

Iodine: The Universal Nutrient

by Guy E. Abraham, MD

It is self-evident that the essential element iodine is important for normal functions of the whole human body, not just the thyroid gland. However, due to thyroid fixation, the essential element iodine is mentioned in textbooks of medicine and of the subspecialties, only in connection with the thyroid gland and the most severe deficiencies of this nutrient: extreme stupidity (cretinism), iodine-deficiency induced goiter and hypothyroidism. Many physicians would be surprised to learn that more than a hundred years ago, iodine was called "The Universal Medicine," and was used in several clinical conditions. Nobel Laureate Albert Szent Györgyi,¹ the physician who discovered Vitamin C in 1928, commented:

"When I was a medical student, iodine in the form of KI was the universal medicine. Nobody knew what it did, but it did something and did something good. We students used to sum up the situation in this little rhyme:

If ye don't know where, what, and why
Prescribe ye then K and I.

Our medical predecessors,...were keen observers and the universal application of iodide might have been not without foundation."

Recent studies on the beneficial effect of adequate intake of iodine (orthoiodosupplementation) in several clinical conditions, may prove indeed that iodine is a universal medicine, or more appropriately, a universal nutrient.²⁻¹³ Only 8 years after the discovery of iodine from seaweed by French chemist Bernard Courtois in 1811, Swiss physician J.F. Coindet who previously used successfully burnt sponge and seaweed for simple goiter, reasoned that iodine could be the active ingredient in seaweed. In 1819, he tested tincture of iodine at 250 mg/day, in 150 goiter patients with great success. He published his results in 1820.¹⁴ Coindet was the first physician to use the newly discovered element iodine in medical practice. Since then, the collective experience of a large number of clinicians from the US over the last century has resulted in the recommended daily amount of 0.1 to 0.3 ml of Lugol, containing from 12.5 to 37.5 mg elemental iodine, for iodine/iodide supplementation.^{5,15} The Lugol solution was developed by French physician, Jean Lugol in 1829 for treatment of infectious diseases using oral ingestion of his preparation.¹⁶ The Lugol solution contains 5% iodine and 10% potassium iodide in water. The range of daily intake of Lugol solution for iodine supplementation (12.5 to 37.5 mg iodine) used by our medical predecessors based on clinical observation of the patient's overall wellbeing, turned out to be the exact range of iodine needed for whole body sufficiency, based on an iodine/iodide loading test developed recently by the author.⁵ British physicians recommended a similar range of daily intake of iodine in the form of hydrogen iodide as the ranges of iodine recommended by US physicians in the form of Lugol solution. The recommended daily intake of hydriodic acid syrup was 2 to 4 ml containing 20 to 40 mg iodide.¹⁷

Before World War II, the essential element iodine was used for the treatment of hypo- and hyperthyroidism⁵ and for many other medical conditions.¹⁸ For hyperthyroidism, the daily dose ranged from 6.25 mg to 180 mg elemental iodine in the form of Lugol solution with the most common intake of 90 mg, achieving success rate as high as 90%,⁵ compared to 90% destruction rate of the thyroid gland with radioiodide used currently by thyroidologists.⁷

After an extensive review of the literature on iodine in medicine eight years ago; after becoming aware that the inorganic non-radioactive forms of iodine were extremely safe (See Table I); and were used extensively by US physicians for many medical conditions, the author initiated the Iodine Project. (For more details on the historical background of the Iodine Project, see reference 7).

Administration of iodine in liquid solution is not very accurate, may stain clothing, has an unpleasant taste and causes gastric irritation. We decided to use a precisely quantified tablet form of Lugol. To prevent gastric irritation, the iodine/iodide preparation was absorbed into a colloidal silica excipient; and to eliminate the unpleasant taste of iodine, the tablets were coated with a thin film of pharmaceutical glaze.²

The bioavailability of the Lugol tablet (Iodoral[®]) containing 12.5 mg elemental iodine, equivalent to 0.1 ml of Lugol solution, was evaluated by measuring 24 hr urine levels of iodide after administration of this preparation. Based on data available in medical textbooks, urinary iodide levels are considered the best index of iodine intake.³ Medical textbooks were wrong and up to 90% of an iodine/iodide load of 50 mg was retained prior to orthoiodosupplementation.^{5,13} After 3

Table I

Various forms of iodine/iodide used in clinical medicine and their toxicity levels (From Reference 7)

