

Version 1 Last updated 30 June 2021

# **ab233500**

## **Histone H3 (tri-methyl K9)**

### **Quantification Kit**

### **(Colorimetric, Circulating)**

For detecting circulating trimethyl histone H3K9 (H3K9me3) in biological fluid samples such as plasma and serum from human, mouse or rat.

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

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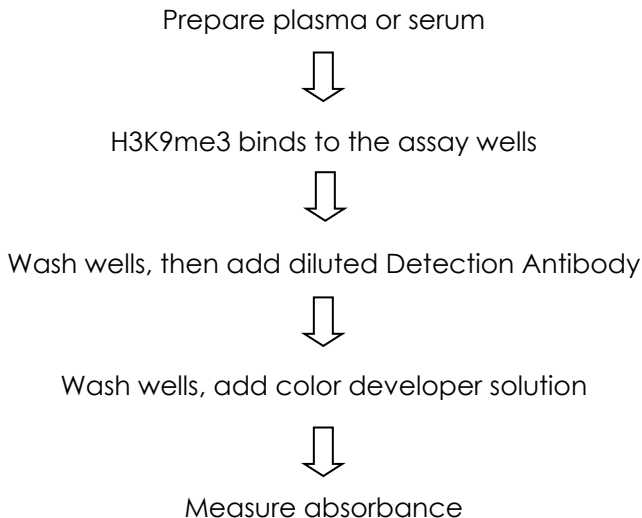
## 1. Overview

Histone H3 (tri-methyl K9) Quantification Kit (Colorimetric, Circulating) (ab233500) is designed to specifically measure circulating trimethyl histone H3K9 (H3K9me3) in biological fluid samples such as plasma and serum from human, mouse or rat.

Histone H3 proteins trimethylated at K9 in the sample are captured on the strip wells coated with anti-H3K9me3 antibody. The captured H3K9me3 proteins can be then recognized with detection antibody followed by a color development reagent. The ratio of H3K9me3 is proportional to the intensity of absorbance. The absolute amount of H3K9me3 can be quantitated by comparing to the standard control.

This kit only recognizes H3K9me3. There is no cross-reactivity with unmodified H3 or other modifications at the same lysine site.

The detection limit is as low as 0.5 ng/well with dynamic range of 1-20 ng/well within the indicated amount range of the plasma/serum.



## 2. Materials Supplied and Storage

Store Detection Antibody and Standard Control at -20°C away from light. Store Wash Buffer, Histone Assay Buffer, Developer Solution, Control Assay Strips and 8-Well Assay Strips at 4°C away from light. Store Stop Solution and Adhesive Covering Film at room temperature away from light.

Kit can be stored for 6 months from receipt, if components have not been reconstituted.

Aliquot components in working volumes before storing at the recommended temperature.

Avoid repeated freeze-thaws of reagents.

Item	48 tests Quantity	96 tests Quantity	Storage temperature (before prep)
10X Wash Buffer	14 mL	28 mL	4°C
Histone Assay Buffer	4 mL	8 mL	4°C
Developer Solution	5 mL	10 mL	4°C
Stop Solution	5 mL	10 mL	RT
8-Well Assay Strips	4	10	4°C
Control Assay Strips	2	2	4°C
Adhesive Covering Film	1	1	RT
Detection Antibody	6 µL	12 µL	-20°C
Standard Control	10 µL	20 µL	-20°C

**Δ Note:** *Control Assay Strips are green trimmed for distinguishing from 8-well Assay Strips (for samples). The Control Assay Strips are only for control use and should not be used for sample assay.*

### 3. Materials Required, Not Supplied

These materials are not included in the kit, but will be required to successfully perform this assay:

- Microplate reader capable of reading absorbance at 450 nm
- Incubator for 37°C incubation
- Aluminum foil or Parafilm M
- Distilled water
- Sample of interest (plasma or serum)

## 4. General guidelines, precautions, and troubleshooting

Please observe safe laboratory practice and consult the safety datasheet.

For general guidelines, precautions, limitations on the use of our assay kits and general assay troubleshooting tips, particularly for first time users, please consult our guide:

[www.abcam.com/assaykitguidelines](http://www.abcam.com/assaykitguidelines)

For typical data produced using the assay, please see the assay kit datasheet on our website.

