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Cytotoxicity of Thymoquinone Alone or in Combination with Cisplatin (CDDP) Against Oral Squamous Cell Carcinoma in Vitro

Authors : Omar M. Al Aufi, Abdulwahab Noorwali, Ahmed Al Abd, Safia Alattas, Fathya Zahran, Fahd Almutairi

Abstract : Cisplatin (CDDP) is a potent anticancer agent used for several tumor types. Thymoquinone (TQ) is a naturally occurring compound drawing great attention as an anticancer and chemomodulator for chemotherapies. Herein, we studied the potential cytotoxicity of thymoquinone, CDDP and their combination against human oral squamous cell carcinoma cells in contrast to normal oral epithelial cells. CDDP similarly killed both head and neck squamous cell carcinoma cells (UMSCC-14C) and normal oral epithelial cells (OEC). TQ alone exerted considerable cytotoxicity against UMSCC-14C cells, while it induced a weaker killing effect against normal oral epithelial cells (OEC). The equitoxic combination of TQ and CDDP showed additive to synergistic interaction against both UMSCC-14C and OEC cells. TQ alone increased apoptotic cell fraction in UMSCC-14C cells as early as after 6 hours. In addition, prolonged exposure of UMSCC-14C to TQ alone resulted in 96.7±1.6% total apoptosis, which was increased after combination with CDDP to 99.3±1.2% in UMSCC-14C cells. On the other hand, TQ induced a marginal increase in the apoptosis in OEC and even decreased the apoptosis induced by CDDP alone. Finally, apoptosis induction results were confirmed by the change in the expression levels of p53, Bcl-2 and Caspase-9 proteins in both UMSCC-14c and OEC cells.

Keywords : thymoquinone, cisplatin, apoptosis, oral squamous cell carcinoma, P53, Caspase-9, Bcl-2
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