dutch
Dried Urine Test for Comprehensive Hormones

Sex Hormones and Metabolites

Accession # 00216506
Sample Female Report
123 A Street
Sometown, CA 90266

PRECISION ANALYTICAL
Consulting & Laboratory

Ordering physician:
Research Only

DOB:1976-01-01
Gender: Female

Collection Times:
2015-11-10 03:00PM
2015-11-10 04:00AM
2015-11-10 06:00AM
2015-11-10 09:00PM

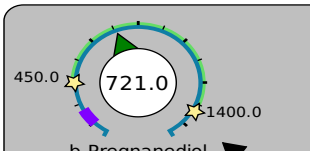
Category	Test		Result	Units	Normal Range
Progesterone Metabolism					
	b-Pregnanediol	Within range	721.0	ng/mg	450 - 1400
	a-Pregnanediol	Low end of range	123.0	ng/mg	120 - 500
Androgen Metabolism					
	DHEAS	Below range	17.0	ng/mg	23 - 350
	Androsterone	Below range	331.0	ng/mg	399 - 1364
	Etiocholanolone	Below range	324.0	ng/mg	371 - 765
	Testosterone	Within range	6.3	ng/mg	4 - 14
	5a-DHT	Within range	3.6	ng/mg	0 - 8.8
	5a-Androstanediol	Below range	16.0	ng/mg	22 - 66
	5b-Androstanediol	Within range	11.4	ng/mg	6 - 32
	Epi-Testosterone	Within range	10.7	ng/mg	4.5 - 22.3
Estrogen Metabolites					
	Estrone(E1)	Low end of range	13.9	ng/mg	12 - 26
	Estradiol(E2)	Within range	3.6	ng/mg	1.8 - 4.5
	Estriol(E3)	High end of range	16.3	ng/mg	5 - 18
	2-OH-E1	Below range	4.3	ng/mg	4.6 - 14.4
	4-OH-E1	High end of range	1.6	ng/mg	0 - 1.8
	16-OH-E1	Above range	4.6	ng/mg	1 - 3.5
	2-Methoxy-E1	Within range	4.1	ng/mg	2 - 5.5
	2-OH-E2	High end of range	1.04	ng/mg	0 - 1.2

Normal Ranges	Luteal	Postmenopausal		Follicular	Ovulatory
Estrone (E1)	12-26	1.3-6.7		4.0-12.0	22-68
Estradiol (E2)	1.8-4.5	0.2-0.8		1.0-2.0	4.0-12.0
Estriol (E3)	5-18	0.8-3.7		N/A	N/A
2-OH-E1	4.6-14.4	0.4-1.9		N/A	N/A
4-OH-E1	0-1.8	0-0.3		N/A	N/A
16-OH-E1	1-3.5	0.1-0.6		N/A	N/A
2-Methoxy-E1	2-5.5	0.2-1.0		N/A	N/A
			Oral Pg (100mg)		
a-Pregnanediol	120-500	5.0-34	750-2300	25-100	25-100
b-Pregnanediol	450-1400	28-135	2300-6000	100-300	100-300

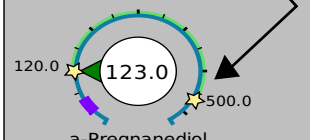
HOW TO READ YOUR RESULTS: Hormones are presented on this page graphically in the order the body metabolizes them. Arrows represent conversion from one hormone to another. The stars represent the low and high limits of the reference ranges (see example, right). The number in the middle is your result.

Progesterone Metabolism female

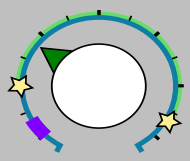
Pregnenolone



b-Pregnanediol



a-Pregnanediol



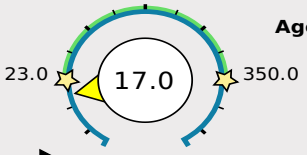
Progesterone

A weighted average of progesterone metabolites Progesterone itself is not found in urine in measurable levels

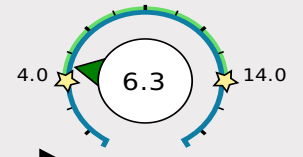
Androgen Metabolism

Age-Dependent DHEAS Ranges

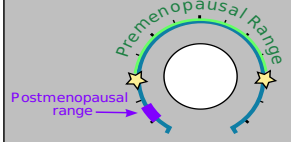
Age	DHEAS
20-40	30-350
40-60	10-100
>60	5-50



