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Instructions for use DOPAMINE high sensitive ELISA









For research use only – Not for use in diagnostic

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Related Products:

- ADRENALINE high sensitive ELISA
- NORADRENALINE high sensitive ELISA
- 2-CAT high sensitive ELISA
- 3-CAT high sensitive ELISA

1. Intended use and principle of the test

Enzyme Immunoassay for the quantitative determination of dopamine. Flexible test system for various biological sample types and volumes.

Dopamine is extracted by using a cis-diol-specific affinity gel, acylated and then converted enzymatically. The subsequent competitive ELISA uses the microtiter plate format. The antigen is bound to the solid phase of the microtiter plate. The derivatized standards, controls and samples compete with the solid phase bound analytes for a fixed number of antibody binding sites. After the system is in equilibrium, free antigen and free antigen-antibody 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 resulting in a colour reaction. The reaction is monitored at a wavelength of 450 nm.

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

2. Procedural cautions, guidelines and warnings

- (1) This kit is intended for professional use only. Users should have a thorough understanding of this protocol for the successful use of this kit. Only the test instruction provided with the kit is valid and must be used to run the assay. Reliable performance will only be attained by strict and careful adherence to the instructions provided.
- (2) The principles of Good Laboratory Practice (GLP) must be followed.
- (3) In order to reduce exposure to potentially harmful substances, wear lab coats, disposable protective gloves and protective glasses where necessary.
- (4) All kit reagents and specimens should be brought to room temperature and mixed gently but thoroughly before use. For dilution or reconstitution purposes, use deionized, distilled, or ultrapure water. Avoid repeated freezing and thawing of reagents and specimens.
- (5) The microplate contains snap-off strips. Unused wells must be stored at 2 8 °C in the sealed foil pouch with desiccant and used in the frame provided. Microtiter strips which are removed from the frame for usage should be marked accordingly to avoid any mix-up.
- (6) Duplicate determination of sample is highly recommended.
- (7) Once the test has been started, all steps should be completed without interruption. Make sure that the required reagents, materials, and devices are prepared for use at the appropriate time.
- (8) Incubation times do influence the results. All wells should be handled in the same order and time intervals.
- (9) To avoid cross-contamination of reagents, use new disposable pipette tips for dispensing each reagent, sample, standard and control.
- (10) A standard curve must be established for each run.
- (11) The controls should be included in each run and fall within established confidence limits. The confidence limits are listed in the QC-Report provided with the kit.
- (12) Do not mix kit components with different lot numbers within a test and do not use reagents beyond expiry date as shown on the kit labels.
- (13) Avoid contact with Stop Solution containing 0.25 M H₂SO₄. It may cause skin irritation and burns. In case of contact with eyes or skin, rinse off immediately with water.
- (14) TMB substrate has an irritant effect on skin and mucosa. In case of possible contact, wash eyes with an abundant volume of water and skin with soap and abundant water. Rinse contaminated items before reuse.
- (15) For information about hazardous substances included in the kit please refer to Safety Data Sheet (SDS). The Safety Data Sheet for this product is made available directly on the website of the manufacturer or upon request.
- (16) Kit reagents must be regarded as hazardous waste and disposed of according to national regulations.
- (17) In case of any severe damage to the test kit or components, the manufacturer has to be informed in writing, at the latest, one week after receiving the kit. Severely damaged single components must not be used for a test run. They must be stored properly until the manufacturer decides what to do with them. If it is decided that they are no longer suitable for measurements, they must be disposed of in accordance with national regulations.

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3. Storage and stability

Store kit and reagents at 2 - 8 °C until expiration date. Do not use kit and components beyond the expiry date indicated on the kit labels. Once opened, the reagents are stable for 2 months when stored at 2 - 8 °C. Once the resealable pouch of the ELISA plate has been opened, care should be taken to close it tightly again including the desiccant.

