

Unrefined Salt & Iodine: Misunderstood Nutrients

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Objectives & Sources of Information

- Value of unrefined salt and doses of iodine well beyond the RDI for clinical practice
- Controversies surrounding each of these areas
- Trace the history for the use of iodine in clinical practice
- Outline suggestions for clinical management of iodine
- Sources of information (No financial interest):
 - www.optimox.com; click on iodine research
 - www.drbrownstein.com; books & DVDs on Salt & Iodine
 - Book: David M Derry: *Breast Cancer & Iodine*
 - www.breastcancerchoices.org
 - My articles (2010 and 2013): Integrative Oncology for Clinicians & Cancer Patients (has discussion on Iodine): Access from our website: www.schachtercenter.com

Unrefined Salt and Iodine: My Personal Journey

- 2005-Use of iodine, but adverse effects; became very cautious about using it
- 2010-Need specific detoxification program to help tolerate higher doses of iodine, probably because of bromine overload
- Unrefined salt & other nutrients are key
- Optimal daily dosage 6 to 50 mg (not mcg) for many patients; others may need lower doses
- My family members & I are benefitting from use of unrefined salt & higher doses of iodine
- Most patients in my practice also appear to be benefitting

Refined vs. Unrefined Salt

- **Big difference: trace minerals** retained (~80)
- Unrefined: only NaCl-No trace minerals; depletes body of minerals
- Different salts-different minerals-different tastes
- Celtic salt, Real, Himalayan = Unrefined
- Less iodine than refined iodized salt; Need to get Iodine from another source
- No studies on unrefined salt

Importance of Salt to the Body

- **Body can't function without salt**
- Every cell-requires salt
- Sodium and potassium need to be in balance
- Potassium high in cells
- Sodium high in blood and extracellular fluid
- Salt & water needed for detoxification-especially bromine
- **Patients feel better with salt; feel lousy on low salt diet**
- Unrefined salt corrects mineral deficiencies, buffers toxic chemicals (such as bromides) and contributes to balancing the adrenals, the thyroid and the entire endocrine system

Acceptance of Low Salt Diet for Hypertension

- 1904-Ambard & Beujard: Salt deprivation associated with low BP
- Various animal studies: High salt (refined & 10 to 20X recommended) associated with high BP; extrapolated to humans
- **1979-Surgeon general: Salt causes ↑BP & need low salt diets; Repeated in 2009**
- Pushed by Govt agencies, researchers, medical schools & dieticians
- Numerous studies-no benefits; yet still pushed. See Brownstein book and DVD on salt

Consequences of Low Salt Diets

No Health Benefits

- 1995-NYC-8 yr study-hypertensives-stratified for salt intake-**4X as many MI's in low salt**
- 1997-MRFIT-Cutler-NHLBI-6 years-No health benefits from low salt diets; Confirmed with 14 yrs of data in 1999
- 1997-10 yr Scottish study-No improved outcomes with low salt diet
- 1998-NHANES-20 years-20% > incidence of MI
- 2002-high quality meta-analysis-BMJ-No benefits from salt restriction

References Showing Little or No Benefits &/or Harm from Low Salt Diets

- Smith, WCS, et al. Urinary electrolyte excretion, alcohol consumption, and blood pressure in the Scottish Heart Health Study. *BMJ*. 297:329-330, 1988.
- Alderman, M., et al. Dietary sodium intake & mortality: The National Health and Nutrition Examination Survey (NHANES I). *Lancet*. Vol. 351, Issue 9105, March 14, 1998, 781-785.
- Swales, JD, Salt saga continued: Salt has only small importance in hypertension. *BMJ*. 1988; 297:307-8.
- Cutler, JA., et al. An overview of randomized trials of sodium reduction & blood pressure. *Hypertension*. 1191; 17 (suppl 1): I-27 to I=33. (Suggests low salt diet, but little evidence to support it)

References Showing Little or No Benefits or Harm from Low Salt Diets 2

- Midgley, J., et al. Effect of reduced dietary sodium on blood pressure. *JAMA*. May 22/29, 1996. Vol. 275, NO 20.
- Alderman, M. Low urinary sodium is associated with greater risk of myocardial infarction among treated hypertensive men. *Hypertension*, 1995; 25:1144-1152.
- Engstrom, A.M. et al. Nutritional consequences of reducing sodium intake. *Ann. Intern. Med.* 1983; 98 (part2): 870-872.
- Rio, A. Del. et al. Metabolic effects of strict salt restriction in essential hypertensive patients. *J. of Int. Med.*, 1993; 233:409-414.

Dr. Brownstein Cases Responding to Unrefined Salt & H2O

Seizure disorders

Hypertension

Arthritis

Adrenal exhaustion

Muscle cramps

Hypotension

Headaches

Fatigue

Autoimmune

Fibromyalgia

CFSIDS

Hydration & Unrefined Salt

- Drink $\frac{1}{2}$ of your weight in pounds as ounces of water per day [If 200 lbs, then 100 oz of water]
- Can add $\frac{1}{4}$ tspf-each quart-1 to 2 tspf-daily-food and water
- Hypertension-Few hypertensives salt sensitive & unrefined salt may reduce high BP by supplying trace minerals & reducing the secretion of aldosterone, renin and angiotensin; Ca, Mg and K reduce BP

Myths About Salt

- **No difference between refined and unrefined salt**; actually the trace minerals in unrefined salt make a huge difference
- **Low salt diet is good for you**; actually it results in mineral deficiencies and stresses the entire endocrine system; large studies show opposite
- **Salt causes hypertension**; actually few hypertensives salt sensitive & unrefined salt may reduce high BP by supplying trace minerals & reducing the secretion of aldosterone, renin and angiotensin; Ca, Mg and K reduce BP

Iodine

- Non-metallic trace element
- Term iodine from Greek iodes meaning purple
- Halogen on the periodic table
- Molecular weight = 127 with 53 electrons
- Has more electrons than any other required element in the animal diet

Electron Structure of Iodine



Periodic Table-Halogen Family in 2nd Column from Right

Periodic Table of the Elements 2005

1 H 1.01																	18 He 4.00
3 Li 6.94	4 Be 9.01											5 B 10.81	6 C 12.01	7 N 14.01	8 O 15.99	9 F 18.99	10 Ne 20.18
11 Na 22.99	12 Mg 24.31											13 Al 26.98	14 Si 28.09	15 P 30.97	16 S 32.07	17 Cl 35.45	18 Ar 39.95
19 K 39.10	20 Ca 40.08	21 Sc 44.96	22 Ti 47.87	23 V 50.94	24 Cr 52.00	25 Mn 54.94	26 Fe 55.85	27 Co 58.93	28 Ni 58.69	29 Cu 63.55	30 Zn 65.41	31 Ga 69.72	32 Ge 72.64	33 As 74.92	34 Se 78.96	35 Br 79.90	36 Kr 83.80
37 Rb 85.47	38 Sr 87.62	39 Y 88.91	40 Zr 91.22	41 Nb 92.91	42 Mo 95.94	(98)	44 Ru 101.07	45 Rh 101.91	46 Pd 106.42	47 Ag 107.87	48 Cd 112.41	49 In 114.82	50 Sn 118.71	51 Sb 121.76	52 Te 127.60	53 I 126.90	54 Xe 131.29
55 Cs 132.91	56 Ba 137.33	57 La 138.91	72 Hf 178.49	73 Ta 180.95	74 W 183.84	75 Re 186.21	76 Os 196.23	77 Ir 192.22	78 Pt 195.08	79 Au 196.97	80 Hg 200.59	81 Tl 204.38	82 Pb 207.2	83 Bi 208.98	(209)	85 At (210)	86 Rn (222)
87 Fr (223)	88 Ra (226)	89 Ac (227)	Rf (261)	Db (262)	Sg (266)	Bh (264)	Hs (276)	Mt (268)	Ds (281)	Rg (272)							
		58 Ce 140.12	59 Pr 140.91	60 Nd 144.24	(145)	62 Sm 150.36	63 Eu 151.97	64 Gd 157.25	65 Tb 158.93	66 Dy 162.50	67 Ho 164.93	68 Er 167.26	69 Tm 168.93	70 Yb 173.04	71 Lu 174.97		
		90 Th 232.04	91 Pa 231.04	92 U 238.03	(237)	(244)	(243)	(247)	(247)	(251)	(257)	(257)	(258)	(259)	(262)		



Molecular Research Institute

Discovery of the Halides in Chronological Order (from Abraham)

Table 2

The Halides: Discovery in Chronological Order

Halide	Discovery		
	Year	Discoverer	Country
Chloride	1809	Gay-Lussac	France
	1810	H. Davy	Great Britain
Iodide	1811	B. Courtois	France
Bromide	1826	A.J. Balard	France
Fluoride	1886	F. Moissan	France
Astatin*	1940	Carson, McKenzie, Segre	US

*All isotopes are radioactive — exist naturally in minute amounts. First isolated as a byproduct of bombardment of a bismuth target with alpha particles in a 60-inch cyclotron.

