Nutritional Support for Optimal Brain Health, Part 1

Jeff Lavell, DC



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Dr. Lavell's recommendations for Standard Process product dosages are sometimes different than the dosages that appear on the product labels. Please refer to the product labels or to the product descriptions found in the product catalog or online at standard process.com for the Standard Process dosage recommendations.

Jeff Lavell, DC



Dr. Jeff Lavell holds a doctorate of chiropractic from Northwestern College of Chiropractic (now Northwestern Health Sciences University). He completed undergraduate studies at the University of Minnesota at Duluth and holds a bachelor's degree in human biology from Northwestern, where he is now an associate professor and instructor.

Dr. Lavell established Specific Family Chiropractic in Minnesota in 1998 and opened a satellite office in 2001 to meet growing demands of his patient base. Spinal Decompression of Minnesota soon followed. Although he has a true family practice, he has developed a unique approach combining chiropractic, massage, physical therapy, nutrition, and exercise to get people well as fast as possible following sports-related and other injuries. Nutrition is one of Dr. Lavell's true passions.

For many years, he assisted bodybuilders with conditioning. He is team chiropractor for the Minnesota Menagerie women's rugby team and for many athletes from the University of Minnesota men's rugby team.

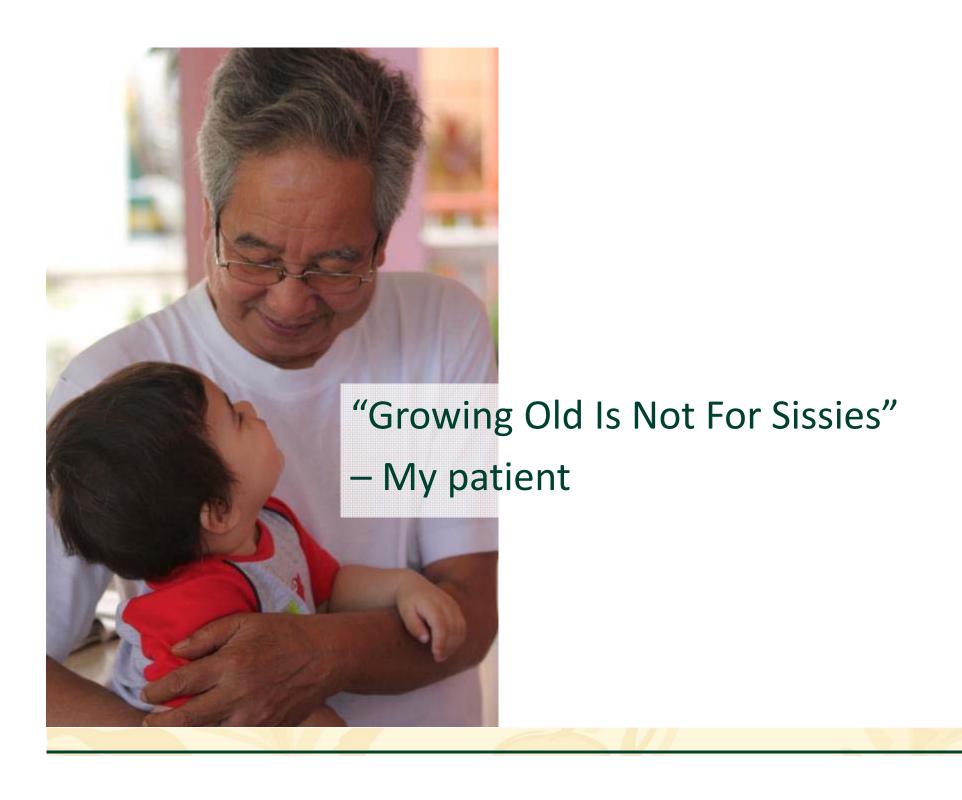




follow your HEART



but take your BRAIN with you



Outline of Our Topic & Discussion

- Physiological responses that clinicians often miss that support brain health.
- Standard Process® and MediHerb® products that help promote and optimize brain health.
- Key strategies for your practice to help promote brain health and help increase your ability to implement them.

