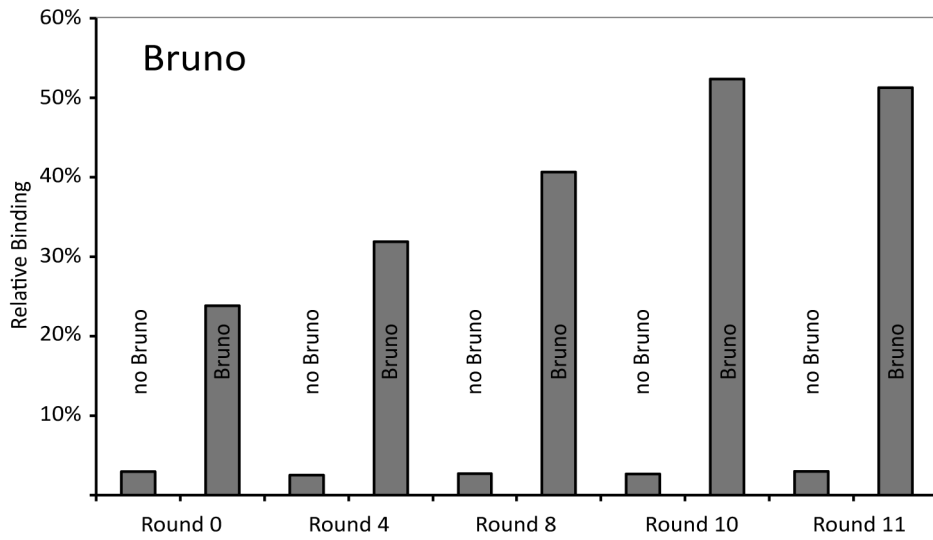
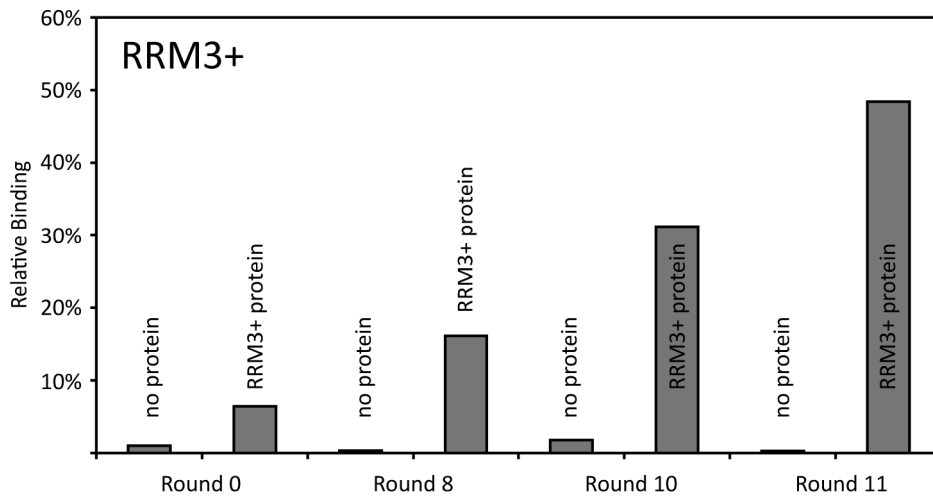
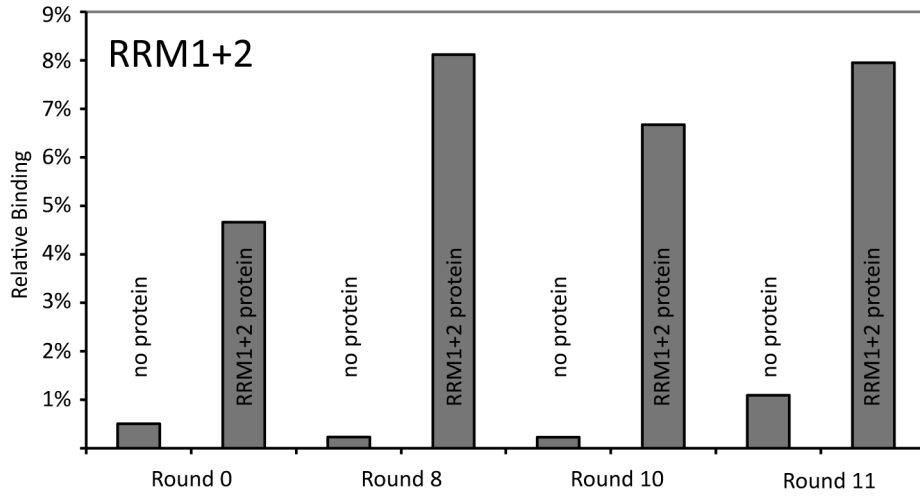


Supplementary Figure 1. Monitoring progression of in vitro selections.

Each graph shows the results of filter binding assays with RNAs from the indicated round of selection with the indicated protein. Relative binding indicates the percentage of input RNA bound.