Halogens Compete with Each Other for Receptor Sites in Body

- Halogens are a class of elements in Group VII of the Periodic Table
- They include: Fluorine, Chlorine, Bromine, Iodine and Astatine
- Bromine (closest in periodic table) in particular competes with iodine for receptor binding sites in the body

Bernard Courtois (1777-1838) Discovered Iodine in 1811-First Paper 1813



- French chemist-saltpeter (potassium nitrate) manufacturer
- Saltpeter needed-gun powder
- Napoleon-engaging wars for France
- Seaweed ash-source of making saltpeter
- Sulfuric acid added to remove interfering compounds before salts could be precipitated
- One day added too much sulfuric acid-Iodide oxidized to iodine which sublimated to form a violet vapor
- Crystals obtained from vapor analyzed & various iodide salts made (Never published)
- Chemist Gay-Lussac got some; named it iodes from Greek word violet; later iodine

Dr. Jean- Francois Coindet of Switzerland: 1774-1834: Iodine Treatment for Goiter



- First used iodine to treat goiter around 1820 (though centuries before iodine discovered- Chinese physicians used seaweed to treat goiter); these patients HYPOTHYROID
- Used three different preparations-a solution of potassium iodide-alcoholic tincture
- Dosage of Iodine: 75 mg to 150 mg of Iodine to treat goiter
- Softening & shrinkage of goiter often in 8 days
- Found helpful in other conditions; became rage of Switzerland
- **Complications, including induced hyperthyroidism seen by practitioners with higher doses & sicker pts**
- Extremely controversial

Jean Batiste Boussingault (1802-1887): Showed Iodine prevented Goiter

- French agricultural chemist
- Identified the biological nitrogen cycle
- Noticed workers in silver mines didn't get Goiter & disappeared when they had it
- Found iodine in water prevented goiter-1824 (verified the discovery of Coindet)



Large Goiter



Lugol's Solution

- Jean Lugol, a 19th century physician in order to make iodine more soluble in water developed a solution, which was 5% iodine and 10% potassium iodide (KI) dissolved in 85% distilled water (1829)
- **Two drops of Lugol's solution contains 5 mg of iodine & 7.5 mg of iodide (contained in 1 tablet of Iodoral (Optimox) or Iodizyme (Biotics))**
- Occurs with formation of I_3^-
- **"Lugol's solution" was used for years to treat many disorders**

Carl Adolph von Basedow (1799 – 1854): First Gave Iodine for Thyrotoxicosis in 1840



Von Basedow GA.

“Exophthalmos durch
Hypertrophie des Zell Gewebca
in der Augenhoeelhle”. Wsrchr
Ges Heilk, 1840; 6: 197; Cited
in:

Abraham G.E., *The safe and
effective implementation of
orthoiodosupplementation in
medical practice*. The Original
Internist, 11:17-36, 2004

Armand Trousseau (1801-1867) Accidentally Treated Hyperthyroidism with Iodine



- 1863-Accidentally successfully Treated exophthalmic goiter (hyperthyroidism) with iodine instead of intended digitalis
- Patient got better
- Upon return visit realized mistake-gave digitalis-patient worse; gave iodine again-better
- First double-blind study in a cohort of one patient with Grave's disease using Iodine
- He used 75 to 100 mg of Tincture of Iodine

Prof. Theodore Kocher (1841-1917)

Born in Berne Switzerland & Prof at University



- 1909-Nobel Prize for work on The Thyroid Gland
- Treated Hyperthyroidism with thyroidectomy
- Adamantly against using Iodine for Hyperthyroidism-Thyroid storm-precipitated in himself with iodine
- Intimidated many physicians & thyroidologists and divided physicians into 2 camps (Iodine not used from 1910-1924)
- Retrospectively, opposition to inorganic iodine/iodide for Graves' disease proved to be the main cause of the high rate of pre- and post-operative mortality, following thyroidectomy.

Henry S Plummer MD-Co-Founder of Mayo Clinic-First Used Lugol's for Thyrotoxicosis



- **1924-Plummer & Boothby** from the **Mayo Clinic** reported **zero mortality** in 600 cases of thyrotoxicosis treated with Lugol's solution. Thought due to iodine deficiency.
- Daily dosage was generally 180 mg Iodine given TID for at least 7 days before surgery, though dosage was individualized depending on severity of case
- Plummer HS and Boothby WM. *"The Value of iodine in exophthalmic goiter."* J Iowa Med Soc, 1924; 14:65.
- Plummer WA. *"Iodin in the treatment of goiter."* Med Cl North America, 1925; 8:1145-1151.
- Both Cited in: Abraham G.E., *The safe and effective implementation of orthoiodosupplementation in medical practice.* The Original Internist, 11:17-36, 2004.

Mass General Study: Lugol's Effective-1924 for Hyperthyroidism

- Dr. Starr at Mass General
- 15 drops (about 90 mg) daily for 25 cases
- 80% responded with extensive remission
- 48% responded the way thyroidectomy responds
- Most of others, success with different course, remission less extensive

Starr P, Walcott HP, Segall HN, *et al.* "The effect of iodine in exophthalmic goiter." *Arch In Med*, 1924; 34:355-364.

Dr. Frank H. Lahey-Founder of Lahey Clinic in Boston MA-Advocated Iodine



Dr. Frank Lahey

- 1925-Reported very favorable Results using Lugol's solution Before and after thyroidectomy
- Lahey FH. *"The use of iodine in goitre."* Boston Med & Surg J, 1925; 193:487-490, cited in:
Abraham G.E., *The safe and effective implementation of orthiodosupplementation in medical practice.* The Original Internist, 11:17-36, 2004.

Dr. Frank H. Lahey Quote from Paper

"The introduction of Lugol's solution by Dr. Henry S. Plummer as a method of preparation for operation in exophthalmic goiter marks a step of forward progress in the surgical management of this disease. It has practically eliminated preliminary pole ligation in our Clinic and has made it possible to complete the operation of subtotal thyroidectomy in one stage upon a great majority of our patients. It has saved for us many of those delirious and desperately toxic cases which previously died before any operation could be done upon them, and it has almost completely done away with post-operative thyroid reactions. It has been a real boon to the patient suffering from exophthalmic goiter or primary hyperthyroidism."

J.L. DeCourcy MD-1927-Surgery May Not be Necessary in Some Cases

- 1927-Reported that out of 30 cases given 30 to 60 mg three times daily, 11 cases recovered without surgery (36% success rate)

DeCourcy JL. *"The use of Lugol's solution in exophthalmic goitre."* Ann Surg, 1927; 86:871-876.

Study on Optimal Dosage of Lugol's for Grave's Disease-1930-Thompson

- 1930-Systematic study of wide range of dosages of **Lugol's solution for Grave's disease**
- Range from 1/5 drop to 30 drops
- 17 hospitalized pts-23 outpatients
- **One drop (6.25 mg of Iodine)** gave maximum reduction in basal metabolism
- Quoted several authors in the late 1800s and early **1900s who used Lugol's solution alone successfully in Graves' disease**, with complete remission of the disease, eliminating the need for surgery
 - Thompson, W.O., Brailey, A.G., Thompson, P.K., et al, *the Range of Effective Iodine Dosage in Exophthalmic Goiter*. Arch. Int. Med., 45:261-281, 1930

Possible Reasons for Adverse Effects of Iodine for Hyperthyroidism

- Though many successful cases—*sometimes severe reactions*, including thyroid storm occurred
- Many reasons-biochemical individuality, environmental issues-toxic overload or other nutrient deficiencies
- Dosage of iodine too high with loss of balance of cellular reactions and increased production of hydrogen peroxide
- Lack of selenium, magnesium, unrefined salt, sufficient water or other nutrients
- Patients toxic with bromine and bromine mobilized by iodine administration

Case History-Hyperthyroidism

- MB, 44 y.o. married female accountant with 2 adopted daughters-first seen by MBS: 7-14-10 for hyperthyroidism
- Scheduled for radioactive iodine treatment within the next two weeks
- Followed by endocrinologist for 2 years for osteoporosis; Did thyroid profile-hyperthyroidism (No reported anxiety, insomnia, palpitations or anxiety; but 25 lb wt loss over past year (intentional & weighed 148 lbs at first visit); Liver enzymes elevated
- Primary ovarian failure as an adolescent & on Prempro for 25 years
- Referred my mother-in-law who was patient & watched Dr. **Brownstein's DVDs on iodine & thyroid disorders & my lecture on diet, salt & iodine** prior to 1st visit
- Program prescribed at first visit.