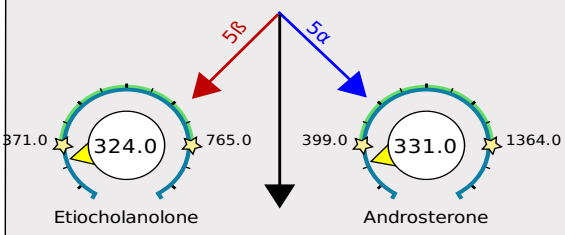
DHEA → DHEAS



Androstenedione → Testosterone



Androstenedione

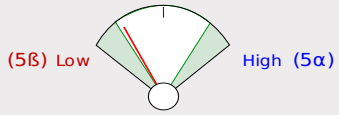


Etiocholanolone — Androsterone

Testosterone

5ß → Less Androgenic Metabolites

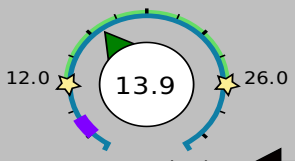
5α → 5α-DHT Most potent androgen



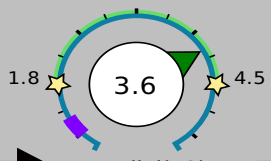
5a-Reductase Activity

5α-metabolism makes androgens more androgenic, most notably 5α-DHT is the most potent testosterone metabolite (~3x more potent than testosterone itself). 5α-Reductase activity is assessed using the ratio of Androsterone (5α) to Etiocholanolone (5ß).

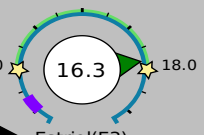
Estrogen Metabolism



Estrone(E1)



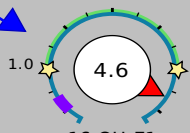
Estradiol(E2)



Estriol(E3)

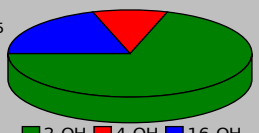
primary estrogens (E1, E2, E3)

protective pathway



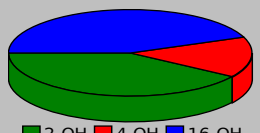
16-OH-E1

Normal Estrogen Metabolism



4-OH-E1

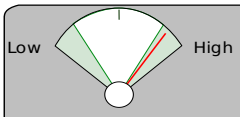
Patient Estrogen Metabolism



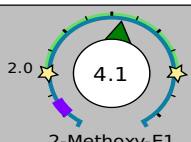
4-Methoxy-E1
(Protective, but not enough in urine to measure)

4-OH-E1

If not methylated, 4-OH-E1 can bind to and damage DNA

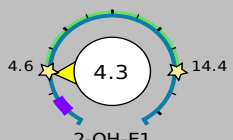


Methylation-activity
2-Methoxy/2-OH



2-Methoxy-E1

methylation (protective)



2-OH-E1

Provider Notes

Thank you for testing with us! If this is your first report, you are encouraged to skip to the last two paragraphs first under "Reading the Report" for an explanation of how to read the report and background information on urine hormone testing. Comments in the report that are specific to the patient ARE IN ALL CAPS. The other information is general information that we hope you will find useful in understanding the patient's results. Reference ranges updated 7/23/2015.

The following video link(s) may help those new to dutch testing to understand the results. If you only have a hardcopy of the results, the video names can be easily found in our video library at www.DutchTest.com. These results and videos are NOT intended to diagnose or treat specific disease states.

The following video may assist with the interpretation of the Progesterone and Estrogen results: Estrogen tutorial video

This video may assist with the interpretation of the Androgen results: Androgen tutorial video

THE PATIENT REPORTED SYMPTOMS OF EXCESS ESTROGEN. THIS CAN BE CAUSED BY EXCESS ESTROGEN OR PROGESTERONE DEFICIENCY. RESULTS SHOULD BE CAREFULLY REVIEWED. WE DO NOT REPORT A PROGESTERONE TO ESTROGEN RATIO. HOWEVER, YOU CAN INVESTIGATE THIS ISSUE BY LOOKING AT THE RELATIVE LEVEL OF THESE TWO HORMONES ON THEIR RESPECTIVE GAUGES.

