

Health Studies Collegium Foundation

Neurohormonal Imbalance in Stress/Distress

A Physiology Before Pharmacology Approach



Health Studies Collegium

DEDICATED TO CLINICAL RESEARCH & HEALTH POLICY



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Health Studies Collegium

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Neurohormonal Imbalance in Stress/Distress

- Stress/distress
- Immune Defense Repair System
- Toxin overload, immune health and neurohormonal integrity
- Gut – immune, neurohormone connections
- ***Physiology First*** approach to comprehensive (neuro)detoxification, stress management, sleep/mood balance and a healthier immune system.

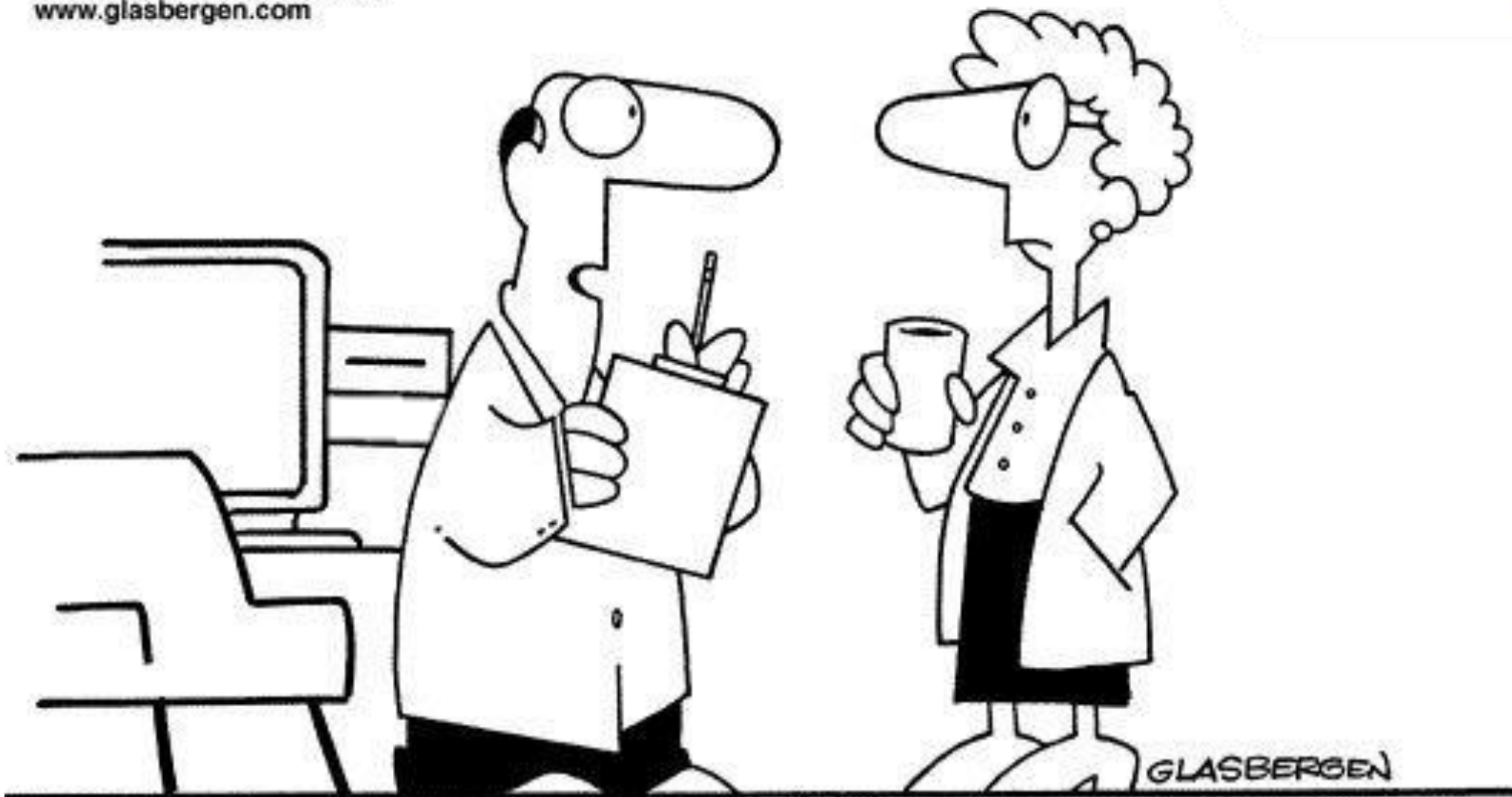
What is Stress?

- Feeling of emotional/physical tension
- Event or thought that leaves you frustrated, angry, or nervous
- Body's reaction to a challenge or demand
- In **short bursts**, stress can be **positive**: deadlines, adrenaline motivation
- **Long term: Costly learned responses**



Nurture, nature, & wholeness nourish, renew, and restore.

© 1996 Randy Glasbergen.
www.glasbergen.com



5

“According to the latest research, the average human body is 20% water and 80% stress.”

Anxie-Trees



WEeping WILLOW



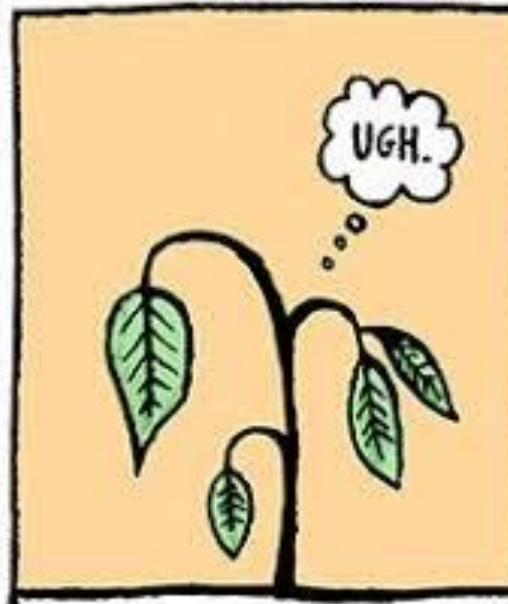
QUAKING ASPEN



WORRIED SEQUOIA



SWEATY PALMS



QUEASY SAPLING



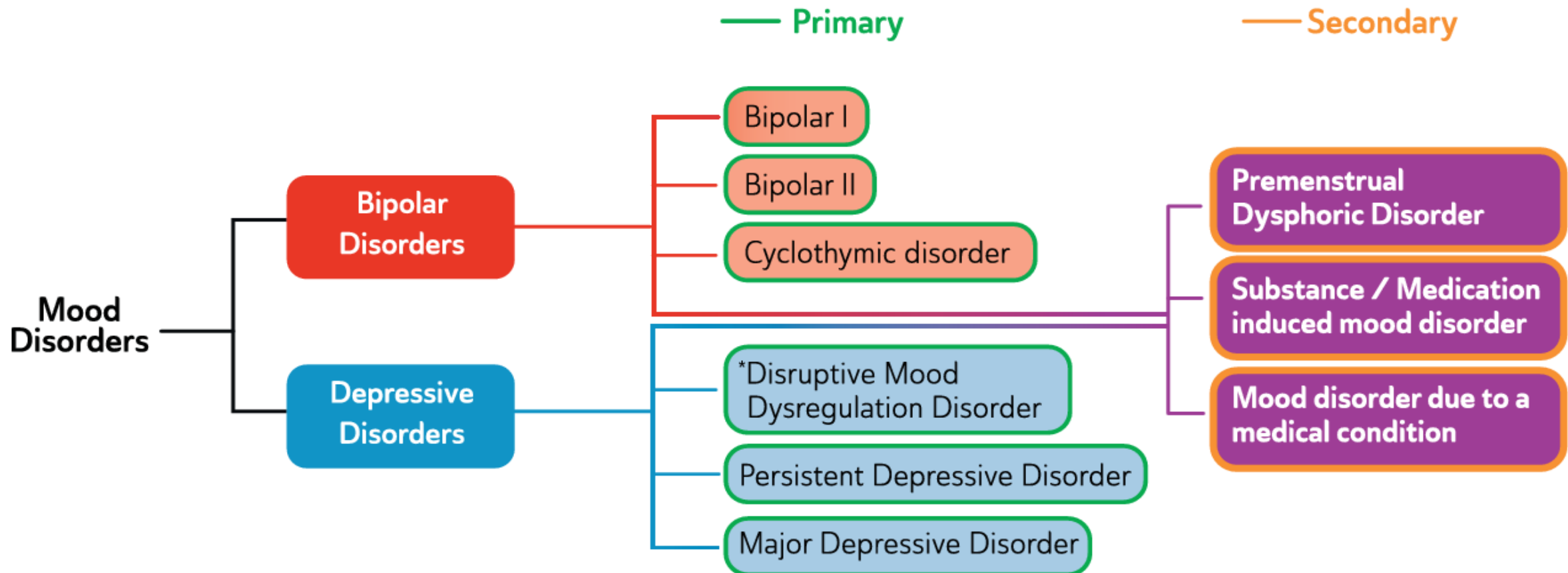
THIS BONSAI MAY
APPEAR OUTWARDLY
CALM, BUT INSIDE
IT'S SCREAMING.

FOUR EYES BY GEMMA CORRELL 2015



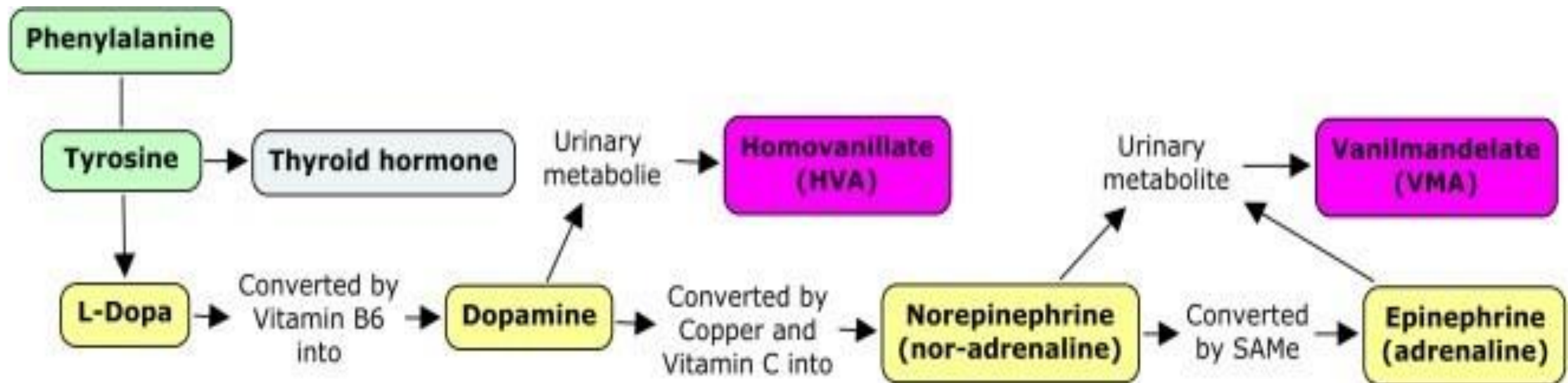
Mood Disorders

Figure 1. Classification of mood disorders.



<https://www.semanticscholar.org/paper/Royal-Australian-and-New-Zeland-College-of-for-Malhi-Bassett/c362aefd1ec64a877c1aacd3ac4d041d98e6e7b3>

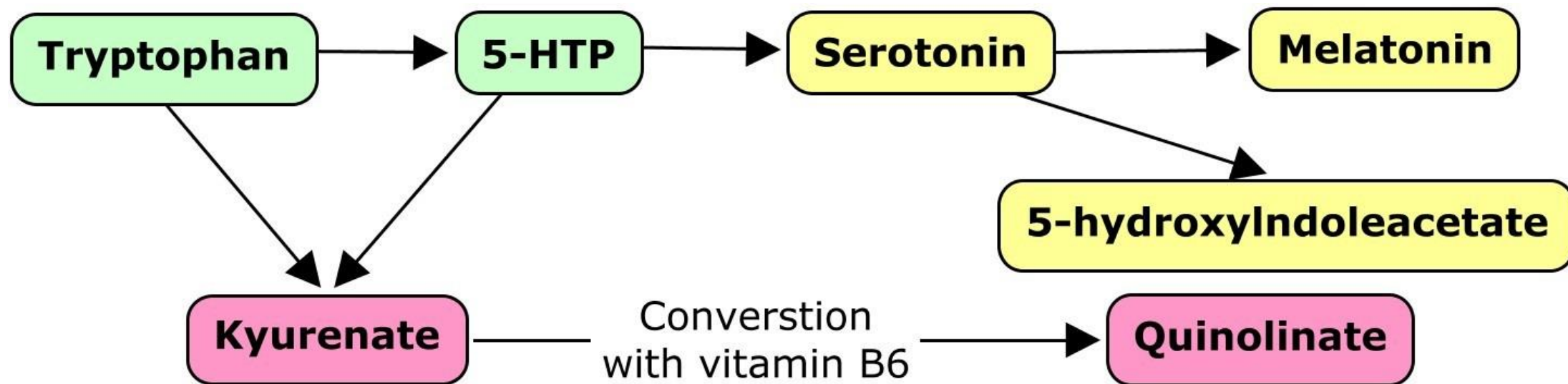
Organic Acid Sources & Metabolites



Low HVA and VMA: depression, anxiety, sleep disturbances, stress intolerance, fatigue

My preferred organic acid testing

Organic Acid Excitoneurotoxins



Elevated kyurenate and quinolinate = tryptophan being used to promote inflammation *instead* of serotonin / melatonin

Neurotransmitters

Non-invasive Biomarkers for Neurobehavioral Toxicology

Tryptophan goes to Serotonin / Melatonin

Tyrosine metabolized to Dopamine

Norepinephrine / Epi

GABA

Glutamate / glutamine

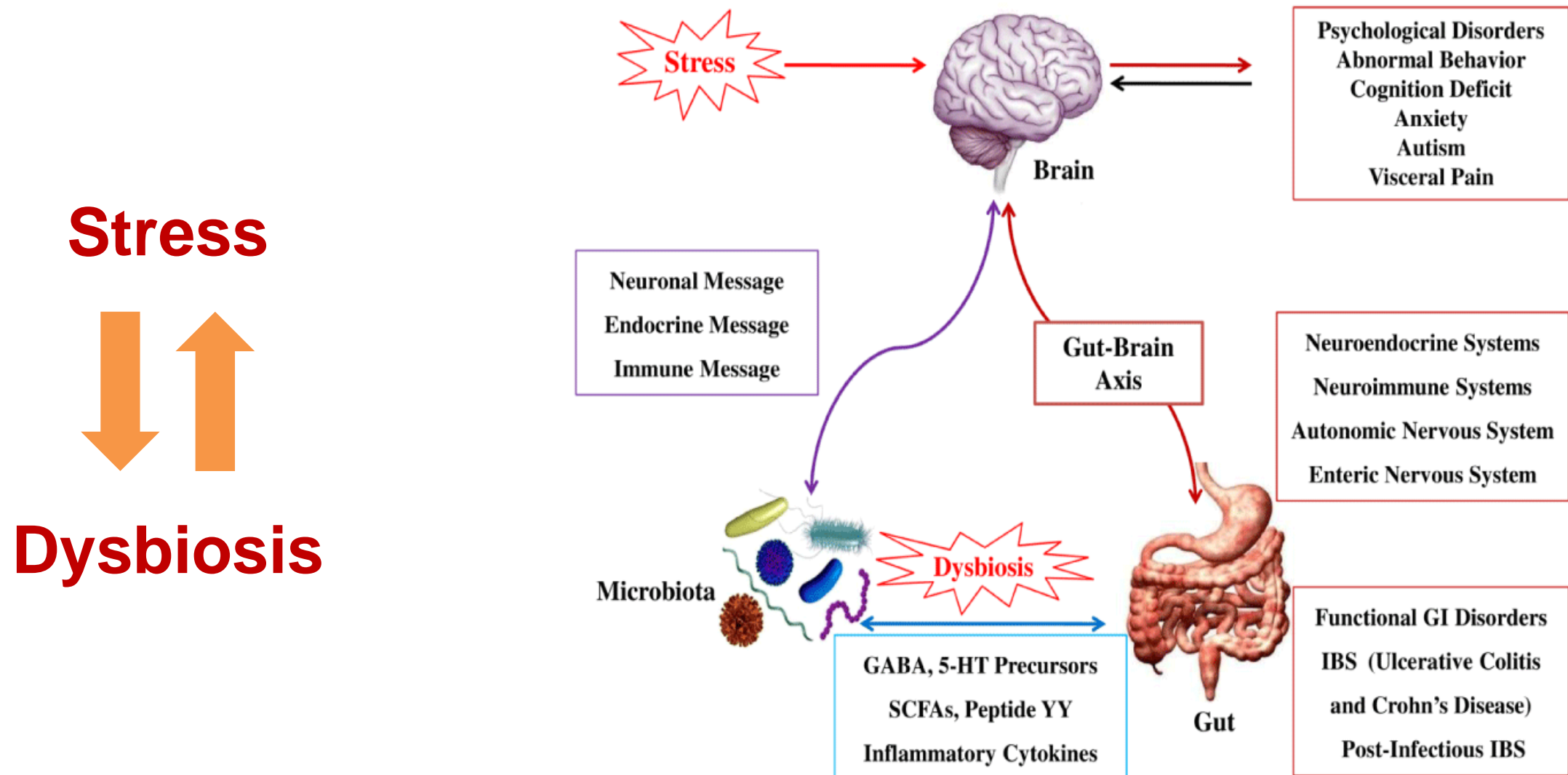
Histamine / histidine

Unexplained...

