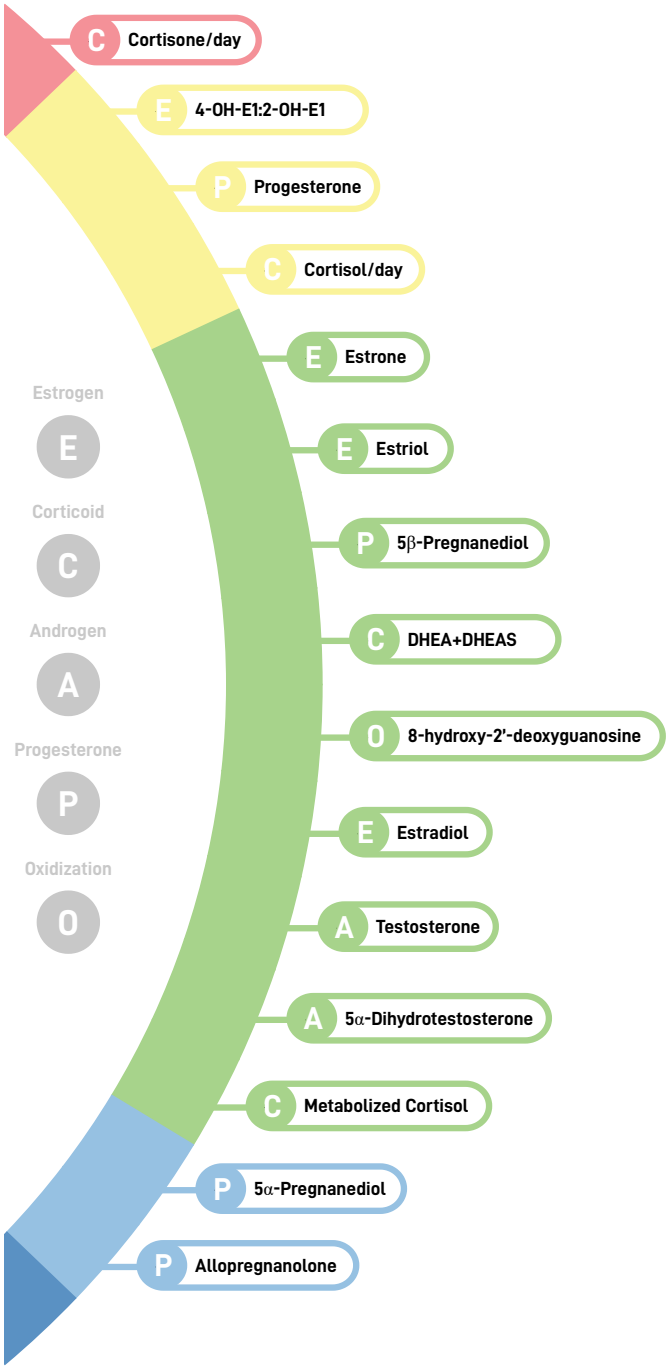
Hormone & Urinary Metabolites Assessment Profile

Order: 999999-9999
Test: X999999-9999-1
Client #: 999999
Doctor: Sample Doctor, MD
Doctors Data Inc
123 Main St.
St. Charles, IL 60174 USA

Patient: Sample Patient
Id: 999999
Age: 33 **DOB:** 01/01/1991
Sex: Female
Menopausal Status: Pre-menopausal , LMP: 10/16/2024 ,

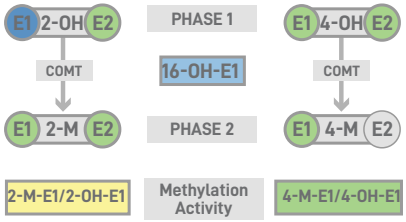
Sample Collection	Date/Time
Midsleep	11/11/2024 02:30
Dinnertime	11/10/2024 18:00
Bedtime	11/10/2024 21:36
Waking	11/11/2024 08:25
2 Hr. Post Waking	11/11/2024 10:55
Collection Period	Multipoint daily
Date Received	11/14/2024
Date Reported	11/21/2024



ESTROGENS

The bar graph represents the relationship of the catechol estrogens (2-OH-E1, 4-OH-E1, 16-OH-E1) to each other. The expected percentage for each is represented by the shaded area.

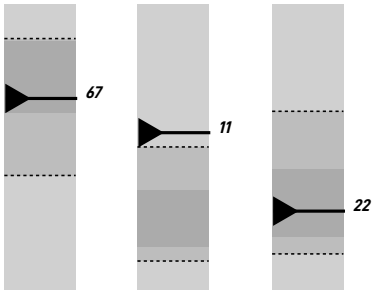
The pathway illustrates phase 1 and phase 2 metabolism of both E1 and E2. Phase 1 metabolites, also known as catechol estrogens, are active and can induce estrogenic actions. Phase 2 metabolism gives insight into a patient's ability to methylate, or potentially inactivate harmful metabolites.



