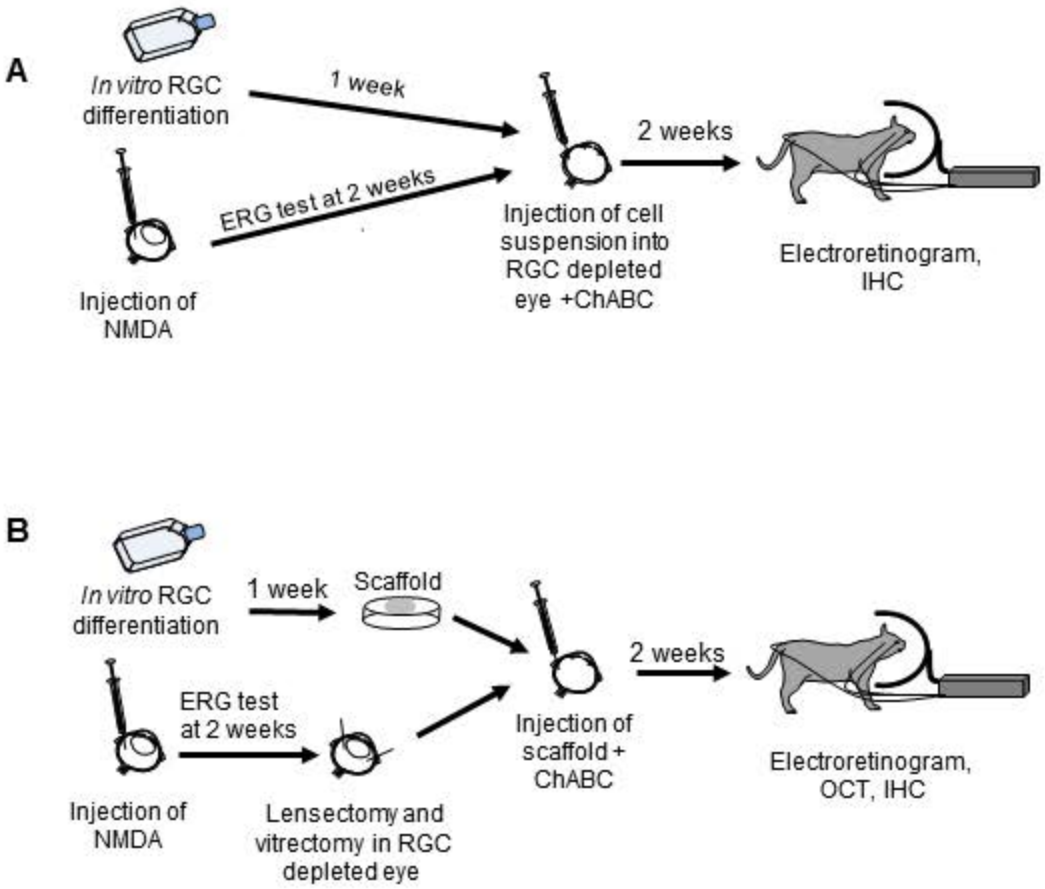
