



**How Do You Make A Baby When You're Not In The Mood?**

Carrie Jones ND, MPH



1

---

---

---

---

---

---

---

---

**Carrie Jones, ND, MPH**  
**Medical Director – Precision Analytical Inc.**




2

---

---

---

---


---

---

---

---

<u>D.U.T.C.H.</u>	<u>Serum(blood)</u>	<u>Saliva</u>
<ul style="list-style-type: none"> <li>• Estrogen</li> <li>• Estrogen (metabolism)</li> <li>• Estrogen (methylation)</li> <li>• Testosterone (available)</li> <li>• Testosterone (metabolism)</li> <li>• DHEA</li> <li>• DHEA (metabolites)</li> <li>• Progesterone</li> <li>• Cortisol/cortisone (free pattern)</li> <li>• Cortisol/cortisone (metabolism)</li> <li>• Cortisol Awakening Response (CAR)</li> <li>• B6, B12, Glutathione deficiency</li> <li>• Neurotransmitter balance</li> <li>• Oxidative stress</li> <li>• Melatonin (production)</li> <li>• Cycle Mapping – all month</li> </ul>	<ul style="list-style-type: none"> <li>• Estrogen</li> <li>• Testosterone (total/free)</li> <li>• DHEA or DHEA-S</li> <li>• Progesterone</li> <li>• Cortisol (total, no diurnal pattern)</li> </ul>	<ul style="list-style-type: none"> <li>• Estrogen</li> <li>• Testosterone (available)</li> <li>• DHEA or DHEA-S</li> <li>• Progesterone</li> <li>• Cortisol (free pattern)</li> <li>• Cortisol (CAR)</li> <li>• Melatonin</li> <li>• Month long estrogen/progesterone</li> </ul>



3

---

---

---

---

---

---

---

---

### Dried Urine = Easier Collection

DUTCH Complete and DUTCH Plus



©2020 Precision Analytical Inc. 

4

---

---

---

---


---

---


---

---


### Salivette Swabs vs. Saliva Tubes



- Easy collection
  - Pop the salivette into your mouth
- A truer CAR result due to rapid collection
- No spitting/passive drool
- Convenient for those with dry mouth
- Used in research



- Collection requires spitting/drooling into a tube
- Could result in a less accurate CAR depending on how long the collection takes for each tube
- Advised to rinse your mouth with water prior to collection – concern for dilution?

©2020 Precision Analytical Inc. 

5

---

---

---

---


---

---

---


---

### Salivette Swabs vs. Saliva Tubes




DUTCH Plus makes it easy with swabs!

- Easy collection
  - Pop the salivette into your mouth
- A truer CAR result due to rapid collection
- No spitting/passive drool
- Convenient for those with dry mouth



- Collection requires spitting/drooling into a tube
- Could result in a less accurate CAR depending on how long the collection takes for each tube
- Advised to rinse your mouth with water prior to collection – concern for dilution?

©2020 Precision Analytical Inc. 

6

---

---

---

---

---

---

---

---



7

---

---

---

---

---

---

---

---

Newman et al. BMC Chemistry (2019) 13:20  
<https://doi.org/10.1186/s13065-019-0529-1>

**METHODOLOGY ARTICLE** **Open Access**

### Evaluating urinary estrogen and progesterone metabolites using dried filter paper samples and gas chromatography with tandem mass spectrometry (GC-MS/MS)

Mark Newman<sup>1\*</sup>, Suzanne M. Pratt<sup>2</sup>, Desmond A. Curran<sup>1</sup> and Frank Z. Stanczyk<sup>3</sup>

**Abstract**  
**Background:** Measuring concentrations of metabolites of estradiol and progesterone in urine, instead of measuring serum concentrations, is common in research and also is used in patient care. The primary aim of this study was to  
**Conclusions:** For estradiol and progesterone, the dried urine assay is a good surrogate for serum testing. The 4-spot method can be used instead of 24-h urine collections and dried urine results are comparable to liquid urine. The dried urine assay is useful for some clinical assessments of hormone disorders and may be useful in large epidemiologic studies due to ease of sample handling.

**BMC** © The Author(s) 2019. This article is distributed under the terms of the Creative Commons Attribution 4.0 International License (<http://creativecommons.org/licenses/by/4.0/>), which permits unrestricted use, distribution, and reproduction in any medium, provided you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license, and indicate if changes were made. The Creative Commons Public Domain Dedication waiver (<http://creativecommons.org/publicdomain/zero/1.0/>) applies to the data made available in this article, unless otherwise stated.

©2020 Precision Analytical Inc.

8

---

---

---

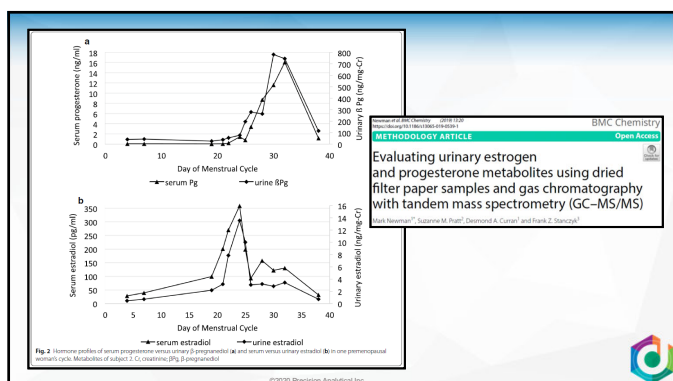
---

---

---

---

---



9

---

---

---

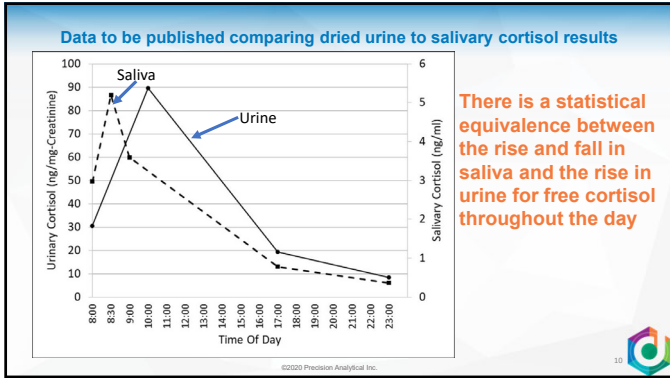
---

---

---

---

---



There is a statistical equivalence between the rise and fall in saliva and the rise in urine for free cortisol throughout the day

---

---

---

---

---

---

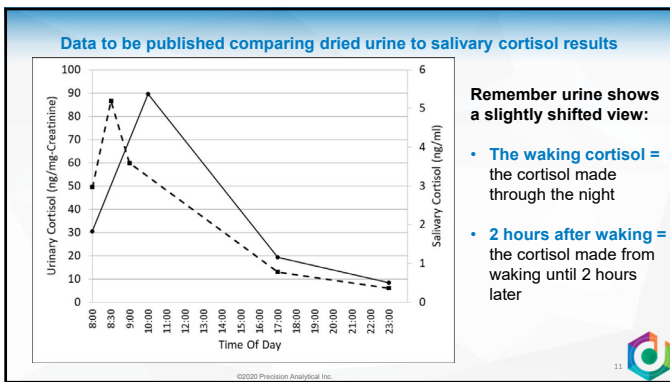
---

---

---

---

10



Remember urine shows a slightly shifted view:

- The waking cortisol = the cortisol made through the night
- 2 hours after waking = the cortisol made from waking until 2 hours later

---

---

---

---

---

---

---

---

---

---

11

# Choosing the Right Test

©2020 Precision Analytical Inc.

---

---

---

---

---

---

---


---

---

---

12

### The DUTCH Complete



- 4 urine collections throughout the day
- 5<sup>th</sup> overnight collection → insomnia
- Sex hormones plus metabolites
- Cortisol/cortisone, metabolites and diurnal pattern
- Melatonin, 8-OHdG, nutritional and neurotransmitter metabolites

©2020 Precision Analytical Inc.

13

---

---

---

---

---

---

---

---

### The DUTCH Plus



- 4 dried urine samples
  - Sex hormones + metabolites
  - Cortisol/cortisone metabolites
  - Melatonin, 8-OHdG, nutritional + neurotransmitter metabolites
- 5 saliva swab sample
  - Cortisol awakening response + diurnal pattern
- Extra overnight sample → insomnia

©2020 Precision Analytical Inc.

14

---

---

---

---

---

---

---

---

### The DUTCH Plus



- 4 dried urine samples
  - Sex hormones + metabolites
  - Cortisol/cortisone metabolites
  - Melatonin, 8-OHdG, nutritional + neurotransmitter metabolites
- 5 saliva swab sample
  - Cortisol awakening response + diurnal pattern

**The DUTCH Plus is a more comprehensive collection requiring dried urine plus saliva swabs. This results in more data points for patient care.**

©2020 Precision Analytical Inc.

15

---

---

---

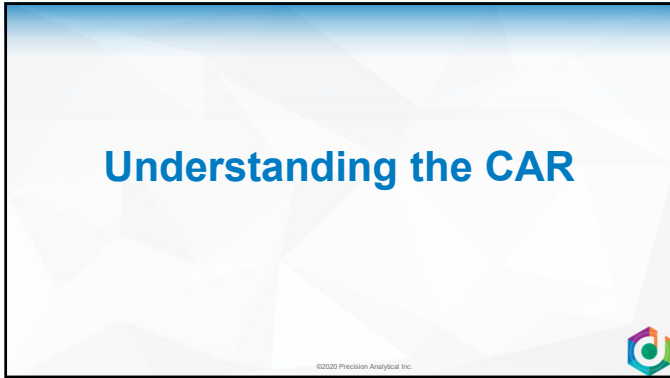
---

---

---

---

---



16

---

---

---

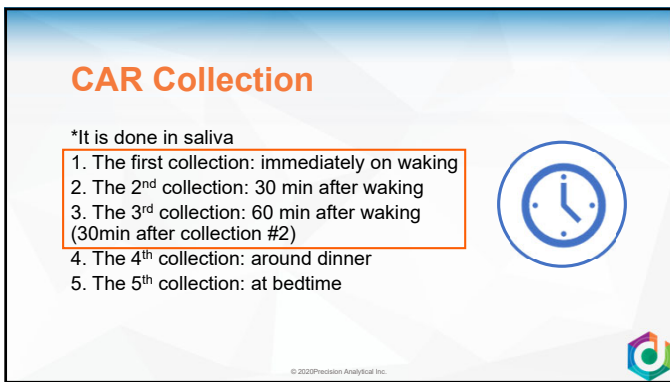
---

---

---

---

---



17

---

---

---

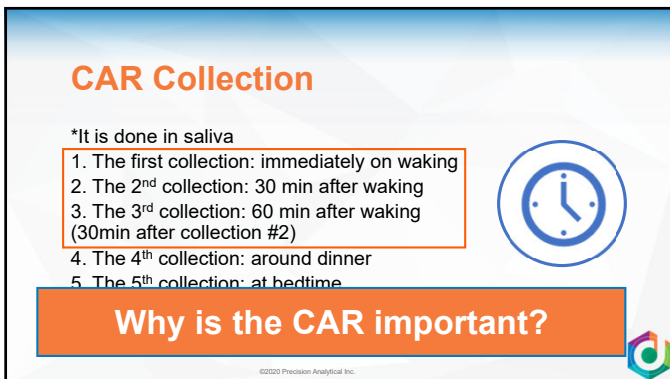
---

---

---

---

---



18

---

---

---

---

---


---

---

---

### The CAR Directly Influences and is Influenced by a Number of Health Outcomes

- Energy levels
- Stress response/resiliency
- Level of feeling "stressed out"
- Alertness
- Blood sugar management (DM2 risk)
- Mood: anxiety, panic, depression, worry
- Autoimmune development/progression
- Inflammation regulation
- Infection regulation
- Memory/recall
- Cancer outcomes



©2020 Precision Analytical Inc.

