Supplemental Material

Epigenetic Changes Induced by Air Toxics: Formaldehyde Exposure Alters miRNA Expression Profiles in Human Lung Cells

Julia E. Rager[1], Lisa Smeester[1], Ilona Jaspers[2], Kenneth G. Sexton[1], and Rebecca C. Fry[1]

Authors' Affiliations:

[1] Department of Environmental Sciences and Engineering, Gillings School of Global Public Health, University of North Carolina, Chapel Hill, North Carolina, USA

[2] Center for Environmental Medicine, Asthma, and Lung Biology, School of Medicine, University of North Carolina, Chapel Hill, North Carolina, USA

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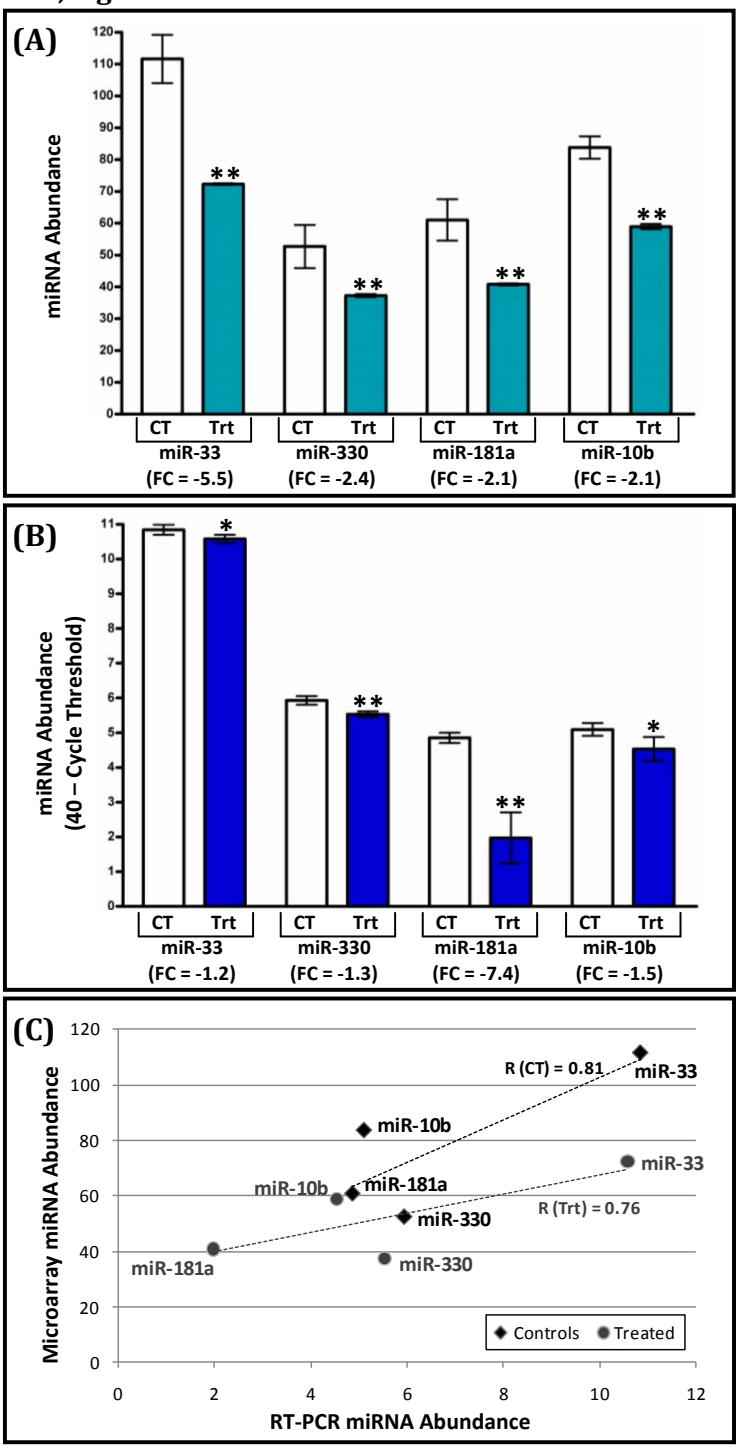
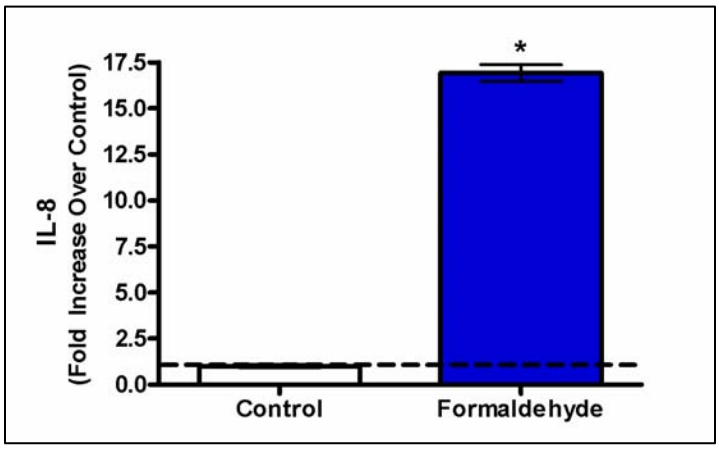
Supplemental Material, Figure 1



Supplemental Material, Figure 1: Comparison of Microarray and qRT-PCR Results: miRNA microarray results **(A)** are displayed as miRNA abundance obtained from raw microarray data. miRNA qRT-PCR results **(B)** are displayed in terms of miRNA abundance relative to 40, the maximum cycle threshold. Star symbols represent significance, where (*) represents p-value < 0.1, and (**) represent p-value < 0.05. Each column represents either control samples (CT) or treated samples (Trt). Average fold changes (FC) are shown, and error bars represent S.E.M. Correlation **(C)** between average miRNA abundance measured by microarrays and RT-PCR is illustrated.

Supplemental Material, Figure 2



Supplemental Material, Figure 2: Interleukin-8 levels in formaldehyde-treated samples compared to untreated samples. Results are displayed as fold increase over control +/- S.E.M. The (*) symbol indicates statistical significance compared to the control (p-value < 0.05).

Supplemental Material, Table 1: miRNAs significantly* changed ≥ 1.5-fold.
Formaldehyde/control ratios shown are from microarray analysis.
*** (p-value < 0.005, FDR < 0.005)**

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miRNA	Agilent Probe ID	Formaldehyde/Control Ratio
miR-33	A_25_P00010466	-5.48
miR-450	A_25_P00010972	-3.57
miR-330	A_25_P00011047	-2.43
miR-181a	A_25_P00010884	-2.11
miR-10b	A_25_P00010136	-2.11
miR-422b	A_25_P00010858	-2.02
miR-532	A_25_P00010270	-1.84
miR-501	A_25_P00011044	-1.82
miR-487b	A_25_P00010113	-1.80
miR-20a	A_25_P00010613	-1.80
miR-34a	A_25_P00010045	-1.73
miR-93	A_25_P00010610	-1.72
miR-106b	A_25_P00010433	-1.71
miR-137	A_25_P00010616	-1.71
miR-103	A_25_P00011004	-1.70
miR-301	A_25_P00010839	-1.70
miR-10a	A_25_P00010470	-1.70
miR-126	A_25_P00010767	-1.70
miR-17-5p	A_25_P00010277	-1.69
miR-107	A_25_P00011068	-1.69
miR-454-3p	A_25_P00010009	-1.69
miR-140	A_25_P00010606	-1.68
miR-101	A_25_P00010679	-1.68
miR-130a	A_25_P00010439	-1.68
miR-19a	A_25_P00010997	-1.67
miR-26a	A_25_P00010779	-1.67
miR-19b	A_25_P00010999	-1.67
miR-106a	A_25_P00010801	-1.66
miR-99a	A_25_P00010472	-1.66
miR-18a	A_25_P00010969	-1.66
miR-424	A_25_P00011110	-1.65
let-7a	A_25_P00011584	-1.65
miR-20b	A_25_P00010614	-1.65
miR-25	A_25_P00010989	-1.64
miR-590	A_25_P00010655	-1.64

miRNA	Agilent Probe ID	Formaldehyde/Control Ratio
miR-15b	A_25_P00011102	-1.64
let-7b	A_25_P00010070	-1.63
miR-660	A_25_P00010459	-1.63
miR-27b	A_25_P00010761	-1.63
miR-194	A_25_P00011007	-1.62
miR-361	A_25_P00010894	-1.62
miR-192	A_25_P00010868	-1.62
miR-215	A_25_P00010926	-1.62
miR-374	A_25_P00010491	-1.62
miR-15a	A_25_P00010467	-1.62
let-7c	A_25_P00010072	-1.61
miR-148b	A_25_P00010133	-1.60
miR-181b	A_25_P00010551	-1.60
miR-425-5p	A_25_P00010977	-1.60
miR-23b	A_25_P00010881	-1.60
let-7d	A_25_P00010281	-1.59
miR-28	A_25_P00010630	-1.58
miR-125a	A_25_P00010481	-1.58
miR-181d	A_25_P00010076	-1.58
miR-130b	A_25_P00010437	-1.58
miR-185	A_25_P00010702	-1.58
miR-324-5p	A_25_P00010153	-1.58
miR-9	A_25_P00010316	-1.57
miR-452	A_25_P00010925	-1.57
miR-565	A_25_P00010005	-1.57
miR-26b	A_25_P00010085	-1.57
miR-152	A_25_P00010550	-1.57
miR-16	A_25_P00010599	-1.57
miR-650	A_25_P00010918	-1.56
miR-21	A_25_P00010975	-1.56
miR-9	A_25_P00011001	-1.56
miR-186	A_25_P00010101	-1.56
miR-151	A_25_P00010578	-1.56
miR-582	A_25_P00010411	-1.55
let-7e	A_25_P00010280	-1.55
let-7g	A_25_P00010305	-1.55
miR-98	A_25_P00010047	-1.55
miR-224	A_25_P00010950	-1.55
miR-23a	A_25_P00010844	-1.54

miRNA	Agilent Probe ID	Formaldehyde/Control Ratio
miR-27a	A_25_P00010796	-1.54
miR-362	A_25_P00010283	-1.54
let-7f	A_25_P00010088	-1.54
miR-17-3p	A_25_P00010141	-1.53
miR-550	A_25_P00010447	-1.53
miR-29b	A_25_P00010054	-1.53
miR-182	A_25_P00011104	-1.53
miR-100	A_25_P00010475	-1.51
miR-509	A_25_P00011035	-1.51
miR-652	A_25_P00011467	-1.51
miR-331	A_25_P00011118	-1.51
miR-34b	A_25_P00010465	-1.51
miR-189	A_25_P00010295	-1.51
let-7i	A_25_P00010184	-1.51
miR-24	A_25_P00010676	-1.50

