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Key Takeaways from DUTCH Fest 2026

Dr. Kelly Ruef

Dr. Allison Smith

Drs. Kelly Ruef and Allison Smith



DUTCH Fest 2026 Goals

- Interpret the DUTCH report with **Clarity and Speed**
- Know hormones, **Change lives!**
- Have **FUN!**



Main Stage Lectures



DUTCH Fest 2026 Resources



DUTCH Fest Case Studies Book



DUTCH Fest Workbook



DUTCH Interpretive Guide



DUTCH Treatment Guide

DUTCH Fest 2026 Hormone Continuums

Pre-Menopausal E2: Causes



Postmenopausal (PMP)
0.2-0.7 ng/mg

Ovaries NOT Cycling Due To:

- Conditions & medications that suppress the HPO axis, including combi OCPs (1)
- Diminished ovarian reserve, POI, perimenopause
- Low androgens affecting follicle development
- Medically induced, such as in oophorectomy (2)
- Hypogonadism, Hypopituitarism



Low
0.7-1.8 ng/mg

Ovaries Cycling but E2 is Low Due To:

- Incorrect timing of sample collection in the follicular phase (E2 reference range 1-2 ng/mg (3))
- Conditions that impair (but do not fully suppress) the HPO axis (2)
- Low androgens affecting follicle development



Normal
1.8-4.5 ng/mg

Ovaries Cycling and Producing Normal Luteal E2

Ovaries NOT cycling but E2 levels are in the luteal range due to:

- Profound aromatase activity, typically obesity-related (1,2)
- Hormone therapy (1,4)



High
>4.5 ng/mg

Ovaries Cycling but E2 is High Due To:

- Incorrect timing of sample collection in the ovulatory phase (E2 reference range 4-12 ng/mg (1,8))
- Perimenopause
- Metabolic issues, including obesity (1,3)
- High aromatase activity, typically obesity-related (1,2)
- Suboptimal estrogen detoxification
- Hormone therapy (1,4)

Ovaries NOT cycling but E2 levels are above the luteal range due to:

- Hormone therapy (1,4)



Very Low Below PMP
0.0-0.2 ng/mg

Ovaries NOT Cycling and Subphysiologic E2 Levels Due To:

- Low aromatase activity, such as with low body fat percentage (4)
- Very low DHEA (5)
- HPA axis suppressive medications, including glucocorticoids (8)
- Adrenal insufficiency, including Addison's Disease

Ovaries NOT Cycling but E2 Levels are Above the PMP Range Due To:

- High aromatase activity, typically obesity-related (1,2)



Very High

Supraphysiologic E2 Levels Due To:

- Oral or sublingual estrogen therapy (1)* (pass affects urine metabolites only, not serum) (1,12)
- Pregnancy
- Hormone-producing neoplasms (rare)

- Brain fog
- Low libido
- Insomnia
- Weight gain
- Joint pain
- Skin changes
- Decreased bone mineral density
- Increased cardiovascular risk

Pre-Menopausal E2: Effects



Low
0.7-1.8 ng/mg



Mildly Low Estrogen Signs & Symptoms:

- May or may not experience symptoms of low estrogen. Symptoms may be subtle or absent.
- Vaginal dryness
- Mood changes, including low mood
- Reduced libido



Normal
1.8-4.5 ng/mg



Normal Estrogen Levels are Associated With:

- Stable, positive mood
- Healthy energy levels
- Restorative sleep
- Normal sexual drive and function
- Weight management with a healthy lifestyle
- Healthy reproductive function
- Healthy cognition and memory
- Maintenance of bone mineral density, joint health, hair growth, skin elasticity, and more!



High
>4.5 ng/mg



High Estrogen Signs & Symptoms*:

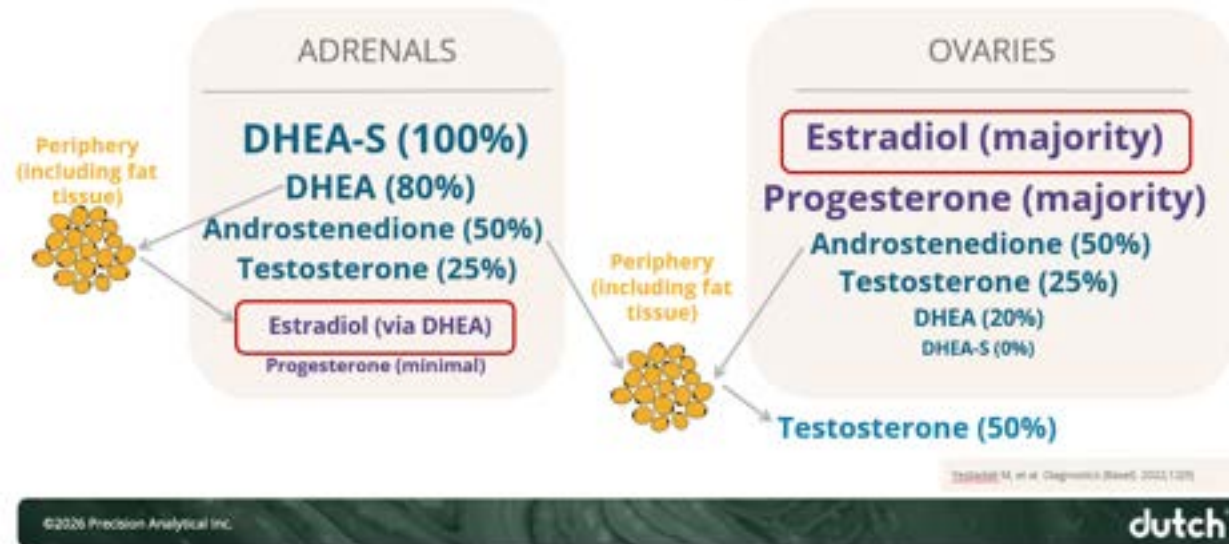
- Heavy bleeding or prolonged menstrual bleeding
- Breast tenderness or fibrocystic changes
- Uterine fibroid growth
- Gallstones
- Increased risk of endometrial hyperplasia or cancer, and breast tumors or cancer

*An appropriate dose of oral or sublingual estradiol taken near the time of testing may increase urinary estrogen metabolites due to first-pass metabolism, without reflecting serum estradiol levels or causing symptoms of estrogen excess.

DUTCH Fest 2026 Education

The DUTCH Dozen: 1 Estrogen

Where E2 is Made in **Pre-menopausal** Women



The DUTCH Dozen: 1 Estrogen



Estrogen's Actions

- **Brain:** Mood, cognition, memory, and focus, thermoregulation, sleep, energy
- **Hair (scalp) growth**
- **Skin:** Elasticity, collagen, repair, moisture
- **Muscle mass**
- **Nervous system:** Parasympathetic balance
- **Joint health**
- **Bone density:** Inhibits bone resorption, increases vitamin D
- **Breast health:** Stimulates breast cell growth
- **Liver function:** Maintains healthy cholesterol, triglycerides
- **Weight management:** Increases metabolic rate, **Insulin sensitivity**
- **Uterine health**
- **Genitourinary system:** Elasticity, acidity, microflora, moisture, lubrication
- **Fertility:** Builds the endometrium
- **Cardiovascular:** Clotting homeostasis, vasodilation, lowers blood pressure, endothelial function, lowers LDL and increases HDL, lowers homocysteine

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The DUTCH Dozen: 4 Methylation Activity (Phase 2)

Think about it!

Game time! *Metabolite levels matter!* Methylation Activity should always be evaluated *in conjunction with* estrogen levels.

- Both women have low-end methylation activity (22%).
- Does this affect them equally regarding risk for excess estrogen, DNA damage, and breast cancer?



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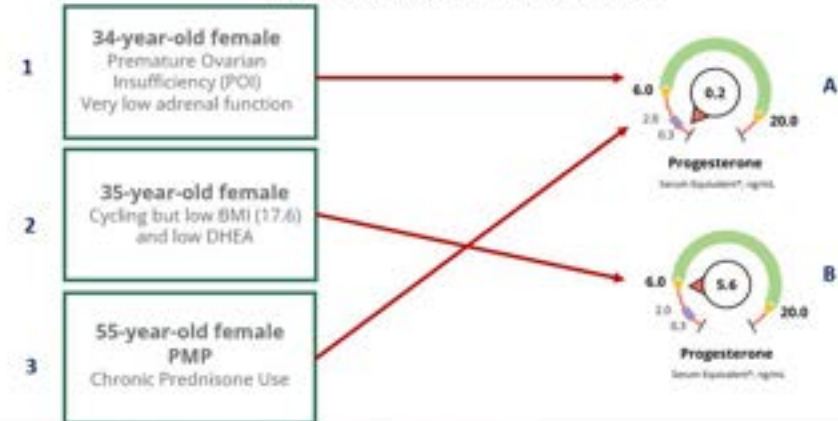
The DUTCH Dozen: 2 Progesterone

Polling Question



Game time!

(Problematic, actionable results)
Match the description to the correct dial:

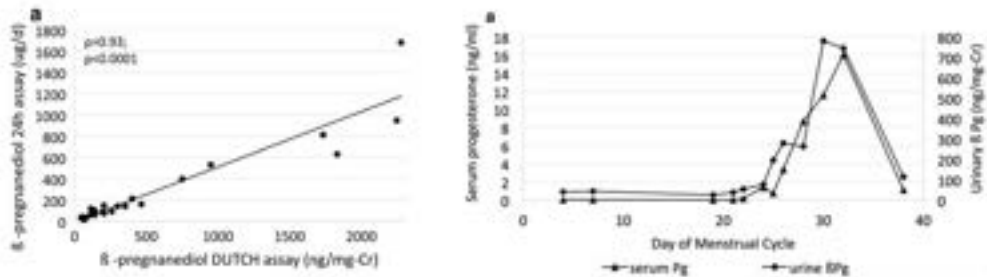


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The DUTCH Dozen: 2 Progesterone

- The DUTCH Test measures progesterone metabolites, **a-pregnenediol** and **b-pregnenediol**. These are used to calculate the Progesterone Serum Equivalent.
- DUTCH dried urine b-pregnenediol correlates with 24-hour liquid b-pregnenediol and serum progesterone.



Wentman M, et al. BMC Obstet. 2016;16:128.

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The DUTCH Treatment Guide: High Estrogen

HPO Axis Support for High Estrogen Page 14	Estrogen Detox Support Page 26	T and DHEA Support if High Pages 20, 22	Mood & Cognition Support Page 57
HPA Axis Support Pages 14, 34, 36	Liver Support Page 55	Stress Support Page 63	Insulin Resistance Support Page 54
Fast CCR Support Page 39	GI Support Indican - page 52 Phase 3 - page 31	Sleep/Circadian Rhythm Support Page 60	Obesity (Weight Loss) Support Page 58
High CAR Support Page 40	Phytoestrogens Page 59	Slow Aromatase if Low Androgens Page 19	Inflammation Support Page 53

● HPO Axis Support
 ● HPA Axis Support
 ● Other Hormone Support
 ● OATx Support
 ● Symptom Support
 ● Detox Support
 ● Lifestyle Support
 ● Other Support

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Case 2: Emma, a 51 yo Female in Early Menopause

Chief Complaints:

- Hot flashes
- Insomnia
- Weight gain
- Vaginal dryness
- Frequent UTIs

PMHx

- Intact uterus
- Menopausal x 1 year
- Metabolic disease & insulin resistance

Medications & Supplements


- Melatonin 5 mg at bedtime
- Occasional ibuprofen for joint stiffness

Physical Exam

- 5'5", 176 lbs., BMI: 29.3
- BP: 138/82 mm Hg
- Pulse: 78 bpm


Pertinent Serum labs

- Fasting glucose: 104 mg/dL **(H)**
- Fasting insulin: 14 µIU/mL **(H)**
- Triglycerides: 178 **(H)**



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Case 2: Emma, a 51 yo Female in Early Menopause

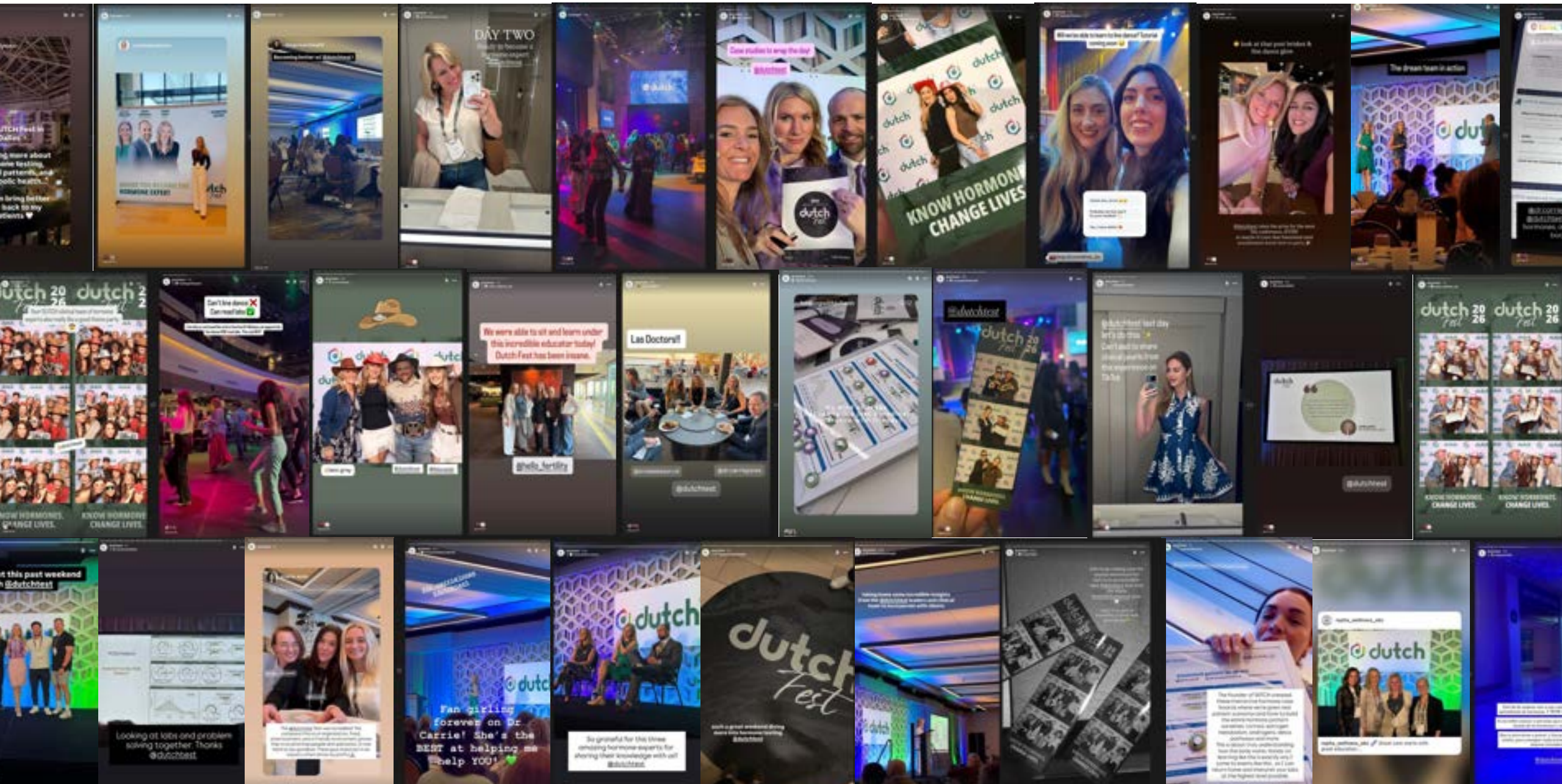


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Case Studies

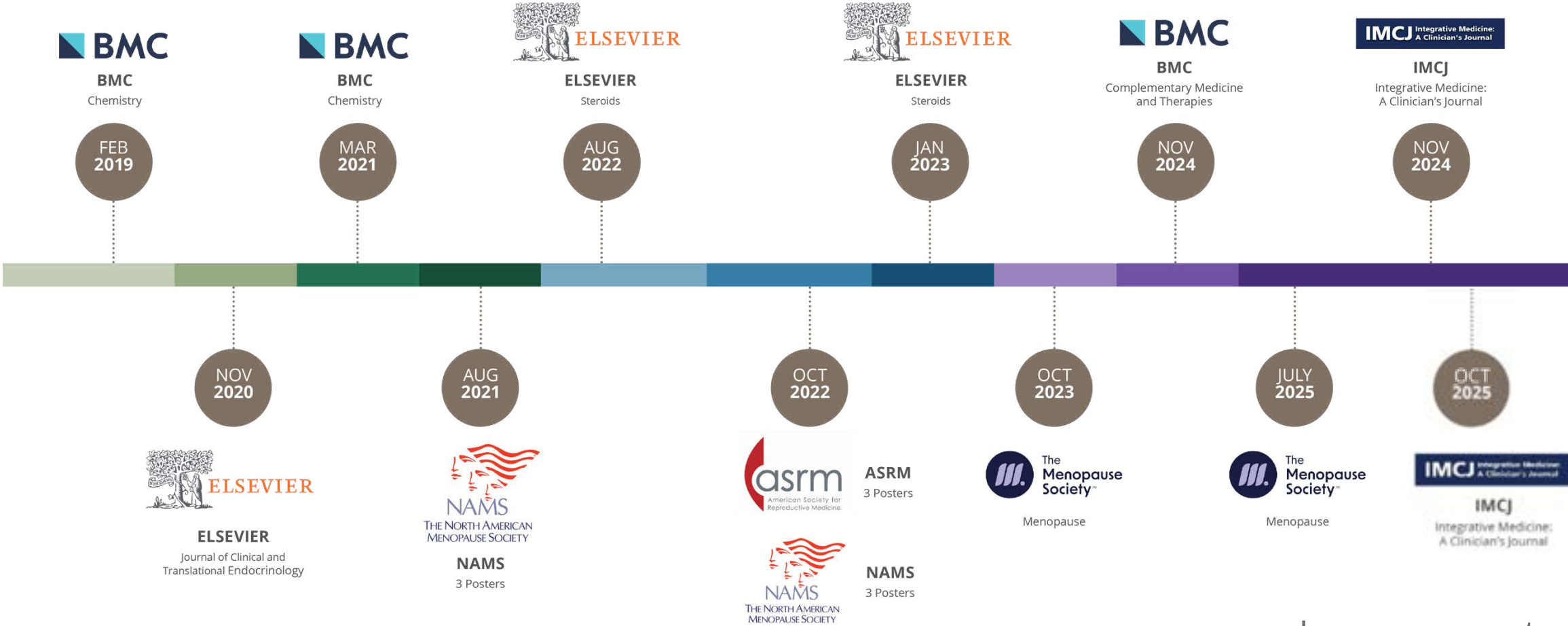


DUTCH Fest 2026: Social Media Posts from Attendees!



