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LET THERE
BE LIGHT

FOCUS: *To make a drug formulation that restores vision to those afflicted with retinitis pigmentosa (RP) and other age-related degenerative blinding diseases.*

Dr. Kramer has always been deeply gratified by attempting to unravel the mysteries of how the nervous system works. As with many of the Harrington Scholars, his boundless scientific curiosity and dedication eventually led him to devote a substantive percent of his research efforts toward a specific biomedical need.

Retinitis pigmentosa and age-related macular degeneration (AMD) are blinding diseases caused by degeneration of the light-sensing neurons in the retina. An

estimated 100,000 people in the U.S. have RP, mainly caused by inherited gene mutations. Most people with RP are legally blind by age 40.

As for AMD, one in ten octogenarians have some form of the disease, making it one of the leading causes of vision loss on the planet.

Using optopharmacology, where drugs are activated and deactivated with light, Dr. Kramer's team has found a way to

bestow light sensitivity onto the ordinarily light-insensitive retinal neurons of mice. The results of intraocular injection of BENAQ, their most promising photoswitch (a chemical sensitive to light), indicates reconstitution of light signaling through brain circuits.

"There is pure scientific joy when one makes a discovery," Dr. Kramer says. "But to know our work has the potential of helping restore people's ability to see has even doubled my enthusiasm for scientific research."

IMPACT WISH:

"Our work represents a critical step in the development of a simple drug treatment for restoring or improving visual function in human blinding diseases."

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