



December 4, 2025

Karen Berger, The Jeffrey W. Berger Research Scholarship Foundation

Re: Research Update, Khaled Safadi, M.D.

Dear Members of the Foundation,

Since my arrival at University of Pennsylvania, I have been evaluating the neuroprotective effect of deuterated docosahexaenoic acid (D-DHA) molecule on retinal ganglion cells in a mouse model of glaucoma under the mentorship of Dr. Qi Cui, M.D., Ph.D.

DHA is a polyunsaturated fatty acid that belongs to the omega-3 family. It is an essential fatty acid that is mainly obtained from diet. The most popular sources are fish oil and cold-water fish like tuna, salmon, sardine, oysters, and mussels. The DHA molecule is present in high concentrations in cell membranes and mitochondrial membranes and is vulnerable to oxidative stress, which damages membrane integrity and leads to cell death. Abstraction of hydrogen atoms from the DHA molecule is an important step in initiating the oxidation process. Therefore, substitution of the hydrogen atom in DHA with another atom, such as deuterium, can decrease oxidative damage and lipid peroxidation.

Glaucoma is the leading cause of irreversible blindness worldwide, and there is significant evidence that oxidative stress is involved in the pathogenesis of glaucoma. We aimed to investigate whether dietary substitution of regular DHA (H-DHA) with deuterated DHA (D-DHA) will decrease oxidative stress, increase RGC survival, and halt glaucoma progression in a mouse model.

For that purpose, mice with and without glaucoma were fed either D-DHA, H-DHA, or a normal diet. Preliminary results showed that DHA-enriched diet rescued RGCs in animals with induced ocular hypertension. We are finalizing our data analysis to include not only RGC quantification, but evaluations of visual function and gene expression. We anticipate manuscript submission for publication early in 2026 prior to the conclusion of my fellowship.



Through my time at University of Pennsylvania, I have learned to handle mice and measure their intraocular pressure, to perform delicate dissections of mouse eyes, to prepare retinal flat mounts and conduct immunohistochemical staining to assess RGC survival, and to work with and analyze optic nerve sections to assess axons. I have also learned to perform and analyze electroretinograms (ERGs) to assess RGC function, and to conduct and analyze quantitative real-time PCR to assess oxidative stress in the retina.

I would like to thank the Jeffrey W. Berger Research Scholarship Foundation for their support, which enabled me to further develop my knowledge and skills in glaucoma research.

Sincerely,

Khaled Safadi, M.D.