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## The expression and significance of Pink-1 in paraquat poisoned rat kidney

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**Objective:** To explore the protein expression level of Pink-1 in rat kidney induced by paraquat (PQ) poisoning and its significance.

**Methods:** We established a PQ poisoning rat model by administration of 1% PQ solution at a dose of 20 mg/kg through intraperitoneal injection. 35 SD mice were randomly divided into 7 groups: normal control (NC) group, PQ exposure 3h group, PQ exposure 6h group, PQ exposure 9h group, PQ exposure 12h group, PQ exposure 24h group, PQ exposure 48h group. There were 5 mice in each group. We observed the rats' behaviours in the NC and PQ poisoning groups. Fresh kidney tissues obtained from rats at a specified time after PQ exposure and were harvested and frozen. We observed the histochemical changes under microscope by H&E staining. Pink-1 expression was assessed with immune-histochemistry. The protein expression level of Pink-1 in rats kidney tissues was examined by western blotting method.

**Results:** No obvious abnormality was found in NC group rats. The mice in the 6 poisoning groups showed restlessness or reduction of activity, slow locomotion, shortness of breath, and increased lip secretion. The abnormal activity gradually became more obvious with increasing time from poisoning. Kidney tissue structure in the NC group was normal, glomerular distribution was dense without hyperemia, edema, vacuolar degeneration and inflammatory cell infiltration. In the PQ poisoning group, the structural clarity was decreased. The renal tubular epithelial cells were swollen. Protein exudates were observed in the lumen with interstitial inflammation and infiltration. Hyperemia, edema and other pathological changes were observed in kidney tissue of PQ 3h group, and became more pronounced in the later timepoints. Low expression of Pink-1 level was observed in renal tubular epithelial cells from the NC group. After PQ poisoning, we observed increased expression of Pink-1 protein in the cytoplasm of renal tubular epithelial cells and presence of staining in the nucleus in some cells. Image pro plus software was used to measure the mean OD of photomicrographs. Pink-1 protein expression level was significantly higher in the 9h, 12h, 24h, 48h PQ poisoning groups ($P<0.01$) than in the NC group by immune-histochemistry. Image J software was used to measure the band density in the Western blots. The outcome was expressed as a ratio of band density to internal band density. There was a significant difference in the expression of Pink-1 between the NC group and 9h, 12h, 24h, and 48h PQ exposure groups ($P < 0.05$) by western blotting, and the Pink-1 protein expression level in the PQ 12 h group was significantly higher than that in the NC group ($P < 0.01$).

**Conclusion:** Pink-1 is found in the respiratory chain complex I- IV. The expression and synthesis of mitochondrial DNA is decreased significantly in dopaminergic neurons lacking PINK-1. PINK-1 expression will affect the production of ATP. From our study, Pink-1 might be involved in the pathogenesis of PQ poisoning. It is of great importance to explore the role and mechanism of Pink-1 in potentially protecting renal function in paraquat poisoning. It will be useful to describe this Pink-1 pathway in greater detail.