

MAGLUMI Cortisol (CLIA)



130298002M



100



**Shenzhen New Industries
Biomedical Engineering Co., Ltd**
4F, Wearnes Tech Bldg,
Science & Industry Park,
Nanshan, Shenzhen, 518057 CHINA
Tel. + 86-755-86028224
Fax. + 86-755-26654850



Lotus Global Co., Ltd
15 Alexandra Road
London
NW8 0DP
UK
Tel. + 44-20-75868010
Fax. + 44-20-79006187



FOR PROFESSIONAL USE ONLY

Store at 2-8°C



**COMPLETELY READ THE INSTRUCTIONS BEFORE
PROCEEDING**



SYMBOLS EXPLANATIONS



Authorized Representative in Europe



Manufacturer



Attention. See Instructions For Use



Contents of kit



In vitro diagnostic medical device
(In vitro diagnostic use)



Lot number



Catalogue Code



Expiry date (Use by...)



Temperature limitation
(store at 2...8 °C)



Number of tests



Keep away from direct sunlight



Keep upright for storage

INTENDED USE

The kit has been designed for the quantitative determination of Cortisol in human serum.

The method can be used for samples over the range of 0-600ng/ml.

The test has to be performed on the MAGLUMI chemiluminescence immunoassay (CLIA) fully auto analyzer (Including MAGLUMI 1000, MAGLUMI 2000, MAGLUMI 2000 Plus and new developed models).

SUMMARY AND EXPLANATION OF THE TEST

Cortisol is the most potent glucocorticoid produced by the human adrenal. It is synthesized from cholesterol and its production is stimulated by pituitary adrenocorticotrophic hormone (ACTH) which is regulated by corticotropin releasing factor (CRF). ACTH and CRF secretions are inhibited by high cortisol levels in a negative feedback loop. In blood a majority of cortisol is bound with high affinity to corticosteroid binding globulin (CBG). Cortisol acts through specific intracellular receptors and affects numerous physiologic systems including immune function, glucose counter regulation, vascular tone, and bone metabolism.

The body level of cortisol in the bloodstream displays what is known as a diurnal variation therefore, normal concentrations of cortisol vary throughout a 24-hour period. Cortisol levels in normal individuals are highest in the early morning at around 6-8 am and are lowest around midnight.

The factor controlling this rhythm is not completely defined and can be disrupted by a number of physical and psychological conditions. ACTH and cortisol are secreted independent of circadian rhythm in response to physical and psychological stress. Elevated cortisol levels and lack of diurnal variation have been identified with Cushing's disease (ACTH hypersecretion). Elevated circulating cortisol levels have also been identified in patients with adrenal tumors. Low cortisol levels are found in primary adrenal insufficiency (e.g. adrenal hypoplasia, Addison's disease) and in ACTH deficiency. Due to the normal circadian variation in cortisol levels, distinguishing normal from abnormally low cortisol levels can be difficult, therefore several daily collections are recommended. Additional stress tests such as ACTH stimulation or dexamethasone suppression aids in the diagnosis of adrenal related disease. The measurement of urinary cortisol levels is of value in the diagnosis of Cushing's Syndrome. For this test, urine is collected over a 24-hour period and analyzed.

PRINCIPLE OF THE TEST

Competitive immunoluminometric assay;

Use a purified Cortisol antigen to label ABEI, and use an anti-Cortisol monoclonal antibody to label FITC. Sample, Calibrator or Control with FITC Label, ABEI Label, and magnetic microbeads coated with anti-FITC are mixed thoroughly and incubated at 37°C, forming antibody-antigen complexes; after sediment in a magnetic field, decant the supernatant, then cycle washing for 1 time. Subsequently, the starter reagents are added and a flash chemiluminescent reaction is initiated. The light signal is measured by a photomultiplier as RLU within 3 seconds and is proportional to the concentration of Cortisol present in controls or samples.



KIT COMPONENTS

Material Supplies

Reagent Integral for 100 determinations	
Nano magnetic microbeads: TRIS buffer,	2.5ml

1.2 % (W/V), 0.2%NaN ₃ , coated with sheep anti-FITC polyclonal antibody.	
Calibrator Low: bovine serum, 0.2%NaN ₃ .	2.5ml
Calibrator High: bovine serum, 0.2%NaN ₃	2.5ml
FITC Label: anti-Cortisol monoclonal antibody labeled FITC, containing BSA, 0.2%NaN ₃ .	10.5ml
ABEI Label: purified Cortisol antigen labeled ABEI, containing BSA, 0.2%NaN ₃ .	10.5ml
All reagents are provided ready-to-use.	

