

# RT<sup>2</sup> Profiler PCR Array (96-Well Format and 384-Well [4 x 96] Format)

## Rat Hypoxia Signaling Pathway

Cat. no. 330231 PARN-032ZA

For pathway expression analysis

| Format                                       | For use with the following real-time cyclers                                                                                                                                                                                                                                          |
|----------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RT <sup>2</sup> Profiler PCR Array, Format A | Applied Biosystems® models 5700, 7000, 7300, 7500, 7700, 7900HT, ViiA™ 7 (96-well block); Bio-Rad® models iCycler®, iQ™ 5, MyiQ™, MyiQ2; Bio-Rad/MJ Research Chromo4™; Eppendorf® Mastercycler® ep realplex models 2, 2s, 4, 4s; Stratagene® models Mx3005P®, Mx3000P®; Takara TP-800 |
| RT <sup>2</sup> Profiler PCR Array, Format C | Applied Biosystems models 7500 (Fast block), 7900HT (Fast block), StepOnePlus™, ViiA 7 (Fast block)                                                                                                                                                                                   |
| RT <sup>2</sup> Profiler PCR Array, Format D | Bio-Rad CFX96™; Bio-Rad/MJ Research models DNA Engine Opticon®, DNA Engine Opticon 2; Stratagene Mx4000®                                                                                                                                                                              |
| RT <sup>2</sup> Profiler PCR Array, Format E | Applied Biosystems models 7900HT (384-well block), ViiA 7 (384-well block); Bio-Rad CFX384™                                                                                                                                                                                           |
| RT <sup>2</sup> Profiler PCR Array, Format F | Roche® LightCycler® 480 (96-well block)                                                                                                                                                                                                                                               |
| RT <sup>2</sup> Profiler PCR Array, Format G | Roche LightCycler 480 (384-well block)                                                                                                                                                                                                                                                |
| RT <sup>2</sup> Profiler PCR Array, Format H | Fluidigm® BioMark™                                                                                                                                                                                                                                                                    |



Sample & Assay Technologies

## Description

The Rat Hypoxia Signaling Pathway RT<sup>2</sup> Profiler PCR Array profiles the expression of 84 genes that respond to low oxygen levels. Oxygen is required for aerobic energy metabolism processes such as oxidative phosphorylation. Low oxygen conditions activate the hypoxia signaling pathway in eukaryotic cells, primarily via the hypoxia inducible factor (HIF) transcription factor. HIF heterodimers consist of a constitutively-expressed beta subunit and one of 3 alpha subunit isoforms whose expression is tightly regulated. The presence of oxygen activates prolyl hydroxylases to hydroxylate HIF, leading to its polyubiquitination and degradation. Under low oxygen conditions, prolyl hydroxylase inactivity allows HIF to accumulate, initiating target gene expression. Hypoxia-inducible target genes mediate multiple biological functions, such as angiogenesis, hematopoiesis, and the maintenance of vascular tone to provide or replenish tissues with blood and oxygen. Hypoxia signaling dysregulation commonly occurs in diseases such as tumor angiogenesis and chronic inflammation. Hundreds of HIF target genes have been identified using experimental techniques such as expression studies and chromatin immunoprecipitation (ChIP) as well as bioinformatic analysis of predicted transcription factor binding sites. This array includes HIF signaling transcription factors, HIF interacting proteins, and highly relevant target genes identified by multiple studies. Results obtained with this array can be used to analyze activation or inhibition of hypoxia signaling. Using real-time PCR, research studies can easily and reliably analyze the expression of a focused panel of genes related to the hypoxia signaling pathway with this array.

For further details, consult the *RT<sup>2</sup> Profiler PCR Array Handbook*.

## Shipping and storage

RT<sup>2</sup> Profiler PCR Arrays in formats A, C, D, E, F, and G are shipped at ambient temperature, on dry ice, or blue ice packs depending on destination and accompanying products. RT<sup>2</sup> Profiler PCR Arrays in format H are shipped on dry ice or blue ice packs.

For long term storage, keep plates at –20°C.

**Note:** Ensure that you have the correct RT<sup>2</sup> Profiler PCR Array format for your real-time cycler (see table above).

