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Instructions for use

Growth Hormone HGH ELISA

REF **ME E-0200R**

2°C – 8°C

Σ 96

RUO For research use only – Not for use in diagnostic procedures

hGH ELISA

INTENDED USE

For the direct quantitative determination of Growth Hormone by an enzyme immunoassay in human serum.

PRINCIPLE OF THE TEST

The principle of the following enzyme immunoassay test follows a typical one-step capture or 'sandwich' type assay. The assay makes use of two highly specific monoclonal antibodies: A monoclonal antibody specific for hGH is immobilized onto the microplate and another monoclonal antibody specific for a different region of hGH is conjugated to horse radish peroxidase (HRP). hGH from the sample and standards are allowed to bind simultaneously to the plate and to the HRP conjugate. The washing and decanting steps remove any unbound HRP conjugate. After the 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 hGH in the sample.
A set of standards is used to plot a standard curve from which the amount of hGH in samples and controls can be directly read.

PROCEDURAL CAUTIONS AND WARNINGS

1. 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.
2. Control materials or serum pools should be included in every run at a high and low level for assessing the reliability of results.
3. When the use of water is specified for dilution or reconstitution, use deionized or distilled water.
4. In order to reduce exposure to potentially harmful substances, gloves should be worn when handling kit reagents and human specimens.
5. 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.
6. A standard curve must be established for every run.
7. The controls should be included in every run and fall within established confidence limits.
8. 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.
9. When reading the microplate, the presence of bubbles in the wells will affect the optical densities (ODs). Carefully remove any bubbles before performing the reading step.
10. 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.
11. When dispensing the substrate and stopping solution, do not use pipettes in which these liquids will come into contact with any metal parts.
12. To prevent contamination of reagents, use a new disposable pipette tip for dispensing each reagent, sample, standard and control.
13. 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.
14. Kit reagents must be regarded as hazardous waste and disposed of according to national regulations.

LIMITATIONS

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

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. No test method however, can offer complete assurance that HIV, HCV and Hepatitis B virus or any infectious agents are absent. The reagents should be considered as 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
1. Precision pipettes to dispense 25, 50, 100 and 300 µl
2. Disposable pipette tips
3. Distilled or deionized water
4. Plate shaker
5. Microplate reader with a filter set at 450nm and an upper OD limit of 3.0 or greater* (see assay procedure step 10)

REAGENTS PROVIDED

1. AA E-0030 WASH-CONC 10x **Wash Buffer Concentrate –** Requires Preparation **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.

2. 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.

3. AA E-0080 STOP-SOLN **Stopping Solution** - Ready To Use.

Contents:	One bottle containing 1M sulfuric acid.
Volume:	6 ml/bottle
Storage:	Refrigerate at 2 - 8 °C
Stability:	12 months or as indicated on label.
Hazards identification:	 H290 May be corrosive to metals. H314 Causes severe skin burns and eye damage.

4. Standards and **Controls**- Ready To Use.

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

Cat. no.	Symbol	Standard	Concentration	Volume/Vial
ME E-0201	STANDARD A	**Standard A**	0 ng/ml	2.0 ml
ME E-0202	STANDARD B	**Standard B**	1 ng/ml	0.5 ml
ME E-0203	STANDARD C	**Standard C**	5 ng/ml	0.5 ml
ME E-0204	STANDARD D	**Standard D**	10 ng/ml	0.5 ml
ME E-0205	STANDARD E	**Standard E**	25 ng/ml	0.5 ml
ME E-0206	STANDARD F	**Standard F**	50 ng/ml	0.5 ml
ME E-0251	CONTROL 1	**Control 1**	Refer to vial labels for expected value and acceptable range!	0.5 ml
ME E-0252	CONTROL 2	**Control 2**		0.5 ml

Contents: hGH in a serum-based buffer with a non-mercury preservative. Prepared by spiking serum with a defined quantity of hGH. Calibrated against World Health Organization (WHO) 1st IS 80/505.

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.

5. ME E-0213 ASSAY-BUFF **Assay Buffer -** Ready To Use.

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

Volume: 15 ml/bottle

Storage: Refrigerate at 2 - 8 °C

Stability: 12 months or as indicated on label.

6. ME E-0231 96 **Mouse Anti-hGH Antibody-Coated Break-Apart Wells Microplate** - Ready To Use.

Contents: One 96 well (12x8) monoclonal antibody-coated microplate in a resealable pouch with desiccant.

Storage: Refrigerate at 2 - 8 °C

Stability: 12 months or as indicated on label.

7. ME E-0240 CONJUGATE-CONC 100x **Mouse Anti-hGH Antibody-Horseradish Peroxidase (HRP) Conjugate Concentrate –** Requires Preparation **X100**

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

Volume: 200 µl /vial

Storage: Refrigerate at 2 - 8 °C

Stability: 12 months or as indicated on label.

Preparation: Dilute 1:100 in assay buffer before use (eg. 20 µl of HRP in 2 ml of assay buffer). If the whole plate is to be used dilute 120 µl of HRP in 12 ml of assay buffer. Discard any that is left over.

