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LDN[®]

Instructions for use

Histamine ELISA

REF

BA E-1000



IVD



Histamine ELISA

1. **Intended use and principle of the test**

Enzyme Immunoassay for the quantitative determination of Histamine in plasma and urine.

In combination with the supplementary kit Histamine Release ([REF](#) BA E-1100), the assay can be used for the measurement of histamine release in heparinized whole blood.

In the first part of the procedure, Histamine is quantitatively acylated. The subsequent competitive ELISA kit uses the microtiter plate format. The antigen is bound to the solid phase of the microtiter plate. The acylated standards, controls and samples and the solid phase bound analyte compete for a fixed number of antiserum binding sites. After the system is in equilibrium, free antigen and free antigen-antiserum complexes are removed by washing. The antibody bound to the solid phase is detected by an anti-rabbit IgG-peroxidase conjugate using TMB as a substrate. The reaction is monitored at 450 nm.

Quantification of unknown samples is achieved by comparing their absorbance with a reference curve prepared with known standard concentrations.

2. **Advice on handling the test**

2.1 **Reliability of the test results**

In order to assure a reliable evaluation of the test results it must be conducted according to the instructions included and in accordance with current rules and guidelines (GLP, RILIBÄK, etc.). Special attention must be paid to control checks for precision and correctness during the test; the results of these control checks have to be within the norm range. In case of significant discrepancies between the pre-set assay characteristics of this test and the actual results please contact the manufacturer of the test kit for further instructions.

It is recommended that each laboratory establishes its own reference intervals. The values reported in this test instruction are only indicative.

The results obtained with this test kit should not be taken as the sole reason for any therapeutic consequence but have to be correlated to other diagnostic tests and clinical observations.

2.2 **Complaints**

In case of complaints please submit to the manufacturer a written report containing all data as to how the test was conducted, the results received and a copy of the original test printout. Please contact the manufacturer to obtain a reclamation form and return it completely filled in to the manufacturer.

2.3 **Warranty**

This test kit was produced according to the latest developments in technology and subjected to stringent internal and external quality control checks. Any alteration of the test kit or the test procedure as well as the usage of reagents from different charges may have a negative influence on the test results and are therefore not covered by warranty. The manufacturer is not liable for damages incurred in transit.

2.4 **Disposal**

Residual substances and/or all remaining chemicals, reagents and ready for use solutions, are special refuse. The disposal is subject to the laws and regulations of the federation and the countries. About the removal of special refuse the responsible authorities or refuse disposal enterprises inform. The disposal of the kit must be made according to the national official regulations. Legal basis for the disposal of special refuse is the cycle economic- and waste law.

The appropriate safety data sheets of the individual products are available on the homepage. The safety data sheets correspond to the standard: ISO 11014-1.

2.5 **Interference**

Do not mix reagents and solutions from different lots. Consider different transport and storage conditions. Inappropriate handling of test samples or deviations from the test regulation can the results affect. Use no kit components beyond the expiration date. Avoid microbiological contamination of the reagents and the washing water. Consider incubation periods and wash references.

2.6 **Precautions**

Observe the incubation periods and washing instructions. Never pipette by mouth and avoid contact of reagents and specimens with skin. No smoking, eating or drinking in areas where samples or kit test tubes are handled. When working with kit components or samples, always wear protective gloves and wash your hand thoroughly as soon as you have finished the work. Avoid spraying of any kind. Avoid any skin contact with reagents. Use protective clothing and disposable gloves. All steps have to be performed according to the protocol. Optimal test results are only obtained when using calibrated pipettes. Sodium azide could react with lead and copper tubes and may form highly explosive metal azide. When clearing up, rinse thoroughly with large volumes of water to prevent such formation.

All reagents of this testkit which contain human or animal 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. **Storage and stability**

Store the reagents at 2 - 8 °C until expiration date. Do not use components beyond the expiry date indicated on the kit labels.

4.1 **Contents of the kit**

BA D-0024	REAC-PLATE	Reaction Plate	1 x 96 Wells	ready for use
BA D-0090	FOILS	Adhesive Foil	1 x 4	ready for use
BA E-0030	WASH-CONC 50x	Wash Buffer Concentrate	1 x 20 mL	concentrate, dilute content with dist. water to a final volume of 1000 mL
BA E-0055	SUBSTRATE	Substrate	1 x 12 ml	ready for use, containing a solution of TMB
BA E-0080	STOP-SOLN	Stop Solution	1 x 12 ml	ready for use, containing 0.25 M H ₂ SO ₄
BA E-1001	STANDARD A	Standard A	1 x 4 ml	ready for use
BA E-1002	STANDARD B	Standard B	1 x 4 ml	ready for use
BA E-1003	STANDARD C	Standard C	1 x 4 ml	ready for use
BA E-1004	STANDARD D	Standard D	1 x 4 ml	ready for use
BA E-1005	STANDARD E	Standard E	1 x 4 ml	ready for use
BA E-1006	STANDARD F	Standard F	1 x 4 ml	ready for use
BA E-1010	HIS-AS	Histamine Antiserum	1 x 12 ml	from goat, ready for use
BA E-1011	ACYL-BUFF	Acylation Buffer	1 x 4 mL	ready for use
BA E-1012	ACYL-REAG	Acylation Reagent	4 x 1.25 mL	lyophilised
BA E-1031	HIS	Histamine Microtiter Strips	1 x 96 wells	12 strips, 8 wells each, break apart, pre-coated
BA E-1040	CONJUGATE	Enzyme Conjugate	1 x 12 mL	ready for use, anti-goat IgG conjugated with peroxidase
BA E-1051	CONTROL 1	Control 1	1 x 4 mL	ready for use
BA E-1052	CONTROL 2	Control 2	1 x 4 mL	ready for use
BA R-0075	ACYL-DILUENT	Acylation Diluent	2 x 4 mL	ready for use

