



CSUS  
Cardiovascular  
Wellness Program

Building a Better-Connected Brain

Use it or Lose it

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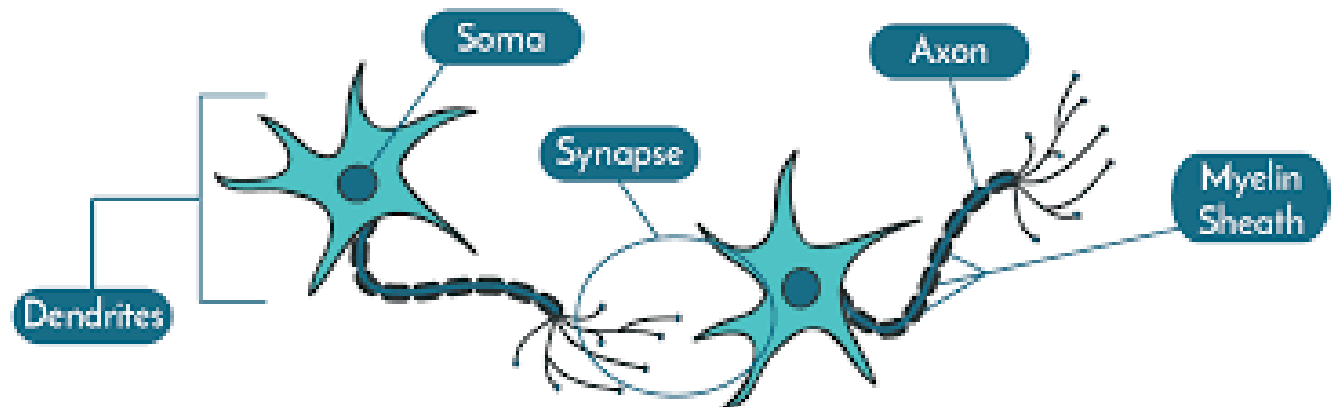
Let's start with a  
trivia quiz....

