



Welcome to the 2023 Cha Chi Ming Educational Series on Brain Health

Food or Supplements? Presented by Dr. Debra Bell

Cooking Demonstration by Chef Jared Batson

August 24, 2023

The UW Osher Center provides Integrative Medicine Consults, Integrative Primary Care, and Acupuncture.

We bring together conventional and complementary practices in a coordinated manner to promote health, illness prevention, and healthy living. We emphasize a holistic, patient-focused approach to health care and wellness – treating the whole person.

For more information:

<https://familymedicine.uw.edu/osher/patients/>



Brain Health & Nutrition

6:00-7:15pm (virtual)

May 18

Mom Your Brain

Dr. Emily Wong presents

Learn how we can engage mindset and purpose to take care of our physical brains

June 22

Healthy Gut, Healthy Brain

Dr. Iman Majd presents

Optimizing gut microbiome for better brain function

Chef Jared Batson leads interactive cooking

July 27

Food for Thought: Meal Planning for Optimal Brain Health

Kelly Morrow, MS, RDN, FAND

Incorporating nutrient-packed foods into balanced, flavorful meals to fuel our brains

August 24

Food or Supplements?

Dr. Debra Bell presents

Do we need to take supplements for better brain function?

Chef Jared Batson leads interactive cooking

September 28

Food and Mood

Dr. Tom Yang presents

How does food affect our mood?

Chef Jared Batson leads interactive cooking

SCAN TO REGISTER



Scan for recording of Mom Your Brain



link: bit.ly/41ENSrH

Dr. Debra Bell



Debra G Bell, MD is Co-Director of Education at the UW Osher Center for Integrative Health and assistant clinical professor at the University of Washington Department of Family Medicine. She has been a pioneer in the field, practicing and studying integrative medicine for over 35 years.

As an integrative medicine family physician, Dr. Bell sees people of all ages for integrative primary care and integrative consults with a particular interest in integrative women's health. She has expertise in many modalities including: botanical medicine and the use of vitamins, and supplements, nutrition, mind-body medicine, health and spirituality and bio-identical hormone replacement therapy.

Chef Jared Batson

At the age of fifteen Jared began his journey into the food industry and never looked back. As a chef, he has cooked and traveled across the country and worldwide, working under accomplished chefs in Chicago, California, and at the esteemed Ballymaloe Cookery School in Ireland. He is proud to have been mentored by James Beard & Bocuse d'Or winners alike, and would credit them for his own Jean Banchet Award, won with his business and team in Chicago. From a culinary standpoint both locally and abroad, Jared has fostered his desire to support sustainable agriculture and forward thinking restaurants that are pushing for impact beyond their menu.

More recently, while still living in Chicago, he brought this mindset to the acclaimed Green City Market, where he served as a Board Member and operated his popular wood-fired catering business for over four years. After passing the torch onto a fellow employee, Jared spent time consulting for various Chicago-Land food businesses, in addition to serving as the Executive Chef of Research & Development for a successful Chicago-Based multi-unit national restaurant group.

Food or Supplements?

BRAIN HEALTH & NUTRITION

2023 Cha Chi Ming Education Series



UW MEDICINE OSHER CENTER FOR INTEGRATIVE HEALTHY

DEBRA G. BELL, MD

August 2023



What is a Supplement?

Definition

Dietary Supplement Health and Education Act (DSHEA, 1994) defines dietary supplements as:

Products, not drugs, that are taken by mouth and contain an ingredient intended to supplement the diet

<https://www.nccih.nih.gov/health/using-dietary-supplements-wisely>



Dietary Supplements



In 2014 - \$36.7 billion spent on natural product supplements

NIH office of dietary supplements <https://ods.od.nih.gov/>
J. Nutr. 2014 Apr.



- **77%** of adults in US take supplements
Females 77%. Male 68%

Estimated at least 29,000 varieties of dietary supplements on the market

FDA recommendation – consult a health care professional before using a dietary supplement

Used to supplement nutrition, for treatment or in conjunction with pharmaceutical treatment

(<https://www.ncbi.nlm.nih.gov/books/NBK216048/>)

Safety & Quality Control



- **cGMP**- Current Good Manufacturing Practices

- **USP**- United States Pharmacopeia

- **NSF**- National Sanitation Foundation

- **Outside resources that test quality**

- Consumer Lab (subscription): consumerlab.com
- CRN Database: <http://crnusa2.org/>
- Canada database: www.hc-sc.gc.ca/

- **Professional nutraceutical companies** can have their own labs

- **Reporting safety concerns**

- FDA: U.S. Health and Human Services Safety Reporting Portal



Essential Vitamins



- "Essential" vitamins are those that cannot be manufactured by the body
- Ideally when a balanced, varied diet is consumed- all necessary nutrients are included
- RDA (Recommended Daily Allowance) developed in 1941 (revised in 1989), intended for healthy people who may have inadequate or poor nutrition to prevent diseases from nutrient deficiency, not necessarily for the prevention of disease

