



Cortisol Interpretation

Becoming a Clinical Expert in the Evaluation of HPA
Axis Health Using the DUTCH Advanced Insights

Carrie Jones, ND, FABNE, MPH, MSCP



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Carrie Jones, ND, FABNE, MPH, MSCP is an internationally recognized speaker, consultant, author and educator on the topic of women's health and hormones with over 20 years in the industry. Dubbed the "Queen of Hormones", Dr. Jones is a Naturopathic Physician who did her 2-year residency focused on women's health and endocrinology. She went on to get her Master of Public Health (MPH), was one of the first to become board certified through the American Board of Naturopathic Endocrinology (FABNE), and is a Menopause Society Certified Practitioner (MSCP). She was the first Medical Director for Precision Analytical (the DUTCH Test), the first Head of Medical Education at Rupa Health (a Fullscript Company) and was on Under Armour's Human Performance Council. She serves as a consultant and educator for several women's health and lab-focused companies. Dr. Jones co-hosted the highly popular show, the Root Cause Medicine Podcast that has over 10 million downloads and now hosts her own, Hello Hormones podcast. She is the Chief Medical Officer at NuEthix Formulations.

A DUTCH Cortisol Insights: Digging Deeper with Page 4



Page 4

DUTCH Dozen (page 1)

- Daily Free Cortisol Pattern
- 24 Hour Free Cortisol
- Metabolized Cortisol
- Cortisol Clearance Rate (CCR)

DUTCH Cortisol Advanced Insights (page 4)

- Daily Free CORTISONE Pattern
- 24 Hour Free CORTISONE
- Systemic preference (Cortisol vs CORTISONE)

DUTCH Cortisol-Related OATs (page 6)

Learning Objectives

-  Understand the purpose and clinical application of the four cortisol-related DUTCH Advanced Insights.
-  Analyze the role of cortisone in enhancing the interpretation of cortisol levels.
-  Evaluate the whole-body preference for cortisone (inactive) versus cortisol (active) using THE and THF markers.
-  Assess whether an anabolic or catabolic state is present based on DUTCH Test findings and recognize related clinical presentations.
-  Identify abnormalities in cortisol-related organic acids and understand their relevance to cortisol imbalances.



Estrogen Progesterone

- 1 Assess estrogen levels given the patient's reproductive status
- 2 Assess progesterone levels given the patient's reproductive status
- 3 Assess 2-OH preference in phase 1 estrogen metabolism
- 4 Assess methylation of 2-OH estrogens

Androgens

- 5 Assess adrenal androgen levels (Total DHEA)
- 6 Assess testosterone levels
- 7 Assess cellular production of 5 α -DHT via 5 α -androstanediol
- 8 Assess if there is a preference for the more potent alpha metabolism of the androgens

Cortisol

- 9 Assess the daily free cortisol pattern
- 10 Assess the daily total of free cortisol in circulation (24hr Free Cortisol)
- 11 Assess the total cortisol produced by the adrenal glands (Metabolized Cortisol)
- 12 Assess the rate of cortisol clearance from the body

Dutch Advanced Insights

Estrogen Progesterone

- 1 Assess whether E1, E3, or 16-OH-E1 add more insight into overall estrogenic activity
- 2 Assess if there is a preference for alpha metabolism of progesterone
- 3 Assess estrogen clearance through phase 1 and 2
- 4 Assess whether any of the estrogen-related organic acids are out of range

Androgens

- 5 Assess if the DHEA-S is relatively lower than the Total DHEA
- 6 Assess the androgen pattern to determine if urine testosterone may not accurately reflect systemic levels (UGT2B17)
- 7 While 5a-androstane-3 α -diol best represents **cellular** 5a-DHT production, assess if 5a-DHT offers additional insight into androgenic activity
- 8 Assess whether any of the androgen-related organic acids are out of range

Cortisol

- 9 Assess if cortisone (inactive) adds more insight to the free cortisol assessment
- 10 Assess if there is a whole-body preference for (inactive) cortisone or (active) cortisol
- 11 Assess for anabolic-catabolic balance
- 12 Assess whether any of the cortisol-related organic acids are out of range

DUTCH Dozen Cortisol

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Advanced Insights Cortisol

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- 12 Assess whether any of the cortisol-related organic acids are out of range

May change your DUTCH Dozen based conclusions

Provide additional information that will add to (but likely won't change) your DUTCH Dozen based conclusions

DUTCH Advanced Insights

Cortisone





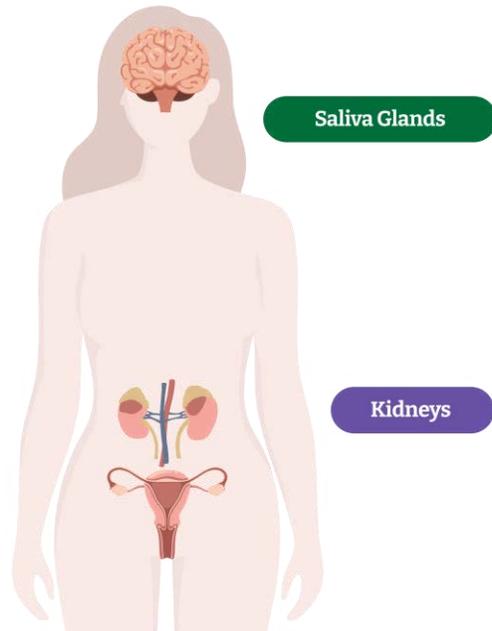
Cortisol

- 9 Assess if cortisone (inactive) adds more insight to the free cortisol assessment

A DUTCH Advanced Insights: 9 Cortisone

Free cortisone can yield more insight into active cortisol levels in circulation.

- **Cortisone** is the **inactive** form of cortisol.
- Cortisol is deactivated to cortisone in the **kidneys, colon, and saliva glands**.
- Cortisone can be activated back into cortisol in the liver and fat.



- Cortisone's diurnal pattern is much more pronounced in the urine and saliva as compared to the serum – all thanks to **11b-HSD2!**



- **Free cortisone in the urine and saliva reflects the (active) free cortisol that entered the kidneys or the saliva glands and was deactivated to cortisone locally before excretion.**
- This makes free cortisone a secondary, confirmatory marker for the up and down diurnal pattern of free cortisol.
- **There are three patterns...**

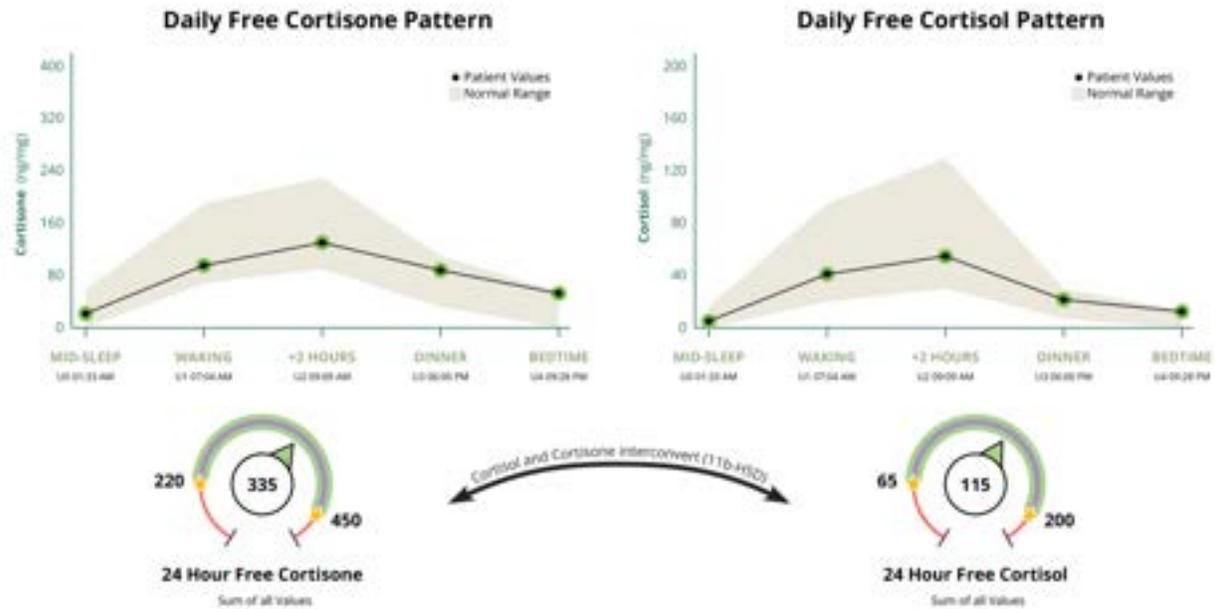
Blair J, et al. Curr Opin Endocrinol Diabetes Obes. 2017; 24(3):161-168.

Perogamvros I, et al. J Clin Endocrinol Met. 2010; 95(11):4951-4958.

Walker BR, et al. Clin Endocrinol (Oxf). 1992 ;37(6):483-492.

Pattern 1: Free cortisone and free cortisol *match*

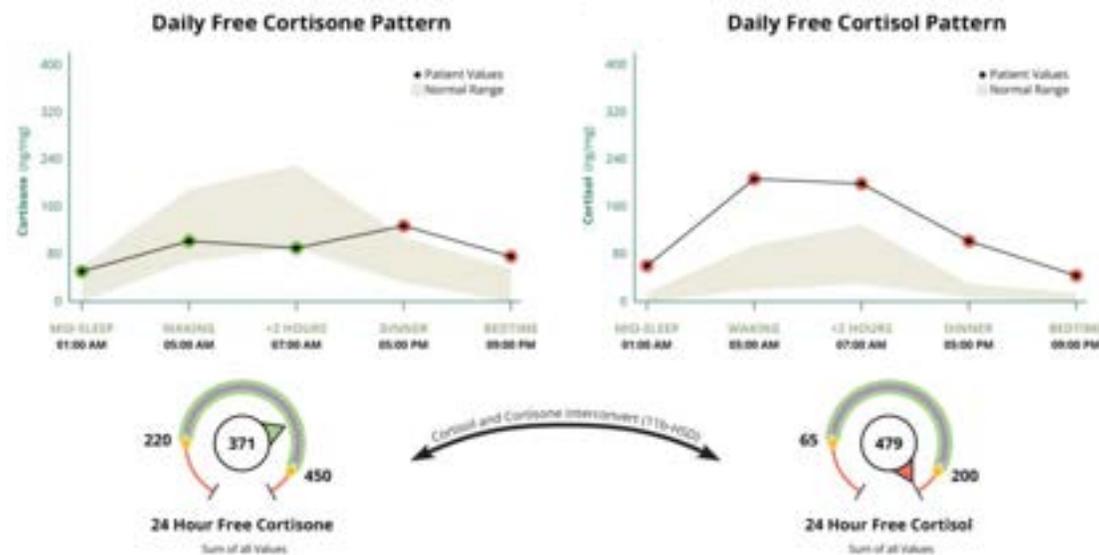
- The free cortisone pattern confirms the free cortisol pattern.



In this example, the normal free cortisone pattern confirms normal free cortisol.

Pattern 2: Free cortisone is *relatively lower* than free cortisol

- Free, active cortisol levels in circulation (serum) may not be quite as high as the Daily Free Cortisol Pattern in the urine or saliva implies.

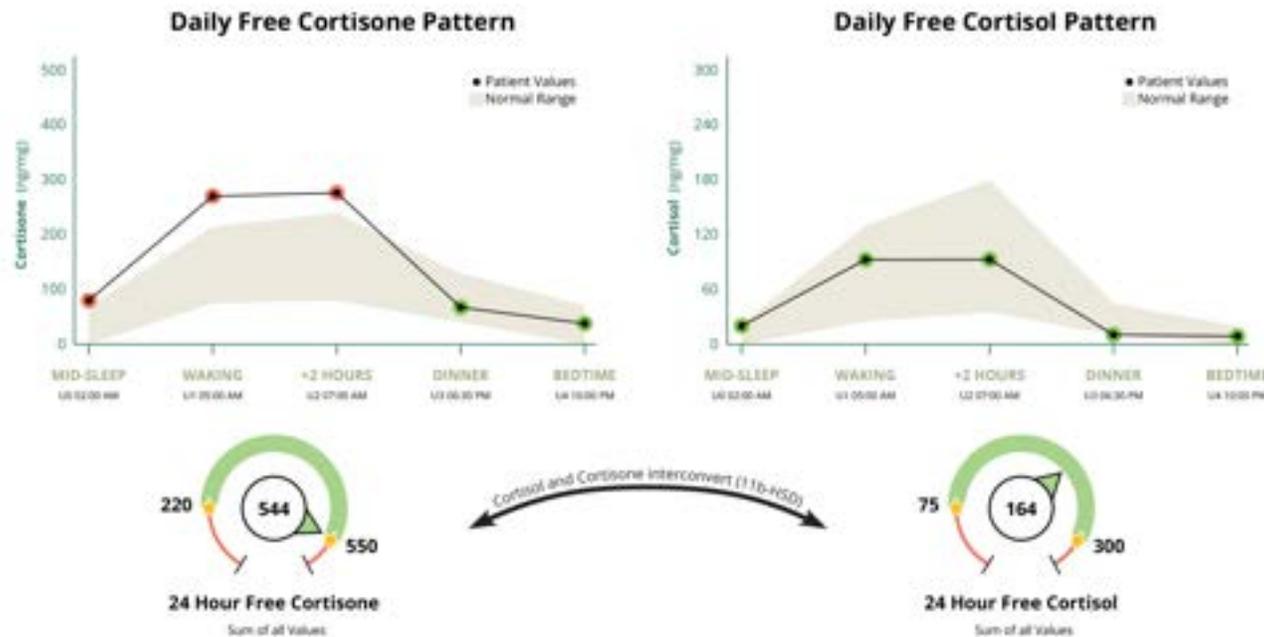


In these cases, look at the Systemic Preference slider bar. If there is a strong **Cortisol (THF) preference**, it confirms a tissue preference for the **active** form.



Pattern 3: Free cortisone is *relatively higher* than free cortisol

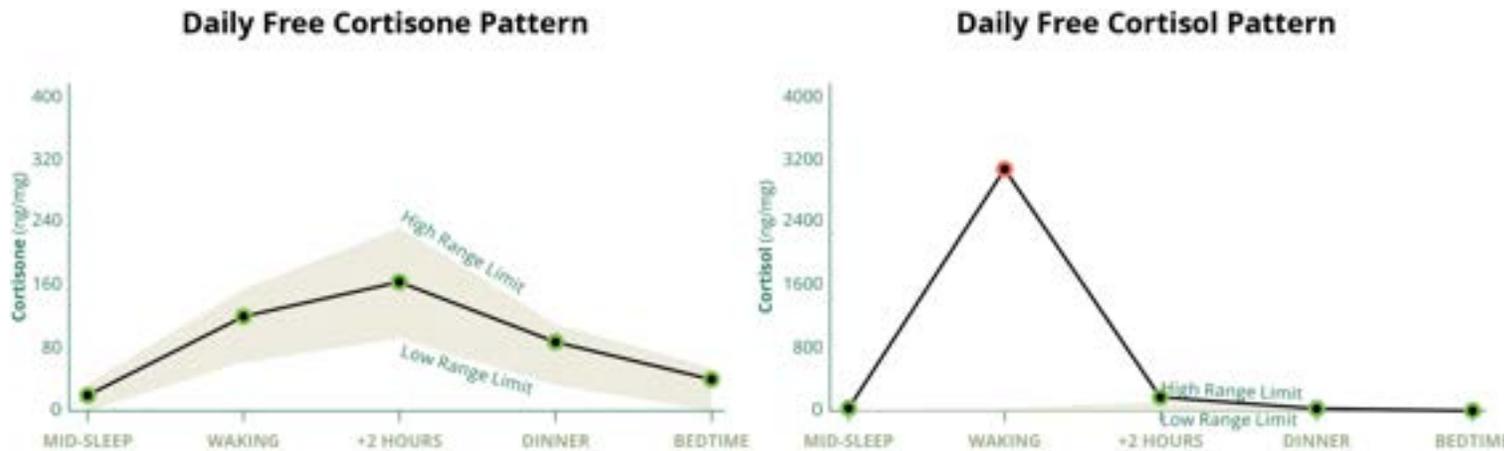
- Free, active cortisol levels in circulation (serum) may be higher than the Daily Free Cortisol Pattern in the urine or saliva implies.



