

Supplementary Information

miRNA-mediated alteration of Sulfatase Modifying Factor 1 expression using self-assembled branched DNA nanostructures

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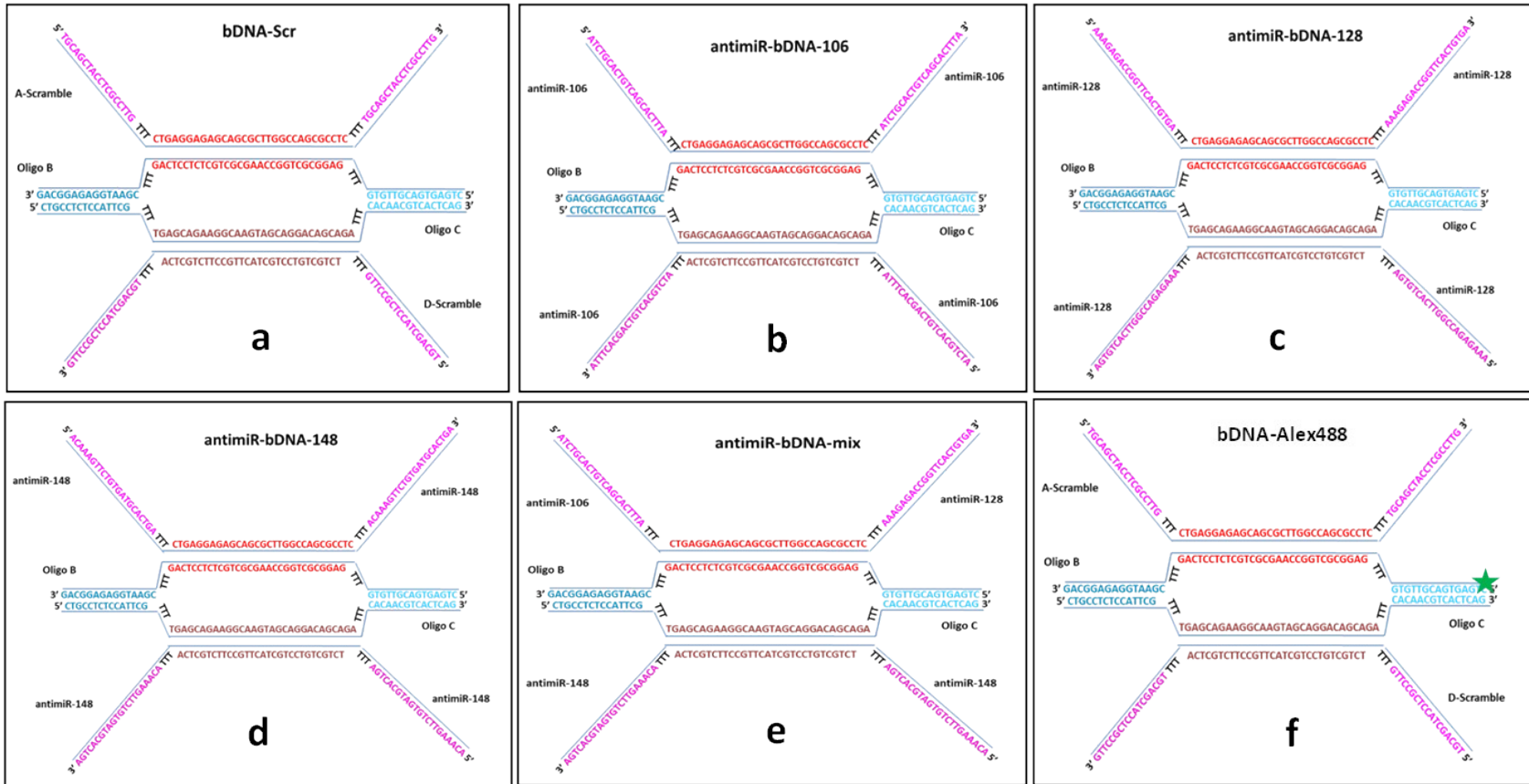


Figure S1. Schematic presentation of self-assembled branched DNA (bDNA) nanostructures containing (a) scramble sequences, (b) antimiR sequences of has-miR-106b-5p, (c) antimiR sequences of has-miR-128-3p, (d) antimiR sequences of has-miR-148b-3p, (e) antimiRNAs sequences of 106, 128 and duplicate sequence of antimiR-148 which named as antimiR-bDNA-mix and (f) bDNA-Alex488 having fluorescein labeled at the 5' end of the oligo B.

