

HEALTHY BRAIN

Aging and Exercise

Samantha Strubel

EXERCISE IN AN AGING POPULATION



HEART DISEASE

- Major risk factors:
 - Age
 - Gender
 - Genetics
 - Smoking
 - **Inactivity**
 - **High cholesterol**
 - **High blood pressure**
 - **Diabetes**
 - **Obesity**

BENEFITS OF EXERCISE

- Weight control
- **Brain function and memory**
- Disease and condition treatment
- Increased energy levels
- Increase overall quality of life
- **Better sleep quality**
- Increased muscle mass and bone density
- **Decreased feelings of depression, anxiety and stress**
- Reduction of pain

ACSM GUIDELINES FOR OLDER ADULTS

150 minutes of aerobic exercise 3x/week

Resistance and/or strength training 2x/week

Flexibility and balance exercises 2x/week



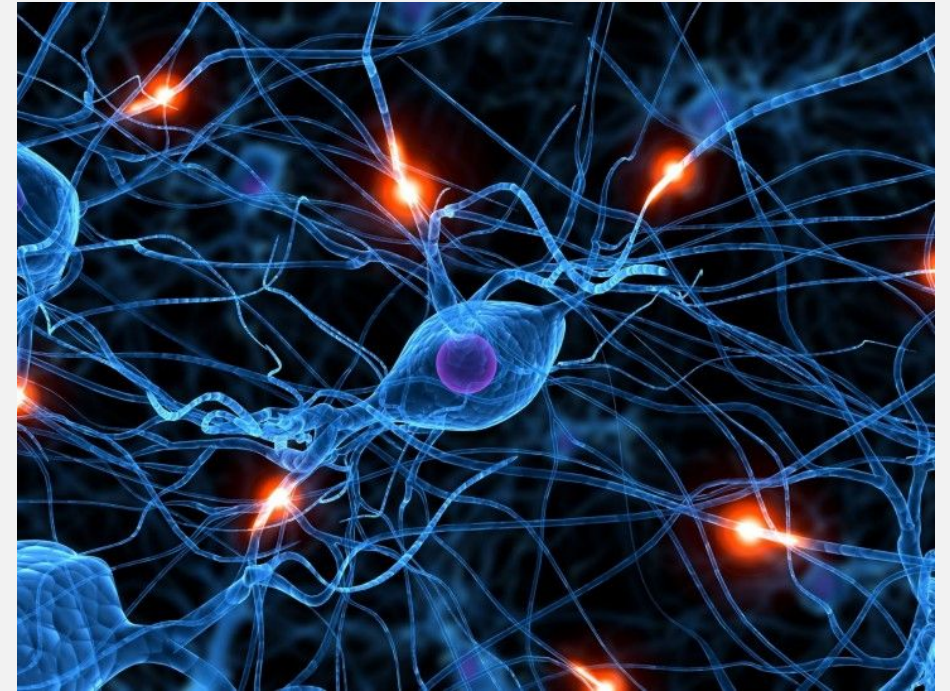
DURING EXERCISE

- Increased heart rate
- Increased blood pressure
- Release of endorphins
- Increased body temperature
- Breathing increases



IN THE BRAIN

- Released during exercise:
- NOREPINEPHERINE—fight or flight hormone
(also called noradrenaline)
- DOPAMINE—“feel good” hormone
- SEROTONIN—happiness hormone



NOREPINEPHRINE

- Released when you're awake—very little is released during sleep
- Released in high doses during situations of stress or danger
- Increases arousal, alertness, and awareness
- Promotes vigilance
- Enhances formation and retrieval of memory
- Focuses attention

DOPAMINE

- Helps regulate movement, attention, learning, and emotional responses
- Plays a part in reward system—contributing to pleasure and satisfaction
- Component of reward-motivated behavior
- ****Dopamine will help you feel good after exercising, and will motivate you to continue exercising!**

SEROTONIN

- Contributes to feelings of happiness and well-being
- Helps control cognition, reward, learning, and memory
- Contributes to sleep
- Leads to more time in REM sleep!!

