

ab133054 – 11-dehydro-TXB₂ ELISA Kit

Instructions for Use

For quantitative detection of 11-dehydro-TXB₂ in tissue culture media and urine.

This product is for research use only and is not intended for diagnostic use.

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1. BACKGROUND

Abcam's 11-dehydro-TXB₂ *in vitro* competitive ELISA (Enzyme-Linked Immunosorbent Assay) kit is designed for the accurate quantitative measurement of 11-dehydro-TXB₂ in tissue culture media and urine.

A goat anti-rabbit IgG antibody has been precoated onto 96-well plates. Standards or test samples are added to the wells, along with an alkaline phosphatase (AP) conjugated-11-dehydro-TXB₂ antigen and a polyclonal rabbit antibody specific to 11-dehydro-TXB₂. After incubation the excess reagents are washed away. pNpp substrate is added and after a short incubation the enzyme reaction is stopped and the yellow color generated is read at 405 nm. The intensity of the yellow coloration is inversely proportional to the amount of 11-dehydro-TXB₂ captured in the plate.

11-dehydro-Thromboxane B₂ (11-dehydro-TXB₂) is a major metabolite of Thromboxane B₂ (TXB₂) found in urine and plasma. It is produced by the dehydrogenation of the alcohol group on the C11 position of TXB₂ by the enzyme 11-OH-dehydrogenase. The detection of 11-dehydro-TXB₂ is often used to measure thromboxane production *in vivo*. Monitoring levels of this metabolite is a helpful tool in the study of several diseases, such as liver cirrhosis, cystic fibrosis, mastocytosis, systemic lupus erythematosus, thrombosis diseases, and other diseases involving platelet activation. 11-dehydro-TXB₂ has also been used in diabetes and asthma studies.

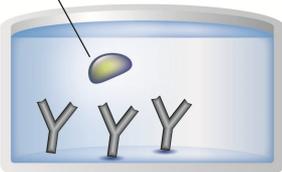
2. ASSAY SUMMARY

Capture Antibody



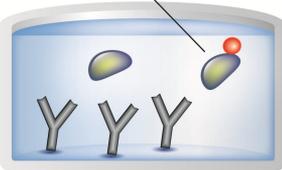
Prepare all reagents and samples as instructed.

Sample



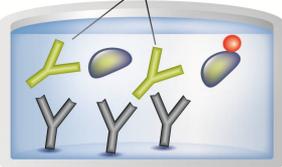
Add standards and samples to appropriate wells.

Labeled AP-Conjugate



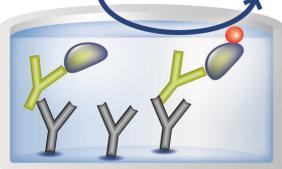
Add prepared labeled AP-conjugate to appropriate wells.

Target Specific Antibody



Add 11-dehydro-TXB₂ antibody to appropriate wells. Incubate at room temperature.

Substrate **Colored Product**



Add pNpp substrate to each well. Incubate at room temperature. Add Stop Solution to each well. Read immediately.

3. PRECAUTIONS

Please read these instructions carefully prior to beginning the assay.

- Some kit components contain azide, which may react with lead or copper plumbing. When disposing of reagents always flush with large volumes of water to prevent azide build-up.
- Stop Solution is a solution of trisodium phosphate. This solution is caustic; care should be taken in use.
- The activity of the alkaline phosphatase conjugate is dependent on the presence of Mg^{2+} and Zn^{2+} ions. The activity of the conjugate is affected by concentrations of chelators (>10 mM) such as EDTA and EGTA.
- We test this kit's performance with a variety of samples, however it is possible that high levels of interfering substances may cause variation in assay results.
- The 11-dehydro-TXB₂ Standard provided is supplied in ethanolic buffer at a pH optimized to maintain 11-dehydro-TXB₂ integrity. Care should be taken handling this material because of the known and unknown effects of eicosanoids.

4. STORAGE AND STABILITY

Store kit at +4°C immediately upon receipt, apart from the Alkaline Phosphatase Conjugate and Standard, which should be stored at -20°C. Avoid multiple freeze-thaw cycles.

Refer to list of materials supplied for storage conditions of individual components.

