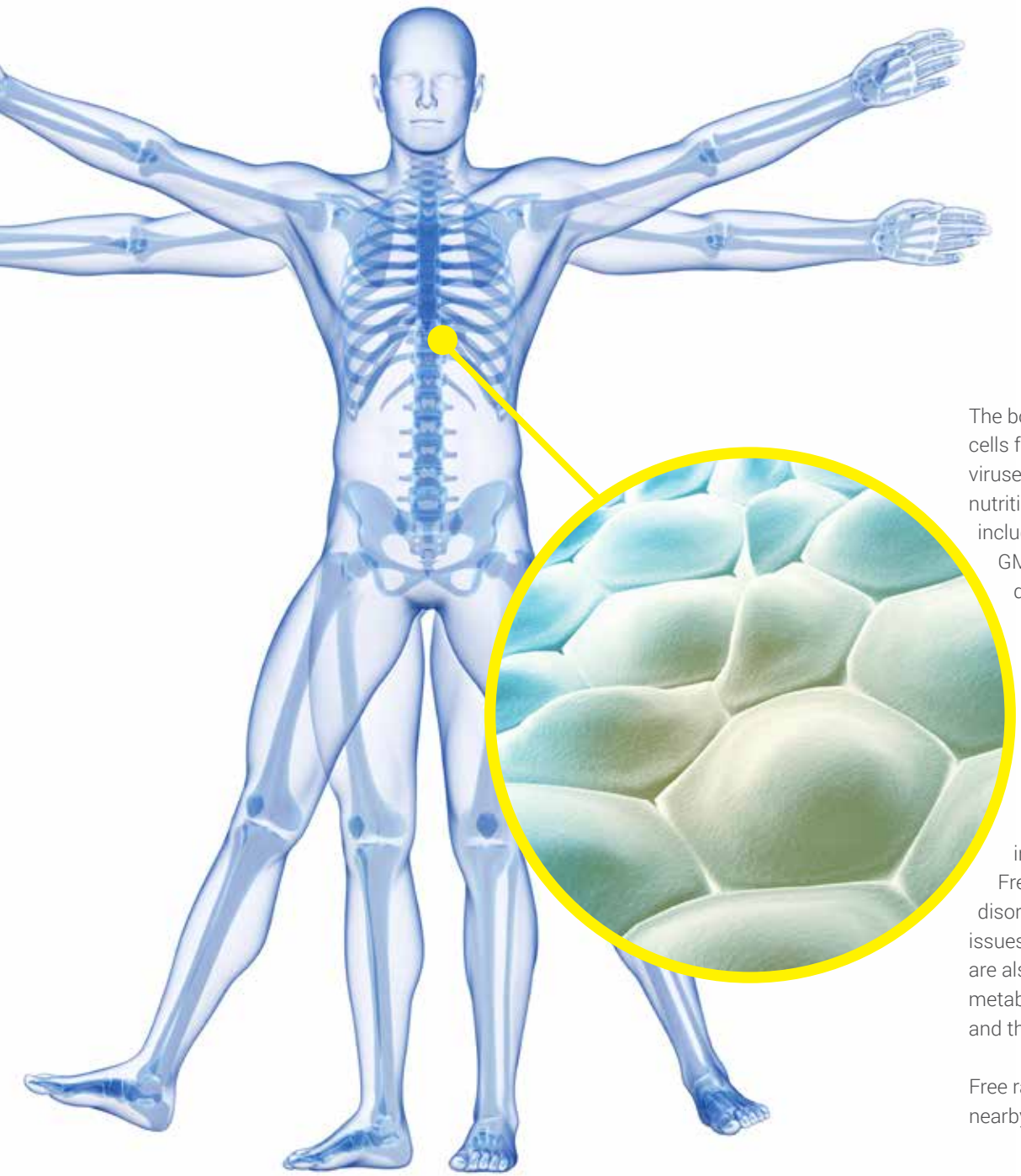
THE SCIENCE OF MMF

The research and Development behind Military Micronutrient Formulation



BACKGROUND
Science

The body's estimated 37.2 trillion[1] cells face constant threats – from viruses to ionizing radiation to poor nutrition. Other formidable threats include chemicals, preservatives, GMOs, trans-fats, food toxicity, drugs, medications, certain dietary supplements and other elements that can cause damage and even change the instructions coded in DNA.

