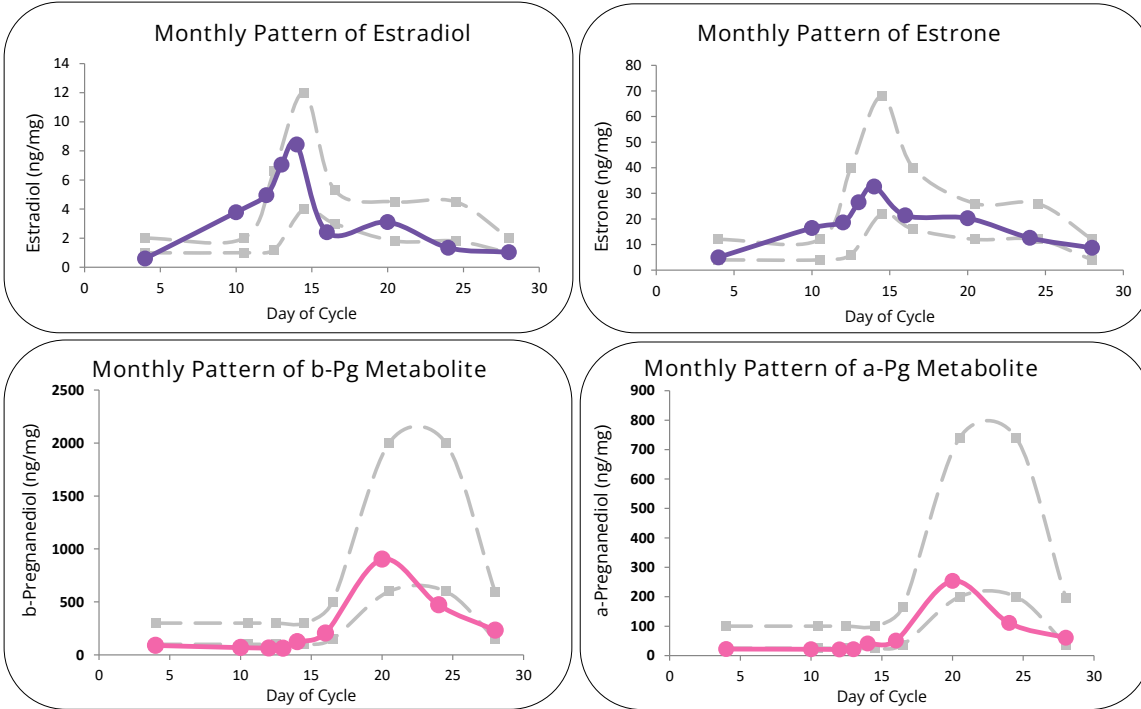


Estrogen (E) patterns can be seen below in green. Progesterone (Pg) patterns can be seen below in purple. Normal ranges are within the gray dashed lines. See page 2 for more information.



All values given in ng/mg creatinine

Measurement	1	2	3	4	5	6	7	8	9
Day(s) of Cycle	4	10	12	13	14	16	20	24	28

The days listed above were used for measurements. Two samples are used and listed for long cycles or patients without a normal cycle.

Estradiol (E2)	0.60	3.78	4.95	7.06	8.43	2.40	3.10	1.34	1.03
Estrone (E1)	5.0	16.5	18.6	26.5	32.7	21.4	20.3	12.6	8.7
a-Pregnanediol	22	22	21	21	41	51	253	111	60
b-Pregnanediol	89	69	64	63	124	206	902	471	232
b-Pregnanediol/E2 Ratio	149	18	13	9	15	86	291	351	225
Creatinine		1.58	1.48	1.56	1.60	1.09	0.94	1.33	1.07

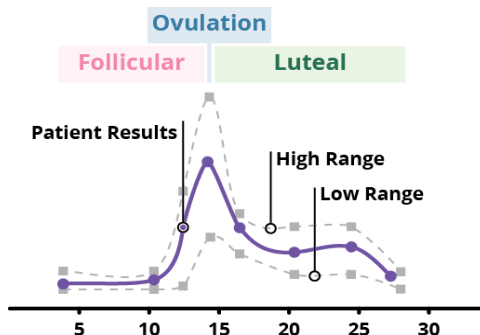
Sample (#7) with the highest b-Pg value (902) is used for E and Pg metabolites for DUTCH Complete or Plus if ordered.

Normal Ranges	Follicular	Ovulatory	Luteal	Postmenopausal
Estradiol	1-2ng/mg	4-12ng/mg	1.8-4.5ng/mg	0.2-0.7ng/mg
Estrone	4-12ng/mg	22-68ng/mg	12-26ng/mg	1.0-7.0ng/mg
a-Pregnanediol	25-100ng/mg	25-100ng/mg	200-740ng/mg	15-50ng/mg
b-Pregnanediol	100-300ng/mg	100-300ng/mg	600-2000ng/mg	60-200ng/mg

b-Pregnanediol/E2 ratio is typically 50-300 in the follicular phase, <100 during ovulation, and 100-500 in the luteal phase. Creatinine normal range, 0.2-2.0 mg/mL. Values outside this range may be less certain due to under or overhydration.

Thank you for testing with us! If this is your first report, you are encouraged to watch our educational videos on how to read the report at www.dutchtest.com in the [video library](#). The comments below include general information that we hope you will find useful in your understanding of the patient's results. These results and comments are not intended to diagnose any specific conditions.

You'll find four stacked graphs with the reference ranges and the patient's results mapped out. The top graphs represent estrogen (E) production, and the bottom graphs represents progesterone (Pg) production. The horizontal axis shows the cycle days (0-30+) and the vertical axis shows hormone concentration or hormone metabolites being measured. Healthy cycles typically range from 21-35 days. The patient likely submitted many samples over one cycle, and we have selected the 9 most relevant measurements. Some measurements from longer cycles are from two-day averages to ensure transitory E and Pg peaks are not missed.

