“It’s all about living for today. Nature favors survival today over tomorrow, Nutrient Triage Theory “makes sense...and will certainly prove correct” World-renowned scientist - Dr. Bruce Ames.
### Supplement Facts

**Serving Size:** 1 Capsule  
**Servings per Container:** 90

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Amount Per Serving</th>
<th>% Daily Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vitamin A (as beta carotene and retinyl palmitate)</td>
<td>10000 IU</td>
<td>200%</td>
</tr>
<tr>
<td>Vitamin C (as ascorbic acid)</td>
<td>150 mg</td>
<td>250%</td>
</tr>
<tr>
<td>Vitamin D (as cholecalciferol)</td>
<td>400 IU</td>
<td>100%</td>
</tr>
<tr>
<td>Vitamin E (as d-alpha tocopheryl acid succinate)</td>
<td>100 IU</td>
<td>333%</td>
</tr>
<tr>
<td>Thiamin (as thiamin mononitrate)</td>
<td>25 mg</td>
<td>1,667%</td>
</tr>
<tr>
<td>Riboflavin</td>
<td>25 mg</td>
<td>1,471%</td>
</tr>
<tr>
<td>Niacin (as niacinamide)</td>
<td>100 mg</td>
<td>500%</td>
</tr>
<tr>
<td>Vitamin B6 (as pyridoxine hydrochloride)</td>
<td>25 mg</td>
<td>1,250%</td>
</tr>
<tr>
<td>Folic Acid</td>
<td>800 mcg</td>
<td>200%</td>
</tr>
<tr>
<td>Vitamin B12 (as cyanocobalamin)</td>
<td>100 mcg</td>
<td>1,667%</td>
</tr>
<tr>
<td>Biotin</td>
<td>300 mcg</td>
<td>100%</td>
</tr>
<tr>
<td>Pantothenic Acid (as d-calcium pantothenate)</td>
<td>50 mg</td>
<td>500%</td>
</tr>
<tr>
<td>Calcium (as calcium carbonate and calcium citrate)</td>
<td>25 mg</td>
<td>3%</td>
</tr>
<tr>
<td>Iodine (as potassium iodide)</td>
<td>150 mcg</td>
<td>100%</td>
</tr>
<tr>
<td>Magnesium (as magnesium oxide and magnesium aspartate)</td>
<td>7.2 mg</td>
<td>2%</td>
</tr>
<tr>
<td>Zinc (as zinc picolinate)</td>
<td>15 mg</td>
<td>100%</td>
</tr>
<tr>
<td>Selenium (as sodium selenate)</td>
<td>200 mcg</td>
<td>286%</td>
</tr>
<tr>
<td>Copper (as copper gluconate)</td>
<td>2 mg</td>
<td>100%</td>
</tr>
<tr>
<td>Manganese (as manganese gluconate)</td>
<td>5 mg</td>
<td>250%</td>
</tr>
<tr>
<td>Chromium (as chromium chloride)</td>
<td>200 mcg</td>
<td>167%</td>
</tr>
<tr>
<td>Molybdenum (as sodium molybdate)</td>
<td>150 mcg</td>
<td>200%</td>
</tr>
<tr>
<td>Choline (as choline bitartrate)</td>
<td>10 mg</td>
<td>*</td>
</tr>
<tr>
<td>Inositol</td>
<td>10 mg</td>
<td>*</td>
</tr>
<tr>
<td>FloraGLO® Lutein</td>
<td>500 mcg</td>
<td>*</td>
</tr>
</tbody>
</table>

*Daily value not established.

**Other Ingredients:** Gelatin, alginic acid, croscarmellose sodium, potassium citrate, soy lecithin, medium chain triglycerides, magnesium silicate, vegetable stearic acid, silica, magnesium stearate, potassium aspartate.
“Men grow gardens...”

– Allen Flanagan
Declining Fruit and Vegetable Nutrient Composition: What Is the Evidence?

Donald R. Davis$^{1,2,3}$

Biochemical Institute, The University of Texas, Austin, TX 78712; and Bio-Communications Research Institute, 3100 Nor.

Additional Index Words: nutritive value • history • dilution effect • genetic dilution effect • agriculture • grains

Three kinds of evidence point toward declines of some nutrients in fruits and vegetables available in the United States and th fertilization found inverse relationships between crop yield and mineral concentrations—the widely cited "dilution effect"; 2 composition data found apparent median declines of 5% to 40% or more in some minerals in groups of vegetables and perhaps protein with similar results; and 3) recent side-by-side plantings of low- and high-yield cultivars of broccoli and grains have shown a newly recognized genetic dilution effect. Studies of historical food crops but the other methods can focus on single crops of any kind, can include any nutrient of interest, and can be carefully controlled to minimize or overcome the diluting effects of yield whether by environmental means or by plant breeding.
Hybridization, picked before they are ripe, Ethylene gas, distribution, http://www.ted.com/talks/birke_baehr_what_s_wrong_with_our_food_system.html
Hey farmer, farmer, put away that DDT...

