

HENNEPIN COUNTY  
MINNESOTA

Physical,  
neurological and  
psychological  
benefits of exercise

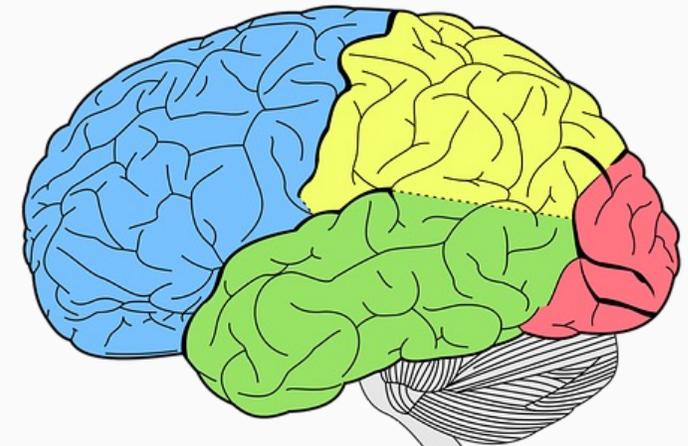
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# Physical, Neurological and Psychological Benefits of Exercise

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- Heart
- Circulation
- Anxiety
- Depression
- Chemical addiction



# Disclaimer

Please consult your primary care provider before starting any exercise program.



# CDC data on physical activity

- Only 1 in 4 US adults and 1 in 5 high school students meet the recommended physical activity guidelines.
- About 31 million adults aged 50 or older are inactive, meaning they get no physical activity beyond that of daily living.
- Low levels of physical activity can contribute to heart disease, type 2 diabetes, some kinds of cancer, and obesity.
- Low levels of physical activity are associated with an estimated \$117 billion annually in health care costs.

# Physical Activity

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*“It’s becoming increasingly common for people to live a sedentary lifestyle and get little to no exercise.”*

