Instructions for Use

For the quantitative measurement of human CKMB in serum, plasma, and cell culture supernatants.

This product is for research use only and is not intended for diagnostic use.
# Table of Contents

## INTRODUCTION
1. BACKGROUND  
2. ASSAY SUMMARY  
3. PRECAUTIONS  
4. STORAGE AND STABILITY  
5. MATERIALS SUPPLIED  
6. MATERIALS REQUIRED, NOT SUPPLIED  
7. LIMITATIONS  
8. TECHNICAL HINTS  

## GENERAL INFORMATION
4. STORAGE AND STABILITY  
5. MATERIALS SUPPLIED  
6. MATERIALS REQUIRED, NOT SUPPLIED  
7. LIMITATIONS  
8. TECHNICAL HINTS  

## ASSAY PREPARATION
9. REAGENT PREPARATION  
10. STANDARD PREPARATIONS  
11. SAMPLE PREPARATION  
12. PLATE PREPARATION  

## ASSAY PROCEDURE
13. ASSAY PROCEDURE  

## DATA ANALYSIS
14. CALCULATIONS  
15. TYPICAL DATA  
16. TYPICAL SAMPLE VALUES  
17. ASSAY SPECIFICITY  

## RESOURCES
18. TROUBLESHOOTING  
19. NOTES  

Discover more at [www.abcam.com](http://www.abcam.com)
1. BACKGROUND

Abcam’s CKMB Human ELISA Kit (ab193696) is an *in vitro* enzyme-linked immunosorbent assay for the quantitative measurement of human CKMB in serum, plasma, and cell culture supernatants.

This assay employs an antibody specific for Human CKMB coated on a 96-well plate. Standards and samples are pipetted into the wells and the immobilized antibody captures CKMB present in the samples. The wells are washed and biotinylated anti-Human CKMB antibody is added. After washing away any unbound biotinylated antibody, an HRP-conjugated streptavidin is pipetted to the wells. After incubation, the wells are again washed, followed by the addition of a TMB substrate solution to the wells. Color will develop in proportion to the amount of CKMB bound in each well. Addition of the Stop Solution will change the color from blue to yellow, and the intensity of the color is measured at 450 nm.
2. **ASSAY SUMMARY**

**Primary capture antibody**

Prepare all reagents, samples and standards as instructed.

**Sample**

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

**Primary detector antibody**

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

**Streptavidin Label**

Add prepared streptavidin solution. Incubate at room temperature.

**Substrate**

Add TMB One-Step Development Solution 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.

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.

Refer to list of materials supplied for storage conditions of individual components. Observe the storage conditions for individual prepared components in sections 9 & 10.

5. **MATERIALS SUPPLIED**

<table>
<thead>
<tr>
<th>Item</th>
<th>Amount</th>
<th>Storage Condition (Before Preparation)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-coated Human CKMB microplate (12 strips x 8 wells)</td>
<td>96 wells</td>
<td>-20°C</td>
</tr>
<tr>
<td>20X Wash Buffer Concentrate</td>
<td>25 mL</td>
<td>-20°C</td>
</tr>
<tr>
<td>Human CKMB Standards</td>
<td>2 vials</td>
<td>-20°C</td>
</tr>
<tr>
<td>5X Assay Diluent B.</td>
<td>15 mL</td>
<td>-20°C</td>
</tr>
<tr>
<td>5X Assay Diluent D</td>
<td>15 mL</td>
<td>-20°C</td>
</tr>
<tr>
<td>Detection Antibody Human CKMB (biotinylated anti-Human CKMB)</td>
<td>2 vials</td>
<td>-20°C</td>
</tr>
<tr>
<td>100X HRP-Streptavidin Concentrate</td>
<td>200 µL</td>
<td>-20°C</td>
</tr>
<tr>
<td>Stop Solution: sulfuric acid.</td>
<td>8 mL</td>
<td>-20°C</td>
</tr>
<tr>
<td>TMB One-Step Substrate Reagent</td>
<td>12 mL</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:

- Microplate reader capable of measuring absorbance at 450 nm.
- Precision pipettes to deliver 2 μL to 1 mL volumes.
- Adjustable 1-25 mL pipettes for reagent preparation.
- 100 mL and 1 liter graduated cylinders.
- Absorbent paper.
- Distilled or deionized water.
- Log-log graph paper or computer and software for ELISA data analysis.
- Tubes to prepare standard or sample dilutions.

