

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

## Human Retinoic Acid Signaling

Cat. no. 330231 PAHS-180Z

For pathway expression analysis

Format	For use with the following real-time cyclers
RT <sup>2</sup> Profiler PCR Array, Format A	Applied Biosystems <sup>®</sup> models 5700, 7000, 7300, 7500, 7700, 7900HT, ViiA™ 7 (96-well block); Bio-Rad <sup>®</sup> models iCycler <sup>®</sup> , iQ™ 5, MyiQ™, MyiQ2; Bio-Rad/MJ Research Chromo4™; Eppendorf <sup>®</sup> Mastercycler <sup>®</sup> ep realplex models 2, 2s, 4, 4s; Stratagene <sup>®</sup> models Mx3005P <sup>®</sup> , Mx3000P <sup>®</sup> ; 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 <sup>®</sup> , DNA Engine Opticon 2; Stratagene Mx4000 <sup>®</sup>
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 <sup>®</sup> LightCycler <sup>®</sup> 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 <sup>®</sup> BioMark™



Sample & Assay Technologies

## Description

The Human Retinoic Acid Pathway RT<sup>2</sup> Profiler PCR Array profiles the expression of 84 key genes involved in retinoic acid signaling. Retinoic acid (RA) is the primary functional derivative of vitamin A (retinol) and its activity is implicated in many aspects of vertebrate development and homeostasis, while disruptions in this pathway cause developmental abnormalities and disrupt function in adipose, cardiac, nervous, reproductive, and integumentary tissues, among others. RA acts primarily by binding a family of nuclear receptors (the retinoic acid receptors alpha, beta, and gamma) that then heterodimerize with their partners (the retinoid X receptors alpha, beta, and gamma) and alter transcription. Additionally, recent evidence suggests that an alternative receptor (PPAR delta) also responds to RA signaling in some tissues and that retinol, and RA may also induce non-genomic cellular effects. Thus, the effect of RA depends on the expression of its cognate receptors, enzymes responsible for converting retinol to RA, metabolic enzymes that reduce RA levels, and transport proteins, some of which act as signal transducers that appear to influence the distribution of RA and its metabolic precursors. This array includes genes encoding the known receptors and proteins responsible for synthesis, transport and metabolism of RA and its precursors, as well as downstream targets of RA signaling. Using real-time PCR, research studies can easily and reliably analyze the expression of a focused panel of genes involved in retinoic acid signaling 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  $-20^{\circ}\text{C}$ .

**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>	ADH1A	ALDH1A1	ALDH1A2	ALDH1A3	APOA2	ASCL1	BHLHE40	BMP2	CD38	CDX1	CHD7	CRABP1
<b>B</b>	CRABP2	CYP1B1	CYP26A1	CYP26B1	CYP26C1	DCX	DHRS3	DHRS9	DLX5	EFNB1	EGR1	EPO
<b>C</b>	FABP5	FGF8	FOXA1	FOXP1	GATA4	GBX2	GLI1	HNF1B	HOXA1	HOXA5	HOXB1	HOXB4
<b>D</b>	HSD17B2	ISL1	JAG1	KLF4	LEFTY1	LHX1	LRAT	MAFB	MEIS2	MSX2	MYC	NANOG
<b>E</b>	NEUROD1	NRIP1	OLIG2	OTX2	PAX6	PITX2	PLAT	PPARA	PPARD	PPARG	RARA	RARB
<b>F</b>	RARG	RARRES3	RBP1	RBP2	RBP4	RDH10	RET	RXRA	RXRB	RXRG	SHH	SOX2
<b>G</b>	SOX9	SREBF1	STRA6	STRA8	TBX1	TFAP2C	TGF2	TGM2	TUBB3	UCP1	WNT5A	WNT8A
<b>H</b>	ACTB	B2M	GAPDH	HPRT1	RPLP0	HGDC	RTC	RTC	RTC	PPC	PPC	PPC

