A Functional Medicine Approach to the Thyroid

presented by

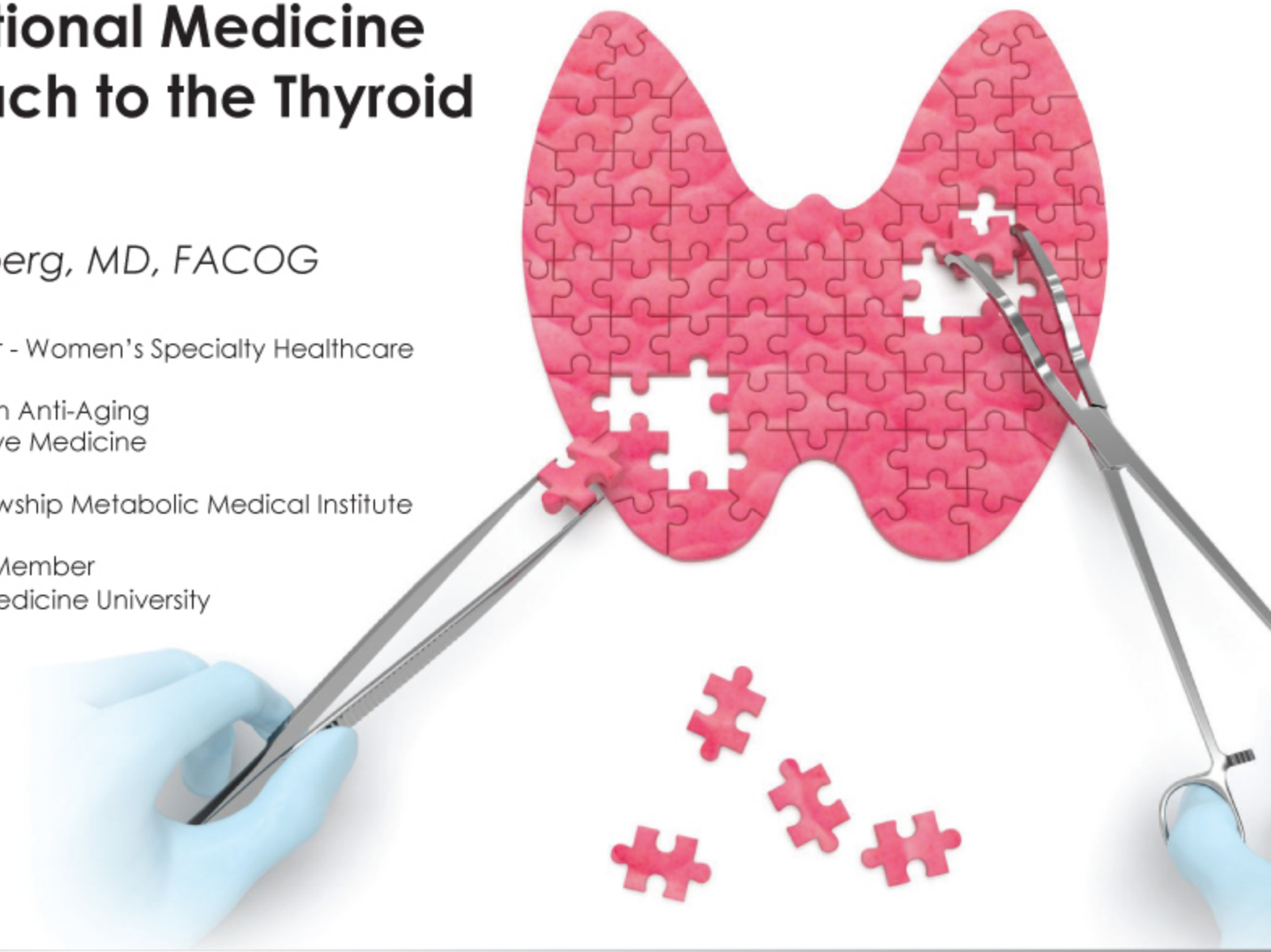
Dian Ginsberg, MD, FACOG

Medical Director - Women's Specialty Healthcare

Board Certified in Anti-Aging
and Regenerative Medicine

Advanced Fellowship Metabolic Medical Institute

Advisory Board Member
for Functional Medicine University



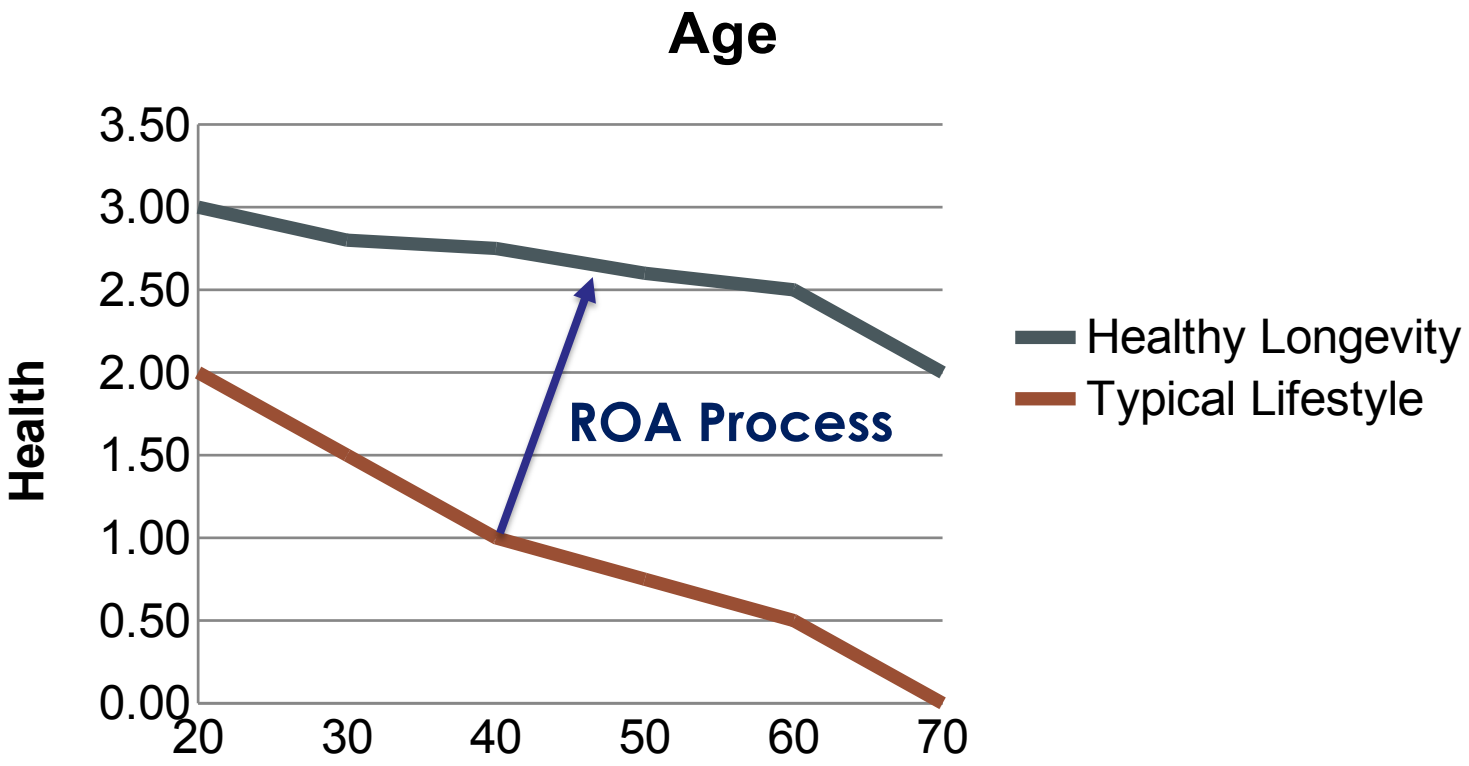
Objectives

- To understand the effect of free radicals on the thyroid and how they contribute to thyroid dysfunction
- -The optimal testing regimen for diagnosis of dysfunction and disease
- How autoimmune processes affect thyroid function—and therefore whole body function
- Treatment, Supplements and Medications used by todays physicians