Supplementary Table 1. RRM1+2 aptamers

aptamer	Aptamer sequence
8.2	UUCUACAGGAUGUGGCAGUCGGAUUCCCAUAAUCCUUUCAUACCUAGCA
8.3	UUUAAUCACUUACGAGAGAAUCAUUCUCUCAUACGAAUUUAUGCAAUGUA
8.4	GCUUAUAGGUCAAAGCAACCAUUUAGUUCUACCGGACGGUUGGAAUUUAU
8.5	UAUGUUUUGCAAGAGUUCAAAAAACUCAGCUUCUGUCUGCCUGGAGCUCUA
8.6	GGAUCAUUCACAUA AAAAGGCUGAUCAAAGUGUUGUAUCUUUAUACCCUCAG
8.7	GGAUCAUUCACAUA AAAAGGCUGAUCAAAGUGUUGUAUCUUUAUACCCUCAG
8.9	GGAUCAUUCACAUA AAAAGGCUGAUCAAAGUGUUGUAUCUUUAUACCCUCGG
8.10	UAUGUUUUGCAAGAGUUCAAAAAACUCAGCUUCUGUCUGCCUGGAGCUCUA
8.11	CUACGUAAAAUUUCUUGUGUAGUCACUUCUAAAGUCAGUAAGUGCAAUUC
8.12	AAUUGCCAAUCCGUCACGACCGUJAGACCGGUAGUCUACAAUGUUUUGUAU
8.13	AUGACGUACGCAUUUAUCUUUGUCGACGGUGUAUCACUUCUCUUUGCCC
8.14	UAUGUUUUGCAAGAGUUCAAAAAACUCAGCUUCUGUCUGCCUGGAGCUCUA
8.15	AUUUAGUAGUGAGGUCUCCAUAAGCCACGUUAUCCAGUACUUAUUUUAGU
8.17	GUCUUGUUUUUAUGUUUUACACGAGUUUUAGAAACUCAAACUGGAAAGCGA
8.18	GCAAAAGCCGGUCGCGCUAAGUAUAGCAUCAUUUCUCUAAGCAUAUGUAA
8.19	UAUGUUUUGCAAGAGUUCAAAAAACUCAGCUUCUGUCUGCCUGGAGCUCUA
8.20	UAUGUUUUGCAAGAGUUCAAAAAACUCAGCUUCUGUCUGCCUGGAGCUCUA
8.21	CUACGUAAAAUUUCUUGUGUAGUCACUUCUAAAGUCAGUAAGUGCAAUUC
8.23	UAUGUUUUGCAAGAGUUCAAGAAACUCAGCUUCUGUCUGCCUGGAGCUCUA
8.26	AUUUAGUAGUGAGGUCUCCAUAAGCCACGUUAUCCAGUACUUAUUUUAGU
8.27	GGAUCAUUCACAUA AAAAGGCUGAUCAAAGUGUUGUAUCUUUAUACCCUCAG
8.28	GGAUCAUUCACAUA AAAAGGCUGAUCAAAGUGUUGUAUCUUUAUACCCUCGG
8.29	AUUUAGUAGUGAGGUCUCCAUAAGCCACGUUAUCCAGUACUUAUUUUAGU
8.30	AAUUAGCUCGAUACAUUAUAUUUUACCAAUCAUGCAGGAGUCGAUUUGU
8.31	AUGACGCACGCAUUUAUCUUUGUCGACGGUGUAUCACUUCUCUUUGCCC
8.32	GGAUCAUUCACAUA AAAAGGCUGAUCAAAGUGUUGCAUCUUUAUACCCUCA
8.33	UAUGUUUUGCAAGAGUUCAAAAAACUCAGCUUCUGUCUGCCUGGAGCUCUA
8.34	UUUAAUCACUUACGAGAGAAUCAUUCUCUCAUACGAAUUUAUGCAAUGUA
8.37	GCUUAUAGGUCAAAGCAACCGUUUAGUUCUACCGGACGGUUGGAAUUUAU
8.39	UAUGUUUUGCAAGAGUUCAAAAAACUCAGCUUCUGUCCGCCUGGAGCUCUA
8.45	AUUUAGUAGUGAGGUCUCCAUAAGCCACGUUAUCCAGUACUUAUUUUAGU
8.46	AGGUCUAAGCAGGAACGCCAAAACCUUGGAAUUAGCAUCCUUCUCAUA
8.50	AGGAGGUUUUACAAACCGUUUGGACUAGCUUCUUUUCAAAAAUUACCCC

