

# RT<sup>2</sup> Profiler™ PCR Array:

## Human Hematopoietic Stem Cells and Hematopoiesis

### Catalog Number

PAHS-054A

PAHS-054C

PAHS-054D

PAHS-054E

PAHS-054F

PAHS-054G

### For Real-Time Instruments:

ABI Standard Blocks; Bio-Rad iCycler, MyiQ, and (MJ Research) Chromo 4; and Stratagene Mx3005p, Mx3000p

ABI 7500 and 7900HT FAST 96-Well Blocks, ABI StepOnePlus

Bio-Rad (MJ Research) Opticon and Opticon 2, Stratagene Mx4000

ABI 7900HT 384-Well Block

Roche LightCycler 480 96-well Blocks

Roche LightCycler 480 384-well Blocks

### Description

The Human Hematopoietic Stem Cells and Hematopoiesis RT<sup>2</sup> Profiler™ PCR Array profiles the expression of 84 genes related to the development of blood-cell lineages from HSCs through progenitor stem cells. Blood cell lineage-specific molecular markers are represented on this array. The cytokines, signaling molecules, and other regulators that are important in stem cell commitment and differentiation are included as well. Using real-time PCR, you can easily and reliably analyze expression of a focused panel of genes related to hematopoietic stem cells and hematopoiesis with this array.

### Functional Gene Groupings

**Cell Surface / Cell Lineage Markers:** CCR1, CD164, CD1D, CD2, CD34, CD3D, CD3G, CD4, CD44, CD80, CD86, CD8A, CSF1, DLL1, FLT3LG, FUT10, FZD1, GALNAC4S-6ST, IL31RA, IL6ST, JAG1, JAG2, KDR, KIT, KITLG, LRMP, MAL, NOTCH2, NOTCH4, PECAM1, PTPRC, SFXN1, STIM2, TEK, TLR3, TLR4, CD27 (TNFRSF7), TNFSF11.

#### **Cytokines and Growth Factors:**

Cytokines: CSF1, CSF2, FLT3LG, IL10, IL11, IL12B, IL25 (IL17E), IL1A, IL2, IL20, INHA, INHBA, PF4, SPP1, TNFSF11.

Growth Factors: CSF1, CSF2, IL10, IL11, IL1A, IL2, INHA, INHBA, JAG1, JAG2, KITLG, SPP1, VEGF.

#### **Cell Cycle Regulators:**

Cell Cycle Arrest: INHA, INHBA, NOTCH2.

Other Regulators of the Cell Cycle: APC, HDAC4, HDAC5, HDAC7A, HDAC9, IL1A, JAG2, STAT1, VEGF.

#### **Blood Cell Activation:**

B-cell Activation: HDAC4, HDAC5, HDAC7A, HDAC9.

T-cell Activation: CD2, CD3D, CD3G, CD80, CD86, CD8A.

Genes Activating Other Blood Cell Types: CD2, IL11, IL12B, IL2, IL31RA, PF4, TLR4.

#### **Cell Differentiation:**

B-cell Differentiation: BLNK, GALNAC4S-6ST, HDAC4, HDAC5, HDAC7A, HDAC9, IL10, IL11, INHA, INHBA, TNFRSF7.

T-cell Differentiation: CD2, CD4, CD80, CD86, IL12B, IL2, JAG2, NOS2A, SOCS5, CD27 (TNFRSF7).

Differentiation Regulators for Other Blood Cell Types: ANGPT1, CD3G, CSF1, DLL1, IL11, IL20, IL31RA, INHA, INHBA, JAG1, MAL, MAP4K1, NCOA6, NOTCH1, NOTCH2, NOTCH4, PAX5, PF4, SPP1, TAL1, TLR3, TLR4, TNFSF11.

**Hematopoiesis Regulators:** ASH2L, CD164, CSF1, DLL1, FUT10, IL10, IL20, IL31RA, JAG1, LMO2, MMP9, NOTCH2, NOTCH4, STIM2, TRIM10.

## Product Specification Sheet

### **Signaling Molecules:**

Notch Signaling Pathway: DLL1, JAG1, JAG2, NOTCH2, NOTCH4.

Wnt Receptor Signaling Pathway: APC, FZD1, LEF1, WNT3A.