**Note:** Open the package and store the products appropriately immediately on receipt.

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## Array layout (96-well)

For 384-well 4 x 96 PCR arrays, genes are present in a staggered format. Refer to the *RT<sup>2</sup> Profiler PCR Array Handbook* for layout.

|          | 1        | 2        | 3       | 4       | 5       | 6     | 7     | 8      | 9         | 10    | 11     | 12     |
|----------|----------|----------|---------|---------|---------|-------|-------|--------|-----------|-------|--------|--------|
| <b>A</b> | Adm      | Adora2b  | Aldoa   | Angptl4 | Ankrd37 | Anxa2 | Apex1 | Arnt   | Bhlhe40   | Blm   | Bnip3  | Bnip3l |
| <b>B</b> | Blg1     | Car9     | Ccng2   | Cdkn2a  | Cops5   | Ctsa  | Ddit4 | Dnajc5 | Edn1      | Egln1 | Egln2  | Egr1   |
| <b>C</b> | Eif4ebp1 | Eno1     | Epo     | Ero1l   | F10     | F3    | Fos   | Gpi    | Gys1      | Hif1a | Hif1an | Hif3a  |
| <b>D</b> | Hk2      | Hmox1    | Hnf4a   | Ier3    | Igfbp3  | Jmjd6 | Ldha  | Lgals3 | LOC367198 | Lox   | Map3k1 | Met    |
| <b>E</b> | Mif      | Mmp9     | Mxi1    | Nampt   | Ndrp1   | Nlkb1 | Nos3  | Odc1   | P4ha1     | P4hb  | Pdk1   | Per1   |
| <b>F</b> | Plkb3    | Plkb4    | Plkl    | Plkp    | Pgam1   | Pgf   | Pgk1  | Pgm2   | Pim1      | Pkm2  | Plau   | Rbpil  |
| <b>G</b> | Ruvbl2   | Serpine1 | Slc16a3 | Slc2a1  | Slc2a3  | Tfrc  | Tp53  | Tpi1   | Txnip     | Usf2  | Vdac1  | Vegfa  |
| <b>H</b> | Actb     | B2m      | Hprt1   | Ldha    | Rplp1   | RGDC  | RTC   | RTC    | RTC       | PPC   | PPC    | PPC    |

