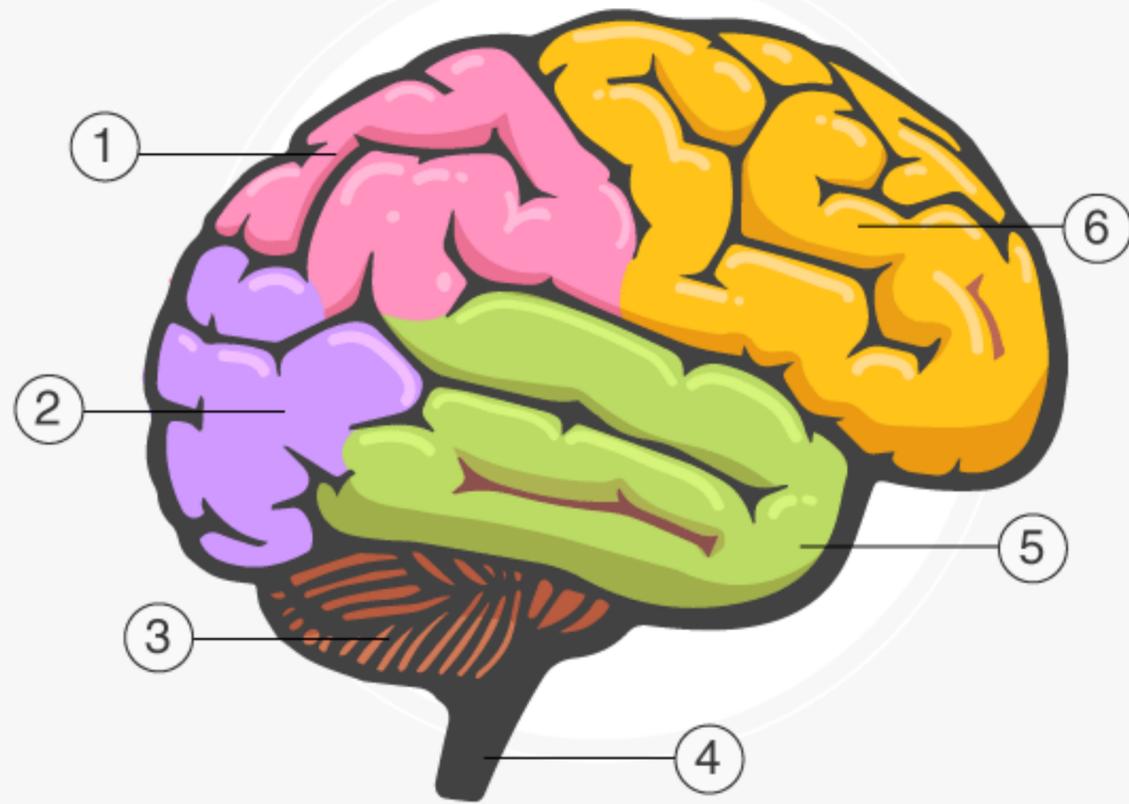




# How to Enhance your Brain Power

## A Lecture on Brain Health

Peter Brodhead CN



- |                 |                  |                |
|-----------------|------------------|----------------|
| ① Parietal Lobe | ② Occipital Lobe | ③ Cerebellum   |
| ④ Spinal Cord   | ⑤ Temporal Lobe  | ⑥ Frontal Lobe |

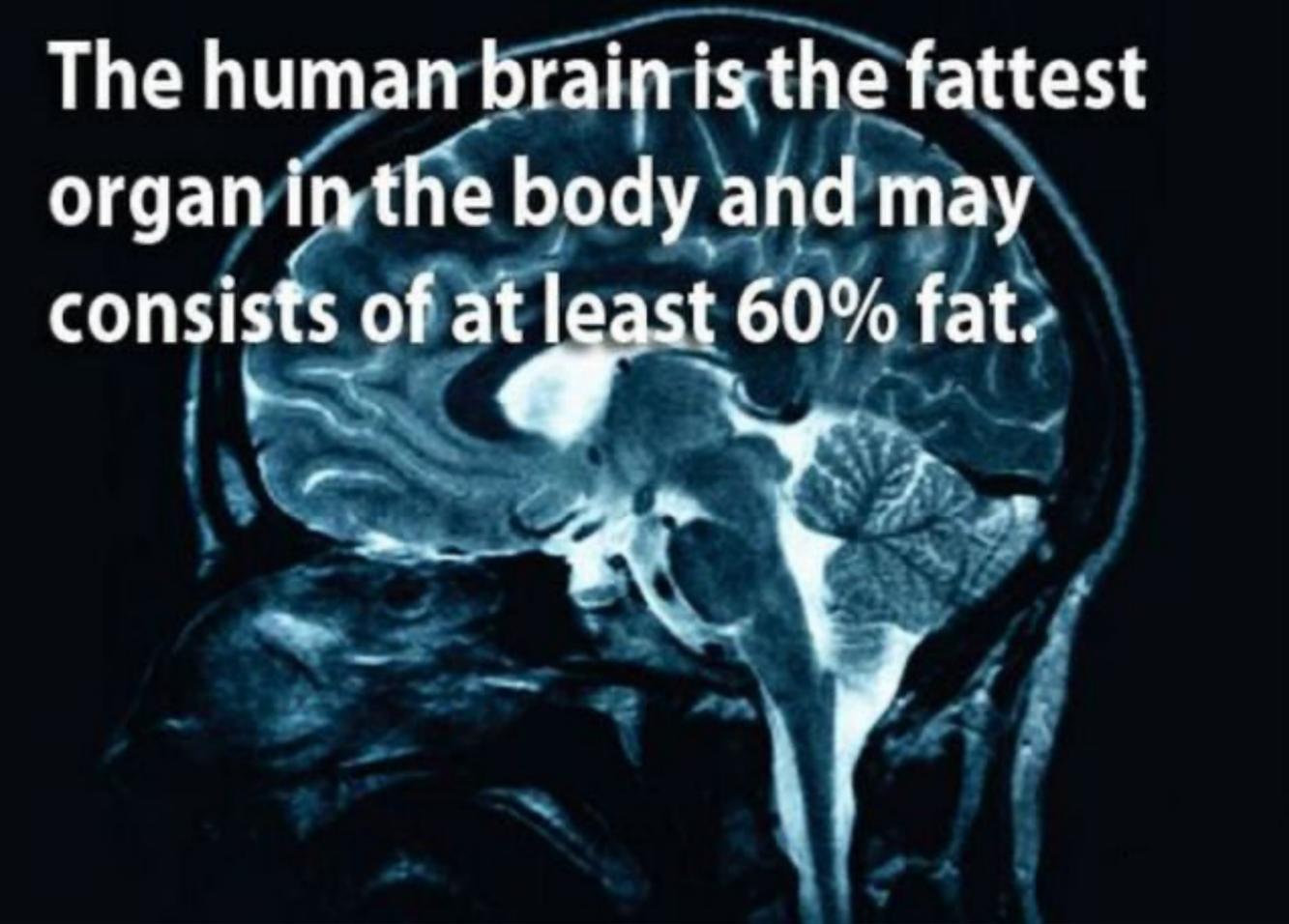
The majority of the brain's weight is in the cerebrum which is divided into 2 halves