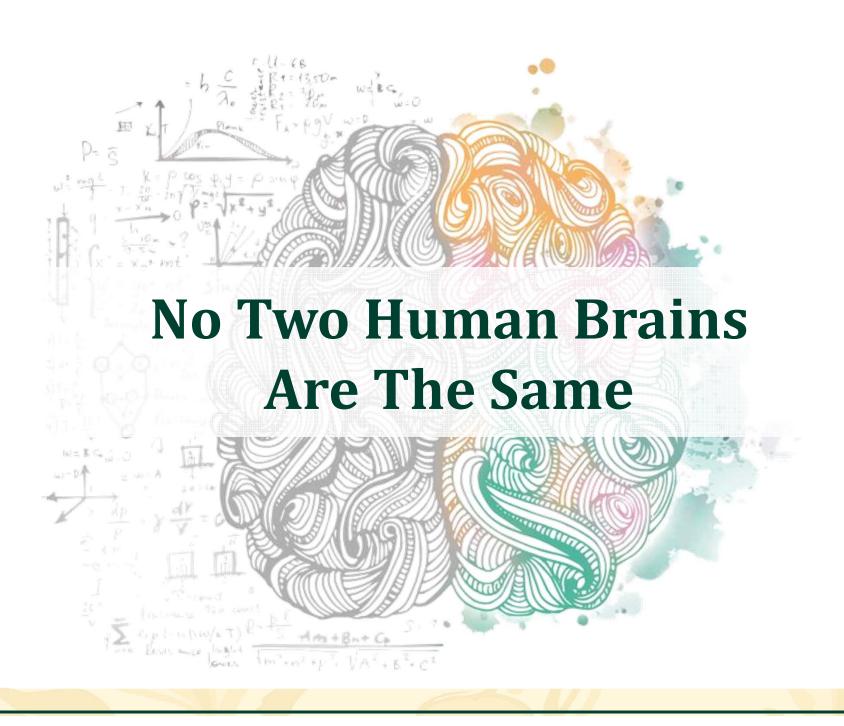
When Does Age Related Decline



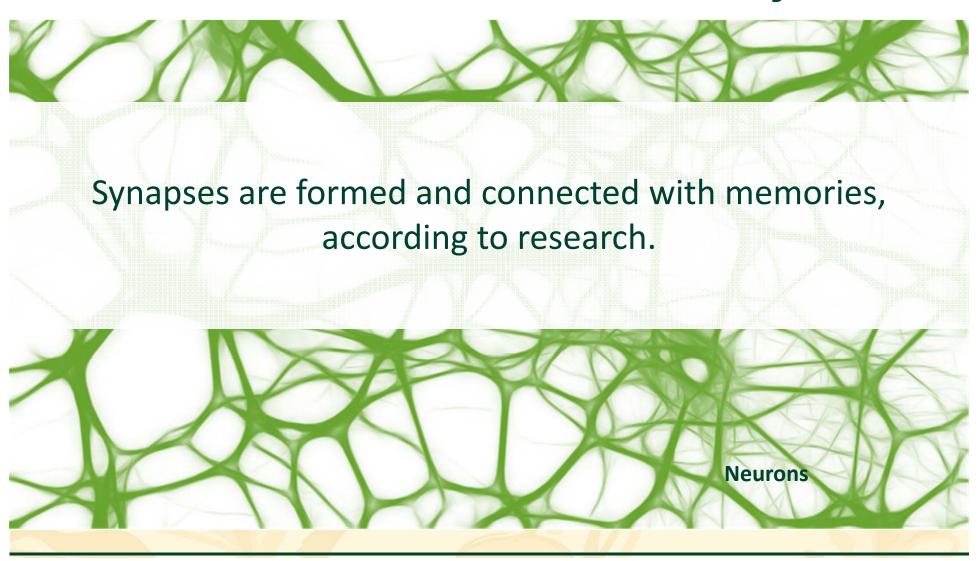
Brain FACToids

While your brain begins a slow downslope at 24, it continues to develop, change and become better.

- The average brain weighs 3 pounds.
- It is capable of performing 1,000 trillion calculations a second.
- 60 percent of your brain is fat.



New Connections Are Made Every Time You Make a Memory.



New Neurons Continue to Develop

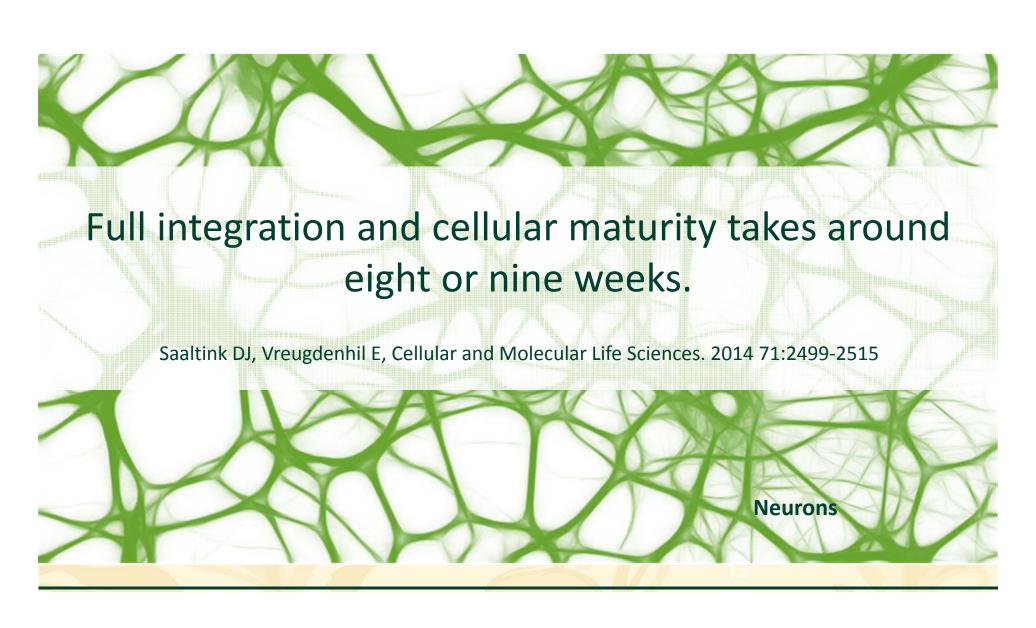
"Neurogenesis does not occur everywhere in the brain but is evident in the hippocampus and olfactory bulb and perhaps in the cerebral cortex. New neurons are born not from mature nerve cells but rather develop from neural stem cells that remain in our brains throughout life."

- Psychology Today, January 16, 2011

Also: Nat Med. 1998 Nov;4(11):1313-7. Neurogenesis in the adult human hippocampus. Eriksson et al.

Neurons

Adult Neurogenesis



Neurochemical Changes

Neuronal circuitry and brain plasticity:

- If you don't use it, you lose it.
- With disuse, the brain will devote less somatotopic space for it.
- One proposed mechanism for the observed age-related plasticity deficits in animals is the result of age-induced alterations in calcium regulation.

Kolb, B. & Whishaw, I. (1988). Brain plasticity and behaviour. Annu Rev Psychol, 49; 43-64 Barnes, C. & Burke, S. (2006). Neural plasticity in the ageing brain. Nature, 7; 30-40 Henkenius, A., Peterson, B., et al. (2003). Mapping cortical change across the human life span. Nature Neuroscience, 6(3); 309-315.



Natural Inflammatory Pathways



The Body's Natural Inflammatory Response

"Free radicals are thought to cause cellular degeneration through oxidation." 1

The body's inflammatory response adds to oxidative activity in the central nervous system. By middle age, there is an increase in the body's natural production of inflammatory proteins.

"Older brains react by producing still more cytokines than younger brains"²

Slide courtesy of Michael Greer, MD

References:

¹ Rosick, ER. Feb 2006. Life Extension Magazine.

²Chang RC, Chen W, Hudson P, et al. J Neurochem. 2001 Feb;76(4):1042-9.