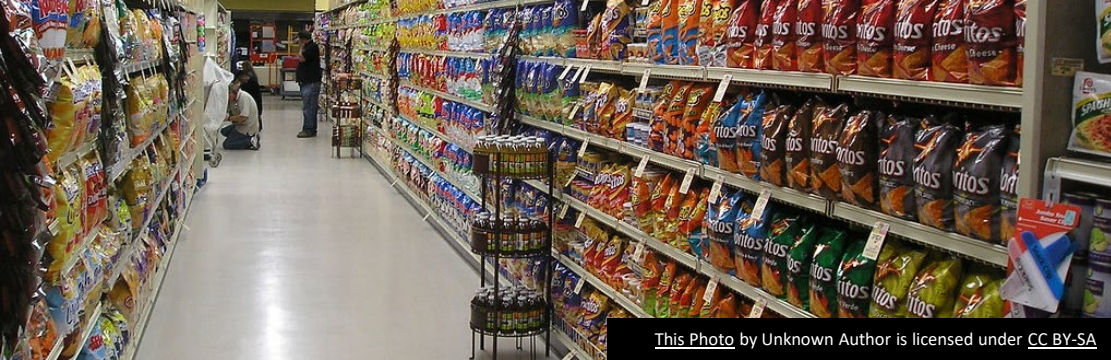
<https://ods.od.nih.gov/factsheets/MVMS-HealthProfessional/>



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Standard American Diet
=
S.A.D

- Simple sugars, high energy/calorie low nutrient foods
- Refined whole grain:
 - 85% magnesium is lost
 - 78% of zinc
 - 75% of vitamins
 - 95% fatty acids
 - 95 % of fiber

NUTRITION FIRST!

MVM Research Review

- Scientific studies have examined value of MVM in prevention of chronic disease and cancer and most are inconclusive.
- US Preventive Services Task Force; Mangione CM, et al Vitamin, Mineral, and Multivitamin Supplementation to Prevent Cardiovascular Disease and Cancer: US Preventive Services Task Force Recommendation Statement. JAMA. 2022 Jun 21;327(23):2326-2333
- Studies support that MVM reduce vitamin insufficiency
- Supplementation is recommended in low- and middle-income countries where specific micronutrient deficiencies are prevalent



Nutrient Deficiencies

- **Nutrient deficiencies** can be related to:

- **Long term medication use**

- PPIs (ferritin B12), statins (CO Q10), diuretics, metformin(B12), steroids, anticonvulsants, etc

<https://naturalmedicines.therapeuticresearch.com/tools/charts/drug-induced-nutrient-depletions.aspx>

- **Dietary deficiency**

- Vegan
- Restrictive diets
- Food insecurity

- **Malabsorption**

- Gastric bypass
- Cystic fibrosis
- Celiac
- Inflammatory bowel disease

- **Age**

- Elderly
- Pregnancy and breastfeeding

Vitamins and minerals are involved thousands of cellular processes within the body

