

**Tables S1: The 82 biological RNA molecules used in this study.**

The biological RNAs with L=30 from the ncRNA data base.

Id	Organism	RNA type	Sequence	Secondary structure	Neutral set size	Error
AF357483	Mus musculus	snmRNA	AAGCAAUUGUUUACUUACAGUCUGGAGAA	...(((((((.....)))))).)....	$1.50 \times 10^{13}$	$3.40 \times 10^{11}$
AJ430257	Archaeoglobus fulgidus	snmRNA	CAUCCGUUAGUAUGUGUAAGAAAGGGAGG	..(((.(.(.....)..).))..	$5.76 \times 10^{11}$	$4.75 \times 10^{10}$
AJ505722	Arabidopsis thaliana	snmRNA	CAGAAGAGCGGAUCCAAUACCAAGACUACU	.....((.....)).....	$1.20 \times 10^{14}$	$6.64 \times 10^{12}$
Z71666	Saccharomyces cerevisiae	snoRNA	AGGCGUGUAACAUUUAUUGGUUACAACAUG	.(...(((((((.....)))))).)...	$1.72 \times 10^{11}$	$2.61 \times 10^{10}$
AB055777	Homo sapiens	Noncoding transcript	CUCUUUACCAAGGACCCGCCAACAUGGGC	.((((.....)))...(((.....)))	$8.65 \times 10^{12}$	$1.36 \times 10^{11}$
D28374	Homo sapiens	Noncoding transcript	CCUUUUGGCUCUCUGACCAGCACCAUGGCG	((.....(((.....))).....)..	$8.66 \times 10^{12}$	$3.90 \times 10^{11}$
AJ564940	Homo sapiens	Noncoding transcript	CGGAAAUCUGAAGGGAAAGUGGCAGGAAAG	.....(((.(.....)..))....	$3.70 \times 10^{13}$	$1.17 \times 10^{12}$
X85345	Homo sapiens	Noncoding transcript	ACAUCUCAUAGGUGCCUCUGACUGAGUUGC	.(.(((((((.....)))..))))..)	$1.95 \times 10^{12}$	$2.46 \times 10^{10}$

**Tables S1: (cont.)**

The biological RNAs with L=33 from the ncRNA data base.

id	Organism	RNA type	Sequence	Secondary structure	Neutral net size	Error
AF061109	Moneuplotes crassus	Telomerase RNA	CCUCCAUAUAUCAAUUUGGGAAGGAUUGAAA	.....((((((((.....)))))))).	$8.54 \times 10^{15}$	$4.84 \times 10^{13}$
AJ430253	Archaeoglobus fulgidus	snmRNA	CAAACUUAACGAACGCUACGAGUUGAAAUCAGA	.....((((.....)))).....	$9.02 \times 10^{15}$	$1.71 \times 10^{14}$
S80603	Trypanosoma cruzi	gRNA	GAUAGAGAACGGAUGAGAAGGAUGUUUGUGAGA	.....((((.....))))....	$1.03 \times 10^{16}$	$1.45 \times 10^{14}$
AB017710	Homo sapiens	snoRNA	UAAUCAAUGAUGAAACCUAUCCCGAAGCUGAUA	.....(((.....))).....	$2.92 \times 10^{16}$	$5.28 \times 10^{14}$
AB055770	Homo sapiens	Noncoding transcript	CUUUCUGGUCUCGGCCGCGAGAAGCGAGAUGACG	.....((((.....)))).	$5.34 \times 10^{13}$	$1.66 \times 10^{12}$
AB056456	Homo sapiens	Noncoding transcript	CUCCUCUCUCCGGUCCGUGCCUCCAAGAUGACA	..(((.....))....)..	$1.27 \times 10^{14}$	$3.47 \times 10^{12}$
D28386	Homo sapiens	Noncoding transcript	CUUCCUUCCAACUAGACGCGUCAGAAUGGCU	.....(((.....))).	$1.87 \times 10^{16}$	$5.78 \times 10^{14}$
S43366	Homo sapiens	Noncoding transcript	GCCUUGAAGGGAGGUUGUAGAAAACUGUAAGC	..(((.....))..((((.....))))))	$1.43 \times 10^{14}$	$1.28 \times 10^{12}$
AJ309206	Homo sapiens	Noncoding transcript	CCCGAAACUCUGGAUCCGGGGCCCUUCACAGC	...(((.....))....)	$1.45 \times 10^{14}$	$3.03 \times 10^{12}$

