



PATIENT: **Sample Report**

TEST REF: **XXXXXX**

TEST NUMBER: #####

PATIENT NUMBER: #####

SEX: Female

AGE: 41

DATE OF BIRTH: mm/dd/yyyy

PRACTITIONER: **Nordic Laboratories**

TEST NAME: DUTCH - Cortisol Awakening Response (CAR)

Category	Test		Result	Units	Normal Range
Free Cortisol and Cortisone (Saliva)					
	Saliva Cortisol - Waking (W)	Low end of range	1.93	ng/mL	1.5 - 4.6
	Saliva Cortisol - W+30 min.	High end of range	6.8	ng/mL	3 - 7.7
	Saliva Cortisol - W+60 min.	Above range	7.88	ng/mL	2 - 4.7
	Saliva Cortisol - Afternoon	Within range	0.76	ng/mL	0.2 - 1.6
	Saliva Cortisol - Night	Within range	0.55	ng/mL	0 - 0.9
	Saliva Cortisone - Waking (W)	Low end of range	6.83	ng/mL	6.7 - 13.3
	Saliva Cortisone - W+30 min.	Within range	13.41	ng/mL	10.3 - 18.8
	Saliva Cortisone - W+60 min.	Above range	16.14	ng/mL	9.2 - 15.3
	Saliva Cortisone - Afternoon	Within range	6.04	ng/mL	2.1 - 8.3
	Saliva Cortisone - Night	Within range	3.81	ng/mL	0 - 5.6
	Saliva Cortisol Total	High end of range	17.92	ng/mL	8 - 18
	Saliva Cortisone Total	Within range	49.23	ng/mL	33 - 55

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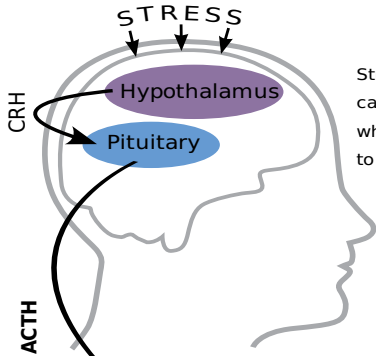
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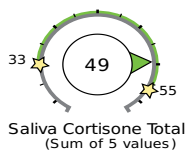
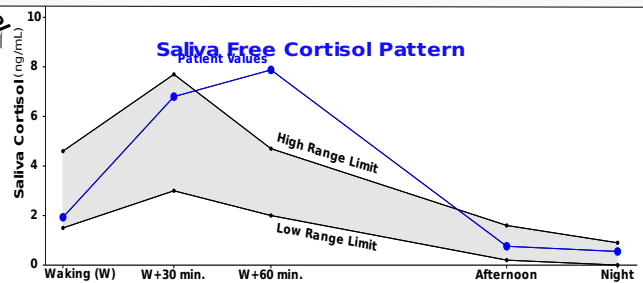
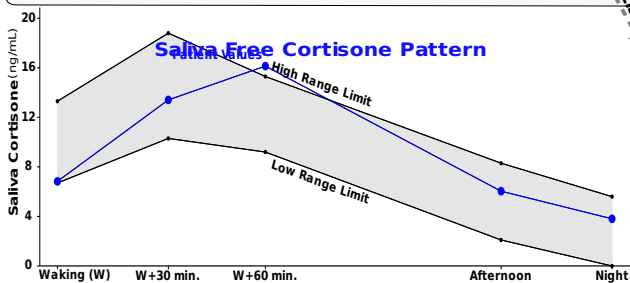
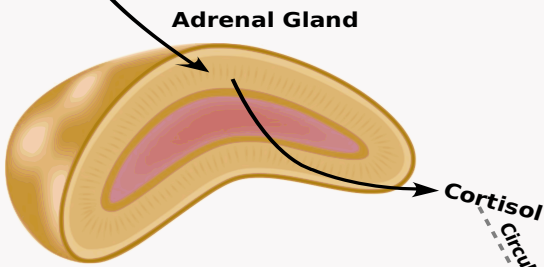
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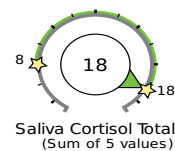
TEST NAME: DUTCH - Cortisol Awakening Response (CAR)



Stress (or inflammation) causes the brain to release ACTH, which stimulates the adrenal glands to make hormones



Cortisol and Cortisone interconvert (11β-HSD)



The Cortisol Awakening Response (CAR) is the rise in salivary cortisol between the waking sample and the sample collected 30 (as well as 60) minutes later. This "awakening response" is essentially a "mini stress test" and is a useful measurement in addition to the overall up-and-down (diurnal) pattern of free cortisol throughout the day. **This patient shows a waking cortisol of 1.9 and an increase to 6.8 after 30 minutes. This is an increase of 4.9ng/mL or 250%.** Expected increases differ depending on the methods used. Preliminary research shows that 50-160% or 1.5-4.0ng/mL increases are common. These guidelines are considered research only. **This patient shows a salivary cortisol of 7.9 measured 60 minutes after waking. This is an increase of 6.0ng/mL or 310% compared to the waking sample.** To date, data suggests that expected results may be 0-70%, and this guideline is considered for research only.

