BioShield-Radiation® - the world’s first patented, safe anti-radiation pill using anti-oxidant science

BACKGROUNDER

What Is Ionizing Radiation And How Does It Affect The Body?
Ionizing radiation is odorless, invisible and has a cumulative effect on the body’s cellular integrity. A radioisotope may be anywhere in the environment – in the air, soil, water, or foods, and its half-life is only one aspect to consider in the unpredictability of assessing the health risks to humans, animals and plants.

The effects of ionizing radiation in the body can be life-long and are seen in the increased incidence of serious chronic diseases and heritable genetic damage.

Ionizing radiation may occur as an episodic event, such as medical imaging with a CT scan, mammogram or x-ray. It may occur on a more regular basis, such as with pilots, flight attendants and frequent fliers who experience 64 times more radiation exposure at cruising altitude than at sea level, as well as the radiation exposure of going through airport security scanners. Sometimes, ionizing radiation occurs as a catastrophic event, such as the accident at the Fukushima Daiichi nuclear plant in Japan, in combat situations, or from a terrorist “dirty bomb.”

Regardless of the source and frequency, the biological damage is caused primarily through the production of free radicals. X-rays and gamma rays are able to drive electrons out of their normal atomic orbits with enough kinetic energy to generate charged molecules and free radicals that create cellular damage. These free radicals react with critical molecular targets including DNA, lipid membranes and cellular proteins leading to acute toxicities as well as potentially heritable mutations.

Free radicals are one of the primary causes of oxidative stress-related disease in humans. Increased oxidative stress is considered one of the critical factors in the development of cancer, heart disease, neurological disease and aging. **Radiation biologists agree that there is no threshold dose of radiation exposure below which there is no risk of cellular and heritable genetic damage.**

Acute Radiation Syndrome
Symptoms of acute radiation syndrome depend on how much radiation is absorbed, which is determined by the strength of the radiated energy and the distance from the source. The absorbed dose of radiation is measured in a unit called a gray (Gy). Diagnostic tests that use radiation,
such as an X-ray, result in a small dose of radiation – typically well below 0.1 Gy, and focus on a few organs or small amount of tissue.

Signs and symptoms of radiation sickness usually appear when the entire body receives an absorbed dose of at least 1 Gy.

- Mid-level exposure of 1-2 Gy may cause nausea and vomiting within a few hours, and fatigue and weakness up to one month after exposure.
- Moderate level exposure of 2-6 Gy may cause nausea, vomiting, headache, fever, and diarrhea within hours of exposure, and weakness and fatigue and hair loss, bloody vomit and stools, infections, poor wound healing and low blood pressure within one to four weeks after exposure.
- Severe exposure of 6-8 Gy may cause all of the above symptoms as well as dizziness and disorientation within a week of exposure.
- Very severe exposure of 8-10 Gy or more will cause all of the above symptoms almost immediately. Doses greater than 6 Gy to the whole body are generally not treatable and usually lead to death within two days to two weeks, depending on the dose and duration of the exposure.

Ways To Protect Against The Damaging Effects Of Ionizing Radiation

Traditional methods of protecting against ionizing radiation exposure include 1) shielding the body behind a non-permeable surface such as a lead apron, 2) maximizing the distance from the source, or 3) limiting exposure times and frequency.

Now, there is a strategy of systemic biological protection – an antioxidant micronutrient anti-radiation pill.

The most effective antioxidant approach to radiation protection in humans utilizes multiple micronutrients because, combined, they are more beneficial than the individual agents themselves. A perfect example is potassium iodide, which is limited in protecting only the thyroid gland from radioactive iodine, Iodine-131.

The body produces several types of free radicals, both oxygen-derived and nitrogen-derived species, during exposure to ionizing radiation. Each antioxidant has a different affinity for each specific class of free radicals. **Radiation biologists have found that a multiple micronutrient anti-radiation pill is the most effective way to support the body’s natural cellular protection against tissue and DNA damage due to radiation exposure.**

Terrorists’ Actions Spur Scientific R&D

After the terrorist attacks on September 11, 2001, Pentagon strategists turned their thoughts to threats of “dirty bomb” exposures, chemical warfare agents and homeland nuclear installations as potential targets of terrorist attack.

