Holistic Medicine for the 21st Century

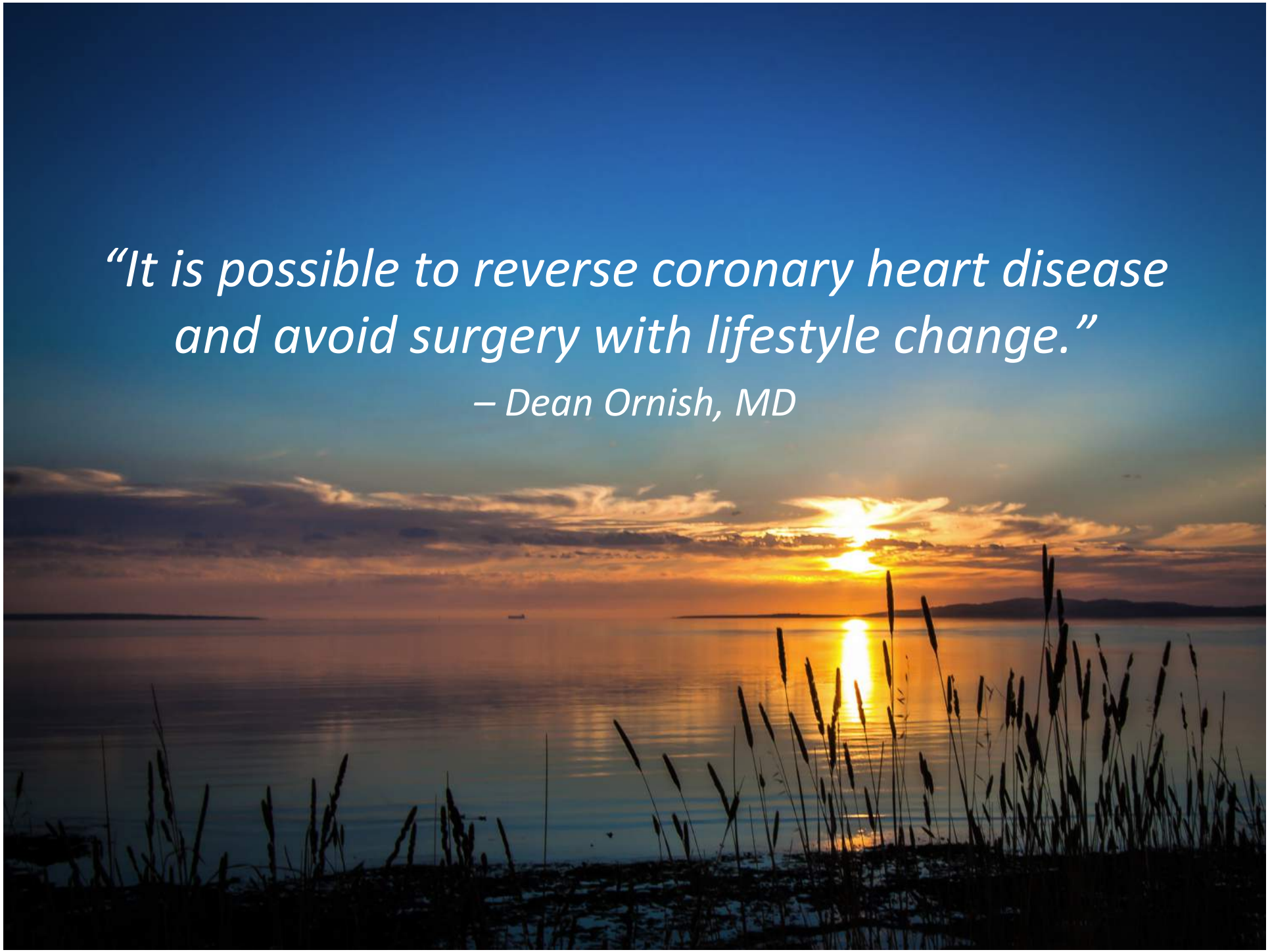
David Brownstein, M.D.
Center for Holistic Medicine
5821 W. Maple Rd. Ste. 192
West Bloomfield, MI 48322
248.851.1600
www.drbrownstein.com

Leo Tolstoy

"I know that most men, including those at ease with problems of the greatest complexity, can seldom accept even the simplest and most obvious truth if it would oblige them to admit to the falsity of conclusions they have delighted in explaining to their colleagues."

Medical Iodophobics Claim Iodine Causes….

- AIT
- Hypothyroidism (IIH)
- Hyperthyroidism
- Brain Melting
- Locusts, frogs, plague, darkness, and more
  - See Passover


“It is possible to reverse coronary heart disease and avoid surgery with lifestyle change.”
– Dean Ornish, MD

Medical Iodophobia

"Medical iodophobia is the unwarranted fear of using and recommending inorganic, non-radioactive iodine/iodide within the range known from the collective experience of three generations of clinicians to be the safest and most effective amounts for treating symptoms and signs of iodine/iodide deficiency (12.5-50mg/day)."

Dr. G. Abraham, 2004

William Beaumont Hospital - Troy
Diagnostic Radiology

Patient Name	DOB: 11/20/36	Patient No.	FC	Room No.	Exam Date
[redacted]		1537204-29	16	OP	05/18/04 0821

** DAVID BROWNSTEIN M.D.
5821 W. MAPLE ROAD #192
WEST BLOOMFIELD MI 48322-2274

RONALD ROTHENBERG D.O., REQUESTO
909 W MAPLE, #100
CLAWSON MI 48017
FAX: (248) 435-7630

REPORT

THYROID ULTRASOUND 5/18/04:

INDICATION: 784.1.

Ultrasound examination of the thyroid is performed. The right thyroid lobe measures 1.2 x 4 x 1.4 cm in width, length and AP dimensions. 5 x 6 x 4 mm relatively isoechoic solid nodule is identified medially within the right upper thyroid lobe. The left thyroid lobe measures 1.1 x 4.3 x 1.2 cm, and width, length, AP dimensions. Note is also made of a 6 x 5 mm and adjacent 10 x 7 x 10 mm hypoechoic solid nodules inferiorly located within the left thyroid lobe.

CONCLUSION:

Small right upper as well as couple left lower hypoechoic solid thyroid nodules are identified. The largest measures approximately 10 x 10 x 7 mm in size, inferiorly located within the left thyroid lobe. Considerations can be given to obtaining a nuclear medicine thyroid examination for further evaluation.

Exam Location

House Officer

Attending Radiologist
Paul Harris, M.D.

HDS

Typed By	Date	Name of Report Complete
PH /	D: 05/18/04 T: T:	XRY UN Thyroid Ultrasound

William Beaumont Hospital - Troy
Diagnostic Radiology

Patient Name	DOB: 11/20/36	Patient No.	FC	Room No.	Exam Date
[redacted]		1537204-31	16	OP	11/29/04 1004

** DAVID BROWNSTEIN M.D.
5821 W. MAPLE ROAD #192
WEST BLOOMFIELD MI 48322-2274

RONALD ROTHENBERG D.O., REQUEST
909 W MAPLE, #100
CLAWSON MI 48017
FAX: (248) 435-7630

REPORT

THYROID ULTRASOUND DATED 11/29/2004:

HISTORY PROVIDED: Compare nodules.

Reference examination 05/18/2004.

The right lobe measures 1.1 x 1.5 x 4.1 cm and the left 1.2 x 1.1 x 3.9 cm. The echo texture appear homogeneous. Previously described left inferior pole 1 cm nodular hypoechogenicity with possible adjacent smaller focus is not identified on the current exam. The 5 mm area of vague decreased echogenicity in the right medial superior pole is also not re-demonstrated.

IMPRESSION:

Previously described nodules not identified on the current exam.

Exam Location

House Officer

Attending Radiologist
Ming Lin Hsieh, M.D.

HDS

Typed By	Date	Name of Report Complete
MLH/km	D: 11/29/04 T: 11/29/04 T: 11/29/04	XRY Thyroid/Parathyroid Ultrasoun

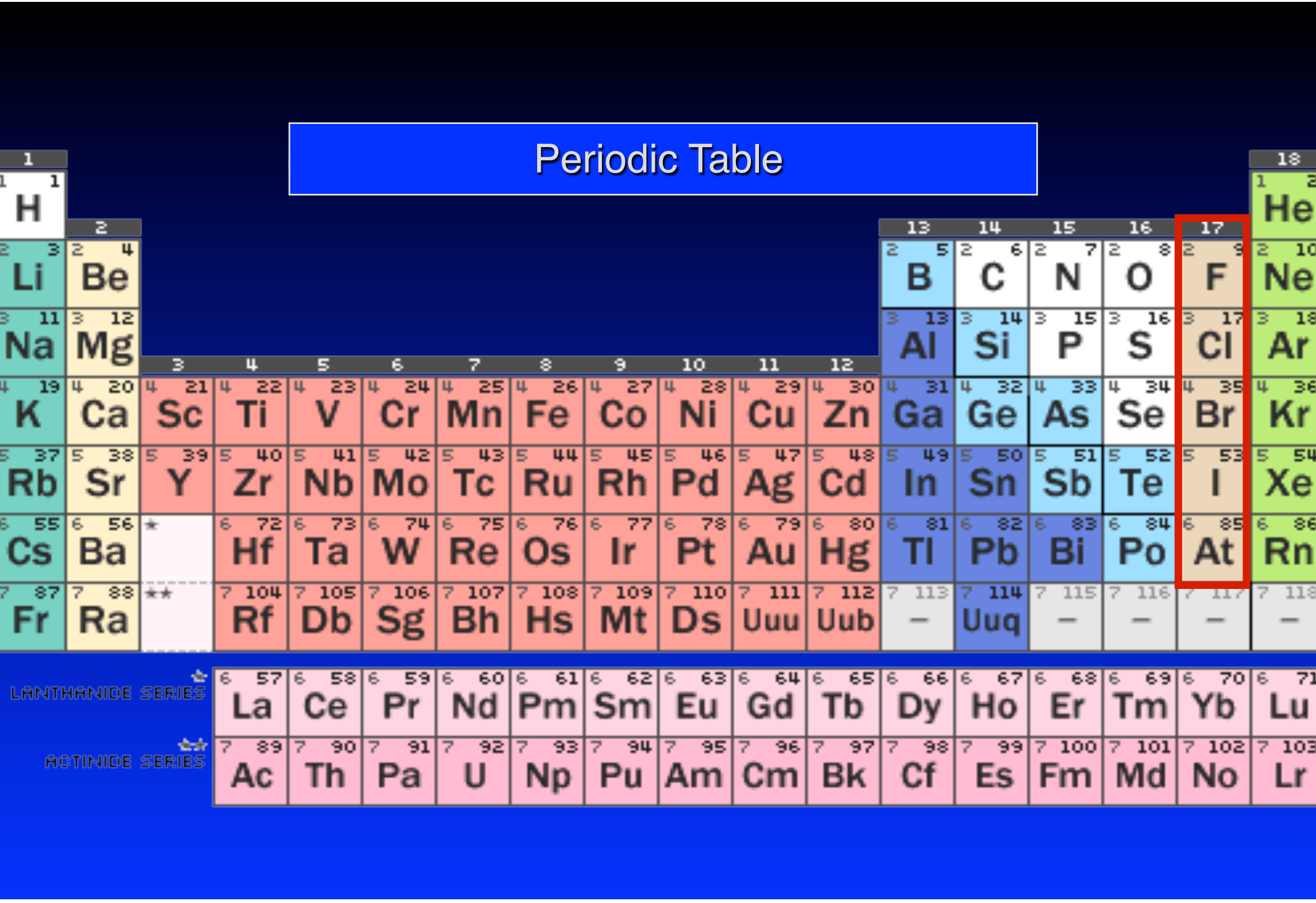
Thyroid Nodules and Iodine

- Both benign and malignant thyroid nodules have significantly less iodine than normal thyroid tissue

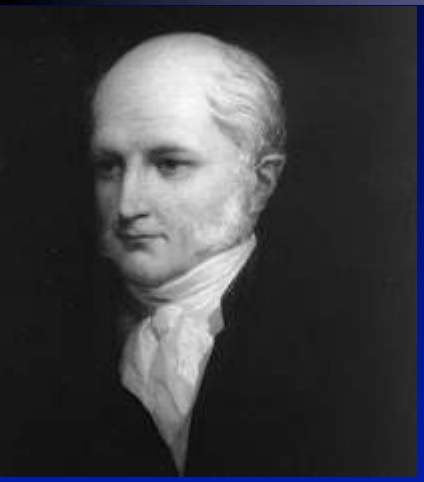
Benign thyroid nodules contain 56% of the iodine content as compared to normal thyroid tissue

Malignant thyroid nodules contain 3% of the iodine content as compared to normal thyroid tissue

Analyst. March 1995, Vol. 120


Periodic Table
1
18
H
He
2
13
14
15
16
17
Li
Be
B
C
N
O
F
Ne
Na
Mg
Al
Si
P
S
Cl
Ar
3
4
5
6
7
8
9
10
11
12
K
Ca
Sc
Ti
V
Cr
Mn
Fe
Co
Ni
Cu
Zn
Ga
Ge
As
Se
Br
Kr
Rb
Sr
Y
Zr
Nb
Mo
Tc
Ru
Rh
Pd
Ag
Cd
In
Sn
Sb
Te
I
Xe
Cs
Ba
★
Hf
Ta
W
Re
Os
Ir
Pt
Au
Hg
Tl
Pb
Bi
Po
At
Rn
Fr
Ra
★★
Rf
Db
Sg
Bh
Hs
Mt
Ds
Uuu
Uub
—
Uuq
—
—
—
—
LANTHANIDE SERIES
La
Ce
Pr
Nd
Pm
Sm
Eu
Gd
Tb
Dy
Ho
Er
Tm
Yb
Lu
ACTINIDE SERIES
Ac
Th
Pa
U
Np
Pu
Am
Cm
Bk
Cf
Es
Fm
Md
No
Lr

History of Iodine



- Discovered in 1811
  - First used by Dr. William Prout (1816) in London for a patient with goiter

J. Royal Soc. Of Med. 2011;104:15-18

History of Iodine

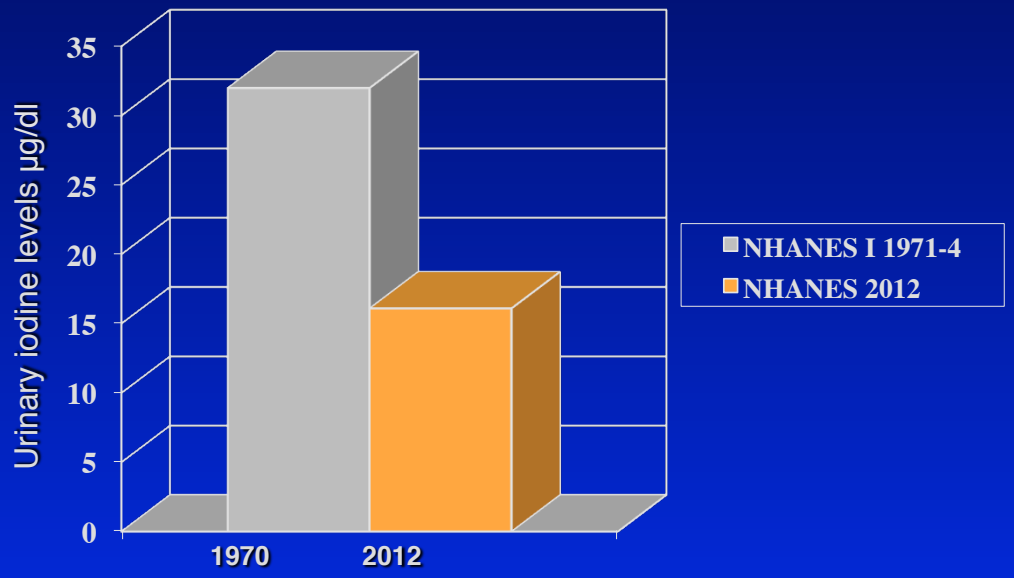
- Birth of western medicine
  - Boussingault (1824) observed that goiter did not occur at many silver mining sites
  - The use of iodine for treating goiter was the first time that a single item (iodine) was used to treat a specific illness (goiter)

