



# Research Week 2020

## Effects of voluntary exercise on behavioral and cognitive performance in mice; a pilot study

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### Keywords

Running Wheel, cognition, learning, memory, mice

### Abstract

Alzheimer's disease (AD) is a neurological disorder that affects 44 million people worldwide and is the leading cause of dementia. It is characterized by memory loss, challenges with executive function, and difficulties learning and storing new information, among many other symptoms. Age is the most significant risk factor for AD, interacting with several genetic and environmental risk factors to contribute to disease manifestation. In addition to AD, age-related cognitive decline (ACD) and mild cognitive impairments (MCI) are of increasing concern with the increased longevity. There might be protective factors that can help mitigate the development of ACD, MCI, and AD. In this pilot study, we started to explore the effects of exercise as possible protective factor in human apoE mice. Voluntary wheel running, even in mild bouts, can improve cognition, memory, and executive function. This indicates that physical exercise may have some protective effect for ACD, MCI, and AD. Three-month-old male and female human apoE mice and 20-month-old wild type male mice underwent one week of home cage activity monitoring followed by a baseline analysis of muscle strength using the grip strength and wire hang tests. Subsequently, mice were provided access to running wheels for six weeks. Performance on the grip strength and wire hang tests were assessed again, followed by home cage activity monitoring for another week. Following this week of home activity testing, mice were tested for spatial and emotional learning and memory. Finally, the mice were perfused and their brains were harvested and preserved for immunohistochemical analyses. Preliminary results indicate that, as expected, wheel running improves some measures of cognition as well as general activity. A progress report on this pilot study will be presented during the Research Week. Funded partially by R21 AG065914 and RF1 AG059088.