In this example, if only free cortisol was tested, we might think the patient has normal cortisol!

Pattern 4: Hydrocortisone contamination

- Despite its name, **hydrocortisone is bioidentical active cortisol** and when a person touches the sample paper with hydrocortisone cream on their hands (***even a little***), it can contaminate the sample paper and make the free cortisol results look high.
- In these cases, the free cortisol pattern can be ignored, and the **free cortisone pattern is more accurate**.



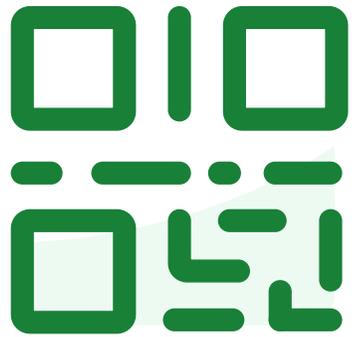
Hydrocortisone contamination of urine sample paper

Fun Fact!

Hydrocortisone cream concentrations are typically 10-50 mg/mL = **10-50 million ng/mL**.

Contamination in amounts as low as 1ng in saliva or 10 ng in urine can be problematic.

This is one reason we use ultra-sensitive testing (mass spectrometry), as common industry tests would only provide an unverified high number for cortisol with no “back up” cortisone result.



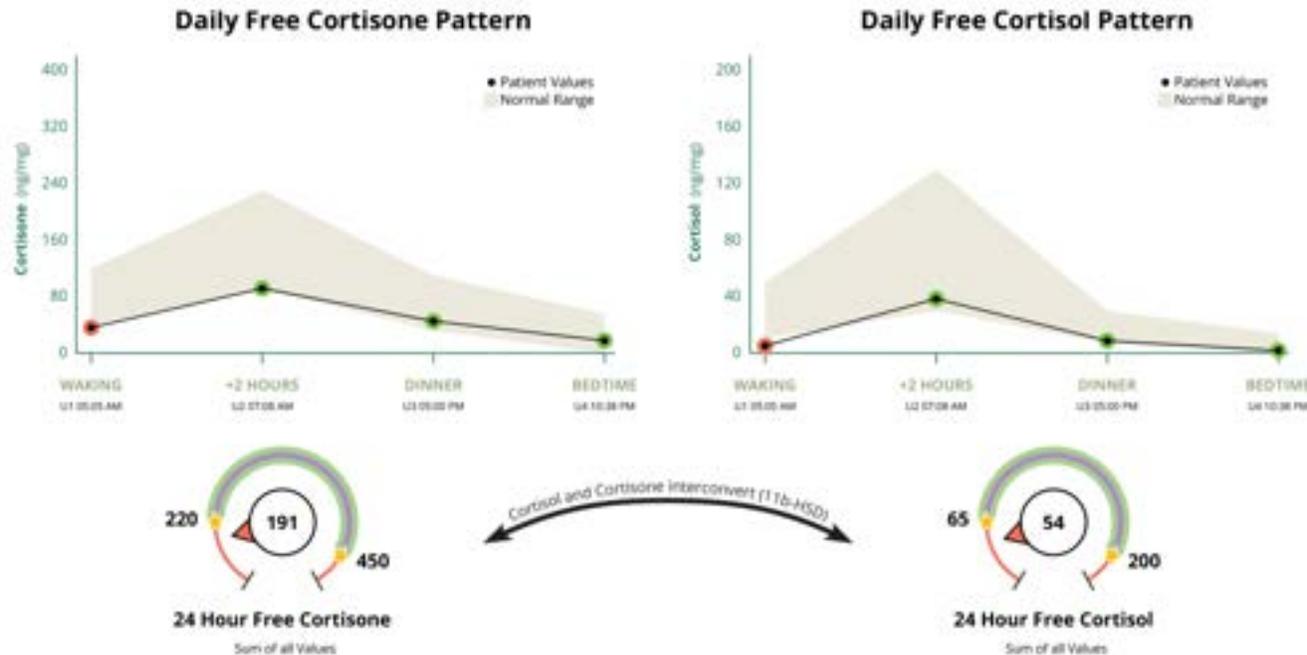
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Polling Question



Game time!

Does free cortisone add more insight into their circulating free cortisol levels?



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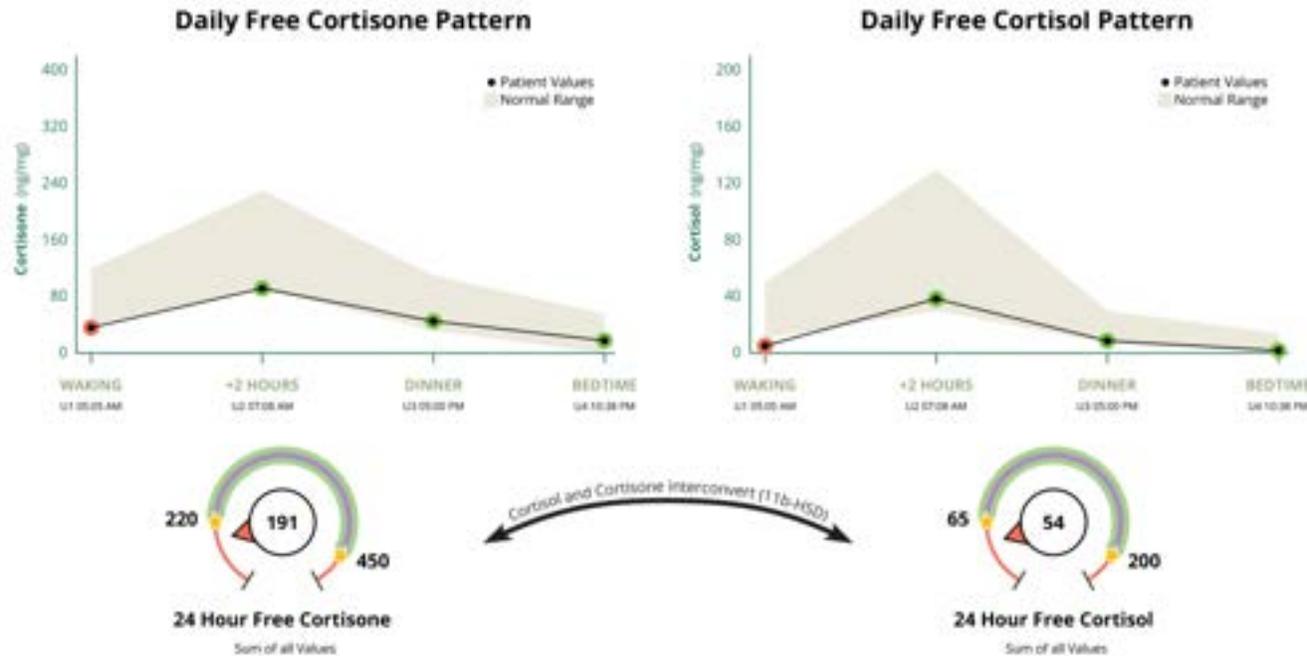
Question 1: Does free cortisone add more insight into their circulating free cortisol levels?

Polling Question



Game time!

Does free cortisone add more insight into their circulating free cortisol levels?



No, not really...

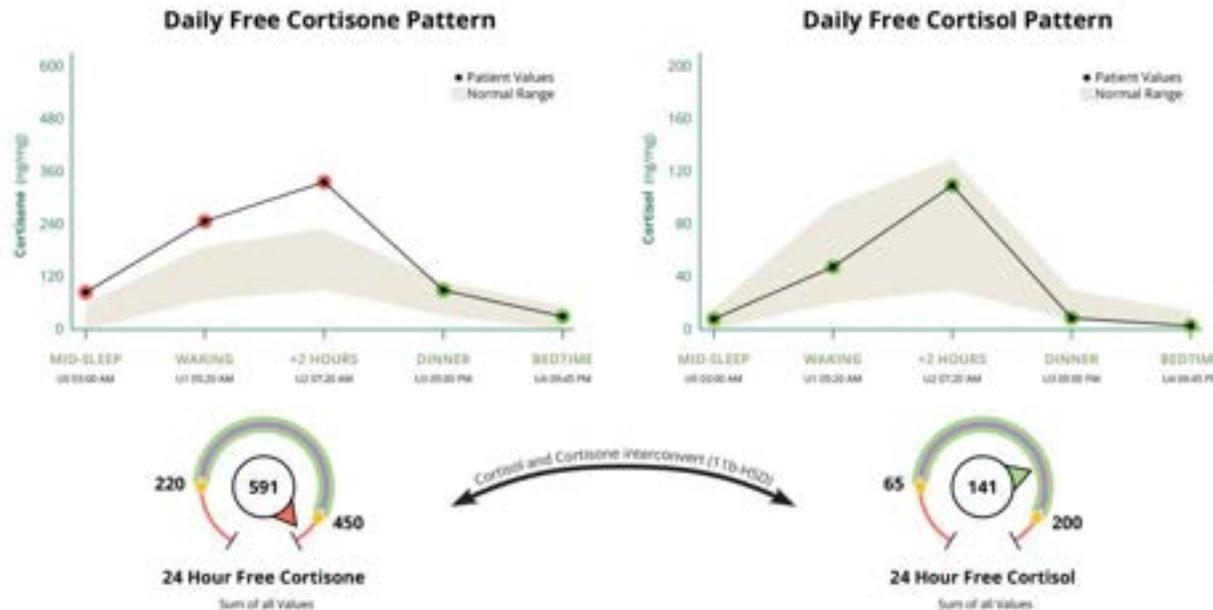
In this case, the free cortisone *confirms* low-end cortisol levels throughout the day.

Polling Question



Game time!

Does free cortisone add more insight into their circulating free cortisol levels?



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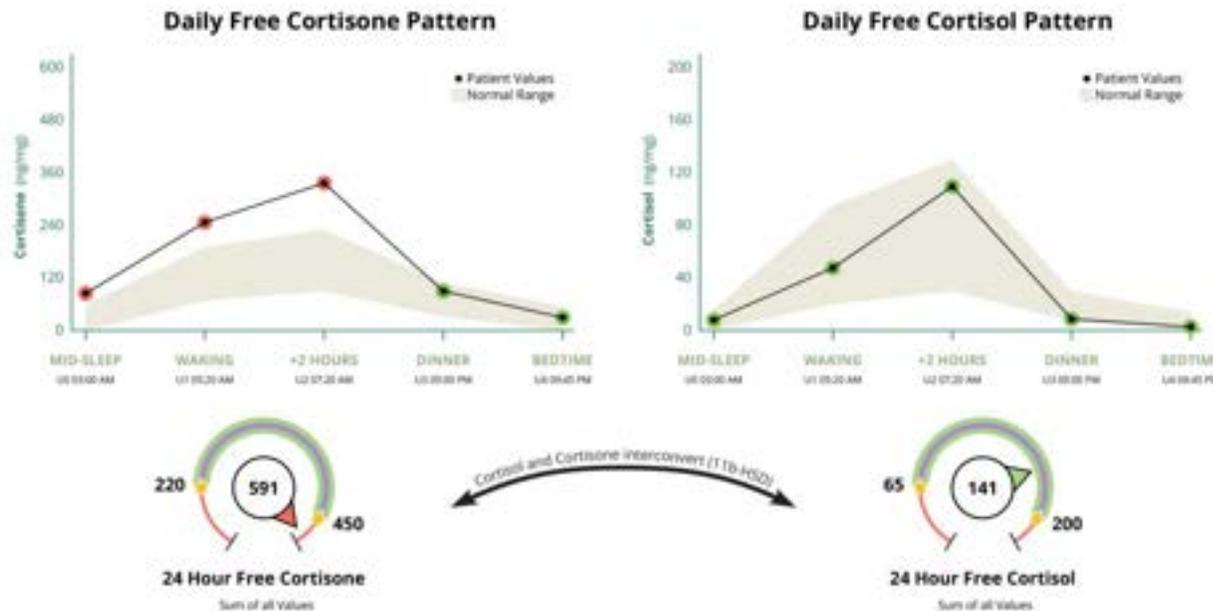
Question 2: Does free cortisone add more insight into their circulating free cortisol levels?

Polling Question



Game time!

Does free cortisone add more insight into their circulating free cortisol levels?



Yes!

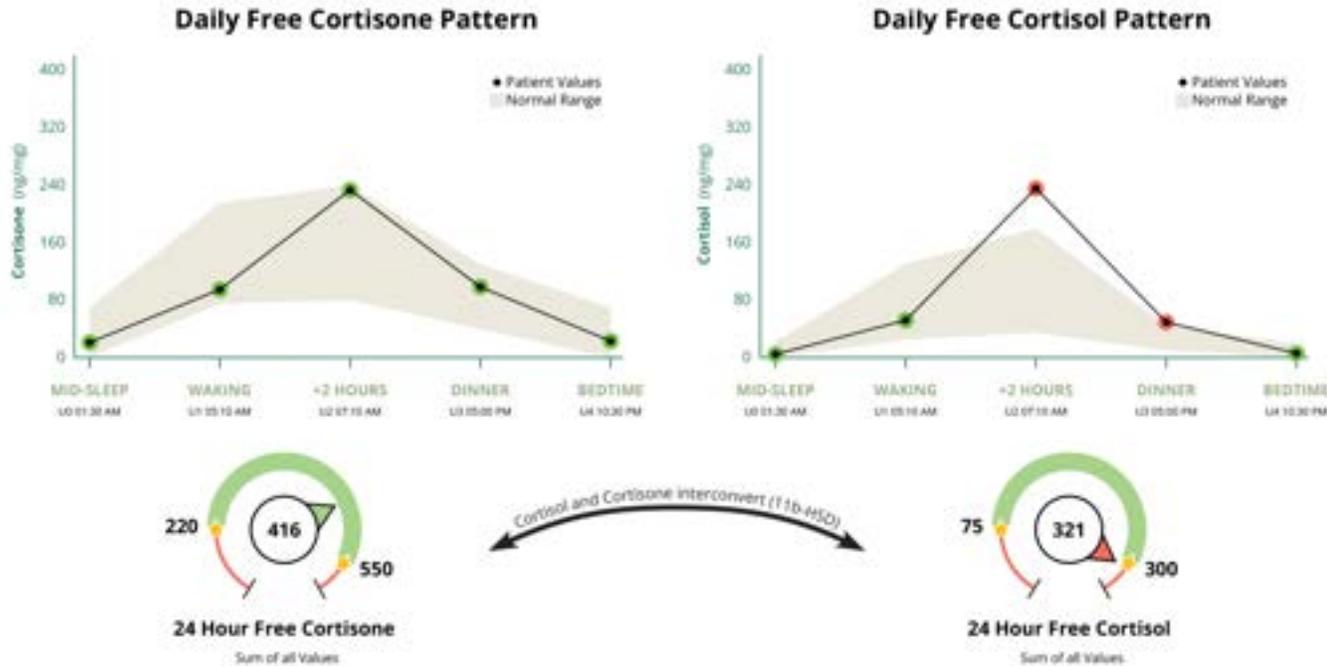
Free cortisol levels in circulation (serum) may be higher than the Daily Free Cortisol Pattern implies.

Polling Question



Game time!

Does free cortisone add more insight into their circulating free cortisol levels?



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Question 3: Does free cortisone add more insight into their circulating free cortisol levels?

