ABSTRACT

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During the whole course of pregnancy, it is important to maintain proper monoamine homeostasis, namely serotonin (5-HT), norepinephrine (NE), and dopamine (DA), which are crucial for proper placental function and fetal development. Monoamines are important neuromodulators, involved in cell proliferation, and differentiation. and neuronal migration. High fetal monoamine secretion during gestation demands a responsible clearance mechanism, as disruption of their balance may lead to long-lasting changes in brain structure and function, provoking a higher risk of attention deficit hyperactivity disorder (ADHD), autism or depression. However, uptake of NE a DA through the fetoplacental unit has not been fully and in detail described. Therefore, in this diploma thesis, we focus on the uptake of NE and DA through *ex vivo* isolated vesicles of microvillous (MVM) and basal (BM) membranes from healthy human term placentas. Our results show that NE and DA uptake is mediated via high-affinity and low-capacity serotonin (SERT) and norepinephrine (NET) transporters in MVM and via low-affinity and high-capacity organic cation transporter 3 (OCT3) in BM. DAT expression in human placental tissue is negligible and excludes any DAT involvement in placental monoamine uptake. Thanks to the joint involvement of SERT and NET in NE and DA uptake through MVM, we reveal monoamine transporter promiscuity also in placental tissue. This diploma thesis provides an unknown, comprehensive overview of the NE and DA uptake through both placental membranes.