

## **Abstract**

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Title of diploma thesis: Expression and function of placental drug transporters in health and disease

There are many physiological changes during pregnancy. Placenta is a crucial organ which mediates exchange of nutrients, metabolites and respiratory gases, provides endocrine functions and fetal protection. A pregnant woman and her fetus may be exposed to various potentially harmful substances during pregnancy, including drugs that may endanger fetal health. Protection of the fetus from xenobiotics is enabled by drug transporters.

Drug transporters are membrane proteins expressed in most tissues of the human body. In the placenta, they are localized in the placental syncytiotrophoblast and occur also in the endothelial cells of the fetal vessels. They belong into two large superfamilies of transporter proteins: ATP-binding cassette (ABC) and solute carrier (SLC). While ABC transporters mediate exclusively efflux of their substrates, SLC are predominantly influx transporters. Therefore, these transport proteins play a key role in the disposition of drugs, some of which facilitate drugs entry into a fetus, and others actively protect the fetus. Whether placenta allows fetal exposure to xenobiotics, it also depends on the location of transporters, some of which are expressed in the apical membrane, other in the basolateral membrane of syncytiotrophoblast.

This diploma thesis is focused on expression and function of placental drug transporters during physiologically running pregnancy and also deals with expression during selected pathological conditions, such as intrauterine growth restriction, preeclampsia and eclampsia, premature delivery, gestational diabetes mellitus and some infectious disease.