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LDN[®]

Instructions for use

LH ELISA

REF

FR E-2600



IVD



LH ELISA

INTENDED USE

For the direct quantitative determination of Luteinizing Hormone by enzyme immunoassay in human serum. For *in vitro* diagnostic use only.

PRINCIPLE OF THE TEST

The principle of the following enzyme immunoassay test follows a typical two-step capture or 'sandwich' type assay. The assay makes use of two highly specific monoclonal antibodies: A monoclonal antibody specific for LH is immobilized onto the microwell plate and another monoclonal antibody specific for a different region of LH is conjugated to horse radish peroxidase (HRP). LH from the sample and standards are allowed to bind to the plate, washed, and subsequently incubated with the HRP conjugate. After a second washing step, the enzyme substrate is added. The enzymatic reaction is terminated by addition of the stopping solution. The absorbance is measured on a microtiter plate reader. The intensity of the colour formed by the enzymatic reaction is directly proportional to the concentration of LH in the sample.

A set of standards is used to plot a standard curve from which the amount of LH in patient samples and controls can be directly read.

CLINICAL APPLICATIONS

Human luteinizing hormone (hLH) is a glycoprotein synthesized by the anterior lobe of the pituitary gland. This hormone consists of two subunits: α and β . The α subunit of LH is similar to the α subunit found in both the FSH and TSH glycoprotein hormones (which are also synthesized by the pituitary gland) as well as the α subunit of hCG (produced by the placenta). However, the β subunit of each of these hormones are unique. Therefore, the specificity of these four hormones are due to the β peptide chains. It is to be noted that the α chain by itself has no biological activity.

The hypothalamic decapeptide, namely the gonadotropin releasing hormone (GnRH), stimulates the release of LH. Both the LH and FSH hormones in men act on the testis, which have two functions: Leydig cells secrete androgens while sperm are formed by the seminiferous tubules. The secretion of testosterone and dihydrotestosterone by the Leydig cells is under the direct control of LH.

PROCEDURAL CAUTIONS AND WARNINGS

- Users should have a thorough understanding of this protocol for the successful use of this kit. Reliable performance will only be attained by strict and careful adherence to the instructions provided.
- Control materials or serum pools should be included in every run at a high and low level for assessing the reliability of results.
- When the use of water is specified for dilution or reconstitution, use deionized or distilled water.
- In order to reduce exposure to potentially harmful substances, gloves should be worn when handling kit reagents and human specimens.
- All kit reagents and specimens should be brought to room temperature and mixed gently but thoroughly before use. Avoid repeated freezing and thawing of reagents and specimens.
- A calibrator curve must be established for every run.
- The controls should be included in every run and fall within established confidence limits.
- Improper procedural techniques, imprecise pipetting, incomplete washing as well as improper reagent storage may be indicated when assay values for the controls do not reflect established ranges.
- When reading the microplate, the presence of bubbles in the microwells will affect the optical densities (ODs). Carefully remove any bubbles before performing the reading step.
- The substrate solution (TMB) is sensitive to light and should remain colourless if properly stored. Instability or contamination may be indicated by the development of a blue colour, in which case it should not be used.
- When dispensing the substrate and stopping solution, do not use pipettes in which these liquids will come into contact with any metal parts.
- To prevent contamination of reagents, use a new disposable pipette tip for dispensing each reagent, sample, standard and control.
- Do not mix various lot numbers of kit components within a test and do not use any component beyond the expiration date printed on the label.
- Kit reagents must be regarded as hazardous waste and disposed of according to national regulations.

LIMITATIONS

- All the reagents within the kit are calibrated for the direct determination of LH in human serum. The kit is not calibrated for the determination of LH in saliva, plasma or other specimens of human or animal origin.
- Do not use grossly hemolyzed, grossly lipemic, icteric or improperly stored serum.
- Any samples or control sera containing azide or thimerosal are not compatible with this kit, as they may lead to false results.
- Only calibrator A may be used to dilute any high serum samples. The use of any other reagent may lead to false results.

- The results obtained with this kit should never be used as the sole basis for clinical diagnosis. For example, the occurrence of heterophilic antibodies in patients regularly exposed to animals or animal products has the potential of causing interferences in immunological tests. Consequently, the clinical diagnosis should include all aspects of a patient's background including the frequency of exposure to animals/products if false results are suspected.
- Some individuals may have antibodies to mouse protein that can possibly interfere in this assay. Therefore, the results from any patients who have received preparation of mouse antibodies for diagnosis or therapy should be interpreted with caution.

