

RT² Profiler™ PCR Array:

Human DNA Damage Signaling Pathway

Catalog Number

PAHS-029A

PAHS-029C

PAHS-029D

PAHS-029E

PAHS-029F

PAHS-029G

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 DNA Damage Signaling Pathway RT² Profiler PCR Array profiles the expression of 84 genes involved in DNA damage signaling pathways. The genes featured are those associated with the ATR/ATM signaling network and transcriptional targets of DNA damage response. DNA damage can result in cell cycle arrest, apoptosis, and the stabilization and repair of the cellular genome. Using real-time PCR, you can easily and reliably analyze expression of a focused panel of genes related to DNA Damage Signaling with this array.

Functional Gene Groupings

Apoptosis: ABL1, BRCA1, CIDEA, GADD45A, GADD45G, GML, IHPK3, PCBP4, AIFM1 (PDCD8), PPP1R15A, RAD21, TP53, TP73.

Cell Cycle:

Cell Cycle Arrest: CHEK1, CHEK2, DDIT3 (CHOP), GADD45A, GML, GTSE1, HUS1, MAP2K6, MAPK12, PCBP4, PPP1R15A, RAD17, RAD9A, SESN1, ZAK.

Cell Cycle Checkpoint: ATR, BRCA1, FANCG, NBN (NBS1), RAD1, RBBP8, SMC1A (SMC1L1), TP53.

DNA Repair:

Damaged DNA Binding: ANKRD17, BRCA1, DDB1, DMC1, ERCC1, FANCG, FEN1, MPG, MSH2, MSH3, N4BP2, NBN (NBS1), OGG1, PMS2L3 (PMS2L9), PNKP, RAD1, RAD18, RAD51, RAD51L1, REV1 (REV1L), SEMA4A, XPA, XPC, XRCC1, XRCC2, XRCC3.

Base-excision Repair: APEX1, MBD4, MPG, MUTYH, NTHL1, OGG1, UNG.

Double-strand Break Repair: CIB1, FEN1, XRCC6 (G22P1), XRCC6BP1 (KUB3), MRE11A, NBN (NBS1), PRKDC, RAD21, RAD50.

Mismatch Repair: ABL1, ANKRD17, EXO1, MLH1, MLH3, MSH2, MSH3, MUTYH, N4BP2, PMS1, PMS2, PMS2L3 (PMS2L9), TP73, TREX1.

Other Genes Related to DNA Repair: APEX2, ATM, ATRX, BTG2, CCNH, CDK7, CRY1, ERCC2 (XPD), GTF2H1, GTF2H2, IGHMBP2, LIG1, MNAT1, PCNA, RPA1, SUMO1.

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. Tran H, Brunet A, Grenier JM, Datta SR, Fornace AJ Jr, DiStefano PS, Chiang LW, Greenberg ME. DNA repair pathway stimulated by the forkhead transcription factor FOXO3a through the Gadd45 protein. *Science* 2002 Apr 19; **296** (5567): 530-4
2. Tusher VG, Tibshirani R, Chu G. Significance analysis of microarrays applied to the ionizing radiation response. *Proc Natl Acad Sci U S A* 2001 Apr 24; **98** (9): 5116-21
3. Li Z, Li JJ. Effector genes altered in mcf-7 human breast cancer cells after exposure to fractionated ionizing radiation. *Radiat Res.* 2001 Apr; **155** (4): 543-53.
4. RoblesAI, Bemmels NA, Foraker AB, Harris CC. APAF-1 is a transcriptional target of p53 in DNA damage-induced apoptosis. *Cancer Res* 2001 Sep 15; **61** (18): 6660-4
5. Kannan K, Amariglio N, Rechavi G, Jakob-Hirsch J, Kela I, Kaminski N, Getz G, Domany E, Givol D. DNA microarrays identification of primary and secondary target genes regulated by p53. *Oncogene* 2001 Apr 26; **20** (18): 2225-34
6. Zhou BB, Elledge SJ. The DNA damage response: putting checkpoints in perspective. *Nature* 2000 Nov 23; **408** (6811): 433-9
7. Bartek J, Lukas J. Mammalian G1- and S-phase checkpoints in response to DNA damage. *Curr Opin Cell Biol* 2001 Dec; **13** (6): 738-47
8. Carr AM. Cell cycle. Piecing together the p53 puzzle. *Science* 2000 Mar 10; **287** (5459): 1765-6
9. MacLachlan TK, Somasundaram K, Sgagias M, Shifman Y, Muschel RJ, Cowan KH, El-Deiry WS. BRCA1 effects on the cell cycle and the DNA damage response are linked to altered gene expression. *J Biol Chem* 2000 Jan 28; **275** (4): 2777-85
10. Yu J, Zhang L, Hwang PM, Rago C, Kinzler KW, Vogelstein B. Identification and classification of p53-regulated genes. *Proc Natl Acad Sci U S A* 1999 Dec 7; **96** (25): 14517-22