- **DUTCH Published Studies**
- Phase One Estrogen Metabolism Demystified
- The Power of 5a-Androstane-3 α -diol in the Androgen Assessment
- Cortisol Mastery

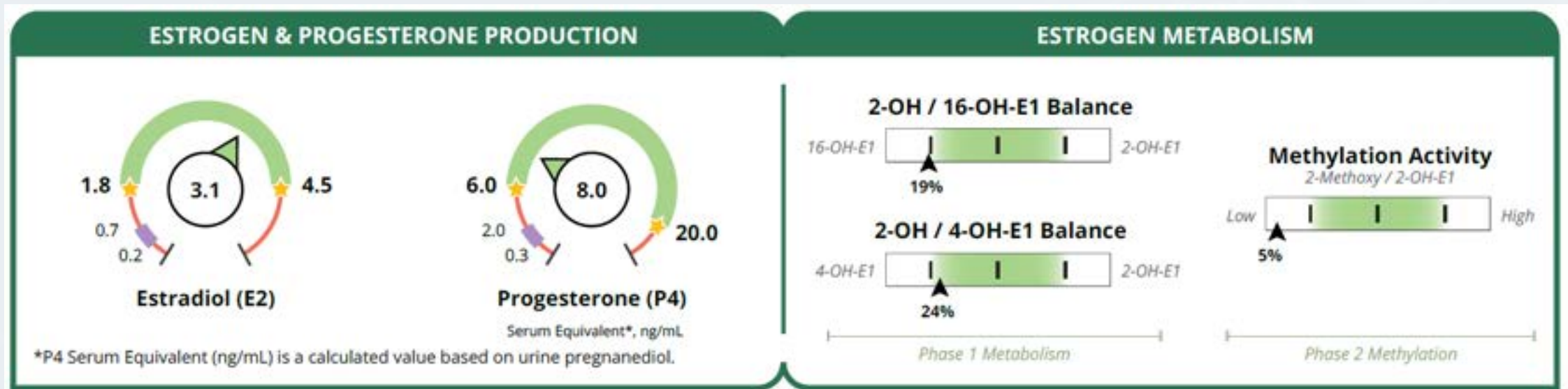
DUTCH Published Research



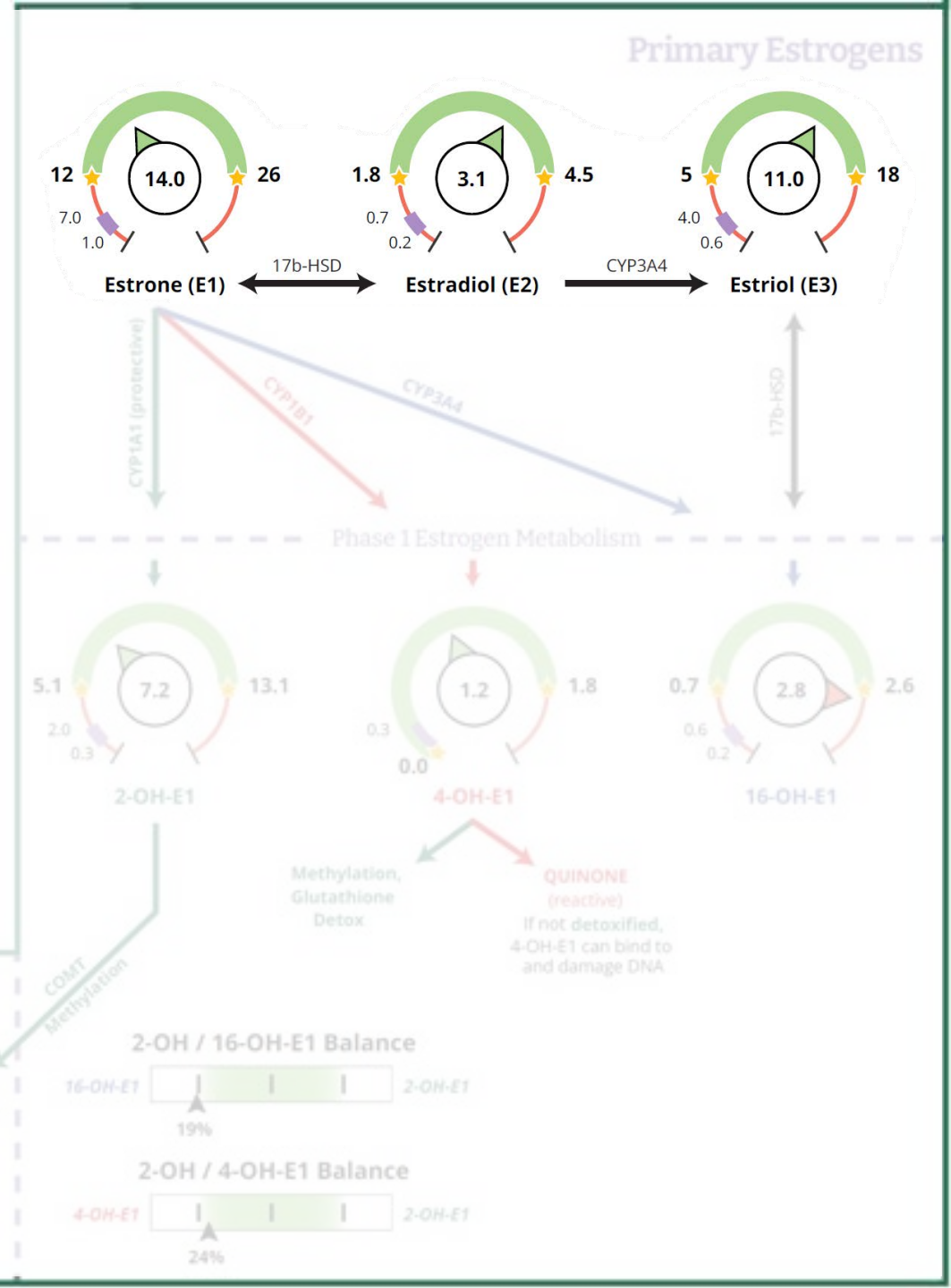
Learn more at dutchtest.com/research

- DUTCH Published Studies
- **Phase One Estrogen Metabolism Demystified**
- The Power of 5a-Androstane-3 α -diol in the Androgen Assessment
- Cortisol Mastery

The Estrogen Story in DUTCH

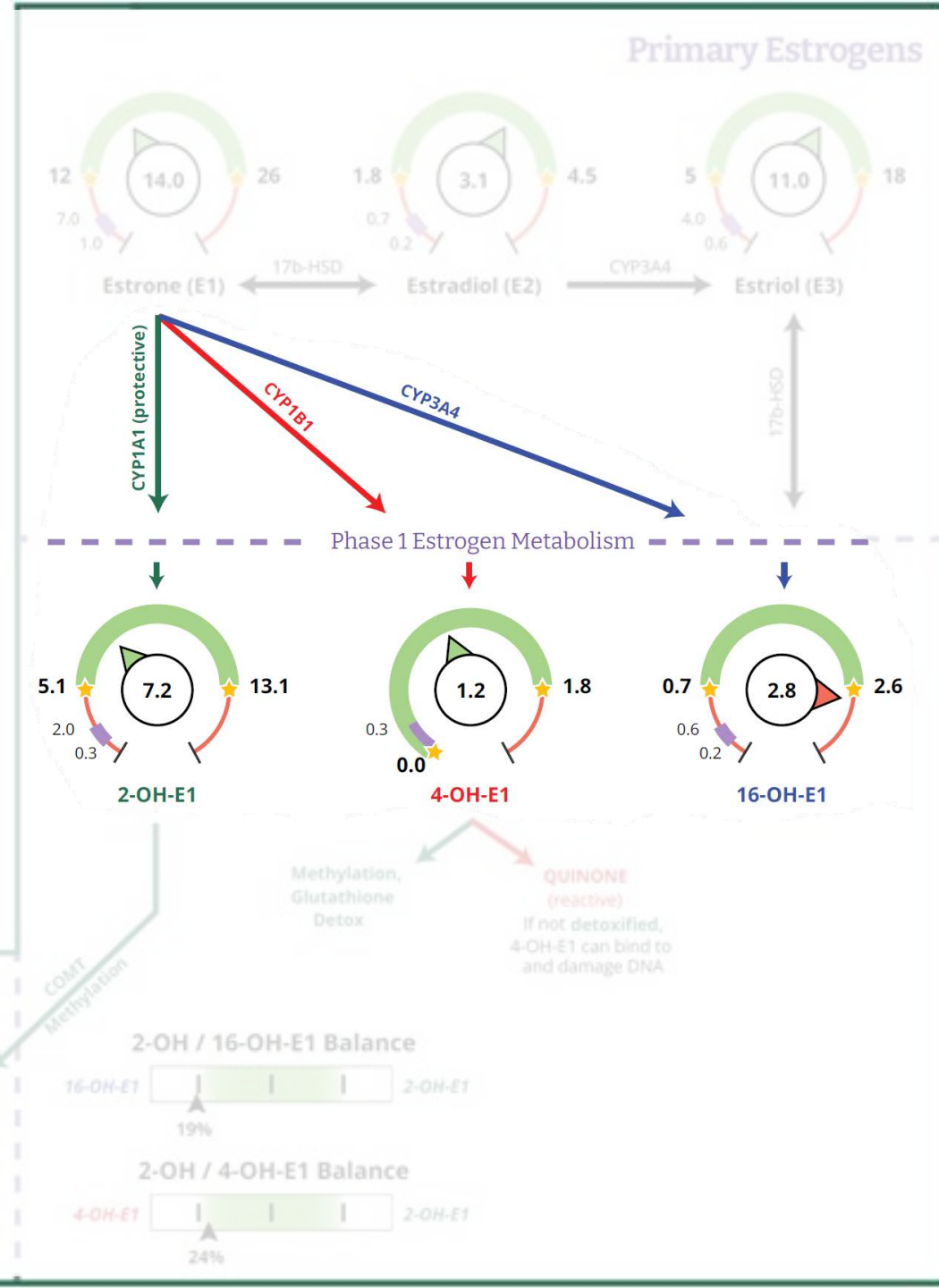


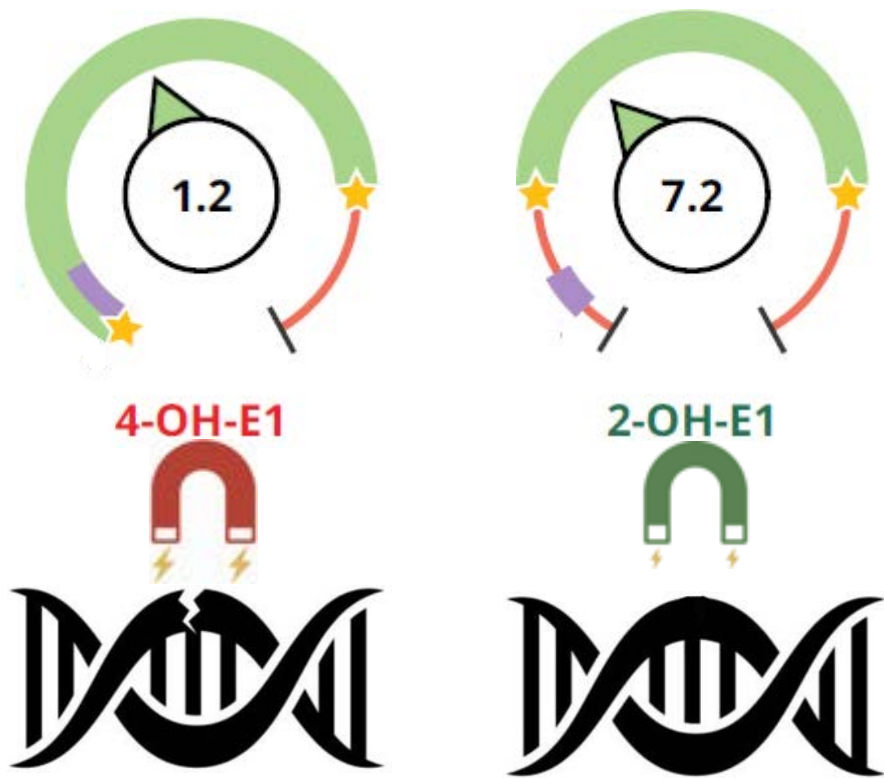
1. Estrogenic Status



1. Estrogenic Status

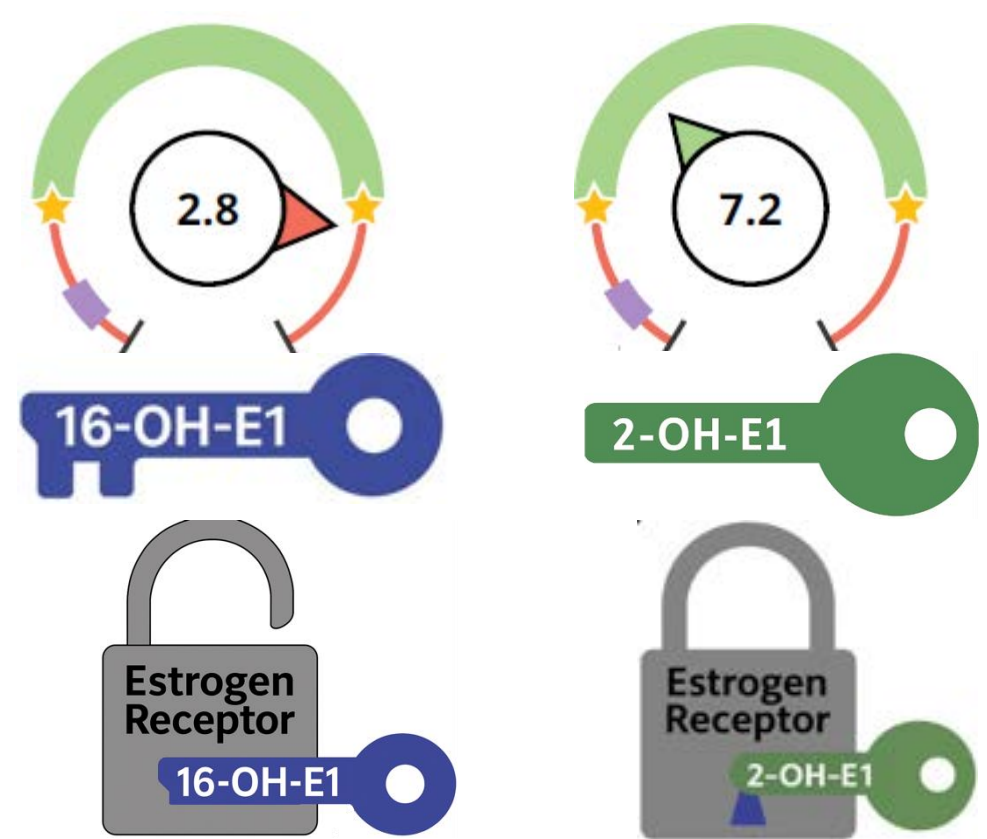
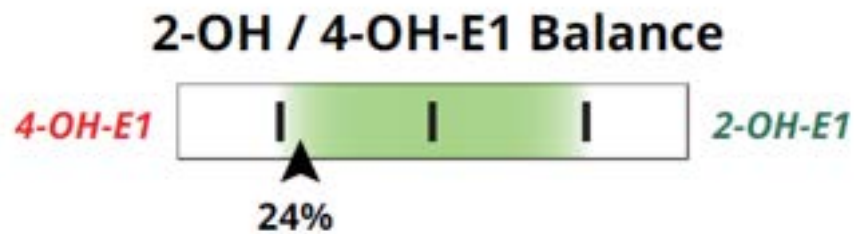
2. Phase 1 Metabolism





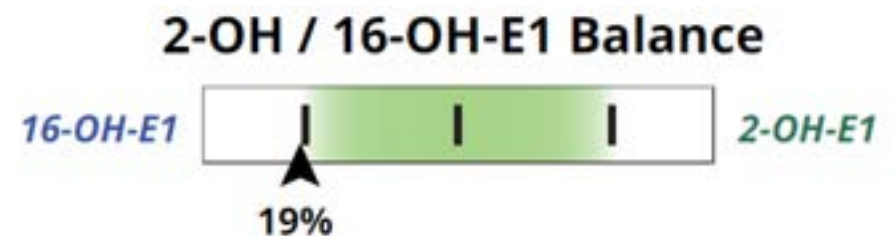
Genotoxic

Protective



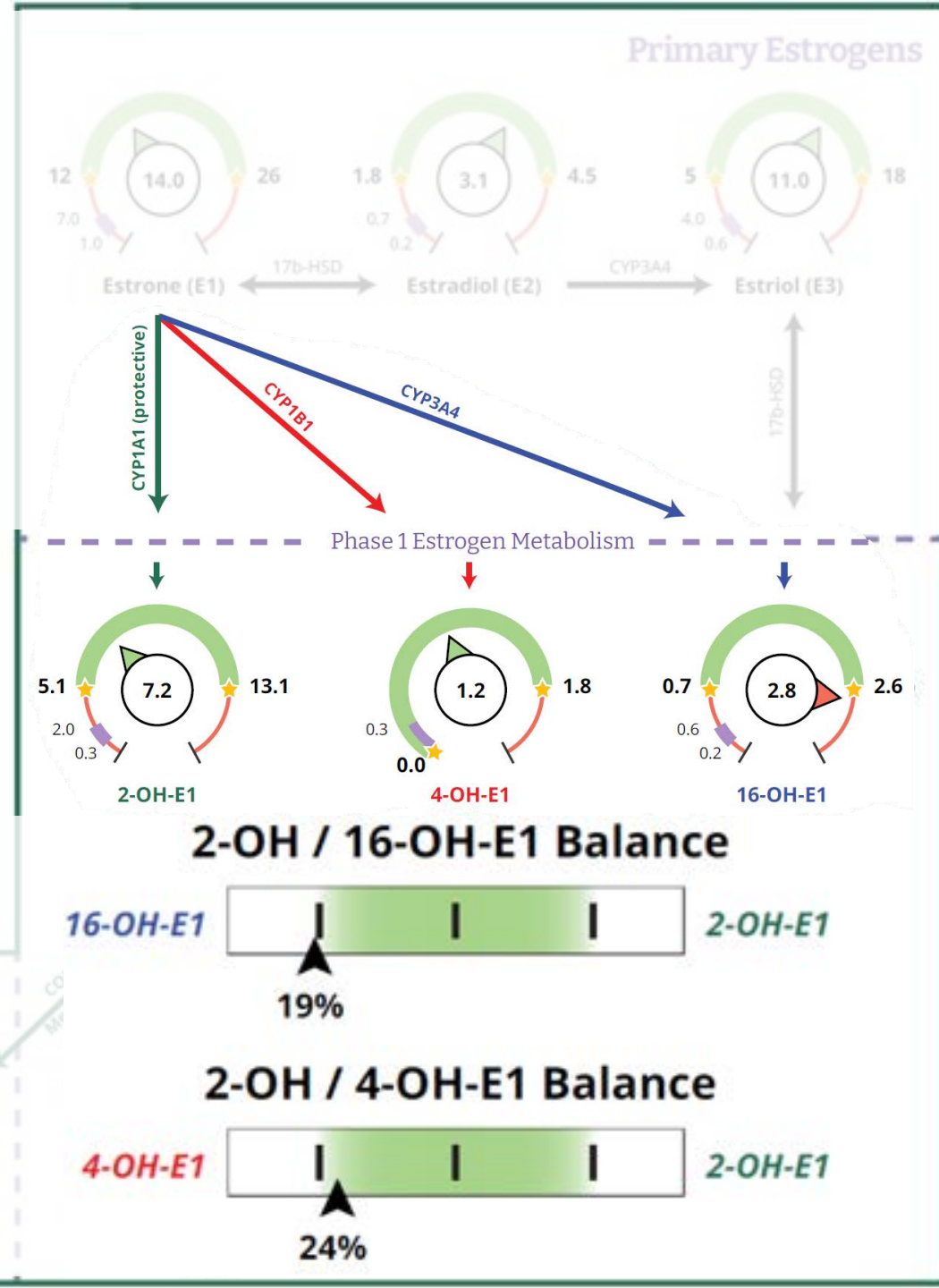
Estrogenic

Anti-Estrogenic



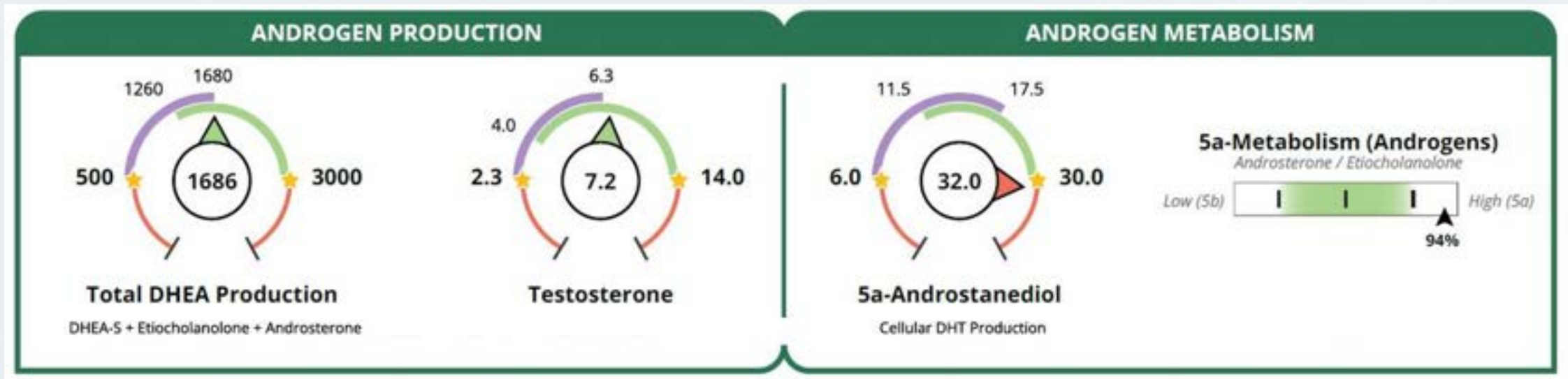
1. Estrogenic Status

2. Phase 1 Metabolism

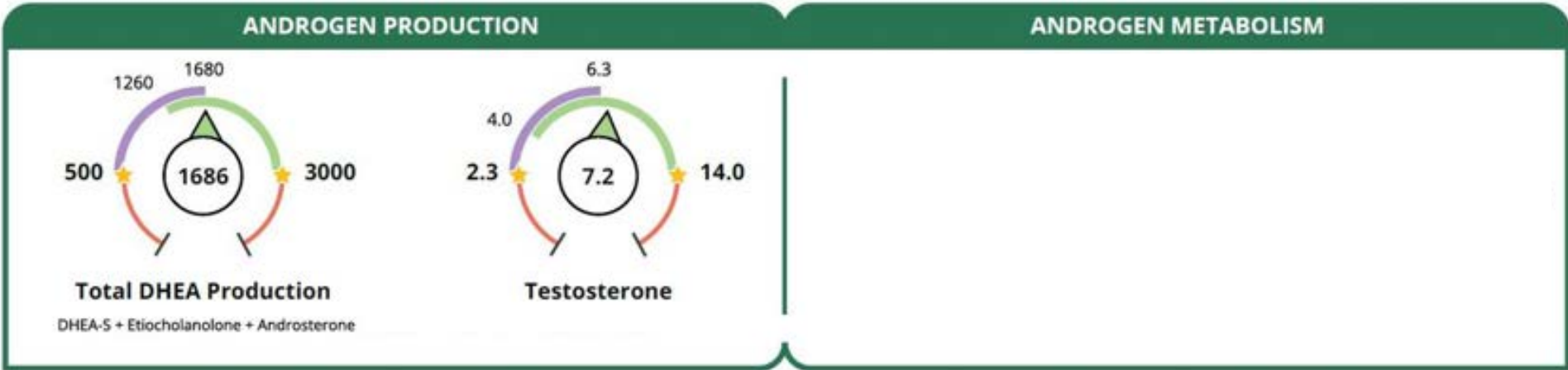


- DUTCH Published Studies
- Phase One Estrogen Metabolism Demystified
- **The Power of 5a-Androstenediol in the Androgen Assessment**
- Cortisol Mastery