Supplemental Material, Table 2: Predicted miRNA targets for miR-33, miR-330, miR-181a, and miR-10b (as recognized by pathway analysis database)

Symbol	GenBank	Entrez Gene ID	miRNAs with Overlapping Targets
		1. miR-33	
ABCA1	NM_005502	19	miR-330
ABCE1	NM_001040876	6059	
APPBP2	NM_006380	10513	
ARID5B	NM_032199	84159	
ASAP1	NM_018482	50807	
B3GALT2	NM_003783	8707	
C11ORF41	NM_012194	25758	
CACNA1C	NM_001129834	775	
CDC42BPA	NM_003607	8476	
CDK6	NM_001259	1021	
CLSPN	NM_022111	63967	
CROT	NM_021151	54677	
CSNK1D	NM_001893	1453	
DPY19L1	NM_015283	23333	
DSC3	NM_001941	1825	miR-181a
DYRK3	NM_001004023	8444	
EBF1	NM_024007	1879	
EEA1	NM_003566	8411	
EN2	NM_001427	2020	
ESCO1	NM_052911	114799	
FAM46C	NM_017709	54855	
FGA	NM_000508	2243	
FUT9	NM_006581	10690	miR-181a
GLCCI1	NM_138426	113263	
GOPC	NM_020399	57120	
GRIA3	NM_007325	2892	miR-330
HADHB	NM_000183	3032	
HBS1L	NM_006620	10767	
HIPK2	NM_001113239	28996	
HMGA2	NM_003483	8091	
ING3	NM_019071	54556	
KCNMA1	NM_001014797	3778	
KIAA2018	NM_001009899	205717	
KIF3C	NM_002254	3797	
LCA5	NM_181714	167691	miR-10b
LIPI	NM_198996	149998	
LOC152742	XM_001128848	152742	
LPP	NM_005578	4026	
MMP16	NM_005941	4325	
MSR1	NM_138715	4481	
NAP1L2	NM_021963	4674	
NARG1	NM_057175	80155	
NAT8	NM_003960	9027	
NAT12	NM_001011713	122830	miR-330
PIM1	NM_002648	5292	

Symbol	GenBank	Entrez Gene ID	miRNAs with Overlapping Targets
PNMA1	NM_006029	9240	
PRDM2	NM_001007257	7799	
PTPN13	NM_080685	5783	
RCAN1	NM_203417	1827	miR-330
RIMBP2	NM_015347	23504	
SATB2	NM_015265	23314	
SCN8A	NM_014191	6334	
SEC24C	NM_004922	9632	miR-181a
SIX4	NM_017420	51804	
SLC25A25	NM_001006642	114789	
SLC26A7	NM_052832	115111	
SLC39A14	NM_015359	23516	
SLITRK3	NM_014926	22865	
SLU7	NM_006425	10569	
SPAST	NM_199436	6683	
ST18	NM_014682	9705	
TNFRSF9	NM_001561	3604	
UBE2V2	NM_003350	7336	
ZNF140	NM_003440	7699	
ZNF148	NM_021964	7707	miR-330
ZNF281	NM_012482	23528	
ZNF300	NM_052860	91975	
2. miR-330			
ABCA1	NM_005502	19	miR-33
ACVR1	NM_001105	90	
ADAMTS5	NM_007038	11096	
AFF2	NM_002025	2334	
AFF4	NM_014423	27125	
AGTR2	NM_000686	186	
AK7	NM_152327	122481	
ANGEL2	NM_144567	90806	
ANKH	NM_054027	56172	
AP2M1	NM_004068	1173	
API5	NM_006595	8539	
APPL1	NM_012096	26060	
ARFGEF2	NM_006420	10564	
ARHGAP12	NM_018287	94134	
ARHGAP20	NM_020809	57569	
ARL17P1	NM_001113738	51326	
ATL2	NM_022374	64225	
ATP2B1	NM_001001323	490	miR-181a
ATP2C1	NM_014382	27032	
AZIN1	NM_148174	51582	
BCL9	NM_004326	607	
BCL11B	NM_022898	64919	
BFSP1	NM_001195	631	
BMPR2	NM_001204	659	
BTRC	NM_033637	8945	
C10ORF10	NM_007021	11067	
C14ORF129	NM_016472	51527	miR-181a

Symbol	GenBank	Entrez Gene ID	miRNAs with Overlapping Targets
C2CD2	NM_015500	25966	
C5ORF15	NM_020199	56951	
C5ORF23	NM_024563	79614	
C9ORF5	NM_032012	23731	
C9ORF64	NM_032307	84267	
CALCR	NM_001742	799	
CAPZA1	NM_006135	829	
CBX5	NM_012117	23468	
CCND3	NM_001760	896	
CD247	NM_000734	919	
CDR2	NM_001802	1039	
CHP	NM_007236	11261	
CLCN5	NM_001127899	1184	
CLDN8	NM_199328	9073	miR-181a
CLDN18	NM_016369	51208	
CMPK1	NM_016308	51727	
CNBP	NM_001127195	7555	
CRLS1	NM_019095	54675	
CSNK1G3	NM_001044722	1456	
CYP7A1	NM_000780	1581	
D4S234E	NM_014392	27065	
DAG1	NM_004393	1605	
DCAF7	NM_005828	10238	
DICER1	NM_030621	23405	
DLX1	NM_001038493	1745	
DNM3	NM_015569	26052	
DNM1L	NM_005690	10059	
DOCK5	NM_024940	80005	
DPP10	NM_001004360	57628	
EDEM1	NM_014674	9695	
EEF1A1	NM_001402	1915	
EFHC1	NM_018100	114327	
EIF5	NM_183004	1983	
EIF4E	NM_001968	1977	
EPM2A	NM_005670	7957	
ERAP1	NM_016442	51752	
ERBB4	NM_005235	2066	
ERC1	NM_178039	23085	
ERLIN2	NM_001003791	11160	
EXOC8	NM_175876	149371	
FAM107B	NM_031453	83641	
FAM72D	NM_207418	728833	
FGFR1	NM_023107	2260	
FMO2	NM_001460	2327	
FOXK1	NM_001037165	221937	miR-181a
FRK	NM_002031	2444	
GJC1	NM_005497	10052	
GNRHR	NM_001012763	2798	
GPRASP1	NM_014710	9737	
GRB10	NM_001001550	2887	miR-181a

Symbol	GenBank	Entrez Gene ID	miRNAs with Overlapping Targets
GRIA3	NM_007325	2892	miR-33
HELZ	NM_014877	9931	
HIVEP2	NM_006734	3097	
HNRNPU	NM_031844	3192	
HSF2	NM_004506	3298	
HSPH1	NM_006644	10808	
ID2	NM_002166	3398	
IMPACT	NM_018439	55364	
INO80D	NM_017759	54891	miR-181a
INSL5	NM_005478	10022	
ITM2C	NM_030926	81618	
JPH1	NM_020647	56704	
KANK2	NM_015493	25959	
KAT2B	NM_003884	8850	
KDM4C	NM_015061	23081	
KDSR	NM_002035	2531	
KIAA1012	NM_014939	22878	
KLF10	NM_005655	7071	
KLHL24	NM_017644	54800	
LAPTM4B	NM_018407	55353	
LNX2	NM_153371	222484	
LRPPRC	NM_133259	10128	
MARK1	NM_018650	4139	miR-181a
MAT2A	NM_005911	4144	
MBNL2	NM_144778	10150	
MECOM	NM_001105078	2122	
METAP2	NM_006838	10988	miR-181a
MMD	NM_012329	23531	
MOBKL1A	NM_173468	92597	
MRPS6	NM_032476	64968	
MYEF2	NM_016132	50804	
MYPN	NM_032578	84665	
NAT12	NM_001011713	122830	miR-33
NEFL	NM_006158	4747	
ONECUT2	NM_004852	9480	miR-181a
OTUD3	NM_015207	23252	
PAFAH1B1	NM_000430	5048	
PCDHA1	NM_018900	56147	miR-181a
PCDHA2	NM_018905	56146	miR-181a
PCDHA3	NM_018906	56145	miR-181a
PCDHA4	NM_018907	56144	miR-181a
PCDHA5	NM_018908	56143	miR-181a
PCDHA6	NM_031849	56142	miR-181a
PCDHA7	NM_018910	56141	miR-181a
PCDHA8	NM_018911	56140	miR-181a
PCDHA9	NM_031857	9752	miR-181a
PCDHA10	NM_018901	56139	miR-181a
PCDHA11	NM_018902	56138	miR-181a
PCDHA12	NM_018903	56137	miR-181a
PCDHAC1	NM_018898	56135	miR-181a

