

### 3 - 95 Effects of $^{12}\text{C}^{6+}$ Ion Beams Irradiation on Endothelial Dependent Relaxation in Isolated Rat Aortic Rings

Wang Zhenhua, Gan Lu, Zhang Hong and Liu Yang

Heavy ion beam has many characteristics which is expected to be the most suitable radiation therapy techniques for malignant tumor, and it is lack of depth-understanding on the potential adverse reactions caused by using this technique, because heavy ion radiotherapy is applied to clinical for a short time. Studies have shown that conventional radiation therapy induced vascular injury plays a pivotal role in radiation-induced normal tissue lesions, but there were no research report on heavy ion beam irradiation-induced vascular injury.

The isolated aortic rings of rats were irradiated by  $^{12}\text{C}^{6+}$  ion beam (300 MeV/u, 0.5 Gy/min), delivered by HIRF facility in Lanzhou, to investigate the effects of  $^{12}\text{C}^{6+}$  ion beam irradiation on aortic rings with endothelium dependent diastolic function, and use NBT reduction method for assaying the vascular ring formation of superoxide anion( $\text{O}_2^{\cdot-}$ ) level, then adding exogenous superoxide dismutase (SOD) intervention on  $\text{O}_2^{\cdot-}$  to investigate superoxide anion in endothelial function injury in rats. The results showed that, vascular endothelial dependent vasodilation dose-dependently impaired significantly ( $P < 0.01$  vs control group) irradiated with 2.0, 4.0 and 6.0 Gy  $^{12}\text{C}^{6+}$  ion beam and the NBT reduction of vascular rings were increased ( $P < 0.05$  at 4.0 Gy,  $P < 0.01$  at 6.0 Gy vs control group). Adding exogenous SOD before irradiation could inhibit the NBT reduction increase significantly ( $P < 0.01$ ), and also had protective effect on vascular endothelium dependent diastolic function ( $P < 0.01$ ), but 10 min after irradiation with exogenous SOD, its protective function significantly less than before. Conclusion:  $^{12}\text{C}^{6+}$  ion beam irradiation could cause endothelial function impaired,  $\text{O}_2^{\cdot-}$  scavenger SOD has a protective effect on endothelial dysfunction, it illustrated that  $\text{O}_2^{\cdot-}$  mediates endothelial injury induced by irradiation.