2-OH: *generally considered safest*

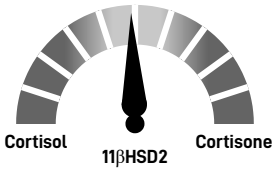
4-OH: *potential for DNA damage*

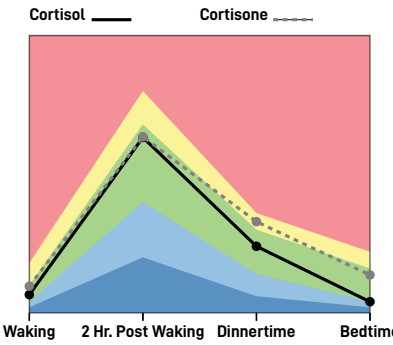
16-OH: *considered highly estrogenic*



CORTICOIDS

11βHSD2 is responsible for the conversion of cortisol to cortisone. Inhibition of this enzyme may lead to the amount of cortisol being greater than cortisone, while increased enzyme activity can lead to higher levels of cortisone in comparison to cortisol.





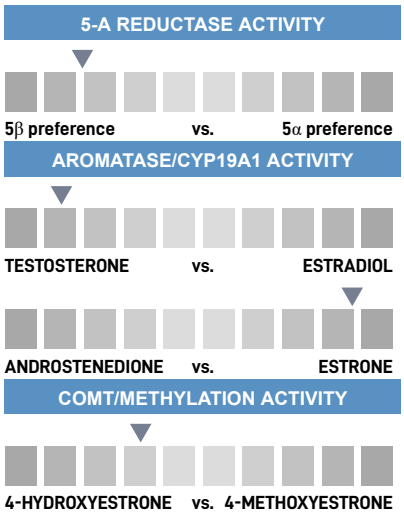
KEY RELATIONSHIPS

The graphs to the right represent metabolism preference by key enzymes, indicated by the arrow.

Metabolites in the 5-alpha pathway are more androgenic than their 5-beta counterparts and can be responsible for androgenic symptoms even when hormone levels appear normal.

Aromatase is an enzyme found in the greatest amounts in peripheral fat tissue which can increase estrogens in both males and females.

4-OH-E1 is considered unfavorable due to its carcinogenic potential within breast and prostatic tissue as a reactive metabolite. When methylated by COMT, this reactive metabolite becomes stable and can be removed from the body.



