

# Whole Systems Approach: Thyroid Health

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## About Me

- ◆ Licensed ND
- ◆ Med School, Digestion, EBV, thyroid nodules
- ◆ Functional Medicine
- ◆ My GOAL
  - ◆ “I want to INSPIRE others to take control of their health; so you can FEEL and LOOK your best!”



# What is a Whole Systems Approach?

- ◆ Patient-Centered Care, Integrative
- ◆ Science-based healthcare Approach
- ◆ Integrating BEST medical practices
- ◆ Healthy Foundations
  - ◆ Energy Production (mitochondria), Detoxification, Brain health/methylation factors, Diet (Nutrients) and Digestion, Stress and Inflammation, Lifestyle and Environment
- ◆ Cellular Health
- ◆ Organ Health
- ◆ System Health
- ◆ State of health

# “Health”?



- ◆ **Sachin Patel**
  - ◆ **“Life is all about energy, not time. Energy amplifies time. Energy is the currency of Life.”**

# Overview

- ◆ Thyroid Gland; Interactions with the Body
- ◆ Thyroid Disorders
  - ◆ Hypothyroid, Hyperthyroid, Autoimmune
  - ◆ What's Going Wrong?
  - ◆ Signs and Symptoms
  - ◆ Lab tests
  - ◆ Nutrient and Botanical Solutions

## What's Up with the Thyroid?

- ◆ 1967 – “Diseases of the Thyroid are not common in medical practice”

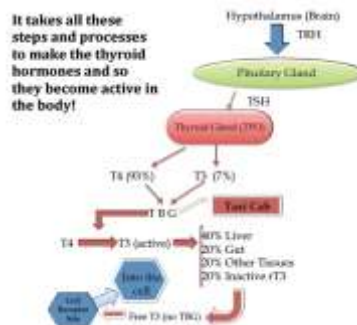
Robbins Pathology Text
- ◆ 1995 – 11.7% abnormal TSH
  - ◆ 13 million undiagnosed abnormal thyroid (Gay et al, 1995)