The Androgen Story in DUTCH

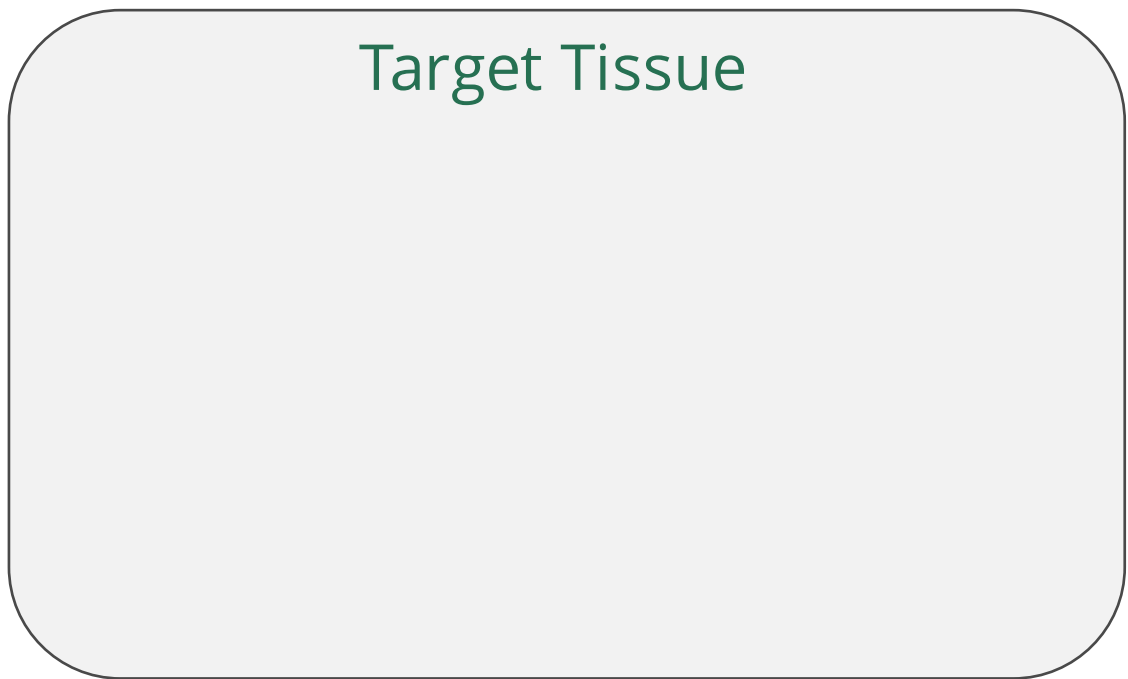


Tissue Androgenic Activity

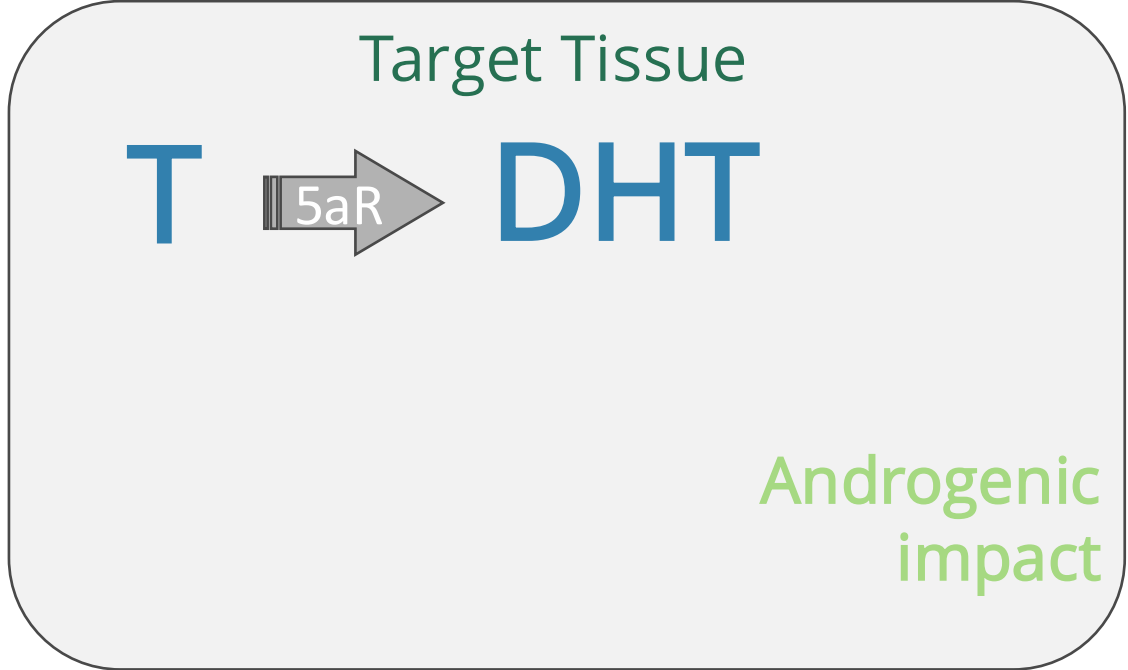
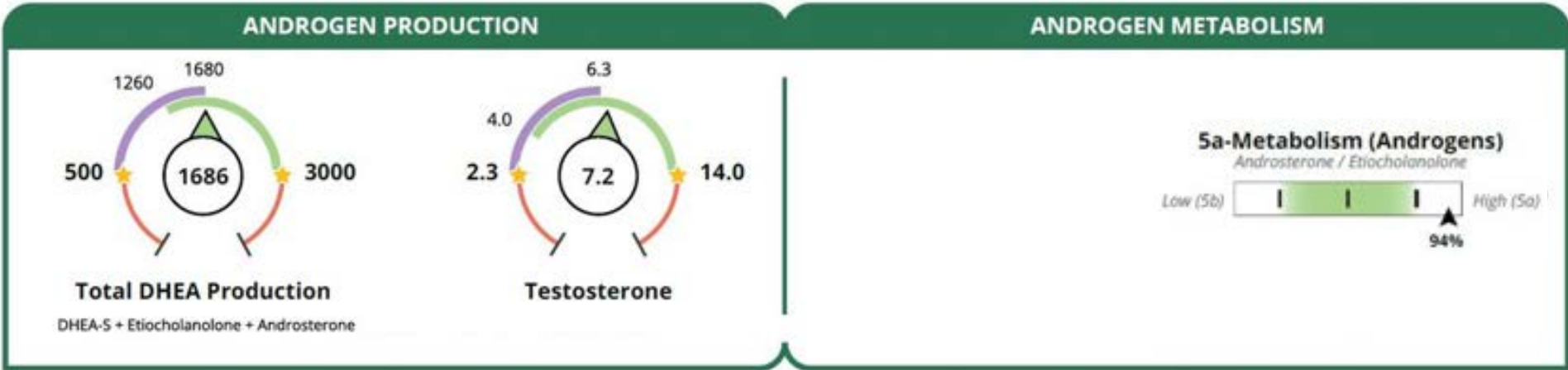


Circulation

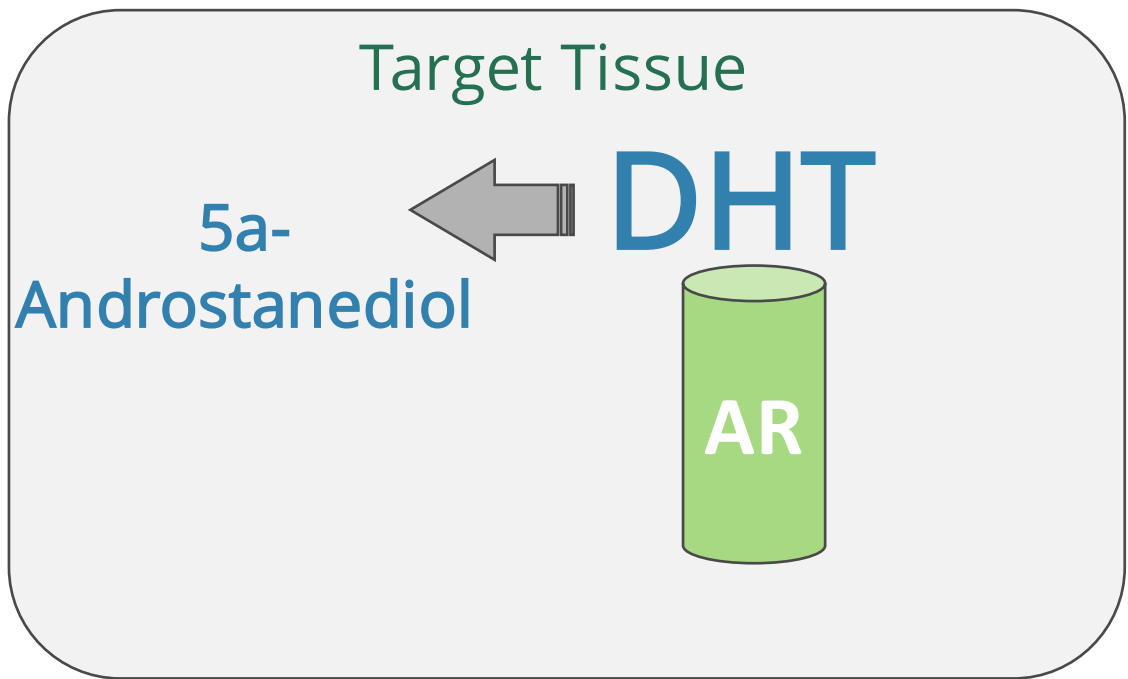
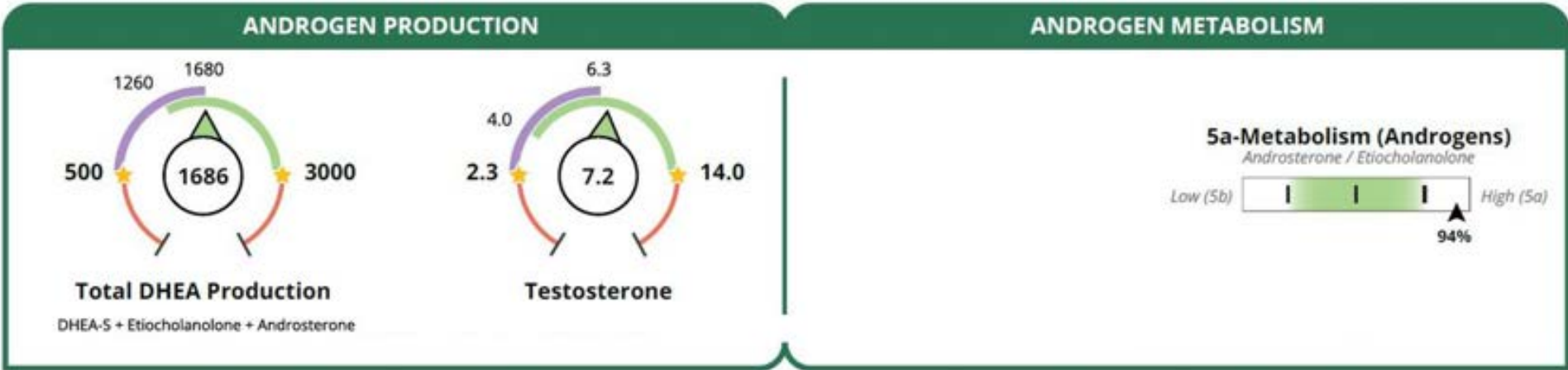
Free T



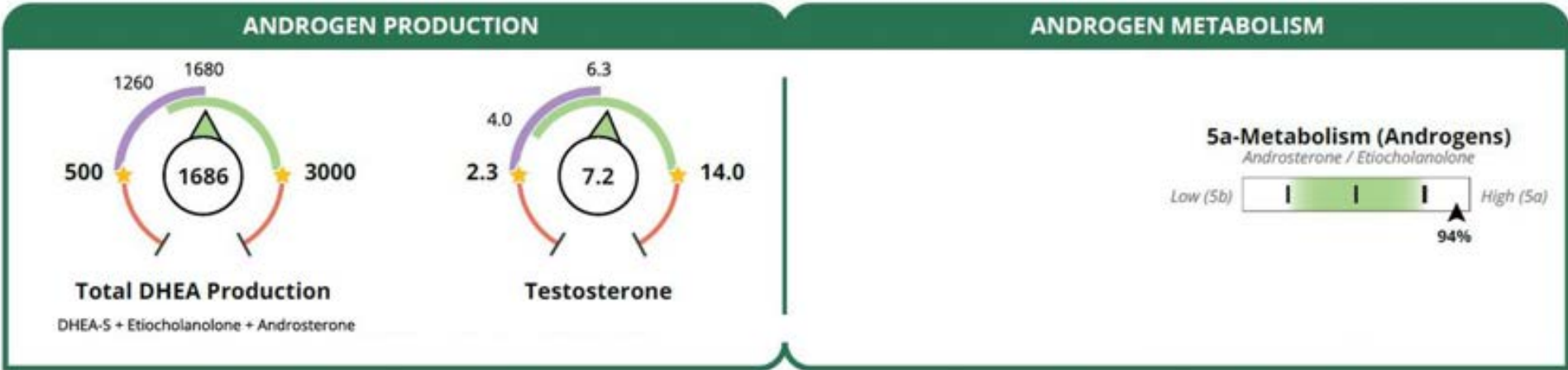
Tissue Androgenic Activity



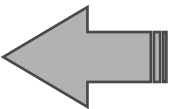
Tissue Androgenic Activity



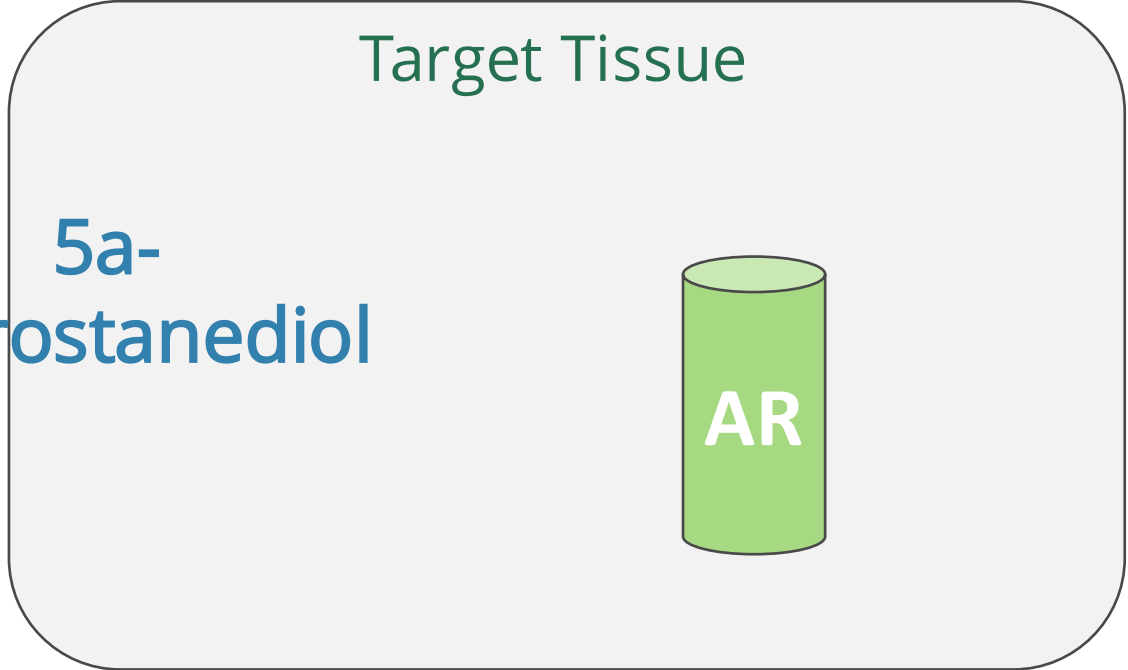
Tissue Androgenic Activity



Circulation

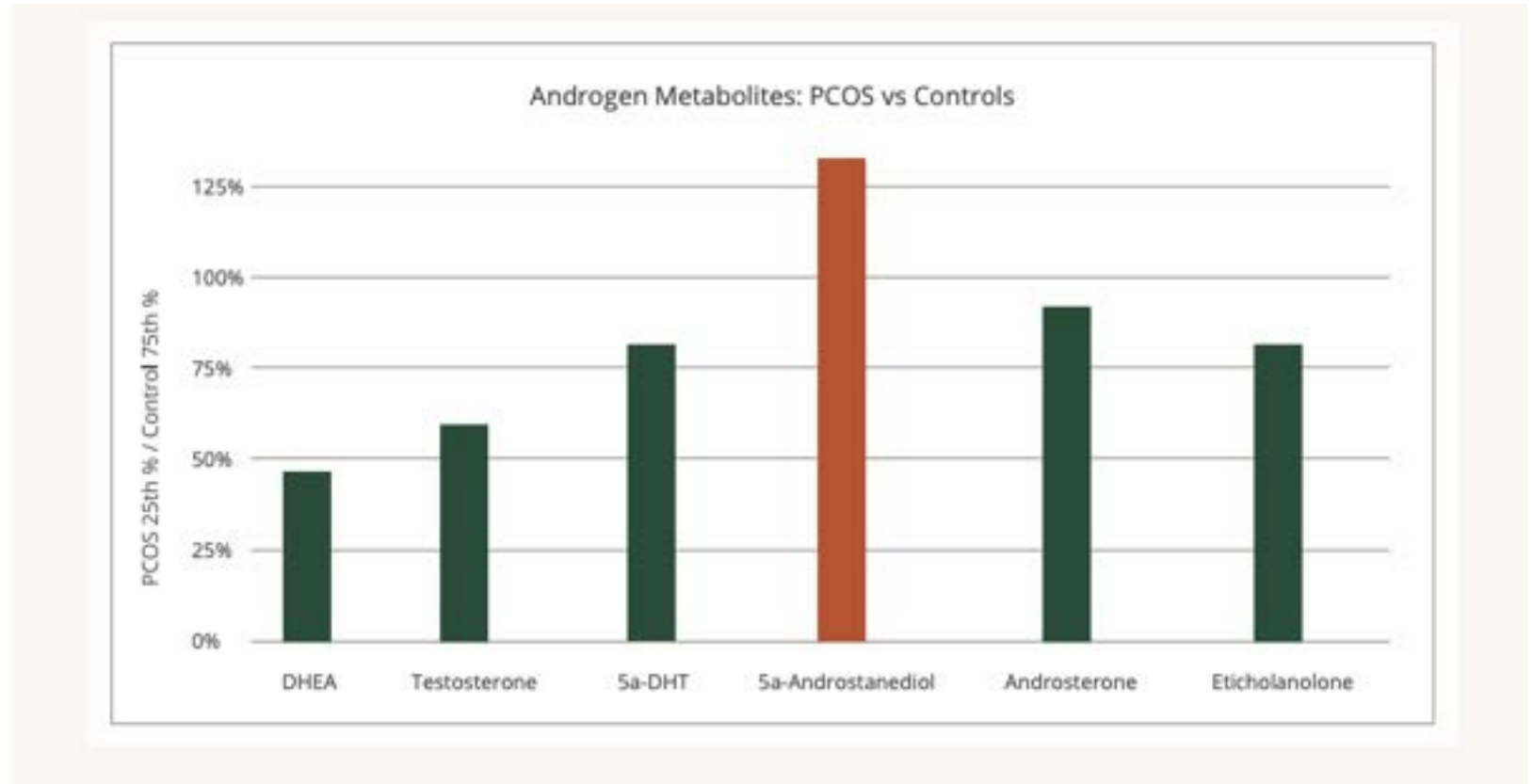


5a-
Androstenediol



5a-Androstenediol is the most differentiating androgen metabolite

Figure 2: An analysis of androgen metabolites in 24-hour urine (nmol/24h) in women with or without PCOS shows that, for 5a-androstenediol, the 25th percentile value for PCOS patients is more than 125% of the 75th percentile value for normal controls. Essentially, even the lower end of the PCOS range (25th percentile) exceeds the upper end of the normal range (75th percentile) for healthy controls, suggesting no overlap between the normal range and the PCOS range for 5a-androstenediol. [98]