Product Specification Sheet

Array Layout: Human DNA Damage Signaling Pathway PCR Array

	1	2	3	4	5	6	7	8	9	10	11	12
A	ABL1	ANKRD17	APEX1	ATM	ATR	ATR	BRCA1	BTG2	CCNH	CDK7	CHEK1	CHEK2
B	CIB1	CIDEA	CRY1	DDB1	DDIT3	DMC1	ERCC1	ERCC2	EXO1	FANCG	FEN1	XRCC6
C	GADD45A	GADD45G	GML	GTF2H1	GTF2H2	GTSE1	HUS1	IGHMBP2	IHPK3	XRCC6BP1	LIG1	MAP2K6
D	MAPK12	MBD4	MLH1	MLH3	MNAT1	MPG	MRE11A	MSH2	MSH3	MUTYH	N4BP2	NBN
E	NTHL1	OGG1	PCBP4	PCNA	AIFM1	PMS1	PMS2	PMS2L3	PNKP	PPP1R15A	PRKDC	RAD1
F	RAD17	RAD18	RAD21	RAD50	RAD51	RAD51L1	RAD9A	RBBP8	REV1	RPA1	SEMA4A	SESN1
G	SMC1A	SUMO1	TP53	TP73	TREX1	UNG	XPA	XPC	XRCC1	XRCC2	XRCC3	ZAK
H	B2M	HPRT1	RPL13A	GAPDH	ACTB	HGDC	RTC	RTC	RTC	PPC	PPC	PPC

