

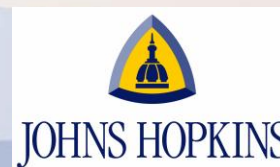
Bad News:

Six Ways to Accelerate the Aging Process in Your Brain

Majid Fotuhi, MD PhD

NeuroGrow Brain Fitness Center

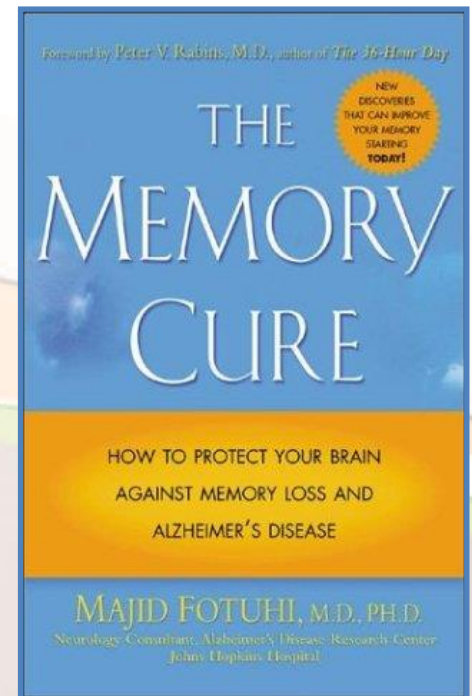
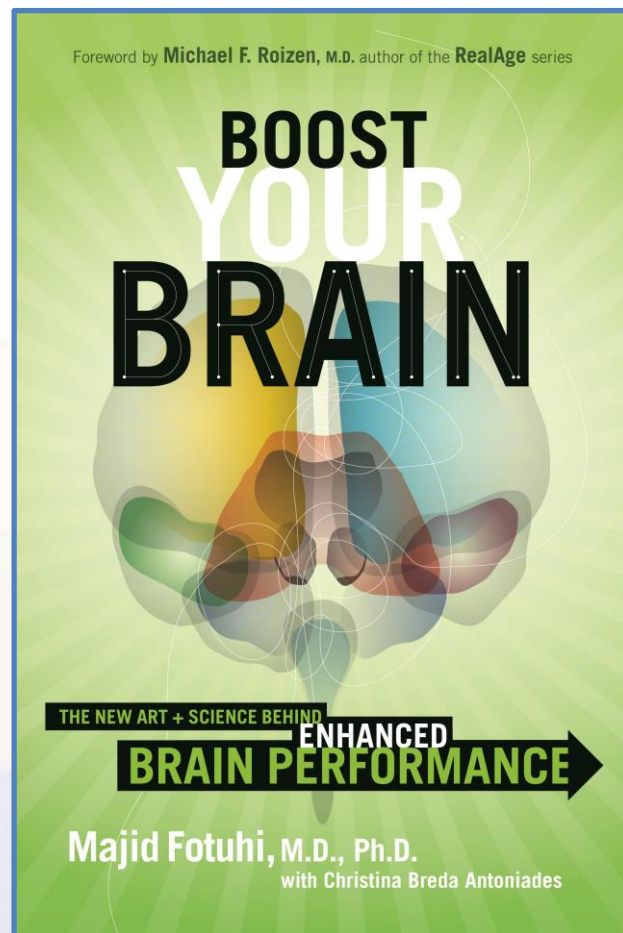
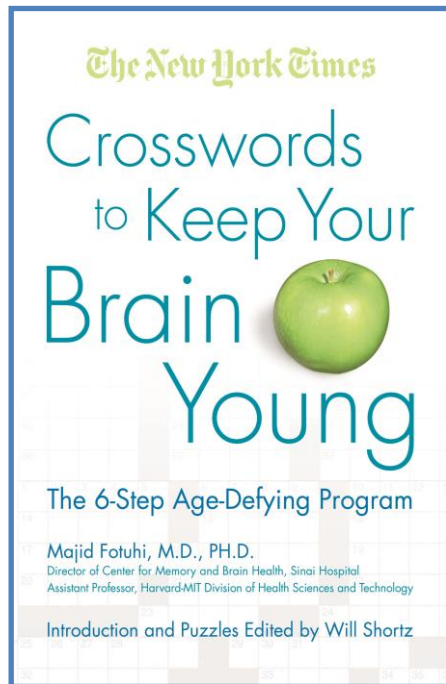
Johns Hopkins Medicine





Neuroplasticity in the Human Brain



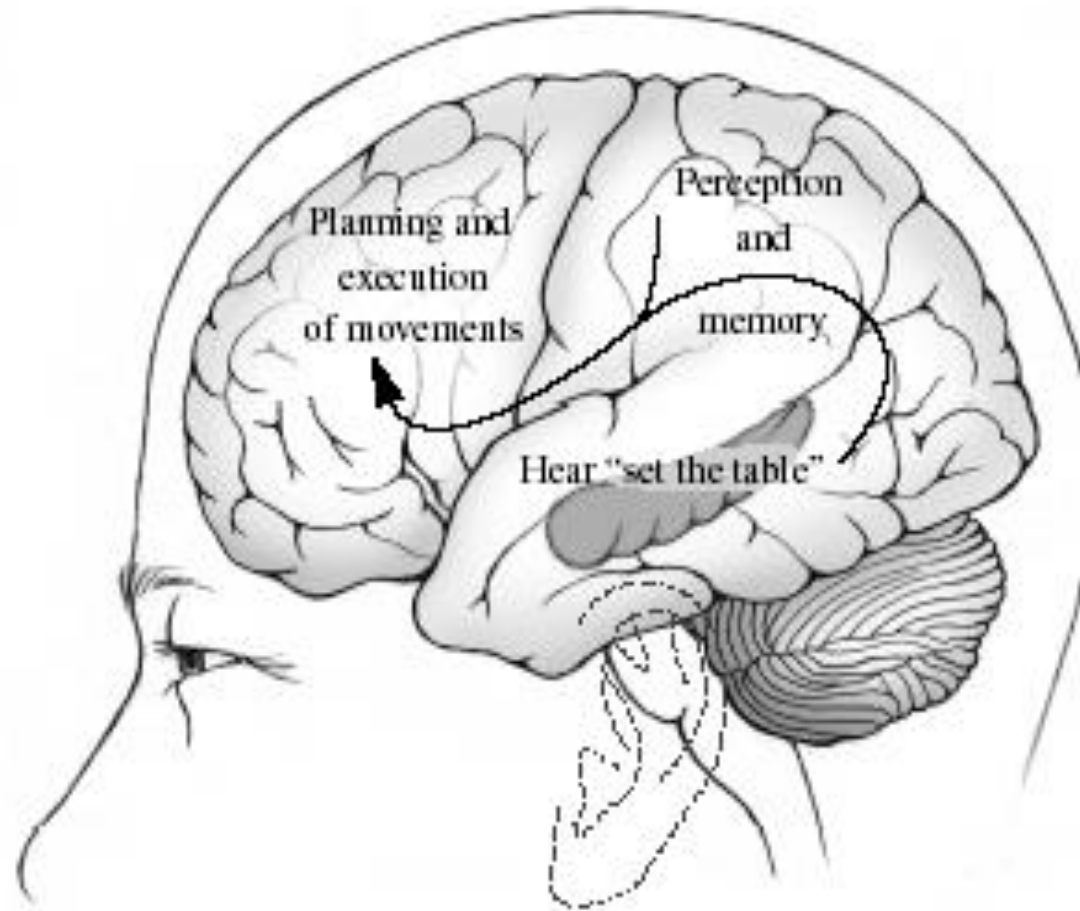




Forbes

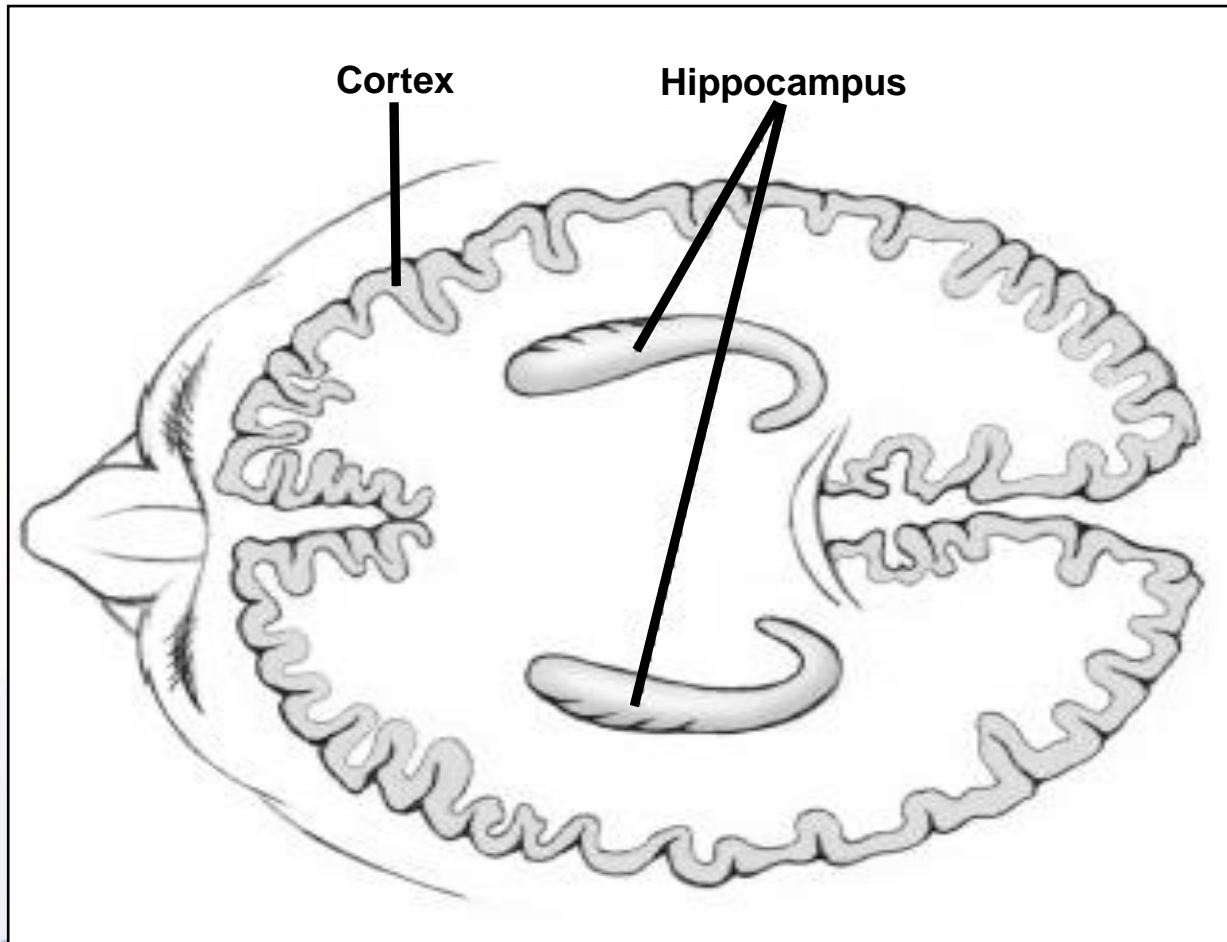


Your Brain At Work: “Set the Table”



