

*How effective are  
the multivitamins you take?*

# The Multivitamin Guide

*What are the best  
multivitamin brands  
on the market?*



2007 EDITION

**Vitamin supplements are becoming increasingly popular.**

According to a recent national health survey, as many as 78 million Americans use multivitamins on a regular basis.

**But are you getting what you're paying for?**

A study conducted at Yale New Haven Hospital tested 257 vitamin products. Only 49 were judged as having adequate ratios of nutrients.

**Find out which multivitamin products really work.**

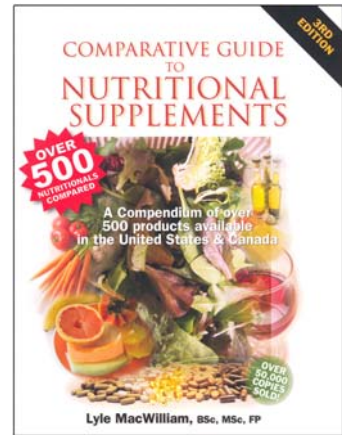
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## What is the source of this information?

The information in this document comes from the third-edition of the *Comparative Guide to Nutritional Supplements* (ISBN: 0973253800) written by Lyle MacWilliam, BSc, MSc, FP. This is the most comprehensive, science-based comparison of multivitamin products published to date.

Please note that this document provides only a high level summary of the findings of the guide. For more in-depth information, it is recommended you purchase a copy of the guide from [www.amazon.com](http://www.amazon.com).



**This guide provides the most comprehensive comparison of vitamin supplements available on the market in North America**



**Lyle MacWilliam, BSc, MSc, FP**

The author of the *Comparative Guide to Nutritional Supplements*, Lyle MacWilliam, is a respected biochemist and a former member of Canadian Parliament. He was **commissioned by the Canadian Minister of Health** to develop a new regulatory framework to ensure people have access to safe, effective, high quality nutritional products. This guide is the culmination of over six years of research and analysis in this area.

In this comparative study, Mr. MacWilliam identified over 1000 multivitamin formulas, which were available on the market in the United States and Canada. He then short-listed 510 of these products for further analysis and comparison.

## How is the comparison made?

Fourteen criteria were used to compare the short-listed 510 multivitamin products. The development of each criterion was based on scientific evidence available in the latest published medical literature. The 14 comparison criteria are as follows:

- |  |                                      |
|--|--------------------------------------|
| 1. <i>Completeness</i>                 | 8. <i>Antioxidant Triad</i>          |
| 2. <i>Potency</i>                      | 9. <i>Glutathione Support</i>        |
| 3. <i>Bioavailability</i>              | 10. <i>Metabolic Support</i>         |
| 4. <i>Bioactivity of Vitamin E</i>     | 11. <i>Bioflavonoid Profile</i>      |
| 5. <i>Cardiac Health Triad</i>         | 12. <i>Phenolic Compound Profile</i> |
| 6. <i>Homocysteine Reduction Triad</i> | 13. <i>Lipotropic Factors</i>        |
| 7. <i>Bone Health Complex</i>          | 14. <i>Potential Toxicities</i>      |

For an in-depth explanation of each of the 14 comparison criteria please refer to Appendix B. From these 14 criteria, a Product Score, based on a percentage ranking, is calculated. A score approaching 100% represents a product that possesses those characteristics for optimal nutrition. Conversely, a low percent score represents a product possessing few, if any, of the characteristics for optimal nutrition.

## What are the optimal doses for each vitamin and mineral?

The “Blended Standard” represents the optimal quantities of vitamins and minerals individuals should be taking every day according to the latest research in the area of nutritional supplementation. This Standard includes the 39 essential ingredients, listed in the table below alongside with their recommended daily dose:

1 Vitamin A	7500 IU	21 n-Acetyl-L-Cysteine	56 mg
2 Vitamin D3	350 IU	22 L-Carnitine	750 mg
3 Vitamin K*	180 ug	23 Choline	59 mg
4 Biotin	200 ug	24 Inositol	125 mg
5 Folic Acid	400 ug	25 Lecithin	350 mg
6 Vitamin B1	50 mg	26 Boron*	3 mg
7 Vitamin B2	43 mg	27 Calcium	800 mg
8 Vitamin B3 complex	75 mg	28 Chromium	275 ug
9 Vitamin B5	75 mg	29 Copper	2 mg
10 Vitamin B6	63 mg	30 Iodine	100 ug
11 Vitamin B12	300 ug	31 Iron	23 mg
12 beta-Carotene	12,500 IU	32 Magnesium	450 mg
13 Coenzyme Q10	45 mg	33 Manganese	7 mg
14 Lipoic Acid	35 mg	34 Molybdenum	63 ug
15 Para-Aminobenzoic Acid	35 mg	35 Potassium	300 mg
16 Vitamin C	2,000 mg	36 Selenium	150 ug
17 Vitamin E	500 IU	37 Silicon	8 mg
18 Bioflavonoids (mixed)	555 mg	38 Vanadium	75 ug
19 Phenolic compounds	25 mg	39 Zinc	23 mg
20 Procyanidolic Oligomers	75 mg		

\* Not available in Canadian products

## What are the findings of the comparison?

After Mr. MacWilliam assessed all 510 products he assigned each of them a score from 1% to 100%, 100% being the highest. The author believed that a score of 80% and above was commendable.

Surprisingly **only 8 out of the 510 products were able to surpass this benchmark.**

The products that scored above 80% are listed in the table below:

<b>Company</b>	<b>Product</b>	<b>Score</b>	<b>Rank</b>
USANA Health Sciences	Essentials (U.S.)	96.1%	1
Douglas Laboratories	Ultra Preventive X	95.4%	2
Vitamin Research Products	Extended Plus	93.1%	3
Source Naturals	Life Force Multiple	92.8%	4
Source Naturals	Elan Vital	91.8%	5
USANA Health Sciences	Essentials (Canadian)	90.2%	6
FreeLife	Basic Mindell Plus	82.3%	7
Life Extension Foundation	Life Extension Mix	81.4%	8

The top four manufacturers listed above - **USANA Health Sciences, Douglas Laboratories, Vitamin Research Products, and Source Naturals** – are considered to set the standard for nutritional supplement quality, potency and bioavailability.

## What is the score of the multivitamins you are taking?

In order to find the Product Score of the multivitamin product you are taking please refer to **Appendix A** where all 510 evaluated products are listed in alphabetic order alongside with their Product Score.

The table below provides a summary of the Product Scores of some of the more popular vitamin brands available on the market.