3'UTR Sequence of SUMF1: Length-998bp

>hg38_knownGene_ENST00000272902.10 range=chr3:4361146-4362143 5'pad=0
3'pad=0 strand=- repeatMasking=none

CAACCAAGGAAAGTCTTCCCCAGTCCAAGGAGCAGTCGTGTCTGACCTAC
ATTGGGCTTTTCTCAGAACTTTGAACGATCCCATGCAAAGAATTCCCACC
CTGAGGTGGGTACATACTGCCAATGGCCAAAGGAACCGCCTTGTGAG
ACCAAATTGCTGACCTGGGTGAGTGCATGTGCTTTATGGTGTGGTGCATC
TTTGGAGATCATCACCATATTTACTTTTGAGAGTCTTTAAAGAGGAAGG
GGAGTGGAGGGAACCCTGAGCTAGGCTTCAGGAGGCCCGCGTCTACGCA
GGCTCTGCCACAGGGGTAGACCCCAGGTCCGACGCTTGACCTTCCTGGG
CCTCAAGTGCCCTCCCCTATCAAATGAAGGGATGGACAGCATGACCTCTG
GGTGTCTCTCCAACCTACCAGTTCTAAAAAGGGTATCAGATTCTATTGTG
ACTTCATAGTGAGAATTTATTATAGATTATTTTTTTAGCTATTTTTTCCAT
GTGTGAACCTTGAGTGATACTAATCATGTAAAGTAAGAGTTCTCTTATGT
ATTATTTTCGGAAGAGGGGTGTGGTACTCCTTTATATTCGTACTIONACT
TTGTTTTTCCAAGGAAATCAGTGTCTTTTACGTTGTTATGATGAATCCCA
CATGGGGCCGGTGATGGTATGCTGAAGTTCAGCCGTTGAACACATAGGAA
TGTCTGTGGGGTACTCTACTGTGCTTTATCTTTTAACATTAAGTGCCTT
TGGTTCAGAGGGGCAGTCATAAGCTCTGTTTCCCCTCTCCCCAAAGCCT
TCAGCGAACGTGAAATGTGCGCTAAACGGGGAAACCTGTTTAATTCTAGA
TATAGGGAAAAAGGAACGAGGACCTTGAATGAGCTATATTCAGGGTATCC
GGTATTTTGTAAATAGGGAATAGGAAACCTTGTGGCTGTGGAATATCCGA
TGCTTTGAATCATGCACTGTGTTGAATAAACGTATCTGCTAAATCAGG

Figure S2. The nucleotide sequence of 3'UTR of SUMF1 used to study the miRNA binding sites.