4.2 **Additional materials and equipment required but not provided in the kit**

- Calibrated variable precision micropipettes (e.g. 10-100 µL /100-1000 µL)
- Microtiter plate washing device
- ELISA reader capable of reading absorbance at 450 nm and 620 or 650 nm
- Shaker (shaking amplitude 3mm; approx. 600 rpm)
- Absorbent material (paper towel)
- Distilled water
- Vortex mixer

5. **Sample collection and storage**

Plasma

Plasma (EDTA, Heparin) should be used. Haemolytic and especially lipemic samples should not be used with this assay.

Storage: up to 6 hours at 2 - 8°C; for longer periods (up to 6 months) at - 20°C.

Repeated freezing and thawing should be avoided.

Urine

Spontaneous or 24-hour urine, collected in a bottle containing 10-15 mL of 6 M HCl, may be used.

Storage: up to 6 hours at 2 - 8°C; for longer periods (up to 6 months) at -20°C.

Repeated freezing and thawing should be avoided.

Avoid exposure to direct sunlight.

Whole Blood

The histamine release is performed with heparinized whole blood. For further information please refer to the instructions for use of the Histamine Release (REF BA E-1100).

6. Test procedure

Allow all reagents and samples to reach room temperature prior to use.
The measurement in duplicates is recommended.

6.1 Preparation of reagents

Wash Buffer

Dilute the 20 mL Wash Buffer Concentrate with distilled water to a final volume of 1000 mL.
Storage: up to 6 months 4–8°C

Acylation Diluent

The Acylation Diluent has a freezing point of 18.5°C. To ensure that the Acylation Diluent is liquid when being used, it must be ensured that the Acylation Diluent has reached room temperature and forms a homogeneous, crystal-free solution before being used. Alternatively the Acylation Diluent can be stored at room temperature (20 – 25°C) separate from the other kit components.

Acylation Reagent

Reconstitute each vial with 1.25 mL Acylation Diluent.



The Acylation Reagent has to be prepared freshly prior to the assay (not longer than 1 hour in advance). If more than 1.25 mL is needed pool the contents of 2 or 3 vials and mix thoroughly.

6.2 Sample preparation and acylation

1.	Pipette 25 µL of standards , 25 µL of controls , 25 µL of plasma samples , 10 µL of urine samples , or 50 µL of supernatant from the release test* into the respective wells of the Reaction Plate .
2.	Add 25 µL of Acylation Buffer to all wells.
3.	Add 25 µL of Acylation Reagent to all wells.
4.	Incubate for 45 min at RT (20–25°C) on a shaker (approx. 600 rpm).
5.	Add 200 µL of distilled water to all wells.
6.	Incubate for 15 min. at RT (20–25°C) on a shaker (approx. 600 rpm).
	Take 25 µL of the prepared standards, controls and samples for the Histamine ELISA

* For the **release test** the **Histamine Release** supplementary kit (**REF** BA E-1100) has to be used.

6.3 Histamine ELISA

1.	Pipette 25 µL of the acylated standards, controls and samples into the appropriate wells of the Histamine Microtiter Strips .
2.	Pipette 100 µL of the Histamine Antiserum into all wells and cover plate with Adhesive Foil .
3.	Incubate for 3 hours at RT (20–25°C) on a shaker (approx. 600 rpm). Alternatively: shake the Histamine Microtiter Strips briefly by hand and incubate for 15 – 20 hours at 2 – 8 °C .
4.	Remove the foil. Discard or aspirate the contents of the wells and wash each well 4 times thoroughly with 300 µL Wash Buffer . Blot dry by tapping the inverted plate on absorbent material.
5.	Pipette 100 µL of the Enzyme Conjugate into all wells.
6.	Incubate for 30 min at RT (20–25°C) on a shaker (approx. 600 rpm).
7.	Discard or aspirate the contents of the wells and wash each well 4 times thoroughly with 300 µL Wash Buffer . Blot dry by tapping the inverted plate on absorbent material.
8.	Pipette 100 µL of the Substrate into all wells and incubate for 20–30 min at RT (20–25°C) on a shaker (approx. 600 rpm). Avoid exposure to direct sun light!
9.	Add 100 µL of the Stop Solution to each well and shake the microtiter plate to ensure a homogeneous distribution of the solution.
10.	Read the absorbance of the solution in the wells within 10 minutes, using a microplate reader set to 450 nm with a reference wavelength between 620 nm and 650 nm.