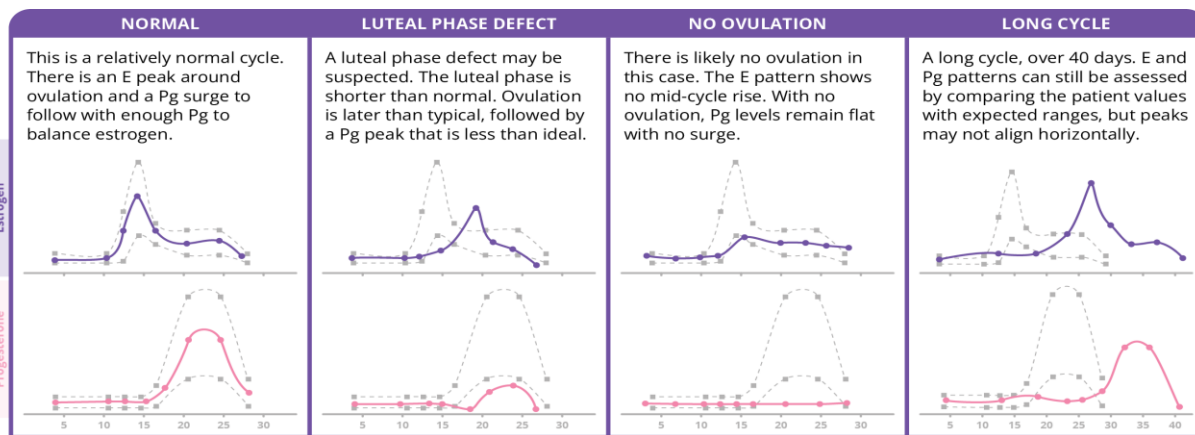


For most cycles <34 days, measurements are made from single days, selected to best represent overall patterns of ovulatory & luteal peaks. The day 4 sample set is usually collected at the end of the cycle, four days after menses (used for DUTCH Complete/Plus), but is plotted at the beginning of the cycle as above. If a DUTCH Complete or Plus was ordered, data for the E and Pg metabolite values are taken from the day on the Cycle Mapping associated with the progesterone (b-pregnanediol) peak in the luteal phase.

The first part of the cycle (days 1-14) is the "follicular phase," ovulation typically occurs mid-cycle, and the "luteal phase" refers to the 2nd half of the cycle (days 14 until menses). These phases may shift in patients with atypical cycle lengths. Levels may still be considered normal in short or long cycles even if the timing of the E or Pg peaks are at different times.

In the top graphs, we follow both primary estrogens, estrone (E1) and estradiol (E2). In a typical cycle, estrogen rises in the follicular phase, which stimulates the luteinizing hormone (LH) surge from the brain about 24-36 hours before ovulation, which leads to the production of Pg the second half of the cycle (measured by its primary pregnanediol metabolites). Pg rises only after ovulation has occurred, reaching its peak 5-7 days later, then begins to decrease before the onset of menses. When Pg does not rise it indicates that the patient is likely not ovulating. A weak rise in Pg can also indicate either no ovulation or a weak corpus luteum (luteal phase defect), which is associated with poor egg maturation, difficulty maintaining a secretory endometrium and infertility. Ranges for Pg are similar for a postmenopausal woman or a cycling woman who is in the follicular phase. In the table near the bottom of page 1 below the graphs, the patient's results are displayed in a table. This includes creatinine, which is used to correct for hydration. If creatinine is very low or very high, hormone measurements from that day may be less reliable.

Below are four different cycle patterns that may help with interpretation ([video tutorial here](#))

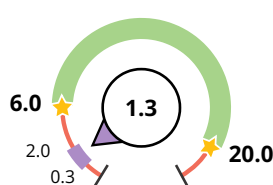
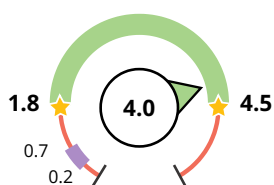


Ordering Provider:

Precision Analytical

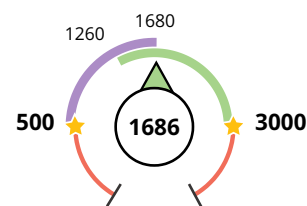
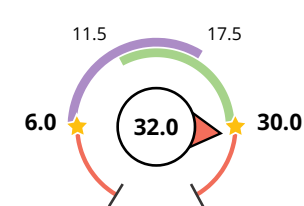
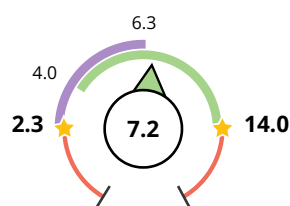
Hormone Testing Summary

ESTROGEN & PROGESTERONE



Serum Equivalent*, ng/mL

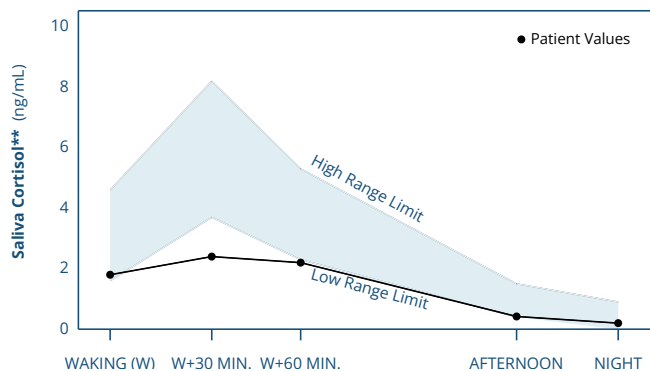
ANDROGENS



DHEA-S + Etiocholanolone + Androsterone

CORTISOL

Saliva Free Cortisol Pattern



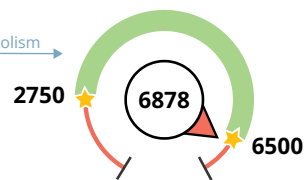
Cortisol Clearance Rate

THF + THE / Cortisol + Cortisone



Sum of 5 values

Cortisol Metabolism



Total Cortisol Production (THF + THE)

Optimal Luteal Range Postmenopausal Range Out of Range Edge of Range

*Progesterone Serum Equivalent is a calculated value based on urine pregnanediol.

