

RT² Profiler™ PCR Array:

Human cAMP / Ca²⁺ Signaling Pathway PathwayFinder™

Catalog Number

PAHS-066A

PAHS-066C

PAHS-066D

PAHS-066E

PAHS-066F

PAHS-066G

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 Block

Roche LightCycler 480 384-well Block

Description

The Human cAMP/Ca²⁺ PathwayFinder RT² Profiler PCR Array contains 84 target genes that are responsive to cAMP or calcium ion (Ca²⁺). This array contains genes whose promoters contain SRE or SRE-like enhancer sequences, the CRE enhancer sequence, and other Ca²⁺ responsive elements. Using real-time PCR, you can easily and reliably analyze expression of a focused panel of genes involved in cAMP/Ca²⁺ signaling with this array.

Functional Gene Groupings

Genes whose promoters contain SRE or SRE-like enhancer sequences: CNN1 (calponin), CYR61, EGR1, EGR2, FOS, FOSB, HSPA4 (hsp70), JUNB, NR4A2 (Nur77), S100A6 (Calcyclin), SCG2 (secretogranin II), SRF, THBS1 (TSP-1), VCL.

Genes whose promoters contain the CRE enhancer sequence:

Neuropeptides / Neurotransmitters: ADRB1 (b1 adrenergic receptor), CGA (Chorionic gonadotropin A), CHGA (Chromogranin), GCG (Glucagon), GIPR, INHBA (Inhibin A), KCNA5 (KV1.5), NOS2A (Inducible nitric oxide synthase), PENK (Enkephalin), PRL, S100A12 (CGRP), S100G, SCG2, SLC18A1 (Vesicular monoamine transporter), SST (Somatostatin), SSTR2 (Somatostatin receptor 2), TACR1 (Substance P receptor), TH (Tyrosine hydroxylase), VIP.

Cell Cycle / Cell Survival / DNA Repair: BCL2, BRCA1, CCNA1 (CyclinA), CCND1 (CyclinD1), CDK5, CDKN2B (p15IND4b), GEM, NF1, PCNA, PMAIP1 (NoxA), PPP1R15A (GADD34), RB1.

Growth Factor: AREG (Amphiregulin), BDNF, CTF1 (Cardiotrophin), FGF6, TGFB3, TNF.

Signaling: DUSP1 (Ptpn16), HSPA5 (Grp78), PLN (Phospholamban), PPP2CA (Protein phosphatase 2A alpha), PRKAR1A (Protein kinase A regulatory subunit), SGK.

Transcription: ATF3, CREB1, CREM, EGR1, EGR2, FOS, JUND, MAF, NR4A2 (Nur77), PER1, POU1F1 (Pit-1), POU2AF1 (OCA-B), STAT3.

Metabolism: AHR, AMD1, ENO2, HK2, LDHA, PCK2, SOD2.

Immune Regulation: IL2, IL6, MIF, PTGS2 (Cox-2).

Genes whose promoters contain other Ca²⁺ responsive elements: ACTB (b-actin), CALB1 (calbindin 1), CALB2 (calbindin 2), CALM1 (Calmodulin 1), CALR (Calreticulin), DDIT3 (GADD153), NCAM1, NPY, PLAT (tPA).

Product Specification Sheet

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. Mayr B, Montminy M. 2001. Transcriptional regulation by the phosphorylation-dependent factor CREB, *Nat Rev Mol Cell Biol* **2** (8):599-609.
2. Vaidya VA, Duman RS. 2001. Depression--emerging insights from neurobiology, *Br Med Bull* **57**: 61-79.
3. Muller FU, Neumann J, Schmitz W. 2000. Transcriptional regulation by cAMP in the heart, *Mol Cell Biochem* **212** (1-2): 11-7.
4. Hardingham GE, Bading H. 1999. Calcium as a versatile second messenger in the control of gene expression, *Microsc Res Tech* **46** (6): 348-55.
5. Finkbeiner S, Greenberg ME. 1998. Ca²⁺ channel-regulated neuronal gene expression, *J Neurobiol* **37** (1): 171-89.
6. Bito H, Deisseroth K, Tsien RW. 1997. Ca²⁺-dependent regulation in neuronal gene expression, *Curr Opin Neurobiol* **7** (3): 419-29.
7. Tsuda M. 1996. Cascade of gene expression induced by Ca²⁺ signals in neurons, *Neurochem Int* **29** (5): 443-51.
8. Bading H, Segal MM, Sucher NJ, Dudek H, Lipton SA, Greenberg ME. 1995. N-methyl-D-aspartate receptors are critical for mediating the effects of glutamate on intracellular calcium concentration and immediate early gene expression in cultured hippocampal neurons, *Neuroscience* **64** (3): 653-64.
9. Roche E, Prentki M. 1994. Calcium regulation of immediate-early response genes, *Cell Calcium* **16** (4): 331-8.
10. Herschman HR. 1991. Primary response genes induced by growth factors and tumor promoters, *Annu Rev Biochem* **60**: 281-319.
11. Sheng M, Greenberg ME. 1990. The regulation and function of c-fos and other immediate early genes in the nervous system, *Neuron*. **4** (4): 477-85.