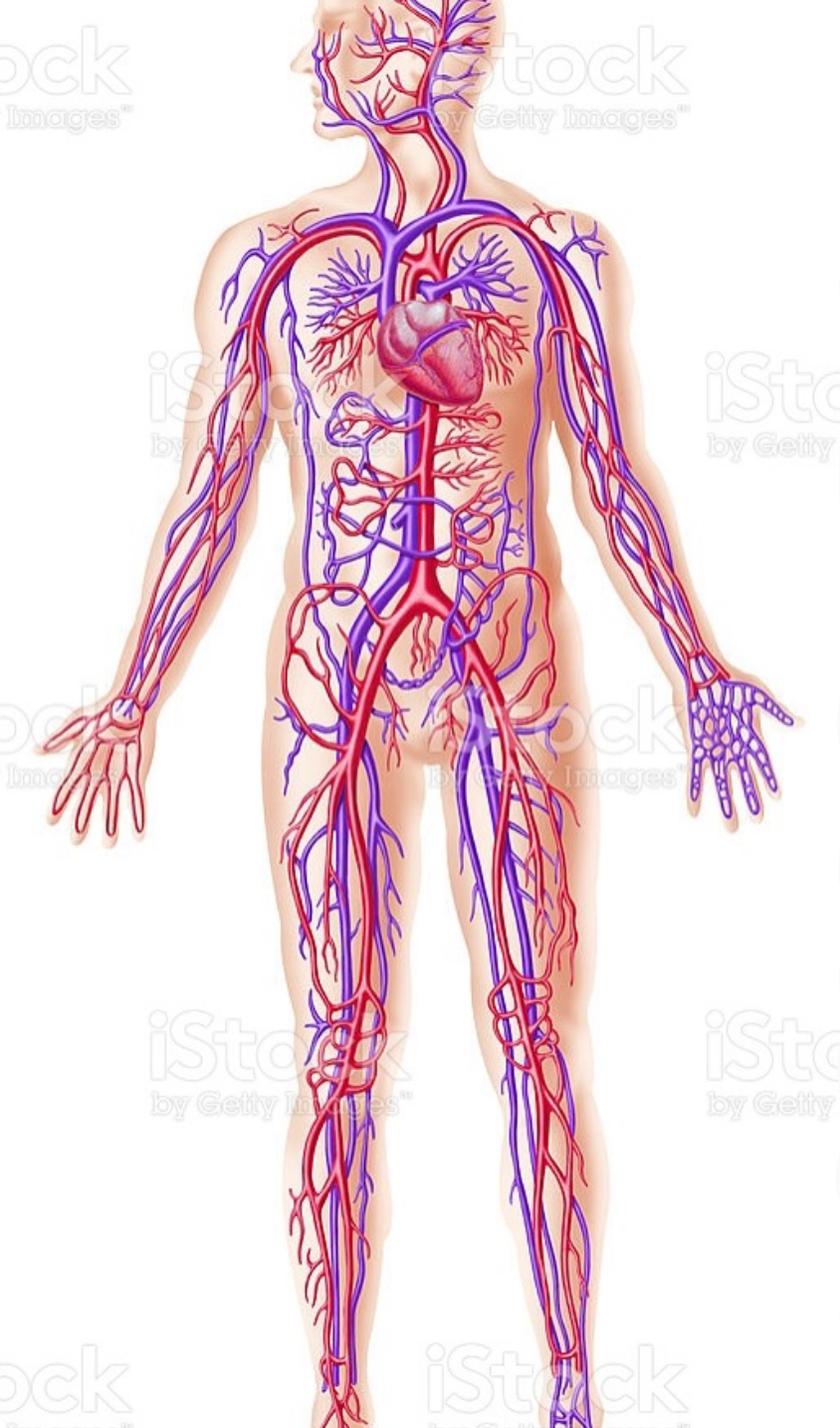
*How Not to Diet* by Dr Michael Greger





# The heart is a muscle

- It needs strength to pump blood efficiently throughout the body.
- Without being strengthened by physical activity, the heart has to struggle to keep blood circulating.
- This strain can cause the heart to enlarge which can lead to heart failure.



# Circulation

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- Need exercise to stimulate the production of new blood vessels (VEGF)
- Muscles around the veins stimulate the flow of blood to the heart.
- Need oxygen to the hands and feet.
- Good circulation helps the immune system get disease-fighting cells to the entire body.
- Arthritis-Walk with Ease program

# Physical Activity

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- *“Even a single bout of exercise increases beneficial hormones that cause your arteries to dilate, bringing more blood flow to your brain (and everywhere else) and reducing biomarkers of inflammation.”*
- *Undo It* by Dr Dean Ornish



# Physical Activity

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- In the *Women's Health Study* involving tens of thousands of women, those who walked briskly for just sixty to ninety minutes each week—just fifteen minutes a day—cut their risk of death from heart attack and stroke in half.
- *Women's Health Study (WHS) at Brigham and Women's Hospital and Harvard Medical School.*



# Physical Activity

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- Weight training helps you build muscle and boost blood flow. Improved cardiovascular health means more efficient circulation.