Give me spots on my apples,

But LEAVE me the birds and the bees, please!

Ethylene, Hybrid, Chemicals
Discover Blue Zones®

Employing a vast amount of data, Blue Zones® researchers and scientists have identified places around the world where people live longer and know how to be happier than the rest of us.

The Islands of Okinawa, Japan

While Okinawans do suffer from diseases that kill Americans, they experience them at far lower rates: a fifth the rate of cardiovascular disease, a fourth the rate of breast and prostate cancer, and one-third the rate of dementia.

Okinawa, Japan

Sardinia, Italy

Loma Linda, California

Nicoya, Costa Rica

Ikaria, Greece

Move Naturally, Connect, Eat Right, Purpose

Loma Linda, California

For the past half-century, members of the Seventh Day Adventist community in Loma Linda, whose faith endorses healthy living, leads the nation in the longest life expectancy. They are vegetarians. They eat frequent servings of nuts. They eschew alcohol. They eat an early, light dinner, and focus on the Sabbath every week when they devote time to their faith and family.
100 yr/old - Centenarian
George Burns (January 20, 1896 – March 9, 1996)
Nutritional Aging Theories
1. Genetic potential –
2. Free radicals (oxidative stress)
3. Cross–linked proteins
4. Chronic inflammation
5. Endocrinology & immunity

All are interrelated – none are complete without the most important aging theory discovered to date
Dr. Bruce Ames – Research focused on aging, mitochondria and malnutrition

He has been published in over 500 scientific journals, and gained long lists of honors and awards

Considered the most important anti-aging theory ever proposed

“the most important thing I have ever worked on”
Nutrient Triage Theory

“It’s all about living for today. Nature favors survival today over tomorrow, Nutrient Triage Theory “makes sense...and will certainly prove correct” says world-renowned scientist Dr. Bruce Ames.

Professor Bruce Ames ‘triage theory’ makes sense and gains support

Why modest shortages of vitamins / minerals matter so much

by the ANH team

Dr Bruce Ames is Professor of Biochemistry and Molecular Biology, University of California, Berkeley, and a Senior Scientist at Children’s Hospital Oakland Research Institute (CHORI). His Curriculum Vitae reminds us of the importance of Dr Ames’ scientific experience and contributions, having published over 500 scientific journals, and gained long lists of honours and awards.

Triage theory: short–term survival at the expense of long–term survival

In 2006, Professor Ames published a key article in the Proceedings of the National Academy of Sciences of the United States of America (PNAS), entitled ‘Low micronutrient..."
Body’s Mechanism for Handling Low Micronutrient Status

Vitamin C
1. Collagen (scurvy) Survival
2. Neurotransmitters Survival
3. Carnitine Survival

4. Inflammation Aging
5. Oxidative stress Aging

Essentially the body cannibalizing itself
Smokers

American Journal of Clinical Nutrition (Vol. 90, pp. 889-907)
Proceedings of the National Academy of Sciences of the United States of America (PNAS), entitled ‘Low micronutrient intake may accelerate the degenerative diseases of aging through allocation of scarce micronutrients by triage’
Fruit proves better than vitamin C alone

Tests show that it isn't just the vitamin that protects the body.

Matt Kaplan

If you're in the market for an antioxidant to keep your body young and healthy, new research suggests you'd be much better off with oranges than vitamin C tablets.
### Fruits Prove Better than Vitamin C

*Journal of Nature*, University of Milan, Italy – April 2007

<table>
<thead>
<tr>
<th></th>
<th>Blood Plasma Vitamin C Levels (3.5hrs later)</th>
<th>Protective Effect (w/hydrogen peroxide-induced DNA damage)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blood orange juice</td>
<td>Increase</td>
<td>Protective effect: damage significantly less</td>
</tr>
<tr>
<td>(150mgs)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vitamin C-fortified</td>
<td>Increase</td>
<td>No protective effect</td>
</tr>
<tr>
<td>water (150mgs)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sugar water</td>
<td>No Change</td>
<td>No protective effect</td>
</tr>
</tbody>
</table>

**Fruits Prove Better than Vitamin C**

**Journal of Nature**, University of Milan, Italy – April 2007

Blood orange juice (150mgs) Increase Protective effect: damage significantly less

Vitamin C-fortified water (150mgs) Increase No protective effect

Sugar water No Change No protective effect
“It appears that vitamin C is not the only chemical responsible for antioxidant protection; there is something more at work here.”

