Media Relations

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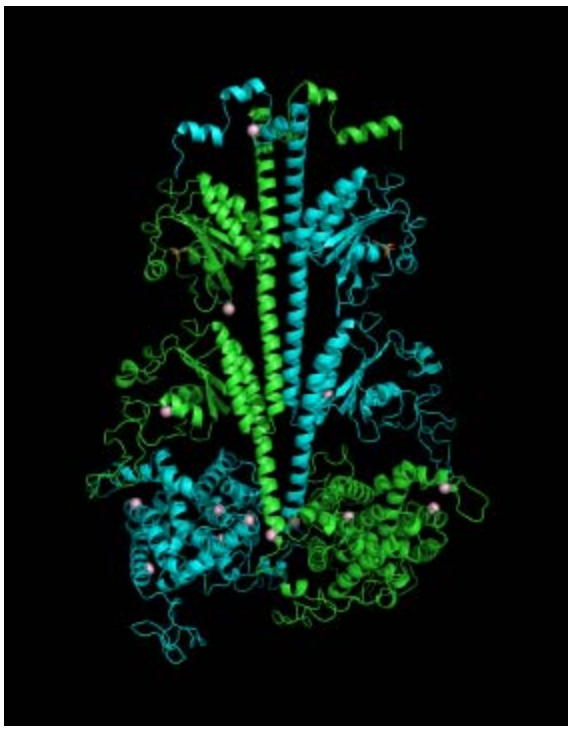
UNH Researchers Receive $1.7M NIH Grant to Study Blindness Disorder



Three-dimensional model of the PDE enzyme responsible for the first steps in vision.

DURHAM, N.H. – University of New Hampshire biomedical researchers have received $1,659,375 from the National Institutes of Health (NIH) for ongoing research on a leading inherited cause of vision loss and blindness. The grant, to Rick Cote, professor of Molecular, Cellular, and Biomedical Sciences, as well as collaborating researchers in his department – assistant professor Feixia Chu and professor Tom Laue – and Hengming Ke at the University of North Carolina, supports research into one of the proteins that causes the vision disorder retinitis pigmentosa.

Retinitis pigmentosa, or RP, is a progressive disorder that affects 100,000 people in the U.S. People with RP typically experience a gradual decline in their vision in their youth, with symptoms most commonly including a loss of peripheral and night vision. By their 40s, many people with RP are considered legally blind.

Cote and his colleagues study the enzyme phosphodiesterase, or PDE, the central enzyme in the photoreceptor cells (rods and cones) that transform light into images. Cones affect color perception and discriminating visual work like reading, while rods control peripheral vision and vision in low light. But when PDE undergoes a genetic mutation, rods and cones can die, resulting in RP. Cote's work, which has been funded by the NIH for more than two decades, aims to better understand how PDE controls this photoreceptor signaling pathway, so that new therapies can be developed to treat RP to prevent vision loss.

"RP is a late-onset retinal disease, typically starting in adolescence and progressively causing vision loss over many years," says Cote. "Thus, we have a window following the initial diagnosis of RP in which we can identify the genetic basis of the disease. In those cases where a mutation in PDE is responsible, our studies of the structure and regulation of PDE may guide clinicians in providing therapeutic treatments that stabilize PDE and thereby prolong normal vision for these affected individuals."

This interdisciplinary research team relies on a variety of approaches, including structural biology, proteomics, and biochemical tools to better understand the three-dimensional structure and complex regulation of PDE during the very first steps in the visual signaling pathway. It taps the pioneering analytical ultracentrifugation tools of UNH's Center to Advance Molecular Interaction Sciences (CAMIS), directed by Laue, and Chu's use of mass spectrometry to identify all proteins in the photoreceptor cell that bind to and regulate PDE.

The University of New Hampshire, founded in 1866, is a world-class public research university with the feel of a New England liberal arts college. A land, sea, and space-grant university, UNH is the state's flagship public institution, enrolling 12,300 undergraduate and 2,200 graduate students.

Images available to download:
http://www.unh.edu/news/releases/2014/06/images/pde6-disease-sites[1]-8038.png
Caption: Three-dimensional model of the PDE enzyme responsible for the first steps in vision.

http://unh.edu/news/cj_nr/2010/may/bp26cote.jpg
Caption: Cote and doctoral student Wei Yao work on understanding one of the proteins that causes retinitis pigmentosa, a leading inherited cause of vision loss and blindness. Cote received a $1.7 million grant from the National Institutes of Health for this work.
Credit: Lisa Nugent, UNH Photographic Services.

-30-

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