Symbol	GenBank	Entrez Gene ID	miRNAs with Overlapping Targets
PCDHAC2	NM_018899	56134	miR-181a
PCK1	NM_002591	5105	
PCMT1	NM_005389	5110	
PCTP	NM_001102402	58488	
PHAX	NM_032177	51808	
PLSCR1	NM_021105	5359	
PLSCR4	NM_001128304	57088	
PLXNA2	NM_025179	5362	
PQLC1	NM_025078	80148	
PRKAB2	NM_005399	5565	
PRKCB	NM_002738	5579	
PSD3	NM_015310	23362	
PTBP2	NM_021190	58155	
RAI2	NM_021785	10742	
RAP2A	NM_021033	5911	
RAVER2	NM_018211	55225	
RBM12	NM_152838	10137	
RCAN1	NM_203417	1827	miR-33
RGS10	NM_002925	6001	
RND3	NM_005168	390	
RNF212	NM_194439	285498	
RNF144B	NM_182757	255488	
RUFY2	NM_001042417	55680	
SAMD12	NM_001101676	401474	miR-181a
SCG3	NM_013243	29106	
SCP2	NM_001007100	6342	
SELI	NM_033505	85465	
SEMA4D	NM_006378	10507	
SEP15	NM_203341	9403	
SERINC3	NM_006811	10955	
SFRS1	NM_006924	6426	
SH3TC2	NM_024577	79628	miR-181a
SIN3A	NM_015477	25942	
SLAIN1	NM_001040153	122060	
SLC2A2	NM_000340	6514	
SLC5A3	NM_006933	6526	
SMG7	NM_173156	9887	
SMNDC1	NM_005871	10285	
SNAP23	NM_130798	8773	
SNX2	NM_003100	6643	
SORL1	NM_003105	6653	
SOSTDC1	NM_015464	25928	
STAU1	NM_001037328	6780	
STEAP4	NM_024636	79689	
STK3	NM_006281	6788	
SUDS3	NM_022491	64426	
SUMF1	NM_182760	285362	
TAPT1	NM_153365	202018	
TBL1XR1	NM_024665	79718	miR-181a
TBX5	NM_080717	6910	miR-10b

Symbol	GenBank	Entrez Gene ID	miRNAs with Overlapping Targets
TEAD1	NM_021961	7003	
TGFBR3	NM_003243	7049	
THBS1	NM_003246	7057	
TJP1	NM_003257	7082	
TMEM59	NM_004872	9528	
TNKS	NM_003747	8658	
TNRC6B	NM_001024843	23112	
TNS1	NM_022648	7145	
TOX	NM_014729	9760	miR-181a
TRA2A	NM_013293	29896	
TRIM2	NM_015271	23321	miR-181a
TRIM37	NM_015294	4591	
TRIP12	NM_004238	9320	
TROVE2	NM_004600	6738	
TSFM	NM_005726	10102	
TSHR	NM_000369	7253	
UBE2Q1	NM_017582	55585	
UBTD2	NM_152277	92181	
UBXN4	NM_014607	23190	
USP15	NM_006313	9958	
USP37	NM_020935	57695	
VAPA	NM_003574	9218	
VASH2	NM_024749	79805	
VGLL3	NM_016206	389136	
VPS54	NM_016516	51542	
WDR37	NM_014023	22884	
XK	NM_021083	7504	
YIPF5	NM_001024947	81555	
YTHDC1	NM_133370	91746	
ZBTB34	NM_001099270	403341	miR-181a
ZC3HAV1	NM_020119	56829	
ZCCHC24	NM_153367	219654	
ZFC3H1	NM_144982	196441	
ZFR	NM_016107	51663	
ZNF148	NM_021964	7707	miR-33
ZNF410	NM_021188	57862	
ZNF423	NM_015069	23090	
ZNF490	NM_020714	57474	
ZNF706	NM_016096	51123	
ZNF280D	NM_001002843	54816	
3. miR-181a			
ACSL1	NM_001995	2180	
ACVR2A	NM_001616	92	
ACVR2B	NM_001106	93	
ACYP1	NM_001107	97	
ADAM28	NM_014265	10863	
ADAMTSL1	NM_001040272	92949	
ADRBK1	NM_001619	156	
AFTPH	NM_203437	54812	
AHCTF1	NM_015446	25909	

Symbol	GenBank	Entrez Gene ID	miRNAs with Overlapping Targets
AKAP5	NM_004857	9495	
AKAP6	NM_004274	9472	
AKAP7	NM_004842	9465	
ARHGAP26	NM_015071	23092	
ARHGEF3	NM_001128615	50650	
ARSJ	NM_024590	79642	miR-10b
ATG5	NM_004849	9474	
ATM	NM_138292	472	
ATP11C	NM_173694	286410	
ATP2A2	NM_170665	488	
ATP2B1	NM_001001323	490	miR-330
ATXN3	NM_001127696	4287	
BAG2	NM_004282	9532	
BAG4	NM_004874	9530	
BAI3	NM_001704	577	
BAZ2B	NM_013450	29994	
BBS7	NM_018190	55212	
BEND3	NM_001080450	57673	
BHLHE40	NM_003670	8553	
BIRC6	NM_016252	57448	
BOLL	NM_197970	66037	
BRAP	NM_006768	8315	
BRD1	NM_014577	23774	
BRWD1	NM_033656	54014	
BTBD3	NM_014962	22903	
C10ORF104	NM_173473	119504	
C14ORF129	NM_016472	51527	miR-330
C15ORF29	NM_024713	79768	
C16ORF87	NM_001001436	388272	
C19ORF12	NM_031448	83636	
C20ORF12	NM_001099407	55184	
C21ORF66	NM_016631	94104	
C2ORF69	NM_153689	205327	
C5ORF41	NM_153607	153222	
C5ORF47	XM_376444	133491	
C6ORF89	NM_152734	221477	
CABC1	NM_020247	56997	
CALB1	NM_004929	793	
CALM1	NM_006888	801	
CAMK2D	NM_172128	817	
CAPRIN1	NM_005898	4076	miR-10b
CARD8	NM_014959	22900	
CBX7	NM_175709	23492	
CCAR1	NM_018237	55749	
CCDC14	NM_022757	64770	
CCDC117	NM_173510	150275	
CCNB1	NM_031966	891	
CCNJ	NM_019084	54619	
CCNL2	NM_001039577	81669	
CD302	NM_014880	9936	

Symbol	GenBank	Entrez Gene ID	miRNAs with Overlapping Targets
CDON	NM_016952	50937	
CHMP2B	NM_014043	25978	
CLASP1	NM_015282	23332	
CLDN8	NM_199328	9073	miR-330
CLIP1	NM_002956	6249	
CLVS1	NM_173519	157807	
CNTN4	NM_175612	152330	
CPNE2	NM_152727	221184	
CPOX	NM_000097	1371	
CREB5	NM_004904	9586	
CSF2RB	NM_000395	1439	
CTDSPL	NM_005808	10217	
CTTNBP2NL	NM_018704	55917	
CUL3	NM_003590	8452	
DARS	NM_001349	1615	
DCN	NM_133504	1634	
DDX52	NM_007010	11056	
DDX3X	NM_001356	1654	
DDX3	NM_004660	8653	
DEPDC6	NM_022783	64798	
DIRAS3	NM_004675	9077	
DLGAP2	NM_004745	9228	
DNAJC13	NM_015268	23317	
DNAL1	NM_031427	83544	
DOCK10	NM_014689	55619	
DSC3	NM_001941	1825	miR-33
DYNC1LI2	NM_006141	1783	
E2F5	NM_001951	1875	
E2F7	NM_203394	144455	
EIF4A2	NM_001967	1974	
ENPP1	NM_006208	5167	
EPC2	NM_015630	26122	
ETV6	NM_001987	2120	
EXD1	NM_152596	161829	
FAM13B	NM_001101801	51306	
FAM160A2	NM_032127	84067	
FBXO33	NM_203301	254170	
FBXO34	NM_017943	55030	
FIGN	NM_018086	55137	miR-10b
FKBP1A	NM_000801	2280	
FMNL2	NM_052905	114793	
FNDC3B	NM_022763	64778	
FOXK1	NM_001037165	221937	miR-330
FOXP1	NM_032682	27086	
FUCA1	NM_000147	2517	
FUT9	NM_006581	10690	miR-33
G3BP2	NM_012297	9908	
GABRA1	NM_001127648	2554	
GAPVD1	NM_015635	26130	
GATA6	NM_005257	2627	

Symbol	GenBank	Entrez Gene ID	miRNAs with Overlapping Targets
GATM	NM_001482	2628	
GCC2	NM_181453	9648	
GHITM	NM_014394	27069	
GPD2	NM_000408	2820	
GPD1L	NM_015141	23171	
GPRIN3	NM_198281	285513	
GPX8	NM_001008397	493869	
GRB10	NM_001001555	2887	miR-330
HEY2	NM_012259	23493	
HIC2	NM_015094	23119	
HOOK1	NM_015888	51361	
HOXB4	NM_024015	3214	
HOXC8	NM_022658	3224	
HOXD1	NM_024501	3231	
HRH1	NM_001098212	3269	
HSPC159	NM_014181	29094	
IL2	NM_000586	3558	
INO80D	NM_017759	54891	miR-330
IPO8	NM_006390	10526	
ITGA2	NM_002203	3673	
ITSN1	NM_001001132	6453	
KANK1	NM_015158	23189	
KCNH8	NM_144633	131096	
KCTD3	NM_016121	51133	
KDM5A	NM_005056	5927	
KIAA0528	NM_014802	9847	
KIAA1219	NM_020336	57148	
KIAA1239	XM_940885	57495	
KIAA2022	NM_001008537	340533	
KIF3A	NM_007054	11127	
KLHL2	NM_007246	11275	
KLHL5	NM_199039	51088	
KRAS	NM_033360	3845	
LAMP2	NM_001122606	3920	
LARP4	NM_199190	113251	
LCLAT1	NM_182551	253558	
LHFPL3	NM_199000	375612	
LIFR	NM_002310	3977	
LMO3	NM_001001395	55885	
LOC161527	XM_929030	161527	
LONRF2	NM_198461	164832	
LRRC8D	NM_018103	55144	
MAP1B	NM_005909	4131	
MAPK1	NM_002745	5594	
MARK1	NM_018650	4139	miR-330
MATN3	NM_002381	4148	
MBOAT2	NM_138799	129642	
MED8	NM_201542	112950	
MEGF9	NM_001080497	1955	
METAP1	NM_015143	23173	

