

Supplemental Table S1

Interactions between differentially expressed circRNAs and miRNAs

mRNA	miRNA	TargetScan_score	miranda_Energy
hsa_circ_0069244	hsa-let-7f-5p	96	-21.72
hsa_circ_0035114	hsa-miR-10399-3p_L+1_1ss22CT	96	-43.90
hsa_circ_0064229	hsa-miR-10399-3p_L+1_1ss22CT	98	-42.31
hsa_circ_0069244	hsa-miR-10399-3p_L+1_1ss22CT	95	-20.62
hsa_circ_0088216	hsa-miR-10399-3p_L+1_1ss22CT	90	-24.80
hsa_circ_0003737	hsa-miR-10527-5p_R+1	90	-24.05
hsa_circ_0005919	hsa-miR-10527-5p_R+1	97	-20.38
hsa_circ_0028023	hsa-miR-10527-5p_R+1	95	-20.19
hsa_circ_0033841	hsa-miR-10527-5p_R+1	96	-155.10
hsa_circ_0056229	hsa-miR-10527-5p_R+1	99	-20.94
hsa_circ_0065041	hsa-miR-10527-5p_R+1	91	-21.04
hsa_circ_0013388	hsa-miR-106a-5p_1ss1AC	94	-50.48
hsa_circ_0027737	hsa-miR-106a-5p_1ss1AC	91	-40.40
hsa_circ_0033841	hsa-miR-106a-5p_1ss1AC	92	-216.96
hsa_circ_0036205	hsa-miR-106a-5p_1ss1AC	96	-26.84
hsa_circ_0050479	hsa-miR-106a-5p_1ss1AC	90	-28.68
hsa_circ_0050488	hsa-miR-106a-5p_1ss1AC	90	-28.68
hsa_circ_0013388	hsa-miR-106b-5p	94	-41.54
hsa_circ_0027737	hsa-miR-106b-5p	96	-20.25
hsa_circ_0033841	hsa-miR-106b-5p	92	-147.59
hsa_circ_0036205	hsa-miR-106b-5p	95	-23.71
hsa_circ_0050479	hsa-miR-106b-5p	91	-24.60
hsa_circ_0050488	hsa-miR-106b-5p	91	-24.60
hsa_circ_0033841	hsa-miR-127-5p_R+1	94	-590.21
hsa_circ_0046927	hsa-miR-127-5p_R+1	93	-41.97
hsa_circ_0059627	hsa-miR-127-5p_R+1	95	-20.94
hsa_circ_0064627	hsa-miR-127-5p_R+1	91	-20.57
hsa_circ_0003737	hsa-miR-130a-3p	91	-40.48
hsa_circ_0058159	hsa-miR-130a-3p	95	-21.03
hsa_circ_0033841	hsa-miR-130b-3p	91	-94.63
hsa_circ_0084956	hsa-miR-130b-3p	98	-20.55
hsa_circ_0015438	hsa-miR-133a-3p_R+1	91	-22.63
hsa_circ_0030465	hsa-miR-133a-3p_R+1	90	-32.96
hsa_circ_0036434	hsa-miR-133a-3p_R+1	97	-20.79
hsa_circ_0071605	hsa-miR-133a-3p_R+1	96	-21.39
hsa_circ_0001760	hsa-miR-145-5p	93	-72.54
hsa_circ_0003737	hsa-miR-145-5p	92	-91.67
hsa_circ_0007119	hsa-miR-145-5p	98	-22.09
hsa_circ_0013026	hsa-miR-145-5p	98	-53.96
hsa_circ_0034976	hsa-miR-145-5p	91	-20.94
hsa_circ_0039343	hsa-miR-145-5p	96	-23.00
hsa_circ_0042323	hsa-miR-145-5p	97	-42.18
hsa_circ_0046782	hsa-miR-145-5p	90	-43.87
hsa_circ_0056229	hsa-miR-145-5p	96	-128.07
hsa_circ_0067585	hsa-miR-145-5p	99	-20.32

