

**510(k) SUBSTANTIAL EQUIVALENCE DETERMINATION
DECISION SUMMARY
ASSAY ONLY TEMPLATE**

A. 510(k) Number:

k052359

B. Purpose for Submission:

New device

C. Measurand:

Cortisol

D. Type of Test:

Quantitative Luminescence immunoassay (LIA)

E. Applicant:

IBL Immuno Biological Laboratories

F. Proprietary and Established Names:

IBL Cortisol LIA test kit

G. Regulatory Information:

1. Regulation section:

21 CFR §862.1205, Cortisol (hydrocortisone and hydroxycorticosterone) test system

2. Classification:

Class II

3. Product code:

CGR

4. Panel:

75 Clinical Chemistry

H. Intended Use:

1. Intended use(s):

See indications for use

2. Indication(s) for use:

The IBL Cortisol Luminescence Immunoassay is for the in-vitro diagnostic quantitative determination of Cortisol in human serum and saliva.

The Cortisol LIA kit is useful as an aid in the differential diagnosis of Cushing syndrome and Addison's disease.

3. Special conditions for use statement(s):

For Prescription use only

4. Special instrument requirements:

Not applicable

I. Device Description:

The IBL Cortisol LIA test is composed of the following materials:

- One microtiter plate coated with anti-cortisol antibodies (rabbit)
- Enzyme conjugate which contains Cortisol (chromatographically purified), conjugated to Horseradish Peroxidase (HRP)
- Chemiluminescence reagents 1 & 2 ready to use; Reagent 1 contains luminal enhancer and Reagent 2 contains peroxide solution and stabilizers
- Wash Buffer Concentrate which contains phosphate buffer, Tween and stabilizers
- Control Levels I and II, Serum controls are not provided.
- Standards A-G (0, 0.03, 0.06, 0.20, 0.60, 1.5, 4.0 µg/dL); cortisol in buffer with BSA and stabilizers
- Adhesive Foil.

J. Substantial Equivalence Information:

1. Predicate device name(s):

DSL Cortisol RIA

2. Predicate 510(k) number(s):

k821068

3. Comparison with predicate:

| Similarities | | |
|---------------------|---|------------------|
| Item | Device | Predicate |
| Analyte | Cortisol | Cortisol |
| Indications for use | Aid in the differential diagnosis of Cushing syndrome and Addison's disease | same |
| Test Principle | Competitive immunoassay | Same |

| Differences | | |
|--------------------|---|---------------------------|
| Item | Device | Predicate |
| Specimen | Serum and Saliva | Serum, plasma and Urine |
| Method | Luminescence Immunoassay | Radioreceptor Immunoassay |
| Assay Range | 0.037 -4.0 µg/dL (saliva) 0.75 – 200 µg/dL (serum) | 0.5 -60.0 µg/dL |

K. Standard/Guidance Document Referenced (if applicable):

None Referenced

L. Test Principle:

The IBL Cortisol luminescence immunoassay (LIA) is based on the competition principle. An unknown amount of antigen present in the sample and a fixed amount of enzyme labeled antigen compete for the binding sites of the antibodies coated onto the wells. After incubation the wells are washed to stop the competition reaction. After addition of the luminescence substrate solution the intensity of the luminescence measured is inversely proportional to the amount of the antigen in the sample. Results of samples can be determined directly using the standard curve.

M. Performance Characteristics (if/when applicable):

1. Analytical performance:

a. *Precision/Reproducibility:*

Established in k010790 for saliva samples. The company presented new data for serum samples which is presented below:

Intra assay precision was assessed using 7 serum samples run twenty times in one day. The mean CV was 6.38% (range 3.99 – 9.08%). Inter assay precision was assessed using 5 serum samples run 2 times per day for 9 days. The mean CV was 9.45% (range 7.60 – 13.21%).

b. Linearity/assay reportable range:

The reportable range of the assay is 0.037 -4.0 µg/dL for saliva samples. Serum samples are diluted 1:50 before analysis. Thus, the reportable range for serum samples is 0.75 – 200 µg/dL.

