

**RESULTS: SALIVA HORMONE TEST**

Accession #: 100035201 • Patient: John Smith

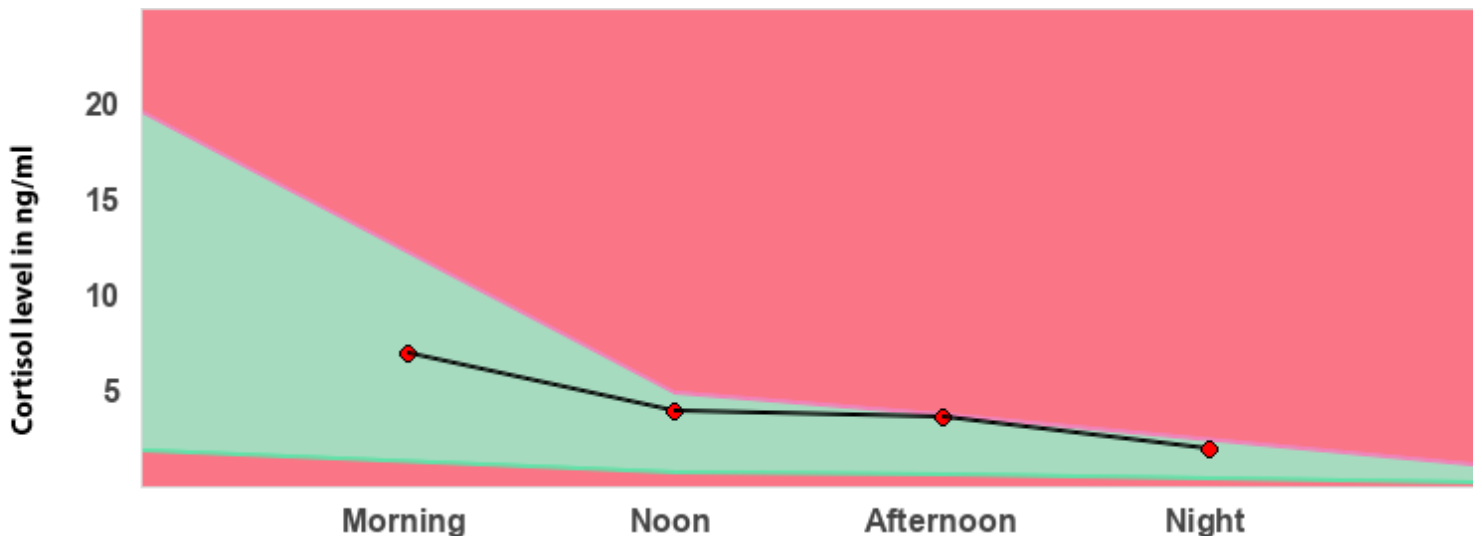
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**Patient:** John Smith  
**Sex:** Male      **Age:** 36 yr      **Date of Birth:** 1985-09-09  
**Height:** 6 ft 5 in      **Weight:** 145 lbs      **Waist size:** 42 in  
**Hormones:** No  
**Health Care Professional:** John Smith

**Accession #:** 100035201  
**Sample received:** 2021-09-15  
**Report issued:** 2021-09-21  
**Sample collection:**  
 2019-03-18 07:30 AM  
 2019-03-18 12:30 PM  
 2019-03-18 18:45 PM  
 2019-03-18 22:30 PM

**ADRENAL CHECK**

HORMONE	RESULT	REFERENCE RANGE	UNITS
Cortisol - morning (30-60 min. after waking)	<b>7 (22.3)</b>	1.6 - 12.6 (5.1 - 40.2)	ng/ml (nM/L)
Cortisol - noon	<b>4 (12.8)</b>	0.7 - 4.9 (2.2 - 15.6)	ng/ml (nM/L)
Cortisol - afternoon	<b>3.6 (11.5)</b>	0.6 - 3.8 (1.9 - 12.1)	ng/ml (nM/L)
Cortisol - night	<b>2 (6.4)</b>	0.3 - 2.9 (1.0 - 9.2)	ng/ml (nM/L)
CORTISOL - TOTAL	<b>16.6 (53)</b>	3.2 - 24.2 (10.2 - 77.1)	ng/ml (nM/L)
DHEA-S	<b>2.7</b>	0.2 - 2.7	ng/ml
TOTAL CORTISOL:DHEA-S RATIO	<b>6:1</b>	5:1 to 6:1	



