CALIFORNIA STATE SCIENCE FAIR
2017 PROJECT SUMMARY

Name(s)

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Project Number

J1309

Project Title

Wheel Running During Adolescence Reduces Weight Gain and Increases Exercise Output During Adulthood

Abstract

Objectives/Goals

To determine whether physical exercise during adolescence will have beneficial effects in adulthood such as decreased body weight and greater exercise output.

Methods/Materials

Adolescent (43-day-old, n=5 males) and adult rats (70-day-old, n=6 males, n=6 females) were single housed in rat cages equipped with running wheels (Nalgene activity wheels) for 6-10 weeks and their activity (number of revolutions of wheel per day) was recorded with VitalView Software (MiniMitter/Resperonics Inc). Rats were weighed once a week to monitor body weight. All procedures were approved by the Institutional Animal Care Committee at The Scripps Research Institute. Age matched male (n=13) and female (n=6) non running control rats were single housed in the Vivarium. A total of 36 Long Evans rats were used in my study. Data was analyzed by a statistical software called GraphPad Prism.

Results

Two-way analysis of variance followed by Fishers LSD posthoc tests were performed to determine group differences at each timepoint. Adult female rats weigh less than adult male rats ($p<0.05$). Adult male rats that performed wheel running during adolescence weigh less than adult male rats that did not exercise during adolescence or did not exercise at all ($p<0.05$). Wheel running during adulthood reduced body weight in adult male rats ($p<0.05$) and did not alter body weight in female rats. Adult female rats run more distance than adult male rats ($p<0.05$). Adult male rats perform equally to adult female rats only when they start wheel running during adolescence ($p>0.05$).

Conclusions/Discussion

My results supported my hypothesis because there was a lower body weight and greater exercise output in rats in adulthood when they started wheel running during adolescence. My findings, in addition to benefits of exercise, reveal gender differences in physical activity in rodents. The gender difference in physical activity is abolished when activity was initiated early on during adolescence in the lower performing gender. This effect is attributable to the lower gain in body weight in adulthood in male rats due to wheel running performed during adolescence. Based on these observations in animal studies, we can speculate that people who exercise during adolescence will have a superior physical exercise output in adulthood compared to adults who did not exercise during adolescence.

Summary Statement

My project is about the beneficial effects of voluntary physical exercise during adolescence on body weight and exercise output during adulthood.

Help Received

My work was performed under the supervision of McKenzie Fannon and Dr. Chitra Mandyam at The Scripps Research Institute. I would like to acknowledge that I used the Vivarium at the Scripps Research Institute to perform my research.