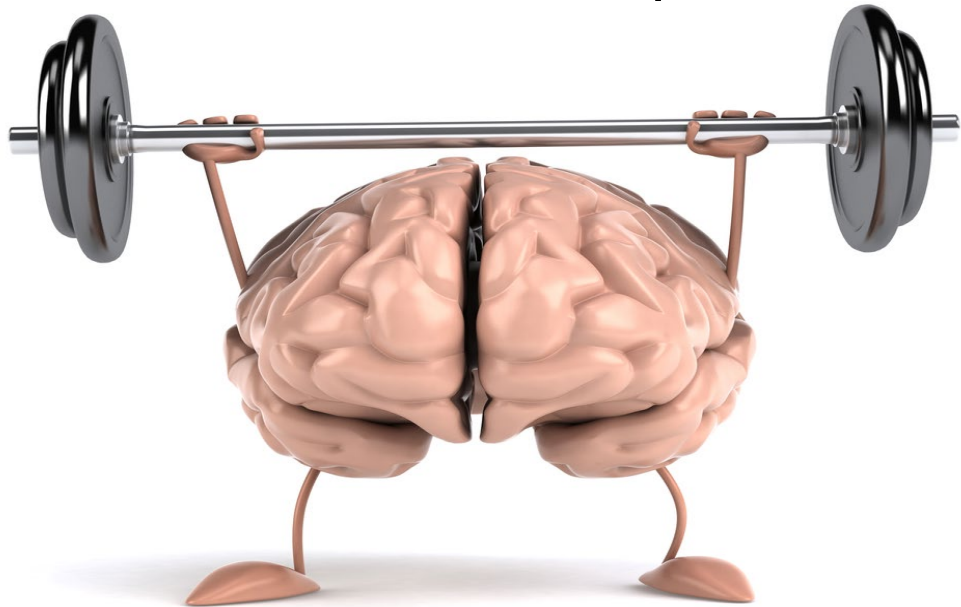




Basics of Brain Health

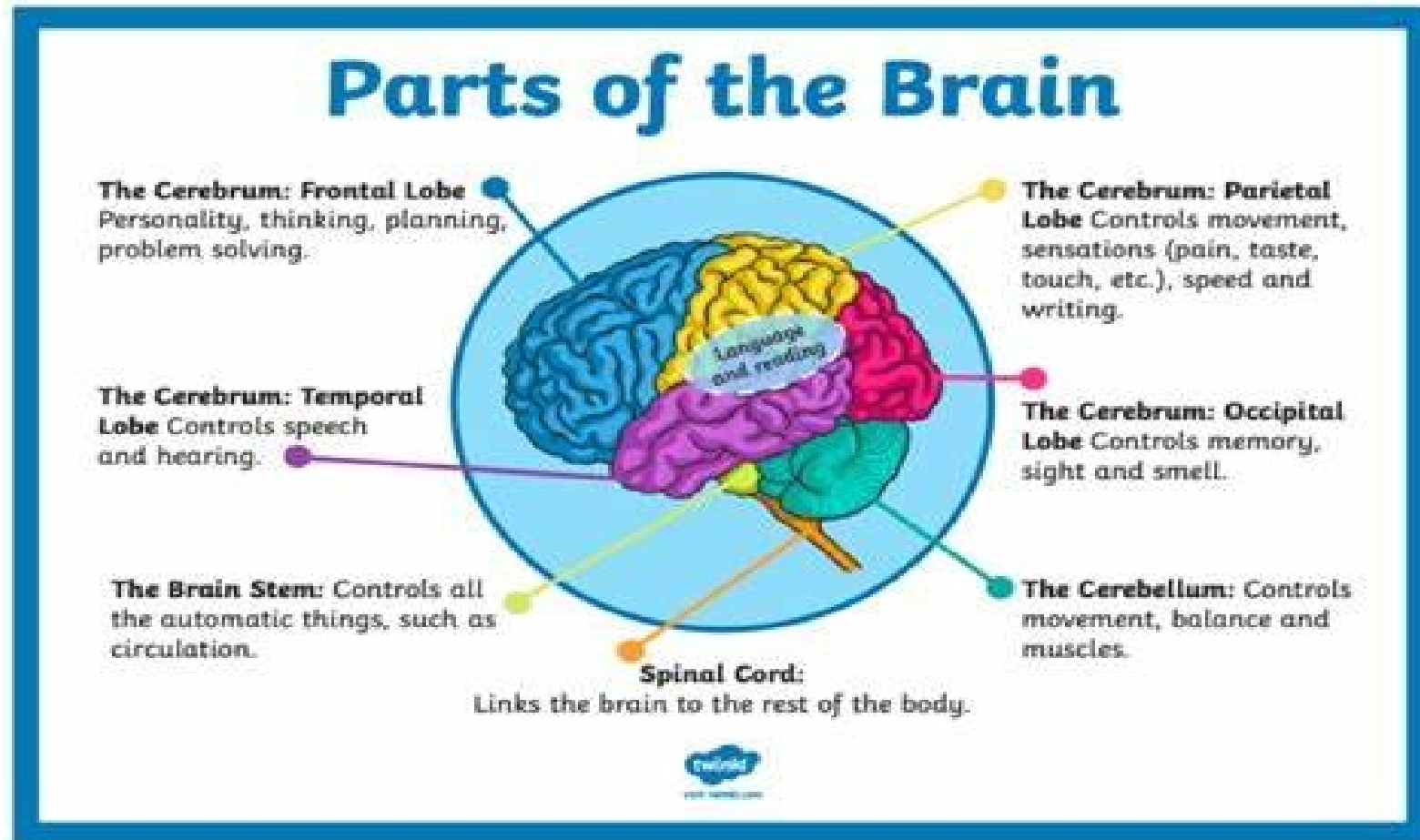
What are they and how do we maintain go about brain maintenance?