Hippocampus: Short-term Memory

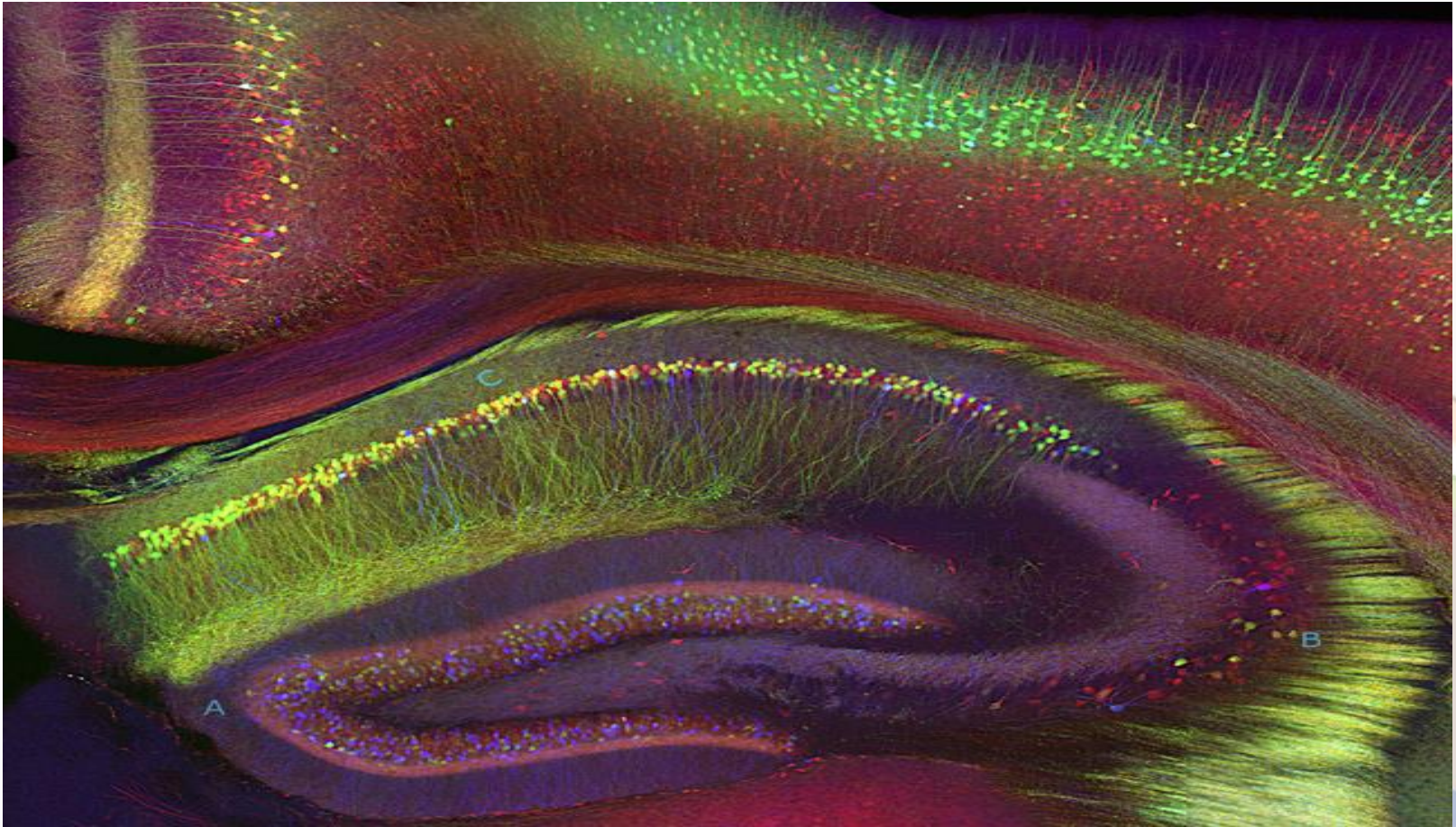
Cortex: Long-term Memory



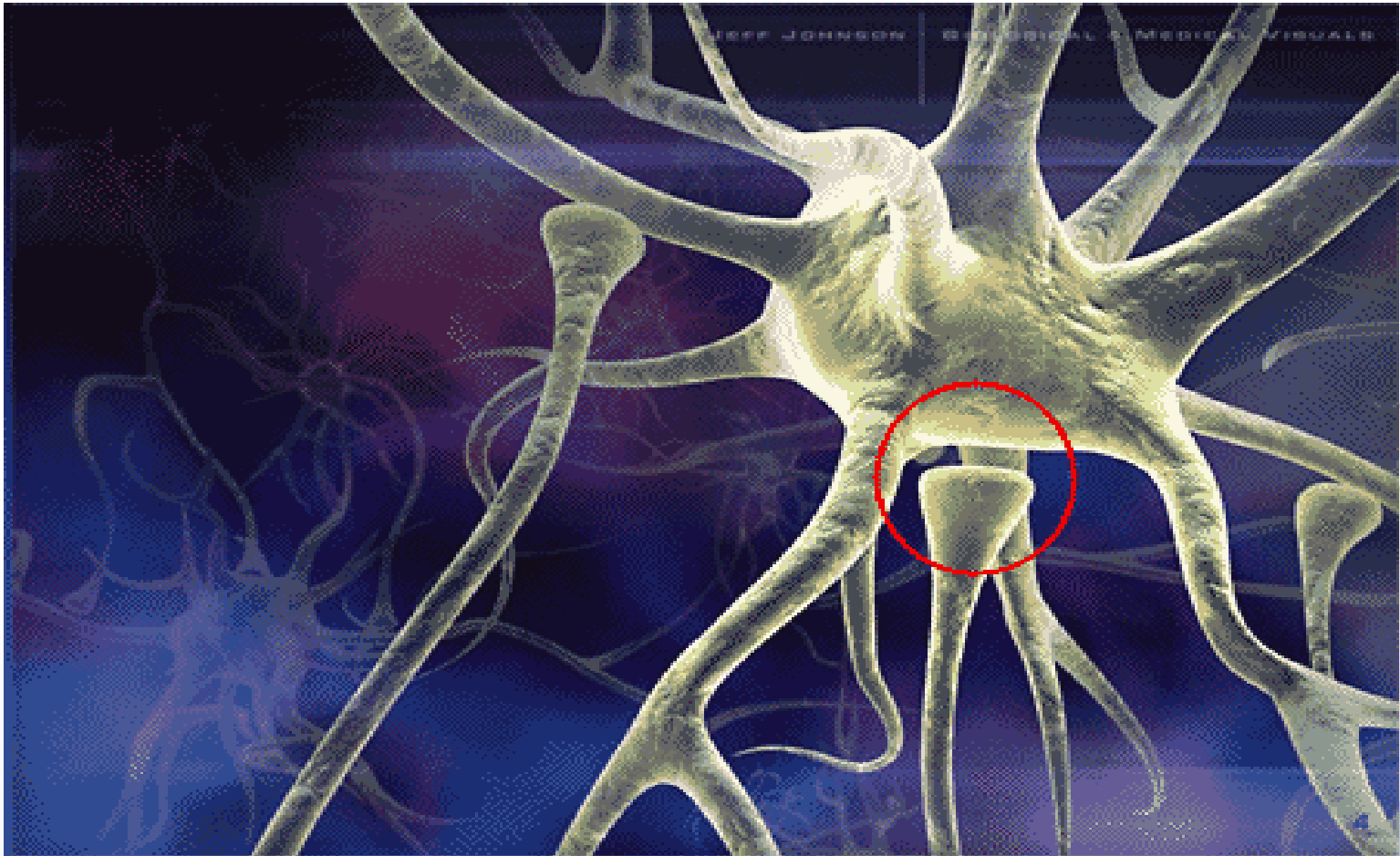
Hippocampus



Neurons in Hippocampus



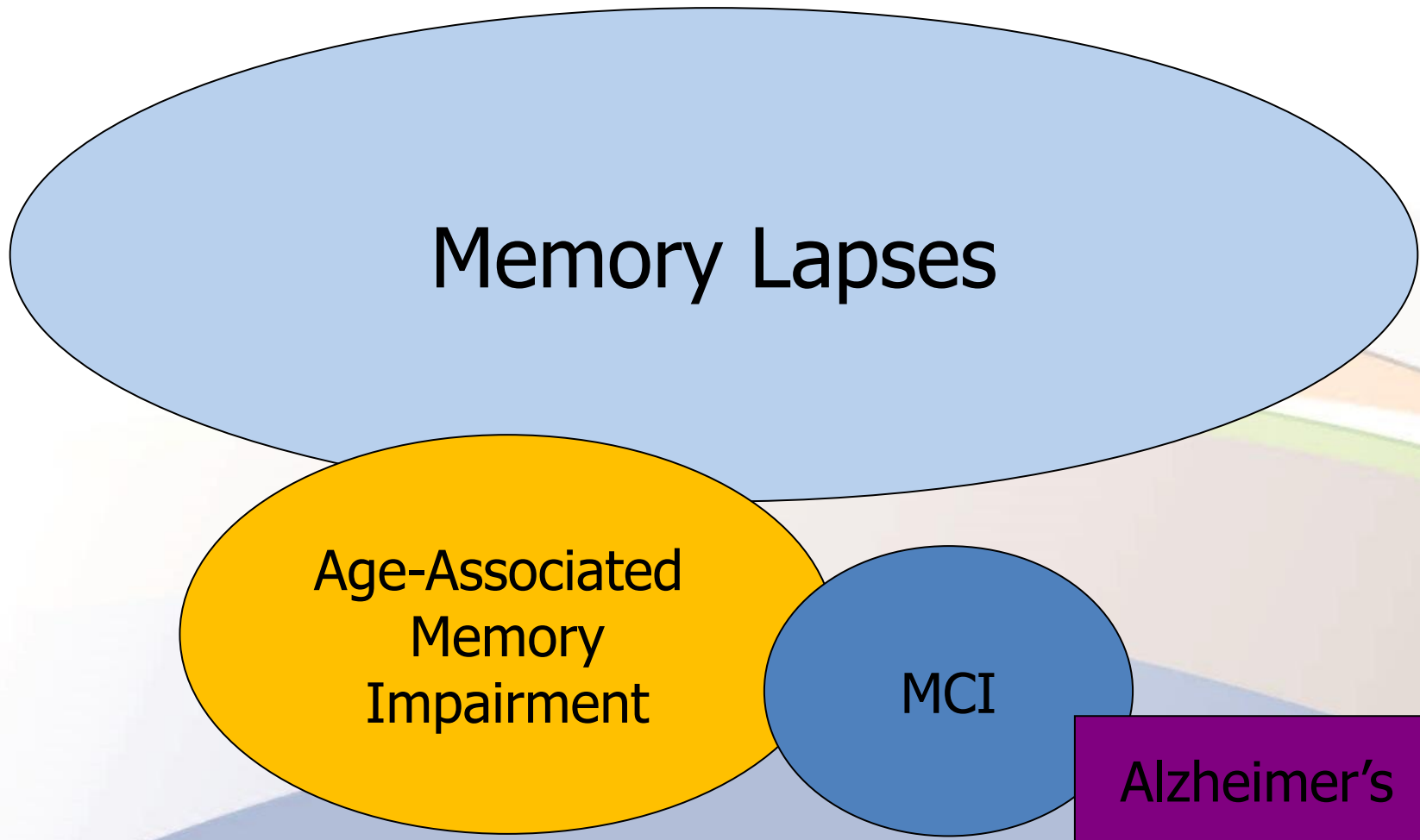
Neurons & Synapses



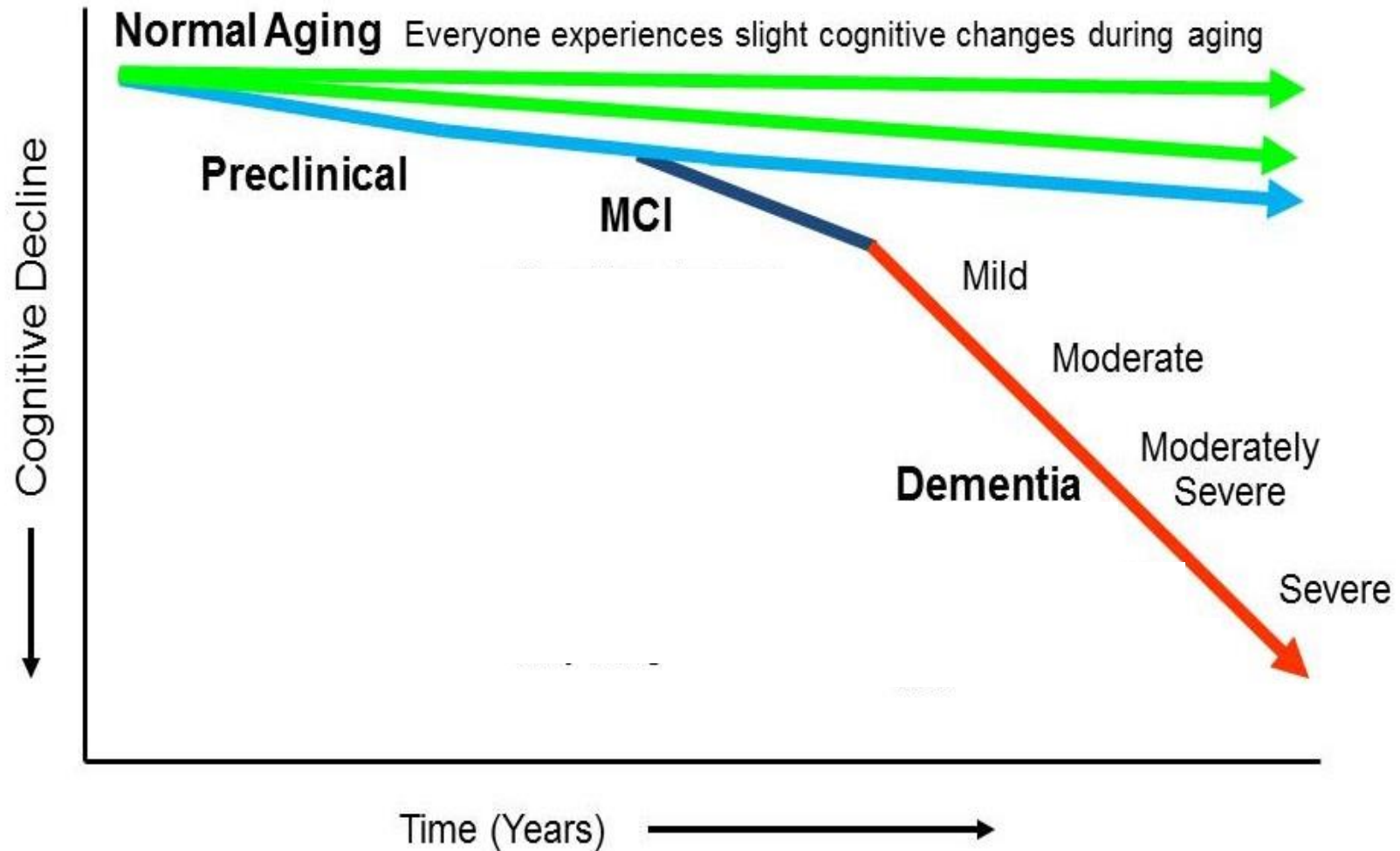
With Aging, Hippocampus and Cortex Shrink Faster Than the Rest of the Brain

- 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

Memory lapses or Alzheimer's?



Memory Loss, MCI, or Alzheimer's



What Causes Atrophy in Hippocampus?