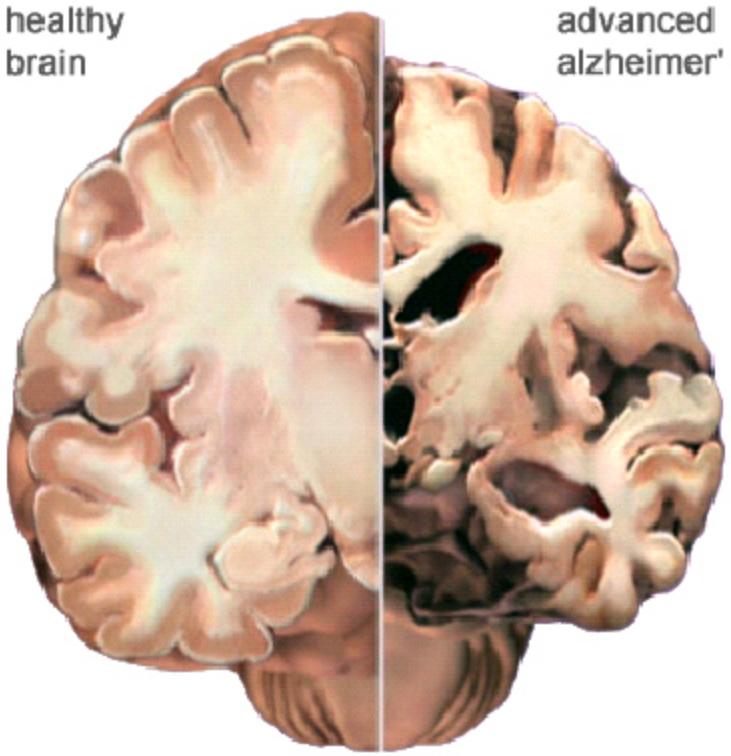
"Success is not final.
Failure is not fatal.
It is the courage to continue
that counts."

Winston Churchill

Rectangularization of Aging (ROA)



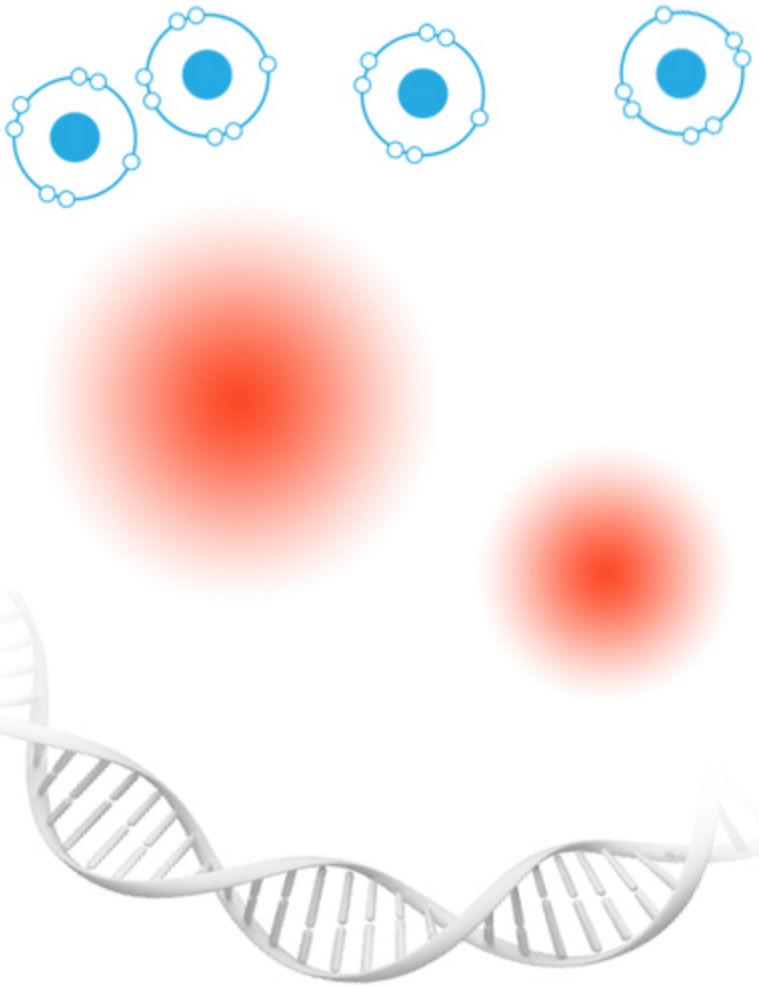
Inflammation and Free Radicals



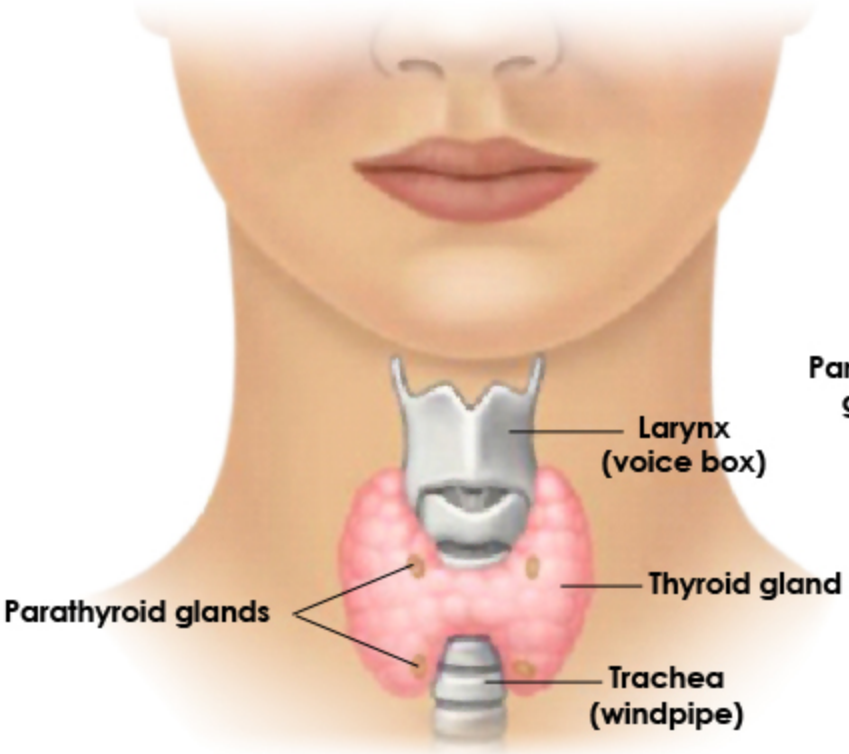
- Alzheimer's
- Obstructive Airway
- DNA Damage
- Learning disabilities in kids
- Mitochondrial aging