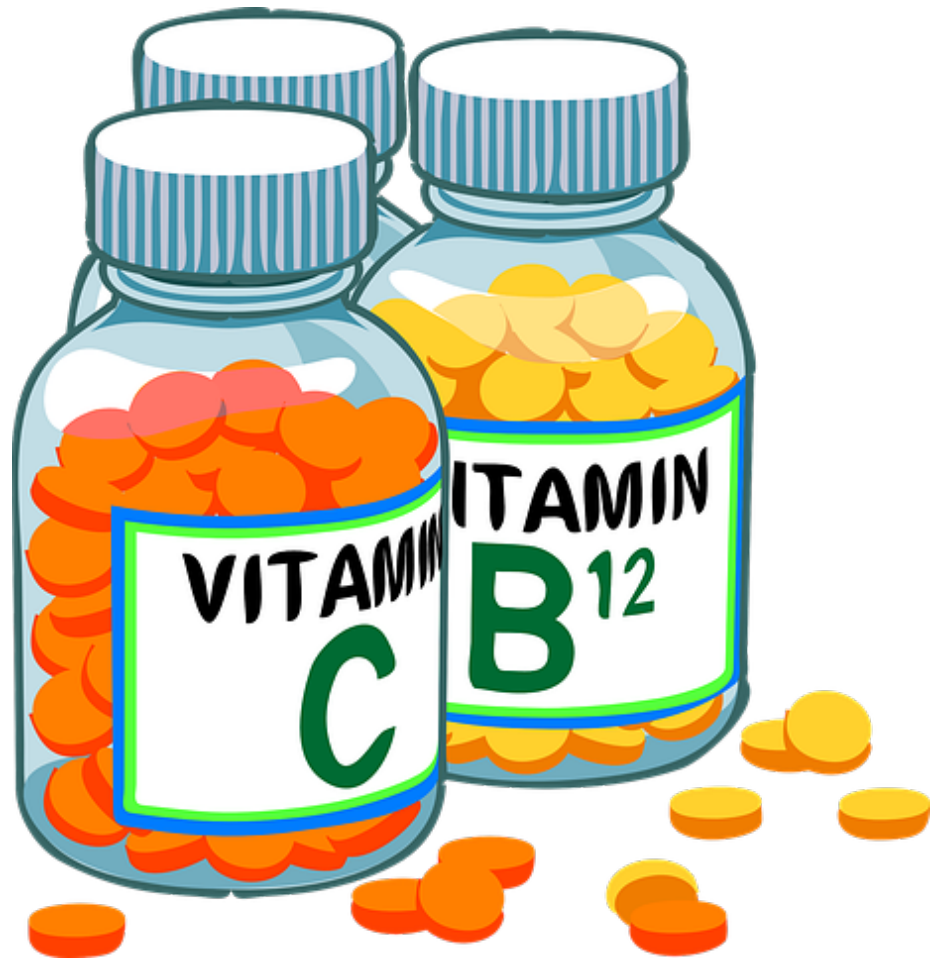




MVM research

- COSMOS-Mind -large randomized clinical trial in older adults
- effects of multivitamin-mineral and cocoa extract supplementation on incident mild cognitive impairment (MCI) and all-cause probable dementia.
- Multivitamin-mineral supplementation slowed cognitive declines for incident mild cognitive impairment
- Daily multivitamin-mineral (MVM) supplementation for 3 years improved global cognition, episodic memory, and executive function in older adults.
- The MVM benefit appeared to be greater for adults with cardiovascular disease.

Reading Vitamin Labels



- Look for quality markers
 - cGMP
 - NSF
 - USP
- What is in it?
- Serving size
- Dosage
- Inert ingredients

Label Review



Supplement Facts

Serving Size 1 Tablet

Amount Per Tablet	% Daily Value
Vitamin A 1500 mcg	167%
Vitamin C 60 mg	67%
Vitamin D3 10 mcg (400 IU)	50%
Vitamin E 13.5 mg	90%
Thiamin 1.5 mg	125%
Riboflavin 1.7 mg	131%
Niacin 20 mg	125%
Vitamin B6 2 mg	118%
Folate 680 mcg DFE (400 mcg folic acid)	170%
Vitamin B12 6 mcg	250%
Pantothenic Acid 10 mg	200%
Iron 18 mg	100%

INGREDIENTS: Ascorbic Acid, Ferrous Fumarate, Calcium Carbonate, Microcrystalline Cellulose, *d*-Alpha Tocopheryl Acetate, Gelatin, Nicotinamide, Starch, D-Calcium Pantothenate, Hydroxypropyl Methylcellulose, Sodium Starch Glycolate. Contains 2% or less of beta-carotene (color), cholecalciferol, cyanocobalamin, FD&C yellow no. 5 lake – tartrazine, FD&C yellow no. 6 lake, folic acid, magnesium stearate, polydextrose, polyethylene glycol, polyvinyl alcohol, pyridoxine hydrochloride, retinyl acetate, riboflavin, talc, thiamine mononitrate, titanium dioxide (color).

Label Review

SUGGESTED USE:

Adults: Take one (1) tablet daily with food.

Do not exceed suggested use. Not formulated for use in children.

Supplement Facts		Amount Per Serving		% DV	
Serving Size 1 Tablet					
Amount Per Serving	% DV	Amount Per Serving	% DV	Amount Per Serving	% DV
Vitamin A 750 mcg (40% as Beta-Carotene)	83%	Thiamin 1.5 mg	125%	Riboflavin 1.7 mg	131%
Vitamin C 60 mg	67%	Niacin 20 mg	125%	Vitamin B ₆ 3 mg	176%
Vitamin D ₃ 25 mcg (1,000 IU)	125%	Folate 667 mcg DFE (400 mcg Folic Acid)	167%	Vitamin B ₁₂ 25 mcg	1,042%
Vitamin E 22.5 mg	150%	Vitamin B ₁₂ 25 mcg	1,042%	Biotin 30 mcg	100%
Vitamin K 30 mcg	25%	Pantothenic Acid 10 mg	200%	Pantothenic Acid 10 mg	200%
Amount Per Serving	% DV	Amount Per Serving	% DV	Amount Per Serving	% DV
Calcium 220 mg	17%	Molybdenum 45 mcg	100%	Chloride 72 mg	3%
Phosphorus 20 mg	2%	Chloride 72 mg	3%	Potassium 80 mg	2%
Iodine 150 mcg	100%	Lutein 250 mcg	*	Lycopene 300 mcg	*
Magnesium 50 mg	12%	Lycopene 300 mcg	*		
Zinc 11 mg	100%				
Selenium 19 mcg	35%				
Copper 0.5 mg	56%				
Manganese 2.3 mg	100%				
Chromium 50 mcg	143%				

*Daily Value (DV) not established.

INGREDIENTS: Calcium Carbonate, Potassium Chloride, Magnesium Oxide, Microcrystalline Cellulose, Ascorbic Acid (Vit. C),

DL-alpha Tocopheryl Acetate (Vit. E), Maltodextrin, Modified Com Starch, Com Starch.

