

BrainSustain™ & BrainSustain™ for Kids

Comprehensive Brain Support Formulas*



Available in Creamy Chocolate & Vanilla Delight
BrainSustain™ for Kids is available in Vanilla Delight

Clinical Applications

- » Support Brain Health and Healthy Recall Ability*
- » Provide Nutrients That Support Antioxidant Mechanisms*
- » Supply Protein and Amino Acids for Neurotransmitter Production*

*BrainSustain™ & BrainSustain™ for Kids represent more than 30 years of neuroscience research. Designed to address brain health, structure, and function, these formulas contain a variety of nutrients and cofactors that support mitochondrial energy production, antioxidant systems, neurotransmitter production, and cell membrane integrity.**

Discussion

EVNol™, currently found in Creamy Chocolate and Vanilla Delight and not in BrainSustain for Kids, is a patented, full-spectrum, pure d-mixed-tocotrienols complex. This advanced tocotrienol ingredient is derived from sustainable red palm fruit oil—a scientifically validated source. It is primarily composed of the four tocotrienol isomers (alpha, beta, gamma, and delta) in natural ratios. EVNol also provides d-alpha tocopherol and phytonutrients that are naturally extracted with the tocotrienols. The result is a natural and wholesome tocotrienol complex. The extraordinary protective benefits of tocotrienols on brain cells (e.g., white matter) and neurons have been demonstrated in in vitro, animal, and human studies.^[1-3] A large, placebo-controlled human trial investigated the effects of tocotrienols on white matter lesions (WML). Individuals taking the placebo showed an increase in WML volume, while those taking 200 mg of EVNol twice a day (equivalent to approximately 68 mg pure d-mixed tocotrienols) remained essentially unchanged.^[2] Scientists later determined that in order to achieve brain protection, the required plasma level of tocotrienols is just 588.6 nanomolar, which equates to approximately 31.25 mg of pure d-mixed tocotrienols/day.*^[4,5]

Furthermore, several studies have shown that good vitamin E status, especially tocotrienols, is associated with cognitive health and reduced risk of cognitive impairment in older adults.^[5,6] In a cross-sectional multicenter study on elderly subjects, researchers at the Aging Research Center at Karolinska Institutet in Stockholm found that cognitively normal individuals had better mean plasma levels of vitamin E, especially tocotrienols, and lower oxidative damage markers.^[5] Other research has demonstrated that combined tocopherol and tocotrienol administration supports healthy liver conditions and liver triglyceride metabolism.*^[7-10]

EVNol has a self-affirmed GRAS (generally recognized as safe) designation. It is 100% vegetarian-based and is derived from non-GMO sources.

N-Acetyl-Cysteine (NAC) is a precursor to glutathione—a tripeptide active in detoxification and antioxidant systems. Research suggests

that NAC hinders the formation of free radicals that can contribute to oxidative stress in the brain.*^[11]

Phosphatidylserine (PS) is a phospholipid that is highly concentrated in the brain and plays a key role in neuronal energy production and communication. The body must synthesize the PS it needs for brain health because very little is found in food. Supplementation can help maintain normal brain levels of PS and thereby support brain functions that are dependent on this vital phospholipid.^[12-14] For some individuals, changes in brain function may be related to “age-related decline in nutrition,”^[15] and early nutrition intervention may be warranted. These BrainSustain formulas contain safe-source PS from non-GMO soy.*

Acetyl-L-Carnitine (ALCAR) supports nerve health.^[16] It is able to cross the blood-brain barrier where it stabilizes cell membranes, provides antioxidant support, and helps maintain brain cell health.^[17-19] In addition, ALCAR supports neuronal energy production, facilitates transport of fuel and waste products into and out of mitochondria, and supports production of acetylcholine, a neurotransmitter essential to the processes of learning and concentration.*^[18,20]

Alpha-Lipoic Acid has fat- and water-soluble properties and therefore imparts intracellular and extracellular protection against oxidative stress. With its low molecular weight, alpha-lipoic acid is easily absorbed in the gastrointestinal tract. It then enters circulation, crosses the blood-brain barrier, and reaches the brain where it can support antioxidant activity and regenerate glutathione, vitamin E, and vitamin C.*^[21,22]

Coenzyme Q10 (CoQ10) plays a pivotal role in energy generation because it transports electrons in the mitochondrial electron transport chain. CoQ10 also donates electrons, helping to protect the brain from oxidative stress and further supporting neuronal cell health.*^[23]

