



### Why You Are HERE, NOW

- ✓ Passionate
- ✓ Dedicated
- ✓ Compassionate
- ✓ Determined
- ✓ Unselfish
- ✓ Unstoppable!



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### My Big WHY



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### What Do You Need to Succeed?

- ✓ Passion – a Big WHY
- ✓ Knowledge
- ✓ A System
- ✓ A Support Network
- ✓ Tools and Resources
- ✓ Superior Interview Skills – Knowing What to Ask
- ✓ Excellent Listening Skills
- ✓ Love and Understanding
- ✓ “Detective Skills” – Functional Assessment Tools
  - Labs
  - History Taking
  - Physical Evaluations
  - Home Tests
- ✓ A Complete Holistic Toolbox
- ✓ Determination to Succeed
- ✓ Comfort with Computer/Internet



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**Medical Disclaimer:** The information in this presentation is not intended to replace a one-on-one relationship with a qualified health care professional and is not intended as medical advice. It is intended as a sharing of knowledge and information from the research and experience of Dr. Ritamarie Loscalzo, drritamarie.com, and the experts who have contributed. We encourage you to make your own health care decisions based upon your research and in partnership with a qualified health care professional.

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**DAY 1**




with Dr. Ritamarie Loscalzo (MS, DC, CCN, DACBN)  
SCIENTIFIC AND HOLISTIC INVESTIGATION  
OF NUTRITIONAL ENDOCRINOLOGY

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**Nutritional Endocrinology Defined**

- ✓ Relationship between nutrition and endocrine imbalances
- ✓ Impact of **nutrient deficiencies or excesses** on hormones
- ✓ The relationship between food and hormones



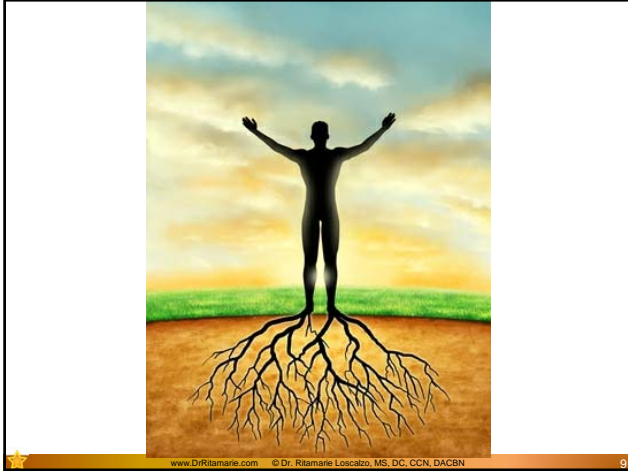
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**Endocrinology is not a subspecialty.  
It is the Master Control Center**



**-- The key to unraveling the profound impact of hormone imbalance on EVERY system of the body!**

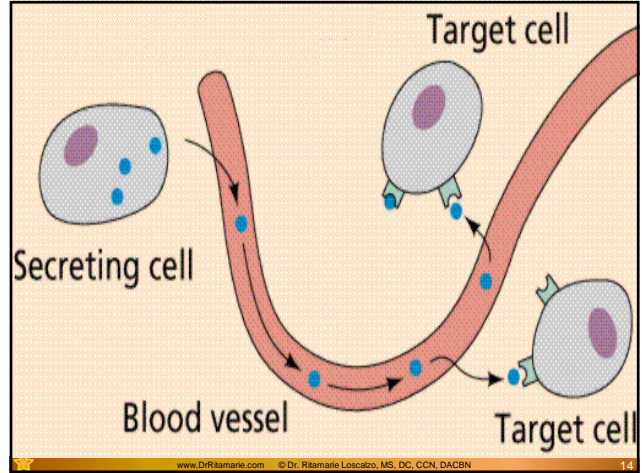
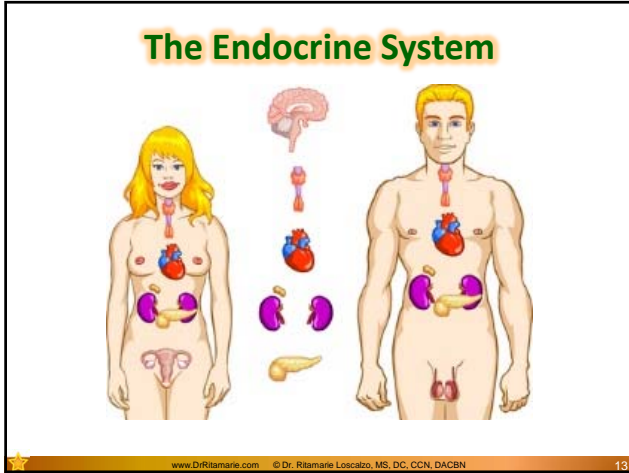
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### What Exactly Are Hormones?

- ✓ Messengers of life
- ✓ **Chemicals secreted by glands:** usually directly into the blood stream
- ✓ Control physiological and behavioral activities such as the processes of digestion, metabolism, growth, reproduction, and mood control
- ✓ **Receptors** are located on a cell membrane or intracellularly within the cytoplasm of their target cell

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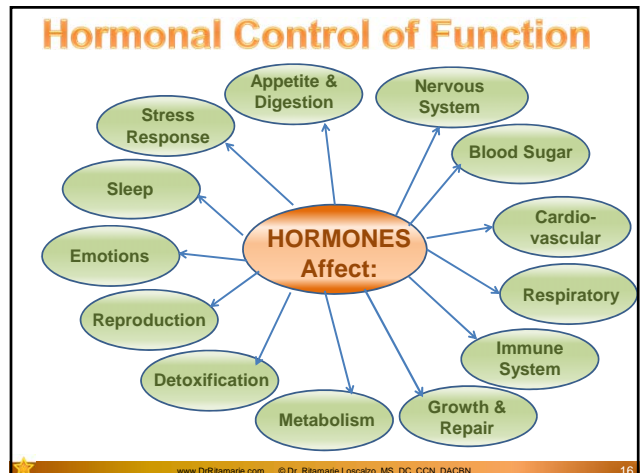