5. MATERIALS SUPPLIED

Item	Amount	Storage Condition
Goat anti-rabbit IgG Microplate (12 x 8 wells)	96 Wells	+4°C
11-dehydro-TXB ₂ Alkaline Phosphatase Conjugate	6 mL	-20°C
11-dehydro-TXB ₂ Antibody	6 mL	+4°C
11-dehydro-Thromboxane B ₂ Standard	500 µL	-20°C
Assay Buffer	30 mL	+4°C
20X Wash Buffer Concentrate	30 mL	+4°C
pNpp Substrate	20 mL	+4°C
Stop Solution	5 mL	+4°C

6. MATERIALS REQUIRED, NOT SUPPLIED

These materials will be required to successfully utilize this assay:

- Standard microplate reader - capable of reading at 405 nm, preferably with correction between 570 and 590 nm
- Automated plate washer (optional)
- Adjustable pipettes and pipette tips. Multichannel pipettes are recommended when large sample sets are being analyzed
- Eppendorf tubes
- Microplate Shaker
- Absorbent paper for blotting
- 200 mg C18 Reverse Phase Extraction Columns (only required for extraction of samples containing low levels of 11-dehydro-TXB₂)
- 2M hydrochloric acid (only required for extraction of samples containing low levels of 11-dehydro-TXB₂)
- Deionized water
- Ethanol
- Hexane
- Ethyl acetate

7. LIMITATIONS

- Assay kit intended for research use only. Not for use in diagnostic procedures
- Do not mix or substitute reagents or materials from other kit lots or vendors. Kits are QC tested as a set of components and performance cannot be guaranteed if utilized separately or substituted

8. TECHNICAL HINTS

- Standards can be made up in either glass or plastic tubes.
- Pre-rinse the pipette tip with the reagent, use fresh pipette tips for each sample, standard and reagent.
- Pipette standards and samples to the bottom of the wells.
- Add the reagents to the side of the well to avoid contamination.
- This kit uses break-apart microtiter strips, which allow the user to measure as many samples as desired. Unused wells must be kept desiccated at +4°C in the sealed bag provided. The wells should be used in the frame provided.
- Care must be taken to minimize contamination by endogenous alkaline phosphatase. Contaminating alkaline phosphatase activity, especially in the substrate solution, may lead to high blanks. Care should be taken not to touch pipet tips and other items that are used in the assay with bare hands.
- Prior to addition of substrate, ensure that there is no residual wash buffer in the wells. Any remaining wash buffer may cause variation in assay results.
- **This kit is sold based on number of tests. A ‘test’ simply refers to a single assay well. The number of wells that contain sample, control or standard will vary by product. Review the protocol completely to confirm this kit meets your requirements. Please contact our Technical Support staff with any questions.**

9. REAGENT PREPARATION

Equilibrate all reagents and samples to room temperature (18 - 25°C) prior to use.

9.1 **1X Wash Buffer**

Prepare the 1X Wash Buffer by diluting 5 mL of the 20X Wash Buffer Concentrate in 95 mL of deionized water. Mix thoroughly and gently.

10. STANDARD PREPARATIONS

Prepare serially diluted standards immediately prior to use. Always prepare a fresh set of standards for every use. Diluted standards should be used within 60 minutes of preparation.

- 10.1 Allow the 100,000 pg/mL 11-dehydro-TXB₂ **Stock Standard** solution to equilibrate to room temperature. The standard solution should be stored at -20°C. Avoid repeated freeze-thaw cycles.
- 10.2 **For urine samples:** dilute the 11-dehydro-TXB₂ standard with Assay Buffer.
- 10.3 **For cell culture supernatant samples:** dilute the 11-dehydro-TXB₂ standard with tissue culture media.
- 10.4 Label six tubes #1 – 6.
- 10.5 Add 900 µL of the appropriate diluent into tube #1 (as per step 10.2 or 10.3).
- 10.6 Add 750 µL of the appropriate diluent into tubes #2-6 (as per step 10.2 or 10.3).
- 10.7 Prepare a 10,000 pg/mL **Standard 1** by adding 100 µL of the 100,000 pg/mL **Stock Standard** to tube #1. Mix thoroughly and gently.
- 10.8 Prepare **Standard 2** by transferring 250 µL from tube #1 to tube #2. Mix thoroughly and gently.
- 10.9 Prepare **Standard 3** by transferring 250 µL from tube #2 to tube #3. Mix thoroughly and gently.
- 10.10 Using the table below as a guide for tubes 4 through 6.