Symbol	GenBank	Entrez Gene ID	miRNAs with Overlapping Targets
METAP2	NM_006838	10988	miR-330
MINA	NM_032778	84864	
MKLN1	NM_013255	4289	
MORC3	NM_015358	23515	
MPP5	NM_022474	64398	
MTF2	NM_007358	22823	
MTMR12	NM_001040446	54545	
MTMR15	NM_014967	22909	
MTX3	NM_001010891	345778	
MUC7	NM_152291	4589	
NCOA2	NM_006540	10499	
NFAT5	NM_001113178	10725	
NLN	NM_020726	57486	
NOTCH4	NM_004557	4855	
NOVA1	NM_002515	4857	
NR3C1	NM_001018076	2908	
NR6A1	NM_033334	2649	
NRAS	NM_002524	4893	
NTS	NM_006183	4922	
NUDT12	NM_031438	83594	
ONECUT2	NM_004852	9480	miR-330
OSBPL3	NM_145320	26031	
OSBPL8	NM_001003712	114882	
OTUD4	NM_001102653	54726	
PAM	NM_138822	5066	
PAPD5	NM_001040285	64282	
PAPOLG	NM_022894	64895	
PARK2	NM_013987	5071	
PARP11	NM_020367	57097	
PAWR	NM_002583	5074	
PAX9	NM_006194	5083	
PCDHA1	NM_031411	56147	miR-330
PCDHA2	NM_018905	56146	miR-330
PCDHA3	NM_018906	56145	miR-330
PCDHA4	NM_018907	56144	miR-330
PCDHA5	NM_018908	56143	miR-330
PCDHA6	NM_031849	56142	miR-330
PCDHA7	NM_018910	56141	miR-330
PCDHA8	NM_018911	56140	miR-330
PCDHA9	NM_031857	9752	miR-330
PCDHA10	NM_018901	56139	miR-330
PCDHA11	NM_018902	56138	miR-330
PCDHA12	NM_018903	56137	miR-330
PCDHAC1	NM_018898	56135	miR-330
PCDHAC2	NM_018899	56134	miR-330
PCNP	NM_020357	57092	
PDE5A	NM_001083	8654	
PER3	NM_016831	8863	
PGAP1	NM_024989	80055	
PHC3	NM_024947	80012	

Symbol	GenBank	Entrez Gene ID	miRNAs with Overlapping Targets
PHLPP2	NM_015020	23035	
PHTF2	NM_001127358	57157	
PI4K2B	NM_018323	55300	
PITPNB	NM_012399	23760	
PKNOX2	NM_022062	63876	
PLAC1L	NM_173801	219990	
PLEKHA3	NM_019091	65977	
PNRC2	NM_017761	55629	
POLQ	NM_199420	10721	
POLR3G	NM_006467	10622	
POM121	NM_172020	9883	
POM121C	NM_001099415	100101267	
PPP1R12B	NM_002481	4660	
PPP1R9A	NM_017650	55607	
PPP2R5E	NM_006246	5529	
PRDM4	NM_012406	11108	
PRDX3	NM_006793	10935	
PRH2	NM_001110213	5555	
PRKCD	NM_006254	5580	
PRTG	NM_173814	283659	
PSG5	NM_002781	5673	
PSRC1	NM_001032291	84722	
PTGER3	NM_198715	5733	
RAB3IP	NM_022456	117177	
RAD21	NM_006265	5885	
RAN	NM_006325	5901	
RAP1B	NM_001010942	5908	
RASSF2	NM_014737	9770	
RBM26	NM_022118	64062	
RBM25	NM_021239	58517	
REPS2	NM_001080975	9185	
RFC1	NM_002913	5981	
RIN2	NM_018993	54453	
RLF	NM_012421	6018	
RNF8	NM_183078	9025	
RNF34	NM_025126	80196	
ROD1	NM_005156	9991	
RP5-1022P6.2	NM_019593	56261	
RPAP2	NM_024813	79871	
RPE65	NM_000329	6121	
RPS6KB1	NM_003161	6198	
RRP15	NM_016052	51018	
S1PR1	NM_001400	1901	
SAMD12	NM_207506	401474	miR-330
SCD	NM_005063	6319	
SCOC	NM_032547	60592	
SEC24C	NM_004922	9632	miR-33
SEMA3C	NM_006379	10512	
SEMA4G	NM_017893	57715	
SFRS7	NM_001031684	6432	

Symbol	GenBank	Entrez Gene ID	miRNAs with Overlapping Targets
SH3TC2	NM_024577	79628	miR-330
SIPA1L2	NM_020808	57568	
SIRT1	NM_012238	23411	
SLC19A2	NM_006996	10560	
SLC24A1	NM_004727	9187	
SLC25A24	NM_213651	29957	
SLC7A11	NM_014331	23657	
SLITRK1	NM_052910	114798	
SPIN1	NM_006717	10927	
SPOCK1	NM_004598	6695	
SPP1	NM_001040058	6696	
SPRY4	NM_030964	81848	
SRPK2	NM_182692	6733	
ST8SIA4	NM_005668	7903	
STX7	NM_003569	8417	
SUCLG2	NM_003848	8801	
SYNE1	NM_133650	23345	
TADA2B	NM_152293	93624	
TBC1D1	NM_015173	23216	
TBC1D4	NM_014832	9882	
TBL1X	NM_005647	6907	
TBL1XR1	NM_024665	79718	miR-330
TBPL1	NM_004865	9519	
TCERG1	NM_006706	10915	
TET2	NM_017628	54790	
TFEC	NM_012252	22797	
TFRC	NM_003234	7037	
TGFBR1	NM_004612	7046	
TGFBRAP1	NM_004257	9392	
TIFA	NM_052864	92610	
TIMP3	NM_000362	7078	
TLL1	NM_012464	7092	
TMEM26	NM_178505	219623	
TMEM27	NM_020665	57393	
TMEM131	NM_015348	23505	
TMEM165	NM_018475	55858	
TMF1	NM_007114	7110	
TNF	NM_000594	7124	
TNFRSF11B	NM_002546	4982	
TNFSF4	NM_003326	7292	
TNPO1	NM_153188	3842	
TOM1L1	NM_005486	10040	
TOR1AIP2	NM_145034	163590	
TOX	NM_014729	9760	miR-330
TRDMT1	NM_176081	1787	
TRIM2	NM_015271	23321	miR-330
TSPAN8	NM_004616	7103	
TSPYL4	NM_021648	23270	
UBE2A	NM_003336	7319	
UBE2D1	NM_003338	7321	

Symbol	GenBank	Entrez Gene ID	miRNAs with Overlapping Targets
UBP1	NM_001128160	7342	
USP42	NM_032172	84132	
VBP1	NM_003372	7411	
VCAN	NM_001126336	1462	
WHSC2	NM_005663	7469	
WNK1	NM_018979	65125	
XRN1	NM_019001	54464	
ZBTB34	NM_001099270	403341	miR-330
ZBTB44	NM_014155	29068	
ZFAND6	NM_019006	54469	
ZFP36L1	NM_004926	677	
ZFP36L2	NM_006887	678	
ZIC3	NM_003413	7547	
ZNF83	NM_001105549	55769	
ZNF124	NM_003431	7678	
ZNF439	NM_152262	90594	
ZNF440	NM_152357	126070	
ZNF441	NM_152355	126068	
ZNF454	NM_182594	285676	
ZNF468	NM_001008801	90333	
ZNF559	NM_032497	84527	
ZNF594	NM_032530	84622	
ZNF655	NM_138494	79027	
ZNF673	NM_001129898	55634	
ZSCAN23	NM_001012455	222696	
4. miR-10b			
ARG2	NM_001172	384	
ARSJ	NM_024590	79642	miR-181a
BDNF	NM_170731	627	
C1ORF71	XM_001717264	163882	
CAPRIN1	NM_005898	4076	miR-181a
CLCC1	NM_001048210	23155	
EBF2	NM_022659	64641	
FIGN	NM_018086	55137	miR-181a
FNBP1L	NM_001024948	54874	
GALNT1	NM_020474	2589	
HOXA3	NM_153631	3200	
HOXB3	NM_002146	3213	
KLF11	NM_003597	8462	
LCA5	NM_001122769	167691	miR-33
MAP3K7	NM_003188	6885	
NONO	NM_007363	4841	
RB1CC1	NM_014781	9821	
RBM27	NM_018989	54439	
RNF7	NM_183237	9616	
SNX18	NM_001102575	112574	
TBX5	NM_181486	6910	miR-330
TFAP2C	NM_003222	7022	
TRNT1	NM_182916	51095	
USP46	NM_022832	64854	
WDR26	NM_001115113	80232	

Supplemental Material, Table 3: 40 networks significantly associated with the predicted targets of miR-33, miR-330, miR-181a, and miR-10b

