

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

## Mouse Osteoporosis

Cat. no. 330231 PAMM-170ZA

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 Mouse Osteoporosis RT<sup>2</sup> Profiler PCR Array profiles the expression of 84 genes involved in pathogenesis of osteoporosis (OP). Advanced age, gender, and immobilization are major risk factors for developing OP, and additional contributing factors include diminished sex steroid production in post-menopausal women. OP is a metabolic disorder of the bones characterized by low bone mineral density (BMD) and increased incidence of fractures due to disruption of bone remodeling — the balance between bone resorption and bone formation. Bone remodeling is conducted by osteoclasts (cells responsible for bone resorption) and by osteoblasts (cells responsible for bone formation). Osteoblasts have a central role in bone metabolism and are responsible for bone matrix synthesis and mineralization, synthesis of growth factors and hormones, and regulation of osteoclastogenesis for bone resorption. In OP, a pathological imbalance in the bone remodeling process is typically linked to a disrupted RANKL/OPG signaling equilibrium wherein elevated RANKL levels favor resorption through osteoclast formation, function, and survival with lowered BMD. Recent evidence also suggests that inflammation plays a significant role in disrupting osteoclast–osteoblast equilibrium, which affects BMD. Enormous research efforts are underway to determine the molecular mechanisms of pathogenesis of OP with the aim of obtaining novel targets for its treatment and prevention as well as the identification of early diagnostic markers. The genes profiled with this array are associated with osteoblast and osteoclast activity including WNT and BMP signaling pathways, ECM and bone matrix remodeling, and cytokines and growth factors currently associated with OP molecular pathogenesis. A set of controls present on each array enables data analysis using the  $\Delta\Delta C_T$  method of relative quantification and assessment of reverse transcription performance, genomic DNA contamination, and PCR performance. Using real-time PCR, research studies can easily and reliably analyze the expression of a focused panel of genes involved in osteoporosis 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> | Acp5    | Adcy10  | Alox12    | Alox15    | Alox5    | Alpl     | Ar     | Bglap  | Bmp2  | Bmp7    | Calca   | Calcr   |
| <b>B</b> | Car2    | Casr    | Cd40      | Clcn7     | Cnr2     | Col1a1   | Col1a2 | Comt   | Crtap | Ctsk    | Cyp17a1 | Cyp19a1 |
| <b>C</b> | Dbp     | Dkk1    | Enpp1     | Esr1      | Esr2     | Esrra    | Fgfr1  | Fgfr2  | Ghrh  | Hsd11b1 | Igf1    | Igfbp2  |
| <b>D</b> | Il15    | Il6     | Il6ra     | Itga1     | Itgb3    | Lep      | Lepre1 | Lrp1   | Lrp5  | Lrp6    | Lta     | Ltbp2   |
| <b>E</b> | Mab21l2 | Mmp2    | Mstn      | Mthfr     | Nfatc1   | Nog      | Nos3   | Npy    | Nr3c1 | P2rx7   | Plod2   | Prl     |
| <b>F</b> | Pth     | Pth1r   | Pthlh     | Runx2     | Sfrp1    | Sfrp4    | Shbg   | Sost   | Sparc | Spp1    | Srat1   | Tgfb1   |
| <b>G</b> | Timp2   | Tnfrsf3 | Tnfrsf11a | Tnfrsf11b | Tnfrsf1b | Tnfrsf11 | Tshr   | Twist1 | Vdr   | Vegfa   | Wnt10b  | Wnt3a   |
| <b>H</b> | Actb    | B2m     | Gapdh     | Gusb      | Hsp90ab1 | MGDC     | RTC    | RTC    | RTC   | PPC     | PPC     | PPC     |

