



Cell Nutritional<sup>TM</sup>

Nourishing cells for life.

# **A Nutritional Approach to Creating & Maintaining Constant Health**

*By*

Cindy Marteney, CEO  
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*With an Introduction by*

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## Cindy Marteney, CEO, Cell Nutritionals



Cindy Marteney has studied complementary and alternative medicine for over 20 years and has led a successful nutritional supplements company, Our Health Co-op, which has served and educated consumers all across the United States and in many countries around the world since 2002.

Cindy has been a strong advocate for supplement quality, insisting on using high-quality ingredients from proven suppliers as well as an independent testing program for all of her company's products.

Cindy conceived of Cell Nutritionals as a subsidiary focused on "concentrated nutrition" backed by evidence-based science. She continually invests in studying the latest science and collaborates with leaders in nutritional science to design and develop new products.

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## Introduction by Dr. Hugo Rodier

As a physician who has studied nutrition intensively for more than a decade, it has been a pleasure and an honor to collaborate on the creation of *Constant Health*.

Over the years, I have concluded that if you focus on just one thing, it should be a healthy gut. With most of the immune system and many neurotransmitters in the gut, enhancing gastrointestinal health should be a priority for everyone. For example, I've never seen neurological issues without also seeing issues with the gut.

*Constant Health* provides a cutting-edge formula designed to be a foundation for a healthy gut and immune system. This formula is equally good for detoxification programs as for daily health maintenance. As a comprehensive formula, with each ingredient at therapeutic doses, *Constant Health* also offers an exceptional value to consumers.

I plan to recommend *Constant Health* to all my patients, and I will replace many similar health drinks that are not as complete, affordable, or tasty.

Meanwhile, I believe the following paper is an excellent primer on the science of cellular health and the science behind *Constant Health*. I consider this paper an important educational piece, which will make clinicians' lives easier and enrich consumers' perspectives on health.

Hugo Rodier, M.D. & Adjunct Faculty  
Integrative Medicine & Nutrition  
University of Utah, School of Medicine

## A Crisis in Nutrition Underlying a Crisis in Health

Poor nutrition is the norm. Modern diets are excessively high in processed foods, refined sugar, bad fats, and empty calories. Obesity is growing.

Many people are deficient in basic RDA levels of inexpensive, readily-available vitamins and minerals. It has been estimated that less than 1% of Americans achieve daily RDA levels of all essential nutrients -- even when eating a relatively good diet.

Meanwhile, there are no RDA thresholds set for many important nutrients, like essential fatty acids, which garner regular press for supporting everything from heart, joint, mood, skin, and immune function.

Yet, none of this is really breaking news. We know diet and nutrition affects health at a macro level, as millions of consumers try mightily to find the “right diet” to maintain health.

### Nutrition at the Cellular Level

What’s less well understood is the role of cellular nutrition or health at the micro level.



Many recent Nobel Prizes in science have been awarded to scientists studying cell-to-cell communication—in fields ranging from medicine and physiology to biology and chemistry.

Understanding how cells work is essential to protecting health. In nutritional science, the focus is on providing energy and information, through sufficient nutrition to allow cells *to determine for themselves* what they do and don’t need to function optimally.

When toxins or contaminants are ingested, they can induce cellular mutations in the intestine. Dietary fibers work to basically sweep toxins through the intestine, but when diets are deficient in fibers and toxic loads continue to increase, the body has to work especially hard.

“Toxin” is defined as a “harmful substance accumulating in the body,” and common toxins include: dangerous bacteria, pesticides, preservatives, over-the-counter and prescription drugs, hormones, and any other industrial chemicals that make their way into food and water supplies.

For example, in the presence of toxins, the body signals the intestine to rapidly turn over its epithelial cells and to heal any damages to the intestinal lining, preventing toxins from being absorbed.



Nutrients across cell membranes

**Cell Membranes & Fatty Acids** -- Human cells are bounded by a semi-permeable membrane composed of phospholipids (primarily fatty acids along with a phosphate group and an organic molecule). A healthy cell membrane allows nutrients to enter and signals for other cells to pass through while prohibiting harmful toxins from entering the cell. The cell membrane essentially allows cells to “talk” to one another.

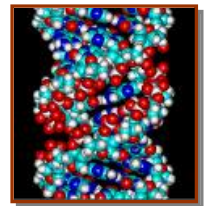
The type of fatty acid in cell membranes is directly correlated to the type of fat consumed in the diet. Saturated fatty acids are incorporated into fluid cell membranes and “pack in” tightly, as saturated fatty acid chains have no gaps, thus preventing nutrients from entering cells.

Optimal cell membrane composition occurs when the diet is *equally* comprised of saturated and unsaturated fatty acids. Unfortunately, many Westerners eat three times the amount of saturated fats and far too many hydrogenated and trans fats, which lead to oxidized fats and damage to cell membranes.

**Cell Membrane Damage** – With damage to its membrane, a cell’s regulation of nutrient and electrolyte intake, excretion of wastes, communication with other cells, and reception of signals from regulating hormones are all at risk.

Moreover, leaky cell membranes allow damaging toxins—especially fat-soluble toxins, such as many pesticides—to cross both the cell’s outer membrane and the nuclear membrane. When this happens, the cell’s DNA and energy-producing mitochondria become more vulnerable to free radicals and thus potential mutations.

**Cell Nucleus** – Most of a cell’s genetic material – DNA molecules organized into chromosomes -- is contained in the cell nucleus, with the nucleus being responsible for regulating gene expression (DNA and cell replication) and protecting gene integrity.



**Cell Mitochondria** – Mitochondria are the energy-producing workhorses of the cellular world, and cells have from one large mitochondrion to thousands of them, depending on metabolic requirements. The dominant role of mitochondria is to produce ATP (adenosine triphosphate) from glucose for energy, with muscle cells requiring more ATP (energy) than liver cells.

In addition to energy production, some mitochondrial functions are specific to certain cells, such as mitochondria in liver cells that detoxify ammonia, a waste product from protein metabolism. Mitochondria also play important roles in metabolic functions, including apoptosis cell-programmed death, a process that ensures billions of cells -- that are damaged beyond repair, infected with a virus, have DNA damage, etc. -- die so that new, healthy cells can be generated.

