

Six Steps For Enhancing Your Memory and Brain Vitality

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Medical Director: NeuroGrow Brain Fitness Center

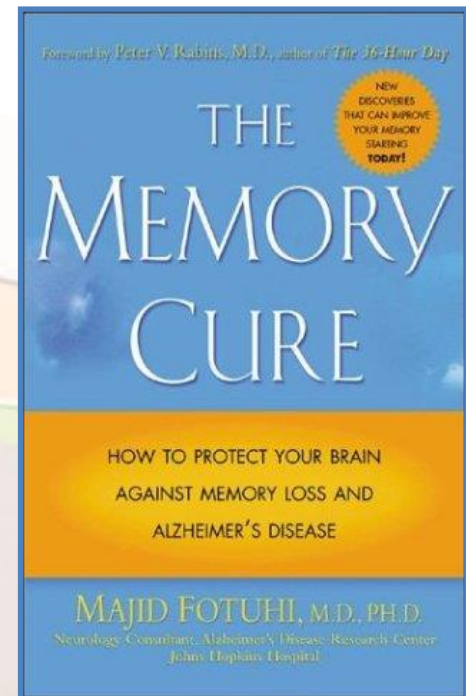
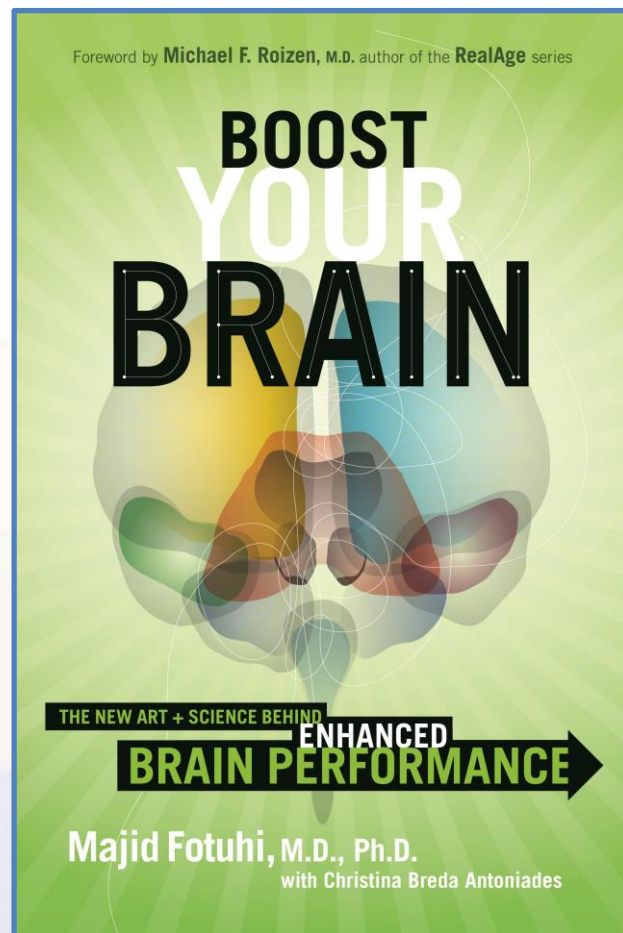
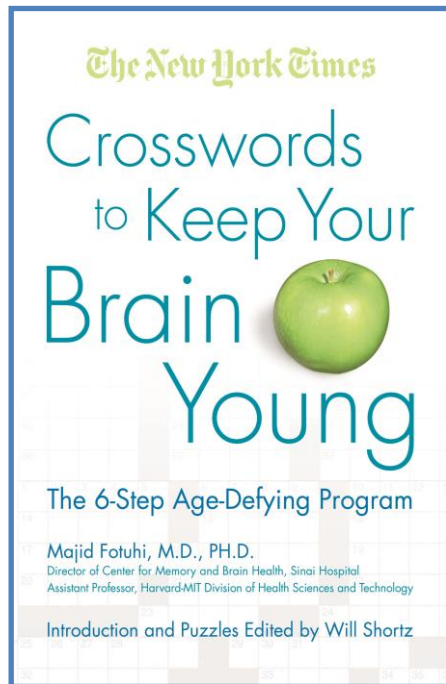
Affiliate Staff: Johns Hopkins Medicine

My Father: There Is No Limit in What Your Brain Can Do



Neuroplasticity in the Brain







Forbes

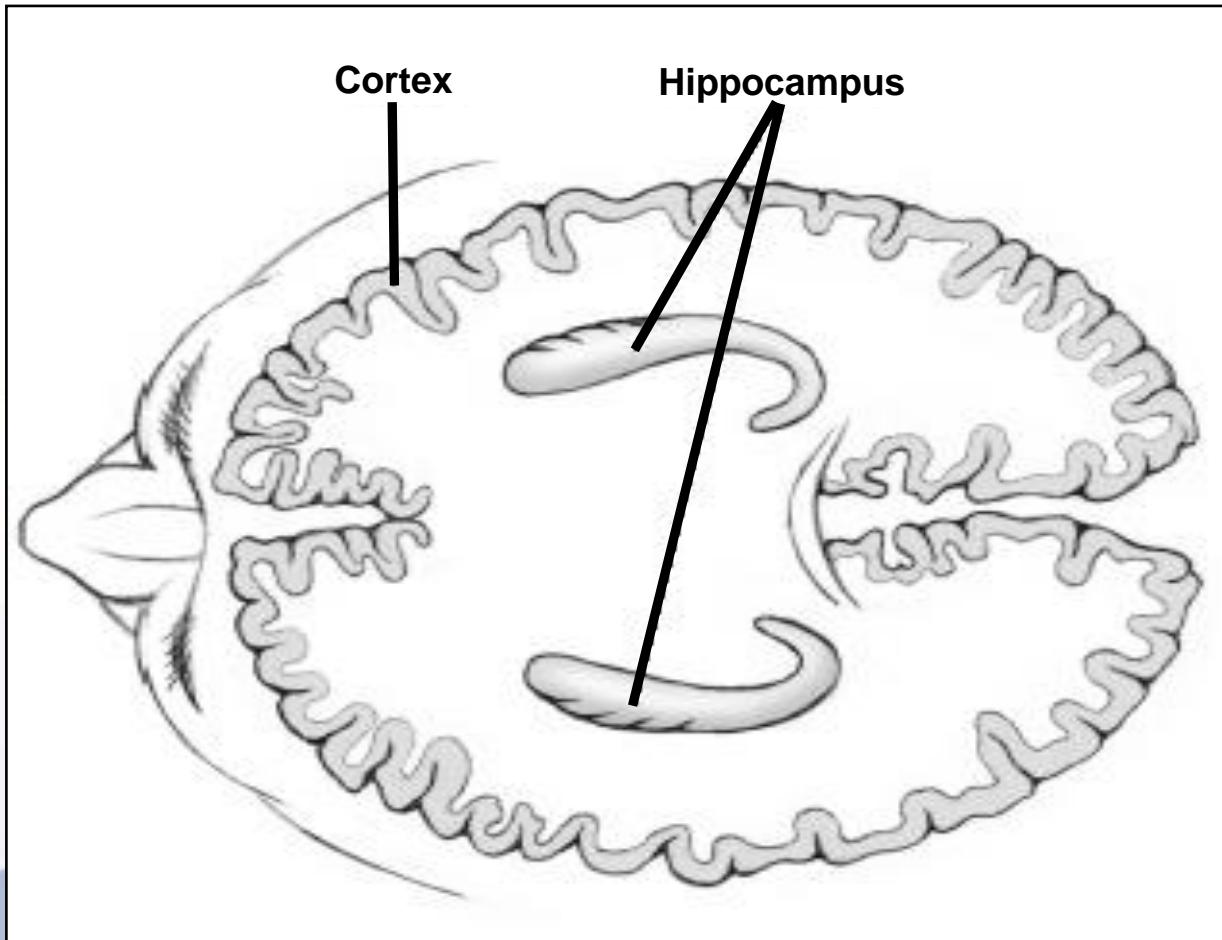


Objectives

1. Basic Anatomy of Memory in the Brain
2. Effects of Aging on Your Brain
3. Six Ways to Sharpen Your Brain
4. Brain Fitness Program

