

Additional File 1. Expression and Fold Change Healthy Smokers Compared to Nonsmokers of Oxidant-related Genes in Small Airway Epithelium and Alveolar Macrophages¹

Category	Probe Set ID	Gene symbol	Gene title	Small airway epithelium		Alveolar macrophages		Small airway epithelium		Alveolar macrophages	
				Healthy		Healthy		Fold-change ²	p value	Fold-change	p value
				Nonsmokers % expression	smokers % expression	Nonsmokers % expression	smokers % expression				
Glutathione metabolism	202804_at	ABCC1	ATP-binding cassette, sub-family C, member 1	100	100	100	100	1.22	0.204	1.02	0.946
	202275_at	G6PD	glucose-6-phosphate dehydrogenase	42	77	100	100	1.78	0.015	1.42	0.143
	202923_s_at	GCLC	glutamate-cysteine ligase, catalytic subunit	100	100	100	100	1.50	0.005	1.67	0.007
	203925_at	GCLM	glutamate-cysteine ligase, modifier subunit	100	100	100	100	1.28	0.110	1.19	0.555
	207131_x_at	GGT1	gamma-glutamyltransferase 1	95	77	100	97	1.01	0.985	1.30	0.342
	200736_s_at	GPX1	glutathione peroxidase 1	100	100	100	100	-1.14	0.414	1.20	0.302
	202831_at	GPX2	glutathione peroxidase 2	100	100	0	0	5.00	0.001	1.16	0.808
	201348_at	GPX3	glutathione peroxidase 3	100	100	100	100	1.27	0.333	1.19	0.625
	201106_at	GPX4	glutathione peroxidase 4	100	100	100	100	-1.11	0.529	1.09	0.684
	213170_at	GPX7	glutathione peroxidase 7	95	73	63	67	-1.31	0.074	1.07	0.853
	205770_at	GSR	glutathione reductase	100	100	100	100	1.60	0.013	1.41	0.093
	211630_s_at	GSS	glutathione synthetase	100	100	100	100	-1.01	0.970	1.06	0.808
	215766_at	GSTA1	Glutathione S-transferase A1	100	100	100	100	-1.20	0.094	-1.06	0.687
	222102_at	GSTA3	glutathione S-transferase A3	100	100	0	0	1.20	0.428	-1.09	0.875
	202967_at	GSTA4	glutathione S-transferase A4	100	100	100	97	1.18	0.188	-1.11	0.562
	217751_at	GSTK1	glutathione S-transferase kappa 1	100	100	100	100	-1.07	0.603	1.13	0.562
	215333_x_at	GSTM1	glutathione S-transferase M1	100	100	95	97	-1.19	0.333	1.25	0.548
	204418_x_at	GSTM2	glutathione S-transferase M2	100	100	100	97	-1.14	0.409	1.20	0.533
	202554_s_at	GSTM3	glutathione S-transferase M3	95	100	100	100	1.10	0.742	-1.18	0.719
	210912_x_at	GSTM4	glutathione S-transferase M4	100	93	100	97	-1.18	0.199	1.15	0.552
	201470_at	GSTO1	glutathione S-transferase omega 1	100	100	100	100	-1.06	0.768	-1.01	0.937
	227163_at	GSTO2	glutathione S-transferase omega 2	100	100	5	3	-1.17	0.142	-1.87	0.099
	200824_at	GSTP1	glutathione S-transferase pi	100	100	100	100	-1.01	0.965	1.10	0.610
	203815_at	GSTT1	glutathione S-transferase theta 1	68	77	74	77	1.35	0.817	1.63	0.684
	205439_at	GSTT2	glutathione S-transferase theta 2	53	30	47	60	-2.23	0.149	-1.41	0.520
	209531_at	GSTZ1	glutathione transferase zeta 1	100	100	95	100	-1.12	0.489	1.01	0.994
	201193_at	IDH1	isocitrate dehydrogenase 1, soluble	100	100	100	100	1.01	0.960	1.39	0.143
	210046_s_at	IDH2	isocitrate dehydrogenase 2	100	100	100	100	1.09	0.742	1.70	0.075
	202069_s_at	IDH3A	isocitrate dehydrogenase 3 alpha	100	100	100	100	-1.02	0.924	1.13	0.460
	201509_at	IDH3B	isocitrate dehydrogenase 3 beta	100	100	100	100	-1.12	0.409	1.19	0.335