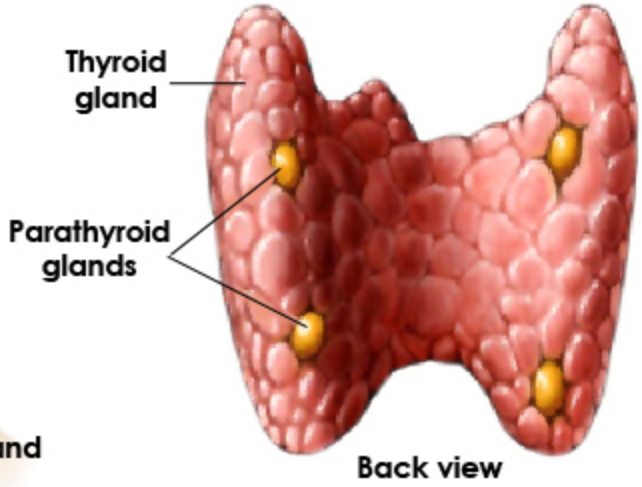
How does this relate to Thyroid Function?

- Free Radicals
- Inflammation
- Aging
  - DNA damage
  - shorten telomeres
  - loss of function



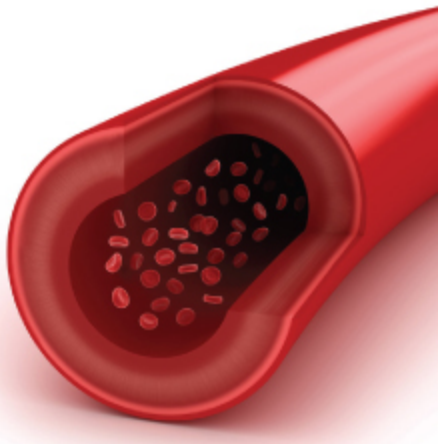
Thyroid Anatomy



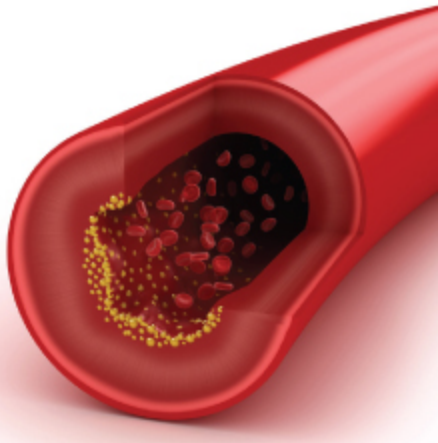


Diagnosis: What are ***normal*** thyroid levels?

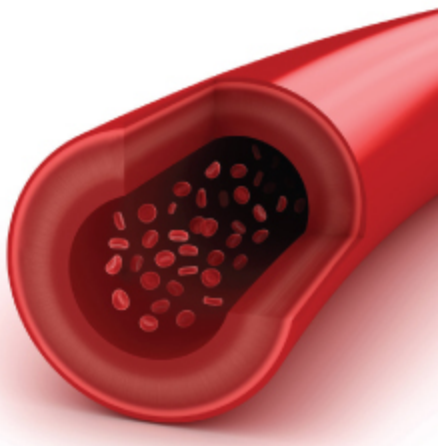
Thyroid Function and the Risk of Atherosclerotic Cardiovascular Morbidity and Mortality: The Rotterdam Study



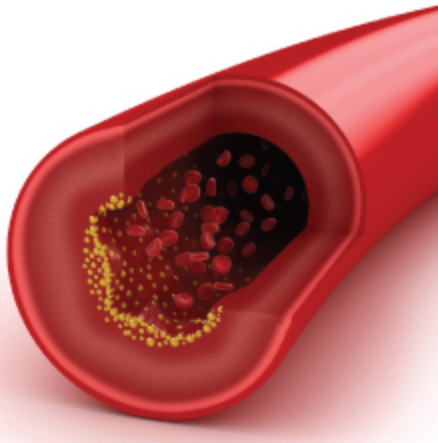
- 9420 participants -45 years and older
- Medical examinations every 3-5 years
- -Coronary Calcium Score
- -Atherosclerotic CV Events
- No pre-existing thyroid disease
- TSH
- FT4
- TPO Antibodies



Thyroid Function and the Risk of Atherosclerotic Cardiovascular Morbidity and Mortality: The Rotterdam Study

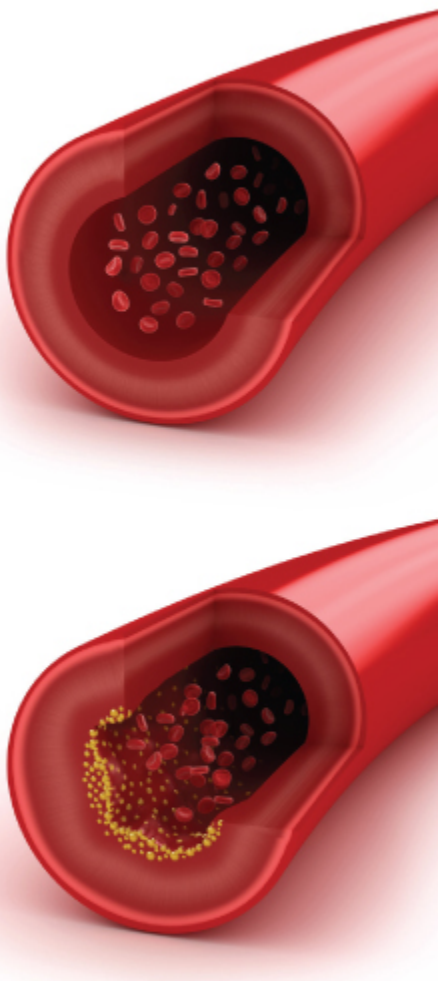


- Higher FT4 levels were associated with an increased risk of atherosclerosis.
- Independent of cardiovascular risk factors.
- The association was consistent throughout the spectrum of atherosclerosis; from subclinical atherosclerosis to overt atherosclerosis to atherosclerotic mortality.



Thyroid Function and the Risk of Atherosclerotic Cardiovascular Morbidity and Mortality: The Rotterdam Study

- Plausible mechanisms that can link high thyroid function to atherosclerosis include endothelial damage, hemostasis, thrombosis and hemodynamic changes. First, excess TH concentrations can increase the production of reactive oxygen species that further induce the expression of adhesion molecules on endothelial cells
- DOI: 10.1161/CIRCRESAHA.117.311603



Study: Effects of Long Term Caloric Restriction with Adequate Protein and Micronutrients on Thyroid Hormones

- Fontana L. et all. *Journal of Clinical Endocrinology & Metabolism* 91.8 (2006) 3232-3235.
- Caloric Restriction retards aging in animals
- Hypothesized that a reduction in T3 hormone may increase lifespan by conserving energy and reducing free radicals
    - 28 men and women
    - Calorically restricted diet
    - Low Free T3

Causes of Hypothyroidism

- Hashimoto's – Affects predominately women
- Thyroidectomy or Radiation Therapy
- Severe Iodine Deficiency
- Medications
- Central Hypothyroidism
- Estrogen Dominance - Young and Peri-Menopause

