

YOU CAN CHANGE YOUR BRAIN AT ANY AGE

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YOUR AGING BRAIN

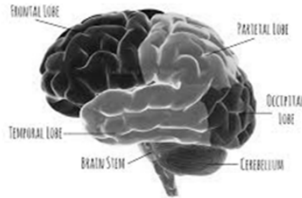
Aging starts from the moment we are born

Your Aging Brain

- Cognitive decline starts around age 25!
- Cognitive function includes: thinking, memory, planning, decision-making.
- Cognitive decline accelerates after age 50.
- Another accelerated decline happens after age 70.
- Decline is characterized by slower speed of processing – the speed it takes to hear information and offer a response

The Miracle Brain

This brain is about you – This is how it works



How Our Brain Works

- Your Brain Cortex:
 - Contains your **gray matter**
 - The convoluted mass of cells with folds and flaps within your skull
 - Responsible for complex thinking, including memory, language, planning, concept formation, problem solving, spatial representation, auditory and visual processing, mood and personality
 - Processing in the cortex is conscious and intentional

The Lobes of the Cortex

- Frontal Lobe: the executive system -> help execute behavior, organize behavior, plan, conceptualize, maintain cognitive flexibility, and stabilize mood
- Temporal Lobes: site of your auditory brain, memory and new learning, and language
- Parietal Lobes: help with orientation to space, memory, reading, and writing, mathematics, and appreciation of left versus right
- Occipital Lobes: help you see, discriminate what you see, and perceive

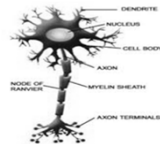
• Save Your Brain, Dr. Paul Rauschenberg

The Subcortex

- **White matter** is situated more deeply in the brain beneath the cortex; helps bridge or connect different regions of the brain; helps propel information and to insulate cells and nerve tracts
- **Subcortex** primarily processes rote skills and procedures: e.g. dressing, driving, and other routine tasks conducted at the subconscious level
- **Cortex and Subcortex** are distinct regions of the brain with numerous connections between the two regions
- Save Your Brain, Dr. Paul Nussbaum

The Neuron

- Our brain functions through **neurons**
- A neuron contains a **cell body (soma)**, a long arm extending from the cell body (**axon**) and branchlike figures called **dendrites**



The Synapses

- Communication through the brain goes through **neurons**
- Information **from** the **cell body** travels down the **axon**, while information from the environment is gathered by the **dendrites** and travels **to** the **cell body**
- Our **brain** contains **million of neurons** and **each neuron** can communicate with **10,000 neurons**
- **Neurons** do not touch each other. Communication happens by way of chemicals in the **synapse** – **the chemical marriage between each neuron**



Neurotransmitters

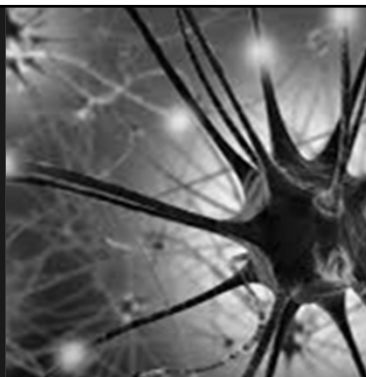
- Brain chemicals that facilitate communication in the **synapses**
- **Glutamate:** most common **neurotransmitter**
- **Adrenalin:** hormone and **neurotransmitter**
- **Norepinephrine:** hormone and **neurotransmitter**
- **Acetylcholine:** most common used in muscle and prefrontal cortex
- **Dopamine:** pleasure/reward/motivation
- **Serotonin:** mood/appetite/sensory perception

Normal Aging Changes

- | | |
|---|---|
| <ul style="list-style-type: none"> ■ Aging Bodies ■ Gray Hair ■ Weight gain in all the wrong places ■ Wrinkles and saggy skin ■ Flexibility, Muscle Strength, Muscle Mass decline ■ Need glasses to read | <ul style="list-style-type: none"> ■ Aging Brains ■ Cognition declines -> memory, analytical reasoning, processing speed ■ Reasoning skills drop steadily after peaking at age 53 ■ Cognitive flexibility declines ■ Intelligence: Fluid decreases; Crystallized increases |
|---|---|

Neuroplasticity

Neuroplasticity is the ability of the brain to change in relation to the environment.