**Tables S1: (cont.)**

The biological RNAs with L=35 from the ncRNA data base.

id	Organism	RNA type	Sequence	Secondary structure	Neutral net size	Error
AF380696	Leishmania tarentolae	gRNA	AAACAAACAGUGCACGGGGUCGGAUGUAAACACA	.....((((...((.....))))).).....	$1.11 \times 10^{14}$	$7.97 \times 10^{12}$
AJ430256	Archaeoglobus fulgidus	snmRNA	GCGAGAGUUUAGGCGGCUUGUAAGAAAGGGAGGCU	((((((.....)).....)).....)	$2.28 \times 10^{16}$	$4.36 \times 10^{14}$
AJ544037	Drosophila melanogaster	snmRNA	GCCCGAAGAAGCCGAAAGCUUGGAUGGCUGGGAUG	.((((.....((((.....)))).....))....	$5.37 \times 10^{15}$	$1.13 \times 10^{14}$
AJ544038	Drosophila melanogaster	snmRNA	CAUUUGGAGAACGAAAGAAGACCAACAAGUGC GCG	((((((.....(.....).....))))....	$2.36 \times 10^{14}$	$2.72 \times 10^{13}$
L11652	Trypanosoma brucei	gRNA	CCAACAAACAGAAUAACUAGUGCACGGUGAUGAUG	.....((..(((.....))))..))	$1.95 \times 10^{15}$	$7.98 \times 10^{13}$
M11772	Homo sapiens	snRNA	ACCCAAUUUUUUGAGGCCUUGCUUUGGCAAGGCUA	.....((((((((.....))))))....	$1.28 \times 10^{17}$	$6.97 \times 10^{14}$
AB055765	Homo sapiens	Noncoding transcript	CUUCUCCUUCUCGCCUAACGCUGCCAACAUGGUG	.....((((.....))....	$3.51 \times 10^{17}$	$6.91 \times 10^{15}$
D28349	Homo sapiens	Noncoding transcript	UUCUUUUUUUCUUUUUUCGGCGUUCAAGAUGUCG	.....((((((((.....))))))....	$9.73 \times 10^{16}$	$8.58 \times 10^{14}$

**Tables S1: (cont.)**

The biological RNAs with L=40 from the ncRNA data base.

Id	Organism	RNA type	Sequence	Secondary structure	Neutral set size	Error
AF380736	Leishmania tarentolae	gRNA	AACCACACAGAGAACAUUUACACGUAGAAUGCAACAUUG	.....(((.....))).....	$1.82 \times 10^{19}$	$5.08 \times 10^{17}$
AJ430248	Archaeoglobus fulgidus	snmRNA	GCCGAAUCGAUCAGAAGAGAACUGACAAGUUGAAAUCAGA	.....((((.....))).....)	$1.12 \times 10^{18}$	$2.54 \times 10^{16}$
AJ430294	Archaeoglobus fulgidus	snmRNA	CAACGUCGCAACAAGAGUGUUUUACCGUGAUAACGUGA	...(((.....))).....(((.....))).	$4.45 \times 10^{15}$	$7.52 \times 10^{14}$
L25589	Trypanosoma brucei	gRNA	GACACAAUGAAGAAAUGCACUCUAAAAUGCACAGUGAUUA	.....(((.....))).....	$1.17 \times 10^{20}$	$3.74 \times 10^{18}$
L25590	Trypanosoma brucei	gRNA	UAAAAGACAAUGUAGAUUUUCUGAGUAAUAGGGAGGAUAAC	.....(((.....))).....	$9.13 \times 10^{17}$	$3.30 \times 10^{16}$
D28454	Homo sapiens	Noncoding transcript	CUUUCGCGCGGUGACGACCUACGCACACGAGAACAUGCCU	.....(((.....))).....	$9.19 \times 10^{15}$	$7.08 \times 10^{14}$
X99684	Homo sapiens	Noncoding transcript	CAGGCCGUCUGUCCUCCUGCUCCUACCCACCUAGUGUCAAG	..(((.....))).....	$7.28 \times 10^{17}$	$6.05 \times 10^{16}$

