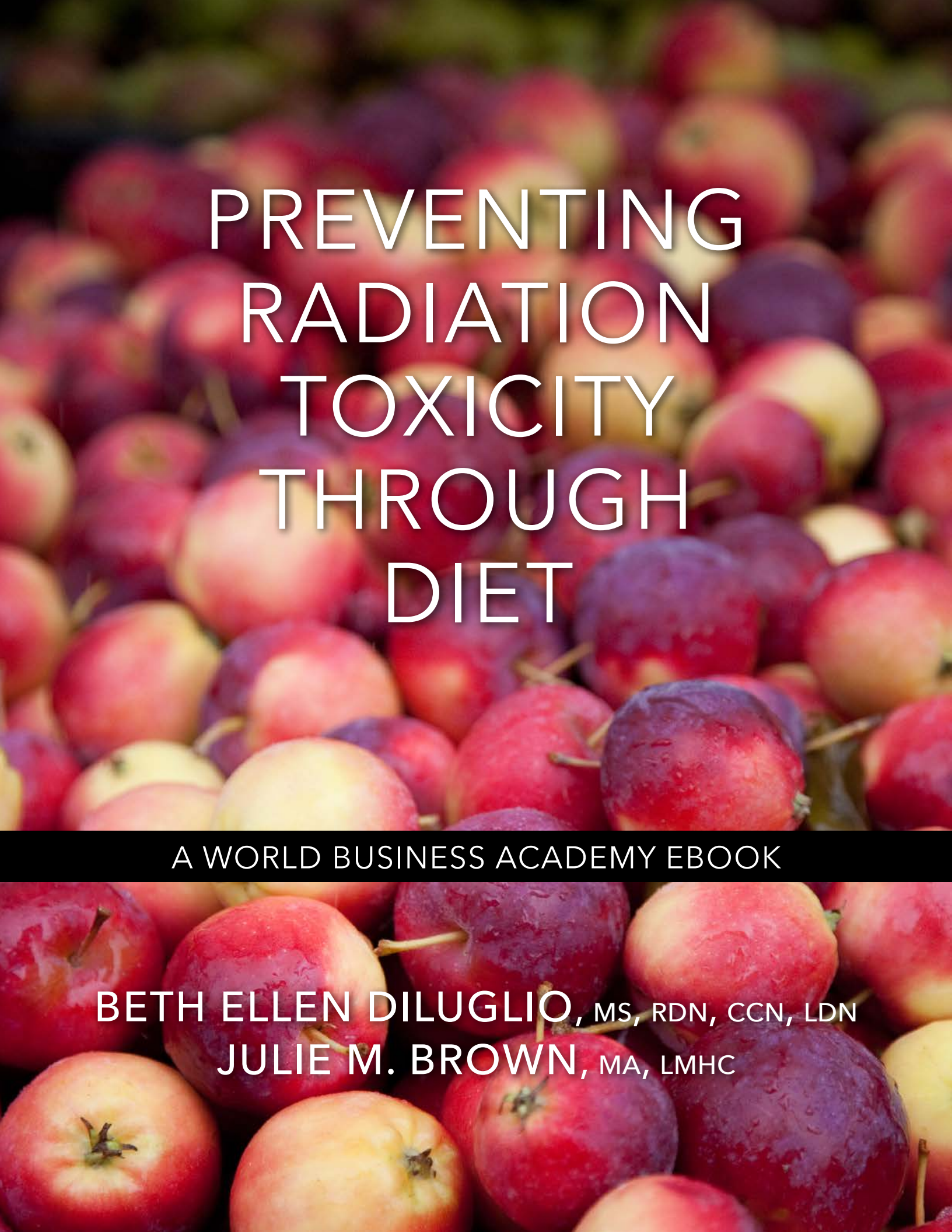

PREVENTING RADIATION TOXICITY THROUGH DIET

A WORLD BUSINESS ACADEMY EBOOK

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Preventing Radiation Toxicity Through Diet
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Book design: Isaac Hernández

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RADIOACTIVE ELEMENTS: NUTRIENT IMPOSTERS

BETH ELLEN DILUGLIO, MS, RD, CCN, LD/N

Did you know that radioactive elements masquerade as nutrients and get absorbed by the body? Nutrients are indispensable to all processes that take place in the body, they are indispensable to life. We get our essential nutrients from food and water. When radioactive elements are released into the air or water, they mimic nutrients and find their way into our food supply and into our bodies.

WHAT IS A RADIOACTIVE ELEMENT?

A radioactive element is a chemically unstable form of an element that is formed during nuclear fission, a process that occurs during production of nuclear weapons and nuclear power. They become dangerous free radicals, emitting ionizing radiation powerful enough to steal electrons from surrounding molecules. These unstable elements can damage tissues, cell membranes and DNA. This damage can lead to altered hormone function; bone decay (osteoporosis); immune suppression; altered cell membrane function and cancer. Radioactive elements are obviously not meant for human ingestion! Some radioactive elements occur naturally, such as radon and uranium, and are found in the ground where they should stay! Many radioactive elements can have a "half" life of hundreds to thousands of years!