19

---

---

---

---

---

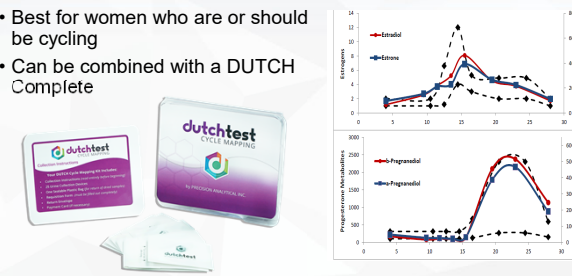
---

---

---

### The DUTCH Cycle Mapping

- Best for women who are or should be cycling
- Can be combined with a DUTCH Complete



©2020 Precision Analytical Inc.

20

---

---

---

---

---


---

---

---

### Consider a Cycle Mapping Test with:

- Women struggling with infertility
- Women whose hormonal symptoms tend to fluctuate throughout the cycle
- PMS, mid-cycle spotting, migraines, etc.
- Women with cycling hormones and no menses
- Partial hysterectomy (ovaries intact but no uterus)
- Ablation with hormonal symptoms
- Mirena IUD (no actual menstrual bleeding due to IUD but still has hormonal symptoms)
- Women with irregular cycles and hormonal symptoms
- PCOS
- If the luteal phase shifts from month-to-month
- Not sure when to test due to long or short cycles



©2020 Precision Analytical Inc.

21

---

---

---

---

---

---

---

---

### Consider a Cycle Mapping Test with:

- Women struggling with infertility
- Women whose hormonal symptoms tend to fluctuate through the cycle
- PMS, mid-cycle spotting, menstrual migraines, etc.
- Women with cycling hormones and no menses
- Partial hysterectomy (ovaries intact but no uterus)
- Ablation with hormonal symptoms
- Mirena IUD (no actual menstrual bleeding due to IUD but still has hormonal symptoms)
- Women with irregular cycles and hormonal symptoms
- PCOS
- If the luteal phase shifts from month-to-month
- Not sure when to test due to long or short cycles

©2020 Precision Analytical Inc.



22

---

---

---

---

---

---

---

---

### Objectives

1. Recognize how multi-faceted 'libido' is for men and women
2. Discuss the questions to ask patients to properly assess libido , deficiencies.
3. Recognize the differences between the SES and SIS including sensitivity and context.
4. Review all the multiple hormones involved in the SES and SIS such that you can explore/test/address further with patients.
5. Evaluate the modality opportunities to discuss libido deficiencies with patients.

©2020 Precision Analytical Inc.

23



23

---

---

---

---

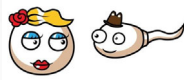
---

---

---

---

### Quick reminder on how to make a baby...



There has to be a healthy egg.  
 There has to be healthy sperm.  
 They have to meet at the proper time, do their thing  
 Then implant and grow!

©2020 Precision Analytical Inc.

24



24

---

---

---

---

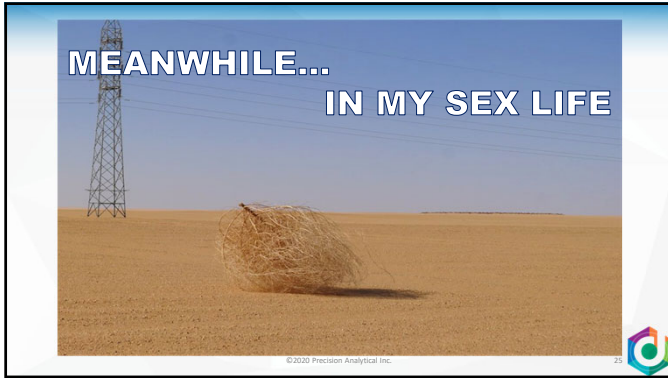
---

---

---

---





25

---

---

---

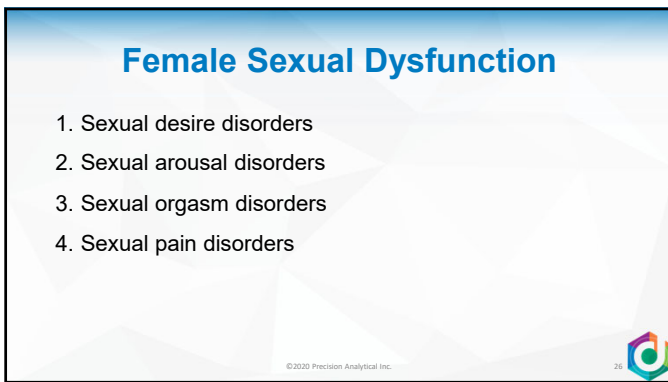
---

---

---

---

---



26

---

---

---

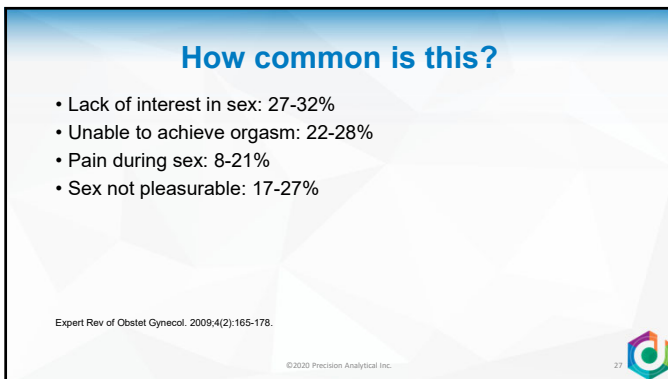
---

---

---

---

---



27

---

---

---

---

---

---

---

---



28

---

---

---

---

---

---

---

---



29

---

---

---

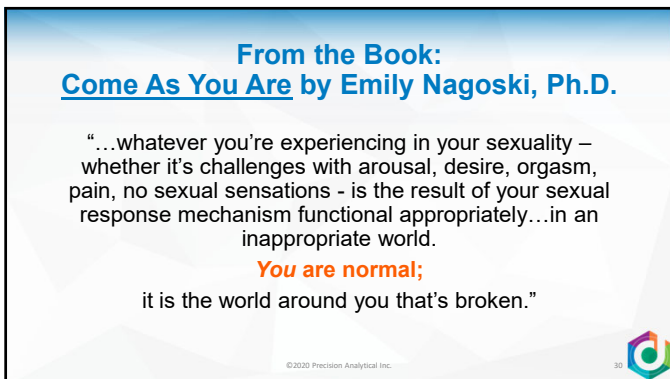
---

---

---

---

---



30

---

---

---

---

---


---

---

---

### My Questions Regarding Libido

- Is this a problem for you?
- Is this a problem for your partner?
- Are you still attracted to your partner?
- Did you have a sex drive in the past? Was it high and now lower/gone or low and now very low/gone?
- Can you reach orgasm? Could you in the past?
- Does sex hurt?



©2020 Precision Analytical Inc. 31

31

---

---

---

---

---

---

---

---

### Other Factors Involved

- Arousal
- Needs being met/love language
- Stress and sleep hormones
- Sex hormone balance
- Thyroid hormones
- Neurotransmitters
- History of trauma or abuse
- Self-esteem/body image
- History of negative sexual experiences
- Lifestyle choices such as alcohol, drugs, smoking
- Disease states (i.e.. HTN or CVD)
- Medication side effects

©2020 Precision Analytical Inc. 32

32

---

---

---

---

---


---

---

---

### If Pain is the Problem...

- **This must be evaluated**
- Ask about past or current trauma history
- Perform or refer for a pelvic exam
- Evaluate pelvic floor muscles – test for muscle strength and prolapse
- Evaluate for vaginal dryness/atrophic vaginitis
- Consider testing for yeast, bacteria and STI's
- Consider a pap with HPV test
- Be on the lookout for lichen sclerosis
- Ask about personal care that could be irritating the vaginal/labia tissue
- Assess for endometriosis



©2020 Precision Analytical Inc. 33

33

---

---

---

---


---

---

---

---

## Sexual Desire and Arousal



©2020 Precision Analytical Inc. 34

34

---

---

---

---


---

---

---

---

## The Dual Control Model



- Developed out of the Kinsey Institute
- It's the central mechanism that determines sexual arousal (or not)
- It's your **ACCELERATOR** and your **BRAKE** to determine if you're aroused and responsive...or can be
- Just like you have the sympathetic (accelerator) and parasympathetic (brake) for your CNS at-large, you have it for sex

Bancroft J, Graham CA, Janssen E, Sanders SA. The dual control model: current status and future directions. Journal of sex research. ; 46(2-3):121-42. [\[pubmed\]](#)  
Nagoski E. Come As You Are. New York, NY:Simon & Schuster Paperbacks;2015.  
©2020 Precision Analytical Inc.

35

35

---

---

---

---

---

---

---

---

## Sexual Excitation System (SES)

- The accelerator!
- “The system that **responds to** sexually relevant stimuli in the environment, from visual stimuli to tactile stimuli and everything in between.”

Nagoski E. Come As You Are. New York, NY:Simon & Schuster Paperbacks;2015.  
Nagoski E. What are the two parts of the sexual response system? Retrieved on January 8, 2020 from <https://www.sharecare.com/health/sex-and-relationships/main-parts-sexual-response-system>  
©2020 Precision Analytical Inc.

