Pacific Biomarkers
The Value of Expertise

Cortisol

Analyte: Cortisol

Specimen Type: Serum, EDTA Plasma

Optimum Volume: 0.5 mL

Stability:

2-8 Degrees C	-20 Degrees C	-70 Degrees C
5 days	3 months	3 months

Reporting Units: mmnol/L

Method: Electrochemiluminescence

Biological or Clinical Significance:

Cortisol (hydrocortisone) is the most prominent glucocorticosteroid, and is essential for the maintenance of several body functions. Like other glucocorticosteroids, cortisol is synthesized from the common precursor cholesterol in the zona fasciculate of the cortex of the adrenal gland. For the transport of cortisol in the blood, about 90% of cortisol is bound to corticosteroid binding globulin (CBG) and to albumin. Only a small amount of cortisol circulates unbound in blood and is free to interact with its receptors.

The most important physiological effects of cortisol are an increase of blood glucose levels (enhancement of gluconeogenesis, catabolic action), and its anti-inflammatory and immunosuppressive action.

Synthesis and secretion of cortisol by the adrenal gland is controlled by a negative feedback mechanism within the hypothalamus-pituitary-adrenal cortex-axis. If the cortisol level is low, corticotrophin releasing hormone (CRH) is secreted by the hypothalamus, which causes the pituitary to release adrenocorticotropic hormone (ACTH). This stimulates the synthesis and secretion of cortisol by the adrenal gland. Cortisol itself acts in a negative feedback mechanism on the pituitary gland and the hypothalamus.In addition, stress is followed by increased cortisol secretion.

Serum cortisol concentrations normally show a diurnal variation. Maximum concentrations (700 nmol/L or 25.4 ug/dL) are usually reached early in the morning, and then concentrations decline throughout the day to an evening level that is about half of the morning concentration. Therefore, for interpretation of results, it is important to know the collection time of the sample. The cortisol status of a patient is used to diagnose the function or malfunction of the adrenal gland, the pituitary, and the hypothalamus. Thereby, cortisol serum concentrations are used for monitoring several diseases with an overproduction (e.g. Cushing's syndrome) or underproduction (e.g. Addison's disease) of cortisol and for the monitoring of several therapeutic approaches.

The determination of cortisol in 24-hour urine is the method of choice for the detection of Cushing's syndrome, since cortisol excretion in urine is not subject to the diurnal rhythm of cortisol secretion. This allows a more exact differentiation between healthy individuals and patients with Cushing's syndrome. Cortisol, which is excreted into urine without alteration is referred to as urinary free cortisol (UFC). Usually, there is a direct proportional relationship between urinary free cortisol and the

Cortisol

unbound and hence biologically active cortisol in the blood.

Recent studies have demonstrated that several night-time salivary cortisol measurements are superior to the measurement of urinary free cortisol in establishing the diagnosis of Cushing syndrome.

Determination of night-time salivary cortisol is particularly helpful in children, psychiatric patients, and subjects where a variety of stress factors might affect the adrenal cortex, causing increased adrenal steroid concentrations.

Principle of Test Method:
The cortisol assay is an automated competitive sandwich immunosassay using electrochemiluminescent detection.