- Anxiety
- ADHD
- Bipolar Disorder
- Depression
- Insomnia
- Memory
- Migraines

Hughes JW, Watkins L, Blumenthal JA, Kuhn C, Sherwood A. Depression and anxiety symptoms are related to increased 24-hour urinary norepinephrine excretion among healthy middle-aged women. *J Psychosom Res.* 2004 Oct;57(4):353-358.

Gut/Brain Connection



Jane A.Foster, Linda Rinaman, John F. Cryan. Stress & the gut-brain axis: Regulation by the microbiome. *Neurobiology of Stress*, 2017, 7:124-136.

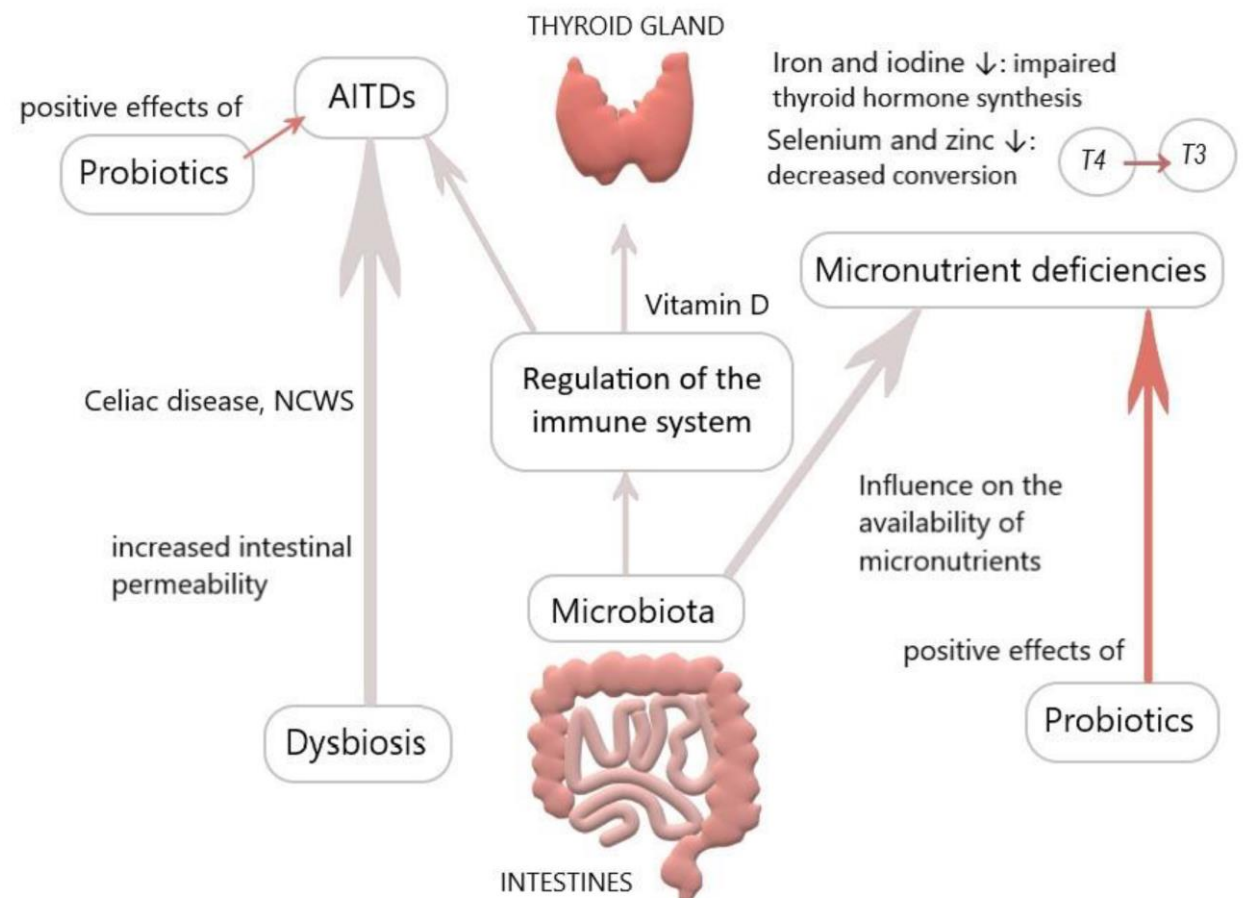
Cryan JF, Stress and the Microbiota-Gut-Brain *Can J Psychiatry* 2016 Apr; 61(4): 201–203.

Thakur AK, Shakya A, Husain GM, Emerald M, Kumar V (2014) Gut-Microbiota and Mental Health: Current and Future Perspectives. *J Pharmacol Clin Toxicol* 2(1):1016.

Gut/Thyroid Connection

- Damaged intestinal barrier = increase of **intestinal permeability**
- Activation of immune system
- Essential thyroid nutrients
I, Cu & Fe - thyroid hormone synthesis
Se & Zn : conversion of T4-T3
Vitamin D: regulates IDRS responses

**Hashimoto's Thyroiditis,
Grave's Disease, Celiac Disease**



Knezevic J, Starchl C, Tmava Berisha A, Amrein K. Thyroid-Gut-Axis: How Does the Microbiota Influence Thyroid Function? *Nutrients*. 2020;12(6):1769.

Adrenal Balance, Restorative Sleep, Enhanced Mood and Immune Homeostasis



- Adrenal physiology basics
- Circadian rhythm, HPA axis
- Toxins, sleep and mood
- Immune System connection
- Essential nutrients
- Alkaline Way - Epigenetic recommendations

Physiology before Pharmacology

Adrenal Health: Stress Hormone Balance

Adrenal Gland

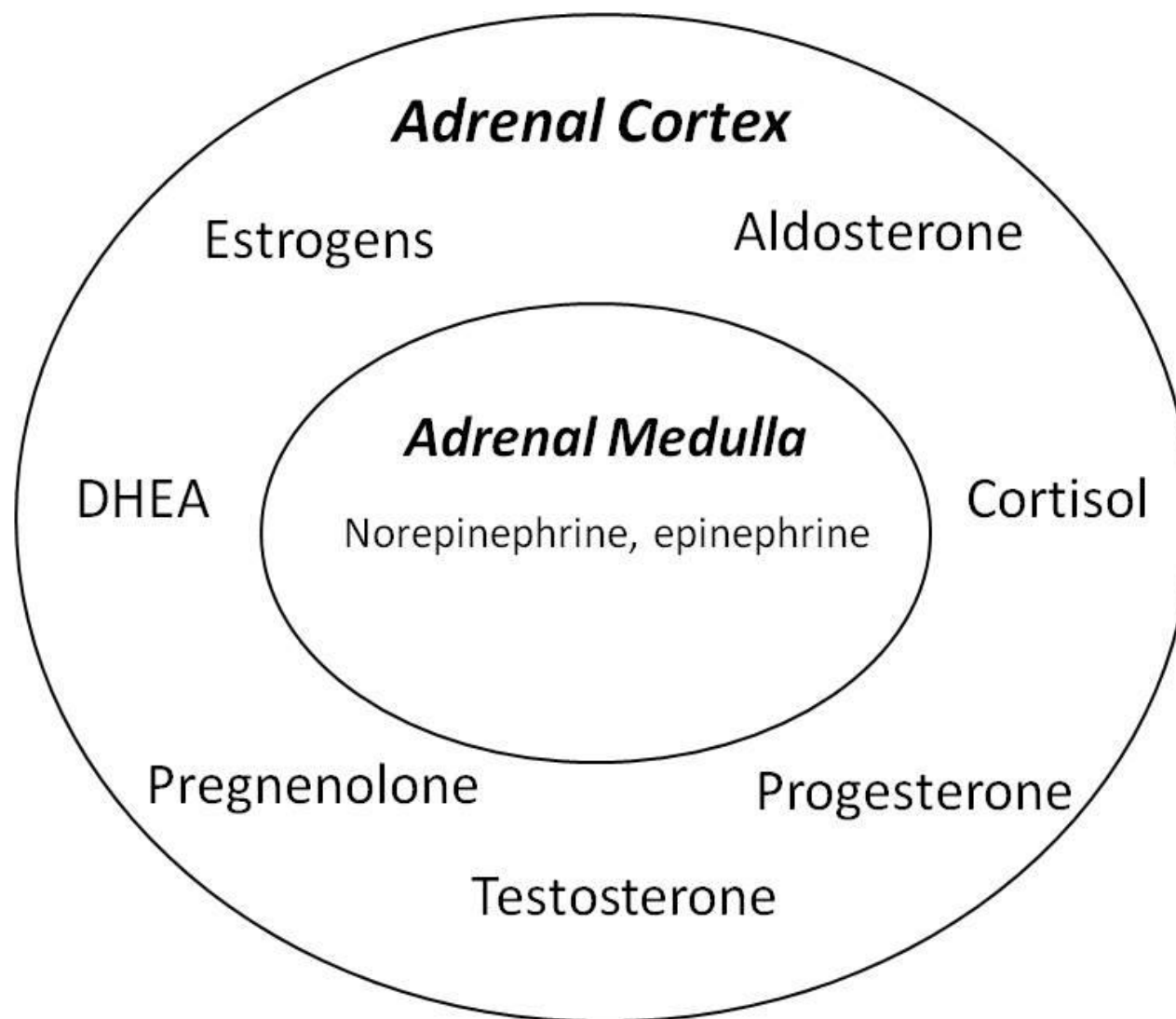


Fig. 1: Areas of the Adrenal Glands and Hormones Produced

DHEA:

‘mother hormone’

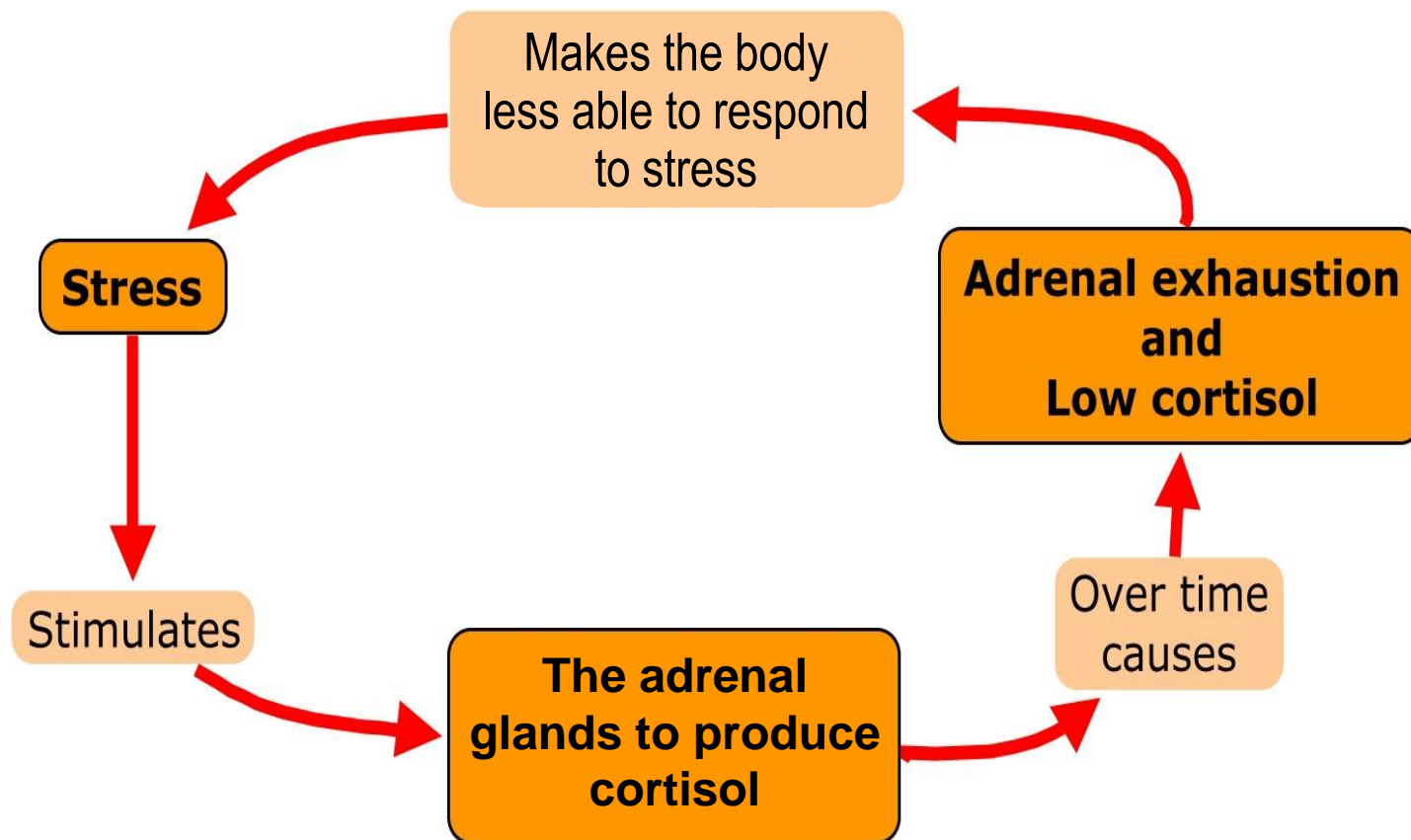
- “**Feel-good**” anabolic hormone
- **Promotes** immune system health & youthful vitality

Low Adrenal Function

- Fatigue most common visit physician, >80%
- Lack of restorative sleep
- *Uncontrollable* need to eat
- Mood *swings*
- Brain *fog*



Adrenal Distress: Vicious Cycle

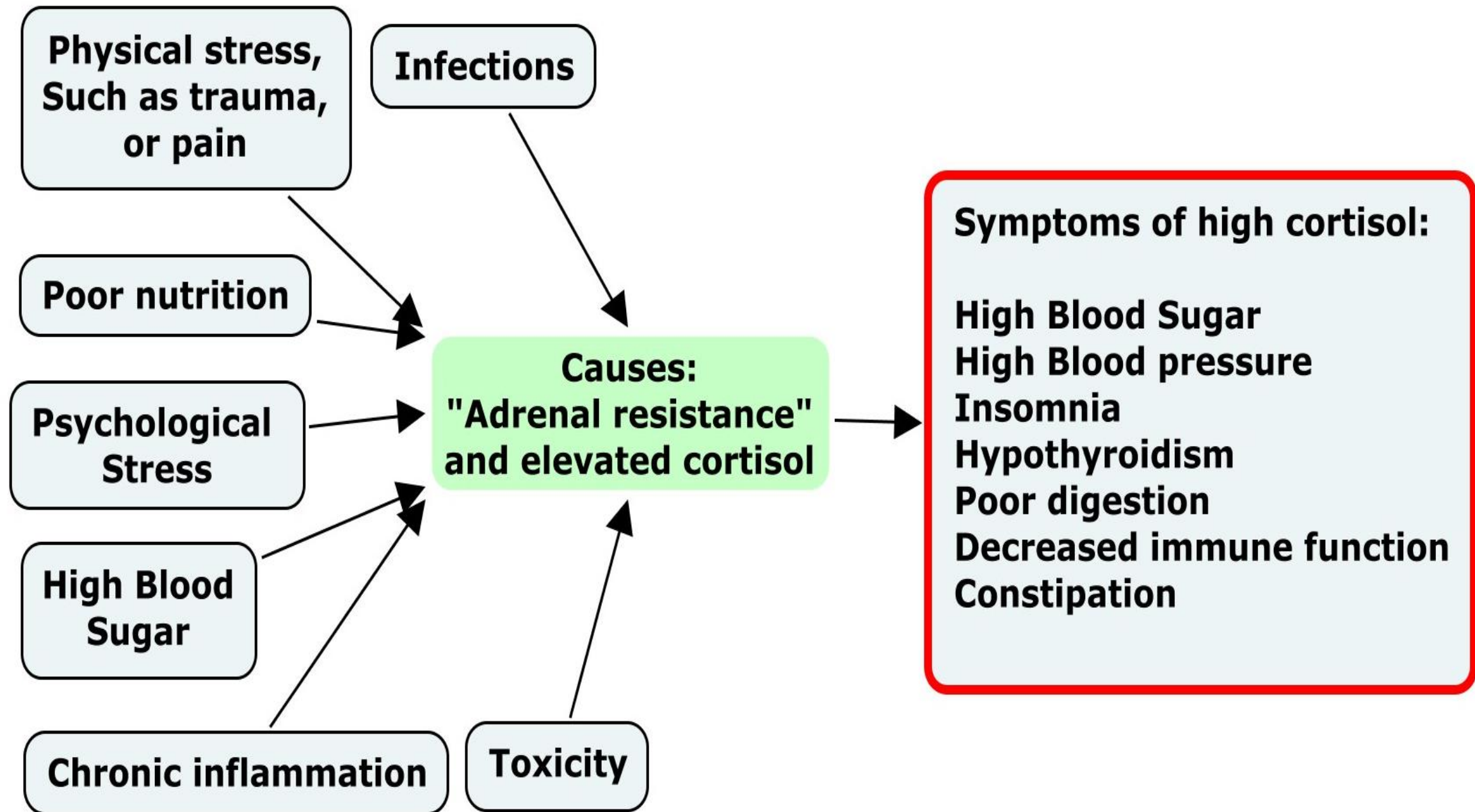


**Eustress = ↑ DHEA
& ± Cortisol**



**Distress = ↑ Cortisol
↓ DHEA**

Adrenal Distress: Vicious Cycle



Adaptogenic Adrenal Support

Rhodiola rosea calus / roseroot rhizome:

- Popular **traditional medicine** in Eastern Europe and Asia
- **Evidence of benefit in...**
 - Decreasing depression
 - Eliminating fatigue
 - Mood regulation
 - Restoring sleep rhythms
 - Improving irritability
 - Unexplained headaches
 - Concentration*



Kelly, Gregory S. Rhodiola rosea: A Possible Plant Adaptogen. *Altern Med Rev* 2001;6(3): 293-302.