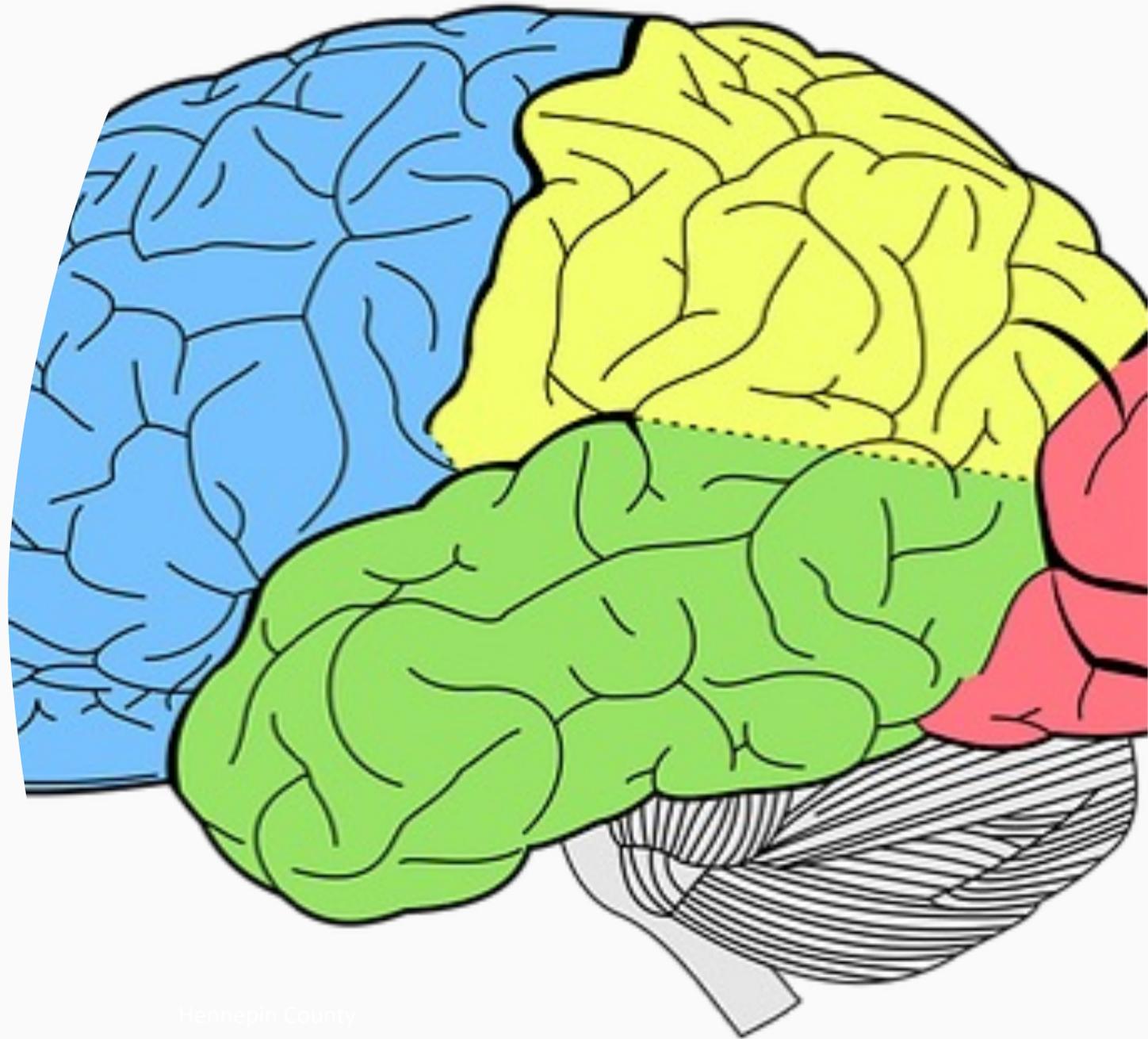




# Neurological and Psychological Benefits of Exercise on:

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- Anxiety
- Depression
- Chemical addiction



# Two kinds of anxiety

## Acute:

- Motivates
- Energizes
- Good memory

## Chronic:

- Cycle of worry
- Hard to break



# Harmful effects of chronic anxiety

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- Strengthens amygdala firing
- Reduces levels of serotonin and dopamine
- Prevents brain cell regeneration

# Harmful effects of depression

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- Erodes neuron connections
- Shrinks grey matter; attention, emotions, memory, and consciousness
- Halts brain cell regeneration



# Harmful effects of substance use disorders

- Destroys endorphin system through extended chemical use
- Activates the reward center of the brain, creating a reinforcing cycle that is difficult to break



# Benefits of Physical Activity on Anxiety

## Outrunning the fear

↑ Tryptophan

↑ Serotonin

↑ Endorphins

↑ Brain-derived neurotrophic factor  
(BDNF)

↑ Neurogenesis



# Exercise and Tryptophan

Exercise  
increases uptake  
of tryptophan

Tryptophan  
converted to  
serotonin

# Beneficial Foods

## Tryptophan rich

- Plant-based sources of tryptophan include **whole grains, leafy greens, sunflower seeds, watercress, soybeans, pumpkin seeds, mushrooms, broccoli, and peas.** While meats such as turkey also contain the amino acid, the body can have a difficult time converting it to serotonin.





## Exercise and Serotonin

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- Reduces aggression
- Increases agreeableness
- Calms us down
- Enhances sense of safety



# Benefits of Physical Activity on Depression

- ↑ Tryptophan
- ↑ Serotonin
- ↑ Endorphins
- ↑ Brain-derived neurotrophic factor (BDNF)
- ↑ Dopamine



# Benefits of Physical Activity on Depression

## Move your mood

↑ Dopamine

↑ Neurogenesis (BDNF)



