

FUNCTIONAL LAB INTERPRETATION

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New Horizons in Clinical Herbalism



American Herbalists Guild

An Association of Herbal Practitioners

SPEAKER

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- Current Medical Director of Fibromyalgia and Neuromuscular Pain Center
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DISCLOSURE

- No financial interests
- Potential conflicting affiliation
 - Owner FNPC of Oregon, LLC
 - Partner consultant in Evolutions Solutions



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BROKEN MODEL

- Current Model is WRONG
 - **Acute Based**-Patients receive only 55% of recommended chronic and preventive services
 - (Ann. Fam Med. September/October 2012 vol. 10 no. 5 396-400)
 - **Symptom Focused**
 - **Reductionist**
 - **Diagnosis** has becomes the focus, not the Person
- Treats the **Branches** not Roots: From Annals of Family Medicine (September/October 2012 vol. 10 no. 5 396-400)
 - *One-half of US adults have at least 1 chronic condition*
 - *Fifty percent of people with hypertension have uncontrolled blood pressures*
 - *More than 80% of people with hyperlipidemia have not attained cholesterol control (previous guidelines)*
 - *43% of people with diagnosed diabetes have not achieved glycemic control*

BROKEN MODEL

- According to the CDC & National Center for Health Statistics the United States is experiencing a trend in increased healthcare utilization
 - This increase is a direct result of the aging population.
- On average, people have four visits to a provider per year
 - with 50% having multiple conditions.
- The five most common conditions, in order, are: **hypertension, arthritis, hyperlipidemia, diabetes, and depression.**



POLYPHARMACY

- Multimorbidity (presence of 2 or more conditions) is now the average
- In a retrospective review of 980 records from 21 family practice offices
 - 90% of patients had at least one chronic condition.
 - The prevalence of multimorbidity was as high as 68% in the 18-44 year old age range
 - Increased with age for both men and women to 97% and 89% respectively over the age of 65 (Fortin, Bravo, Hudon, Vanasse, & Lapointe, 2005).
- Of particular concern is the management of multiple conditions through **polypharmacy** prescriptions.
 - 1.5 million people in the United States are injured or killed directly related to medication error.
 - Particularly highlighted, was drug to drug interactions that occur when new prescriptions are written (Kaufman, 2006).

MOST COMMON RX

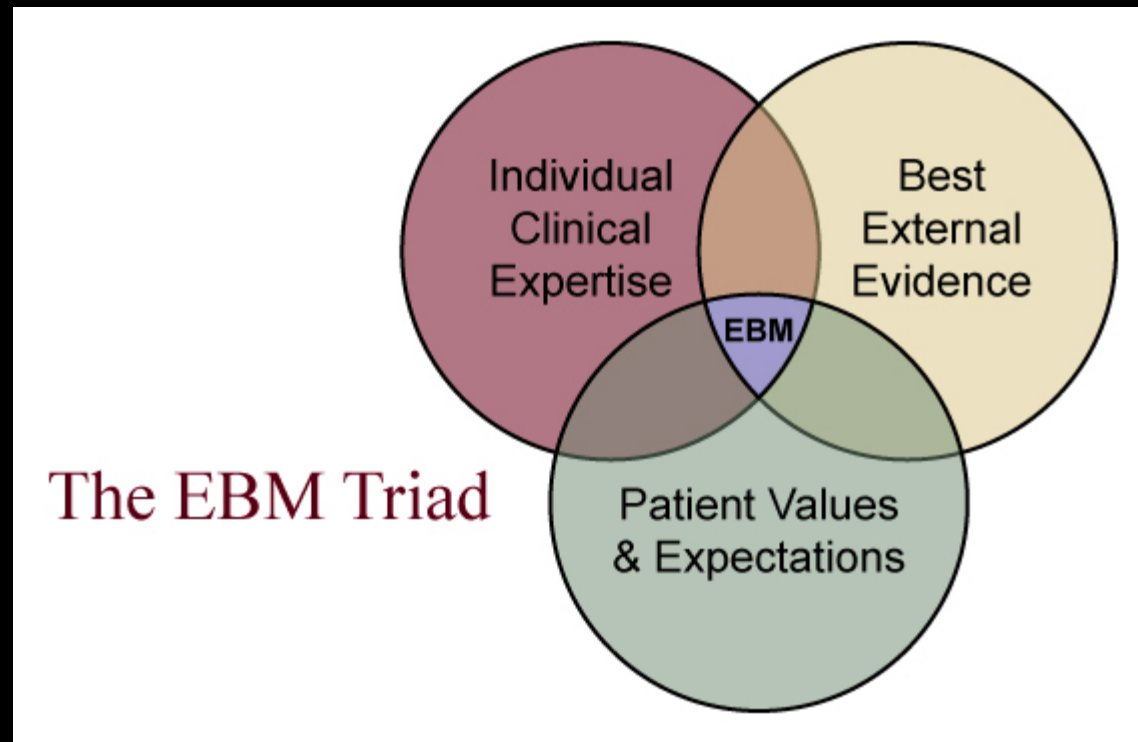
- www.theatlantic.com, April 2011

Drug	Prescriptions (millions)	Condition
Vicodin	131.2	Pain
Zocor	94.1	High cholesterol
Lisinopril	87.4	High blood pressure
Synthroid	70.5	Hypothyroid
Norvasc	57.2	High blood pressure
Prilosec	53.4	Acid reflux
Zithromax	52.6	Bacterial infection
Amoxicillin	52.3	Bacterial infection
Metformin	48.3	Diabetes
Hydrochlorothiazide	47.8	High blood pressure
Xanax	46.3	Anxiety
Lipitor	45.3	High cholesterol
Furosemide	43.4	High blood pressure
Metoprolol tartrate	38.9	High blood pressure
Ambien	38.0	Insomnia

EVIDENCED BASED MEDICINE

- Evidence-based medicine is a systematic approach to clinical problem solving which allows the integration of the best available **research** evidence with clinical **expertise** and **patient values**.

(Sackett DL, Strauss SE, Richardson WS, et al. Evidence-based medicine: how to practice and teach EBM. London: Churchill-Livingstone, 2000)



WHERE & HOW TO INTERVENE GIVEN CURRENT PARAMETERS

- Advocating **GREEN ALLOPATHY**
 - Frame Herbs within EBM model
- Target most relevant conditions
- Decrease polypharmacy
 - Harm reduction
- Create Opportunity for change & teaching- holistic models

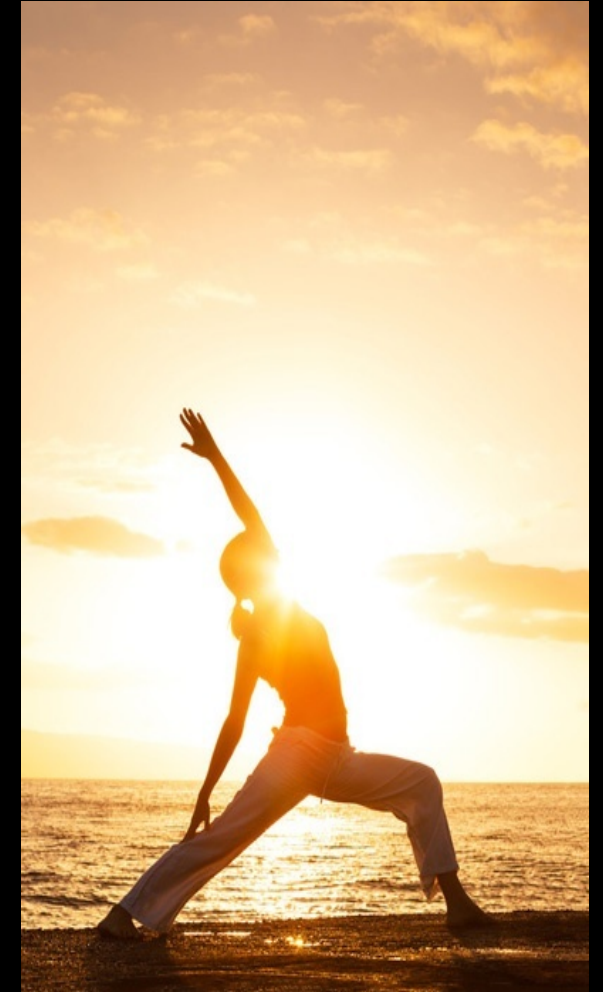


CLINICAL TARGETS

- Cardiometabolic Risk reduction
 - HTN
 - Blood Sugar & Insulin resistance
 - Systemic Inflammation
 - Lipids and Oxidative stress
- Improvement of Digestive Cascade
 - Digestive strength
 - Nutrient absorption
 - Minerals
 - Balancing GI microbiota
- Immune Support
- Hormones
 - Adrenal, Thyroid, Sex Hormones

REASONABLE START- CLINICAL BASICS

- Initiate **dietary** discussion
 - Modified Paleo- Mediterranean-anti-inflammatory
 - Increased veggies
 - Low CHO/Low glycemic, Grains vs. Gluten free???
 - Non-GMO
 - Animal Protein???
- Initiate **exercise** or activity program / discussion
- **Evaluate** for common nutrient deficiencies & drug induced depletions



FOOD

- Food and herbs influence genetic expression
 - Evolutionary mechanisms
- Can we get necessary nutrients?
 - Problematic: multi-factorial
- Influence with Systems level support
- Herbs are safe & reasonable approach



