



63 Zillicoa Street  
Asheville, NC 28801  
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Patient: **SAMPLE PATIENT**

**Order Number:**

Completed: August 06, 2007

Age: 50

Received: July 31, 2007

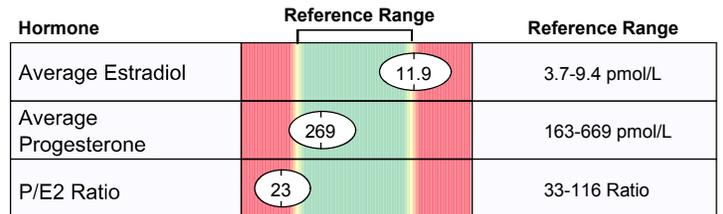
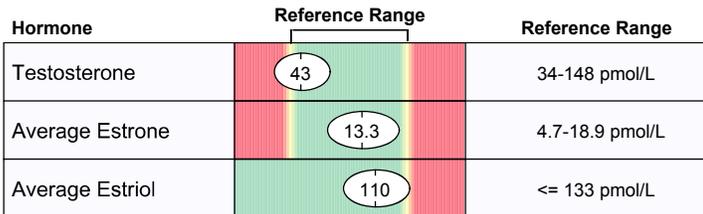
Sex: F

Collected: July 18, 2007

MRN:

### Salivary Hormone Results

Sample #	Estrone (E1) (pmol/L)	Estradiol (E2) (pmol/L)	Estriol (E3) (pmol/L)	Progesterone (pmol/L)
1	20.6	25.2	250	315
2	9.5	5.8	19	235
3	9.7	4.7	62	257
Reference Range	4.7-18.9	3.7-9.4	<=133	163-669



### Commentary

#### Introduction

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Please note that hormone results which are absent, NR or begin with "<" or ">" are excluded from the calculation of analyte averages.

This profile measures the levels of progesterone, testosterone, and the three forms of estrogen in your body, estradiol, estrone, and estriol. All of these measurements reflect the amount of hormone directly available to the body, that is the fraction of hormone not bound to binding globulin.

Estrogen, in general, is vital for healthy reproductive and menstrual cycle function. It is also responsible for maintaining secondary sexual characteristics, is required for endometrial (uterine) gland development, and the production of cervical and vaginal mucus. In addition, estrogen positively influences cardiovascular health, bone

## Commentary

density, brain function and mood, and libido. Estrogen also reduces bowel motility and stimulates the synthesis of many enzymes in the body. Because of estrogen's stimulatory effect upon the endometrium, levels should be balanced by progesterone.

**Estradiol** is the most potent estrogen, with a potency 12 times that of estrone and 80 times that of estriol. The bulk of estradiol pre-menopausally derives from the ovary, so it is the predominant estrogen during the pre-menopausal years. Although it remains the most potent estrogen among the three, its levels typically decline in menopause, as ovarian function declines.

**Estrone** becomes the primary estrogen as the ovary loses its ovulatory function in menopause. Most of estrone's biosynthesis is dependent upon the production of androstenedione (an androgen) in the adrenal glands and the conversion of androstenedione to estrone (aromatization) in various peripheral tissues, particularly adipose, or fat tissue.

**Estriol** is the least potent estrogen in the body, and is considered to be a mild and brief-acting hormone. Estriol is thought to primarily originate from estrone, via 16-alpha-hydroxyestrone, although some estriol may come directly from androstenedione. Estriol has a much lower affinity for sex-hormone binding globulin (SHBG), so a greater percent is typically available for biological activity. It is thought that estriol may protect against estrogen-associated cancers, although further research is needed to confirm this.

**Progesterone** is also important for normal reproductive and menstrual function, and influences the health of bone, blood vessels, heart, brain, skin, and many other tissues and organs. As a precursor, progesterone is used by the body to make other steroid hormones, including DHEA, cortisol, estrogen, and testosterone. In addition, progesterone plays an important role in mood, blood sugar balance, libido, and thyroid function, as well as adrenal gland health.

**Testosterone** is an important hormone for women, helping to maintain lean body mass, bone density, skin elasticity, blood cell production, and libido.

