

Supplementary Table 1: Stem-loop RT-PCR primers

Stem-loop RT primers (5'-3')	
hsa-miR-515-5p-RT	GTC GTA TCC AGT GCA GGG TCC GAG GTA TTC GCA CTG GAT ACG ACC AGA AAG T
hsa-miR-515-3p-RT	GTC GTA TCC AGT GCA GGG TCC GAG GTA TTC GCA CTG GAT ACG ACA ACG CTC C
hsa-mir-519e-5p-RT	GTC GTA TCC AGT GCA GGG TCC GAG GTA TTC GCA CTG GAT ACG ACG AAA GTG C
hsa-mir-519e-3p-RT	GTC GTA TCC AGT GCA GGG TCC GAG GTA TTC GCA CTG GAT ACG ACA ACA CTC T
hsa-miR-214-5p-RT	GTC GTA TCC AGT GCA GGG TCC GAG GTA TTC GCA CTG GAT ACG ACG CAC AGC A
hsa-miR-214-3p-RT	GTC GTA TCC AGT GCA GGG TCC GAG GTA TTC GCA CTG GAT ACG ACA CTG CCT G
hsa-miR-424-5p-RT	GTC GTA TCC AGT GCA GGG TCC GAG GTA TTC GCA CTG GAT ACG ACT TCA AAA C
hsa-miR-424-3p-RT	GTC GTA TCC AGT GCA GGG TCC GAG GTA TTC GCA CTG GAT ACG ACA TAG CAG C
microRNA specific PCR primers (5'-3')	
hsa-miR-515-5p	CGG CGG TTC TCC AAA AGA AAG CA
hsa-miR-515-3p	CGG CGA GTG CCT TCT TTT GGA
hsa-mir-519e-5p	CGG CGA TTC TCC AAA AGG GAG C
hsa-mir-519e-3p	CGG CGC AAG TGC CTC CTT TTA G
hsa-miR-214-5p	CGG CGT GCC TGT CTA CAC TTG
hsa-miR-214-3p	CGG ACA GCA GGC ACA GAC A
hsa-miR-424-5p	CGG GCA GCA GCA ATT CAT GT
hsa-miR-424-3p	CGC AAA ACG TGA GGC GCT
U6-F	CTC GCT TCG GCA GCA CA
U6-R	AAC GCT TCA CGA ATT TGC GT
Universal reverse primer	CCA GTG CAG GGT CCG AGG TA

Supplementary Table 2. miRNA altered in expression levels in stem cells

A. miRNAs altered in iPSC relative to ESC

	Activated		Up-regulated		Shutdown		Down-regulated	
	miRNA	Log ₂ (fold change)	miRNA	Log ₂ (fold change)	miRNA	Log ₂ (fold change)	miRNA	Log ₂ (fold change)
1	HSA-MIR-502-3P	9.05477652	HSA-MIR-199A-5P	3.289988274	HSA-MIR-636	-4.973121579	HSA-MIR-3615	-1.680011726
2	HSA-MIR-656	6.91477652	HSA-MIR-199A-3P	2.913321607	HSA-MIR-664*	-3.518121579	HSA-MIR-548D-3P	-1.575011726
3	HSA-MIR-130A*	6.758109853	HSA-MIR-154*	2.771654941	HSA-MIR-585	-2.218121579	HSA-LET-7F-2*	-1.560011726
4	HSA-MIR-378*	6.371443186	HSA-MIR-199B-5P	2.589988274			HSA-MIR-4279	-1.520011726
5	HSA-MIR-648	5.41477652	HSA-MIR-411	2.213321607				
6	HSA-MIR-589	3.91477652	HSA-MIR-432	2.129988274				
7	HSA-MIR-196B	2.51477652	HSA-MIR-181C	2.081654941				
8	HSA-MIR-4328	2.311443186	HSA-MIR-369-3P	1.998321607				
9	HSA-MIR-451	2.108109853	HSA-MIR-651	1.973321607				
10	HSA-MIR-1297	2.03477652	HSA-MIR-487B	1.898321607				
11	HSA-MIR-548V	1.56477652	HSA-MIR-410	1.798321607				
12	HSA-MIR-181C*	1.52477652	HSA-MIR-181B	1.584988274				
13			HSA-MIR-329	1.506654941				
	12		13		3		4	
	Total = 32							

B. miRNAs altered in iPSC relative to MSC

	Activated		Up-regulated		Shutdown		Down-regulated	
	miRNA	Log ₂ (fold change)	miRNA	Log ₂ (fold change)	miRNA	Log ₂ (fold change)	miRNA	Log ₂ (fold change)
1	HSA-MIR-302F	13.15477652	HSA-MIR-302D	13.04792715	HSA-MIR-10A	-12.45851603	HSA-LET-7I	-10.99207285
2	HSA-MIR-1231	11.40810985	HSA-MIR-367	11.66459382	HSA-MIR-139-5P	-10.19351603	HSA-LET-7G	-9.538739512
3	HSA-MIR-302A*	11.06810985	HSA-MIR-302C	9.899593821	HSA-MIR-143	-9.473516032	HSA-MIR-199A -5P	-8.530406179
4	HSA-MIR-1290	10.89810985	HSA-MIR-135A	8.932927154	HSA-LET-7D	-9.083516032	HSA-MIR-199A -3P	-8.457072846
5	HSA-MIR-200C	10.70144319	HSA-MIR-518F	7.177927154	HSA-MIR-22*	-7.923516032	HSA-LET-7F	-8.120406179
6	HSA-MIR-3665	10.39144319	HSA-MIR-517B	6.777927154	HSA-MIR-1306	-6.408516032	HSA-LET-7A	-7.933739512
7	HSA-MIR-302C*	9.658109853	HSA-MIR-135B	6.499593821	HSA-LET-7D*	-6.403516032	HSA-MIR-199B -5P	-7.690406179
8	HSA-MIR-520C-3P	8.621443186	HSA-MIR-141	6.446260488	HSA-MIR-3660	-5.818516032	HSA-LET-7C	-7.603739512
9	HSA-MIR-302B*	8.611443186	HSA-MIR-335*	6.177927154	HSA-MIR-98	-5.808516032	HSA-LET-7E	-7.492072846
10	HSA-MIR-517A	8.598109853	HSA-MIR-372	5.261260488	HSA-MIR-876-5P	-4.248516032	HSA-MIR-137	-7.203739512
11	HSA-MIR-3670	8.26477652	HSA-MIR-96	5.239593821	HSA-MIR-4268	-3.883516032	HSA-MIR-29A	-6.937072846
12	HSA-MIR-187	8.101443186	HSA-MIR-429	5.204593821	HSA-MIR-664*	-3.033516032	HSA-MIR-145	-6.200406179
13	HSA-MIR-182	7.91477652	HSA-MIR-520H	5.201260488	HSA-MIR-10A*	-2.973516032	HSA-MIR-99A	-6.082072846
14	HSA-MIR-296-3P	7.89477652	HSA-MIR-520G	5.174593821	HSA-MIR-506	-2.778516032	HSA-MIR-100	-6.072072846
15	HSA-MIR-550A*	7.828109853	HSA-MIR-18A	5.079593821	HSA-MIR-567	-2.428516032	HSA-MIR-196A	-5.812072846
16	HSA-MIR-18B	7.711443186	HSA-MIR-3175	4.871260488	HSA-MIR-24-1*	-2.193516032	HSA-MIR-196B	-5.688739512

17	HSA-MIR-373	7.57477652	HSA-MIR-335	4.171260488	HSA-MIR-218-2*	-1.613516032	HSA-LET-7F-2*	-5.640406179
18	HSA-MIR-515-5P	7.388109853	HSA-MIR-205	4.134593821			HSA-MIR-29B	-5.588739512
19	HSA-MIR-150	7.348109853	HSA-MIR-935	4.122927154			HSA-MIR-31	-5.380406179
20	HSA-MIR-3180-3P	7.11477652	HSA-MIR-598	4.121260488			HSA-MIR-22	-5.193739512
21	HSA-MIR-519A	6.921443186	HSA-MIR-106A	4.116260488			HSA-MIR-31*	-5.182072846
22	HSA-MIR-3648	6.918109853	HSA-MIR-526B	4.049593821			HSA-MIR-27A	-4.660406179
23	HSA-MIR-518C	6.618109853	HSA-MIR-29B-2*	3.831260488			HSA-MIR-193A -5P	-4.615406179
24	HSA-MIR-371-5P	6.591443186	HSA-MIR-766	3.831260488			HSA-MIR-214	-4.365406179
25	HSA-MIR-9	6.511443186	HSA-MIR-421	3.827927154			HSA-MIR-155	-4.342072846
26	HSA-MIR-4303	6.498109853	HSA-MIR-520E	3.821260488			HSA-MIR-424*	-4.215406179
27	HSA-MIR-3147	6.391443186	HSA-MIR-17	3.816260488			HSA-MIR-21	-4.025406179
28	HSA-MIR-1180	6.32477652	HSA-MIR-20A	3.697927154			HSA-MIR-24	-3.940406179
29	HSA-MIR-4282	6.05477652	HSA-MIR-18A*	3.617927154			HSA-MIR-424	-3.883739512
30	HSA-MIR-449B*	6.038109853	HSA-MIR-126	3.566260488			HSA-MIR-181C	-3.833739512
31	HSA-MIR-656	5.74477652	HSA-MIR-301A	3.539593821			HSA-MIR-34A	-3.593739512
32	HSA-MIR-3605-5P	5.47477652	HSA-MIR-489	3.514593821			HSA-MIR-152	-3.495406179
33	HSA-MIR-4266	5.458109853	HSA-MIR-19B	3.436260488			HSA-MIR-218	-3.442072846
34	HSA-MIR-33A	5.21477652	HSA-MIR-532 -3P	3.429593821			HSA-MIR-221*	-3.382072846
35	HSA-MIR-520A-5P	5.198109853	HSA-MIR-20A*	3.411260488			HSA-MIR-221	-3.355406179
36	HSA-MIR-412	4.92477652	HSA-MIR-498	3.382927154			HSA-MIR-10B	-3.118739512
37	HSA-MIR-3685	4.878109853	HSA-MIR-1281	3.329593821			HSA-MIR-222	-2.923739512

38	HSA-MIR-433	4.788109853	HSA-MIR-92A	3.286260488			HSA-MIR-29A*	-2.775406179
39	HSA-MIR-192	4.611443186	HSA-MIR-19A	3.224593821			HSA-MIR-146B -5P	-2.755406179
40	HSA-MIR-524-3P	4.538109853	HSA-MIR-651	3.117927154			HSA-MIR-4288	-2.755406179
41	HSA-MIR-515-3P	4.418109853	HSA-MIR-518B	3.102927154			HSA-MIR-365	-2.648739512
42	HSA-MIR-522	4.39477652	HSA-MIR-296 -5P	3.081260488			HSA-MIR-21*	-2.475406179
43	HSA-MIR-105	4.371443186	HSA-MIR-572	3.039593821			HSA-MIR-145*	-2.448739512
44	HSA-MIR-3150B	4.301443186	HSA-MIR-92B	2.919593821			HSA-MIR-708	-2.393739512
45	HSA-MIR-612	4.27477652	HSA-MIR-338 -3P	2.912927154			HSA-MIR-181B	-2.300406179
46	HSA-MIR-520D-5P	4.268109853	HSA-MIR-548F	2.864593821			HSA-MIR-34A*	-2.267072846
47	HSA-MIR-648	4.24477652	HSA-MIR-126*	2.861260488			HSA-MIR-15A	-2.163739512
48	HSA-MIR-524-5P	4.14477652	HSA-MIR-340	2.831260488			HSA-MIR-30A*	-2.105406179
49	HSA-MIR-518D-3P	3.948109853	HSA-MIR-219-1 -3P	2.806260488			HSA-MIR-181D	-1.990406179
50	HSA-MIR-516A-5P	3.918109853	HSA-MIR-877	2.792927154			HSA-MIR-30A	-1.913739512
51	HSA-MIR-744*	3.728109853	HSA-MIR-20B*	2.774593821			HSA-MIR-450A	-1.893739512
52	HSA-MIR-9*	3.721443186	HSA-MIR-106B	2.771260488			HSA-MIR-411	-1.862072846
53	HSA-MIR-575	3.691443186	HSA-MIR-1274A	2.766260488			HSA-MIR-27B	-1.852072846
54	HSA-MIR-200B*	3.678109853	HSA-MIR-130A	2.721260488			HSA-MIR-497	-1.847072846
55	HSA-MIR-519E*	3.65477652	HSA-MIR-940	2.721260488			HSA-MIR-34C -5P	-1.803739512