ASSAY PREPARATION

Standard	Sample to Dilute	Volume to Dilute (μL)	Volume of Diluent (μL)	Starting Conc. (pg/mL)	Final Conc. (pg/mL)
1	Stock Standard	100	1,000	100,000	10,000
2	Standard 1	250	750	10,000	2,500
3	Standard 2	250	750	2,500	625
4	Standard 3	250	750	625	156.3
5	Standard 4	250	750	156.3	39.1
6	Standard 5	250	750	39.1	9.8



11. SAMPLE COLLECTION AND STORAGE

- The 11-dehydro-TXB₂ kit is compatible with 11-dehydro-TXB₂ samples in a wide range of matrices after dilution in Assay Buffer. However, the end user must verify that the recommended dilutions are appropriate for their samples. Samples containing rabbit IgG may interfere with the assay
- Samples in the majority of tissue culture media, including those containing fetal bovine serum, can also be read in the assay, provided the standards have been diluted into the tissue culture media instead of Assay Buffer. There will be a small change in binding associated with running the standards and samples in media
- For tissue and urine samples, prostaglandin synthetase inhibitors such as indomethacin or meclofenamic acid at concentrations up to 10 µg/mL should be added to either the tissue homogenate or urine and plasma samples. Some samples normally have very low levels of 11-dehydro-TXB₂ present and extraction may be necessary for accurate measurement. A suitable extraction procedure is outlined below:
 - 11.1. Acidify the urine or tissue homogenate by addition of 2M HCl to pH of 3.5. Approximately 50 µL of HCl will be needed per mL of plasma. Allow to sit at 4°C for 15 minutes. Centrifuge samples in a micro-centrifuge for 2 minutes to remove any precipitate.
 - 11.2. Prepare the C18 reverse phase column (see Section 6) by washing with 10mL of ethanol followed by 10mL of deionized water.
 - 11.3. Apply the sample under a slight positive pressure to obtain a flow rate of about 0.5 mL/minute. Wash the column with 10 mL of water, followed by 10 mL of 15% ethanol, and finally 10 mL hexane. Elute the sample from the column by addition of 10 mL ethyl acetate.
 - 11.4. If analysis is to be carried out immediately, evaporate samples under a stream of nitrogen. Add at least 250 µL of

Assay Buffer to the dried sample. Mix well and hold at room temperature for 5 minutes. Repeat twice more. If analysis is to be delayed, store samples as the eluted ethyl acetate solutions at -80°C until the immunoassay is to be run. Evaporate the organic solvent under a stream of nitrogen prior to running assay and reconstitute as above.

12. PLATE PREPARATION

- The 96 well plate strips included with this kit are supplied ready to use. It is not necessary to rinse the plate prior to adding reagents
- Unused well strips should be returned to the plate packet and stored at +4°C
- For statistical reasons, we recommend each sample should be assayed with a minimum of two replicates (duplicates)
- Well effects have not been observed with this assay.

Recommended plate layout

	1	2	3	4
A	B _s	Std 1	Std 5	Sample 2
B	B _s	Std 1	Std 5	Sample 2
C	TA	Std 2	Std 6	etc
D	TA	Std 2	Std 6	etc
E	NSB	Std 3	Std 7	
F	NSB	Std 3	Std 7	
G	B ₀	Std 4	Sample 1	
H	B ₀	Std 4	Sample 1	

Plate layout shows controls, blanks and standards required for each assay. Use additional strips of wells to assay all your samples.

Key:

B_s = Blank; contains substrate only.

TA = Total Activity; contains conjugate (5 µL) and substrate.

NSB = Non-specific binding; contains standard diluent, assay buffer, conjugate and substrate.

B₀ = 0 pg/mL standard; contains standard diluent, conjugate, antibody and substrate.

13. ASSAY PROCEDURE

- **Equilibrate all materials and prepared reagents to room temperature prior to use**
- **It is recommended to assay all standards, controls and samples in duplicate**
- **Refer to the recommended plate layout in Section 12 before proceeding with the assay**

13.1 Add 150 μ L appropriate diluent* into the NSB (non-specific binding) wells. (*Use the same diluent used to prepare standards in section 10, either Assay Buffer or Tissue Culture Media).

