**Iodine Therapy**

Iodine is an excellent fungicide and has a special affinity for mucous membranes which are also an attractive hiding place for fungi. I prefer to start the systemic therapy with Lugol's solution or similar iodine remedies. However, due to pressure by health authorities it is now difficult to obtain this trusted remedy, and you may instead start with one of the other recommended antimicrobials. Those who can still obtain iodine may use the following guidelines.

Full-strength Lugol's solution, called a 5% iodine solution, contains 10% of potassium iodide and 5% iodine. Each drop contains 6.5 mg of iodine/iodide. If you have a 2% iodine solution then take 2.5 times more drops than for the standard 5% solution. Iodoral tablets available in the US have 13 mg iodine/iodide per tablet. Iosol, an iodine/ammonium iodide remedy has 1.8 mg of iodine/iodide per drop. Other names for Lugol’s solution are Aqueous Iodine Oral Solution BP or Strong Iodine Solution USP. Iodine Topical Solution (USP) contains 2% iodine and 2.4% potassium iodide. The following recommendations are for the standard 5% Lugol's solution, if you use another remedy then adjust the dose accordingly.

Presently iodine solutions with more than 2.2% elemental iodine are banned in the US as they may be used in the production of methamphetamine, although up to 30 ml of Lugol's solution are exempt from this regulation. Standard Lugol's solution is still available in Canada and Mexico. The TGA in Australia does no longer allow Lugol's and similar iodine solutions to be used as remedies. I do not recommend pharmaceutical iodine dissolved in alcohol.

Before starting take a drop of iodine in liquid other than just water to test for allergies. With the standard program you gradually increase up to 10 drops of Lugol's solution 3 times daily with food or drink. You may use more or less iodine according to body weight. Continue for 3 weeks with the full dose, but interrupt or reduce it during a reaction. After 3 weeks continue with 1 or 2 drops daily for much longer. Plenty of iodine helps to prevent and dissolve cysts of any kind and helps tissue to regenerate. When on thyroid medication, or with goitre or an overactive thyroid, it is usually beneficial to increase gradually to 1 or 2 drops daily but initially do not go any higher. Also see [Iodine: Bring Back the Universal Nutrient Medicine](http://www.health-science-spirit.com/iodine.html).

**Lugol's iodine**

From Wikipedia, the free encyclopedia

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**Lugol's iodine**, also known as **Lugol's solution**, first made in 1829, is a solution of elemental [iodine](http://en.wikipedia.org/wiki/Iodine) and [potassium iodide](http://en.wikipedia.org/wiki/Potassium_iodide) in water, named after the [French](http://en.wikipedia.org/wiki/France) physician [J.G.A. Lugol](http://en.wikipedia.org/wiki/Jean_Guillaume_Auguste_Lugol). Lugol's iodine solution is often used as an [antiseptic](http://en.wikipedia.org/wiki/Antiseptic) and [disinfectant](http://en.wikipedia.org/wiki/Disinfectant), for emergency disinfection of drinking water, and as a reagent for [starch detection](http://en.wikipedia.org/wiki/Iodine_test) in routine laboratory and medical tests. These uses are possible since the solution is a source of effectively free elemental iodine, which is readily generated from the equilibration between elemental iodine molecules and [triiodide](http://en.wikipedia.org/wiki/Triiodide) ion in the solution.

It has been used more rarely to replenish iodine deficiency.[[1]](http://en.wikipedia.org/wiki/Lugol%27s_iodine#cite_note-0) However, pure [potassium iodide](http://en.wikipedia.org/wiki/Potassium_iodide), containing the relatively benign [iodide](http://en.wikipedia.org/wiki/Iodide) [ion](http://en.wikipedia.org/wiki/Ion) without the more toxic elemental [iodine](http://en.wikipedia.org/wiki/Iodine), is strongly preferred for this purpose. Likewise, in the [Chernobyl disaster](http://en.wikipedia.org/wiki/Chernobyl_disaster) some Lugol's solution was used as an emergency source of iodide to block radioactive iodine uptake, simply because it was widely available as a drinking water decontaminant, and pure potassium iodide without iodine (the preferred agent) was not available.