Experimental analysis of therapeutic properties of Rhodiola rosea herb and its possible application in medicine. *Medicina (Kaunas)* 2004; 40(7): 614-619.

Adaptogenic Adrenal Support (cont.)

Magnolia plus Phellodendron extracts

- **Patented Magnolia officinalis + Phellodendron amurense extract**
- Magnolia officinalis: Tree native to Asian rain forests
Bark long used for **stress and anxiety control**.
- **Magnolia and phellodendron work together by binding to stress hormone receptors in nervous systems**
 - Support *or* restore cortisol / DHEA hormones balance.
 - Promote relaxation and feelings of well-being*
 - Does not sedate*
 - Reduces stress-related eating



Sufka KJ, et al. Anxiolytic properties of botanical extracts in the chick social separation-stress procedure. *Psychopharmacology (Berl)*. 2001 Jan 1;153(2):219-24.

Living Longer Clinic Study by Dr. Lavalle

Adaptogenic Adrenal Support (cont.)

Perilla Oil and MCTs



- Micellize above ingredients for maximum uptake & chaperoned delivery where needed.
- Perilla Oil is Omega 3 rich; enhances repair
- MCTs *reduce* cell acid load, easy to assimilate & metabolize.

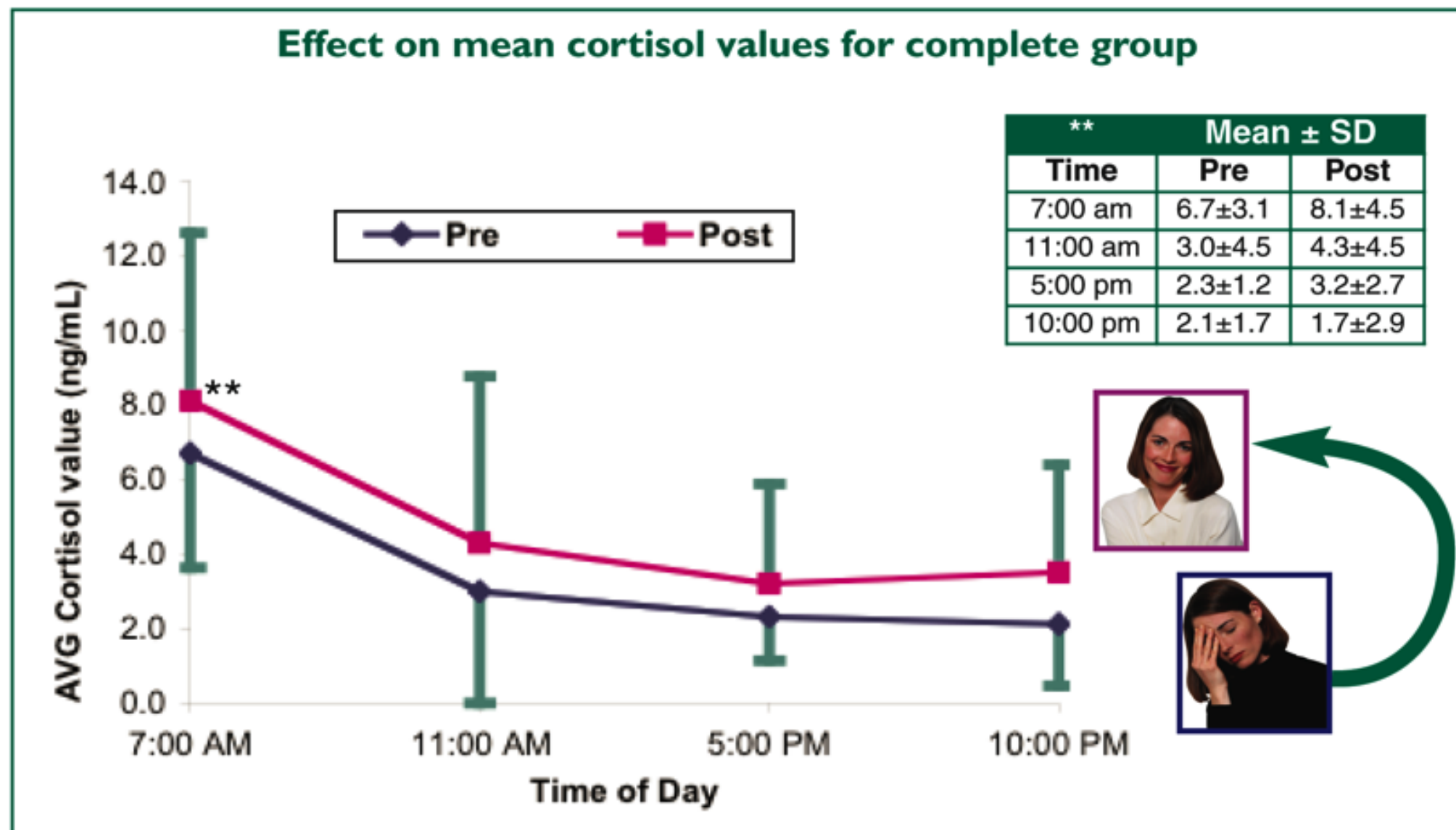
Successful Outcome Results

Adrenal Support

- Results from six (6) weeks on Cortisol / DHEA levels & rhythm
- Non-invasive, saliva free = blood (plasma) hormone levels
- Measure 7 AM, 11 AM, 5 PM & 10 PM
- Pre- & post- evaluations

Balance Stress Hormones

Better Cortisol Rhythms after just 6 weeks on Adrenal Support Product



21st Century Adrenal Balance

- Relief for stress tax from high tech living
- Avoids afternoon “crash”
- Repairs HPA axis, *naturally*
- Restores sleep, improves energy level
- Combats food cravings & uncontrollable binges
- Rebuilds immunity, tolerance, resilience



Cortisol / DHEA rhythm changes = Healthier balance

Stress and Pituitary Activity



Hormones and restorative sleep

- Growth Hormone, Prolactin, LH, Oxytocin
- Thyroid: TSH, Free T3, Free T4 \pm rT3
- Adrenal: ACTH, Cortisol / DHEA

Stress affects sleep & vice versa

Lack of Restorative Sleep

- Impaired resilience, endurance, output
- Suppressed immune defense & repair
- Memory problems
- Cardiac issues e.g., hypertension, AFib
- Poor weight control

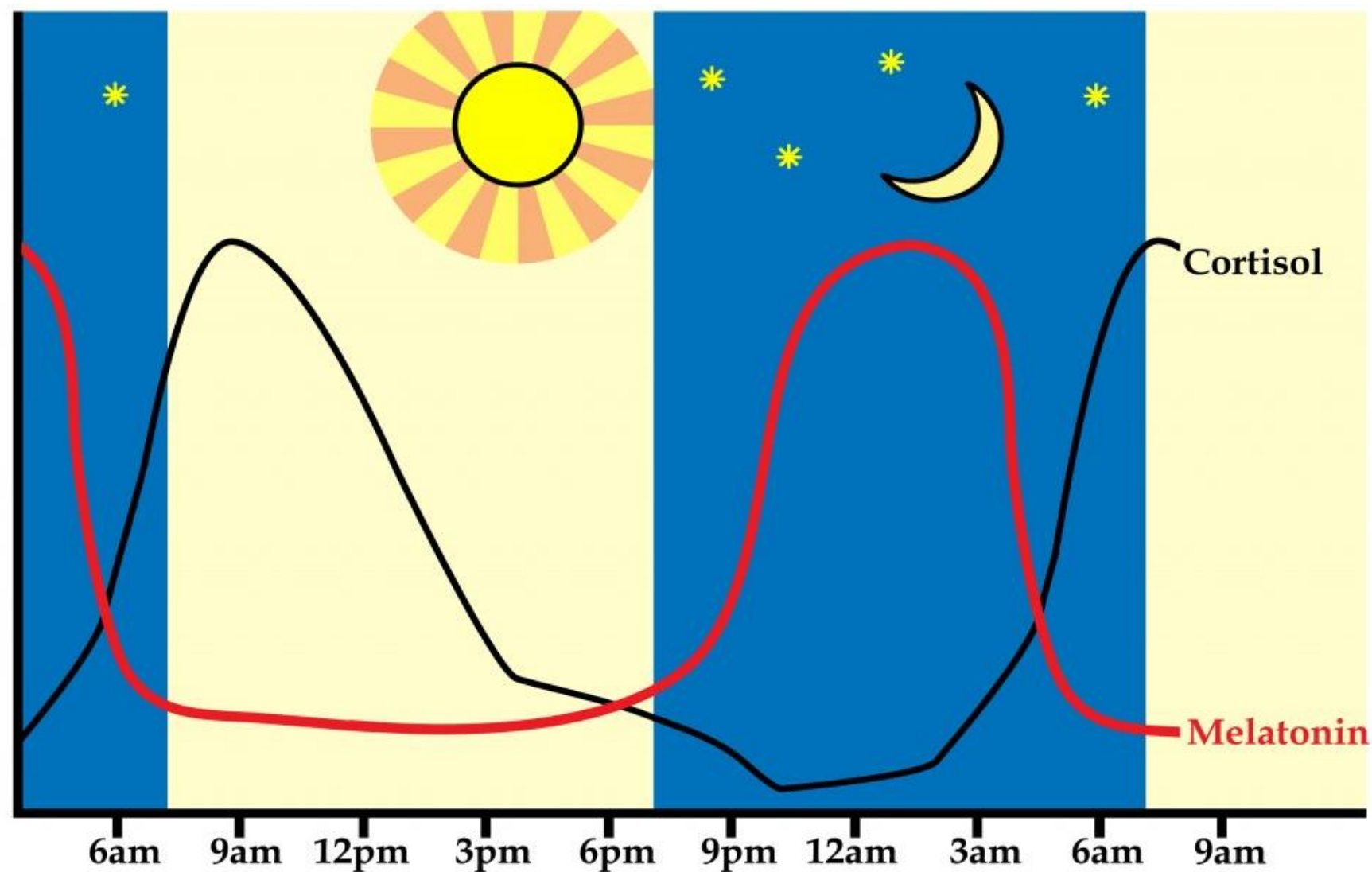


~60 million Americans suffer from sleep related issues

Sleep Disorders and Sleep Deprivation: An Unmet Public Health Problem. HR Colten, BM Altevogt. Institute of Medicine (US) Committee on Sleep Medicine and Research. Washington (DC): National Academies Press (US); 2006. ISBN-10: 0-309-10111-5

Circadian Rhythms and Sleep

Adrenal hormones: Cortisol / DHEA & adrenaline
lower at night for restful sleep.



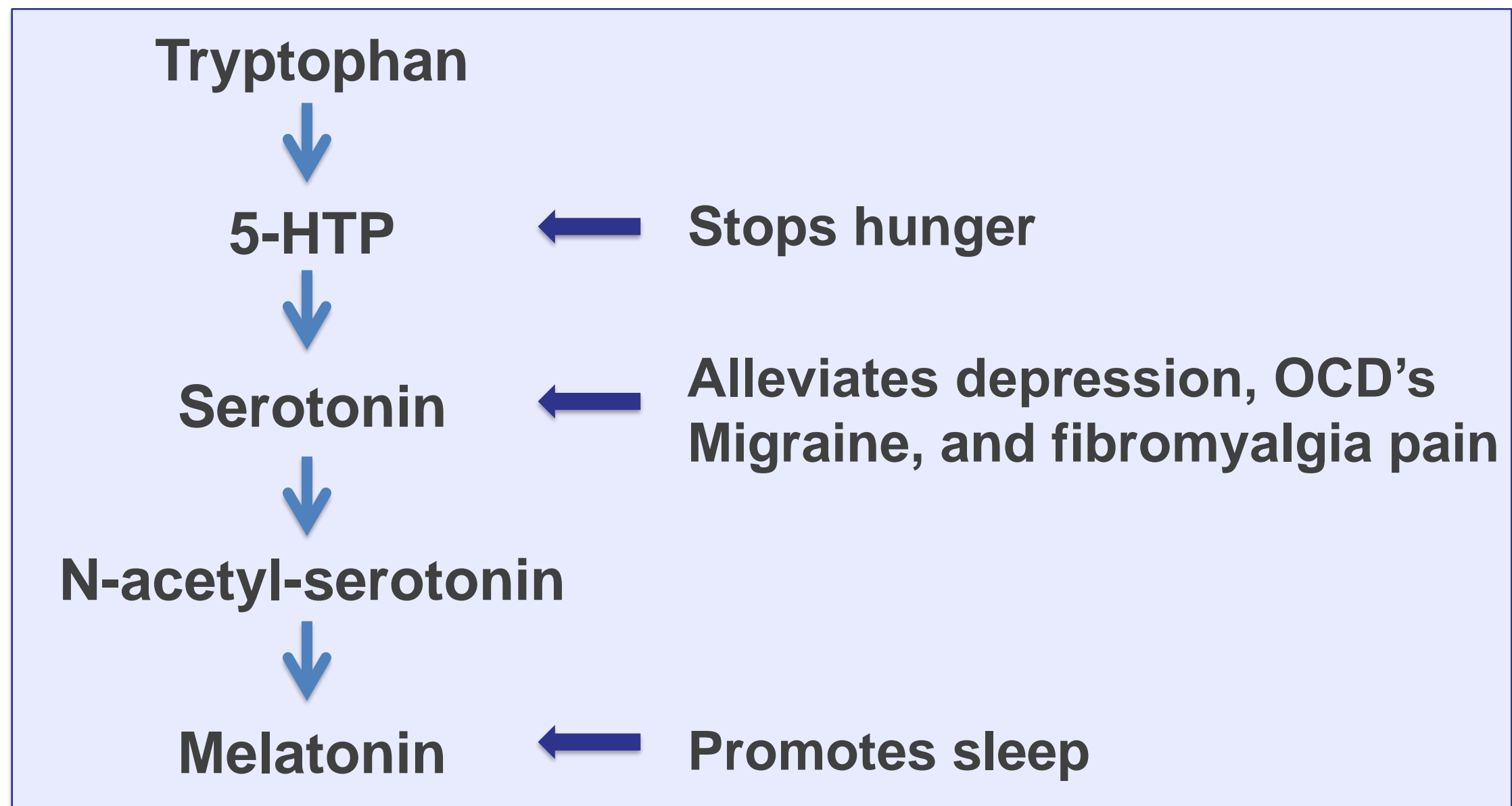
Circadian Rhythms and Sleep

A rise in serotonin with conversion to melatonin, and a concurrent fall in cortisol and adrenaline is *required* to transition into sleep.



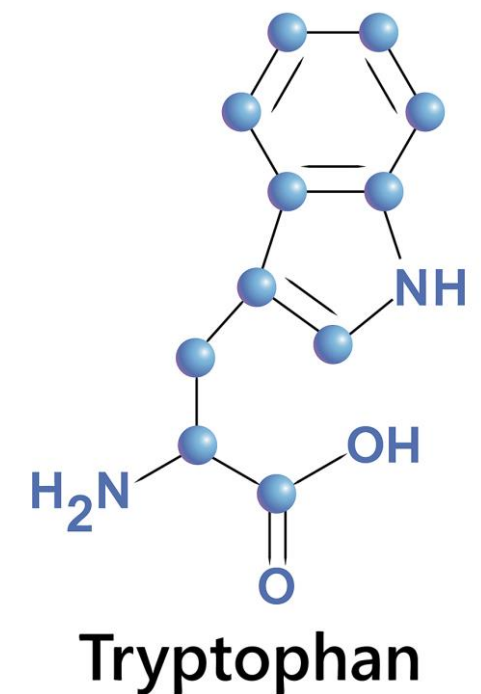
Sleep Cycle: Tryptophan is Source

Effectively converts to serotonin and then melatonin in CNS/GNS



Tryptophan, Essential Amino Acid

- Enhances melatonin production
- Stabilizes circadian rhythms
- Improves relaxation and mood balance
- Increases “delta wave deep sleep”
- No grogginess/brain fog upon waking



Schneider-Helmert D, Spinweber C L, Evaluation of L-tryptophan for treatment of insomnia: a review. *Psychopharmacology*, 1986. 89(1): 1-7.