hsa_circ_0069740	hsa-miR-145-5p	95	-21.09
hsa_circ_0085470	hsa-miR-145-5p	91	-24.03
hsa_circ_0086047	hsa-miR-145-5p	94	-21.83
hsa_circ_0087868	hsa-miR-145-5p	95	-24.64
hsa_circ_0032496	hsa-miR-150-3p_R-1	95	-50.06
hsa_circ_0040671	hsa-miR-150-3p_R-1	93	-23.84
hsa_circ_0042323	hsa-miR-150-3p_R-1	94	-28.88
hsa_circ_0051024	hsa-miR-150-3p_R-1	97	-21.03
hsa_circ_0064229	hsa-miR-150-3p_R-1	98	-26.08
hsa_circ_0083737	hsa-miR-150-3p_R-1	93	-20.05
hsa_circ_0088223	hsa-miR-150-3p_R-1	96	-51.76
hsa_circ_0049673	hsa-miR-151b_R+3	92	-20.65
hsa_circ_0003737	hsa-miR-15a-5p	91	-25.13
hsa_circ_0012339	hsa-miR-15a-5p	99	-20.81
hsa_circ_0033841	hsa-miR-15a-5p	93	-258.05
hsa_circ_0051557	hsa-miR-15a-5p	92	-42.63
hsa_circ_0052609	hsa-miR-15a-5p	97	-21.38
hsa_circ_0059275	hsa-miR-15a-5p	92	-20.03
hsa_circ_0059627	hsa-miR-15a-5p	91	-20.21
hsa_circ_0070737	hsa-miR-15a-5p	95	-21.44
hsa_circ_0003737	hsa-miR-15b-5p	91	-48.15
hsa_circ_0033841	hsa-miR-15b-5p	93	-221.37
hsa_circ_0053367	hsa-miR-15b-5p	93	-21.49
hsa_circ_0059627	hsa-miR-15b-5p	94	-24.28
hsa_circ_0085194	hsa-miR-15b-5p	96	-24.29
hsa_circ_0013388	hsa-miR-17-5p	94	-50.48
hsa_circ_0027737	hsa-miR-17-5p	91	-40.40
hsa_circ_0033841	hsa-miR-17-5p	92	-216.96
hsa_circ_0036205	hsa-miR-17-5p	96	-26.84
hsa_circ_0050479	hsa-miR-17-5p	90	-28.68
hsa_circ_0050488	hsa-miR-17-5p	90	-28.68
hsa_circ_0004902	hsa-miR-196b-5p_R-1	96	-23.42
hsa_circ_0033841	hsa-miR-196b-5p_R-1	94	-238.42
hsa_circ_0003737	hsa-miR-20a-3p_R+1	93	-24.75
hsa_circ_0033841	hsa-miR-20a-3p_R+1	91	-41.48
hsa_circ_0059312	hsa-miR-20a-3p_R+1	92	-20.01
hsa_circ_0013388	hsa-miR-20a-5p	95	-46.26
hsa_circ_0033841	hsa-miR-20a-5p	92	-157.07
hsa_circ_0036205	hsa-miR-20a-5p	93	-22.74
hsa_circ_0050479	hsa-miR-20a-5p	90	-25.03
hsa_circ_0050488	hsa-miR-20a-5p	90	-25.03
hsa_circ_0053633	hsa-miR-20a-5p	97	-20.48
hsa_circ_0013388	hsa-miR-20b-5p	95	-50.48
hsa_circ_0027737	hsa-miR-20b-5p	96	-20.27
hsa_circ_0028023	hsa-miR-20b-5p	92	-20.07
hsa_circ_0033841	hsa-miR-20b-5p	92	-259.90
hsa_circ_0036205	hsa-miR-20b-5p	93	-22.48
hsa_circ_0050479	hsa-miR-20b-5p	90	-24.82
hsa_circ_0050488	hsa-miR-20b-5p	90	-24.82
hsa_circ_0033841	hsa-miR-223-3p_R+1	92	-89.97
hsa_circ_0033841	hsa-miR-22-5p	98	-116.54
hsa_circ_0086999	hsa-miR-22-5p	93	-21.16