What do the experts say about brain health?

- **The American Heart Association/American Stroke Association (AHA/ASA)** describes optimal brain health as average performance levels among people of a specific age who are free from known brain or other organ system diseases. This includes both decline from function levels and the ability to perform desired activities
- **The US Centers for Disease Control and Prevention (CDC)** defines brain health as the ability to perform all mental processes of cognition, including learning, judgment, language **Good brain health goes beyond the absence of disease.** It encompasses overall cognitive functioning, resilience, and a state of well-being.

Why is the Brain so important?
What are the basics of the human brain?



Brain map

The brain can be divided into distinct structures, each with a specialist set of functions

Memory

CEREBRUM

The cerebral cortex makes up the majority of the human brain. It is divided into four lobes, which handle the most complex of tasks, including planning, memory and vision.



Temperature and hydration

HYPOTHALAMUS

The hypothalamus is responsible for maintaining equilibrium within the body. It monitors and adjusts a variety of vital parameters, like the body's temperature and hydration.



Hormones

PITUITARY GLAND

This pea-sized gland is connected to the hypothalamus and produces hormones, passing on chemical messages instead of electrical impulses.

Perception

THALAMUS

The thalamus is a switchboard for sensory information, connecting the parts of the brain and body involved in perception and movement. It also controls the sleep/wake cycle.

Sleep and dreaming

PONS

The pons is another relay station within the brain, allowing nerves in the cerebellum to contact those in the cortex. The pons also plays an important role in the sleep cycle and dreaming.



Breathing

MEDULLA

The medulla is responsible for the involuntary functions that keep us all alive, like breathing, swallowing and heartbeat.

HOW IT WORKS

Information transfer

CORPUS CALLOSUM

Latin for 'tough body', this wide sheet of nerves connects the left and right sides of the brain, transferring information from one to the other.

Visual and auditory systems

MIDBRAIN

The midbrain is buried near the centre of the brain and is home to part of the reward pathway, responsible for reinforcing positive behaviours and addiction.



Coordinated movement

CEREBELLUM

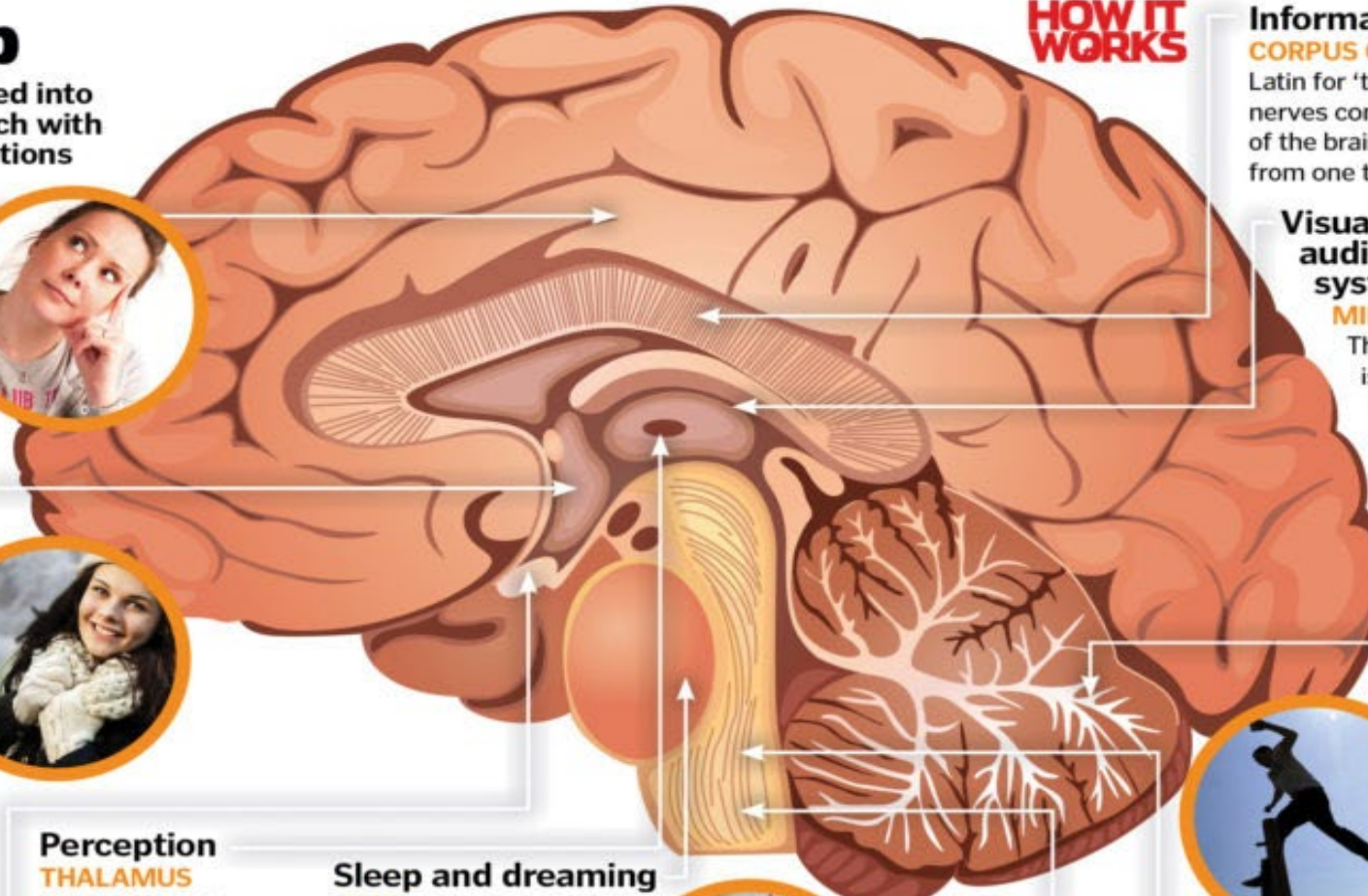
Cerebellum means 'little brain.' It is the control centre for coordinated movement, making fine adjustments before the signals are sent to the body.