36

36

---

---

---

---

---

---

---

---

## Sexual Inhibition System (SIS)

- The Brake!
- This system scans for **threats**
  - Anything that affects what you see, hear, smell, touch, taste or imagine that keeps you turned off, distracted, not interested
  - i.e., avoid STIs, avoid pregnancy, social consequences, worry

• Nagoski E. Come As You Are. New York, NY:Simon & Schuster Paperbacks;2015.  
 • Nagoski E. What are the two parts of the sexual response system? Retrieved on January 8, 2020 from <https://www.sharecare.com/health/sex-and-relationships/main-parts-sexual-response-system>

©2020 Precision Analytical Inc. 37

---

---

---

---

---

---

---

---

37

## This feeling (ahem, COVID) does not help libido



©2020 Precision Analytical Inc.

---

---

---

---

---

---

---

---

38

## What Does This Mean?

- The SES and SIS have different levels of **sensitivity**
  - How sensitive are your accelerator and your brake independently?
    - i.e., extra sensitive SIS = extra sensitive brake system that may require more trust, relaxation, distraction elimination, worry reduction than someone else
    - i.e., low sensitivity of SES = requires more stimulation to actually get in the mood and want sex but once you're there...you're there!

©2020 Precision Analytical Inc. 39

---

---

---

---

---

---

---

---

39

**What Does This Mean?**

You need to help them figure out what increases the SES and decreases the SIS

©2020 Precision Analytical Inc. 40

40

---

---

---

---

---

---

---

---

**What Does This Mean?**

Life and situational context are important for both

©2020 Precision Analytical Inc. 41

41

---

---

---

---

---

---

---

---

**Context at 21 Years Old vs 41 Years Old**

- "Why did I have no problems with sex and libido at 21yo but now at 41yo I can't get in the mood and have lost all desire?"

©2020 Precision Analytical Inc. 42

42

---

---

---

---

---

---

---

---

**Context at 21 Years Old vs 41 Years Old**

- "Why did I have no problems with sex and libido at 21yo but now at 41yo I can't get in the mood and have lost all desire?"
- Lets re-word this...
- "Why did I have no problems with sex and libido at 21yo but now at 41yo married with a full-time job, 2 kids, a huge to-do list, all these obligations, hormonal changes and an extra 15 pounds around my waist can I not get in the mood and have lost all desire?"

©2020 Precision Analytical Inc. 43

43

---

---

---

---

---

---

---

---

**Context at 21 Years Old vs 41 Years Old**

- "Why did I have no problems with sex and libido at 21yo but now at 41yo I can't get in the mood and have lost all desire?"
- Lets re-word this...
- "Why did I have no problems with sex and libido at 21yo but now at 41yo married with a full-time job, 2 kids, a huge to-do list, all these obligations, hormonal changes and an extra 15 pounds around my waist can I not get in the mood and have lost all desire?"

**CONTEXT!!!**

©2020 Precision Analytical Inc. 44

44

---

---

---

---

---

---

---

---

**What Hormones Affect These Systems?**

- Testosterone
- Estrogen
- Progesterone
- Cortisol
- Norepinephrine
- Epinephrine
- Oxytocin
- Dopamine
- Serotonin
- GABA

©2020 Precision Analytical Inc. 45

45

---

---

---

---

---


---

---

---

# Let's Start with the HPA Axis

©2020 Precision Analytical Inc. 46



46

---

---

---

---

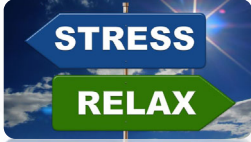
---

---


---

---

<p><b>Elevated Stress Hormones</b></p> <ul style="list-style-type: none"> <li>• Hard to be 'in the mood' when you're in fight or flight</li> <li>• It might indicate other things going on that reduce libido = inflammation, blood sugar issues, etc.</li> <li>• Elevated cortisol awakening response (CAR) can indicate anticipatory stress</li> <li>• It can interfere with thyroid</li> <li>• It can cause a shift in tryptophan away from serotonin = low mood, poor sleep</li> </ul>	<p><b>Decreased Stress Hormones</b></p> <ul style="list-style-type: none"> <li>• Hard to be 'in the mood' when you're tired</li> <li>• Low CAR can indicate psychological burnout</li> <li>• Low metabolized cortisol can indicate hypothyroidism</li> </ul>
--	--



©2020 Precision Analytical Inc. 47



47

---

---

---

---

---

---

---

---


"Chronic stress, if continued for a long time, can damage many parts of the body.

A significant part of the damage is due to the effects of sustained norepinephrine release, because of norepinephrine's general function of **directing resources away from maintenance, regeneration, and reproduction, and toward systems that are required for active movement.**

The consequences can include sleeplessness, loss of libido, gastrointestinal problems, impaired disease resistance, slower rates of injury healing, depression, and increased vulnerability to addiction."

Chrousos GP. Stress and disorders of the stress system Nat Rev Endocrinol. 2009; 5(7):374-381.  
<https://doi.org/10.1038/nrendo.2009.10>  
 © 2020 Precision Analytical Inc.

48



48

---

---

---

---

---

---

---

---



**Question:**  
**When you go on vacation with your partner alone (no kids) how is your sex drive?**

**Key to ask!**

©2020 Precision Analytical Inc. 49

49

---

---

---

---

---

---

---

---

**35yo female: Anxiety, High Stress, PMS, Low Libido**

- Lost her job due to the pandemic, worried about money/health
- Side note: Luteal phase progesterone is low

**Saliva Free Cortisol Pattern**

Saliva Cortisol (pg/mg)

Time	Low/High Range Limit	Patient Results
Waking	~4	~8
Waking (+30 Minutes)	~8	~15
Waking (+90 Minutes)	~6	~12
Afternoon	~2	~3
Night	~1	~1

24hr Free Cortisol (A+B+C+D) → Metabolized Cortisol (ma-THE) (Total Cortisol Production)

©2020 Precision Analytical Inc.

50

---

---

---

---

---

---

---

---

**Remember cortisol's effect on hormones like progesterone!**

- Glucocorticoids can inhibit GnRH pulses
- This results in less LH and FSH stimulation

```

    graph TD
      Glucocorticoids --> Hypothalamus
      Glucocorticoids --> Anterior Pituitary
      Glucocorticoids --> Ovaries
      Hypothalamus --> GnRH
      Anterior Pituitary --> LH_FSH[LH/FSH]
      Ovaries --> E2_Pg[E2/Pg]
      GnRH --> Anterior Pituitary
      LH_FSH --> Ovaries
      E2_Pg --> Ovaries
  
```

©2020 Precision Analytical Inc.

51

---

---

---

---

---

---

---


---

**GnRH Pulse Reminder**

- **FSH:**
  - Dominant in the early follicular phase
  - GnRH pulses are slower/lower (<1 pulse per 2-3hr) to stimulate FSH
- **LH:**
  - Dominant in the late follicular phase
  - GnRH pulses are faster/higher (1 pulse per hour) to stimulate LH

**Cortisol could be potent enough to suppress both or just slow down the pulses which now favors FSH = estradiol**

Tsutsumi R and Webster N. GnRH Pulsatility, the Pituitary Response and Reproductive Dysfunction. Endocr J. 2015;58(6):729-737. ©2020 Precision Analytical Inc.



52

---

---

---

---

---

---

---

---


**GnRH Pulse Reminder**

- **FSH:**
  - Dominant in the early follicular phase
  - GnRH pulses are slower/lower (<1 pulse per 2-3hr) to stimulate FSH

**In her case, the high cortisol suppressed LH resulting in low progesterone  
Low progesterone can increase anxiety and PMS**

**Cortisol could be potent enough to suppress both or just slow down the pulses which now favors FSH = estradiol**

Tsutsumi R and Webster N. GnRH Pulsatility, the Pituitary Response and Reproductive Dysfunction. Endocr J. 2015;58(6):729-737. ©2020 Precision Analytical Inc.



53

---

---

---

---

---

---


---

---

**Over Time,  
High Cortisol Can Result  
in Low Cortisol**

**Always keep the feedback loop in mind  
with chronic conditions/stress**

©2020 Precision Analytical Inc.



54

---

---

---

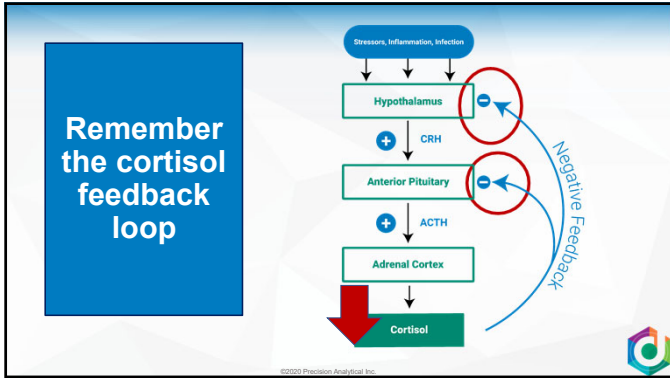
---

---

---

---

---



55

---

---

---

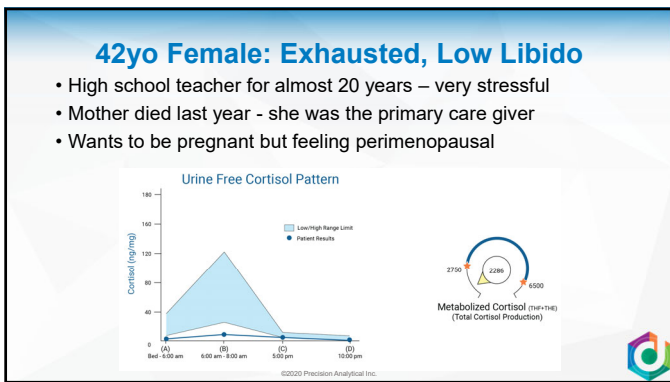
---

---

---

---

---



56

---

---

---

---

---

---

---

---

# HPA and Men

57

---

---

---

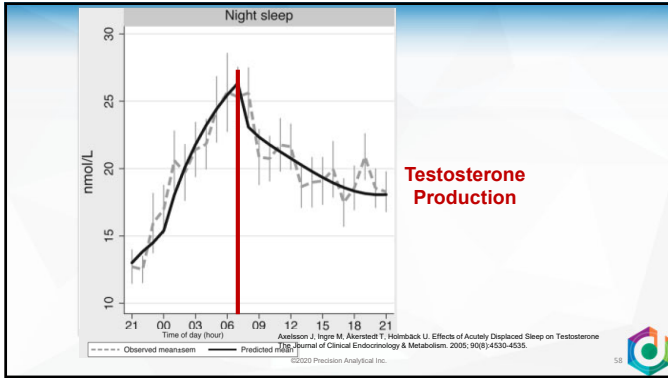
---

---

---

---

---



58

---

---

---

---

---

---

---

---

---

---

### Testosterone and Sleep

- Made during the night and is strongly tied to **REM cycle sleep** therefore the circadian rhythm is important
- Daytime testosterone levels were **decreased by 10% to 15%** in a small sample of young healthy men who underwent 1 week of sleep **restriction to 5 hours per night**

©2020 Precision Analytical Inc.