Materials

4.1 Contents of the kit				
BA D-0032	Ш 96	Microtiter Plate – ready to use		
Content:	1 x 96 wells, empty i	n a resealable pouch		
BA D-0090	FOILS	Adhesive Foil – ready to use		
Content:	Adhesive foils in a res	sealable pouch		
Number:	1 x 4 foils			
BA E-0030	WASH-CONC 50x	Wash Buffer Concentrate – concentrated 50x		
Content:	Buffer with a non-ion	ic detergent and physiological pH		
Volume:	1 x 20 ml/vial, purple	e cap		
BA E-0040	CONJUGATE	Enzyme Conjugate - ready to use		
Content:	Goat anti-rabbit imm	unoglobulins conjugated with peroxidase		
Volume:	1 x 12 ml/vial, red ca	p		
Description:	Species is goat			
BA E-0055	SUBSTRATE	Substrate – ready to use		
Content:	Chromogenic substra and hydrogen peroxic	te containing 3,3',5,5'-tetramethylbenzidine, substrate buffer de		
Volume:	1 x 12 ml/vial, black	сар		
BA E-0080	STOP-SOLN	Stop Solution – ready to use		
Content:	0.25 M sulfuric acid			
Volume:	1 x 12 ml/vial, grey of	ар		
BA E-0331	Ш DOP	Dopamine Microtiter Strips – ready to use		
Content:	1 x 96 wells (12x8) a with desiccant	ntigen precoated microwell plate in a resealable green pouch		
BA E-5310	DOP-AS	Dopamine Antiserum – ready to use		
Content:	Rabbit anti-dopamine preservative, green c	e antibody in buffer with proteins and non-mercury coloured		
Volume:	1 x 6 ml/vial, green o	сар		
Description:	Species of antibody is	s rabbit, species of protein in buffer is bovine		
BA E-6612	ACYL-REAG	Acylation Reagent – ready to use		
Content:	Acylation reagent in I	DMSO		
Volume:	1 x 3 ml/vial, white c	ар		
BA R-0050	ADJUST-BUFF	Adjustment Buffer – ready to use		
Content:	TRIS buffer			
Volume:	1 x 4 ml/vial, green o	сар		
BA R-4617	TE-BUFF	TE Buffer – ready to use		
Content:	TRIS-EDTA buffer			
Volume:	1 x 4 ml/vial, brown	сар		
BA R-6611	ACYL-BUFF	Acylation Buffer – ready to use		
Content:	Buffer with light alkal	ine pH for the acylation		
Volume:	1 x 20 ml/vial, white	сар		

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BA R-6614	COENZYME	Coenzyme – ready to use		
Content:	S-adenosyl-L-meth	S-adenosyl-L-methionine		
Volume:	1 x 4 ml/vial, purp	1 x 4 ml/vial, purple cap		
BA R-6615	ENZYME	Enzyme – lyophilized		
Content:	Catechol-O-methy	ltransferase		
Volume:	4 vials, pink cap	4 vials, pink cap		
Description:	Catechol-O-methy	Catechol-O-methyltransferase from pig liver		
BA R-6618	EXTRACT-PLATE 4	8 Extraction Plate – ready to use		
Content:	2 x 48 well plates	coated with boronate affinity gel in a resealable pouch		
BA R-6619	HCL	Hydrochloric Acid – ready to use		
Content:	0.025 M Hydrochlo	oric Acid, yellow coloured		
Volume:	1 x 20 ml/vial, dar	rk green cap		

4.2 Calibration and Controls

Standards and Controls – ready to use

Cat. no.	Component	Colour/Cap	Concentration [ng/ml] DOP	Concentration [nmol/l] DOP	Volume/ Vial
BA R-5601	STANDARD A	white	0	0	4 ml
BA R-5602	STANDARD B	yellow	0.5	3.3	4 ml
BA R-5603	STANDARD C	orange	1.5	9.8	4 ml
BA R-5604	STANDARD D	blue	5	33	4 ml
BA R-5605	STANDARD E	grey	20	131	4 ml
BA R-5606	STANDARD F	black	80	522	4 ml
BA R-5651	CONTROL 1	green	Refer to QC-Report	•	4 ml
BA R-5652	CONTROL 2	red	and acceptable ran	ge.	4 ml
•	J : / -	17 6 50 1			

Conversion: dopamine $[ng/ml] \times 6.53 = dopamine [nmol/l]$

Content: Acidic buffer with non-mercury stabilizer, spiked with defined quantity of dopamine.