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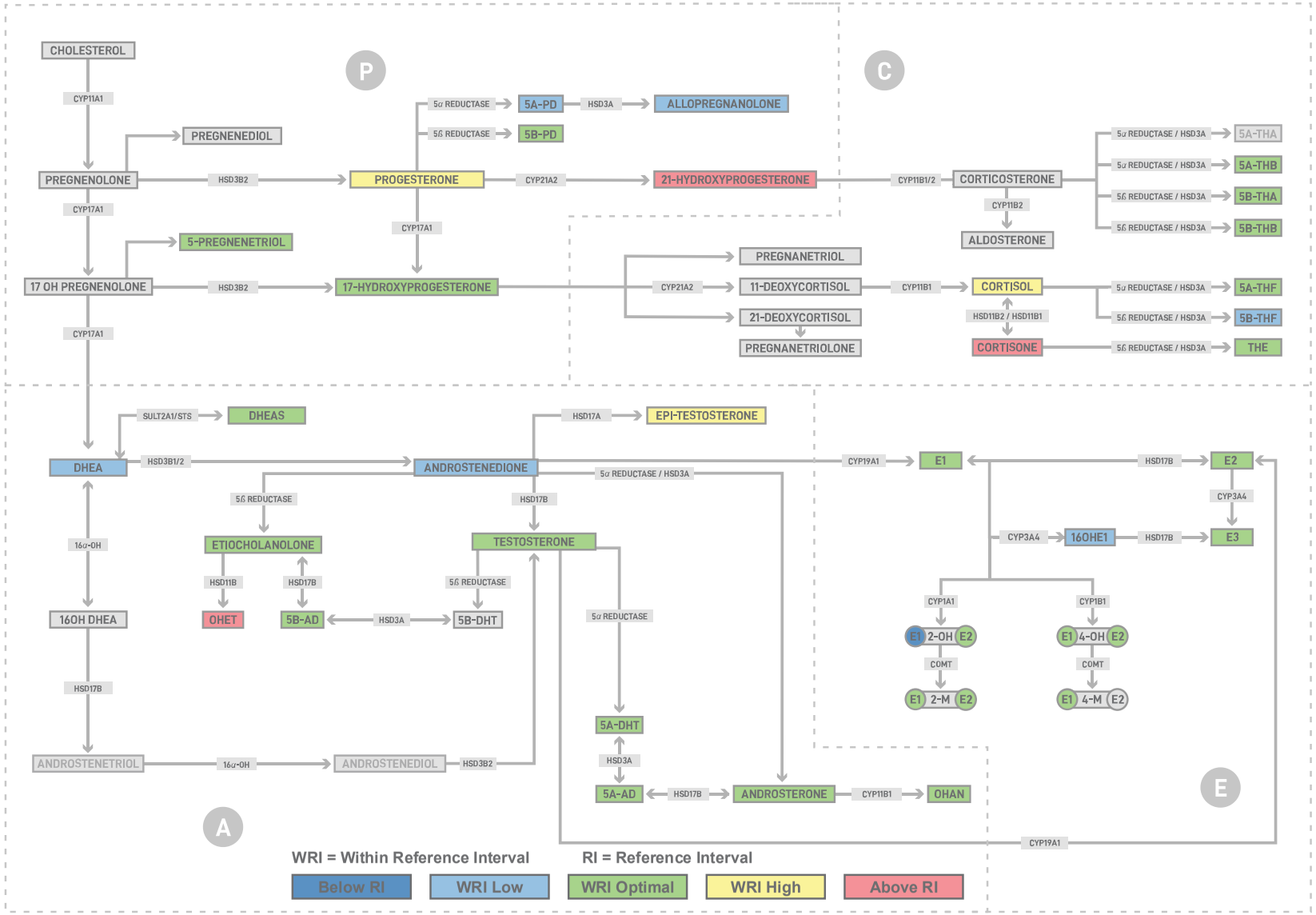
CHOLESTEROL
CYP11A1
PREGNENEDIOL
PREGNENOLONE
HSD3B2
PROGESTERONE
CYP21A2
21-HYDROXYPROGESTERONE
CYP17A1
5-PREGNENETRIOL
17 OH PREGNENOLONE
HSD3B2
17-HYDROXYPROGESTERONE
CYP17A1
5α REDUCTASE
5A-PD
HSD3A
ALLOPREGNANOLONE
5β REDUCTASE
5B-PD
P
C
CYP11B1/2
CORTICOSTERONE
CYP11B2
ALDOSTERONE
5α REDUCTASE / HSD3A
5A-THA
5A-THB
5β REDUCTASE / HSD3A
5B-THA
5B-THB
PREGNANETRIOL
CYP21A2
11-DEOXYCORTISOL
CYP11B1
CORTISOL
21-DEOXYCORTISOL
PREGNANETRIOLONE
HSD11B2 / HSD11B1
CORTISONE
5A-THF
5B-THF
THE
SULT2A1/STS
DHEAS
DHEA
HSD3B1/2
ANDROSTENEDIONE
HSD17A
EPI-TESTOSTERONE
CYP19A1
E1
HSD17B
E2
CYP3A4
16OHE1
E3
16α-OH
16OH DHEA
5β REDUCTASE
ETIOCHOLANOLONE
HSD11B
OHET
HSD17B
5B-AD
HSD3A
5B-DHT
HSD17B
TESTOSTERONE
5α REDUCTASE
5α REDUCTASE / HSD3A
5α REDUCTASE
5A-DHT
HSD3A
5A-AD
HSD17B
ANDROSTERONE
CYP11B1
OHAN
CYP1A1
CYP1B1
E1 2-OH E2
E1 4-OH E2
COMT
E1 2-M E2
E1 4-M E2
ANDROSTENETRIOL
16α-OH
ANDROSTENEDIOL
HSD3B2
A
E
WRI = Within Reference Interval
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WRI Low
WRI Optimal
WRI High
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Progesterone Metabolites; urine

