

AAPPN

Association Of Advanced
Practice Psychiatric Nurses

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**Targeting the Endocrine System to Optimize
Treatment Outcomes for Anxiety, Fatigue, and
Mood Disorders**


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Dr. Kristen Allott, ND, MS

- Clinical practice specializing in non-pharmaceutical intervention for mental health and addictions in Seattle and Tacoma WA
- Wellness Director of A Positive Alternative in Seattle, an outpatient addiction treatment center
- Co-Founder of the Protein for All Program
- Consultant for the Court Improvement Training Academy (CITA) of Washington State and Maricopa County Juvenile State Court – Cradle to Crayons Program
- Speaker at Washington State Superior Courts Judges Conference
- Co-author of the workbook Fuel Your Brain. Not Your Anxiety. Stop the Cycle of Worry, Fatigue, and Sugar Cravings with Simple Protein-Rich Foods, published with New Harbinger in February 2021

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- This presentation is for educational and informational purposes only.
- Nothing is intended to constitute medical advice, consultation, recommendation, diagnosis, or treatment.

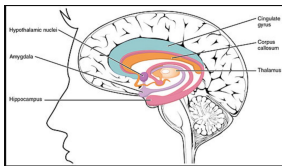
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Goals

- Review some of endocrine system as it relates to energy and mood
- How to use endocrine system and glucose regulation to stabilize mood and increase energy and improve self-esteem
- Novel labs to assess physical cause of fatigue and mood disorders
- Review tools to improve glucose control, fatigue and mood disorders

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Endocrine System



- The endocrine system is a messenger system comprising feedback loops.
- Many hormones are often released into the body fluids by an endocrine glands to regulating distant receptors on cells of various tissues and organs
- **One of the main purposes of the endocrine system is to maintain homeostasis**

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 Wikimedia Commons

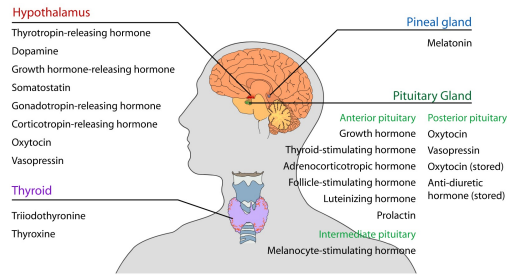
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Systems Influence by Hormones

- Circadian Rhythm- All of the below
- Digestion – Serotonin, Insulin, glucagon, epinephrine
- Fuel Regulation – Insulin, glucagon, epinephrine, cortisol
- Metabolism – thyroid, growth hormone, leptin, ghrelin
- Immune system – ACTH, cortisol, thyroid, serotonin, catecholamines
- Sleep –Cortisol, melatonin, insulin, glucose tolerance, ghrelin and leptin
- Sex hormones- Cortisol, testosterone, estrogens
- Mood – ALL OF THE ABOVE

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What of these does not affect mental health?



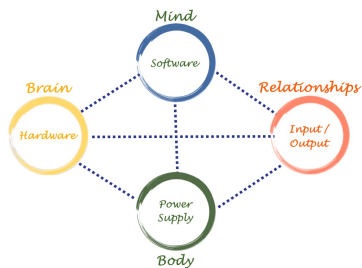
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Thought Process

- What is obstructing the person's vital force?
- What is the physical and emotional causes of the symptoms?
 - Neuro-physiology and physiology
 - Neuro-endocrinology and endocrinology
 - Neuro-coordination and physical coordination
- Can I validate the physical causes of the symptoms, so that I and the patient can measure effect of treatment?
- What change is the patient capable of?
- What is the experiment we can do to reduce symptoms?
- What was the return of investment for the change?
- Does the patient have the skills to maintain the change?

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What is the cause of anxiety, fatigue, and mood disorders



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Assessment Tools

Anxiety

- GAD-7
- Snap Shot of Anxiety *

Fatigue

- Power Supply Scale of 1-10 *
- Modified Fatigue Impact Scale (MFIS)*
 - page 47 of the pdf shared in the link sheet

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Anxiety or Hypoglycemic

1. Feeling nervous, anxious, or on edge.
2. Not being able to stop or control worrying.
3. Worrying too much about different things.
4. Trouble relaxing.
5. Being so restless that it's hard to sit still.
6. Becoming easily annoyed or irritable.
7. Feeling afraid as if something awful might happen.

GAD-7 found at SAMHSA.Gov

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Anxiety/Anger or Hypoglycemia?