<i><b>Company</b></i>	<i><b>Product</b></i>	<i><b>Score</b></i>	<i><b>Rank</b></i>
Atkins	Basic #3	46.1%	104
Bronson Laboratories	Performance Edge for Women	43.8%	120
Centrum	Forte	4.7%	442
DaVinci Laboratories	Spectra Woman	66.8%	17
Dr. Julian Whitaker's	Forward Multi-Nutrient	74.7%	13
Equate	Complete	4.9%	430
GNC	Mega Men's	21.1%	255
Herbalife	Formula 2	14.8%	319
Jamieson	Mega-Vim Level 4 Potency	9.0%	376
Kirkland Signature (Costco)	Daily Multivitamin	5.2%	416
Lifestyles	Lifecycles for Women	14.5%	323
Mannatech	Glycentials	33.1%	181
Melaleuca	Vitality Pak (Mel-VIta, Mela-Cal)	6.2%	402
Metagenics	Multigenics Intensive Care Formula	51.0%	82
Nature Made	Essential Mega	17.9%	292
Nikken	Bio-Directed Multi-Vitamin/Mineral	11.1%	353
NOW Foods	Vit-Min Caps High Potency Multiple	26.2%	221
Nutrilite (Amway, Quixtar)	Double X	30.0%	201
One A Day	Active	5.1%	419
Puritan's Pride	Time Release Mega Vita-Min	15.3%	311
Purity Products	Perfect Multi Focus Formula	68.9%	16
Safeway Select	Super Women's Multivitamin	28.2%	209
Sundown	Complete Ultra	8.1%	382
Rite Aid	Whole Source	6.2%	403
Shaklee	Basics with Iron	30.5%	200
Solgar	Omnium	56.5%	62
SupraLife	Maxum Essentials	48.9%	91
Thompson	Human Nature Green Multi	29.3%	203
TwinLab	Daily One without Iron	26.4%	218
USANA Health Sciences	Essentials	96.1%	1
Vitamin Power	Power Source 100	26.9%	215
Vitamin World	Mega Vita Min for Women	19.4%	272
Walgreens	Ultra Choice Premium Women	22.1%	247
YourLife	Super Multi with Herbs	7.5%	391

Given that the benchmark for product excellence is 80%, we can conclude that the great majority of multivitamin products on the market do not provide adequate protection against diseases, such as cancer, atherosclerosis, stroke, diabetes, and arthritis.

**Using a multivitamin product with a score of 80% or above is strongly advised.**

## Price and availability of top nutritional supplements

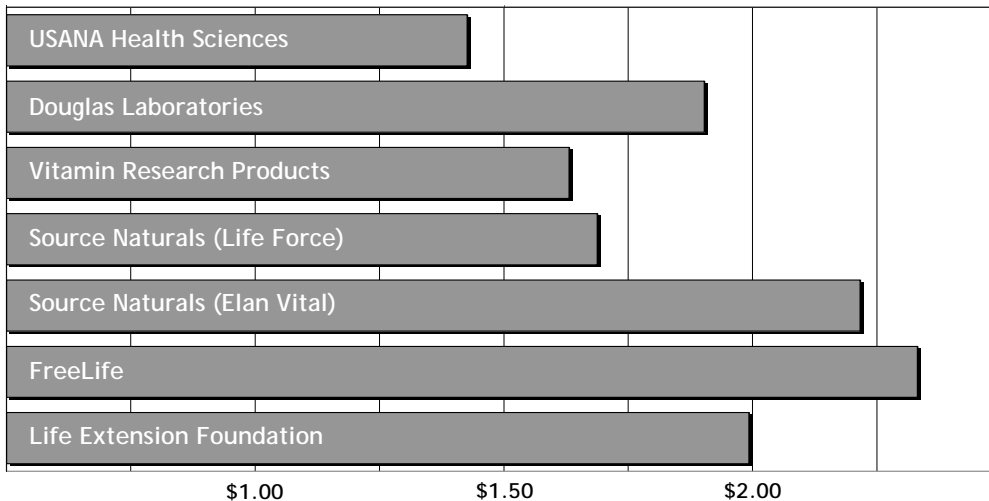
Nutritional supplements with a product score of 80% and above are typically several times more expensive than low-end multivitamins that can be found in grocery stores. The table below provides a cost comparison of the top-ranked nutritional supplements. The table lists the price of each product, the number of tablets in a single package, as well as, the recommended daily dose. These numbers are then used to calculate the products' Cost-Per-Day.

### Product Cost of Top Multivitamin Brands

Company	Product	Price	Contents	Daily Dose	Cost/Day	Availability
USANA Health Sciences	Essentials (U.S.)	\$39.95	224 tablets	8	\$1.43	Online
Douglas Laboratories	Ultra Preventive X	\$57.10	240 tablets	8	\$1.90	Online
Vitamin Research Products	Extended Plus	\$48.95	360 capsules	12	\$1.63	Online
Source Naturals	Life Force Multiple	\$37.98	180 capsules	8	\$1.69	Online
Source Naturals	Elan Vital	\$66.50	180 tablets	6	\$2.22	Online
FreeLife	Basic Mindell Plus	\$69.95	60 packets	2	\$2.33	Online
Life Extension Foundation	Life Extension Mix	\$69.75	315 tablets	9	\$1.99	Online

The diagram below takes the Cost-Per-Day numbers from the table and provides a visual comparison of the cost for the top multivitamin brands.

### Cost-Per-Day Comparison



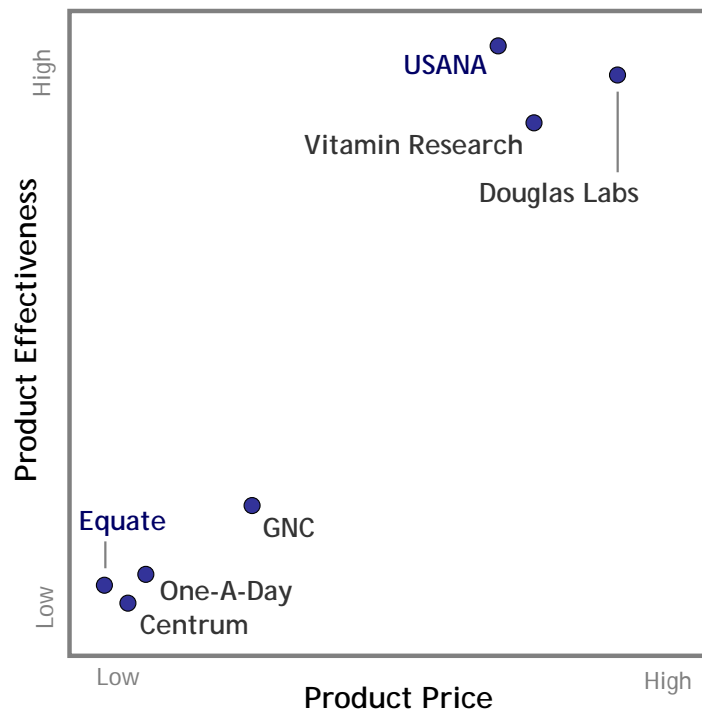
High-end multivitamin products are generally not available through traditional retail outlets, such as supermarkets and health stores. The main reason for that is their higher production cost, which comes as a result of the R&D and the superior quality of the raw materials used in the preparation of the product. Because of the higher production costs, most high-end supplement manufacturers have chosen to sell their products over the Internet directly to consumers. In that way they are able to avoid the markups charged by distributors/retailers and offer their premium products at a lower retail price than would otherwise be possible. In other words, buying direct from the manufacturer saves you money.

## How do the commonly-available vitamin brands compare?

The most widespread multivitamin brands are Centrum, GNC, One-A-Day, and Equate. The main reasons behind the popularity of these brands are their low cost and their widespread availability through a variety of retail outlets. Unfortunately none of the above products is very effective from a medical point of view. Centrum, One-A-Day and Equate multivitamins have Product Scores of 4.7%, 5.1%, and 4.9% respectively, while GNC multivitamins (which retail at a slightly higher price) have a Product Score of 21%.

The diagram below provides a visual depiction of the Price versus Effectiveness relationship of the most popular multivitamin brands, relative to the top three nutritional supplements.

