Thymoquinone inhibits growth and augments 5-fluorouracil-induced apoptosis in gastric cancer cells both in vitro and in vivo.


Source

Department of Gastroenterology, Renmin Hospital of Wuhan University, Wuhan 430060, Hubei Province, PR China.

Abstract

Thymoquinone (TQ), a component derived from the bioactive constituent of black seed (Nigella sativa), has been shown to exert biological activity on various types of human cancers. However, there are few studies addressing its effects on gastric cancer. Here, we present the first report describing the chemosensitizing effect of thymoquinone and 5-fluorouracil (5-FU) on gastric cancer cells both in vitro and in vivo. Studies have shown that pretreatment with TQ significantly increased the apoptotic effects induced by 5-FU in gastric cancer cell lines in vitro. Moreover, we found that TQ enhanced the 5-FU-induced killing of gastric cancer cells by mediating the downregulation of the anti-apoptotic protein bcl-2, the upregulation of the pro-apoptotic protein bax, and the activation of both caspase-3 and caspase-9. In addition to the in vitro results, it has been shown that the combined treatment of TQ with 5-FU represents a significantly more effective antitumor agent than either agent alone in a xenograft tumor mouse model. These data suggest that the TQ/5-FU combined treatment induces apoptosis by enhancing the activation of both caspase-3 and caspase-9 in gastric cancer cells. These results, which provide molecular evidence both in vitro and in vivo, support our conclusion that thymoquinone can activate caspase-3 and caspase-9 and thus result in the chemosensitisation of gastric cancer cells to 5-FU-induced cell death.

Copyright © 2011 Elsevier Inc. All rights reserved.

PMID:22206670