# Exercise and Dopamine

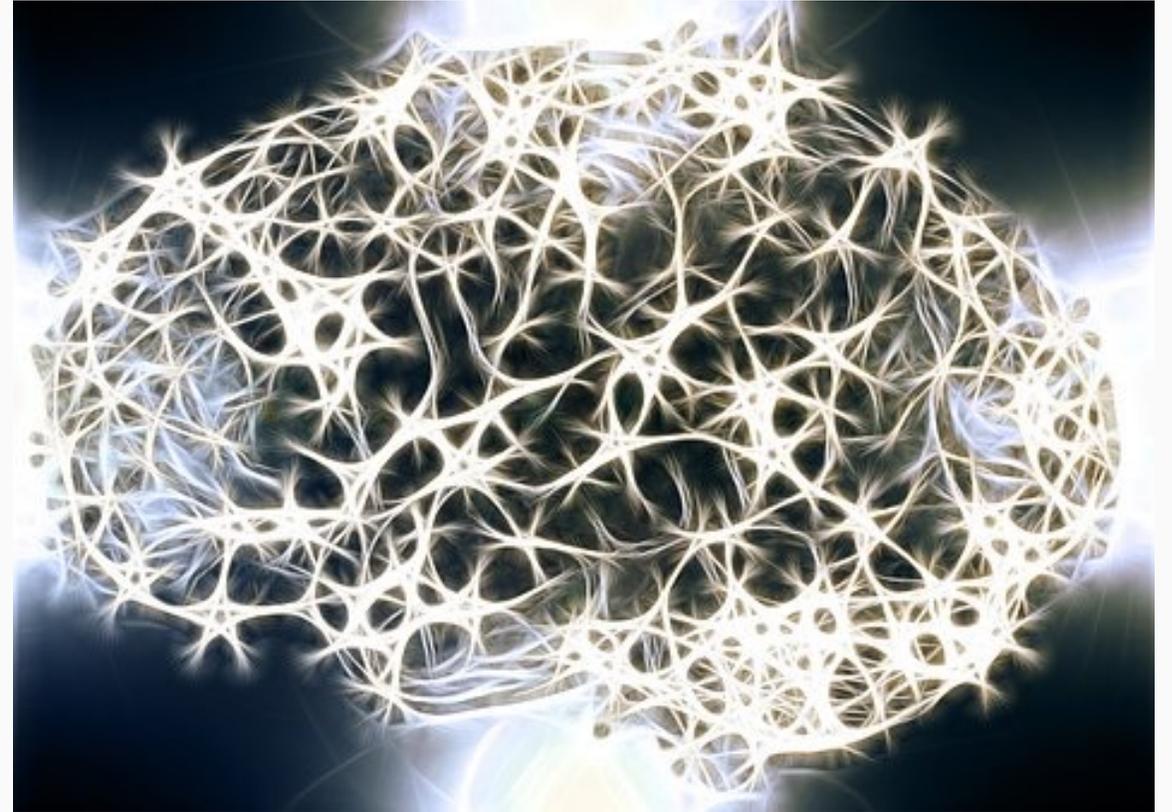
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- Boosts dopamine in reward center of brain
- Increases dopamine storage and triggers enzymes that create dopamine receptors in reward center
- Dopamine improves mood and feelings of wellness; jumpstarts attention system that is rusty from disuse

