Thymoquinone efficiently inhibits the survival of EBV-infected B cells and alters EBV gene expression.

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Abstract

Epstein--Barr virus (EBV) is a human virus with oncogenic potentials that is implicated in various human diseases and malignancies. In this study, the modulator activity of the potent herbal extract drug thymoquinone on EBV was assessed in vitro. Thymoquinone was tested for cytotoxicity on human cells of lymphoblastoid cells, Raji Burkitt's lymphoma, DG-75 Burkitt's lymphoma, peripheral blood mononuclear cells, and periodontal ligament fibroblast. Apoptosis induction was analyzed via TUNEL assay and activity studies of caspase-3. The effect of thymoquinone on EBV gene expression was determined using real-time polymerase chain reaction. We report here, for the first time, a promising selective inhibitory affect of thymoquinone on EBV-infected B cell lines in vitro, compared with lower activity on EBV negative B cell line and very low toxicity on human peripheral blood mononuclear cells and periodontal ligament fibroblasts. Moreover, the drug was found to efficiently suppress the RNA expression of EBNA2, LMP1, and EBNA1 genes. Specifically, EBNA2 expression levels were the most affected indicating that this gene might have a major contribution to thymoquinone potency against EBV infected cells. Overall, our results suggest that thymoquinone has the potential to suppress the growth of EBV-infected B cells efficiently.

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