Polling Question

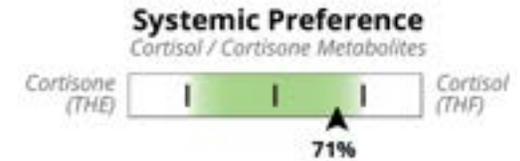
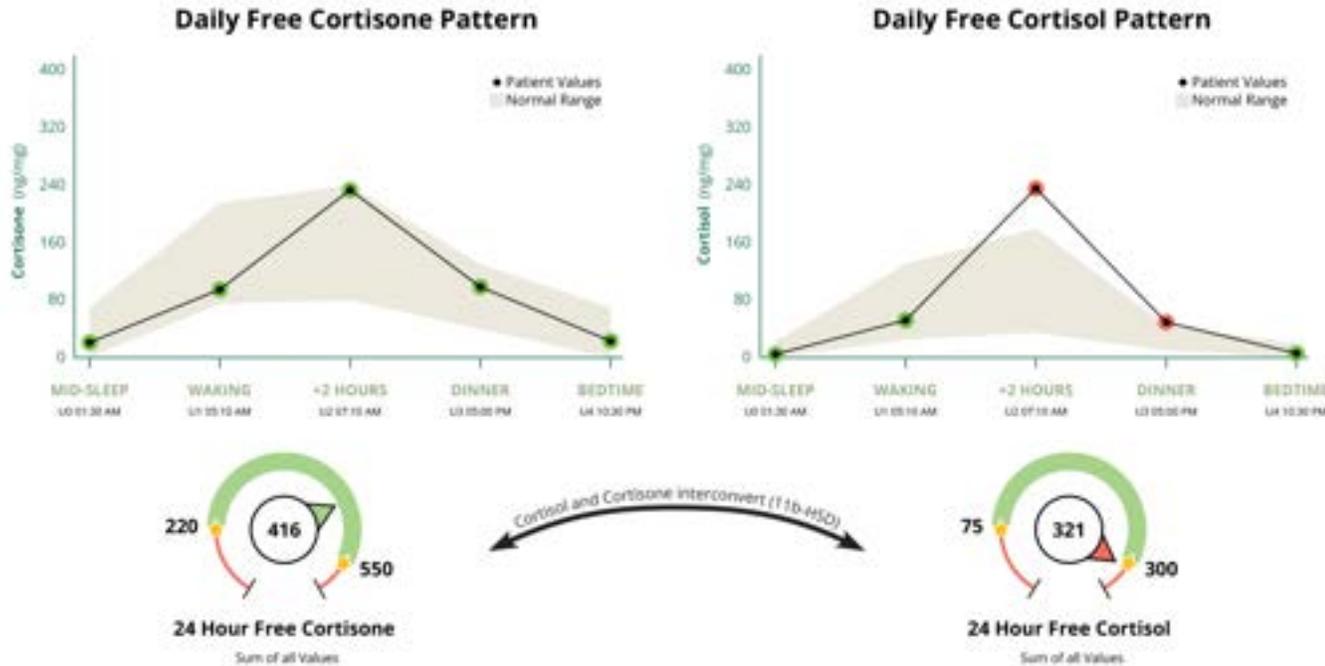


Game time!

Does free cortisone add more insight into their circulating free cortisol levels?

Yes, possibly!

Cortisol in circulation (serum) may not be quite as high as the Daily Free Cortisol Pattern implies.



Her cortisol (THF) preference tells us that the tissues are preferring the **active** form of cortisol.

Always consider the patient's picture when interpreting!

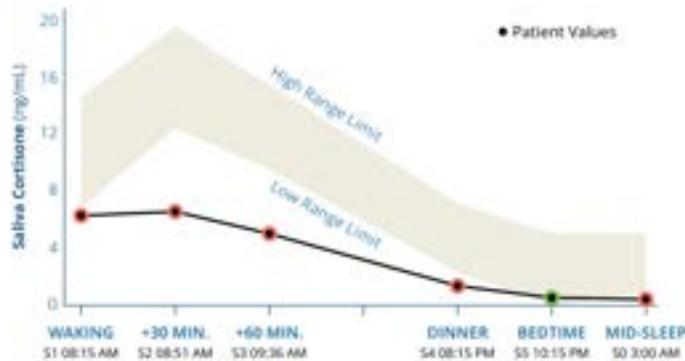
Polling Question



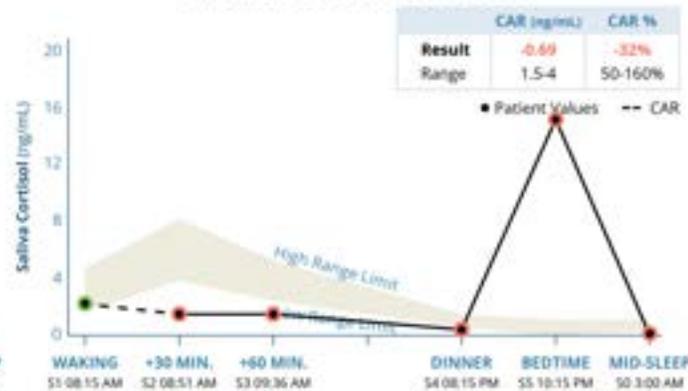
Game time!

Does free cortisone add more insight into their circulating free cortisol levels?

Saliva Free Cortisone Pattern



Saliva Free Cortisol Pattern



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Question 4: Does free cortisone add more insight into their circulating free cortisol levels?

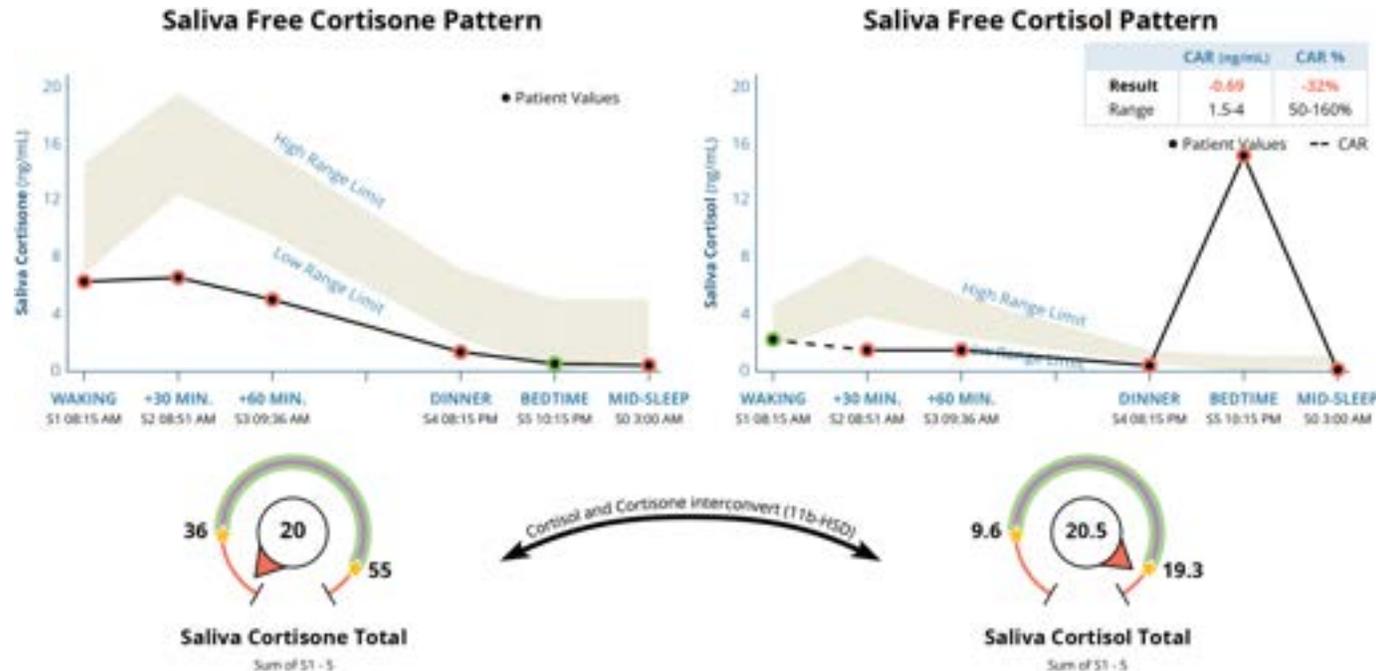
Polling Question



Game time!

Does free cortisone add more insight into their circulating free cortisol levels?

In this case, there was likely contamination of the salivette.



Therefore, the free cortisone graph may better represent free cortisol levels in circulation.

Note that the Cortisol Clearance Rate (CCR) will be artificially low in cases of contamination.

Yes! This is likely an example of hydrocortisone contamination!

DUTCH Advanced Insights

Systemic Preference:
Cortisol vs. Cortisone



10

A DUTCH Advanced Insights: 10 THE vs THF



← Page 4

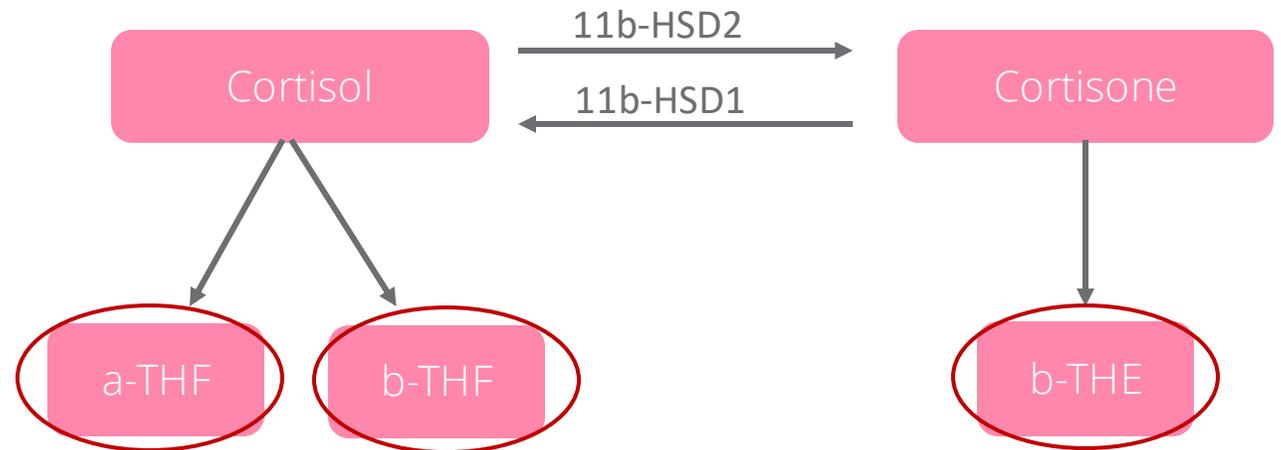
Cortisol

10 Assess if there is a whole-body preference for inactive cortisone (THE) or active cortisol (THF)

A DUTCH Advanced Insights: 10 THE vs THF

- When asking the question, “Is there relatively more **active** cortisol or **inactive** cortisone in the body?” research shows it’s more accurate to compare cortisol and cortisone metabolites, **THF** and **THE**, than free cortisol and free cortisone levels.

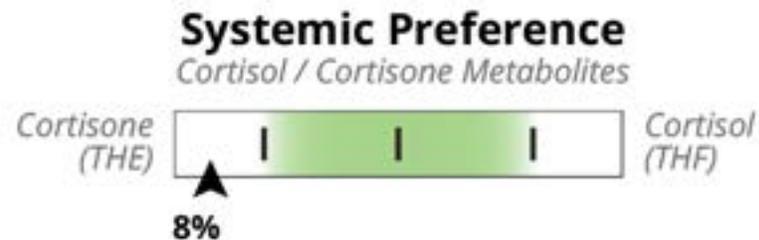
- Free **cortisol** is metabolized into **THF** metabolites.
- Free **cortisone** is metabolized into **THE** metabolites.



Both cortisone and THE end with an “e” so it’s EASY to remember!

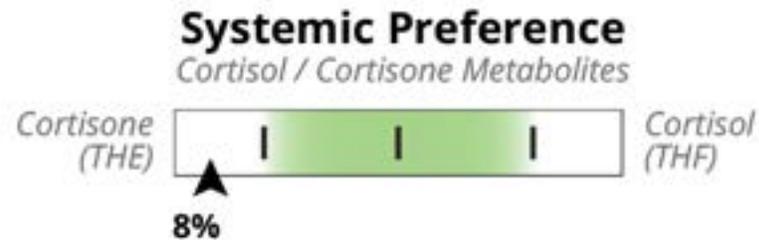
A DUTCH Advanced Insights: 10 THE vs THF

- The **Systemic Preference** slider shows the ratio of cortisol to cortisone metabolites and is the best way to assess systemic preference for cortisol or cortisone.
- A **Cortisol (THF) preference** occurs when there is **more active cortisol** in the body relative to inactive cortisone.
- A **Cortisone (THE) preference** occurs when there is **more inactive cortisone** in the body relative to active cortisol.
- In the example, the Systemic Preference is low at 8%, signifying that systemically there is a preference for more inactive cortisone (THE).



THE (Cortisone) Preference

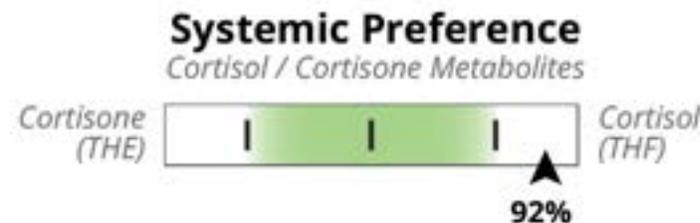
- A person may have a THE preference if the 11b-HSD2 enzyme is readily deactivating cortisol to cortisone in the kidneys, saliva glands and colon.
- A THE preference may be seen with **elevated estrogen levels, chronic stress or inflammation depending on the tissue, glucocorticoid medications, hyperthyroidism (or too much thyroid medication).**
- With hyperthyroidism (or too much thyroid medication), the Cortisol Clearance Rate is usually high (i.e., fast).



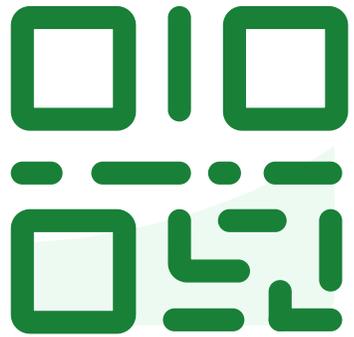
For references, see "THF Preference" in the Reference slides at the end of the presentation.

THF (Cortisol) Preference

- A person may have a THF preference if the 11b-HSD1 enzyme is readily reactivating cortisone to cortisol in the liver, fat cells and the periphery.
- **We tend to see this pattern with acute stress/inflammation/infection and HPA axis activation or dysfunction.**
- A THF preference may be seen with **obesity, insulin resistance, inflammation, licorice root supplementation, hypothyroidism (or insufficient thyroid medication), and phthalates, organotins, and alkylphenols.**
- With hypothyroidism (or not enough thyroid medication), the Cortisol Clearance Rate is usually low (i.e., slow).



For references, see "THF Preference" in the Reference slides at the end of the presentation.



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Game time!

Match the description to the Systemic Preference slider bar:

1

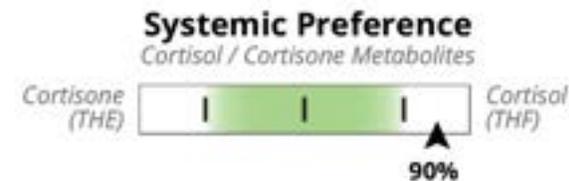
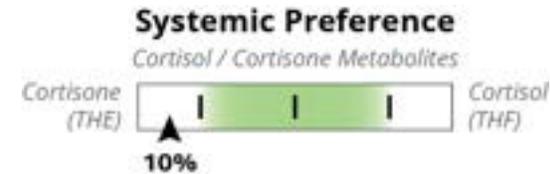
42-year-old female
Blood sugar dysregulation
CRP-hs 12
GLP-1 x 6 months

2

32-year-old female
Migraine on day of testing

3

36-year-old female
Long-term use of prednisone
to manage Crohn's disease



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Question 5: Match the description to the correct Systemic Preference slider



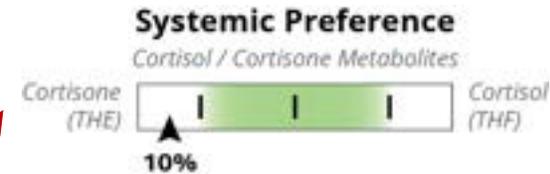
Game time!