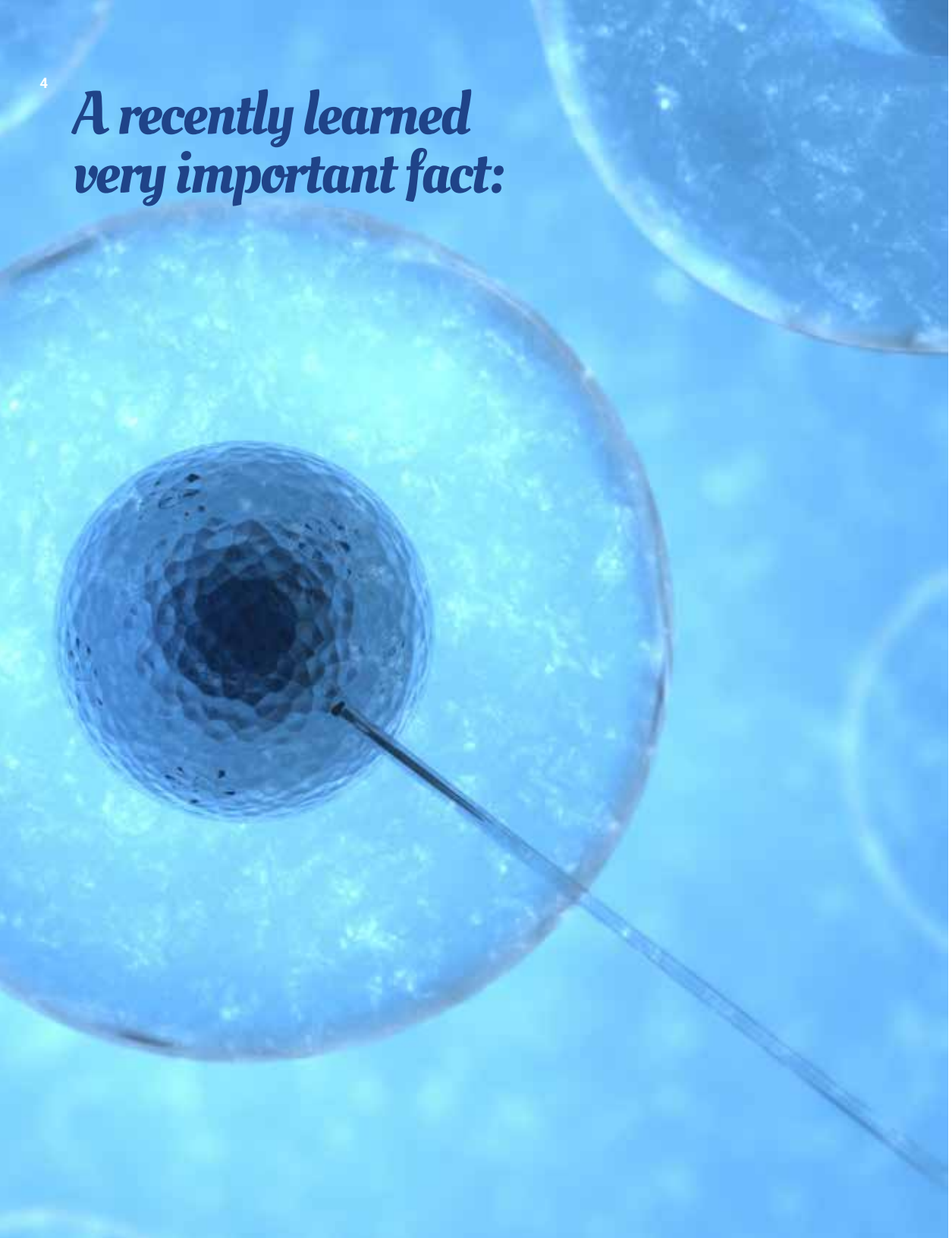
All of these contribute to the formation of an excessive number of unstable chemicals in our cells called free radicals. Free radicals cause aging, immune disorders, and many other health issues in the human body. Free radicals are also formed during digestion and metabolism of food ingredients we eat and the air we breathe.[2]

Free radicals "steal" electrons from nearby chemicals, altering the "loser's" structure. This theft, if not caught, is called oxidative stress and can change the instructions coded in the DNA.

Fortunately, our bodies create molecules that fight free radicals. We also get free-radical fighters from food. These fighters are called antioxidants.[2] Antioxidants act as electron donors, essentially neutralizing free radicals before they can damage healthy tissue through a process known as oxidation.