### Connection Between Hormones And Persistent Symptoms

- ✓ Fatigue and lethargy
- ✓ Weight gain / weight loss (yo-yo)
- ✓ Insomnia
- ✓ Depression, anxiety, and mood swings
- ✓ Skin lesions
- ✓ Anorexia
- ✓ Cold intolerance
- ✓ Hair loss
- ✓ Headache

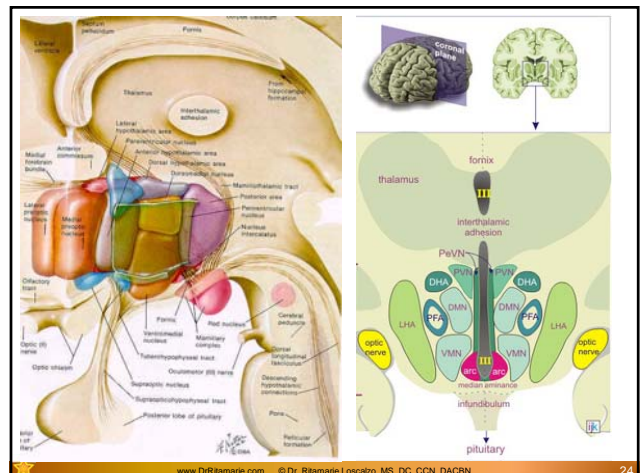
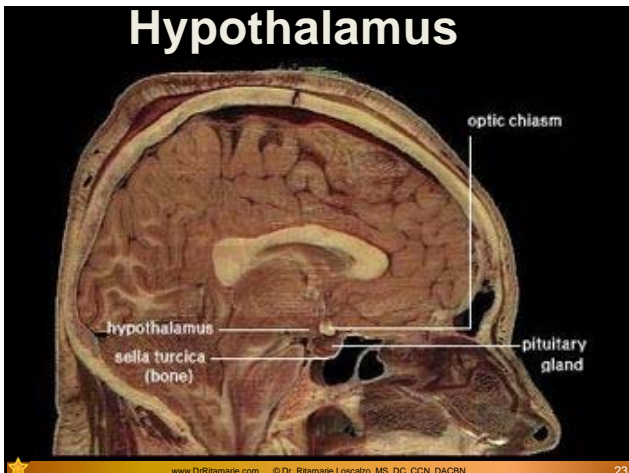
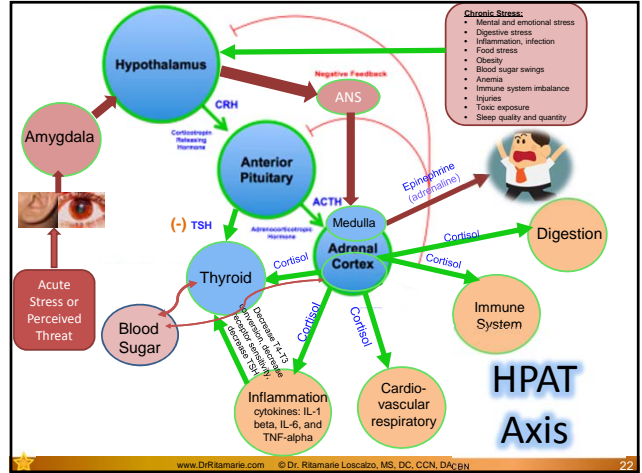
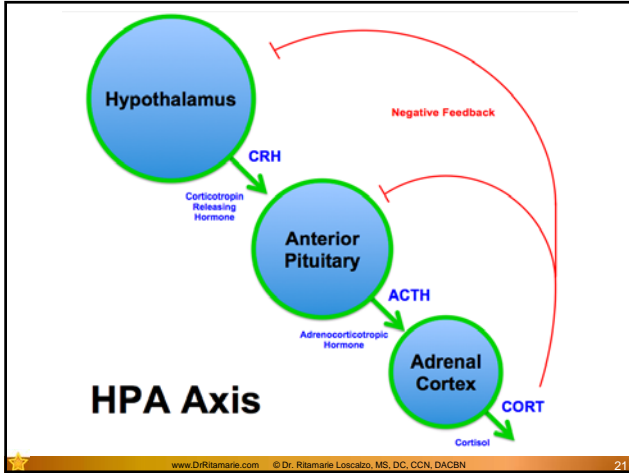
- ✓ Weakness
- ✓ Shortness of breath
- ✓ Brain fog
- ✓ Decreased libido
- ✓ insomnia
- ✓ Neuromuscular disturbances
- ✓ Impaired immune system
- ✓ High cholesterol
- ✓ Angina
- ✓ Cancer...

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## Hormones of the Hypothalamus

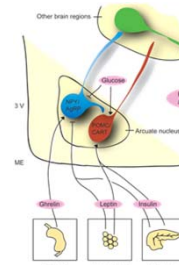


- ✓ **Thyrotropin-releasing hormone (TRH)**
- ✓ **Corticotropin-releasing hormone (CRH)**
- ✓ **Gonadotropin-releasing hormone (GnRH)**
- ✓ **Growth hormone-releasing hormone (GHRH)**
- ✓ **Somatostatin: inhibits growth hormone (GHIH)**
- ✓ **Oxytocin: Uterine contraction, milk letdown (OT)**
- ✓ **Anti-diuretic Hormone: increases water retention (ADH)**

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## The Hypothalamus Controls:



- ✓ Temperature
- ✓ Hunger
- ✓ Glucose and insulin levels
- ✓ Aspects of parenting and attachment behaviors
- ✓ Thirst
- ✓ Moods
- ✓ Energy and fatigue
- ✓ Sleep
- ✓ Circadian rhythms
- ✓ Blood pressure
- ✓ Heart rate
- ✓ Growth and repair
- ✓ Gut motility
- ✓ Sex drive