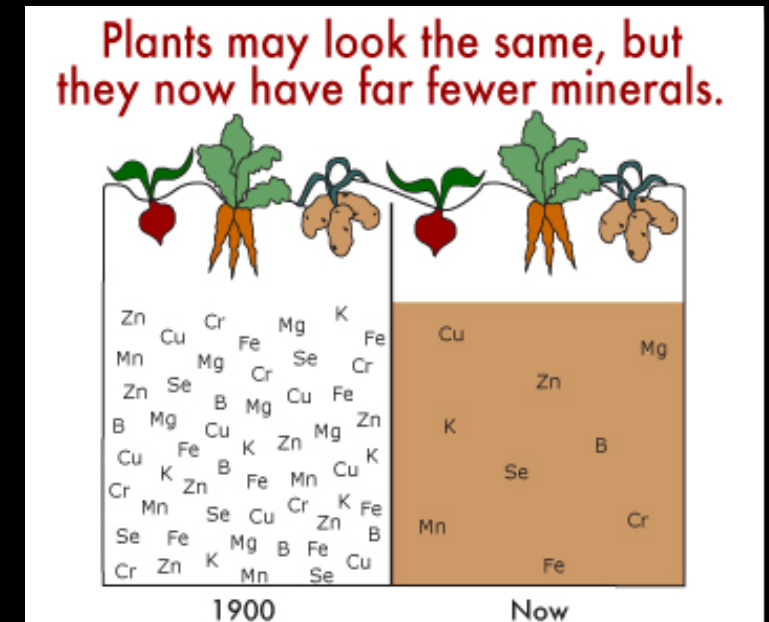
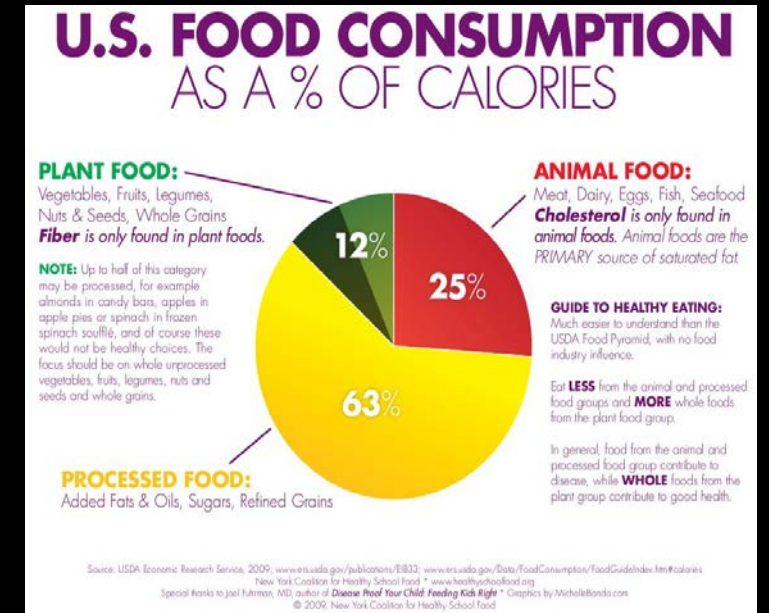
LOW RISK DHI

- A review of the literature demonstrated that beliefs about herb–drug interactions are mainly **theoretical** considerations, and not **clinically** observed facts.
 - Herb–drug interactions do occur but, equally, common to foods such as broccoli, grapefruit juice, alcohol, and cigarette smoking may cause interactions (Butterweck V, Derendorf H, Gaus W, Nahrstedt A, Schulz V, Unger M. Pharmacokinetic herb-drug interactions: are preventive screenings necessary and appropriate? *Planta Med*2004;70:784–91)
- A review of devil’s claw, ginkgo, and garlic RE: **antiplatelet or anticoagulant** effects, potentially exacerbating the risk of gastrointestinal bleeding from non-steroidal anti-inflammatory drugs or corticosteroids.
 - **No direct evidence supports these claims** (*Ann Rheum Dis* 2005;64:1527-1528)

NUTRITION

- Most Common Nutrition deficiencies USA:
 - Iron deficiency
 - Calcium
 - Vit D
 - B Vitamins

- 27,000 calories to meet all of the RDIs for micronutrients
 - (<http://www.jissn.com/content/pdf/1550-2783-7-24.pdf> Research article Prevalence of micronutrient deficiency in popular diet plans -Jayson B Calton)



NUTRITION

Many common **drugs known to cause nutrient deficiencies**

- Diuretics= hyponatremia, magnesium deficiency
- Metformin, Insulin = B1, B12, Magnesium
- Statins= CoQ10
- H2 Blockers= Iron, Vit C
- Tylenol, ASA, NSAID's= Vit C, Glutathione, Iron, Folic acid
- ABX= multiple, particular B's and GI microflora

(<http://naturaldatabase.therapeuticresearch.com/ce/ceCourse.aspx?pc=08-40&cec=0&pm=5>)

Other:

- Vitamin D secondary to geography, lack of exposure
 - Receptor down-regulation
- Calcium secondary to Vit D Def & Magnesium deficiency
- Vit K- no longer part of diet

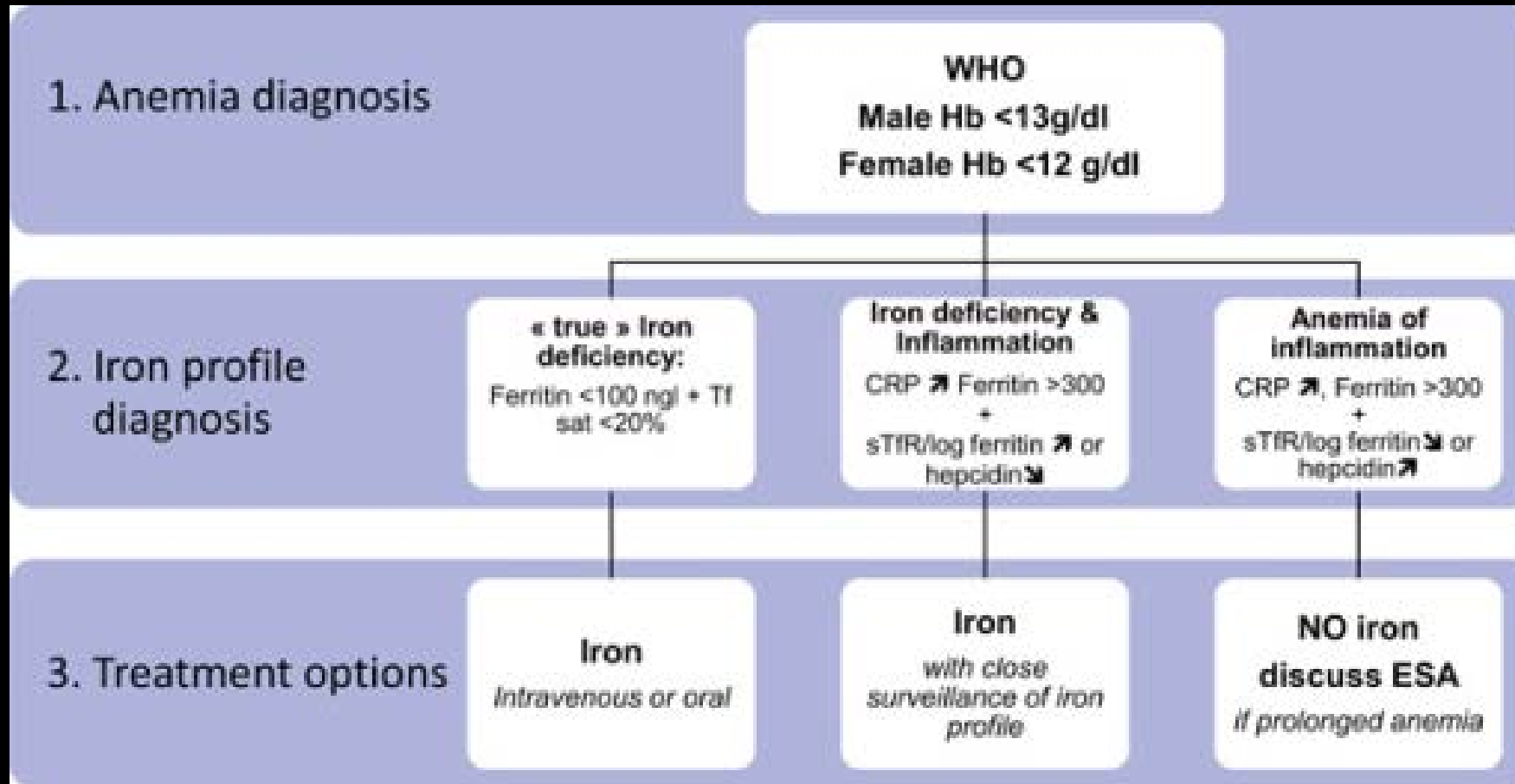
IRON

- **Consider iron deficiency if there is:**
 - Decreased HCT (♀ <37, ♂ <40)
 - Decreased HGB (♀ <12, ♂ <13.0) Fx Ranges slightly higher: (♀ <13.5, ♂ <14)
- **Verify:**
 - **Decreased** MCV (<82), MCH (<28), and MCHC (<32)
 - **Increased** RDW (<13.5)
 - **Decreased** ferritin (<30)
 - **Decreased** % transferrin saturation (<20-30%)
- **Note:**
 - A frank Iron deficiency is best diagnosed when the serum ferritin is (<20) and the transferrin saturation is (<16-20%)
 - **RO GI Bleed**
- **Hints:**
 - Iron deficiency anemia may be secondary to **hypochlorhydria**

FERRITIN

- Ferritin is directly proportional to iron stores
- **Functional Ranges:** 40-70 mcg/L
 - Minimum 40-60 Thyroid (?)
- **Interpretation:**
 - <20 frank def
 - <30 iron def
 - >80-120 high norm
 - >120-180 mild overload.
 - >200 verify inflammation (ESR, CRP). Note: >160 woman requires work-up
 - Blood donation, diet avoidance
 - >300 likely iron overload: Liver MRI, Biopsy, hematology
- **Hints:**
 - Elevated ferritin in presence of low serum iron is suggestive inflammation
 - Elderly or chronically ill with normal ferritin and elevated ESR/CRP likely iron def.

