Mercodia
Developing diagnostics

Mercodia Mouse Insulin ELISA

Directions for Use

10-1247-01
REAGENTS FOR 96 DETERMINATIONS

10-1247-10
REAGENTS FOR 10 X 96 DETERMINATIONS

For Research Use only

Manufactured by

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EXPLANATION OF SYMBOLS USED ON LABELS

	Reagents for 96 determinations
	Expiry date
	Store between 2–8°C
	Lot No.

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INTENDED USE

Mercodia Mouse Insulin ELISA provides a method for the quantitative determination of insulin in mouse serum or plasma.

SUMMARY AND EXPLANATION OF THE TEST

Insulin is the principal hormone responsible for the control of glucose metabolism. It is synthesized in the ß-cells of the islets of Langerhans as the precursor, proinsulin, which is processed to form C-peptide and insulin. Both are secreted in equimolar amounts into the portal circulation. The mature insulin molecule comprises two polypeptide chains, the A chain and the B chain. The two chains are linked together by two inter-chain disulphide bridges. There is also an intra-chain disulphide bridge in the A chain.

Secretion of insulin is mainly controlled by plasma glucose concentration, and the hormone has a number of important metabolic actions. Its principal function is to control the uptake and utilisation of glucose in peripheral tissues via the glucose transporter. This and other hypoglycaemic activities, such as the inhibition of hepatic gluconeogenesis and glycogenolysis are counteracted by the hyperglycaemic hormones including glucagon, epinephrine (adrenaline), growth hormone and cortisol.

PRINCIPLE OF THE PROCEDURE

Mercodia Mouse Insulin ELISA is a solid phase two-site enzyme immunoassay. It is based on the direct sandwich technique in which two monoclonal antibodies are directed against separate antigenic determinants on the insulin molecule. During incubation insulin in the sample reacts with peroxidase-conjugated anti-insulin antibodies and anti-insulin antibodies bound to microplate wells. A simple washing step removes unbound enzyme labeled antibody. The bound conjugate is detected by reaction with 3,3',5,5'-tetramethylbenzidine. The reaction is stopped by adding acid to give a colorimetric endpoint that is read spectrophotometrically.

WARNINGS AND PRECAUTIONS

- For research use only.
- Not for internal or external use in humans or animals.
- The content of this kit and their residues must not be allowed to come into contact with ruminating animal or swine.
- The Stop Solution in this kit contains 0.5 M H_2SO_4. Follow routine precautions for handling hazardous chemicals.
- All samples should be handled as capable of transmitting infections.
- Each well can only be used once

MATERIAL REQUIRED BUT NOT PROVIDED

- Pipettes with appropriate volumes (repeating pipettes preferred for addition of enzyme conjugate 1X solution, Substrate TMB and Stop Solution)
- Tubes, beakers and cylinders for reagent preparation
- Redistilled water
- Magnetic stirrer
- Vortex mixer
- Microplate reader with 450 nm filter
- Microplate shaker (700–900 cycles per minute, orbital movement)
- Microplate washing device with overflow function (recommended but not required)

REAGENTS FOR 1 X 96 KIT

Each Mercodia Mouse Insulin ELISA kit (10-1247-01) contains reagents for 96 wells, sufficient for 42 samples and one Calibrator curve in duplicate. For larger series of assays, use pooled reagents from packages bearing identical lot numbers. The expiry date for the complete kit is stated on the outer label. The recommended storage temperature is 2–8°C.

Coated Plate Mouse monoclonal anti-insulin	1 plate	96 wells 8-well strips	Ready for Use
For unused microplate strips, reseal the bag using adhesive tape, store at 2–8°C and use within 8 weeks.			
Calibrators 1, 2, 3, 4, 5 Mouse insulin Color coded yellow Concentration stated on vial label.	5 vials	1000 µL	Ready for Use
Calibrator 0 Color coded yellow	1 vial	5 mL	Ready for Use
Enzyme Conjugate 11X Peroxidase conjugated mouse monoclonal anti-insulin	1 vial	1.3 mL	Preparation, see below
Enzyme Conjugate Buffer Color coded blue	1 vial	13 mL	Ready for use
Wash Buffer 21X Storage after dilution: 2-8°C for 8 weeks.	1 bottle	50 mL	Dilute with 1000 mL redistilled water to make wash buffer 1X solution.
Substrate TMB Colorless solution *Note! Light sensitive!*	1 bottle	22 mL	Ready for Use
Stop Solution 0.5 M H_2SO_4	1 vial	7 mL	Ready for Use

Preparation of enzyme conjugate 1X solution

Prepare the needed volume of enzyme conjugate 1X solution by mixing Enzyme Conjugate 11X with Enzyme Conjugate buffer (1+10) according to the table below. When preparing enzyme conjugate 1X solution for the whole plate, pour all of the Enzyme Conjugate Buffer into the Enzyme Conjugate 11X vial. Mix gently.

Number of strips	Enzyme Conjugate 11X	Enzyme Conjugate Buffer
12 strips	1 vial	1 vial
8 strips	800 µL	8.0 mL
4 strips	400 µL	4.0 mL

Storage after dilution: 2–8°C for two months.