RADIOACTIVE ELEMENTS IN THE AIR, FOOD AND WATER

Radioactive steam and radioactive waste can be released into the air and enter our lungs, come down in the rain and end up in our water and food crops. If we don't ingest enough healthy essential nutrients, the body will absorb the radioactive imposters. For example, iodine-131, strontium-90, cesium-137 and plutonium-239 can be absorbed as if they were iodine, strontium/calcium, potassium and iron respectively. cobalt-60, sulfur-35 and zinc-65 will be taken up as if they were vitamin B12, sulfur and zinc. Low doses of radiation appear to be even more dangerous as they stealthily incorporate themselves into our bones and tissues. This is known as the "Petkau Effect."

BIOACCUMULATION CONCENTRATES RADIOACTIVE ELEMENTS AND TOXINS

Toxins accumulate as we go up the food chain. For example, plankton absorb toxins and radioactive elements and they are eaten by small fish. The small fish will be eaten by larger fish who get a "double dose." Then we eat the large fish and get an even more concentrated dose of toxins and radiation. The concentration of toxins and radioactivity in fish can be thousands of times greater than what can be measured in the water they swim in. Bioaccumulation leads to an overdose for everyone!

RADIOACTIVE ELEMENTS WREAK HAVOC IN OUR BODIES

These dangerous nutrient imposters are sent to do the jobs of healthy nutrients and become incorporated into our bones, brains, soft tissues and crucial hormone producing organs such as the ovaries, testes and pancreas. When surrounding tissues become radiated over time, the damage can become incapacitating. Radioactive elements that settle in the bone and radiate the bone marrow can lead to suppression of both red blood cells (anemia) and white blood cells (immune dysfunction).

Radiation can damage the DNA of the cell, altering the delicate genetic blueprints that lie at the base of our existence. When the genes for cell replication are damaged, the cell will divide nonstop and form cancer cells and ultimately tumors. The fetus and growing children are especially sensitive to radiation. Critical periods of development can be irreversibly disrupted, leading to altered functioning of the brain, nervous system, cardiovascular system, etc.

WHAT CAN WE DO?!

Purify your water through reverse osmosis, distillation or softening. These processes will remove radioactive elements. It will remove healthy nutrients as well so be sure to consume a diet rich in vitamins, minerals and phytonutrients (from plants)! Willard Water is an easy way to add major minerals and trace minerals back into your drinking water.

ANTIOXIDANTS PROTECT AGAINST RADIATION

Antioxidants protect us against the oxidizing effects of free radicals and may reduce the damage caused by radioactive elements. Plant based foods are naturally high in antioxidants as a protective measure for the plants themselves. Fresh

fruits, vegetables, legumes, nuts, seeds, herbs and spices are especially good sources. Choose produce that has been allowed to ripen on the vine to maximize production of antioxidants and phytonutrients. Eating a plant based diet low on the food chain will also reduce our exposure to toxic chemicals, pesticides and radiation.

PROTECTIVE FOODS

Seaweed such as kelp, nori, dulce and sea vegetables are especially protective against uptake of radioactive iodine-131 as well as blocking strontium-90. Miso (fermented soybean paste) has an alkalizing effect and provides calcium, iron, B vitamins and zybicolin (helps detoxify and eliminate radioisotopes).

Healthy foods high in calcium can help block strontium-90 uptake (almonds, collard and turnip greens, blackstrap molasses, spinach and sardines and salmon with the bone in).

Foods high in potassium are also important (baked sweet and white potatoes, tomato paste, white beans, carrot juice, bananas and spinach are good examples).

Cruciferous vegetables (arugula, Bok choy, broccoli, Brussels sprouts, cabbage, cauliflower, collards, horseradish, kale, kohlrabi, mustards greens, radishes, turnips, wasabi and watercress) provide us with antioxidants, indoles and sulfur.

Supplements can be helpful in creating a nutrient rich environment in which radioactive imposters are crowded out. Taking a high quality supplement containing Vitamin C, Vitamin E Complex (tocopherols and tocotrienols), carotenoids, CoQ10 and selenium along with adequate levels of B vitamins, Vitamin D and essential minerals would be a prudent start. Be sure to discuss supplementation with a qualified healthcare practitioner.

Glutathione is a master antioxidant and is actually produced by our bodies from glutamine, glycine and N-acetylcysteine. Cordyceps, Gotu Kola, milk thistle and alpha lipoic acid have also been shown to increase glutathione levels. A topical liposomal cream containing glutathione can also boost our internal levels.

So, in our struggle to stay healthy, it's important not to be afraid, but instead Be Aware!

Photo: Isaac Hernández

RADIOACTIVE ELEMENTS AND THEIR EFFECT ON THE HUMAN BODY

BETH ELLEN DILUGLIO, MS, RD, CCN, LD/N

THE AMERICAN DIETETIC ASSOCIATION'S POSITION PAPER

"It is the position of the American Dietetic Association to **encourage environmentally responsible practices** that conserve natural resources, minimize the quantity of waste that is generated, and have the least adverse effect on the health of all living organisms and the environment. All components of the food system, from farmer to consumer, are affected by the availability and cost of energy and the availability and quality of water. [Harmon AH, Gerald BL; American Dietetic Association. Position of the American Dietetic Association: food and nutrition professionals can implement practices to conserve natural resources and support ecological sustainability. J Am Diet Assoc. 2007 Jun;107(6):1033-43. PubMed PMID: 17571455].

