Thymoquinone decreases F-actin polymerization and the proliferation of human multiple myeloma cells by suppressing STAT3 phosphorylation and Bcl2/Bcl-XL expression.

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Abstract:

BACKGROUND: Thymoquinone (TQ), the major active component of the medicinal herb Nigella sativa Linn., has been described as a chemopreventive and chemotherapeutic compound. METHODS: In this study, we investigated the effect of TQ on survival, actin cytoskeletal reorganization, proliferation and signal transduction in multiple myeloma (MM) cells. RESULTS: We found that TQ induces growth arrest in both MDN and XG2 cells in a dose- and time-dependent manner. TQ also inhibited CXC ligand-12 (CXCL-12)-mediated actin polymerization and cellular proliferation, as shown by flow cytometry. The signal transducer and activator of transcription (STAT) and B-cell lymphoma-2 (Bcl-2) signaling pathways may play important roles in the malignant transformation of a number of human malignancies. The constitutive activation of the STAT3 and Bcl-2 pathways is frequently observed in several cancer cell lines, including MM cells. Using flow cytometry, we found that TQ markedly decreased STAT3 phosphorylation and Bcl-2 and Bcl-XL expression without modulating STAT5 phosphorylation in MM cells. Using western blotting, we confirmed the inhibitory effect of TQ on STAT3 phosphorylation and Bcl-2 and Bcl-XL expression. CONCLUSIONS: Taken together, our data suggests that TQ could potentially be applied toward the treatment of MM and other malignancies.

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