CNSLab

LABORATORY REPORT

PATIENT DETAILS			
PATIENT NAME:	Sample Report		
PATIENT ID:	76592	**SAMPLE DATE:**	05/12/2022
PATIENT DOB:	07/09/1962	**SAMPLE TIME:**	08:00:00
ORDER ID:	I47726	**RECEIVED DATE:**	05/12/2022
TEST ID:	147409	**REPORT DATE:**	05/12/2022

CLINIC DETAILS

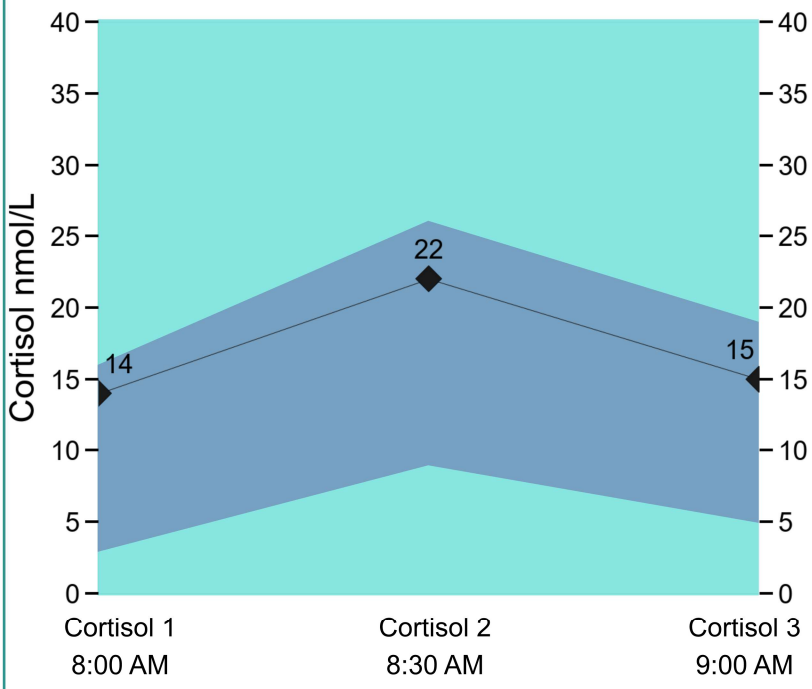
Laboratory CNS
Eden Research Park
Henry Crabb Road
Littleport
ELY
CB6 1SE

HPA Axis and Stress Function

Cortisol Awakening Response (CAR)

This is the increase in free cortisol concentration that occurs in the morning post awakening and is brought about due to normal circadian hypothalamic-pituitary-adrenal axis (HPA) activation. This process starts several hours prior to waking, with ACTH (adrenocorticotrophic hormone) stimulating a rise in cortisol levels captured in the first saliva sample. The second sample captures cortisol stimulation resulting from both light activation via the suprachiasmatic nucleus plus the anticipated demands of the day ahead.

The cortisol awakening response (CAR) is perhaps one of the most informative measurements reported in an HPA Axis Function profile in terms of identifying potential HPA axis stress dysfunction and can therefore give a good indication of how well an individual is coping with their daily stressors and their subsequent impact on health. As a guideline, a gradual increase of 50% from sample 1 to sample 2 should ideally be exhibited for a healthy CAR. Older subjects can have higher morning cortisol levels and will also see less of a dynamic change as result.