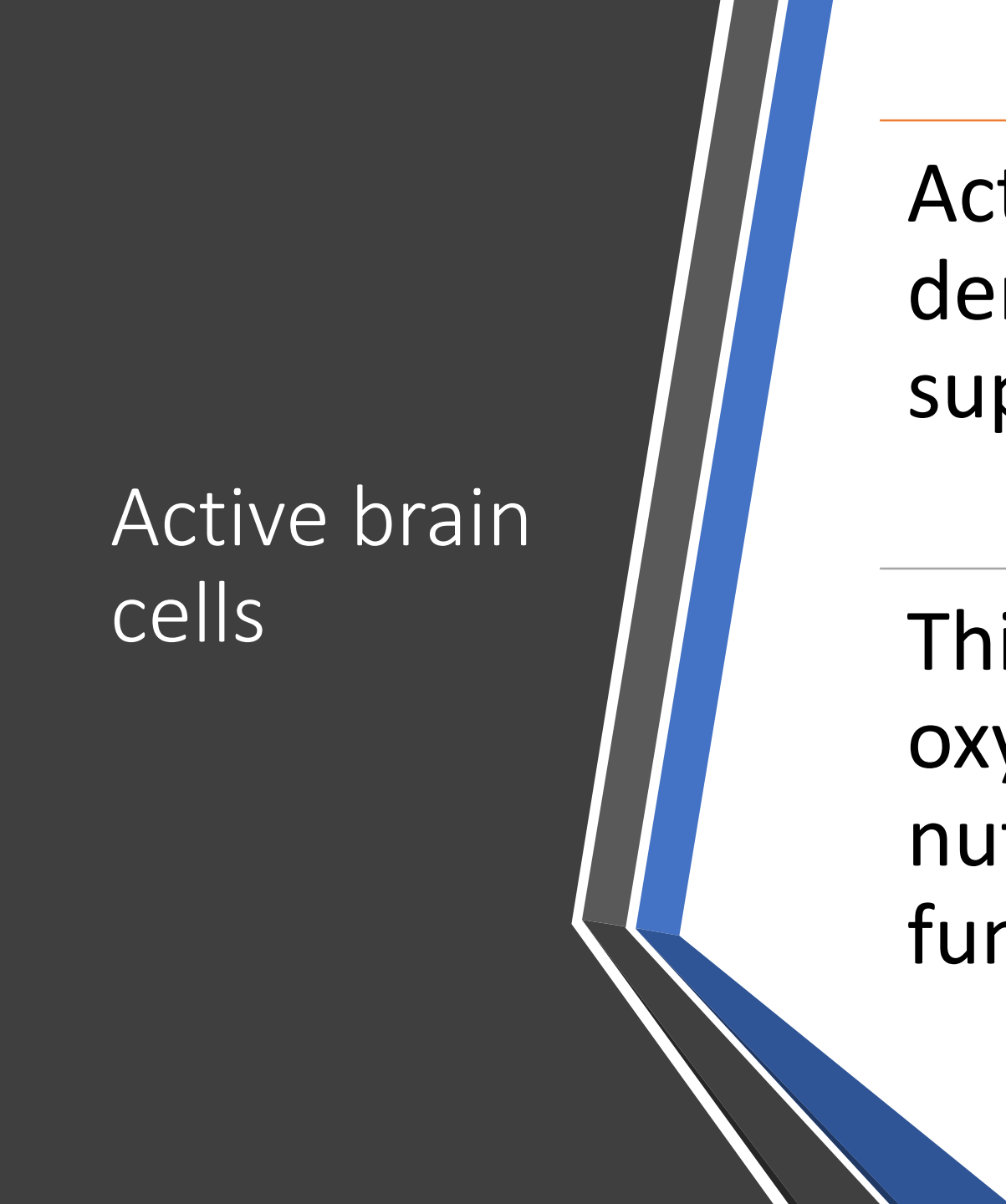
Polling please



# Neuron basics

Neurons are information messengers. They use electrical impulses and chemical signals to transmit information between different areas of the brain, and between the brain and the rest of the **nervous system**





Active brain  
cells

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Active brain cells (neurons)  
demand a better blood  
supply than idle ones

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This preferential supply of  
oxygen and a variety of  
nutrients enhances their  
function

Use it or  
lose it

- The better connected each brain cell is (ie the greater number of neural connections) the more chance it has of being stimulated by other neurons when they are activated