Tryptophan/5 HTP

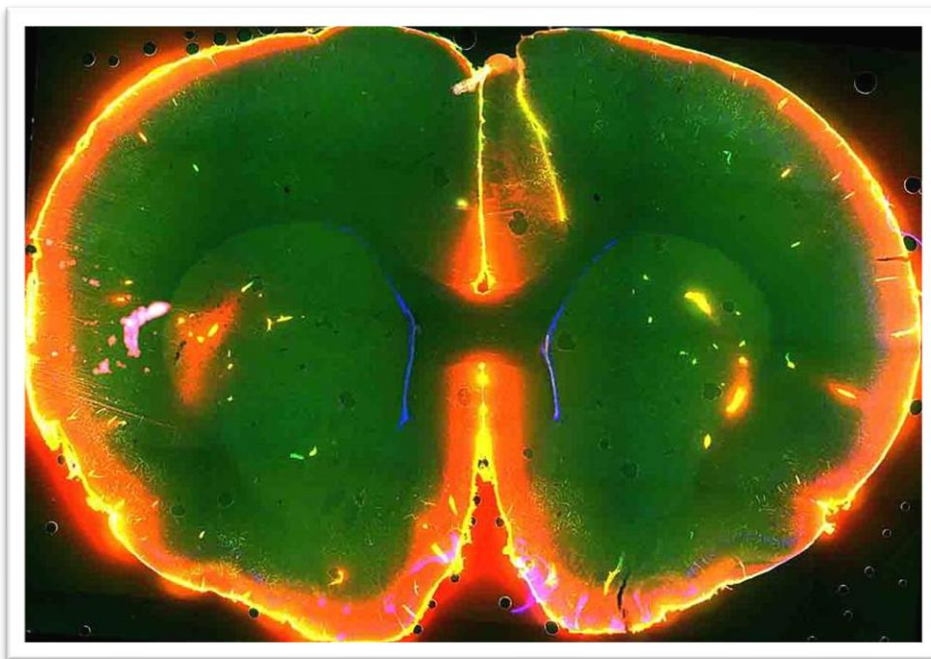
	Tryptophan	5 HTP
	Starting substrate	Downstream metabolite
Conversion to serotonin/melatonin	Needs to cross BBB	Needs to cross BBB
Alternate pathways	NAD/NADP, Niacin	Only serotonin
Absorption	Optimum when taken on empty stomach & with Vitamin B6, Zn	Quick uptake & metabolism to quinolinic excitotoxins
Long term use	Safer/healthier/sustained	Mostly short term
Drug interaction	Few	More

Hinz M, Stein A, Uncini T. Relative nutritional deficiencies associated with centrally acting monoamines. *Int J Gen Med.* 2012;5:413–430.

Marty Hinz, Alvin Stein, Thomas Uncini. 5-HTP efficacy and contraindications. *Neuropsychiatr Dis Treat.* 2012; 8: 323–328.

Detoxification and Sleep: Interrelated

Sleep cleanses the brain

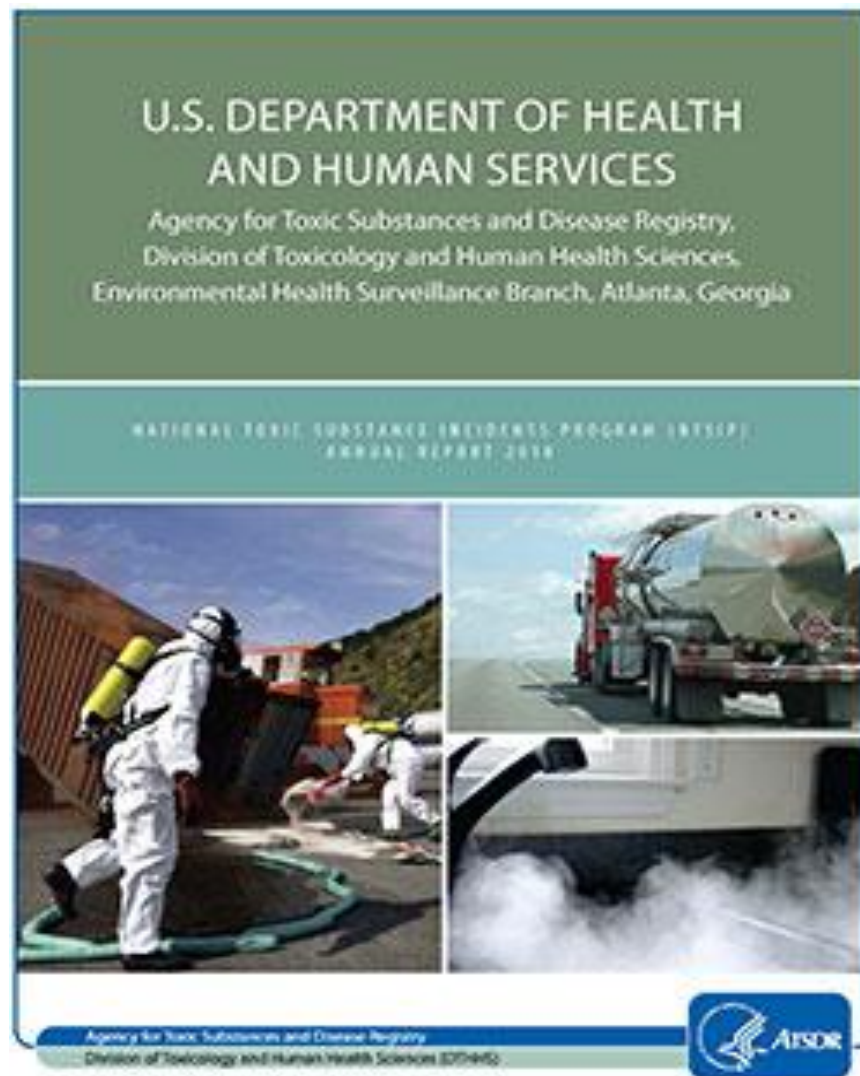


However, presence of toxins affects the normal hormonal cycle necessary for sleep.

*A good night's rest
literally clears the mind*

Xie et al "Sleep initiated fluid flux drives metabolite clearance from the adult brain." *Science*, October 18, 2013. DOI: 10.1126/science.1241224

Functional Detoxification Need



2000 v 1900: Industrial chemicals >15-fold
(↑ 1500%!)
All pregnant women (US) exposed to 43+ xenotoxins

Board of Governors of the Federal Reserve System. Industrial capacity and capacity utilization. G.17 (419). Washington, DC: Board of Governors of the Federal Reserve System; 2013. <http://www.federalreserve.gov/>

Woodruff TJ, Zota AR, Schwartz JM. Environmental chemicals in pregnant women in the United States: NHANES 2003-2004. *Environ Health Perspect* 2011;119:878-85

BioDetox Super Foods

Garlic, ginger, onions, broccoli sprouts, eggs

GGOBE, Sulforaphane, IP6, minerals



Glutamine recycled **by PAK** cell energy repair

Jaffe, R. Diabetes as an Immune Dysfunction Syndrome. *In: Watson RR, Preedy VR, Eds. Bioactive Food as Dietary Interventions for Diabetes, Academic Press, 2013, 41-52.*

Individual Ascorbate Based on Oxidative Stress

Ascorbate Calibration

± Probiotics, recycled Glutamine, Mg, Polyphenolics

Healthy

- 1.5 grams; ½ tsp
- Every 15 min
- 6 grams / hour

Moderate Ills

- 3 grams; 1 tsp
- Every 15 min
- 12 grams / hour

Chronic Ills

- 6 grams; 2 tsp
- Every 15 min
- 24 grams / hour

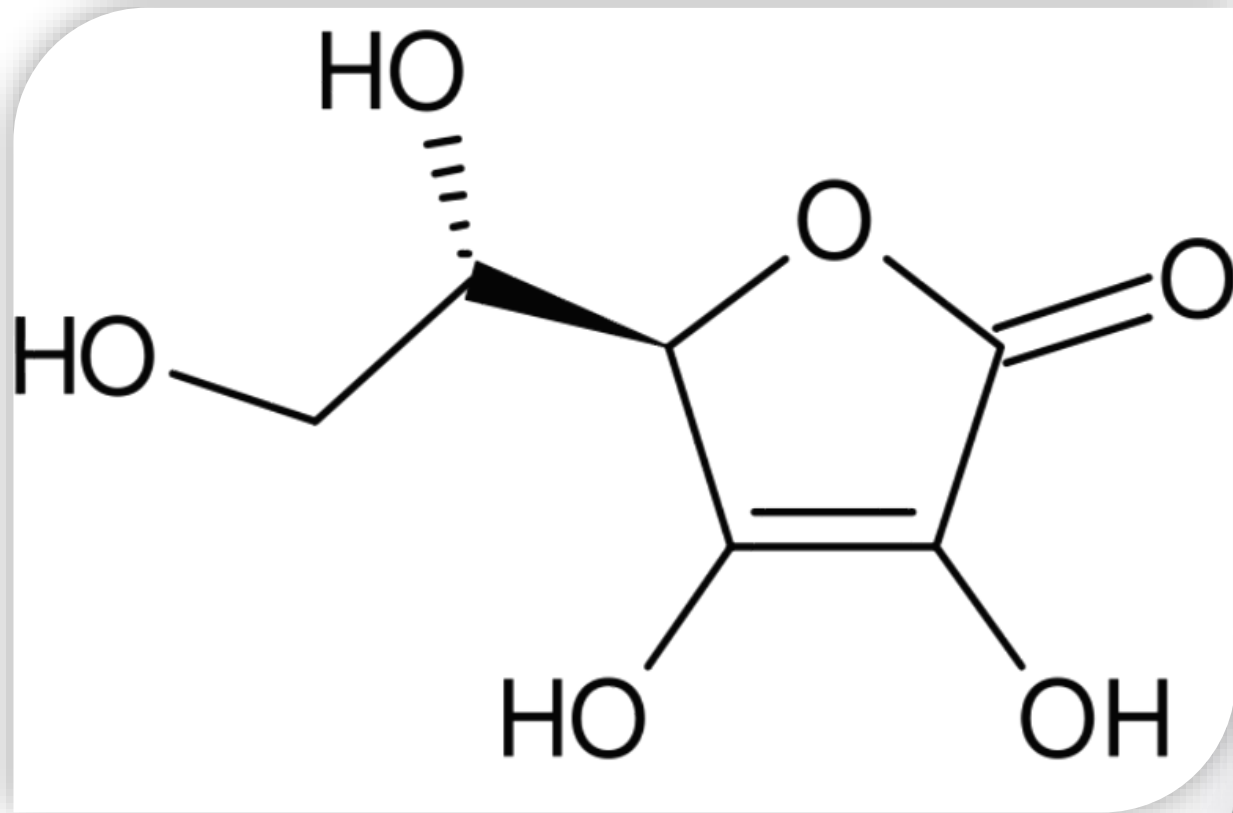
Health Studies Collegium, Joy in Living The Alkaline Way, 20th ed. 1990-2015.

Wintergerst ES, Maggini S, Hornig DH. Immune-enhancing role of vitamin C and zinc and effect on clinical conditions. *Ann Nutr Metab*. 2006;50(2):85-94.

Level of Evidence III and IV

Ascorbate: Toxic Mineral Excretion

Pump toxins out more safely...



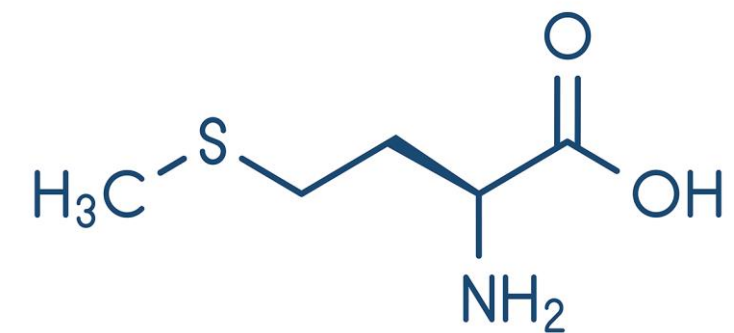
1 gm ascorbate =
1,000,000 mcg;
~0.01% can bind ToxMin =
1,000 mcg ascorbate binds
~0.1 μ mol ToxMin =
~10 mcg ToxMin / gm Asc

Daily ToxMin exposure =
~2 gm ascorbate/day to
safely protect & excrete

Mood and Sleep Relationship

Methionine

- Reduces *excito-neurotoxins*; mind less jumpy, better able to relax into sleep, reduces depression/anxiety; healthy methylation
- L- methionine preferred to SAMe
 - less expensive
 - more stable
 - functional



methionine

Simon N. Young and Marjan Shalchi. The effect of methionine and S-adenosylmethionine on S-adenosylmethionine levels in the rat brain. *J Psychiatry Neurosci* 2005 Jan; 30(1): 44–48.

Mood and Sleep Relationship



Glycine

- Enables more restful sleep
- Supports healthy serotonin levels
- Helps normalize circadian rhythms
- Decreases fatigue; improves mental clarity

Glutamine: *Always* recycled

- Stress, depression & anxiety; Increases GABA

Brooks, P. and J. Peever. “Unraveling the mechanisms of REM sleep atonia”. *Sleep* Vol. 31, No. 11 (2008): 1492–1497.

Zulley, J., R. Wever, and J. Aschoff. “The dependence of onset and duration of sleep on the circadian rhythm of rectal temperature”. *Pflügers Archiv* Vol. 391 (1981): 314–318.

Kawai, N., M. Bannai, and M. Takahashi. “Glycine decreases core body temperature and increases cutaneous blood flow via NMDA receptors in rats”. *Neuroscience* 2009, Abstract.

Young, L.S., Bye, R., Scheltinga, M., Ziegler T.R., Jacobs, D.O. & Wilmore, D.W. (1993) Patients Receiving Glutamine-Supplemented Intravenous Feedings Report an Improvement in Mood, *Journal of Parenteral and Enteral Nutrition*, 17 (5): 422-427.

Restorative Sleep – It's a Choice



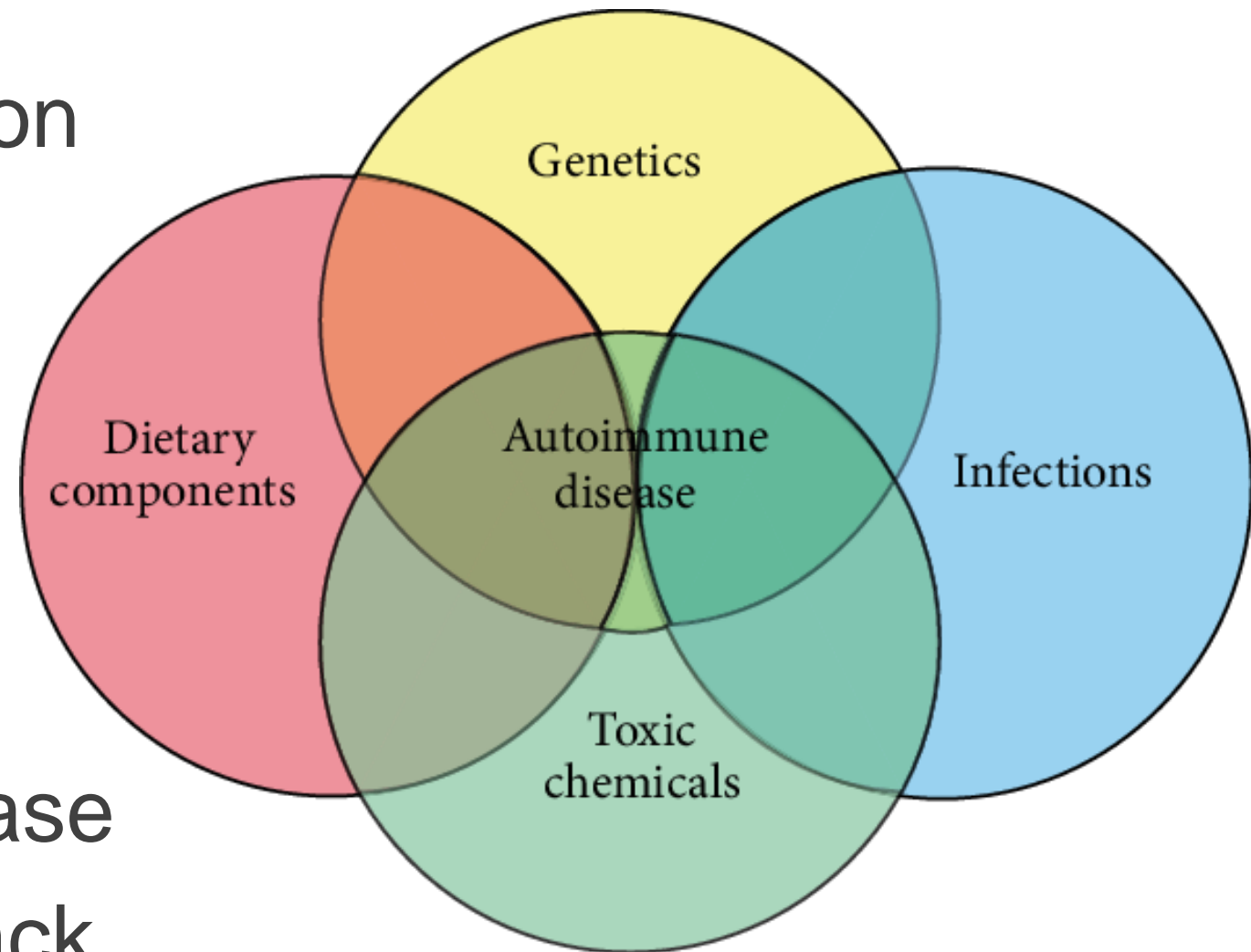
- Salt/soda bath for 20 min
½ cup each Epsom salts + baking soda
- Abdominal breathing for 5 min
- Dichromatic green lights:
positively affect deep brain structures & chemical pathways
- No electronics policy; power down
- No PM caffeine/heavy meals
- Tryptophan, Mg, Vitamin B6

Ben Carter, Philippa Rees, Lauren Hale. Association Between Portable Screen-Based Media Device Access or Use and Sleep Outcomes. A Systematic Review and Meta-analysis. *JAMA Pediatr.* 2016;170(12):1202-1208.

