Supplementary Material

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Left Ventricular gene expression profile of healthy and cardiovascular compromised rat models used in air pollution studies

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Supplementary Table 1. Selected differentially expressed genes in the ventricles of SH relative to WKY.

AffyID	Gene Title	Gene Symbol	WKY expression level	SH/ WKY
1371237_a_at	Metallothionein	Mt1a	165	1.76
1398252_at	nuclear receptor binding factor 1	Nrbf1	57	1.76
1370319_at	peptidylprolyl isomerase F	Ppif	94	1.75
1369804_a_at	casein kinase 1, epsilon	Csnk1e	23	1.74
1369177_at	phosphatidylinositol 4-kinase type II	Pi4KII	72	1.67
1370080_at	heme oxygenase 1	Hmox1	38	1.66
1368583_a_at	histidine-rich glycoprotein	Hrg	41	1.64
1368456_at	gamma-aminobutyric acid A receptor, rho 1	Gabrr1	29	1.62
1370574_a_at	protein tyrosine phosphatase, non-receptor type substrate 1	Ptpns1	33	1.61
1371242_at	metabotropic glutamate receptor 8	Grm8	62	1.60
1370193_at	protein tyrosine phosphatase 4a1	Ptp4a1	110	1.59
1386944_a_at	glucose-6-phosphatase, catalytic	G6pc	28	1.59
1370409_at	solute carrier family 38, member 1	Slc38a1	62	1.58
1388932_at	laminin, alpha 5	Lama5	118	1.58
1398313_a_at	potassium channel, subfamily K, member 3	Kcnk3	46	1.57
1368315_at	ectonucleoside triphosphate diphosphohydrolase 6	Entpd6	55	1.54
1387388_at	calcium binding protein p22	Chp	68	1.53
1383686_at	synaptogyrin 1	Syngr1	64	1.52
1369673_at	purinergic receptor P2X, ligand-gated ion channel, 5	P2rx5	33	1.52
1386888_at	eukaryotic translation initiation factor 4E binding protein 1	Eif4ebp1	151	1.50
1369121_at	growth differentiation factor 9	Gdf9	25	1.50
1388167_at	nuclear factor I/B	Nfib	270	-1.50
1367807_at	procollagen-lysine, 2-oxoglutarate 5-dioxygenase	Plod	227	-1.50
1368331_at	di-N-acetylchitobiase	Ctbs	46	-1.52
1373419_at	protein tyrosine phosphatase, receptor type, G	Ptprg	37	-1.53
1387351_at	fibrillin-1	Fbn1	174	-1.53
1368426_at	carnitine O-octanoyltransferase	Crot	52	-1.54
1368829_at	fibrillin-1	Fbn1	105	-1.54
1370895_at	collagen, type V, alpha 2	Col5a2	196	-1.54
1388122_at	glutathione S-transferase, pi 2	Gstp2	265	-1.55
1370956_at	decorin	Dcn	1999	-1.55
1386993_at	myosin heavy chain, polypeptide 7	Myh7	5727	-1.57
1398835_at	actin, beta	Actb	1022	-1.57
1370161_at	steroid sensitive gene 1	Ssg1	372	-1.58
1370247_a_at	peripheral myelin protein 22	Pmp22	263	-1.59
1388608_x_at	hemoglobin, alpha 1	Hba1	3293	-1.61