## Gene table: RT<sup>2</sup> Profiler PCR Array

| Position | UniGene   | GenBank      | Symbol   | Description                                                                             |
|----------|-----------|--------------|----------|-----------------------------------------------------------------------------------------|
| A01      | Rn.10232  | NM_012715    | Adm      | Adrenomedullin                                                                          |
| A02      | Rn.89544  | NM_017161    | Adora2b  | Adenosine A2B receptor                                                                  |
| A03      | Rn.1774   | NM_012495    | Aldoa    | Aldolase A, fructose-bisphosphate                                                       |
| A04      | Rn.119611 | NM_199115    | Angptl4  | Angiopietin-like 4                                                                      |
| A05      | Rn.21120  | NM_001108400 | Ankrd37  | Ankyrin repeat domain 37                                                                |
| A06      | Rn.90546  | NM_019905    | Anxa2    | Annexin A2                                                                              |
| A07      | Rn.5949   | NM_024148    | Apex1    | APEX nuclease (multifunctional DNA repair enzyme) 1                                     |
| A08      | Rn.10520  | NM_012780    | Arnt     | Aryl hydrocarbon receptor nuclear translocator                                          |
| A09      | Rn.81055  | NM_053328    | Bhlhe40  | Basic helix-loop-helix family, member e40                                               |
| A10      | Rn.211198 | NM_001107526 | Blm      | Bloom syndrome, RecQ helicase-like                                                      |
| A11      | Rn.2060   | NM_053420    | Bnip3    | BCL2/adenovirus E1B interacting protein 3                                               |
| A12      | Rn.827    | NM_080888    | Bnip3l   | BCL2/adenovirus E1B interacting protein 3-like                                          |
| B01      | Rn.1000   | NM_017258    | Blg1     | B-cell translocation gene 1, anti-proliferative                                         |
| B02      | Rn.162391 | NM_001107956 | Car9     | Carbonic anhydrase 9                                                                    |
| B03      | Rn.162246 | NM_001105725 | Ccng2    | Cyclin G2                                                                               |
| B04      | Rn.48717  | NM_031550    | Cdkn2a   | Cyclin-dependent kinase inhibitor 2A                                                    |
| B05      | Rn.2243   | NM_001025695 | Cops5    | COP9 constitutive photomorphogenic homolog subunit 5 (Arabidopsis)                      |
| B06      | Rn.104631 | NM_001011959 | Ctsa     | Cathepsin A                                                                             |
| B07      | Rn.9775   | NM_080906    | Ddit4    | DNA-damage-inducible transcript 4                                                       |
| B08      | Rn.100120 | NM_024161    | Dnajc5   | DnaJ (Hsp40) homolog, subfamily C, member 5                                             |
| B09      | Rn.10918  | NM_012548    | Edn1     | Endothelin 1                                                                            |
| B10      | Rn.44718  | XM_002725436 | Egln1    | EGL nine homolog 1 (C. elegans)                                                         |
| B11      | Rn.43384  | NM_001004083 | Egln2    | EGL nine homolog 2 (C. elegans)                                                         |
| B12      | Rn.9096   | NM_012551    | Egr1     | Early growth response 1                                                                 |
| C01      | Rn.11161  | NM_053857    | Eif4ebp1 | Eukaryotic translation initiation factor 4E binding protein 1                           |
| C02      | Rn.4236   | NM_012554    | Eno1     | Enolase 1, (alpha)                                                                      |
| C03      | Rn.11365  | NM_017001    | Epo      | Erythropoietin                                                                          |
| C04      | Rn.64648  | NM_138528    | Ero1l    | ERO1-like (S. cerevisiae)                                                               |
| C05      | Rn.21393  | NM_017143    | F10      | Coagulation factor X                                                                    |
| C06      | Rn.9980   | NM_013057    | F3       | Coagulation factor III (thromboplastin, tissue factor)                                  |
| C07      | Rn.103750 | NM_022197    | Fos      | FBJ osteosarcoma oncogene                                                               |
| C08      | Rn.84435  | NM_207592    | Gpi      | Glucose phosphate isomerase                                                             |
| C09      | Rn.95278  | NM_001109615 | Gys1     | Glycogen synthase 1, muscle                                                             |
| C10      | Rn.10852  | NM_024359    | Hif1a    | Hypoxia-inducible factor 1, alpha subunit (basic helix-loop-helix transcription factor) |
| C11      | Rn.83240  | NM_001113749 | Hif1an   | Hypoxia-inducible factor 1, alpha subunit inhibitor                                     |
| C12      | Rn.161814 | NM_022528    | Hif3a    | Hypoxia inducible factor 3, alpha subunit                                               |
| D01      | Rn.91375  | NM_012735    | Hk2      | Hexokinase 2                                                                            |
| D02      | Rn.3160   | NM_012580    | Hmox1    | Heme oxygenase (decycling) 1                                                            |
| D03      | Rn.44442  | NM_022180    | Hnf4a    | Hepatocyte nuclear factor 4, alpha                                                      |
| D04      | Rn.23638  | NM_212505    | Ier3     | Immediate early response 3                                                              |
| D05      | Rn.26369  | NM_012588    | Igfbp3   | Insulin-like growth factor binding protein 3                                            |
| D06      | Rn.19923  | NM_001012143 | Jmjd6    | Jumonji domain containing 6                                                             |
| D07      | Rn.107896 | NM_017025    | Ldha     | Lactate dehydrogenase A                                                                 |
| D08      | Rn.764    | NM_031832    | Lgals3   | Lectin, galactoside-binding, soluble, 3                                                 |

