

ABSTRACT

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Title of diploma thesis: The effect of trans-nerolidol and valencene in ovarian cancer cells

Trans-nerolidol and valencene belong to sesquiterpenes, which present a large group of secondary plant metabolites. In practice, we can encounter them in the food or perfume industry. However, they are also used in traditional Chinese medicine. Recently, the biological activities of sesquiterpenes, which include e.g. anti-inflammatory or antineoplastic activities, were studied. Doxorubicin is one of the most important cytostatic drugs and various ways to improve its effectiveness and reduce side effects are being studied. One such usage is in combination therapy with natural substances, e.g. with sesquiterpenes.

The aim of this study was to test antiproliferative effects of doxorubicin, trans-nerolidol and valencene on ovarian cancer cell lines SK-OV-3 and A2780. We also assayed the possible pro-oxidant potential of doxorubicin and terpenes by measuring the production of ROS. In addition, we evaluated the interaction between doxorubicin and terpenes by quantification of combination indexes. We also studied the possible effect of the terpenes on the accumulation of doxorubicin in cancer cells and its distribution within the cells.

Results showed the cytotoxic effects of doxorubicin, trans-nerolidol and valencene. Cell line A2780 was more sensitive to all tested substances. Doxorubicin in line SK-OV-3 and valencene in line A2780 increased ROS production. Trans-nerolidol acted synergistically with doxorubicin in both cell lines. Valencene had synergic effect only in line A2780. Trans-nerolidol increased the accumulation of doxorubicin in the cells of both lines.