BIOACCUMULATION

Toxins and contaminants concentrate as we go up the food chain from plants to animals/seafood up to humans.

Larger flesh eating fish and animals will have a higher concentration of mercury, radiation, pesticides, etc.

Synergistic effect of complexing radiation with other harmful chemicals can increase 1000 fold.

WHAT ARE RADIOACTIVE ELEMENTS?

Many elements from the Periodic Table are **minerals** that are essential to human health.

For all elements, there are varying forms known as isotopes, determined by differing numbers of neutrons.

Unstable isotopes are radioactive and release energy (electromagnetic waves) and particles in order to become stable.

Radioactive isotopes are produced from nuclear fission and can be taken up by the body as if they were their essential mineral counterparts.

For example, iodine-131, strontium-90, cesium-137 and plutonium-239 can be absorbed as if they were iodine, strontium/calcium, potassium and iron respectively.

Once in the body, they travel through the bloodstream and are incorporated into living tissue.

As radioisotopes "decay", they release ionizing radiation (a known carcinogen) that is strong enough to remove electrons from surrounding molecules or atoms.

The resulting free radical can damage cell membranes and DNA, the blueprint of the cell.

Low doses of radiation are more damaging than a direct hit on the cell's DNA (which can be repaired quickly), known as the Petkau effect.

PETKAU EFFECT

In 1972 Dr. Abram Petkau discovered that biological damage to cells is greater from ionizing radiation delivered in low doses over long periods of time versus high intensity exposure over a short period of time.

The cause of the long term damage was from free radical. Many foods and antioxidants can help protect us from free radical damage. Several elements are essential to human health.

RADIOISOTOPES AND THEIR HALF-LIFE

The half-life of a radioactive substance is the amount of time it takes for half of it to decay. Half of the original amount remains and one half of that half will then decay in a "half-life" , etc. Unfortunately, radioactive elements persist in the environment and in our bodies.

EFFECTS ON THE DEVELOPING FETUS

Damaging effects of radioisotopes are magnified in the developing fetus.

Dr. Alice Stewart demonstrated correlation of x-rays during pregnancy to increased incidence of leukemia in the offspring. [Stewart A. Aetiology of Childhood Malignancies. Br Med J. 1961 Feb 18;1(5224):452-60. PubMed PMID: 20789069]

Critical Periods of development are especially vulnerable to irreversible damage.

CRITICAL PERIODS OF DEVELOPMENT

Usually a period of rapid cell development, Critical Periods are particularly vulnerable to disruptive influences that can have permanent effects

http://thyroidbook.com/blog/radiation-nutritional-intervention/

http://drknews.com/

TRACKING RADIATION

Ionizing radiation is a known human carcinogen. The "St. Louis Baby Teeth Survey" (conducted in the 1950's and 1960's) demonstrated that radioactive fallout from nuclear bomb testing in the USA was indeed being absorbed by humans.

The presence of radioactive Strontium-90 in deciduous teeth was an indicator/marker of how much radiation the mother was exposed to during pregnancy. This study and scientific debate on the issue (Dr. Ernest Sternglass – June 1963 issue of **Science**) led to a partial test ban treaty on nuclear bomb testing between the USA and the USSR despite the ongoing "Cold War."

THE "ST. LOUIS BABY TEETH SURVEY"

Tracking radioactive elements from nuclear fission was first conducted between the 1940's and 1960's during the nuclear bomb test years. Strontium-90 (Sr-90) was chosen as a marker because it could be tracked in human teeth and bones. Sr-90 is the radioactive isotope of Strontium (a nutrient similar to calcium in it's roles in the body and the bone).

The **"St. Louis Baby Teeth Survey"** demonstrated an increase in Sr-90 in the teeth of children born during nuclear weapons testing in the 1950's and 60's. The study collected 385,000 baby teeth and completed analysis on 60,000 of them revealing that the average Sr-90 for children born in 1964 was 50 times greater than for those born in 1951, the first birth year for which teeth were measured.

Miraculously, 85,000 of the teeth, collected but not analyzed, were discovered in St. Louis this past spring. Washington University, involved with the initial St. Louis study, has sent the teeth to the Radiation and Public Health Project (RPHP) Tooth Fairy Project where they can be used in a prospective study of the health effects of low level radiation and Sr-90 ingestion.

THE RPHP TOOTH FAIRY PROJECT

Dr. J. Sternglass, PhD (cofounder and chief technical officer of the RPHP) and colleagues conducted a second "Baby Teeth Study- The Tooth Fairy Project" 1997 – present. Data indicate that levels of Sr-90 in **baby teeth** are as high today in counties close to nuclear power plants as they were during above ground nuclear bomb testing. Sr-90 in drinking water was also significantly higher in these counties.

