

# **PHYSIOLOGICAL RESPONSES OF ADIPOSE TISSUE TO DIFFERENT MODELS OF PHYSICAL ACTIVITY AND INACTIVITY**

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## **ABSTRACT**

Childhood is a critical time of growth, and decisions made during this time lead to positive and negative health consequences, specifically pertaining to adiposity. There is convincing evidence that children who are overweight and obese are at higher risk for adult obesity and risk factors associated with obesity for their whole life course.

A unique model of childhood obesity to test whether: 1) seven days of decreased physical activity (wheel lock) in 49-56 day old rats and 70-77 day old rats would result in gains in visceral adipose mass seen in age-matched sedentary rats concurrent with an increase in adipocyte size and inflammatory mRNA expression, and 2) glucocorticoid block would attenuate the visceral adipose depot gains seen with wheel lock in rats.

These studies show that the age at which wheel lock occurs influences visceral adipose tissue growth. Further, blocking glucocorticoid action attenuated rapid growth of adipose tissue mass that occurred during wheel lock at the same level that maintaining voluntary wheel running does, but importantly it does not exhibit the same transcript expression as running.

Collectively, these findings reinforce the role of the beneficial effects of physical activity. Sustained daily physical activity in young animals maintains lower body fat, lowers visceral adiposity and total adipocyte number, which can be translated into a powerful public health message of primary prevention of obesity.