ANEMIA



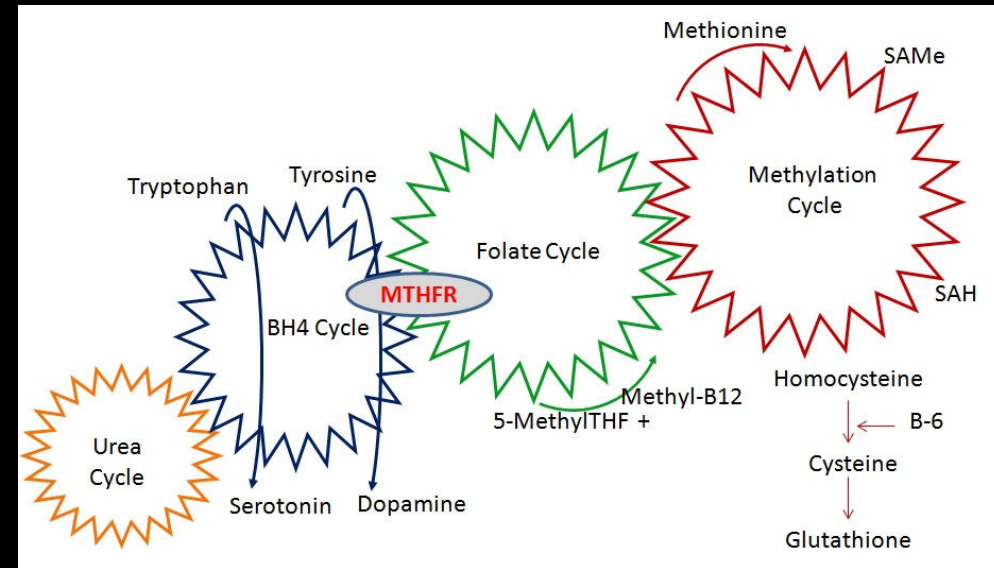
B12/FOLATE

- **Consider B12/Folate deficiency if there is:**
 - **Increased** MCV (> 90) in conjunction with an MCH of (>40)
 - **Decreased** RDW (>13.5)= B12/folate
- **Verify:**
 - **Elevated** homocysteine levels (>9.5)
 - **Decreased** uric acid level
 - Intestinal permeability
 - Serum LDH levels are **elevated** (>200 but <250) in about **85%** of those with megaloblastic anemia
 - **especially the LDH-1 isoenzyme fraction**
 - Increased destruction of RBC
- **Note:**
 - Low HCT does not automatically = iron def.
 - methylmalonic acid levels are more reliable indicators of B12 deficiency than serum levels
- **Hint:**
 - If MCV is (>97) oral supplementation may be ineffective. B12 injections may be needed

MTHFR

- MTHFR gene is responsible for making a functional MTHFR enzyme
 - works with the folate vitamins
 - *5-mthf converts to Methionine to SAM-e*
 - **Anti-inflammatory, Immune, detoxification, regulates neurotransmitters**

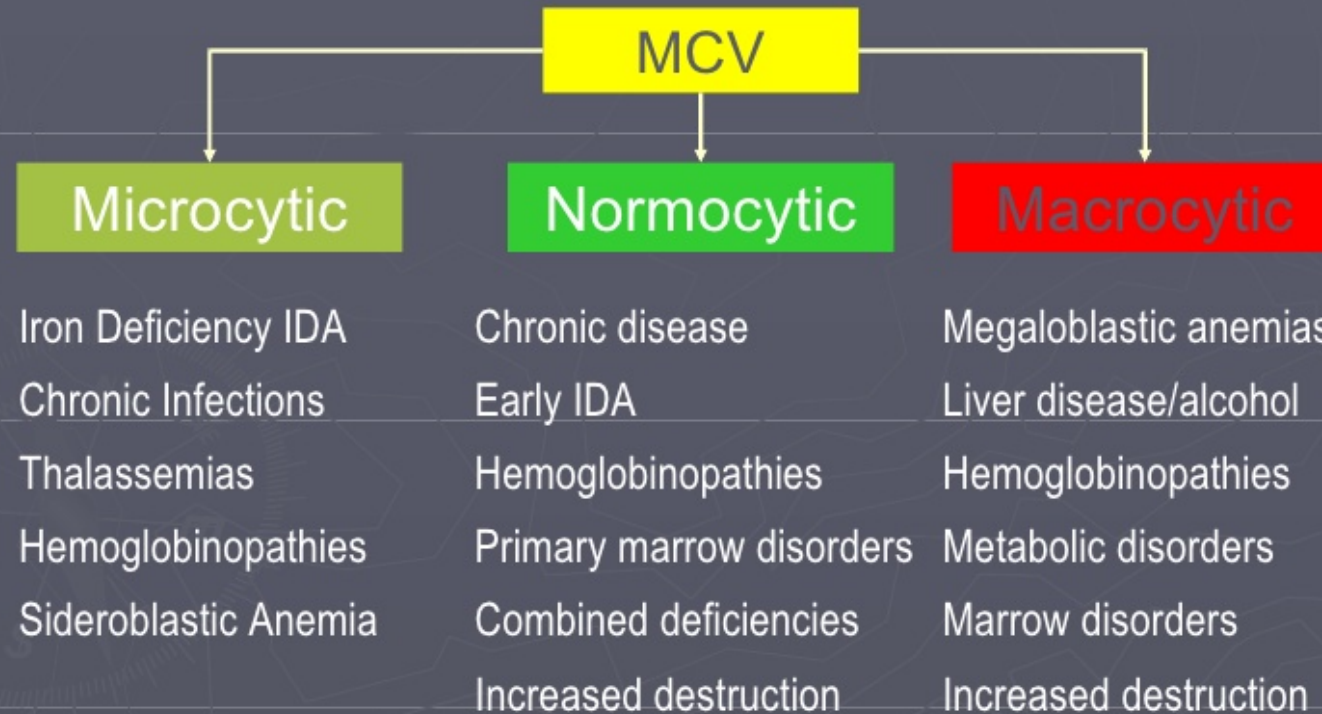
- C677T homozygous mutation:
 - elevated levels of homocysteine
 - Inability to process folate and B12
 - Low zinc secondary to copper accumulation
 - Pyroluria?
 - Glutathione deficiency



- **Note:** high serum B12 along with a high MCV and other signs of B12 deficiency consider using methylcobalamin in injectible form to bypass this rate limiting step.

ANEMIA

Anaemia Workup - MCV



IRON VS B12/FOLATE

- **Iron**

- **Decreased** MCV (<82), MCH (<28), and MCHC (<32)
- **Increased** RDW (<13.5)
- **Decreased** ferritin (<30)
- **Decreased** % transferrin saturation (<20-30%)

- **B12/Folate**

- **Increased** MCV (> 90) in conjunction with an MCH of (>40)
- **Decreased** RDW (>13.5)= B12/folate
- Elevated homocysteine levels (>95)
- LDH (>200 but <250) = 85% chance

- Low HCT can be either due to destruction of RBC but important r/o frank def- GI bleed
- Ferritin and LDH can be elevated with inflammation or infection
- Parasitism, worm infections cause anemia. Elevated eosinophils >3
- Normal or elevated serum B12/Folate with elev MCV, RDW and homocysteine- consider MTHFR
 - Not utilized by cell

ZINC

- **Consider zinc deficiency:**
 - Alkaline phosphatase (<70)
 - Alkaline phosphatase is a zinc dependent enzyme.
- **Verify:**
 - low normal or decreased total WBC (<5.5). Functional Range: 5.5-7.5
- **Hint:**
 - If WBC is <5.5 consider chronic infection
 - Zinc associated with immune function: Cell-mediated and generalized host defense
 - Elevated ferritin with low or norm serum iron and WBC <5.5 suggests **chronic infection**
 - White spots on nails, loss of smell and taste
- **Note:**
 - Zinc is part of more enzyme systems than the rest of all the trace minerals combined
 - No zinc stores
 - Basal metabolic rate- zinc deficiency has been associated with a decreased BMR
 - Zinc is essential for the production of stomach acid
 - Iron def.

ZINC TALLY

- **In-Office Lab testing:**
 - **Check for a positive zinc tally:** A client holds a solution of aqueous zinc sulfate in their mouth and tells you if and when they can taste it.
 - Almost immediate very bitter taste indicates the client does NOT need zinc.
 - Clients who are zinc deficient will report **no taste** from the solution.



KRYPTOPYRROLE TEST

- Pyrrole Disorder: Also known as **Pyroluria**
 - Abnormality resulting in the overproduction of pyrrole molecules
 - Pyrroles have little or no function in the body and are effectively excreted in the urine.
- Pyrroles have an affinity for zinc and vitamin B6 (pyridoxine).
 - When pyrroles are elevated in the urine they deplete the body of vitamin B6 and zinc
 - Pyroluria can be diagnosed by the kryptopyrrole test
- A high incidence of pyrrole disorder is found in:
 - anxiety disorder, depression, obsessive-compulsive disorder, schizophrenia, bipolar disorder, aspergers, and ADHD
 - Due to B6 (p5p) as co-factor for most neurotransmitter production
- **Note:**
 - Functional zinc and B6 def. with associated functionally increase copper

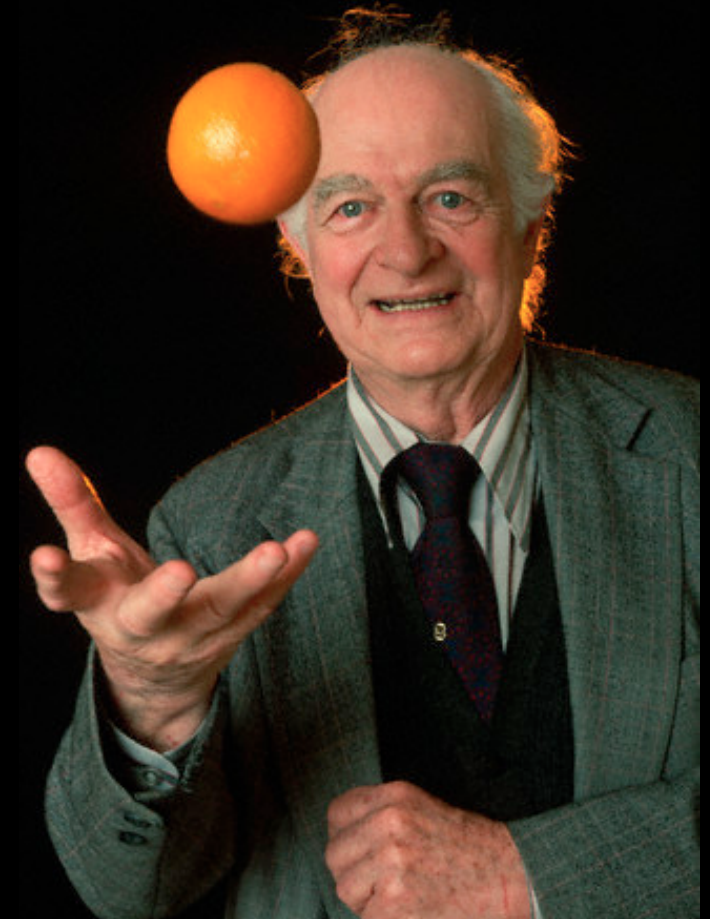
THIAMINE-B1

- **Consider Thiamine deficiency:**
 - If you see a pattern of anemia either iron or B12/folate **likely** need thiamine support
 - **All dysmetabolic syndrome patients**
 - B/P, CHO metabolism and glucose level stabilization
 - Suspected hypochlorhydria
- **Pattern:**
 - Iron def markers:
 - Decreased HCT (♀ <37, ♂ <40)
 - Decreased HGB (♀ <12, ♂ <13.0)
 - Decreased **CO2** (<25)
 - Increased **anion gap** (>12)
 - **LDH** (<140) Due to thiamine's role in glycolysis = dysglycemia
 - Glucose levels may be normal to increased (>86 or 4.77 mmol/L) with normal A1c
- **Hints:**
 - Cheilosis (cracks at corner of mouth)
 - Pulse slow (below 65 in a non-exercising individual)
 - Also Zinc d/t BMR, Thyroid ?
 - Numbness, tingling, or itching in extremities
 - Also B12/Folate

VITAMIN C

corbis.

