

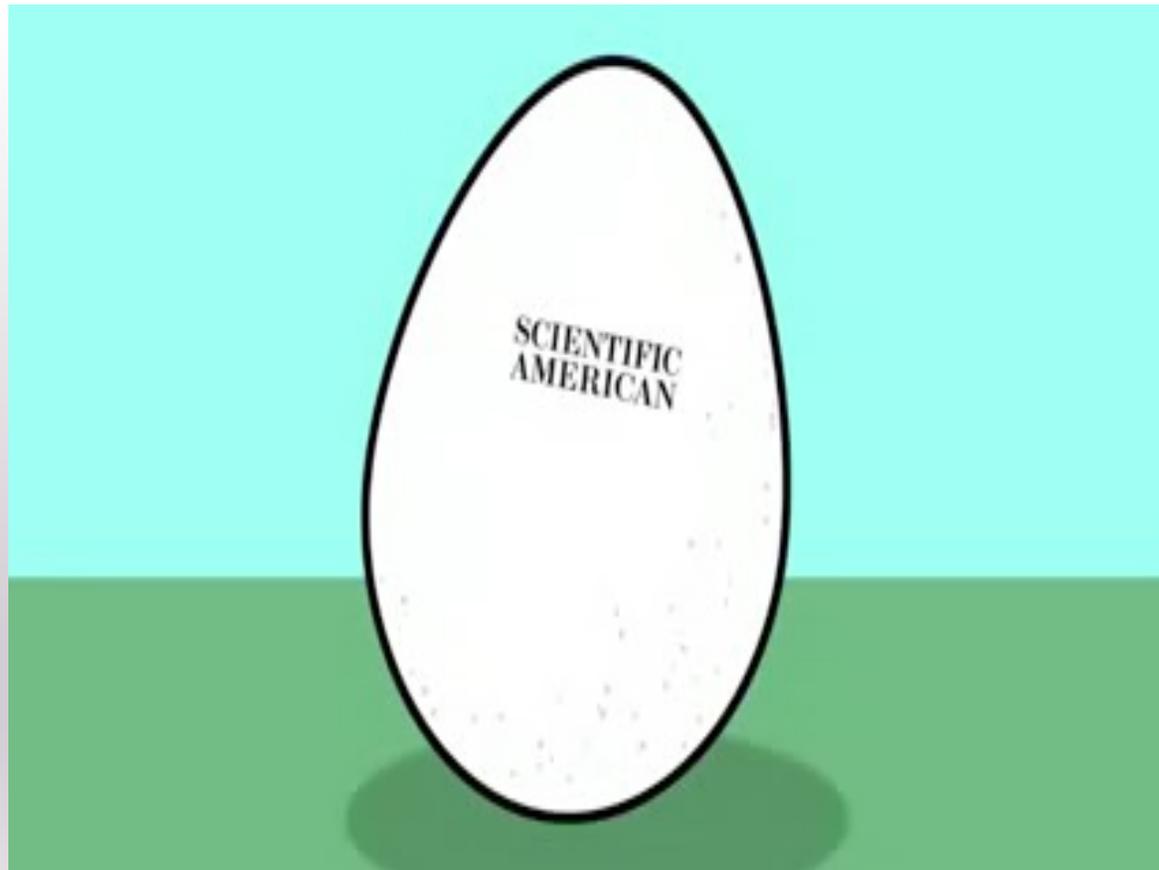
The Science of Stress

*...and what to do
about it!!*



DR. ERICA
Oberg

Stress physiology in 3 minutes



58%

of Americans say work is a significant source of stress. (APA, 2017)



1 in 5

Americans say tech is a major source of stress



43%

(APA, 2017)

of Americans identify as "constant checkers"

Main sources of work stress (ComPsych, 2016)



4x

Workers experiencing a recent organizational change are 4x more likely to report experiencing physical health symptoms at work (APA, 2017)



Millennials

experience more depression and anxiety at work than any other generation (BDA, 2013, MMPI, 2017)



\$300

billion / year

Occupational stress costs U.S. employers an estimated \$300B annually through absenteeism, illness, productivity.

(APA, 2017)

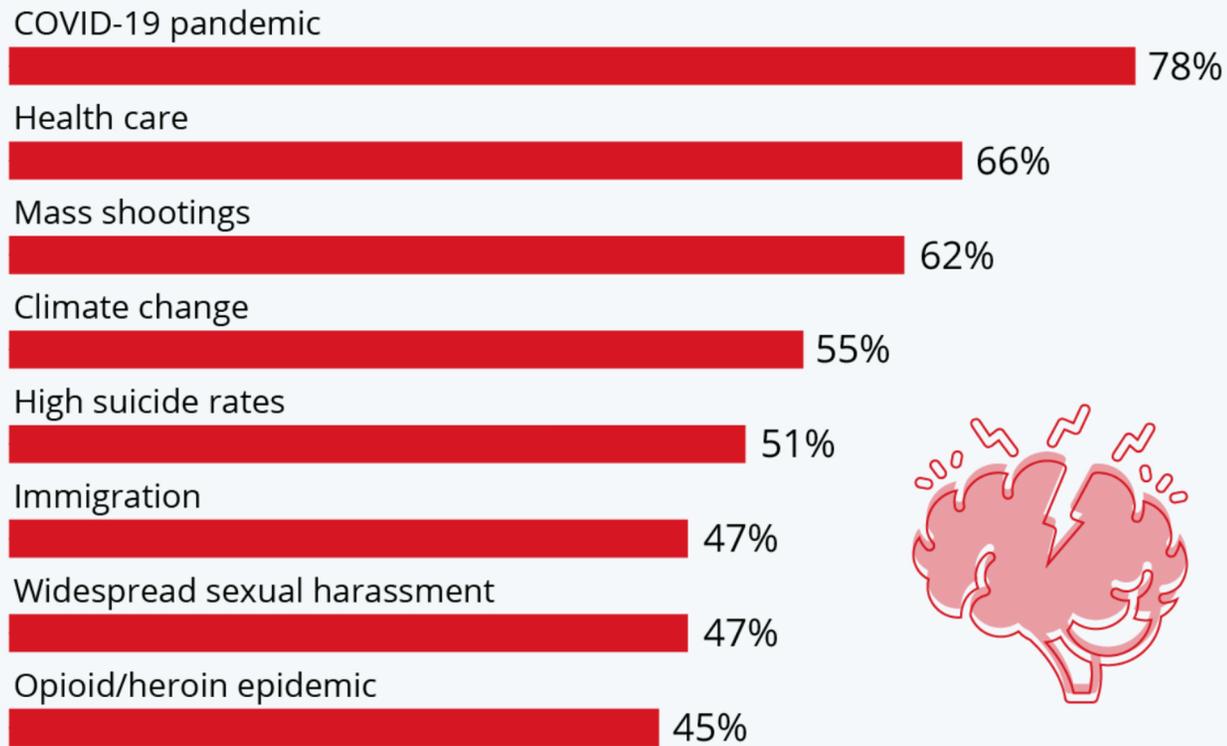
Companies in the FTSE 100 that prioritize employee engagement and well-being outperform the rest of the FTSE 100 by 10% (Workwell FTSE 100, 2014)



meditationatwork.com

What Is Stressing America Out?