4.3 Additional materials required but not provided in the kit

- Water (deionized, distilled, or ultra-pure)
- Absorbent material (paper towel)

4.4 Additional equipment required but not provided in the kit

- Calibrated precision pipettes to dispense volumes between 1 750 µl; 1 ml
- Microtiter plate washing device (manual, semi-automated or automated)
- ELISA reader capable of reading absorbance at 450 nm and if possible 620 650 nm
- Microtiter plate shaker (shaking amplitude 3 mm; approx. 600 rpm)
- Vortex mixer
- Temperature controlled incubator (37 °C) or similar heating device

Sample collection, handling and storage

Storage: up to 6 hours at 2-8 °C; for longer periods (up to 6 months) at -20 °C or -80 °C. Advice for the preservation of the biological sample: to prevent catecholamine degradation, add EDTA (final concentration 1 mM) and sodium metabisulfite (final concentration 4 mM) to the sample.

6. Test procedure

Allow all reagents and samples to reach room temperature and mix thoroughly by gentle inversion before use. Number the Microtiter Plate, Extraction Plate and microwell plates (Microtiter Strips which are removed from the frame for usage should be marked accordingly to avoid any mix-up). Duplicate determinations are recommended.

The binding of the antisera and of the enzyme conjugate and the activity of the enzyme are temperature dependent. The higher the temperature, the higher the absorption values will be. Varying incubation

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times will have similar influences on the absorbance. The optimal temperature during the enzyme immunoassay is between 20 - 25 °C.

If the product is prepared in parts, unused wells in Extraction Plates should be covered to avoid contamination. After preparation, the used wells must be labelled to prevent double use.

During the overnight incubation at 2 - 8 °C with the antiserum, the temperature should be uniform all over the ELISA plate to avoid any drift and edge-effect.

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

6.1 Preparation of reagents and further notes

Wash Buffer

Dilute the 20 ml Wash Buffer Concentrate $\boxed{\text{WASH-CONC}}$ 50X with water to a final volume of 1000 ml. Storage: 2 months at 2 – 8 °C

Enzyme Solution

Reconstitute the content of the vial **ENZYME** with 1 ml water (deionized, distilled, or ultra-pure) and mix thoroughly. Add 0.3 ml of **COENZYME** followed by 0.7 ml of **ADJUST-BUFF**. The total volume of the Enzyme Solution is 2.0 ml.

The Enzyme Solution has to be prepared freshly prior to the assay (not longer than 10 - 15 minutes in advance). Discard after use!

Dopamine Microtiter Strips

In rare cases residues of the blocking and stabilizing reagent can be seen in the wells as small, white dots or lines. These residues do not influence the quality of the product.

Acylation Reagent

The **ACYL-REAG** (BA E-6612) has a freezing point of 18.5 °C. To ensure that it is liquid when being used, it must be ensured that the Acylation Reagent has reached room temperature and forms a homogeneous, crystal-free solution before being used.

6.2 Sample preparation

The DOPAMINE high sensitive ELISA is a flexible test system for various biological sample types and volumes. It is not possible to give a general advice how to prepare the samples. However, the following basics should help the researcher to fit the protocol to his specific needs.

- Avoid excess of acid: excess of acid might exceed the buffer capacity of the extraction buffer. A pH > 7.0 during the extraction is mandatory.
- Prevent dopamine degradation by adding preservatives to the sample (see *Sample collection, handling and storage*).
- Avoid chaotropic chemicals like perchloric acid. The high salt content might reduce the recovery of dopamine. If your samples already contain high amounts of perchloric acid, neutralize the sample prior to the extraction step.
- Tissue samples can be homogenised in 0.01 N HCl in the presence of EDTA and sodium metabisulfite. Under these conditions, dopamine is positively charged which reduces binding to proteins and optimizes solubility.
- Avoid samples that contain substances with a cis-diol structure. These will reduce the recovery of dopamine.
- It is advisable to perform a "Proof of Principle" to determine the recovery of dopamine in your samples. Prepare a stock solution of dopamine. Add small amounts (to change the native sample matrix as less as possible) of the stock solutions to the sample matrix and check the recovery.
- The used sample volume determines the sensitivity of this test. Determine the sample volume needed to determine the dopamine in your sample by testing different amounts of sample volume.

If you need any support in establishing a protocol for your specific purposes, do not hesitate to contact the manufacturer directly!

6.3 Extraction and acylation

The DOPAMINE high sensitive ELISA offers a flexible test system for various biological sample types and volumes. Step 1 of the extraction procedure depends on the sample volume:

- in case you have sample volumes between 1 100 μl follow **1.1**
- in case you have sample volumes between 100 500 μl follow **1.2**
- in case you have sample volumes between 500 750 μl follow **1.3**

 $ilde{\mathbb{N}}$ Within a run it is only possible to measure samples with the same volume!