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

| Position | UniGene   | GenBank      | Symbol  | Description                                            |
|----------|-----------|--------------|---------|--------------------------------------------------------|
| A01      | Mm.46354  | NM_007388    | Acp5    | Acid phosphatase 5, tartrate resistant                 |
| A02      | Mm.66952  | NM_173029    | Adcy10  | Adenylate cyclase 10                                   |
| A03      | Mm.12286  | NM_007440    | Alox12  | Arachidonate 12-lipoxygenase                           |
| A04      | Mm.4584   | NM_009660    | Alox15  | Arachidonate 15-lipoxygenase                           |
| A05      | Mm.41072  | NM_009662    | Alox5   | Arachidonate 5-lipoxygenase                            |
| A06      | Mm.288186 | NM_007431    | Alpl    | Alkaline phosphatase, liver/bone/kidney                |
| A07      | Mm.39005  | NM_013476    | Ar      | Androgen receptor                                      |
| A08      | Mm.389459 | NM_007541    | Bglap   | Bone gamma carboxyglutamate protein                    |
| A09      | Mm.103205 | NM_007553    | Bmp2    | Bone morphogenetic protein 2                           |
| A10      | Mm.595    | NM_007557    | Bmp7    | Bone morphogenetic protein 7                           |
| A11      | Mm.4361   | NM_007587    | Calca   | Calcitonin/calcitonin-related polypeptide, alpha       |
| A12      | Mm.4642   | NM_007588    | Calcr   | Calcitonin receptor                                    |
| B01      | Mm.1186   | NM_009801    | Car2    | Carbonic anhydrase 2                                   |
| B02      | Mm.103619 | NM_013803    | Casr    | Calcium-sensing receptor                               |
| B03      | Mm.271833 | NM_011611    | Cd40    | CD40 antigen                                           |
| B04      | Mm.270587 | NM_011930    | Clcn7   | Chloride channel 7                                     |
| B05      | Mm.297251 | NM_009924    | Cnr2    | Cannabinoid receptor 2 (macrophage)                    |
| B06      | Mm.277735 | NM_007742    | Col1a1  | Collagen, type I, alpha 1                              |
| B07      | Mm.277792 | NM_007743    | Col1a2  | Collagen, type I, alpha 2                              |
| B08      | Mm.100940 | NM_007744    | Comt    | Catechol-O-methyltransferase                           |
| B09      | Mm.20904  | NM_019922    | Crtap   | Cartilage associated protein                           |
| B10      | Mm.272085 | NM_007802    | Ctsk    | Cathepsin K                                            |
| B11      | Mm.1262   | NM_007809    | Cyp17a1 | Cytochrome P450, family 17, subfamily a, polypeptide 1 |
| B12      | Mm.5199   | NM_007810    | Cyp19a1 | Cytochrome P450, family 19, subfamily a, polypeptide 1 |
| C01      | Mm.378235 | NM_016974    | Dbp     | D site albumin promoter binding protein                |
| C02      | Mm.214717 | NM_010051    | Dkk1    | Dickkopf homolog 1 (Xenopus laevis)                    |
| C03      | Mm.27254  | NM_008813    | Enpp1   | Ectonucleotide pyrophosphatase/phosphodiesterase 1     |
| C04      | Mm.9213   | NM_007956    | Esr1    | Estrogen receptor 1 (alpha)                            |
| C05      | Mm.2561   | NM_010157    | Esr2    | Estrogen receptor 2 (beta)                             |
| C06      | Mm.386776 | NM_007953    | Esrra   | Estrogen related receptor, alpha                       |
| C07      | Mm.265716 | NM_010206    | Fgfr1   | Fibroblast growth factor receptor 1                    |
| C08      | Mm.16340  | NM_010207    | Fgfr2   | Fibroblast growth factor receptor 2                    |
| C09      | Mm.389327 | NM_010285    | Ghrh    | Growth hormone releasing hormone                       |
| C10      | Mm.28328  | NM_008288    | Hsd11b1 | Hydroxysteroid 11-beta dehydrogenase 1                 |
| C11      | Mm.268521 | NM_010512    | Igf1    | Insulin-like growth factor 1                           |
| C12      | Mm.141936 | NM_008342    | Igfbp2  | Insulin-like growth factor binding protein 2           |
| D01      | Mm.4392   | NM_008357    | Il15    | Interleukin 15                                         |
| D02      | Mm.1019   | NM_031168    | Il6     | Interleukin 6                                          |
| D03      | Mm.2856   | NM_010559    | Il6ra   | Interleukin 6 receptor, alpha                          |
| D04      | Mm.482186 | NM_001033228 | Itga1   | Integrin alpha 1                                       |
| D05      | Mm.87150  | NM_016780    | Itgb3   | Integrin beta 3                                        |
| D06      | Mm.277072 | NM_008493    | Lep     | Leptin                                                 |
| D07      | Mm.27961  | NM_019782    | Lepre1  | Leprecan 1                                             |
| D08      | Mm.271854 | NM_008512    | Lrp1    | Low density lipoprotein receptor-related protein 1     |
| D09      | Mm.274581 | NM_008513    | Lrp5    | Low density lipoprotein receptor-related protein 5     |

