

## Introduction

- Alzheimer's disease (AD) is associated with ageing and brain atrophy.
- Initial volume loss occurs in the temporal lobe regions.
- It has been demonstrated that brain atrophy and cognitive functioning decline in unison, the loss of brain volume is associated with memory and cognitive decline.
- Exercise has been demonstrated to be protective against cognitive decline and AD.
- The mechanisms by which exercise exerts a protective role are not fully understood.

## Objective

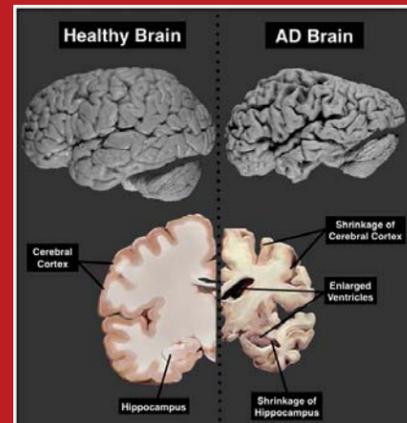
- Determine the association between cardiorespiratory fitness and temporal lobe volume in a cohort of older adults at-risk for AD.

## Methods

- Sixty three participants from the Wisconsin Registry for Alzheimer's Prevention participated in this study.
- All participants were classified as at risk for AD by either having a family history of the disease, or being at genetic risk (APOE e-4).
- Participants performed a peak effort exercise test on a graded treadmill (VO<sub>2</sub>peak).
- Participants underwent structural MRI scanning where temporal lobe volumes were derived using the Freesurfer software.

## Participants (n=63)

Males / Females	24 / 39
Age (years)	63±6
Height (inches)	66±4
Weight (pounds)	175±38
Fitness (VO <sub>2</sub> )	26±6
Right Temporal Pole Volume (mm <sup>3</sup> )	389±57

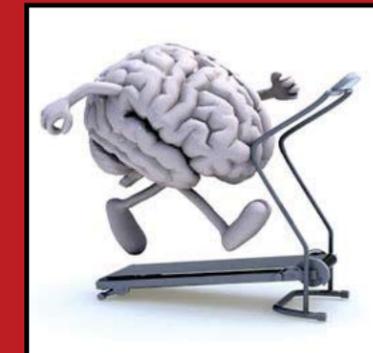
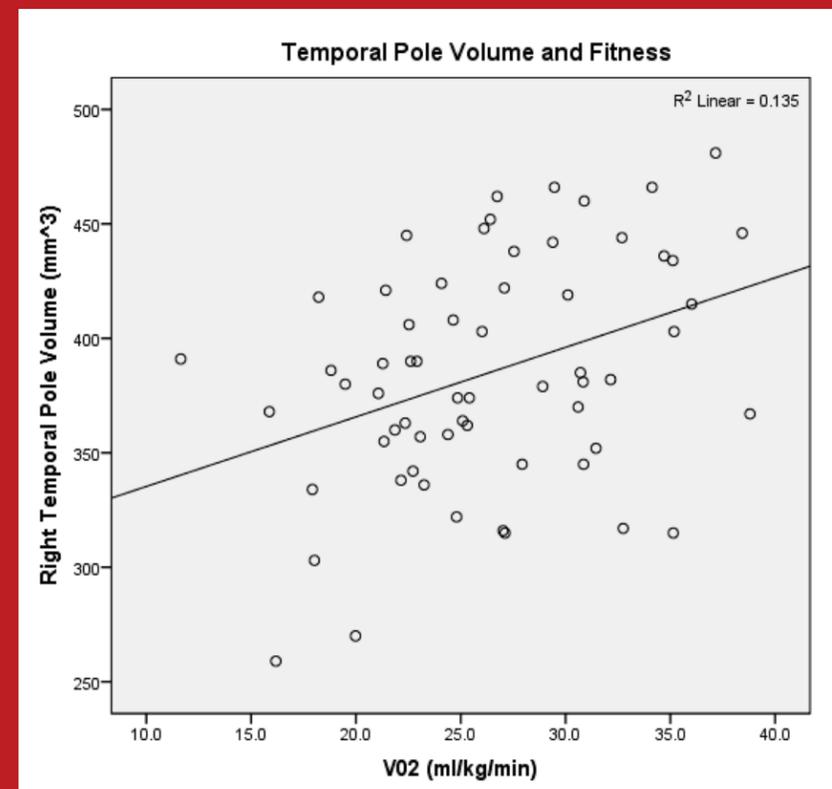


## Exercise Testing

- The gold standard in assessing cardiorespiratory fitness is through a maximal oxygen consumption test (VO<sub>2</sub>peak), which requires participants to exercise until volitional exhaustion while measuring both oxygen consumption and carbon dioxide production.
- High levels are indicative of increased habitual physical activity, and low levels are related to decreased physical activity.
- All the exercise tests were conducted on treadmills while continuously measuring expired gases. The treadmill grade was incrementally increased until participants reached volitional exhaustion (i.e. could no longer continue exercise).

## Results

- Cardiorespiratory fitness was positively associated with right temporal pole volume ( $p < .05$ ) after controlling for age, gender, education, and intracranial volume.



## Key Findings

- Higher cardiorespiratory fitness is associated with greater right temporal pole volume in adults at risk for AD. This suggests that for individuals at risk for AD, participation in regular exercise, that improves or maintains cardiorespiratory fitness levels, may delay brain atrophy.