Exercising early in life yields rewards in adult years

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Theodore Garland is a professor of biology at UC Riverside. Credit: CNAS, UC Riverside.

More than one in three adults in the United States is considered to be obese. What impact can exercise done early in life have on the propensity for exercising during the adult years?

A team of researchers at the University of California, Riverside did experiments on mice in the lab to find out. Specifically, they evaluated the effects of early exercise on adult physical activity, body mass, food consumption and circulating leptin levels.

They found that early-age exercise in mice has positive effects on adult levels of voluntary exercise in addition to reducing body mass - results that may have relevance for the public policy debates concerning the importance of physical education for children.

"These results may have implications for the importance of regular physical education in elementary and middle schools," said Theodore Garland, a professor of biology, who led the research project. "If kids exercise regularly through the school years, then they may be more likely to exercise as adults, which could have far-reaching positive effects on human health and well-being.

"Modest levels of exercise can perhaps lower body mass without necessarily triggering homeostatic compensatory responses in food intake. If true, and if this relationship exists in humans, then it could prove of value for ultimately determining recommended daily exercise criteria."

Study results appear online in *Physiology & Behavior*.

The researchers conducted their experiments on male mice, half of which were selectively bred for high voluntary wheel running (high runners), the rest serving as the control. Half of the high runners and half of the control mice were allowed wheel access when they were about 24 days old for a total of 21 days, which got the mice through puberty. The rest of the mice were given no wheel access. After three weeks the researchers removed the wheels for seven weeks. Then, they gave all the mice wheel access for about two weeks. They continued to monitor the mice's cage activity, food consumption and body mass.

They found increased adult wheel running on both the high runners and the control lines of mice during the first of the two weeks of adult testing.

"Although the positive effect of early-life exercise lasted for only one week, it is important to note that one week in the life of a mouse is equivalent to about nine months for humans," Garland said. "Our results suggest that any positive effects of early-life exercise on adult exercise propensity will require reinforcement and maintenance if they are to be long-lasting."

His team of researchers found, too, that all mice that had access to early exercise were lighter in weight than their non-exercised counterparts.

Garland explained that, in general, exercise will stimulate appetite sooner or later. However, it is possible that certain types of exercise, engaged in for certain durations or at certain moderate levels, might not stimulate appetite much, if at all, at least in some individuals.

"If we could understand what sorts of exercise these might be, then we might be able to tailor exercise recommendations in a way that would

bring the benefits of exercise without the compensatory increases in appetite that usually occur, hence leading to better prospects for weight loss," he said.

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