Oxidative stress causes our bodies to prematurely age and decline. For example, blotchy, wrinkled, and sagging skin is a result of oxidation. During the 1980's, scientists discovered that increased oxidative stress also contributes to many leading health problems. This discovery led to millions of dollars of antioxidant research and the creation of an enormous market for antioxidant-labeled foods and supplements.

A recently learned very important fact:



MICRONUTRIENTS *are the Answer*

Recently, scientists discovered a very important fact: not all antioxidant products are effective. In fact, the majority of food additives and supplements offer no measurable health benefits. Enter micronutrients: the real power behind good health.

Micronutrients are antioxidants, vitamins, minerals, and other essential molecules that help and protect the basic building blocks of our bodies. They act as antioxidants in the body and play several key roles in good health. Micronutrients are also cofactors and co-enzymes in metabolism. Very importantly, micronutrients also regulate certain genetic activity and protect the DNA from oxidative damage.

These important substances help regulate basic body functions and are critical to the body's chemical processes that maintain good health. Lack of micronutrients can lead to significant increases in cellular damage and can diminish the body's defenses.

The PROBLEM

Oxidative Damage and Inflammation

After September 11, the Department of Defense (DOD) studied the health impact of diet, lifestyle and environmental factors, sleep quality, and physical and emotional stress within military personnel. They learned that soldiers in the field are much more likely than civilians to suffer from mental, physical, and emotional fatigue, stress, lack of sleep, loss of energy, pollution and other environmental toxins, and poor nutrition. These were all significant factors in breaking down their bodies, possibly due to increased oxidative stress and inflammation.

This alarming statistic prompted the DOD to join forces with several academic institutions and Premier Micronutrient Corporation (PMC) – a world-renowned leader in the field of antioxidant and micronutrient science – to solve the problem. Under several Cooperative Research and Development Agreements (or CRADAs) [3] this team set out to research and produce an advanced formula that would greatly diminish oxidative damage in military personnel operating in hostile combat conditions.

Premier Micronutrient Corporation researched and developed products formulated to decrease oxidative damage and inflammation while increasing immune function. As a wholly-owned division of PMC, the Antioxidant Research Institute in Novato, CA, was created to study oxidative stress and inflammation and to support human and animal research protocols using PMC micronutrient formulations.

Armed with $12.5 million in DOD contracts for antioxidant research, PMC has successfully served as the source for numerous studies with the Office of Naval Research, the U.S. Army Medical Research Institute of Chemical Defense, the Naval Health Research Center, the Armed Forces Radiobiology Research Institute, the Walter Reed National Military Medical Center, various academic institutions, and NASA, at the Johnson Space Center and the Ames Research Center.

PMC is the world's leader in antioxidant research. The above-mentioned $12.5 million in government funds supported seven animal studies and seven human studies. The result of these collaborative studies is Military Micronutrient Formulation, or MMF. A "smart pill" designed to combat the oxidative stress found in the work environments of American troops all over the world. MMF helps protect the body against oxidative damage and inflammation better than any existing product.

In 2012, Engage Global joined forces with PMC. After months of negotiations, Engage Global secured worldwide exclusive rights to MMF. Since 2012, the two companies have forged a deep relationship. Today, PMC co-founders and researchers (see Key Personnel Biographies below) are working closely with Engage Global to bring MMF to the public.

KEDAR PRASAD
Phd

Dr. Prasad is PMC's chief scientific officer. He was primarily responsible for developing all intellectual properties of PMC and is senior inventor in all PMC patents. He is president of PMC Holdings, Inc.

Dr. Kedar N. Prasad earned a PhD in radiation biology from the University of Iowa and joined Brookhaven National laboratory for post-doctoral training. He then joined the University of Colorado Medical School where he became professor and director of Vitamins and Cancer research. In 1982, he was the first to show that vitamin E succinate can be used to kill cancer cells. He also demonstrated the novel concept that multiple antioxidants are more effective in killing tumor cells than individual antioxidants.

He has published over 250 articles in peer-reviewed journals and 25 books in the areas of nutrition and cancer, and nutrition and neurological diseases – particularly Alzheimer's disease and Parkinson's disease. These studies, supported by the National Institute of Health, were published in prestigious journals including Science, Nature, and Proceedings of the National Academy of Sciences, USA.