MB's Program

- Drink 2.5 quarts of water daily with $\frac{1}{4}$ tspf of unrefined salt added to each quart (1tspf salt daily including food)
- Buffered C 500 mg 3 to 6 daily
- Selenium 200 mcg 3 daily
- Magnesium Taurate 125 mg 3 daily
- Multivitamin-Mineral; Calcium; Fish Oil; Vitamin D 5,000 IU daily
- Iodine (mixed iodide & iodine) 12.5 mg. Start with $\frac{1}{2}$ & work up to 4 daily (50 mg of Iodine)
- Milk Thistle 4 daily
- Plan to switch from Prempro to Bio-identical hormones

MB's Lab Results Before & During Treatment

Test	July 14 2010	October 4 2010
TSH	< 0.01 Low	< 0.01 Low
T4	17.0 High	11.8 Normal
Free T4	2.6 High	1.4 Normal
Free T3	783 High	418 Normal
Reverse T3	60 High	38 Normal
Thyroid Peroxidase Antibody	36 High	26 Normal
Thyroglobulin Antibody	90 High	24 Slightly High
Alkaline Phosphatase	181 High	111 Normal
AST	52 High	24 Normal
ALT	87 High	24 Normal
LDH	227 High	192 Normal

David Marine MD-Pathologist-Ohio Clinical Trials-Iodine to Prevent Goiter

- Medical Student-Thesis on iodine & goiter in the early 1920's-familiar with Boussingault
- US Govt –study on animals-goiter-hypothyroid-not reproducing-fed animals different amounts of iodine
- Expands study to humans-but for convenience only goiter checked
- Akron Ohio-56% school aged girls-goiter
- 6X more adolescent girls had goiter than boys-due to breast development-taking iodine from thyroid



Dr. Marine Proves Iodine Prevents Goiter in Akron Ohio-1924

- Study in Akron (1923)-2305 adolescent girls control group; 2190 in treatment group--**No palpable goiters prior to study**-9 mg of iodine/iodide for 2.5 years; No side effects
- End of study: control group 22% goiter
- Treatment group-0.2% incidence of goiter
 - Marine, D. Prevention and treatment of simple goiter. Atl. Med. J. 26;437-442, 1923.
- Replicated in Michigan
- Iodine added to salt and encouraged throughout USA
- Conclusion was: Iodine deficiency no longer a problem because goiter & cretinism no longer occurred; did not deal with total body iodine sufficiency

Iodized Salt: A Blessing & a Curse

- Assumed that the only function of iodine was to make thyroid hormones & determined that only tiny amounts of iodine necessary
- Subsequently, in 1980-RDA (Recommended Daily Allowance) of 150 mcg established and confirmed in 1989
- RDA not based on **whole body sufficiency**, but the minimum amount to prevent goiter and cretinism

Cretinism



- Severe brain damage and mental retardation in newborns
- Occurs when pregnant woman is severely deficient in iodine
- Virtually wiped out in the USA with the use of iodized salt by the general population introduced in the 1920's

Use of Lugol's Solution or SSKI During the 1930's & 40's

- Accepted small doses of iodine could treat and prevent goiter and hypothyroidism
- Treatment of hypothyroidism in the late 20's & 30's became thyroid hormone & not iodine
- Larger doses used to treat hyperthyroidism, but some bad reactions
- Nevertheless, considered treatment of choice to treat hyperthyroidism
- Used to treat many other conditions as well

1932-Textbook by Rowland on Treatment of Diseases of the Thyroid

- Chapters from 24 thyroidologists
- **Recommended treatment for hypothyroidism: "The treatment of hypothyroidism of any type consists merely in the substitution of thyroid extract for the deficient secretion. Any form of prepared gland or the active principle, thyroxin, may be used."** (First used 1891 & **adopted in the 1920's following paper by George Redmayne Murray of UK in 1920)**
- Not all physicians abandoned iodine/iodide, some **continued to use Lugol's solution or potassium iodide to treat iodine deficiency and simple goiter.**

Abraham G.E., *The safe and effective implementation of orthiodosupplementation in medical practice*. The Original Internist, 11:17-36, 2004.

Conditions Treated with Lugol's Solution

- All kinds of thyroid conditions
- Septicemia
- “Consumption” (Tuberculosis)
- Painted on sore throats and tonsils and tonsils would shrink
- Gerson used Lugol's in TBC patients & cancer patients
- Many other conditions

Albert Szent-Gyorgyi (1883-1986)



- Nobel Prize in Medicine-1937-for discovery of vitamin C
- “A discovery is said to be an accident meeting a prepared mind.”
- “Discovery consists of seeing what everybody has seen and thinking what nobody has thought”

Albert Szent-Gyorgyi: Quotes from *Bioenergetics-1958*

- "When I was a medical student, iodine in the form of KI was the universal medicine. Nobody knew what it did, but it did something and it did something good."
- 'If ye don't know where, what & why, prescribe ye then K and I.'
- Optimal Iodine concentration for energy transfer and protection against free radicals: 10^{-4}M
- US population of iodine in serum 10^{-8}M

Iodine Used in Syphilis

- **Iodine use began in the 1820's and was still being used in 1840** (Salter, *The Endocrine Function of Iodine*, Harvard University Press, 1940)
- Dosages: several grams daily to treat sclerotic lesions of aorta due to syphilis
- **Encyclopedia Britannica 1911: "In its tertiary stages and also earlier—this disease (syphilis) yields in the most rapid and most unmistakable fashion to iodides." Dosages 300 to 1,800 mg/day**

From Guy Abraham lecture 2007.

Encyclopedia Britannica: 1911 Edition on Iodides and Syphilis

- **“In its tertiary stages and also earlier—this disease (syphilis) yields in the most rapid and most unmistakable fashion to Iodides.”**
 - Encyclopedia Britannica, 11th edition, XIV, 725-26, 1910-11
- Potassium iodide is most commonly used to treat many conditions and the usual dose is 5 to 30 grains or more (300 to 1,800 mg daily)
 - After this edition, it was purchased and useful information about iodine was deleted
 - Guy Abraham lecture-2007

Conditions Treated by Iodine Listed in 1911 by Encyclopedia Britannica

- Metallic poisonings, as by lead and mercury
- Asthma
- Aneurisms
- **Arteriosclerosis...**

Dosages of Potassium Iodide Used in the Early 1900's

- “The most commonly used salt is the iodide of potassium...”
- “The usual doses of these salts are from five to thirty grains or more.” This would translate to 300 to 1,800 mg daily, more than ½ of which was Iodine

Source: Encyclopedia Britannica 11th Edition published in 1910-1911; Cited in lecture by Guy Abraham MD-Iodine Conference-2007

Francis D Kelly-Article in 1961 Regarding History of Iodine Use

- Iodide “was applied to almost every case that resisted the ordinary routine of practice”
- Kelly listed 23 medical conditions for which iodine was prescribed and then added “to mention only a few.”
 - Kelly Francis D. Iodine in Medicine and Pharmacy Since its Discovery in 1811. *Proc R Soc Med*, 54:831-836, 1961
- Confirmed Szent-Gyorgyi’s statements about use in the early 1900’s
- From Guy Abraham lecture-2007

Decline of Therapeutic Use of Lugol's

- Prior to WWII-Lugol's used by many physicians to treat many conditions
- 1920's & 30's: Use of desiccated thyroid to treat most **hypothyroidism**
- Around WW II, Iodine not patentable-big Pharma grows-looking for profits with patentable medications; seeking safe alternatives to iodine
- Publications of Lugol's to treat Grave's disease disappeared in the 1940's concurrent with iodophobic publications
- Antithyroid meds developed by leading thyroidologists) to treat **hyperthyroidism**; Thiouracil-Astwood-1943-later others like PTU; 1953-Godley & Standbury-new goitrogen Potassium Perchlorate; so toxic shortly removed
- The Wolff-Chaikoff Effect-1949

Wolff-Chaikoff Effect

- 1948-Thyroidologists Wolff and Chaikoff at the U of Ca Berkeley did a study to determine effect of iodine on thyroid function in rats
- At the time, one method of evaluating thyroid function was to check for uptake of radioactive iodine by the thyroid
- If uptake was reduced, the thyroid was interpreted to be underactive
- Potassium iodine (a relatively high dose) was injected intraperitoneally in the rats

Wolff-Chaikoff Effect (2)

- Then radioactive iodine was administered and the uptake by the thyroid was measured; little or no radioactive iodine was picked up by the thyroid
- **Wolff and Chaikoff's interpretation was that iodine** caused hypothyroidism in the rats and declared iodine to be goitrogenic causing both hypothyroidism and goiter; though thyroid hormone was not measured in the rats and there was no evidence of goiter
- They then extrapolated their results to humans and declared that doses above 2 mg daily of iodide caused hypothyroidism and goiter (Wolff-Chaikoff Effect)

Wolff, J. & Chaikoff, I.L. Plasma inorganic iodide as a homeostatic regulator of thyroid function. *J. Biol. Chem.*, 174:555-64, 1948.