All three forms of estrogen, progesterone and testosterone must be in proper balance with each other for optimal health.

### Laboratory Results

The average estradiol is elevated while the average estrone is within the reference range. Any individual estradiol or estrone measurement above or below the reference range is still considered clinically significant. Elevated estradiol has been associated with increased risk for breast and endometrial cancer, especially when unopposed by progesterone. Estradiol is derived from both estrone and testosterone, and normally becomes less predominant than estrone post-menopausally, as the ovary loses its ovulatory function. Estradiol levels may be temporarily elevated perimenopausally, while the ovary is still responding to gonadotropins. Elevated free estradiol may also result from increased concentrations of androstenedione or DHEA (e.g. polycystic ovary syndrome), increased conversion from testosterone (aromatization), reduced amounts of sex-hormone binding globulin, reduced metabolism, or exogenous administration.

The average estriol is within the reference range. *In-vitro* studies have demonstrated estriol's ability to compete with estradiol in terms of receptor binding, suggesting some antagonistic estrogen activity. At the same time, estriol administration has demonstrated an estrogenic effect when given by itself. Thus, estriol's estrogenic influence in this case should probably be evaluated in light of the levels of estradiol and estrone. Positive reports regarding estriol's influence on bone and the cardiovascular system are mixed, as well as studies focusing on possible cancer-preventive properties, although observations have suggested higher estriol levels in association with lower incidence of breast cancer. Estriol is metabolized irreversibly from estradiol as well as from estrone via 16 alpha-hydroxyestrone.

The average for progesterone is within the reference range, suggesting ample progesterone protection in the body. Any individual progesterone measurement above or below the reference range is still considered clinically significant.

***Commentary***

Testosterone is within the reference range.

# Comprehensive Melatonin Profile



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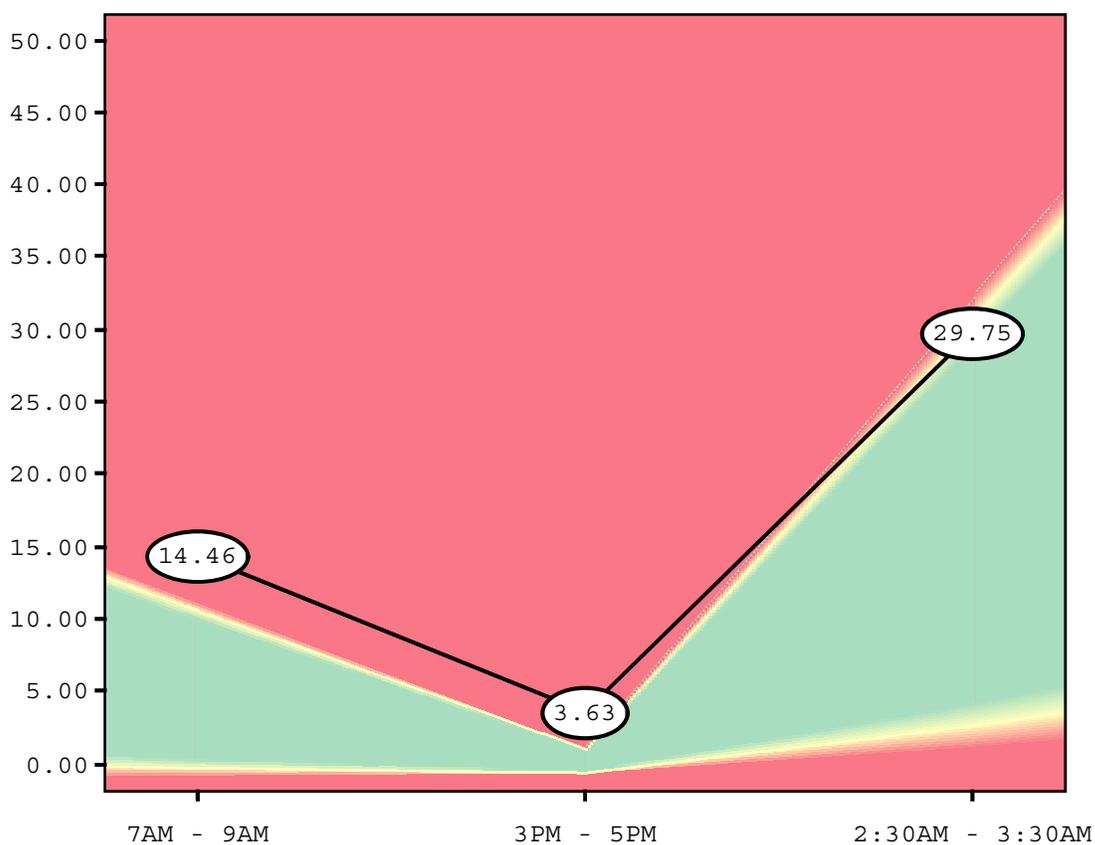
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## Salivary Melatonin