59

---

---

---

---

---

---

---

---

---

---

### Testosterone and Stress

- Higher levels of epinephrine is associated with lower levels of circulation testosterone
- “Penile erection is regulated by two opposing systems: **noradrenergic (anti-erectile)** and nitrenergic (pro-erectile) neurotransmission.” (Cellek, 2000)

©2020 Precision Analytical Inc.

60

---

---

---

---

---

---

---

---

---

---

**Citations: Testosterone**

- Andersen ML, Tufik S. The effects of testosterone on sleep and sleep-disordered breathing in men: Its bidirectional interaction with erectile function *Sleep Medicine Reviews*. 2008; 12(5):365-379.
- Axelsson J, Ingre M, Akerstedt T, Holmbäck U. Effects of Acutely Displaced Sleep on Testosterone *The Journal of Clinical Endocrinology & Metabolism*. 2005; 90(8):4530-4535.
- Celtek S. Nitroergic-noradrenergic interaction in penile erection: A new insight into erectile dysfunction *Drugs Today*. 2000; 36(2-3):135-.
- Elman I, Goldstein DS, Adler CM, Shoaf SE, Breier A. Inverse relationship between plasma epinephrine and testosterone levels during acute glucoprivation in healthy men *Life Sciences*. 2001; 68(16):1889-1898.
- Leproult R, Van Cauter E. Effect of 1 week of sleep restriction on testosterone levels in young healthy men. *JAMA*. 2011; 305(21):2173-4. [pubmed]

©2020 Precision Analytical Inc. 61

61

---

---

---

---

---

---

---

---

---

---

**Estrogen**

©2020 Precision Analytical Inc. 62

62

---

---

---

---

---

---

---

---

---

---

<p><b>Elevated Estrogen in ♀</b></p> <ul style="list-style-type: none"> <li>• Often results in unsexy estrogen dominant symptoms</li> <li>• It can cause a shift in tryptophan away from serotonin = low mood, poor sleep</li> </ul>	<p><b>Decreased Estrogen in ♀</b></p> <ul style="list-style-type: none"> <li>• Often results in unsexy low estrogen symptoms</li> <li>• Vaginal dryness/atrophic vaginitis can be a result of low estrogen (estriol)</li> <li>• Stimulation of estrogen receptors in the brain is important for serotonin production and dopamine so low levels = low mood, low motivation, low arousal</li> <li>• Estrogen impacts dopamine <u>synthesis</u> and <u>binding</u></li> </ul>
--	---

©2020 Precision Analytical Inc. 63

63

---

---

---

---

---

---

---

---

---

---

## Estrogen in Men ♂

- ER are located all over: brain, penis, testicles, adipocytes
- Modulates libido, erectile function, and spermatogenesis
- Symptoms of low estrogen:
  - Depression, lack of focus
  - Hot flashes
  - Bone loss
  - Loss of muscle mass
  - Sexual dysfunction

©2020 Precision Analytical Inc. 64

64

---

---

---

---

---

---

---

---

## Estrogen Dominance In Males

- As men age >50, prostate levels of estradiol gradually rise, and levels of progesterone and testosterone decline. The decline in testosterone and progesterone levels is greater than the rise of estradiol.
- Estradiol and DHT are synergistic in creating prostate problems.

**Theoretical Biology and Medical Modelling**

**The Estradiol-Dihydrotestosterone model of prostate cancer**  
A Edward Friedman\*

Address: Department of Mathematics, University of Chicago, 5734 S. University Avenue, Chicago, IL 60637, USA  
Email: A Edward Friedman\* - edgf@math.uchicago.edu  
\* Corresponding author

Published: 18 March 2005      Received: 08 February 2005  
Theoretical Biology and Medical Modelling 2:10      doi:10.1186/1745-6216-2-10      Accepted: 18 March 2005  
©2020 Precision Analytical Inc.

65

---

---

---

---

---

---

---

---

## Aromatase: Androgens → Estrogens (CYP19A1)

©2020 Precision Analytical Inc. 66

66

---

---

---

---

---

---

---

---

### What Upregulates Aromatase?

- Excess alcohol
- Zinc deficiency
- Insulin resistance
- Inflammation PGE2
- Obesity (central)
- Stress
- Leptin
- Aging
- Gonadotropins

©2020 Precision Analytical Inc.

67

---

---

---

---

---

---

---

---

---

---

### What does over-aromatization look like in men on the DUTCH test?

**What's his story?**  
 \*Early 40's male on the T injection weekly  
 \*Complains of weight gain, poor erections, low libido and fatigue

©2020 Precision Analytical Inc.

68

---

---

---

---

---

---

---

---

---

---

### Citations: Estrogen

- Aggarwal S, Thareja S, Verma A, Bhardwaj TR, Kumar M. An overview on 5alpha-reductase inhibitors. Steroids. 2010 Feb;75(2):109-53. doi: 10.1016/j.steroids.2009.10.005.
- Eng ET, Ye J, Williams D, et al. Suppression of estrogen biosynthesis by procyanidin dimers in red wine and grape seeds. Cancer research. 2003; 63(23):8516-22. [pubmed]
- Cabeza M, Heuze I, Bratoeff E, Murillo E, Ramirez E, Lira A. New progesterone esters as 5alpha-reductase inhibitors. Chem Pharm Bull (Tokyo). 2001 Sep;49(9):1081-4.
- Lephart ED. Modulation of Aromatase by Phytoestrogens Enzyme Research. 2015; 2015:1-11.
- Matsuda T, Abe H, Suda K. [Relation between benign prostatic hyperplasia and obesity and estrogen]. Rinsho Byon. The Japanese Journal Of Clinical Pathology. April 2004;52(4):291-294.
- Schulster M, Bernie AM, Ramasamy R. The role of estradiol in male reproductive function. Asian journal of andrology. ; 18(3):435-40. [pubmed]

©2020 Precision Analytical Inc.

69

---

---

---

---

---

---

---


---

---

---

# Low Progesterone

©2020 Precision Analytical Inc.



70

---

---

---

---

---

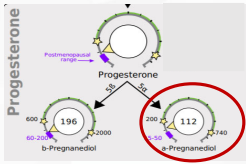
---

---

---


## Low Progesterone in Women

- Low levels can result in relative estrogen dominance
- Low levels results in low neurosteroids = less GABA-A stimulation
  - This could cause symptoms of anxiety



The diagram illustrates the metabolic pathways of progesterone. Progesterone is converted to b-Pregnenediol (value 196) and Pregnenediol (value 112). The conversion to b-Pregnenediol is associated with a value of 600, and the conversion to Pregnenediol is associated with a value of 200. The diagram also shows Progesterone being converted to Postmenopausal Weight (value 2000) and Progesterone being converted to Pregnenediol (value 112). The diagram is labeled with 'Progesterone' and 'Pregnenediol'.

©2020 Precision Analytical Inc.



71

---

---

---

---

---

---

---

---

# Testosterone

©2020 Precision Analytical Inc.



72

---

---

---

---

---

---

---

---



### Low Testosterone in Women

- In women, testosterone comes primarily from the ovaries and adrenal glands
- It can be converted into testosterone from androstenedione in adipose tissue
- It enhances dopamine release in the brain
- Although unclear, a few studies have shown testosterone can suppress an overactive HPA axis
- Testosterone has both anxiolytic (GABA-A) and anti-depressive (5-HT) effects

**Is testosterone 100% correlated to sex drive and/or arousal?**

McHenry J, Carrier N, Hull E, Kabbaj M. Sex differences in anxiety and depression: Role of testosterone. *Frontiers in Neuroendocrinology*. 2014; 35(1):42-57.



73

---

---

---

---

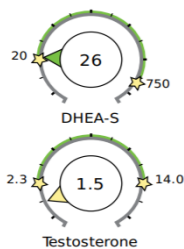
---

---

---

---

### Low Androgen Example



©2020 Precision Analytical Inc.

74

74

---

---

---

---

---

---

---

---

## What about T and Men?

©2020 Precision Analytical Inc.

75

---

---

---

---

---

---

---

---

### Where are androgens made in men?

- >95% of testosterone is made in the testicles
- 80% of DHEA (no "S") is made in the adrenals
- 20% of DHEA (no "S") is made in the testicles
- 100% of DHEA-S is made in the adrenal glands

©2020 Precision Analytical Inc.



76

---

---

---

---

---

---

---

---

### Low Testosterone Symptoms in Men

- Belly Fat
- Bone Loss
- Low Energy
- Low Sex Drive
- Low Muscle Mass
- Mood Issues/Brain Fog
- Gynecomastia
- Erectile Dysfunction

©2020 Precision Analytical Inc.



77

---

---

---

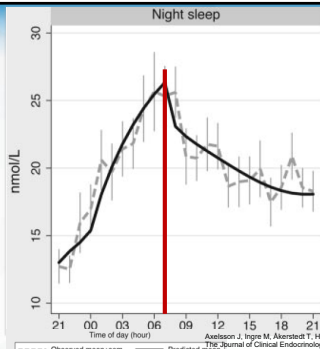
---

---

---

---

---



Axelsson J, Ingre M, Akerman T, Holmback U. Effects of Acutely Displaced Sleep on Testosterone. The Journal of Clinical Endocrinology & Metabolism. 2005; 90(8):4330-4335.

©2020 Precision Analytical Inc.



78

---

---

---

---

---

---

---

---

# Oxytocin Men and Women

©2020 Precision Analytical Inc.

79

---

---

---

---

---

---

---

---

## Low Oxytocin

- Hormone associated with love, attachment and bonding
- If healthy, it downregulates the sympathetic nervous system = pushes parasympathetic
- If healthy it reduces amygdala activity = less fear and anxiety
- Sexual application appears to have a greater effect in men however...
- It can help improve orgasm and the feeling of sexual satisfaction afterwards ("cuddle hormone")

©2020 Precision Analytical Inc.

80

---

---

---



---

---

---

---

---

<p><b>Adrenaline</b></p>  <p>Muscles tighten Energy sent to limbs Increased sensitivity to pain</p> <p>Fight or flight</p>	<p><b>Oxytocin, Endorphins</b></p>  <p>Muscles relax Energy sent to uterus Decreased sensitivity to / awareness of pain</p> <p>Collect &amp; Protect "Love Hormone"</p>
---	--

<https://www.inner-light-in.com/2016/11/meditation-oxytocin-boost-positive-emotions/>

©2020 Precision Analytical Inc.

81

---

---

---

---

---

---

---

---

**Right now, the world is struggling with  
illness, separation, social isolation,  
financial insecurity,  
bereavement and death  
that will lead to a fall out with  
chronic conditions**

©2020 Precision Analytical Inc.