Cortex: Long-term memory

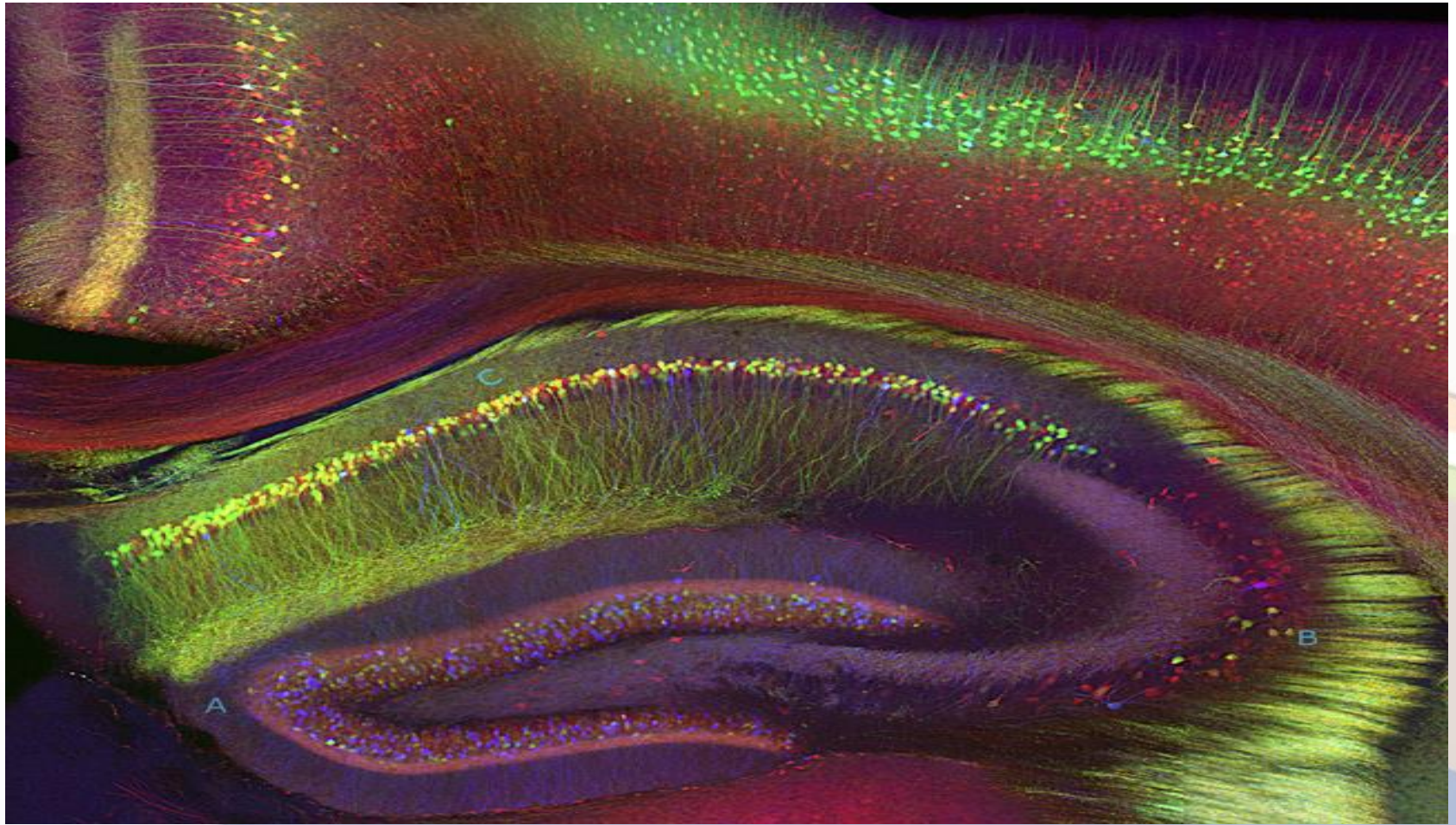
Hippocampus: Short-term memory



Hippocampus



Neurons in Hippocampus



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With aging, hippocampus and cortex shrink faster than the rest of the brain

- They atrophy by about 0.5% per year after age 50
- With advancing age, we have more difficulty with
 - Memory
 - Sustained attention
 - Processing information quickly

What Causes Atrophy in the Cortex & Hippocampus?