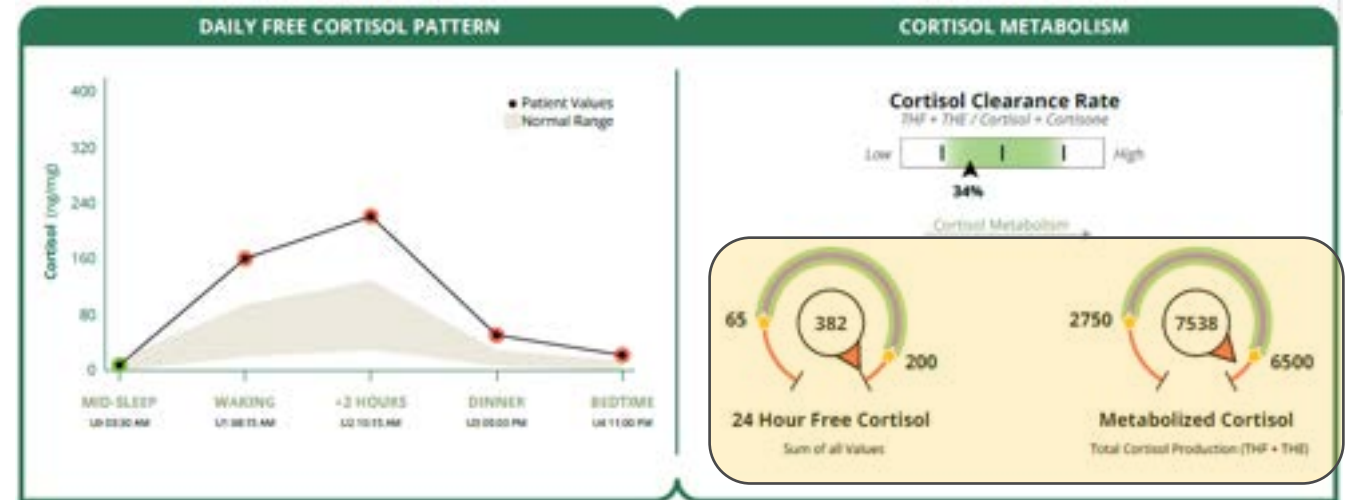


Dhayat NA, Marti N, Kollmann Z, et al. Urinary steroid profiling in women hints at a diagnostic signature of the polycystic ovary syndrome: A pilot study considering neglected steroid metabolites. PLOS ONE. 2018; 13(10):e0203903. doi:10.1371/journal.pone.0203903

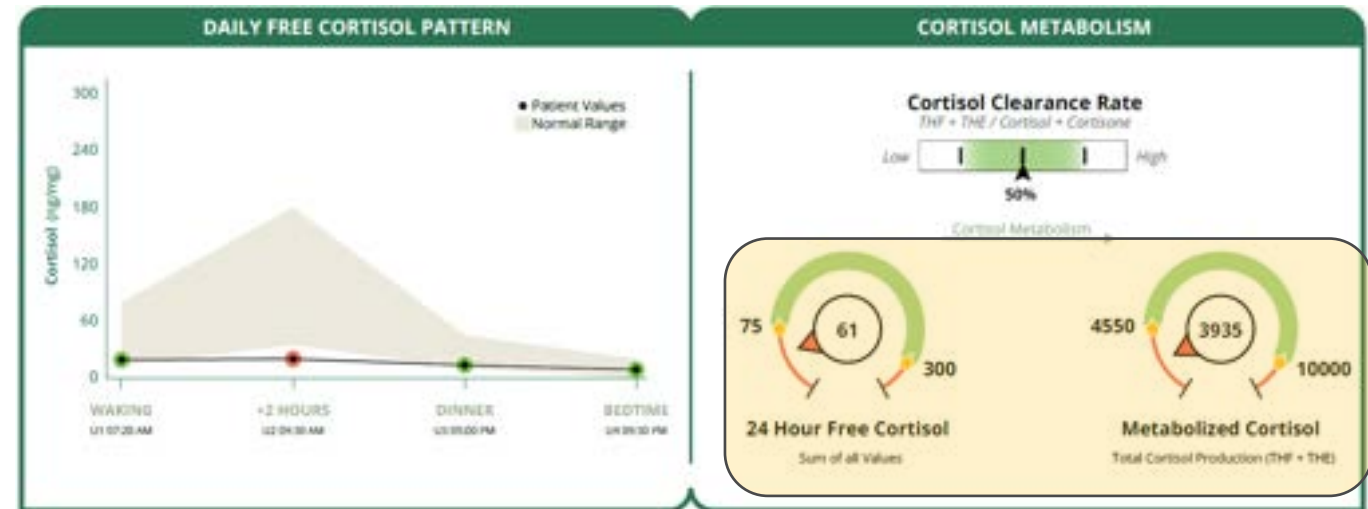
- DUTCH Published Studies
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- **Cortisol Mastery**

Metabolized Cortisol: Confirms the Free Cortisol Assessment

Both High



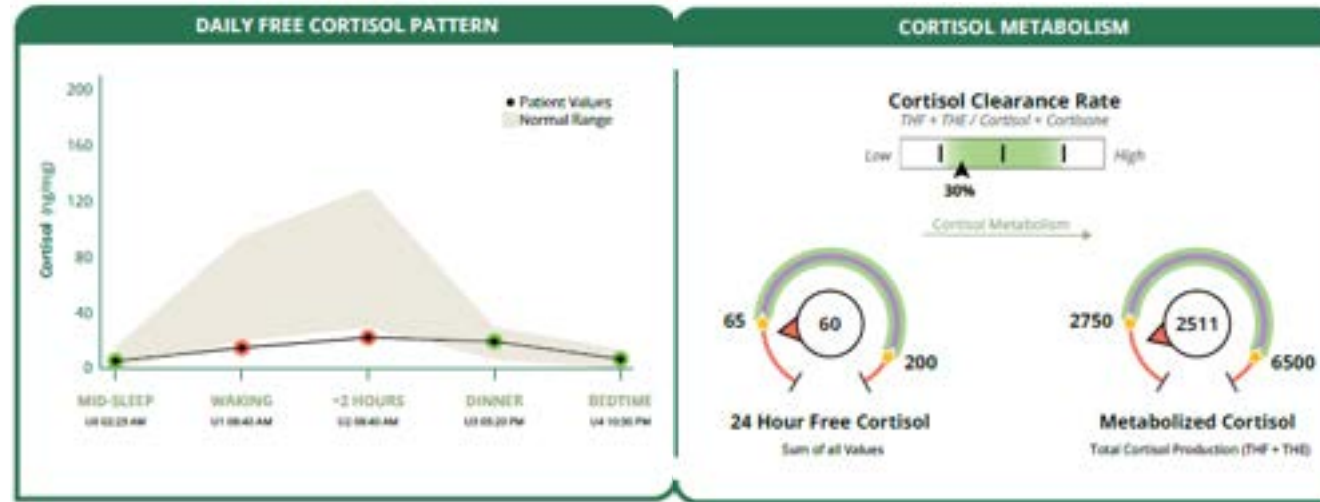
Both Low



Cortisol Metabolites Fill in the Rest of the Story

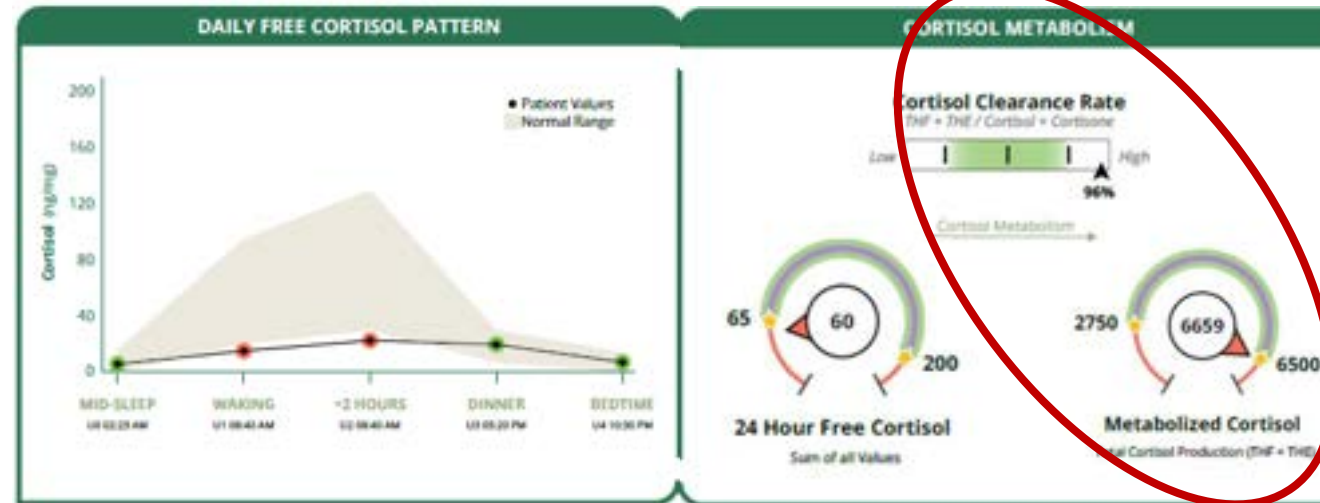
Same Diurnal Curves:

Low HPA Axis Activity?



Yes!
Adrenal Output is
LOW

or.....



No!
Adrenal Output is
HIGH
and
Low Free Cortisol is
misleading

Metabolized Cortisol Informs Free Cortisol is Adapting to Stressors

Free Cortisol Normal or Low
Metabolites High

ADAPTED

✓ Top Considerations:

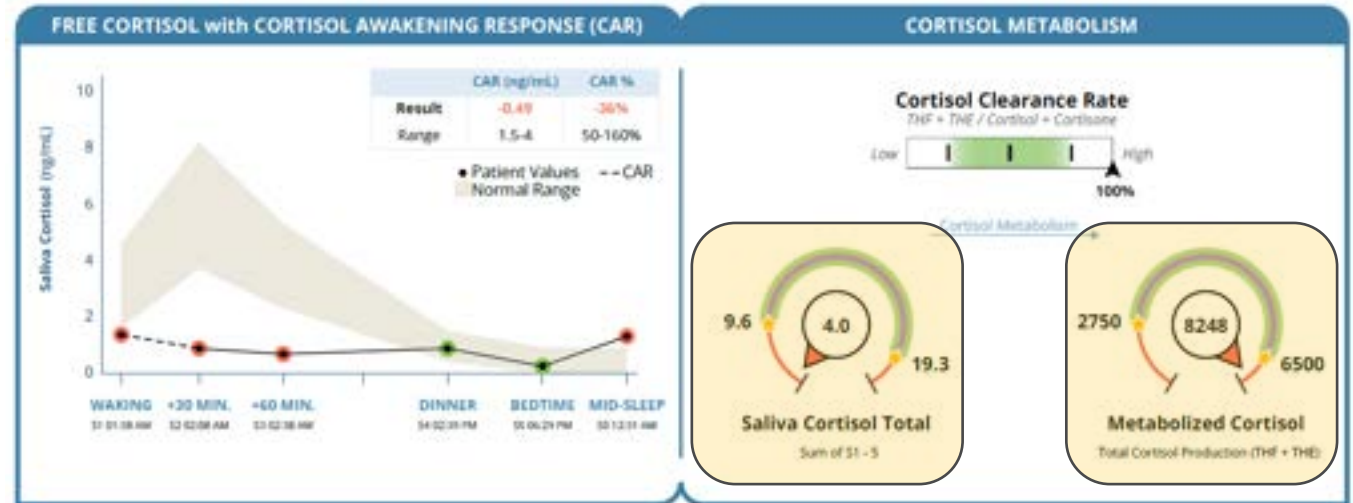
🧫 Inflammation

🪡 Insulin Resistance

💧 Obesity

🍷 Fatty Liver

🏠 Hypert thyroid



Cortisol's bioavailability adapts to stressors which speed metabolism

Metabolized Cortisol Informs Free Cortisol is Adapting to Stressors

Free Cortisol Normal or High
Metabolites Low

ADAPTED



Top Considerations:



Hypothyroid (even subclinical)



Anemia (iron deficiency)



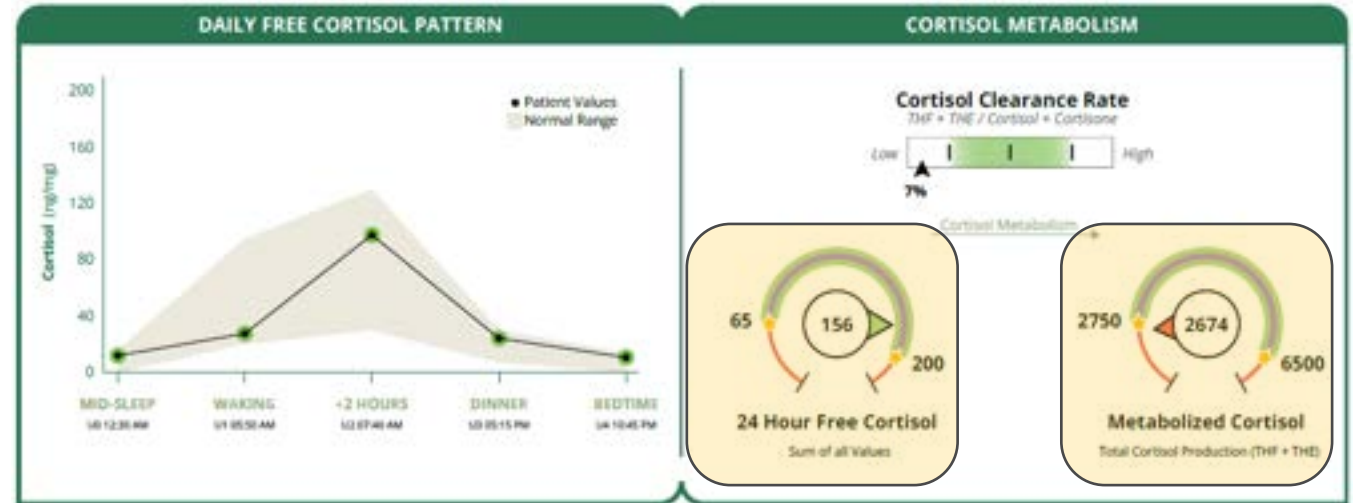
Mitochondrial dysfunction



Liver/Gallbladder Stasis



Low caloric intake (esp anorexia)



Cortisol's bioavailability adapts to stressors
which slow metabolism

2 Cases – with Comparison

Using Cycle Mapping to Properly Assess
Irregular Cycles and Cycle-Related Symptoms

Case #1: Robin
39-year-old female

Case 1: 39-year-old female Heavy menses/Sleep Disturbed

Chief Complaints

- Heavy menses
- PMS with Breast tenderness
- Irregular cycles
- Nighttime waking, difficulty falling back asleep

Physical Exam

- 5'7"
- 165 lbs.
- BMI 25.8 (overweight)
- BP 110/78 mm Hg
- Pulse 68

PMHx

- Cycles started getting heavier after having a baby at 35
- Cycles vary 22-40 days
- Nighttime waking for last year getting more severe, difficulty falling back asleep, especially right at the end of her cycle
- Would like another baby but not currently TTC

Medications

- NSAIDs for headaches

Baseline labs

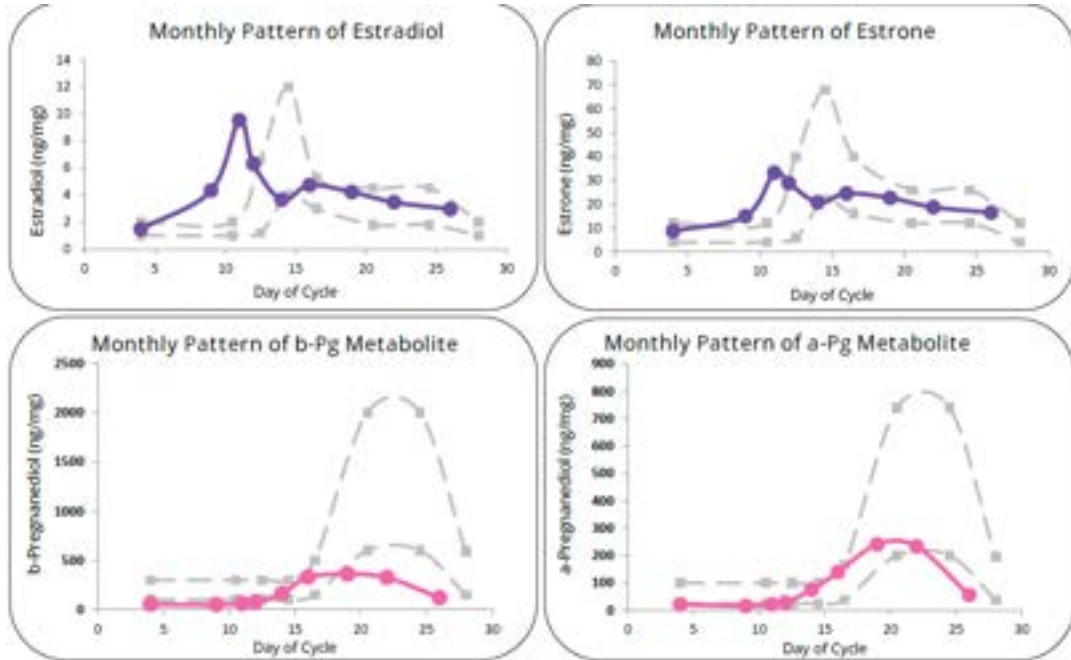
- CBC & CMP: WNL except
- Fasting glucose = 78
- HbA1c: 5.1
- Fasting insulin: 8
- Lipids: TG: 89, LDL: 195, HDL: 50
- Thyroid labs: all WNL
- hs-CRP 0.5 (goal <1)
- Vitamin D, 25-OH: 44
- Prolactin: 30 ng/mL
- Ordered DUTCH Cycle Mapping Plus

