

## ExProfile™ Human Ubiquitination (Ubiquitylation) Related Gene qPCR Array

For focused group profiling of human ubiquitination (ubiquitylation) genes expression

Cat. No. QG059-A (1 x 96-well plate, Format A)

Cat. No. QG059-B (1 x 96-well plate, Format B)

Cat. No. QG059-C (1 x 96-well plate, Format C)

Cat. No. QG059-D (1 x 96-well plate, Format D)

Cat. No. QG059-E (1 x 96-well plate, Format E)

Plates available individually or as a set of 6. Each set contains 84 unique gene primer pairs deposited in one 96-well plate.

### Introduction

The ExProfile human ubiquitination (ubiquitylation) related gene qPCR array profiles the expression of 84 human genes related to regulated degradation of cellular proteins or foreign proteins by the ubiquitin-proteasome system. These genes are carefully chosen for their close correlation based on a thorough literature search of peer-reviewed publications, mainly including genes that encode ubiquitin-activating enzymes, ubiquitin-conjugating enzymes and ubiquitin-protein ligases. This array allows researchers to study the pathway-related genes to gain understanding of their roles in ubiquitin degradation.

- QG059 plate 01: 84 unique gene PCR primer pairs

### Shipping and storage condition

Shipped at room temperature

Stable for at least 6 months when stored at -20°C

### Array format

GeneCopeia provides five qPCR array formats (A, B, C, D, and E) suitable for use with the following real-time cyclers.

**Important note:** Upon receiving, please check to make sure that the correct array format was ordered to ensure the compatibility with your qPCR instrument.

| Plate format | Instrument provider   | qPCR instrument model  |
|--------------|-----------------------|--|
| A (96-well)  | Applied Biosystems    | 5700, 7000, 7300, 7500, 7700, 7900HT (Standard 96-well block), ViiA™7 (Standard 96-well block) |
| B (96-well)  | Applied Biosystems    | 7500 (Fast block), 7900HT (Fast block), StepOnePlus™, ViiA™7 (Fast block)                      |
| C (96-well)  | Bio-Rad Laboratories  | iCycler iQ®, MyiQ™, iQ™5   |
| D (96-well)  | Bio-Rad Laboratories  | CFX96™, DNA Engine Opticon™, DNA Engine Opticon 2™, Chromo4™                                   |
| E (96-well)  | Roche Applied Science | LightCycler® 480 (96-well block)   |

### Quality control

1. Each pair of primers in the ExProfile gene qPCR array has been experimentally validated to yield a single dissociation curve peak and to generate a single amplicon of the correct size for the targeted gene.
2. The positive PCR controls (PCR) have been verified to amplify a single amplicon of the correct size with Ct values around **20±2**.
3. The Spike-in reverse transcription controls (RT) have been verified to amplify a single amplicon of the correct size with Ct values around **20±3**.
4.  $R^2 > 0.99$  was observed for high inter/ intra-array reproducibility.

### Materials required but not provided

All-in-One™ First-Strand cDNA Synthesis Kit  
 All-in-One™ qPCR Mix  
 Total RNA extraction kit (RNAzol® RT RNA extraction reagent is recommended)  
 DNase/RNase free tips, PCR reaction tubes, 1.5 ml microcentrifuge tubes  
 5 ml and 10 ml graduated pipettes, beakers, flasks, and cylinders  
 10 µl to 1,000 µl adjustable single channel micropipettes with disposable tips  
 5 µl to 20 µl adjustable multichannel micropipette, disposable tips, and reservoir  
 qPCR instrument, compatible with gene qPCR arrays ordered

### Array layout

|   | 1      | 2      | 3       | 4      | 5      | 6      | 7      | 8      | 9      | 10      | 11     | 12     |
|---|--------|--------|---------|--------|--------|--------|--------|--------|--------|---------|--------|--------|
| A | UBE2C  | UBE2C  | FBXO4   | PARK2  | HPRT1  | WWP1   | VHL    | UBR2   | UBR1   | UBE4B   | UBE2Z  | UBE2W  |
| B | UBE2T  | UBE2R2 | UBE2Q1  | UBE2N  | UBE2M  | UBE2L3 | HIP2   | UBE2J2 | UBE2J1 | UBE2I   | UBE2G2 | UBE2G1 |
| C | UBE2E3 | UBE2E2 | UBE2D3  | UBE2D2 | UBE2D1 | UBE2C  | UBE1L2 | UBE1C  | SAE2   | UBE1    | TP53   | Kua    |
| D | SMURF2 | SMURF1 | SKP2    | SKP1A  | SAE1   | RNF123 | PARK2  | PARC   | APPBP1 | MIB1    | MDM2   | 41703  |
| E | HUWE1  | HECW2  | HECW1   | FBXW10 | FBXO4  | FBXO3  | DZIP3  | DDB1   | CUL7   | CUL5    | CUL4B  | CUL4A  |
| F | CUL3   | CUL2   | CUL1    | CDC34  | CBL    | BTRC   | BRCC3  | BRCA1  | BARD1  | ATG7    | ARIH1  | ANAPC2 |
| G | UBE2E1 | UBE2H  | ANAPC11 | FBXO31 | UBE2S  | NEDD8  | RFWD2  | RNF148 | SYVN1  | UBE1DC1 | UBE2A  | UBE2B  |
| H | HGDC   | HGDC   | GAPDH   | ACTB   | B2M    | RPL13A | HPRT1  | RN18S1 | RT     | RT      | PCR    | PCR    |