Anxiety or Anger

Obsessive thoughts

Worrying about the future

Reliving past events

Hyper-vigilance

Restlessness

Palpitations

Angry outbursts

Irritability

Muscle tension

Fatigue

Difficulty sleeping

Sweating, trembling

Shortness of breath

Feeling light-headed

Chills and hot flashes

Hypoglycemia

Mild signs:

Nervousness

Trembling

Increased heart rate

Palpitations

Increased sweating

Hunger

Moderate signs:

Irritability

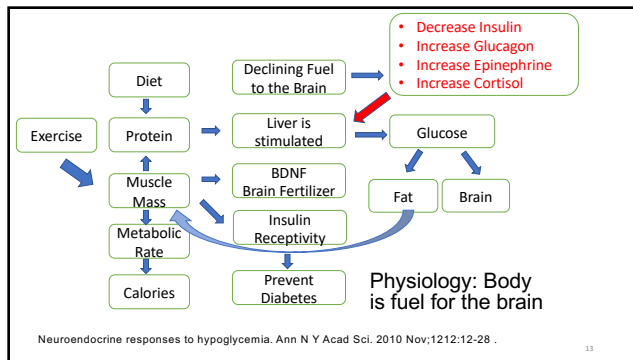
Decreased concentration

Headache

Fatigue

Mental confusion

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Fatigue

- Lack of energy and mental alertness that negatively impacts work performance, family life, and social relationships....
- Fatigue may be classified as secondary, physiologic, or chronic.
 - Secondary fatigue is caused by an underlying medical condition and may last one month or longer, but it generally lasts less than six months.
 - Physiologic fatigue is an **imbalance in the routines of exercise, sleep, diet, or other activity that is not caused by an underlying medical condition** and is relieved with rest
 - Chronic fatigue lasts longer than six months and is not relieved with rest.

• Am Fam Physician. 2008 Nov 15;78(10):1173-1179

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Depressed, Fatigue or Malnourished

1. Little interest or pleasure in doing things.
2. Feeling down, depressed, or hopeless.
3. Trouble falling/staying asleep, sleeping too much.
4. Feeling tired or having little energy.
5. Poor appetite or overeating.
6. Feeling bad about yourself – or that you are a failure or have let yourself or your family down.
7. Trouble concentrating on things, such as reading the newspaper or watching television
8. Moving or speaking so slowly that other people could have noticed, or the opposite – being so fidgety or restless that you have been moving around a lot more than usual.
9. Thoughts that you would be better off dead or of hurting yourself in some way.

PHQ-9 found at SAMHSA.Gov

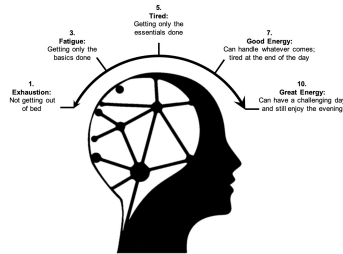
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If routines of exercise, sleep, and diet are disrupted...

- we can expect physiological problems.
- Physiological disruption is endocrine disruption.
- Both can present as, or contribute to a mental health condition

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- ❑ **Small frequent meals:** protein, carbs, fat and fiber.
- ❑ **Sleep:** 7-9 hours at consistent times. Naps (20-45 min.) are good.
- ❑ **Movement:** creates brain fertilizer (BDNF) and protects your body from inflammation.
- ❑ **Breathing:** nasal breathing increase O₂ to the body by 20%.



What is sustaining the power supply?

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Chaos and Rigidity

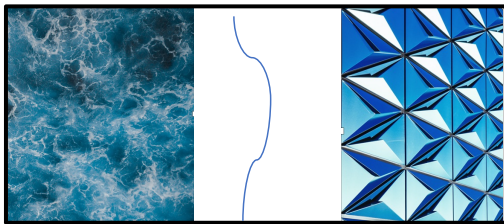


Photo by [Ishan @seefromthesky](#) on [Unsplash](#)

Photo by [Scott Webb](#) on [Unsplash](#)

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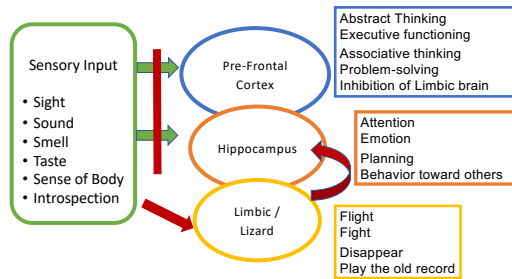
How your brain processes information



