

3 - 60 Impact Effect of Carbon Ion Irradiation on Mice Brain Mitochondrial Respiration*

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Mitochondria supply the central nervous system with energy (ATP). Mitochondrial dysfunction has been suggested to play a pivotal role in neurodegenerative disorders. Our previous work has shown that 4 Gy carbon ion radiation could increased injury in mice brain, and the irradiation increased the level of mitochondrial ROS. Here, we investigated the injury of $^{12}\text{C}^{6+}$ radiation on mitochondrial respiration.

The male Kunming mice were divided into 2 groups: control and 4 Gy $^{12}\text{C}^{6+}$ irradiation group. 24 h after the irradiation, the mice were decapitated and the brains rapidly removed. The mitochondrial isolation protocol and all procedures were performed on ice^[1]. The tissue cores were homogenized and mitochondria isolated by differential centrifugation. The homogenate was centrifuged twice at 1 300 g. The resulting supernatant was diluted with isolation buffer containing EGTA and centrifuged at 13 000 g for 10 min. The resulting pellet was resuspended in 500 μL of isolation buffer with EGTA. After rupturing the synaptosomes, the samples were maintained in the isolation buffer containing EGTA, and centrifuged at 13,000 g for 10 min. The pellet was resuspended in isolation buffer without EGTA and centrifuged at 10 000 g for 10 min. The final mitochondrial pellet was resuspended in

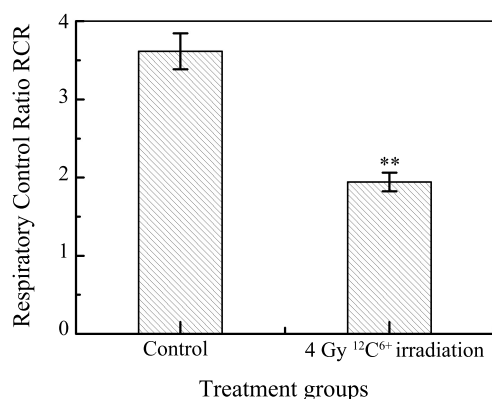


Fig. 1 (color online) The Effect of irradiation on mitochondrial respiration rate of mice brain.

isolation buffer without EGTA to yield a concentration of 20 mg/mL or higher. Mitochondrial functionality was assessed using an Oxytherm Clark-type oxygen electrode. Respiratory control ratio (RCR) was determined by dividing the rate of oxygen utilization for state III (ADP) by state IV (oligomycin).

In order to determine the impact of radiation on the mitochondrial respiratory function, we compared the changes of mitochondrial respiration rate. Our data has shown that after the $^{12}\text{C}^{6+}$ irradiation, the brain mitochondrial RCR reduced compared with control group $**P < 0.01$ (as shown in Fig. 1).

Reference

- [1] K. G. Lesley, N. R. Kelly, J. Kelly, et al., J. Neurotraum, 26(2009)1271.

* Foundation item: Key Program of National Natural Science Foundation of China (U1432248), National Natural Science Foundation of China (11175222, 11205219)