- **Consider need for Vitamin C:**
 - Known Iron def. or B12/Folate def.
 - Vit C necessary for iron absorption
 - All cardiovascular disease including HTN
 - Liver disease
 - Known xenobiotic burden
 - Depressed immune function
 - Related to zinc
 - History of Cancer
 - Smokers
 - Oxidative stress
 - Suspected hypochlorhydria



HYPOCHLORHYDRIA

- **Suspect hypochlorhydria:**
 - Dysmetabolic patients
 - Anemia patients iron or B12/folate
 - Mineral deficiency: zinc, potassium, Calcium (<9)
 - Hypothyroid patients
 - selenium
 - All patients on PPI or H2 medications
 - Smokers
 - History of H. Pylori- known association
- **Note:** reflux is NOT indicator
 - No correlation in literature
 - Amount of HCl produced in GERD sufferers is greater than, or equal to, that produced by healthy controls (Gardner et al, 2003)(Collen et al, 1994) (Johansson et al, 1986)

HYPOCHLORHYDRIA

- **Pattern:**

- Normal or **decreased** total protein (<6.9 or 69 g/L)
 - Composed of albumin and total globulin
 - Associated with digestive dysfunction, malnutrition and liver dysfunction
- **Decreased** Albumin (<4.0 or 40g/L)
 - Produced in Liver- serves as transport protein
- **Increased** Globulin (>2.8 or >28) or **decreased** (<2.4 or <24)
 - Acute/Chronic infection, oxidative stress, Liver metabolism
- **Decreased** gastrin (<50)
 - Stomach hormone triggers HCL production
- Phosphorous is **decreased** (<3.0 or <0.97)
 - Hypochlorhydria most common
 - Elevated levels more concerning
 - can be diet, check renal function and parathyroid if also elevated calcium
- **Decreased** chloride (<100)
 - Regulated by kidneys- inversely correlated to CO₂
 - Levels below or above functional range relate to adrenal function

- **Hint:**

- Elevated total protein and albumin = dehydration

HYPOCHLORHYDRIA FXM EXAM

- **Positive Ridler HCL reflex :**

- check for tenderness 1 inch below xyphoid & over to the left edge of the rib cage.

- **Positive Chapman reflex:** for the stomach and upper digestion

- check for tenderness in the 6th intercostal space on the left hand side - mid-clavicular line.



HYPOCHLORHYDRIA TREATMENT

- Betaine HCL
 - Also Thyroid
- Apple Cider Vinegar
 - Oxymels
 - H. Pylori tx
 - Acetate extractions (*acetous tincture*)
- Digestive enzymes
- Bitters
- Warming digestive Qi formulas



Ginger



Lemon



Peppercorns



Gentian Extract



Cinnamon

"BITTERS"

Taste Buds + Bitter



Gastrin hormone: (Hypochlorhydria <50)



Increases:

- **Gastric Acid** & Pepsin Production- increase digestive secretions
- Pancreatic Digestive Secretion
- Hepatic Bile Flow-flow increasing the excretion of toxins and stimulating the bowel.
- Bicarbonate Production- protect gut mucosa and counteract stomach acid.
- Brunner's Gland Secretion- protect gut mucosa and counteract stomach acid.
- Intrinsic Factor Secretion
- Insulin, Glucagon, and Calcitonin- an influence on normalizing blood sugars
- Increase muscle tone of the gastro-esophageal sphincter
- Muscle Tone of Stomach and Small Intestine
- Cell Division & Growth of Gastric & Duodenal Mucosa
- Cell Division & Growth of Pancreatic Cells

"BITTERS"

- **Broad physiologic effect on system**
 - Based on physiological **function** rather than on chemical structure.
 - Largest found among the terpenes- particularly the monoterpene iridoids and secoiridoids, Also sesquiterpene lactones & Alkaloids Flavonoids can be either bitter or sweet
- Bitters can be used for **any atonic condition** of the GI:
 - Digestive stimulant, *Choleretics*, endocrine activator, Anti-inflammatory, Antimicrobial, Influences Microbiome
- Dose: 5-10 drops in an ounce of water sipped slowly 15 minutes before the meal
 - **Smaller** doses seem to stimulate function
 - **Large** doses constrict tissues and decrease secretion.
- **Hot vs Cold formulation**

(Bitters Monograph. Nancy Welliver. 2006)

DIGESTIVE HERBS- WARM/HOT

- **Zingiberis rhizoma**, ginger root (Pungent)
 - Dyspepsia, prevention of motion sickness
- **Cinnamomi cassiae cortex**, Chinese cinnamon (carminative, antiglycemic, Antimicrobial, anti-inflammatory)- **German E Commission Approved** (American Botanical Council)
 - Loss of appetite, dyspeptic complaints such as mild spasms of the gastrointestinal tract, bloating, flatulence- German E Commission Approved (American Botanical Council)
- **Millefolii herba**, yarrow herb (Neutral)
 - Loss of appetite, dyspeptic ailments, such as mild, spastic discomforts of the gastrointestinal tract- German E Commission Approved (American Botanical Council)
 - Bitter tonic, astringent, diaphoretic, peripheral vasodilator, anti-inflammatory, styptic, antifungal, antiseptic, anodyne, antispasmodic, menstrual regulator.
 - It soothes the digestive system by relieving muscle spasms in the intestines, promotes the flow of digestive bile (Bastyr Monograph. Nany Welliver 2006)

DIGESTIVE HERBS – COOL/COLD

- **Gentianae radix**, gentian root (Bitter, Gastric stimulant, Sialagogue, Cholagogue, Anti-inflammatory)
 - Digestive disorders, such as loss of appetite, fullness, flatulence- **German E Commission Approved** (American Botanical Council)
 - Hypochlorhydria, Low level depressed states with gastrointestinal complaints, Anemia (Bastyr Monograph. Nany Welliver 2006)
 - Priming effect on the upper digestive system mediated by a nerve reflex from the bitter taste buds (Bastyr Monograph. Nany Welliver 2006)
- **Menthae piperitae aetheroleum**, peppermint oil (Carminative)
 - Spastic discomfort of the upper gastrointestinal tract and bile ducts, irritable colon, catarrhs of the respiratory tract, inflammation of the oral mucosa- German E Commission Approved (American Botanical Council)
- **Taraxaci herba**, dandelion herb (Bitter)
 - Loss of appetite and dyspepsia, such as feeling of fullness and flatulence- German E Commission Approved (American Botanical Council)

BITTERS- COMBINATIONS

- Fixed combinations of dandelion root , celandine herb, and Artichoke leaf
 - Spastic epigastric discomfort due to functional disorders of the biliary system - **German E Commission Approved** (American Botanical Council)
- Digestive Bitters Compound by Herb Pharm Inc (Mixed Formula)
 - Evidence range is **effective** to insufficient data.
 - No evidence of harm. (Natural Medicine Comprehensive Database)
- Fixed Combinations of Peppermint leaf, Caraway seed, and Chamomile
 - Dyspeptic discomfort, especially with mild spasms in the gastrointestinal region, flatulence, and a sensation of fullness- **German E Commission Approved** (American Botanical Council)

GASTRIC INFLAMMATION

- Gastric Inflammation **considered** to be strongly associated with hypochlorhydria
 - More **likely** related to H. Pylori, Diet (lack of bitter), Vit C def
- GERD not associated
- Loss of Lower esophageal tone common
 - Gluten?
- **Note:**
 - **Acute** digestive inflammation may lead to an increased globulin level (>2.8 or 28 g/L) due to the increased production of inflammatory immunoglobulins.
 - PPI rebound
- **Hint:**
 - **Chronic** digestive inflammation due to Gastritis, infx, colitis, enteritis, Crohn's etc.
 - will compromise protein breakdown and absorption
 - Leading to a widespread protein deficiency in the body
 - Decreased total globulin level (<2.4 or 24 g/L).

GASTRIC INFLAMMATION TREATMENTS

- Life changes
 - Avoid ETOH, caffeine, smoking, saturated fats
 - Relationship to Gluten?
- Acid suppression therapy?
- Treat H. Pylori
 - Abx- controversy
- Melatonin (de Oliveira Torres et al, 2010) (Konturek et al, 2007) (Lahiri et al, 2009)
- Betaine HCL
- Pre & probiotics
- Vulnerary Herbs: *Althaea officinale*, *Ulmus fulva*, *aloe vera* (juice & gel)
- Curcumin
- Blueberry, Cranberry, Pomegranate- antioxidant



METABOLIC SYNDROME

- **ATP III guidelines-** no longer valid
 - New **ATP 4** Guidelines
- **Metabolic Risks:**
 - Family Hx
 - CVD & Diabetes
 - Obesity
 - Inflammation
 - Insulin resistance
 - Oxidative stress pattern
- **Note:**
 - Consider patterns
 - HDL:Triglyceride ratio important
 - Complete picture & patterns

CHOLESTEROL

- **Optimal Range: Total 160-180**
 - LDL: 0-123
 - HDL: 55-70
 - Chol:HDL ratio: <4
 - Trig: 70-80. Note: conventional range 0-150
 - Trig:HDL ratio: <2
- **Note:**
- **apolipoprotein B**, also known as apoB.
 - Each LDL particle contains a molecule of apoB.
 - Measuring apoB more accurate way to determine total number of LDL particles and risk of adverse cardiovascular outcomes
- **Hint:**
 - **Elevated Levels:**
 - Thyroid, adrenal dysfunction
 - Liver/biliary stasis
 - Pancreatic insufficiency

PATTERNS

- **Low Chol:HDL ratio <4**
 - Increased risk of CVD
 - Particularly with insulin resistance and inflammatory markers
- **HDL >70 + Triglycerides <40**
 - Suggestive of autoimmunity
- **Optimal Triglyceride:HDL ratio <2**
 - Decreased risk of insulin resistance and diabetes
- **Trig > Chol**
 - Suggests oxidative stress
 - Chol >180 + HDL <55
 - Lymphocytes <20