Wolff-Chaikoff Effect (3)

- In 1969, Wolff again reiterated his assertion of this effect in another paper (Wolff, J. Iodide, goiter and the pharmacologic effects of excess iodide. *Am. J. Med.* 47: 101-24, 1969.) while he was at the NIH and carried a lot of influence
- This is how the toxic dose was established !!!!
- Swallowed hook, line and sinker by the medical establishment, including most orthomolecular and alternative practitioners
- Resulted in massive mistreatment of patients
- **Abraham's interpretation was that the radioactive iodide uptake test only works when the thyroid is deficient in iodine and by giving the rats iodide, they became iodine sufficient** (In other words, the W-C interpretation was in error)
- Nevertheless, its effect on medicine has persisted

Critique of the Wolff-Chaikoff Effect

- Women in US who have low iodine intake have one of highest breast cancer rates
- Women in Japan with lowest breast cancer rates ingest about 13 mg of iodine daily from seaweed and show no evidence of toxicity from iodine (increase hypothyroidism or other thyroid conditions)
- **David Marine in the 1920's used 9 mg of sodium iodide** in 2,190 students for 2.5 years to cure and prevent goiter --0.2% goiter in treatment group and 22% goiter in control group at end of study. (Marine, D. Prevention and treatment of simple goiter. *Atl. Med. J.* 26:437-442, 1923.

Critique of the Wolff-Chaikoff Effect (2)

- Studies show that 5 mg or more of iodine can reverse fibrocystic breast disease without side effects (Finley, J.W., Bogardus, G.M. Breast cancer and thyroid disease. *Quart Rev Surg Obstet Gynec*, 1960; 17:139-147.)
- **Prior to World War II, many physicians used Lugol's solution** (at much higher doses than 2 mg of iodine) to treat all kinds of medical conditions, especially those involving the thyroid gland with no reports of it causing hypothyroidism
- Both hypo and hyperthyroid conditions were treated **with Lugol's solution**
- Higher doses were needed for hyperthyroidism- average 90 mg daily resulted in 90% remission

Critique of the Wolff-Chaikoff Effect (3)

- Women on thyroid hormone have an increased risk of developing breast cancer, which may occur as a result of using thyroid hormone in iodine depleted women (aggravates iodine deficiency in the breasts)
 - Chandrakant, C & Wolfe, John N. Breast cancer: relationship to thyroid supplements for hypothyroidism, JAMA, Sept 6, 1976-Vol 236, No.10, 1124-1127.
- Despite all of this, the Wolf-Chaikoff effect has persisted
- Did the acceptance of the Wolf-Chaikoff effect impede medical progress for the past 50 years?

Radio-active Iodine Introduced in the 1980's to treat Thyrotoxicosis

- 1980's-Use of goitrogens reduced because of poor results
- Inorganic iodide reintroduced, but the wrong kind (Abraham)
- Radioactive Iodine wipes out the thyroid gland and may increase cancer risk in the area
- Current standard of care: Antithyroid drugs- Radioactive Iodine-Thyroidectomy
- **Shouldn't we go back to Lugol's**

Iodine: Prevalent View

- Physicians horrified-mg doses; will damage thyroid
- Merck Manual: Toxicity: Chronic iodine **toxicity when iodide above 2 mg/day."**
- Linus Pauling Institute: RDA for Iodine sufficient; no supplementation is necessary
- Jeff Bland: nothing about higher doses of iodine in Functional Medicine Update (FMU) over the last 10 yrs

Conventional Medicine's Positive View on Iodine

- Essential element
- Used to make thyroid hormones (and not needed anywhere else in the body)
- Prevents goiter (enlarged thyroid)
- Helps to prevent miscarriages and/or severely damaged children (cretinism)
- Microgram quantities are all that is necessary to prevent goiter & cretinism
- You can get all of the iodine needed from using iodized salt

Bernard Eskin MS, MD-Evidence that Breasts Need Larger Amounts of Iodine



- Prof-Ob-Gyn-Drexel Univ. in Philadelphia PA
- Published well over 100 Peer-reviewed journal Articles
- Author &/or Editor of 20 textbooks
- 1960s-recognized iodine was major activator for metabolism of breast and critical for nursing

Breast Cysts & Breast Cancer and Iodine

- Website: www.breastcancerchoices.org 3 cases of breast cancer reversed with iodine (Brownstein)
- Finley-reversed cystic breast disease-1 year with 5 mg daily (Finley, J.W., Bogardus, G.M. Breast cancer and thyroid disease. *Quart Rev Surg Obstet Gynec*, 1960; 17:139-147)
- Numerous rat studies-Eskin-iodine deficiency causes breast abnormalities-cysts & cancer*

*Eskin, B. Mammary gland dysplasia. *JAMA*. 200, 1967.

*Eskin, B. Iodine & mammary cancer. *Adv. In Exp. Medicine & Biology*. Vol.91, 1977

*Eskin, B. et al. Iodine metabolism & breast cancer. *Trans. NY Acad of Sciences*. 32:911-947, 1970,

Organ Preferences for Iodine and Dosage

- Thyroid gland, skin & salivary glands prefer the iodide form*
- Breasts, ovaries and prostate prefer the elemental iodine form (Reason for increased goiter in pubescent females is that as breasts develop, they use more iodine)*
- Therefore, a combination product is probably best
- Dr. Brownstein claims that the combination of the two works much better than just potassium iodide, which he had used previously
- Fat sequesters iodine (not iodide); so that an obese person would require more iodine to reach optimal levels in the breasts, ovaries, prostate, uterus and prostate)

*Eskin, B, et al. Different tissue responses for iodine and iodide in rat thyroid and mammary glands. *Biological Trace Element Research*, 1995, 49:9-19.

Breast Cancer and Iodine

- Iodine deficiency predisposes to breast cancer & high fat diet predisposes to Iodine deficiency. (J Epid Comm Health 2000; 54:851-858.)
- Japan and Iceland have high Iodine intake and low goiter and breast cancer, just the reverse occurs in Mexico and Thailand. (Finley, J.W., Bogardus, G.M. Breast cancer and thyroid disease. *Quart Rev Surg Obstet Gynec*, 1960; 17:139-147.)
- Iodine protects against estrogenic effects in breast cancer. JAMA 1967; 200:115-119, Adv Exp Med Biol, 1977; 91:293-304.
- Thyroid hormone therapy contributes to breast cancer in Iodine deficient women. JAMA , 1976; 238-1124.

Breast Cancer, Iodine and Bromine

- **Female rats require 20 to 40 times** the amount of Iodine needed to control breast cancer & fibrocystic disease than to prevent goiter. (Can J Surg 1993; 36:453-460, Biological Trace Element Research, 1995; 49:9-19.)
- **When Iodine was used in dough during the sixties one slice of bread a day contained the RDA of 150 mcg, average iodine intake was > 700 mcg daily and the breast cancer risk was 1:20.** With the **replacement of iodine** in bread dough by the goitrogen **bromine**, average iodine intake reduced below RDA of 150 mcg and **the rate of breast cancer** increased to **1:8** (Absorption of iodine from bread much better than from iodized salt); Is there a causal relationship?
- To overcome the effects of goitrogens in the food chain such as bromine in dough, amounts of Iodine used in Japan would be necessary. (Hormone & Metabolic Res 1995, 27:450-454.)

Iodine & Japanese

- Highest iodine intake in the world due to seaweed in diet (10 mg or more daily)
- Lowest cancer rate in the world, especially for breast, prostate, ovarian, EXCEPT for stomach
- Stomach cancer probably due to high concentration of nitrates in diet to form nitrosamines' (preserved foods), which blocks uptake of iodine in the stomach
- Japanese move toward western diet-same risks as westerners

Small Thyroids in Iceland-1

- Iodine deficiency makes thyroids enlarge to 20 gms or more
- Japanese thyroids are low in keeping with high iodine intake from seaweed
- Prior to WWI, thyroid glands of Icelandic males 14 gms & women 12 gms (lowest in the world)
- Leftover fish parts were ground up and given to dairy cows as part of their feed
- Breast cancer rate was extremely low

Small Thyroids in Iceland-2

- **40's & 50's**-competition of fishing industry & more efficient harvesting system-↓ fish parts-much less fish to dairy cows
- **1960's**-fish parts to designated countries & amounts of iodine following international standards of iodine intake (level to prevent goiters)
- Breast cancer rate rose 10 times-approaching US breast cancer rate
- Never before had there been such a drop in dietary iodine intake-except when Japanese move to USA and adopt western habits (their breast cancer rates also go way up)