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## Hypothalamus Hormone Details

| Secreted hormone                                 | Abbreviation | Produced by   | Effect  |
|--|--------------|---|---|
| Thyrotropin-releasing hormone                    | TRH          | Parvocellular neurosecretory cells of the paraventricular nucleus | Stimulate thyroid-stimulating hormone (TSH) release from anterior pituitary (primarily)   |
| (Prolactin-releasing hormone)                    | PRH          | Parvocellular neurosecretory cells of the paraventricular nucleus | Stimulate prolactin release from anterior pituitary   |
| Corticotropin-releasing hormone                  | CRH          | Parvocellular neurosecretory cells of the paraventricular nucleus | Stimulate adrenocorticotropic hormone (ACTH) release from anterior pituitary  |
| Dopamine (Prolactin-inhibiting hormone)          | DA or PIH    | Dopamine neurons of the arcuate nucleus                           | Inhibit prolactin release from anterior pituitary   |
| Growth hormone-releasing hormone                 | GHRH         | Neuroendocrine neurons of the arcuate nucleus                     | Stimulate growth hormone (GH) release from anterior pituitary   |
| Gonadotropin-releasing hormone                   | GnRH         | Neuroendocrine cells of the preoptic area                         | <ul style="list-style-type: none"> <li>• Stimulate follicle-stimulating hormone (FSH) release from anterior pituitary</li> <li>• Stimulate luteinizing hormone (LH) release from anterior pituitary</li> </ul>    |
| Somatostatin (growth hormone-inhibiting hormone) | GHIH         | Neuroendocrine cells of the paraventricular nucleus               | <ul style="list-style-type: none"> <li>• Inhibit growth hormone (GH) release from anterior pituitary</li> <li>• Inhibit (moderately) thyroid-stimulating hormone (TSH) release from anterior pituitary</li> </ul> |

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## Additional Hypothalamus Jobs

| Nucleus                                       | Function/hormone released   |
|---|---|
| Medial preoptic nucleus                       | • GnRH  |
| Supraoptic nucleus                            | • Vasopressin (anti-diuretic hormone – ADH)   |
| Paraventricular nucleus                       | <ul style="list-style-type: none"> <li>• <b>Thyrotropin-releasing hormone (TRH)</b></li> <li>• <b>Corticotropin-releasing hormone (CRH)</b></li> <li>• Oxytocin</li> <li>• Somatostatin (growth hormone release inhibiting hormone – GHIH)</li> </ul> |
| Anterior hypothalamic nucleus                 | <ul style="list-style-type: none"> <li>• Thermoregulation</li> <li>• Panting</li> <li>• Sweating</li> <li>• Thyrotropin (thyroid-stimulating hormone – TSH) inhibition</li> </ul>   |
| Suprachiasmatic nucleus                       | • Circadian rhythms   |
| Lateral nucleus                               | • Thirst and hunger   |
| Dorsomedial hypothalamic nucleus              | <ul style="list-style-type: none"> <li>• Blood pressure</li> <li>• Heart rate</li> <li>• GI stimulation</li> <li>• Satiety</li> </ul>   |
| Ventromedial nucleus                          | • Neuroendocrine control  |
| Arcuate nucleus                               | <ul style="list-style-type: none"> <li>• Growth hormone-releasing hormone (GHRH)</li> <li>• Appetite and glucose regulation (triggered by leptin, insulin, and glucose)</li> <li>• Dopamine</li> </ul>  |
| Lateral nucleus                               | • Thirst and hunger   |
| Mammillary nuclei (part of mammillary bodies) | • Memory  |
| Posterior nucleus                             | <ul style="list-style-type: none"> <li>• Increase blood pressure</li> <li>• Pupillary dilation</li> <li>• Shivering</li> <li>• Vasopressin (ADH)</li> </ul>   |

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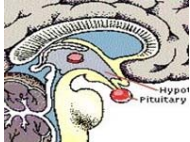




## Pituitary Hormones

### Anterior Lobe (Adenohypophysis)

- ✓ **Thyroid Stimulating Hormone (TSH)**
- ✓ **Adrenocorticotropic Hormone (ACTH)**
- ✓ **Follicle-Stimulating Hormone (FSH)**
- ✓ **Luteinizing Hormone (LH)**
- ✓ **Prolactin (PRL)**
- ✓ **Growth Hormone (GH)**
- ✓ **Alpha Melanocyte-Stimulating Hormone ( $\alpha$ -MSH)**



**Posterior Lobe (Neurohypophysis)\*\***

- ✓ **Anti-diuretic Hormone aka Vasopressin (ADH)**
- ✓ **Oxytocin (OT)**

\*\*Produced by hypothalamus, stored and secreted by posterior pituitary

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## Pituitary Malfunctions

- ✓ Causes
  - Tumor
  - Insufficient blood supply

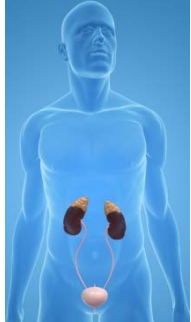
| Hormone        | Excess                                  | Deficiency                      |
|----------------|---|---------------------------------|
| Growth Hormone | Acromegaly                              | Dwarfism                        |
| ACTH           | Cushing's                               | Addison's **                    |
| TSH            | Hyperthyroid                            | Hypothyroid **                  |
| FSH, LH        | Too many sex hormones<br>hyperfertility | Infertility, anovulatory cycles |

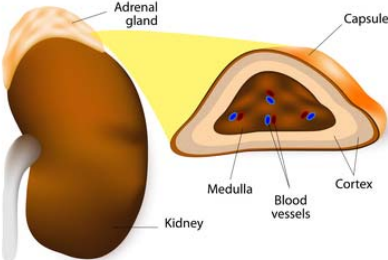
- ✓ **Panhypopituitarism:** under functioning of pituitary – all hormones affected

