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Effects of Iodine on Radioactive Treatment

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Introduction

Iodine is a chemical element with a symbol "I", and an atomic number of 53 and an average atomic mass of 127. There are 37 known isotopes of Iodine from I-108 to I-144, but the only stable isotope is I-127, and all others are radioactive.

This poster serves to investigate the causes and treatments of radioactive exposure and the diseases that follow, and outline the parts in which Iodine play as an effective treatment. One specific isotope of Iodine: I-131 will be focused in investigating its effects and uses in radioactive activity and treatment, as it is the "most common radioactive fission-product of nuclear fission, and is the isotope most abundant inside nuclear reactors"; meaning that I-131 is primarily responsible for most radioactive exposure and emissions concerned with the health and medicinal effects due to radioactive exposure and diseases associated with it.

Properties of I-131

"I-131, an isotope of Iodine, was discovered by Glenn T. Seaborg and John Livingood at the University of California-Berkeley in the late 1930's". It is produced by the fission of Uranium atoms during the operation of nuclear reactors, and in the detonation of nuclear weapons. I-131 has a half-life of about 8 days, and emits beta particles upon decay. Because of the useful beta emission, Iodine (I-131in particular) is used extensively in medical field to treat various diseases related with radioactivity and thyroid glands. Iodine also has a tendency to form bonds with other elements to form compounds, therefore if radioactive Iodine leaks out of a nuclear power plant, it rapidly forms compounds with other substances such as soil, also known as 'organic fixation', fixing itself into the environment emitting beta and gamma radiation. I-131 is mainly used in large amounts to treat thyroid cancer, and other thyroidal diseases associated with radioactivity.

Radioactive exposure and treatment of diseases

When radioactive Iodine is emitted into the environment, due to leaks and waste from nuclear power plants, it rapidly adapts to the environment by forming compounds. Though I-131 has a short half life and therefore can disintegrate completely in weeks, another isotope, I-129 remains in the environment as long as it wants to with a half-life of about 15.7 million years, constantly emitting beta and gamma particles.

When radioactive Iodine enters into human body through inhalation or consumption of radioactive compounds, they gather in the thyroid gland, which is the part of the body most sensitive to Iodine. The thyroid gland cannot tell the difference between stable Iodine in common foods such as seaweed, or radioactive Iodine which is harmful, so it absorbs both in portions of any amounts that it can absorb from the environment.

Applications of I-131 in the medical field

When radioactive Iodine is consumed and concentrated in the thyroid gland, it can cause problems and diseases such as "overactive thyroids, and thyroid cancer", which is often fatal.

Though I-131 would only seem to be harmful, it is also used to treat such diseases the same way vaccines are made with the same viruses to treat viral diseases. "Doses of I-131 are used in large amounts when treating thyroid cancer", due to the low tolerance of cancer cells to any form of harm, the radioactive emissions of I-131 destroy the cancer cells before they harm the healthy cells. This is because I-131 strive to attain a stable state by emitting gamma and beta rays which attack the bodily cells. Since cancer cells are merely deviated forms of healthy cells, they are more prone to attacks and are weaker. Therefore doses of I-131 destroys these cancer cells, which provide a effective cure for thyroid cancer.

Compounds of stable Iodine such as KI (Potassium Iodide) are used in forms of pills to prevent thyroid contamination by blocking radioactive Iodine from entering the thyroid by "filling" the gland with stable Iodine before any more radioactive Iodine has room to be absorbed. Such methods were highly advertised after the crisis at Fukushima Power Plant in Japan.

Figure A

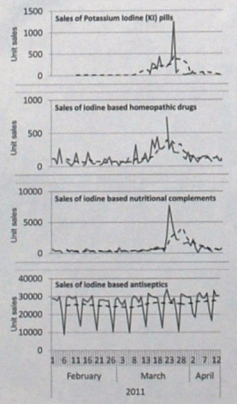
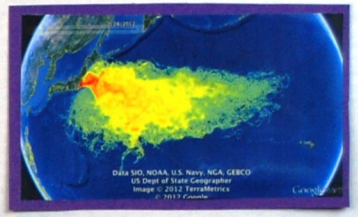


Figure A illustrates the incline in the purchase and consumption of Iodine-related products before and after the Fukushima Crisis, due to the high advertisement and promotion of prevention of radioactive exposure.

The Fukushima crisis

The Fukushima Plant Crisis, which happened in Japan in March 2011, was an accident initiated by the tsunami of the Tohoku earthquake. Equipment damage and failures due to the tsunami caused huge amounts of radiation to be exposed to the environment, causing severe problems not only to the residents near the plant, but to other countries by sea and coastal contaminations even to the U.S. It has been recorded the largest radioactive disaster following Chernobyl, and caused huge debates and awareness all around the world. Advertisements of prevention and treatment of such radioactive exposure was rapidly announced, promoting consumption of KI pills, and Iodine based nutritional compliments to at least alleviate the effects of radiation.



Summary

In sum, the effects and uses of Iodine to treat radioactive exposure is highly regarded, both in terms of abundance and ability. But such knowledge is often ignored as people do not understand how much radiation they actually do absorb each and every day, and only react to large scale disasters to actually begin to realize the effects.

The effectiveness of KI pills and I-131 treatment for cancer is notable in that Government controlled facilities such as the EPA promote the prevention of such disasters and inform consumers of hazards and preventive methods to take.

References to Sources.

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