hsa_circ_0090057	hsa-miR-22-5p	95	-20.46
hsa_circ_0005873	hsa-miR-23b-5p	95	-48.22
hsa_circ_0026329	hsa-miR-23b-5p	93	-43.77
hsa_circ_0027276	hsa-miR-23b-5p	97	-20.85
hsa_circ_0033841	hsa-miR-23b-5p	92	-1065.21
hsa_circ_0035500	hsa-miR-23b-5p	96	-21.93
hsa_circ_0038714	hsa-miR-23b-5p	91	-46.23
hsa_circ_0048820	hsa-miR-23b-5p	97	-47.57
hsa_circ_0053367	hsa-miR-23b-5p	93	-22.10
hsa_circ_0061698	hsa-miR-23b-5p	91	-24.28
hsa_circ_0061803	hsa-miR-23b-5p	92	-45.64
hsa_circ_0077142	hsa-miR-23b-5p	95	-22.21
hsa_circ_0003737	hsa-miR-24-3p	96	-41.21
hsa_circ_0007119	hsa-miR-24-3p	92	-61.35
hsa_circ_0008193	hsa-miR-24-3p	93	-21.36
hsa_circ_0009516	hsa-miR-24-3p	90	-20.36
hsa_circ_0015476	hsa-miR-24-3p	99	-23.14
hsa_circ_0027276	hsa-miR-24-3p	96	-21.34
hsa_circ_0029362	hsa-miR-24-3p	91	-26.64
hsa_circ_0033841	hsa-miR-24-3p	95	-1051.47
hsa_circ_0041122	hsa-miR-24-3p	96	-46.29
hsa_circ_0043366	hsa-miR-24-3p	98	-22.31
hsa_circ_0045191	hsa-miR-24-3p	92	-23.61
hsa_circ_0052922	hsa-miR-24-3p	94	-22.61
hsa_circ_0053467	hsa-miR-24-3p	94	-61.68
hsa_circ_0053574	hsa-miR-24-3p	97	-61.68
hsa_circ_0053681	hsa-miR-24-3p	94	-87.83
hsa_circ_0059275	hsa-miR-24-3p	90	-20.59
hsa_circ_0060565	hsa-miR-24-3p	97	-20.14
hsa_circ_0060913	hsa-miR-24-3p	98	-26.99
hsa_circ_0063606	hsa-miR-24-3p	97	-47.15
hsa_circ_0070161	hsa-miR-24-3p	91	-42.85
hsa_circ_0079713	hsa-miR-24-3p	95	-21.98
hsa_circ_0080774	hsa-miR-24-3p	98	-23.25
hsa_circ_0082319	hsa-miR-24-3p	90	-28.27
hsa_circ_0003737	hsa-miR-26a-1-3p	90	-20.33
hsa_circ_0033841	hsa-miR-26a-1-3p	91	-88.66
hsa_circ_0001760	hsa-miR-28-5p_R-1	97	-24.61
hsa_circ_0007119	hsa-miR-28-5p_R-1	97	-65.45
hsa_circ_0010268	hsa-miR-28-5p_R-1	92	-21.61
hsa_circ_0033841	hsa-miR-28-5p_R-1	95	-188.71
hsa_circ_0058608	hsa-miR-28-5p_R-1	95	-43.56
hsa_circ_0088223	hsa-miR-28-5p_R-1	93	-20.77
hsa_circ_0014179	hsa-miR-29c-3p_R-1	92	-20.41
hsa_circ_0033841	hsa-miR-29c-3p_R-1	96	-105.05
hsa_circ_0035237	hsa-miR-301a-3p	99	-20.88
hsa_circ_0001760	hsa-miR-3074-5p_R+1	90	-41.77
hsa_circ_0009445	hsa-miR-3074-5p_R+1	94	-23.75
hsa_circ_0012780	hsa-miR-3074-5p_R+1	98	-22.63
hsa_circ_0033013	hsa-miR-3074-5p_R+1	94	-22.28
hsa_circ_0033841	hsa-miR-3074-5p_R+1	92	-735.24
hsa_circ_0034283	hsa-miR-3074-5p_R+1	98	-20.25