Insomnia

Sleep Apnea

Obesity

Smoking

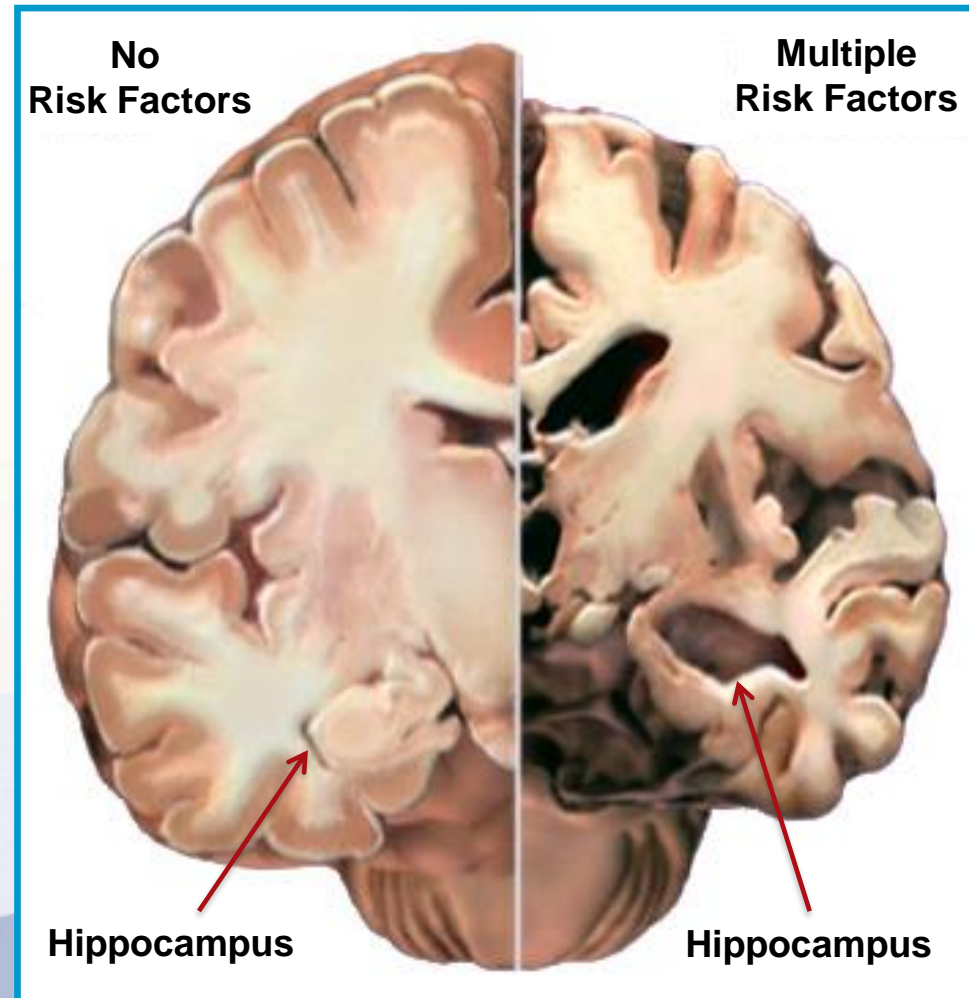
Diabetes

Concussion

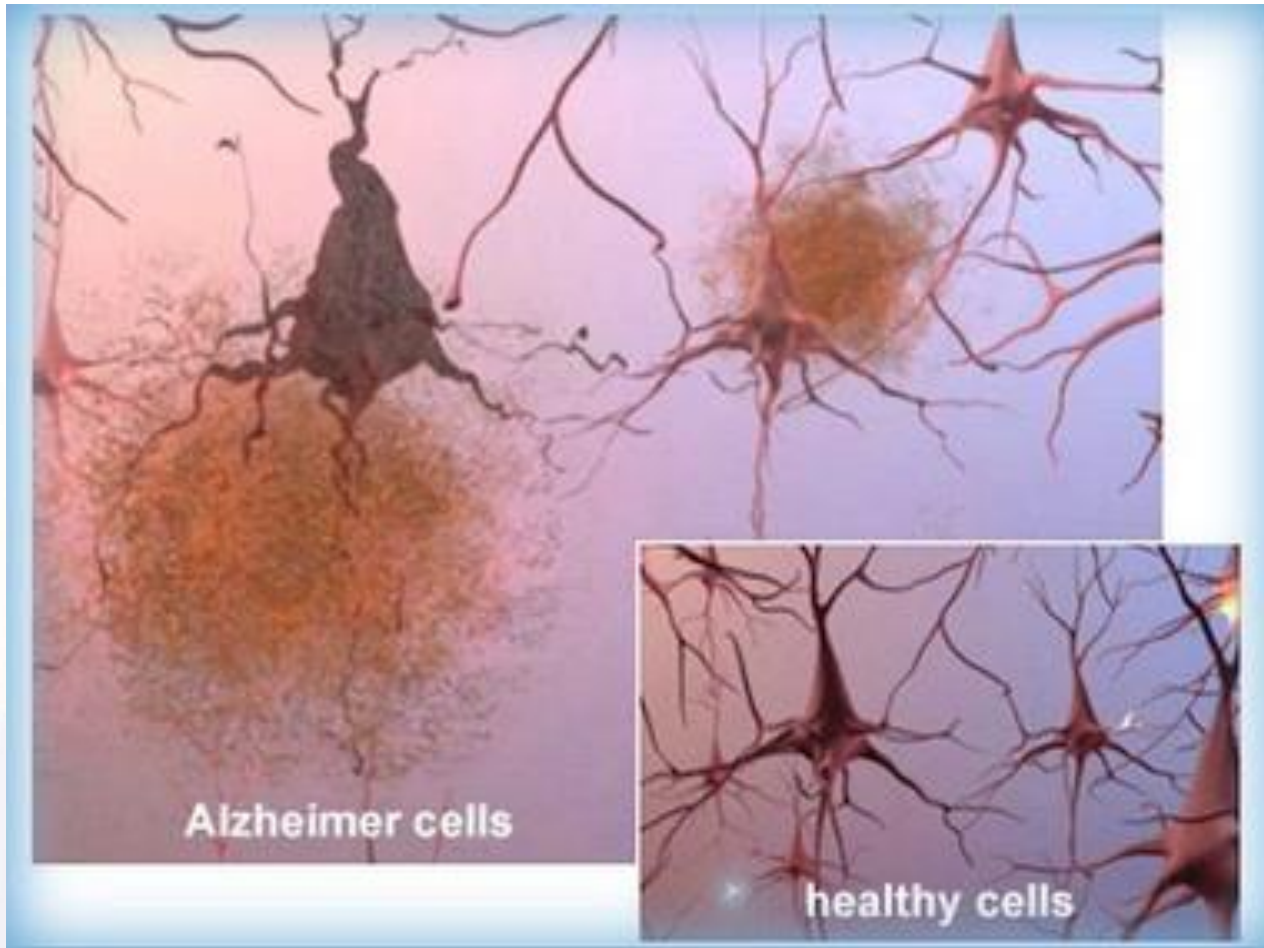
**Stress
Depression**

Alzheimer's

Multiple Risk Factors, Much Smaller Cortex & Hippocampus

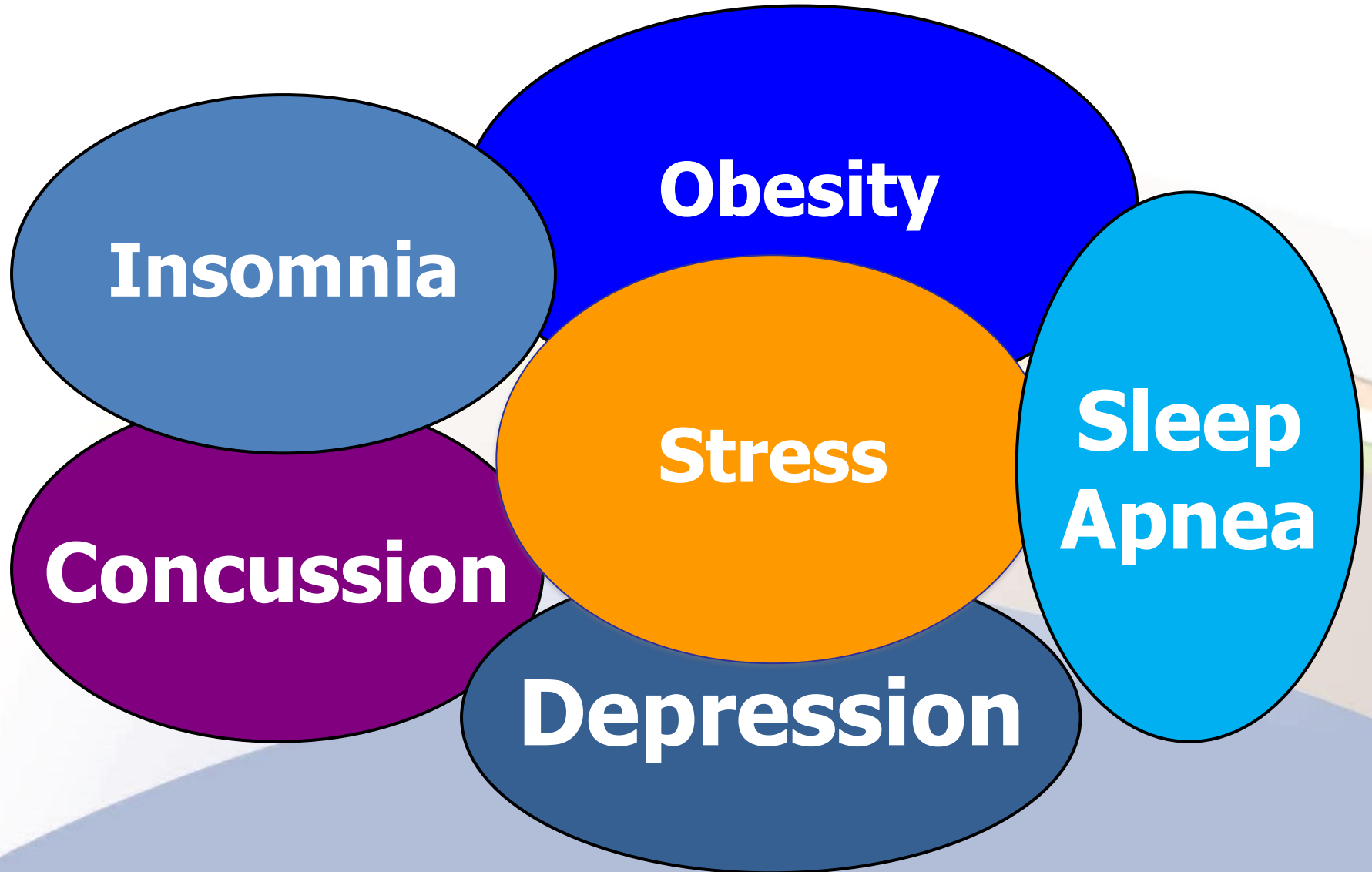


Alzheimer's Disease: Plaques and Tangles



<https://www.braininjury-explanation.com/causes-disorders/brain-injury-by-detoriating-processes/brain-injury-by-alzheimer-disease>

Six Ways to Reduce the Size of Your Cortex and Hippocampus

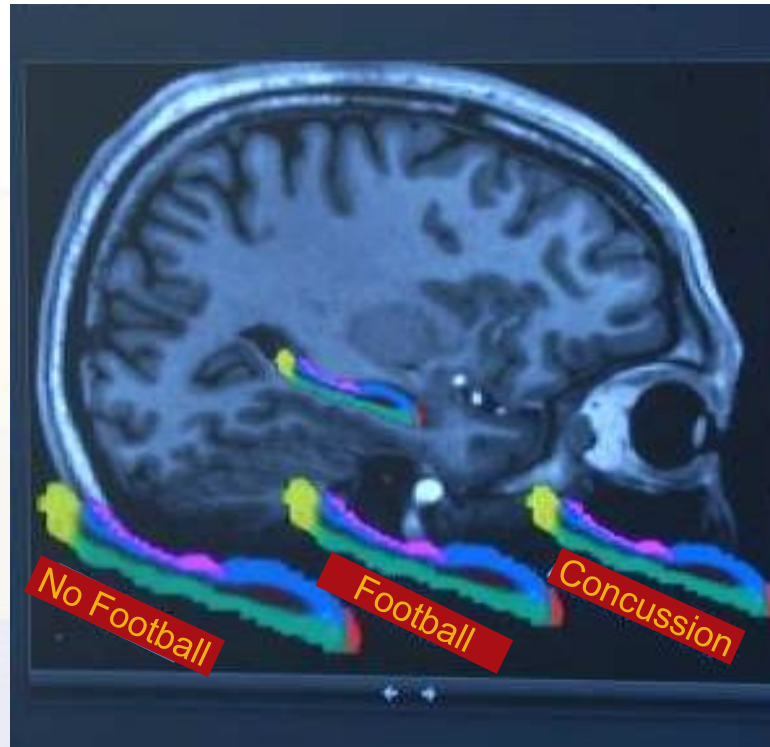


1. More Concussions, Smaller Hippocampus



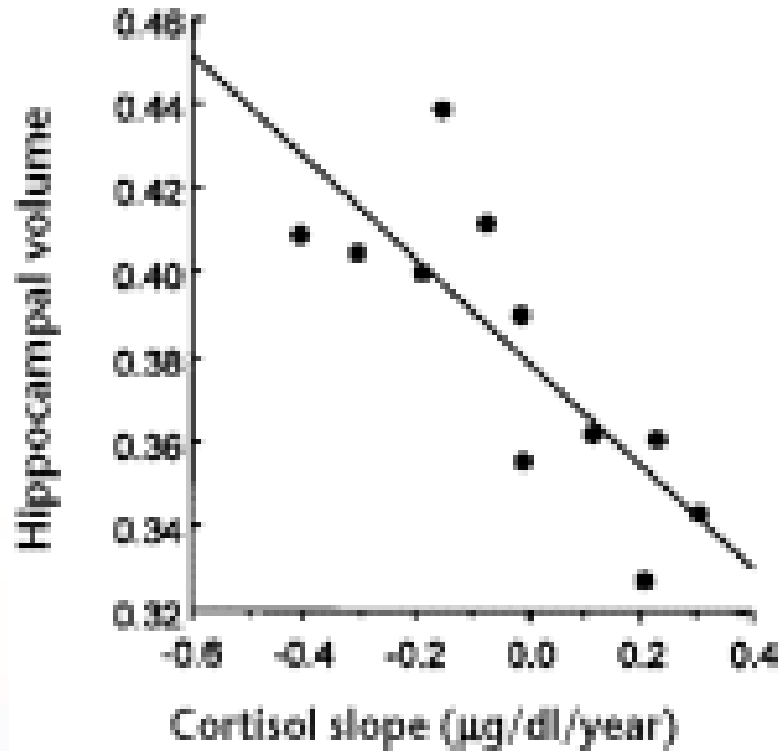
<https://lowermerionihc.com/concussion-protocol-high-school-icshl/>