THE PATIENT REPORTED SIGNIFICANT SYMPTOMS OF EXCESS ANDROGEN LEVELS.

Progesterone Metabolism: The primary role of progesterone is to balance the strong effects of estrogen. Progesterone metabolites are measured and reflect progesterone levels well because very little progesterone is found in urine, so b-Pregnanediol is typically used a surrogate marker because it is the most abundant metabolite, but we also test the corresponding a-pregnanediol. The average of the two metabolites is reported for progesterone. If levels are in the lower part of the reference range compared to estrogen levels, symptoms of too much estrogen may occur
When ordering the DUTCH Complete, you will see Progesterone Serum Equivalent on the summary page 1. The urine metabolites of progesterone have been proven to correlate strongly enough to serum progesterone to provide this value. The correlation is the strongest for values within the premenopausal luteal range. Urine metabolites can at times result in somewhat higher serum equivalent results in the postmenopausal range. For this reason the postmenopausal Serum Equivalent range is slightly higher than typical serum ranges. NOTE: If progesterone is taken orally (also with sublingual), these metabolites are elevated from gut metabolism and results do NOT accurately reflect serum levels.

Androgen Metabolism: This group of hormones is typically thought of as “male” hormones, but they play a key role for women as well. Testosterone is made in the ovaries as well as the adrenal glands. In postmenopausal women, the adrenal glands are the primary source of testosterone. a-DHT (a-dihydrotestosterone) is the most potent androgen (3X more than testosterone), but it is primarily made within the liver and target cells (it is a paracrine hormone) and not by the gonads. a-DHT is subsequently deactivated to a-androstanediol within target tissues and then excreted. Only a fraction of a-DHT formed actually enters circulation as a-DHT (Toscano, 1987). The corresponding beta metabolites (for example b-DHT) are not androgenic. Looking at the balance of androsterone (alpha) and etiocholanolone offer the best approximation of how readily DHT will be made. Elevated androgens can cause general and sexual aggression, increased muscle mass, increased facial/body hair, reduction of fat deposition, and increased libido. Androgen deficiency can lead to decreased sexual function, vaginal dryness, fatigue, depression, and bone loss.

5a-Reductase Activity: The competing enzymes 5a and 5b-reductase act on the androgens androstenedione (creating androsterone and etiocholanolone located under the progesterone picture) and testosterone (creating a-DHT and b-DHT). They also metabolize progesterone, and cortisol. The alpha metabolites of androstenedione and testosterone are far more androgenic than their beta counterparts. Consequently, increased 5a-reductase activity may be accompanied by clinical signs of androgenicity (excess facial hair growth, scalp hair loss, acne, irritability, oily skin, prostate issues in men...etc). If the patient heavily favors the 5a pathway and there are concerns of excess androgenicity (or prostate cancer risk), this may be worth addressing.

Estrogen Metabolism: There are two primary issues with respect to estrogens. 1) Estrogen production (is the patient deficient, sufficient, or in excess?) and 2) Estrogen metabolism (is the metabolism of estrogen favorable or unfavorable when looking at the phase 1 hydroxylation and phase 2 methylation pathways?)

While estradiol (E2) is the most potent estrogen, levels of estrone (E1) and estriol (E3) should also be considered when evaluating the patient's estrogen production. It is important to compare the patient's distribution of metabolites from the pie chart (2nd pie chart) to "Normal Estrogen Metabolism" pie chart. If they are making considerably less of the protective 2-OH estrogens, consider something to improve this metabolism (DIM, I-3-C, etc). Be advised that increasing 2-OH metabolism will likely lower E1 and E2 as well which may not be warranted if E1 and E2 are already low. It is our position that the ratio of 2:16 OHE1 is not as relevant as has been thought historically (Obi, 2011). Providers may still wish to use this index and it can be calculated by simply dividing the two numbers. A female reference range for the ratio with our methodology is 2.4-6.0.