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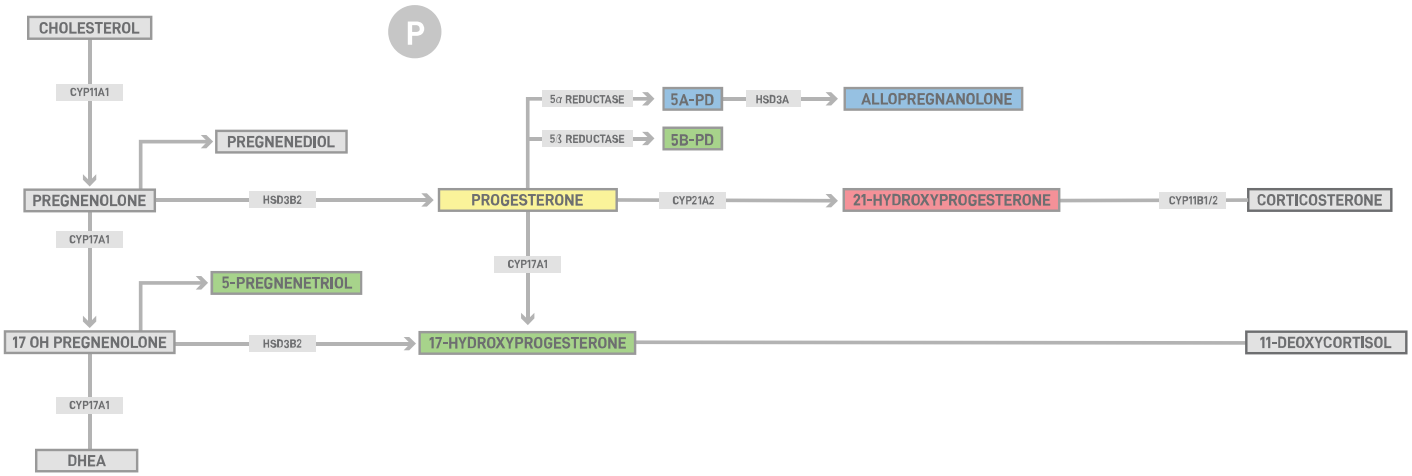

Progesterones		Result	Unit	L WRI H	Reference Interval
Progesterone‡	(P4)	0.72	ng/mg Creat/Day		0.10 – 1.10
5α-Pregnanediol‡	(5A-PD)	144	ng/mg Creat/Day		30 – 405
5β-Pregnanediol‡	(5B-PD)	2250	ng/mg Creat/Day		300 – 2700
Allopregnanolone‡	(ALLOP)	28	ng/mg Creat/Day		3.3 – 110
21-Hydroxyprogesterone‡	(21-OHP)	0.86	ng/mg Creat/Day		0.10 – 0.80
17-Hydroxyprogesterone‡	(17-OHP)	0.39	ng/mg Creat/Day		0.15 – 1.3
5-pregnenetriol‡	(5-PT)	91	ng/mg Creat/Day		70 – 245

Ratios and Calculations		Result	Unit	L WRI H	Reference Interval
5A-PD:5B-PD‡	(alpha vs beta metabolism)	0.064			0.06 – 0.24

Progesterone Metabolites Information

Progesterone is excreted in urine in small quantities. Majority of progesterone is metabolized to 5β-pregnanediol (typically highest), 5α-pregnanediol, and subsequently to allopregnanolone. This test measures progesterone and its metabolites. Allopregnanolone concentrations are useful in the context of oral progesterone use due to its GABA-like effects for sleep and anxiety relief. 17-hydroxyprogesterone and 21-hydroxyprogesterone results are also reported. They reflect endogenous cortisol and corticosterone production.

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Methodology: LCMS QQQ

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Adrenal Corticoid Metabolites; urine

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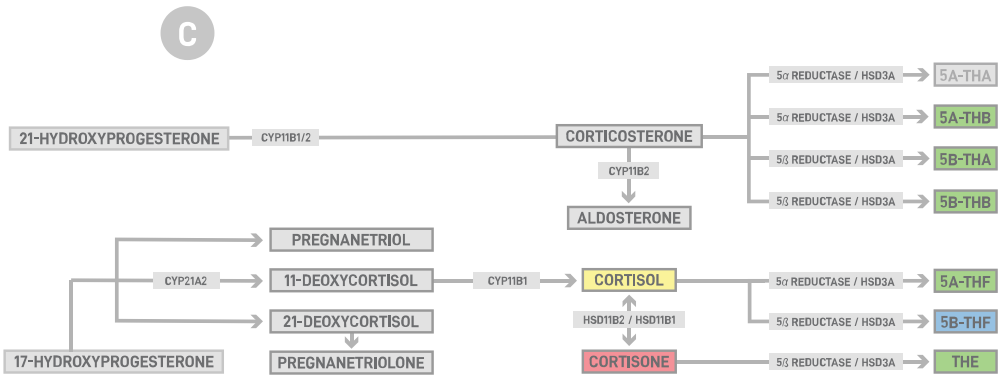