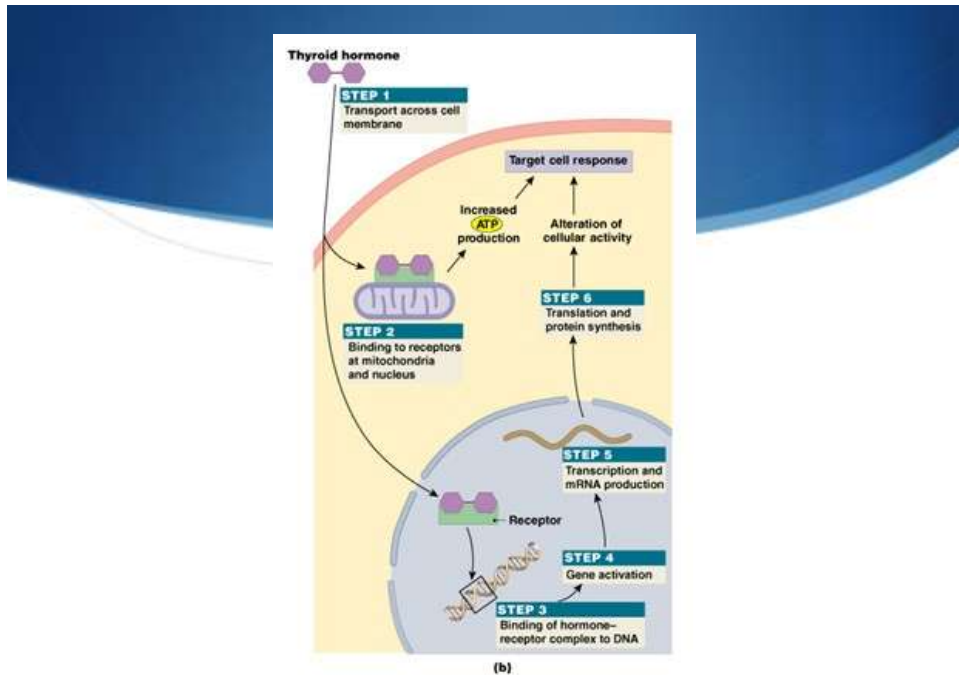
# The Thyroid Gland



Figure 16-16 Principles of Anatomy and Physiology, 11/e  
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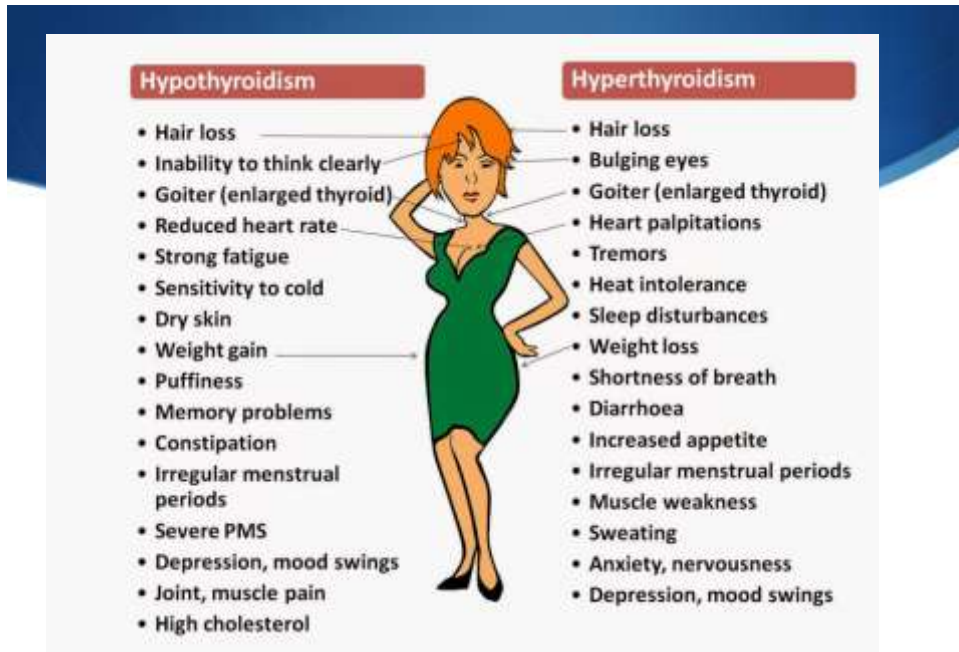
## How it all works?





## Thyroid Disorders

- ◆ Hypothyroid
- ◆ Hyperthyroid
- ◆ Hashimoto's (Hypo)
- ◆ Grave's Disease (Hyper)
- ◆ Goitre (Both)
- ◆ Thyroid Nodules (Both) – Hashimoto's, Iodine def, Cancer (5%)
- ◆ Thyroid Cancer (90% differentiated)



## Lab Values - TSH

- ◆ How much stimulation the thyroid is receiving
- ◆ Ideal 1-2 mIU/L

<1 mIU/L	>2 mIU/L
Hypothyroid due to pituitary issues	Hypothyroid due to inadequate iodine or goitrogen exposure
Hypothyroidism due to stress	Presence of antibodies
Hyperthyroidism	Thyroid hormone cell receptor insensitivity
Healthy response to medications	

## Pituitary Thyroid Hormone Receptors

- ◆ Are NOT energy dependent
- ◆ Will maintain steady uptake of T4 and T3 in low energy states
- ◆ Does not happen in ANY other cell of body (that require ATP to transport T3 into the cell)
- ◆ ALL OTHER CELLS NEED HEALTHY MITOCHONDRIA!

