

3 - 94 Effect of Heavy Ion Beam Irradiation on Interleukin-2 Level in Serum of Golden Hamster with Cheek Pouch Carcinoma

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Immune system acts an important role in the genesis and development of many human carcinomas, so patients with malignant tumor are obviously accompanied with immune dysfunctions. A number of studies have demonstrated that interleukin-2 (IL-2) and its receptor system are in the hinge position of the immune network on anti-tumor effects. IL-2 can enhance the activities of CTLs, NK cells, LAK cells and macrophages through inducing the production of other cytokines and the expression of cytokine receptors in T-cell activation.

The aim of the study was to investigate the relationship between the serum levels of IL-2 and radiation doses in serum of golden hamster with cheek pouch carcinoma after irradiation by heavy ion beams. The golden hamsters with cheek pouch carcinoma were exposed to different doses of carbon ion beams. The serum levels of IL-2 were detected using enzyme-linked immunosorbant assay in 40 hamsters bearing cheek pouch carcinoma before and after exposure to heavy ion irradiation, with 8 normal animals as control. The results of experiment are shown as follow.

Serum IL-2 level was 0.16 ± 0.01 in the tumor-bearing hamsters before the irradiation, lower than that in the control group. After heavy ion beams irradiation at 4, 6, 8, and 12 Gy, serum IL-2 level in the tumor-bearing hamsters were 0.18 ± 0.04 , 0.22 ± 0.05 , 0.15 ± 0.03 , and 0.13 ± 0.04 , respectively, showing a peak level after irradiation at 6 Gy and an obvious decrease after irradiation by greater doses.

Table 1 Changes in serum IL-2 levels in the groups (Mean \pm SD, $n=8$)

Groups	Dose (Gy)	D ₄₅₀
Control group	0	0.25 ± 0.06
Cancer group	0	$0.16 \pm 0.01^*$
Radiation group	4	$0.18 \pm 0.04^*$
	6	$0.22 \pm 0.05^{**}$
	8	$0.15 \pm 0.03^*$
	12	$0.13 \pm 0.04^*$

* $P < 0.05$ vs control group, ** $P < 0.05$ vs cancer group.

The result of the experiments showed that low-dose irradiation by heavy-ion can activate the interleukin-2 level in serum of golden hamster with cheek pouch carcinoma, whereas high dose can inhibit this response obviously and cause irreversible damage. Therefore, the abnormal expression of IL-2 may be involved in the genesis and development of oral squamous Cell Carcinoma, and it might be an accessory diagnostic marker in prediction of the prognosis. The result also indicated IL-2 can be served as a secondary indicator for efficacy evaluation the biological effects of radiation therapy by heavy-ion irradiation.

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