

## Instructions for Use of Hela Cell Residual DNA Detection Kit(qPCR)

The kit is intended for scientific research only and should not be used for diagnosis

**Cat. No. HG-HD005**

### Introduction

Hela Cell residual DNA detection kit is a kit specially designed for quantitative detection of Hela Cell DNA in intermediate products, bulk products and final products of various biological products.

This kit quantitatively detects Hela Cell residual DNA in samples based on Taqman probe principle. The kit is a rapid, specific and reliable device, with the minimum detection limit reaching fg level.

The kit is equipped with the sample preprocessing kit of our company (Cat. No.: HG-CL100) for sample preprocessing.

Detection range :  $3 \times 10^1$  fg/ $\mu$ L-  $3 \times 10^5$  fg/ $\mu$ L.

### Specification

100 Reactions

### Kit components

Table 1: Kit components and storage conditions

| Components  | Specification              | Storage temperature |
|---|----------------------------|---------------------|
| Hela cell DNA Quantitative reference (30 ng/ $\mu$ L) | 50 $\mu$ L $\times$ 1vial  | -20 $^{\circ}$ C    |
| Hela Primer&Probe MIX                                 | 550 $\mu$ L $\times$ 1vial |                     |
| 2 $\times$ qPCR Reaction Buffer                       | 1.2 mL $\times$ 1vial      |                     |
| DNA diluent   | 1.5mL $\times$ 3vial       |                     |
| ROX High  | 50 $\mu$ L $\times$ 1vial  |                     |
| ROX Low   | 50 $\mu$ L $\times$ 1vial  |                     |

### Product storage conditions and shelf life

See the above table for storage conditions, and the shelf life is 18 months.

### Applicable model

Including but not limited to ABI7500, BioRad CFX96, Bioer FQD-96A, Roche Light Cyclers 480 and other real-time quantitative fluorescence PCR instruments. (Table2)

| Instruments   | ROX reference stain |
|---|---------------------|
| Applied Biosystems <sup>®</sup> 5700, 7000, 7300, 7700, 7900HT, StepOne <sup>™</sup> , and StepOnePlus <sup>™</sup>   | ROX High            |
| Applied Biosystems <sup>®</sup> 7500, ViiA <sup>™</sup> 7, QuantStudio <sup>™</sup> 12K Flex, Agilent Mx3000P <sup>™</sup> , Mx3005P <sup>™</sup> , and Mx4000 <sup>™</sup>   | ROX Low             |
| Rotor-Gene <sup>™</sup> , DNA Engine Opticon <sup>™</sup> , Opticon <sup>™</sup> 2, Chromo 4 <sup>™</sup> Real-Time Detector, Mastercycler <sup>®</sup> ep realplex, Smart Cycler <sup>®</sup> , Roche LightCycle <sup>®</sup> 480, Roche LightCycler <sup>®</sup> Nano, Bio-Rad CFX96, and Illumina Eco <sup>™</sup> | No ROX              |

Note:Select an appropriate ROX for the model. If the corresponding model is not found in the above table, please consult our company or the instrument manufacturer

## Consumables and equipment to be self-prepared

Please prepare the following consumables and equipment before the test

- ◆ 1.5 mL or 2 mL sterile low adsorption centrifuge tubes
- ◆ 96-well qPCR plate or 8-strip tube adapted to PCR instrument
- ◆ 1000  $\mu$ L, 200  $\mu$ L, and 10  $\mu$ L sterile low adsorption pipette tips with cartridge
- ◆ Fluorescence quantitative PCR instrument
- ◆ Pipettes of various specifications (e.g., 1000  $\mu$ L, 200  $\mu$ L, 10  $\mu$ L, 2.5  $\mu$ L)
- ◆ Centrifuge
- ◆ Oscillator
- ◆ Magnetic stand
- ◆ Water bath/metal bath

## Test steps

### I. Sample Preprocessing

Please refer to the operating instructions of our sample preprocessing kit (Cat. No.: HG-CL100) for details.