# Exercise and Neurogenesis

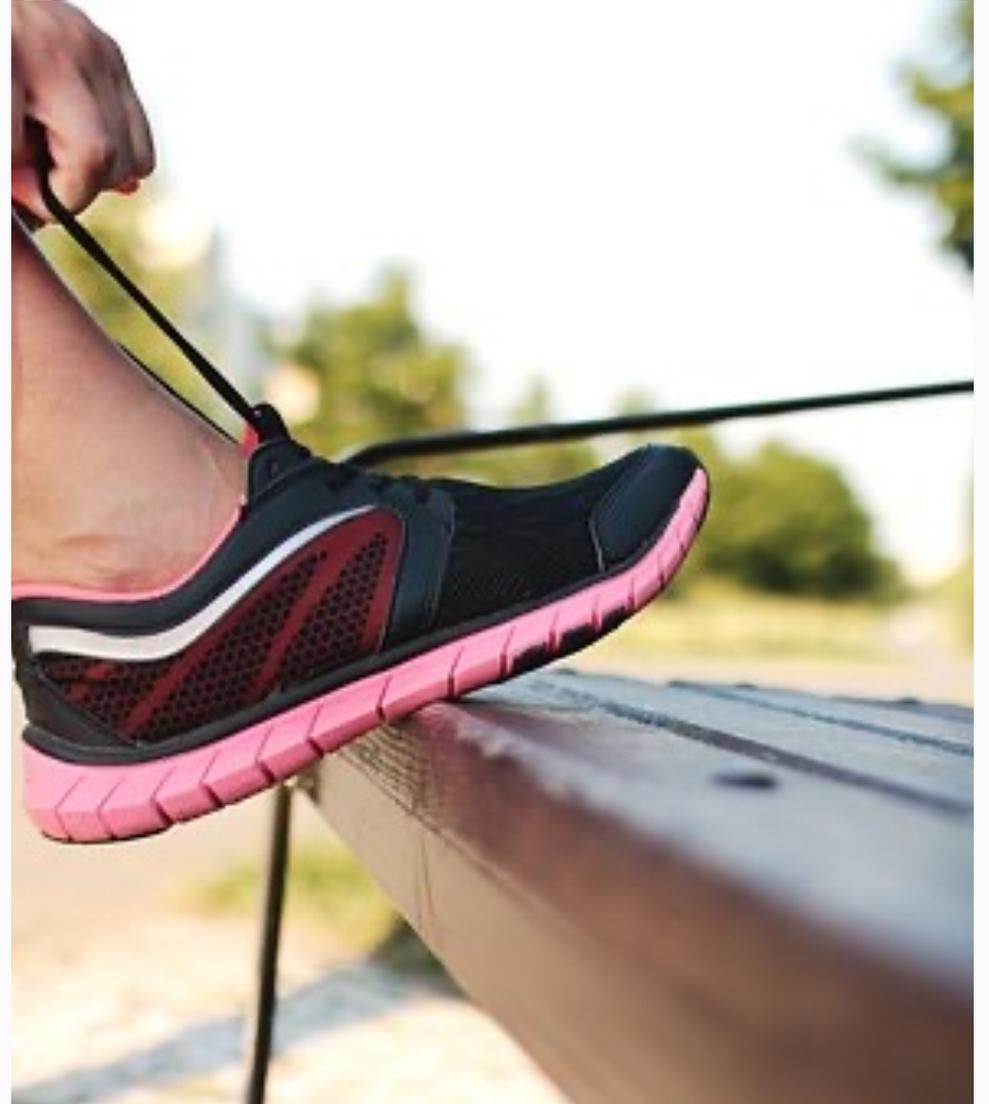
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- Grows new nerve cells in hippocampus and prefrontal cortex (BDNF): miracle grow
- Stokes neurons' metabolic furnaces
- When outside, the environment stimulates the senses (novel enrichment)
- When with others, social interactions hatch neurons



# Benefits of Physical Activity on Addiction

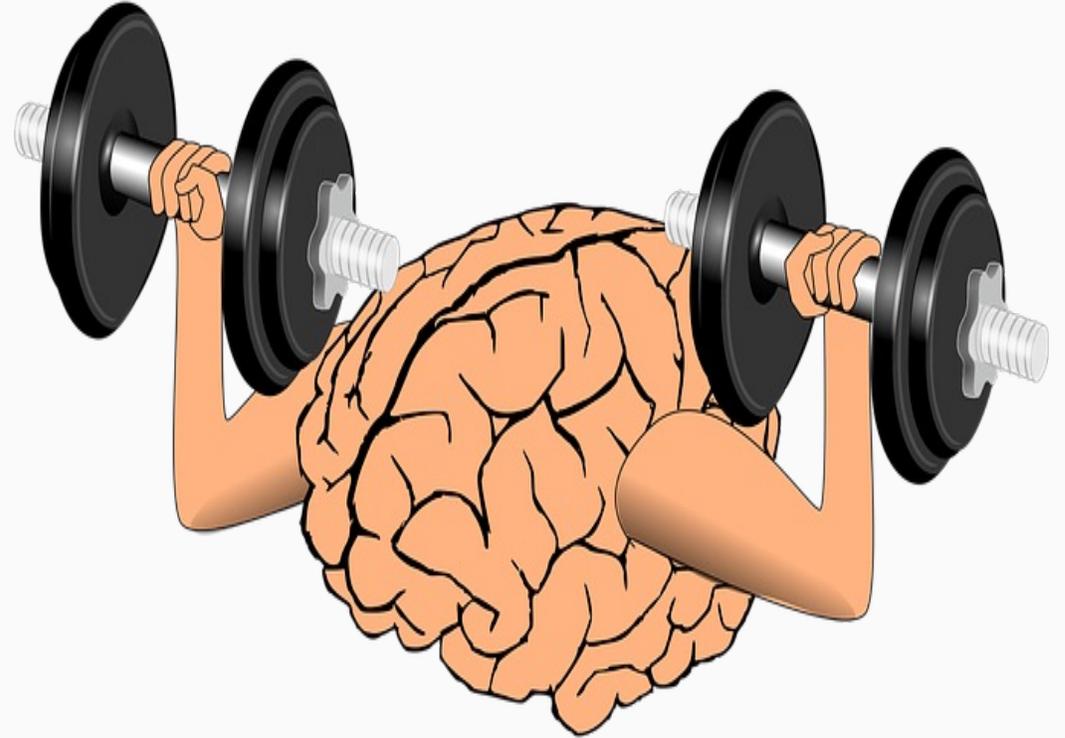
- ↑ Tryptophan
- ↑ Serotonin
- ↑ Gamma aminobutyric acid (GABA)
- ↑ Brain-derived neurotrophic factor (BDNF)
- ↑ Atrial natriuretic peptide (ANP)