7. **LIMITATIONS**

- Do not mix or substitute reagents or materials from other kit lots or vendors.

8. **TECHNICAL HINTS**

- Samples which generate values that are greater than the most concentrated standard should be further diluted in the appropriate sample dilution buffer.
- Avoid foaming or bubbles when mixing or reconstituting components.
- Avoid cross contamination of samples or reagents by changing tips between sample, standard and reagent additions.
- Ensure plates are properly sealed or covered during incubation steps.
- Completely aspirate all solutions and buffers during wash steps. When preparing your standards, it is critical to briefly centrifuge the
vial first. The powder may adhere to the cape and not be included in the standard solution resulting in an incorrect concentration. Be sure to dissolve the powder thoroughly when reconstituting. After adding Assay Diluent to the vial, we recommend inverting the tube a few times, then flick the tube a few times, and centrifuge briefly; repeat this procedure 3-4 times. This is an effective technique for thorough mixing of the standard without using excessive mechanical force.

- Do not vortex the standard during reconstitution, as this will destabilize the protein.
- Once your standard has been reconstituted, it should be used right away or else frozen for later use.
- Keep the standard dilutions on ice during preparation, but the ELISA procedure should be done at room temperature.
- Be sure to discard the working standard dilutions after use – they do not store well.
- 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 Scientific 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 Assay Diluent D**

Dilute 5X Assay Diluent D 5-fold with deionized or distilled water before use.

9.2 **1X Wash Buffer**

If the 20X Wash Concentrate contains visible crystals, equilibrate to room temperature and mix gently until dissolved. Dilute 20 mL of 20X Wash Buffer Concentrate into deionized or distilled water to yield 400 mL of 1X Wash Buffer.

9.3 **Biotinylated Human CKMB Detection Antibody**

Briefly centrifuge the Detection Antibody vial before use. Add 100 μL of 1X Assay Diluent B into the vial to prepare a detection antibody concentrate. Pipette up and down to mix gently (the concentrate can be stored at 4°C for 5 days). The detection antibody concentrate should be diluted 80-fold with 1X Assay Diluent B and used in Assay Procedure.

9.4 **1X Assay Diluent B**

Dilute 5X Assay Diluent B 5-fold with deionized or distilled water before use.

9.5 **1X HRP-Streptavidin Solution**

Briefly spin the HRP-Streptavidin concentrate vial (and pipette up and down to mix gently before use. HRP-Streptavidin concentrate should be diluted 100-fold with 1x Assay Diluent B.

For example: Briefly spin the vial and pipette up and down to mix gently. Add 100 μL of HRP-Streptavidin concentrate into a tube with 10 mL 1x Assay Diluent B to prepare a 100-fold diluted HRP-Streptavidin solution (don’t store the diluted solution for next day use). Mix well.
10. STANDARD PREPARATIONS

- Prepare serially diluted standards immediately prior to use. Always prepare a fresh set of standards for every use.
- Standard (recombinant protein) should be stored at -20°C or -80°C (recommended at -80°C) after reconstitution.

10.1 Briefly centrifuge a vial of Human CKMB Standards and then add 1000 µL 1X Assay Diluent D into the Human CKMB Standards vial to prepare an 80 ng/mL **Stock Standard**. Mix thoroughly but gently.

10.2 Label tubes #1-8.

10.3 Prepare the 32 ng/mL **Standard #1** by adding 200 µL Stock Standard into tube #1 along with 300 µL 1X Assay Diluent D. Mix thoroughly but gently.