Finally, metabolic disturbances can also negatively affect mitochondria, as during a process of glycation and periods of high glucose levels, whereby glucose molecules bind to proteins in the mitochondria of cells. These “sugar-coated proteins,” or *glycoproteins*, distort mitochondrial function, produce excessive free radicals that harm cells, and create a “metabolic memory” for a diabetic state, even after high glucose levels fall to normal.<sup>1</sup>

### Fighting “Cellular TOIL”

Cell Nutritionals’ Medical Advisor, Hugo Rodier, an integrative M.D., stresses four essential things cells have to be able to manage to maintain health: toxicity, oxidation, inflammation, and energy conversion.

Typical Western dietary habits lead to a condition of constant “cellular TOIL,” which means the cells are suffering from:

- **Toxicity** – Every cell in the body excretes waste endogenously. If cells can’t eliminate this waste properly, it stays in the system and becomes toxic. Exogenous toxins ingested (i.e., hormones, pesticides, heavy metals, etc.) add to toxic loads and to problems in cellular health and communication. The more toxins ingested and created metabolically, the harder cells must work to eliminate toxins.
- **Oxidation** – Free radicals are reactive electrons produced by normal metabolic oxidation processes. Excessive free radical formation can wreak havoc by stealing electrons from and destabilizing healthy atoms, causing oxidative stress that damages all components of cells. Oxidized lipids, sugars, enzymes, and proteins stop functioning properly and become harmful waste products in their oxidized states.
- **Inflammation** – Damaged cell membranes become irritated and inflamed. This leads to a progressive shift in the type of cells which are present and is characterized by a release of toxins and free radicals, which causes more membrane inflammation. Chronically inflamed cell membranes can't communicate properly. Without adequate cellular communication, hormones, neurotransmitters, and enzymes can't organize body functions properly. Vascular tissues then respond to harmful stimuli from damaged cells by becoming inflamed themselves.
- **Lack of mitochondrial energy** – Most of health problems are due to a breakdown in cellular communication, diminishing the energy cells need to do their job. Without proper nutrition, cells become sickly and body systems deprived. With over 6 billion cells being constantly regenerated, *abundant nutrition* is required to support cellular needs and energy production.

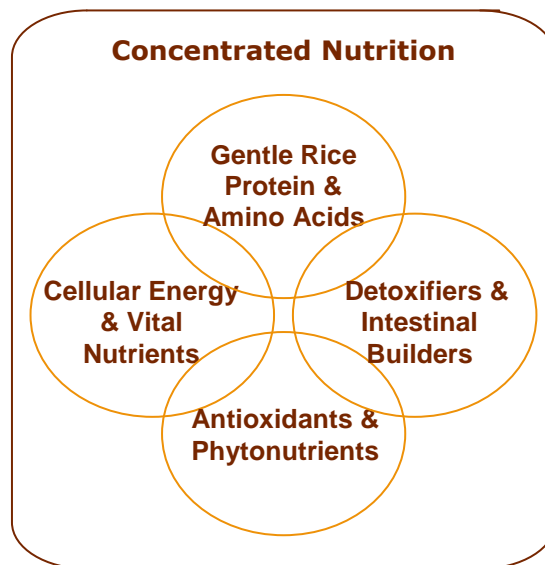
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<sup>1</sup> Warwick Medical School, June 2007

## The Science Behind *Constant Health*™

Creating and maintaining optimal health, given modern diets and environmental exposures, requires a comprehensive array of nutrients, in doses that are considered clinically significant. *Constant Health*™ is the foundational product for Cell Nutritionals, with dozens of ingredients carefully blended to provide:

- **Gentle Protein & Amino Acids** - Gentle, easy-to-digest rice protein that has low-allergenic potential and is also suitable for vegetarian requirements.
- **Detoxifiers & Intestinal Builders** – A combo of amino acids that boost glutathione levels, along with fibers and other agents that help detoxify the body of heavy metals, chemicals, pesticides, and xenoestrogens. Intestinal soothing agents support nerve endings in the stomach and intestinal cells.
- **Antioxidants & Phytonutrients** - A powerful suite of antioxidants and phytonutrients that support the immune system, with doses determined by clinical studies and peer-reviewed research.
- **Cellular Energy & Vital Nutrients** – A targeted suite of vitamins and minerals to provide cellular energy and support immune system and intestinal health.
- **Natural Sweeteners** – All-natural sweeteners and flavorings that create an appealing formula while still delivering concentrated nutrition.



**Figure 1 - Constant Health Provides Concentrated Nutrition**

Concentrated nutrition, in an easy-to-drink powder, enhances consumer acceptance when many nutrients are required, each in significant serving size.

## Suggested Use for Constant Health

Constant Health yields approximately 37 grams of concentrated nutrition per serving. For maintenance programs, one fully-rounded scoop is recommended.

For detoxification programs and other intensive nutrition programs, one scoop twice daily is recommended. People who are new to detoxification may want to build up to the two scoops more slowly, starting with a half scoop and moving to two scoops over the course of a week. Normal detoxification symptoms may include mild headache, fatigue, and minor aches, and typically these symptoms disappear after continued use of Constant Health.

Constant Health was designed to be the ongoing foundation for a comprehensive nutritional program, and combines the benefits of four core components of nutrition (shown in Figure 1): gentle protein and amino acids, detoxifiers and intestinal builders, antioxidants and phytonutrients, and nutrition for cellular energy and metabolic processes.

## Gentle Rice Protein & Amino Acids

### Selection of Rice Protein

Constant Health™ offers a complete rice protein, which is easily digested and is considered one of the only hypoallergenic protein sources and compares favorably against dairy-based whey, egg, and soy proteins. Rice protein is very gentle and has been used successfully with populations with sensitive systems, including infants and the elderly.



Ground-breaking epidemiological studies<sup>2</sup> support the use of plant proteins for optimizing health, and rice protein is perfect for vegetarians and other people adopting a vegetarian program. Regardless of form, many people choose to increase their intake of protein, and it is recommended that the elderly, in particular, add supplemental protein to their diets.

### A Complete Protein

Protein is the main component of muscles, tendons, ligaments, organs, and glands. Every living cell and all body fluids, with the exception of bile and urine, contain protein.

Rice yields the highest quality protein of all grains and has a bland taste that doesn't require masking agents for palatability.