– Researcher, Serena Guarnieri, *British Journal of Nutrition*
Brief Communications


Nutrition: Antioxidant activity of fresh apples

Marian V. Eberhardt¹, Chang Yong Lee¹ & Rui Hai Liu¹

Vitamin C is used as a dietary supplement because of its antioxidant activity, although a high dose (500 mg) may act as a pro-oxidant in the body¹,². Here we show that 100 g of fresh apples has an antioxidant activity equivalent to 1,500 mg of vitamin C, and that whole-apple extracts inhibit the growth of colon- and liver- cancer cells *in vitro* in a dose-dependent manner. Our results indicate that natural antioxidants from fresh fruit could be more effective than a dietary supplement.

1. Department of Food Science, 108 Stocking Hall, Cornell University, Ithaca, New York 14853-7201, USA

Correspondence to: Rui Hai Liu¹ e-mail: Email: RL23@cornell.edu
The Evolution of Vitamin E

What’s Next?

New Tocopherols discovered

Tocotrienols

Mixed Tocopherols

D-Alpha

Brown Rice

Journal of Diabetes Care

• Vitamin E rich foods work
• Supplements don’t
δ-Tocomonoenol: A new vitamin E from kiwi (Actinidia chinensis) fruits

Antonio Fiorentino a,*, Claudio Mastellone a, Brigida D'Abrosca a, Severina Pacifico a, Monica Scognamiglio a, Giuseppe Cefarelli a, Romualdo Caputo b, Pietro Monaco a

a Dipartimento di Scienze della Vita, Laboratorio di Fitochimica, Seconda Università degli Studi di Napoli, via Vivaldi 43, I-81100 Caserta, Italy
b Dipartimento di Chimica Organica e Biochimica, Università Federico II, Complesso Universitario di Monte Sant'Angelo-Via Cinthia 4, I-80126 Napoli, Italy

A R T I C L E  I N F O

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Keywords:
Actinidia chinensis (kiwi)
δ-Tocomonoenol
Vitamin E
NMR analysis
GC–MS
Antioxidant activity

A B S T R A C T

A new vitamin E, δ-tocomonoenol, has been isolated from Actinidia chinensis (kiwi) fruits. The new structure, 2,8-dimethyl-2-(4,8,12-trimethyltridec-11-enyl)chroman-6-ol, has been elucidated on the basis of EIMS, 1D, and 2D NMR spectral data. GC–MS analysis of peels and pulps of kiwi showed that the new compound, together with δ-tocopherol, is mainly present in the fruit peel, whilst α-tocopherol is present in a similar amount in both matrices. The compound was tested for its radical-scavenging and antioxidant capabilities, by measuring its ability to scavenge DPPH (2,2'-diphenyl-1-picrylhydrazyl radical) and anion superoxide radical, and inhibit the formation of methyl linoleate conjugated diene hydroperoxides and TBARS (thiobarbituric acid reactive species).

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Loss of Relationship Between Molecules Outside of a Living Structure

Inductive Reasoning:
Separating ourselves from living foods
Oranges

170 phytochemicals
60 bioflavonoids
20 carotenoids
Vitamin C
Folic acid
Potassium
Fiber