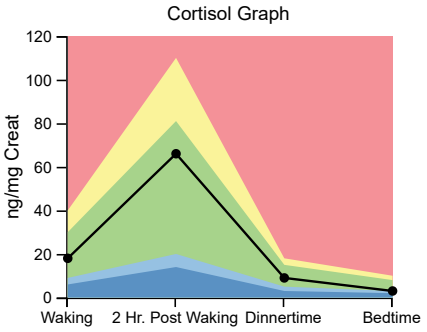

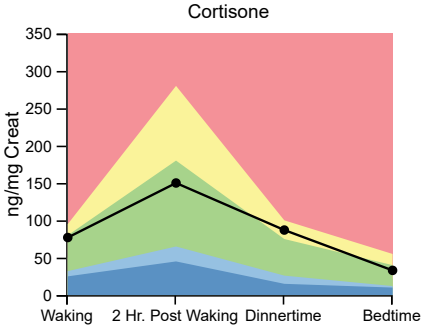

Free Cortisol and Cortisone		Result	Unit	L WRI H	Reference Interval
Cortisol Waking‡		18	ng/mg Creat		6 – 40
Cortisol Waking+2hrs‡		66	ng/mg Creat		14 – 110
Cortisol Dinnertime‡		9	ng/mg Creat		3 – 18
Cortisol Bedtime‡		3	ng/mg Creat		2 – 10
Cortisol/day‡	(F)	33	ng/mg Creat/Day		9 – 35
Cortisone Waking‡		77	ng/mg Creat		25 – 95
Cortisone Waking+2hrs‡		150	ng/mg Creat		45 – 280
Cortisone Dinnertime‡		87	ng/mg Creat		15 – 100
Cortisone Bedtime‡		33	ng/mg Creat		10 – 55
Cortisone/day‡	(E)	97	ng/mg Creat/Day		30 – 95
Creatinine Waking		91.5	mg/dL		30 – 225

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Free Cortisol and Cortisone	Result	Unit	L WRI H	Reference Interval
Creatinine Waking+2hrs	115	mg/dL		30 – 225
Creatinine Dinnertime	54.3	mg/dL		30 – 225
Creatinine Bedtime	38.3	mg/dL		30 – 225
Creatinine/day	75.5	mg/dL/Day		30 – 225

Corticoid Metabolites and DHEA		Result	Unit	L WRI H	Reference Interval
Tetrahydrodehydrocorticosterone‡	(5B-THA)	90	ng/mg Creat/Day		40 – 130
5β-Tetrahydrocorticosterone‡	(5B-THB)	120	ng/mg Creat/Day		58 – 240
5α-Tetrahydrocorticosterone‡	(5A-THB)	210	ng/mg Creat/Day		90 – 380
5α-Tetrahydrocortisol‡	(5A-THF)	502	ng/mg Creat/Day		450 – 1300
5β-Tetrahydrocortisol‡	(5B-THF)	812	ng/mg Creat/Day		720 – 2050
Tetrahydrocortisone‡	(THE)	2580	ng/mg Creat/Day		1650 – 4000
Dehydroepiandrosterone‡	(DHEA)	17	ng/mg Creat/Day		15 – 190
Dehydroepiandrosterone Sulfate‡	(DHEAS)	600	ng/mg Creat/Day		45 – 3000

Ratios and Calculations		Result	Unit	L WRI H	Reference Interval
DHEA+DHEAS‡		620	ng/mg Creat/Day		50 – 2000
THE+5A-THF+5B-THF‡	(Metabolized Cortisol)	3890	ng/mg Creat/Day		2600 – 7200
5A-THF+5B-THF/THE‡	(Cortisol/Cortisone Metabolites)	1			0.6 – 1.2
Cortisol/Cortisone‡	(11B HSD activity)	0.34			0.18 – 0.60
5A-THF/5B-THF ratio‡	(alpha vs beta metabolism)	0.62			0.19 – 0.82

Adrenal Corticoid Metabolites Information

Under stress, the HPA axis controls the secretion of cortisol from the adrenal cortex. In saliva and blood, cortisol levels are the highest 30 minutes after waking and gradually decline throughout the day (measured by “cortisol awakening response” – CAR). When testing cortisol in urine throughout the day, highest value is typically seen during the second timed collection. Adrenal corticoid page provides four different aspects of cortisol metabolism and excretion: graphical pattern of cortisol and cortisone excretion, average cortisol and cortisone per day, metabolized cortisol, and metabolic preference for cortisol or cortisone. Cortisol and cortisone output is graphed in a diurnal pattern over the course of the day. Metabolized cortisol calculation includes the daily metabolites of cortisol (5A-THF, 5B-THF) and cortisone (THE) which may be a better representation of daily cortisol output than measuring cortisol and cortisone alone.

