

Figure S1. Pearson's correlation coefficient between nextPARS scores of NRUs within small or larger NORAD fragments.

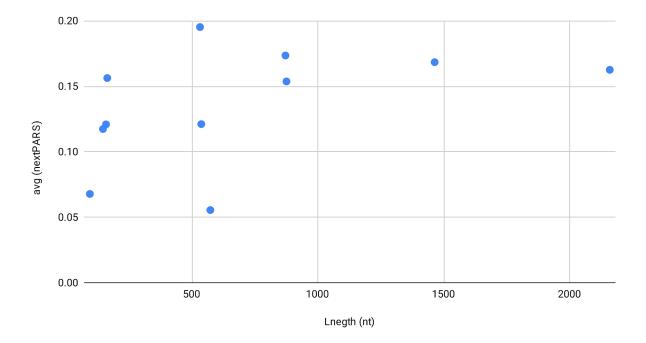


Figure S2.

Structural stability at different temperatures (average of nextPARS score) for previously performed nextPARS experiments of 11 RNAs molecules with variable size. Our results did not detect any statistically significant correlation between stability and sequence length, Pearson correlation coefficient 0.4428 (p-value 0.1725510616)

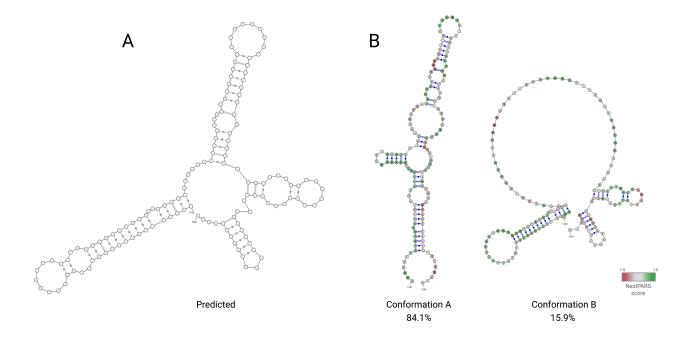


Figure S3. The Secondary structure of NRU#2 as predicted with RNAfold (**A**) in comparison with the two conformations predicted using Rsample combined with nextPARS data (B).