SAFETY CAUTIONS AND WARNINGS

POTENTIAL BIOHAZARDOUS MATERIAL

Human serum that may be used in the preparation of the standards and controls has been tested and found to be non-reactive for Hepatitis B surface antigen and has also been tested for the presence of antibodies to HCV and Human Immunodeficiency Virus (HIV) and found to be negative. However no test method can offer complete assurance that HIV, HCV and Hepatitis B virus or any infectious agents are absent. The reagents should be considered a potential biohazard and handled with the same precautions as applied to any blood specimen.

CHEMICAL HAZARDS

Avoid contact with reagents containing TMB, hydrogen peroxide and sulfuric acid. If contacted with any of these reagents, wash with plenty of water. TMB is a suspected carcinogen.

SPECIMEN COLLECTION AND STORAGE

Approximately 0.1 ml of serum is required per duplicate determination. Collect 4-5 ml of blood into an appropriately labelled tube and allow it to clot. Centrifuge and carefully remove the serum layer. Store at 4°C for up to 24 hours or at -10°C or lower if the analyses are to be done at a later date. Consider all human specimens as possible biohazardous materials and take appropriate precautions when handling.

SPECIMEN PRETREATMENT

This assay is a direct system; no specimen pretreatment is necessary.

REAGENTS AND EQUIPMENT NEEDED BUT NOT PROVIDED

- Precision pipettes to dispense 20, 50, 75, 100 and 300 µl
- Disposable pipette tips
- Distilled or deionized water
- Plate shaker
- Microwell plate reader with a filter set at 450 nm and an upper OD limit of 3.0 or greater* (see assay procedure step 13).

REAGENTS PROVIDED

AA E-0030

WASH-CONC 10x

Wash Buffer Concentrate – X10

Contents: One bottle containing buffer with a non-ionic detergent and a non-mercury preservative.

Volume: 50 mL/bottle

Storage: Refrigerate at 2-8°C

Stability: 12 months or as indicated on label.

Preparation: Dilute 1:10 in distilled or deionized water before use. If the whole plate is to be used dilute 50 mL of the wash buffer concentrate in 450 mL of water.

AA E-0055

SUBSTRATE

TMB Substrate - Ready To Use.

Contents: One bottle containing tetramethylbenzidine and hydrogen peroxide in a non-DMF or DMSO containing buffer.

Volume: 16 mL/bottle

Storage: Refrigerate at 2-8°C

Stability: 12 months or as indicated on label.

AA E-0080

STOP-SOLN

Stopping Solution - Ready To Use.

Contents: One vial containing 1M sulfuric acid.

Volume: 6 mL/bottle

Storage: Refrigerate at 2-8°C

Stability: 12 months or as indicated on label.

Calibrators and Controls- Ready To Use.

Listed below are approximate concentrations, please refer to vial labels for exact concentrations:

Cat. no.	Symbol	Calibrator	Concentration	Volume/Vial
FR E-2601	STANDARD A	Calibrator A	0 IU/L	2.0 ml
FR E-2602	STANDARD B	Calibrator B	1 IU/L	0.5 ml
FR E-2603	STANDARD C	Calibrator C	4 IU/L	0.5 ml
FR E-2604	STANDARD D	Calibrator D	10 IU/L	0.5 ml
FR E-2605	STANDARD E	Calibrator E	40 IU/L	0.5 ml
FR E-2606	STANDARD F	Calibrator F	100 IU/L	0.5 ml
FR E-2651	CONTROL 1	Control 1	Refer to vial labels for expected value and acceptable range!	0.5 ml
FR E-2652	CONTROL 2	Control 2		0.5 ml

Contents: LH in a protein-based buffer with a non-mercury preservative. Prepared by spiking buffer with a defined quantity of LH. Calibrated against World Health Organization (WHO) 2nd IS 80/552.

Storage: Refrigerate at 2-8°C

Stability: 12 months in unopened vials or as indicated on label. Once opened, the standards should be used within 14 days or aliquoted and stored frozen. Avoid multiple freezing and thawing cycles.