82

---

---

---

---

---

---


---

---

**Let's Talk About the Amygdala**

- While many areas of the brain are involved with **anxiety or fear related information processing**, the amygdala plays a huge role in **emotion-based memory processing**
  - Examples: fear, anxiety related emotions, post traumatic stress disorder (PTSD)

©2020 Precision Analytical Inc.



83

---

---

---

---

---

---


---

---

**Let's Talk About the Amygdala**

- While many areas of the brain are involved with **anxiety or fear related information processing**, the amygdala plays a huge role in **emotion-based memory processing**
  - Examples: fear, anxiety related emotions, post traumatic stress disorder (PTSD)
- Emotional intelligence
- Social interaction including personal space
- Modulation of aggression
- Alcoholism/binge drinking.

©2020 Precision Analytical Inc.



84

---

---

---

---

---

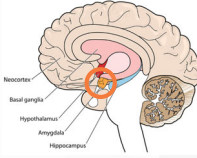
---

---

---

## The Amygdala

- Located in the temporal lobes at the end of the hippocampus
- Has major influence on the HPA and gut/brain axis



Babaei O, Pileti Chetan C, Krueger-Burg D. Inhibition in the amygdala anxiety circuitry. Experimental & molecular medicine. 2018; 50(4): 18. [pubmed]

©2020 Precision Analytical Inc.

85

---

---

---

---


---

---

---

---

**We feel fear to heighten our awareness and protect ourselves.**



©2020 Precision Analytical Inc.

86

---

---

---

---

---

---

---

---

**We feel fear to heighten our awareness and protect ourselves.**



©2020 Precision Analytical Inc.

87

---

---

---

---

---

---

---

---

# Dopamine and Serotonin

## For Men and Women

©2020 Precision Analytical Inc.

88

---

---

---

---

---

---

---

---

### Dopamine & Serotonin

- **Dopamine release increases attraction to our mate**
  - Helps us feel motivated and have more energy
  - Gives us that 'high' from all aspects of sex
  - Fantasy, daydreaming, hoping/waiting/wishing on that person, pornography, etc. = can all stimulate dopamine

Fisher HE, Aron A, Mashek D, Li H, Brown LL. Defining the Brain Systems of Lust, Romantic Attraction and Attachment. Psychology Medicine Archives of Sexual Behavior. 2002; 31(8):413-419.

©2020 Precision Analytical Inc.

89

---

---

---

---

---

---

---

---

### No, you can't just take L-dopa and suddenly be attracted to your mate

©2020 Precision Analytical Inc.

90

---

---

---

---

---

---

---

---

## Dopamine & Serotonin

- **Dopamine release increases attraction to our mate**
  - Helps us feel motivated and have more energy
  - Gives us that 'high' from all aspects of sex
  - Fantasy, daydreaming, hoping/waiting/wishing on that person, pornography, etc. = can all stimulate dopamine
- **Serotonin:**
  - Low = associated with depressive feelings
  - High = hypoactive sexual dysfunction (i.e.. SSRI's) = it directly inhibits the SES

Croft HA. Understanding the Role of Serotonin in Female Hypoactive Sexual Desire Disorder and Treatment Options. The Journal of Sexual Medicine. 2017; 14(12):1575-1584. [PubMed](#)

©2020 Precision Analytical Inc. 91

91

---

---

---

---

---

---

---

---

---

---

## To summarize (mostly)...

©2020 Precision Analytical Inc. 92

92

---

---

---

---

---

---

---

---

---

---

**a Lust "libido" per the paper below**  
Sex hormones (Testes and Ovaries) ↑

**b Attraction**  
Dopamine (Hypothalamus) ↑  
Some research says ↑ NE and ↓ Serotonin too

**c Attachment**  
Oxytocin/Vasopressin (Hypothalamus) ↑

**d**  
Prefrontal cortex, Hypothalamus, Pituitary

http://dx.doi.org/10.1016/j.neurosci.2017.05.017 (see actually science behind lust attraction comparison!)

©2020 Precision Analytical Inc. 93

93

---

---

---

---

---

---

---

---

---

---

## Unrealistic Social Media

*Social comparison, social media, and self-esteem.*  
 By Vogel, Erin A., Rose, Jason P., Roberts, Lindsay R., Eckles, Kathryn  
 Psychology of Popular Media Culture, Vol 3(4), Oct 2014, 206-222

**★ Stop comparing to others on social media  
 It results in lower self-esteem and lower mood  
 This does not help sex drive, self-worth or feelings of desire**

Abstract  
 Social media use is associated with lower self-esteem and lower mood. The purpose of this study was to investigate the mediating role of social comparison in the relationship between social media use and self-esteem. Results revealed that social media use was associated with lower self-esteem and lower mood, and this association was mediated by social comparison. The results also revealed that the impact of temporary exposure to social media profiles on state self-esteem and relative self-evaluations. The results revealed that participants' state self-esteem and relative self-evaluations were lower when the target person's profile contained upward comparison information (e.g., a high activity social network, healthy habits) than when the target person's profile contained downward comparison information (e.g., a low activity social network, unhealthy habits). Results are discussed in terms of extant research and their implications for the role of social media in well-being. (PsycINFO Database Record (c) 2018 APA, all rights reserved)

©2020 Precision Analytical Inc. 94

94

---

---

---

---

---

---

---

---

## Where Do I Start?

- Ask questions – don't be afraid to talk about sex, arousal and orgasm
- Get a thorough history
- Address the lifestyle, stress, sleep...etc.
- Work up pain if it is an issue – men have pelvic pain too
- Strongly consider testing
- Supplemental support
- BHRT
- Counseling/emotional work
- Prescribe her/him/them a vacation – no family

©2020 Precision Analytical Inc. 95

95

---

---

---

---

---

---

---

---

## How do I...

©2020 Precision Analytical Inc. 96

96

---

---

---

---

---

---


---

---



### Start with the Brain...

- Follow a strict circadian rhythm
- Get the gut healthy and work on the vagus nerve
- Improve blood flow and oxygen in the brain



©2020 Precision Analytical Inc. 97

97

---

---

---

---

---


---

---

---

### Increase Blood/Oxygen to the Brain

- Exercise – cardio, weights and inversion poses
- Stop smoking
- Normalize your blood sugar
- Neurofeedback, bio-tuning, cranial-sacral work, energy medicine
- Acupuncture/chiropractic/massage/lymphatic work = upper back, shoulders, neck
- HBOT – hyperbaric oxygen therapy
  - Post-TBI – increases oxygen levels in blood and tissues to improve brain repair
- Test for iron overload (hemochromatosis)
  - Iron deposits can affect brain function
- Reduce EMF/Cell phone to the head
  - In rats, 6 hours/day x 2 months = increased vacuolation in the brain (cellular vacuum and delivery). Cell phones also increase brain temperature.



©2020 Precision Analytical Inc. 98

98

---

---

---

---

---


---

---

---

### Citations: Brain

- Boussi-Gross R, Golan H, Fishlev G, et al. Hyperbaric Oxygen Therapy Can Improve Post Concussion Syndrome Years after Mild Traumatic Brain Injury - Randomized Prospective Trial. PLoS One. 2013;8(11):e79995.
- Forouharmaid F, Ebrahimi H and Pourabdian S. Mobile Phone Distance from Head and Temperature Changes of Radio Frequency Waves on Brain Tissue. Int J Prev Med. 2018;9:61.
- Shahabi S, Hassanzadeh I, Hoseinnehzaddarzi M, et al. Exposure to cell phone radiofrequency changes corticotrophin hormone levels and histology of the brain and adrenal glands in male Wistar rat. Iran J Basic Med Sci. 2018;21(12):1269-1274.
- Stankiewicz J, Panter S, Neema M, et al. Iron in Chronic Brain Disorders: Imaging and Neurotherapeutic Implications. Neurotherapeutics. 2007;4(3):371-386.



©2020 Precision Analytical Inc. 99

99

---

---

---

---

---

---

---

---

### Brain: Supplements

- **Bacopa monnieri** – 200-600mg/day
  - Reduces brain inflammation, improve cognition, ↓hyperactivity, ↑attention, ↑BDNF
- **Cordyceps sinensis (fruiting body)** – 100-500mg/day
  - Increased learning and memory, eNOS, GABA and glutamate in the brain
- **Omega 3 fatty acids** – 1000-3000mg/day
- **Rosemary** – use as a spice, inhale the essential oil, drink the tea
  - Diterpine “has cognitive enhancing powers,” antioxidant, increases Nrf-2 (phase 2 detoxification), protects against LPS damage, anti-inflammatory (inhibits TNF-α and IL-6), increases acetylcholine, will suppress iron absorption from the gut

©2020 Precision Analytical Inc. 100

100

---

---

---

---

---

---

---

---

---

---

### Brain: Supplements

- **Ginkgo biloba** – 150-1500mg/day
  - Shown to affect recall, recognition, reaction time, attention, concentration through antioxidant effect, improved blood flow and neuroprotection, ↑ BDNF
- **Pyrrroloquinoline quinone (PQQ)** – 10-40mg (often paired with Co-Q10)
  - Increase nerve growth factor, protects NMDA receptors, antioxidant to peroxyinitrite (improving mitochondrial health), reduces C-reactive protein and IL-6.
- **Maca Lepidium** – 1000-2000mg/day
  - Alkaloids affect hypothalamus and pituitary (reduces ACTH and thus cortisol), antidepressant effect