Percent of U.S. adults who reported stress caused by the following topics



3,409 U.S. adults surveyed Aug 4-26, 2020
Source: APA Stress in America 2020

INTERHEART study

researched 24,767 people from 52 countries

- ✓ Stressful life events
- ✓ Financial stress:
dissatisfaction with economic status
- ✓ Sense of control
- ✓ Presence of depression



Lancet. 2004;364(9438):937-52

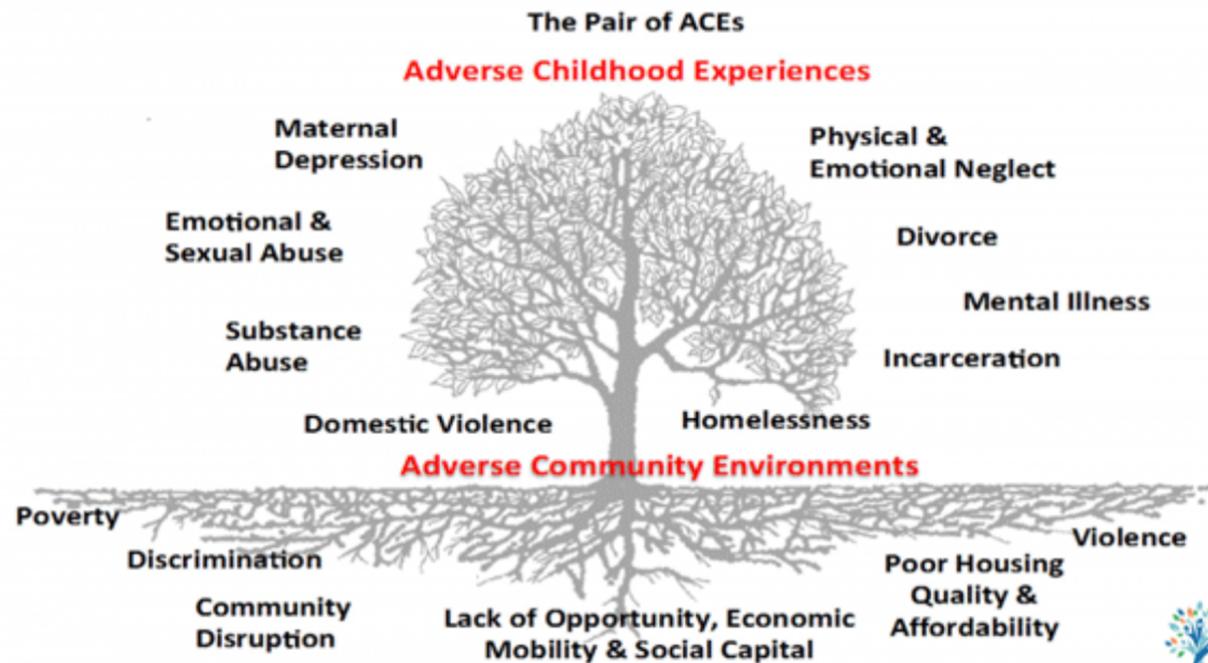
DR. ERICA
Oberg

Stress increases CVD risk more than 50%

ACES study

over 17,000 children

- Childhood stress leads to adverse health effects in adulthood
- Childhood stress predicts earlier mortality
- Childhood stress can be healed with counseling & forgiveness



© Ellis 2020



DR. ERICA
Oberg

HOW **STRESS** & **ANXIETY** AFFECTS YOUR BODY

BRAIN

Difficulty concentrating, anxiety, depression, irritability, mood, mind fog

CARDIOVASCULAR

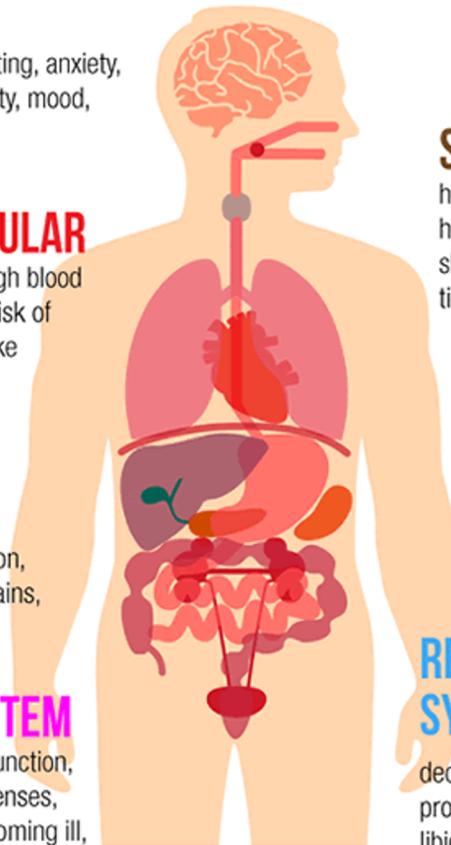
higher cholesterol, high blood pressure, increased risk of heart attack and stroke

JOINTS AND MUSCLES

increased inflammation, tension, aches and pains, muscle tightness

IMMUNE SYSTEM

decreased immune function, lowered immune defenses, increased risk of becoming ill, increase in recovery time



SKIN

hair loss, dull/brittle hair, brittle nails, dry skin, acne, delayed tissue repair

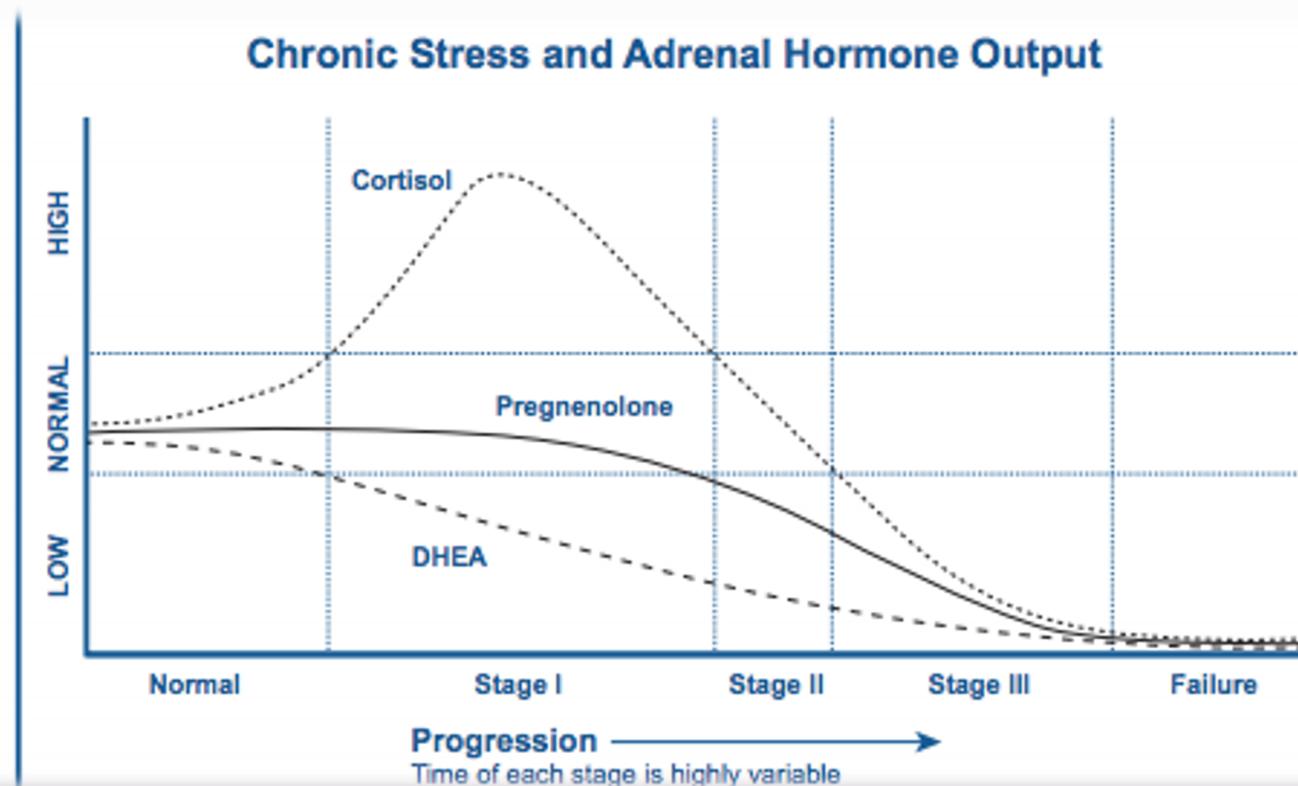
GUT

nutrient absorption, diarrhea, constipation, indigestion, bloating, pain and discomfort