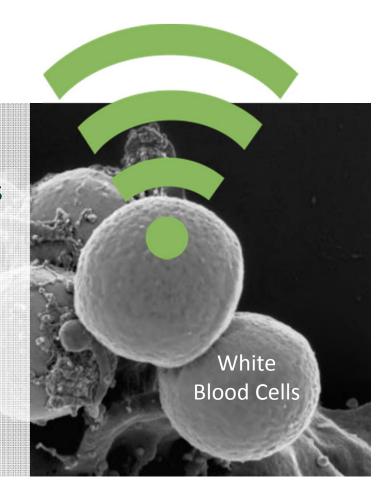


These substances need to be balanced to promote normal tissue response.



Cytokines

- Part of our immune response.
- The body has the ability to know it has been insulted and has cytokines that act as messengers to mount a natural response appropriate to the insult.
- Secreted primarily from leukocytes (white blood cells), cytokines regulate the hosts' response to challenges.



Slide courtesy of Michael Greer

Nietfeld A, et al. Cytokines and proteoglycans. In: Jolles P (ed.). Proteoglycans. Basel: Birkhäuser 1994; Elenkov IJ, Chrousos GP. Ann NYAcad Sd. 2002 Jun; 966:290-303

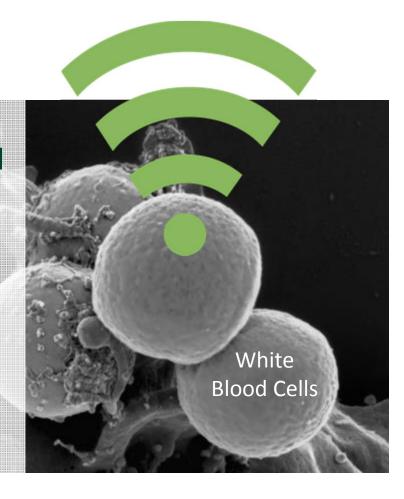
Cytokines

Cytokines are cellular growth factors that are synthesized by nearly every cell of the body

 Generally produced only in response to "stress"

Cytokines may be either:

- Pro-inflammatory
- Anti-inflammatory



Slide courtesy of Michael Greer, MD

Source: Elenkov IJ, Chrousos GP. Ann NYAcad Sd. 2002 Jun; 966:290-303

The Immune Balance: Cytokines and Interleukins

Cell-Mediated Immunity

Th1
IL-2
IL-8
IFNy
TNFa
IL-12
II-18

Humoral-Mediated Immunity

Th2
IL-4
IL-5
IL-6
IL-10
IL-13

Slide courtesy of Michael Greer

Natural Inflammatory Response Function and Mood

Evidence for immune system involvement in the pathophysiology of brain health is abundant. IL-1, IL-6 and TNF-alpha are all need to be balanced.

Metabolic and endocrine effects can be:

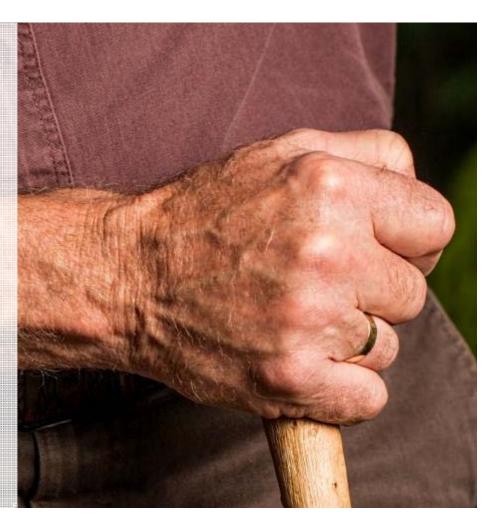
- HPA-axis stimulation
- Neurotransmitter metabolism
- Neuroendocrine function
- Neural plasticity

Slide courtesy of Lee Carroll, BSc, BHSc

Villanueva R 2013, Neural Plasticity, volume 2013, article ID 873278

Advanced Glycation End Products

- A prominent feature of aging is the modification of proteins by glucose and fructose (glycation)
- Glycated proteins undergo a series of reactions to become advanced glycation end (AGE) products



Slide courtesy of Lee Carroll, BSc, BHSc

Verzijl N, etal. Current Opinion in Rheumatology, 2003; 15(5): 616 622

Advanced Glycation End (AGE)Products

- May have a negative impact on the health of both the body and the brain.
- Linked to oxidative cellular damage and pro-inflammatory interleukin cascades.



Takagi, M., et al. (1997), Advanced Glycation Endproducts Stimulate Interleukin-6 Production by Human Bone-Derived Cells. J Bone Miner Res, 12: 439–446

Brain Health Factors

- Blood flow
- Stress
- Sleep
- Exercise
- Natural toxin exposure*
- Nutrition status
- Gut health
- Brain use



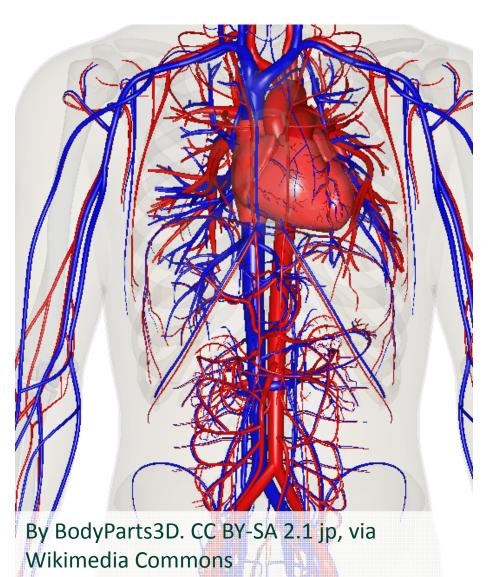
^{*}hormonal, environmental, and chemical