The Frontal Lobe found just below the forehead "**The Executive Center**" is the decision part of the brain - responsible for judgement, reasoning, solving problems, self regulation, paying attention, remembering and controlling emotions

## Neurons and Glial Cells

Neurons feed on glucose and ketones  
Glial Cells on glucose - Glial cells are the brain's trash collectors

**The Cerebrum is located in the back of the brain - it helps with motor skills and equilibrium. It is 10% of brain volume but contains 50% of your neurons**



**The human brain is the fattest organ in the body and may consist of at least 60% fat.**

**Fats build brain structure** and EFA's essential fatty acids as messengers are involved in the synthesis and function of brain neurotransmitters

Dietary **DHA/EPA** are the most important essential fats for the brain

Brain accounts for 2% of body weight but uses 25% of oxygen and energy

Brain generates up to 25 watts of power - Incandescent light bulb

You have 100,000 miles of axons in your brain enough to go around the world 4x

There are more than 100,000 chemical reactions happening in your brain every second

Over a lifetime the human brain may be able to retain up to 1 quadrillion pieces of information



The brain has a lot of water  
75% by weight

Hydration really affects brain  
performance

# Neurotransmitters: Key Brain Molecules

**Dopamine** - pleasure, reward, co-ordination

**Serotonin** - mood stabilizer, social connection, digestion, 90% + is made in the gut

**Acetyl-Choline** - working memory, focus, learning, alertness

## Inhibitory Neurotransmitters:

**Anandamide** - “The Bliss Molecule” - anti-depressant, increases happiness, reduces fear

**GABA** - anti-anxiety, calms a racing mind, puts problems in the proper context

**Glycine** - improves sleep quality, helps overwhelmed, calm focus

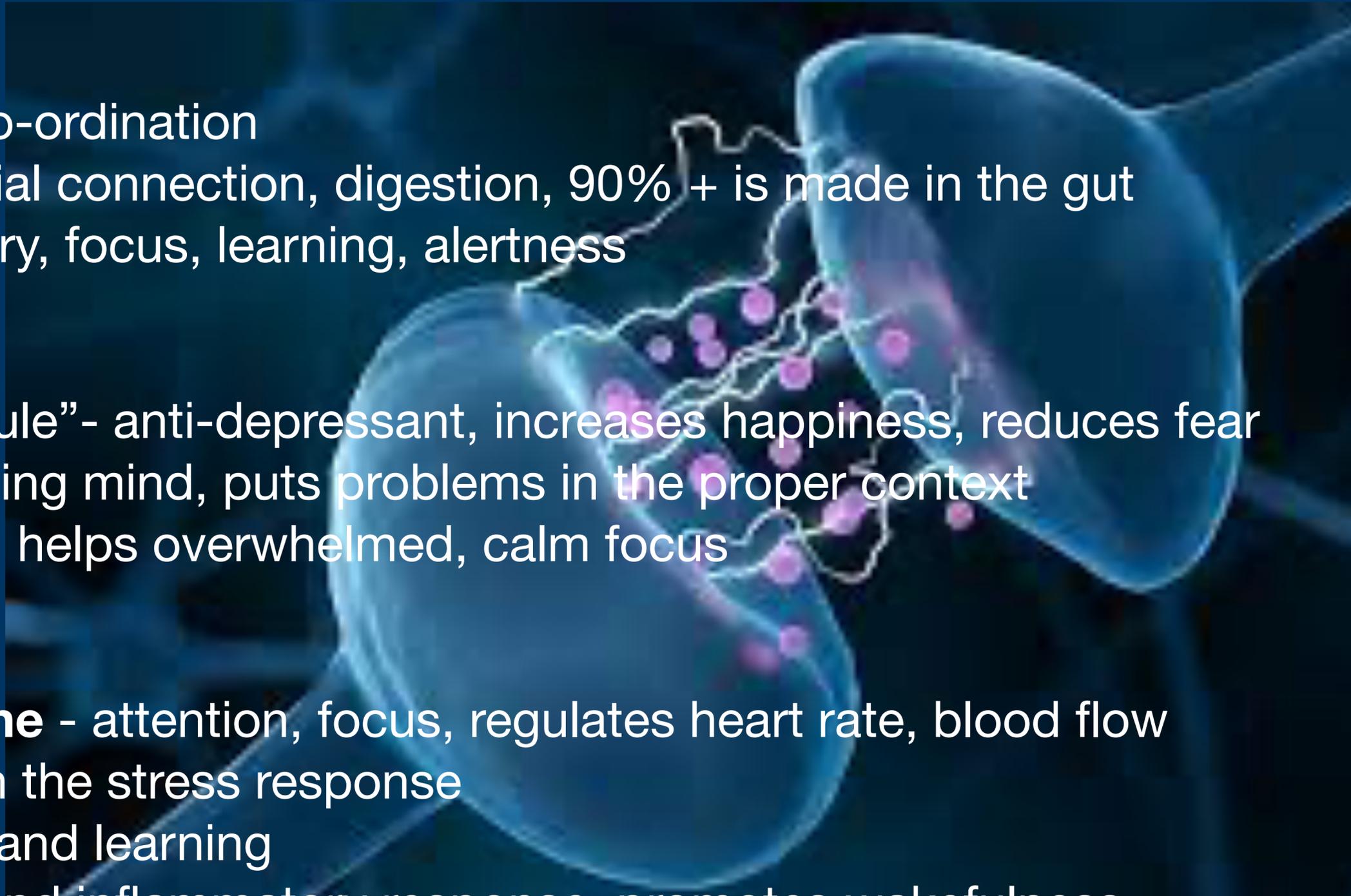
## Excitatory Neurotransmitters:

**Norepinephrine or noradrenaline** - attention, focus, regulates heart rate, blood flow

**Epinephrine** - heavily involved in the stress response

**Glutamate** - cognition, memory and learning

**Histamine** - sleep wake cycles and inflammatory response, promotes wakefulness



# Glycine - The amino acid for our times

Bonds to the locus cerulean in the mid - brain  
And decreases the release of norepinephrine

Calms “Overwhelmed feeling”

Calms down overactive thinking

Tastes like sugar - easy to add to tea

My favorite combo  
Tulsi ( Holy Basil ) Rose Tea  
with a teaspoon of Glycine



**GLYCINE** -  $CH_2(NH_2)CO_2H$  is the shortest and simplest of all amino acids - it occurs in all protein-containing foods - it tastes like sugar - which makes it very easy to take - either directly in the mouth or as a sweetener for tea or beverages or food, being an amino acid it has no negative effects on blood sugar levels.