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Network No.	p-value	No. of Predicted Transcripts	Molecules in Network
1. miR-33			
1	1E-34	16	ABCA1,ACAA2,Alcohol group acceptor phosphotransferase,CACNA1C, CACNA1D, CACNA1H,CDK6,CROT,CSNK1D,GLO1,HADHB,HMGA2,KCNMA1,LDL,LIMK2,MIR124 , MMP16,MSR1,NARG1,NEK2,NFkB (complex),PDGF BB,PGRMC2,PIM1,Pka, PLEKHA1,PPP1R13L,PTPN13,RCAN1,RYR1 (includes EG:114207),SERPINB6,ST18, SUCLG2,TNFRSF9,Trypsin
2	1E-27	14	AHSG,ARD1A,BAT1,CHMP1B,CLSPN,CP110,CPB2,CTNNB1,DSC3,FBXW11,FGB,FH,G LCCI1,GOT1,Groucho,HBS1L,HNF1A,HNF4A,HPX,ING3,LIN7C,MIR9-1 (includes EG:407046),NAT8,NFYB,PCBD1,PLK1,PNMA1,PTPN13,PZP, RIMBP2,SLC26A7, SLITRK3,SPAST,ZNF281,ZNF300
3	1E-26	13	ABCE1,ANP32A,ARID5B,ATXN1,B3GALT2,BACE1,BAT2,BECN1,C11ORF41,CCDC85B ,CFL1,CHI3L1,CSF1R,DAZAP2 (includes EG:9802),DZIP3,EEA1, FAM46C(includes EG:54855),FGA,KIAA2018,KIF3C,KRT18,LPA,MIR17 (includes EG:406952),MIR212 (includes EG:406994),MIR29A (includes EG:407021),MIR29B1,MIR29B2,NAT12, NEDD4L,SATB2,SLC39A14,SLU7,TARDBP,TGFB1,TRIP6
4	1E-21	11	ASAP1,CADM1,CCL9,CDC42,CDC42BPA,CDC42BPB,CXCL12,EBF1,EFS,ERK,FCGR2B, FUT9,FZD5,GOPC,IL1B,ITSN2,LIMK2,LPP,MATK,PALLD,POSTN,progesterone,PRRX1 ,PTK2,RRS1,SEC23A,SEC24C (includes EG:9632),SHPRH, SIX4,SLC25A25,SLC6A4, SSTR3,UBE2V2,VIM,ZNF140
5	1E-13	8	amino acids,APLP2,APP,APPBP2,beta-estradiol,CA2,CXCL5,DYRK3,EN2, EPB41L3, EPO,FLOT1,FSTL1,GRI,GRIA3,GRIA4,GRIP2,HIPK2,HIST4H4 (includes EG:121504), HSP90B1,KISS1,MLLT3,nitric oxide,NSF,PARD6B, PPP3R1,PRDM2,PRKCA,PRKG1, PTPN13,SLC6A4,SYT11,WNT5B,ZNF148,ZNRF1
2. miR-330			
1	1E-40	23	ACVR1,AGTR2,Ap1,APPL1,ATP2B1,BMPR2,C5ORF23,CAPZA1,CCND3,CD247,ERK,Es trogen Receptor,FGFR1,FSH,GNRH,GNRHR,hCG,HSF2,HSPH1, Insulin,KLF10,Lh, MAT2A,MRPS6 (includes EG:64968),PDGF BB,PP2A, RAP2A,RND3,SFRS1,Shc, SMG7,SNAP23,Tgf beta,THBS1,TRA2A
2	1E-37	24	ABCA1,ARFGEF2,BCL11B,BTRC,Calcineurin protein(s),CALCR,CBX5,CHP, cldn, CLDN8,CLDN18,Creb,CYP7A1,GJC1,HELZ,HNRNPU,LDL,N-cor,Nfat (family),NFkB (complex),PCK1,PRKAC,PRKCB,RCAN1,RNA polymerase II,Rxr,SEP15,SLC2A2, STAU1,TBL1XR1,TEAD1,TGFBR3,TJP1,TSHR,Vegf
3	1E-33	20	Akt,BCL9,Caspase,Ck2,EEF1A1,EIF5,EIF4E,ERBB4,ERK1/2,F Actin,FRK, GRB10, Histone h3,Histone h4,ID2,Jnk,KAT2B,KDM4C,MAGED2,Mapk, MECOM,MYEF2, NRG2 (includes EG:381149),P38 MAPK,PAFAH1B1, PCDHA4,PCDHA11,PI3K,Pkc(s), Rb,SIN3A,STK3,SUDS3,TNS1,XK
4	1E-26	17	AFF2,C10ORF10,CBLC,CD19,CD82,CNTFR,CRK,DAB1,EDEM1,EFEMP2,ERBB,FCGR1 A/2A/3A,INPPL1,KHDRBS1,KRTAP4-12,LYN,NEDD9,PCDHA1, PCDHA2,PCDHA3, PCDHA5,PCDHA6,PCDHA7,PCDHA8,PCDHA9,PCDHA10,PCDHA12,PLSCR1,PLSCR4,R BM12,SSR1,STX18,XBP1,YIPF5
5	1E-25	16	ADIPOR1,ANGEL2,APOC3,ARL17P1,C9ORF5,C9ORF64,CIAO1,CNBP,EEF2K,FAM107 B,FOXA2,glycogen,HNF1B,HNF4A,HNRNPR,KIAA1012,LRP5,MAGOH,METAP2,MLXI PL,NCBP1,ONECUT2,PCK1,PEPCK,PRKAB2,RAI2,RPL31,SLC2A2,SYTL4,TADA3L,TME M59 (includes EG:9528),TOE1,TROVE2,TTR,USP15
6	1E-25	16	BMP2,C14ORF129,C2CD2,C5ORF15,CRADD,D4S234E,DNM1L,EPM2A (includes EG:7957),FRK,GSK3B,HNRNPA3,HOXA13,ITM2C,KLF10,MIR17 (includes EG:406952),MIR27B (includes EG:407019),MIRN330,MNT,MYPN,NAT12,PAX8, PLXNA2,PPP1CA,PPP1R3C,RBL2,SERPINB2,SFRP1,SFRS5,SMYD2,SOSTDC1,TBX2,TN F,ZBTB34,ZNF410,ZNF423

Network No.	p-value	No. of Predicted Transcripts	Molecules in Network
7	1E-23	15	ATL2,BCL2,BCLAF1,CGN,CMPK1,DCAF7,DERL1,DHX15,DPP10,E2F4,EFHC1,HIST2H2BE,IFNA2,KIF1B,LAPTM4B,MARK1,MIR122,MYCBP2,NDE1,NEFL,OFD1,PTPN3,SCG3,TBC1D4,TP53BP2,TRIM2,TSFM (includes EG:10102),UBXN4,USP18,USP37 (includes EG:57695),VCP,VPS54,YWHAG,YWHAZ,ZC3HAV1
8	1E-23	15	ABL1,AFF4,amino acids,APEX2,ARHGAP12,CSNK1G3,DLGAP5,DNM3,DYRK2,ERLIN2,EWSR1,GNS,hydrogen peroxide,MBNL2,MERTK,MIR133A,MIR133A-1,MIR133A-2,MIRN140,MOBKL1A,NBEA (includes EG:26960),PCDHAC2,PCMT1,PTBP2,RIPK4,SELI,SMNDC1,SNX2,SRF,STK38L (includes EG:23012),TCEB3B,TGFB1,TRAF2,TRIM37,UBTD2
9	1E-22	15	AGT,ANKH,AZIN1,BOK,CLNS1A,DICER1,DOCK5,EIF5,EIF2C2,FMR1,GRIA3,HSF2,LNX2,MIRLET7B (includes EG:406884),MIRN346,NR3C1,OTUD3,PIWIL4,PPP1R3C,PPP2CA,PRKRA,RNF144B,SERINC3,STXBP5,TARBP2,TBX2,TBX5,TNRC6B,UBE2A,UBE2I,UBE2L6,UBE2Q1,UBE2T,UGCG,WDR37
10	1E-21	14	AGR2,ARSA,ARSB,ARSD,ARSE,ARSF,ARSG,ARSI,ARSJ,BFSP1,BMX,CDKN2A,D4S234E,DAG1,DLX1,ERBB2,ERC1,KANK2,MMD,PLXNB2,PQLC1,PTRF,RASA3,RUFY2,SCP2,SLCO1A1,STEAP4,SULF1,SULF2,SUMF1,TLN1,TNF,VIM,ZFR,ZNF148
11	1E-19	13	ASS1,ATP2C1,BTRC,CCDC85B,CDKN1A,CDR2,CLCN5,Cofilin,ERAP1,EXOC7,EXOC8,GCN1L1,HIVEP2,HOXB4,IGF2BP1,IMPACT,KRT20,LRPPRC,MAZ,MBIP,MCM10,MIRLET7A1,MYC,PKN1,PNN,POLR1B,POLR2L (includes EG:5441),PRC1,RFX1,TADA2L,TRIP12,UXT,VASH2,YTHDC1,ZFC3H1
12	1E-19	13	ADAMTS5,AP1S2,API5,DHX15,DRD2,FMO,FMO2,FOXK1,GH1,GPRASP1,HTT,KCNK3,KLF16,MIR103-1 (includes EG:406895),MLH1,PCTP,PSD3,PTPN22,RALB,retinoic acid,RPL6,RPS19,SATB1,SFRS2IP,SLAIN1,SLC5A3,TOX,UBA7,VAMP1,VAPA,VAPB,VGLL3,YWHAB,ZNF133,ZNF706
13	1E-13	10	ACTR5,ACTR8,AP2M1,APEX2,ARHGAP29,ATP6V0E1,ERVK6,FGD1,FIGF,FURIN,GATS,HEBP2,INO80,INO80B,INO80D,INO80E,INS1,ITGB1,JPH1,KATNA1,KLHL24,LDLRAP1,MIR124,MIR124-1,phosphatidylinositol-3,4,5-triphosphate,PREX1,Rac,RAVER2,RGS10,SEMA4D,SLC16A1,SORL1,SURF4,TNKS,ZCCHC24
3. miR-181a			
1	1E-43	26	BAG4,BIRC6,CALB1,CAMK2D,DLGAP2,E2F7,ENPP1,FUCA1,HEY2,HRH1,Ifn,MIR1,MTMR12,MUC7,NFkB (complex),NFkB (family),NOTCH4,NTS,PARK2,PAWR,POM121C,PRDX3,PRH2,Proteasome,SPHINGOMYELINASE,TFRC,TIMP3,Tnf receptor,TOM1L1,TRIM2,UBE2,UBE2A,UBE2D1,Ubiquitin,ZFAND6
2	1E-41	25	ACVR2A,ACVR2B,Alcohol group acceptor phosphotransferase,ATM,BHLHE40,DDX3X,EIF4A2,FBXO33,FBXO34,FKBP1A,GABRA1,Histone H1,IFN Beta,Importin beta,IPO8,KLHL2,MAPK1,p70 S6k,PDE5A,POLQ,PP1,PP1-C,PPP1R9A,PPP2R5E,PRKCD,RAN,REPS2,Smad,SPRY4,Tgf beta,TGFBR,TGFBR1,TGFBRAP1,TNFRSF11B,TNPO1
3	1E-34	22	Akt,Ap1,ATXN3,BAG2,BRWD1,CABC1,Cbp/p300,CBX7,CCAR1,E2F5,Estrogen Receptor,ETV6,GRB10,Growth hormone,Histone h4,HOXB4,HOXC8,Hsp90,ITSN1,KDM5A,N-cor,NCOA2,NR3C1,Pias,RAD21,Rxr,SPP1,SRPK2,STAT5a/b,TBC1D4,TBL1X,TBL1XR1,TET2,tyrosine kinase,VitaminD3-VDR-RXR
4	1E-32	21	ACSL1,AKAP,AKAP5,AKAP6,AKAP7,AMPK,ATG5 (includes EG:9474),ATP2A2,CaMKII,Caspase,CCNL2,CDON,Creb,CREB5,Cytochrome c,DNAJC13,DYNC1LI2,FSH,GATA6,hCG,Histone h3,Hsp70,Mmp,P38 MAPK,PCDHA4,Pka,RFC1,RNA polymerase II,SCD,SFRS7,SIRT1,TBPL1,TCERG1,ZBTB44,ZNF83
5	1E-21	16	ADAM11,ADAM28,C2ORF69,C5ORF41,CCNJ,CD40LG,CTDSPL,FBXO33,FRK,ILK,KCNH8,MEGF9,MIR140 (includes EG:406932),MIR153-1,MIR153-2,MIR181B1,MIR181B2,MIR21 (includes EG:406991),MIR217 (includes EG:406999),MT1G,NEFH,NFIB,OTUD4,PAPOLA,PAPOLG,PAX8,PCDHAC2,PHLPP2,RAB9A,RB1,SEMA4G,SLITRK1,SPIN1,TERT,ZIC3