13.2 Add 100 μ L appropriate diluent (Assay Buffer or Tissue Culture Media) into the B₀ (0 pg/mL standard) wells

13.3 Add 100 μ L of prepared standards and 100 μ L diluted samples to appropriate wells.

13.4 Add 50 μ L of Assay Buffer to the NSB wells only.

13.5 Add 50 μ L of 11-dehydro-TXB2 Alkaline Phosphatase Conjugate (blue) into NSB, B₀, standard and sample wells, i.e. not the Total Activity (TA) and B_s wells .

13.6 Add 50 μ L of 11-dehydro-TXB2 Antibody (yellow) into B₀, standard and sample wells, i.e. not B_s, TA and NSB wells.

Note: Every well used should be green except the NSB wells which should be blue. B_s and TA wells are empty at this point and have no color.

13.7 Incubate the plate at room temperature on a plate shaker for 2 hours at ~500 rpm. The plate may be covered with the plate sealer provided.

13.8 Empty the contents of the wells and wash by adding 400 μ L of 1X Wash Buffer to every well. Repeat the wash 2 more times for a total of 3 washes. After the final wash, empty or aspirate the wells, and firmly tap the plate on a lint free paper towel to remove any remaining wash buffer.

13.9 Add 5 μ L of the blue Conjugate to the TA wells.

ASSAY PROCEDURE

- 13.10 Add 200 μL of the pNpp Substrate solution to every well. Incubate at room temperature for 1 hour without shaking.
- 13.11 Add 50 μL Stop Solution into each well. The plate should be read immediately.
- 13.12 After blanking the plate reader against the B_s (blank) wells, read optical density at 405 nm, preferably with correction between 570 and 590 nm. If the plate reader is not able to be blanked against the B_s wells, manually subtract the mean optical density of the blank wells from all readings.

14. CALCULATIONS

- 14.1 Calculate the average net absorbance measurement (Average Net OD) for each standard and sample by subtracting the average NSB absorbance measurement from the average absorbance measurement (Average OD) for each standard and sample.

$$\text{Average Net OD} = \text{Average Bound OD} - \text{Average NSB OD}$$

- 14.2 Calculate the binding of each pair of standard wells as a percentage of the maximum binding wells (B_0), using the following formula

$$\text{Percent Bound} = \frac{\text{Average Net OD}}{\text{Average Net } B_0 \text{ OD}} \times 100$$

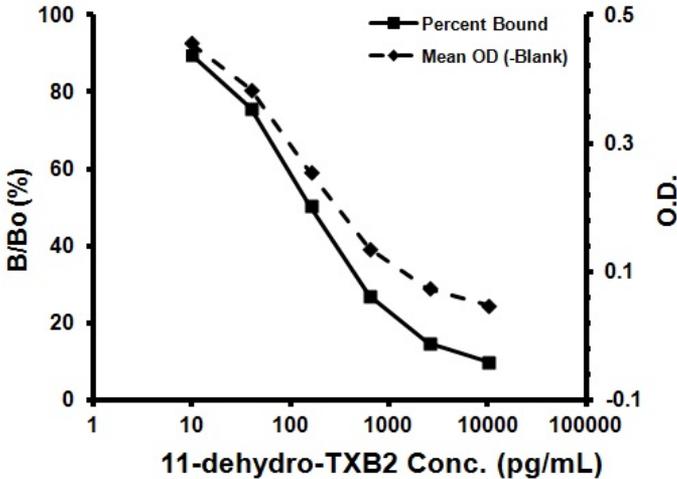
- 14.3 Plot the Percent Bound (B/B_0) and the net OD versus concentration of 11-dehydro-TXB₂ for the standards. The concentration of 11-dehydro-TXB₂ in the unknowns can be determined by interpolation of net OD values.

A four parameter algorithm (4PL) provides the best fit, though other equations can be examined to see which provides the most accurate (e.g. linear, semi-log, log/log, 4 parameter logistic). Interpolate protein concentrations for unknown samples from the standard curve plotted.