10.4 Add 300 µL 1X Assay Diluent D into tubes 3-8.

10.5 Prepare **Standard #2** by adding 200 µL Standard #1 to tube #2. Mix thoroughly but gently.

10.6 Prepare **Standard #3** by adding 200 µL from Standard #1 to tube #3. Mix thoroughly but gently.

10.7 Using the table below as a guide, prepare further serial dilutions.

10.8 **Standard #8** contains no protein and is the Blank control.
# Standard Dilution Preparation Table

<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. (ng/mL)</th>
<th>Final Conc. (ng/mL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Stock</td>
<td>-</td>
<td>400</td>
<td></td>
<td>80</td>
</tr>
<tr>
<td>2</td>
<td>Standard #1</td>
<td>200</td>
<td>300</td>
<td>80</td>
<td>32</td>
</tr>
<tr>
<td>3</td>
<td>Standard #2</td>
<td>200</td>
<td>300</td>
<td>32</td>
<td>12.8</td>
</tr>
<tr>
<td>4</td>
<td>Standard #3</td>
<td>200</td>
<td>300</td>
<td>12.8</td>
<td>5.12</td>
</tr>
<tr>
<td>5</td>
<td>Standard #4</td>
<td>200</td>
<td>300</td>
<td>5.12</td>
<td>2.048</td>
</tr>
<tr>
<td>6</td>
<td>Standard #5</td>
<td>200</td>
<td>300</td>
<td>2.048</td>
<td>0.819</td>
</tr>
<tr>
<td>7</td>
<td>Standard #6</td>
<td>200</td>
<td>300</td>
<td>0.819</td>
<td>0.328</td>
</tr>
<tr>
<td>8 (Blank)</td>
<td>none</td>
<td>-</td>
<td>300</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
11. SAMPLE PREPARATION

- Plasma sample should be collected using EDTA or citrate as an anticoagulant. Heparin is not recommended for use in this assay.

- Sample dilution: If your samples need to be diluted, 1X Assay Diluent D should be used for dilution of serum, plasma and cell culture supernatants.

- Suggested dilution for normal serum/plasma is 2 fold.

- Please note that levels of the target protein may vary between different specimens. Optimal dilution factors for each sample must be determined by the investigator.

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 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.
13. ASSAY PROCEDURE

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

  It is recommended to assay all standards, controls and samples in duplicate.

13.1. Add 100 μL of each standard (see Standard Preparations, section) and sample into appropriate wells. Cover plate and incubate for 2.5 hours at room temperature or overnight at 4°C with gentle shaking.

13.2. Discard the solution and wash 4 times with 1X Wash Buffer. Wash by filling each well with 300 μL 1X Wash Buffer using a multi-channel pipette or automatic plate washer. Complete removal of liquid at each step is essential to good performance. After the last wash, remove any remaining Wash Buffer by aspirating or decanting. Invert the plate and blot it by tapping gently against clean paper towels.

13.3. Add 100 μL of the prepared Biotinylated Human CKMB Detection Antibody (see Reagent Preparation section) to each well. Incubate for 1 hour at room temperature with gentle shaking.

13.4. Discard the solution. Repeat the wash as in step 13.2.

13.5. Add 100 μL of prepared 1X HRP-Streptavidin solution (see Reagent Preparation section) to each well. Incubate for 45 minutes at room temperature with gentle shaking.

13.6. Discard the solution. Repeat the wash as in step 13.2.

13.7. Add 100 μL of TMB One-Step Substrate Reagent to each well. Incubate for 30 minutes at room temperature in the dark with gentle shaking.