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Provider Notes

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.

THE PATIENT REPORTS NO MENSTRUAL CYCLES.

DUTCH Adrenal: The HPA-Axis refers to the communication and interaction between the hypothalamus (H) and pituitary (P) in the brain down to the adrenal glands (A) that sit on top of your kidneys. When a physical or psychological stressor occurs, the hypothalamus tells the pituitary to make ACTH, a hormone. ACTH stimulates the adrenal glands to make the stress hormone, cortisol and to a lesser extent DHEA and DHEA-S. Normally, the HPA-axis production follows a daily pattern in which cortisol rises rather rapidly in the first 10-30 minutes after waking in order to help with energy, then gradually decreases throughout the day so that it is low at night for sleep. The cycle starts over the next morning. Abnormally high activity occurs in Cushing's Disease where the HPA-axis is hyper-stimulated causing cortisol to be elevated all day. The opposite is known as Addison's Disease, where cortisol is abnormally low because it is not made appropriately in response to ACTH's stimulation. These two conditions are somewhat rare. Examples of more common conditions related to less severely abnormal cortisol levels include fatigue, depression, insomnia, fibromyalgia, anxiety, inflammation and more.

Only a fraction of cortisol is "free" and bioactive. This fraction of cortisol is very important, but levels of metabolized cortisol best represents overall production of cortisol therefore both should be taken into account to correctly assess adrenal function.

When evaluating cortisol levels, it is important to assess the following:

-The overall up-and-down pattern of free cortisol throughout the day, looking for low and high levels: Abnormal results should be considered along with related symptoms.

-The sum of the free cortisol as an expression of the overall tissue cortisol exposure:

-The total level of cortisol metabolites (only available with the DUTCH Plus with urine collections): We call this calculation "Metabolized Cortisol" which is the sum of a-THF, b-THF and b-THE. While free cortisol is the best assessment for tissue levels of cortisol, it only represents 1-3% of the total produced. The majority of cortisol results in a urine metabolite and the total of these metabolites best represents the total glandular output of cortisol for the day. When overall production is much higher than free cortisol levels, cortisol clearance may be increased (as seen in hyperthyroidism, obesity, etc.) The most common reason for sluggish cortisol clearance (assumed when free cortisol levels are much higher than metabolized cortisol) is low thyroid.

-A potential preference for cortisol or cortisone (the inactive form): Looking at the comparison between the total for free cortisol and free cortisone is NOT the best indication of a person's preference for cortisol or cortisone. The saliva gland converts cortisol to cortisone in the local tissue. This localized conversion can be seen by comparing cortisol and cortisone levels. To see the patient's preference systemically, it is best to look at which *metabolite* predominates (THF or THE). This preference can be seen in the gauge below metabolized cortisol (only if ordering the DUTCH Plus with urine collections). This is known as the 11b-HSD index. The enzyme 11b-HSD II converts cortisol to cortisone in the kidneys, saliva gland and colon. 11b-HSD I is more active in the liver, fat cells and the periphery and is responsible for reactivating cortisone to cortisol. Both are then metabolized by 5a-reductase to become tetrahydrocortisol (THF) and tetrahydrocortisone (THE) respectively.

-The Cortisol Awakening Response (CAR): The unique feature of the DUTCH Plus is the inclusion of the CAR assessment. The response to waking adds one more piece to HPA-axis function. In some cases overall levels of free cortisol may be normal, but the response to stress may be under or overactive. Reasons for a lower CAR might include: an underactive HPA Axis, excessive psychological burnout, seasonal affective disorder (SAD), sleep apnea or poor sleep in general, PTSD, and "chronic fatigue" patients. An elevated CAR can be a result of an over-reactive HPA axis, ongoing job-related stress (anticipatory stress for the day), glycemic dysregulation, pain (ie. waking with painful joints or a migraine), and general depression (not SAD). Scientific literature points to the magnitude of the morning cortisol increase as being connected to HPA-axis health whether the overall production of cortisol is low, normal or high.

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