Thymoquinone attenuates phosphorylation of AKT to inhibit kidney cancer cell proliferation

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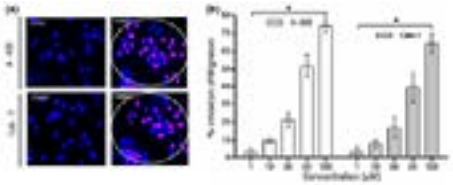
Abstract

Background: Nigella sativa is extensively used for medical remedies since ages in Middle East. Thymoquinone (Tq) is the major active constituent of this plant in which many reports confirmed the anticancer activities of the compound. However, the effect of Tq in kidney cancer cells and the pathway of action remains unproven. Herein we report anticancer properties of Tq in the kidney cancer cells.

Methods: Cancer proliferation was assessed using A498 and Caki1 kidney cancer cells 000by MTT assay. Nuclear fragmentation was detected using Hoechst 333258 and Propedium iodide dual straining. Trans endothelial migration assay was used to study migration inhibitory effects of Tq. Flow cytometry was used to analyze apoptosis and cell cycle. Anti, pro apoptotic markers and Akt phosphorylation were measured by Western bolting procedure.

Results: Tq demonstrated anti-proliferative effects in A498 cells with GI50 value of 40.07 µM and Caki-1 cells with GI50 of 51.04 µM. Tq exhibited nuclear fragmentation and inhibited trans-endothelial migration of A498 and Caki-1 cells in a dose dependent manner. Time dependent increase of Annexin V positive cells and sub G0/G1 cell population was observed in both cell lines after Tq treatment. Tq increased the pro apoptotic Bax protein and reduced anti-apoptotic Bcl-2 protein dose dependently in A498 and Caki-1 cells favoring apoptosis. Increasing concentration of Tq decreased the phosphorylation of Akt in both kidney cell types.
Conclusion: Our observations suggest effective anticancer activity of Tq in kidney cancer cells which may be mediated by the Akt pathway.



Biography

Ayed Dera currently works as a head of Clinical Laboratory Sciences Department, Collage of Applied Medical Sciences in King Khalid University, Abha, Saudi Arabia. The current project is 'Studies on the Thymoquinone for its biological activities. His group approved that Tq has an evidence for the therapeutic potential of Tq has been shown in kidney and lung cancer cells. Also, they approved that effect of Tq to exert nephron-protective effects of kidney mitochondria in hyperuricemia rats. The compound is also proven to work synergistically along with curcumin in cisplatin induced acute kidney injury. Now, they focuse on the effects of Tq on cigarette smoke extract-exposed human lung, bronchial epithelial cells (BEAS-2B) and elucidates the underlying mechanistic pathways involved.

Publications

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