56	HSA-MIR-516B	3.578109853	HSA-MIR-602	2.626260488			HSA-MIR-26B	-1.788739512
57	HSA-MIR-92A-2*	3.558109853	HSA-MIR-512-3P	2.574593821			HSA-MIR-193B	-1.782072846
58	HSA-MIR-1283	3.391443186	HSA-MIR-92A-1*	2.567927154			HSA-MIR-4301	-1.763739512
59	HSA-MIR-519E	3.381443186	HSA-MIR-346	2.557927154			HSA-MIR-4328	-1.707072846
60	HSA-MIR-373*	2.83477652	HSA-MIR-3621	2.542927154			HSA-MIR-4291	-1.697072846
61	HSA-MIR-466	2.79477652	HSA-MIR-2277 -3P	2.531260488			HSA-MIR-625	-1.673739512
62	HSA-MIR-589	2.74477652	HSA-MIR-210	2.504593821			HSA-MIR-299-5P	-1.670406179
63	HSA-MIR-141*	2.44477652	HSA-MIR-3618	2.496260488			HSA-MIR-195	-1.647072846
64	HSA-MIR-1273C	1.938109853	HSA-MIR-874	2.491260488			HSA-MIR-24-2*	-1.627072846
65	HSA-MIR-876-3P	1.84477652	HSA-MIR-142 -3P	2.439593821			HSA-MIR-362-3P	-1.540406179
66	HSA-MIR-196B*	1.83477652	HSA-MIR-483 -5P	2.396260488			HSA-MIR-99B	-1.523739512
67			HSA-MIR-1468	2.379593821			HSA-MIR-3158	-1.500406179
68			HSA-MIR-503	2.297927154				
69			HSA-MIR-1247	2.262927154				
70			HSA-MIR-3181	2.221260488				
71			HSA-MIR-1233	2.217927154				
72			HSA-MIR-3622A- 5P	2.194593821				
73			HSA-MIR-942	2.167927154				
74			HSA-MIR-4314	2.097927154				

75			HSA-MIR-518E*	2.089593821				
76			HSA-MIR-519B -3P	2.086260488				
77			HSA-MIR-1244	2.057927154				
78			HSA-MIR-93	2.022927154				
79			HSA-MIR-339 -5P	2.011260488				
80			HSA-MIR-25*	1.999593821				
81			HSA-MIR-675	1.987927154				
82			HSA-MIR-153	1.934593821				
83			HSA-MIR-545*	1.911260488				
84			HSA-MIR-3656	1.901260488				
85			HSA-MIR-718	1.879593821				
86			HSA-MIR-18B*	1.876260488				
87			HSA-MIR-216A	1.874593821				
88			HSA-MIR-1224 -3P	1.871260488				
89			HSA-MIR-374B	1.869593821				
90			HSA-MIR-25	1.854593821				
91			HSA-MIR-130B	1.847927154				
92			HSA-MIR-92B*	1.834593821				
93			HSA-MIR-1237	1.819593821				
94			HSA-MIR-526A	1.811260488				

95			HSA-MIR-4321	1.726260488			
96			HSA-MIR-937	1.719593821			
97			HSA-MIR-7	1.692927154			
98			HSA-MIR-4279	1.674593821			
99			HSA-MIR-378	1.667927154			
100			HSA-MIR-154*	1.661260488			
101			HSA-MIR-3615	1.654593821			
102			HSA-MIR-3137	1.636260488			
103			HSA-MIR-148A	1.619593821			
104			HSA-MIR-301B	1.611260488			
105			HSA-MIR-431*	1.604593821			
106			HSA-MIR-1270	1.601260488			
107			HSA-MIR-29C*	1.571260488			
108			HSA-MIR-130A*	1.539593821			
109			HSA-MIR-4318	1.537927154			
110			HSA-MIR-4263	1.534593821			
111			HSA-MIR-1307	1.527927154			
		66		111		17	67
Total = 261							

Supplementary Table3. Mir families and expression levels in pair-comparison for iPSC vs MSC (n=82)

I. Up-regulated in iPSC (both -5p and -3p species Log₂(FC) >1.5) (n=14 pairs, 28 miRNAs)

No	miRNA family	Chromos' l site	miRNA-5p	Other name(s)	Expression status	Log ₂ (FC)	miRNA-3p	Other name(s)	Expression status	Log ₂ (FC)
1	mir-17	13q31.3	miR-18a-5p	miR-18A	Up	5.823	miR-18a-3p	miR-18A*	Up	4.133
2		13q31.3	miR-20a-5p	miR-20A	Up	4.226	miR-20a-3p	miR-20*	Up	4.096
3		Xq26.2	miR-20b-5p	miR-20b	Up	5.171	miR-20b-3p	miR-20B*	Up	3.023
4		Xq26.2	miR-106a-5p	miR-106A	Up	4.640	miR-106a-3p	miR-106A*	Up	2.739
5	mir-8	12p13.31	miR-141-5p	miR-141*	Act	2.110	miR-141-3p	miR-141	Up	6.446
6	mir-25	1q22	miR-92b-5p	miR-92B*	Up	1.835	miR-92b-3p	miR-92B	Up	2.920
7		7q22.1	miR-25-5p	miR-25*	Up	2.000	miR-25-3p	miR-25	Up	1.983
8		13q31.3	miR-92a-1-5p	miR-92A-1*	Up	2.568	miR-92a-3p	miR-92A	Up	2.923
9	mir-126	9q34.3	miR-126-5p	miR-126*	Up	2.133	miR-126-3p	miR-126	Up	3.186
10	mir-130	11q12.1	miR-130a-5p	miR-130A*	Up	1.610	miR-130a-3p	miR-130a	Up	3.770
11	mir-135	3p21.2	miR-135a-5p	miR-135A	Up	8.933	miR-135a-3p	miR-135A*	Act	5.265
12	mir-335	7q32.2	miR-335-5p	miR-335	Up	4.416	miR-335-3p	miR-335*	Up	5.066
13	mir-340	5q35.3	miR-340-5p	miR-340	Up	3.283	miR-340-3p	miR-340*	Up	1.922
14	mir-515	19q13.42	miR-518f-5p	miR-518F*	Up	3.556	miR-518-3p	miR-518F	Up	7.178

II. Down-regulated in iPSC (both -5p and -3p species Log₂(FC)<-1.5) (n=10 pairs, 20 miRNAs)

No	miRNA family	Chromos' l site	miRNA-5p	Other name(s)	Expression Status	Log ₂ (FC)	miRNA-3p	Other name(s)	Expression Status	Log ₂ (FC)
1	mir-29	7q32.3	miR-29a-5p	miR-29A*	Down	-1.807	miR-29a-3p	miR-29A	Down	-6.487
2		7q32.3	miR-29b-1-5p	miR-29B-1*	Down	-5.000	miR-29b-3p	miR-29B	Down	-4.553
3	mir-31	9p21.3	miR-31-5p	miR-31	Down	-4.737	miR-31-3p	miR-31*	Down	-4.447
4	mir-145	5q32	miR-145-5p	miR-145	Down	-4.8407	miR-145-3p	miR-145*	Down	-2.0969
5	mir-193	17q11.2	miR-193a-5p		Down	-4.6307	miR-193a-3p	miR-193A	Down	-2.026
6	mir-199	19p13.2	miR-199a-5p	miR-199A	Down	-7.677	miR-199a-3P	miR-199a*	Down	-8.274
7	mir-214	1q24.3	miR-214-5p	miR-214*	Down	-2.869	miR-214-3p	miR-214	Down	-3.834
8	mir-218	5q34	miR-218-5p	miR-218	Down	-3.257	miR-218-2-3p	miR-218-2*	Shut	-1.540
19	mir-221	Xp11.3	miR-221-5p	miR-221*	Down	-3.277	miR-221-3p	miR-221	Down	-3.080
10	mir-322	Xq26.3	miR-424-5p	miR-424	Down	-3.657	miR-424-3p	miR-424*	Down	-3.934

III. Activated in iPSC (both 5p/3p Log₂(FC)>1.5) (n=12 pairs, 24 miRNA)

No	miRNA family	Chromos' l site	miRNA-5p	Other name(s)	Expression status	Log ₂ (FC)	miRNA-3p	Other name(s)	Expression status	Log ₂ (FC)
1	mir-8	12p13.31	miR-200c-5p	miR-200C*	Up	1.583	miR-200c-3p	miR-200C	Act	10.366
2	mir-17	Xq26.2	miR-18b-5p	miR-18B	Act	7.376	miR-18b-3p	miR-18B*	Up	2.453
3	mir-373	19q13.42	miR-373-5p	miR-373*	Act	2.500	miR-373-3p	miR-373	Act	7.240
4	mir-515	19q13.42	miR-515-5p		Act	7.053	miR-515-3p		Act	4.083
5	mir-290	19q13.42	miR-371a-5p	miR-371-5P	Act	6.256	miR-371a-3p	miR-371-3P	Up	4.024
6	mir-296	20q13.32	miR-296-5p	miR-296	Up	3.083	miR-296-3p		Act	7.560
7	mir-515	19q13.42	miR-519e-5p	miR-519E*	Act	3.320	miR-519e-3p	miR-519E	Act	3.046
8	mir-339	7p22.3	miR-339-5p	miR-339	Up	2.690	miR-339-3p		Act	5.490
9	mir-589	7p22.1	miR-589-5p	miR-589	Act	2.410	miR-589-3p	miR-589*	Up	1.734
10	mir-3180		miR-3180-5p		Up	2.189	miR-3180-3p		Act	6.780
11	mir-148	7p15.2	miR-148a-5p	miR-148A*	Act	4.625	miR-148a-3p	miR-148A	Up	1.650
12	mir-744	7p12	miR-744-5p	miR-744	Up	1.536	miR-744-3p	miR-744*	Act	3.393

IV. Shutdown in iPSC (both <1.5) (n=4 pairs, 8 miRNAs)

No	miRNA family	Chromos' l site	miRNA-5p	Other name(s)	Expression status	Log2(FC)	miRNA-3p	Other name(s)	Expression status	Log2(FC)
1	mir-10	7q21.32	miR-10a-5p	miR-10A	Shut	-12.420	miR-10a-3p	miR-10A*	Shut	-2.790
2	let-7	9q22.32	let-7d-5p	let-7D	Shut	-9.120	let-7d-3p	let-7D*	Shut	-6.090
3	mir-22	17p13.3	miR-22-5p	miR-22*	Shut	-7.880	miR-22-3p	miR-22	Down	-4.527
4	mir-24	9q22.32	miR-24-1-5p	miR-24-1*	Shut	-1.927	miR-24-3p	miR-24	Down	-3.167

V. Reverse direction in iPSC (both -5p and -3p species Log2(FC)<-1.5) (n=4 pairs, 8 miRNAs)

No	miRNA family	Chromos' l site	miRNA-5p	Other name(s)	Expression Status	Log2(FC)	miRNA-3p	Other name(s)	Expression Status	Log2(FC)
1	mir-146	10q24.32	miR-146b-5p	miR-146B	Down	-4.367	miR-146b-3p		Up	1.500
2	mir-196	7p15.2	miR-196b-5p	miR-196B	Down	-5.587	miR-196b-3p	miR-196B*	Act	1.500
3	mir-139	11q13.4	miR-139-5p	miR-139	Shut	-9.810	miR-139-3p		Up	1.943
4	mir-876	9p21.1	miR-876-5p		Shut	-3.797	miR-876-3p		Act	1.510

Supplementary Table 4: Predicted targets of differentially expressed miR-5p and-3p pairs in iPSCs relative to MSCs

miRNA family	Chromosomal site	miRNA ¹	-5p/-3p name	Log ₂ (Fold change) (mean±SD)	Affected processes: Selected target mRNAs ²
(I) Co-upregulated/-activated pairs (n=26)					
mir-8	12p13.31	hsa-miR-141*	miR-141-5p	2.110	<p>Cell cycle: FZR1, CCND1, SMC1A, TGFB1, CCND2, CDC25C, CDKN1B, TP53, MYC</p> <p>p53 signaling pathway: PTEN, CCND1, CCND2, TP53</p> <p>PI3K-Akt signaling pathway: PTEN, VEGFA, MYB, MET, CCND1, EIF4E, CCND2, PIK3CA, LAMC2, CDKN1B, CREB1, MYC</p> <p>Wnt signaling pathway: FBXW11, SFRP1, JUN, CCND1, CCND2, CSNK1A1, TP53, MYC</p> <p>Adhesion: PTEN, ACTG1, SNAI2, VEGFA, JUN, MET, CCND1, CDH1, CCND2, PIK3CA, LAMC2</p> <p>HIF-1 signaling pathway: VEGFA, EIF4E, PIK3CA, CDKN1B</p> <p>Apoptosis: PIK3CA, TP53</p> <p>ErbB signaling pathway: JUN, MAP2K4, PIK3CA, ERBB4, CDKN1B, MYC</p> <p>GnRH signaling pathway: MAPK14, JUN, MAP2K4</p> <p>Chemokine signaling pathway: PIK3CA</p> <p>Cytokine-cytokine receptor interaction: MET, TGFB1, INHBC, BMP2</p> <p>TGF-beta signaling pathway: TGFB1, INHBC, BMP2, MYC</p> <p>MAPK signaling pathway: MAPK14, JUN, MAP2K4, TGFB1, TP53, MYC</p> <p>Osteoclast differentiation: MAPK14, JUN, TGFB1, PIK3CA, CREB1</p> <p>Oocyte meiosis: FBXW11, SMC1A, CDC25C</p> <p>mTOR signaling pathway: PTEN, VEGFA, EIF4E, PIK3CA</p> <p>Metabolic pathways: HPRT1, PSAT1, RPIA, AMACR</p> <p>VEGF signaling pathway: MAPK14, VEGFA, PIK3CA</p>
mir-8	12p13.31	hsa-miR-141	miR-141-3p	6.446	<p>Cell cycle: E2F3, TGFB2</p> <p>p53 signaling pathway: PTEN</p> <p>PI3K-Akt signaling pathway: EIF4E</p> <p>Wnt signaling pathway: TCF7L1, CTBP2</p> <p>Adhesion: PTEN, SHC1, TCF7L1</p> <p>HIF-1 signaling pathway: EIF4E</p>