Insomnia

Sleep Apnea

Obesity

Smoking

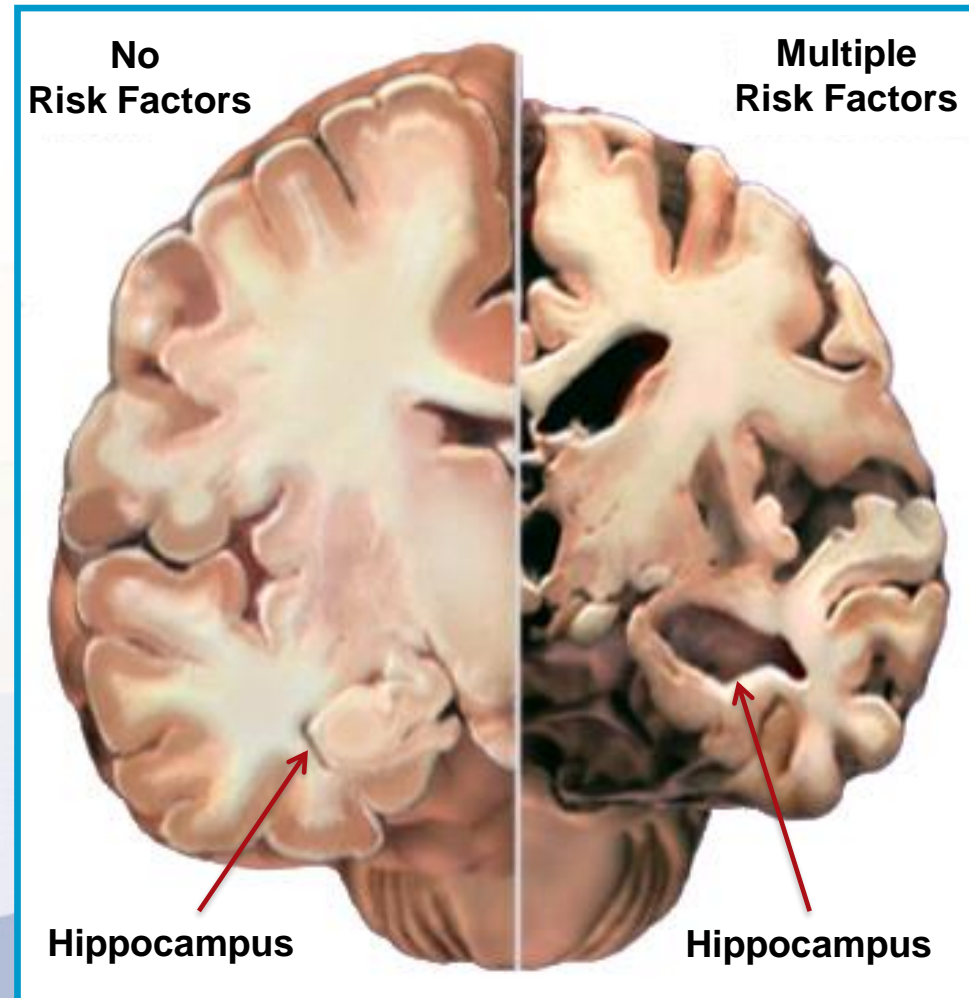
Diabetes

Concussion

Stress
Depression

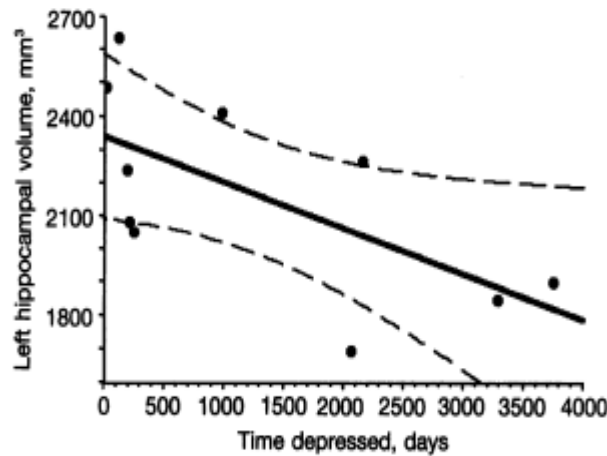
Alzheimer's

Multiple Risk Factors, Much Smaller Cortex & Hippocampus

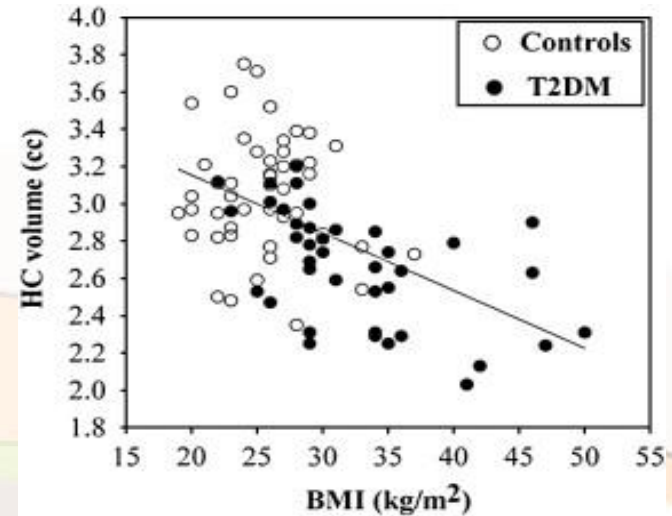


More Depression, Obesity, Stress, and Insomnia, Smaller Hippocampus

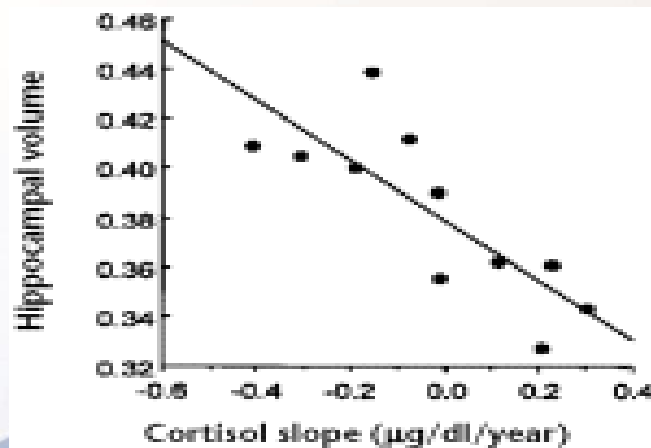
Depression¹



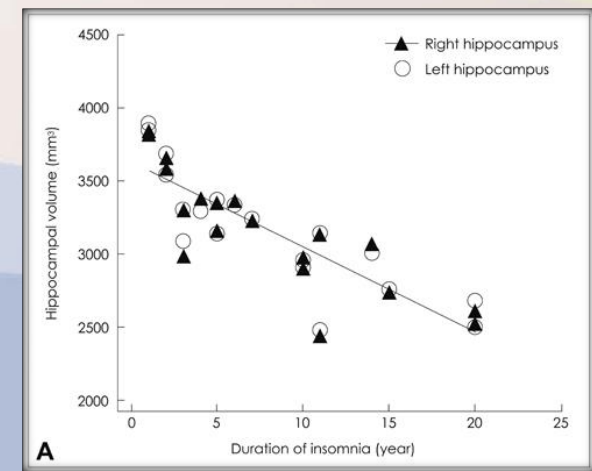
Obesity²



Cortisol / Stress³



Insomnia⁴



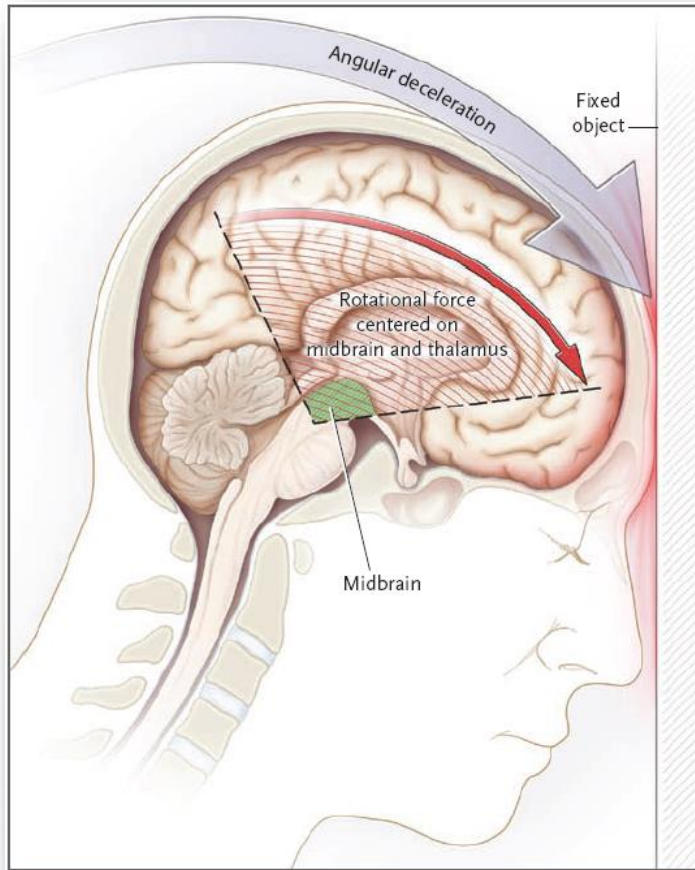
(1) Sheline, (1996). *PNAS*, 93(9);3908-13.