©2020 Precision Analytical Inc. 101

101

---

---

---

---

---

---

---

---

---

---

### Citations: Brain Supplements

- Aguiar S and Borowski T. Neuropharmacological Review of the Nootropic Herb Bacopa monnieri. *Rejuvenation Research*. 2013;16(4) <https://doi.org/10.1089/rej.2013.1631>
- Ehrlich S. (ed). Rosemary. Penn State Hershey A.D.A.M. 2017. Retrieved on September 11, 2019 from <http://penntaliatehershheyadarn.com/comment.aspx?productid=107&pid=33&ad=000271>
- Gonzalez G. Ethnobotany and Ethnopharmacology of *Lepidium meyeri* (Maca), a Plant from the Peruvian Highlands. 2012. eCAM. Retrieved on September 11, 2019 from <http://dx.doi.org/10.1155/2012/1153496>
- Habtemariam S. The Therapeutic Potential of Rosemary (*Rosmarinus officinalis*) Diterpenes for Alzheimer's Disease. *Evid Based Complement Alternat Med*. 2016; 2016:268049.
- Harris CB, Chownadisaal W, Mishuk DO, et al. Dietary pyrroloquinoline quinone (PQQ) alters indicators of inflammation and mitochondrial-related metabolism in human subjects. *J Nutr Biochem*. 2013;24(12):2076-2084.
- Haseguchi M, Ohta Y, Shimizu M, et al. Meta-analysis of the efficacy and safety of Ginkgo biloba extract for the treatment of dementia. *J Pharm Health Care Sci*. 2015; 1(14). Published online 2015 Apr 10. doi: 10.1186/s40762-015-0114-z
- Jackson P, Reay J, Scholley A and Kennedy D. Docosahexaenoic acid-rich fish oil modulates the cerebral hemodynamic response to cognitive tasks in healthy young adults. *Biology Psychology*. 2012;89(1):183-190.
- Liu Y, Wang J, Wang W, et al. The Chemical Constituents and Pharmacological Actions of *Cordyceps sinensis*. eCAM. 2015; retrieved on September 11, 2019 from <https://doi.org/10.1155/2015/75063>.
- Nakano M, Murayama Y, Hu L, Ikemoto K, et al. Effects of Antioxidant Supplements (BioPQQ™) on Cerebral Blood Flow and Oxygen Metabolism in the Prefrontal Cortex: Oxygen Transport to Tissue XXXVIII. *Advances in Experimental Medicine and Biology*, vol 923. Springer, Cham. Retrieved September 11, 2019 from [https://link.springer.com/chapter/10.1007/978-3-319-38811-6\\_29#363a](https://link.springer.com/chapter/10.1007/978-3-319-38811-6_29#363a)
- Ohwada K, Takeda H, Yamazaki M, et al. Pyrroloquinoline Quinone (PQQ) Prevents Cognitive Deficit Caused by Oxidative Stress in Rats. *J Clin Biochem Nutr*. 2008;42(1):28-34.
- Yuan G, An L, Sun Y, et al. Improvement of Learning and Memory Induced by Cordyceps Polypeptide Treatment and the Underlying Mechanism. *Exp Ther Med*. 2018;15(3):1000-1004. doi: 10.3892/etm.2018.10004

©2020 Precision Analytical Inc. 102

102

---

---

---

---

---

---

---

---

---

---

### Next, Address the Mitochondria

- R-lipoic Acid
- Vitamin C
- Selenium
- B- Complex
- Magnesium, Mn, Cu
- Co Q10
- Glutathione Support, NAC
- Sulforaphane
- PQQ

Picture: <https://www.memoragapp.com/flashcards/125866/Physiology-III-Block-III/>

©2020 Precision Analytical Inc. 103

103

---

---

---

---

---

---

---

---

---

---

### Next, Address the Mitochondria

- R-lipoic Acid
- Vitamin C
- Selenium
- B- Complex
- Magnesium, Mn, Cu
- Co Q10
- Glutathione Support, NAC
- Sulforaphane
- PQQ

Picture: <https://www.memoragapp.com/flashcards/125866/Physiology-III-Block-III/>

©2020 Precision Analytical Inc. 104

104

---

---

---

---

---

---

---

---

---

---

### Test and Address Stress

©2020 Precision Analytical Inc.

105

---

---

---

---

---

---

---


---

---

---

### Comprehensive Testing Options

- DUTCH Complete (dried urine only)



- 4-5 dried urine collections
- Progesterone metabolites
- Androgens and androgen metabolites
- Estrone, Estradiol and Estriol
- Estrogen metabolites (Phase 1 and 2 metabolism)
- Metabolized cortisol
- Free cortisol and free cortisone levels
- Overnight cortisol sample
- Free cortisol and free cortisone patterns
- MMA, KYN, XAN, Pyroglutamate
- Neurotransmitter metabolites: HVA, VMA
- 8-OHdG (DNA Damage)

DUTCH Complete

©2020 Precision Analytical Inc.

106

---

---

---

---

---

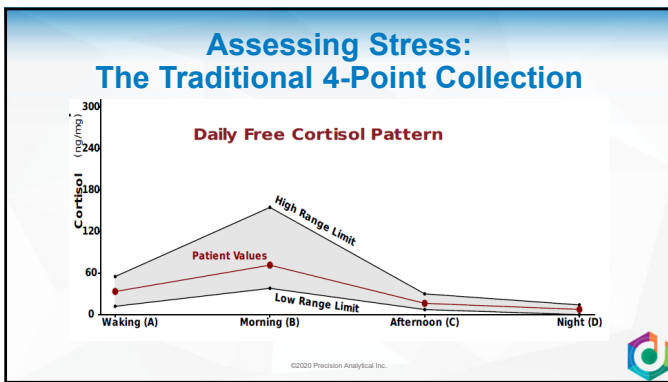
---

---

---

---

---



107

---

---

---

---

---

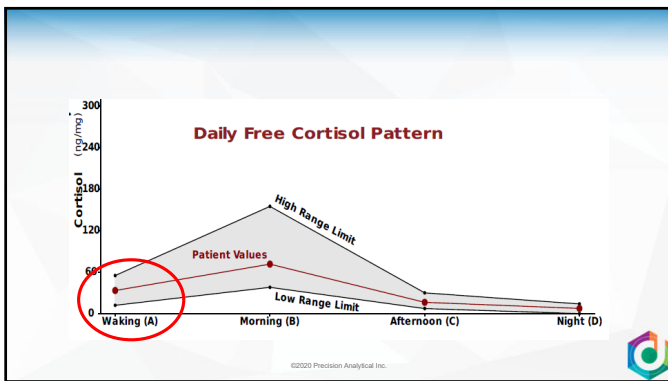
---

---

---

---

---



108

---

---

---

---

---

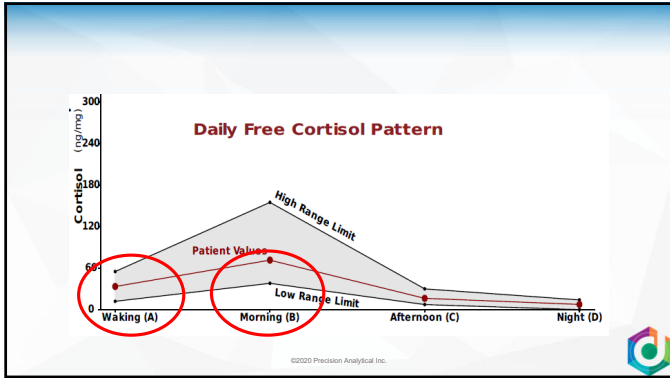
---

---

---

---

---



109

---

---

---

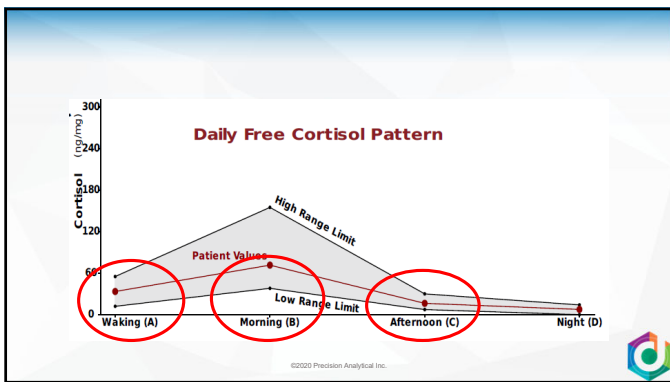
---

---

---

---

---



110

---

---

---

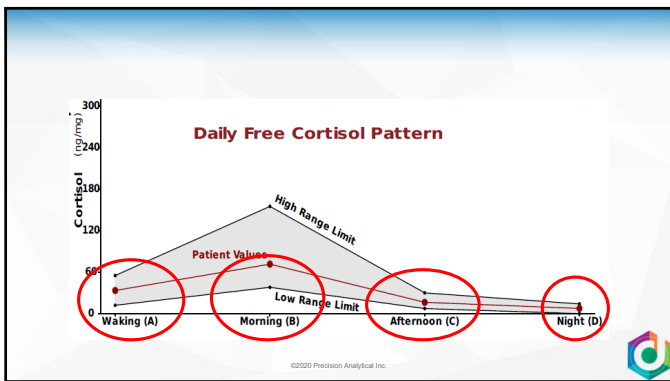
---

---

---

---

---



111

---

---

---

---

---


---

---

---

### Comprehensive Testing Options

- DUTCH Plus (dried urine + saliva)
  - 4 dried urine samples + 5-6 salivary samples
  - Progesterone metabolites
  - Androgens and androgen metabolites
  - Estrone, Estradiol and Estriol
  - Estrogen metabolites (Phase 1 and 2 metabolism)
  - Metabolized cortisol
  - Free cortisol and free cortisone levels
  - Free cortisol and free cortisone patterns – focusing on the cortisol awakening response (CAR)
  - Overnight insomnia sample
  - MMA, KYN, XAN, Pyroglutamate
  - Neurotransmitter metabolites: HVA, VMA
  - 8-OHdG (DNA Damage)



**DUTCH Plus**

©2020 Precision Analytical Inc.

112

---

---

---

---

---

---

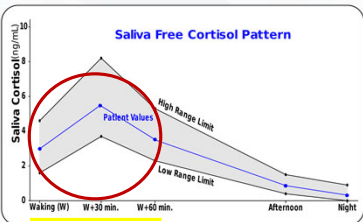
---

---

---

---

### What Does the Whole Curve Look Like?



**Saliva Free Cortisol Pattern**

Saliva Cortisol (ng/ml)

Waking (W) W +30 min. W +60 min. Afternoon Night

High Range Limit

Low Range Limit

Fathead Values

©2020 Precision Analytical Inc.

113

---

---

---

---

---

---

---

---

---

---

### Addressing the HPA Axis

- Start with the brain
- Consider adaptogens, B vitamins and Vitamin C
- Remember cortisol is made (mostly) in the mitochondria
- Use the light and dark for circadian rhythm entrainment and resetting
- Consider all therapeutic recommendations to be within the first 30min of waking to affect the CAR
- Work on coping strategies for feelings of fear, threat, and burnout

©2020 Precision Analytical Inc.

114

---

---

---

---

---

---

---


---

---

---

**Address Estrogen**

©2020 Precision Analytical Inc.



115

---

---

---

---

---

---


---

---

**★ Estrogen Metabolism** ♂♀

**Learn it as phase 1 → 2 →(2.5)→3**  
**Address it as phase 3 → (2.5) → 2 →1**

©2020 Precision Analytical Inc.



116

---

---

---

---

---

---

---


---

**★ Estrogen Metabolism**

**Learn it as phase 1 → 2 →(2.5)→3**  
**Address it as phase 3 → (2.5) → 2 →1**

**Don't just put everyone on DIM or I3C.**  
 They are specific for phase 1 estrogen detoxification.  
 They will mainly upregulate CYP1A1.  
 Phase 2 & 3 must be open first!

©2020 Precision Analytical Inc.