Match the description to the Systemic Preference slider bar:

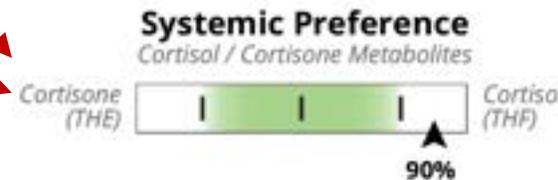
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32-year-old female
Migraine on day of testing

3
36-year-old female
Long-term use of prednisone
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A



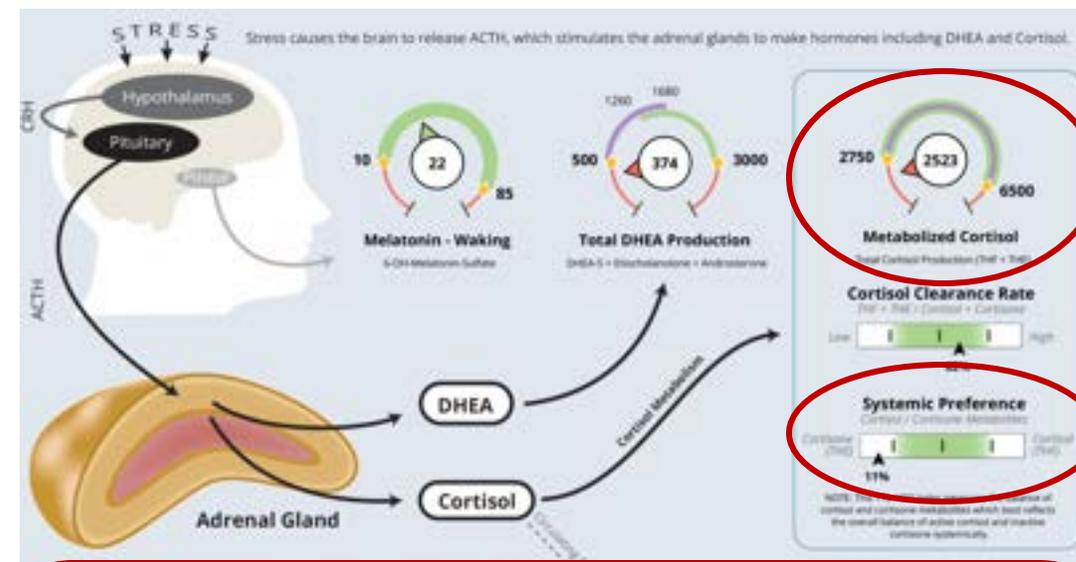
B

THE vs THF Treatments

When thinking about treatments,
look at the entire cortisol picture.

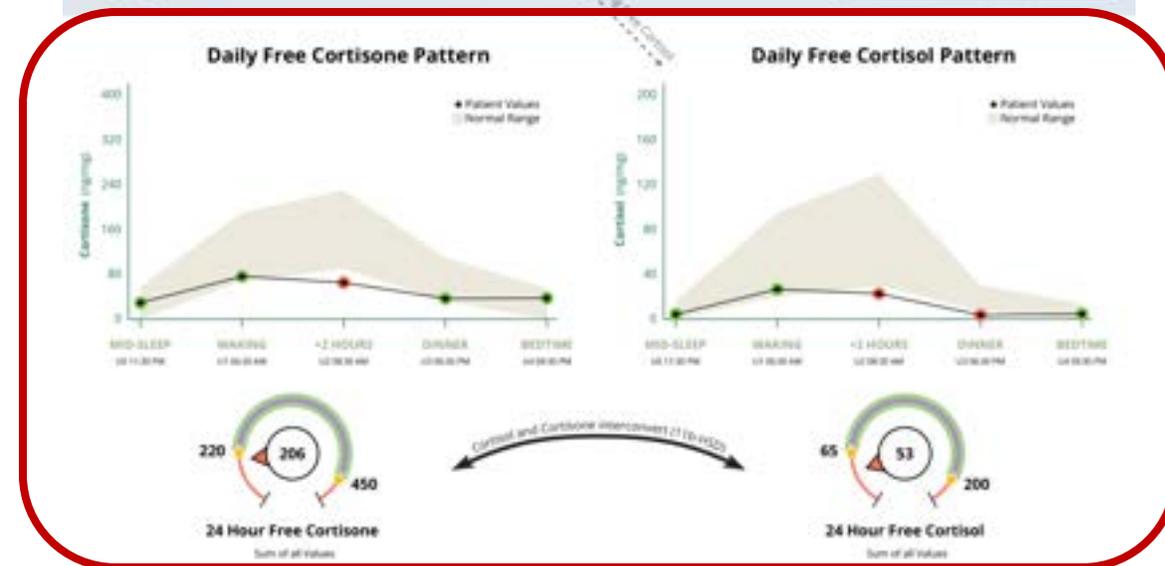
A DUTCH Advanced Insights: THE vs THF

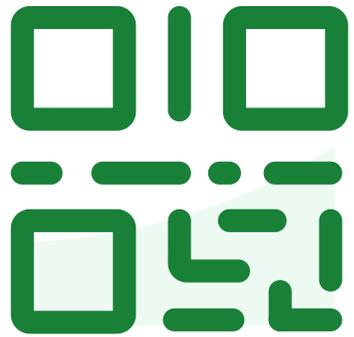
- For example, what if cortisol is low and Systemic Preference is toward Cortisone (THE)?
- We may want to use treatments for low cortisol.



Note about Licorice. Some providers use licorice root (not DGL) in these scenarios as it limits the deactivation of free cortisol into free cortisone. **Use caution in individuals with hypertension, as licorice root can worsen hypertension.**

Always monitor blood pressure and electrolyte balance when using licorice root.





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A DUTCH Advanced Insights: THE vs THF

Polling Question



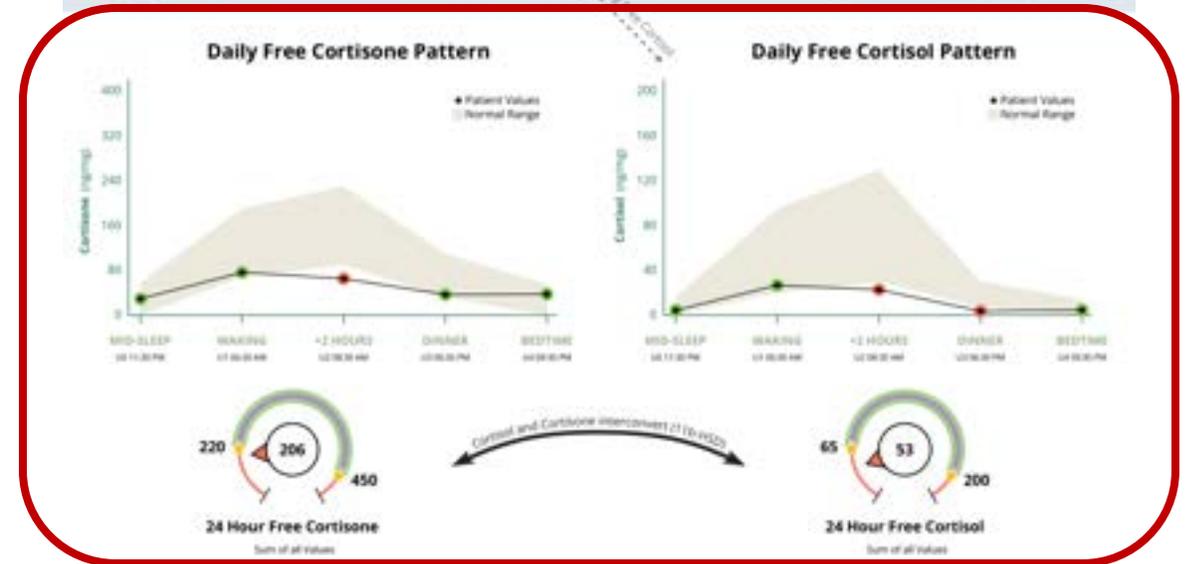
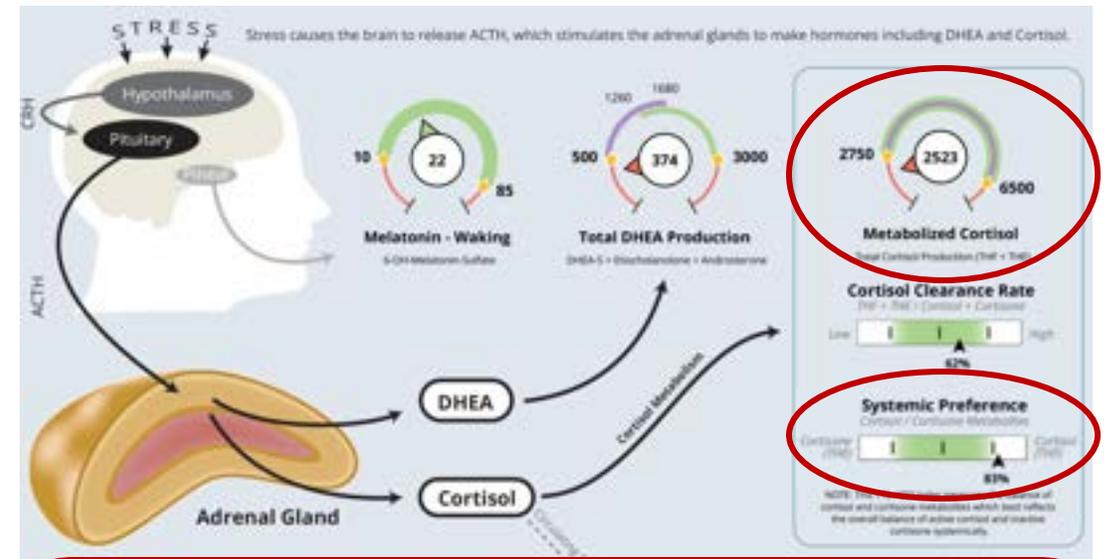
Game time!

What if cortisol is still low but Systemic Preference is the opposite – toward Cortisol (THF).

Would you try to lower cortisol levels?



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Question 6: What if cortisol is low but Systemic Preference is toward Cortisol (THF)? Would you try to lower cortisol levels?

A DUTCH Advanced Insights: THE vs THF

Polling Question

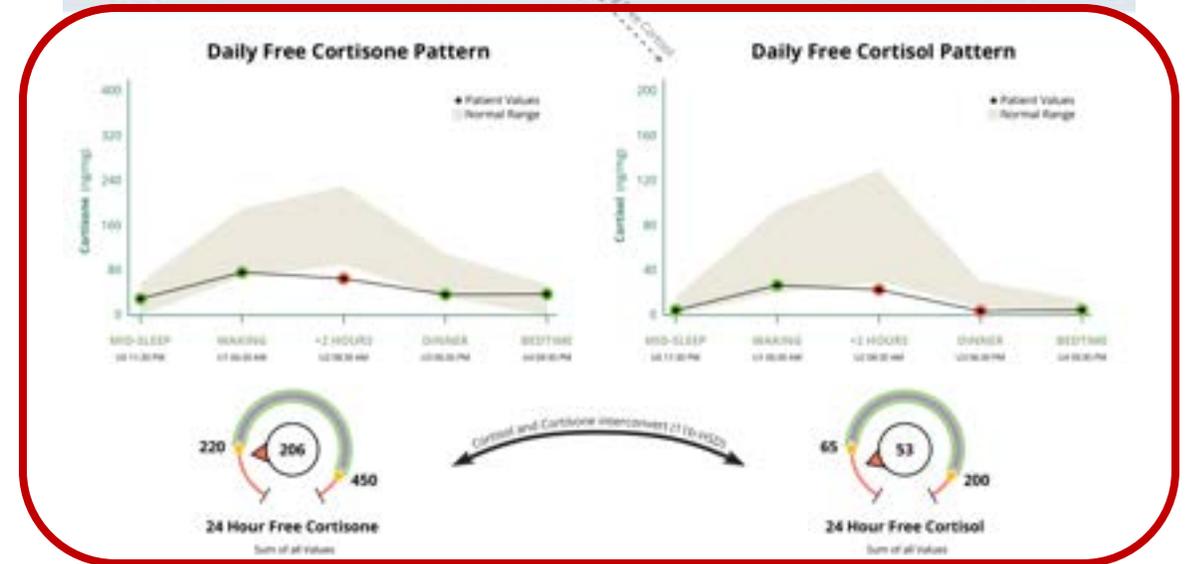
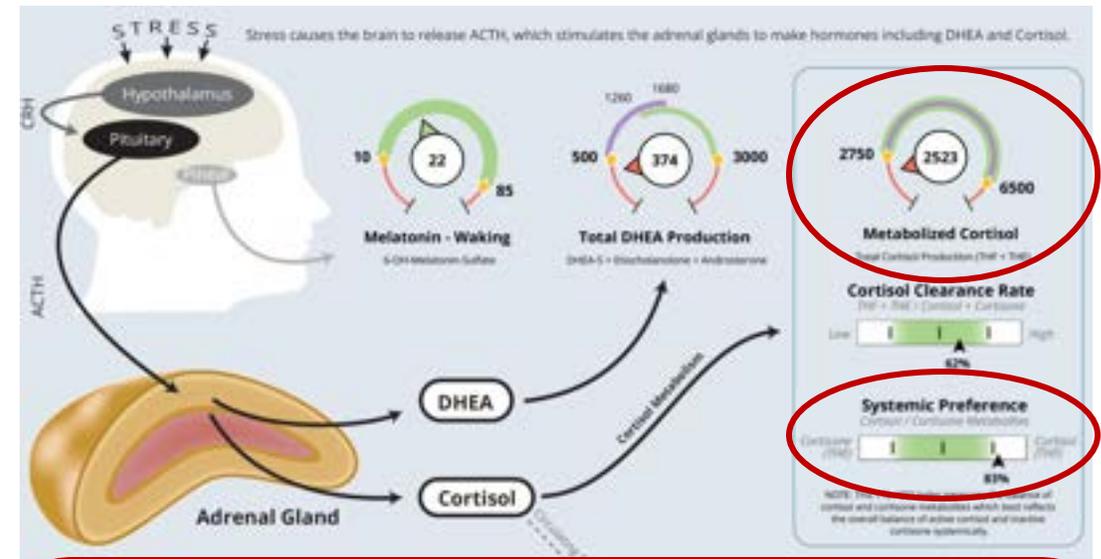


Game time!

What if cortisol is still low but Systemic Preference is the opposite – toward Cortisol (THF).

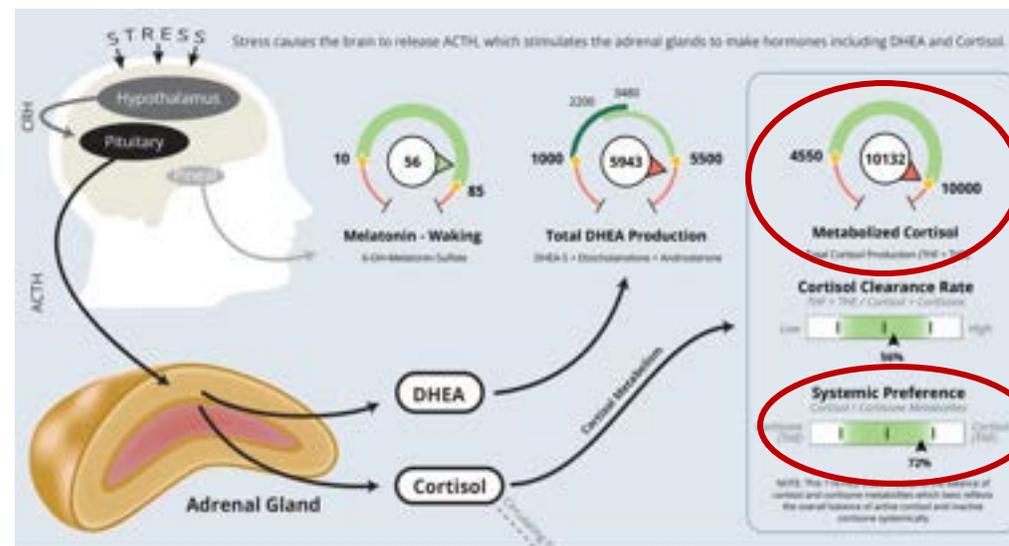
Would you try to lower cortisol levels?

- **Likely not!** The Cortisol (THF) preference may be a compensatory mechanism to preserve cortisol.
- You'd still want to address stressors!
- If psychological stress and anxiety are present, you may choose to use calming adaptogens (e.g., ashwagandha) or nervines (e.g., passionflower).
- But you probably wouldn't choose supplements like phosphatidylserine, a phospholipid that lowers cortisol.



A DUTCH Advanced Insights: THE vs THF

- **What if Systemic Preference is toward Cortisol (THF), but cortisol is high?**
- This means that cortisol levels are elevated in circulation and the body is keeping cortisol in the active form.
- There is A LOT of cortisol activity in the body!
- In these cases, we'd want to consider treatments for high cortisol and address the cause.