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1. 1.1 Sample volume 1 – 100 μl

Pipette into the respective wells of the **EXTRACT-PLATE 48**:

10 µl standards, 10 µl controls and 1 – 100 µl sample.

Fill up each well with water (deionized, distilled, or ultrapure) to a **final volume** of 100 µl [e.g. 10 µl standard plus 90 µl water (deionized, distilled, or ultra-pure)].

1.2 Sample volume 100 – 500 μl

Pipette into the respective wells of the EXTRACT-PLATE 48:

10 µl standards,

10 µl controls and

100 – 500 µl sample.

Fill up each well with water (deionized, distilled, or ultrapure) to a **final volume** of 500 µl [e.g. 10 µl standard plus 490 µl water (deionized, distilled, or ultra-pure)].

1.3 Sample volume 500 - 750 μl

Pipette into the respective wells of the EXTRACT-PLATE 48:

10 µl standards,

10 µl controls and

500 - 750 µl sample.

Fill up each well with water (deionized, distilled, or ultrapure) to a **final volume** of 750 µl [e.g. 10 µl standard plus 740 µl water (deionized, distilled, or ultra-pure)].

- **2.** Pipette **25** μ **I** of **TE-BUFF** into all wells.
- **3.** Cover the plate with **FOILS**. Shake **60 min** at **RT** (20 25 °C) on a **shaker** (approx. 600 rpm).
- **4.** Remove the foil and empty the plate. Blot dry by tapping the inverted plate on absorbent material.
- 5. Pipette 1 ml of Wash Buffer into all wells.
- **6.** Shake **5 min** at **RT** (20 25 °C) on a **shaker** (approx. 600 rpm).
- **7.** Blot dry by tapping the inverted plate on absorbent material.
- **8. Wash one more time** as described (step 5, 6 and 7)!
- **9.** Pipette **150** μ I of **ACYL-BUFF** into all wells.
- **10.** Pipette **25 μl** of **ACYL-REAG** into all wells.
- **11.** Shake **20 min** at **RT** (20 25 °C) on a **shaker** (approx. 600 rpm).
- **12.** Empty the plate and blot dry by tapping the inverted plate on absorbent material.
- 13. Pipette 1 ml of Wash Buffer into all wells.
- **14.** Shake **5 min** at **RT** (20 25 °C) on a **shaker** (approx. 600 rpm).
- **15.** Blot dry by tapping the inverted plate on absorbent material.
- **16.** Wash one more time as described (step 13, 14, 15).
- 17. Pipette 100 μl of HCL into all wells.
- **18.** Cover plate with **FOILS**. Shake **10 min** at **RT** (20 25 °C) on a **shaker** (approx. 600 rpm).
- ⚠ Do not decant the supernatant thereafter!
 - 90 µl of the supernatant is needed for the subsequent enzymatic conversion.

6.4 Enzymatic Conversion

- 1. Pipette 90 μl of the extracted standards, controls and samples into the respective wells of the Microtiter Plate Ψ 96.
- **2.** Add **25** μ I of **Enzyme Solution** (refer to 6.1) to all wells.
- **3.** Cover plate with **FOILS**. Shake **1 min** at **RT** (20 25 °C) on a **shaker** (approx. 600 rpm) to mix.
- **4.** Incubate for **2 h** at **37 °C**. The following volumes of the supernatants are needed for the subsequent ELISA:

Dopamine 100 μl

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6.5 Dopamine ELISA

- 1. Pipette 100 μl of standards, controls and samples from the Enzyme Plate (refer to 6.4) into the respective pre-coated Dopamine Microtiter Strips μ DOP.
- 2. Pipette 50 µl of the respective DOP-AS into all wells.
- **3.** Cover the plate with **FOILS**. Shake **1 min** at **RT** (20 25 °C) on a **shaker** (approx. 600 rpm).
- 4. Incubate for 15 20 h (overnight) at 2 8 °C.
- 5. Remove the foil. Discard or aspirate the content of the wells. Wash the plate 4 x by adding 300 μl of Wash Buffer, discarding the content and blotting dry each time by tapping the inverted plate on absorbent material.
- **6.** Pipette **100** μ **I** of **CONJUGATE** into all wells.
- 7. Incubate **30 min** at **RT** (20 25 °C) on a **shaker** (approx. 600 rpm).
- **9.** Pipette **100** μ **I** of **SUBSTRATE** into all wells.
- **10.** Incubate **20 30 min** at **RT** (20 25 °C) on a **shaker** (approx. 600 rpm).
- Avoid exposure to direct sunlight!
- 11. Pipette 100 μl of STOP-SOLN into all wells.
- **12. Read** the absorbance of the solution in the wells within 10 minutes, using a microplate reader set to **450 nm** (if available a reference wavelength between 620 nm and 650 nm is recommended).

