Public Abstract

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Title:Effects of Voluntary Running on Brain Mitochondrial Biogenesis in Rats Selectively Bred to Run High and Low Nightly Distances.

It is known that brain mitochondrial dysfunction is strongly associated with the advent of neurodegenerative diseases and that exercise is an important non-pharmaceutical method of maintaining brain mitochondrial health. The purpose of this study was to determine whether innate differences in the motivation to voluntarily run play a role in mitochondrial biogenesis of the selected brain regions as a result of exercise. Methods: HVR, LVR, and WT rats were randomly selected at 28-34 days of age and divided into two groups: those with a voluntary-running wheel (RUN) and those without a voluntary-running wheel (SED). For a period of 5 weeks, running distance, and duration was recorded daily, while food intake and body weight were recorded weekly. Western blotting was performed on the NAc, HC, and LH brain tissue to examine PGC-1? and mitochondrial respiratory chain complexes 1-5. Results: Despite the inherent differences in motivation to run between the selectively bred rat lines and the WT rats, data suggests that the LVR SED rats possessed the highest content of PGC-1? as well as mitochondrial respiratory chain complexes. Conclusions: These results suggest that, perhaps, the selective breeding model unintentionally co-selects for genes affecting the content of mitochondria in the selected brain tissues. It is also possible that the SED animals, being dual-housed, conferred this advantage as a result of cage activity and social stimulation.