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Androgen Metabolites; urine

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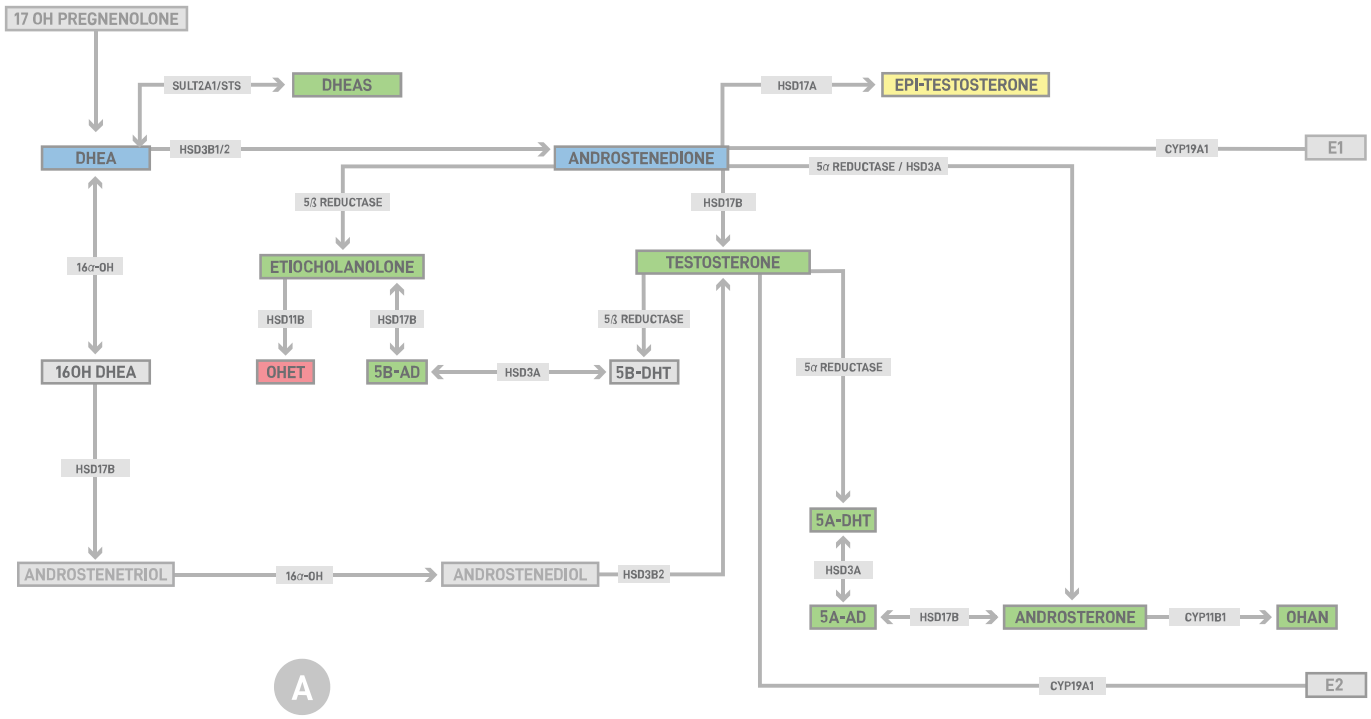

Androgens		Result	Unit	L WRI H	Reference Interval
Androstenedione‡	(A4)	0.63	ng/mg Creat/Day		0.35 – 4.0
EPI-Testosterone‡	(EPI-T)	14	ng/mg Creat/Day		0.0 – 15
Testosterone‡	(T)	2.7	ng/mg Creat/Day		1.0 – 12
Androsterone‡	(AN)	725	ng/mg Creat/Day		390 – 2200
11-hydroxy-Androsterone‡	(OHAN)	475	ng/mg Creat/Day		180 – 800
5α-Androstanediol‡	(5A-AD)	7.8	ng/mg Creat/Day		4.0 – 25
5α-Dihydrotestosterone‡	(5A-DHT)	0.8	ng/mg Creat/Day		0.4 – 4.0
Etiocholanolone‡	(ET)	1390	ng/mg Creat/Day		540 – 2500

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Androgens		Result	Unit	L WRI H	Reference Interval
11-hydroxy-Etiocholanolone‡	(OHET)	504	ng/mg Creat/Day		40 – 470
5β-Androstanediol‡	(5B-AD)	33	ng/mg Creat/Day		9.0 – 110
Dehydroepiandrosterone‡	(DHEA)	17	ng/mg Creat/Day		15 – 190
Dehydroepiandrosterone Sulfate‡	(DHEAS)	600	ng/mg Creat/Day		45 – 3000

Ratios and Calculations		Result	Unit	L WRI H	Reference Interval
DHEA+DHEAS‡		620	ng/mg Creat/Day		50 – 2000
Androsterone (5α) / Etiocholanolone (5β)‡	(5α Reductase Activity)	0.52			0.5 – 1.4
Testosterone / EPI-Testosterone‡		0.19			0.1 – 2.0