Neurogenesis

Neurogenesis is the growth of new brain cells



Reasons Why Our Aging Brains Decline

- The brain shrinks though aging.
- We lose brain cells (neurons) if we don't use them.
- Noisy processing – deterioration of sensory input
- Weakened neuromodulatory function
- Negative learning



THE HEALTHY BRAIN LIFESTYLE

Six Lifestyle Practices to Keep Your Brain Sharp

MOVE



MOVE

■ Why Exercise?

- Gives our brains a healthy boost
- Increases blood flow to the brain
- Stimulates growth of brain cells and connections between them
- Associated with larger brain volume



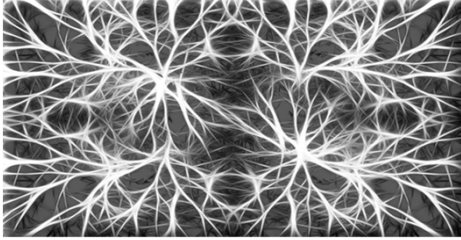
MOVE



■ Brain Benefits of Exercise

- Strong evidence of:
 - Better brain function
 - Better mental health
 - Reduced risk of cognitive decline and dementia

CHALLENGE



CHALLENGE

- Building stronger brains
- Rich lifetime experiences have a major influence on how you age cognitively
- Cognitive reserve: the brain's resilience or ability to cope despite damage or degeneration
- Mental activity builds cognitive reserve



CHALLENGE



- Different ways to challenge your brain
- Lifelong learning
- Travel
- Board games
- Playing a musical instrument
- Writing

CHALLENGE

Intelligence:

the ability to reason, plan, solve problems, think abstractly, comprehend complex ideas, and learn quickly from experience

- **Fluid Intelligence:** the ability to think logically, reason and solve problems independent of education or knowledge. Studies indicate that **fluid intelligence declines with age.**
- **Crystallized intelligence:** skills, knowledge and experience learned during the course of a lifetime - from family, at school, and from society. **Crystallized intelligence increases with age.**

NOURISH



NOURISH

- **What is the Best Diet for the Brain?**
- Diet impacts mental health and wellbeing
- Healthy, nutrient-dense dietary patterns such as the **MIND diet** or whole food diets slow **brain aging**, protect against **Alzheimer's disease** and **dementia** and help prevent **depression and anxiety**



NOURISH



- Time to say 'NO' to all that red meat
- The brain needs lots of green, leafy vegetables and dark red fruits – antioxidants
- A fish tale – cold water fatty fish – (e.g. salmon, tuna, mackerel) should become your favorite food baked/grilled – Omega 3 fatty acids
- Dark chocolate – flavonoids, antioxidants protect the brain and the heart

NOURISH

- | | |
|--|--|
| <ul style="list-style-type: none"> ■ This is your brain on: ■ Sugar: Eating too much sugar is linked to weight gain, obesity, type 2 diabetes, and heart disease. Diabetes is a risk factor for Alzheimer's disease and dementia ■ Grains & Gluten: Evidence weak for gluten causing dementia. Reduce refined grains, but include whole grains in your diet. | <ul style="list-style-type: none"> ■ This is your brain on: ■ Coffee: Coffee is high in antioxidants, and 2-3 cups/day is associated with a decreased risk of developing dementia. ■ Alcohol: Low to moderate alcohol use (one glass red wine a day with meals) is associated with reduced risk of developing dementia. ■ Omega -3s: Eating cold water fatty fish is best way to get Omega-3s. |
|--|--|

CONNECT



CONNECT



- **Your brain has a fundamental need to connect**
- Social connection is the perception and reality that you're cared for, have assistance available from other people, and are part of a supportive social network
- Research shows being socially connected protects the brain against the risk of developing dementia and improves mental health and wellbeing.

CONNECT

■ Cognitive Reserve

- *Interacting with others people may build cognitive reserve*
- *Social interaction involves many cognitive functions:*
- Thinking; Feeling; Sensing; Reasoning; Intuition



CONNECT



- **Passion, Purpose and Brain Health**
- People who have meaning and purpose in their life have lower risk of cognitive decline, mental health issues and dementia
- Purpose in life is linked to positive health outcomes, including better mental health, less depression, happiness, satisfaction, self-acceptance, better sleep, and longevity.

