

电磁脉冲辐照对小鼠受孕率、胚胎发育和子代的影响

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电磁辐射的危害、尤其对胚胎发育及子代的影响已引起人们的高度关注^[1,2]。本研究对 BALB/C 雌性小鼠或雄性小鼠进行电磁脉冲照射(场强 95.41 kV m^{-1} 、 3×10^6 次和 4×10^6 次脉冲),受照雌鼠或雄鼠与未照的雄鼠或雌鼠于照后 1 天和 2 月分别交配,用胚胎畸形学的方法分别观察各组雌鼠的受孕率、孕鼠所产的胚胎数及其子代性别比等。经 3×10^6 次脉冲的电磁脉冲辐照后的各组,均留一部分孕鼠让其自然分娩,饲养仔鼠,仔鼠成年后采用 Y 型电迷宫法检测子代小鼠的学习记忆能力,同时将仔代小鼠放置于 50°C 金属平面上测量其对热伤害感受的反应潜伏期。经 3×10^6 次辐照后,于照后 1 天合笼的雌性受照组的受孕率明显低于对照组,经 4×10^6 次辐照后,照后 1 天合笼雌性受照组产生的死胎率明显高于对照组,而在照后 2 月合笼,雌性受照组和雄性受照组产生的吸收胎率则明显高于对照组 ($p<0.05$)。其它各检测指标则无明显差异。亲代中任一方受辐照后的子代会走 Y 型电迷宫的所需的学习次数,明显比对照组增加。雌性受照组的子代的第一潜伏期,明显比对照组延长($p<0.05$),其它指标则无差异性。

本研究发现电磁脉冲对小鼠的生殖系统造成一定程度的损伤,引起受照雌性小鼠受孕率降低,死胎率、吸收胎率有所增加,并且导致其子代的学习能力有所下降,但是对小鼠伤害感受无显著影响,其损伤机理有待于进一步探讨。

关键词 电磁脉冲,小鼠,子代,胚胎

中图分类号 R818.2

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Effects of ultra-wide-band electromagnetic radiation on the fertility, and embryos and the filial generation in mice

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The work is to investigate the effects of electromagnetic pulses (EMP) irradiation on the procreative system and to provide references for protecting EMP irradiation. BALB/C female or male mice were exposed to EMP radiation (95.41 kV m^{-1} field intensity, 3×10^6 and 4×10^6 pulses). Using the method of embryos teratology, BALB/C female mice were examined to pregnancy rate, the numbers of embryos and gender ratio after the exposed female or male mice mated with the shamed male or female respectively at the 1 day and 2 month. For part of the EMP 3×10^6 pulses exposed group, the birth filial generation and learning ability of filial generation was tested with Y type electricity labyrinth, and when the filial grew up, their reaction latency for thermal nociception was tested on a 50°C surface. In comparison to the sham control, pregnancy rate decreased with the female group exposed to 3×10^6 pulses EMP radiation and mated 1d after the exposure, and fetal deaths rate increased with the

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4×10^6 pulses EMP irradiation and 1d mated group, resorption embryos rate increased ($p < 0.05$) with the exposed and 2 month mated male or female whereas, the other indexes didn't change. Learning times of the filial generation whose either parent had been exposed increased distinctly with the control. The first latency on filial generation of the exposed female prolonged comparing to the control, but no significant differences were found in the other indexes. These results suggest that the EMP irradiation can induce some degree of injury on procreative system of mice, causing decreased pregnancy rate, increased fetal death rate and resorption embryos rate, and decreased learning ability of the filial generation. However, there were no evidence for effects of the EMP exposure on nociception of the filial generation. Further investigations are necessary to elucidate mechanisms of the EMP irradiation.

KEYWORDS Electromagnetic pulses (EMP), Mouse, Filial generation, Embryos

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