

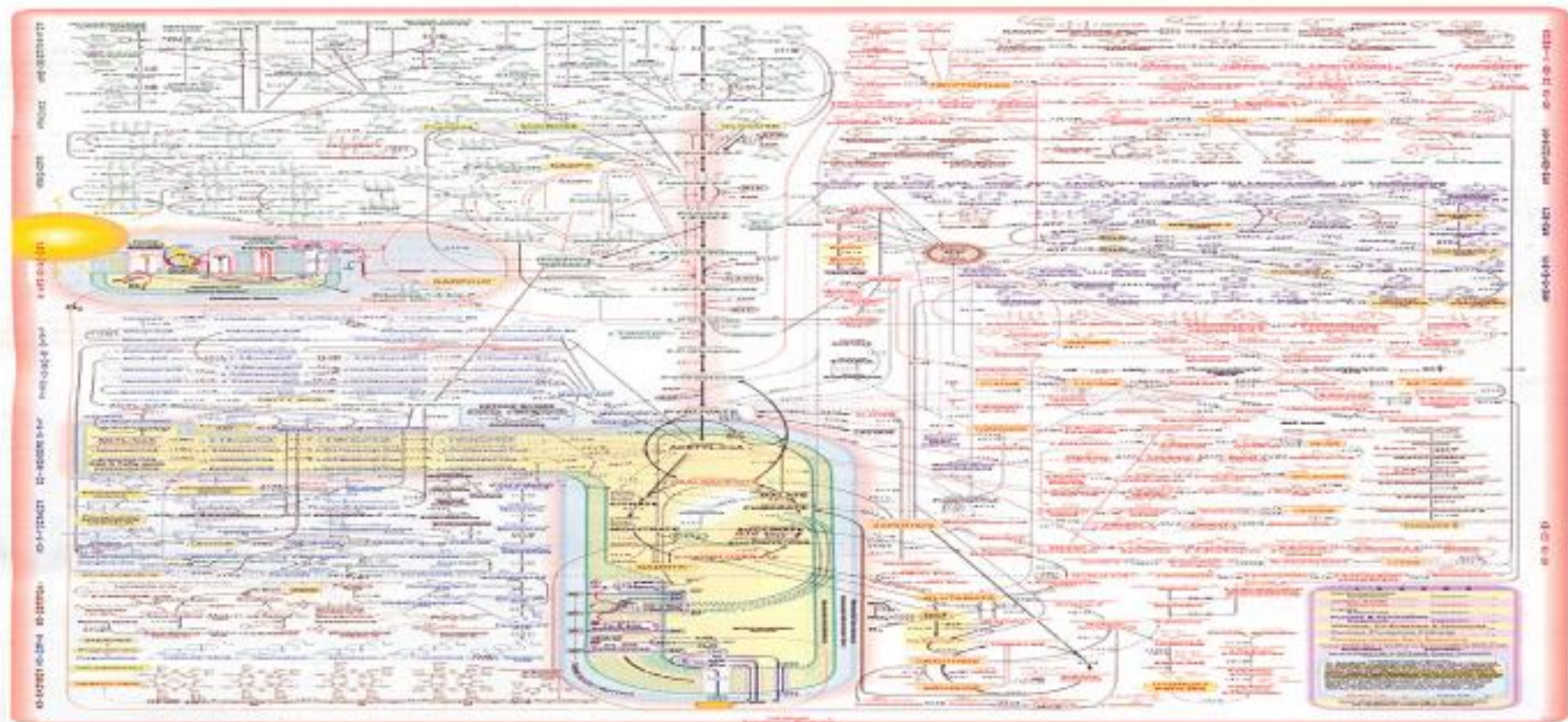
Nutrition 5

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Metabolic Dysfunction: The Key to Health

- All cells need to:
 1. Produce energy: ATP(adenosine triphosphate)
 - a. Micronutrients (vitamins, minerals, amino acids, fatty acids) needed to use protein, fat, carbohydrates
 - b. Macronutrients (protein, fat, carbohydrates) needed to provide energy
 2. Reproduce and repair itself
 - a. Micronutrients needed to use fats, cholesterol, & protein
 3. Get rid of waste
 - a. Micronutrients and Macronutrients needed

