Instructions for Use

For quantitative detection of Human Kallikrein 1 (KLK1) in cell culture supernatants, cell lysates, tissue homogenates, serum and plasma (heparin, EDTA).

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

1. BACKGROUND

Abcam’s Human Kallikrein 1 (KLK1) in vitro ELISA (Enzyme-Linked Immunosorbent Assay) kit is designed for the accurate quantitative measurement of Human Kallikrein 1 in cell culture supernatants, cell lysates, tissue homogenates, serum and plasma (heparin, EDTA).

A Kallikrein 1 specific mouse monoclonal antibody has been precoated onto 96-well plates. Standards and test samples are added to the wells and incubated. A biotinylated detection polyclonal antibody from goat specific for Kallikrein 1 is then added subsequently and then followed by washing with PBS or TBS buffer. Avidin-Biotin-Peroxidase Complex is added and unbound conjugates are washed away with PBS or TBS buffer. TMB is then used to visualize the HRP enzymatic reaction. TMB is catalyzed by HRP to produce a blue color product that changes into yellow after adding acidic stop solution. The density of yellow coloration is directly proportional to the Human Kallikrein 1 amount of sample captured in plate.

Kallikrein-1, also known as tissue kallikrein, is a protein that in Humans is encoded by the KLK1 gene. This serine protease generates Lys-bradykinin by specific proteolysis of kininogen-1. KLK1 is a member of the peptidase S1 family. Its gene is mapped to 19q13.3. In all, it has got 262-amino acids which contain a putative signal peptide, followed by a short activating peptide and the protease domain. The protein is mainly found in kidney, pancreas, and salivary gland, showing a unique pattern of tissue-specific expression relative to other members of the family. KLK1 is implicated in carcinogenesis and some have potential as novel cancer and other disease biomarkers.
2. ASSAY SUMMARY

Prepare all reagents, samples and standards as instructed.

Add standard or sample to each well used. Incubate at room temperature.

Add prepared biotin antibody to each well. Incubate at room temperature.

Add prepared Avidin-Biotin-Peroxidase Complex (ABC). Incubate at room temperature.

Add TMB to each well. Incubate at room temperature. Add Stop Solution to each well. Read
3. **PRECAUTIONS**

Please read these instructions carefully prior to beginning the assay.

All kit components have been formulated and quality control tested to function successfully as a kit. Modifications to the kit components or procedures may result in loss of performance.

4. **STORAGE AND STABILITY**

Store kit at -20°C immediately upon receipt. Avoid multiple freeze-thaw cycles.

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

5. **MATERIALS SUPPLIED**

<table>
<thead>
<tr>
<th>Item</th>
<th>Amount</th>
<th>Storage Condition (Before Preparation)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anti-Human Kallikrein 1 antibody Microplate (12 x 8 wells)</td>
<td>96 Wells</td>
<td>-20°C</td>
</tr>
<tr>
<td>Lyophilized recombinant Human Kallikrein 1 standard</td>
<td>2 x 10 ng</td>
<td>-20°C</td>
</tr>
<tr>
<td>Biotinylated anti-Human Kallikrein 1 antibody</td>
<td>130 µL</td>
<td>-20°C</td>
</tr>
<tr>
<td>Avidin-Biotin-Peroxidase Complex (ABC)</td>
<td>130 µL</td>
<td>-20°C</td>
</tr>
<tr>
<td>Sample Diluent Buffer</td>
<td>30 mL</td>
<td>-20°C</td>
</tr>
<tr>
<td>Antibody Diluent Buffer</td>
<td>12 mL</td>
<td>-20°C</td>
</tr>
<tr>
<td>ABC Diluent Buffer</td>
<td>12 mL</td>
<td>-20°C</td>
</tr>
<tr>
<td>TMB Color Developing Agent</td>
<td>10 mL</td>
<td>-20°C</td>
</tr>
<tr>
<td>TMB Stop Solution</td>
<td>10 mL</td>
<td>-20°C</td>
</tr>
<tr>
<td>Plate seals</td>
<td>4 units</td>
<td>-20°C</td>
</tr>
</tbody>
</table>
6. **MATERIALS REQUIRED, NOT SUPPLIED**  
These materials are not included in the kit, but will be required to successfully utilize this assay:

- Standard microplate reader
- Automated plate washer (optional)
- Adjustable pipettes and pipette tips. Multichannel pipettes are recommended when large sample sets are being analyzed
- Eppendorf tubes
- Washing buffer, either neutral PBS or TBS (see Section 9 for recipes)

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**

- To determine the appropriate sample dilution to use in this ELISA a pilot experiment using standards and a small number of samples is recommended.
- The TMB Color Developing agent is colorless and transparent before use.
- Before using the kit, briefly centrifuge the tubes in case any of the contents are trapped in the lid.
- It is recommended to assay all standards, controls and samples in duplicate.
- Do not let the 96-well plate dry out as this will inactivate active components on plate.
- To avoid cross contamination do not reuse tips and tubes.
- In order to avoid marginal effects of plate incubation due to temperature difference (reaction may be stronger in the marginal wells), it is suggested that the diluted ABC and TMB solution be pre-warmed in 37°C for 30 minutes before using.
- **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 Biotinylated anti-Human Kallikrein 1**

Biotinylated anti-Human Kallikrein 1 antibody must be diluted in 1:100 with the antibody Diluent buffer and mixed thoroughly. (i.e. Add 1µl Biotinylated anti-Human Kallikrein 1 antibody to 99µl antibody Diluent buffer.) The total volume should be: 0.1mL/well x (the number of wells). (allow 100 µL - 200 µL extra for pipetting error).

9.2 **1X Avidin-Biotin-Peroxidase Complex**

Avidin- Biotin-Peroxidase Complex (ABC) must be diluted in 1:100 with the ABC Diluent Buffer and mixed thoroughly. (i.e. Add 1µl ABC to 99µl ABC Diluent Buffer.) The total volume should be: 0.1mL/well x (the number of wells). (Allow 100 µL - 200 µL extra for pipetting error).

9.3 **0.01 M TBS**

Add 1.2 g Tris, 8.5 g NaCl; 450 µL of purified acetic acid or 700 µL of concentrated hydrochloric acid to distilled water and adjust pH to 7.2 - 7.6. Finally, adjust the total volume to 1 L with distilled water.

9.4 **0.01 M PBS**

Add 8.5 g NaCl, 1.4 g Na₂HPO₄ and 0.2 g NaH₂PO₄ to distilled water and adjust pH to 7.2 - 7.6. Finally, adjust the total volume to 1 L with distilled water.
10. STANDARD PREPARATIONS

Prepare serially diluted standards immediately prior to use. Always prepare a fresh set of standards for every use. Reconstitution of the Human Kallikrein 1 standard should be prepared no more than 2 hours prior to the experiment. Two tubes of KLK1 standard (10 ng per tube) are included in each kit. Use one tube for each experiment.

10.1 Prepare a 10 ng/mL **Standard #1** by reconstituting the Kallikrein 1 standard with addition of 1 mL Sample Diluent Buffer. Hold at room temperature for 10 minutes. This should be stored at 4°C for up to 12 hours, or at -20°C for up to 48 hours. Avoid repeated freeze-thaw cycles.