(2) *Brain Research*, 2009, Pages 186–194

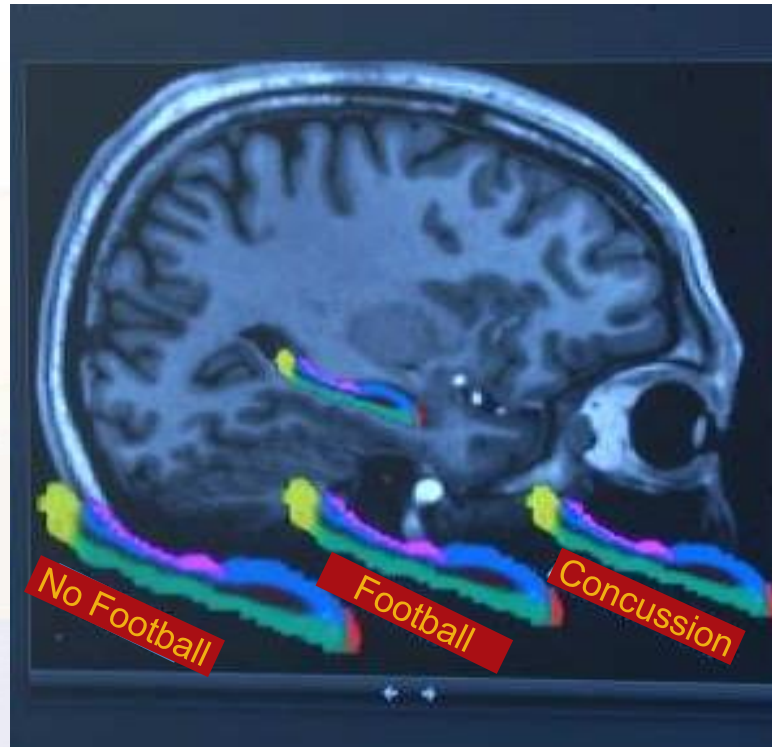
(3) Lupien et al (1998), *Nature NeuroSci* 1 (1), 69-73

(4) [Ho et al; J Clin Neurol](#). 2012 Jun;8(2):130-8

More Traumatic Brain Injury (TBI), Smaller Cortex & Hippocampus



More Football Concussions, Smaller Hippocampus



Singh, JAMA Neurology, 2014

Objectives

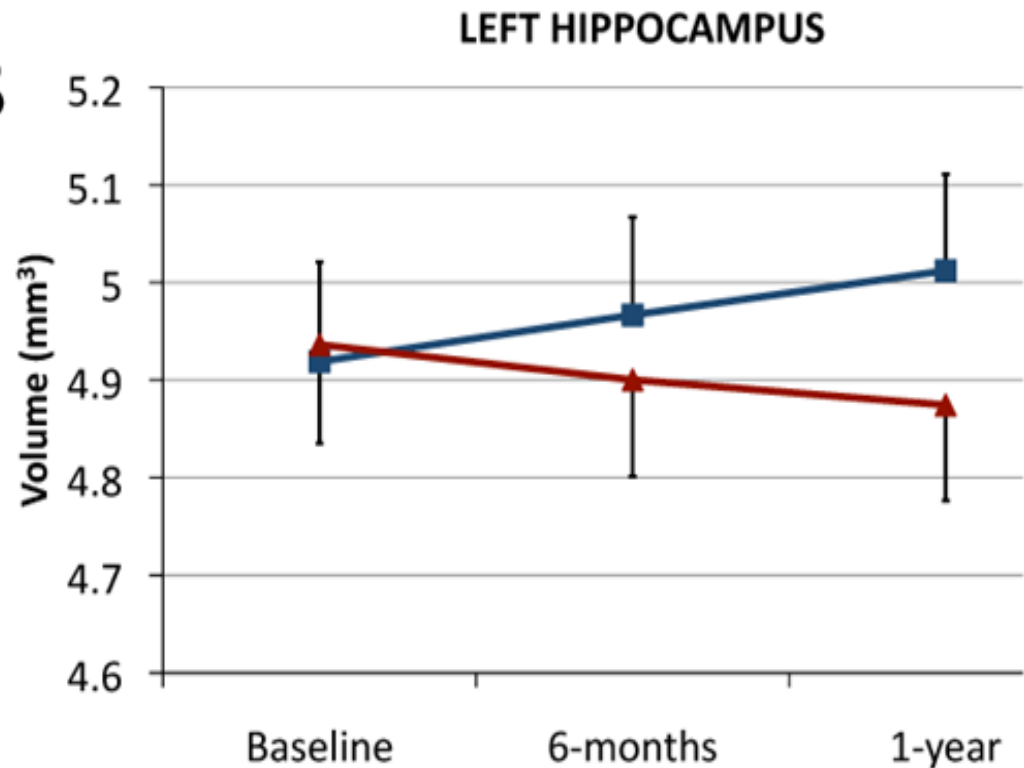
1. Basic Anatomy of Memory in the Brain
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The brain has lots of blood vessels



1. More Exercise, Bigger Hippocampus

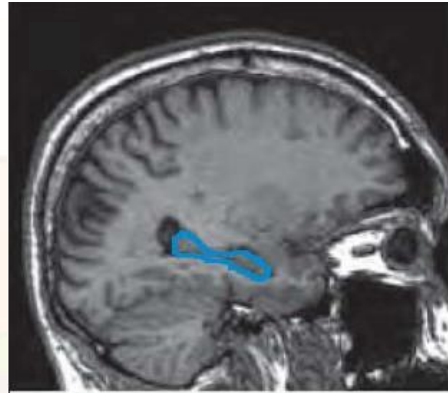
Hippocampus



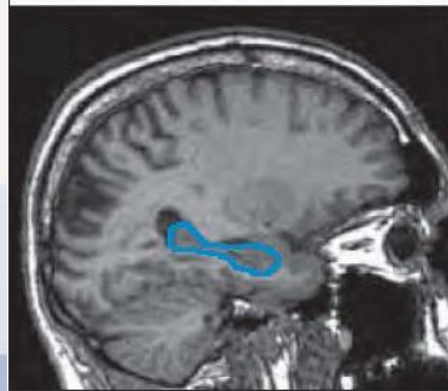
Erikson, PNAS 2011

Three Months of Vigorous Exercise, Bigger Hippocampus

Before
Exercise



After
Exercise



Walking 1 Mile a Day...