## Lab Values – fT4

- ◆ Thyroxine – 2 tyrosine + 4 bound iodine
- ◆ How much storage form of thyroid hormone is the thyroid able to make?
- ◆ How close is patient to iodine adequacy?
- ◆ Ideal 14-18 (reference range 10-28pmol/L)

## Lab Values – fT3

- ◆ Triiodothyronine (2 tyrosine + 3 bound iodine)
- ◆ How much of the active form of thyroid hormone is the thyroid able to make/peripheral tissues able to convert from T4?
- ◆ How close is patient to iodine adequacy?
- ◆ Ideal 5-6 pmol/L (reference range 4.3-8.1)

## Relationship T4:T3

Mineral Context	TSH	fT4:fT3	Comment
Optimal	1.5-<2.5	3:1	
Iodine excess (mild)	N or decreased	>3:1	Increased storage form
Iodine excess (severe)	decreased	>3:1	Inhibition of homogenesis
Iodine deficiency	N or increased	<3:1	Preferential production T3
Selenium deficiency	N or decreased	>3:1	Impaired conversion
Zinc deficiency	elevated	>3:1	Impaired TRH and conversion
I, Se or Zn deficiency	N or increased	“Normal or Low values”	“push, pull effect”

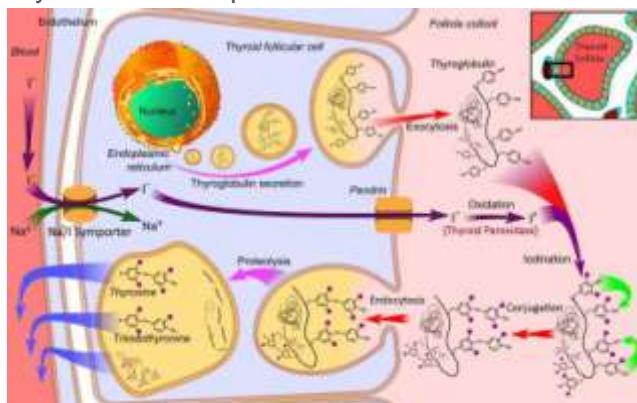


## Lab Values: rT3

- ◆ Reverse T3 – mirror image of T3; can bind to T3 receptors but will not evoke a T3 action
- ◆ rT3 is made during the conversion of T4 as a natural buffer against hyperthyroidism
- ◆ High rT3 with Low Se and High/Low Cortisol
- ◆ Reference range 140-540 pmol/L
- ◆ Ideal rT3:T3 <100:1

## Lab Values: Anti-TPO Ab

- ◆ Antibodies against a major enzyme, Thyroid Peroxidase, in thyroid hormone production



## Anti-TPO Ab

- ◆ Signifies autoimmunity
- ◆ The higher it is, the more likely Hashimoto's or Graves Disease
- ◆ The higher it is, the greater the oxidative stress within the thyroid gland
- ◆ Can predict risk of thyroid disease in future (within 5 years)

## Lab Values: Anti-TG Ab

- ◆ Anti-thyroglobulin Antibody
- ◆ Less specific and sensitive than TPO Ab, but MORE specific for detecting autoimmune nodular goitre in iodine deficient areas
- ◆ Can signify whether you should exercise caution with iodine dosing

## Lab Values: TR Ab

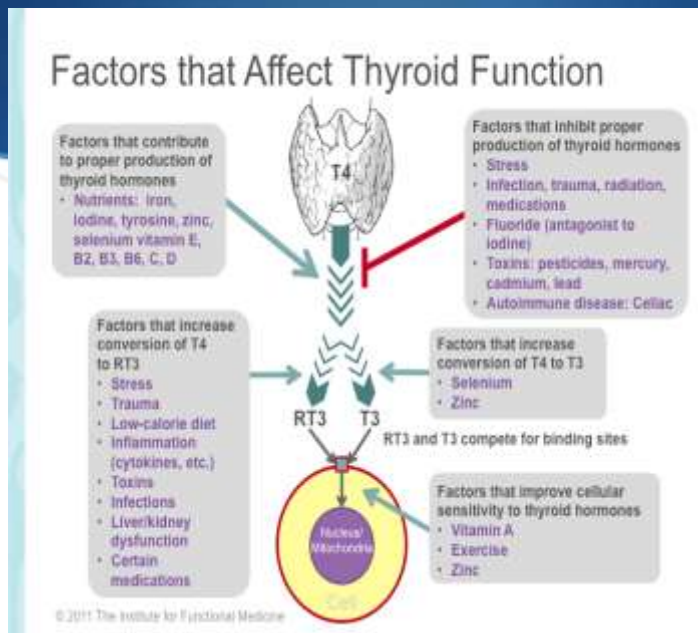
- ◆ Thyroid Receptor Antibodies
- ◆ Mimics TSH, and increases regulate thyroid production
- ◆ Important to do in suspected HYPERthyroidism