# Use it or lose it

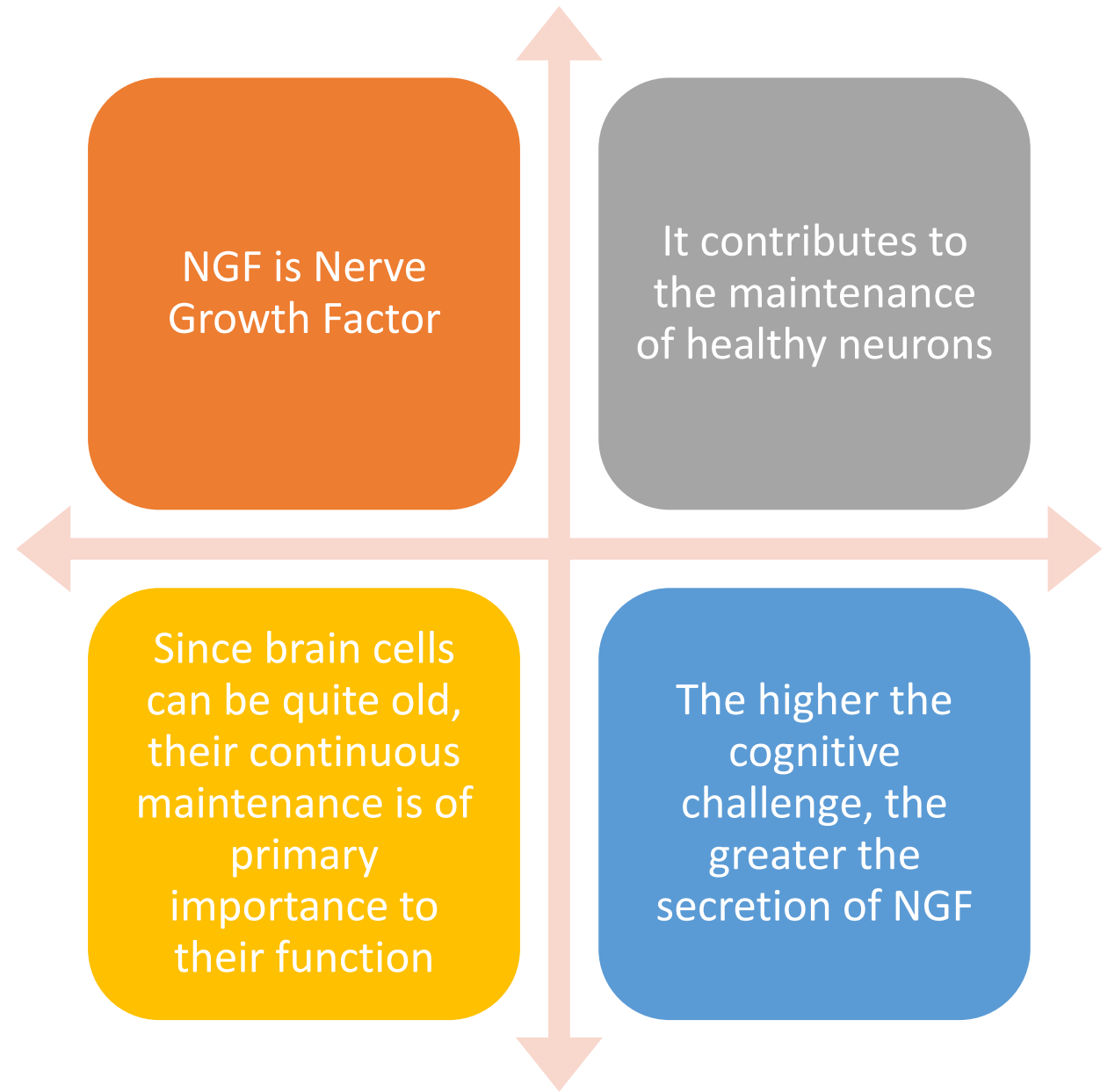


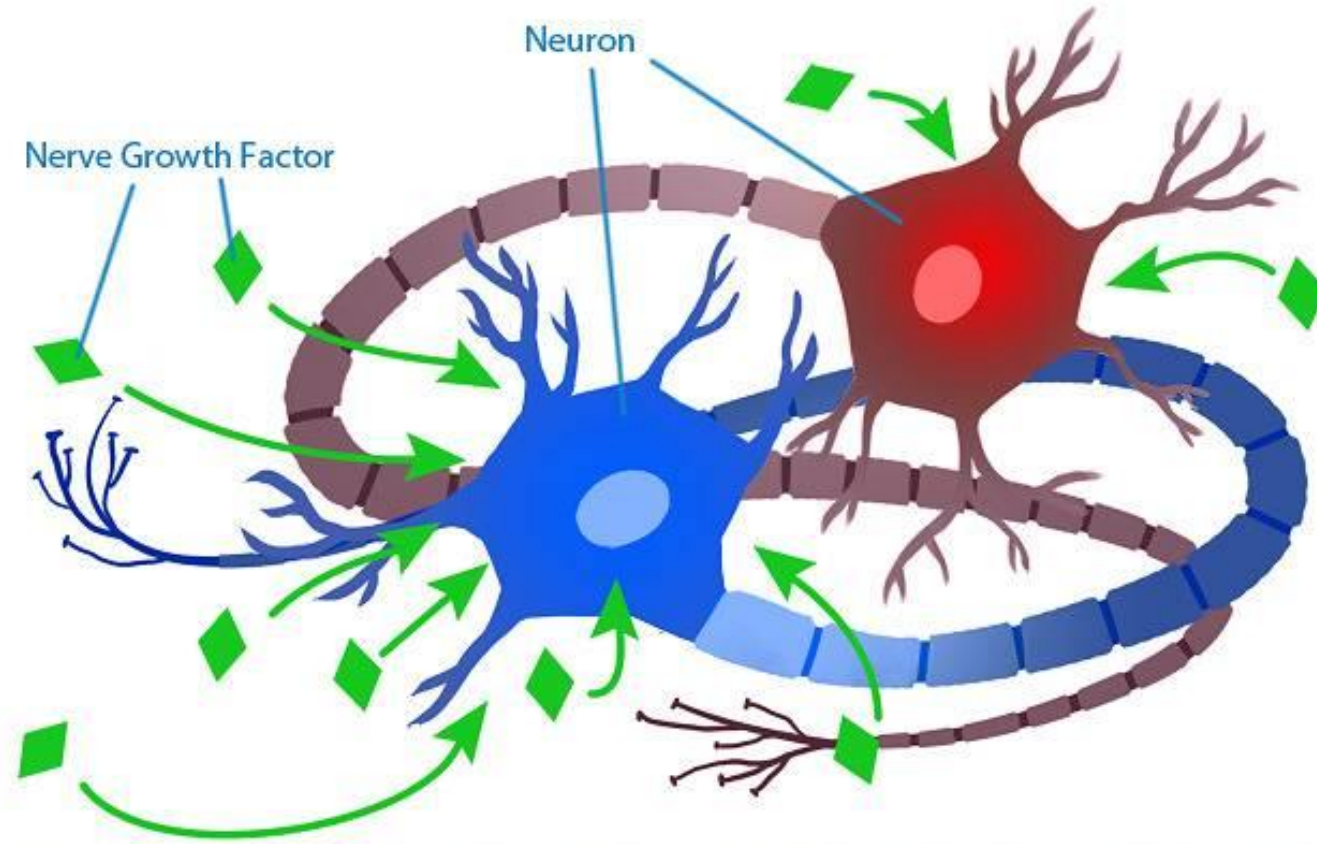
Inactive cells, on the other hand lose their connectivity and become targets for cell death