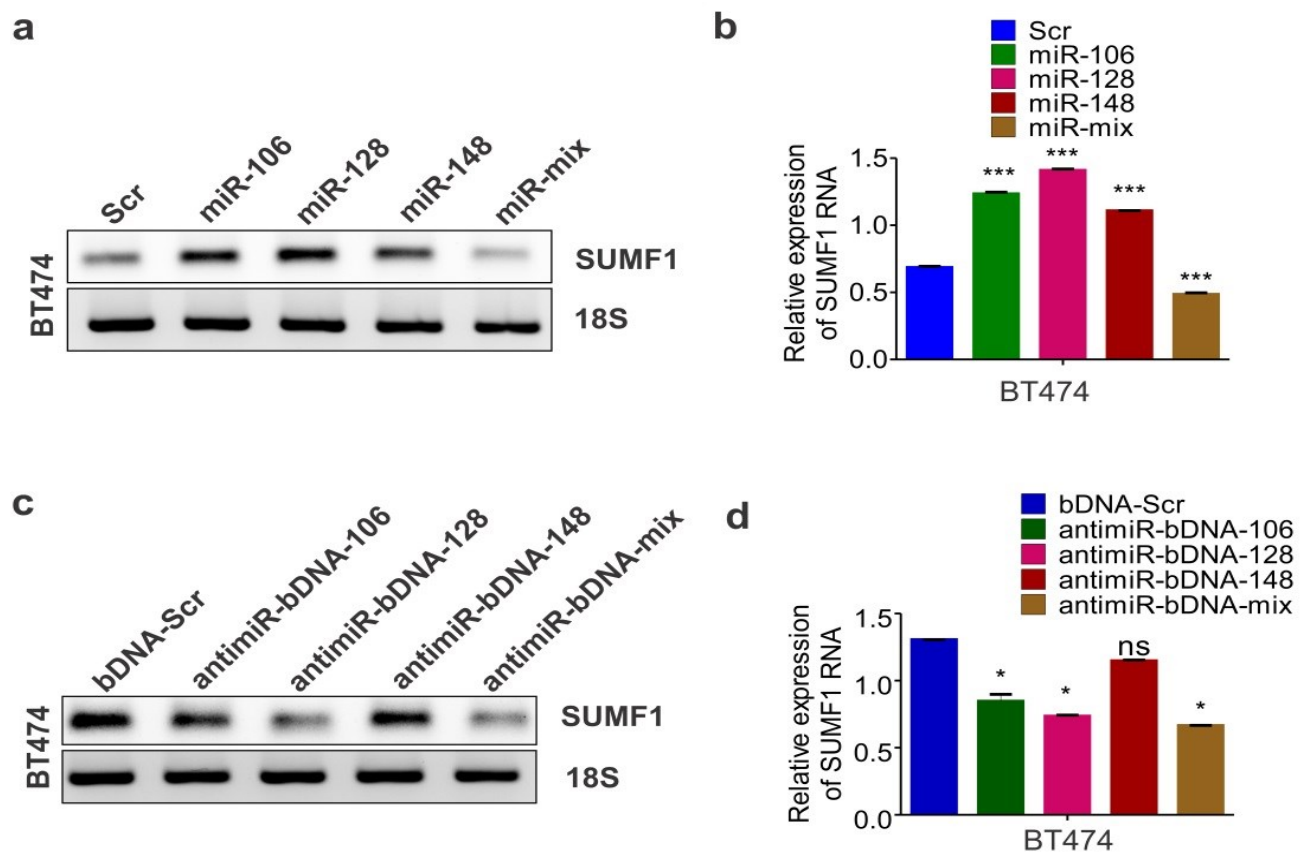


Figure S3. Expression of SUMF1 in BT474 upon transfection with (a,b) miRNA-106, 128 and 148 sequences and (b) bDNA structures containing anti-miR sequences for miRNA-106, 128 and 148 as observed in qRT-PCR.

Table S1. Sequence of oligonucleotides used in the study including the self-assembly of bDNA structures. Primer sequence for reverse transcription of miRNAs, real time primers for genes and miRNA, miRNA oligonucleotides for miRNAs and antimiRs.

