A4M | MEDICINE REDEFINED

CLINICAL WEIGHT MANAGEMENT

Certification Program

IPS | THE PREMIER EDUCATIONAL RESOURCE FOR SAFE & ADVANCED PEPTIDE THERAPY

EDUCATIONALLY PARTNERED WITH A4M

Managing Cortisol AND Thyroid Hormones

Gordon Crozier, D.O. FAARFM ABAARM

Disclosure

I am a share holder in Biotech Nutritional Science

To Be Covered

01	Systems biology approach to thyroid/adrenal/pancreas
02	Circadian rhythm and its relation to weight
03	GLP affects on thyroid/adrenal/pancreas
04	Supplements

Future Healthcare Journal 2018 Vol 5, No 3: 151–5 SYSTEMS APPROACH

PROCESS AND SYSTEMS

A systems approach to healthcare: from thinking to practice

Authors: John Clarkson,[A] John Dean,[B] James Ward,[C] Alexander Komashie[D] and Tom Bashford[E]

Systems Theory

It is an interdisciplinary theory about every system in nature, in society and in many scientific domains as well as a framework with which we can investigate phenomena from a holistic approach.

Cristina Mele, Jacqueline Pels, Francesco Polese, (2010) A Brief Review of Systems Theories and Their Managerial Applications. Service Science 2(1-2):126-135. https://doi.org/10.1287/serv.2.1_2.126

Open access Original research

BMJ Open

Systems approach to health service design, delivery and improvement: a systematic review and meta-analysis

Alexander Komashie ,[1,2,3] James Ward,[1] Tom Bashford ,[1,3,4] Terry Dickerson,[1] Gulsum Kubra Kaya ,[5] Yuanyuan Liu ,[1] Isla Kuhn,[6] Aslı Günay ,[1,7] Katharina Kohler ,[1,4] Nicholas Boddy,[1,8] Eugenia O'Kelly ,[1] Joseph Masters,[9] John Dean,[10] Catherine Meads ,[11] P John Clarkson [1]

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International Journal of General Medicine
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Int J Gen Med. 2019; 12: 299–304.
Published online 2019 Aug 23. doi: 10.2147/IJGM.S206983
PMCID: PMC6711558
PMID: 31692525

Relationship between thyroid dysfunction and body weight: a not so evident paradigm

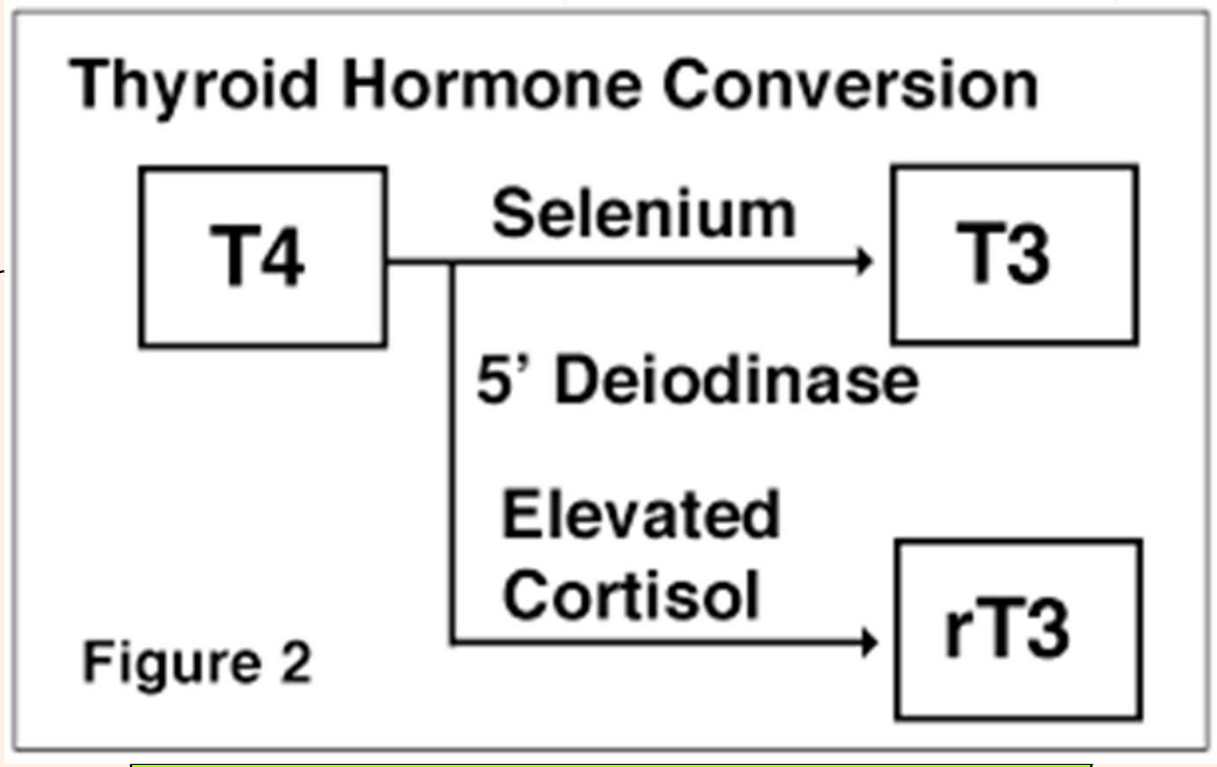
Mónica Ríos-Prego,[1] Luis Anibarro,[1] and Paula Sánchez-Sobrino[2]

Thyroid

- Hypothyroid has traditionally been associated with obesity.
- There is more to thyroid dysfunction.
- The relationship between thyroid and BMI.

Thyroid

- From the article above
  - 330 individuals in the study
    - 76.5% of individuals were obese in the hypothyroid group.
    - 58.8% of individuals were hyperthyroid and obese.
    - Because thyroid hormones are involved with multiple physiological processes and regulating metabolism, this can be complicated.



rT3 binds to T3 receptors
Blocks T3 from binding

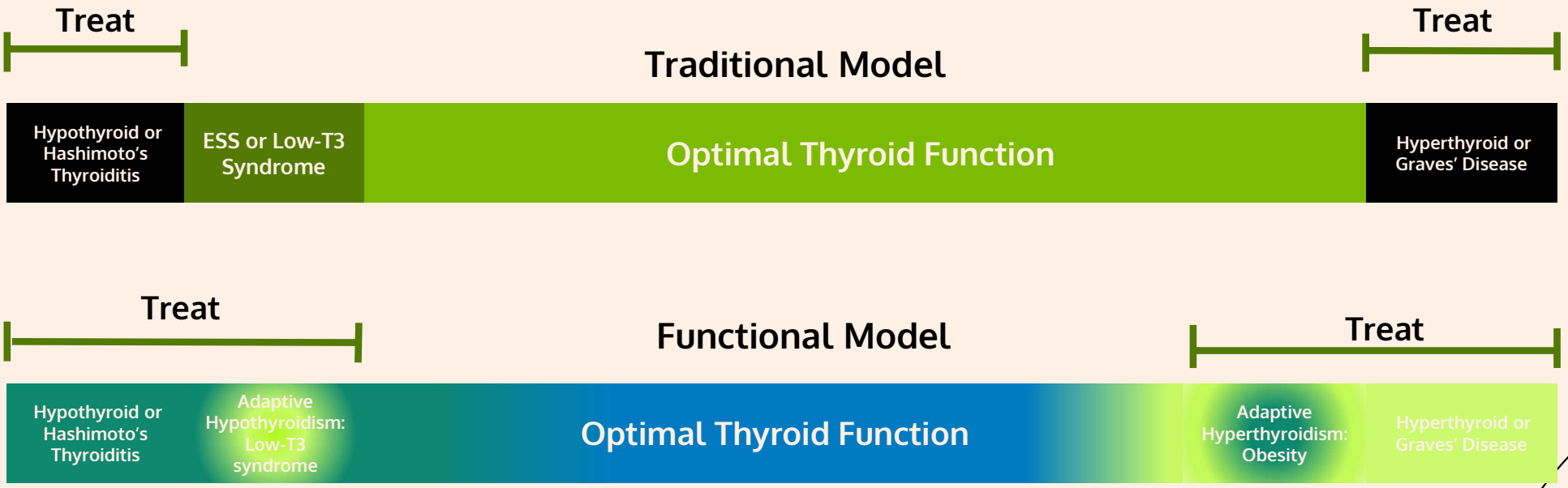
Stress and Thyroid Antibodies

- Reduced glucocorticoid activity is associated with an increased prevalence of ThAbs positivity in older ambulatory subjects.
- HPA axis (neuro-endocrine) imbalances caused by stress-mediated activation
- Involved in autoimmune thyroid diseases (AITD).

Terzidis K, et al. Eur J Endocrinol. 2010;162(2):307-13

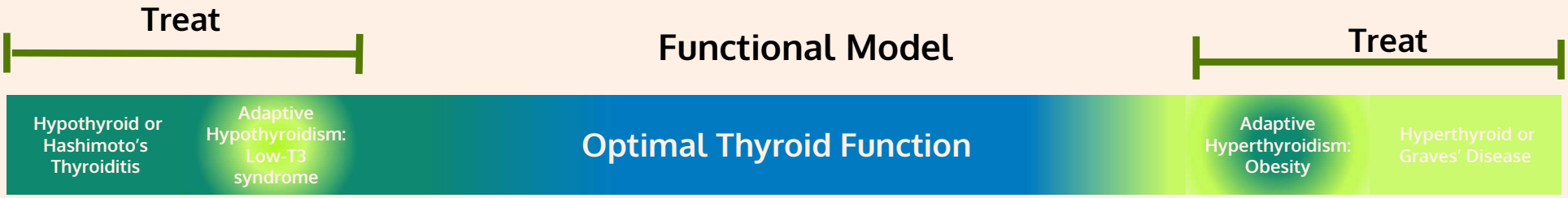
Klecha AJ, et al. Neuroimmunomodulation. 2008;15(1):68-75

Thyroid & the Functional Medicine Model



Chatzitomaris A, et al. Front Endocrinol (Lausanne). 2017; 8:163.