Hashimoto's Thyroiditis

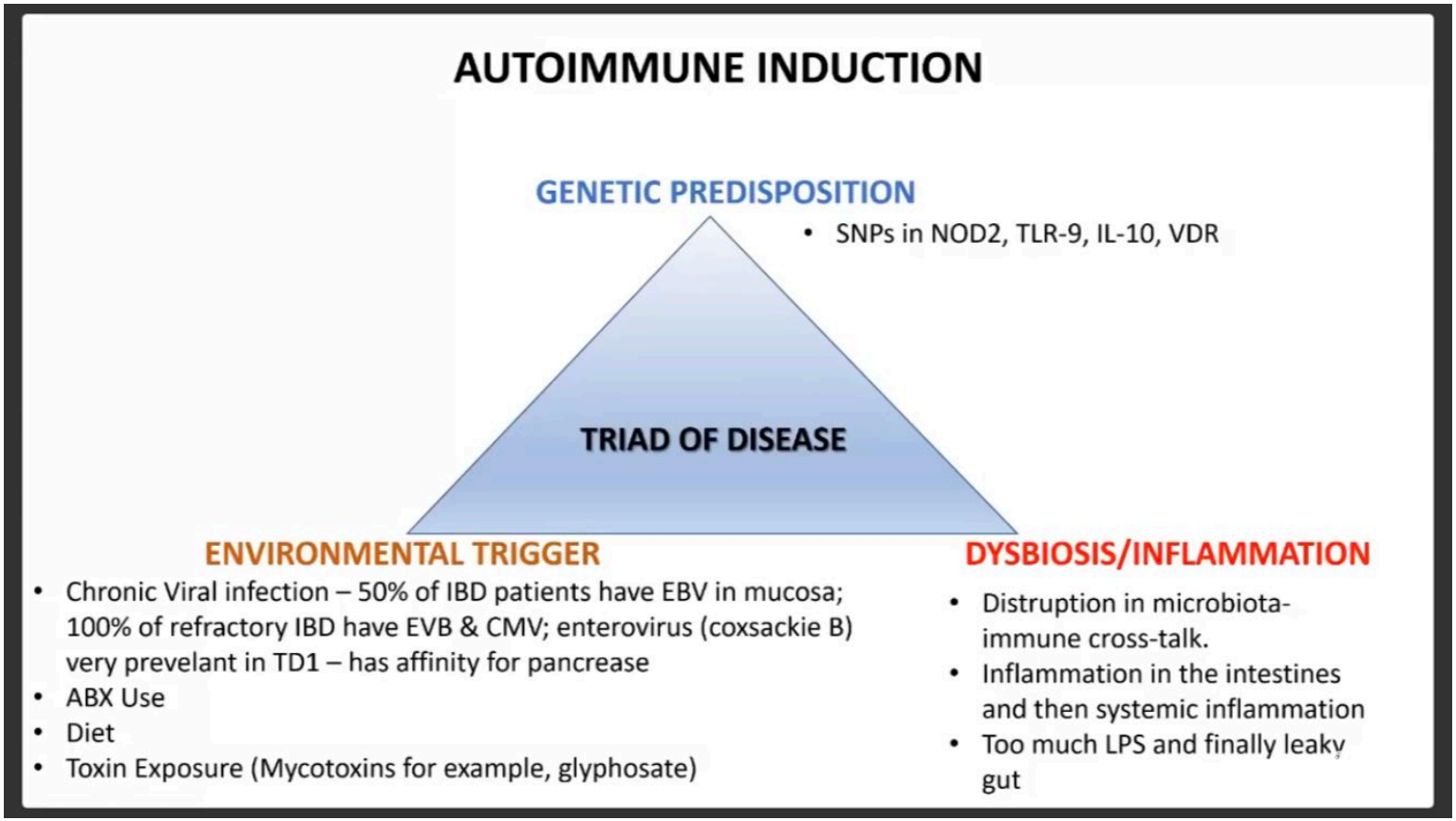
- Antibodies
  - ~90% positive for TPO Antibodies
  - ~50% positive for Thyroglobulin Antibodies
  - ~5% Based on Clinical Grounds

Hashimoto's and Iodine

- Iodide is absorbed from food and is not usable by thyroid. Must be converted to iodine by enzyme TPO which makes hydrogen peroxide as by product.
- Only 52 mcg of iodine needs to be taken up daily by thyroid gland to produce thyroid hormones
- If deficiency of any thyroid building blocks (iodide, selenium, zinc, tyrosine) TSH will trigger TPO to convert stored iodide into iodine which will increase hydrogen peroxide production (this is not good)
- Iodine should not be supplemented if TPO or TgAb are present. Iodine will cause an increase in antibodies.