Sl. No.	Oligo name	Sequences	No. of nucleotides
1	scramble-A	5' TGCAGTACCTCGCCTTG TTT CTGAGGAGAGCAGCGCTTGGCCAGCGCCTC TTT TGCAGTACCTCGCCTTG 3'	72
2	oligo B	5' CTGAGTGACGTTGTG TTT GAGGCGCTGGCCAAGCGCTGCTCTCCTCAG TTT CGAATGGAGAGGCAG 3'	66
3	Oligo B/Alex488N	5' Alex488N CTGAGTGACGTTGTG TTT GAGGCGCTGGCCAAGCGCTGCTCTCCTCAG TTT CGAATGGAGAGGCAG 3'	66
4	oligo C	5' CTGCCTCTCCATTCG TTT TGAGCAGAAGGCAAGTAGCAGGACAGCAGA TTT CACAACGTCAGTCA 3'	66
5	scramble-D	5' TGCAGTACCTCGCCTTG TTT TCTGCTGTCCTGCTACTTGCCTTCTGCTCA TTT TGCAGTACCTCGCCTTG 3'	72
6	antimiR-106 & 128A	5' ATCTGCACTGTCAGCACTTTA TTT CTGAGGAGAGCAGCGCTTGGCCAGCGCCTC TTT AAAGAGACCGGTTCACTGTGA 3'	78
7	antimiR-106 A	5' ATCTGCACTGTCAGCACTTTA TTT CTGAGGAGAGCAGCGCTTGGCCAGCGCCTC TTT ATCTGCACTGTCAGCACTTTA 3'	78
8	antimiR-106D	5' ATCTGCACTGTCAGCACTTTA TTT TCTGCTGTCCTGCTACTTGCCTTCTGCTCA TTT ATCTGCACTGTCAGCACTTTA 3'	78
9	antimiR-128A	5' AAAGAGACCGGTTCACTGTGA TTT CTGAGGAGAGCAGCGCTTGGCCAGCGCCTC TTT AAAGAGACCGGTTCACTGTGA 3'	78
10	antimiR-128D	5' AAAGAGACCGGTTCACTGTGA TTT TCTGCTGTCCTGCTACTTGCCTTCTGCTCA TTT AAAGAGACCGGTTCACTGTGA 3'	78
11	antimiR-148A	5' ACAAGTTCTGTGATGCACTGA TTT CTGAGGAGAGCAGCGCTTGGCCAGCGCCTC TTT ACAAGTTCTGTGATGCACTGA 3'	80
12	antimiR-148D	5' ACAAGTTCTGTGATGCACTGA TTT TCTGCTGTCCTGCTACTTGCCTTCTGCTCA TTT ACAAGTTCTGTGATGCACTGA 3'	80
13	hsa-miR-106b-5p(RvTs)	5' GTCGTATCCAGTGCAGGGTCCGAGGTATTCGCACTGGATACGAC ATCTGC 3'	50
14	hsa-miR-128-3p (RvTs)	5' GTCGTATCCAGTGCAGGGTCCGAGGTATTCGCACTGGATACGACAAAGAG 3'	50
15	hsa-miR-148b-3p (RvTs)	5' GTCGTATCCAGTGCAGGGTCCGAGGTATTCGCACTGGATACGACACAAAG 3'	50
16	miR SL_Universal (RT-R)	5' GTCGTATCCAGTGCAGGGT 3'	21
17	hsa-miR-148b-3p (RT-F)	5' AACAGTGTGATGATCAGCACTCA 3'	18
18	hsa-miR-106b-5p(RT-F)	5' AACACGTGTAAGTGCTGACA 3'	20
19	hsa-miR-128-3p (RT-F)	5' AACAGTGTGATGATGATGATGAT 3'	18
20	antimiR-106b-5p	5' ATCTGCACTGTCAGCACTTTA 3'	21
21	antimiR-128-3p	5' AAAGAGACCGGTTCACTGTGA 3'	21
22	antimiR-148b-3p	5' ACAAGTTCTGTGATGCACTGA 3'	22
23	hsa-miR-148b-3p	5' TCAGTGCATCACAAGTTTGT 3'	22
24	hsa-miR-106b-5p	5' TAAAGTGTGATGATGATGATGAT 3'	21
25	hsa-miR-128-3p	5' TCACAGTGAACCGTCTCTTT 3'	21
26	Scramble	5' TGCAGTACCTCGCCTTG 3'	18
27	SUMF1 F	5' CCATCCCTGCTGGAGTA 3'	17
28	SUMF1 R	5' GGTCCTCACTGCTCACTC 3'	19
29	18S RNA F	5' GTAACCCGTTGAACCCATT 3'	20
30	18S RNA R	5' CCATCCAATCGGTAGTAGCG 3'	20

Table S2. AllGenPromo-based analysis for identifying binding sites of important transcription factors at 3kb upstream promoter of SUMF1. Factors predicted within a dissimilarity margin less than or equal to 15%.