There are glycine receptor sites in the brain and spinal cord, which respond to glycine by decreasing the activity of the central nervous system. Glycine bonds to the locus ceruleus in the mid brain and decreases the release of norepinephrine. The effect is to calm the mind and spirit. Excess activity of the locus ceruleus can lead to feelings of anxiety and panic. It can be used both daytime or nighttime. At night it can help calm down an over busy brain when you can't sleep because of too much mental stress. It also supports detoxification pathways in the liver.

Because it tastes like sugar it makes an excellent sweetener for calming - sleep enhancing herbs such as passion flower and chamomile tea.

**Dosage:** 1 level teaspoon - 2x a day or 1/2 a teaspoon 4x a day  
Too much taken over long periods of time can deplete other amino acids so don't use more than 5 grams a day for extended periods of time

For a stronger support for anxiety try adding 1/4 of a teaspoon of GABA powder to 1 tsp of Glycine - GABA is more directly supportive of reducing anxiety. - limit this dose to 2x a day

taken from: Applications of Botanical Remedies in Naturopathic Medicine - William A. Mitchell, ND - year 2000 update p.110 and 265





Neurotransmitter Testing - a urine test available from Life Extension [www.lef.com](http://www.lef.com)

Basic \$ 199.00

Comprehensive \$ 295

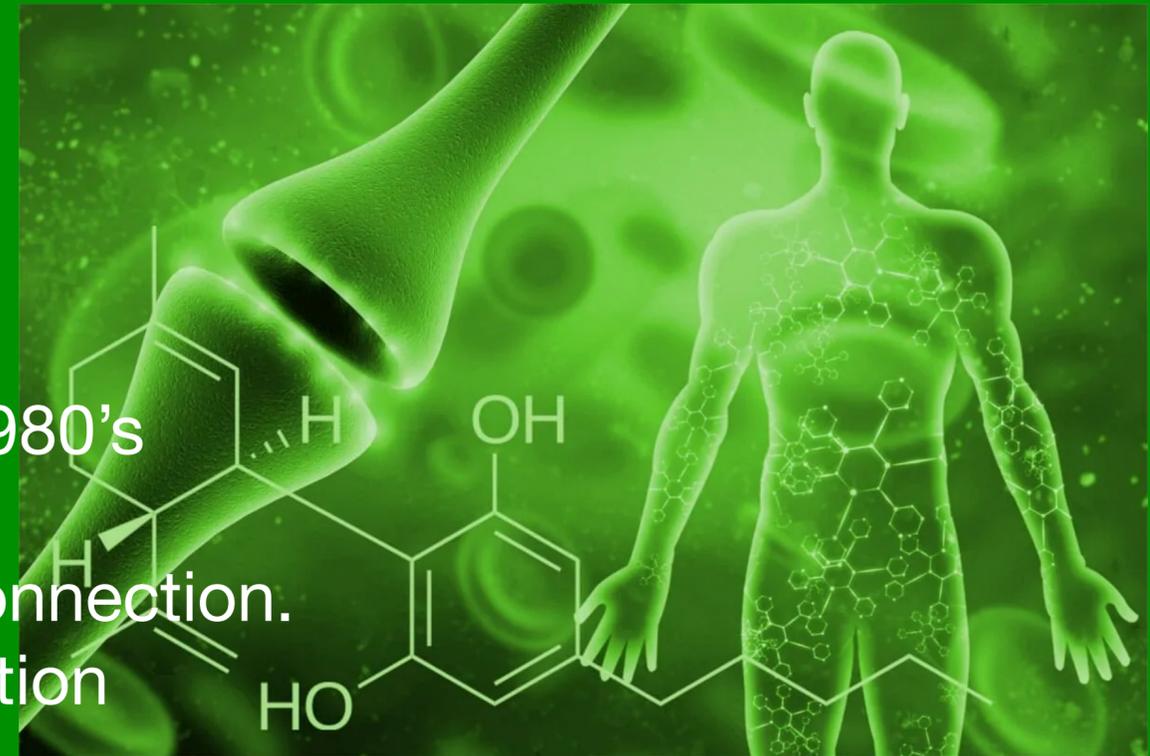
# The Endocannabinoid System

Dr Raphael Mechoulam - Israeli researcher

Discovered this entire new regulatory system of the body in the 1980's

Plays a crucial role in governing neurotransmission and neuron connection.

It influences memory, mood, cognition, emotions, and motor function



There are more endocannabinoid receptors than all other neurotransmitter receptors combined

CB-1 receptors regulate neuron development, pain signaling, learning & memory processing, motor control and inflammation

Many foods influence the endocannabinoid system - Hemp is one of the most potent.

Fish Oils enhance the ability of the endocannabinoid system to work better

PEA - Palmitoylethanolamide - found in Egg Yolks and Lecithin are food sources shares many of the same therapeutic uses as hemp.

# Bloodwork to consider

**Omega Quant** - this tests the amount of omega 3's and 6's in the blood very important info in knowing how much fish oil you need to supplement and how much Omega 6 fats to cut back

**Fasting Insulin** - elevated levels may indicate insulin resistance

**Hemoglobin A1c** - average blood sugar levels for the past 120 days

**hsCRP** - inflammation marker

**Uric Acid** - keep your level below 5.5 - this may be a critically important number to look at for inflammation, blood sugar , and insulin

**Homocysteine** - inflammation marker, liver detoxification - methylation marker and brain issues depression and Alzheimers

**Vitamin D** - 25OH D - the ideal number should be between 50 - 80 - Vitamin D is a regulating hormone

**Plasma Zinc**

**RBC Magnesium**



## Environmental Toxins



Chronic Sinus issues are a risk  
For Alzheimer's - the nose and sinus  
Cavities are very close to the brain

20% of Alzheimer's is caused  
by Air Pollution

## Heavy Metals



Dietary Sensitivities  
Morphine like effects from casein and gluten

## Brain Fog



## Mold



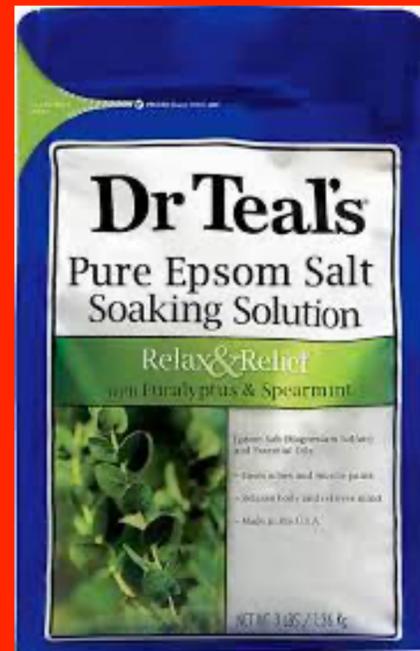
Green Tea + Turmeric are outstanding to support liver detoxification - also NAC