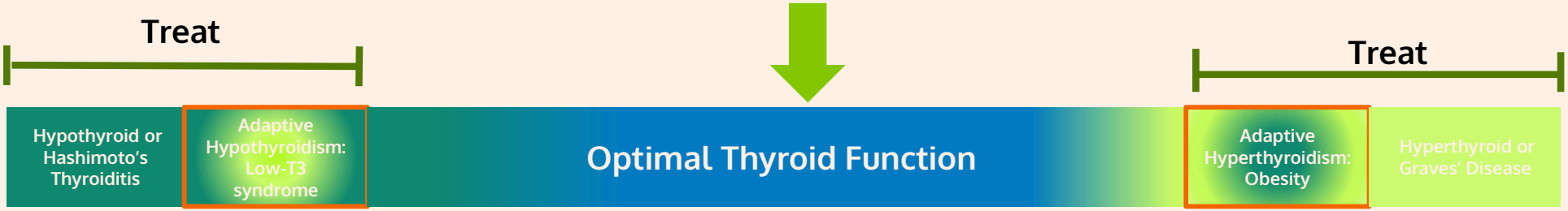
The Thyroid Adapts To The Allostatic Load



- During restful times, thyroid under tight control
- With chronic stress, inflammation, inflammatory syndromes, and disease states, the thyroid adapts to the allostatic load
- **Referred to as thyroid adaptation to type 1 and 2 allostasis**

Chatzitomaris A, et al. Front Endocrinol (Lausanne). 2017; 8:163.

The Thyroid Adapts To The Allostatic Load



- The thyroid is an energy consuming organ
- Thyroid activation is associated with glutathione, ATP, and oxygen consumption

Type 1 Allostatic Load

- Energy demands exceed sum of energy intake and energy reserve
- Without adequate glutathione, ATP, etc., thyroid hormone is down-regulated
- Examples: chronic illness, exhaustion
- **Labs: low TSH, low T3, low T4, increased RT3**

Chatzitomaris A, et al. Front Endocrinol (Lausanne). 2017; 8:163.

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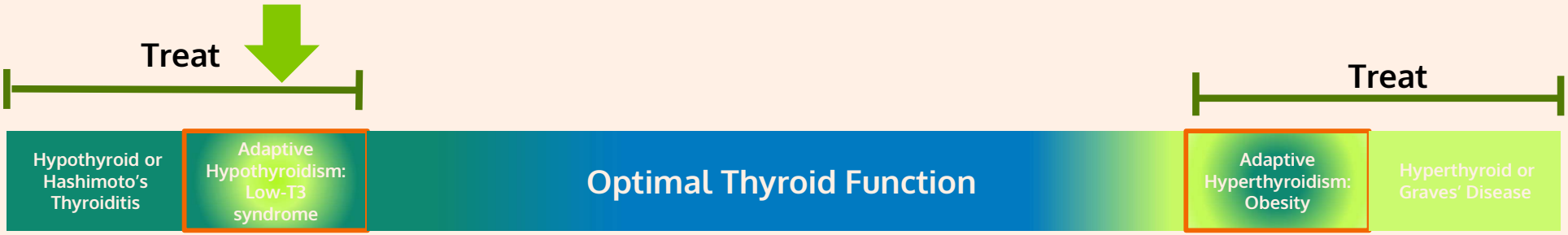

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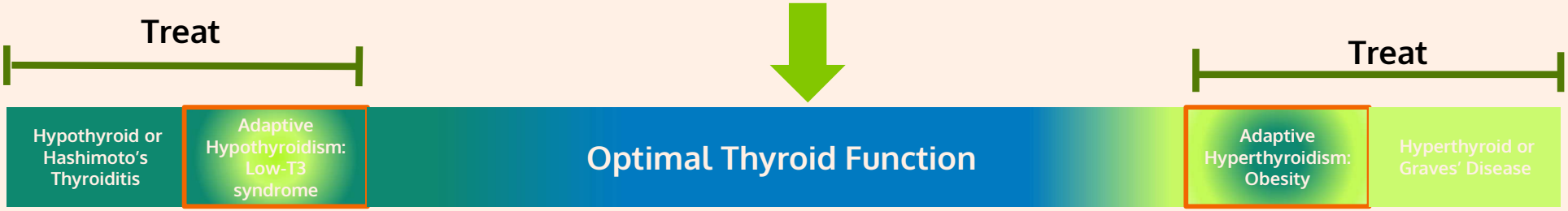

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Type 2 Allostatic Load

- Expected increase in energy demands with adequate reserve
- With adequate stores, thyroid hormone is upregulated to meet demands, i.e., increased T3
- Examples: obesity, endurance activity, pregnancy
- **Labs: normal/increased TSH, normal/increased T4, increased T3, decreased RT3**

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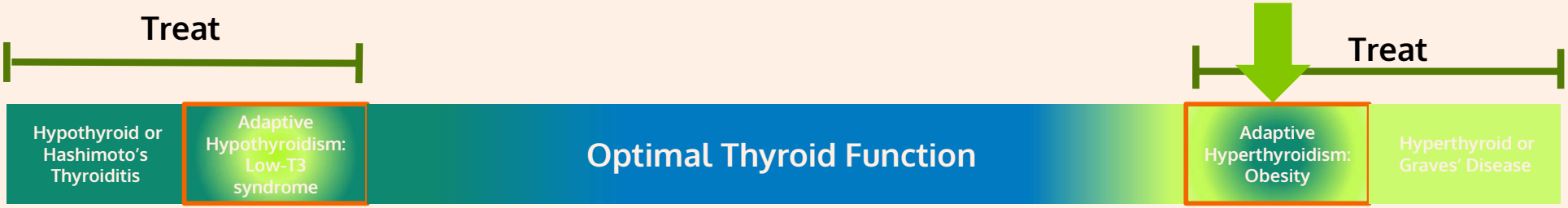
The Thyroid Adapts To The Allostatic Load



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Symptoms of Hypothyroidism % of Cases

Memory Impairment	66	Weakness	99
Constipation	61	Dry skin	97
Weight gain	59	Coarse skin	97
Loss of hair	57	Lethargy	91
Pallor of lips	57	Slow speech	91
Dyspnea	55	Edema of eyelids	90
Peripheral edema	55	Cold hands and feet	89
Hoarseness or aphonia	55	Decreased sweating	89
Anorexia	45	Cold Skin	83

BMJ 1997;314:1175 (19 April)

Metabolic Effects of Suboptimal Thyroid Function

- Glucose tolerance
- Rate of glucose absorbed from GI tract and cellular uptake
- Insulin signaling/receptor problems
- Reduces target cell insulin binding/number of insulin receptor expressed
- Decreases metabolism fats and increases serum lipids & availability of cardioprotective essential fatty acids
- Decreases Inadequate T3 lowers oxygen consumption, contributes to lipids peroxidation and free radical damage

(J Clin Endocrin Metal, 82 (10) Oct. 1997)

Your Metabolism

- Glucose control loss
- Inflammation increase
- Blood pressure
- Cholesterol increases
- Belly fat increases
- Lactic acid increases
- Immune system less effective
- Short term memory decreases
- Sex drive hormones alter

Body Composition Changes in Weight Loss

- 1/3 of US population has BMI > 30kg/m2
- Weight loss is generally accompanied by loss of lean body mass
- In overweight people, 20-30 % of total weight loss is muscle mass
- Multiple health implications:
  - Lowered resting energy expenditure/metabolism
  - Decline in neuromuscular function / disability
  - Fatigue
  - Emotional effects
  - Poor day-to-day performance issues
  - Increased risk of injury

Willoughby D, et al. Body Composition Changes in Weight Loss: Strategies and Supplementation for Maintaining Lean Body Mass, a Brief Review. Nutrients. 2018;10(12):1876.

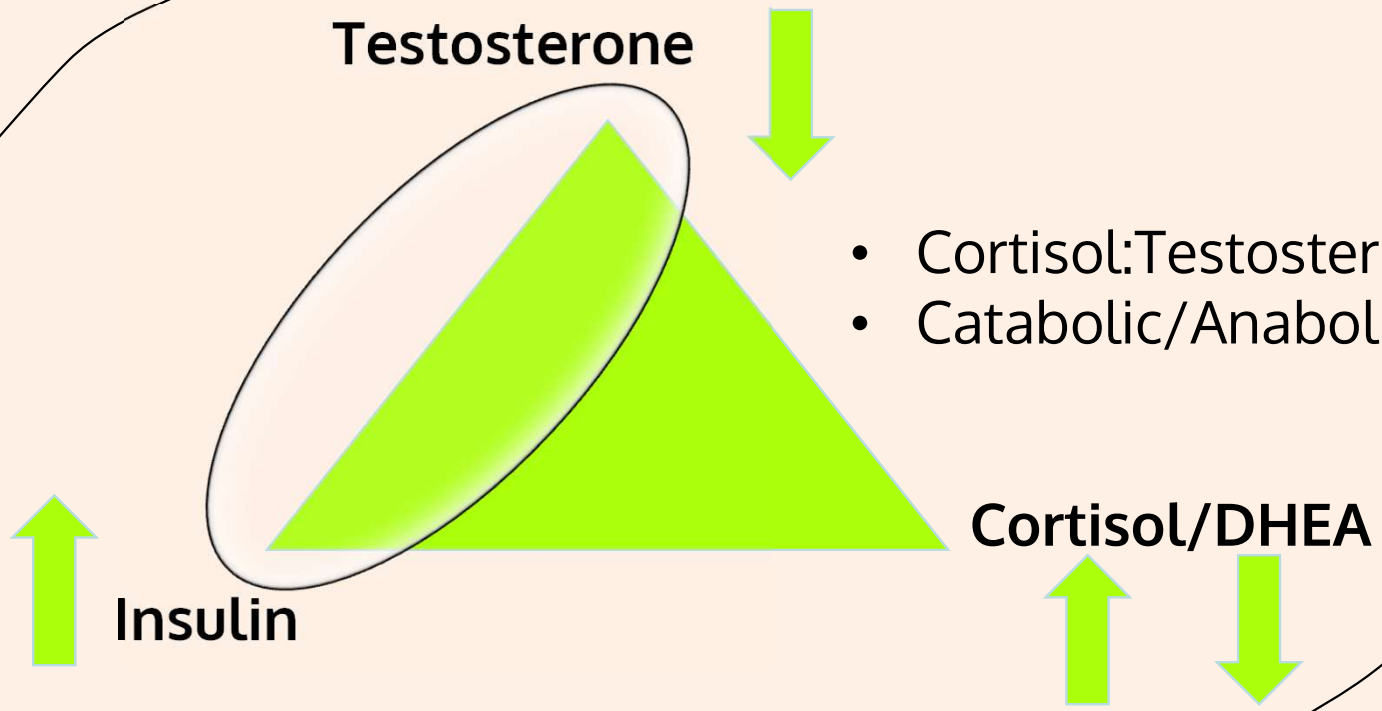
Cortisol and Weight Gain

- Chronic stress directly related to weight gain
- Imbalances in hypothalamic-pituitary-adrenal (HPA) axis
- Leads to:
  - Increased cortisol output
  - Insulin resistance
  - Inflammation
  - Sleep problems
  - Hormonal imbalances
  - Weight gain
- Increases visceral “belly” fat
- “Fad” diets reported to increase cortisol levels

Dam Offspring Study population. Depress Anxiety. 2010. 27(9):846-51. PMID: 20112247.