Dr. Prasad has received several honors, including: an invitation by the Nobel Prize Committee to nominate a candidate for the Nobel Prize in Medicine for 1982; best review of 1998-1999 on antioxidants and cancer; best review of 1999-2000 on antioxidants and Parkinson's disease; and best research paper of 2001-2002 on antioxidants and statin drugs, all from the American College of Nutrition. He is former president of International Society of Nutrition and Cancer

GERALD M.HASSE
Md

Dr. Haase is chief medical officer and chairman of the board of directors of PMC.

As such, he is responsible for the clinical aspects of PMC's research and for the development of the government programs of PMC. He is also clinical professor of surgery at the University of Colorado School of Medicine and Children's Hospital of Colorado.

He received a BA degree from Johns Hopkins University and an MD degree from Tufts University School of Medicine where he was awarded graduate honors in medical research. His postgraduate training was at the University of Colorado, the Children's Hospital Medical Center, Boston, and the Children's Hospital, Columbus, Ohio. He was chairman of pediatric surgery at Children's Hospital Colorado, and consultant pediatric surgeon to the Department of the Army.

Dr. Haase has been active in clinical research trials for three decades including the development of novel strategies for antioxidant micronutrient therapy for war fighter protection against hazardous exposures, for certain chronic conditions, and for optimal health.

Dr. Haase is the author or co-author of 175 scientific publications. He holds eight U.S. patents for antioxidant micronutrient therapy and is the recipient of clinical research grants and contracts funded at a multi-million dollar cumulative level.

JAMES EHRLICH *Md*

Dr. Ehrlich is a long-time medical advisor at PMC. He is also a clinical associate professor at the University of Colorado in endocrinology.

After graduating with honors from the Boston University School of Medicine in 1976 at age 23, Dr. Ehrlich completed his internship and residency at the University of Colorado Health Sciences Center where he was a clinical assistant professor in the department of anesthesiology, a specialty he had practiced for twenty years. Switching careers from anesthesiology to personalized preventive/diagnostic medicine with "high tech risk assessment," he founded and became the medical director of Colorado Heart and Body Imaging in Denver.

In June 2013, Dr, Ehrlich received the Ambassador of Bergamotto research award in Calabria, Italy, for his organization of clinical studies on an anti-oxidant rich fruit (bergamot).

PMC RESEARCH *Summary*

The smart pill – Military Micronutrient Formulation (or MMF) – is derived from all of the research and development that PMC engaged in. The following outlines the research that either directly or indirectly contributed to the creation of MMF.

Human Clinical Trials

Completed Study Results with MMF

1. US Marines in harsh environments; Mountain Warfare Training Center Protection against oxidative damage
2. US Marines injured in Iraq; Naval Medical Center San Diego. Improved recovery from concussive blasts, balance disorders

Studies Supporting Product Development

3. Low dose radiation study; University of Erlangen-Nurnberg. Protection of human DNA against radiation exposure
4. Normal volunteers; University of Montevideo Oxidative damage reduction, immune function enhancement
5. Audiology study; Academy of Doctors of Audiology member Improvement in tinnitus (ringing), hearing
6. MAVRIC trial; Metro Fire Fighter divisions. Improvement in lipid status, regression of carotid artery thickness (PP)

Clinical Trials In Progress

7. Diabetes adjuvant study; Walter Reed National Military Medical Center

Animal Studies Supporting Product Development

1. Murine radiation model; Armed Forces Radiobiology Research Institute
2. Rabbit radiation model; NASA, Russian Academy of Sciences
3. Sheep radiation model; NASA, Russian academy of Sciences
4. Fruit fly (genetically altered) radiation model; Ames Research Center, NASA
5. Murine hyperbaric oxygen model; Naval Medical Research Center
6. Rodent overpressure blast model; Naval Medical Research Center

7. Rodent Parkinson's disease model; Meharry Medical College

Cooperative Research and Development Agreements

1. Space Act Agreement - NASA. "Development of a Successful Protection Formula Against Radiation-Induced Oxidative Injury in Vulnerable Populations."
2. US Navy CRADA – NMRC-06-2338"Investigations into the Efficacy of an Antioxidant-containing Micronutrient Formulation for the Treatment of Hearing Loss and Balance Disorders Associated with Blast Injuries."
3. US Navy CRADA – NMRC-06-2383 "The Effects of Antioxidant Supplementation to Protect Against Cold at High Altitude."
4. US Army CRADA – W81XWH-07-0321 "Efficacy of Multiple Antioxidants in Reducing Damage Produced by Mustard Gas."
5. US Army CRADA – W91YTZ-10-P-0773 "Evaluation of the Effects of Micronutrients in Combination with Standard Therapy in the Management of Type 2 Diabetes."