					<p>ErbB signaling pathway: SHC1</p> <p>GnRH signaling pathway: MAPK14</p> <p>Chemokine signaling pathway: SHC1</p> <p>Cytokine-cytokine receptor interaction: TGFB2, ACVR2B</p> <p>TGF-beta signaling pathway: TGFB2, ACVR2B</p> <p>MAPK signaling pathway: STK3, TGFB2, MAPK14</p> <p>Osteoclast differentiation: TGFB2, MAPK14</p> <p>mTOR signaling pathway: EIF4E</p> <p>VEGF signaling pathway: MAPK14</p>
mir-126	9q34.3	hsa-miR-126*	miR-126-5p	2.133	<p>Cell cycle: TP53, CCND1, CDKN1A, MCM2, CCNE2</p> <p>p53 signaling pathway: TP53, CCND1, PTEN, BAX, CDKN1A, CCNE2, CASP3</p> <p>PI3K-Akt signaling pathway: MYB, AKT1, VEGFA, PIK3CA, CREB1, MET, TP53, CCND1, KRAS, EGF, PIK3R2, KDR, NRAS, JAK2, IRS1, PTEN, PDGFB, TLR2, TLR4, CDKN1A, CCNE2, TNC</p> <p>Wnt signaling pathway: JUN, TP53, CCND1, MAPK8</p> <p>Adhesion: AKT1, VEGFA, JUN, MET, CCND1, EGF, PIK3R2, KDR, CRK, EGFR, PTEN, PDGFB, MAPK8, PAK1, SRC, TNC</p> <p>NF- kappa B signaling pathway: VCAM1, IL1B, TLR4, CXCL12</p> <p>HIF-1 signaling pathway: AKT1, VEGFA, PIK3CA, EGF, PIK3R2, EGFR, TLR4, CDKN1A</p> <p>Apoptosis: AKT1, PIK3CA, TP53, PIK3R2, IL1B, BAX, CASP3</p> <p>ErbB signaling pathway: AKT1, PIK3CA, JUN, KRAS, EGF, PIK3R2, CRK, NRAS, EGFR, MAPK8, CDKN1A, PAK1, SRC, STAT5A</p> <p>GnRH signaling pathway: JUN, KRAS, NRAS, EGFR, MAPK8, SRC</p> <p>Chemokine signaling pathway: AKT1, PIK3CA, CXCR4, KRAS, PIK3R2, CRK, NRAS, JAK2, PAK1, SRC, CXCL12</p> <p>Adipocytokine signaling pathway: JAK2, IRS1, MAPK8</p> <p>Cytokine-cytokine receptor interaction: VEGFA, MET, CXCR4, EGF, KDR, FLT3, EGFR, CD70, TGFB2, PDGFB, IL1B, ACVR2A, CXCL12</p> <p>TGF-beta signaling pathway: TGFB2, ACVR2A</p> <p>MAPK signaling pathway: PTPN7, AKT1, JUN, TP53, KRAS, EGF, CRK, NRAS, STMN1, EGFR, TGFB2, PDGFB, IL1B, MAPK8, PAK1, CASP3</p> <p>Osteoclast differentiation: AKT1, PIK3CA, JUN, CREB1, PIK3R2,</p>

					<p>TGFBR2, IL1B, MAPK8</p> <p>Oocyte meiosis: CCNE2</p> <p>mTOR signaling pathway: AKT1, VEGFA, PIK3CA, PIK3R2, IRS1, PTEN</p> <p>Metabolic pathways: COX8A, CYP2A6, POLR2A</p> <p>VEGF signaling pathway: AKT1, VEGFA, PIK3CA, KRAS, PIK3R2, KDR, NRAS, SRC</p>
mir-126	9q34.3	hsa-miR-126	miR-126-3p	3.186	<p>Cell cycle: E2F1, CCNE2, E2F1</p> <p>p53 signaling pathway: CCNE2</p> <p>PI3K-Akt signaling pathway: IRS1, VEGFA, KRAS</p> <p>Adhesion: PIK3R2, CRK, VEGFA</p> <p>NF- kappa B signaling pathway: VCAM1</p> <p>HIF-1 signaling pathway: VEGFA</p> <p>Apoptosis: PIK3R2</p> <p>ErbB signaling pathway: PIK3R2, CRK, KRAS</p> <p>GnRH signaling pathway: KRAS</p> <p>Chemokine signaling pathway: PIK3R2, CRK, KRAS</p> <p>Adipocytokine signaling pathway: IRS1, IRS1</p> <p>Cytokine-cytokine receptor interaction: VEGFA</p> <p>MAPK signaling pathway: CRK, PTPN7, KRAS</p> <p>Osteoclast differentiation: PIK3R2</p> <p>Oocyte meiosis: CCNE2</p> <p>mTOR signaling pathway: PIK3R2, IRS1, VEGFA</p> <p>Metabolic pathways: DNMT1</p> <p>VEGF signaling pathway: PIK3R2, VEGFA, KRAS</p>
mir-130	11q12.1	hsa-miR-130a*	miR-130a-5p	1.610	<p>Cell cycle: TP53, TGFB1</p> <p>p53 signaling pathway: PTEN, TP53</p> <p>PI3K-Akt signaling pathway: PTEN, TP53, ITGA2B, PIK3CA, CSF1, IKBKB, RELA, KIT, MTOR</p> <p>Wnt signaling pathway: TP53</p> <p>Adhesion: PTEN, ITGA2B, PIK3CA</p> <p>NF- kappa B signaling pathway: CXCL12, IL1B, IRAK1, IKBKB, RELA</p> <p>HIF-1 signaling pathway: PIK3CA, RELA, MTOR</p> <p>Apoptosis: TP53, PIK3CA, IL1B, IRAK1, IKBKB, IL1A, RELA</p> <p>ErbB signaling pathway: PIK3CA, MTOR</p>

					Chemokine signaling pathway: CXCL12, PIK3CA, IKBKB, RELA Adipocytokine signaling pathway: RELA, POMC, MTOR Cytokine-cytokine receptor interaction: CXCL12, TGFB1, IL1B, CSF1, IL1A, KIT TGF-beta signaling pathway: TGFB1 MAPK signaling pathway: TP53, TGFB1, IL1B, BDNF, IKBKB, IL1A, RELA, FOS Osteoclast differentiation: TGFB1, PIK3CA, IL1B, CSF1, IKBKB, IL1A, RELA, FOS mTOR signaling pathway: PTEN, PIK3CA, IKBKB, MTOR Metabolic pathways: COX8A, ME1, G6PD VEGF signaling pathway: PIK3CA PPAR signaling pathway: ME1
mir-130	11q12.1	hsa-miR-130a	miR-130a-3p	3.770	PI3K-Akt signaling pathway: CSF1 Cytokine-cytokine receptor interaction: CSF1 Osteoclast differentiation: CSF1, PPARG PPAR signaling pathway: PPARG
mir-135	3p21.2	hsa-miR-135a	miR-135a-5p	8.933	Cell cycle: TGFB1 PI3K-Akt signaling pathway: ITGA2B, COL1A1, BCL2L1 Wnt signaling pathway: APC Adhesion: ITGA2B, COL1A1 NF- kappa B signaling pathway: BCL2L1 HIF-1 signaling pathway: STAT3, HIF1A Apoptosis: BCL2L1 Chemokine signaling pathway: JAK2, STAT3 Adipocytokine signaling pathway: JAK2, STAT3 Cytokine-cytokine receptor interaction: TGFB1, BMP2 TGF-beta signaling pathway: TGFB1, BMP2, SMAD5 MAPK signaling pathway: FOS, TGFB1 Osteoclast differentiation: FOS, TGFB1 mTOR signaling pathway: HIF1A Metabolic pathways: ME1, ALOX5, IMPDH1, RDH10 PPAR signaling pathway: ME1, SLC27A4
mir-135	3p21.2	hsa-miR-135a*	miR-135a-3p	5.265	PI3K-Akt signaling pathway: BCL2L1, JAK2, ITGA2B

					<p>Wnt signaling pathway: APC</p> <p>Adhesion: ITGA2B</p> <p>NF- kappa B signaling pathway: BCL2L1</p> <p>Apoptosis: BCL2L1</p> <p>Chemokine signaling pathway: JAK2</p> <p>Adipocytokine signaling pathway: JAK2</p> <p>Cytokine-cytokine receptor interaction: BMP2</p> <p>TGF-beta signaling pathway: SMAD5, BMP2</p> <p>Metabolic pathways: ME1</p> <p>PPAR signaling pathway: ME1</p>
mir-148	7p15.2	hsa-miR-148a*	miR-148a-5p	4.625	<p>Cell cycle: TP53, MYC, RBL2, CDK6, CDKN2A, E2F3</p> <p>p53 signaling pathway: TP53, CDK6, CDKN2A</p> <p>PI3K-Akt signaling pathway: TP53, TLR4, KIT, MYC, VEGFA, RBL2, CDK6, KITLG, IL6, IFNA1</p> <p>Wnt signaling pathway: TP53, APC, MYC, CTNNB1</p> <p>Adhesion: VEGFA, CTNNB1</p> <p>NF- kappa B signaling pathway: TLR4, ZAP70</p> <p>HIF-1 signaling pathway: TLR4, VEGFA, IL6</p> <p>Apoptosis: TP53</p> <p>ErbB signaling pathway: MYC</p> <p>Adipocytokine signaling pathway: POMC</p> <p>Cytokine-cytokine receptor interaction: FLT3, KIT, CD70, TGFBR2, VEGFA, KITLG, IL6, IFNA1</p> <p>TGF-beta signaling pathway: MYC, TGFBR2</p> <p>MAPK signaling pathway: TP53, MYC, TGFBR2, BDNF, RASGRP1, RPS6KA5</p> <p>Osteoclast differentiation: TGFBR2, MITF</p> <p>mTOR signaling pathway: VEGFA</p> <p>Metabolic pathways: DNMT1, DNMT3B</p> <p>VEGF signaling pathway: VEGFA</p>
mir-148	7p15.2	hsa-miR-148a	miR-148a-3p	1.650	<p>Cell cycle: CDC25B</p> <p>p53 signaling pathway: CYCS</p> <p>Apoptosis: CYCS</p> <p>Chemokine signaling pathway: GNB5</p>

					MAPK signaling pathway: CDC25B, RPS6KA5 Metabolic pathways: UQCRCQ, DNMT3B, DNMT1
mir-296	20q13.32	hsa-miR-296	miR-296-5p	3.083	Cell cycle: CCND1, CDKN1B p53 signaling pathway: CCND1, BAX PI3K-Akt signaling pathway: CCND1, CDKN1B, BCL2, VEGFA, IFNA1, AKT1, PPP2R1B, PDGFRB Wnt signaling pathway: CCND1, PPP2R1B Adhesion: CCND1, BCL2, VEGFA, AKT1, KDR, ERBB2, PDGFRB NF- kappa B signaling pathway: BCL2, IL1B, IRAK1 HIF-1 signaling pathway: CDKN1B, BCL2, VEGFA, ERBB2 Apoptosis: BCL2, BAX, IL1B, IRAK1, AKT1 ErbB signaling pathway: CDKN1B, STAT5A, AKT1, ERBB2 Chemokine signaling pathway: AKT1 Adipocytokine signaling pathway: AKT1 Cytokine-cytokine receptor interaction: VEGFA, IFNA1, IL1B, KDR, PDGFRB TGF-beta signaling pathway: PPP2R1B MAPK signaling pathway: IL1B, AKT1, PDGFRB Osteoclast differentiation: IL1B, AKT1 Oocyte meiosis: PPP2R1B mTOR signaling pathway: VEGFA, AKT1 Metabolic pathways: ME1, ZNRD1 VEGF signaling pathway: VEGFA, AKT1, KDR PPAR signaling pathway: ME1
mir-296	20q13.32	-	miR-296-3p	7.560	Cell cycle: CCND1, CDKN1B p53 signaling pathway: CCND1, <u>BAX</u> PI3K-Akt signaling pathway: CCND1, CDKN1B, BCL2, VEGFA, IFNA1, AKT1, PPP2R1B, PDGFRB Wnt signaling pathway: CCND1, PPP2R1B Adhesion: CCND1, BCL2, VEGFA, AKT1, <u>KDR</u> , ERBB2, PDGFRB NF- kappa B signaling pathway: BCL2, IL1B, IRAK1 HIF-1 signaling pathway: CDKN1B, BCL2, VEGFA, ERBB2 Apoptosis: BCL2, BAX, IL1B, IRAK1, AKT1 ErbB signaling pathway: CDKN1B, STAT5A, AKT1, ERBB2

