Cortisol

ELISA kit

(96 Tests)

Zellbio GmbH (Germany)

CAT No. ZX-55102-96

www.zellx.de

Sample Types Validated for:

Serum, EDTA and Heparin Plasma, Urine, Saliva, Dried Fecal Extracts, and Tissue Culture Media

!!! Caution: This product is for Research Use Only. Not for *in vitro* Diagnostics !!!

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Please read this insert completely prior to using the product.

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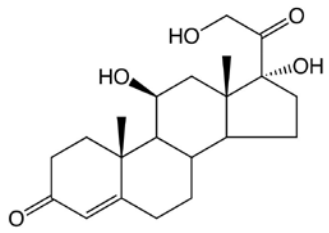
Introduction

Background

Cortisol ($C_{21}H_{30}O_5$, hydrocortisone, compound F) is the primary glucocorticoid produced and secreted by the adrenal cortex. It is often referred to as the "stress hormone" because it is involved in body's response to stress via affecting blood pressure, blood sugar levels, and other actions of stress adaptation. Immunologically, Cortisol functions as an important anti-inflammatory factor, and plays a role in hypersensitivity, immunosuppression, and disease resistance. In the metabolic aspect, Cortisol promotes gluconeogenesis, liver glycogen deposition, and the reduction of glucose utilization. Production of Cortisol follows an ACTH-dependent circadian rhythm, with a peak level in the morning and decreasing levels throughout the day. Most serum Cortisol, all but about 4 %, is bound to proteins including corticosteroid binding globulin and serum albumin. Only free Cortisol is available to most receptors and it is through these receptors that physiological processes are modulated. Abnormal Cortisol levels are being evaluated for correlation with a variety of different conditions, such as prostate cancer, depression, and schizophrenia. It is already known that abnormal levels of Cortisol are involved in Cushing's Syndrome and Addision's disease



Assay principle

The ZellX® Cortisol Immunoassay kit is designed to quantitatively measure Cortisol present in serum, plasma, urine, saliva, extracted dried fecal samples, and tissue culture media samples. A Cortisol stock solution is provided to generate a standard curve for the assay and all samples should be read off the standard curve. This assay has been designed to measure total Cortisol in extracted samples and in serum and plasma and free Cortisol in saliva and urine.

The kit includes a 96-well plate that is pre-coated with a secondary goat anti-mouse antibody. The function of this antibody is to capture the mouse anti-Cortisol antibody bound to Cortisol conjugate (peroxidase-labeled) and hold this complex to the plate during the subsequent detection steps. The Cortisol-conjugate (labeled) and the sample Cortisol (unlabeled) compete for binding to the mouse antibody. After 1 hour of incubation, the substrate is added to react with the peroxidase-labeled antibody-antigen conjugate. After stopping the reaction, the intensity of the generated color can be measured at 450 nm. The lower the amount of Cortisol in the sample, the stronger the signal due to more labeled Cortisol bound to the well.

This kit uses Cortisol Standard solutions calibrated to the US National Institute for Science and Technology Standard Reference Materials and ISO/IEC standards.

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General information

Materials supplied in the Kit

Component	*Quantity*
Cortisol Standard (32 ng/mL)	125 µL
Cortisol Antibody	2.6 mL
Cortisol Conjugate	2.6 mL
Assay Buffer Concentrate (5x)	11 mL
Wash Buffer Concentrate (20x)	25 mL
Dissociation Reagent	1 mL
TMB Substrate	11 mL
Stop Solution	5 mL
Coated Clear 96-Well Plate & Sealer	1 plate

Storage instruction

All reagents should be stored at 4° C until the expiration date of the kit.

Materials required but not supplied

Deionized water (diH_2O)

Phosphate Buffer Saline (PBS)

Microplate/ELISA reader capable of reading optical absorption at 450 nm

Microplate shaker, Centrifuge, Vortex mixer

Precision pipettes, multichannel/repeater pipettes and disposable pipette tips

For Dried Fecal Sample:

ACS Grade Ethanol

Glass test tubes

Precautions

This kit should only be used by qualified personnel who have had laboratory safety instruction. The complete insert should be read and understood before attempting to use the product.