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

Position	UniGene	GenBank	Symbol	Description
A01	Hs.654433	NM_000667	ADH1A	Alcohol dehydrogenase 1A (class I), alpha polypeptide
A02	Hs.76392	NM_000689	ALDH1A1	Aldehyde dehydrogenase 1 family, member A1
A03	Hs.643455	NM_003888	ALDH1A2	Aldehyde dehydrogenase 1 family, member A2
A04	Hs.459538	NM_000693	ALDH1A3	Aldehyde dehydrogenase 1 family, member A3
A05	Hs.237658	NM_001643	APOA2	Apolipoprotein A-II
A06	Hs.703025	NM_004316	ASCL1	Achaete-scute complex homolog 1 (Drosophila)
A07	Hs.744856	NM_003670	BHLHE40	Basic helix-loop-helix family, member e40
A08	Hs.73853	NM_001200	BMP2	Bone morphogenetic protein 2
A09	Hs.479214	NM_001775	CD38	CD38 molecule
A10	Hs.1545	NM_001804	CDX1	Caudal type homeobox 1
A11	Hs.733236	NM_017780	CHD7	Chromodomain helicase DNA binding protein 7
A12	Hs.346950	NM_004378	CRABP1	Cellular retinoic acid binding protein 1
B01	Hs.405662	NM_001878	CRABP2	Cellular retinoic acid binding protein 2
B02	Hs.154654	NM_000104	CYP1B1	Cytochrome P450, family 1, subfamily B, polypeptide 1
B03	Hs.150595	NM_000783	CYP26A1	Cytochrome P450, family 26, subfamily A, polypeptide 1
B04	Hs.91546	NM_019885	CYP26B1	Cytochrome P450, family 26, subfamily B, polypeptide 1
B05	Hs.369993	NM_183374	CYP26C1	Cytochrome P450, family 26, subfamily C, polypeptide 1
B06	Hs.34780	NM_178153	DCX	Doublecortin
B07	Hs.289347	NM_004753	DHRS3	Dehydrogenase/reductase (SDR family) member 3
B08	Hs.179608	NM_005771	DHRS9	Dehydrogenase/reductase (SDR family) member 9
B09	Hs.99348	NM_005221	DLX5	Distal-less homeobox 5
B10	Hs.144700	NM_004429	EFNB1	Ephrin-B1
B11	Hs.708393	NM_001964	EGR1	Early growth response 1
B12	Hs.2303	NM_000799	EPO	Erythropoietin
C01	Hs.408061	NM_001444	FABP5	Fatty acid binding protein 5 (psoriasis-associated)
C02	Hs.57710	NM_006119	FGF8	Fibroblast growth factor 8 (androgen-induced)
C03	Hs.163484	NM_004496	FOXA1	Forkhead box A1
C04	Hs.741222	NM_005249	FOXP1	Forkhead box G1
C05	Hs.243987	NM_002052	GATA4	GATA binding protein 4
C06	Hs.184945	NM_001485	GBX2	Gastrulation brain homeobox 2
C07	Hs.632702	NM_005269	GLI1	GLI family zinc finger 1
C08	Hs.191144	NM_000458	HNF1B	HNF1 homeobox B
C09	Hs.67397	NM_005522	HOXA1	Homeobox A1
C10	Hs.655218	NM_019102	HOXA5	Homeobox A5
C11	Hs.99992	NM_002144	HOXB1	Homeobox B1
C12	Hs.664706	NM_024015	HOXB4	Homeobox B4
D01	Hs.162795	NM_002153	HSD17B2	Hydroxysteroid (17-beta) dehydrogenase 2
D02	Hs.505	NM_002202	ISL1	ISL LIM homeobox 1
D03	Hs.626544	NM_000214	JAG1	Jagged 1
D04	Hs.376206	NM_004235	KLF4	Kruppel-like factor 4 (gut)
D05	Hs.656214	NM_020997	LEFTY1	Left-right determination factor 1
D06	Hs.443727	NM_005568	LHX1	LIM homeobox 1
D07	Hs.658427	NM_004744	LRAT	Lecithin retinol acyltransferase (phosphatidylcholine--retinol O-acyltransferase)
D08	Hs.169487	NM_005461	MAFB	V-maf musculoaponeurotic fibrosarcoma oncogene homolog B (avian)
D09	Hs.510989	NM_172316	MEIS2	Meis homeobox 2