					<p>Chemokine signaling pathway: AKT1</p> <p>Adipocytokine signaling pathway: AKT1</p> <p>Cytokine-cytokine receptor interaction: VEGFA, IFNA1, IL1B, KDR, PDGFRB</p> <p>TGF-beta signaling pathway: PPP2R1B</p> <p>MAPK signaling pathway: IL1B, AKT1, PDGFRB, RASGRP3</p> <p>Osteoclast differentiation: IL1B, AKT1</p> <p>Oocyte meiosis: PPP2R1B</p> <p>mTOR signaling pathway: VEGFA, AKT1</p> <p>Metabolic pathways: ME1, ZNRD1</p> <p>VEGF signaling pathway: VEGFA, AKT1, KDR</p> <p>PPAR signaling pathway: ME1</p>
mir-335	7q32.2	hsa-miR-335	miR-335-5p	4.416	<p>Cell cycle: RBL2, TP53, RB1</p> <p>p53 signaling pathway: TP53</p> <p>PI3K-Akt signaling pathway: TP53, TNC, CSF1, MAP2K1, FGFR1</p> <p>Wnt signaling pathway: CTNNBIP1, TP53, MAPK9</p> <p>Adhesion: IGF1R, TNC, MAPK9, MAP2K1, FGFR1</p> <p>HIF-1 signaling pathway: MAP2K1</p> <p>Apoptosis: TP53</p> <p>ErbB signaling pathway: PLCG2, MAPK9, MAP2K1</p> <p>GnRH signaling pathway: ITPR1, MAPK9, MAP2K1</p> <p>Chemokine signaling pathway: MAP2K1</p> <p>Adipocytokine signaling pathway: MAPK9</p> <p>Cytokine-cytokine receptor interaction: CXCR7, CSF1</p> <p>TGF-beta signaling pathway: ID4, SP1, RBL2</p> <p>MAPK signaling pathway: FOS, NTRK2, RASA1, MAPK9, MAP2K1, FGFR1</p> <p>Osteoclast differentiation: PLCG2, FOS, CSF1, FOSB, MAPK9, PPARG, MAP2K1</p> <p>Oocyte meiosis: IGF1R, ITPR1, MAP2K1</p> <p>Metabolic pathways: PLCG2, ACSL5, SAT1, ASAH1, FASN</p> <p>VEGF signaling pathway: PLCG2, MAP2K1</p> <p>PPAR signaling pathway: ACSL5, FABP4, PPARG</p>
mir-335	7q32.2	hsa-miR-335*	miR-335-3p	5.066	<p>Cell cycle: RBL2, TP53, RB1</p>

					<p>p53 signaling pathway: TP53</p> <p>PI3K-Akt signaling pathway: TP53, TNC, CSF1, MAP2K1, FGFR1</p> <p>Wnt signaling pathway: CTNNBIP1, TP53, MAPK9</p> <p>Adhesion: IGF1R, TNC, MAPK9, MAP2K1, FGFR1</p> <p>HIF-1 signaling pathway: MAP2K1</p> <p>Apoptosis: TP53</p> <p>ErbB signaling pathway: PLCG2, MAPK9, MAP2K1</p> <p>GnRH signaling pathway: ITPR1, MAPK9, MAP2K1</p> <p>Chemokine signaling pathway: MAP2K1</p> <p>Adipocytokine signaling pathway: MAPK9</p> <p>Cytokine-cytokine receptor interaction: CXCR7, CSF1</p> <p>TGF-beta signaling pathway: ID4, SP1, RBL2</p> <p>MAPK signaling pathway: FOS, NTRK2, RASA1, MAPK9, MAP2K1, FGFR1</p> <p>Osteoclast differentiation: PLCG2, FOS, CSF1, FOSB, MAPK9, PPARG, MAP2K1</p> <p>Oocyte meiosis: IGF1R, ITPR1, MAP2K1</p> <p>Metabolic pathways: PLCG2, ACSL5, SAT1, ASAH1, FASN</p> <p>VEGF signaling pathway: PLCG2, MAP2K1</p> <p>PPAR signaling pathway: ACSL5, FABP4, PPARG</p>
mir-339	7p22.3	hsa-miR-339	miR-339-5p	2.690	<p>PI3K-Akt signaling pathway: JAK2</p> <p>NF- kappa B signaling pathway: ICAM1</p> <p>Chemokine signaling pathway: JAK2</p> <p>Adipocytokine signaling pathway: POMC, JAK2</p> <p>MAPK signaling pathway: BDNF</p> <p>Metabolic pathways: COX8A</p>
mir-339	7p22.3	-	miR-339-3p	5.490	<p>PI3K-Akt signaling pathway: JAK2</p> <p>NF- kappa B signaling pathway: ICAM1</p> <p>Chemokine signaling pathway: JAK2</p> <p>Adipocytokine signaling pathway: POMC, JAK2</p> <p>MAPK signaling pathway: BDNF</p> <p>Metabolic pathways: COX8A</p>
mir-340	5q35.3	hsa-miR-340	miR-340-5p	3.283	<p>PI3K-Akt signaling pathway: MET</p> <p>Adhesion: MET</p>

					Cytokine-cytokine receptor interaction: MET Osteoclast differentiation: MITF
mir-340	5q35.3	hsa-miR-340*	miR-340-3p	1.922	Cell cycle: CDKN2A p53 signaling pathway: CDKN2A, PTEN PI3K-Akt signaling pathway: PTEN, PDGFA, HGF Wnt signaling pathway: JUN Adhesion: JUN, PTEN, PDGFA, HGF ErbB signaling pathway: JUN GnRH signaling pathway: JUN Cytokine-cytokine receptor interaction: PDGFA, HGF MAPK signaling pathway: JUN, PDGFA Osteoclast differentiation: JUN mTOR signaling pathway: PTEN
mir-515	19q13.42	hsa-miR-519e*	miR-519e-5p	3.320	Cell cycle: CDKN1A p53 signaling pathway: CDKN1A Adhesion: PAK3 HIF-1 signaling pathway: CDKN1A ErbB signaling pathway: PAK3, CDKN1A
mir-515	19q13.42	hsa-miR-519e	miR-519e-3p	3.046	Cell cycle: CDKN1A p53 signaling pathway: CDKN1A ErbB signaling pathway: CDKN1A
mir-589	7p22.1	hsa-miR-589	miR-589-5p	2.410	No pathway for validated genes
mir-589	7p22.1	hsa-miR-589*	miR-589-3p	1.734	No pathway for validated genes
mir-744	7p12	hsa-miR-744	miR-744-5p	1.536	No pathway for validated genes
mir-744	7p12	hsa-miR-744*	miR-744-3p	3.393	No pathway for validated genes
mir-3180	-	-	miR-3180-5p	2.189	No pathway for validated genes
mir-3180	-	-	miR-3180-3p	6.780	No pathway for validated genes
(II) Co-downregulated/-shutdown pairs (n=14)					
mir-10	7q21.32	hsa-miR-10a	miR-10a-5p	-12.420	Cell cycle: WEE1, CDK4, CCND1, MYC, TGFB1 p53 signaling pathway: BAX, CDK4, CCND1

					<p>PI3K-Akt signaling pathway: JAK2, CDK4, ITGA2B, CCND1, MCL1, TLR4, MYC, IL6, CREB1, RELA, FGFR3</p> <p>Wnt signaling pathway: MAP3K7, MAPK8, BTRC, CCND1, MYC, CAMK2B</p> <p>Adhesion: ITGA2B, CCND1</p> <p>NF- kappa B signaling pathway: TLR4, IRAK4, NFKBIA, RELA, MAP3K7</p> <p>HIF-1 signaling pathway: TLR4, CAMK2B, IL6, RELA</p> <p>Apoptosis: BAX, TNFSF10, IRAK4, NFKBIA, RELA</p> <p>ErbB signaling pathway: CRK, MAPK8, MYC, CAMK2B</p> <p>GnRH signaling pathway: MAPK8, CAMK2B</p> <p>Chemokine signaling pathway: CRK, JAK2, CXCR4, NFKBIA, RELA, CCL2</p> <p>Adipocytokine signaling pathway: MAPK8, JAK2, NFKBIA, RELA</p> <p>Cytokine-cytokine receptor interaction: ACVR2A, FLT3, TNFSF10, TGFB1, IL6, CCL2</p> <p>TGF-beta signaling pathway: ACVR2A, MYC</p> <p>MAPK signaling pathway: MAP3K7, CRK, MAPK8, DUSP3, MAP3K8, BDNF, MYC, TGFB1, RELA, FGFR3</p> <p>Osteoclast differentiation: MAP3K7, MAPK8, TGFB1, CREB1, NFKBIA, RELA</p> <p>Oocyte meiosis: BTRC, CAMK2B</p> <p>mTOR signaling pathway: PDPK1, ALG2</p> <p>Metabolic pathways: NDUFB6, CMPK1, AMACR, DNMT1, DNMT3B</p>
mir-10	7q21.32	hsa-miR-10a*	miR-10a-3p	-2.790	<p>Cell cycle: CDK4, CCND1, MYC, TGFB1</p> <p>p53 signaling pathway: BAX, CDK4, CCND1</p> <p>PI3K-Akt signaling pathway: JAK2, CDK4, ITGA2B, CCND1, MCL1, TLR4, MYC, IL6, CREB1, RELA, FGFR3</p> <p>Wnt signaling pathway: BTRC, CCND1, MYC, CAMK2B, MAP3K7</p> <p>Adhesion: ITGA2B, CCND1</p> <p>NF- kappa B signaling pathway: TLR4, IRAK4, NFKBIA, RELA, MAP3K7</p> <p>HIF-1 signaling pathway: TLR4, CAMK2B, IL6, RELA</p> <p>Apoptosis: BAX, TNFSF10, IRAK4, NFKBIA, RELA</p> <p>ErbB signaling pathway: MYC, CAMK2B</p> <p>GnRH signaling pathway: CAMK2B</p> <p>Chemokine signaling pathway: JAK2, CXCR4, NFKBIA, RELA, CCL2</p>

					<p>Adipocytokine signaling pathway: NFKBIA, RELA</p> <p>Cytokine-cytokine receptor interaction: CXCR4, FLT3, TNFSF10, TGFB1, IL6, CCL2</p> <p>TGF-beta signaling pathway: TGFB1</p> <p>MAPK signaling pathway: MAP3K8, BDNF, MYC, TGFB1, RELA, FGFR3, MAP3K7</p> <p>Osteoclast differentiation: CREB1, NFKBIA, RELA, MAP3K7</p> <p>Oocyte meiosis: BTRC, CAMK2B</p> <p>Metabolic pathways: DNMT1, PTGS1, AMACR, ALG2, DNMT1, DNMT3B</p>
mir-22	17p13.3	hsa-miR-22*	miR-22-5p	-7.880	<p>Cell cycle: MYC, CDC25C</p> <p>p53 signaling pathway: PTEN,</p> <p>PI3K-Akt signaling pathway: TLR4, MYC, PTEN, FGF23, FRAP1, NFKB1, PIK3CA, AKT1,</p> <p>Wnt signaling pathway: MYC</p> <p>Adhesion: PTEN</p> <p>NF- kappa B signaling pathway: TLR4, IL1B, NFKB1</p> <p>HIF-1 signaling pathway: TFRC, TLR4, FRAP1, NFKB1, PIK3CA, AKT1, HMOX1</p> <p>Apoptosis: IL1B, NFKB1, PIK3CA, AKT1</p> <p>ErbB signaling pathway: MYC, FRAP1, PIK3CA, AKT1, ERBB3, MYC</p> <p>Chemokine signaling pathway: CCL28, NFKB1, PIK3CA, AKT1</p> <p>Adipocytokine signaling pathway: POMC, FRAP1, NFKB1, AKT1, CD36</p> <p>Cytokine-cytokine receptor interaction: IL1B, CCL28, BMP7</p> <p>TGF-beta signaling pathway: MYC, BMP7</p> <p>MAPK signaling pathway: MYC, BDNF, IL1B, FGF23, EVI1, NFKB1, AKT1, MYC, MAX</p> <p>Osteoclast differentiation: IL1B, NFKB1, PIK3CA, AKT1</p> <p>Oocyte meiosis: CDC25C</p> <p>mTOR signaling pathway: PTEN, FRAP1, PIK3CA, AKT1</p> <p>Metabolic pathways: PAH, COX8A</p> <p>VEGF signaling pathway: PIK3CA</p> <p>PPAR signaling pathway: PPARA, CD36</p>
mir-22	17p13.3	hsa-miR-22	miR-22-3p	-4.527	<p>Cell cycle: E2F2, CDK6, CDKN1B, CDKN1C, MYC, MCM7, CDC25C</p>

