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Anxiety and Depression: The Dimensions in Developing Prophylactic and Therapeutic Approaches

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Anxiety and Depression: The Dimensions in Developing Prophylactic and Therapeutic Approaches

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Disclosures

Nothing to report other than I am not a big meat eater

Mental health

- Conditions are till rising despite more resource allocation
- One size fits all approach is not working
- There is a need to personalize therapies to improve prognosis

Dimension in personalizing mental health therapies

- Gender
- Age-groups

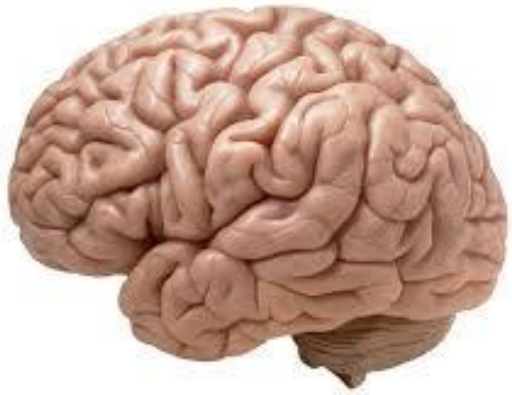
Your Brain in a Nutshell

A Crash Course in Nutritional Neuroscience

TROPHY EXPERT

Brain Overview

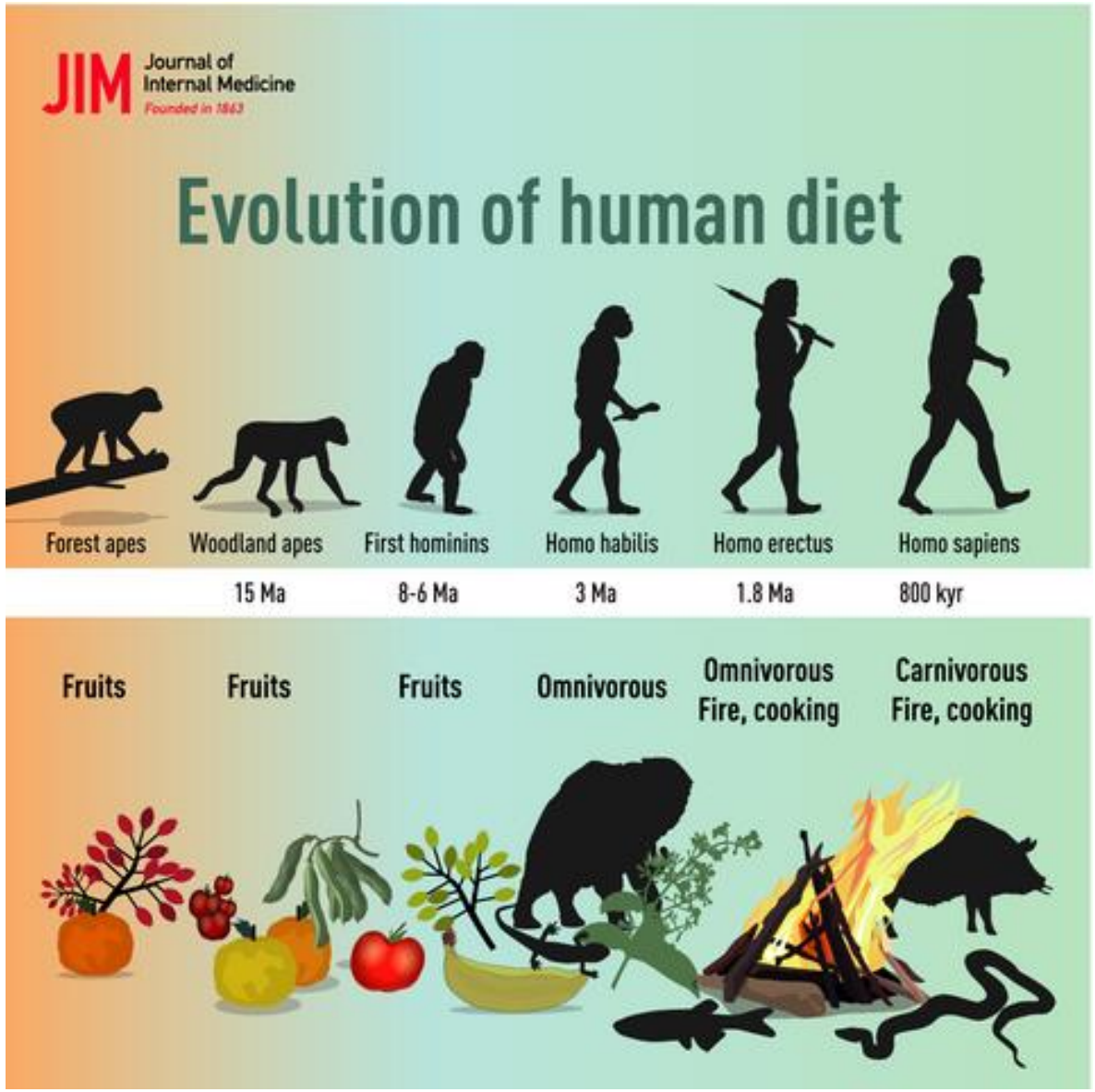
- Houses trillions of brain cells (neurons)
- Neurons cannot divide to replace dead neurons
- ➔ prevention is key
- Diet provides building blocks and chemicals
  - ➔ A healthy diet produces a healthy brain



