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Advancing the Science of Wellness
Rocky Mountain Analytical

**Collection Date:** July 23, 2009
**Collection Time(s):** 9:00 am
1:00 pm
6:00 pm
11:00 pm
**Sample Received:** July 29, 2009
**Reported On:** February 01, 2010

## SALIVA HORMONE TEST REPORT

***Accession Number :*** **111111**

**Provider:**

Healthy Me Clinic
Jan Now MD
1234 Ready Street
Calgary, AB T0L 0L0

Phone:
Fax:

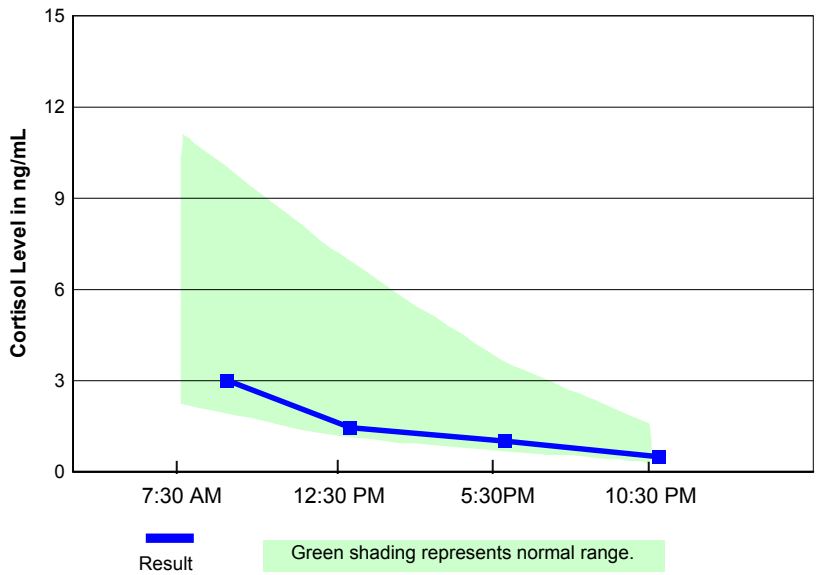
**Client:**

Jane Doe
4321 Wait Avenue
Calgary, AB T0M 0M0

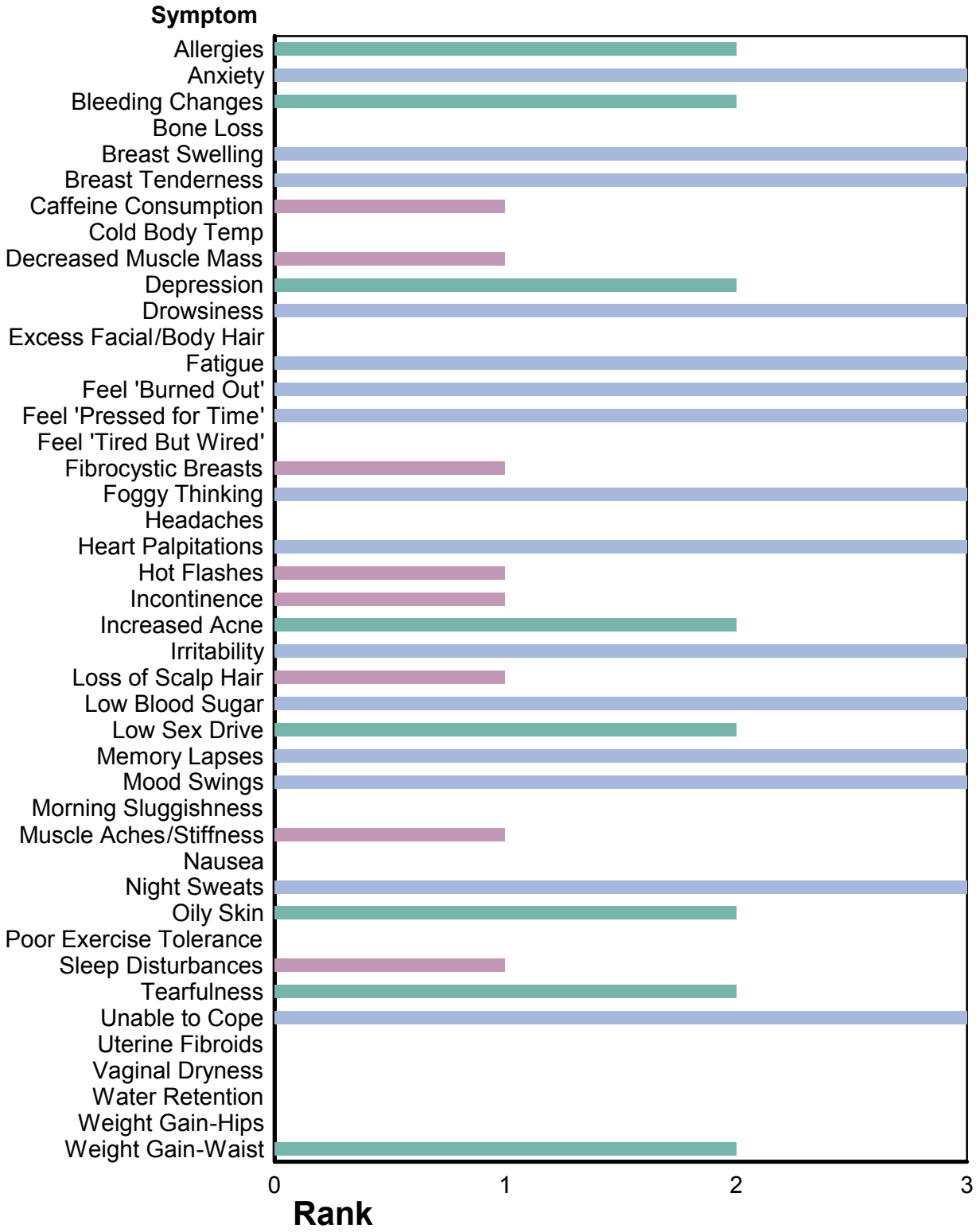
**Age:** 44
**DOB:**
**Gender:** F
**Status:** Regular
**Cycle Day:** 18
**Health #:**