# Benefits of Physical Activity on Addiction

- ↑ Dopamine
- ↑ Endorphins
- ↑ Neurogenesis

Reprograms basal ganglia  
(reward center)



# Exercise and Endorphins

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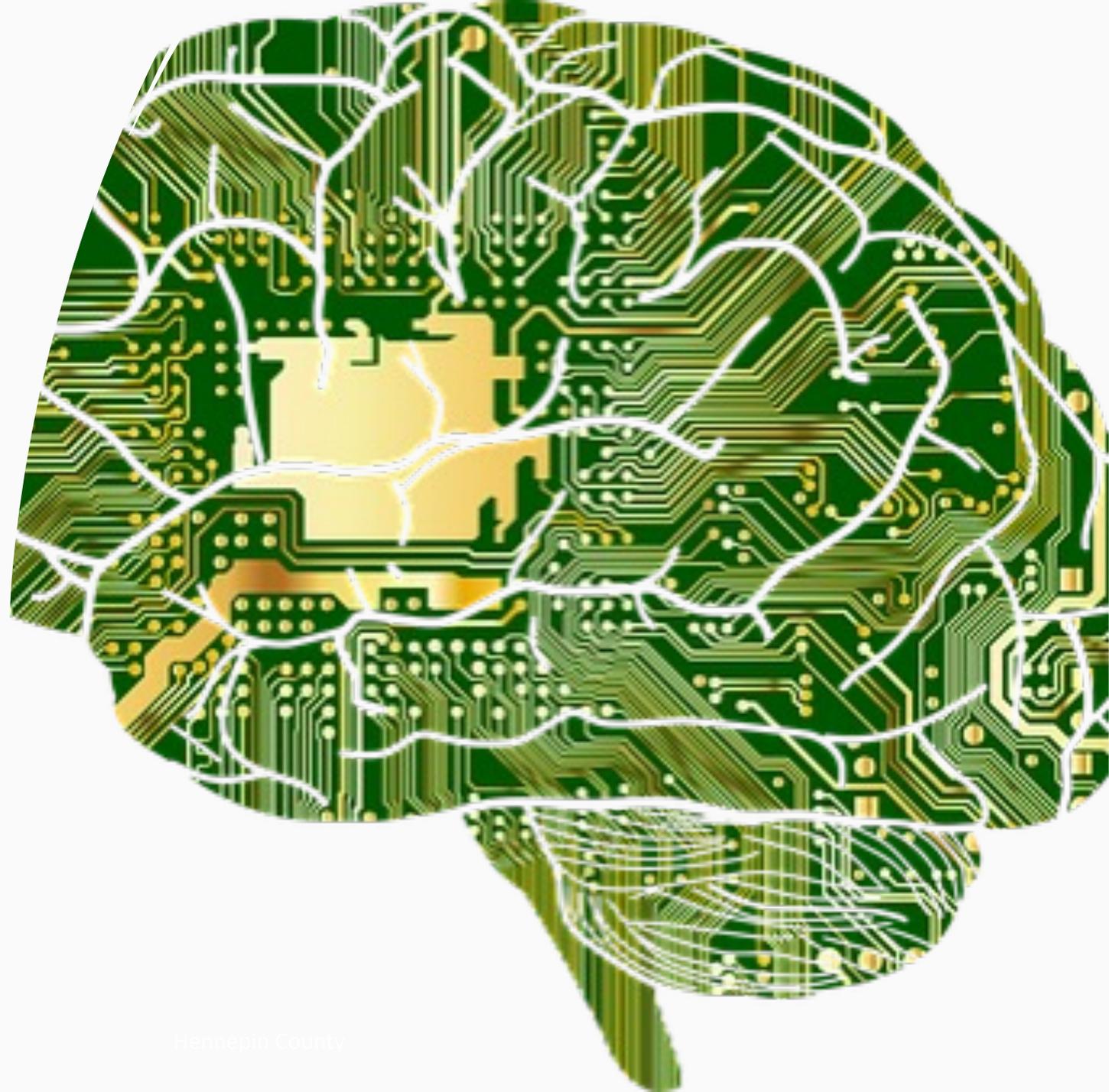
- Runner's "high"
- Diminishes withdrawal symptoms
- Dulls pain in the body: nature's morphine
- The "elixir of heroism"