Product Specification Sheet

Array Layout: Mouse cAMP / Ca²⁺ Signaling Pathway PathwayFinder™ PCR Array

	1	2	3	4	5	6	7	8	9	10	11	12
A	ADRB1	AHR	AMD1	AREG	ATF3	BCL2	BDNF	BRCA1	CALB1	CALB2	CALM1	CALR
B	CCNA1	CCND1	CDK5	CDKN2B	CGA	CHGA	CNN1	CREB1	CREM	CTF1	CYR61	DDIT3
C	DUSP1	EGR1	EGR2	ENO2	FGF6	FOS	FOSB	GCG	GEM	GIPR	HK2	HSPA4
D	HSPA5	IL2	IL6	INHBA	JUNB	JUND	KCNA5	LDHA	MAF	MIF	NCAM1	NF1
E	NOS2A	NPY	NR4A2	PCK2	PCNA	PENK	PER1	PLAT	PLN	PMAIP1	POU1F1	POU2AF1
F	PPP1R15A	PPP2CA	PRKAR1A	PRL	PTGS2	RB1	S100A12	S100A6	S100G	SCG2	SGK	SLC18A1
G	SOD2	SRF	SST	SSTR2	STAT3	TACR1	TGFB3	TH	THBS1	TNF	VCL	VIP
H	B2M	HPRT1	RPL13A	GAPDH	ACTB	HGDC	RTC	RTC	RTC	PPC	PPC	PPC

Gene Table

Position	UniGene	GenBank	Symbol	Description
A01	Hs.642658	NM_000684	ADRB1	Adrenergic, beta-1-, receptor
A02	Hs.171189	NM_001621	AHR	Aryl hydrocarbon receptor
A03	Hs.159118	NM_001634	AMD1	Adenosylmethionine decarboxylase 1
A04	Hs.270833	NM_001657	AREG	Amphiregulin (schwannoma-derived growth factor)
A05	Hs.460	NM_001674	ATF3	Activating transcription factor 3
A06	Hs.150749	NM_000633	BCL2	B-cell CLL/lymphoma 2
A07	Hs.502182	NM_001709	BDNF	Brain-derived neurotrophic factor
A08	Hs.194143	NM_007294	BRCA1	Breast cancer 1, early onset
A09	Hs.65425	NM_004929	CALB1	Calbindin 1, 28kDa
A10	Hs.106857	NM_001740	CALB2	Calbindin 2, 29kDa (calretinin)
A11	Hs.282410	NM_006888	CALM1	Calmodulin 1 (phosphorylase kinase, delta)
A12	Hs.515162	NM_004343	CALR	Calreticulin
B01	Hs.417050	NM_003914	CCNA1	Cyclin A1
B02	Hs.523852	NM_053056	CCND1	Cyclin D1
B03	Hs.647078	NM_004935	CDK5	Cyclin-dependent kinase 5
B04	Hs.72901	NM_004936	CDKN2B	Cyclin-dependent kinase inhibitor 2B (p15, inhibits CDK4)
B05	Hs.119689	NM_000735	CGA	Glycoprotein hormones, alpha polypeptide
B06	Hs.150793	NM_001275	CHGA	Chromogranin A (parathyroid secretory protein 1)
B07	Hs.465929	NM_001299	CNN1	Calponin 1, basic, smooth muscle
B08	Hs.584750	NM_004379	CREB1	CAMP responsive element binding protein 1
B09	Hs.200250	NM_183011	CREM	CAMP responsive element modulator
B10	Hs.483811	NM_001330	CTF1	Cardiotrophin 1
B11	Hs.8867	NM_001554	CYR61	Cysteine-rich, angiogenic inducer, 61
B12	Hs.505777	NM_004083	DDIT3	DNA-damage-inducible transcript 3
C01	Hs.171695	NM_004417	DUSP1	Dual specificity phosphatase 1
C02	Hs.326035	NM_001964	EGR1	Early growth response 1
C03	Hs.1395	NM_000399	EGR2	Early growth response 2 (Krox-20 homolog, Drosophila)
C04	Hs.511915	NM_001975	ENO2	Enolase 2 (gamma, neuronal)
C05	Hs.166015	NM_020996	FGF6	Fibroblast growth factor 6
C06	Hs.25647	NM_005252	FOS	V-fos FBJ murine osteosarcoma viral oncogene homolog
C07	Hs.590958	NM_006732	FOSB	FBJ murine osteosarcoma viral oncogene homolog B
C08	Hs.516494	NM_002054	GCG	Glucagon
C09	Hs.345139	NM_005261	GEM	GTP binding protein overexpressed in skeletal muscle
C10	Hs.251412	NM_000164	GIPR	Gastric inhibitory polypeptide receptor
C11	Hs.406266	NM_000189	HK2	Hexokinase 2
C12	Hs.90093	NM_002154	HSPA4	Heat shock 70kDa protein 4
D01	Hs.605502	NM_005347	HSPA5	Heat shock 70kDa protein 5 (glucose-regulated protein, 78kDa)
D02	Hs.89679	NM_000586	IL2	Interleukin 2
D03	Hs.512234	NM_000600	IL6	Interleukin 6 (interferon, beta 2)