FR E-2613 ASSAY-BUFF **Assay Buffer - Ready To Use.**

Contents: One vial containing a protein-based buffer with a non-mercury preservative.

Volume: 25 mL/bottle

Storage: Refrigerate at 2-8°C

Stability: 12 months or as indicated on label.

FR E-2631 96 **Mouse Anti-hLH Antibody Coated Microwell Plate-Break Apart Wells - Ready To Use.**

Contents: One 96 well (12x8) polyclonal antibody-coated microwell plate in a resealable pouch with desiccant.

Storage: Refrigerate at 2-8°C

Stability: 12 months or as indicated on label.

FR E-2640 CONJUGATE-CONC 50x **Mouse Anti-hLH Antibody-Horseradish Peroxidase (HRP) Conjugate – X50**

Contents: Anti-hLH monoclonal antibody-HRP conjugate in a protein-based buffer with a non-mercury preservative.

Volume: 0.3 mL/vial


Storage: Refrigerate at 2-8°C

Stability: 12 months or as indicated on label.

Preparation: Dilute 1:50 in assay buffer before use (eg. 40 µL of HRP in 2 mL of assay buffer). If the whole plate is to be used dilute 240 µL of HRP in 12 mL of assay buffer. Discard any that is left over.

ASSAY PROCEDURE

All reagents must reach room temperature before use. Calibrators, controls and specimen samples should be assayed in duplicate. Once the procedure has been started, all steps should be completed without interruption.

1.	Prepare working solutions of the anti-hLH-HRP conjugate and wash buffer .
2.	Remove the required number of microwell strips. Reseal the bag and return any unused strips to the refrigerator.
3.	Pipette 25 µL of each calibrator, control and specimen sample into correspondingly labelled wells in duplicate.
4.	Pipette 100 µL of the assay buffer into each well. <i>(We recommend using a multichannel pipette).</i>
5.	Incubate on a plate shaker (approximately 200 rpm) for 30 minutes at room temperature .
6.	Wash the wells 3 times with prepared wash buffer (300 µL/well for each wash) and tap the plate firmly against absorbent paper to ensure that it is dry <i>(The use of a washer is recommended).</i>
7.	Pipette 100 µL of the conjugate working solution into each well. <i>(We recommend using a multichannel pipette).</i>
8.	Incubate on a plate shaker (approximately 200 rpm) for 30 minutes at room temperature .
9.	Wash the wells 3 times with prepared wash buffer (300 µL/well for each wash) and tap the plate firmly against absorbent paper to ensure that it is dry <i>(The use of a washer is recommended).</i>
10.	Pipette 100 µL of TMB substrate into each well at timed intervals.
11.	Incubate the plate on a plate shaker at room temperature for 15-20 minutes. <i>(or until Calibrator F attains dark blue colour for desired OD).</i>
12.	Pipette 50 µL of stopping solution into each well at the same timed intervals as in step 10.
13.	Read the plate on a microwell plate reader at 450 nm within 20 minutes after addition of the stopping solution.
	<i>If the OD exceeds the upper limit of detection or if a 450nm filter is unavailable, a 405 or 415nm filter may be substituted. The optical densities will be lower, however, this will not affect the results of patient/control samples.</i>

CALCULATIONS

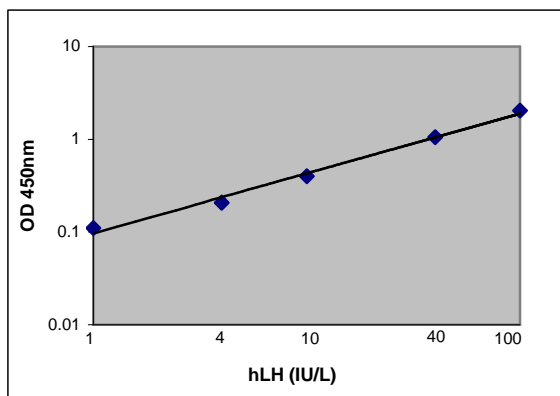
- Calculate the mean optical density of each calibrator duplicate.
- Calculate the mean optical density of each unknown duplicate.
- Subtract the mean absorbance value of the "0" calibrator from the mean absorbance values of the calibrators, controls and serum samples.
- Draw a calibrator curve on log-log paper with the mean optical densities on the Y-axis and the calibrator concentrations on the X-axis. If immunoassay software is being used, a 4-parameter or 5-parameter curve is recommended.
- Read the values of the unknowns directly off the calibrator curve.
- If a sample reads more than 100 IU/L then dilute it with assay buffer at a dilution of no more than 1:8. The result obtained should be multiplied by the dilution factor.

