Your Best Brain:

Ten Great Ways To Change Your Brain for the Better

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Physical Methods
Key Physical Interventions for the Brain

- Provide a complete array of nutrients.
- Get the gut right.
- Optimize serotonin.
- Increase GABA/glutamic acid ratio.
- Enhance excitatory neurotransmitters.
- Increase glutathione.
- Get hormones right.
Provide a Complete Array of Nutrients
Perspectives on Natural Methods

Potential benefits:
- Often highly effective
- Minimal side effects (pure molecules that the body knows how to metabolize)
- Readily available

But use wisely:
- Gather information.
- Don’t do on your own with psychototropic meds.
- Start with low doses.
- If something does not feel good, stop.
- Make sure other co-factors are adequate (e.g., B-6, iron).
- Consider further testing (e.g., amino acids).
Key Functions of Nutrients

- Build tissue
- Act as substrate for metabolic processes
- Act as co-factors for enzymes that facilitate metabolic steps
- Act as anti-oxidants
Patient: “What do you think about the blood type diet?”

Jan: “I love it. But I don’t think it matters what type you pick.”
Nutrients from Food - 1

- **Protein:**
  - 3 servings a day, the size of the palm of your hand
  - Animal protein: well absorbed, hypoallergenic
  - Nuts and seeds
  - Protein powder
  - Vegetarians: consider an amino acid supplement

- **Vegetables and fruits:**
  - Vegetables: at least several cups a day
  - Primary source of carbohydrates
  - Fruit: eat whole fruit; be mindful of sugar content
Nutrients from Food - 2

- Grains:
  - Not so much -- very high in carbohydrate
  - Least bad: whole grain in kernals, not made into flour
  - Gluten-free (gluten = wheat, oats, rye, barley, spelt, kamut)

- Oils:
  - Primary oil is olive
  - No trans-fats
  - Be mindful of saturated fats
Dairy:
- Try to eliminate cow dairy -- a major allergen
- Goat and sheep products are best
- Substitute with almond milk, coconut milk, etc.

Go paleolithic!
- Eat like the hunter-gatherers did -- that is your evolutionary heritage.
- Animal protein, vegetables, fruit, eggs, nuts, healthy oils.
Eat No Sugar and little refined flour . . .

If you must, eat as little sugar as possible.

- The average American eats 158 lbs per year.
- Sugar raises and dysregulates blood sugar.
- Sugar raises insulin and puts you on the road to diabetes.
- High insulin is inflammatory.
- Increased risk of Alzheimer’s disease, Parkinson’s and depression with diabetes
- Decreases cognitive performance
Nutrients From Food - Review

For Brain Health:

Decrease carbohydrates

Increase healthy oils

Increase vegetables

Increase protein
Supplement B-Vitamins

- Start with a good multi-vitamin/mineral supplement, with high B-vitamins (10x DVs for B’s and 800 mcg folic acid, ideally as 5-methyl-tetrahydrofolate)

- Folate, B-12, and B-6 cut brain shrinkage in half in older mildly cognitively impaired adults with high homocysteine. Take B-12 under the tongue.

- Low folate predisposes people to depression.

- Folic acid + SSRI almost doubles success rate over SSRI alone.
Supplement Minerals

- The multi should have the DV or more of zinc, copper, selenium, manganese, molybdenum, chromium, iodine.

- Typically add calcium and magnesium:
  - At least 400 mg. magnesium.
  - Women should consume at least 1000 mg. calcium.

- Iron:
  - A critical brain nutrient, but toxic if you get too much
  - Carnivorous men usually shouldn’t add iron.
  - Menstruating women usually do need iron.
  - It’s best to test for iron with an iron panel or serum ferritin. A blood count helps, but can miss low iron.
  - If you have fatigue and/or depression, test.
Supplement Essential Fatty Acids

- Much DHA (decosahexaenoic acid) in the brain

- DHA & EPA (ecosipentanoic acid) are important regulators of inflammation.

- EPA & DHA negatively correlate with depression (DHA has more data)


- May be preventive for Parkinson’s and Alzheimer’s.

- Fish oil: 500 mg. each of EPA and DHA
Supplement Essential Fatty Acids

- Vegetarians can get DHA from algae source.

- Very little value in EPA and DHA from flax oil, but if you are a devoted vegetarian, use an algae form of DHA plus flax oil.

