

# RT<sup>2</sup> Profiler™ PCR Array:

## Mouse Cell Cycle

### Catalog Number

PAMM-020A

PAMM-020C

PAMM-020D

PAMM-020E

PAMM-020F

PAMM-020G

### 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 Mouse Cell Cycle RT<sup>2</sup> Profiler PCR Array profiles the expression of 84 genes key to cell cycle regulation. This array contains genes that both positively and negatively regulate the cell cycle, the transitions between the each of the phases, DNA replication, checkpoints and arrest. Using real-time PCR, you can easily and reliably analyze expression of a focused panel of genes related to the cell cycle with this array.

### Functional Gene Groupings

**G1 Phase and G1/S Transition:** Camk2a, Camk2b, Gpr132, Itgb1, Mtpb, Myb (C-MYB), Nfatc1, Ppp2r3a, Ppp3ca, Skp2, Taf10, Slnf1.

**S Phase and DNA Replication:** Dnajc2 (Zrf2), Mcm2, Mcm3, Mcm4, Mki67, Mre11a, Msh2, PcnA, Rad17, Rad51, Sumo1.

**G2 Phase and G2/M Transition:** Dnajc2 (Zrf2), Chek1, Ppm1d.

**M Phase:** Brca2, Ccna1 (Cyclin A1), Ccnb1, Cdc25a, Cdc25b, Cdk2, Nek2, Npm2, Pes1, Prm1, Rad21, Ran, Shc1, Smc1a (Smc111), Stag1, Terf1, Tnfsf5ip1, Wee1.

**Cell Cycle Checkpoint and Cell Cycle Arrest:** Ak1, Apbb1, Brca2, Casp3, Cdk5rap1, Cdkn1a, Cdkn1b, Cdkn2a, Chek1, Cks1b, Ddit3 (CHOP), Dst, Gadd45a, Hus1, Inha, Macf1, Mad2l1, Mdm2, Msh2, Notch2, Pkd1, Pmp22, Ppm1d (WIP1), Rad9, Sesn2 (Sestrin 2), Sfn (Stratifin), Slnf1, Smc1a (Smc111), Tsg101.

**Regulation of the Cell Cycle:** Abl1, Brca2, Ccna1, Ccna2, Ccnb1, Ccnb2, Ccnc, Ccnd1, Ccne1, Ccnf, Cdk4, Cdkn1a, Cks1b, E2f1, E2f2, E2f3, E2f4, Gadd45a, Itgb1, Rad9, Ran, Sfn (Stratifin), Shc1, Skp2, Tfdp1, Tnfsf5ip1.

**Negative Regulation of the Cell Cycle:** Apbb1, Atm, Brca1, Casp3, Cdkn2a, Inha, Rbl1, Rbl2, Trp53, Trp63.

### 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. Nurse, P. (2000) A Long Twentieth Century Of The Cell Cycle And Beyond. *Cell* **100**: 71-80.
2. Sherr, C. J. and Roberts, J. M. (1999) CDK Inhibitors: Positive And Negative Regulators Of G1-Phase Progression. *Genes & Development* **13**: 1501-12.
3. Harbour, J. W. and Dean, D. C. (2000) Rb Function In Cell-Cycle Regulation And Apoptosis. *Nature Cell Biology* **2**: E65-7.
4. Deshaies, R. J. (1995) The Self-Destructive Personality Of A Cell Cycle In Transition. *Current Biology* **7**: 781-789.
5. Gardner R. D. and Burke D. J. (2000) The Spindle Checkpoint: Two Transition, Two Pathways. *Trends in Cell Biology* **10**: 154-8.
6. Dasika, G. K., Lin, S. C., Zhao, S., Sung, P., Tomkinson, A., and Lee, E. Y. (1999) DNA Damage-Induced Cell Cycle Checkpoints And DNA Strand Break Repair In Development And Tumorigenesis. *Oncogene* **18**: 7883-99.
7. Amati, B. and Vlach, J. (1999) Kip1 Meets SKP2: New Links in Cell-Cycle Control. *Nature Cell Biology* **1**: E91-3.
8. Muller, H. and Helin, K. (2000) The E2F Transcription Factors: Key Regulators of Cell Proliferation. *Biochim. Biophys. Acta* **1470**: M1-12.
9. Bottazzi, M. E. and Assoian, R. K. (1997) The Extracellular Matrix And Mitogenic Growth Factors Control G1 Phase Cyclins And Cyclin-Dependent Kinase Inhibitors. *Trends in Cell Biology* **7**: 348-352.
10. Sherr C. J. and Weber J. D. (2000) The ARF/p53 Pathway. *Curr Opin Genet. Dev* **10**: 94-99.

