

# EpiQuik™ Global Di-Methyl Histone H4-K20 Quantification Kit (Fluorometric)

Base Catalog # P-3067

## PLEASE READ THIS ENTIRE USER GUIDE BEFORE USE

The EpiQuik™ Global Di-Methyl Histone H4-K20 Quantification Kit (Fluorometric) is suitable for specifically measuring global histone H4-K20 di-methylation using a variety of mammalian cells (human, mouse, etc.) including fresh and frozen tissues, cultured adherent and suspension cells.

## KIT CONTENTS

Components	48 assays P-3067-48	96 assays P-3067-96
F1 (10X wash buffer)	10 ml	20 ml
F2 (antibody buffer)	6 ml	12 ml
F3 (detecting antibody, 1 mg/ml)*	5 $\mu$ l	10 $\mu$ l
F4 (fluoro developer)*	12 $\mu$ l	24 $\mu$ l
F5 (fluoro enhancer)*	12 $\mu$ l	24 $\mu$ l
F6 (fluoro dilution)	4 ml	8 ml
Standard control (100 $\mu$ g/ml)*	10 $\mu$ l	20 $\mu$ l
Signal report solution*	5 $\mu$ l	10 $\mu$ l
Signal enhancer*	120 $\mu$ l	240 $\mu$ l
8 well sample strips (with frame)	4	9
8 well standard control strips	2	3
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\* For maximum recovery of the products, centrifuge the original vial prior to opening the cap.

## SHIPPING & STORAGE

Upon receipt, store **F4** and **standard control** at  $-20^{\circ}\text{C}$ . Store **all other components** at  $4^{\circ}\text{C}$  away from light. The components of the kit are stable for up to 6 months from date of shipment when stored properly.

**Note:** Check if buffers **F1** and **F2** contain salt precipitates before using. If so, warm (at room temperature or  $37^{\circ}\text{C}$ ) and shake the buffers until the salts are re-dissolved.

## MATERIALS REQUIRED BUT NOT SUPPLIED

- Orbital shaker
- Pipettes and pipette tips
- Reagent reservoir
- Fluorescence microplate reader
- 15 ml conical tube
- 1.5 ml microcentrifuge tubes

## GENERAL PRODUCT INFORMATION

**Usage Limitation:** The EpiQuik™ Global Di-Methyl Histone H4-K20 Quantification Kit (Fluorometric) is for research use only and is not intended for diagnostic or therapeutic application.

**Safety:** Suitable lab coat, disposable gloves, and eye protection are required when working with the kit.

**Quality Control:** Epigentek guarantees the performance of all products in the manner described in our product instructions.

**Product Updates:** Epigentek reserves the right to change or modify any product to enhance its performance and design.

**Intellectual Property:** The *EpiQuik*<sup>™</sup> Global Di-Methyl Histone H4-K20 Quantification Kit (Fluorometric) and methods of use contain proprietary technologies by Epigentek. *EpiQuik*<sup>™</sup> is a trademark of Epigentek Group Inc.