HYPERLIPIDEMIA

- **Natural Medicine Comprehensive Database** Likely effective Herbs:
 - **Oats:** modestly reduces total and LDL
 - 3.6-10 grams of beta-glucan, i.e. soluble fiber
 - ***Avena sativa* Medicinal actions:** Antidepressant, nervous system trophorestorative, cardiac tonic
 - Observed to act as a tonic to improve energy of myocardium. (Bastyr Monograph)
- **Beta Glucans:** meta-analysis of clinical research shows beta glucans (barley) in doses of 3-10 grams/day significantly lowers total and low-density lipoprotein (LDL) over 4-6 weeks of treatment.
 - Did not significantly affect high-density lipoprotein (HDL)
 - Effect of barley on cholesterol is dose dependent



HYPERLIPIDEMIA

- **Psyllium:** reduces cholesterol mild to moderate hypercholesterolemia.
 - Psyllium seed husk or seed 10-12 grams daily significantly reduces the LDL to high-density lipoprotein (HDL) ratio after 6 months
 - Natural Standards Grade A
 - Health Notes Grade B
 - Level A2 Raket
 - German E Commission approved as fiber for constipation and diarrhea



- **Garlic:**
 - Natural Standards Grade B
 - Health Notes 2 Stars
 - German E Commission Approved

HYPERLIPIDEMIA

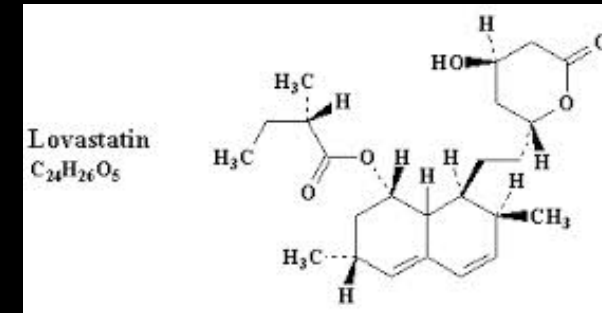
- **Natural Medicine Comprehensive Database Herbs Possibly Effective**
 - **Flaxseed:**
 - Significantly reduces total cholesterol & (LDL) cholesterol
 - **Avocado:**
 - Related to monounsaturated fatty acids
 - Influences Inflammation cascade
 - **Artichoke:**
 - Modestly reduce total and low-density lipoprotein (LDL) cholesterol, & the LDL/high density lipoprotein (HDL) ratio
 - Isolated cynarin did not show effect
 - Action related to choleric
 - German E Commission Approved only for Dyspeptic problems



HYPERLIPIDEMIA

Red Yeast Rice - *Monascus purpureus*:

- Long history of use TCM
- Same as Statin- "Active" compounds in red yeast rice is monacolins.
 - **Monacolin "K"** is also known as mevinolin or **lovastatin**
 - Multiple clinical studies demonstrate positive response for: (Kurn and Shook. Integrated medicine for Neurologic Disorders, Health press. 2008.)
 - Reducing total cholesterol
 - Reducing LDL
 - Raising HDL
 - Lowing Triglycerides
- **Same Side effects**= Caution (Mercola.com. Sept 2009. By Ray Ellis. www.SaveYourHeart.com)
 - Depletes CoQ10 > inhibits mitochondria
- Statins activates the atrogen-1 gene > rhabdomyolysis & Mylagias
 - Most common side effect



ADRENAL

Factors Affecting the Adrenals

LIFE ISSUES:

Financial Pressures

Death of a Loved One

Emotional Stress

Unwanted Unemployment

Marital Stress

Psychological Stress

Negative Attitudes & Beliefs

FEAR

BODY ISSUES:

Allergies

Infections: Acute & Chronic

Prescription Drugs

Wound Healing

LIFESTYLE

Smoking

Lack of or Excessive Exercise

Lack of Sleep

Over Exertion

Lack of RELAXATION

TOXINS

POOR EATING HABITS

DIET

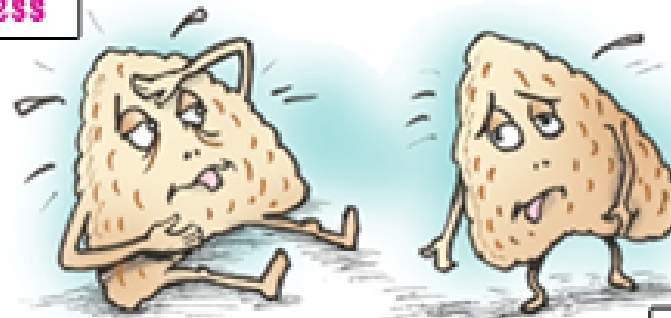
COFFEE

Lack of Good Food

CAFFEINE

WHITE FLOUR PRODUCTS

SUGAR



ADRENAL

- **Adrenal Hypofunction- Pattern**

- **Increased** Potassium levels ($>4.50-4.5$)
- Sodium **decreased** (<135)
- **Decreased** glucose (<80)

- **Adrenal stress - Pattern**

- **Decreased** Potassium levels (<4.0)
- Sodium **increased** (>142)
- **Elevated** glucose (>80)

- **Note:**

- Lactate Dehydrogenase (**LDH**) <140 = reactive hypoglycemia
- Chloride values will often follow sodium

- **Hint:**

- **Check cortisol**

PARADOXICAL PUPILLARY RESPONSE

- Clinical sign: pupils abnormally respond to light
- Represents mineral corticoid imbalance
 - Sodium & potassium
- Secondary to aldosterone dysregulation from adrenal fatigue/exhaustion
- Excellent: Pupil constricts and holds tight for 20 seconds without pulsing
- Good: Holds but pulses after 10 seconds
- Poor: Pupil pulses & gradually enlarges over 10 seconds
- Failure Pupil pulses & rapidly enlarges over 5-10 seconds
- Exhaustion Pupil immediately becomes larger or fails to constrict



Weatherby D. (2004). *Signs and Symptoms Analysis from a Functional Perspective*, 2nd ed. Oregon: Weatherby and Associates, LLC. .

KEY SYMPTOMS: DYSGLYCEMIA

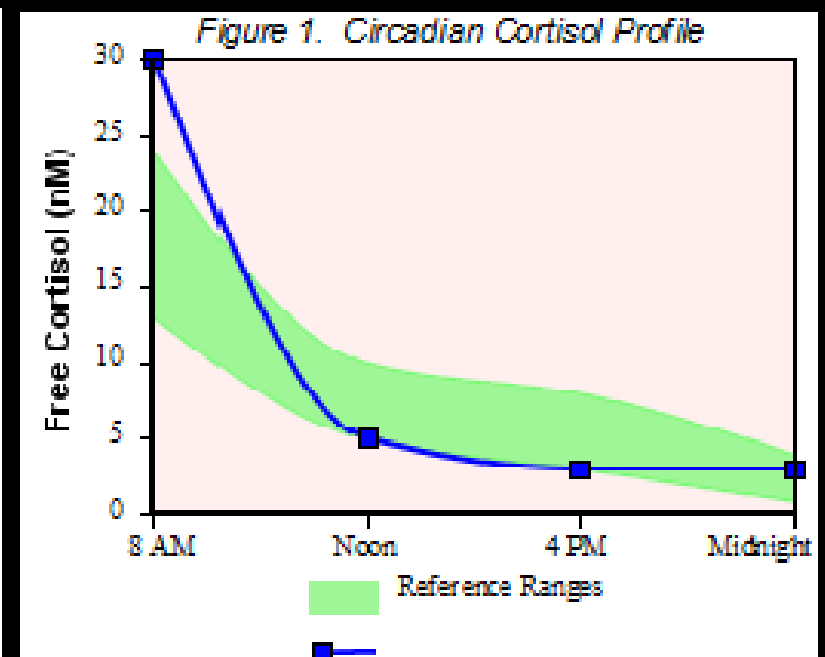
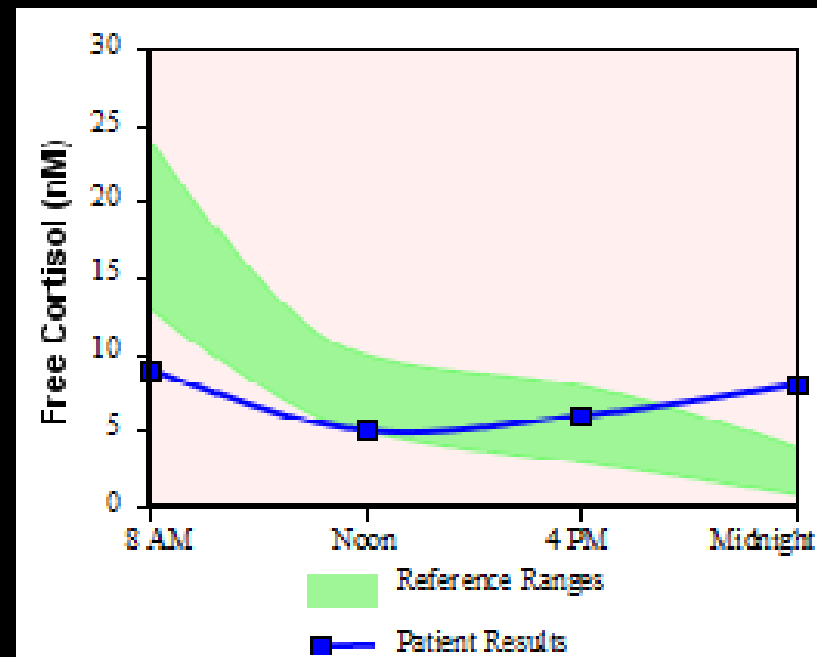
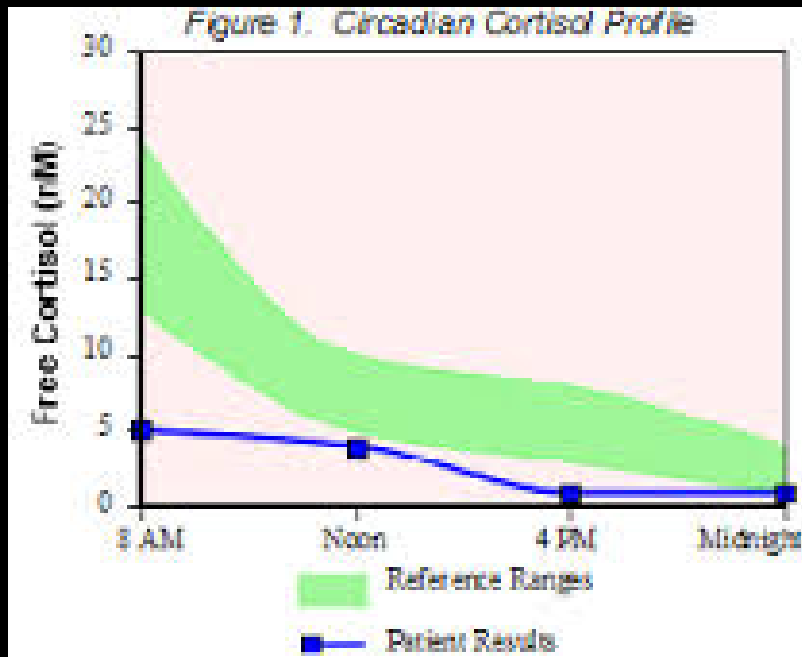
- Crave sugar
- Shaky and irritable between meals
- “Food buzz”
- Tremor
- Morning nausea
- Mental confusion