- Use 1 tablespoon a day of flax oil (forget the capsules).

- If you are not a totally committed vegetarian, take fish oil.
Supplement Vitamin D

- Co-factor in synthesis of serotonin, dopamine, and norepinephrine
- Low levels of D are implicated in depression.
- Major support for the immune system
- May be helpful in preventing dementia and Parkinson’s disease
- Made in the skin from unprotected sunlight
- Get 10 - 15 minutes sun mid-day; do not burn.
- Goal for D: 50 - 60 ng./ml. The correct test is “25-OH-vitamin D.”
- If you cannot test, try 2000 I.U./day.
About Supplements

Most supplements are available at health food stores.


If you want to check the formulas of vitamin, mineral, or amino acid products at health food stores, etc., you can compare them to products on my website.

For comparisons, look on my site at the Twice Daily Multi, and BAM or All Basic Plus amino acid mixes.
Get the Gut Right
The GI Tract and the Brain

- The road to health is paved with good intestines.
  - Our gastrointestinal (GI) tract has a huge effect on our brain.
  - We can have a huge effect on our GI tract.
  - Key issues: cytokines, malabsorption, dysbiosis

- GI tract effects on the brain via the immune system:
  - 60 - 70% of the immune system is in the GI tract.
  - When the GI tract is inflamed, it sends messengers called cytokines throughout the body - including the brain - causing inflammation and trouble.
  - By activating a particular enzyme, cytokines deplete the brain of serotonin.
  - Cytokines stimulate hypothalamic-pituitary stress pathway, resulting in higher stress hormones, including cortisol.
GI Malabsorption

- When the intestines are inflamed, malabsorption of nutrients occurs.

- Malabsorption decreases amino acids, iron, folic acid, and fats. (And probably all nutrients).

- We need these nutrients for brain health.
Increase Beneficial Microflora - 1

- There are trillions of bacteria in the intestines.
  - Beneficial bacteria protect intestinal walls, help build vitamins, and decrease inflammation and bad microbes.
  - Pathogenic bacteria cause inflammation.

- Increase beneficial bacteria:
  - Eat a low sugar, low refined flour, high fiber diet.
    - Bad bugs like sugar; good bugs like fiber.
    - Some people don’t tolerate fiber.
  - Supplement probiotics:
    - Lactobacillus GG (Culturelle)
    - Saccharomyces boulardii (Florastor)
    - Biﬁfido-biﬁﬁdus (particularly for kids)
    - Lactobacillus paracasei, casei, plantarum, rhamnosus, and salivarius
Increase Beneficial Microflora - 2

- Dosing multi-strain probiotics
  - Must sustain treatment: probiotics bloom then leave within two weeks
  - 5 billion CFUs (colony forming units) per day for ongoing healthy GI support
  - 25-50 billion CFUs for GI repair
  - 450 billion - 3.6 trillion CFUs: ulcerative colitis (VSL #3)

- Make your own yogurt or kefir
  - Dairy-free recipes using coconut milk are on-line.
  - Add your own probiotics.
  - Most supermarket brands have no active probiotics.
Decrease Pathogenic Microbes

- Get rid of bad bugs: parasites, yeast overgrowth, and bacterial overgrowth.

- Decrease sugar and starch.

- You may need to test to identify pathogens. A comprehensive stool test is offered by integrative practitioners.

- Treat microbes as appropriate. If possible use natural products. Parasites usually require prescription medication, and perhaps a long treatment.
Eliminate Food Allergens

- Food allergens cause inflammation and reactivity all over the body.
  - No down side, except giving up your favorite foods
  - Dramatic effects on mood and energy
  - Particularly noticeable in children

- The worst offenders are gluten and dairy, then soy.
  - Gluten: wheat, oats, rye, barley, spelt, kamut
  - Dairy: cow is usually worse than goat and sheep.

- Test:
  - Try a couple weeks off.
  - Or you can do an IgG antibody test (through integrative practitioners).
Optimize Serotonin
Working with Neurotransmitters

- Two core functions of neurotransmitters:
  - Calming down - Inhibitory
  - Energizing up - Excitatory

- You can supplement neurotransmitters or their co-factors - in a context of overall health.