More Concussions, Smaller Hippocampus

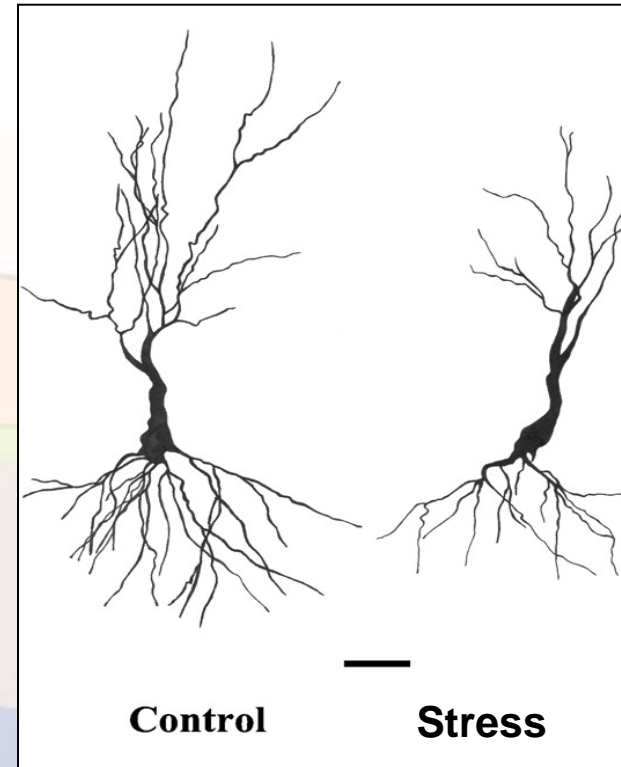


Singh, JAMA Neurology, 2014

2. More stress, smaller hippocampus

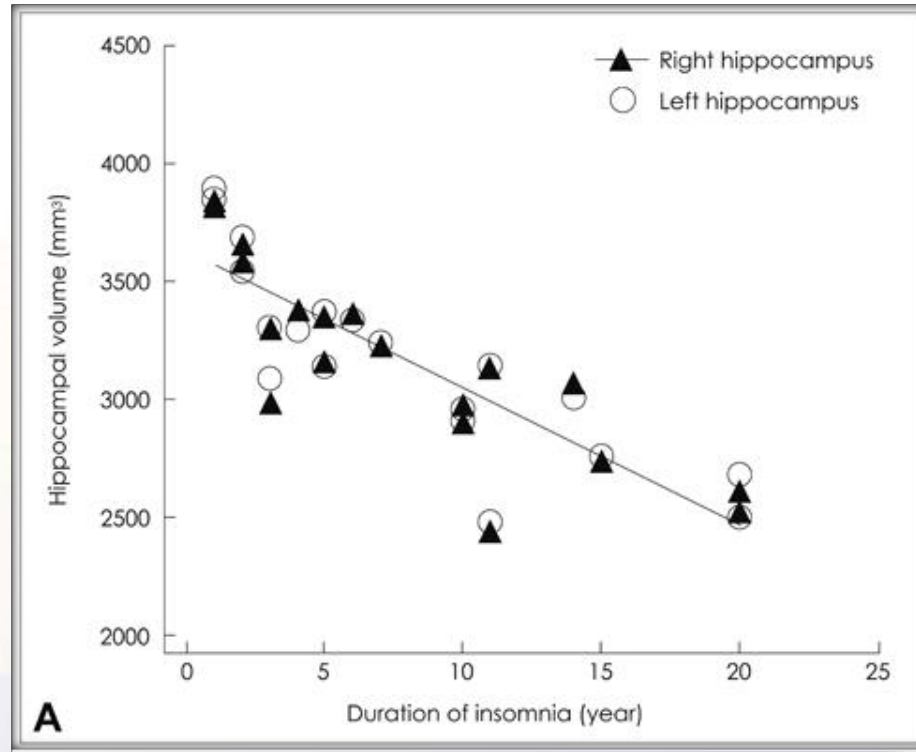


3- Lupien et al (1998), Nature NeuroSci 1 (1), 69-73



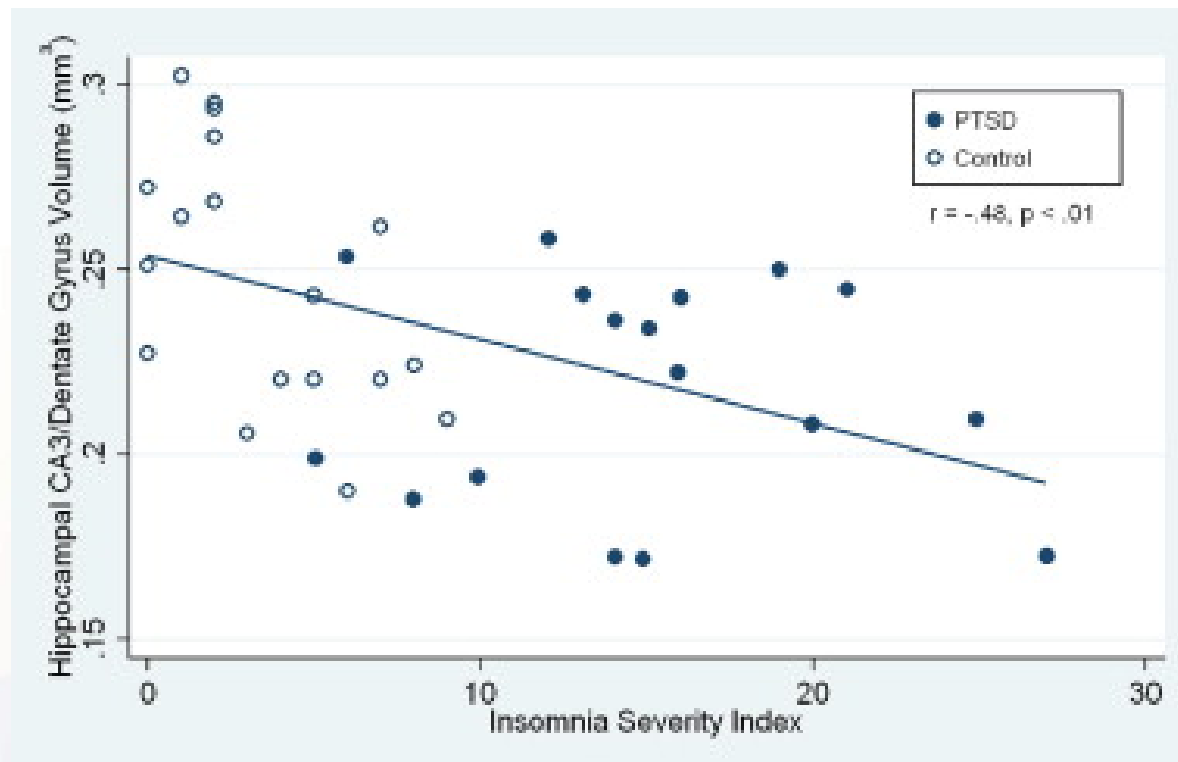


3. More Years of insomnia, Smaller Hippocampus



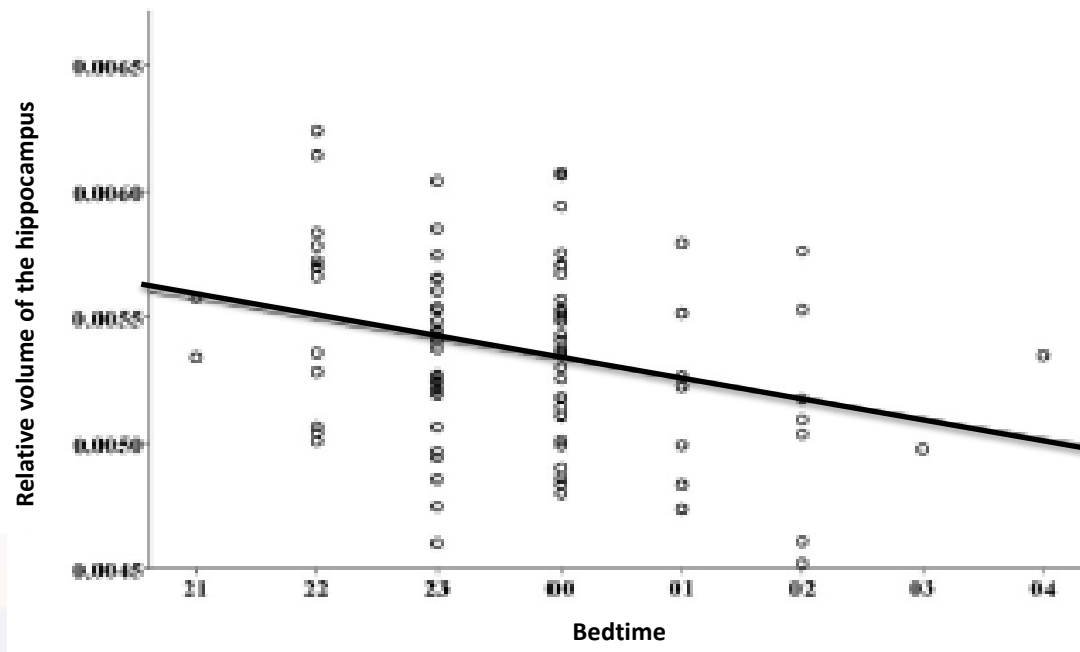
4- Ho et al; J Clin Neurol. 2012 Jun;8(2):130-8

More Severe Insomnia, Smaller Hippocampus



Neylan, Biological psychiatry, 2010

Later Bedtime, Smaller Hippocampus



<https://onlinelibrary.wiley.com/doi/pdf/10.1111/sbr.12077>

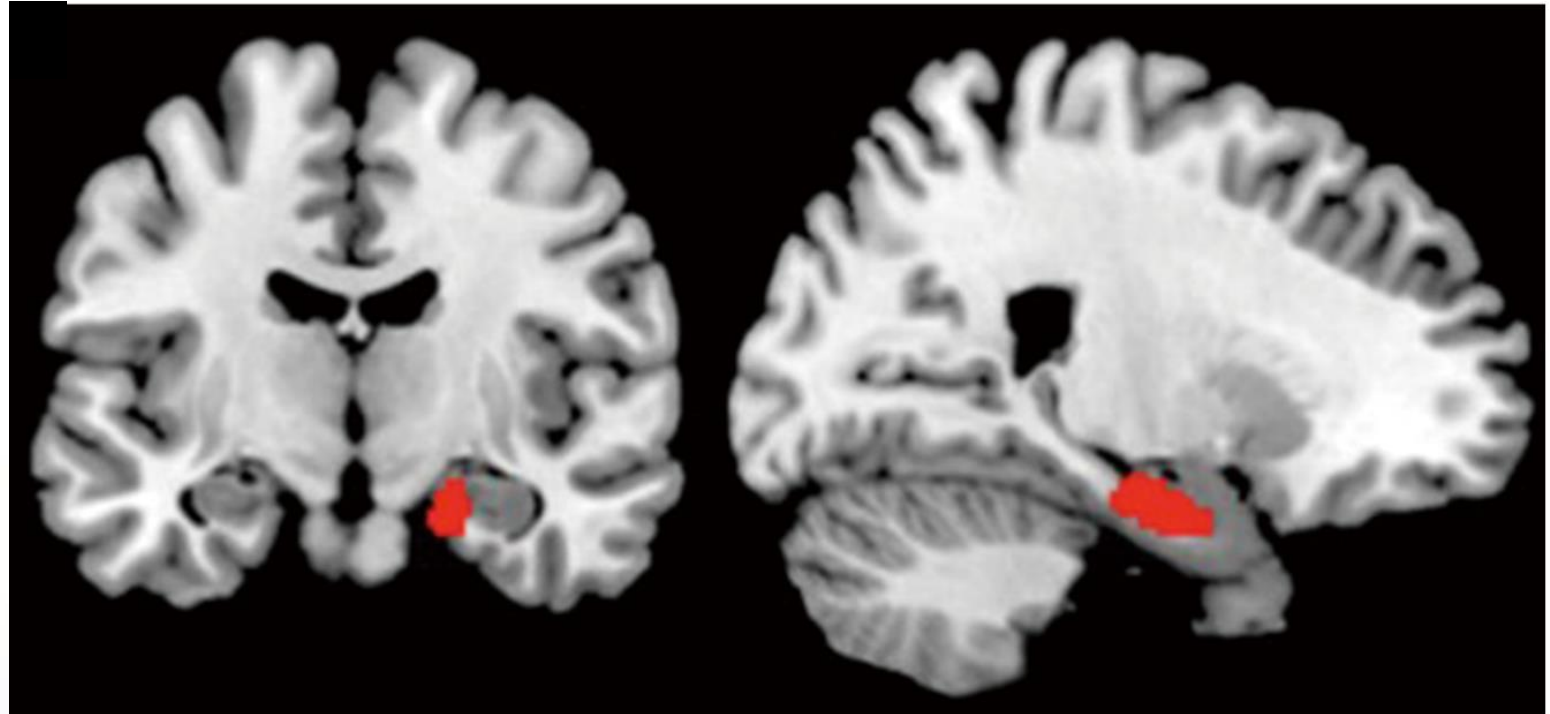
Sleep and Biological Rhythms 2015; 13: 68–75

More Sleep Apnea, Smaller Hippocampus



<https://www.helpguide.org/articles/sleep/sleep-apnea.htm>

4. More Sleep Apnea, Smaller Hippocampus



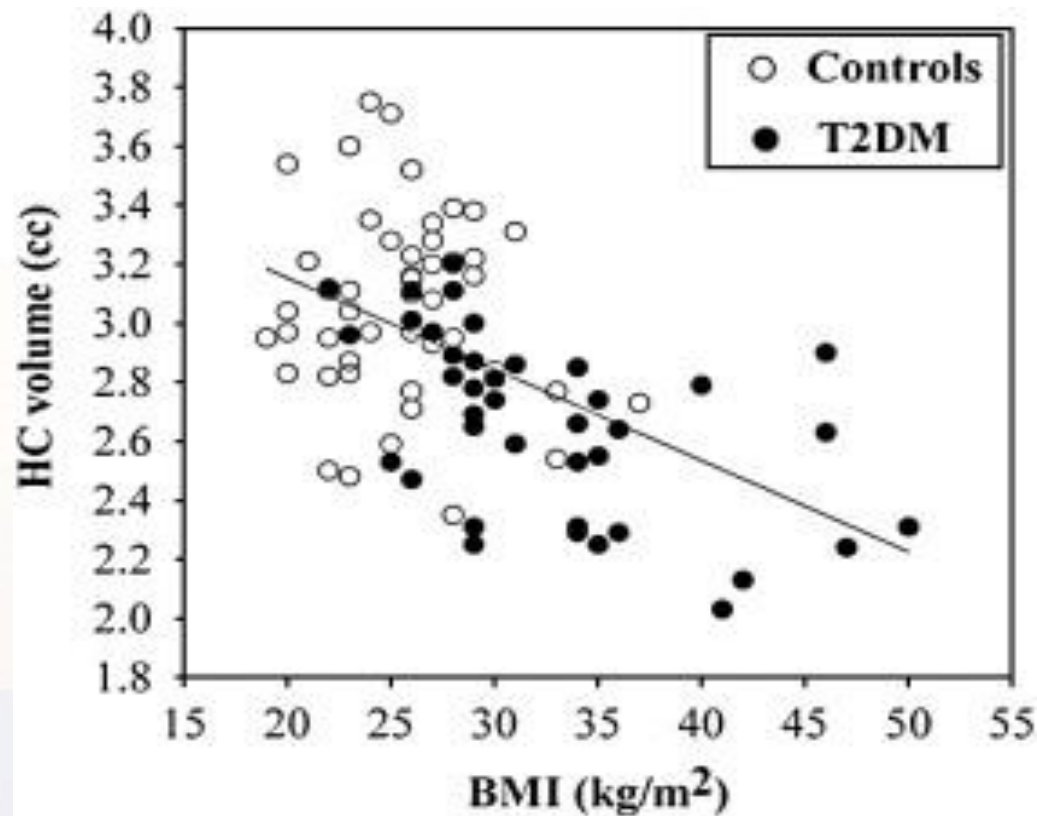
<http://jtd.amegroups.com/article/view/9339/html>

5. Bigger Belly, Smaller Hippocampus

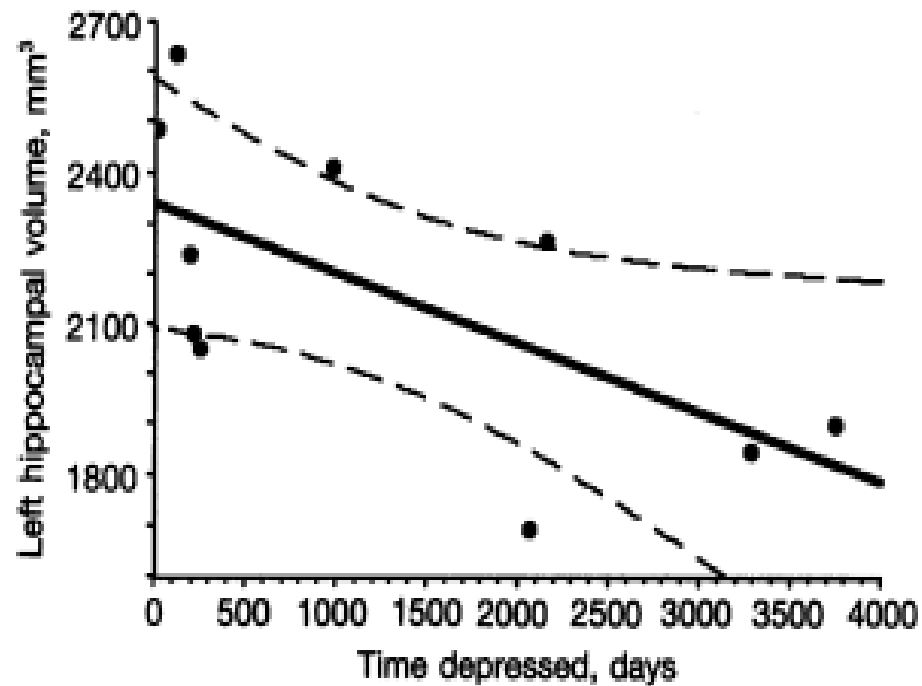


<https://her.womenworking.com/excess-belly-fat-may-cause-brain-shrinkage-new-study>

