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Protective efficacy of carnosic acid against hydrogen peroxide (H_2O_2)-induced oxidative injury in HepG2 cells through SIRT1 pathway

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Carnosic acid (CA), found in rosemary, has been reported to have antioxidant and anti-adipogenic properties. Here, we investigate the molecular mechanism by which CA inhibits hydrogen peroxide (H_2O_2)-induced oxidative injury in HepG2 cells. Cells were pretreated with 2.5–10 μM of CA for 2 h and then exposed to 3 mM H_2O_2 for an additional 4 h. CA dose dependently increased cell viability and decreased lactate dehydrogenase (LDH) activities. Pretreatment with CA completely attenuated the inhibited expression of manganese superoxide dismutase (MnSOD) and the B-cell lymphoma-extra large (Bcl-xL) caused by H_2O_2 exposure, whereas reversed the reactive oxygen species (ROS) accumulation and the increase in cleaved caspase-3. Importantly, sirtuin1 (SIRT1), a NAD^+-dependent deacetylase, was significantly increased by CA. Considering the above results, we hypothesized that SIRT1 may play important roles in the protective effects of CA in the H_2O_2 injury. As expected, SIRT1 suppression by a specific inhibitor of SIRT1, Ex527, significantly aggravated H_2O_2-induced increased level of cleaved caspase-3, but deeply reduced the decreased expression of MnSOD and Bcl-xL. Collectively, the present study indicated that CA can alleviate H_2O_2-induced hepatocyte oxidative and apoptotic damage through SIRT1 pathway.

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