# Sauna



**Stimulates Heat Shock Protein  
BDNF  
Brain and Mood  
Anti-Depressent  
Hypertension and Heart Benefits  
Detoxification of Heavy Metals  
Plastics from the environment  
BPA  
Pthalates**

# Epsom Salt Baths combined with diaphoretic herbal tea drinking



+

**Recipe for an Epsom salts bath - put 2 cups of Epsom salts in a bathtub of hot water ( *as hot as you are comfortable with* ) add 1 cup of baking soda**

**And soak for 20 to 40 min. 102 degrees is a therapeutic temp.**

**To make a good diaphoretic tea:**

**Add 1 heaping tablespoon of Yarrow or Elder Flowers**

**Add also 1 tablespoon of Peppermint Leaves**

**Pour 2 cups of boiling water over the loose herbs and cover for 5 min.**

**Drink the hot diaphoretic tea while soaking in the tub**



# Exercise and the brain

Staving off mental decline - exercise is a polypill  
WHO - World Health Organization - exercise is the  
#1 thing to do for the brain over anything !!  
150 to 180 minutes a week of moderate to vigorous aerobic exercise.

1 study showed that taking a brisk walk daily  
can reduce getting Alzheimer's disease by 43%

## Types of Exercise

1. Aerobic - 60 to 80% of your maximum heart rate
2. Strength Training
3. Skill based exercise - Neuro Motor Training

*Taking up something new that is challenging and that you are bad at  
Tennis, TaiChi, Ballroom Dancing, Zumba, Ski-ing ect.*



# Exercise grows the brain

Has immediate effects it increases dopamine, norepinephrine and serotonin - it enhances focus for 2 hours

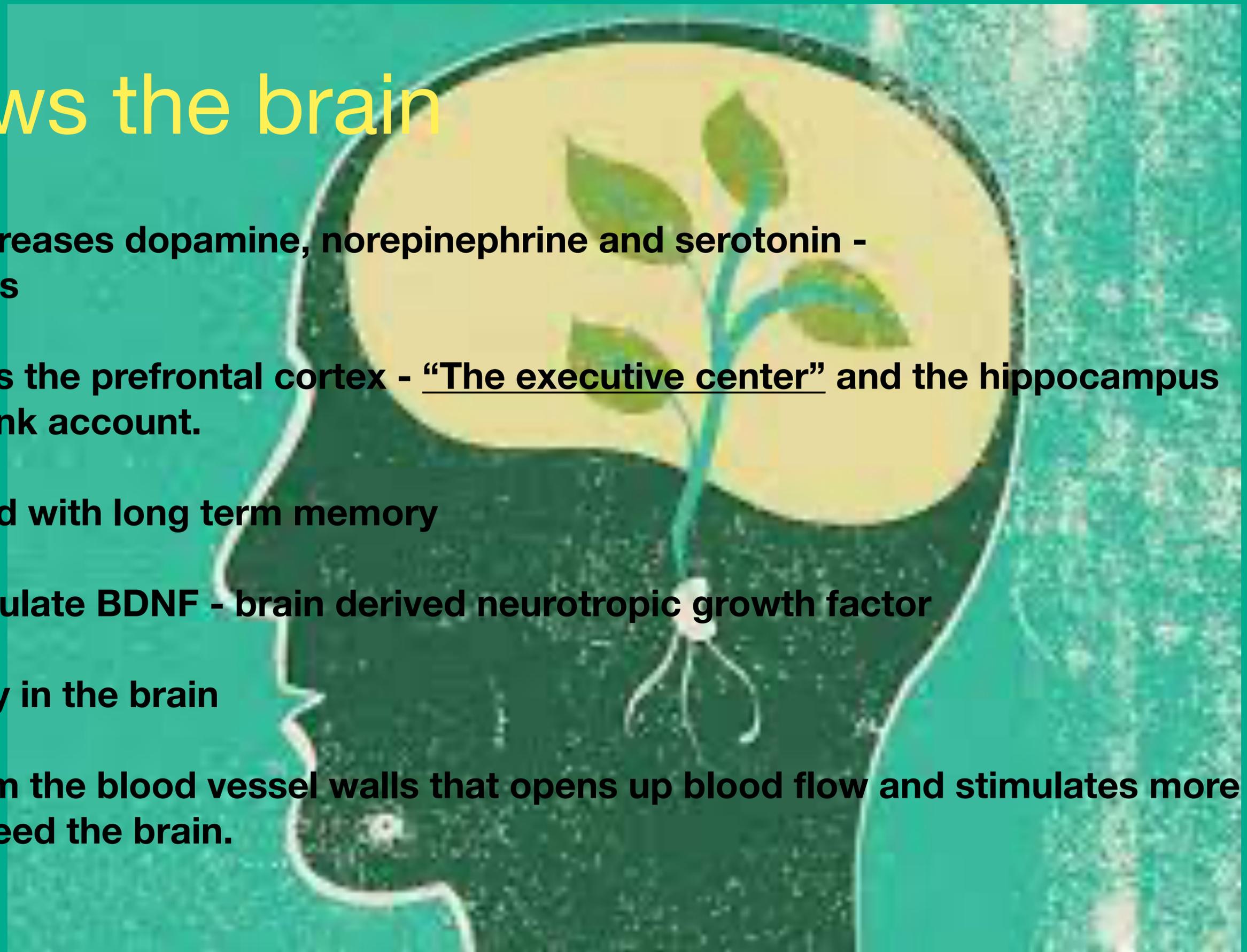
Long lasting effects it makes the prefrontal cortex - “The executive center” and the hippocampus bigger - you get a bigger bank account.

The hippocampus is involved with long term memory

When you exercise you stimulate BDNF - brain derived neurotropic growth factor

You get more neuroplasticity in the brain

You release Nitric Oxide from the blood vessel walls that opens up blood flow and stimulates more blood vessels to grow and feed the brain.



# BDNF

Miracle Grow for the Brain

Things that help BDNF

Intense exercise

Sauna

Foreign Travel

Socializing with others

Tennis, Racket Ball - complex sports

Learning entirely new things

Drinking Green Tea

Consuming Lion's Mane Mushroom

Turmeric - Curcumin

Brain  
Derived  
Neurotrophic  
Factor





## Sleep

### #1 Stressor for the brain - Lack of Sleep

During deep sleep the Glymphatic System of the brain  
The brain's lymphatic system - cleans out the metabolic waste  
In the brain - like a sanitation department taking out the trash.