REPRODUCTIVE SYSTEM

decreased hormone production, decrease in libido, increase in PMS symptoms

Selye's General Adaptation Theory



Example 1: hyperactive adrenals



- 21F taking semester off college d/t health status
- 60 lb gain in 8 mo
- Rashes, anxiety, freneticism insomnia, fatigue
- Misdiagnosed as Lyme Dz



Hyperactive adrenals



Hyperactive adrenals

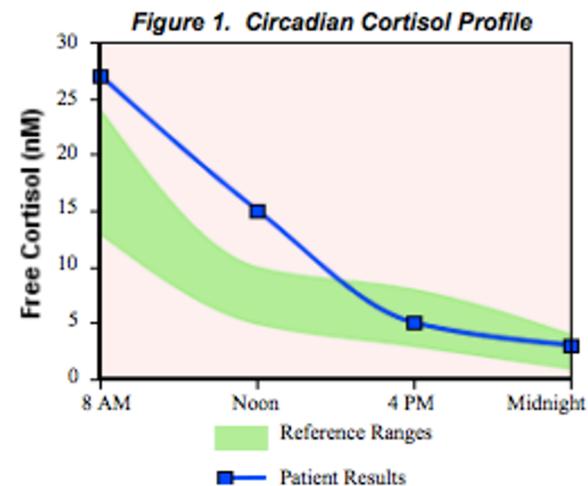
Test	Description	Result	Ref Values
------	-------------	--------	------------

ASI Adrenal Stress Index (Original) - Saliva

TAP	Cortisol rhythm (saliva)	Result	Ref Values
	06:00 - 08:00 AM	27 Elevated	Adults (M/F): 13-24 nM
	11:00 - 1:00 PM	15 Elevated	5-10 nM
	04:00 - 05:00 PM	5 Normal	3-8 nM
	10:00 - Midnight	3 Normal	1-4 nM

Total Cortisol Output: 50 **22 - 46 nM**

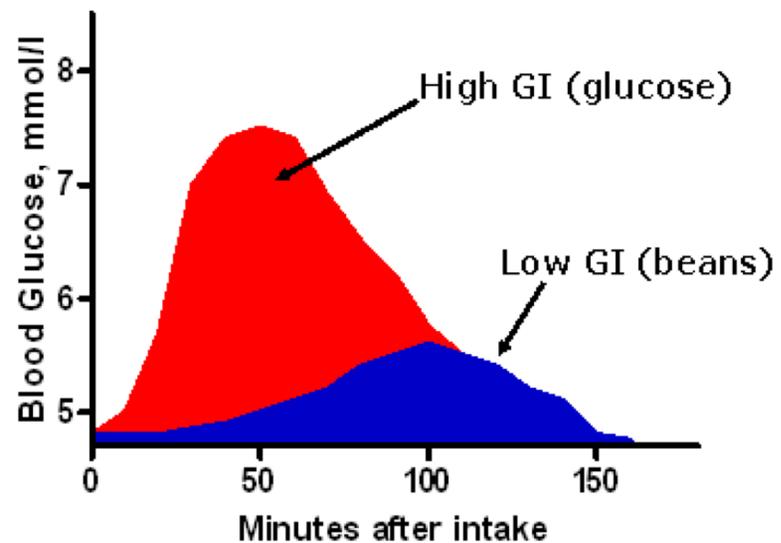
The Total Cortisol Output is the sum of the four cortisol values. Elevated values may indicate hypercortisolism or exogenous exposure, and low values suggest adrenal hypofunction.



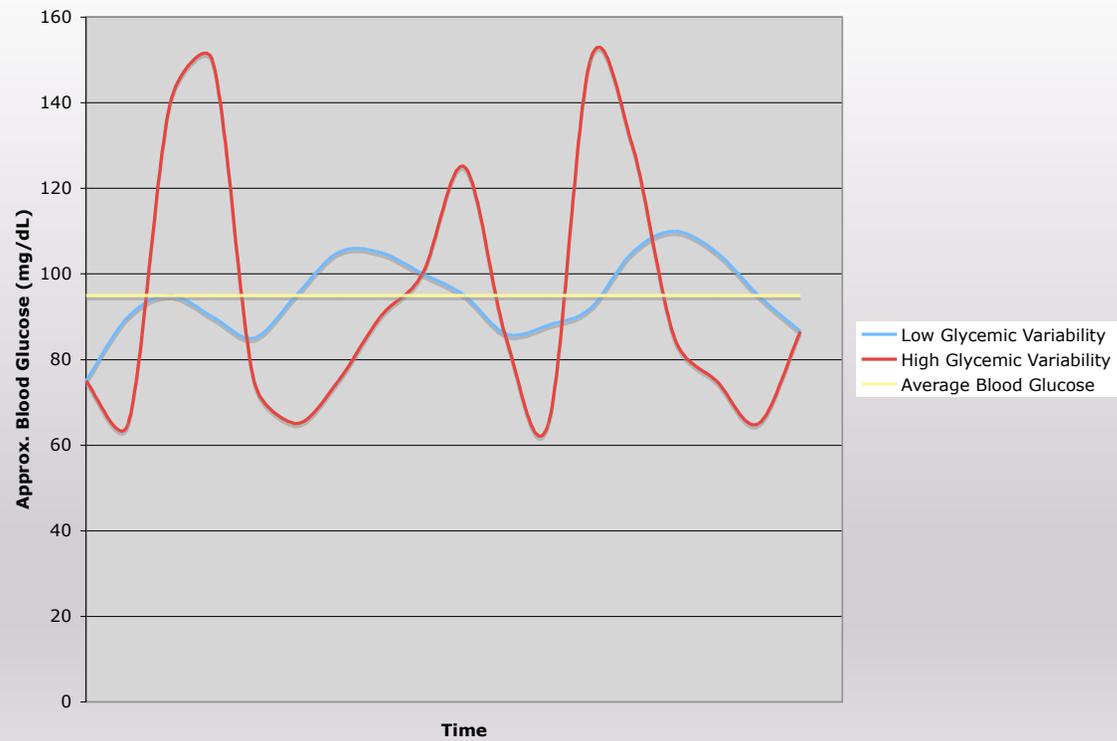
Eating for overactive adrenals

- Anti-inflammatory diet
- Avoid food allergies
- Low glycemic index
- Ketogenic or paleo diet?