Brain Overview

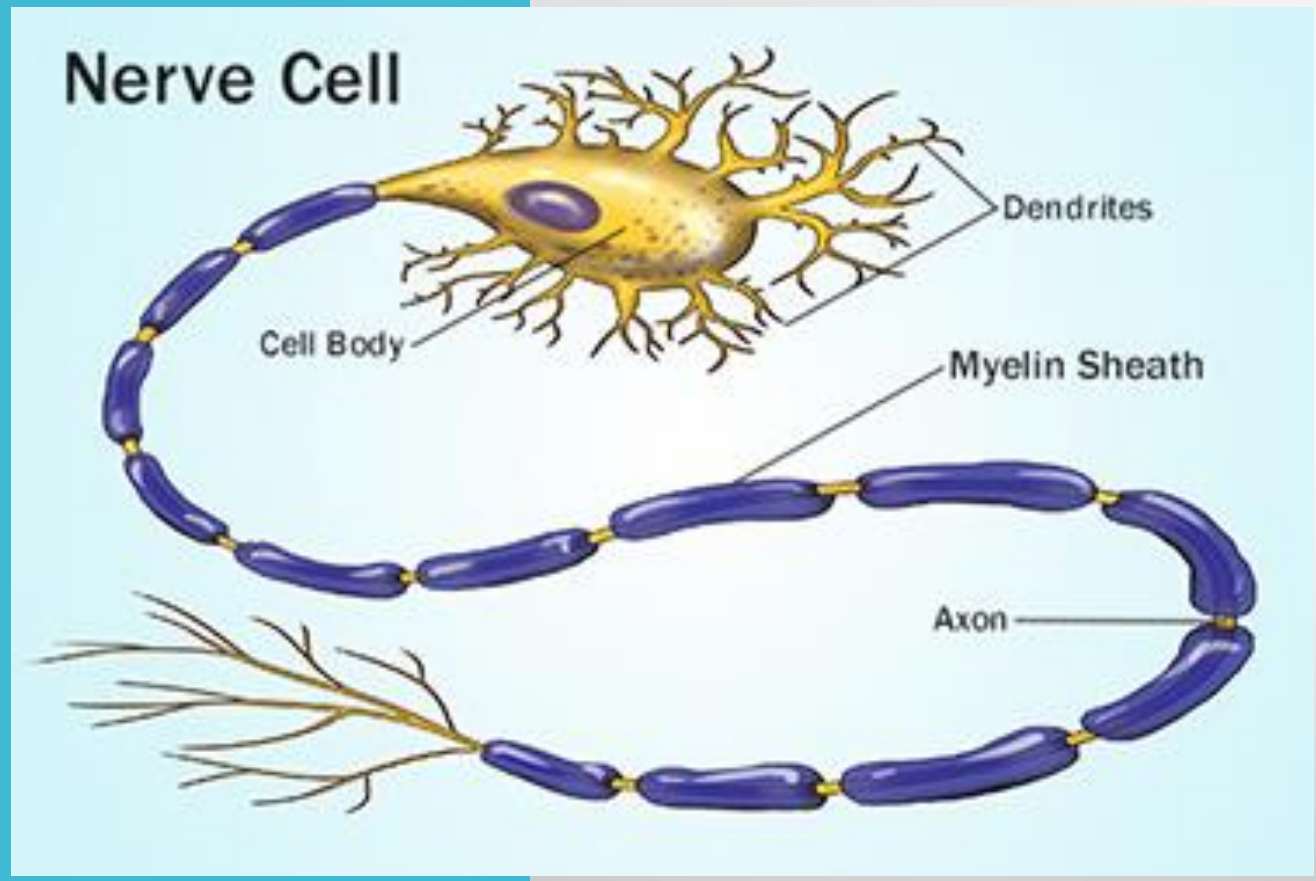
- Fat-rich organ ➔ dietary fats impact function
- Evolved over the centuries ➔ diet a major contributor
- ➔ mismatch between contemporary diet and the evolved brain leading to decline in:
  - ➔ Mental health
  - ➔ Cognitive functions