# Exercise and Brain Reprogramming

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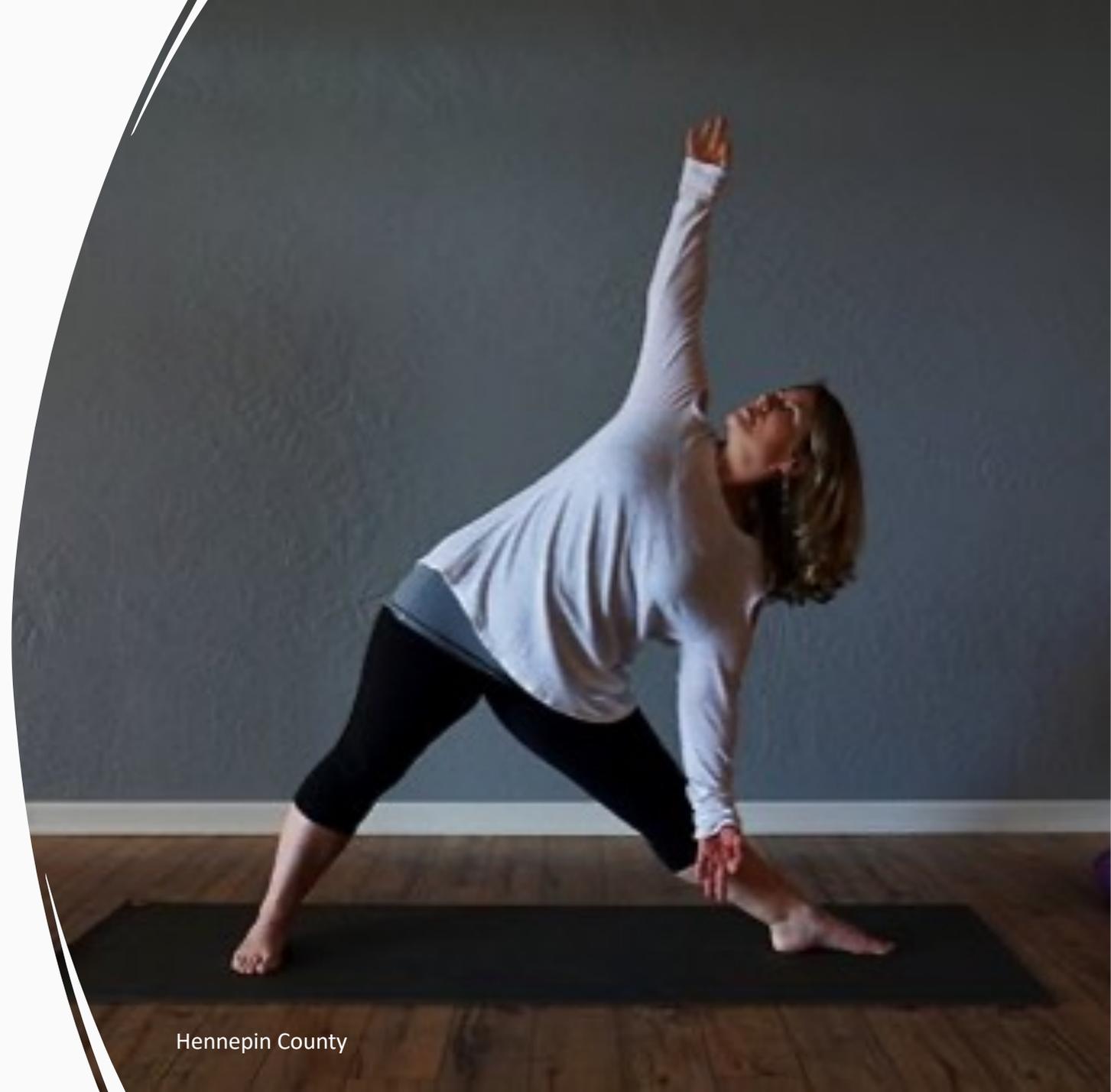
- Adapts to new stimulus (exercise) other than the chemical
- Builds synaptic detours around well-worn connections automatically looking for next fix



