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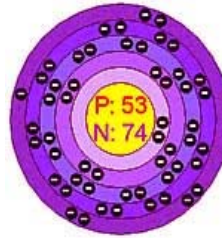
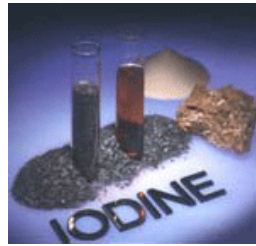
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# The Forgotten Iodine



*Trace Nutrient, Natural Antibiotic, Stimulant, Deobstruent, Expectorant, Disinfectant*

Only a little over two centuries ago, man struggled to discover the value of fresh fruit, vegetables, and vitamin C. The first attempt to give scientific basis for the cause of scurvy was by a ship's surgeon in the British Royal Navy, James Lind.



While at sea in May 1747, Lind provided some crew members with two oranges and one lemon per day, in addition to normal rations, while others continued on cider, vinegar or sea water, along with their normal rations. In the history of science this is considered to be the first example of a controlled experiment comparing results on two populations of a dietary factor applied to one group only with all other factors the same. The results conclusively showed that citrus fruits prevented the disease. Lind wrote up his work and published it in 1753, in *Treatise on the Scurvy*.

It was 1795, some forty years later, the life expectancy for many at that time, before the British navy adopted lemons or lime as standard issue at sea. This practice led to the nickname *limey* for British sailors. Captain James Cook had previously demonstrated and proven the principle of the advantages of fresh and preserved foods, such as sauerkraut, by taking his crews to the Hawaiian islands and beyond without losing any of his men to scurvy, that is debility, spongy gums, and hemorrhages into the skin and mucous membranes. One can well imagine the status of a sailor's arse [hemorrhoid] in a case of scurvy, would be of equal concern as it was for Napoleon when he could not ride his horse into Russia for the pain he experienced for the status of his rump. [1]

The name "antiscorbutic" was used in the eighteenth and nineteenth centuries as general term for those foods known to prevent scurvy, even though there was no biochemical understanding. These foods include lemons, limes, and oranges; sauerkraut, salted cabbage, malt, and portable broth which were employed with variable effect. While most discovered vitamins are a group of organic substances, present in minute amounts in natural foodstuffs, that are essential to normal metabolism are nitrogenous based, ascorbic acid is a pure carbohydrate. Cobalamin is the general term for compounds containing the dimethylbenzimidazolylcobamide nucleus of vitamin B12 containing the trace element cobalt.

With iodine, the medical world has struggled to understand a trace mineral, readily available in nature, yet has not reached the commercial awareness as vitamin C, scurvy, and the common cold. In 1811 when Bernard Courtois (1777-1838) discovered iodine, he was not searching for a way to heal his fellow humans. On the contrary; he was looking for a way to kill his fellow humans. Napoleon's army at the time required huge quantities of gunpowder and supplies were running short. Saltpeter (potassium nitrate—KNO<sub>3</sub>) is a major component in gunpowder and requires an abundant source of sodium

## A History of Lugol's Iodine

It was first developed by the French physician, Jean Lugol, in 1829. It is a transparent brown liquid consisting of 10 parts potassium iodide (KI) to 5 parts iodine to 85 parts of

carbonate to be manufactured. Sodium carbonate is extracted from wood ashes, but the war had gone on so long that they had run out of willow wood, the preferred source. Someone suggested using dried seaweed burnt to ash. In the process of making saltpeter, excess sulfur compounds were created and they had to add sulfuric acid to the mixture to get rid of the sulphur. Courtois accidentally added a bit too much acid one day, and a violet vapor cloud appeared and condensed onto the colder, metal objects and formed lustrous, purple crystals. Courtois, a working chemist, realized he'd created something new. However, it would be two years later that the English chemist, Sir Humphrey Davy, realized it was a halogen and named it *iodine*. Later, French physician, Jean Lugol discovered that bonding iodine to a mineral (potassium) made it water soluble, and allowed for the later discovery of iodine's antiseptic qualities. Iodine naturally dissolves in alcohol, but not in water until it is first bonded to the elements potassium or chlorine.

(distilled) water. It is an effective bactericide and fungicide and, in fact, was, for the better part of a century, a common antiseptic - (though it has laboratory uses separate and apart from any medical application). Lugol's and similar iodine solutions probably fell out of favor in the last half of the 20th century due to combination of economics and esthetics: first, it is so cheap to make that it cannot compare to "cleaner," value-added antiseptics with more marketing muscle; and secondly, it will stain clothes and will even temporarily stain skin when used topically to treat a wound. The internal applications of various iodine solutions have been published and discussed for well over a century.

Eight years after the purple haze discovery by Courtois, Swiss physician J.F. Coindet who previously showed successfully that giving burnt sponge and seaweed for reducing simple goiter, reasoned that iodine could be the active ingredient in seaweed. [2] In 1819, he tested *tincture of iodine* at 250 mg per day, [labeled as a *poison* on bottles of tincture iodine today], an excessive amount by today's minimum daily requirement of 150 mcg (0.15 mg) per day. Of 150 goiter patients with goiter, he had great success. He published his results in 1820. Coindet was the first physician to use the newly discovered element iodine in medical practice. In 19th Century Europe, potassium iodide (KI) was used empirically for a wide range of medical conditions. [3] Shortly thereafter, it would be one of the most frequently prescribed *drugs* of medical physicians, which led to the aphorism - "If ye don't know where, what, and why, prescribe ye then K and I."

In 1932, Bernard Cohn, M.D. wrote: "...the widespread use of compound solution of iodine, U.S.P., is the result of a paper by Plummer and Boothby, published in that year (1923). Since then compound solution of iodine has been used by nearly every clinician ..." [6]

According to Hungarian Nobel Laureate Szent-Györgyi, KI was the universal medicine in Europe during the late 1800's and early 1900's. Szent-Györgyi himself ingested 1 gm of KI [potassium iodide] daily to keep himself fit. [12]

Deficiency diseases, both glandular and dietary, were but dimly understood in those days. Proper diagnosis and effective treatment of goitre, diabetes, and the various vitamin deficiencies belong to the twentieth century, as is true with allergies, many of which must also have imitated the early symptoms of acute diseases. Thousands of sufferers from eczema, hives, pellagra, beriberi or asthma not only were given superficial relief, but were ignorant of the nature of their maladies.

Cretinism, a severe mental retardation due to congenitally under-active thyroid, derived from *creta* (eraie)—a sallow or yellow-earthy complexion, being a mark of cretinism. The condition was known to be commonest when born far away from the sea as seawater contains iodine. It was commonest in Switzerland and in the UK mainly in the midlands at Lancashire, Yorkshire and Derbyshire dales. Indeed an acquired form of under-active thyroid disease due to dietary deficiency of iodine and causing swelling of the thyroid (or goitre) is often known as *Derbyshire neck* was well recorded. [4] Wherever endemic goitre is present, endemic cretinism is present also, and it has been constantly observed that when a new family moves into a goitrous district, goitre appears in the first generation, cretinism in the second. Cretinism usually remains unrecognized until the child reaches some eighteen months or two years, when its lack of mental development and awkward bodily form begin to attract attention. Occasionally the child appears to be normal in infancy, but the cretinoid condition develops later, anytime of up to puberty. The essential point in the morbid anatomy of these cases is the absence or abnormal condition of the thyroid gland.



### Derbyshire neck

There is one disease," wrote James Pilkington in 1789, "to which the inhabitants of Derbyshire are so much subject, that it has taken its name from its great prevalence in this situation."

Derbyshire Neck, also called Goitre, is a swelling of the thyroid gland and is now known to be caused by lack of iodine. It is almost unknown today because iodine is added to drinking water. In the eighteenth century no-one knew for sure what caused it. Some thought it was hereditary in particular families, others that it was caused by living "on the bleak sides of hills." They all agreed that women, particularly "child-bearing poor women" were the main victims of "this very unfortunate female disease."

### Cretinism

Mental retardation due to congenital under-activity or absence of the thyroid gland

The **condition** is commonest when born far away from the sea, as seawater contains iodine, which is essential for the thyroid gland to work. Therefore, it is commonest in the Swiss valleys in mainland Europe and in the U.K. mainly in the Lancashire, Yorkshire and Derbyshire dales. Indeed an acquired form of under-active thyroid disease due to dietary deficiency of iodine and causing swelling of the thyroid (or goitre) is often known as Derbyshire neck

Cretins have a characteristic face that is pale and puffy, the hair is coarse (like horse hair) and the tongue protrude. The subjects of this disease seldom reach five feet in height, and usually not more than four. The word cretin is derived from the Latin creatura. They are found all over the world. In Switzerland it is estimated that in some cantons there is one cretin to every 25 inhabitants. In Styria, the Tyrol, and along the Rhine cretins are quite common, and not long since cases existed in Derbyshire.