Androgen Metabolites Information

Androgens play a significant role in structure and function of muscle, bone, and connective tissue, metabolic homeostasis and reproduction in both men and women. When evaluating the androgens, it is important to look at unconjugated hormones, enzymes, metabolites, and clinical symptoms to gain an understanding of the complete clinical picture. The key areas of focus within the androgen pathway are androstenedione, DHEA, testosterone, 5-alpha and 5-beta reductase, and aromatase (CYP19). Monitoring 5-alpha vs 5-beta activity is of particular interest as 5-alpha metabolites are more androgenic. Symptoms associated with higher androgen levels are often seen when levels of 5-alpha reductase and its corresponding metabolites are elevated. 5-beta reductase and its corresponding metabolites are much less androgenic.

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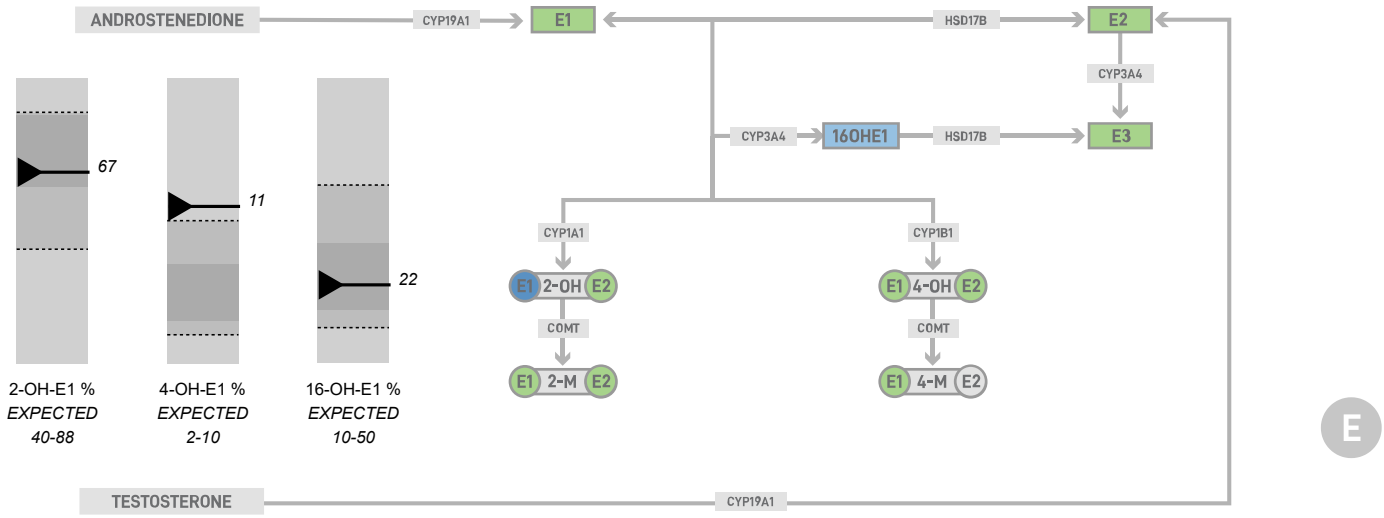

Estrogens		Result	Unit	L WRI H	Reference Interval
Estrone‡	(E1)	7.9	ng/mg Creat/Day		3.8 – 22
2-Hydroxyestrone‡	(2-OH-E1)	10	ng/mg Creat/Day		13 – 34
4-Hydroxyestrone‡	(4-OH-E1)	1.6	ng/mg Creat/Day		0.0 – 2.9
16α-Hydroxyestrone‡	(16-OH-E1)	3.4	ng/mg Creat/Day		1.4 – 15
2-Methoxyestrone‡	(2-M-E1)	2.4	ng/mg Creat/Day		1.0 – 7.10
4-Methoxyestrone‡	(4-M-E1)	0.015	ng/mg Creat/Day		0.005 – 0.060
Estradiol‡	(E2)	3.7	ng/mg Creat/Day		1.5 – 13
2-Hydroxyestradiol‡	(2-OH-E2)	1.7	ng/mg Creat/Day		0.80 – 3.9
4-Hydroxyestradiol‡	(4-OH-E2)	0.54	ng/mg Creat/Day		0.0 – 1.2
2-Methoxyestradiol‡	(2-M-E2)	0.24	ng/mg Creat/Day		0.06 – 0.70
Estriol‡	(E3)	11	ng/mg Creat/Day		2.8 – 23

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123 Main St.
St. Charles, IL 60174 USA

Patient: Sample Patient
Id: 999999
Age: 33 **DOB:** 01/01/1991
Sex: Female
Menopausal Status: Pre-menopausal, LMP: 10/16/2024,