\*\*Adrenals and thyroid often affected later in process

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## Adrenal Glands

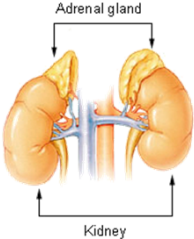




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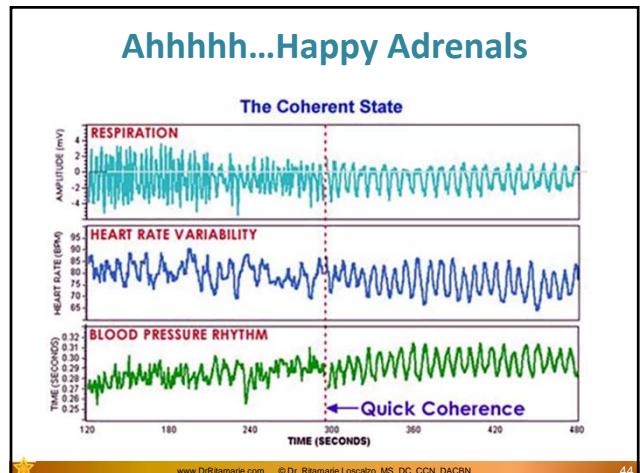
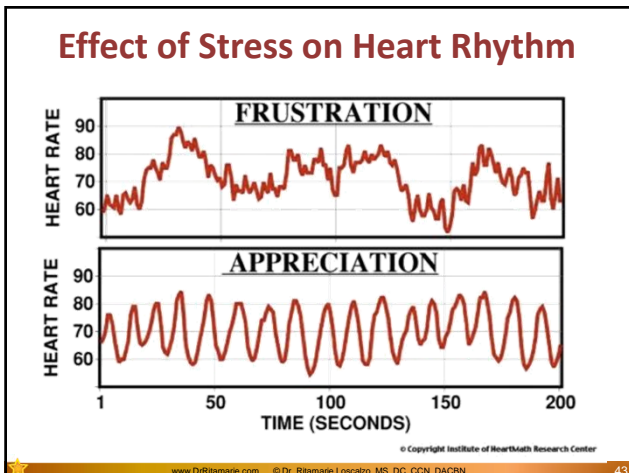
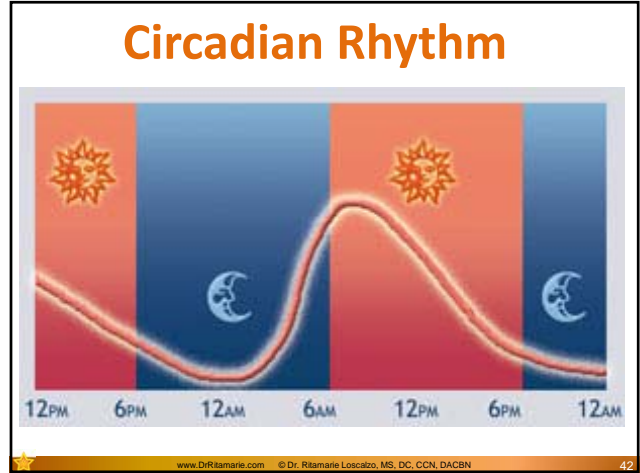
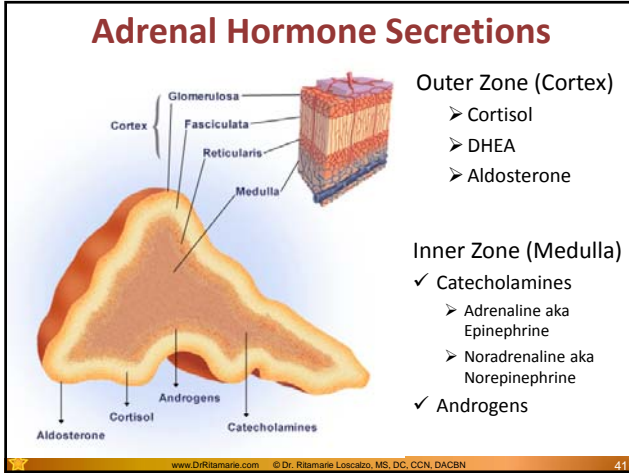
## Adrenal Gland Anatomy and Function

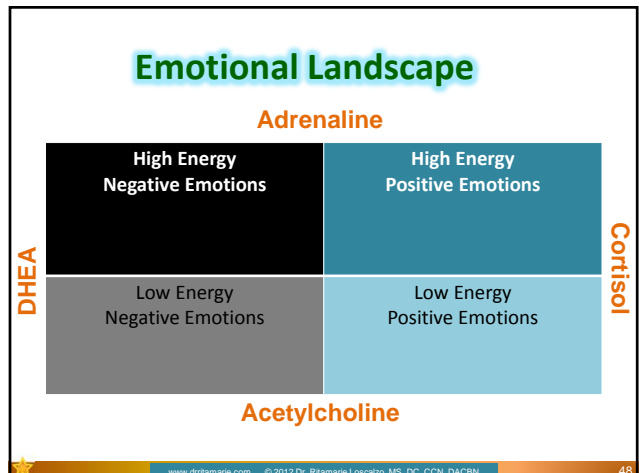
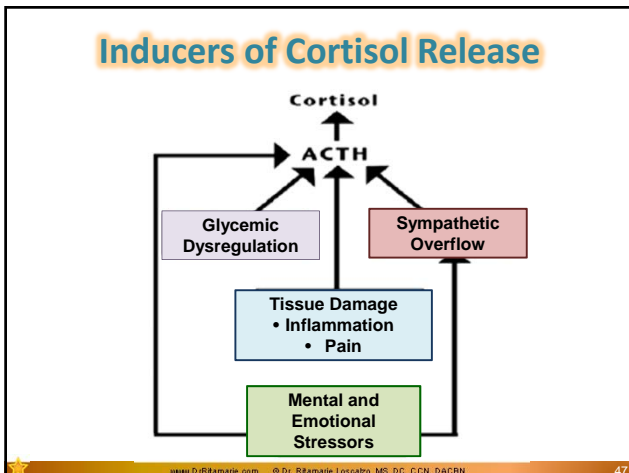
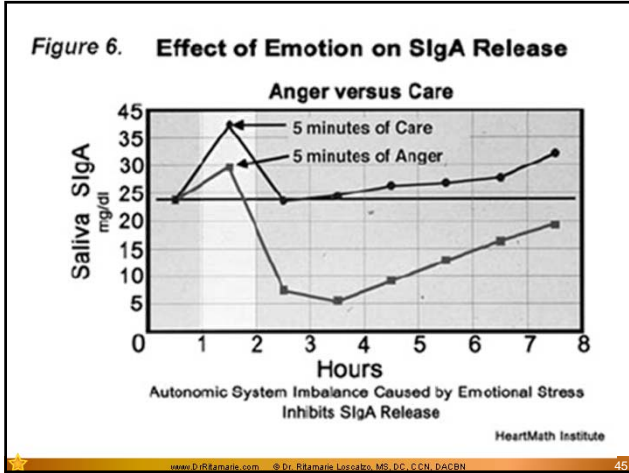
- ✓ Two small glands, each weighing 3 to 5 grams
- ✓ Located above the kidneys
- ✓ One of the highest rates of blood flow per gram of tissue
- ✓ Highest concentration of vitamin C per gram of any tissue in the body
- ✓ The hormones released in a cycle with the highest value in the morning and the lowest value at night – Circadian Rhythm