Dr. Brownstein's Breast Cancer Cases in Iodine Book

- 60 y.o. English teacher-Dx breast cancer 1989-No conventional treatment
- Treated with 2 mg Iodine & nutritional program & thyroid hormone with Dx of hypothyroidism
- 1985-Metastatic breast cancer with fatigue, weight loss & increased cancer markers-felt terrible
- Found MD who increased iodine to 50 to 62.5 mg daily
- After 6 weeks on program, repeat PET scan showed tumors disintegrating
- Long-term did well.
- Page 61 of book and follow-up phone call to Dr. B

Dr. Brownstein's Breast Cancer Cases in Iodine Book

- 73 year old dx-2003--declined conventional treatment & took 50 mg of Iodoral daily. Ultrasound of the breast 18 months later showed reduction in size of cancer -2 years later-no evidence of cancer
- 52 year old with breast cancer and no conventional treatment-After 3 years of Iodoral 50 mg per day- mammograms and ultrasound exams show decreasing size of the tumor with no progression
- All patients doing well as of a few months ago

Iodinated Lipids and Cancer: Relationship to Iodine Dosage

- 1976-Rabinovitch-3 levels of iodine in dogs-6 weeks-Iodinated lipids found only in dogs with highest level of iodine
- 1994-Dugrillon reported for 1st time delta iodolactone in a human thyroid following 10-day ingestion of 15 mg of iodide

High Doses of Iodine at 100X RDA

- Forms iodinated lipids, such as Delta-Iodolactone, which causes apoptosis in cancer cells; does not do this in microgram doses of the RDA
- Recent work show strong anticancer activity in breast cancer cells

R.E. Nuñez-Anita, et al. A complex between 6-iodolactone and the peroxisome proliferator-activated receptor type gamma may mediate the antineoplastic effect of iodine in mammary cancer. *Prostaglandins & Other Lipid Mediators, Volume 89, Issues 1-2, June 2009, Pages 34-42*

Iodine Induces Apoptosis in Human Breast Cancer Cells

- Molecular iodine (I_2) is known to inhibit the induction and promotion of *N*-methyl-*n*-nitrosourea-induced mammary carcinogenesis and to regress 7,12-dimethylbenz(a) anthracene-induced breast tumors (rats)
- Iodine induced apoptosis in all of the following cell lines, except MDA-MB-231: Cytotoxicity of iodine on cultured human breast cancer cell lines, namely MCF-7, MDA-MB-231, MDA-MB-453, ZR-75-1, and T-47D.

Schriavastava A, Tiwari, M, et al. Molecular Iodine Induces Caspase-independent Apoptosis in Human Breast Carcinoma Cells Involving the Mitochondria-mediated pathway. *The Journal of Biological Chemistry*, 281, 19762-19771, 2006.

Iodine's Role in Preventing & Treating CV Disease

- 1958: Finland had the highest rate of CAD mortality in Europe
- More prevalent in Eastern Finland compared to Western Finland—Why?
- Researchers checked 47 variables & found greatest statistical difference between East & West was iodine intake
- Risk of death from CAD was 353% higher in individuals with goiter & people with goiter died at a younger age

Increase in Iodine in Finland Results in Decreased CV Mortality

- 1970: looked at elements in drinking water in 21 Finnish cities and strongest correlation was inverse relationship between iodine & CV disease
- Finland added iodine to dairy feed and animal salt
- Past several decades, CV mortality has decreased over 50% and life expectancy has increased by 5 years
- Finland currently has the highest iodine intake of any European country

Rabbits, Atherosclerosis, T4, Desiccated Thyroid & Iodine

- Control rabbits given cholesterol-marked atherosclerosis
- Cholesterol rich diet plus T4 slight atherosclerosis
- Cholesterol rich diet plus either desiccated thyroid or iodine-absence of atherosclerosis
- Iodine has independent positive benefit with cholesterol rich diet and is synergistic with desiccated thyroid
- Potassium iodide loses effect if thyroid gland previously removed

Turner, KB. Studies on the prevention of cholesterol atherosclerosis in rabbits I The effects of whole thyroid and of potassium iodide. *J. Exp Med*, 1933 June 30; 58(1): 115-125. and Ibid. *J Exp Med*. 1933 June 30; 58(1): 127–135.

Cardiac Arrhythmias—Does Iodine Deficiency Play a Role? Amiodarone

- Amiodarone: organic iodine-containing drug used to treat cardiac arrhythmias (Contains 70 mg of Iodine per 200 mg tablet and releases 9 mg per day of Iodine); sustained release form of iodine
- Iodine release may be the active therapeutic agent, while the rest of the molecule accounts for the toxicity factor (though conventional view is that iodine is the toxic factor)

Phillippou G, et. al. *Clinical Endocr*, 1992; 36: 573-578.

- 1998-Amiodarone prescriptions in Europe, N. America & S. America 100 X that of Japan (dietary intake of iodine is 100 X)

Connolly, SJ. Evidence-based analysis of Amiodarone efficacy & safety. *Circulation*, 1999, 100: 2025-34

The Iodine Project-Guy Abraham MD-Begun in 1997

- Became aware of study-5 mg of iodine daily for a year cured cystic breasts with no significant side effects
- Could all the textbooks be wrong about the toxicity of iodine at more than 1 or 2 mg daily?
- Intensive library research: many papers at website: www.optimox.com. Click on iodine research
- Jorge Flechas MD & David Brownstein MD-involved with iodine project

Why are we not all using Iodine?

Medical Iodophobia

- For reasons discussed in this presentation, Dr. **Abraham formulated the concept of “medical iodophobia**
- **“Medical Iodophobia is the unwarranted fear of using and recommending inorganic, non-radioactive iodine/iodide within the range known from collective experience of three generations of clinicians to be the safest and most effective amounts for treating symptoms and signs of iodine/iodide deficiency (12.5 to 50 mg/day)”**
Dr. Guy Abraham, 2004

Forms of Inorganic Iodine

- Iodide-Negatively charged ion or anion (I^-) usually used as potassium iodide or supersaturated potassium iodide (SSKI)
- Elemental iodine-Two atoms of iodine form the elemental iodine molecule (I_2)
- Elemental iodine form is necessary to make thyroid hormones; thyroid cells take in iodide using the symporter system and then convert iodide to iodine using the enzyme thyroid peroxidase (TPO)

The Sodium-Iodide Symporter System in the Thyroid

- Iodide is actively transported into thyroid cells by the Sodium-Iodide Symporter system (Channels into cells)
- 600 mcg per day able to enter the thyroid (4 times the RDA)
- Bromine and other toxins may damage this system
- TSH stimulates formation
- When larger doses of iodine given to deficient patient, TSH may go up for months, but does not require treatment if no hypothyroid sx's present

Dr. Abraham & Dr. Brownstein's Theory of Autoimmune Disease Thyroid Disease

- Thyroid cells take in iodide by the symporter system & convert Iodide to Iodine in the presence of H₂O₂ [derived from oxidative phosphorylation and catalyzed by intracellular calcium] utilizing the Thyroid Peroxidase Enzyme (TPO)
- Too much H₂O₂ damages the TPO enzyme &/or thyroglobulin protein & antibodies are formed against them (autoimmune antibodies) leading to the development of autoimmune disease
- Glutathione peroxidase & selenium are necessary help to break down H₂O₂ to H₂O

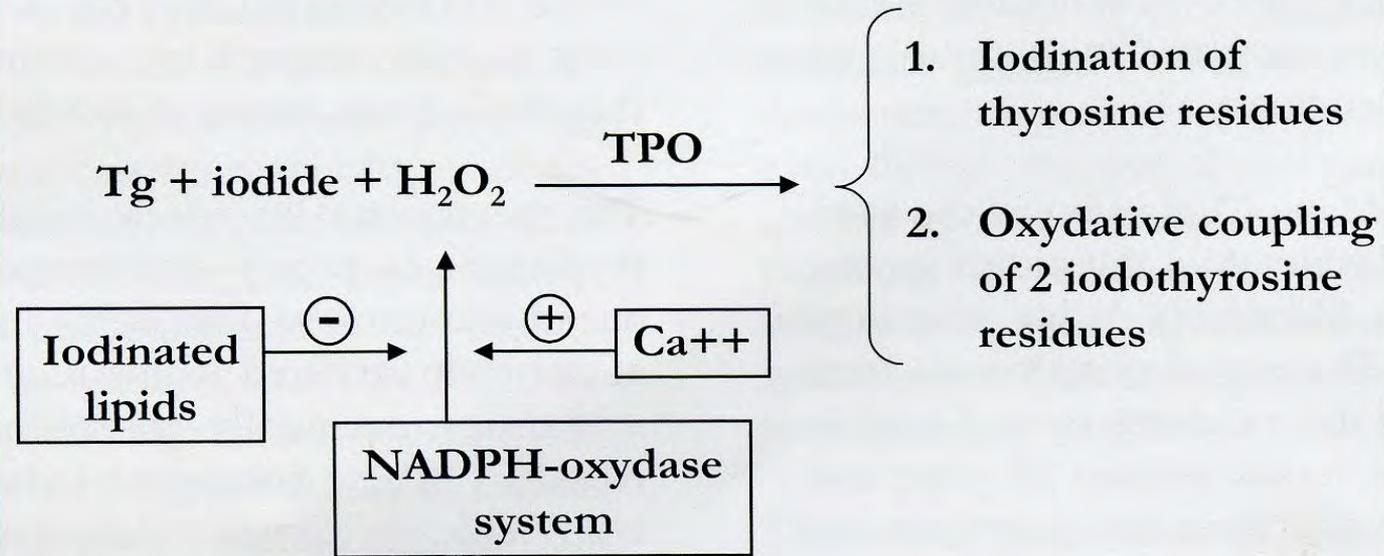
Dr. Abraham & Dr. Brownstein's Theory of Autoimmune Disease Thyroid Disease-2