Supplementary Table 2. RRM3+ aptamers

Aptamer	Aptamer sequence
4.1	AUAUGAUUGCUGCAGUUCUUGAUUCCCUCAAAGUAAUCUGUCCACCUGGC
4.3	GCUCAAGUUUCCUGUAGCAGGUUUCCTAAAAAUGAAUAGUUCUUCUUA
4.4	GGGUUACUUUUGUGCUUGUAGACCAAAGUGUUGCCUCUACCCUCAACUA
4.5	AUUAGUUCAGUACUCCCAAUGCUAAAUCGAUUUACCGAUACACCUUAGGA
4.8	GCUCAAGUUUCCUGUAGCAGGUUUCCTAAAAAUGAAUAGUUCUUCUUA
4.11	AAAACCUUCAUCCAAUUGCGUUACUAUGGUUUGAGAAAAGUCUUCGCU
4.12	CCACUUAUUGAAAUAUAGCCUUGCAAACAAGGCCGUUUUGUGAUUGACAU
4.13	UAUCUGGUUGAAAAGUUUCCGCAAAAGGCAUCGAAGGAUUAUAUCACAA
4.16	GCUCAAGUUUCCUGUAGCAGGUUUCCTAAAAAUGAAUAGUUCUUCUUA
4.18	AAUGGGCCAUAUUUJAGAUGAGCCAAAGUGUUGUAGAAUCUACUAACUUUU
4.21	CUGAUUCAGUAUGGGAUGGCUAUUACCGCCACUCCGAAGUGUUUUAUUGAU
4.22	UUCUAUCUGACUCGGAUUUUAUUGAUCUAUAUACCUUCAGGUGUUGUCAGA
4.25	CUGAUUCAGUAUGGGAUGGCUAUUACCGCCACUCCGAAGUGUUUUAUUGAU
4.26	UAGCUUCUUGCUAAAUGUUUAUUGACUCCUCUGUCUGAUGCAGGAGCUU
4.27	UAAUCGAGGACAUAAGAGUUJGACUCCUCACCGGUACAGCCAGUCAUC
4.28	UAGCUUCUUGCUAAAUGUUUAUUGACUCCUCUGUCUGAUGCAGGAGCUU
4.29	GGGCCUACAAGCCAAAGUGUJGCGUCCACACAUUGGUUUAAUCACUCAAG
4.30	GCUCAAGUUUCCUGUAGCAGGUUUCCTAAAAAUGAAUAGUUCUUCUUA
4.33	AAUGGGCCAUAUUUJAGAUGAGCCAAAGUGUUGUAGAAUCUACUAACUUUU
4.34	CAGAUUCAGUAUGGGAUGGCUAUUACCGCCACUCCGAAGUGUUUUAUUGAU
4.36	GGGCCUACAAGCCAAAGUGUJGCGUCCACACAUUGGUUUAAUCACUCAAG
4.37	UUUUAAAAGAUUCUCUGCAGUGGCGAGCAAAGCUAAACAAGCUUUUAUCAA
4.38	GCUCAAGUUUCCUGUAGCAGGUUUCCTAAAAAUGAAUAGUUCUUCUUA
4.39	UAGCUUCUUGCUAAAUGUUUAUUGACUCCUCUGUCUGAUGCAGGAGCUU
4.40	UAGCUUCUUGCUAAAUGUUUAUUGACUCCUCUGUCUGAUGCAGGAGCUU
4.42	UAUCUGGUUGAAAAGUUUCCGCAAAAGGCAUCGAAGGAUUAUAUCACAA
4.45	CCGUAAUUAUCUAUUCUACAGCUUAGACUCACGAAUUAUAUGUAUCAGCA
4.46	CUGAUUCAGUAUGGGAUGGCUAUUACCGCCACUCCGAAGUGUUUUAUUGAU
4.48	GUCCAUAGCAAUUGCAGUUCGAUUCCTCACUAUGGCUAUACACUAGAA
4.49	GCUCAAGUUUCCUGUAGCAGGUUUCCTAAAAAUGAAUAGUUCUUCUUA
4.50	CUGAUUCAGUAUGGGAUGGCUAUUACCGCCACUCCGAAGUGUUUUAUUGAU
4.51	GCUCAAGUUUCCUGCAGCAGGUUUCCTAAAAAUGAAUAGUUCUUCUUA
4.54	AAUGGGCCAUAUUUJAGAUGAGCCAAAGUGUUGUAGAAUCUACUAACUUUU

Supplementary table 4. Tetranucleotides in the anti-RRM1+2 and anti-Bru aptamers

tetranucleotide	RRM1+2 count	RRM1+2 rank	Bru count	Bru rank
aaaa	18	10t	3	181t
aaac	12	32t	2	192t
aaag	17	12t	3	181t
aaat	9	60t	12	84t
aaca	0	220t	4	180
aacc	4	136t	10	95t
aacg	1	192t	5	147t
aact	10	49t	6	133t
aaga	8	69t	0	241t
aagc	6	101t	6	133t
aagg	6	101t	1	218t
aagt	9	60t	9	105t
aata	0	220t	11	90t
aatc	10	49t	15	74t
aatg	3	155t	7	121t
aatt	10	49t	35	32t
acaa	2	172t	3	181t
acac	1	192t	9	105t
acag	1	192t	2	192t
acat	7	90t	6	133t
acca	3	155t	7	121t
acc	1	192t	8	120
accg	5	122t	6	133t
acct	8	69t	25	51
acga	6	101t	2	192t
acgc	4	136t	3	181t
acgg	5	122t	1	218t
acgt	8	69t	9	105t
acta	5	122t	7	121t
actc	9	60t	13	77t
actg	1	192t	10	95t
actt	6	101t	12	84t
agaa	3	155t	1	218t
agac	1	192t	3	181t
agag	10	49t	0	241t
agat	0	220t	0	241t
agca	7	90t	1	218t
agcc	5	122t	7	121t
agcg	1	192t	4	164t
agct	18	10t	3	181t
agga	4	136t	0	241t
aggc	6	101t	2	192t
aggg	0	220t	1	218t
aggt	8	69t	2	192t
agta	10	49t	5	147t
agtc	5	122t	5	147t
agtg	11	40t	5	147t

Supplementary table 4. Tetranucleotides in the anti-RRM1+2 and anti-Bru aptamers

agtt	11	40t	10	95t
ataa	8	69t	9	105t
atac	4	136t	10	95t
atag	7	90t	4	164t
atat	8	69t	32	37t
atca	27	2	11	90t
atcc	7	90t	18	66t
atcg	0	220t	7	121t
atct	11	40t	29	42t
atga	3	155t	3	181t
atgc	11	40t	10	95t
atgg	0	220t	2	192t
atgt	14	21t	24	52t
atta	11	40t	24	52t
attc	8	69t	26	49t
attg	1	192t	39	26t
atth	14	21t	71	14
caaa	23	4	5	147t
caac	2	172t	13	77t
caag	8	69t	2	192t
caat	6	101t	20	60t
caca	6	101t	5	147t
cacc	7	90t	12	84t
cacg	6	101t	4	164t
cact	6	101t	9	105t
caga	0	220t	4	164t
cagc	8	69t	2	192t
cagg	3	155t	2	192t
cagt	6	101t	9	105t
cata	16	15t	17	69t
catc	2	172t	12	84t
catg	1	192t	7	121t
catt	13	29t	26	49t
ccaa	3	155t	20	60t
ccac	4	136t	7	121t
ccag	4	136t	6	133t
ccat	7	90t	33	36
ccca	1	192t	19	63t
cccc	0	220t	9	105t
cccg	0	220t	6	133t
ccct	1	192t	28	45
ccga	0	220t	5	147t
ccgc	0	220t	9	105t
ccgg	4	136t	2	192t
ccgt	3	155t	23	55t
ccta	1	192t	27	46t
cctc	6	101t	43	23t
cctg	9	60t	20	60t
cctt	2	172t	48	21

