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IRF3 is Essential in Acute Lung Injury Induced by Paraquat

Na Wang and Min Zhao
Shengjing Hospital of China Medical University

OBJECTIVE: The aim was to investigate that IRF3 was required for acute lung injury induced by paraquat (PQ).

METHOD: Wild type C57BL/6J mice were randomly distributed into two groups: PQ group (n=24) and Control group (n=24). PQ group was given an intraperitoneal injection with PQ at a dose of 30 mg/kg. And control group was given an intraperitoneal injection with an isovolumetric saline. At 2h, 12h, 24h and 48 h after PQ injection, six mice were taken from each group for the following tests including pathological scores of lung injury, lung wet-to-dry (W/D) weight ratios, HE staining, RT-PCR, immunohistochemistry, Western blot. The data were expressed as the mean ± SD. Differences were considered to be statistically significant when $P<0.05$.

RESULT: Histopathological changes occurred early in 2 hours after PQ exposure. The typical histological lesions mainly included alveolar hemorrhage, alveolar wall thickening, interstitial edema, cellular infiltration, and even structural collapse. The lung injury scores and lung wet-to-dry (W/D) weight ratios of PQ group were significantly higher than the control group. The level of IRF3 mRNA increased significantly in PQ group at 24h and 48h, compared with the control group. IRF3 was found mainly in the cytoplasm in lung of the control group. IRF3 was translocated to the nucleus from cytoplasm after PQ exposure. The level of total IRF3 in lung tissue of the two groups were not significantly different. However, the phosphorylated IRF3 was increased significantly in PQ group compared with the control group.

CONCLUSION: The phosphorylation of IRF3 was essential in acute lung injury induced by PQ. IRF3 would be a therapeutic target for PQ poisoning in the future.