

# Corticosteroid- Binding Globulin

Assessment of cortisol imbalance



The kits are CE-IVD certified and intended for professional use.



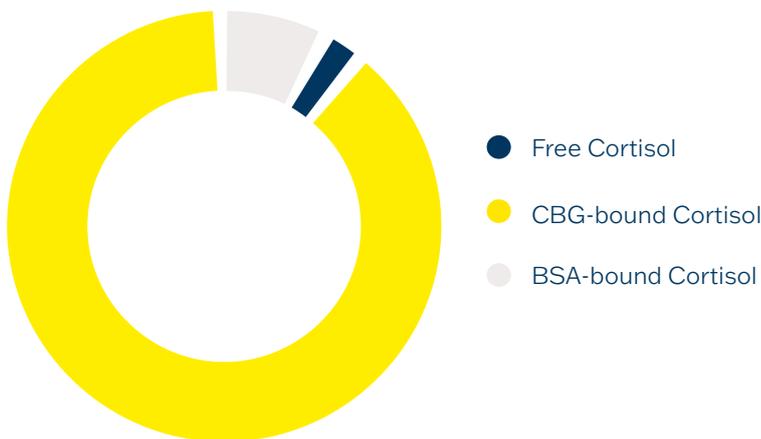
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# General overview

Corticosteroid-Binding Globulin (CBG, transcortin) is a nonfunctional serine protease inhibitor (SERPIN) predominantly synthesized by the liver and secreted into the blood. It is a 383-amino-acid protein and its molecular weight may vary between 50 and 60 kDa depending on glycosylation status. Production of CBG is regulated by estrogen, while its main biological effects are connected to cortisol. Approximately 80–90% of circulating cortisol is bound to CBG, about 5–10% is bound to albumin, and only around 2–5% remains unbound.

Only the unbound fraction of cortisol is biologically active form and can enter cells. By binding cortisol, CBG limits its availability to tissues, regulates the level of biologically active free cortisol, and serves as the main reservoir of circulating cortisol. Binding capacity of CBG under normal conditions is 650 nmol/L, and might increase 2-3x during pregnancy or after taking ovulation inhibitors (hormonal contraceptives, birth control pills), estrogen therapy, in liver cirrhosis, nephrosis or multiple myeloma.

## Cortisol distribution in blood



# Effects of cortisol imbalance

### Metabolic effects of high cortisol:

- Hyperglycemia, insulin resistance
- Immune suppression
- Hypertension
- Redistribution of adipose tissue from the periphery to the central regions (trunk, face, neck)
- Inhibition of collagen synthesis
- Increases sodium reabsorption

### Metabolic effects of low cortisol:

- Hypoglycemia level
- Fatigue
- Hypotension
- Overall reduced lipolysis

# Clinical relevance of CBG

When CBG is altered, total cortisol becomes less reliable as an indicator of adrenal function, and free cortisol or calculated free cortisol correlates more closely with clinical status. The concentration

of CBG in blood varies with physiological states such as pregnancy or stress, increases with estrogen therapy, and is influenced by liver function, which regulates the production of both CBG and albumin.

## Endogenous cortisol imbalance

- Cushing syndrome
- Addison disease

## Drug-induced cortisol imbalance (iatrogenic Cushing syndrome)

- Glucocorticoid therapy: induced adrenal insufficiency
- Estrogen therapy

## Corticosteroid-Binding Globulin

## Critical illness-related corticosteroid insufficiency (CIRCI)

- Septic shock: adrenal function assessment in patients who do not respond to vasopressor therapy
- Hypoalbuminemia in trauma: assessment of adrenal insufficiency in normovolemic patients with persistent hypotension

## Neuroendocrine response

- Hypothalamic-Pituitary-Adrenal axis response to stress (post-traumatic stress disorder)
- Sleep disorders, obesity

# Clinical applications

Normocortisol individuals with hypercortisol-like or hypocortisol-like clinical manifestations

Calculation of free cortisol (Coolens Formula) or Free Cortisol Index



# Human Corticosteroid-Binding Globulin ELISA

<b>Cat. No.</b>	RD192234200R
<b>Size</b>	1 x 96 wells
<b>Assay type</b>	Sandwich, capture - pAb detection - MAb
<b>Regulatory status</b>	EU: CE IVD Rest of the world: RUO
<b>Sample type</b>	Serum, EDTA, heparin or citrate plasma
<b>Reactivity</b>	Human
<b>Assay time</b>	3 hours
<b>Measuring range</b>	1.56 to 100 ng/ml
<b>Sensitivity</b>	0.01 ng/ml
<b>Sample volume requirement</b>	5 µl/well, sample dilution 2 000x
<b>Quality control</b>	QC Low, QC High



