Supplementary Tables

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Table S1: *minsamp* sample dataset that includes interaction factors.

competing	miRNA	Competing_expression	miRNA_expression	seed_type	region	energy
Gene1	Mir1	10000	1000	0.43	0.30	-20
Gene2	Mir1	10000	1000	0.43	0.01	-15
Gene3	Mir1	5000	1000	0.32	0.40	-14
Gene4	Mir1	10000	1000	0.23	0.50	-10
Gene4	Mir2	10000	2000	0.35	0.90	-12
Gene5	Mir2	5000	2000	0.05	0.40	-11
Gene6	Mir2	10000	2000	0.01	0.80	-25

Note: Energy values in miRNA:target pairs are represented by high-throughput studies (Helwak et al. 2013; Moore et al. 2015) which are utilized in this study. On the other hand, we have specified the other interaction factors, seed type and location of binding region on the target, as numeric values based on the previous studies.(Grimson et al. 2007) have compared the seed types' effect on target repression with few miRNA had canonical seed pairing in their study. Additionally, (Bartel 2009) and (Betel et al. 2010) have studied on functional and non-functional seed interactions. Based on results of these studies we have arranged seed types of miRNA:target interactions as numeric values. We also have redefined location of binding region on the target as numeric values, based on studies of (Hausser et al. 2013) and (Helwak et al. 2013). With this process, we have handled this entegrated dataset in context of competitor behaviours and functionality of interactions.

Table S2: Efficiency factors for seed types.

seed_type	Coefficient
5-mer	0.05
5-mer_noncanonical	0.04
6-mer	0.07
6-mer_noncanonical	0.05
6-merA1	0.07
6-merA1_noncanonical	0.05
7-mer	0.23
7-mer_noncanonical	0.19
7-merA1	0.19
7-merA1_noncanonical	0.16
7-mer-8m	0.25
7-mer-8m_nonacnonical	0.21
8-mer	0.43
8-mer_noncanonical	0.35
9-mer	0.43
9-mer_noncanonical	0.35
none	0.01

Table S3: Efficiency factors for binding regions on targets

location of binding region on target	Coefficient
3'UTR	0.84
CDS	0.42
5'UTR	0.01

Table S4: Example of E9GE_mirnagenenormal dataset.

hgnc_symbol	miRNA_name	mirna_RPM	GE_normal	Energy	seed_type_effect	region_effect
CCNG1	hsa-let-7a-5p	111204.15	5245.00	-25.10	0.05	0.84
DICER1	hsa-let-7a-5p	111204.15	3285.00	-24.40	0.43	0.42
SESN1	hsa-let-7a-5p	111204.15	1179.00	-22.20	0.05	0.93
NIPBL	hsa-let-7a-5p	111204.15	4503.00	-22.10	0.05	0.42
INTS12	hsa-let-7a-5p	111204.15	600.00	-21.90	0.05	0.42
FNIP1	hsa-let-7a-5p	111204.15	1248.00	-21.80	0.43	0.84

As a result of simulation a dataset, a graph object is obtained that includes various variables in edge and node data. A graph object includes variables at followings.

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