Bigger Belly, Smaller Hippocampus

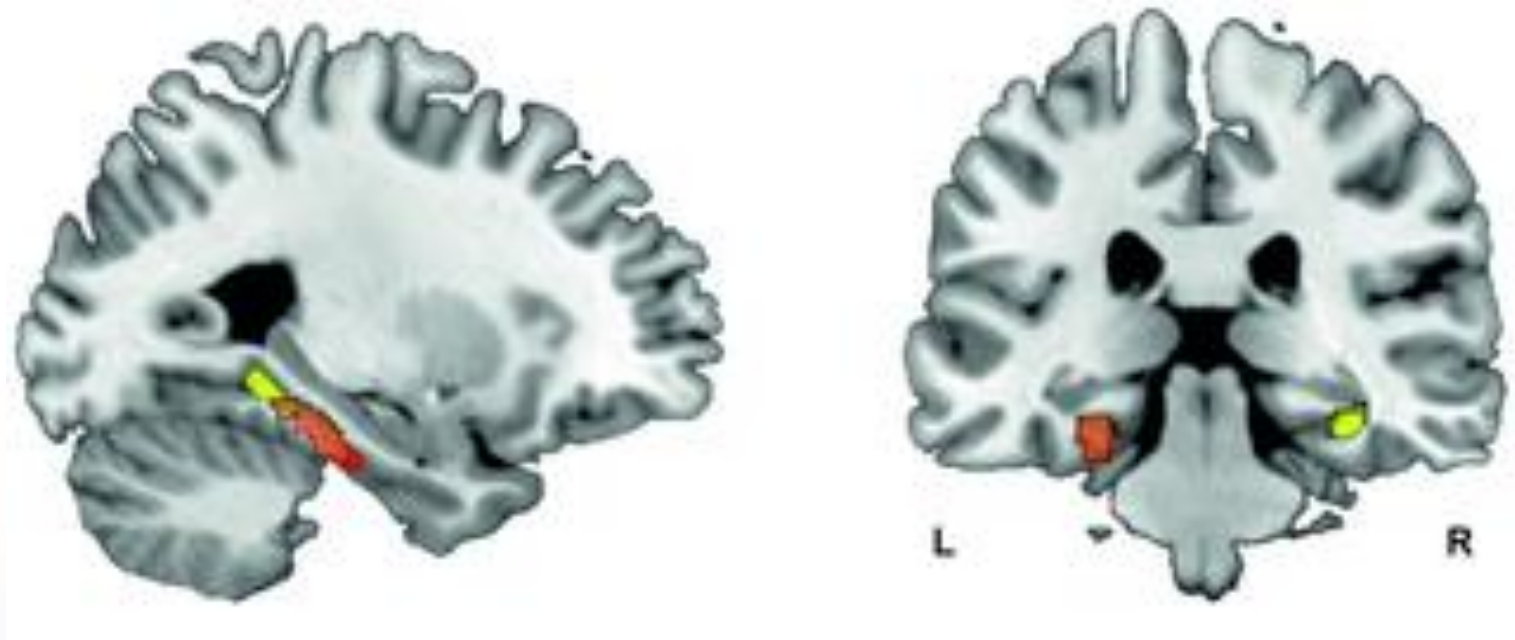


6. More Depression, More Hippocampus Atrophy



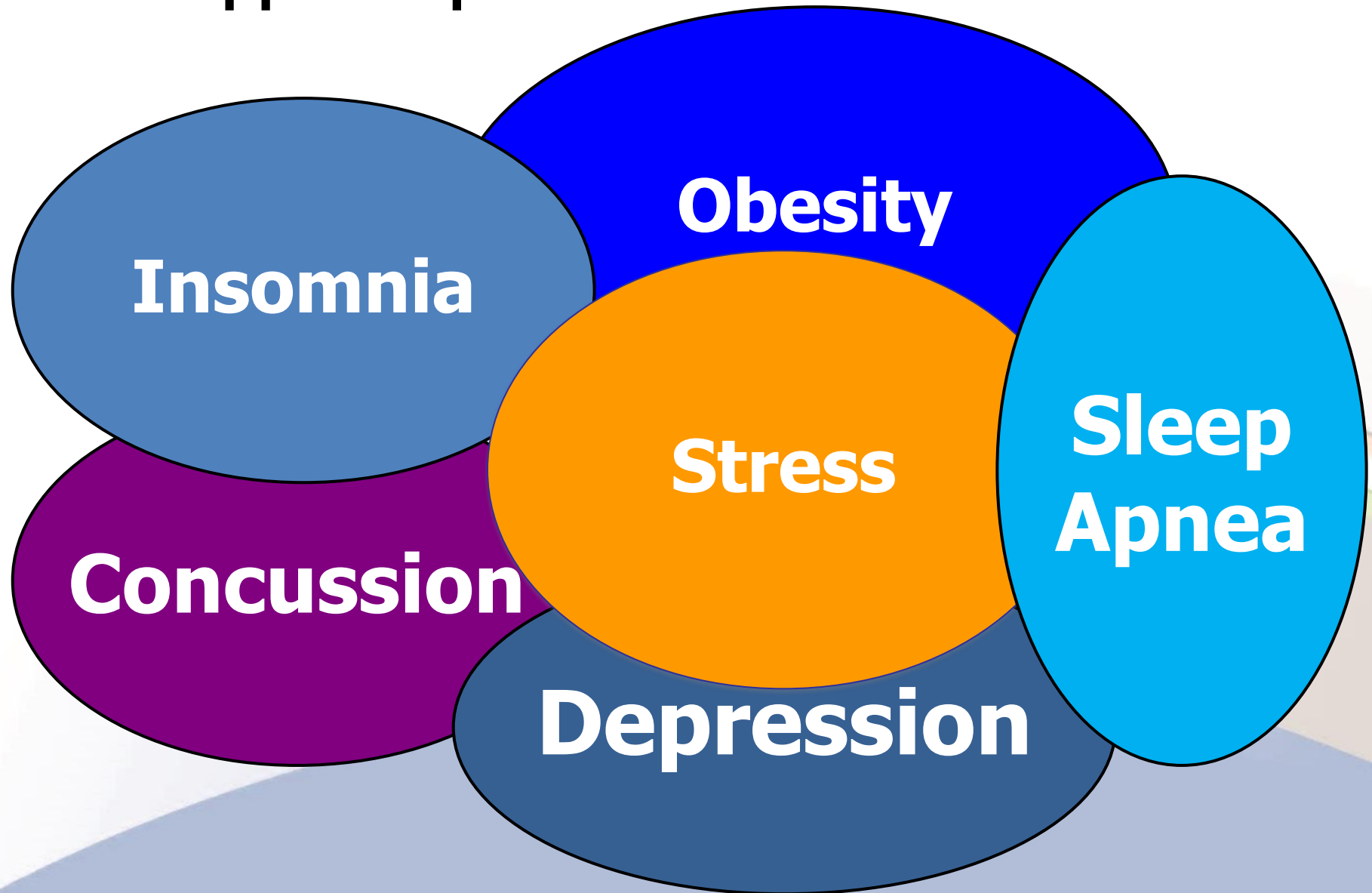
1- Sheline, (1996). *PNAS*, 93(9);3908-13.

6. More Depression, More Hippocampus Atrophy

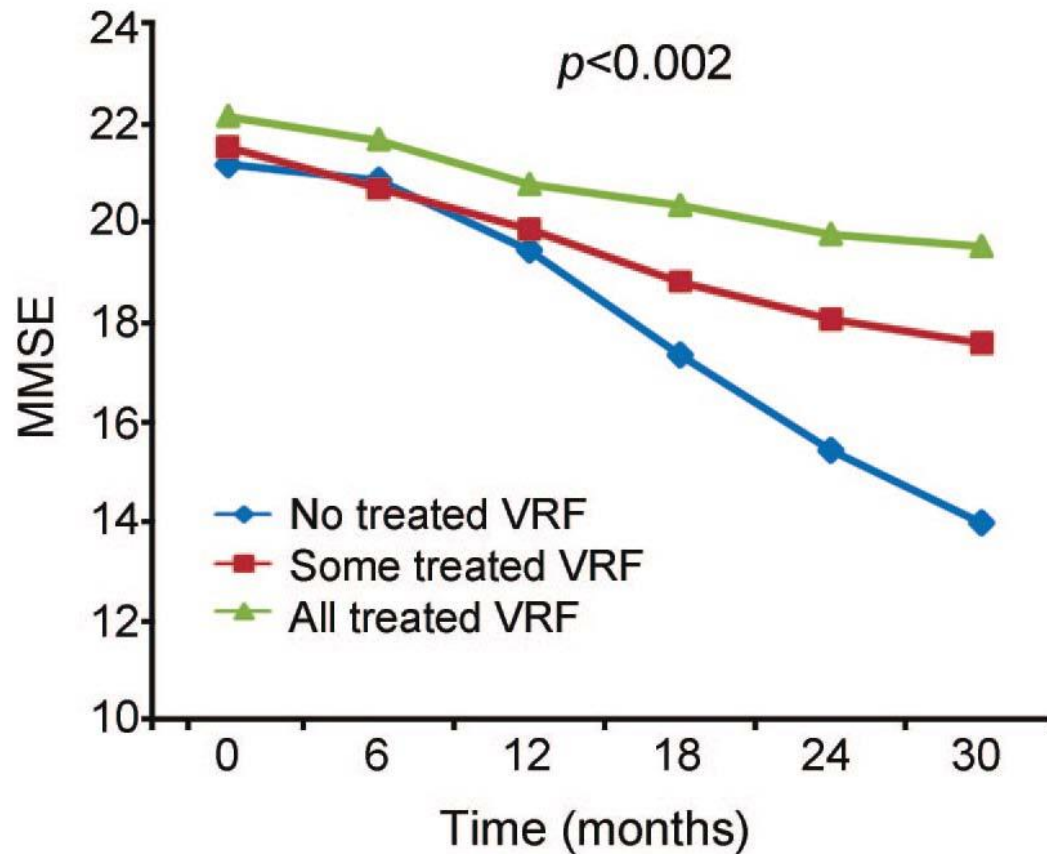


<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0102692>

Six Ways to Reduce the Size of Your Cortex and Hippocampus



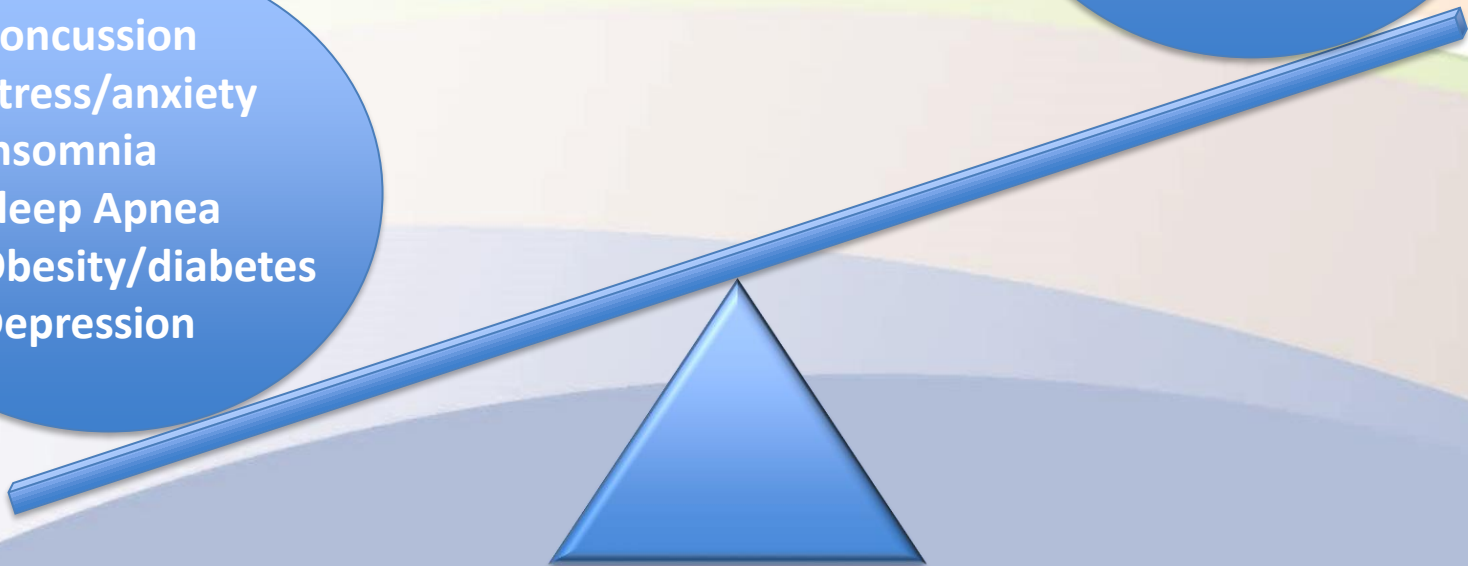
Treating Vascular Risk Factors Slows Brain Decline with Aging





Concussion
Stress/anxiety
Insomnia
Sleep Apnea
Obesity/diabetes
Depression

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

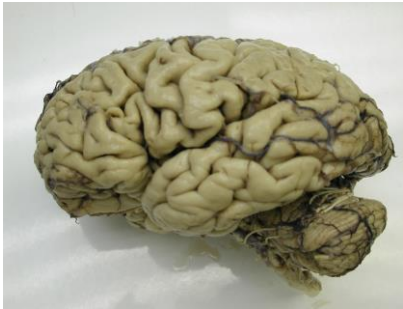




Good News:

**Six Ways to Rejuvenate Your Brain and Boost your
Memory, in 3 Months**

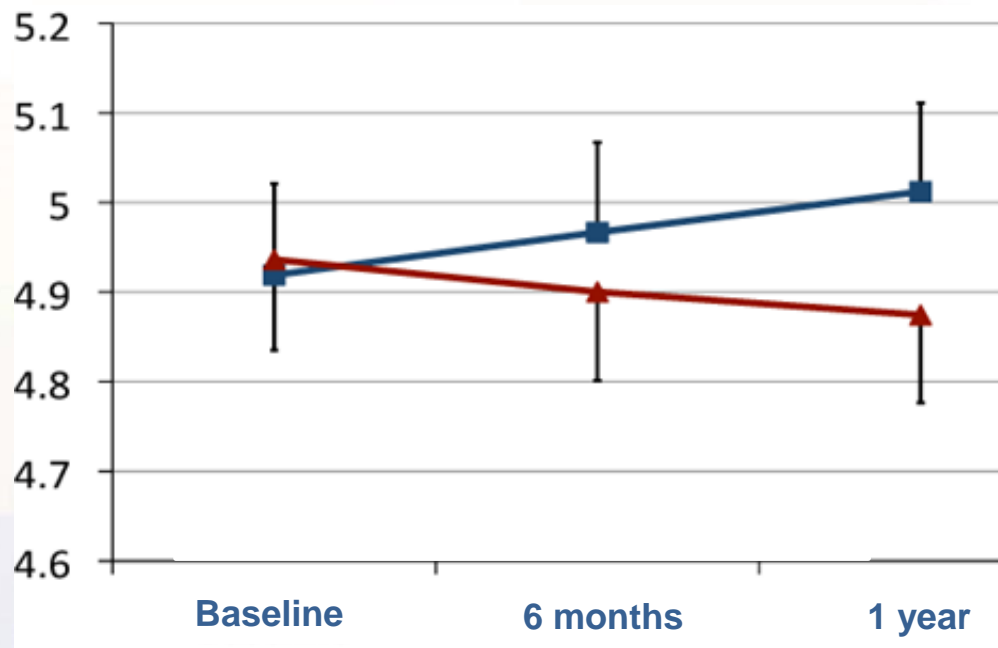
The Brain Has Lots of Blood Vessels



Zlokovic et al. Neurosurgery 43(4), 877-78, 1998

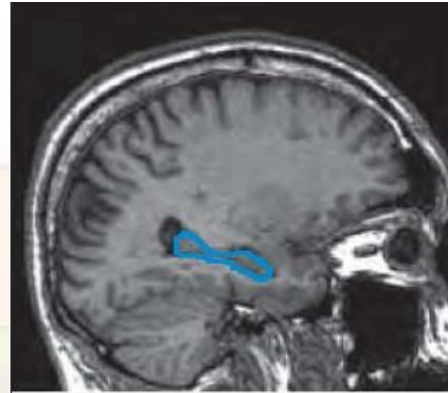
1. Get Fit

Walking 3 Times a Week For One Year Grows Your Hippocampus

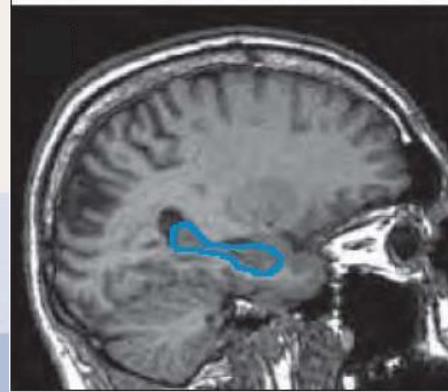


Three Months of Vigorous Exercise, Bigger Hippocampus

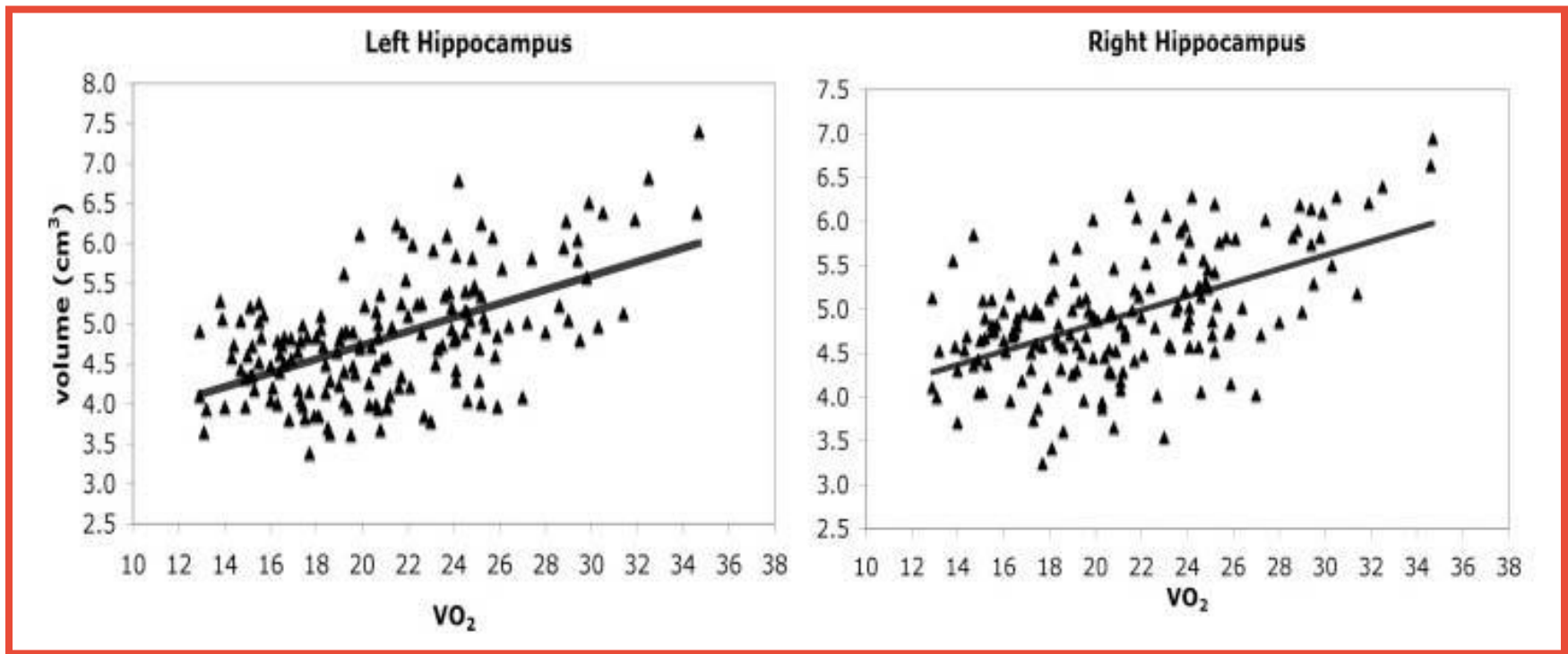
Before
Exercise



After
Exercise

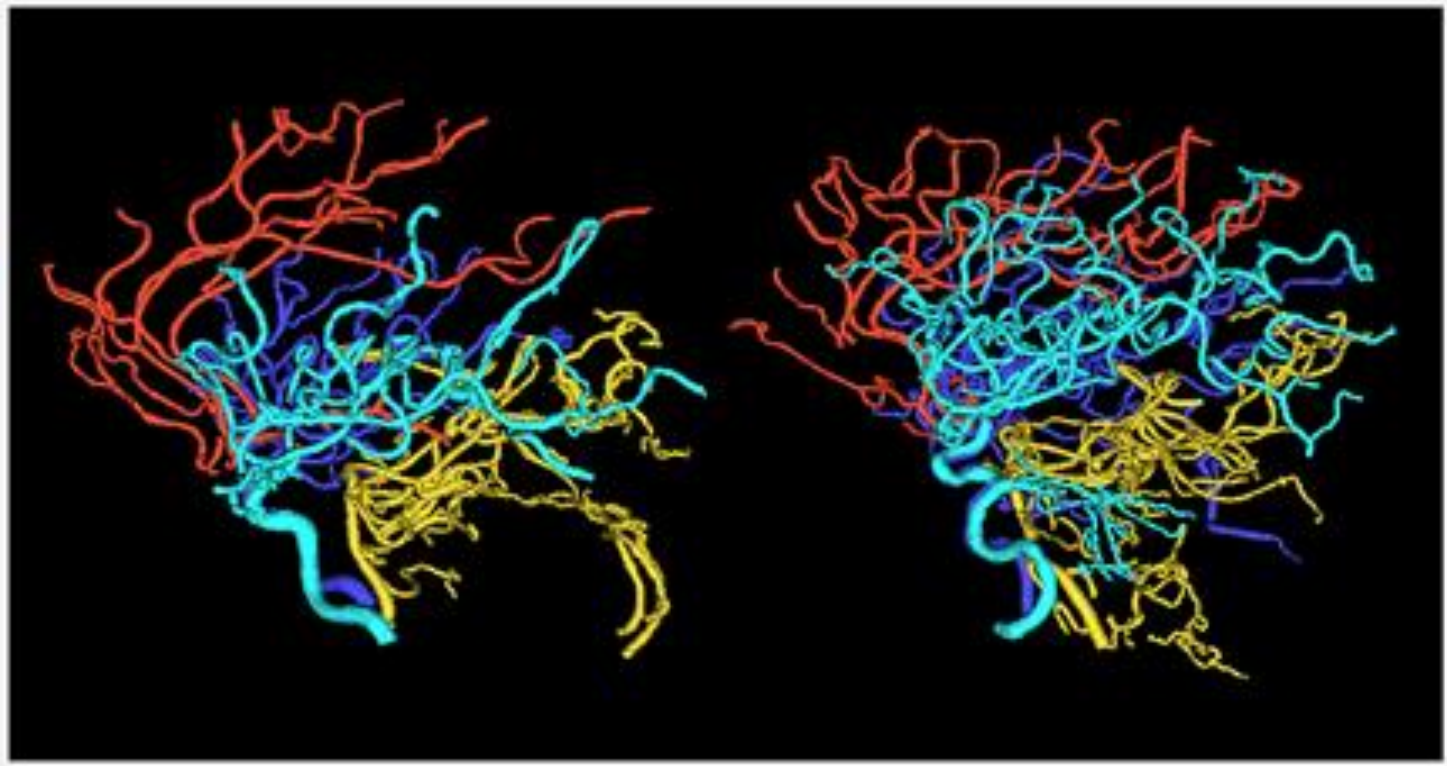


Better Fitness, Bigger Hippocampus



Erickson et al., Hippocampus 19:1030–9, 2009

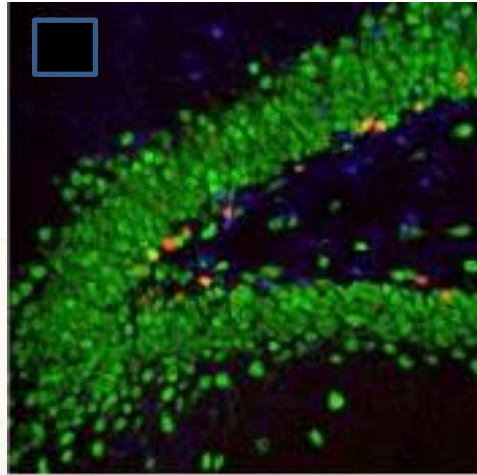
More Exercise, More Blood Vessels in the Brain



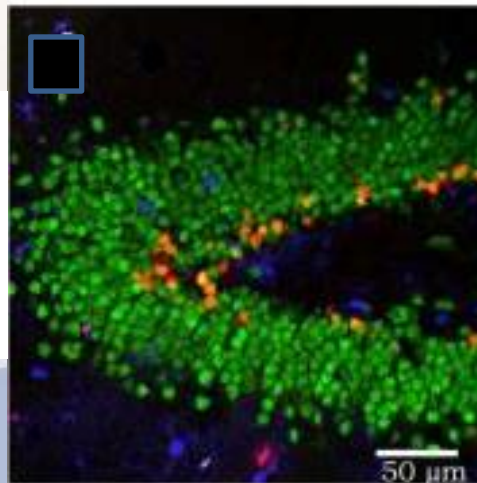
<http://archive.jsonline.com/news/health/35319459.html/>