Reagent Vials in kit box	
Internal Quality Control: containing BSA, 0.2%NaN ₃ . (target value refer to Quality Control Information date sheet)	2.0ml

Accessories Required But Not Provided

MAGLUMI Reaction Module	REF: 630003
MAGLUMI Starter 1+2	REF: 130299004M
MAGLUMI Wash Concentrate	REF: 130299005M
MAGLUMI Light Check	REF: 130299006M



Preparation of the Reagent Integral

Before the sealing is removed, gentle and careful horizontal shaking of the Reagent Integral is essential (avoid foam formation!) Remove the sealing and turn the small wheel of the magnetic microbeads compartment to and fro, until the colour of the suspension has changed into brown. Place the Integral into the reagent area and let it stand there for 30 min. During this time, the magnetic microbeads are automatically agitated and completely resuspended.

Do not interchange integral component from different reagents or lots!

Storage and Stability

- Sealed: Stored at 2-8°C until the expiry date.
- Opened: Stable for 4 weeks. To ensure the best kit performance, it is recommended to place opened kits in the refrigerator if it's not going to be used on board during the next 12 hours.

- Keep upright for storage.

- Keep away from direct sunlight.

CALIBRATION AND TRACEABILITY

1) Traceability

To perform an accurate calibration, we have provided the test calibrators standardized against the SNIBE internal reference substance.

Calibrators in the Reagent Kit are from Sigma.

2) 2-Point Recalibration

Via the measurement of calibrators, the predefined master curve is adjusted (recalibrated) to a new, instrument-specific measurement level with each calibration.

3) Frequency of Recalibration

- After each exchange of lot (Reagent Integral or Starter Reagents).
- Every 2 weeks and/or each time a new Integral is used (recommendation).
- After each servicing of the MAGLUMI Fully Auto analyzer.
- If controls are beyond the expected range.

SPECIMEN COLLECTION AND PREPARATION

Sample material: serum

Collect samples using standard procedures.

Store at 2-8°C: 12 hours, for longer storage periods: freeze to below -20°C.

Avoid repeated freezing and thawing cycles, stored samples should be thoroughly mixed prior to use (Vortex mixer).

Please ask local representative of SNIBE for more details if you have any doubt.

Vacuum Tubes

- Blank tubes are recommended type for collecting samples.
- Please ask SNIBE for advice if special additive must be used in sample collecting.

Specimen Conditions

- Do not use specimens at the following conditions:
 - heat-inactivated specimens;
 - Cadaver specimens or body fluids other than human serum;
 - Obvious microbial contamination.
- Use caution when handling patient specimens to prevent cross contamination. Use of disposable pipettes or pipette tips is recommended.
- Inspect all samples for bubbles. Remove bubbles with an applicator stick prior to analysis. Use a new applicator stick for each sample to prevent cross contamination.
- Serum specimens should be free of fibrin, red blood cells or other particulate matter.
- Ensure that complete clot formation in serum specimens has taken place prior to centrifugation. Some specimens, especially those from patients receiving anticoagulant or thrombolytic therapy, may exhibit increased clotting time. If the specimen is centrifuged before a complete clot forms, the presence of fibrin may cause erroneous results.

Preparation for Analysis

- Patient specimens with a cloudy or turbid appearance must be centrifuged prior to testing. Following centrifugation, avoid the lipid layer (if present) when pipetting the specimen into a sample cup or secondary tube.
- Specimens must be mixed **thoroughly** after thawing by **low** speed vortexing or by gently inverting, and centrifuged prior to use to remove red blood cells or particulate matter to ensure consistency in the results. Multiple freeze-thaw cycles of specimens should be avoided.
- All samples (patient specimens or controls) should be tested within 3 hours of being placed on board the MAGLUMI System. Refer to the SNIBE service for a more detailed discussion of onboard sample storage constraints.

Storage

- If testing will be delayed for more than 8 hours, remove serum or plasma from the serum or plasma separator, red blood cells or clot. Specimens removed from the separator gel, cells or clot may be stored up to 12 hours at 2-8°C.
- Specimens can be stored up to 30 days frozen at -20°C or colder.

Shipping

Before shipping specimens, it is recommended that specimens be removed from the serum or plasma separator, red blood cells or clot. When shipped, specimens must be packaged and labeled in compliance with applicable state, federal and international regulations covering the transport of clinical specimens and infectious substances. Specimens must be shipped frozen (dry ice). Do not exceed the storage time limitations identified in this section of the package insert.