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*The China Study*, T.C. & T. M. Campbell, 2005

Some wonder how rice, a carbohydrate, can yield a complete protein. The fact is that all foods, including vegetables and fruits, contain amino acids, the building blocks of protein.

Protein is isolated from the carbohydrate molecules in brown rice to produce rice protein. To be considered a complete protein, a protein must have all nine essential amino acids. Rice protein qualifies as a complete protein, and includes all the other non-essential amino acids as well.

### More on Proteins & Amino Acids

Proteins are essential to all living cells. In fact, all the millions of different proteins in living organisms are formed by bonding only 20 building blocks called amino acids. As large molecules in the human body, proteins include vital agents like enzymes (the catalysts for digestion), neurotransmitters (like dopamine and acetylcholine), hormones (like insulin and human growth hormone), and antibodies.



Growth, repair, and maintenance of cells are all dependent upon digestion of proteins into constituent amino acids in the gastrointestinal tract. These amino acids are then distributed to cells, which then assemble proteins required for specific functions, like keratin for skin and collagen for tendons.

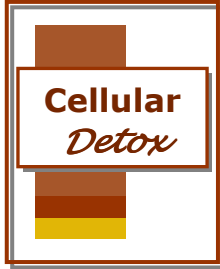
Organs active in metabolism; such as the liver, kidney, intestinal mucosa, and pancreas; have especially *high* requirements for protein. Stress to the body; such as intensive exercise, wounds, infections, surgery, even aging; also *increases* the body's protein requirements.

Anti-bacterial agents and toxins, however, can inhibit cells from synthesizing proteins that they need to function. And, poor protein metabolism can cause toxic levels of waste (ammonia) that can put undue stress on the kidneys and liver.

Many popular diets subscribe to “more protein” and “fewer carbohydrates.” However, little attention is given to the quality of the protein being ingested.

Animal proteins are more difficult to digest than vegetable proteins and studies, such as the ground-breaking epidemiological research in *The China Study*; by T. Colin Campbell, professor of Nutritional Sciences at Cornell University; link ingestion of diets high in animal protein with disease, while plant-based proteins are protective of health.

## Detoxifiers & Intestinal Builders



Bad diets and environmental pollution can cause malabsorption problems, build-up of toxins and oxidized stress. If there is excessive free radical formation and accumulation of toxins, inflammation in cells and tissues can occur.

Since most people consume too many toxic foods (trans-fats, simple sugars), the stage is set for significant cellular dysfunction and the need for cellular detoxification.

The body's natural detoxification process removes toxic substances, including foreign chemicals, free radicals, and oxidized fats and proteins. Detoxification is one of the major functions of the liver and lower gastrointestinal tract.

However, most people need additional nutritional support to aid the liver and gastrointestinal system in removing the excessive load of toxic compounds that can accumulate in the body. This is particularly true if the digestive system is not functioning optimally.

Gastro-protective and digestive agents can restore the balance in the gastrointestinal system, thus aiding the absorption of nutrients and reducing the build-up of damaging toxins and oxidized molecules.

### Detoxification by Boosting the Body's Glutathione Production

Glutathione is the most powerful antioxidant produced in the body. Glutathione is synthesized in the liver from the amino acids cysteine, glutamic acid, and glycine.

All proteins support cellular, muscle, and organ health. However, enhancing immune system response, improving intestinal and detoxification functions, and preventing damage from oxidative stress creates special needs for cellular glutathione.

Glutathione inhibits the formation of, and protects against cellular damage from, free radicals. As a detoxifier of heavy metals and drugs, it is crucial to liver health.

**Glutathione Boosters**

- Glycine
- Glutamine
- N-Acetyl Cysteine
- Curcumin
- Milk Thistle
- Selenium

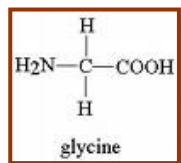
Higher blood levels of glutathione are associated with better health, especially in elderly people. Recognition of this link between glutathione and good health has led to major commercial efforts aimed at promoting the use of glutathione supplements.

However, most experts believe that the body *does not* convert glutathione supplements into glutathione inside cells. Instead, the body must produce glutathione naturally, and that process is limited by the levels of the precursor amino acids available in the body.

Supplemental compounds can boost glutathione levels, including the amino acids glycine and glutamine. N-acetyl-cysteine (NAC) is derived from cysteine and is quickly converted to glutathione once it enters the body, with studies proving that NAC boosts intracellular glutathione levels. Additionally, curcumin (the curry spice), milk thistle (known for liver protection), and selenium are considered glutathione boosters as well.

## L-Glycine

*2 grams per serving*



Glycine is one of the three amino acids that form glutathione.<sup>3</sup> In addition to enabling glutathione production, glycine directly nourishes key detoxification organs – the liver, kidneys, and intestines.<sup>4</sup>

Glycine is essential not only for elimination, but also for a normally-functioning digestive system. It supports healthy gastric secretions (regulating synthesis of the bile acids used to digest fats) and also healthy gastric mucosa.

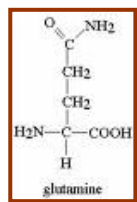
Glycine is further required for the metabolism of proteins, amino acids, hemoglobin, glucose; is found abundantly in prostate fluid; and is used to construct normal DNA and RNA strands—the genetic material needed for proper cellular function and formation.<sup>5</sup>

Glycine is necessary for central nervous system function, may improve memory and other cognitive functions,<sup>6</sup> and converts to the neurotransmitter, serine, which helps the body synthesize cysteine, the precursor to glutathione.

And, glycine is, perhaps, best known for its role in helping create muscle tissue and preventing the breakdown of muscle (by boosting the body's levels of creatine).<sup>7</sup> In this way glycine enhances energy use, increases endurance, and aids in muscle tissue recovery and repair.

## L-Glutamine

*2 grams per serving*



Glutamine is involved in more metabolic processes than any other amino acid, and is used by nearly every cell in the body.<sup>8</sup>

Glutamine is one of the amino acids that helps form the antioxidant glutathione and works to remove toxins from the body. It is essential for protecting the liver and maintaining intestinal function, cellular hydration,

3 J. Current Opinion Clinical Nutrition Metab Care 2003;6:229.

4 Alcohol Clin Exp Res. 2005 Nov;29(11 Suppl):162S-5S

5 J Pediatr 1996;129:449-52.

6 J Clin Psychopharmacol. 1999;19:506-12.

7 J Pediatr 1996;129:449-52.

8 Minerva Gastroenterol Dietol 1996 Mar;42(1):17-26.

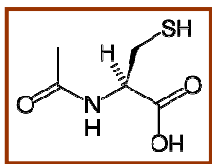
and protein metabolism.<sup>9</sup>

Glutamine is the primary source of energy for the various cells of the immune system, including T cells and macrophages. However, under stress, the body's need for glutamine outpaces the body's ability to synthesize it. Without sufficient glutamine, the immune system cells become malnourished.