Glycemic Index



Glycemic Variability

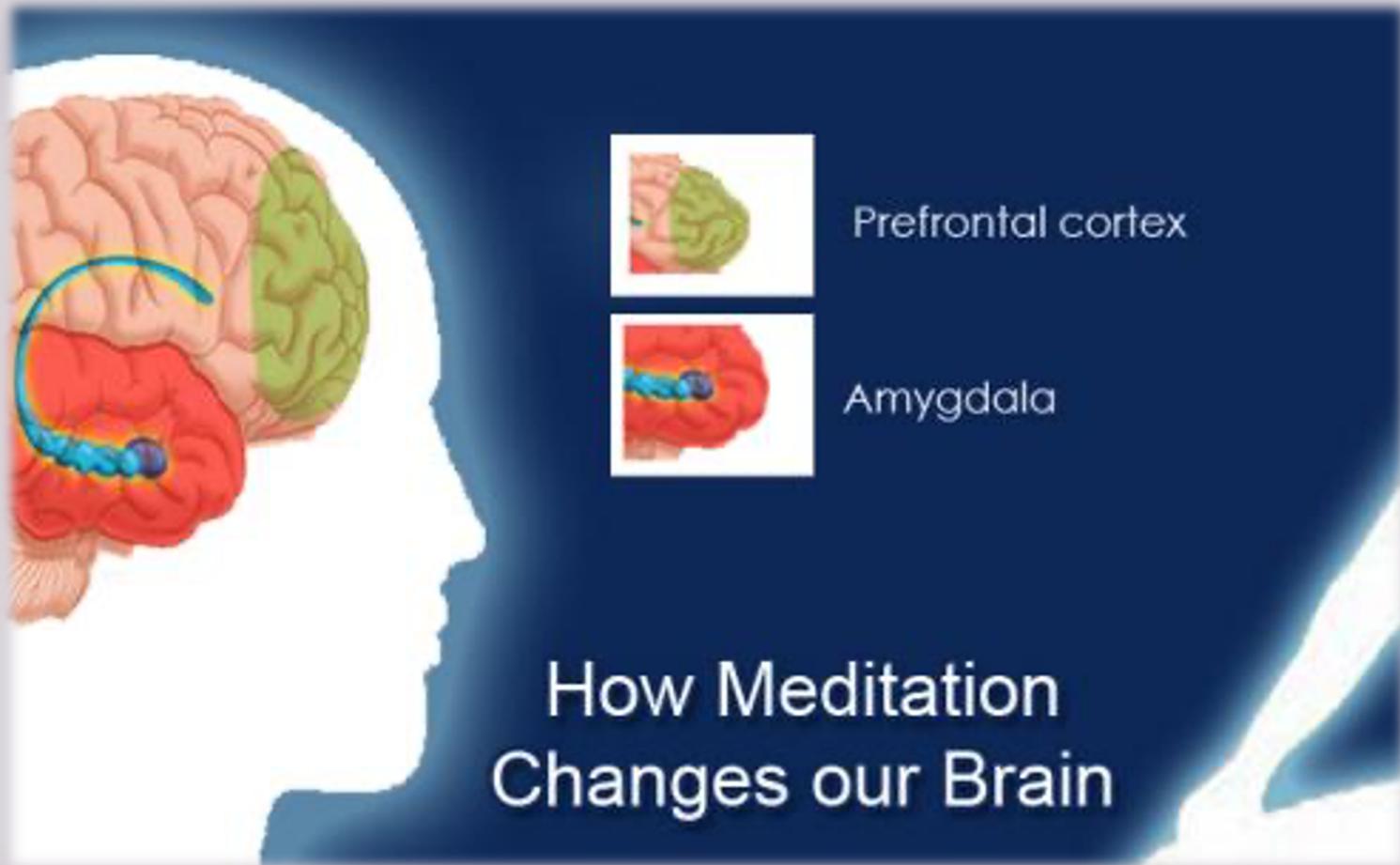


DR. ERICA
Oberg

DR. ERICA
Oberg

The most
important
thing...





Prefrontal cortex

Amygdala

How Meditation Changes our Brain

DR. ERICA
Oberg

Rebecca Gladding "This is your Brain on Meditation" Psychology Today 2019

CASE REPORT

Self-directed Mindfulness Training and Improvement in Blood Pressure, Migraine Frequency, and Quality of Life

自我指导式的正念训练及改善高血压、偏头痛频率和生活质量

Formación autodirigida en la atención plena y mejora de la tensión arterial, la frecuencia de las migrañas y la calidad de vida

Erica B. Oberg, ND, MPH, *United States*; Margaret Rempe, PhD, *United States*; Ryan Bradley, ND, MPH, *United States*

Author Affiliations
Bastyr University,
California, San Diego;
(Drs Oberg and Bradley);
Seattle University,
Washington (Dr Rempe).

Correspondence
Erica B. Oberg, ND, MPH
eoberg@bastyr.edu

Citation
Global Adv Health Med.
2013;2(2):20-25. DOI:
10.7453/gahmj.2013.006

Disclosures
The authors have no
ethical or financial
conflicts of interest
to report.

Key Words
Mindfulness, medita-
tion, hypertension,
migraine, complementary
and alternative
medicine, case report,
patient-centered care

ABSTRACT

Background: Interest in case studies has undergone a resurgence concurrent with increasing prioritization of illustrations of patient-centered care. However, substantial inclusion of the patient in these reports remains limited. Here, a doctor and patient collaborate to present her case report of self-directed mindfulness training and the subsequent changes in blood pressure, migraine frequency, and quality of life.

Methods: After receiving encouragement from her naturopathic doctor, the patient initiated an 8-week program in mindfulness training following the Kabat-Zinn protocol and logged her daily blood pressure and symptoms before and after meditation sessions over an 11-week period.

Results: Patient-reported outcomes included decreased perceived stress, increased focus, and a newfound sense of centeredness and calm. Changes in objective outcomes were clinically and statistically significant, including reductions in mean systolic and diastolic blood pressure between week 1 and week 11 ($P = .0001$ and $P = .0004$ for systolic and diastolic, respectively, by paired, 2-sided *t*-tests). Self-reported frequency of chronic migraine was also reduced. Critical to the patient's success was that mindfulness training was first approached in a simple, accessible manner prior to embarking on a deeper, extended experience.

Discussion and Conclusion: Self-directed mindfulness training can have a meaningful impact on both

subjective and objective health outcomes. It may take years of encouragement from a healthcare provider before a patient is ready to adopt a mind-body practice; it is important to recognize and counsel patients with messages appropriate to their stage of change and self-efficacy. Additionally, case studies that combine the voice of the clinician and the patient can provide useful illustrations of truly patient-centered care.

抽象

背景: 在对病例研究的兴趣重现的同时, 对以患者为中心的护理描述也得到进一步的重视。但是, 这些报告中有关患者的实在内容仍是有限。一名医生和患者共同完成她的病例报告, 在此介绍其自我指导式的正念训练及随后在高血压、偏头痛频率和生活质量上的变化。

方法: 在自然疗法医生的鼓励下, 该患者在接受 Kabat-Zinn 的治疗方案后, 开始了一项为期 8 周的正念训练计划, 并每天记录冥想前后的血压和症状, 为期 11 周。

结果: 病人报告的结果包括感觉压力降低、注意力更集中、并产生中心与平静感。客观结果有临床和统计上显著的变化, 包括第 1 周和第 11 周之间的平均收缩压和舒张压降低 (通过配对双面对 *t* 检验, 收缩压和舒张压分别为 $P = .0001$ 及 $P = .0004$)。自我报告的慢性偏头痛频率也有所降低。患者成功的关键是先前简单、易于理解的方式开始正念训练, 之后再进行更深层次、更久的训练。

讨论和结论: 自我指导式正念训

练可对主观和客观的健康结果产生有意义的影响。患者准备采取身心治疗方式前, 可能需要医疗服务提供者多年的支持; 重要的是识别及使用符合患者变化与自我效能阶段的话语以进行咨询。此外, 结合临床医生和患者感受的病例研究可为真正以患者为中心的护理提供有用的例证。

SINOPSIS

Fundamentación: El interés en los estudios de casos clínicos ha experimentado un resurgir coincidente con el aumento del énfasis en la ejemplificación de la atención centrada en el paciente. Sin embargo, la inclusión del paciente de forma sustancial en estos estudios sigue siendo limitada. En el presente estudio, un médico y su paciente colaboran para presentar un caso clínico de formación autodirigida en la atención plena y los posteriores cambios en la tensión arterial, la frecuencia de las migrañas y la calidad de vida.

Métodos: Tras ser animada a ello por su médico naturista, la paciente inició un programa de 8 semanas sobre formación en la atención plena siguiendo el protocolo de Kabat-Zinn, y registró su tensión arterial diaria y sus síntomas antes y después de las sesiones de meditación durante un período de 11 semanas.