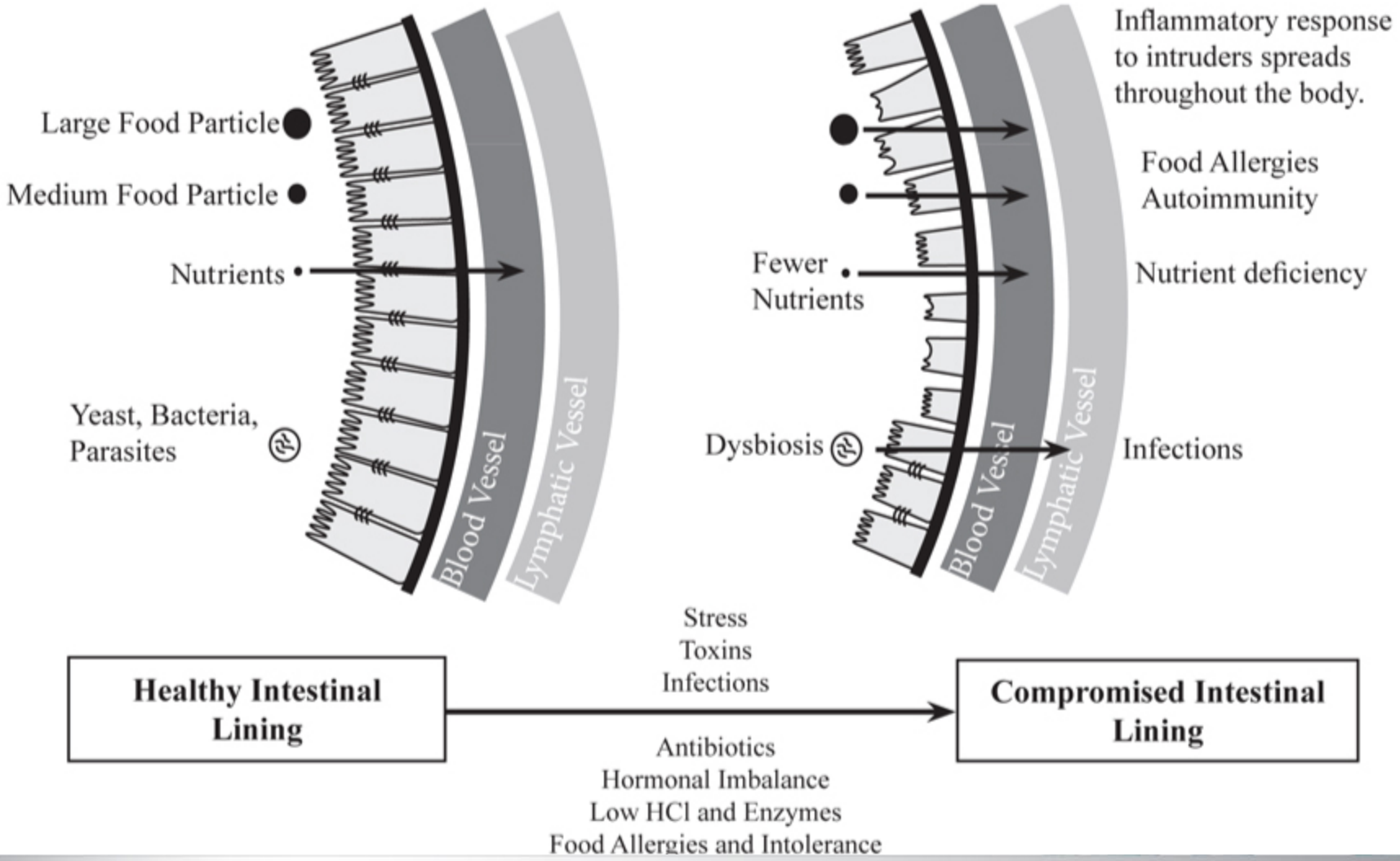
Autoimmune Link to Hypothyroidism

"Autoimmune diseases have increased dramatically worldwide since WWI. This is coincidental with an increased production and use of chemicals both in industrial countries and agriculture."



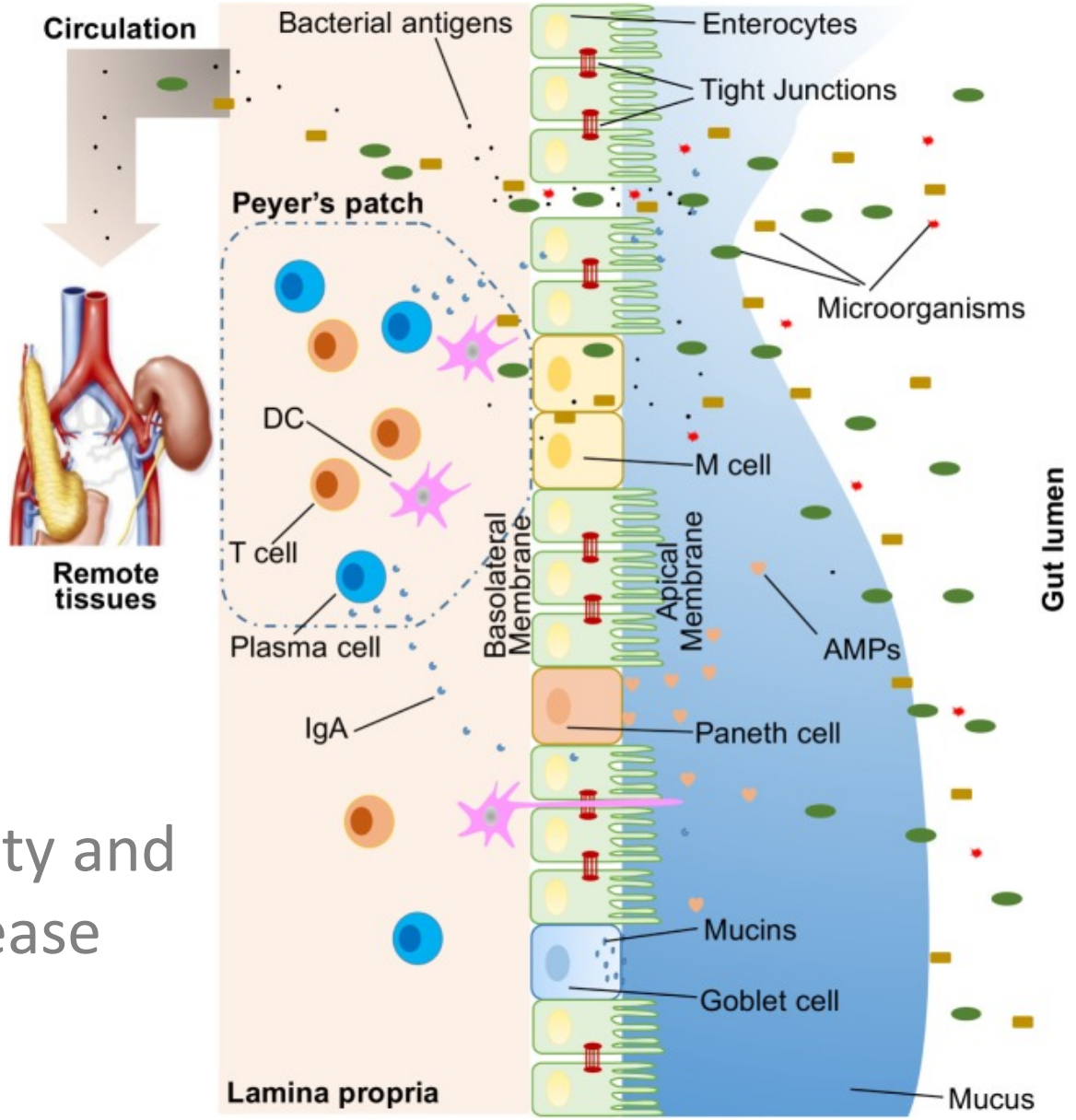
Kiran Krishnan - Development of Autoimmune Disease

Leaky Gut – Gluten Sensitivity



Intestinal Permeability and Autoimmune Disease

Loss of Tolerance

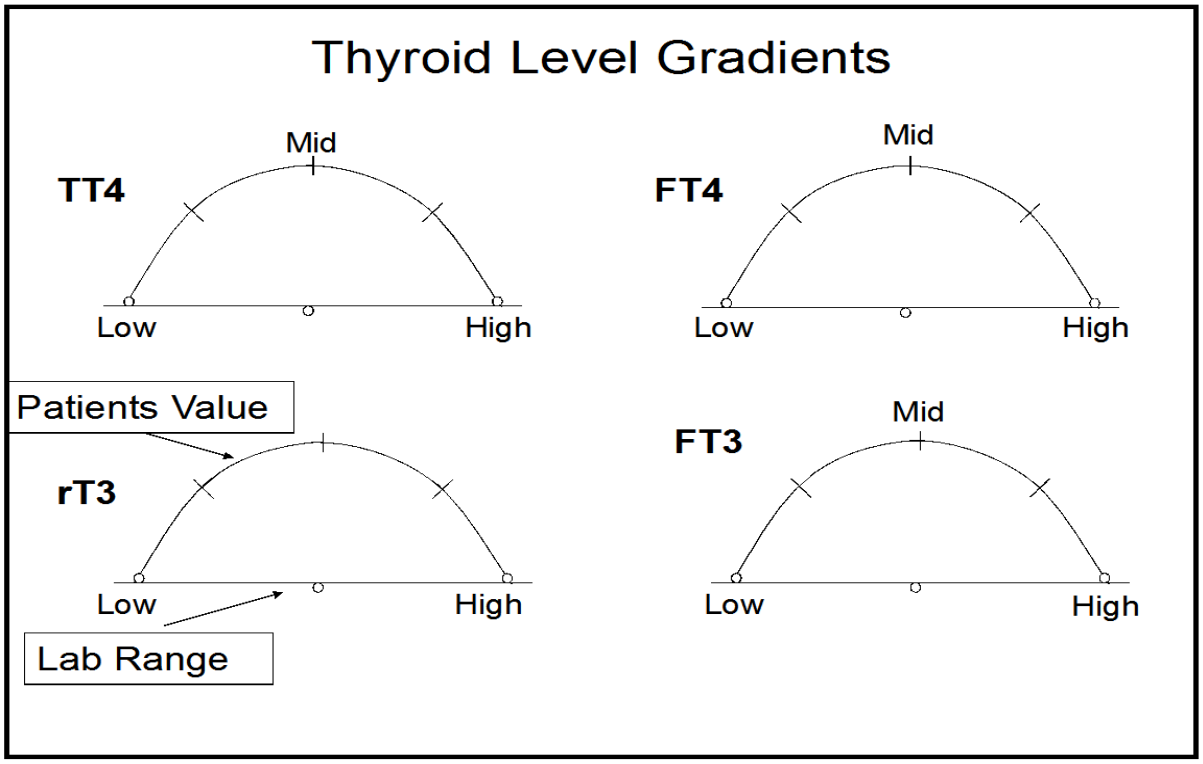


https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5440529/

Diagnosis: What are normal levels?