Your Metabolism: Micronutrients are the catalysts



Essential Metabolic Nutrients That Run Your Metabolism

Vitamins

- Biotin
- Vitamin B1-Thiamin
- Vitamin B2- Riboflavin
- Vitamin B3- Niacin
- Vitamin B4- Choline
- Vitamin B5- Pantothenate
- Vitamin B6- Pyrodoxine
- Vitamin B9- Folate
- Vitamin B12- Cobalamin
- Vitamin A
- Vitamin D
- Vitamin E
- Vitamin K
- Vitamin C

Minerals

- Calcium
- Chloride
- Chromium
- Cobalt
- Copper
- Iodine
- Iron
- Magnesium
- Manganese
- Molybdenum
- Phosphorus
- Potassium
- Selenium
- Sodium
- Zinc

Essential Metabolic Nutrients

Amino Acids(Proteins)

- Leucine
- Isoleucine
- Valine
- Methionine
- Threonine
- Tryptophan
- Phenylalanine
- Lysine

Fatty Acids

- Omega 3 fat- alpha linolenic acid
- Omega 6 fat- linoleic acid

Metabolic Syndrome

- Excess abdominal fat
- High blood sugar
- High Triglycerides
- High blood pressure
- Low HDL

Having any 2-3 of the above means a diagnosis of metabolic syndrome

High levels of insulin (hyperinsulinemia) is the primary driver of all 5



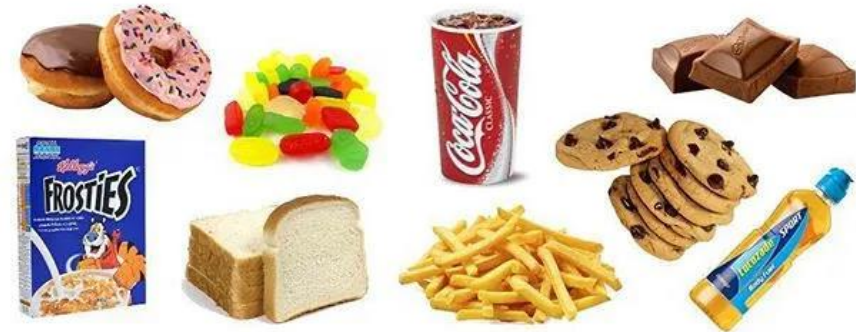
Carbohydrate Monitoring is the Key

- Carbohydrates break down into glucose
- Glucose levels rise in the blood
- Insulin rises to drive glucose out of blood and into cells that need it
- If you are active the glucose will get used as fuel
- If not active, glucose will get stored in the muscles and liver as glycogen
- If glycogen levels in the muscles are full, insulin takes the glucose to the liver to be stored

✓ **COMPLEX CARBS**



✗ **SIMPLE CARBS**



Carbohydrate Monitoring is the Key

- If liver glycogen is full, the liver converts the glucose to triglycerides to get stored and/or transported to fat cells
- If liver is full of triglycerides the liver becomes fatty (fatty liver)
- Triglycerides start to rise significantly in the blood
- Triglycerides cannot get into fat cells without insulin stimulating an enzyme called hormone sensitive lipase
- Hormone sensitive lipase splits triglycerides into glycerol and fatty acids
- Fatty acids now easily enter fat cells