**Price vs. Effectiveness Comparison**



If you would like more information on the top three multivitamin products, visit the manufacturers' websites by clicking on the links below:

- **USANA Health Sciences** Essentials  
<http://www.usana-health.com/en/essentials.htm>
- **Douglas Labs** Ultra Preventive X  
<http://www.douglaslabs.com/pdf/pds/45410.pdf>
- **Vitamin Research Products** Extended Plus  
<http://www.vrp.com/ProductPage.aspx?ProdID=3226>

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## Appendix A: Full list of multivitamin products and their SCORES (sorted by company name)

Company	Product	Country	Score <sup>1</sup>	Rank <sup>2</sup>
21st Century	Advanced 21 with Lutein	US	4.9%	429
21st Century	One Daily Maximum	US	5.3%	413
21st Century	One Daily Men's	US	7.3%	394
21st Century	Therapeutic-M With Lutein	US	4.6%	453
4Life	BioVitaMins Type II	US	33.2%	178
4Life	BioVitamins Type III	US	44.0%	119
4Life	BioVitaMins Type I	US	21.6%	251
4Life	MultiPlex Stress Formula	US	5.9%	406
Absolute Nutrition	Dieters' Multi's	US	26.4%	216
Action Labs	Action-Tabs Made for Men	US	1.3%	495
Action Labs	Action-Tabs Made for Women	US	0.0%	502
Action Labs	Essential Nutrients	US	4.4%	460
Adrien Gagnon (Sante Naturelle)	Multi-Vitamines et Mineraux	CA	9.9%	367
Advanced Physician's Products	Complete MultiVitamin/Mineral with Iron	US	49.1%	89
Advanced Physician's Products	Complete MultiVitamin/Mineral without Iron	US	49.1%	90
Advanced Physician's Products	Maximum MultiVitamin/Mineral without Iron	US	57.2%	53
Advanced Physician's Products	Maximum Potency MultiVitamin/Mineral with Iron	US	57.4%	52
Advocare	Gold	US	35.7%	168
Albi Imports	Rocky Mountain Multiple	CA	34.3%	174
Albi Imports	Super One a Day	CA	10.9%	355
Alive Vitamins	Super One Plus	CA	20.9%	260
All One Powder	Multiple Vitamins and Minerals	US	49.9%	87
Allergy Research Group	EDP Basic	US	18.3%	286
Allergy Research Group	Multi-Vi-Min	US	16.6%	297
Allergy Research Group	Multi-Vi-Min without Copper and Iron	US	18.7%	278
Alpha Nutrition	Alpha ENF	CA	21.9%	248
American Longevity	Ultimate Daily	US	60.7%	39
amni	Added Protection III	US	69.1%	15
amni	Basic Preventive 1	US	60.2%	41
amni	Basic Preventive 2	US	59.6%	46
amni	Basic Preventive 3	US	60.2%	42
amni	Basic Preventive 4	US	59.6%	47
amni	Basic Preventive 5	US	59.9%	45
amni	Basic Preventive with Extra D	US	60.0%	43
amni	Essential Basics	US	51.5%	76
Andrew Lessman's	Maximum Complete for Men	US	30.8%	195
Andrew Lessman's	Maximum Complete for Women	US	31.2%	193
Apex Fitness Group	Profile 5	US	16.8%	296
Atkins	Basic #1	US	38.2%	146
Atkins	Basic #3	US	46.1%	104
Atkins	Immune	US	14.6%	322
Avon	VitAdvance Men's Complete Multivitamin	US	10.9%	356
Avon	VitAdvance Women's Complete I Balanced Multi	US	10.5%	361
Avon	VitAdvance Women's Complete II Balanced Multi	US	10.5%	362
Basic Nutrition	Multiple Vitamins & Minerals	US	4.4%	461
Bio Actif Inc.	Phytobec #1	CA	15.1%	315
Bluebonnet	Super Earth Formula	US	54.0%	71
Body Wise International	Right Choice AM/PM	CA/US	52.2%	74
Bronson Laboratories	Advanced Mature Gold	US	18.0%	290
Bronson Laboratories	Fortified Vitamin & Mineral Insurance Formula	US	33.2%	179
Bronson Laboratories	Mature Formula	US	8.6%	378
Bronson Laboratories	Men's Complete Formula with 7-Keto	US	21.5%	252
Bronson Laboratories	Performance Edge for Men	US	43.6%	121
Bronson Laboratories	Performance Edge for Women	US	43.8%	120
Carlson	Multi-Gel	US	45.7%	107
Cell Tech	Alpha Sun	US	0.3%	497
Cell Tech	Omega Sun	US	0.3%	498
Centrum	Centrum	US	3.2%	482
Centrum	Forte	CA/US	4.7%	442
Centrum	Performance	US	5.2%	415
Centrum	Protegra	CA	7.2%	395
Centrum	Select	CA	4.6%	454
Centrum	Select Chewables	CA	4.0%	474
Centrum	Select Chewables for Adults over 50	CA	4.7%	443
Centrum	Select for Adults over 50	CA	5.0%	423
Centrum	Silver	US	4.7%	444
Club Vitamin	Best	US	3.6%	477
Colgan Institute	Formula MCS	US	63.3%	30
Comprehensive Formula	Men's	US	14.0%	328
Comprehensive Formula	Women's	US	11.8%	348
Cooper	Complete	US	45.8%	106
Cooper	Complete with Iron	US	38.0%	149
Country Life	Adult's Multi	US	9.8%	370
Country Life	Daily Vegetarian Support	US	44.5%	115
Country Life	Hi Potency Action 75	US	24.0%	234
Country Life	Max for Men	US	32.8%	184
Country Life	Maxine	US	43.1%	124
Country Life	VegiCaps	US	19.2%	273
Creative Nutrition Canada	PLUS Formula	CA/US	54.8%	66
Creative Nutrition Canada	PRIME Formula	CA	52.4%	73
Cypress (Star 2000)	MultiVitamin with Minerals	US	14.1%	326
DaVinci Laboratories	Daily Best	US	21.9%	249