Brain Health Factors: Healthy

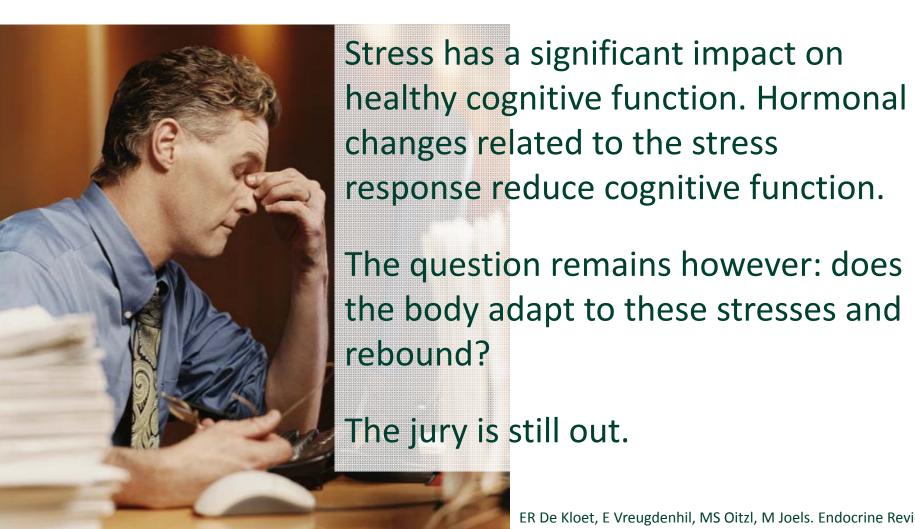
Blood Flow

 Research shows that healthy cardiovascular function is vital for the aging brain.

 Since brain needs high levels of oxygen (20% of your circulating levels) it's important to keep your CV system up and running at high levels.



Brain Health Factors: Stress



ER De Kloet, E Vreugdenhil, MS Oitzl, M Joels. Endocrine Reviews Vol 19, No 3 Endocrine reviews 19 (3), 269-301

Stress Hormones

Stress and adrenal hormones downregulate adult neurogenesis.¹

 Cortisol has been shown to modify the function of brain derived neurotrophic factor (BDNF).

 This can impact normal and necessary neurogenic functions.

1. Saaltink DJ, Vreugdenhil E, Cellular and Molecular Life Sciences. 2014 71:2499-2515





Stress hormones associated with the burden of stress protect the body in the short run and promote adaptation (allostasis), but in the long run, can impact brain function.



Proc Natl Acad Sci U S A. 2012 Oct 16;109 Suppl 2:17180-5. doi: 10.1073/pnas.1121254109. Epub 2012 Oct 8. Brain on stress... McEwen BS1

Brain Health Factors: Sleep



Brain Behav Immun. 2015 Feb 28. pii: S0889-1591(15)00065-3. doi: 10.1016/j.bbi.2015.02.023. [Epub ahead of print]

Brain Health Factors: Exercise

As mentioned before, blood flow is key to keeping a brain healthy by promoting optimal exchange of nutrients and waste products.

Exercise also has anti-aging and supportive effects throughout the whole body, especially the brain:

Increased endorphins

 Positive cytokines such as IL-2 and IL-4 production

Can increase resting TNF response



Rejuvenation Res. 2015 Feb;18(1):57-89. doi: 10.1089/rej.2014.1623.Exercise attenuates the major hallmarks of aging. Garatachea N et al.

Brain Health Factors: Exercise



Research has shown that brain derived growth factors (BDNF) can elevate with exercise. This elevation can be used to help to maintain and improve neurologic health.

Lee T Ferris, et al. The effect of acute exercise on serum brain-derived neurotrophic factor levels and cognitive function. Medicine & Science in Sports & Exercise 04/2007; 39(4):728-34.

Brain Health Factors: Natural Toxin Exposure

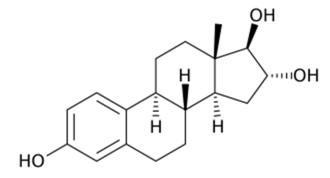
Toxin exposure can be from a number of sources:

- Hormonal
- Environmental
- Chemical



Brain Health Factors: Natural Hormonal Toxin Exposure

Research has clearly demonstrated a correlation to toxin exposure and metabolic effect on brain health.



Some examples include:

- Previously mentioned and referenced issue of high corticoids in the body and brain.
- Effects of other hormones on the body, such as artificial estrogens and the effects it has on thyroid function, male hormonal patterns and metabolic hormones such as ghrelin.

Wise A, O'Brien K, Woodruff T. Critical review: are oral contraceptives a significant contributor to the estrogenicity of drinking water?. Environ Sci Tech. 2011;1:51–60

Brain Health Factors: Environmental/Chemical Toxin Exposure

Environmental exposure of toxins is probably our largest source.

- Since World War II approximately 87,000-100,000 man- made chemicals (depending upon source) have been introduced into environment. Most have no toxicity data available.
- Virtually no one knows for certain how these chemicals interact when combined!
- Numerous conditions related to brain health have correlation to environmental and chemical toxin exposure.



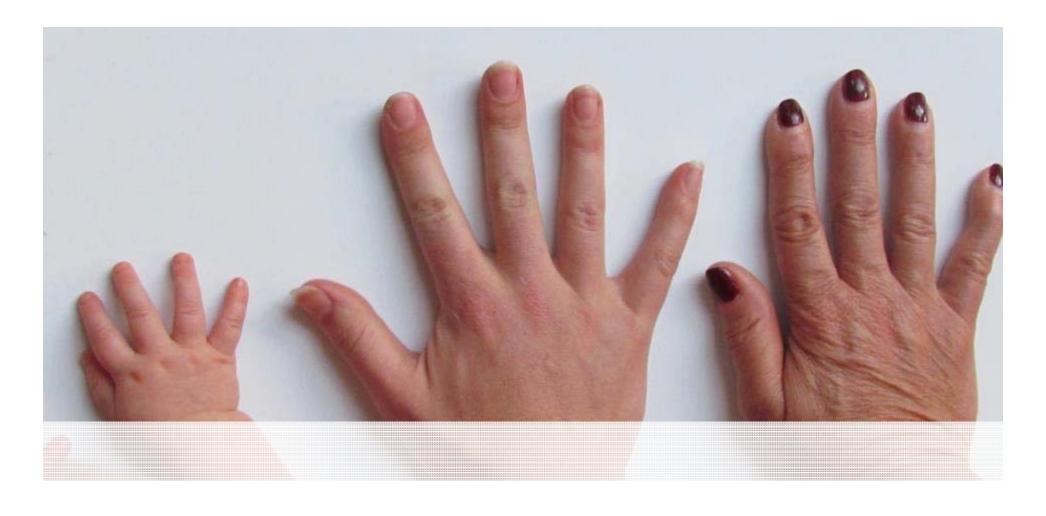
Neurotoxic Industrial Compounds

Over 201 chemicals in common industrial use can have neurotoxic effects on the public, children in particular, and lack sufficient safety regulation.

