Protective efficacy of carnosic acid against hydrogen peroxide (H$_2$O$_2$)-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$_2$O$_2$)-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$_2$O$_2$ 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$_2$O$_2$ 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$_2$O$_2$ injury. As expected, SIRT1 suppression by a specific inhibitor of SIRT1, Ex527, significantly aggravated H$_2$O$_2$-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$_2$O$_2$-induced hepatocyte oxidative and apoptotic damage through SIRT1 pathway.

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