SLEEP



SLEEP

Circadian Rhythms

- Period of sleep dictated by the rotation of the earth, and time cues that indicate night and day.
- **Circadian Clock** – synchronized by a small number of ganglion cells in the retina of the eye that respond to light and project directly to the **suprachiasmatic nucleus** in the **hypothalamus** of the brain



SLEEP



- **Why do we sleep?**
- Newer evidence shows sleep is required for neuroplasticity and to flush toxins from the brain
- Sleep (including napping) promotes memory formation. It moves memories from short - to - long-term storage

CALM



CALM

- **What is stress?**
- Stress is your response to a real (or imagined) threat or challenge. Your stress response involves your body, mind, emotions and thought processes.
- The ability to respond to stressful or threatening situations is critical to your survival. But prolonged exposure to stress has a toxic effect on the brain and body.
- You have two biological stress pathways, The **rapid-response autonomic nervous system** – acts via the neurochemicals adrenaline and noradrenalin.
- The **slow responding hypothalamic-pituitary-adrenal (HPA) axis** activates the stress hormone cortisol.

Stress Effects on the Body

- Acute stage of stress:
primed for survival
- Senses become more acute
- Memory is sharpened
- Feel less sensitive to pain



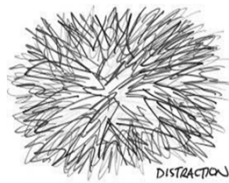
Stress Effects on the Brain

- Acute stress effects on the brain
 - Neurochemical norepinephrine is released
 - Creates new memories; improves mood; encourages creative thinking; stimulates brain to increase cognitive reserve



CALM

- **What does stress do to the brain?**
 - Mild stress enhance attention and memory formation
 - Excessive or chronic stress changes your brain chemistry. It can create traumatic memories; result in the development of mood and anxiety disorders; and, increase the risk of dementia
 - Too much stress prevents the birth of new brain cells and impacts the connections between brain cells



CALM

- **Effects of Chronic Stress on Your Brain:**
 - The brain is the control center in the chronic stress cycle
 - Two areas specifically affected: hippocampus (learning and memory), amygdala (center of emotional control)
 - Through the actions of cortisol - cause the brain to hardwire connections between the hippocampus and the amygdala, creating a vicious cycle of maintained fight or flight
 - Inhibits connections to the prefrontal cortex (learning, memory, executive function) and sets the brain up for anxiety and depression

The Power of Cortisol

Cortisol is so powerful – it can alter the structure of neurons (brain cells); affect their connections; influence behavior; change hormonal processes



MEMORY AND AGING

Attention and Meaning

How Aging Impacts Intellectual Function

- These age related changes make it harder to remember
 - *Attention*
 - *Processing Speed*
 - *Cognitive Flexibility*
 - *Short-term Memory/Encoding*
 - *Daily Reasoning*

How Your Memory Works

■ Three Steps:

- Acquisition
- Storage
- Retrieval

■ Two Processes:

- Short-term memory
- Long-term memory

Why We Forget

- Distraction
- Lifestyle Choices
- Aging
- Lack of Memory Strategies



How We Can Remember

■ Attention

- Increased awareness and effort
- Get mentally healthy
- Get mentally active

■ Meaning

- Why meaning matters
- Strategies for making information more meaningful

Why We Need Memory Tools

- Memory tools **increase attention** to information we want to remember
- Memory tools are critical for **managing information we need to remember but not memorize**. Three kinds of information:
 - **Information we must commit to memory** (addresses, PIN numbers)
 - **Information we don't really need to commit to memory** (phone numbers, etc)
 - **Information we need to remember but not to memorize** (appointments, errands, etc)

Why We Need Memory Tools

- Memory tools allow us to **control information** and decrease our risk of information overload
- Memory tools **get us organized**
- Memory tools **enhance our confidence** in our daily memory function

Top Tools for Remembering

Remembering Appointments:

- Schedulers
- To Do Lists

Remembering What Was Said:

- Memory Minutes

Remembering Where Things Are:

- Forget-Me-Not Spot
- Locator Log



How To Remember Names

How We Learn Names:

- Attention
- Rehearsal

Why names are hard to learn and remember:

- Distraction
- Time Sensitivity
- Lifestyle Issues
- Aging
- Lack of Techniques

Techniques for Better Name Recall:

- Repetition
- Connection
- Snapshot
- Storytelling
- Moviemaking

Total Memory Workout by Dr. Cynthia Green



THANK YOU!!!

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