Andrews RC, Herlihy O, Livingstone DEW, et al. Abnormal cortisol metabolism and tissue sensitivity to cortisol in patients with glucose intolerance.The Journal of Clinical Endocrinology. 2002;87(12):5587-5593.

To Make Matters Worse: Multiple Hormonal Shifts



- Cortisol:Testosterone ratio
- Catabolic/Anabolic Balance

•Cortisol mobilizes glycogen from liver
•Cortisol decreases insulin sensitivity
•Cortisol increases TNF alpha directly

Cortisol and Sex Hormone Imbalances

- Increased cortisol blocks T4 conversion to T3 which causes
- TRH is up-regulated to create more T4
- Increasing TRH will increase prolactin which in turn
- Down regulates LH and FSH production which
- Down regulates testosterone
- As testosterone goes down, so does growth hormone

Brownlee KK, et al. Relationship between circulating cortisol and testosterone: influence of physical exercise. J Sports Sci Med. 2005;4(1):76-83.

Glucose Regulation/Obesity – Testosterone

- Low testosterone levels are reported in those with insulin signaling problems/diabetes, obesity
- Increased CVD risk
- Decreased libido
- Fatigue
- **Loss of muscle mass**
- Increases in estradiol in men
- Increased mortality in men
- Abuse of anabolic steroids reported to decrease insulin sensitivity

Grossmann M, et al. Low Testosterone levels are common and associated with insulin resistance in men with diabetes. J Clin Endocrinol Metab. 2008 May; 93(5):1834-40.

Cohen JC, et al. Insulin resistance and diminished glucose tolerance in powerlifters ingesting anabolic steroids. J. Clin. Endocrinol. Metab. 1987;64:960-963

Chapter 17 - Adrenal and thyroid glands and the pancreas

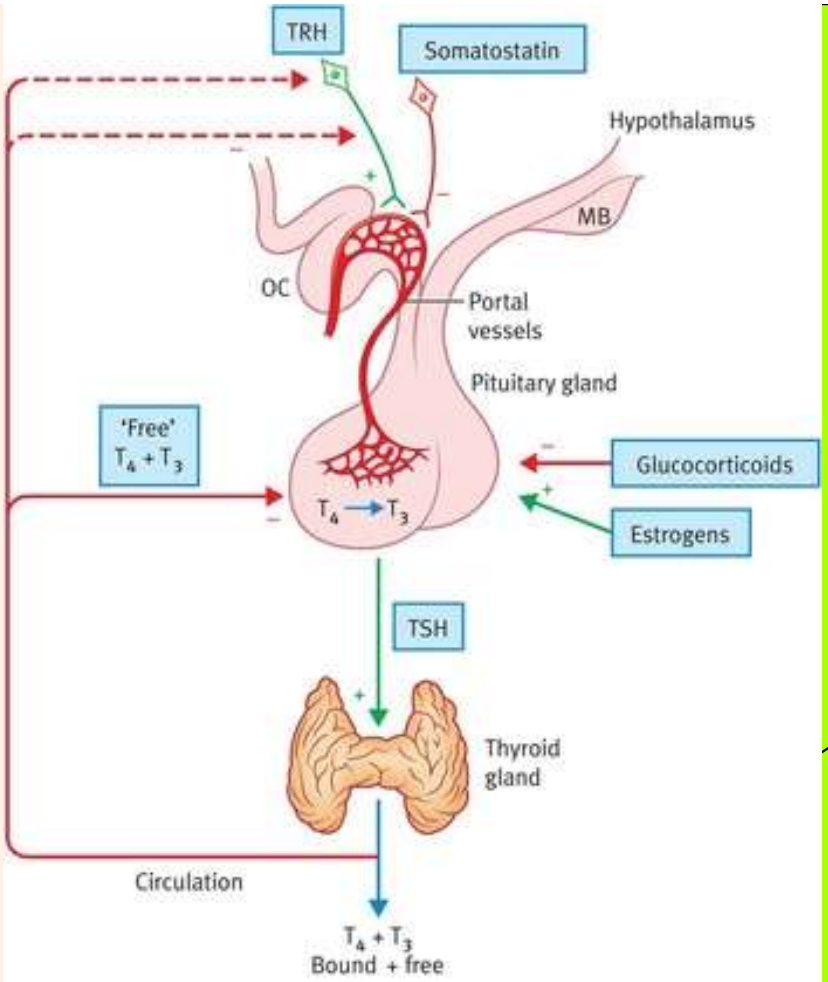
from 6 - Endocrinology

Published online by Cambridge University Press: **27 January 2017**

By Gul Bano

Edited by Alison Fiander and Baskaran Thilaganathan

Show author details



IL-1β = interleukin-1 beta | T_3 = triiodothyronine | T_4 = thyroxine | TRH = TSH-releasing hormone | TSH = thyroid-stimulating hormone | MB = mamillary bodies | OC = optic chiasm | + = stimulatory effects | – = inhibitory effects

Adapted with permission from: Nussey S, Whitehead SA. *Endocrinology: An Integrated Approach.* Oxford: BIOS Scientific Publishers; 2001.

Female Estrogen Dominance

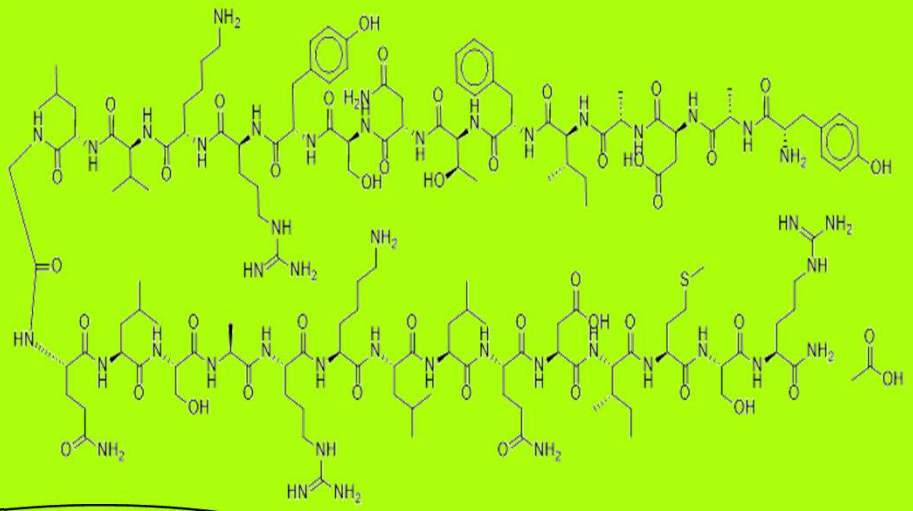
- Can lead to:
  - Thyroid Autoimmunity
  - Insulin signaling problems
  - Obesity
  - Fibrocystic breast disease
  - Ovarian cysts
  - Migraines
  - Fibroids
  - Cancer
    - Including breast and ovarian

Endocrine Restoration - Peptides

TARGETS:

- Support Hypothalamic-Pituitary-Adrenal (HPA) axis and Hypothalamic-Pituitary-Gonadal (HPG) Axis Signaling
- Decreases effects of stress on HPA axis
- Improve sex hormonal levels
- Supports GH levels
- Improve sexual desire/libido – melanocortin binding
- Supports harmonious metabolic signaling

Endocrine Restoration — Peptide Examples



Sermorelin

- Synthetic growth hormone releasing hormone GHRH
- 28 amino acids
- TYR-ALA-ASP-ALA-ILE-PHE-THR-ASN-SER-TYR-ARG-LYS-VAL-LEU-GLY-GLN-LEU-SER-ALA-ARG-LYS-LEU-LEU-GLN-ASP-ILE-MET-SER-ARG-NH2

Walker RF. Sermorelin: A better approach to management of adult-onset growth hormone insufficiency? Clin Interv Aging. 2006;1(4):307-8.

Sermorelin

- Stimulates GH
- Improves IGF-1
- Immunomodulatory
- Pro-angiogenic

Walker RF. Sermorelin: A better approach to management of adult-onset growth hormone insufficiency? Clin Interv Aging. 2006;1(4):307-8.

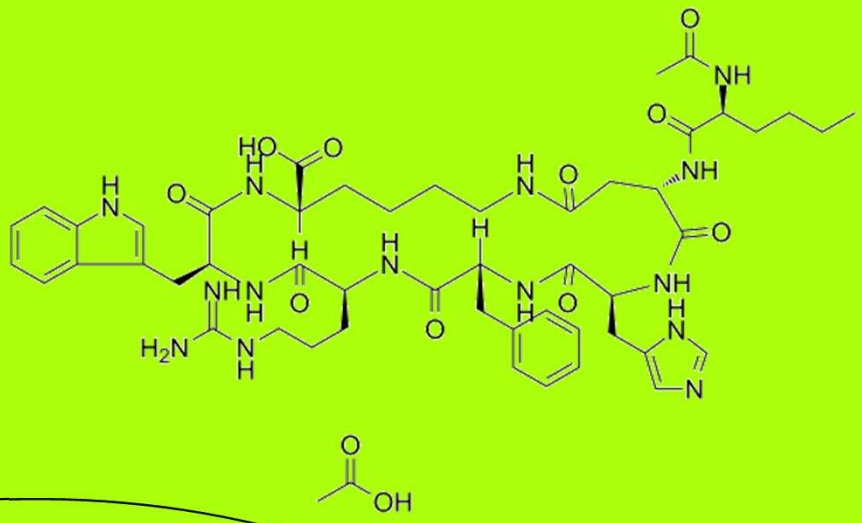
Sermorelin Dosage

Inject 0.1 ml to 0.3 ml (100-300 mcg) SQ 5 out of 7 nights of the week before bedtime on an empty stomach.