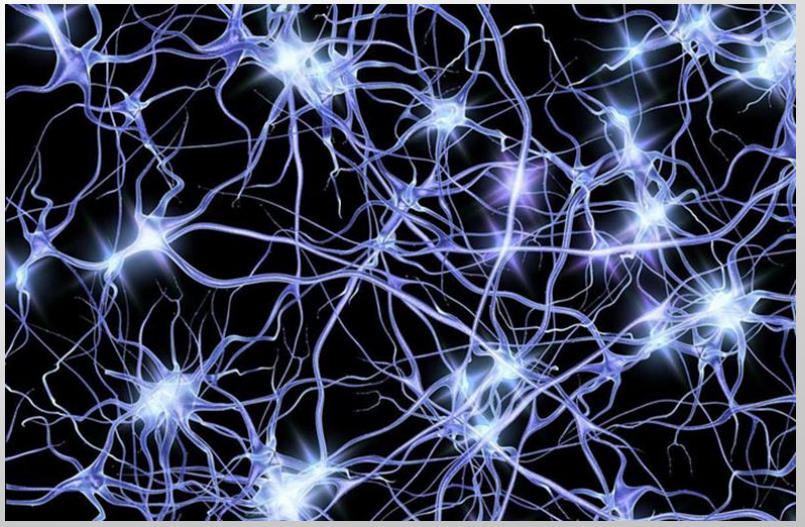
A wholesome diet and human evolution



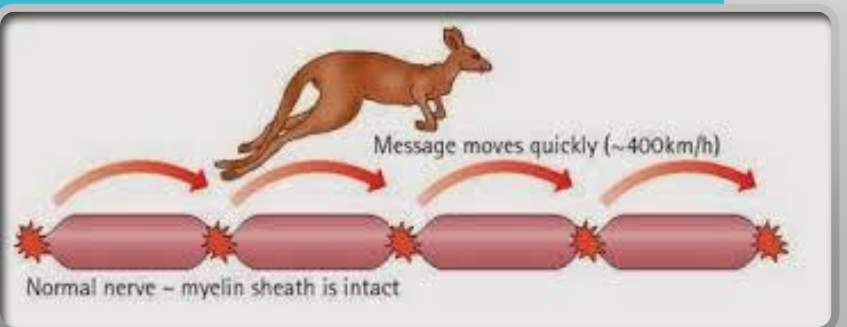
Andrews and Johnson, 2019

A neuron



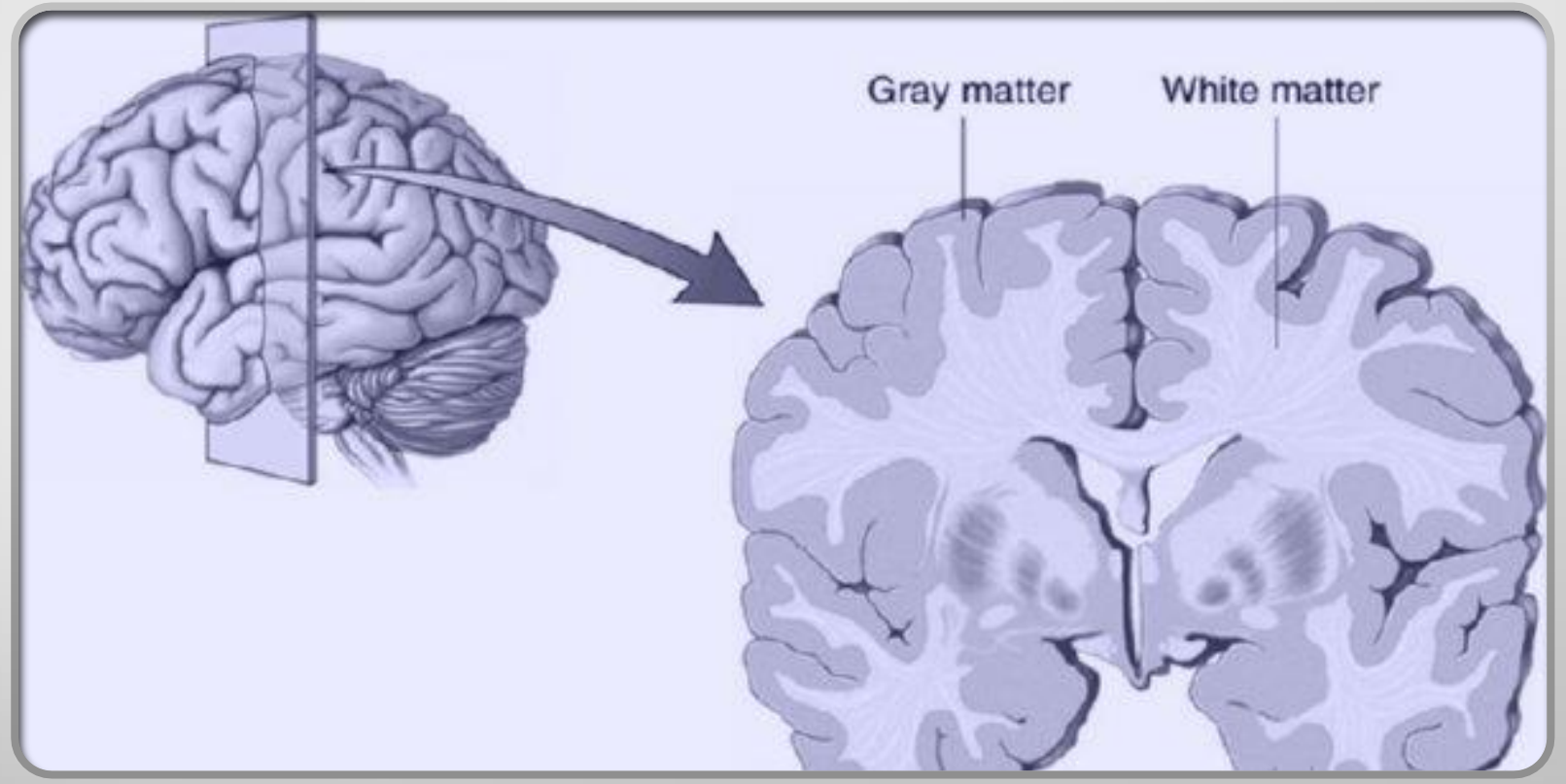


Myelin sheath



- High turnover rate = need continuous replenishment
- Fats (Fish oil), proteins and others:
  - Iron
  - Zinc
    - → Better absorption from animal food
  - B-vitamins
    - Vitamin B12 (only in animal food)
- Dietary deficiencies → microlesions

The Gender brain: Difference in brain morphology



- **"Men are from Mars and Women are from Venus"**

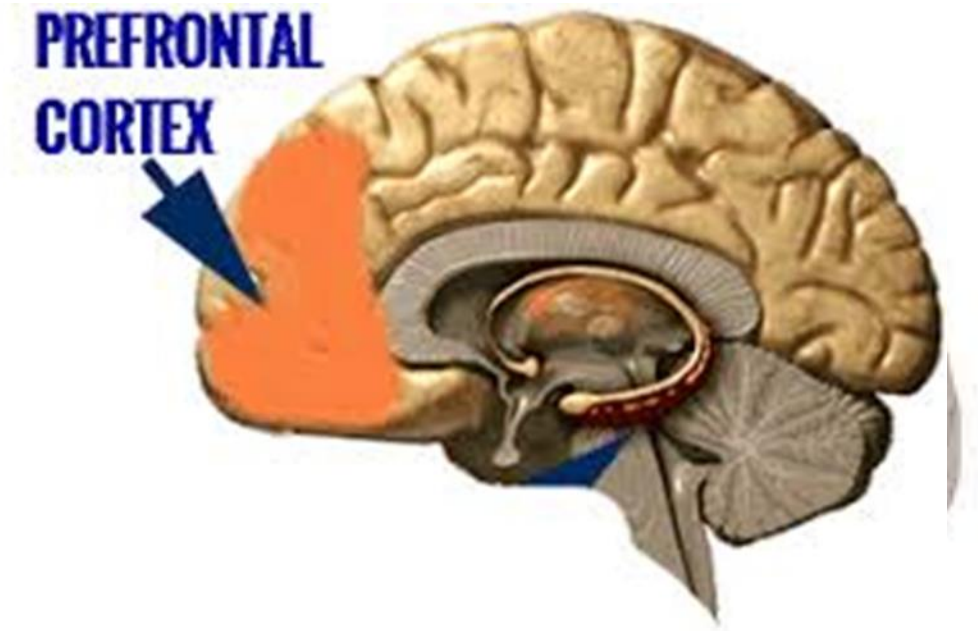
  Women : Twice the risk of mental distress with longer episodes than men
  More prone to relapse

Age groups

- Brain maturity
- Brain function

The "executive brain" and the "impulsive brain"

