Design of COMT-Knockout mouse as a preeclampsia mode

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Preeclampsia is a multisystem pregnancy disorder that occurs after 20 weeks of gestation, leading to e.g. preterm labor. It is characterized by hypertension, proteinuria, edema, and multiple organ dysfunction. Up to 8% of pregnancies are complicated by preeclampsia, which is one of the most serious causes of maternal and perinatal mortality [1]. For research of pregnancy disorders and development of therapy for it, a mouse model can be used due of the fact that pregnancy development in mice, especially at early stages, is somewhat similar to human and is well-studied, in particular, in terms of molecular biology [2]. One of the possible options for creating mouse models of preeclampsia is considered to be a mutation in the COMT gene encoding catechol-O-methyltransferase [3]. This enzyme plays an important role in the catecholamines conversion and it also catalyzes the O-methylation of hydroxyestradiol producing methoxyestradiol. COMT gene knockout results in a phenotype similar to preeclampsia with elevated blood pressure and proteinuria [3]. The previous model was obtained through classic transgenesis methods with Neomycin cassette insertion in the COMT locus potentially influencing the results of the experiments. The development of the genome editing systems and its active utilization at Saint Petersburg State University made it possible to obtain a COMT-KO mouse line using CRISPR/Cas9 technology which had not been done in Russia before. This model will allow to effectively study the development of preeclampsia and ways to prevent and treat it.

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REFERENCES
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