### II. qPCR Operation Steps

#### 1. Preparation of quantitative reference and NTC

- 1.1 Quantitative reference: Take out DNA quantitative reference and DNA diluent, and thaw on ice; after thawing completely, shake gently to mix well, and centrifuge instantly;
- 1.2. Take 6 clean 1.5 mL centrifuge tubes and label them as ST0, ST1, ST2, ST3, ST4, and ST5, respectively;
- 1.3. The standard dilution process is shown in the table below:

Table 3

| Standard No. | Dilution volume  | Concentration (fg/ $\mu$ L) |
|--------------|--|-----------------------------|
| ST0          | 10 $\mu$ L Quantitative reference + 90 $\mu$ L DNA diluent | $3 \times 10^6$             |
| ST1          | 10 $\mu$ L ST0 + 90 $\mu$ L DNA diluent                    | $3 \times 10^5$             |
| ST2          | 10 $\mu$ L ST1 + 90 $\mu$ L DNA diluent                    | $3 \times 10^4$             |
| ST3          | 10 $\mu$ L ST2 + 90 $\mu$ L DNA diluent                    | $3 \times 10^3$             |
| ST4          | 10 $\mu$ L ST3 + 90 $\mu$ L DNA diluent                    | $3 \times 10^2$             |
| ST5          | 10 $\mu$ L ST4 + 90 $\mu$ L DNA diluent                    | $3 \times 10^1$             |

1.4 Preparation of NTC: 100  $\mu$ L DNA diluent;

1.5 Spike recovery of ERC: It is suggested that 90  $\mu$ L sample + 10  $\mu$ L Quantitative Reference 3 can be prepared in other ways according to the actual situation.

#### 2. Preparation and addition of qPCR reaction solution

2.1 Calculate the required number of reaction wells based on the numbers of standards and samples to be tested (generally, 3 replicate wells will be required for each sample):

$$\text{Number of reaction wells} = (\text{Standard curve with 5 concentration gradients} + 1 \text{ negative control(NTC)} + \text{test sample}) \times 3$$

2.2 Calculate the total amount of qPCR MIX required for this time based on the number of reaction wells:

$$\text{qPCR MIX} = (\text{Number of reaction wells} + 2 \text{ or } 3) \times 20 \mu\text{L} \text{ (2 or 3 is operational loss)}$$

2.3 Thaw the reagents to be used on ice, mix by gentle shaking, and prepare the qPCR MIX as shown in Table 4.

Table 4 qPCR MIX Preparation

| Components            | Volume required for single reaction(μL) |
|-----------------------|---|
| 2 × qPCR Reaction MIX | 10                                      |
| Hela Primer&Probe MIX | 4.6                                     |
| ROX*                  | 0.4                                     |
| Total volume          | 15                                      |

\* Please select appropriate ROX for corresponding model. If there is no ROX suitable for the model, please add deionized water (free of nucleic acid and nuclease contamination) of same volume.

3. Thaw the required reagents on ice, mix well by gentle shaking, and load as shown in Table 5 (total volume of 20 μL):

Table 5. Examples of loading to each reaction well

|                               |                                |
|-------------------------------|--------------------------------|
| <b>Standards</b>              | 15μL qPCR Mix +5μL ST1/2/3/4/5 |
| <b>Negative control (NTC)</b> | 15μL qPCR Mix +5μL DNA diluent |
| <b>Test sample</b>            | 15μL qPCR Mix +5μL test sample |

4. In the experiment, sterile nuclease-free 8-tube strips or 96-well plates should be used for qPCR experiment, bubbles should be removed from the reaction system, and the liquid should be centrifuged to the bottom of the tube to prepare for the reaction.

5. Layout illustration of reaction wells

Table 6. Layout illustration of Plate

|          | 1   | 2   | 3   | 4 | 5   | 6   | 7   | 8 | 9 | 10      | 11      | 12      |
|----------|-----|-----|-----|---|-----|-----|-----|---|---|---------|---------|---------|
| <b>A</b> | ST1 | ST1 | ST1 |   |     |     |     |   |   | S1      | S1      | S1      |
| <b>B</b> | ST2 | ST2 | ST2 |   |     |     |     |   |   | S2      | S2      | S2      |
| <b>C</b> | ST3 | ST3 | ST3 |   |     |     |     |   |   | S3      | S3      | S3      |
| <b>D</b> | ST4 | ST4 | ST4 |   |     |     |     |   |   |         |         |         |
| <b>E</b> | ST5 | ST5 | ST5 |   |     |     |     |   |   |         |         |         |
| <b>F</b> |     |     |     |   |     |     |     |   |   | ERC -S1 | ERC -S1 | ERC -S1 |
| <b>G</b> |     |     |     |   | NTC | NTC | NTC |   |   | ERC -S2 | ERC -S2 | ERC -S2 |
| <b>H</b> |     |     |     |   | NCS | NCS | NCS |   |   | ERC -S3 | ERC -S3 | ERC -S3 |