Company	Product	Country	Score <sup>1</sup>	Rank <sup>2</sup>
DaVinci Laboratories	Omni	US	63.6%	29
DaVinci Laboratories	Spectra	US	64.7%	23
DaVinci Laboratories	Spectra Man	US	62.5%	33
DaVinci Laboratories	Spectra Vegetarian	US	48.6%	93
DaVinci Laboratories	Spectra without Copper and Iron	US	64.5%	26
DaVinci Laboratories	Spectra Woman	US	66.8%	17
Doctor's Nutrition	Mega Veggie Vites	US	43.3%	122
Doctor's Nutrition	Mega Vites Senior	US	54.7%	67
Doctor's Nutrition	Mega Vites without Copper & Iron	US	64.2%	27
Doctor's Nutrition	Mega Vites Woman	US	66.8%	18
Doctor's Nutrition	UltraNutrient	US	55.9%	64
Douglas Laboratories	Ultra Preventive Beta	US	75.1%	11
Douglas Laboratories	Ultra Preventive III	US	70.0%	14
Douglas Laboratories	Ultra Preventive IX	US	66.6%	20
Douglas Laboratories	Ultra Preventive X	US	95.4%	2
Douglas Laboratories	Ultra Vita 75 II	US	16.2%	306
Dr. Julian Whitaker's	Forward Multi-Nutrient	US	74.7%	13
Dr. Julian Whitaker's	Forward Multi-Nutrient	CA	58.5%	48
EAS	Multi-Blend	US	62.1%	38
EcoNugenics	Men's Longevity Essentials Plus	US	20.3%	265
EcoNugenics	Women's Longevity Rhythms Gold	US	57.0%	54
EHN Inc.	protect+	CA	7.8%	383
Enorex	Sona	CA	20.6%	262
Enzymatic Therapy	Doctor's Choice for Men	US	42.5%	126
Enzymatic Therapy	Doctor's Choice for Women	US	45.5%	109
Epic4Health	Physician's Multi Vitamin Formula	US	31.3%	192
Equate	Century Complete	CA	3.5%	478
Equate	Century Plus	CA	4.7%	445
Equate	Complete	US	4.9%	430
Equate	Complete Mature	US	4.7%	446
Equate	Multi-Vitamin & Minerals	CA	2.8%	486
Essentials by Megafood	Essentials for Life	US	51.2%	79
Essentials by Megafood	Essentials for Women	US	34.8%	172
Essentials by Megafood	One Daily for Men	US	20.6%	263
Flora	MultiCaps	CA	10.6%	358
Flora	MultiTabs	CA	10.6%	359
FoodScience of Vermont	Daily Best	US	21.9%	250
FoodScience of Vermont	Men's Superior	US	62.5%	34
FoodScience of Vermont	Superior Care	US	64.7%	24
FoodScience of Vermont	Total Care	US	13.3%	333
FoodScience of Vermont	Women's Superior	US	63.8%	28
For Mor International	AnOx	US	42.1%	129
For Mor International	Oral Chelate	US	13.7%	331
Freedra Vitamins	Quintabs-M	US	1.5%	494
Freedra Vitamins	Ultra Freedra Iron-Free	US	25.8%	225
Freedra Vitamins	Ultra Freedra with Iron	US	23.4%	240
FreeLife	Basic Mindell Plus	US	82.3%	7
Futurebiotics	Hi Energy Multi for Men	US	40.3%	137
Futurebiotics	Multi-Vitamin Energy Plus for Women	US	18.7%	279
Futurebiotics	Vegetarian Super Multi	US	40.3%	138
Garry Null's	Super AM Formula	US	17.7%	294
Garry Null's	Supreme Health Formula	US	47.2%	98
Genestra (Seroyal)	Super Orti-Vite	CA	44.8%	114
Gerbex	Gerivol	CA	0.0%	503
Geritol	Complete	US	3.4%	480
GNC	Mega Men's	US	21.1%	255
GNC	Preventron	US	9.9%	368
GNC	SoloCaps	US	10.6%	360
GNC	Solotron without Iron	US	7.7%	385
GNC	Ultra Mega Gold without Iron	US	37.1%	155
GNC	Ultra Mega Green	US	46.9%	100
GNC	Ultra Mega Two without Iron	US	24.5%	231
GNC	Women's Ultra Mega	US	28.2%	207
Golden Neo-Life Diamite International	Formula IV	CA	0.0%	504
Good Neighbor Pharmacy	Balanced Care Complete Multi	US	5.0%	424
Good Neighbor Pharmacy	Century Senior	US	4.7%	447
Great Earth	Super Hy-Vites-Ultra Strength/Timed Release	US	29.4%	202
Great Earth	TNT - Total Nutrition Tablet	US	48.6%	94
Greens+	Greens+	US	14.8%	318
Greens+	Multi+	CA	37.9%	151
Herbalife	Formula 2	CA	15.2%	314
Herbalife	Formula 2	US	14.8%	319
Hillestad Pharmaceuticals	Sterling	US	21.0%	259
Hillestad Pharmaceuticals	Summit Gold	US	19.1%	274
Holista Health	Multi-Spectrum	CA	35.9%	165
Immuvit	Immuvit	US	4.4%	462
Inno-Vite	Total NRG Lift	CA	15.5%	309
Jamieson	Adult's 50+ Vita-Vim	CA	4.4%	463
Jamieson	Mega-Vim Level 4 Potency	CA	9.0%	376
Jamieson	Power Vitamins for Men	CA	3.5%	479
Jamieson	Super Vita-Vim	CA	8.3%	380
Jarrow	Multi 1-to-3	US	37.7%	153
Jarrow	Multi E-Z Powder	US	48.7%	92
Jarrow	Women's Multi	US	31.5%	191
Jean Carper's	Stop Aging Now!	US	58.5%	49
Jean Carper's	Stop Aging Now! Plus	US	58.5%	50

Company	Product	Country	Score <sup>1</sup>	Rank <sup>2</sup>
KAL	Enhanced Energy with Lutein, Iron-Free	US	49.2%	88
KAL	High Potency Soft Multiple, Iron-Free	US	19.1%	275
KAL	Multi-Four	US	33.0%	183
KAL	Multiple Energy	US	51.2%	80
KAL	Vegetarian Multiple	US	31.7%	190
KAL	Vitality for Women	US	35.0%	171
Karuna	HIM	US	41.2%	133
Karuna	Maxxum 2	US	65.7%	22
Karuna	Maxxum 4	US	79.0%	9
Kirkland Signature (Costco)	Daily Multivitamin	US	5.2%	416
Kirkman Laboratories	Kirkman's Everyday	US	3.1%	484
Kirkman Laboratories	Kirkman's Super Nu-Thera	US	12.3%	344
Klamath Blue Green Algae	Tablets	US	0.3%	499
Klamath Blue Green Algae	Vegicaps	US	0.3%	500
Kroger	Advanced Formula Complete	US	4.9%	431
Laboratoire Lalco Enr.	Multi Max	CA	7.7%	386
Le Naturiste (Jean Marc Brunet)	US-100 Multi-vitamines	CA	9.5%	372
Les Produits Naturels Suisse Inc.	Swical Energy	CA	0.0%	505
Life Brand	Optimum	CA	5.0%	425
Life Brand	Optimum 50+	CA	5.0%	426
Life Brand	Spectrum Forte	CA	4.3%	465
Life Extension Foundation	Life Extension Mix	US	81.4%	8
Life Force International	Body Balance	US	9.2%	374
Life Plus	Daily Bio-Basics	US	32.3%	188
Life Plus	TVM-Plus	US	22.7%	245
LifeScript	Daily Essentials, plus Calcium Complete	US	36.6%	162
Lifestyles	Lifecycles for Mature Men	CA/US	14.7%	320
Lifestyles	Lifecycles for Mature Women	CA/US	14.7%	321
Lifestyles	Lifecycles for Men	CA/US	5.8%	407
Lifestyles	Lifecycles for Women	CA/US	14.5%	323
LifeTime	Nutrilife	CA	7.4%	392
LiFizz	Multivitamin	CA	2.9%	485
London Drugs	Multi Premium	CA	15.0%	317
London Naturals	Multi-Vitamin Select	CA	12.4%	340
London's Best	Premier	CA	18.8%	277
Lorna Vanderhaeghe	FemmEssentials (multiple only)	CA	56.5%	61
Mannatech	Glycentials	US	33.1%	181
Mannatech	GlycoLEAN Catalyst	US	26.2%	219
Market America	Isotonix Multitech Multivitamin	CA/US	3.2%	483
Matoi	Matolife	US	40.0%	141
MD Healthline	Advanced Green Multi	US	4.8%	439
Melaleuca	Vitality Pak (Mel-Vita, Mela-Ca)	US	6.2%	402
Metagenics	Multigenics Intensive Care Formula	US	51.0%	82
Metagenics	Multigenics Intensive Care Formula without Iron	US	50.5%	84
Michael's Naturopathic Programs	Active Senior Tabs	US	56.6%	60
Michael's Naturopathic Programs	for Men	US	36.9%	158
Michael's Naturopathic Programs	for Women	US	36.9%	159
Michael's Naturopathic Programs	Just One	US	23.6%	239
MMS Pro	Preventamins	US	58.1%	51
Moducare	Multi-mune	US	8.6%	379
Molecular Biologics	Allervimin	US	8.3%	381
Molecular Biologics	Bio-Naturalvite	US	9.7%	371
Molecular Biologics	Derma-Vite	US	20.2%	266
More Than A Multiple	More Than A Multiple	US	44.4%	116
Mountain Naturals of Vermont	Men's Superior	US	62.5%	35
Mountain Naturals of Vermont	Superior Care	US	64.7%	25
Mountain Naturals of Vermont	Women's Superior	US	66.8%	19
N. V. Perricone, MD	Physician's Super Antioxidant Vitamin, Mineral & Phyto-Nutrient Fc	US	41.7%	132
National Vitamin Company	Life-line Mega Multi with Minerals	US	11.9%	347
Natrol	My Favorite Multiple Complete Care	US	27.3%	212
Natrol	My Favorite Multiple Original	US	36.7%	161
Natrol	My Favorite Multiple Take One	US	27.2%	213
Natural Factors	MultiStart	CA	13.3%	334
Natural Factors	MultiStart Men's	CA	47.7%	97
Natural Factors	MultiStart Women's	CA	56.9%	57
Nature Made	Essential Balance	CA	4.4%	464
Nature Made	Essential Mega	US	17.9%	292
Nature's Answer	Multi-Daily	US	21.2%	254
Nature's Blend	Maximum Daily Green	US	37.5%	154
Nature's Blend	Vitaminix Ultimate	US	54.7%	68
Nature's Bounty	Green Source Vegetarian Formula	US	40.1%	139
Nature's Bounty	Mega Vita Min for Women Time Release	US	19.4%	270
Nature's Bounty	Ultra Man Time Release	US	12.5%	337
Nature's Bounty	Ultra Vita-Time Iron Free	US	4.7%	448
Nature's Life	Green Multi	US	42.0%	130
Nature's Plus	Regeneration	US	30.7%	196
Nature's Plus	Source of Life No Iron	US	29.2%	204
Nature's Plus	Ultra One	US	18.6%	281
Nature's Plus	Ultra II	US	18.6%	280
Nature's Plus	Ultra-One Iron-Free Sustained Release	US	23.7%	238
Nature's Sunshine	Super Supplemental Vitamins and Minerals	US	26.2%	220
Nature's Sunshine	Super Supplemental without Iron	US	28.6%	206
Nature's Sunshine	SynerPro	US	4.9%	432
Nature's Way	Age Right Formula	US	38.0%	150
Nature's Way	Alive! Whole Food Energizer (Iron-Free)	US	60.0%	44
Nature's Way	Completia Ultra Energy Multi (Iron-Free)	US	17.6%	295