7. Calculation of results

	Concentration of the standards					
Standard	A	B	C	D	E	F
Histamine (ng/mL = µg/L)	0	0.5	1.5	5	15	50
Histamine (nmol/L)	0	4.5	13.5	45	135	450
Conversion:	Histamine (ng/mL) x 9 = Histamine (nmol/L)					

The calibration curve is obtained by plotting the absorbance readings (calculate the mean absorbance) of the standards (linear, y-axis) against the corresponding standard concentrations (logarithmic, x-axis).

Use a non-linear regression for curve fitting (e.g. spline, 4- parameter, akima).

Plasma samples and controls:

The concentrations of the **plasma samples** and the **controls** can be read directly from the standard curve.

Urine samples:

The read concentrations of **histamine in urine** have to be **multiplied by 2.5**

The total amount of Histamine excreted in urine during 24 h is calculated as following:

$$\mu\text{g}/24\text{h} = \mu\text{g}/\text{L} \times \text{L}/24\text{h}$$

7.1 Quality control

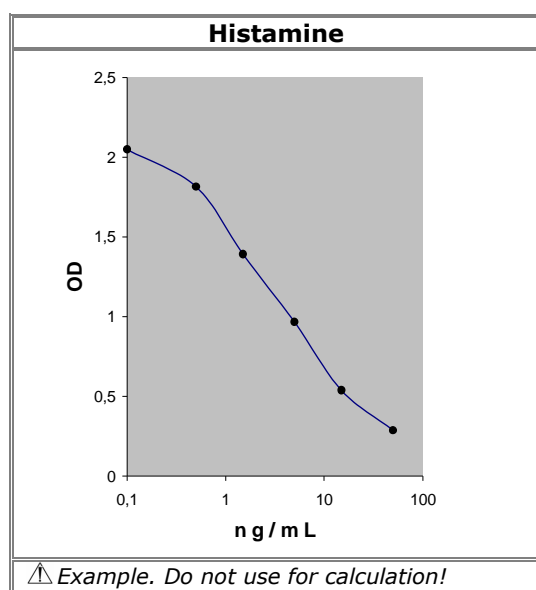
It is recommended to use control samples according to state and federal regulations. Use controls at both normal and pathological levels. The kit, or other commercially available, controls should fall within established confidence limits. The confidence limits of the kit controls are printed on the QC-Report.

7.2 Calibration

The binding of the antisera and the enzyme conjugates and the activity of the enzyme used are temperature dependent, and the extinction values may vary if a thermostat is not used. The higher the temperature, the higher the extinction values will be. The extinction values also depend on the incubation times. The optimal temperature during the Enzyme Immunoassay is between 20-25°C.


⚠ In case of overflow, read the absorbance of the solution in the wells within 10 minutes, using a microplate reader set to 405 nm

7.3 Typical calibration curve















8. Assay characteristics

Expected Reference Values	Histamine						
	Plasma	Urine					
		24 h	spontaneous				
	< 1 ng/mL	< 45 µg/d	< 45 µg/g creatinine				
Analytical Sensitivity (Limit of Detection)	Histamine						
	Sensitivity Plasma	0.12 ng/mL					
	Sensitivity Urine	0.30 ng/mL					
Analytical Specificity (Cross Reactivity)	Substance		Cross Reactivity (%)				
			Histamine				
	Histamine		100				
	3-Methyl-Histamine		0.1				
	Tyramine		0.01				
	L-Phenylalanine		< 0.001				
	L-Histidine		< 0.001				
	L-Tyrosine		< 0.001				
	Tryptamine		< 0.001				
	5-Hydroxy-Indole-Acetic Acid		< 0.001				
	Serotonin		< 0.001				
Precision							
Intra-Assay	Sample	Range (ng/mL)	CV (%)	Inter-Assay	Sample	Range (ng/mL)	CV (%)
Histamine	1	8.7 ± 0.6	7.4	Histamine	1	0.6 ± 0.1	12
	2	30.1 ± 2.2	7.3		Control samples	2	4.6 ± 0.3
Urine	1	2.03 ± 0.16	8				
	2	6.74 ± 0.37	5.6				
Histamine Plasma							
Linearity			Range	Serial dilution up to		Range (%)	
	Histamine	Urine	4.33 - 70 ng/mL	1:16		90 - 124	
		Plasma	0.74 – 8.48 ng/mL	1:16		85 -106	
Recovery			Mean (%)	Range (%)		% Recovery after spiking	
	Histamine	Urine	112	108 - 123			
		Plasma	103	92 - 120			
Method comparison versus ELISA	Histamine	Urine	ELISA = 0.9 ELISA (LDN) – 3.1			r = 0.98; n = 29	
		Plasma	ELISA = 1.0 ELISA (LDN) – 0.4			r = 0.99; n = 47	

 **For current literature, information about clinical significance or any other information please contact your local supplier.**

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!