

Comparison of two types of mouse running wheels

G S PRABHU, D P FERGUSON, & J T LIGHTFOOT

Department of Health & Kinesiology, Texas A&M University

ABSTRACT

Voluntary wheel running of mice has been used as a measure of physical activity in a multitude of studies. The aim of this study was to validate low profile wireless running wheels (Med Associates Inc.) against solid-surface, traditionally-mounted vertical running wheels. All animal procedures were approved by the Texas A & M IACUC. Eleven week old female C57BL/6J mice (Jackson Labs, Bar Harbor, ME) were randomly assigned to either vertical running wheels (n=5) or low profile running wheels (n=5). Daily distance run was monitored for 12 days following initial wheel orientation exposure. Average daily distance run by the mice was not different ($p=0.37$) between the two types of wheels, with the mice on vertical wheels averaging $6.74(\pm 1.74)$ km/day; average \pm SD) versus $8.58(\pm 1.87)$ km/day) on the low profile wheels. The distance run by the mice on the low profile wheels was also compared to the distance the same mice ran on the vertical wheels (8.6 ± 1.04 km/day; $p=0.96$). Thus data collected on the low-profile wheels was similar to the vertical running wheels not only among two age and sex-matched groups of mice, but also when the same group of mice ran on the two wheel types. However, on the low-profile wheels, the inability to measure duration of wheel running due to software limitations of the data-collection bin size eliminates the calculation of running speed, both of which are important phenotypes of physical activity. Additionally, there were also numerous observations of the mice coasting on the low-profile wheels, an issue not present on the traditional, solid-surface wheels. The presence of coasting would inflate distance measures over true measures of activity and may have been responsible for the non-significant elevation of distance on the low-profile wheels. Thus, if accurate measures of distance or measurement of duration and speed are not required, the low-profile wheel is a valid methodology.

Generously supported by NIH NIAMS AR050085.