Green shade represents the normal range

◆ represents the patient results

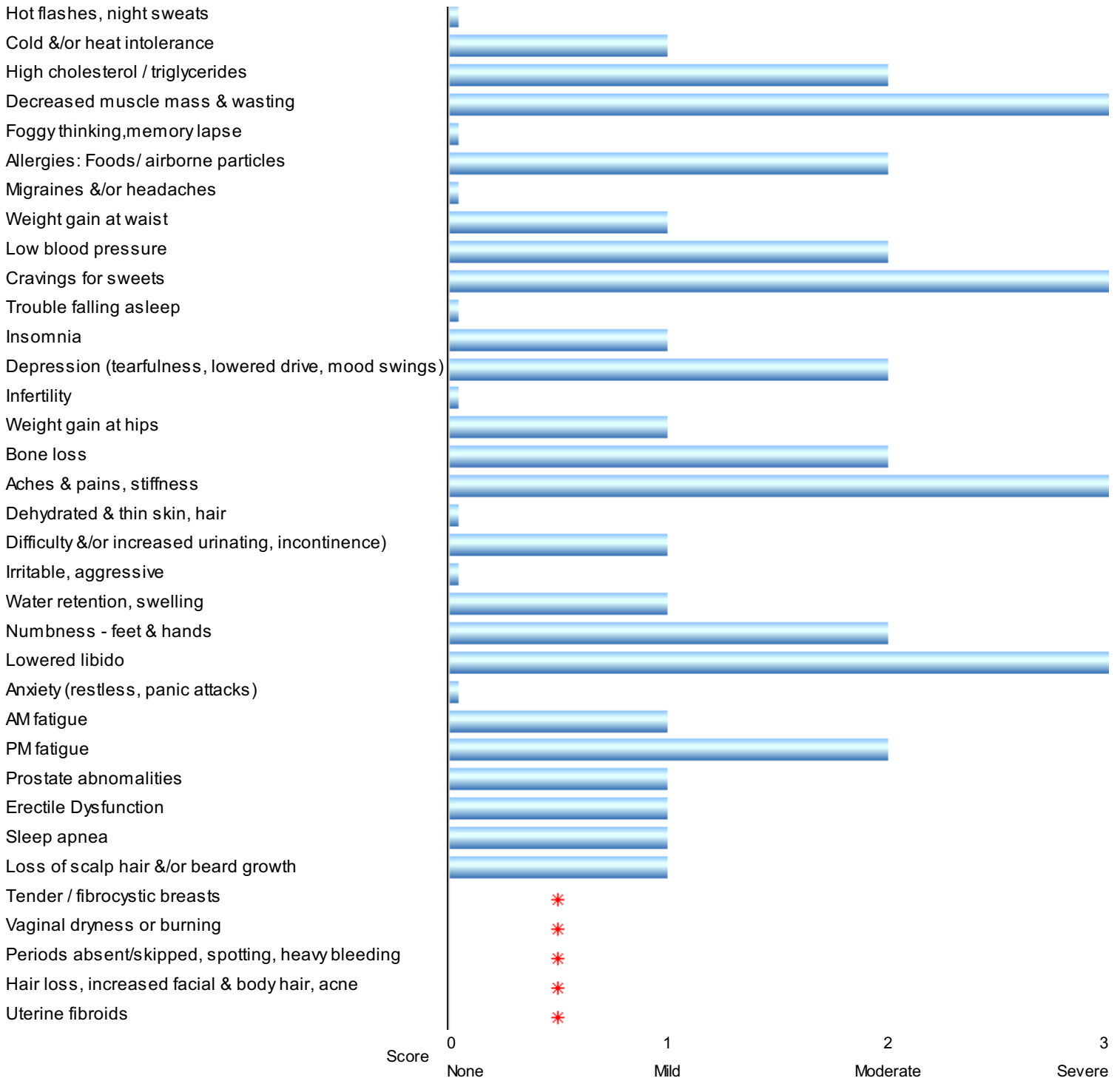


Dr. Aron Gonshor PhD, DDS, FRCD(C), FAO • Laboratory Director

The reference range is derived from a normal distribution of results that encompass 95% of randomly selected individuals in a population.

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\* Indicates that symptom left blank

## Understanding Hormone Excess and Deficiency

The comments provided here are for educational purposes only. They should not be interpreted as being diagnostic or treatment recommendations. Those decisions are the responsibility of the health care professional. Moreover, the reference range shown in this report is derived from a normal distribution of results that encompass 95% of randomly selected individuals in a population.

### IN THE PRESENT TEST

#### CORTISOL

The Morning cortisol level lies inside the reference range. Cortisol levels are normally highest shortly after waking and indicate normal adrenal function at its circadian peak.

The Noon cortisol level lies inside the reference range and indicate that the adrenal glands are responding well to the needs of the day, especially in glycemic control. This highlights the importance of the adrenal glands in the regulation of blood glucose levels.

The Afternoon cortisol level lies inside the reference range and indicate that the adrenal glands are responding well to the needs of the day, especially in glycemic control.

The Nighttime cortisol level lies inside the reference range, and indicates that adrenal glands are functioning normally within the circadian cycle. It is a good indicator of a normal baseline level of adrenal activity.

#### DHEA-S (Dehydroepiandrosterone Sulphate)

DHEA-S lies within the reference range. DHEA, together with cortisol, plays an important role in maintaining normal blood glucose levels (glycemic control). Normal levels are important in proper metabolism of carbohydrates, fats and proteins.