- Excessive amounts of H₂O₂ may occur with selenium deficiency
- Magnesium reduces intracellular calcium and slows H₂O₂ production
- Iodinated lipids (formed only when dosages of iodine beyond the RDA are taken) inhibit the formation of too much H₂O₂
- Deficiency of magnesium, selenium and iodine **contributes to Hashimoto's thyroiditis & other thyroid autoimmune diseases**

Iodination of Tg by TPO Using H₂O₂ and Iodide (Abraham): Balance is Key

Figure 1

Iodination of Tg by TPO Using H₂O₂ and Iodide



The NADPH-oxidase system which generates H₂O₂ is modulated by free cytosolic calcium and iodinated lipids.

Suggested Protocol for Optimal Iodine Use-Can Administer Protocol before starting Iodine

- At least 2 quarts of unfluoridated and unchlorinated water daily-1/2 body weight in ounces of water daily
- Unrefined Celtic or sea salt-1 to 2 tspf or more daily (Add 1/4 tspf per quart of water)
- Selenium 200 to 400 mcg daily
- Vitamin C 3,000 to 6,000 mg or more daily
- Magnesium : 300 to 600 mg or more daily
- Iodoral: Start 1/2 tablet & increase by 1/2 tablet/ every 2 weeks until up to 1/2 to 4 tablets daily

LEVEL EVIDENCE UNAVAILABLE-RECOMMENDATIONS FROM CLINICAL EXPERIENCE OF DR. BROWNSTEIN & OTHERS

Locations of Iodine in the Body

- Every cell in body contains iodine
- Concentrated in the glandular system
- Found in salivary glands, CSF, the brain* (concentrated in substantia nigra-area of damage in PD), gastric mucosa, choroid plexus, breasts, ovaries and ciliary body of the eye
 - *Adrasi, E. Iodine concentration in different human brain parts. Analytical & Bioanalytical chemistry. November 13, 2003.

Iodine Loading Challenge Test

- Give 50 mg of Iodine & collect urine for 24 hours
- If body iodine is sufficient, excrete 90% of iodine (Several labs do test)
- Use to monitor dose
- Healthy people-90% excretion in 3 months
- Sick people-may take a year or more to obtain normal tests
- If sodium-iodide symporter abnormal, can get false normal reading

Dosage of Iodine

- **Lugol's Solution**-2 drops = 5 mg iodine & 7.5 mg Potassium Iodide
- Available as tablets or capsules (Iodoral 12.5 mg = **2 drops of Lugol's**) = **Biotics Iodizyme (others)**
- Start low and go slow while on detoxification program
- Full dose: 6 mg to 50 mg for most pts
- Cancer patients: may benefit from 50 mg or more
- Loading test helpful to help monitor dose

Contrast RDA & Optimal Amt of Iodine: Dosage is Key!!!!

- Adult Males & Females 150 mcg/day
- Pregnancy 220 mcg/day
- Lactation 290 mcg/day
- Optimal (Abraham-Flechas-Brownstein) 12.5 to 50 mg or more (NOT MCG)
- Japanese women ingest: about 13 mg daily with benefits and no problems
- Forms iodinated lipids-causes apoptosis in cancer cells; does NOT do this in mcg doses
- Recent work show strong anticancer activity in breast cancer cells at higher doses

New Uses of Iodine as a Chaotropic Element to Remove Toxic Metals

- Chaotropic element = increases the solubility of proteins in water and this may be one of the mechanisms involved in the elimination of lead and other heavy metals.
- **Iodine doesn't bind to the metal; rather it changes the structure of water, making the metals more soluble in water. Increases the wetness of water.**

Hatefi Br Y and Hanstein W.G. Solubilization of Particulate Proteins and Nonelectrolytes by Chaotropic Agents, Proc. Natl Acad. Sci. USA, 62:1129-1136, 1969. Cited in Guy Abraham Lecture at Iodine Conference-2007

Iodine Increases Toxic Mineral Elimination

- Iodine (12.5 to 50 mg daily) increases urinary excretion of lead and mercury as early as 24 hours post iodine intake.
- Mixing lead acetate (clear and soluble) and Potassium Iodide (Clear and soluble) forms lead acetate (yellow and insoluble)
- In intestinal tract, when lead from liver binds to iodine, it forms lead iodide, which prevents its reabsorption after elimination by the liver

Abraham, G.E. The Orig. Int. 12(2):57-66, 2005

Chinese Human Study on Iodine and Lead Poisoning-1999

- KI added to table salt at a concentration of 1% (10 mg per gram of salt) on 50 workers exposed to high lead levels
- Following iodide supplementation, urine lead levels increased significantly by the 3rd day and reached peak levels after 9 days. Urine lead concentrations reached normal values by the 4th week.
- Lead levels were 43.5 micrograms % pre and 17.6 micrograms percent post intervention. The upper limit of blood lead considered safe in the work place is 20 micrograms/Liter.
- Mean hemoglobin concentrations increased from 10.1 to 12.8% ($p = 0.05$).

Chinese Human Study on Iodine and Lead Poisoning-1999 (2)

- All parameters of lead toxicity improved markedly. With an estimated ingestion of 10 gms of salt, these workers received 100 mg KI containing 75 mg iodide

Hu et al. 1999

Effects of Iodine on Thyroid Medication Dosage

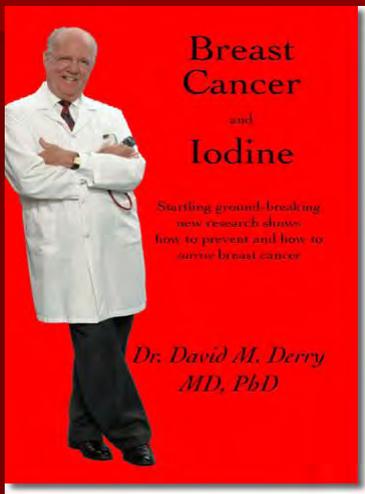
- 1/3 off thyroid hormones
- 2/3 stay on, possibly lower dosage
- Iodine insufficient hypothyroid pts have increased cancer risk of cancer if given thyroid without iodine
- Both Iodine and Desiccated thyroid may be needed for optimal effects, especially in CA pts

David M Derry, MD, PhD-Advocate for Use of Iodine and Thyroid Support



- 1962-MD-Univ British Columbia
- 1967-PhD-Biochemistry-McGill
- 1967-1972: Basic research & taught medical students-Univ of Toronto-Asst Professor
- 1972-General practice in Victoria British Columbia
- 1973-1984: Interest in vitamins, Linus Pauling work
- 1984-Interest in thyroid problems and later iodine
- 2001: Book *Breast CA & Iodine*
- 2002-Medical license suspended

David Derry MD, PhD-Breast Cancer & Iodine-Book Published 2001



Dr. Schachter has no financial interest in this book

- Iodine and evolution-Unicellular organisms don't use iodine
- How iodine kills bacteria, viruses, etc...Combines with tyrosine & histidine of cell wall & denatures proteins
- Iodine is trigger for apoptosis for CA cells
- Iodine & thyroid act as team to prevent & treat cancer
- Iodine: 1st phase up to Ca-in-Situ-apoptosis
- Thyroid strengthens connective tissue & helps prevent invasion & metastases
- Thyroid helps other glands to permissively function better
- Reacts with allergenic proteins to reduce allergies and autoimmunity

Dr. Derry's View on TSH

- TSH-poorly correlated with hypothyroid sx's
 - Too sensitive; under treatment; 1/3 previous dosage to reduce symptoms (1 Gr instead of 3 or 4)
- 1st part 20th century-treatment-based on sx's
- Before 1960-CPK, cholesterol, BMR used
- CFS & fibromyalgia-**paper in 1930's**-hypothyroid; cleared if treated early-later chronic and difficult to treat; if chronic long time to resolve sx's (months)
- Search for reliable lab test-**RAI in the 40's, 60's**
PBI, , T4, finally TSH in 1973-4

Dr. Derry on the Thyroid Gland

- Develops 22nd day of life, same time as CNS
- First gland to develop & most important
- Turns genes on and off-Key to CNS development
- Thyroid hormone helps communication among cells, organs and organ systems
- View on cancer related to work of Dr. David Clarke, Jr-2 phases of cancer-up to CA-in-situ (occult Ca) & spread of cancer within Connective tissue
- Thyroid strengthens CT-decreasing spread (myxedema characterized by weak CT & mucin accumulation)
- Cancer pts to receive enough TH to make comfortable; cut back if ↑ thyroid sx

Local Regulation of Thyroid Hormone

- Thyroid hormone regulated locally to various organs
- One regulation is deiodinase ($T4 \rightarrow T3$); different deiodinases in different organs
- Example: starvation; brain deiodinase upregulated 10x and liver deiodinase ↓
- Symptoms associated with various organs
- High enough dose allows TH to correct sx's.