Klotsche C, Color Medicine: The secrets of color/vibrational healing, Light Tech Pub, 1993

Autoimmune Common Conditions

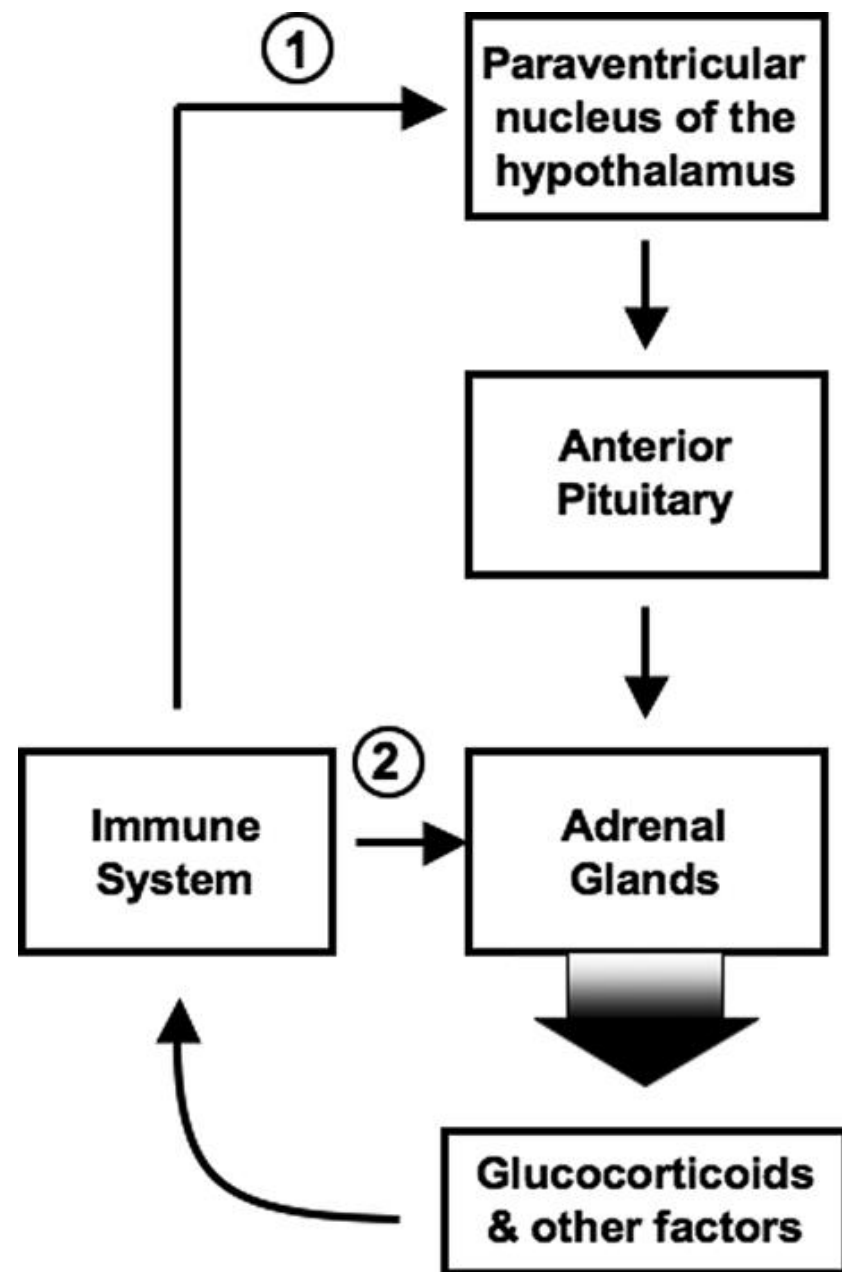
- Becoming more common
- Affects > 23.5 million Americans;
80% women
- >80 diseases
- Autoimmunity different from autoimmune disease
- Tolerance lost; self-attack



<https://www.womenshealth.gov/a-z-topics/autoimmune-diseases>

Vojdani, Aristo & Pollard, Kenneth & Campbell, Andrew. (2014). Environmental Triggers and Autoimmunity. Autoimmune diseases. 2014. 798029.

Adrenal Immune Connection



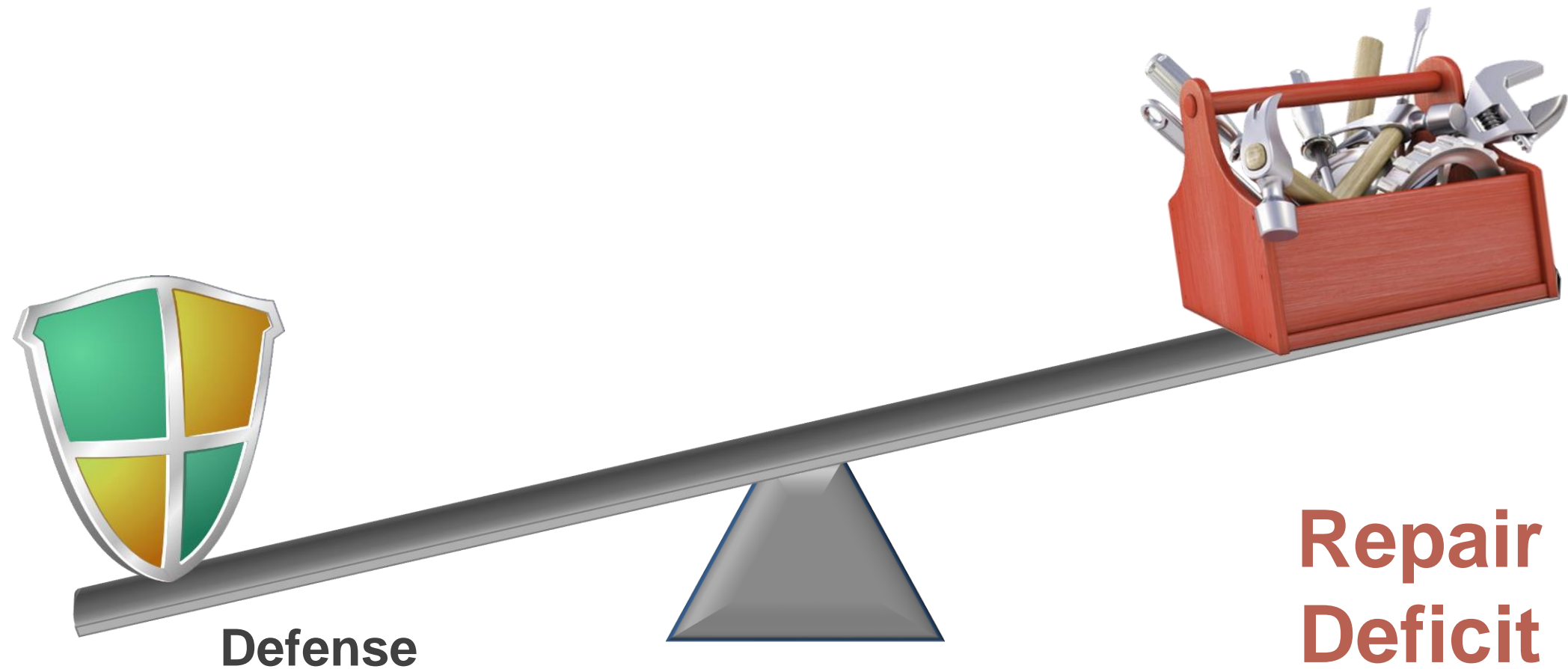
Chronic stress

- Lowered circulating cortisol and/or a dysfunctional HPA axis
- Affects immune system negatively -diminished cytokine regulation
- Increased inflammation
- Dissociation between plasma concentrations of ACTH and glucocorticoids seen after immune challenge

Glucocorticoids & catecholamines regulate

- cytokine expression
- immune cell activation
- bacterial proliferation

Overburdened Immune System



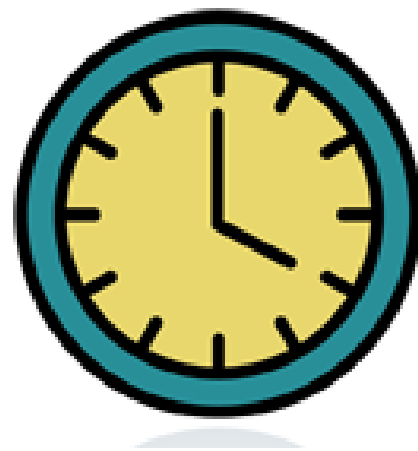
Immune dysfunction

Critical need to tune up immune system *now!*

Hidden Immune Burdens

Delayed hypersensitivities/allergies hard to find.
Symptoms occur...

**3
Hours**



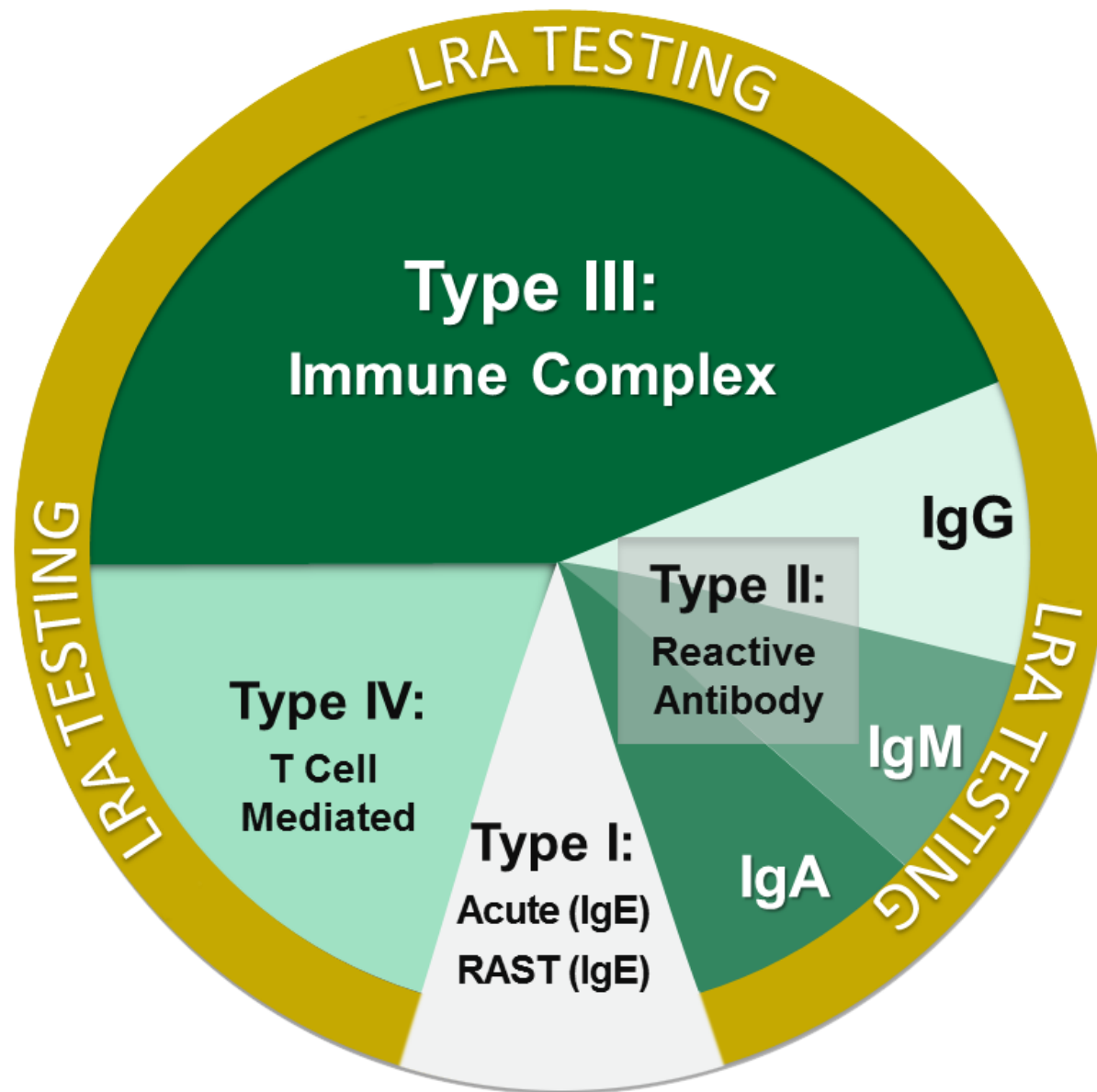
**to 3
Weeks**



After exposure

Symptoms often not specific... **reactors** drain vitality; unwell; **'get up and go, got up and went'**