## Iodine, forgotten nutrient

Iodine (from the Gr. Iodes, meaning "violet"), is a chemical element in the periodic table that has the symbol I and atomic number 53. It is required as a trace element for most living organisms. Chemically, iodine is the least reactive of the halogens, and the most electropositive halogen. Lack of iodine is the cause of goitre (Derbyshire neck). Historically underactive thyroids were common in Derbyshire causing people to develop a neck 'goitre' (swollen thyroid) - termed 'Derbyshire neck' - because their diets were deficient in iodine. It is assimilated by seaweeds from which it may be recovered, and is found in Chilean saltpetre, caliche, old salt brines, and salt wells.

In areas where there is little iodine in the diet—typically remote inland areas and semi-arid equatorial climates where no marine foods are eaten—iodine deficiency gives rise to goiter, so called endemic goiter. In some such areas, this is now combatted by the addition of small amounts of iodine to table salt in form of sodium iodide, potassium iodide, potassium iodate—this product is known as iodized salt. Iodine deficiency is the leading cause of preventable mental retardation. Iodine deficiency remains a serious problem that affects people around the globe. [5]

After the discovery of thyroid hormones and their clinical applications in the 1930's, medical textbooks started promoting the idea that the only role of iodine as an essential element was in the synthesis of thyroid hormones. Thyroid fixation resulted in endocrinologists, not nutritionists, dictating the human need for this nutrient, which was defined as the minimum amount of iodine needed for synthesis of thyroid hormones, that is, 200 ug/day. [7] The RDA for iodine was established based on data supplied by endocrinologists regarding the minimum amount of iodine needed for synthesis of thyroid hormones. [8] No attempt was apparently made to assess the optimal daily requirement of iodine for whole body sufficiency and nutrition, yet many medical doctors used it very successfully and wrote about it, like Dr. D. C. Jarvis [9] and Dr. Max Gerson [10].

You will ask, "How can such a cancerous tumor go down?" That was a difficult question for me to understand. I had learned in my treatment of tuberculosis patients that I had to add potassium, iodine, and liver injections to help the liver and the whole body to restore the potassium. Now as far as I can see this is the situation. At first we give the patient the most salt-free diet possible. So, as much salt (sodium) is removed from the body as can be. During the first days, 3 grams, 5 grams, up to 8 grams a day of sodium are eliminated while the patients receive only about one half gram of sodium content in the diet and no sodium is added." *Lecture given by Dr. Gerson in Escondido, California, in 1956*

## **Far away from the sea, evolutionary understandings**

Being born far away from the sea was an early observation of goiter and cretinism. And is it here that this clue was left for the clueless. The prevalence of endemic goitre and endemic cretinism is closely related to geological conditions. As a rule, endemicity is prominent in mountainous areas, but serious endemic foci have also been found on sedimentary plains. *Goitre is usually prevalent in places far away from the sea.*

Humans (as well as any other species), are adapted by evolution to live in particular environments. In other words, we thrive best under conditions with a particular combination of environmental factors, including social and nutritional factors. There are many differences between the Stone Age environment to which we are adapted and the industrialized environment in which we live today. While many of these differences have a positive impact on health and quality of life, like creature comforts, many also have a negative impact, like obesity, diabetes, and cardiovascular disease.

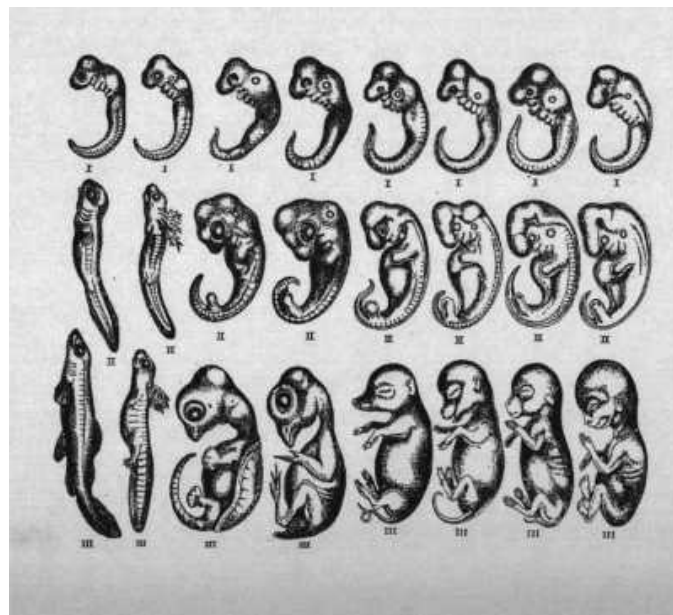
The story of iodine deficiency takes us to the work's and observations of early biologists. Until quite recently the notion was universally entertained that human beings were, in many respects, quite different from all other beings, forming, as it were, a world by themselves. This notion is even now very generally held by those not versed in natural science, and is often put forward by those who are considered teachers of people. The fact is, however, as all observation proves, that man is, in all respects, like other animals. His body is composed of the same elements, he has the same organs, acting in the same way, the same or similar nutritional needs, and only different in his mental faculties, the cortical factors far more fully developed. In short, man is a part of the animal world, and not something separate and distinct from it, save for his brain.

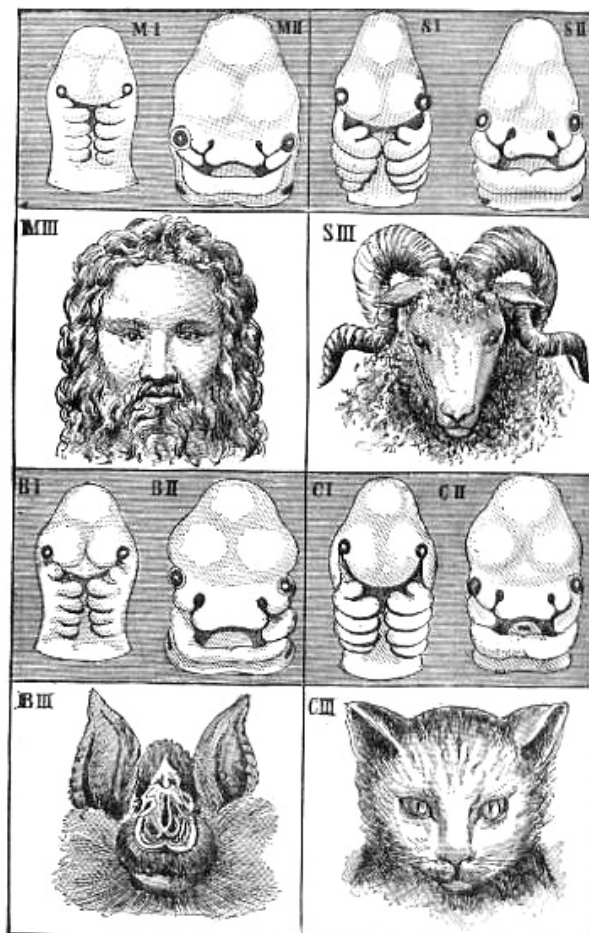
Evolution, then, teaches us that not only have all organic forms been derived from pre-existing and simpler ones, but also all our social organizations, our corporeal impulses, and our nutritional needs. It teaches us, also, that all the various departments of knowledge have not only developed individually in this way; but that they have also developed conjointly, as a whole. No one science ever did or could originate and perfect itself, standing alone, but each one contributes upon every other one, and develops only as that does, so that knowledge advances as a whole by separate steps. At this stage in our evolution we are able to appreciate many branches of science, not only biology, but also paleontology, geology, genetics, chemistry and physics.

The whole universe, according to physics, is one in every department, and the same laws rule, from the atom to the mountain, and from molecular motion to thought. Everything that is, is connected with everything else, and there is nothing that exists or acts alone. Quantum physics teaches us this postulate, but it was first proposed by Paracelsus.

The timeline of human evolution outlines the major events in the development of our species and the evolution of our ancestors. Human evolution is the process of change and development by which human beings emerged as a distinct species from a former species. It is the subject of a broad scientific inquiry that seeks to understand and describe how this change and development occurred. The study of human evolution encompasses many scientific disciplines, most notably physical anthropology and genetics.

When we study the development of animals from the primary germs, or eggs, we observe that they all begin the same as an egg, but some progress farther than others in differentiation. Darwin in particular showed that through evolution it was possible for one species to be transformed into another species. [Ernst Haeckel](#) first gave us an evolutionary viewpoint from observations in embryology. With the evolution of life, at a certain stage, came the development of animals with a nervous system, and eventually human beings with a large brain. Some embryos stop at one stage of development, and others at another, and each one on reaching its limit having gone through all the stages below that limit. Thus, taking the most perfectly organized being in either type, and tracing its embryonic growth, from the primary germ upward, we find that it has gone through every stage, first as germ, then as fish, then as amphibian, and finally through mammals. The embryo goes through stages of its growth, like every one of the lower animals of its type.