**Tables S1: (cont.)**

The biological RNAs with L=43 from the ncRNA data base.

id	Organism	RNA type	Sequence	Secondary structure	Neutral set size	Error
AF036740	Schistosoma mansoni	Ribozyme	AUCCAGCUCACGAGUCCCAAUAGGACGAAACGCGUCCUCAU	.....(((.....)).....((((.....)))).....	$5.84 \times 10^{19}$	$1.75 \times 10^{18}$
X15621	Schistosoma mansoni	Ribozyme	AUCCAGACGCGCGUUCGUCUUAUUUGGACUCGUCAGCUGGAU	(((((((.....)))).....)))).....	$2.19 \times 10^{18}$	$5.06 \times 10^{16}$
AF380675	Leishmania tarentolae	gRNA	AAUACGCAUAAUACUAGAUCGUGAAUAGAAGAGAUAGAUUU	.....(((.....)).....)	$1.34 \times 10^{20}$	$6.96 \times 10^{18}$
AF380679	Leishmania tarentolae	gRNA	ACUCCUGGCAGAUAAUAGAACUAUCACUCUCGGUUGUAGACA	.....(((.....)).....)	$9.38 \times 10^{20}$	$2.92 \times 10^{19}$
AF380717	Leishmania tarentolae	gRNA	UUUAUGCUUGACAGACUAACAAUACUACUUUAACUAGAGACG	.....(((.....)).....)	$6.29 \times 10^{21}$	$1.75 \times 10^{20}$
AF380724	Leishmania tarentolae	gRNA	ACUCCUGGCAAGUCAAUAGAAUUAUCGUCUCCGAUUAUAGAU	..(((.....)).....)	$1.19 \times 10^{19}$	$4.64 \times 10^{17}$
AJ430285	Archaeoglobus fulgidus	snmRNA	GCGGGAUCUGCAUUGUUUCACCCAGAGGAGGCUUACGCCUCCU	..(((.....)).....)	$9.34 \times 10^{16}$	$5.85 \times 10^{15}$
AJ544018	Drosophila melanogaster	snoRNA	GCUUCACCCAGAGCAGGGCAGUGAAAAUUGUCAAGCACAAAU	(((.....)).....)	$2.09 \times 10^{18}$	$1.56 \times 10^{17}$
AJ544036	Drosophila melanogaster	snmRNA	GCGGCGGCGGCCGUUCAACAUGUGUUGUUUAACUUUGUGGCA	..(((.....)).....)	$1.16 \times 10^{18}$	$2.60 \times 10^{16}$
S80581	Trypanosoma cruzi	gRNA	AAACAAAACAUAAGAUAAGGUGAAGUGAAUAUUGAGAGAUUUG	...(((.....)).....)	$9.98 \times 10^{19}$	$7.23 \times 10^{18}$
U12393	Trypanosoma brucei	gRNA	AUAUAAGUACAAACAGACAGUGAGAAGAUACGAGACUGAGUA	.....(((.....)).....)	$1.24 \times 10^{21}$	$5.01 \times 10^{19}$
D28352	Homo sapiens	Nc. transcript	CUUUUCCGGUGUGGAGUCUGGAGACGACGUGCAGAAAUGGCA	(((((.....)).....)))..	$8.98 \times 10^{16}$	$5.70 \times 10^{15}$