10.2 Label seven tubes with #2 - 8.

10.3 Add 300 μL Sample Diluent Buffer into tubes #2 - 8.

10.4 Prepare **Standard #2** by transferring 300 μL from Standard #1 to tube #2. Mix thoroughly and gently.

10.5 Prepare **Standard #3** by transferring 300 μL from Standard #2 to tube #3. Mix thoroughly and gently.

10.6 Prepare **Standard #4** by transferring 300 μL from Standard #3 to tube #4. Mix thoroughly and gently.

10.7 Using the table below as a guide, repeat for tubes #5 through #7.

10.8 **Standard #8** contains no protein and is the Blank control.
### ASSAY PREPARATION

<table>
<thead>
<tr>
<th>Standard #</th>
<th>Sample to Dilute</th>
<th>Volume to Dilute (µL)</th>
<th>Volume of Diluent (µL)</th>
<th>Starting Conc. (pg/mL)</th>
<th>Final Conc. (pg/mL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Step 10.1</td>
<td>300</td>
<td>300</td>
<td>10,000</td>
<td>10,000</td>
</tr>
<tr>
<td>2</td>
<td>Standard #1</td>
<td>300</td>
<td>300</td>
<td>5,000</td>
<td>5,000</td>
</tr>
<tr>
<td>3</td>
<td>Standard #2</td>
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<td>300</td>
<td>2,500</td>
<td>2,500</td>
</tr>
<tr>
<td>4</td>
<td>Standard #3</td>
<td>300</td>
<td>300</td>
<td>1,250</td>
<td>1,250</td>
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<tr>
<td>5</td>
<td>Standard #4</td>
<td>300</td>
<td>300</td>
<td>625</td>
<td>625</td>
</tr>
<tr>
<td>6</td>
<td>Standard #5</td>
<td>300</td>
<td>300</td>
<td>312</td>
<td>312</td>
</tr>
<tr>
<td>7</td>
<td>Standard #5</td>
<td>300</td>
<td>300</td>
<td>156</td>
<td>156</td>
</tr>
<tr>
<td>8</td>
<td>None</td>
<td>-</td>
<td>300</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

![Diagram of assay preparation](image-url)
11. SAMPLE COLLECTION AND STORAGE

Store samples to be assayed within 24 hours at 2 - 8°C. For long-term storage, aliquot and freeze samples at -20°C. Avoid repeated freeze-thaw cycles.

11.1 Cell Culture Supernatants

Remove particulates by centrifugation, assay immediately or aliquot and store samples at -20°C.

11.2 Tissue Homogenates:

Rinse tissue with PBS to remove excess blood, chopped into 1-2 mm pieces, and homogenize with a tissue homogenizer in PBS or in lysate solution (Mammal Tissue Protein Extraction Reagent), lysate solution: tissue net weight = 10 mL:1g (i.e. Add 10 mL lysate solution to 1g tissue). Centrifuge at approximately 5,000 x g for 5 min. Assay immediately or aliquot and store homogenates at -20°C. Avoid repeated freeze-thaw cycles.

11.3 Cell Lysates:

Collect cells and rinse cells with PBS. Homogenize and lyse cells thoroughly in lysate solution (Cell Protein Extraction Reagent) Centrifuge cell lysates at approximately 10,000 x g for 5 min to remove debris. Aliquots of the cell lysates were removed and assayed.

11.4 Serum

Allow the serum to clot in a serum separator tube (about 4 hours) at room temperature. Centrifuge at approximately 1,000 x g for 15 minutes. Analyze the serum immediately or aliquot and store samples at -20°C.

11.5 Plasma

Collect plasma using heparin or EDTA as an anticoagulant. Centrifuge for 15 minutes at 1,000 x g within 30 minutes of collection. Assay immediately or aliquot and store samples at -20°C.
12. SAMPLE PREPARATION

General Sample information:

The user needs to estimate the concentration of the target protein in the sample and select the correct dilution factor so that the diluted target protein concentration falls near the middle of the linear regime in the standard curve.

Dilute the samples using the provided Sample Diluent Buffer. The following is a guideline for sample dilution. Several trials may be necessary to determine the optimal dilution factor. The sample must be thoroughly mixed with the Sample Diluent Buffer before assaying.