Resultados: Los resultados indicados por la paciente incluyeron una disminución del estrés percibido, un aumento de la concentración, y una nueva sensación de encontrarse centrada y en calma. Los cambios en los resultados objetivos



DR. ERICA
Oberg

Blood pressure changes

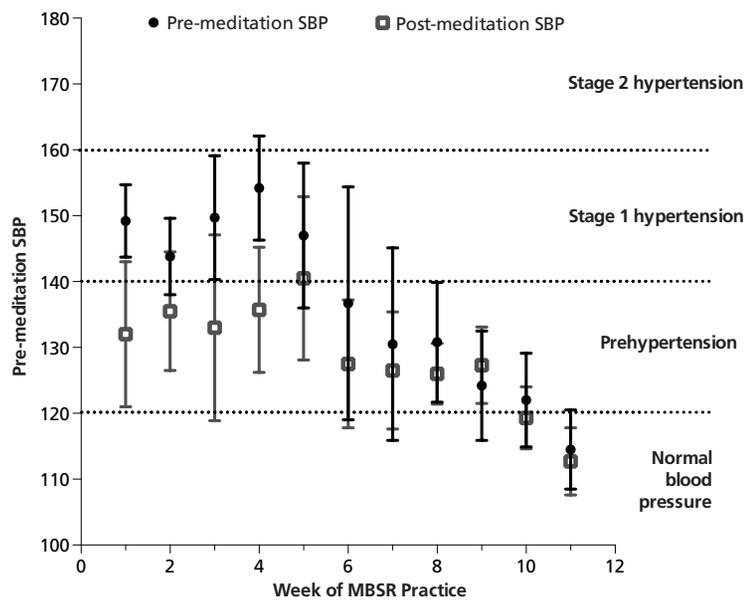


Figure 1a Systolic blood pressure over 11 weeks of MBSR.

Abbreviations: MBSR, mindfulness-based stress reduction; SBP, systolic blood pressure.

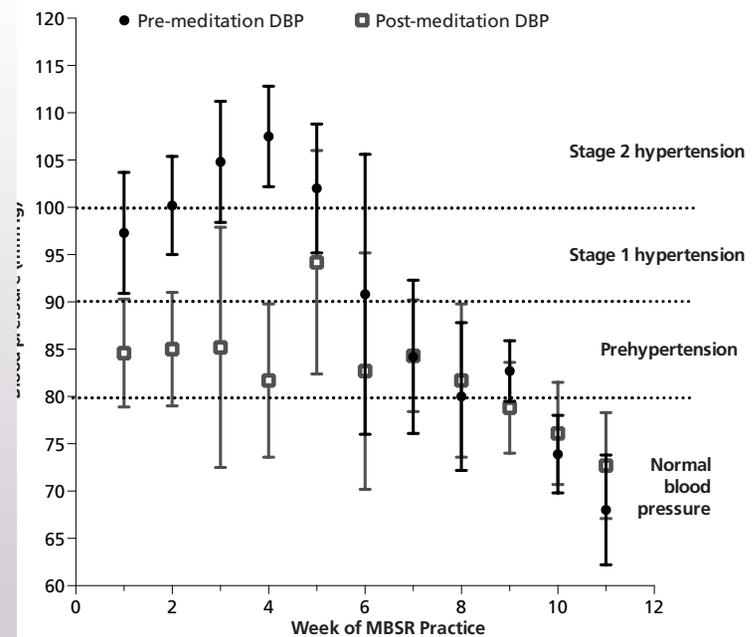


Figure 1b Diastolic blood pressure over 11 weeks of MBSR.

Abbreviations: DBP, diastolic blood pressure MBSR, mindfulness-based stress reduction.

L-theanine

Theanine (*Camellia sinensis*)

- Relaxing without sedation
- Increased GABA, dopamine
- Increased alpha-wave activity
- Synergistic with caffeine – best consumed as tea



Withania somnifera (ashwagandha)

- 300 mg reduces perceived stress, BMI & food cravings
- 55% decrease in cortisone metabolites



Choudhary et al. J Evid Based CAM 2019
Kalani et al, BMJ Case Rep 2018

Melatonin

- Increases in theta waves
- Inhibits cortisol
- Prevents nocturnal glucocorticoid signaling and gluconeogenesis
- Mitochondrial antioxidant
- Helps even in Alz-affected EEG changes

DR. ERICA
Oberg

Randomized Controlled Trial > Int J Neurosci. 2021 Jun;131(6):580-590.
doi: 10.1080/00207454.2020.1750392. Epub 2020 Apr 13.

Melatonin effects on EEG activity during non-rapid eye movement sleep in mild-to-moderate Alzheimer's disease: a pilot study

Manuel Alejandro Cruz-Aguilar ¹, Ignacio Ramírez-Salado ¹, Marisela Hernández-González ², Miguel Angel Guevara ³, Jahaziel Molina Del Río ⁴

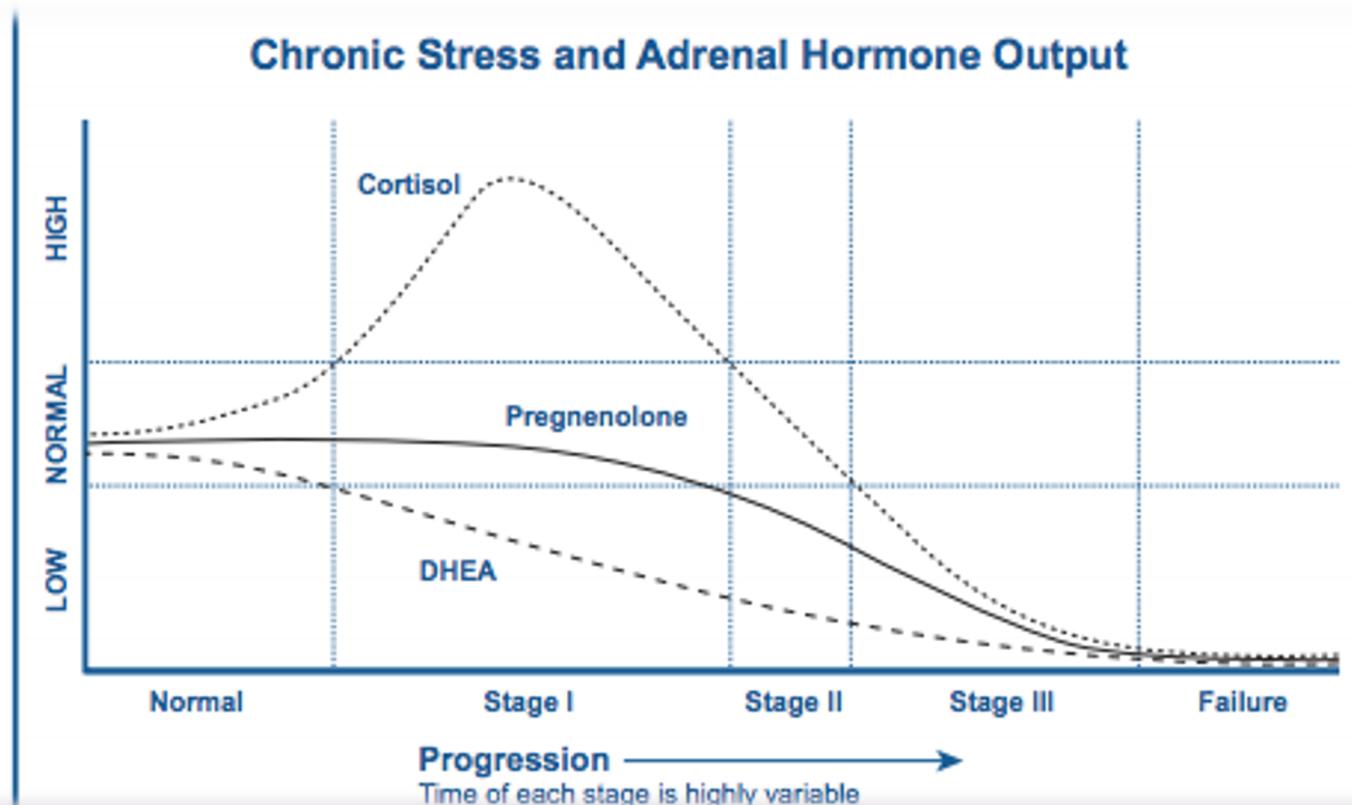
Affiliations + expand
PMID: 32228330 DOI: 10.1080/00207454.2020.1750392