## 5. Reagent Preparation

- Briefly centrifuge small vials at low speed prior to opening.
- If Wash Buffer contains salt precipitates, warm (at room temperature or 37°C) and shake the buffer until the salts are re-dissolved.
- Check if a blue color is present in the Developer Solution, which would indicate contamination of the solution and should not be used. To avoid contamination, transfer the amount of Developer Solution required into a secondary container (tube or vial) before adding it into the assay wells.

### 5.1 10X Wash Buffer

- 5.1.1 For a 48-reaction size kit, prepare diluted 1X Wash Buffer by adding 13 mL of 10X Wash Buffer to 117 mL of distilled water and adjust pH to 7.2-7.5.
- 5.1.2 For the 96-reaction size kit, add 26 mL of 10X Wash Buffer to 234 mL of distilled water and adjust pH to 7.2-7.5.

**Δ Note** *Diluted 1X Wash Buffer can now be stored at 4°C for up to six months.*

### 5.2 Histone Assay Buffer

Ready to use as supplied.

### 5.3 Developer Solution

Ready to use as supplied.

### 5.4 Stop Solution

Ready to use as supplied.

### 5.5 8-Well Assay Strips

Ready to use as supplied.

### 5.6 Control Assay Strips

Ready to use as supplied.

### 5.7 Adhesive Covering Film

Ready to use as supplied.

### 5.8 Detection Antibody

Dilute Detection Antibody with 1X Wash Buffer at a ratio of 1:1000 (i.e., add 1  $\mu\text{L}$  of Detection Antibody to 1000  $\mu\text{L}$  of 1X Wash Buffer). 50  $\mu\text{L}$  of this diluted Detection Antibody will be required for each assay well.

### 5.9 Standard Control

Prepare just before assay (Step 6).

**Δ Note:** Keep each of the individual solutions (except diluted 1X Wash Buffer) on ice until use. Any remaining diluted solutions, other than the diluted 1X Wash Buffer, should be discarded if not used within the same day.



## 6. Standard Preparation

- Always prepare a fresh set of standards for every use.
  - Discard working standard dilutions after use as they do not store well.
1. Dilute Standard Control to 50 ng/μL by adding 5 μL of Standard Control to 5 μL of Histone Assay Buffer and then to 5 ng/μL by adding 1 μL of Standard Control to 19 μL of Histone Assay Buffer.
  2. Prepare seven concentrations by using the 5 ng/μL and 50 ng/μL of diluted Standard Control with Histone Assay Buffer into final concentrations of 0.5, 1, 2, 5, 10, 20 and 50 ng according to the following dilution chart:

Tub e	Standard Control (5 ng/ml)	Standard Control (50 ng/ml)	Histone Assay Buffer	Resulting concentration
1	1.0 μL	---	9.0 μL	0.5 ng/μL
2	1.0 μL	---	4.0 μL	1 ng/μL
3	2.0 μL	---	3.0 μL	2 ng/μL
4	4.0 μL	---	0 μL	5 ng/μL
5	---	1.0 μL	4.0 μL	10 ng/μL
6	---	2.0 μL	3.0 μL	20 ng/μL
7	---	4.0 μL	0.0 μL	50 ng/μL

**Δ Note:** Keep each of the diluted solutions (except 1X Wash Buffer) on ice until use. Any remaining diluted solutions, other than 1X Wash Buffer, should be discarded if not used within the same day.

## 7. Sample Preparation

### **General sample information:**

We recommend that you use fresh samples for the most reproducible assay.

Input materials should be plasma or serum. The amount of plasma or serum for each assay can be 10 to 40  $\mu\text{L}$  with an optimal amount of 30  $\mu\text{L}$ .

The standard control is provided in this kit for the quantification of circulating histone H3K9me3. Because content of H3K9me3 can vary from different individuals and from normal and diseased states, it is advised to run replicate samples to ensure that the signal generated is validated.

## 8. Assay Procedure

- Equilibrate all materials and prepared reagents to room temperature just prior to use and gently agitate.
- Assay all standards, controls and samples in duplicate.

### 8.1 Histone Binding:

1. Predetermine the number of strip-wells required for your experiment. Carefully remove un-needed strip-wells from the plate frame and place them back in the bag (seal the bag tightly and store at 4°C).
2. Blank Wells: Add 50 µL of Histone Assay Buffer to each blank well.
3. Standard Wells: Add 50 µL of Histone Assay Buffer and 1 µL of diluted Standard Control to each standard well, each at a different concentration between 0.5 and 50 ng/µL.
4. Sample Wells: Add 50 µL of Histone Assay Buffer and 30 µL of your plasma or serum sample.