Supplementary table 4. Tetranucleotides in the anti-RRM1+2 and anti-Bru aptamers

cgaa	2	172t	1	218t
cgac	4	136t	4	164t
cgag	3	155t	1	218t
cgat	2	172t	7	121t
cgca	3	155t	5	147t
cgcc	1	192t	8	117t
cgcg	1	192t	1	218t
cgct	1	192t	7	121t
cgga	3	155t	1	218t
cggc	0	220t	4	164t
cggg	0	220t	0	241t
cggt	7	90t	1	218t
cgta	4	136t	9	105t
cgtc	1	192t	22	58
cgtg	0	220t	8	117t
cgtt	6	101t	24	52t
ctaa	4	136t	12	84t
ctac	5	122t	19	63t
ctag	2	172t	2	192t
ctat	4	136t	43	23t
ctca	12	32t	16	72t
ctcc	4	136t	30	40t
ctcg	7	90t	17	69t
ctct	14	21t	52	19
ctga	6	101t	4	164t
ctgc	8	69t	13	77t
ctgg	10	49t	2	192t
ctgt	8	69t	50	20
ctta	10	49t	18	66t
cttc	14	21t	38	28t
cttg	2	172t	34	35
cttt	8	69t	75	11
gaaa	7	90t	1	230
gaac	1	192t	2	192t
gaag	0	220t	0	241t
gaat	2	172t	3	181t
gaca	0	220t	2	192t
gacc	2	172t	8	117t
gacg	8	69t	2	192t
gact	1	192t	1	218t
gaga	2	172t	0	241t
gagc	8	69t	4	164t
gagg	5	122t	2	192t
gagt	10	49t	1	218t
gata	1	192t	1	218t
gatc	12	32t	4	164t
gatg	1	192t	2	192t
gatt	2	172t	5	147t
gcaa	14	21t	2	192t

Supplementary table 4. Tetranucleotides in the anti-RRM1+2 and anti-Bru aptamers

gcac	0	220t	5	147t
gcag	3	155t	2	192t
gcat	6	101t	7	121t
gcca	6	101t	5	147t
gccc	3	155t	9	105t
gccg	1	192t	1	218t
gcct	8	69t	13	77t
gcga	1	192t	0	241t
gcgc	1	192t	5	147t
gcgg	0	220t	1	218t
gcgt	0	220t	1	218t
gcta	1	192t	6	133t
gctc	9	60t	6	133t
gctg	6	101t	0	241t
gctt	11	40t	10	95t
ggaa	5	122t	0	241t
ggac	3	155t	1	218t
ggag	10	49t	1	218t
ggat	8	69t	1	218t
ggca	0	220t	4	164t
ggcc	0	220t	2	192t
ggcg	0	220t	0	241t
ggct	6	101t	1	220
ggga	0	220t	2	192t
gggc	0	220t	1	218t
gggg	0	220t	2	192t
gggt	0	220t	4	164t
ggta	2	172t	0	241t
ggtc	8	69t	4	164t
ggtg	3	155t	0	241t
ggtt	2	172t	6	133t
gtaa	3	155t	12	84t
gtac	7	90t	10	95t
gtag	6	101t	0	241t
gtat	12	32t	23	55t
gtca	5	122t	5	147t
gtcc	0	220t	79	10
gtcg	6	101t	2	192t
gtct	15	19t	81	9
gtga	4	136t	3	181t
gtgc	2	172t	6	133t
gtgg	0	220t	4	164t
gtgt	11	40t	39	26t
gtta	13	29t	21	59
gttc	10	49t	13	77t
gttg	8	69t	15	74t
gttt	5	122t	94	6
taaa	8	69t	11	90t
taac	0	220t	10	95t

Supplementary table 4. Tetranucleotides in the anti-RRM1+2 and anti-Bru aptamers

taag	4	136t	13	77t
taat	6	101t	29	42t
taca	5	122t	9	105t
tacc	4	136t	19	63t
tacg	8	69t	5	147t
tact	4	136t	27	46t
taga	2	172t	2	192t
tagc	9	60t	5	147t
tagg	4	136t	0	241t
tagt	12	32t	9	105t
tata	11	40t	30	40t
tatc	22	5	35	32t
tatg	24	3	23	55t
tatt	9	60t	91	8
tcaa	20	6t	15	74t
tcac	20	6t	11	90t
tcag	9	60t	7	121t
tcat	12	32t	17	69t
tcca	8	69t	36	31
tccc	2	172t	37	30
tccg	1	192t	27	46t
tcct	1	192t	74	12t
tcga	5	122t	6	133t
tcgc	1	192t	6	133t
tcgg	7	90t	2	192t
tcgt	0	220t	32	37t
tcta	16	15t	38	28t
tctc	11	40t	60	17
tctg	16	15t	40	25
tctt	15	19t	92	7
tgaa	0	220t	4	164t
tgac	3	155t	5	147t
tgag	4	136t	4	164t
tgat	6	101t	4	164t
tgca	14	21t	6	133t
tgcc	12	32t	11	90t
tgcg	0	220t	2	192t
tgct	2	172t	13	77t
tgga	19	8t	1	218t
ggc	0	220t	0	241t
ggg	0	220t	6	133t
gggt	0	220t	3	181t
tgta	14	21t	35	32t
tgtc	12	32t	137	3
tgtg	2	172t	32	37t
tgtt	17	12t	103	5
ttaa	2	172t	29	42t
ttac	5	122t	16	72t
ttag	14	21t	10	95t