7. Calculation of results

The standard curve, which can be used to determine the concentration of the unknown samples, 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) using a concentration of 0.001 ng/ml for Standard A (this alignment is mandatory because of the logarithmic presentation of the data). Use non-linear regression for curve fitting (e.g. 4-parameter, marquardt).

This assay is a competitive assay. This means: the OD-values are decreasing with increasing concentrations of the analyte. OD-values found below the standard curve correspond to high concentrations of the analyte in the sample and have to be reported as being positive.

The concentrations of the samples taken from the standard curve have to be multiplied by a correction factor.

To μl (volume of standards extracted)

Correction factor = sample volume (μl) extracted

Example

 $750~\mu l$ of the sample is extracted and the concentration taken from the standard curve is 0.45~ng/m l dopamine.

Correction factor = 10/750 = 0.013

Concentration of the sample = $0.45 \text{ ng/ml} \times 0.013 = 0.006 \text{ ng/ml} = 6 \text{ pg/ml}$ dopamine

Conversion:

Dopamine $[ng/ml] \times 6.53 = Dopamine [nmol/l]$

7.1 Quality control

The confidence limits of the kit controls are indicated on the QC-Report.

8. Assay characteristics

Sensitivity (Limit	of Detection)
Dopamine	0.25 ng/ml x C*

C* = Correction factor (refer to 7.)

Analytical Sensitivity (750 µl undiluted sample)			
Dopamine	3.3 pg/ml		

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Functional Sensitivity (750 µl undiluted sample)			
Dopamine	5 pg/ml		

Analytical Specificity (Cross Reactivity)			
Substance	Cross Reactivity [%]		
Substance	Dopamine		
Derivatized Adrenaline	0.03		
Derivatized Noradrenaline	0.87		
Derivatized Dopamine	100		
Metanephrine	< 0.007		
Normetanephrine	0.008		
3-Methoxytyramine	0.55		
3-Methoxy-4-hydroxyphenylglycol	< 0.007		
Tyramine	0.13		
Phenylalanine, Caffeinic acid, L- Dopa, Homovanillic acid, Tyrosine, 3-Methoxy-4-hydroxymandelic acid	< 0.007		

Precision					
Intra-Assay Human EDTA-Plasma					
Sample Mean \pm 3 SD [pg/ml] SD [pg/ml] CV [%					
Dopamine	high	1,438.6 ± 465.6	155.2	10.8	
	medium	565.9 ± 246.3	82.1	14.5	
	low	56.4 ± 36.3	12.1	21.5	

Precision					
Intra-Assay Cell Culture Medium (RPMI)					
	Sample	Mean \pm 3 SD [pg/ml]	SD [pg/ml]	CV [%]	
Dopamine	high	2,784.5 ± 1,238.7	412.9	14.8	
	medium	1,003.7 ± 526.2	175.4	17.5	
	low	74.7 ± 51.6	17.2	23.0	

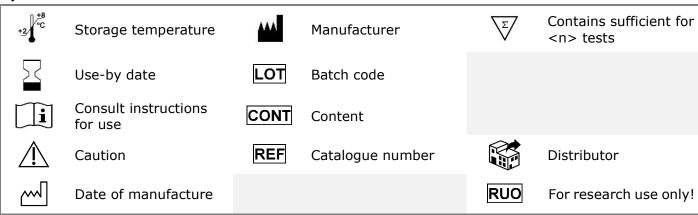
Recovery Dopamine						
	Mean [%]	Range [%]	SD [%]	CV [%]		
Human EDTA-Plasma	97.7	83.7 - 115.9	11.8	12.1		
Cell Culture Medium	98.6	77.7 - 113.4	12.1	12.2		

 \triangle For literature or any other information please contact your local supplier.

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 $[\]triangle$ The liability of the manufacturer shall be limited to the replacement of defective products. The manufacturer takes no liability for any damages or expenses arising directly or indirectly from the use of this product.

Symbols:



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