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Research article

Hepatoprotective Activity of Bergenin against Xenobiotics-Induced Oxidative Stress in Human Hepatoma (HepG2) Cells

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Abstract Bergenin, a natural derivative of gallic acid, has been shown to exert anti-oxidant and anti-inflammatory activities. This study aimed to determine hepatoprotective activity of bergenin against ethanol and *tert*-butyl hydroperoxide (TBHP) induced oxidative stress in human hepatoma (HepG2) cells. HepG2 cells (5×10^5 cells/well) were co-treated with ethanol (100 mM) or TBHP (100 μ M) and either bergenin (75, 150, and 300 μ M) or gallic acid (60 μ M, positive control) for 24 h. Cell viability, hematoxylin and eosin staining of cell morphology, cellular injury biomarkers: lactate dehydrogenase (LDH), aspartate aminotransferase (AST), alanine aminotransferase (ALT), and malondialdehyde (MDA), and antioxidant biomarkers: superoxide dismutase (SOD), catalase (CAT), and total glutathione (GSH) content, were determined. Ethanol and TBHP decreased cell viability (86.67% and 84.49% of control, respectively), increased LDH toxicity (12.53% and 15.91% of control, respectively), and increased AST, ALT, and MDA levels, compared with the control. Based on cell morphology, both ethanol and TBHP injured HepG2 cells causing the loss of cell nuclei. Treatment of HepG2 cells with either ethanol or TBHP reduced SOD and CAT activities and depleted total GSH content, compared with the control. Bergenin and gallic acid improved the cell morphology, elevated cell viability (95.94-99.20% and 97.72-99.62% of control, respectively), lowered LDH toxicity (8.14-9.10% and 7.82-8.92% of control, respectively), restored AST, ALT, and MDA levels, promoted SOD and CAT activities, and enhanced the total GSH content of ethanol- and TBHP-treated HepG2 cells. Bergenin exhibited hepatoprotective activity via restoration of the oxidant-antioxidant system and is a potential candidate for hepatoprotective treatment.

Keywords: Antioxidant biomarkers, Cellular injury biomarkers, Ethanol, Glutathione, *Tert*-butyl hydroperoxide

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