Dr. Duke's - Phytochemical and Ethnobotanical Databases

http://www.ars-grin.gov/duke/
Orange Constituents

- **Chemicals**

  - 2'-TRANS-O-FERULOYL-GLACTARIC ACID *Pericarp* DUKE1992A
  - 2'-TRANS-O-COUMAROYL-GLACTARIC ACID *Pericarp* DUKE1992A
  - 2'-TRANS-O-COUMAROYL-GLUCARIC ACID *Pericarp* DUKE1992A
  - 2,4-TRANS,TRANS-O-FERULOYL-GLUCARIC ACID *Pericarp* DUKE1992A
  - 2-METHYL-1-PROPANOL *Fruit Juice* 0.07 ppm DUKE1992A
  - 2-TRANS-O-FERULOYL-GLUCARIC ACID *Pericarp* DUKE1992A
  - 3,4,4,6,7,8-HEPTAMETHOXY-FLAVONI *Fruit* DUKE1992A
  - 3-HYDROXY-ETHYL HEXANOATE *Fruit* DUKE1992A
  - 3-METHYL-BUT-3-ENE *Essential Oil* DUKE1992A
  - 3-METHYL-BUTAN-1-OL *Fruit* DUKE1992A
  - 4-(3-METHYL-2-BUTENONYL)-ISO-NITROSO-ACETOPHENONE *Pericarp* 48 ppm DUKE1992A
  - 5,6-DIHYDRO-BETA-CAROTEN-3,7,9,11-TEROOL *Fruit Juice* DUKE1992A
  - 5,8-EPOXY-5,8-DIHYDRO-8'-APO-BETA-CAROTEN-3,10-DIOL *Fruit Juice* DUKE1992A
  - ACETALDEHYDE *Fruit Juice* 3 : 15 ppm DUKE1992A
  - ALANINE *Fruit* 30 - 3.775 ppm DUKE1992A
  - ALPHA-BERGAMOTENE *Fruit* 6 ppm DUKE1992A
  - ALPHA-CAROTENE *Fruit* 0.19 - 1.9 ppm DUKE1992A
  - ALPHA-COPAENE *Pericarp* DUKE1992A
  - ALPHA-HYDROXY-CAROTENE *Pericarp* DUKE1992A
  - ALPHA-LINOLENIC-ACID *Fruit* 70 - 528 ppm DUKE1992A
  - ALPHA-PINENE *Fruit* 10 - 60 ppm DUKE1992A *Plant* DUKE1992A
  - ALPHA-SINESAL *Fruit* 3 ppm DUKE1992A *Pericarp* JBH
  - ALPHA-TERPINOL *Fruit* 10 - 50 ppm DUKE1992A *Fruit Juice* 0.99 - 1.1 ppm DUKE1992A
  - ALPHA-TOCOPHEROL *Fruit* 4 - 29 ppm DUKE1992A
  - ALUMINUM *Fruit* 1 - 165 ppm DUKE1992A
  - ANHERAXANTHIN *Fruit* DUKE1992A
  - APOVIOLAXANTH-10'AL *Pericarp* DUKE1992A
  - ARABAN *Fruit* DUKE1992A
  - ARGinine *Fruit* 230 - 4.908 ppm DUKE1992A
  - ARSEnic *Fruit* 0.001 - 0.154 ppm DUKE1992A
  - ASCORBIC ACID *Fruit* 500 - 4.071 ppm DUKE1992A
  - ASH *Fruit* 4.100 - 36.920 ppm DUKE1992A
  - ASPARAGINE *Fruit* 200 - 1,800 ppm DUKE1992A
  - ASPARTIC ACID *Fruit* 70 - 8.607 ppm DUKE1992A
  - AURAPTENE *Fruit* DUKE1992A
  - AURAXANTHIN *Fruit* 4 ppm DUKE1992A
  - BARIUM *Fruit* 0.94 - 16.5 ppm DUKE1992A
  - BERGAPTON *Fruit* DUKE1992A
  - BETA-APO-8' CAROTINAL *Pericarp* DUKE1992A
  - BETA-APO-CAROTEN-8' AL *Pericarp* DUKE1992A
  - BETA-CAROTENE *Fruit* 1 - 28 ppm DUKE1992A
  - BETA-CITRAURIN *Pericarp* DUKE1992A
  - BETA-CRYTOXANTHIN *Fruit* JBH
  - BETA-CUBEBENE *Fruit* 10 ppm DUKE1992A
  - BETA-ELEMEN *Fruit* 5 ppm DUKE1992A
  - BETA-SINESAL *Fruit* 6 ppm DUKE1992A *Pericarp* JBH
  - BETA-STOSTEROL *Fruit* DUKE1992A
  - BETA-ZEACAROTENE *Pericarp* DUKE1992A
  - BETAIN *Fruit* 390 - 630 ppm DUKE1992A
  - BOBON *Fruit* 1.89 - 27.5 ppm DUKE1992A
  - BROMINE *Fruit* DUKE1992A
  - BUTYRIC ACID *Fruit* DUKE1992A
  - CADMUM *Fruit* 0.001 - 0.138 ppm DUKE1992A
  - CAFFEE ACID *Fruit* 36 - 50 ppm DUKE1992A
  - CALCIUM *Fruit* 210 - 5.615 ppm DUKE1992A
  - CAMPESTEROL *Fruit* DUKE1992A
  - CAPRIC ACID *Fruit* DUKE1992A
  - CAPROIC ACID *Fruit* DUKE1992A
  - CAPRYLIC ACID *Fruit* DUKE1992A
  - CARBOHYDRATES *Fruit* 99,000 - 887,125 ppm DUKE1992A
  - CAROTENOIDS *Fruit* 12 - 35 ppm DUKE1992A
  - CARVONE *Fruit* 2 - 10 ppm DUKE1992A
  - CARYOPHYLLENE *Pericarp* DUKE1992A
  - CHLORINE *Fruit* 12 - 32 ppm DUKE1992A
  - CHOLESTEROL *Fruit* DUKE1992A
  - CHOLINE *Fruit* 70 - 160 ppm DUKE1992A
  - CHROMIUM *Fruit* 0.005 - 0.385 ppm DUKE1992A
  - CITRABASINE *Root Bark* 14 ppm DUKE1992A
  - CITRACRIDONE 1 *Root Bark* 400 ppm DUKE1992A
  - CITRIC ACID *Fruit* 5,600 - 9,800 ppm DUKE1992A
  - CITRONELLAL *Fruit* 55 ppm DUKE1992A
  - COBALT *Fruit* 0.001 - 0.055 ppm DUKE1992A
  - CONIFERN *Pericarp* DUKE1992A
  - COPPER *Fruit* 0.44 - 5.5 ppm DUKE1992A
  - CRENULATIN *Root Bark* 60 ppm DUKE1992A
  - CRYPTOFLAVIN *Pericarp* DUKE1992A
  - CRYPTOXANTHIN *Fruit* DUKE1992A
  - CRYPTOXANTHIN-5',6',6'-DIEPOXY *Pericarp* DUKE1992A
  - CYANIDIN 3-GLUCOSIDE *Fruit* DUKE1992A
  - CYSTINE *Fruit* 100 - 755 ppm DUKE1992A
  -
Orange Cont...