REVERSE OSMOSIS FOUND TO REMOVE SR-90

Sr-90 is mistaken for calcium and settles in the bone, radiating bone marrow, damaging red blood cells, white blood cells… contributing to childhood cancer, immune deficiency and osteoporosis.

www.radiation.org

CANCER: RELATION OF PRENATAL RADIATION TO DEVELOPMENT OF THE DISEASE IN CHILDHOOD

STERNGLASS EJ. CANCER: RELATION OF PRENATAL RADIATION TO DEVELOPMENT OF THE DISEASE IN CHILDHOOD. SCIENCE. 1963 JUN 7;140(3571):1102-4. PUBMED PMID: 13983978.

In 1963, Dr. Sternglass was invited to testify before the congressional Joint Committee on Atomic Energy, as to how the exponential increase in strontium-90 in baby teeth caused by bomb-test fallout was associated with increased childhood leukemia. His research and testimony played a role in President Kennedy's decision to sign the Partial Test Ban Treaty.

As Professor Emeritus of Radiological Physics at the University of Pittsburgh Medical School, Dr. Sternglass has written numerous articles on the health effects of low-level radiation.

His 1981 book Secret Fallout: Low-level Radiation from Hiroshima to Three Mile Island established him as a pioneer in the study of the health effects of low-level radiation.

RPHP RADIATION.ORG

Five books published by RPHP research associates summarize hundreds of articles in peer-reviewed journals dealing with these impacts of ingested, low-level fission products--products which did not exist in nature prior to the Nuclear Age. In addition to the effects upon the immune response of all age groups, the very young have been especially affected. RPHP has repeatedly pointed out the radiation-induced damage apparent in official vital statistics, tracing changes in infant mortality rates and underweight live births in the postwar

period, especially during the aboveground nuclear test years of the 1950s and the 1960s.

RPHP has also been able to track the radiation-induced damage done to the hormonal and immune systems of the 80 million baby boomers born between 1945 and 1965 in each of the post war decades, revealing the various epidemiological anomalies: In the 1950s, children born after the enormous initial exposure to nuclear fission products began to experience epidemic increases in childhood cancer in the ages 5 to 9.

A total of 422 nuclear weapons were detonated in the atmosphere by the United States (206 tests) and the Soviet Union (216 tests) before large-scale testing ended with the 1963 Partial Test Ban Treaty. Yield from the six largest Soviet tests alone totaled 136.9 megatons, or the equivalent of nearly 4,000 Hiroshima and Nagasaki bombs (36 kilotons). As testing escalated, deposition of fallout in human bodies was documented around the world. Risks to health from large-scale atmospheric nuclear weapons testing are still relatively unknown.

HEALTH STATISTICS EMERGE DECADES LATER

On October 20, 2009, RPHP released its report on the cancer risk from atomic bomb testing: **"Cancer Risk to Americans from Atomic Test Fallout, a Case Control Study of Strontium-90 in Baby Teeth."** Our new study finds high levels of radioactive strontium-90 (Sr-90) in baby teeth of U.S. "Baby Boomers" who have died of cancer. The study marks the first attempt to estimate cancer risk from bomb fallout by measuring actual levels in bodies of Americans.

ELEVATED IN VIVO STRONTIUM-90 FROM NUCLEAR WEAPONS TEST FALLOUT AMONG CANCER DESCENDANTS: A CASE CONTROL STUDY OF DECIDIOUS TEETH

A sample of 85,000 deciduous teeth collected from Americans born during the bomb-testing years assessed risk by in vivo measurement of residual SR-90 concentrations, using liquid scintillation spectrometry. The authors' analysis included 97 deciduous teeth from persons born between 1959 and 1961 who were diagnosed with cancer, and 194 teeth of matched controls. Average Sr-90 in teeth of persons who died of cancer was significantly greater than for controls (OR = 2.22; $p < 0.04$). This discovery suggests that many thousands have died or will die of cancer due to exposure to fallout, far more than previously believed. [Mangano JJ, Sherman JD. Elevated in vivo strontium-90 from nuclear weapons test fallout among cancer decedents: a case-control study of deciduous teeth. Int J Health Serv. 2011;41(1):137-58. PubMed PMID: 21319726]

FOOD IRRADIATION THREATENS PUBLIC HEALTH, NATIONAL SECURITY

As well documented since the 1960s, these massive doses of ionizing radiation produce **profound chemical changes in meat**. These include elevated levels of the carcinogenic chemical benzene, and also the production of unique new chemicals, known as radiolytic products, some of which have been implicated as carcinogenic.

Additionally, irradiated food has been shown to **induce genetic damage** in a wide range of studies … Furthermore, as admitted by USDA's Agricultural Research Service, irradiation results in **major losses of vitamins, particularly A, C, E and the B complex**. (Epstein SS, Hauter W. Preventing pathogenic food poisoning: sanitation, not irradiation. Int J Health Serv. 2001;31(1):187-92. PubMed PMID: 11271643).

THE CENTER FOR DISEASE CONTROL AND PREVENTION'S REPORT ON HUMAN EXPOSURE TO ENVIRONMENTAL CHEMICALS

The first Report (March 2001) presented exposure data for 27 chemicals from NHANES 1999; this Second Report (January 2003) presents **human exposure** data for 116 chemicals (including the 27 in the first Report) from NHANES 1999-2000. The Second Report also presents exposure data for the U.S. population divided into age, gender, and race/ethnicity groups. Radioactive elements and toxins have a synergistic effect and are more deadly when combined.