Overall Cautions

- GH may be mitogenic
- If a patient is prone to cancer or has cancer, use with caution
- GH may mask symptoms of hypothyroidism
- Make sure to test thyroid hormone levels
  - Free and Total T3, T4, TSH and thyroid antibodies

Endocrine Restoration



PT-141 – bremelanotide acetate

- Melanocortin 4 receptor (MCR4) agonist
- Analog of alpha MSH (melanocyte stimulating hormone)
- Ac-Nle-cyclo[Asp-His-D-Phe-Arg-Trp-Lys]-OH

Clayton AH, Althof SE, Kingsberg S, et al. Bremelanotide for female sexual dysfunctions in premenopausal women: a randomized, placebo-controlled dose-finding trial. Women's Health. 2-16;12(3):325-337.

PT-141 Weight Loss

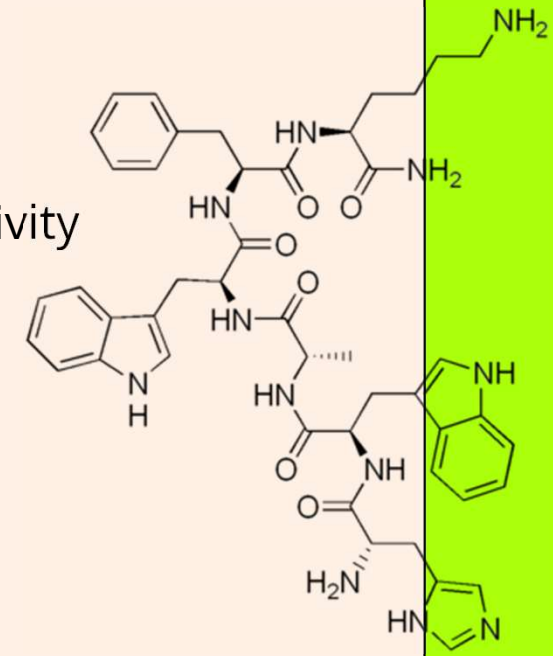
- MCR4 (melanocortin 4 receptor) agonists play role in appetite regulation
- Agonistic activity at this receptor promotes satiety
- 2022 study randomized, double-blind placebo-controlled n= 60 premenopausal women ; 18-55 yrs BMI = 30-37 kb/m2
- Placebo or bremelanotide SubQ, TID x 15 days
    - On day 1, subjects in the bremelanotide group received a 1.25-mg dose followed by two doses of 1.0 mg.
    - On all subsequent days, subjects in this group received a 2.5-mg dose followed by two doses of 2.0 mg
- Bremelanotide subjects had significant weight loss compared to placebo
- Mean caloric intake also decreased in bremelanotide patients by 400 kcal/day

Spana C, et al. Diabetes Obes Metab. 2022;24(6):1084-1093.

Endocrine Restoration – Peptide Examples

Hexarelin

- Synthetic GHRP-6 (growth hormone releasing peptide-6)
- Stimulates secretion of growth hormone (GH) by ghrelin mediation
- Hexarelin a met-enkephalin analogue that lacks opioid activity
- Lab studies report:
  - Improved body composition
  - Increased muscle growth
  - Improved glucose metabolism
  - Improved memory/cognition
  - Improved cardiac function



Lei T, et al. J Mol Endocrinol. 1995;14(1):135-8.

Endocrine Restoration – Peptide Examples

Hexarelin

- Peripheral distribution of hexarelin in heart and blood vessels suggests it has direct cardiovascular actions beyond growth hormone release and neuroendocrine effects
- Growth Hormone Secretagogue Receptor (GHSR) CD36 demonstrated to be a specific cardiac receptor for hexarelin
  - Mediates its cardioprotective effects
  - Inotropic
  - Inhibition of angiotensin-II induced myocyte apoptosis
  - Ischemia-reperfusion injury and MI protective
  - Anti-atherosclerosis activity
- When compared with ghrelin for cardio effects, hexarelin is chemically more stable and functionally more potent

Mao Y, et al. J Geriatr Cardiol. 2014;11(3):253-58.

Endocrine Restoration – Peptide Examples

Hexarelin

- Reported to improve fat metabolism via the CD36 receptor
  - Decreased fat mass and increased lean mass
- Dosage = 100-300 mcg SubQ daily split into multiple injections due to short T1/2
- Side effects may include water retention, increased appetite, tingling or numbness in extremities, and fatigue.

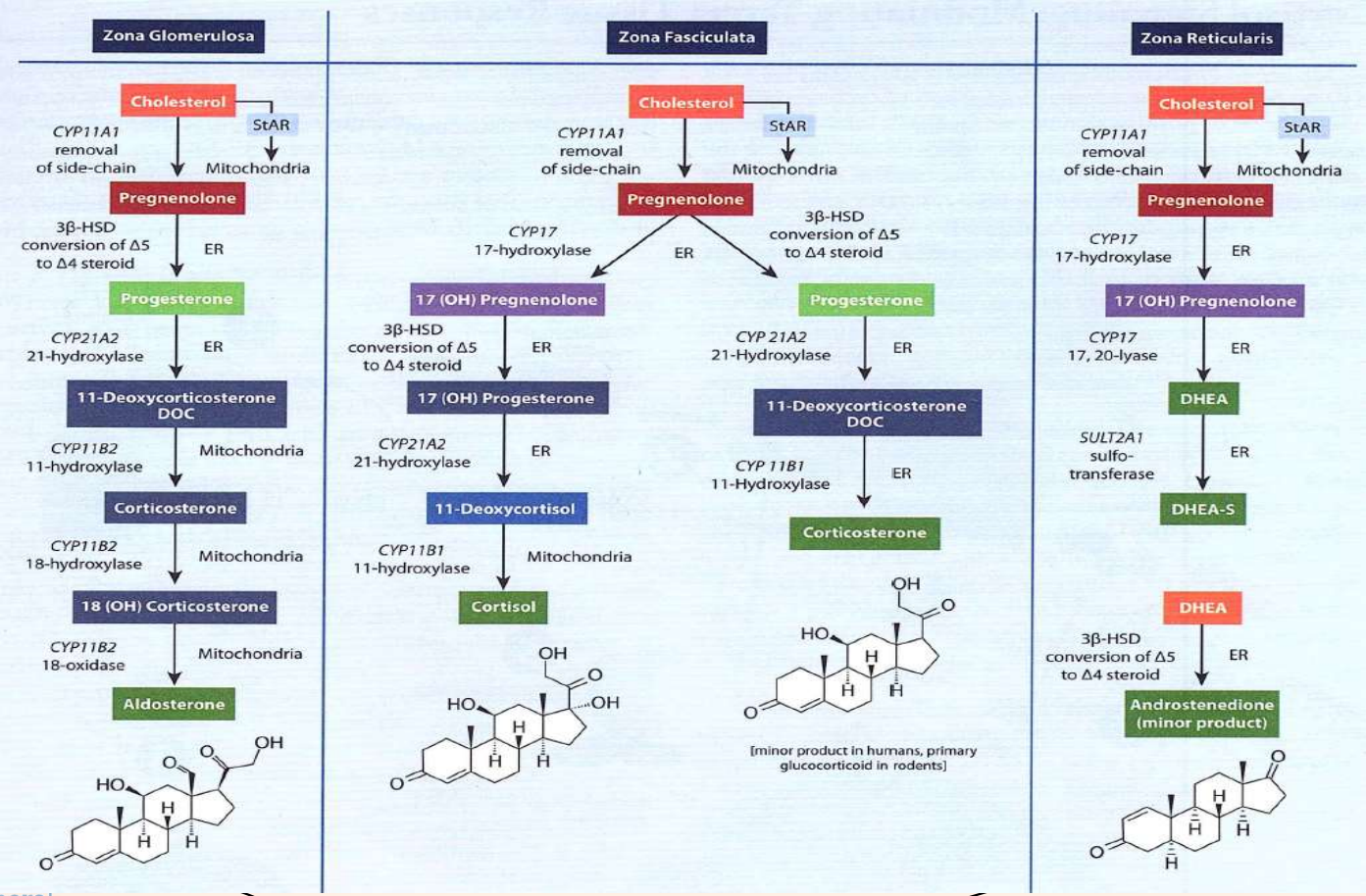
Mosa R, et al. Endocrinology. 2017;158(10)3174-87.

How is Cortisol Made?

Some hormones are made from circulating precursors; however, CORTISOL is not one of those hormones

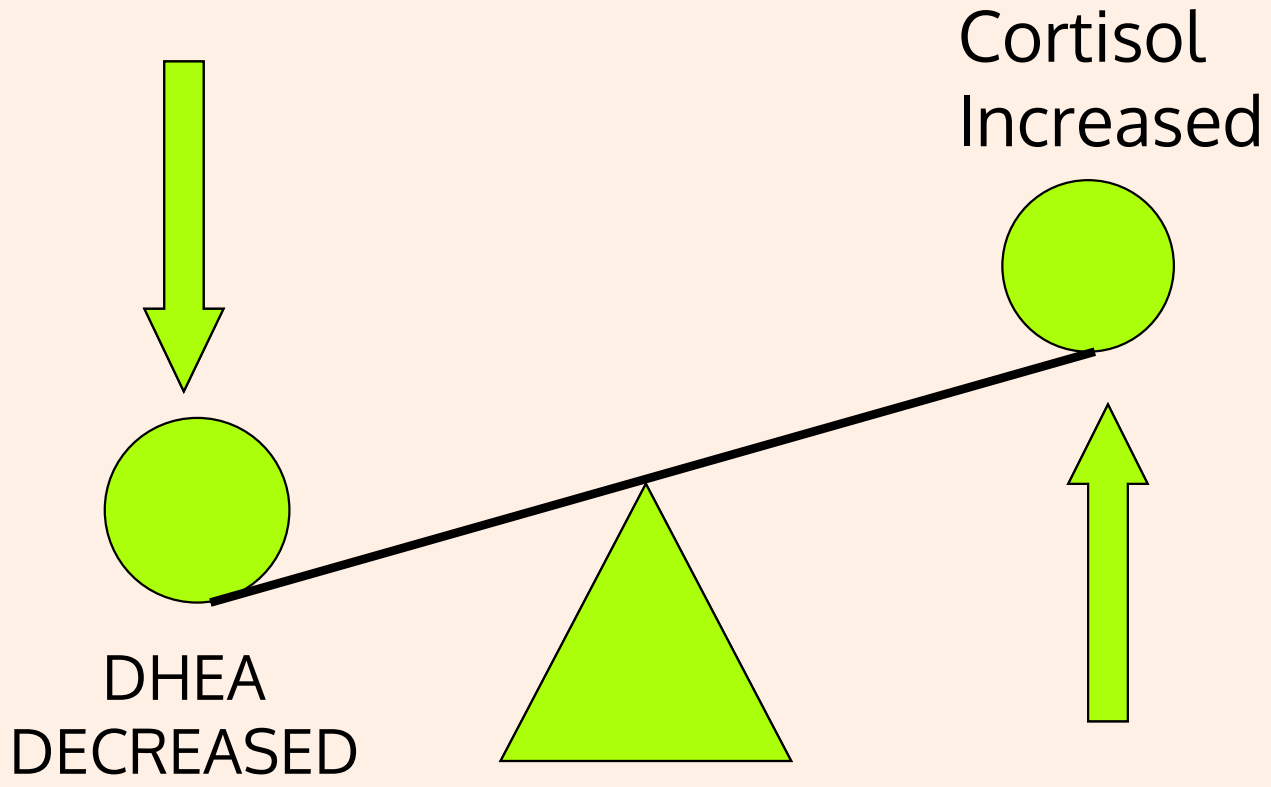
Schiffer L., et al. J Steroid Biochem Mol Biol. 2019; 194: 105439

