

Marquette University: Health sciences faculty receive \$3.02 million grant to study exercise limitations in the pre-diabetic population

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MILWAUKEE — [Dr. Sandra Hunter](#), professor of exercise science, and [Dr. Christopher Sundberg](#), assistant professor of exercise science, both in the Department of Physical Therapy in Marquette University's College of Health Sciences, have been awarded a \$3.02 million R01 grant from the National Institutes of Health's National Institution on Aging to study the limitations of exercise in people diagnosed with pre-diabetes.

People who are diagnosed as pre-diabetic or with Type-2 diabetes are at a higher risk for cardiovascular disease, for which exercise is a key preventative measure. This study will look at the factors that lead to fatigue, exhaustion and other impediments for exercise performance to better understand what limits exercise and functional performance in people with diabetes. The research will also work to aid in the development of targeted, more effective exercise programs.

"Pre-diabetes affects about 90 million Americans, and both pre-diabetes and Type-2 diabetes are highly associated with cardiovascular disease and among the top five causes of mortality worldwide," Hunter said.

Sundberg added, "Exercise is the cornerstone of management of cardiovascular risk and is most efficacious during the pre-diabetes stage, but people who are pre-diabetic are limited by excessive fatigability of lower extremities during exercise, which limits exercise performance."

Researchers will conduct their study with two aims: The first aim will study blood flow and muscle oxygenation in the legs in response to dynamic fatiguing exercise. The second aim of this study will be a clinical trial that will determine the effectiveness of resistance exercise training coupled with blood flow restriction to improve fatigability and vascular function in people with diabetes.

“Drs. Hunter and Sundberg have assembled a strong team of colleagues from across campus to address a very serious ancillary health issue facing those who are pre-diabetic or suffer from Type-2 diabetes,” said Dr. William Cullinan, dean of the College of Health Sciences. “Their expertise is uniquely positioned to gain great insight into what causes excessive fatiguability in pre-diabetics, as well as develop novel training programs designed to overcome these challenges and promote positive cardiovascular health.”

Hunter and Sundberg are principal investigators on the award and are joined by co-investigators [Dr. Carolyn Smith](#), clinical associate professor of exercise science; [Dr. Kathleen Lukaszewicz](#), clinical associate professor of physical therapy; and [Dr. Mehdi Maadooliat](#), associate professor of mathematics and statistical sciences in the Klingler College of Arts and Sciences. Dr. Michael Widlansky, Northwestern Mutual Professor of Cardiovascular Medicine at the Medical College of Wisconsin, and Dr. Shane Phillips, professor of physical therapy at the University of Illinois at Chicago, are also co-investigators on the study.

The National Institutes of Health’s Research Project Grant (R01) is the original and historically oldest grant mechanism used by the NIH. The R01 provides support for health-related research and development based on the mission of the NIH. R01s can be investigator-initiated or can be solicited.