**Free cortisol best reflects tissue levels. Metabolized cortisol best reflects total cortisol production.

**Accession # 01035994**Female Sample Report
123 A Street
Sometown, CA 90266**DOB:** 1976-01-01**Age:** 46**Sex:** Female**Last Menstrual Period:****Collection Times:**2022-06-13 04:00AM (S)
2022-06-13 04:30AM (S)
2022-06-13 05:00AM (S)
2022-06-13 03:00PM (S)
2022-06-13 08:00PM (S)

2022-06-13 04:00AM (U)
2022-06-13 06:00AM (U)
2022-06-13 03:00PM (U)
2022-06-13 08:00PM (U)**Ordering Provider:**

Precision Analytical

Sex Hormones & Metabolites

TEST		RESULT	UNITS	LUTEAL*	POSTMENOPAUSAL
Progesterone Metabolites (Urine)					
b-Pregnanediol	Below luteal range	100.0	ng/mg	600 - 2000	60 - 200
a-Pregnanediol	Below luteal range	49.0	ng/mg	200 - 740	15 - 50
Estrogens and Metabolites (Urine)					
Estrone (E1)	High end of luteal range	24.01	ng/mg	12 - 26	1.0 - 7.0
Estradiol (E2)	High end of luteal range	4.00	ng/mg	1.8 - 4.5	0.2 - 0.7
Estriol (E3)	High end of luteal range	16.0	ng/mg	5 - 18	0.6 - 4.0
2-OH-E1	Below luteal range	3.58	ng/mg	5.1 - 13.1	0.3 - 2.0
4-OH-E1	Within luteal range	1.20	ng/mg	0 - 1.8	0 - 0.3
16-OH-E1	Above luteal range	2.80	ng/mg	0.7 - 2.6	0.2 - 0.6
2-Methoxy-E1	Below luteal range	1.35	ng/mg	2.5 - 6.5	0.3 - 1.4
2-OH-E2	Within luteal range	0.74	ng/mg	0 - 3.1	0 - 0.52
4-OH-E2	Within luteal range	0.41	ng/mg	0 - 0.52	0 - 0.12
Total Estrogen	Within range	54.1	ng/mg	35 - 70	3.5 - 15
Metabolite Ratios (Urine)					
2-OH / 16-OH-E1 Balance	Below range	1.28	ratio	2.69 - 11.83	
2-OH / 4-OH-E1 Balance	Below range	2.98	ratio	5.4 - 12.62	
2-Methoxy / 2-OH Balance	Below range	0.38	ratio	0.39 - 0.67	
Androgens and Metabolites (Urine)				Range	
DHEA-S	Below range	16.0	ng/mg	20 - 750	
Androsterone	Within range	1195.0	ng/mg	200 - 1650	
Etiuchanolone	Within range	474.6	ng/mg	200 - 1000	
Testosterone	Within range	7.16	ng/mg	2.3 - 14	
5a-DHT	High end of range	6.2	ng/mg	0 - 6.6	
5a-Androstanediol	Above range	32.0	ng/mg	6 - 30	
5b-Androstanediol	Within range	42.6	ng/mg	12 - 75	
Epi-Testosterone	Within range	8.6	ng/mg	2.3 - 14	

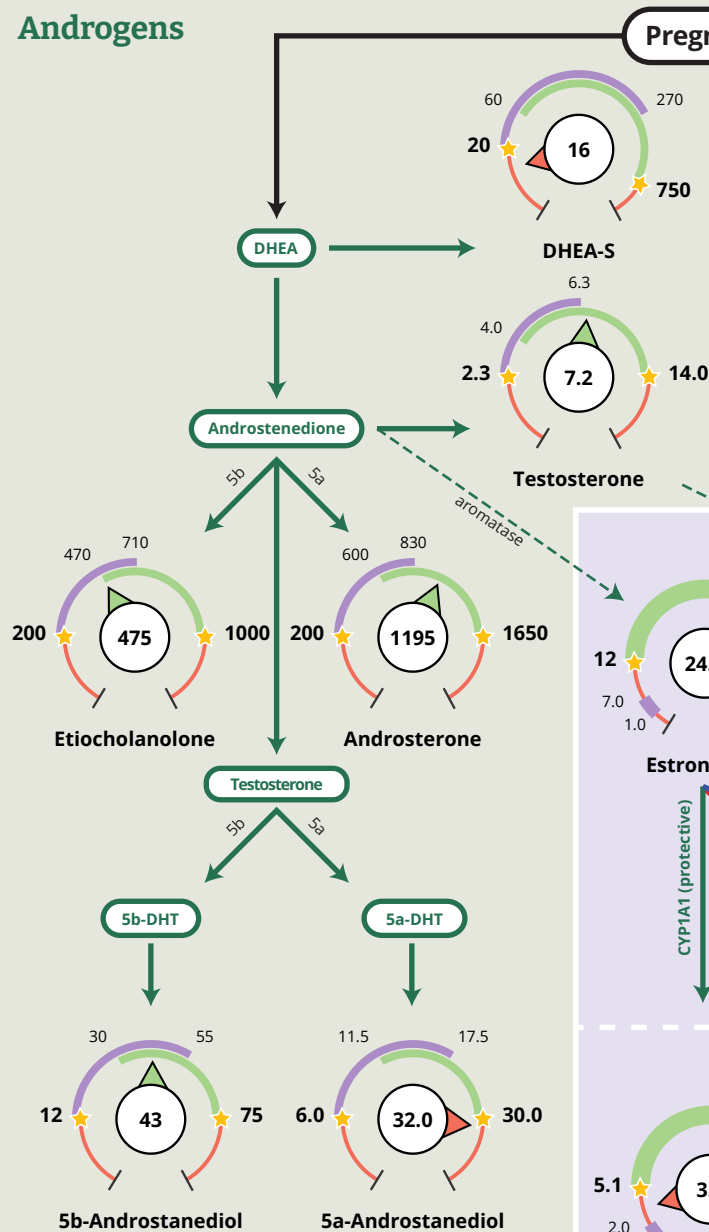
* The Luteal Range represents the expected premenopausal luteal range, collected menstrual cycle days 19-22 of a 28-day cycle. If your patient noted taking oral progesterone, the reference range represents the expected range on 100 - 200 mg of oral micronized progesterone (OMP). The ranges in the table 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