Continued on page 3

BrainSustain™ Creamy Chocolate Supplement Facts

Serving Size: 2 Scoops (about 51 g)
Servings Per Container: About 15

Amount Per Serving	%Daily Value	
Calories 180		
Calories from Fat 50		
Total Fat 6 g	9% [†]	
Saturated Fat 1.5 g	8% [†]	
Total Carbohydrate 19 g	6% [†]	
Dietary Fiber 9 g	36% [†]	
Sugars 6 g	**	
Protein 19 g		
Vitamin C (as calcium ascorbate and ingredients with naturally occurring vitamin C)	415 mg	692%
Vitamin D3 (cholecalciferol)	1000 IU	250%
Vitamin E (as d-alpha tocopheryl succinate and mixed tocopherols)	200 IU	667%
Riboflavin (as riboflavin 5'-phosphate sodium)	25 mg	1471%
Niacin (as niacinamide)	200 mg	1000%
Vitamin B6 (as pyridoxal 5'-phosphate)	50 mg	2500%
Folate (400 mcg as Quatrefolic® (6S)-5-methyltetrahydrofolic acid, glucosamine salt and 400 mcg as calcium folinate)	800 mcg	200%
Vitamin B12 (as MecobalActive™ methylcobalamin)	1000 mcg	16,667%
Calcium (as calcium ascorbate and ingredients with naturally occurring calcium)	95 mg	10%
Iron (naturally occurring)	6 mg	33%
Phosphorus (as potassium phosphate)	50 mg	5%
Magnesium (as Albion® di-magnesium malate)	50 mg	13%
Sodium (naturally occurring)	380 mg	16%
Potassium (naturally occurring)	340 mg	10%
Acetyl-L-Carnitine (as acetyl-L-carnitine HCl)	800 mg	**
N-Acetyl-L-Cysteine	300 mg	**
Phosphatidylserine (Sharp•PS® GREEN)	200 mg	**
Alpha-Lipoic Acid	200 mg	**
Coenzyme Q10 (as ubiquinone)	200 mg	**
DHA (docosahexaenoic acid from algal oil)(life'sDHA®)	50 mg	**
EVNol™ Mixed Tocotrienols	50 mg	**
Benfotiamine	50 mg	**
Glucoraphanin (from broccoli extract)(<i>Brassica oleracea italica</i>)(seed) (truebroc™)	30 mg	**

† Percent Daily Values are based on a 2,000 calorie diet.
** Daily Value not established.


Other Ingredients: VegaPro™ (XYMOGEN®'s proprietary blend of pea protein concentrate, pea protein isolate, taurine, glycine, rice protein concentrate, and L-glutamine), dried cane syrup, inulin (from chicory), sunflower oil, cocoa powder, natural flavors (no MSG), cellulose gum, xanthan gum, medium-chain triglyceride oil, Aminogen®, guar gum, stevia leaf extract, and silica.

DIRECTIONS: Blend, shake, or briskly stir two scoops (51 g) into 8-12 oz chilled water and consume once daily, or as directed by your healthcare practitioner. Adjust amount of water to desired sweetness and thickness.


Consult your healthcare practitioner prior to use. Individuals taking medication should discuss potential interactions with their healthcare practitioner. Do not use if tamper seal is damaged.

STORAGE: Keep tightly closed in a cool, dry place out of reach of children.


DOES NOT CONTAIN: Wheat, gluten, yeast, soy protein, dairy products, fish, shellfish, peanuts, tree nuts, egg, artificial colors, or artificial sweeteners.




life'sDHA® is a trademark of DSM.




Produced under US patent 5,725,895; 5,968,505; 5,968,567; 6,177,122; and 6,242,018 licensed from Brassica Protection Products LLC; truebroc is a trademark of Brassica Protection Products LLC.




AMINOGEN® is a registered trademark of Triarco Industries. AMINOGEN® is protected under US patent 5,387,422.



EVNol™ (formerly known as Tocotrienol) is a trademark of EcoVite. Tocotrienols are extracted and concentrated from sustainably sourced Malaysian red palm oil. Protected by US patent 5,151,132.



Quatrefolic® is a registered trademark of Gnosis S.p.A. Produced under US patent 7,947,662.



MecobalActive™ is a trademark of Ferrer Health Tech. The active form of B₁₂.



Sharp•PS® GREEN is a registered trademark of Enzymotec Ltd.



Albion is a registered trademark of Albion Laboratories, Inc.