- Action/behaviors
- Thoughts
- Emotions
- Perception
- Sensation

Image by [ElsaBiva](#) from [Pixabay](#)

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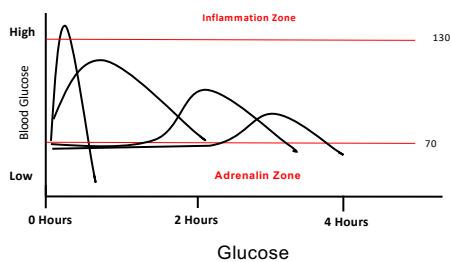


What brain is being used?

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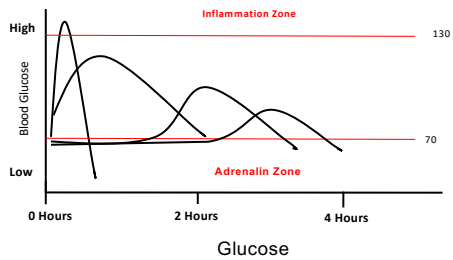
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Fueling the Body with Refine Carbs, Fiber, Protein, and Fats



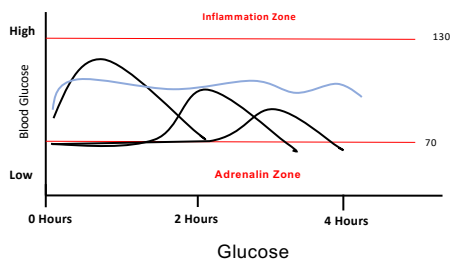
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Fueling the Body with Refine Carbs, Fiber, Protein, and Fats



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Meal and Snacks: Carb+Protein+Fiber+Fat



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Reactive Hypoglycemia ICD10- E16.1

"Occurrence of pseudohypoglycemic symptoms and lower glucose value was more common after ingestion of glucose itself rather than after ingestion of a balanced meal. This could suggest an important role that nutritionally balanced diet may play in maintaining correct glucose."

Metabolic Parameters in Patients with Suspected Reactive Hypoglycemia. J Pers Med. 2021 Apr 7;11(4):276.

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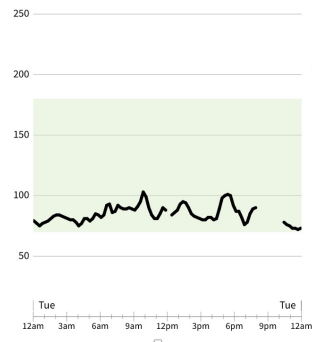
Effect on GABA and hypoglycemia

" In conclusion, the current study provides, for the first time, evidence that recurrent hypoglycemia may cause molecular alterations in Ventromedial Hypothalamus (VMH) neurons that lead to impaired regulation of GABAergic tone and, ultimately, to suppression of glucose counterregulatory responses."

Increased GABAergic Tone in the Ventromedial Hypothalamus Contributes to Suppression of Counterregulatory Responses After Antecedent Hypoglycemia Diabetes 57:1363–1370, 2008

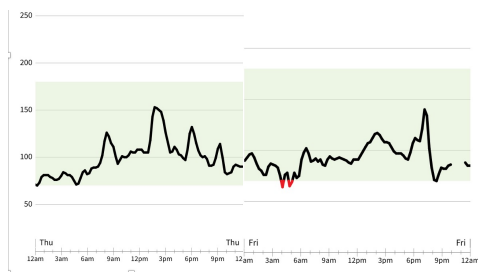
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A Normal Day



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Glucose Spikes Preceding Early Morning waking



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Fatigue, PTSD, and Anxiety

CRP-HS 1.84. (0.00 -3.00 mg/dl)

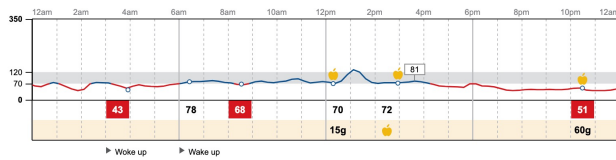
TSH 5.02 (0.5 to 5.0 mIU/L)

Hemoglobin A1C – 5.2 (4.8-5.6 %) = 103 mg/dl glucose

CGM **82** **100%** **16**
mg/dL Days of Data Hypo Events
Average Glucose

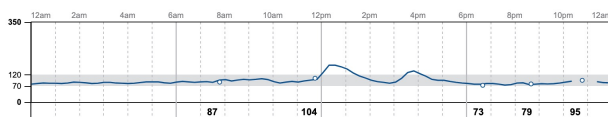
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Second Day of Using a CGM