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Stop Solution is an acidic solution and should not come in contact with skin or eyes. Handling this reagent needs appropriate precaution.

General remarks

- Equilibrate all kit components to room temperature (RT) 30 minutes before use.
- The instruction must be strictly followed.
- The reading of Microplate/ELISA reader must be set at the appropriate wavelength.
- Pipette tips should not be used more than once in order to avoid cross contamination.
- Reagents of different batches should not be mixed or used after their expiration dates.
- The antibody-coated plate needs to be stored desiccated. The silica gel pack included in the foil ziploc bag will keep the plate dry. The silica gel pack will turn from blue to pink if the ziploc has not been closed properly.
- This kit utilizes a peroxidase-based readout system. Buffers, including Wash Buffers from other manufacturers, containing sodium azide will inhibit color production by the enzyme. Make sure all buffers used for samples are azide-free. Ensure that any plate washing system is rinsed well with deionized water prior to using the supplied Wash Buffer.

Assay protocol

Reagent preparation

i. **Assay Buffer:** Prepare a 1:5 dilution of Assay Buffer Concentrate with diH_2O (1 part Assay Buffer Conc. with 4 parts diH_2O), and mix well. Assay Buffer can be stored at 4°C for up to 3 months.

ii. **Wash Buffer:** Prepare a 1:20 dilution of Wash Buffer Concentrate with diH_2O (1 part Wash Buffer Conc. with 19 parts diH_2O), and mix well. Assay Buffer can be stored at room temperature for up to 3 months.

Sample preparation

Samples containing visible particulate should be centrifuged prior to conducting the assay. Moderate to severely hemolyzed samples should not be used for this assay.

Since Cortisol is identical across all species, it is expected that this kit can measure Cortisol in human and other species.

Dissociation Reagent must be used only with Serum and Plasma samples.

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All samples and standards must be used within 2 hours of preparation or must be stored at ≤ -20 for later analysis.

I. **Serum, Plasma:**

- Collect the fresh serum or plasma with heparin or EDTA.
- Centrifuge at 600 g for 10 min at 4˚C.
- Separate the serum or plasma from the red blood cells, and transfer into fresh tubes.
- Serum and plasma samples need to be treated with the supplied Dissociation Reagent. Adding this reagent will yield the total Cortisol concentration in serum or plasma.
- Allow the Dissociation Reagent to warm completely to Room Temperature before use.
- Add 5 µL of Dissociation Reagent into 1 mL Eppendorf tubes.
- Add 5 µL of serum or plasma to the Dissociation Reagent in the tube, vortex gently and incubate at room temperature for at least 5 minutes.
- Add 490 µL of Assay Buffer to the tube.
- This 1:100 dilution can be diluted further with Assay Buffer. Final serum and plasma dilutions should be ≥ 1:100.

II. **Urine:**

- Urine should be diluted ≥ 1:8 by taking one part of sample and adding 7 or more parts of Assay Buffer prior to conducting assay.
- **Normalize the sample value based on creatinine levels using our Urine Creatinine assay kit Cat NO. ZX-44110-96 in random urine specimen.**

III. **Dried Fecal Sample:**

- Ensure that the sample is completely dry, and powder the sample to improve extraction recovery. Remove any large particles if possible.
- Weigh out ≥ 0.2 gram of dried fecal solid into a tube. Samples can be dried by passive drying, gentle heating (≤ 60°C), or freeze-drying (lyophilization).
- Add 1 mL of ethanol per 0.1 gram of solid fecal sample (100 mg/mL) and seal.
- Shake strongly for at least 30 minutes.
- Centrifuge at 5000 rpm at 4°C for 15 minutes and collect supernatant in a clean tube. This material can be stored at ≤ -20°C for at least a month if properly sealed.
  - **Note:** Samples containing low levels of analyte can be concentrated by drying down the extract and resuspension in a reduced volume of Assay Buffer.
- Supernatant should be diluted ≥ 1:5 by taking one part of sample and adding 4 or more parts of Assay Buffer.
- Vortex well and allow to rest 5 minutes at room temperature
- Repeat the vortex step 2 more times to ensure complete steroid solubility.
- The final concentration of ethanol in the sample to be added to the wells should be ≤ 5%. **(≥ 1:4 dilution with Assay Buffer is needed.)**

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IV. **Saliva:**

- Saliva sample should be diluted ≥ 1:4 by taking one part of sample and adding 3 or more parts of Assay Buffer prior to conducting assay.