The first National Report measured lead, **mercury**, cadmium, and other metals; dialkyl phosphate metabolites of organo-phosphate **pesticides**; cotinine; and **phthalates**. The Second Report includes these chemicals and adds:

Polycyclic aromatic hydrocarbons (PAHs)

Dioxins, furans and coplanar

Polychlorinated biphenyls (PCBs)

Non-coplanar PCBs

Phytoestrogens

Herbicides

Selected organophosphate pesticides

Organochlorine pesticides

Carbamate pesticides

Pest repellents and disinfectants

The Fourth National Report on Human Exposure to Environmental Chemicals 2009 and the Updated Tables, February 2011, together are the most comprehensive assessment of environmental chemical exposure in the U.S. population. Since 1999, CDC has measured 219 chemicals in people's blood or urine. The Fourth Report, 2009, includes the findings from national samples for 1999-2000, 2001-2002, and 2003-2004.

http://www.cdc.gov/exposurereport/

AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY, 4770 BUFORD HWY NE, ATLANTA, GA 30341. CONTACT CDC: 800-232-4636 / TTY: 888-232-6348

IONIZING RADIATION

Ionizing radiation is any one of several types of particles and rays given off by radioactive material, high-voltage equipment, nuclear reactions, and stars. The types that are normally important to your health are alpha particles, beta particles, x rays, and gamma rays. Alpha and beta particles are small, fast-moving bits of atoms that a radioactive atom gives off when it changes into another substance. X rays and gamma rays are types of electromagnetic radiation. These radiation particles and rays carry enough energy to knock out electrons from atoms and molecules (such as water, protein, and DNA) that they hit or pass near. This process is called ionization, which is why this radiation is called "ionizing radiation." CAS ID #: HZ1800-45-T.

Affected Organ Systems: Dermal (skin), developmental (effects during periods when organs are developing) , musculoskeletal (muscles and skeleton), neurological (nervous system), renal (urinary system or kidneys), respiratory (from the nose to the lungs).

Chemical Classification: Radionuclides (radioactive materials).

IONIZING RADIATION IS A KNOWN HUMAN CARCINOGEN

Ionizing radiation is electromagnetic radiation that has sufficient energy to remove electrons from atoms. Ionization results in the production of negatively charged free electrons and positively charged ionized atoms. Ionizing radiation can be classified into two categories: photons (X-radiation and gamma radiation) and particles (alpha and beta particles and neutrons). Five types or sources of ionizing radiation are listed in the Report on Carcinogens as known to be human carcinogens, in four separate listings:

• X-radiation and gamma radiation (included in one listing) were first listed in the Eleventh Report on Carcinogens (2004).

• Neutrons were first listed in the Eleventh Report on Carcinogens (2004).

• Radon and its isotopic forms radon-220 and radon-222, which emit primarily alpha particles, were first listed in the Seventh Annual Report on Carcinogens (1994).

• Thorium dioxide, which decays by emission of alpha particles, was first listed in the Second Annual Report on Carcinogens (1981).

NATIONAL TOXICOLOGY PROGRAM'S REPORT ON CARCINOGENS 12TH EDITION

FOR MORE INFORMATION CONTACT: ROBIN MACKAR, NIEHS (919) 541-0073

10 Jun 2011: News Release. New Substances Added to HHS Report on Carcinogens - The U.S. Department of Health and Human Services today added eight substances to its Report on Carcinogens, a science-based document that identifies chemicals and biological agents that may put people at increased risk for cancer.

"Reducing exposure to cancer-causing agents is something we all want, and the Report on Carcinogens provides important information on substances that pose a cancer risk," said Linda Birnbaum, Ph.D., director of both the National Institute of Environmental Health Sciences (NIEHS) and the National Toxicology Program (NTP). "The NTP is pleased to be able to compile this report."

John Bucher, Ph.D., associate director of the NTP added, "This report underscores the critical connection between our nation's health and what's in our environment."

Read more about how ionizing radiation damages cells, tissues, and organs. http://ntp.niehs.nih.gov/ntp/roc/twelfth/profiles/IonizingRadiation.pdf. Accessed September 27, 2013.

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Uspirg.org

Ucsusa.org

Cehn.org

EWG.org

Ourstolenfuture.org

EPA Health Effects of Radiation http://www.epa.gov/radiation/understand/health_effects.html

Pubmed Collection: More Radiation and Nutrition Resources: http://www.ncbi.nlm.nih.gov/sites/myncbi/collections/public/10Mdxrf0gqL7bPluBqVKZjv5d/

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ALKALIZING AND ACIDIFYING FOODS

MOST ALKALIZING

- Baking soda
- Sea salt
- Mineral water
- Umeboshi plum
- Pumpkin seed
- Lentils
- Brocoflower
- Seaweed
- Sea vegetables
- Onion
- Miso
- Daikon
- Taro Root
- Burdock
- Lotus root
- Sweet potato/yam
- Lime
- Nectarine
- Persimmon
- Raspberry
- Watermelon
- Tangerine
- Pineapple