## Product features

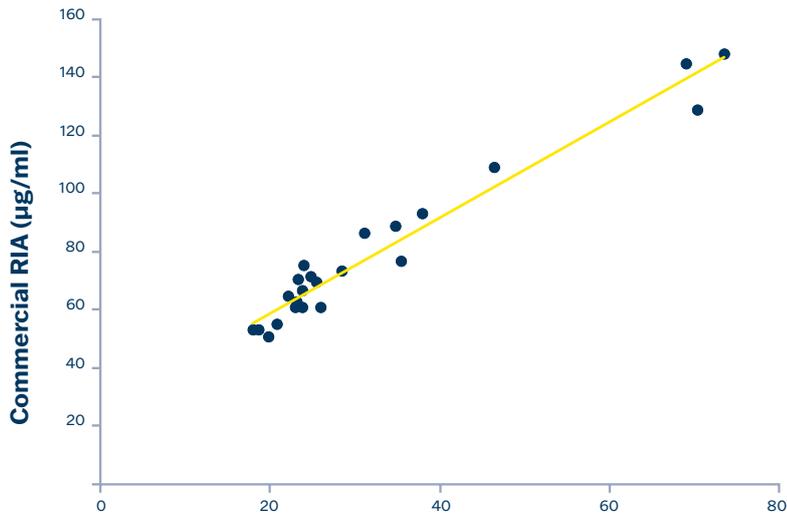
- Fully validated for serum and plasma samples
- Cost effective alternative for RIA
- Preselection of samples for mass spectrometry (LC-MS/MS)
- No need to collect 24-hours urine

Distribution of CBG in serum samples from healthy individuals and pregnant women was determined using the Biovendor Human Corticosteroid-Binding Globulin ELISA. Serum samples were collected from 120 normal, apparently healthy individuals and 86 pregnant women, and measured using the assay.

Samples	Mean (µg/ml)	Minimum value (µg/ml)	Maximum value (µg/ml)
Healthy individuals	40.2	20.0	102.2
Pregnant woman	60.8	24.5	123.4

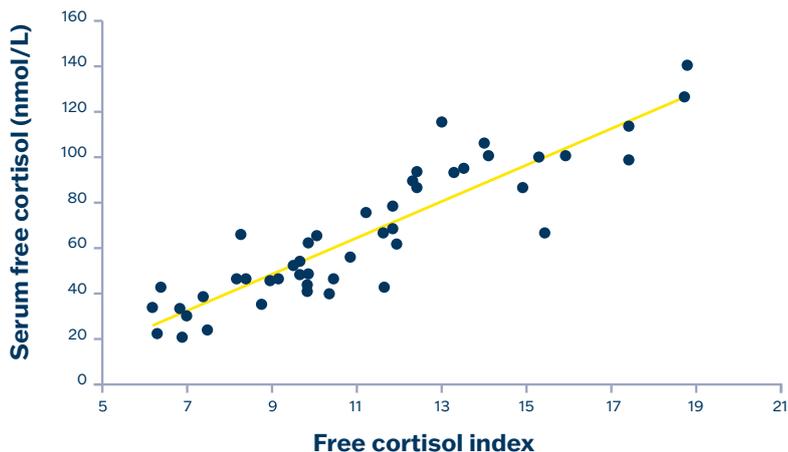
CBG unit conversion: 1 µg/ml ≈ 19.2 nmol/L  
1000 nmol/L ≈ 52 µg/ml

## ELISA vs RIA comparison



BioVendor Human Corticosteroid Binding Globulin ELISA (µg/ml)

## Free Cortisol Index assessment



The Free Cortisol Index (FCI), calculated as the ratio of serum total cortisol to CBG, correlates with serum free cortisol concentrations ( $R = 0.90$ ).

Serum free cortisol values estimated using Coolens' formula, based on serum total cortisol and CBG, show an even stronger correlation ( $R = 0.98$ ), indicating high predictive accuracy of the model.

**Source:** Data adapted from le Roux et al., "Free cortisol index as a surrogate marker for serum free cortisol," *Ann Clin Biochem.* 2002 Jul;39:406-8.

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