

Oligo GEArray[®] DNA Microarray: Human DNA Damage Signaling Pathway

Catalog Number

OHS-029
EHS-029

Format:

HybTube (Standard protocol)
HybPlate (Higher throughput protocol)

Description

The Oligo GEArray[®] Human DNA Damage Signaling Pathway Microarray profiles the expression of 113 genes involved in DNA damage signaling pathways. The genes associated with the ATR / ATM signaling network and transcriptional targets of DNA damage response are included on this array. Genes related to cell cycle arrest, apoptosis, and the stabilization and repair of the cellular genome as a result of DNA damage signaling are represented as well. Through a simple side-by-side hybridization experiment you can determine differential gene expression between your samples with this array.

Functional Gene Groupings

Apoptosis Genes: ABL1, BRCA1, CIDEA, CIDEB, GADD45A, GADD45G, GML, IHPK3, PCBP4, PDCD8, PPP1R15A, RAD21, TP53, TP73.

Cell Cycle Genes:

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

Cell Cycle Checkpoint: ATR, BRCA1, FANCG, NBS1, RAD1, RBBP8, SMC1L1, TP53.

DNA Repair:

Damaged DNA Binding: ANKRD17, BRCA1, DDB1, DDB2, DMC1, ERCC1, ERCC3, FANCG, FEN1, GTF2H3, MPG, MSH2, MSH3, MSH4, MSH5, MSH6, N4BP2, NBS1, OGG1, PMS2L4, PMS2L9, PNKP, RAD1, RAD18, RAD51, RAD51C, RAD51L1, RAD51L3, REV1L, SEMA4A, XPA, XPC, XRCC1, XRCC2, XRCC3.

Base-excision Repair: APEX1, MBD4, MPG, MUTYH, NTHL1, OGG1, RAD51L3, UNG, UNG2.

Double-strand Break Repair: BRCA2, CIB1, FEN1, G22P1, KUB3, MRE11A, NBS1, PRKDC, RAD21, RAD50, RAD52, XRCC4, XRCC5.

Mismatch Repair: ABL1, ANKRD17, EXO1, MLH1, MLH3, MSH2, MSH3, MSH4, MSH5, MSH6, MUTYH, N4BP2, PMS1, PMS2, PMS2L4, PMS2L9, TP73, TREX1.

Other Genes Involved in DNA Repair: APEX2, ATM, ATRX, BTG2, CCNH, CDK7, CKN1, CRY1, CRY2, ERCC2, ERCC4, ERCC5, GTF2H1, GTF2H2, IGHMBP2, INPPL1, LIG1, LIG3, LIG4, MNAT1, NUDT1, PCNA, RAD23A, RAD23B, RAD54L, RPA1, RPA3, SUMO1, TREX2.

Storage Conditions

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

GEArray microarrays are shipped at ambient temperature enclosed in either a HybTube or ExpressPak Storage Box. They should be stored at -20°C upon receipt.

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

Oligo GEArray® Human DNA Damage Signaling Pathway Microarray

Array Layout:

RPS27A 1	ABL1 2	ANKRD17 3	APEX1 4	APEX2 5	ATM 6	ATR 7	ATRX 8
BRCA1 9	BRCA2 10	BTG2 11	CCNH 12	CDK7 13	CHEK1 14	CHEK2 15	CIB1 16
CIDEA 17	CIDEB 18	CKN1 19	CRY1 20	CRY2 21	DDB1 22	DDB2 23	DDIT3 24
DMC1 25	ERCC1 26	ERCC2 27	ERCC3 28	ERCC4 29	ERCC5 30	EXO1 31	FANCG 32
FEN1 33	G22P1 34	GADD45A 35	GADD45G 36	GML 37	GTF2H1 38	GTF2H2 39	GTF2H3 40
GTSE1 41	HUS1 42	IGHMBP2 43	IHPK3 44	INPPL1 45	KUB3 46	LIG1 47	LIG3 48
LIG4 49	MAP2K6 50	MAPK12 51	MBD4 52	MLH1 53	MLH3 54	MNAT1 55	MPG 56
MRE11A 57	MSH2 58	MSH3 59	MSH4 60	MSH5 61	MSH6 62	MUTYH 63	N4BP2 64
NBS1 65	NTHL1 66	NUDT1 67	OGG1 68	PCBP4 69	PCNA 70	PDCD8 71	PMS1 72
PMS2 73	PMS2L4 74	PMS2L9 75	PNKP 76	PPP1R15A 77	PRKDC 78	RAD1 79	RAD17 80
RAD18 81	RAD21 82	RAD23A 83	RAD23B 84	RAD50 85	RAD51 86	RAD51C 87	RAD51L1 88
RAD51L3 89	RAD52 90	RAD54L 91	RAD9A 92	RBBP8 93	REV1L 94	RPA 95	RPA3 96
SEMA4A 97	SESN1 98	SMC1L1 99	SUMO1 100	TP53 101	TP73 102	TREX1 103	TREX2 104
UNG 105	UNG2 106	XPA 107	XPC 108	XRCC1 109	XRCC2 110	XRCC3 111	XRCC4 112
XRCC5 113	ZAK 114	PUC18 115	Blank 116	Blank 117	AS1R2 118	AS1R1 119	AS1 120
GAPD 121	B2M 122	HSPCB 123	HSPCB 124	ACTB 125	ACTB 126	BAS2C 127	BAS2C 128