TYPICAL TABULATED DATA:

Calibrator	OD 1	OD 2	Mean OD	Value (IU/L)
A	0.080	0.082	0.081	0
B	0.110	0.109	0.110	1
C	0.210	0.203	0.207	4
D	0.388	0.406	0.397	10
E	1.027	1.075	1.051	40
F	2.039	2.049	2.044	100
Unknown	0.527	0.540	0.534	15.6

TYPICAL CALIBRATOR CURVE

Sample curve only. **Do not** use to calculate results.



PERFORMANCE CHARACTERISTICS

SENSITIVITY

The lower detection limit is calculated from the standard curve by determining the resulting concentration of the mean OD of Calibrator A (based on 10 replicate analyses) plus 2 SD. Therefore, the sensitivity of the dbc Direct hLH ELISA kit is **0.2 IU/L**.

SPECIFICITY (CROSS REACTIVITY)

The specificity of the Direct hLH ELISA kit was determined by measuring the apparent hLH value of the following compounds:

Substance	Concentration (IU/L)	Apparent hLH Value (IU/L)
hCG	50,000	55
Calibrated	25,000	22
against WHO 1st	10,000	7.8
IS 75/537	5,000	3.4
	1,000	<1.0
hFSH	1000	13
Calibrated	500	6.2
against WHO 1st	100	1.7
IS 83/575	50	1.5
	20	1.2
hTSH	500	<1.0
Calibrated	250	<1.0
against WHO 2nd	100	<1.0
IS 80/558	50	<1.0
	5	<1.0

INTRA-ASSAY PRECISION

Three samples were assayed ten times each on the same calibrator curve. The results (in IU/L) are tabulated below:

Sample	Mean	SD	CV%
1	4.84	0.22	4.5
2	16.58	0.44	2.7
3	53.28	1.53	2.9

INTER-ASSAY PRECISION

Three samples were assayed ten times over a period of four weeks. The results (in IU/L) are tabulated below:

Sample	Mean	SD	CV%
1	5.15	0.32	5.1
2	17.37	1.40	8.1
3	51.50	4.70	9.2

RECOVERY

Spiked samples were prepared by adding defined amounts of hLH to three patient serum samples. The results (in IU/L) are tabulated below:

Sample	Obs.Result	Exp.Result	Recovery%
1	0.00	-	-
Unspiked	5.06	4.90	103.3
+4.9	53.79	48.79	110.2
+48.79			
2	2.12	-	-
Unspiked	5.76	6.02	95.7
+3.9	40.22	41.12	97.8
+39.0			
3	5.81	-	-
Unspiked	9.10	9.71	93.7
+3.9	22.05	25.31	87.1
+19.5			

LINEARITY

Three patient serum samples were diluted with calibrator A. The results (in IU/L) are tabulated below:

Sample	Obs.Result	Exp.Result	Recovery%
1	9.28	-	-
1:2	5.02	4.64	108.2
1:4	2.48	2.32	106.9
1:8	1.16	1.16	100.0
2	37.52	-	-
1:2	20.49	18.76	109.2
1:4	10.73	9.38	114.4
1:8	5.44	4.69	116.0
3	42.33	-	-
1:2	20.56	21.17	97.1
1:4	11.20	10.58	105.9
1:8	5.74	5.29	108.5

HIGH DOSE HOOK EFFECT

The Direct hLH ELISA kit did not experience a high dose hook effect when it was tested up to a hLH concentration of 20,000 IU/L.

REFERENCE VALUES













As for all clinical assays each laboratory should collect data and establish their own range of expected normal values.

Group	Range (IU/L)
Males	1.5-9.3
Females	
Follicular Phase	1.9-12.5
Midcycle Peak	8.7-76.3
Luteal Phase	0.5-16.9
Postmenopausal	5.0-52.3

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Symbols:

	Storage temperature		Manufacturer		Contains sufficient for <n> tests
	Expiry date		Batch code		For in-vitro diagnostic use only!
	Consult instructions for use		Content		CE labelled
	Caution		Catalogue number		For research use only!