Network No.	p-value	No. of Predicted Transcripts	Molecules in Network
6	1E-20	17	14-3-3,Angiotensin II receptor type 1,Calcineurin A,Calcineurin protein(s),CARD8, CD3,CLASP1,CLIP1,DOCK10,DSC3,Eotaxin,Fcer1,GPD2,Ifn gamma,IKK (complex), Importin alpha,LRRC8D,MAP2K1/2,MEF2,MHC Class II,MKLN1,NFAT5,NFAT (complex),Nfat (family),NR6A1,PLEKHA3,Ptger,PTGER3,SEMA3C,TCR,TIFA,TNF, TNFSF4,VAV,ZFP36L1
7	1E-20	15	ADRBK1,CRK,EFNA1,ENG,ERBB4,FLNA,GNB2L1,INHBA,KAT2B,MIR34A (includes EG:407040),MMP13,MTF2,NEDD9,NFYC,NKX2-1,PCDHA1,PCDHA2,PCDHA3, PCDHA5,PCDHA6,PCDHA7,PCDHA8,PCDHA9,PCDHA10,PCDHA11,PCDHA12,PDPK1 ,PRDM4,SMAD3,sphingosine-1-phosphate,TMEM165,TP53BP2,WEE1,ZEB2
8	1E-20	15	ACTR5,ACTR8,ALDOB,BBS7,BEND3,CD302,CDCA7L,CHMP2B,ERVK6,FOXA2,GATS,H NF1A,HOXD1,INO80B,INO80D,INO80E,KANK1,METAP1,MIR124,MIR124-1, ONECUT2,OSBPL8,PCNP,POLR3G,POU2F1,retinoic acid,RPE65,RUVBL1,SUCLG1, SUCLG2,SUMO1,TMEM109,TNFRSF21,TWIST2,ZNF673
9	1E-19	15	ACTB,AFTPH,ANKH,APBB1,beta-estradiol,C19ORF12,CPNE2,EIF3M,ENC1,FUT9, GH1,Glutathione peroxidase,GPX8,GSTM3 (includes EG:2947),GSTT1,hydrogen peroxide,MGST2,PARP,PARP4,PARP11,PER3,PNRC2 (includes EG:55629), progesterone,PSG5,PTGER3,PTP4A2,ROD1,SLC7A11,SMARCA4,SMPDL3A,SPOCK1, SRD5A2,TOR1AIP2,TOX,TSC22D1
10	1E-18	14	ATYPICAL PROTEIN KINASE C,BCR,C1q,Collagen type I,Collagen(s),DCN,ERK,Focal adhesion kinase,Ige,IgG,Igm,Integrin,ITGA2,KIF3A,Laminin,LAMP2,LIFR,Mek,NRAS, Pdgf,PDGF BB,PLA2,Pld,PP2A,RAB3IP,Rac,Rap1,Ras,RASSF2,RIN2,RPS6KB1,S1PR1, TLL1,TSPAN8,VCAN
11	1E-18	14	AP3B2,ARRB1,ATP11C,BRD1,BRF1,cldn,CLDN4,CLDN6,CLDN8,CNTN4,CSDA,DNAJB 6,FIGN,FOXK1,GAPVD1,HNRNPAB,KCTD3,LOC161527,MIR31 (includes EG:407035),MIRN341,MTX3,NFYB,OGG1,OSBPL3,PLEC1,RAB8B,RBM26,SON,SSTR 3,ST8SIA4,TJP1,VIM,VPS39,YWHAB,ZNF468
12	1E-18	14	AHCTF1,ARHGEF3,BTBD3,CDC2L1 (includes EG:984),COBRA1,DDX52,FAM13B, HEATR1,IPO7,KIAA1239,KIAA2022,KPNB1,MED8,MED25,MED26,MED28,MED29, MIR195,MIR373,MIR181C (includes EG:406957),MIR199A1,MLH1,MTMR15,MYC, NUP133,PAPD5,PHTF2,POLR2C,POLR2D,RDBP,Rfc,RPAP2,SR140,WHSC2,XRN1
13	1E-16	13	BRAP,C15ORF29,C20ORF12,CDC14A,CDK5,CTSB,DNAL1,FAM160A2,GFI1B,GHITM, GOLGA2,GPS2,HIC2,HLA-B,HNF4A,LARP4,MINA,MIRN336,MYST2,NDRG1, ONECUT1,PDK2,PPARGC1A,PPP1CA,PPP1R12B,PRDM5,PRKCE,RAB33B,RABAC1,R OCK1,SEC23A,SEC24C (includes EG:9632),SLC6A4,TMF1,ZNF594
14	1E-16	13	ADAMTS4,ADAMTS5,ARF4,C21ORF33,CAPRIN1,CASP14,CCDC14,CCDC85B,COMP, DNAJB4,FNDC3B,GCC2,MATN3,MATN4,NNMT,PARVA,PAX3,PHGDH,PI4K2B,RAB1 8,RBM25 (includes EG:58517),RNF8,RNH1,SDPR,SF3A3,SLC2A4,STOML2,STX7, TBC1D1,TGFB1,TSPYL4,VPS11,WBP4,WNK1,ZFP36L2
15	1E-16	13	ADAMTSL1,AHSG,ALP,ALPI,ATP2A1,B4GALNT1,BMYO,C16ORF87,CD274,CD1A,CSF 1,DBT,DDX3Y (includes EG:8653),DGKA,EPC2,GATM,GRB2,HMGN3,HSPC159,IL4,L-triiodothyronine,LIF,MIRN328,PAX9,RP5-1022P6.2,SHH,SLC24A1,SLC29A1,ST5, TFEC,TMEM131,VEGFA,ZBTB34,ZFP36,ZNF124
16	1E-15	13	ACADVL,AIMP2,ALB,BAI3,BAZ2B,BBC3,C10ORF104,CBX4,CPOX,CTBP2,DENR (includes EG:8562),EEF2K,EIF4A3 (includes EG:9775),GPRIN3,HIPK2,HP,ITGA2, LMO3,METAP2,MORC3,MTA1,PAX5,PCGF2,PDE4B,PEG3,PHC2,PHC3,PSRC1,RBBP6 (includes EG:5930),S100A4,SERPING1,SLC19A2,SUPT3H (includes EG:8464), TADA2B,TP53
17	1E-15	12	ACYP1,APOBEC3B,C14ORF129,CDC5L,CHIC2,CMBL,CRB3,CYP2D9,DISC1,ETNK2,EX OSC4,G3BP2,GSK3B,HNF4A,HOOK1,Hydrolase,KIF3C,LTA4H,MDFI (includes EG:4188),MPP1,MPP5,NLN,NPDC1,PARP4,PRCC,PTPN7,REXO2,SCOC,SFI1,SYNE1,U BP1,VPS29,ZNF439,ZNF440,ZNF559
18	1E-14	12	ADCY,ADRBK1,ARHGAP26,ATP2B1,CCNB1,Cdc2,CSF2RB,CUL3,Cyclin A,Cyclin B,Cyclin E,DARS,DIRAS3,ERK1/2,G protein beta gamma,Gpcr,IL1,IL2,Insulin, Interferon alpha,Jnk,KRAS,LDL,Lh,Mapk,PI3K,PITPNB,Pkc(s),PLC,RAP1B,Ras homolog,Sapk,Shc,STAT,Vegf

