

Tetramethylpyrazine attenuates adriamycin-induced apoptotic injury in rat renal tubular cells NRK-52E

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摘要

Abstract

Tetramethylpyrazine (TMP), a compound purified from *Rhizoma Ligustici*, is a widely used active ingredient in Chinese herbal medicine to treat cardiovascular diseases on account of its vasodilatory actions and antiplatelet activity. Studies have shown that TMP can remove oxygen free radicals and protect rat kidney from ischemia-reperfusion injury. In addition, adriamycin-induced nephrosis in rats is commonly used in pharmacological studies of human chronic renal diseases. Apoptosis of renal tubular cells has been reported in adriamycin-treated rats. To examine the therapeutic potential of TMP on chronic progressive renal diseases, adriamycin-induced injury in rat renal tubular cells NRK-52E has been used to monitor its protective effect. In TUNEL staining, TMP showed a dose-dependent protective effect against adriamycin-induced apoptosis in NRK-52E cells. Pretreatment of the cells with 10 or 100 microM of TMP effectively decreased the reactive oxygen species (ROS) formation induced by adriamycin, as measured in fluorescent assays. TMP was found to reduce the adriamycin-stimulated activities of caspase-3, caspase-8 and caspase-9, inhibit adriamycin-induced release of cytochrome C, and elevate the expression of Bcl-x (L). TMP was also able to inhibit the death receptor signaling pathway and suppress the activation of transcription factor NF-kappaB in adriamycin-treated NRK-52E cells. Based on the results of this study, we suggest that TMP can attenuate adriamycin-induced oxidative stress and apoptotic injury in NRK-52E cells, and that it may have therapeutic potential for patients with renal diseases. TMP: tetramethylpyrazine LDH: lactate dehydrogenase ROS: reactive oxygen species DCF: 2',7'-dichlorofluorescein TNF-alpha: tumor necrosis factor-alpha TUNEL: terminal deoxynucleotidyl transferase-mediated deoxyuridine triphosphate nick end-labeling.