They **wanted a comprehensive biological solution to help protect troops** from the chromosomal damage that can occur from excessive exposure to ionizing radiation. The desire
was to support good health, not just for a service member’s natural life, but to guard against the heritable mutations that may occur as a result of radiation exposure.

U.S. Marine Corps Systems Command contacted Kedar N. Prasad, Ph.D. and Gerald M. Haase MD. Dr. Prasad is the nation’s first Ph.D. in radiation biology and considered one of the world’s top radiation biologists. He is the author of 15 authoritative books and more than 220 articles, published in scientific publications and peer-reviewed journals on the general topics of nutrition and cancer, nutrition and neurodegenerative diseases, differentiation and gene expression, neurodegeneration in Alzheimer's disease and gene expression. Since 2005, Dr. Prasad has served as chief scientific officer of Premier Micronutrient Corporation.

Dr. Haase is known for his ground-breaking work in oncologic research and the development of novel strategies for chemoprevention and nutritional oncology. Among his many credentials, Dr. Haase served on the Board of Directors of the America Cancer Society and as a senior member of the Commission on Cancer of the American College of Surgeons. He has published more than 180 scientific papers. Dr. Haase is chief medical officer of Premier Micronutrient Corporation.

Prasad and Haase recruited Dr. William C. Cole, an experienced basic science and clinical investigator for more than 30 years in pharmaceutical sciences and nuclear medicine. He served on the academic faculty at the University of the Colorado Health Sciences Center and was director of the Nuclear Pharmacy of its University Hospital. Dr. Cole is the chief research officer of Premier Micronutrient Corporation.

Drs. Cole, Haase, and Prasad have invented formulations and applications that have resulted in six U.S. patents for antioxidant micronutrient therapy.

Their assignment: work with the scientists at Department of Defense laboratories and NASA to develop a micronutrient formulation that can help support the body’s natural protections against tissue and DNA damage due to radiation.

The team worked in collaboration with the Armed Forces Radiobiology Research Institute, the Naval Health Research Center, the Marine Corps Systems Command, and NASA. Drs. Prasad, Haase, and Cole developed a micronutrient “anti-radiation” pill with the potential for important outcomes for use by humans.

Animal Studies
Fruit flies are often used for modeling human cellular reactions due to the similarity of our DNA. Fruit flies carry a dominant mutant gene that increases the risk of heritable leukemia-type cancer. Proton irradiation increases the incidence of tumors in these flies. When given the “anti-radiation” micronutrient formulation mixed in the diet before and after radiation exposure, the flies were completely protected against the tumor formation.
**Human Studies**

Because it would be clearly unethical to deliberately subject a person to ionizing radiation, four groups were studied in the course of their normal activities. Each group suffered oxidative cellular damage as a result of the occurrence of free radicals and inflammation due to oxidative stress caused by a variety of factors such as smoking, extreme aerobic and isometric body training, traumatic brain injury, and exposure to toxins encountered in fire fighting.

Normal healthy smoking volunteers in Montevideo, Uruguay were divided into two groups by age, tested for immune function, and then were given the PMC antioxidant micronutrient formulation for a period of 24 weeks. Younger volunteers showed better results than the older volunteers but all showed a gradual decrease in oxidative damage, as measured by the level of cell membrane damage in the plasma and urine, and increased immune function.

Volunteers of the 34 1st Tank Marines during a 12-week training participated in a randomized double-blind placebo control study. The results showed that although increased oxidative damage occurred during the training, the group taking the PMC antioxidant micronutrient formulation decreased the levels of certain markers of oxidative damage. This study was performed in collaboration with the Naval Health Research Center, San Diego.