- DEACETYL-NOMILIN Seed: DUKE1992A
- DECANAL Fruit 10 - 60 ppm DUKE1992A Fruit Juice 0.15 ppm; DUKE1992A
- DELPHINIDIN-3-GLUCOSIDE Fruit: DUKE1992A
- DELTA-CADINENE Pericarp: DUKE1992A
- DIHYDROKAMPFEROL-3'-METHYL-ETHER-7-O-RHAMNOSIDE Fruit: DUKE1992A
- DIOSMIN Pericarp: DUKE1992A
- DODECANAL Fruit 5 - 20 ppm DUKE1992A
- EO Fruit 10,000 ppm; DUKE1992A
- EPOXY-NOOTKATONE Pericarp: DUKE1992A
- EPOXY-VALÉNCENE Fruit: DUKE1992A
- ETA-CAROTÉNÉ Pericarp: DUKE1992A
- ETHANOL Fruit Juice 64 - 900 ppm DUKE1992A
- ETHYL-ACETATE Fruit Juice 0.01 - 0.58 ppm DUKE1992A
- ETHYL-BUTYRATE Fruit Juice 0.08 - 1.02 ppm DUKE1992A
- FARNÉSENE Fruit 2 - 7 ppm DUKE1992A
- FAT Fruit 1,100 - 16,000 ppm DUKE1992A
- FERULIC-ACID Fruit 10 - 19 ppm DUKE1992A
- FERULOYL-PUTRESCINE Fruit 5 ppm; DUKE1992A
- FIBER Fruit 3,740 - 47,000 ppm DUKE1992A
- FLAVOXANTHIN Pericarp: DUKE1992A
- FLUORINE Fruit 0.04 - 0.76 ppm DUKE1992A
- FOLACIN Fruit 2 ppm; DUKE1992A
- FR Juice: DUKE1992A
- FRUCTOSE Fruit 23,800 ppm; DUKE1992A
- GALACTAN Fruit: DUKE1992A
- GALACTOSE Fruit: DUKE1992A
- GALACTURONIC-ACID Fruit: DUKE1992A
- GAMMA-AMINOBUTYRIC-ACID Fruit 40 - 730 ppm DUKE1992A
- GAMMA-TERPINÈNE Fruit 10 ppm; DUKE1992A Fruit Juice 0.04 - 0.46 ppm DUKE1992A
- GERANIAL Fruit 6 - 350 ppm DUKE1992A
- GERANIOL Fruit 50 ppm; DUKE1992A
- GERANYL-OXY-2-PYRANO-COUMARIN Root: DUKE1992A
- GLUCOSAN Fruit: DUKE1992A
- GLUCOSE Fruit 23,600 ppm; DUKE1992A
- GLUTAMIC-ACID Fruit 60 - 7,097 ppm DUKE1992A
- GLUTAMINE Fruit 30 - 630 ppm DUKE1992A
- GLYCINE Fruit 50 - 7,097 ppm DUKE1992A
- HE!TANAL Fruit 3 - 5 ppm DUKE1992A
- HEPTULOSE Fruit: DUKE1992A
- HESPERIDIN Pericarp 40,600 - 63,500 ppm DUKE1992A
- HESPERIDIN-7-O-ALPHA-L-RHAMNO-GLUCOSIDE Fruit: DUKE1992A
- HEXANAL Fruit 1 - 2 ppm DUKE1992A Fruit Juice 0.02 - 0.65 ppm DUKE1992A
- HEXANOL Fruit Juice 0.02 - 0.22 ppm DUKE1992A
- HISTIDINE Fruit 180 - 1,359 ppm DUKE1992A
- HORDENINE Fruit: DUKE1992A
- IRON Fruit 1 - 8 ppm DUKE1992A
- ISOCAPROIC-ACID Fruit: DUKE1992A
- ISOLEUCINE Fruit 7,097 - 23,600 ppm DUKE1992A
- JASMONIC-ACID Fruit: DUKE1992A
- LEAD Fruit 0.02 - 1.1 ppm DUKE1992A
- LECITINE Fruit 230 - 1,136 ppm DUKE1992A
- LIMONÈNE Fruit 8,300 - 9,700 ppm DUKE1992A Fruit Juice 1 - 278 ppm DUKE1992A
- LIMONÈXIC-ACID Fruit: DUKE1992A
- LIMONIN Fruit: DUKE1992A
- LIMONATE-A-RING LACTONE Fruit: DUKE1992A
- LINALOL Fruit 30 - 530 ppm DUKE1992A Fruit Juice 0.15 - 4.69 ppm DUKE1992A
- LINOLEIC-ACID Fruit 180 - 1,359 ppm DUKE1992A
- LITHIUM Fruit 0.108 - 1.54 ppm DUKE1992A
- LOCHNOCARPOL A Root: DUKE1992A
- LUTEIN Fruit 3 ppm; DUKE1992A
- LUTEOLIN-7-O-ALPHA-L-RHAMNO-GLUCOSIDE Fruit: DUKE1992A
- LUTEOLIN-7-O-BETA-D-RUTINOSIDE Leaf: DUKE1992A
- LUTEOXANTHINS Fruit 6 ppm; DUKE1992A
- LYSINE Fruit 470 - 3,548 ppm DUKE1992A
Orange Cont...