ISSUED *Patents*

US Patent No.	Title	Date Issued
6,849,613	"Multiple Antioxidant Micronutrients"	February 1, 2005
7,399,755	"Formulations Comprising Multiple Dietary and Endogenously Made Antioxidants and B-Vitamins and Use of Same"	July 15, 2008
7,449,451	"Use of Multiple Antioxidant Micronutrients as Systemic Biological Radioprotective Agents Against Potential Ionizing Radiation Risks"	November 11, 2008
7,605,145	"Micronutrient Formulations for Treatment of Diabetes Mellitus"	October 20, 2009
7,628,984	"Micronutrient Formulations for Pulmonary and Heart Health"	December 8, 2009
7,635,469	"Micronutrient Formulations for Hearing Health"	December 22, 2009
8,221,799	"Multiple Antioxidant Optimal Health/Veteran's Ultimate Complete Formulations"	July 17, 2012

MMF STUDY *Highlights*

The micronutrients in MMF have been tested in the lab and in humans and have proven effective.

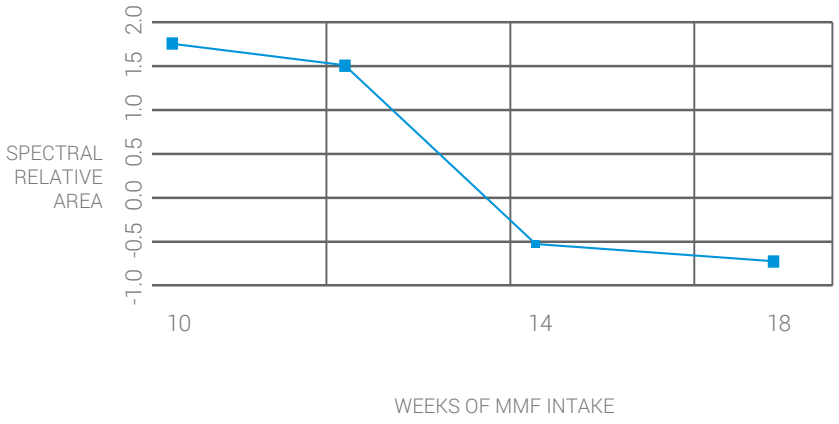
The resources and time put into ensuring that MMF is safe and effective are unmatched. The following paragraphs break down some of the key study results and highlight the effects one might expect from regular consumption of MMF.

REVERSING OXIDATIVE DAMAGE

After preliminary lab studies showed promising and safe results, some ingredients present in MMF were administered (orally) daily to normal healthy human volunteers throughout a six-month, prospective, randomized trial.[4] During this period, there was a gradual, steady decrease of a oxidative damage marker in the plasma and urine of volunteers (Fig. 1) and an associated increase in immune competency. There were no adverse side effects from the micronutrients.

Figure 1

Plasma level of malondialdehyde, a measure of oxidative damage, in human subjects while consuming MMF.

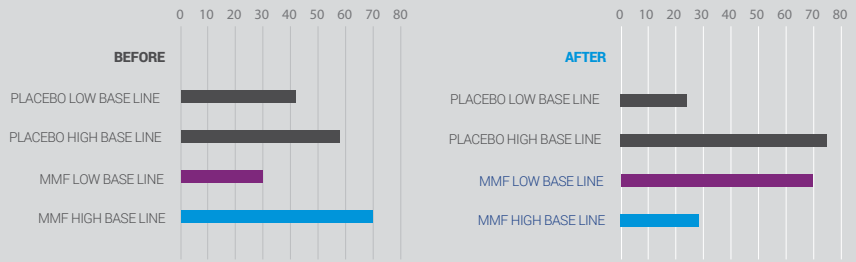


This six-month study demonstrated a steady decrease in a marker of oxidative damage in the blood and urine. The consistent lowering of oxidative damage demonstrates the short- and long-term benefits associated with regular, consistent MMF consumption.