| Position | UniGene   | GenBank      | Symbol    | Description                                                                                     |
|----------|-----------|--------------|-----------|-------------------------------------------------------------------------------------------------|
| D09      | Rn.112309 | XM_346005    | LOC367198 | Similar to Serine/threonine-protein kinase ATR (Ataxia telangiectasia and Rad3-related protein) |
| D10      | Rn.11372  | NM_017061    | Lox       | Lysyl oxidase                                                                                   |
| D11      | Rn.11081  | NM_053887    | Map3k1    | Mitogen activated protein kinase kinase kinase 1                                                |
| D12      | Rn.10617  | NM_031517    | Met       | Met proto-oncogene                                                                              |
| E01      | Rn.2661   | NM_031051    | Mif       | Macrophage migration inhibitory factor                                                          |
| E02      | Rn.10209  | NM_031055    | Mmp9      | Matrix metalloproteinase 9                                                                      |
| E03      | Rn.37510  | NM_013160    | Mxi1      | MAX interactor 1                                                                                |
| E04      | Rn.203508 | NM_177928    | Nampt     | Nicotinamide phosphoribosyltransferase                                                          |
| E05      | Rn.153992 | NM_001011991 | Ndrp1     | N-myc downstream regulated 1                                                                    |
| E06      | Rn.2411   | XM_342346    | Nfkb1     | Nuclear factor of kappa light polypeptide gene enhancer in B-cells 1                            |
| E07      | Rn.44265  | NM_021838    | Nos3      | Nitric oxide synthase 3, endothelial cell                                                       |
| E08      | Rn.874    | NM_012615    | Odc1      | Ornithine decarboxylase 1                                                                       |
| E09      | Rn.8531   | NM_172062    | P4ha1     | Prolyl 4-hydroxylase, alpha polypeptide I                                                       |
| E10      | Rn.4234   | NM_012998    | P4hb      | Prolyl 4-hydroxylase, beta polypeptide                                                          |
| E11      | Rn.11185  | NM_053826    | Pdk1      | Pyruvate dehydrogenase kinase, isozyme 1                                                        |
| E12      | Rn.34433  | NM_001034125 | Per1      | Period homolog 1 (Drosophila)                                                                   |
| F01      | Rn.10791  | NM_057135    | Pfkfb3    | 6-phosphofructo-2-kinase/fructose-2,6-bisphosphatase 3                                          |
| F02      | Rn.90092  | NM_019333    | Pfkfb4    | 6-phosphofructo-2-kinase/fructose-2,6-bisphosphatase 4                                          |
| F03      | Rn.4212   | NM_013190    | Pfkl      | Phosphofructokinase, liver                                                                      |
| F04      | Rn.2278   | NM_206847    | Pfkl      | Phosphofructokinase, platelet                                                                   |
| F05      | Rn.1383   | NM_053290    | Pgam1     | Phosphoglycerate mutase 1 (brain)                                                               |
| F06      | Rn.6960   | NM_053595    | Pgf       | Placental growth factor                                                                         |
| F07      | Rn.108127 | NM_053291    | Pgk1      | Phosphoglycerate kinase 1                                                                       |
| F08      | Rn.203347 | NM_001106007 | Pgm2      | Phosphoglucomutase 2                                                                            |
| F09      | Rn.34888  | NM_017034    | Pim1      | Pim-1 oncogene                                                                                  |
| F10      | Rn.1556   | NM_053297    | Pkm2      | Pyruvate kinase, muscle                                                                         |
| F11      | Rn.6064   | NM_013085    | Plau      | Plasminogen activator, urokinase                                                                |
| F12      | Rn.219869 | NM_001108604 | Rbpjl     | Recombination signal binding protein for immunoglobulin kappa J region-like                     |
| G01      | Rn.136577 | NM_001025405 | Ruvbl2    | RuvB-like 2 (E. coli)                                                                           |
| G02      | Rn.29367  | NM_012620    | Serpine1  | Serpin peptidase inhibitor, clade E (nexin, plasminogen activator inhibitor type 1), member 1   |
| G03      | Rn.10826  | NM_030834    | Slc16a3   | Solute carrier family 16, member 3 (monocarboxylic acid transporter 4)                          |
| G04      | Rn.3205   | NM_138827    | Slc2a1    | Solute carrier family 2 (facilitated glucose transporter), member 1                             |
| G05      | Rn.95055  | NM_017102    | Slc2a3    | Solute carrier family 2 (facilitated glucose transporter), member 3                             |
| G06      | Rn.98672  | NM_022712    | Tfrc      | Transferrin receptor                                                                            |
| G07      | Rn.54443  | NM_030989    | Tp53      | Tumor protein p53                                                                               |
| G08      | Rn.37838  | NM_022922    | Tpi1      | Triosephosphate isomerase 1                                                                     |
| G09      | Rn.2758   | NM_001008767 | Txnip     | Thioredoxin interacting protein                                                                 |
| G10      | Rn.44637  | NM_031139    | Usf2      | Upstream transcription factor 2, c-fos interacting                                              |
| G11      | Rn.54594  | NM_031353    | Vdac1     | Voltage-dependent anion channel 1                                                               |
| G12      | Rn.1923   | NM_031836    | Vegfa     | Vascular endothelial growth factor A                                                            |
| H01      | Rn.94978  | NM_031144    | Actb      | Actin, beta                                                                                     |
| H02      | Rn.1868   | NM_012512    | B2m       | Beta-2 microglobulin                                                                            |
| H03      | Rn.47     | NM_012583    | Hprt1     | Hypoxanthine phosphoribosyltransferase 1                                                        |
| H04      | Rn.107896 | NM_017025    | Ldha      | Lactate dehydrogenase A                                                                         |
| H05      | Rn.973    | NM_001007604 | Rplp1     | Ribosomal protein, large, P1                                                                    |
| H06      | N/A       | U26919       | RGDC      | Rat Genomic DNA Contamination                                                                   |
| H07      | N/A       | SA_00104     | RTC       | Reverse Transcription Control                                                                   |
| H08      | N/A       | SA_00104     | RTC       | Reverse Transcription Control                                                                   |
| H09      | N/A       | SA_00104     | RTC       | Reverse Transcription Control                                                                   |
| H10      | N/A       | SA_00103     | PPC       | Positive PCR Control                                                                            |
| H11      | N/A       | SA_00103     | PPC       | Positive PCR Control                                                                            |
| H12      | N/A       | SA_00103     | PPC       | Positive PCR Control                                                                            |