More Exercise: More Neurogenesis

Controls

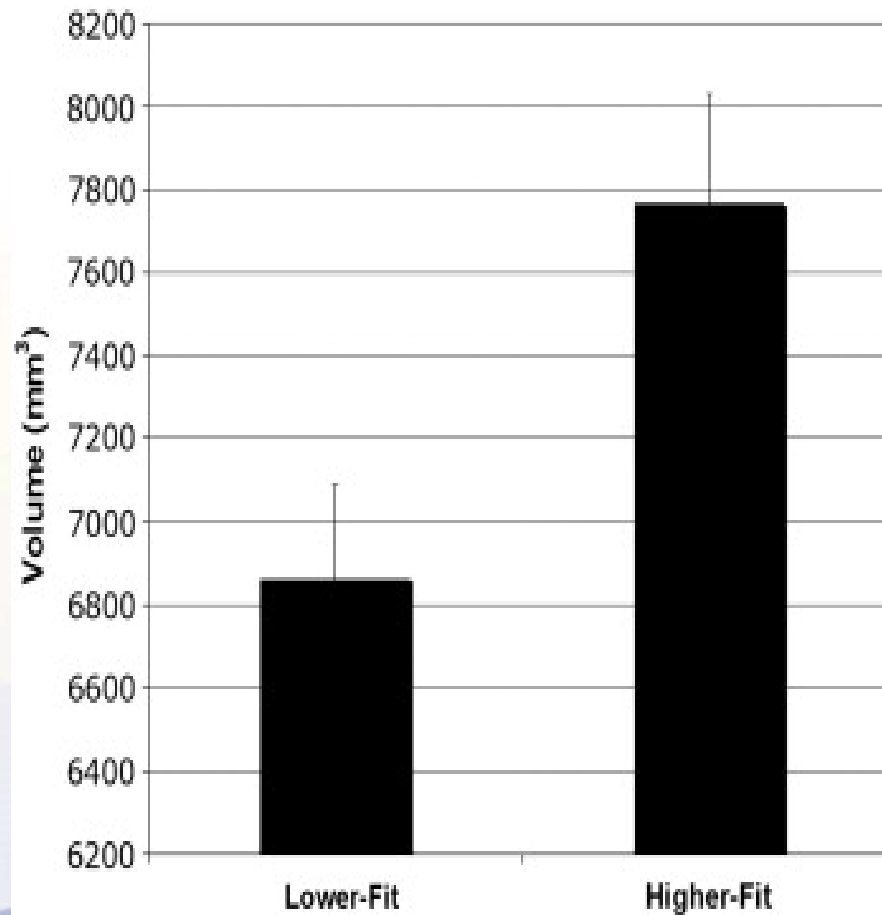


Runners



Lazarov et al., Trends in Neurosciences, 2010

Hippocampus is 12% Larger in Fit Children



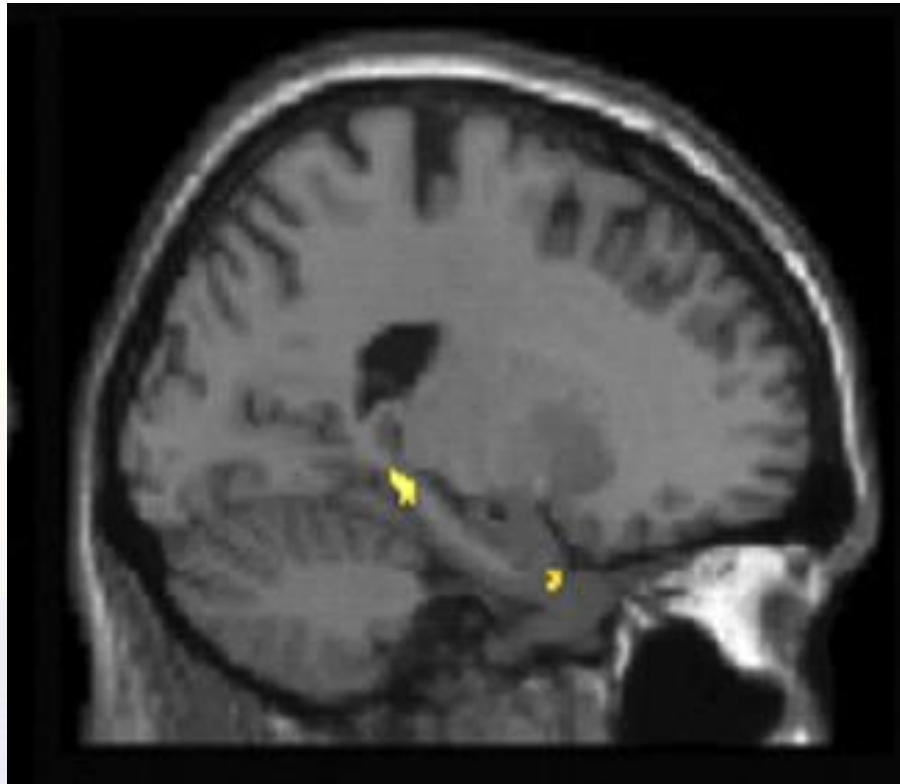
Brain Research, 2010

Brain-Mind-Body Connection



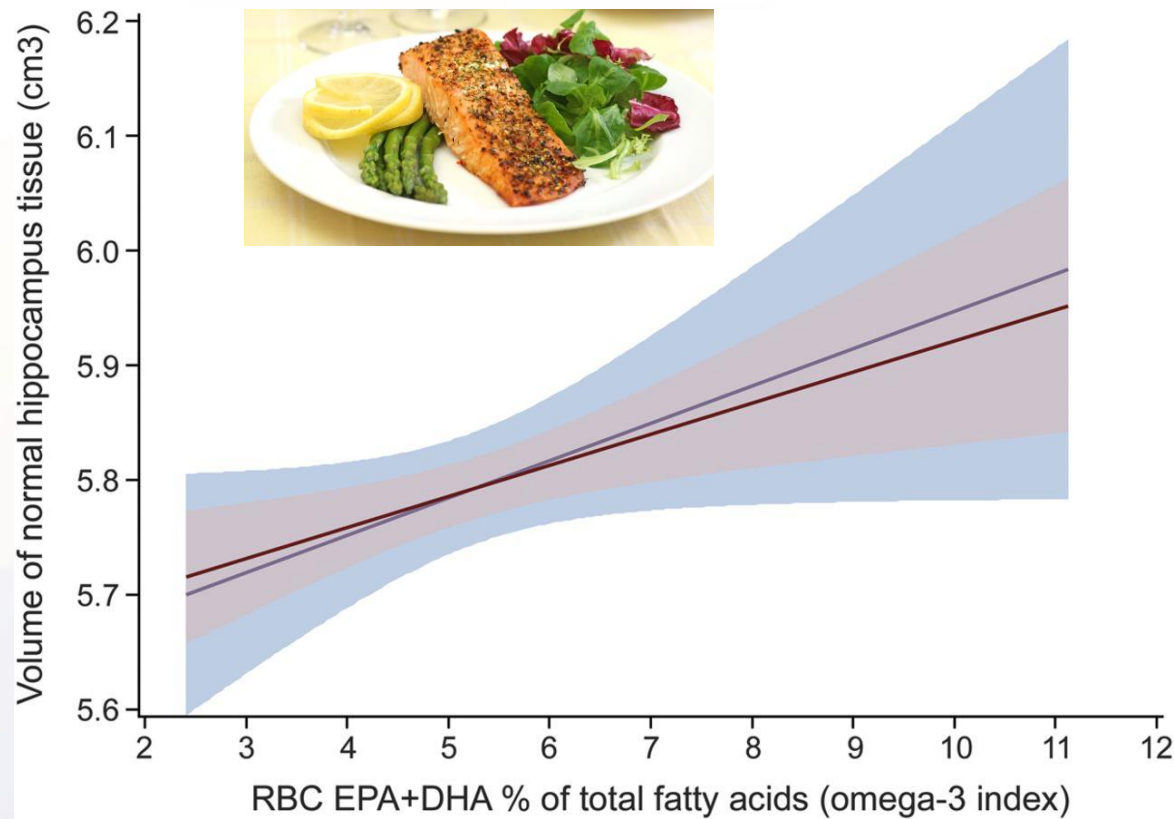
2. Sleep Well

Treat Your Sleep Apnea



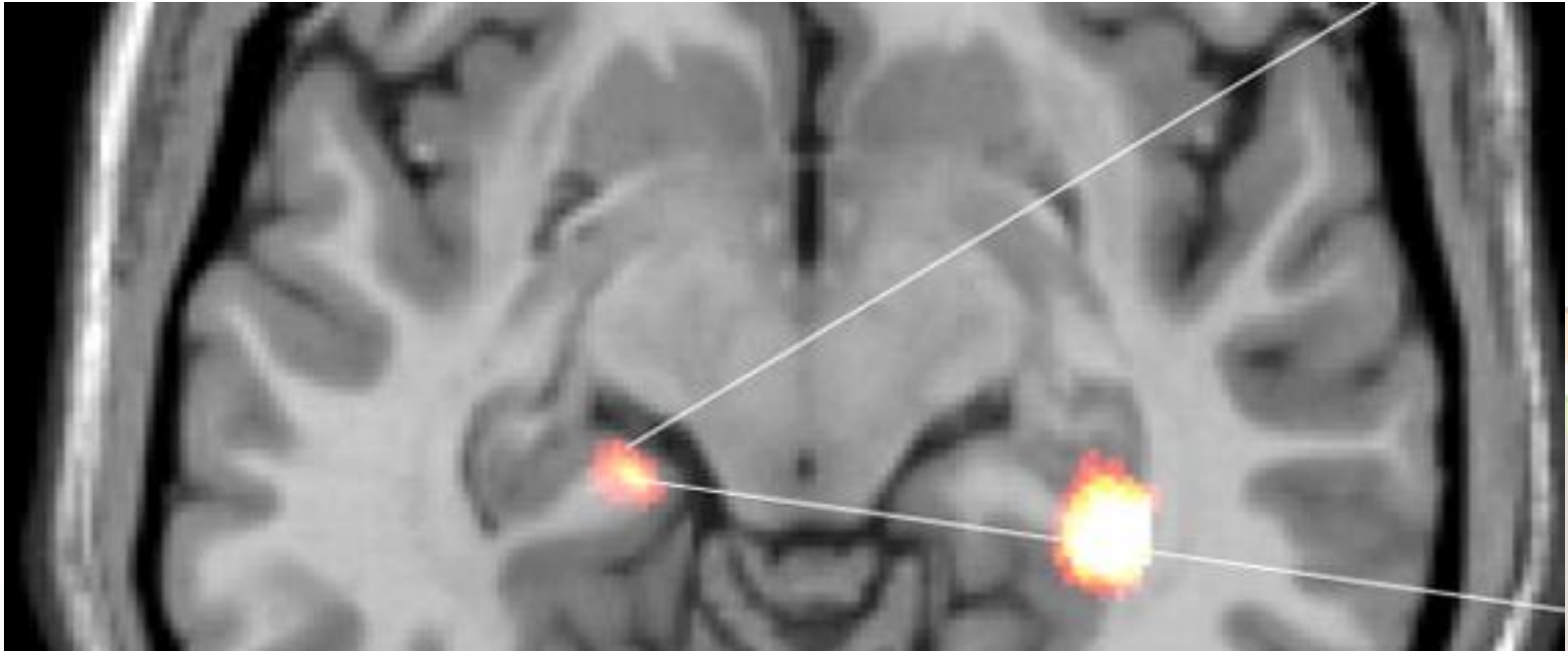
3. Eat a Mediterranean Diet

Take Omega-3 Supplements

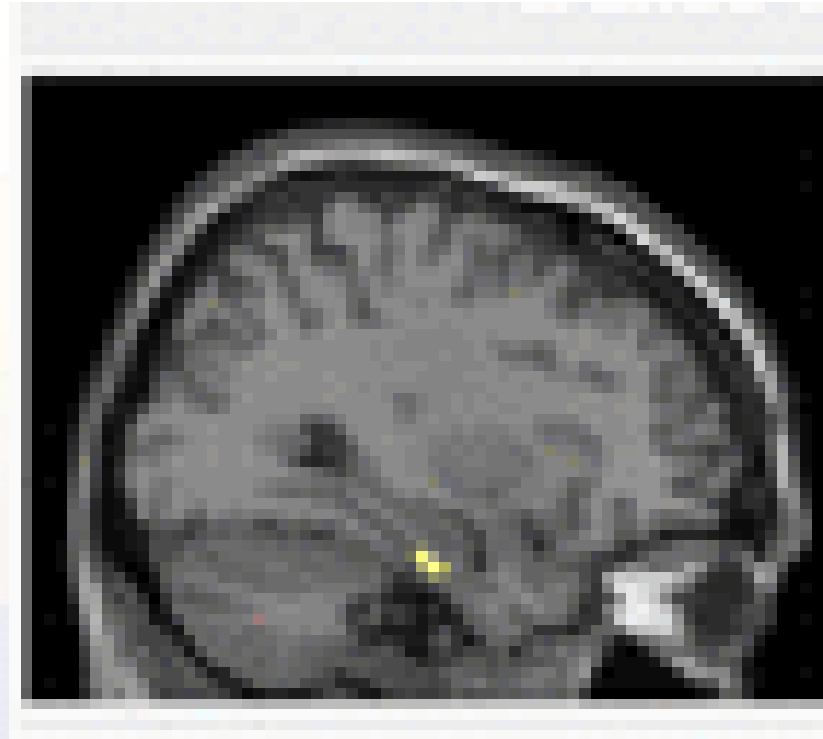


4. Learn Something New

Learn a New Language



Dancing Can Grow Your Hippocampus



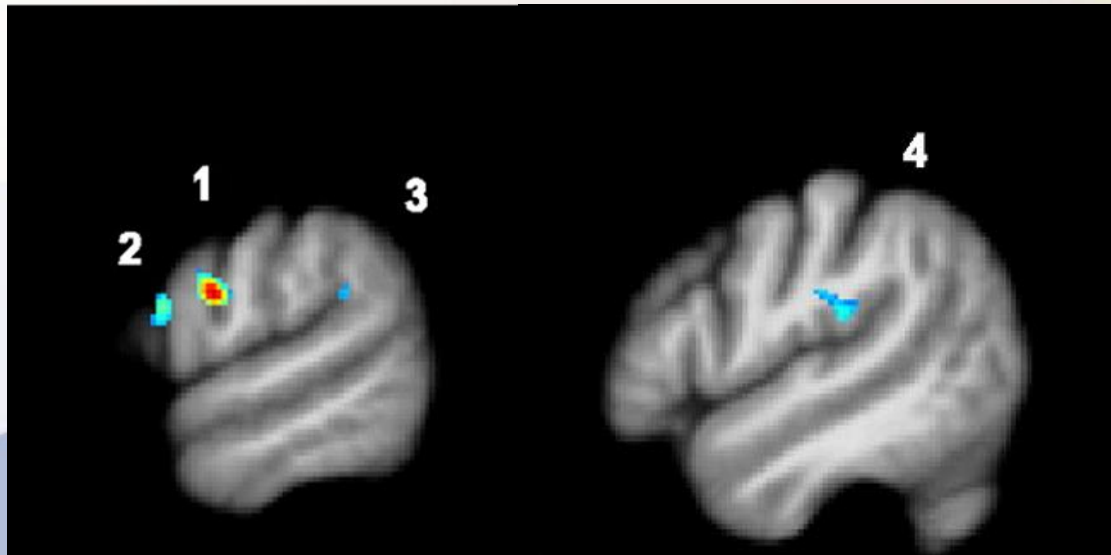
Dancing Can Grow Your Hippocampus



Learning to Play Golf Grows Your Cortex

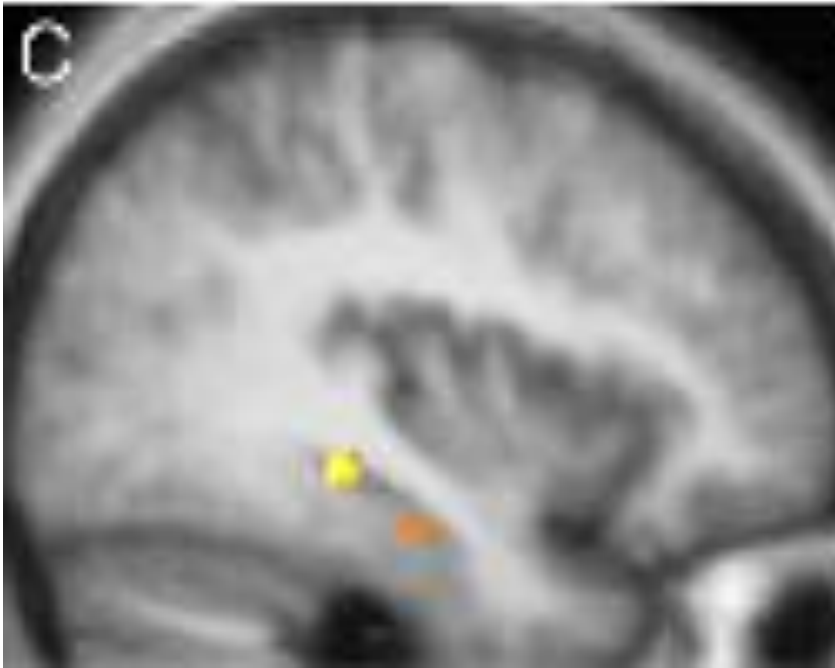


<https://www.pga.com/archive/learn-golf-golf-course>



5. Meditate

Lower Your Stress, Be Happy



Holzel, Psychiatric Research, 2011



Yoga & Tai Chi

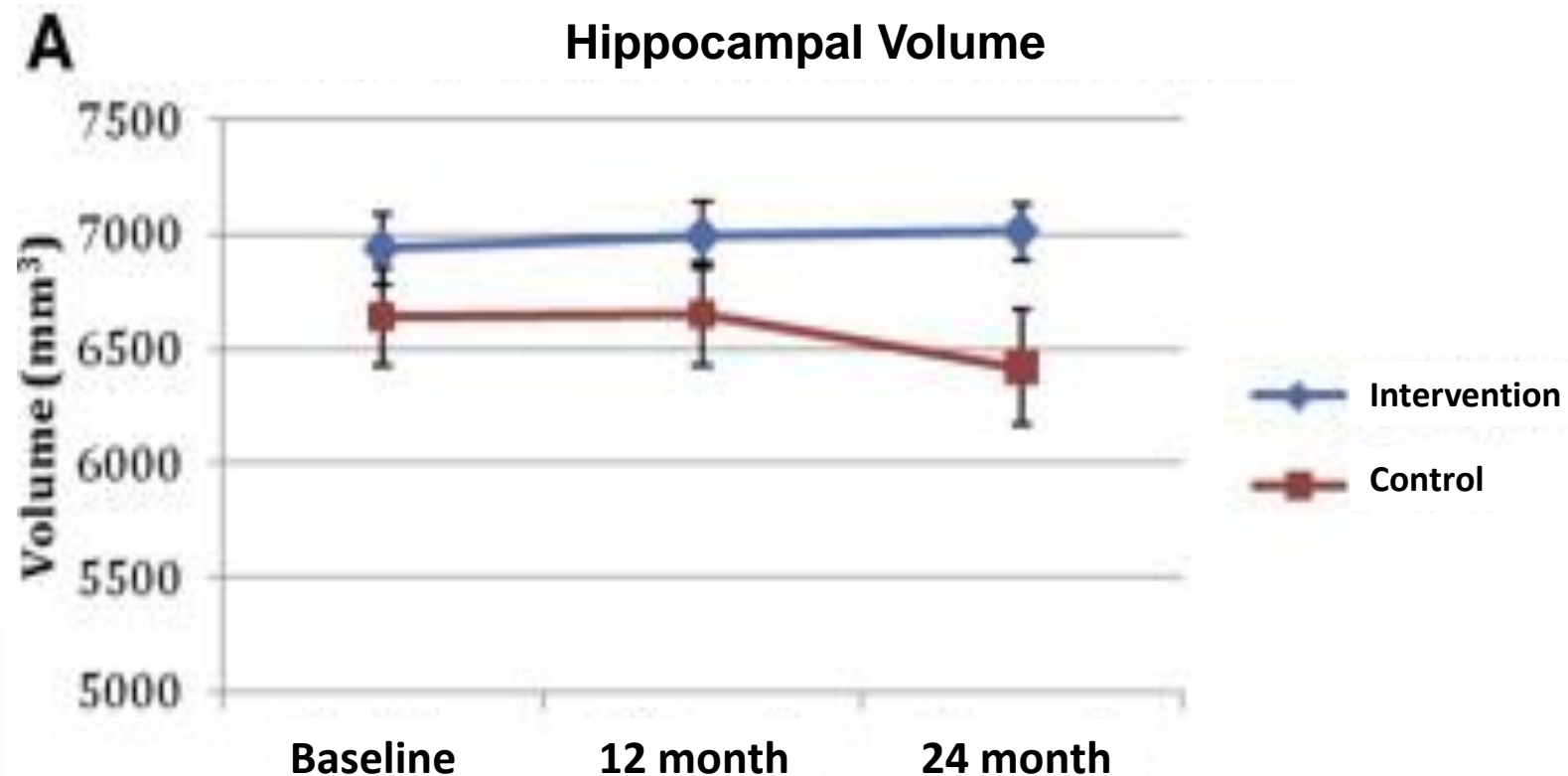


6. Have a Purpose in Life

Pursue Your Passion

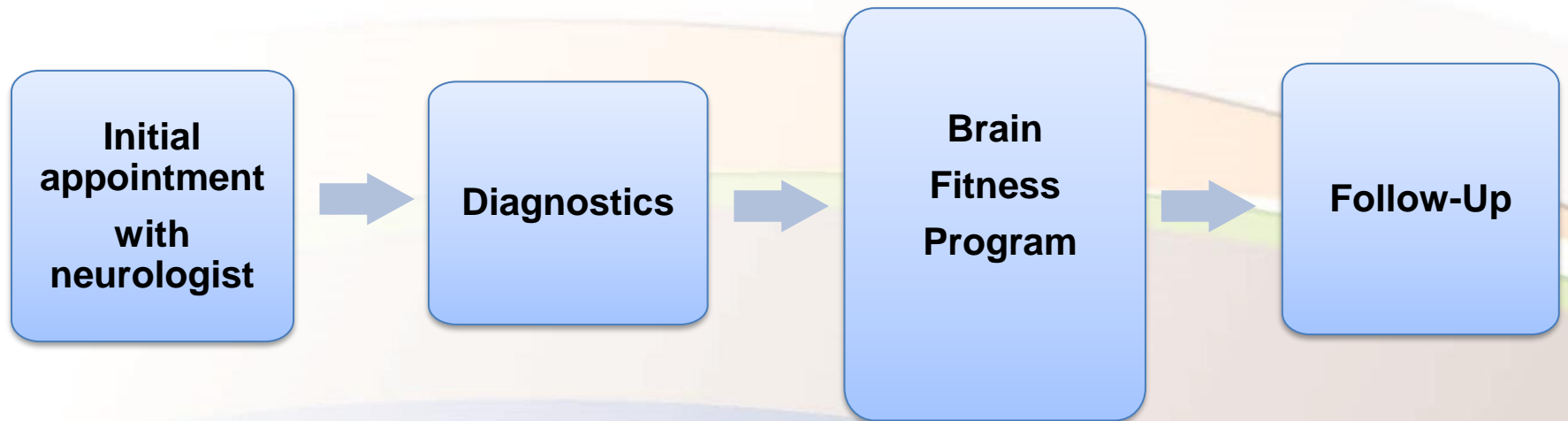


6. Hippocampus Grows Bigger with Civic Engagement

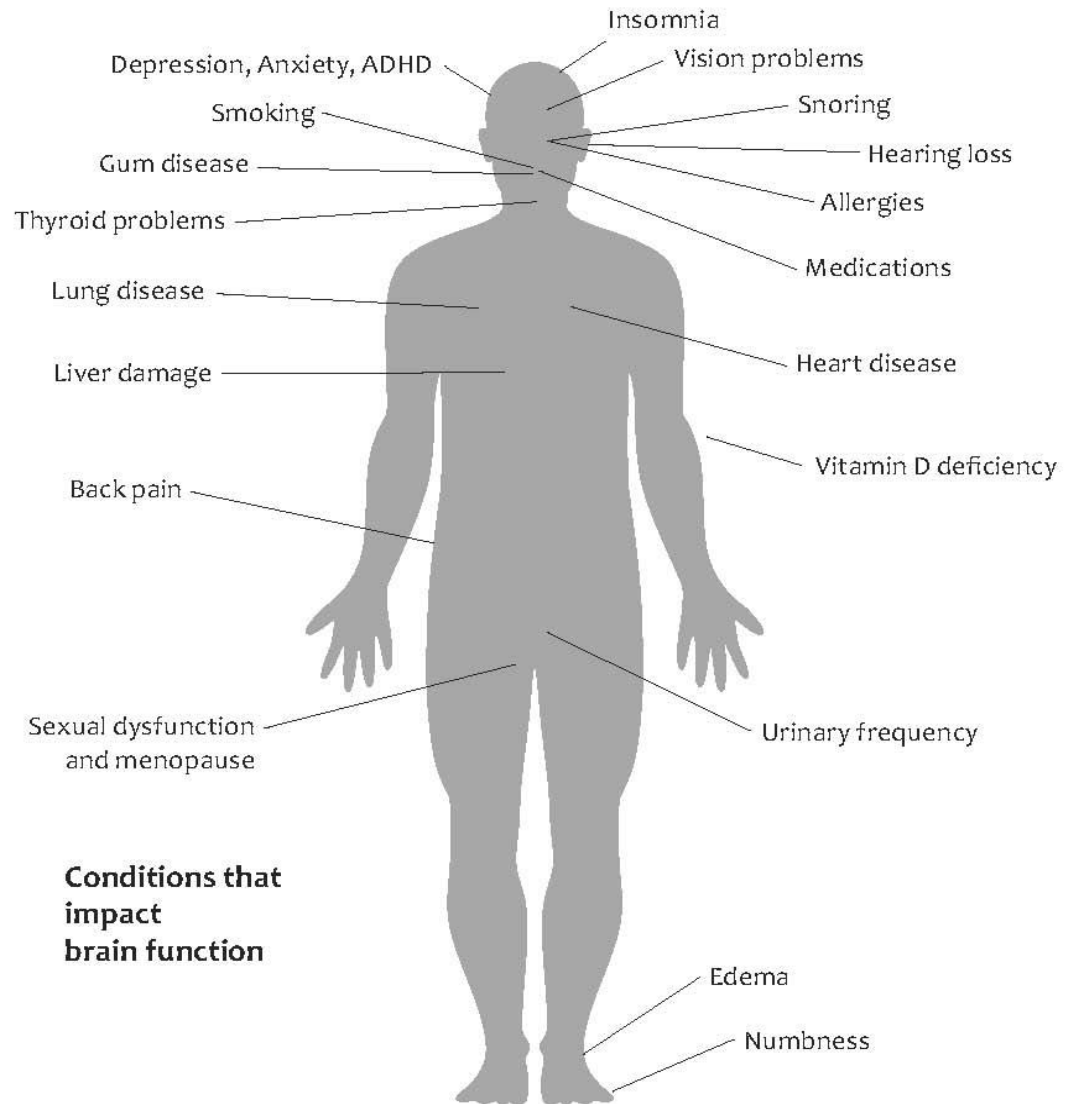


Carlson et al, Alzheimer's and Dementia, March 2015