SEX HORMONES & METABOLITES

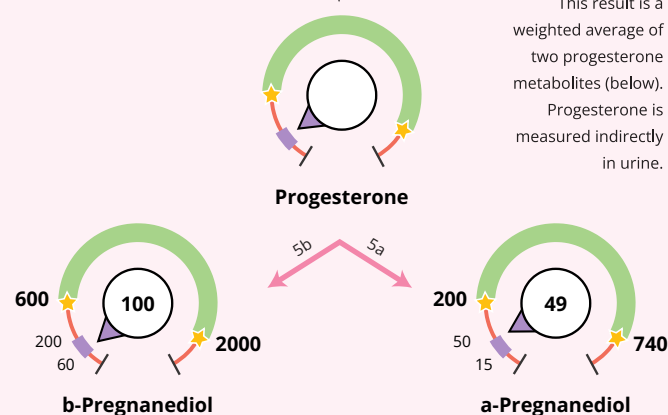
● Optimal Luteal Range ● Postmenopausal Range ● Out of Range ★ Edge of Range

Androgens

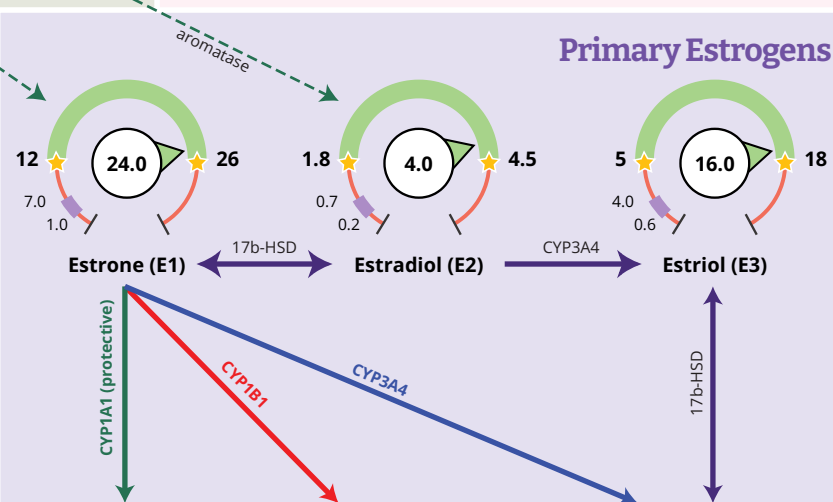


Progesterone

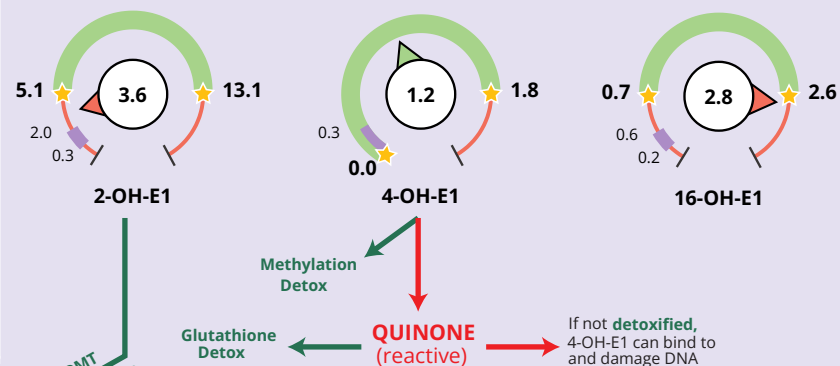
This result is a weighted average of two progesterone metabolites (below). Progesterone is measured indirectly in urine.



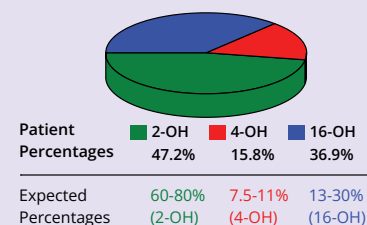
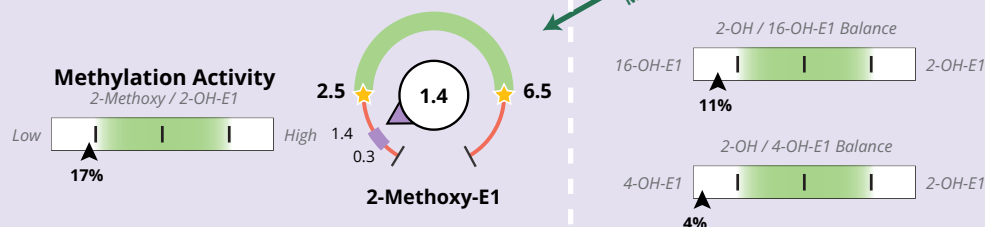
Primary Estrogens