*Embryonic Development of the Face, in a Man, a Cat, and a Bat.*

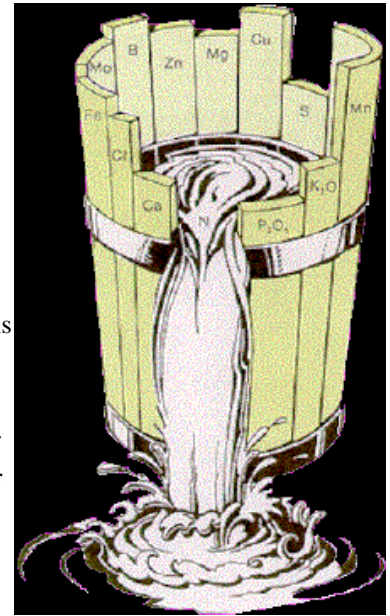
This is the case with man, the most neurologically perfected of all the vertebrates. He starts embryonically the same as all the rest below him; but the other mammals stop at various inferior stages, while man/woman passes on. Thus the human embryo, after it has passed the simpler stages, from the germ, resembles (microscopically) first a fish, then it becomes like one of the amphibia, and, still progressing, it next becomes a reptile, then a bird, and finally a true mammifer. Thus men may be said to be a true epitome of his type, or to comprise it wholly in himself in the course of his foetal development. We can comprehend from this how different beings have originated from those below them, by the gradual evolution of new organs for special purposes. In one sense all animals are the same. They are all, when primary germs, alike in many respects save that other chromosomes, but some develop farther than others. Fundamentally it is thus a evolutionary process.

The beginnings of human culture reach back about a half a million years ago. The first men as we have learned were meat eating hunters that lived in tropical grasslands. For thousands of years man threw whole animals into his fires where the skin burst, and he cracked skulls with stones to eat the brain and marrow. Towards the end of this paleolithic age and into the mesolithic stage, man was collecting grains of wild grasses, pounding them into flour and making a watery paste into bread. In the Indus valley, man learned to cultivate rice. Once the principles of seeding, transplanted, and harvesting were mastered, man moved to a mixed dietary, and moved to the harvesting of carbohydrates. This knowledge spread rapidly from a historical view, and forever changed man's dietary. Iodine in general diets comes mainly from animal-derived foods just as does cobalamin. As to be expected, with migrations and settlements, dietary elements would be diverse.

The rapid evolution of man, and the apparent rapid cortical development in terms of evolution, allowed him to migrate and adapt to many different geological locations. In thousands of millions of years of animal evolution, paleolithic man is the first instance of survival depending on fire, tools, agriculture and housing, rather than on biological adaptations to the environment like other animals. Man learned to make the environment adapt to him, rather than adapting to an abrupt change of his environment by migration. However, the nutritional needs for his body remained essentially the same. Cortical development has far out paced corporeal and glandular development. For as we see with cretinism, a withdrawal of iodine during fetal development has disastrous cortical effects, just as does folate in spina bifida.

Our biology dictates that we emerged from marine life. In adult humans the body content of iodine is between 20 and 50 milligrams. Most of this trace element is concentrated in the thyroid gland, but it is also found in the liver which can concentrate iodine. All vertebrates require iodine and possess a similar gland or tissue somewhere in their bodies. Dietary iodine is rapidly absorbed by the intestinal tract, chiefly as iodide, and is then transported by the blood to the thyroid gland. There iodide is oxidized to iodine and combined with the amino acid tyrosine to produce mono- and di-iodotyrosines. Further conversion, which results in the formation of the hormones thyroxine ( $T^4$ ) and triiodothyronine ( $T^3$ ), takes place in the epithelial cells of this gland. Both hormones are essential for human health and are involved in brain development, growth, and metabolism. Mentality, speech, and the condition of the teeth, skin, hair, and nails are all dependent on a thyroid gland that functions well [24].

Justus von Liebig, generally credited with being the "Father of the Fertilizer Industry", propounded the "Law of the Minimum" which states that if one crop of the nutritive elements is deficient or lacking, plant growth will be poor even when all the other elements are abundant. Any deficiency of a nutrient, no matter how small an amount is needed, will hold back plant development. If the deficient element is supplied, growth will be increased up to the point where the supply of that element is no longer the limiting factor. Increasing the supply beyond this point is not helpful, as some other element would then be in a minimum supply and become the limiting factor.



The yield potential of a crop is like a barrel with staves of unequal length. The capacity of the barrel is limited by the length of the shortest stave (in this case, nitrogen), and can only be increased by lengthening that stave. When that stave is lengthened, another one becomes the limiting factor.

In the case of the thyroid, there is no question iodine is the limiting factor. If withdrawn, the gland swells into hyperplasia. Not only is iodine essential for the production of triiodothyronine, selenium is as well, and thus another stave in the body's requirements. Researchers from the Hahn-Meitner Institute in Berlin first discovered that selenium plays a key role in deiodinase, an enzyme required to catalyze the conversion of thyroxine to triiodothyronine. When a selenium deficiency is present, deiodinase levels are depressed, and so too is the production of triiodothyronine .

### Chemistry of Iodine

Iodine is a basic element, as are calcium, zinc, oxygen and other elements. The word "iodine" usually refers to two iodine molecules chemically "bonded together" (I<sub>2</sub>), just as the word "oxygen" usually refers to two oxygen molecules "stuck together" (O<sub>2</sub>). Since iodine is more reactive, and therefore more likely to cause problems, iodine is usually used as "iodide", a word which refers to one iodine molecule combined with another molecule such as potassium (KI) or sodium (NaI, as in *iodized salt*). Iodide is the negative ion of iodine. In chemical terms, such molecules are called "salts"; the best known salt is sodium chloride (NaCl), a "salt" of chlorine (Cl<sub>2</sub>).

The chemistry of iodine is relatively complex since it can exist in a number of valence states, it is chemically reactive and forms various inorganic and organic compounds. [11] In the atmosphere, iodine is derived largely from seawater. Iodine concentrations have been reported to range from 3 ng/m<sup>3</sup> to 50 ng/m<sup>3</sup> with an average global concentration estimated to be about 10-20 ng/m<sup>3</sup>. Based on this latter estimate, the daily iodine intake from air would be less than 0.4 µg/person and air is therefore not considered a significant source of iodine.

The iodine present in the upper crust of earth is leached by glaciation and repeated flooding and is carried to the sea. Sea water is, therefore, a rich source of iodine. About 1/3 of iodine found in seawater is composed of iodide eventually oxidised to iodate by organic matter. Iodide is mostly found above a depth of approximately 500'. Iodine in the ocean takes a wide variety of forms, both organic and inorganic, and the iodine cycles between these various compounds are very complex and are still an active area of research. The nature of inorganic iodine in the oceans has been generally known for decades. The two predominate forms are iodate (IO<sub>3</sub><sup>-</sup>, with the central iodine and three attached oxygen atoms) and iodide (I<sup>-</sup>). Together these two iodine species usually add up to about 0.06 ppm total iodine (~0.5 mM), but the reported values vary over about a factor of 2. In surface seawater, iodate usually is the dominant form with typical iodate values in the 0.04 to 0.06 ppm iodine (0.3 – 0.5 mM). Likewise, iodide is usually present at lower concentrations, typically 0.01 to 0.02 ppm iodine (0.07 – 0.18 mM). Organic forms of iodine are any in which the iodine atom is covalently attached to a carbon atom, such as methyl iodide, CH<sub>3</sub>I. All of these various forms can be interconverted in the oceans. Phytoplankton, for example, take up iodate and convert it into iodide, which is mostly, but not completely, released. Iodate is also converted to iodide by bacteria in low oxygen environments of the oceans.

### Who uses iodine: Algae

The presence of large quantities of iodine in various species of marine algae has been known for nearly 100 years. Plankton, micro/macroalgae, bacteria, fish, coralline algae, anemones, sponges and other invertebrates utilise iodine, existing in natural seawater mostly as iodide and iodate. Some species can contain almost 1% iodine (100,000 ppm) by dry weight. Iodine is concentrated considerably by all macroalgae, including the Rhodophyta (red algae), Phaetophyta (kelp and other brown algae) and the Chlorophyta (green algae). There are, however, great species differences in the amount of iodine contained in the macroalgae tissue. [22, 23] Japanese consume 4.6 grams of seaweed per day and continue to be amongst the world's healthiest peoples.

### The RDA

Drs Steve Hickey and Hilary Roberts have for a limited time made their new book: "[Ridiculous Dietary Allowance](#)" free (until Jan. 15th 2005) so more people can read it and understand what a travesty the RDA limits are. In the pretense of improving our health these guidelines actually hinder it.

The same rationale for iodine was used for the RDA of vitamin C; that is the daily, miniscule amount that prevents your teeth from falling out (scurvy). The RDA for iodine was established based on data supplied by

endocrinologists regarding the minimum amount of iodine needed for synthesis of thyroid hormones. Based on research performed by other investigators on animals who can synthesize vitamin C, Linus Pauling suggested that the optimal intake of vitamin C for humans was around 100 fold the RDA. Pauling was ridiculed by physicians for attacking the sacred cow, the RDA. He consulted with his friend, the discoverer of vitamin C, A. Szent-Györgyi. This is an excerpt from Szent-Györgyi's reply:

“...the medical profession said that if you don't get scurvy you are all right. I think that is a very grave error. Scurvy is not the first sign of the deficiency but a premortal syndrome.”

