

Nrf2 attenuates methamphetamine-induced myocardial injury by regulating oxidative stress and apoptosis in mice

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Abstract

Objectives: We aimed to clarify the effects of methamphetamine (MA) on myocardial injury, oxidative stress, and apoptosis in myocardial cells and to explore the potential mechanism of nuclear factor-erythroid factor 2-related factor 2 (Nrf2) in MA-induced oxidative stress and apoptosis. **Methods:** An acute mice cardiac toxicity model of MA was established by intraperitoneal injection of MA (2 mg/kg) for 5 days. Nrf2 activation (by sulforaphane (SFN)) and Nrf2 gene knockout were performed to explore the regulatory effects of Nrf2 on cardiac toxicity. **Results:** The protein expression levels of Nrf2 and HO-1 were increased, suggesting that MA activated the Nrf2/HO-1 pathway. In the MA group, cardiac troponin I (cTnI) protein expression increased. Malondialdehyde (MDA) content increased, superoxide dismutase (SOD) activity decreased. Protein expression levels of Caspase-3 and Bax increased, and protein expression levels of Bcl-2 decreased. These changes were reversed by activation of Nrf2 but became more pronounced after Nrf2 knockout, suggesting that the activation and knockout of Nrf2 attenuated and aggravated MA-induced myocardial injury, oxidative stress and apoptosis in myocardial cells, respectively. **Conclusions:** MA administration induced myocardial injury, oxidative stress, and apoptosis in mice. Nrf2 attenuated MA-induced myocardial injury by regulating oxidative stress and apoptosis, thus playing a protective role.

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