



Histopathological examination of the Purkinje cells in the cerebellum of newborn rats following prenatal exposure to 900 MHz electromagnetic field

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ABSTRACT

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Electromagnetic fields (EMF) inhibit the formation and differentiation of neural stem cells during embryonic development. There are several studies which have indicated that EMF emitted by mobile phones could affect body tissue, systems and their physiologic activities. Besides, studies are especially focused on the central nervous system (CNS) since the mobile phone is used in close vicinity to the brain. In this study, we investigated the effect of EMF on the cerebellum since it is known that the cerebellum has substantial connections with the brain cells that point a cognitive role of cerebellum, beside of the control of muscle movement, equilibrium and posture of body. For that reason, we aimed to study the effect of prenatal exposure to 900 MHz EMF on the Purkinje cells in the cerebellum of the 4-week old rats. Male and female Wistar albino rats weighing between 250-280g were used in this study. They were mated overnight and after two days, when a vaginal plug was found, the female rats were accepted as pregnant and the day was designated as gestational day (GD) 1. Pregnant rats were randomly divided into two groups (three pregnant rats each group), the control (Cont) and electromagnetic field (EMF) groups. The Cont group pregnant rats were kept under the standard laboratory conditions. The EMF group was exposed to an EMF of 900 MHz for 60 min/day from the first to the last day of the gestation period. After delivery, totally 11 pups were randomly selected for study, without regarding their sex. They were divided into the Cont group (n=5), and the EMF group (n=6). At the end of 4 weeks, offspring were anesthetized with urethane. Then, cerebellums were histologically processed and paraffin sections of the cerebellum were evaluated under the light microscope. In the offspring of the EMF group, Purkinje cells were degenerated appearance with nuclear swelling and irregular boundaries of the nuclei. Also some Purkinje cells had pycnotic nuclei and dark cytoplasm suggesting cell death in this group. In some areas of the Purkinje layer empty lines were detected in EMF group which occurred due to the dead cells. According to the results we found that prenatal exposure to 900 MHz EMF could not only cause to a decrease of the Purkinje cell number but also destroy the structure of it's in the newborn rat cerebellum.

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