Cell-Specific Expression of Cre recombinase in Purkinje and Retinal Bipolar Neurons

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The cerebellum is comprised of two anatomical components, the cerebellar cortex and nuclei. The Purkinje neuron is one of the most fascinating characters in the cerebellar cortex. It is involved in motor learning, motor coordination and cognitive function . *LacZ* gene was shown to be expressed in Purkinje and bipolar neurons under the control of Purkinje-Cell protein 2 (*Pcp2*) promoter . However, non-specific expression was detected in brain, liver and kidney besides in Purkinje and bipolar neurons when a 2.88-kb Pcp2 DNA fragment was used to direct Cre expression . To achieve more restricted expression of Cre in cerebellum, we inserted Cre cDNA into a 170-kb BAC carrying the intact *Pcp2* gene. Here we present the characterization of Cre transgenic mice expressing Cre-recombinase. Cre-recombinase activities were detected by β-galactosidase histochemistry in 3-week old mouse tissues from the F1 progenies of BAC/Pcp2-IRES-Cre transgenic lines × ROSA26 reporter strain. Our results showed that strong β-galactosidase staining was present in Purkinje cells in all folia of the cerebellum and to a less extent in retinal bipolar neurons. We didn't detect any β-galactosidase staining in any other tissues examined, including spin cord, heart, liver, kidney and skin. Therefore, the BAC/Pcp2-IRES-Cre mice are potentially of great use for establishing mouse models for human genetic diseases and providing insight into cerebellar and bipolar neuron functions.