					<p>p53 signaling pathway: CDK6,PTEN</p> <p>PI3K-Akt signaling pathway: CDKN1B, KIT, FOXO3,DDIT4, TLR4, MYC, PTEN, FGF23, FRAP1, NFKB1, PIK3CA, AKT1</p> <p>Wnt signaling pathway: FRAT2, PRKACA, CSNK2A1, MYC</p> <p>Adhesion: PTEN</p> <p>NF- kappa B signaling pathway: ICAM1, TLR4, IL1B, NFKB1</p> <p>HIF-1 signaling pathway: TFRC, CDKN1B, TLR4,FRAP1, NFKB1, PIK3CA, AKT1, HMOX1</p> <p>Apoptosis: PRKACA,TNFSF10, IL1B, NFKB1, PIK3CA, AKT1</p> <p>ErbB signaling pathway: ERBB3, CDKN1B, MYC, FRAP1, PIK3CA, AKT1, ERBB3</p> <p>GnRH signaling pathway: PRKACA</p> <p>Chemokine signaling pathway: PRKACA, FOXO3, CCL28, NFKB1, PIK3CA, AKT1</p> <p>Adipocytokine signaling pathway: PPARA, POMC, FRAP1, NFKB1, AKT1, CD36</p> <p>Cytokine-cytokine receptor interaction: BMP7,TNFSF10, KIT, IL1B, CCL28</p> <p>TGF-beta signaling pathway: SP1, BMP7, ACVR1C, MYC</p> <p>MAPK signaling pathway: PRKACA, BDNF, FOS, MYC, IL1B, FGF23, EVI1, NFKB1, AKT1, MAX</p> <p>Osteoclast differentiation: FOS, IL1B, NFKB1, PIK3CA, AKT1</p> <p>Oocyte meiosis: PRKACA , CDC25C</p> <p>mTOR signaling pathway: DDIT4, PTEN, FRAP1, PIK3CA, AKT1</p> <p>Metabolic pathways: PIK3C2A, MAOA, PAH, COX8A</p> <p>VEGF signaling pathway: PIK3CA, AKT1</p> <p>PPAR signaling pathway: PPARA, CD36</p>
mir-24	9q22.32	hsa-miR-24-1*	miR-24-1-5p	-1.927	<p>Cell cycle: CDKN1B, TGFB1, CDKN2A, CDKN1A, TP53</p> <p>p53 signaling pathway: CDKN2A, CDKN1A, TP53</p> <p>PI3K-Akt signaling pathway: PDGFB, CDKN1B, BRCA1, CDKN1A, TP53</p> <p>Wnt signaling pathway: TP53</p> <p>HIF-1 signaling pathway: CDKN1B, CDKN1A</p> <p>Apoptosis: NTRK1, TP53</p> <p>ErbB signaling pathway: CDKN1B, CDKN1A</p>

					<p>GnRH signaling pathway: MAPK14</p> <p>Cytokine-cytokine receptor interaction: PDGFB, TGFB1, ACVR1B</p> <p>TGF-beta signaling pathway: TGFB1</p> <p>MAPK signaling pathway: NTRK1, PDGFB, TGFB1, MAPK14, TP53</p> <p>Osteoclast differentiation: TGFB1, MAPK14</p> <p>VEGF signaling pathway:MAPK14</p> <p>Adhesion: PDGFB</p>
mir-24	9q22.32	hsa-miR-24	miR-24-3p	-3.167	<p>Cell cycle: CDKN2A, MYC, E2F2, CDK4, CCNA2, CDKN1B, TGFB1, SMAD2, CDKN2A, CDKN1A, CDC2, TP53, TGFB1, CCNA2, CCNB1, SMC1A, CDKN1B, CDK4</p> <p>p53 signaling pathway: CDKN2A, CDK4, CDKN2A, CDKN1A, PPM1D, CDC2, TP53, CCNB1, CDK4</p> <p>PI3K-Akt signaling pathway: MYC, BRCA1, CDK4, CDKN1B, PDGFB, CDKN1A, VEGFA, BRCA1, KIT, TP53, PIK3CA, CDKN1B, CDK4, PDGFB, NOS3, LAMC2, FGF7</p> <p>Wnt signaling pathway: MYC, NFAT5, SMAD2, JUN, TP53, FBXW11</p> <p>Adhesion: PDGFB</p> <p>HIF-1 signaling pathway: CDKN1B, HMOX1, CDKN1A, VEGFA, PIK3CA, CDKN1B, NOS2A,NOS3</p> <p>Apoptosis: TP53, FADD, PIK3CA, AIFM1, NTRK1</p> <p>ErbB signaling pathway: MYC, CDKN1B, JUN, MAP2K4, CDKN1A, PIK3CA, CDKN1B, NOS3</p> <p>GnRH signaling pathway: JUN, MAPK14</p> <p>Cytokine-cytokine receptor interaction: ACVR1B, TGFB1, PDGFB, ACVR1B, VEGFA, KIT, TGFB1, PDGFB</p> <p>TGF-beta signaling pathway: MYC ,TGFB1, SMAD2, TGFB1</p> <p>MAPK signaling pathway: MAPK14, MYC ,TGFB1, PDGFB, STK3, JUN, MAP2K4, MAPK14, MAPKAPK5, TP53, TGFB1, PDGFB, DDIT3, NTRK1, FGF7</p> <p>Osteoclast differentiation: MAPK14,TGFB1, JUN, MAPK14, SPI1, PIK3CA</p> <p>Oocyte meiosis: CDC2, FBXW11, CCNB1, SMC1A</p> <p>mTOR signaling pathway: VEGFA, PIK3CA</p> <p>Metabolic pathways: DHFR, POLD1, XYLT2POLD1, RPE, B3GALNT1,</p>

					RPIA, FASN, NME1, NOS2A, NOS3, DCXR VEGF signaling pathway: MAPK14, NFAT5, MAPK14, VEGFA, PIK3CA, NOS3
mir-29	7q32.3	hsa-miR-29a*	miR-29a-5p	-1.807	Cell cycle: TGFB3, E2F1, SMAD3, CCND1, RB1, TGFB1, CDK6, CDK4, TGFB2, TP53, HDAC2, MYC p53 signaling pathway: CCND1, CDK6, CDK4, PPM1D, PTEN, TP53 PI3K-Akt signaling pathway: IKBKB, PCK2, COL3A1, BCL2, RELA, PIK3CA, MCL1, CCND1, LAMC1, FASLG, CDK6, CDK4, COL5A3, IL4, PTEN, TP53, COL4A1, AKT1, MYC, COL1A1, BRCA1, COL4A2, TLR4, COL1A2, CD19 Wnt signaling pathway: SMAD3, CCND1, CTNNBIP1, TP53, MYC, FZD5 Adhesion: AKT1, COL3A1, COL5A3, COL4A1, PTEN NF- kappa B signaling pathway: IKBKB, BCL2, RELA, ZAP70, TLR4 HIF-1 signaling pathway: BCL2, RELA, PIK3CA, GAPDH, IFNG, AKT1, TLR4 Apoptosis: IKBKB, BCL2, RELA, PIK3CA, FASLG, TNFSF10 ErbB signaling pathway: PIK3CA, PAK1, AKT1, MYC GnRH signaling pathway: CDC42, PIK3CA Chemokine signaling pathway: IKBKB, CDC42, RELA, PAK1, AKT1, CCR7 Adipocytokine signaling pathway: IKBKB, PCK2, RELA, AKT1, PPARA Cytokine-cytokine receptor interaction: TGFB3, TGFB1, FASLG, TGFB2, IFNG, IL4, FLT3, ACVR2A, CCR7, TNFSF10, TNFRSF4 TGF-beta signaling pathway: TGFB3, SMAD3, TGFB1, TGFB2, IFNG, MYC, ACVR2A MAPK signaling pathway: IKBKB, TGFB3, CDC42, RELA, PAK1, STMN1, TGFB1, FASLG, TGFB2, TP53, AKT1, MYC, DUSP2 Osteoclast differentiation: IKBKB, SOCS1, RELA, PIK3CA, TGFB1, TGFB2, IFNG, AKT1 mTOR signaling pathway: IKBKB, PIK3CA, PTEN, AKT1 Metabolic pathways: PCK2, GLUL, IMPDH1, GAPDH, RDH10, DNMT1, DNMT3A, FH, DNMT3B, ME1, NOS1, COX8A VEGF signaling pathway: CDC42, PIK3CA, AKT1 PPAR signaling pathway: PCK2, ME1, PPARA

mir-29	7q32.3	hsa-miR-29a	miR-29a-3p	-6.487	<p>Cell cycle: CDK6,TGFB3, E2F1, SMAD3, CCND1, RB1, TGFB1, CDK4, TGFB2, TP53, HDAC2, MYC</p> <p>p53 signaling pathway: CDK6, PTEN, PPM1D, CCND1, CDK4, TP53</p> <p>PI3K-Akt signaling pathway: MCL1, BCL2, COL4A1, ADAMTS9, ITGA11, IKBKB, PCK2, COL3A1, RELA, PIK3CA, CCND1, LAMC1, FASLG, CDK4, BCL2, COL5A3, IL4, TP53, AKT1, MYC, COL1A1, BRCA1, COL4A2, TLR4, COL1A2, COL3A1, CD19, PTEN</p> <p>Wnt signaling pathway: SFRP2, DKK1, SMAD3, CCND1, CTNNBIP1, TP53, MYC, FZD5</p> <p>Adhesion: PTEN, AKT1,COL3A1, COL5A3, COL4A1</p> <p>NF- kappa B signaling pathway: BCL2, IKBKB, RELA, BCL2, ZAP70, TLR4</p> <p>HIF-1 signaling pathway: BCL2, RELA, PIK3CA, GAPDH, BCL2, IFNG, AKT1, TLR4</p> <p>Apoptosis: BCL2, PIK3R1, BCL2, IKBKB, RELA, PIK3CA, FASLG, BCL2, TP53, AKT1, TNFSF10</p> <p>ErbB signaling pathway: PIK3R1, PIK3CA, PAK1, AKT1, MYC</p> <p>GnRH signaling pathway: CDC42</p> <p>Chemokine signaling pathway: PIK3R1, IKBKB, CDC42, RELA, PIK3CA, PAK1, AKT1, CCR7</p> <p>Adipocytokine signaling pathway: IKBKB, PCK2, RELA, AKT1, PPARA</p> <p>Cytokine-cytokine receptor interaction: TGFB3, TGFB1, FASLG, TGFB2, IFNG, IL4, FLT3, ACVR2A, CCR7, TNFSF10, TNFRSF4</p> <p>TGF-beta signaling pathway: TGFB3, SMAD3, TGFB1, TGFB2, IFNG, MYC, ACVR2A</p> <p>MAPK signaling pathway: IKBKB, TGFB3, CDC42, RELA, STMN1, TGFB1, FASLG, TGFB2, TP53, AKT1, MYC, ME1, DUSP2</p> <p>Osteoclast differentiation: PIK3R1, IKBKB, RELA, PIK3CA, TGFB1, TGFB2, IFNG, AKT1</p> <p>mTOR signaling pathway: IKBKB, PIK3CA, AKT1, PTEN</p> <p>Metabolic pathways: DNMT3B, DNMT3A, IMPDH1, GLUL, PCK2, IMPDH1, PAK1, GAPDH, RDH10, DNMT1, FH, NOS1, COX8A</p> <p>VEGF signaling pathway: PIK3R1, CDC42, PIK3CA, AKT1</p> <p>PPAR signaling pathway: LPL, PCK2, ME1, PPARA</p>
mir-29	7q32.3	hsa-miR-29b-1*	miR-29b-1-5p	-5.000	<p>Cell cycle: CDK6, CCND1, SMAD3, CDK4, TGFB3, TGFB1, TGFB2,</p>