- According to the study's lead author, Dr.
 Philippe Grandjean, millions of children may have already been affected by exposure to industrial toxins.
- "About half of the 201 chemicals that we list are high-volume production chemicals," Grandjean said, including tin and aluminum compounds, solvents such as acetone and benzene, and dozens of pesticides."

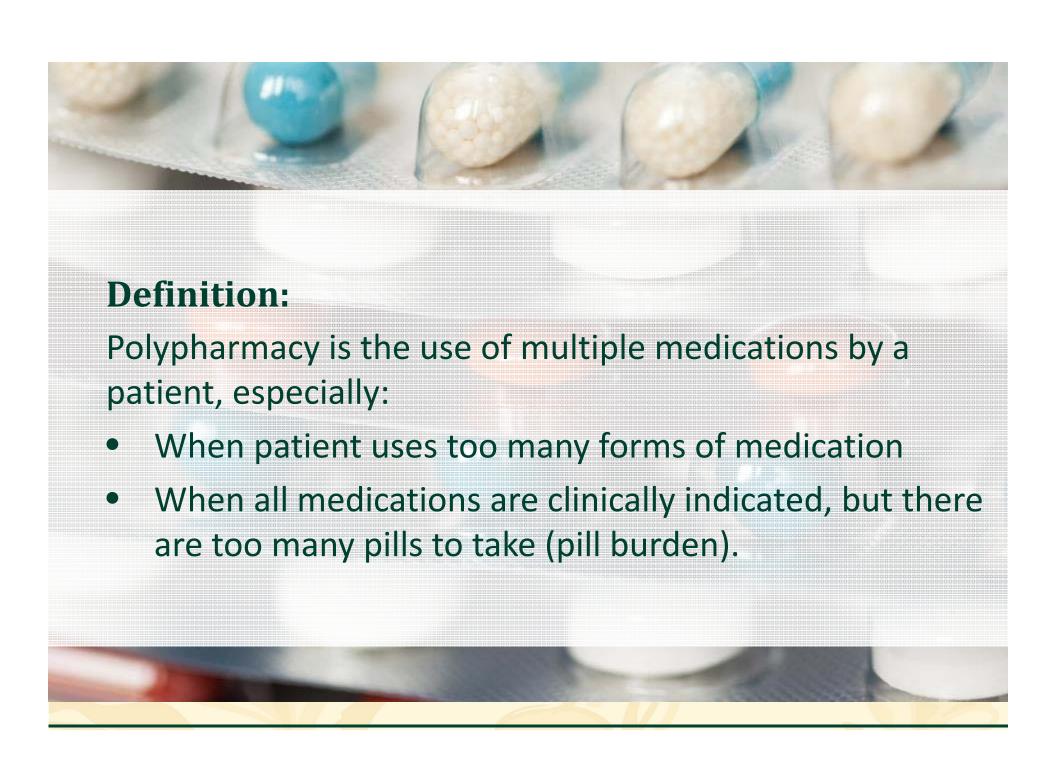


P. Grandjean, P. Landrigan. Developmental neurotoxicity of industrial chemicals. *The Lancet*, Volume 368, Issue 9553, Pages 2167-2178



Many years may pass before the toxic effect of chemical exposure manifests fully.





Older adults, who make up only 13% of the population account for almost 30% of all prescribed drugs.

Average number of prescription medication?

4.5 percent

Average number of over-the-counter medication?

3.5 percent



http://www.aoa.acl.gov/Aging_Statistics/index.aspx

Brain Health Factors: Nutrition

- Many health benefits throughout the body but also the brain.
- Many phytochemicals have shown neuroprotective effects such as green tea, curcumin, anti-oxidants, and others.
- What is interesting is many phytochemicals evolved for plant protection rather than benefits...





It's not always what you think: (FDA Health Claims)

- Low fat diets rich in fiber-containing grain products, fruits, and vegetables may reduce the risk of some types of cancer, a disease associated with many factors.
- Diets low in saturated fat and cholesterol and rich in fruits, vegetables, and grain products that contain some types of dietary fiber, particularly soluble fiber, may reduce the risk of heart disease, a disease associated with many factors
- Low fat diets rich in fruits and vegetables (foods that are low in fat and may contain dietary fiber, Vitamin A, or Vitamin C) may reduce the risk of some types of cancer, a disease associated with many factors. Broccoli is high in vitamin A and C, and it is a good source of dietary fiber.

The consumption of flavonoid-rich foods, such as berries and cocoa, throughout life holds a potential to support and maintain healthy brain function.

December 2009, Volume 4, Issue 4, pp 243-250 Flavonoids and brain health: multiple effects underpinned by common mechanisms. Genes and Nutrition. Jeremy P. E. Spencer

Flavonoids

- The neuroprotective actions of dietary flavonoids involve a number of effects within the brain, including a potential to support and protect neurons, and the potential to support and maintain healthy brain function.
- Interact with important neuronal signaling cascades, leading to support and promotion of neuronal survival.
- Secondly, they induce peripheral and cerebral vascular blood flow in a manner which may lead to the induction of angiogenesis, and new nerve cell growth in the hippocampus, all of which support brain health.

Flavonoids...continued

- Grape seed extract and resveratrol have antioxidant activity
- In addition, studies in animal models have shown that both of these compounds may support healthy amyloid-3 plaque status, indicating their importance in supporting cognitive health.



