

ABSTRACT

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Title of diploma thesis: Modulation of cytostatics efficacy in cancer cells by sesquiterpenes

Oxaliplatin (OxPt) belongs between the cytostatics regularly used during standard chemotherapy treatment of colorectal cancer. The successful treatment of colorectal cancer is often limited by various side effects of OxPt on healthy tissue as well as by the possible development of drug-resistance. The main aim of this thesis is to find out if, sesquiterpenes can affect the antiproliferative activity of OxPt. Sesquiterpenes, natural substances, are the main component of essential oils. In human organism, sesquiterpenes have a wide variety of biological effects especially antibacterial, antifungal, immunomodulatory, inflammatory, antirheumatic, antioxidant, antiviral and antitumor. Our study confirmed the antiproliferative effects of sesquiterpenes α -humulen (HUM), caryophyllene-oxide (CAO), valencene (VAL) and *trans*-nerolidol (NER) in cell lines of colorectal cancer SW-620 and Caco-2. Testing of combinations of OxPt with each sesquiterpenes proved synergistic effects of sesquiterpenes CAO, VAL and partially HUM with OxPt in cell line Caco-2. It was also proven that HUM, VAL, and NER increased the pro-oxidative action OxPt in the cell line Caco-2. Based on these results, we suppose that the ability to increase the pro-oxidative effect of OxPt on cells represents one of the possible mechanisms of VAL and HUM synergism with OxPt. CAO and OxPt combination has probably different mechanism of synergy as CAO has little effect on pro-oxidative activity of OxPt. In our experiments, sesquiterpenes VAL, CAR and HUM showed the promising potential for their use in combination therapy with OxPt. These substances are suitable for further testing and they could be potentially used for the treatment of colorectal cancer in future.