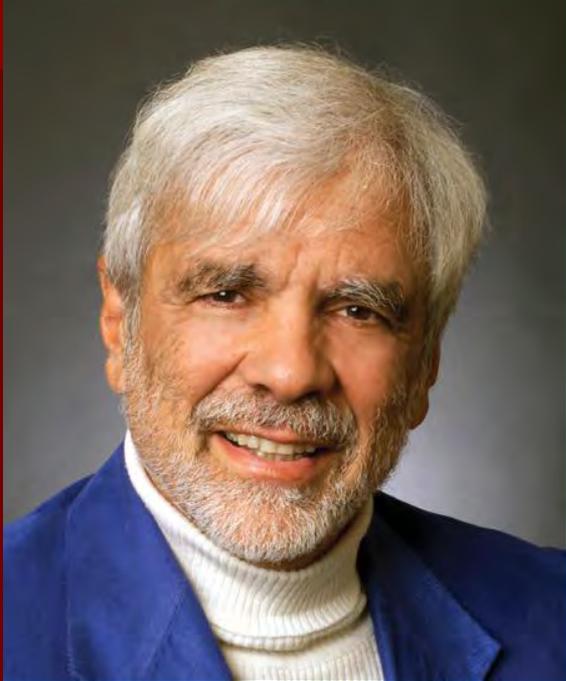
Dr. Derry's Views on Iodine

- Only chemical element with 2 meteoric rises 100 years apart (1820's and 1920's) in popularity & use by medical establishment; due to side effects of high doses & probably deficiencies of necessary nutrients
- At same time-in between & after fell into obscurity, in spite of its importance to vertebrates & especially humans
- Single cell organisms-no iodine
- First signs in algae-allowed for development of multicellular organisms
- Seaweed concentrates iodine 20,000 times the ocean concentration
- **Discusses evolution of nucleus, mitochondria, etc...**
- No mechanism for reabsorption of iodine

Properties of Iodine According to Dr. Derry

- Trigger for apoptosis of abnormal cells
- Anti-bacterial, anti-viral, anti-fungal, anti-parasitic
- Coats proteins to prevent allergies & autoimmunity
- Deactivates poisons in stomach
- Necessary for formation & secretion of thyroid
- Necessary for structure & organization of organs **other than thyroid (breast, ovaries, etc...)**
- Combines with lipids to prevent oxidation when traveling through body
- Crucial for pregnancy and lactation

Jonathan Wright MD



- Pioneer in integrative medicine in state of Washington
- Written many books & articles
- Has a newsletter Nutrition & Healing
- Gives courses in nutritional use of supplements for physicians with Alan Gaby MD
- Presenting at this conference
- One of few nutritional MD's who strongly advocated iodine (SSKI) for a variety of conditions

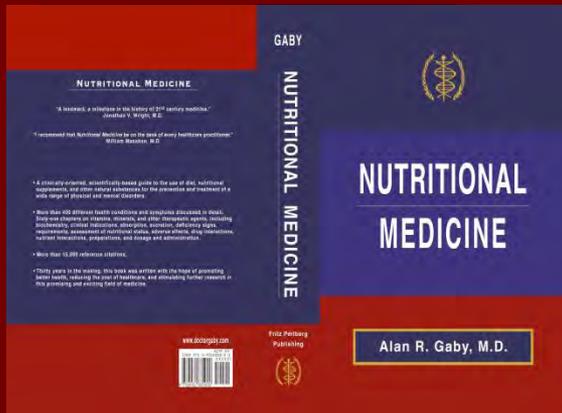
J. Wright Newsletter: Nutrition and Healing: Vol. 12, Issue 4; May 2005

- Why you need 83 times more of this essential, cancer-fighting nutrient than the “experts” say you do
- *“Even if you’re eating a healthful diet, taking a good multivitamin/mineral supplement, and all your major health markers are within normal ranges, you should still reconsider your intake of this nutrient.”*
- The RDA barely scratches the surface
- Reluctant to go beyond 20 mg daily
- Long time advocate of use of SSKI for a variety of conditions: 1 drop of SSKI = 50 mg of I

Alan Gaby MD Questions Value of Relatively High Doses of Iodine



- Expressed concern in article in Townsend Letter re: routine use of megadose iodine therapy (Primarily concerned with Abraham arguing that high doses of iodine good for everyone)
- Cited published research –iodine might increase hypo & hyperthyroidism & autoimmune thyroiditis
- Criticized use of term orthoiodosupplementation until high dosages proven safe & effective
- Said Lugol's solution was used primarily for infections & hyperthyroidism & not as general treatment



• Order online:

www.doctorgaby.com/order.php

• MBS No financial interest

Alan Gaby MD Questions Value of Relatively High Doses of Iodine-2

- Questioned how closely possible adverse effects were monitored by Brownstein at his clinic
- Advocated a systemic study for adverse side-effects
- Suggested some benefits may have been due to removal of bromine from patients (Brownstein would agree)
- Suggests high dose iodine therapy (higher than doses recommended by Brownstein & Abraham) were abandoned for heart failure & suggests again doses might be problem long term

Abraham & Brownstein Respond to Gaby

- Drs. Abraham & Brownstein wrote two long rebuttals to Gaby with several references
- Articles can be found online at Townsend **Letter's website: See:**
- <http://www.townsendletter.com/AugSept2005/gabyiodine0805.htm>
- All 4 articles can be accessed from this website
- My experience generally verifies Abraham & **Brownstein's views, though Gaby's points need further evaluation**

Extrathyroidal Benefits of Iodine by Donald W. Miller MD

- Prof of Surgery-University of Washington School of Medicine
- **“growing evidence that iodine provides important extrathyroidal benefits when taken in milligram amounts, in doses 100 times more than its RDI”**
 - Miller Jr., DW. Extrathyroidal benefits of iodine. J. of American Physicians & Surgeons, Vol 11 (4), Winter 2006.

National Health & Nutrition Survey (NHANES): Re-emergence of Iodine Deficiency

- Iodine levels in the United States declined 50% during the past 30 years (1971-2000)* as measured by iodine in urine (Proportion of US population with moderate to severe iodine deficiency has gone from 2.6% in 1970 to 11.7% in 2000 and 16.8% in 2005).
- During this time, thyroid cancer and other thyroid illnesses, breast cancer , prostate cancer, uterine endometrial cancers and ovarian cancers all have increased dramatically; Iodine deficiency can cause all of these problems as shown by correlation studies of goiter with these conditions

Hollowell, JE et al. Iodine nutrition in the US. Trends and public health implications: Iodine excretion data from NHANES I and III (1971-74 and 1988-94). *J Clin Endocrinol Metab* 83:3401-3408. 1998 & *Thyroid* 15:692-9, 2005.

Iodine in Pregnant Women

- Nearly 17% of US women of childbearing age had moderate to severe iodine deficiency (*Thyroid* 15: 692-9, 2005)
- **“More than 70% of women with access to dietary iodine may remain at risk for unrecognized iodine deficiency during pregnancy” and most prenatal multivitamins lack adequate iodine; only 28% of prescription prenatal vitamins contain iodine (Family Practice News: 11-13-08)**
- **Low iodine during pregnancy plays role in lower IQ’s, ADD & ADHD, health problems and probably autism**
- **Brownstein declares this to be: “a public health disaster that is unparalleled!”**

Pregnant Women in Boston

- 100 consecutive pregnant women
- 50% were taking less than the RDA of iodine of 220 mcg per day
- 9% were below 50 mcg per day (WHO classifies below 50 as moderate to severe iodine deficiency)

Thyroid 2004, 14, 327-8.