Supplementary table 4. Tetranucleotides in the anti-RRM1+2 and anti-Bru aptamers

ttat	37	1	74	12t
ttca	17	12t	10	95t
ttcc	1	192t	47	22
ttcg	0	220t	18	66t
ttct	19	8t	66	15
ttga	0	220t	7	121t
ttgc	4	136t	5	147t
ttgg	3	155t	3	181t
ttgt	13	29t	196	1
ttta	16	15t	57	18
tttc	5	122t	64	16
tttg	9	60t	124	4
tttt	10	49t	152	2

Count: number of times the sequence is present in the sequenced aptamers.
 Rank: 1 indicates the most frequent tetranucleotide. Ties are indicated with a t.

Supplementary Table 5. Structural features of RNAs used for binding assays.

Binding site ^a	ΔG^b	copy number ^c	size	# of base pairs in binding site		
				G-C	A-U	G-U
UGUUUUUAUAUGU	-19.9	1	12	1	4	3
		2		0	5	4
		3		1	6	4
		4		1	4	3
CAAUUUUUAUAUGU	-20.5	1	13	1	6	3
		2		1	8	2
		3		1	6	1
		4		1	7	3
UGUUUGUAGU	-25.6	1	10	2	2	0
		2		1	3	2
		3		2	4	0
		4		2	3	1
UUGUCC	-24.0	1	6	3	1	1
		2		1	0	1
		3		0	0	0
		4		3	3	0
UAAAGUCUUCUA	-24.3	1	12	1	6	0
		2		0	5	0
		3		2	7	1
		4		1	5	1
UCAAUUGCAGU	-36.1	1	11	3	6	2
		2		3	6	2
		3		3	5	2
		4		3	5	2

^a The binding site that is present in four copies in the RNA used for binding assays (and inserted into a reporter transgene for in vivo assays).

^b Predicted ΔG for folding of entire RNA.

^c Copy number refers to position of individual binding sites within the RNA.

Supplementary Table 1. RRM1+2 aptamers

aptamer	Aptamer sequence
8.2	UUCUACAGGAUGUGGCAGUCGGAUUCCCAUAAUCCUUUCAUACCUAGCA
8.3	UUUAAUCACUUACGAGAGAAUCAUUCUCUCAUACGAAUUUAUGCAAUGUA
8.4	GCUUAUAGGUCAAAGCAACCAUUUAGUUCUACCGGACGGUUGGAAUUUAU
8.5	UAUGUUUUGCAAGAGUUCAAAAAACUCAGCUUCUGUCUGCCUGGAGCUCUA
8.6	GGAUCAUUCACAUA AAAAGGCUGAUCAAAGUGUUGUAUCUUUAUACCCUCAG
8.7	GGAUCAUUCACAUA AAAAGGCUGAUCAAAGUGUUGUAUCUUUAUACCCUCAG
8.9	GGAUCAUUCACAUA AAAAGGCUGAUCAAAGUGUUGUAUCUUUAUACCCUCGG
8.10	UAUGUUUUGCAAGAGUUCAAAAAACUCAGCUUCUGUCUGCCUGGAGCUCUA
8.11	CUACGUAAAAUUUCUUGUGUAGUCACUUCUAAAGUCAGUAAGUGCAAUUC
8.12	AAUUGCCAAUCCGUCACGACCGUJAGACCGGUAGUCUACAAUGUUUUGUAU
8.13	AUGACGUACGCAUUUAUCUUUGUCGACGGUGUAUCACUUCUCUUUGCCC
8.14	UAUGUUUUGCAAGAGUUCAAAAAACUCAGCUUCUGUCUGCCUGGAGCUCUA
8.15	AUUUAGUAGUGAGGUCUCCAUAAGCCACGUUAUCCAGUACUUAUUUUAGU
8.17	GUCUUGUUUUUAUGUUUUACACGAGUUUUAGAAACUCAACUGGAAAGCGA
8.18	GCAAAAGCCGGUCGCGCUAAGUAUAGCAUCAUUUCUCUAAGCAUAUGUAA
8.19	UAUGUUUUGCAAGAGUUCAAAAAACUCAGCUUCUGUCUGCCUGGAGCUCUA
8.20	UAUGUUUUGCAAGAGUUCAAAAAACUCAGCUUCUGUCUGCCUGGAGCUCUA
8.21	CUACGUAAAAUUUCUUGUGUAGUCACUUCUAAAGUCAGUAAGUGCAAUUC
8.23	UAUGUUUUGCAAGAGUUCAAGAAACUCAGCUUCUGUCUGCCUGGAGCUCUA
8.26	AUUUAGUAGUGAGGUCUCCAUAAGCCACGUUAUCCAGUACUUAUUUUAGU
8.27	GGAUCAUUCACAUA AAAAGGCUGAUCAAAGUGUUGUAUCUUUAUACCCUCAG
8.28	GGAUCAUUCACAUA AAAAGGCUGAUCAAAGUGUUGUAUCUUUAUACCCUCGG
8.29	AUUUAGUAGUGAGGUCUCCAUAAGCCACGUUAUCCAGUACUUAUUUUAGU
8.30	AAUUAGCUCGAUACAUUAUAUUUUACCAAUCAUGCAGGAGUCGAUUUGU
8.31	AUGACGCACGCAUUUAUCUUUGUCGACGGUGUAUCACUUCUCUUUGCCC
8.32	GGAUCAUUCACAUA AAAAGGCUGAUCAAAGUGUUGCAUCUUUAUACCCUCA
8.33	UAUGUUUUGCAAGAGUUCAAAAAACUCAGCUUCUGUCUGCCUGGAGCUCUA
8.34	UUUAAUCACUUACGAGAGAAUCAUUCUCUCAUACGAAUUUAUGCAAUGUA
8.37	GCUUAUAGGUCAAAGCAACCGUUUAGUUCUACCGGACGGUUGGAAUUUAU
8.39	UAUGUUUUGCAAGAGUUCAAAAAACUCAGCUUCUGUCCGCCUGGAGCUCUA
8.45	AUUUAGUAGUGAGGUCUCCAUAAGCCACGUUAUCCAGUACUUAUUUUAGU
8.46	AGGUCUAAGCAGGAACGCCAAAACCUUGGAAUUAGCAUCCUUCUCAUA
8.50	AGGAGGUUUUACAAACCGUUUGGACUAGCUUCUUUUCAAAAAUUACCCC