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Eleven Days with CGM: Experiment with 3 Meals and Snacks



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Low glucose, high adrenaline, and mental health challenges

- Anxiety - general, social, phobia, test/performance
- Panic attacks
- Depression/fatigue
- Bipolar - Mania
- Bipolar - Depression
- Binge eating disorder - sugar binging

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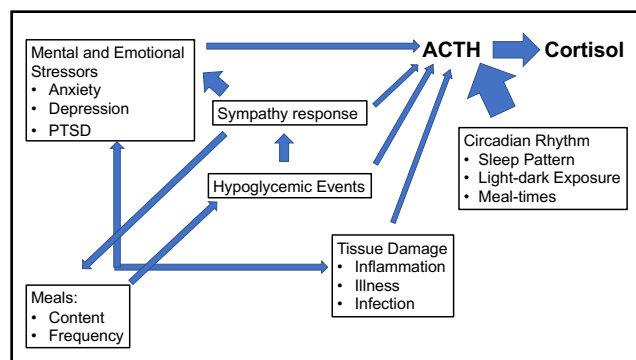
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Low glucose, adrenaline, and mental health challenges

- ADD/ADHD
- Insomnia - 3 AM waking
- PTSD - anxiety, nightmares, past invading present, dissociation
- Addictions - reaching for maladaptive coping mechanism
- Not hungry - in the morning, eating disorders, bipolar

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By David Richfield
(User:Slasmeid) and Mikael
Hägström. Derived from
previous version by Hoffmeier
and Setters.In external use,
this diagram may be cited as:
(2014).
"Diagram of the pathways
of human
steroidogenesis".
WikiJournal of Medicine 1 (1).
DOI:10.15347/wjm.2014.005.
ISSN 20018762. - Hägström M,
Richfield D (2014).
"Diagram of the pathways
of human
steroidogenesis".
WikiJournal of Medicine 1 (1).
DOI:10.15347/wjm.2014.005.
ISSN 20024436, CC BY-SA 3.0,
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[illegible]

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Cortisol Waking Response and Anxiety and Depression

“The cortisol awakening response (CAR) predicts onsets of a combined group of anxiety disorders, as well as smaller group of social anxiety disorder onsets in older adolescents and young adults. This was true even when covarying lifetime depression (another disorder we have shown the CAR to predict) at the time of cortisol measurement as well future onsets of depression over the follow-up period.”

Prospective associations between the cortisol awakening response and first onsets of anxiety disorders over a six-year follow-up--2013 Curt Richter Award Winner. *Psychoneuroendocrinology*. 2014;44:47-59.

[illegible]

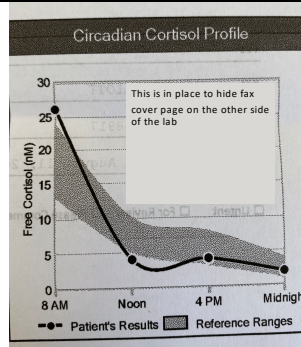
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Cortisol Waking Response and PTSD

"The evidence from this meta-analysis supports that salivary samples collected in the morning consistently showed a lower salivary cortisol level in patients with PTSD than in controls, although whether salivary cortisol could be used as a diagnostic tool requires further research."

Salivary cortisol in post-traumatic stress disorder: a systematic review and meta-analysis. *BMC Psychiatry*. 2018;18(1):324.

Cortisol Testing with Fatigue, PTSD, and Anxiety



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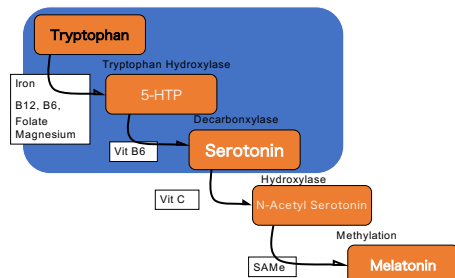
Thyroid

- Normal ranges for TSH: 0.450-4.500 MIU/L
- Functional optimal range: 1.5 to 2.5 MIU/L
- Run T4 and T3 initially or with follow up labs
- Consider Thyroid antibody, test cortisol, stabilize glucose, and check total protein in Comprehensive Metabolic Panel

TSH cut off point based on depression in hypothyroid patients. *BMC Psychiatry*. 2017;17(1):327

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Neurotransmitter Synthesis



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Fasting Total Protein Comprehensive Metabolic Panel

- Total Protein 6.0 - 8.4
- Optimal range: 6.7-7.2
- Protein deficient: < 6.7
- Catabolic: <7.2
- Be sure to look at the whole person. What are they eating, what is the amount and type of exercise they do regularly. What is the amount of agitation/anxiety.