Contains <2% of: Beta-Carotene, BHT (to preserve freshness), Biotin, Blue 2 Lake, Calcium Pantothenate,

Cholecalciferol (Vit. D₃), Chromium Picolinate, Copper Sulfate, Cospovidone, Cyanocobalamin (Vit. B₁₂),

Folic Acid, Gelating, Hypromellose, Lutein, Lycopene, Magnesium Stearate, Manganese Sulfate,

Medium-Chain Triglycerides, Niacinamide, Phytonadione (Vit. K), Polydextrose,

Potassium iodide, Pyridoxine Hydrochloride (Vit. B₆), Red 40 lake, Riboflavin (Vit. B₂),

Silicic Dioxide, Sodium Ascorbate (to preserve freshness), Sodium

Molybdate, Sodium Selenate, Talc, Thiamine Mononitrate

(Vit. B₁), Titanium Dioxide, Tocopherols (to preserve freshness),

Vitamin A Acetate, Yellon 6 Lake,

Zinc Oxide.



Label Review

Supplement Facts

Serving size 1 capsule
Servings per container 120

	Amount Per Serving	%DV
Vitamin A (as vitamin A acetate and 73% beta carotene)	1,125 mcg	125%
Vitamin C (as ascorbic acid)	180 mg	200%
Vitamin D (as cholecalciferol) (D ₃)	50 mcg (2,000 IU)	250%
Vitamin E (as d-alpha tocopherol succinate)	20 mg	134%
Thiamin (as thiamin HCl) (B ₁)	3 mg	250%
Riboflavin (as vitamin B ₂ and 43% riboflavin 5' phosphate (activated B ₂))	3 mg	231%
Niacin (as niacinamide)	20 mg	125%
Vitamin B ₆ (as pyridoxine HCl and 38% pyridoxal 5' phosphate (activated B ₆))	4 mg	235%
Folate (as Metafolin [®] , L-5-MTHF)	667 mcg DFE (400 mcg L-5-MTHF)	167%
Vitamin B ₁₂ (as methylcobalamin)	500 mcg	20,833%
Biotin	300 mcg	1,000%

Pantothenic acid (as calcium pantothenate) (B ₅)	10 mg	200%
Choline (as choline bitartrate)	10 mg	2%
Iodine (as potassium iodide)	150 mcg	100%
Zinc (as zinc citrate)	25 mg	227%
Selenium (as selenomethionine)	70 mcg	127%
Manganese (as manganese citrate)	2 mg	87%
Chromium (as chromium polynicotinate)	200 mcg	571%
Molybdenum (as TRAACS [®] molybdenum glycinate chelate)	75 mcg	167%
Boron (as boron glycinate)	1 mg	*
Inositol	25 mg	*
Coenzyme Q ₁₀ (from MicroActive [®] Q ₁₀ -cyclodextrin complex and CoQ ₁₀)	50 mg	*
Alpha lipoic acid	50 mg	*
FloraGLO [®] lutein	3 mg	*
Zeaxanthin	500 mcg	*
Lycopene	500 mcg	*

*Daily value (DV) not established

Other ingredients: vegetarian capsule (cellulose, water), potato starch, ascorbyl palmitate
Product may have a mottled appearance.

CHROMEMATE[®] ChromeMate[®] brand niacin-bound chromium. ChromeMate[®] is a registered trademark of InterHealth, N.I.

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

MicroActive[®] is a registered trademark of BioActives, LLC

*FloraGLO is a registered trademark of Kemin Industries, Inc.



Label Review



Supplement Facts		
Serving size 1 capsule Servings per container 60		
	Amount Per Serving	%DV
Vitamin A (as vitamin A acetate and 27% beta carotene)	1,125 mcg	125%
Vitamin C (as ascorbic acid)	180 mg	200%
Vitamin D (as cholecalciferol (D ₃))	25 mcg (1,000 IU)	125%
Vitamin E (as d-alpha tocopherol succinate)	20 mg	134%
Vitamin K (as vitamin K ₁)	60 mcg	50%
Thiamin (as thiamin HCl (B ₁))	3 mg	250%
Riboflavin (as vitamin B ₂ and 43% riboflavin 5' phosphate (activated B ₂))	3 mg	231%
Niacin (as niacinamide)	20 mg	125%
Vitamin B ₆ (as pyridoxine HCl and 38% pyridoxal 5' phosphate (activated B ₆))	4 mg	235%
Folate (as Metafolin®, L-5-MTHF)	1,333 mcg DFE (800 mcg L-5-MTHF)	333%
Vitamin B ₁₂ (as adenosylcobalamin and 50% hydroxycobalamin)	1,000 mcg	41,667%
Biotin	300 mcg	1,000%
Pantothenic acid (as calcium pantothenate) (B ₅)	10 mg	200%
Choline (as choline bitartrate)	56 mg	10%
Iodine (as potassium iodide)	150 mcg	100%
Zinc (as zinc citrate)	25 mg	227%
Selenium (as selenomethionine)	70 mcg	127%
Manganese (as manganese citrate)	2 mg	87%
Chromium (as chromium polynicotinate)	200 mcg	571%
Molybdenum (as TRAACS® molybdenum glycinate chelate)	75 mcg	167%
Vitamin K ₂ (as menaquinone-7)	20 mcg	*
BenfoPure® benfotiamine	3 mg	*
Boron (as boron glycinate)	1 mg	*
Inositol	25 mg	*
FloraGLO® lutein	3 mg	*
Zeaxanthin	500 mcg	*

* Daily value (DV) not established

Other ingredients: vegetarian capsule (cellulose, water), trimagnesium citrate, ascorbyl palmitate

ChromoMate® ChromeMate® brand niacin-bound chromium. ChromeMate® & logo are trademarks of Lonza or its affiliates.

