

Real Science vs. Marketing Science

Will taking large doses of Potassium Iodide protect me from nuclear fallout?

IS IT REAL SCIENCE?

The science of nutrition is the study of nutrients and the body's handling of them. Within the nutritional community, disagreement often occurs among legitimate scientists who are interpreting legitimate scientific data. This type of disagreement among experts is certainly confusing to lay people who are trying to figure out what type of diet to eat, and which dietary supplements to take to assist them in achieving their health goals. Obtaining accurate scientific information becomes even more difficult when the source of the data is "marketing science" rather than real science.

In the case of marketing science, many so-called "experts" may have part, but not all of their facts correct. This partial correctness often lends credibility to claims which are not, in fact, accurate. Other times, the "experts" are not experts at all, but rather individuals who are proselytizing their personal beliefs about dietary supplements which, frequently, are not only incorrect but often have no basis whatsoever in scientific fact. This series of Real Science vs. Marketing Science will attempt to provide a fair, unbiased view on many issues relating to nutrition and dietary supplement science.

Radioactive iodine & thyroid cancer

Radioactive iodine, especially ^{131}I , may be released into the environment as a result of nuclear reactor accidents. Thyroid accumulation of radioactive iodine increases the risk of developing thyroid cancer, especially in children. The increased iodine trapping activity of the thyroid gland in iodine deficiency results in increased thyroid accumulation of radioactive iodine (^{131}I). Thus, iodine-deficient individuals are at increased risk of developing radiation-induced thyroid cancer because they will accumulate greater amounts of radioactive iodine.

Potassium iodide

Potassium iodide (a popular supplemental form of the trace mineral iodine) administered in pharmacologic doses (50-100 mg for adults) within 48 hours before or eight hours after radiation exposure from a nuclear reactor accident can significantly reduce thyroid uptake of ^{131}I and decrease the risk of radiation-induced thyroid cancer.¹ The prompt and widespread use

of potassium iodide prophylaxis in Poland after the 1986 Chernobyl nuclear reactor accident may explain the lack of a significant increase in childhood thyroid cancer in Poland compared to fallout areas where potassium iodide prophylaxis was not widely used.² In the U.S., the Nuclear Regulatory Commission (NRC) requires that consideration be given to potassium iodide as a protective measure for the general public in the case of a major release of radioactivity from a nuclear power plant.³

Your personal risk

Now all this having been said, is there any value to *you personally* in taking pharmacologic doses of potassium iodide? To answer this question, consider the following:

- The U.S. Nuclear Regulatory Commission⁴, requires that States with a population within the 10-mile emergency planning zone (EPZ) of commercial nuclear power plants consider including potassium iodide as a protective measure for the general public to supplement sheltering and evacuation in the unlikely event of a severe nuclear power plant accident.
- Section 127 of the Public Health Security and Bioterrorism Preparedness and Response Act of 2002 (the Bioterrorism Act)⁵ requires State and local governments through the national KI stockpile to distribute KI tablets to population within 20 miles of a nuclear power plant.
- According to a Dutch analysis, the increased risk zone for thyroid cancer is a 31 mile radius from nuclear power plants.⁶

Perhaps by now you are getting the point—namely that that the uptake of a certain concentration of radioactive iodine is necessary to cause thyroid cancer⁷, and that risk dissipates with distance from a nuclear powerplant disaster (because the concentration of radioactive iodine also dissipates).

As an example, take the recent earthquake that hit Japan. As of March 16, 2011, the news indicates that authorities are struggling to control the situation at the Fukushima Daiichi

nuclear plant. Of greatest concern is Reactor 3, about which Japan's government said that there a "possibility" that the reactor's primary containment vessel for radiation had been damaged after steam was seen rising into the air.⁸ Now, for the sake of argument, let's say that radioactive iodine has already (or soon will be), leaking from the reactor. Who should be concerned from the perspective of increase risk of thyroid cancer? Certainly anyone within a 10-31 mile radius. How about people in the United States? There is absolutely no data to suggest that sufficient amounts of ¹³¹I could possibly travel thousands of miles to the west coast of the United States to pose any risk whatsoever.

Normal doses of iodine as a nutrient

In any case, keep in mind that normal daily doses of nutrient iodine (as opposed to the radioactive form) range between 150-225 mcg (micrograms), and the pharmacologic doses used to prevent radiation-induced thyroid cancer range between 50-100 mg (milligrams) for adults. Note: it takes 1,000 mcg to make 1 mg. While such a high pharmacologic dose of iodine could be used once or twice without risking toxicity, you would never want to take such large amounts on an ongoing basis.

In iodine-sufficient populations (which, for the most part, includes the U.S.), excess iodine intake is most commonly associated with elevated blood levels of thyroid stimulating hormone (TSH), hypothyroidism, and goiter. Although a slightly elevated TSH level does not necessarily indicate inadequate thyroid hormone production, it is the earliest sign of abnormal thyroid function when iodine intake is excessive.

Conclusion

If live within 10-31 miles of a nuclear powerplant, then it may make sense to keep high pharmacologic doses of potassium iodide (50-100 mg for adults) on hand, which you would only take once in the event of a nuclear reactor accident. If you don't live near a nuclear powerplant, there is really no need to use such high doses. There is definitely no need if the reactor accident happens thousands of miles away from you. If it makes you feel better, though, it is certainly safe and beneficial to supplement with 150-225 mcg of iodine (from potassium iodide) on a daily basis.

References

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- ⁴ Nuclear Regulatory Commission. Consideration of potassium iodide in emergency plans. Nuclear Regulatory Commission. Final rule. *Fed Regist.* 2001;66(13):5427-5440.
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