(Szent-Györgyi, To Pauling, 1966)

Based on a review of the literature, Dr. Abraham's research group have calculated that a daily intake of 6 mg iodide would be required for sufficiency of the thyroid gland alone, without considering the rest of the human body. (Abraham et al, Orig. Int., 9:30-41, 2002)

The medical use of Iodine and iodides has more than a 100 year history. Rural Medicine Editor of Medical World, Dr. DeForest Clinton Jarvis, born in 1881, a member of the Academy of Ophthalmology and Otolaryngology, the American Medical Association and other leading medical societies of the time was a great user and advocate of Lugol's solution. His interest in the folk medicine of Vermont began soon after the start of his medical practice. To counter the effects of iodine loss, Dr. Jarvis recommended various methods including: (1) Eating foods rich in iodine: food from the ocean, radishes, asparagus, carrots, tomatoes, spinach, rhubarb, potatoes, peas, strawberries, mushrooms, lettuce, bananas, cabbage, egg yolk, and onions; (2) Painting a small area of the body with tincture of iodine; and (3) taking preparations known to be rich in iodine, including cod liver oil, kelp tablets ...

But he was particularly keen on the power of Lugol's iodine, for treating various illnesses, including colds and flu, and for countering the effects of stress: "Supposing you do follow the suggestions outlined above and find that some weeks the pressures of your private and your business life are causing you to lose the ability to bounce back. Then you should add a drop of Lugol's solution of iodine to your glass of apple or grape juice at breakfast, or you may take it in the mixture of apple cider vinegar and water. The point is that the potassium in the solution (Lugol's is 5% potassium iodine) blocks off the body mechanism that organizes for aggressive action, releasing its hold on the body when opportunity for rest and relaxation arises. The iodine swings into action the body and the building up and storing of body reserves. When working under pressure, include the Lugol's solution dose each day until the period of pressure passes. If it should happen that your body becomes saturated with iodine, you will find that there is an increase of moisture in the nose. If this occurs, omit the iodine until the nose is normal."

" I believe the doctor of the future will be a teacher as well as a physician.  
His real job will be to teach people how to be healthy."

"All the old remedies do not do any harm if they do not do any good  
which means they are safe remedies to take." Dr. D.C. Jarvis

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## The many uses of Iodine

**1. Germicide:** Elemental iodine is a potent germicide with wide spectrum and low tissue toxicity. A solution of 50 ppm (eg, 50 mg/L) kills bacteria in 1 min and bacterial spores in 15 min. Topically, Iodine is excellent for toenail fungus, ringworm, fever blisters, moles and skin tags, warts, hangnails, etc. Just a few drops on a q-tip is all it takes. Use daily until the topical gaffes are gone.

**2. Water purification:** Iodine has been used to disinfect water for nearly a century. It has advantages over chlorine in convenience and probably efficacy; many travellers find the taste less offensive as well. It appears safe for short and intermediate length use (3-6 months), but questions remain about its safety in long-term usage. It should not be used for a long term by persons with allergy to iodine, persons with active thyroid disease, or pregnant women.

A retired Indian physician used of SSKI during more than 30 years traveling from village to village in rural Africa. Most usually, the only drinking water available was from a local stream or river, muddy and contaminated. After removing sediment and debris by straining the dirty water through cheesecloth, he'd add several drops of SSKI, and wait two to three minutes. He and his team could then drink the water. In over 30 years, he never got an infection from contaminated water. The SSKI killed any micro-organisms present.

Note that Iodine and other halogens appear to be relatively ineffective at killing cyclospora, a troublesome diarrhea-causing bacteria seen in Nepal only in the late Spring and Summer months. At these times it may be reasonable to pre-filter water to remove the large cyclospora (about the size of Giardia cysts), and then treating with iodine.

Iodine Preparations		
Preparation	Iodine	Amount/Liter

Iodine Topical Solution	2%	8 drops
Iodine Tincture	2%	8 drops
Lugol's Solution	5%	4 drops
Povidone-Iodine (Betadine®)	10%	4 drops
Tetraglycine hydroperiodide (Globaline®, Potable Aqua®, EDWGT®)	8 mg	1 tablet

<b>Disinfecting Contact Times</b>		
<b>WATER CLARITY</b>	<b>WATER TEMPERATURE</b>	
	<b>5 °C</b>	<b>15 °C</b>
Clear	30 min	15 min
Cloudy	60 min	30 min

<b>Iodine Preparations</b>		
<b>Preparation</b>	<b>Iodine</b>	<b>Amount/Liter</b>
Iodine Topical Solution	2%	8 drops
Iodine Tincture	2%	8 drops
Lugol's Solution	5%	4 drops
Povidone-Iodine (Betadine®)	10%	4 drops
Tetraglycine hydroperiodide (Globaline®, Potable Aqua®, EDWGT®)	8 mg	1 tablet

<b>Disinfecting Contact Times</b>		
<b>WATER CLARITY</b>	<b>WATER TEMPERATURE</b>	
	<b>5 °C</b>	<b>15 °C</b>
Clear	30 min	15 min
Cloudy	60 min	30 min

**NOTES:**

- final drinking concentrations calculated at 8 mg iodine/liter
- measure with a tuberculin syringe or dropper: 1 drop = 0.05 ml
- In general, if you are in a hurry double the chemical dose and halve the contact time; if you want better flavor halve the dose and double the contact time.
- If you believe the water may be heavily contaminated, double the chemical dose or double the contact time.
- Iodine Topical Solution and Iodine Tincture also contain 2.4% sodium iodide, Lugol's Solution also contains 10% potassium iodide, increasing the dose of iodine ingested.
- Povidone is a non-toxic polymer that binds the iodine and allows higher concentrations in a water-based solution. This complex system provides a sustained-release reservoir of free iodine, and makes calculation of the "strength" of the solution difficult.
- A system comprising iodine crystals in plain water is available, and works well. It lasts an extremely long time. I have not shown it here because the amount of iodine dissolved in the water is highly temperature-dependent, and this is problematic in the universally cold environment of the Himalaya.
- Addition of a small amount of vitamin C (50 mg) to your water after the contact time with the iodine will render the water nearly flavorless!

**3. Radioactive Fallout:** There is no medicine that will effectively prevent nuclear radiations from damaging the human body cells that they strike. However, a salt of the elements potassium and iodine, taken orally even in very small quantities 1/2 hour to 1 day before radioactive iodines are swallowed or inhaled, prevents about 99% of the damage to the thyroid gland that otherwise would result. The thyroid gland readily absorbs both non-radioactive and radioactive iodine, and normally it retains much of this element in either or both forms.

When ordinary, non-radioactive iodine is made available in the blood for absorption by the thyroid gland before any radioactive iodine is made available, the gland will absorb and retain so much that it becomes saturated with non-radioactive iodine. When saturated, the thyroid can absorb only about 1% as much additional iodine, including radioactive forms that later may become available in the blood: then it is said to be blocked. (Excess iodine in the blood is rapidly eliminated by the action of the kidneys.)

**4. Fibrocystic Breasts:** Many women develop "fibrocystic breast disease". In the 1970s, pioneering trace element researcher Dr. John Myers showed that iodine would eliminate even the most severe cases of fibrocystic breast disease. In "medium" to "minor" cases, 6 to 8 drops of SSKI or Lugol's taken in a few ounces of water daily will frequently reduce fibrocystic breast disease to insignificance within three to six months. [16]

**5. Herpes virus:** If the truth be known, there are many chemicals that destroy or inactivate the herpes simplex virus. Iodine is a very common antiviral, antibacterial, antifungal agent for topical use. A bit of a water soluble iodine complex like Povidone Iodine (Betadine iodine) might be added to the "zinc gluconate" wash to help in the struggle against herpes. Tincture of iodine is also used, but it is in alcohol, which may sting tender tissues. Iodine stains the skin and clothing, and it is absorbed into the skin where it has its activity. An iodine-colored zinc gluconate wash might be helpful in reminding one to retreat. Iodine disappears into the skin at rates that are different between people. For example, in a very small 1975 study patients with vulvovaginal and cervical herpes virus infections were treated with a regimen of external and intravaginal povidone-iodine preparations. In all but one case, the expected duration of symptoms and healing time were shortened.

**7. Ophthalmia neonatorum prevention.** "Ophthalmia neonatorum" is defined as conjunctivitis with eye discharge that occurs during the first month of life. Various bacteria can cause this condition, including gonococcus and Chlamydia trachomatis. Several agents have been used as drops in the eyes to prevent this condition in infants, including erythromycin, silver nitrate, gentamicin, and Povidone-iodine. Tetracycline and penicillin drops have also been used. Although this condition is now uncommon in industrialized nations, it remains a problem in the developing world with an incidence as high as 20-30% and cases of blindness reported in Africa each year. Povidone-iodine ophthalmic solution appears to have broad spectrum activity against bacteria, and is less expensive than many antibiotics. It therefore may be a cost-effective option in some populations. One drop of 2.5% solution in each eye has been demonstrated as being effective in multiple studies.

