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## **1 INTRODUCTION**

### **Intended Use**

An enzyme immunoassay for measurement of active free cortisol (hydrocortisone and hydroxycorticosterone) in saliva.

## **2 PRINCIPLE**

The **DRG Salivary Cortisol HS ELISA** Kit is a solid phase enzyme-linked immunosorbent assay (ELISA), based on the principle of competitive binding.

The microtiter wells are coated with a polyclonal rabbit antibody directed towards an antigenic site on the cortisol molecule.

Endogenous cortisol of a donor sample competes with a cortisol-horseradish peroxidase conjugate for binding to the coated antibody. After incubation the unbound conjugate is washed off.

The amount of bound peroxidase conjugate is inversely proportional to the concentration of cortisol in the sample. After addition of the substrate solution, the intensity of colour developed is inversely proportional to the concentration of cortisol in the donor sample.

## **3 WARNINGS AND PRECAUTIONS**

1. For professional use only.
2. All reagents of this test kit which contain human serum or plasma have been tested and confirmed negative for HIV I/II, HBsAg and HCV by FDA approved procedures. All reagents, however, should be treated as potential biohazards in use and for disposal.
3. Before starting the assay, read the instructions completely and carefully. Use the valid version of the package insert provided with the kit. Be sure that everything is understood.
4. The microplate contains snap-off strips. Unused wells must be stored at 2 °C to 8 °C in the sealed foil pouch and used in the frame provided.
5. Pipetting of samples and reagents must be done as quickly as possible and in the same sequence for each step.
6. Use reservoirs only for single reagents. This especially applies to the substrate reservoirs. Using a reservoir for dispensing a substrate solution that had previously been used for the conjugate solution may turn solution colored. Do not pour reagents back into vials as reagent contamination may occur.
7. Mix the contents of the microplate wells thoroughly to ensure good test results. Do not reuse microwells.
8. Do not let wells dry during assay; add reagents immediately after completing the rinsing steps.
9. Allow the reagents to reach room temperature (21-26°C) before starting the test. Temperature will affect the absorbance readings of the assay. However, values for the donor samples will not be affected.
10. Never pipet by mouth and avoid contact of reagents and specimens with skin and mucous membranes.
11. Do not smoke, eat, drink or apply cosmetics in areas where specimens or kit reagents are handled.
12. Wear disposable latex gloves when handling specimens and reagents. Microbial contamination of reagents or specimens may give false results.



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13. Handling should be done in accordance with the procedures defined by an appropriate national biohazard safety guideline or regulation.
14. Do not use reagents beyond expiry date as shown on the kit labels.
15. All indicated volumes have to be performed according to the protocol. Optimal test results are only obtained when using calibrated pipettes and microtiterplate readers.
16. Do not mix or use components from kits with different lot numbers. It is advised not to exchange wells of different plates even of the same lot. The kits may have been shipped or stored under different conditions and the binding characteristics of the plates may result slightly different.
17. Avoid contact with *Stop Solution* containing 0.5 M H<sub>2</sub>SO<sub>4</sub>. It may cause skin irritation and burns.
18. Some reagents contain Proclin, BND and/or MIT as preservatives. In case of contact with eyes or skin, flush immediately with water.
19. TMB substrate has an irritant effect on skin and mucosa. In case of possible contact, wash eyes with an abundant volume of water and skin with soap and abundant water. Wash contaminated objects before reusing them. If inhaled, take the person to open air.
20. Chemicals and prepared or used reagents have to be treated as hazardous waste according to the national biohazard safety guideline or regulation.
21. For information on hazardous substances included in the kit please refer to Material Safety Data Sheets.

#### 4 REAGENTS

##### 4.1 Reagents provided

1. **Microtiterwells**, 12x8 (break apart) strips, 96 wells;  
Wells coated with a anti-cortisol antibody (polyclonal).
2. **Standard (Standard 0-6)**, 7 vials, 1 mL each, ready to use;  
Concentrations: 0 - 0.1 - 0.5 - 1.5 - 4 - 10 - 30 ng/mL,  
*Conversion factor: 1 ng/mL = 2.76 nmol/L;*  
contain 0.003% Proclin as a preservative
3. **Control low / Control high**, 2 vials, 1.0 mL each, ready to use;  
For control values and ranges please refer to vial label or QC-Datasheet.  
Contains 0.003% Proclin as a preservative.
4. **Enzyme Conjugate**, 1 vial, 26 mL, ready to use;  
Cortisol conjugated to horseradish peroxidase;  
contains < 0,019% BND and < 0,017% MIT as preservative.
5. **Substrate Solution**, 1 vial, 25 mL, ready to use;  
Tetramethylbenzidine (TMB).
6. **Stop Solution**, 1 vial, 14 mL, ready to use;  
contains 0.5M H<sub>2</sub>SO<sub>4</sub>.  
Avoid contact with the stop solution. It may cause skin irritations and burns.
7. **Wash Solution**, 1 vial, 30 mL (40X concentrated);  
see „Preparation of Reagents“.