- **MAGNESIUM** Fruit 98 - 1,075 ppm DUKE1992A
- **MALIC-ACID** Fruit 600 - 2,000 ppm DUKE1992A
- **MALONIC-ACID** Plant: DUKE1992A
- **MANGANESE** Fruit 8 ppm; DUKE1992A
- **MANNOSE** Fruit: DUKE1992A
- **MERANZINE** Fruit: DUKE1992A
- **MERCURY** Fruit 0.001 ppm; DUKE1992A
- **METHANOL** Fruit Juice 0.8 - 80 ppm DUKE1992A
- **METHIONINE** Fruit 200 - 1,510 ppm DUKE1992A
- **METHYL-BUTYRATE** Fruit Juice 0.01 - 0.3 ppm DUKE1992A
- **MEVALONIC-ACID** Fruit 0.5 ppm; DUKE1992A, Pericarp 6 ppm; DUKE1992A
- **MOLYBDENUM** Fruit 0.1 - 0.385 ppm DUKE1992A
- **MUTATOCHROME** Fruit: JBH
- **MUTATOXANTHIN** Fruit 2 ppm; DUKE1992A
- **MYRCENE** Fruit 69 - 210 ppm DUKE1992A
- **N-METHYL-TYRAMINE** Fruit 2 ppm; DUKE1992A
- **NARINGENIN** Pericarp 35,000 - 45,800 ppm DUKE1992A
- **NARINGENIN-4-BETA-D-GLUCOSIDE** Plant: DUKE1992A
- **NARINGENIN-RUTINOSIDE** Fruit: DUKE1992A
- **NARINGENIN-RUTINOSIDE-4-BETA-D-GLUCOSIDE** Fruit: DUKE1992A
- **NARINGIN** Fruit: DUKE1992A
- **NARINGIN-7-O-ALPHA-L-RHAMNO-GLUCOSIDE** Fruit: DUKE1992A
- **NABRIRUTIN** Pericarp: DUKE1992A
- **NEO-BETA-CAROTENE** Pericarp: DUKE1992A
- **NEOCHROME-A** Pericarp: DUKE1992A
- **NEOCHROME-B** Pericarp: DUKE1992A
- **NEOCHERRY** Pericarp 28,000 ppm; DUKE1992A
- **NEOCHERRY-DIHYDROCHALCONE** Pericarp: DUKE1992A
- **NEOPONCERIN** Pericarp: DUKE1992A
- **NEOXANTHIN-A** Pericarp: DUKE1992A
- **NEOXANTHIN-B** Pericarp: DUKE1992A
- **NERAL** Fruit 1 - 20 ppm DUKE1992A
- **NEROLIDOL** Flower: JBH
- **NERYL-ACETATE** Fruit 10 ppm; DUKE1992A
- **NERYL-FORMATE** Fruit 10 ppm; DUKE1992A
- **NEUROSPORIN** Pericarp: DUKE1992A
- **NIacin** Fruit: DUKE1992A
- **NICKEL** Fruit 0.01 - 0.55 ppm DUKE1992A
- **NITROGEN** Fruit 500 - 13,845 ppm DUKE1992A
- **NOBELEIN** Fruit: DUKE1992A
- **NONANAL** Fruit 6 - 20 ppm DUKE1992A
- **NONTANOL** Fruit 10 ppm; DUKE1992A
- **NOOTKATOL** Fruit: DUKE1992A
- **NOOTKATONE** Fruit 1 ppm; DUKE1992A
- **OCTAN-1-AL** Fruit: DUKE1992A
- **OCTANOL** Fruit 20 - 280 ppm DUKE1992A, Fruit Juice 0.28 ppm; DUKE1992A
- **OCTOPAMINE** Fruit 1 ppm; DUKE1992A
- **OCTYL-ACETATE** Fruit 10 ppm; DUKE1992A
- **OLEIC-ACID** Fruit 20 - 1,510 ppm DUKE1992A
- **OXALIC-ACID** Fruit 87 ppm; DUKE1992A
- **P-COUMARIC-ACID** Fruit 5 - 17 ppm DUKE1992A
- **P-CYMENE** Fruit 20 ppm; DUKE1992A
- **PALMITIC-ACID** Fruit 130 - 982 ppm DUKE1992A
- **PALMITOLEIC-ACID** Fruit 30 - 226 ppm DUKE1992A
- **PANTOTHENIC-ACID** Fruit 2 - 19 ppm DUKE1992A
- **PECTIN** Fruit 1.300 - 5,900 ppm DUKE1992A
- **PECTINERASE** Fruit: DUKE1992A
- **PERILLALDEHYDE** Fruit 2 ppm; DUKE1992A
- **PHENYLALANINE** Fruit 310 - 2,340 ppm DUKE1992A
- **PHOSPHORUS** Fruit 136 - 1,980 ppm DUKE1992A
- **PHYTOENES** Fruit 2 ppm; DUKE1992A
- **PHYTOFLUENE** Fruit 4 ppm; DUKE1992A
- **POLYGAUTURONIC-ACID** Fruit: DUKE1992A
- **POTASSIUM** Fruit 1,400 - 13,772 ppm DUKE1992A
- **PROLINE** Fruit 60 - 3,473 ppm DUKE1992A
- **PROTEIN** Fruit 9,260 - 78,000 ppm DUKE1992A
- **QUINIC-ACID** Fruit: DUKE1992A
- **RIBOFLAVIN** Fruit 3 ppm; DUKE1992A
- **RUBIDIUM** Fruit 0.1 - 7.7 ppm DUKE1992A
Orange Cont...