Figure1. Illustration of QG059 plate 01

- **Gene primer pairs:** 84 wells (A row to G row) are designated for a real-time PCR assay for genes (see the primer list).
- **HK1-6:** Six pre-deposited housekeeping gene (HK1-6) primer pairs, which can be used as endogenous positive controls as well as for array normalization.
- **GDC:** Genomic DNA controls, which can be used to specifically detect genomic DNA contamination with a high level of sensitivity.
- **RT:** Spike-in reverse transcription controls, which can be used to monitor the efficiency of the RT reactions. These pre-deposited primer pairs specifically amplify the cDNA template reversed transcribed from the spike-in control RNA in the sample.
- **PCR:** Positive PCR controls, which are used to verify the PCR efficiency by amplifying the pre-deposited DNA template with its specific pre-deposited primer pairs.

**Gene primer list**

| Plate    | Position | Catalog No. of Primer | Accession No. of Gene | Symbol |
|----------|----------|-----------------------|-----------------------|--------|
| QG059-01 | A01      | HQP001215             | NM_181799             | UBE2C  |
| QG059-01 | A02      | HQP001217             | NM_181801             | UBE2C  |
| QG059-01 | A03      | HQP007187             | NM_033484             | FBXO4  |
| QG059-01 | A04      | HQP012195             | NM_013988             | PARK2  |
| QG059-01 | A05      | HQP009026             | NM_000194             | HPRT1  |
| QG059-01 | A06      | HQP001203             | NM_007013             | WWP1   |
| QG059-01 | A07      | HQP018485             | NM_000551             | VHL    |
| QG059-01 | A08      | HQP005973             | NM_015255             | UBR2   |
| QG059-01 | A09      | HQP004660             | NM_174916             | UBR1   |
| QG059-01 | A10      | HQP000338             | NM_006048             | UBE4B  |
| QG059-01 | A11      | HQP017382             | NM_023079             | UBE2Z  |
| QG059-01 | A12      | HQP014272             | NM_018299             | UBE2W  |
| QG059-01 | B01      | HQP008400             | NM_014176             | UBE2T  |
| QG059-01 | B02      | HQP013865             | NM_017811             | UBE2R2 |
| QG059-01 | B03      | HQP014486             | NM_017582             | UBE2Q1 |
| QG059-01 | B04      | HQP018383             | NM_003348             | UBE2N  |
| QG059-01 | B05      | HQP021936             | NM_003969             | UBE2M  |
| QG059-01 | B06      | HQP018381             | NM_003347             | UBE2L3 |
| QG059-01 | B07      | HQP008834             | NM_005339             | HIP2   |
| QG059-01 | B08      | HQP054042             | NM_194458             | UBE2J2 |
| QG059-01 | B09      | HQP012761             | NM_016021             | UBE2J1 |
| QG059-01 | B10      | HQP018379             | NM_003345             | UBE2I  |
| QG059-01 | B11      | HQP018376             | NM_182688             | UBE2G2 |
| QG059-01 | B12      | HQP018373             | NM_003342             | UBE2G1 |
| QG059-01 | C01      | HQP000577             | NM_006357             | UBE2E3 |
| QG059-01 | C02      | HQP018372             | NM_152653             | UBE2E2 |
| QG059-01 | C03      | HQP018369             | NM_181893             | UBE2D3 |
| QG059-01 | C04      | HQP018366             | NM_181838             | UBE2D2 |
| QG059-01 | C05      | HQP018364             | NM_003338             | UBE2D1 |
| QG059-01 | C06      | HQP001218             | NM_181803             | UBE2C  |
| QG059-01 | C07      | HQP014208             | NM_018227             | UBE1L2 |
| QG059-01 | C08      | HQP021932             | NM_003968             | UBE1C  |
| QG059-01 | C09      | HQP000071             | NM_005499             | SAE2   |
| QG059-01 | C10      | HQP018357             | NM_003334             | UBE1   |
| QG059-01 | C11      | HQP018175             | NM_000546             | TP53   |
| QG059-01 | C12      | HQP010193             | NM_199129             | Kua    |
| QG059-01 | D01      | HQP017122             | NM_022739             | SMURF2 |
| QG059-01 | D02      | HQP015449             | NM_020429             | SMURF1 |
| QG059-01 | D03      | HQP017300             | NM_005983             | SKP2   |
| QG059-01 | D04      | HQP017289             | NM_006930             | SKP1A  |
| QG059-01 | D05      | HQP000072             | NM_005500             | SAE1   |
| QG059-01 | D06      | HQP016673             | NM_022064             | RNF123 |