Glutamine plays a major role in protecting the integrity of the gastrointestinal tract by increasing mucosal and villi health in the intestine. It also helps maintain normal blood sugar by converting to glucose when more energy is needed, and particularly serves as a source of fuel for cells lining the intestines.

### N-Acetyl-Cysteine

300mg per serving



N-acetyl-Cysteine (NAC) is a derivative of the amino acid L-cysteine, a major precursor in the formation of the antioxidant glutathione.<sup>10</sup> NAC is more stable than L-cysteine and is quickly metabolized into glutathione once it enters the body.

NAC is a potent cell detoxifier, as well as helping to strengthen cell membranes. NAC strengthens the protective lining of the stomach and intestines, and has demonstrated liver-protecting qualities.

### Calcium D-glucarate

300mg per serving



Calcium D-glucarate, similar to indole-3-carbinol, is a natural substance found in many fruits and particularly in cruciferous vegetables. As a form of glucaric acid, this phytochemical supports the body's process of eliminating toxins, foreign pollutants, and excess hormones<sup>11</sup> and promotes a clean internal environment for optimum metabolism.

Calcium D-glucarate helps to deactivate or inhibit beta-glucuronidase, an enzyme found in certain bacteria in the gut. When not properly regulated, B-glucuronidase allows potentially damaging toxins and excess hormones to be reabsorbed into the body instead of being excreted.

Detoxifying the body reduces the load on the liver and immune system, so that these systems can focus on repair and generation of healthy cells. Some body-building reports indicate that calcium D-glucarate can improve physiques.

<sup>9</sup> Wien Klin Wochenschr. 1996;108(21):669-76.

<sup>10</sup> J. Skin and Allergy News. August 2006, page 36.

<sup>11</sup> Biochem Med Metab Biol. 1990; 43:83-92.

**Milk Thistle** (standardized to 80% silymarin)  
300mg per serving



The active component of Milk Thistle is silymarin, a unique type of flavanoid with antioxidant ability. Silymarin has a stimulatory effect on key cells of the immune system,<sup>12</sup> and offers substantial protection for cell membranes against oxidative stress from environmental contaminants.

Silymarin has been shown to protect the liver from a variety of harmful substances and free radical damage. It prevents toxins from penetrating the interior of liver cells, while promoting the growth of healthy new cells.<sup>13,14</sup>

### Dietary Fiber - Soluble & Insoluble Agents

Dietary fibers are the indigestible portion of plant foods that move through the digestive system, keeping the gastrointestinal tract clean.

Soluble fibers undergo metabolic processing via fermentation in the large intestine and colon, and serve a prebiotic function that encourages growth and activity of beneficial gut flora, bifidobacteria and lactobacilli.<sup>15</sup> Metabolism of these soluble fibers by bacteria in the colon yields short-chain fatty acids, which increase absorption of minerals<sup>16</sup> and protect the mucosal lining of the intestine.

Because soluble fiber takes longer to digest, it helps to regulate blood sugar levels. Short-chain fatty acids from soluble fibers also help regulate blood glucose levels by acting on pancreatic insulin release and liver control of glycogen breakdown.

Insoluble fibers then shorten transit time through the intestinal tract and support elimination of toxins and cholesterol-producing substances from the body.<sup>17</sup>

**Guar Gum**  
1 g per serving



Guar gum is a *soluble* fiber from the seeds of the guar plant and is used both to increase satiety and support bulk in stools, easing and promoting regularity with elimination.

Guar gum is able to absorb toxic substances, like unhealthy bacteria, to

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12 J Cancer Res Clin Oncol. Epub 2007 Apr 14.  
13 Eur J Pharmacol. 2007 Apr 10;560(2-3):110-6. Epub 2007 Jan 19.  
14 J. Molecular Carcinogenesis. 1999;26:321.  
15 Am J Clin Nutr. 2005;82 (2): 471-6.  
16 J Nutr. 2003;133 (1): 1-4.  
17 J Nutr. 1994; 124:78-83.

support intestinal health. Animal studies have shown guar gum to improve calcium absorption in the small intestine and improve dietary glucose tolerance.

### Apple Pectin

500mg per serving

Pectins, a *soluble* fiber, are polysaccharides found in the cell walls of plants, and extracts of fruit pectins are typically associated with the making of jams and jellies. In the large intestine and colon, microorganisms digest pectin and liberate short-chain fatty acids that support intestinal health.



Pectin delays stomach emptying, helping prevent blood sugar swings and is associated with healthy cholesterol levels by increasing viscosity of the intestinal tract, leading to reduced absorption of cholesterol from bile or food.

Pectins are also considered important in supporting excretion of heavy metals and endocrine-disrupting chemicals from the body.

### Apple Fiber

2 g per serving

A mostly *insoluble* fiber that adds bulk and softens stools, apple fiber is good for people who are sensitive to wheat and oat bran. Apple fiber, which does include some apple pectin, also helps rid the body of heavy metals, promotes regularity, and tones the gastrointestinal tract.

### Cellulose

1 g per serving



Cellulose, an *insoluble* fiber, constitutes about one-third of all plant matter, making it the most common of polysaccharides. Cellulose is used in nutritional formulas as a bulking and colon cleansing agent, with positive associations with healthy cholesterol levels.

## Antioxidants & Phytonutrients

Life requires oxygen for existence. Oxygen is also a highly reactive molecule. Free radicals are reactive electrons produced by normal oxidation processes. Oxidative stress on cells results when there is an imbalance between production of reactive oxygen species free radicals and the body's ability to detoxify it.