Gene Table

Position	UniGene	GenBank	Symbol	Description
A01	Hs.431048	NM_005157	ABL1	V-abl Abelson murine leukemia viral oncogene homolog 1
A02	Hs.601206	NM_198889	ANKRD17	Ankyrin repeat domain 17
A03	Hs.73722	NM_080649	APEX1	APEX nuclease (multifunctional DNA repair enzyme) 1
A04	Hs.367437	NM_000051	ATM	Ataxia telangiectasia mutated (includes complementation groups A, C and D)
A05	Hs.271791	NM_001184	ATR	Ataxia telangiectasia and Rad3 related
A06	Hs.533526	NM_000489	ATR	Alpha thalassemia/mental retardation syndrome X-linked (RAD54 homolog, <i>S. cerevisiae</i>)
A07	Hs.194143	NM_007294	BRCA1	Breast cancer 1, early onset
A08	Hs.519162	NM_006763	BTG2	BTG family, member 2
A09	Hs.292524	NM_001239	CCNH	Cyclin H
A10	Hs.184298	NM_001799	CDK7	Cyclin-dependent kinase 7 (MO15 homolog, <i>Xenopus laevis</i> , cdk-activating kinase)
A11	Hs.24529	NM_001274	CHEK1	CHK1 checkpoint homolog (<i>S. pombe</i>)
A12	Hs.291363	NM_007194	CHEK2	CHK2 checkpoint homolog (<i>S. pombe</i>)
B01	Hs.135471	NM_006384	CIB1	Calcium and integrin binding 1 (calmyrin)
B02	Hs.249129	NM_001279	CIDEA	Cell death-inducing DFFA-like effector a
B03	Hs.151573	NM_004075	CRY1	Cryptochrome 1 (photolyase-like)
B04	Hs.290758	NM_001923	DDB1	Damage-specific DNA binding protein 1, 127kDa
B05	Hs.505777	NM_004083	DDIT3	DNA-damage-inducible transcript 3
B06	Hs.339396	NM_007068	DMC1	DMC1 dosage suppressor of mck1 homolog, meiosis-specific homologous recombination (yeast)
B07	Hs.435981	NM_001983	ERCC1	Excision repair cross-complementing rodent repair deficiency, complementation group 1 (includes overlapping antisense sequence)
B08	Hs.487294	NM_000400	ERCC2	Excision repair cross-complementing rodent repair deficiency, complementation group 2 (xeroderma pigmentosum D)
B09	Hs.498248	NM_130398	EXO1	Exonuclease 1
B10	Hs.591084	NM_004629	FANCG	Fanconi anemia, complementation group G
B11	Hs.409065	NM_004111	FEN1	Flap structure-specific endonuclease 1
B12	Hs.292493	NM_001469	XRCC6	X-ray repair complementing defective repair in Chinese hamster cells 6 (Ku autoantigen,
C01	Hs.80409	NM_001924	GADD45A	Growth arrest and DNA-damage-inducible, alpha
C02	Hs.9701	NM_006705	GADD45G	Growth arrest and DNA-damage-inducible, gamma
C03	Hs.545196	NM_002066	GML	GPI anchored molecule like protein
C04	Hs.577202	NM_005316	GTF2H1	General transcription factor IIH, polypeptide 1, 62kDa
C05	Hs.191356	NM_001515	GTF2H2	General transcription factor IIH, polypeptide 2, 44kDa
C06	Hs.386189	NM_016426	GTSE1	G-2 and S-phase expressed 1
C07	Hs.152983	NM_004507	HUS1	HUS1 checkpoint homolog (<i>S. pombe</i>)
C08	Hs.503048	NM_002180	IGHMBP2	Immunoglobulin mu binding protein 2
C09	Hs.17253	NM_054111	IHPK3	Inositol hexaphosphate kinase 3
C10	Hs.61188	NM_033276	XRCC6BP1	XRCC6 binding protein 1
C11	Hs.1770	NM_000234	LIG1	Ligase I, DNA, ATP-dependent
C12	Hs.463978	NM_002758	MAP2K6	Mitogen-activated protein kinase kinase 6
D01	Hs.432642	NM_002969	MAPK12	Mitogen-activated protein kinase 12
D02	Hs.35947	NM_003925	MBD4	Methyl-CpG binding domain protein 4
D03	Hs.195364	NM_000249	MLH1	MutL homolog 1, colon cancer, nonpolyposis type 2 (<i>E. coli</i>)
D04	Hs.436650	NM_014381	MLH3	MutL homolog 3 (<i>E. coli</i>)