Herto, S. *Dysglycemia the Epidemic*. 2014. University Western States

Gaby, A. (2011). *Nutritional Medicine*. New Hampshire: Fritz Perlberg

Weatherby, D. (2002). *Clinical Laboratory Testing from a Functional Perspective*. Oregon: Bear Mountain Publishing

FUNCTIONAL MEDICINE LAB PATTERNS: CORTISOL



ADRENAL TREATMENT

- Normalize Cortisol
 - Gladulars & Adaptogens in AM
 - Phosphatidylserine & Adaptogens in PM
- Adrenal Repair/Rest
 - Pregnanalone vs. DHEA
 - Cortef
- Co-Factors: Mineral salts; B Vit Thiamine-B1, Pantothenic acid-B5, B6; C; Betaine HCL
- Acupuncture
- Mindfulness & stress reduction

ADRENAL TREATMENT- DYSGLYCEMIA

- A review of traditional herbs used in diabetes
 - Demonstrated positive hypoglycemic action.
- Herbal preparations
 - Showed improved outcomes when combined with standard pharmacological therapy.
 - Overall quality of methodology was poor.
- No adverse effects
- No safety issues reported



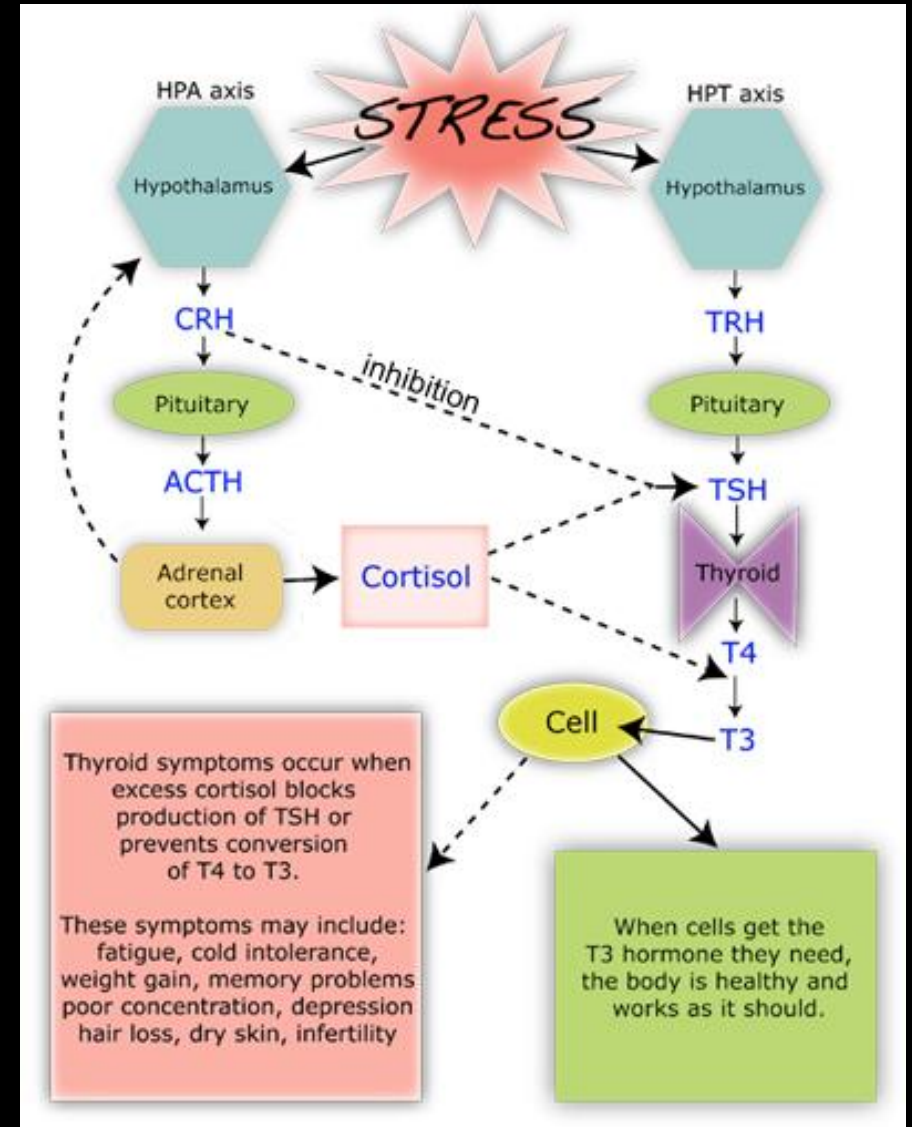
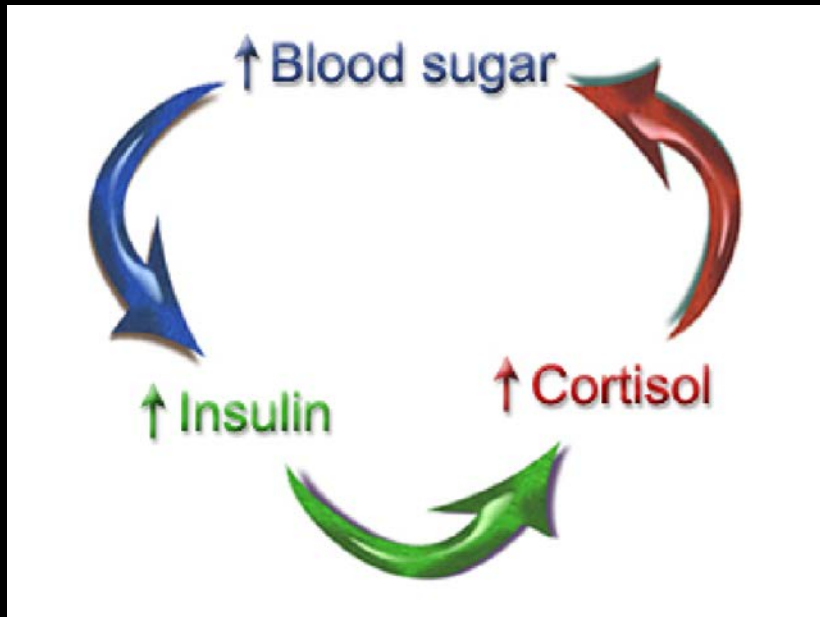
(Cochrane Database)

ADAPTOGENS

- Very useful clinically for multiple targets- system modulation
 - Metabolic, HPA(Go) axis, immune etc.
- Variety/Choices:
 - *Panax ginseng*: Ginseng (Ren Shen)
 - *Panax quinquefolius*: American Ginseng (Xi Yang Shen)
 - *Eleutherococcus senticosus*: Siberian Ginseng
 - *Astragalus membranaceus* (Huang Qi)
 - *Withania somnifera* (Ashwagandha)
 - *Bupleurum falcatum*: Hare's ear /Thorowax (Chai Hu)
 - *Glycyrrhiza glabra*: Licorice (Gan Cao)
 - *Schizandra sinensis*: 5 flavor fruit (Wu-wei-zi)
- Essentially interchangeable: Adaptogens in general likely effective
 - Modulating influence on the HPA axis- influences glycemic control
 - Advise differentiation based on classical uses

STRESS

- Stress raises cortisol
- Cortisol raises Blood Glucose
 - Further increases cortisol
- Elevated Glucose causes insulin resistance
 - Further increases cortisol
- Cortisol suppresses TSH



THYROID

- **Optimal thyroid range:**

- TSH= 1.3-2.0 (<2 clinical endocrinology) vs. (<3-4 = norm)
- Free t3= 3.0-3.5 (3.5-4.3)
- Free t4 = 1.0-1.5
- reverse t3 ration: 8-25 (<13)
- neg Ab: TPO 0-6.8 / Thyroglogulin 0-0.9

- **Patterns:**

- Primary Hypothyroid: TSH >2
- Pituitary dysfunction: all low or mixed normal-low with sx
- Under conversion: Norm to high fT4; Low fT3; normal to high rT3
- Over conversion: Norm to low Ft4; High fT3

- **Hint:**

- Check BMR with temperature

KEY SSX: HYPOTHYROID

- signs

- Dry skin
- Brittle nails
- Loss outer 1/3 eyebrows
- Edema- non pitting
 - most common- ankles
- Delayed Achilles reflex return
- Low body Tem
 - Basal metabolic Rate

- symptoms

- Depression > anxiety
- Cold / heat intolerance
- Cold intolerance
- Fatigue
- Dysmenorrhea

ACHILLES' REFLEX RETURN

- Delayed relaxation of deep tendon reflexes (Woltman sign):
 - Seen in about 75% of patients with hypothyroidism
 - Positive predictive value of 92%
- The most reliable clinical sign of hypothyroidism
 - May indicate radiculopathy
 - Normal return does not rule out sub-clinical hypothyroidism

Gaby, A. (2011). Nutritional Medicine. New Hampshire: Fritz Perlberg

*Houston CS. The diagnostic importance of the myxoedema reflex (Woltman's sign). CMAJ 1958;78:108-12.
Available: www.pubmedcentral.nih.gov/picrender.fcgi?artid=1829539&blobtype=pdf (accessed 2014 Jul 30)*