Why? There Is No Pregnenolone Steal

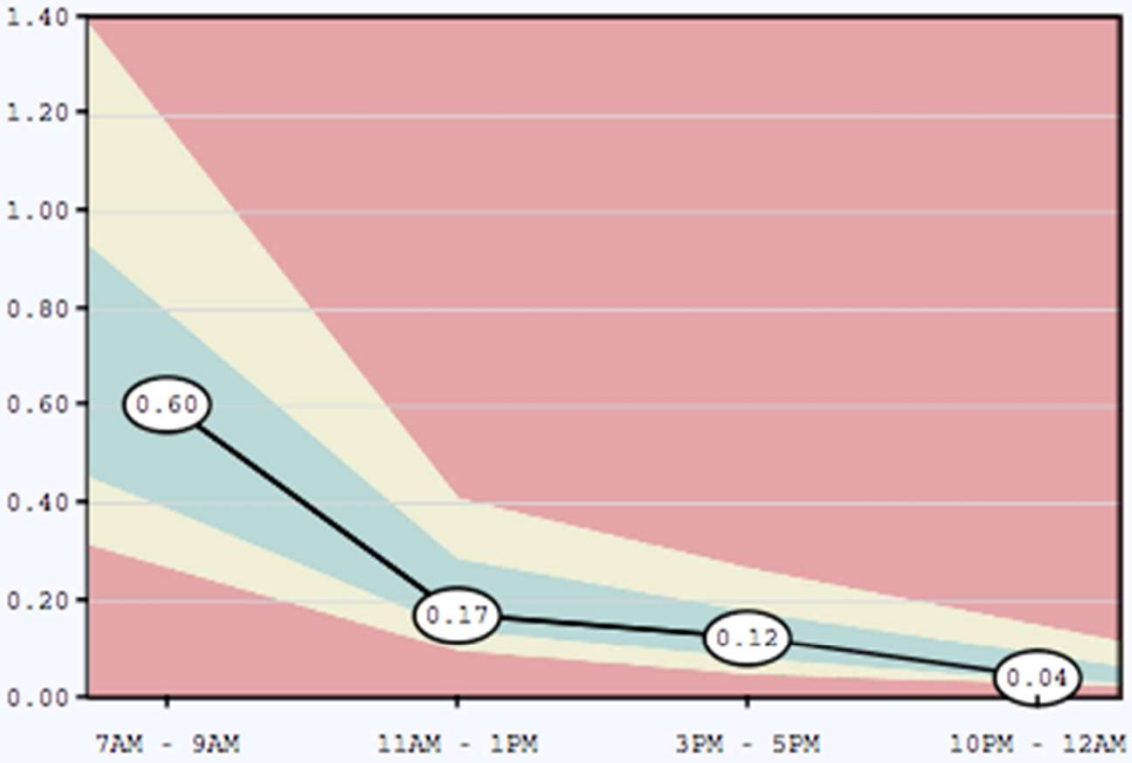


Guilliams T. The Standard. Maintaining HPA Axis Adaptability. 2019; 15:11.

IMBALANCE = DISEASE



Salivary Cortisol and DHEA



Cortisol

Reference Range

1 Hour After Rising
7AM - 9AM:

0.27-1.18 mcg/dL

11AM - 1PM:

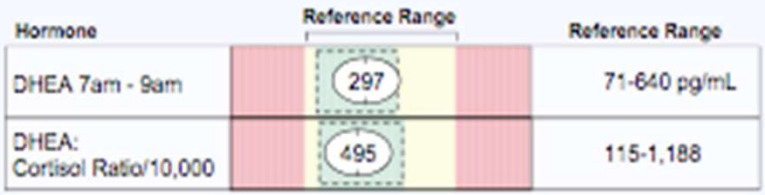
0.10-0.41 mcg/dL

3PM - 5PM:

0.05-0.27 mcg/dL

10PM - 12AM:

0.03-0.14 mcg/dL



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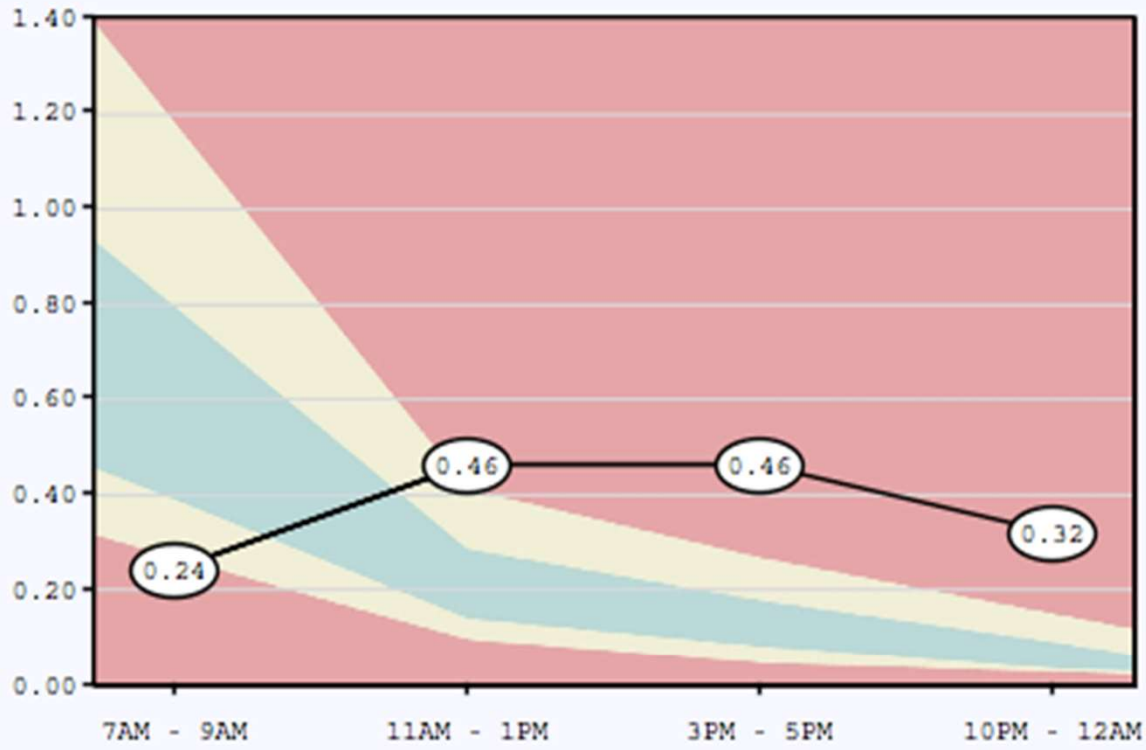

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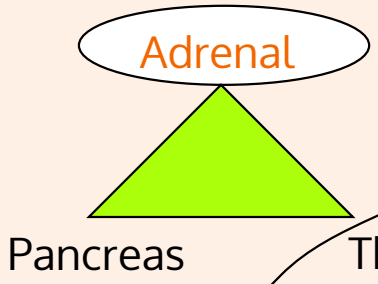
Metabolic Effects of Chronic Cortisol Elevation

- Increased insulin secretion
- Increased fat deposition
- Alteration in immune function
- Muscle wasting
- Hypothyroidism (adrenal exhaustion)
- Memory loss
- Alteration in sex hormones
- Mental and emotional instability
- Bone loss/mineral loss
- Sodium and water retention
- Elevated blood lipids
- Loss of REM sleep
- Increase plaque formation
- Increase in cardiovascular risk factors
- Receptor site activation on tumor cells