# Exercise Recommendations for Anxiety

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- Move large muscles (i.e., march in place) when first feeling anxious. Repeat until diminished
- Exercise indoors at first and work up to outdoors as anxiety lessens
- Panic attacks may take up to 30 minutes to subside
- Routine daily exercise important



# Exercise Recommendations for Depression

- Increase physical activity immediately with first symptoms of depression (sleep disturbances) and do not stop!
- Force yourself to exercise daily (if possible) and long-term
- Exercise outdoors
- Exercise with others



# Exercise Recommendations for People with Substance Use Disorders

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- Even 10 minutes of exercise can blunt chemical cravings and symptoms of withdrawal (5 for food and tobacco cravings)
- Exercise 30 minutes of vigorous aerobic exercise five days a week
- Exercise with others
- Exercise in nature





# General mental well-being

- Exercise is strongly linked to happiness.
- It didn't take much—just 10 minutes a day of exercise was linked with being happier!
- Both aerobic exercise and stretching/balancing exercises were effective in improving happiness.
- Again, a little exercise goes a long way!



## Three types of exercise

- Aerobic exercise
- Resistance (strength) training
- Stretching for flexibility

# Minimum recommendations

## Moderate-intensity aerobic activity:

- At least 150 minutes per week
- Or, 75 minutes of high-intensity exercise like running per week

## Muscle-strengthening activity:

- At least two days per week

## Stretching activity:

- At least 2-3 days per week for 5-10 minutes



# General exercise guidelines for patients

- Always warm up before exercise, and gradually cool down when finishing.
- After eating, wait one to two hours or more before exercising.
- Discuss with your provider how changes in your medication may affect your exercise routine, and how exercising may affect the need for medications.



# General exercise guidelines for patients

- Be careful of temperature extremes.
- Avoid overexertion; you should be able to talk while exercising.
- Stay hydrated.
- Dress appropriately and invest in a good pair of shoes, which makes it fun and safe to exercise.
- Don't exercise when you're not feeling well.



# General exercise guidelines for patients

- Exercise indoors if it's cold or if there is smog or smoke.
- If you have heart disease, get a prescription from your provider or from an exercise physiologist to let you know what a safe heart rate is for you and how and when to measure it.
- If you are diabetic, monitor your blood glucose levels before, during, and after exercising.
- Good form (e.g., keeping your back straight, bending your knees slightly) helps to prevent injuries.

# Space and Equipment



Hennepin County



# Built-in Activities

- Activity classes
- Activity breaks
- Gardening
- Activity challenges
- Bikes available for use





# Food and mood

- Is there a link?
- There have been hints that food can play a role in depression
- The research regarding dietary factors and depression is still inconclusive
- Observational studies show links between diet and depression
- Lots of research going on



# Food and mood

- A 2014 study in *Brain, Behavior and Immunity* that used data from the Nurses' Health study did find an association between depression and a diet rich in:
  - Sugar-sweetened soft drinks,
  - Refined grains
  - Red meat



# Food and mood

- A 2018 meta-analysis published in the *European Journal of Nutrition* suggested that high consumption of meat could be associated with risk of developing depression.



# Food and mood

- There is consistent observational evidence that a diet rich in fruits, vegetables, whole grains, and legumes may lower the risk for depression.



# Food and mood

- Theories are:
- Gut microbiome
- Inflammation
- Tryptophan

# Food and mood

## Foods that may improve mood

- Spicy foods
- Dark chocolate
- Fermented foods
- Oats
- Fruits and vegetables-berries/greens
- Nuts and seeds
- Legumes
- Coffee



# Health coaching techniques

First: open-ended question

The Four Questions

Ask-tell-ask

Teach back

# Readiness to change

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Pre-contemplative

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Contemplative

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Ready for action (preparation)

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Action

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Maintenance

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Relapse

# Reference

- Book *Spark* by John J. Ratey, M.D.

Questions?



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