Hypersensitivity/Allergy Types



Immediate Allergies

Type I: Acute, RAST (IgE) Histaminic

Delayed Allergies

Type II: Reactive Antibody; B-Cell

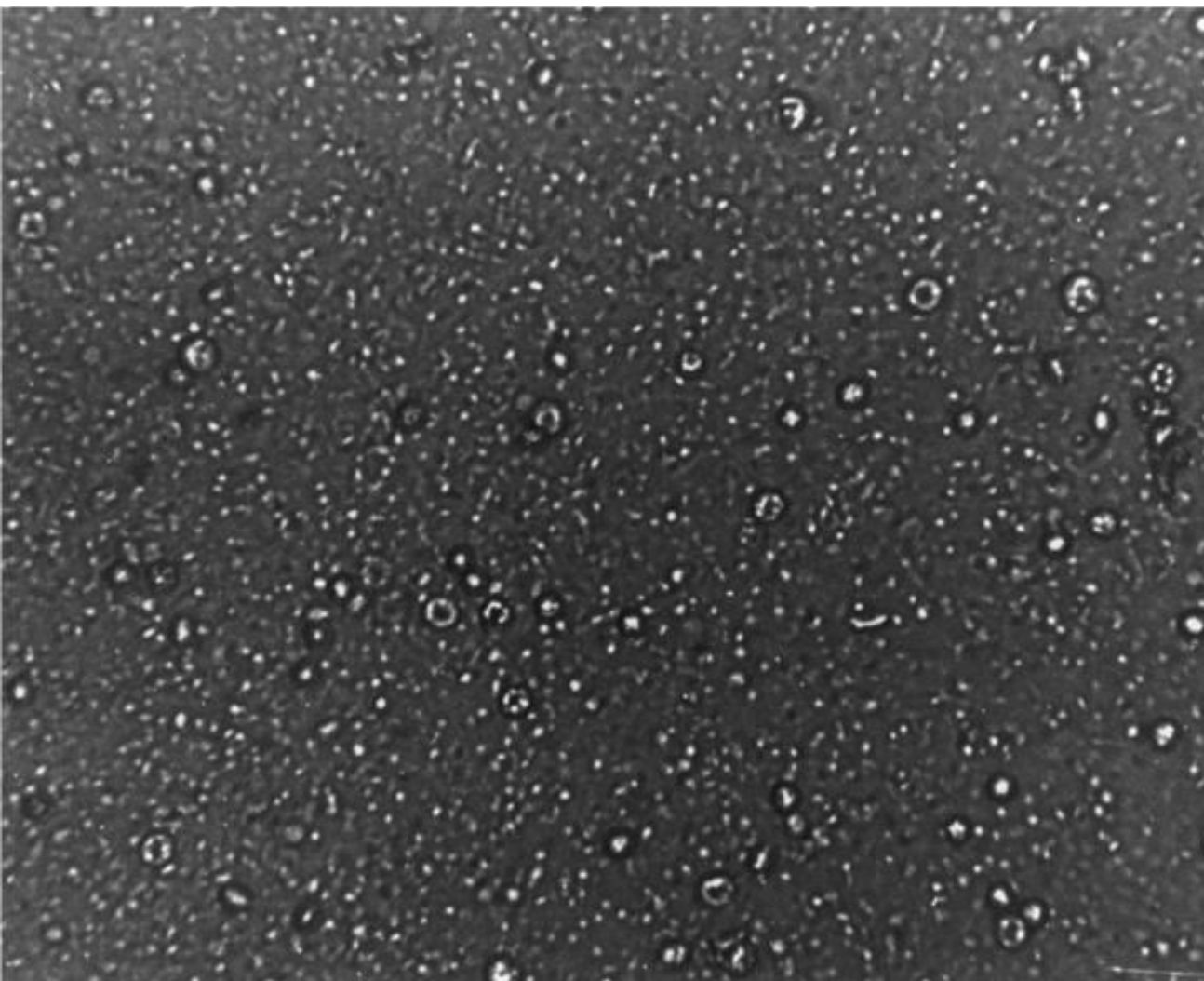
Type III: Immune Complex; vasculitis

Type IV: T-Cell Mediated

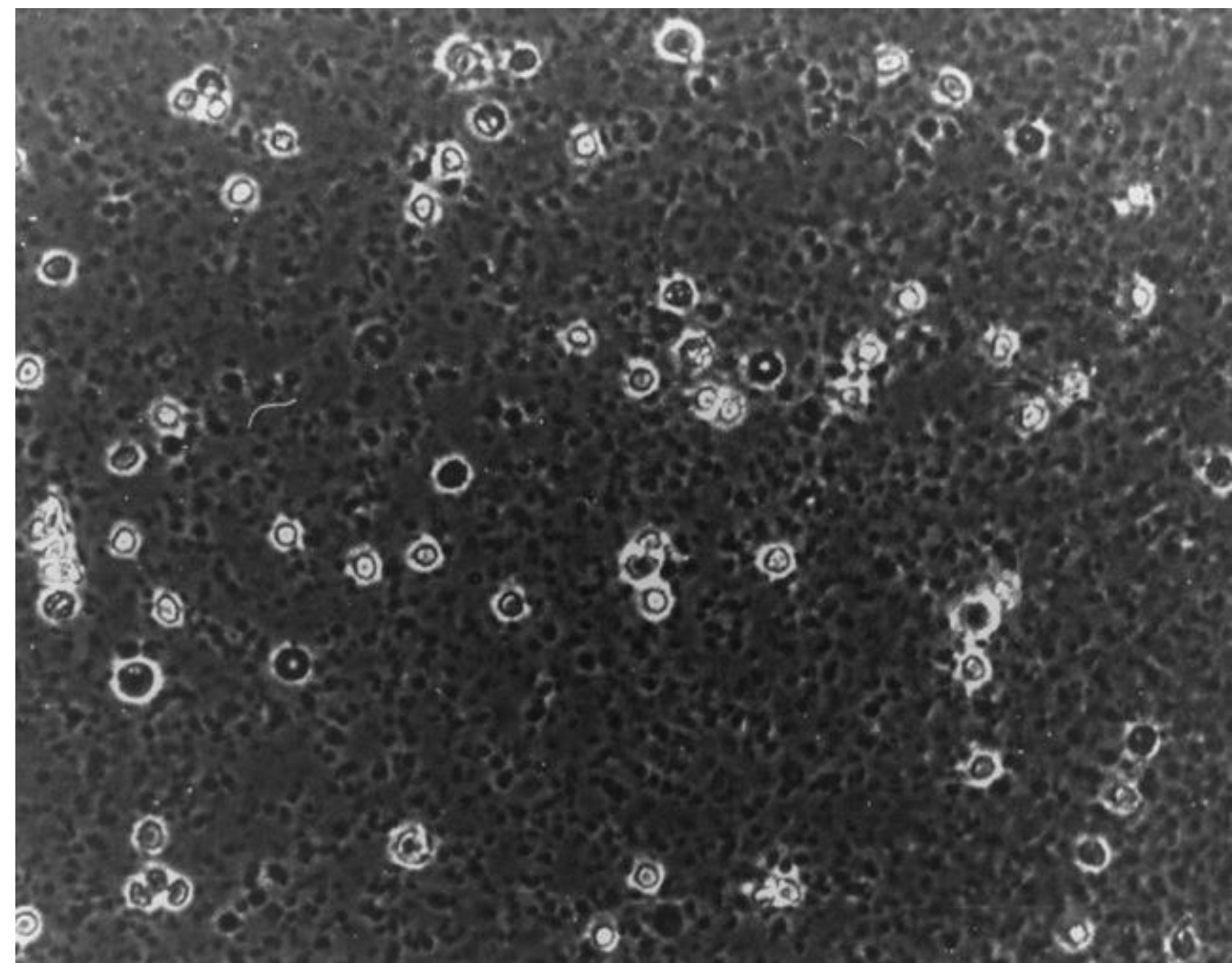
**Delayed/hidden allergies
HARD to identify by
history / serology**

LRA Cell Culture Tests

**Non-reactive
lymphocytes**



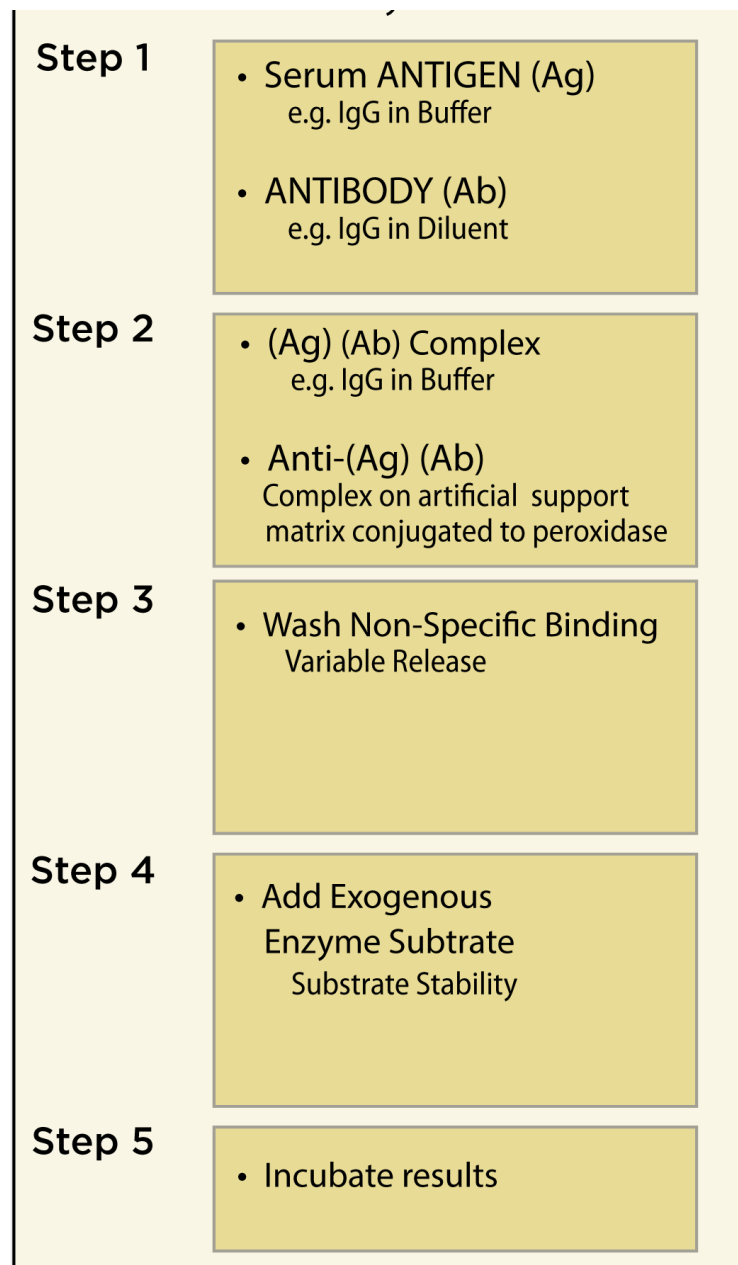
**Reactive
lymphocytes**



Olympus SC35 Magnification 600x

Standard ELISA vs LRA

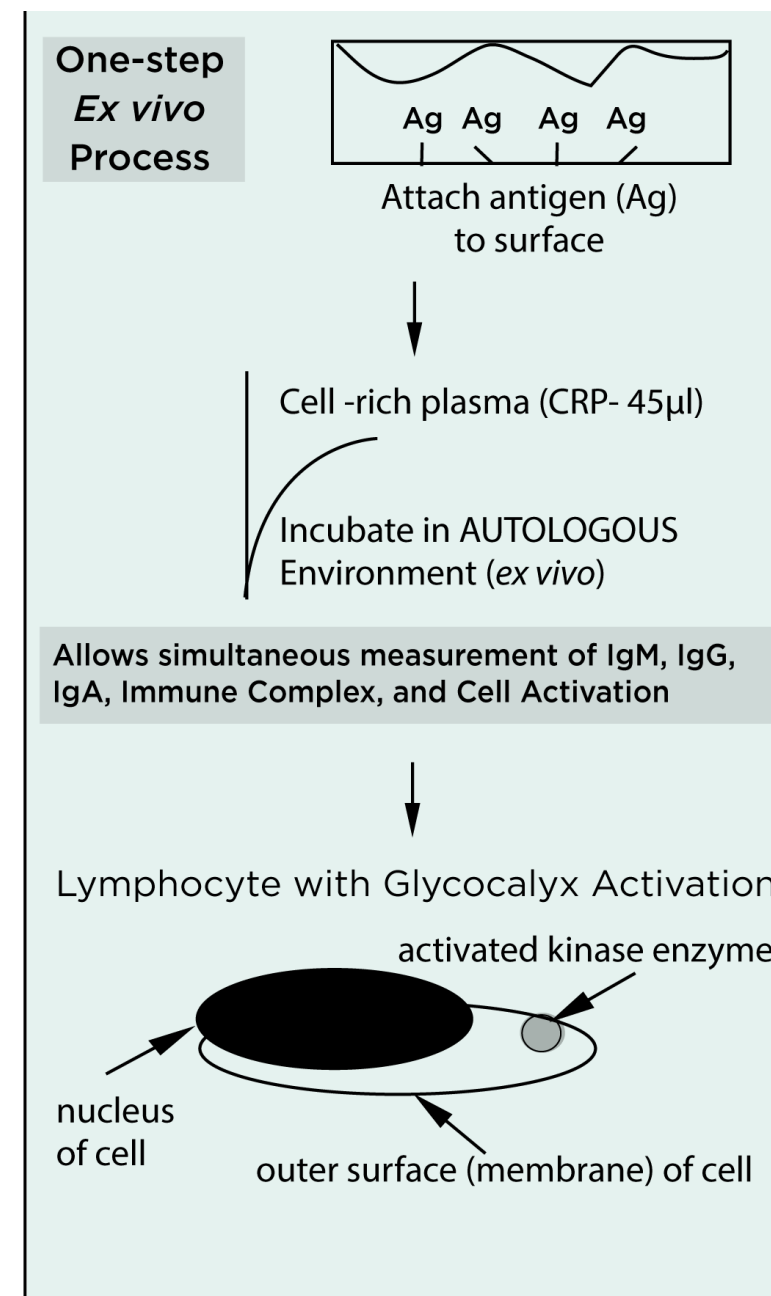
Standard ELISA IgG Test



3-4%
variance
introduced
per step

**15 – 20 %
Variance**

LRA



Single Step

**<3 %
Variance on
Consecutive
Split
Samples**

LRA Split Sample Reproducibility

LRA cell cultures are reproducible with a variance of less than 3% for over 30 years on consecutive blind split samples – consecutive data shown in Table 1 presented at the American Society for Investigative Pathology (ASIP) conference in 2016.

# items tested	# items matched	# items unmatched	(%) items matched	(%) items unmatched	Time (years)
4138	4050	88	97.60±3.0	2.25±2.75%	2011-14

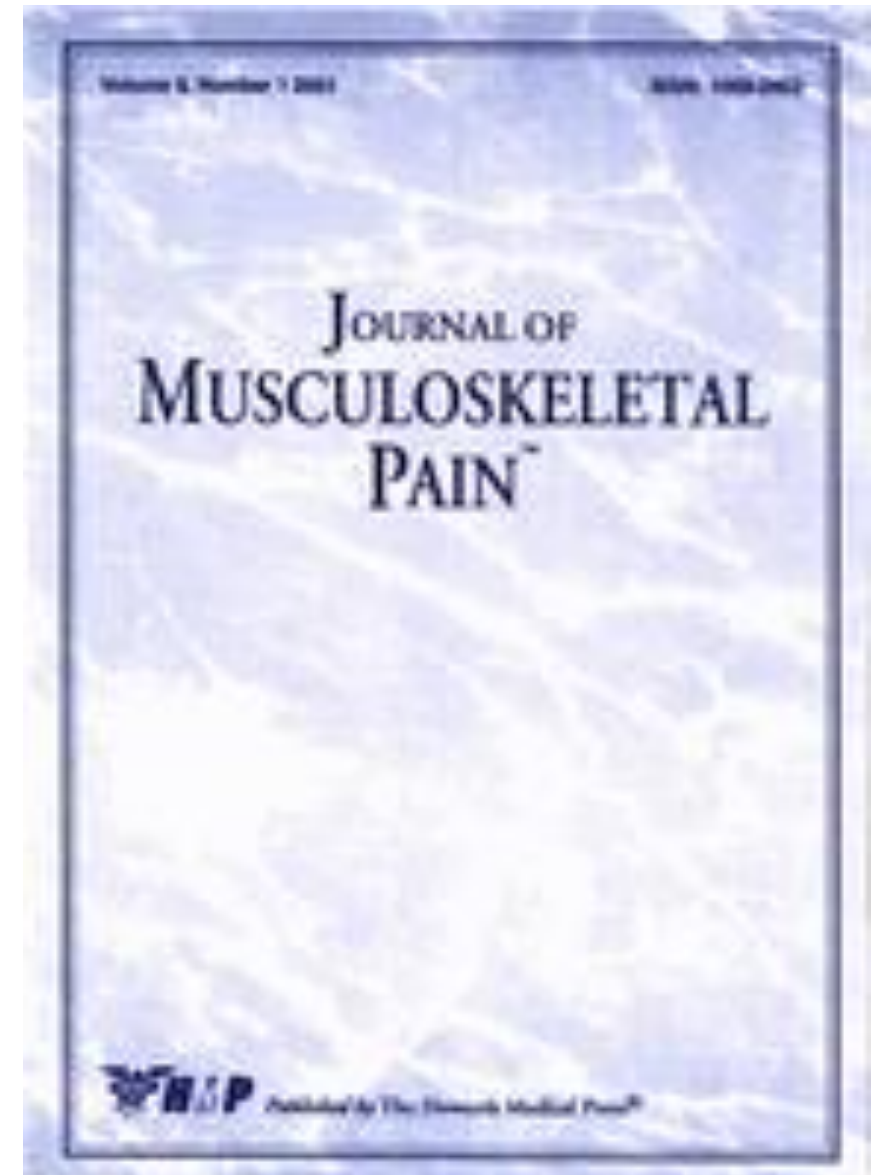
Table 1. Consecutive blind split Lymphocyte Response Assay (LRA) samples showing high split sample reproducibility.

AE Lynch, R Jaffe, “*Lymphocyte Response Assay: Report on Precision of Novel Cell Culture Test, Experimental Biology*,” Poster at the American Society for Investigative Pathology conference, San Diego, CA, 2016.

Multiple Successful Outcome Studies

“A Novel Treatment for Fibromyalgia Improves Clinical Outcomes in a Community-Based Study”

- 50% less pain
- 70% less depression
- 50% more energy
- 30% less stiffness

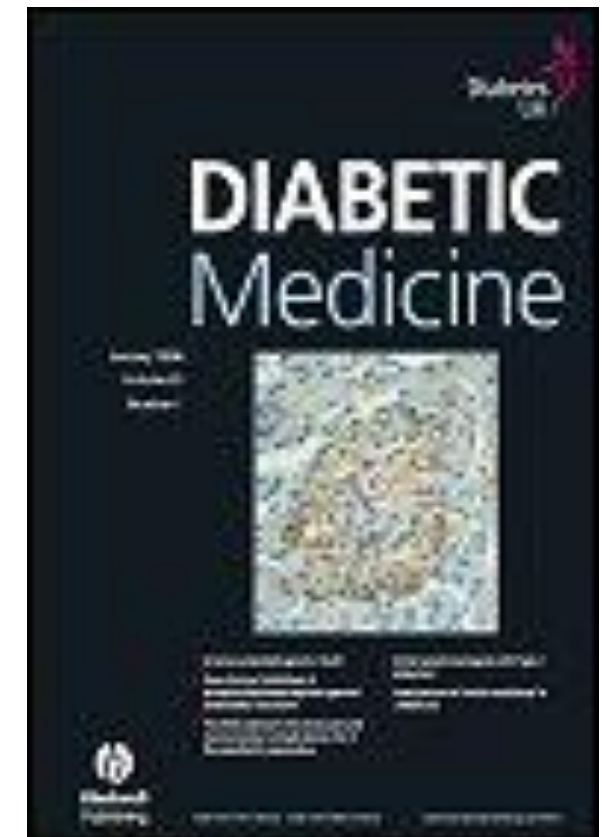


Jaffe RM, Deuster PA. A Novel Treatment of Fibromyalgia Improves Clinical Outcomes in a Community-Based Study. *Journal of Musculoskeletal Pain*, Vol. 6, No. 2.

