Researchers find significant link to daily physical activity, vascular health

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As millions of Americans resolve to live healthier lives in 2015, research from the University of Missouri School of Medicine shows just how important diligent daily physical activity is. The researchers found that reducing daily physical activity for even a few days leads to decreases in the function of the inner lining of blood vessels in the legs of young, healthy subjects causing vascular dysfunction that can have prolonged

effects.

Paul Fadel, associate professor of medical pharmacology and physiology, and John Thyfault, associate professor of nutrition and exercise physiology, also found that the vascular dysfunction induced by five days of inactivity requires more than one day of returning to physical activity and taking at least 10,000 steps a day to improve.

"We know the negative consequences from not engaging in physical activity can be reversed," said Fadel. "There is much data to indicate that at any stage of a disease, and at any time in your life, you can get active and prolong your life. However, we found that skipping just five days of physical activity causes damage to blood vessels in the legs that can take a prolonged period of time to repair."

"Inactivity is typically going to lead to people being overweight and obese," said Fadel. "The next step after that is insulin resistance which leads to Type 2 diabetes and cardiovascular disease."

According to the Centers for Disease Control and Prevention, more than 29 million Americans are living with diabetes. That number is expected to continue to increase: the CDC estimates one-third of people born after 2000 will have Type 2 diabetes in their lifetimes.

"The best treatment is to become more active, and our research lends proof to that concept," Fadel said. "If you do not realize how harmful sitting around all day and not doing any activity is to your health, this proves it."

The researchers studied the early effects on the body's blood vessels when someone transitions from high daily physical activity—10,000 or more steps per day—to low daily physical activity, less than 5,000 steps per day. Five thousand steps is the national average, but only half of the

daily recommendation from the U.S. Surgeon General. The researchers found going from high to low levels of daily physical activity for just five days decreases the function of the inner lining of the blood vessels in the legs.

"The impairment we saw in just five days was quite striking," Fadel said. "It shows just how susceptible the vascular system is to physical inactivity."

For several years, Fadel and Thyfault have studied inactivity and glycemic control as well as how inactivity affects blood flow and vascular function through the body. A decrease in blood vessel function has been shown in previous studies to be linked to early cardiovascular death and hypertension. Now, this research shows that even an acute period of inactivity of five days changes the measure that is already known to be important for long-term cardiovascular health. Also, although blood flow responses to glucose ingestion were not affected by five days of inactivity, impairments in glycemic control and insulin sensitivity are also a consequence of reduced daily physical activity.

Counting steps and daily physical activity is different than defined exercise, such as working out at the gym. While there are significant benefits to defined exercise, Thyfault and Fadel's research is based on what amounts to 30 minutes of moderate activity per day.

"We need to teach and explain to people about the physiology of their bodies and the physiology of the disease process and help them understand that inactivity plays a foundational role in the disease process," said Thyfault. "Then we give them behavioral tools, like pedometers, to monitor and help them achieve higher physical activity so they start to see and feel health improvements. These studies are proof we need to get people to understand their activity every day plays a role in their health, and that their health is not simply a matter of body weight

and how they look in the mirror."

The research was published in September in *Medicine and Science in Sports and Exercise*.

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