- Individual differences:
  - More benefit from inhibitory neurotransmitters
Inhibitory and Excitatory Neurotransmitters

- **Inhibitory:**
  - Serotonin
  - GABA

- **Excitatory:**
  - Norepinephrine
  - Dopamine
  - Acetylcholine
  - Glutamic acid (glutamate)
A Neuron
A SYNAPSE

- Presynaptic membrane
  neurotransmitter released by exocytosis

- Axon Terminal

- Mitochondrion
  produce ATP

- Synaptic vesicles
  contain neurotransmitter

- Synaptic Cleft

- Postsynaptic membrane
  has receptors for neurotransmitters

- Dendrite of second neuron
Serotonin Effects

- Serotonin is the key neurotransmitter for “happy and relaxed.”

- Serotonin is a neuro-modulator of GABA that increases its effects, and also helps decrease overactive norepinephrine, dopamine, adrenaline, and cortisol.

- Major effect on depression and anxiety
Serotonin Production and Supplementation

- Tryptophan (with iron) -> 5-hydroxytryptophan (5-HTP) (with B-6 [P-5-P]) -> serotonin
  l----> melatonin

- Options for increasing serotonin:
  - 5-HTP, 50 - 200 mg./day; empty morning stomach
  - Tryptophan: 500 - 1500 mg./day; before bed (great for sleep)

- Stop if it doesn’t feel good.
Seroitonin and “Prozac Poop-Out”

- Serotonin is eliminated from the synapse through re-uptake, which SSRI’s prevent, or through degradation by monoamine oxidase (MAO).

- A theory: when the uptake of serotonin is inhibited, it leaves more serotonin available for breakdown by MAO. This could increase MAO action over time, thus depleting available serotonin.

- Possibly: add a little (50 mg.) 5-HTP. Be very careful -- if it feels at all wrong, stop.
St. John’s Wort

- Neurochemistry:
  - Many pathways of action due to molecular complexity
  - Uptake inhibitor of serotonin and probably dopamine and norepinephrine; mild MAO inhibitor
  - If the drug companies could make this, they would!

- Dosing: 300 mg. 3 times per day

- Concerns about decreasing the effectiveness of other medications:
  - Do not use with protease inhibitors for HIV.
  - Unproven concern with birth control pills, but be mindful
Increase GABA/Glutamic Acid Ratio
GABA and Glutamic Acid: Overview

- GABA and glutamic acid (GA) have a dance in the brain. GABA is Yin (inhibitory) and Glutamic Acid is Yang (excitatory).

- Too much GA feels like a monosodium glutamate (MSG) overdose.

- High GA and/or low GABA are associated with:
  - Anxiety, depression, bipolar disorder
  - Migraines, seizures
  - Parkinson’s disease
  - Schizophrenia
Supplement Magnesium

- Supplementing magnesium increases GABA.

- Studies on migraines, seizures, and preeclampsia found magnesium to be effective.

- Take 400 - 1000 mg. magnesium.
  - Magnesium citrate will likely be a laxative.
  - Magnesium glycinate is not usually a laxative.
Supplement Vitamin B-6

- Glutamic acid --> GABA
- Vitamin B-6 as Pyridoxal-5-Phosphate (P-5-P) is the key nutritional co-factor that shifts the balance in the direction of GABA.
- Take 50 mg./day of P-5-P on an empty stomach.
- Many don’t make P-5-P from pyridoxine effectively.
- Often deficient in women on birth control pills
Supplement Taurine

- Taurine binds to GABA receptors, thus stimulating GABA-like activity.

- It stimulates enzymes that make GABA, and inhibits enzymes that break it down.

- It’s typically a benign amino acid, also depleted during breastfeeding.

- Consider 1000 mg./day (maybe more).
Supplement Melatonin

- Melatonin blocks the main glutamate receptor.

- Get good sleep. Take the time. Sleep is perhaps the most restorative activity for the brain.

- For sleep, use 1 - 3 mg. melatonin before bed, or a smaller amount for middle-of-the-night waking. Try sublingual preparations.

- Melatonin Zn Se distributes melatonin throughout the night.
Supplement Theanine

- Theanine is an amino acid found in green tea and added to soft drinks in Japan (!).

- It is “antagonistic” to glutamic acid.

- Consider 100 - 200 mg./day.
Supplement GABA

- Theoretically, GABA does not cross the blood-brain barrier, but many people do report a calming effect.

- Possibly there is a “leaky brain syndrome” allowing GABA to get through.

- Several studies show efficacy of GABA with anxiety.

- Consider 500 - 1500 mg./day on an empty stomach.
Supplement Progesterone

- For women only . . .