MOST ACIDIFYING

- Table Salt
- Yeast/hops/malt
- Beer
- Sugar
- Cocoa
- White/acetic vinegar
- Processed cheese
- Ice cream
- Beef
- Lobster
- Pheasant
- Barley
- Processed flour
- Cottonseed oil
- Hazelnut
- Walnut
- Brazil nut
- Fried foods
- Soybean
- Carob

Prepared by Dr. Russell Jaffe, MD, PhD, used with permission.
Complete tables, updates and reprints available from
ELISA/ACT Biotechnologies. 109 Carpenter Drive, Suite 100,
Sterling, VA 20164. 1-800-553-5472

Photo: Isaac Hernández

PREVENTING RADIATION TOXICITY

JULIE M. BROWN, MA, LMHC

Water: drink reverse osmosis water to protect yourselves and your families from radiation. Molecules of radiation are extremely small and are only screened out by reverse osmosis. You can add ¼ tsp of sea salt into a gallon of R.O. water in order to add minerals back into your water, but if you are eating sea vegetables, you will be getting sufficient minerals.

To protect yourself from Iodine 131 exposure, take Nascent Atomic Iodine (Detoxidine®) or detoxified iodine (iodinesource.com) or you can take 5 kelp tablets a day. Seaweed, plentiful in Iodine 127, protects the body from absorbing Iodine131. It has been recorded that 20 years after the Chernobyl disaster, the Polish people treated with Iodine 127 have almost 1000 times less thyroid disease than neighboring countries even further than Poland from the disaster site.

To protect yourself from cesium poisoning, consume plenty of high potassium foods, as potassium competively inhibits cesium uptake. Foods high in potassium include sea vegetables, avocados, leafy green vegetables, bananas, or make yourself a potassium tonic, juice of 3 carrots, ½ bunch spinach, ½ bunch parsley and 3 stalks celery. That said, you may not get enough potassium from your diet. Potassium oratate is the best form of potassium to take for radiation exposure.

To protect yourself from plutonium poisoning, eat lots of dulse and sea algaes such as spirulina, and chlorella. Miso soup has shown to be protective against plutonium. NCD, which comes from the mineral, zeolite, at 10 drops 4 times daily, is excellent for taking most radioactive elements out of the body.

Other supplements to reduce radiation exposure are:

• French green clay. Taken internally, like Zeolite, it has been shown to absorb radiation, heavy metals and toxic metals, and remove them from the body.

• Activated charcoal. Taken internally, it has the ability to neutralize radiation.

Other foods that protect against radiation are bee pollen, beets, papain, brewers yeast, and cold-pressed vegetable oils like coconut, extra virgin olive oil and sesame oil. An intake of four ounces of oil has been shown to bind the lipids to the toxins.

Eating foods high in calcium and/or taking a high quality vit/min formula will protect the body from strontium-90 (Sr-90) uptake. Some foods high in calcium are spinach, almonds, figs and canned Alaskan salmon, bone-in. Sr-90 acts like calcium and enters through the bone into the bone marrow. Drinking reverse osmosis water and having sufficient calcium in your bones will protect you from Sr-90.

Eat foods high in antioxidants and/or take antioxidant supplements, with vitamins C, E, beta carotenes, selenium, zinc, CoQ10, silymarin, N-acetyl-cysteine, and curcumin, and green and white tea. Two products recommended by Dr. Gabriel Cousens are Mega-Hydrate and Anti-Oxidant Extreme.

Eating cruciferous vegetables, broccoli, cauliflower, kale and brussel sprouts increase antioxidant and detoxification support.

Eat a high fiber diet, high pectin foods like carrots, sunflower seeds and apples take toxins, including radioactive particles out of your body.

Eating a plant-based diet, anything that grows out of the ground, is very important as well.

Radioactive pollutants in the environment become more concentrated in foods like milk, cheese and meat. This is one reason why a live-food, plant-based diet, eating low on the food chain, is the safest and best diet as this point in history and the foreseeable future.

SOURCES: DR. RUSSELL BLAYLOCK AND DR. GABRIEL COUSENS.

Photo: Isaac Hernández

RADIATION EXPOSURE NUTRITION INTERVENTION STRATEGIES

BETH ELLEN DILUGLIO, MS, RD, CCN, LD/N (NUTRITION MISSION™)

PROTECTIVE FACTORS IN RADIATION EXPOSURE

Well-nourished individuals are best equipped to block uptake, excrete radionuclides, and repair DNA damage from EMR exposure. Nutrient deficiency can be detrimental while nutrient sufficiency and saturation have protective effects.