V. **Tissue Culture Media:**

- For measuring Cortisol in tissue culture media (TCM), samples should be read off a standard curve generated in TCM. Samples may need to be diluted further in TCM. The assay has been validated using RPMI-1640.

All the samples must be used within 2 hours of preparation; otherwise, aliquots of the sample should be kept at ≤ -20˚C for later use.

Standard preparation

- Prepare a 1:10 dilution of Cortisol Standard with Assay Buffer (mix 50 µL of standard with 450 µL of Assay Buffer), and label as the Standard No.7 (3200 pg/mL).
- Make series of lower dilutions as described in the table.
- The Assay Buffer is used as the 0 pg/mL standard.

No.	*Concentration*	*Material needed*
Standard No.7	3200 pg/mL	50 µL Cortisol Standard + 450 µL Assay Buffer
Standard No.6	1600 pg/mL	250 µL Standard No.7 + 250 µL Assay Buffer
Standard No.5	800 pg/mL	250 µL Standard No.6 + 250 µL Assay Buffer
Standard No.4	400 pg/mL	250 µL Standard No.5 + 250 µL Assay Buffer
Standard No.3	200 pg/mL	250 µL Standard No.4 + 250 µL Assay Buffer
Standard No.2	100 pg/mL	250 µL Standard No.3 + 250 µL Assay Buffer
Standard No.1	50 pg/mL	250 µL Standard No.2 + 250 µL Assay Buffer
Standard No.0	0 pg/mL	250 µL Assay Buffer

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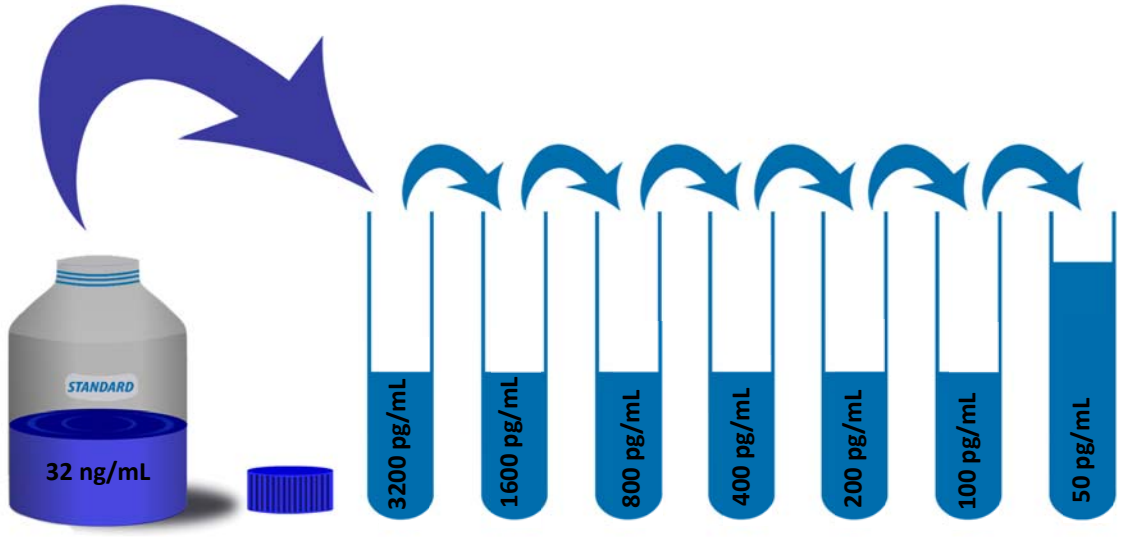