JAK / STAT Cascade: IL31RA, SOCS5, STAT1, STAT3.

Cell Surface Receptors Linked to Signal Transduction: CCR1, CD14, CD2, CD3D, CD3G, CD4, CSF2, FZD1, IL6ST, INHA, INHBA, PTPRC, TNFRSF7.

**Transcription Factors and Regulators:** ASH2L, CBFB, CD80, CD86, CEBPE, CEBPG, ETS1, ETV6, GATA1, GATA2, HDAC4, HDAC5, HDAC7A, HDAC9, IL31RA, LEF1, NCOA6, NOTCH1, NOTCH2, NOTCH4, PAX5, RBPSUH, RUNX1, STAT1, STAT3, TAL1, VAV1.

### **Storage Conditions**

**Please check the kit components immediately after you receive this package. We are only responsible for missing items reported within two (2) business days of receipt.**

**Storage Conditions:** PCR Arrays are shipped at ambient temperature. Keep plates at -20 °C for long-term storage.

**NOTE:** Be sure that you have the correct PCR Array format for your instrument before starting the experiment.

### **References**

1. Maillard I, Adler SH, Pear WS. Notch and the immune system. *Immunity*. 2003 Dec; **19**(6): 781-91.
2. Ohishi K, Katayama N, Shiku H, Varnum-Finney B, Bernstein ID. Notch signalling in hematopoiesis. *Semin Cell Dev Biol*. 2003 Apr; **14**(2): 143-50.
3. Martin-Rendon E, Watt SM. Stem cell plasticity. *Br J Haematol*. 2003 Sep; **122**(6): 877-91.
4. Nakano T. Hematopoietic stem cells: generation and manipulation. *Trends Immunol*. 2003 Nov; **24**(11): 589-94.
5. Reya T. Regulation of hematopoietic stem cell self-renewal. *Recent Prog Horm Res*. 2003; **58**:283-95.
6. Douagi I, Vieira P, Cumano A. Lymphocyte commitment during embryonic development, in the mouse. *Semin Immunol*. 2002 Dec; **14**(6): 361-9.
7. Payne KJ, Crooks GM. Human hematopoietic lineage commitment. *Immunol Rev*. 2002 Sep; **187**: 48-64.
8. Barreda DR, Belosevic M. Transcriptional regulation of hemopoiesis. *Dev Comp Immunol*. 2001 Oct-Dec; **25**(8-9): 763-89.

## Product Specification Sheet

### Array Layout: Human Hematopoietic Stem Cells and Hematopoiesis PCR Array

	1	2	3	4	5	6	7	8	9	10	11	12
A	ANGPT1	APC	ASH2L	BLNK	CBFB	CCR1	CD14	CD164	CD1D	CD2	CD27	CD34
B	CD3D	CD3G	CD4	CD44	CD80	CD86	CD8A	CEBPE	CEBPG	CSF1	CSF2	DLL1
C	ETS1	ETV6	FLT3LG	FUT10	FZD1	GALNAC4S-6ST	GATA1	GATA2	HDAC4	HDAC5	HDAC7A	HDAC9
D	IL10	IL11	IL12B	IL1A	IL2	IL20	IL25	IL31RA	IL6ST	INH A	INHBA	JAG1
E	JAG2	KDR	KIT	KITLG	LEF1	LMO2	LRMP	MAL	MAP4K1	MMP9	NCOA6	NOS2A
F	NOTCH1	NOTCH2	NOTCH4	PAX5	PECAM1	PF4	PTPRC	RBPJ	RUNX1	SFXN1	SOCS5	SPP1
G	STAT1	STAT3	STIM2	TAL1	TEK	TLR3	TLR4	TNFSF11	TRIM10	VAV1	VEGFA	WNT3A
H	B2M	HPRT1	RPL13A	GAPDH	ACTB	HGDC	RTC	RTC	RTC	PPC	PPC	PPC