Forms	Toxicity
A) Inorganic	
1) Non-radioactive	} Extremely safe
a) iodides (i.e., SSKI)	
b) tincture of iodine	
c) Lugol Solution	
2) Radioactive iodides for diagnostic and therapeutic purposes	} Carcinogenic Cytotoxic
B) Organic	
1) Naturally occurring	} Safe within Physiological ranges
a) thyroid hormones	
b) thyroidal iodolipids	
2) Man made	} Extremely toxic
a) radiographic contrast media	
b) iodine-containing drugs (i.e., amiodarone)	



Iodine: The Universal Nutrient

► months of supplementation with 50 mg iodine/iodide/day, most non-obese subjects not exposed to excess goitrogens and with normal symporter function achieved whole body iodine sufficiency, arbitrarily defined as 90% or more of the iodine load excreted in the 24 hr urine collections.^{5,6} Adult subjects retained approximately 1.5 gm of iodine when they reach sufficiency.⁶ When whole body iodine sufficiency is achieved, the ingested iodate/iodine/iodide is quantitatively excreted as iodide in the urine.^{6,7} The mechanism involved in adjusting urinary excretion to balance intake at sufficiency is unknown.

Studies performed with a sustained release form of iodine, amiodarone, give further support for the validity of the iodine/iodide loading test. Amiodarone is a benzofuranic derivative containing 75 mg of iodine per 200 mg tablet. It is widely used for the long-term treatment of cardiac arrhythmias.¹¹ Broekhuysen et al.¹⁹ using balance studies of amiodarone and the non-amiodarone iodine released from amiodarone, reported the following: In 2 subjects treated with 300 mg of amiodarone/day containing 112.5 mg iodine, the total amount of iodine measured in urine and feces was very low during the first 3 days, with a mean of 19% and 7% of the total iodine ingested, suggesting that as much as 93% of the iodine ingested was retained in the body, or 105 mg iodine per day was retained by the patient. After 25 to 27 days of therapy with 300 mg amiodarone/day, the mean % iodine excretion of combined urine plus feces in these 2 subjects increased 48% and 75%. Therefore, after approximately one month, the percent of iodine retained by the body had decreased to 25% and 50%. No inorganic iodine/iodide was found in feces, only the organic form, amiodarone, whereas only inorganic iodide was excreted in urine.

In 2 other subjects treated with 300 mg amiodarone/day for 7 weeks, balance studies revealed that at the end of the study, the total excreted iodine in urine and feces averaged 97.4% and 96.9%. Again, only the organic form amiodarone was found in feces and only the inorganic form in urine. Based on the balance studies, the amount of iodine retained by the body following 7 weeks on amiodarone at 300 mg/day containing 112.5 mg iodine, was estimated at 1.5 gm. The authors commented: "These results suggest that iodine is retained in the body until a mechanism is triggered that adjusts the excretion of iodine to balance completely the intake."

The goal of orthiodosupplementation is not the treatment of disease, but the supply of optimal amounts of an essential nutrient for whole body sufficiency and for optimal mental and physical performances. Whole body sufficiency for iodine correlated well with overall wellbeing, and some subjects could tell when they achieved sufficiency even before knowing the results of the test. Iodine sufficiency was associated with a sense of overall wellbeing, lifting of a brain fog, feeling warmer in cold environments, increased energy, needing less sleep, achieving more in less time, experiencing regular bowel movements and improved skin complexion. Whole body iodine deficiency, based on the concept of

orthoiodosupplementation, may play an important role in several clinical conditions listed in Table II. Hundreds of physicians and other health care providers are now using the iodine loading test and implementing orthiodosupplementation in their practice, using a tablet form of Lugol (Iodoral[®]). A very good correlation between the results of the loading test and clinical response of their patients to iodine supplementation was reported.^{12,13,20} For consistency and reproducibility of results, the same Lugol tablets are used in the loading test and in the orthiodosupplementation program.

