Histone H3 (Total) Quantification Kit (Colorimetric)

Catalog Number KA0624

96 assays

Version: 03

Intended for research use only

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Introduction

Intended Use

The Histone H3 (Total) Quantification Kit (Colorimetric) is suitable for specifically measuring total histone H3 using human, mouse and rat samples, including fresh and frozen tissues, and cultured adherent and suspension cells.

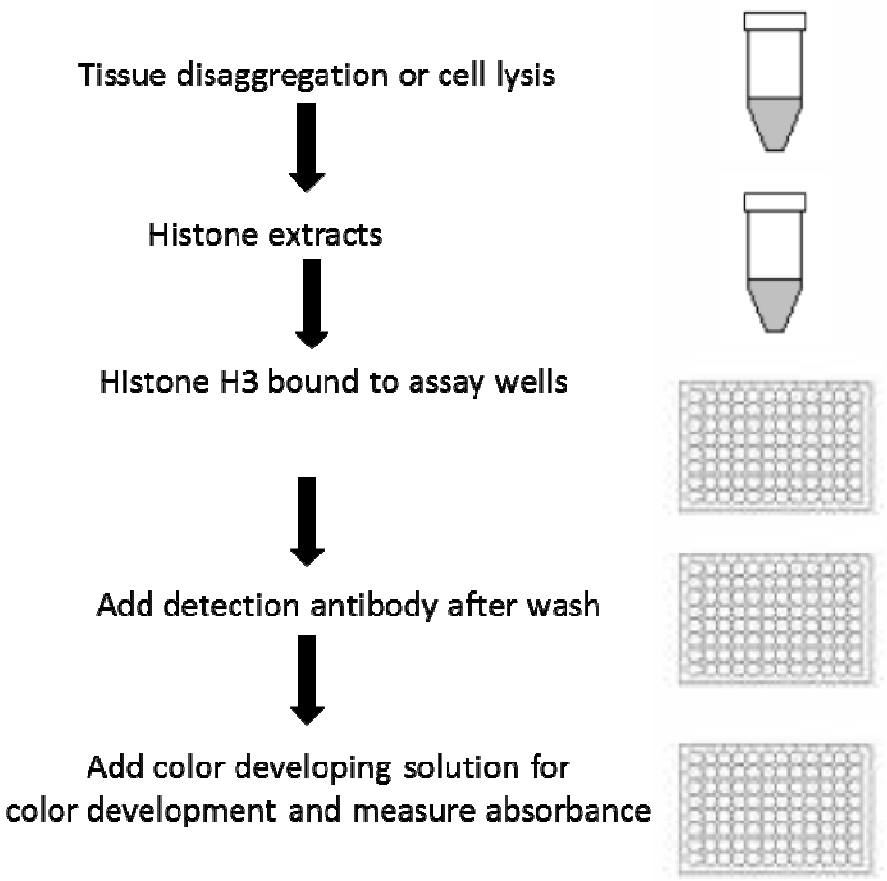
Background

Histone H3 along with H2A, H2B and H4 is involved in the structure of chromatin in eukaryotic cells. Histone H3 can undergo several different types of epigenetic modifications that influence cellular processes such as transcription activation/ inactivation, chromosome packaging and DNA damage/repair. These modifications, including acetylation, phosphorylation, methylation, ubiquitination, and ADP-ribosylation, occur on the N-terminal tail domains of histone H3 through catalyzing of histone modifying enzymes, which result in remodeling of the nucleosome structure into an open conformation more accessible to transcription complexes. In most species, histone H3 is primarily acetylated at lysine 9, 14, 18, 23, and 56, and methylated at lysine 4, 9, 27, 36 and 79, and phosphorylated at ser10, ser28, Thr3 and Thr11, respectively. Thus, quantitative detection of various histone modifications would provide useful information for better understanding epigenetic regulation of cellular processes and for developing HMT-targeted drugs.
The kit has the following features:

- ✓ Quick and efficient procedure, which can be finished within 2.5 hours.
- ✓ Innovative colorimetric assay without need for radioactivity, electrophoresis, or chromatography.
- ✓ Specifically captures histone H3 with the detection limit as low as 10 ng/ well and detection range from 20 ng-1 µg/well of histone extracts.
- ✓ The unmodified histone H3 control is conveniently included for quantification of the amount of total histone H3.
- ✓ Strip microplate format makes the assay flexible: manual or high throughput.
- ✓ Simple, reliable, and consistent assay conditions.

Principle of the Assay

The Histone H3 (Total) Quantification Kit (Colorimetric) is designed for quantifying levels of histone H3 proteins independent of its modified state. In an assay with this kit, the histone H3 protein is captured to the strip wells coated with an anti-histone H3 antibody. The captured histone H3 can then be detected with a detection antibody, followed by a color development reagent. The ratio of histone H3 is proportional to the intensity of absorbance. The absolute amount histone H3 can be quantified by comparing to the standard control.



Schematic Procedure for using Histone H3 (Total) Quantification Kit (Colorimetric)

General Information

Materials Supplied

List of component

Component	Amount
C1 (10X Wash Buffer)	20 ml
C2 (Antibody Buffer)	12 ml
C3 (Detection Antibody, 1 mg/ml)*	10 µl
C4 (Color Developer)	10 ml
C5 (Stop Solution)	6 ml
Standard Control (100 µg/ml)*	20 µl
8 Well Sample Strips (With Frame)	9 strips
8 Well Standard Control Strips	3 strips

* For maximum recovery of the products, centrifuge the original vial prior to opening the cap.