A DUTCH Advanced Insights: THE vs THF

Polling Question



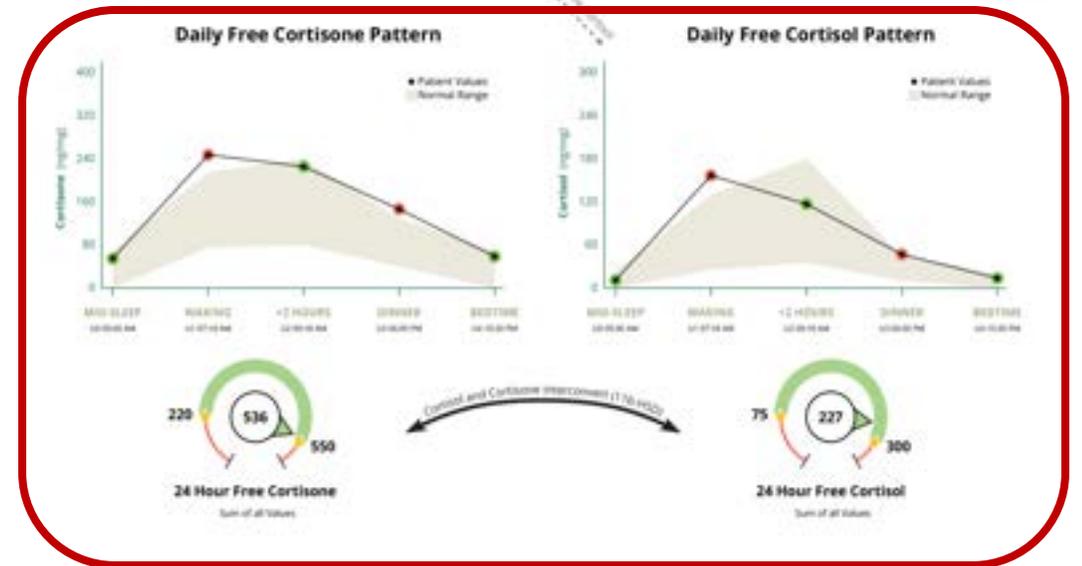
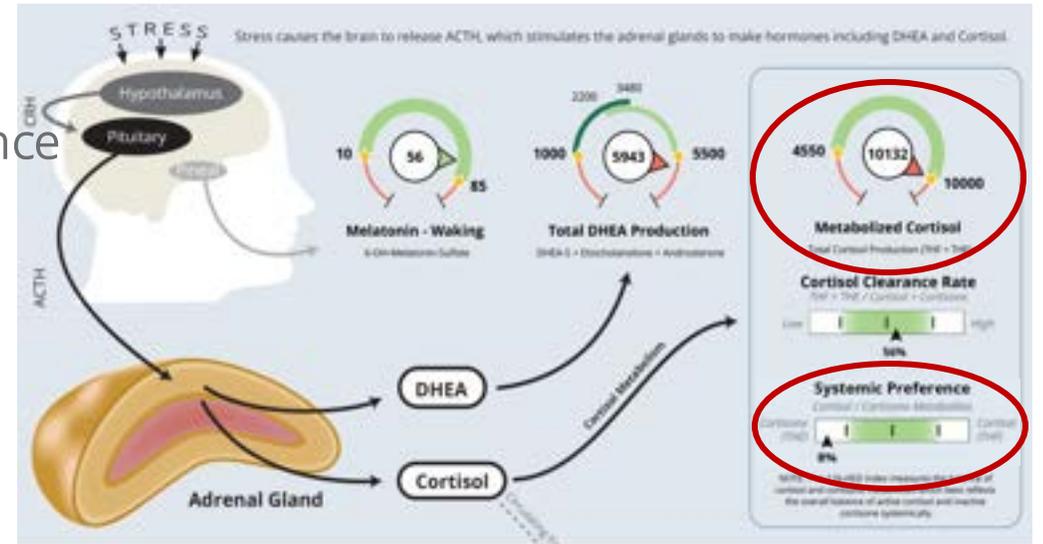
Game time!

What if cortisol is high but Systemic Preference is toward Cortisone (THE).

Would you treat with licorice?



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Question 7: What if cortisol is high but Systemic Preference is toward Cortisone (THE). Would you treat with licorice?

A DUTCH Advanced Insights: THE vs THF

Polling Question

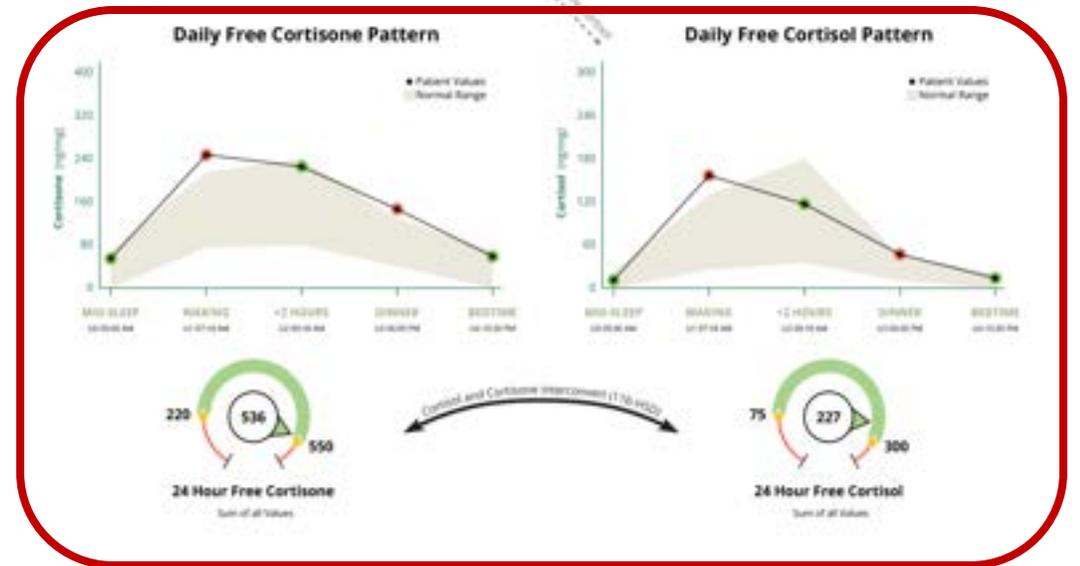
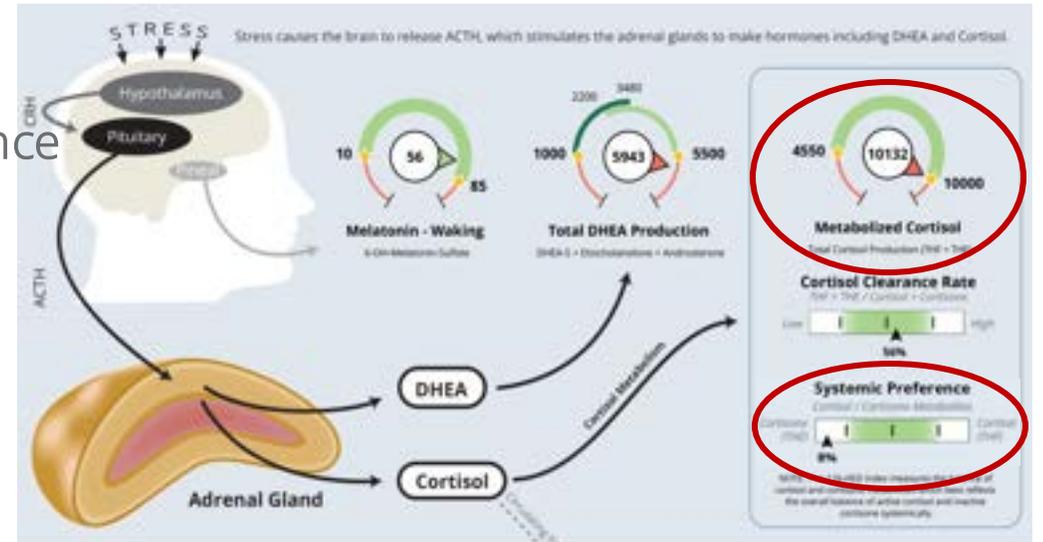


Game time!

What if cortisol is high but Systemic Preference is toward Cortisone (THE).

Would you treat with licorice?

- Likely no!
- This may signify that **the body is compensating by deactivating cortisol.**
- In this case, we wouldn't choose licorice, as it could keep cortisol from being deactivated.
- Instead, we would choose treatments that help to lower cortisol.



DUTCH Advanced Insights

Anabolic-Catabolic Balance



11

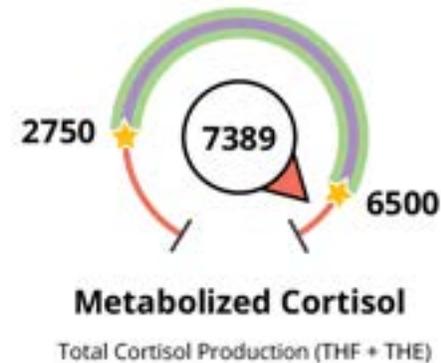
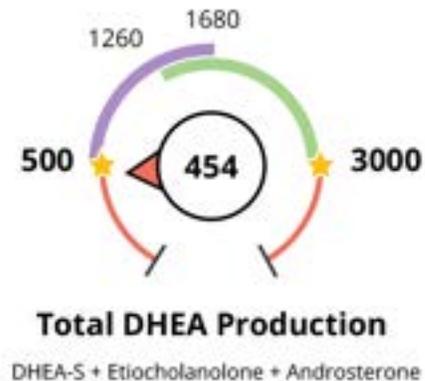
- **Anabolism** is an energy consuming (**endergonic**) metabolic process through which simple molecules (proteins, lipids, nucleic acids, etc.) are used to **build** complex molecules. The energy that is released when ATP is hydrolyzed into ADP is used in this process.
 - Anabolism is important for protein, glycogen, glucose, and fatty acid **synthesis**. It promotes tissue repair, bone growth, and gains in muscle mass from exercise.
- **Catabolism** is an energy releasing (**exergonic**) metabolic process through which complex molecules (fats, proteins, carbohydrates) are **broken down** into simpler ones. The energy from these breakdowns is captured in high-energy compounds such as ATP (and NADH, FADH₂, etc.).
 - Catabolism is important for the **breakdown** of complex carbohydrates, fats, and proteins into simple sugars (like glucose), fatty acids and glycerol, and amino acids. It promotes digestion, ATP production, and detoxification.

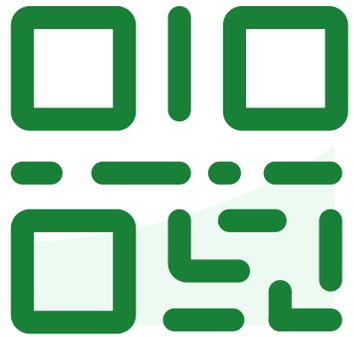
Why is it important for anabolism and catabolism to be balanced?

- Excessive catabolism results in the body **breaking down** more tissue than it builds.
- It can result in fatigue, muscle loss, low bone mineral density, weakness, impaired tissue repair, poor wound healing and weakened immune function.
- **DHEA** is considered more **anabolic**.
- **Cortisol** is considered more **catabolic**.
- More DHEA relative to cortisol may put a patient in an anabolic state.
- On the other hand, more cortisol relative to DHEA may put a patient in a catabolic state. ***This is the state we are concerned about.***

A DUTCH Advanced Insights: 11 Anabolic-Catabolic Balance

- Therefore, if a patient has low Total DHEA Production but high Metabolized Cortisol, they are likely in a more catabolic state. *This is what we want to avoid!*
 - It may be more difficult for this person to see gains in muscle mass, maintain muscle mass, exercise and recover from exercise, and recover from illnesses, injuries, and traumas, etc.
 - They may experience immunological issues (e.g., get sick more often).





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#DUTCHFEST6**

A DUTCH Advanced Insights: 11 Anabolic-Catabolic Balance

Polling Question

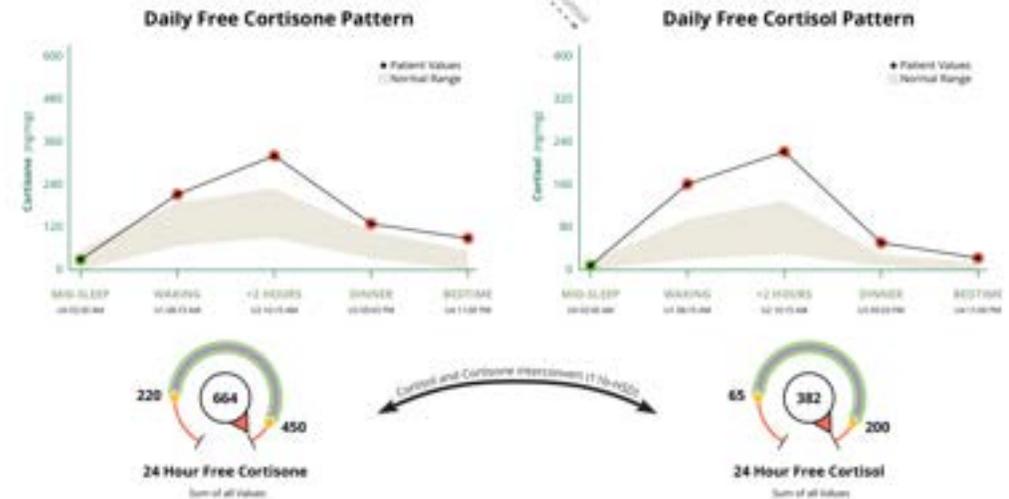
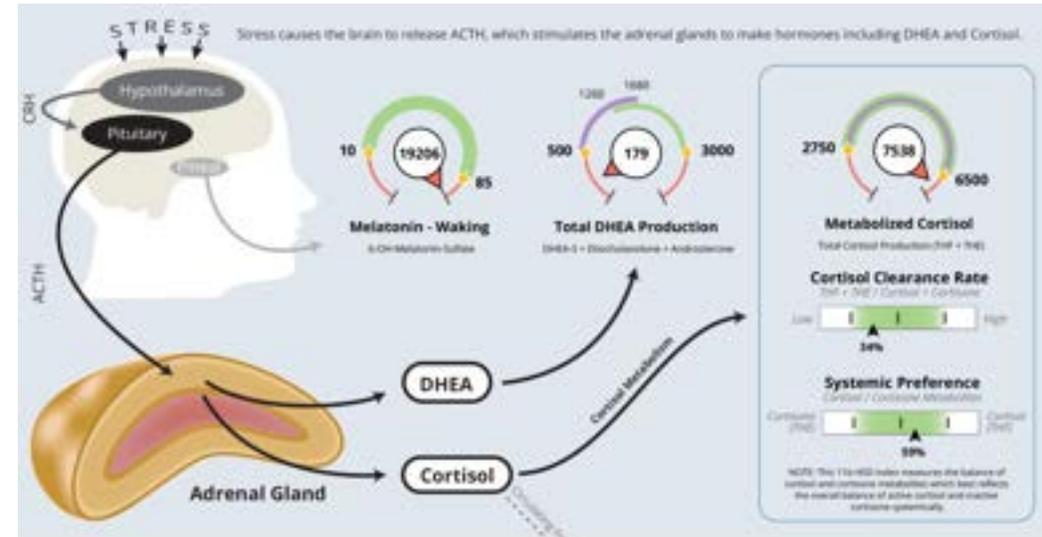


Game time!

Anabolic or catabolic state?



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Question 8: Does this DUTCH Test cortisol result show an anabolic or catabolic state?