IMMEDIATELY AFTER EXERCISE

- Decreased blood pressure
- “Over-reaching” effect
- Possible fatigue followed by an increase in energy



THE NEXT DAY

- Delayed onset muscle soreness (DOMS)
- Better quality of sleep
- Increased energy levels
- Reduced stress
- Lower blood pressure
- Up to a 40% rise in metabolic rate (after 45 min. of vigorous aerobic exercise)

LONG TERM BENEFITS

- Physical and mental changes
- Decreased resting heart rate
- Increased speed at which intestines empty
- Increased metabolism
- Decreased body fat
- Improves muscle tone and strength
- Increased mood—decreased depression
- Strengthens heart
- Strengthens and builds bones
- More mitochondria in cells—leads to increased energy

BENEFITS OF EXERCISE

- Reduce insulin resistance
 - Reduce inflammation
- Stimulate release of growth factors

**Chemicals in the brain affect the health of brain cells, growth of new blood vessels in the brain, and abundance and survival of new brain cells –Harvard Health

BENEFITS OF EXERCISE

- Improvements in mood and sleep
- Reduction of stress and anxiety

**problems in these areas may cause or lead to cognitive impairment

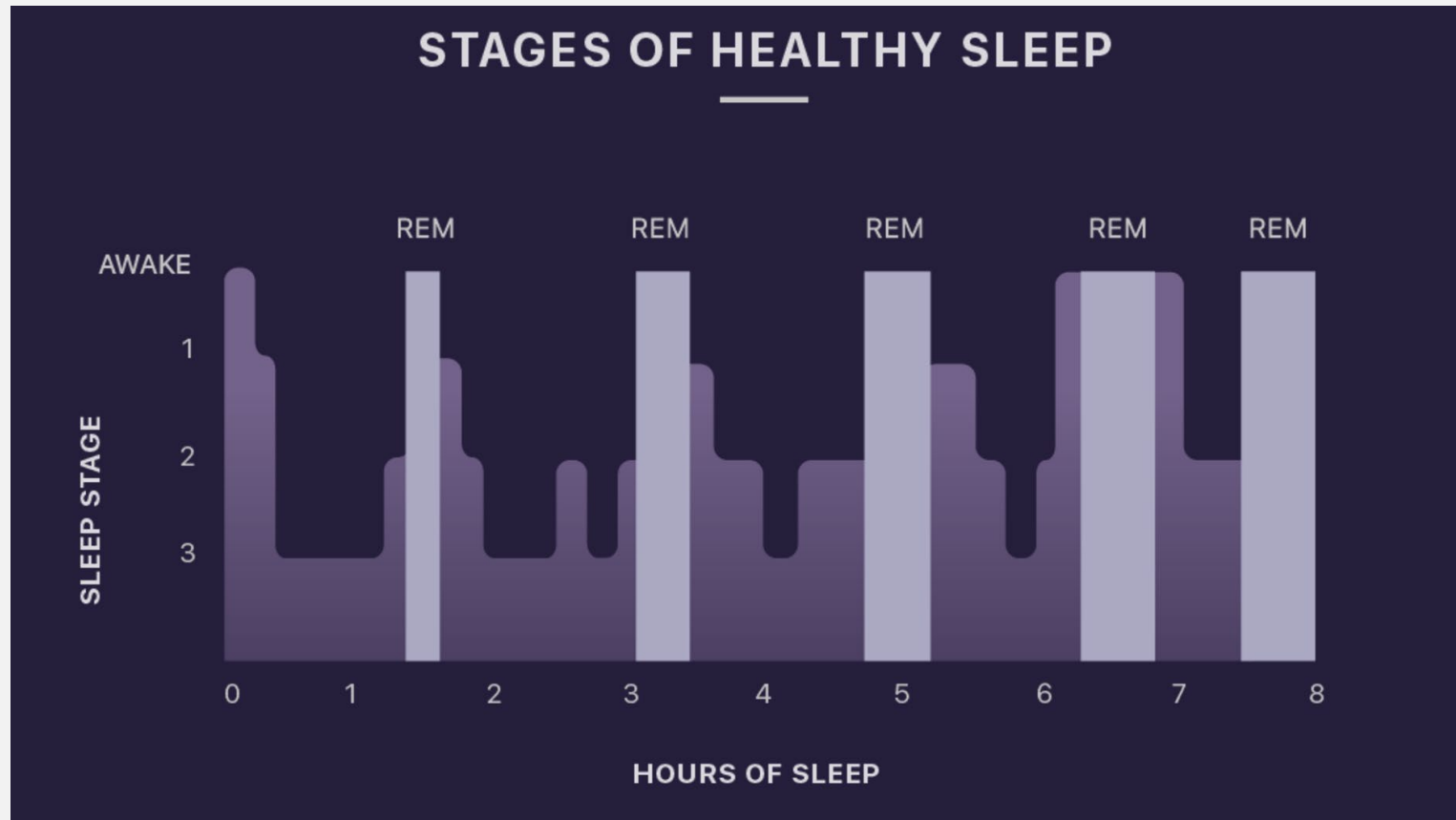
BENEFITS OF EXERCISE

Parts of the brain responsible for thinking and memory have greater volume in people who exercise vs. people who don't!!