## Related products

For optimal performance, RT<sup>2</sup> Profiler PCR Arrays should be used together with the RT<sup>2</sup> First Strand Kit for cDNA synthesis and RT<sup>2</sup> SYBR<sup>®</sup> Green qPCR Mastermixes for PCR.

| Product                                                         | Contents                                                                                                                                                                                                                                                                                                                                                            | Cat. no. |
|-----------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| RT <sup>2</sup> First Strand Kit (12)                           | Enzymes and reagents for cDNA synthesis                                                                                                                                                                                                                                                                                                                             | 330401   |
| RT <sup>2</sup> SYBR Green qPCR Mastermix (2)*                  | For 2 x 96 assays in 96-well plates; suitable for use with real-time cyclers that do not require a reference dye, including: Bio-Rad models CFX96, CFX384, DNA Engine Opticon 2; Bio-Rad/MJ Research Chromo4; Roche LightCycler 480 (96-well and 384-well); all other cyclers                                                                                       | 330500   |
| RT <sup>2</sup> SYBR Green ROX <sup>™</sup> qPCR Mastermix (2)* | For 2 x 96 assays in 96-well plates; suitable for use with the following real-time cyclers: Applied Biosystems models 5700, 7000, 7300, 7500 [Standard and FAST], 7700, 7900HT 96-well block [Standard and FAST] and 384-well block, StepOnePlus; Eppendorf Mastercycler ep realplex models 2, 2S, 4, 4S; Stratagene models Mx3000P, Mx3005P, Mx4000; Takara TP-800 | 330520   |
| RT <sup>2</sup> SYBR Green Fluor qPCR Mastermix (2)*            | For 2 x 96 assays in 96-well plates; suitable for use with the following real-time cyclers: Bio-Rad models iCycler, iQ5, MyiQ, MyiQ2                                                                                                                                                                                                                                | 330510   |

\* Larger kit sizes available; please inquire.

RT<sup>2</sup> Profiler PCR Array products are intended for molecular biology applications. These products are not intended for the diagnosis, prevention, or treatment of a disease.

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