## A BRIEF OVERVIEW

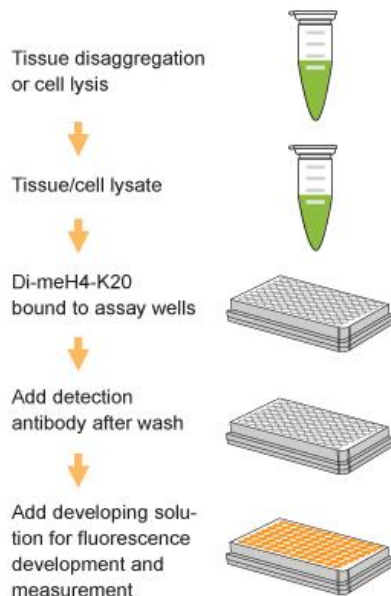
Epigenetic activation or inactivation of genes play a critical role in many important human diseases, especially in cancer. A major mechanism for epigenetic inactivation of the genes is methylation of CpG islands in genome DNA caused by DNA methyltransferases. Histone methyltransferases (HMTs) control or regulate DNA methylation through chromatin-dependent transcriptional repression or activation. HMTs transfer 1-3 methyl groups from S-adenosyl-L-methionine to the lysine and arginine residues of histone proteins. PR-SET7, SET9, SUV4.20h, and ASH1 are histone methyltransferases that catalyze methylation of histone H4 at lysine 20 (H4-K20) in mammalian cells. Di-methylation of H4-K20 has been described as another repressive chromatin domain and is involved in DNA damage response. The global H4-K20 di-methylation can also be changed by inhibition or activation of HMTs. Thus, quantitative detection of global di-methyl histone H4-K20 would provide useful information for better understanding epigenetic regulation of gene activation/repression and for developing HMT-targeted drugs. The *EpiQuik*<sup>™</sup> Global Di-Methyl Histone H4-K20 Quantification Kit (Fluorometric) provides a tool for measuring global di-methylation of histone H4-K20. The kit has the following features:

- Quick and efficient procedure, which can be finished within 2.5 hours.
- Innovative fluorometric assay without the need for radioactivity, electrophoresis, or chromatography.
- Specifically captures di-methylated H4-K20 with the detection limit as low as 1 ng/well and detection range from 10 ng-2  $\mu$ g/well of histone extracts.
- The control is conveniently included for quantification of di-methylated H4-K20.
- Strip microplate format makes the assay flexible: manual or high throughput.
- Simple, reliable, and consistent assay conditions.

## PRINCIPLE & PROCEDURE

The *EpiQuik*<sup>™</sup> Global Di-Methyl Histone H4-K20 Quantification Kit (Fluorometric) is designed for measuring global histone H4-K20 di-methylation. In an assay with this kit, the di-methylated histone H4 at lysine 20 is captured to the strip wells coated with an anti-dimethyl H4-K20 antibody. The captured di-methylated histone H4-K20 can then be detected with a detection antibody, followed by a fluorescent development reagent. The ratio of di-methylated H4-K20 is

proportional to the intensity of fluorescence. The absolute amount of di-methylated H4-K20 can be quantitated by comparing to the standard control.



Schematic Procedure for Using the EpiQuik™ Global Di-Methyl Histone H4-K20 Quantification Kit (Fluorometric)

## PROTOCOL

- Prepare histone extracts from cells/tissues treated or untreated by using your own successful method (acid extraction or high salt extraction).
  - For your convenience and the best results, Epigentek offers the EpiQuik™ Total Histone Extraction Kit (Cat. # OP-0006) optimized for use in the EpiQuik™ modified histone quantification series.
  - Preparation of histone extracts can also be performed using the attached procedure (See Appendix). Histone extracts can be used immediately or stored at  $-80^{\circ}\text{C}$  for future use.
- Determine the number of strip wells required. Leave these strips in the plate frame (remaining unused strips can be placed back in the bag. Seal the bag tightly and store at  $4^{\circ}\text{C}$ ). Dilute **F1** with distilled water (pH 7.2-7.5) at a 1:9 ratio (1 ml of **F1** + 9 ml of distilled water).
- Add  $50\ \mu\text{l}$  of **F2** into each well. For the sample, add 50-200 ng of the histone extract into the sample wells. For standard curve, dilute **standard control** with **F2** to 1 – 100 ng/ $\mu\text{l}$  for 5-7 points (e.g., 1.5, 3, 6, 12, 25, 50, and 100 ng/ $\mu\text{l}$ ). Add  $1\ \mu\text{l}$  of **standard control** at the different concentrations into the standard well. For the blank, do not add any nuclear extracts or standard control protein. Mix and cover the strip wells with Parafilm M and incubate at room temperature for 1 hour.