RDA for Iodine

Life Stage	RDA
Adult Male	150µg/d
Adult Female	150µg/d
Pregnancy	220µg/d
Lactation	290µg/d

National Health and Nutrition Survey

- 1971-2012 NHANES showed iodine levels declined **50%** in the United States

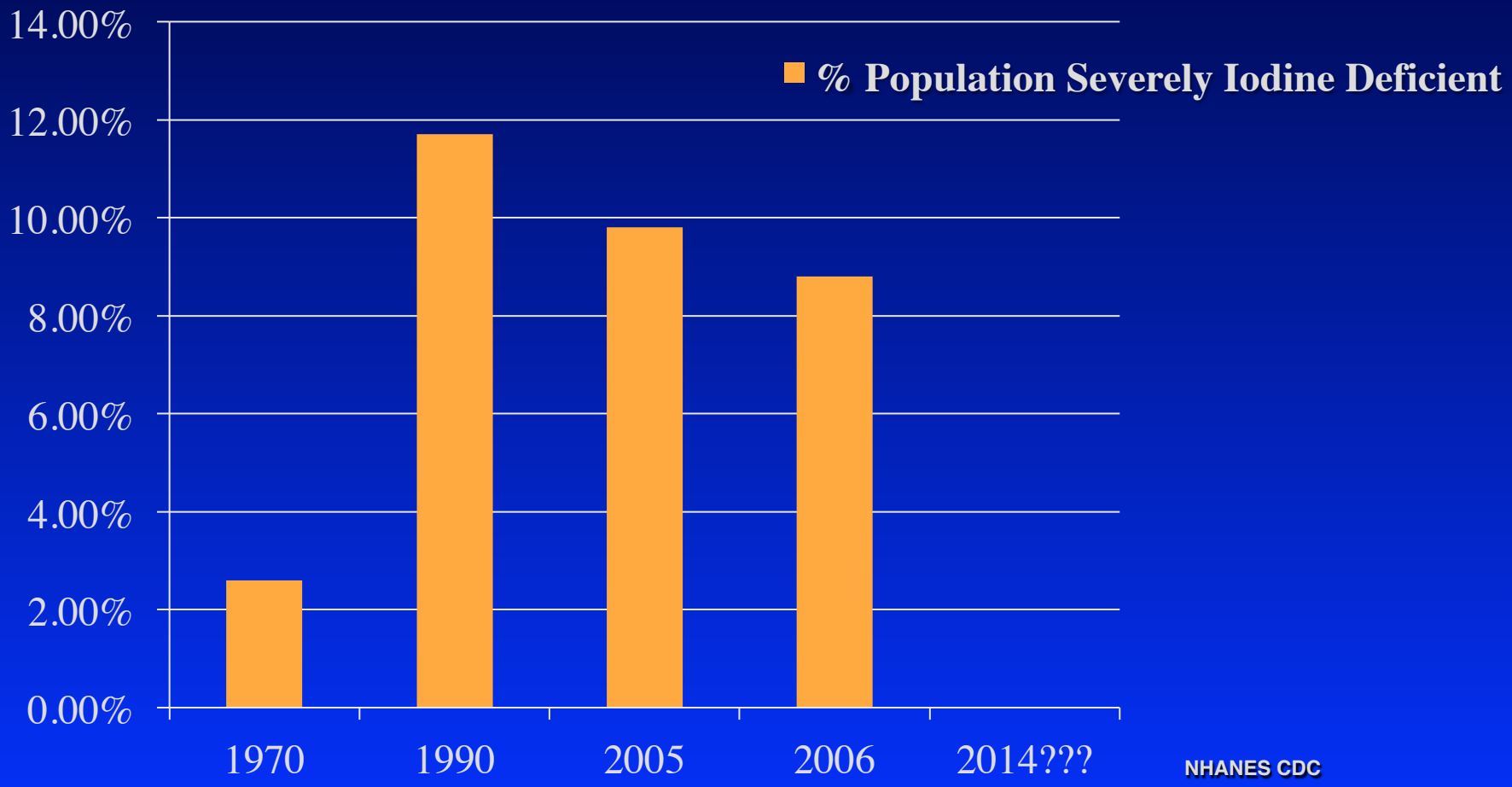


http://www.cdc.gov/nutritionreport/pdf/Nutrition_Book_complete508_final.pdf#zoom=100

National Health and Nutrition Survey

- 1971-2012 NHANES showed iodine levels declined 50% in the United States
- During this time, increased incidence of:
  - Thyroid illnesses (hypo, autoimmune, cancer)
  - Cancers of the breast, prostate, endometrium, pancreas, and ovaries
- All of the above conditions can be caused by iodine deficiency.

Severe Iodine Deficiency in U.S. From 1970-2006



NHANES CDC

Thyroid 2011. Vol. 21. Number 4, 2011

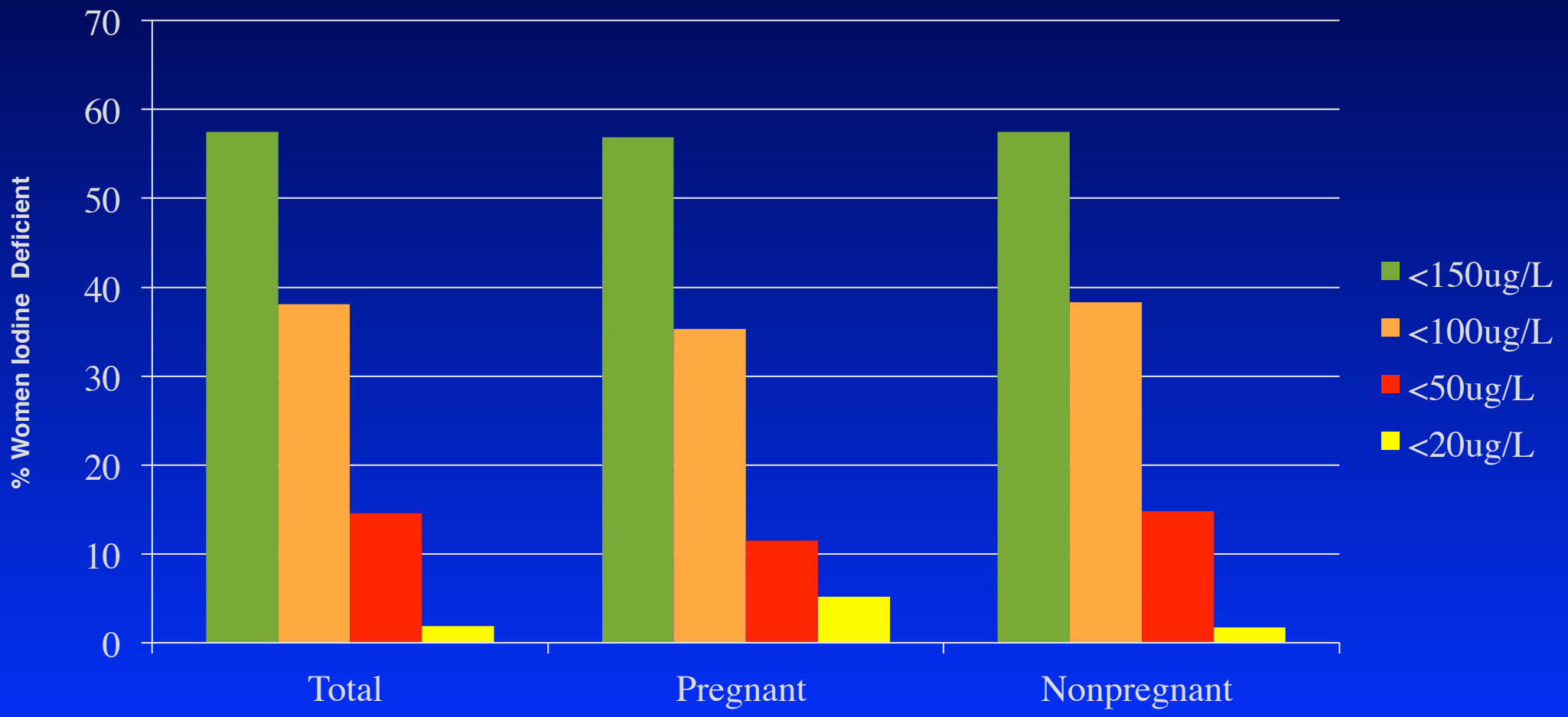
Iodine Deficiency in UK

- 737 14-15 year old girls in UK
- Urinary samples

70% of samples below 100ug/L and 18% below 50ug/L.

Presented at Society for Endocrinology
BES 2011: April 11, 2011-14.

Iodine Deficiency and Women of Childbearing Age: NHANES 2005-8



Thyroid. Vol. 21 N. 4. 2011

The Importance of Ensuring Optimal Prenatal Iodine Intake [1]

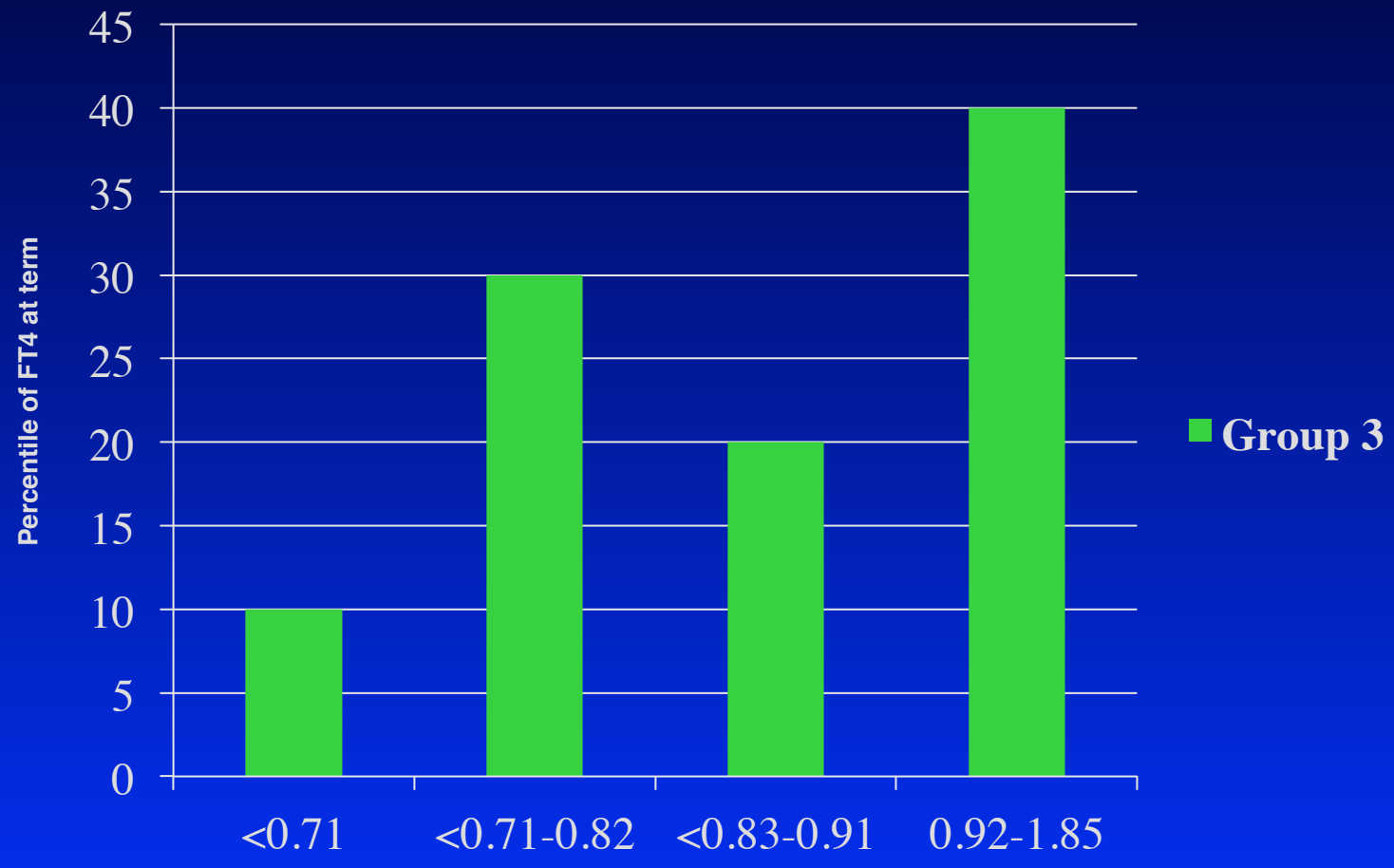
- Three groups of children
  - Group 1: Supplemented with KI (200ug/day) at 4-6 weeks gestational age.
  - Group 2: Supplemented with KI (200ug/day)at 12-14 weeks gestational age
  - Group 3: No iodine supplementation during gestation. Supplemented with 200ug/day after delivery

All groups supplemented with KI until end of lactation.

All children given a neurocognitive evaluation at 18 months of age

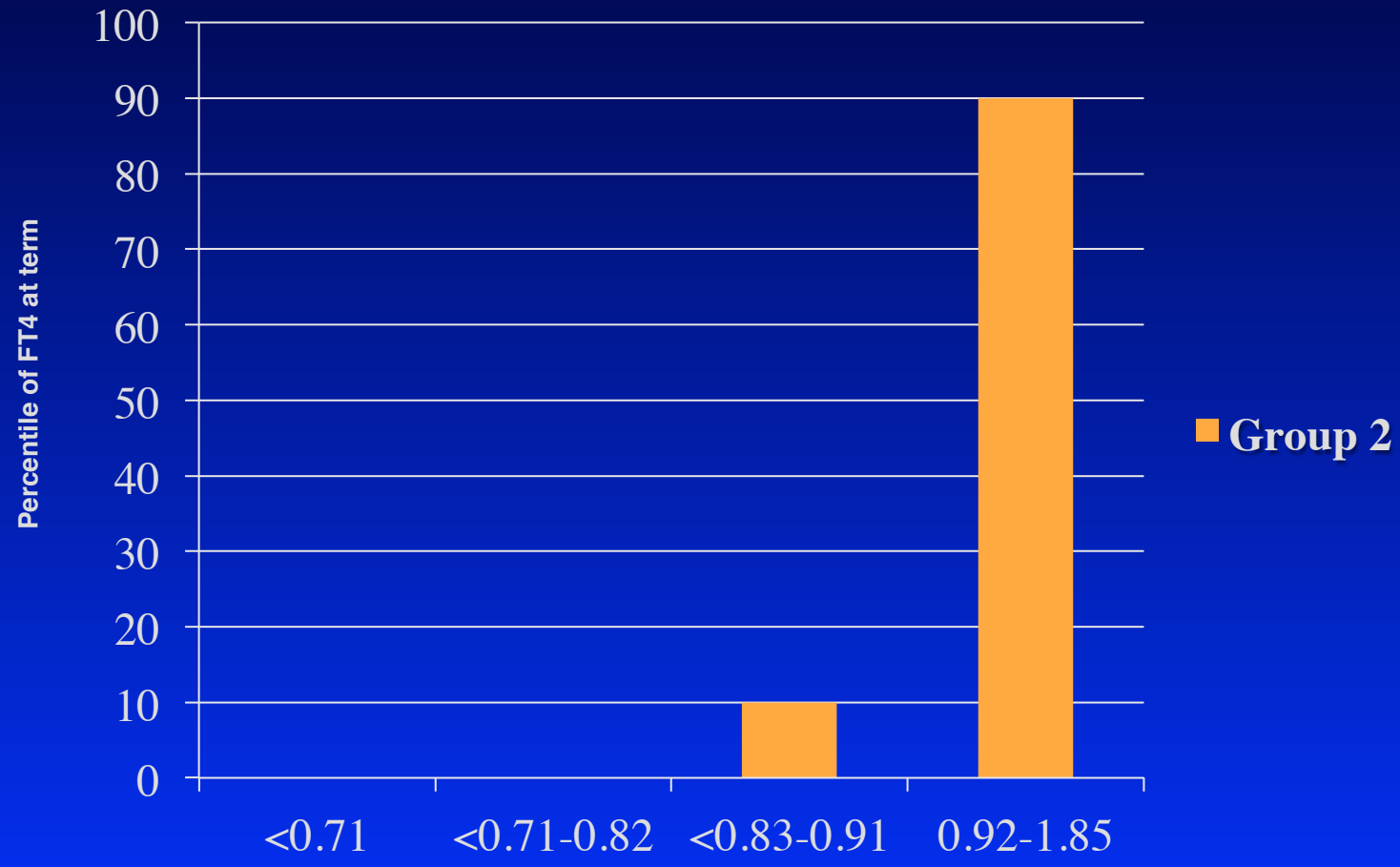
Thyroid.Vol. 19. N. 5. 2009. 511-519

The Importance of Ensuring Optimal Prenatal Iodine Intake [2]