High Stress Oxidative Damage Protection and Repair

Increased oxidative damage as determined by selected urinary markers occurred during a 12-week Marine training period.[5] A prospective, randomized, double-blinded, placebo-controlled trial demonstrated that MMF consumed twice daily reduced the oxidative damage in some subjects or prevented it from increasing in others (Fig. 2).[5] In the placebo group, the number of subjects with high baseline levels of oxidative damage increased in some marines(58-75%; see Fig. 2) after intense training; in the group taking MMF, the number of subjects with high baseline levels of oxidative damage significantly decreased in some marines(70-29%; see Fig. 2). Also, plasma levels of antioxidants were significantly increased by supplementation, even under conditions of intense exertion. Again, no adverse side effects were noted.

Figure 2



Proven Protection

These and other studies demonstrate the validity of MMF in terms of decreasing oxidative damage, improving immune function, reducing inflammation, improving hearing and balance disorders in combination with standard care, reversal of vascular disease and lipid abnormalities, and protection against hostile environmental factors. Micronutrients in MMF have been shown to be completely safe in all studies.

MMF works. It can reduce oxidative damage and help keep the body healthy. Studies show that when taking MMF, even in very stressful environments, MMF not only protects the body from further oxidative damage, further helping the body in maintaining good health. MMF has been tested and proven effective.

MMF Ingredients

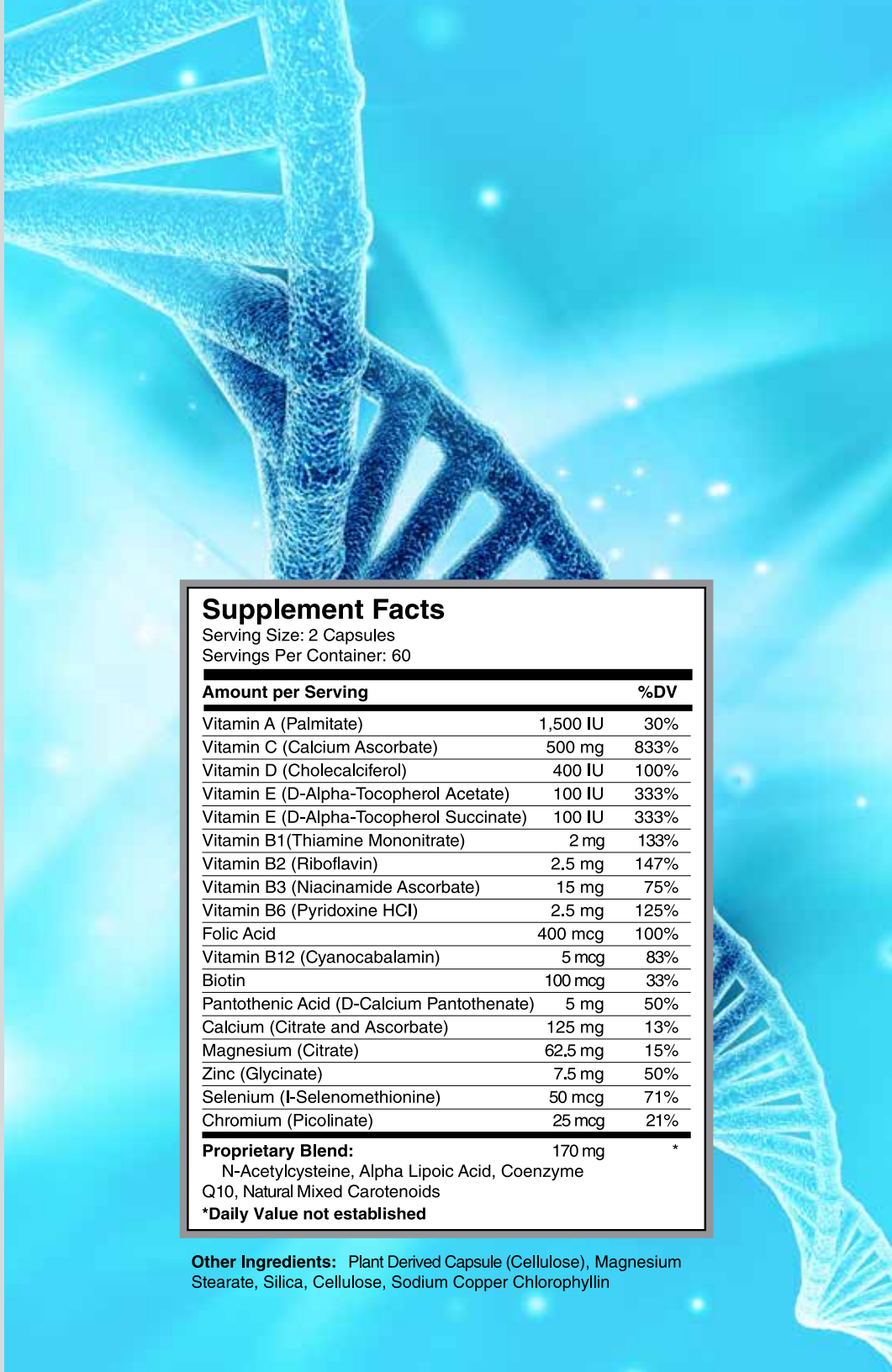
MMF acts like smart technology in pill form. This "smart pill" is formulated to act with laser-like precision, honing in on what the body needs. And, unlike many off-the-shelf products that use a shotgun approach to pack a supplement, MMF contains nothing that is potentially harmful or of no health benefit such as iron or other heavy metals.