Storage Instruction

Upon receipt:

1. Store C3 and Standard control at –20℃.
2. Store all other components at 4℃ away from light. The kit should be stable for 6 months from the shipment date, when stored properly.

Note: Check if buffers C1 and C2 contain salt precipitates before using. If so, warm (at room temperature or 37℃) and shake the buffers until the salts are re-dissolved.

Materials Required but Not Supplied

- ✓ Orbital shaker
- ✓ Pipettes and pipette tips
- ✓ Reagent reservoir
- ✓ Microplate reader

Precautions for Use

- ✓ Usage Limitation: The Histone H3 (Total) Quantification Kit (Colorimetric) 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: Abnova guarantees the performance of all products in the manner described in our product instructions.

Assay Protocol

Assay Procedure

1. a) Prepare histone extracts from cells/tissues treated or untreated by using your own successful method (acid extraction or high salt extraction). b) Preparation of histone extracts can be also performed using the attached procedure (See Histone Extraction Protocol). Histone extracts can be used immediately or stored at –80℃ for future use.
2. Determine the number of the strip wells required. Leave these strips in the plate frame (remaining unused strips can be put back in the bag. Seal the bag tightly and store at 4℃). Dilute C1 with distilled water (pH 7.2-7.5) at the 1:9 ratios (ex: 1 ml of C1+ 9 ml of water).
3. Add 50 µl of C2 into each well. For the sample, add 50-200 µg of the histone extract into the sample wells. For standard curve, dilute standard control with C2 to 1–60 ng/µl for 5-7 points (ie: 1, 1.9, 3.8, 7.5, 15, 30, and 60 ng/µl). Add 1 µl of standard control at the different concentrations into the standard well. For the blank, do not add any nuclear extracts or no standard control protein. Mix and cover the strip wells with Parafilm M and incubate at room temperature for 1-2 hours.
4. Aspirate and wash the wells with 150 µl of diluted C1 three times.
5. Dilute C3 (at 1:1000 ratio) to 1 µg/ml with C2. Add 50 µl of diluted C3 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 µl of diluted C1 six times.
7. Add 100 µl of C4 into the wells and incubate at room temperature for 2-10 min away from light. Monitor color development in the sample and standard well (blue).
8. Add 50 µl of C5 to each well to stop enzyme reaction when color in the standard wells containing the higher concentrations of standard control turns medium blue. The color should change to yellow and absorbance can be read on a microplate reader at 450 nm within 2-15 minutes.

- Plate Configuration

✓ Strip 1-3: standard wells (green trimmed); the standard curve can be generated with 5-8 concentration points (includes blank).

✓ Example amount of standard control/well: A1: 60 ng; B1: 30 ng; C1: 15 ng; D1: 7.5 ng; E1: 3.8 ng; F1: 1.9 ng; G1: 1 ng; H1: 0 ng.

✓ Strip 4-12: sample wells (no label).

✓ Each sample or standard point can be assayed in duplicates or triplicates.

- Histone Extraction Protocol

1. For tissues (treated and untreated), weigh the sample and cut the sample into small pieces (1-2 mm^3) 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_3) 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 minutes at 4℃. If total mixture volume is less than 2 ml, transfer mixture to a 2 ml vial and centrifuge at 10,000 rpm for 1 minute at 4℃. Remove supernatant.

For cells (treated and untreated), harvest cells and pellet the cells by centrifugation at 1000 rpm for 5 minutes at 4℃. Resuspend cells in TEB buffer at 10^7 cells/ml and lyse cells on ice for 10 minutes with gentle stirring. Centrifuge at 3000 rpm for 5 minutes at 4℃. If total volume is less than 2 ml, transfer cell lysates to a 2 ml vial and centrifuge at 10,000 rpm for 1 minute at 4℃. Remove supernatant.

2. Resuspend cell/tissue pellet in 3 volumes (approx. 200 µl/10^7 cells or 200 mg of tissue) of extraction buffer (0.5N HCl + 10% glycerol) and incubate on ice for 30 minutes.
3. Centrifuge at 12,000 rpm for 5 minutes at 4℃ and remove the supernatant fraction to a new vial.
4. Add 8 volumes (approx. 0.6 ml/10^7 cells or 200 mg of tissue) of acetone and leave at –20℃ overnight.
5. Centrifuge at 12,000 rpm for 5 minutes and air-dry the pellet. Dissolve the pellet in distilled water (30-50 µl/10^7 cells or 200 mg of tissue).
6. Quantify the protein concentration. Aliquot the extract and store the extract at –20℃ or –80℃.

Data Analysis

Calculation of Results

Calculate % histone H3:

Plot delta OD versus amount of standard control and determine the slope as delta OD/ng.

Calculate the amount of Histone H3 using the following formula:

$$\text{Amount (ng/mg protein)} = \frac{\text{OD (sample} - \text{blank)}}{\text{Protein (µg)* x slope}} \quad \text{x 1000}$$

* Histone extract amount added into the sample well at step 3 of Assay Procedure.

Resources

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 is incorrect.	Ensure the incubation time and temperature described in the protocol are followed correctly.

- **No Signal or Very Weak Signal for Only the Standard Control**

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 Only the Sample**

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 a sufficient amount of proteins.
Protein extracts are stored incorrectly.	Ensure the nuclear extracts are stored at –20℃ or –80℃.

- **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 by adding the control protein or from using control protein contaminated tips.
Overdevelopment.	Decrease development time in protocol step 7.

Plate Layout

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11								
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6								
5								
4								
3								
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1								
	A	B	C	D	E	F	G	H