REAGENTS FOR 10 X 96 KIT

Each Mercodia Mouse Insulin ELISA kit (10-1247-10) contains reagents for 10 x 96 wells, sufficient for 42 samples and one calibrator curve in duplicate on each plate. For larger series of assays, use pooled reagents from packages bearing identical lot numbers. The expiry date for the complete kit is stated on the outer label. The recommended storage temperature is 2–8°C.

Coated Plate Mouse monoclonal anti-insulin	10 plate	96 wells 8-well strips	Ready for Use
For unused microplate strips, reseal the bag using adhesive tape, store at 2–8°C and use within 8 weeks.			
Calibrators 1, 2, 3, 4, 5 Mouse insulin Color coded yellow Concentration stated on vial label.	5 vials	1000 µL	Ready for Use
Calibrator 0 Color coded yellow	1 vial	5 mL	Ready for Use
Enzyme Conjugate 11X Peroxidase conjugated mouse monoclonal anti-insulin	1 vial	12 mL	Preparation, see below
Enzyme Conjugate Buffer Color coded blue	1 vial	120 mL	Ready for use
Wash Buffer 21X	2 bottles	200 mL	Preparation, see below
Substrate TMB Colorless solution *Note! Light sensitive!*	1 bottle	220 mL	Ready for Use
Stop Solution 0.5 M H_2SO_4	1 vial	70 mL	Ready for Use

Preparation of enzyme conjugate 1X solution

Prepare the needed volume of enzyme conjugate 1X solution by dilution of Enzyme Conjugate 11X in Enzyme Conjugate buffer 1+10 according to the table below. Mix gently.

Number of plates	Enzyme Conjugate 11X	Enzyme Conjugate Buffer
10 plates	1 vial	1 vial
5 plates	5.0 mL	50 mL
3 plates	3.6 mL	36 mL
2 plates	2.4 mL	24 mL
1 plate	1.2 mL	12 mL

Storage after dilution: 2–8°C for two months.

Preparation of wash buffer 1X solution

Prepare the needed volume of wash buffer 1X solution by dilution of Wash Buffer 21X in redistilled water 1+20 according to the table below. Mix gently.

Number of plates	Wash Buffer 21X	Redistilled water
10 plates	2 bottles	8000 mL
5 plates	180 mL	3600 mL
3 plates	110 mL	2200 mL
2 plates	70 mL	1400 mL
1 plate	35 mL	700 mL

Storage after dilution: 2-8°C for 8 weeks.

SPECIMEN COLLECTION AND HANDLING

Serum

Collect blood by venipuncture, allow to clot, and separate the serum by centrifugation. Samples can be stored at 2–8°C up to 24 hours. For longer periods store samples at -20°C. Avoid repeated freezing and thawing.

Plasma

Collect blood by venipuncture into tubes containing heparin or EDTA as anticoagulant, and separate the plasma fraction. Samples can be stored at 2–8°C up to 24 hours. For longer periods store samples at –20°C. Avoid repeated freezing and thawing.

Preparation of samples

No dilution is normally required, however, samples containing > 6.5 µg/L should be diluted 1/10 v/v with Calibrator 0. *Note!* Buffers containing sodium azide (NaN_3) can not be used for sample dilution.

TEST PROCEDURE

Prepare a calibrator curve for each assay run. All reagents and samples must be brought to room temperature before use.

1. Prepare enzyme conjugate 1X solution, wash buffer 1X solution (according to the tables on previous pages) and samples.
2. Prepare sufficient microplate wells to accommodate Calibrators, controls and samples in duplicate.
3. Pipette 10 µL each of Calibrators, controls and samples into appropriate wells.
4. Add 100 µL of enzyme conjugate 1X solution into each well.
5. Incubate on a plate shaker (700-900 rpm) for 2 hours at room temperature (18-25°C).
6. Wash 6 times with 700 µL wash buffer 1X solution per well using an automatic plate washer with overflow-wash function. After final wash, invert and tap the plate firmly against absorbent paper. Do not include soak step in washing procedure.
   Or manually,
   Discard the reaction volume by inverting the microplate over a sink. Add 350µL wash buffer 1X solution to each well. Discard the wash solution, tap firmly several times against absorbent paper to remove excess liquid. Repeat 5 times. Avoid prolonged soaking during washing procedure.
7. Add 200 µL Substrate TMB into each well.
8. Incubate 15 minutes on the bench at room temperature (18-25°C).
9. Add 50 µL Stop Solution to each well.
   Place the plate on the shaker for approximately 5 seconds to ensure mixing.
10. Read optical density at 450 nm and calculate results.
    Read within 30 minutes.

Note! To prevent contamination between the conjugate and substrate, separate pipettes are recommended.

INTERNAL QUALITY CONTROL

Commercial controls such as Mercodia Diabetes Antigen Control Rat/Mouse (L, M, H) (10-1220-01) and/or internal serum pools with low, intermediate and high insulin concentrations should routinely be assayed as samples, and results charted from day to day. It is good laboratory practice to record the following data for each assay: kit lot number, preparation dates of kit components, OD values for the blank, Calibrators and controls.