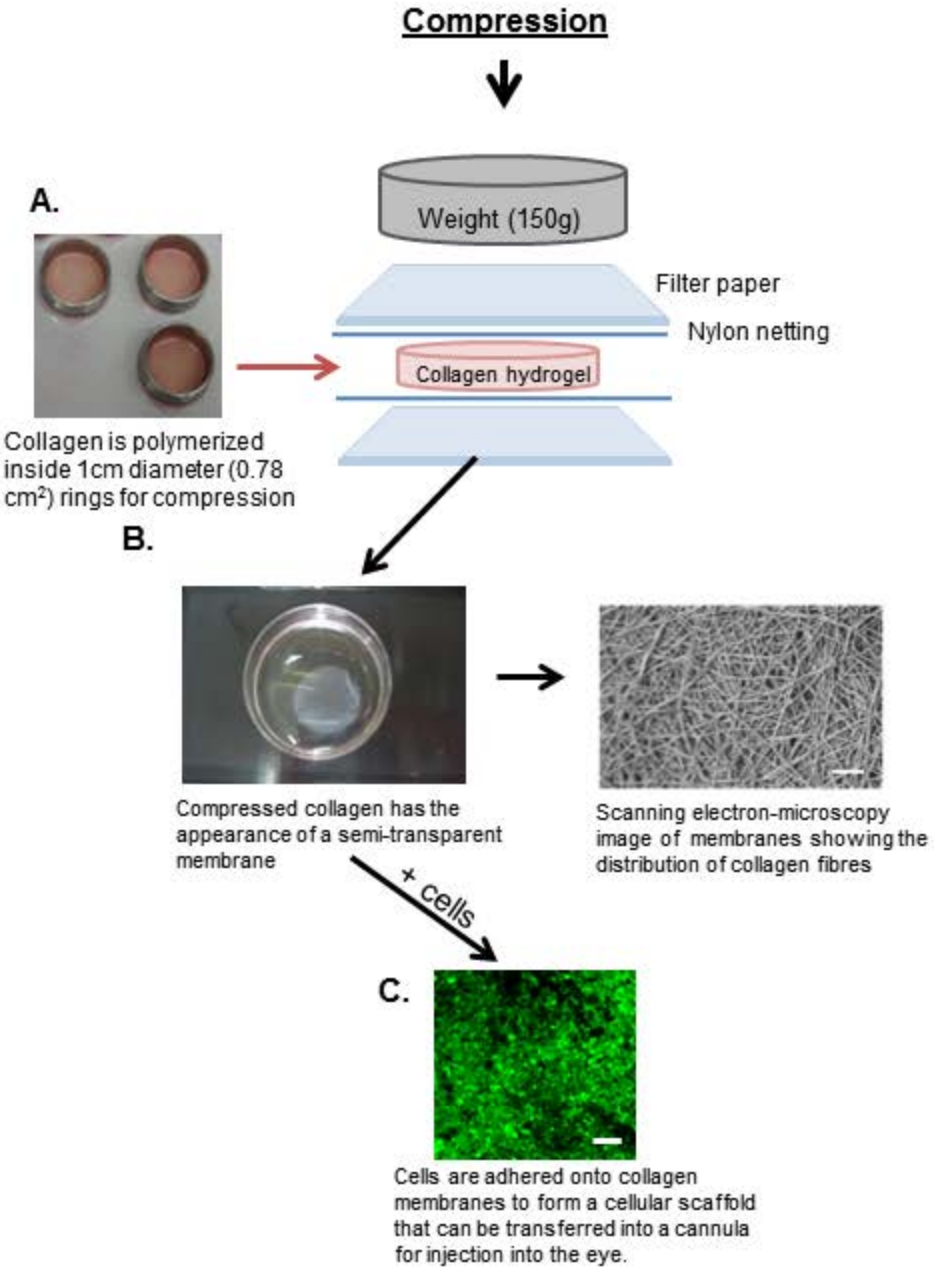
Supplementary Figure 1



