

Supplementary materials

Table S1. The primer sequences for mRNA analysis.

Target mRNA	Forward primer	Reverse primer
Mouse <i>Gapdh</i>	5'- CAGTGGCAAAGTGGAGATTGTTG-3'	5'-TCGCTCCTGGAAGATGGTGAT- 3'
Mouse <i>Grem1</i>	5'-GGGACCCTACTGCCAACAG-3'	5'-TTTGCACCAATCTCGCTTCAG- 3'
Rattus norvegicus <i>Gapdh</i>	5'-GAAGGTCGGTGTGAACGGAT-3'	5'-CCCATTTGATGTTAGCGGGAT- 3'
Rattus norvegicus <i>Grem1</i>	5'-GCGCAAATACCTGAAGCGAG-3'	5'-CTGTTTCCGCTGGTGTGG-3'
Human <i>GAPDH</i>	5'-GGAGTCCACTGGCGTCTTCA-3'	5'- GTCATGAGTCCTTCCACGATACC- 3'
Human <i>CDH5</i>	5'-CTTCACCCAGACCAAGTACACA- 3'	5'-TGTTGGCCGTGTTATCGTGA-3'
Human <i>PECAM1</i>	5'-AACAGTGTTGACATGAAGAGCC- 3'	5'- TGTA AACAGCACGTCATCCTT-3'
Human <i>VIM</i>	5'-GACGCCATCAACACCGAGTT-3'	5'-CTTTGTCGTTGGTTAGCTGGT -3'
Human <i>COL4A1</i>	5'-GGACTACCTGGAACAAAAGGG- 3'	5'- GCCAAGTATCTCACCTGGATCA-3'
Human <i>ACTA1</i>	5'-GGCATTACGAGACCACCTAC-3'	5'- CGACATGACGTTGTTGGCATAAC-3'
Mouse <i>Spp1</i>	5'-ATCTCACCATTCCGGATGAGTCT-3'	5'- TGTAGGGACGATTGGAGTGAAA- 3'
Mouse <i>Lgals3</i>	5'- GGAGAGGGAATGATGTTGCCT-3'	5'- TCCTGCTTCGTGTTACACACA- 3'
Mouse <i>Ctsb</i>	5'- CAGGCTGGACGCAACTTCTAC- 3'	5'- TCACCGAACGCAACCCTTC-3'
Mouse <i>Fn1</i>	5'- ATGTGGACCCCTCCTGATAGT-3'	5'- GCCCAGTGATTCAGCAAAGG-3'
Mouse <i>Tgfb1</i>	5'- CGCCAAGTCACCCTACCAG-3'	5'- TGCACAGCACATACATTGGGG- 3'

Mouse <i>Spar</i>	5'- GTCGCAGACCGAAAGACCTG-3'	5'- CGACGCATGTAGAAGTCATCG- 3'
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Table S2. The antibodies used for Western blotting.

Antigen	Catalog#	Manufacturer	Dilution
Gremlin1	sc-515877	Santa Cruz Biotechnology, Dallas, USA	1:500
β -actin	BL005B	Biosharp, Shanghai, China	1:5000
Vimentin	ab92547	Abcam, Cambridge, UK	1:1000
Collagen type IV	55131-1-AP	Proteintech, Wuhan, China	1:1000
Smooth muscle actin	sc-53142	Santa Cruz Biotechnology, Dallas, USA	1:1000
Tublin	66031-1-Ig	Proteintech, Wuhan, China	1:1000
EGF Receptor	4267	Cell Signaling, Boston, USA	1:1000
Phospho-EGF Receptor	3777	Cell Signaling, Boston, USA	1:1000
MEK1/2	9122	Cell Signaling, Boston, USA	1:1000
Phospho-MEK1/2	9154	Cell Signaling, Boston, USA	1:1000
p44/42 MAPK	9102	Cell Signaling, Boston, USA	1:1000
Phospho-p44/42 MAPK	4370	Cell Signaling, Boston, USA	1:1000
Rock-2	sc-100425	Santa Cruz Biotechnology, Dallas, USA	1:500
ROCK2 (phospho Ser1366)	GTX122651	GeneTex Biotechnology, State of Texas, USA	1:500
Myosin Light Chain 2	ab79935	Abcam, Cambridge, UK	1:500
MLC (phospho S20)	ab2480	Abcam, Cambridge, UK	1:500
Fibronectin	ab268020	Abcam, Cambridge, UK	1:1000
TGFBI	ab170874	Abcam, Cambridge, UK	1:1000
Cathepsin B	ab214428	Abcam, Cambridge, UK	1:1000
Osteopontin	ab63856	Abcam, Cambridge, UK	1:1000

Table S3. The primary antibodies used for immunofluorescence.