LRA: Successful Diabetes Studies

“Tolerance loss in diabetics:
Link with foreign antigen exposure”

- >1 % ↓ in HbA1C levels in both Type 2 & Type 1 diabetes
- 18% reduction of insulin levels in Type 2 diabetes



70,000+ Cases 30+ years
Patient & Practitioner Case Successes

Jaffe R, Mani J, DeVane J, Mani H. Tolerance loss in diabetics: Association with foreign antigen exposure.
Diabetic Medicine: Journal British Diabetic Association 2006 Aug; 23(8): 924-925.

LRA Immune Enhancement Program

- Personalized recommendations based on **Health Assessment Questionnaire (HAQ)**:
 - Supplements
 - Activity & environment recommendations
 - Rotation diet option
- Joy in Living:
The Alkaline Way
EVOKE HEALING!

Health Assessment Questionnaire for Determining Supplement Protocols

PATIENT'S NAME: _____ DATE: _____

HEALTH PRACTITIONER'S NAME: _____

INSTRUCTIONS: Use the following numbers to indicate the degree of severity of the symptoms or conditions listed below.
0 - None 1 - Mildly or least 2 - Moderately or mid 3 - Greatly or most
Answer only those questions that apply to your case; do not write "NO" when a question does not apply.
IF ONLY PART OF THE QUESTION APPLIES, UNDERScore THAT PART.

I. GASTROINTESTINAL INDICATIONS

Section A

0 1 2 3	Distress from fats or greasy foods (nausea, dizziness, headaches, etc.).
0 1 2 3	Distress from onions, cabbage, radishes, cucumbers (bloating, gas, etc.).
0 1 2 3	Stool appears yellow or clay-colored, is foul-odored, shows undigested foods.
0 1 2 3	Skin is grayish, pasty, oily on nose and forehead.
0 1 2 3	Have had jaundice, hepatitis.
0 1 2 3	Bad breath, bad taste in mouth, body odor (including feet).
0 1 2 3	Unusual redness on palms of hands.
0 1 2 3	Unaccountable burning on soles of feet.
0 1 2 3	Varicose veins, hemorrhoids ("piles"), phlebitis, veins showing on chest or stomach (blush areas).
0 1 2 3	Able to go all day without urinating.
0 1 2 3	Long history of ...

loating, sourness, etc.).

anemia.

vels "too loose or too tight").

nd is relieved by drinking milk or cream.
(seasonal occurrence).

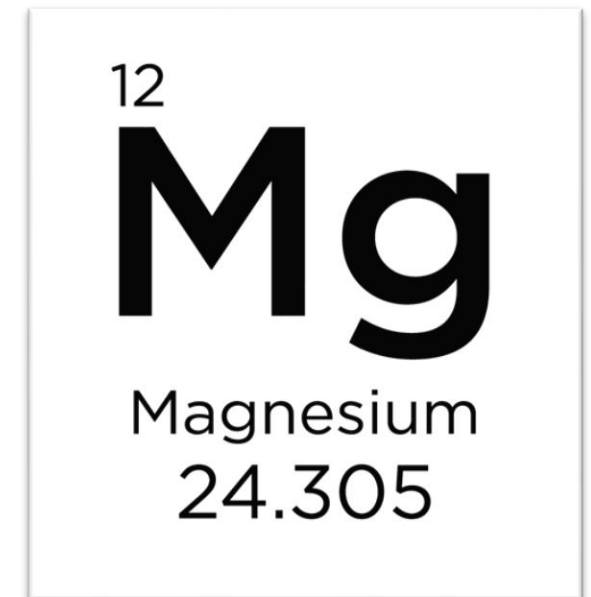
ved by vacationing.

sensations in stomach.



Magnesium: Nature's Stress Buster

- HPA axis regulation
 - Reduces ACTH
 - Better Cortisol / DHEA balance
 - Less stress hormones cross blood brain barrier
- Reduces systemic inflammation (repair deficit)
- Protects brain from depression



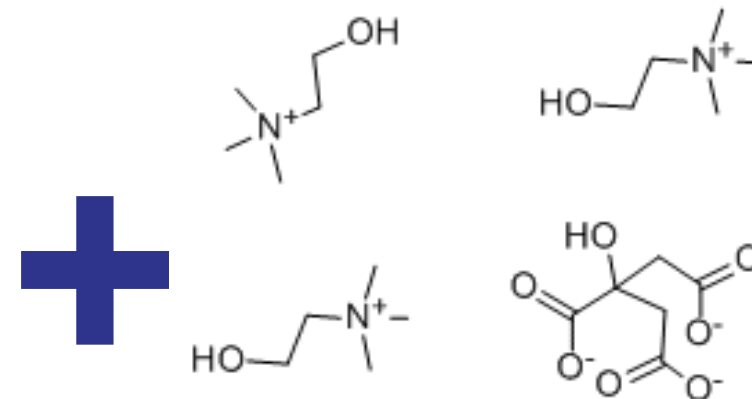
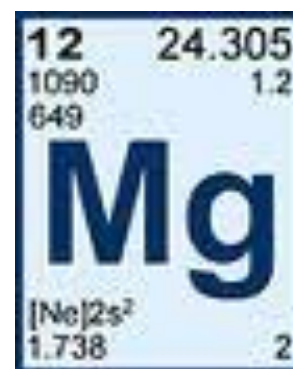
Kyu In Jung, Sun Myeong Ock, Ju Hye Chung, Chan Hee Song. Associations of Serum Ca and Mg Levels with Mental Health in Adult Women Without Psychiatric Disorders *Biological Trace Element Research*. February 2010, 133(2) 153–161.

Fromm L, Heath DL, Vink R, Nimmo AJ. Magnesium attenuates post-traumatic depression/anxiety following diffuse traumatic brain injury in rats. *J Am Coll Nutr*. 2004 Oct;23(5):529S-533S.

Magnesium, Mg⁺⁺

Mg uptake enhanced w/
Choline Citrate:
220-880+ Mg/d elemental
magnesium

Mg⁺⁺ displaces toxic
minerals, protects fats...
Choline → acetylcholine,
cholinergic bile
Citrate → energizes &
alkalinizes



THE PERIODIC TABLE

Magnesium (Mg)

1 H 1.008 Hydrogen	2 He 4.003 Helium																	18 Ar 39.948 Argon													
3 Li 6.941 Lithium	4 Be 9.012 Beryllium																	19 K 39.098 Potassium	20 Ca 40.078 Calcium												
5 B 10.811 Boron	6 C 12.011 Carbon	7 N 14.007 Nitrogen	8 O 15.999 Oxygen	9 F 18.998 Fluorine	10 Ne 20.180 Neon																	36 Kr 83.798 Krypton									
11 Na 22.990 Sodium	12 Mg 24.305 Magnesium	13 Al 26.982 Aluminum	14 Si 28.086 Silicon	15 P 30.974 Phosphorus	16 S 32.065 Sulfur	17 Cl 35.453 Chlorine	18 Ar 39.948 Argon	37 Rb 85.468 Rubidium	38 Sr 87.62 Strontium	39 Y 88.906 Yttrium	40 Zr 91.224 Zirconium	41 Nb 92.906 Niobium	42 Mo 95.94 Molybdenum	43 Tc 98 Technetium	44 Ru 101.07 Ruthenium	45 Rh 102.91 Rhodium	46 Pd 106.42 Palladium	47 Ag 107.87 Silver	48 Cd 112.41 Cadmium	49 In 114.82 Indium	50 Sn 118.71 Tin	51 Sb 121.76 Antimony	52 Te 127.60 Tellurium	53 I 126.91 Iodine	54 Xe 131.29 Xenon						
55 Cs 132.91 Cesium	56 Ba 137.33 Barium	57 La 138.91 Lanthanum	58 Ce 140.12 Cerium	59 Pr 140.91 Praseodymium	60 Nd 144.24 Neodymium	61 Pm 145 Promethium	62 Sm 150.36 Samarium	63 Eu 151.96 Europium	64 Gd 157.25 Gadolinium	65 Tb 158.93 Terbium	66 Dy 162.50 Dysprosium	67 Ho 164.93 Holmium	68 Er 167.26 Erbium	69 Tm 168.93 Thulium	70 Yb 173.05 Ytterbium	71 Lu 174.97 Lutetium	72 Hf 178.49 Hafnium	73 Ta 180.95 Tantalum	74 W 183.85 Tungsten	75 Re 186.21 Rhenium	76 Os 190.23 Osmium	77 Ir 192.22 Iridium	78 Pt 195.08 Platinum	79 Au 196.97 Gold	80 Hg 200.59 Mercury	81 Tl 204.38 Thallium	82 Pb 207.2 Lead	83 Bi 208.98 Bismuth	84 Po [209] Polonium	85 At [210] Astatine	86 Rn [222] Radon
87 Fr 223.02 Francium	88 Ra 226.025 Radium	89 Ac 227.033 Actinium	90 Th 232.038 Thorium	91 Pa 231.036 Protactinium	92 U 238.029 Uranium	93 Np 237.048 Neptunium	94 Pu 244.064 Plutonium	95 Am 243.061 Americium	96 Cm 247.077 Curium	97 Bk 247.077 Berkelium	98 Cf 251.08 Californium	99 Es 252.083 Einsteinium	100 Fm 257.10 Fermium	101 Md 258.10 Mendelevium	102 No 259.10 Nobelium	103 Lr 262.10 Lawrencium															

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Moshfegh, Alanna, et al. "What we eat in America, NHANES 2005-2006: usual nutrient intakes from food and water compared to 1997 dietary reference intakes for vitamin D, calcium, phosphorus, and magnesium." *US Department of Agriculture, Agricultural Research Service* (2009).

Urine $>6^0$ rest

**Excess acid
wears you out**



**Too Acidic
(<6.5)**

**Healthy Repair /
Restore Zone**



**Healthy pH
($6.5-7.5$)**

**Catabolic illness
tears you down**



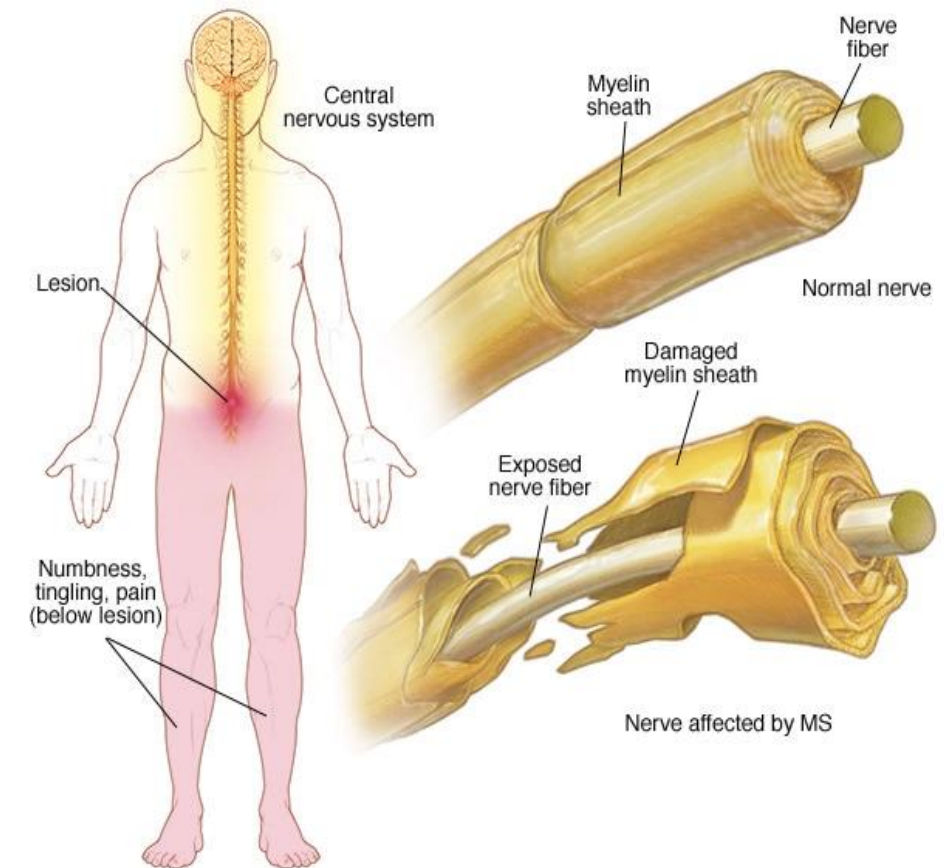
**Too Alkaline
(>7.5)**

Predictive Goal Value = pH 6.5 – 7.5

Jaffe R, Mani J. Clinical Evidence in Favor of Specific Polyphenolics. *In: Watson RR, Preedy VR & Zibadi S, Eds. Polyphenols in Human Health and Disease, Academic Press, 2013: 695-705*

Gut/Brain in Multiple Sclerosis

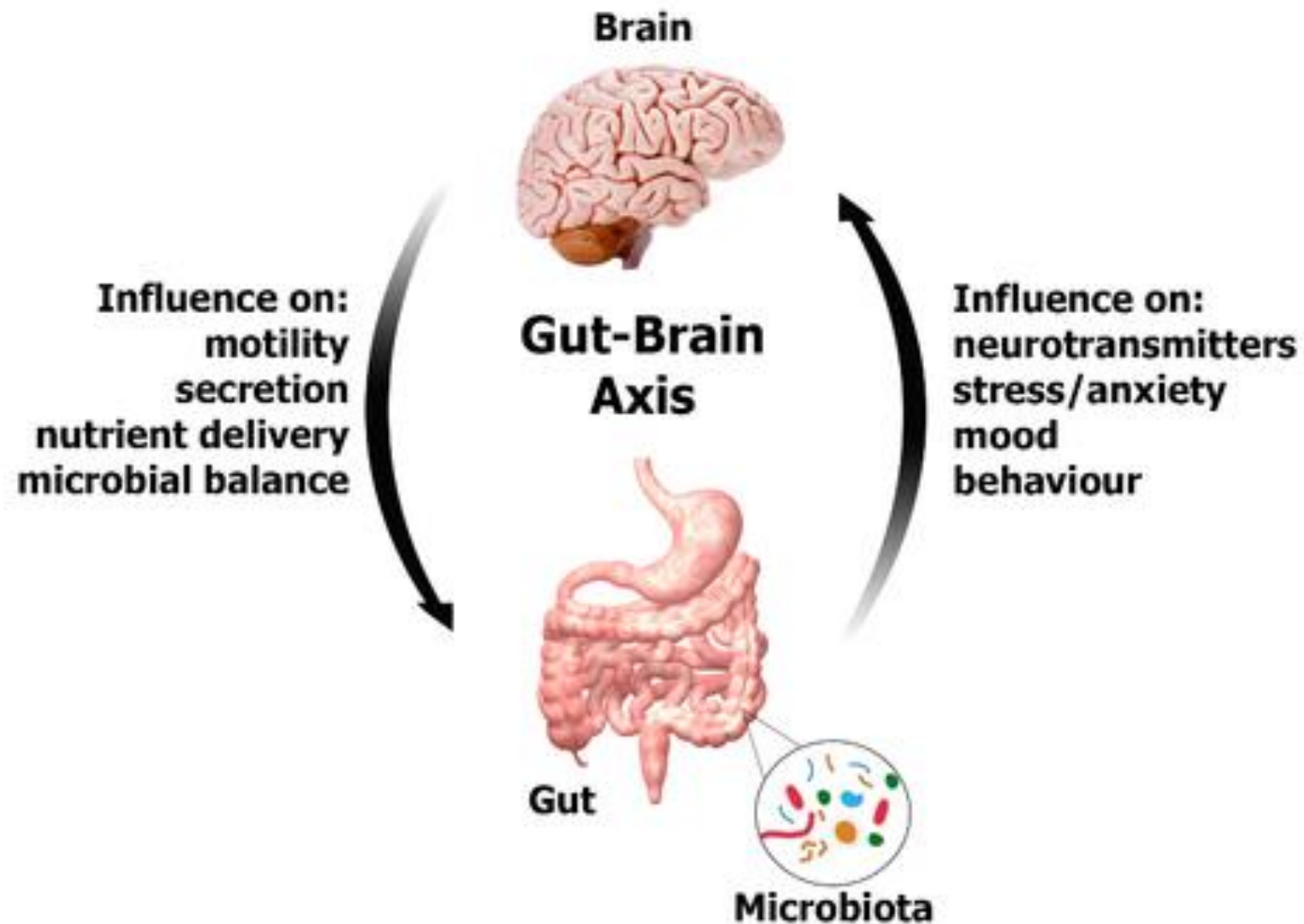
- **Gut dysbiosis** triggers autoimmune attack in **CNS**
- Microbial metabolites cross leaky BBB; burden **glial cells**
- **T cells** modulate reactive chemokines and cytokines
- **Autoimmune** example



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Dopkins N, Nagarkatti PS, Nagarkatti M. The role of gut microbiome and associated metabolome in the regulation of neuroinflammation in multiple sclerosis and its implications in attenuating chronic inflammation in other inflammatory and autoimmune disorders. *Immunology*. 2018;154(2):178–185.

Gut/Brain Connection



Jane A. Foster, Linda Rinaman, John F. Cryan. Stress & the gut-brain axis: Regulation by the microbiome. *Neurobiology of Stress*, 2017, 7:124-136.

Cryan JF, Stress and the Microbiota-Gut-Brain Can J Psychiatry 2016 Apr; 61(4): 201–203.