0	C/TL1 [T00100]	1	HNF-1B [T01950]	2	HNF-1C [T01951]	3	USF2b [T02377]	4	OC-2 [T03259]	5	oJun [T00133]	6	HNF-3beta [T02513]	7	SRV [T00997]
8	LCR-F1 [T01599]	9	p300 [T01427]	10	B47 [T00207]	11	EIk-1 [T00250]	12	TCF-1A [T00999]	13	LEF-1 [T02905]	14	TCF-4E [T02878]	15	HMG I(Y) [T02368]
16	STAT4 [T01577]	17	oEts-1 [T00112]	18	R2 [T00712]	19	P/box binding factor [T00704]	20	HOXD9 [T01424]	21	HOXD10 [T01425]	22	GATA-1 [T00306]	23	GATA-3 [T00311]
24	PR-B [T00696]	25	PRA [T01661]	26	GR-alpha [T00337]	27	POU3F2 [T00630]	28	TGIF [T04076]	29	oFos [T00123]	30	Pax-2 [T01823]	31	AP-2alphaA [T00035]
32	TBP [T00794]	33	TMF [T00835]	34	GR-beta [T01920]	35	POU2F2 (Oct-2.1) [T00646]	36	DBP [T04875]	37	CDX2 [T03246]	38	FOXP3 [T04280]	39	TFIID [T00820]
40	STAT3A [T04683]	41	oEts-2 [T00113]	42	Ctcf-1 [T03978]	43	NF-AT4 [T01946]	44	NF-AT3 [T02462]	45	RelA [T00594]	46	HSE1 (long) [T01042]	47	HSE1 (short) [T02104]
48	HNF-3alpha [T02512]	49	Nkx2-1 [T00857]	50	TFIIB [T00818]	51	NF-X3 [T01514]	52	Oct-B1 [T00545]	53	POU2F2B [T00662]	54	C/EBPalpha [T00105]	55	C/EBPbeta [T00581]
56	LF-A1 [T00467]	57	ROREalpha1 [T01527]	58	COUP-TE1 [T00149]	59	ER-beta [T04651]	60	RAR-beta [T00721]	61	SF-1 [T02769]	62	ER-alpha [T00261]	63	FOU6E1 [T04470]
64	POU2F2C [T00665]	65	ENKTF-1 [T00255]	66	HNF-1A [T00368]	67	NFdeltaE3A [T00976]	68	AML1 [T01067]	69	AML1a [T02256]	70	AP-4 [T00036]	71	WT1.1 [T01840]
72	AP-3 (2) [T00039]	73	NHP-1 [T00621]	74	E1aE-A [T00246]	75	FOXO3a [T02938]	76	Hif [T01071]	77	Pbx1b [T02087]	78	NF-1 [T00539]	79	T3R-beta1 [T00851]
80	YY1 [T00915]	81	TCF-4 [T02918]	82	RXR-1:RXR-alpha [T05671]	83	T3R-alpha1 [T01152]	84	Myf-3 [T00519]	85	MyoD [T00525]	86	USF2 [T00878]	87	AR [T00040]
88	RAR-alpha1 [T00719]	89	ARP-1 [T00045]	90	RXR-alpha [T01345]	91	MRF-2 [T04675]	92	AIRE [T05990]	93	Nkx3-1 [T04255]	94	NF1/CTF [T00094]	95	Pax-6 [T01122]
96	oMyh [T00137]	97	AP-1 [T00029]	98	RAR-gamma [T00720]	99	IRF-2 [T01491]	100	p53 [T00671]	101	TGT3 [T00833]	102	FOXJ2 (long isoform) [T04169]	103	NF-Y [T00150]
104	Nrf2 [T01443]	105	POU2F1 [T00641]	106	POU2F2 [T00647]	107	octamer-binding factor [T01225]	108	MZF-1 [T00529]	109	NF-AT2 [T01945]	110	NF-AT1 [T01948]	111	STAT1beta [T01573]
112	MBF1 [T00492]	113	SKR:RXR-alpha [T05670]	114	Myf-5 [T00521]	115	Tal-1 [T00790]	116	RAR-beta:RXR-alpha [T05420]	117	WT1.1-KTS [T00900]	118	WT1-KTS [T01839]	119	E2F-1:DP-1 [T05204]
120	HTEB3 [T05051]	121	Aml1 [T01346]	122	LSE1 [T00874]	123	AhR [T01795]	124	Pax-5 [T00070]	125	AhR:Arnt [T05394]	126	Chx10 [T04139]	127	VDR [T00885]
128	PEA3 [T00685]	129	DP-1 [T01548]	130	E2F-1 [T01542]	131	HNF-4alpha [T03828]	132	RPS8 [T05040]	133	Sp1 [T00759]	134	CREMalpha [T01803]	135	ATF [T00051]
136	ATF-1 [T00868]	137	E2F [T00221]	138	AREB6 [T00625]	139	REX1 [T01673]	140	Fra-1 [T01462]	141	JunD [T01978]	142	Sp3 [T02338]	143	oMyc [T00140]
144	DEC1 [T05838]	145	ETF [T00270]	146	E2F-5 [T01607]	147	HOX11 [T02054]	148	CREB [T00163]	149	ATF-2 [T00167]	150	aMEF-2 [T01006]	151	PPAR-alpha:RXR-alpha [T05221]
152	Ik-1 [T02702]	153	XBP-1 [T00902]	154	ANF [T00025]	155	FOXJ1 [T02474]	156	TFII-I [T00824]	157	WT1 [T00899]	158	GATA-2 [T00308]	159	IRF-1 [T00423]
160	IRF-3 [T04673]	161	NF-AT1 [T00550]	162	Egr3 [T00243]	163	CRF [T00170]	164	Pbx1 [T06000]	165	CTE [T00174]	166	PKNOX1 [T04122]	167	IPF1 [T04362]
168	E4F1 [T00223]	169	ROREalpha2 [T01528]	170	E2 [T00204]	171	NF-E2 [T00558]	172	B4F [T00222]	173	T3R-alpha [T00838]	174	ERREalpha1 [T05682]	175	RAR-beta2 [T01326]