An effective communication is needed to control emotions



Limbic system

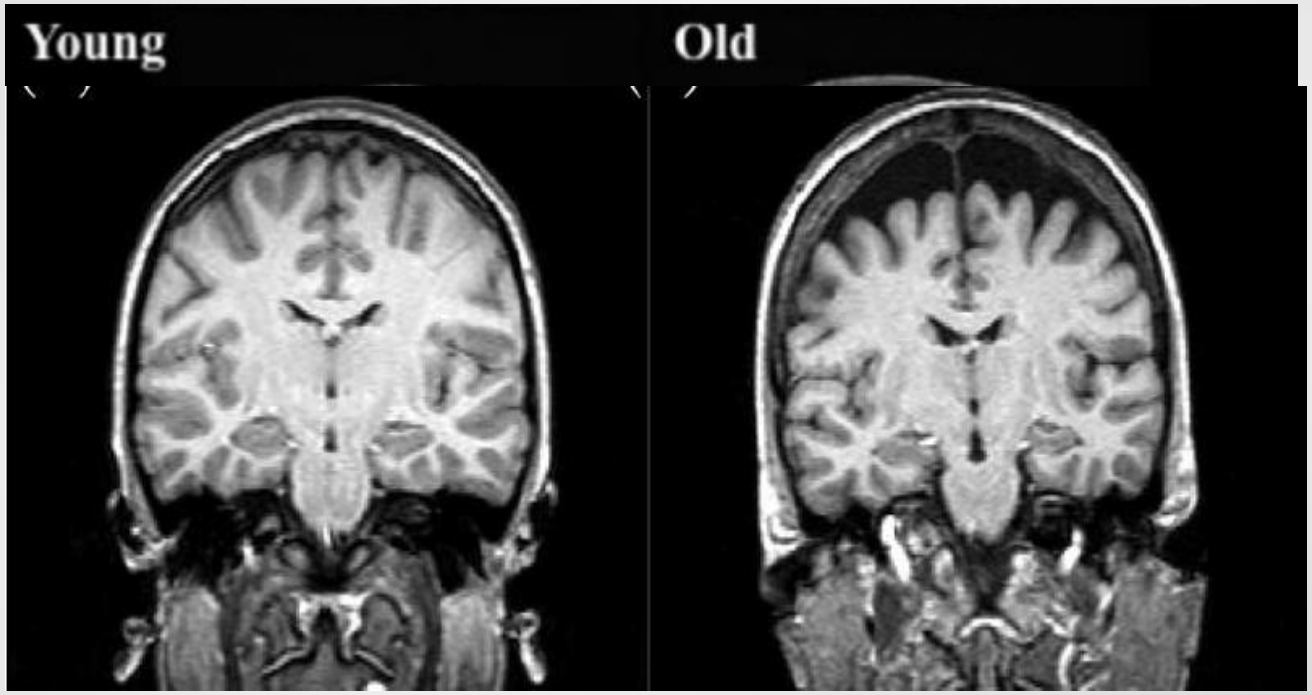
Blood Brain Barrier

Controls what enters and leaves the brain
➔ becomes leaky with age

➔low grade inflammation

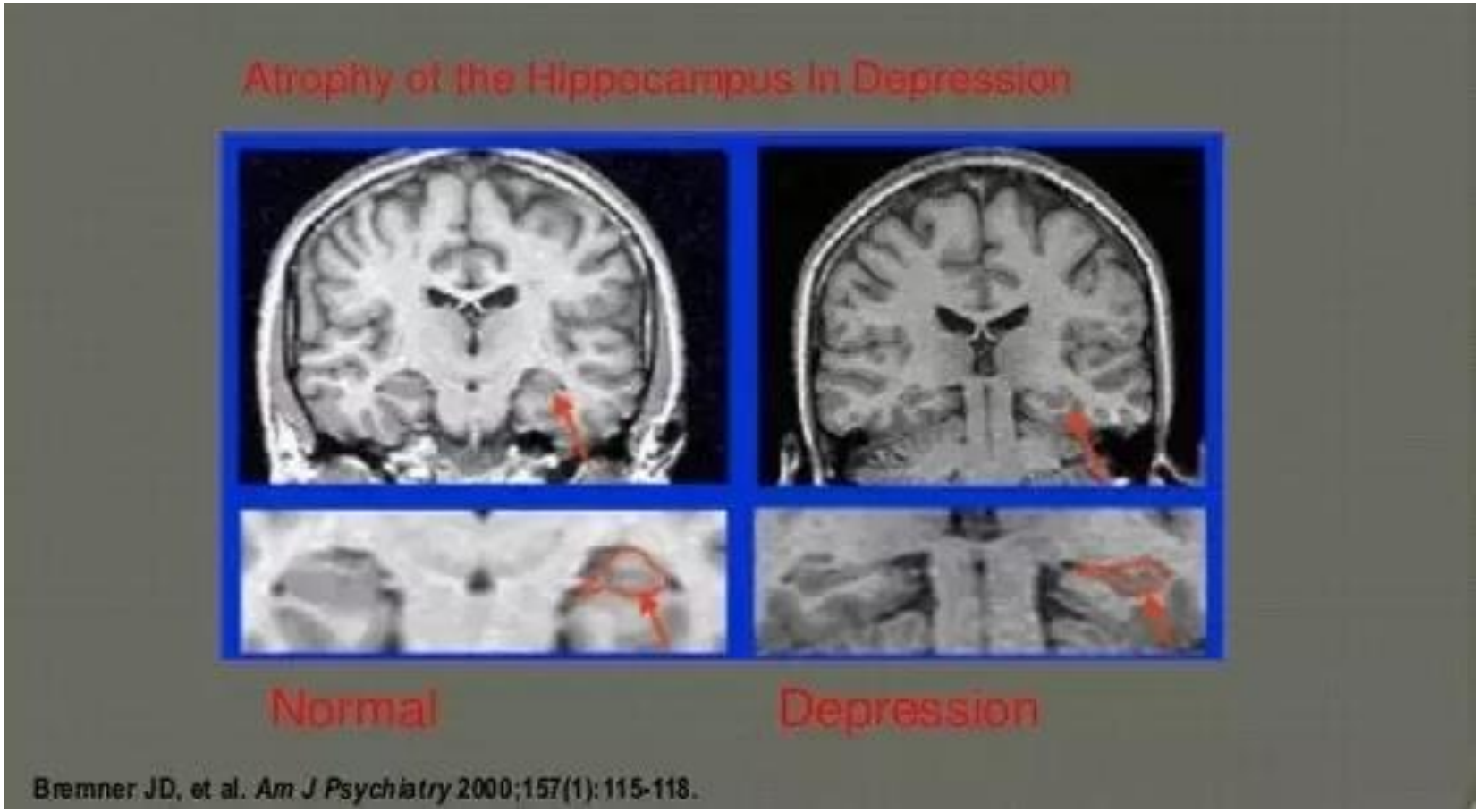
➔ slowly destroys brain structure, connection and brain chemicals

Years of brain changes



Shan et al., 2005

Brain atrophy and depression



Young versus mature adult brain

Pre- PFC maturity

Adults 18-29 years

1. Poor emotional control
    1. Prone to mental distress

Post-PFC maturity

- Adults 30 years or older
- Threshold to stress is lower
- Inflammation
- Vitamin B12 absorption
- Loss of brain cells and connectivity
    - Brain function changes ➔ cognitive functions
    - Mood alteration