Connects nerves

BRAIN STEM

The brain stem marks the end of the brain and connects the nerves to the spinal cord. It contains two distinct structures, the pons and the medulla.



Brain and Neurons, quickly!

- The brain has an outermost cover called the cortex. It is around 1.5-3 mm thick. The cortex, which is full neurons, covers all of the cerebral hemispheres.
- Neurons are the principle communicators of the CNS/PNS. Neuronal density is thick in the cerebral cortex, but density is thick throughout the CNS, including the deeper structures of the brain.
- The different regions of the brain have specialized purposes and actions within the brain to help create memory, think critically, and to create our senses (audio, visual, sensation, hormonal activation, and neurotransmitter communication).

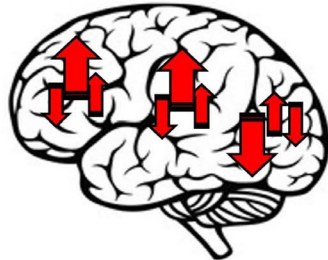
Our Brain and the process of aging and illness

Patterns of Brain Aging

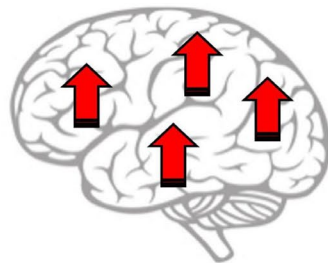
Red = related to poor cognition
Green = related to maintained cognition
↑ = activation
↓ = suppression

Healthy Young Adult
Balanced activation and suppression of brain activity with intact cognition

Aging



Loss of Neural Distinctiveness/Differentiation
Unorganized additional activation and suppression of brain regions/networks and cognitive decline



Neural Inefficiency
Less suppression of brain activity and cognitive decline



Neural Compensation
Additional activation needed to minimize cognitive decline



Brain Maintenance
No changes to brain activity and cognition remains intact

Even in healthy aging patterns of decline in neural activity regarding consistency and reliability have been noticed by brain region using fMRI