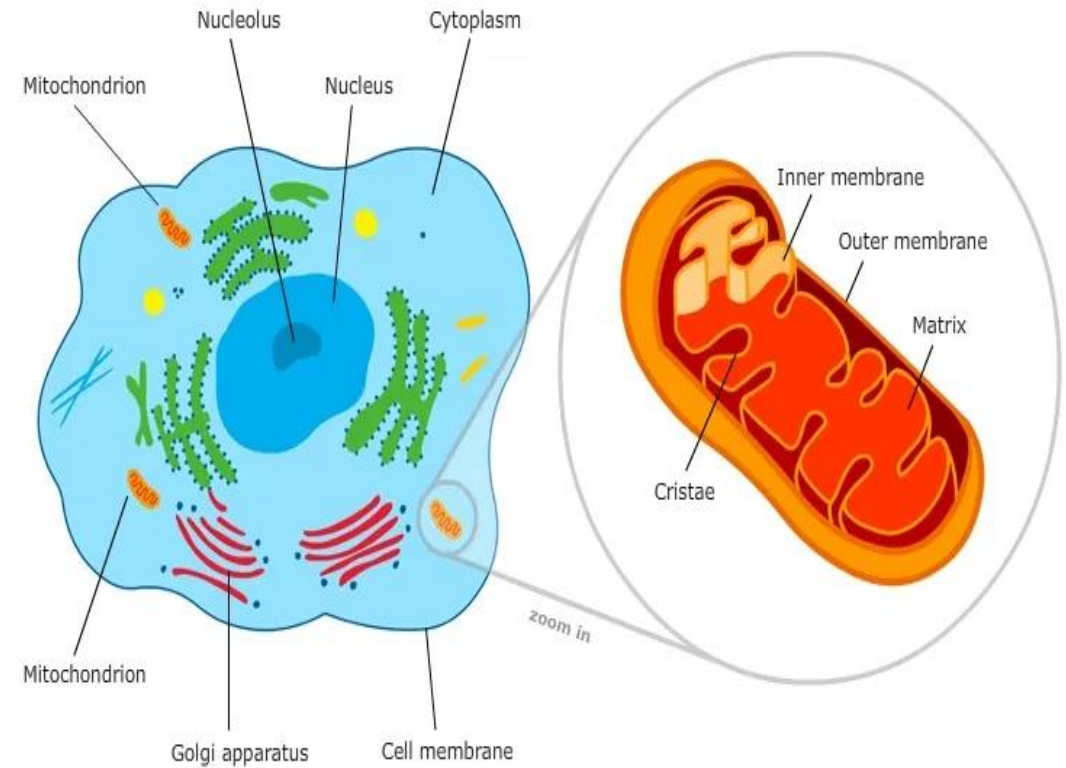
Carbohydrate Monitoring is the Key

- Insulin also activates Glut 4 transporters allowing glucose to enter the fat cells
- The glucose will get converted into glycerol in the fat cells
- The glycerol combines with the fatty acids in the fat cells to form new triglycerides
- To get the body to break the triglycerides back down into fatty acids and glycerol you need an enzyme called hormone sensitive lipase
- Insulin blocks hormone sensitive lipase
- Insulin also stimulates sodium retention in the kidneys
- This can lead to water retention



A Healthy Metabolism

- Keep the mitochondria healthy
- Keep or get insulin down
- Restrict intake of polyunsaturated omega 6 fats
- Eat foods rich in vitamins and minerals
- Drink clean water
- Protein is very important
- Get adequate sleep
- Stay active



Top 10 Purchased Items in Grocery Stores

1. Soda
2. Milk
3. Bread
4. Beer
5. Salty Snacks
6. Cheese
7. Frozen entrees
8. Cold cereal
9. Wine
10. Cigarettes

Grocery Store Index 2016

Priority is fast, tasty and convenience



Processed Foods are the Number 1 Problem

- Main Ingredients:
 - White flour, or other processed flour
 - High omega 6 vegetable oils
 - Sugar in many forms
 - Preservatives
 - Colors and flavors
- ~ 70% of American diet is Processed Foods
- Very few micronutrients/highly toxic



Micronutrient Dense Whole Foods



Why Supplements MAY Be Warranted

Farming Techniques

Monoculture vs. Polyculture
Quality vs. Quantity

Food Quality

Food Anti-nutrients

phytates, enzyme inhibitors
(reduced by soaking, sprouting,
fermenting)

Food Processing

-Nutrients removed

Food Preservation

Many preservatives can
block nutrient absorption

Storage

Loss during storage



Why Supplements May Be Warranted- cont.

Genetics

e.g. MTHFR mutation

Gender

e.g. male/zinc, female/mag.