Typical Amino Acid Profile Per Serving:

Alanine	834 mg	Methionine	204 mg
Arginine	1,673 mg	Phenylalanine	1,059 mg
Aspartic Acid	2,259 mg	Proline	845 mg
Cysteine	182 mg	Serine	1,039 mg
Glutamic Acid	3,293 mg	Threonine	726 mg
Glycine	797 mg	Taurine	500 mg
Histidine	483 mg	Tryptophan	191 mg
Isoleucine	899 mg	Tyrosine	742 mg
Leucine	1,634 mg	Valine	973 mg
Lysine	1,417 mg		

BrainSustain™ for Kids Vanilla Delight Supplement Facts

Serving Size: 1 Scoop (About 17 g)
Servings Per Container: 15

	Amount Per Serving	%Daily Value
Calories	70	
Calories from Fat	25	
Total Fat	3 g	5% [†]
Saturated Fat	1 g	5% [†]
Total Carbohydrate	8 g	3% [†]
Dietary Fiber	2 g	8% [†]
Sugars	3 g	**
Protein	6 g	
Vitamin C (naturally occurring)	14 mg	24%
Iron (naturally occurring)	2 mg	11%
Sodium (naturally occurring)	115 mg	5%
N-Acetyl-L-Cysteine	100 mg	**
DHA (docosahexaenoic acid from algal oil)(life'sDHA®)	50 mg	**
Coenzyme Q10 (as ubiquinone)	50 mg	**
Glucoraphanin (from broccoli extract)(<i>Brassica oleracea italica</i>)(seed)(truebroc™)	30 mg	**
Phosphatidylserine (Sharp•PS® GREEN)	25 mg	**
Alpha-Lipoic Acid	20 mg	**

† Percent Daily Values are based on a 2,000 calorie diet.
** Daily Value not established.


Other Ingredients: VegaPro™ (XYMOGEN®'s proprietary blend of pea protein concentrate, pea protein isolate, Aminogen®, rice protein concentrate, L-glutamine, and glycine), sunflower oil, dried cane syrup, natural flavors (no MSG), inulin (from chicory), medium chain triglyceride oil, cellulose gum, xanthan gum, guar gum, stevia leaf extract, and silica.

DIRECTIONS: For children four years of age or older, blend, shake, or briskly stir 1 level scoop (17 grams) of BrainSustain™ for Kids into 4-6 oz chilled water or other beverage, or as directed by your healthcare practitioner. Adjust amount of water to desired sweetness and/or thickness.


Consult your healthcare practitioner prior to use. Individuals taking medication should discuss potential interactions with their healthcare practitioner. Do not use if tamper seal is damaged.

STORAGE: Keep tightly closed in a cool, dry place out of reach of children.

DOES NOT CONTAIN: Wheat, gluten, yeast, soy protein, animal or dairy products, fish, shellfish, peanuts, tree nuts, egg, artificial colors, artificial sweeteners, or artificial preservatives.

 life'sDHA® is a trademark of DSM.

 Produced under US patent 5,725,895; 5,968,505; 5,968,567; 6,177,122; and 6,242,018 licensed from Brassica Protection Products LLC; truebroc is a trademark of Brassica Protection Products LLC.

 AMINOGEN® is a registered trademark of Triarco Industries. AMINOGEN® is protected under US patent 5,387,422.



Sharp•PS® GREEN is a registered trademark of Enzymotec Ltd.

Typical Amino Acid Profile Per Serving:

Alanine	296 mg
Arginine	590 mg
Aspartic Acid	793 mg
Cysteine	65 mg
Glutamic Acid	1,162 mg
Glycine	304 mg
Histidine	170 mg
Isoleucine	316 mg
Leucine	576 mg
Lysine	494 mg
Methionine	75 mg
Phenylalanine	374 mg
Proline	299 mg
Serine	365 mg
Threonine	257 mg
Tryptophan	67 mg
Tyrosine	264 mg
Valine	345 mg

Glucoraphanin (previously Brassica's SGS™, now Brassica's truebroc™) is a patented phytochemical derived from broccoli extract. Extensive research suggests that when glucoraphanin is enzymatically converted to sulforaphane (its active form), it safely and effectively supports the Nrf2 system, antioxidant systems, and vital phase II detoxification enzymes.^[24,25] This process provides protection from common toxins and xenobiotics.*

DHA (docosahexaenoic acid) is a conditionally essential fatty acid and the main polyunsaturated fatty acid in the brain. DHA supports the structure and function of brain cell membranes, and hence plays a fundamental role in neuronal communication.^[26] Studies suggest that DHA supports the biosynthesis and accumulation of PS in neuronal and glial cells as well.*^[27]