1370047_at	ectonucleotide pyrophosphatase/phosphodiesterase 1	Enpp1	37	-1.61
1370864_at	collagen, type 1, alpha 1	Col1a1	141	-1.61
1386906_a_at	septin-like protein	Slpa	92	-1.63
1370260_at	adducin 3, gamma	Add3	160	-1.63
1398345_at	angiopoietin-like 2	Angptl2	155	-1.64
1370959_at	collagen, type III, alpha 1	Col3a1	1363	-1.64
1371150_at	cyclin D1	Ccnd1	52	-1.65
1370155_at	procollagen, type I, alpha 2	Col1a2	1216	-1.68
1369235_at	transmembrane receptor Unc5H2	Unc5h2	65	-1.69
1370000_at	NEFA precursor	Nucb2	100	-1.69
1368517_at	sequence-specific single-stranded-DNA-binding protein	Ssdp	57	-1.71
1388936_at	cadherin-11	Cdh11	36	-1.72
1367553_x_at	hemoglobin beta chain complex	Hbb	3449	-1.72
1387005_at	cathepsin S	Ctss	72	-1.74
1371732_at	dermatopontin	Dpt	540	-1.76
1370960_at	insulin-like growth factor-binding protein 5	Igfbp5	149	-1.76
1387918_at	tropomyosin isoform 6	LOC286890	28	-1.76
1387794_at	ficolin A	Fcna	36	-1.78
1368054_at	lamin A	Lmna	60	-1.78
1368536_at	ectonucleotide pyrophosphatase/phosphodiesterase 2	Enpp2	51	-1.85
1388712_at	pleckstrin homology, Sec7 and coiled/coil domains 3	Pscd3	57	-1.85
1389554_at	nuclear receptor subfamily 2, group F, member 2	Nr2f2	26	-1.88
1390707_at	regulator of G-protein signaling 10	Rgs10	52	-1.89
1371102_x_at	hemoglobin beta chain complex	Hbb	971	-1.90
1367751_at	dolichol-phosphate mannosyltransferase 2	Dpm2	29	-1.94
1370963_at	growth arrest specific 7	Gas7	41	-1.95
1388201_at	bone morphogenetic protein 6	Bmp6	41	-2.01
1368751_at	Shab-related delayed-rectifier K+ channel (Kv9.3)	Kcns3	34	-2.06
1368903_at	double-stranded RNA-binding protein p74	Spnr	25	-2.15
1370266_at	parvin, alpha	Parva	24	-2.21
1371672_at	chromobox 7	Cbx7	23	-2.37
1373345_at	transmembrane protein AMIGO2	Amigo2	30	-2.38
1368347_at	collagen, type V, alpha 3	Col5a3	25	-2.41
1368647_at	G protein-coupled receptor kinase 6	Gprk6	22	-3.14
1369653_at	transforming growth factor, beta receptor II	Tgfbr2	23	-3.21

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Supplementary Table 2. Selected differentially expressed genes in SHSP left ventricles relative to WKY.

AffyID	Gene Title	Gene Symbol	WKY expression level	SHSP/ WKY
1371056_at	neogenin	Neo1	22	2.31
1369007_at	nuclear receptor subfamily 4, group A, member 2	Nr4a2	27	2.05
1387668_at	protein tyrosine phosphatase, non-receptor type 11	Ptpn11	16	1.99
1369637_at	kinesin family member 3C	Kif3c	22	1.95
1368180_s_at	glutathione-S-transferase, alpha type2	Gsta2	17	1.87
1387695_at	Cdc42-binding protein kinase beta	Cdc42bpb	46	1.74
1368039_at	synaptojanin 2 binding protein	Synj2bp	76	1.68
1370614_s_at	serine threonine kinase 39 (STE20/SPS1 homolog, yeast)	Stk39	84	1.65
1368596_at	SNF1-like kinase	Snf1lk	37	1.61
1387664_at	ATPase, H+ transporting, beta 56/58 kDa, isoform 2	Atp6b2	131	1.59
1387413_at	neutrophil cytosolic factor 1	Ncf1	35	1.58
1369059_at	transient receptor potential-related protein, ChaK	Chak	33	1.56
1374855_at	period 1	Per1	60	1.54
1371046_at	spectrin beta 2	Spnb2	235	1.53
1368984_at	septin 2	38232	62	1.53
1374827_at	N-deacetylase/N-sulfotransferase (heparan glucosaminyl) 2	Ndst2	50	1.52
1371104_at	sterol regulatory element binding factor 1	Srebf1	34	1.51
1368064_a_at	dopa decarboxylase	Ddc	47	1.50
1370011_at	adenylate kinase 1	Ak1	228	1.50
1372658_at	desmuslin	LOC308709	106	-1.50
1367925_at	major vault protein	Mvp	119	-1.51
1374157_at	phosphodiesterase 4B	Pde4b	78	-1.51
1368477_at	ATPase, Ca++ transporting, ubiquitous	Atp2a3	32	-1.58
1389189_at	actinin, alpha 1	Actn1	49	-1.59
1388178_at	nuclear receptor coactivator 3	Ncoa3	28	-1.89
1372528_at	N-ethylmaleimide sensitive factor	Nsf	50	-2.08
1375719_s_at	cadherin 13	Cdh13	120	-2.08
1389188_at	G protein-coupled receptor 108	Gpr108	23	-2.26
1369131_at	solute carrier family 18, member 2	Slc18a2	23	-2.55
1371204_at	solute carrier family 14, member 2	Slc14a2	17	-3.04
1374452_at	phosphodiesterase 9A	Pde9a	28	-3.22

Supplementary Table 3. Selected differentially expressed genes in left ventricles of SHHF rats relative to WKY.