**Tables S1: (cont.)**

The biological RNAs with L=50 from the ncRNA data base.

id	Organism	RNA type	Sequence	Secondary structure	Neutral net size	Error
AJ248286	Pyrococcus abyssi GE5	snRNA	UAUGAUGAGAGAGCUGUAAAUGAUUGAUGAUUAGAGGAUGGCUGGCUGA	.....((..(((((((.....)))))).....))..)	$6.37 \times 10^{21}$	$1.67 \times 10^{20}$
AJ248285	Pyrococcus abyssi GE5	snRNA	AAUGAUGAAAUCGGUCUUGUCCGAGGAGUGAUGAUAGUGGUCACCGCUGA	.....(((.....))..(((.....)))..)	$6.57 \times 10^{22}$	$1.40 \times 10^{21}$
AJ248283	Pyrococcus abyssi GE5	snRNA	AAUGAUGAGACCGGCACUAACUGAGUUGUGAUGAGCACUCGGUUGGCUGA	.....(((((((.....)))))).....)	$1.16 \times 10^{21}$	$3.33 \times 10^{19}$
AJ248287	Pyrococcus abyssi GE5	snRNA	GAUGAUGAGGCCUAACUCGUCGAGCUGUGAUGAGUGGGUGAGCUGGCUGA	.....(((.....(((.....))))))..)	$1.82 \times 10^{22}$	$5.39 \times 10^{20}$
AF254841	Pyrococcus abyssi GE5	snoRNA	GAUGAUGAGCGCCAUCGAUGCUGAGGAGUGAUGACCGGAUUCUGGCUGA	..((((.....))..(((.....)))).....	$9.17 \times 10^{21}$	$1.94 \times 10^{20}$
AF254842	Pyrococcus abyssi GE5	snoRNA	GAUGAUGAGCGUUUACCGGUCUGAGCUGUGAUGACAUCGGCACUGUCUGA	..((((.....(((.....)))))).....)	$2.93 \times 10^{22}$	$7.66 \times 10^{20}$
AJ248283	Pyrococcus abyssi GE5	snRNA	AAUGAUGAGAUGGGCGGAUUGCUGAGCUGUGAUGAAGACCUAGGGUCUGA	.....((.....))..(((.....)))..)	$3.07 \times 10^{22}$	$1.15 \times 10^{21}$
AJ248283	Pyrococcus abyssi GE5	snRNA	GAUGAGGAAGCCGAGGACACUGAAUUGUGAUGAAUUCUUCGCUUCGCCGA	.....(((((((.....)))))).....)	$4.49 \times 10^{21}$	$1.26 \times 10^{20}$
AJ248283	Pyrococcus abyssi GE5	snRNA	UCAGGUGAUGCGGACUUCACACCACUCAGCCGGUUGAUCCAUCAUCAUC	..(((((((.....)))))).....)	$6.62 \times 10^{19}$	$2.51 \times 10^{18}$
AJ248283	Pyrococcus abyssi GE5	snRNA	UCAGCCAGAUUGCCUUCACACCCUUCAGCAACAAGCGAGUUCAUCAUC	...((.....))..(((.....)))..)	$1.50 \times 10^{22}$	$1.34 \times 10^{21}$