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Economic Costs of Iron Deficiency in Women

- 1010 women who received an ID diagnosis with a blood test in the last 2 years
- In total, 354 (35.0% of the total sample) patients received an initial diagnosis other than ID. Of those, 46.8% were treated prior to the ID diagnosis with a pharmacological medical therapy or psychotherapy and carried a the following diagnoses depression, burnout, anxiety state, chronic fatigue and others.
- In Swiss dollars, the annual direct medical costs would be CHF 78 million annual indirect costs would be CHF 33 million.

Economic burden of symptomatic iron deficiency - a survey among Swiss women.(2019). *BMC women's health*, 19(1), 39.

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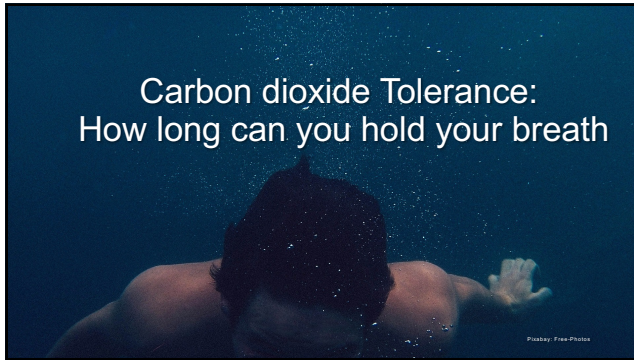
Iron Deficiency: Laboratory Analysis

- Low iron strongly associated with fatigue
- RBC indices are not always enough
- Serum Ferritin less than 50 ng /mL
- Low serum iron less than 8.1 mmol/ L

Verdon (2003), Vaucher P (2012)

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CO₂ and Anxiety

- Acute anxiety and autonomic arousal induced by CO₂ inhalation impairs prefrontal executive functions in healthy humans. *Transl Psychiatry*. 2019 Nov 12;9(1):296

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Carbon Dioxide Intolerance and Anxiety

“Overall, CO₂ inhalation produced robust anxiogenic effects and impaired fronto-executive functions of cognitive flexibility and working memory.”

Acute anxiety and autonomic arousal induced by CO₂ inhalation impairs prefrontal executive functions in healthy humans. *Transl Psychiatry*. 2019 Nov 12;9(1):296.

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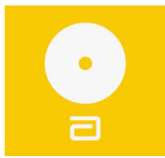
Continuous Glucose Monitor

- Insurance will not pay for it
- Free Style Libre Cost is \$65 – 80 for 2 weeks for one monitor
- Just order through a pharmacy the sensor and not the external reader, smart phones can collect data
- **ICD-10 Codes**
 - Elevated Blood Glucose R73.01
 - Hereditary and idiopathic neuropathy, unspecified G60.9
 - Hypoglycemia, unspecified E16.2

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Abbott Free Style Libre

- <https://www.libreview.com/> - Dashboard for clinicians



FreeStyle LibreLink - US - Apps ...
play.google.com



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Dexcom

- www.dexcom.com
- Dexcom G6 CGM



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Labs for Testing Cortisol and Names

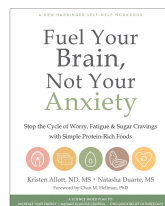
- Diagnostechs ([Diagnostechs.com](https://www.diagnostechs.com)) Adrenal Stress Index
- Genova Diagnostics (www.gdx.net) Adrenocortex Stress Profile
- Thorne ([Thorne.com](https://www.thorne.com)) Stress Test

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Questions?