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**Formula and manufacture**

Lugol's solution is available in different potencies of 1%, 2%, or 5% [Iodine](http://en.wikipedia.org/wiki/Iodine). The 5% solution consists of 5% ([wt/v](http://en.wikipedia.org/wiki/Mass_concentration_%28chemistry%29)) [iodine](http://en.wikipedia.org/wiki/Iodine) (I2) and 10% ([wt/v](http://en.wikipedia.org/wiki/Mass_concentration_%28chemistry%29)) [potassium iodide](http://en.wikipedia.org/wiki/Potassium_iodide) (KI) mixed in [distilled water](http://en.wikipedia.org/wiki/Water_%28molecule%29) and has a total iodine content of 130 mg/mL.[[2]](http://en.wikipedia.org/wiki/Lugol%27s_iodine%22%20%5Cl%20%22cite_note-1) Potassium iodide renders the elementary iodine [soluble](http://en.wikipedia.org/wiki/Soluble) in water through the formation of the [triiodide](http://en.wikipedia.org/wiki/Triiodide) (I−
3) ion. It is not to be confused with [tincture of iodine](http://en.wikipedia.org/wiki/Tincture_of_iodine) solutions, which consist of elemental iodine, and iodide salts dissolved in water and alcohol. Lugol's solution contains no alcohol.

Other names for Lugol's solution are I2KI (iodine-potassium iodide); Markodine, Strong solution (Systemic); and Aqueous Iodine Solution BCP.[[3]](http://en.wikipedia.org/wiki/Lugol%27s_iodine#cite_note-2)

Lugol's is obtained over the counter from drug stores or health food stores. This indicator, also called a stain, is used in many different fields.