Company	Product	Country	Score <sup>1</sup>	Rank <sup>2</sup>
Nature's Way	Daily Two Multi Iron-Free	US	34.8%	173
Nature's Way	Multivitamin Iron-Free	US	33.2%	180
New Image International	Multi	US	27.4%	211
New Roots Herbal	Multi-Max	CA	46.3%	103
New Roots Herbal	Phytomax	CA	2.5%	487
Neways	Orachel	US	24.1%	233
NewVision	JuicePower Vegetable Caps	CA/US	2.4%	488
Nikken	Bio-Directed Multi-Vitamin/Mineral	CA/US	11.1%	353
NOW Foods	Iron-Free Vit-Min 75+	US	32.6%	186
NOW Foods	Special Two	US	43.1%	125
NOW Foods	Vit-Min 100 (Timed Release High Potency)	US	32.8%	185
NOW Foods	Vit-Min Caps High Potency Multiple	US	26.2%	221
Nu-life	Gourmet Multiple	CA	23.8%	236
Nu-life	The Legend for Women	CA	33.8%	175
Nu-life	Ultimate One for Men	CA	35.8%	166
Nu-life	Ultimate One for Women	CA	21.4%	253
Nutra Therapeutics	All-In-One	CA	22.7%	246
NutriBiotics	Ultimate Matrix Men	US	35.2%	169
NutriBiotics	Ultimate Matrix Women	US	35.2%	170
Nutricology	Multi-Vi-Min	US	13.1%	335
Nutricology	Multi-Vi-Min without Copper & Iron	US	13.0%	336
Nutriex	Nutriex	US	40.5%	136
Nutrilite (Amway, Quixtar)	Double X	CA	23.0%	242
Nutrilite (Amway, Quixtar)	Double X	US	30.0%	201
Nutrilite (Amway, Quixtar)	Daily	US	3.4%	481
Nutrina	Athlete Formula	US	18.1%	288
Nutrina	Champion Formula	US	24.6%	229
Nutrina	Fitness Formula	US	19.9%	267
Nutrition Dynamics	Basic Formula	US	37.0%	157
Nutrition Dynamics	Day Start/Day End Essentials	US	63.0%	32
Nutrition Dynamics	Iodine Free "Vegi" Formula	US	16.5%	300
Nutrition Dynamics	Multi-vitasorb	US	0.7%	496
Nutrition Dynamics	Optimum Health Essentials	US	66.6%	21
Nutrition for Life	Essentials	CA/US	15.1%	316
Nutrition for Life	Grand Master Formula	CA/US	54.3%	69
Nutri-West	Multi Complex	US	10.5%	363
Nutri-West	Multibalance for Men	US	16.6%	298
Nutri-West	Multibalance for Women	US	16.6%	299
Nutri-West	Whole System Health Maintenance	US	19.8%	268
Olympian Labs	Vita-Vitamin	US	22.8%	244
Omnitrition	Omni4	US	0.0%	506
One A Day	Active	US	5.1%	419
One A Day	Advance Men's Formula	CA	4.6%	455
One A Day	Advance Women's Formula	CA	1.9%	492
OneSource	Multivitamins and Minerals for Adults	CA	5.8%	408
Optimox	Androvite for Men	US	50.1%	85
Optimox	Gynovite Plus	US	30.5%	198
Optimox	Optivite PMT for Women	US	42.5%	127
Oregon Health	Multi-Guard with CoQ10	US	55.0%	65
Paramettes	Adults Complete	CA	4.5%	458
Pataki USA	2101 Formula	US	10.1%	365
Perfect Choice	Complete Extra	US	6.0%	404
Perfect Choice	Multivitamin Specially Formulated for Men	US	21.1%	256
Perfect Choice	Multivitamin Specially Formulated for Women	US	28.2%	208
Performance Labs	Vitalert	US	7.6%	388
Personnelle (Pharmetics Inc.)	Multivitamines et Mineraux Forte	CA	4.3%	466
Personnelle (Pharmetics Inc.)	Multivitamines et Mineraux Preventa-Tab	CA	6.9%	397
Personnelle (Pharmetics Inc.)	Multivitamines et Mineraux Natura Senior	CA	4.9%	433
Pharmacist's Ultimate Health	Man's Ultimate Formula	US	37.8%	152
Pharmacist's Ultimate Health	Woman's Ultimate Formula	US	60.7%	40
Pharmanex (Nu Skin)	Life Essentials	US	13.8%	330
Pharmanex (Nu Skin)	LifePak Prime	US	52.7%	72
Pharmanex (Nu Skin)	LifePak with Catechins	CA	28.0%	210
Pharmasave	MultiForte 29	CA	4.3%	467
Pharmasave	MultiSelect 29	CA	4.6%	456
PharmAssure	Men's Biomultiple	US	11.5%	350
PharmAssure	Women's Biomultiple	US	12.2%	345
Pharmetics	Formula Forte	CA	4.3%	468
Pharmetics	Multivitamins and Minerals with beta-Carotene	CA	18.3%	287
PhytoPharmica	Clinical Nutrients for 45-Plus Women	US	45.3%	112
PhytoPharmica	Clinical Nutrients for 50-Plus Men	US	45.4%	111
PhytoPharmica	Clinical Nutrients for Men	US	42.5%	128
PhytoPharmica	Clinical Nutrients for Women	US	45.5%	110
Pilgrim's	Sense of Energy	US	51.7%	75
Pilgrim's	Silver Stars Multi	US	26.4%	217
Prairie Naturals	Multi-Force	CA	35.8%	167
ProActive	for Active Men	CA	41.2%	134
ProActive	for Adult Men	CA	30.5%	199
Puritan's Pride	Green Source Iron Free	US	37.1%	156
Puritan's Pride	High Potency Puritron	US	0.0%	507
Puritan's Pride	Mega Vita Min for Women	US	19.4%	271
Puritan's Pride	Solovites	US	12.2%	346
Puritan's Pride	Super All Day Nutricom	US	5.7%	410
Puritan's Pride	Time Release Mega Vita-Min	US	15.3%	311
Puritan's Pride	Ultra-Vita-Min	US	5.1%	420
Puritan's Pride	Ultra-Vita-Min Iron-Free	US	4.3%	469