Antigen	Catalog#	Manufacturer	Dilution
EGFR	ab52894	Abcam, Cambridge, UK	1:100
Fibronectin	ab268020	Abcam, Cambridge, UK	1:100
Iba1	ab178846	Abcam, Cambridge, UK	1:100
Vimentin	ab92547	Abcam, Cambridge, UK	1:100
Collagen type IV	sc-59814	Santa Cruz Biotechnology, Dallas, USA	1:100
Smooth muscle actin	sc-53142	Santa Cruz Biotechnology, Dallas, USA	1:100

Figure S1.

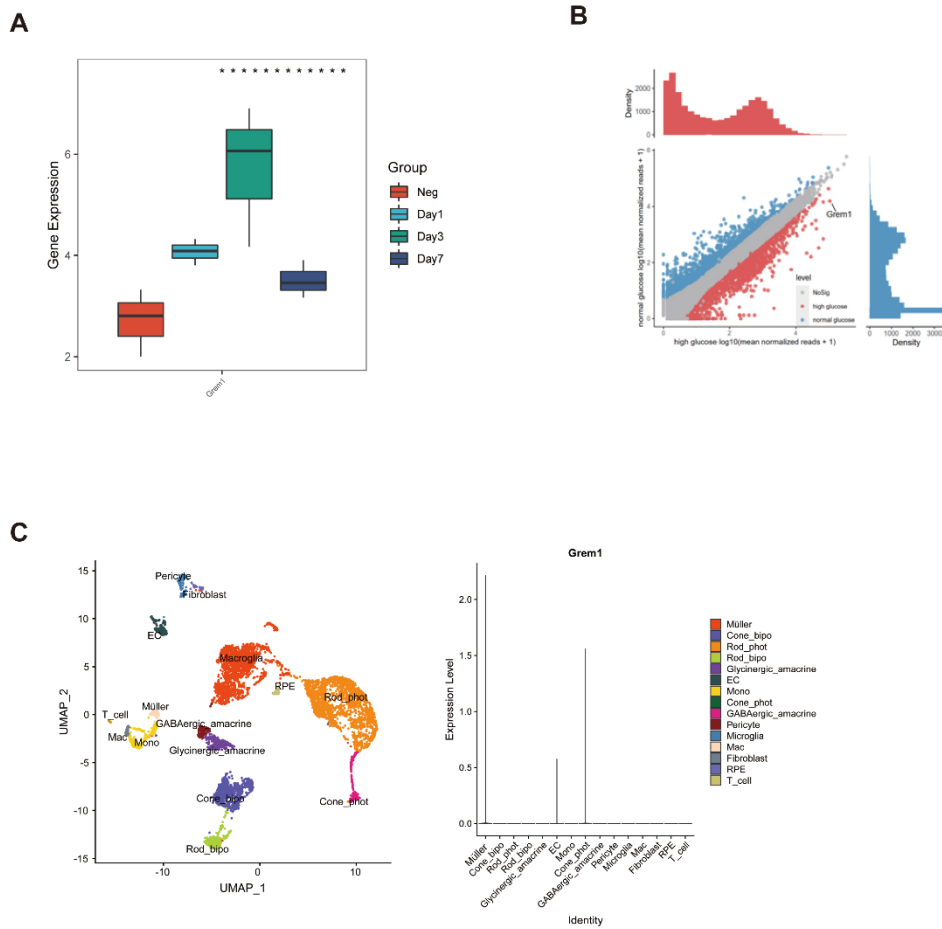


Figure S1. Bioinformation analysis of *Grem1* expression. (A) *Grem1* expression levels in Müller cells after laser coagulation. (B) Scatter plot using the log₂ fold change to visualize DGEs between Müller cells treated with normal glucose (5.5 mM) and high glucose (25 mM) for 48h. The *Grem1* gene was labeled. Definition of DEGs: $abs(\log_2 FC) > 1.5$ & $adj. p\text{-value} < 0.05$. (C) Fifteen cell types were detected from single-cell sequencing analysis of Akimba mice retina. *Grem1* was mainly expressed in retinal Müller cells of Akimba mice.