- **Sabinene** Fruit 10 - 60 ppm DUKE1992A Fruit Juice 0.15 ppm DUKE1992A
- **Scutellarein** Fruit: DUKE1992A
- **Selenium** Fruit 0.002 ppm; DUKE1992A
- **Serine** Fruit 40 - 2,410 ppm DUKE1992A
- **Silicon** Fruit: DUKE1992A
- **Silver** Fruit 0.027 - 0.055 ppm DUKE1992A
- **Sinapic Acid** Fruit 7 - 19 ppm DUKE1992A
- **Selenite** Fruit: DUKE1992A
- **Serine** Fruit 40 - 2,410 ppm DUKE1992A
- **Silicon** Fruit: DUKE1992A
- **Silver** Fruit 0.027 - 0.055 ppm DUKE1992A
- **Sinapic Acid** Fruit 7 - 19 ppm DUKE1992A
- **Selenite** Fruit: DUKE1992A
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- **Serine** Fruit 40 - 2,410 ppm DUKE1992A
- **Silicon** Fruit: DUKE1992A
Number of Essential Nutrients May be Endless
10,000 compounds on a mission can effect the body in some amazing ways

Broccoli contain glucosinolates that turn on enzymes that detoxify

Blueberries have a dramatic ability to penetrate cell membranes and decrease levels of inflammation
Oxford University: No benefit for “Pure” C, E, or Beta on these factors:

Heart Disease, Cancer, Cataracts, Bone Fractures, Mental Decline

MRC/BHF Heart Protection Study of antioxidant vitamin supplementation in 20,536 high-risk individuals: a randomised placebo-controlled trial

Heart Protection Study Collaborative Group

Collaborators and participating hospitals are listed in Lancet 2002; 360: 7–22

Summary

Background
It has been suggested that increased intake of various antioxidant vitamins reduces the incidence rates of vascular disease, cancer, and other adverse outcomes.

Methods
20,536 UK adults (aged 40–80) with coronary disease, other occlusive arterial disease, or diabetes were randomly allocated to receive antioxidant vitamin supplementation (600 mg vitamin E, 250 mg vitamin C, and 20 mg β-carotene daily) or matching
Triage Theory & Carotenoids

Tomatoes and carotenoid rich foods are highly correlated with a lower risk of cancer

- *Journal of the National Cancer Institute*
  - Lycopene (carotenoids) not as effective as tomatoes for the prostate

- *American Journal of Clinical Nutrition*
  - Food carotenoids work against coronary artery disease, supplements don’t
“Carotenoids and other secondary plant compounds evolved as sets of interacting compounds, and because of this complexity it limits the usefulness of reductionist approaches that seek to identify single protective compounds.”

Journal of the National Cancer Institute 2003;95:1578-86
What is a Vitamin Anyway?
What is a Vitamin Anyway?