THYROID TREATMENT

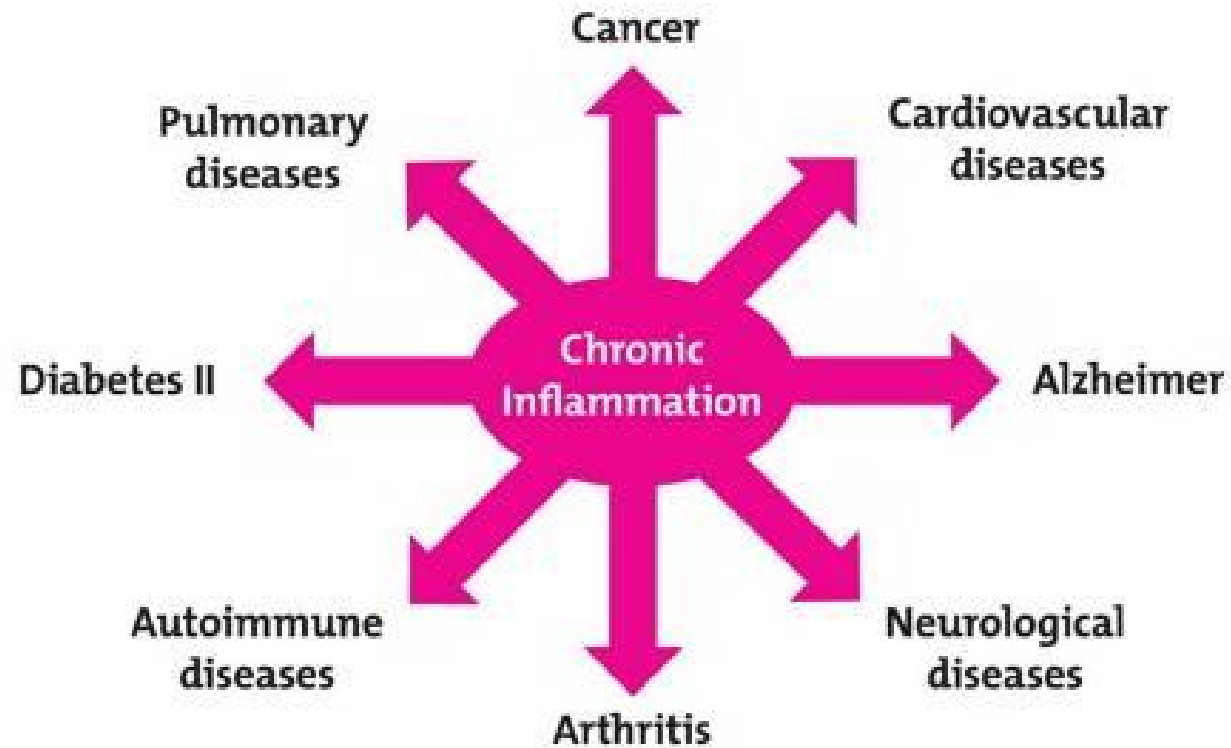
- HRT T3/T4 or combination as appropriate
 - Caution porcine glandular in Autoimmunity (?)
 - No evidence in review: Edwin Lee, MD. Institute for Hormonal Balance. Reversing Hashimoto's Lecture, Nov 2015.
 - Selenium 200 mcg for Ab suppression
 - Improves 5' deiodinase production
- Ensure adequate Vit D3 as pro-hormone, immune receptor modulator
- Liver support for adequate conversion T4>T3
- Reduce inflammation
- Modulate cortisol
- Co-Factors: B12; Tyrosine; selenium; Iodine (?)
 - Iodine form, duration, contributing features

THYROID TREATMENT

- Guggul: *Commiphora mukal*
 - Elevates T3 levels in hypo
 - Lowers T3 in Hyper
 - Improves T4>T3 conversion
 - Anti-inflammatory
- Blue Flag: *Iris versicolor*
 - Stimulates glandular secretion
 - Lymphagogue- improves thyroid hormone production
- Bladderwrack (Kelp): *Fucus vesiculosus*
 - Increases metabolic rate
 - Iodine rich: substrate co-factor

INFLAMMATION

Chronic Inflammation Can Lead To...



INFLAMMATION

- A number of findings on a blood test can point towards inflammation:
- **General:**
 - ESR
 - Tissue destruction
 - CRP
 - HS-CRP (<1)
 - Elevated Ferritin
 - Iron overload
 - Elevated uric acid
 - Neutrophils (>60)
- **Endothelial:**
 - Elevated Homocysteine
 - B12/Folate def.
 - Elevated hs C-Reactive protein
 - Elevated Blood Glucose
 - Elevated Fibrinogen (>300)

INFLAMMATION

- In **chronic** inflammation, something inhibits completion of healing process:
 - weakened immune state, elevated blood glucose, oxidative burden, adrenal fatigue- ie. low cortisol reserves.
- **Basophils** (>3) particularly are a non-specific marker for sustained inflammation.
 - Relate to histamine and increase heperin to the target site.
 - This is a good clue when other markers are absent but again is non-specific
- **Monocytes**: mild elevation with chronic inflammation (7-15)
- **LDH**: (>200)
- **Hint:**
 - (ESR) inversely related albumin
 - Liver production albumin declines with dysfunction and clumping RBC
 - Elevated BUN can be secondary to ammonia production from dysbiosis or detox impairment
 - Check Infx markers and Liver Markers
 - Check MTHFR

INFECTION

AN INFECTIOUS DISEASE ENTERS
* * A BAR. THE BARTENDER
SAYS, "WE DON'T SERVE * *
YOUR KIND HERE." IT REPLIES,
"WELL, YOU'RE NOT
A VERY GOOD HOST." 

ASAP SCIENCE

BACTERIAL

- **Acute:**
 - Total WBC **elevated** (>7.5)
 - Neutrophils **increased** (>65)
 - Normal likely **decreased** lymphocyte count (<24)
- **Chronic:**
 - **Decreased** WBC (<5.5)
 - **Increased** neutrophil count (>60)
 - **Increased** monocytes (>7)
- **Hint:**
 - If monocytes elevated (>7) indicates recovery from acute phase
 - Consider **parasite** if eosinophils elevated (>3)

VIRAL

- **Acute:**
 - **Increased** total WBC (>7.5)
 - **Increased** Lymphocytes (>44)
 - **Normal** neutrophils (>40)
- **Chronic:**
 - **Decreased** total WBC count (<5.5)
 - **Decreased** lymphocyte count (<20)
 - **Decreased** neutrophils (<40)
- **Hint:**
 - If monocytes elevated (>7) indicates recovery from acute phase
 - Consider **parasite** if eosinophils elevated (>3)

IMMUNE

- **Consider immune insufficiency if there is:**
 - **Decreased** total white blood cell count (<5.5)
 - **Decreased** Globulin (<24)
 - Chronic infection, oxidative stress, Liver metabolism
 - **Decreased** albumin levels (<4.0)
- **Confirmation:**
 - Lyme, mycoplasma, Gram Neg bacteria (LPS), Strep, Virus, mold
- **Hints:**
 - **Consider** MSID= multiple systemic infectious disease syndrome and dysbiosis
 - **Consider zinc** deficiency:
 - Alkaline phosphatase (<70)

CONFIRMATION TESTING

- Lyme and NK cell profile
 - Specialized testing
- Viral Titers, ASO and mycoplasma profile
- Breathe testing
 - Hydrogen and methane
- Intestinal permeability
 - Lactulose mannitol challenge
 - Zonulin
- Comprehensive stool analysis
 - Fecal calprotectin
 - Eosinophils
 - Inflammatory markers

IMMUNE SUPPORT/MSID TX

- **Multiple options:** disagreement on optimal approach
 - Controversy over antibiotic therapy: Type & course
 - Doxy and azithromycin reasonable
 - Timing: short-term, long-term, pulsed
- Address Dysbiosis on **terrain level**
 - Netti pot; suppositories, bathes
- **Biofilms:**
 - Bismuth Citrate 250-500, 2-3x/d
 - ALA 150-300 mg bid & NAC 500 mg bid
 - Adds thiol molecule
 - Bee Venom

IMMUNE SUPPORT/MSID TX

- Nutrients:
 - Vit D, Vit A, Vit E, Zinc, Vit C, NAC/Glutathione (NEB)
- LDN
- Acupuncture
- Bee Venom Therapy
- Hyperbaric O2

DYBIOSIS

- **Markers:**

- Increased BUN (>16) is a useful indicator for dysbiosis.
 - Putrefactive by bacterial overgrowth in large intestine releases significant amounts of ammonia
 - Converted into urea by the liver leading to increased BUN levels (>16).
 - Urea travels from the liver to the colon and is acted upon by gut microflora
 - Recirculated nitrogen > Increased catabolism > increase BUN.
- **Urine metabolites dysbiotic flora:**
 - Dihydroxyphenylpropionic Acid
 - 3 and 4 -Hydroxyphenylacetic Acid
 - Benzoic and Hippuric Acid
- **Urine metabolites Yeast/Fungal:**
 - Arabinose
 - Citramalic and Tartaric Acid
- **Breath Test:**
 - Positive Hydrogen/Methane
- **Antibodies:**
 - LPS

DYSBIOSIS/SIBO

- **Gut bacterial endotoxins (LPS)** – gram neg
 - produce d-lactase, methane and hydrogen sulfide toxins
 - dose dependent, <200 ppm is **protective**; >200 ppm is **pathologic**
 - microglia activation (immune signals & toll like receptor 4)
 - Drives inflammation
- Increase intestinal permeability
 - Increased circulating immune complexes
 - Promotes food intolerances & sensitivities.
- **Note:** Methane & hydrogen sulfide influence GI motility and can cause hypochlorydia or alternately set environment up for H pylori > xs HCL



DYSBIOSIS/SIBO TREATMENT

- Multiple options: disagreement on optimal approach
 - Controversy over antibiotic therapy
 - Rifaxamin typical
 - Timing, Type & course
 - Anti-yeast/fungal
 - Nystatin & Fluconazole
- Dietary intervention needed
 - Controversy over type: elemental, specific carb diet (SCD), FODMAP, GAPS etc.