| Position | UniGene   | GenBank   | Symbol    | Description                                                               |
|----------|-----------|-----------|-----------|---------------------------------------------------------------------------|
| D10      | Mm.321990 | NM_008514 | Lrp6      | Low density lipoprotein receptor-related protein 6                        |
| D11      | Mm.87787  | NM_010735 | Lta       | Lymphotoxin A                                                             |
| D12      | Mm.3900   | NM_013589 | Ltbp2     | Latent transforming growth factor beta binding protein 2                  |
| E01      | Mm.389466 | NM_011839 | Mab21l2   | Mab-21-like 2 (C. elegans)                                                |
| E02      | Mm.29564  | NM_008610 | Mmp2      | Matrix metalloproteinase 2                                                |
| E03      | Mm.3514   | NM_010834 | Mstn      | Myostatin                                                                 |
| E04      | Mm.89959  | NM_010840 | Mthfr     | 5,10-methylenetetrahydrofolate reductase                                  |
| E05      | Mm.329560 | NM_016791 | Nfatc1    | Nuclear factor of activated T-cells, cytoplasmic, calcineurin-dependent 1 |
| E06      | Mm.135266 | NM_008711 | Nog       | Noggin                                                                    |
| E07      | Mm.258415 | NM_008713 | Nos3      | Nitric oxide synthase 3, endothelial cell                                 |
| E08      | Mm.154796 | NM_023456 | Npy       | Neuropeptide Y                                                            |
| E09      | Mm.129481 | NM_008173 | Nr3c1     | Nuclear receptor subfamily 3, group C, member 1                           |
| E10      | Mm.42026  | NM_011027 | P2rx7     | Purinergic receptor P2X, ligand-gated ion channel, 7                      |
| E11      | Mm.79983  | NM_011961 | Plod2     | Procollagen lysine, 2-oxoglutarate 5-dioxygenase 2                        |
| E12      | Mm.1270   | NM_011164 | Prl       | Prolactin                                                                 |
| F01      | Mm.284168 | NM_020623 | Pth       | Parathyroid hormone                                                       |
| F02      | Mm.3542   | NM_011199 | Pth1r     | Parathyroid hormone 1 receptor                                            |
| F03      | Mm.28440  | NM_008970 | Pthlh     | Parathyroid hormone-like peptide                                          |
| F04      | Mm.391013 | NM_009820 | Runx2     | Runt related transcription factor 2                                       |
| F05      | Mm.281691 | NM_013834 | Sfrp1     | Secreted frizzled-related protein 1                                       |
| F06      | Mm.42095  | NM_016687 | Sfrp4     | Secreted frizzled-related protein 4                                       |
| F07      | Mm.1431   | NM_011367 | Shbg      | Sex hormone binding globulin                                              |
| F08      | Mm.265602 | NM_024449 | Sost      | Sclerostin                                                                |
| F09      | Mm.291442 | NM_009242 | Sparc     | Secreted acidic cysteine rich glycoprotein                                |
| F10      | Mm.288474 | NM_009263 | Spp1      | Secreted phosphoprotein 1                                                 |
| F11      | Mm.277406 | NM_009283 | Stat1     | Signal transducer and activator of transcription 1                        |
| F12      | Mm.248380 | NM_011577 | Tgfb1     | Transforming growth factor, beta 1                                        |
| G01      | Mm.206505 | NM_011594 | Timp2     | Tissue inhibitor of metalloproteinase 2                                   |
| G02      | Mm.116683 | NM_009397 | Tnfaip3   | Tumor necrosis factor, alpha-induced protein 3                            |
| G03      | Mm.6251   | NM_009399 | Tnfrsf11a | Tumor necrosis factor receptor superfamily, member 11a                    |
| G04      | Mm.15383  | NM_008764 | Tnfrsf11b | Tumor necrosis factor receptor superfamily, member 11b (osteoprotegerin)  |
| G05      | Mm.235328 | NM_011610 | Tnfrsf1b  | Tumor necrosis factor receptor superfamily, member 1b                     |
| G06      | Mm.249221 | NM_011613 | Tnfsf11   | Tumor necrosis factor (ligand) superfamily, member 11                     |
| G07      | Mm.173847 | NM_011648 | Tshr      | Thyroid stimulating hormone receptor                                      |
| G08      | Mm.3280   | NM_011658 | Twist1    | Twist homolog 1 (Drosophila)                                              |
| G09      | Mm.245084 | NM_009504 | Vdr       | Vitamin D receptor                                                        |
| G10      | Mm.282184 | NM_009505 | Vegfa     | Vascular endothelial growth factor A                                      |
| G11      | Mm.4709   | NM_011718 | Wnt10b    | Wingless related MMTV integration site 10b                                |
| G12      | Mm.1367   | NM_009522 | Wnt3a     | Wingless-related MMTV integration site 3A                                 |
| H01      | Mm.328431 | NM_007393 | Actb      | Actin, beta                                                               |
| H02      | Mm.163    | NM_009735 | B2m       | Beta-2 microglobulin                                                      |
| H03      | Mm.343110 | NM_008084 | Gapdh     | Glyceraldehyde-3-phosphate dehydrogenase                                  |
| H04      | Mm.3317   | NM_010368 | Gusb      | Glucuronidase, beta                                                       |
| H05      | Mm.2180   | NM_008302 | Hsp90ab1  | Heat shock protein 90 alpha (cytosolic), class B member 1                 |
| H06      | N/A       | SA_00106  | MGDC      | Mouse 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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