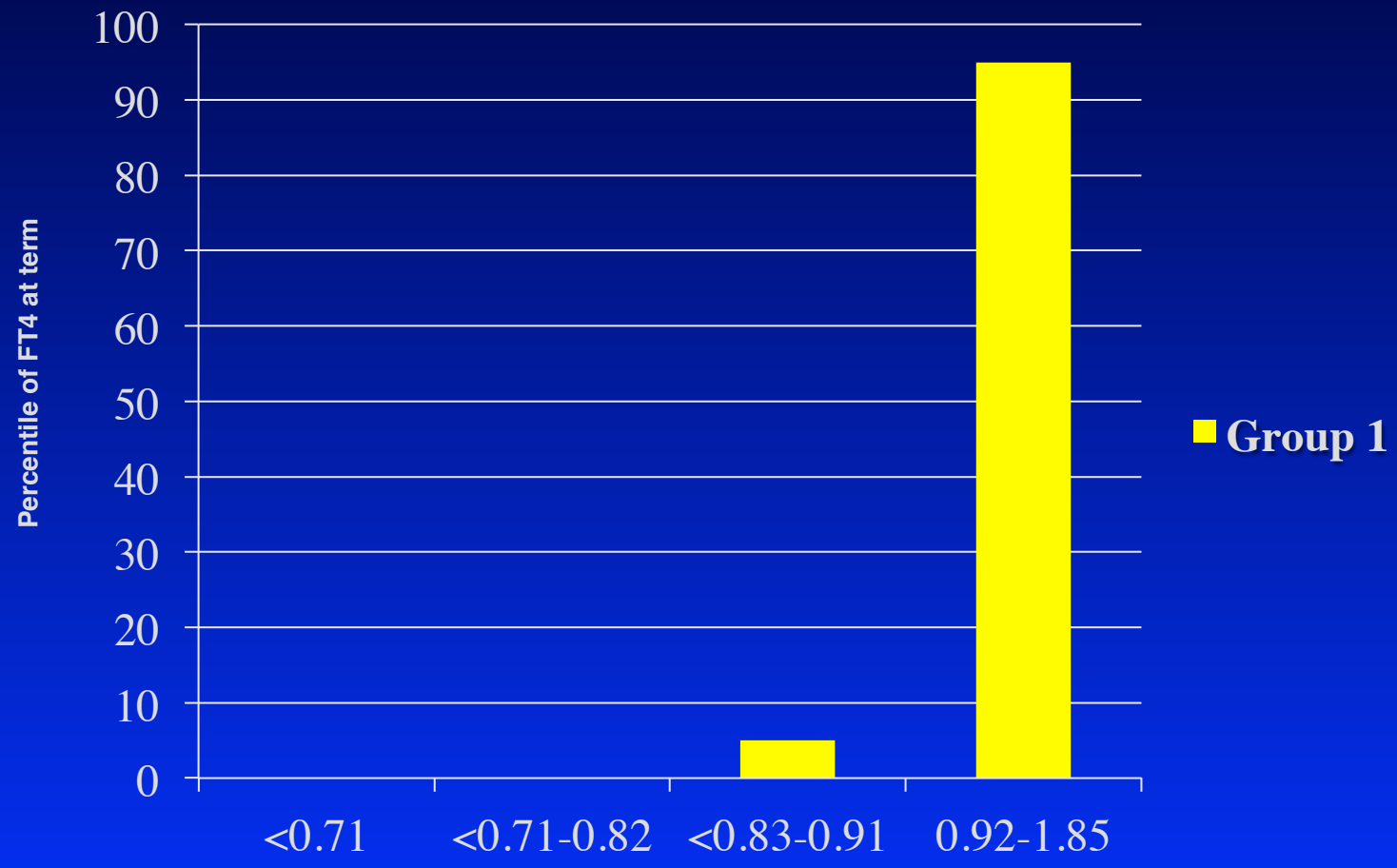
Thyroid.Vol. 19. N. 5. 2009. 511-519

The Importance of Ensuring Optimal Prenatal Iodine Intake [2]

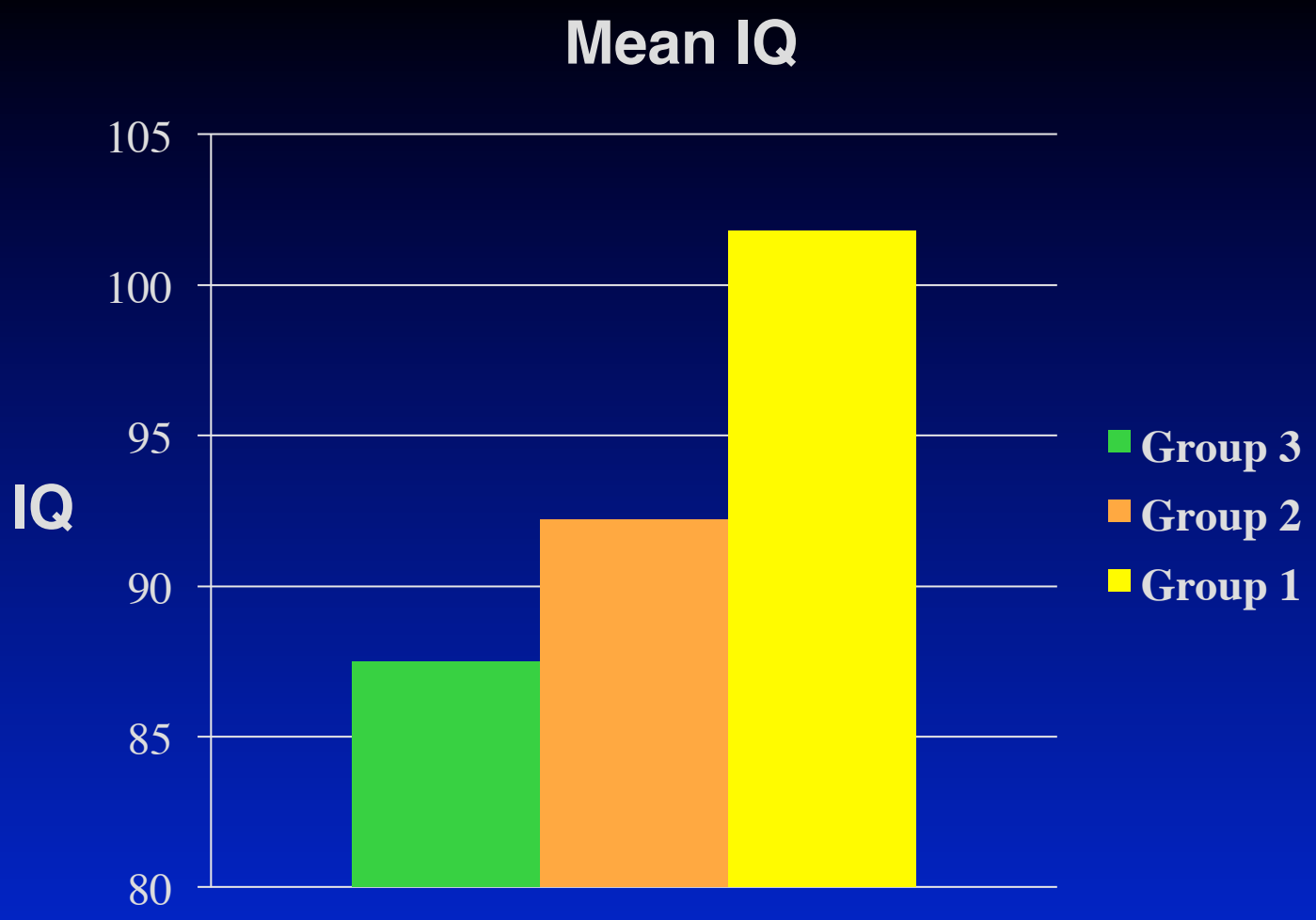


Thyroid.Vol. 19. N. 5. 2009. 511-519

The Importance of Ensuring Optimal Prenatal Iodine Intake [2]



Thyroid.Vol. 19. N. 5. 2009. 511-519



Delayed neurobehavioral performance was observed in 36% of children in group 3 and 25% of children in group 2 and none in group 1. "A delay in 6-10 weeks in iodine supplementation of hypothyroxinemic mothers at the beginning of gestation increases the risk of neurodevelopmental delay in the progeny."

Thyroid.Vol. 19. N. 5. 2009. 511-519

Iodine and Immunity

- Iodine:
  - Has been shown to increase the movement of granulocytes into areas of inflammation
  - Improves the phagocytosis of bacteria by granulocytes
  - Improves ability of granulocytes to kill bacteria

Iodine has a major physiologic role in the inflammatory process

Med Hyppothesis. 1988;25:125-9

Why Iodine?

- Iodine deficiency is a worldwide problem
  - Mental impairment, reduced intellectual ability, ADD, autism
  - Goiter
  - Infertility
  - Increased risk of breast, prostate, endometrial, ovarian and other cancers

Why Iodine?

- 1.9 billion individuals world-wide estimated to have inadequate iodine nutrition
- WHO claims iodine deficiency is the world's greatest single cause of preventable mental retardation
- WHO estimates that there are 300,000,000 school-aged children worldwide who are iodine deficient (36% of school aged children)
- Over half of the population of Europe live in areas of iodine deficiency
- 1/3 of the world's population live in an iodine deficient area
  - 129 countries
  - Decreased childhood survival rate in iodine deficient areas
    - Neonatal mortality declines over 50% when iodine deficiency is rectified
  - 72% of world's population is affected by iodine deficiency

Lancet. 2003;362:1859-60
Lancet. Vol. 350. 9.13.97. p. 771-773
WHO
J. Clin. Endocrinand Metabl. 2007;92:437-442
Anderson, M. 2007 Iodine deficiency in Europe: a

Cholesterol and Iodine

- 1918, researchers demonstrated that **feeding iodine to rabbits could prevent the deposition of cholesterol in arteries of rabbits that were fed cholesterol.**

Trans. Jpn. Path. 8:221-4, 1918.

- These studies were reproduced and similar results **reported in the literature four times.**

Arch. Exp. Pathol. Pharmokol. 159:265-274, 1931
Z. Gesamte. Exp. Med. 87: 683-702, 1933
J. Exp. Med. 58: 115-25, 1933
Res. Commun. Chem. Pathol. Pharmacol. 1:169-184, 1970

CAD: An Underlying Mechanism (1)

- Researchers looked at the development of atherosclerosis in rabbits
  - Control group: Rabbits fed high cholesterol diet
  - Treatment group: Rabbits fed high cholesterol diet and treated with:
    - T4
    - Desiccated thyroid
    - Iodine

CAD: An Underlying Mechanism (2)

- Control rabbits **fed cholesterol developed marked aortic atherosclerosis**
- Rabbits fed cholesterol-rich diet and T4 showed **slight to moderate aortic atherosclerosis**
- Rabbits fed cholesterol-rich diet and either desiccated thyroid or iodine showed an **absence of atherosclerotic lesions**

This study showed that iodine has an independent positive benefit in a cholesterol-rich diet as well as a synergistic effect with desiccated thyroid hormone.

J. Exp. Med. 58: 115-25, 1933

High Cholesterol Diets Can Exacerbate Iodine Deficiency

- Rats
  - Iodine deficient diet vs. Iodine sufficient diet
  - Iodine sufficient diet resulted in a much lower thyroid weight (10.3 v. 43.4mg).

When the rats were fed a high cholesterol diet, thyroid weight significantly increased in both groups. The high-cholesterol diet was also found to increase the body's excretion of iodine.

Metabolism. 15;714-9. 1966

Why Iodine?

- Only 28% of prescription prenatal vitamins contain iodine
- Average iodine content of I-prenatal vitamins was found to be below the RDA for I (119µg)
- Of the prenatal vitamins that do contain iodine, only 15% have more than 150µg of iodine per daily dose

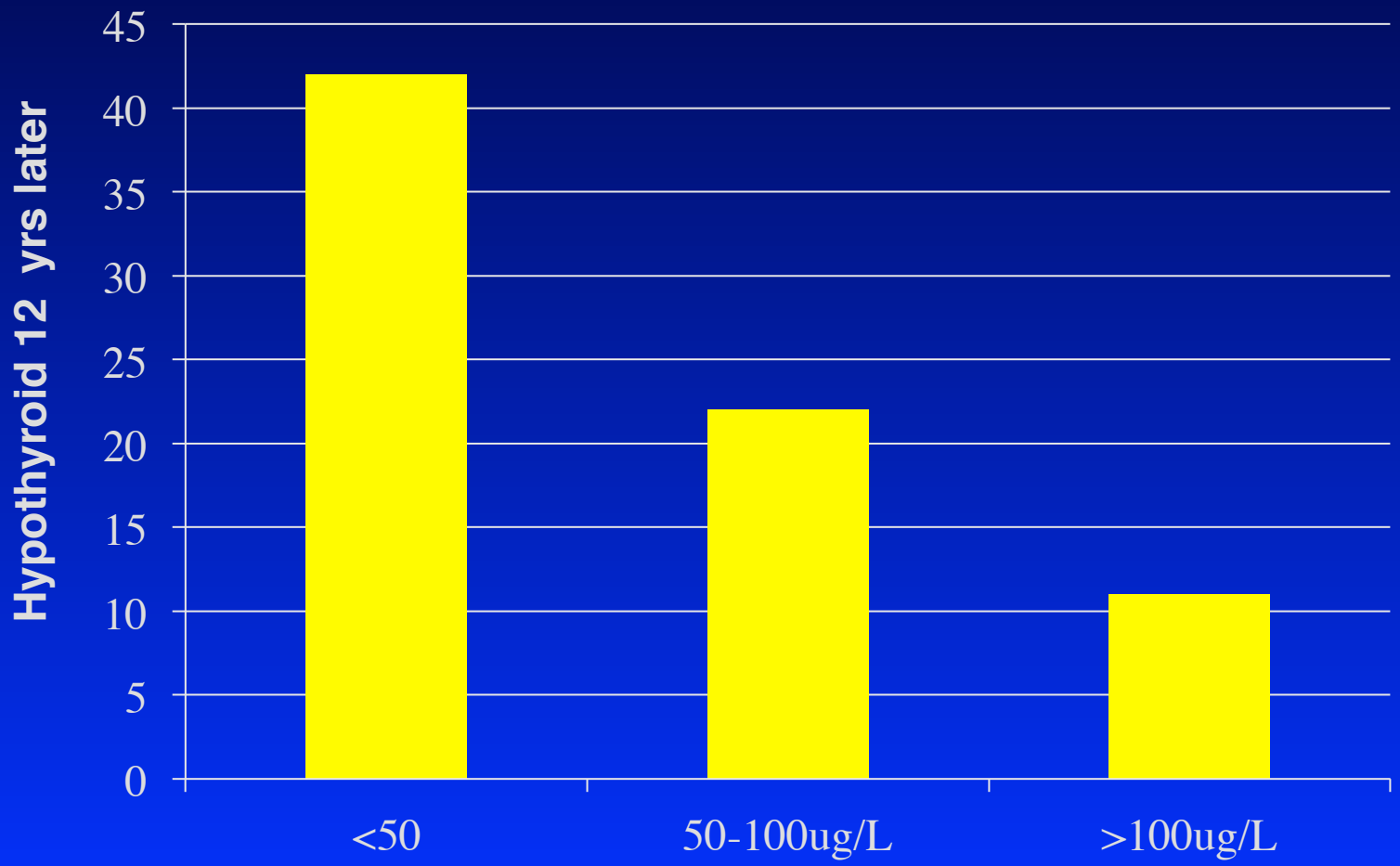
This is a public health disaster that is unparalleled!

