Cytoprotective role of omentin against oxidative stress-induced vascular endothelial cells injury

ABSTRACT

Endothelial cell injury caused by reactive oxygen species (ROS) plays a critical role in the pathogenesis of cardiovascular diseases. Omentin, an adipocytokine that is abundantly expressed in visceral fat tissue, has been reported to possess anti-inflammatory and antidiabetic properties. However, endothelial protective effects of omentin against oxidative stress remain unclear. This study aimed to evaluate the protective effect of omentin against hydrogen peroxide (H2O2)-induced cell injury in human umbilical vein endothelial cells (HUVECs). Cytotoxicity and cytoprotective effects of omentin were evaluated using 3-(4,5-Dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide (MTT) assay. The apoptotic activity of HUVECs was detected using Annexin-V/PI and Hoechst 33258 staining methods. Antioxidant activity of omentin was evaluated by measuring both reactive oxygen species (ROS) levels and glutathione peroxidase (GPx) activity. No cytotoxicity effect was observed in HUVECs treated with omentin alone at concentrations of 150 to 450 ng/ml. MTT assay showed that omentin significantly prevented the cell death induced by H2O2 ($p < 0.001$). Hoechst staining and flow cytometry also revealed that omentin markedly prevented H2O2-induced apoptosis. Moreover, omentin not only significantly inhibited ROS production ($p < 0.01$) but also significantly ($p < 0.01$) increased GPx activity in HUVECs. In conclusion, our data suggest that omentin may protect HUVECs from injury induced by H2O2.

Keyword: Omentin; Oxidative stress; Hydrogen peroxide; Human umbilical veins endothelial cell; Endothelial injury