

# Single-cell transcriptome analysis of regenerating RGCs reveals potent glaucoma neural repair genes

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Axon regeneration holds great promise for neural repair of CNS axonopathies, including glaucoma. Pten deletion in retinal ganglion cells (RGCs) promotes potent optic nerve regeneration, but only a small population of Pten-null RGCs are actually regenerating RGCs (regRGCs) ; most surviving RGCs (surRGCs) remain non-regenerative. Here, we developed a strategy to specifically label and purify regRGCs and surRGCs, respectively, from the same Pten-deletion mice after optic nerve crush, in which they differ only in their regeneration capability.

Smart-Seq2 single-cell transcriptome analysis revealed novel regeneration-associated genes that significantly promote axon regeneration. The most potent of these, *Anxa2*, acts synergistically with its ligand tPA in Pten-deletion-induced axon regeneration. *Anxa2*, its downstream effector ILK, and *Mpp1* dramatically protect RGC somata and axons and preserve visual function in a clinically relevant model of glaucoma, demonstrating the exciting potential of this innovative strategy to identify novel effective neural repair candidates.

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