All standard must be used within 2 hours of preparation

Assay Procedure

1. Pipette 50 µL of either samples or standards into duplicate wells in the plate.
2. Pipette 50 µL of Assay Buffer into duplicate wells of the Zero standard.
3. Pipette 75 µL of Assay Buffer into duplicate wells of the nonspecific binding (NSB).
4. Add 25 µL of Cortisol Conjugate to each well, using a repeater pipette.
5. Add 25 µL of Cortisol Antibody to each well except the NSB wells, using a repeater pipette.
6. Gently tap the sides of the plate to ensure adequate mixing of the reagents.
7. Cover the plate with the plate sealer and shake for 1 hour at room temperature.
8. Aspirate the plate and wash each well 4 times with 300 µL Wash Buffer.
9. Tap the plate on clean absorbent towels to dry.
10. Add 100 µL of TMB Substrate to each well using a multichannel/repeater pipette.
11. Incubate at room temperature for 30 minutes without shaking.
12. Add 50 µL of Stop Solution to each well using a multichannel/repeater pipette.
13. Read the optical density at 450 nm.

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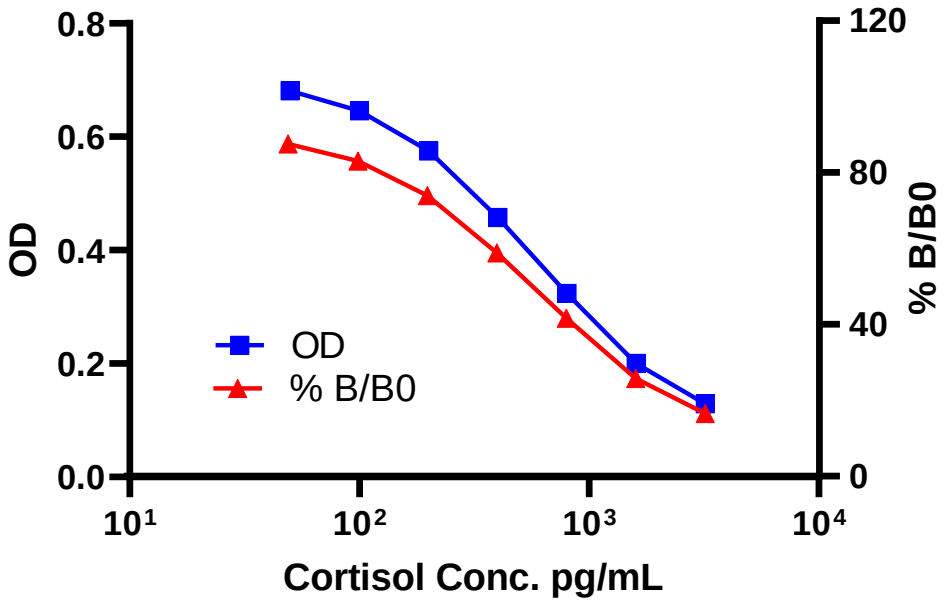
Calculation

- Average the duplicate optical density (OD) readings for each standard and sample.
- Subtract the mean ODs of the NSB from all OD values
- Create a standard curve by reducing the data using the four parameter logistic curve (4PLC) fitting routine on the plate reader
- Calculate the % B/B0 ratio.
  - **Note:** B0 is the binding for the zero standard or the maximum binding well, which represents the maximum signal from enzyme captured by the specific antibody in competitive ELISA. All other standards and samples are expressed as a percentage of this value (% B/B0).
- The concentrations obtained should be multiplied by the dilution factor to obtain sample values.

Conversion Factor: 100 pg/mL of Cortisol is equivalent to 275.9 pM



A typical standard curve of ZellX® Cortisol ELISA Assay kit

Run your own standard curves for calculation of results

Assay range

The detection limit of ZellX® Cortisol ELISA assay was determined as 45.4 pg/mL.

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Sensitivity

The sensitivity of the ZellX® Cortisol ELISA assay was determined as 27.6 pg/mL.

Precision

Intra-Assay Precision (Precision within an assay): 3 human samples were tested 20 times in an assay.

Inter-Assay Precision (Precision between assays): 3 human samples were tested in duplicate on 10 different assays over multiple days.

Item	*%CV*
Intra assay	6.0, 14.7, 5.6
Inter assay	10.9, 7.2, 6.3

Cross Reactivity

The following cross reactants were tested in the assay and calculated at the 50% binding point.