Additional File 1. Expression and Fold Change Healthy Smokers Compared to Nonsmokers of Oxidant-related Genes in Small Airway Epithelium and Alveolar Macrophages¹ (cont. page 2)

Category	Probe Set ID	Gene symbol	Gene title	Small airway epithelium		Alveolar macrophages		Small airway epithelium		Alveolar macrophages	
				Healthy Nonsmokers % expression	Healthy smokers % expression	Healthy Nonsmokers % expression	Healthy smokers % expression	Fold-change ²	p value	Fold-change	p value
Redox balance	202471_s_at	IDH3G	isocitrate dehydrogenase 3 gamma	100	100	100	100	-1.20	0.387	1.15	0.463
	1565162_s_at	MGST1	microsomal glutathione S-transferase 1	100	100	100	100	1.03	0.899	1.14	0.392
	204168_at	MGST2	microsomal glutathione S-transferase 2	100	100	100	100	-1.10	0.458	1.24	0.328
	201403_s_at	MGST3	microsomal glutathione S-transferase 3	100	100	100	100	-1.05	0.811	1.06	0.649
	242617_at	TMED8	Transmembrane emp24 protein transport domain containing 8	100	97	100	100	1.16	0.419	1.28	0.214
	210505_at	ADH7	alcohol dehydrogenase 7 (class IV), mu or sigma polypeptide	100	100	5	10	5.37	0.001	-1.28	0.562
Catalase/ SOD	201272_at	AKR1B1	aldo-keto reductase family 1, member B1	100	100	100	100	1.72	0.001	-1.15	0.328
	209160_at	AKR1C3	aldo-keto reductase family 1, member C3	100	100	100	100	2.53	0.001	1.16	0.439
	201432_at	CAT	catalase	100	100	100	100	1.05	0.808	1.11	0.591
Other oxidants scavengers	200642_at	SOD1	superoxide dismutase 1, soluble	100	100	100	100	1.07	0.649	1.08	0.631
	216841_s_at	SOD2	superoxide dismutase 2	100	100	100	100	-1.19	0.338	-2.06	0.006
	205236_x_at	SOD3	superoxide dismutase 3	5	0	5	0	-1.05	0.899	1.11	0.780
	227253_at	CP	ceruloplasmin	100	100	63	47	-1.10	0.648	-1.64	0.294
	219933_at	GLRX2	glutaredoxin 2	100	100	100	100	-1.18	0.294	1.10	0.512
	210682_at	LPO	lactoperoxidase	0	0	0	0	1.09	0.899	-1.20	0.742
	202018_s_at	LTF	lactotransferrin	100	0	87	0	-3.16	0.000	-1.070	0.772
	216336_x_at	MT1A	metallothionein 1A	100	100	100	100	-1.47	0.005	-1.57	0.089
	212859_x_at	MT1E	metallothionein 1E	100	100	100	100	-1.75	0.001	-1.54	0.075
	217165_x_at	MT1F	metallothionein 1F	100	100	100	100	-1.99	0.001	-1.51	0.151
	217546_at	MT1M	metallothionein 1M	21	10	100	97	-2.49	0.015	-2.91	0.093
	208581_x_at	MT1X	metallothionein 1X	100	100	100	100	-1.56	0.002	-1.39	0.211
	212185_x_at	MT2A	metallothionein 2A	100	100	100	100	-1.64	0.001	-1.32	0.213
	208680_at	PRDX1	peroxiredoxin 1	100	100	100	100	1.40	0.038	-1.01	0.965
	39729_at	PRDX2	peroxiredoxin 2	100	100	100	100	-1.20	0.180	-1.03	0.963
	201619_at	PRDX3	peroxiredoxin 3	100	100	100	100	-1.23	0.094	-1.02	0.924
	201923_at	PRDX4	peroxiredoxin 4	100	100	100	100	-1.11	0.409	1.17	0.282
	222994_at	PRDX5	peroxiredoxin 5	100	100	100	100	-1.14	0.377	1.20	0.460
	200845_s_at	PRDX6	peroxiredoxin 6	100	100	100	100	-1.04	0.817	-1.06	0.742
	203400_s_at	TF	transferrin	42	37	0	3	-1.23	0.808	1.41	0.562
	207332_s_at	TFRC	transferrin receptor	100	100	100	100	1.10	0.711	1.01	0.971
	210614_at	TTPA	tocopherol transfer protein	11	0	0	0	-1.05	0.950	1.28	0.693
	216609_at	TXN	Thioredoxin	100	100	100	100	1.44	0.199	-1.68	0.224
	209077_at	TXN2	thioredoxin 2	100	100	100	100	-1.15	0.409	1.16	0.263