caused by damage or illness

— Able to activate new pathways of communication

Our Aging Brain

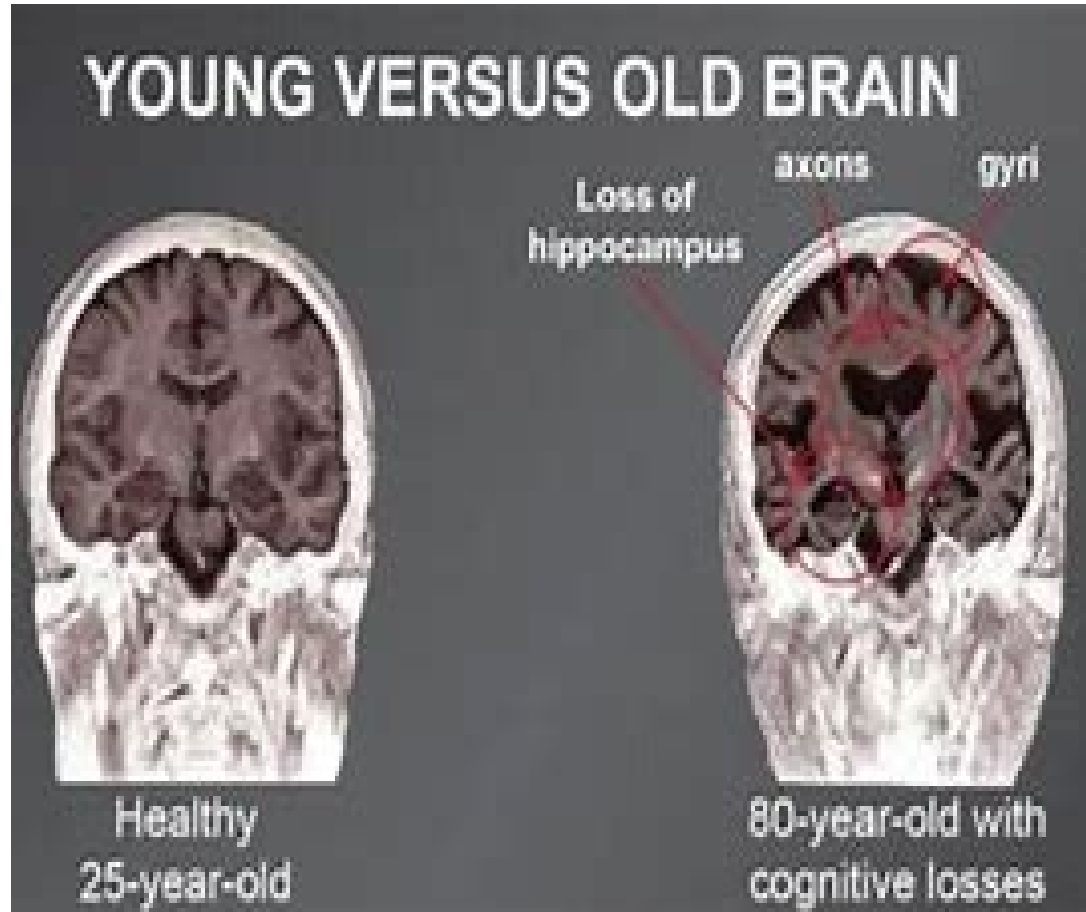
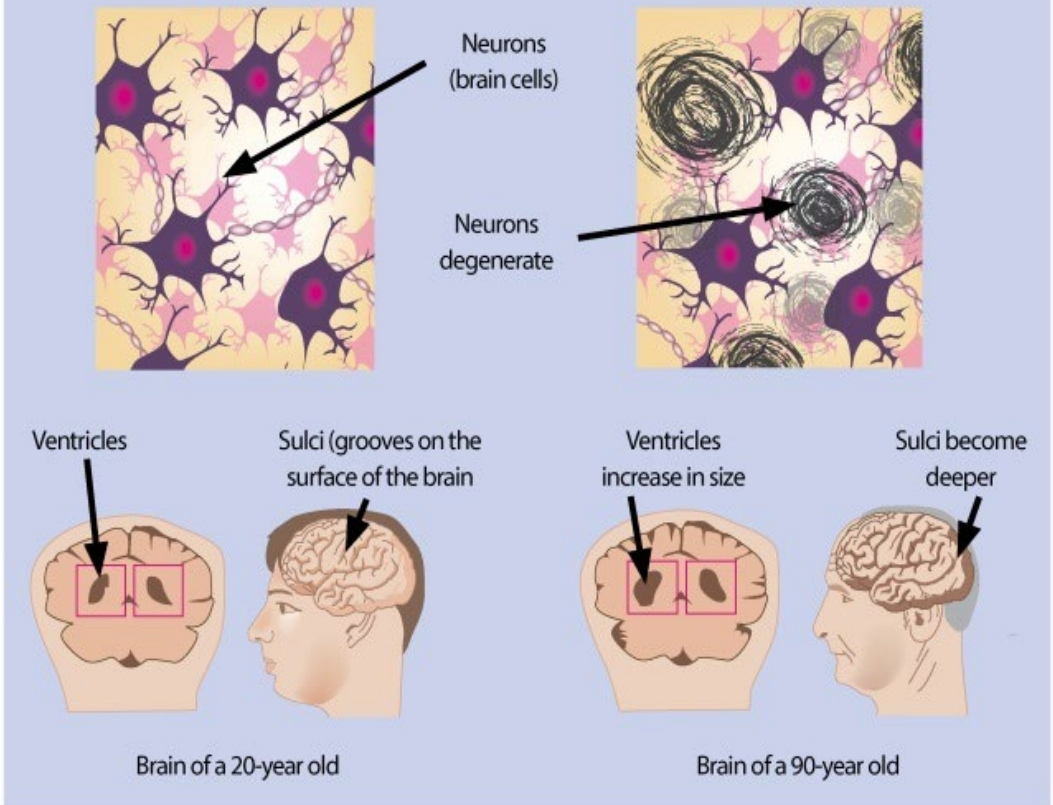


Fig 1. Three age-related changes in the brain



Quick basics of brain health: What can we do?