Autophagy is the process of the body self-digesting old worn out  
senescent cells and cellular waste products.  
It is activated during fasting and time restricted eating

### Stages of Sleep:

1. Light Sleep - brain waves similar to the waking state
2. Deep Sleep - brain waves have long - burst brain waves called Delta waves -  
we convert the activities of the day before into our long term memory and personality
3. Delta Waves are a marker of biological youth.
4. REM - rapid eye movement - dreaming state

# Nitric Oxide Pathway



Is a cell signaling molecule created in the lining of the blood vessels and is a neurotransmitter that tells blood vessels to relax and open up.

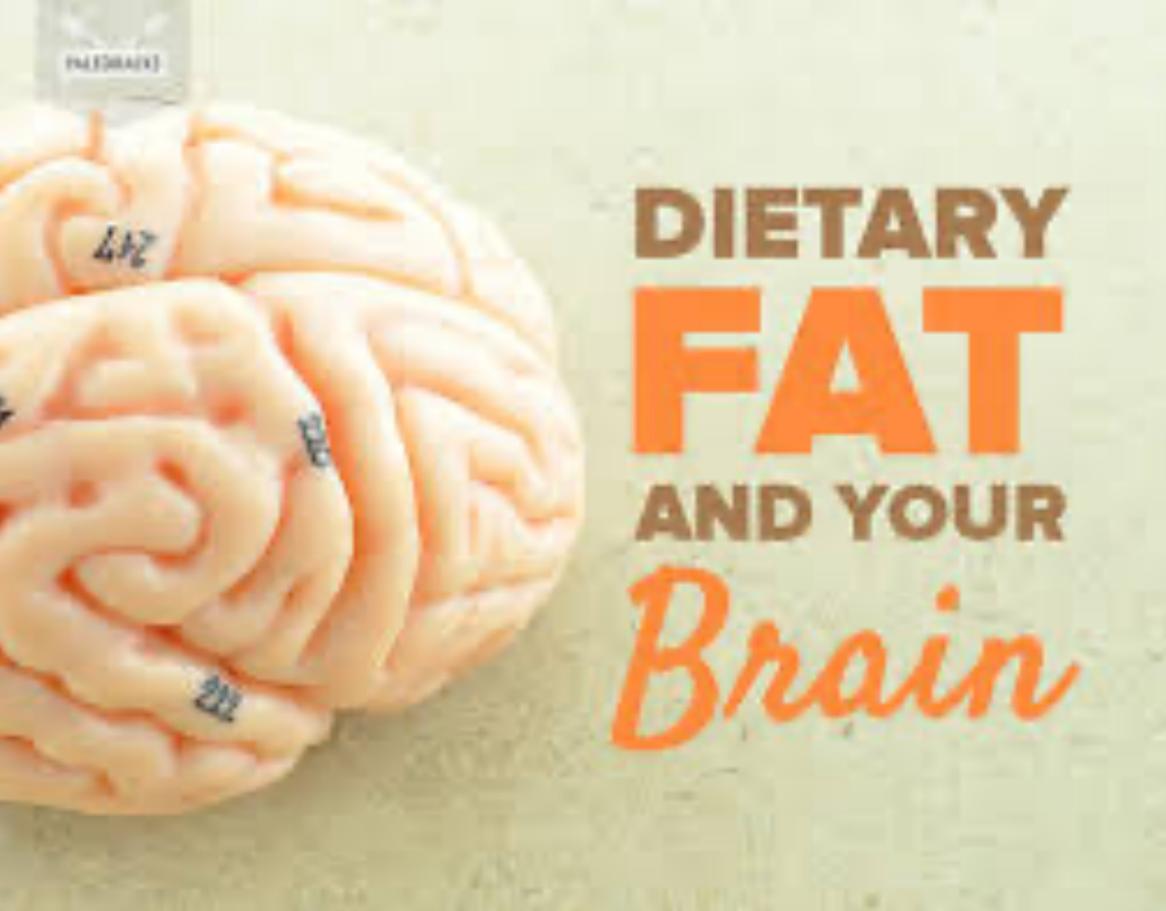
It increases blood flow to every tissue and organ in the body - including the brain

It naturally decreases after the age of 40

Nitrates found in certain vegetables when chewed well and mixed with saliva release nitrates which when stomach acid reacts with it to create Nitrite and then to Nitric Oxide

Bacteria in the mouth and stomach acid allow this conversion to happen  
Mouthwash kills the beneficial bacteria in the mouth - Mouthwash has been linked with hypertension. Acid blocking drugs also prevent Nitric Oxide from being created from Nitrates in foods.





**The ideal ratio of Omega 3 to Omega 6 fats  
The typical Western Diet are 1:16 to 1:30 Omega 3 to 6  
A 1:4 was associated with a 70% decrease in Cardiac Mortality**

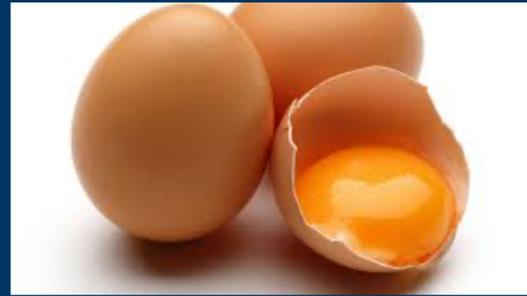
**Nix the 6 - eliminate whenever possible Corn Oil,  
Soybean Oil, Sunflower Oil, Safflower Oil, Canola Oil**

**Olive Oil, Avocado Oil, Coconut Oil, and Ghee are better**

**Eat Extra Virgin Olive Oil - check for quality  
lots of olive oils are adulterated with canola oil**

**Olive Oil can restore the function of the Blood Brain Barrier  
Auburn Univ. Study**





## Phospholipids - Structural Fats

Egg Yolks and Lecithin

Grass Fed Dairy Sardines Clams

Salmon Roe is the richest source

## Supplementing Fish Oils

Triglyceride Form vs Ethyl Ester Form



MCT's from Coconut are a clean brain fuel

They supply Ketones directly to the brain

The brain uses ketones as an alternative fuel

In Alzheimers disease it can support brain function as an alternate energy pathway for the brain

