Grant, student research put the 'interdisciplinary' in cancer research

Arizona State University

If ever you have wondered how interdisciplinarity works, or if ever you have pondered its value, Peter Jurutka is about to demonstrate. In fact, he could give you a million-and-a-half examples.

Jurutka, an associate professor in the Division of Mathematical and Natural Sciences [1] in Arizona State Universitys New College of Interdisciplinary Arts and Sciences [2], is part of a team that has been awarded a prestigious and highly competitive $1.5-million NIH R01 grant to examine important questions in cancer disease and prevention. Specifically, Jurutka and Elizabeth Jacobs of the Arizona Cancer Center will bring molecular medicine and human epidemiology together in a unique interdisciplinary approach to student-driven colorectal cancer research.

Most in the industry refer to the National Institutes of Health R01 award as the "gold standard" of grants, and Jurutka agrees, because, he says, it comes out of the most highly competitive and carefully reviewed granting process. The Research Project Grant (R01) is the original and historically oldest grant mechanism used by NIH and provides a stable source of funding to researchers through its five-year term.

The grant, "Vitamin D Status, Genetic Variation in Vitamin D Signaling and Metabolism, and Risk for Colorectal Neoplasia," will be divided equally between ASU and the University of Arizona, with the Jurutka research team at the West campus taking the lead in carrying out the molecular biology studies, while the effort led by Jacobs will pilot the epidemiology portion of the investigation.

Molecular biology focuses on the formation, structure, and function of macromolecules essential to life, such as nucleic acids and proteins, and especially with their role in cell replication and the transmission of genetic information. Conversely, epidemiologists study the frequency and distribution of diseases within human populations and environments. Specifically, they measure the incidence of disease occurrence and relate it to different characteristics of populations and environments.

"This is a very exciting collaboration," says Jurutka, who received his Ph.D. in biochemistry from the University of Arizona in 1993 and has been on the New College faculty roster since 2004. "In the past, epidemiologists and molecular biologists have not routinely combined forces to study the same questions at the same time.

"In this study, Dr. Jacobs and I will examine the effects of genetic variation in key enzymes in the vitamin D metabolism pathway, and if those differences lead to a differential risk for colon cancer. This will create a better understanding of

vitamin/nutrient chemoprotection against colon cancer at both the molecular and population levels."

The focus of the research in Jurutkas lab will be to acquire molecular evidence for the functional effects of genetic variation in key enzymes in the vitamin D metabolism pathway. Jurutka says individual differences in the human populations ability to synthesize or degrade vitamin D may lead to differences in the risk for certain disease states, including colorectal cancer.

Colorectal cancer is a disease in which normal cells in the lining of the colon or rectum begin to change, start to grow uncontrollably, and no longer die. Both genetic and environmental factors can cause the changes. Most colon and rectal cancers are a type of tumor called adenocarcinoma, which is cancer of the cells that line the inside tissue of the colon and the rectum.

According to the American Society of Clinical Oncology (ASCO), nearly 150,000 adults in the U.S. will be diagnosed with colorectal cancer in 2010, with almost a third of those cases resulting in death.

Jurutka will be bringing his students onto the research team, as usual. An active member of several scientific research societies, his lab provides undergraduate students with research opportunities that have led to more than a dozen published scholarly papers co-authored by his ASU students and focused on such topics as the fight against cancer and a greater understanding of post-menopausal osteoporosis. He has received a number of prestigious honors, including the Norwich-Eaton Young Investigator Research Award for significant contributions to the field of bone and mineral research, and the John Haddad Young Investigator Award presented by Advances in Mineral Metabolism and the American Society of Bone and Mineral Research.

"Absolutely we will have our students involved in this important research," he says. "Students have already been involved in the preliminary research leading up to this grant award, and student-driven research will continue to provide valuable contributions to this novel work throughout the funding period of five years and beyond."

Zachary Hernandez is a New College senior who has done research in Jurutkas lab. An ASU SOLAR fellow and a National Hispanic Scholar, he has been recognized nationally for his vitamin D research relative to heart disease.

"The opportunities Dr. Jurutka provides in his student research lab have allowed me to get a better feel for what basic science research is like," says Hernandez, whose recent research presentation at the annual meeting of the Society for the Advancement of Chicanos and Native Americans in Science (SACNAS) was good enough to earn him the only honors awarded in the endocrinology research section at the Dallas conference. "As I move on to medical school I am interested in possibly branching out to clinical research, and the interest has been sparked by the research experience here in New College and with Dr. Jurutka; it has made me a more attractive applicant for medical school."

Jurutka notes that the interdisciplinary nature of the research makes this particular project unique; few such studies have been conducted with a focus on both the molecular and epidemiological effects of genetic variation in two key enzymes. He says compelling evidence exists that active vitamin D metabolites play a role in reducing the risks for colorectal neoplasia – the abnormal proliferation of cells.

The eventual applications of the research are important. Jurutka zeroes in on a mind-boggling statistic.

"Given that colorectal cancer is one of the few preventable cancers, and that one in 17 people in this country will develop this disorder in their lifetime, we believe that the results of this research will lead not only to a greater understanding of the molecular aspects of the disease, but also it will allow us the potential to offer a cost-effective preventative regimen for colorectal carcinogenesis by understanding and establishing optimal vitamin D intake/consumption."

SOURCE [3]

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