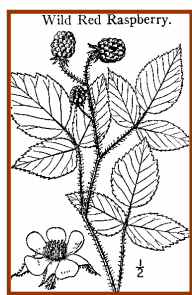
Under healthy conditions, balance is preserved by enzymes that provide constant inputs of metabolic energy and antioxidants to reduce and repair cell damage caused by free radicals. If there is excessive free radical formation, and the body's network of antioxidants is depleted, the metabolic oxidation processes become imbalanced and toxic.

The presence of dangerous amounts of free radicals can alter the way in which the cells code genetic material and cause toxic effects that damage all components of the cell, including mitochondria. If too much damage is caused to the mitochondrion, the cell will die.

Phytonutrients are extremely beneficial plant-derived food compounds. In contrast with nutrients, they are not required for normal metabolic function. Still they are potent antioxidants that reduce, neutralize, and prevent damage to cells from free radicals.

### Red Raspberry Seeds

*1 gram per serving*



Red raspberry seeds are rich in anthocyanins, natural antioxidant compounds, and are good dietary sources of tocopherols and carotenoids. Berry anthocyanins repair and protect cell integrity and are beneficial in reducing age-associated oxidative stress.<sup>18</sup>

Red raspberries also provide a complete complex of ellagitannins, a proven dietary source for creating ellagic acid in the body (as with glutathione, supplemental ellagic acid is *not* considered effective, since the body requires the precursor ellagitannins to create health-promoting ellagic acid).

Ellagitannins have been studied for their ability to slow the growth of abnormal cells, promote wound healing, and support liver health.

One gram of red raspberry seeds yields approximately 40mg of ellagitannins, which is equivalent to what is found in 1 cup of fresh red raspberries, and also additional beneficial fiber for healthy gastrointestinal function.

### Slippery Elm (inner bark rind)

*500mg per serving*



Slippery elm bark is rich in calcium and bioflavonoids, and is typically used to soothe mucous membranes of the bowels, stomach and urinary tract.<sup>19</sup> Slippery elm is also considered valuable in supporting the body's adrenal glands and upper respiratory system.

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18 J. Agric. Food Chem. 2005; 53 (3), 566 -573.

19 J. Alimentary Pharmacology Therapy 2002;16:197.

Additionally, slippery elm is used to draw out toxins and assist the body in expelling toxins.

### **Boswellia serrata** (standardized to 55% boswellic acids)

500mg per serving



*Boswellia serrata* (also known as Frankincense) is a large tree native to India and is considered a guggul (a sticky gum resin from the sap of a tree). *Boswellia* has been used in Indian Ayurvedic medicine for centuries as to provide joint and tissue comfort, to reduce swelling and inflammation, and for digestive relief.

Boswellic acids, the active ingredients in the resin, have been found to have significant gastro-protective and soothing effects.<sup>20,21</sup>

### **Turmeric** (*curcuma longa* standardized to 95% curcuminoids)

500mg per serving



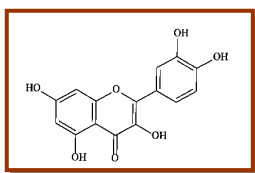
The bright orange curcuminoids contained in turmeric are powerful bioflavonoids, with a wide range of antioxidant activities and which have been shown to increase glutathione in the body.<sup>22</sup>

Curcuminoids are also associated with inhibiting eicosanoids, which are involved with the body's inflammation process. Turmeric is used widely in India and Indonesia to promote joint and tissue comfort and as an aid in digestion.

Curcumin has been shown in clinical studies to provide significant soothing effects in the stomach and small intestine, and has demonstrated protective activity in the stomach and colon.<sup>23</sup>

### **Quercetin**

500mg per serving



Quercetin is one of the most potent bioflavonoids used by plants to protect against UV radiation and microbes. Quercetin is the most active of the flavonoids. Quercetin has powerful cell protecting properties<sup>24</sup> and stabilizes cell membranes so they are less reactive to allergens and toxins by inhibiting the manufacture and release of histamine. Bioflavonoids are, in fact, considered "nature's biological response modifiers."

20. DNA Cell Biol. 2005 Apr;24(4):244-55

21 Inflammopharmacology. 2004;12(2):131-52

22 J. Skin and Allergy News, May 2005, page 20.

23 Biosci Biotechnol Biochem. 2000; 64:503-509.

24 Clin Cancer Res. 1996; 2:659-668.

While bioflavonoids, like quercetin, are poorly absorbed by the body, they stimulate the body to produce uric acid to excrete them, which gears the body up to eliminate other unwanted compounds.

Quercetin inhibits lipid peroxidation and increases protective mucus production in the gastrointestinal tract.<sup>25</sup> Quercetin is also thought to help preserve vitamin C in the body and support the health of fragile capillaries.

**Grape Seed Extract (95% proanthocyanidins)**  
*200mg per serving*



The main active components of grape seed extract are oligomeric proanthocyanidins (OPCs), another potent bioflavonoid. OPCs are water soluble, highly bioavailable, and have uniquely powerful antioxidant capabilities.<sup>26</sup> For example, they are able to cross the challenging blood-brain barrier and thus provide antioxidant protection to both the brain and the central nervous system.

OPCs maintain cell integrity, enhance the growth and viability of normal cells,<sup>27</sup> promote vascular health, and protect the liver and other organs from toxicity.<sup>28</sup>

Grape seed extract have been shown to have a positive effect on how we metabolize food<sup>29</sup> and can help support the body in maintaining balanced blood sugar<sup>30</sup> and healthy cholesterol levels.

**Ginger Root (root powder with 5% standardized gingerols)**  
*100mg per serving*



Ginger is used in folk medicine throughout the world to aid in digestion and is thought to fight unfriendly intestinal bacteria without impairing friendly bacteria. Gingerols are associated with inhibiting prostaglandin and leukotrine formation, which influence blood flow and inflammation).

Ginger has gastro-protective qualities<sup>31</sup> and is a digestive stimulant. It has been shown to have a positive influence on the activity of digestive enzymes<sup>32</sup> and promote production of saliva, digestive juices, and bile. Ginger enhances blood circulation and is considered supportive of healthy cholesterol levels.

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25 Z Naturforsch[C]. 1998; 53:82-88.