Substances With Antioxidant Activity

- Carotenoids: beta-carotene, lycopene, phytoene
- Glutathione (the so-called "master" antioxidant activity substance)
- Flavonoids: Coco, wine, tea, blueberries, citrus fruits
- Allyl sulfides
- Polyphenols (catechins, theaflavins): berries, grape skins and seeds, green tea

Cognition-Supporting Berries and Grapes (Plant Polyphenols)

- Polyphenols: Grape skins and seeds
 - Plant molecules with potent antioxidant capabilities
- Higher consumption of these molecules have lower rates of neurochallenge to brain cells¹
- The reduction in oxidant challenge to brain cells increases concentrations of the neurotransmitter acetylcholine in animals fed grape seed extract²

^{1.} http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4037119/ and http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3690243/

^{2.} Devi A et al. . Grape seed proanthocyanidin extract (GSPE) and antioxidant defense in the brain of adult rats. Med Sci Monit. 2006.12(4):BR124-9. in Goepp, J. March 2009. Life Extension Magazine

Oligomeric Proanthocyanadins (OPCs) OPC Synergy®

Key Ingredients:

• Grape (Seed) Extract, Red Wine Extract (Provinols), Green Tea (leaves) Extract (60% Catechins), Bilberry (fruit) (25% Anthocyanins) in a base of dried buckwheat (leaf) and juice, green tea (leaf) powder, and dried carrot (root).

Action:

Cellular antioxidant activity protection



OPC Synergy®

- OPC Synergy provides a synergistic blend with antioxidant activity and supports cell functioning. Supports and maintains normal cell function
- Helps maintain normal cognitive function
- Traditionally used in support of eye health
- Supports the complex processes associated with aging
- Supports a healthy cardiovascular system
- Helps maintains capillary integrity*

Best dosed before cardiovascular exercise, or with meals 1 capsule, 1-2x per day.

*These statements have not been evaluated by the Food and Drug Administration. These products are not intended to diagnose, treat, cure, or prevent any disease.

Brain Health Factors: Gut Health

Gut health is multifaceted.

 Nutrition, environmental toxins, and ability to eliminate waste all have huge factors in gut health.

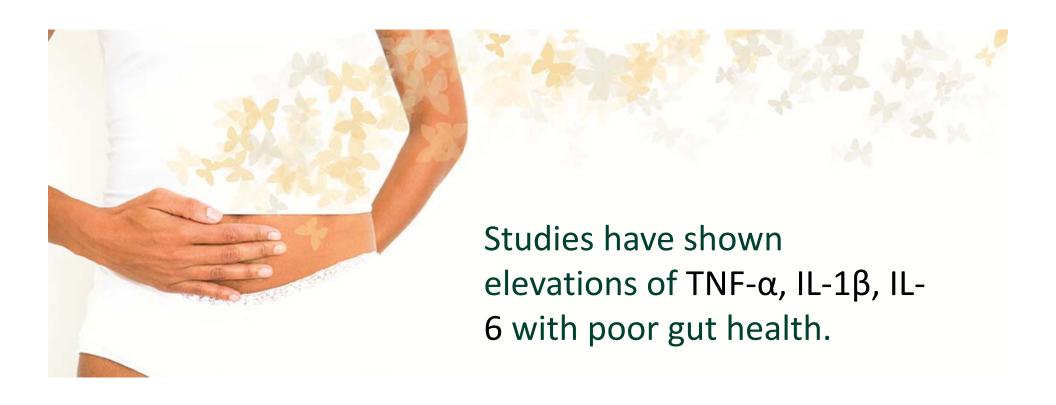
 Recent research has shown gut health has a key impact on brain health.

Brain Health Factors: Gut Health

Recent research supporting a role for the microbiota in maintaining normal brain function offers the intriguing possibility that the therapeutic targeting of the gut microbiome might be a viable strategy in in supporting CNS health (Forsythe et al., 2010).

Source: Grenham S, Clarke G, Cryan JF, Dinan TG. Brain–Gut–Microbe Communication in Health and Disease. Frontiers in Physiology. 2011;2:94. doi:10.3389/fphys.2011.00094.

Brain Health Factors: Gut Health



Source: Grenham S, Clarke G, Cryan JF, Dinan TG. Brain–Gut–Microbe Communication in Health and Disease. *Frontiers in Physiology*. 2011;2:94. doi:10.3389/fphys.2011.00094

Brain Health Factors: Brain Use



Brain Health Factors: Brain Use

Challenge your brain and stimulate it.

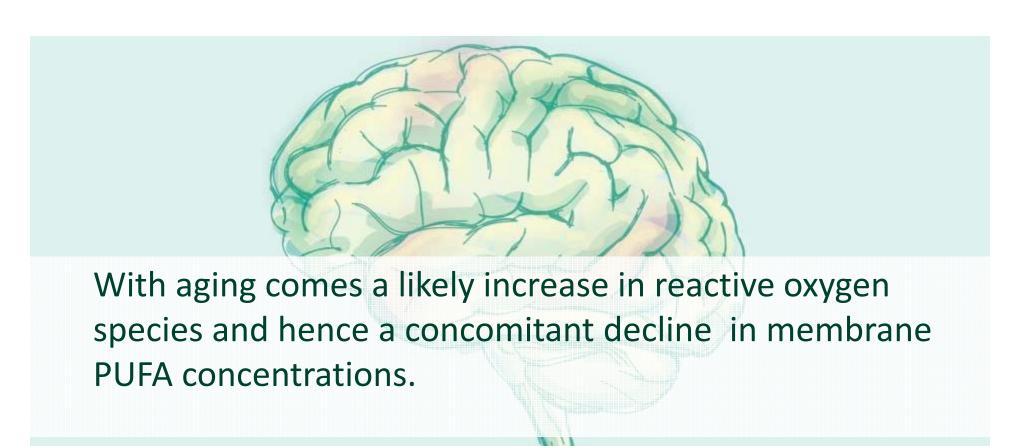
- Word challenges, crosswords, puzzles
- Learn a new language
- Read (a lot!) it forces you to form a mental image of the event it stimulates thinking, television does not do that!