hsa_circ_0047727	hsa-miR-3074-5p_R+1	92	-21.38
hsa_circ_0053467	hsa-miR-3074-5p_R+1	91	-25.23
hsa_circ_0069157	hsa-miR-3074-5p_R+1	93	-22.75
hsa_circ_0071661	hsa-miR-3074-5p_R+1	91	-27.54
hsa_circ_0075640	hsa-miR-3074-5p_R+1	97	-29.75
hsa_circ_0075847	hsa-miR-3074-5p_R+1	95	-23.66
hsa_circ_0091368	hsa-miR-3074-5p_R+1	97	-23.43
hsa_circ_0005873	hsa-miR-30b-3p	92	-23.60
hsa_circ_0007346	hsa-miR-30b-3p	96	-76.94
hsa_circ_0014371	hsa-miR-30b-3p	98	-44.28
hsa_circ_0014391	hsa-miR-30b-3p	99	-44.28
hsa_circ_0014421	hsa-miR-30b-3p	99	-23.18
hsa_circ_0030392	hsa-miR-30b-3p	94	-21.92
hsa_circ_0033841	hsa-miR-30b-3p	96	-1679.56
hsa_circ_0037542	hsa-miR-30b-3p	92	-150.10
hsa_circ_0037817	hsa-miR-30b-3p	91	-44.27
hsa_circ_0038547	hsa-miR-30b-3p	98	-22.10
hsa_circ_0038572	hsa-miR-30b-3p	97	-28.56
hsa_circ_0042154	hsa-miR-30b-3p	95	-42.92
hsa_circ_0046118	hsa-miR-30b-3p	93	-22.38
hsa_circ_0046927	hsa-miR-30b-3p	95	-23.58
hsa_circ_0056229	hsa-miR-30b-3p	91	-276.89
hsa_circ_0059275	hsa-miR-30b-3p	94	-45.99
hsa_circ_0061803	hsa-miR-30b-3p	98	-22.45
hsa_circ_0064229	hsa-miR-30b-3p	96	-45.18
hsa_circ_0070737	hsa-miR-30b-3p	93	-165.89
hsa_circ_0071342	hsa-miR-30b-3p	90	-25.89
hsa_circ_0071605	hsa-miR-30b-3p	93	-42.30
hsa_circ_0075792	hsa-miR-30b-3p	92	-21.10
hsa_circ_0076133	hsa-miR-30b-3p	95	-48.85
hsa_circ_0083737	hsa-miR-30b-3p	94	-23.06
hsa_circ_0088216	hsa-miR-30b-3p	92	-22.97
hsa_circ_0009474	hsa-miR-3138_L-5R+2	97	-23.33
hsa_circ_0013344	hsa-miR-3138_L-5R+2	96	-75.33
hsa_circ_0022764	hsa-miR-3138_L-5R+2	99	-24.22
hsa_circ_0024554	hsa-miR-3138_L-5R+2	93	-27.53
hsa_circ_0025325	hsa-miR-3138_L-5R+2	98	-20.96
hsa_circ_0025793	hsa-miR-3138_L-5R+2	95	-20.45
hsa_circ_0028023	hsa-miR-3138_L-5R+2	99	-21.39
hsa_circ_0028236	hsa-miR-3138_L-5R+2	92	-93.49
hsa_circ_0033841	hsa-miR-3138_L-5R+2	95	-1252.45
hsa_circ_0038714	hsa-miR-3138_L-5R+2	97	-30.41
hsa_circ_0038871	hsa-miR-3138_L-5R+2	95	-47.44
hsa_circ_0043345	hsa-miR-3138_L-5R+2	90	-20.11
hsa_circ_0070529	hsa-miR-3138_L-5R+2	92	-21.39
hsa_circ_0086806	hsa-miR-3138_L-5R+2	98	-45.80
hsa_circ_0003737	hsa-miR-31-5p_R-1_1ss20CA	94	-64.18
hsa_circ_0033841	hsa-miR-31-5p_R-1_1ss20CA	91	-88.61
hsa_circ_0038212	hsa-miR-31-5p_R-1_1ss20CA	92	-21.93
hsa_circ_0088987	hsa-miR-31-5p_R-1_1ss20CA	95	-25.93
hsa_circ_0014869	hsa-miR-331-5p_R-2	94	-24.97
hsa_circ_0033841	hsa-miR-331-5p_R-2	92	-24.03