**Applications**

* As a [mordant](http://en.wikipedia.org/wiki/Mordant) when performing a [Gram Stain](http://en.wikipedia.org/wiki/Gram_Stain). It is applied for 1 minute after staining with [crystal violet](http://en.wikipedia.org/wiki/Crystal_violet), but before ethanol to ensure that gram positive organisms' peptidoglycan remains stained, easily identifying it as a gram positive in microscopy.
* This solution is used as an indicator test for the presence of [starches](http://en.wikipedia.org/wiki/Starch) in [organic compounds](http://en.wikipedia.org/wiki/Organic_compounds), with which it reacts by turning a dark-blue/black. Elemental iodine solutions like Lugol's will stain starches due to iodine's interaction with the coil structure of the [polysaccharide](http://en.wikipedia.org/wiki/Polysaccharide). Starches include the plant starches amylose and amylopectin and glycogen in animal cells. Lugol's solution will not detect simple sugars such as [glucose](http://en.wikipedia.org/wiki/Glucose) or [fructose](http://en.wikipedia.org/wiki/Fructose). In the pathologic condition [amyloidosis](http://en.wikipedia.org/wiki/Amyloidosis), amyloid deposits (i.e., deposits that stain like starch, but are not) can be so abundant that affected organs will also stain grossly positive for the Lugol reaction for starch.
* It can be used as a cell [stain](http://en.wikipedia.org/wiki/Staining_%28biology%29), making the [cell nuclei](http://en.wikipedia.org/wiki/Cell_nucleus) more visible and for preserving phytoplankton samples.
* During [colposcopy](http://en.wikipedia.org/wiki/Colposcopy), Lugol's iodine is applied to the [vagina](http://en.wikipedia.org/wiki/Vagina) and [cervix](http://en.wikipedia.org/wiki/Cervix). Normal vaginal tissue stains brown due to its high glycogen content, while tissue suspicious for cancer does not stain, and thus appears pale compared to the surrounding tissue. [Biopsy](http://en.wikipedia.org/wiki/Biopsy) of suspicious tissue can then be performed. This is called a [Schiller's Test](http://en.wikipedia.org/wiki/Schiller%27s_Test).
* Lugol's iodine may also be used to better visualize the [mucogingival junction](http://en.wikipedia.org/wiki/Mucogingival_junction) in the mouth. Similar to the method of staining mentioned above regarding a colposcopy, [alveolar mucosa](http://en.wikipedia.org/wiki/Gingiva) has a high glycogen content that gives a positive iodine reaction vs. the [keratinized gingiva](http://en.wikipedia.org/wiki/Gingiva).[[4]](http://en.wikipedia.org/wiki/Lugol%27s_iodine#cite_note-3)
* Lugol's solution can also be used in various experiments to observe how a [cell membrane](http://en.wikipedia.org/wiki/Cell_membrane) uses [osmosis](http://en.wikipedia.org/wiki/Osmosis) and diffusion.
* Lugol's iodine may also be used as an oxidizing [germicide](http://en.wikipedia.org/wiki/Germicide), however it is somewhat undesirable in that it may lead to scarring and discolors the skin temporarily. One way to avoid this problem is by using a solution of 70% ethanol to wash off the iodine later.
* Lugol's solution is also used in the marine aquarium industry. Lugol's solution provides a strong source of free iodine and iodide to reef inhabitants and macroalgae. Although the solution is thought to be effective when used with stony [corals](http://en.wikipedia.org/wiki/Coral), systems containing xenia and soft corals are assumed to be particularly benefited by the use of Lugol's solution. Used as a dip for stony and soft or leather corals, Lugol's may help rid the animals of unwanted parasites and harmful bacteria. The solution is thought to foster improved coloration and possibly prevent bleaching of corals due to changes in light intensity, and to enhance coral [polyp](http://en.wikipedia.org/wiki/Polyp) expansion. The blue colors of *Acropora* spp. are thought to be intensified by the use of potassium iodide. Specially packaged supplements of the product intended for aquarium use can be purchased at specialty stores and online.
* Preoperative administration of Lugol's solution decreases intraoperative blood loss during [thyroidectomy](http://en.wikipedia.org/wiki/Thyroidectomy) in patients with [Grave's disease](http://en.wikipedia.org/wiki/Grave%27s_disease).[[5]](http://en.wikipedia.org/wiki/Lugol%27s_iodine#cite_note-4) However, it appears ineffective in patients who are already [euthyroid](http://en.wikipedia.org/wiki/Euthyroid) on [anti-thyroid drugs](http://en.wikipedia.org/wiki/Antithyroid_agent) and [levothyroxine](http://en.wikipedia.org/wiki/Levothyroxine).[[6]](http://en.wikipedia.org/wiki/Lugol%27s_iodine#cite_note-5)

**Historical applications**

Lugol's was often used in the treatment of [gout](http://en.wikipedia.org/wiki/Gout).

It was also used at one time as a first line treatment for [hyperthyroidism](http://en.wikipedia.org/wiki/Hyperthyroidism), as the administration of pharmacologic amounts of iodine leads to temporary inhibition of iodine organification in the thyroid gland, a phenomenon called the [Wolff-Chaikoff effect](http://en.wikipedia.org/wiki/Wolff-Chaikoff_effect). However it is not used to treat certain autoimmune causes of thyroid disease as iodine-induced blockade of iodine [organification](http://en.wikipedia.org/wiki/Organification) may result in [hypothyroidism](http://en.wikipedia.org/wiki/Hypothyroidism). They are not considered as a first line therapy because of possible induction of resistant hyperthyroidism but may be considered as an adjuvant therapy when used together with other hyperthyrodism medications.