					<p>CDKN2B, E2F1, TP53</p> <p>p53 signaling pathway: CDK6, CCND1, CDK4, PTEN, TP53</p> <p>PI3K-Akt signaling pathway: COL1A1, CDK6, TLR4, CCND1, COL1A2, BCL2, CDK4, FASLG, COL3A1, COL4A1, PIK3CA, PTEN, BRCA1, IL4, TP53</p> <p>Wnt signaling pathway: CCND1, SMAD3, CTNNBIP1, TP53</p> <p>Adhesion: COL1A1, CCND1, COL1A2, BCL2, COL3A1, COL4A1, CDC42, PAK1, PTEN</p> <p>NF- kappa B signaling pathway: TLR4, BCL2, ZAP70</p> <p>HIF-1 signaling pathway: TLR4, BCL2, PIK3CA</p> <p>Apoptosis: TNFSF10, BCL2, FASLG, PIK3CA, TP53</p> <p>ErbB signaling pathway: PIK3CA PAK1</p> <p>GnRH signaling pathway: CDC42</p> <p>Chemokine signaling pathway: CDC42, PIK3CA, PAK1</p> <p>Adipocytokine signaling pathway: PPARA</p> <p>Cytokine-cytokine receptor interaction: TNFSF10, FASLG, TGFB3, TGFB1, TGFB2, IL4</p> <p>TGF-beta signaling pathway: TGFB3, TGFB1, TGFB2, CDKN2B</p> <p>MAPK signaling pathway: DUSP2, FASLG, TGFB3, TGFB1, CDC42, TGFB2, PAK1, TP53</p> <p>Osteoclast differentiation: TGFB1, TGFB2, PIK3CA</p> <p>mTOR signaling pathway: PIK3CA, PTEN</p> <p>Metabolic pathways: NOS1, RDH10, DNMT3A, FH, DNMT3B, ME1</p> <p>VEGF signaling pathway: CDC42, PIK3CA</p> <p>PPAR signaling pathway: ME1, PPARA</p>
mir-29	7q32.3	hsa-miR-29b	miR-29b-3p	-4.553	<p>Cell cycle: CDK6, CCND1, SMAD3, CDK4, TGFB3, TGFB1, TGFB2, CDKN2B, E2F1, TP53, CDKN2A, E2F3</p> <p>p53 signaling pathway: CDK6, CCND1, CDK4, PTEN, TP53, IGF1, CDKN2A</p> <p>PI3K-Akt signaling pathway: COL1A1, CDK6, TLR4, CCND1, COL1A2, BCL2, CDK4, FASLG, COL3A1, COL4A1, PIK3CA, PTEN, BRCA1, IL4, TP53, VEGFA, KRAS</p> <p>Wnt signaling pathway: CCND1, SMAD3, CTNNBIP1, TP53</p> <p>Adhesion: COL1A1, CCND1, COL1A2, BCL2, COL3A1, COL4A1, CDC42, IGF1,PAK1, PTEN, VEGFA</p>

					<p>NF- kappa B signaling pathway: TLR4, BCL2, ZAP70, PTGS2, IL1B, IRAK1</p> <p>HIF-1 signaling pathway: TLR4, BCL2, PIK3CA, IGF1, VEGFA</p> <p>Apoptosis: TNFSF10, BCL2, FASLG, PIK3CA, TP53, IL1B, IRAK1</p> <p>ErbB signaling pathway: PIK3CA PAK1, KRAS</p> <p>GnRH signaling pathway: CDC42, KRAS</p> <p>Chemokine signaling pathway: CDC42, PIK3CA, PAK1, KRAS</p> <p>Adipocytokine signaling pathway: PPARA</p> <p>Cytokine-cytokine receptor interaction: TNFSF10, FASLG, TGFB3, TGFB1, TGFB2, IL4, VEGFA, IL1B</p> <p>TGF-beta signaling pathway: TGFB3, TGFB1, TGFB2, CDKN2B, ID3</p> <p>MAPK signaling pathway: DUSP2, FASLG, TGFB3, TGFB1, CDC42, TGFB2, PAK1, TP53, IL1B, KRAS</p> <p>Osteoclast differentiation: TGFB1, TGFB2, PIK3CA, IL1B</p> <p>mTOR signaling pathway: PIK3CA, PTEN, IGF1, VEGFA</p> <p>Metabolic pathways: NOS1, RDH10, DNMT3A, FH, DNMT3B, ME1, PTGS2</p> <p>VEGF signaling pathway: CDC42, PIK3CA, PTGS2, VEGFA, KRAS</p> <p>PPAR signaling pathway: ME1, PPARA</p> <p>Oocyte meiosis: IGF1</p>
mir-31	9p21.3	hsa-miR-31	miR-31-5p	-4.737	<p>Cell cycle: CDKN2B, CDKN2A, CDKN2D, MCM2, E2F3, E2F2, MYC, TP53</p> <p>p53 signaling pathway: CDKN2A, BAX, TP53, PTEN</p> <p>PI3K-Akt signaling pathway: PPP2R2A, MYC, IBSP, TP53, JAK2, PTEN, MYB, FGFR3</p> <p>Wnt signaling pathway: RHOA, FZD3, NFAT5, DKK1, SFRP1, SFRP4, WIF1, DKK1, MYC, TP53</p> <p>Adhesion: RHOA, ITGA5, IBSP, PTEN</p> <p>NF- kappa B signaling pathway: ICAM1, TNF</p> <p>HIF-1 signaling pathway: HIF1A</p> <p>Apoptosis: BAX, TNF, TP53</p> <p>ErbB signaling pathway: MYC, HBEGF</p> <p>GnRH signaling pathway: HBEGF</p> <p>Chemokine signaling pathway: RHOA, TIAM1, CXCL12, CCL16, JAK2</p> <p>Adipocytokine signaling pathway: TNF, JAK2</p>

					<p>Cytokine-cytokine receptor interaction: CXCL12, TNF, CCL16 TGF-beta signaling pathway: RHOA, CDKN2B, TNF, MYC, DCN MAPK signaling pathway: FOS, TNF, STMN1, MYC, TP53, FGFR3 Osteoclast differentiation: FOS, TNF mTOR signaling pathway: TNF, PTEN, HIF1A Metabolic pathways: MTAP, COX8A VEGF signaling pathway: NFAT5 (All are based on validated genes from Tarbase, miRTarBase, miRWalk and NCBI website)</p>
mir-31	9p21.3	hsa-miR-31*	miR-31-3p	-4.447	<p>Cell cycle: CDKN2B, CDKN2A, CDKN2D, MCM2, E2F3, E2F2, MYC, TP53 p53 signaling pathway: CDKN2A, BAX, TP53, PTEN PI3K-Akt signaling pathway: PPP2R2A, MYC, IBSP, TP53, JAK2, PTEN, MYB, FGFR3 Wnt signaling pathway: RHOA, FZD3, NFAT5, DKK1, SFRP1, SFRP4, WIF1, DKK1, MYC, TP53 Adhesion: RHOA, ITGA5, IBSP, PTEN NF- kappa B signaling pathway: ICAM1, TNF HIF-1 signaling pathway: HIF1A Apoptosis: BAX, TNF, TP53 ErbB signaling pathway: MYC, HBEGF GnRH signaling pathway: HBEGF Chemokine signaling pathway: RHOA, TIAM1, CXCL12, CCL16, JAK2 Adipocytokine signaling pathway: TNF, JAK2 Cytokine-cytokine receptor interaction: CXCL12, TNF, CCL16 TGF-beta signaling pathway: RHOA, CDKN2B, TNF, MYC, DCN MAPK signaling pathway: FOS, TNF, STMN1, MYC, TP53, FGFR3 Osteoclast differentiation: FOS, TNF mTOR signaling pathway: TNF, PTEN, HIF1A Metabolic pathways: MTAP, COX8A VEGF signaling pathway: NFAT5</p>
mir-145	5q32	hsa-miR-145	miR-145-5p	-4.8407	<p>Cell cycle: MYC, CDKN1A, CCND1, TP53, E2F3, SMC1A, CDK4 p53 signaling pathway: CDKN1A, PPM1D, CCND1, TP53, PTEN, CDK4, TSC2, TP73 PI3K-Akt signaling pathway: CCND1, TP53, VEGFA, CREB1, AKT1,</p>

					<p>BCL2, EIF4E, PDGFB, PTEN, EGF, MTOR, KRAS, IFNA1, LAMC2, RPS6KB1, CDK4, TSC2, EIF4EBP1, MCL1</p> <p>Wnt signaling pathway: PPP3CA, MYC, FZD7, CCND1, TP53, CTNNB1, FBXW11</p> <p>Adhesion: F11R, CCND1, ERBB2, VEGFA, CTNNB1, AKT1, BCL2, PAK3, PDGFB, PAK1, PTEN, SRC, EGF, LAMC2, BIRC2, ACTG1</p> <p>NF- kappa B signaling pathway: BCL2, BIRC2</p> <p>HIF-1 signaling pathway: ERBB2, VEGFA, AKT1, BCL2, EIF4E, EGF, MTOR, RPS6KB1, IFNG, EIF4EBP1, PGK1</p> <p>Apoptosis: PPP3CA, DFFA, TP53, AKT1, BCL2, TNFSF10, BIRC2</p> <p>ErbB signaling pathway: MYC, CDKN1A, ERBB2, AKT1, PAK3, PAK1, SRC, EGF, MTOR, KRAS, RPS6KB1, EIF4EBP1</p> <p>GnRH signaling pathway: MAP2K6, MMP14, SRC, KRAS, MAPK14</p> <p>Chemokine signaling pathway: STAT1, AKT1, PAK1, SRC, KRAS,</p> <p>Adipocytokine signaling pathway: IRS1, AKT1, MTOR</p> <p>Cytokine-cytokine receptor interaction: IFNB1, VEGFA, TGFBR2, PDGFB, EGF, IFNA1, IFNG, TNFSF10</p> <p>TGF-beta signaling pathway: MYC, TGFBR2, RPS6KB1, IFNG</p> <p>MAPK signaling pathway: MAP2K6, PPP3CA, MYC, TP53, TGFBR2, AKT1, PDGFB, PAK1, EGF, KRAS, STK3, MAPK14</p> <p>Osteoclast differentiation: MAP2K6, PPP3CA, IFNB1, STAT1, CREB1, TGFBR2, AKT1, IFNG, MAPK14, SPI1</p> <p>Oocyte meiosis: PPP3CA, IGF1R, FBXW11, SMC1A</p> <p>mTOR signaling pathway: VEGFA, AKT1, EIF4E, PTEN, MTOR, RPS6KB1, TSC2, EIF4EBP1</p> <p>Metabolic pathways: AKR1B10, ALPPL2, ALDH3A1, NDUFA4, PIGF, COX8A, RPIA, SMPD1, POLD3, PGK1</p> <p>VEGF signaling pathway: PPP3CA, VEGFA, AKT1, SRC, KRAS, MAPK14</p> <p>PPAR signaling pathway: MMP1, FABP4</p>
mir-145	5q32	hsa-miR-145*	miR-145-3p	-2.0969	<p>Cell cycle: MYC, CDKN1A, CCND1, TP53, E2F3, SMC1A, CDK4</p> <p>p53 signaling pathway: CDKN1A, PPM1D, CCND1, TP53, PTEN, CDK4, TSC2, TP73</p> <p>PI3K-Akt signaling pathway: CCND1, TP53, VEGFA, CREB1, AKT1, BCL2, EIF4E, PDGFB, PTEN, EGF, MTOR, KRAS, IFNA1, LAMC2,</p>

					<p>RPS6KB1, CDK4, TSC2, EIF4EBP1, MCL1</p> <p>Wnt signaling pathway: PPP3CA, MYC, FZD7, CCND1, TP53, CTNNB1, FBXW11</p> <p>Adhesion: F11R, CCND1, ERBB2, VEGFA, CTNNB1, AKT1, BCL2, PAK3, PDGFB, PAK1, PTEN, SRC, EGF, LAMC2, BIRC2, ACTG1</p> <p>NF- kappa B signaling pathway: BCL2, BIRC2</p> <p>HIF-1 signaling pathway: ERBB2, VEGFA, AKT1, BCL2, EIF4E, EGF, MTOR, RPS6KB1, IFNG, EIF4EBP1, PGK1</p> <p>Apoptosis: PPP3CA, DFFA, TP53, AKT1, BCL2, TNFSF10, BIRC2</p> <p>ErbB signaling pathway: MYC, CDKN1A, ERBB2, AKT1, PAK3, PAK1, SRC, EGF, MTOR, KRAS, RPS6KB1, EIF4EBP1</p> <p>GnRH signaling pathway: MAP2K6, MMP14, SRC, KRAS, MAPK14</p> <p>Chemokine signaling pathway: STAT1, AKT1, PAK1, SRC, KRAS,</p> <p>Adipocytokine signaling pathway: IRS1, AKT1, MTOR</p> <p>Cytokine-cytokine receptor interaction: IFNB1, VEGFA, TGFBR2, PDGFB, EGF, IFNA1, IFNG, TNFSF10</p> <p>TGF-beta signaling pathway: MYC, TGFBR2, RPS6KB1, IFNG</p> <p>MAPK signaling pathway: MAP2K6, PPP3CA, MYC, TP53, TGFBR2, AKT1, PDGFB, PAK1, EGF, KRAS, STK3, MAPK14</p> <p>Osteoclast differentiation: MAP2K6, PPP3CA, IFNB1, STAT1, CREB1, TGFBR2, AKT1, IFNG, MAPK14, SPI1</p> <p>Oocyte meiosis: PPP3CA, IGF1R, FBXW11, SMC1A</p> <p>mTOR signaling pathway: VEGFA, AKT1, EIF4E, PTEN, MTOR, RPS6KB1, TSC2, EIF4EBP1</p> <p>Metabolic pathways: AKR1B10, ALPPL2, ALDH3A1, NDUFA4, PIGF, COX8A, RPIA, SMPD1, POLD3, PGK1</p> <p>VEGF signaling pathway: PPP3CA, VEGFA, AKT1, SRC, KRAS, MAPK14</p> <p>PPAR signaling pathway: MMP1, FABP4</p>
mir-193	17q11.2	-	miR-193a-5p	-4.6307	<p>Cell cycle: CDK6, TGFB1, TP53</p> <p>p53 signaling pathway: TP73, CDK6, TP73</p> <p>PI3K-Akt signaling pathway: CDK6, MCL1, PTK2, NRAS, TP53</p> <p>Wnt signaling pathway: CTNNB1, TP53</p> <p>Adhesion: CTNNB1, BRAF, PTK2</p> <p>Apoptosis: TP53</p>

