

## Cortisol

### WHAT IS CORTISOL?

Cortisol is a steroid hormone that is predominantly produced in the adrenal gland. It is widely known as the body's stress hormone, but also influences various other functions throughout the body (1).

### ROLES OF CORTISOL

Cortisol receptors are present on most cells throughout the body; therefore, cortisol is able to influence nearly every organ system (1). Cortisol is released in response to low blood sugar and stress. It helps to increase blood sugar through gluconeogenesis (synthesis of 'new' glucose), and is involved in the metabolism of fat, protein, and carbohydrates. It also suppresses the immune system and inflammatory response, helps control blood pressure, is involved in memory formation, and decreases bone formation (1,2).

### REFERENCE RANGES FOR CORTISOL

Blood concentrations of cortisol differ during the day, with higher levels typically occurring in the morning. Reference ranges provided by the Endocrine Society are 5-25 µg/dL at 8 am and 2-14 µg/dL at 4 pm (3). Cortisol measurements can be used to directly monitor adrenal status and indirectly monitor pituitary hyper or hypofunction.

### CORTISOL AND STRESS

Stress is a natural response to a perceived threat. It results in a surge of hormones, including cortisol. Cortisol increases blood glucose levels, enhances the brain's use of glucose, and reduces non-essential functions. Usually, cortisol levels return to normal after the threat has passed. However, in long-term stressful situations, the persistently elevated levels of cortisol can increase the risk of various health complications, including anxiety, depression, digestive problems, weight gain, and insomnia (4,5).

### CORTISOL AND METABOLIC SYNDROME

Metabolic syndrome (MetS) refers to a range of metabolic derangements, including insulin resistance, hypertension, high glucose and triglycerides, low HDL-cholesterol, and abdominal obesity. MetS increases the risk of type 2 diabetes and cardiovascular disease (6). Although the primary mechanism of MetS is insulin resistance, research also suggests that slightly elevated cortisol is another contributing factor towards the development of MetS (7,8).

### SPECIAL INSTRUCTIONS

The time of day that the blood sample is collected should be referenced for all cortisol analyses. This enables the appropriate comparison to the correct reference range for cortisol.

### TEST PROCEDURE

Correct specimen collection and handling is required for optimal assay performance.

This test requires a blood sample from a finger prick. All supplies for sample collection are provided in this kit. First wash and dry hands. Warm hands aid in blood collection. Clean the finger prick site with the alcohol swab and allow to air dry. Use the provided lancet to puncture the skin in one quick, continuous and deliberate stroke. Wipe away the first drop of blood. Massage hand and finger to increase blood flow to the puncture site. Angle arm and hand downwards to facilitate blood collection on the fingertip. Drip blood onto the blood collection card or into the microtainer tube.

Avoid squeezing or 'milking' the finger excessively. If blood flow stops, perform a second skin puncture on another finger, if more blood is required. Do not touch the fingertip.

Dispose of all sharps safely and return sample to the laboratory in the provided prepaid return shipping envelope.

Upon receipt at the laboratory, the blood sample is analyzed by the fully automated Alinity i Cortisol chemiluminescent microparticle immunoassay on the Alinity ci series analyzer. This assay measures cortisol levels by binding to anti-cortisol coated microparticles. The amount of cortisol in the blood sample is measured in relative light units by a chemiluminescent reaction.

### TEST INTERPRETATION

This assay will provide accurate cortisol values for the tested specimen. This value is to be used in conjunction with other clinical and laboratory information for analyses of metabolic and mental health.

### DISCLAIMERS/LIMITATIONS

Various factors can affect cortisol results, including physical or emotional stress, depression, pregnancy, infection, injury, recent surgery, low blood sugar, recent vigorous activity, and certain medications (e.g., birth control pills, estrogen, and corticosteroids).

These results should be interpreted in conjunction with other laboratory and clinical information. Additional testing is recommended if cortisol results are inconsistent with clinical evidence.

False results may occur in specimens from individuals that have received preparations of mouse monoclonal antibodies for diagnosis or therapy. Additional clinical or diagnostic information may be required for these specimens.

Artificially elevated cortisol values may occur in individuals receiving fludrocortisone, prednisolone or prednisone.

Heterophilic antibodies present in the tested blood sample may interfere with this cortisol assay.

The concentration of cortisol determined in this assay may vary slightly to concentrations obtained from alternative assays due to differences in assay methods, calibration, and reagent specificity.

Correct specimen collection and handling is required for optimal assay performance. Potential assay interference may occur in samples that contain  $\geq 20$  mg/dL bilirubin,  $\geq 500$  mg/dL haemoglobin,  $\geq 10$  g/dL total protein, or  $\geq 2000$  mg/dL triglycerides.

## REFERENCES

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