Radiation Hormesis: Magic Stones and Cancer, Part One

By Jacob Schor, ND

Several weeks ago, a fellow came to our office to show me stones that he mines and uses to cure cancer.

He kept saying "piece of cake" in reference to various types of cancer that most oncologists consider difficult to treat. "Mr. Nighthawk," as I will call him in this article, was not talking about remission, but about curing cancer. He did not appear delusional.

I lean toward skepticism. There are few half-full glasses in my world view. Listening to Mr. Nighthawk's story, skepticism does not even begin to describe my sense of doubt. Just as I was about to invent an excuse to get him out of the office, he used one word and caught my interest. That word was *hormesis*.

Hormesis refers to the beneficial and immune stimulatory action of low doses of toxic substances, usually in reference to low-dose radiation. Janet Raloff, my favorite *Science News* writer, wrote an intriguing article early this year on the subject, and the term *hormesis* was still fresh in my mind. Mr. Nighthawk's mention of the word sat me back in my chair, ready to listen.

The first line of Ms. Raloff's article reads:

"For decades, researchers largely assumed that a poison's effects increase as the dose rises and diminish as it falls. However, scientists are increasingly documenting unexpected effects – sometimes disproportionately adverse, sometimes beneficial – at extremely low doses of radiation and toxic chemicals."[1]

Blame this fascination with hormesis on my new toothbrush – one of those electric vibrating ones with an internal timer that insists I continue brushing for what seems like an eternity. Looking to pass the time while brushing, I had reread Raloff's article numerous times during the weeks preceding Mr. Nighthawk's visit.

When we think of toxic effects, we envision the effect as linear. The more exposure, the greater the toxic effect. The less exposure, the less effect – but there is always some toxic effect. Logically, this makes sense; but the reality, at least in some instances, is different. Ms. Raloff first presented examples of various chemicals that have opposite effects on biological reactions at high concentrations versus low concentrations.[1]

Then she wrote about radiation, pointing out the well-known danger of radiation overexposure.

"Data collected over decades have shown that exposures to 1 gray (Gy) – the dose from perhaps 100 computerized tomography scans – typically increase an individual's lifetime risk of cancer by 5 percent. However, a growing body of animal data now indicates that lower radiation exposures can defend against cancer-inducing biological changes. Conceptually, it's analogous to a vaccine."[1]

These days, the term *hormesis* is used to describe the process by which "a compound at high doses has an inhibitory – and generally toxic – effect on some biological process, but the opposite effect at certain low doses." Initially, the term referred only to radiation toxicity.

Raloff mentioned several recent studies on the effect of low-dose radiation, which caught my attention and would distract me day after day while impatiently brushing my teeth.

First, she described the work of Leslie Redpath of the University of California, Irvine. Redpath reported that cells exposed to less than 0.1 Gy of radiation were less likely to "spawn tumors" than were cells receiving either higher doses or no radiation.[1]

Then Raloff brought up Brenda Rodgers from Texas Tech University. Rodgers left mice in cages in a Ukrainian forest, about a mile from where the Chernobyl nuclear accident occurred 18 years ago. She left them there until they got a cumulative radiation dose of about 0.1 Gy. Once the animals reached the 0.1 Gy dose, she moved them to her lab and quickly bombarded them with 1.5 Gy. This big dose created only about half the number of chromosome breaks in the mice pre-exposed to low-dose radiation, as compared to the mice without the pre-exposure. The vaccine analogy works.[1]

Low-dose exposure reduces damage even if it occurs after the large dose. Tanya Day, of Flinders University in Australia, gave mice a 1-Gy dose of radiation. Four hours later, some mice received a second, far smaller dose. Rodents getting both doses developed only half as much DNA damage as mice that just got the large first dose. In fact, the mice that got the low dose had less damage than the control group of mice receiving no radiation at all.[1]

Hearing from Mr. Nighthawk that curing colon cancer or brain tumors was a "piece of cake" had me internally mouthing the words, "nut-case." It was only when he explained that his magic stones were weakly radioactive and used the word *hormesis* that I began to listen seriously.

Let me summarize his story. He is a helicopter pilot. While still serving in the military and on training maneuvers, he landed his helicopter somewhere in Wyoming and found an outcropping of turquoise. He brought a piece of this stone home with him and made some of it into jewelry. Over the course of years, people wearing the jewelry reported back stories of miracle cures; the kind of stories that a Marine helicopter pilot doesn't swallow. These were far-fetched stories that he wasn't prepared to accept. He hired a lab to analyze the stone and was told the stone was radioactive. He then discovered the writings of T.D. Luckey.