Cortisol 1	Cortisol 2	Cortisol 3
14.0 nmol/L	22.0 nmol/L	15.0 nmol/L
NORMAL RANGE 3.0 — 16.0	NORMAL RANGE 9.0 — 26.0	NORMAL RANGE 5.0 — 19.0

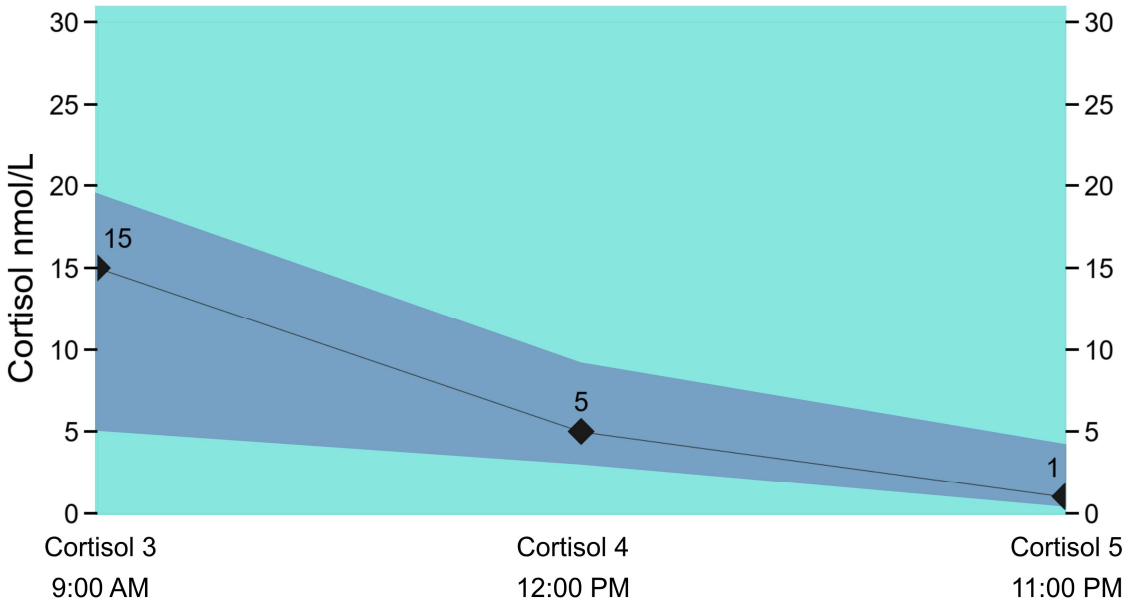
Normal CAR Response

Cortisol levels are generally high in the morning as we wake from a prolonged period of sleep, with an increase of up to 50% 20 to 30 minutes after waking. This is known as the 'cortisol awakening response' (CAR). This peak morning cortisol is a useful indicator of the function of the HPA axis and stress control.

Within Reference Range

Morning cortisol levels within reference range are suggestive of optimal HPA axis and stress control with regard to peak circadian activity.

Cortisol Diurnal Rhythm



Cortisol 3

15.0

nmol/L

NORMAL RANGE
5.0 — 19.0

RESULT: Within Reference Range

Morning cortisol levels within reference range are suggestive of optimal HPA axis and stress control with regard to the cortisol awakening response CAR.

Cortisol 4

5.0

nmol/L

NORMAL RANGE
3.0 — 9.0

RESULT: Within Reference Range

Afternoon levels within the reference range suggest normal optimal HPA axis and stress control. Afternoon cortisol levels may be a good indication of the adrenal glands' ability to help regulate blood sugar, since they represent a postprandial sample.

Cortisol 5

1.0

nmol/L

NORMAL RANGE
0.5 — 4.0

RESULT: Within Reference Range

Normal late-night cortisol levels suggest normal HPA axis and stress control with regard to baseline circadian activity. Late-night cortisol levels may be a good indication of baseline HPA axis and stress control since they typically represent the lowest level during the day.

Total Daily Cortisol & DHEA

Cortisol Daily Total

57.0

nmol/L

NORMAL RANGE
20.5 — 74.0

RESULT: Within Reference Range

Suggests optimal daily adrenal secretion levels of cortisol, indicating normal diurnal and HPA axis regulation.

DHEA am

1.00

nmol/L

NORMAL RANGE
0.23 — 1.38

RESULT: Within Reference Range

DHEA production increases from around nine or ten years of age, peaks during the 20s and gradually decreases into old age. It is an important precursor hormone and is the most abundant circulating steroid present in the human body. Normal levels indicate correct functioning of the HPA axis.