- TSH
- T4
- Free T4
- Free T3
- Reverse T3
- Ferritin
- Vitamin D
- Anti-thyroglobulin antibodies
- Thyroid peroxidase antibodies

Hypothyroidism, Functional Hypothyroidism, and Functional Hypometabolism
Jim Paoletti, FAARFM



Functional Treatment

- Diet

- Supplements

- Environment - Toxic Exposure

- Stress - Cortisol

Diet

- Hashimoto's Diet: Keys to Success - Hashimoto's Healing
- Best Diet for Hashimoto's Hypothyroidism - Dr. Isabella Wentz
- Hashimoto's Diet - Girls Gone Strong
- Why Changing Your Diet is the First Step - Chris Kresser
- 30 Day Reset Autoimmune Diet Plan - Wellness Mama

Importance of Diet - Literature

- Digestive Enzymes

  Nordio M., Basciani S. "Efficacy of food supplement in patients with hashimoto thyroiditis." *J Biol Regul Homeost Agents* 29.1 (2015):93-102 Pubmed Dec 2016

- Anti-Inflammatory

  Bhatia SK et. all. "Influence of diet on the induction of experimental autoimmune thyroid disease." *Proc Soc Exp Biol Med* 213.3 (1996):294-300 Pubmed Dec 2016

- Gluten Sensitivity

  Tozzoli R. et. All. "Infections and autoimmune thyroid disease: parallel detection of antibodies against pathogens with proteomic technology." *Autoimmun Rev* 8.2 (2008):112-115 Pubmed Dec 2016

Nutrient Depletions and Thyroid

- Selenium, iron, vit A, vit E, B vitamins, potassium, iodine, and zinc all required for thyroid function
- Lack of antioxidants (especially glutathione) may result in thyroid damage from hydrogen peroxide every time iodine is processed by thyroid

Micronutrient Testing Can Be Key!

SpectraCell's Micronutrient test includes:

Vitamins

- Vitamin A
- Vitamin B1
- Vitamin B2
- Vitamin B3
- Vitamin B6
- Vitamin B12
- Biotin
- Folate
- Pantothenate
- Vitamin C
- Vitamin D
- Vitamin K

Minerals

- Calcium
- Magnesium
- Manganese
- Zinc
- Copper

Amino Acids

- Asparagine
- Glutamine
- Serine

Fatty Acids

- Oleic Acid

Antioxidants

- Alpha Lipoic Acid
- Coenzyme Q10
- Cysteine
- Glutathione
- Selenium
- Vitamin E

Carbohydrate Metabolism

- Chromium
- Fructose Sensitivity
- Glucose-Insulin Metabolism

Metabolites

- Choline
- Inositol
- Carnitine

SPECTROX™
for Total Antioxidant Function

IMMUNIDEX™
Immune Response Score

Testing for actual Iodine deficiency is tricky

Role of Selenium

- More iodine – more hydrogen peroxide – not enough selenium/glutathione to neutralize – lots of cells with oxidative damage – inflammation and convergence of WBCs – excessive amount of antibodies form to mark damaged cells – immune shift – self-recognition impaired (autoimmunity)
- Acts as catalyst to convert T4 to T3
- Protects thyroid cells from oxidative damage from H2O2 by forming selenoproteins
- Glutathione peroxidase (made from selenium) reduces H2O2 to water
- Minimal dose for reduction of TPO is 200mcg

Role of Zinc

- Not stored in the body, so daily intake is required to maintain sufficient levels
- Deficiency prevents conversion from T4 to T3
- Needed to form TSH
- Deficiency is associated with increased intestinal permeability
- Deficiency can show up on blood test as low alkaline phosphatase levels
- Zinc supplementation may cause deficiency in copper, if above 40mg/day
- Should take 1mg of copper for every 15mg of zinc supplemented.

Soy and the Thyroid

- Isoflavones genistein, daidzein and glycitein in soy reduce thyroid output by blocking activity of the TPO enzyme
- Millet also contains isoflavones that inhibit thyroid peroxidase and should be avoided by people with thyroid disorders

What About Goitrogens?

- Main concern with these foods is inhibition of iodine uptake by the thyroid, especially in those already iodine deficient
- Cassava (yuca), soy, dark greens like kale, cruciferous veggies like broccoli, cauliflower, cabbage and brussel sprouts and sweet potato are all in this group
- Called goitrogens because they can cause swelling of the thyroid known as goiter
- Raw foods have much higher goitrogen content than cooked foods

Best way to eat these is cooked and include high iodine foods in diet

Main Goitrogens to Avoid

- Raw green smoothies daily may lead to problems with conversion of thyroid hormone
- Supplements made with high concentrates of raw greens or cruciferous veggies
- Pregnant women should be especially careful about high intakes of raw green and cruciferous veggies – make sure yucca and sweet potato are well cooked (preferably boiled)
- These are really only a problem for people that eat high amounts of these foods raw daily (likes tons of raw spinach) – Eat the rainbow and eat a varied diet!

What About the AIP Diet?

- Takes the Paleo diet one step further and eliminates otherwise healthful foods that may promote further inflammation in autoiummune conditions.
- Not meant to be followed forever! The health promoting foods (such as nuts and seeds) are reintroduced after a gut healing, stress reducing and anti-inflammatory protocol is followed.
- The amount of time the diet needs to be followed is very bioindividual.
- Can be followed by anyone looking to reduce inflammatory factors.