### Gene Table

Position	UniGene	GenBank	Symbol	Description
A01	Hs.369675	NM_001146	ANGPT1	Angiotensin 1
A02	Hs.158932	NM_000038	APC	Adenomatous polyposis coli
A03	Hs.521530	NM_004674	ASH2L	Ash2 (absent, small, or homeotic)-like (Drosophila)
A04	Hs.444049	NM_013314	BLNK	B-cell linker
A05	Hs.460988	NM_001755	CBFB	Core-binding factor, beta subunit
A06	Hs.301921	NM_001295	CCR1	Chemokine (C-C motif) receptor 1
A07	Hs.163867	NM_000591	CD14	CD14 molecule
A08	Hs.520313	NM_006016	CD164	CD164 molecule, sialomucin
A09	Hs.1799	NM_001766	CD1D	CD1d molecule
A10	Hs.523500	NM_001767	CD2	CD2 molecule
A11	Hs.355307	NM_001242	CD27	CD27 molecule
A12	Hs.374990	NM_001773	CD34	CD34 molecule
B01	Hs.504048	NM_000732	CD3D	CD3d molecule, delta (CD3-TCR complex)
B02	Hs.2259	NM_000073	CD3G	CD3g molecule, gamma (CD3-TCR complex)
B03	Hs.631659	NM_000616	CD4	CD4 molecule
B04	Hs.502328	NM_000610	CD44	CD44 molecule (Indian blood group)
B05	Hs.838	NM_005191	CD80	CD80 molecule
B06	Hs.171182	NM_006889	CD86	CD86 molecule
B07	Hs.85258	NM_001768	CD8A	CD8a molecule
B08	Hs.558308	NM_001805	CEBPE	CCAAT/enhancer binding protein (C/EBP), epsilon
B09	Hs.429666	NM_001806	CEBPG	CCAAT/enhancer binding protein (C/EBP), gamma
B10	Hs.591402	NM_000757	CSF1	Colony stimulating factor 1 (macrophage)
B11	Hs.1349	NM_000758	CSF2	Colony stimulating factor 2 (granulocyte-macrophage)
B12	Hs.379912	NM_005618	DLL1	Delta-like 1 (Drosophila)
C01	Hs.369438	NM_005238	ETS1	V-ets erythroblastosis virus E26 oncogene homolog 1 (avian)
C02	Hs.504765	NM_001987	ETV6	Ets variant gene 6 (TEL oncogene)
C03	Hs.428	NM_001459	FLT3LG	Fms-related tyrosine kinase 3 ligand
C04	Hs.458713	NM_032664	FUT10	Fucosyltransferase 10 (alpha (1,3) fucosyltransferase)
C05	Hs.94234	NM_003505	FZD1	Frizzled homolog 1 (Drosophila)
C06	Hs.287537	NM_015892	GALNAC4S-6ST	B cell RAG associated protein
C07	Hs.765	NM_002049	GATA1	GATA binding protein 1 (globin transcription factor 1)
C08	Hs.367725	NM_032638	GATA2	GATA binding protein 2
C09	Hs.20516	NM_006037	HDAC4	Histone deacetylase 4
C10	Hs.438782	NM_005474	HDAC5	Histone deacetylase 5
C11	Hs.200063	NM_016596	HDAC7A	Histone deacetylase 7A
C12	Hs.196054	NM_178425	HDAC9	Histone deacetylase 9
D01	Hs.193717	NM_000572	IL10	Interleukin 10
D02	Hs.467304	NM_000641	IL11	Interleukin 11
D03	Hs.674	NM_002187	IL12B	Interleukin 12B (natural killer cell stimulatory factor 2, cytotoxic lymphocyte maturation factor 2, p40)
D04	Hs.1722	NM_000575	IL1A	Interleukin 1, alpha
D05	Hs.89679	NM_000586	IL2	Interleukin 2
D06	Hs.272373	NM_018724	IL20	Interleukin 20
D07	Hs.302036	NM_022789	IL25	Interleukin 25
D08	Hs.55378	NM_139017	IL31RA	Interleukin 31 receptor A
D09	Hs.532082	NM_002184	IL6ST	Interleukin 6 signal transducer (gp130, oncostatin M receptor)
D10	Hs.407506	NM_002191	INH A	Inhibin, alpha
D11	Hs.583348	NM_002192	INHBA	Inhibin, beta A (activin A, activin AB alpha polypeptide)
D12	Hs.224012	NM_000214	JAG1	Jagged 1 (Alagille syndrome)
E01	Hs.433445	NM_002226	JAG2	Jagged 2
E02	Hs.479756	NM_002253	KDR	Kinase insert domain receptor (a type III receptor tyrosine kinase)
E03	Hs.479754	NM_000222	KIT	V-kit Hardy-Zuckerman 4 feline sarcoma viral oncogene homolog