Company	Product	Country	Score <sup>1</sup>	Rank <sup>2</sup>
Puritan's Pride	Vita-Min	US	0.0%	508
Purity Products	Perfect Multi Focus Formula	US	68.9%	16
Purity Products	Purity's Perfect Multi	US	62.2%	36
QCI Nutritionals	Ultra Vitality #1	US	51.2%	81
QCI Nutritionals	Ultra Vitality #2	US	51.5%	77
QCI Nutritionals	Ultra Vitality #3	US	50.9%	83
QCL Nutritionals	Daily Preventive #1	US	48.4%	95
QCL Nutritionals	Daily Preventive #3	US	48.1%	96
Quest	Extra Once A Day	CA	18.6%	282
Quest	Maximum Once A Day	CA	40.6%	135
Quest	Once A Day	CA	0.3%	501
Quest	Premium Multi-One with Niacinamide	CA	23.2%	241
Quest	Super Once a Day	CA	11.4%	352
R Garden Internationale	Multiple Vitamin Mineral Formula	US	12.4%	341
Rainbow Light	Advanced Nutritional System	US	63.2%	31
Rainbow Light	Complete Nutritional System	US	36.0%	164
Rainbow Light	Iron-Free Advanced Nutritional System	US	62.2%	37
Rainbow Light	Just Once Iron Free	US	9.9%	369
Rainbow Light	Performance Energy Multivitamin for Men	US	41.9%	131
Reliv	Classic	US	10.4%	364
Reliv	Classic	CA	7.7%	387
Reliv	Now	US	9.0%	377
Reliv	Now	CA	6.0%	405
Re-Vita	Liqua Health	US	5.8%	409
Ripple Creek	Mega-100 (Slow Release)	US	32.2%	189
Ripple Creek	Mega-Caps 2 (Quick Release)	US	23.0%	243
Ripple Creek	Mega-One 75 (Slow Release)	US	16.4%	301
Rite Aid	Central-Vite	US	4.9%	434
Rite Aid	Central-Vite Select	US	4.8%	440
Rite Aid	Whole Source	US	6.2%	403
Rite Aid	Whole Source Complete Formula for Men	US	5.6%	411
Rite Aid	Whole Source Complete Formula for Women	US	4.8%	441
Royal Bodycare	Omega Boost	US	36.3%	163
Royal Bodycare	Ultimate	CA/US	16.3%	305
Rx Vitamins	Revitalize	US	39.1%	143
Rx Vitamins	Revitalize No Iron	US	39.1%	144
Safeway Select	Central-Vite Forte 29	CA	4.7%	449
Safeway Select	One Tablet Daily	CA	3.7%	476
Safeway Select	One Tablet Daily Advanced Formula for Women	CA	0.0%	509
Safeway Select	Super Men's Multivitamin	US	18.0%	291
Safeway Select	Super Women's Multivitamin	US	28.2%	209
Sante Naturelle	Feminx Multi	CA	9.2%	375
Sav-On Osco by Albertson's	One Daily Active	US	4.9%	435
Sav-On Osco by Albertson's	Therapeutic-M	US	4.3%	470
Schiff	Double Day	US	4.9%	436
Schiff	Prime Years	US	7.0%	396
Schiff	Single Day	US	15.9%	307
Shaklee	Basics with Iron	US	30.5%	200
Shaklee	Basics with Iron	CA	24.6%	230
Shaklee	Vita-Lea Advanced Formula	CA	13.4%	332
Sisu	Man Only One, Iron Free	CA/US	16.4%	302
Sisu	Nutricology Multi-Vi-Min	CA	10.1%	366
Sisu	Only One	CA/US	16.4%	303
Sisu	Vegi-Mins	CA/US	47.1%	99
Solaray	Vegetarian Spectro Multi-Vita-Min	US	57.0%	56
Solaray	Iron-Free Spectro Multi-Vita-Min	US	56.7%	58
Solaray	Iron-Free Spectro Multi-Vita-Min	CA	38.2%	147
Solaray	Spectro 3 Iron Free	US	56.7%	59
Solaray	Spectro Multi-Vita-Min	US	57.0%	55
Solgar	Earth Source Multi-Nutrient	US	51.4%	78
Solgar	Female Multiple	US	50.1%	86
Solgar	Formula VM-2000	US	32.5%	187
Solgar	Iron-Free Omnium	US	45.1%	113
Solgar	Multi II Vegicaps	US	15.5%	310
Solgar	Naturvite	US	14.5%	324
Solgar	Omnium	US	56.5%	62
Solgar	Solovite Iron-Free	US	5.6%	412
Solgar	Vegicaps Vegetarian Multiple	US	25.9%	222
Solgar	VM-75 Iron-Free	US	18.5%	284
SomaLife	SomaVit	CA/US	9.5%	373
Source Naturals	Elan Vital	US	91.8%	5
Source Naturals	Life Force Multiple	US	92.8%	4
Source Naturals	Mega-one Multiple	US	30.6%	197
Source Naturals	Ultra Multiple	US	7.5%	390
SportPharma	Multiguard	US	74.9%	12
Sports Nutrition 2000	Athlete's Multi	US	28.9%	205
Spring Valley	Maximum One Dally	US	5.0%	427
Spring Valley	Multiplus	CA	5.0%	428
Sundown	Complete Energy	US	5.1%	421
Sundown	Complete Multi 50+	US	5.3%	414
Sundown	Complete Multi Daily	US	5.1%	422
Sundown	Complete Ultra	US	8.1%	382
Sunkist	Multi-Active	CA	12.4%	342
Sunkist	Multi-Men's	CA	15.8%	308
Sunrider	Metabalance 44	US	20.4%	264
SupraLife	Formula Plus	US	43.3%	123