A DUTCH Advanced Insights: 11 Anabolic-Catabolic Balance

Polling Question

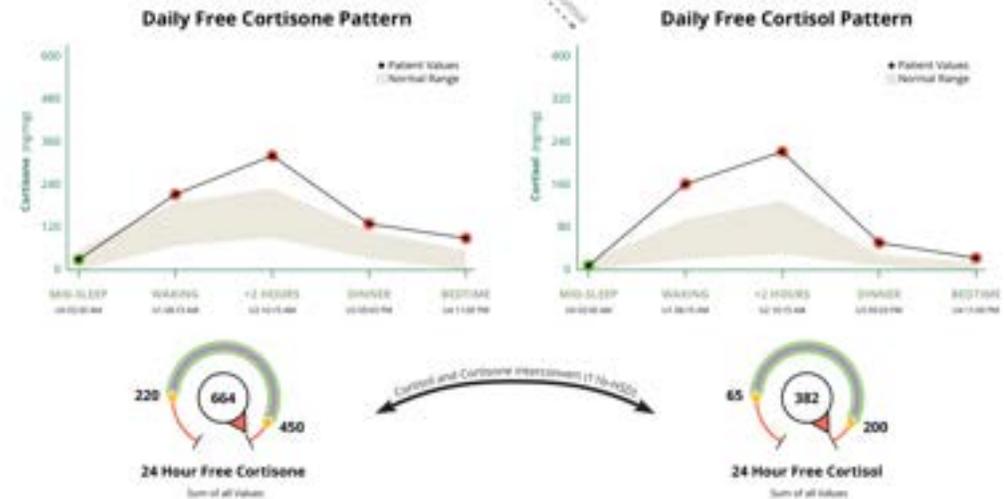
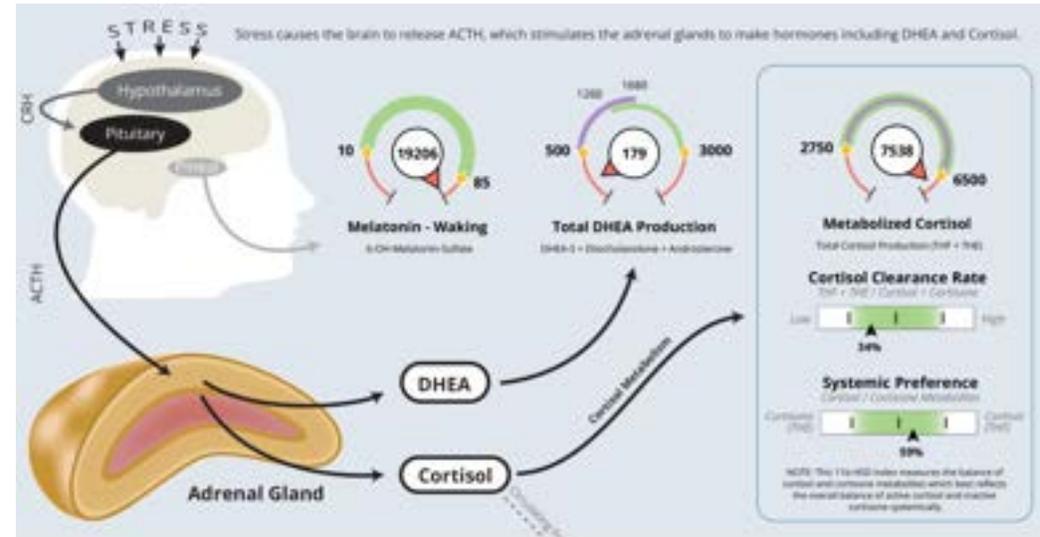


Game time!

Anabolic or catabolic state?

Catabolic!

67-year-old female
 "Tiredness, cold hands + feet, mood swings, can't lose weight, joint/muscle pain, thinning of eyebrows and lashes"



Anabolic / Catabolic Treatments

The treatment you choose depends on the cause, but also the symptoms, treatment goals, and patient preferences.

The DUTCH Treatment Guide: To Lessen a Catabolic State

Lower Cortisol, if Elevated

HPA Axis Support <i>Pages 10, 34, 36</i>	T and DHEA Support if High <i>Pages 20, 22</i>	Progesterone Support if Low <i>Page 8</i>
High CAR Support <i>Page 40</i>	Estrogen Support if High <i>Page 14</i>	Insulin Resistance Support <i>Page 54</i>
Cortisol Calming Herbs <i>Page 37</i>	Stress Support <i>Page 63</i>	Obesity (Weight Loss) Support <i>Page 58</i>
Mood & Cognition Support <i>Page 57</i>	Sleep/Circadian Rhythm Support <i>Page 60</i>	Inflammation Support <i>Page 53</i>

Increase DHEA (Androgens), if Low

*And additionally, HPG axis and gonadal support in females and males, respectively (pages 10 and 18)

HPA Axis Support* <i>Pages 24, 34, 36</i>	Hypothyroidism Support <i>Page 52</i>	Mitochondrial Support <i>Page 56</i>	(Chronic) Insulin Resistance Support <i>Page 54</i>
Slow CCR Support <i>Page 39</i>	DHEA & Testosterone Therapy <i>Page 72</i>	(Chronic) Stress Support <i>Page 63</i>	(Chronic) Obesity (Weight Loss) Support <i>Page 58</i>
Low CAR Support <i>Page 41</i>	Androgen-Supportive Herbs <i>Page 36</i>	(Chronic) Sleep/Circadian Support <i>Page 60</i>	(Chronic) Inflammation Support <i>Page 53</i>
5a-Reductase Activity Support <i>Page 25</i>	DHEA, T & E Support if Low <i>Pages 24, 16, 10</i>	Mood & Cognition Support <i>Page 57</i>	Hyperprolactinemia Support, if Contributing to Low T <i>Page 52</i>

- HPO Axis Support
- HPA Axis Support
- Other Hormone Support
- OATs Support
- Symptom Support
- Detox Support
- Lifestyle Support
- Other Support

DUTCH Advanced Insights

Cortisol-Related OATs



12

Organic Acid Tests (OATs)

TEST	RESULT	UNITS	NORMAL RANGE	
Nutritional Organic Acids (Urine)				
Vitamin B12 Marker - May be deficient if high				
Methylmalonate (MMA)	Above range	4.9	ug/mg	0 - 2.5
Vitamin B6 Markers - May be deficient if high				
Xanthurenate	Above range	1.23	ug/mg	0.12 - 1.2
Kynurenate	Above range	5.3	ug/mg	0.8 - 4.5
Biotin Marker - May be deficient if high				
b-Hydroxyisovalerate	Within range	7.9	ug/mg	0 - 12.5
Glutathione Marker - May be deficient if low or high				
Pyroglutamate	Below range	0.0	ug/mg	28 - 58
Gut Marker - Potential gut putrefaction or dysbiosis if high				
Indican	High end of range	90.4	ug/mg	0 - 100
Neuro-Related Markers (Urine)				
Dopamine Metabolite				
Homovanillate (HVA)	Within range	4.4	ug/mg	3 - 11
Norepinephrine/Epinephrine Metabolite				
Vanilmandelate (VMA)	Above range	7.3	ug/mg	2.2 - 5.5
Neuroinflammation Marker				
Quinolate	Above range	13.2	ug/mg	0 - 9.6
Additional Markers (Urine)				
Melatonin - Waking				
6-OH-Melatonin-Sulfate	Below range	1.3	ng/mg	10 - 85
Oxidative Stress / DNA Damage				
8-Hydroxy-2-deoxyguanosine (8-OHdG)	Within range	3.8	ng/mg	0 - 5.2

Cortisol

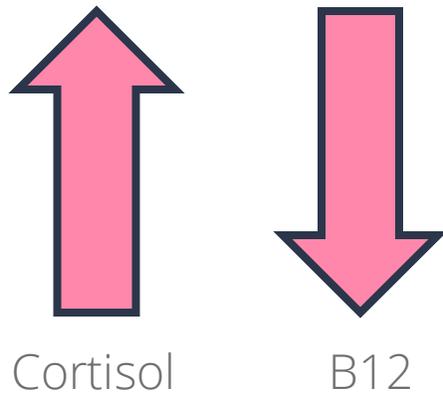
The cortisol OATs include:

- **Methylmalonate (MMA)**
- **Xanthurenate**
- **Kynurenate**
- **Vanilmandelate (VMA)**
- **Melatonin (6-OH-MS)**

12 Assess whether any of the cortisol-related organic acids are out of range

Methylmalonate (MMA)

- Elevated MMA is a sensitive and specific functional marker of vitamin **B12 deficiency (AdenoB12)**.
- Some studies have linked higher cortisol levels to reduced circulating vitamin B12, potentially through mechanisms like stress-induced malabsorption or depletion of B vitamins.
- Also, higher circulating vitamin B12 concentrations have been associated with lower levels of key inflammatory markers (such as IL-6 and CRP).



Vitamin B12 Marker - May be deficient if high
Methylmalonate (MMA) Above range 5.1 ug/mg 0 - 2.5

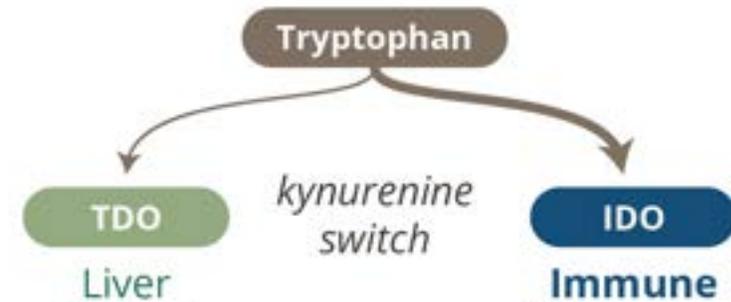
41-year-old female
Heavy bleeding, macrocytic anemia, and anxiety

Camfield D, et al. *Nutrients*. 2013;5(11):4429-4450.

Domínguez-López I, et al. *J Sci Food Agric*. 2024 Jan 30;104(2):875-882.

Xanthurenate and Kynurenate

- High Xanthurenate and Kynurenate are associated with vitamin **B6 deficiency**, but also **impaired tryptophan metabolism**.
- Elevated kynurenate may be associated with stress, **high cortisol**, oxidative damage, and inflammation; These conditions can increase the need for vitamin B6.
- **Xanthurenate can complex with iron** and increase oxidative damage in the body. This damage can increase the risk for diabetes and blood sugar/insulin issues and may also result in DNA damage and elevated 8-OHdG.



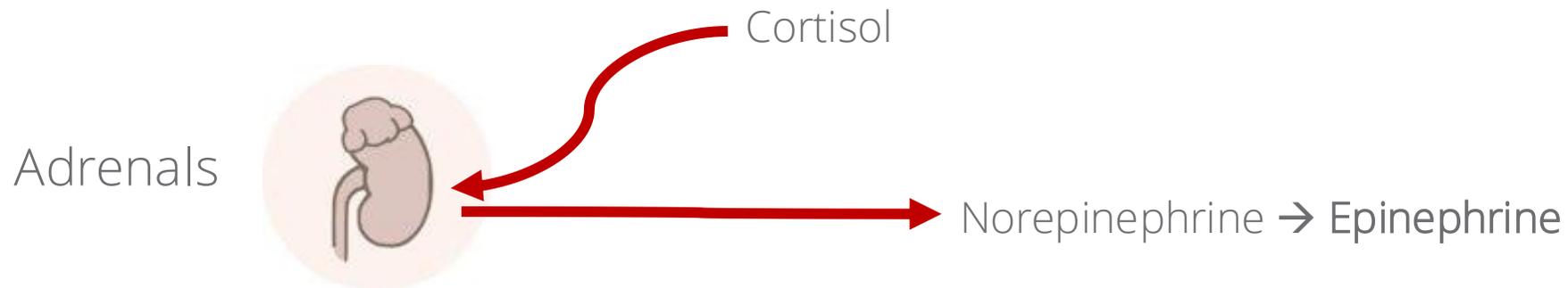
With inflammation, tryptophan metabolism switches from the normal metabolic TDO pathway to the inflammatory immune dedicated IDO pathway.

Therefore, when Xan and Kyn are elevated, we may want to assess for inflammation.

A DUTCH Advanced Insights: 12 Cortisol-Related OATs

VMA – (an Epinephrine and Norepinephrine metabolite)

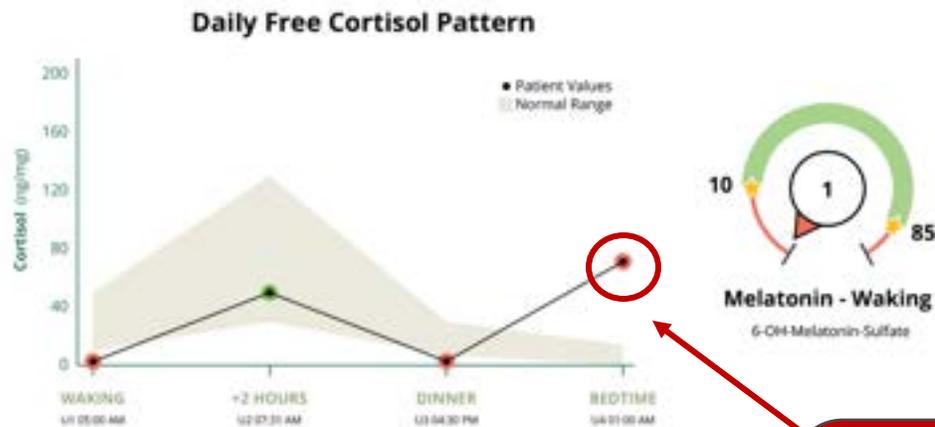
- Adrenaline is released roughly 10 minutes before cortisol; however, cortisol can further increase epinephrine levels.
- During stress, cortisol enters the adrenal medulla at high concentrations and increases the conversion of **norepinephrine into epinephrine** (i.e., adrenaline!)
- If a patient has a high metabolized cortisol (which represents total cortisol production on the day of testing), it was likely that their adrenal medulla experienced higher levels of cortisol.
- Therefore, even if **free** cortisol levels are not high on the DUTCH Test, an elevated metabolized cortisol and VMA may indicate that cortisol levels in the **adrenal medulla** were elevated due to stress.



A DUTCH Advanced Insights: 12 Cortisol-Related OATs

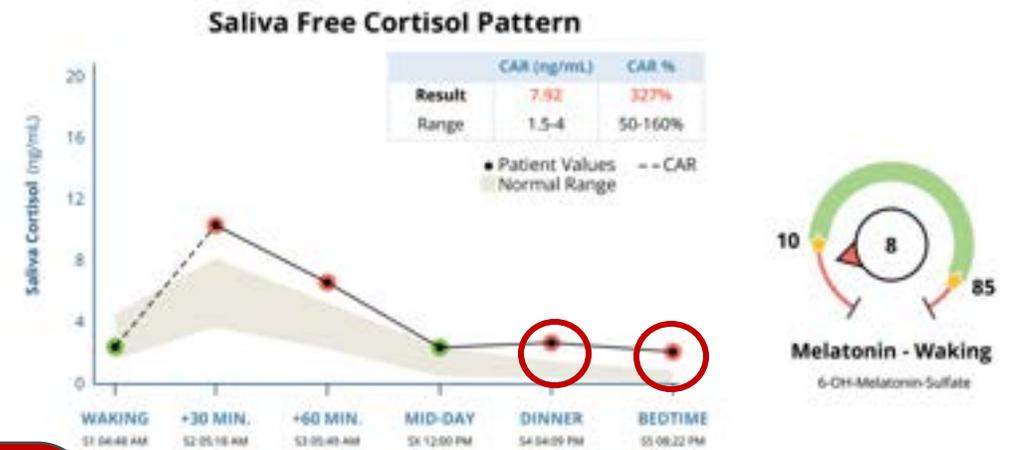
Melatonin

- Cortisol that is elevated at the end of the day can suppress melatonin production.
 - *Note: high evening/bedtime cortisol can have suppressive effects on melatonin even if cortisol is not elevated throughout the entire night (represented by normal/low waking cortisol below).*



49-year-old female
Mild issues falling and staying asleep
Breast Cancer Diagnosis
ER/PR+

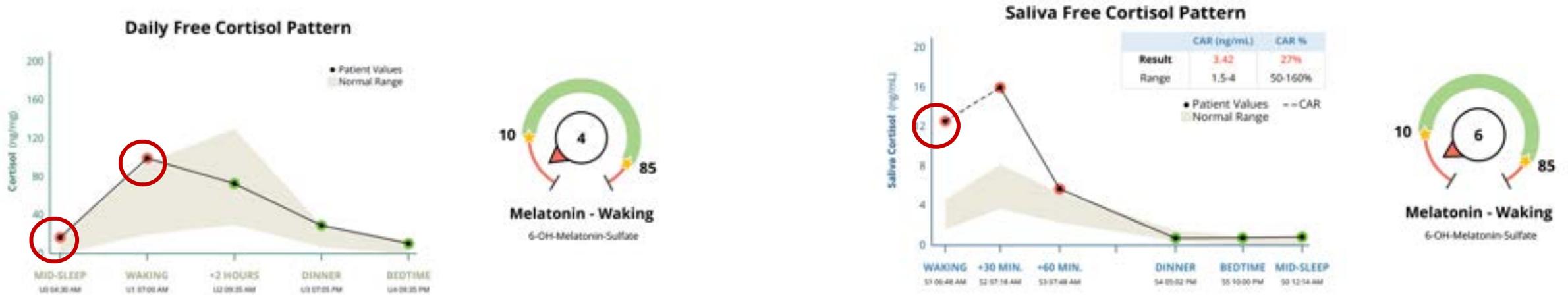
Remember to look at the free cortisol graph to ensure this isn't hydrocortisone contamination. In this example, her free cortisone matched her free cortisol, so it really was elevated at bedtime!