Supplementary Table 2. RRM3+ aptamers

Aptamer	Aptamer sequence
4.1	AUAUGAUUGCUGCAGUUCUUGAUUCCCUCAAAGUAAUCUGUCCACCUGGC
4.3	GCUCAAGUUUCCUGUAGCAGGUUCCCAAAAUGAAUAGUUCUUCUUA
4.4	GGGUUACUUUUGUGCUUGUAGACCAAAGUGUUGCCUCUACCCUCAACUA
4.5	AUUAGUUCAGUACUCCCAAUGCUAAAUCGAUUUACCGAUACACCUUAGGA
4.8	GCUCAAGUUUCCUGUAGCAGGUUCCCAAAAUGAAUAGUUCUUCUUA
4.11	AAAACCUUCAUCCAAUUGCGUUACUAUGGUUUGAGAAAAGUCUCCGCUC
4.12	CCACUUAUUGAAAUAUAGCCUUGCAAACAAGGCCGUUUUGUGAUUGACAU
4.13	UAUCUGGUUGAAAAGUUUCCGCAAAAGGCAUCGAAGGAUUAUAUCACAA
4.16	GCUCAAGUUUCCUGUAGCAGGUUCCCAAAAUGAAUAGUUCUUCUUA
4.18	AAUGGGCCAUAUUUJAGAUGAGCCAAAGUGUUGUAGAAUCUACUAACUUUU
4.21	CUGAUUCAGUAUGGGAUGGCUAUUACCGCCACUCCGAAGUGUUUUAUUGAU
4.22	UUCUAUCUGACUCGGAUUUUAUGAUCAUUAUCCUCAGGUGUUGUCAGA
4.25	CUGAUUCAGUAUGGGAUGGCUAUUACCGCCACUCCGAAGUGUUUUAUUGAU
4.26	UAGCUUCUUGC UAAAUGUUUAUAGACUCCUCUGUCUGAUGCAGGAGCUU
4.27	UAAUCGAGGACAUAAGAGUUJG CAGUCCUCACCGGUACAGCCAGUCAUC
4.28	UAGCUUCUUGC UAAAUGUUUAUAGACUCCUCUGUCUGAUGCAGGAGCUU
4.29	GGGCCUACAAGCCAAAGUGUJGCGUCCACACAUUGGUUUAAUCACUCAAG
4.30	GCUCAAGUUUCCUGUAGCAGGUUCCUAAAAUGAAUAGUUCUUCUUA
4.33	AAUGGGCCAUAUUUJAGAUGAGCCAAAGUGUUGUAGAAUCUACUAACUUUU
4.34	CAGAUUCAGUAUGGGAUGGCUAUUACCGCCACUCCGAAGUGUUUUAUUGAU
4.36	GGGCCUACAAGCCAAAGUGUJGCGUCCACACAUUGGUUUAAUCACUCAAG
4.37	UUUUAAAAGAUUCUCUGCAGUGUGCGAGCAAAGCUAAACAAGCUUUUAUCAA
4.38	GCUCAAGUUUCCUGUAGCAGGUUCCCAAAAUGAAUAGUUCUUCUUA
4.39	UAGCUUCUUGC UAAAUGUUUAUAGACUCCUCUGUCUGAUGCAGGAGCUU
4.40	UAGCUUCUUGC UAAAUGUUUAUAGACUCCUCUGUCUGAUGCAGGAGCUU
4.42	UAUCUGGUUGAAAAGUUUCCGCAAAAGGCAUCGAAGGAUUAUAUCACAA
4.45	CCGUAAUUAUCUAUUCUACAGCUUAGACUCACGAAUUAUAUGUAUCAGCA
4.46	CUGAUUCAGUAUGGGAUGGCUAUUACCGCCACUCCGAAGUGUUUUAUUGAU
4.48	GUCCAUAGCAAUUGCAGUUCGAUUCACACUAUGGCUAUACACUAGAA
4.49	GCUCAAGUUUCCUGUAGCAGGUUCCCAAAAUGAAUAGUUCUUCUUA
4.50	CUGAUUCAGUAUGGGAUGGCUAUUACCGCCACUCCGAAGUGUUUUAUUGAU
4.51	GCUCAAGUUUCCUGCAGCAGGUUCCCAAAAUGAAUAGUUCUUCUUA
4.54	AAUGGGCCAUAUUUJAGAUGAGCCAAAGUGUUGUAGAAUCUACUAACUUUU