Microbiome/GI Essentials

Stomach Digestion Promoters (*Aides*):

Herbal bitters: 3 drops in liquid before each meal

L-Histidine: 650 mg, 30 min before each meal

Prebiotic fibers:

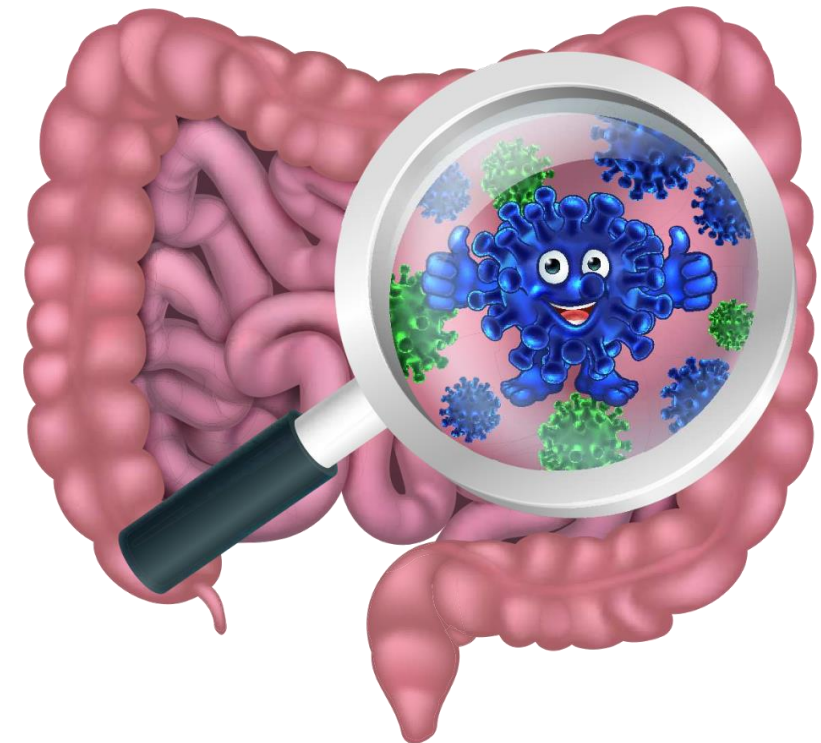
40-100 g/day; 80:20 soluble: insoluble

Probiotic bugs:

40-100 billion CFU/day; live, dairy free medium

Symbiotics:

Recycled Glutamine; 1.5 g x 2-3/d



Gibson GR, Roberfroid MB. Dietary modulation of the human colonic microbiota. Introducing the concept of prebiotics. *J Nutr* 1995;125:1401–1412.

Xue H, Sufit AJ, Wischmeyer PE. Glutamine therapy improves outcome of in vitro and in vivo experimental colitis models. *JPEN J Parenter Enteral Nutr*. 2011 Mar;35(2):188-197.

Gibson GR, Collins DM, Concept of Balanced Colonic Microbiota, Prebiotics, and Symbiotics." in "Probiotics, other nutritional factors, and intestinal microflora", Nestle Nutrition Workshop Series, Vol. 42, Lippincott-Raven, Philadelphia, 1999.

Moriguchi T, Takai J. Histamine and histidine decarboxylase: Immunomodulatory functions and regulatory mechanisms. *Genes Cells*. 2020;25(7):443-449.

Lu P, Zhang CH, Lifshitz LM *et al*. Extraoral bitter taste receptors in health and disease *J Gen Physiol* (2017) 149 (2): 181–197

Microbiome/GI Essentials

DIGESTIVE HEALTH

Lack of Stomach Acid

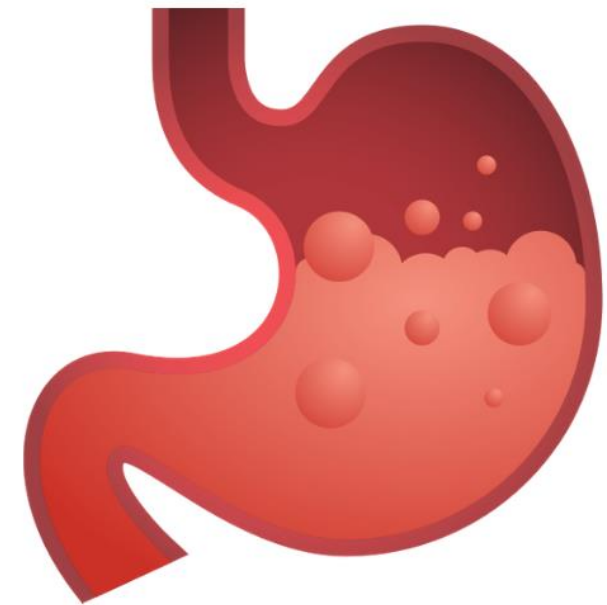
- Worsens digestive impairment
Gut bacterial overgrowth (SIBO), parasite and *H. pylori* infections.
- A result of:
 - Age ?
 - *Accumulated toxins* that impair detoxification
 - *Lack* of essential dietary nutrients
 - *Excess* caffeine, stress, alcohol
 - *Medications* (especially those that block the production or excretion of stomach acid, e.g., PPI, Pepcid[®], and H2 blockers Zantac 360[®]).

Microbiome/GI Essentials

DIGESTIVE HEALTH

Gastric Acid in Stomach

- Continues digestion
- Prevents developing infections
- Helps absorb vitamin B12 & Mg
- Signals the other digestive organs (e.g., gallbladder and pancreas) to release their juices and enzymes



Microbiome/GI Essentials

DIGESTION PROMOTERS: BITTERS

Angelica, Burdock, Dandelion, Fennel, Ginger, and Yellow dock

Reduced bloating, indigestion, heartburn & reflux

- Improved stomach acid production
- Enhanced GI mobility (peristalsis)
- Enhanced nutrient absorption
- Reduced nausea and vomiting
- Appetite suppression



Yu M, Li T, Raza A, et al. Sensory-guided identification of bitter compounds in Hangbaizhi (Angelica Dahurica). *Food Res Int.* 2020;129:108880.

Microbiome/GI Essentials

DIGESTION PROMOTERS: L-HISTIDINE




- Supports healthy stomach acid production for better digestion.
- Provides safer antioxidant benefit to address oxidative stress.
- Supports healthier cellular metabolism and histidine-histamine balance.

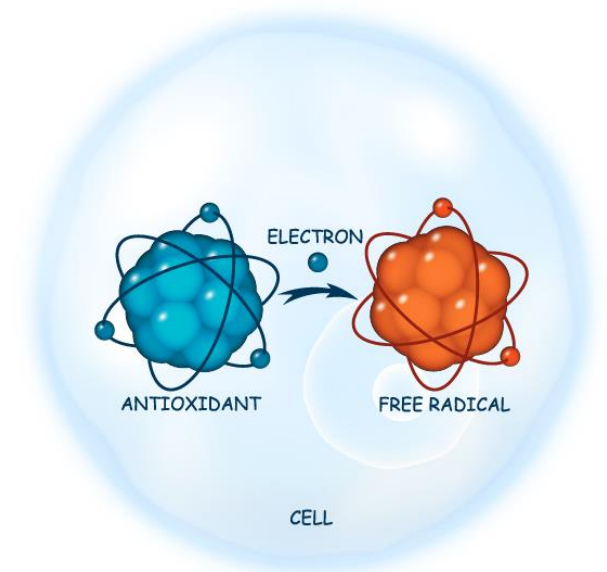


L-Histidine is source of stomach acid protons, often lacking in people with inherent digestive issues & those with acute or delayed allergies.

Microbiome/GI Essentials

L-HISTIDINE - REPAIR

- Significant physiological antioxidant properties.
 - **Anserine** and **carnosine** flourish
-  repair activity,  extent of oxidative stress
 - Neurological disease
 - Cardiovascular disease
 - Diabetes
 - Arthritis
 - Multiple Sclerosis & more.
- Helps in atopic dermatitis (eczema) – Natural Moisturizing Factor (NMF) &  filaggrin protein formation.



Gibbs NK. L-Histidine Supplementation in Adults and Young Children with Atopic Dermatitis (Eczema). *J Nutr.* 2020 Oct 1;150(Suppl 1):2576S-2579S.

Tan SP, Brown SB, Griffiths CE, Weller RB, Gibbs NK. Feeding filaggrin: effects of L-histidine supplementation in atopic dermatitis. *Clin Cosmet Investig Dermatol.* 2017 Oct 5;10:403-411

Microbiome/GI Essentials

Healthy Flora... Healthy Digestion Probiotic Balance Promotes Digestive & Mental Health

- Supportive impacts on central nervous systems - anxiety, depression - HPA Axis
- 10 live active strains
 - e.g., *Lactobacillus*, *Bifidobacterium*, *S. Thermophilus*
- No enteric coating necessary
- Live, implantable, gut friendly strains
 - Not soil based!



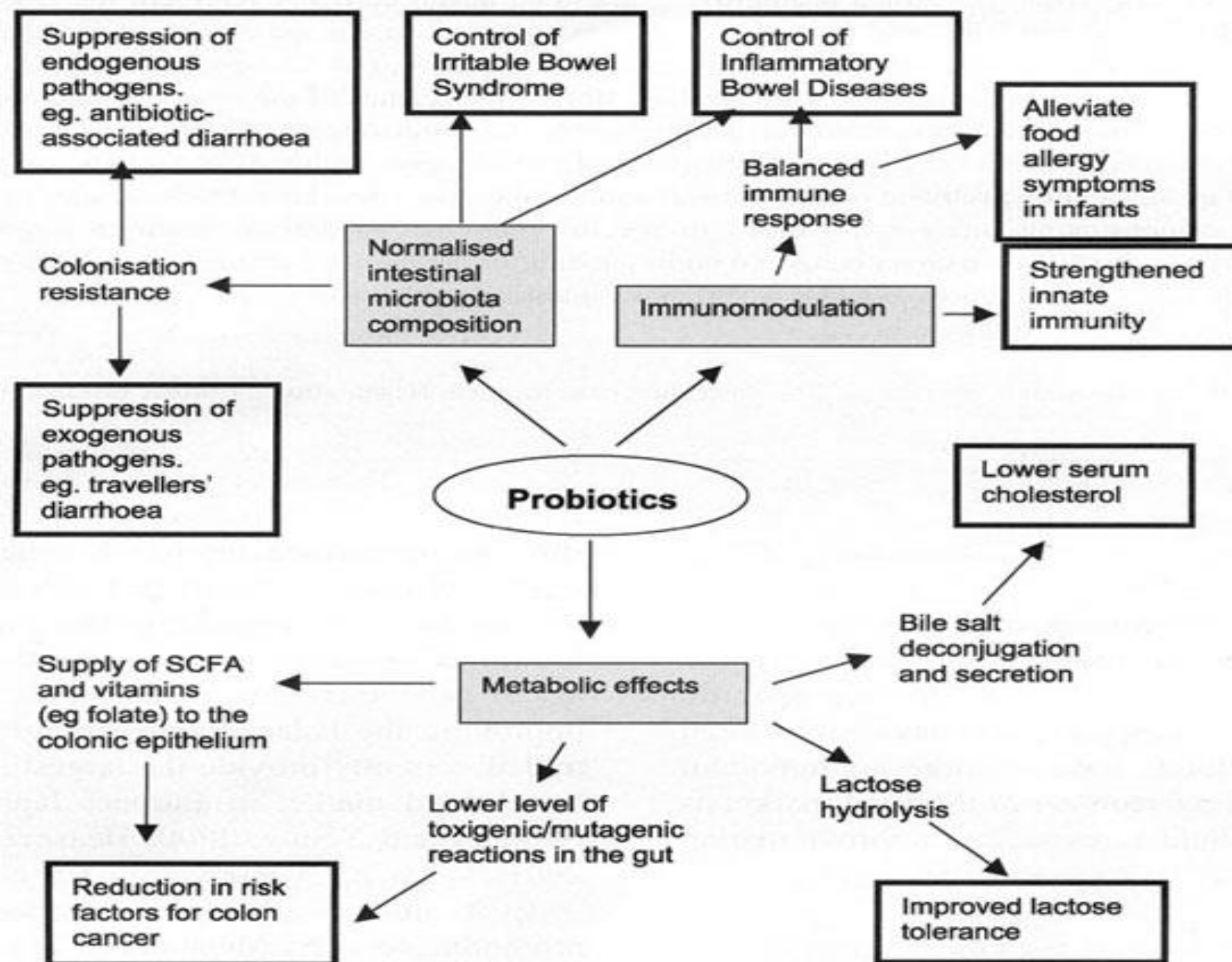
Implant & protect...Crowd out pathogens

Collado MC, Isolauri E, Salminen S, Sanz Y. The impact of probiotic on gut health. *Curr Drug Metab*. 2009 Jan;10(1):68-78.

<https://www.frontiersin.org/articles/10.3389/fnut.2023.1173660/full>

Wallace CJK, Milev R. The effects of probiotics on depressive symptoms in humans: a systematic review. *Ann Gen Psychiatry*. 2017 Feb 20;16:14.

Microbiome/GI Essentials



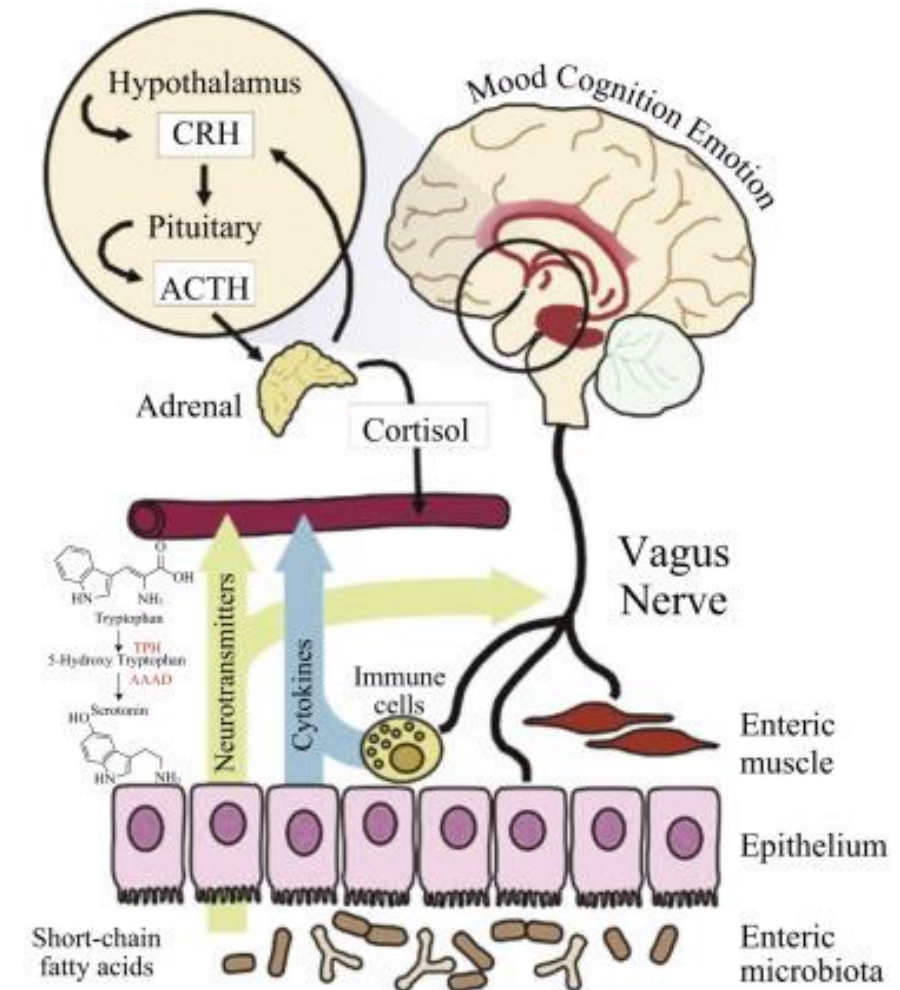
Proposed health benefits stemming from probiotic consumption.

Microbiome/GI Essentials

Safer Repair & Energy

Recycled glutamine w/ Pyridoxal Alpha Ketoglutarate (PAK)

- **Prevents** accumulation of **glutamate** – **extra-neuronal excitoneurotoxin**
PAK induces enzymatic transamination to recycle glutamine from glutamate 10X per molecule
- Energizes gut repair & digestion
- Affects cognitive performance, influences GABA to be utilized



Xue H, Sufit AJ, Wischmeyer PE. Glutamine therapy improves outcome of *in vitro* and *in vivo* experimental colitis models. *JPEN J Parenter Enteral Nutr.* 2011 Mar;35(2):188-197.

Brett J. Deters, Mir Saleem, The role of glutamine in supporting gut health and neuropsychiatric factors, *Food Science and Human Wellness*, 2021; 10 (2):149-154.

Neurohormonal Imbalance in Stress/Distress

- Stress/distress
- Immune Defense Repair System
- Toxin overload, immune health and neurohormonal integrity
- Gut – immune, neurohormone connections
- ***Physiology First*** approach to comprehensive (neuro)detoxification, stress management, sleep/mood balance and a healthier immune system.



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Health Studies Collegium

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