Metafolin® is a registered trademark of Merck KGaA, Darmstadt, Germany.

*FloraGLO is a registered trademark of Kemin Industries, Inc.

BenfoPure® is a registered trademark of Hamari Chemicals USA, Inc.

TRAACS® is a registered trademark of Albion Laboratories, Inc.

Zeaxanthin is sourced from OPTISHARP® brand. OPTISHARP® is a trademark of DSM.

Label Review



Supplement Facts			
Serving Size 1 Tablet			
	Amount Per Serving	% DV	
Vitamin A (as beta-carotene)	900 mcg	100%	
Vitamin C (ascorbic acid)	60 mg	67%	
Vitamin D (as cholecalciferol)	50 mcg	250%	
Vitamin E (as d-alpha tocopheryl succinate)	15 mg	100%	
Vitamin K (as phytonadione)	120 mcg	100%	
Thiamin (as thiamin mononitrate)	20 mg	1667%	
Riboflavin (vitamin B2)	20 mg	1538%	
Niacin (as niacinamide)	20 mg	125%	
Vitamin B6 (as pyridoxine hydrochloride)	20 mg	1176%	
Folate (as folic acid)	400 mcg DFE (240 mcg folic acid)	100%	
Vitamin B12 (as methylcobalamin)	10 mcg	417%	
Biotin	30 mcg	100%	
Pantothenic Acid (as calcium pantothenate)	13 mg	260%	
Choline (as choline bitartrate)	55 mg	10%	
Calcium (from mineral-rich red algae)	100 mg	8%	
Iron (as iron amino acid chelate)	6 mg	33%	
Iodine (from inactivated <i>Saccharomyces cerevisiae</i>)	150 mcg	100%	
Magnesium (as marine magnesium extract from sea water)	100 mg	24%	
Zinc (as zinc citrate)	11 mg	100%	
Selenium (as selenomethionine)	55 mcg	100%	
	Amount Per Serving	% DV	
Copper (as copper amino acid chelate)	0.9 mg	100%	
Manganese (as manganese citrate)	2.3 mg	100%	
Molybdenum (as molybdenum amino acid chelate)	45 mcg	100%	
Women's Nourishing Blend	91 mg	†	
Organic chlorella, grape (whole fruit) extract, organic pomegranate (fruit) juice powder, lutein			
Organic Rainbow Superfoods Blend	80 mg	†	
Organic spirulina, organic beet (root), organic broccoli (plant), organic kale (leaf), organic spinach (leaf), organic blackberry (fruit), organic blueberry (fruit), organic carrot (root), organic cranberry (fruit)			
Enzyme and Probiotic Blend	33 mg	†	
Ginger (root) juice extract, amylase (180 DU†), protease (720 HUT†), xylanase (96 XU†), maltase (5 DPT†), glucoamylase (1 AGU†), hemicellulase (738 HCU†), beta-glucanase (21 BGU†), phytase (0.1 FTU†), cellulase (29 CU†), alpha-galactosidase (5 GalU†), lipase (26 FIP†), lactase (8 ALU†), invertase (4 SU†), <i>Bacillus coagulans</i> MTCC 5856 (25 million CFU†)			
Citrus (fruit) bioflavonoids	25 mg	†	
Inositol	20 mg	†	
Boron (as boron glycinate)	1 mg	†	

†Daily Value (DV) not established.

Other ingredients: Microcrystalline cellulose, coating (hydroxypropyl cellulose), hydroxypropyl methylcellulose. Contains milk, soy, and wheat traces from enzyme fermentation media.



Vegetarian
Gluten-Free



Label Review



Supplement Facts					
Serving Size 1 Tablet					
Amount Per Serving		% DV	Amount Per Serving		% DV
Vitamin A (as 60% acetate, 40% beta-carotene)	5000 IU	100%	Magnesium (as magnesium oxide)	100mg	25%
Vitamin C (as ascorbic acid)	60mg	100%	Zinc (as zinc oxide)	15mg	100%
Vitamin D3 (as cholecalciferol)	400 IU	100%	Selenium (as selenomethionine)	20mcg	29%
Vitamin E (as d-alpha tocopheryl succinate)	30 IU	100%	Copper (as copper oxide)	2mg	100%
Thiamin (as thiamine mononitrate)	1.5mg	100%	Manganese (as manganese sulfate)	3.5mg	175%
Riboflavin	1.7mg	100%	Chromium (as chromium chloride)	65mcg	54%
Niacin (as niacinamide)	20mg	100%	Molybdenum (as sodium molybdate)	150mcg	200%
Vitamin B6 (as pyridoxine HCl)	2mg	100%	Chloride (as potassium chloride)	72mg	2%
Folic Acid	400mcg	100%	Potassium (as potassium chloride)	80mg	2%
Vitamin B12 (as cyanocobalamin)	6mcg	100%	Silicon (as silicon dioxide)	2mg	*
Biotin (as d-biotin)	30mcg	10%	Lycopene	300mcg	*
Pantothenic Acid (as d-calcium pantothenate)	10mg	100%	Lutein (from marigold flower extract)	250mcg	*
Calcium (as calcium carbonate)	162mg	16%	Boron (as amino acid complex)	150mcg	*
Iron (as ferrous fumarate)	18mg	100%	Vanadium (as vanadium amino acid chelate)	10mcg	*
Iodine (from kelp)	150mcg	100%	*Daily Value (DV) not established.		