- Progesterone stimulates GABA receptors, triggering a GABA-like effect.

- Approaching menopause, progesterone decreases before estrogen does, so supplementing progesterone may be helpful.

- Consider Pro-Gest cream, during the second half of your cycle.
Possible Daily Supplements for Enhancing GABA/Glutamic Acid Ratio

- Magnesium: 400 - 1000 mg. citrate (lax.) or glycinate (non-lax.)
- Vitamin B6 as P-5-P: 50 mg. on an empty stomach
- Taurine: 1000 mg. (or more) on an empty stomach (in a.m.)
- Melatonin 1-3 mg.
- Theanine: 100 – 200 mg.
- GABA: 250 - 750 mg.
- Progesterone cream (women only)
- Tryptophan or 5-HTP to enhance serotonin --> modulates GABA
Enhance Excitatory Neurotransmitters
Enhance Dopamine, Norepinephrine

- Increase dopamine and norepinephrine, which support attention, energy, and mood.

- Phenylalanine (with iron) -> tyrosine (with P-5-P) -> dopamine -> norepinephrine

- Tyrosine also builds thyroid hormone.

- On a foundation of good serotonin, supplement:
  - 500-1000 mg./day of L-Phenylalanine or L-Tyrosine
    (empty stomach in the morning)
  - 50 mg./day of P-5-P (empty stomach in the morning)
  - Supplement iron as indicated by testing.
Enhance Acetylcholine - 1

- Phosphatidylserine:
  - A structural component of a neuron’s membrane
  - Enhances acetylcholine release
  - Calms stress pathways in the brain, reducing cortisol
  - Many studies show decreased cognitive decline with aging
  - 100 - 300 mg./day
Enhance Acetylcholine - 2

- Alpha GPC (glycerylphosphorylcholine) stimulates manufacture of new acetylcholine by providing a supply of choline for neurons.

- Stimulates release of GABA

- Benefits shown for memory, stroke, Alzheimer’s, and vascular dementia

- Try 300 - 600 mg. (by prescription in Europe)
Huperzine A is extracted from Chinese club moss. It helps prevent breakdown of acetylcholine.

Some studies have shown effectiveness with Alzheimer’s disease; one study showed improved memory in adolescents.

50 - 200 mg./day. Start slow. Although studies say no side effects, I have seen them.
Broad Neurotransmitter Increase

- When fatigue is an issue, even chronic fatigue, a complete amino acid blend can be very useful.
  - Taken on an empty stomach, it temporarily but strongly boosts amino acids levels.
  - The theory is that it primes the pump and gets the body and brain going.

- Use a free amino acid balanced blend.
  - Take on an empty stomach, 30 minutes before food in the morning.
  - 3 - 10 grams
  - Can modify with amino acid testing (from integrative practitioners).
  - Make sure vitamin and mineral co-factors are present.
Increase glutathione, perhaps the most important anti-oxidant in the brain.
- Lipoic acid: 100 - 600 mg. per day.
  - Consider R-Lipoic form.
  - Consider time-release lipoic acid.

- NAC (N-Acetyl-Cysteine)
  - Most important building block of glutathione
  - May benefit the GABA/Glutamic Acid ratio
  - May be hard to tolerate on the digestive system
  - Try 500 - 2000 mg. per day on an empty stomach.

- Oral glutathione is not well absorbed.
Bonus #7: Hormones

- Check thyroid if fatigue is a factor.
  - TSH should ideally be under 2.00, but certainly under 3.00.

- Estrogen does many good things for the brain:
  - Improves mood
  - Supports memory
  - Helps prevent dementia

- Menopausal women should test estrogen levels and consider supplementation.
  - Always bioidentical
  - Always transdermal -- patch, cream, or spray
Bonus #7: Hormones

- Various studies of bio-identical estradiol showed a decreased risk of dementia of 20% - 40%. (Hathaway review in Townsend Letter, 2012.)

- 2014 Stanford imaging study showed that bio-idential estradiol -- not Premarin -- protected areas of the brain that decline with approaching Alzheimers Disease.

- WHI study found that Prempro -- Premarin with Provera -- increased breast cancer, but that Premarin alone actually decreased it (although not statistically significant).
Mental Methods
Neurons that fire together,
wire together.
Key Mental Interventions for the Brain

- Be on your own side.
- Be mindful.
- Take in the good.
- Rest in love.
- Come home to happiness.
Be on Your Own Side
The good life, as I conceive it, is a happy life. I do not mean that if you are good you will be happy; I mean that if you are happy you will be good.