Gene Table

Position	UniGene	GenBank	Symbol	Description	Gene Name
1	Hs.311640	NM_002954	RPS27A	Ribosomal protein S27a	RPS27A
2	Hs.446504	NM_005157	ABL1	V-abl Abelson murine leukemia viral oncogene homolog 1	c-Abl
3	Hs.131059	NM_198889	ANKRD17	Ankryn repeat domain 17	ANKRD17
4	Hs.73722	NM_080649	APEX1	APEX nuclease (multifunctional DNA repair enzyme) 1	APEX/Ref-1
5	Hs.154149	NM_014481	APEX2	APEX nuclease (apurinic/apurimidinic endonuclease) 2	APEX2
6	Hs.526394	NM_000051	ATM	Ataxia telangiectasia mutated (includes complementation groups A, C and D)	ATM
7	Hs.77813	NM_001194	ATR	Ataxia telangiectasia and Rad3 related	ATR
8	Hs.440734	NM_000489	ATRX	Alpha thalassemia/mental retardation syndrome X-linked (RAD54 homolog, <i>S. cerevisiae</i>)	RAD54
9	Hs.194143	NM_007294	BRCA1	Breast cancer 1, early onset	BRC1
10	Hs.34012	NM_000059	BRCA2	Breast cancer 2, early onset	FANCB/FANCD1
11	Hs.75462	NM_006763	BTG2	BTG family, member 2	BTG2
12	Hs.514	NM_001239	CCNH	Cyclin H	Cyclin_H
13	Hs.184298	NM_001799	CDK7	Cyclin-dependent kinase 7 (MO15 homolog, <i>Xenopus laevis</i> , cdk-activating kinase)	CDK7
14	Hs.24529	NM_001274	CHEK1	CHK1 checkpoint homolog (<i>S. pombe</i>)	Chk1
15	Hs.146329	NM_007194	CHEK2	CHK2 checkpoint homolog (<i>S. pombe</i>)	CHK2/RAD53
16	Hs.135471	NM_006384	CIB1	Calcium and integrin binding 1 (calmyrin)	CIB1
17	Hs.249129	NM_001279	CIDEA	Cell death-inducing DFFA-like effector a	CIDE-A
18	Hs.448590	NM_014430	CIDEB	Cell death-inducing DFFA-like effector b	CIDE-B
19	Hs.32967	NM_000082	CKN1	Cockayne syndrome 1 (classical)	CSA
20	Hs.151573	NM_004075	CRY1	Cryptochrome 1 (photolyase-like)	CRY1
21	Hs.7278	NM_021117	CRY2	Cryptochrome 2 (photolyase-like)	CRY2
22	Hs.290758	NM_001923	DDB1	Damage-specific DNA binding protein 1, 127kDa	DDB1
23	Hs.446564	NM_000107	DDB2	Damage-specific DNA binding protein 2, 48kDa	DDB2
24	Hs.392171	NM_004083	DDIT3	DNA-damage-inducible transcript 3	GADD153(CHOP)
25	Hs.339396	NM_007068	DMC1	DMC1 dosage suppressor of mck1 homolog, meiosis-specific homologous recombination (yeast)	DMC1
26	Hs.435981	NM_001983	ERCC1	Excision repair cross-complementing rodent repair deficiency, complementation group 1 (includes overlapping antisense sequence)	ERCC1
27	Hs.99987	NM_000400	ERCC2	Excision repair cross-complementing rodent repair deficiency, complementation group 2 (xeroderma pigmentosum D)	XPD
28	Hs.77929	NM_000122	ERCC3	Excision repair cross-complementing rodent repair deficiency, complementation group 3 (xeroderma pigmentosum group B complementing)	XPB
29	Hs.511917	NM_005236	ERCC4	Excision repair cross-complementing rodent repair deficiency, complementation group 4	XPF
30	Hs.258429	NM_000123	ERCC5	Excision repair cross-complementing rodent repair deficiency, complementation group 5 (xeroderma pigmentosum, complementation group G (Cockayne syndrome))	XPG
31	Hs.47504	NM_130398	EXO1	Exonuclease 1	EXO1
32	Hs.434873	NM_004629	FANCG	Fanconi anemia, complementation group G	FANCG
33	Hs.409065	NM_004111	FEN1	Flap structure-specific endonuclease 1	RAD2
34	Hs.169744	NM_001469	G22P1	Thyroid autoantigen 70kDa (Ku antigen)	KU70
35	Hs.80409	NM_001924	GADD45A	Growth arrest and DNA-damage-inducible, alpha	GADD45
36	Hs.9701	NM_006705	GADD45G	Growth arrest and DNA-damage-inducible, gamma	GADD45gamma
37	Hs.86161	NM_002066	GML	GPI anchored molecule like protein	GML
38	Hs.432593	NM_005316	GTF2H1	General transcription factor IIH, polypeptide 1, 62kDa	GTF2H1
39	Hs.422901	NM_001515	GTF2H2	General transcription factor IIH, polypeptide 2, 44kDa	GTF2H2
40	Hs.30724	NM_001516	GTF2H3	General transcription factor IIH, polypeptide 3, 34kDa	GTF2H3
41	Hs.122552	NM_016426	GTSE1	G-2 and S-phase expressed 1	B99
42	Hs.152983	NM_004507	HUS1	HUS1 checkpoint homolog (<i>S. pombe</i>)	Hus1
43	Hs.33286	NM_002180	IGHMBP2	Immunoglobulin mu binding protein 2	IGHMBP2
44	Hs.17253	NM_054111	IHPK3	Inositol hexaphosphate kinase 3	IHPK3
45	Hs.75339	NM_001567	INPPL1	Inositol polyphosphate phosphatase-like 1	SHIP2