OTHER INGREDIENTS: MICROCRYSTALLINE CELLULOSE, STEARIC ACID (VEGETABLE SOURCE), SILICON DIOXIDE, CROSCARMELLOSE SODIUM, MAGNESIUM STEARATE (VEGETABLE SOURCE), VEGETABLE COATING (SODIUM CARBOXYMETHYLCELLULOSE).
CONTAINS SOY (VITAMIN E) INGREDIENTS. PRODUCED IN A FACILITY THAT PROCESSES TREE NUTS, MILK, EGGS, SHELLFISH, FISH AND WHEAT.

Label Review



Supplement Facts

Serving Size 2 Gummy Vitamins
Servings Per Bottle 75

Amount Per Serving	% Daily Value	
Calories	15	
Total Carbohydrate	4 g	1%†
Total Sugars	3 g	**
Includes 3 g Added Sugars		6%†
Vitamin A (as retinyl palmitate)	450 mcg RAE	50%
Vitamin C (as ascorbic acid and sodium ascorbate)	36 mg	40%
Vitamin D (as cholecalciferol)	25 mcg (1000 IU)	125%
Vitamin E (as dl-alpha-tocopheryl acetate)	15 mg	100%
Niacin (as inositol niacinate)	8 mg NE	50%
Vitamin B-6 (as pyridoxine HCl)	1.7 mg	100%
Folate	400 mcg DFE	100%
	(240 mcg folic acid)	
Vitamin B-12 (as cyanocobalamin)	4.8 mcg	200%
Biotin	30 mcg	100%
Pantothenic acid (as calcium d-pantothenate)	3 mg	60%
Chromium (as chromium picolinate)	35 mcg	100%
Molybdenum (as molybdenum citrate)	11 mcg	24%
Sodium	10 mg	<1%
Inositol (as inositol niacinate)	1.5 mg	**
Boron (as boron citrate)	150 mcg	**

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

Other ingredients: Glucose syrup, sugar, water, gelatin; less than 2% of: blend of oils (coconut and/or palm) with beeswax and/or carnauba wax, citric acid, colors (annatto extract, blueberry and carrot concentrates), lactic acid, natural flavors, and pectin. **Contains: tree nuts (coconut).**
Processed in a facility with products that contain egg fish shellfish soy and tree nuts

MVM Use

- **Dosing**
 - No standard or regulatory definition available
 - Delivers stated nutrients in 1-2 capsules
- **Safety**
 - Check contents for additives, fillers, coloring
- **Quality**
 - Avoid MVM with added herbal ingredients
 - Look for quality assurance label
 - cGMP
 - USP
 - NSF