DHEA pm

0.60

nmol/L

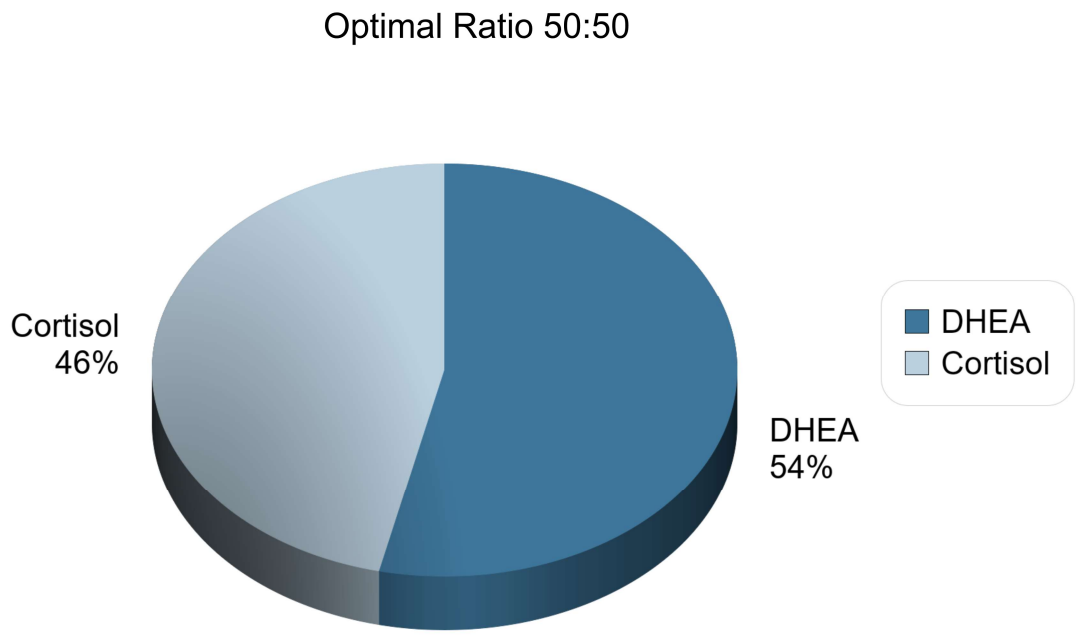
NORMAL RANGE
0.13 — 0.69

RESULT: AM greater than PM

DHEA levels that are lower later in the day (for the pm reading) than they are in the morning is a sign that the adrenal glands are responsive to HPA axis regulatory pathways.

Cortisol : DHEA Balance

The cortisol to DHEA ratio is considered to be a measure of catabolic vs anabolic activities. It is believed to be very important to health with numerous functions in the body becoming dysregulated if imbalanced. Cortisol and DHEA are both powerful adrenal hormones that have a variety of physiological functions and are both synthesised from pregnenolone, the master steroidal hormone, which is derived from cholesterol. In many ways, the cortisol to DHEA ratio modulates biological energy output, and their effects are felt at the cellular level throughout the body.