Additional File 1. Expression and Fold Change Healthy Smokers Compared to Nonsmokers of Oxidant-related Genes in Small Airway Epithelium and Alveolar Macrophages¹ (cont. page 3)

Category	Probe Set ID	Gene symbol	Gene title	Small airway epithelium		Alveolar macrophages		Small airway epithelium		Alveolar macrophages	
				Healthy Nonsmokers % expression	Healthy smokers % expression	Healthy Nonsmokers % expression	Healthy smokers % expression	Fold-change ²	p value	Fold-change	p value
Pentose phosphate cycle	201266_at	TXNRD1	thioredoxin reductase 1	100	100	100	100	1.87	0.001	1.28	0.163
	211177_s_at	TXNRD2	thioredoxin reductase 2	37	47	79	97	-1.22	0.338	1.21	0.509
	59631_at	TXNRD3	thioredoxin reductase 3	100	97	79	77	-1.11	0.416	1.09	0.843
	208308_s_at	GPI	glucose phosphate isomerase	100	100	100	100	1.01	0.952	1.14	0.579
	210976_s_at	PFKM	phosphofructokinase, muscle	100	100	100	97	-1.02	0.899	1.00	0.997
	201037_at	PFKP	phosphofructokinase, platelet	100	100	100	100	-1.13	0.545	1.09	0.781
	201118_at	PGD	phosphogluconate dehydrogenase	100	100	100	100	1.66	0.008	1.17	0.352
	218388_at	PGLS	6-phosphogluconolactonase	100	100	100	100	-1.01	0.958	1.25	0.477
	201968_s_at	PGM1	phosphoglucomutase 1	100	100	100	100	-1.18	0.280	1.05	0.815
	213093_at	PRKCA	protein kinase C, alpha	100	100	95	100	-1.52	0.001	1.86	0.037
	209440_at	PRPS1	phosphoribosyl pyrophosphate synthetase 1	100	100	100	100	-1.02	0.899	1.04	0.852
	230352_at	PRPS2	Phosphoribosyl pyrophosphate synthetase 2	100	100	100	100	-1.47	0.204	-1.43	0.445
	225040_s_at	RPE	ribulose-5-phosphate-3-epimerase	100	100	100	100	-1.06	0.820	1.18	0.277
	212973_at	RPIA	ribose 5-phosphate isomerase A	100	100	100	100	-1.16	0.393	-1.12	0.392
	206283_s_at	TAL1	T-cell acute lymphocytic leukemia 1	42	53	16	20	1.26	0.534	1.16	0.781
Xenobiotic metabolism	226835_s_at	TALDO1	transaldolase 1	100	100	100	100	-1.17	0.338	1.27	0.266
	208699_x_at	TKT	transketolase	100	100	100	100	1.79	0.008	1.52	0.198
	205749_at	CYP1A1	cytochrome P450, family 1, subfamily A, polypeptide 1	0	43	0	10	9.07	0.001	1.29	0.699
	207608_x_at	CYP1A2	cytochrome P450, family 1, subfamily A, polypeptide 2	68	70	47	53	1.01	0.970	1.34	0.460
	202437_s_at	CYP1B1	cytochrome P450, family 1, subfamily B, polypeptide 1	32	97	100	100	25.41	0.001	1.69	0.143
	1494_f_at	CYP2A6	cytochrome P450, family 2, subfamily A, polypeptide 6	100	100	32	50	-1.26	0.103	1.41	0.143
	216340_s_at	CYP2A7P1	cytochrome P450, family 2, subfamily A, polypeptide 7 pseudogene 1	0	3	0	3	1.11	0.820	-1.15	0.762
	207718_x_at	CYP2A13	cytochrome P450, family 2, subfamily A, polypeptide 13	89	73	0	3	-1.39	0.015	1.48	0.472
	217133_x_at	CYP2B6	cytochrome P450, family 2, subfamily B, polypeptide 6	95	90	47	50	-1.14	0.587	-1.23	0.277
	210272_at	CYP2B7P1	cytochrome P450, family 2, subfamily B, polypeptide 7 pseudogene 1	100	100	0	7	-1.10	0.759	-1.41	0.548
	208147_s_at	CYP2C8	cytochrome P450, family 2, subfamily C, polypeptide 8	100	100	0	0	1.11	0.647	1.17	0.825
	216025_x_at	CYP2C9	cytochrome P450, family 2, subfamily C, polypeptide 9	100	100	21	17	1.18	0.301	-1.11	0.857