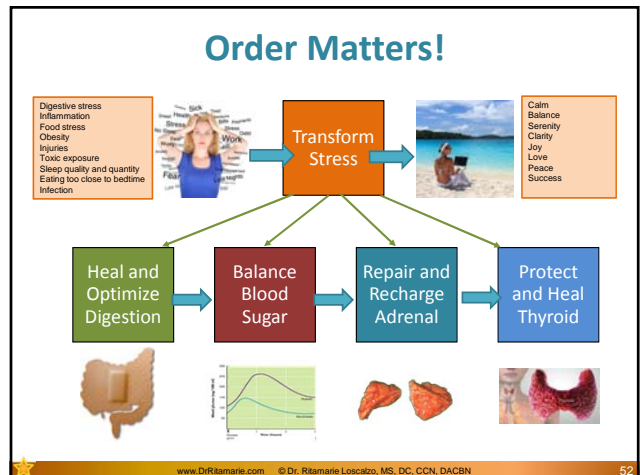
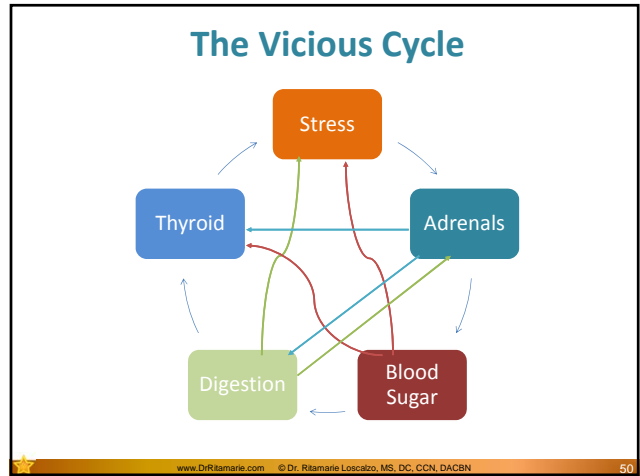
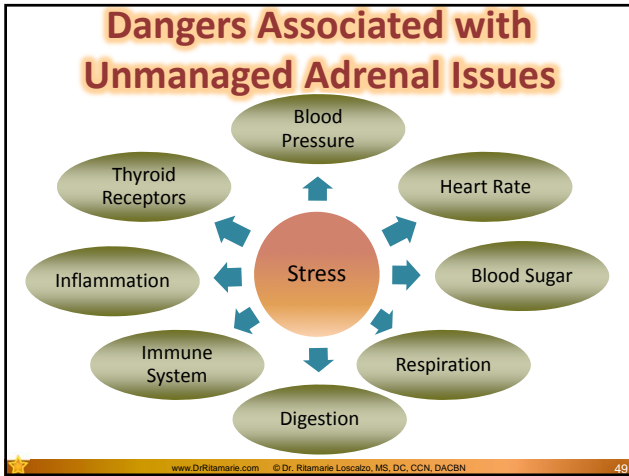
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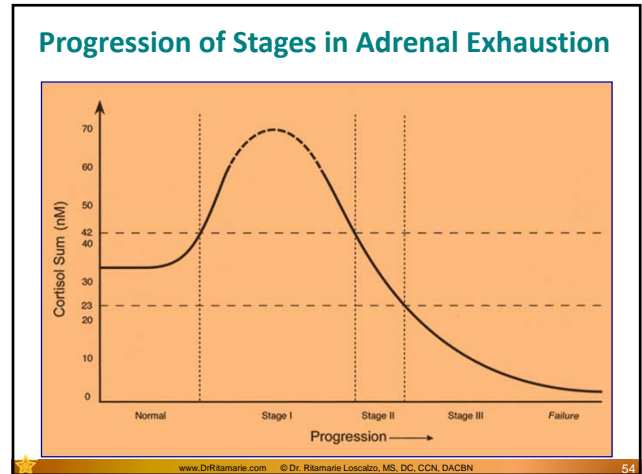
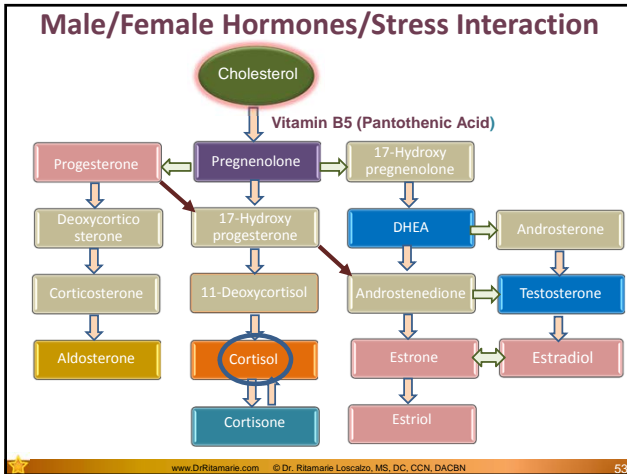












### Adrenal Fatigue – Stage 1 Tired and Wired

- ✓ Sympathetic Dominant State
  - DHEA low
  - Cortisol high
- ✓ Draining Your Reserves
- ✓ Negative Effects of Cortisol
- ✓ Slump in Mid-Afternoon
- ✓ Wired at Bedtime

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### Adrenal Fatigue – Stage 2 Reserves Becoming Depleted

- ✓ Sympathetic Dominant State
  - DHEA low
  - Cortisol normal, with possible low dips
- ✓ Low Reserves
- ✓ Immune System Compromised