Network No.	p-value	No. of Predicted Transcripts	Molecules in Network
19	1E-11	10	amino acids,ASPH,C7ORF16,CDKL1,CTTNBP2NL,DAPK2 (includes EG:23604), DEPDC6 (includes EG:64798),EEF1A1,FMNL2 (includes EG:114793),FNBP4,FOXP1, HAT1,HTT,IL12 (complex),MARK1,MBOAT2,MLST8,MTOR,NXN,PDK1,PGGT1B, PPP2CA,PQBP1,PRPF40A,PTPN7,RIPK4,RLF,RNF34,RP6-213H19.1,STAT4,STRADA, TPP2,TRDMT1,TRIM30,ZNF655
20	1E-11	10	Actin,AFAP1,AKAP5,Alpha tubulin,APLNR,ARPP-21,C21ORF66,CALM1,Calmodulin, CAMK2N2,Ck2,CYB5R3,F Actin,FGD4,GABRR1,GRIN1,KCNQ2,KCNQ3,KIAA1219, MAP1B,NOVA1,PAM,PCP4,PFDN4,PFDN6,POM121,PPEF2,sodium chloride,SRC, TMEM27,TRIM13,Tubulin,UNC13A,USP6,VBP1
4. miR-10b			
1	1E-23	10	ACT1,ANKRD1,ARPP-21,ASB2,BDNF,CALB2,CNGA2,EBF2,EDARADD,FASLG,FIGN, FNBP1L,GRIN2B,GRIN2C,HTT,IP6K2,KLF11,LCA5,MAP3K7,MBTPS1,MIR124-1,NAPB,NEUN,NFkB (complex),PELI1,PELI3,RBM27,RNF7,SGSM2,SNX18,TPH1, UBC,UBE2V1,WDR34,YY1
2	1E-22	10	AGT,ANKRD1,ARG2,Arginase,beta-estradiol,CAPRIN1,CREB1,G3BP1,GALNT1, GRIN2C,GRM3,HOXA2,HOXA3 (includes EG:3200),HOXB3,HOXD3,LOR,MAFB, MYLPF,NR3C1,PBX1,PPP3R1,RB1CC1,RPS6KA5,SLC19A1,STAT3,TBX2,TBX3,TBX5,TFAP2C,TGFB1,TP53,TRNT1,WDR26,WWOX,WWTR1

Supplemental Material, Table 4: Canonical pathways involving at least three molecules present in top networks significantly associated with predicted targets of miR-33, miR-330, miR-181a, and miR-10b

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Canonical Pathways	Present in miR-33 Network?	Present in miR-330 Network?	Present in miR-181a Network?	Present in miR-10b Network?	Total miRNA Networks with Canonical Pathway
Molecular Mechanisms of Cancer	Yes	Yes	Yes	Yes	4
Acute Phase Response Signaling	Yes	Yes	Yes	No	3
Colorectal Cancer Metastasis Signaling	Yes	Yes	Yes	No	3
Glucocorticoid Receptor Signaling	Yes	Yes	Yes	No	3
GNRH Signaling	Yes	Yes	Yes	No	3
G-Protein Coupled Receptor Signaling	Yes	Yes	Yes	No	3
Hepatic Cholestasis	Yes	Yes	Yes	No	3
NF-kB Signaling	Yes	No	Yes	Yes	3
PPAR Signaling	Yes	Yes	Yes	No	3
Production of Nitric Oxide and Reactive Oxygen Species in Macrophages	Yes	Yes	Yes	No	3
Role of Macrophages, Fibroblasts and Endothelial Cells in Rheumatoid Arthritis	Yes	Yes	Yes	No	3
Tight Junction Signaling	Yes	Yes	Yes	No	3
Type I Diabetes Mellitus Signaling	No	Yes	Yes	Yes	3
Actin Cytoskeleton Signaling	Yes	Yes	No	No	2
Androgen Signaling	Yes	Yes	No	No	2
Aryl Hydrocarbon Receptor Signaling	Yes	Yes	No	No	2
Axonal Guidance Signaling	Yes	Yes	No	No	2
B Cell Receptor Signaling	No	Yes	Yes	No	2
BMP signaling pathway	Yes	Yes	No	No	2
Breast Cancer Regulation by Stathmin1	Yes	Yes	No	No	2
Calcium Signaling	Yes	Yes	No	No	2
Cardiac Hypertrophy Signaling	Yes	Yes	No	No	2
Ceramide Signaling	No	Yes	Yes	No	2
Ephrin Receptor Signaling	Yes	Yes	No	No	2
Glioblastoma Multiforme Signaling	Yes	Yes	No	No	2
Glioma Signaling	Yes	Yes	No	No	2
Hepatic Fibrosis / Hepatic Stellate Cell Activation	No	Yes	Yes	No	2
HMGB1 Signaling	No	Yes	Yes	No	2
Huntington's Disease Signaling	No	Yes	No	Yes	2
iCOS-iCOSL Signaling in T Helper Cells	Yes	No	Yes	No	2
IL-12 Signaling and Production in Macrophages	Yes	Yes	No	No	2
IL-6 Signaling	No	Yes	Yes	No	2
IL-8 Signaling	Yes	Yes	No	No	2
ILK Signaling	No	Yes	Yes	No	2
LXR/RXR Activation	Yes	No	Yes	No	2
PAK Signaling	Yes	Yes	No	No	2
PPARalpha/RXRalpha Activation	Yes	Yes	No	No	2
Protein Kinase A Signaling	Yes	No	Yes	No	2

Canonical Pathways	Present in miR-33 Network?	Present in miR-330 Network?	Present in miR-181a Network?	Present in miR-10b Network?	Total miRNA Networks with Canonical Pathway
PTEN Signaling	No	Yes	Yes	No	2
RAR Activation	Yes	Yes	No	No	2
Renin-Angiotensin Signaling	Yes	Yes	No	No	2
Role of NFAT in Cardiac Hypertrophy	Yes	Yes	No	No	2
Role of NFAT in Regulation of the Immune Response	Yes	Yes	No	No	2
Role of Osteoblasts, Osteoclasts and Chondrocytes in Rheumatoid Arthritis	No	Yes	Yes	No	2
Thrombin Signaling	No	Yes	Yes	No	2
Type II Diabetes Mellitus Signaling	Yes	No	Yes	No	2
4-1BB Signaling in T Lymphocytes	Yes	No	No	No	1
Acute Myeloid Leukemia Signaling	Yes	No	No	No	1
AMPK Signaling	No	Yes	No	No	1
Amyloid Processing	Yes	No	No	No	1
Amyotrophic Lateral Sclerosis Signaling	Yes	No	No	No	1
Apoptosis Signaling	No	No	Yes	No	1
Atherosclerosis Signaling	Yes	No	No	No	1
Autoimmune Thyroid Disease Signaling	No	Yes	No	No	1
Cardiac B-adrenergic Signaling	Yes	No	No	No	1
CCR5 Signaling in Macrophages	No	Yes	No	No	1
CD28 Signaling in T Helper Cells	No	Yes	No	No	1
CD40 Signaling	No	No	No	Yes	1
Cdc42 Signaling	No	Yes	No	No	1
Cellular Effects of Sildenafil (Viagra)	Yes	No	No	No	1
Cholecystokinin/Gastrin-mediated Signaling	No	Yes	No	No	1
Chronic Myeloid Leukemia Signaling	Yes	No	No	No	1
Crosstalk between Dendritic Cells and Natural Killer Cells	No	No	Yes	No	1
CXCR4 Signaling	No	Yes	No	No	1
Death Receptor Signaling	No	No	Yes	No	1
Dendritic Cell Maturation	No	No	Yes	No	1
EGF Signaling	No	Yes	No	No	1
EIF2 Signaling	No	Yes	No	No	1
Endothelin-1 Signaling	No	Yes	No	No	1
ERK/MAPK Signaling	No	Yes	No	No	1
Erythropoietin Signaling	No	Yes	No	No	1
Estrogen Receptor Signaling	No	Yes	No	No	1
Estrogen-Dependent Breast Cancer Signaling	No	Yes	No	No	1
Factors Promoting Cardiogenesis in Vertebrates	No	Yes	No	No	1
Germ Cell-Sertoli Cell Junction Signaling	No	Yes	No	No	1
Human Embryonic Stem Cell Pluripotency	No	Yes	No	No	1
Hypoxia Signaling in the Cardiovascular System	No	No	Yes	No	1
IGF-1 Signaling	No	Yes	No	No	1
IL-1 Signaling	Yes	No	No	No	1
IL-2 Signaling	No	Yes	No	No	1

Canonical Pathways	Present in miR-33 Network?	Present in miR-330 Network?	Present in miR-181a Network?	Present in miR-10b Network?	Total miRNA Networks with Canonical Pathway
IL-3 Signaling	No	Yes	No	No	1
Induction of Apoptosis by HIV1	No	No	Yes	No	1
Inositol Phosphate Metabolism	Yes	No	No	No	1
Insulin Receptor Signaling	No	Yes	No	No	1
Integrin Signaling	No	Yes	No	No	1
mTOR Signaling	No	Yes	No	No	1
Natural Killer Cell Signaling	No	Yes	No	No	1
Neuropathic Pain Signaling in Dorsal Horn Neurons	No	No	No	Yes	1
Neurotrophin/TRK Signaling	No	Yes	No	No	1
Nicotinate and Nicotinamide Metabolism	Yes	No	No	No	1
Nitric Oxide Signaling in the Cardiovascular System	Yes	No	No	No	1
Ovarian Cancer Signaling	No	Yes	No	No	1
P13K/AKT Signaling	No	Yes	No	No	1
p70S6K Signaling	No	Yes	No	No	1
PDGF Signaling	No	Yes	No	No	1
Phospholipase C Signaling	No	Yes	No	No	1
Prolactin Signaling	No	Yes	No	No	1
Protein Ubiquitination Pathway	No	No	Yes	No	1
PXR/RXR Activation	Yes	No	No	No	1
Rac Signaling	Yes	No	No	No	1
Regulation of eIF4 and p70S6K Signaling	No	Yes	No	No	1
Regulation of IL-2 Expression in Activated and Anergic T Lymphocytes	No	Yes	No	No	1
Relaxin Signaling	Yes	No	No	No	1
Renal Cell Carcinoma	No	Yes	No	No	1
Role of NANOG in Mammalian Embryonic Stem Cell Pluripotency	No	Yes	No	No	1
Role of PKR in Interferon Induction and Antiviral Response	No	No	Yes	No	1
SAPK/JNK Signaling	No	Yes	No	No	1
Small Cell Lung Cancer Signaling	Yes	No	No	No	1
Sphingosine-1-phosphate Signaling	No	Yes	No	No	1
Synaptic Long Term Potentiation	Yes	No	No	No	1
Systemic Lupus Erythematosus Signaling	No	Yes	No	No	1
T Cell Receptor Signaling	No	Yes	No	No	1
TGF-B Signaling	No	Yes	No	No	1
Thrombopoietin Signaling	No	Yes	No	No	1
VDR/RXR Activation	Yes	No	No	No	1
Wnt/B-catenin Signaling	No	Yes	No	No	1
Xenobiotic Metabolism Signaling	No	No	Yes	No	1

