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“Role of transcription factor Pax6 in the development of mouse cerebellar cortex”

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In the cerebellum, there are two main populations of neurons: Gamma-aminobutyric acid-ergic (GABA-ergic) – inhibitory and glutamatergic – excitatory cells. The first group of neurons arises from the embryonic ventricular zone (VZ) of the fourth ventricle and expresses the transcription factor Ptf1a. The other type of cells generates in the embryonic zone “rhombic lip” (RL) and expresses the transcription factor Pax6.

The **aim** of the present study is to investigate the function of Pax6 during the development of the cerebellar cortex, in particular the glutamatergic neurons in the cortex. For this purpose, cerebellar tissues of a genetically modified (transgenic) mouse are used. The results published so far are on mice with general (global) inactivation (knock-out, KO) of the Pax6 gene. These mice die at birth, which hinders the study of neurogenesis in the cerebellar cortex. In mice, neurogenesis occurs also after birth and ends by postnatal day 21 (P21). To address this perinatal mortality, the project team uses an innovative approach that includes transgenic animals with selective inactivation of Pax6 in the cerebellar cortex (Pax6 conditioned KO, Pax6cKO). These animals survive to adulthood, and at a selected time, they show a reduction in Pax6 levels in the cerebellar cortex.

Comparing mutants with healthy (control) animals of different stages will allow to be analyzed: 1) defects in the morphogenesis (foliation) of the cerebral cortex; 2) the effects of Pax6cKO on the amount of glutamatergic neurons in the cortex. These results will show for the first time the function of Pax6 for the development of the cerebellum in mammals, postnatally in vivo.