Effect of cell phone radiation on reproductive system and behavior using female albino mice

Hana Abusaida1, Habiba El Jaafari2, Feras Alkayed3, Naema Shibani1, Suliman Shalabi1, Arwa Dali5, Marwa Ayad3, Omima Altaboni3, Suhera Aburawi*3

1 Department of Histology and Medical Genetics, Faculty of Medicine, University of Tripoli. Tripoli, LIBYA.
2 Zoology Department, Science Faculty - University of Tripoli. Tripoli, LIBYA.
3 Department of Pharmacology and Clinical Pharmacy, Faculty of Pharmacy, University of Tripoli. Tripoli, LIBYA.
4 The Libyan Academy / Biology Department. Tripoli, LIBYA
5 Pathology Department, Tripoli Teaching Hospital. Tripoli, LIBYA

Aim of the work is to determine the behavioral effect and the histopathological changes of female reproductive system due to exposure to cell phone radiation using albino mice. Design of the work: Twelve female albino mice were divided into two groups (n=6). One group as control (healthy mice), the second group exposed to cell phone radiation one hour/day for three months. At the end of experiment, behavior scoring using plus maze and force swimming maze was applied for the two groups. Mice were killed by cervical dislocation, and dissected. The ovary and uterus collected and kept in formalin for histological examination. Results and Conclusion: Behavior study using plus maze and forced swimming maze did not show any changes after exposure to cell phone radiation for three months. In histological examination, the control ovary revealed that the ovary was covered by a single layer of simple cuboidal (germinal) epithelium; the ovarian parenchyma formed of cortex and medulla. In the ovarian cortex, the primordial follicles were seen underneath the tunica albuginea. Growing follicles were seen in the ovarian cortex includes primary, secondary and mature Graffian follicles. The secondary follicle formed of large primary oocyte in the center and surrounded by zona pellucida and multilayers of follicular granulosa cells, the cystic spaces within the granulosa cells coalesce and form a large central cavity, the follicular antrum. Mature Graffian follicle was larger follicle, located near the surface. Primary oocyte surrounded by clear zona pellucida and few follicular cells called corona radiata. The whole follicle surrounded by theca interna, and theca externa. The corpus luteum formed of both granulosa and theca lutein cells, which were polyhedral cells containing large spherical nuclei and large amount of vacuolated cytoplasm. Sections of control mouse's uterus revealed that the inner mucosa, or endometrium, consists of surface columnar epithelium and lamina propria (stroma), the lamina propria containing numerous blood vessels and endometrial glands, which are simple or branched tubular glands. Also, the lamina propria consists of loose connective rich with neutrophils, lymphocytes and an abundance of fibers and smooth muscles. The middle muscular layer, or myometrium, is composed of an inner circular and outer longitudinal smooth vessel. The outer layer, the perimetrium is the serosa of the uterus, composed of loose connective tissue with a large number of lymphatic vessels. Cell phone radiation exposure ovary showed normal appearance of germinal epithelium covering the ovary. The ovarian cortex, showed significant reduction in number of primordial and primary follicles were seen underneath the tunica albuginea and absence of oocyte inside the follicle, normal antral and mature Graffian follicles. The secondary follicle shows normal appearance. Mature Graffian follicle was larger follicle, located near the surface. It formed of primary oocyte surrounded by clear zona pellucida and few follicular cells called corona radiata. The whole follicle surrounded by theca interna, and theca externa. Corpus luteum formed of both granulosa and theca lutein cells, which were polyhedral cells containing large spherical nuclei and large amount of vacuolated cytoplasm. Cell phone radiation exposure uterus showed in some areas abnormal histological features of the inner mucosa, or
endometrium, that the lining simple columnar epithelial cells of endometrium and some glands extends to the underlying lamina propria (stroma), glands appears as a focal inactive atrophic gland with hyperchromatic nuclei appeared darkly stained. Also, histopathology observations showed atrophy of the uterine glands that reduces the number of glands in the stroma. The middle muscular layer, or myometrium is composed of an inner circular and outer longitudinal smooth muscle layer; the region in between the two layers of smooth muscle contains large blood vessels. The outer layer, the perimetrium, is the serosa of the uterus, composed of loose connective tissue with large number of lymphatic vessels, where the histological structures of the uterus in the mobile radiation exposed group was different in some endometrial glands to that of the control group. It can conclude that the radiation of the cell phone may produce damage to the reproductive system.

**Keywords:** Female mice, Cell phone radiation, Reproductive system, Plus maze, swimming maze.


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* **Correspondence:** Dr. Suhera Aburawi, Department of Pharmacology and Clinical Pharmacy, Faculty of Pharmacy, University of Tripoli. Tripoli, Libya, maburawi@gmail.com