Low Iodine Postpartum and Thyroid Dysfunction

- 149 women at 6 months postpartum and 98 controls followed for 12 years
- Urinary iodine at 6 months postpartum and thyroid function at 12 years follow-up
- Results:
  - Decreased UIC predicted hypothyroidism at 12 years follow-up
  - UIC <100ug/L and <50ug/L associated with significantly more hypothyroidism

Clin. Endocrin. 2011.74:631-5

Low Iodine Postpartum and Thyroid Dysfunction



Clin. Endocrin. 2011.74:631-5

Why Iodine?

- Elevates pH
  - Alkalinizing agent
- Deficiency causes intellectual deficiency, goiter, hypothyroidism, autoimmune thyroid illness, thyroid cancer and other cancers
- Production of thyroid hormone
  - T4, T3, T2, T1
- Necessary for the production of all the hormones of the body
  - Adrenals, ovaries, testicles, etc.
- Iodine also responsible for formation of normal architecture of the glandular tissue
  - Breast
  - Thyroid
  - Ovary
  - Prostate?

Iodine: Therapeutic Actions

- Alkalinizing agent
- Antibacterial
- Anticancer
- Antifungal
- Antiparasitic
- Antiviral
- Detoxifying agent
- Mucolytic agent

Conditions Treated/Prevented With Iodine

- ADD
- Asthma
- Atherosclerosis
- Biofilms
- Breast Disease
- Cancer
  - Breast, ovaries, prostate, thyroid
- Cerebral Palsy
- COPD
- Cystoid Macular Edema
- Dental caries
- Diabetes
- Dry Eyes
- Dupuytren's Contracture
- Excess Mucous Production
- Hemorrhoids
- H. pylori
- Hypertension
- Infections
- Keloids
- Liver Diseases (Enterohepatic Circulation)
- Nephrotic Syndrome
- Ovarian Cysts
- Parotid Duct Stones
- Peyronie's
- Pre-eclampsia
- Retinitis Pigmentosa
- Sebaceous Cysts
- Thyroid Disorders
  - (hypo, autoimmune and cancer)

Different Forms of Iodine

- Iodine is not very soluble in water
- Dr. Lugol (1829) found that when potassium iodide added to water increased the solubility of iodine
  - Lugol's solution: 5% iodine and 10% potassium iodide in distilled water
  - 2 drops of Lugol's solution contains 5mg of iodine and 7.5mg of iodide

Lugol's Solution

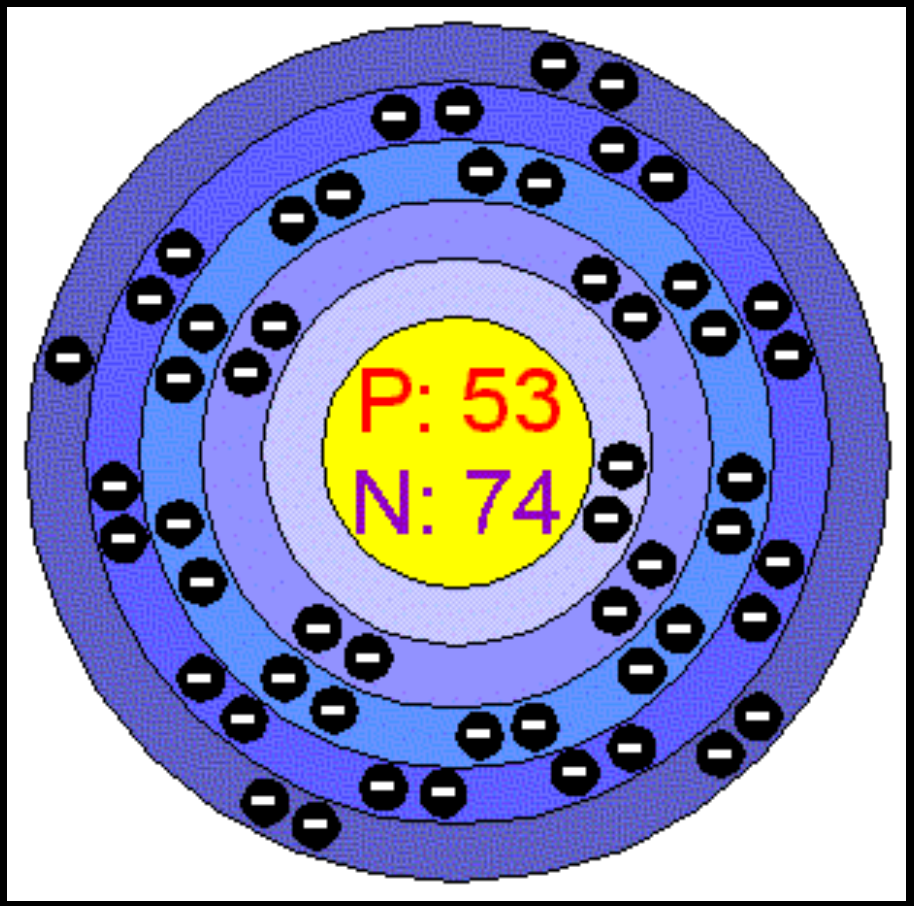
- Widely available at most apothecaries
- Recommended for almost any condition
  - Infection
- Probably the most used medical item before patent medicine took hold

RDA for Iodine

Life Stage	RDA
Adult Male	150µg/d
Adult Female	150µg/d
Pregnancy	220µg/d
Lactation	290µg/d

Iodide and Iodine

- Iodine is rare element
  - 62nd in abundance of the elements of the earth
    - Bottom third of elements in terms of abundance
- Reduced form of iodine is known as iodide
  - Extra electron
  - Full complement of electrons


P: 53
N: 74

Iodine/Iodide Bind to Different Areas of Body

Iodine	Iodide
Breast	Thyroid
Prostate	Salivary Glands
Stomach	Skin

Where is Iodine Found in the Body?

- Every cell in the body contains and utilizes iodine
  - WBC's cannot effectively guard against infection without adequate amounts of iodine
- Concentrated in the glandular system
- Thyroid gland contains the largest concentration of iodine (50mg adult saturation)
- Breasts, salivary glands, parotid glands, pancreas, cerebrospinal fluid, brain, stomach, skin, lacrimal glands, etc.

How Much Iodine Stored In The Body?

- Na/I Symporter transports I across the cell membrane, against gradient
  - Maximum ≈600µg/day I in thyroid gland

How Much Iodine Stored In The Body?

- Approximately 1.5-2gm stored in body at sufficiency
  - Fat tissue: 700mg
  - Striated tissue: 650mg
  - Thyroid: 50mg

Every organ and all tissues contain iodine

How Do You Ingest Iodine?

- Trace element, not very common in most foods
- Ocean foods
  - Cod, sea bass, haddock, perch
  - Sea Vegetables such as seaweed
- Can be found in food products if iodine is added to animal feed or the food source
  - Salt

Iodized Salt

- Potassium iodide
  - 74μg iodide/gram of salt
- Cost effective way to prevent goiter
  - Effective tool to decrease the presence of goiter
  - Inadequate to provide the body's need for iodine

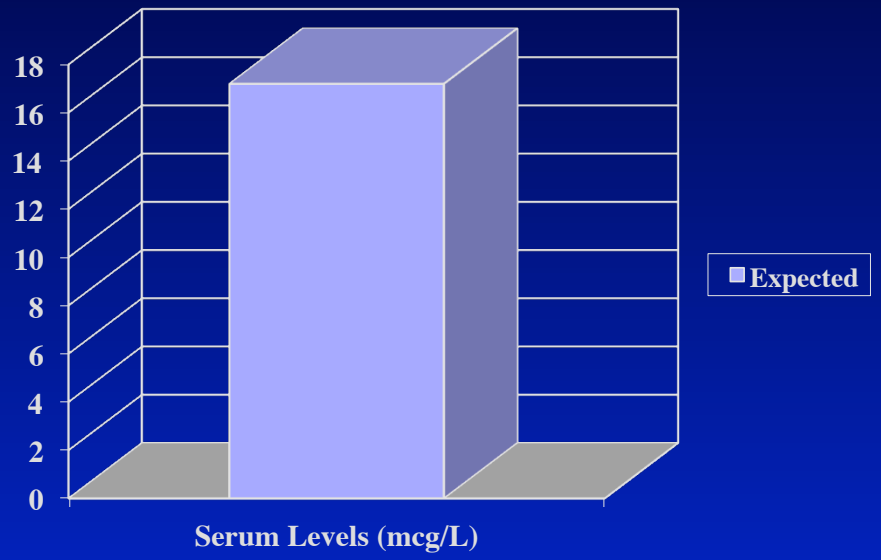
Iodized Salt: Low Bioavailabilty

- 2 Groups
  - Group 1: Iodized salt
  - Group 2: Iodized bread
- ≈750µg/day iodide in both groups

Expected result: 17.2µg/L (Serum)

Pittman NEJM 1969; 280:1431

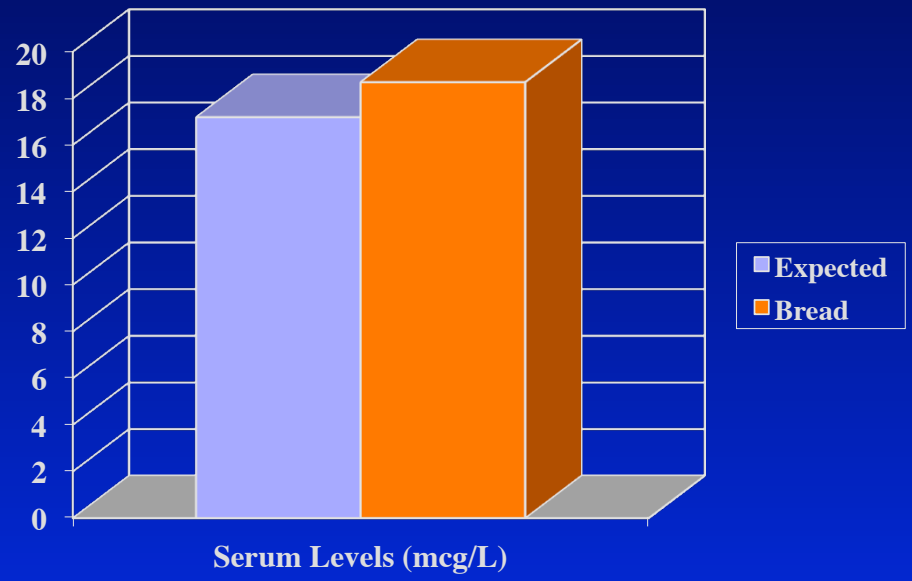
Iodized Salt: Low Bioavailability



Pittman NEJM 1969; 280:1431

Abraham, G. 2004

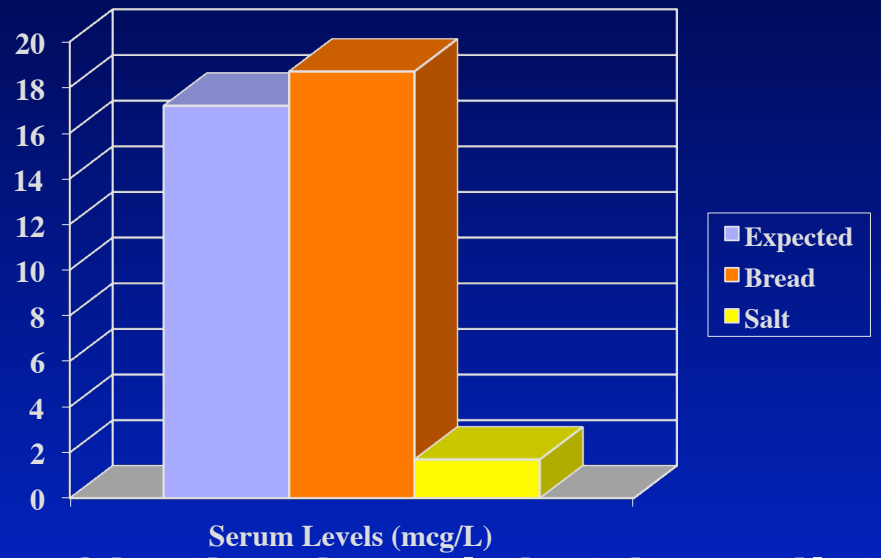
Iodized Salt: Low Bioavailability



Pittman NEJM 1969; 280:1431

Abraham, G. 2004

Iodized Salt: Low Bioavailability



Only 10% of iodine in salt is bioavailable

Is this because of competitive inhibition by chloride in salt?

So, who would still recommend iodized table salt?