### Reference Range

7AM - 9AM:  $\leq 10.50$  pg/mL

3PM - 5PM:  $\leq 0.88$  pg/mL

2:30AM - 3:30AM: 2.53-30.67 pg/mL

## ***Commentary***

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The 7-9 AM and 3-5 PM melatonin levels are elevated.

High morning melatonin levels are often present in individuals with Seasonal Affective Disorder. This may be due to prolonged nocturnal production of melatonin, and/or late onset of its production. High melatonin levels may bring about inhibition of ovulation in women as well as decreased body temperature. High melatonin has been noted in the manic phase of bipolar mood disorder. Many antidepressant drugs may stimulate melatonin production, including fluvoxamine (Luvox), desipramine, and most MAO inhibitors. Prozac may lower melatonin levels.

This profile reveals a disturbance in the circadian rhythm of melatonin. This may influence other hormones such as thyroid, testosterone, and estrogen. As well as playing a crucial role in sleep-wake cycles, melatonin influences other vital functions including cardiovascular and antioxidant protection, endocrine function, immune regulation and body temperature.

# Adrenocortex Stress Profile



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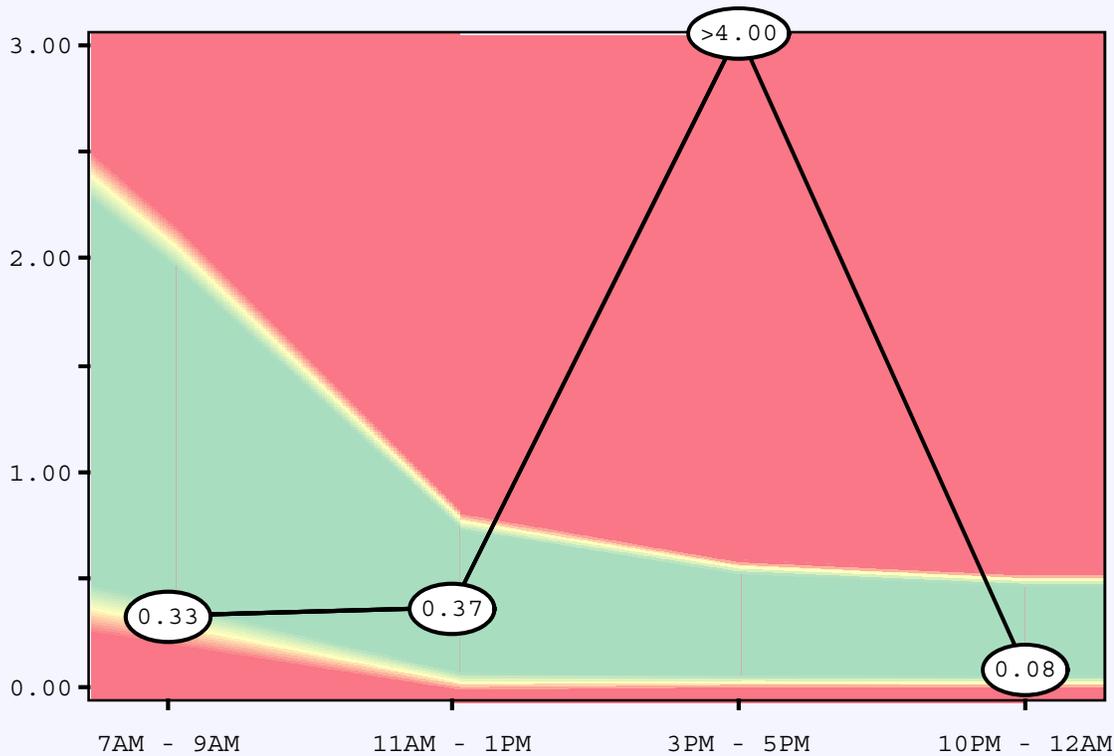
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## Salivary Cortisol and DHEA