Product Specification Sheet

Position	UniGene	GenBank	Symbol	Description
D04	Hs.583348	NM_002192	INHBA	Inhibin, beta A (activin A, activin AB alpha polypeptide)
D05	Hs.25292	NM_002229	JUNB	Jun B proto-oncogene
D06	Hs.2780	NM_005354	JUND	Jun D proto-oncogene
D07	Hs.150208	NM_002234	KCNA5	Potassium voltage-gated channel, shaker-related subfamily, member 5
D08	Hs.2795	NM_005566	LDHA	Lactate dehydrogenase A
D09	Hs.134859	NM_005360	MAF	V-maf musculoaponeurotic fibrosarcoma oncogene homolog (avian)
D10	Hs.407995	NM_002415	MIF	Macrophage migration inhibitory factor (glycosylation-inhibiting factor)
D11	Hs.503878	NM_000615	NCAM1	Neural cell adhesion molecule 1
D12	Hs.113577	NM_000267	NF1	Neurofibromin 1 (neurofibromatosis, von Recklinghausen disease, Watson disease)
E01	Hs.462525	NM_000625	NOS2A	Nitric oxide synthase 2A (inducible, hepatocytes)
E02	Hs.1832	NM_000905	NPY	Neuropeptide Y
E03	Hs.563344	NM_006186	NR4A2	Nuclear receptor subfamily 4, group A, member 2
E04	Hs.75812	NM_004563	PCK2	Phosphoenolpyruvate carboxykinase 2 (mitochondrial)
E05	Hs.147433	NM_182649	PCNA	Proliferating cell nuclear antigen
E06	Hs.339831	NM_006211	PENK	Proenkephalin
E07	Hs.445534	NM_002616	PER1	Period homolog 1 (Drosophila)
E08	Hs.491582	NM_000930	PLAT	Plasminogen activator, tissue
E09	Hs.170839	NM_002667	PLN	Phospholamban
E10	Hs.96	NM_021127	PMAIP1	Phorbol-12-myristate-13-acetate-induced protein 1
E11	Hs.591654	NM_000306	POU1F1	POU domain, class 1, transcription factor 1 (Pit1, growth hormone factor 1)
E12	Hs.2407	NM_006235	POU2AF1	POU domain, class 2, associating factor 1
F01	Hs.631593	NM_014330	PPP1R15A	Protein phosphatase 1, regulatory (inhibitor) subunit 15A
F02	Hs.483408	NM_002715	PPP2CA	Protein phosphatase 2 (formerly 2A), catalytic subunit, alpha isoform
F03	Hs.280342	NM_002734	PRKAR1A	Protein kinase, cAMP-dependent, regulatory, type I, alpha (tissue specific extinguisher 1)
F04	Hs.1905	NM_000948	PRL	Prolactin
F05	Hs.196384	NM_000963	PTGS2	Prostaglandin-endoperoxide synthase 2 (prostaglandin G/H synthase and cyclooxygenase)
F06	Hs.408528	NM_000321	RB1	Retinoblastoma 1 (including osteosarcoma)
F07	Hs.19413	NM_005621	S100A12	S100 calcium binding protein A12
F08	Hs.275243	NM_014624	S100A6	S100 calcium binding protein A6
F09	Hs.639	NM_004057	S100G	S100 calcium binding protein G
F10	Hs.516726	NM_003469	SCG2	Secretogranin II (chromogranin C)
F11	Hs.296323	NM_005627	SGK	Serum/glucocorticoid regulated kinase
F12	Hs.158322	NM_003053	SLC18A1	Solute carrier family 18 (vesicular monoamine), member 1
G01	Hs.487046	NM_000636	SOD2	Superoxide dismutase 2, mitochondrial
G02	Hs.520140	NM_003131	SRF	Serum response factor (c-fos serum response element-binding transcription factor)
G03	Hs.12409	NM_001048	SST	Somatostatin
G04	Hs.514451	NM_001050	SSTR2	Somatostatin receptor 2
G05	Hs.463059	NM_003150	STAT3	Signal transducer and activator of transcription 3 (acute-phase response factor)
G06	Hs.591590	NM_001058	TACR1	Tachykinin receptor 1
G07	Hs.592317	NM_003239	TGFB3	Transforming growth factor, beta 3
G08	Hs.435609	NM_000360	TH	Tyrosine hydroxylase
G09	Hs.164226	NM_003246	THBS1	Thrombospondin 1
G10	Hs.241570	NM_000594	TNF	Tumor necrosis factor (TNF superfamily, member 2)
G11	Hs.643896	NM_003373	VCL	Vinculin
G12	Hs.53973	NM_003381	VIP	Vasoactive intestinal peptide
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