- Exercise on a regular basis. What does that mean and how intense?
- Eat a healthy diet/Mediterranean diet. What is that about?
- Don't drink alcohol. What does the research say about brain and alcohol?
- Stay socially active. What does that entail?
- Get plenty of sleep. How much? Is it different to everybody?
- Engage in challenging activities. What kinds of activities?
- Play it safe and wear a helmet while cycling or riding a motorcycle

Exercise on a regular basis/Healthy dining

- There are disagreements as to how much exercise is enough per week: CDC says 150 (2.5 hrs) minutes of moderately intense physical activity, and that includes two days of physical muscle strengthening.
- Exercise is useful for cardiovascular health and blood sugar control. In addition, effective management of depression and anxiety can be met with weekly exercise.

What kind of foods or diet is said to be most beneficial?

Mediterranean diets include: high portions of fruits, veggies, breads and grains. In addition, plenty of nuts, beans, seeds, and potatoes.

Olive Oil is the primary oil fat. Eggs, fish, and some dairy products are good in moderate amounts.

Fish and poultry are more common constituents of this kind of diet.


What about alcohol?

- Separate occasional alcohol use from alcohol abuse disorder: Alcohol abuse has been shown to bring on dementia at an earlier time in life, and cognitive changes.
- In addition Alcohol abuse can exacerbate chronic health conditions, like HTN, osteoporosis, DM, CVA, and stomach ulcers.
- These conclusions are mainly from studies regarding abuse of alcohol.
- Some studies appear to say that even one drink per day is detrimental to ones health.
- Other studies say there is a slight benefit to one drink or light drinking of alcohol.
- Many questions remain regarding intake of alcohol, how much, how often, benefits vs. debits to alcohol.
- Bottom line question: Is it realistic to advise a zero amount?

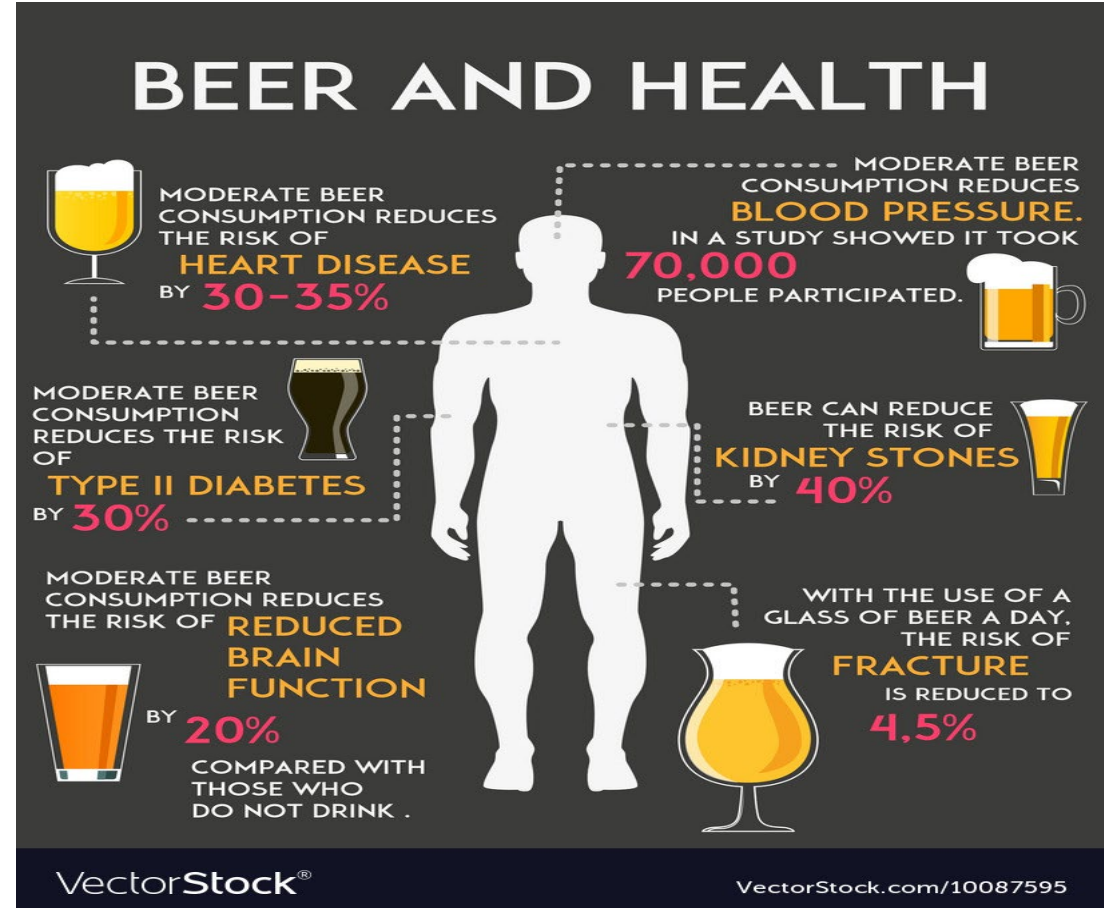
Pros and Cons of alcohol: Decide for yourself

What does alcohol do to my diet?