Well	Strip 1	Strip 2	Strip 3	Strip 4	Strip 5	Strip 6
A	Blank	Blank	Sample	Sample	Sample	Sample
B	SC 0.5 ng	SC 0.5 ng	Sample	Sample	Sample	Sample
C	SC 1 ng	SC 1 ng	Sample	Sample	Sample	Sample
D	SC 2 ng	SC 2 ng	Sample	Sample	Sample	Sample
E	SC 5 ng	SC 5 ng	Sample	Sample	Sample	Sample
F	SC 10 ng	SC 10 ng	Sample	Sample	Sample	Sample
G	SC 20 ng	SC 20 ng	Sample	Sample	Sample	Sample
H	SC 50 ng	SC 50 ng	Sample	Sample	Sample	Sample

**Δ Note:** The suggested strip-well plate setup for H3K9me3 quantification in a 48-assay format (in a 96-assay format, Strips 7 to 12 can be configured as Sample). The controls and samples can be measured in duplicate. Strip 1 and Strip 2 are the green trimmed control strips.

5. Tightly cover strip-well microplate with Adhesive Covering Film to avoid evaporation and incubate at 37°C for 60 minutes.

**Δ Note:** The Adhesive Covering Film can be cut to the required size to cover the strips based on the number of strips to be used.

6. Remove the reaction solution from each well. Wash each well three times with 150  $\mu$ L of the 1X Wash Buffer each time.

## 8.2 Detection Antibody Binding:

1. Add 50  $\mu$ L of the diluted Detection Antibody (from Step 5.8) to each well, then cover with Parafilm M or aluminum foil and incubate at room temperature for 60 minutes.

**Δ Note:** Do not exceed incubation time of 90 minutes.

2. Remove the diluted Detection Antibody from each well.
3. Wash each well four times with 150  $\mu$ L of the 1X Wash Buffer each time.

**Δ Note:** Ensure any residual wash buffer in the wells is removed as much as possible at each wash step.

## 7.3

### Signal Detection:

1. Add 100  $\mu$ L of Developer Solution to each well and incubate at room temperature for 1-10 minutes away from light. Begin monitoring color change in the sample wells and control wells. The Developer Solution will turn blue in the presence of sufficient H3K9me3 product.
2. Add 100  $\mu$ L of Stop Solution to each well to stop enzyme reaction when color in the positive control wells turns medium blue. The color will change to yellow after adding Stop Solution and the absorbance should be read on a microplate reader within 2-10 minutes at 450 nm with an optional reference wavelength of 655 nm.

**Δ Note:** Most microplate readers have the capability to carry out dual wavelength analysis and will automatically subtract reference wavelength absorbance from the test wavelength absorbance. If your plate reader does not have this capability, the plate can be read twice, once at 450 nm and once at 655 nm. Then, manually subtract the 655 nm ODs from 450 nm ODs.

## 9. Data Analysis

### H3K9me3 Calculation:

Calculate the average duplicate readings for the sample wells and blank wells. Calculate % H3K9me3 change using the following formula if the samples are from treated and un- treated control tests:

$$\text{H3K9me3\%} = \frac{\text{Treated (Tested) Sample OD} - \text{Blank OD}}{\text{Untreated (Control) Sample OD} - \text{Blank OD}} * 100\%$$

### Example Calculation:

Average OD450 of treated sample is 0.3

Average OD450 of untreated control is 0.4

Average OD450 of blank is 0.1

$$\text{H3K9me3\%} = \frac{0.3 - 0.1}{0.4 - 0.1} * 100\% = 66.7\%$$

### Accurate Calculation:

Generate a standard curve and plot OD value versus amount of Standard Control at each concentration point. Determine the slope as OD/ng (you can use Microsoft Excel statistical functions for slope calculation), then calculate the amount of H3K9me3 using the following formula:

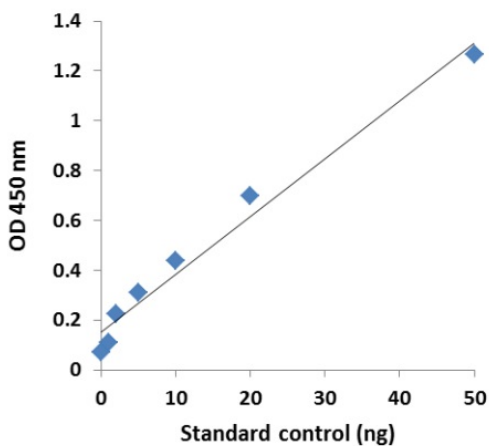
$$\text{H3K9me3 (ng/ml)} = \frac{(\text{Sample OD} - \text{Blank OD})}{\text{Slope} \times \text{sample amount } (\mu\text{L} *)} \times 1000$$

\* Plasma or serum added into the sample wells at Step 8.1.4.