While taking several different supplements together might provide similar ingredients to MMF, the combination, quantities, and ratios of the natural forms in MMF are more readily absorbed than a combination of ordinary supplements.
MMF's specific, patent-protected, Combination Quantity and Form (CQF) – The CQF Standard – drove the decision-making process behind the ingredients used in MMF. The following pages give brief descriptions of each ingredient.

What should I take?

Not all antioxidant supplements are equal. The vast majority of products contain ingredients that are not nearly as effective as their natural, easily metabolized, counterparts. Others contain unnecessary substances that, in some cases, can actually increase oxidation in the body. Additionally, many supplement manufacturers use tricks, like inflating oxygen radical absorbance capacity (ORAC) scores, to make their products appear more effective.[6]

Military Micronutrient Formulation (MMF) is a supplement that contains antioxidants and other micronutrients in their natural forms. MMF is readily used by the body and contains no unnecessary or harmful substances.



Supplement Facts

Serving Size: 2 Capsules
Servings Per Container: 60

Amount per Serving		%DV
Vitamin A (Palmitate)	1,500 IU	30%
Vitamin C (Calcium Ascorbate)	500 mg	833%
Vitamin D (Cholecalciferol)	400 IU	100%
Vitamin E (D-Alpha-Tocopherol Acetate)	100 IU	333%
Vitamin E (D-Alpha-Tocopherol Succinate)	100 IU	333%
Vitamin B1(Thiamine Mononitrate)	2 mg	133%
Vitamin B2 (Riboflavin)	2.5 mg	147%
Vitamin B3 (Niacinamide Ascorbate)	15 mg	75%
Vitamin B6 (Pyridoxine HCl)	2.5 mg	125%
Folic Acid	400 mcg	100%
Vitamin B12 (Cyanocabalamin)	5 mcg	83%
Biotin	100 mcg	33%
Pantothenic Acid (D-Calcium Pantothenate)	5 mg	50%
Calcium (Citrate and Ascorbate)	125 mg	13%
Magnesium (Citrate)	62.5 mg	15%
Zinc (Glycinate)	7.5 mg	50%
Selenium (l-Selenomethionine)	50 mcg	71%
Chromium (Picolinate)	25 mcg	21%
Proprietary Blend: N-Acetylcysteine, Alpha Lipoic Acid, Coenzyme Q10, Natural Mixed Carotenoids	170 mg	*

***Daily Value not established**

Other Ingredients: Plant Derived Capsule (Cellulose), Magnesium Stearate, Silica, Cellulose, Sodium Copper Chlorophyllin

Combination Quantitiy and Form (CQF) drove the decision making process behind the ingredients used in MMF. The following pages give brief descriptions of each ingredient.

Ingredient Name	Use(s)
Vitamin A (Palmitate)	Supports vision, gene transcription, immune function, bone metabolism, skin and cellular health, antioxidant activity
Vitamin C (Calcium Absorbate)	Enzyme co-factor, supports the immune system
Vitamin D (Cholecalciferol)	Supports normal immune function, normal inflammatory response, normal muscle function
Vitamin E (D-Alpha-Tocopherol)	Supports antioxidant activity, healthy skin cells, healthy cardiovascular system
Thiamine Mononitrate (Vitamin B1)	Supports normal metabolic function, normal neurological function
Riboflavin (Vitamin B2)	Supports carbohydrate, protein and lipid metabolism
Niacinamide Ascorbate	Supports normal cardiovascular function
Vitamin B6 (Pyridoxine HCl)	Supports normal cardiovascular function. Plays a role in protein and engergy metabolism
Folate (Folic Acid)	Supports normal cardiovascular function, supports normal neurological function
Vitamin B12 (Cyanocabalamin)	Supports normal cardiovascular function, normal cell health and maintenance, normal DNA formation