Company	Product	Country	Score <sup>1</sup>	Rank <sup>2</sup>
SupraLife	Maxum Essentials	US	48.9%	91
SupraLife	Ultra Body Toddy	US	38.1%	148
Swiss Natural Sources	Hi Potency Swiss One "80"	CA	20.9%	261
Swiss Natural Sources	Super Adult Chewable	CA	23.8%	237
Swiss Natural Sources	Super Swiss One "50"	CA	19.6%	269
Symmetry	NutraPack	US	25.5%	227
Symmetry	Ultra Vitality	US	7.8%	384
The Green Turtle Bay Vitamin Co.	Sunnie	US	10.9%	357
The Green Turtle Bay Vitamin Co.	PowerMate	US	11.1%	354
The Green Turtle Bay Vitamin Co.	PowerVites	US	7.4%	393
Thompson	Human Nature Green Multi	US	29.3%	203
Thompson	Mega 80	US	4.9%	437
Thompson	Multi-Formula for Women	US	6.3%	401
Thompson	Multiple Choice	US	4.5%	459
Thompson	Super Maxicaps	US	19.0%	276
Thorne Research	Al's Formula	US	46.9%	101
Thorne Research	Basic Nutrients III	US	38.7%	145
Thorne Research	Basic Nutrients V	US	44.4%	117
Total Health Solutions	Bone Plants	US	6.7%	400
Total Health Solutions	Vita Actives	US	18.1%	289
Trace Minerals	Electro-Vita-Min	US	14.3%	325
Trace Minerals	ImmunoMax	US	1.7%	493
Trace Minerals	Maxi Multi	US	13.9%	329
Trophic	Select	CA	33.1%	182
Truehope	Empowerplus	CA/US	25.9%	223
Truly Health	Century Premium	CA	6.9%	398
Truly Health	Century Silver	CA	4.6%	457
TwinLab	Daily One without Iron	US	26.4%	218
TwinLab	Daily Two Caps without Iron	US	33.8%	176
TwinLab	DualTabs	US	40.1%	140
TwinLab	Mega 6 Caps	US	56.2%	63
TwinLab	SuperTwin	US	33.6%	177
Tyler	Multiplex-2 without Iron	US	54.2%	70
Ultimate Health	40+ Multiple	US	18.6%	283
Ultimate Health	P.M. Formula	US	14.1%	327
Ultimate Nutrition	Super Complete	US	75.8%	10
Unicity Network (Rexall, Enrich)	Cardio-Basics	US	31.0%	194
USANA Health Sciences	Essentials (Canadian)	CA	90.2%	6
USANA Health Sciences	Essentials (U.S.)	US	96.1%	1
Valu-Rite	Advanced Formula Complete Premium	US	5.2%	417
Valu-Rite	Iron-Free Multivitamin Mineral Supplement	US	0.0%	510
Vaxa	Daily Essentials	US	7.6%	389
Vega Nutritionals	Formula ZM3	US	2.3%	489
Vega Nutritionals	Spectrum	US	2.3%	490
VegLife	SpectroVeg High Energy	US	45.9%	105
VirtuVites	Vita-Min 75	US	24.2%	232
Vitality Products	Complete Multi-Vitamins with Minerals	US	25.9%	224
Vitality Products	Two-A-Day	US	21.1%	257
Vitamin Power	Power Source 100	US	26.9%	215
Vitamin Power	Super-Vite	US	15.3%	312
Vitamin Power	Ultra Multi 90 Plus	US	11.5%	351
Vitamin Power	Vita-Max 1	US	6.8%	399
Vitamin Research Products	Extended Plus	US	93.1%	3
Vitamin World	Daily 3 With Antioxidant Factors	US	45.6%	108
Vitamin World	Green Source Iron Free	US	39.8%	142
Vitamin World	Mega Vita Min for Women	US	19.4%	272
Vitamin World	Mega Vita Min for Women, Iron Free	US	16.4%	304
Vitamin World	More Than A Multiple	US	44.4%	118
Vitamin World	Nutri 100	US	25.6%	226
Vitamin World	Time Release Mega Vita-Min Iron-Free	US	15.3%	313
Vitamin World	Ultra Vita MAN	US	12.5%	338
Vitamin World	Ultra Vita-Min Iron Free	US	4.7%	450
VitaSmart	Century Advantage	US	5.2%	418
VitaSmart	Century Senior Iron Free	US	4.7%	451
Vitazan Herbs and Vitamins	Multi #2	CA	12.5%	339
Vitazan Herbs and Vitamins	ORO #1	CA	18.4%	285
Viva Life Sciences	DailyGuard	US	36.8%	160
Viva Life Sciences	VIVA for Life	US	17.9%	293
Vita-Complete	AA (Anti-Aging)	CA	4.3%	471
Walgreens	Ultra Choice Premium Men	US	21.1%	258
Walgreens	Ultra Choice Premium Women	US	22.1%	247
Wampole	Complete Multi-Adult	CA	4.3%	472
Watkins	Super Multi	CA	23.9%	235
Watkins	Superfood Multiple	US	27.2%	214
Webber Naturals	Multivitamins Extra B	US	2.3%	491
Wellness International Network	Phyto-Vite	US	46.6%	102
Western Family	Complete Advanced Formula with Lutein	US	4.9%	438
Western Family	Multra Forte	CA	12.4%	343
Western Family	Multra Plex	CA	11.6%	349
Western Family	Therapeutic-M	US	4.3%	473
YourLife	Natural Iron-free	US	3.9%	475
YourLife	One Daily 50+	US	4.7%	452
YourLife	Super Multi with Herbs	US	7.5%	391
ZonePerfect	Multi Vitamin & Mineral	US	25.1%	228

<sup>1</sup> Overall product score based on 14 scientific criteria

<sup>2</sup> Ranking of this product out of all the 510 products compared

## Appendix B: Definition of the 14 comparison criteria

The definitions of each of the fourteen criteria used in the comparison are as follows:

- 1. Completeness** - Does the product contain the full spectrum of nutrients listed in the Blended Standard and considered essential for optimal health?
- 2. Potency** - Of those nutrients in the product, what percent are found at potency levels meeting or exceeding 50 percent of the potency for those nutrients in the Blended Standard?
- 3. Bioavailability** - Does the product contain minerals in their most bioavailable forms as amino acid chelates or organic acid complexes?
- 4. Bioactivity of Vitamin E** - Does the product contain only the d-isomer of vitamin E (the natural, biologically active form of alpha tocopherol) or does the product use the d/l isomers of vitamin E (a synthetic form, where the biological activity is about one-half [or less] of the natural vitamin E)?
- 5. Cardiac Health Triad** - Does the product contain vitamin E, coenzyme Q10 and magnesium, three nutritional components important to cardiac health, at potencies that meet or exceed 50 percent of the Blended Standard?
- 6. Homocysteine Reduction Triad** - Does the product contain the nutritional triad of vitamin B6, vitamin B12 and folic acid, at levels meeting or exceeding 50 percent of the Blended Standard?
- 7. Bone Health Complex** - Does the product contain the nutrients shown by clinical studies to be important for optimal bone health (vitamin D, vitamin K, folic acid, vitamin B6, vitamin B12, boron, calcium, magnesium, silicon and zinc) at potencies equal to or exceeding 50 percent of the potencies listed in the Blended Standard?
- 8. Antioxidant Triad** - Does the product contain the important antioxidant triad of vitamin E, vitamin C and beta-carotene at potencies equal to or exceeding 50 percent of the potencies listed in the Blended Standard?
- 9. Glutathione Support** - Does the product contain the nutritional precursors necessary for glutathione synthesis and the proper functioning of the Glutathione Peroxidase Pathway, at potencies equal to or exceeding 50 percent of the potencies listed in the Blended Standard?
- 10. Metabolic Support** - Does the product contain the nutrients necessary to help regulate glucose metabolism and support the body's ability to generate, store and utilize energy, and are these nutrients available at potencies equal to or exceeding 50 percent of the potencies listed in the Blended Standard?

**11. Bioflavonoid Profile** - Does the product contain a mixture of bioflavonoids (citrus flavonoids, soy isoflavones, quercetin, quercitrin, hesperidin, rutin, bilberry extract and green tea catechins) and proanthocyanidins at potencies that meet or exceed 50 percent of the combined recommended potencies for PCOs and mixed bioflavonoids in the Blended Standard?