Don Luckey wrote two books on radiation hormesis (1980 and 1991). The more recent, *Radiation Hormesis*, currently sells for $300 on Amazon. I confess, I have not read it. A short overview of the subject written by Luckey is posted at: www.radpro.com/641luckey.pdf.[2]

Luckey argues that low-dose radiation is needed to maintain health, and that we suffer from radiation deficiency. He presents data compiled on thousands of people working in jobs that exposed them to low-dose radiation. In the summary, and I assume in his book, Luckey reviews the data from studies that followed workers in nuclear power plants, research facilities, bomb factories and submarines. When comparing the number of deaths per 1,000 workers, those exposed to radiation consistently had fewer deaths. Combined data from 7 million person-years show those exposed to low-level radiation had 52 percent the risk of dying as unexposed control groups.

Data collected on Japanese atomic-bomb victims shows a similar protective benefit of low-dose radiation exposure: "For every 10,000 persons exposed to 1-1.9 cGy, there were three fewer leukemia deaths and 50 fewer solid cancer deaths than in controls."

In this short overview, Luckey references 23 separate animal studies conducted from 1942 to 1975, in which low-dose radiation increased lifespan, and five animal and human studies, in which radiation exposure reduced sterility. Pregnant rats exposed to low-dose radiation became more fecund, producing more offspring per litter, an effect that persisted through

12 generations. In his text, he references about 3,000 studies to support his view. Luckey concludes that we live in a subclinical state of radiation deficiency.[2]

I confess that reading Luckey's article was difficult. His thoughts so contrasted my basic assumptions about how things work that I found myself wondering if he was faking it – even making up the references. I wanted to explain away the awkward sensation caused by my world turning upside down. His writing style is reminiscent of others who believe strongly in something that most people find implausible. He could be talking about UFOs or various conspiracy theories. I suddenly could relate to people who thought Columbus's plan to sail around the world was lunacy. When information does not agree with how we see the world, the easiest approach is to pretend it isn't true.

A PubMed search on *radiation hormesis* produced an eight-page list of abstracts and 143 papers, the majority of which appear to support Luckey's premise.

A mouse study published in December 2006 demonstrated that low-dose pre-exposure protected the brain from subsequent high dose exposure.[3] A Japanese paper from October 2006 suggests low-dose radiation triggers a "radiation adaptive response" that stimulates certain "bioprotective functions, including antioxidative capacity, DNA repair functions, apoptosis, and immune functions."[4] An October 2005 paper reported on an "intensive analysis of immune cell populations" in mice exposed to low-level radiation found "Chronic low-dose-rate radiation activated the immune system of the whole body."[5]

An excellent article appeared in the January 2005 issue of the *British Journal of Radiology*, which you can download free.[6] The authors describe a dual effect seen with low-dose radiation. They point out a low chance of DNA damage, which increases in proportion to the dose of radiation. This DNA damage is "orders of magnitude lower than that from endogenous sources, such as reactive oxygen species." At the same time, there is an adaptive reaction to the radiation providing protection against DNA damage. This adaptive protection prevents DNA damage, stimulates DNA repair and immune activity. This protective reaction begins hours after exposure and, "may last for days to months, decreases steadily at doses above about 100 mGy to 200 mGy and is not observed any more after acute exposures of more than about 500 mGy." These protective effects far outweigh the damaging effect of low-dose radiation.

Reviewing their data, the writers conclude that:

"[T]he linear-no-threshold (LNT) hypothesis for cancer risk is scientifically unfounded and appears to be invalid in favour of a threshold or hormesis. This is consistent with data both from animal studies and human epidemiological observations on low-dose induced cancer. The LNT hypothesis should be abandoned and be replaced by a hypothesis that is scientifically justified and causes less unreasonable fear and unnecessary expenditure."[6]

We have lived with this LNT hypothesis so long that we take it for granted, just as at one time people simply assumed that the world was flat, or that the sun moved across the sky. To read that it is "unfounded" is difficult. To think that we should be using low-dose radiation therapeutically turned my world upside down.

The most comprehensive reviews published are by Calabrese and Baldwin, toxicologists from the University of Massachusetts, Amherst.[7-9] They present a history that puts this business into perspective and makes it believable.

Calabrese and Baldwin point to the Hugo Schulz's work in the late 1800s as the first reported demonstration of hormesis. (Henschler though, identifies Rudolf Virchow, the father of cellular pathology, as the first to demonstrate the phenomenon of hormesis years earlier in 1854.[10])

In the later decades of the 19th century, low-dose chemical stimulation focused on the effect on plant and fungal growth:

"In fact, prior to 1900, the general belief had emerged in the realm of chemical toxicology that low doses as a general rule had the capacity to stimulate, while higher doses would inhibit the activity. This so-called truism became referred to as either the Arndt-Schulz Law or Hueppe's Rule as a result of Hugo Shulz's research on chemical stimulation of yeast metabolism and Ferdinand Hueppe's research on chemical stimulation of bacterial growth."[11]

Part 2

The concept of radiation hormesis followed that of chemical hormesis, obviously having to wait until after the discovery of X-rays, radium and uranium in the 1890s. The first decades of the 1900s saw numerous papers published on the positive stimulatory effects of low-dose radiation on plants, fungi, mice and insects.