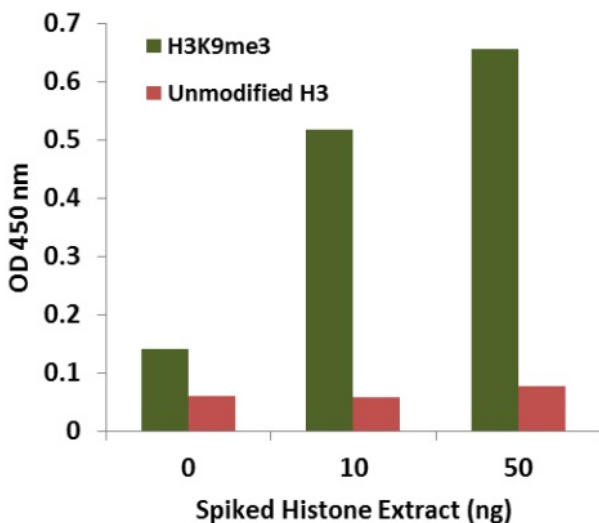
**Δ Note:** To measure the content of H3K9me3 in total histone H3 for normalizing accuracy of the quantified H3K9me3 %, total histone H3 amount in the samples should be quantified.

## 10. Typical Data

Data provided for demonstration purposes only.



**Figure 1.** Example standard curve generated with Histone H3 (tri-methyl K9) Quantification Kit (Colorimetric, Circulating) (ab233500).



**Figure 2.** Histone extracts were prepared from HL-60 (human promyelocytic leukemia cell line) cells and spiked into bovine plasma at different concentrations. The amount of H3K9me3 was measured using Histone H3 (tri-methyl K9) Quantification Kit (Colorimetric, Circulating) (ab233500).

## 11. Troubleshooting

Problem	Possible Cause	Suggestion
<b>No signal or weak signal in both the positive control and sample wells</b>	Reagents are added incorrectly.	Check if reagents are added in the proper order with the right amount, and if any steps in the protocol may have been omitted by mistake.
	Incubation time and temperature are incorrect.	Ensure the incubation time and temperature described in the protocol are followed correctly.
	Incorrect absorbance reading.	Check if appropriate absorbance wavelength (450 nm) is used.
	Kit was not stored or handled properly.	Ensure all components of the kit were stored at the appropriate temperature and the cap is tightly secure after each opening or use.
<b>No signal or weak signal in only the standard curve wells</b>	The standard amount is insufficiently added to the well in Step 8.1.3.	Ensure a sufficient amount of standard is added.
	The standard is degraded due to improper storage conditions.	Follow the Materials supplied and Storage guidance for storage of Standard Control.
<b>High background present in the blank wells</b>	Insufficient washing of wells.	Check if washing recommendations at each step are performed according to the protocol.
	Contaminated by sample or standard.	Ensure the well is not contaminated from adding sample or standard accidentally or from using contaminated tips.
	Incubation time with Detection Antibody is too long.	The incubation time at Step 8.2.1 should not exceed 90 minutes.



<b>High background present in the blank wells</b>	Over development of color.	Decrease the development time in Step 8.3.1 before adding Stop Solution in Step 8.3.2
<b>No signal or weak signal only in sample wells.</b>	Sample amount added into the wells is insufficient.	Ensure a sufficient amount of plasma or serum is used as indicated in Step 8.1.4.
	Sample was not stored properly or has been stored for too long.	Ensure plasma or serum is stored in aliquots at proper temperature, for no more than 6 months.
	Little or no H3K9me1 in the sample.	This problem may be a result of many factors. If the affecting factors cannot be determined, use new or re-prepared samples.
<b>Uneven color development</b>	Insufficient washing of the wells.	Ensure the wells are washed according to the guidance of washing and that residue washing buffer is removed as much as possible.
	Delayed color development or delayed stopping of color development in the wells.	Ensure color development solution or stop solutions is added sequentially and consistent with the order you added the other reagents.

## 12. Notes



# Technical Support

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