

## 基础研究

### 电离辐射对小鼠免疫器官不同亚群T淋巴细胞调节因子的影响

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#### 摘要:

目的: 通过观察电离辐射作用后Th1、Th2、Th3/Tr1标志性细胞因子 $\gamma$ 干扰素(IFN- $\gamma$ )、白细胞介素10(IL-10)、转化生长因子 $\beta$ (TGF- $\beta$ )分泌量的变化, 探讨其细胞平衡与辐射剂量之间的关系。方法: 采用ELISA方法检测不同剂量(低剂量组为0.075、0.100和0.200 Gy, 高剂量组为1.000、2.000、4.000和6.000 Gy, 同时设立假照组), X射线全身照射小鼠16 h后, 脾脏和胸腺中IFN- $\gamma$ (Th1型细胞因子)、IL-10(Th2型细胞因子)、TGF- $\beta$ (Th3/Tr1型细胞因子)分泌量的变化。结果: 在低剂量辐射(0.075~0.200 Gy)照射后, 脾细胞分泌IFN- $\gamma$ 、TGF- $\beta$ 与假照组比较有所下降, 但差异无统计学意义( $P>0.05$ ), 而IL-10分泌量明显低于假照组( $P<0.05$ ); 在高剂量辐射(2.000~6.000 Gy)照射后, 脾细胞分泌IFN- $\gamma$ 、IL-10、TGF- $\beta$ 与假照组比较明显增多( $P<0.05$ 或 $P<0.01$ )。胸腺细胞分泌变化与脾细胞不同, IFN- $\gamma$ 、IL-10分泌量在低剂量和高剂量辐射照射后均上调( $P<0.05$ 或 $P<0.01$ ); 而TGF- $\beta$ 分泌量在低剂量辐射照射后明显低于假照组( $P<0.01$ ), 在高剂量辐射照射后明显高于假照组( $P<0.01$ )。结论: 高、低剂量辐射可影响小鼠免疫器官Th3/Tr1型细胞调节因子TGF- $\beta$ 的分泌, 在辐射诱导不同免疫效应中起关键作用。

#### 关键词:

### Effects of ionizing radiation on regulatory factors in different subsets of T lymphocytes of immune organs in mice

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#### Abstract:

##### Abstract: Objective

To observe the changes of Th1, Th2 and Th3/Tr1 cytokines IFN- $\gamma$ , IL-10 and TGF- $\beta$  after treated with ionizing radiation, and explore the relationship between cell balance and radiation dose. Methods After whole-body irradiation with various doses (low dose: 0, 0.075, 0.100, 0.200 Gy; high dose: 0, 1.000, 2.000, 4.000, 6.000 Gy) for 16 h, ELISA was used to detect the contents of IFN- $\gamma$  (Th1-type cytokine), and IL-10 (Th2 type cytokine), TGF- $\beta$ 1 (Th3/Tr1 type cytokine) in spleen and thymus. Results Compared with sham irradiation control group, the IFN- $\gamma$  and TGF- $\beta$  levels in spleen cells were decreased after low-dose radiation (0.075-0.200 Gy), but there was no statistically significant difference ( $P>0.05$ ); however the IL-10 secretion was significantly lower than that in sham irradiation group ( $P<0.01$ ,  $P<0.05$ ). After high-dose radiation (2.000-6.000 Gy), the IFN- $\gamma$ , IL-10, and TGF- $\beta$  levels in spleen cells were higher than those in sham irradiation group ( $P<0.01$ ,  $P<0.05$ ). The IFN- $\gamma$  and IL-10 after low- or high-dose radiation expressed more than sham irradiation group ( $P<0.01$ ,  $P<0.05$ ). But the TGF- $\beta$  level was lower than that in sham irradiation group after radiation at low doses ( $P<0.01$ ), and it was significantly higher than that in sham irradiation group after exposed to high-dose radiation ( $P<0.01$ ). Conclusion High and low-dose radiation may influence the secretion of Th3/Tr1 type cells regulatory factor TGF- $\beta$  of mouse immune organs and play a key role in different immune response effects induced by different doses of radiation.

Keywords: ionizing radiation; T cells subsets; interferon- $\gamma$ ; interleukin-10; transforming growth factor- $\beta$

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