That is why people experience the “use it or lose it” phenomenon

Active  
neurons  
enhance NGF





Nerve Growth Factors (shown in green) is required by neurons in order to survive. As they are a limited extracellular resource, some neurons (shown in blue) may uptake a disproportionate share of survival factors, leading to the eventual death of neighboring neurons (shown in red).

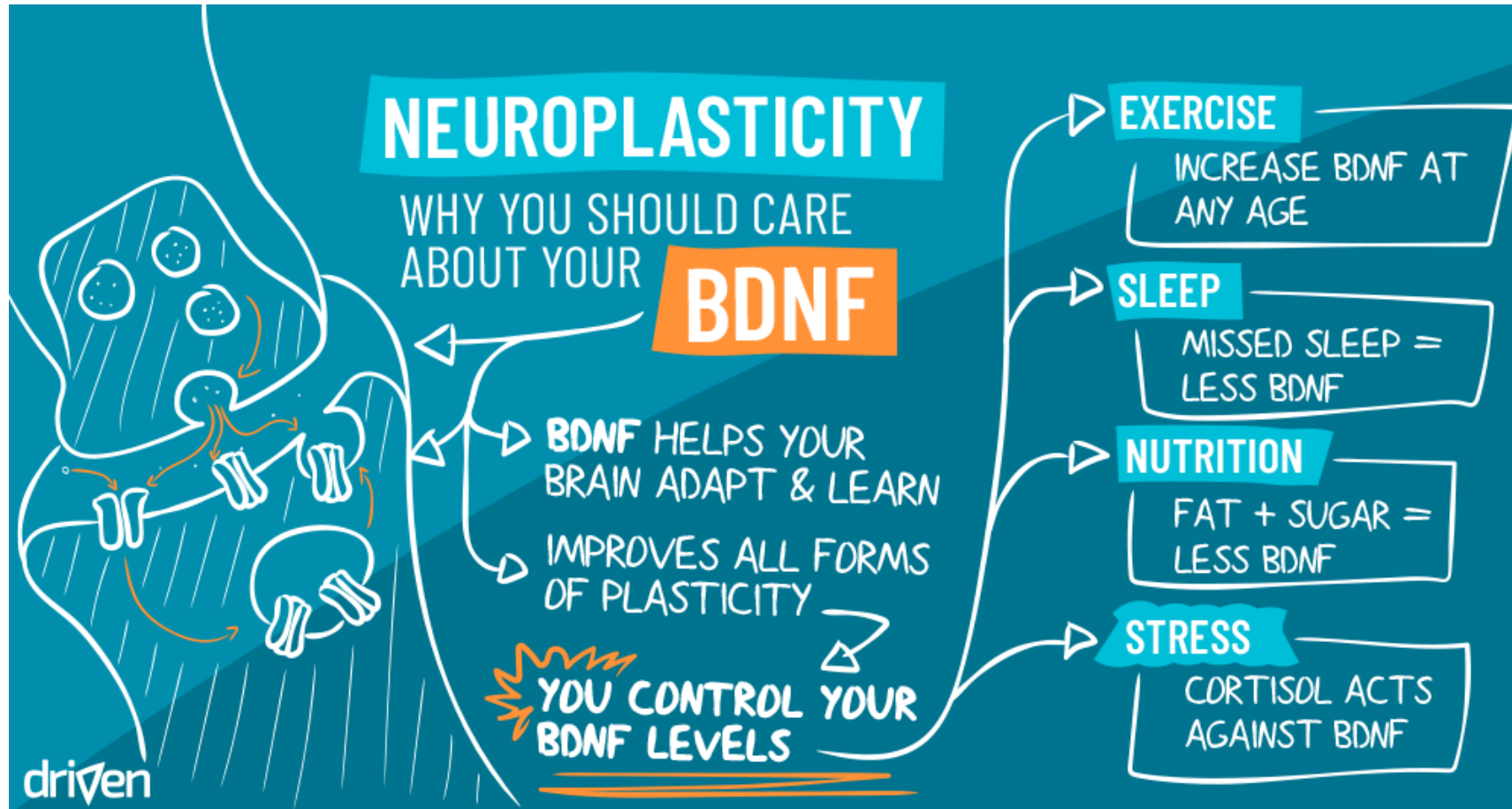


# Use it or lose it

- Neuroplasticity- the ability of the brain to form and reorganize synaptic connections, especially in response to learning or new experiences



# BDNF: Brain Derived Neurotrophic Factor



It is essential for learning and memory

# Training at your personal “optimal threshold”



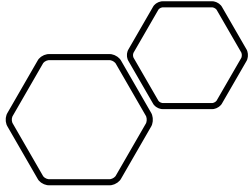
Cognitive exercise is most effective when you are challenged at a level that is neither too easy, nor too difficult...right on the cusp of what you are capable of



Training at your “optimal threshold of ability” triggers the chemical reactions that builds your neural pathways