Current health status

e.g. no gall bladder

Lifestyle Habits

e.g. sun avoidance,
personal tastes, diet choice

Exercise (Stress)

Medication Interaction

Diagnosed deficiency (labs)

e.g. Vit. D, B12



Why Supplements May Not Be Warranted

Current health condition-

- severe kidney disease (minerals)

Medication Interaction-

- blood thinners (vitamin K)
- potassium sparing diuretics

Allergy

- iodine
- milk, wheat, etc

High Lab Value

- vitamin D



Medication Interactions

Acid Reflux drugs-

zinc, magnesium, B12,
folate, etc

Anti-Hypertensives-

potassium, magnesium,
zinc, B vitamins, Vit. C

Cholesterol reducers (statins)-

CoQ10, vitamin K2

Antibiotics-

Most minerals, B vitamins

Oral hypoglycemics-

B12, folate, magnesium

Hormone replacement-

B6, folate, B12, magnesium



Multivitamin



SUPPLEMENT FACTS

Serving Size: Eight Capsules
Servings Per Container: 30

Eight Capsules Contain:			Eight Capsules Contain:		
		%DV			%DV
Vitamin A (375 mcg from Beta Carotene and 750 mcg as Palmitate)	1.125 mg	125%	Magnesium (as Albion® DiMagnesium Malate)+++	250 mg	60%
Vitamin C (as Ascorbic Acid)	850 mg	944%	Zinc (as TRAACS® Zinc Bisglycinate Chelate)++++	15 mg	136%
Vitamin D (as Vitamin D3) (2,000 IU)	50 mcg	250%	Selenium (as L-Selenomethionine)	200 mcg	364%
Vitamin E (200 IU as d-Alpha Tocopherol from Mixed Tocopherols)	134 mg	893%	Copper (as TRAACS® Copper Bisglycinate Chelate)++++	1.5 mg	167%
Vitamin K (50 mcg as Vitamin K1 and 50 mcg as Vitamin K2 as MK-7)	100 mcg	83%	Manganese (as TRAACS® Manganese Bisglycinate Chelate)++++	6 mg	261%
Thiamin (as Thiamin HCl)	40 mg	3,333%	Chromium (as Chromium Nicotinate Glycinate Chelate)++++	200 mcg	571%
Riboflavin (as Riboflavin 5'-Phosphate Sodium)	10 mg	769%	Quercetin Phytosome (<i>Sophora japonica</i> extract (flower) / Phospholipid complex from Sunflower)	100 mg	*
Niacin (130 mg as Niacinamide and 30 mg as Niacin)	160 mg	1,000%	Bilberry extract (fruit) (<i>Vaccinium myrtillus</i>)++++	80 mg	*
Vitamin B6 (as Pyridoxal 5'-Phosphate)	10 mg	588%	Nicotinamide Riboside Chloride++++	25 mg	*
Folate (1 mg as L-5-Methyltetrahydrofolate† from L-5-Methyltetrahydrofolic Acid, Glucosamine Salt)	1.7 mg DFE	425%	Trans-Resveratrol	25 mg	*
Vitamin B12 (as Methylcobalamin)	450 mcg	18,750%	Mixed Carotenoids (1 mg as Lutein, 1 mg as Astaxanthin, 1 mg as Zeaxanthin, and 1 mg as Lycopene)	4 mg	*
Biotin	400 mcg	1,333%	Boron (as Bororganic™ Boron Glycinate Complex)++++	3 mg	*
Pantothenic Acid (as Calcium Pantothenate)	450 mg	9,000%			
Choline (as Choline Citrate)	35 mg	6%			
Calcium (as DimaCal® DiCalcium Malate)††	250 mg	19%			
Iodine (as Potassium Iodide)	225 mcg	150%			

*Daily Value (DV) not established.

Other Ingredients: Hypromellose (derived from cellulose) capsule, Microcrystalline Cellulose, Calcium Laurate, Silicon Dioxide.

Pure Encapsulations



Supplement Facts

Serving size 1 capsule
Servings per container 60

	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)	25 mg	5%
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 (as CoQ ₁₀ and as 18% from sustained-release MicroActive [®] Q ₁₀ -cyclodextrin complex)	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), hypoallergenic plant fiber (cellulose), ascorbyl palmitate, potato starch
Product may have a mottled appearance.

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

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

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

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

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

*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.