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Category	Probe Set ID	Gene symbol	Gene title	Small airway epithelium		Alveolar macrophages		Small airway epithelium		Alveolar macrophages	
				Healthy Nonsmokers % expression	Healthy smokers % expression	Healthy Nonsmokers % expression	Healthy smokers % expression	Fold-change ²	p value	Fold-change	p value
	208126_s_at	CYP2C18	cytochrome P450, family 2, subfamily C, polypeptide 18	68	67	0	0	1.08	0.808	1.82	0.152
	216058_s_at	CYP2C19	cytochrome P450, family 2, subfamily C, polypeptide 19	5	10	0	0	1.42	0.428	-1.09	0.875
	207498_s_at	CYP2D6	cytochrome P450, family 2, subfamily D, polypeptide 6	47	63	58	43	-1.04	0.899	-1.18	0.591
	209975_at	CYP2E1	cytochrome P450, family 2, subfamily E, polypeptide 1	79	53	0	3	-1.54	0.070	-1.54	0.341
	205073_at	CYP2J2	cytochrome P450, family 2, subfamily J, polypeptide 2	100	100	0	0	-1.25	0.047	-1.40	0.512
	227109_at	CYP2R1	cytochrome P450, family 2, subfamily R, polypeptide 1	100	100	100	100	1.01	0.952	1.06	0.745
	223385_at	CYP2S1	cytochrome P450, family 2, subfamily S, polypeptide 1	100	97	74	97	-1.01	0.988	1.83	0.093
	226393_at	CYP2U1	cytochrome P450, family 2, subfamily U, polypeptide 1	100	100	89	100	1.01	0.924	-1.27	0.335
	220562_at	CYP2W1	cytochrome P450, family 2, subfamily W, polypeptide 1	42	20	0	0	-1.41	0.236	-1.08	0.910
	205999_x_at	CYP3A4	cytochrome P450, family 3, subfamily A, polypeptide 4	11	3	53	17	-1.01	0.988	-1.61	0.214
	211440_x_at	CYP3A43	cytochrome P450, family 3, subfamily A, polypeptide 43	11	3	5	3	-1.11	0.817	1.16	0.852
	205765_at	CYP3A5	cytochrome P450, family 3, subfamily A, polypeptide 5	26	57	42	13	1.08	0.820	-1.98	0.400
	205939_at	CYP3A7	cytochrome P450, family 3, subfamily A, polypeptide 7	5	10	58	10	1.13	0.820	-3.69	0.030
	207407_x_at	CYP4A11	cytochrome P450, family 4, subfamily A, polypeptide 11	0	23	5	17	1.35	0.419	-1.03	0.965
	217319_x_at	CYP4A22	cytochrome P450, family 4, subfamily A, polypeptide 22	0	3	5	27	1.70	0.182	1.12	0.802
	210096_at	CYP4B1	cytochrome P450, family 4, subfamily B, polypeptide 1	100	100	0	3	-1.39	0.005	2.03	0.147
	210452_x_at	CYP4F2	cytochrome P450, family 4, subfamily F, polypeptide 2	0	0	0	0	1.92	0.094	-1.25	0.405
	206515_at	CYP4F3	cytochrome P450, family 4, subfamily F, polypeptide 3	95	93	5	7	2.27	0.001	-1.06	0.946
	210576_at	CYP4F8	cytochrome P450, family 4, subfamily F, polypeptide 8	0	0	0	0	1.09	0.886	-1.64	0.266