BAD AVG GOOD

NRU#1	:	63 -	- GC	- TG -	C '	т	CTCA	- A C -	- TCC.	AC-CO	C <mark>C</mark> AA	CTTTTA	т	2	AGAAA	ACATT	TGT -	CAC-		AT-	CTAGCCC	 TTCT	AGATGG	A A	A-GA	GGTT	GCCGAC	GT	ATGA-		TA	
NRU#2	:	78 -	- T A	тт <mark>с</mark> -	CTC	7	ACTAC	- TG -	- TGT	AT-AS	Г-АG	TTGACA	T - G	CTA	A G C'	ттттт	TGA -	AAT-		GT-	CTCTTCT	 TTTT	AGATGT	т С	CT-GA	AGTG	- CCTG -	AT	ATGT -		<u>1</u>	
N R U # 3	:	81 -	- T C	- T G -	T G - '	T	ATAT	- A G -	- TGT	AC-A	г - аа	AGGACAC	A - C	- <mark>G</mark> - 2	AGTCC	TAATT	G - AC	AAC		AT-	CTAGTCT	 TTCT	GGATGT	т А	A <mark>A</mark> G A	GGTT	<mark>GC</mark> CAGT	GT	ATGA -			
NRU#4	:	81 -	- <mark>T</mark> -	<mark>c</mark> -	AA-	G 7	ACTGC	- TG -	- TAT	AC - A	r - ag	TAGACA	A - T	- TA2	ACTCC	ТТ <mark>А</mark> СТ	TGA -	AAC-		AT-	CTAGTCT	 ATCT	AGATGT	т т	A-GA	AGTG	CCCGAT	GT	ATGT -			
N R U # 5	:	82 -	<mark>C</mark>	- <mark>тс</mark> -	T G - '	T	- <mark>A</mark> TAT	- A G -	- TAT.	AT-AS	г - АА	TGGACA	А-Т	2	AGTCC	T A <mark>A T T</mark>	тттс	AAC		ΑT -	CTAGTCT	 CT	AGATGT	т А	A <mark>A</mark> G A	GGTT	<mark>G C</mark> C A G T	GT	ATGA -		CAA	
N R U # 6	:	79 -	- T -	<mark>т</mark> -	AA-	c 7	A G T G C	- T G -	- TGT	AT-GI	r - <mark>g</mark> g	TGGACA	G - T	- <mark>T</mark> A		ТА	TGA-	AAT		ΑT-	CTAGTCT	 TTCT	AGATAT	т т	G - <mark>G A</mark>	AGTG	CTTG <mark>AT</mark>	GT	ATTT -		AAA - AG	TGG
NRU#7	:	82 -	C	- TG -	T A - '	T	- <mark>A</mark> T A T	- T G -	- TAT.	A T - A ?	г - <mark>а</mark> а	CGGACA	А-Т	- T - 2	AGTCC	CGA <mark>T</mark> T	T <mark>T A</mark> T	AAT		ΑT-	CTAGTCT	 C T	AGATAT	т А	A A <mark>A</mark> G A	GGTT	<mark>ЗС</mark> СААТ	GT	ATGA-		<mark>C</mark> - A	
N R U # 8		83 -	- <mark>T</mark> -	<mark>C</mark> -	AA -	<mark>c (</mark>	CCTAC	- T G -	- TGT.	AT-AS	Г - <mark>А</mark> G	CGGACA	ACT	- Т <mark>А</mark>	AGTCC	T T <mark>A T</mark> T	TGA-	AAC-		ΑT-	CTAGTCT	 TTCT	AGATGT	т т	A-GA	AGTG	<mark>са</mark> сааа	GT	ATGT -			
N R U # 9	:	73.	- GC	- <mark>T G</mark> -	T G - '	T	- <mark>A</mark> TAT	- A G -	- TGT	AT-A	Г - А А	GCGGACA	'A - <mark>G</mark>	- <mark>G</mark> - 2	AGTCC	T A <mark>A T</mark> T	т	- AC -		GT-	CTAGTCG	 	ATGT	т А	AAAA	GGTT	GCCAGT	'AT	ATGA		CA AAAG	TA-
NRU#10																					CTAGTCT											
NRU#10a																					CGAGGCT											
NRU#10b																					GTTAAA -											
NRU#11	:	73.	- <mark>T</mark> -	- TT -	- A G	TAAA	A G T G C	CTG-	- TGT	ГС - А'	Г - Т G	TGGACA	A-G	- TT2	AT 7	TATT	TGC -	AAC -		ΑТ-	CTAAGCT	 TTAC	G <mark>A</mark> A T G <mark>G</mark>	G		- GTG	- ACAAC	ТТ	ATGA	C	- <mark>A</mark> AAAA	
NRU#12	:	59 -	- T A	- TGC	A T -	c	- TCT	- TG <mark>G</mark>	CTGT	A <mark>C T</mark> A !	Г - A A	GAACAO	CA-T	- T - 2	AATTC	- AA - <mark>T</mark>	GGA-	A A T Z	CACT-	ΤTG	<mark>СТ</mark> ААТА <mark>Т</mark>	 - TTT	A - ATGG	T A	A T A G A	TCT-			0	GCTAATO	3 A	
											_									_												
cons	:	75																								*						



