Pronase E improves gene transduction of retinal ganglion cells

Purpose: Intravitreal injection is used for gene delivery to retinal ganglion cells, but has low efficiencies of transduction. The aim of the present study was to optimise recombinant adenovirus?associated vector (rAAV)?mediated gene transduction of retinal ganglion cells by co?administration with proteolytic enzymes.

Method: Female Sprague?Dawley rats (n = 4) received a 5??L intravitreal injection containing 5e+9 genome copies (gc) rAAV. The rAAV contained a bistronic cassette expressing green fluorescent protein (rAAV2/2.CAG.NGB.HA.IRES.GFP.pA). Further groups received co?administration of Pronase E (n = 6) or Heparinase III?+?Hyaluronidase (n = 8). The fellow eye received a vehicle injection. Retinal function was analysed at 2?weeks by scotopic electroretinography (ERG). At 3 weeks, GFP expression was assessed in vivo using a confocal scanning laser ophthalmoscope (cSLO). Animals were then euthanized for whole mount retinas.

Results: The mean in vivo GFP expression on cSLO fundal images in rAAV + Pronase E eyes (360° of fundus ±0°) was significantly greater than rAAV + Hep/Hyal (70°?±?35°;P