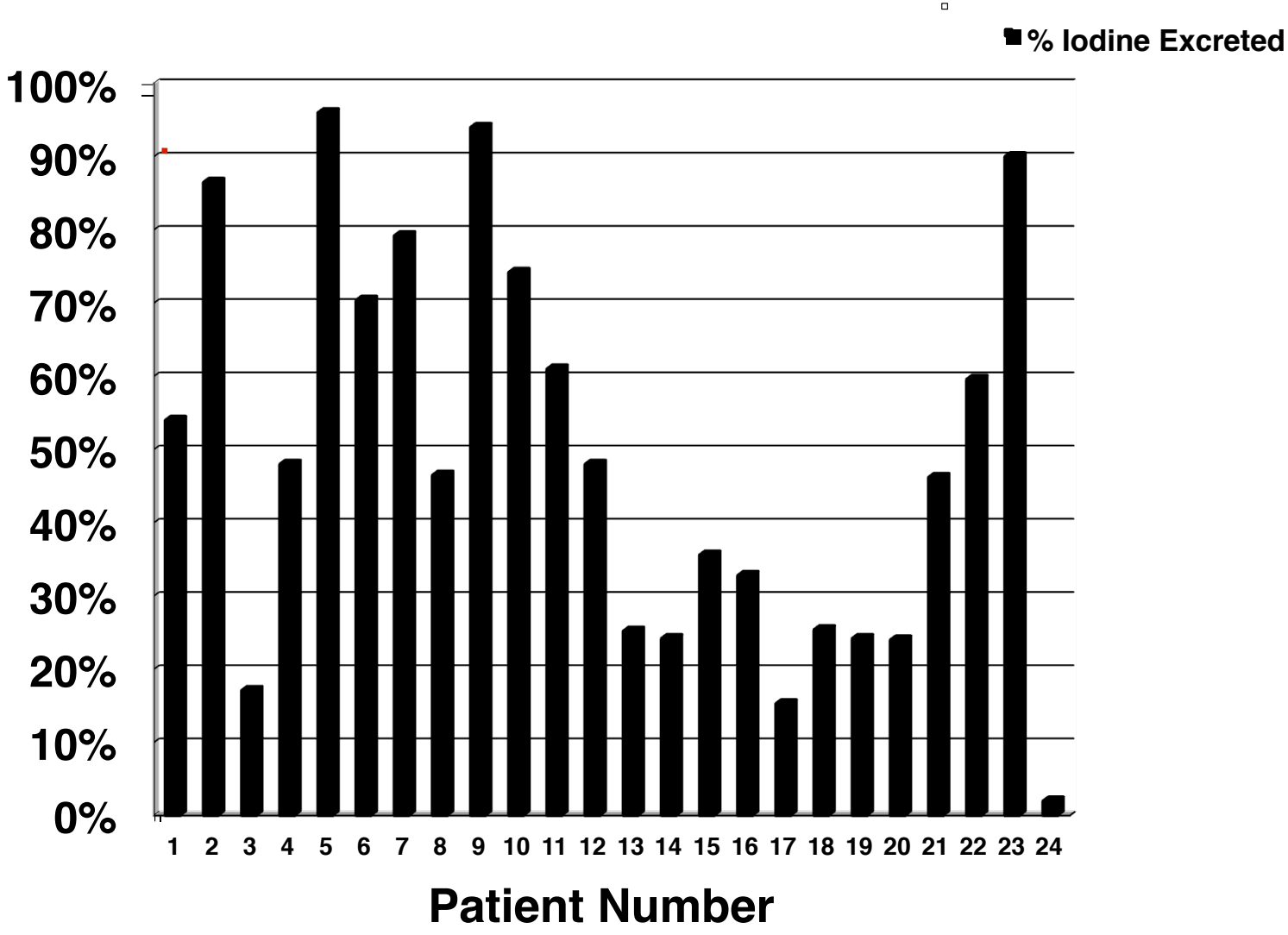
Pittman NEJM 1969; 280:1431

Abraham, G. 2004

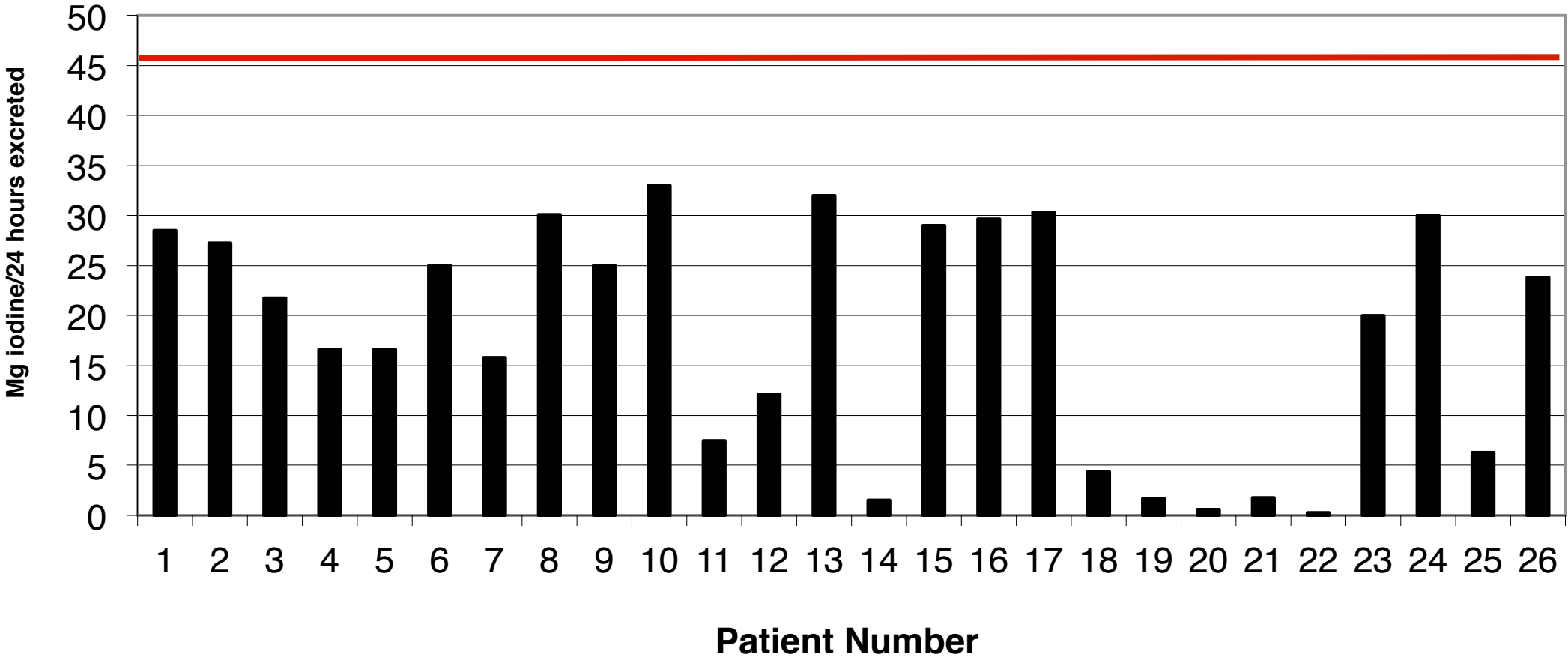
Center for Holistic Medicine

- **94.7%** of patients tested had significantly low iodine levels
  - First 250 patients

FIGURE 1: IODINE EXCRETION IN 24 PATIENTS: 92% DEFICIENT



Iodine Excretion/24 Hours



Iodine Deficiency: CHM

- Over 6,000 patients tested

Results: 96.4% have tested low via urine or serum testing.

Why the Soil is Deficient in Iodine

- More inland and mountainous areas
  - Midwestern United States
    - Great Lakes Basin
    - Michigan, Ohio, Indiana, Wisconsin
- Soil Erosion
  - Glaciers
  - Deforestation
  - Poor farming techniques
- Pollution
  - Pesticides and insecticides
    - Bromide, fluoride and chlorine
    - National/worldwide problem

Iodine in Food

Food	µg iodine/serving
Ready to eat Cereal	87
Dairy-based desert	70
Fish	57
Milk	56
Overall diary products	49
Eggs	27
Bread	27
Beans, peas, tuber	17
Meat	16
Poultry	15

Why Are People Deficient in Iodine?

- Stigma of using salt
  - Hypertension
  - <50% of U.S. households use iodized salt
- Radioactive iodine use in medicine
  - Exacerbate an iodine-deficient state
- Chemical exposures: Goitrogens
  - Bromine, Chlorine and Fluoride (fluorine)
  - Drugs
    - Fluoride, bromide
    - Competitively inhibit iodine binding as well as decrease iodine uptake
  - Nitrate, perchlorate, thiocyanate
    - Competitive inhibitors of iodine at NIS
- Declining mineral levels
  - Soil erosion, poor farming techniques, etc.
- Diet.

Dietary Reasons for Iodine Deficiency

- Diets without ocean fish or sea vegetables
- Inadequate use of iodized salt including low sodium diets
- Vegan and vegetarian diets
- Bromine in food and drink
  - Brominated vegetable oils
    - Some Gatorade products, Mountain Dew and other soft drinks
- Bakery products
  - Bread, pasta, cereal, etc.
    - Contain bromine

What Happened to Bakery Products?

- 1960's iodine was added to bakery products as a conditioning agent
  - 1 slice of bread contained the RDA for iodine: 150µg
- In the 1970's, bromine was substituted for iodine due to misinformation about iodine

What did this substitution do?

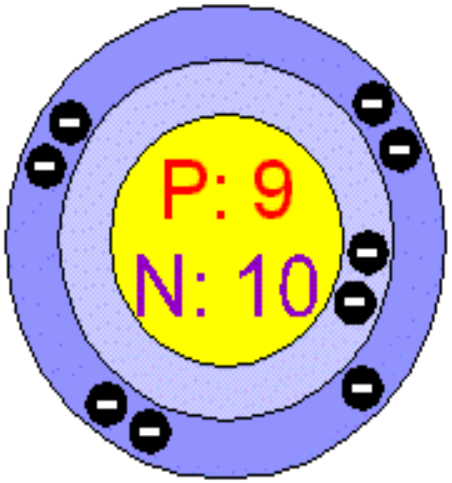
Bromine for Iodine: *Double Wammy!!*

1. Worsened an iodine-deficiency problem already present in the United States
2. Competitively inhibited iodine in the body by adding a goitrogen (bromine) to bakery products

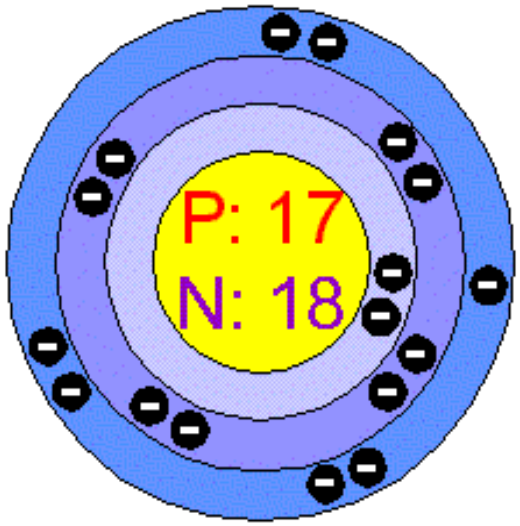
This could be the most asinine act (amongst many) in the history of the food industry.

Halogens

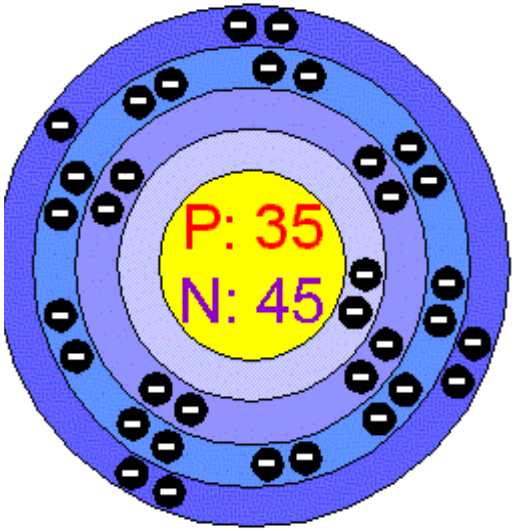
	MW
• Fluorine (Fluoride)	19
• Chlorine (Chloride)	36
• Bromine (Bromide)	80
• Iodine (Iodide)	127
• Astatine (Astatide)	210



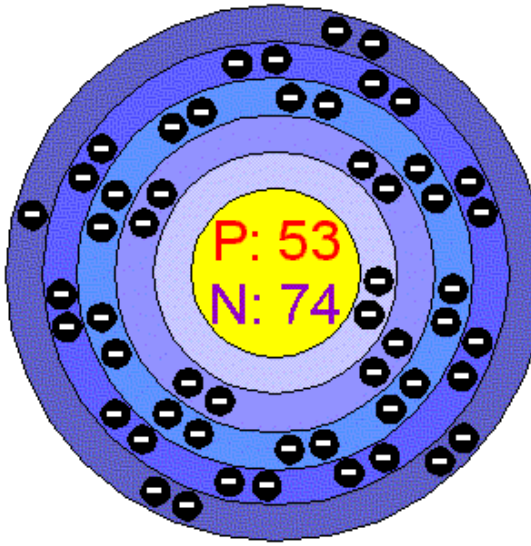
Fluorine



Chlorine



Bromine



Iodine

Halogens

	MW
• Fluorine (Fluoride)	19
• Chlorine (Chloride)	36
• **Bromine (Bromide)**	**80**
• **Iodine (Iodide)**	**127**
• Astatine (Astatide)	210

Bromine

- Animal studies show that bromine intake can adversely affect the accumulation of iodine in the thyroid and the skin
- High bromide intake results in iodine being eliminated from the thyroid gland and replaced by bromine
- Ingestion of bromine has been shown to cause hypothyroidism in animals

When iodine deficiency is present, the toxicity of bromine is accelerated in the body.

Iodine Transport

To achieve the maximum transport of iodine ≈600µg/day across the cell membrane, there must be sufficient iodine in the serum:

$\approx 10^{-5}$-10^{-6} M

These numbers are <u>impossible</u> to reach at the RDA (150µg/day) for iodine!

However, 50mg/day iodine/iodide can reach a 10^{-5} M!

How Much Iodine Stored In The Body?

- Thyroid: ≈50mg/day
- Breasts: Minimum of 5mg/day(50kg or 110# woman) for maintenance of normal breast tissue
  - Larger woman or woman with larger breasts will have increased requirement
  - Men have smaller breasts and a lower iodine requirement
- Other glandular tissue: Minimum of 2mg/day
    - Adrenals, thymus, ovaries, hypothalamus, pituitary and others.

How To Check Iodine Levels

- Blood levels
- Saliva
  - Saliva/serum
- Skin testing
  - Rub iodine on skin and observe for its' disappearance
    - Inaccurate measure of body's iodine status
    - Approx. 88% of I evaporates from skin
      - J. Pharm. Exp. Therap. 1932;45:85-107
- Urinary excretion
  - Accepted measure
    - Iodine loading test

Transport of Iodine [1]

- Iodine present in every cell in the body
- Many different glands and cells concentrate iodine against gradient
- Na/I symporter
  - Transports iodide at a concentration gradient 20-50 times that of plasma

One iodine atom is transferred into cell with two atoms of sodium transported inside of cell.

Angewandte Chm

Defects in Iodine Retention System

- Normal gastrointestinal absorption of iodine
- Defective iodine retention system
  - Na/I symporter defect (or Pendrin defect)
    - Congenital Defect
      - Rare
    - Oxidative damage
      - Fluoride or perchlorate
        - Treat with antioxidants
    - Inhibition of symporter iodide uptake by competition
      - Goitrogen binding to receptor
        - Iodide can overcome competitive inhibition

Iodine loading test will come back >90% excretion!

How to Spot Defects in Iodine Retention System

- Non-responders to iodine supplementation
- Adverse effects to orthoiodosupplementation
- Very high iodide excretion on iodine loading test (>90% excretion on first test) when not expected
  - Adverse effects to first iodine dose taken
    - Palpitations, metallic taste in mouth, etc.