Other modifiable factors

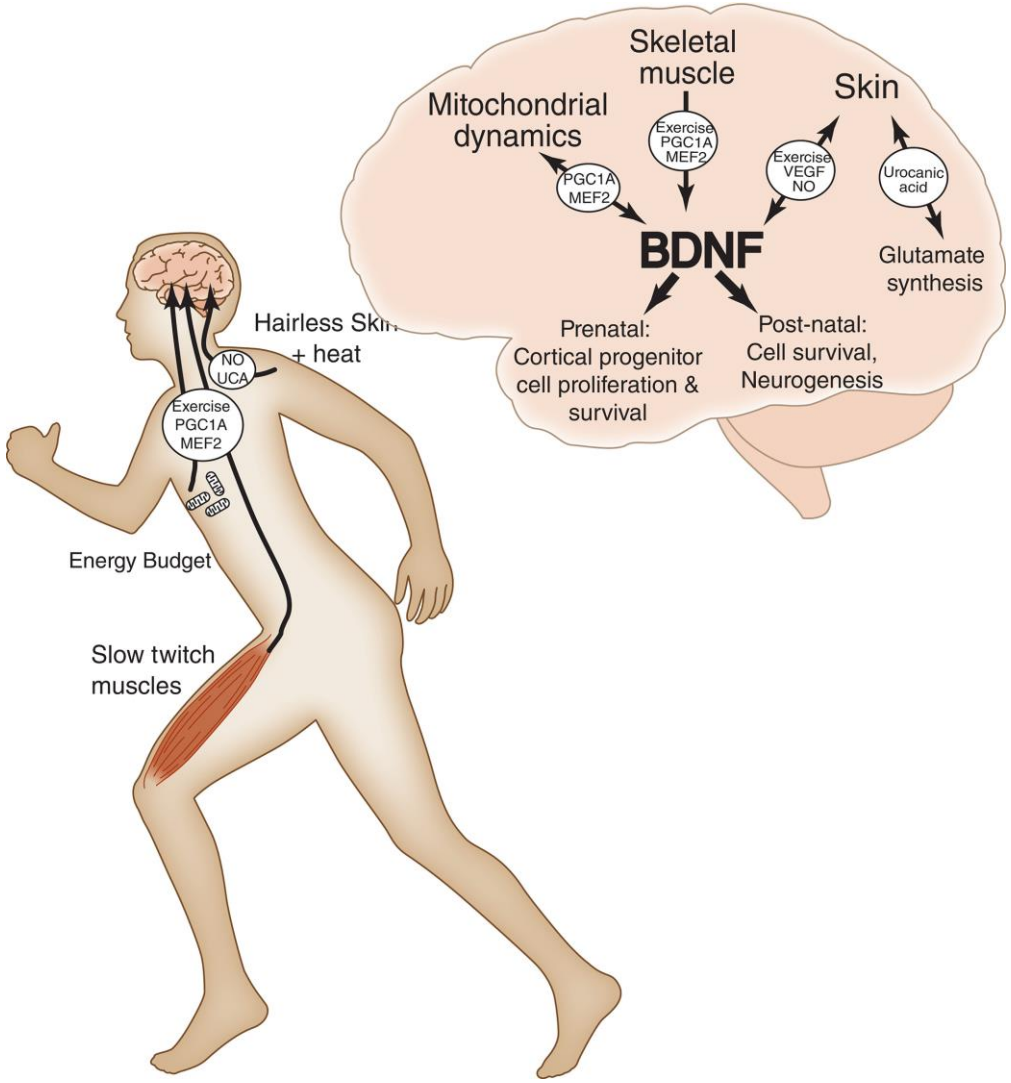
- Exercise
- Sleep

Exercise

Exercise

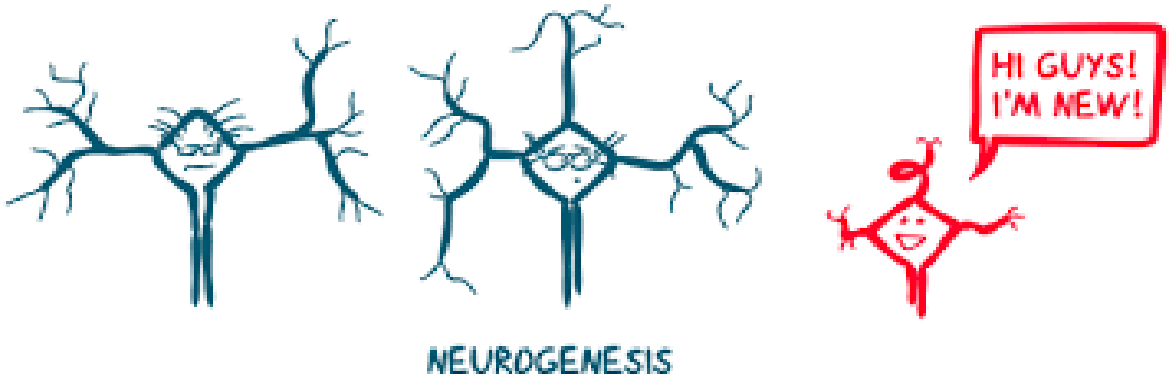
- Also contributed to brain evolution (as scavenging tasks, equivalent to the modern exercise)
- Physically and mentally taxing
- Favorable changes in brain chemistry and release of growth factors

Exercise and BDNF (Brain Derived Neurotrophic Factor)



Hill and Polk, 2018
Am. J. Phys. Anthrop

The magic effect of BDNF



- **Neurogenesis**: formation of new neurons from stem cells
  - Important for memory preservation
  - Restore cognitive functions
  - Mood improvement
  - *Physical exercise, brain exercises*