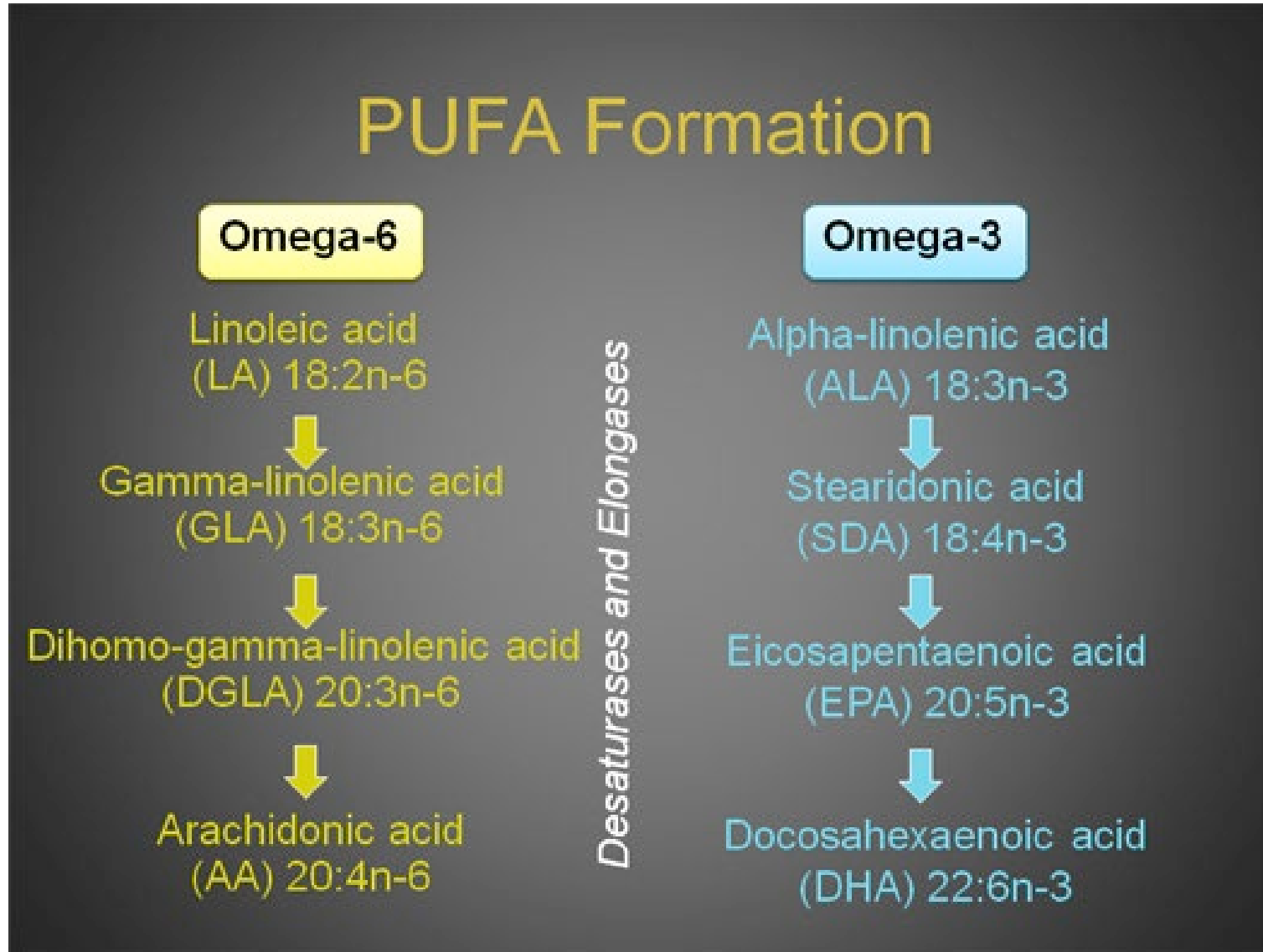




Fish Oil



Polyunsaturated Fatty Acids (PUFAs)



- Essential= body cannot manufacture and must get from diet
- Rate limiting step for both catalyzed by **delta 6 desaturase (D6D)** and compete for same enzyme

PUFA Formation

Nutrient CoEnzymes Required

- Magnesium, zinc, biotin, B3, B6, C

D6D Impaired By

- Excess consumption of alcohol, cholesterol, sugar, trans-fats
- Aging
- Diabetes

Dietary Factors

- High LA in the diet = less ALA converted to EPA
- SAD diet: 15% of ALA converted to EPA, 5% to DHA



Omega Fatty Acids

- Ratio of Omega 3,6,9 is important
- Estimated ratio of Omega 6:3 intake has changed over time
 - Early humans 1:1
 - 1900s 4:1
 - SAD diet 20:1
 - Am. J Clin Nutr. 1999. 70(3Suppl) 560S-563S)
- Poor ratios are result of:
 - Recommendations to substitute for saturated fats
 - Addition of corn & soy to packaged foods
 - Changes in agricultural practices for raising meat, poultry and fish

Omega 3 Fatty Acids Mechanism of Action



- Omega 3 Fatty Acids (EPA and DHA)
 - EPA is anti-inflammatory via synthesis of lipid mediators
 - DHA important for making new synapses for neurons, high in cells of retina
 - EPA and DHA are structural components of cell membranes





Fish oil and cognition

- Fish oil supplementation may modestly help older patients with self-reported cognitive decline to perform daily activities Neurobiol Aging. 2018 Apr;64:147-156
- Clinical research in young and middle-aged adults shows that taking a fish oil supplement providing eicosapentaenoic acid (EPA) 900 mg plus docosahexaenoic acid (DHA) 360 mg daily for 6 months improves some measures of cognitive function, Am J Clin Nutr. 2021 Sep 1;114(3):914-924.



Fish Oil Supplementation

- Fish oil has the highest content of EPA and ideal ratio of EPA/DHA
- As a dietary supplement potency and quality of these fatty acids in fish oil supplements can vary
- Dosing in studies are variable -Often state “3 grams of fish oil”
- Best data is at least 1000 mg EPA
 - **Take with food**
 - **Keep the capsules in the freezer, less reflux/fish burps**
 - **NOT** cod liver oil, krill oil, Omega 3-6-9, or salmon oil
- For pregnancy at least 200 mg DHA Pregnancy (Koletzko, 2008)

• No Artificial Colors • No Artificial Flavors • No Yeast or Gluten

SUGGESTED USE: Take one (1) softgel two times daily with a full glass of water preferably with a meal.

Supplement Facts

Serving Size 1 Softgel

Each Softgel Contains	% Daily Value
Calories 10	
Total Fat 1 g	1%*
Cholesterol 10 mg	3%*
Fish Oil 1000 mg	"
Omega-3 Fatty Acids (EPA+DHA) 250 mg	"
Other Omega-3 Fatty Acids 50 mg	"

*Percent Daily Values are based on a 2,000 calorie diet.

**Daily Value not established.

INGREDIENTS: Fish Oil, Gelatin (Porcine), Glycerin, Water, Tocopherols.

CONTAINS: Fish (Mackerel, Anchovy, Menhaden, Herring, Sardine).