| Hormone | Status | Result | Range | Units | Range Applied |
|---|---|---|---|---|---|
| Estradiol | Low end of range | 1.1 | 1.0 - 9.0 | pg/mL | Midluteal phase estradiol |
| Progesterone | Below range | 47 | 50 - 250 | pg/mL | Midluteal phase progesterone |
| Testosterone | High end of range | 39 | 15 - 45 | pg/mL | Endogenous testosterone > 30 yrs |
| DHEAS | Within range | 6.0 | 3.0 - 11 | ng/mL | Endogenous DHEAS 35-54 years |
| Cortisol AM | Low end of range | 3.0 | 2.0 - 11 | ng/mL | Sampled within 1 hour of waking |
| Cortisol Noon | Low end of range | 1.5 | 1.0 - 7.0 | ng/mL | Sampled at noon |
| Cortisol PM | Low end of range | 1.0 | 0.50 - 3.5 | ng/mL | Sampled prior to evening meal |
| Cortisol HS | Within range | 0.50 | 0.20 - 1.3 | ng/mL | Sampled at bedtime |

## Adrenal Function Graph




George Gillson MD, PhD
Medical Director




* Indicates symptom left blank.

Strictly speaking, vasomotor symptoms including hot flashes and night sweats reflect sympathetic nervous system (SNS) instability. Hence these symptoms are dependent on many factors such as stress, brain chemical levels (T3, serotonin, norepinephrine, melatonin, GABA, progesterone, estradiol and cortisol), and HPA axis function. They are not "pure" symptoms of estrogen deficiency (Prior J. Endocrine Rev 1998;19:397-428), and in fact, these symptoms may co-exist with symptoms of estrogen dominance. Vasomotor symptoms can be seen with many different patterns of hormone imbalance, such as low progesterone, low testosterone, low or high DHEAS, high estradiol, high cortisol. (Note: A one year trial of progesterone cream demonstrated efficacy compared to placebo, for the control of vasomotor symptoms (Leonetti HB, Longo S, Anasti JN. Transdermal progesterone cream for vasomotor symptoms and postmenopausal bone loss. Obstet Gynecol. 1999 Aug;94(2):225-228).) Excessive use of progesterone (higher dose or unbroken daily usage) can also result in vasomotor symptoms by downregulation of estradiol receptors.