- A little alcohol isn't as bad as you may think. In moderation, some kinds of alcohol may even offer certain health benefits.
- However, too much alcohol can lead to excessive weight gain
- The bottom line? You don't have to cut it out all together, just keep it to a minimum



BEER AND HEALTH



MODERATE BEER CONSUMPTION REDUCES THE RISK OF **HEART DISEASE** BY **30-35%**

MODERATE BEER CONSUMPTION REDUCES **BLOOD PRESSURE**. IN A STUDY SHOWED IT TOOK **70,000** PEOPLE PARTICIPATED.

MODERATE BEER CONSUMPTION REDUCES THE RISK OF **TYPE II DIABETES** BY **30%**

BEER CAN REDUCE THE RISK OF **KIDNEY STONES** BY **40%**

MODERATE BEER CONSUMPTION REDUCES THE RISK OF **REDUCED BRAIN FUNCTION** BY **20%** COMPARED WITH THOSE WHO DO NOT DRINK .

WITH THE USE OF A GLASS OF BEER A DAY, THE RISK OF **FRACTURE** IS REDUCED TO **4.5%**

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How can we stay social?

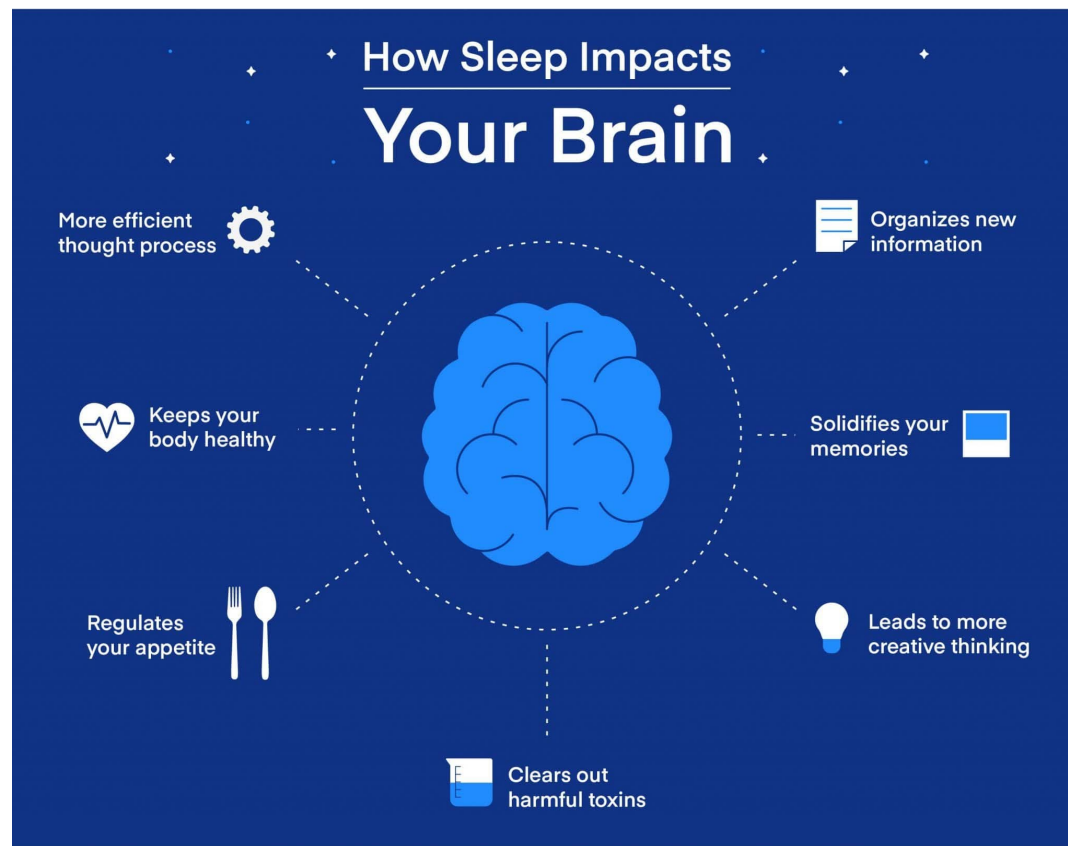
- Findings from a few studies suggest that social engagement and absorbing leisure activities may play a role in maintaining cognitive function in late adulthood and even in delaying or preventing **dementia**. (NIH, L. Carston, 2006)
www.ncbi.nlm.nih.gov/books/NBK83766/
- Loneliness and social isolation pose health risks similar to obesity and smoking. These risks include **depression, anxiety, increased suicide risk, and chronic health issues**. (Brain and Life, December 2014/January 2015)
- Interacting with others is like exercise for the brain. Shown to enhance cognitive flexibility (Mayo Clinic, Healthy Aging, 3/2024)