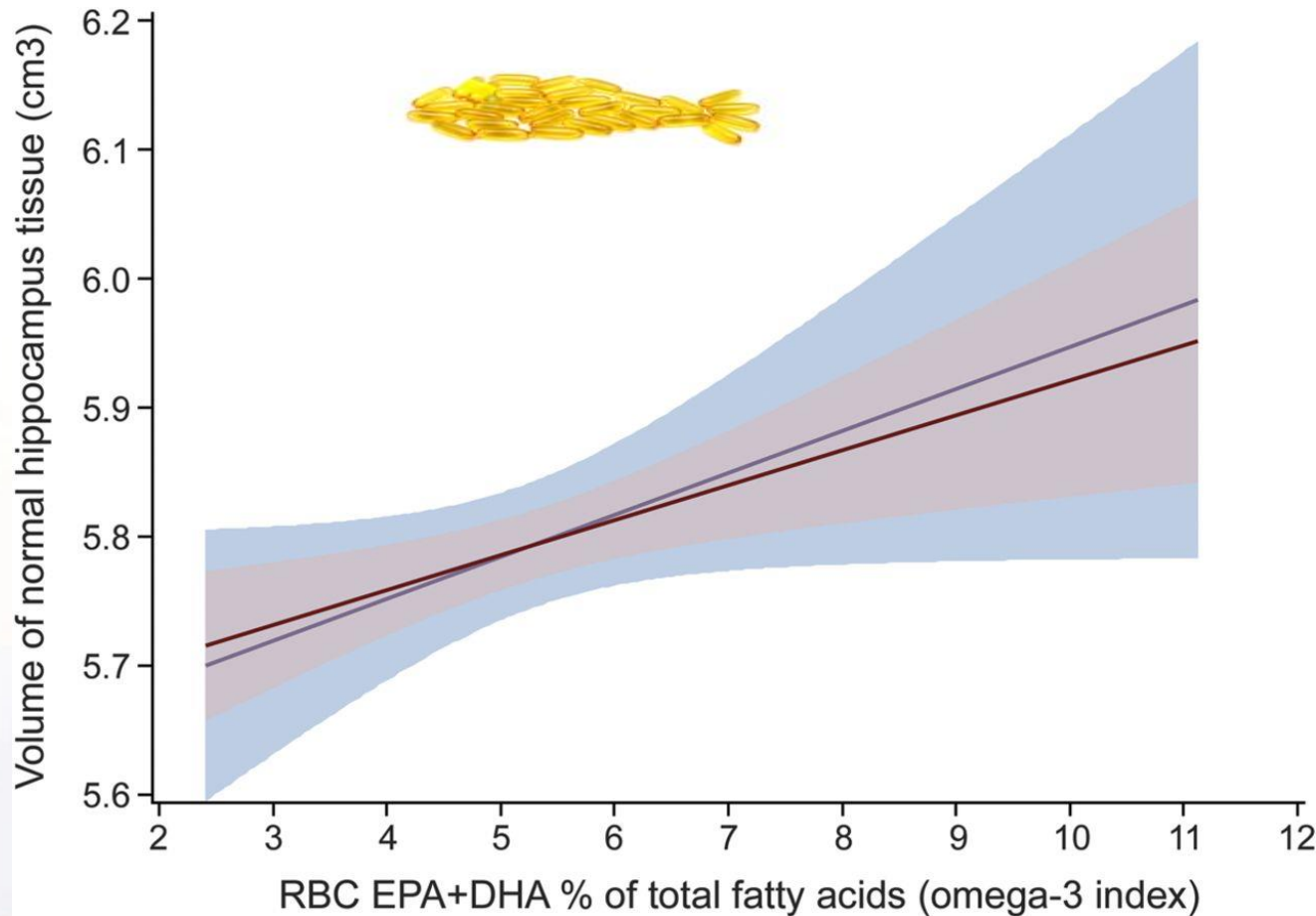


Reduces Your Risk of Alzheimer's ~50%

2. More Omega-3 Fatty Acids, Bigger Hippocampus

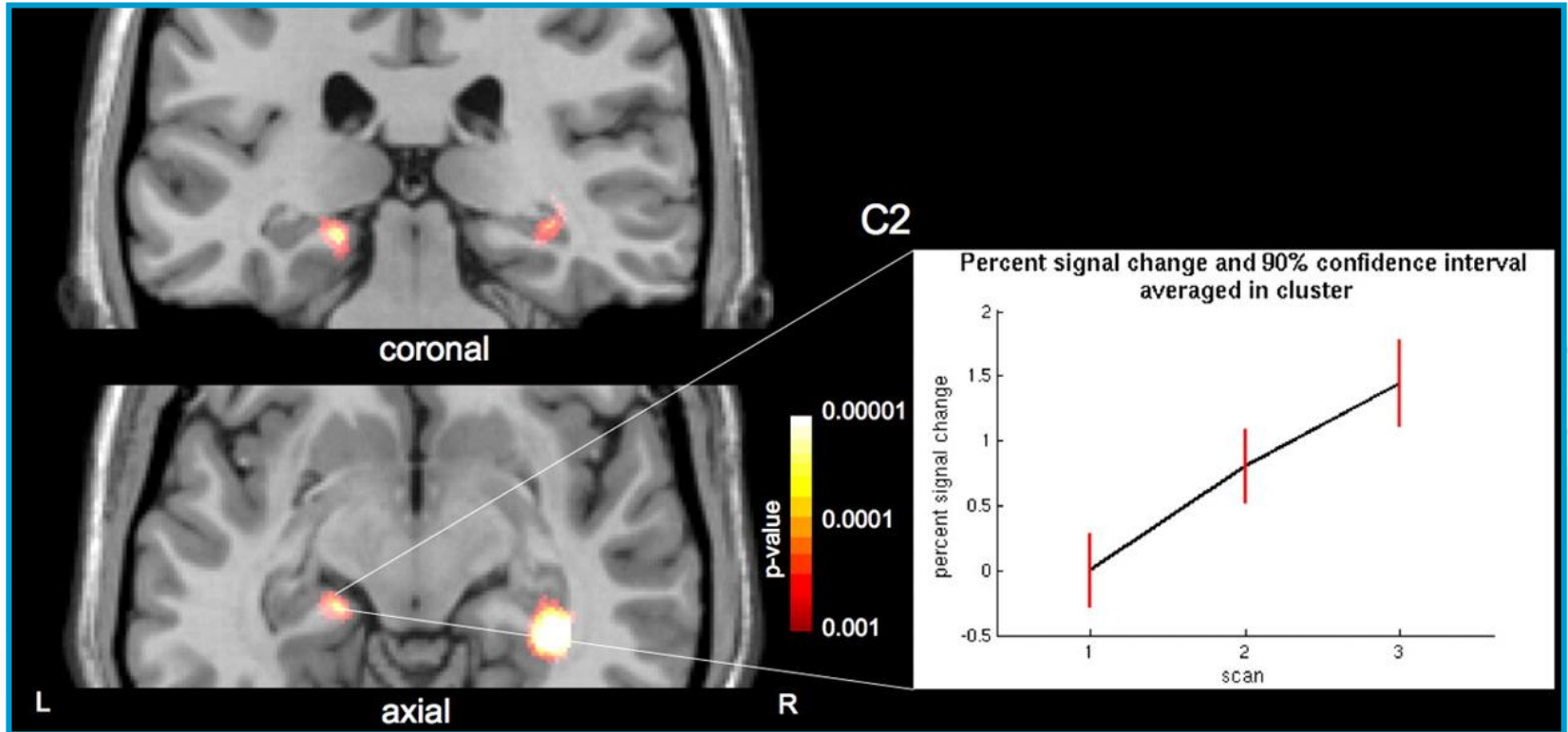


More Omega-3 Fatty Acids, Bigger Hippocampus



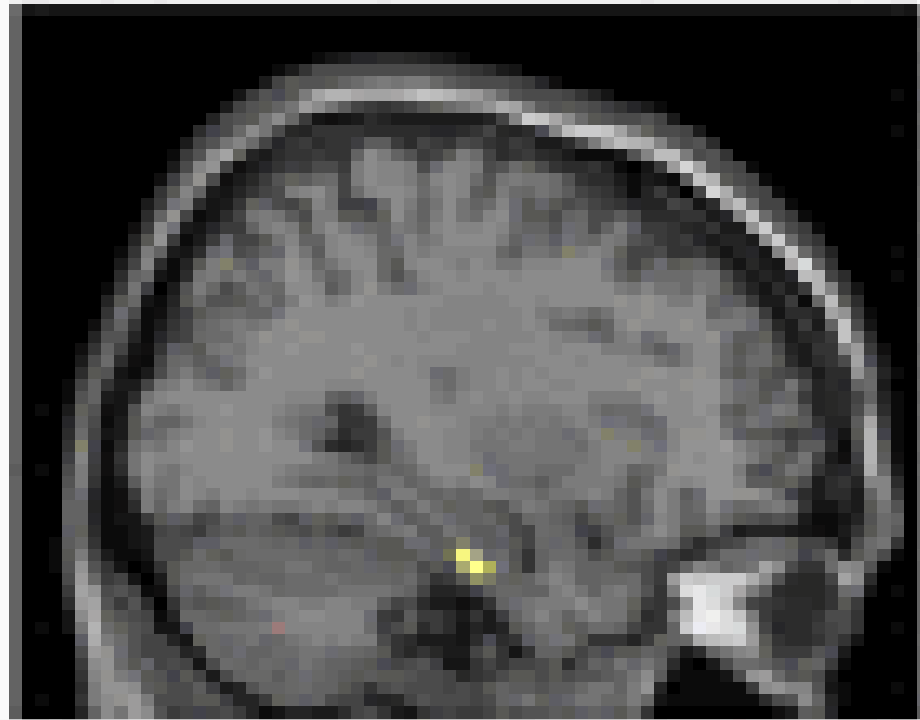
Pottala J V et al. Neurology 2014;82:435-442