III. qPCR reaction program and parameter setting

Taking the CFX96 qPCR system (BIO-RAD) as an example.

1. Create an experimental reaction program and set up a two-step reaction program as shown in the table below.

Table 7. PCR reaction program

|        |                  |         |     |      |
|--------|------------------|---------|-----|------|
| Stage1 | Pre-denaturation | Reps:1  | 95℃ | 2min |
| Stage2 | Cyclic reaction  | Reps:40 | 95℃ | 15s  |
|        |                  |         | 60℃ | 30s  |

Note: The reaction volume is 20 μL. Set the program at 60℃ for 30 s for fluorescence collection; For other models of equipment, if you encounter any problems, you can consult our company or the instrument manufacturer.

2. Create the experimental reaction plate, click Select Fluorophores to select the fluorescence FAM; in the reaction plate diagram, select the Sample well, pull down in Sample Type to select Unknown, check the fluorescence FAM, Target Name is designated as Hela-DNA; input the number of replicates for each sample and Sample Name.

3. In the reaction plate diagram, select the Standard well, pull down in Sample Type to select Standard, check the fluorescence FAM, and Target Name is designated as Hela-DNA; input the number of replicates for each dilution gradient and Sample Name. And the Concentration column of ST1, ST2, ST3, ST4, ST5 is assigned values of 3.00E+05, 3.00E+04, 3.00E+03, 3.00E+02, 3.00E+01 (in fg/μL), respectively.

4. Click "Start Run" on the "Run" interface to perform PCR analysis.

#### IV. qPCR result analysis

Taking the CFX96 qPCR system (BIO-RAD) as an example.

1. Click Quantitation in Data Analysis Window to read the slope, intercept, amplification efficiency (Effect) and  $R^2$  of the standard curve.
2. In the window Quantitation Data, the SQ Mean column reads the RCL test values of the no-template control (NTC) and the test sample in fg/ $\mu$ L.
3. Data reliability evaluation:
  - The difference in Ct values between 3 replicate wells shall be less than 1.0, except for wells with Ct value greater than 35;
  - The CT values of negative controls NTC and NCS should be greater than the CT value of the lowest concentration of the standard curve, or the criteria should be set based on the laboratory's own validation results;
  - Linear correlation coefficient  $R^2$  of the standard curve shall be equal or greater than 0.98, amplification efficiency shall be within 85%-110%;
  - The recovery of ERC shall be within 50%-150%(spike recovery =  $ERC / (0.9 * sample + 0.1 * Quantitative Reference 3)$ ).

#### Precautions

1. The kit has been validated for the stability (freezing-thawing and other factors) and does not require dispensing.
2. The preparation for negative samples and positive samples (reference and samples to be tested, etc.) should be separated into different environments and should not be operated in one area. The preparation personnel should wear neat masks, gloves and cleanroom garment.
3. Tips shall be changed between different loading steps in time to avoid cross-contamination and long-time opening.
4. The kit must be used within the shelf life.
5. All components in the kit are recommended to be used after melting in a low temperature environment.
6. The best detection effect can be ensured only by strictly following the instructions and using all the reagents provided with this kit.
7. Subsequent qPCR detection shall be performed immediately after sample preprocessing and purification as far as possible on the same day to ensure the accuracy of test results.
8. The final test results are closely related to the efficacy of reagents, operator's operation methods and test environment.
9. Our company is only responsible for the kit itself and not for the sample consumption caused by the use of the kit. Users should fully consider the possible usage of sample before use and reserve sufficient samples.
10. This kit is for in vitro research use only and is not used for clinical diagnosis.

#### Disclaimer

Under all circumstances, the liability of our company for this product is only limited to the value of the product itself.

