

“POTASSIUM IODIDE IN THE AGE OF NUCLEAR REACTORS AND TERRORISM

Potassium iodide (KI) is the same form of iodine used to iodize table salt. Given in sufficient amounts, it floods the thyroid with stable (non-radioactive) iodine, thus preventing radioactive iodine from being taken into the thyroid gland in the event of a nuclear accident. If taken at the proper time, potassium iodide protects the thyroid from radioactive iodine from all sources - air, food, milk, and water. Potassium iodide is a non-prescription drug that can be bought over the internet and at some pharmacies. It's made in liquid or pill form. The two FDA-approved brands of full adult dose 130-mg pills are IOSAT® (Anbex, Inc.) and Thyro-Block® (Medpointe, Inc.). The FDA-approved brand of 65-mg pills is ThyroSafe® (Recip US). Properly packaged, the shelf life is at least 5 years and possibly as long as 11 years. If you accidentally take a very old pill, it may not work fully but it won't hurt you.

“Basically, potassium iodide is a salt that is cheap to make, with an almost unlimited shelf life. It is highly valuable in the wake of a nuclear reactor accident, or a terrorist attack with a radioactive bomb. Potassium iodide's capacity to protect the healthy thyroid gland derives its ability to flood the thyroid gland with so much iodine that radioactive iodine isn't taken into the gland. As a public health measure, having households supplied with potassium iodide is a prudent guard against nuclear disasters.

“After the Chernobyl nuclear reactor accident in 1986, Poland successfully prevented its citizens from developing thyroid cancer by making sure everyone got adequate doses of potassium iodide as soon as the news hit of the reactor accident. This did not happen in the former Soviet Union, however, where 1,800 children in the fallout region developed highly aggressive thyroid cancer as a direct result of the accident, and thousands more developed it years after the accident because of their exposure.

“In the wake of September 11, 2001, The Department of Health and Human Services announced that it was buying millions of doses of potassium iodide to protect people from thyroid cancer caused by radioactive fallout. The Food and Drug Administration issued new guidelines calling for more rapid administration of the drug in radiation emergencies. Finally, the Nuclear Regulatory Commission advised states that free stockpiles of potassium iodide were available to them for the asking. Unfortunately, not all U.S. States believe this is important, and there is not yet a Federal mandate to force states into stockpiling and distributing potassium iodide.

“When should potassium iodide be taken?”

Potassium iodide needs to be taken 6-12 hours before exposure to radioactive iodine, and is also protective if taken within the first few hours after exposure to radioactive iodine. People should take one dose a day, only while they are being exposed to radioactive iodine and one day afterward. Only health authorities can determine which radioactive isotopes are released during a nuclear event, and, if radioactive iodine is released, when to take potassium iodide and how long to keep taking potassium iodide it.

“What about a “dirty bomb” attack?”

Not every radioactive release includes the radioactive iodine that can cause thyroid cancer. For example, a "dirty bomb" may not contain radioactive iodine because it has a short half-life. A "dirty bomb" is a conventional bomb mixed with radioactive material, and designed to explode spewing out the radioactive isotopes and contaminating a wide area.

“What are the recommended doses?”

The U.S. Food and Drug Administration (FDA) has published general recommendations for minimum potassium iodide doses: a full 130-mg pill for adults, 65 mg for children 3 to 18 years old, 32 mg for babies 1 month to 3 years old, and 16 mg for newborns up to 1 month old. In the U.S., potassium iodide pills are now sold in both 130-mg and 65-mg doses. The pills are scored to make it easier to cut them up for children's doses. According to the FDA, children over 1 month old can safely be given a full-dose 130-mg pill on each of 2 consecutive days. However, newborns should be given only a 16-mg dose. The easiest way to prepare a 16-mg dose is to dissolve a 130-mg pill in 8 oz of a clear liquid and feed the newborn 1 oz of the liquid. Another alternative is to give the newborn 16 mg of the liquid form of a saturated solution of potassium iodide, which requires a doctor's prescription. For FDA suggestions on preparing potassium iodide doses for children, see <http://www.fda.gov/cder/drugprepare/potassiumiodideprep.htm> <<http://www.fda.gov/cder/drugprepare/kiprep.htm>> .

“Who should not take potassium iodide?”

If you don't have a thyroid gland, or you already had your thyroid gland ablated by radioactive iodine (as in Graves' disease, see chapter 6), you don't need to worry about taking potassium iodide. In our family, Sara wouldn't need to worry about taking potassium iodide, nor her sister (who had Graves' disease), but Ken and our two teenage boys would need to take it. I (Ken) have also taken potassium iodide to protect my thyroid gland during times when my laboratory research could have potentially exposed me to radioactive iodine used to label proteins in laboratory testing.

“ The Public Health Security and Bioterrorism Preparedness and Response Act of 2002, enacted by Congress in May 2002, created a mechanism to extend the radius of potassium iodide distribution to communities within 20 miles of nuclear plants, and directs the President to decide which agency or agencies will oversee stockpiling and distribution. The American Thyroid Association (ATA) has been urging potassium iodide stockpiling since 1984. Its members have been studying the Chernobyl nuclear accident and participating in studies and care for its victims. The Association's recommendations are outlined in the public health statement on its website.”

References:

From the Authors consent:

Ain, KB and Rosenthal MS. 2011. “Thyroid and Public Health” In Ain, KB and Rosenthal, MS, *The Complete Thyroid Book*. McGraw-Hill, New York: 335-41.