26 J Clin Pharm Ther. 1998 Oct;23(5):385-9.

27 Carcinogenesis. 1999 Sep;20(9):1737-45.

28 Ann N Y Acad Sci. 2002 May;957:260-70.

29 J. Skin and Allergy News June 2006, page 24.)

30 J. Nature. 2006;444:1009.

31 Am J Chin Med. 1989;17(1-2):51-6.

32 Nahrung. 2003 Dec;47(6):408-12

**Vitamin A** (100% natural beta-carotene)  
*5000IU per serving (100% RDA)*



Vitamin A is a fat-soluble antioxidant, essential for overall health. Beta-carotene is one of the most important carotenoids in nature, and it is most efficiently converted by the liver into vitamin A (retinol) compared with other carotenoids.

Beta-carotene enhances intercellular communication and normal cell division; promotes vision, eye, skin, and mucous membrane health; enhances the immune response against environmental toxins; and protects cells from damage caused by damaging free radicals.<sup>33</sup>

The evidence is overwhelming that a diet rich in beta-carotene may reduce the risk of certain types of cancer.<sup>34</sup>

**Vitamin C** (calcium ascorbate and ascorbic acid)  
*753mg per serving (1255% RDA)*

Vitamin C may be the most important water-soluble antioxidant in the body, as it protects the body during times of stress, aids in the absorption of other nutrients, and is essential to maintaining normal immune function.<sup>35, 36</sup>

Vitamin C works synergistically with lysine and proline to synthesize collagen and elastin, which support vascular, skin, muscle, and connective tissue health. It also plays critical roles in protecting the eyes, kidneys, and nerves. Vitamin C has been shown in test tubes to detoxify histamine, a product of stress and immune system challenge.

Vitamin C protects cells, plasma lipids, DNA, proteins and even other antioxidants from oxidative damage (e.g., it reduces oxidized vitamin E in cell membranes).<sup>37</sup> Vitamin C also increases the synthesis of natural antiviral and antibody substances produced by the body, and it stimulates the activity of other key immune cells.

**Vitamin E** (as mixed tocopherols and tocotrienols)  
*100IU per serving (333% RDA)*



Vitamin E is a potent lipid-soluble dietary antioxidant with immune enhancing properties.<sup>38</sup>

Vitamin E (alpha-tocopherol) protects cell membranes from deterioration by free radicals.<sup>39</sup> In particular, it has been shown to decrease oxidative stress on lipid

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33 J Infect Dis. 2006 Nov 1;194(9):1217-25

34 J Natl Cancer Institute. 1999; 91:547-56

35 Psychopharmacology. 2002;37:261-7.

36 Int J Sports Med. 1996 Jul;17(5):379-83

37 Free Radic Biol Med. 1999 Nov;27(9-10):1064-79.

38 JAMA. 1997; 277:1380-1386.

cells,<sup>40</sup> and improve glucose disposal.<sup>41</sup> This leads to improved oxygen utilization and balanced blood sugar, and promotes cardiovascular health.<sup>42</sup>

Effective absorption of vitamin E by the gastrointestinal tract is critical to central nervous system health and coordination.

### **Vitamin D3** (as cholecalciferol)

*1000IU per serving (250% RDA)*

Vitamin D is a fat-soluble vitamin required for absorption and utilization of important nutrients by the intestinal tract. It is necessary for growth, maintains healthy bone density, and protects against muscle weakness.

Recent research all indicates to the need for increasing the daily requirement for Vitamin D from 400 IU daily to 1000 to 2000 IU daily, since blood serum levels typically show critically low vitamin D levels. Increasingly, consumers are becoming aware that Vitamin D3 or cholecalciferol is the preferred and more bioavailable form (vitamin D3 is up to ten times more potent than D2 or ergocalciferol).

The active form of Vitamin D is actually a steroid hormone found to enhance how immune cells communicate. Vitamin D has extensive immune-enhancing, antioxidant, and cell-protecting activities yet to be fully understood.<sup>43</sup>

### **Selenium** (as selenomethionine)

*70mcg per serving*



Selenium is a vital antioxidant that protects the body from free radical damage in many ways and speeds up the metabolism of fatty acids.

First, it is incorporated into proteins to make selenoproteins, important antioxidant enzymes that protect cells from cellular damage.<sup>44</sup> One of the selenoproteins is the body's most powerful antioxidant, glutathione. Without selenium, the body cannot produce glutathione.

Another crucial selenoprotein is thioredoxin reductase, which maintains the antioxidant function of vitamin C (ascorbic acid) by catalyzing its regeneration from its oxidized form.<sup>45</sup> Selenium also acts synergistically with vitamin E, each improving the efficiency

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39 FASEB J. 1999; 13:1145-1155.

40 Annu Rev Nutr 2005;25:151-74.

41 J Investig Med. 2004 Jan;52(1):24-32.

42 Diabetes Res Clin Pract. 1999; 45:169-182.

43 Nutr Res. 2000; 20:91-102.

44 J Nutr. 2000;130:1653

45 Biochem J. 2000 Feb 15;346 Pt 1:1-8.

of the other. They work together to aid in the production of antibodies and to help maintain a healthy heart and liver.

The FDA allows limited claims for selenium as protection against cancer.

### Zinc (as methionate)

*15mg per serving*

Zinc is an essential nutrient needed to maintain the integrity of cell membranes. It has potent antioxidant properties, and is required for a number of immune functions, including boosting of the thymus gland function. Zinc increases the absorption of vitamin A and is needed to maintain the proper concentration of vitamin E in the blood.

Zinc also functions as a catalyst for many essential enzymes, including the antioxidant enzyme super-oxide dismutase (SOD), which supports cellular health by protecting cytoplasm and mitochondria from the body's most common and aggressive free radical, super-oxide.<sup>46</sup>

## Vitamins Supporting Cellular Energy & More

Cells need nutrients to create energy. Dysfunction of nutrient processing leads to a "metabolic syndrome" with breakdown in cellular communication and diminished energy production. Without adequate cellular communication, hormones, neurotransmitters and enzymes cannot organize body functions or cell metabolism properly.

### B Vitamins



The B vitamins are essential for cell metabolism, and they support the body's enzymes in energy production.

B vitamins help maintain a healthy gastrointestinal tract, play important roles in the metabolism of carbohydrates and fats into energy, and they combat the symptoms and causes of stress, which sap energy.

The B vitamins are water soluble and must be replenished daily. Ideally, B vitamins should be taken together in complex.

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<sup>46</sup> J Toxicol Clin Toxicol. 1999;37:279-92.

