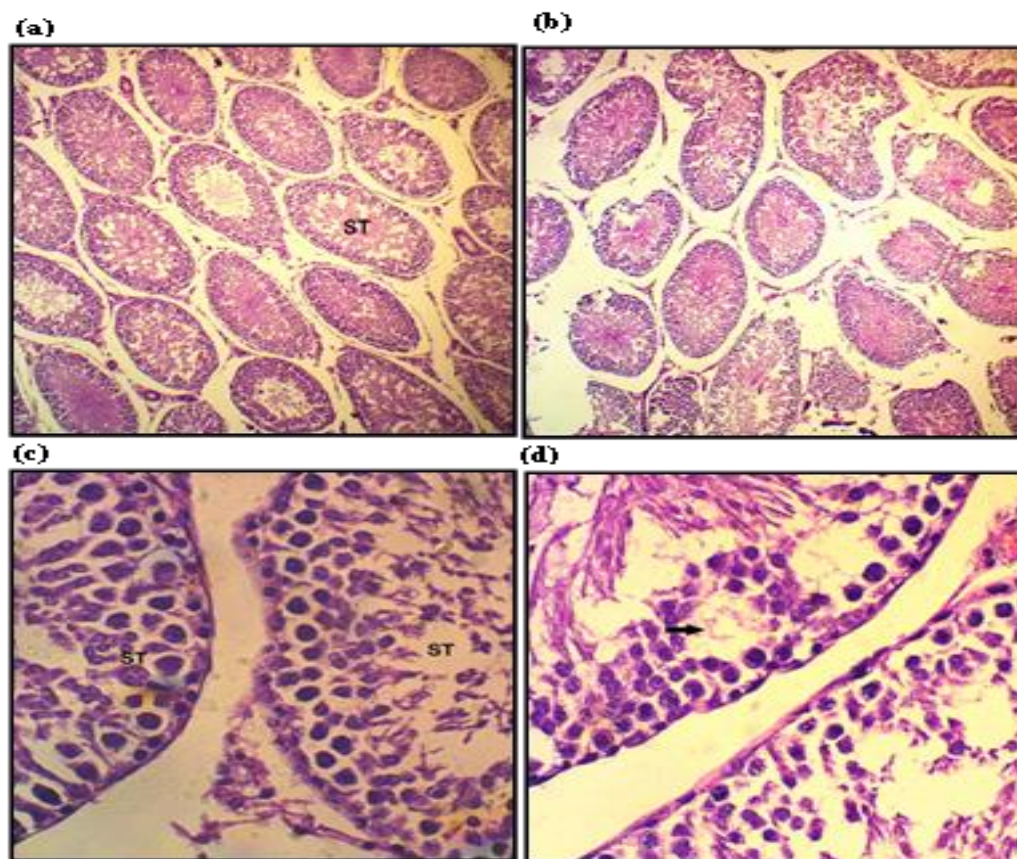


Fig. 1 shows the effect of 2115MHz (3G) radiation on morphology of testis of Wistar rat. Exposed groups (b & d) showing variation in size of seminiferous tubules and reduced number of spermatogenic cells as compared to control (a and c). a & b at 4X, c and d at 40X magnification.

References

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- [3] R. Gautam, VS. Kumari, J. Nirala, N. N. Murmu, R. Meena, R. Paulraj, "Oxidative stress-mediated alterations on sperm parameters in male Wistar rats exposed to 3G mobile phone radiation", *Andrologia*, **51**(3) 2019:e13201.