hsa_circ_0010343	hsa-miR-424-5p_R-1	90	-20.95
hsa_circ_0028023	hsa-miR-424-5p_R-1	90	-21.04
hsa_circ_0033841	hsa-miR-424-5p_R-1	92	-108.08
hsa_circ_0034976	hsa-miR-424-5p_R-1	97	-22.46
hsa_circ_0051557	hsa-miR-424-5p_R-1	93	-32.06
hsa_circ_0056560	hsa-miR-424-5p_R-1	90	-21.03
hsa_circ_0059627	hsa-miR-424-5p_R-1	91	-20.12
hsa_circ_0070799	hsa-miR-424-5p_R-1	96	-20.30
hsa_circ_0005894	hsa-miR-450a-2-3p_L-1	97	-21.70
hsa_circ_0009700	hsa-miR-450a-2-3p_L-1	97	-20.19
hsa_circ_0009701	hsa-miR-450a-2-3p_L-1	92	-20.19
hsa_circ_0023190	hsa-miR-450a-2-3p_L-1	95	-21.20
hsa_circ_0023598	hsa-miR-450a-2-3p_L-1	94	-23.52
hsa_circ_0029823	hsa-miR-450a-2-3p_L-1	91	-20.64
hsa_circ_0033627	hsa-miR-450a-2-3p_L-1	90	-21.91
hsa_circ_0034976	hsa-miR-450a-2-3p_L-1	94	-21.27
hsa_circ_0034986	hsa-miR-450a-2-3p_L-1	98	-21.27
hsa_circ_0034991	hsa-miR-450a-2-3p_L-1	98	-21.27
hsa_circ_0038590	hsa-miR-450a-2-3p_L-1	99	-22.15
hsa_circ_0041881	hsa-miR-450a-2-3p_L-1	97	-20.98
hsa_circ_0043336	hsa-miR-450a-2-3p_L-1	92	-20.34
hsa_circ_0045372	hsa-miR-450a-2-3p_L-1	92	-24.78
hsa_circ_0056229	hsa-miR-450a-2-3p_L-1	93	-64.50
hsa_circ_0059312	hsa-miR-450a-2-3p_L-1	90	-22.41
hsa_circ_0067562	hsa-miR-450a-2-3p_L-1	93	-20.12
hsa_circ_0086047	hsa-miR-450a-2-3p_L-1	91	-20.20
hsa_circ_0007119	hsa-miR-4521_R+1	93	-21.66
hsa_circ_0024554	hsa-miR-4521_R+1	90	-21.65
hsa_circ_0069784	hsa-miR-4521_R+1	92	-20.49
hsa_circ_0082959	hsa-miR-4521_R+1	91	-42.09
hsa_circ_0090255	hsa-miR-4521_R+1	98	-20.35
hsa_circ_0003050	hsa-miR-490-3p_R+1	92	-24.86
hsa_circ_0004902	hsa-miR-490-3p_R+1	96	-21.55
hsa_circ_0033341	hsa-miR-490-3p_R+1	97	-21.00
hsa_circ_0033841	hsa-miR-490-3p_R+1	95	-649.21
hsa_circ_0042154	hsa-miR-490-3p_R+1	98	-44.75
hsa_circ_0049673	hsa-miR-490-3p_R+1	92	-20.58
hsa_circ_0067983	hsa-miR-490-3p_R+1	99	-24.06
hsa_circ_0083774	hsa-miR-490-3p_R+1	97	-25.17
hsa_circ_0003737	hsa-miR-494-3p_R+1	91	-62.64
hsa_circ_0007299	hsa-miR-494-3p_R+1	90	-21.01
hsa_circ_0012339	hsa-miR-497-5p	99	-22.54
hsa_circ_0028023	hsa-miR-497-5p	91	-23.41
hsa_circ_0033841	hsa-miR-497-5p	92	-510.00
hsa_circ_0039785	hsa-miR-497-5p	90	-20.01
hsa_circ_0059275	hsa-miR-497-5p	92	-42.40
hsa_circ_0088223	hsa-miR-497-5p	94	-45.56
hsa_circ_0090746	hsa-miR-497-5p	95	-24.80
hsa_circ_0003737	hsa-miR-505-3p_L-1R+2	93	-47.77
hsa_circ_0005779	hsa-miR-505-3p_L-1R+2	98	-21.79
hsa_circ_0053467	hsa-miR-505-3p_L-1R+2	97	-26.90
hsa_circ_0062231	hsa-miR-505-3p_L-1R+2	92	-20.42

hsa_circ_0076133	hsa-miR-505-3p_L-1R+2	99	-23.68
hsa_circ_0077508	hsa-miR-505-3p_L-1R+2	94	-26.89
hsa_circ_0046927	hsa-miR-548ag_R+1_1ss4GA	98	-20.14
hsa_circ_0077508	hsa-miR-548au-5p	95	-30.89
hsa_circ_0077508	hsa-miR-548o-5p	95	-32.34
hsa_circ_0003737	hsa-miR-576-3p_R+1	92	-20.48
hsa_circ_0033841	hsa-miR-576-3p_R+1	94	-67.23

Supplemental Table S2
The primer sequences of circRNAs

Gene	Forward(5'-3')	Reverse(5'-3')
U6	GGAACGATACAGAGAAGATTAGC	TGGAACGCTTCACGAATTTGCG
circ_0009885	CTCACTGATGCCACACCATG	CCCCTTCTCCACATTCCAGT
circ_0066651	CTGAAAGCTGCATCTGTCTGT	TATATGCCTGGCGGTAGAGC
circ_0043753	TAGGACACACACAGGCTTGG	GCAGCTCTTCCCCATGCTTA
circ_0041881	GGTTACAGCTGATCCTCGGG	CAGGATGCCCATGATCAGCT
circ_0011760	TACTGCAGTGCCTTTTCCTC	TCTTCATAGAACAGCTCCAGG
circ_0032872	TTGGTGGAGCAGATCACTCT	TGGCTGGTACAAATCCCAAGA
circ_0061803	CCGAGTACATGCTGCAGAAG	AGCCATCTCTGACACCTCG
circ_0004716	CTCCAGCAACATCTTGTTCA	TCCAGTTGCTAGGGATCTGT
circ_0009445	CGTCCCCTTCAAGTTCCAGA	GGTCATGTGTCTGTTTTCTTG
circ_0075792	TTTTGGTCACGTTCTCCCA	GGTACAGTGACTAATACCTGG