Adrenal Glands

Chronic Stress
Cortisol Levels Increase

Serotonin Levels

- Depression/Anxiety
- Cravings for Sugar and Carbohydrates
- Feeling flat

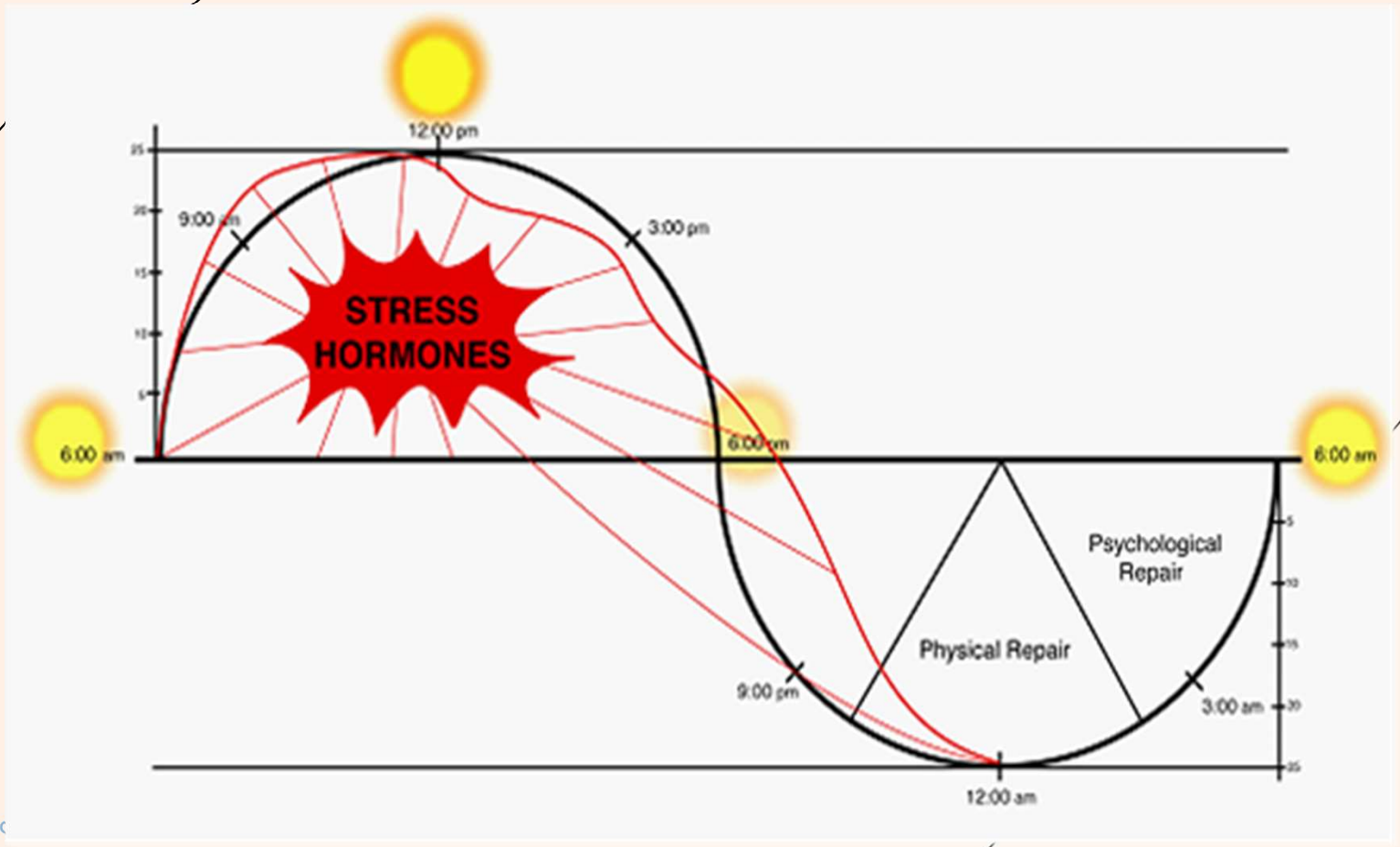
DHEA Levels

- Now Focused on Stress
- Sex Drive drops-changes making testosterone, Progesterone, etc.

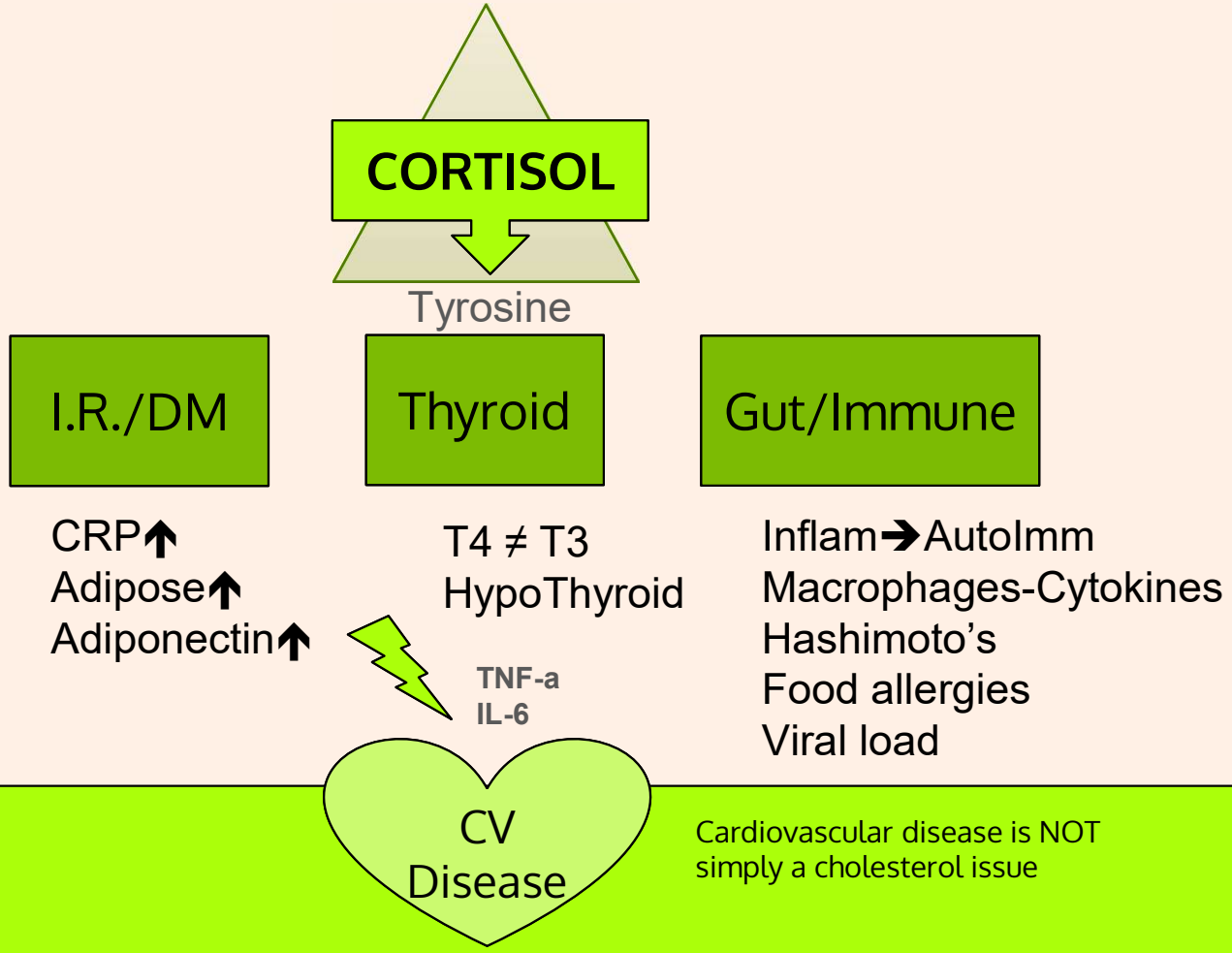
Melatonin Levels

- Lose/Can't Sleep
- Lose Energy
- Increase cravings for comfort food

Normal Diurnal Hormone Release



Cortisol - Inflammation



Cardiovascular disease is NOT simply a cholesterol issue

Metabolic Effects of Chronic Cortisol Elevation:

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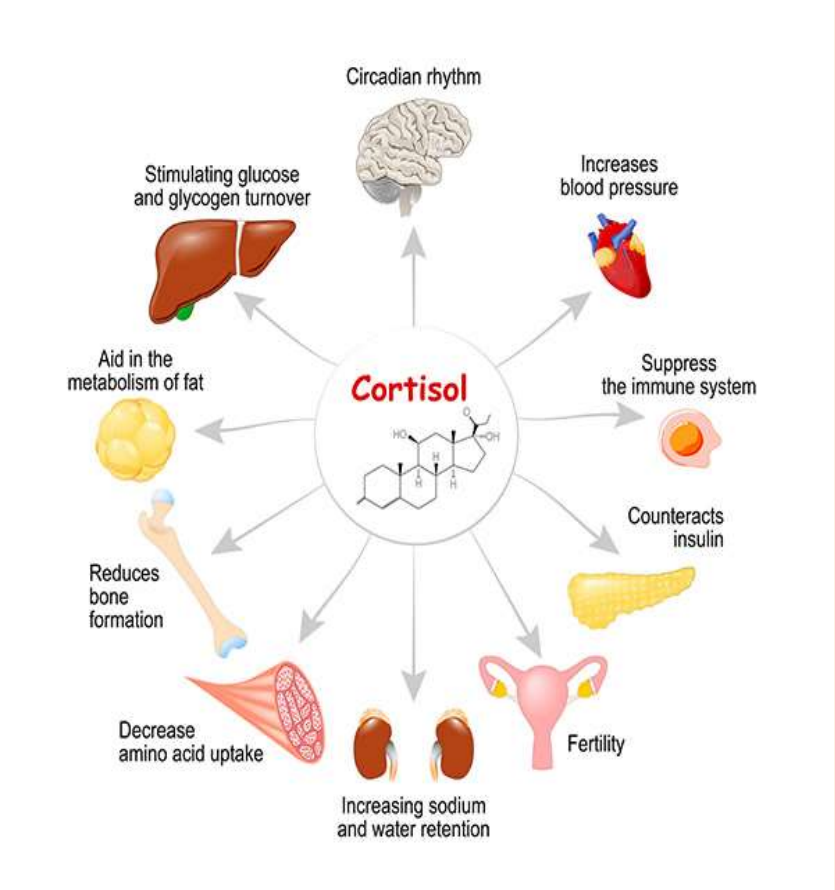