- Short-term deficiencies such as scurvy, Beriberi and rickets.
- Long-term deficiencies such as heart disease, diabetes and cancer
- Casmir Funk – Vital amines
- Absorption is not the goal of nutrition; absorb anything
- Vitamins are nutrient cargo (coenzymes)
SYNTHETIC OR NATURAL—
WHICH SUPPLEMENTS ARE BEST?

I will acknowledge right up front that this is a hot issue, fraught with misinformation, limited research, commercial biases and passionately held beliefs. Nonetheless, this issue affects us every day in our practice.

I’ve been puzzling over this question since the early 1970s, when I was enrolled in naturopathic medical school. Some of my teachers were inspired by recent advances that enhanced understanding of human biochemistry and were excited by the falling costs of high-dose synthetic nutrients that provided improved clinical success. Linus Pauling was lecturing widely on the wonders of “orthomolecular” medicine and promulgating the benefits of vitamin C at levels difficult to achieve from diet alone. After graduation, I attended 2 inspirational monthly study clubs, one with Jeff Bland, PhD, and the other with Jonathan Wright, MD, and Alan Gaby, MD. Both clubs provided a strong research foundation for nutritional medicine and found favorable results using synthetic supplements.

But then there were the “old timers,” who would comment now were found to be major determinants of health! I also noticed that the recognized importance of a new class of nutrients was limited by the available technology for detection and the increased understanding of human biochemistry. The final indication of the need to re-examine my assumptions on supplementation was the growing number of high-profile supplement intervention failures.

On the one hand, virtually every study shows an inverse correlation between whole foods and most chronic degenerative disease. Cardiovascular illness is a good example in which, for each increase in daily servings of fruits or vegetables consumed, we see about a 4% drop in cardiovascular disease. But what happens when we assert that a single nutrient is responsible for a specific health benefit, then synthesize it (or a close analog) and use the nutrient to treat or prevent a specific disease? The high-profile vitamin E failure studies we discussed in volume 4, issue 1, demonstrate the limitations of this approach. Why did high-dose synthetic vitamin E not work the way we expected in cardiovascular disease and actually seemed to increase some forms of the illness? Can it be explained away as a poor choice of dosing level, or is there more to it?
Triage Theory & Folate

- Published in *British Medical Journal*
- Extremely easy to absorb
- 50% of folic acid (PGA) unmetabolized at dosages of 400 mcg or more
- Food folate in correct form: Safe
- Cautious outlook: Bioavailability not the answer
Science, medicine, and the future

Is folic acid the ultimate functional food component for disease prevention?

Mark Lucock

We are entering a new era in preventive medicine, which focuses on diet as a means to health. Folate has received much attention as a vitamin that can protect against many diseases, but do we know enough about the long term effects of supplementation?

Mankind has been relatively unsuccessful in the search for the ultimate panacea for all ills; however, in the field of functional foods, few nutritional components have so many fundamental and diverse biological properties as folic acid and related B group vitamins. Moreover, few nutrients can claim to modulate, if not overtly benefit, such a wide array of clinical conditions.

Around 2500 years ago Hippocrates first espoused the “food as medicine” philosophy, which fell into obscurity by the 19th century. The first 50 years of the 20th century saw the discovery of the essential elements and vitamins, particularly in the context of

<table>
<thead>
<tr>
<th>Summary points</th>
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<td>B vitamins, particularly folate, may give considerable protection against serious diseases such as cancer, heart disease, and birth defects.</td>
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<tr>
<td>The method of protection is by lowering homocysteine or through epigenetic mechanisms.</td>
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<tr>
<td>Common single nucleotide polymorphisms of several genes coding for folate dependent</td>
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Mark Lucock
lecturer
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BMJ 2004;328:211–4
What does all this mean?

"You have a serious vitamin deficiency — Eat as much breakfast cereal as you can."
Nutrient Triage
Live For Today

“Sha-la-la-la-la-la-la, live for today...and don't worry 'bout tomorrow, hey, hey, hey. Sha-la-la-la-la-la-la, live for today. Live for today”

–The Grass Roots
Nutritional Longevity

Limited nutritional resources every day

Rationing: the body will always direct nutrients toward short-term health and reproductive capabilities and away from regulation and repair of cellular DNA

Creating nutritional starvation

Long-term diseases (inflammation and oxidation) take time to manifest in outward symptoms
Nutritional Longevity

• Known and unknown factors – number of essential nutrients
• Absorption vs. utilization
• Phytonutrient cascade
• Vitamins are nutrient cargo – metabolically active forms
• Long-term vs. short-term benefits
“My own scientific career was a decent from higher to lower dimensions, led by a desire to understand life. I went from animals to cells, from cells to bacteria, from bacteria to molecules, from molecules to electrons. The story has its irony, for molecules and electrons have no life at all. On my way, life ran out between my fingers.”

Thank you for your time.

James Doherty
Director of Education
Innate Response Formulas