**12. Phenolic Compound Profile** - Does the product contain phenolic compounds (poly phenolic acids and their derivatives, including curcumin) at a potency level recently established in the literature (25 mg) that has been associated with a reduced incidence of coronary heart disease?

**13. Lipotropic Factors** - Does the product contain the important lipotropic factors, choline (including phosphatidylcholine) and inositol, at levels meeting or exceeding 50 percent of the Blended Standard?

**14. Potential Toxicities** - Does the nutritional supplement contain levels of vitamin A and iron that exceed 100% of the Blended Standard?

## Appendix C: Why take vitamin supplements?

By Dr. George Obikoya

Vitamins are substances that are found in many of the foods we eat. Your body uses vitamins to do many things, like help you grow and develop. It needs vitamins to help your blood clot when you get a cut. Some vitamins help us make energy. Vitamins are even involved in making sure you can see in color, the world would look black and white without them! And if you've ever wondered what helps make your teeth healthy and strong, then you'll be sure to smile when you find out it's, guess what, vitamins!

Vitamins regulate metabolism reactions, in contrast to other dietary components known as macronutrients, for example, fats, carbohydrates, proteins, which are the compounds utilized in the reactions regulated by the vitamins. Absence of a vitamin blocks one or more specific metabolic reactions in a cell and eventually may disrupt the metabolic balance within a cell and in our entire body. Vitamins contain no calories but play an essential role in your body. Think of vitamins kind of like the fluids in your car. If you have no oil (vitamins) in your car, it does not matter how much gasoline (calories) you put in your car, your car will not run. For this reason, it is critically important to ensure a proper supply of vitamins in your car. Unlike the oil in your car, many vitamins are purged from your body daily.

With the exception of vitamin C (ascorbic acid), all of the water-soluble vitamins assist enzymes that function in energy transfer or in the metabolism of fats, carbohydrates, and proteins. In other words, it will be difficult for our body to break down these nutrients into energy we can use without vitamins.

Some of the fat-soluble vitamins form part of the structure of biological membranes or assist in maintaining the integrity and functioning of these membranes. Some fat-soluble vitamins also may function at the genetic level to control the synthesis of certain enzymes. These vitamins are necessary for specific functions in highly differentiated cells.

When you take fat-soluble vitamins (A, D, E and K), the vitamins are stored in the fat tissues in your body and in your liver until your body needs them. Some are stored for a few days, some for up to six months! Water-soluble vitamins such as Vitamin C and the B group of vitamins, on the other hand are different. They are not stored as much in your body. Instead, they travel through your bloodstream and whatever your body doesn't use comes out when you urinate. So these kinds of vitamins need to be replaced often, and many people fail to do so. That is why you need to take a high-quality multivitamin in order to replenish lost vitamins and minerals.

Daily vitamin supplementation is, no doubt, absolutely critical for maintaining a healthy body.



## Appendix D: Do medical authorities recommend vitamin supplements?

By Lyle MacWilliam, BSc, MSc, FP

After 20 years, the American Medical Association (AMA) has completely reversed its anti-vitamin stance and now encourages all adults to supplement daily with a multiple vitamin.

A landmark review of 38 years of scientific evidence by Harvard researchers, Dr. Robert Fletcher and Dr. Kathleen Fairfield, convinced the conservative Journal of the American Medical Association (JAMA) to rewrite its policy guidelines regarding the use of vitamin supplements.

In two reports, published in the June 19, 2002 edition of JAMA, the authors conclude that the current North American diet, while sufficient to prevent vitamin deficiency diseases (such as scurvy and pellagra), is inadequate to support the need for optimal health.

*Insufficient vitamin intake is apparently a cause of chronic diseases. Recent evidence has shown that sub-optimal levels of vitamins (below standard), even well above those causing deficiency syndromes, are risk factors for chronic diseases such as cardiovascular disease, cancer and osteoporosis. A large portion of the general population is apparently at increased risk for this reason.*

Dr. Robert Fletcher and Dr. Kathleen Fairfield

In the study, the authors examine several nutrients, including vitamins A, B6, B12, C, D, E, K, folic acid and several of the carotenoids (alpha- and beta-carotene, cryptoxanthin, zeaxanthin, lycopene and lutein). Among their conclusions, they note:

- Folic acid, vitamin B6 and B12 are required for proper homo cysteine metabolism, and low levels of the vitamins are associated with increased risk of heart disease;
- Inadequate folic acid status increases the risk of neural tube defects and some cancers;
- Vitamin E and lycopene appear to decrease the risk of prostate cancer;
- Vitamin D is associated with a decreased risk of osteoporosis and fracture, when taken with calcium;
- Inadequate vitamin B12 is associated with anemia and neurological disorders;
- Low levels of the carotenoids appear to increase the risk of breast, prostate and lung cancer;
- Inadequate vitamin C is associated with increased cancer risk; and,
- Low vitamin A status is associated with vision disorders and impaired immune functions.

In a striking departure from JAMA's anti-vitamin stance of the last twenty years, the authors conclude that, given today's diet, daily supplementation with a multiple vitamin is a prudent preventive measure against chronic disease. The researchers base their guidance on the fact that more than 80 percent of the American population does not consume anywhere near the five-per-day servings of fruits and vegetables required for optimal health.

*All of us grew up believing that if we ate a reasonable diet, that would take care of our vitamin needs. But, the new evidence, much of it in the last couple of years, is that vitamins also prevent the usual diseases we deal with everyday - heart disease, cancer, osteoporosis and birth defects.*

Dr. Robert Fletcher

JAMA's last comprehensive review of vitamins, conducted in the 1980s, concluded that people of normal health do not need to take a multivitamin and can meet all their nutritional needs through diet. The sudden "about-face," along with JAMA's public declaration that supplementation is now deemed important to your health, underscores the strength of the scientific evidence that now prevails.

The JAMA declaration also underscores a growing concern among nutrition experts that the current recommended daily allowances (RDAs) for vitamins and minerals are too low. The RDAs were originally established to prevent acute vitamin deficiency disorders; however, a growing volume of evidence supports the argument that higher levels of many vitamins and minerals are necessary to achieve optimal health.

Much of the evidence supporting the need for daily supplementation as a preventive measure comes from large population-based (epidemiological) studies. Among them is a study conducted some years ago by three eminent scientists, Nobel Laureate Dr. Linus Pauling, Dr. Richard Passwater and Dr. Jim Enstrom. They examined mortality rates in elderly Californians, and what they found was remarkable: the death rate for supplement users was significantly lower than for non-users. Male supplement users had a 22 percent lower risk of death and female users a 46 percent lower risk, over a given time period.

Later, Enstrom and co-workers found that supplementation with vitamin C, in excess of 250 mg per day (much above the RDA standard), reduced the risk of male mortality from cardiovascular disease by 42 percent and lowered the risk of death by all causes by 35 percent, providing an estimated six-year increase in life expectancy.

In two large studies of self-supplementation, vitamin E was associated with reduced coronary risk. The studies, conducted among 39,910 male health care professionals and 87,245 female nurses, found that men and women who took vitamin E supplements for more than two years showed a 37 percent and 41 percent reduction, respectively, in the risk of heart disease. These results support a recent large-scale study conducted at Laval University, Quebec, which found a 69 percent reduction in ischemic heart disease and a 47 percent reduction in cardiac-related deaths among long-term consumers of nutritional supplements. These results indicate that supplementing your diet with a high-quality multivitamin on a daily basis is essential for long-term health.