## Lab Values

	Reference Values	Optimal Values
<b>Anti-TPO Ab</b>	<b>&lt;60 IU/L</b>	<b>&lt;20 IU/L</b>
<b>Anti-TG Ab</b>	<b>&lt;40 IU/L</b>	<b>&lt;20 IU/L</b>
<b>TR Ab</b>	<b>&lt;1-1.8 IU/L</b>	<b>None</b>

# My tests are back...NOW WHAT? Thyroid Medications

- ◆ Hypothyroidism
  - ◆ Synthetic T4 – Levothyroxine sodium (Synthroid, Levoxyl, Eltroxin)
  - ◆ Synthetic T3 – Liothyronine sodium (Cytomel, Triostat)
  - ◆ BOTH – Liotrix (Thyrolar) NDT, ERFA, Porcine, Armour
- ◆ Hyperthyroidism:
  - ◆ **Propylthiouracil (PTU)** and **methimazole** (also known as **Tapazole**)
  - ◆ stop the thyroid from producing T3 and T4 **hormones**.



# Goitrogens

- ◆ Substances that disrupt the production of thyroid hormones
  - ◆ Halogens: Bromines (flame retardants, pesticides, soda), Fluorine, Lithium, Chlorine
  - ◆ Soy >30g per day
  - ◆ Brassicas
  - ◆ Medications: B-blockers, Theophylline, Amiodarone, PTU, chemotherapy

# Goitrogens

- ◆ Perchlorate
- ◆ Organochlorine pesticides
- ◆ PCB's
- ◆ PDBE's (97% of US residents)
- ◆ BPA



## Goitrogens: Heavy Metals

- ◆ Mercury, Lead, Cadmium
- ◆ Blood Test – If positive...TROUBLE
- ◆ Hair Mineral Analysis
- ◆ Provoked Urinalysis (not with amalgams)

## Infections and Thyroid

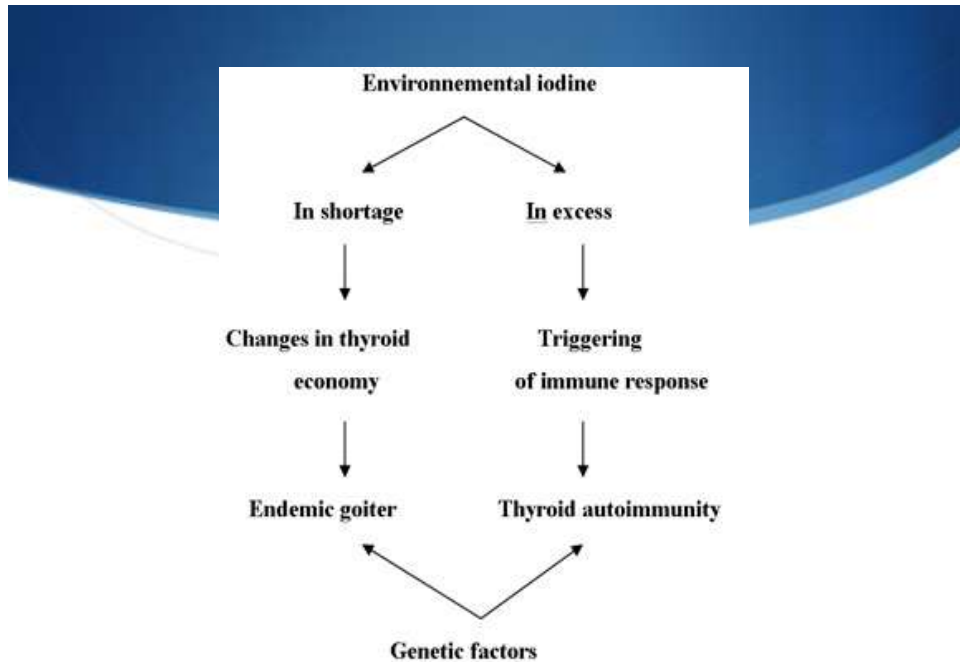
- ◆ Candida – 50% increase in hypothyroidism
- ◆ Lyme, Chlamydia, Shigella, EBV, Hepatitis, Aspergillus, H.pylori
- ◆ Blood? Stool?
- ◆ Treatment – Berberis 8-12 weeks