13.8. Add 50 μL of Stop Solution to each well. Read at 450 nm immediately.
14. **CALCULATIONS**

Calculate the mean absorbance for each set of duplicate standards, controls and samples, and subtract the average zero Blank absorbance value. Plot the standard curve on log-log graph paper, with standard concentration on the x-axis and absorbance on the y-axis. Draw the best-fit straight line through the standard points.
15. **TYPICAL DATA**

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

![Typical Standard Curve Diagram](image-url)
16. **TYPICAL SAMPLE VALUES**

**SENSITIVITY** –  
The minimum detectable dose of CKMB is 0.3 ng/mL.

**RECOVERY** –  
Recovery was determined by spiking various levels of CKMB into normal human serum, plasma and cell culture media. Mean recoveries are as follows:

<table>
<thead>
<tr>
<th>Sample Type</th>
<th>Average % Recovery</th>
<th>Range (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serum</td>
<td>97.17</td>
<td>71-123</td>
</tr>
<tr>
<td>Plasma</td>
<td>87.57</td>
<td>78-108</td>
</tr>
<tr>
<td>Cell culture media</td>
<td>86.45</td>
<td>67-106</td>
</tr>
</tbody>
</table>

**LINEARITY OF DILUTION -**

<table>
<thead>
<tr>
<th>Serum Dilution</th>
<th>Average % Expected Value</th>
<th>Range (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1:2</td>
<td>109.6</td>
<td>99-120</td>
</tr>
<tr>
<td>1:4</td>
<td>106.1</td>
<td>94-118</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Plasma Dilution</th>
<th>Average % Expected Value</th>
<th>Range (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1:2</td>
<td>100.1</td>
<td>92-107</td>
</tr>
<tr>
<td>1:4</td>
<td>82.60</td>
<td>75-91</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cell Culture Media Dilution</th>
<th>Average % Expected Value</th>
<th>Range (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1:2</td>
<td>128.3</td>
<td>120-136</td>
</tr>
<tr>
<td>1:4</td>
<td>98.56</td>
<td>83-114</td>
</tr>
</tbody>
</table>

**PRECISION** –
17. **ASSAY SPECIFICITY**

The antibodies used within this ELISA kit detect human CKMB.

Cross reaction of these antibodies to other species of CKMB has not been tested.

Please contact our Scientific Support team for more information.

<table>
<thead>
<tr>
<th></th>
<th>Intra-Assay</th>
<th>Inter-Assay</th>
</tr>
</thead>
<tbody>
<tr>
<td>%CV</td>
<td>&lt;10</td>
<td>&lt;12</td>
</tr>
</tbody>
</table>
# 18. TROUBLESHOOTING

<table>
<thead>
<tr>
<th>Problem</th>
<th>Cause</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inaccurate pipetting</td>
<td>Inaccurate pipetting</td>
<td>Check pipette performance</td>
</tr>
<tr>
<td>Improper standards dilution</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>Incubation times too brief</td>
<td>Incubation times too brief</td>
<td>Ensure sufficient incubation time; change to overnight standard/sample incubation</td>
</tr>
<tr>
<td>Inadequate reagent</td>
<td>Inadequate reagent</td>
<td>Check pipettes and ensure correct preparation</td>
</tr>
<tr>
<td>volumes or improper dilution</td>
<td>volumes or improper dilution</td>
<td></td>
</tr>
<tr>
<td>Inaccuat pipetting</td>
<td>Inaccurate pipetting</td>
<td>Check pipette performance</td>
</tr>
<tr>
<td>Plate is insufficiently washed</td>
<td>Plate is insufficiently washed</td>
<td>Review manual for proper wash technique. If using a plate washer, ensure it is working properly.</td>
</tr>
<tr>
<td>Contaminated wash buffer</td>
<td>Contaminated wash buffer</td>
<td>Prepare fresh wash buffer</td>
</tr>
<tr>
<td>Improper storage</td>
<td>Improper storage</td>
<td>Store the reconstituted protein at -80°C, all other assay components 4°C. Keep substrate solution protected from light.</td>
</tr>
<tr>
<td>of the ELISA kit</td>
<td>of the ELISA kit</td>
<td></td>
</tr>
<tr>
<td>Stop solution</td>
<td>Stop solution</td>
<td>Stop solution should be added to each well before measuring</td>
</tr>
<tr>
<td>High %CV</td>
<td>High %CV</td>
<td></td>
</tr>
<tr>
<td>Low sensitivity</td>
<td>Low sensitivity</td>
<td></td>
</tr>
</tbody>
</table>