Source: http://www.rd.com/health/wellness/7-anti-aging-tips-to-keep-your-brain-young/

EFA's and Brain Health



Source: **Essential fatty acids and the brain: possible health implications** <u>International Journal of Developmental Neuroscience</u> <u>Volume 18, Issues 4–5, 1 July 2000, Pages 383–399 <u>Kuresh A. Youdim</u>, <u>Antonio Martin, James A. Joseph</u></u>

Omega-3's

- The plant form of Omega-3 FAs is the short-chain α -linolenic acid, and the marine forms are the long-chain fatty acids: docosahexaenoic acid and eicosapentaenoic acid. Omega-3 FAs have unlimited usages, and they are considered as omnipotent since they may benefit heart health, support healthy brain function, and support healthy mood.
- Omega-3 FAs can have direct effects on addressing the natural inflammatory state by modulating IL-6, TNF- α , CRP and many other factors. While the appropriate dosage along with the administrative duration is not known, the scientific evidence-based recommendations for daily intake remain.

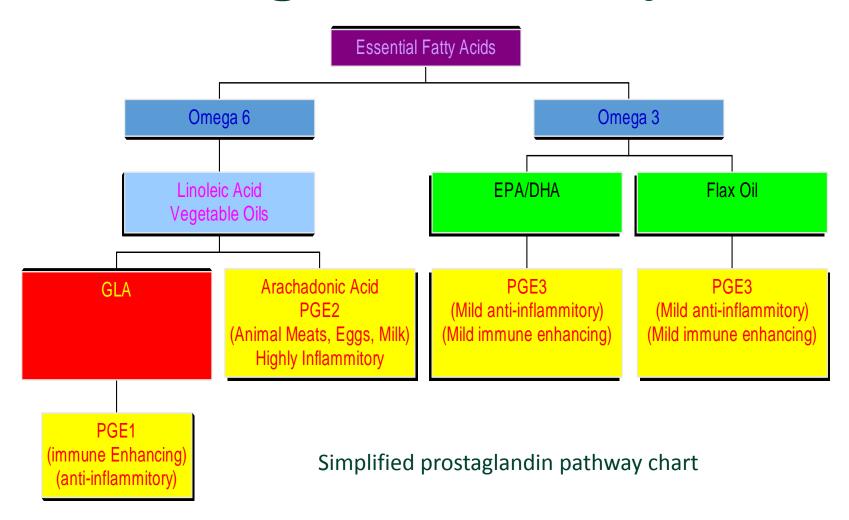
Source: <u>Inflammopharmacology.</u> 2015 Feb 14. [Epub ahead of print] **Role of fish oil in human health and possible mechanism to reduce the inflammation.** <u>Ellulu MS</u>¹, <u>Khaza'ai H</u>, <u>Abed Y</u>, <u>Rahmat A</u>, <u>Ismail P</u>, <u>Ranneh Y</u>.

EFA's and Brain Health

- The brain is particularly rich in PUFAs such as DHA, and changes in tissue membrane composition of these PUFAs reflect that of the dietary source. The support of structural and functional integrity of this tissue appears to correlate with membrane DHA concentrations. Arachidonic acid, also predominant in this tissue, is a major precursor for the synthesis of eicosanoids, that serve as intracellular or extracellular signals.
- With aging comes a likely increase in reactive oxygen species and hence a concomitant impact on membrane PUFA concentrations, and cognitive health.

Source: Int J Dev Neurosci. 2000 Jul-Aug;18(4-5):383-99. Essential fatty acids and the brain: possible health implications. Youdim KA1, Martin A, Joseph JA.

Essential Fatty Acids and Prostaglandin Pathways



Omega 3 vs. Omega 6

Much of the publicity with Omega 6 is that it is "bad".

It's not bad, it's essential! Hence *essential* fatty acids.

It's the end product that is key for all of them!

Omega-3 Cognitive Benefits

- Age-related memory loss
- Since typical western diets have insufficient DHA from Omega-3 EFA's it is important to supplement with them.
- Research suggests that omega-3s may help protect against age-related memory loss.
 - Although exact mechanisms as to how this happens are a bit of an unknown.

Source: Ageing Res Rev. 2013 Mar;12(2):579-94. doi: 10.1016/j.arr.2013.01.007. Epub 2013 Feb 6. Omega-3 fatty acids and brain resistance to ageing and stress: body of evidence and possible mechanisms. Denis I1, Potier B, Vancassel S, Heberden C, Lavialle M.

High Arachidonic Acid Levels

- Excess levels of arachidonic acid (AA) lead to increases in proinflammation levels of leukotrienes and prostaglandins, these have been linked to common and natural effects.
- Foods rich in Omega-6 fatty acids trigger overproduction of arachidonic acid (AA).
- Research has shown that EPA and DHA from Omega-3
 Essential fats will reduce these pro-inflammatory compounds.

Source: n-3 Polyunsaturated fatty acids, inflammation, and inflammatory diseases. Am J Clin Nutr June 2006 vol. 83 Philip C Calderno.

Tuna Omega-3 Oil

- Tuna Omega-3 Oil delivers essential omega-3 fatty acids.
- Natural profile of tuna oil—not concentrated
- Supports normal lipid profiles within normal range
- Supports the body's natural inflammatory response function as it relates to periodic challenges like consumption of high-fat meal or strenuous activity
- Third-party tested for environmental contaminants
- Supports cognition
- Supports skin and hair health
- Supports emotional balance
- DHA is important for proper fetal eye and brain development.
- Supportive but not conclusive research has shown that EPA and DHA omega-3 fatty acids may reduce the risk of coronary heart disease.*

I recommend 2, 2x per day as a general support, 3, 2x day during acute situations.



*These statements have not been evaluated by the Food and Drug Administration. These products are not intended to diagnose, treat, cure, or prevent any disease.