Phase 1 Estrogen Metabolism



Phase 2 Estrogen Metabolism



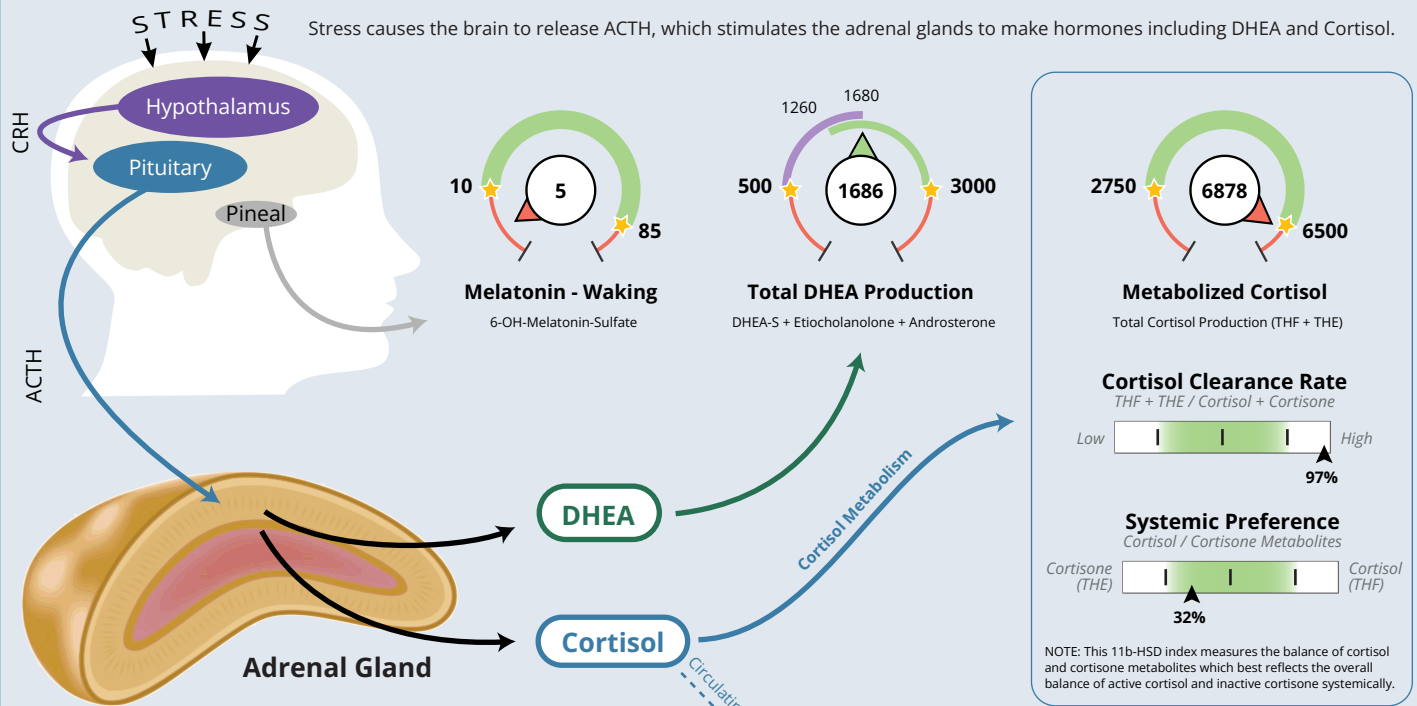
**Accession # 01035994**Female Sample Report
123 A Street
Sometown, CA 90266**DOB:** 1976-01-01**Age:** 46**Sex:** Female**Last Menstrual Period:****Collection Times:**2022-06-13 04:00AM (S)
2022-06-13 04:30AM (S)
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2022-06-13 08:00PM (S)
2022-06-13 01:00AM (S*)
2022-06-13 04:00AM (U)
2022-06-13 06:00AM (U)
2022-06-13 03:00PM (U)
2022-06-13 08:00PM (U)**Ordering Provider:**

Precision Analytical

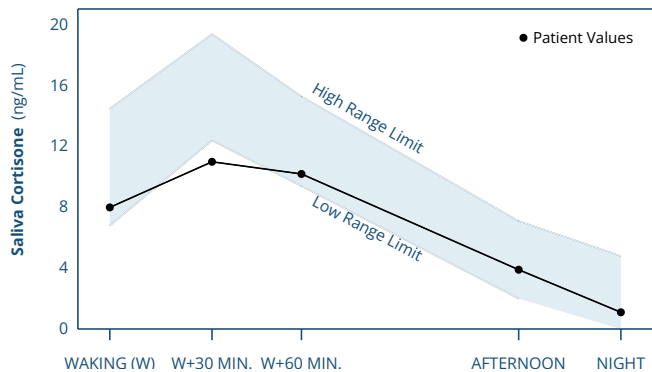
Adrenal Hormones & Metabolites

TEST		RESULT	UNITS	NORMAL RANGE
Free Cortisol and Cortisone (Saliva)				
Saliva Cortisol - Waking (W)	Low end of range	1.80	ng/mL	1.6 - 4.6
Saliva Cortisol - W+30 min.	Below range	2.40	ng/mL	3.7 - 8.2
Saliva Cortisol - W+60 min.	Below range	2.20	ng/mL	2.3 - 5.3
Saliva Cortisol - Afternoon	Low end of range	0.42	ng/mL	0.4 - 1.5
Saliva Cortisol - Night	Within range	0.20	ng/mL	0 - 0.9
Saliva Cortisone - Waking (W)	Low end of range	8.00	ng/mL	6.8 - 14.5
Saliva Cortisone - W+30 min.	Below range	11.00	ng/mL	12.4 - 19.4
Saliva Cortisone - W+60 min.	Low end of range	10.20	ng/mL	9.4 - 15.3
Saliva Cortisone - Afternoon	Within range	3.90	ng/mL	2 - 7.1
Saliva Cortisone - Night	Within range	1.10	ng/mL	0 - 4.8
Saliva Cortisol Total	Below range	7.02	ng/mL	9.6 - 19.3
Saliva Cortisone Total	Below range	34.20	ng/mL	36 - 55
Creatinine (Urine)				
Creatinine A - Waking	Within range	0.50	mg/ml	0.2 - 2
Creatinine B - Morning	Within range	0.72	mg/ml	0.2 - 2
Creatinine C - Afternoon	Within range	0.48	mg/ml	0.2 - 2
Creatinine D - Night	Within range	0.34	mg/ml	0.2 - 2
Cortisol Metabolites and DHEA-S (Urine)				
a-Tetrahydrocortisol (a-THF)	Above range	464.0	ng/mg	75 - 370
b-Tetrahydrocortisol (b-THF)	Within range	2318.9	ng/mg	1050 - 2500
b-Tetrahydrocortisone (b-THE)	Above range	4095.1	ng/mg	1550 - 3800
Metabolized Cortisol (THF + THE)	Above range	6878.0	ng/mg	2750 - 6500
DHEA-S	Below range	16.0	ng/mg	20 - 750
Cortisol Clearance Rate (CCR)	Above range	166.9		45 - 95
Additional Cortisol and Cortisone (Saliva)				
* Saliva Cortisol - Insomnia	Above range	1.10	ng/mL	0 - 0.9
* Saliva Cortisone - Insomnia	Above range	5.43	ng/mL	0 - 4.8