# B-Vitamins and the brain

## Methylcobalamin B-12

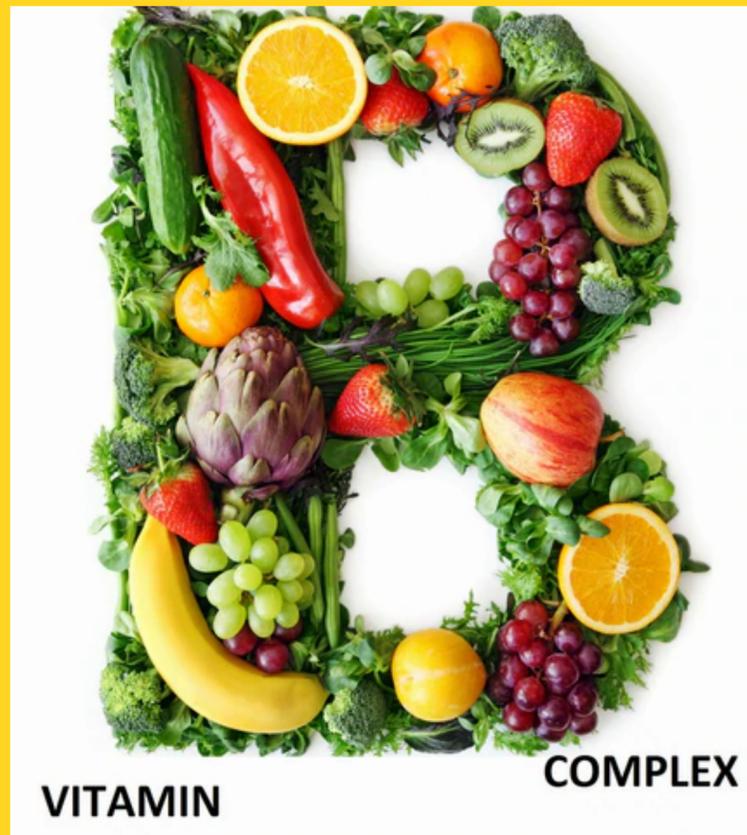
## Methyl - Folate

## B-6

**Supports Neurotransmitter synthesis**  
**Supports Energy Production**

**Lowers Homocysteine Levels**

**Supports Methylation a major pathway for detoxification and inflammation**



# Magnesium - the most important mineral for the Brain



As much as 50% of the population is deficient  
It is involved with **360** enzymatic reactions in the body  
Many of these are in the brain  
Magnesium restores brain plasticity -  
It supports age reversal in the brain

It converts - ALA the Omega - 3 fats found in plants  
such as Chia seed, Flax Seed, Hemp Seed, Walnuts  
Into EPA/DHA - It helps form DHA in the brain  
by working with the Delta-6 desaturase enzyme system



# More Facts about Magnesium:

It helps regulate the neurons, the synapses -the gaps between them and the structure of the neurons

It stabilizes the neurons to be protected from stressors

It helps with neural plasticity

It is involved with DNA repair

It is involved with ATP - the production of energy in the mitochondria



There is more Magnesium in the cerebral spinal fluid than in the blood plasma

It is calmative to the nervous system

Irritability, twitches, muscle spasms and cramp are all signs of a deficiency

Calcium contracts, Magnesium relaxes

Taken at bedtime it supports sleep

## Available forms of Magnesium

Oxide - cheapest form and the least bio-available

Citrate - better absorbed draws water into the colon and too much can be laxative

Amino Acid Chelate - proteins are bonded to magnesium for better absorption

Taurate - supports the heart and heart beat rhythm

Glycinate - easiest form for the body - generally won't have a laxative effect

Theronate - “Mag Brain” most expensive - developed by researchers at MIT uses an active transport to get it into the brain



# Zinc

Zinc is important for neuronal health

Is involved with many enzyme systems in the brain

Helps get heavy metals out of the brain

It helps process and release neurotransmitters

It supports memory function

It alleviates the symptoms of ADD

It protects brain health as we age

# Iron

Iron is a co-factor for neurotransmitters  
Dopamine in particular

It supports the energy production in the brain  
The Cytochromes

Involved with logical thinking - solving complex  
Problems such as math equations

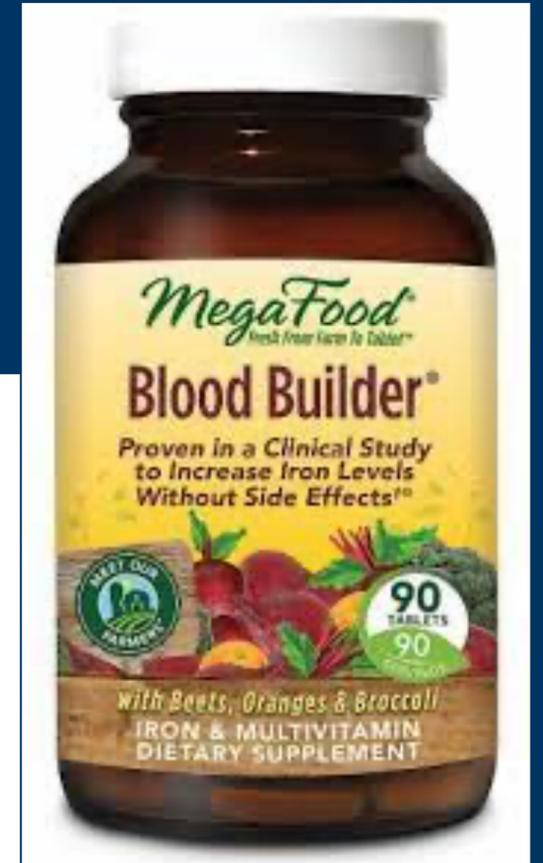
Transporting oxygen to the brain

Severe Insomnia  
can be caused by an Iron deficiency

**Iron - Bisglycinate** is easy to absorb  
Non-constipating



**Natura Food Grown Zinc**  
Better absorbed and easier on the stomach



# Probiotics and the Biome - Gut Health



## The Gut Brain Connection

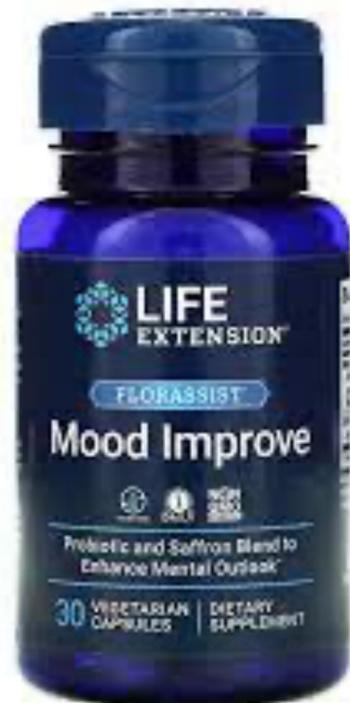
You have 100 trillion bacteria in the gut

The majority of your Serotonin is made in the gut

“Psycho-biotics”

Massive Research is constantly discovering more about the biome

There is a biome in the brain



Lactobacillus Helveticus and Bifidobacterium Longum  
Have been found to allay anxiety and insomnia

Fermented foods, fibers, and polyphenols feed your gut bacteria

Read my Handout - Let's Get Cultured to learn all about diet and gut health

# Mediterranean diet



Nutrient Dense - Colorful Foods

The more variety of colors the better

Each color has different carotenes, flavonoids and polyphenols

They all have anti-inflammatory effect

Lowering inflammation is the key to brain and body

Longevity and disease prevention

Inflammation is the driver of brain decline as well as glucose “blood sugar” control.