39-year-old female
"Insomnia, fatigue, anxiety/stress,
mood swings"

Melatonin

- High waking cortisol is often associated with higher overnight levels of cortisol which may also be suppressive to melatonin.



80-year-old female
 "Insomnia, fatigue, depression/anxiety"

50-year-old female
 Significant sleep issues
 Daughter suicidal - "Watching over her 24/7"
 "Hair loss, fatigue, stress/anxiety, libido"

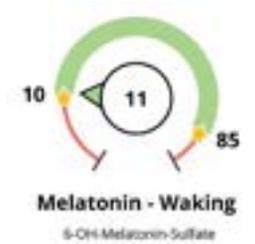
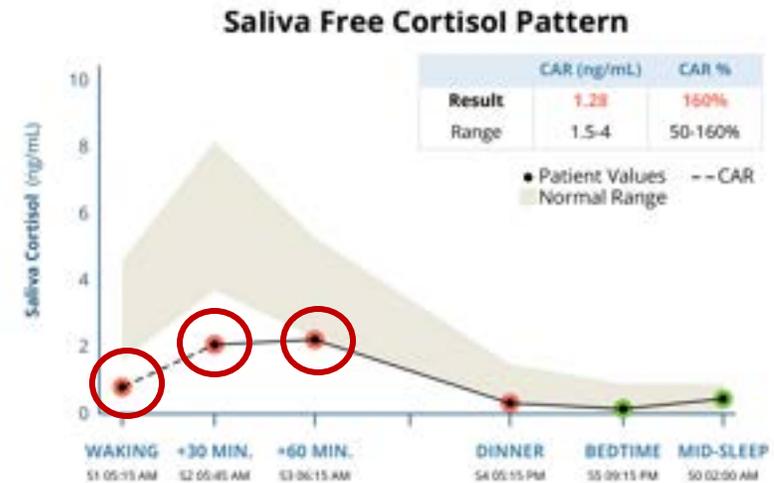
A DUTCH Advanced Insights: 12 Cortisol-Related OATs

Melatonin

- When sleep is significantly impaired, morning cortisol may be low. Improving sleep (and low melatonin if present) may help to improve low morning cortisol.



61-year-old female
Trouble sleeping

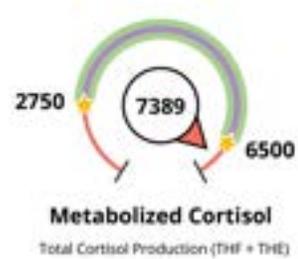


69-year-old female
Trouble staying asleep
Stage 1 Breast Cancer Diagnosis ER+ and PR+

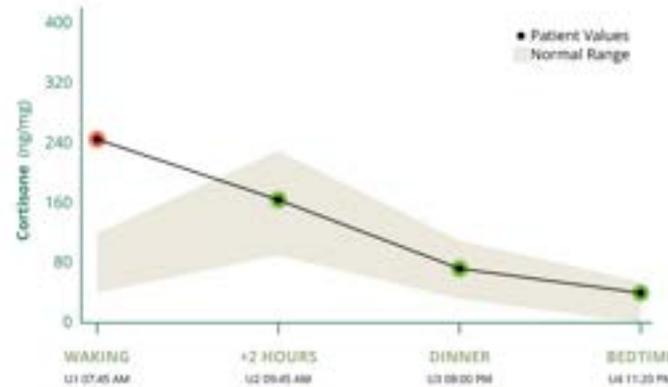
A DUTCH Advanced Insights: 12 Cortisol-Related OATs

Example: 41-year-old female with ulcerative colitis, anemia, fatigue, and poor sleep

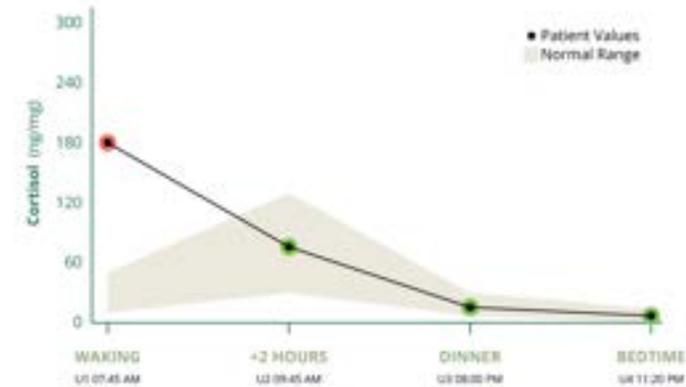
- BMI 44.1



Daily Free Cortisone Pattern



Daily Free Cortisol Pattern



Cortisol and Cortisone interconvert (11 β -HSD)

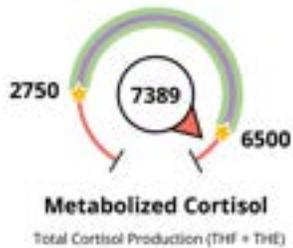


A DUTCH Advanced Insights: 12 Cortisol-Related OATs

Example: 41-year-old female with ulcerative colitis, anemia, fatigue and poor sleep
 • BMI 44.1

Organic Acid Tests (OATs)

TEST	RESULT	UNITS	NORMAL RANGE
Nutritional Organic Acids (Urine)			
Vitamin B12 Marker - May be deficient if high			
Methylmalonate (MMA)	Above range	5.1 ug/mg	0 - 2.5
Vitamin B6 Markers - May be deficient if high			
Xanthurenate	Within range	0.71 ug/mg	0.12 - 1.2
Kynurenate	Within range	2.5 ug/mg	0.8 - 4.5
Biotin Marker - May be deficient if high			
b-Hydroxyisovalerate	Above range	74.6 ug/mg	0 - 12.5
Glutathione Marker - May be deficient if low or high			
Pyroglutamate	Above range	43.6 ug/mg	28 - 58
Gut Marker - Potential gut putrefaction or dysbiosis if high			
Indican	Within range	56.3 ug/mg	0 - 100
Neuro-Related Markers (Urine)			
Dopamine Metabolite			
Homovanillate (HVA)	Within range	5.4 ug/mg	3 - 11
Norepinephrine/Epinephrine Metabolite			
Vanilmandelate (VMA)	Above range	5.9 ug/mg	2.2 - 5.5
Neuroinflammation Marker			
Quinolinate	Above range	17.7 ug/mg	0 - 9.6
Additional Markers (Urine)			
Melatonin - Waking			
6-OH-Melatonin-Sulfate	Below range	6.7 ng/mg	10 - 85
Oxidative Stress / DNA Damage			
8-Hydroxy-2-deoxyguanosine (8-OHdG)	Within range	2.0 ng/mg	0 - 5.2



High cortisol has been associated with low B12

High VMA is associated with high cortisol

Cortisol that is elevated at the end of the day and during the night can suppress melatonin production

Cortisol-Related OATs Treatments

The treatment you choose depends on the cause, but also the symptoms, treatment goals, and patient preferences.

The DUTCH Treatment Guide: **Cortisol-Related OATs**

Methylmalonate (MMA)
Page 44

Xanthurenate
Kynurenate
Page 44

VMA
Page 46

Melatonin
Page 47

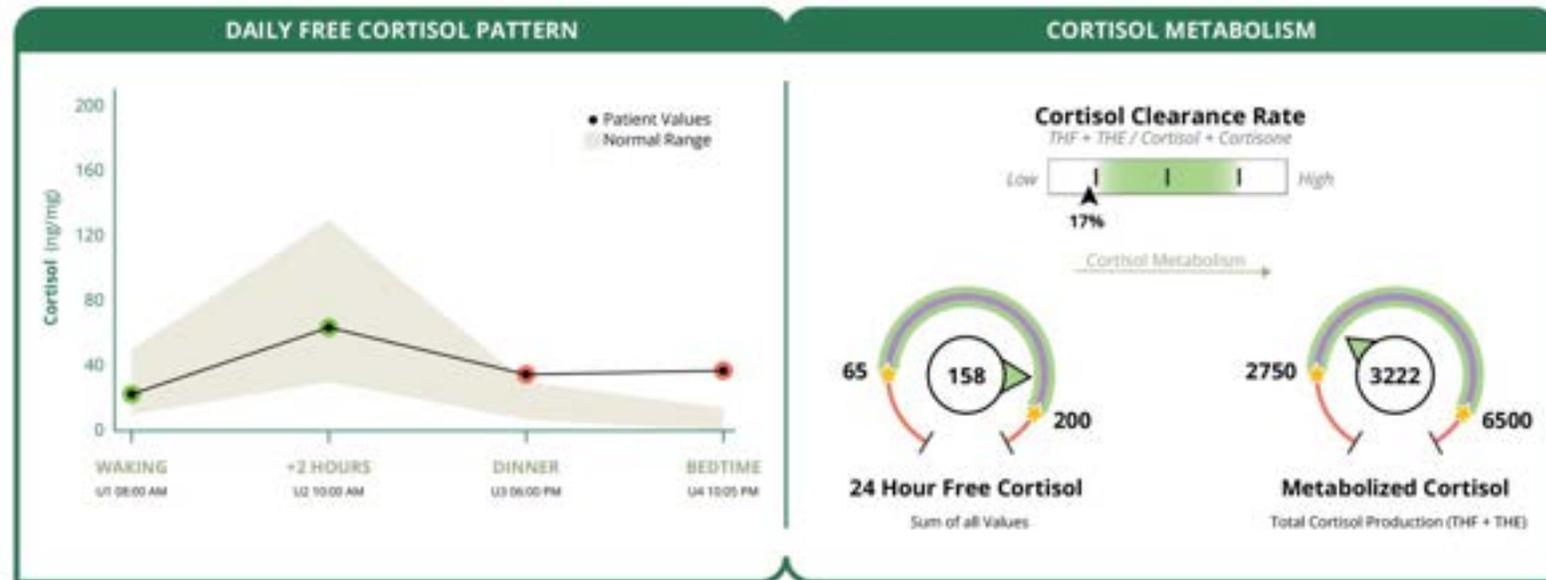
 OATs Support



Putting it All Together!

A DUTCH Advanced Insights: Putting it all together!

- 24-year-old female diagnosed with Premature Ovarian Insufficiency (POI). Complains of fatigue, low libido, and stressful roommate situation (doesn't like to be home). BMI 21.3.

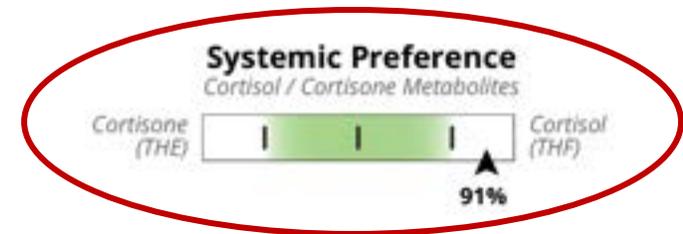


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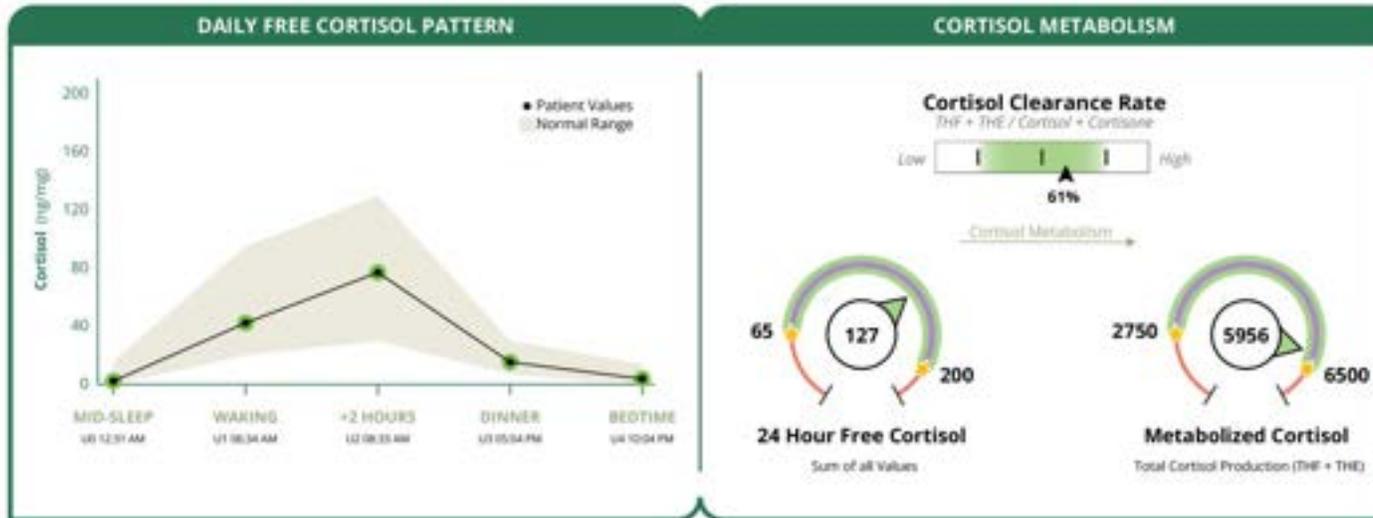


- **What is happening in her body given her situation?**



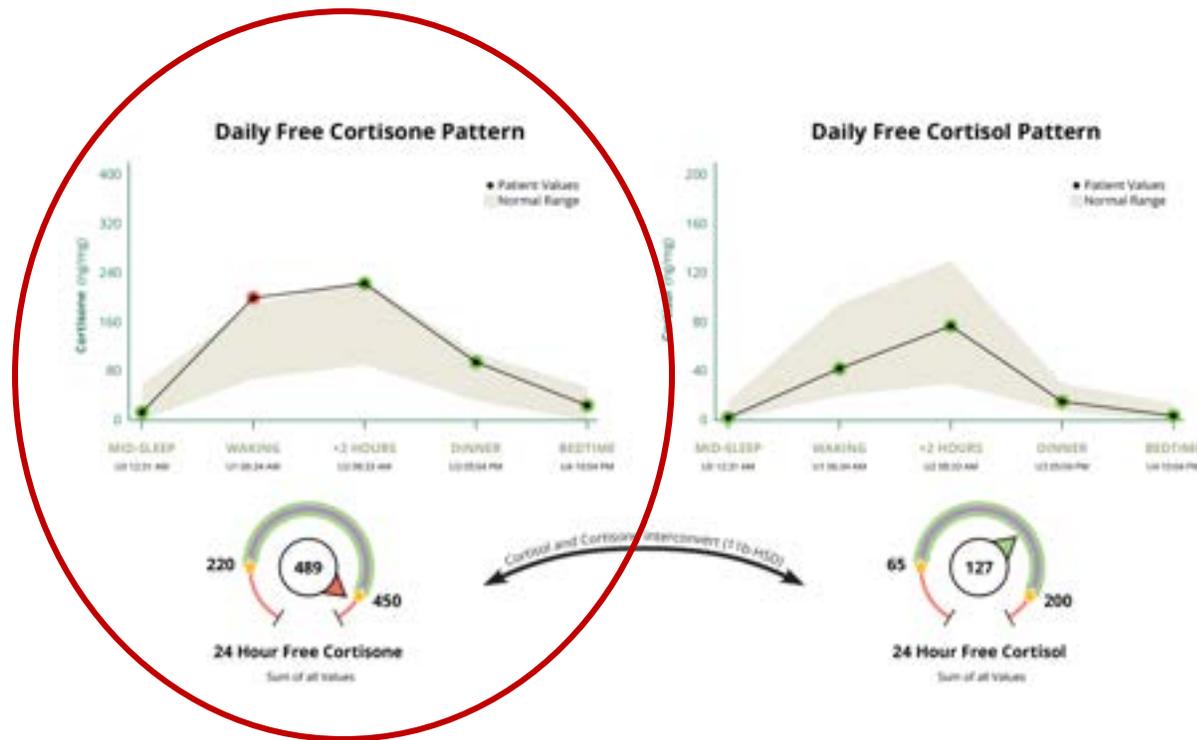
A DUTCH Advanced Insights: Putting it all together!

- 29-year-old female diagnosed with PCOS. Complains of irregular cycles, high stress, facial hair, and breast tenderness. BMI 29.3.