117

---

---

---

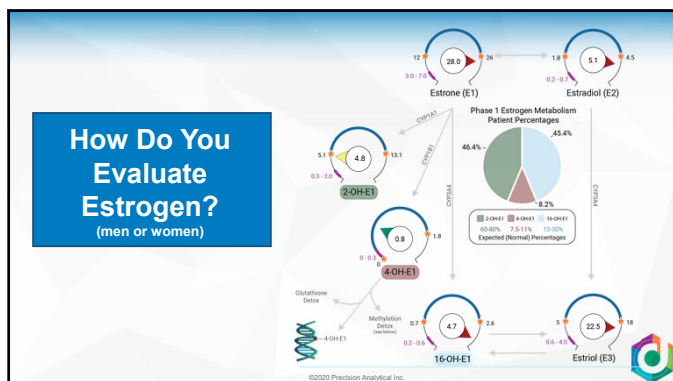
---

---

---

---

---



118

---

---

---

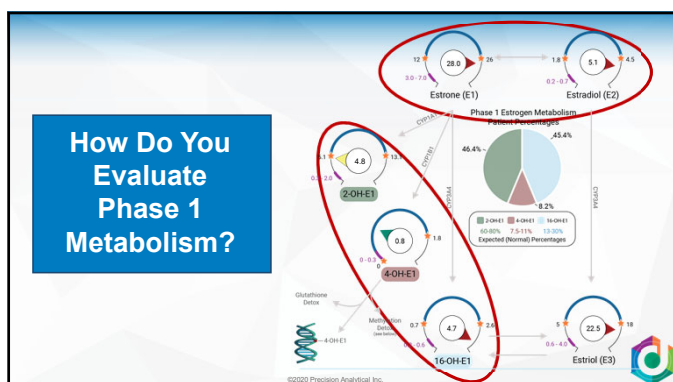
---

---

---

---

---



119

---

---

---

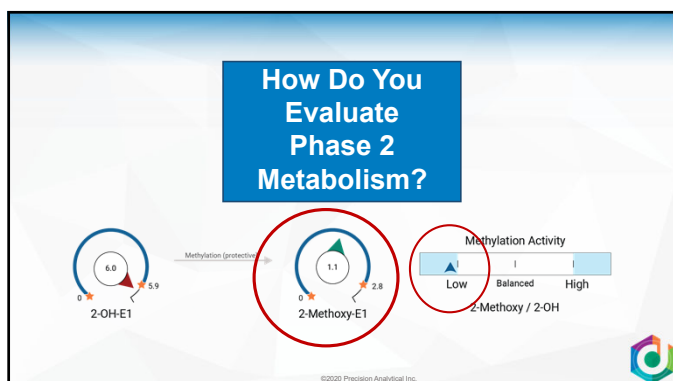
---

---

---

---

---



120

---

---

---

---

---

---

---

---



## Phase-2 Requires COMT and Methyl Donors

### Examples:

- Magnesium
- SAmE
- Tri-methyl-glycine
- Methionine
- Choline
- Methylated B vitamins
- Zinc

©2020 Precision Analytical Inc.



121

---

---

---

---

---

---

---

---

## What Slows Down/Affects COMT?

- **COMT mutation (+/+)**
- **Being estrogen dominant**
  - Even elevated estrogen catechols
- **Gut infections**
  - Phenols from gut bacteria
- **Certain Phenols from foods/supplements**
  - Green tea, quercetin
- **High levels of SAH (blocks methyltransferases)**
  - Consider Sam/SAH ratio
- **Bisphenol and PCB exposure**
- **Serotonin can competitively block SAM receptors in COMT**
- **COMT inhibitors**
  - Medications
- **Really anything that affects the methionine cycle**

©2020 Precision Analytical Inc.



122

---

---

---

---

---

---

---

---

## Citations

- Cavaliere EL, Rogan EG. Is bisphenol A a weak carcinogen like the natural estrogens and diethylstilbestrol? IUBMB life. 2010; 62(10):746-51. [pubmed]
- Tsao D, Wieskopf JS, Rashid N, et al. Serotonin-induced hypersensitivity via inhibition of catechol O-methyltransferase activity. Molecular pain. 2012; 8:25. [pubmed]
- van Duursen MB, Sanderson JT, de Jong PC, Kraaij M, van den Berg M. Phytochemicals inhibit catechol-O-methyltransferase activity in cytosolic fractions from healthy human mammary tissues: implications for catechol estrogen-induced DNA damage. Toxicological sciences : an official journal of the Society of Toxicology. 2004; 81(2):316-24. [pubmed]
- Wang P, Heber D, Henning SM. Quercetin increased bioavailability and decreased methylation of green tea polyphenols in vitro and in vivo. Food & function. 2012; 3(6):635-42. [pubmed]

©2020 Precision Analytical Inc.



123

---

---

---

---

---



---

---

---

### Support Phase 3: Estrobolome

- Address the gut microbiome
- Diet: increase fruits, vegetables, fiber
- Avoid the 'standard western diet'
- Be selective with antibiotic use
- Reduce or eliminate alcohol
- Avoid and minimize toxicants
- Consume prebiotics/resistant starches
- Consider probiotics
- Consider calcium-d-glucarate (CDG) supplementation

©2020 Precision Analytical Inc.

124

---

---

---

---

---


---

---

---

### Citations: Estrogen

- Aggarwal S, Thareja S, Verma A, Bhardwaj TR, Kumar M. An overview on 5 $\alpha$ -reductase inhibitors. *Steroids*. 2010 Feb;75(2):109-53. doi: 10.1016/j.steroids.2009.10.005.
- Eng ET, Ye J, Williams D, et al. Suppression of estrogen biosynthesis by procyanidin dimers in red wine and grape seeds. *Cancer research*. 2003; 63(23):8516-22. [[pubmed](#)]
- Cabeza M, Heuze I, Bratoeff E, Murillo E, Ramirez E, Lira A. New progesterone esters as 5 $\alpha$ -reductase inhibitors. *Chem Pharm Bull (Tokyo)*. 2001 Sep;49(9):1081-4.
- Lephart ED. Modulation of Aromatase by Phytoestrogens *Enzyme Research*. 2015; 2015:1-11.
- Matsuda T, Abe H, Suda K. [Relation between benign prostatic hyperplasia and obesity and estrogen]. *Rinsho Byori. The Japanese Journal Of Clinical Pathology*. April 2004;52(4):291-294.
- Schulster M, Bernie AM, Ramasamy R. The role of estradiol in male reproductive function. *Asian journal of andrology*. . 18(3):435-40. [[pubmed](#)]



©2020 Precision Analytical Inc.

125

---

---

---

---

---


---

---

---

## Estrogen and Progesterone Deficiency

### In Women



©2020 Precision Analytical Inc. 126

126

---

---

---

---

---

---

---

---

### Estrogen Deficiency in Women

- Address the Cause
- Refer to the brain slides = communication
- Refer to the mitochondria slides
- Ovarian glandulars
- DHEA if warranted
- Estrogen replacement if warranted

©2020 Precision Analytical Inc. 127

127

---

---

---

---

---

---

---

---

### Estrogen Deficiency in Women

**Supportive herb examples:**

- Withania somnifera – 200-1000mg
- Chaste tree (vitex) – 100-400mg
- Angelica sinensis – 50-500mg
  - Consider days 1-12
- Cimicifuga racemose – 120-500mg
  - Done days 1-12
- Tribulus (Bulgarian) – 500-1000mg/day or days 5-14
- Genestein and Daidzein (isoflavones)
- Shatavari – 250-1500mg/day

©2020 Precision Analytical Inc. 128

128

---

---

---

---

---

---

---

---

### Addressing Low Progesterone in Women

**1. Are they ovulating?**

- Address the cause
- No pain medications within 10 days of ovulation
- See brain support slides
- Consider acupuncture/abdominal body work
- Chaste tree berry (Vitex) – 100-400mg/day
- Vitamin B6(P5P) – 25-50mg/day
- Tribulus terrestris extract – 500-1000mg/day (or days 5-14)
- Withania somnifera – 200-1000mg
- Mitochondrial support
- Consider ovarian glandulars

©2020 Precision Analytical Inc. 129

129

---

---

---

---

---

---


---

---

## Addressing Low Progesterone

1. Are they ovulating?
2. **Can they produce progesterone?**
  - Address the cause – LH pulses are still needed here
    - See brain slides
  - Oils for cellular health
    - Omega 3 fatty acids
    - Evening primrose and borage oil
  - Carotenoids (lutein cells!)
    - Beta-cryptoxanthin – research is mixed
  - Other anti-oxidant support
  - Mitochondrial support
  - Ovarian glandulars
  - Progesterone HRT

©2020 Precision Analytical Inc. 130



130

---

---

---

---

---

---


---

---

## Progesterone and GABA?

- GABA = primary inhibitory neurotransmitter
- **GABA Supplementation:** Originally thought not to cross the blood brain barrier but some recent research is questioning that or is suspecting that exogenous GABA stimulates the enteric nervous system that then stimulates the CNS to make GABA
- **Consider GABA support:**
  - GABA – 500-1000mg
- **Oral/sublingual progesterone and pregnenolone** → ALLO → support GABA-A receptors

Boonstra E, de Kleijn R, Colzato LS, Alkemade A, Forstmann BU, Nieuwenhuis S. Neurotransmitters as food supplements: the effects of GABA on brain and behavior Front Psychol. 2015; 6. ©2020 Precision Analytical Inc.



131

---

---

---

---

---


---

---

---

# Aromatase in Men

©2020 Precision Analytical Inc.



132

---

---

---

---

---

---


---

---

## Aromatase Inhibitors

- **Medications:**
  - Anastrozole or Letrozole
- **Supplements:**
  - Apigenin and other flavonoids
  - White Button Mushroom (Agaricus)
  - Chrysin
  - Genistein
  - Grape Seed Extract
  - Red Wine Procyanadin Dimers

©2020 Precision Analytical Inc. 133



133

---

---

---

---

---

---


---

---

## Citations

- Akhtari E, Raisi F, Keshavarz M, et al. Tribulus terrestris for treatment of sexual dysfunction in women: randomized double-blind placebo - controlled study DARU J Pharm Sci. 2014; 22(1).
- Arentz S, Abbott JA, Smith CA, Bensoussan A. Herbal medicine for the management of polycystic ovary syndrome (PCOS) and associated oligo/amenorrhoea and hyperandrogenism: a review of the laboratory evidence for effects with corroborative clinical findings. BMC complementary and alternative medicine. 2014; 14:S11. [pubmed]
- European Medicines Agency. Assessment report on Angelica sinensis (oliv.) Diels, radix. 2013. [https://www.ema.europa.eu/en/documents/herbal-report/final-assessment-report-angelica-sinensis-oliv-diels-radix-first-version\\_en.pdf](https://www.ema.europa.eu/en/documents/herbal-report/final-assessment-report-angelica-sinensis-oliv-diels-radix-first-version_en.pdf)
- Lans C, Taylor-Swanson L, Westfall R. Herbal fertility treatments used in North America from colonial times to 1900, and their potential for improving the success rate of assisted reproductive technology. Reproductive biomedicine & society online. 2018; 5:60-81. [pubmed]
- Nasimi Doost Azgomi R, Zomorodi A, Nazemiyeh H, et al. Effects on Reproductive System: A Systematic Review of the Available Evidence. Biomed research international. 2018; 2018:4076430. [pubmed]

©2020 Precision Analytical Inc. 134



134

---

---

---

---

---


---

---

---

# Androgens in Women

©2020 Precision Analytical Inc.