Product Specification Sheet

Position	UniGene	GenBank	Symbol	Description	Gene Name
46	Hs.61188	NM_033276	KUB3	Ku70-binding protein 3	KUB3
47	Hs.1770	NM_00234	LIG1	Ligase I, DNA, ATP-dependent	DNA ligase 1
48	Hs.100299	NM_002311	LIG3	Ligase III, DNA, ATP-dependent	DNA ligase III
49	Hs.160291	NM_002312	LIG4	Ligase IV, DNA, ATP-dependent	LIG4
50	Hs.256924	NM_002758	MAP2K6	Mitogen-activated protein kinase kinase 6	MKK6
51	Hs.432642	NM_002969	MAPK12	Mitogen-activated protein kinase 12	p38g MAPK
52	Hs.35947	NM_003925	MBD4	Methyl-CoG binding domain protein 4	MBD4
53	Hs.433618	NM_002049	MLH1	MutL homolog 1, colon cancer, nonpolyposis type 2 (E. coli)	MLH1
54	Hs.279843	NM_014381	MLH3	MutL homolog 3 (E. coli)	MLH3
55	Hs.72870	NM_002431	MNAT1	Menage a trois 1 (CAK assembly factor)	MNAT1
56	Hs.79396	NM_002434	MPG	N-methylpurine-DNA glycosylase	MDG
57	Hs.20555	NM_005590	MRE11A	MRE11 meiotic recombination 11 homolog A (S. cerevisiae)	MRE11A
58	Hs.440394	NM_000251	MSH2	MutS homolog 2, colon cancer, nonpolyposis type 1 (E. coli)	MSH2
59	Hs.42674	NM_002439	MSH3	MutS homolog 3 (E. coli)	MSH3
60	Hs.115246	NM_002440	MSH4	MutS homolog 4 (E. coli)	MSH4
61	Hs.132399	NM_002441	MSH5	MutS homolog 5 (E. coli)	NG23
62	Hs.445052	NM_000179	MSH6	MutS homolog 6 (E. coli)	MSH6
63	Hs.271353	NM_012222	MUTYH	MutY homolog (E. coli)	MYH
64	Hs.396494	NM_018177	N4BP2	Nedd4 binding protein 2	N4BP2
65	Hs.25812	NM_002485	NBS1	Nijmegen breakage syndrome 1 (nibrin)	Nibrin
66	Hs.66196	NM_002528	NTHL1	Nth endonuclease III-like 1 (E. coli)	NTH1
67	Hs.413078	NM_002452	NUDT1	Nudix (nucleoside diphosphate linked moiety X)-type motif 1	8-oxo-dGTPase
68	Hs.380271	NM_002542	OGG1	8-oxoquinone DNA glycosylase	OGH1
69	Hs.20930	NM_020418	PCBP4	Pol(rR) binding protein 4	MCG10
70	Hs.78996	NM_182649	PCNA	Proliferating cell nuclear antigen	PCNA
71	Hs.18720	NM_004208	PDCD8	Programmed cell death 8 (apoptosis-inducing factor)	AIF
72	Hs.111749	NM_000534	PMS1	PMS1 postmeiotic segregation increased 1 (S. cerevisiae)	PMS1
73	Hs.177548	NM_000535	PMS2	PMS2 postmeiotic segregation increased 2 (S. cerevisiae)	PMS2
74	Hs.278468	D38500	PMS2L4	Postmeiotic segregation increased 2-like 4	PMS6
75	Hs.278467	NM_005395	PMS2L9	Postmeiotic segregation increased 2-like 9	PMS2L9, PMS2L3
76	Hs.78016	NM_007254	PNKP	Polynucleotide kinase 3'-phosphatase	PNKP
77	Hs.76556	NM_014330	PPP1R15A	Protein phosphatase 1, regulatory (inhibitor) subunit 15A	GADD34
78	Hs.415749	NM_006904	PRKDC	Protein kinase, DNA-activated, catalytic polypeptide	DNA-PK
79	Hs.7179	NM_002853	RAD1	RAD1 homolog (S. pombe)	RAD1
80	Hs.16184	NM_002873	RAD17	RAD17 homolog (S. pombe)	RAD17
81	Hs.375684	NM_020165	RAD18	RAD18 homolog (S. cerevisiae)	RAD18
82	Hs.81848	NM_006265	RAD21	RAD21 homolog (S. pombe)	RAD21
83	Hs.440960	NM_005053	RAD23A	RAD23 homolog A (S. cerevisiae)	HHR23A
84	Hs.159087	NM_002874	RAD23B	RAD23 homolog B (S. cerevisiae)	RAD23B
85	Hs.41587	NM_005732	RAD50	RAD50 homolog (S. cerevisiae)	RAD50
86	Hs.446554	NM_002875	RAD51	RAD51 homolog (RecA homolog, E. coli) (S. cerevisiae)	RAD51