Treatment of Defective Retention System

- Defective iodine retention system
  - Na/I symporter defect
    - Genetic defect: ?
    - Oxidative damage: **Antioxidant**
    - Goitrogen binding to receptor: **Detoxification and Competitive Inhibition**
      - **Iodine**
      - **Salt**

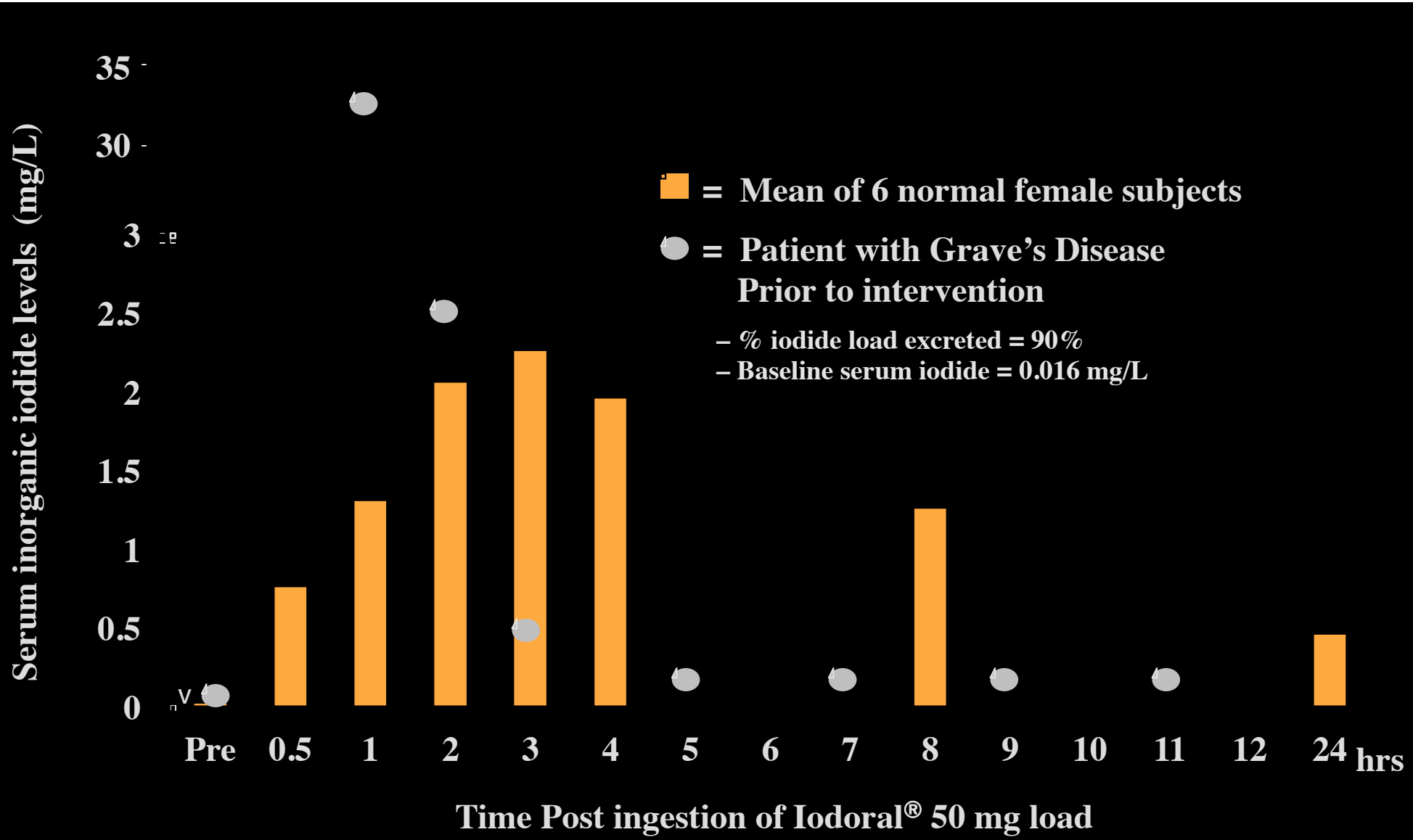
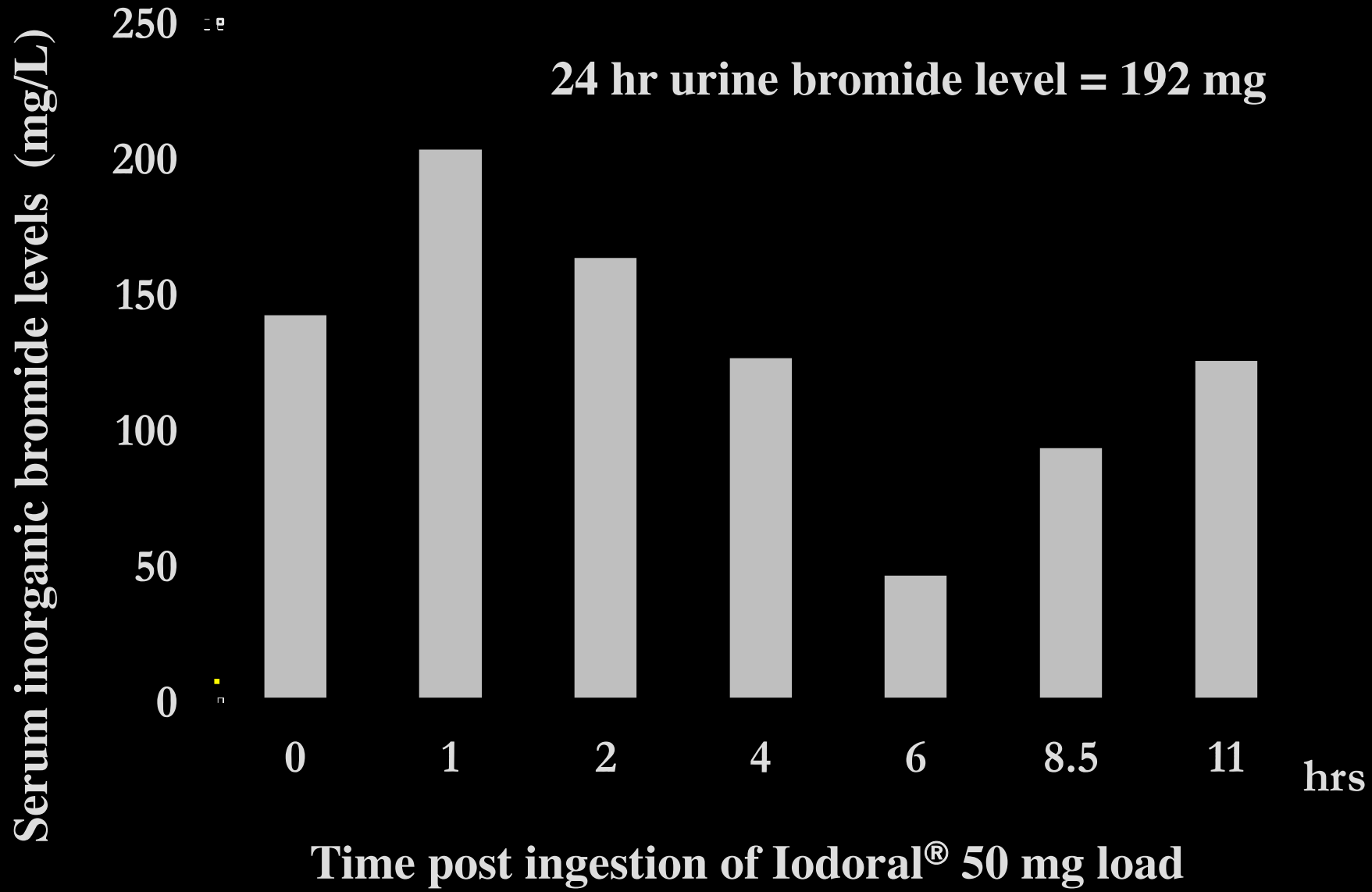


Fig. 1 Serum profile of inorganic iodide levels following the iodine/iodide load (50 mg) in 6 normal female subjects; and in a patient with iodide transport defect. Patient excreted 90% of the iodine load, but her basal serum inorganic iodide level was very low at 0.016 m/L. This pattern suggests a defect in the iodine retention mechanism.


24 hr urine bromide level = 192 mg
Serum inorganic bromide levels (mg/L)
250
200
150
100
50
0
0
1
2
4
6
8.5
11
hrs
Time post ingestion of Iodoral® 50 mg load

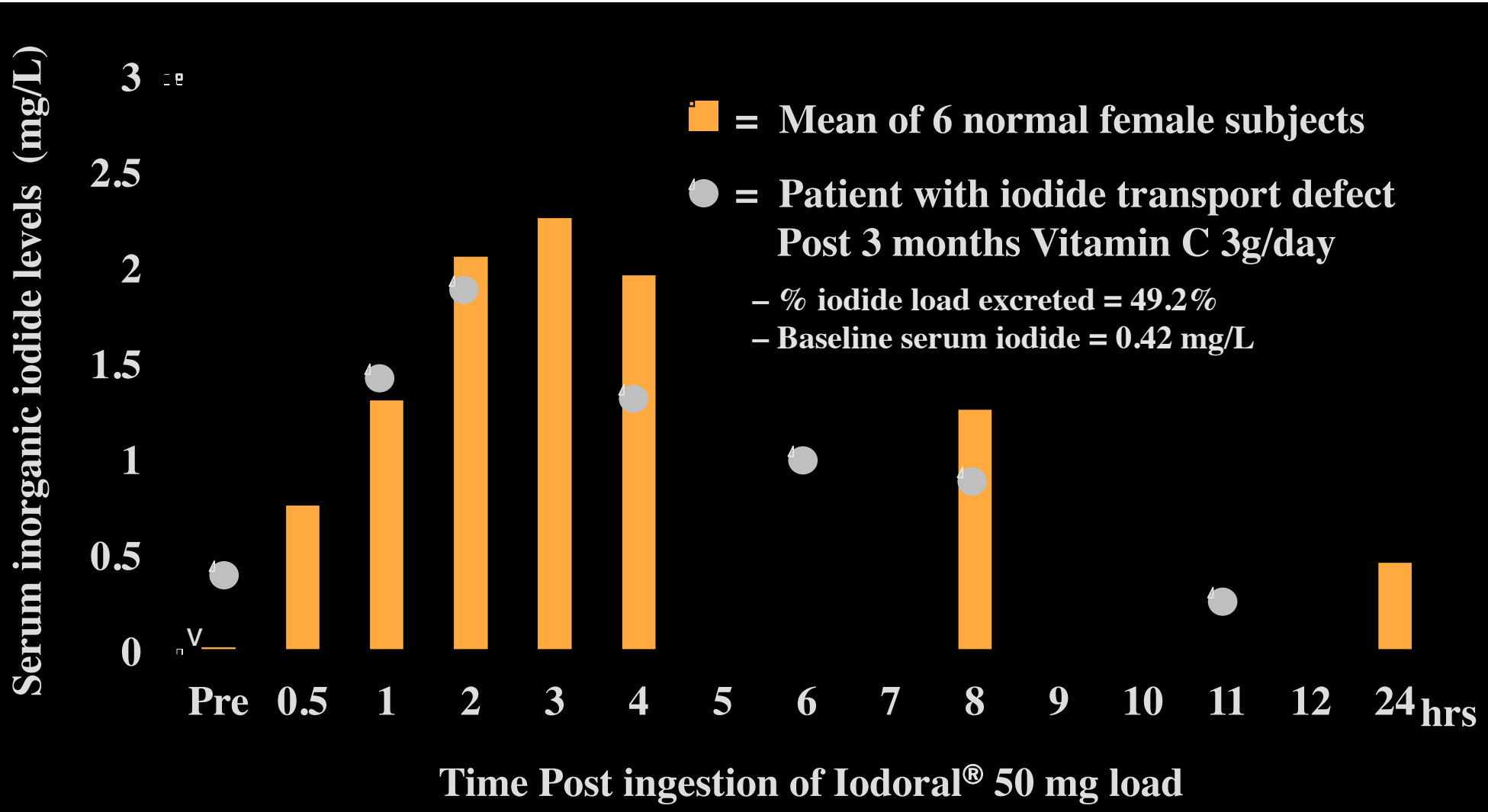


Fig. 2 Serum profile of inorganic iodide levels following the iodine/iodide load (50 mg) in 6 normal female subjects; and in a patient with iodide transport defect following 5 years of intervention with a sustained release Vitamin C at 3 gm/day. Her serum level was 0.42 mg/L, evidence of improved function of the iodine cellular transport mechanism.

Denni: 5 Years Later

- Feeling better with unrefined salt and vitamin C
- Euthyroid
- TPO titers: WNL
- Agreed to do another loading test (7.26.11)

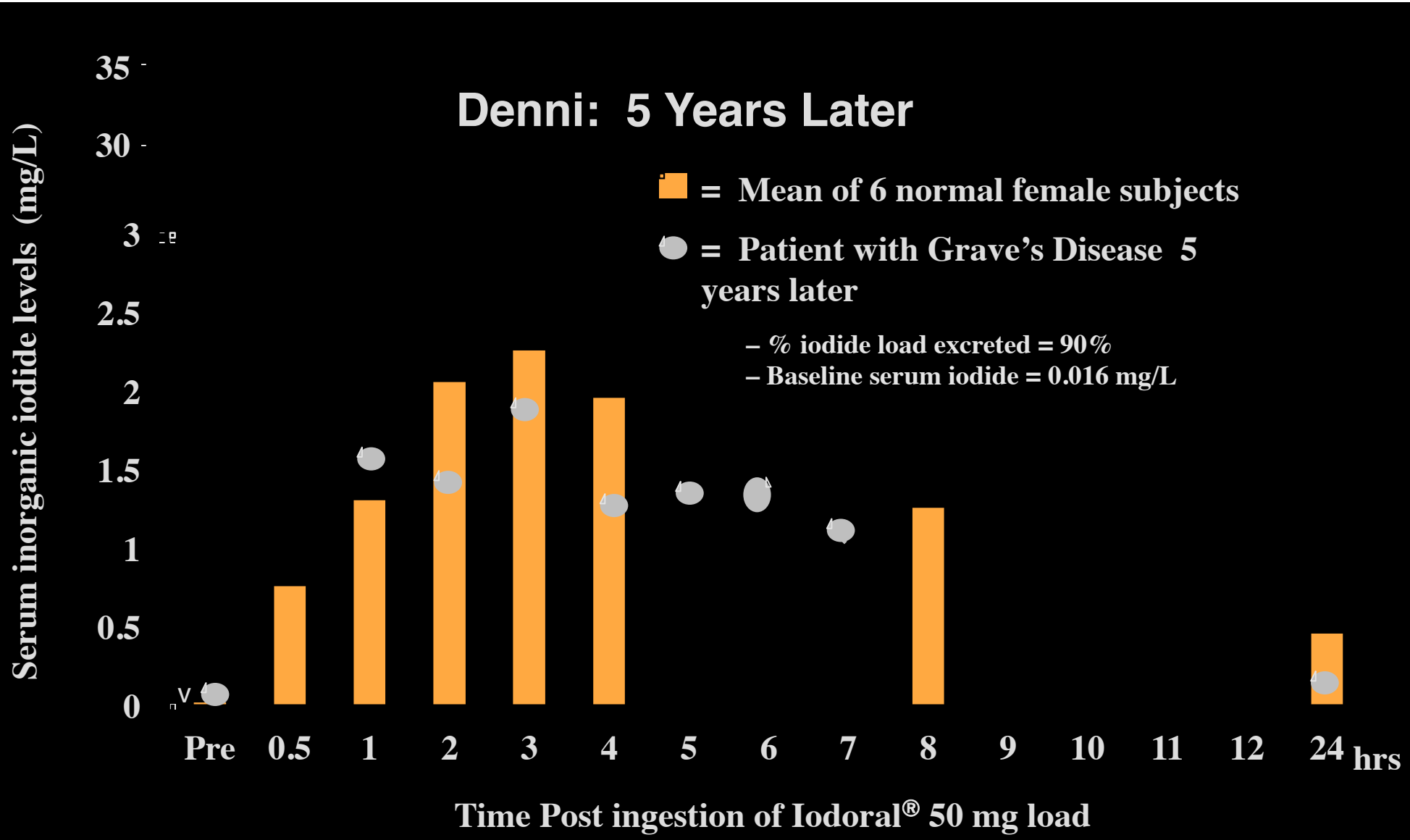
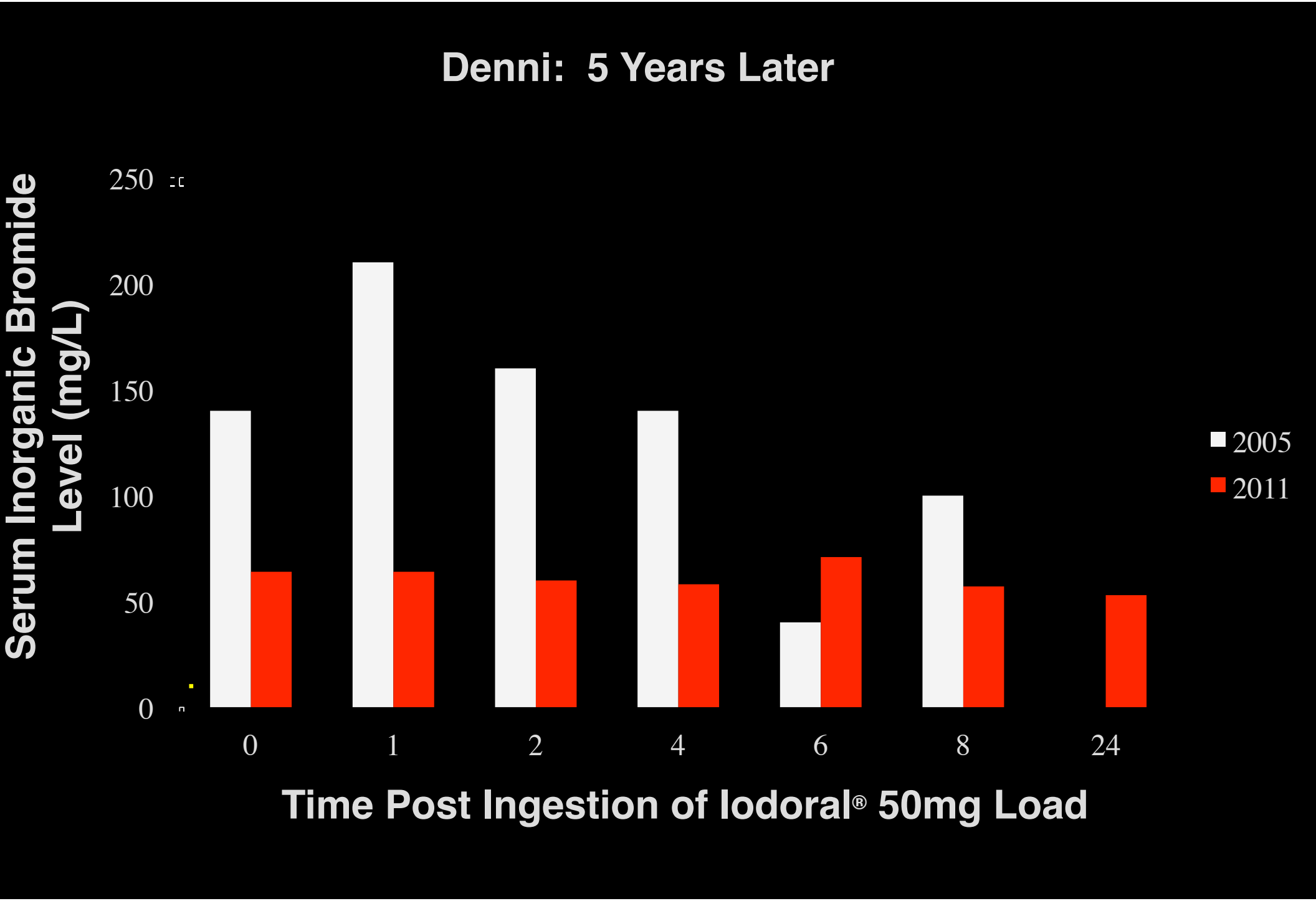