AJ248284	Pyrococcus abyssi GE5	snoRNA	UCAGCUAAUACCGACAUCAUACCCUUCAGGCUGGGCAAGGCUCGUCUUC	.....((((.....)))).....	$5.55 \times 10^{23}$	$1.62 \times 10^{22}$
AJ248284	Pyrococcus abyssi GE5	snRNA	UCAGCCCAUGCGAGUUUCUACCCUUCGCGCCAAAUCUUCUUCAUCAUC	((.....)).....	$2.63 \times 10^{21}$	$3.03 \times 10^{20}$
AJ248284	Pyrococcus abyssi GE5	snRNA	GAUGAUUGGAAACGGAGUGAGCUGAGGUGUGAUGACCGACUUCGCGUGA	....(((.....)).....(((.....))))..)	$6.96 \times 10^{20}$	$3.36 \times 10^{19}$
AJ248284	Pyrococcus abyssi GE5	snRNA	UCAGUUGCGAGGGUACUUCACUUUCAGCUAGCGAAAUUUCUUCUUCUUC	..(((((((.....)))))).....)	$5.82 \times 10^{21}$	$1.24 \times 10^{20}$
AJ248285	Pyrococcus abyssi GE5	snRNA	GAUGAGGAGUUCAGCCUAGGCUGAGGCGUGAUGAGGGAGUGACGGACUGA	.....((((.....))))..(((.....))).....	$3.72 \times 10^{22}$	$1.43 \times 10^{21}$
AJ248286	Pyrococcus abyssi GE5	snRNA	UCAGGGGGUGUUCACCUCAUCAUAGGUCAGGUGGCUUCUUCUUCUUCUUC	..(((((((.....)))))).....)	$2.28 \times 10^{21}$	$7.06 \times 10^{19}$
AJ248287	Pyrococcus abyssi GE5	snRNA	UCAGGAAGCCGUCCACUCCUACCCUUCAGGUGCGGAAGGCUUCAUCAUU	....((((.....(((.....)))))).....)	$1.41 \times 10^{22}$	$4.01 \times 10^{20}$
AJ248287	Pyrococcus abyssi GE5	snRNA	GAUGAGGAGAGGGUAGGUAGCUGAGUUAUGAUGAACUAAUCGGCCCCCGA	.....(((.....(((.....))))))..)	$1.11 \times 10^{22}$	$6.90 \times 10^{20}$
AJ248287	Pyrococcus abyssi GE5	snRNA	UCAGAACCACGAGACAUCACACUUCAGCCAAGGGUGGGAUCAUCCUC	.....((((.....)))).....	$2.24 \times 10^{25}$	$5.21 \times 10^{23}$
AF357428	Mus musculus	snoRNA	GAUCUGAUGGGGNCUGAGUGUUUCUGNUGACAUGAACAGAUUCUGAGG	..(((((((.....)))))).....)	$5.16 \times 10^{20}$	$2.11 \times 10^{19}$
AF357500	Mus musculus	snmRNA	CAGGAAGAGAUGAAAUUCUAAAGAGAGGUCCUCAGAAAUCAAAAGAAGA	.....(((.....(((.....)))))).....	$1.62 \times 10^{22}$	$6.55 \times 10^{20}$