Linearity was established in the k010790 for saliva samples. The company presented new data for serum samples which is presented below:

Serum samples with varying concentrations of cortisol were serially diluted with zero standard and assayed. Results demonstrate good linearity across the range of the assay. The mean linearity recovery for serum was 105.4%.

| Sample | Dilution | Calculated µg/dL | Expected µg/dL | Recovery (%) |
|---------|----------|------------------|----------------|--------------|
| Serum 1 | 1:50 | 111.6 | | 100 |
| | 1:100 | 57.0 | 55.8 | 102 |
| | 1:200 | 28.5 | 27.9 | 102 |
| | 1:400 | 14.8 | 13.9 | 106 |
| | 1:800 | 7.5 | 7.0 | 108 |
| | 1:1600 | 4.0 | 3.5 | 115 |
| Serum 2 | 1:50 | 79.8 | | 100 |
| | 1:100 | 42.4 | 39.9 | 106 |
| | 1:200 | 20.7 | 19.9 | 104 |
| | 1:400 | 10.0 | 9.9 | 100 |
| | 1:800 | 5.5 | 4.9 | 109 |
| Serum 3 | 1:50 | 55.8 | | 100 |
| | 1:100 | 27.8 | 27.9 | 99 |
| | 1:200 | 12.2 | 13.9 | 87 |
| | 1:400 | 7.2 | 6.9 | 103 |
| | 1:800 | 3.9 | 3.5 | 110 |
| Serum 4 | 1:50 | 101.2 | | 100 |
| | 1:100 | 57.5 | 50.6 | 114 |
| | 1:200 | 30.1 | 25.3 | 119 |
| | 1:400 | 14.2 | 12.7 | 113 |
| | 1:800 | 7.3 | 6.3 | 116 |

Recovery

Unspiked serum samples at five different cortisol concentrations were used. Increasing amounts of cortisol were added and samples (spiked and unspiked) were assayed in duplicate. The concentrations were measured and the percent recovery was calculated. The mean recovery was 105% (range 93-124%).

c. Traceability, Stability, Expected values (controls, calibrators, or methods):

Established in k010790.

d. Detection limit:

Established in k010790

e. Analytical specificity:

Established in k010790

f. Assay cut-off:

The functional sensitivity, defined as the concentration with a coefficient of variation (CV) not to exceed 20%, is 0.037 µg/dL.

2. Comparison studies:

a. Method comparison with predicate device:

Established in k010790.

b. Matrix comparison:

Established in k010790.

3. Clinical studies:

a. Clinical Sensitivity:

Not applicable

b. Clinical specificity:

Not applicable

c. Other clinical supportive data (when a. and b. are not applicable):

4. Clinical cut-off:

Not applicable

5. Expected values/Reference range:

Established in k010790:

| | N | µg/dL | | nmol/L | |
|--------|-----|---------|----------|-----------|------------|
| | | AM | PM | AM | PM |
| Saliva | 725 | 0.5-1.5 | 0.03-0.3 | 13.8-41.4 | 0.83-8.3 |
| Serum | 125 | 5-25 | 2-12 | 138-690 | 55.2-331.2 |

The following normal ranges were established by collecting samples from 110 healthy adults. All profiles were collected on days with “normal” rhythm (working, school etc.). The results are present below:

| Time after awakening (h) | Cortisol (Saliva) Range | | | |
|--------------------------|---|----------------|----------------|---------------|
| | (Male/female; >6y; n=110; 5-95% percentile) | | | |
| | Median (nmol/L) | Range (nmol/L) | Median (µg/dL) | Range (µg/dL) |
| 0-1.5 | 18.9 | 5.1-40.2 | 0.685 | 0.185-1.457 |
| 1.5-3.0 | 11.8 | 3.6-28.4 | 0.428 | 0.130-1.029 |
| 3.0-6.0 | 6.7 | 2.1-15.7 | 0.243 | 0.076-0.569 |
| 6.0-9.0 | 5.5 | 1.8-12.1 | 0.199 | 0.065-0.438 |
| 9.0-15.0 | 3.3 | 0.9-9.2 | 0.120 | 0.033-0.333 |

N. Proposed Labeling:

The labeling is sufficient and it satisfies the requirements of 21 CFR Part 809.10.

O. Conclusion:

The submitted information in this premarket notification is complete and supports a substantial equivalence decision.