**8. Molluscum contagiosum:** Iodine has been suggested as a topical treatment for molluscum.

**9. Ovarian cysts:** It's very likely that SSKI helps eliminate fibrocystic breast disease and ovarian cysts at least partly through its interaction with estrogens...which brings us to another important use for SSKI (and other forms of iodine such as "Lugol's solution" and "di-atomic iodine"). All of these forms of iodine help your body to metabolize estrone (a slightly carcinogenic human estrogen) and 16-alpha-hydroxyestrone (a much more dangerous metabolite of human estrogen) into estriol, an "anti-carcinogenic" or at worst "neutral" form of human estrogen.

**10. Dupuytren's contracture and Peyronie's disease** are two "fibrotic" conditions that can be helped considerably by SSKI or Lugol's solution. In Dupuytren's contracture, thickening (fibrosis) occurs along one of the tendons in the palm in the hand, pulling the related finger down towards the palm. As the problem progresses, the finger often can't be straightened any more.

In Peyronie's disease, a very similar thickening occurs along the shaft of the penis, making erections increasing "curved" and painful. In both cases, rubbing SSKI into the thickened tissue at least twice daily softens and lessens the fibrotic area over a period of several months, allowing for more normal function.

For these conditions, it's additionally helpful to take para-aminobenzoic acid (PABA) 2 grams, three times daily, and to rub a mixture of Vitamin E and DMSO into the thickened areas, also. However, if "caught early", SSKI alone will often "do the job".

**11. Keloids** are abnormally thick scars, sometimes as much as an inch thick, that can form after injury. Although anyone can get a keloid, they're more common among blacks than other ethnic groups. Rubbing SSKI into a keloid at least twice daily will ultimately flatten them down to a "normal scar", but it can take many months to a year for particularly bad ones. The treatment goes faster if SSKI or Lugol's is mixed "50-50" with DMSO.

**12. Fistulas** are literally abnormal tunnels through tissues, "tunnels" prevented from healing by chronic infection. Two not-unusual types are "peri-anal fistulas" (a "tunnel" from outside the anus to the inside of the rectum) and "recto-vaginal" fistulas. Although these fistulas can be treated successfully by surgery, they can often be healed by frequent swabbing inside and out with an SSKI-soaked "Q-tip". Patience is required: Complete healing often takes several months. The treatment appears to work better if the SSKI is mixed with DMSO, which enhances penetration.

**13. Hemorrhoids.** Richard Kunin, M.D. of San Francisco, is a "world class" expert on the use of SSKI and other forms of iodine. He has found that hemorrhoids will sometimes disappear literally overnight, when SSKI (20 drops) mixed with flaxseed oil (1 ounce) is rubbed in them at bedtime. He's also found that SSKI alone will do the same job, although it "really stings" when applied to a hemorrhoid by itself.

**14. Arteriosclerosis.** Over 30 years ago, two ophthalmologists observed that a combination tablet called "Iodo-niacin" (iodide 120 milligrams, niacin 15 milligrams) taken for several months could actually reverse

atherosclerotic clogging of arteries. They proved this effect by taking pictures of clogged arteries in the backs of the eyes (retinal photomicrographs) before and after treatment. The published photographs showed a significant lessening of the cholesterol-laden artery clogging in the "after" pictures. [14] True to cause, no follow-up study has ever been published (probably because niacin and iodide aren't patentable). Recommended is 1 to 2 drops of SSKI or Lugol's and niacin-containing B-complex daily (along with essential fatty acids or fish oil) for anyone with significant cholesterol-related atherosclerotic clogging. Thyroid function must be monitored!

15. **Sebaceous cysts** are cysts which contain oily, fatty material. They usually appear rather suddenly on the face or in the groin or labia. Rubbing in SSKI mixed 50-50 with DMSO will almost always persuade these cysts to go away in a week or two; it appears that the iodide "dissolves" the fatty, oily material contained in the cysts, allowing your body to slowly re-absorb and dispose of it. The famous chemistry professor Louis Feiser made a point of demonstrating to all the medical students that iodine and iodide would make oils, fats, and waxes (cholesterol is actually a wax) more soluble in water. This known action of iodide might likely explain why it might be needed in patients with lipomas.

16. **Sialoliths, parotid duct stone.** These are "stones" which can form in the saliva-carrying duct(s) from the major salivary glands ("parotid" glands, located at the "angle of the jaw"). 3 to 4 drops of SSKI taken in water daily reportedly will almost always dissolve parotid duct stones within four to eight months.

17. **Chronic bronchitis and emphysema ("COPD").** Lugol's is an invaluable medicine, it gets into all body secretions, including often thick and hard to cough up bronchial secretions, which get infected very easily. As a well known and old time expectorant, it "loosens" secretions remarkably, making them much easier to expectorate, and it prevents micro-organisms from growing easily. With regular use, bronchial infection is a much less frequent problem for these patients. Depending on the severity of COPD, I recommend 3 to 6 drops of Lugol's taken in water once daily. As COPD is usually a chronic condition, use will usually be indefinite, so make sure to monitor thyroid function!

18. **Infected hangnails** are perhaps the easiest to clear up this way, as are nagging bacterial infections around the edges of the toenails. Rub in the mixture several times daily, and the problem's usually gone in a few days. Herpes simplex ("herpes") outbreaks can be "stopped cold" in the same way, but it often takes longer for the "sore" to heal itself over.

19. **Enlarged tonsils.** Persistent "swollen glands" in the throat or groin areas, see a doctor first! These can very rarely be signs of leukemia, lymphoma, or another cancer, especially in older people. But if all tests and studies are negative, rub in the SSKI with DMSO. In a large majority of cases, the "just swollen glands" will gradually fade away.

20. **Onychomycosis.** Fungus under the toenails is a difficult problem to treat. Even "conventional" anti-fungal drug treatment takes months to work, and (for safety) monthly liver function tests are necessary. Lugol's or Tincture of Iodine and DMSO rubbed on, around, and under the affected toenails doesn't work any faster, but it's just as effective, and definitely safer.

21. **Vaginal infections.** 20 to 30 drops in water, used in a small "douche" once daily for five to ten days will usually resolve the infection in several days.

22. **Bladder Infections.** 1-2 drops of Lugol's in a glass of water, four times daily. Since the iodide excretion generally exits the kidney in four hours, for a severe bladder infection give it every four hours. I have treated successfully some of the worst bladder infections by this method. Lugol's works better than antibiotics, and unlike antibiotics, the infection is not so nearly prone to return.

23. **Hypothyroidism.** Even though iodine and iodide are absolutely essential to thyroid hormone formation, in most "developed" countries, hypothyroid conditions are not usually due to an outright lack of iodine or iodide. Still, hypothyroidism is occasionally helped by 1 drop of Lugol's daily. Make sure to monitor the thyroid profiles!

24. **Vegan gas.** reducing the gas from eating beans! Macrobioticists have known for years that cooking beans with seaweed reduces bean flatulence. If you're soaking beans before cooking them, add 1 or 2 drops of Lugol's, and let them soak for an hour or more. Pour off that water before cooking, and add fresh water. You'll be surprised at the reduction in resulting intestinal gas! (Technical explanation: There's a naturally occurring enzyme inhibitor in beans which interferes with starch digestion in the gut, producing gas. Lugol's inactivates this enzyme inhibitor.)

25. **Baldness:** In Mexico, some people have used iodine as a means of preventing baldness. One woman used iodine for years as a preventive measure against her baldness. She used it as a rinse after washing her hair. Another woman told me to "cure" a bald spot by dabbing iodine on the bald spot or area of thinning hair. After a while, a crust will form. Eventually, beneath the crust fine hairs will start to grow. She said it can take about three months to see the results.

26. **Heavy Metal Detox.** The bioavailability of a Lugol's containing 12.5 mg elemental iodine was evaluated by measuring 24 hr urine levels of iodide together with the minerals, trace elements and toxic metals before and after administration of this preparation. The results obtained following iodine supplementation revealed that in some subjects, the urine levels of mercury, lead and cadmium increased by several fold after just one day of supplementation. For aluminum, this increased excretion was not observed usually until after one month or more on the iodine supplementation. [15] Preliminary data so far suggest that orthoiodosupplementation results in

detoxification of the body from the toxic metals aluminum, cadmium, lead and mercury. [One of the old materia medicas listed using iodine for mercury detoxification. \[Mercurial Poisoning, and other chronic metallic toxaemias, —Potassium Iodide, to promote elimination of the poison.\]](#)

27. **Precancerous skin lesions:** From my own clinical experience, repeated application of Lugol's to the skin appears to cause regeneration of the skin from the bottom up, causing eventually sloughing the old version of the skin off. It is very helpful in granulation of new skin in leg ulcers when used twice daily as a wound spray. For suspicious spots, if there was a pre-cancerous lesion on the old skin, it is replaced with new skin minus the lesion. There does not seem to be any skin lesions which are not helped or cured by this procedure. In some cases I found clinically obvious low thyroid conditions also needed to be treated to be more aggressively. Minor lacerations and healing of surgical wounds respond well. If skin regeneration is from the bottom, then there is little or no scar formation. It is better than vitamin E, but that helps too.