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Cortisol and Weight Gain

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- Imbalances in hypothalamic-pituitary-adrenal (HPA) axis
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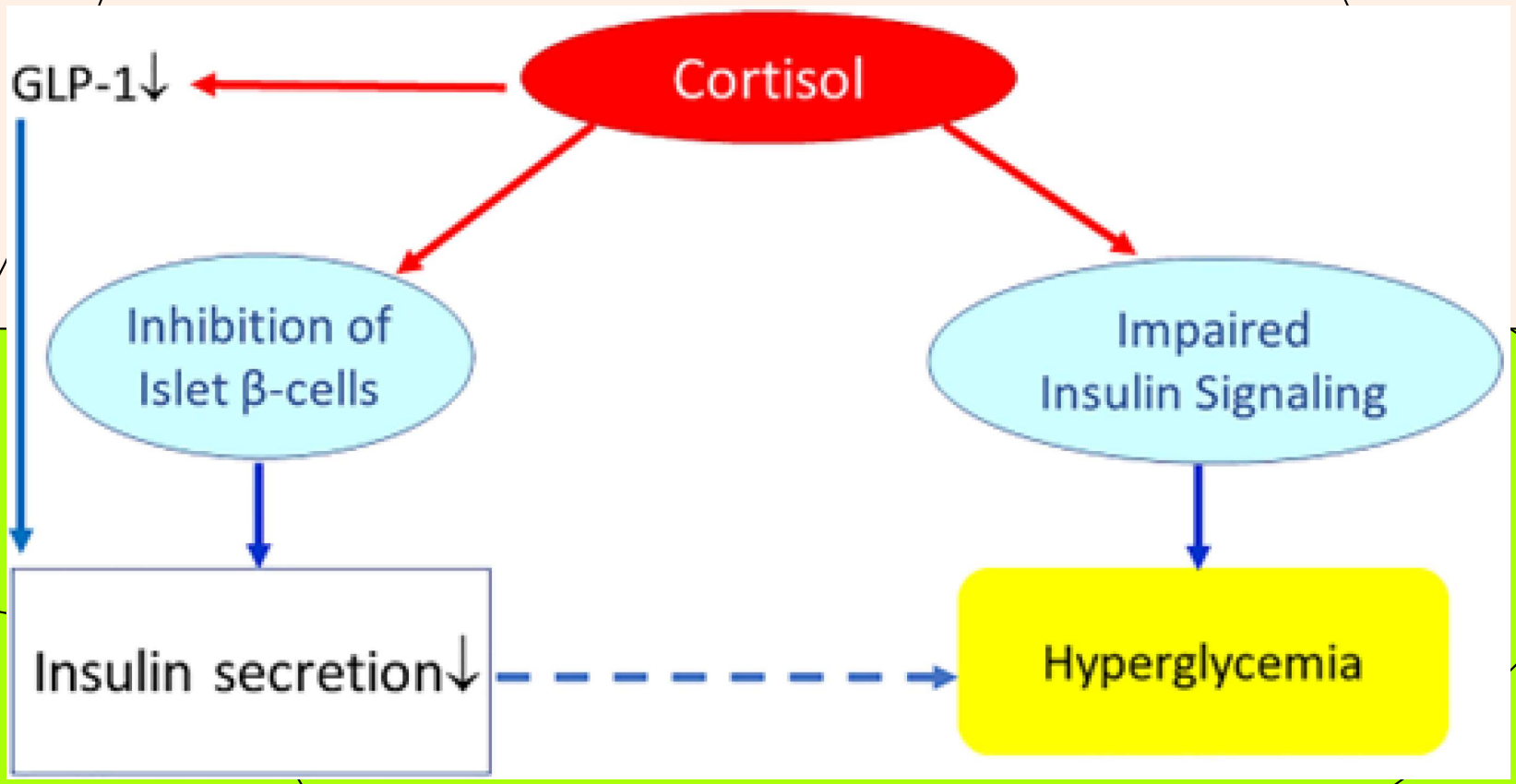
Dam Offspring Study population. Depress Anxiety. 2010. 27(9):846-51. PMID: 20112247.

Andrews RC, Herlihy O, Livingstone DEW, et al. Abnormal cortisol metabolism and tissue sensitivity to cortisol in patients with glucose intolerance.The Journal of Clinical Endocrinology. 2002;87(12):5587-5593.

IR and Cortisol/Stress



Joseph AM, Janssen JL. Int J Mol Sci. 2022;23(15):8178.

Cortisol and Cardiovascular Disease

- 2006 CARDIA study (n=718, av. Age 40)
- Results – the quartile with the flattest diurnal cortisol slopes were approximately 3 & 1/3 times more likely to have coronary calcification
- Results independent upon socioeconomic status and established cardiovascular risk factors

Matthews K, et al. Diurnal cortisol decline is related to coronary calcifications: CARDIA Study. Psychosom Med. 2006;68:657-661.

Cortisol and Cardiovascular Disease

- 2020 study, n=174 middle-aged patients with acute MI compared to 3156 controls
- Median hair cortisol studied

RESULTS:

- The median Hair Cortisol Concentrations (HCC) for those who had suffered an AMI was 53.2 pg/mg compared to 22.2 pg/mg for the control group
- Conclusion: Middle-aged persons with acute myocardial infarction have significantly elevated cortisol levels during the month before the cardiac event

Faresjo T, et al. Elevated levels of cortisol in hair preceded acute myocardial infarction. Sci Reports. 2020;10(1):10.1038/s41598-020-80559-9

HPA axis: Cortisol and Cholesterol Metabolism

- Chronic stress and elevated cortisol are correlated with cholesterol imbalances
  - Decreased HDL
  - Increased triglycerides
  - Increased total cholesterol
  - Increased ox-LDL

Rosmond R, et al. The hypothalamic-pituitary-adrenal axis activates as a predictor of cardiovascualr disease, type 2 diabetes and stroke. J Intern Med. 2000;247(2):188-97.

Cortisol and Metabolic Syndrome (MetS)

- 2013 clinical study (n=1258 aged 16-64)
- Hair cortisol analyzed
- A higher prevalence of MetS reported in those with elevated long-term cortisol secretion

Stalder T, et al. Cortisol in hair and the metabolic syndrome. J Clin Endocrinol Metab. 2013;98(6):2573-80.

Cortisol Bone Loss

- Clinical study (n=43) men ages 20-59
- 27 male cyclists (non-weight bearing) and 16 runners (weight bearing)
- Results – cyclists had significantly lower bone mineral density vs. runners
- Cyclists 7x more likely to develop osteopenia of the spine

Rector RS, et al. Participation in road cycling vs running is associated with lower bone mineral density in men. Metabolism. 2008;57(2):226-32.

Cortisol and Stress Fractures

- Cortisol reported to imbalance acid/base regulation – lactate □
- Exacerbation of acid-induced net calcium efflux from bone
- Decreased bone mineral density
- Functional vitamin D deficiency also reported to be correlated with w/acute stress

Lee P. Vitamin D metabolism and deficiency in critical illness. Best Pract Res Clin Endocrinol Metab. 2011;25(5):769-81.

Boling EP. Secondary osteoporosis: underlying disease and the risk for glycocorticoid-induced osteoporosis. Clin Ther. 2004;26(1):1-14.

Cortisol and Bone Loss

Cortisol and Cognitive Dysfunction

- 2013 randomized clinical study (n=390 elderly pts)
- 158 control, 92 cognitive impaired and 59 dementia
- Measured serum cortisol
- RESULTS: A positive correlation between elevated cortisol and dementia

Lara VP, et al. High cortisol levels are associated with cognitive impairment no-dementia (CIND) and dementia. Clin Chim Acta. 2013;423:18-22.

Cortisol and Sleep

- Cortisol release is controlled in slow-wave sleep by decreases in corticotropin-releasing hormone (CRH) and increases in growth hormone (GH)
- Exposure to chronic stressors imbalances HPA axis and disrupts normal diurnal pattern of GH, CRH and ACTH release
- Results in a paradoxical rise in cortisol in evening hours and initial sleep phases
- Nocturnal hypercortisolism can lead to sleep fragmentation, increasing cortisol even more

Nys LD, et al. The effects of physical activity on cortisol and sleep: A systematic review and meta-analysis. Psychoneuroendocrinology. 2022;143:105843.

Insomnia or Disrupted Sleep

- Alters Growth Hormone release
- Increases TNF alpha, IL-6
- Increases insulin resistance
- Contributes to weight gain
- Increases TBG
- Decreases mental performance and focus
- < 7 hr sleep reported to increase musculoskeletal injury in athletes

Cauter EV, et al. Metabolic consequences of sleep and sleep loss. Sleep med. 2008l9 Suppl 1(0 1):S23-8.

Huang K, Ihm J. Sleep and injury risk. Curr Sports Med Rep. 2021;20(6):286-90.

Prolactin

- Stress can increase release of prolactin
- Exercise also increases circulating prolactin lvels
- Prolactin can interfere with secretion of gonadotropin-releasing hormone
- Results in decreasing testosterone levels
  - Decreased performance
  - Increased time to recovery
  - Increased injury risk
  - Sexual dysfunction

Sonksen PH, et al. Why do endocrine profiles in elite athletes differ between sports? Clin Diab Endocrin. 2018;4:3.

Study: Exercise and Testosterone/Cortisol Ratio

- 2012 Clinical study (n=24) untrained men
- Divided equally into 3 groups
  - Endurance training
  - Resistance training
  - Concurrent training
- 12-week protocol

Shakeri N, et al. The effect of different types of exercise on the testosterone/cortisol ratio in untrained young males. Annals Biol Res. 2012;3(3):1452-1460.

Free Testosterone/Cortisol (FTCR)

- Free testosterone and Cortisol monitored
- Sex Hormone Binding Globulin is elevated in over trained
- Decreased FSH and LH excretion

Shakeri N, et al. The effect of different types of exercise on the testosterone/cortisol ratio in untrained young males. Annals Biol Res. 2012;3(3):1452-1460.

Testosterone over 12 weeks

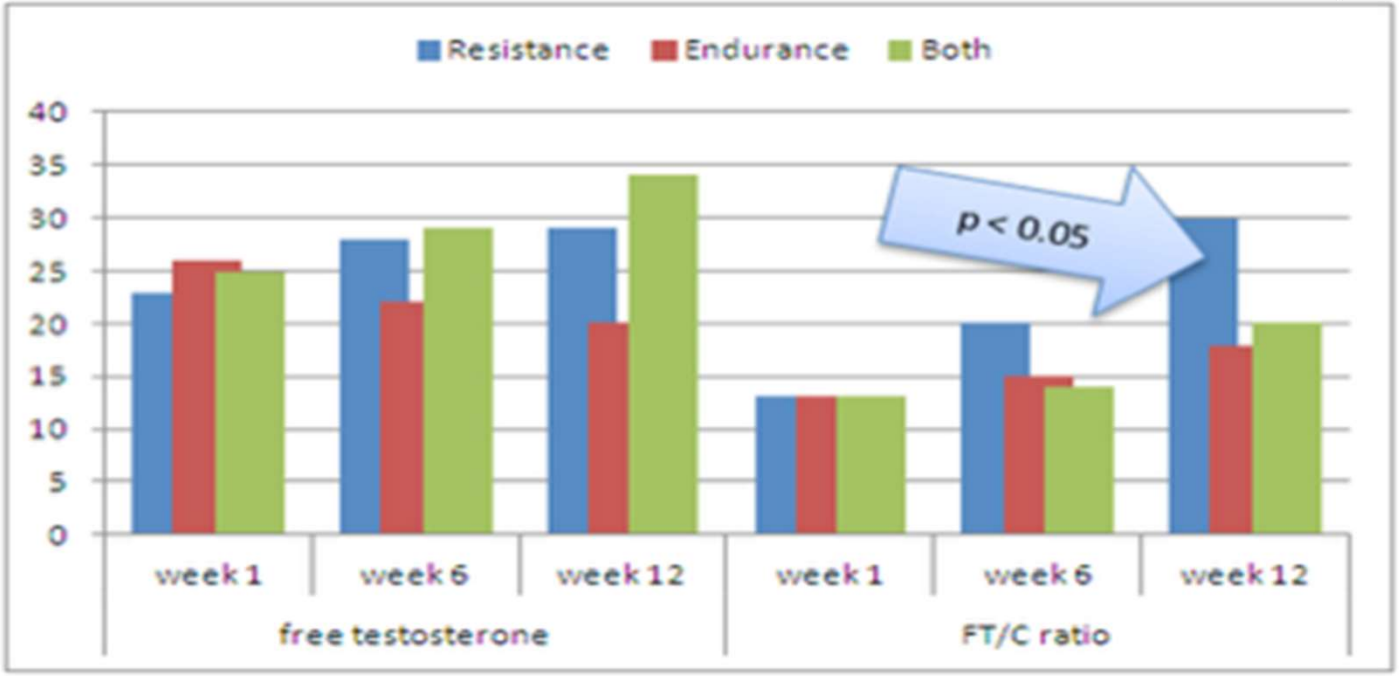


Figure 2: Free testosterone (pg/ml) and free testosterone to cortisol ratio (data adapted from Shakeri. 2012)

Shakeri N, et al. The effect of different types of exercise on the testosterone/cortisol ratio in untrained young males. Annals Biol Res. 2012;3(3):1452-1460.