Cortisol DHEA Ratio

53.8

NORMAL RANGE
46.6 — 77.6

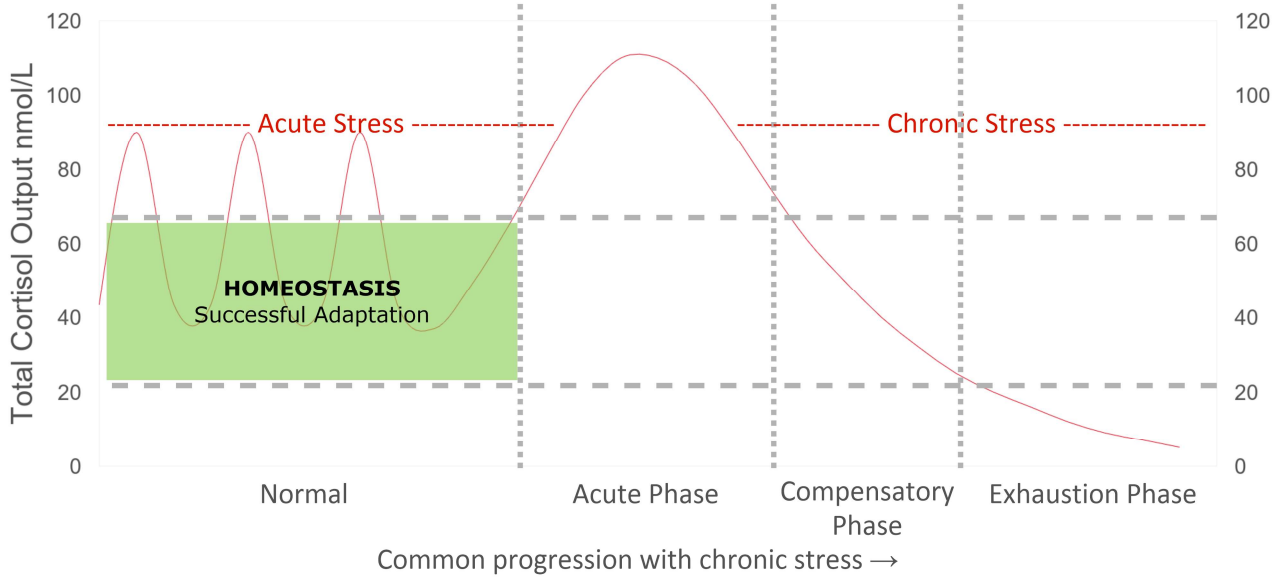
RESULT: Within Reference Range

This ratio indicates that adrenal output of androgens and cortisol is balanced. Both of the hormones are released in response to ACTH from the pituitary and a normal ratio indicates a balanced function of the HPA axis. This protective effect is also seen if both cortisol and DHEA are equally elevated or lowered above or below the reference range respectively.

Stress Stage Evaluation

In the HPA axis, an increase in ACTH output from the pituitary gland stimulates the adrenal glands to release stress hormones including cortisol. The level of cortisol is regulated through the HPA negative feedback loop. Continued demand for increased cortisol production necessitates ongoing ACTH release by the pituitary, and results in semi-permanent downregulation of the HPA Axis and both cortisol and DHEA levels drop as a result.

This diagram illustrates the common pattern of cortisol through the stages of HPA Axis dysfunction. The total cortisol sum is shown to rise then fall as the stages of dysfunction progress left to right. This should not be confused with Addison's disease where cortisol cannot be produced.



Adrenal Response: Normal

Normal or optimal HPA axis stress function is achieved when both cortisol and DHEA levels are within the optimal range and the ratio of cortisol to DHEA (dehydroepiandrosterone) is balanced. Measurement of this ratio is the best way to both evaluate HPA axis stress function and determine the effects that stress is having on overall health. When cortisol and DHEA are in the correct ratio, the HPA axis, is functioning optimally.

Adrenal Function

SYMPTOMS OF HIGH CORTISOL LEVELS	SYMPTOMS OF ADRENAL INSUFFICIENCY (LOW CORTISOL LEVELS)
Wired or fatigued High blood pressure Hyperglycaemia Worsening memory and concentration Difficulty sleeping (insomnia) Decreased sex drive Erectile dysfunction Weight gain and obesity Weakened immune response Increased gut permeability (leaky gut) Food intolerance	Fatigue Worsening memory and concentration Difficulty sleeping (insomnia) Sugar and salt cravings Decreased sex drive Depressed mood Weight gain Bone and muscle loss Anxiety Irritability

Adrenal Glands and Their Essential Bodily Functions