ASSAY PROCEDURE

Specimen Pretreatment: **None**

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

CALCULATIONS

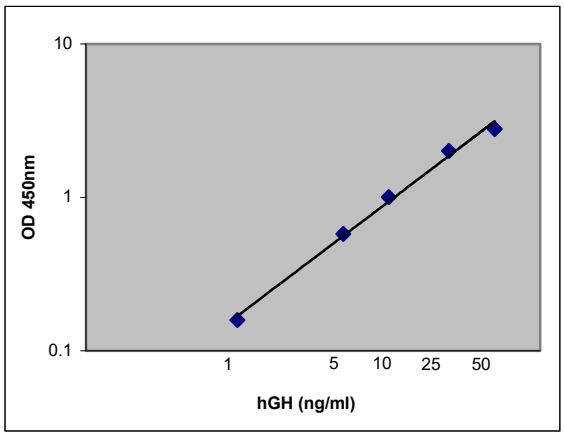
1. Calculate the mean optical density of each standard duplicate.
2. Calculate the mean optical density of each unknown duplicate.
3. Subtract the mean absorbance value of the "0" standard from the mean absorbance values of the standards, controls and serum samples.
4. Draw a standard curve on log-log paper with the mean optical densities on the Y-axis and the standard concentrations on the X-axis. If immunoassay software is being used, a 4-parameter or 5-parameter curve is recommended.
5. Read the values of the unknowns directly off the standard curve.
6. If a sample reads more than 50 ng/ml then dilute it with Standard A at a dilution of no more than 1:10. The result obtained should be multiplied by the dilution factor.

TYPICAL TABULATED DATA

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

Standard	OD 1	OD 2	Mean OD	Value (ng/ml)
A	0.074	0.072	0.073	0
B	0.158	0.159	0.159	1
C	0.574	0.580	0.577	5
D	0.997	1.014	1.006	10
E	2.021	2.009	2.015	25
F	2.809	2.773	2.791	50
Unknown	0.549	0.561	0.555	5.0

TYPICAL STANDARD 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 Standard A (based on 10 replicate analyses) plus 2 SD. Therefore, the sensitivity of the Direct hGH ELISA kit is **0.2 ng/ml.**

SPECIFICITY (CROSS REACTIVITY)
The specificity of the Direct hGH ELISA kit was determined by measuring the apparent hGH value of Standard A spiked with various levels of prolactin.

Substance	Concentration Range (ng/ml)	Apparent hGH Value (ng/ml)
Prolactin Calibrated against WHO 3rd IS 84/500	50 100 500 1000	Not Detected Not Detected Not Detected Not Detected

INTRA-ASSAY PRECISION
Three samples were assayed ten times each on the same standard curve. The results (in ng/ml) are tabulated below:

Sample	Mean	SD	CV%
1	1.46	0.09	5.8
2	12.33	0.68	5.5
3	41.87	0.97	2.3

INTER-ASSAY PRECISION
hree samples were assayed ten times over a period of four weeks. The results (in ng/ml) are tabulated below:

Sample	Mean	SD	CV%
1	2.95	0.27	9.0
2	19.29	0.86	4.4
3	36.06	1.72	4.7

RECOVERY
Spiked samples were prepared by adding defined amounts of hGH to three serum samples.
The results (in ng/ml) are tabulated below:

Sample	Obs. Result	Exp. Result	Recovery %
1 Unspiked	ND	-	-
+1.0	0.96	1.0	96.0
+5.0	5.6	5.0	112.0
+50	49	50	98.0
2 Unspiked	0.7	-	-
+1.0	1.5	1.7	88.2
+5.0	6.6	5.7	115.8
+50	53	50.7	104.5
3 Unspiked	1.0	-	-
+1.0	1.7	2.0	85.0
+5.0	6.8	6.0	113.3
+50	48.8	51	95.7

LINEARITY
Three serum samples were diluted with Standard A. The results (in ng/ml) are tabulated below:

Sample	Obs. Result	Exp. Result	Recovery %
1	6.44	-	-
1:2	3.12	3.22	96.9
1:5	1.15	1.29	89.1
1:10	0.59	0.64	92.2
2	16.60	-	-
1:2	7.97	8.30	96.0
1:5	2.82	3.32	84.9
1:10	1.59	1.66	95.8
3	33.00	-	-
1:2	16	16.5	97.0
1:5	6.4	6.6	97.0
1:10	3.3	3.3	100.0

HIGH DOSE HOOK EFFECT
The Direct hGH ELISA kit did not experience any high dose hook effect.

EXPECTED VALUES
Each laboratory should collect data and establish their own range of expected normal values.

Group	N	95% Confidence Range (ng/ml)
Males	120	ND-3.7
Females		
Premenopausal	120	ND-8.71
Postmenopausal	120	ND-3.09

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Symbols:

	Storage temperature		Manufacturer		Contains sufficient for <n> tests
	Expiry date	LOT	Batch code		
	Consult instructions for use	CONT	Content		
	Caution	REF	Catalogue number	RUO	For research use only!