Sample Collection	Date/Time
Midsleep	11/11/2024 02:30
Dinnertime	11/10/2024 18:00
Bedtime	11/10/2024 21:36
Waking	11/11/2024 08:25
2 Hr. Post Waking	11/11/2024 10:55
Collection Period	Multipoint daily
Date Received	11/14/2024
Date Reported	11/21/2024

Ratios and Calculations		Result	Unit	L WRI H	Reference Interval
2-OH-E1 %‡	(2-OH-E1 %)	67	%		40 – 88
4-OH-E1 %‡	(4-OH-E1 %)	11	%		2 – 10
16-OH-E1 %‡	(16-OH-E1 %)	22	%		10 – 50
2-M-E1:2-OH-E1‡	(COMT/Methylation activity)	0.22			0.08 – 0.60
2-M-E2:2-OH-E2‡	(COMT/Methylation activity)	0.13			0.06 – 0.80
4-M-E1:4-OH-E1‡	(COMT/Methylation activity)	0.0087			0.004 – 0.10
2-OH-E1:16-OH-E1 ‡		3.0			≥ 0.70
4-OH-E1:2-OH-E1‡		0.16			0.00 – 0.17

Oxidative Stress Metabolite		Result	Unit	L WRI H	Reference Interval
8-hydroxy-2'-deoxyguanosine‡	(8-OHdG)	5.7	ng/mg Creat/Day		0.0 – 7.5

Estrogen Metabolites Information

Evaluation of the estrogen metabolism pathway relies on understanding several key steps of metabolism: the amount of unconjugated estrogens, hydroxylation of E1 and E2 (phase I), methylation of hydroxy estrogens (phase II), and the function of key enzymes. Estrogen is metabolized down three phase I pathways: 2-OH (considered the safest), 4-OH (considered the most genotoxic), and 16-OH (considered the most estrogenic). In phase II, estrogens are methylated, making them less reactive and ready for excretion. The ratio of 4-M E1/E2 to 4-OH E1 / 2 and 2-M E1/E2 to 2-OH E1/E2 can help determine if adequate methylation of catechol estrogens is occurring. The higher the ratio, the higher the likelihood of metabolizing toward the pathway with lower harm potential, and therefore less reactive quinone formation. Even if 4-OH metabolites are elevated, adequate methylation can indicate these metabolites are being detoxified, rendering them potentially less harmful.

Notes:
WRI – Within Reference Interval - represented by bracket and stated ranges on report, Dark Blue = Below RI, Light Blue = WRI low, Green = Optimal, Yellow = WRI high, Red = Above RI, <dl = result below detection limit
‡This test was developed and its performance characteristics determined by Doctor's Data Laboratories in a manner consistent with CLIA requirements. The U.S. Food and Drug Administration (FDA) has not approved or cleared this test; however, FDA clearance is not currently required for clinical use.
Methodology: LCMS QQQ

Analyzed by DOCTOR'S DATA, INC. • 3755 Illinois Avenue, St. Charles, IL 60174-2420 USA • LAB DIR: Saim Qazi, MD • CLIA ID: 14D0646470

Order: 999999-9999
Test: X999999-9999-1
Client #: 999999
Doctor: Sample Doctor, MD
Doctors Data Inc
123 Main St.
St. Charles, IL 60174 USA

Patient: Sample Patient
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Progesterones

↑ **21-OH Progesterone (21-OHP)**
21-Hydroxyprogesterone is a steroid hormone with mineralocorticoid properties produced in the adrenal gland which serves as a precursor hormone to aldosterone. Elevated levels may not be clinically significant on their own, but could lead to mineralocorticoid hypertension. Elevations have been associated with chronic exposure to ACTH, Cushing's disease, type 2 diabetes, congenital adrenal hyperplasia or rarely adrenocortical carcinoma.

Androgens

↑ **11-hydroxy-Etiocholanolone (OHET)**
OHET is the product of cortisol metabolism as well as 11-oxygenated androgens produced from the adrenal gland. Levels tend to reflect levels of etiocholanolone.

Corticoids

↑ **Cortisone**
Cortisone is the inactive form of cortisol. Elevations of cortisone may reflect high cortisol production, excessive 11B-HSD2 activity, or insufficient conversion by 11B-HSD1.

Estrogens

↓ **2-Hydroxyestrone (2-OH-E1)**
Adequate levels of 2-OH-E1 have been shown to be a favorable marker for breast health. Low levels of 2-OH E1 may be due to low levels of estrone, or more active CYP3A4 or CYP1B1 enzymes. Increasing the activity of CYP1A1 to increase 2-OH-E1 is a consideration.

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