### Vitamin B1 (thiamine)

*10 mg per serving*

Thiamine, or B1, plays a key role in intracellular glucose metabolism<sup>47</sup>, and the body cannot effectively convert carbohydrates into energy without it.<sup>48</sup> Thiamine is also involved in the metabolism of branched-chain amino acids (proteins), and is important to the growth and protection of cells.<sup>49</sup>

Thiamine is crucial to normal neural activity, has positive effects on the health of intestinal muscles and mucous membranes, and aids proper digestion by contributing to the production of hydrochloric acid.

### Vitamin B2 (riboflavin)

*10 mg per serving*

The body needs riboflavin, or vitamin B2, to ensure the cells can reproduce correctly and supply the body with fuel. Riboflavin acts as an important facilitator and protector for a number of other nutrients and enzymes, without which the body could not convert fats, carbohydrates, and proteins into cellular energy.

Riboflavin also acts a pre-cursor and cofactor with other antioxidants in the production of glutathione.<sup>50</sup> In this way, it protects cells from mitochondrial damage<sup>51</sup> and helps regenerate vitamin E in the body. With vitamin A, riboflavin supports healthy mucous membranes in the digestive system.

### Vitamin B3 (niacin)

*20 mg per serving*

Niacin, or vitamin B3, combines with other B vitamins to release energy from carbohydrates to the cells and regulate glucose in the body. Niacin is also indispensable to fat and protein metabolism and is perhaps best known for its role in inhibiting cholesterol synthesis and promoting heart health.

Niacin also aids in the production of hydrochloric acid and other digestive juices, and is required for the metabolism of fats.<sup>52</sup>

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47 Diabetologia. 1996; 39:1263-1268.

48 Mayo Clin Proc. 1999; 74:259-263.

49 Ann Vasc Surg. 2000; 14:37-43.

50 Nutr Rev. 1998; 51:149-150.

51 AIDS Rev. 2003 Jan-Mar;5(1):36-43.

52 Atherosclerosis. 2007 Jun;192(2):432-7. Epub 2007 Jan 19

### Vitamin B5 (pantothenic acid)

*10 mg per serving*

Pantothenic acid, or B5, is involved in an array of biological functions related to the production of energy, and is necessary for normal functioning of the gastrointestinal tract.

Pantothenic acid is an essential precursor of coenzyme A, a vital body chemical involved in many necessary metabolic functions, including the production of glucose from amino acids.<sup>53</sup> It also contributes to the formation of acetylcholine in the intestines, which enhances peristalsis (rhythmic intestinal motion) and facilitates healthy elimination.

Pantothenic acid is also needed to make adrenal hormones and in the production of neurotransmitters, and works to protect the nervous system from stress.

### Vitamin B6 (as pyridoxine)

*10 mg per serving*

Vitamin B6 is necessary for the production of hydrochloric acid, normal red blood cells, and the absorption of fats and proteins.

Vitamin B6 is needed for the synthesis of the nucleic acids RNA and DNA, which are necessary for normal cellular growth, and aids in the absorption of iron, vitamin B12, and a host of other nutrients.<sup>54</sup> B6 combines with folic acid and B12 to normalize homocysteine metabolism and maintain cardiovascular and circulatory health.<sup>55</sup>

B6 is also required by the nervous system for the synthesis of mood-regulating neurotransmitters, such as serotonin. Optimal levels of riboflavin (B2), vitamin C, magnesium, and selenium improve B6 absorption.

### Vitamin B12 (methylcobalamin)

*10 mg per serving*

Vitamin B12 is required for proper digestion, absorption of nutrients, synthesis of protein, and metabolism of carbohydrates and fats.<sup>56</sup> It also works with folate and vitamin B6 (pyridoxine) to protect the heart by removing homocysteine from the blood.

Methylcobalamin is a cofactor in the creation of methionine, a precursor of S-adenosylmethionine (S-AdoMet). S-AdoMet is involved in the synthesis of myelin basic protein and important neurotransmitters. Myelin is a protective layer that coats nerve cells and aids in cellular communication.

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53 Free Rad Biol Med. 1996; 20:793-800.

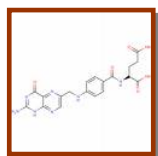
54 Nippon Jinzo Gakkai Shi. 1993 Aug;35(8):975-80.

55 J Vasc Surg. 1994 Dec;20(6):933-40.

56 Baillieres Clin Haematol 8: 441-459.

## Folate

400mcg per serving



Folate is needed for protein metabolism and energy production,<sup>57</sup> and is crucial to the good health of every cell in the body.<sup>58</sup> Folate functions as an active coenzyme in DNA and RNA synthesis, and is thus needed to regulate cell formation and maintain cell integrity.<sup>59</sup>

## Biotin

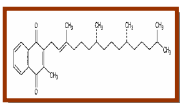
300mcg per serving

Biotin, or vitamin B7, is essential to cell growth, and is necessary to the production of essential fatty acids and the conversion of carbohydrates and fats into energy.

Biotin stimulates the enzymes that regulate carbohydrate metabolism in the liver, and thus enhances glucose uptake in muscle cells<sup>60</sup> and helps maintain steady blood sugar levels.<sup>61</sup>

## Vitamin K

40mcg per serving



Vitamin K is crucial in the absorption of other important nutrients, in particular calcium. Vitamin K also aids in converting glucose into glycogen for storage in the liver, and thus promotes healthy liver function and regulation of blood sugar<sup>62</sup>, while protecting the inner linings of the organs.<sup>63</sup>

## Minerals Supporting Cellular Energy & More

### Boron

1.5mg per serving

Boron contributes to the efficiency and absorption of other vital nutrients, including calcium, vitamin D, copper, magnesium, phosphorus, calcium and magnesium.<sup>64</sup>

Boron is known for building bone and muscle, and also for boosting brain activity, and is considered important for immune function and energy use in the body.

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57 La Revue du praticien 43 (11): 1358-63.

58 Semin onco. (5 Suppl 18): S18-30-S18-39.

59 Gastroenterology (USA), 1997, 112/1 (29-32).

60 Nippon Rinsho. 1999;57:2261-2269.

61 U.S. Pharmacist (Nov 2006). 31 (11).

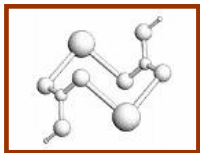
62 Int J Vitam Nutr Res. 1999; 69:27-31.