Transplantation methods employed in the study

A. Human or feline Müller stem cells (hMSC or fMSC) were differentiated into enriched populations of RGCs for one week. Cells were detached from tissue culture flasks and suspended in saline containing 0.5U Chondroitinase ABC (ChABC). The cell suspension was then transplanted by intravitreal injection into the feline eye depleted of RGC by injection of 1.5mmole/L NMDA. Retinal function was assessed by ERG at two weeks after transplantation. Cell engraftment was evaluated by immunohistochemistry. **B.** An alternative procedure for cell transplantation was used to transplant fMSC-derived RGCs cells onto the cat retina: Following injection of 1.5mmole/L NMDA and confirmation of RGC depletion by ERG testing after two weeks, vitrectomy were performed in the cat eye. This was followed by injection of cellular scaffolds (preparation shown in Suppl Fig 2) and 0.5U ChABC onto the inner retinal surface. Retinal function was assessed two weeks after transplantation by ERG and cell engraftment was evaluated by OCT and immunohistochemistry.



Preparation of cellular scaffolds using type I collagen.
A. Following polymerization of collagen hydrogels,150g weight was applied to remove the aqueous component. The dehydration process involved collecting the gel between two nylon sheets supported on filter paper, and applying the mass onto the rat tail type I collagen hydrogel for 5 minutes. **B.** The compression process yielded a semi-transparent membrane with an extensive network of crosslinks between collagen fibres, as judged by their appearance under the electron-microscope. Scale bar= 10μm. **C.** Compressed collagen membranes were placed over the well of a glass bottom culture dish (MacTek Corp. USA) filled with 150 μl of a cell suspension containing $3x10^5$ cells in DMEM + 5% FCS. To ensure that cells adhered to both surfaces of the collagen mats, 150 μl of the same cell suspension were placed over the collagen mats, which were then incubated for 60-90 min at 37°C. Scale bar= 100μm. Non-adherent cells were removed by gently washes with PBS. Cellular scaffolds were then transferred into an 18 G cannula for injection into the eye. The image shows the appearance of the membranes ready for transplantation, as seen under an inverted light microscope.

Table S1 Sequences of primers used for PCR

Gene	Sequence	Accession Number or Reference	Cycles	Annealing temperature	Product Size (bp)
Notch1	F; CAGTGTCTGCAGGGCTACAC R; CTCGCACAGAAACTCGTTGA	XM_011288797.1 [1]	28	60	231
Hes1	F; GCCAGCAGATATAATGGGAGA R; GCATCCAAAATCAGTGTTTTCA	[1]	40	60	
Sox2	F; ACCAGCTCGCAGACCTACAT R; TGGAGTGGGAGGAAGAGGTA	NM_001173447.1 [1]	25	60	154
Pax 6	F; AGGAGGGGGAGAGAATACCA R; CTTTCTCGGGCAAACACATC	XM_011279805.1, [1]	25	60	183
Vimentin	F; ATCCAGGAGCTACAGGCTCA R; GGACCTGTCTCCGGTACTCA	XM_003988131.2, [1]	25	60	247
Beta tubulin	F; CATTCTCGTGGACCTTGAGC R; GCAGTCGCAATTCTCACATT	[1]	25	60	
Brn3b	F; CAGGTTCGAGTCCCTCACAC R; ATGGCAAAGTAGGCTTCGAGC	XM_003980945.2 (based on human sequence) [2]	38	55	198
Beta Actin	F; GCCGTCTTCCCTTCCATC R; CTTCTCCATGTCGTCCCAGT	XM_006941899.2 [1]	25	60	168

References:

1. You XJ, *et al.* (2011) Efficient transduction of feline neural progenitor cells for delivery of glial cell line-derived neurotrophic factor using a feline immunodeficiency virus-based lentiviral construct. *J Ophthalmol* 2011.
2. Singhal S, *et al.* (2012) Human Muller glia with stem cell characteristics differentiate into retinal ganglion cell (RGC) precursors in vitro and partially restore RGC function in vivo following transplantation. *Stem Cells Transl Med* 1(3):188-199

Table S2. List of primary antibodies and sources used

Primary Antibody	Supplier/Code	Host	Concentration
Glutamine Synthetase	Santa Cruz SC-6640	Goat	1:100
Vimentin	Santa Cruz SC-5565	Rabbit	1:100
Notch1	Santa Cruz SC-6014	Rabbit	1:50
CRALBP	Santa Cruz SC-28193	Mouse	1:50
Brn3b	Santa Cruz SC-31987	Goat	1:50
Isl-1	DSHB 39.4D5	Mouse	1:50
rdU	Novocastra NC1-BrdU	Mouse	1:100

Table S3. Stimulus intensities and interflash intervals for ERG recordings

Stimulus Intensity ($cd.s.m^{-2}$)	Interflash Interval (sec)
Scotopic ERG	
10^{-8}	7.5
10^{-7}	7.5
$10^{-6.5}$	7.5
10^{-6}	7.5
$10^{-5.5}$	7.5
10^{-5}	7.5
10^{-4}	7.5
10^{-3}	7.5
10^{-1}	20
10^{1}	20
PhNR	
0.01	4
0.1	4
0.5	4
1	4
2	4
3	4
3.5	4