Alkalizing Diet	Goal: arterial blood pH 7.45, first morning urine pH 6.7-7.5. Fruits and vegetables in general tend to be the most alkalizing foods, while sugar, meat, dairy, fried foods, and trans-fats are most acid-forming [1]. Mineral sufficiency is also crucial.
Antioxidants and Phytonutrients	Antioxidants, vitamins C and E, alphalipoic acid, ubiquinol, superoxide dismutases, glutathione [2].
Detoxification Support	• Phase I: B-complex, glutathione, branched-chain amino acids, flavonoids, phospholipids. • Phase II: glycine, taurine, glutamine, N-acetylcysteine, cysteine, methionine, methyl donors. • Intermediary: Vitamins C and E, selenium, copper, zinc, manganese, CoQ10, thiols, bioflavonoids, silymarin, pycnogenol.
Fiber	Insoluble (cellulose, lignin) and soluble (pectins, gums, gels) fiber plays an important role in radioprotection. Fiber adds bulk, speeds gastrointestinal transit time, absorbs toxicants, and promotes the growth of protective, probiotic bacteria.
Herbs and Spices	Herbs and spices are rich sources of antioxidants and phytonutrients that can inhibit carcinogen formation and activation, upregulate phase II detoxification enzymes, inhibit oxidation and inflammation, and demonstrate anti-tumor activity [3]. Herbs and spices studied for their protective antioxidant and anti-inflammatory effects include garlic, chives, onions, parsley, sage, rosemary, thyme, watercress, horseradish, dill, bay leaves, turmeric, and tea.
Legumes	Legumes (dried beans) contain minerals, chelating-phytates and radioprotective protease inhibitors [4, 5].
Miso	Miso, a lactobacillus-fermented paste made from soybean and sea salt (aged ~18 months), has an alkalizing effect and is a source of calcium, iron, B vitamins, and zybicolin which helps bind and eliminate radionuclides [4, 5].
Nuts and Seeds	Nuts and seeds provide full spectrum vitamin E, B-complex, calcium, magnesium, potassium, iron, zinc, fiber, pectin, phytates, and omega-3 fatty acids. Sesamol from sesame seeds was also found to be radioprotective a`nd exhibited a free-radical scavenging capacity 20 times that of melatonin [6].
Selective Uptake	Stable elements will block uptake of radionuclides: Calcium blocks Sr-90; Cobalamin blocks cobalt-60; Iodine blocks iodine-131; Iron blocks plutonium 238,239; Potassium blocks cesium-137; Sulfur blocks sulfur-35; Zinc blocks zinc-65.

Tempeh	Tempeh, a fermented soy product, contains beneficial bacteria, phytates, and analogues of B12 that can block cobalt-58,60.
Vegetables	Vegetables contain fiber, minerals, phytonutrients, and antioxidants. The Brassicaceae family (broccoli, cabbage, collard, kale, watercress, cauliflower, Brussels sprouts, radish, etc.) contains sulfur compounds which protect cells from radiation.
Vegetables, Sea	Sea vegetables, (including agar, dulse, hijiki, irish moss, kelp, wakame, and nori from uncontaminated sources) are rich in minerals and found to reduce intestinal absorption of Sr-90.
Water Purification	Reverse osmosis, distillation, and ion exchange can remove radionuclides.
Whole Grains	Whole grains, as tolerated, provide vitamins, minerals, fiber, and phytates (which bind radionuclides but can also bind nutritive minerals).

PROTECTIVE SUPPLEMENTS IN RADIATION EXPOSURE

Adaptogens	Adaptogens (astragalus, ashwagandha, ginseng, eleutheroccus, schizandra, rhodiola, maitake and reishi mushrooms, holy basil, and boerhaavia diffusa) exert radioprotective effects and modulate neuroendocrine-immune communication.
Aged Garlic Extract	Aged Garlic Extract (AGE) protects against ionizing radiation, scavenges reactive oxygen species, enhances cellular antioxidant enzymes and cellular glutathione, protects DNA from free-radical damage, and inhibits multi-step carcinogenesis [7].
Alpha-lipoic Acid	Alpha-lipoic acid (ALA), a potent antioxidant, regenerates vitamins C and E, increases intracellular glutathione, and protects the intracellular and extracellular environment [8]. "ALA may be beneficial to people exposed to high levels of radiation" [9]. The Linus Pauling Institute at OSU recommends 200-400 mg/d for healthy people.
Antioxidant Enzymes	Radiation depletes antioxidants and antioxidant enzymes such as glutathione peroxidase and glutathione reductase, superoxide dismutases (SODs), and catalase. SODs utilize the essential minerals copper, zinc, manganese, and iron. Manganese superoxide dismutase (MnSOD) and copper-zinc superoxide dismutase (CuZn-SOD) are key intracellular antioxidants. Glutathione, a tri-peptide produced endogenously from glutamic acid, glycine, and cysteine, is also available in IV, topical, and oral form (as stable s-acetyl glutathione). Glutathione and MnSOD are particularly protective against ionizing radiation [10, 11].