Bertrand Russell
Self-Compassion

- Compassion is the warmhearted wish that a being not suffer.

- Self-compassion applies this wish to oneself.

- It increases resilience and self-worth.

- To strengthen it:
  - Get the sense of being cared about.
  - Bring to mind others you feel compassion for.
  - Shift the compassion to yourself.
“Anthem”

Ring the bells that still can ring
Forget your perfect offering
There is a crack in everything
That’s how the light gets in
That’s how the light gets in

Leonard Cohen
Be Mindful
The education of attention
would be the education
par excellence

William James
Self-Focused (blue) and Open Awareness (red) Conditions (following 8 weeks of MT)

Staying Present in the Present

- Finding a simple object of attention such as the sensations of breathing

- Allowing thoughts and feelings to come and go while disengaging from them.

- Relaxing . . . Staying present . . . Perhaps finding some warm feelings for yourself and others

- Finding the simplicity in be-ing
Take in the Good
INNER STRENGTHS ARE BUILT FROM BRAIN STRUCTURE
The Neuropsychology of Learning

Learning – changing neural structure and function – proceeds in two stages:

From state to trait

From activation to installation

From short-term memory buffers to long-term storage
You become more compassionate
by repeatedly installing experiences of compassion.

You become more grateful
by repeatedly installing experiences of gratitude.

You become more mindful
by repeatedly installing experiences of mindfulness.
We’re good at activation but bad at installation.

This is the fundamental weakness in most patient education, human resources training, psychotherapy, coaching, and mindfulness training.
Velcro for Bad, Teflon for Good

The negativity bias

bad experiences

good experiences
The Negativity Bias
Stone age brains in the 21st century
Learning to Take in the Good
Have a Good Experience
Enrich It
Absorb It
Link Positive and Negative Material
HEAL by Taking in the Good

1. **Have** a beneficial experience.

2. **Enrich** it.

3. **Absorb** it.

4. **Link** beneficial and painful material. [optional]
Have It, Enjoy It
Growing Gratitude

- Think of things you feel grateful for . . . Let this become a feeling of gratitude.

- Stay with this experience . . . Open to it.

- Imagine or sense that gratitude is sinking into you . . . As you sink into it.
Think not lightly of good, saying, “It will not come to me.”

Drop by drop is the water pot filled.

Likewise, the wise one, gathering it little by little, fills oneself with good.

Dhammapada 9.122
Rest in Love
The Social Brain

- Social capabilities have been a primary driver of brain evolution.

- Reptiles and fish avoid and approach. Mammals and birds *attach* as well - especially primates and humans.

- Mammals and birds have bigger brains than reptiles and fish.

- The more social the primate species, the bigger the cortex.

- Since the first hominids began making tools ~ 2.5 million years ago, the brain has roughly tripled in size, much of its build-out devoted to social functions (e.g., cooperative planning, empathy, language). The growing brain needed a longer childhood, which required greater pair bonding and band cohesion.
If we could read the secret history of our enemies, we should find in each [person’s] life sorrow and suffering enough to disarm any hostility.

Henry Wadsworth Longfellow
Compassion and Kindness

- We can strengthen the neural substrates of empathy, compassion, kindness, and love

- Good wishes: safety, health, happiness, ease

- All beings, “omitting none”
  - Benefactor
  - Friend
  - Neutral person
  - Oneself
  - Difficult person
Come Home to Happiness
The Evolving Brain

The Triune Brain - (P. MacLean 1990)
Our Three Fundamental Needs

- Safety
- Satisfaction
- Connection
Pet the Lizard
Feed the Mouse
Hug the Monkey
The Responsive Mode
The Reactive Mode

- Avoid
- Hatred
- Greed

- Ignorance
- Suffering
- Heartache
- Attach

- Approach
Choices . . .

Reactive Mode

Or?

Responsive Mode
Coming Home . . .

Peace

Contentment

Love
Thank you
Great Books

See www.RickHanson.net for other great books.


Key Papers - 2


- Hanson, R. 2008. Seven facts about the brain that incline the mind to joy. In *Measuring the immeasurable: The scientific case for spirituality*. Sounds True.
Key Papers - 3