Position	UniGene	GenBank	Symbol	Description
D10	Hs.89404	NM_002449	MSX2	Msh homeobox 2
D11	Hs.202453	NM_002467	MYC	V-myc myelocytomatosis viral oncogene homolog (avian)
D12	Hs.635882	NM_024865	NANOG	Nanog homeobox
E01	Hs.709709	NM_002500	NEUROD1	Neurogenic differentiation 1
E02	Hs.155017	NM_003489	NR1P1	Nuclear receptor interacting protein 1
E03	Hs.732068	NM_005806	OLIG2	Oligodendrocyte lineage transcription factor 2
E04	Hs.741558	NM_021728	OTX2	Orthodenticle homeobox 2
E05	Hs.611376	NM_000280	PAX6	Paired box 6
E06	Hs.738484	NM_000325	PITX2	Paired-like homeodomain 2
E07	Hs.491582	NM_000930	PLAT	Plasminogen activator, tissue
E08	Hs.592209	NM_005036	PPARA	Peroxisome proliferator-activated receptor alpha
E09	Hs.696032	NM_006238	PPARD	Peroxisome proliferator-activated receptor delta
E10	Hs.162646	NM_015869	PPARG	Peroxisome proliferator-activated receptor gamma
E11	Hs.654583	NM_000964	RARA	Retinoic acid receptor, alpha
E12	Hs.733004	NM_000965	RARB	Retinoic acid receptor, beta
F01	Hs.733399	NM_000966	RARG	Retinoic acid receptor, gamma
F02	Hs.17466	NM_004585	RARRES3	Retinoic acid receptor responder (tazarotene induced) 3
F03	Hs.529571	NM_002899	RBP1	Retinol binding protein 1, cellular
F04	Hs.655516	NM_004164	RBP2	Retinol binding protein 2, cellular
F05	Hs.50223	NM_006744	RBP4	Retinol binding protein 4, plasma
F06	Hs.244940	NM_172037	RDH10	Retinol dehydrogenase 10 (all-trans)
F07	Hs.350321	NM_020630	RET	Ret proto-oncogene
F08	Hs.590886	NM_002957	RXRA	Retinoid X receptor, alpha
F09	Hs.388034	NM_021976	RXRB	Retinoid X receptor, beta
F10	Hs.26550	NM_006917	RXRG	Retinoid X receptor, gamma
F11	Hs.164537	NM_000193	SHH	Sonic hedgehog
F12	Hs.732963	NM_003106	SOX2	SRY (sex determining region Y)-box 2
G01	Hs.647409	NM_000346	SOX9	SRY (sex determining region Y)-box 9
G02	Hs.733635	NM_004176	SREBF1	Sterol regulatory element binding transcription factor 1
G03	Hs.24553	NM_022369	STRA6	Stimulated by retinoic acid gene 6 homolog (mouse)
G04	Hs.592279	NM_182489	STRA8	Stimulated by retinoic acid gene 8 homolog (mouse)
G05	Hs.173984	NM_005992	TBX1	T-box 1
G06	Hs.473152	NM_003222	TFAP2C	Transcription factor AP-2 gamma (activating enhancer binding protein 2 gamma)
G07	Hs.133379	NM_003238	TGFB2	Transforming growth factor, beta 2
G08	Hs.517033	NM_004613	TGM2	Transglutaminase 2 (C polypeptide, protein-glutamine-gamma-glutamyltransferase)
G09	Hs.511743	NM_006086	TUBB3	Tubulin, beta 3
G10	Hs.249211	NM_021833	UCP1	Uncoupling protein 1 (mitochondrial, proton carrier)
G11	Hs.643085	NM_003392	WNT5A	Wingless-type MMTV integration site family, member 5A
G12	Hs.591274	NM_058244	WNT8A	Wingless-type MMTV integration site family, member 8A
H01	Hs.520640	NM_001101	ACTB	Actin, beta
H02	Hs.534255	NM_004048	B2M	Beta-2-microglobulin
H03	Hs.544577	NM_002046	GAPDH	Glyceraldehyde-3-phosphate dehydrogenase
H04	Hs.412707	NM_000194	HPRT1	Hypoxanthine phosphoribosyltransferase 1
H05	Hs.546285	NM_001002	RPLP0	Ribosomal protein, large, P0
H06	N/A	SA_00105	HGDC	Human 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™ 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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