Ascorbic Acid	Ascorbic acid (vitamin C) is a primary antioxidant and regenerates other antioxidants. Radiation and heavy metal exposure, stress, infection, and temperature changes increase requirements. The Linus Pauling Institute at OSU recommends a base dose of 250 mg vitamin C BID. For optimal health, Dr. Pauling recommends 2.3 grams or more per 2,500 Kcals [12].
Astaxanthin	Astaxanthin is a xanthophyll carotenoid primarily found in marine organisms such as microalgae (Haematococcus pluvialis, and Chlorella zofingiensis) krill, trout, salmon, shrimp, crayfish, and crustaceans, as well as bee propolis [13]. Astaxanthin possesses radioprotective, antioxidant, and immune-stimulating effects [14].
Beta-glucans	Beta-glucans are plant and microbe-based polysaccharides found in barley, oats, baker's yeast, and mushrooms. Beta-glucans stimulate hematopoiesis following ionizing radiation [15], stimulate immune cells, and down-regulate immunosuppressive cells [16]. Administration prior to, and within 24 hours of radiation exposure reduced signs of radiation sickness, enhanced immune cell response [17, 18], and may be considered for use during nuclear emergencies and RT [19,20].
Chlorella	Chlorella species are a type of single-celled fresh water green algae known to bind and eliminate toxins and heavy metals [21]. Chlorella's radioprotective, bioprotective, and antioxidant effects have been documented in several studies [22-27]. Chlorella should be consumed in "broken cell wall" form to enhance its bioavailability. Dr. Joseph Mercola recommends at least 4 g daily (from uncontaminated sources) combined with fresh cilantro for a synergistic effect.
Fatty Acids	Conditionally-essential omega-3 fatty acids EPA and DHA are considered anti-inflammatory and immune-supportive with EPA specifically protective against UV radiation [28, 29]. Cold water, oily fish such as mackerel, sardines, salmon, and purified fish oils are excellent source of EPA and DHA, while flaxseed, chia seed, hemp seed, and English walnuts are excellent sources of their precursor – alpha-linolenic acid. Flaxseeds were found to mitigate the negative effects of radiation, including inflammation, pulmonary fibrosis, and cytokine secretion [30]. USDA "Adequate Intake" of omega-3 fatty acids is 1.1-1.6 g/d for adults. Eating omega-3 rich seafood or consuming 2 g of high-quality fish oil is recommended several times per week by the Linus Pauling Institute at OSU.
Genistein	Genistein, a phytonutrient found in soybeans, exerts radioprotective, antioxidant, and anti-tumor effects [31]. Genistein applied following radiation was found to mitigate oxidative damage, lung fibrosis, and pneumonitis [32].
Melatonin	Melatonin, produced primarily in the pineal gland from serotonin, possesses radioprotective and antioxidant properties in addition to its role in circadian rhythm regulation [33, 34]. Recommended doses range from 0.5-6 mg at bedtime [35].

Potasium Iodide	Potassium iodide protects the thyroid during acute exposure to radioactive iodine. FDA guidelines must be followed. [http://www.fda.gov/drugs/emergencypreparedness/bioterrorismanddrugpreparedness/ucm072265.htm]
Seaweed, Sodium Alginate	Supplementing with sodium alginate from kelp and other sea vegetables was found to have a profound radioprotective effect as it blocks intestinal absorption and bone uptake of radioactive strontium, and increases Sr-90 excretion without interfering with calcium metabolism [36, 37].
Spirulina	Spirulina plantensis, a radioprotective, unicellular blue-green algae [38], was used extensively following the Chernobyl nuclear meltdown in workers and children with radiation sickness at a dose of 5 g per day for 45 consecutive days [39-41]. The phycocyanin content of Spirulina contributes to its radioprotective effects, complexing with heavy metals and radionuclides and facilitating their excretion. Spirulina inactivates superoxide and exerts dose-dependent anti-inflammatory effects [42]. Dr. Mercola recommends preventative doses of 3 g/d and increase to 10-20 g/d for therapeutic purposes [39].
Vitamin D (1,25-dihydroxy-vitamin D3)	Vitamin D, a hormone produced in the body from cholesterol in the presence of UV light, can be administered in supplement form to protect individuals from background radiation as well as nuclear accidents. Protective mechanisms include "cellular differentiation and communication, Programmed Cell Death (PCD) (apoptosis and autophagy) and antiangiogenesis... vitamin D... should be considered among the prime (if not the primary) nonpharmacological agents that offer protection against sublethal low radiation damage and, in particular, against radiation-induced cancer" [43]. Endogenous synthesis is inhibited by inadequate sunlight exposure, amount of body fat, skin pigmentation, amount of skin exposed, and use of sun block. Deficiency occurs at a serum level less than 20 ng/mL and sufficiency occurs in the range of 33-80 ng/mL. "Studies indicate that intake of vitamin D in the range from 1,100 to 4,000 IU/d and a serum 25-hydroxyvitamin D concentration [25(OH)D] from 60-80 ng/mL may be needed to reduce cancer risk" [44] while a supplemental dose of 9,600 IU/d was needed to achieve at least 40 ng/mL in 97.5% of a community-based cohort. Few foods contain vitamin D and supplementation may be indicated. The Linus Pauling Institute recommends that adults supplement with at least 2,000 IU (50 mcg) daily and maintain a serum level of at least 80 nmol/L (32 ng/mL).
Zeolites	Zeolites, hydrated aluminum silicates with cation exchange capacity, occur naturally but also can be synthesized and are frequently used as ion-exchange agents, filters, and water softeners. HYPERLINK "http://www.chemistryexplained.com" Both natural and synthetic zeolites have been utilized in the removal of radionuclides from biological tissues as well as from water supply systems [45, 46].

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