# Treatment of Infections and Detoxification

- ◆ Clean Lifestyle, Diet, Environment and Attitude
- ◆ SWEAT!!
- ◆ Detoxification: Remove heavy metals
  - ◆ Selenium, Glutathione, DMPS
- ◆ Treat Leaky gut
  - ◆ Hypoallergenic diet
  - ◆ Gluten?
  - ◆ Probiotics

# Iodine: Do I need it?

- ◆ Component of T4 and T3
- ◆ Iodine deficiency is most common cause of Thyroid disease worldwide
- ◆ In Iodine SUFFICIENT areas, Autoimmune thyroid disease (Hashimoto's) is most common cause
- ◆ May stimulate antibody production and increase risk of autoimmune thyroid disease
- ◆ Random urinary iodine
  - ◆ Reflects dietary intake
  - ◆ Best time is first morning void
  - ◆ Iodine (mcg)/creatinine (mmol) x 8.85 = corrected
  - ◆ Minimum 100mcg/L Adults and Children
  - ◆ Minimum 150mcg/L Pregnant or lactating
- ◆ Iodine – Luggol's or potassium iodide



## Selenium

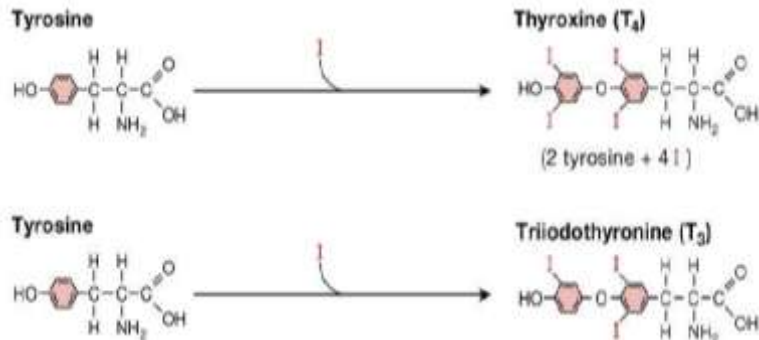
- ◆ Most accurate Test:
  - ◆ Whole Blood Selenium

<b>Optimal Activity of Thyroid Enzymes</b>	<b>&gt;1.0 mcmol/L</b>
For Grave's or Hashimoto's	>1.5mcmol/L
Protection against thyroid cancer	>1.6mcmol/L

- ◆ Brazil nuts, Selenomethionine – 100-200mcg
- ◆ NOTE: If high levels of mercury exposure – always supplement with Selenium
- ◆ Correct Iodine prior to Se supplementation



# Tyrosine



# Zinc

- ◆ Required for T<sub>4</sub>→T<sub>3</sub>; T<sub>3</sub> to bind to receptor
- ◆ Plasma Zinc
- ◆ Can be influenced by:
  - ◆ Infection, inflammation, trauma (low)
  - ◆ Catabolic states (increase)
  - ◆ Hormone levels
  - ◆ Food intake (low)
- ◆ Run hsCRP



## Zinc Tally Test

- ◆ Not as sensitive as blood, but can be useful:
  - ◆ Zinc deficiency decreases gastrin (responsible for taste bud growth and development)
  - ◆ Other factors can affect taste

## Vitamin D3

- ◆ Decreases TPO Ab in adequate amounts
- ◆ 25-OH D blood test
- ◆ Generally decreased in Thyroid disorders, especially Autoimmune
- ◆ Optimal 150-200 nmol/L
- ◆ Excess >250nmol/L
- ◆ RDA – 2000IU per day...but you may need more!!!