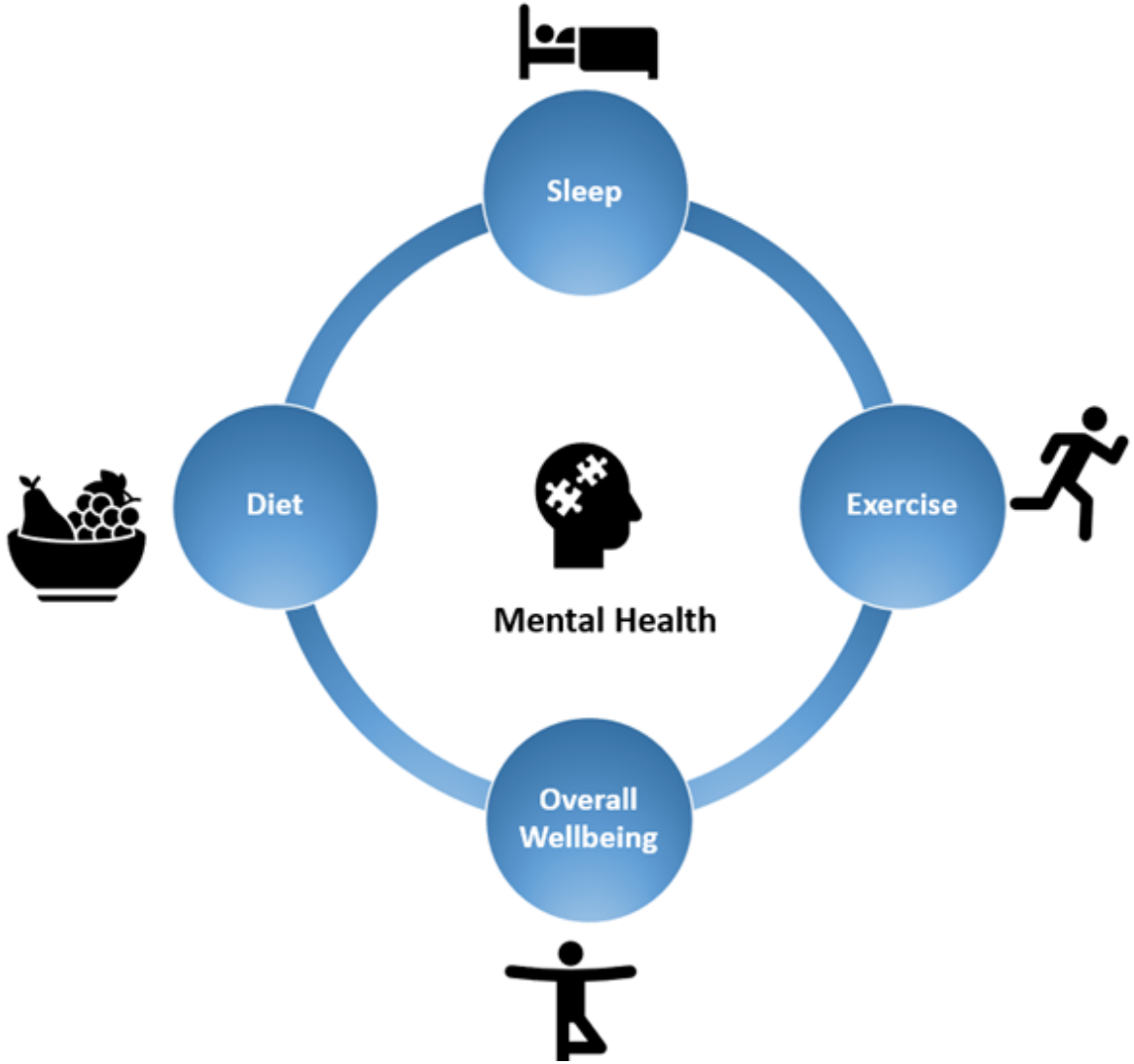
- **Neuroplasticity**: ability of brain connections to change or strengthen
  - Important for thought control ➔ mood
  - Improve cognitive functions
  - *Learning, thought challenges,…*

Sleep

Circadian rhythm

- "Reset button"
- Gene function
- Growth hormone

Intertwined factors that affect mental health



Research findings

Age Group Differences

Assessment of dietary factors, dietary practices and exercise on mental distress in young adults versus matured adults: A cross-sectional study

Lina Begdache [1], Maher Chaar [2], Nasim Sabounchi [3], Hamed Kianmehr [3]

Young adults (18-29 yrs)

- Mental wellbeing was linked to food and lifestyle factors that increase brain chemicals :
  - High frequency of meat consumption
  - High frequency of exercise

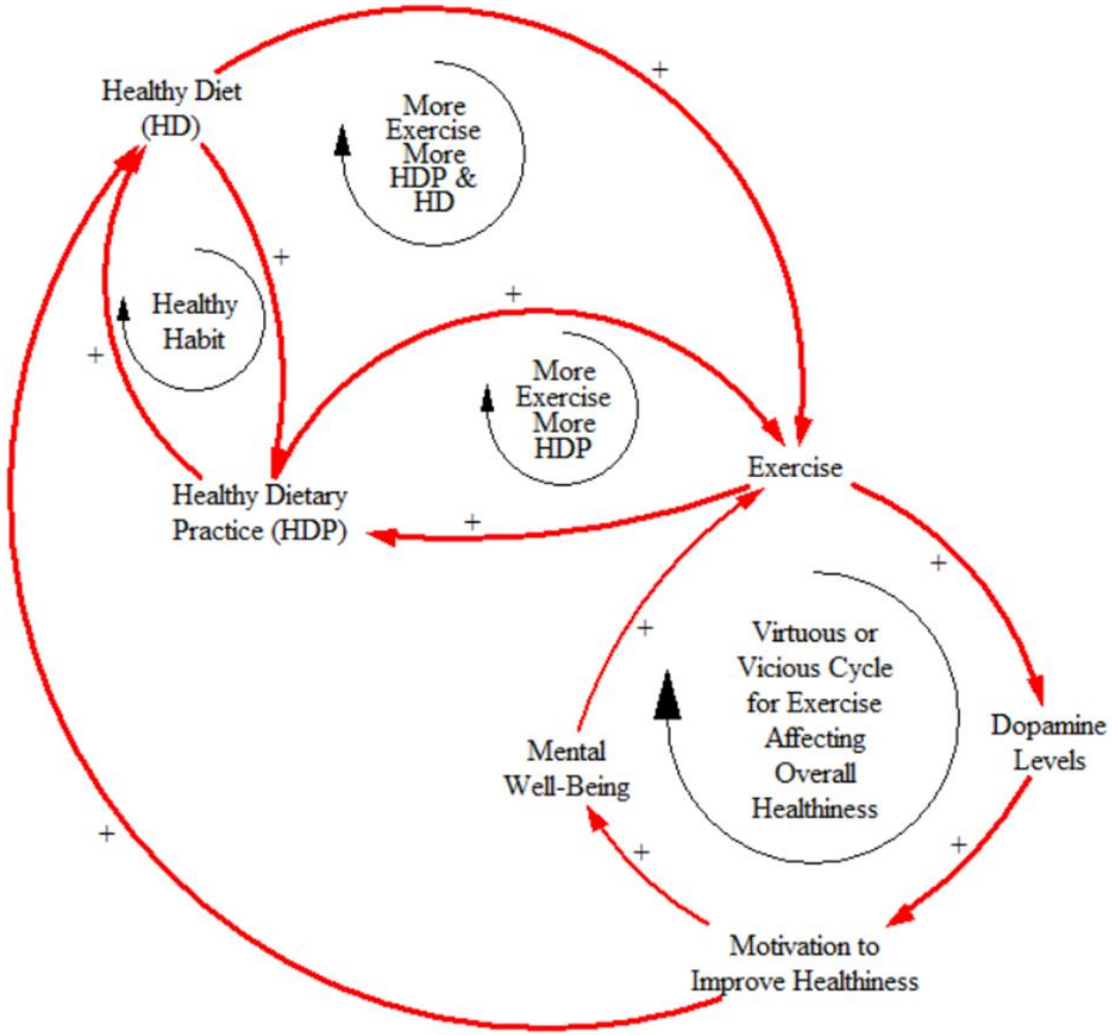
Mature adults (≥ 30 yrs)

- Mental wellbeing was linked to :
  - High consumption of antioxidants
  - Mental distress: food that increases the stress response (coffee, high glycemic index, and skipping breakfast).