					<p>ErbB signaling pathway: BRAF, PTK2, NRAS GnRH signaling pathway: NRAS Chemokine signaling pathway: BRAF, PTK2, NRAS Cytokine-cytokine receptor interaction: TGFB1 TGF-beta signaling pathway: TGFB1 MAPK signaling pathway: BRAF, TGFB1, NRAS, TP53 Osteoclast differentiation: TGFB1 mTOR signaling pathway: BRAF Metabolic pathways: DNMT1 VEGF signaling pathway: PTK2, NRAS</p>
mir-193	17q11.2	hsa-miR-193a	miR-193a-3p	-2.026	<p>Cell cycle: CDK6, TGFB1, TP53, E2F3 p53 signaling pathway: TP73, CDK6, TP73 PI3K-Akt signaling pathway: CDK6, MCL1, PTK2, NRAS, TP53 Wnt signaling pathway: CTNNB1, TP53 Adhesion: CTNNB1, BRAF, PTK2 Apoptosis: TP53, IL1B, TNF ErbB signaling pathway: BRAF, PTK2, NRAS GnRH signaling pathway: NRAS Chemokine signaling pathway: BRAF, PTK2, NRAS Cytokine-cytokine receptor interaction: TGFB1, IFNG, IL1B, TNF TGF-beta signaling pathway: TGFB1, IFNG, TNF MAPK signaling pathway: BRAF, TGFB1, NRAS, TP53, IL1B, TNF Osteoclast differentiation: TGFB1, IFNG, IL1B, TNF mTOR signaling pathway: BRAF, TNF Metabolic pathways: DNMT1, CYP7A1, NOS2 VEGF signaling pathway: PTK2, NRAS PPAR signaling pathway: CYP7A1 HIF-1 signaling pathway: IFNG, NOS2 NF- kappa B signaling pathway: IL1B, TNF</p>
mir-199	19p13.2	hsa-miR-199a	miR-199a-5p	-7.677	<p>p53 signaling pathway: PTEN PI3K-Akt signaling pathway: IKBKB, MAPK1, AKT1, FASLG, PTEN, NFKB1, INSR, MET Wnt signaling pathway: MAPK8, MAPK9 Adhesion: MAPK1, AKT1, PTEN, MAPK8, MAPK9, MET</p>

					<p>NF- kappa B signaling pathway: IKBKB, NFKB1</p> <p>HIF-1 signaling pathway: HIF1A, MAPK1, AKT1, NFKB1, INSR</p> <p>Apoptosis: IKBKB, AKT1, FASLG, NFKB1</p> <p>ErbB signaling pathway: MAPK1, AKT1, MAPK8, MAPK9</p> <p>GnRH signaling pathway: MAPK1, MAPK14, MAPK8, MAPK9</p> <p>Chemokine signaling pathway: IKBKB, MAPK1, AKT1, NFKB1</p> <p>Adipocytokine signaling pathway: IKBKB, AKT1, MAPK8, MAPK9, NFKB1</p> <p>Cytokine-cytokine receptor interaction: LIF, FASLG, MET</p> <p>TGF-beta signaling pathway: MAPK1</p> <p>MAPK signaling pathway: IKBKB, MAP3K11, MAPK1, AKT1, FASLG, MAPK14, MAPK8, MAPK9, NFKB1</p> <p>Osteoclast differentiation: IKBKB, JUNB, MAPK1, AKT1, MAPK14, MAPK8, MAPK9, NFKB1</p> <p>Oocyte meiosis: MAPK1</p> <p>mTOR signaling pathway: IKBKB, HIF1A, MAPK1, AKT1, PTEN</p> <p>Metabolic pathways: FASN, ALOX5, COX8A, CYP2A6</p> <p>VEGF signaling pathway: MAPK1, AKT1, MAPK14</p>
mir-199	19p13.2	hsa-miR-199a*	miR-199a-3p	-8.274	<p>Cell cycle: RB1</p> <p>p53 signaling pathway: PTEN</p> <p>PI3K-Akt signaling pathway: COMP, IKBKB, AKT1, NFKB1, PIK3CA, MET, MTOR, MAPK1, PTEN</p> <p>Wnt signaling pathway: MAPK8, MAPK9</p> <p>Adhesion: MAPK8, MAPK9, COMP, AKT1, PIK3CA, MET, MAPK1, PTEN</p> <p>NF- kappa B signaling pathway: IKBKB, NFKB1, TNF</p> <p>HIF-1 signaling pathway: AKT1, NFKB1, PIK3CA, MTOR, MAPK1</p> <p>Apoptosis: IKBKB, AKT1, NFKB1, PIK3CA, TNF</p> <p>ErbB signaling pathway: MAPK8, MAPK9, AKT1, PIK3CA, MTOR, MAPK1</p> <p>GnRH signaling pathway: MAPK8, MAPK9, MAPK1, MAPK14</p> <p>Chemokine signaling pathway: IKBKB, AKT1, NFKB1, PIK3CA, MAPK1</p> <p>Adipocytokine signaling pathway: MAPK8, MAPK9, IKBKB, AKT1, NFKB1, MTOR, TNF</p> <p>Cytokine-cytokine receptor interaction: BMP2, MET, TNF</p>

					<p>TGF-beta signaling pathway: BMP2, COMP, MAPK1, TNF</p> <p>MAPK signaling pathway: MAPK8, MAPK9, IKBKB, AKT1, NFKB1, MAPK1, TNF, MAPK14</p> <p>Osteoclast differentiation: MAPK8, MAPK9, IKBKB, AKT1, NFKB1, PIK3CA, MAPK1, TNF, MAPK14</p> <p>mTOR signaling pathway: IKBKB, AKT1, PIK3CA, MTOR, MAPK1, PTEN, TNF</p> <p>Metabolic pathways: CYP2A6, COX8A</p> <p>VEGF signaling pathway: AKT1, PIK3CA, MAPK1, MAPK14</p>
mir-214	1q24.3	hsa-miR-214*	miR-214-5p	-2.869	<p>Cell cycle: CDKN1A, MYC, CCND2</p> <p>p53 signaling pathway: PTEN, CDKN1A, CCND2</p> <p>PI3K-Akt signaling pathway: PTEN, AKT1, NOS3, VEGFA, CDKN1A, IKBKB, MYC, NRAS</p> <p>Wnt signaling pathway: APC, CTNNB1, MYC, CCND2, JUN, MAPK8</p> <p>Adhesion: BIRC3, PTEN, AKT1, VEGFA, CTNNB1, PAK1, CCND2, JUN, MAPK8</p> <p>NF- kappa B signaling pathway: BIRC3, IKBKB</p> <p>HIF-1 signaling pathway: AKT1, NOS3, VEGFA, CDKN1A</p> <p>Apoptosis: BIRC3, AKT1, IKBKB</p> <p>ErbB signaling pathway: AKT1, CDKN1A, MYC, NRAS, PAK1, JUN, MAPK8</p> <p>GnRH signaling pathway: NRAS, JUN, MAPK8, MAP2K3</p> <p>Chemokine signaling pathway: AKT1, IKBKB, NRAS, PAK1</p> <p>Adipocytokine signaling pathway: AKT1, IKBKB, MAPK8</p> <p>Cytokine-cytokine receptor interaction: VEGFA, TGFBR2</p> <p>TGF-beta signaling pathway: MYC, TGFBR2</p> <p>MAPK signaling pathway: AKT1, IKBKB, MYC, NRAS, PAK1, TGFBR2, JUN, MAPK8, MAP2K3</p> <p>Osteoclast differentiation: AKT1, IKBKB, TGFBR2, JUN, MAPK8</p> <p>mTOR signaling pathway: PTEN, AKT1, VEGFA, IKBKB</p> <p>Metabolic pathways: NOS3, ZNRD1, DCT, COX8A</p> <p>VEGF signaling pathway: AKT1, NOS3, VEGFA, NRAS</p>
mir-214	1q24.3	hsa-miR-214	miR-214-3p	-3.834	<p>Cell cycle: CDKN1A, MYC, CCND2</p> <p>p53 signaling pathway: PTEN, CDKN1A, CCND2</p>

					<p>PI3K-Akt signaling pathway: PTEN, AKT1, NOS3, VEGFA, CDKN1A, IKBKB, MYC, NRAS, CCND2</p> <p>Wnt signaling pathway: APC, CTNNB1, MYC, CCND2, JUN, MAPK8</p> <p>Adhesion: BIRC3, PTEN, AKT1, VEGFA, CTNNB1, PAK1, CCND2, JUN, MAPK8</p> <p>NF- kappa B signaling pathway: BIRC3, IKBKB</p> <p>HIF-1 signaling pathway: AKT1, NOS3, VEGFA</p> <p>Apoptosis: BIRC3, AKT1, IKBKB</p> <p>ErbB signaling pathway: AKT1, CDKN1A, MYC, NRAS, PAK1, JUN, MAPK8</p> <p>GnRH signaling pathway: NRAS, JUN, MAPK8, MAP2K3</p> <p>Chemokine signaling pathway: AKT1, IKBKB, NRAS, PAK1</p> <p>Adipocytokine signaling pathway: AKT1, MAPK8</p> <p>Cytokine-cytokine receptor interaction: VEGFA, TGFBR2</p> <p>TGF-beta signaling pathway: MYC, TGFBR2</p> <p>MAPK signaling pathway: AKT1, IKBKB, MYC, NRAS, PAK1, TGFBR2, JUN, MAPK8, MAP2K3</p> <p>Osteoclast differentiation: AKT1, IKBKB, TGFBR2, JUN, MAPK8</p> <p>mTOR signaling pathway: PTEN, AKT1, VEGFA, IKBKB</p> <p>Metabolic pathways: NOS3, ZNRD1, DCT, COX8A</p> <p>VEGF signaling pathway: AKT1, NOS3, VEGFA, NRAS</p>
mir-218	5q34	hsa-miR-218	miR-218-5p	-3.257	<p>Cell cycle: CDKN1B</p> <p>PI3K-Akt signaling pathway: NFKB1, LAMB3, CD19, COL1A1, IKBKB, VEGFA, LAMB3, PIK3R2, EFNA1</p> <p>Adhesion: LAMB3, COL1A1, PXN, VEGFA, CRK, LAMB3, PIK3R2, SRC, ERBB2, ACTN1, COL4A1</p> <p>NF- kappa B signaling pathway: NFKB1, IKBKB</p> <p>HIF-1 signaling pathway: NFKB1, VEGFA, PIK3R2, ERBB2</p> <p>Apoptosis: NFKB1, IKBKB, PIK3R2</p> <p>ErbB signaling pathway: CRK, PIK3R2, SRC, ERBB2, CDKN1B</p> <p>GnRH signaling pathway: SRC</p> <p>Chemokine signaling pathway: NFKB1, IKBKB, PXN, CRK, PIK3R2, SRC</p> <p>Adipocytokine signaling pathway: NFKB1, IKBKB</p> <p>Cytokine-cytokine receptor interaction: VEGFA</p>

					<p>TGF-beta signaling pathway: SP1</p> <p>MAPK signaling pathway: NFKB1, IKBKB, CRK</p> <p>Osteoclast differentiation: NFKB1, IKBKB, PIK3R2</p> <p>mTOR signaling pathway: IKBKB, VEGFA, PIK3R2, RICTOR, AC026713.5</p> <p>Metabolic pathways: PDXP, COX8A, EBP, GLCE, GLB1, ATP6V0E</p> <p>VEGF signaling pathway: PXN, VEGFA, PIK3R2, SRC</p>
mir-218	5q34	hsa-miR-218-2*	miR-218-2-3p	-1.540	No pathway for validated genes
mir-221	Xp11.3	hsa-miR-221*	miR-221-5p	-3.277	<p>Cell cycle: CDKN1C, CDKN1B, CDK2, MYC, CDKN1A, MDM2, TP53, SKP2, ATR, CCND1</p> <p>p53 signaling pathway: BBC3, PTEN, CDK2, CDKN1A, MDM2, TP53, CASP3, BAX, ATR, CCND1, CCNG1</p> <p>PI3K-Akt signaling pathway: KIT, JAK3, CDKN1B, NGF, AKT1, PTEN, MAPK3, JAK2, BRCA1, CDK2, MTOR, BCL2, BCL2L11, MYC, CDKN1A, KDR, MDM2, SYK, TP53, FOXO3, TEK, TKR4, DDIT4, CSF1R, PIK3CA, EPOR, AKT3, IFNA1, MYB, MAP2K1, JAK1, CCND1, PDGFD, PDGFRA</p> <p>Wnt signaling pathway: MYC, TP53, MAPK8, KRAS, DKK2, CCND1</p> <p>Adhesion: AKT1, PTEN, MAPK3, BCL2, KDR, MAPK8, PIK3CA, ERBB2, AKT3, SRC, MAP2K1, CCND1, PDGFD, PDGFRA</p> <p>NF- kappa B signaling pathway: VCAM1, NFKBIA, BCL2, ICAM1, SYK, CXCL12, TKR4, BTK, TNF, IL1B, IRAK1</p> <p>HIF-1 signaling pathway: CDKN1B, AKT1, MAPK3, MTOR, BCL2, CDKN1A, IFNG, TEK, TKR4, PIK3CA, ERBB2, AKT3, TFRC, MAP2K1</p> <p>Apoptosis: NGF, AKT1, NFKBIA, TNFSF10, BCL2, TP53, CASP3, PIK3CA, TNF, BAX, AKT3, IL1B, IRAK1</p> <p>ErbB signaling pathway: CDKN1B, AKT1, MAPK3, MTOR, MYC, CDKN1A, MAPK8, PIK3CA, KRAS, ERBB2, AKT3, SRC, MAP2K1, STAT5A</p> <p>GnRH signaling pathway: MAPK3, MAPK8, KRAS, SRC, MAP2K1</p> <p>Chemokine signaling pathway: JAK3, AKT1, CCL2, CXCR4, MAPK3, JAK2, NFKBIA, CXCL12, FOXO3, PIK3CA, KRAS, AKT3, SRC, MAP2K1, STAT1, STAT2</p> <p>Adipocytokine signaling pathway: AKT1, JAK2, NFKBIA, MTOR, MAPK8, TNF, CD36, AKT3</p> <p>Cytokine-cytokine receptor interaction: KIT, CCL2, CXCR4, FLT3, TNFSF10, KDR, CXCL12, IFNG, CSF1R, TNF, EPOR, IFNA1, IL1B, PDGFD,</p>