Small Fish, loads of colorful vegetables, berries, whole fruits (no fruit juice except pomegranate).

Kiwi fruit is a superstar ! Gluten free whole grains in smaller quantities. Avoid hybridized wheat.

Ancient varieties are better - Kamut, Spelt, Einkorn. If you eat pasta try gluten free or Italian grown wheat,

Lots of fermented foods. Avoid Oats that are not organic - Glyphosate ie. Roundup is sprayed on Wheat and Corn before it is harvested - Glyphosate is an anti-biotic and will damage your gut biome. Avoid GMO soy and corn - heavily sprayed with Roundup.

Eat Organic whenever possible - the EWG - Environmental Working Group has a list of the “Dirty Dozen” and the “Clean 15” - worst and best vegetable and fruits to eat that are non-organic [www.EWG.org](http://www.EWG.org)



# Polyphenol Rich Foods

Are specific food for your biome  
 Anti-inflammatory  
 Anti-oxidant  
 Cell Protective

Cloves are the #1 richest polyphenol food, Coffee, Tea - Green and Oolong, Cacao - Chocolate, Peppermint and Spearmint, Flax Seed Meal, Rosemary, Sage, Oregano, Olive Oil, Black Elderberry, Blueberry, Black Currant, Capers, Black Olive, Hazel Nut, Pecans, Plums, Basil, Curry Powder, Roasted Soynuts, Strawberry, Raspberry, Ginger, Prune, Shallots, Apple Cider Vinegar, Pomegranate Juice, Cinnamon, Black Bean, Walnut, Organic Oats, Pear, Carrot, Broccoli, Asparagus, Purple Sweet Potato, Blue Potato and many more.....

Table 1 Polyphenol and antioxidant content in the 100 richest foods (mg per 100 g or mg per 100 ml)

From: Identification of the 100 richest dietary sources of polyphenols: an application of the Phenol-Explorer database

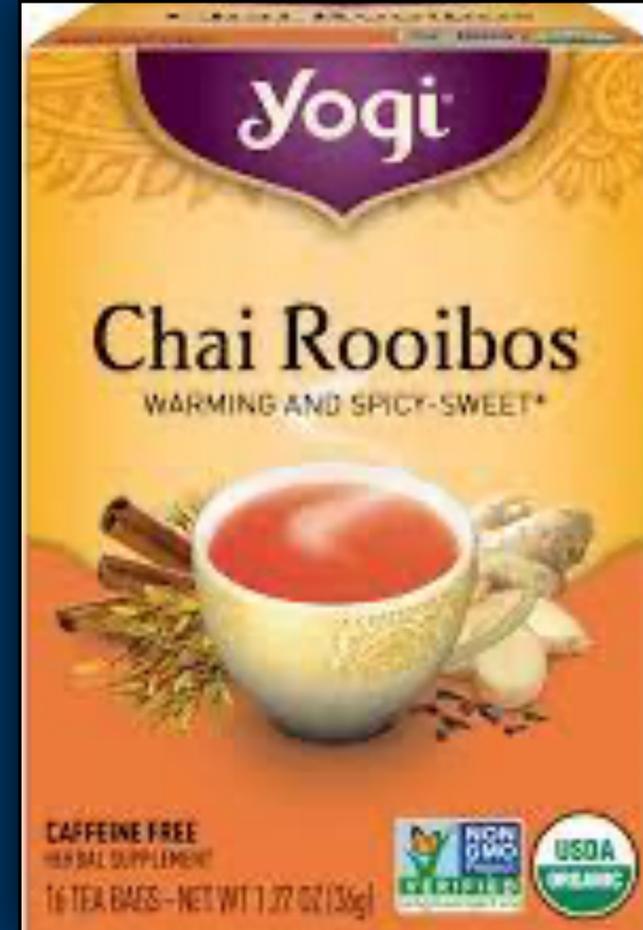
Food	Food group	Polyphenols <sup>a</sup>		Polyphenols AE <sup>a</sup>		Antioxidants <sup>b</sup>	
		Content	Rank	Content	Rank	Content	Rank
Cloves	Seasonings	15188	1	15188	1	16047	1
Peppermint, dried	Seasonings	11960	2	7920	2	980	26
Star anise	Seasonings	5460	3	5460	3	1810	16
Cocoa powder	Cocoa products	3448	4	3294	4	1104	24
Mexican oregano, dried	Seasonings	2319	5	2137	5	—	—
Celery seed	Seasonings	2094	6	1007	10	—	—
Black chokeberry	Fruits	1756	7	1432	7	1752	17
Dark chocolate	Cocoa products	1664	8	1618	6	1860	13



Chai Tea is a great example of a polyphenol rich beverage  
 Dark Chocolate 72% with Coffee !!!



# Non - Caffeinated Chai Tea's



Dark Chocolate  
The higher the % of cocoa  
The better !!



# Carotenes - Lutein and Zeaxanthin

## The Eyes are an extension of the Brain

Protects against Macular Degeneration  
Brain and cognitive protection too

### Foods Highest in Lutein and Zeaxanthin:

Spinach, Kale, Dark Green Leafy's  
Green Peas, Summer Squash, Pumpkin,  
Brussels sprouts, Broccoli, Asparagus,  
Romaine Lettuce, Carrots, Pistachios,  
Avocados



**University of Georgia study:** Students were given 12mg a day of Lutein - Zeaxanthin and it enhanced their visual processing speed Helping reaction time and executive function. .

**Fats help carotenes absorb better always use olive oil on your salad !**

# Mushrooms and the Brain

Humans are closer genetically to mushrooms - fungi than plants

Mushrooms contain an anti-oxidant compound called **Ergothioneine** - It shares the same metabolic pathway as Glutathione (the master anti-oxidant - regulator of detoxification in the body).

You cannot cook out the Ergothioneine

Mushrooms must be cooked completely to be digested

They have Chitin a compound that is part of crab shells

The mushrooms highest in Ergothioneine are  
Oyster, Shitake, Porcini, Lions Mane even Button Mushrooms  
Have it 5 medium button mushrooms have 4mg.

Mushrooms make Vitamin D2

Put them in sunlight for 30min



Mushrooms may prevent neurological diseases - Italians consume the most 4.6mg a day Americans the least 1.1mg a day on average.



