

34<sup>th</sup> Euro-Global Summit on **Cancer Therapy & Radiation Oncology**  
&  
6<sup>th</sup> International Conference on **Big Data Analysis and Data Mining**  
&  
13<sup>th</sup> International Conference on **Orthopedics, Arthroplasty and Rheumatology**  
July 25-27, 2019 London, UK

## Promising chemopreventive activities of tea tree oil against human malignant melanoma and squamous cell carcinoma *in vitro*

Ashraf Osman Abdellatif Mohamed<sup>1,2</sup>

<sup>1</sup>Cairo University, Egypt

<sup>2</sup>Karary University, Sudan

**Background:** Tea tree oil (TTO) is an essential oil obtained by steam distillation from the leaves of *Melaleuca alternifolia*. This oil has traditionally been used for the treatment of various skin infections.

**Aim:** The present study aimed to investigate the cytotoxic effects of TTO against two representative types of human skin cancer, namely malignant melanoma (A-375) and squamous cell carcinoma (HEp-2).

**Materials & Methods:** To outline the basic molecular mechanisms involved in apoptosis induction in A-375 and HEp-2 cell lines, Annexin V/PI staining for apoptosis detection, cell cycle analysis were monitored using flow cytometry and mRNA expression levels of the apoptosis-regulatory genes P53, BAX, and BCL-2 were determined by real-time PCR and western blot after treatment with TTO.

**Results:** Results showed that TTO exhibited a strong cytotoxicity towards A-375 and HEp-2 cell lines, with IC<sub>50</sub> values of 0.038% (v/v) and 0.024% (v/v) respectively. This cytotoxicity resulted from TTO induced apoptosis in both A-375 and HEp-2 cell lines as evidenced by morphological features of apoptosis and Annexin V/PI staining results in addition to the activation of caspase- 3/7 and -9, upregulation of pro-apoptotic genes (P53 and BAX) and downregulation of the anti-apoptotic gene BCL-2. Additionally, cell cycle analysis showed that TTO caused cell cycle arrest mainly at G2/M phase.

**Conclusions:** Taken together, the results of this study reveal that TTO is an effective apoptosis inducer in A-375 and HEp-2 cancer cell lines, indicating that it could be a promising chemopreventive candidate to be used in topical formulations against melanoma and squamous cell cancers; however, further *in vivo* studies may be warranted.

## Biography

Ashraf Osman Abdellatif Mohamed has his expertise in the field of Microbiology and Immunology and he has published eight papers in reputed journals. Currently, he works on developing new strategies in fighting infectious diseases and cancer by using natural compounds.

ashrafpharm@hotmail.com

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