Abstract

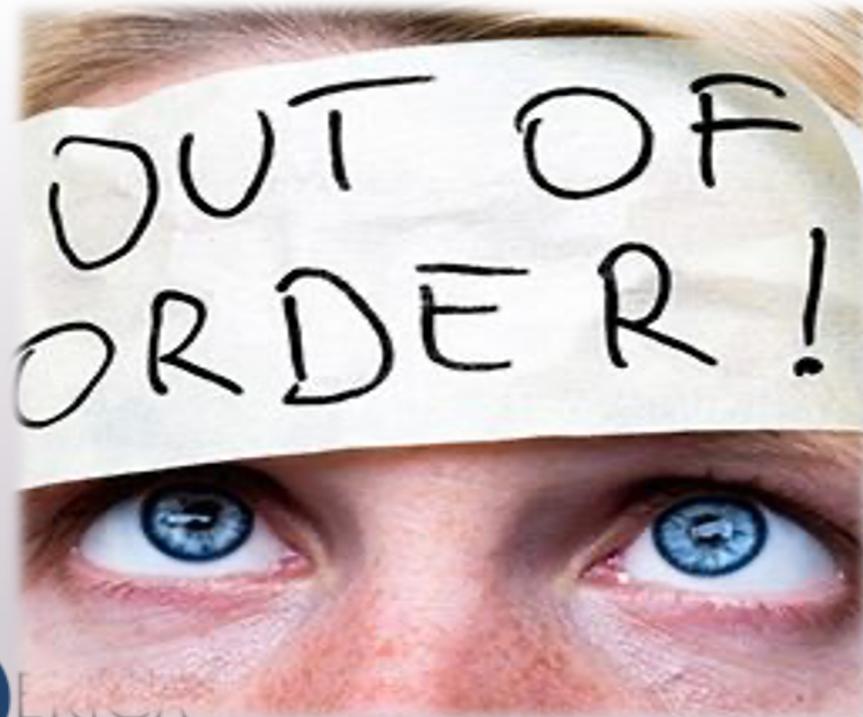
Introduction: There is evidence to suggest that melatonin diminishes non-rapid eye movement sleep (NREMS) latency in patients with Alzheimer's disease (AD). However, melatonin's effects on cortical activity during NREMS in AD have not been studied. The objective of this research was to analyze the effects of melatonin on cortical activity during the stages of NREMS in 8 mild-to-moderate AD patients that received 5-mg of fast-release melatonin.

Methods: During a single-blind, placebo-controlled crossover study, polysomnographic recordings were obtained from C3-A1, C4-A2, F7-T3, F8-T4, F3-F4 and O1-O2. Also, the relative power (RP)

Selye's General Adaptation Theory



Burned out adrenals



- Light-headedness, dizziness
- Low blood pressure
- Unstable blood sugar
- Cognitive, memory problems, brain fog
- Darkening skin
- Excess urination, craving salt
- Wired but tired

DR. ERICH
Oberg

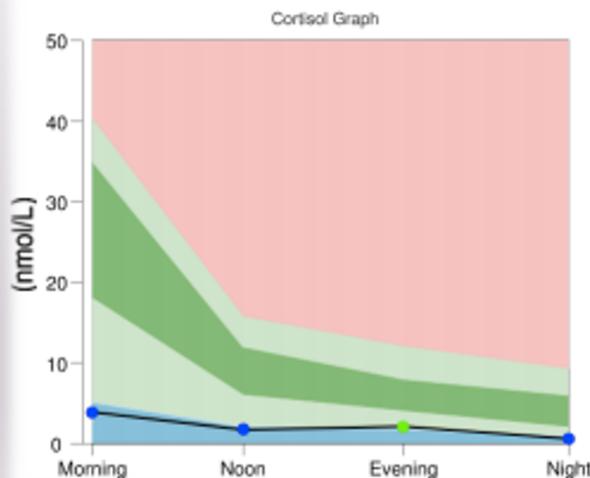
Example 2: burned out adrenals

- 57yo female
- Lean but type 2 diabetes x4 years
- 24yo son back at home, caretaking for mother with dementia
- Self-described “stress-eater” with no time for exercise
- Wondering about her “rash”



Adrenal insufficiency

ADRENALS					
DHEA	42.36	pg/ml	↓		106.0-300.0 female
Cortisol Morning	3.91	nmol/L	↓		5.1-40.2; optimal range: 18-35*
Cortisol Noon	1.72	nmol/L	↓		2.1-15.7; optimal range: 6-12*
Cortisol Evening	2.13	nmol/L	↓	◆	1.8-12; optimal range: 4-8*
Cortisol Night	0.60	nmol/L	↓		0.9-9.2; optimal range: 2-6*



H Hormone Interpretations:

- While DHEA levels are expected to decline with age (adrenopause), the current level is below the age related decline. The low DHEA level may warrant supplementation.
Note: Supplementation with DHEA may increase testosterone and/or estradiol.
- Diurnal cortisol pattern and reported symptoms are consistent with adrenal insufficiency (hypoadrenia), although concomitant thyroid and/or iodine insufficiency should be assessed.
- The reported symptoms are consistent with estrogen dominance; however, this should be assessed without progesterone and estradiol levels. The current sample is low for additional testing.

Notes:

L=Low (below range) WR=Within Range (within range) H=High (above range)

DHEA, Testosterone, Estrone and Estradiol results are for investigational use only.

*Always evaluate all four corticoids together. Clinical interpretation may vary.

Menopause & adrenal exhaustion



DR. ERICA
Oberberg

> Menopause. 2020 Dec 14;28(4):439-443. doi: 10.1097/GME.0000000000001703.

Hypothalamic-pituitary-adrenal axis, subjective, and thermal stress responses in midlife women with vasomotor symptoms

Margo D Nathan ¹, Aleta Wiley ^{1 2}, Pamela B Mahon ¹, Julie Camuso ¹, Kathryn Sullivan ¹, Kathleen McCormick ¹, Akanksha Srivastava ¹, Kim Albert ³, Paul Newhouse ^{3 4}, Hadine Joffe ^{1 2}

