Novel Fusion Protein Approach in Slowing Glaucoma Progression With Computational and Mathematical Modelling

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Primary open-angle glaucoma (POAG) is a leading cause of irreversible blindness, characterized by progressive optic nerve damage often without symptoms until significant vision loss occurs. Existing treatments focus primarily on lowering intraocular pressure (IOP) but fail to prevent retinal ganglion cell (RGC) degeneration, highlighting the need for a non-invasive, comprehensive therapy. Our team has developed a novel eyedrop formulation combining two fusion peptides: F7, which reduces IOP by enhancing aqueous humor outflow, and BC, which protects RGCs from apoptosis. This dual-targeted approach addresses both critical aspects of glaucoma, offering a promising strategy to slow disease progression. Computational and experimental analyses reveal that both peptides exhibit excellent stability, strong target binding affinity, and favorable pharmacokinetics, including extended half-lives and optimal dose responses. They are also predicted to be non-toxic and non-allergenic, supporting their safety profile for clinical development. Our approach represents a paradigm shift in glaucoma treatment by combining IOP management with neuroprotection, aiming to improve long-term outcomes and quality of life for patients worldwide.

Awards Won:
Fourth Award of $600