**Tables S1: (cont.)**

The biological RNAs with L=50 from the ncRNA data base (cont.)

AF380713	Leishmania tarentolae	gRNA	UAAAACAUCAAACAAAAAGUUGAGUCACAGAUAAAUGAGAGACACGUUAG	...(((.....(((.....)))..(((.....))..)))..))..	$5.55 \times 10^{19}$	$5.12 \times 10^{18}$
AF380749	Leishmania tarentolae	gRNA	AUACAAACGGCGAUAAUAUAUUAGACAUAGCGGAAAUAAGAUAAUUAUA	.....((.....(((.....))).....).).....	$3.65 \times 10^{21}$	$1.11 \times 10^{21}$
M10126	Leishmania tarentolae	gRNA	ACAUAUGACUUGAAGUAAAAAGAUAAUAUAAUUUUUAAAUAUAACUUA	.....(((((((((((.....)))))).....))))).	$1.66 \times 10^{23}$	$2.85 \times 10^{21}$
X60509	Leishmania tarentolae	gRNA	GUUAAAACUUAACUCGGUUAUAAAUAUAGGGAACAUUUGAGAGUCGUUAU	(((.....))).....((((.....))).....)	$4.87 \times 10^{21}$	$2.84 \times 10^{20}$
AJ430259	Archaeoglobus fulgidus	snmRNA	UGGUGACUUGGCAACCAUCUUGUAAGAAAGGGAGGCCUCCGAAAAUGGAG	.(.....).....((.....)).....((.....))	$2.01 \times 10^{17}$	$5.91 \times 10^{16}$
L16537	Trypanosoma brucei	gRNA	UAUAAAUAACCACAUGAAUCUUAUAUGUACGAUGGAGAUGAGAAUUAUGC	.....((((.....(((.....)).....))))).	$1.81 \times 10^{22}$	$9.16 \times 10^{20}$
L16541	Trypanosoma brucei	gRNA	AUAUAAAACAAACAAACUAAUAAAUGUAAAUCUGAUGUGUGUAUAUCUAUG	.....((((.....(((.....)).....))))....	$3.02 \times 10^{24}$	$1.23 \times 10^{23}$
L16543	Trypanosoma brucei	gRNA	AUAUAAACCAAAAAACUCGCGAUUUUGAUGUAAUAAUGACUGUGUAAAUUU	.....((((.....(((.....)).....)))).....	$1.52 \times 10^{23}$	$5.67 \times 10^{21}$
M17439	Tobacco ringspot virus	Ribozyme	UACCAGGUAAUAUACCACAACGUGUGUUUCUCUGGUUGACUUCUCUGUUU	.(.....((((.....)))).....)	$3.98 \times 10^{22}$	$1.11 \times 10^{21}$
S80611	Trypanosoma cruzi	gRNA	GGUGUAUAUGGUGACAAACUAUGAAAGGUAGAGUUGUGGAGUUGAUAGAA	..(((.....(((.....))).....)).....)	$1.51 \times 10^{19}$	$2.09 \times 10^{18}$
U30216	Crithidia fasciculata	gRNA	UCUCUCCCUAUAUAAAAACAUAUAGGGAGAGAGUAAAGGUGCCCUAUA	(((((((((((.....)))))).....)))).....((.....))...	$7.05 \times 10^{20}$	$1.90 \times 10^{19}$
U30217	Crithidia fasciculata	gRNA	GAGCCACGGUUCUAGAUCGAACCAUGUGUAUAGUACAGGCAUAACUAUUU	..(((.....))).....((.....)).....	$9.00 \times 10^{21}$	$3.44 \times 10^{20}$
AB055774	Homo sapiens	Noncoding transcript	CUCUUCUUAAGCCGGCGCUCGGCAAGUUCUCCAGGAGAAAGCCAUGUUC	.....((((.....))).....((.....)).....	$3.03 \times 10^{23}$	$8.57 \times 10^{21}$
AF082503	Homo sapiens	Noncoding transcript	CGACCAGCCGAAUCGCUCUCGAGCAGAGGCCGAUACAAAGCAGGGGAAA	.....((((.....)))).....	$4.56 \times 10^{24}$	$1.57 \times 10^{23}$
AF279138	Homo sapiens	Noncoding transcript	CCCGCCAGAGACAGCUCAGGUGCAAGGAGAUGAGACUAUACAUCAGGCAG	..(((.....)).....((((.....))))..)	$6.60 \times 10^{21}$	$2.97 \times 10^{20}$
S60300	Homo sapiens	Noncoding transcript	GGGUGUUUAUCCUCAUGGACUAAUUAAGGAACAGGACUGAACGUCUUGCU	((.....((((.....(((.....)).....)))).....)).....	$1.50 \times 10^{21}$	$7.44 \times 10^{19}$
X58756	Homo sapiens	Noncoding transcript	UGGAAAACAAGCUGGUCUUUGGCGCAGGAACCAUUCUGAGAGUCAAGUCCU	((.....).....((.....))).....((.....)).....)	$6.40 \times 10^{19}$	$4.08 \times 10^{18}$