63 Biochim Biophys Acta 1157:313-17.

64 Environ Health Perspect 1994;102(suppl 7):59-63;79-82.

### Calcium (from carbonate and d-glucarate)

300mg per serving



Calcium, the most abundant mineral in the human body, is crucial to building and maintaining strong bones, teeth, and connective tissue.

Calcium absorption from the small intestine and excretion from the kidneys are carefully regulated to ensure precise concentrations of calcium in the blood plasma, since high or low calcium levels both cause problems in the body.

Calcium also promotes healthy digestion through the production of hormones and enzymes. Calcium increases fat breakdown, and also discourages the accumulation of excess dietary fat within the digestive tract<sup>65, 66</sup> thus protecting the colon from oxidative damage.<sup>67</sup>

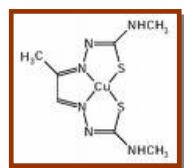
### Chromium (as polynicotinate)

400mcg per serving

Chromium is vital in the synthesis of cholesterol, fats, and protein, and it is needed for energy production. It is particularly important in the metabolism of glucose,<sup>68</sup> and proper insulin utilization.<sup>69</sup> Some claim that chromium may increase lean body mass by boosting protein metabolism.

### Copper (as gluconate)

2mg per serving



Copper is found primarily in the bloodstream as a co-factor in various enzymes, energy production, insulin function, and breakdown of fats. The body has to have both copper and zinc to produce the powerful antioxidant, Superoxide Dismutase (SOD).<sup>70</sup>

Copper protects the heart, bones, and joints by keeping collagen and elastin fibers healthy. Copper also helps supply the heart with healthy, oxygenated blood and protects nerve fibers and aids in the transmission of nerve signals in the brain.

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65 Int J Obes 2005;29:292-301.

66 J Clin Nutr 2003;77:281-7.

67 N Engl J Med 1999;340:101-7.

68 Metabolism. 1987 Apr;36(4):351-5

69 Biol Trace Elem Res 2004;Summer;99(1-3):1-16.

70 Metabolism. 1997;46:1380-3.

**Iodine** (as natural kelp source)  
150mcg per serving

Iodine's major role is as a precursor to the formation of thyroid hormones, which are involved in protein synthesis and control many enzymatic processes.<sup>71</sup>

Iodine is required for proper mental and physical development, impacts cell respiration, and supports muscle and nerve function. Iodine also contributes to growth and repair of tissues and impacts the health of skin, teeth, hair, and nails.

**Magnesium** (as aspartate)  
300mg per serving

Magnesium is critical in energy metabolism and glucose utilization.<sup>72</sup> It is required by more than 300 enzymatic, cellular, and hormonal energy processes in the body.

Magnesium is involved in activating amino acids for use by cells and in the synthesis and breakdown of DNA. It also plays a significant role in the metabolism of other minerals,<sup>73</sup> and it is important in maintaining intracellular electrolyte balance, facilitating neurotransmission and nervous system health, as well as heart health.

High fat diets may interfere with magnesium absorption, whereby excess fats that cannot be absorbed in the small intestine remain in the gut and bind with magnesium to form insoluble soaps, which cannot pass through the intestinal wall.

**Manganese** (as gluconate)  
2mg per serving

Manganese is concentrated in the liver, brain, pancreas, and skeleton. It acts as a catalyst and cofactor in many enzymatic processes needed for protein and fat metabolism, and aids in the regulation of blood sugar and storage of glycogen in the liver.<sup>74</sup>

**SOD  
Boosters**

- Copper
- Manganese
- Zinc
- Vitamin C

Manganese is an integral part of the antioxidant enzyme Superoxide Dismutase (SOD) and the synthesis of glycoproteins needed to protect mitochondria, the principal energy source for all cellular functions.

Manganese is also needed for the utilization of vitamin B1 (thiamine) and vitamin E, and works with the B-complex vitamins to protect the body from stress.

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71 J Nutr. 2000; 130:493S-495S.

72 DIABETOLOGIA. 1990, 33/9 (511-514)

73 Clin Calcium. 2004 Dec;14(12):96-9

74 Neurotoxicol. 1999; 20:213-223.

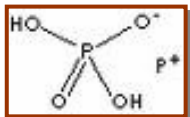
**Molybdenum** (as amino acid chelate)

75mcg per serving

Molybdenum is a trace mineral found in all tissues of the body, particularly in the bones, teeth, kidney, and liver. It is important because it helps the body make several enzymes which aid the body in protein synthesis and promote normal cell function.

**Phosphorus** (as potassium phosphate)

200mg per serving



In plants, phosphorus is necessary for photosynthesis, and is found in every human cell. Phosphorus forms part of the structural framework of DNA and RNA. More than 80% of the phosphorus is stored in the bones and teeth; the remainder is in phospholipids in cell membranes, nucleic acids, and involved in cellular energy production via adenosine triphosphate (ATP).

Working with vitamin B, phosphorus is involved in the metabolism of fats and carbohydrates and in the repair and maintenance of cells. It is necessary for a regular heartbeat, contraction of muscles in the body, healthy kidney function, and conduction of nerve impulses within the nervous system.

**Potassium** (as phosphate)

300mg per serving

Potassium is an essential macro-mineral and electrolyte that is vital to keeping cells alive and production of cellular energy. It is important in maintaining fluid and electrolyte balance in the body,<sup>75</sup> and it regulates the transfer of nutrients through cell membranes.

Potassium is antagonistic with sodium, which means that an imbalance in one creates an imbalance in the other, and normally, potassium should predominate in cells.

Potassium is important to vascular health, normal muscle contractions, kidney function, and stomach juice secretion, and it is essential to healthy nerve transmission. It is also thought to alleviate allergic responses, promote healing, and address fatigue.

**Vanadium** (as vanadyl sulfate)

3mg per serving

Vanadium is needed for cellular metabolism and is an essential component of some enzymes. It plays a role in growth and reproduction and for the formation of bones and teeth. Vanadium also has a balancing effect on blood sugar levels and inhibits cholesterol synthesis.<sup>76,77</sup>

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75 Nutr Rev (USA) Nov 1994, 52 (11) p367-75

76 Diabetics. 1996;45:659-66.

77 J Clin Invest. 1995;95:2501-9.

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