# Iron

- ◆ Cofactor for TPO enzymes
- ◆ If Iron deficient, blunts responsiveness to Iodine and Tyrosine supplementation
- ◆ Ferritin (Measure of iron storage)



# Peripheral Tissue Resistance

- ◆ All labs are normal
- ◆ Metabolism accelerates to normal ONLY when thyroid hormone concentration within cells is high enough to override resistance.
- ◆ Medications that inhibit uptake of T3 into cells:
  - ◆ Diazepam, Lorazepam, alprazolam
- ◆ Toxins that inhibit T3 uptake:
  - ◆ PCBs, PBDEs, Triclosan, BPA, Pesticides

# Hashimoto's Thyroiditis

- ◆ Most common form of Thyroid Disease in North America
- ◆ Most often middle-aged women
- ◆ Autoimmune:
  - ◆ Rosmarinic Acid (polyphenol decreases TPO Ab)
    - ◆ Polyphenols (ImmunoCare – 1 per day)
  - ◆ Selenium – 200mcg
  - ◆ D3
  - ◆ Liposomal Glutathione (increases glutathione peroxidase and prevents damage of thyroid gland)

# Treatment: Hypothyroid

- ◆ Botanicals:
  - ◆ Seaweed – Fucus vesiculosus “Bladderwrack” - good bioavailability of iodine; Antioxidant effect and decreases LDL cholesterol
  - ◆ Blue Flag (Iris versicolor)
  - ◆ Commiphora merkel – “guggul”
- ◆ Topical: Myrrh essential oil with 3 parts olive oil
  - ◆ Massage over thyroid once per day

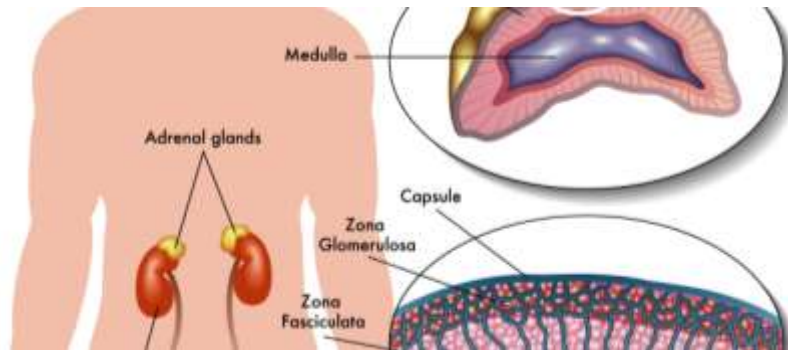
## Treatment: Hyperthyroid

- ◆ Lycopodium virginicum
  - ◆ 905 patients; 87% improvement
  - ◆ Officially recognized in Germany as prescription
- ◆ Rauwolfia serpentina (caution drug interactions)
- ◆ Topical: Lemonbalm essential oil in 3 parts olive oil
  - ◆ Massage over thyroid once daily
- ◆ CoQ10, Carnitine 2g/d, Vit D
- ◆ Minimize ROS
  - ◆ Quit smoking
  - ◆ Selenium, Vit E, C, NAC (increase Glut perox.)

## Differential Diagnoses

- ◆ CVD
- ◆ Hypercholesterolemia
- ◆ Depression, Bipolar
- ◆ Fibromyalgia, CFS
- ◆ Migraines
  
- ◆ T3 use for above conditions is well documented

# Adrenals



## Are you adrenal fatigued?

- ◆ Probably if you answer YES to more than 2:
  - ◆ Hard time falling asleep?
  - ◆ Wake frequently at night?
  - ◆ Hard time waking in morning and feeling unrefreshed?
  - ◆ Bright lights bother you more than they should?
  - ◆ Startle easily due to noise?
  - ◆ Take others too seriously and are easily defensive?
  - ◆ Don't cope well emotionally with certain people or events in life?
  - ◆ Does it take a long time to get over a stressful event?
  - ◆ Shaky, sweaty or nauseous when you need to eat?
  - ◆ Nausea is the face of a stressful situation?
  - ◆ Seem to crave salt?
  - ◆ Do you feel better after 6pm?

