

3 - 88 Effect of N-Acetylcysteine on ¹²C⁶⁺ Ion Irradiation-induced Immune System Changes in Mice

Xie Yi and Zhang Hong

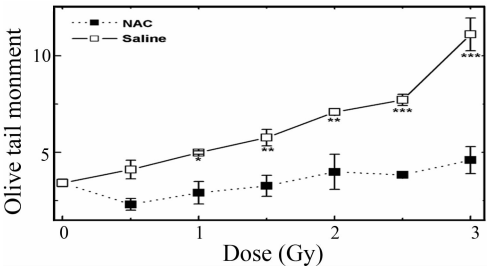


Fig.1 The damage of DNA assessed of splenic lymphocytes in mice administration of NAC and saline at 0, 0.5, 1, 1.5, 2, 2.5, 3 Gy of carbon-ion irradiation (* $p<0.05$, * * $p<0.01$, * * * $p<0.001$ vs controls).

Thiols are a kind of important molecules to control apoptosis^[1,2]. Here we evaluate the effects of different doses of ¹²C⁶⁺ ion irradiation and administration modes of N-acetylcysteine (NAC) against carbon ion irradiation in mice^[3]. In our study, the results showed lymphocyte DNA damage increased with doses (Fig. 1), which caused IFN- γ level (≥ 3 Gy), number of thymocyte G₀/G₁ and immunocyte apoptosis increases and the alteration of SOD activity level. However, no significant changes are showed in NAC-treated group. These indicated whole-body ¹²C⁶⁺ ion irradiation could induce lymphocyte DNA double-strand breaks (DSBs); Pre-treatment with NAC could significantly reduce the acute immunity radiation damages; and the increase of IFN- γ (≥ 3 Gy) in serum were concomitant of DSBs enhancement in vivo.

References

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3 - 89 Curcumin Treatment Alleviates Irradiation Damage in Mouse Testis Induced by ¹²C⁶⁺ Ions

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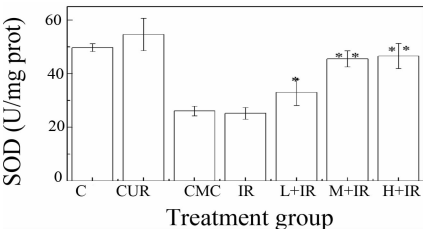


Fig.1 Effect of CUR on the superoxide dismutase level in mouse testis. * $P<0.05$ and * * $P<0.01$ vs IR group.

Curcumin (5-hydroxy-1,7-bis(4-hydroxy-3-methoxyphenyl)-1,4,6-heptatrien-3-one, CUR), the major component extracts from the rhizomes of turmeric^[1]. This compound has been reported to possess antioxidant, anti-inflammatory, antimicrobial and anticancer properties, and thus has a potential protective effect against various malignant disease^[2]. Ionizing radiation instantaneously causes the formation of water radiolysis products that contain some reactive oxygen species (ROS)^[3]. And the level of ROS is very important to organism. In this paper, 42 male Kun-Ming mice were divided into 7 groups: Control group, CUR group, carboxymethylcellulose sodium+irradiated group, irradiated group, CUR+irradiated group. Mice were irradiated by ¹²C⁶⁺ ions with dose of

4 Gy, respectively. Superoxide dismutase (SOD) was measured. The result indicated that CUR could protect normal tissues from heavy ion radiotherapy in some extent via activation of the antioxidant enzymes.

Note: Control group: C, CUR group: CUR, Carboxymethylcellulose sodium+irradiated group: CMC, Irradiated group: IR, Low CUR+irradiated group: L+IR, Middle CUR+irradiated group: M+IR, High CUR+irradiated group: H+IR.

References

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3 - 90 Astragaloside IV Modulates Acute Lung Damage Induced by Carbon Ions In Mice

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Astragaloside IV (ASI), a saponin-like compound, one of the major important secondary metabolites isolated from *Astragalus Membranaceus*, has been shown has many biological properties, such as antioxidant, antiaging, antiviral, inhibiting intracellular calcium overload and reducing the cardiac ischemia reperfusion injury in rat model by scavenging free radical species.

To estimate the potential radioprotective ability of ASI against radiation-induced acute lung damages in mice and provide experimental evidence for cancer radiotherapy in the chest. The Kun-Ming mice were randomly divided into four groups: normal control group (did not receive any treatment, CK), irradiation only group (exposed to carbon ion beams at the dosage of 4.0 Gy, R), ASI-treated group (injected with 50 mg/kg of ASI intraperitoneally for 7 d, ASI) and irradiation + ASI-treated group (exposed to $^{12}\text{C}^{6+}$ beams at 4.0 Gy 1 h after i. p. administration with 50 mg/kg of ASI for 7 d, ASI+R). The histopathological changes of mice lung were examined by HE staining and the expression of transforming growth factor- β (TGF- β) and tumor necrosis TNF- α (TNF- α) in lung tissues was evaluated by enzyme-linked immunosorbent assay (ELISA) at 21 d after irradiation. Furthermore, the lung index and concentration of hydroxyproline (HYP) in lung tissues of mice were measured also. The results showed that compared with irradiated control group, the lung index and concentration of hydroxyproline (HYP) displayed a significant decrease ($P < 0.05$), the expression of TGF- β and TNF- α down-regulated dramatically ($P < 0.05$) in mice lung tissues in ASI-pretreated group. Moreover, the histopathological images indicated that severity of lung injury significantly decreased in combine group also compared to the irradiation only group. All these results suggested that ASI has radioprotective effects against irradiation induced lung injury, its underlying protective mechanisms needs to be further studied.

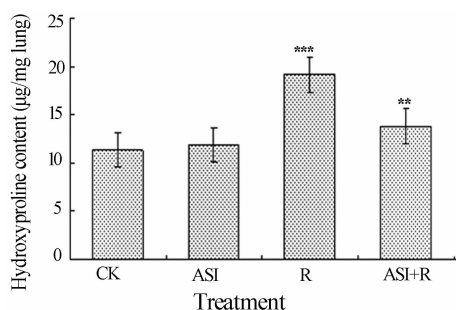


Fig.1 The effects of ASI on the concentration of HYP in mice lung tissues irradiated with $^{12}\text{C}^{6+}$ ions. * * $P < 0.05$ vs R group, * * * $P < 0.01$ vs CK group.

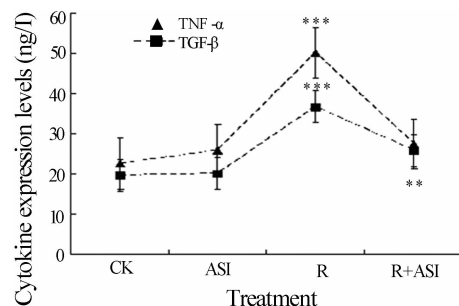


Fig.2 The effects of ASI on the expression levels of cytokine in mice lung tissues irradiated with $^{12}\text{C}^{6+}$ ions. * * $P < 0.05$ vs R group, * * * $P < 0.01$ vs CK group.

References

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