Supplementary table 4. Tetranucleotides in the anti-RRM1+2 and anti-Bru aptamers

tetranucleotide	RRM1+2 count	RRM1+2 rank	Bru count	Bru rank
aaaa	18	10t	3	181t
aaac	12	32t	2	192t
aaag	17	12t	3	181t
aaat	9	60t	12	84t
aaca	0	220t	4	180
aacc	4	136t	10	95t
aacg	1	192t	5	147t
aact	10	49t	6	133t
aaga	8	69t	0	241t
aagc	6	101t	6	133t
aagg	6	101t	1	218t
aagt	9	60t	9	105t
aata	0	220t	11	90t
aatc	10	49t	15	74t
aatg	3	155t	7	121t
aatt	10	49t	35	32t
acaa	2	172t	3	181t
acac	1	192t	9	105t
acag	1	192t	2	192t
acat	7	90t	6	133t
acca	3	155t	7	121t
accc	1	192t	8	120
accg	5	122t	6	133t
acct	8	69t	25	51
acga	6	101t	2	192t
acgc	4	136t	3	181t
acgg	5	122t	1	218t
acgt	8	69t	9	105t
acta	5	122t	7	121t
actc	9	60t	13	77t
actg	1	192t	10	95t
actt	6	101t	12	84t
agaa	3	155t	1	218t
agac	1	192t	3	181t
agag	10	49t	0	241t
agat	0	220t	0	241t
agca	7	90t	1	218t
agcc	5	122t	7	121t
agcg	1	192t	4	164t
agct	18	10t	3	181t
agga	4	136t	0	241t
aggc	6	101t	2	192t
aggg	0	220t	1	218t
aggt	8	69t	2	192t
agta	10	49t	5	147t
agtc	5	122t	5	147t
agtg	11	40t	5	147t

Supplementary table 4. Tetranucleotides in the anti-RRM1+2 and anti-Bru aptamers

agtt	11	40t	10	95t
ataa	8	69t	9	105t
atac	4	136t	10	95t
atag	7	90t	4	164t
atat	8	69t	32	37t
atca	27	2	11	90t
atcc	7	90t	18	66t
atcg	0	220t	7	121t
atct	11	40t	29	42t
atga	3	155t	3	181t
atgc	11	40t	10	95t
atgg	0	220t	2	192t
atgt	14	21t	24	52t
atta	11	40t	24	52t
attc	8	69t	26	49t
attg	1	192t	39	26t
attt	14	21t	71	14
caaa	23	4	5	147t
caac	2	172t	13	77t
caag	8	69t	2	192t
caat	6	101t	20	60t
caca	6	101t	5	147t
cacc	7	90t	12	84t
cacg	6	101t	4	164t
cact	6	101t	9	105t
caga	0	220t	4	164t
cagc	8	69t	2	192t
cagg	3	155t	2	192t
cagt	6	101t	9	105t
cata	16	15t	17	69t
catc	2	172t	12	84t
catg	1	192t	7	121t
catt	13	29t	26	49t
ccaa	3	155t	20	60t
ccac	4	136t	7	121t
ccag	4	136t	6	133t
ccat	7	90t	33	36
ccca	1	192t	19	63t
cccc	0	220t	9	105t
cccg	0	220t	6	133t
ccct	1	192t	28	45
ccga	0	220t	5	147t
ccgc	0	220t	9	105t
ccgg	4	136t	2	192t
ccgt	3	155t	23	55t
ccta	1	192t	27	46t
cctc	6	101t	43	23t
cctg	9	60t	20	60t
cctt	2	172t	48	21

Supplementary table 4. Tetranucleotides in the anti-RRM1+2 and anti-Bru aptamers

cgaa	2	172t	1	218t
cgac	4	136t	4	164t
cgag	3	155t	1	218t
cgat	2	172t	7	121t
cgca	3	155t	5	147t
cgcc	1	192t	8	117t
cgcg	1	192t	1	218t
cgct	1	192t	7	121t
cgga	3	155t	1	218t
cggc	0	220t	4	164t
cggg	0	220t	0	241t
cggt	7	90t	1	218t
cgta	4	136t	9	105t
cgtc	1	192t	22	58
cgtg	0	220t	8	117t
cgtt	6	101t	24	52t
ctaa	4	136t	12	84t
ctac	5	122t	19	63t
ctag	2	172t	2	192t
ctat	4	136t	43	23t
ctca	12	32t	16	72t
ctcc	4	136t	30	40t
ctcg	7	90t	17	69t
ctct	14	21t	52	19
ctga	6	101t	4	164t
ctgc	8	69t	13	77t
ctgg	10	49t	2	192t
ctgt	8	69t	50	20
ctta	10	49t	18	66t
cttc	14	21t	38	28t
cttg	2	172t	34	35
cttt	8	69t	75	11
gaaa	7	90t	1	230
gaac	1	192t	2	192t
gaag	0	220t	0	241t
gaat	2	172t	3	181t
gaca	0	220t	2	192t
gacc	2	172t	8	117t
gacg	8	69t	2	192t
gact	1	192t	1	218t
gaga	2	172t	0	241t
gagc	8	69t	4	164t
gagg	5	122t	2	192t
gagt	10	49t	1	218t
gata	1	192t	1	218t
gatc	12	32t	4	164t
gatg	1	192t	2	192t
gatt	2	172t	5	147t
gcaa	14	21t	2	192t