Metagenics



Supplement Facts

Serving Size 2 Tablets
Servings Per Container 60

Amount Per Serving	% Daily Value	Amount Per Serving	% Daily Value
Total Carbohydrate	<1 g..... <1%*	Molybdenum (as molybdenum aspartate complex)	50 mcg..... 111%
Dietary Fiber	<1 g..... 2%*	Proprietary Phytonutrient Blend of:	400 mg..... **
Vitamin A (from mixed carotenoids and retinyl acetate)	3,000 mcg 333%	Citrus bioflavonoid complex [standardized to 45% hesperidin], green coffee bean extract [standardized to 45% chlorogenic acid], pomegranate whole fruit extract [standardized to 43.2 mg gallic acid equivalents (GAE)], grape seed extract [standardized to 85% oligomeric proanthocyanidins], blueberry (<i>Vaccinium</i> spp.) fruit extract [standardized to 20% total polyphenols and 15% anthocyanins], green tea leaf extract [standardized to 60% catechins and 40% EGCG], bitter melon fruit extract, prune skin extract [standardized to 50% polyphenols], watercress aerial parts 4:1 extract, Chinese cinnamon (<i>Cinnamomum cassia</i>) bark powder, Indian gum Arabic tree bark and heartwood extract [standardized to 6% catechins], rosemary extract [standardized to 7.6% min sum of carnosol+arnosic acid], artichoke leaf extract [containing cynarin and chlorogenic acid]	
Vitamin C (as ascorbic acid and ascorbyl palmitate)	120 mg..... 133%	Myo-Inositol	25 mg..... **
Vitamin D (as cholecalciferol)	25 mcg (1,000 IU)..... 125%	Resveratrol (from <i>Polygonum cuspidatum</i> root extract)	10 mg..... **
Vitamin E (as d-alpha tocopheryl succinate)	67 mg 447%	Lutein	6 mg..... **
Vitamin K (as phytonadione USP)	120 mcg..... 100%	Lycopene	6 mg..... **
Thiamin (as thiamin mononitrate)	25 mg..... 2,083%	Zeaxanthin	2 mg..... **
Riboflavin	15 mg..... 1,154%		
Niacin (as niacinamide and niacin)	50 mg..... 313%		
Vitamin B ₆ (as pyridoxine HCl)	25 mg..... 1,471%		
Folate (as calcium L-5-methyltetrahydrofolate) ^f	1,360 mcg DFE..... 340%		
Vitamin B ₁₂ (as methylcobalamin)	200 mcg..... 8,333%		
Biotin	500 mcg..... 1,667%		
Pantothenic Acid (as calcium D-pantothenate)	75 mg..... 1,500%		
Choline (as choline bitartrate)	25 mg..... 5%		
Iodine (as potassium iodide)	150 mcg..... 100%		
Magnesium (as magnesium citrate)	40 mg..... 10%		
Zinc (as zinc citrate)	15 mg..... 136%		
Selenium (as selenium aspartate)	100 mcg..... 182%		
Copper (as copper citrate)	1 mg..... 111%		
Manganese (as manganese citrate)	0.5 mg..... 22%		
Chromium (as chromium polynicotinate)	200 mcg..... 571%		

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

Other Ingredients: Microcrystalline cellulose, croscarmellose sodium, cellulose, stearic acid (vegetable), silica, and coating [hypromellose, medium-chain triglycerides, hydroxypropylcellulose, and sodium copper chlorophyllin (color)].

Centrum Adult Multivitamin

Supplement Facts		Amount Per Serving		Amount Per Serving	
Serving Size 1 Tablet			% DV		% DV
Amount Per Serving	% DV				
Vitamin A 3,500 IU (29% as Beta-Carotene)	70%	Folic Acid 400 mcg	100%	Manganese 2.3 mg	115%
Vitamin C 60 mg	100%	Vitamin B ₁₂ 6 mcg	100%	Chromium 35 mcg	29%
Vitamin D 1,000 IU	250%	Biotin 30 mcg	10%	Molybdenum 45 mcg	60%
Vitamin E 30 IU	100%	Pantothenic Acid 10 mg	100%	Chloride 72 mg	2%
Vitamin K 25 mcg	31%	Calcium 200 mg	20%	Potassium 80 mg	2%
Thiamin 1.5 mg	100%	Iron 18 mg	100%	Nickel 5 mcg	*
Riboflavin 1.7 mg	100%	Phosphorus 20 mg	2%	Silicon 2 mg	*
Niacin 20 mg	100%	Iodine 150 mcg	100%	Tin 10 mcg	*
Vitamin B ₆ 2 mg	100%	Magnesium 50 mg	13%	Vanadium 10 mcg	*
		Zinc 11 mg	73%		
		Selenium 55 mcg	79%		
		Copper 0.5 mg	25%		

*Daily Value (DV) not established.