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For handouts, worksheets and resources:
<https://www.kristenallott.com/aappn>

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Lizard brain treat

When to use:

- When someone is anxious, irritated, agitated, emotionally upset
- Early morning waking
- Unable to eat in the morning
- When changing from professional mode to family mode



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Lizard brain meal

Suggested meals:

- Sandwich with protein
- Protein bar
- Protein shake
- Burrito or roll up with protein

When to use:

- Before an important meeting or conversation
- Before doing something that requires emotional intelligence
- Before making pivotal decisions



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Optimizing your brain's fuel supply: Eating protein every 3 hours for three days

- **8 am Breakfast:** 1-2 eggs, 1 piece of toast, 1 apple (14 grams)
- **11 am Snack:** 1 handful of nuts, 1 spoonful of nut butter, or 1 spoonful of cottage cheese (6-8 grams)
- **12:30 pm Lunch:** portion of meat the size of a pack of cards eaten by itself or in a sandwich/wrap, soup, or burrito; 1-2 cups of veggies (21 grams)
- **3:30 pm Snack:** 1 handful of nuts, 1 spoonful of nut butter, or 1 spoonful of cottage cheese (6-8 grams)
- **6:30 pm Dinner:** portion of meat the size of a pack of cards eaten by itself or in a sandwich/wrap, soup, or burrito; 1-2 cups of veggies (21 grams)
- **Pre-bedtime Snack:** One slice of turkey meat (6-8 grams)

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How much protein per day for stable blood glucose?

Your Weight (lbs)	Protein Target (g)	Acceptable Protein Range (g)
100	40	36-45
120	48	43-54
140	56	50-63
160	64	67-72
180	72	64-81
200	80	71-90

Adults RDA 0.8 gram/kg/day or 8 grams/20 lbs/day
Max protein per day = 120 grams

Adolescent girls .36 x wt (lbs)= Grams of protein per day

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Depression

- Assume fatigue
- More than 2 cups of coffee a day= fatigue
- Three days protein experiment with Lizard Brain Treats
- Labs for fatigue – CGM, Ferritin, CRP-HS, TSH, Total Protein, Liver enzymes, Salivary cortisol
- Sleep hygiene
- Movement: Minimum of 10 minutes per day
- Assess brain-body problems: deconditioning, chronic disease, TBI, substance abuse/internet abuse, nutrition deficiencies

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Anxiety/Panic Attacks/PTSD/TBI

- Assume hypoglycemia is a component
- Eliminate caffeine
- Three days protein experiment with Lizard Brain Treats
- PTSD-protein may need to be every 2 hours
- Labs - CGM, Ferritin, CRP-HS, TSH, Total Protein, Liver enzymes, Salivary cortisol
- Movement: Minimum of 10 minutes per day
- Assess brain-body problems: deconditioning, chronic disease, TBI, substance abuse/internet abuse, nutrition deficiencies, beware of benzodiazepines.

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Bipolar Disorder

Take a thorough intake of history: including drug use, history of trauma, medications and drugs, work stress, spiritual events, use of stimulants such as caffeine, hours on a screen internet gaming, and life structure (sleep, friends, eating patterns)

- Establish a routine for eating, sleeping and moving
- Rule out reactive hypoglycemia with A1c below 5 and CGM
- Labs - CGM, Ferritin, CRP-HS, TSH, Total Protein, Liver enzymes, Salivary cortisol
- Three days protein experiment with Lizard Brain Treats
- Movement: Martial arts, climbing, hyper focus sports

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ADD/ADHD

- Rule out hypoglycemia with CGM
- Treat caffeine as a medication
- Three days protein experiment with Lizard Brain Treats
- Labs - CGM, Ferritin, CRP-HS, TSH, Total Protein, Salivary cortisol
- Movement: Lots! Martial arts, climbing, hyper focus sports

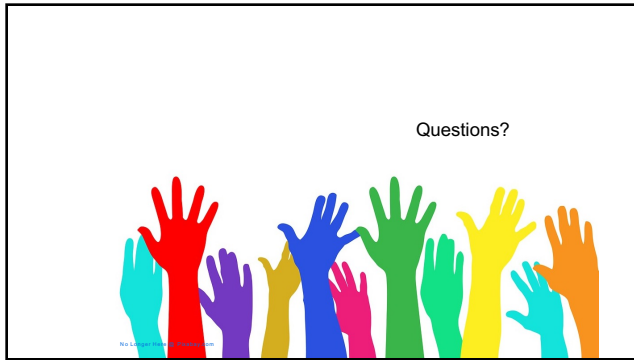
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What is your
take home?

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Dynamic Brains
CONSULTING

**Fuel Your Brain,
Not Your Anxiety**

Stop the Cycle of Worry, Fatigue & Sugar Cravings
with Simple Protein-Rich Foods

Kristen Allott, ND, MS • Natalie Dierker, MS
Foreword by Cheri M. Hoffman, PhD

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