No significant findings on baseline labs except for **slightly elevated prolactin**

Case #1

DUTCH Test Results

Case 1: Robin, 39-year-old female Heavy menses/Sleep Disturbed



All values given in ng/mg creatinine

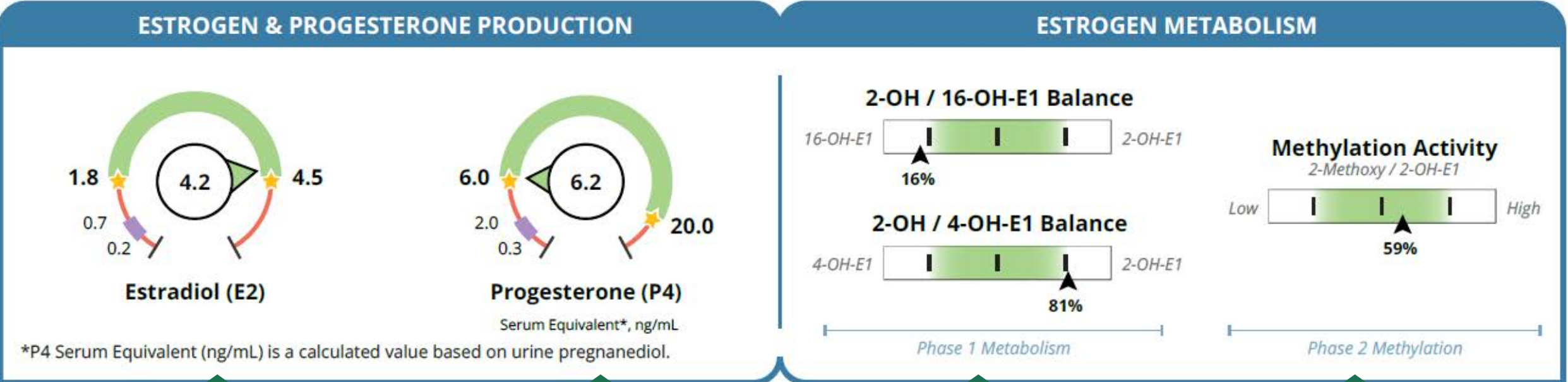
Measurement	1	2	3	4	5	6	7	8	9
Days of Cycle	4	9	11	12	14	16	19	22	26
<i>The days listed above were used for measurements. Two samples are used and listed for long cycles or patients without a normal cycle.</i>									
Estradiol (E2)	1.47	4.33	9.52	6.29	3.65	4.73	4.21	3.46	2.95
Estrone (E1)	8.7	14.9	33.1	28.8	20.7	24.5	22.6	18.7	16.5
a-Pregnenediol	21	16	21	28	75	139	244	233	55
b-Pregnenediol	55	49	60	78	163	330	398	325	121
b-Pregnenediol/E2 Ratio	38	11	6	12	45	70	95	94	41
Creatinine		1.00	1.45	1.15	1.06	1.18	0.89	0.68	0.85



Organic Acid Tests (OATs) suggests the Following Possible Imbalances | See page 6 for details

Watch Needs Attention

Case 1: Robin, 39-year-old female Heavy menses/Sleep Disturbed: Estrogens



Assess estrogen levels given the patient's reproductive status

1

Assess progesterone levels given the patient's reproductive status

2

Assess 2-OH preference in phase 1 estrogen metabolism

3

Assess methylation of 2-OH estrogens

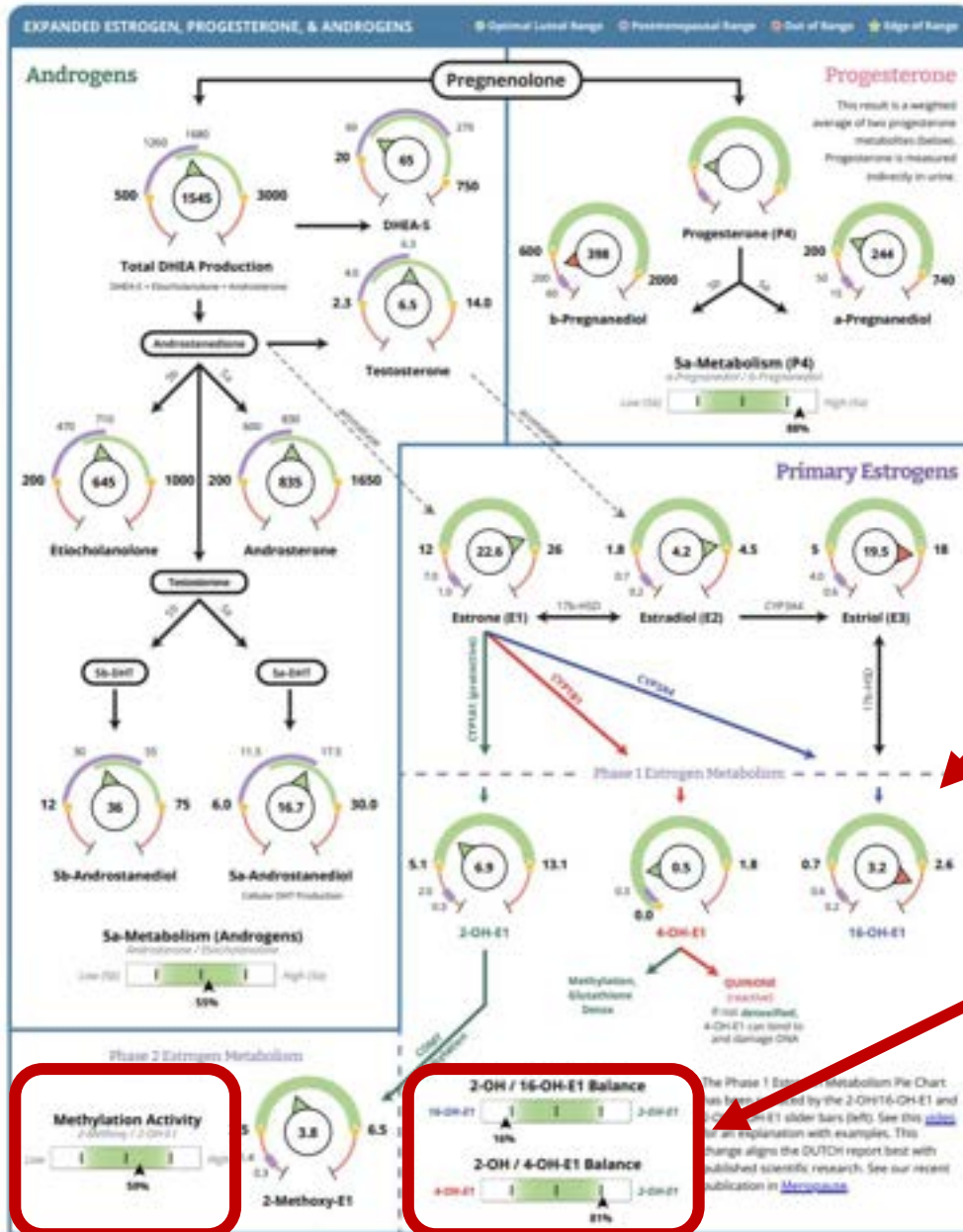
4

Case 1: Robin, 39-year-old female Heavy menses/Sleep Disturbed: Estrogens

Estrogen and Progesterone Findings:

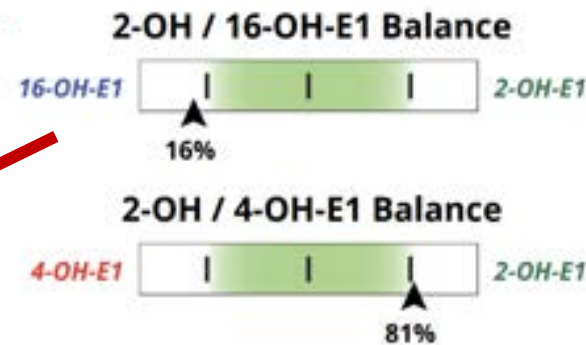
- Estradiol high-normal
- Progesterone low-normal within the luteal range (ovulation occurred)
 - Estrogen dominance pattern
- 2-OH/16-OH-E1 Balance favors 16-OH (bad)
- 2-OH/4-OH Balance favors 2-OH (good)
- Normal methylation activity

Case 1: Robin, 39-year-old female Heavy menses/Sleep Disturbed: Estrogens



Assess estrogen metabolism

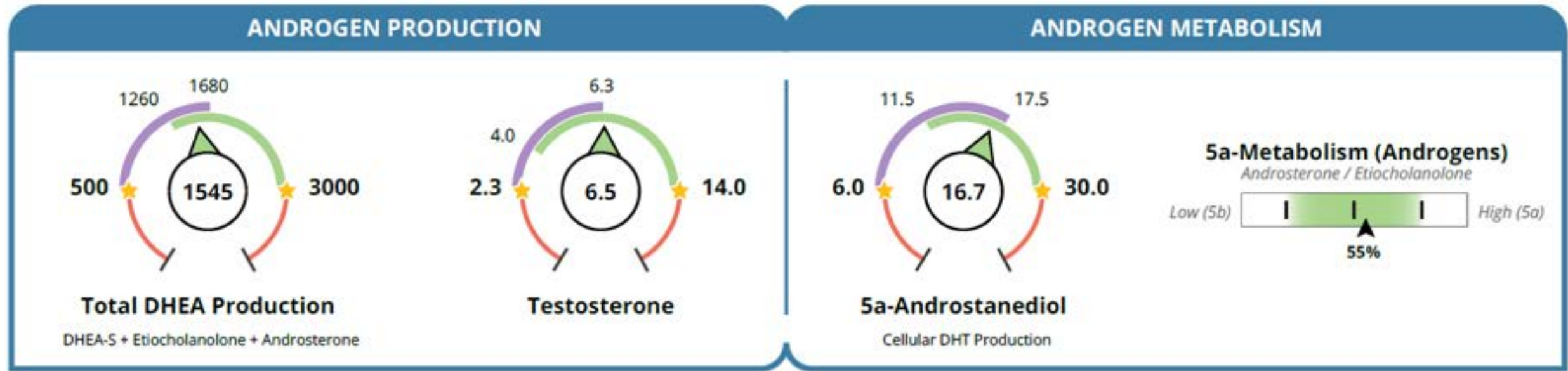
- Phase I estrogen metabolism shows a preference for 16-OH-E1 metabolism.
 - 16-OH-E1 is a more estrogenic phase I metabolite, contributing further to estrogen dominance symptoms (heavy menses, shortened luteal phase).
- Phase II slider shows normal methylation.



High Estrogenic Load

Low Genotoxic Risk

Case 1: Robin, 39-year-old female Heavy menses/Sleep Disturbed: Androgens



Assess adrenal androgen levels (Total DHEA)

5

Assess testosterone levels

6

Assess cellular production of 5a-DHT via 5a-Androstanediol

7

Assess if there is a preference for the more potent alpha metabolism of the androgens

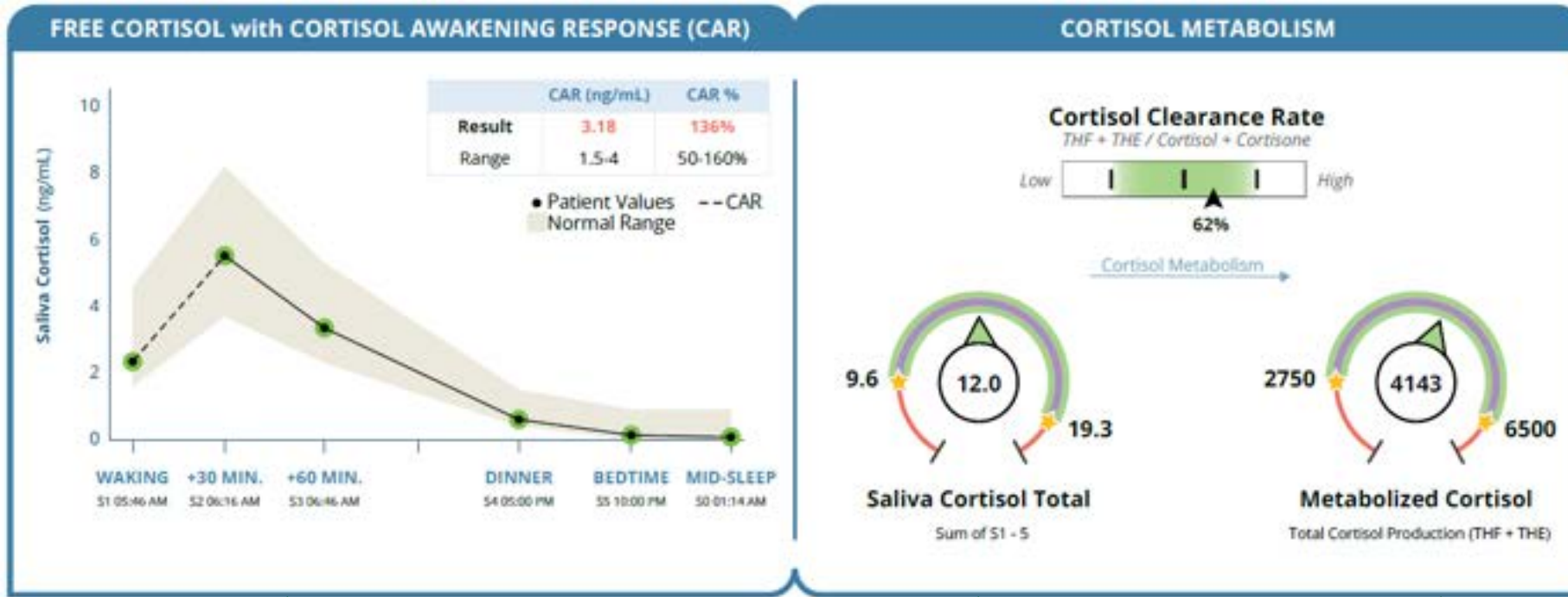
8

Case 1: Robin, 39-year-old female Heavy menses/Sleep Disturbed: Androgens

Androgen Findings: All normal

- Normal DHEA
- Normal Testosterone
- Normal 5 α -Androstanediol
- Normal (androgen) alpha preference

Case 1: Robin, 39-year-old female Heavy menses/Sleep Disturbed: Cortisol



Assess the rate of cortisol clearance from the body

12

Assess the daily free cortisol pattern

9

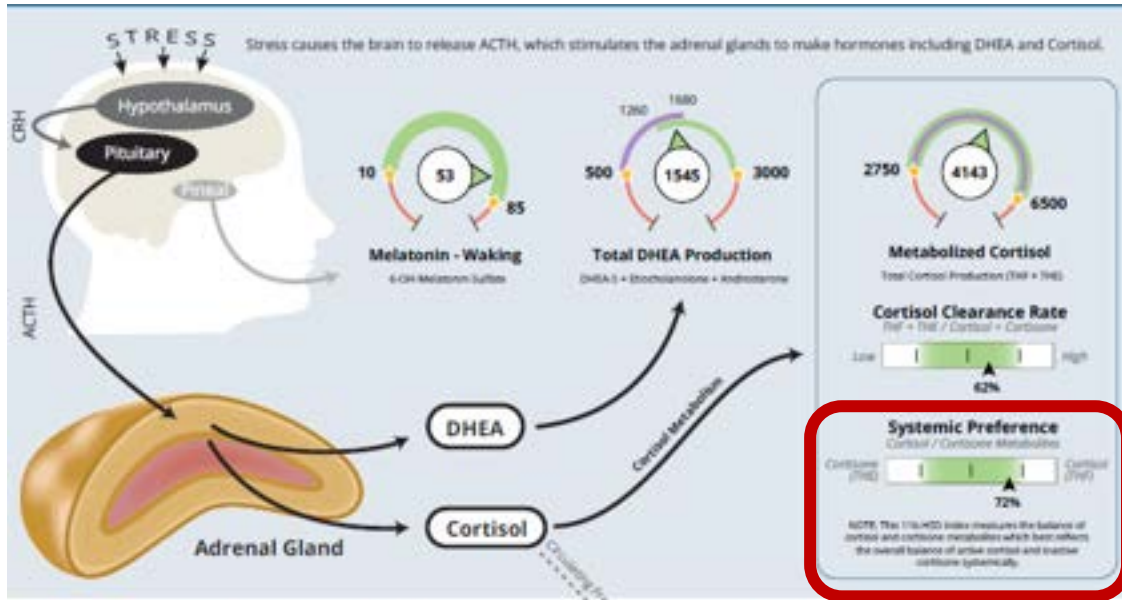
Assess the daily total of free cortisol in circulation

10

Assess the total cortisol produced by the adrenal glands (Metabolized Cortisol)

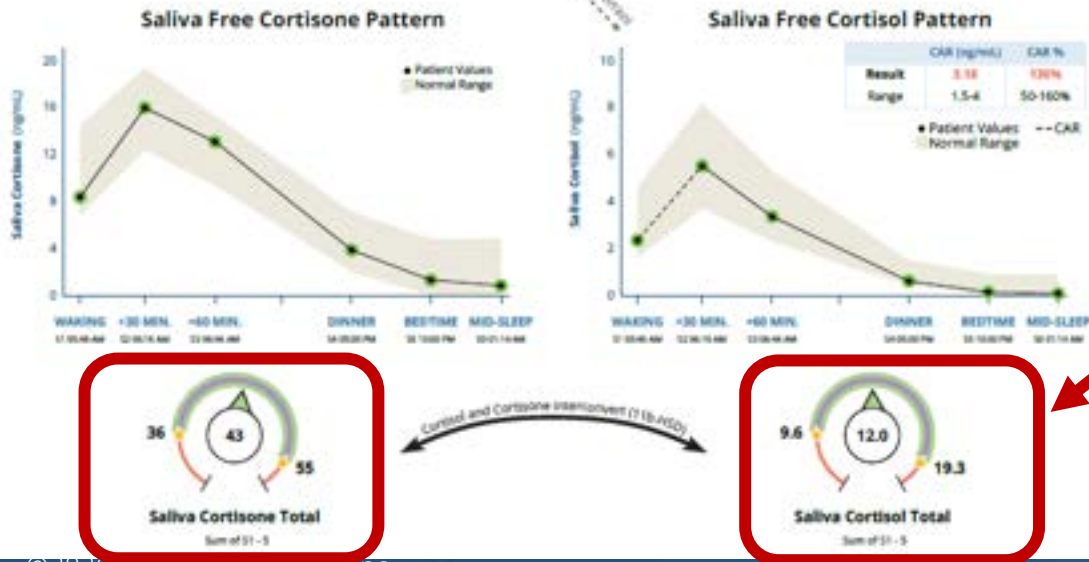
11

Case 1: Robin, 39-year-old female Heavy menses/Sleep Disturbed: Estrogens



Assess Cortisol Systemic Preference

- Normal but...
- Slight preference toward THF might be pertinent if cortisol metabolites were high (they're not) and/or if CCR was low (it's not)



Assess Systemic Preference Free Cortisol and Free Cortisone Balance

- Normal
- Free cortisol and cortisone have the same shape to pattern and relatively similar levels within their ranges throughout the day

Case 1: Robin, 39-year-old female Heavy menses/Sleep Disturbed: Cortisol

Cortisol Findings: All normal

- Normal Daily Free Cortisol Pattern
- 24hr Free Cortisol is within range
 - The total amount of cortisol that was in circulation was normal
- Normal Metabolized Cortisol
 - The adrenals made a normal amount of cortisol that day
- Normal Cortisol Clearance Rate (CCR)
 - Cortisol was cleared from circulation at a normal rate

Case 1: Putting it all together

- Relative Estrogen Dominance
 - Elevated 16-OH-E1 = increased estrogenic load
 - 16-OH-E1 adds to E2's tissue-proliferative effects
 - Contributing to heavy bleeding and breast tenderness
- Mid-Luteal Progesterone is low-normal (but not anovulatory)
 - Low progesterone may be contributing to PMS, breast tenderness, heavy bleeding, and to disturbed sleep at the end of the menstrual cycle