US soldiers returning from Iraq with mild to moderate traumatic brain injury volunteered to participate in a 12-week study. One group received standard therapy (steroids, physical therapy, vestibular rehabilitation and supportive care); the other group received standard therapy plus PMC antioxidant micronutrient formulation. The second group demonstrated more rapid, more complete recovery than did those receiving only the standard therapy. The differences in terms of postural stability, dynamic gait index, and dizziness handicap scores were significant at the early date of four weeks, and grew in significance by the final point time of 12 weeks. Additionally, the PMC antioxidant micronutrient group showed a significant improvement over the other group in terms of energy level, exercise tolerance and cognition at each weekly measurement. This study was in collaboration with the Naval Medical Center, San Diego.

Sixty-four young fire fighters in Denver volunteered to participate in a one-year study. The PMC antioxidant micronutrient formulation improved several indices of cardiovascular disease risk including advanced cholesterol and other lipids parameters and carotid artery ultrasound measurements taken before, at six months, and again at the end of year. These progressive improvements were achieved without the use of any pharmaceuticals.

**Human DNA Study**

Dr. Michael Kuefner, Radiation Biologist, Department of Radiology, University of Erlangen-Nürnberg, Germany has developed a very sensitive test that allows him to quantify the difference in DNA damage, specifically double strand DNA breakages (DSB) among various CT scan methods and equipment. He analyzed the effect of the PMC radiation pill with 10mGy – a diagnostic dose of ionizing radiation, such as would be received in a CT scan. The formulation showed a 53% protective effect on cells exposed to radiation.

Importantly, the study was based on both in-vivo (taken orally by patients) and in-vitro testing.
Dr. Kuefner writes: "DSBs (double-strand breaks) are among the most significant radiation-induced DNA lesions since they can initiate carcinogenesis (cancer).

“During the past month, my laboratory has demonstrated that BioShield-Radiation® significantly decreases the number of DSBs in both in-vitro and in-vivo studies. Our research clearly proves that a single dose of BioShield-Radiation® taken before exposure confers significant protection from this kind of DNA lesion introduced by ionizing radiation that individuals normally encounter for diagnostic studies."

**BioShield-Radiation® – The World’s First Patented, Safe Anti-Radiation Pill Using Anti-Oxidant Science**

In 2009, after years of robust scientific research and rigid animal and human DNA tests, the team introduced two products:

- **BioShield-Radiation® R1** designed to reduce the effects of acute radiation sickness when taken orally before a single exposure to radiation such as a CT scan, mammogram, x-ray, or air flight.

- **BioShield-Radiation® R2** for daily use by people who are regularly exposed to radiation like nuclear power plant workers and those who live close-by, pilots and flight attendants, radiology technicians, first-responders, and military troops in combat.

Both micronutrient formulations are more comprehensive than potassium iodide pills. Because BioShield-Radiation® affects the basic underlying causes of radiation damage, it can protect the whole body against all radioisotopes from nuclear or other sources, such as iodine, strontium, cesium, uranium, plutonium, xenon, zirconium, etc. Potassium iodide can only protect against radioactive iodine, which is absorbed in the thyroid.

**Dosage**

*In human clinical trials, there have been no negative side effects*, and because it is formulated as a complete daily supplement, no other additional vitamins should be taken when on a BioShield-Radiation® regimen. Dosage instructions are important, however. The formulations are designed to the internationally accepted principle of ALARA (as low as reasonably achievable). The body absorbs micronutrients at varying levels and speeds, with a biological half-life of most micronutrients of about six to twelve hours. So, it’s important to take the daily dosage twice a day, two capsules in the morning and two capsules in the evening for maximum efficacy.

**Intended consumers**

There are at least seven demographic groups that could benefit from taking BioShield-Radiation®:
- **Residents who live by and workers at nuclear power plants.** There are 104 active nuclear power plants in the United States located in 33 states. Recent radiation leak incidences at plants in Vermont, Ohio, Illinois, Tennessee and New York, coupled with the catastrophic events at the Fukushima plant in Japan, have made the risks associated with radiation exposure top-of-mind for the 60,000 employees of the plants. (Source: Nuclear Energy Institute). These people would benefit from a daily regimen of BioShield-Radiation® R-2.