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### Adrenal Fatigue – Stage 3 Exhaustion

- ✓ Sympathetic Dominant State
  - DHEA low
  - Cortisol low
- ✓ Suffering From Negative Effects of Chronic Elevated Cortisol
- ✓ Low Libido
- ✓ Sex Hormone Imbalances
- ✓ Accelerated Aging
- ✓ Poor Memory



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### HPA Impact on Thyroid

- ✓ Inflammatory **cytokines IL-1 beta, IL-6, and TNF-alpha** released during the stress response
- ✓ IL-1 beta, IL-6, and TNF-alpha **down-regulate the HPA axis** and **reduce levels of thyroid stimulating hormone (TSH)**
- ✓ A single injection of **tumor necrosis factor alpha (TNF-alpha)** reduced serum TSH, T3, free T4, free T3 and hypothalamic TRH for 5 days.
- ✓ **TNF-alpha** was also found to **decrease the conversion of T4 to T3**, reduce thyroid hormone uptake, and decrease the **sensitivity of the thyroid to TSH**.

<http://www.ncbi.nlm.nih.gov/pubmed/1906893>  
<http://chrisresser.com/5-ways-that-stress-causes-hypothyroid-symptoms>

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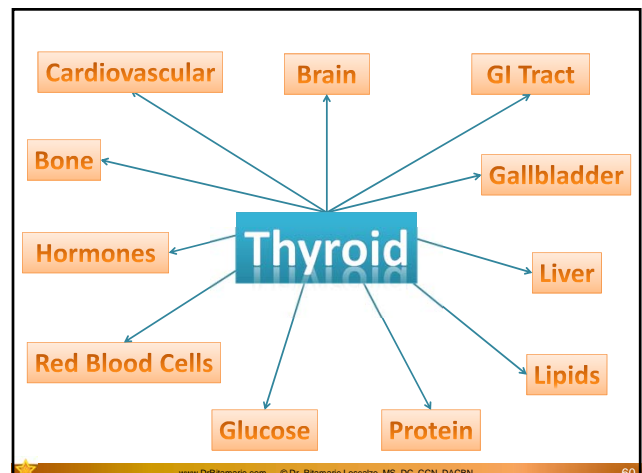


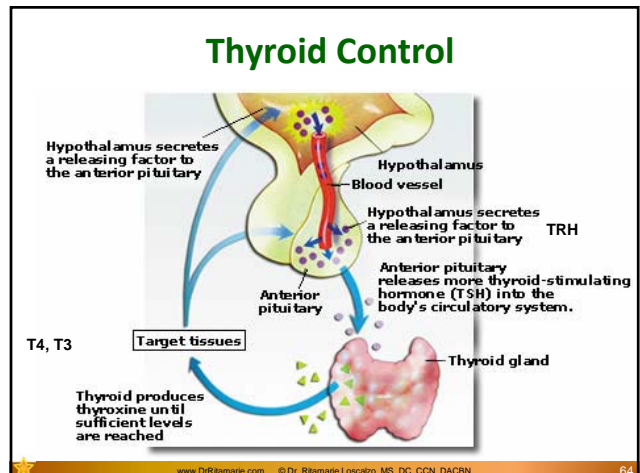
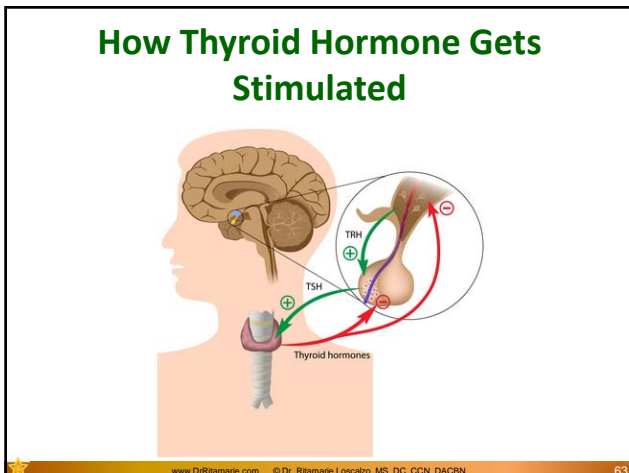
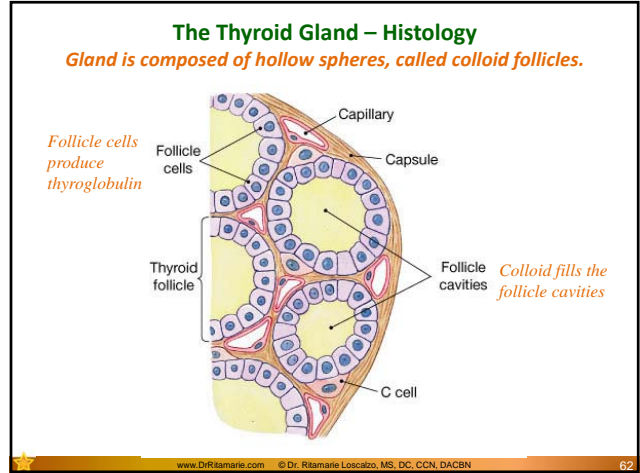
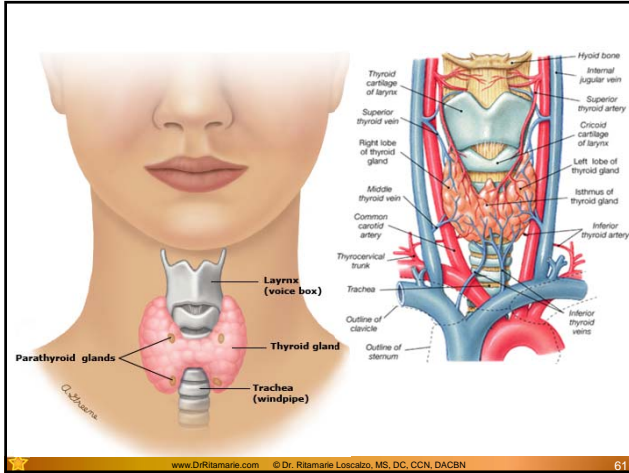
### More HPA Impact on Thyroid