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				Healthy Nonsmokers % expression	Healthy smokers % expression	Healthy Nonsmokers % expression	Healthy smokers % expression	Fold-change ²	p value	Fold-change	p value
	206153_at	CYP4F11	cytochrome P450, family 4, subfamily F, polypeptide 11	79	90	11	7	3.21	0.013	-1.77	0.472
	206539_s_at	CYP4F12	cytochrome P450, family 4, subfamily F, polypeptide 12	63	63	0	0	1.14	0.565	-1.10	0.843
	228391_at	CYP4V2	cytochrome P450, family 4, subfamily V, polypeptide 2	100	100	100	100	-1.15	0.411	1.06	0.907
	227702_at	CYP4X1	cytochrome P450, family 4, subfamily X, polypeptide 1	100	100	0	3	-2.02	0.001	-1.27	0.687
	237395_at	CYP4Z1	cytochrome P450, family 4, subfamily Z, polypeptide 1	95	90	0	0	-1.45	0.014	-1.24	0.762
	1553434_at	CYP4Z2P	cytochrome P450 4Z2 pseudogene	11	0	0	3	2.01	0.143	-1.29	0.642
	207406_at	CYP7A1	cytochrome P450, family 7, subfamily A, polypeptide 1	0	0	0	3	-1.48	0.428	-1.83	0.266
	207386_at	CYP7B1	cytochrome P450, family 7, subfamily B, polypeptide 1	74	60	5	7	1.13	0.782	-1.15	0.852
	232494_at	CYP8B1	cytochrome P450, family 8, subfamily B, polypeptide 1	0	0	0	0	1.04	0.928	-1.43	0.163
	204309_at	CYP11A1	cytochrome P450, family 11, subfamily A, polypeptide 1	0	0	0	0	1.04	0.957	1.01	0.996
	214610_at	CYP11B1	cytochrome P450, family 11, subfamily B, polypeptide 1	0	0	0	0	1.72	0.316	-1.21	0.766
	214630_at	CYP11B2	cytochrome P450, family 11, subfamily B, polypeptide 2	0	0	5	3	1.18	0.565	1.22	0.591
	1562573_at	CYP17A1	cytochrome P450, family 17, subfamily A, polypeptide 1	0	7	5	0	1.03	0.970	1.18	0.762
	203475_at	CYP19A1	cytochrome P450, family 19, subfamily A, polypeptide 1	5	3	5	0	1.18	0.811	-1.30	0.687
	219565_at	CYP20A1	cytochrome P450, family 20, subfamily A, polypeptide 1	95	100	100	100	1.06	0.808	1.15	0.406
	214622_at	CYP21A2	cytochrome P450, family 21, subfamily A, polypeptide 2	0	0	0	0	1.25	0.533	-1.22	0.508
	206504_at	CYP24A1	cytochrome P450, family 24, subfamily A, polypeptide 1	79	80	0	3	1.22	0.680	1.06	0.946
	206424_at	CYP26A1	cytochrome P450, family 26, subfamily A, polypeptide 1	37	63	0	0	2.05	0.045	1.05	0.946
	234721_s_at	CYP26B1	cytochrome P450, family 26, subfamily B, polypeptide 1	0	0	0	0	1.24	0.594	-1.23	0.562