WARNING AND PRECAUTIONS FOR USERS



- For use in *IN-VITRO* diagnostic procedures only.
- Package insert instructions must be carefully followed. Reliability of assay results cannot be guaranteed if there are any deviations from the instructions in this package insert.

Safety Precautions

CAUTION: This product requires the handling of human specimens.

- The calibrators in this kit are prepared from bovine serum products. However, because no test method can offer complete assurance that HIV, Hepatitis B Virus or other infectious agents are absent; these reagents should be considered a potential biohazard and handled with the same precautions as applied to any serum or plasma specimen.
- All samples, biological reagents and materials used in the assay must be considered potentially able to transmit infectious agents. They should therefore be disposed of in accordance with the prevailing regulations and guidelines of the agencies holding jurisdiction over the laboratory, and the regulations of each country. Disposable materials must be incinerated; liquid waste must be decontaminated with sodium hypochlorite at a final concentration of 5% for at least half an hour. Any materials to be reused must be autoclaved using an overkill approach (USP 24, 2000, p.2143). A minimum of one hour at 121°C is usually considered adequate, though the users must check the effectiveness of their decontamination cycle by initially validating it and routinely using biological indicators.
- It is recommended that all human sourced materials be considered potentially infectious and handled in accordance with the OSHA Standard on Blood borne Pathogens¹³. Biosafety Level 214 or other appropriate biosafety practices should be used for materials that contain or are suspected of containing infectious agents.
- This product contains Sodium Azide; this material and its container must be disposed of in a safe way.
- Safety data sheets are available on request.

Handling Precautions

- Do not use reagent kits beyond the expiration date.
- Do not mix reagents from different reagent kits.
- Prior to loading the Reagent Kit on the system for the first time, the microbeads requires mixing to re-suspend microbeads that have settled during shipment.
- For microbeads mixing instructions, refer to the KIT COMPONENTS, Preparation of the Reagent Integral section of this package insert.
- To avoid contamination, wear clean gloves when operating with a reagent kit and sample.
- Over time, residual liquids may dry on the kit surface, please pay attention the silicon film still exists on the surface of the kit.
- For a detailed discussion of handling precautions during system operation, refer to the SNIBE service information.

TEST PROCEDURE

To ensure proper test performance, strictly adhere to the operating instructions of the MAGLUMI Fully Auto analyzer. Each test parameter is identified via a RFID tag on the Reagent Integral. For further information please refer to the MAGLUMI Chemiluminescence Analyzer Operating Instructions.

40µl	Sample, calibrator or controls
+80µl	ABEI Label
+80µl	FITC Label

+20µl	Nano magnetic microbeads
15 min	Incubation
400µl	Cycle washing
3 s	Measurement

DILUTION

Sample dilution by analyzer is not available in this reagent kit. Samples with concentrations above the measuring range can be diluted manually. After manual dilution, multiply the result by the dilution factor.

Please choose applicable diluents or ask SNIBE for advice before manual dilution must be processed.

QUALITY CONTROL

- Observe quality control guidelines for medical laboratories
- Use suitable controls for in-house quality control. Controls should be run at least once every 24 hours when the test is in use, once per reagent kit and after every calibration. The control intervals should be adapted to each laboratory's individual requirements. Values obtained should fall within the defined ranges. Each laboratory should establish guidelines for corrective measures to be taken if values fall outside the range.

LIMITATIONS OF THE PROCEDURE

1) Limitations

Assay results should be utilized in conjunction with other clinical and laboratory data to assist the clinician in making individual patient management decisions.

A skillful technique and strict adherence to the instructions are necessary to obtain reliable results.

Procedural directions must be followed exactly and careful technique must be used to obtain valid results. Any modification of the procedure is likely to alter the results.

Bacterial contamination or repeated freeze-thaw cycles may affect the test results.

2) Interfering Substances

No interference with test results is seen by concentrations of bilirubin<0.06mg/ml, haemoglobin<16mg/dl or triglycerides<12.5mg/ml.

3) HAMA

Patient samples containing human anti-mouse antibodies (HAMA) may give falsely elevated or decreased values. Although HAMA-neutralizing agents are added, extremely high HAMA serum concentrations may occasionally influence results.

RESULTS

1) Calculation of Results

The analyzer automatically calculates the Cortisol concentration in each sample by means of a calibration curve which is generated by a 2-point calibration master curve procedure. The results are expressed in ng/ml. For further information please refer to the MAGLUMI Chemiluminescence Analyzer Operating Instructions.