Additional Treatment

- Address Diet Scientifically
- Glycemic Control means Thyroid Stability

  Cardiometabolic Panel

  - Insulin
  - Glucose
  - Adiponectin
  - Leptin
  - CRP

Study: Stress

- Walter K. et all. *Thyroid Research* 2012 Oct. 30 5:13
- Elevated Thyroid Stimulating Hormone is Associated with Elevated Cortisol in Healthy Young Men and Women.
  - 54 healthy men and women with no thyroid disease
  - Approx. 18-30 years old
  - Cortisol, TSH, Estradiol, Progesterone, FT3, FT4
- Frankly Hypothyroid Patients Have Elevated Cortisol Levels

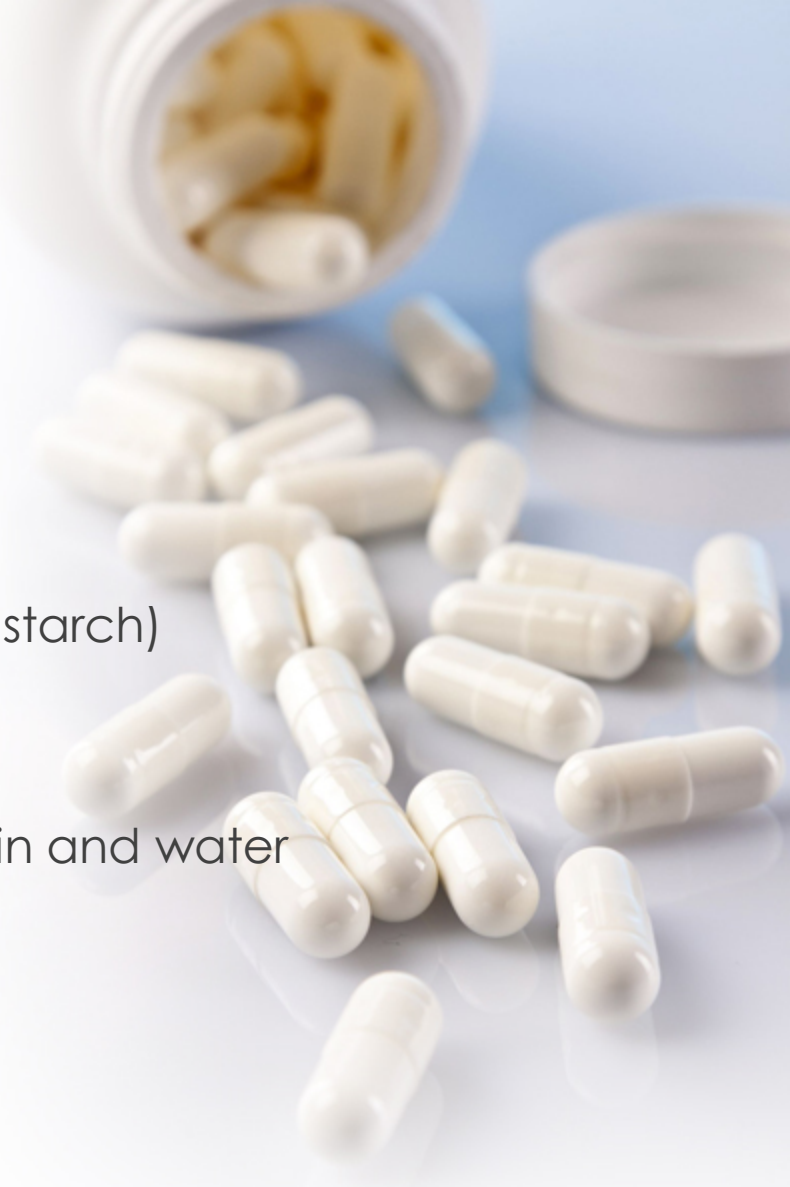
Environment

- Perchlorate (Rocket Fuel)
- Polychlorinated Biphenyls (PCB)
  - Man-made chlorinated hydrocarbons
  - Plastic, Rubber products
  - Insulation
  - Foam, Felt
- Reduce circulating thyroid hormone levels or impair thyroid hormone action, interfere with receptors, interfere with iodine uptake

Additional Treatments

- Sleep Patterns
- Meditation
  - Meditation can help with conditions including depression, sleep disorder, anxiety and chronic pain
- Yoga
- Tai Chi
- FIX THE STRESSOR ON THE THYROID AND YOU FIX THE THYROID

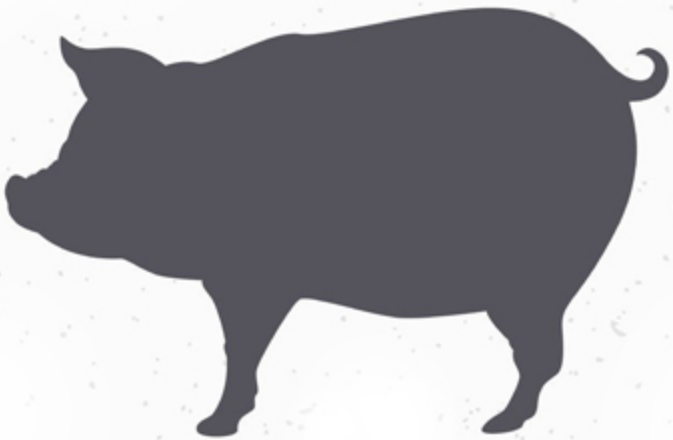
Medications



- Synthetic forms of T4
  - Synthroid(contains lactose and corn starch)
  - Levoxyl
  - generic can have variations
  - Tirosint - contains only gelatin, glycerin and water
- Synthetic T3-
  - Cytomel

Medications

- T4/T3 Combination
- Naturethroid
- WP thyroid
- Armour thyroid?



Compounded Thyroid

Slow Release T3

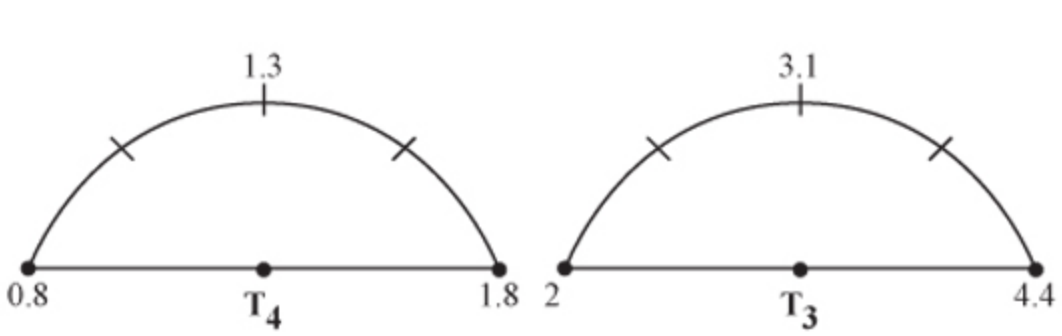
2 mcg – 7 mcg

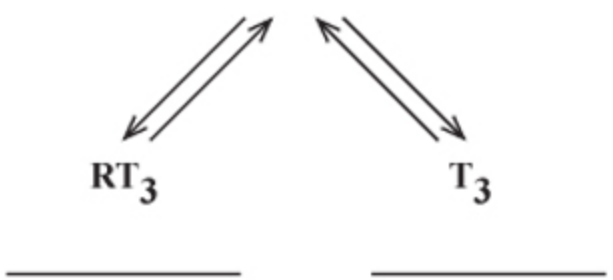
Thyroid Function

Thyroid hormones produced by the thyroid gland determine how the body uses the energy that it produces, control how sensitive the body is to all its hormones, and play a crucial role in healthy brain maturation and development in the fetus.