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Position	UniGene	GenBank	Symbol	Description
E04	Hs.1048	NM_003994	KITLG	KIT ligand
E05	Hs.555947	NM_016269	LEF1	Lymphoid enhancer-binding factor 1
E06	Hs.34560	NM_005574	LMO2	LIM domain only 2 (rhombotin-like 1)
E07	Hs.124922	NM_006152	LRMP	Lymphoid-restricted membrane protein
E08	Hs.80395	NM_002371	MAL	Mal, T-cell differentiation protein
E09	Hs.95424	NM_007181	MAP4K1	Mitogen-activated protein kinase kinase kinase kinase 1
E10	Hs.297413	NM_004994	MMP9	Matrix metalloproteinase 9 (gelatinase B, 92kDa gelatinase, 92kDa type IV collagenase)
E11	Hs.368971	NM_014071	NCOA6	Nuclear receptor coactivator 6
E12	Hs.462525	NM_000625	NOS2A	Nitric oxide synthase 2A (inducible, hepatocytes)
F01	Hs.495473	NM_017617	NOTCH1	Notch homolog 1, translocation-associated (Drosophila)
F02	Hs.487360	NM_024408	NOTCH2	Notch homolog 2 (Drosophila)
F03	Hs.436100	NM_004557	NOTCH4	Notch homolog 4 (Drosophila)
F04	Hs.591091	NM_016734	PAX5	Paired box gene 5 (B-cell lineage specific activator)
F05	Hs.514412	NM_000442	PECAM1	Platelet/endothelial cell adhesion molecule (CD31 antigen)
F06	Hs.81564	NM_002619	PF4	Platelet factor 4 (chemokine (C-X-C motif) ligand 4)
F07	Hs.192039	NM_002838	PTPRC	Protein tyrosine phosphatase, receptor type, C
F08	Hs.479396	NM_005349	RBPJ	Recombination signal binding protein for immunoglobulin kappa J region
F09	Hs.149261	NM_001754	RUNX1	Runt-related transcription factor 1 (acute myeloid leukemia 1; aml1 oncogene)
F10	Hs.369440	NM_022754	SFXN1	Sideroflexin 1
F11	Hs.468426	NM_144949	SOCS5	Suppressor of cytokine signaling 5
F12	Hs.313	NM_000582	SPP1	Secreted phosphoprotein 1 (osteopontin, bone sialoprotein I, early T-lymphocyte activation 1)
G01	Hs.642990	NM_007315	STAT1	Signal transducer and activator of transcription 1, 91kDa
G02	Hs.463059	NM_003150	STAT3	Signal transducer and activator of transcription 3 (acute-phase response factor)
G03	Hs.135763	NM_020860	STIM2	Stromal interaction molecule 2
G04	Hs.73828	NM_003189	TAL1	T-cell acute lymphocytic leukemia 1
G05	Hs.89640	NM_000459	TEK	TEK tyrosine kinase, endothelial (venous malformations, multiple cutaneous and mucosal)
G06	Hs.543332	NM_003265	TLR3	Toll-like receptor 3
G07	Hs.174312	NM_138554	TLR4	Toll-like receptor 4
G08	Hs.333791	NM_003701	TNFSF11	Tumor necrosis factor (ligand) superfamily, member 11
G09	Hs.274295	NM_006778	TRIM10	Tripartite motif-containing 10
G10	Hs.116237	NM_005428	VAV1	Vav 1 oncogene
G11	Hs.73793	NM_003376	VEGFA	Vascular endothelial growth factor A
G12	Hs.336930	NM_033131	WNT3A	Wingless-type MMTV integration site family, member 3A
H01	Hs.534255	NM_004048	B2M	Beta-2-microglobulin
H02	Hs.412707	NM_000194	HPRT1	Hypoxanthine phosphoribosyltransferase 1 (Lesch-Nyhan syndrome)
H03	Hs.546356	NM_012423	RPL13A	Ribosomal protein L13a
H04	Hs.544577	NM_002046	GAPDH	Glyceraldehyde-3-phosphate dehydrogenase
H05	Hs.520640	NM_001101	ACTB	Actin, beta
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