2) Interpretation of Results

- Reference values: Normal adult: 52-350ng/ml
08:30-09:30 72.6-322.8ng/ml
16:30-17:30 32.4-150.0ng/ml
- Results may differ between laboratories due to variations in population and test method. If necessary, each laboratory should establish its own reference range.

PERFORMANCE CHARACTERISTICS

1) Precision

Intra-assay coefficient of variation was evaluated on 3 different levels of control serum repeatedly measured 20 times in the same

run, calculating the coefficient of variation.

Intra-assay precision			
Control	Mean(ng/ml)	SD(ng/ml)	CV%
Level 1	33.56	1.73	5.15
Level 2	225.12	10.78	4.79
Level 3	356.78	15.88	4.45

Inter-assay coefficient of variation was evaluated on three batches of kits. Repeatedly measured 3 different levels of control serum 21 times, calculating the coefficient of variation.

Inter-assay precision			
Control	Mean(ng/ml)	SD(ng/ml)	CV%
Level 1	34.27	3.00	8.75
Level 2	219.35	18.75	8.55
Level 3	350.55	29.83	8.51

2) Analytical Sensitivity

The sensitivity is defined as the concentration of Cortisol equivalent to the mean RLU of 20 replicates of the zero standard plus two standard deviations corresponding to the concentration from the standard curve. The sensitivity is typically less than 2.5ng/ml.

3) Specificity

The specificity of the Cortisol assay system was assessed by measuring the apparent response of the assay to various potentially cross reactive analytes.

Compound	Concentration	Cross reactivity
testosterone	100ng/ml	2.5%
progesterone	100ng/ml	2.5%
androstenedione	100ng/ml	2.5%

4) Recovery

Consider calibrator high of known concentration as a sample, dilute it by 1:2 ratios with diluents, and measure its diluted concentration for 10 times. Then calculate the recovery of measured concentration and expected concentration. The recovery should be within 90% -110%.

Expected	Mean Measuring	Recovery
179.8ng/ml	185.6ng/ml	103%

5) Linearity

Use Cortisol calibrator to prepare the six-point standard curve, measuring all points' RLU except point A, and then do four-parameter linear fitting in double logarithm coordinate, the absolute linear correlation coefficient(r) should be bigger than 0.9800.

Calibrator Point	Concentration ng/ml	Absolute linear correlation coefficient (r)
A	0.0	
B	10.0	r=0.9875
C	30.0	
D	100.0	
E	250.0	
F	600.0	

6) Method comparison

A comparison of MAGLUMI Cortisol (y) with a commercially available Cortisol test (x) using clinical samples gave the following correlations (ng/ml):

Linear regression

$$y = 1.15x - 202.1$$

$$r = 0.968$$

$$Sy.x = 405.4$$

Number of samples measured: 98

The sample concentrations were between 8.3 and 540 ng/ml

REFERENCES

1. Canalis E, Caldarella AM, Reardon GE. Serum cortisol and 11-deoxycortisol by liquid chromatography: Clinical studies and comparison with radioimmunoassay Clin, Chem 1979; 25: 1700-1703.
2. Kaye TB et al. The Cushing Syndrome: An update on diagnostic tests. Ann intern Med 1990; 112:434-444.
3. Tunn S, Pappert G, Willnow P, Krieg M. Multicentre evaluation of an enzyme immunoassay for cortisol determination. J Clin Chem Clin Biochem 1990;28:929-935.
4. Pagana, K. D. & Pagana, T. J. (© 2011). Mosby's Diagnostic and Laboratory Test Reference 10th Edition: Mosby, Inc., Saint Louis, MO. Pp 311-313.
5. Aron DC, Tyrell JB. Glucocorticoids & Adrenal Androgens. In: Greensoan FS, Baxter JD (eds), Basic & Clinical Endocrinology 4th edition Appleton & Lange, USA 1994;307-346.
6. Hasinski S. Assessment of adrenal glucocorticoid function. Postgrad Med 1998;104(1):61-64.
7. Rosalki SB. Biochemical Testing of adrenocortical function. Int J Clin Pract 1998;52(3):189-191.
8. Newell-Price J, Trainer P, Besser M, Grossman A. The Diagnosis and Differential Diagnosis of Cushing's Syndrome and Pseudo-Cushing's States. Endocr Rev 1998;19(5):647-672.
9. Ross RJM, Trainer PJ. Endocrine investigation: Cushing's syndrome. Clin Endocrinol 1998;49:153-155.