- ✓ Th1 and Th2, IL-6, TNF-alpha, IFN-gamma and IL-1 beta **suppress the conversion of T4 to T3**.
- ✓ **As IL-6 rises, T3 falls.**
- ✓ Inflammatory cytokines in the healthy resulted in a **rapid reduction of serum T3** and TSH levels, increase in reverse T3, and minimal change in T4
- ✓ **Adrenal stress weakens immune barriers** and promotes poor immune system regulation, which can lead to autoimmune thyroiditis
- ✓ Inflammatory cytokines **suppress thyroid receptor site sensitivity**.
- ✓ Prolonged cortisol elevations decrease liver clearance of excess estrogens leading to increased thyroid binding globulin (TBG)

<http://www.ncbi.nlm.nih.gov/pubmed/1906893>  
<http://chrisresser.com/5-ways-that-stress-causes-hypothyroid-symptoms>

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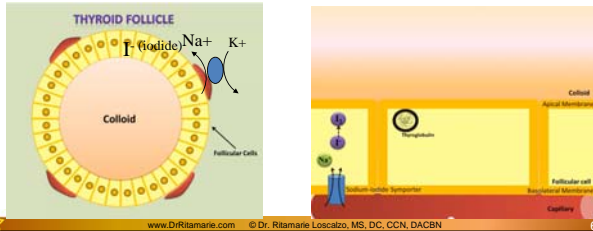






### Action of TSH on the Thyroid

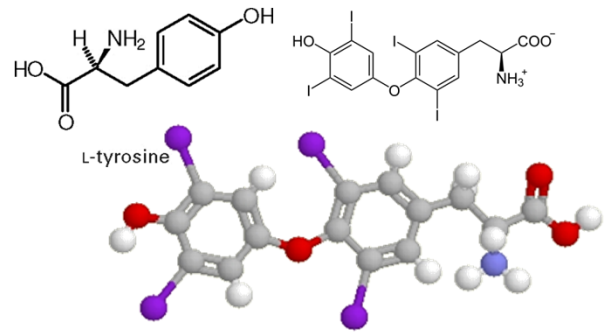
- TSH acts on follicular cells of the thyroid.
- ✓ Increases **iodide transport** into follicular cells by NIS - Sodium Iodide Symporter
  - ✓ Oxidizes iodide to release iodine for iodination of tyrosine
  - ✓ Increases production and iodination of **thyroglobulin**
  - ✓ Brings the thyroglobulin back into the follicle cell



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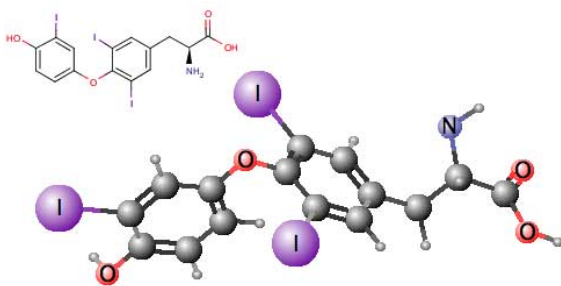
### T4 - Thyroxine



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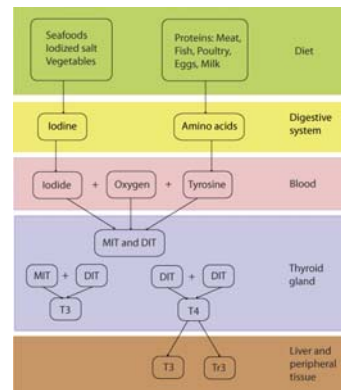
### T3 - Triiodothyronine



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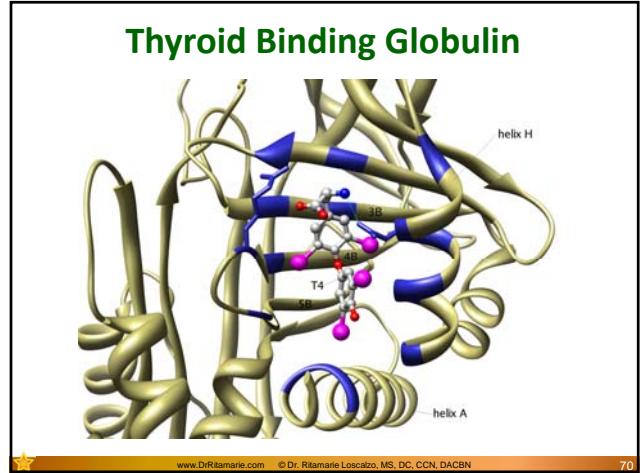
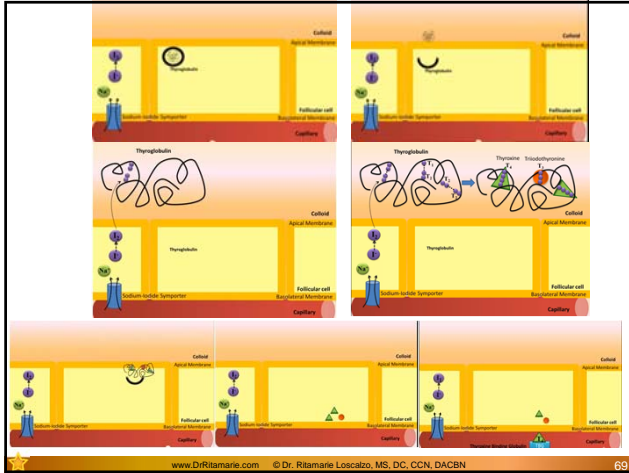
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### Thyroid Hormone Synthesis



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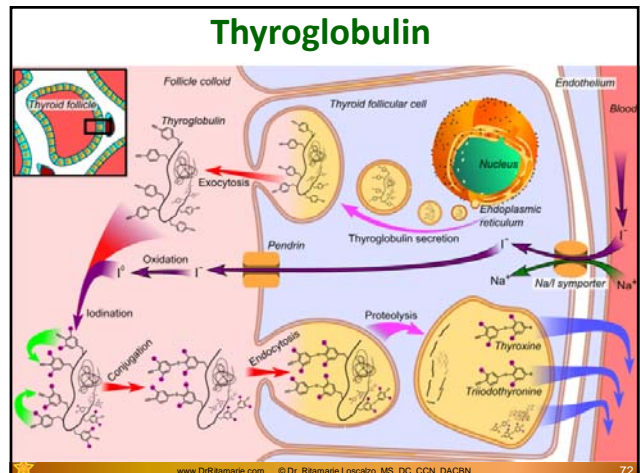
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### The Making of Triiodothyronine (T3)

