

3 - 98 Oxidative Stress Effect and Damage of $^{12}\text{C}^{6+}$ Ion Irradiation on Zebrafish Eyes

Zhou Rong and Zhang Hong

High levels of free radicals (such as $\cdot\text{OH}$ and $\cdot\text{H}$) are produced when organisms are exposed to ionizing irradiation^[1]. Superoxide dismutase (SOD), which exists in cornea, retina and lens, is one of the most important antioxidant enzymes in eyes. The increase of oxidative stress was accompanied by increased SOD activity and the increase of oxidative damage was accompanied by increased malondialdehyde (MDA) content^[2]. Adult zebrafish (*Danio rerio*) was divided into control group and three irradiation groups (5, 10 and 15 Gy groups). The levels of MDA and the activities of SOD were assayed using diagnostic reagent kits.

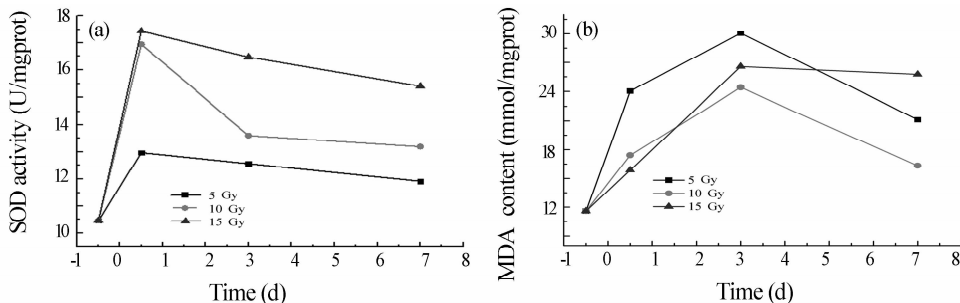


Fig. 1 Radiation-induced changes in the activities of SOD (a) and the content of MDA (b) in zebrafish eyes.

The results show that the activities of SOD maximize at 12 hours after irradiation (Fig. 1 (a)), indicating that significant oxidative stress in zebrafish eyes was induced by ion irradiation. The radiation-induced oxidative stress increased with radiation dose. The contents of MDA maximize at 3 d after irradiation when the activities of SOD had decreased (Fig. 1). The significant increase of MDA content indicated that ion radiation induced serious oxidative damage in zebrafish eyes. The increase of oxidative damage was accompanied by the decrease of oxidative stress. The content of MDA significantly decreased at 7 d after irradiation for 5 and 10 Gy but not for 15 Gy, indicating that the oxidative damage induced by high dose (15 Gy) ion irradiation needed more time to repair.

References

- [1] P. A. Riley, International Journal of Radiation Biology, 65(2005)27.
- [2] D. W. Xiong, T. Fang, X. D. Chen, et al., Environment Science, 31(2010)1320.