Case 1: Robin, 39-year-old female Heavy menses/Sleep Disturbed

Goals of Treatment

DUTCH Test Goals

- Increase progesterone/support ovulation
- Lower estrogen
- Improve 2/16 Balance
- Lower 16-OH-E1

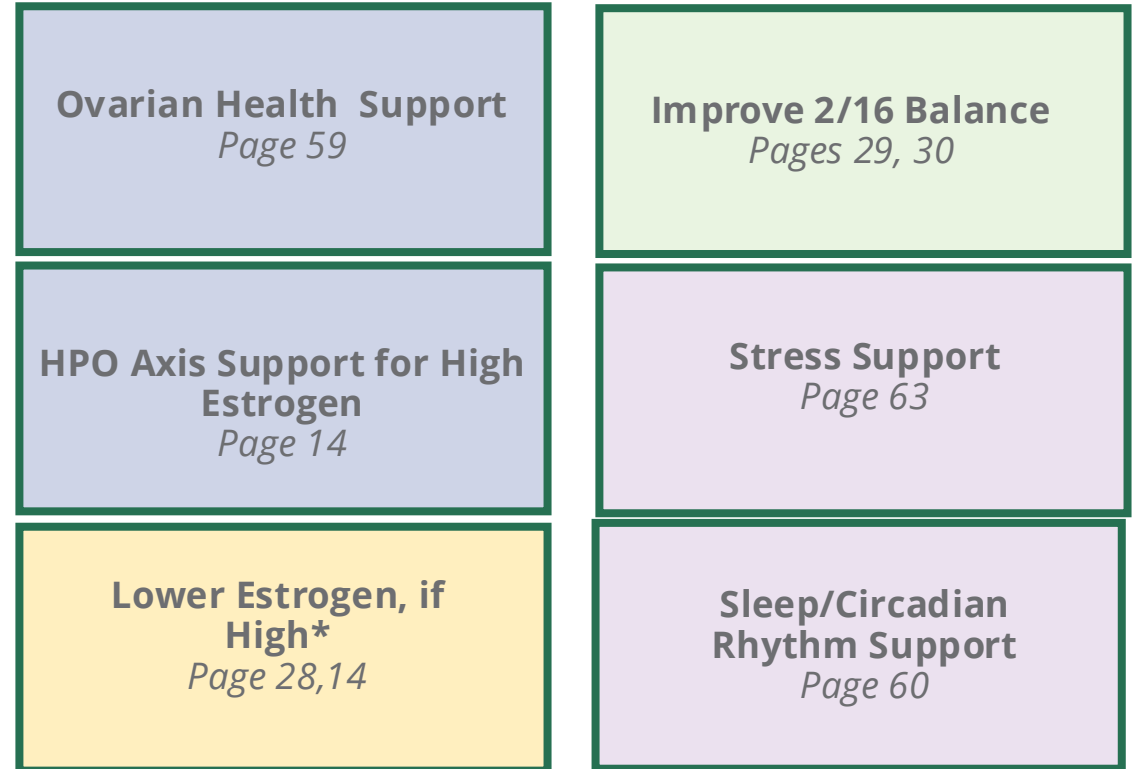
Blood Lab Goals

- Lower prolactin (*lower stress*)

Lifestyle Goals

- Reduce stress, support sleep
- Encourage movement
- Encourage anti-inflammatory diet

Treatment Guide Key:



What is your treatment plan?



Case 1: Robin, 39-year-old female Heavy menses/Sleep Disturbed

Sample Treatment Plan

Diet and Lifestyle for Optimal Female Hormones

- Low glycemic index mediterranean diet, rich in phytoestrogenic plant foods (nuts, seed, legumes).
- 30 different plant foods per week.
- Weightlifting 30 minutes 2-3x/weekly.
- 30 minutes yoga twice weekly.
- Meditation app x 5-10 minutes every evening before bed.

Supplements based on DUTCH Test Goals

- **Breakfast:** Omega-3s 2 g (estrogen metabolism & egg quality), DIM 180 mg
- **Lunch or Dinner:** Vitex 500 mg
- **1-2 hrs before bed:** Oral micronized progesterone SR 100 mg during luteal phase to support sleep in the week before menses

What mechanism of Vitex will support her natural progesterone output?

Review

Can Vitex *Agnus Castus* be Used for the Treatment of Mastalgia? What is the Current Evidence?

A. R. Carmichael

Russells Hall Hospital, Dudley DY1 2HQ, West Midlands, UK

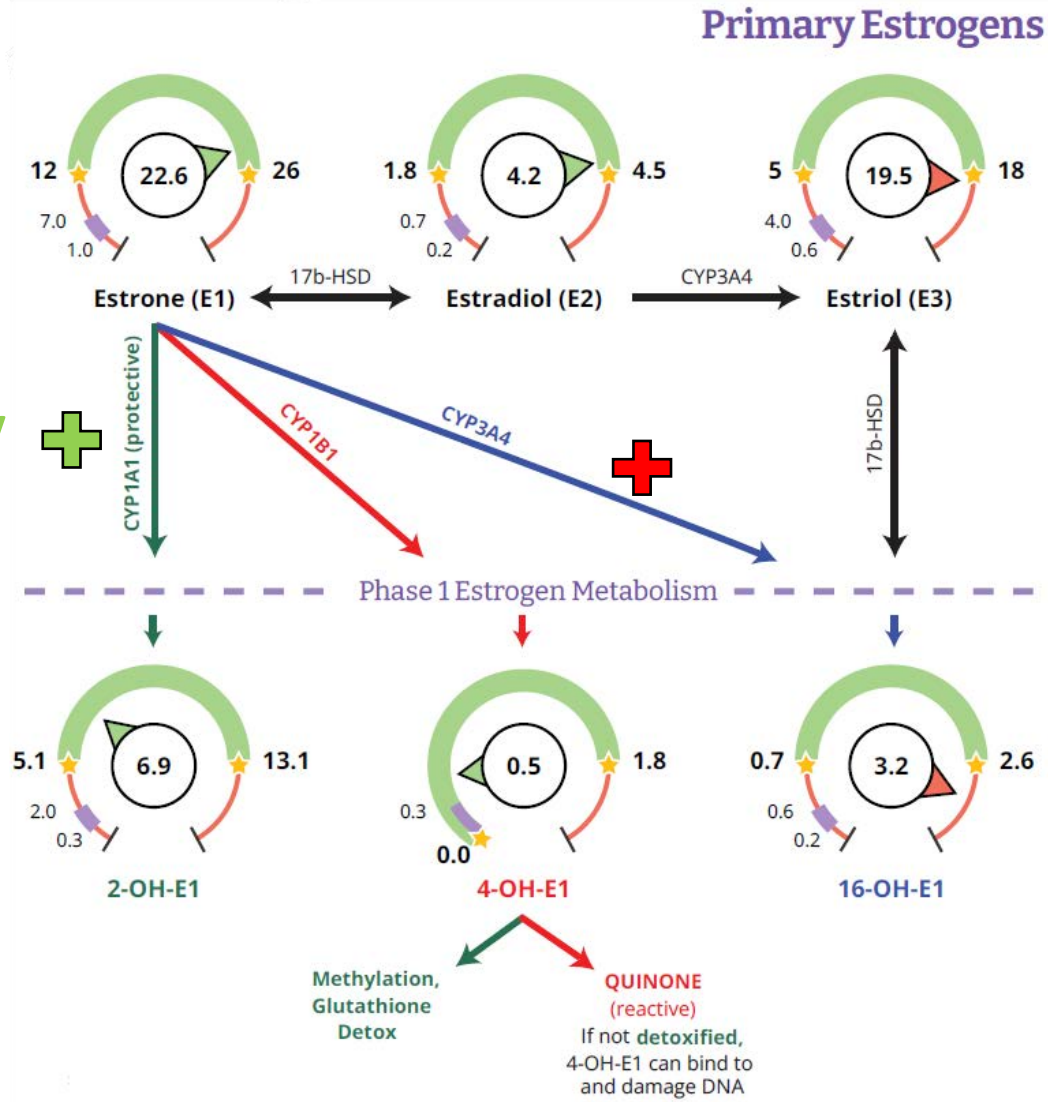
There have been many treatments suggested for the management of mastalgia; one of these is the fruit extract of *Vitex Agnus castus* L. commonly known as *Agnus castus*, an extract of a deciduous shrub native to Mediterranean Europe and Central Asia. It is postulated that *A. castus* suppresses the stress-induced latent hyperprolactinemia which is a release of supra-physiological levels of prolactin in some patients in response to stressful stimuli. It is postulated that *A. castus* could be effective in the treatment of cyclical mastalgia by inhibiting the release of excess prolactin by blocking Dopamine-2 receptor type on pituitary. The adverse events following *A. castus* treatment are mild and reversible. The aim of this review is assess the efficacy of *A. castus* in the treatment of mastalgia. Data from randomized and non-randomized studies regarding the efficacy and safety of *A. castus* is reviewed in a systematic fashion. It is concluded that *A. castus* can be considered as an efficient alternative phytotherapeutic agent in the treatment of mastalgia.

Why did we recommend
omega-3s?

Why did we recommend omega-3s?

High omega 6/3 ratio increases 16-OH-E1 preference

Good-quality fish oil



What mechanism(s) behind DIM are expected to help reduce her breast tenderness and heavy bleeding?

DIM's Estrogen Metabolism Mechanisms

- Increases SHBG in serum – decreases E2 bioavailability
- **Lowers 16-OH-E1 level**
- Raises 2-OH-E levels
 - *This improves 2:16 balance - 16-OH-E1 is estrogenic and 2-OH is anti-proliferative!*
- **Little known fact: DIM also induces 4-OH-E** and in our studies **only slightly improved the 2/4 balance.**
 - *This is significant because 4-OH is genotoxic; Thus, use caution with DIM and I3C supplementation.*



Newman and Smeaton *BMC Complementary Medicine and Therapies* (2024) 24:405
<https://doi.org/10.1186/s12906-024-04708-7>

BMC Complementary
Medicine and Therapies

RESEARCH

Open Access

Exploring the impact of 3,3'-diindolylmethane on the urinary estrogen profile of premenopausal women

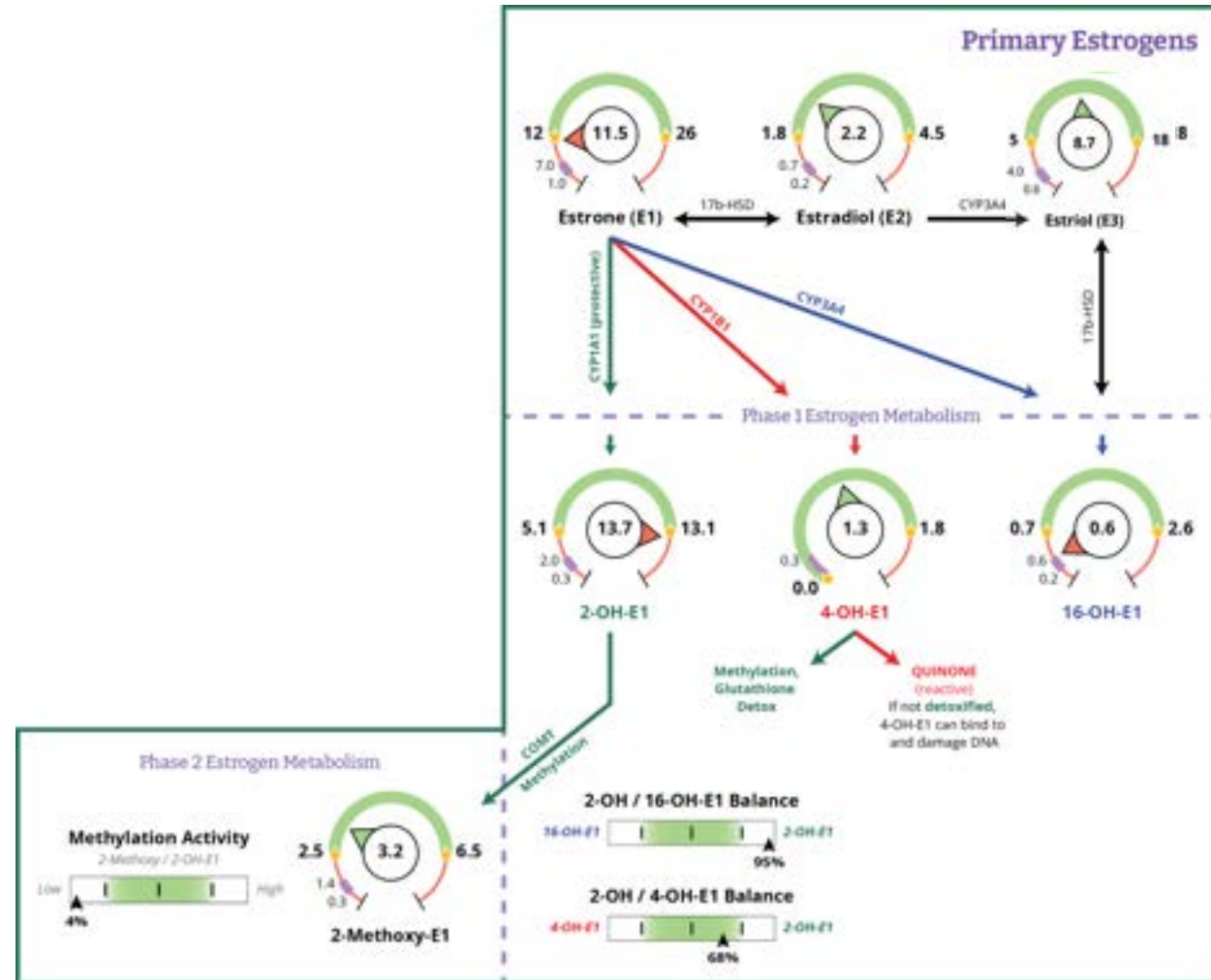
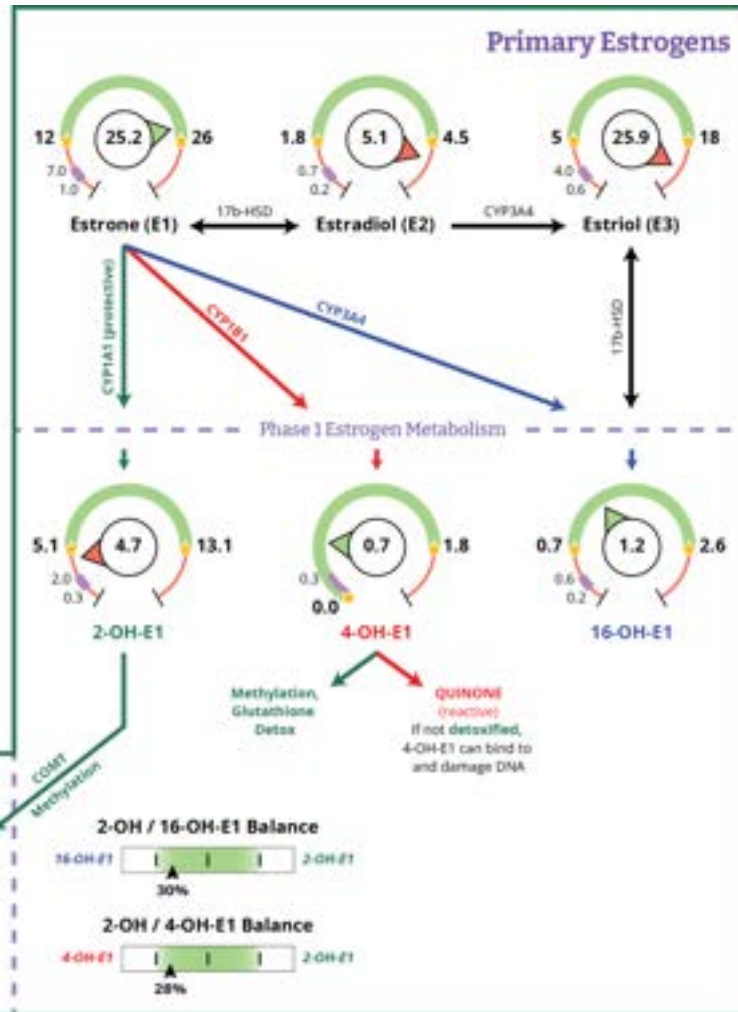


Mark Newman^{1*} and Jaclyn Smeaton¹

Newman M et al. *BMC Complement Med Ther.* 2024 Nov 22;24(1):405.

Newman MS et al. *Menopause.* 2025 Jul 1;32(7):630-639.

Example: Before and After DIM



Case #2: Gabby
31-Year-Old Female

Case 2: Gabby, a 31-yo Female with Infertility/PCOS

Chief Complaints

- Infertility
- Hair loss
- Acne
- High stress

PMHx

- High stress due to demanding job and poor sleep
- History of irregular cycles, sometimes absent for 2-3 months
- Sedentary lifestyle

Medications

- Prenatal Multivitamin

Physical Exam

- 5'5"; 175 lbs.; BMI 29.1
- BP 110/76 mm Hg
- Pulse 74 bpm

Baseline labs

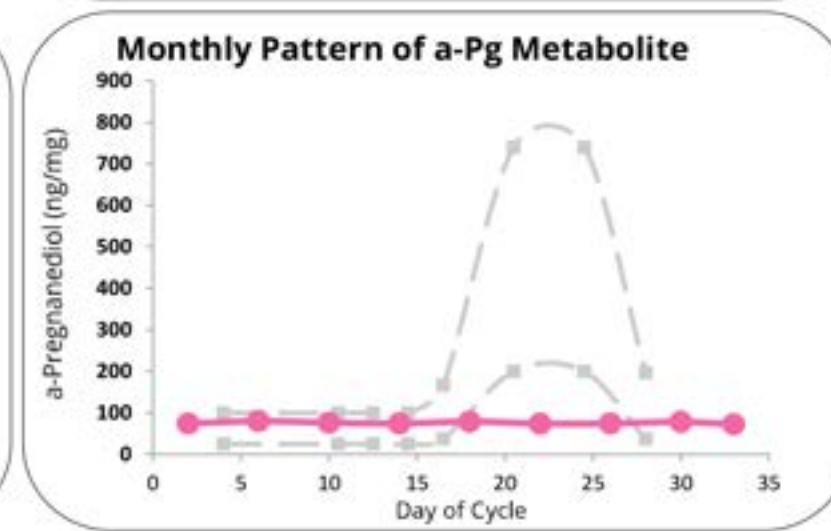
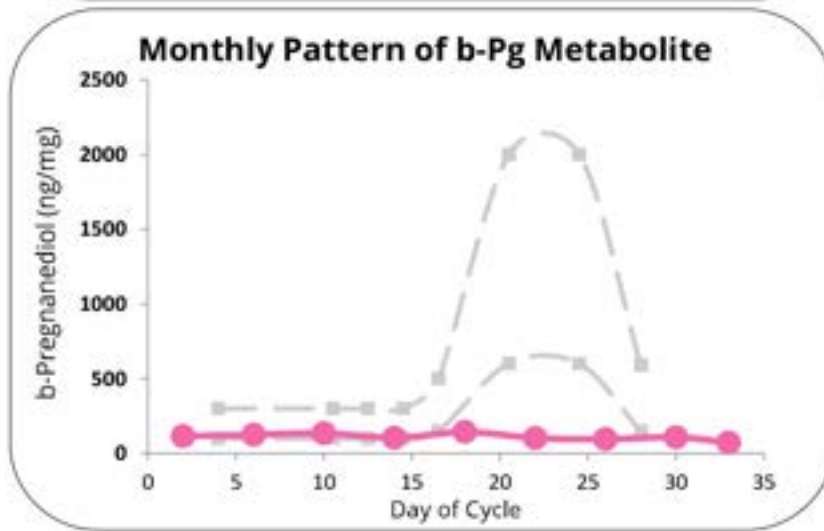
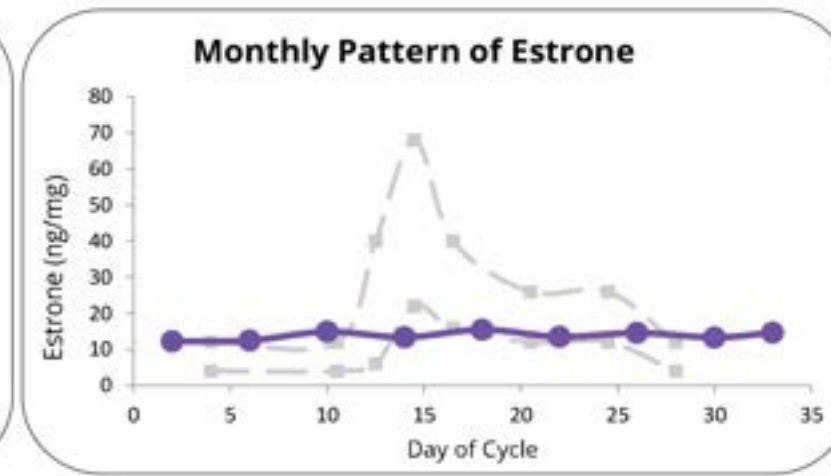
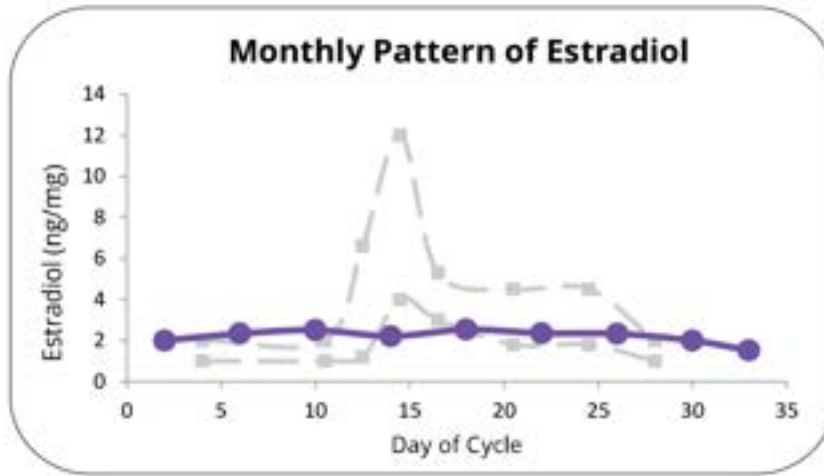
- Dyslipidemia (**high** TG and LDL)
- Fasting Insulin: 17 (**H**); HbA1c: 5.9 (**H**)
- CRP-hs: 2.6 (**H**)
- Total Testosterone: 42 ng/dL (**high-end**)
- SHBG 28 nmol/L (**Low-end**)