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Position	UniGene	GenBank	Symbol	Description
D05	Hs.509523	NM_002431	MNAT1	Menage a trois homolog 1, cyclin H assembly factor (Xenopus laevis)
D06	Hs.459596	NM_002434	MPG	N-methylpurine-DNA glycosylase
D07	Hs.192649	NM_005590	MRE11A	MRE11 meiotic recombination 11 homolog A (S. cerevisiae)
D08	Hs.597656	NM_000251	MSH2	MutS homolog 2, colon cancer, nonpolyposis type 1 (E. coli)
D09	Hs.280987	NM_002439	MSH3	MutS homolog 3 (E. coli)
D10	Hs.271353	NM_012222	MUTYH	MutY homolog (E. coli)
D11	Hs.396494	NM_018177	N4BP2	Nedd4 binding protein 2
D12	Hs.492208	NM_002485	NBN	Nibrin
E01	Hs.66196	NM_002528	NTHL1	Nth endonuclease III-like 1 (E. coli)
E02	Hs.380271	NM_002542	OGG1	8-oxoguanine DNA glycosylase
E03	Hs.20930	NM_020418	PCBP4	Poly(rC) binding protein 4
E04	Hs.147433	NM_182649	PCNA	Proliferating cell nuclear antigen
E05	Hs.424932	NM_004208	AIFM1	Apoptosis-inducing factor, mitochondrion-associated, 1
E06	Hs.111749	NM_000534	PMS1	PMS1 postmeiotic segregation increased 1 (S. cerevisiae)
E07	Hs.632637	NM_000535	PMS2	PMS2 postmeiotic segregation increased 2 (S. cerevisiae)
E08	Hs.225784	NM_005395	PMS2L3	Postmeiotic segregation increased 2-like 3
E09	Hs.78016	NM_007254	PNKP	Polynucleotide kinase 3'-phosphatase
E10	Hs.631593	NM_014330	PPP1R15A	Protein phosphatase 1, regulatory (inhibitor) subunit 15A
E11	Hs.491682	NM_006904	PRKDC	Protein kinase, DNA-activated, catalytic polypeptide
E12	Hs.531879	NM_002853	RAD1	RAD1 homolog (S. pombe)
F01	Hs.16184	NM_002873	RAD17	RAD17 homolog (S. pombe)
F02	Hs.375684	NM_020165	RAD18	RAD18 homolog (S. cerevisiae)
F03	Hs.81848	NM_006265	RAD21	RAD21 homolog (S. pombe)
F04	Hs.128904	NM_005732	RAD50	RAD50 homolog (S. cerevisiae)
F05	Hs.631709	NM_002875	RAD51	RAD51 homolog (RecA homolog, E. coli) (S. cerevisiae)
F06	Hs.172587	NM_133509	RAD51L1	RAD51-like 1 (S. cerevisiae)
F07	Hs.240457	NM_004584	RAD9A	RAD9 homolog A (S. pombe)
F08	Hs.546282	NM_002894	RBBP8	Retinoblastoma binding protein 8
F09	Hs.443077	NM_016316	REV1	REV1 homolog (S. cerevisiae)
F10	Hs.461925	NM_002945	RPA1	Replication protein A1, 70kDa
F11	Hs.408846	NM_022367	SEMA4A	Sema domain, immunoglobulin domain (Ig), transmembrane domain (TM) and short cytoplasmic domain, (semaphorin) 4A
F12	Hs.591336	NM_014454	SESN1	Sestrin 1
G01	Hs.211602	NM_006306	SMC1A	Structural maintenance of chromosomes 1A
G02	Hs.81424	NM_003352	SUMO1	SMT3 suppressor of mif two 3 homolog 1 (S. cerevisiae)
G03	Hs.408312	NM_000546	TP53	Tumor protein p53 (Li-Fraumeni syndrome)
G04	Hs.192132	NM_005427	TP73	Tumor protein p73
G05	Hs.344812	NM_016381	TREX1	Three prime repair exonuclease 1
G06	Hs.191334	NM_003362	UNG	Uracil-DNA glycosylase
G07	Hs.591907	NM_000380	XPA	Xeroderma pigmentosum, complementation group A
G08	Hs.475538	NM_004628	XPC	Xeroderma pigmentosum, complementation group C
G09	Hs.98493	NM_006297	XRCC1	X-ray repair complementing defective repair in Chinese hamster cells 1
G10	Hs.647093	NM_005431	XRCC2	X-ray repair complementing defective repair in Chinese hamster cells 2
G11	Hs.592325	NM_005432	XRCC3	X-ray repair complementing defective repair in Chinese hamster cells 3
G12	Hs.444451	NM_016653	ZAK	Sterile alpha motif and leucine zipper containing kinase AZK
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