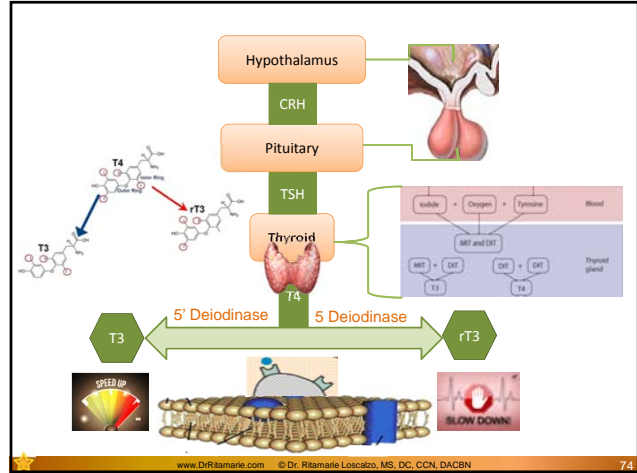
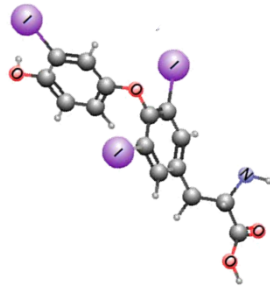
- ✓ T4 is converted to T3 by 5' Deiodinase
- ✓ Inhibited by stress, acute and chronic illness, fasting, cortisol (steroids)
- ✓ T4 is also converted to inactive Reverse T3 (RT3) by 5 deiodinase
- ✓ 80% of T3 is produced in body tissues: liver, kidney, gut

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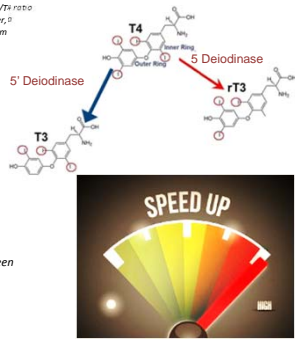
### How T3 Increases Metabolic Rate

- ✓ Pumps sodium and potassium across cell membranes to maintain resting membrane potential
- ✓ Acts on mitochondria to increase ATP synthesis
- ✓ Increases the synthesis of Na<sup>+</sup>/K<sup>+</sup> pumps, markedly increasing ATP consumption.
- ✓ The resulting increased metabolic rate increases thermogenesis (heat production).



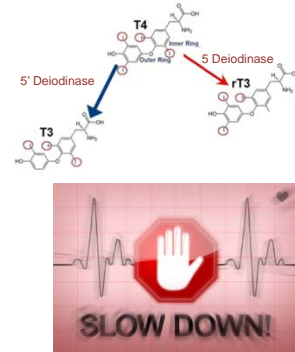
### T4 to T3 Conversion Enhancers

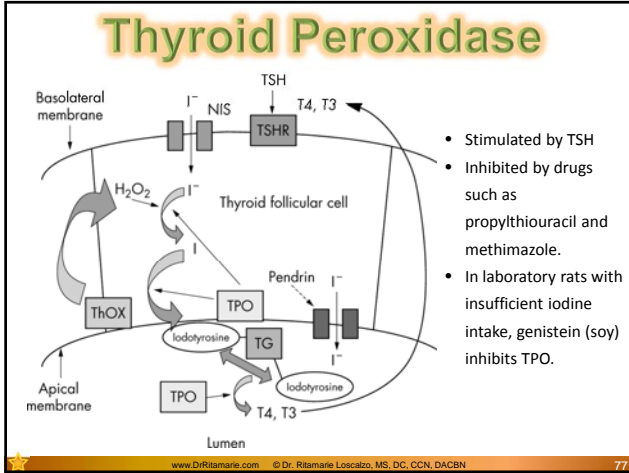
- ✓ Selenium  
A double-blind, placebo controlled trial of selenium normalized the T3/T4 ratio in selenium-treated subjects (Clin Sci (Colch) 1995;89:637-42). However, a German study documented that inorganic, non-cysteine bound selenium dropped serum T3 33% percent (Z Ernährungswiss 1995;34:277-283)
- ✓ Zinc
- ✓ Vitamin D
- ✓ Iron
- ✓ Iodine
- ✓ Vitamins B6 and B12
- ✓ Copper
- ✓ Ashwagandha  
Krause's Food & the Nutrition Care Process, By L. Kathleen Mahan, Janice L Raymond, Sylvia Escott-Stump
- ✓ Blood Sugar Balance
- ✓ Low stress



### Inducers of Reverse T3 aka rT3

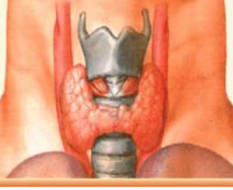
- ✓ Illness
- ✓ Immune challenges
- ✓ Stress
- ✓ Inflammation (IL-6)
- ✓ Blood sugar imbalances
- ✓ Fasting or famine
- ✓ Toxins
- ✓ Impaired liver function
- ✓ Impaired kidney function
- ✓ Heavy metals, especially mercury and lead






### Types of Thyroid Dysfunction

- ✓ Hypothyroidism
- ✓ Hyperthyroidism
- ✓ Autoimmune Thyroid Conditions
  - Graves' Disease
  - Hashimoto's Thyroiditis
- ✓ Subclinical Thyroid Conditions
  - Binding Protein Problems
  - Conversion Problems
  - Thyroid Receptor Resistance
  - Wilson's Temperature Syndrome
- ✓ Cancer



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### *The Zen to Wellness – Healing the Adrenals Through the Asian Self-Care Practices of Acupressure, Pranayama, Meditation, Tai Chi / Chi Gong and Tonic Herbs*



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