135

---

---

---

---

---

---

---


---

### Improve Androgens in Women

- **Remember androgens come from the ovaries and adrenals**
- Regular HIIT training/resistance training/weightlifting
- Proper sleep
- Support the mitochondria

**Supplements:**

- Zinc: dose depending
- Maca: 750-3000mg/day
- Tribulus: 500-1000mg/day or 5-14 depending
- Shatavari: 250mg twice/day
- Tongkat Ali: 50-100mg/day
- Pine Pollen: 500-2000mg/day
- Consider DHEA and/or testosterone HRT



©2020 Precision Analytical Inc. 136

136

---

---

---

---

---

---

---

---

## Androgens in Men

©2020 Precision Analytical Inc.

137

---

---

---

---

---

---

---

---

### Primary Hypogonadism

- Origin: Testes
- High LH
- Low T

### Secondary Hypogonadism

- Origin: Pituitary
- Low or Low Normal LH
- Low T

### Mixed Hypogonadism

- Dual origin: testes, hypothalamic-pituitary
- Low T, mild increase LH/FSH (can vary)

©2020 Precision Analytical Inc.

138

---

---

---

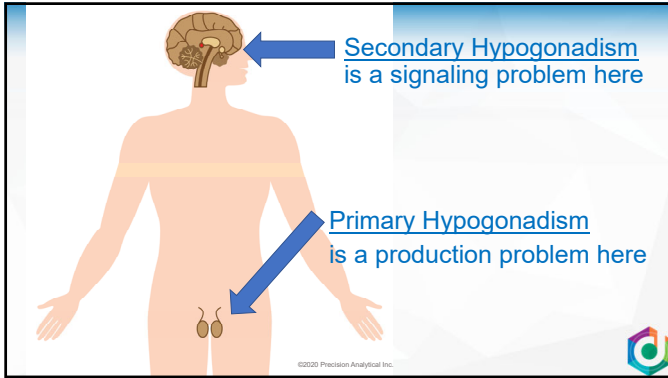
---

---

---

---

---



139

---

---

---

---

---

---

---

---

### Address the Potential Root Causes

- Age
- Diabetes
- Elevated SHBG
- Hypothyroidism
- TBI (male patients in violent sports are at risk)
- Zinc deficiency (gut issues, malabsorption)
- Regular alcohol or THC use
- Removed testicle
- Environmental exposure
- Obesity
- Stress and/or sleep deprivation (T is made most in sleep)
- Medications (opioids, anabolic steroids)
- Increased conversion to estrogen (aromatization)

©2020 Precision Analytical Inc.

140

---

---

---

---

---

---

---

---

### Potential Root Causes – Less Common

- Testicular infarction
- Space occupying lesion to pituitary or hypothalamus
- Infarction affection pituitary or hypothalamus
- Decreased blood flow to the glands
- Radiation to the groin area, chemo at large

©2020 Precision Analytical Inc.

141

---

---

---

---

---


---

---

---

### Low Testosterone: Treatment

- Address the cause!
  - Exercise (lift weights, HIIT), Lifestyle, Sleep, Diet
- Conventional:
  - Testosterone replacement therapy
  - HCG (acts like LH)
  - Clomid (Estrogen modulator to increase LH/FSH)

©2020 Precision Analytical Inc. 

142

---

---

---

---

---


---

---

---

### Low Testosterone: Natural Treatment

- **Micronutrients-**
  - Zinc
  - Vit D
  - B-complex
  - Mitochondrial support
  - Vitamin A, C and E
  - Selenium

©2020 Precision Analytical Inc. 

143

---

---

---

---

---

---

---

---

### Low Testosterone: Natural Treatment

- **Botanicals-**
  - Tribulus?
  - Maca?
  - Long Jack (*Eurycoma longifolia*)
  - Fenugreek
  - Mucuna
  - Ashwagandha
  - Black Seed

©2020 Precision Analytical Inc. 

144

---

---

---

---

---

---

---

---



### Citations: Testosterone

- Heitor O. Santos et al. Beyond tribulus (Tribulus terrestris L.): The effects of phytotherapics on testosterone, sperm and prostate parameters. Journal of Ethnopharmacology Volume 235, 10 May 2019, Pages 392-405
- Izquierdo M, et al. J App Physiol 2001;90(4):1497-1507
- Li J, Gao R, Li S, Wang J, Tang Z, Xu S. Testicular toxicity induced by dietary cadmium in cocks and ameliorative effect by selenium. Biometals: An International Journal On The Role Of Metal Ions In Biology, Biochemistry, And Medicine. August 2010;23(4):695-705.
- Pilz S, Frisch S, Koertke H, et al. Effect of Vitamin D Supplementation on Testosterone Levels in Men. Hormone and Metabolic Research. 2010;43(03):223-225.
- Ren X, Wang G, Cai Y, et al. The protection of selenium on cadmium-induced inhibition of spermatogenesis via activating testosterone synthesis in mice. Food And Chemical Toxicology: An International Journal Published For The British Industrial Biological Research Association. October 2012;50(10):3521-3529
- Netter A, et al. Arch Androl 1981; 7(11): 69-73.
- Tikkiwal M, et al. Ind J Phys Pharm 1987 Jan-Mar; 31(1):30-34.
- Takihara H, et al. Urology 1987 Jun; 29(6): 638-641.
- Netter A, et al. Arch Androl 1981; 7(11): 69-73.

©2020 Precision Analytical Inc. 145

---

---

---

---

---

---

---

---

---

---

145

## Oxytocin Men and Women

©2020 Precision Analytical Inc.

---

---

---

---

---

---

---

---

---

---

146

### What Increases Oxytocin?

- Physical touch
  - Hugging, kissing, cuddling those you love (including pets)
- Words of encouragement and appreciation
- Genuine laughing – not just LOL
- Meditation and prayer
- “Eat, drink and be merry” with your friends and family
- Breastfeeding
- Sexual self stimulation
- Orgasm (in general)

©2020 Precision Analytical Inc.

---

---

---

---

---

---

---

---

---

---

147

# Serotonin and Dopamine

## In Men and Women

©2020 Precision Analytical Inc.

148

---

---

---

---

---

---

---

---

### Balance Serotonin

- **Low Serotonin**
  - Depression, anxiety
  - Address the estrogen (high or low) and testosterone (low)
  - 5HTP – 25-300mg/day
    - watch for anti-depressant use, don't deplete dopamine (same enzyme)
- **High Serotonin**
  - Decreases the ability of the excitatory systems to turn on/work – via the hydroxylases
  - Think women/men on SSRIs, Serotonin based migraine medications, some pain meds like fentanyl and tramadol, supplements to raise serotonin
  - Hard to tell on functional testing because it's mostly made in the gut
    - Roberts KM, Fitzpatrick PF. Mechanisms of tryptophan and tyrosine hydroxylase. *JBBMB Life*. 2013; 65(4):350-357.

©2020 Precision Analytical Inc.

149

---

---

---

---

---


---

---

---

### Crocus sativus L. (Saffron)

- Studies on the heart, mood, PMS and libido
- Esp. for those on an SSRI
- 15-30mg concentrate
- 150-300mg whole plant
- It should be a deep red in color!



• Ann Hausenblas H, Heekin K, Mutchie HL, Anton S. A systematic review of randomized controlled trials examining the effectiveness of saffron (Crocus sativus L.) on psychological and behavioral outcomes. *Journal of Integrative Medicine*. 2015; 13(4):231-240.  
 • Croft HA. Understanding the Role of Serotonin in Female Hypoactive Sexual Desire Disorder and Treatment Options. *The Journal of Sexual Medicine*. 2017; 14(12):1575-1584.  
 • Kashani L, Raisi F, Saroukhani S, et al. Saffron for treatment of fluoxetine-induced sexual dysfunction in women: randomized double-blind placebo-controlled study. *Hum. Psychopharmacol Clin Exp*. 2013; 28(1):54-60.

©2020 Precision Analytical Inc.

150

---

---

---

---

---


---

---

---

### Trying to Increase Dopamine?

- Manage your stress, sugar, drinking...etc. vices – they work in the short term but could result in long term downregulation of dopamine
- Exercise regularly
- Get passionate about something
- Find your passion with your partner – rediscover each other, be spontaneous, go on vacation without the kids, mix things up in the bedroom, get out of the rut
- Supplements to consider:
  - DLPA – 500-3000mg/day
  - Acetyl-L-Tyrosine – 500-2000mg/day
  - Macuna pruriens – 500-100mg/day



©2020 Precision Analytical Inc.

151

---

---

---

---

---


---

---

---

### Summary

- The libido has a brake and accelerator
- Everything involves context
- Hormones might play a big role in libido
- Stress, fear, & survival negatively impact hormonal outputs and libido of both men and women
- Test don't guess – know your patient's levels to be personalized
- There is no magic pill for libido
- ...but a solid night of sleep goes a long way towards feeling refreshed and resilient (and increases testosterone in men!)



©2020 Precision Analytical Inc.

152

---

---

---

---


---

---

---

---

### \*Remember practitioners, you have to take care of YOU first...



**Me trying to excel in my career, maintain a social life, drink enough water, exercise, text everyone back, stay sane, survive and be happy**

©2020 Precision Analytical Inc.

153

---

---

---

---

---

---


---

---


**Need more resources?**  
Ensure you have an account!

- Contact Customer Service at 503.687.2050 or go to <https://dutchtest.com/providers/> to open your account today!

**BECOME A PROVIDER TODAY!**



Receive 50% off up to five test kits when you sign up



© 2020 Precision Analytical Inc.

154

---

---

---

---

---


---

---



---

**...and that concludes our talk**  
Thank you for listening.

Lecture questions?  
[info@dutchtest.com](mailto:info@dutchtest.com)



*Like Us, Follow Us, or Leave a Review!*  
<https://www.facebook.com/dutchtest>  
<https://twitter.com/DutchTestLab>  
<https://www.linkedin.com/company/10883377>  
<https://www.instagram.com/dutchtest/>  
<https://www.youtube.com/channel/UCauTDzKu4VS74PMiYgda-PQ>



© 2020 Precision Analytical Inc.

155

---

---

---

---

---

---

---

---