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- \* BND = 5-bromo-5-nitro-1,3-dioxane
- MIT = 2-methyl-2H-isothiazol-3-one

**Note:** Additional *Standard 0* for sample dilution is available upon request.

#### 4.2 Materials required but not provided

- A microtiter plate calibrated reader (450±10 nm), (e.g. the DRG Instruments Microtiter Plate Reader).
- Calibrated variable precision micropipettes (100 µL, 200 µL).
- Absorbent paper.
- Distilled or deionized water
- Timer.
- Semilogarithmic graph paper or software for data reduction

#### 4.3 Storage Conditions

When stored at 2 °C to 8 °C unopened reagents will retain reactivity until expiration date. Do not use reagents beyond this date.

Opened reagents must be stored at 2 °C to 8 °C. Microtiter wells must be stored at 2 °C to 8 °C. Once the foil bag has been opened, care should be taken to close it tightly again.

#### 4.4 Reagent Preparation

Bring all reagents to room temperature before use.

##### **Wash Solution**

Add deionized water to the 40X concentrated *Wash Solution*.

Dilute 30 mL of concentrated *Wash Solution* with 1170 mL deionized water to a final volume of 1200 mL.

*The diluted Wash Solution is stable for 2 weeks at room temperature.*

#### 4.5 Disposal of the Kit

The disposal of the kit must be made according to the national regulations. Special information for this product is given in the Material Safety Data Sheet.

#### 4.6 Damaged Test Kits

In case of any severe damage of the test kit or components, DRG have to be informed written, latest one week after receiving the kit. Severely damaged single components should not be used for a test run. They have to be stored until a final solution has been found. After this, they should be disposed according to the official regulations.



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## 5 SPECIMEN COLLECTION AND PREPARATION

Eating, drinking, chewing gums or brushing teeth should be avoided for 30 minutes before sampling. Otherwise, it is recommended to rinse mouth thoroughly with cold water 5 minutes prior to sampling.

Do not collect samples when oral diseases, inflammation or lesions exist (blood contamination).

If there is visible blood contamination the donor specimen, it should be discarded, rinse the sampling device with water, wait for 10 minutes and take a new sample.

*Note:* Samples containing sodium azide should not be used in the assay.

### 5.1 Specimen Collection

Saliva samples should be collected only using special saliva sampling devices (vial and straw), e.g. SALI-TUBES 100 (SLV-4158).

Due to the cyclic secretion pattern of steroid hormones it is important to care for a proper timing of the sampling. In order to avoid arbitrary results we recommend that 5 samples always be taken within a period of 2 – 3 hours (*multiple sampling*) preferably before a meal.

As food might contain significant amounts of steroid hormones samples preferably should be taken while fasting. If fasting should be a problem the collection period should be timed just before lunch or before dinner.

### 5.2 Specimen Storage and Preparation

The saliva samples may be stored at 2 °C to 8 °C up to one week, and should be frozen at –20 °C for longer periods; repeated thawing and freezing is no problem.

Each sample has to be frozen, thawed, and centrifuged at least once in order to separate the mucins by centrifugation.

Upon arrival of the samples in the lab the samples have to stay in the deep freeze at least overnight. Next morning the frozen samples are warmed up to room temperature and mixed carefully.

Then the samples have to be centrifuged for 5 to 10 minutes (at 2000 - 3000 x g).

Now the clear colorless supernatant is easy to pipette.

If a set of multiple samples is to be tested, the lab (after at least one freezing, thawing, and centrifugation cycle) has to mix the 5 single samples in a separate sampling device and perform the testing from this mixture.

### 5.3 Specimen Dilution

If in an initial assay, a specimen is found to contain more than the highest standard, the specimens can be diluted with *Standard 0* and re-assayed as described in Assay Procedure.

For the calculation of the concentrations this dilution factor has to be taken into account.

Example:

a) Dilution 1:10: 10 µl saliva + 90 µl *Standard 0* (mix thoroughly)

b) Dilution 1:100: 10 µl of dilution a) + 90 µl *Standard 0* (mix thoroughly).