Calamari Omega-3 Liquid

- Natural concentration of omega-3 fatty acids, including DHA and EPA
- Perfect for those who cannot or prefer not to swallow pills, especially children and the elderly
- Certified sustainable from the independent nonprofit group Friend of the Sea®
- Third-party tested for contaminants
- Has a clean, understated, citrus taste
- Supports cardiovascular health
- Assists in triglyceride management for triglyceride levels already in a normal range
- Supports normal blood pressure already within a normal range
- Supports healthy normal blood coagulation
- Supports a healthy immune system
- Supports the body's natural inflammatory response function as it relates to periodic challenges like consumption of a high-fat meal, or strenuous activity
- Supports cognition
- Promotes emotional balance
- Supports people at all stages of life
- Supports skin, nail, and hair health
- Supportive but not conclusive research has shown that consumption of EPA and DHA omega-3 fatty acids may reduce the risk of coronary heart disease.*

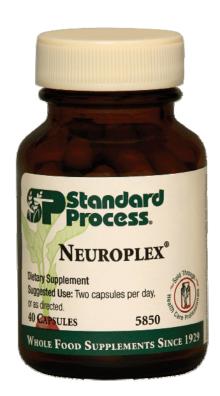
My recommended dosage is 5mL/day for regular use, and 7.5 mL/day for acute.





Neuroplex[®]

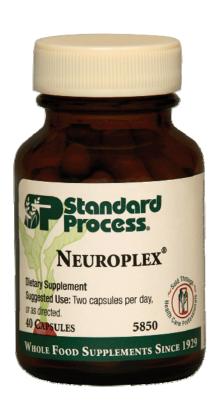
- Think of this product as a food based multivitamin for brain health.
- This provides many key nutrients that may support brain health.
- Also contains the Protomorphogen™ extracts (PMG™) that promotes healthy tissue response and function.*
 - The PMG extracts are organ specific, in this case brain and hypothalamus



Whole Food and Other Ingredients: Neuroplex®

- Neuroplex combines synergistic ingredients to support the nervous and endocrine systems.
- Supports the nervous system
- Supports cognitive functioning
- Contains a broad spectrum of vitamins, minerals, and complementary tissues to support endocrine organ function*

Best taken 15-30 minutes before meals. 1-3 per day.



Bacopa Monnieri

In one double blinded study with 103 (81 completed) older Australian adults Bacopa significantly improved verbal learning, memory acquisition, and delayed recall as measured by the AVLT (Rey Auditory Verbal Learning Test).

Conclusions: Bacopa significantly improved memory acquisition and retention in healthy older Australians. This concurs with previous findings and traditional use.

Reference: Does *Bacopa monnieri* Improve Memory Performance in Older Persons? Results of a Randomized, Placebo-Controlled, Double-Blind Trial: Annette Morgan and John Stevens. The Journal of Alternative and Complementary Medicine. July 2010, 16(7): 753-759. doi:10.1089/acm.2009.0342.

Bacopa Complex

Contains:

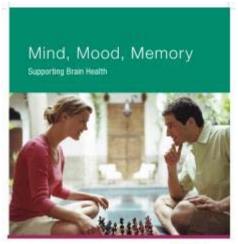
- Schisandra fruit, 6:1 extract, 110mg
- Bacopa herb, 50:1 extract, 75 mg
- Eleuthero root, 10:1 extract, 50 mg
- Rosemary leaf (Rosmarinus ollicinalis) essential oil, 10 mg

1 tablet 3-4 times per day is best



Promoting Products in Your Practice









- Brain Support Brochure (L1120)
- Brain Support Handout (L4955)
- Brain Support Poster (L4213)
- Brain Support Acrylic Display Insert (L8930) Order these items at standardprocess.com today!



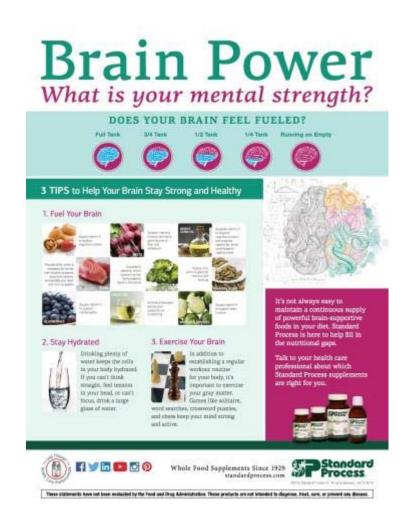
Power Points

- One of my favorite strategies
- Can place in lobby, change rooms, report of findings rooms...easy way to promote your information to a passive audience.
- Use a digital frame or a monitor or smart TV to play them.



Poster/Flyer Connection

- Have poster frames that you can open up (displays2go.com has them) are an easy way to swap out different products each month...the posters are free through SP. Creates a conversation
- Have brochure/mini-poster on front desk



Product of the Month

- Pick a product each month, try to correlate it to the time of the year. For example use digestive products for the summer when everyone goes on BBQ's and picnics, immune support products for winter season.
- Have flyers in the office, in front desk area with the brochure/mini-poster as well as posters to match products you are promoting.
- Offer a discount on those products (we do 20%) as an effort to get them to try them.



In Office Workshops

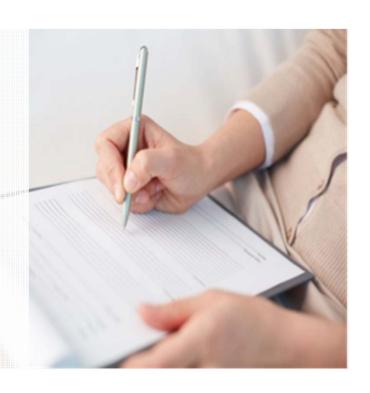
- Have multiple seminars you rotate on a monthly basis.
- Great way to educate your patients who want to learn more.
- Easy way to get people "on board" with recommendations in a controlled setting (detox seminar examples).

Systems Survey

 Re-exams are a great time to get patients interested in nutrition.

 I use a script that makes it an easy way to promote what you are doing in a non-threatening, non-high pressure way.

Very simple to do and very ethical.



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- Instagram.com/Standard Process
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- 8+ Plus.Google.com/+StandardProcess

Thank You for Attending

For more information about
Standard Process® and MediHerb® products,
please contact your local
Standard Process representative.