Fig. 1 Serum profile of inorganic iodide levels following the iodine/iodide load (50 mg) in 6 normal female subjects; and in a patient with iodide transport defect. Patient excreted 90% of the iodine load, but her basal serum inorganic iodide level was very low at 0.016 m/L. This pattern suggests a defect in the iodine retention mechanism.


Denni: 5 Years Later
Serum Inorganic Bromide Level (mg/L)
250
200
150
100
50
0
0
1
2
4
6
8
24
2005
2011
Time Post Ingestion of Iodoral® 50mg Load

Denni: 2014

- Feeling well for six months
- No Antithyroid medications
- Agreed to do another loading test

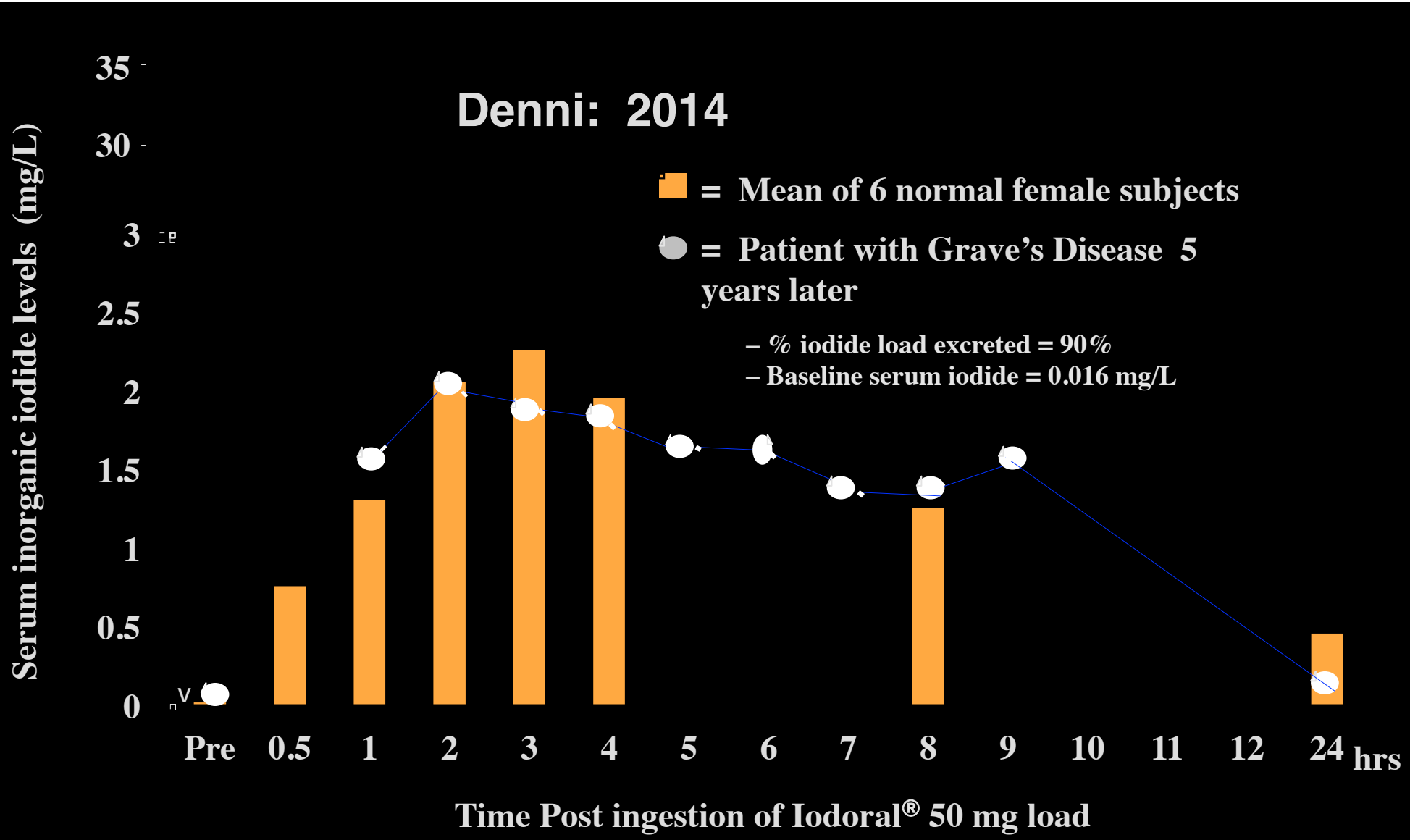
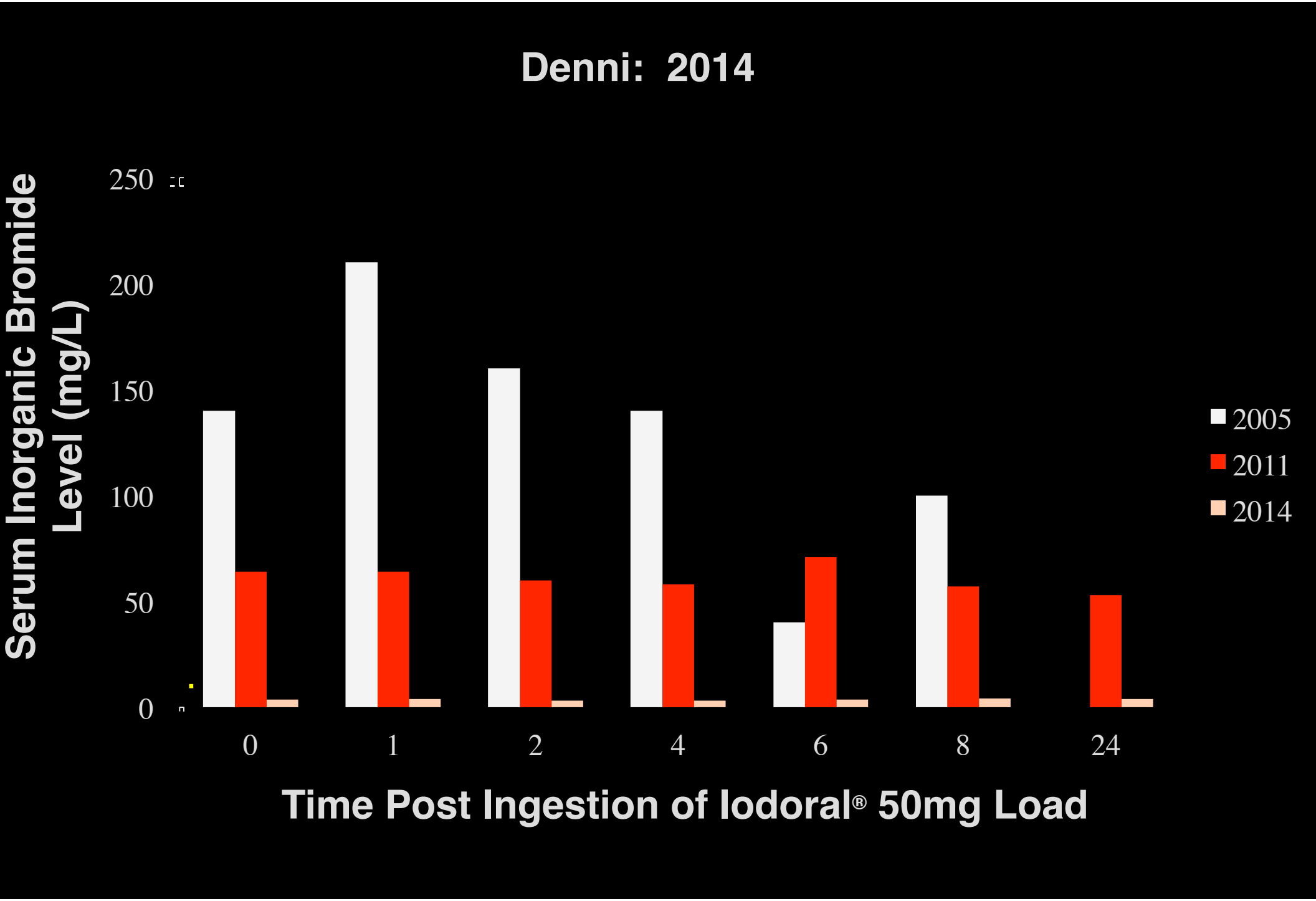


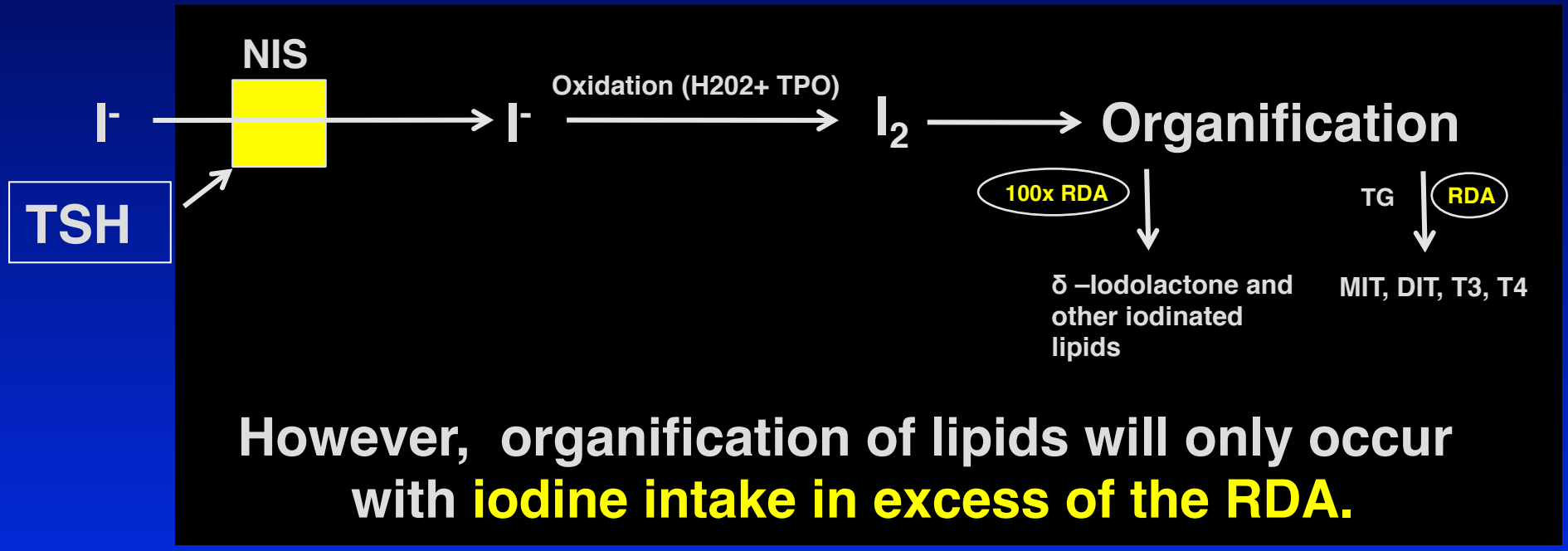
Fig. 1 Serum profile of inorganic iodide levels following the iodine/iodide load (50 mg) in 6 normal female subjects; and in a patient with iodide transport defect. Patient excreted 90% of the iodine load, but her basal serum inorganic iodide level was very low at 0.016 m/L. This pattern suggests a defect in the iodine retention mechanism.


Denni: 2014
Serum Inorganic Bromide Level (mg/L)
250
200
150
100
50
0
0
1
2
4
6
8
24
Time Post Ingestion of Iodoral® 50mg Load
2005
2011
2014

Iodine Transport Problems

- When problems develop with iodine use, think detoxification
  - Vitamin C
  - Salt
  - Water
  - Liver and kidney support
  - Exercise
  - Clean Diet

In Thyroid, What Happens to Iodine After Absorption?