Bottom Line — Exercise and Metabolism

Higher testosterone to cortisol ratios are correlated to strength gains and tissue anabolism and improved performance and overall well-being in men and women

Shakeri N, et al. The effect of different types of exercise on the testosterone/cortisol ratio in untrained young males. Annals Biol Res. 2012;3(3):1452-1460.

Cortisol Supportive Supplements

Cortisol - Supportive Nutrients
Rhodiola rosea root

- "Second generation" plant adaptogen
- Used to support stress and stress response
- Helps balance cortisol and support adrenals
- Decreases anxiety
- Supports improved mental and physical performance
  - Rhodiola – adaptogen; 2011 meta-analysis supported positive effects on physical and mental performance
- 500mg daily std. to 5 % rosavins

Hung SK, Perry R, Ernst E. Phytomedicine. 2011;18(4):235-44.

Rhodiola - Selected Clinical Studies

- 2011 systematic review of clinical studies on Rhodiola
  - 11 randomized, placebo-controlled clinical studies reviewed
  - Conclusion: Rhodiola has beneficial effects on:
    - Physical Performance
    - Mental Performance
    - Mood Stabilization
- 2017 open-label, multicenter, single-arm trial (n=118, male/female)
  - Patients presented with adrenal "burnout"
  - 400 mg daily single dose of rhodiola standardized extract for 12 weeks
  - Results: Significant improvement in symptoms after 1 week of therapy and continued improvement

Hung SK, Perry R, Ernst E. The effectiveness and efficacy of Rhodiola rosea L.: a systematic review of randomized clinical trials. Phytomedicine. 2011;18(4):235-44.

Kasper S, et al. Multicenter, open-label, exploratory clinical triad with Rhodiola rosea extract in patients suffering from burnout symptoms. Neuropsychiat Dis Treat. 2017;22:889-898.

Cordyceps (*Cordyceps sinensis*)

- Caterpillar mycelium
- Used for adaptogenic and immune support
- Decreases oxidative stress
- Supports kidney function
  - Reported to protect against aminoglycoside and cyclosporine toxicity

Zhu J, et al., CordyMax Cs-4: A Scientific Product Review. Pharmanex Phytoscience Review Series, 1997.

Weng, S. C., Chou, C. J., Lin, L. C., Tsai, W. J., and Kuo, Y. C. Immunomodulatory functions of extracts from the Chinese medicinal fungus Cordyceps cicadae. J.Ethnopharmacol. 2002;83(1-2):79-85.

Cordyceps (Cordyceps sinensis)

- Improves cellular oxygenation; improves VO2
- Increased sexual vitality in both men and women
- Direct action on sexual center of brain/ HPA axis

Zhu J, et al., CordyMax Cs-4: A Scientific Product Review. Pharmanex Phytoscience Review Series, 1997.

Weng, S. C., Chou, C. J., Lin, L. C., Tsai, W. J., and Kuo, Y. C. Immunomodulatory functions of extracts from the Chinese medicinal fungus Cordyceps cicadae. J.Ethnopharmacol. 2002;83(1-2):79-85.

Thai Ginseng

- Thai ginseng (Kaempferia parviflora) root
- Aka Black ginger
- Improves mitochondrial biogenesis
- Supports stress, cortisol
- SIRT1 regulation – 4x more powerful than resveratrol
- Increases whole-body energy expenditure (EE)
- Improves brown adipose tissue (BAT) production

- 100-200mg daily std. to 4-5% 5,7 dimethoxyflavone

Kim MB, et al. Standardized Kaempferia parviflora extract enhances exercise performance through activation of mitochondrial biogenesis. J Med Food. 2018;21(1):30-38.

Magnolia/Phellodendron

- Proprietary blend of Chinese herbs Magnolia and Phellodendron (bark)
- Used for Stress and Stress-related appetite control
- Anti-anxiety and anti-stress properties rival benzodiazepines, yet non-sedating and no “hangover” effect
- Improves cortisol balance

Kuribara H, Kishi E, Hattori N, Okada M, Maruyama Y. The anxiolytic effect of two oriental herbal drugs in Japan attributed to honokiol from magnolia bark. J Pharm Pharmacol. 2000;52(11):1425-9.

Maruyama Y, Kuribara H, Morita M, Yuzurihara M, Weintraub ST. Identification of magnolol and honokiol as anxiolytic agents in extracts of saiboku-to, an oriental herbal medicine. J Nat Prod. 1998;61:135-8.

Kalman et al. Effect of a proprietary Magnolia and Phellodendron extract on stress levels in healthy women: a pilot, double-blind,placebo-controlled clinical trial. Nutr J. 2008;7(1):11.

Magnolia/ Phellodendron Study

Double blind-placebo controlled clinical study (n=26)

- Overweight, otherwise healthy premenopausal females
- 250mg tid x 6 weeks
- Significantly reduced transitory anxiety and stress-related eating

Kuribara H, Kishi E, Hattori N, Okada M, Maruyama Y. The anxiolytic effect of two oriental herbal drugs in Japan attributed to honokiol from magnolia bark. J Pharm Pharmacol. 2000;52(11):1425-9.

Maruyama Y, Kuribara H, Morita M, Yuzurihara M, Weintraub ST. Identification of magnolol and honokiol as anxiolytic agents in extracts of saiboku-to, an oriental herbal medicine. J Nat Prod. 1998;61:135-8.

Kalman et al. Effect of a proprietary Magnolia and Phellodendron extract on stress levels in healthy women: a pilot, double-blind,placebo-controlled clinical trial. Nutr J. 2008;7(1):11.

Magnolia/Phellodendron Study

- 2013 clinical study (n=56) published in Journal of International Society of Sports Nutrition
- 250mg bid x 4 weeks
- Improved salivary cortisol
- Improved mood
- Improved overall well-being and decreased stress

Talbott et al. Effect of Magnolia officinalis and Phellodendon amurense (Relora) on cortisol and psychological mood state in moderately stressed subjects. J Int Soc Sports Nutr. 2013;10(1):37.

Holy basil (*Ocimum sanctum*) leaf/whole plant

- Ayurvedic herb
- Adaptogenic
- Antifatigue, antistress
- 2011 Study (n=79, 6 weeks) to evaluate a proprietary holy basil extract in stress
- 1,200mg daily x 6 weeks
- Results = 39% improvement in stress symptoms vs. placebo
- No adverse events/ well tolerated

Saxena RC, et al. Efficacy of an Extract of Ocimum tenuiflorum (OciBest) in the Management of General Stress: A Double-Blind, Placebo-Controlled Study. Evid Based Compolement Alternat Med. 2012;2012:894509

Cortisol - Supportive Nutrients

- B vitamins
  - B6 (pyridoxal-5-phosphate) – attenuates rise in growth hormone during exercise
  - PQQ (Pyrroloquinoline quinone)
  - Benfotiamine
  - B12 cyanocobalamin
- Vitamin C
  - Highest concentration of vitamin C in adrenals

Adrenal Glandular

- From grass-fed Argentinian or New Zealand cattle
- Improved cortisol regulation
- Improved cellular energy production and utilization
- Improved energy, stamina and performance
- Adrenal glandular whole extract for LOW cortisol, no anxiety
- Adrenal cortex for LOW cortisol and anxiety
- Can be pulsed to match circadian rhythm

Nutrients: Thyroid Support

- **7 Keto DHEA**: 100mg BID
- **Selenium**: 200mcg/day
- **Ashwagandha**: 500mg daily std. 3.5% with anolides
- **Coleus**: 250mg BID std. 20% forskohlin
- **Iodine/fucus/kelp**: 1-3mg/day
- **Thyroid glandular**: 37-120mg BID
- **L-tyrosine**: 250mg BID-TID

Selenium

- Thyroid gland has highest concentration of selenium per gram of organ tissue
- Reported effective support in autoimmune thyroiditis
- Selenomethionine more absorbable and bioavailable

Van Zuuren EJ, Albusta AY, Fedorowicz Z, et al. Selenium supplementation for Hashimoto's thyroiditis. Cochrane Database Syst Rev. 2013;CD010223.

Thyroid Support – Antibodies?

If no antibodies:

- Selenomethione + Iodine – 1 tab TID (200mcg/3mg)
- Provides all nutrients needed to support thyroid hormone production
  - Iodine – kelp 3mg/3
  - Selenium- cofactor in T4/T3 conversion

If high antibodies:

- Low allergen diet
- Balance gut – Berberine/cat's claw, L-Glutamine, avian albumin powder, Aloe, probiotics, digestive enzymes
- Plant sterols/sterolins - balance immune cells
- Check for environmental exposures (heavy metals)
- Check stress hormones

URL of this page: https://medlineplus.gov/druginfo/meds/a619057.html

Semaglutide

pronounced as (sem" a gloo' tide)

Semaglutide

- Semaglutide may have an affect on the thyroid with an increased risk of thyroid nodules.
- Semaglutide may slow down the absorption of thyroid medications.
  - Must take into consideration and adjust thyroid medications as needed.

American Diabetes Association. Diabetes Care

Diabetes Care. 2023 Feb; 46(2): 249–251.
Published online 2022 Dec 16. doi: 10.2337/dci22-0052

PMCID: PMC9887624
PMID: 36525594

Putting GLP-1 RAs and Thyroid Cancer in Context: Additional Evidence and Remaining Doubts

Caroline A. Thompson and Til Stürmer

Thank You