Ingredient Name	Use(s)
Biotin	Supports hair and nail health, energy production, normal cell development
Pantothenic Acid (D-Calcium Pantothenate)	Supports normal cardiovascular function, immune function, normal neurological function
Calcium Citrate	Supports normal muscle and skeletal structures, normal neurological function
Magnesium Citrate	Supports normal nerve and muscle function, immune function, normal cardiovascular function
Zinc Glycinate	Supports cell signaling, cell structure. Involved in... hormone release and apoptosis
Selenium (l-Selenomethionine)	Supports normal cardiac function, antioxidant function
Chromium (Chromium Picolinate)	Supports normal carbohydrate metabolism, normal cardiovascular function.
N-Acetylcystein	Is an amino acid. Supports normal gastrointestinal function, liver function, antioxidant function. Is a glutathione precursor
D-Alpha-Tocopheryl Succinate	Supports normal cardiovascular function, normal neurological function, normal inflammation response, antioxidant effectiveness
Alpha-Lipoic-Acid	Supports normal neurological function, immune function, antioxidant effectiveness, normal cardiovascular function
Coenzyme Q10	Supports normal cardiovascular function, normal cardiac function, normal vision, normal neurological function
Natural Mixed Carotenoids	Supports normal immune function and response, antioxidant effectiveness

These statements have not been evaluated by the Food and Drug Administration.
This product is not intended to diagnose, treat, cure, or prevent any disease.

USAGE & Warnings

Maximize Effectiveness

MMF was designed to fortify your body daily. To ensure maximum absorption and benefit from the MMF patented combination of micronutrients, it is recommended that two capsules of MMF be taken twice daily roughly 8-12 hours apart. Spacing the capsules this way maintains consistent levels of antioxidants in the body.

Warnings

If you take prescription medications regularly or have a health condition, please consult your physician before using MMF. Pregnant or lactating women should consult their physician prior to using MMF. If any adverse side effects occur, please stop usage immediately and consult your physician.

Health Benefits

The following list outlines the health benefits of MMF:

- Supports organs, tissues, and cells in the body
- Micronutrients are absorbed from the digestive system to the blood stream maximizing effects
- Assists the body in reducing inflammation
- Maximizes protection against free radicals
- Supports circulatory health with a unique blend of antioxidants and micronutrients
- Protects cells and tissues with unique combinations of micronutrients and antioxidants
- Supports the body's natural DNA repair function
- Supports muscle structure and proper function
- Supports recovery and athletic performance
- Supports hearing quality
- Elevates glutathione levels in the body

References

1. Zimmer C. How many cells are in your body? The Loom. 23 October 2013. Found at: http://phenomena.nationalgeographic.com/2013/10/23/how-many-cells-are-in-your-body/. Accessed April 8, 2015.
2. Harvard School of Public Health. Antioxidants: beyond hype. The Nutrition Source. Found at: http://www.hsph.harvard.edu/nutritionsource/antioxidants/. Accessed April 8, 2015.
3. US Navy CRADA – NMRC-06-2383 "The Effects of Antioxidant Supplementation to Protect Against Cold at High Altitude."
4. Coppes Z, et al. A multiple micronutrient supplement increases immune competency and decreases oxidative stress in healthy volunteers: a pilot study. Montevideo, Uruguay: University of Uruguay; 2006 (unpublished).
5. See unpublished study description in: Haase, et al., Antioxidant Micronutrient Impact on Hearing Disorders: Concept, Rationale, and Evidence. Am J Otolaryngol 32: 55-61, 2011.
6. Reinagel M. What are ORAC values? Scientific American. August 14, 2013. Found at: http://www.scientificamerican.com/article/what-are-orac-values/. Accessed April 8, 2015.

If you would like to learn more about MMF please contact me.

ENGAGE GLOBAL
ABUNDANCE IN HEALTH · ABUNDANCE IN LIFE

5314 River Run Dr.
Provo, UT 84604
+1 (801) 655-4501
Support@engage-global.com