Supplementary table 4. Tetranucleotides in the anti-RRM1+2 and anti-Bru aptamers

gcac	0	220t	5	147t
gcag	3	155t	2	192t
gcat	6	101t	7	121t
gcca	6	101t	5	147t
gccc	3	155t	9	105t
gccg	1	192t	1	218t
gcct	8	69t	13	77t
gcga	1	192t	0	241t
gcgc	1	192t	5	147t
gcgg	0	220t	1	218t
gcgt	0	220t	1	218t
gcta	1	192t	6	133t
gctc	9	60t	6	133t
gctg	6	101t	0	241t
gctt	11	40t	10	95t
ggaa	5	122t	0	241t
ggac	3	155t	1	218t
ggag	10	49t	1	218t
ggat	8	69t	1	218t
ggca	0	220t	4	164t
ggcc	0	220t	2	192t
ggcg	0	220t	0	241t
ggct	6	101t	1	220
ggga	0	220t	2	192t
gggc	0	220t	1	218t
gggg	0	220t	2	192t
gggt	0	220t	4	164t
ggta	2	172t	0	241t
ggtc	8	69t	4	164t
ggtg	3	155t	0	241t
ggtt	2	172t	6	133t
gtaa	3	155t	12	84t
gtac	7	90t	10	95t
gtag	6	101t	0	241t
gtat	12	32t	23	55t
gtca	5	122t	5	147t
gtcc	0	220t	79	10
gtcg	6	101t	2	192t
gtct	15	19t	81	9
gtga	4	136t	3	181t
gtgc	2	172t	6	133t
gtgg	0	220t	4	164t
gtgt	11	40t	39	26t
gtta	13	29t	21	59
gttc	10	49t	13	77t
gttg	8	69t	15	74t
gttt	5	122t	94	6
taaa	8	69t	11	90t
taac	0	220t	10	95t

Supplementary table 4. Tetranucleotides in the anti-RRM1+2 and anti-Bru aptamers

taag	4	136t	13	77t
taat	6	101t	29	42t
taca	5	122t	9	105t
tacc	4	136t	19	63t
tacg	8	69t	5	147t
tact	4	136t	27	46t
taga	2	172t	2	192t
tagc	9	60t	5	147t
tagg	4	136t	0	241t
tagt	12	32t	9	105t
tata	11	40t	30	40t
tatc	22	5	35	32t
tatg	24	3	23	55t
tatt	9	60t	91	8
tcaa	20	6t	15	74t
tcac	20	6t	11	90t
tcag	9	60t	7	121t
tcat	12	32t	17	69t
tcca	8	69t	36	31
tccc	2	172t	37	30
tccg	1	192t	27	46t
tcct	1	192t	74	12t
tcga	5	122t	6	133t
tcgc	1	192t	6	133t
tcgg	7	90t	2	192t
tcgt	0	220t	32	37t
tcta	16	15t	38	28t
tctc	11	40t	60	17
tctg	16	15t	40	25
tctt	15	19t	92	7
tgaa	0	220t	4	164t
tgac	3	155t	5	147t
tgag	4	136t	4	164t
tgat	6	101t	4	164t
tgca	14	21t	6	133t
tgcc	12	32t	11	90t
tgcg	0	220t	2	192t
tgct	2	172t	13	77t
tgga	19	8t	1	218t
ggc	0	220t	0	241t
ggg	0	220t	6	133t
gggt	0	220t	3	181t
tgta	14	21t	35	32t
gtc	12	32t	137	3
gtg	2	172t	32	37t
gtt	17	12t	103	5
ttaa	2	172t	29	42t
ttac	5	122t	16	72t
ttag	14	21t	10	95t

Supplementary table 4. Tetranucleotides in the anti-RRM1+2 and anti-Bru aptamers

ttat	37	1	74	12t
ttca	17	12t	10	95t
ttcc	1	192t	47	22
ttcg	0	220t	18	66t
ttct	19	8t	66	15
ttga	0	220t	7	121t
ttgc	4	136t	5	147t
ttgg	3	155t	3	181t
ttgt	13	29t	196	1
ttta	16	15t	57	18
tttc	5	122t	64	16
tttg	9	60t	124	4
tttt	10	49t	152	2

Count: number of times the sequence is present in the sequenced aptamers.
 Rank: 1 indicates the most frequent tetranucleotide. Ties are indicated with a t.

Supplementary Table 5. Structural features of RNAs used for binding assays.

Binding site ^a	ΔG^b	copy number ^c	size	# of base pairs in binding site		
				G-C	A-U	G-U
UGUUUUUAUAUGU	-19.9	1	12	1	4	3
		2		0	5	4
		3		1	6	4
		4		1	4	3
CAAUUUUUAUAUGU	-20.5	1	13	1	6	3
		2		1	8	2
		3		1	6	1
		4		1	7	3
UGUUUGUAGU	-25.6	1	10	2	2	0
		2		1	3	2
		3		2	4	0
		4		2	3	1
UUGUCC	-24.0	1	6	3	1	1
		2		1	0	1
		3		0	0	0
		4		3	3	0
UAAAGUCUUCUA	-24.3	1	12	1	6	0
		2		0	5	0
		3		2	7	1
		4		1	5	1
UCAAUUGCAGU	-36.1	1	11	3	6	2
		2		3	6	2
		3		3	5	2
		4		3	5	2

^a The binding site that is present in four copies in the RNA used for binding assays (and inserted into a reporter transgene for in vivo assays).

^b Predicted ΔG for folding of entire RNA.

^c Copy number refers to position of individual binding sites within the RNA.

Supplementary Figure 1. Monitoring progression of in vitro selections.

Each graph shows the results of filter binding assays with RNAs from the indicated round of selection with the indicated protein. Relative binding indicates the percentage of input RNA bound.