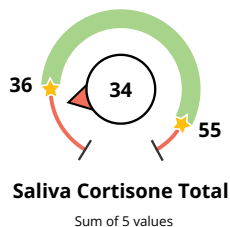
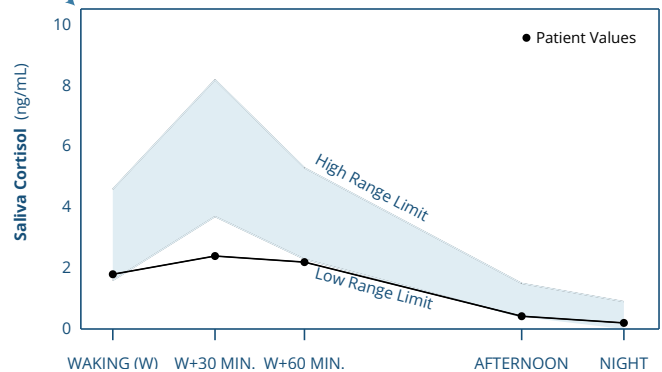
ADRENAL HORMONES & METABOLITES



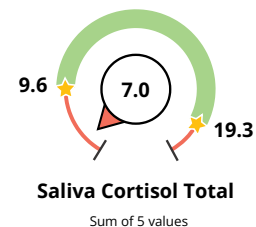
Saliva Free Cortisone Pattern



Saliva Free Cortisol Pattern



Cortisol and Cortisone interconvert (11b-HSD)



The patient submitted an Insomnia salivary sample. The cortisol result for this sample was **1.10ng/mL** (expected range 0-0.9) The cortisone result for this sample was **5.4 ng/mL** (expected range 0-4.8).

The Cortisol Awakening Response (CAR) is the rise in salivary cortisol between the waking sample and the sample collected 30 minutes later. This patient shows a waking cortisol of **1.80ng/mL** and an increase to **2.40ng/mL** after 30.0 minutes. This is an increase of **0.60ng/mL** or **33.3%**. Preliminary research shows that 50-160% or 1.5-4.0ng/mL increases are common with samples collected 30 minutes after waking. These guidelines are considered research only.

This patient shows a salivary cortisol of **2.20ng/mL** measured 60 minutes after waking. This is an increase of **0.40ng/mL** or **22.2%** compared to the waking sample. To date, data suggests that expected results may be 0-70%, and this guideline is considered for research only.



Accession # 01035994

Female Sample Report
123 A Street
Sometown, CA 90266

DOB: 1976-01-01

Age: 46

Sex: Female

Last Menstrual Period:

Collection Times:

2022-06-13 04:00AM (S)
2022-06-13 04:30AM (S)
2022-06-13 05:00AM (S)
2022-06-13 03:00PM (S)
2022-06-13 08:00PM (S)

2022-06-13 04:00AM (U)
2022-06-13 06:00AM (U)
2022-06-13 03:00PM (U)
2022-06-13 08:00PM (U)

Ordering Provider:

Precision Analytical

Organic Acid Tests (OATs)

TEST		RESULT	UNITS	NORMAL RANGE
Nutritional Organic Acids (Urine)				
Vitamin B12 Marker - May be deficient if high				
Methylmalonate (MMA)	Above range	4.9	ug/mg	0 - 2.5
Vitamin B6 Markers - May be deficient if high				
Xanthurenate	Above range	1.23	ug/mg	0.12 - 1.2
Kynurenate	Above range	5.4	ug/mg	0.8 - 4.5
Biotin Marker - May be deficient if high				
b-Hydroxyisovalerate	Within range	7.9	ug/mg	0 - 12.5
Glutathione Marker - May be deficient if low or high				
Pyroglutamate	Within range	42.0	ug/mg	28 - 58
Gut Marker - Potential gut putrefaction or dysbiosis if high				
Indican	Above range	114.0	ug/mg	0 - 100
Neuro-Related Markers (Urine)				
Dopamine Metabolite				
Homovanillate (HVA)	Within range	4.4	ug/mg	3 - 11
Norepinephrine/Epinephrine Metabolite				
Vanilmandelate (VMA)	Within range	4.3	ug/mg	2.2 - 5.5
Neuroinflammation Marker				
Quinolate	Above range	13.2	ug/mg	0 - 9.6
Additional Markers (Urine)				
Melatonin - Waking				
6-OH-Melatonin-Sulfate	Below range	5.3	ng/mg	10 - 85
Oxidative Stress / DNA Damage				
8-Hydroxy-2-deoxyguanosine (8-OHdG)	Within range	2.6	ng/mg	0 - 5.2

Clinical Support Overview

Thank you for choosing DUTCH for your functional endocrinology testing needs!

Please take a moment to read through the Clinical Support Overview below. These comments are specific to the patient's lab results. These comments are intended for educational purposes only. Specific treatment should be managed by a healthcare provider.

Please review our DUTCH resources for information on reading the DUTCH test:

For DUTCH Overviews and Tutorials, click here: <https://dutchtest.com/tutorials>

To view the steroid pathway chart, click here: <https://dutchtest.com/steroid-pathway>

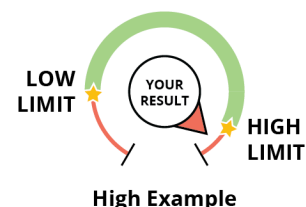
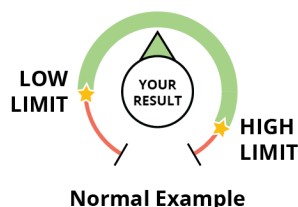
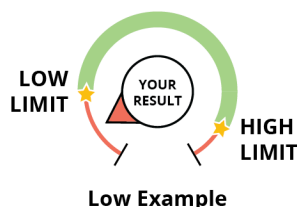
Alert Comments:

How to read the DUTCH report

This report is not intended to treat, cure or diagnose any specific diseases.

DUTCH DIALS

The graphic dials in this report are intended for quick and easy evaluation of hormone levels. The green highlighted area between the stars shows the normal range. Results below the left star and beyond the right star are shaded red representing below and above the normal range respectively. The arrow points to the patient's result and will be the color of the result status (ie red for out of range, green for in range).



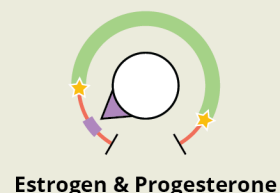
NEW! - AGE DEPENDENT RANGES

Age-dependent ranges for females are oriented around optimal **premenopausal** and **postmenopausal** levels.

