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UNH Receives \$1.8 Million For Biomolecular Research in Diabetes and Cancer

Thursday, September 24, 2020

(HTTPS://WWW.UNH.EDU/UNHTODAY/NEWS/2020/09/24/UNH-RECEIVES-18-MILLION-BIOMOLECULAR-RESEARCH-DIABETES-AND-CANCER)

DURHAM, N.H.— The University of New Hampshire will receive \$1.8 million from the National Institutes of Health (NIH) that will further molecular research to better understand drug interactions at the cellular level and help lead to the development of new targeted drugs to treat wide-spread metabolic, growth, neurological and visual disorders including diabetes and cancer.

“This is an exciting opportunity to support some of our preliminary research that showed promise in new protein drug targets involved in several diseases,” said Harish Vashisth, associate professor of chemical engineering and recipient of the NIH’s Outstanding Investigator award. “The NIH MIRA award (Maximizing Investigators’ Research Award) is meant to provide flexibility to investigators and will



HARISH VASHISTH, ASSOCIATE PROFESSOR OF CHEMICAL ENGINEERING AND RECIPIENT OF THE NIH’S OUTSTANDING INVESTIGATOR AWARD. PHOTO CREDIT: BROOKS PAYETTE / UNH

allow us to explore new ideas and change direction based on our findings during the process.”

Vashisth and his team will use computational techniques combined with experimental data to explore new and more suitable stages in the signaling cycle of a cell protein to target drug interventions. One of the studies will focus on better understanding the folding and binding mechanisms of novel peptides, a short string of amino acids that are building blocks of proteins and perform biological functions. Researchers will look at how they affect cell surface receptor proteins, part of the tyrosine kinase family, to signal responses within the cell. Small peptides can fold and bind to the receptor and mimic the normal physiological effects of natural peptides. The goal is to understand the folding and binding and ultimately find drugs to work around the fold.

“Imagine a cell as a flexible bag with the outer surface as the cell membrane containing proteins that act as gate keepers to communicate, or sense, specific conditions outside the cell that in turn trigger a cascade of signaling inside the cell,” said Vashisth.

Their second research project will take an unconventional approach to target protein-protein interactions in proteins inside the cell, part of the G-protein coupled receptor family, that are important in touch, smell and sight and are implicated in many diseases. This work would create new small molecule drugs that would cross inside the membrane rather than bind to an outside receptor. These drugs would be synthetic and not naturally occurring.

The NIH MIRA provides support for the research in an investigator's laboratory that falls within the mission of National Institute of General Medical Sciences (NIGMS). The goal of MIRA is to provide investigators with greater stability and flexibility, allowing them to pursue new research directions as opportunities arise, thereby enhancing scientific productivity and the chances for important breakthroughs. The program helps distribute funding more widely among the nation's highly talented and promising investigators. MIRA grants are generally for 5 years, for both established investigators and early stage investigators.

The University of New Hampshire (<http://unh.edu>) inspires innovation and transforms lives in our state, nation, and world. More than 16,000 students from all 50 states and 71 countries engage with an award-winning faculty in top-ranked programs in business, engineering, law, health and human services, liberal arts and the sciences across more than 200 programs of study. As one of the nation's highest-performing research universities, UNH partners with NASA, NOAA, NSF and NIH, and receives more than \$110 million in competitive external funding every year to further explore and define the frontiers of land, sea and space.

PHOTO FOR DOWNLOAD:

http://unh.edu/sites/default/files/media/harish_vashisth.png (http://unh.edu/sites/default/files/media/harish_vashisth.png)

Caption: Harish Vashisth, associate professor of chemical engineering and recipient of the NIH's Outstanding Investigator award.

Photo credit: Brooks Payette / UNH

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