

New Year's resolution to exercise affects more than your waistline

ANN ARBOR, Mich.—Freshly dedicated to a resolution to lose those extra pounds in 2003, many Americans will head to the gyms in January.

While some health and appearance benefits are well known, University of Michigan researchers are working to understand the details of how exercise affects us: How might it change the proteins in our tissues and organs, or our secretion of hormones? How does our body use its fuel, and how and why is that different in a person who is obese or who has a disease like diabetes?

The Center for Exercise Research includes U-M Division of Kinesiology faculty members Marvin Boluyt, Katarina Borer and Jeffrey Horowitz. Boluyt examines the heart—exercise-induced heart growth, heart failure, molecular cardiology and aging of the heart. Borer focuses on exercise and post-menopausal women in her current work, including looking at the effects of exercise on the secretion of various hormones.

Horowitz is primarily interested in the regulation of fat and carbohydrate metabolism. Boluyt and his team have mapped the heart proteins of rats, looking at which proteins are changed by exercise. They are pursuing more information about one protein in particular that seems related to use of testosterone in exercise. He sees potential for a medication that might give people with heart disease and who can't exercise some of the benefits of exercise. He can also see his research helping improve understanding of how much exercise is good and when it's not good. Borer, who has a doctorate in zoology, also began her research with rodents. She started researching golden hamsters because they voluntarily run marathon distances each night.



Borer's observations of hamsters unearthed unexpected information: running without coercion triggered secretion of growth hormones. Borer now studies women to see what happens hormonally when they exercise and to examine whether hormone secretion changes when they exercise on an empty stomach versus shortly after a meal. The goal is to develop specific recommendations about ideal levels of exercise for burning calories, maintaining bone mass and heart health, and perhaps other goals. Horowitz wants to know how we use fuel and how that changes in a person with disease. His study participants exercised in the morning and then ate either low-fat or high-fat meals. Then Horowitz measured insulin sensitivity the next morning, discovering that insulin sensitivity improved the day after a single session of exercise regardless of what people ate in the hours thereafter.

Understanding insulin sensitivity—that is, how effective insulin is at promoting use of sugars—is especially helpful for diabetics and those at risk for developing diabetes, as that disease involves trouble with regulating the uptake and use of sugar. Horowitz also is interested in how exercise affects cardiovascular risk factors, and how lipids are cleared from the bloodstream. In this continuing study, volunteers drink a fat-filled shake in the morning, then either relax in bed all day or walk on a treadmill periodically throughout the day. The fat drink has isotopic tracers so Horowitz and his team can follow where the ingested fats go. Both Borer and Horowitz conduct many of their studies at the U-M Health System so participants can be closely monitored for hours at a time.

To learn more about the Center for Exercise Research, visit <http://www.umich.edu/~divkines/kinweb/research/research.htm> Scroll down to Directory of Research Centers and Laboratories, and click on Center for Exercise Research.

U-M has professional TV studios and uplink capabilities. Photos of the researchers in their labs are available.

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