My fellow naturopathic doctors will recall Schulz's name from the Arndt-Schulz Law, often mentioned in homeopathic courses. This is pretty much the same idea as hormesis, a term that did not come into use until 1943, when Southam and Erhlich proposed its use.

Association of the Arndt-Schulz Law with homeopathy put the fledgling science of hormesis into trouble. Even though distinguished researchers were publishing outstanding research in the early 20th century:

"The area of low-dose chemical stimulation was to become the object of intense criticism. ... This criticism was to have its origin in the fact that this area of research was too closely allied to the controversial medical practice of homeopathy. The area of chemical hormesis had become used as an explanatory factor by advocates of the medical practice of homeopathy. ... The concept of hormesis, especially chemical hormesis, became a cultural victim of guilt by association with homeopathy. This marginalization was encouraged by traditional medical philosophy because of the long standing antipathy with homeopathy. ... It was only natural to ... lump hormesis with homeopathy and the marginalization was complete."[1]

Reading through these and other papers, I found myself coming around to the idea that Mr. Nighthawk might not be all that crazy. Taken together, the past research, the current number of recent papers and my own empathy generated by the historic persecution of hormesis proponents, along with homeopaths, make these ideas both acceptable and actually somewhat appealing to me.

Therefore, I have begun to explore what Mr. Nighthawk is doing with his cancer patients, meeting with him on several occasions. Aside from Mr. Nighthawk, I know of no one else actually using low-dose radiation to treat cancer. He has two basic methods of treatment. He cuts slices of his "magic" turquoise into ½-inch thick slices, varying from cookie-sized to larger pieces that almost cover my hand. These rocks are placed directly on the skin, in close proximity to existing tumors. They contain a fair quantity of quartz and exhibit a piezoelectric effect, in addition to giving off radiation. When heated, the stones give off a mild electric current. He saves the mud, the results of cutting the stones with a water-cooled diamond-bladed saw. He heat-seals this mud mixture into plastic food-storage bags. Patients who no longer have discernable tumors are told to sleep on these radioactive mudpacks. Both stones and mudpacks emit in the range of 0.4 to 0.6 millirems of radiation. Mudpacks are used alone for nonlocalized tumors such as leukemia and lymphomas. For localized tumors, he may use both stone and mudpack. The stones are kept in contact with the skin for six to eight hours a day; the packs are slipped under the bed sheets and slept on overnight. It is all very simple.

In describing his use of the stones, Mr. Nighthawk describes a "healing response" when people first begin using them. Symptoms such as headache, nausea, even a worsening of symptoms, might occur in the first days of use. He considers these good signs, indicating that the body is mounting a response. He expects the stones will eliminate solids tumors in four months. He considers colon, breast and brain cancers to be a "piece of cake to treat." He admits pancreatic cancer is a little tricky.

Sakai, in the October 2006 issue of *Yakugaku Zasshi*, groups radiation hormesis together with other biological stressors, writing:

"A good example of such responses is the so-called radiation adaptive response, a process in which acquired radioresistance is induced by low-dose radiation given in advance. The stimulation of certain bioprotective functions, including antioxidative capacity, DNA repair functions, apoptosis, and immune functions are thought to underly adaptive response."[2]

Thinking in terms of biological stressors inducing a generalized "adaptive response" gives us a new way to view naturopathy and the multitude of therapies that fit under our umbrella. Might we now think of natural cure and naturopathy as utilizing natural elements to stimulate this adaptive response? Heat, cold, fasting, hydrotherapy, exercise and all the other sublethal semi-traumatic therapies we employ may, each in their own way, trigger this same adaptive response. It seems logical that an adaptive response triggered by low-dose radiation might be effective at repairing and restoring the damage created by radiation, which is genetic damage and if unsuccessful at causing apoptosis. In other words, this response would conceivably be ideal for treating cancer. This is all intellectually intriguing but really just a distraction from thinking about Mr. Nighthawk's claims.

As far as his claim to cure cancer, I do not have enough information to know what to think. I would love to discover these magic stones work as promised. But to paraphrase Eric Feigel, MD, a professor of physiology and cardiology at the University of Washington School of Medicine, whom I asked about these ideas, "Jacob, the history of medicine is full of stories like this, which in the end, prove to be fruitless."

Yet, if we choose to ignore any new thing that threatens to shake our worldview, we doom ourselves. Rather than cast aside something that at first impression sounds ridiculous, my plan is to explore this territory cautiously. I have begun to collect case histories, anecdotal though they are, from Mr. Nighthawk and see if the details support his story. A few of my patients, who have little to lose, are using the magic stones. It is too soon for me to come to any conclusion. At some point in the future, watch for part three of this article.

Note: Here in Colorado, the Cancer Treatment Act outlaws the diagnosis or treatment of cancer by anyone except a specific list of health care practitioners, specifically MDs and DOs. I pointed this out to Mr. Nighthawk, thinking I should conceal his identity.

"I'm an ex-Marine and so are all my buddies," he said. "Let them try and come after me." Stones can be ordered directly from him online at: www.nighthawkminerals.com.

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