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Category	Probe Set ID	Gene symbol	Gene title	Small airway epithelium		Alveolar macrophages		Small airway epithelium		Alveolar macrophages	
				Healthy Nonsmokers % expression	Healthy smokers % expression	Healthy Nonsmokers % expression	Healthy smokers % expression	Fold-change ²	p value	Fold-change	p value
Selenium-related	203979_at	CYP27A1	cytochrome P450, family 27, subfamily A, polypeptide 1	68	63	100	100	-1.33	0.218	1.24	0.152
	205676_at	CYP27B1	cytochrome P450, family 27, subfamily B, polypeptide 1	0	3	63	70	1.34	0.470	-1.92	0.143
	1553977_a_at	CYP39A1	cytochrome P450, family 39, subfamily A, polypeptide 1	100	97	5	10	1.16	0.294	1.14	0.765
	220331_at	CYP46A1	cytochrome P450, family 46, subfamily A, polypeptide 1	26	23	0	0	-1.19	0.561	1.23	0.632
	216607_s_at	CYP51A1	cytochrome P450, family 51, subfamily A, polypeptide 1	100	100	100	100	-1.05	0.894	1.36	0.228
	202017_at	EPHX1	epoxide hydrolase 1, microsomal (xenobiotic)	100	100	100	100	-1.08	0.820	1.39	0.335
	209368_at	EPHX2	epoxide hydrolase 2, cytoplasmic	95	97	0	0	-1.19	0.409	-1.46	0.301
	214627_at	EPX	eosinophil peroxidase	0	0	0	3	1.09	0.834	-1.43	0.294
	228678_at	FAM116B	family with sequence similarity 116, member B	95	90	0	0	-1.16	0.587	1.78	0.151
	1558549_s_at	VNN1	vanin 1	53	43	74	97	-1.52	0.218	2.04	0.081
	224888_at	SELI	selenoprotein I	100	100	100	100	1.03	0.820	1.07	0.631
	223070_at	SELK	selenoprotein K	100	100	100	100	-1.13	0.424	-1.16	0.266
	226051_at	SELM	selenoprotein M	100	93	84	100	-1.04	0.894	-1.04	0.946
	223209_s_at	SELS	selenoprotein S	100	100	100	100	1.03	0.886	1.02	0.946
	225561_at	SELT	selenoprotein T	100	100	100	100	-1.21	0.414	-1.25	0.266
Bilirubin-related	237475_x_at	SEPP1	Selenoprotein P, plasma, 1	100	100	100	100	1.10	0.693	-1.05	0.684
	201194_at	SEPW1	selenoprotein W, 1	100	100	100	100	-1.17	0.294	1.23	0.143
	203771_s_at	BLVRA	biliverdin reductase A	100	100	100	100	-1.05	0.820	1.13	0.508
	203665_at	HMOX1	heme oxygenase (decycling) 1	89	70	100	100	-1.02	0.952	1.51	0.077
	218120_s_at	HMOX2	heme oxygenase (decycling) 2	100	100	100	100	-1.08	0.742	1.16	0.507
Ascorbic acid-related	209236_at	SLC23A2	solute carrier family 23, member 2	95	90	89	100	1.08	0.680	1.50	0.038
	237799_at	SLC22A12	solute carrier family 22, member 12	0	0	0	3	1.28	0.603	1.07	0.921
Prod of free radicals	223732_at	SLC23A1	solute carrier family 23, member 1	100	97	0	0	-1.38	0.142	-1.32	0.579
	203949_at	MPO	myeloperoxidase	0	7	0	13	1.26	0.647	1.24	0.610
	207309_at	NOS1	nitric oxide synthase 1 (neuronal)	0	0	11	23	-1.26	0.470	1.08	0.852
	210037_s_at	NOS2A	nitric oxide synthase 2A (inducible, hepatocytes)	32	17	0	0	-1.89	0.110	-1.18	0.765
	205581_s_at	NOS3	nitric oxide synthase 3 (endothelial cell)	0	10	0	0	1.17	0.820	1.32	0.520

¹ % expression of oxidant-related genes in small airway epithelium and alveolar macrophages from the same healthy nonsmokers (n=19) and healthy smokers (n=30). Where more than one probe set identification exists for a gene, the probe set identification with the highest expression is presented here.

² Fold-change represents the average expression in healthy smokers compared to the average expression in healthy nonsmokers.