Phase 1b Randomized Controlled Study of Short Course Topical Recombinant Human Nerve Growth Factor (rhNGF) for Neuroenhancement in Glaucoma: Safety, Tolerability, and Efficacy Measure Outcomes

Gala Beykin (1) , Laurel Stell (1) , Muhammad Sohail Halim (1) , Mariana Nuñez (1) , Lilia Popova (1) , Bac T Nguyen (1) , Sylvia L Groth (1) , Amy Dennis (1) , Zhongqiu Li (1) , Melissa Atkins (1) , Tom Khavari (1) , Sophia Y Wang (1) , Robert Chang (1) , Ann C Fisher (1) , Yasir J Sepah (1) , Jeffrey L Goldberg (2)

1 Spencer Center for Vision Research, Byers Eye Institute, Stanford University, Palo Alto, California, USA.
2 Spencer Center for Vision Research, Byers Eye Institute, Stanford University, Palo Alto, California, USA. Electronic address: galab8@stanford.edu.

PURPOSE: No approved therapies directly target retinal ganglion cells (RGCs) for neuroprotection or neuroenhancement in glaucoma. Recombinant human nerve growth factor (rhNGF) has been shown to promote RGC survival and function in animal models of optic neuropathy. Here we evaluate the safety, tolerability, and efficacy of short-term, high-dose rhNGF eye drops versus placebo in a cohort of glaucoma patients.

DESIGN: This was a prospective, phase 1b, single-center, randomized, double-masked, vehicle-controlled, parallel-group study.

METHODS: This study was designed to assess safety and tolerability as well as short-term neuroenhancement of structure and function (clinicaltrials.gov NCT02855450) . A total of 60 open-angle glaucoma patients were randomized 40:20 to receive either 180 ?g/mL rhNGF or vehicle control eye drops in both ey

RESULTS: Of the 60 randomized patients, 23 were female (38%) and the average age was 66.1 years. Through week 32, there were no treatment-related serious adverse events, including no unexpectedly severe progression of optic neuropathy, no adverse events affecting ocular function or pressure, and no drug-related systemic toxicity. Topical high-dose rhNGF was tolerated well, with a low level of symptom burden mainly eliciting periocular ache (in 52% of treated group and 5% of placebo group) and only 3 patients (7.5%) discontinuing treatment because of discomfort, of whom 1 patient (2.5%) prematurely withdrew from the study. There were no statistically significant differences in global indices of Humphrey visual field and no meaningful differences in total, quadrant, or clock-hour mean RNFL thickness between the groups, although both of these function and structure measures showed nonsignificant trends toward significance in favor of rhNGF. Real-world participant data was used to generate an estimate of cohort size needed to power subsequent studies.

CONCLUSIONS: Use of rhNGF is safe and tolerable in a topical 180-?g/mL formulation. Although no statistically sig

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