Brain Fitness Program: Overview



Brain Fitness Program: Initial Exam



Brain Fitness Program: A Personalized Set of Interventions

Meditation Training



Brain Training



Sleep counseling



Diet Counseling



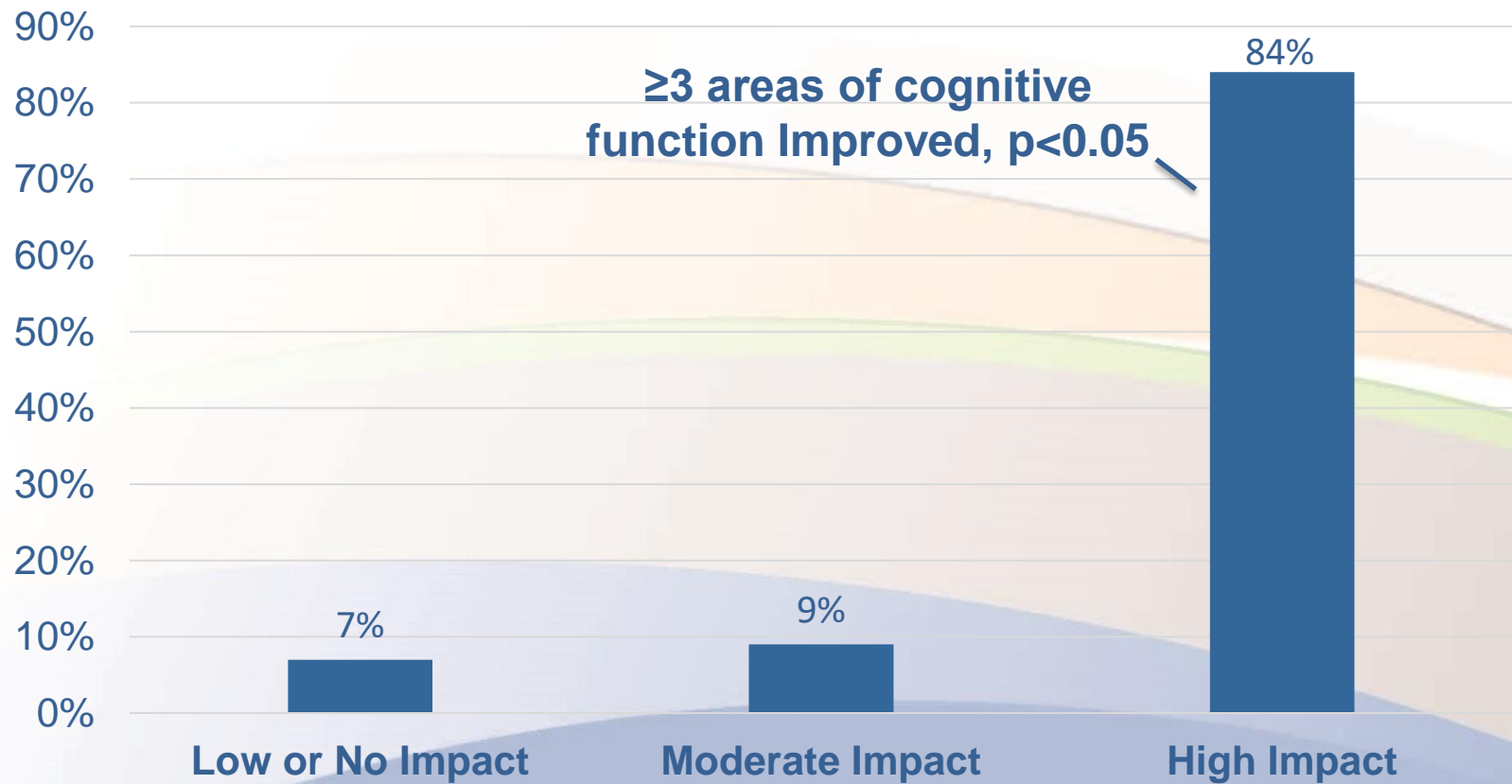
Exercise Training



Weekly Monitoring

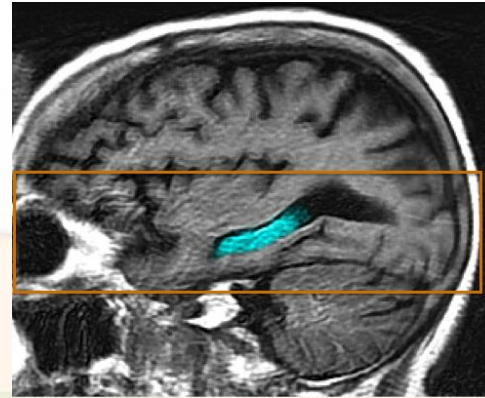


Brain Fitness Program: Statistical Analysis of 127 Patients with MCI

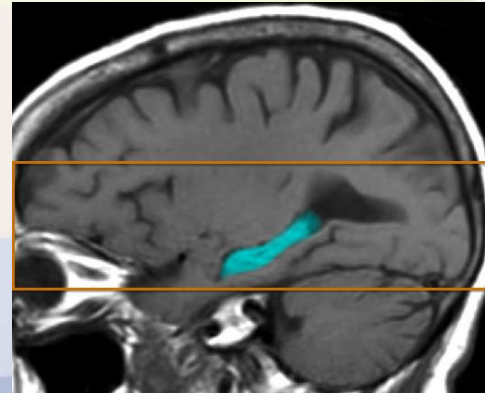


Brain Fitness Program: Growth in the Size of Cortex and Hippocampus

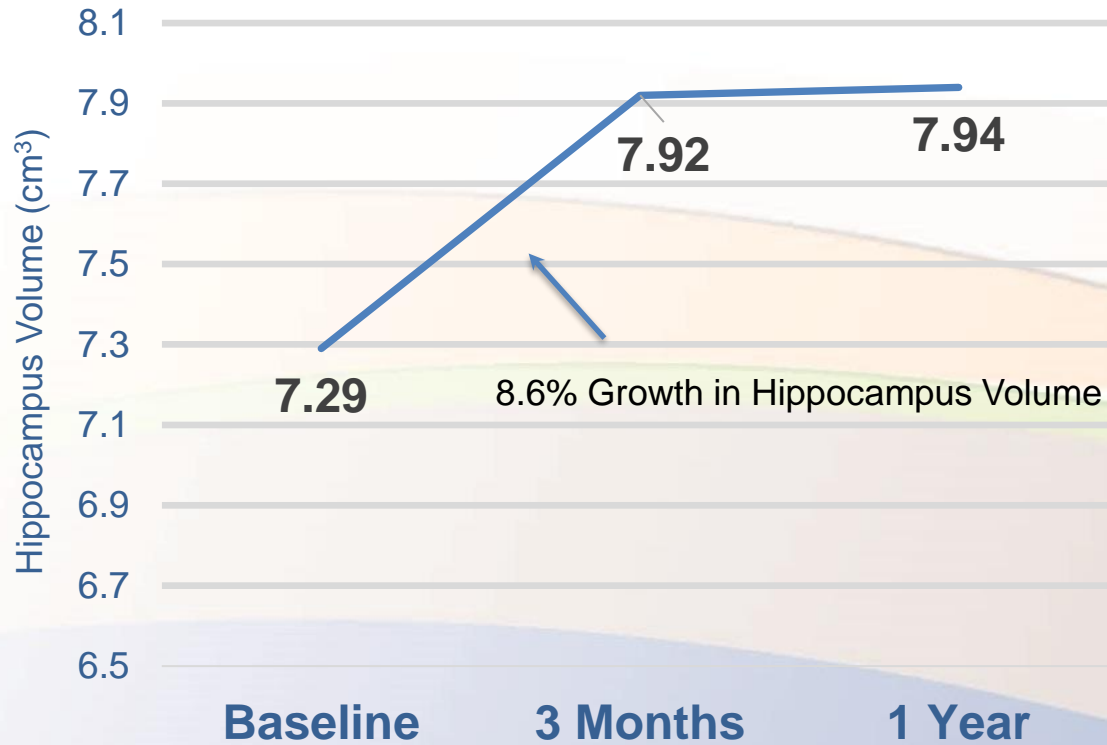
Before
Program



After
Program



Sustained Benefits One Year Later



Published in The 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" is written in a bold, red, serif font, centered within a white rectangular box. The box is positioned in the lower center of the slide, overlapping a background of soft, abstract, curved shapes in shades of blue, purple, and orange.



Defy Aging



Concussion
Stress/anxiety
Insomnia
Sleep Apnea
Obesity/diabetes
Depression

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

MAJID FOTUHI, MD, PHD

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mfotuhi@neurogrow.com