Breast tenderness is listed as a complaint for this patient. Breast tenderness usually indicates an estrogen-progesterone imbalance, with high estradiol or low progesterone. Sometimes both estradiol and progesterone are within range, but the proportions are still wrong. Sometimes breast tenderness persists despite topical progesterone therapy; in these cases, there is usually another factor at play, such as high cortisol, or excess caffeine consumption. Breast tenderness is often seen in women who have low estradiol; the mechanism for this is not well understood. Low testosterone may also be a factor; research indicates that testosterone plays a role in balancing the proliferation-inducing effect of estradiol. (Testosterone inhibits estrogen/progestogen-induced breast cell proliferation in postmenopausal women. Hofling et al. Menopause 2007; 14:1-8.) *

Symptoms of hypothyroidism are present. These may include cold intolerance/feeling cold all the time, depression, weight gain, fatigue, headaches, thinning hair, and aching muscles, although not all these symptoms will be present in every individual. Other symptoms (not inventoried here) can include constipation, dry skin and muscle cramps. (Baiser W, Hertoghe J, Eeckhaut W. J Nutritional Env Med 2000;10:105-113.) Note that these symptoms may be present in the face of normal thyroid studies including TSH. This is known as a functional deficiency state in which the blood level of a hormone is normal, but the action of the hormone at the tissue level is being blocked by other hormone imbalances. For example, unopposed/insufficiently opposed estrogen replacement (especially oral estrogen) and excessive estrogen dosing are common causes of hypothyroid symptoms. High cortisol can oppose the action of T3 at the tissue level, whereas low cortisol can fail to potentiate the tissue action of T3, even if there is sufficient T3. Many individuals with low cortisol complain of hypothyroid sympoms. Note also that hypothyroid symptoms may persist despite supplementation with T4 (Synthroid, Eltroxin, L-throxine). In this situation, conversion of T4 to T3 (the more active form) may be blocked by high cortisol, heavy metal toxicity or deficiencies of nutrients including selenium, chromium and zinc. Note that some insight into hypothyroid symptoms in the face of normal serum thyroid testing might be had by assessing T3, T4 and selenium in a 24 hour urine specimen. For more information on this test, please contact the laboratory at 866 370 5227.

Estradiol is low and the patient's BMI is 20.20. In general, individuals with a BMI below approximately 22 have a low percentage of fat relative to body weight. Since some estrogen is made from adrenal hormones in peripheral fatty tissues, low BMI / less body fat is associated with lower estrogen levels.

Estradiol is low. Low estradiol symptoms usually include hot flushes, night sweats, depression, "brain fog", vaginal dryness, low sex drive and bone loss, although not all these symptoms will be present in every individual. If these symptoms are prominent, the best course of action will have to be determined by the treating physician. Note that if the patient is on estriol monotherapy, the salivary estradiol level usually (although not always) remains normal.*

An August 2007 analysis of the RMA database confirms that the adrenal contribution to circulating progesterone is less than or equal to approximately 50 pg/ml. Women who have a progesterone level below approximately 50 pg/ml in the luteal phase therefore have two issues: failure to produce ovarian progesterone, and suboptimal adrenal production of progesterone. Suboptimal adrenal progesterone output may also be accompanied by suboptimal levels of DHEAS and cortisol.

Low/low normal progesterone may result in diminished response to endogenous or supplemental estradiol, and may impair tissue action of thyroid hormone. Symptoms which can accompany low progesterone include breast tenderness, weight gain, fluid retention, vasomotor symptoms, poor sleep, decreased libido, irritability and anxiety.

A one year, placebo-controlled, randomized trial has demonstrated that topical progesterone is effective for relief of vasomotor symptoms in early menopause. (Leonetti HB, Longo S, Anasti JN. Transdermal progesterone cream for vasomotor symptoms and postmenopausal bone loss. Obstet Gynecol. 1999 Aug;94(2):225-228)

Hair loss is a prominent symptom. Hair loss is considered to be a symptom of high testosterone/high DHEAS, and indeed, there is an association in some cases. A melatonin solution applied to the scalp once daily for 6 months was shown to stimulate hair growth in women with androgenic alopecia as well as diffuse hair loss, in a 2004 placebo-controlled trial (Fischer TW et al. Br J Dermatol 2004;150:341-345). Hair loss is also associated with decreased delivery of T3 to tissue, as well as iron deficiency. One of the first blood tests to become abnormal when iron is deficient is serum ferritin. Low ferritin-associated hair loss is well recognized. Some toxic or potentially toxic metals (arsenic, selenium, thallium) can also cause hair loss. A trace element analysis of hair can be helpful to detect metal retention/toxicity.

Although elevated testosterone and/or elevated DHEAS can be associated with insulin resistance and obesity, here the BMI is approximately 22, indicating that this is a slender patient. In these patients, it is also possible that the high androgens/androgen precursors, rather than contributing to ill health, may actually be the reason for a lower body mass index. (Androgens preserve muscle mass; high muscle mass contributes to a higher basal metabolic rate and may counteract any tendency to gain fat.) It is still worth checking for insulin resistance/hyperinsulinemia when high androgens are found, however, as a percentage of slender women with high androgens and irregular menses will have problems with insulin.