Because of its wide availability as a drinking-water decontaminant, and high content of potassium iodide, emergency use of it was at first recommended to the Polish government in 1986, after the [Chernobyl disaster](http://en.wikipedia.org/wiki/Chernobyl_disaster) to replace and block any intake of radioactive [131I](http://en.wikipedia.org/wiki/Iodine-131), even though it was known to be a non-optimal agent, due to its somewhat toxic free-iodine content.[[7]](http://en.wikipedia.org/wiki/Lugol%27s_iodine#cite_note-6) Other sources state that pure [potassium iodide](http://en.wikipedia.org/wiki/Potassium_iodide) solution in water ([SSKI](http://en.wikipedia.org/wiki/SSKI)) was eventually used for most of the thyroid protection after this accident.[[8]](http://en.wikipedia.org/wiki/Lugol%27s_iodine#cite_note-7) There is "strong scientific evidence" for potassium iodide thyroid protection to help prevent [thyroid cancer](http://en.wikipedia.org/wiki/Thyroid_cancer). Potassium iodide does not provide immediate protection but can be a component of a general strategy in a radiation emergency.[[9]](http://en.wikipedia.org/wiki/Lugol%27s_iodine#cite_note-8)

Historically, Lugol's iodine solution has been widely available and used for a number of health problems with some precautions.[[10]](http://en.wikipedia.org/wiki/Lugol%27s_iodine#cite_note-9) Lugol's is sometimes prescribed in a variety of [alternative medical treatments](http://en.wikipedia.org/wiki/Alternative_medicine).[[11]](http://en.wikipedia.org/wiki/Lugol%27s_iodine#cite_note-10)[[12]](http://en.wikipedia.org/wiki/Lugol%27s_iodine#cite_note-11)

Until 2007, in the [United States of America](http://en.wikipedia.org/wiki/United_States_of_America), Lugol's solution was unregulated and available [over the counter](http://en.wikipedia.org/wiki/Over-the-counter_drug) as a general [reagent](http://en.wikipedia.org/wiki/Reagent), an [antiseptic](http://en.wikipedia.org/wiki/Antiseptic), a [preservative](http://en.wikipedia.org/wiki/Preservative),[[13]](http://en.wikipedia.org/wiki/Lugol%27s_iodine#cite_note-12) or as a medicament for human or veterinary application.

However, effective August 1, 2007, the [DEA](http://en.wikipedia.org/wiki/Drug_Enforcement_Administration) now regulates Lugol's solution (and, in fact, all iodine solutions containing greater than 2.2% iodine) as a [List I](http://en.wikipedia.org/wiki/DEA_list_of_chemicals) precursor because it may potentially be used in the [illicit production](http://en.wikipedia.org/wiki/Clandestine_laboratory) of [methamphetamine](http://en.wikipedia.org/wiki/Methamphetamine).[[14]](http://en.wikipedia.org/wiki/Lugol%27s_iodine#cite_note-13) However, transactions of up to one fluid ounce (30 ml) of Lugol's solution are exempt from this regulation. By contrast, Lugol's iodine solution is available over the counter in [Canada](http://en.wikipedia.org/wiki/Canada) and [Mexico](http://en.wikipedia.org/wiki/Mexico).

**Toxicity**

Because it contains free iodine, Lugol's solution at 2% or 5% concentration without dilution is irritating and destructive to mucosa, such as the lining of the esophagus and stomach. Doses of 10 mL of 5% solution have been reported to cause gastric lesions when used in endoscopy. [[15]](http://en.wikipedia.org/wiki/Lugol%27s_iodine#cite_note-14) The lethal dose of free iodine for an adult human of 2 to 3 grams (2000-3000 mg) free iodine represents 40 to 60 mL (less than 2 fluid ounces) of 5% Lugol's solution.

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15. [**^**](http://en.wikipedia.org/wiki/Lugol%27s_iodine#cite_ref-14) [[7]](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1774547/) Direct toxicity of Lugol's solution.

**See also**