The potential biological effects of electromagnetic waves (EMWs), have become a great concern in the public. In the present study the biological effects of Digital Cellular System (DCS) 1800-MHz radiation from a common digital mobile phone which has the highest specific absorption rate (SAR) value 1.79 W/kg on the urinary bladders of male wistar albino rats are investigated. The study was performed in five different groups. 1) Control group; 2) Stand-by fetal group (rats exposed to EMW emitted by mobile phone on stand-by mode from embryonic day 14 until parturition); 3) Stand-by group (rats exposed to the same EMW mode as Stand-by fetal group from embryonic day 14 until postnatal day 60); 4) EMW fetal group (rats exposed to EMW emitted by mobile phone on speaking mode from embryonic day 14 until parturition); 5) EMW group (rats exposed to same EMW mode as EMW fetal group from embryonic day 14 until postnatal day 60). The exposure time was 2 hours per day for all groups. All of the animals in experimental groups were sacrificed under ether anesthesia at postnatal day 60. The effects of EMWs exposure were examined in terms of urothelial morphology, barrier function, inflammatory cell infiltration and oxidative damage. The barrier function of urothelium was assessed using zonula occludens 1 (ZO-1) and E-cadherin immunohistochemistry and ruthenium red (RR) staining for transmission electron microscopy. Luminal urothelial morphology was evaluated with scanning electron microscope. EMW group showed desquamation of urothelial cells and degradation of the glycosaminoglycan layer, inflammatory cell infiltration and increased number of total mast cells. Decrease in the immunoreactivity of ZO-1 and E-cadherin were detected in the EMW group. The diffusion of the RR to the intercellular spaces was detected in all EMW exposed groups. Finally increase in the malondialdehyde and decrease in the glutathione levels were observed in all experimental groups comparing to control group. Exposure intensity and time correlate with adverse effects in developing period of urinary bladder. These changes can lead to urinary bladder inflammatory disorders.

**Key Words:** Cell Phone, Electromagnetic Waves, Urinary bladder, ZO-1, e-cadherin

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