Bear in mind also, that various supplements such as DHEA, pregnenolone, progesterone, vitex, horny goatweed and tribulus can also elevate testosterone and/or DHEA. So if these supplements are being used, it is not possible to tell if the patient has "naturally" high testosterone, or if it is due to supplementation with testosterone prescursors.

DHEAS is within the normal range for the patient's age, but this may not be an optimal level for this patient. Bear in mind that for reference, in healthy individuals less than 25 years of age, the normal range for DHEAS is 6 to 18 ng/ml for women, and slightly higher than this for men. Note that some some women less than 35 years of age, whose DHEAS is toward the upper end of their normal range might have complaints such as oily skin or facial hair growth.

RMA database analysis (February 2008) indicates that a low first morning cortisol result has fairly good ability to predict cortisol levels throughout the rest of the day, and correlates fairly well to certain symptoms. If morning cortisol is low, this tends to be "as good as it gets"; subsequent levels may often (but not always!) also be low. Symptoms which correlate reasonably well to low morning cortisol include anxiety, increased tendency to allergies, morning sluggishness, feeling tired but wired, headaches, irritability, muscle aches and problems with memory. These symptoms will not necessarily all be present in every individual with low morning cortisol. Note that some individuals using inhaled or topical glucocorticoids can exhibit low morning cortisol and these people are often asymptomatic.

There is some evidence of an association between low cortisol and chronic pain syndromes including pelvic pain and functional gastrointestinal pain. (Ehlert U, Nater U, Bohmelt A. J Psychosomatic Res 2005;59:7-10.)

Recent literature indicates that poor sleep is also associated with lower morning cortisol. More specifically, individuals who experience frequent nightly awakening, have poor self-rated quality of sleep and a subjective impression of poor recovery after awakening have lower morning cortisol levels compared to those who sleep soundly and wake refreshed. Backhaus JB, Junghanns K, Hohagen F. Sleep disturbances are correlated with decreased morning awakening salivary cortisol. Psychoneuroendocrinology 2004;29:1184-1191.

Finally, experimentally-induced tryptophan depletion has been shown to lower morning salivary cortisol (Vielhaber K et al. Pharmacopsych 2005;38:87-94). Presumably this is due to lowered serotonin levels. It does not automatically follow that tryptophan supplementation will raise morning cortisol, but this may be a worthwhile option to consider, in patients with low morning cortisol, who also complain of morning depression/sadness.

Here, at least two of the cortisol points are below normal and there are symptoms consistent with a degree of adrenal axis dysfunction. Fatigue (especially morning fatigue), anxiety, difficulty maintaining energy throughout the day, feeling flat or "burned out", excessive use of caffeine, hypoglycemic episodes, depression, allergies, and decreased exercise tolerance are some of the symptoms which can be indicative of adrenal dysregulation/adrenal fatigue, although not all these symptoms will be present in every individual. Low or low normal cortisol output may impair the action of thyroid hormone, and lead to functional hypothyroidism (symptoms of low thyroid such as feeling cold, depression, dry skin, constipation and weight gain, with normal thyroid tests). "Adrenal Fatigue: The 21st Century Stress Syndrome" by James Wilson DC ND PhD is an excellent reference on this topic. Ultimately, the treating physician is best able to determine the appropriate course of action.*

The ratio C/DHEAS is 0.51. This ratio normally increases with age. Based on a large in-house analysis of more than 15,000 samples at ZRT Laboratory in Portland, the ratio at age 20 is approximately 0.6; at age 45 it is 1.0; at age 60 it is 1.5 and at age 75 it is 2.3. This is because DHEAS declines with age whereas morning cortisol stays the same or increases slightly. If the ratio is higher than expected, based on the patient's age, this may be indicative of unbalanced adrenal function (cortisol too high or DHEAS too low). Factors which can contribute to imbalance include acute or chronic stress, obesity, metabolic syndrome/diabetes, and hypothyroidism. If the ratio is lower than expected for age, and DHEAS is within normal limits, this may simply be an indicator of healthy aging (i.e. preservation of DHEA output with age); however, a lower-than-expected ratio for age may also be due to low cortisol, high DHEAS, or both.

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Note: The College of Physicians and Surgeons of Alberta considers saliva hormone testing and some forms of bio-identical hormone replacement to be complementary medicine. The interpretation comments have not been evaluated or approved by any regulatory body. Commentary is provided to clinicians for educational purposes and should not be interpreted as diagnostic or treatment recommendations. *General treatment suggestions can be found in the Rocky Mountain Analytical Resource Binder.