Get Plenty of Sleep! Brain Benefits

- Where to begin with topic?
- Correlations have been made between poor sleep and the incidence of neurologic disease.
- Cognitive aging, Parkinson's Disease, CVA, and Alzheimer's dementia, amongst many others.
- Sleep interruption has been associated with the build up of Beta Amyloid, a protein that creates tangles in the brain.
- It is estimated that 50 million people suffer from some kind of sleep disorder. (ABF, 3/16, 2022)
- Good quality sleep is associated with a “flushing” process that helps clean out toxins and is also associated with long term storage of memories, or memory consolidation, as well as, capacity for new learning. (Harvard Health Publishing, 3/11/19, www.health.harvard.edu)

Benefits of sleep/Debits of poor sleep



AMERISLEEP BLOG
Boost Brain Health: How Sleep Impacts Your Brain



SLEEP & AGING

WHAT'S NORMAL?

Aging itself doesn't seem to account for sleep complaints in older adults. If you're not happy with your sleep, talk with your doctor about possible causes and healthy ways to improve it, says Johns Hopkins sleep researcher Adam Spira, Ph.D.

NATURAL SLEEP CHANGES

- FALLING ASLEEP AND WAKING UP EARLIER
- MORE TIME IN LIGHTER SLEEP
- MORE AWAKENINGS—3-4X/NIGHT

WHY
CHANGES IN PART OF BRAIN THAT CONTROLS SLEEP + NATURALLY LOWER LEVELS OF GROWTH HORMONE AND MELATONIN

IS YOUR SLEEP HEALTHY?

- 1:3** HAS TROUBLE FALLING ASLEEP
- 1:4** HAS OBSTRUCTIVE SLEEP APNEA
- 1:8** HAS RESTLESS LEGS SYNDROME
- 7-9** HOURS OF SLEEP; WHAT A HEALTHY, OLDER ADULT NEEDS

KNOW THE SLEEP STEALERS

- LONG OR LATE NAPS
- CAFFEINE IN THE AFTERNOON OR EVENING
- LACK OF EXERCISE
- "SCREEN TIME" CLOSE TO BEDTIME
- CERTAIN HEALTH CONDITIONS

THE SLEEP DIFFERENCE

POOR SLEEP IS LINKED TO HIGHER RISK FOR FALLS, DEPRESSION AND DEMENTIA + MORE DIFFICULTY MANAGING CONDITIONS LIKE CHRONIC PAIN, DIABETES AND HEART DISEASE

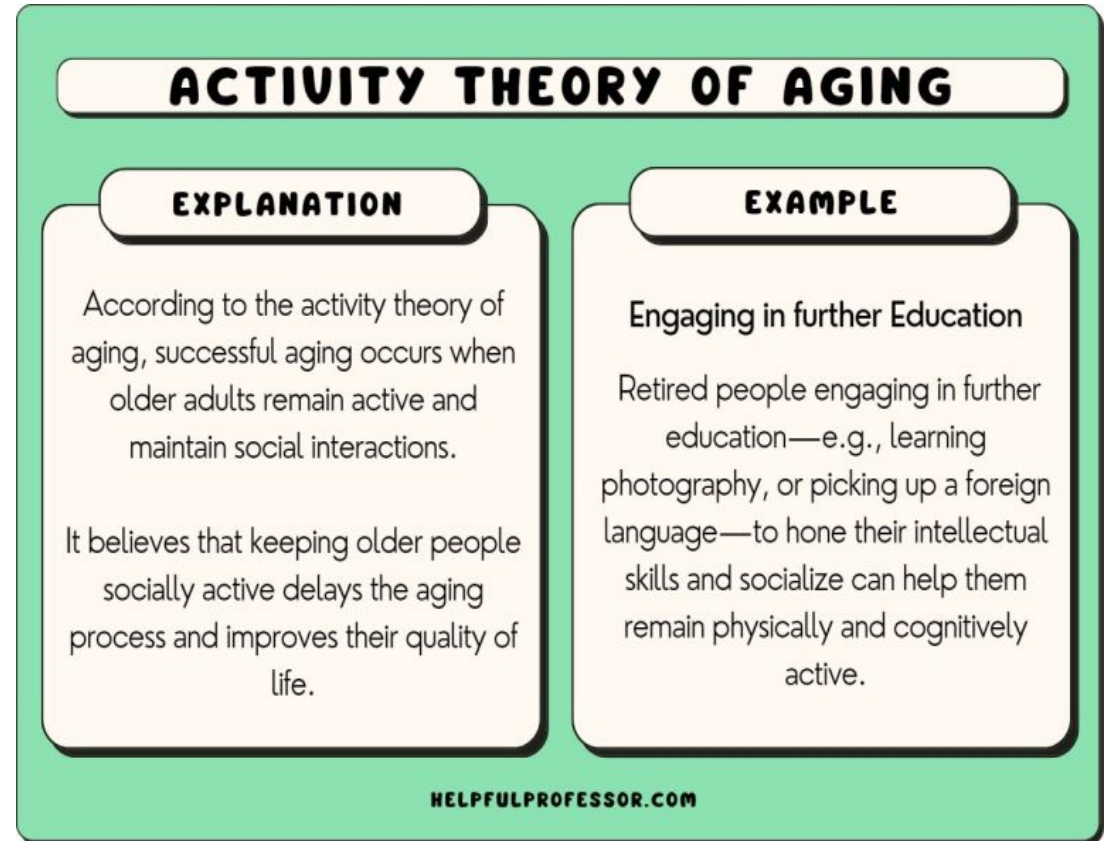
NIGHTTIME BATHROOM TRIPS
Eighty percent of adults age 80 and older are awakened by the need for night-time bathroom trips. Underlying causes may include diabetes, enlarged prostate, infections and kidney disease.