Iodine in Breast Milk

- 47% of women sampled showed levels of iodine in milk insufficient to meet infants requirements- J. Clin Endocrin. & Metabolism-check year
- 13 breast feeding women [12/13 (92%) inadequate iodine]
- 9/13 (69%) had high concentrations of perchlorate (goitrogen-inhibition of iodine)

Env Sci andTech, Vol 42, No 21, 2008

Most Prenatal Vitamins Lack Proper Amount of Iodine

- Most prenatal vitamins do not contain any iodine
- Ones that do have considerably less than RDI for pregnant women
- Boston New England Journal of Medicine suggest that some prenatal vitamins do not contain the amount of iodine that they should.
- Researchers from the Boston University Iodine Research Laboratory tested as many as 60 different brands of prenatal vitamins, finding that the majority of them that contained iodine, did not contain as much as was implied on their labels.

Beginning Iodine Supplementation at Various Stages of Pregnancy

- Three groups of pregnant women started on 200 mcg per day of Potassium iodide at different stages of pregnancy
 - Group 1-Started at 4th to 6th week of pregnancy
 - Group 2-Started at 12 to 14 weeks of gestation
 - Group 3-Supplementation started only after delivery
- All of babies given a neurocognitive evaluation at 18 months of age
- Mothers continued iodine until lactation finished
- The earlier the iodine was started, the higher the IQ at 18 months

Thyroid Vol 16, 2006 or 2008, pages

ADHD in Offspring of Mild-Mod. Iodine Deficiency-in Italy

- 10 yr period: prospective study of the neuropsychological development of the offspring of 16 women from a moderately iodine-deficient area (A) & 11 control women from a marginally iodine-sufficient area (B)
- Attention deficit and hyperactivity disorder (ADHD) was diagnosed in 11 of 16 area A children (68.7%) but in none from area B
- Major IQ difference: 92 vs 110
- F. Vermiglio, V. P. Lo Presti, et al. Attention Deficit and Hyperactivity Disorders in the Offspring of Mothers Exposed to Mild-Moderate Iodine Deficiency: A Possible Novel Iodine Deficiency Disorder in Developed Countries, *The Journal of Clinical Endocrinology & Metabolism* Vol. 89, No. 12 6054-6060, 2004

Iodine deficiency, more than cretinism and goiter

- Hypothesis that iodine deficiency may give rise to subtle impairment of thyroid function leading to clinical syndromes resembling hypothyroidism or diseases that have been associated with the occurrence of hypothyroidism.
- Suggest that iodine deficiency may be associated with: obesity, attention deficit hyperactivity disorder (ADHD), psychiatric disorders, fibromyalgia, and malignancies

Verheesena,RH & Schweitzerb, CM. **Iodine deficiency, more than cretinism and goiter**, *Medical Hypothesis*; 71 (5), 645-648, 2008

Why Are USA Citizens Deficient in Iodine?

- Large areas of US-very low iodine in soil
- Fear-salt causes high blood pressure
- < 50% of households use iodized salt
- Substitution of bromine for Iodine in bread
- Iodine in dairy products drastically reduced
- **Don't eat seaweed & do eat soy**
- Exposures to goitrogens (halogen family elements: fluoride, bromide, chlorine and perchlorate)

Goitrogens

- Any chemical or food substance that interferes with the formation of thyroid hormones
- Chemicals: Polychlorinated biphenyls (PCBs), organophosphate & organochlorine pesticides, dioxin by products, organochlorine chemicals, thiocyanate
- Foods: Millet, cassava, Brassica family (cabbage, brussel sprouts, broccoli) (cyanoglycosides yielding thiocyanate)

Perchlorate

- Comes from making rocket fuel & other manufacturing
- Dumped into water supplies
- Massive contamination of water in various parts of the USA (southern CA and Colorado River basin: gets on crops from these areas)
- Gets into food supply and winds up in **mothers' milk**
- Goitrogen and very toxic

Bromide-A Competing Halogen



Antoine Jerome Balard
(1802-1876)-French
Chemist-Discovered
Bromine in 1826

- Term bromide comes from the Greek work “bromos” meaning “stench”
- Bromine is a red, dense liquid with a sharp, distinctive smell. It is poisonous and is extremely corrosive to skin

Bromide-A Competing Halogen 2

- Competes with iodine for absorption and reduces iodine in thyroid and skin
 - Pavelka, S. High bromine intake affects the accumulation of iodide in the rat thyroid & skin. *Biol. Trace elem. Res.* 2001. summer: 82 (1-3): 133*
 - **Binds to iodine receptors and blocks iodine's action; replaces iodine in thyroid gland and causes hypothyroidism-**thyroid tests can't distinguish****
 - Buchberger, W. Effects of sodium bromine on the biosyntheses of thyroid hormones and brominated/iodinated thyronines. *J. Trace Elem. Elec. Health Dis.* Vol. 4. 1990, p25-30.*
 - Iodine deficiency causes bromine to be more toxic
- * Cited in Brownstein D. Salt Book

Exposure to Bromides

- Major bromine and bromide exposure in the USA
- Baked goods (they used to contain iodine as decaking agents, **but it was replaced by bromide in the 80's**); **All non-organic** bread, bagels, cakes, cookies, etc..)
- Some soft drinks, such as Mountain Dew & some Gatorades
 - Horowitz, B. Bromism from excessive cola consumption. *Clinical Toxicology*, 35(3), 315-320, 1997.
- Pesticides (PCBs and others) on non-organic fruits and vegetables
 - Van Leewen, FX. The toxicology of bromine ion. *Crit. Rev. Toxicol.* 1987; 18:189-213.
- Hot tubs
- Fumigants of produce
- New cars, fabrics, flame retardants and many other environmental exposures
- Medications-[e.g. For Asthma-Atrovent Inhaler, Atrovent Nasal Spray, Ipratropium Nasal Spray, Pro-Panthine (bladder dysfunction)]

Toxic Effects of Bromine/Bromides (Bromism)

- Feelings of lethargy and dullness
- Depression
- Headaches
- Irritability
- Delirium
- Psychomotor Retardation
- Hallucinations
- Schizophrenia

Levin, M. Bromide psychosis: four varieties. *Am J Psych.* 104: 798-804, 1948.

Pharmacokinetics of Bromine

- Half-life of bromine-humans-12 days
 - Soremark, R. Excretion of bromine ions by human urine. Acta Physiol. Scand. 50,306, 1960.
- Rats-half-life bromine-3 days
- On low salt diet-half life bromine 25 days-833% increase
- Toxic bromine stays in body much longer with low-salt diet
- Need adequate chloride (NaCl) to rid body of bromine (low Cl-increases Br reabsorption in kidneys)
 - Rauws, AG. Pharmacokinetics of bromine ion-an overview. Chem. Toxic Vol21, No1, 379, 1983.

How To Get Rid of Bromine

- Stop inorganic baked goods, fruits and vegetables
- Reduce environmental exposures as much as possible
- Drink good quantities of pure water (wt in lbs divided by 2) in ounces
- Ingest 1 to 2 tspf daily of unrefined salt
- Ingest optimal amounts of iodine supplement containing iodide and iodine
- Take large doses of vitamin C
- Ingest at least 200 to 400 mcg Selenium daily
- **Brownstein:** "It is nearly impossible to optimize the detoxification pathways in the liver when the patient is on a low-salt diet. Unrefined salt should be part of any healthy eating plan."

Worldwide Iodine Deficiencies

- Worldwide-soil in large geographic areas is **deficient in iodine. 29% of world's population in 130 countries**
- WHO: Iodine deficiency-**world's greatest single** cause of preventable mental retardation & is # 1 cause of under functioning intellect. J Clin Endocr and Met 1998; 83:3401-08
- Iodine: most deficient trace mineral in the world. 1/3 of all peoples are deficient. J Clin Endocr and Met 1998; 83:3398-3400

Worldwide Iodine Deficiency

Iodine Deficiency	None	Mild	Moderate	Severe
Median Urine Iodine, mcg/Liter of spot urine	> 100	50-99	20-49	< 20
Goiter prevalence	< 5%	5-20%	20-30%	> 30%
Neonatal TSH > 5 IU/ml Whole Blood	< 3%	3-20%	20-40%	> 40%
Cretinism	0	0	+	+

Adapted from the World Health Organization (WHO)/United Nations Children's Fund (UNICEF)/International Council for Control of Iodine Deficiency Disorders (ICCIDD). (From Medscape 8-09)

Possible Clinical Indications for Therapeutic Iodine Use

- Cancer-especially breast, prostate, uterine
- Thyroid conditions
- Cardiovascular conditions
- Allergies
- GI conditions
- Cystic breasts, diabetes, infertility and other endocrine imbalances
- Infectious diseases (All)
- Neurological & psychiatric conditions

Summary

- Use of unrefined salt & milligram doses of iodine remains controversial
- Evidence presented that using unrefined salt and milligram doses of iodine under the proper conditions should significantly improve patient care
- Recommended that various sources of information be reviewed and evaluated