28. **Cuts and scabs.** It is my belief a water solution of iodine (like Lugol's) is an important therapeutic agent for skin. Because of its effectiveness and the results, perhaps many skin diseases are related to local tissue areas of relative iodine deficiency. Perhaps the most graphic lesions are the "keloid" (worm) incision scars formed after surgical procedures. If the iodine intake and tissue levels are adequate, such as in Japan, keloid formation doesn't happen (17). In addition, iodine's ability to trigger natural cell death (apoptosis) (18) makes it effective against all pre-cancerous skin lesions and likely many cancerous lesions. The local site is replaced with normal skin.

Our older generation tended to put tincture of iodine onto a fresh wound to prevent infection. This turns out to be helpful. It is much more effective (and doesn't hurt) to apply iodine repeatedly after a scab has been formed also. The iodine put onto the scab helps to organize total repair of the tissue. It is implied a similar approach could be taken to burns of all depths but at the same time the physiology of burns suggest there is an acute lack of thyroid hormone.

29. **Common cold.** The next time you feel that scratchy throat or that first onset snuffle, reach for a bottle of Lugol's and start snorting from the open top. You may be surprised to see it rapidly quench a rhinovirus infection before it sets in.

30. **Breast Cancer:** Based on an extensive review of breast cancer epidemiological studies, R.A. Wiseman [25] came to the following conclusions: 92-96% of breast cancer cases are sporadic; there is a single cause for the majority of cases; the causative agent is deficiency of a micronutrient that is depleted by a high-fat diet; and if such an agent is detected, intervention studies with supplementation should lead to a decline in the incidence of breast cancer. It is the opinion of several investigators that this protective micronutrient is the essential element iodine. [26] Demographic surveys of Japan and Iceland revealed that both countries have a relatively high intake of iodine and low incidences of simple endemic goiter and breast cancer. Whereas in Mexico and Thailand, just the reverse is observed -- a high incidence of both endemic goiter and breast cancer.

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## Conclusions

From one year of clinical observations and experience in the use of dispensing oral lugol's, I believe that 80% of North Americans, and by extension the general populations, are iodine/iodide deficient. They used to put iodine in many flour products before 1966, then they discovered bromide, it is easier, cheaper, and makes ingredients mix well, so it's in all of our bread, flour products, cakes, even Gatorade, Mountain Dew and it was found in Dansani water too! Bromide is a serious goitrogen. The anion salt of hydrogen bromide (HBr); and several salts were formerly used as sedatives, hypnotics, and anticonvulsants. Chronic bromide intoxication is characterized by headache, drowsiness, confusion and occasionally violent delirium, muscular weakness, cardiac depression, an acneform eruption, foul breath, anorexia, and gastric distress. Sound familiar?

Fluoride, chlorine, bromide & iodine are all halogens, their atomic weight determines which one deletes the other, fluoride being the worst. Iodine is the loser, so all three compete with iodine. That's why we are all deficient, we cannot escape fluoride, chlorine and bromide! It's in food and water. J.C. Jarvis, was particularly fond of iodine replacement due to the chlorine content of our drinking water. [9] He writes: "[The clinical activity of any one of these four halogens is in inverse proportion to its atomic weight. This means that any one of the four can displace the element with a higher atomic weight, but cannot displace an element with a lower atomic weight. For example, fluorine can displace chlorine, bromine and iodine because fluorine has a lower atomic weight than the other three. Similarly, chlorine can displace bromine and iodine because they both have a higher atomic weight. Likewise, bromine can displace iodine from the body because iodine has a higher atomic weight. But a reverse order is not possible. A knowledge of this well-known chemical law brings us to a consideration of the addition of chlorine to our drinking water as a purifying agent. We secure a drinking water that is harmful to the body not because of its harmful germ content but because the chlorine content now causes the body to lose the much-needed iodine...](#)

There is mounting evidence that the major contributor of breast, ovarian, uterine and prostrate fibroids and cancers is dietary iodine deficiency. Iodine deficiency is probably also a major contributor of obesity, arthritis and some mental illness. I think that the [MD's](#) who performed the research for these discoveries should be nominated for the Nobel Prize. The health care implications for this discovery are enormous. Virtually every older patient I see shows some symptoms of iodine deficiency and those symptoms are fibroids/cysts of the reproductive organs, thyroid problems, obesity, arthritis, dry eyes, compromised immune systems, reduced sex drive, urinary tract infections, enlarged prostate, and a long list of other symptoms. Some young people already

show symptoms of iodine deficiency such as acne and ADD. Iodine deficiency may play a role in autism.

As cheap as making Lugol's is, and the universal medical uses as a disinfectant and germicide, would be of great service to all impoverished countries. Its implications on the benefit to HIV, tuberculosis and malaria deserve important attention. [[Malaria](#),—the Ammonium Iodide with Arsenic, in chronic malaria.]

Iodine deficiency is responsible not only for very widespread endemic goitre and cretinism, but also for retarded physical growth and intellectual development and a variety of other conditions. These conditions together are now termed iodine deficiency disorders (IDD). They are particularly important because:

- perhaps one-quarter to one-half of the world's people consume inadequate amounts of iodine;
- the disorders have a major impact on the individual and on society;
- of the four major deficiency diseases, IDD is the easiest to control.

The treatment of goitre caused by iodine deficiency is easy and satisfying in the case of a simple goitre or a colloid goitre that is not very large. Usually either potassium iodide (6 mg daily) or Lugol's iodine (one drop daily for ten days, then one drop weekly) will lead to a fairly rapid reduction in the size of the goitre. One drop of Lugol's iodine provides about 6 mg of iodine. Alternatively, Lugol's iodine can be diluted in any small hospital laboratory so that one teaspoonful of the dilute solution yields 1 mg of iodine. Lugol's solution is very cheap and is widely available. Of primary school children treated in Tanzania, over 60 percent with Grade 1 goitre had no goitre after 12 weeks of receiving Lugol's iodine, and most larger goitres had improved markedly. The alternative treatment which is also effective but which needs careful medical supervision is the use of thyroid extract or medicinal thyroxine, which makes no sense as it does not treat the cause, only the effect.

Clearly, rather than treating each individual who has goitre caused by iodine deficiency, it is much preferable to take measures to control iodine deficiency in the community, the district or the nation. The most common measure is iodization of salt, which will reduce the prevalence and also the severity of goitre over a relatively short period among those who consume the salt. But salt itself is not healthy and the amounts of iodide are very scanty. If rural doctors would use iodine routinely as a drug, and iodine was freely dispensed to purify drinking water, so many more health benefits would be enjoyed.

There has been no significant clinical research on iodine therapy or use for over 40 years until recently that of Dr. Abraham. I feel it is important for research to be directed at this potentially significant area of medical treatment. It is worth noting the greatest part of significant research with iodine was done before the Medline search facilities were available. Since large doses of iodine are tolerated intravenously without side effects, it has yet to be explored what help this may have for many cancer patients or even other diseases like malaria, HIV, Lyme disease, and tuberculosis. For many decades in the 1800s people carried around little bottles of iodine around their necks to use on all occasions, just as before they used garlic during the plague. People in mosquito, fly and tick infested areas should think of doing this again. Iodine put onto a mosquito bite would kill all bacteria and viruses at the site of the bite within 10-30 seconds making it impossible for any virus or bacteria to multiply and get started --such as in West Nile Fever. In addition, it has been forgotten vaporized iodine rapidly kills air borne viruses such as polio and SARS viruses.. Used extensively in the forties and fifties it may be of use to explore this approach again.

**A Compend of Materia Medica, Therapeutics, and Prescription Writing**  
by Sam'l O. L. Potter, M.D., M.R.C.P.L., 1902.

**Therapeutics of Iodine.** The Tincture is much used locally as a counterirritant, and an alterative application. Iodo-tannin is chiefly employed as an antiseptic and alterative application in local diseases. The preparations of Iodine are used with benefit in—  
Catarrh and Hay Fever,—inhalations of Iodine or the Carbolate.  
Inflammations,—Tincture of Iodine locally, to promote absorption.  
Skin Diseases,—the Glycerite or Tincture, in chloasma, lentigo, lupus.  
Chronic Diseases of the Spleen and Liver,— the Tincture or Ointment may be used locally for counter-irritation.  
Glandular Tumors, hypertrophied tonsils, cervical cysts, etc.,—the Tincture or Compound Solution parenchymatously injected, is an efficient resolvent.  
Empyema, Hydrocele, Ovarian Cysts, etc. ,—the Tincture injected undiluted, is one of the best applications to prevent return of the effusion.  
Sores, Ulcers, Fissures, etc,—Iodoform, Iodo-tannin, or Iodized Starch, are highly recommended, as local antiseptics and alteratives.  
Vomiting of Pregnancy,—drop doses of the tincture every hour, have often succeeded in very obstinate cases.