|          |     |           |              |         |
|----------|-----|-----------|--------------|---------|
| QG059-01 | D07 | HQP012193 | NM_004562    | PARK2   |
| QG059-01 | D08 | HQP005770 | NM_015089    | PARC    |
| QG059-01 | D09 | HQP021668 | NM_003905    | APPBP1  |
| QG059-01 | D10 | HQP015685 | NM_020774    | MIB1    |
| QG059-01 | D11 | HQP011135 | NM_002392    | MDM2    |
| QG059-01 | D12 | HQP013642 | NM_017824    | 5-Mar   |
| QG059-01 | E01 | HQP000096 | NM_031407    | HUWE1   |
| QG059-01 | E02 | HQP015673 | NM_020760    | HECW2   |
| QG059-01 | E03 | HQP005726 | NM_015052    | HECW1   |
| QG059-01 | E04 | HQP000620 | NM_031456    | FBXW10  |
| QG059-01 | E05 | HQP007186 | NM_012176    | FBXO4   |
| QG059-01 | E06 | HQP007188 | NM_012175    | FBXO3   |
| QG059-01 | E07 | HQP023052 | NM_014648    | DZIP3   |
| QG059-01 | E08 | HQP004111 | NM_001923    | DDB1    |
| QG059-01 | E09 | HQP023238 | NM_014780    | CUL7    |
| QG059-01 | E10 | HQP019709 | NM_003478    | CUL5    |
| QG059-01 | E11 | HQP020764 | NM_003588    | CUL4B   |
| QG059-01 | E12 | HQP020774 | NM_003589    | CUL4A   |
| QG059-01 | F01 | HQP020782 | NM_003590    | CUL3    |
| QG059-01 | F02 | HQP020788 | NM_003591    | CUL2    |
| QG059-01 | F03 | HQP020798 | NM_003592    | CUL1    |
| QG059-01 | F04 | HQP023443 | NM_004359    | CDC34   |
| QG059-01 | F05 | HQP021430 | NM_005188    | CBL     |
| QG059-01 | F06 | HQP021753 | NM_033637    | BTRC    |
| QG059-01 | F07 | HQP018988 | NM_024332    | BRCC3   |
| QG059-01 | F08 | HQP017713 | NM_007294    | BRCA1   |
| QG059-01 | F09 | HQP015946 | NM_000465    | BARD1   |
| QG059-01 | F10 | HQP000641 | NM_006395    | ATG7    |
| QG059-01 | F11 | HQP006752 | NM_005744    | ARIH1   |
| QG059-01 | F12 | HQP008560 | NM_013366    | ANAPC2  |
| QG059-01 | G01 | HQP018371 | NM_182666    | UBE2E1  |
| QG059-01 | G02 | HQP018378 | NM_182697    | UBE2H   |
| QG059-01 | G03 | HQP012810 | NM_001002244 | ANAPC11 |
| QG059-01 | G04 | HQP019258 | NM_024735    | FBXO31  |
| QG059-01 | G05 | HQP007682 | NM_014501    | UBE2S   |
| QG059-01 | G06 | HQP011745 | NM_006156    | NEDD8   |
| QG059-01 | G07 | HQP016911 | NM_022457    | RFWD2   |
| QG059-01 | G08 | HQP010064 | NM_198085    | RNF148  |
| QG059-01 | G09 | HQP020731 | NM_172230    | SYVN1   |
| QG059-01 | G10 | HQP019348 | NM_198329    | UBE1DC1 |
| QG059-01 | G11 | HQP018359 | NM_003336    | UBE2A   |
| QG059-01 | G12 | HQP018363 | NM_003337    | UBE2B   |
| QG059-01 | H01 | HGDC      |              |         |
| QG059-01 | H02 | HGDC      |              |         |
| QG059-01 | H03 | HQP006940 | NM_002046    | GAPDH   |
| QG059-01 | H04 | HQP016381 | NM_001101    | ACTB    |

|          |     |           |           |        |
|----------|-----|-----------|-----------|--------|
| QG059-01 | H05 | HQP015171 | NM_004048 | B2M    |
| QG059-01 | H06 | HQP006171 | NM_012423 | RPL13A |
| QG059-01 | H07 | HQP009026 | NM_000194 | HPRT1  |
| QG059-01 | H08 | HQP054253 | NR_003286 | RN18S1 |
| QG059-01 | H09 | RT        |           |        |
| QG059-01 | H10 | RT        |           |        |
| QG059-01 | H11 | PCR       |           |        |
| QG059-01 | H12 | PCR       |           |        |

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