ABSTRACT

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Title of diploma thesis: Effect of vitamin D on the expression of *ABCB1* and *CYP3A4* in human intestinal slices

When drugs are administered orally, their absorption is significantly affected by the intestinal barrier. This barrier expresses a variety of efflux and uptake transporters, as well as first and second-phase biotransformation enzymes. The most important efflux transporter in the intestinal barrier is P-glycoprotein, which has a broad substrate specificity. Among the first-phase biotransformation enzymes, cytochrome P450 3A4 is the most important.

Their function is to protect the human body from the toxic effects of xenobiotics, including drugs. Many clinically important drugs act as substrates, inhibitors or inducers in relation to these proteins, which may result in an increased risk of drug interactions.

A plethora of dietary supplements or medicines containing vitamin D can be found in the pharmacy. It is used for the proper development of bones and teeth, for the proper function of the immune system or for the treatment of osteomalacia, rickets or osteoporosis. Limited information is available on its effects on *P-gp* and *CYP3A4* expression in the human small intestine.

The aim of this thesis was to investigate the effect of vitamin D3 on *P-gp* and *CYP3A4* expression in the intestinal barrier using the method of precision cut intestinal slices from human proximal jejunum. We used rifampicin 30 μM as a model inducer. In the experiments we tested vitamin D3 with the following concentrations: 100 nM, 50 nM. The obtained results show that vitamin D3 has no significant effect on *P-gp* and *CYP3A4* expression at the concentrations used. As expected, rifampicin was confirmed to have a significant effect on both *P-gp* and *CYP3A4* expression.