(Prefrontal cortex and medial temporal cortex)

Regular exercise for 6-12 months may lead to an increase in volume in certain areas of the brain.

SLEEP



LACK OF SLEEP

- Unable to consolidate memories
- Slower reflexes
- Impaired judgement
- Decreased fine motor skills



HOW EXERCISE AFFECTS SLEEP

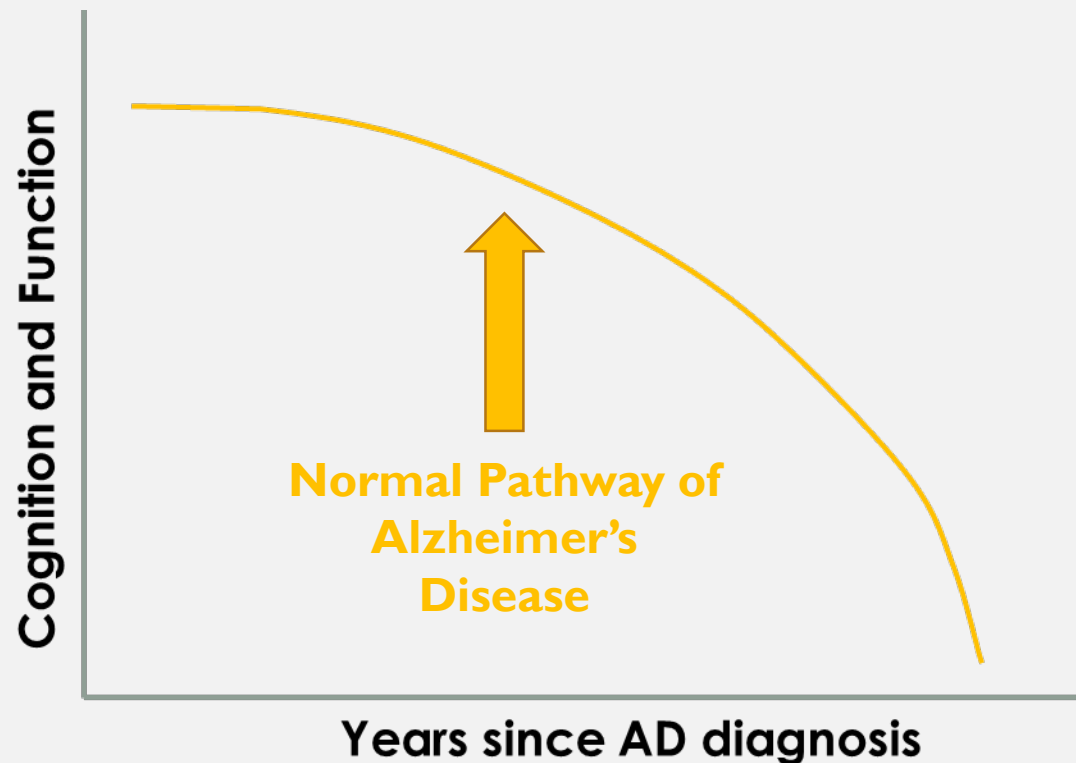
- Increase of serotonin during the day
- Decreased body temperature after exercising
- Full use of energy during the day
- Decreased stress
 - Decreased cortisol before bed
 - Decreased norepinephrine before bed

EXERCISES TO TARGET DEPRESSION

- Biking
- Dancing
- Gardening
- Golf—walk instead of using cart
- Jogging
- Low-impact aerobics
- Tennis
- Swimming
- Walking—try walking on an incline, or up hills
- Yard work
- Yoga

ALZHEIMER'S DISEASE AND DEMENTIA

- By 2050, it's estimated that more than 115 million people worldwide will have dementia
 - Alzheimer's Disease makes up 60-80% of all dementia cases



- Alzheimer's Disease is a progressive disease and symptoms will get worse over time

EXERCISE IS MEDICINE

- No cure for Alzheimer's Disease
- FDA-approved drugs may temporarily improve symptoms (sometimes)
- Cognitive enhancing drugs
- FDA-approved drugs for AD have shown no long term impact on MCI



