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 Commission$^4$,
  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 cancer,$^7$ and that risk dissipates
with distance from a nuclear power plant 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. 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 $^{131}$I 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**