## Product Specification Sheet

### Array Layout: Mouse Cell Cycle PCR Array

	1	2	3	4	5	6	7	8	9	10	11	12
A	Abl1	Ak1	Apbb1	Atm	Brca1	Brca2	Camk2a	Camk2b	Casp3	Ccna1	Ccna2	Ccnb1
B	Ccnb2	Ccnc	Ccnd1	Ccne1	Ccnf	Cdc25a	Cdk2	Cdk4	Cdk5rap1	Cdkn1a	Cdkn1b	Cdkn2a
C	Chek1	Cks1b	Ddit3	Dnajc2	Dst	E2f1	E2f2	E2f3	E2f4	Gadd45a	Gpr132	Hus1
D	Inha	Itgb1	Macf1	Mad2l1	Mcm2	Mcm3	Mcm4	Mdm2	Mki67	Mre11a	Msh2	Mtbp
E	Myb	Nek2	Nfatc1	Notch2	Npm2	Pcna	Pes1	Pkd1	Pmp22	Ppm1d	Ppp2r3a	Ppp3ca
F	Prm1	Rad17	Rad21	Rad51	Rad9	Ran	Rbl1	Rbl2	Sesn2	Sfn	Shc1	Skp2
G	Slnf1	Smc1a	Stag1	Sumo1	Taf10	Terf1	Tfdp1	Tnfsf5ip1	Trp53	Trp63	Tsg101	Wee1
H	Gusb	Hprt1	Hsp90ab1	Gapdh	Actb	MGDC	RTC	RTC	RTC	PPC	PPC	PPC

### Gene Table

Position	UniGene	GenBank	Symbol	Description
A01	Mm.1318	NM_009594	Abl1	V-abl Abelson murine leukemia oncogene 1
A02	Mm.29189	NM_021515	Ak1	Adenylate kinase 1
A03	Mm.38469	NM_009685	Apbb1	Amyloid beta (A4) precursor protein-binding, family B, member 1
A04	Mm.5088	NM_007499	Atm	Ataxia telangiectasia mutated homolog (human)
A05	Mm.244975	NM_009764	Brca1	Breast cancer 1
A06	Mm.236256	NM_009765	Brca2	Breast cancer 2
A07	Mm.131530	NM_177407	Camk2a	Calcium/calmodulin-dependent protein kinase II alpha
A08	Mm.439733	NM_007595	Camk2b	Calcium/calmodulin-dependent protein kinase II, beta
A09	Mm.34405	NM_009810	Casp3	Caspase 3
A10	Mm.4815	NM_007628	Ccna1	Cyclin A1
A11	Mm.4189	NM_009828	Ccna2	Cyclin A2
A12	Mm.260114	NM_172301	Ccnb1	Cyclin B1
B01	Mm.22592	NM_007630	Ccnb2	Cyclin B2
B02	Mm.278584	NM_016746	Ccnc	Cyclin C
B03	Mm.273049	NM_007631	Ccnd1	Cyclin D1
B04	Mm.16110	NM_007633	Ccne1	Cyclin E1
B05	Mm.77695	NM_007634	Ccnf	Cyclin F
B06	Mm.307103	NM_007658	Cdc25a	Cell division cycle 25 homolog A (S. pombe)
B07	Mm.111326	NM_016756	Cdk2	Cyclin-dependent kinase 2
B08	Mm.6839	NM_009870	Cdk4	Cyclin-dependent kinase 4
B09	Mm.289427	NM_025876	Cdk5rap1	CDK5 regulatory subunit associated protein 1
B10	Mm.195663	NM_007669	Cdkn1a	Cyclin-dependent kinase inhibitor 1A (P21)
B11	Mm.2958	NM_009875	Cdkn1b	Cyclin-dependent kinase inhibitor 1B
B12	Mm.4733	NM_009877	Cdkn2a	Cyclin-dependent kinase inhibitor 2A
C01	Mm.16753	NM_007691	Chek1	Checkpoint kinase 1 homolog (S. pombe)
C02	Mm.3049	NM_016904	Cks1b	CDC28 protein kinase 1b
C03	Mm.110220	NM_007837	Ddit3	DNA-damage inducible transcript 3
C04	Mm.266312	NM_009584	Dnajc2	DnaJ (Hsp40) homolog, subfamily C, member 2
C05	Mm.336625	NM_134448	Dst	Dystonin
C06	Mm.18036	NM_007891	E2f1	E2F transcription factor 1
C07	Mm.307932	NM_177733	E2f2	E2F transcription factor 2
C08	Mm.268356	NM_010093	E2f3	E2F transcription factor 3
C09	Mm.34554	NM_148952	E2f4	E2F transcription factor 4
C10	Mm.389750	NM_007836	Gadd45a	Growth arrest and DNA-damage-inducible 45 alpha
C11	Mm.20455	NM_019925	Gpr132	G protein-coupled receptor 132
C12	Mm.42201	NM_008316	Hus1	Hus1 homolog (S. pombe)
D01	Mm.1100	NM_010564	Inha	Inhibin alpha
D02	Mm.263396	NM_010578	Itgb1	Integrin beta 1 (fibronectin receptor beta)
D03	Mm.402299	XM_884922	Macf1	Microtubule-actin crosslinking factor 1

