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Entitled

ANTI-COLON CANCER EFFECT OF ORIGANUM MAJORANA ESSENTIAL OIL

by

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Abstract

Plants have been shown to be an excellent source of new drugs, including anticancer agents. Origanum majorana commonly known as majoram is a plant that is known to possess different therapeutic values including antioxidant and antimicrobial activities. Our research team has previously tested the ethanolic extract of O. majorana on triple negative breast cancer and published the findings. The ethanolic extract promoted mitotic arrest at G2/M phase, induced apoptosis as well as inhibition of migration and metastasis. The promising potential of the ethanolic extract encouraged us to test the effect of O. majorana essential oil on human colon cancer cell lines. We demonstrated that O. majorana essential oil inhibited the proliferation of HT-29 and Caco-2 colon cancer cell lines in a time- and concentration-dependent manner. Colony formation assay illustrated that O. majorana essential oil reduced the ability of HT-29 to form colonies, and when established colonies were treated with the essential oil, it showed that the treatment was able to reduce colonies' size at low concentrations while at higher concentrations the oil was able to completely eliminate the already formed colonies. Moreover, the essential oil, induced cell death and minimal cell cycle arrest at G1 phase. Annexin V staining revealed induction of apoptosis in HT-29 cells. Western blot assessment further confirmed apoptosis for being the main programmed cell death mechanism triggered by the plant's essential oil. Blotting for survivin, which is a protein that belongs to the inhibitor of apoptosis protein (IAP) family, levels indicate that O. majorana essential oil exerts its cytotoxic anti-cancer effect at least partially through the down-regulation of survivin. These preliminary results make O. majorana oil a promising alternative candidate against colon cancer.

Keywords: *Origanum majorana,* colon cancer, apoptosis, cell cycle.