## General Discussion

### CORTISOL

**About Cortisol:** Cortisol is produced by the adrenal glands, which are controlled by parts of the brain called the hypothalamus and pituitary. Cortisol plays an important role in breaking down glycogen to glucose in liver and muscle tissue. It mobilizes glucose, so as to maintain normal blood sugar levels, the primary energy source for the brain. Cortisol levels are highest in the early morning (approximately 8 am) and reach the lowest level about midnight to 4 am, or three to five hours after the onset of sleep. Diurnal cycles of cortisol levels are found in human saliva. Cortisol production comes in response to daily stress, as well as emotional upset, infections and surgery. It prevents the release of substances in the body that cause inflammation. It is used to treat conditions resulting from over activity of the B-cell-mediated antibody response. Examples include inflammatory and rheumatoid diseases, as well as allergies. Low-potency hydrocortisone, available as a non-prescription medicine in some countries, is used to treat skin problems such as rashes, and eczema<sup>1,2,3</sup>.

**Low Cortisol**, especially if it remains so throughout the day, may indicate **Adrenal Exhaustion**, which is caused by stress, such as sleep deprivation, emotional stress, poor diet, nutrient deficiencies, and/or synthetic glucocorticoid medications that suppress cortisol production. Chronic stress depletes cortisol and is associated with symptoms of morning and evening fatigue, aches and pains, fibromyalgia, cold body temperature, decreased stamina, slow pulse rate, low blood sugar (sugar craving) and low blood pressure. In addition one often encounters increased allergies (immune dysfunction), and sensitivity to chemicals. Symptoms of thyroid deficiency can also be due to low cortisol levels. Exercise, more adequate sleep, a diet with adequate protein, 'bio-identical' progesterone, adrenal extracts and nutritional supplements are often helpful in correcting low cortisol.

**High Cortisol.** Although normal cortisol levels are essential for life, chronically elevated levels can be very detrimental. Increased cortisol production by the adrenals is a normal response to routine stress, but when stress is chronic and cortisol output remains high over a prolonged period (months/years), break-down of normal tissues (muscle wasting, thinning of skin, bone loss) and immune suppression can result. Common symptoms of chronic high cortisol include sleep disturbances, fatigue, depression and weight gain in the waist and anxiety. Stress and persistently elevated cortisol levels can contribute to premature aging and chronic illness.

**b) DHEA-S (Dehydroepiandrosterone Sulphate)**

**About DHEA:** DHEA, a testosterone precursor, is the most abundant circulating steroid hormone. DHEA is produced predominately by the adrenal glands, the gonads, and the brain, where it functions predominantly as a metabolic intermediate in the biosynthesis of the androgen and estrogen sex steroids. DHEA-S is the sulphated form, and in blood it approaches levels 300 times that of free DHEA. Whereas DHEA levels are at a peak in the early morning, DHEA-S levels show no diurnal variation. From a practical point of view, measurement of DHEA-S is preferable to DHEA, as its levels are more stable. In the young the levels approach the high end of the range. They decrease with age and get to the lower end of normal in middle age.

Low DHEA-S can be caused by adrenal exhaustion and is commonly seen in accelerated aging and diseases such as cancer.

High DHEA-S can be associated with insulin resistance/PCOS<sup>4</sup> (polycystic ovaries) or DHEA supplementation.

**TOTAL CORTISOL : DHEA-S RATIO**

The normal ratio ranges from 5:1 to 6:1, and is an indicator of the adrenal output of cortisol and the androgens. It is age dependent, since there is a decline in DHEA-S with age, while the levels of morning cortisol remain relatively stable or increase slightly. If the ratio is higher than normal it is due to adrenal dysfunction. When the body experiences chronic stress, pregnenolone, the precursor to all other steroidal hormones, begins to overproduce cortisol (known as 'cortisol escape'). This is at the expense of all the other steroidal hormones (DHEA and its metabolites, including progesterone, testosterone, and the estrogens). As pregnenolone is diverted to cortisol, DHEA-S depletion begins. This creates an elevated cortisol to DHEA-S ratio. If the ratio is lower than normal for that age, and the DHEA-S level is within the normal range, it is probably due to the maintenance of DHEA-S output with advancing age. However, if the ratio for that age is lower than expected, it is probably due to high DHEA-S levels, low cortisol, or both of these.

**References**

1. Fukaya M et al. Topical steroid addiction in atopic dermatitis. Drug, Healthcare and Patient Safety 2014; 6: 131-138.
2. Nieman, LK. Recent Updates on the Diagnosis and Management of Cushing's Syndrome. Endocrinol Metab 2018; 33:139-146.
3. Crona J, Beuschlein F, Pacak K and Skogseid B. Advances in adrenal tumors 2018. Endocrine-Related Cancer 2018; 25: R405-R420.
4. Gill J. Low Cortisol, High DHEA, and High Levels of Stimulated TNF $\alpha$ , and IL-6 in Women with PTSD. J Trauma Stress. 2008; 21: 530–539.