For estrogen and progesterone dials, the optimal premenopausal range is captured during the luteal phase of the menstrual cycle. The premenopausal range is shown in green, and the postmenopausal range is shown in purple, with **no overlap**. Due to the dramatic decline in estrogen and progesterone during the menopausal transition, the purple band is separate on the left hand (low) side of the dial.

For female androgens, the optimal premenopausal range is not significantly affected by the phase in the menstrual cycle or menopause but declines with age more gradually. The premenopausal range is shown in green, and the postmenopausal range is shown in purple, with some overlap. Note that the arrow pointer changes color to the range it points to, with a preference for the premenopausal green when the ranges overlap.

● Optimal Luteal or Premenopausal Range ● Postmenopausal Range ● Out of Range



DUTCH SLIDERS

The graphic sliders indicate the relative ratio of the metabolites noted on the slider. The percentage stated is a population percentage. A result of 50% indicates that the ratio is higher than 50% of individuals tested, or right in the middle of the population's range. If the result is lower than 50% it will move to the left and higher than 50% will move to the right. The normal range is shaded green and out of range is shaded white.



For more information about the new slider bars, please click to read our [DUTCH Blog](#).

Patient or Sample Comments

You will find comments specific to the patient results in each section below in bulleted text. Please refer to our DUTCH resources for further information on interpreting results.

- The patient reports regular menstrual cycles.

PROGESTERONE

The progesterone dial shows the weighted average of the two main urinary metabolites of progesterone, 5b-pregnanediol and 5a-pregnanediol.

- The weighted average of the two progesterone metabolites shows that progesterone is low for the luteal phase of the menstrual cycle. The ideal collection timing for capturing peak luteal levels occurs 4-9 days before menses. The patient reports irregular cycles, so check in with the patient about the timing of sample collection in relation to menstruation. Patients with irregular cycles experience less progesterone exposure overall due to anovulatory cycles, the most common cause of irregularity. Women over 40 who are experiencing irregular cycles may be experiencing perimenopause, another common cause of irregular cycles and low progesterone.

ESTROGEN

When evaluating estrogen levels, it is important to assess the following:

Estrogen Levels

The primary ovarian hormone, estradiol (the strongest estrogen), and "total estrogen" levels should be reviewed with the appropriate reference range (premenopausal or postmenopausal). For women on HRT, check in with DUTCH resources on specific HRT types and monitoring.

Estrogen Metabolism

- The 2-OH/16-OH-E1 is low. This indicates less 2-OH and/or more 16-OH. The 2-OH is considered a beneficial phase 1 detox pathway because it is stable, anti-estrogenic, and anti-carcinogenic. But in this case there is more 16-OH-E1 which is not ideal because this pathway is more estrogenic, proliferative, and is associated with inflammation.
- The 2-OH/4-OH-E1 is low. This indicates less 2-OH and/or more 4-OH. The 2-OH is considered a beneficial phase 1 detox pathway because it is stable, anti-estrogenic, and anti-carcinogenic. But in this case there is more 4-OH-E1 which is not ideal because this pathway is unstable, can form reactive quinones that cause DNA damage, and has been associated with increased breast cancer risk.
- The methylation slider shows the patient has slow estrogen methylation. Estrogen is methylated via the COMT enzyme, which can be impacted by nutrient deficiency and COMT genetic polymorphisms. Testing for COMT gene polymorphisms may also be helpful, depending on the case.

ANDROGENS

When evaluating androgen levels, it is important to assess the following:

Androgen Levels

Review Testosterone and Total DHEA levels for insight into androgen production. While urinary testosterone levels generally agree well with serum testosterone levels, there are some cases where they do not. We recommend using serum testing to confirm a low testosterone result on the DUTCH test.

- Women aged 41-55 may be within or below the optimal premenopausal range. Symptoms plus other androgens are important for assessing if the levels are appropriate for the patient. This is the normal age for perimenopause and menopause which, for different women, can vary by years. Therefore, this age group should view the expected androgen levels with both optimal premenopausal and postmenopausal ranges in mind.

Androgen Metabolism

5a-reductase converts testosterone into 5a-DHT (DHT), which is even more potent (~3x) than testosterone. The best representation of tissue 5a-DHT and overall androgen status, is 5a-Androstenediol. Metabolites created down the 5b-pathway are significantly less androgenic than their 5a counterparts.

- The 5a-Androstenediol is high. 5a-androstenediol is a target tissue metabolite of 5a-DHT, the body's most potent androgen. 5a-androstenediol levels represent tissue 5a-DHT better than measuring 5a-DHT directly, whether in urine or serum, because 5a-DHT typically remains in target tissues until it is metabolized into 5a-androstenediol. High 5a-androstenediol indicates high tissue androgens even in the absence of high testosterone or DHEA metabolites. Review the full status of androgens, including symptoms, before considering a treatment plan. You can find more information about this [here](#).
- The DHEA-S is lower than the other major metabolites of DHEA, etiocholanolone and androsterone. DHEA-S is mostly formed in the adrenal glands via sulfation. Inflammation can block sulfation. This lowers the DHEA-S and drives the 5a & 5b-reductase enzymes, metabolizing DHEA away from DHEA-S. Consider addressing inflammation and adrenal health.

CORTISOL

Review the Cortisol Awakening Response, the percent increase from waking to 30 minutes. Next review the sum of free cortisol as an expression of overall tissue cortisol exposure.

Free Cortisol Levels

- The Saliva Cortisol Total (sum of 5 values) is low. This may indicate low overall cortisol exposure, which is associated with fatigue and poor immune function. The diurnal pattern should be reviewed carefully along with the CAR results on the Adrenal Hormones & Metabolites page. If the CAR is low, this point has a significant influence on the sum of the 5 values, as it is usually the highest point. A low CAR may be associated with short-term events like significantly disrupted sleep the night before testing or more long-term issues such as sleep apnea and chronic psychiatric illness (major depression, generalized anxiety disorder).
- The patient submitted an Insomnia salivary sample. The cortisol result for this sample was **1.10ng/mL** (expected range 0-0.9). The cortisone result was **5.4ng/mL** (expected range 0-4.8).