**Therapeutics of the Iodides.** They are especially used in—  
Acute Catarrh and Hay Fever,—Potassium Iodide with Arsenic internally ; also Iodine and Carbolic Acid in weak solution locally .  
Chronic and Capillary Bronchitis,—the Ammonium Iodide, in small doses, rapidly administered, is remarkably efficacious.  
Catarrhal Pneumonia,—the Ammonium Iodide, to prevent caseation of the products. Arsenic may well be combined with it.  
Spasmodic Asthma,—Potassium Iodide, in 15 to 30-gr. doses, is often very efficient, especially when the asthma is due to bronchial catarrh.  
Hepatic Cirrhosis, in the first stage,—Ammonium Iodide with Arsenic.  
Duodenal Catarrh, and jaundice therefrom,—Ammonium Iodide.  
Aneurisms,—Potassium Iodide, in large doses (gr. xv-xxx) is often curative of internal

aneurisms, when conjoined with absolute rest.

Tertiary Syphilis, and many of its results, as neuralgiae, paralysis from gummata, syphilitic ulcerations, syphiloma of the internal viscera, chronic rheumatism and sciatica of syphilitic origin, lupus of syphilitic or scrofulous origin,—are all best treated by Potassium Iodide.

Mercurial Poisoning, and other chronic metallic toxaemiae, —Potassium Iodide, to promote elimination of the poison.

Malaria,—the Ammonium Iodide with Arsenic, in chronic malaria.

Tonsillitis, and simple sore throat,—a weak solution of Potassium Iodide.

Chronic Bright's Disease,—the prolonged use of Potassium Iodide has seemed to retard the progress of the parenchymatous changes.

### Diagnostic Used of Iodine/Iodide

1. **Gram iodine:** Iodine crystals 1.0 gm Potassium iodide 2.0 gm , Distilled water 300 ml. Gram's stain is a method for differential staining of bacteria; smears are fixed by flaming, stained in a solution of crystal violet, treated with iodine solution, rinsed, decolorized, and then counterstained with safranin O; Gram-positive organisms stain purple black and Gram-negative organisms stain pink; useful in bacterial taxonomy and identification, and also in indicating fundamental differences in cell wall structure.

Grind the dry iodine and potassium iodide in a mortar. Add water, a few ml at a time, and grind thoroughly after each addition until the iodine and iodide dissolve. Rinse the solution into an amber glass bottle with the remainder of the distilled water.

2. **Vaginal smears:** This is a simple test to detect the onset of menopause: swab the vagina with a q-tip, place on a glass slide and put it over a small vial of a few drops of lugol's. Let the iodine evaporate and fixate to the slide for 5 minutes. If glycogen is present, it will stain reddish orange, if no glycogen is present, meaning onset of menopause, it will not stain or show a very faint yellow.

3. **Pap smears:** Schiller's test is a test for nonglycogen-containing areas of the portio vaginalis of the cervix, which may be the site of early carcinoma; such areas fail to stain dark brown with iodine solution; loss of glycogen due to erosion and other benign conditions may also give a positive result. The old naturopaths learned that by using this as a cheap and easy office test for cervical screening, the breast nods disappeared in 3-6 months after diagnosis! This is indisputable proof. of the value of the Schiller Lugol test and is a definite aid in locating cervical cancer.

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### Sources of Iodine:

**Tincture of Iodine:** USP tincture of iodine contains 2% iodine and 2.4% sodium iodide dissolved in 50% ethyl alcohol. For water purification use, the sodium iodide has no purification effect, but contributes to the total iodine dose. Thus it is not a preferred source of iodine, but can be used if other sources are not available. 0.4 cc's (or 8 drops) of USP tincture (2% iodine) added to a liter of water will give the 8 mg/l (same as 8 PPM). If the iodine tincture isn't compounded to USP specs, then you will have to calculate an equal dose based on the iodine concentration.

**SSKI:** The "SS" in "SSKI" refers to "Saturated Solution Potassium Iodide". Potassium iodide (KI) is an odorless, colorless, transparent or opaque crystalline substance. It may occur as a white granular powder. In either case, the powder is fairly hygroscopic. One gram is soluble in 0.7 mL of water, about 23 mL of alcohol, and 2 mL of glycerin. Aqueous solutions are neutral or alkaline to litmus. When iodine is added to an aqueous solution of KI, a dark brown solution containing potassium triiodide is formed. The chemical should be stored in containers with tight-fitting lids and should be protected from light. In acid, KI decomposes rapidly to liberate iodine; the reaction can be retarded with sugar. Oxidizing agents will liberate iodine from KI as the agent is reduced.

Saturated solution of KI may be used instead of Lugol's solution to treat toxic goiter. The dose is 0.3 mL (well diluted), 3 times daily. This solution is potassium iodide oral solution USP, containing 94% to 106% of the labeled amount of KI. The former National Formulary SSKI monograph defined it as containing 97 g to 103 g of KI in each 100 mL of solution. Other medically useful forms of iodine include "Lugol's solution", invented by Dr. Lugol of Paris in the 1840s, which contains a mixture of types of iodine and iodide, and "di-atomic iodine", which is another name for iodine, but usually prepared as a solid in a capsule instead of a liquid.

**Lugol's solution:** Contains 5% iodine and 10% potassium iodide. 0.15 cc (3 drops) can be added per liter of water, but 3 times more iodine is consumed compared to sources without iodide.

**Betadyne (povidone iodine):** Some have recommended 8 drops of 10% povidone iodine per liter of water as a water treatment method, claiming that at low concentrations povidone iodine can be regarded as a solution of iodine. One study indicated that at 1:10,000 dilution (2 drops/liter), there was 2 PPM iodine, while another study resulted in conflicting results. However, at 8 drops/liter, there is little doubt that there is an antimicrobial effect. The manufacturer hasn't spent the money on testing this product against EPA standard tests, but in other countries it has been sold for use in field water treatment.

**Kahn-Vassher solution:** By adding a sufficient amount of iodine crystals to a small bottle, an almost unlimited

supply of saturated iodine solution can be produced. As long as crystals remain in the bottle, the solution is saturated.

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## Safety

The safety of long-term exposure to low levels of iodine was proven when inmates of three Florida prisons were given water disinfected with 0.5 to 1.0 PPM iodine for 15 years. No effects on the health or thyroid function of previously healthy inmates was observed. Of 101 infants born to prisoners drinking the water for 122- 270 days, none showed detectable thyroid enlargement. However 4 individuals with preexisting cases of hyperthyroidism became more symptomatic while consuming the water.

Nevertheless experts are reluctant to recommend iodine for long term use. Average American iodine intake is estimated at 0.24 to 0.74 mg/day, higher than the RDA of 0.4 mg/day. Due to a recent National Academy of Science recommendation that iodine consumption be reduced to the RDA, the EPA discourages the use of iodized salt in areas where iodine is used to treat drinking water.

### Allergies

Some individuals are allergic/hypersensitive to iodide or to organic preparations containing iodine. Hypersensitivity reactions may involve rash, angioedema (throat swelling), cutaneous/mucosal hemorrhage (bleeding), fever, arthralgias (joint pains), eosinophilia (abnormal blood counts), urticaria (hives), thrombotic thrombocytopenic purpura, or severe periarteritis (inflammation around blood vessels). Reactions can be severe and deaths have occurred with exposure. Iodine-based products should be avoided if there is known allergy/hypersensitivity to iodine.

Topical use of iodine preparations may irritate/burn tissues and cause sensitization in some individuals.

Note: This review does not cover adverse effects associated with intravenous iodine-based contrast agents used for CT scan imaging, or radioactive iodine.

General: Iodine preparations used orally (by mouth) or topically (on the skin) are generally considered to be safe in healthy non-allergic individuals when used in recommended amounts, not exceeding tolerated upper limits. Higher amounts taken acutely or chronically may result in adverse effects.

Acute toxicity: Acute iodine poisoning is rare and generally occurs only with doses of many grams. Symptoms may include burning of the mouth, throat, and stomach, fever, nausea, vomiting, diarrhea, cardiovascular compromise, and loss of consciousness/coma.

Most people are unaffected by excess iodine. The dosages and responses presented here represent those individuals who respond adversely to excessive levels. The studies providing incidence information indicate that probably less than 10% the general population responds adversely to excess iodine. Side effects have not been reported from the current high levels of iodine (0.200-0.710 for teenagers and adults) in the USA food supply. The National Academy of Sciences (1980) has indicated that levels of iodine intake between 0.050 and one mg per day are safe, however no references are provided to substantiate this fact.

