

基础研究

持续高剂量电磁辐射对小鼠外周血免疫细胞数量影响的长期效应

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摘要:

目的:观察慢性持续高剂量电磁辐射照射后小鼠外周血免疫细胞数量及比例变化,探讨慢性持续高剂量电磁辐射对小鼠免疫系统的影响。方法:采用随机、平行对照分组法,将30只雄性Balb/c小鼠平均分为正常对照组、10 mW·cm⁻²辐照组及环磷酰胺给药组,每组10只。辐照组动物予以30 min·d⁻¹、每周辐照5 d,持续4周;给药组在辐照组开始辐照时给药,每次每只30 mg·kg⁻¹,共7次;各组小鼠于辐照结束后30、45、60、75、90、105和120 d分别采集尾静脉血,应用流式细胞术检测外周血中CD4+ T细胞、CD8+T细胞、CD4+/CD8+比率、CD49+NK细胞数量及比例的变化。结果:经持续高剂量电磁辐射后,小鼠的外周血白细胞数量显著上升,CD4+T细胞数量于辐照后75 d开始明显升高,辐照后90 d开始下降但仍高于正常组(P<0.05),观察周期结束时,CD4+T细胞数量下降到与正常组相同(120 d);CD8+T细胞数量于辐照后75 d明显降低,直到观察周期结束时(120 d),T细胞的数量恢复至与正常组的T细胞数量相同;CD4+/CD8+比率在持续高剂量电磁辐射诱导下呈上升趋势,并且明显高于正常对照组(P<0.05);CD49+NK细胞数量在辐射后明显低于正常对照组(P<0.05)。结论:慢性、持续性大剂量电磁辐射可导致小鼠免疫系统的紊乱,通过检测外周血中CD4+T细胞、CD8+T细胞、CD4+/CD8+T细胞、CD49+NK细胞数量及比例的变化,可了解辐照后机体的免疫状态。

关键词: 电磁辐射;免疫细胞;小鼠 近交BALB / C

Long-term effects of lasting and high-dose electromagnetic radiation on peripheral blood immune cells in mice

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Abstract:

Abstract:Objective

To study the long-term effects of lasting and high-dose electromagnetic radiation on number and percent of peripheral immune cells in mice and explore the influence of the lasting and high-dose electromagnetic radiation in murine immune system.Methods Thirty BALB/c mice were randomly divided into control group,CTX group and irradiation group.The mice in irradiation group were exposed to electromagnetic radiation at the power density of 10 mW·cm⁻²,30 min a day,for 5 consecutive days every week,lasting for 4 weeks.The mice in CTX group were fed with CTX with the concentration of 30 mg·kg⁻¹,for seven times.The number and percents of CD4+T cells,CD8+T cells,CD4+/CD8+,CD49+ NK cells in peripheral blood cells were detected 30,45,60,75,90,105 and 120 d after electromagnetic radiation.Results After high-dose electromagnetic radiation,the number of WBC was increased obviously (P<0.05).The number of CD4+ T cells was increased on the 75th day (P<0.05) and began to decrease on the 90th day,while the number was much more than that in control group (0 mW·cm⁻²).Until the 120th day,the number of T cells was as the same as the control.After the long-term effect of lasting and high-dose electromagnetic radiation,the number of CD8+T cells was decreased,and from the 90th day to the 120th day the number of T cells became normal (P<0.05).The ratio of CD4+/CD8+ and the number of CD49+ NK cells were lower than those in control group after irradiation (P<0.05).

Conclusion Chronic,persistent large doses of electromagnetic radiation can lead to immune system disorders,through detecting the changes in the number of peripheral blood CD4+ T cells,CD8+ T cells,CD49+ NK cells and the proportion of CD4+/CD8+,the immune status of mice after irradiation can be found.

Keywords: electromagnetic radiation;immune cells;mice,inbred BALBC

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