# Lion's Mane Mushroom

*Hericium erinaceus*



Has the ability to stimulate the synthesis of Nerve Growth Factor (NGF)

Which may protect the nerves in the brain and body from deterioration associated with the aging process.

Rebuilds brain cells and connections BDNF

Enhanced mental clarity and recall in human studies with 50 - 80 year olds

Delicious when cooked - grows wild in our Coastal Georgia region

Available in supplement form also



# Choline - Acetyl-Choline

Helps with focus, learning and concentration.  
Acetyl-Choline is a neurotransmitter in the brain and nervous system

It is a conductor - amping it up and slowing it down  
Alzheimer's drugs are used on upping the availability of Choline  
Choline is the backbone of acetyl choline production

We need ideally about 550mg a day - Egg Yolks are one of the richest sources 1 egg yolk contains 150mg and is highly bioavailable. It's delivered in the body in the phospholipid form this way along with Lutein.  
Lecithin supplements - sold in granular form from either Non-GMO soy or Sunflower Lecithin

Supplement forms available:

Alpha - GPC 300mg - very bio-available form

Citi-Choline - Cognizin

PS - Phosphatidyl Serine

*Doctor's Best - Natural Brain Enhancers combines the 2 - Alpha GPC and PS*



# N-Acetyl Carnitine

Passes the BBB

Benefits Brain Neurons

Involved with cellular ATP

Helps the brain energy through

Mitochondrial efficiency

Supports synthesis of Acetyl-Choline

Supports Nerve Growth Factor



# Creatine



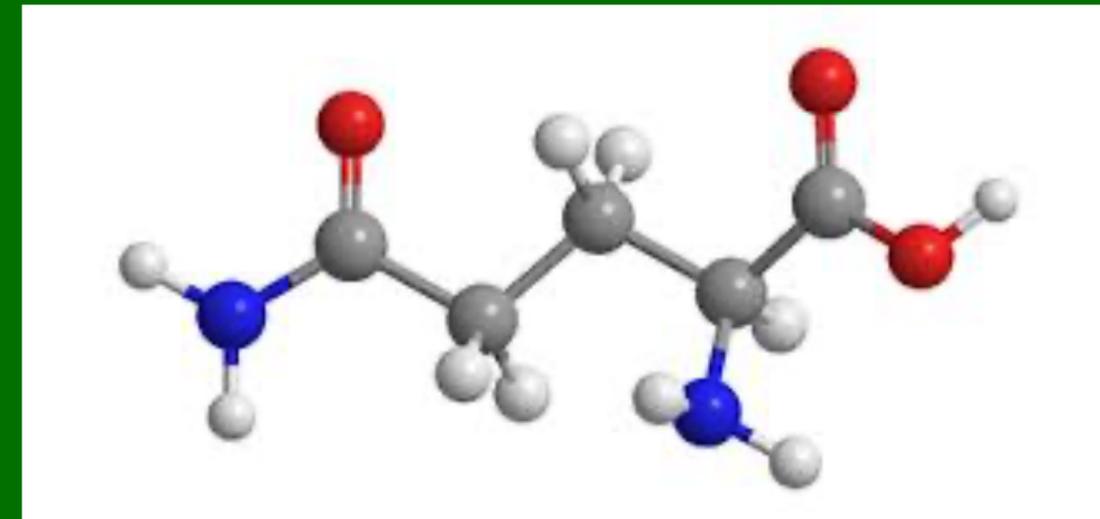
Traditionally used for athletic performance  
It can be used as a fuel source for the brain

Emerging scientific literature  
Supports its use in mood regulation and motivation  
and depression

Evidence is showing that it increased cognitive functioning  
1 rounded tsp a day of the powder = 5 grams

# Glutamine

It can offset sugar and alcohol cravings  
It may act as a source of energy for the brain  
It helps with altitude and oxygen deprivation  
Supports the healing of the gut lining



# Turmeric - Curcumin

“The King of Spices “



Long used in traditional Indian Cooking  
Research has exploded in the last 20 years in its role as an  
Anti-inflammatory botanical - it has become one of the most popular herbs  
used today for pain and inflammation. It down - regulates numerous  
Inflammatory pathways - NF-Kappa Beta, Cox-2, LOX-5 and more...



In brain health - Curcumin modulates the release of neurotransmitters,  
including **Brain Derived Neurotrophic Factor - BDNF**  
It is used for Neuro-Inflammation, anti-oxidant, anti-depressant.



**Longvida** - a form of turmeric that is in a phospholipid form -  
when it's released in the gut as free Curcumin it readily passes the BBB  
- Blood Brain Barrier

**This enhances its 1/2 life from 1 hour to 7 hours  
acting like a timed release form**

In studies it helped working memory, learning, focus and attention  
Using only 1 to 2 capsules a day for 30 days



# Huperzine A

Derived from Chinese Clubmoss it has been used for Centuries in Chinese Medicine

It increases nerve growth factor production  
Promotes brain cell recovery  
Enhances antioxidant systems in the brain such as Glutathione

It inhibits the breakdown of the neurotransmitter acetylcholine (ACH)  
A deficiency is one of the hallmark features of Alzheimer's Disease as well as poor memory and concentration

It's able to cross the BBB efficiently  
And goes to the hippocampus and frontal cortex of the brain



Doses in clinical studies: 200 - 400mg  
2x a day

# Ginkgo Biloba & Bacopa Monniera



# Bacopa

Used in Ayurvedic Medicine for Centuries

Rich in steroidal saponins called Bacosine A and B

It modulates stress hormones released by the brain

It stimulates GABA and Choline

It has a calming effect on the brain as well as

Increasing one's ability to concentrate and retain information

Improves memory performance in older persons

Used by students for better focus and performance on exams



# Rosemary

&

# Spearmint





# Rosemary

“Herb of Remembrance”



Possess some of the most powerful antioxidant activities of any plant studied  
Caffeic acid , Ursolic acid, Carnosic acid and rosmarinic acid - phenolics  
Carnisol works 3x as it gets used it recharges itself to work again and again.

Increases the flow of blood to the head  
It stimulates the brain and heightens concentration

Neuroprotective works even better when combined with Bacopa increases BDNF

# Spearmint



Super high in polyphenols

Boosts mental focus, attention and concentration

Spearmint polyphenols may promote neurogenesis

While protecting existing neurons and boosting neurotransmitter levels

Like Huperzine A phenolics in spearmint inhibit acetylcholinesterase

The enzyme that breaks down acetylcholine



# Saffron

24 randomized controlled trials - for depression  
Rather than being anti-sexual - it is a pro sexual.

Modulation of serotonin, neuro-hormonal, anti-inflammatory,  
Oxidative stress protective.



Rich in Carotenoids it is a  
potent cell oxygenator

Blood pressure lowering effects  
Artery cleansing effects - dissolving  
Plaque