DYSBIOSIS/SIBO TREATMENT

- Use of some medicinal herbs commonly advocated to treat dysbiosis may actually cause harmful alterations to the GIT ecosystem
- Should be viewed as an extremely potent, broad-acting antimicrobial that may decimate the GIT microflora
 - more active against beneficial members of the GIT flora than pathogenic members
- **Clinical Implications?**

DYSBIOSIS/SIBO TREATMENT

- Allium sativum/Allimax
 - Best evidence and safety profile
- Oregano oil 300 mg bid
 - Emulsified
- Berberine Spp. 400 mg qd
 - No effect on GIT microbiota at clinical doses
- Artemesia spp. 100 mg bid
 - No evidence of activity against any GI bacterial or protozoal pathogens
 - Bio-films ?
- Propolis and Resins
- Caprylic Acid (coconut oil)
 - Anti-fungal
- Proteolytic enzymes
- Probiotics
- Grapefruit Seed
 - ? Safety: Not natural, broad activity similar to clindamycin

GREEN TEA

- *Camellia sinensis*
 - ~300 mg catechins/day, ECGC equivalent
- Action:
 - Inhibits bacterial drug-resistant pump activity
 - (Sudano Roccaro et al, 2004)(Kurincic et al, 2012)
 - Prevents formation of biofilms: *E. coli*, Strep & Staph
 - (Faraz et al, 2012), (Blanco et al, 2005)
 - Inhibits growth of *C. albicans*. (Evensen & Braun, 2009)
 - 80% reduction in established *C. albicans* biofilm

POMEGRANATE HUSK

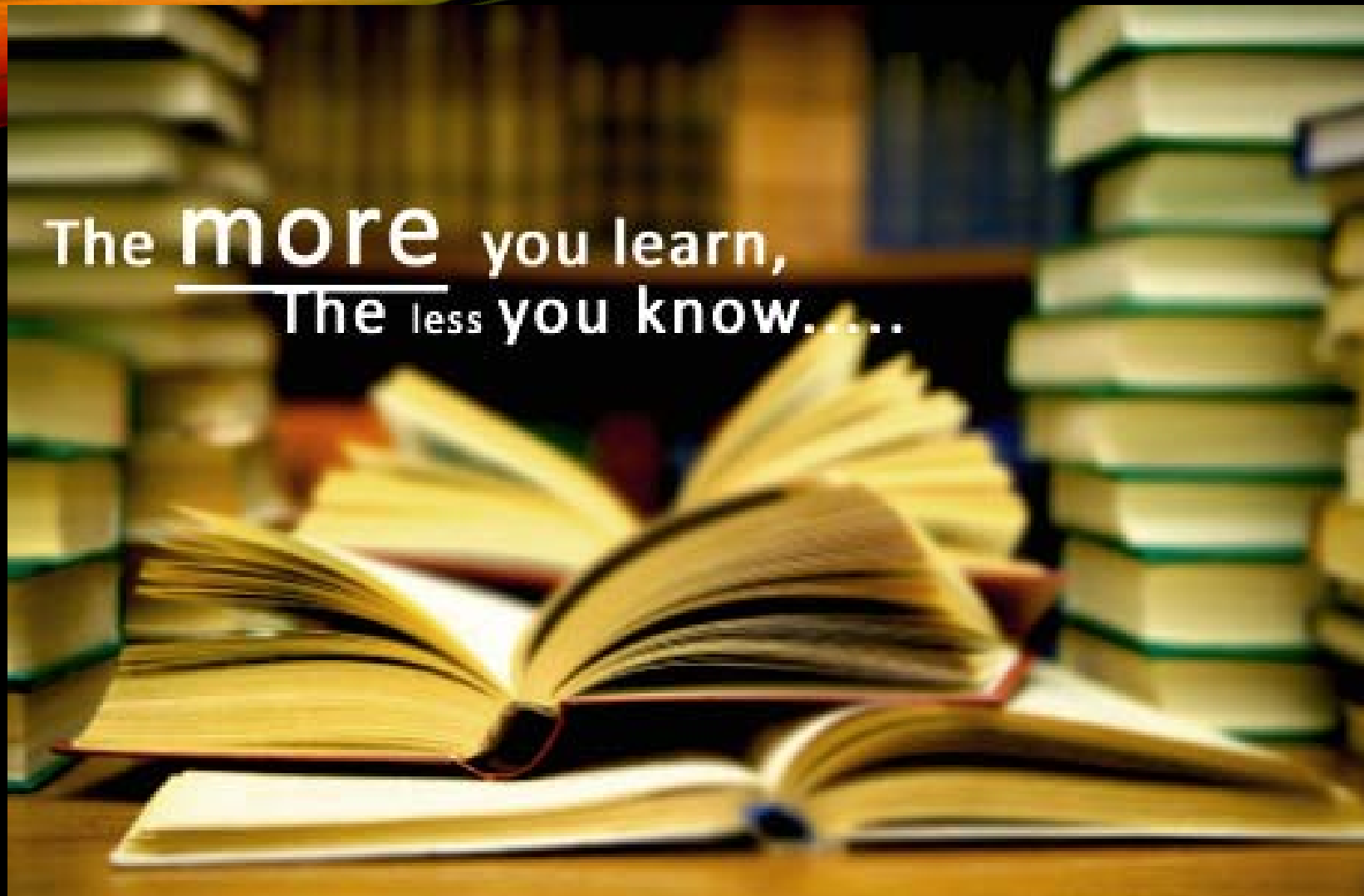
- Antimicrobial
 - (Pai et al, 2011)(Egharevba et al, 2010)(Ponce-Macotela et al, 1994)(Al-Mathal & Alsalem, 2012)(Ismail et al, 2012)(El-Sherbini et al, 2010)
- Antiprotozoal, Antihelmintic, Antifungal
 - (Pai et al, 2011)(Egharevba et al, 2010)(Ponce-Macotela et al, 1994)(Al-Mathal & Alsalem, 2012)(Ismail et al, 2012)(El-Sherbini et al, 2010)
- No negative impact on lactobacilli
- Enhanced growth of bifidobacteria
 - (Bialonska et al, 2009)(Neyrinck et al, 2013)

PROPOLIS

- **Classification:** Wide range of internal and topical applications
 - Anti-oxidant
 - Inflammatory modulatory
 - Mucolytic
 - Immune stimulant
 - Immune modulating (adaptogen?)
 - Anti-neoplastic (direct and indirect)
 - Anti-microbial- bacteria (best against permeable cell walls)
 - viral and fungal
 - Breaks bio-films
 - Hepatoprotective
 - Anodyne

INTESTINAL PERM

- **Consider Intestinal Permeability:**
 - Anemias
 - Elevated uric acid with low grade inflammation
 - Difficult to differentiate Gout
- **Pattern on Blood Chemistry Analysis:**
 - Decreased BUN (<10)
 - Chronic intestinal malabsorption, which can lead to a functional protein deficit
 - Elevated serum **zonulin**
- **Lab Testing:**
 - Check **Urine Indican** Levels – patient may have an elevated urine indican.
 - **Lactulose-Mannitol challenge**
 - **Mucosal Barrier Test:**
 - **Cyrex**
 - Immunosciences, Inc



The more you learn,
The less you know....

MICHEL LEGRAND

QUESTIONS ???

COMMENTS...

ARGUMENTS!!!

FIBROMYALGIA AND
NEUROMUSCULAR PAIN CENTER OF
OREGON, LLC

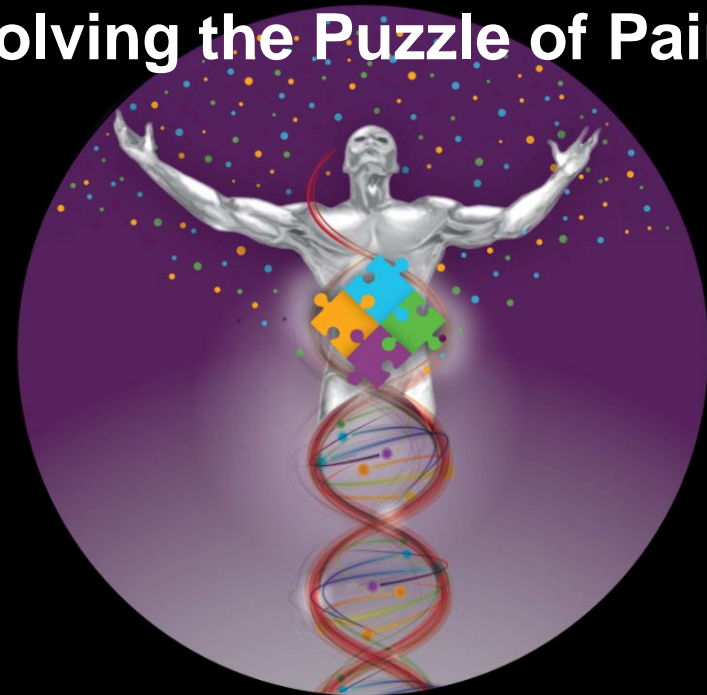
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WWW.PAIN-PUZZLE.COM

Solving the Puzzle of Pain™



REFERENCES

Texts:

- Integrative Rheumatology- Alex Vasquez, MD, ND, DC
- Textbook of Functional Medicine- Multiple Authors, IFM
- Nutritional Medicine- Alan Gaby, MD
- Clinical Laboratory Testing- Dicken Weatherby , ND & Scott Ferguson, ND
- Herb, Nutrient, and Drug Interactions: Clinical Implications and Therapeutic Strategies, 1e Mitchell Stragrove, ND, L.Ac; Jonathan Treasure MA MNIMH, RH (AHG), MCPP; Dwight L. McKee MD
- Health Notes- Jeffery Bland, PhD
- Chinese Medical Herbology and Pharmacology- Chen and Chen
- Integrative Medicine, 2e.- David raket, MD

Misc.:

- Bastyr University Herbal Monographs, Department of Botanical Medicine. Multiple Authors: Yarnell, Welliver, Kingsbury, Stansbury, Dipasquale

EVIDENCE RUBRIC AND SOURCES

- Evidence grading systems were utilized to focus the literature review
 - *Natural Standard evidence-based validated grading rationale™*
 - A Jadad score of 0-5 is given, with 5 being the highest quality
 - *Healthnotes™*
 - Rating scale from 1 to 3 stars. Three stars indicate that the evidence for that treatment is based on "Reliable and relatively consistent scientific data showing a substantial health benefit"
 - *Rakel's Evidence versus Harm Scale©*
 - Strength of Recommendation Taxonomy (SORT)
 - Evidence of benefit is graded from A to C
 - Potential harm of a therapy is graded from 1 (little or no risk of harm) to 3 (potential to result in death or permanent disability).
 - *German Commission E Monographs*
 - Federal multidisciplinary commission
 - Reviews and analyzes available data, to form clinical recommendations
 - Natural medicine Comprehensive Database
 - Critical Appraisal of literature: relevance, validity and consistency
 - Lists effective, possible, ineffective, and insufficient. Level and A-C for Quality
 - American Botanical Council
 - Advisory council of experts look at evidence- modern scientific and traditional
 - Not a true evidence-graded system