Table II
Iodine deficiency may play an important role in the following clinical disorders:

1. Subclinical hypothyroidism
2. Graves' disease
3. Autoimmune thyroiditis
4. Thyroid nodules
5. Fibrocystic Disease and Cancer of the Breast
6. Polycystic Ovary Syndrome
7. Obesity
8. Diabetes (both types)
9. Hypertension
10. Cardiac arrhythmias
11. Hormone resistance syndromes
12. Recurrent and chronic infections

We have confirmed the observation of our medical predecessors regarding the beneficial effect of orthiodosupplementation in Graves' disease, saving the patient's thyroid gland from radioiodide, goitrogens and surgery.⁵ Orthiodosupplementation decreased the need for thyroid hormones in patients on these hormones.^{2,5,12,20} In some cases, this occurred during the first months of orthiodosupplementation.^{2,5,7} However, in a patient with atrophic autoimmune thyroiditis, 11 months of orthiodosupplementation was required before decreasing the amount of thyroid hormones.⁵

Summary of Findings

Based on a review of the literature, and recent clinical research studies,²⁻¹³ the concept of orthiodosupplementation can be summarized as follows:

1. The nutrient iodine is essential for every cell of the human body requiring peripheral concentrations of inorganic iodide ranging from 10^{-6} M to 10^{-5} M. Serum inorganic iodide levels of 10^{-8} M reported in the US population are 2 to 3 orders of magnitude lower than the ideal range of 10^{-5} M to 10^{-6} M.⁶
2. In non-obese subjects without a defecting cellular transport system for iodine, these concentrations can be achieved with daily intake of 12.5 mg to 50 mg elemental iodine. The adult body retains approximately 1.5 gm iodine at sufficiency. At such time, 90% or more of the ingested iodine is excreted in the urine as iodide.^{5,7}

continued on page 88 ►

Iodine: The Universal Nutrient

3. The thyroid gland is the most efficient organ of the human body, capable of concentrating iodide by 2 orders of magnitude to reach $10^{-6}M$ iodide required for the synthesis of thyroid hormones when peripheral levels of inorganic iodide are in the $10^{-8}M$ range.

4. The thyroid gland has a protective mechanism, limiting the uptake of peripheral iodide to a maximum of 0.6 mg/day when 50 mg or more elemental iodine are ingested.⁴ This amount therefore would serve as a preventative measure against radioactive fallout.

5. Goiter and cretinism are evidence of extremely severe iodine deficiency, because the smallest intake of iodine that would prevent these conditions, that is 0.05 mg/day, is 1000 times less than the optimal intake of 50 mg elemental iodine.

6. An intake of 50 mg elemental iodine/day would achieve peripheral concentration of iodide at $10^{-5}M$, which is the concentration of iodide markedly enhancing the singlet \rightarrow triplet radiationless transition.⁵ Singlet oxygen causes oxidative damage to DNA and macromolecules predisposing to the carcinogenic effects of these reactive oxygen species.⁵ This effect of orthiodosupplementation at 50 mg iodine/day would be expected to decrease DNA damage, with an anticarcinogenic effect on every organ of the body.

7. Preliminary data so far suggest that orthiodosupplementation results in detoxification of the body from the toxic metals, aluminum, cadmium, lead and mercury.⁷

8. Orthiodosupplementation increases urinary excretion of fluoride and bromide, decreasing the iodine-inhibiting effects of these halides.⁷

9. Most patients on a daily intake ranging from 12.5 mg to 50 mg elemental iodine reported higher energy levels and greater mental clarity with 50 mg (4 tablets Iodoral[®]) daily.⁶ The amount of iodine used in patients with Fibrocystic Disease of the Breast by Ghent et al.²¹ that is 0.1 mg/Kg BW/day, is 10 times below the optimal daily intake of 50 mg. In our experience, patients with this clinical condition responded faster and more completely when ingesting 50 mg iodine/iodide/day.^{6,13}

10. For best results, orthiodosupplementation should be part of a complete nutritional program, emphasizing magnesium instead of calcium.⁵ As an example of the importance of other nutrients for optimal response to orthiodosupplementation, the administration of Vitamin C in a sustained release matrix at 3 gm/day for 3 months improved markedly a defective cellular transport system for iodine.⁸

11. A beneficial effect of orthiodosupplementation was observed in the clinical conditions listed in Table II.^{5,7,12,13}

12. The iodine/iodide loading test and serum inorganic iodide levels are reliable means of assessing whole body sufficiency for elemental iodine, for quantifying the bioavailability of the forms of iodine ingested and for assessing cellular uptake and utilization of iodine by target cells.

13. We are currently investigating the value of saliva/serum iodide ratios as a mean of assessing iodide symporter

function in whole body.⁸ Salivary glands concentrate iodide by a mechanism similar to the one involved in thyroidal iodide uptake. Several organs can concentrate and utilize iodide via oxidation and organification.⁸

14. *Orthiodosupplementation may be the safest, simplest, most effective and least expensive way to solve the healthcare crisis crippling our nation.*

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