Ingredients: Calcium Carbonate, Potassium Chloride, Dibasic Calcium Phosphate, Magnesium Oxide, Microcrystalline Cellulose, Ascorbic Acid (Vit. C), Ferrous Fumarate, dl-Alpha Tocopheryl Acetate (Vit. E), Maltodextrin. **Contains < 2% of:** Beta-Carotene, BHT (to preserve freshness), Biotin, Calcium Pantothenate, Cholecalciferol (Vit. D₃), Chromium Picolinate, Copper Sulfate, Corn Starch, Crospovidone, Cyanocobalamin (Vit. B₁₂), Folic Acid, Gelatin, Hydrogenated Palm Oil, Magnesium Stearate, Manganese Sulfate, Modified Corn Starch, Niacinamide, Nickelous Sulfate, Phytonadione (Vit. K), Polyethylene Glycol, Polyvinyl Alcohol, Potassium Iodide, Pyridoxine Hydrochloride (Vit. B₆), Riboflavin (Vit. B₂), Silicon Dioxide, Sodium Ascorbate (to preserve freshness), Sodium Metavanadate, Sodium Molybdate, Sodium Selenate, Stannous Chloride, Talc, Thiamine Mononitrate (Vit. B₁), Titanium Dioxide, Tocopherols (to preserve freshness), Vitamin A Acetate, Yellow 6 Lake, Zinc Oxide.

Vitamin C

- Formation of collagen (bone)
- Formation of carnitine
- Formation of norepinephrine, adrenaline,
- Formation of peptide hormones (insulin, leptin), and bile acid
- Water soluble antioxidant
- Formation of immune cells
- Anti-viral
- Humans are one of a few species that cannot make vitamin C from glucose



Vitamin C

- Whole food sources are best to get full spectrum vitamin C
- Mineral ascorbates work well
- Freeze dried powder supplements of:
 - camu camu
 - acerola
 - amla berry

Taken to bowel tolerance



Liposomal Vitamin C



YOUR SOURCE FOR A **HEALTHIER LIFESTYLE**

SUPPLEMENT FACTS

SERVING SIZE: 2 CAPSULES	
SERVING PER CONTAINER: 90	
AMOUNT PER SERVING	%DV
VITAMIN C (LIPOSOMAL; FROM ASCORBIC ACID, ORGANIC ACEROLA CHERRIES, & ORGANIC CAMU CAMU)	1500MG 1667%
DAILY VALUE (DV) NOT ESTABLISHED	

Other Ingredients: Methylcellulose Capsule, Phosphatidylcholine, Sunflower Lecithin

Ascorbates



B vitamins

- B6, B9, and B12 are synergistic
- B6-pyridoxal-5-phosphate
- B9-methylfolate over folic acid (MTHFR)
- B12- methylcobalamin or adenosylcobalamin over cyanocobalamin
- Get b12 levels checked
- Sublingual forms are safest bet



Vitamin K2 and Vitamin D

- Vitamin D levels should be checked to figure out optimal dose
- Choose vitamin D3 (cholecalciferol) over vitamin D2 (ergocalciferol)
- An upper dose of K2 has not been established, no known toxicity
- Work with physician if on blood thinners



Magnesium

- Involved in over 1,000 enzymatic reactions
- Critical to balance with calcium
- “relaxing” mineral
- Magnesium required for chlorophyll production
(dark greens)
- 200-800 mgs/ daily
(bowel tolerance)
- Malate, taurate, threonate and glycinate are best forms
- Magnesium oxide poorest form



Conclusion

- Focus should be on eating right first
- Go for food sources first
- Be aware of supplement interactions
- Watch combinations of multiple supplements: A good multi may provide everything
- Get the right form
- Get a good brand:
 - Thorne
 - Pure Encapsulations
 - Metagenics
 - Designs for Health
 - Biotics Research
 - Jarrow