Research Article Open Acces

: Electromagnetic eld; Mobile; Neurotransmitters; Brain; Radiation

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Natural electromagnetic environment is necessary for life on the earth and, this environment has sharply changed because of introduction of the enormous and rising spectrum of manmade electromagnetic eld (EMF). Radiofrequency electromagnetic radiation (RFR), a form of energy between 10 KHz-300 GHz in the electromagnetic spectrum, is used in wireless communication and emitted from antennae of mobile telephones (handys) and from cellular masts.

Mobile (cellular) telephony is based on two-way radio communication between a portable handset and the nearest base-station. Every base-station serves a cell, varying from hundreds of meters in extent in densely populated areas to kilometers in rural areas, and is connected both to the conventional land-line telephone network and, by tightly focused line-of-sight microwave links, to neighboring stations. As the user of a mobile phone moves from cell to cell, the call is transferred between base-stations without interruption [1]. Nowadays advances in cell phone communication have led people to take advantages of these technological achievements. It is estimated that the cell phone users in the world in 2009 is about 3 billion sets [2]. In nearly a third of the countries, the number of cell phones in use is greater than the number of people living in those countries [3]. Mobile technology has already been widely adopted around the world; its utilization is growing at a rapid rate, not just for interpersonal communication but

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Cairo University, Giza, Egypt, which followed the recommendations o he National Institutes of Health Guide for Care and Use of Laboratory Animals (Publication No.85-23, revised 1985). Six of pregnant female Albino rats were used for conducting the current investigation, one of them presents the control group and the remaining, ve rats were exposed to three mobile (Nokia C6-01, SAR Speci c Absorption Rate 1.00 W/kg, head) phone frequencies (900/1800/2100). e animals were exposed to 15 missed calls per day for pregnant period (21 day). Mobile phone was placed on the 15 cm distance of the cage of rats. e rats were housed in temperature-controlled rooms (25 ± 2°C) with constant humidity (55 ± 5%) and a 12 h/12h light/dark cycle prior to experimental protocols. e room equipped with timer for adjusting the cycle of light. All animals were allowed to drink water ad libitum. e animals were fed a basal diet. e basal diet was formulated according to (A.O.A.C., 2000). A er delivery, 40 of infant rats were obtained; Newborn rats were also subjected to the same condition of exposition to EMF. Brain samples of newborn rats were taken on 1, 7, 14, 21 and 28 days a er delivery.

Rats were killed by decapitation .Brains were removed within 90 seconds of death and were weighed and placed directly in a deep-freezer (−42°C) until further use.

Brain samples were homogenized in 1.5 mL of 0.2 M ice-cold perchloric acid for 2 minutes and centrifuged at 14,000 rpm for 20 min at 4°C. One ml of the supernatant was added to 10 µl of the internal standard, 3, 4 dihydroxybenzyl amine (DBA). e mixture stored in a deep- freezer (−25°C) until further use.

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Monoamine neurotransmitters were determined using HPLC system (1200 series). HPLC system equipped with autosapling injector, solvent degasser, quaternary HP pump and aUV detector was set at 204 nm (Hewlett-Packard, Palo Alto, CA, USA). e mobile phase consisted of (0.025MKH2 PO4 + 0.3 mM heptanes sulfonic acid in water (pH=3) andacetonitrile. e ow rate was 1.0 ml/min. Samples and mobile phases were ltrated through a 0.45 mm Millipore lter, type GV (Millipore, Bedford,MA, USA), prior to HPLC injection. Each sample was analyzed in triplicate.

Data are expressed as mean ± standard deviation (SD) of three replicates. e data were analyzed by analysis of variance (ANOVA) according to the procedures outlined by [10]. Results were processed by Excel (Microso O ce 2007) and SPSS Version 18.0 (SPSS Inc., Chicago, IL, USA).Duncan's multiple range test was used to determine the di erences among samples. Signi cant levels were de ned as probabilities of 0.05 or less.

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I E F (/1)

Brain histamine is implicated in brain homeostasis and control of several neuroendocrine functions. Histamine has an important role in the control of behavioral state, biological rhythms, body weight, energy metabolism, thermoregulation, uid balance, stress and reproduction [11]. Figure 1 illustrates the changes in the levels of histamine for control rats and those treated with EMF. No signi cant ($p \geq 0.05$) changes in the concentration of histamine were shown for the control ratsat di erent ages. Generally the levels of histamine in control rats were lower than those of rats treated with EMF. Signi cant ($p \leq 0.05$) increases in the level of histamine were shown for rats treated with EMF. Histamine level of rats treated with electromagnetic eld EMF for 14, 21 and 28 dayswere about 1.59,2.17 and 5.64 times as high as that in control rats at the same times . Histamine content of rats treated with electromagnetic eld EMF increased signi cantly from 3.6 at the rst day to 31.89 µg/1 g tissues at the end of the experiment.In facial skin samples of electrohypersensitive (EHS) persons,the most common

Citation:

that melatonin is an antioxidant, which scavenges hydroxyl radicals generated in vitro by hydrogen Peroxide exposed to ultraviolet light [26,27]. Figure 4 shows the changes in the levels of melatonin for control rats and rats treated with EMF. Generally the levels of melatonin in control rats were higher than those of rats treated with EMF.

e lowest content (0.62 µg/1 g tissue) of melatonin was observed for the rats which treated with electromagnetic eld EMF for 4 weeks. Melatonin level of rats treated with electromagnetic eld EMF decreased from 1.67 at the rst day to 0.69 µg/1 g tissue at the end of the experiment. ere is some research indicating that low frequency EMF

the concentration of adrenaline were shown for the rats of control group. Adrenaline content of rats treated with electromagnetic eld EMF signi cantly increased from 4.19 at the rst day to5.66 µg/1 g