3. More Learning, Bigger Hippocampus



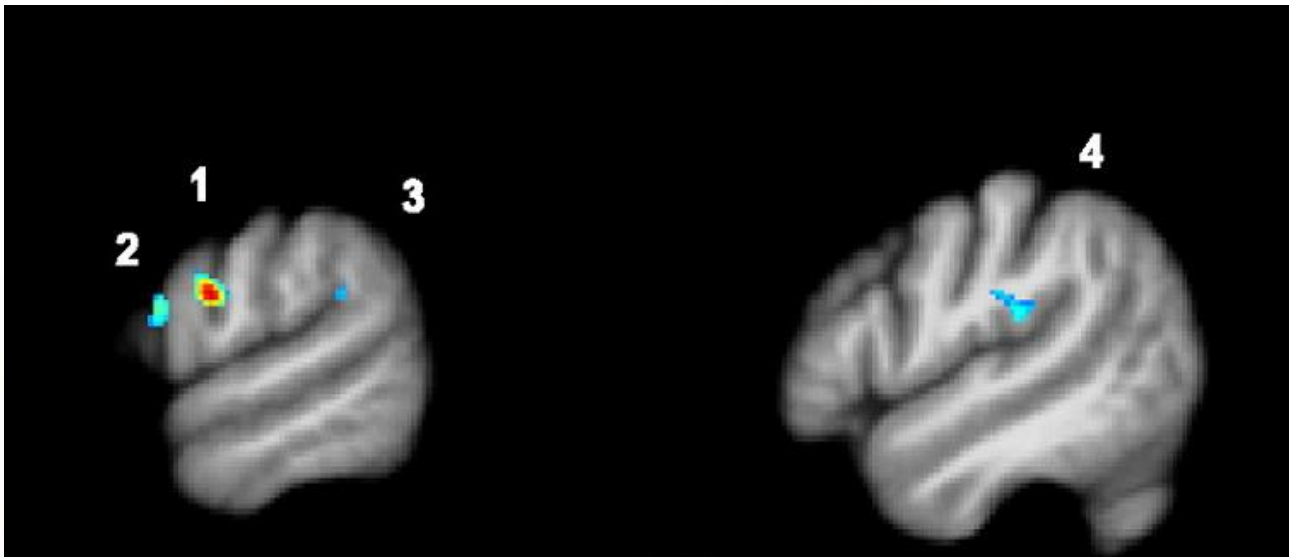
Draganski et al. J Neurosci 2006; 26:6314–7

More Dancing, Bigger Hippocampus



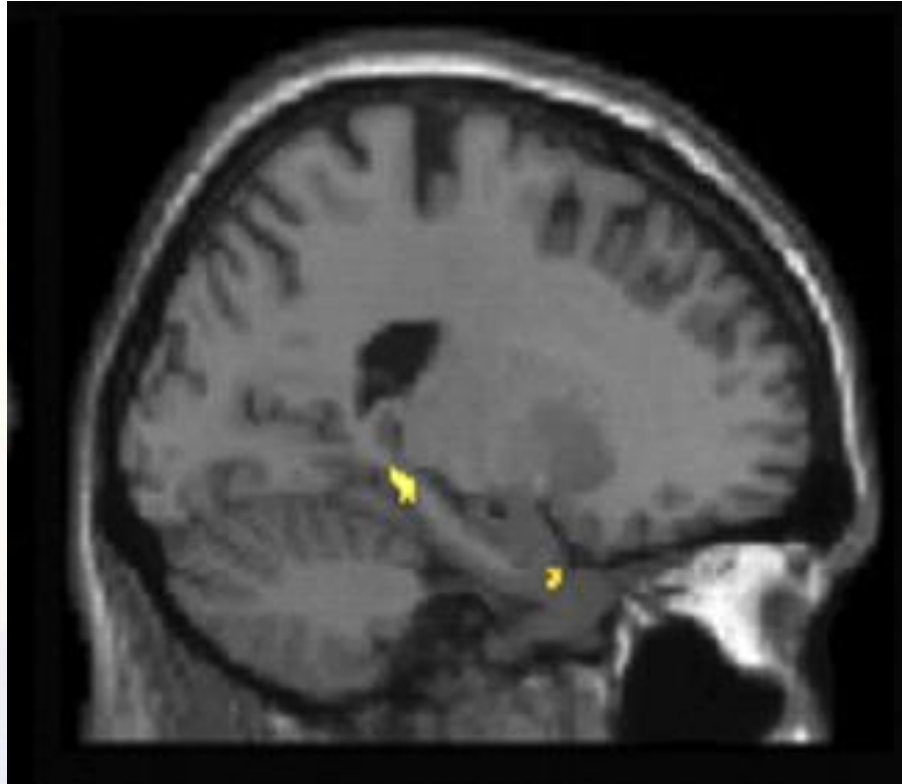
<https://www.frontiersin.org/articles/10.3389/fnhum.2017.00305/full>

