Public Abstract
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Ph.D.
Physiology
Physical Inactivity-Induced Dysregulation of Skeletal Muscle and Adipose Tissue Metabolism
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Graduation Term Winter/Spring 2005

Whereas obesity was rare just a century ago, today over 30% of the population of the United States is overweight or obese. Obese individuals are at a much higher risk for developing diabetes, heart disease, cancer, and a litany of other health problems. The amount of physical activity that people do every day has been declining steadily, and it is this lower amount of regular physical activity that is the main cause of the increase in obesity. The goal of this research was to better understand why a decrease in physical activity brings about various health problems. To simulate the decline in physical activity, rats that had been active on voluntary running wheels for three weeks had their wheels locked for one or two days. After just two days of lower physical activity, the animals had a decreased ability for insulin to cause glucose to go into muscle, or a decreased efficiency of insulin. This is interesting, as a decreased efficiency of insulin is common to both obesity and diabetes. After two days of lower physical activity, the animals also had a 25% increase in the weight of one of their major fat depots. It was found that regular physical activity hindered the ability to store fat, but stoppage of the regular physical activity boosted the ability to store fat. These findings emphasize the importance of regular physical activity, and they begin to provide a biology-based understanding of how a lower level of physical activity leads to disease.