Meanwhile, prepare **detection solution**: for each 1 ml detection solution to be prepared, first add  $1\ \mu\text{l}$  of **F3** and  $0.5\ \mu\text{l}$  of **signal report solution** into each of  $10\ \mu\text{l}$  of **diluted F1**, mix and incubate at

room temperature for 10 min. Then add 20  $\mu$ l of signal enhancer, mix and incubate at room temperature for 15 min. Finally, add 970  $\mu$ l of **diluted F1** and mix.

4. Aspirate and wash the wells with 150  $\mu$ l of **diluted F1** 3 times.
5. Add 50  $\mu$ l of the **detection solution** to each well and incubate at room temperature for 60 min on an orbital shaker (100 rpm).
6. Aspirate and wash the wells with 150  $\mu$ l of **diluted F1** 6 times.
7. Prepare **fluoro-development solution** by adding 1  $\mu$ l of **F4** and 1  $\mu$ l of **F5** into each 400  $\mu$ l of **F6**. Add 50  $\mu$ l of **fluoro-development solution** into the wells and incubate at room temperature for 1-5 min away from light. The color in the standard wells containing the higher concentrations may turn slightly pink during this period. Measure and read fluorescence on fluorescence microplate reader at 530<sub>EX</sub>/590<sub>EM</sub> nm.

**Note:** If the strip well frame does not fit the fluorescence reader, transfer the solution to the standard 96-well microplate and read fluorescence at 530<sub>EX</sub>/590<sub>EM</sub> nm.

8. Calculate % histone H4-K20 di-methylation:

$$\text{Di-methylation \%} = \frac{\text{RFU (treated (tested) sample - blank)}}{\text{RFU (untreated (control) sample - blank)}} \times 100\%$$

For the amount quantification, plot delta RFU versus amount of **standard control** and determine the slope as delta RFU/ng.

Calculate the amount of di-methylated H4-K20 using the following formula:

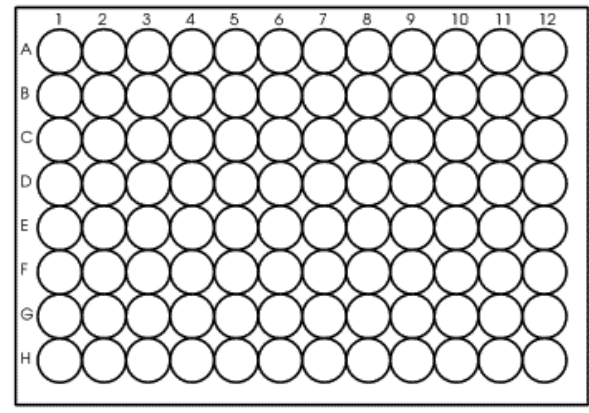
$$\text{Amount (ng/mg protein)} = \frac{\text{RFU (sample - blank)}}{\text{Protein } (\mu\text{g})^* \times \text{slope}} \times 1000$$

\* Histone extract amount added into the sample well at step 3.





## PLATE CONFIGURATION



- **Strip 1-3 (for 96 assays) or strip 1-2 (for 48 assays):** standard wells (**green trimmed**); The standard curve can be generated with 5-8 concentration points (includes blank).
- Example amount of standard control/well: **A1:** 100 ng; **B1:** 50 ng; **C1:** 25 ng; **D1:** 12 ng; **E1:** 6 ng; **F1:** 3 ng; **G1:** 1.5 ng; **H1:** 0 ng
- **Strip 4-12 (for 96 assays) or strip 3-6 (for 48 assays):** sample wells (**No label**).
- Each sample or standard point can be assayed in duplicates or triplicates.