Learning to Play Golf Grows Your Cortex



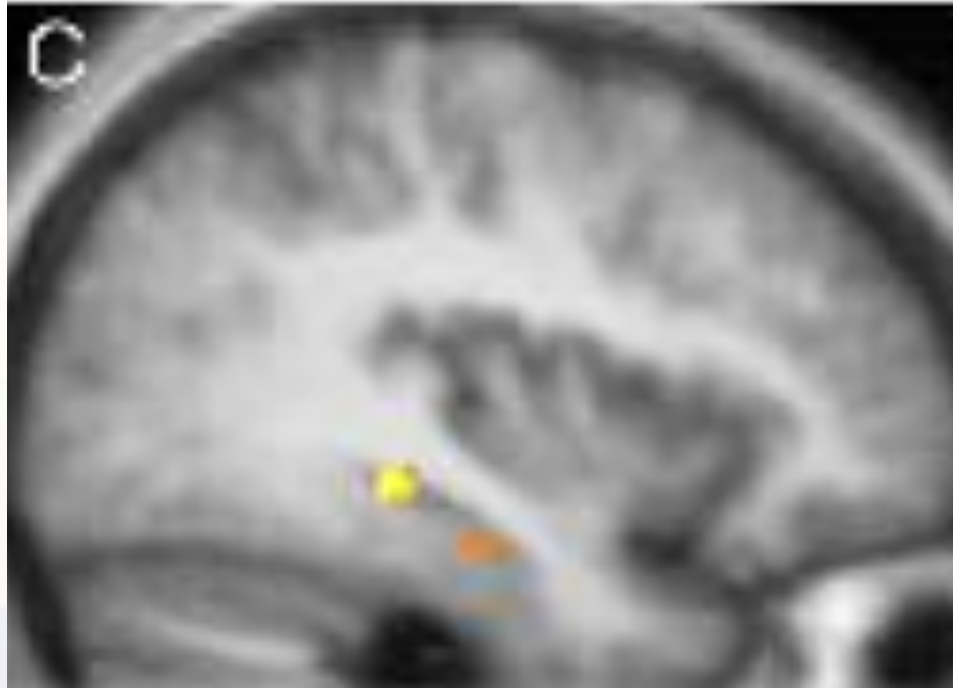
Bezzola, Landina 2009

4. Better Sleep, Bigger Hippocampus



Canesa, American Journal of Respiratory Medicine, 2011

5. More Meditation, Bigger Hippocampus



Holzel , Psychiatric Research, 2011

6. Having a “Sense of Purpose in Life” Bigger Hippocampus



Hippocampus Grows Bigger When You Start Early



Objectives

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2. Effects of Aging on Your Brain
3. Six Ways to Sharpen Your Brain
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Brain Fitness Program