## Signs/Symptoms Adrenal Fatigue

- ◆ Anxiety/Nervousness
- ◆ Inability to cope with stress
- ◆ Impatience
- ◆ Irritability
- ◆ Light-headedness, dizziness
- ◆ Shaky, trembling
- ◆ Racing or pounding heart
- ◆ Trouble sleeping
- ◆ Nausea or flushing during stress
- ◆ Decreased blood sugar
- ◆ Sweating
- ◆ Salt or sweet craving

## Adrenals

- ◆ 50% of hypothyroid patients may have an adrenal problem...must address FIRST!
- ◆ Too much or too little cortisol can block the conversion of T4→T3
- ◆ If you start on thyroid meds without treating the adrenals:
  - ◆ SSx hyperthyroidism
  - ◆ Increased T3 or rT3 on labs

## Causes of Adrenal Fatigue

- ◆ Being on T4 ONLY; Adrenals NEED T3
- ◆ Years of undiagnosed hypothyroidism
- ◆ Chronic stress – biological, environmental (FI, CI, heavy metals, etc.), emotional or physical
- ◆ Eating high carb diet with low fat

## Adrenal Fatigue: How do you know for sure?

- ◆ Blood Serum Cortisol:
  - ◆ 8am, noon, 4pm
- ◆ 24 Hour Salivary Cortisol:
  - ◆ 8am, noon, 4pm, 11pm



## 4 point Cortisol



## Are you adrenal fatigued?

- ◆ 3 at home tests:
    - ◆ Pupil test
    - ◆ Temperature Test
    - ◆ Blood Pressure Test \*
- (Dr. James Wilson, Adrenal Fatigue: 21<sup>st</sup> Century Stress Syndrome)

## Treating Your Adrenals

- ◆ Care for your healthy adrenals:
  - ◆ Vitamin C – 1000mg
  - ◆ B vitamins (esp. B5 & B6)
  - ◆ Vit. E, Calcium, Magnesium, trace minerals
  - ◆ Herbs: Licorice Root\*, Ashwaghandha, Ginseng, RHODIOLA ROSEA
  - ◆ Adrenal Glandulars (Cortex ONLY)

## Treating Your Adrenals

- ◆ Laugh and enjoy life
- ◆ Meditation, Yoga, Breathing
- ◆ Sleep and Rest
- ◆ 3 Meals per day
- ◆ Avoid over-stimulating exercise

## Treating Your Adrenals

- ◆ High night time cortisol
  - ◆ Melatonin 1-3mg
  - ◆ Phosphatidylserine (PS) 300-1000mg
  - ◆ Zinc 25-50mg (with Cu)
  - ◆ Holy Basil
  - ◆ Relora

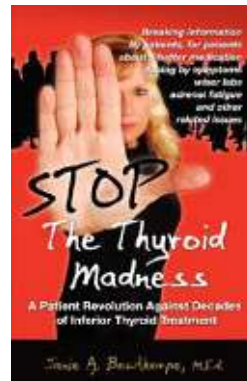
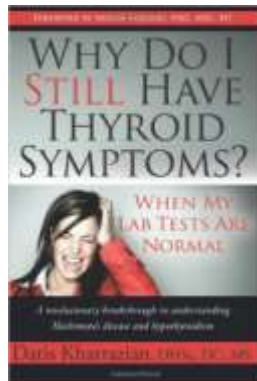
## Treating Your Adrenals

- ◆ Treat Adrenals first before addressing thyroid...
- ◆ But what if I'm already on thyroid meds??
  - ◆ Clear rT3

# Conclusion

- ◆ Take control of your own health!
- ◆ You know your body...GET TESTED (especially TPO)
- ◆ Care for your adrenals

# Books



# Questions?

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