

## **Cellphone radiofrequency radiation induced inflammatory response and oxidative stress in rat brain**

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The exponential worldwide growth in the use of mobile phones has raised concerns regarding potential harmful effect of exposure to radiofrequency modulated electromagnetic field radiations. Of particular concern has been the effect on brain and hippocampus in specific. Oxidative stress has been proposed as the possible underlying mechanism responsible for radio frequency (RF) effects on nervous system. It has also been known that Stressful events affect the immune system by reducing the cellular response to mitogen stimulation, decreasing production of natural killer cell activity and altering levels of cytokines. An important and detrimental consequence of increased cytokine production is the induction of nitric oxide (NO) and reactive oxygen species. However reports on direct correlation between exposure to RF radiation and immune response has been inconsistent. Thus the present study was undertaken to determine if long term exposure to RF cause inflammatory cytokines mediated oxidative stress in brain.

Study was carried out on twelve adult male Wister rats randomly divided in to two groups, sham exposed (n = 6) and exposed (n =6 ). Animals of exposure group were subjected to cellphone radiation at frequency 1966.1MHz with SAR value of 0.1839W/Kg in a specially designed anechoic chamber for 90 days (2hr/day, 5 days a week). At the end of exposure period animals were sacrificed to collect blood sample and isolate hippocampus. Level of inflammatory cytokines (IL1, IL6, TNF $\alpha$ ), stress hormones (Corticosterone & ACTH) and oxidative stress markers were estimated in the serum and hippocampus respectively.

Long term exposure to cell phone radiofrequency signal resulted in significant increase in level of inflammatory cytokines (IL1, IL6, TNF $\alpha$ ) and stress hormone (CORT, ACTH) in exposed group as compared to sham exposed. A significant increase in level of oxidative stress markers viz. reactive oxygen species (ROS), malonaldehyde (MDA) and protein carbonyl (PCO) and decrease in total antioxidant capacity (TAC) was observed in exposed group. Present study indicate that RF exposure may have acted as a chronic stressor and activated immune response. These blood born cytokines may have crossed the blood brain barrier and induced oxidative stress in brain and activated hypothalamic-pituitary-adrenal (HPA) axis resulting in increased level of corticosterone. Present study shows that long term RF exposure induces immune response as well as a state of oxidative stress in brain which may affect normal functioning if exposed for longer period.