Steroid	*Cross Reactivity (%)*
Cortisol	100
Dexamethasone	18.8
Prednisolone (1-DehydroCortisol)	8.7
Corticosterone	1.2
Cortisone	1.2
Progesterone	< 0.1
Estradiol	< 0.1
Cortisol 21-Glucuronide	< 0.1
1α-hydroxycorticosterone	< 0.1
Testosterone	< 0.1

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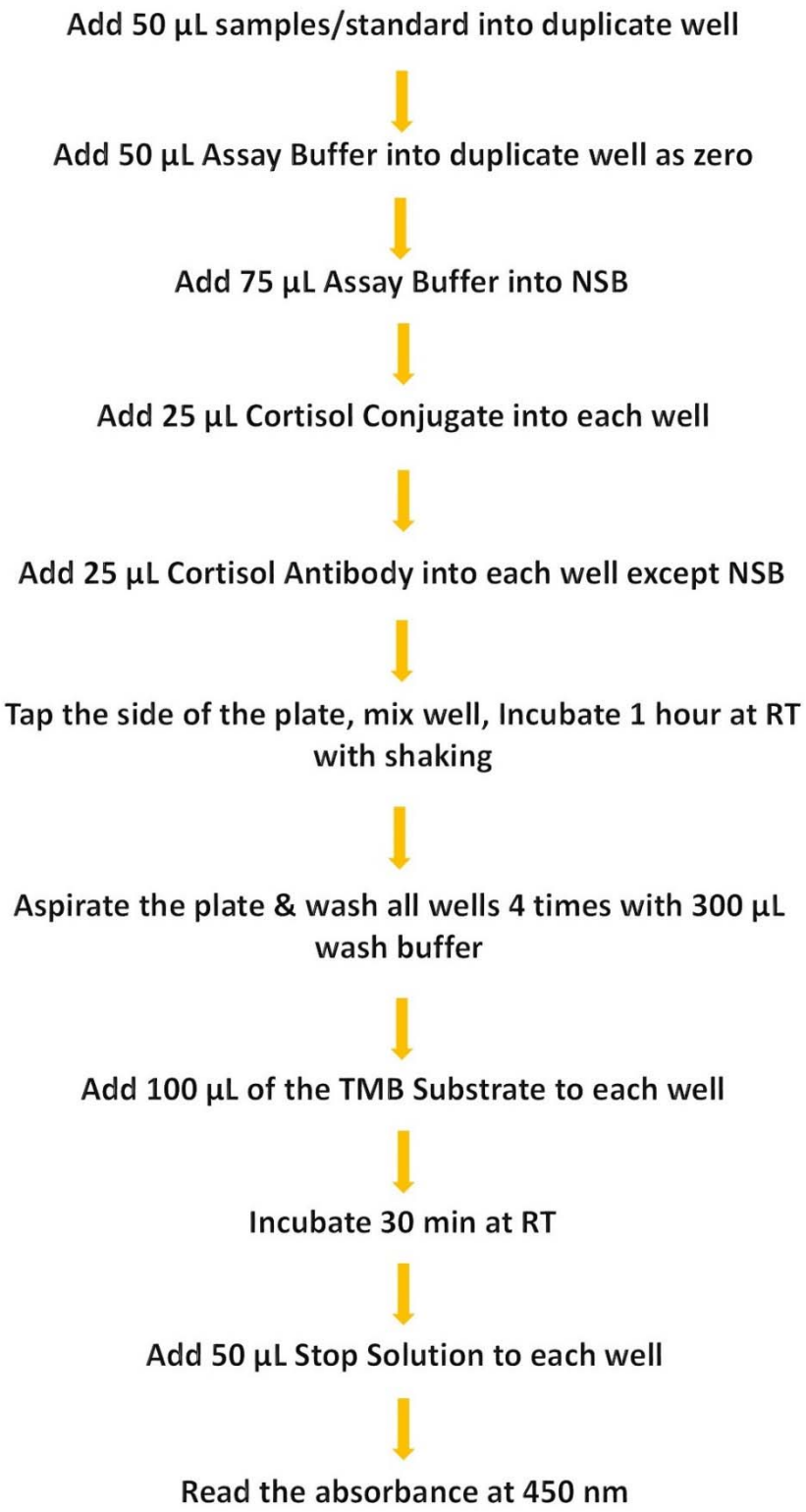
Protocol summary



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