- High target protein concentration (100 – 1,000 ng/mL). The working dilution is 1:100. i.e. Add 1 μL sample into 99 μL Sample Diluent Buffer
- Medium target protein concentration (10 - 100 ng/mL). The working dilution is 1:10. i.e. Add 10 μL sample into 90 μL Sample Diluent Buffer
- Low target protein concentration (156 - 10,000 pg/mL). The working dilution is 1:2. i.e. Add 50 μL sample to 50 μL Sample Diluent Buffer
- Very Low target protein concentration (≤ 156 pg/mL). No dilution necessary, or the working dilution is 1:2.
13. **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 each assay performed, a minimum of 2 wells must be used as blanks, omitting primary antibody from well additions.
- 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. Contents of each well can be recorded on the template sheet included in the Resources section.
14. 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.

14.1 Prepare all reagents, working standards, and samples as directed in the previous sections.

14.2 Add 100 µL of prepared standards and diluted samples to appropriate wells.

14.3 Seal the plate with a new plate seal and incubate at 37°C for 90 minutes.

14.4 Remove the seal, discard contents of each well, and blot the plate onto paper towels or other absorbent material. Do NOT let the wells completely dry at any time.

14.5 Add 100 µL of 1X Biotinylated anti-Human Kallikrein 1 antibody into each well and incubate the plate at 37°C for 60 minutes.

14.6 Wash the plate three times with 300 µL 0.01 M TBS or 0.01 M PBS, and each time let the washing buffer stay in the wells for one minute. Discard the washing buffer and blot the plate onto paper towels or other absorbent material. 

*Note:* For automated washing, aspirate all wells and wash THREE times with PBS or TBS buffer, overfilling wells with each wash. Blot the plate onto paper towels or other absorbent material.

14.7 Add 100 µL of 1X Avidin-Biotin-Peroxidase Complex working solution into each well and incubate the plate at 37°C for 30 minutes.

14.8 Wash plate five times with 0.01M TBS or 0.01M PBS, and each time let washing buffer stay in the wells for 1 - 2 minutes. Discard the washing buffer and blot the plate onto paper towels or other absorbent material. (See Step 14.6 for plate washing method).
ASSAY PROCEDURE

14.9 Add 90 μL of prepared TMB color developing agent into each well and incubate plate at 37°C in dark for 25 - 30 minutes

Note: The optimal incubation time should be determined by end user. The shades of blue should be seen in the wells with the four most concentrated Human Kallikrein 1 standard solutions; the other wells show no obvious color.

14.10 Add 100 μL of prepared TMB Stop Solution into each well. The color changes into yellow immediately.

14.11 Read the O.D. absorbance at 450 nm in a microplate reader within 30 minutes after adding the stop solution.
15. **CALCULATIONS**

For calculation, the relative O.D.450 = (the O.D.450 of each well) – (the O.D.450 of Zero well). The standard curve can be plotted as the relative O.D.450 of each standard solution (Y) vs. the respective concentration of the standard solution (X). The Human Kallikrein 1 concentration of the samples can be interpolated from the standard curve.

Note: If the samples measured were diluted, make sure to account for this in your calculations.
16. TYPICAL DATA

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

<table>
<thead>
<tr>
<th>Conc. (pg/mL)</th>
<th>O.D. 450nm</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0</td>
<td>0.042</td>
</tr>
<tr>
<td>156</td>
<td>0.144</td>
</tr>
<tr>
<td>312</td>
<td>0.215</td>
</tr>
<tr>
<td>625</td>
<td>0.343</td>
</tr>
<tr>
<td>1,250</td>
<td>0.668</td>
</tr>
<tr>
<td>2,500</td>
<td>1.024</td>
</tr>
<tr>
<td>5,000</td>
<td>1.771</td>
</tr>
<tr>
<td>10,000</td>
<td>2.326</td>
</tr>
</tbody>
</table>
17. **TYPICAL SAMPLE VALUES**

**RANGE** – 156 - 10,000 pg/mL

**SENSITIVITY** – < 10 pg/mL

18. **ASSAY SPECIFICITY**

This kit detects both endogenous and recombinant Human Kallikrein 1. No detectable cross-reactivity with other relevant proteins.
### 19. TROUBLESHOOTING

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