Abstract

The retinal ganglion cells (RGCs) are one of the primary cell types in the retina, responsible for bridging the eyes and the central nervous system. Despite their importance, the molecular mechanisms of RGCs remain poorly understood due to their complex cellular systems. Researchers have used driver mouse lines, such as the Cre mouse lines, to study specific genes. Given the lack of RGC-specific Cre driver mouse lines, this research aimed to develop a Cre driver mouse line with expression restricted to RGCs. This study targets the Rbpms1 gene, a known RGC marker. To integrate the Cre gene into the Rbpms1 locus, ssDNA was inserted using microinjection combined with electroporation of the ribonucleoprotein complex containing the CRISPR/Cas9 cassette. Five runs were performed, resulting in 17 pups. Verification of the Cre gene was performed using genotyping PCR, which resulted in no Cre-positive pups. This outcome was likely due to the lack of viable pups and low HDR efficiency. Future experiments to improve Cre knock-in efficiency should optimize transfection methods, increase HDR efficiency, and implement screening strategies.

Keywords: Rbpms, Cre, Knock-in, Mouse models, Retinal ganglion cells