Samples producing signals greater than that of the highest standard should be further diluted and reanalyzed, then multiplying the concentration found by the appropriate dilution factor

15. TYPICAL DATA

TYPICAL STANDARD CURVE – Data provided for **demonstration purposes only**. A new standard curve must be generated for each assay performed.



Sample	Mean OD (-B _s)	% Bound	11-dehydro-TXB ₂ pg/mL
B _s	(0.093)	-	-
TA	0.125	-	-
NSB	-0.003	0	-
Standard 1	0.047	9.8	10,000
Standard 2	0.074	15.0	2,500
Standard 3	0.136	27.1	625
Standard 4	0.256	50.6	156.3
Standard 5	0.384	75.6	39.1
Standard 6	0.456	89.6	9.8
B ₀	0.509	100	0
Unknown 1	0.110	22.1	966
Unknown 2	0.212	42.0	246

Typical Quality Control Parameters

Total Activity Added	= $0.125 \times 10 = 1.25$
% NSB	= 0.0%
%B ₀ /TA	= 41.0%
Quality of Fit	= 1.0000 (Calculated from 4 parameter logistic curve fit)
20% Intercept	= 1,212 pg/mL
50% Intercept	= 162 pg/mL
80% Intercept	= 28 pg/mL

16. TYPICAL SAMPLE VALUES

SENSITIVITY –

The sensitivity, minimum detectable dose of 11-dehydro-TXB₂ using this ELISA kit was found to be 4.31 pg/mL. This was determined by the average optical density of the B₀ (0 pg/mL standard) and comparing to the average optical density for standard 6. The detection limit was determined as the concentration of 11-dehydro-TXB₂ measured at two standard deviations from the zero along the standard curve.

SAMPLE RECOVERY –

Recovery was determined by 11-dehydro-TXB₂ into tissue culture media and urine. Mean recoveries are as follows:

Sample Type	Average % Recovery	Recommended Dilution
Tissue culture media	104.8	None
Human urine	112.2	1:32

LINEARITY OF DILUTION –

A sample containing 6,613 pg/mL 11-dehydro-TXB₂ was diluted 6 times 1:2 in the kit Assay Buffer and measured in the assay. The data was plotted graphically as actual 11-dehydro-TXB₂ concentration versus measured 11-dehydro-TXB₂ concentration. The line obtained had a slope of 0.943 and a correlation coefficient of 0.999.

PRECISION –

Intra-assay

	11-dehydro-TXB₂ (pg/mL)	%CV
Low	67	13.2
Medium	165	15.3
High	318	8.1

Inter-assay

	11-dehydro-TXB₂ (pg/mL)	%CV
Low	72	17.5
Medium	216	12.6
High	1,250	16.3

17. ASSAY SPECIFICITY**CROSS REACTIVITY –**

The cross reactivities for a number of related eicosanoid compounds was determined by dissolving the cross reactant in Assay Buffer at concentrations from 100,000 to 1.0 pg/mL. These samples were then measured in the assay, and the measured 11-dehydro-TXB₂ concentration at 50% B/B₀ calculated. The % cross reactivity was calculated by comparison with the actual concentration of cross reactant in the sample and expressed as a percentage.

Compound	% Cross Reactivity
11-dehydro-TXB ₂	100
PGE ₂	1.85
TXB ₂	0.4
PGF _{2α}	0.2
6-keto-PGF _{1α}	0.17
PGD ₂	0.1
2,3-dinorTXB ₂	0.1
8-iso-PGF _{2α}	0.07
11-b-PGF _{2α}	0.05

18. TROUBLESHOOTING

Problem	Cause	Solution
Poor standard curve	Inaccurate pipetting	Check pipettes
	Improper standards dilution	Prior to opening, briefly spin the stock standard tube and dissolve the powder thoroughly by gentle mixing
Low Signal	Incubation times too brief	Ensure sufficient incubation times; change to overnight standard/sample incubation
	Inadequate reagent volumes or improper dilution	Check pipettes and ensure correct preparation
Samples give higher value than the highest standard	Starting sample concentration is too high	Dilute the specimens and repeat the assay
Large CV	Plate is insufficiently washed	Review manual for proper wash technique. If using a plate washer, check all ports for obstructions
	Contaminated wash buffer	Prepare fresh wash buffer
Low sensitivity	Improper storage of the kit	Store the all components as directed

19. NOTES

UK, EU and ROW

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