Case #2

DUTCH Test Results

Case 2: Gabby, a 31-yo Female with Infertility/PCOS



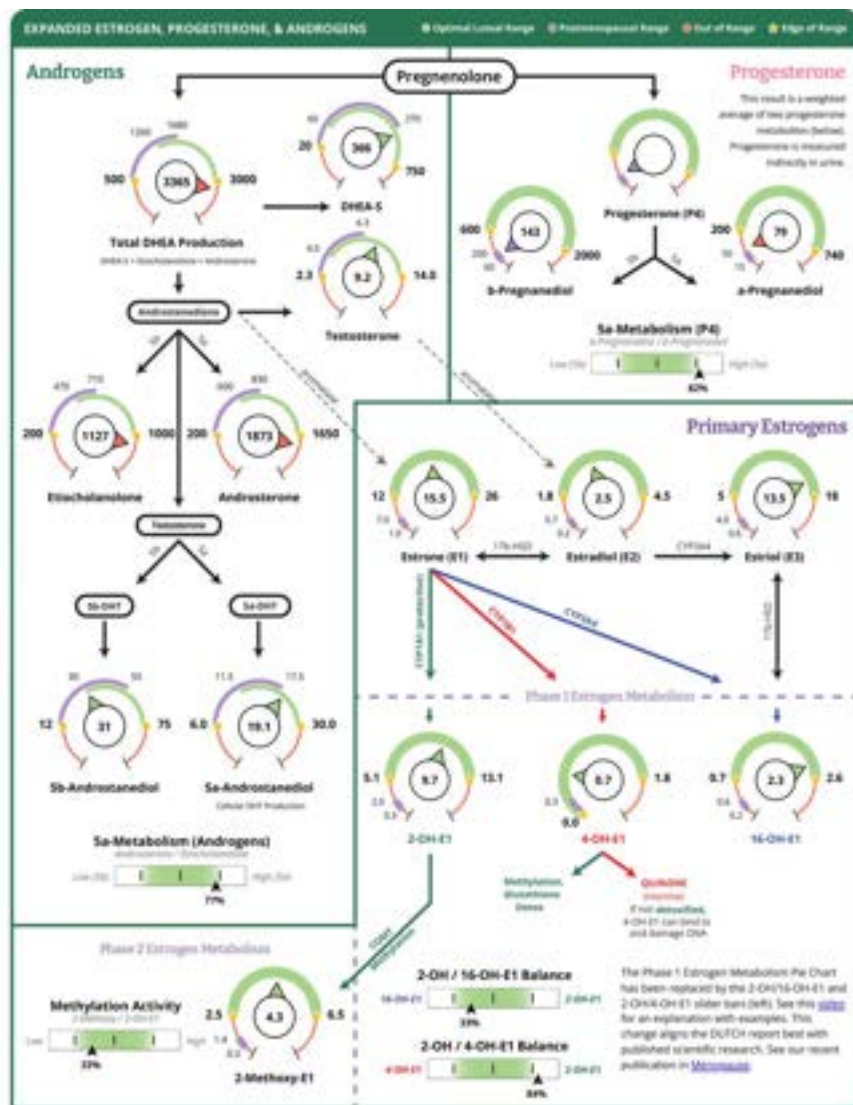
Case 2: Gabby, a 31-yo Female with Infertility/PCOS



Case 2: Gabby, a 31-yo Female with Infertility/PCOS



Case 2: Gabby, a 31-yr Female with Infertility/PCOS



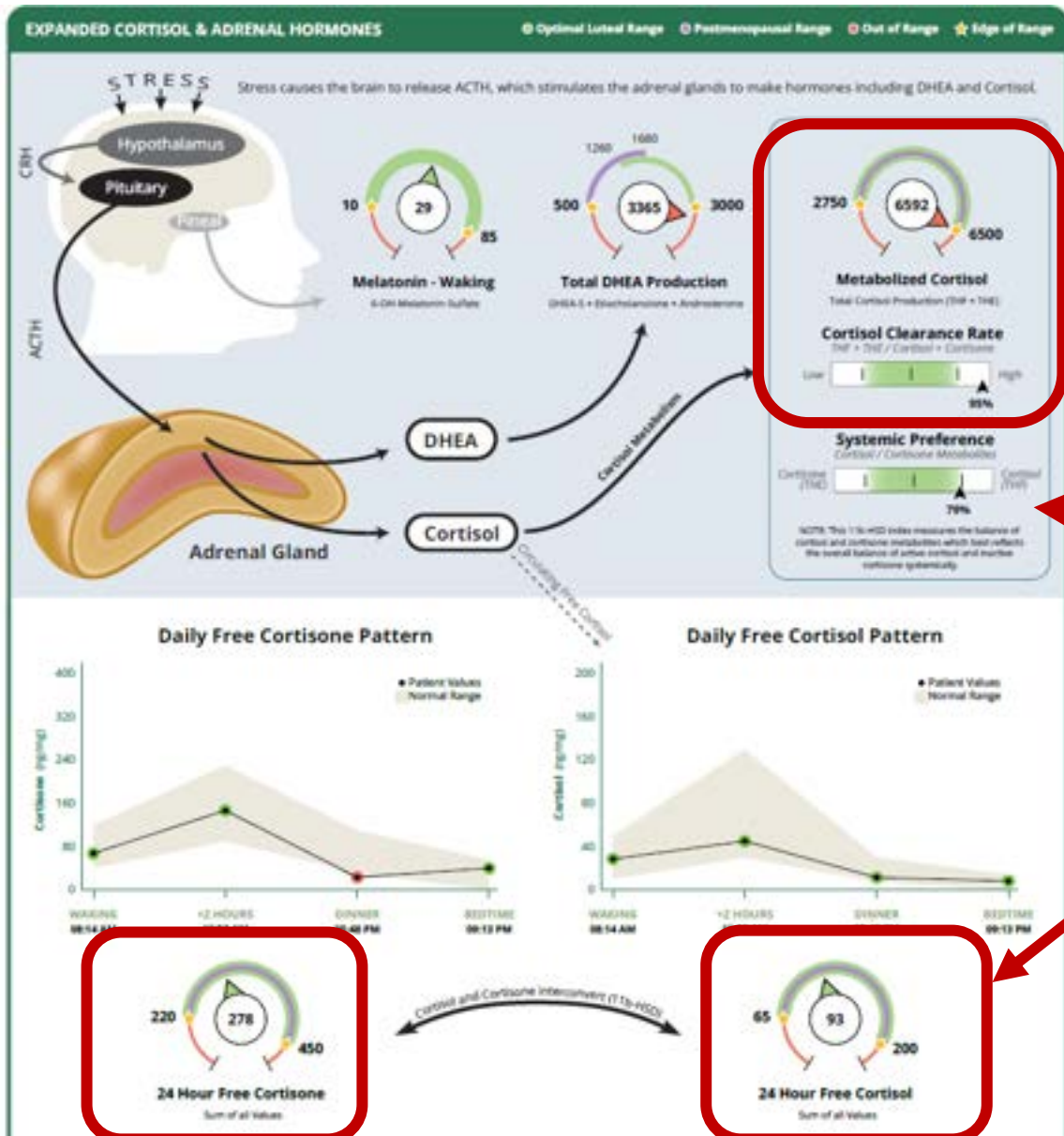
Sex Hormones & Metabolites

TEST	RESULT	UNITS	LUTEAL*	POSTMENOPAUSAL
Progesterone Metabolites (Urine)				
b-Pregnanediol	Below luteal range	143.2	ng/mg	600 - 2000
a-Pregnanediol	Below luteal range	78.5	ng/mg	200 - 740
Estrogens and Metabolites (Urine)				
Estrone (E1)	Within luteal range	15.49	ng/mg	12 - 26
Estradiol (E2)	Within luteal range	2.53	ng/mg	1.8 - 4.5
Estriol (E3)	Within luteal range	13.5	ng/mg	5 - 18
2-OH-E1	Within luteal range	9.70	ng/mg	5.1 - 13.1
4-OH-E1	Within luteal range	0.71	ng/mg	0 - 1.8
16-OH-E1	High end of luteal range	2.28	ng/mg	0.7 - 2.6
2-Methoxy-E1	Within luteal range	4.28	ng/mg	2.5 - 6.5
2-OH-E2	Within luteal range	1.01	ng/mg	0 - 3.1
4-OH-E2	Within luteal range	0.12	ng/mg	0 - 0.52
Total Estrogen	Within range	49.6	ng/mg	35 - 70
Metabolite Ratios (Urine)				
2-OH / 16-OH-E1 Balance	Within range	4.25	ratio	2.69 - 11.83
2-OH / 4-OH-E1 Balance	Above range	13.66	ratio	5.4 - 12.62
2-Methoxy / 2-OH Balance	Within range	0.44	ratio	0.39 - 0.67
Androgens and Metabolites (Urine)				
Range				
DHEA-S	Within range	365.5	ng/mg	20 - 750
Androsterone	Above range	1872.9	ng/mg	200 - 1650
Etiocholanolone	Above range	1126.7	ng/mg	200 - 1000
Testosterone	Within range	9.21	ng/mg	2.3 - 14
5a-DHT	Within range	4.6	ng/mg	0 - 6.6
5a-Androstenediol	Within range	19.1	ng/mg	6 - 30
5b-Androstenediol	Within range	30.8	ng/mg	12 - 75
Epi-Testosterone	Within range	8.6	ng/mg	2.3 - 14

* The Luteal Range represents the expected premenopausal luteal range, collected menstrual cycle days 19-22 of a 28-day cycle. If your patient noted taking oral progesterone, the reference range represents the expected range on 100 - 200 mg of oral micronized progesterone (OMP). The ranges in the table below represent ranges in other times of the cycle your patient may have collected, such as follicular or ovulatory phases.

ADDITIONAL NORMAL RANGES	FOLLICULAR	OVULATORY	ON ORAL PG
b-Pregnanediol	100 - 300	100 - 300	2000 - 9000
a-Pregnanediol	25 - 100	25 - 100	580 - 3000
Estrone (E1)	4.0 - 12.0	22 - 68	N/A
Estradiol (E2)	1.0 - 2.0	4.0 - 12.0	N/A

Case 2: Gabby, a 31-yo Female with Infertility/PCOS



Assess Metabolized Cortisol and Cortisol Clearance Rate

- High Cortisol Production
- High cortisol clearance rate due to?
 - Inflammation/Neuroinflammation

Assess Systemic Preference

- Preference toward Cortisol Metabolites
 - Inflammation/Neuroinflammation

Free Cortisol and Free Cortisone Balance

- Normal
- Free cortisol and cortisone have the same shape to pattern and relatively similar levels within their ranges throughout the day

Case 2: Gabby, a 31-yo Female with Infertility/PCOS

High Xanthurenate and High Kynurenate →

- Low B6

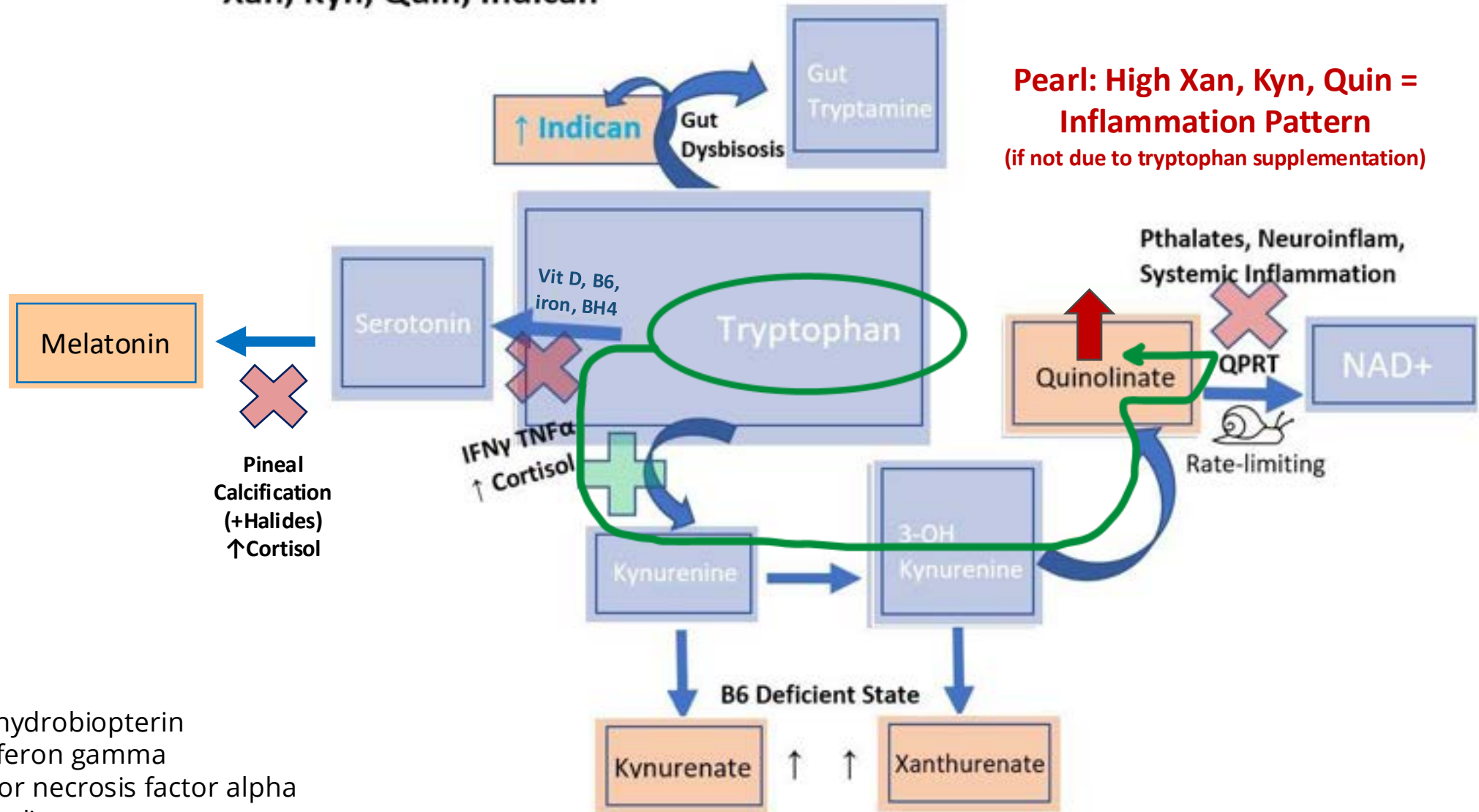
High Quinolate →

- Inflammatory marker
- Particularly neuroinflammation

TEST		RESULT	UNITS	NORMAL RANGE
Nutritional Organic Acids (Urine)				
Vitamin B12 Marker - May be deficient if high				
Methylmalonate (MMA)	Within range	2.0	ug/mg	0 - 2.5
Vitamin B6 Markers - May be deficient if high				
Xanthurenate	Above range	1.50	ug/mg	0.12 - 1.2
Kynurenate	Above range	4.8	ug/mg	0.8 - 4.5
Biotin Marker - May be deficient if high				
b-Hydroxyisovalerate	Within range	5.6	ug/mg	0 - 12.5
Glutathione Marker - May be deficient if high				
Pyroglutamate	Within range	42.4	ug/mg	28 - 58
Gut Marker - Potential gut putrefaction or dysbiosis if high				
Indican	Within range	67.2	ug/mg	0 - 100
Neuro-Related Markers (Urine)				
Dopamine Metabolite				
Homovanillate (HVA)	Within range	4.3	ug/mg	3 - 11
Norepinephrine/Epinephrine Metabolite				
Vanilmandelate (VMA)	Within range	2.9	ug/mg	2.2 - 5.5
Neuroinflammation Marker				
Quinolate	Above range	13.6	ug/mg	0 - 9.6
Additional Markers (Urine)				
Melatonin - Waking				
6-OH-Melatonin-Sulfate	Within range	28.9	ng/mg	10 - 85
Oxidative Stress / DNA Damage				
8-Hydroxy-2-deoxyguanosine (8-OHdG)	Within range	2.1	ng/mg	0 - 5.2

- Both the xanthurenate and kynurenate are above the range. This may indicate vitamin B6 deficiency. B6 is important for phase 2 methylation (estrogen detox), neurotransmitter synthesis, and other key processes. Tryptophan taken within 72 hours before testing can also raise these markers without indicating a true B6 deficiency.
- The quinolate is above the normal range. This increase may be in response to high cortisol and inflammation, potentially contributing to mood and sleep dysregulation through neuroinflammation. Tryptophan taken within 72 hours before testing can also raise quinolate in the urine without raising it in circulation.