**Chronic toxicity (iodism, intoxication):** There are three "hazards" to using SSKI: staining, allergy, and a very small possibility of thyroid suppression with longer-term use of "too much". Chronic iodism, also known as iodide intoxication, may cause eye irritation, eyelid swelling, unpleasant/metallic taste, burning or swelling of the mouth/throat, soreness of the gums/teeth, increased salivation, gastrointestinal upset, diarrhea, anorexia, flu-like symptoms, sneezing, cough, pulmonary edema (fluid in the lungs), confusion, headache, fatigue, depression, numbness, tingling, pain, weakness, muscle aches, easy bruising, irregular heart beat, or acne-like skin lesions. Prolonged excess intake of iodides can lead to thyroid gland dysfunction including hypo- or hyperthyroidism, parotiditis, thyroid gland hyperplasia (enlargement), thyroid adenoma, goiter, autoimmunity, and elevated thyroid stimulating hormone (TSH) levels.

**Iodide acne:** a follicular eruption on the face, trunk, and extremities, due to injection or ingestion of iodide in a hypersensitive individual.

Endocrine (thyroid effects): Prolonged excess intake of iodides can lead to thyroid gland dysfunction including hypo- or hyperthyroidism, thyroid gland hyperplasia (enlargement), thyroid adenoma, goiter, autoimmunity, and elevated thyroid stimulating hormone (TSH) levels. Individuals with autoimmune thyroid disease (AITD) may have increased sensitivity to adverse effects of iodine. Those with previous iodine deficiency or nodular goiter may be particularly susceptible.

Dermatologic: Topical cadexomer iodine has been associated with local burning sensation in clinical trials.

Cutaneous (skin) intolerance may develop with the topical use of iodinated polyvidone. Other reported reactions to tinctures include rash, blistering, crusting, irritation, itching, or erythema (reddening) of skin. Topical use of iodine may stain the skin.

Ocular/Otic: Eyelid edema may result from administration of povidone-iodine.

Genitourinary: Povidone-iodine bladder irrigation has been associated with increased risk of urinary tract infection.

Renal: Sodium iodide should be used cautiously in those with renal failure. Lugol solution and saturated solution of potassium iodide (SSKI, PIMA) should be avoided in those with hyperkalemia. (Note: This review does not cover adverse effects associated with intravenous iodine-based contrast agents used for CT scan imaging. However, such contrast agents can cause impairment of kidney function including permanent damage. Individuals with a history of kidney disease or diabetes may be particularly susceptible. This concern should be discussed with the patient's physician prior to receiving intravenous contrast.)

Gastrointestinal: Sodium iodide should be used cautiously in those with gastrointestinal obstruction.

Pulmonary: Lugol solution and saturated solution of potassium iodide (SSKI, PIMA) should be avoided in patients with pulmonary edema, bronchitis, or known tuberculosis.

Immunologic: It has been suggested that application of povidone-iodine to wounds (particularly surgical wounds) may locally suppress immune cells and wound healing, and increase susceptibility to local infection.

#### Pregnancy and Breastfeeding

Pregnancy: Iodine requirements are increased during pregnancy. The U.S. recommended daily allowance of iodine for pregnant women is 220mcg daily, which is higher than the recommended daily dose for non-pregnant adults (150mcg). Iodine supplementation during pregnancy may be particularly relevant in areas of endemic iodine deficiency, such as non-industrialized nations. Iodine deficiency during pregnancy has been associated with an increased incidence of miscarriage, stillbirth, birth defects, and mental retardation. Moreover, severe iodine deficiency during pregnancy may result in congenital hypothyroidism in the newborn. In contrast, excess iodine intake by pregnant women may lead to effects of excess iodine in the fetus/newborn, including thyroid dysfunction or skin irritation.

Labor: It has been suggested to avoid topical use of povidone-iodine for perianal preparation during delivery or postpartum antiseptis due to possible iodine absorption by the newborn, or absorption by the mother leading to increased breastmilk iodine concentrations. Other reports suggest that this may not be a significant concern.

Breastfeeding: The U.S. recommended daily allowance of iodine for breastfeeding women is 290mcg daily, which is higher than the recommended daily dose for non-pregnant adults (150mcg). Iodine supplementation during breastfeeding may be particularly relevant in areas of endemic iodine deficiency, such as non-industrialized nations. Infants are particularly vulnerable to the effects of iodine deficiency, and iodine deficient women may not be able to provide sufficient iodine in their breastmilk.

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useful links

<http://www.thyroidmanager.org/thyroidbook.htm>

## Chemical Safety

### IODINE

ICSC: 0167

Jod  
Iode  
Iodio  
Yodo  
I<sub>2</sub>

Molecular mass: 253.8

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
<b>FIRE</b>	Not combustible but enhances combustion of other substances. Many reactions may cause fire or explosion. Gives off irritating or toxic fumes (or gases) in a fire.	NO contact with flammable substances.	In case of fire in the surroundings: use appropriate extinguishing media.
<b>EXPLOSION</b>			
<b>EXPOSURE</b>		STRICT HYGIENE!	
<b>•INHALATION</b>	Cough. Wheezing. Laboured breathing. Symptoms may be delayed (see Notes).	Ventilation (not if powder), local exhaust, or breathing protection.	Fresh air, rest. Half-upright position. Artificial respiration may be needed. Refer for medical attention.
<b>•SKIN</b>	Redness. Pain.	Protective gloves. Protective clothing.	First rinse with plenty of water, then remove contaminated clothes and rinse again.
<b>•EYES</b>	Causes watering of the eyes. Redness. Pain.	Face shield or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
<b>•INGESTION</b>	Abdominal pain. Diarrhoea. Nausea. Vomiting.	Do not eat, drink, or smoke during work.	Rinse mouth. Give plenty of water to drink. Refer for medical attention.
<b>SPILLAGE DISPOSAL</b>		<b>STORAGE</b>	<b>PACKAGING &amp; LABELLING</b>
Sweep spilled substance into sealable containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place. Do NOT absorb in saw-dust or other combustible absorbents. Do NOT let this chemical enter the environment. Personal protection: filter respirator for inorganic gases, vapours and halogens.		Separated from incompatible materials . See Chemical Dangers. Well closed. Ventilation along the floor.	Xn symbol N symbol R: 20/21-50 S: 2-23-25-61

## Chemical Safety

### IODINE

ICSC: 0167

<b>I M P O R T A N T</b>	<b>PHYSICAL STATE; APPEARANCE:</b> BLUISH BLACK OR DARK PURPLE CRYSTALS , WITH PUNGENT ODOUR.	<b>ROUTES OF EXPOSURE:</b> The substance can be absorbed into the body by inhalation of its vapour, through the skin and by ingestion.
	<b>PHYSICAL DANGERS:</b> Iodine readily sublimes.	<b>INHALATION RISK:</b> A harmful contamination of the air can be reached rather quickly on evaporation of this substance at 20°C.
<b>T A N K</b>	<b>CHEMICAL DANGERS:</b> Upon heating, toxic fumes are formed. The substance is a strong oxidant and reacts with combustible and reducing materials. Reacts violently with metal powders, antimony, ammonia, acetaldehyde, acetylene causing fire and explosion hazard.	<b>EFFECTS OF SHORT-TERM EXPOSURE:</b> Lachrymation. The substance is severely irritating to the eyes and the respiratory tract , and is irritating to the skin . Inhalation of the vapour may cause asthma-like reactions (RADS). Inhalation of the vapour may cause lung oedema (see Notes). The effects may be delayed. Medical observation is indicated.
	<b>OCCUPATIONAL EXPOSURE LIMITS:</b> TLV: 0.1 ppm; (Ceiling value); (ACGIH 2004). MAK: Iib (not established but data is available); (DFG 2005). OSHA PEL: C 0.1 ppm (1 mg/m <sup>3</sup> ) NIOSH REL: C 0.1 ppm (1 mg/m <sup>3</sup> ) NIOSH IDLH: 2 ppm See: <a href="#">7553562</a>	<b>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:</b> Repeated or prolonged contact may cause skin sensitization in rare cases. Repeated or prolonged inhalation exposure may cause asthma-like syndrome (RADS). The substance may have effects on the thyroid.

**PHYSICAL  
PROPERTIES**

Boiling point: 184°C  
Melting point: 114°C  
Relative density (water = 1): 4.9  
Solubility in water, g/100 ml at 20°C: 0.03  
Vapour pressure, kPa at 25°C: 0.04  
Relative vapour density (air = 1): 8.8  
Relative density of the vapour/air-mixture at 20°C (air = 1): 1  
Octanol/water partition coefficient as log Pow: 2.49

**ENVIRONMENTAL DATA** This substance may be hazardous in the environment; special attention should be given to fish.



**NOTES**

The occupational exposure limit value should not be exceeded during any part of the working exposure. Rinse contaminated clothes (fire hazard) with plenty of water. The symptoms of lung oedema often do not become manifest until a few hours have passed and they are aggravated by physical effort. Rest and medical observation is therefore essential. Immediate administration of an appropriate inhalation therapy by a doctor or a person authorized by him/her, should be considered. The symptoms of asthma often do not become manifest until a few hours have passed and they are aggravated by physical effort. Rest and medical observation are therefore essential.

**ICSC: 0167**

**IODINE**

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