## Appendix

### Histone Extraction Protocol

1. For tissues (treated and untreated), weigh the sample and cut the sample into small pieces (1-2 mm<sup>3</sup>) with a scalpel or scissors. Transfer tissue pieces to a Dounce homogenizer, add TEB buffer (PBS containing 0.5% Triton X 100, 2 mM PMSF and 0.02% NaN<sub>3</sub>) at 200 mg/ml, and disaggregate tissue pieces by 50-60 strokes. Transfer homogenized mixture to a 15 ml conical tube and centrifuge at 3000 rpm for 5 min at 4°C. If total mixture volume is less than 2 ml, transfer mixture to a 2 ml vial and centrifuge at 10,000 rpm for 1 min at 4°C. Remove supernatant.

For cells (treated and untreated), harvest cells and pellet the cells by centrifugation at 1,000 rpm for 5 min at 4°C. Resuspend cells in TEB buffer at 10<sup>7</sup> cells/ml and lyse cells on ice for 10 min with gentle stirring. Centrifuge at 3,000 rpm for 5 min at 4°C. If total volume is less than 2 ml, transfer cell lysates to a 2 ml vial and centrifuge at 10,000 rpm for 1 min at 4°C. Remove supernatant.

2. Resuspend cell/tissue pellet in 3 volumes (approx. 200 µl/10<sup>7</sup> cells or 200 mg tissues) of extraction buffer (0.5N HCl + 10% glycerol) and incubate on ice for 30 min.
3. Centrifuge at 12,000 rpm for 5 min at 4°C and remove the supernatant fraction to new vial.
4. Add 8 volumes (approx. 0.6 ml/10<sup>7</sup> cells or 200 mg tissues) of acetone and leave overnight at –20°C.

5. Centrifuge at 12,000 rpm for 5 min and air-dry the pellet. Dissolve the pellet in distilled water (30-50  $\mu$ l/ $10^7$  cells or 200 mg tissues).
6. Quantify the protein concentration. Aliquot the extract and store the extract at  $-20^{\circ}\text{C}$  or  $-80^{\circ}\text{C}$ .

## TROUBLESHOOTING

### No Signal for Both the Standard Control and the Samples

Reagents are added incorrectly.

Check if reagents are added in order and if any steps of the procedure 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.

### No Signal or Very Weak Signal for Standard Control Only

The amount of standard control is not added into "standard control wells" or is added insufficiently.

Ensure sufficient amount of control is properly added to the standard control wells.

### No Signal for the Sample Only

The protein sample is not properly extracted.

Ensure the procedure and reagents are correct for the nuclear protein extraction.

The protein amount is added into well insufficiently.

Ensure extract contains sufficient amount of protein.

Protein extracts are incorrectly stored.

Ensure the nuclear extracts are stored at  $-20^{\circ}\text{C}$  or  $-80^{\circ}\text{C}$ .

### High Background Present for the Blank

The well is not washed sufficiently.

Check if wash at each step is performed according to the protocol.

Contaminated by the standard control.

Ensure the well is not contaminated from adding the control protein or from using control protein contaminated tips.

Overdevelopment.

Decrease development time in Step 7.



## RELATED PRODUCTS

P-3064	<i>EpiQuik</i> <sup>™</sup> Global Mono-Methyl Histone H4-K20 Quantification Kit (Colorimetric)
P-3065	<i>EpiQuik</i> <sup>™</sup> Global Mono-Methyl Histone H4-K20 Quantification Kit (Fluorometric)
P-3066	<i>EpiQuik</i> <sup>™</sup> Global Di-Methyl Histone H4-K20 Quantification Kit (Colorimetric)
P-3068	<i>EpiQuik</i> <sup>™</sup> Global Tri-Methyl Histone H4-K20 Quantification Kit (Colorimetric)
P-3069	<i>EpiQuik</i> <sup>™</sup> Global Tri-Methyl Histone H4-K20 Quantification Kit (Fluorometric)
P-3070	<i>EpiQuik</i> <sup>™</sup> Global Pan-Methyl Histone H4-K20 Quantification Kit (Colorimetric)
P-3071	<i>EpiQuik</i> <sup>™</sup> Global Pan-Methyl Histone H4-K20 Quantification Kit (Fluorometric)