VegaPro™ is XYMOGEN's proprietary and lactose-free pea/rice protein blend. In BrainSustain and BrainSustain for Kids, VegaPro is coupled with Aminogen®, an enzyme complex that facilitates protein digestion and absorption. Amino acids from protein metabolism provide the precursors needed for neurotransmitter production.*

Micronutrients complete the adult version of this formula's comprehensive design. These include magnesium, calcium, phosphorus, vitamin D3, vitamin E (as mixed tocopherols), and activated B vitamins riboflavin 5'-phosphate (B2), pyridoxal 5'-phosphate (B6), methylcobalamin (B12), and folate as 5-MTHF (5-methyltetrahydrofolate). 5-MTHF supports healthy folate nutrition, especially in individuals with genetic variations in folate metabolism. 5-MTHF is provided as Quatrefolic® for enhanced stability, solubility, and bioavailability.^[28,29] In addition, two scoops of BrainSustain adult formula provide the same amount of NAC, PS, ALCAR, alpha-lipoic acid, CoQ10, and glucoraphanin as eight capsules of NeuroActives™ BrainSustain™.*

References

- Selvaraju TR, Khaza'ai H, Vidyadaran S, et al. The neuroprotective effects of tocotrienol rich fraction and alpha tocopherol against glutamate injury in astrocytes. *Bosn J Basic Med Sci.* 2014 Nov 16;14(4):195-204. [PMID: 25428670]
- Gopalan Y, Shuaib IL, Magosso E, et al. Clinical investigation of the protective effects of palm vitamin E tocotrienols on brain white matter. *Stroke.* 2014 May;45(5):1422-28. [PMID: 24699052]
- Rink C, Christoforidis G, Khanna S, et al. Tocotrienol vitamin E protects against preclinical canine ischemic stroke by inducing arteriogenesis. *J Cereb Blood Flow Metab.* 2011 Nov;31(11):2218-30. [PMID: 21673716]
- Khosla P, Patel V, Whinter JM, et al. Postprandial levels of the natural vitamin E tocotrienol in human circulation. *Antioxid Redox Signal.* 2006 May-Jun;8(5-6):1059-68. [PMID: 16771695]
- Mangialasche F, Xu W, Kivipelto M, et al. Tocopherols and tocotrienols plasma levels are associated with cognitive impairment. *Neurobiol Aging.* 2012 Oct;33(10):2282-90. [PMID: 22192241]
- Mangialasche F, Solomon A, Kåreholt I, et al. Serum levels of vitamin E forms and risk of cognitive impairment in a Finnish cohort of older adults. *Exp Gerontol.* 2013 Dec;48(12):1428-35. [PMID: 24113154]
- Muto C, Yachi R, Aoki Y, et al. Gamma-tocotrienol reduces the triacylglycerol level in rat primary hepatocytes through regulation of fatty acid metabolism. *J Clin Biochem Nutr.* 2013 Jan;52(1):32-37. [PMID: 23341695]
- Yachi R, Muto C, Ohtaka N, et al. Effects of tocotrienol on tumor necrosis factor- α /d-galactosamine-induced steatohepatitis in rats. *J Clin Biochem Nutr.* 2013 Mar;52(2):146-53. [PMID: 23526264]
- Magosso E, Ansari MA, Gopalan Y, et al. Tocotrienols for normalisation of hepatic echogenic response in nonalcoholic fatty liver: a randomised placebo-controlled clinical trial. *Nutr J.* 2013 Dec 27;12(1):166. [PMID: 24373555]
- Thendiono EJ, Arguillas M. The effect of vitamin E (mixed tocotrienol) on the liver stiffness measurement measured by transient elastography (fibroscan) among NAFLD patients. Poster presented at APASL Liver Week; June 6-10, 2013; Suntec, Singapore.
- Sansone RA, Sansone LA. Getting a knack for NAC: N-acetyl-cysteine. *Innov Clin Neurosci.* 2011 Jan;8(1):10-14. [PMID: 21311702]
- Kato-Kataoka A, Sakai M, Ebina R, et al. Soybean-derived phosphatidylserine improves memory function of the elderly Japanese subjects with memory complaints. *J Clin Biochem Nutr.* 2010 Nov;47(3):246-55. [PMID: 21103034]