Thyroid Gland

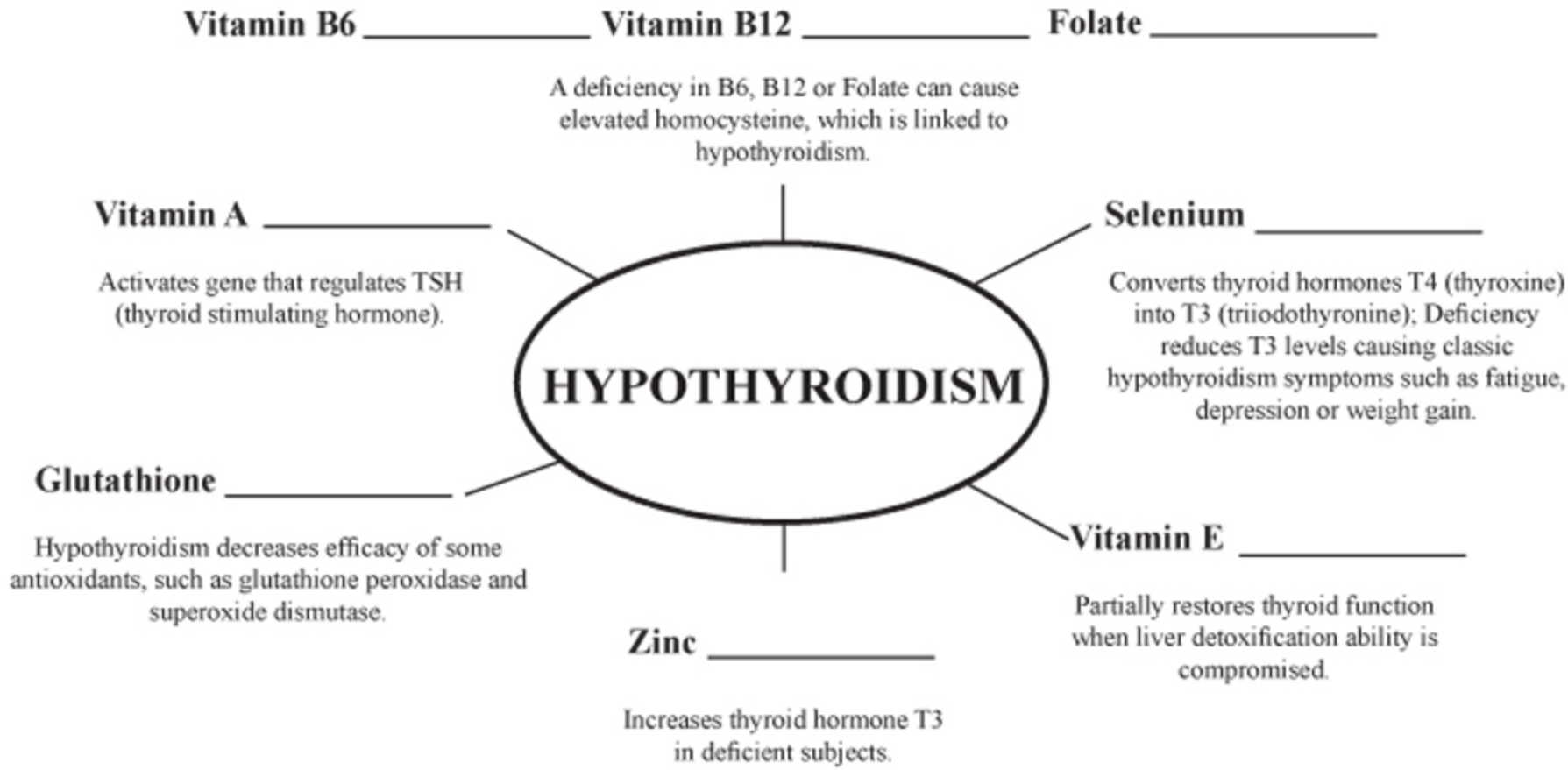
TSH _____ **TPO** _____ **Antithyroglobulin Antibodies** _____

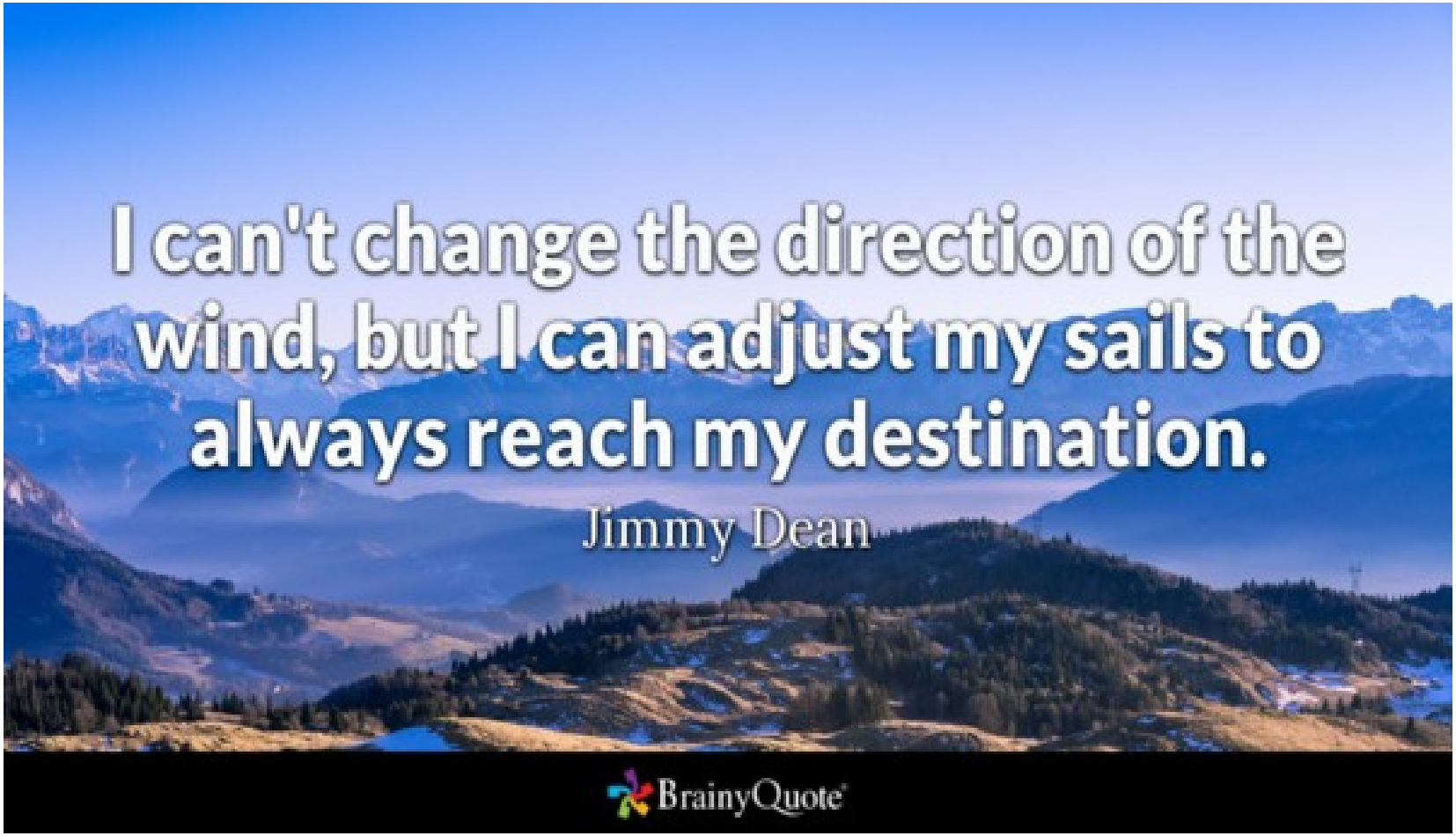




Vitamin D _____

Ferritin _____




I can't change the direction of the wind, but I can adjust my sails to always reach my destination.
Jimmy Dean
BrainyQuote