However, organification of lipids will only occur with **iodine intake in excess of the RDA.**

Iodolactone

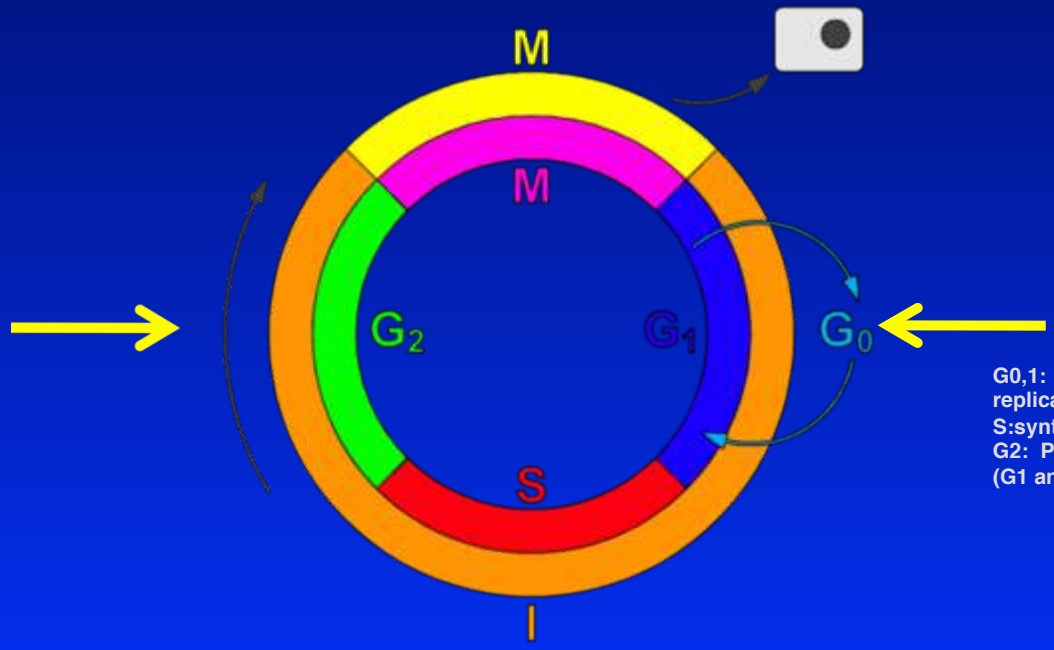
$$\text{Iodine} + \text{arachidonic acid} \xrightarrow{\text{TPO}} \delta\text{-iodolactone}$$

δ-iodolactone is a key regulator of apoptosis and cellular proliferation in the thyroid. δ-iodolactone is not detected in human tissue when iodine deficiency is present, but is present with iodine administration at 100x the RDA.

Eur. J. of Endocrin. 132. 735-43, 1995
Horm. Metab. Res. 26. 465-69. 1994

Organified Iodine

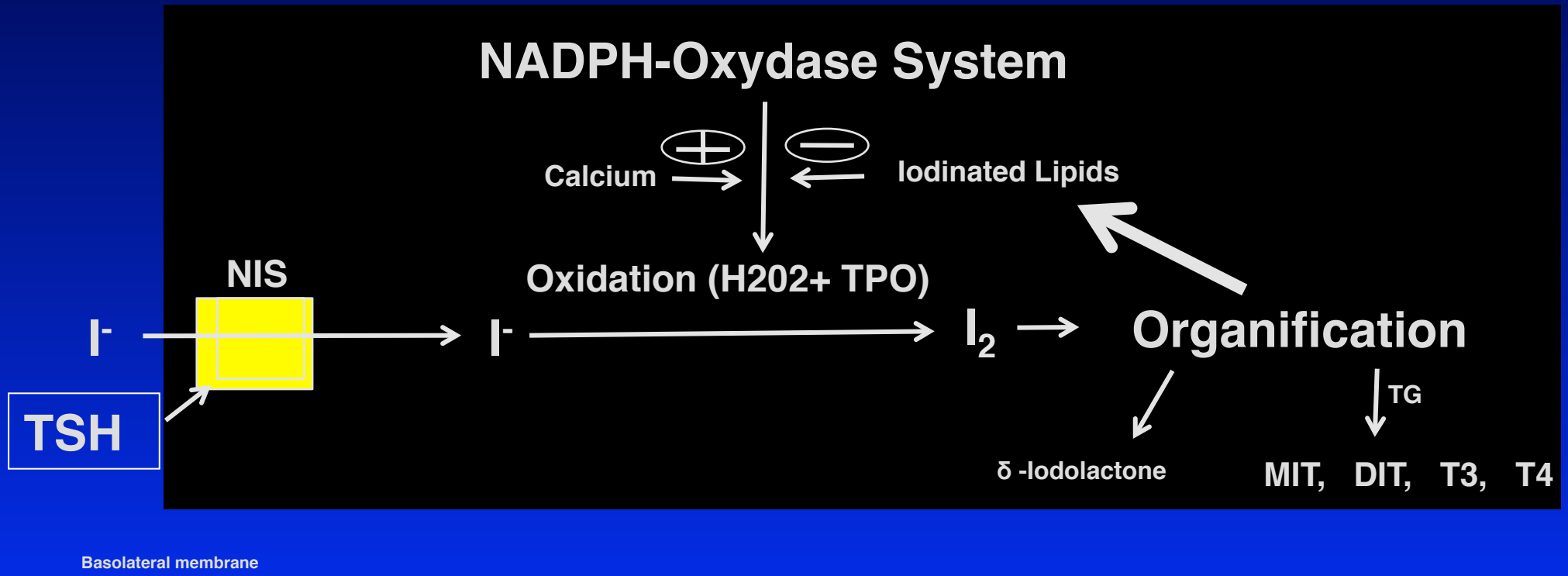
- Regulates the cell cycle in thyroid gland by inducing apoptosis



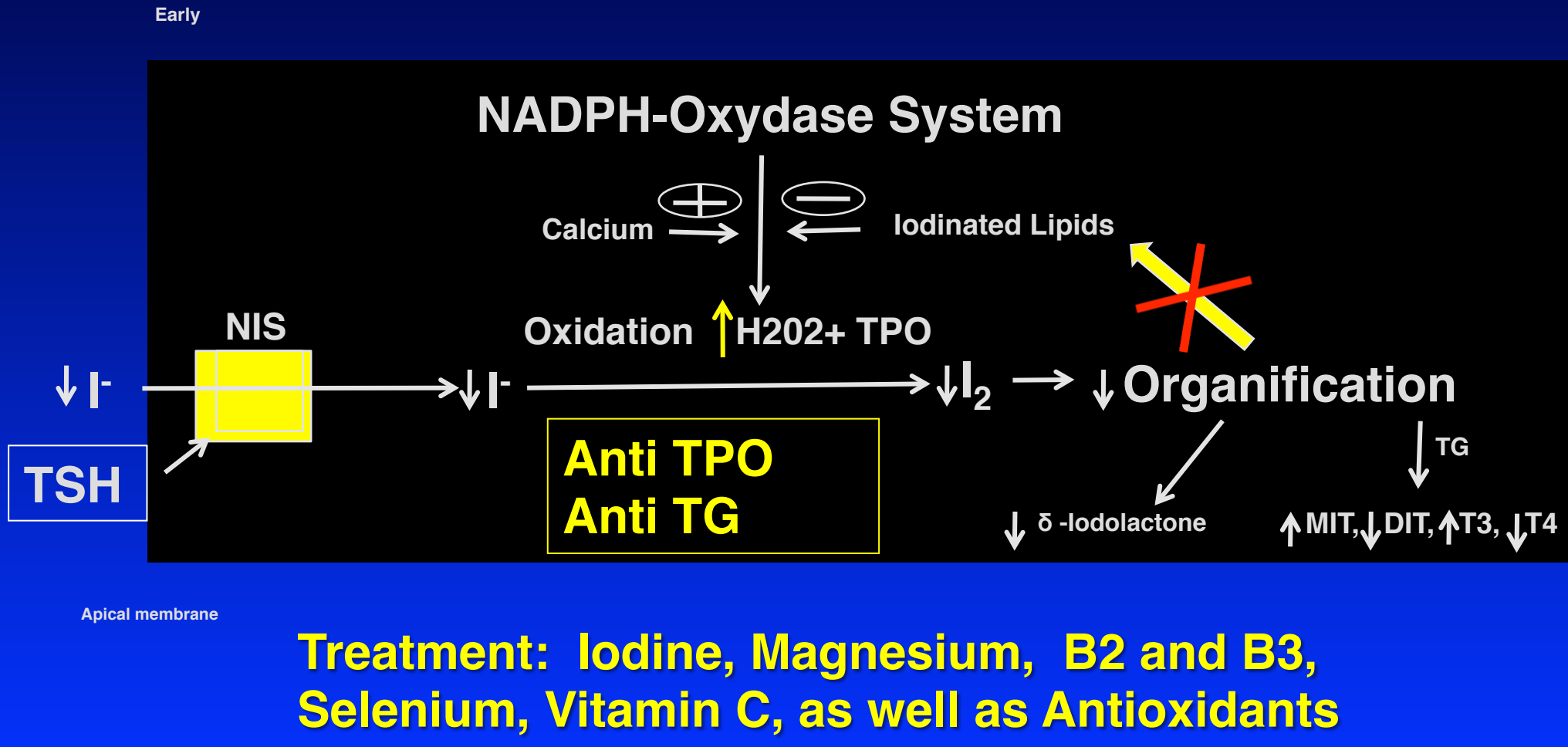
G0,1: growth and preparation of the chromosomes for replication
S:synthesis of DNA
G2: Preparation for Mitosis
(G1 and G2)

Endocrin. 126. 984-92

In Thyroid, What Happens to Iodine After Absorption?(2)



In Thyroid, What May Happen If Iodine Levels Are Too Low?



Treatment: Iodine, Magnesium, B2 and B3, Selenium, Vitamin C, as well as Antioxidants

H_2O_2 Control: Selenium

- Glutathione Peroxidase
  - High expression in the thyroid gland
    - Produced and secreted by thyrocytes

$$H_2O_2 \xrightarrow[GPx3]{} 2H_2O$$

How to Dose Iodine

- Use a combination of iodine/iodide
- Lugol's Solution
  - 1 drop: 6.25mg (2.5mg iodine /4mg iodide)
- Iodozyme HP
  - 1 tablet: 12.5mg (5mg iodine/7.5mg iodide)

Therapeutic doses of iodine/iodide combinations vary between 12.5-50mg/day.

How Much Iodine Should You Take?

- When there is iodine sufficiency, there is little (or no) radioactive iodine uptake by the thyroid gland

How much iodine is required to achieve sufficiency?

How Much Iodine Should You Take?

- Thyroid
  - 3-5mg I/day decreased absorption of radioactive iodine by thyroid below 5%

Saxena. Science. 138:430-31. 1962

How Much Iodine Should You Take?

Amt. Iodide Ingested (12 days)	% Uptake Radioactive Iodide by Thyroid
10mg	4%
15mg	1.9%
30mg	1.6%
50mg	1.2%
100mg	0.6%

Sternthal. N. .Eng. J. Med. 303:1083-1080. 1980

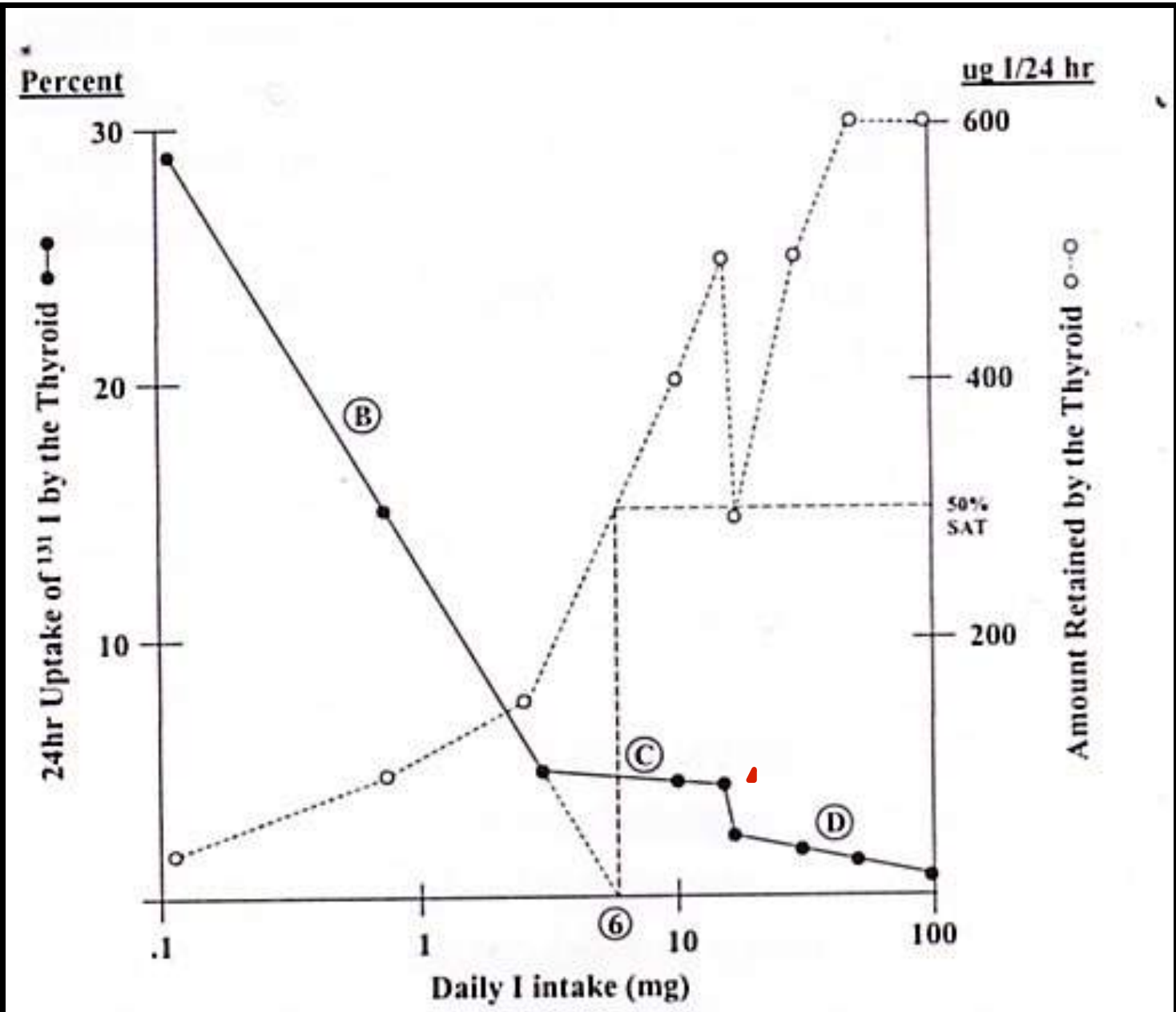


Fig. 2 - Percent 24hr uptake of radioiodide and computed uptake of I/24hr by the thyroid gland, following intake of increasing amount of I.

Iodine Dosage Guidelines

- RDA is 150μg/day
- RDA is inadequate to supply the body's need
- Dosage must be individualized
- Use a combination of iodine and iodide
  - Iodozyme HP Biotics: 800.437.1298
- Appropriate testing pre and post

Final Thoughts

- Iodine deficiency is common
- Not rectified by the use of iodized salt
- Iodine deficiency may be the underlying cause of autoimmune thyroid disorders
- Using a combination of iodine/iodide more effective than using iodide alone
- Best results achieved with a holistic approach
  - Vitamins and minerals, diet, detoxification, hormone-balancing, etc.
  - Magnesium supplementation
  - Electrolyte supplementation

Final Thoughts (2)

- Impossible to balance the hormonal system without iodine sufficiency
  - Thyroid and adrenals
- Whole body iodine sufficiency generally requires higher doses of iodine/iodide combinations
  - 12-50mg/day

Medical Iodophobia

"Medical iodophobia is the unwarranted fear of using and recommending inorganic, non-radioactive iodine/iodide within the range known from the collective experience of three generations of clinicians to be the safest and most effective amounts for treating symptoms and signs of iodine/iodide deficiency (12.5-50mg/day)."

CURED!!

Dr. G. Abraham, 2004

Albert Szent-Gyorgyi, M.D., Ph.D

"Discovery consists in seeing what everybody else has seen and thinking what nobody has thought."

Nobel Prize 1937 for the discovery of Vitamin C


© Warner Bros. Entertainment Inc. All rights Reserved.