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**6 ASSAY PROCEDURE**

**6.1 General Remarks**

- All reagents and specimens must be allowed to come to room temperature before use. All reagents must be mixed without foaming.
- Once the test has been started, all steps should be completed without interruption.
- Use new disposal plastic pipette tips for each standard, control or sample in order to avoid cross contamination.
- Absorbance is a function of the incubation time and temperature. Before starting the assay, it is recommended that all reagents are ready, caps removed, all needed wells secured in holder, etc. This will ensure equal elapsed time for each pipetting step without interruption.
- As a general rule the enzymatic reaction is linearly proportional to time and temperature.
- Respect the incubation times as stated in this instructions for use.



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## 6.2 Assay Procedure

Each run must include a standard curve.

1. Secure the desired number of coated strips in the frame holder.
2. Dispense **100 µL** of each *Standard, Control and samples* with new disposable tips into appropriate wells.
3. Dispense **200 µL Enzyme Conjugate** into each well.  
Thoroughly mix for 10 seconds. It is important to have a complete mixing in this step.
4. Incubate for **60 minutes** at room temperature  
**Note:** Incubation on a shaker at 300 rpm is recommended.
5. Briskly shake out the contents of the wells.  
Rinse the wells 5 times with diluted Wash Solution (400 µL per well). Strike the wells sharply on absorbent paper to remove residual droplets.  
**Important note:**  
The sensitivity and precision of this assay is markedly influenced by the correct performance of the washing procedure!
6. Add **200 µL** of *Substrate Solution* to each well.
7. Incubate for **30 minutes** at room temperature.
8. Stop the enzymatic reaction by adding **100 µL** of *Stop Solution* to each well.
9. Determine the absorbance of each well at **450±10 nm**.  
It is recommended that the wells be read within 10 minutes.

## 6.3 Calculation of Results

1. Calculate the average absorbance values for each set of standards, controls and donor samples.
2. Construct a standard curve by plotting the mean absorbance obtained from each standard against its concentration with absorbance value on the vertical(Y) axis and concentration on the horizontal (X) axis.
3. Using the mean absorbance value for each sample determine the corresponding concentration from the standard curve.
4. Automated method: The results in the IFU have been calculated automatically using a 4 PL (4 Parameter Logistics) curve fit. 4 Parameter Logistics is the preferred calculation method. Other data reduction functions may give slightly different results.
5. The concentration of the samples can be read directly from this standard curve. Samples with concentrations higher than that of the highest standard have to be further diluted. For the calculation of the concentrations this dilution factor has to be taken into account.



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**6.3.1 Example of Typical Standard Curve**

The following data is for demonstration only and cannot be used in place of data generations at the time of assay.

Standard		Optical Units (450 nm)
Standard 0	0 ng/mL	1.93
Standard 1	0.1 ng/mL	1.62
Standard 2	0.5 ng/mL	1.05
Standard 3	1.5 ng/mL	0.67
Standard 4	4.0 ng/mL	0.40
Standard 5	10 ng/mL	0.23
Standard 6	30 ng/mL	0.12

**7 QUALITY CONTROL**

Good laboratory practice requires that controls be run with each calibration curve. A statistically significant number of controls should be assayed to establish mean values and acceptable ranges to assure proper performance. It is recommended to use control samples according to state and federal regulations. The use of control samples is advised to assure the day to day validity of results. Use controls at both normal and pathological levels. The controls and the corresponding results of the QC-Laboratory are stated in the QC certificate added to the kit. The values and ranges stated on the QC sheet always refer to the current kit lot and should be used for direct comparison of the results.

Employ appropriate statistical methods for analysing control values and trends. If the results of the assay do not fit to the established acceptable ranges of control materials donor results should be considered invalid. In this case, please check the following technical areas: Pipetting and timing devices; photometer, expiration dates of reagents, storage and incubation conditions, aspiration and washing methods.

After checking the above mentioned items without finding any error contact your distributor or DRG directly.

**8 LIMITATIONS OF PROCEDURE**

Reliable and reproducible results will be obtained when the assay procedure is performed with a complete understanding of the package insert instruction and with adherence to good laboratory practice. Any improper handling of samples or modification of this test might influence the results.

**8.1 Drug Interferences**

Until today no substances (drugs) are known to us, which have an influence to the measurement of Cortisol in a sample.



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## 9 LEGAL ASPECTS

### 9.1 Reliability of Results

The test must be performed exactly as per the manufacturer's instructions for use. Moreover the user must strictly adhere to the rules of GLP (Good Laboratory Practice) or other applicable national standards and/or laws.

## 10 REFERENCES

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