- Richter Y, Herzog Y, Cohen T, et al. The effect of phosphatidylserine-containing omega-3 fatty acids on memory abilities in non-demented elderly with subjective memory complaints: a pilot study. *Clin Interv Aging.* 2010 Nov 2;5:313-16. [PMID: 21103402]
- Vakhapova V, Cohen T, Richter Y, et al. Phosphatidylserine containing omega-3 fatty acids may improve memory abilities in non-demented elderly with memory complaints: a double-blind placebo-controlled trial. *Dement Geriatr Cogn Disord.* 2010;29(5):467-74. [PMID: 20523044]
- Suchy J, Chan A, Shea TB. Dietary supplementation with a combination of alpha-lipoic acid, acetyl-L-carnitine, glycerophosphocoline, docosahexaenoic acid, and phosphatidylserine reduces oxidative damage to murine brain and improves cognitive performance. *Nutr Res.* 2009 Jan;29(1):70-74. [PMID: 19185780]
- Picconi B, Barone I, Pisani A, et al. Acetyl-L-carnitine protects striatal neurons against in vitro ischemia: the role of endogenous acetylcholine. *Neuropharmacology.* 2006 Jun;50(8):917-23. [PMID: 16500685]
- Steffen V, Santiago M, de la Cruz CP, et al. Effect of intraventricular injection of 1-methyl-4-phenylpyridinium: protection by acetyl-L-carnitine. *Hum Exp Toxicol.* 1995 Nov;14(11):865-71. [PMID: 8588946]
- Sorbi S, Forleo P, Fani C, et al. Double-blind, crossover, placebo-controlled clinical trial with L-acetylcarnitine in patients with degenerative cerebellar ataxia. *Clin Neuropharmacol.* 2000 Mar-Apr;23(2):114-18. [PMID: 10803803]
- Jones LL, McDonald DA, Borum PR. Acylcarnitines: role in brain. *Prog Lipid Res.* 2010 Jan;49(1):61-75. Review. [PMID: 19720082]
- Kobayashi S, Iwamoto M, Kon K, et al. Acetyl-L-carnitine improves aged brain function. *Geriatr Gerontol Int.* 2010 Jul;10 Suppl 1:S99-106. [PMID: 20590847]
- Packer L, Tritschler HJ, Wessel K. Neuroprotection by the metabolic antioxidant alpha-lipoic acid. *Free Radic Biol Med.* 1997;22(1-2):359-78. Review. [PMID: 8958163]
- Liu J. The effects and mechanisms of mitochondrial nutrient alpha-lipoic acid on improving age-associated mitochondrial and cognitive dysfunction: an overview. *Neurochem Res.* 2008 Jan;33(1):194-203. Review. [PMID: 17605107]
- Mancuso M, Orsucci D, Volpi L, et al. Coenzyme Q10 in neuromuscular and neurodegenerative disorders. *Curr Drug Targets.* 2010 Jan;11(1):11-21. Review. [PMID: 20017723]
- Ping Z, Liu W, Kang Z, et al. Sulforaphane protects brains against hypoxic-ischemic injury through induction of Nrf2-dependent phase 2 enzyme. *Brain Res.* 2010 Jul 9;1343:178-85. [PMID: 20417626]
- Vauzour D, Buonfiglio M, Corona G, et al. Sulforaphane protects cortical neurons against 5-S-cysteinyl-dopamine-induced toxicity through the activation of ERK1/2, Nrf-2 and the upregulation of detoxification enzymes. *Mol Nutr Food Res.* 2010 Apr;54(4):532-42. [PMID: 20166144]
- Chang CY, Ke DS, Chen JY. Essential fatty acids and human brain. *Acta Neurol Taiwan.* 2009 Dec;18(4):231-41. Review. [PMID: 20329590]
- Guo M, Stockert L, Akbar M, et al. Neuronal specific increase of phosphatidylserine by docosahexaenoic acid. *J Mol Neurosci.* 2007 Sep;33(1):67-73. [PMID: 17901548]
- Prinz-Langenohl R, Brämswig S, Tobolski O, et al. [6S]-5-methyltetrahydrofolate increases plasma folate more effectively than folic acid in women with the homozygous or wild-type 677C->T polymorphism of methylenetetrahydrofolate reductase. *Br J Pharmacol.* 2009 Dec;158(8):2014-21. [PMID: 19917061]
- Quatrefolic®. <http://quatrefolic.com>. Accessed April 30, 2012.

Additional references available upon request

All XYMOGEN® Formulas Meet or Exceed cGMP Quality Standards.

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