Supplement Facts

Serving Size: 2 Soft Gels

Amount Per Serving	% Daily Value**	
Calories	20	
Calories from fat	20	
Total Fat	2 g	3%
Saturated Fat	0.1 g	1%
Trans Fat	0 g	†
Total Omega-3s	1280 mg	†
EPA (Eicosapentaenoic Acid)	650 mg	†
DHA (Docosahexaenoic Acid)	450 mg	†
Other Omega-3s	180 mg	†

**Percent Daily Values are based on a 2,000 calorie diet.

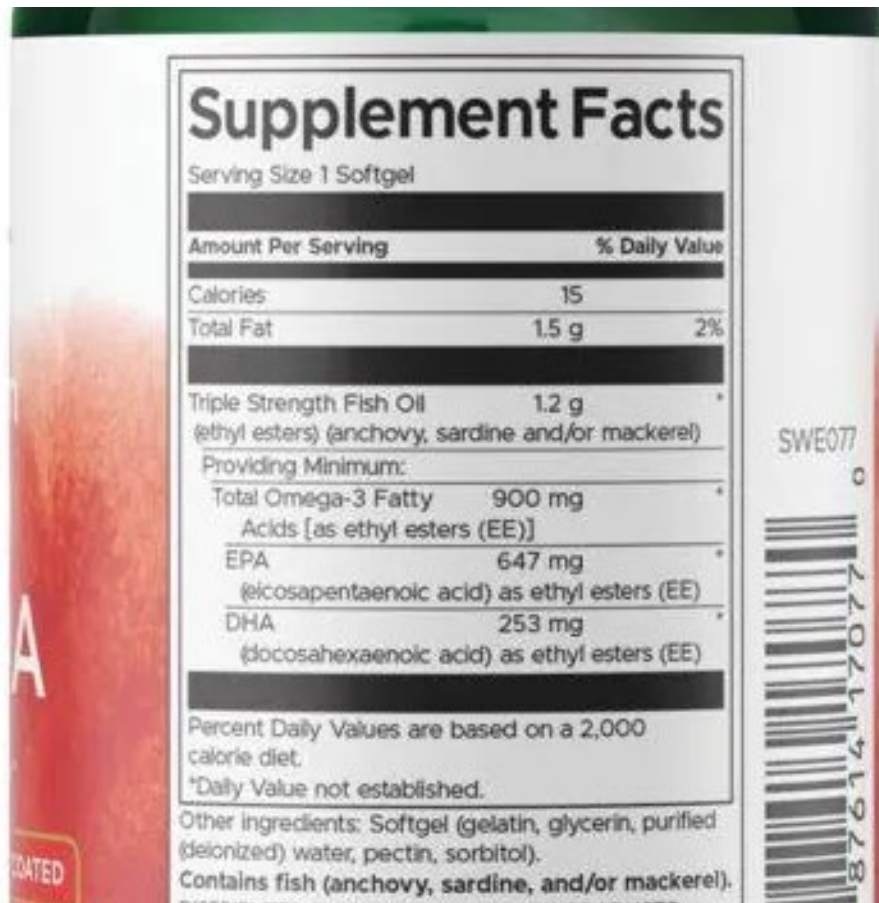
† Daily Value not established.

Less than 5 mg of Cholesterol per serving.

Ingredients: purified deep sea fish oil (from anchovies and sardines), soft gel capsule (gelatin, glycerin, water, natural lemon flavor), natural lemon flavor, d-alpha tocopherol, rosemary extract (a natural preservative).

No gluten, milk derivatives, or artificial colors or flavors.

Fish oil



Serving Size: 2 Soft Gels

Amount Per Serving	% Daily Value*	
Calories	25	
Calories from fat	25	
Total Fat	2.5 g	4%
Saturated Fat	0 g	0%
Trans Fat	0 g	†
Total Omega-3s	2150 mg	†
EPA (Eicosapentaenoic Acid)	1125 mg	†
DHA (Docosahexaenoic Acid)	875 mg	†
Other Omega-3s	150 mg	†

* Percent Daily Values are based on a 2,000 calorie diet.

† Daily Value not established.

Less than 5 mg of Cholesterol per serving.

Ingredients: purified deep sea fish oil (from anchovies and sardines), soft gel capsule (gelatin, water, glycerin, natural lemon flavor). natural lemon flavor. d-alpha tocopherol.



Fish Oil Supplementation Safety

- Likely safe in doses of 3 grams daily or less
- Adverse effects are rare and mild
 - Most common side effects are fishy after-taste and gastrointestinal complaints
 - Bruising
- Very high doses may increase risk for bleeding
- Appear to contain almost no mercury or other contaminants but best if label indicates testing for purity and mercury contaminants
- No significant interactions with medication except caution if on blood thinners.
- Caution if fish allergy



Vitamin D Summary

- Prevalence of Vitamin D Deficiency - vitamin D is primarily made through the skin from ultraviolet rays from the sun.
- Not specific for cognition. Has activity in **bone health, immune system function, cellular differentiation, & mood**
- **2,000 IU (50mcg) daily is safe**
- **Consider sublingual** in obese patients or if factors present that may reduce intestinal absorption



QUESTIONS?