*																
BAD <mark>AVG</mark>	GOO	D														
*			<mark>СТ</mark> G-	G A <mark>G </mark>	A T G A C	- т <mark>тт</mark>	TGGAA	ATG	GAGT	TGTTAA	GAC	GGCC	тст	- <mark>G</mark>	- <mark>GAAGC</mark>	- <mark>G</mark>
NRU#1	:	85	<mark>CAT</mark> AG -	G A <mark>A A</mark>	AT - AT	- <u>ттт</u>	TGGGG	G - G	GAAT	GGCCAA	АТC	- ACC	ΤGΤ	rga -	· <mark>GTAA</mark> -	- т
NRU#2	:	83	- <mark>ATA</mark> G -	GA <mark>A</mark>	<mark>ат - </mark> GС	- т <mark>тт</mark>	TGGAA	АТТ	GAAT	TGTGAA	GCC	- <mark>A</mark> CC	ттт·	- <mark>G T</mark> -	• <mark>GAACA</mark>	- <mark>G</mark>
NRU#4	:	85	- <mark>TCT</mark> G-	· T A <mark>A A</mark>	<mark>AG-A</mark> C	- <u>ттт</u>	TGCAT	<mark>A</mark> GG	ΑΑΤΤ	TGTTTG	ACC	- A T <mark>C</mark>	тст	- <mark>aa</mark> -	· <mark>GСА</mark> ТТ	- A
NRU#5	:	82	<mark>T</mark> - <mark>G</mark> -	• <mark>C</mark> 1		TT	TGGAA	GΤG	GAAT	TGTTGA	ACC	- ACC	TGG ·	- <mark>G A</mark> -	. <mark>G G T G G</mark>	- <mark>G</mark>
NRU#6	:	86	- <mark>GGAG</mark> -	TGGT	TG-C	- ATT	TGGGA	ΑTG	GAAT	TGTTAA	A <mark>A</mark> -	<mark>СТ</mark>	TGA	ГGСΊ	TAG <mark>G</mark> A	- <mark>G</mark>
NRU#10a	:	79	<mark>GATA</mark> G -	GA-	TA-C	АТСТ	TGGA <mark>C</mark>	АTG	GAAT	TGTTAA	GCC	- ACC	тСТ	- <mark>G A</mark> -	. <mark>GСАG</mark> Т	- G
NRU#11	:	83	- <mark>ACT</mark> CZ	A <mark>TA</mark> - ·	TAGC	- <u>ттт</u>	GGGAT	ттт	GAAT	TGGTAA	A T <mark>A</mark>	- <mark>TT</mark> C	A T G ·	<mark>A</mark> -	TGTGT	G <mark>A</mark>
Pos5097	:	81														
cons	:	83				*	*		* *	*						

Figure S4. Multiple sequence alignments (A) of the core of the NRUs and (B) of a motif located at ~50 nt downstream of the end of some NRUs.

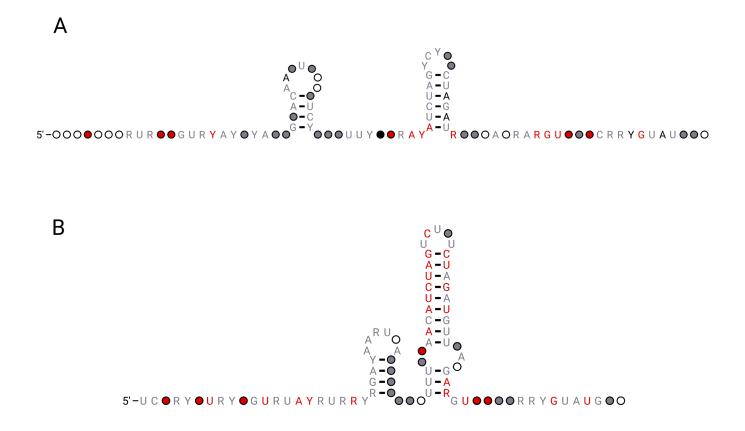


Figure S5. (A) The consensus secondary structure of NRUs cores, derived by using a multiple MSA alignment to derive a from the eight NRUs that have a clear conserved long stem-loop hairpin (NRU#1, NRU#3-8 and NRU#10) with the addition of the two newly identified NRUs (NRU#10a and NRU#10b). **(B)** The same consensus secondary structure from the core of the NRUs, without the two newly identified NRUs.