Affiliations + expand

PMID: 33323762 DOI: 10.1097/GME.0000000000001703

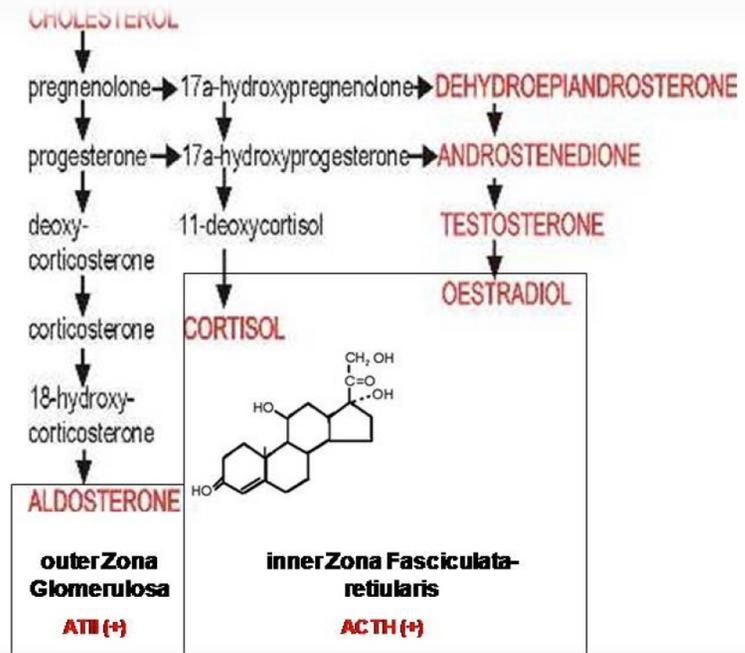
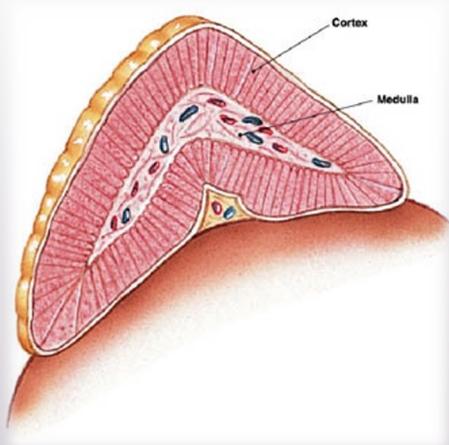
Abstract

Objective: Dysregulated responses to experimental stress paradigms may indicate exposure to chronic stress. Vasomotor symptoms (VMS) are linked with diminished quality of life and psychological stress, but induced stress responsivity has received limited investigation. We examined whether women with and without VMS differ in their evoked hypothalamic-pituitary-adrenal axis, subjective, hemodynamic, and thermal stress responses.

Methods: A total of 37 midlife women (27 VMS+; 10 VMS-) completed 2 experimental stress paradigms: (1) Montreal Imaging Stress Task (MIST; computerized social-evaluative stressor) and (2) Quantitative Sensory Testing (QST; thermal stress task). Responses on a five-domain (range 0-50) Visual Analog Scale, salivary cortisol (hypothalamic-pituitary-adrenal axis), and hemodynamic indices (blood pressure, heart rate) were measured before and after each task to compare within-person change between groups. Thermal sensitivity was assessed on the QST.

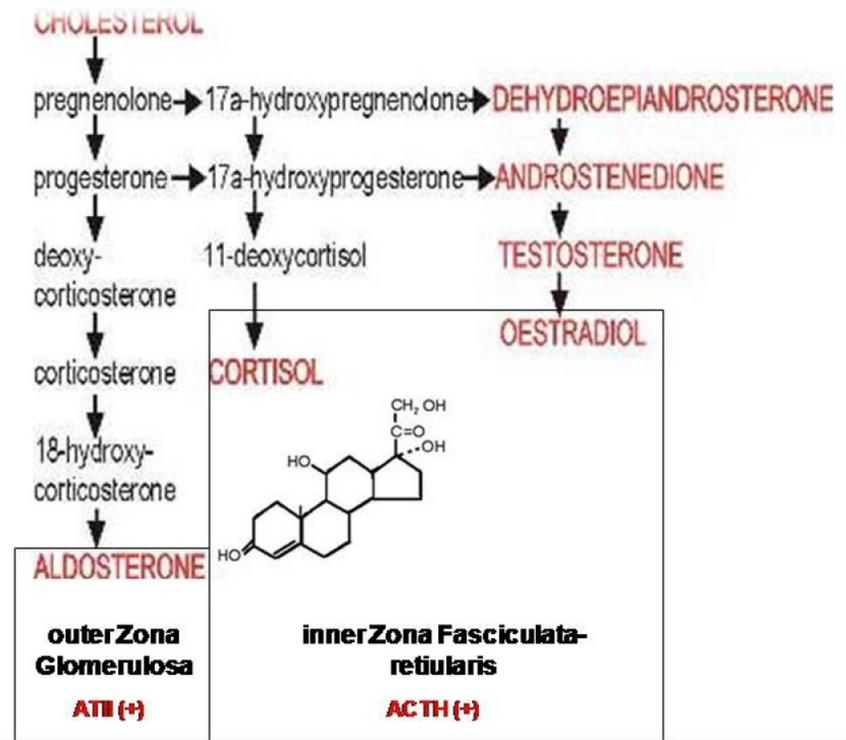
Results: On the MIST, the VMS+ group showed a smaller cortisol release (0.01 vs 0.02

How we make cortisol



Cofactor nutrients

- B5, B6
- Zinc, selenium
- DHEA (precursor)
- L-carnitine (if TG low)



Glycyrrhiza glabra (Licorice)



- Prolongs cortisol
- Inhibits conversion of cortisol to cortisone

- Antiviral
- Raises blood pressure

Eating for depleted adrenals

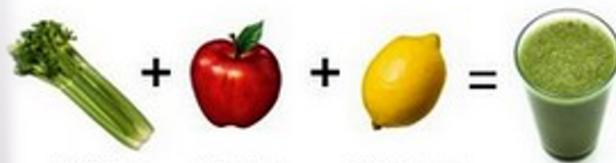


- Nourishing, slow burning foods
- Never skip meals, especially breakfast
- Pay attention to electrolytes
- Consider grass-fed beef, bone broth, coconut oil

Replacing electrolytes

Without Artificial Ingredients, Refined Sugars and other Carcinogens

JUICE



6 stalks
Celery

1 Apple

1 Lemon

STIR w/ Water



1/2 tsp
Sea Salt

1/2 tsp
Baking Soda

Lemon
Juice

1 tsp
Maple Syrup

SHAKE



3 coconuts raw

1 tbsp Chia Seeds

BLEND

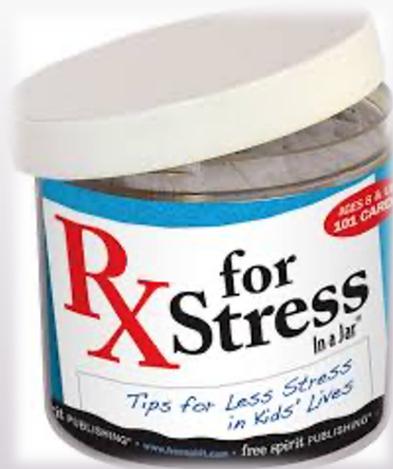


Frozen Banana

1 cup Almond Milk

1 cup Kale

Rx for stress resiliency



- Understand what stress does to the body and blood sugar
- Use supplements/lifestyle to correct physiologic imbalances
- Plan for the impact stress has on mood & motivation
- Learn ways to reframe your relationship with life stressors
- Mind-body techniques and self-care practices

Other techniques

- Biofeedback
- Visualization & Guided Imagery
- Yoga, Tai Chi, Qi Gong
- Prayer
- Time in nature
- Socializing, esp. with women
- Laughter



Balancing brain waves



DR. ERICA
Oberberg

The Efficacy of Binaural Beats as a Stress-buffering Technique

Katherine Kelton, MS; Terri L. Weaver, PhD; Lisa Willoughby, PhD;
David Kaufman, PhD; Anna Santowski, MFT

ABSTRACT

Context • Distress has deleterious effects on health. While complementary and alternative medicine (CAM) is a growing system of practices in the treatment of health and mental-health conditions, many individuals have limited access to mind-body interventions. Creating accessible stress-inoculation strategies may augment traditional mental-health interventions and services.

Objective • This pilot study intended to assess the effectiveness of a theta binaural beat (TBB) auditory stimulus on heart rate and self-reported stress, which was experimentally induced by the Trier Social Stress Test (TSST).