Cortisol Metabolism

- The Cortisol Clearance Rate is high. This indicates the level of metabolized cortisol exceeds the level of free cortisol and free cortisone. Fast cortisol clearance occurs with elevated levels of 5a and 5b-reductase.

This occurs mostly in obesity and insulin resistance but can also be seen with hyperthyroidism or too much thyroid medication. The HPA axis can adjust cortisol excretion to maintain normal levels of free cortisol, but fast clearance can result in upregulation of ACTH and all adrenal products (such as DHEA). In some cases, fast cortisol clearance leads to low free cortisol and low symptoms.

NUTRITIONAL ORGANIC ACIDS

Organic acids begin to build up when a nutrient cofactor or mineral is not present for a specific reaction to occur.

- The MMA is high. Elevated urinary MMA indicates impaired vitamin B12 dependent enzymatic activity and is a reliable marker of functionally low B12 status. Vitamin B12 is important for estrogen detoxification (phase 2 methylation), neurotransmitter production and function, among others. Signs and symptoms of low B12 include fatigue, megaloblastic anemia, numbness and tingling in the hands and feet, mood changes, and more.
- Xanthurenate and kynurenate are both high. This can indicate low vitamin B6 from not eating B6, not absorbing it, not activating it, not having the co-factors to activate it/circulate it, or from conditions like pyroluria that bind up B6, impairing absorption. B6 is important for estrogen methylation and neurotransmitter production and can help make cysteine (glutathione/pyroglutamate) in the transsulfuration pathway. If tryptophan supplements are taken within 72 hours of collecting DUTCH samples, xanthurenate and kynurenate can be high in the urine without indicating any health conditions or deficiency. Keep supplements in mind when interpreting results.
- The indican is high. Elevated indican can indicate gut dysbiosis. Once elevated, levels do not correlate with the severity of dysbiosis, but simply that dysbiosis is present. Consider further testing for insight into gut health if the symptom picture fits.

NEURO-RELATED MARKERS

- The quinolinate is high. Tryptophan is normally metabolized in the liver to produce NAD and small amounts of 5-HTP. When high cortisol or inflammatory cytokines are present, extra-hepatic tryptophan metabolism is activated and leads to high quinolinate production. High quinolinate can cross the blood-brain-barrier and is excitatory and toxic, potentially leading to mood and sleep dysregulation.

ADDITIONAL MARKERS

- The waking urinary 6-OH-Melatonin-Sulfate is low. This reflects low overnight production of melatonin. This may be implicated in poor sleep and insomnia.

Reference Range Percentiles

Reference ranges are developed by testing thousands of healthy individuals, while excluding results from outliers or those on impactful medications. A percentile approach is applied, as is done with most labs. Classic reference ranges use the 95th percentile as the upper end of range and the 5th percentile as the lower end of range. Our DUTCH ranges uses the percentiles found in the table below. We feel these ranges reflect the more optimal range sought in functional medicine practices. The table below shows the percentiles used for the reference range of each analyte on the DUTCH report:

Female Reference Ranges (Updated 05.20.2025)									
	Low%	High%	Low	High		Low%	High%	Low	High
b-Pregnanediol	20%	90%	600	2000	Saliva Cortisol Waking (W)	20%	90%	1.6	4.6
a-Pregnanediol	20%	90%	200	740	Saliva Cortisol (W+30 min.)	20%	90%	3.7	8.2
Estrone (E1)	20%	80%	12	26	Saliva Cortisol (W+60 min.)	20%	90%	2.3	5.3
Estradiol (E2)	20%	80%	1.8	4.5	Saliva Cortisol (Afternoon)	20%	90%	0.4	1.5
Estriol (E3)	20%	80%	5	18	Saliva Cortisol (Night)	0	95%	0	0.9
2-OH-E1	20%	80%	5.1	13.1	Saliva Cortisol (2-3 am)	0	90%	0	0.9
4-OH-E1	0	80%	0	1.8	Saliva Cortisone Waking (W)	20%	90%	6.8	14.5
16-OH-E1	20%	80%	0.7	2.6	Saliva Cortisone (W+30 min.)	20%	90%	12.4	19.4
2-Methoxy-E1	20%	80%	2.5	6.5	Saliva Cortisone (W+60 min.)	20%	90%	9.4	15.3
2-OH-E2	0	80%	0	3.1	Saliva Cortisone Afternoon	20%	90%	2	7.1
4-OH-E2	0	80%	0	0.52	Saliva Cortisone Night	0	95%	0	4.8
2-16-ratio	20%	80%	2.69	11.83	Saliva Cortisone (2-3 am)	0	95%	0	4.8
2-4-ratio	20%	80%	5.4	12.62	Cortisol Clearance Rate (CCR)	20%	80%	45	95
2Me-2OH-ratio	20%	80%	0.39	0.67	Melatonin (6-OHMS)	20%	90%	10	85
DHEA-S	20%	90%	20	750	8-OHdG	0	90%	0	5.2
Androsterone	20%	80%	200	1650	Methylmalonate	0	90%	0	2.5
Etiocholanolone	20%	80%	200	1000	Xanthurenate	0	90%	0.12	1.2
Testosterone	20%	80%	2.3	14	Kynurenate	0	90%	0.8	4.5
5a-DHT	0	80%	0	6.6	b-Hydroxyisovalerate	0	90%	0	12.5
5a-Androstanediol	20%	80%	6	30	Pyroglutamate	10%	90%	28	58
5b-Androstanediol	20%	80%	12	75	Indican	0	90%	0	100
Epi-Testosterone	20%	80%	2.3	14	Homovanillate	10%	95%	3	11
a-THF	20%	90%	75	370	Vanilmandelate	10%	95%	2.2	5.5
b-THF	20%	90%	1050	2500	Quinolinatate	0	90%	0	9.6
b-THE	20%	90%	1550	3800	Calculated Values				
% = population percentile: Example - a high limit of 90% means results higher than 90% of the women tested for the reference range will be designated as "high."					Total DHEA Production	20%	80%	500	3000
					Total Estrogens	20%	80%	35	70
					Metabolized Cortisol	20%	90%	2750	6500
					Saliva Cortisol Total	20%	90%	9.6	19.3
					Saliva Cortisone Total	20%	90%	36	55