The methylation index will show you how effectively the patient is turning 2 and 4-OH estrogens into methoxy estrogens. Methylation protects against potentially harmful 4-OH estrogens (carcinogenic) made in phase 1 detoxification. Supporting the methylation pathway should be considered if this index is low.

PATIENTS TYPICALLY METABOLIZE A MUCH HIGHER PERCENTAGE OF THEIR ESTROGENS DOWN THE MORE PROTECTIVE 2-OH PATHWAY IN PHASE 1 DETOXIFICATION. DIINDOLYLMETHANE (DIM) OR INDOLE-3-CARBINOL CONTAINING PRODUCTS CAN HELP MOVE ESTROGENS MORE EFFICIENTLY DOWN THIS PATHWAY. BE AWARE THAT THIS TYPICALLY LOWERS MOST OF THE OTHER ESTROGENS, INCLUDING E1 AND E2 AS WELL. IF PATIENTS ARE TAKING OR CONSIDERING HORMONE REPLACEMENT THERAPY, THESE PRODUCTS MAY BE CONSIDERED BUT A HIGHER DOSE OF ESTROGEN MAY BE NEEDED FOR THE SAME CLINICAL EFFECT IF TAKEN AT THE SAME TIME.

Reading the Report: The first page of the Dutch Complete lab report is a summary page while the second page of the Dutch Complete lab report and first page of the Dutch sex hormone and Dutch adrenal test are a classic lab report showing each result and the respective range of each hormone. Reference ranges shown are those of young healthy individuals with females collecting on days 19-21 (mid-luteal phase) of the menstrual cycle. The graphical representation of results on the page that follows allows the viewing of hormone results within the biochemical flowchart to more easily see the relative level of each hormone. The gauge format shows the patient result (represented by the “needle” of the gauge) and the area between the stars represents the reference range.
Reference ranges are typically set at the 20th to the 80th percentile of young, healthy individuals (DHEAS for example). This means that a result at the low end of a range is lower than 80 percent of young, healthy individuals. Likewise a result at the high end of a range is higher than 80 percent of the population. Some reference ranges are set more widely. For example, slightly elevated progesterone is not generally considered problematic, so its metabolites have reference ranges that extend further (90th percentile instead of 80th).
The “fan” style gauges are used for indexes/ratios such as on 5a-reductase activity, cortisol/cortisone, and estrogen methylation. Because these values are all based on ratios there are no values or units, but they give a general idea of a particular relationship and can tell you how ‘turned up’ or ‘turned down’ a particular process is. The middle of the gauge represents an average value, while the lines towards the edge represent results lower or higher than most (80%) of the population. Being outside of any range is not always considered unfavorable. For example, on the estrogen methylation gauge, an elevated level means someone methylates estrogens very effectively which may have positive consequences.

What is actually measured in urine? In blood, most hormones are bound to binding poteins. A small fraction of the total hormone levels are "free" and unbound such that they are active hormones. These free hormones are not found readily in urine except for cortisol and cortisone (because they are much more water soluble than, for example, testosterone). As such, free cortisol and cortisone can be measured in urine and it is this measurement that nearly all urinary cortisol research is based upon. In the DUTCH Adrenal Profile the diurnal patterns of free cortisol and cortisone are measured by LC-MS/MS.

All other hormones measured (cortisol metabolites, DHEA, and all sex hormones) are excreted in urine predominately after the addition of a glucuronide or sulfate group (to increase water solubility for excretion). As an example, Tajic (Natural Sciences, 1968 publication) found that of the testosterone found in urine, 57-80% was testosterone-glucuronide, 14-42% was testosterone-sulfate, and negligible amounts (<1% for most) was free testosterone. The most likely source of free sex hormones in urine is from contamination from hormonal supplements. To eliminate this potential, we remove free hormones from conjugates (our testing can be used even if vaginal hormones have been given). The glucuronides and sulfates are then broken off of the parent hormones, and the measurement is made. These measurements reflect well the bioavailable amount of hormone in most cases as it is only the free, nonprotein-bound fraction in blood/tissue that is available for phase II metabolism (glucuronidation and sulfation) and subsequent urine excretion.
Disclaimer: the filter paper used for sample collection is designed for blood collection, so it is technically considered "research only" for urine collection. Its proper use for urine collection has been thoroughly validated.