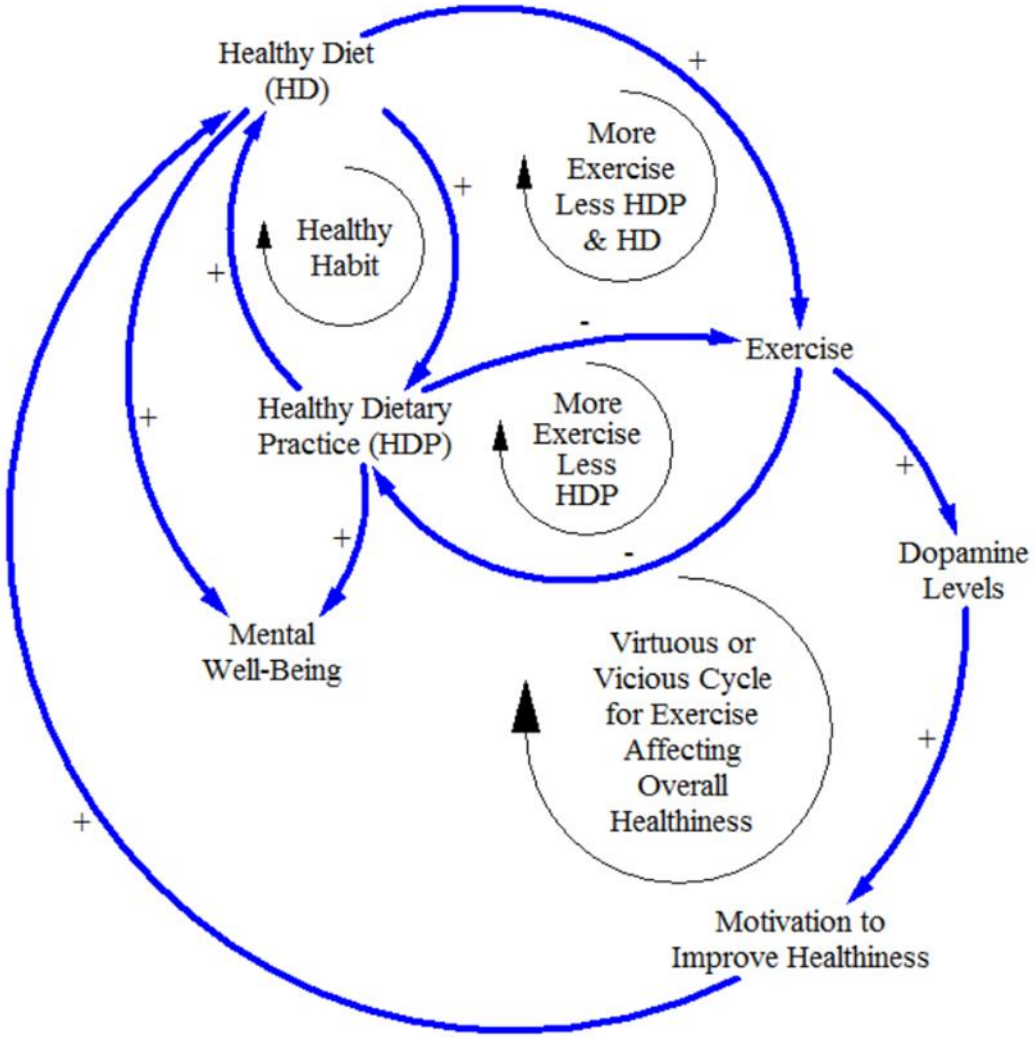
Deciphering the results

- Coffee: caffeine is a stimulant, activates a nervous system that increases the stress response (Fight or Flight)
- High glycemic index food: (simple sugar, starchy food)➔ fluctuation in blood sugar (more pronounced as we get older) ➔ affects serotonin levels (the happy brain chemical)
- Antioxidants: reduce the negative effects of inflammation
- Breakfast skipping keeps stress hormone high

Modeling behaviors in young adults



Modeling behaviors in mature adults



Gender differences

› Nutr Neurosci. 2020 Apr;23(4):295-308. doi: 10.1080/1028415X.2018.1500198. Epub 2018 Jul 20.

Principal component analysis identifies differential gender-specific dietary patterns that may be linked to mental distress in human adults

Lina Begdache [1], Hamed Kianmehr [2], Nasim Sabounchi [2], Maher Chaar [3], Jade Marhaba [4]