- **Pilots, flight attendants, and frequent fliers.** Radiation exposure at cruising altitude is approximately 64 times greater than at sea level. There are 53,000 members of the Air Line Pilots Union and 14,000 members of the U.S. Airline Pilots Association. "It is important to note that there are "backscatter" [Advanced Imaging Technology] devices now being deployed that produce ionizing radiation, which could be harmful to your health,” wrote Captain Dave Bates, president of the Allied Pilots Association, which represents 11,000 American Airlines pilots. “Airline pilots in the United States already receive higher doses of radiation in their on-the-job environment than nearly every other category of worker in the United States, including nuclear power plant employees.” There are at least 63,000 U.S. flight attendants, according to union membership reports. In 2005, there were an estimated 120 million frequent-flier club members of all the world's airlines. These people would benefit from a daily regimen of BioShield-Radiation® R-2.

- **First responders,** primarily fire fighters, bomb squad and demolitions experts, and emergency medical service providers, police or any personnel trained to handle a radiation event. There are more than 240,000 members of the International (U.S. and Canada) Firefighters Association. An estimated nine million Americans have a “first-responder” job responsibility. (Source: Heritage Foundation) These people would benefit from the single dose regimen of BioShield-Radiation® R-1 taken prior to or shortly after radiation exposure.

- **Health care workers exposed to radiation on a regular basis** such as x-ray technicians, radiologists, emergency room, operating room and ICU personnel, dental technicians, and mammographers. In 2009, 906,000 hospital workers were unionized, representing about 14% of health care workers. Radiologic technologists and technicians held about 215,000 jobs in 2008, primarily in hospitals, and that number is expected to shoot up more than 17 percent to 252,000 positions by 2018. (Source: US News & World Report). These people would benefit from a daily regimen of BioShield-Radiation® R-2.

- **Patients receiving discrete or episodic imaging procedures** such as mammography, dental x-rays, CT scans, chest X-rays and diagnostic nuclear medicine. It is estimated that more than 62 million CT scans per year are currently given in the United States, compared to three million 1980. Because CT scans result in a far larger radiation exposure compared with conventional plain-film X-ray, this has resulted in a marked increase in the average personal radiation exposure in the United States, which has about doubled since 1980, largely because of the increased defensive-medicine practice of CT usage. (Source: ScienceDaily.com Nov 29, 2007) These people would benefit from the
single dose regimen of BioShield-Radiation® R-1 taken prior to or shortly after radiation exposure.

- **Military troops** serving aboard nuclear submarines or in a combat environment with possible exposure to biological or nuclear weapons. As of March 2008, there were 50,000 troops deployed in Iraq and 71,000 deployed in Afghanistan. These people would benefit from a daily regimen of BioShield-Radiation® R-2.

- **People working or living close by Fukushima Daiichi nuclear plant in Japan.** Officials are now concerned that the reactor vessel of the No. 3 unit may have been damaged. The radioactive isotope, Iodine-131, has been detected in the water supply of Kawaguchi City, just north of Tokyo, as well as in those of two of Tokyo’s neighboring prefectures, Chiba and Saitama. The public has been cautioned not to consume water or milk from sources near the plant. The Japanese government initially recommended that persons living within 12 miles of the plant evacuate, that distance has since been increased to at least 19 miles. The U.S. government has recommended evacuation of persons within a 50 mile radius of the nuclear site; some American radiation physicists have recommended that members of the media covering the story stay 200 miles away. These people would benefit from a daily regimen of BioShield-Radiation® R-2.

Due to high demand, the product currently has limited availability and interested individuals are asked to limit their on-line purchase to no more than three bottles in one order. A supply is being set aside to gift to the workers at the Fukushima Daiichi nuclear plant in Japan.

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