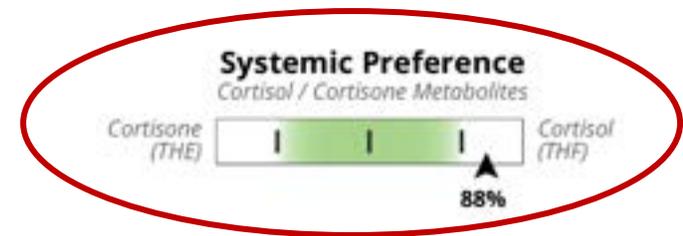
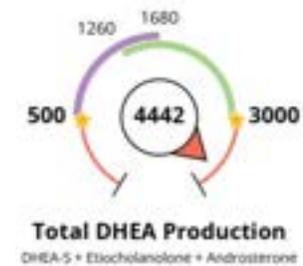


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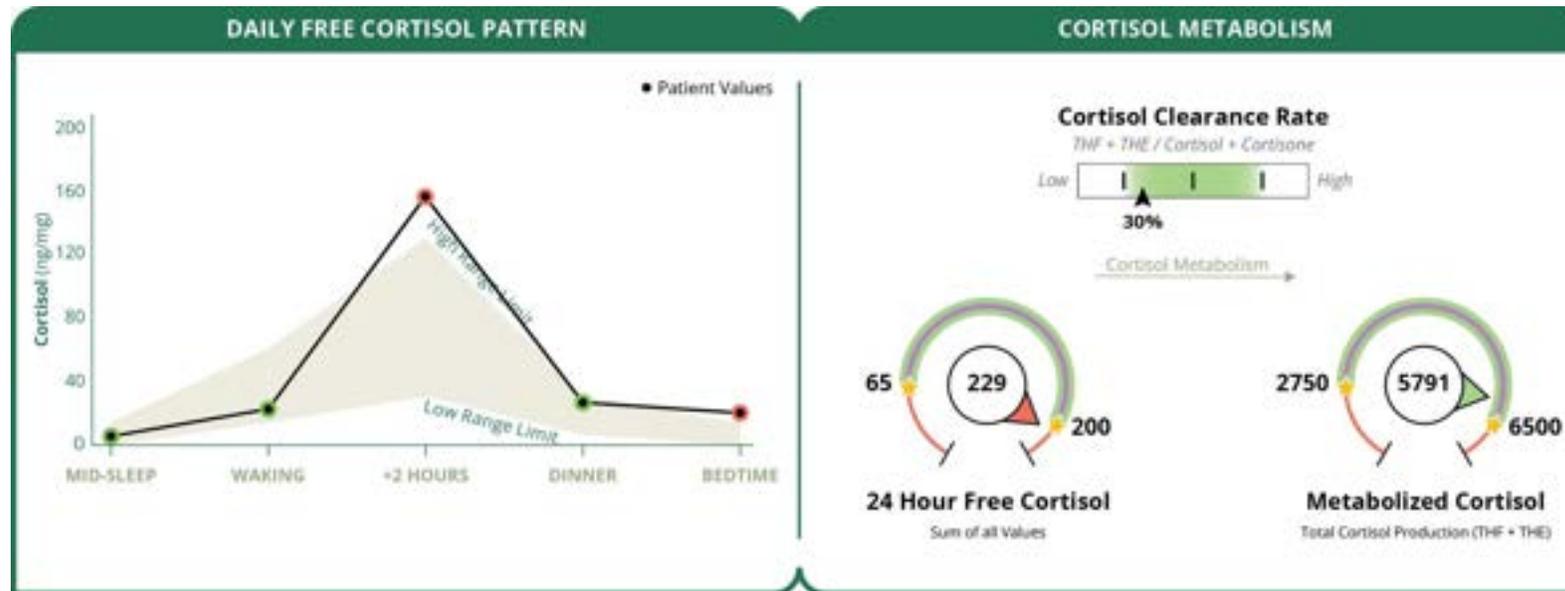


- Could high HPA axis activity be contributing to her high DHEA production after all?



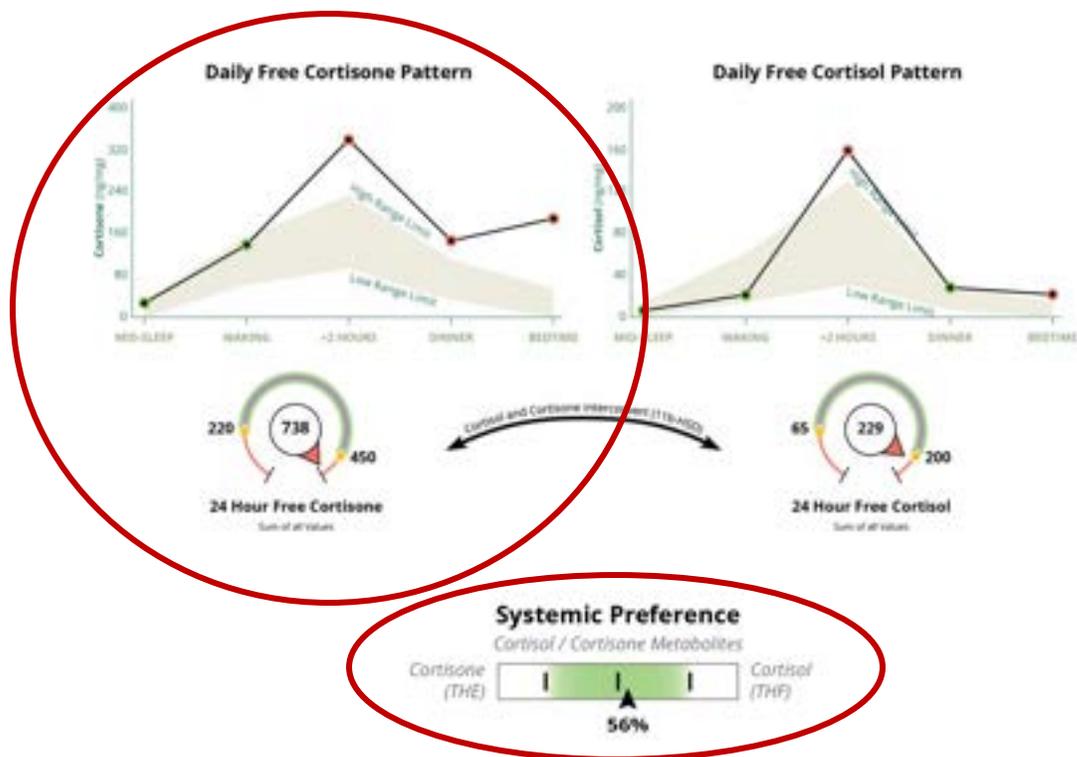
A DUTCH Advanced Insights: Putting it all together!

- 39-year-old female with suspected endometriosis. Complains of dysmenorrhea, heavy bleeding, and frequent night wakings. BMI 26.6.



A DUTCH Advanced Insights: Putting it all together!

- 39-year-old female with suspected endometriosis. Complains of dysmenorrhea, heavy bleeding, and frequent night wakings. BMI 26.6.
- Do the Advanced Insights give you more clues as to why she may be waking up a lot at night?

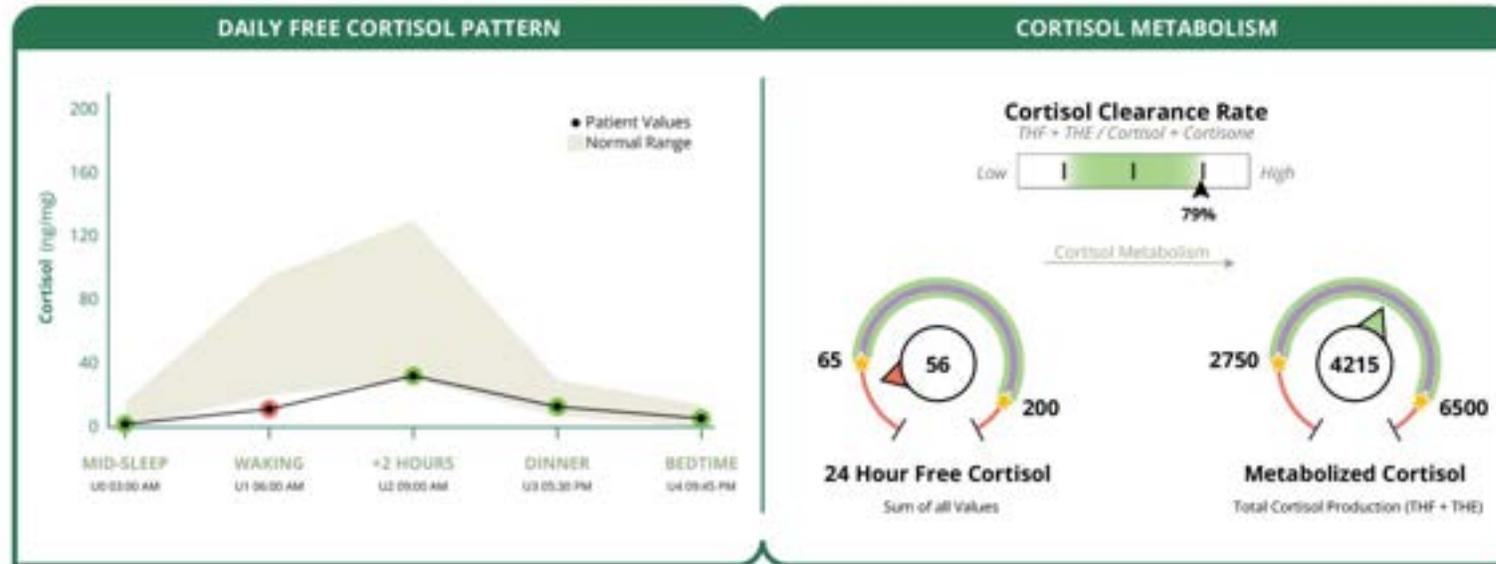


Organic Acid Tests (OATs)

TEST	RESULT	UNITS	NORMAL RANGE
Nutritional Organic Acids (Urine)			
Vitamin B12 Marker - May be deficient if high			
Methylmalonate (MMA)	Above range	2.7 ug/mg	0 - 2.5
Vitamin B6 Markers - May be deficient if high			
Xanthurenate	Within range	0.33 ug/mg	0.12 - 1.2
Kynurenate	Within range	1.3 ug/mg	0.8 - 4.5
Biotin Marker - May be deficient if high			
b-Hydroxyisovalerate	Above range	9.4 ug/mg	0 - 12.5
Glutathione Marker - May be deficient if low or high			
Pyroglutamate	Within range	35.9 ug/mg	28 - 58
Gut Marker - Potential gut putrefaction or dysbiosis if high			
Indican	Within range	44.8 ug/mg	0 - 100
Neuro-Related Markers (Urine)			
Dopamine Metabolite			
Homovanillate (HVA)	Within range	5.5 ug/mg	3 - 11
Norepinephrine/Epinephrine Metabolite			
Vanilmandelate (VMA)	Within range	2.9 ug/mg	2.2 - 5.5
Neuroinflammation Marker			
Quinolinatate	Within range	8.7 ug/mg	0 - 9.6
Additional Markers (Urine)			
Melatonin - Waking			
6-OH-Melatonin-Sulfate	Below range	1.5 ng/mg	10 - 85
Oxidative Stress / DNA Damage			
8-Hydroxy-2-deoxyguanosine (8-OHdG)	Within range	0.9 ng/mg	0 - 5.2

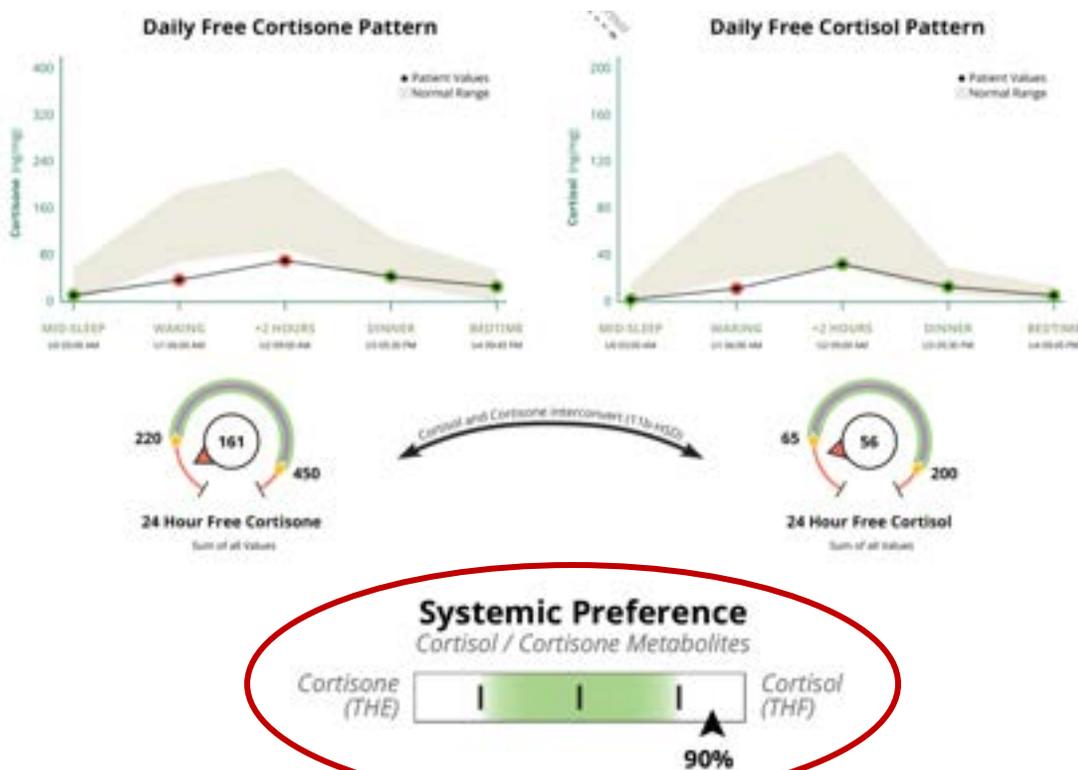
A DUTCH Advanced Insights: Putting it all together!

- **58-year-old PMP female** on 100 mg OMP, 0.075 E2 patch, 5 mg transdermal T cream, and 1.0 mg vaginal E3. Complains of acne, occasional bothersome hot flashes, and weight loss resistance. BMI 30.1.



A DUTCH Advanced Insights: Putting it all together!

- **58-year-old PMP female** on 100 mg OMP, 0.075 E2 patch, 5 mg transdermal T cream, and 1.0 mg vaginal E3. Complains of acne, occasional bothersome hot flashes, and weight loss resistance. BMI 30.1.
- What type of stress does her cortisol levels suggest – acute or chronic?
- How does inflammation affect the Systemic Preference?



Organic Acid Tests (OATs)

TEST	RESULT	UNITS	NORMAL RANGE
Nutritional Organic Acids (Urine)			
Vitamin B12 Marker - May be deficient if high			
Methylmalonate (MMA)	Within range	1.4 ug/mg	0 - 2.5
Vitamin B6 Markers - May be deficient if high			
Xanthurenate	Within range	0.54 ug/mg	0.12 - 1.2
Kynurenate	Above range	5.2 ug/mg	0.8 - 4.5
Biotin Marker - May be deficient if high			
b-Hydroxyisovalerate	Within range	4.8 ug/mg	0 - 12.5
Glutathione Marker - May be deficient if low or high			
Pyroglutamate	High end of range	57.7 ug/mg	28 - 58
Gut Marker - Potential gut putrefaction or dysbiosis if high			
Indican	Within range	65.6 ug/mg	0 - 100
Neuro-Related Markers (Urine)			
Dopamine Metabolite			
Homovanillate (HVA)	Within range	5.0 ug/mg	3 - 11
Norepinephrine/Epinephrine Metabolite			
Vanilmandelate (VMA)	Within range	5.1 ug/mg	2.2 - 5.5
Neuroinflammation Marker			
Quinolinate	Above range	9.9 ug/mg	0 - 9.6
Additional Markers (Urine)			
Melatonin - Waking			
6-OH-Melatonin-Sulfate	Within range	43.5 ng/mg	10 - 85
Oxidative Stress / DNA Damage			
8-Hydroxy-2-deoxyguanosine (8-OHdG)	High end of range	4.9 ng/mg	0 - 5.2

Patterns of high inflammation

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THE Preference (may push to cortisone):

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THF Preference (may push to cortisol):

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Thank You!

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