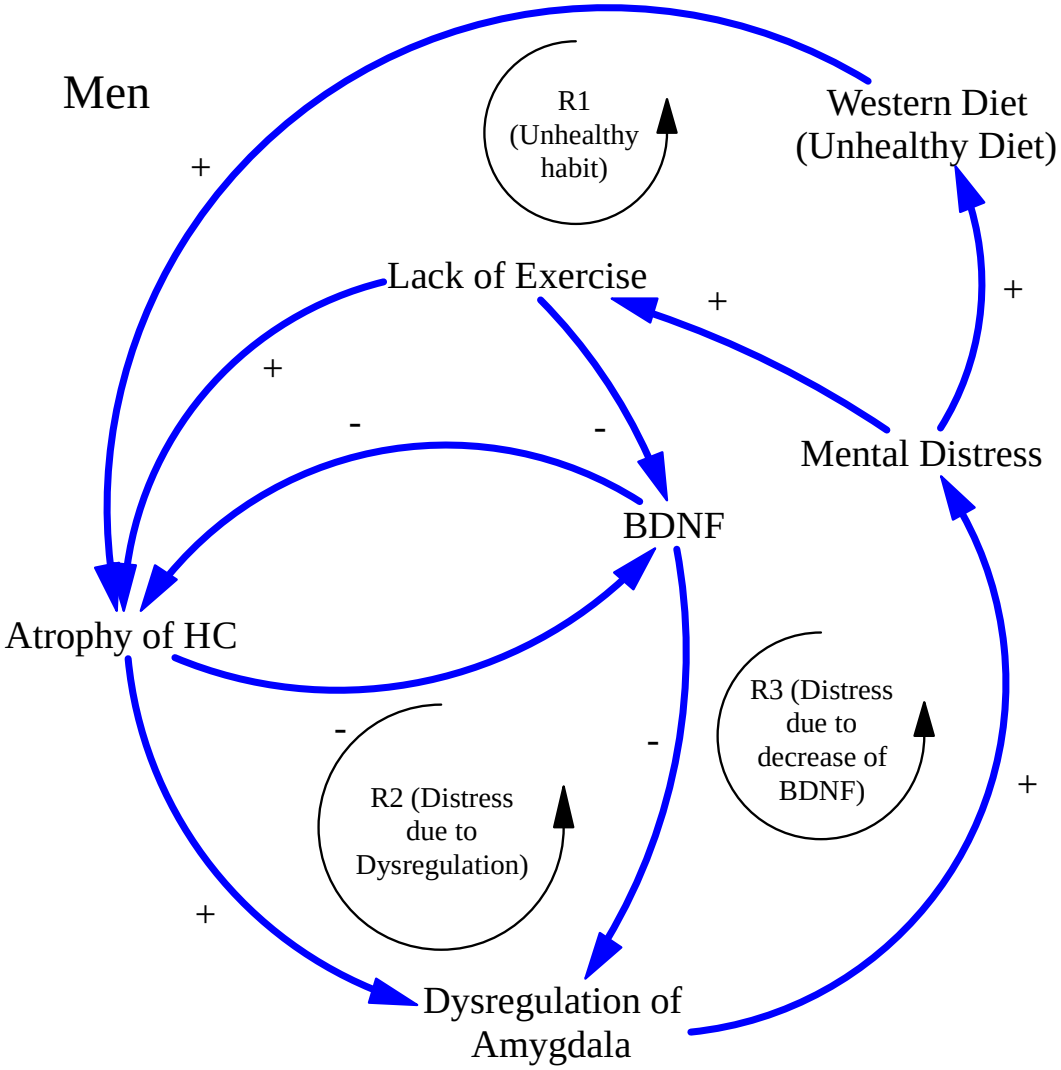
Men

- Mental distress associated with fast food (very unhealthy)
- ➔ Men are less sensitive to dietary deficiencies (short-term) than women➔ due to differences in brain morphology

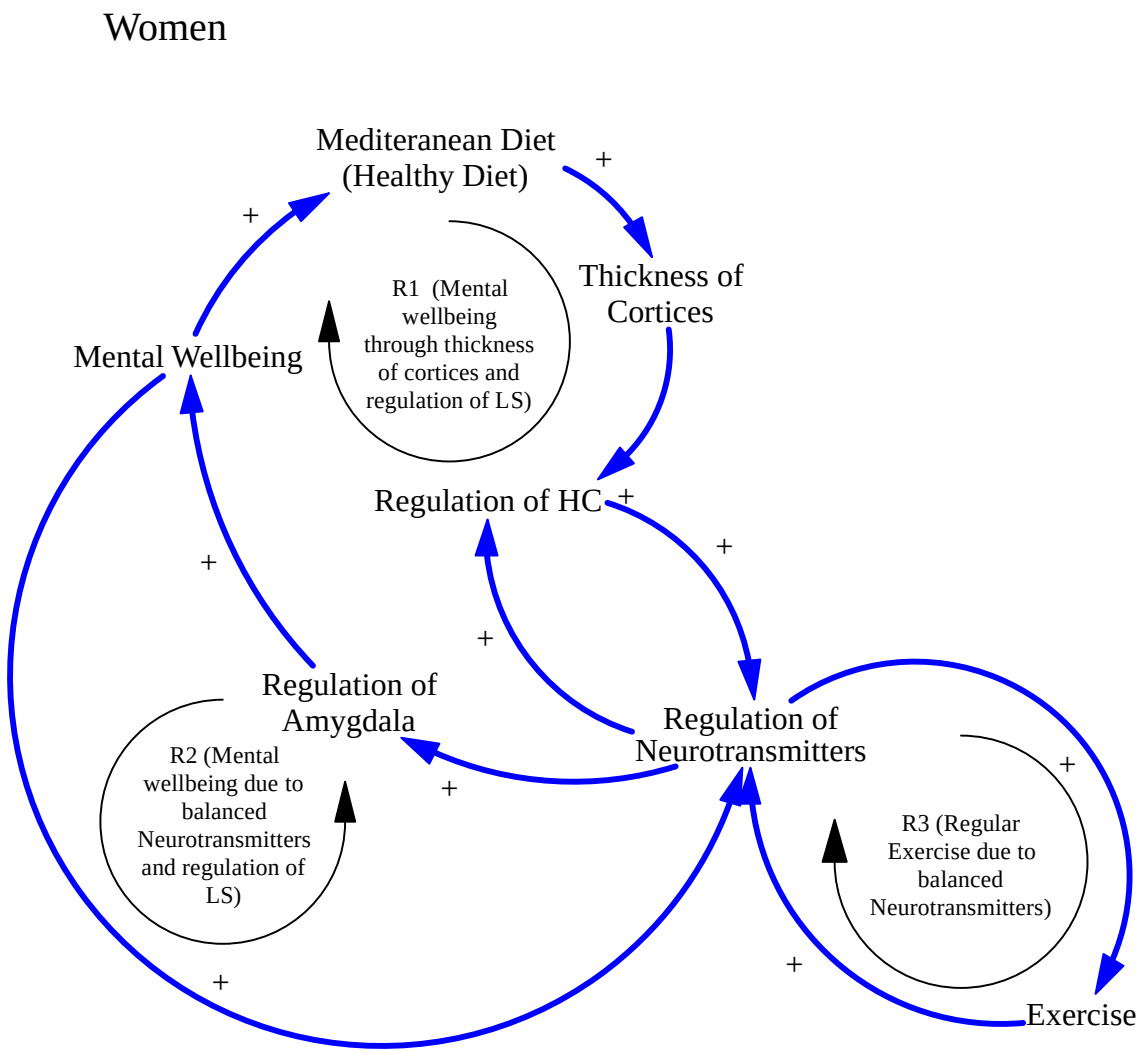
Women

- Mental wellbeing associated with a Mediterranean diet and lifestyle

Diet and mood in men



Diet and mood in women



Conclusion

Eating a healthy diet supports a positive mood

However, customization of diet (and lifestyle factors) based on age-groups and gender may optimize mood

Thank you