87	Hs.412587	NM_058216	RAD51C	RAD51 homolog C (S. cerevisiae)	RAD51C
88	Hs.509754	NM_133509	RAD51L1	RAD51-like 1 (S. cerevisiae)	RAD51B
89	Hs.125244	NM_002878	RAD51L3	RAD51-like 3 (S. cerevisiae)	RAD51D
90	Hs.148221	NM_002879	RAD52	RAD52 homolog (S. cerevisiae)	RAD52
91	Hs.66718	NM_003579	RAD54	RAD54-like (S. cerevisiae)	RAD54L
92	Hs.240457	NM_004584	RAD9A	RAD9 homolog A (S. pombe)	RAD9
93	Hs.437224	NM_002894	RBBP8	Retinoblastoma binding protein 8	CTIP
94	Hs.443077	NM_016316	REV1L	REV1-like (yeast)	REV1L
95	Hs.84318	NM_002945	RPA1	Replication protein A1, 70kDa	RPA1
96	Hs.1608	NM_002947	RP3	Replication protein A3, 14kDa	RP3
97	Hs.408846	NM_022367	SEMA4A	Sema domain, immunoglobulin domain (Ig), transmembrane domain (TM) and short cytoplasmic domain, (semaphorin) 4A	SEMA4A
98	Hs.14125	NM_014454	SESN1	Sestrin 1	PA26
99	Hs.211602	NM_006306	SMC1L1	SMC1 structural maintenance of chromosomes 1-like 1 (yeast)	SMC1L1
100	Hs.81424	NM_003352	SUMO1	SMT3 suppressor of mit two 3 homolog 1 (yeast)	UBL1
101	Hs.408312	NM_000546	TP53	Tumor protein p53 (Li-Fraumeni syndrome)	p53
102	Hs.192132	NM_005427	TP73	Tumor protein p73	p73
103	Hs.278408	NM_016381	TREX1	Three prime repair exonuclease 1	ATRIP
104	Hs.170835	NM_007205	TREX2	Three prime repair exonuclease 2	TREX2
105	Hs.78853	NM_003362	UNG	Uracil-DNA glycosylase	Uracil-DNA glycosylase
106	Hs.3041	NM_021147	UNG2	Uracil-DNA glycosylase 2	UNG2
107	Hs.288867	NM_000390	XPA	Xeroderma pigmentosum, complementation group A	XPC
108	Hs.320	NM_004628	XPC	Xeroderma pigmentosum, complementation group C	XPC
109	Hs.98493	NM_006297	XRCC1	X-ray repair complementing defective repair in Chinese hamster cells 1	XRCC1
110	Hs.129727	NM_005431	XRCC2	X-ray repair complementing defective repair in Chinese hamster cells 2	XRCC2
111	Hs.512716	NM_005432	XRCC3	X-ray repair complementing defective repair in Chinese hamster cells 3	XRCC3
112	Hs.150930	NM_003401	XRCC4	X-ray repair complementing defective repair in Chinese hamster cells 4	XRCC4
113	Hs.257082	NM_021141	XRCC5	X-ray repair complementing defective repair in Chinese hamster cells 5 (double-strand-break rejoining, Ku autoantigen, 80kDa)	KU80
114	Hs.115175	NM_016653	ZAK	Sterile alpha motif and leucine zipper containing kinase AZK	ZAK
115	N/A	L08752	PUC18	PUC18 Plasmid DNA	PUC18
116	Blank	Blank	Blank	Blank	0
117	Blank	Blank	Blank	Blank	0
118	N/A	N/A	AS1R2	Artificial Sequence 1 Related 2 (80% identity)(48/60)	N/A
119	N/A	N/A	AS1R1	Artificial Sequence 1 Related 1 (90% identity)(56/60)	N/A
120	N/A	N/A	AS1	Artificial Sequence 1	N/A
121	Hs.169476	NM_002046	GAPD	Glyceraldehyde-3-phosphate dehydrogenase	GAPDH
122	Hs.48516	NM_004048	B2M	Beta-2-microglobulin	B2M
123	Hs.74335	NM_007355	HSPCB	Heat shock 90kDa protein 1, beta	HSP90 b
124	Hs.74335	NM_007355	HSPCB	Heat shock 90kDa protein 1, beta	HSP90 b
125	Hs.426930	NM_001101	ACTB	Actin, beta	b-Actin
126	Hs.426930	NM_001101	ACTB	Actin, beta	b-Actin
127	N/A	N/A	BAS2C	Biotinylated Artificial Sequence 2 Complementary sequence	N/A
128	N/A	N/A	BAS2C	Biotinylated Artificial Sequence 2 Complementary sequence	N/A