AffyID	Gene Title	Gene Symbol	WKY Expression level	SHHF/ WKY
1370916_at	tec protein tyrosine kinase	Tec	25	2.98
1387542_at	solute carrier family 9, member 3	Slc9a3	20	2.49
1375089_at	filamin-interacting protein L-Filip	Filip	74	1.65
1370850_at	sodium channel beta 3 subunit	Scnb3	35	1.62
1372864_at	adenylate cyclase 5	Adcy5	126	1.59
1367601_at	Cbp/p300-interacting transactivator	Cited2	302	1.55
1368252_at	sarcomeric muscle protein	Sarcosin	127	1.54
1398240_at	heat shock protein 8	Hspa8	2866	1.54
1367624_at	activating transcription factor ATF-4	Atf4	465	1.53
1387379_at	Rho-associated coiled-coil forming kinase 2	Rock2	37	1.53
1368933_at	adenosine deaminase, RNA-specific, B1	Adarb1	43	1.53
1387430_at	heat shock factor 2	Hsf2	35	1.51
1388805_at	protein phosphatase 2a, catalytic subunit, alpha isoform	Ppp2ca	103	1.51
1368646_at	stress activated protein kinase alpha II	Mapk9	37	1.51
1372444_at	kinesin family member 5B	Kif5b	187	1.50
1376425_at	transforming growth factor, beta 2	Tgfb2	32	1.50
1367644_at	adenylyl cyclase 6	Adcy6	163	-1.50
1387113_at	C-terminal binding protein 2	Ctbp2	152	-1.50
1370340_x_at	tropomyosin isoform 6	LOC286890	63	-1.52
1367890_at	caspase 2	Casp2	62	-1.52
1367725_at	serine threonine kinase pim3	Pim3	166	-1.55
1368422_at	mesenchyme homeo box 2	Meox2	67	-1.57
1376767_at	G protein-coupled hepta-helical receptor Ig-Hepta	Ig-Hepta	172	-1.58
1367936_at	serine/threonine kinase 10	Stk10	54	-1.61
1369983_at	chemokine (C-C motif) ligand 5	Ccl5	44	-1.61
1398297_at	mitogen-activated protein kinase 12	Mapk12	61	-1.62
1370209_at	Kruppel-like factor 9	Klf9	753	-1.65
1387800_at	Fas death domain-associated protein	Daxx	59	-1.66
1370245_at	cathepsin L	Ctsl	185	-1.67
1368772_at	solute carrier family 4, member 3	Slc4a3	202	-1.68
1368975_at	CD38 antigen	Cd38	34	-1.71
1370054_at	cyclin dependent kinase inhibitor 2C	Cdkn2c	34	-1.73
1388102_at	dithiolethione-inducible gene-1	Dig1	272	-1.74
1368375_a_at	interleukin 15	Il15	37	-1.78
1367857_at	fatty acid desaturase 1	Fads1	25	-1.87
1373544_at	monokine induced by gamma interferon	Mig	30	-1.87
1367961_at	nerve growth factor, gamma	Ngfg	27	-1.88
1371139_at	plastin 3 (T-isoform)	Pls3	51	-1.89

Supplementary Table 4. Selected differentially expressed genes in left ventricles of JCR rats relative to WKY.