Xan, Kyn, Quin, Indican



Legend:

BH4 = tetrahydrobiopterin

IFN γ = interferon gamma

TNF α = tumor necrosis factor alpha

QPRT = quinolinate

phosphoribosyltransferase

Case 2: Gabby, a 31-yo Female with Infertility/PCOS

Goals of Treatment

DUTCH Test Goals

- Increase progesterone/support ovulation
- Lower Total DHEA
- Balance 5a metabolism preference
- Lower Metabolized Cortisol and CCR
- Replenish B6, lower quinolinate

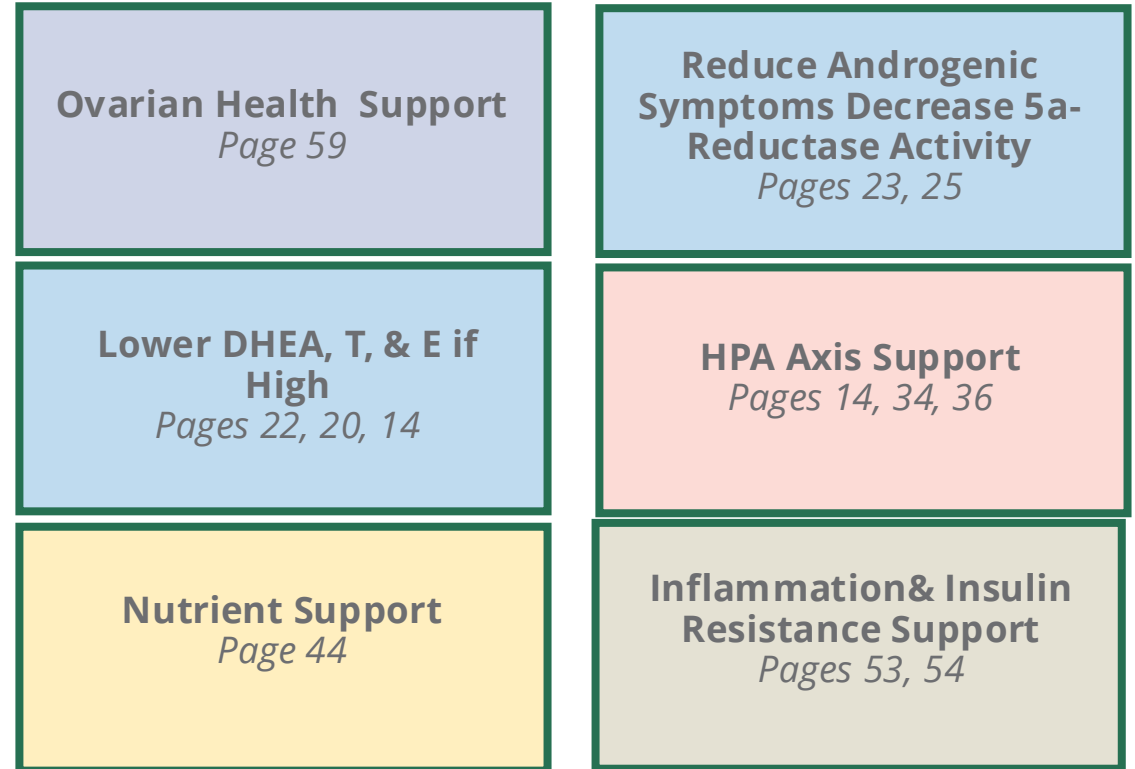
Blood Lab Goals

- Lower insulin, HbA1c, TGs, hs-CRP, total T

Lifestyle Goals

- Reduce stress, support sleep, increase physical activity
- Encourage anti-inflammatory diet

Treatment Guide Key:



What is your treatment plan?



Case 2: Gabby, a 31-yo Female with Infertility/PCOS

Treatment Options:

Supplements

- **Consider** Myo-inositol 1000 mg po bid
 - **To reduce insulin resistance, support ovulation and fertility**
- **Consider** EGCG 500 mg po daily
 - **To lower 5a-reductase activity and inflammation**
- **Consider** Magnesium glycinate 400 mg po qhs
 - **To support sleep, lower stress and cortisol, and support healthy blood sugar/metabolism**
- **Consider continuing** Prenatal multivitamin ensure ~1.7 mg of B6 (P5P)

Diet

- **Consider** Mediterranean Diet
 - **To lower inflammation, support healthy blood sugar and lipid levels**
- **Consider** Spearmint tea 2-3 cups per day
 - **To decrease androgens and androgenic symptoms**

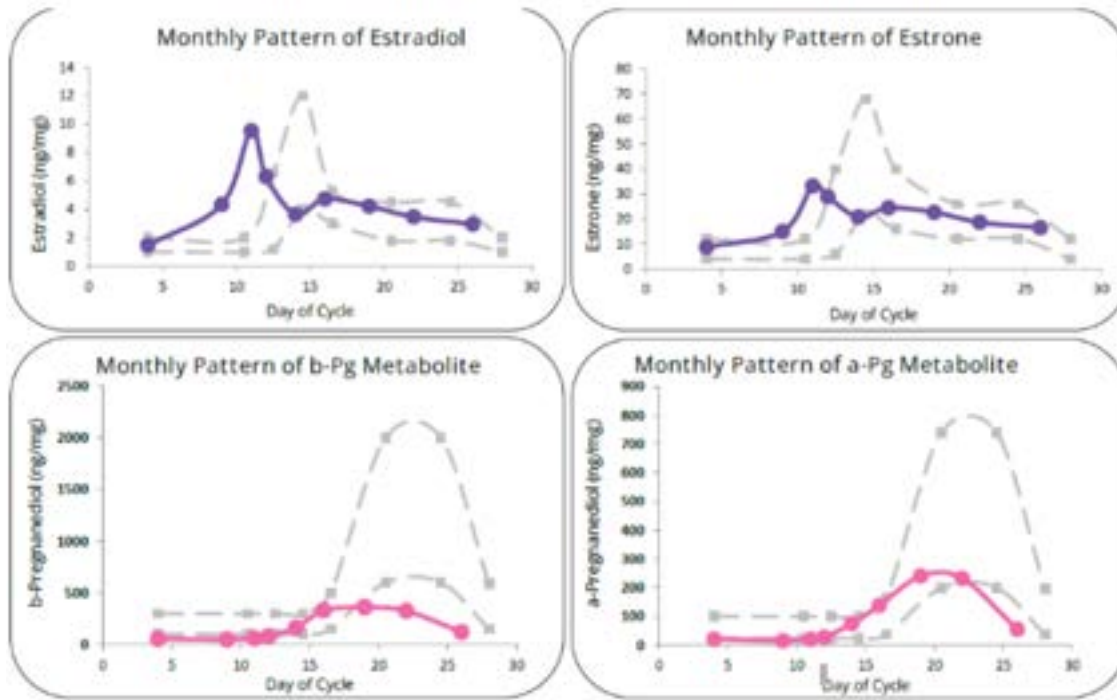
Lifestyle

- **Consider** Resistance training 3-4x per week and daily walking goal of 7-10k steps
 - **To reduce stress, increase lean muscle mass, reduce insulin resistance, support weight loss, and support sleep**
- **Consider** Gratitude journaling before bed
 - **To lower cortisol levels, reduce stress, and support sleep**

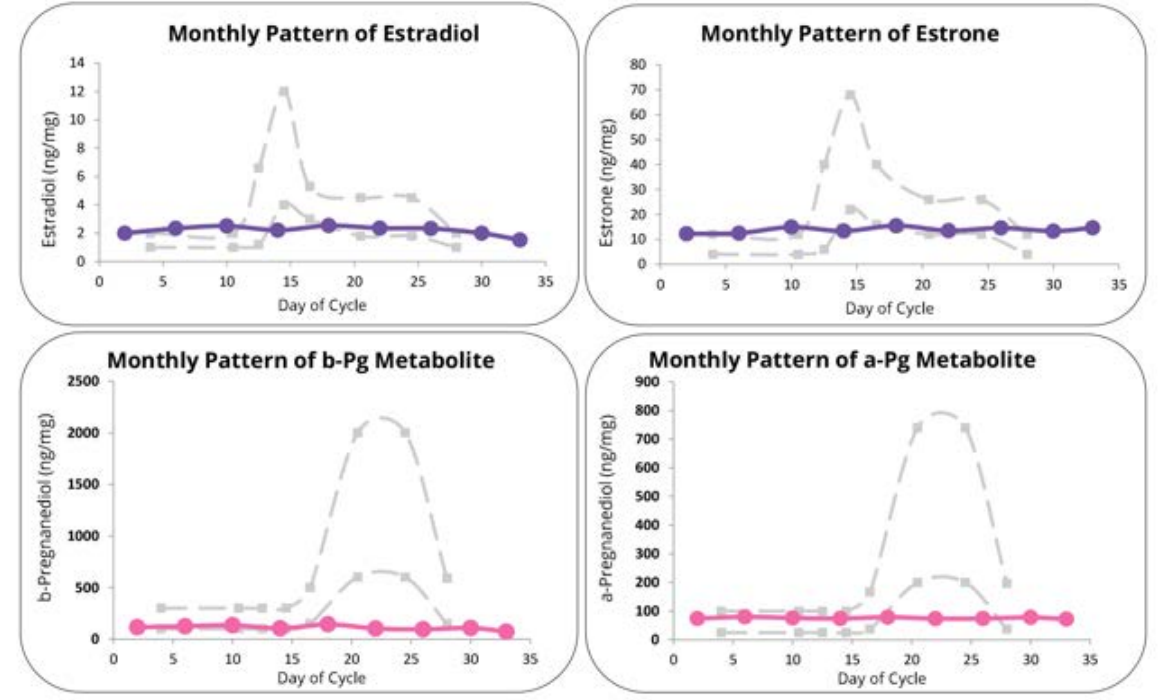
Let's Compare the Cycle
Mappings for Case #1 and #2

Cycle Mapping Comparison

Case #1 – Low Progesterone

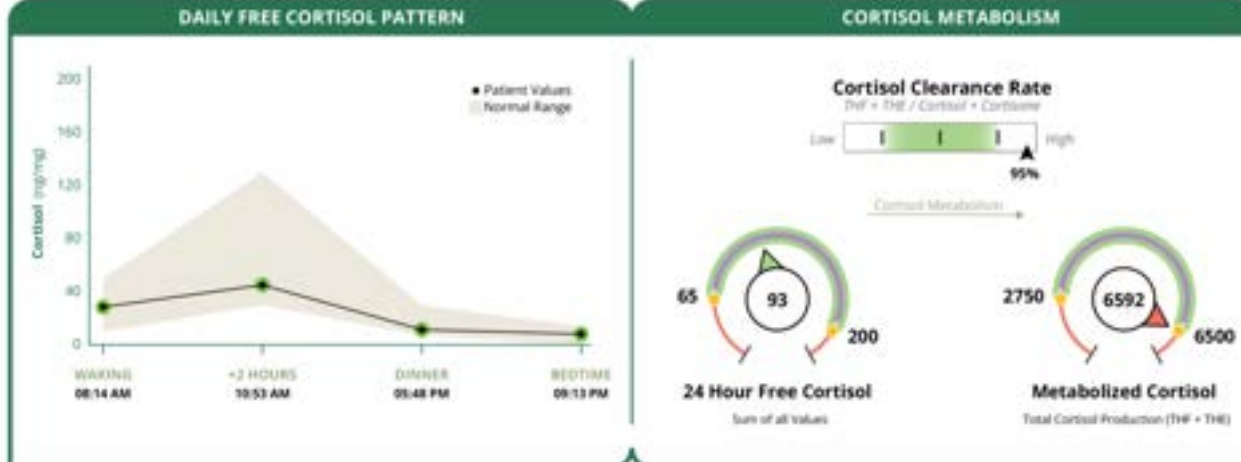
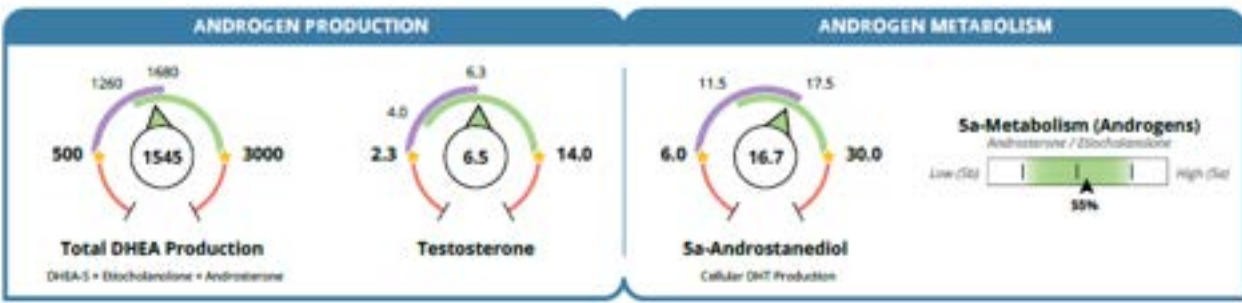
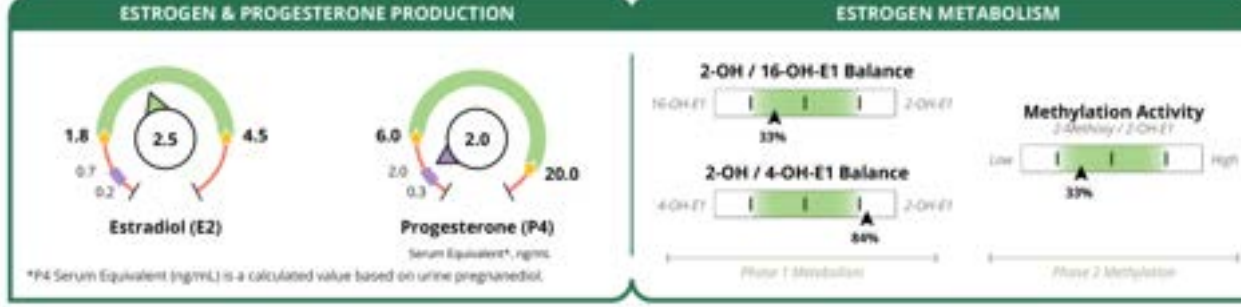
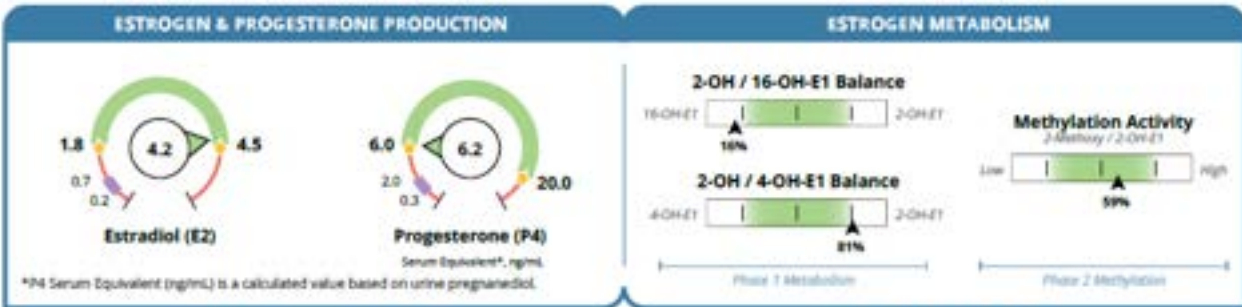


Case #2 - Anovulation



Case #1

Case #2



Organic Acid Tests (OATs) Suggests the Following Possible Imbalances | see page 6 for details

● Watch ● Needs Attention

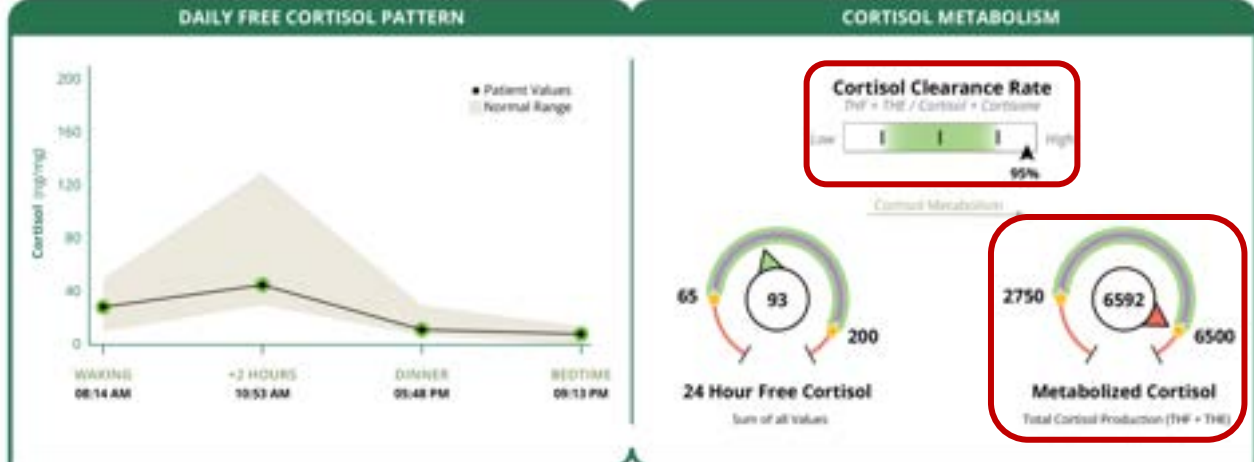
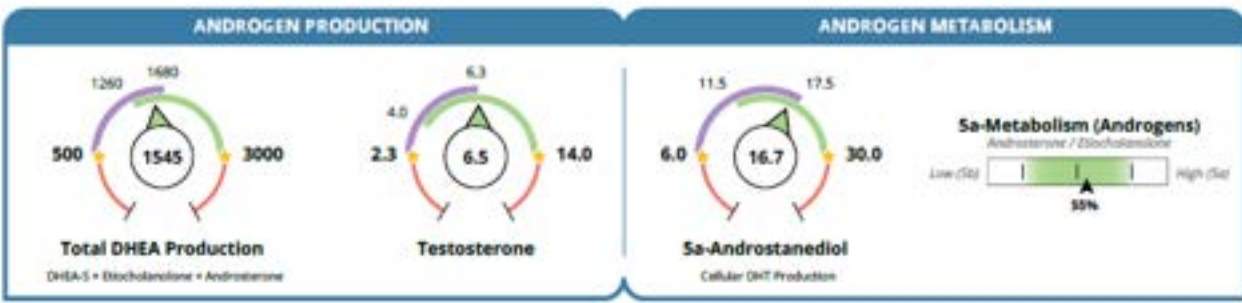
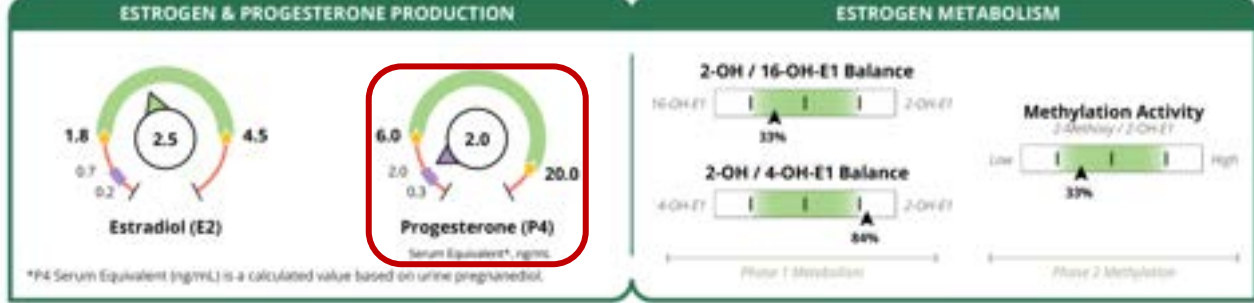
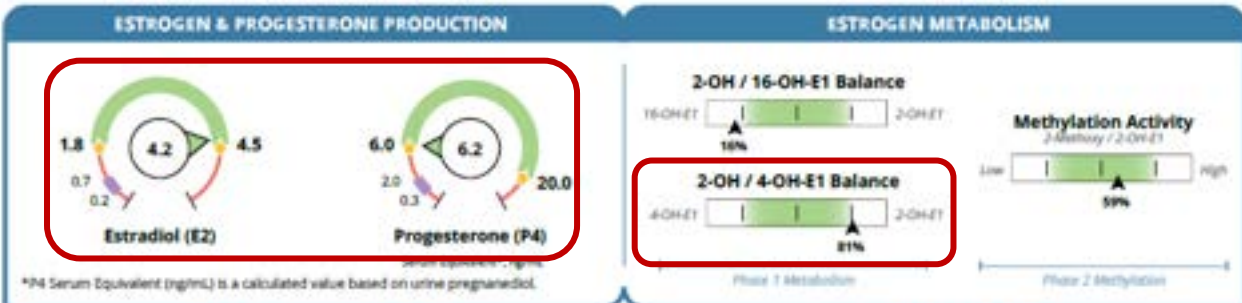
Organic Acid Tests (OATs) Suggests the Following Possible Imbalances | see page 6 for details

● Watch ● Needs Attention

● B6 Deficiency ● Neuroinflammation

Case #1

Case #2



Organic Acid Tests (OATs) Suggests the Following Possible Imbalances | see page 6 for details

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