Laboratories should follow government regulations or accreditation requirements for quality control frequency.

CALCULATION OF RESULTS

Computerized calculation

The concentration of insulin is obtained by computerized data reduction of the absorbance for the Calibrators, except for Calibrator 0, versus the concentration using cubic spline regression.

Manual Calculation

1. Plot the absorbance values obtained for the Calibrators, except for Calibrator 0, against the insulin concentration on a log-log paper and construct a calibrator curve.
2. Read the concentration of the samples from the calibrator curve.

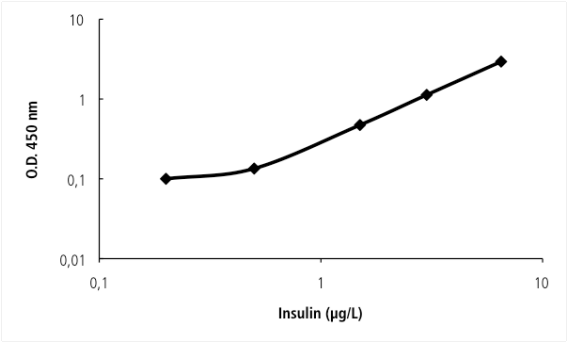
Example of results

Wells	Identity	A_{450}	Mean conc. µg/L
1A–B	Calibrator 0	0.072/0.073	
1C–D	Calibrator 1*	0.099/0.101	
1E–F	Calibrator 2*	0.136/0.133	
1G–H	Calibrator 3*	0.466/0.479	
2A–B	Calibrator 4*	1.136/1.118	
2C–D	Calibrator 5*	2.901/2.985	
2E–F	Sample 1	0.163/0.170	0.63
2G–H	Sample 2	0.352/0.361	1.2
3A–B	Sample 3	1.468/1.464	3.7

* Concentration stated on vial label.

Calibrator curve

A typical calibrator curve is shown here. Do not use this curve to determine actual assay results.



Conversion factor
1 µg corresponds to 174 pmol.

LIMITATIONS OF THE PROCEDURE
Performance limitations
Grossly lipemic, icteric or hemolyzed samples do not interfere in the assay. However, hemolysis in serum and plasma samples may result in a degradation of insulin which could give falsely low values and contributes to higher inter assay variation. The degradation is dependent on time, temperature and the hemoglobin concentration. Keep hemolyzed samples cold or on ice to prevent the insulin degradation.

EXPECTED VALUES
Good practice dictates that each laboratory establishes its own expected range of values.

PERFORMANCE CHARACTERISTICS
Detection limit
Detection limit is defined as the Capability of Detection according to ISO11843-Part 1. Capability of Detection should be seen as a part of a method validation, rather than the lowest concentration that can be measured.

The detection limit is ≤0.2 µg/L as determined with the methodology described in ISO11843-Part 4.

Concentration of samples with absorbance below Calibrator 1 should not be calculated, instead expressed less or equal to (≤) the concentration indicated on the vial for Calibrator 1.

Recovery
Recovery upon addition is 100-130% (113%).
Recovery upon dilution is 109-149% (129%).

Hook effect
Samples with a concentration up to at least 450 µg/L can be measured without giving falsely low results.

Precision
Each sample was analyzed in 4 replicates on 16 different occasions.

		Coefficient of variation		
Sample	Mean value µg/L	within assay %	between assay %	total assay %
1	0.65	3.1	5.9	6.1
2	1.3	1.9	3.4	3.5
3	3.6	2.9	5.1	5.3

Specificity

IGF-I	< 0.02%
IGF-II	< 0.02%
Mouse C-peptide I	< 0.002%
Mouse C-peptide II	< 0.002%
Rat C-peptide I	< 0.04%
Rat C-peptide II	< 0.04%
Rat insulin	146%
Mouse proinsulin I	43%
Mouse proinsulin II	60%
Rat proinsulin I	14%
Rat proinsulin II	60%
Porcine insulin	628%
Ovine insulin	256%
Bovine insulin	110%
Human insulin	195%
Human proinsulin	82%
Human C-peptide	< 0.05%

CALIBRATION

Mercodia Mouse Insulin ELISA is calibrated against an inhouse reference preparation of mouse insulin.

WARRANTY

The performance data presented here was obtained using the procedure indicated. Any change or modification in the procedure not recommended by Mercodia AB may affect the results, in which event Mercodia AB disclaims all warranties expressed, implied or statutory, including the implied warranty of merchantability and fitness for use.

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Further references can be found on our website: www.mercodia.com

SUMMARY PROTOCOL SHEET

Mercodia Mouse Insulin ELISA

Add Calibrators, controls* and samples	10 µL
Add enzyme conjugate 1X solution to all wells	100 µL
Incubate	2 hours at 18-25°C on a plate shaker (700-900 rpm)
Wash plate with wash buffer 1X solution	700 µL, 6 times
Add Substrate TMB	200 µL
Incubate	15 minutes at 18-25°C
Add Stop Solution	50 µL Shake for 5 seconds to ensure mixing
Measure A_{450}	Evaluate results

*not provided

For full details see page 7