Supplemental Material, Table 5: Biological functions significantly* associated with predicted miRNA targets of miR-33, miR-330, miR-181a, and miR-10b
***(p-value < 0.005)**

Functions	p-value
1. miR-33	
Amino Acid Metabolism	0.0034
Behavior	0.0001
Cancer	0.0041
Carbohydrate Metabolism	0.0041
Cardiovascular Disease	0.0046
Cell Cycle	0.0009
Cell Death	0.0041
Cell Morphology	0.0003
Cell-mediated Immune Response	0.0041
Cell-To-Cell Signaling and Interaction	0.0036
Cellular Assembly and Organization	0.0036
Cellular Compromise	0.0041
Cellular Development	0.0003
Cellular Function and Maintenance	0.0041
Cellular Growth and Proliferation	0.0041
Cellular Movement	0.0041
Connective Tissue Development and Function	0.0041
Drug Metabolism	0.0041
Embryonic Development	0.0003
Endocrine System Development and Function	0.0041
Gene Expression	0.0041
Genetic Disorder	0.0002
Hair and Skin Development and Function	0.0017
Hematological Disease	0.0041
Hematological System Development and Function	0.0041
Hematopoiesis	0.0041
Immunological Disease	0.0041
Inflammatory Response	0.0041
Lipid Metabolism	0.0041
Metabolic Disease	0.0041
Molecular Transport	0.0041
Nervous System Development and Function	0.0041
Neurological Disease	0.0002
Organ Development	0.0041
Organ Morphology	0.0041
Organismal Injury and Abnormalities	0.0041
Post-Translational Modification	0.0034
Protein Synthesis	0.0025
Psychological Disorders	0.0002
Renal and Urological System Development and Function	0.0009
Reproductive System Development and Function	0.0041
Skeletal and Muscular Disorders	0.0014

Functions	p-value
Skeletal and Muscular System Development and Function	0.0040
Small Molecule Biochemistry	0.0034
Tissue Development	0.0040
Vitamin and Mineral Metabolism	0.0041
2. miR-330	
Carbohydrate Metabolism	0.0006
Cell Cycle	0.0043
Cell Morphology	0.0038
Cell-mediated Immune Response	0.0038
Cell-To-Cell Signaling and Interaction	0.0011
Cellular Development	0.0028
Cellular Function and Maintenance	0.0002
Cellular Growth and Proliferation	0.0028
Cellular Movement	0.0002
Embryonic Development	0.0019
Endocrine System Development and Function	0.0028
Gene Expression	0.0028
Hematological System Development and Function	0.0038
Immune Cell Trafficking	0.0038
Inflammatory Response	0.0019
Lipid Metabolism	0.0006
Molecular Transport	0.0018
Nervous System Development and Function	0.0004
Organismal Development	0.0013
RNA Trafficking	0.0028
Small Molecule Biochemistry	0.0006
Tissue Development	0.0019
3. miR-181a	
Cancer	0.0012
Carbohydrate Metabolism	0.0032
Cardiovascular Disease	0.0000
Cell Cycle	0.0001
Cell Death	0.0001
Cell Morphology	0.0012
Cell-mediated Immune Response	0.0038
Cell-To-Cell Signaling and Interaction	0.0004
Cellular Assembly and Organization	0.0015
Cellular Development	0.0012
Cellular Function and Maintenance	0.0012
Cellular Growth and Proliferation	0.0004
Cellular Movement	0.0012
Connective Tissue Development and Function	0.0012
Connective Tissue Disorders	0.0012
Dermatological Diseases and Conditions	0.0012
DNA Replication, Recombination, and Repair	0.0038
Drug Metabolism	0.0036
Endocrine System Development and Function	0.0002
Endocrine System Disorders	0.0020

Functions	p-value
Gastrointestinal Disease	0.0005
Gene Expression	0.0001
Genetic Disorder	0.0003
Hair and Skin Development and Function	0.0012
Hematological Disease	0.0012
Hematological System Development and Function	0.0038
Hematopoiesis	0.0038
Immune Cell Trafficking	0.0038
Immunological Disease	0.0012
Infection Mechanism	0.0010
Inflammatory Disease	0.0005
Inflammatory Response	0.0012
Lipid Metabolism	0.0023
Metabolic Disease	0.0020
Molecular Transport	0.0012
Nervous System Development and Function	0.0003
Neurological Disease	0.0005
Nucleic Acid Metabolism	0.0012
Organ Development	0.0017
Organismal Development	0.0030
Organismal Functions	0.0023
Organismal Injury and Abnormalities	0.0019
Organismal Survival	0.0020
Respiratory Disease	0.0023
Respiratory System Development and Function	0.0004
Skeletal and Muscular Disorders	0.0012
Skeletal and Muscular System Development and Function	0.0002
Small Molecule Biochemistry	0.0004
Tissue Development	0.0002
Tissue Morphology	0.0004
Tumor Morphology	0.0012
4. miR-10b	
Amino Acid Metabolism	0.0015
Auditory and Vestibular System Development and Function	0.0046
Behavior	0.0030
Cardiovascular Disease	0.0015
Cardiovascular System Development and Function	0.0001
Cell Death	0.0015
Cell Morphology	0.0015
Cell-To-Cell Signaling and Interaction	0.0015
Cellular Assembly and Organization	0.0015
Cellular Compromise	0.0017
Cellular Development	0.0000
Cellular Function and Maintenance	0.0015
Cellular Growth and Proliferation	0.0013
Cellular Movement	0.0015
Connective Tissue Development and Function	0.0016
Connective Tissue Disorders	0.0030

Functions	p-value
Developmental Disorder	0.0046
Digestive System Development and Function	0.0015
Embryonic Development	0.0010
Endocrine System Development and Function	0.0002
Endocrine System Disorders	0.0046
Gastrointestinal Disease	0.0046
Gene Expression	0.0003
Genetic Disorder	0.0046
Hair and Skin Development and Function	0.0030
Hematological Disease	0.0015
Hematological System Development and Function	0.0015
Hematopoiesis	0.0015
Humoral Immune Response	0.0015
Immune Cell Trafficking	0.0046
Immunological Disease	0.0046
Inflammatory Disease	0.0030
Inflammatory Response	0.0046
Lymphoid Tissue Structure and Development	0.0030
Nervous System Development and Function	0.0015
Neurological Disease	0.0002
Organ Development	0.0002
Organ Morphology	0.0015
Organismal Development	0.0002
Organismal Functions	0.0015
Organismal Injury and Abnormalities	0.0015
Reproductive System Development and Function	0.0046
RNA Post-Transcriptional Modification	0.0030
Skeletal and Muscular Disorders	0.0030
Skeletal and Muscular System Development and Function	0.0016
Small Molecule Biochemistry	0.0015
Tissue Development	0.0010
Tissue Morphology	0.0001
Visual System Development and Function	0.0015

Supplemental Material, Table 6: Biological functions significantly* associated with formaldehyde-responsive genes, as identified through pathway analysis of the Li et. al. (2007) genomic database
***(p-value < 0.005)**

Functions	p-value
Cell Death	1.65E-22
Cellular Growth and Proliferation	1.17E-19
Cancer	1.87E-19
Gene Expression	4.40E-16
Cell Cycle	1.51E-15
Cellular Development	6.49E-13
Developmental Disorder	7.45E-12
Reproductive System Disease	2.93E-11
Cardiovascular System Development and Function	2.38E-10
Organismal Development	2.38E-10
Organismal Survival	3.94E-10
Hematological System Development and Function	1.93E-09
Hematopoiesis	1.93E-09
Tissue Development	5.73E-09
Cell-mediated Immune Response	1.09E-08
Cellular Function and Maintenance	1.09E-08
Connective Tissue Disorders	1.10E-08
Immunological Disease	1.10E-08
Inflammatory Disease	1.10E-08
Skeletal and Muscular Disorders	1.10E-08
Tissue Morphology	5.86E-08
Gastrointestinal Disease	5.86E-08
Skeletal and Muscular System Development and Function	7.68E-08
DNA Replication, Recombination, and Repair	1.47E-07
Cardiovascular Disease	3.01E-07
Organ Development	4.23E-07
Genetic Disorder	4.39E-07
Neurological Disease	4.39E-07
Embryonic Development	4.92E-07
Reproductive System Development and Function	4.92E-07
Connective Tissue Development and Function	7.51E-07
Cellular Compromise	9.51E-07
Cellular Movement	9.84E-07
Cell Morphology	1.74E-06
Hematological Disease	4.32E-06
Infection Mechanism	5.28E-06
Nervous System Development and Function	5.28E-06

Functions	p-value
Hair and Skin Development and Function	1.06E-05
Molecular Transport	1.53E-05
Protein Synthesis	1.53E-05
Post-Translational Modification	2.79E-05
Protein Folding	2.79E-05
Cell Signaling	5.05E-05
Small Molecule Biochemistry	5.05E-05
Digestive System Development and Function	8.26E-05
Hepatic System Development and Function	8.26E-05
Cell-To-Cell Signaling and Interaction	1.31E-04
Behavior	1.40E-04
Organ Morphology	1.40E-04
Organismal Injury and Abnormalities	1.47E-04
Cellular Assembly and Organization	1.59E-04
Lymphoid Tissue Structure and Development	2.00E-04
Respiratory Disease	2.03E-04
Metabolic Disease	2.40E-04
Tumor Morphology	2.84E-04
Endocrine System Disorders	3.15E-04
Dermatological Diseases and Conditions	3.39E-04
Lipid Metabolism	6.94E-04
RNA Trafficking	6.94E-04
Renal and Urological Disease	6.94E-04