MEDICATIONS
Alpha-blockers and beta-blockers (for high blood pressure and heart disease), selective serotonin reuptake inhibitors (for depression), steroids, cold medicines, diuretics, nicotine gum and patches, and more can interfere with sound sleep.

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Engage in new and challenging activities!

- The biggest benefit is to your overall health!
- Older adults who engage in new learning opportunities and challenging physical tasks have an overall benefit to themselves in the dimensions of happiness, resilience, and better overall health—which benefits the brain!



Playing it safe as we age and engage!

PHYSICAL ACTIVITY AND OLDER ADULTS: 10 REASONS TO BE ACTIVE

Physical activity is important as a person ages. A little exercise can make a big difference in health and quality of life. Here are 10 reasons to get and stay as active as possible.

- 1. Activity can slow down the aging process.**
 - ✓ The loss of strength and stamina that happens as a person ages can be caused, in part, by a lack of physical activity.
- 2. You or the person you care for may live independently longer.**
 - ✓ Being active means having more strength.
 - ✓ It is easier to do housework, climb stairs and carry groceries.
 - ✓ Better mobility helps you remain in your home.
- 3. It will help prevent falls.**
 - ✓ Stronger bones and muscles mean better posture and better balance – and less risk of falling.
 - ✓ Broken hips and other injuries from falls may make it difficult to live on your own.
- 4. Activity helps prevent and manage illness.**
 - ✓ Regular physical activity lowers the chance of getting some cancers.
 - ✓ It helps lower the risk of heart disease, diabetes, obesity and high blood pressure.
- 5. Activity helps you feel better.**
 - ✓ Exercise reduces stress, anxiety and depression.
 - ✓ It may improve your energy.
 - ✓ It may even help you sleep better.
- 6. Memory may improve.**
 - ✓ Keeping active helps combat memory loss.
 - ✓ It may help lower the risk of some types of dementia.
- 7. Arthritis may be more manageable.**
 - ✓ Exercise can help arthritis pain.
 - ✓ It can help reduce stiffness.
 - ✓ It can relieve other aches and pains, including lower back pain.
- 8. It will be easier to stay at a healthy weight.**
 - ✓ Staying active keeps weight off.
 - ✓ Keeping extra weight off helps prevent aches, pains, injuries and illness.

- 9. Your doctor can help.**
 - ✓ Talk with a doctor before exercising if you or the person you are caring for has:
 - Not exercised for a long time.
 - A history of heart disease or another health condition.
 - Osteoporosis.
- 10. It is never too late to get active.**
 - ✓ Try walking, dancing, swimming or gardening. Seated exercises are a great option for people with limited mobility.
 - ✓ Start with 5 or 10 minutes at a time – every bit counts.
 - ✓ Work up to 30 minutes of moderate activity on most days (about 2½ hours a week). You can add 10 minutes here and there for your 30-minute total.
 - ✓ Add in strength and balance exercises at least 2-3 times per week.

How much physical activity should you do?

All adults should undertake muscle strengthening activity, such as

- exercising with weights
- yoga
- or carrying heavy shopping

at least 2 days a week

Minimise the amount of time spent sedentary (sitting) for extended periods

Adults (19 to 64) should aim for at least **150 minutes** of moderate intensity activity, in bouts of 10 minutes or more, each week

This can also be achieved by 75 minutes of vigorous activity across the week or a mixture of moderate and vigorous.

Playing it safe continued.....

- Mix it up!
- Do different activities to keep the imagination and the brain used to different tasks and exercise multiple neurological pathways.
- Come prepared to do whatever task you've chosen. Use thought and know yourself and your limitations.



Recap.....

- A healthy brain is a multi-faceted effort
- The human brain ages just like our bodies age
- If overall health is good the brain benefits
- Prevention is the best medicine when it comes to maintenance
- Develop healthy habits. It is never too late to engage and learn.
- Questions????????????