Brain Fitness Program

Twice Weekly (90-minute) Treatments, 12 Weeks

Neurofeedback



Brain Training



Meditation Training



Nutrition Counseling



Exercise Training



Weekly Monitoring

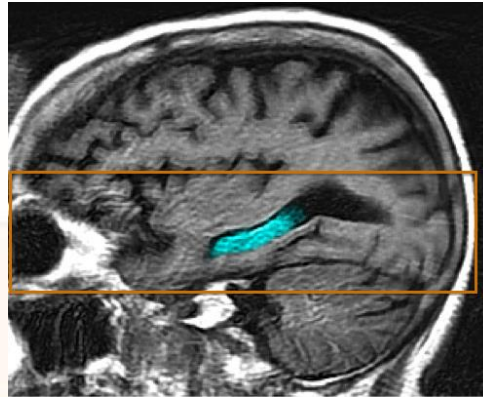


Brain Fitness Program

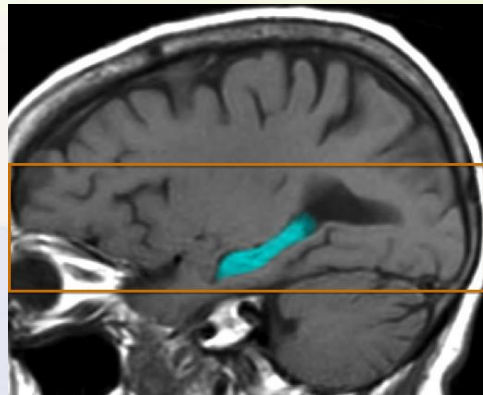


MRI Results

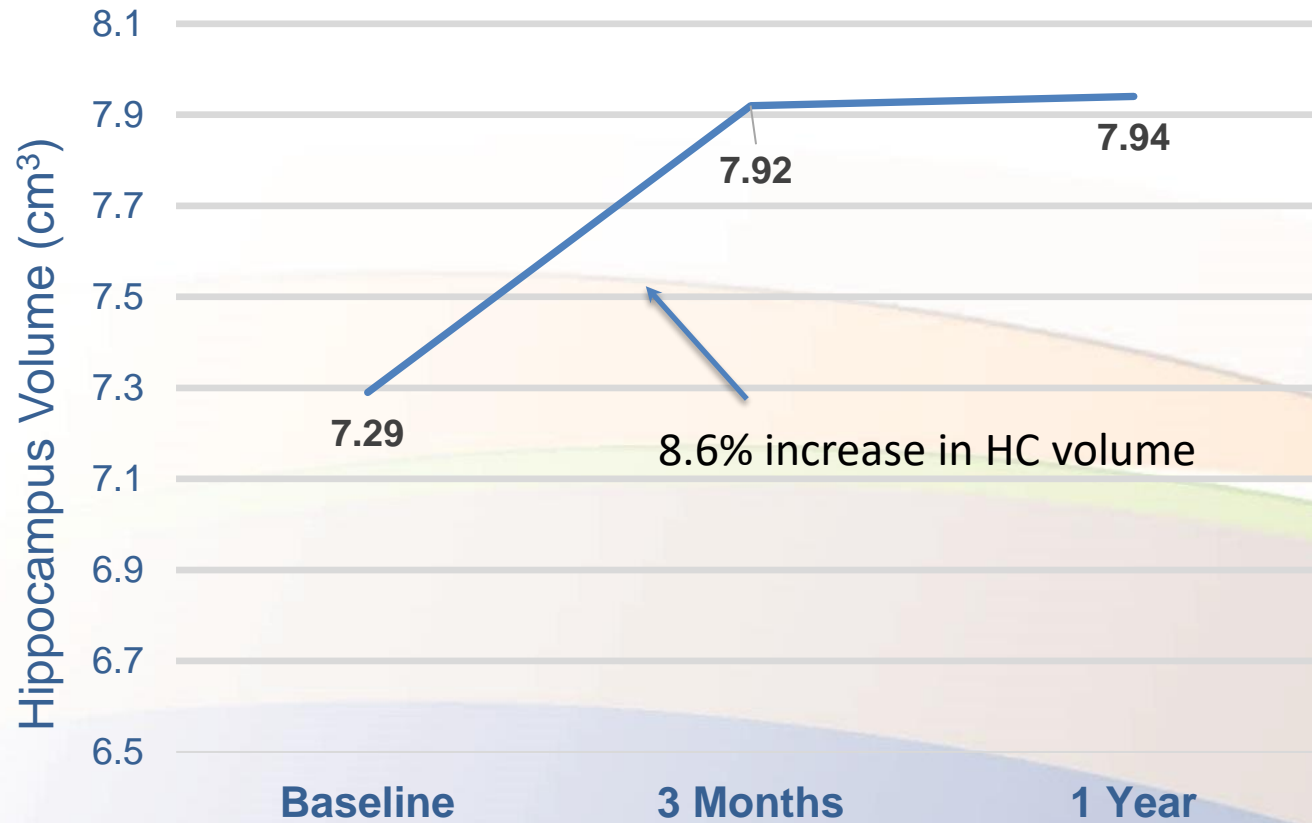
Before
Program



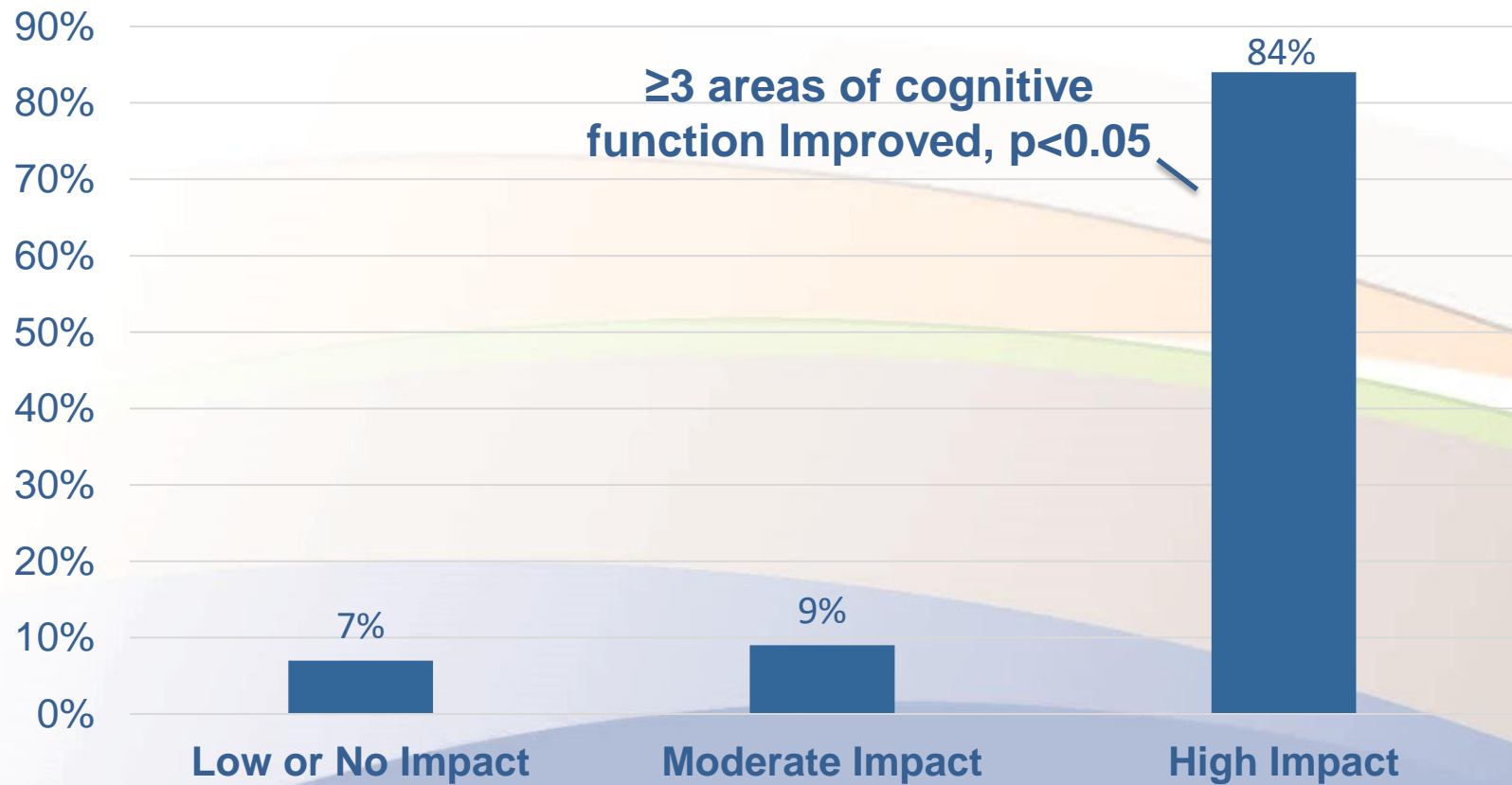
After
Program



Sustained Benefits



Brain Fitness Program: Statistical Analysis of 127 Patients with MCI



Published in Journal of Prevention of Alzheimer's Disease

The Journal of Prevention of Alzheimer's Disease - JPAD©

A Personalized 12-week “Brain Fitness Program” for Improving Cognitive Function and Increasing the Volume of Hippocampus in Elderly with Mild Cognitive Impairment

M. Fotuhi^{1,2}, B. Lubinski^{1,3}, N. Hausterman^{1,4}, T. Riloff¹, M. Hadadi⁵, C.A. Raji⁶

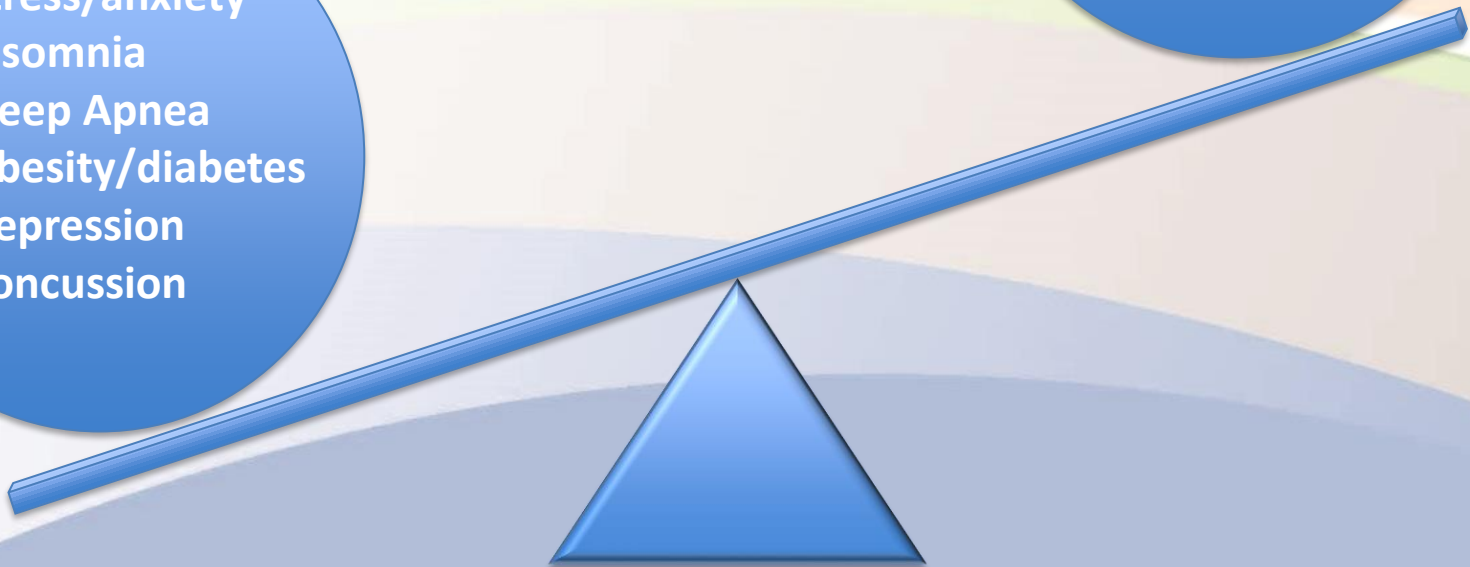
The word "TIME" in a red, serif font, centered within a white rectangular box. The box is positioned in the lower center of the slide, overlapping a blue curved background element.

You CAN Defy Aging



Stress/anxiety
Insomnia
Sleep Apnea
Obesity/diabetes
Depression
Concussion

Physical Fitness
Quality sleep
Brain-healthy Diet
Cognitive Stimulation
Meditation
Sense of Purpose



Brain-Body Connection



THANK YOU