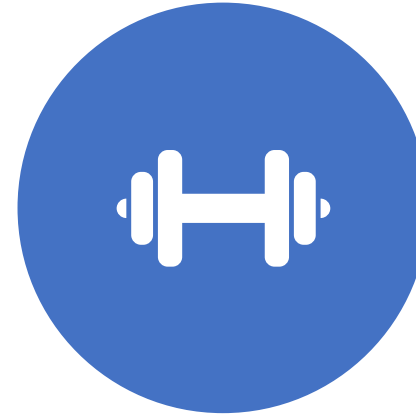
Your brain becomes better connected



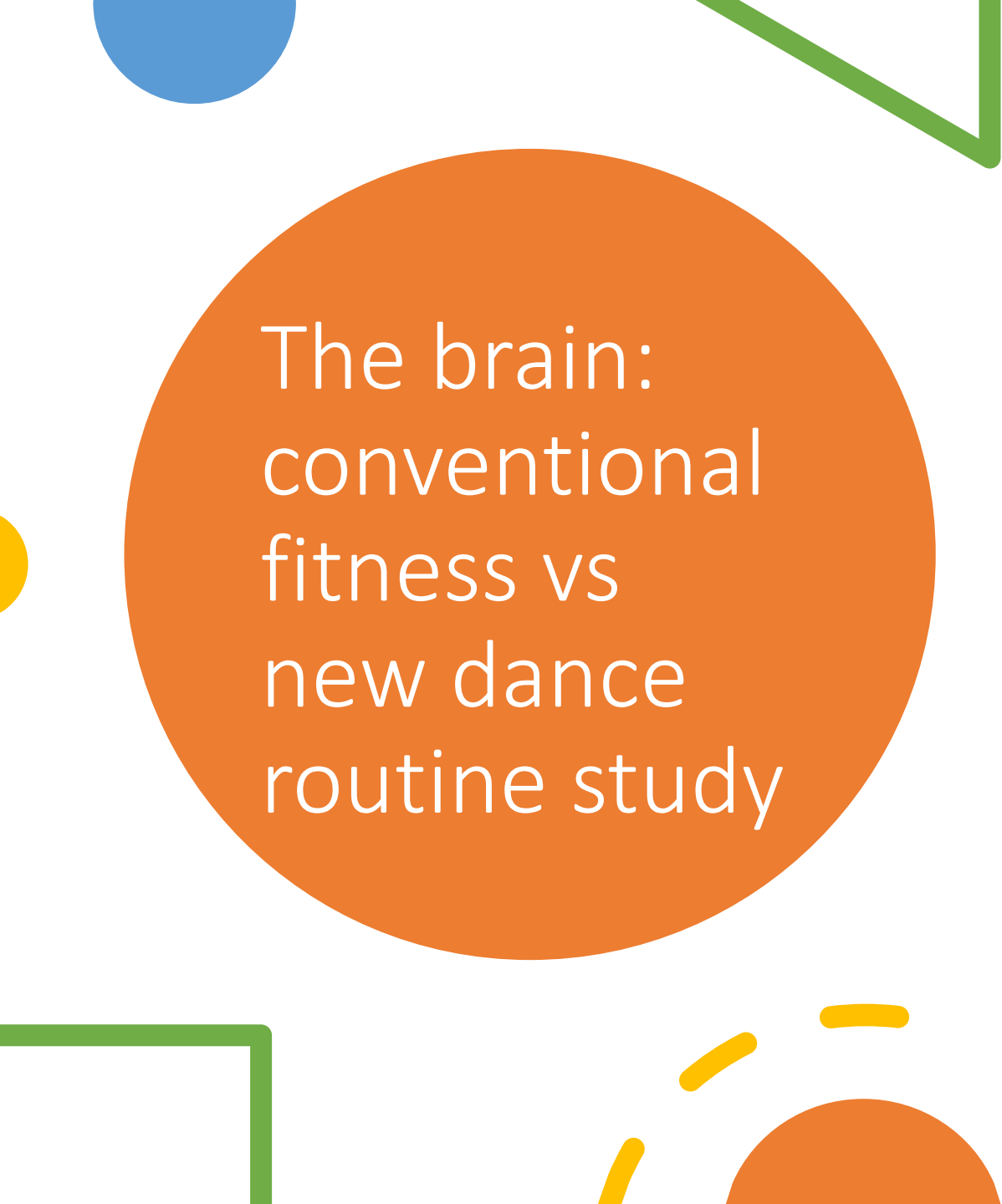
# Delaying age related cognitive decline



A WELL-CONNECTED BRAIN IS  
BETTER ABLE TO RESIST  
COGNITIVE DECLINE AND  
DEMENTIA



THERE IS NO CURE FOR MANY COGNITIVE DISEASES.  
REGULAR COGNITIVE EXERCISE CAN HELP BUILD  
ADDITIONAL NEURAL PATHWAYS SO THAT PEOPLE CAN  
CONTINUE TO FUNCTION NORMALLY FOR A LONGER  
PERIOD OF THEIR LIFE AND TO DELAY THE ONSET OF THE  
SYMPTOMS



The brain:  
conventional  
fitness vs  
new dance  
routine study

Frontiers in Aging Neuroscience March 2017

22 healthy seniors (63-80 years)

randomly assigned

dance group

sports group

18 month study

MRI

BDNF

neuropsychological tests

Dancers: increased gray matter volume in PNG

increased BDNF plasma levels

increased volume in parahippocampal region

# Ok folks, we know what we gotta do ....

- Get quality sleep ....the brain needs to reset to function well
- Continue learning....a new language, art skills, new social groups
- Keep moving....exercise is key. New and different CV exercises boost oxygen supply to the brain and increases brain volume
- Reduce stress...it is a silent killer, and it diminishes neuroplasticity
- Find a strong purpose for what you're planning to learn...if you find a good reason for learning, then you will try harder and focus more on the task
- Read a novel...reading fiction creates heightened connectivity in the brain

Let's end with a  
trivia quiz....

Polling please



# Thank you!!

- Any questions or comments?
- What are you going to do today to boost your neuroplasticity?



I had 4 items on the title slide in each corner, what were they?...slide 8?