

Supplementary Table S13 Gene set enrichment analysis of biological pathways v
(Gene Ontology Portal tools, <http://geneontology.org>).

Database	Gene set	Original # genes in gene set
GO biological process complete		11
	cellular response to UV-A	
	response to UV-A	14
	response to UV	150
	response to light stimulus	311
	response to radiation	439
	response to abiotic stimulus	1106
	cellular response to UV	91
	cellular response to light stimulus	116
	cellular response to radiation	181
	cellular response to abiotic stimulus	320
	cellular response to environmental stimulus	320
	collagen catabolic process	38
	collagen metabolic process	57
	extracellular matrix disassembly	47
	extracellular matrix organization	294
	extracellular structure organization	295
	external encapsulating structure organization	297
	cellular component disassembly	300
	regulation of neuroinflammatory response	35
	endodermal cell differentiation	41
	endoderm formation	51
	endoderm development	77
	formation of primary germ layer	115
	gastrulation	162
	response to amyloid-beta	49
GO molecular function complete		114
	metalloendopeptidase activity	
	endopeptidase activity	457
	peptidase activity	643
	metallopeptidase activity	190
	serine-type endopeptidase activity	180
	serine-type peptidase activity	198
	serine hydrolase activity	202
	zinc ion binding	837

	transition metal ion binding	1113
GO cellular component complete		572
	extracellular matrix	
	external encapsulating structure	573
PANTHER Pathways	Plasminogen activating cascade	17
	Alzheimer disease-presenilin pathway	131
PANTHER GO-Slim Molecular Function		84
	metalloendopeptidase activity	
	endopeptidase activity	324
	peptidase activity	433
	hydrolase activity	1739
	catalytic activity, acting on a protein	1473
	metallopeptidase activity	116
PANTHER GO-Slim Biological Process		74
	extracellular matrix organization	
	external encapsulating structure organization	74
	cellular component organization	2518
	cellular component organization or biogenesis	2644
	extracellular structure organization	75
	catabolic process	893
PANTHER Protein Class		155
	metalloprotease	
	protease	595
	protein modifying enzyme	1622
Reactome pathways		33
	Activation of Matrix Metalloproteinases	
	Degradation of the extracellular matrix	140
	Collagen degradation	64
	Extra-nuclear estrogen signaling	73
	ESR-mediated signaling	187
	Signaling by Nuclear Receptors	261
	Interleukin-4 and Interleukin-13 signaling	111
	Signaling by Interleukins	448
	Cytokine Signaling in Immune system	697

with 9 BC-associated genes in breast (BC-associated polymorphisms functionality in breast)

# genes in gene set analyzed by Gene Ontology	Fold Enrichment	raw P-value	FDR
4	> 100	0.0000000000229	0.00000012
4	> 100	0.0000000000513	0.000000161
4	61	0.000000368	0.00048
4	29.42	0.00000636	0.00525
4	20.84	0.0000244	0.0166
5	10.34	0.0000475	0.0298
4	> 100	0.0000000526	0.000137
4	78.89	0.000000135	0.000192
4	50.56	0.000000766	0.000801
4	28.06	0.00000711	0.00558
4	28.06	0.00000711	0.00531
5	> 100	0.0000000000039	0.0000000612
5	> 100	0.0000000000262	0.000000102
5	> 100	0.0000000000105	0.0000000825
5	38.91	0.0000000749	0.000168
5	38.77	0.0000000761	0.000149
5	38.51	0.0000000787	0.000137
5	38.13	0.0000000827	0.00013
3	> 100	0.000000483	0.000582
3	> 100	0.000000757	0.000848
3	> 100	0.00000141	0.0013
3	89.13	0.00000466	0.00406
3	59.68	0.000015	0.0107
3	42.36	0.0000409	0.0267
3	> 100	0.00000126	0.00124
5	> 100	0.000000000731	0.00000359
5	25.03	0.00000065	0.000531
5	17.79	0.00000344	0.00241
5	60.2	0.00000000883	0.0000144
5	63.55	0.00000000678	0.0000166
5	57.77	0.0000000108	0.0000132
5	56.63	0.0000000119	0.0000117
5	13.67	0.0000124	0.0076

5	10.28	0.000049	0.0267
5	20	0.00000195	0.00397
5	19.96	0.00000196	0.002
4	> 100	0.0000000001	0.000000016
4	69.85	0.000000217	0.0000173
5	> 100	0.000000000167	0.0000000912
5	35.3	0.000000121	0.0000219
5	26.42	0.000000499	0.0000681
5	6.58	0.000408	0.0371
5	7.77	0.000186	0.0204
5	98.61	0.000000000796	0.000000217
5	> 100	0.0000000000909	0.000000202
5	> 100	0.0000000000909	0.000000101
7	6.36	0.0000119	0.00658
7	6.06	0.0000165	0.00732
5	> 100	0.0000000000969	0.0000000717
5	12.81	0.0000169	0.00627
5	73.8	0.00000000326	0.00000064
5	19.22	0.00000236	0.000231
5	7.05	0.000294	0.0192
5	> 100	0.0000000000204	0.0000000508
5	81.7	0.00000000199	0.00000165
5	> 100	0.0000000000454	0.0000000566
3	94.01	0.00000399	0.00166
3	36.7	0.0000623	0.0194
3	26.03	0.000165	0.0412
4	82.44	0.000000114	0.0000567
4	20.43	0.0000264	0.00941
4	13.13	0.000146	0.0405

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