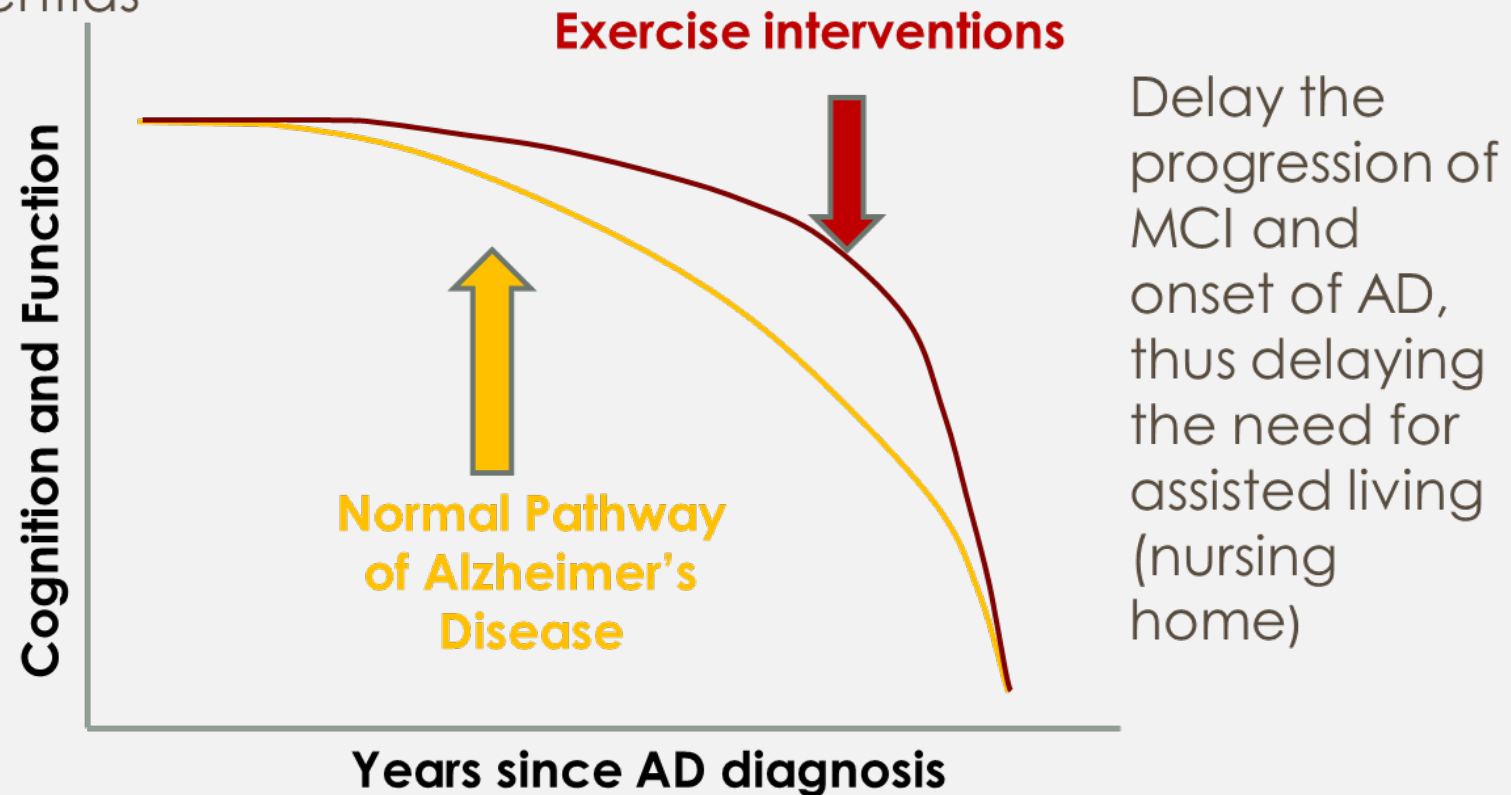
EXERCISE IS MEDICINE

Alzheimer's Association Suggests:

- **Exercise** on a regular basis to benefit your heart and blood vessels, including those that nourish your brain
- **Control Cardiovascular Risk Factors** to protect your heart and blood vessels, including those that support brain function
- **Participation in Mentally and Socially Engaging Activities** which may help sustain brain function

DEVELOPING AND EVOLVING DR. YU'S RESEARCH PROGRAM

- Ultimate goal of research:
 - Using exercise to alter the declining trajectory of MCI and dementias



Brain training alone does not have any effects on MCI or AD.

HOW TO GET MOVING

1. Start exercising with a friend or spouse
2. Find a gym that you enjoy and that's convenient for you
3. Get started with a personal trainer
4. Track your progress and set goals
5. Find programs or classes tailored to older adults
6. Be active in ways that are fun for you!
7. Move for a short time, multiple times a day