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Position	UniGene	GenBank	Symbol	Description
D04	Mm.290830	NM_019499	Mad21	MAD2 (mitotic arrest deficient, homolog)-like 1 (yeast)
D05	Mm.16711	NM_008564	Mcm2	Minichromosome maintenance deficient 2 mitotin (S. cerevisiae)
D06	Mm.4502	NM_008563	Mcm3	Minichromosome maintenance deficient 3 (S. cerevisiae)
D07	Mm.1500	NM_008565	Mcm4	Minichromosome maintenance deficient 4 homolog (S. cerevisiae)
D08	Mm.22670	NM_010786	Mdm2	Transformed mouse 3T3 cell double minute 2
D09	Mm.4078	XM_133912	Mki67	Antigen identified by monoclonal antibody Ki 67
D10	Mm.149071	NM_018736	Mre11a	Meiotic recombination 11 homolog A (S. cerevisiae)
D11	Mm.428585	NM_008628	Msh2	MutS homolog 2 (E. coli)
D12	Mm.61901	NM_134092	Mtbp	Mdm2, transformed 3T3 cell double minute p53 binding protein
E01	Mm.52109	NM_033597	Myb	Myeloblastosis oncogene
E02	Mm.33773	NM_010892	Nek2	NIMA (never in mitosis gene a)-related expressed kinase 2
E03	Mm.329560	NM_016791	Nfatc1	Nuclear factor of activated T-cells, cytoplasmic, calcineurin-dependent 1
E04	Mm.254017	NM_010928	Notch2	Notch gene homolog 2 (Drosophila)
E05	Mm.347749	NM_181345	Npm2	Nucleophosmin/nucleoplasmin 2
E06	Mm.7141	NM_011045	Pcna	Proliferating cell nuclear antigen
E07	Mm.28659	NM_022889	Pes1	Pescadillo homolog 1, containing BRCT domain (zebrafish)
E08	Mm.290442	NM_013630	Pkd1	Polycystic kidney disease 1 homolog
E09	Mm.1237	NM_008885	Pmp22	Peripheral myelin protein
E10	Mm.45609	NM_016910	Ppm1d	Protein phosphatase 1D magnesium-dependent, delta isoform
E11	Mm.271249	XM_918708	Ppp2r3a	Protein phosphatase 2 (formerly 2A), regulatory subunit B", alpha
E12	Mm.331389	NM_008913	Ppp3ca	Protein phosphatase 3, catalytic subunit, alpha isoform
F01	Mm.42733	NM_013637	Prr1	Protamine 1
F02	Mm.248489	NM_011233	Rad17	RAD17 homolog (S. pombe)
F03	Mm.182628	NM_009009	Rad21	RAD21 homolog (S. pombe)
F04	Mm.434303	NM_011234	Rad51	RAD51 homolog (S. cerevisiae)
F05	Mm.277629	NM_011237	Rad9	RAD9 homolog (S. pombe)
F06	Mm.297440	NM_009391	Ran	RAN, member RAS oncogene family
F07	Mm.244671	NM_011249	Rbl1	Retinoblastoma-like 1 (p107)
F08	Mm.235580	NM_011250	Rbl2	Retinoblastoma-like 2
F09	Mm.23608	NM_144907	Sesn2	Sestrin 2
F10	Mm.44482	NM_018754	Sfn	Stratifin
F11	Mm.86595	NM_011368	Shc1	Src homology 2 domain-containing transforming protein C1
F12	Mm.35584	NM_013787	Skp2	S-phase kinase-associated protein 2 (p45)
G01	Mm.10948	NM_011407	Slnf1	Schlafen 1
G02	Mm.26412	NM_019710	Smc1a	Structural maintenance of chromosomes 1A
G03	Mm.42135	NM_009282	Stag1	Stromal antigen 1
G04	Mm.362118	NM_009460	Sumo1	SMT3 suppressor of mif two 3 homolog 1 (yeast)
G05	Mm.285771	NM_020024	Taf10	TAFF10 RNA polymerase II, TATA box binding protein (TBP)-associated factor
G06	Mm.4306	NM_009352	Terf1	Telomeric repeat binding factor 1
G07	Mm.925	NM_009361	Tfdp1	Transcription factor Dp 1
G08	Mm.150701	NM_134138	Tnfsf5ip1	Tumor necrosis factor superfamily, member 5-induced protein 1
G09	Mm.222	NM_011640	Trp53	Transformation related protein 53
G10	Mm.20894	NM_011641	Trp63	Transformation related protein 63
G11	Mm.241334	NM_021884	Tsg101	Tumor susceptibility gene 101
G12	Mm.287173	NM_009516	Wee1	Wee 1 homolog (S. pombe)
H01	Mm.3317	NM_010368	Gusb	Glucuronidase, beta
H02	Mm.299381	NM_013556	Hprt1	Hypoxanthine guanine phosphoribosyl transferase 1
H03	Mm.2180	NM_008302	Hsp90ab1	Heat shock protein 90kDa alpha (cytosolic), class B member 1
H04	Mm.343110	NM_008084	Gapdh	Glyceraldehyde-3-phosphate dehydrogenase
H05	Mm.328431	NM_007393	Actb	Actin, beta, cytoplasmic
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