Design • The repeated measures study compared the stress levels after a stimulus and stressor for two groups, within an experimentally induced psychological stress paradigm, the Trier Social Stress Test (TSST).

Setting • The study occurred at a private Midwestern university.

Participants • Participants were 64 US adults recruited from undergraduate classes at the university, with a mean age of 19 years and a range from 18 to 30.

Intervention • Participants were randomly assigned to the intervention or the control group. The intervention group listened to pink sound, carrier tones, and embedded TBB, while the control group listened to pink sound and carrier tones without embedded TBB.

Outcome Measures • Participants completed self-report assessments about the auditory stimulus, perceived stress, and mindfulness and then engaged in the Trier Social Stress Test (TSST). Subsequently, they completed measures

on perceived stress using a visual analogue scale (VAS), and heart rate variability (HRV) was recorded throughout the study.

Results • With respect to the evaluation of subjective stress using the VAS, psychological stress increased significantly between the exposure to the stimuli and the TSST— $F_{(1,28,33)} = 42.76, P = .01$, partial $\eta^2 = 0.44$. The change in stress levels for the intervention group, however, was not significantly different from that of the control group at any time point $F_{(1,28,33)} = 1.03, P = .33$, partial $\eta^2 = 0.02$. With respect to the evaluation of physiological response to stress using the HRV, the changes in HF HRV between the 4, five-minute segments during stimulus exposure were not significantly different between the groups $F_{(3,55)} = 0.90, P = .44$, partial $\eta^2 = 0.02$. A significantly greater change— $F_{(1,55)} = 4.84, P = .03$ partial $\eta^2 = 0.08$ —in the HF HRV occurred over the TSST period for the intervention group compared to the control group suggesting that on average across the TSST stress tasks, those in the intervention group demonstrated higher HF signals.

Conclusions • The current study found that the intervention group, who listened to TBBs, had greater parasympathetic dominance during TSST than the control group. This suggests that TBB exposure may dampen subsequent stress responses to an acute, psychological stressor. This finding, however, should be interpreted with caution, because further research and independent replication are warranted. (*Altern Ther Health Med*. 2021;27(4):28-33).

Cannabidiol (noun)

can · na · bi · di · ol



Abbreviated CBD.

A non-psychoactive constituent of the hemp plant. Not the same as THC.

“relax, eat, sleep, forget, and protect”

The Human Endocannabinoid System

CBD, CBN and THC fit like a lock and key into existing human receptors. These receptors are part of the endocannabinoid system which impact physiological processes affecting pain modulation, memory, and appetite plus anti-inflammatory effects and other immune system responses. The endocannabinoid system comprises two types of receptors, CB1 and CB2, which serve distinct functions in human health and well-being.



Tetrahydrocannabinol



Cannabidiol



Cannabinol

CB1

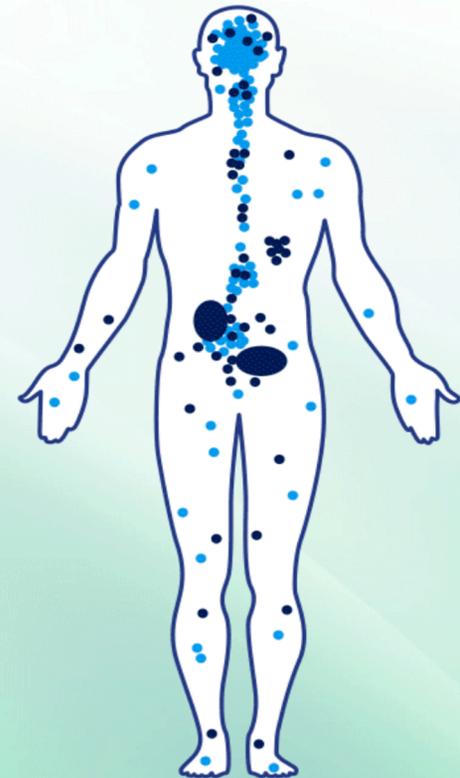
CB1 receptors are primarily found in the brain and central nervous system, and to a lesser extent in other tissues.

CBD does not directly "fit" CB1 or CB2 receptors but has powerful indirect effects still being studied.

CB2

CB2 receptors are mostly in the peripheral organs especially cells associated with the immune system.

Receptors are found on cell surfaces



source: www.the-human-solution.org

Self-assess: How is your endocannabinoid tone?



- Reliant on drugs to mask pain & inflammation?
- Dreamless sleep? Low REM? Difficulty falling or staying asleep?
- Prone to anxiety, rumination? “In your head”?
- Motor/balance/neurologic issues?
- Difficulty accessing your creativity, imagination?
- History of concussion, head trauma, brain injury, stroke?

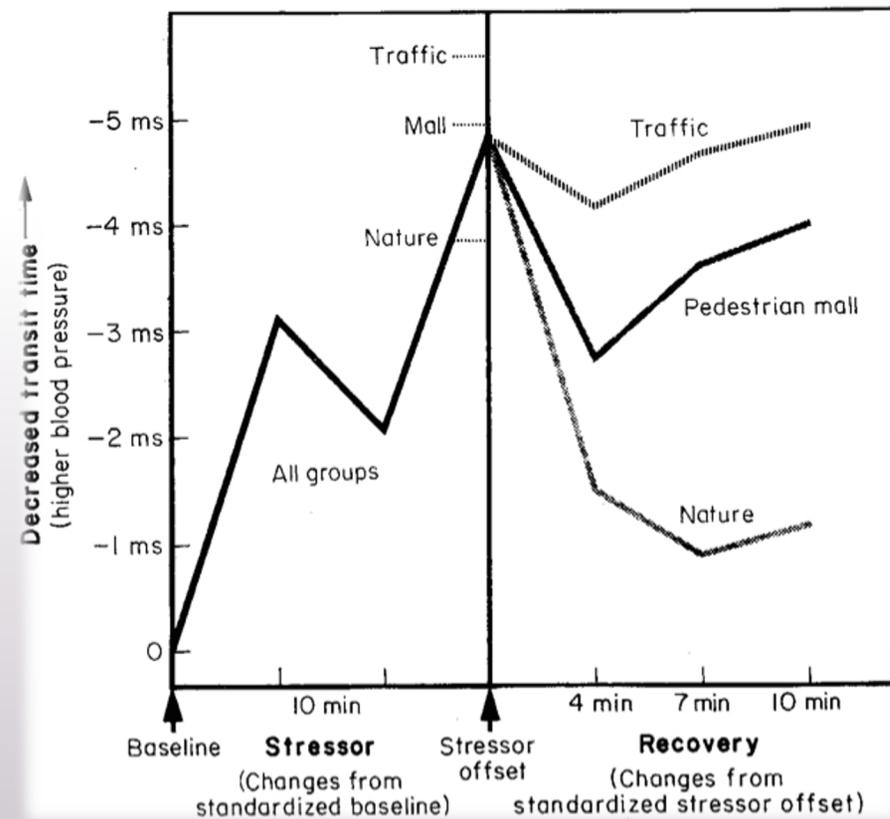
Non-hemp ways to increase Endocannabinoids

- Joyful, pleasant physical activity – dance, golf, hiking, surfing
- Omega-3 fatty acids - Fish Oil, Flax or Chia seeds, Walnuts, Sardines, Anchovies, Salmon, Eggs (pasture-fed or omega-3 enriched only)
- Socializing
- Cacao nibs - 70% or more dark chocolate



DR. ERICA
Oberg

Time in Nature



Balance through vagus nerve stimulation



Sthira = Effort
Sukha = Ease

*A concept from yoga
philosophy*



Tomorrow: Healthy Brains

- Dr. Erica Oberg, ND MPH
- www.drericaoberg.com
- 858-215-4935