Cortisol<sup>♦</sup>

Reference Range

1 Hour After Rising  
7AM - 9AM:

0.27-2.06 mcg/dL

11AM - 1PM:

0.03-0.77 mcg/dL

3PM - 5PM:

0.03-0.56 mcg/dL

10PM - 12AM:

0.03-0.50 mcg/dL

Hormone	Reference Range	Reference Range
DHEA 7am - 9am	57	14-277 pg/mL
DHEA / Cortisol Ratio x 10,000	173	35-435

## Commentary

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## Commentary

For the patient:

This profile measures the levels of cortisol and DHEA and provides an evaluation of how cortisol levels differ throughout the day. Cortisol levels typically peak shortly after rising and are at their lowest after the onset of sleep.

Cortisol is involved in many important functions in your body, including the metabolism and utilization of proteins, carbohydrates and fats, your body's response to physiological or psychological stress, and the control of inflammation and proper blood sugar levels. Cortisol also helps maintain proper blood pressure, normal nerve and brain activity and normal heart and immune function. DHEA also plays a role in the metabolism of protein, carbohydrates and fats, and works with cortisol to help maintain proper blood sugar levels. DHEA helps regulate body weight, blood pressure and immune function, and is used by the body to make the hormones, testosterone and estradiol.

Too much or too little of cortisol or DHEA can lead to illness, and it is important that these two hormones be in balance with each other.

For the physician:

In this profile, the 7-9 AM cortisol level is within the reference range. Because cortisol levels are typically at their peak shortly after awakening, morning cortisol may be a good indicator of peak adrenal gland function. Morning cortisol levels within reference range suggest a component of normal adrenal function with regard to peak circadian activity.

The 11 AM-1 PM cortisol level is within the reference range. Mid-day cortisol levels may be a good indication of adaptive adrenal gland function since they represent the adrenal glands' response to the demands of the first few hours of the day. Mid-day cortisol levels within reference range suggest a component of normal adrenal function in regard to adaptive response.

The 3-5 PM cortisol level is above the reference range. Afternoon cortisol levels may be a good indication of glycemic control exerted by the adrenal gland since they represent a postprandial sample. High afternoon levels suggest a degree of adrenal hyperfunction with increased adrenal assistance in glycemic control. Other possible causes of high salivary cortisol include stress, heavy exercise, pregnancy, smoking, obesity, depression, alcoholism, or if significantly elevated, adrenal hyperplasia and Cushing's syndrome.

The 10 PM-12 AM cortisol level is within the reference range. Late-night cortisol levels may be a good indication of baseline adrenal gland function since they typically represent the lowest level during the day. Normal late-night cortisol levels suggest normal adrenal function with regard to baseline circadian activity.

DHEA is within the reference range. Proper levels contribute to the ideal metabolism of proteins, carbohydrates and fats, including efficient glycemic control.

The ratio of DHEA to cortisol is normal. This ratio indicates a relative balance of the adrenal output of androgens and cortisol. Both of the hormones are released in response to ACTH from the pituitary and a normal ratio indicates a balanced function of the hypothalamic-pituitary-adrenal axis.

A pattern showing one or more elevated cortisol levels, while the level of DHEA is within reference range, is clinically significant. Elevated cortisol suggests adrenal hyperfunction of the zona fasciculata (the primary source of cortisol). At this time there is no evidence of hyperfunction of the zona reticularis (the primary source of DHEA). This profile may present in the presence of increased physiological or psychological stress, anxiety, hypertension, and/or dysglycemia.