AffyID	Gene Title	Gene Symbol	WKY expression level	JCR/ WKY
1367973_at	small inducible cytokine A2	Scya2	28	4.02
1369843_at	cholinergic receptor, nicotinic, alpha polypeptide 1	Chrna1	10	3.42
1398844_at	thioredoxin 2	Txn2	178	3.24
1370623_at	fibrinogen-like 2	Fgl2	25	3.05
1376089_at	low density lipoprotein receptor	Ldlr	29	2.86
1387728_at	interleukin 10 receptor, alpha	Il10ra	9	2.71
1387791_at	angiotensin 1 converting enzyme 1	Ace	20	2.05
1367862_at	Ras-related associated with diabetes	Rrad	371	2.02
1369187_a_at	prostaglandin E receptor 3	Ptger3	17	2.02
1367570_at	transgelin	Tagln	91	1.98
1370930_at	kinesin 1C	Kif1c	381	1.89
1398791_at	thioredoxin reductase 1	Txnrd1	138	1.87
1387659_at	guanine deaminase	Gda	325	1.85
1367939_at	retinol binding protein 1	Rbp1	20	1.80
1373272_at	phosphoinositol 3-phosphate-binding protein 2	Pepp2	19	1.79
1371232_a_at	chondroitin sulfate proteoglycan 2 (versican)	Cspg2	38	1.77
1370281_at	fatty acid binding protein 5, epidermal	Fabp5	219	1.75
1370906_at	branched chain keto acid dehydrogenase E1, beta	Bckdhb	258	1.73
1387206_at	UDP-Gal:betaGlcNAc beta 1,4-galactosyltransferase	B4galt6	129	1.72
1367938_at	UDP-glucose dehydrogeanse	Ugdh	49	1.70
1367741_at	endoplasmic reticulum stress-inducible, ubiquitin-like 1	Herpud1	285	1.66
1367571_a_at	insulin-like growth factor 2	Igf2	51	1.62
1386859_at	transketolase	Tkt	62	1.61
1390383_at	adipose differentiation-related protein	ADRP	134	1.60
1371368_at	SEC61, alpha subunit (S. cerevisiae)	Sec61a	115	1.58
1371926_at	interleukin 6 signal transducer	Il6st	230	1.55
1367800_at	plasminogen activator, tissue	Plat	185	1.51
1368468_at	cytochrome P450, subfamily 11A	Cyp11a	55	1.50
1387348_at	insulin-like growth factor-binding protein 5	Igfbp5	59	1.50
1367846_at	S100 calcium-binding protein A4	S100a4	74	1.50
1370268_at	potassium voltage-gated channel, member 5	Kcna5	35	1.50
1371696_at	G protein-coupled receptor 56	Gpr56	119	1.50
1369590_a_at	DNA-damage inducible transcript 3	Ddit3	186	-1.50
1367767_at	3-hydroxy-3-methylglutaryl CoA lyase	Hmgcl	265	-1.53
1387398_at	protein kinase inhibitor, alpha	Pkia	654	-1.57
1387933_s_at	podocalyxin-like	Podxl	52	-1.59

1390398_at	bone morphogenetic protein receptor, type 1A	Bmpr1a	39	-1.60
1369630_at	adenosine kinase	Adk	523	-1.63
1386851_a_at	palmitoyl-protein thioesterase 2	Ppt2	69	-1.64
1369876_at	G protein beta-subunit gene	LOC60449	169	-1.65
1368371_at	potassium voltage-gated channel, KQT-like, member 1	Kcnq1	78	-1.65
1386880_at	acetyl-Coenzyme A acyltransferase 2 (mitochondrial)	Acaa2	2365	-1.66
1368677_at	brain derived neurotrophic factor	Bdnf	70	-1.66
1387015_at	profilin II	Pfn2	70	-1.69
1388958_a_at	solute carrier family 2 , member 4	Slc2a4	285	-1.75
1368698_at	ATPase, Ca++ transporting, plasma membrane 2	Atp2b2	47	-1.80
1369970_at	vesicle-associated membrane protein 8 (endobrevin)	Vamp8	66	-1.80
1399029_at	ubiquitin specific protease 31	Usp31	78	-1.81
1369629_at	adenosine kinase	Adk	149	-1.82
1375529_at	carbonyl reductase 4	Cbr4	66	-1.91
1368696_at	FXYD domain-containing ion transport regulator 7	Fxyd7	38	-1.98
1386943_at	plasmolipin	Z49858	56	-2.03
1368126_at	acetoacetyl-CoA synthetase	LOC65984	26	-2.06
1370489_a_at	phospholipase C, beta 4	Plcb4	25	-2.28
1387531_at	methionine sulfoxide reductase A	Msra	40	-2.29
1369989_at	pyridoxine 5-phosphate oxidase	U91561	206	-2.35
1376849_at	ubiquitin specific protease 31	Usp31	59	-2.95
1370176_at	amyotrophic lateral sclerosis 2, candidate 3	Als2cr3	683	-3.15
1370148_at	haptoglobin	Hp	19	-3.48
1371137_at	acyl-Coenzyme A oxidase 2, branched chain	Acox2	98	-3.83
1368637_at	caspase recruitment domain protein 9	LOC64171	335	-4.78
1368471_at	guanylate cyclase activator 2A	Guca2a	25	-4.82
1374583_at	mRNA decapping enzyme	Dcps	74	-5.24

Footnotes for supplementary tables 1-4:
Among large number of statistically significant genes changed uniquely in each strain relative to WKY, those having relatively high expression values (WKY expression levels ~20 or above; shown in the first data column), with assigned gene name (annotated) and increased or decreased at 1.5 fold or higher levels were selected to prepare these tables. The purpose was to determine any unique disease specific signatures that might be apparent from genes that were changed relative to healthy rats in each disease strain.