					<p>PDGFRA</p> <p>TGF-beta signaling pathway: MAPK3, MYC, IFNG, TNF</p> <p>MAPK signaling pathway: NGF, AKT1, MAPK3, MYC, STMN1, TP53, CASP3, MAPK8, KRAS, TNF, AKT3, IL1B, MAP2K1, PDGFRA</p> <p>Osteoclast differentiation: AKT1, MAPK3, NFKBIA, SYK, IFNG, MAPK8, BTK, CSF1R, PIK3CA, TNF, SOCS1, TYK2, AKT3, IL1B, MAP2K1, JAK1, STAT1, STAT2</p> <p>Oocyte meiosis: MAPK3, CDK2, MAP2K1</p> <p>mTOR signaling pathway: AKT1, PTEN, MAPK3, MTOR, DDIT4, PIK3CA, TNF, AKT3</p> <p>Metabolic pathways: COX8A, DNMT1, AMACR, MDH2, PSAT1</p> <p>VEGF signaling pathway: AKT1, MAPK3, KDR, PIK3CA, KRAS, AKT3, SRC, MAP2K1</p> <p>PPAR signaling pathway: FABP4, CD36</p>
mir-221	Xp11.3	hsa-miR-221	miR-221-3p	-3.080	<p>Cell cycle: CDKN1C, CDKN1B, CDK2, MYC, CDKN1A, MDM2, TP53, SKP2, ATR, CCND1</p> <p>p53 signaling pathway: BBC3, PTEN, CDK2, CDKN1A, MDM2, TP53, CASP3, BAX, ATR, CCND1, CCNG1</p> <p>PI3K-Akt signaling pathway: KIT, JAK3, CDKN1B, NGF, AKT1, PTEN, MAPK3, JAK2, BRCA1, CDK2, MTOR, BCL2, BCL2L11, MYC, CDKN1A, KDR, MDM2, SYK, TP53, FOXO3, TEK, TLR4, DDIT4, CSF1R, PIK3CA, KRAS, EPOR, AKT3, IFNA1, MYB, MAP2K1, JAK1, CCND1, PDGFD, PDGFRA</p> <p>Wnt signaling pathway: MYC, TP53, MAPK8, DKK2, CCND1</p> <p>Adhesion: AKT1, PTEN, MAPK3, BCL2, KDR, MAPK8, PIK3CA, ERBB2, AKT3, MAP2K1, CCND1, PDGFD, PDGFRA</p> <p>NF- kappa B signaling pathway: VCAM1, NFKBIA, BCL2, ICAM1, SYK, CXCL12, TLR4, BTK, TNF, IL1B, IRAK1</p> <p>HIF-1 signaling pathway: CDKN1B, AKT1, MAPK3, MTOR, BCL2, CDKN1A, IFNG, TEK, TLR4, PIK3CA, ERBB2, AKT3, TFRC, MAP2K1</p> <p>Apoptosis: NGF, AKT1, NFKBIA, TNFSF10, BCL2, TP53, CASP3, PIK3CA, TNF, BAX, AKT3, IL1B, IRAK1</p> <p>ErbB signaling pathway: CDKN1B, AKT1, MAPK3, MTOR, MYC, CDKN1A, MAPK8, PIK3CA, KRAS, ERBB2, AKT3, MAP2K1, STAT5A</p>

					<p>GnRH signaling pathway: MAPK3, MAPK8, KRAS, MAP2K1</p> <p>Chemokine signaling pathway: JAK3, AKT1, CCL2, CXCR4, MAPK3, JAK2, NFKBIA, CXCL12, FOXO3, PIK3CA, KRAS, AKT3, MAP2K1, STAT1</p> <p>Adipocytokine signaling pathway: AKT1, JAK2, NFKBIA, MTOR, MAPK8, TNF, CD36, AKT3</p> <p>Cytokine-cytokine receptor interaction: KIT, CCL2, CXCR4, FLT3, TNFSF10, KDR, CXCL12, IFNG, CSF1R, TNF, EPOR, IFNA1, IL1B, PDGFD, PDGFRA</p> <p>TGF-beta signaling pathway: MAPK3, MYC, IFNG, TNF</p> <p>MAPK signaling pathway: NGF, AKT1, MAPK3, MYC, STMN1, TP53, CASP3, MAPK8, KRAS, TNF, AKT3, IL1B, MAP2K1, PDGFRA, FOS</p> <p>Osteoclast differentiation: AKT1, MAPK3, NFKBIA, SYK, IFNG, MAPK8, BTK, CSF1R, PIK3CA, TNF, SOCS1, TYK2, AKT3, IL1B, MAP2K1, JAK1, STAT1, STAT2</p> <p>Oocyte meiosis: MAPK3, CDK2, MAP2K1</p> <p>mTOR signaling pathway: AKT1, PTEN, MAPK3, MTOR, DDIT4, PIK3CA, TNF, AKT3</p> <p>Metabolic pathways: COX8A, DNMT1, AMACR, MDH2, PSAT1</p> <p>VEGF signaling pathway: AKT1, MAPK3, KDR, PIK3CA, KRAS, AKT3, MAP2K1</p> <p>PPAR signaling pathway: FABP4, CD36</p>
mir-322	Xq26.3	hsa-miR-424	miR-424-5p	-3.657	<p>Cell cycle: CCNE2, E2F3, CCND1, CCND3, CDC25A, E2F1, SMAD3, WEE1, CDC14A, CDKN1A, CCNE1, CHEK1, CDK6</p> <p>p53 signaling pathway: CCNE2, CCND1, CCND3, SIAH1, CDKN1A, CCNE1, CHEK1, CDK6</p> <p>PI3K-Akt signaling pathway: CCNE2, MAP2K1, CCND1, CCND3, EGFR, FGFR1, MYB, AKT1, CREB1, CDKN1A, CCNE1, ATF2, CDK6</p> <p>Wnt signaling pathway: CCND1, CCND3, SMAD3, SIAH1, JUN, MAPK9</p> <p>Adhesion: MAP2K1, CCND1, CCND3, EGFR, PAK3, AKT1, JUN, MAPK9</p> <p>HIF-1 signaling pathway: MAP2K1, EGFR, AKT1, CUL2, HIF1A, CDKN1A</p> <p>Apoptosis: AKT1</p> <p>ErbB signaling pathway: MAP2K1, EGFR, PAK3, AKT1, JUN, CDKN1A, MAPK9</p> <p>GnRH signaling pathway: MAP2K1, EGFR, ITPR1, JUN, MAPK9</p>

					<p>Chemokine signaling pathway: MAP2K1, AKT1</p> <p>Adipocytokine signaling pathway: AKT1, RXRA, MAPK9</p> <p>Cytokine-cytokine receptor interaction: FLT3, EGFR</p> <p>TGF-beta signaling pathway: SMAD3</p> <p>MAPK signaling pathway: MAP2K1, RASA1, EGFR, FGFR1, AKT1, JUN, MAPK9, ATF2</p> <p>Osteoclast differentiation: MAP2K1, AKT1, FOSB, CREB1, JUN, MAPK9</p> <p>Oocyte meiosis: CCNE2, MAP2K1, ITPR1, CCNE1</p> <p>mTOR signaling pathway: AKT1, HIF1A</p> <p>VEGF signaling pathway: MAP2K1, AKT1</p> <p>PPAR signaling pathway: RXRA</p>
mir-322	Xq26.3	hsa-miR-424*	miR-424-3p	-3.934	<p>Cell cycle: CCNE2, E2F3, CCND1, CCND3, CDC25A, E2F1, SMAD3, WEE1, CDC14A, CDKN1A, CCNE1, CHEK1, CDK6</p> <p>p53 signaling pathway: CCNE2, CCND1, CCND3, SIAH1, CDKN1A, CCNE1, CHEK1, CDK6</p> <p>PI3K-Akt signaling pathway: CCNE2, MAP2K1, CCND1, CCND3, EGFR, FGFR1, MYB, AKT1, CREB1, CDKN1A, CCNE1, ATF2, CDK6</p> <p>Wnt signaling pathway: CCND1, CCND3, SMAD3, SIAH1, JUN, MAPK9</p> <p>Adhesion: MAP2K1, CCND1, CCND3, EGFR, PAK3, AKT1, JUN, MAPK9</p> <p>HIF-1 signaling pathway: MAP2K1, EGFR, AKT1, CUL2, HIF1A, CDKN1A</p> <p>Apoptosis: AKT1</p> <p>ErbB signaling pathway: MAP2K1, EGFR, PAK3, AKT1, JUN, CDKN1A, MAPK9</p> <p>GnRH signaling pathway: MAP2K1, EGFR, ITPR1, JUN, MAPK9</p> <p>Chemokine signaling pathway: MAP2K1, AKT1</p> <p>Adipocytokine signaling pathway: AKT1, RXRA, MAPK9</p> <p>Cytokine-cytokine receptor interaction: FLT3, EGFR</p> <p>TGF-beta signaling pathway: SMAD3</p> <p>MAPK signaling pathway: MAP2K1, RASA1, EGFR, FGFR1, AKT1, JUN, MAPK9, ATF2</p> <p>Osteoclast differentiation: MAP2K1, AKT1, FOSB, CREB1, JUN, MAPK9</p> <p>Oocyte meiosis: CCNE2, MAP2K1, ITPR1, CCNE1</p> <p>mTOR signaling pathway: AKT1, HIF1A</p> <p>VEGF signaling pathway: MAP2K1, AKT1</p>

					PPAR signaling pathway: RXRA
(III) Pairs with reverse regulation (n=2)					
mir-139	11q13.4	hsa-miR-139	miR-139-5p	-9.810	<p>Cell cycle: CDKN1B, MYC</p> <p>p53 signaling pathway: PTEN</p> <p>PI3K-Akt signaling pathway: PTEN, CDKN1B, BRCA1, MYC</p> <p>Wnt signaling pathway: ROCK2, MYC</p> <p>Adhesion: ROCK2, PTEN</p> <p>NF- kappa B signaling pathway: PTGS2</p> <p>HIF-1 signaling pathway: CDKN1B</p> <p>ErbB signaling pathway: CDKN1B, MYC</p> <p>GnRH signaling pathway:</p> <p>Chemokine signaling pathway: ROCK2</p> <p>TGF-beta signaling pathway: ROCK2, MYC</p> <p>MAPK signaling pathway: MYC</p> <p>mTOR signaling pathway: PTEN</p> <p>Metabolic pathways: PTGS2</p> <p>VEGF signaling pathway: PTGS2</p>
mir-139	11q13.4	-	miR-139-3p	1.943	<p>Cell cycle: CDKN1B, MYC</p> <p>PI3K-Akt signaling pathway: CDKN1B, MYC, BRCA1</p> <p>Wnt signaling pathway: ROCK2, MYC</p> <p>Adhesion: ROCK2</p> <p>HIF-1 signaling pathway: CDKN1B</p> <p>ErbB signaling pathway: CDKN1B, MYC</p> <p>Chemokine signaling pathway: ROCK2</p> <p>TGF-beta signaling pathway: ROCK2, MYC</p> <p>MAPK signaling pathway: MYC</p>
mir-876	9p21.1	-	miR-876-5p	-3.797	No pathway for validated genes
mir-876	9p21.1	-	miR-876-3p	1.510	No pathway for validated genes

¹ ** $p < 0.01$, * $p < 0.05$. ²Validated targets sourced mainly from miRWalk and NCBI website, and also from miRTarBase and Tarbase