

Supplementary Tables for:
“Ancestry of RNA/RNA interaction regions within segmented ribosomes”
Rivas and Fox 2023.

<i>T. brucei</i> srRNA-II						
Region	Nucleotide 1	Segment	Nucleotide 2	Distance Å / Interaction	HB / Type	Functional Groups
R1	G1	rRNA-β	C1461	2.7	B-B	O-NH ₂
				3.0	B-S	NH ₂ -OH
				3.6	B-B	NH ₂ -O
	U2	rRNA-β	C1461	2.6	S-B	OH-O
	G3	srRNA-III	C11	4.0	B-B	N-NH ₂
				4.0	P-B	O-NH ₂
R2	G11	rRNA-α	G480	3.2	B-S	O-OH
		5.8s	G9	3.4	B-S	NH ₂ -OH
	A12	rRNA-α	U231	2.5	B-P	NH ₂ -O
			A1564	2.7	B-B	NH ₂ -N
				3.7	B-B	NH ₂ -O
	A13	rRNA-α	C238	2.7	P-S	O-OH
			C239	3.5	B-B	NH ₂ -O
	G14	rRNA-α	A237	2.6	B-S	N-OH
				3.1	B-S	O-OH
	G15	rRNA-α	A483	Base Pair	tWS	-
	G16	rRNA-α	A483	2.9	S-B	OH-N
				3.2	S-B	OH-N
				3.9	S-B	OH-NH ₂
	A17	rRNA-α	A483	3.7	P-S	O-OH
R3	G22	srRNA-III	C11	2.9	B-S	N-OH
			U12	Base Pair	cWS	-
	C23	rRNA-β	G1462	3.3	P-S	O-OH
			G1464	3.2	B-P	NH ₂ -O
	G24	srRNA-IV	U135	Base Pair	cHH	-
	G25	rRNA-β	G1464	2.7	P-B	O-NH ₂
R4	G26	srRNA-IV	U2	Base Pair	tSW	-
	A42	rRNA-β	U1349	3.0	P-S	O-OH
	C133+	rRNA-α	U1306	2.5	P-B	O-NH
		rRNA-β	U1367+	2.6	S-S	OH-OH
	U134+	rRNA-β	C1352	3.4	B-S	O-OH
			C1366+	3.1	S-S	OH-OH
	C135	rRNA-β	C1352	2.7	S-S	OH-OH
	A157	rRNA-β	A1350	2.6	S-S	OH-OH
	A158	rRNA-β	A1346	Base Pair	tW.	-

			A1368	Base Pair	cSW	-
			G1370	3.0	S-B	OH-NH ₂
				3.5	S-B	OH-N
R5	A52	rRNA-β	G1359	2.7	B-S	N-OH
	C53	rRNA-β	G1359	2.7	B-S	O-OH
			A1358	A-minor	Type II	-
	G54	rRNA-β	A1358	3.3	S-B	OH-N
	G56	rRNA-β	A1358	Base Pair	cWH	-
	A57	rRNA-β	A1358	Base Pair	tWW	-
	G58	rRNA-β	G1359	Base Pair	tSS	-
	A60	rRNA-β	A1360	2.5	S-P	OH-O
R6	U82	rRNA-β	G609	2.7	S-S	OH-OH
			U79	3.2	P-S	O-OH
	U83	rRNA-β	U79	3.9	P-S	O-OH
	C117	rRNA-β	G609	3.9	S-P	OH-O
	U118	rRNA-β	A608	3.5	S-S	OH-OH
R7	U86	srRNA-IV	A116	3.6	P-B	O-NH ₂
				3.8	P-B	O-NH ₂
	G87	srRNA-IV	G113	3.3	S-S	OH-OH
	G88	srRNA-IV	C40	2.7	S-S	OH-OH
				3.6	B-S	NH ₂ -OH
			A41	3.3	B-P	NH ₂ -O
	C112	srRNA-IV	C40	3.7	S-P	OH-O
R8	G97	srRNA-I	C55	Base Pair	cWW	-
			U56	Base Pair	tWS	-
	A98	srRNA-I	C55	2.7	B-B	N - NH ₂
				3.1	S-B	OH-N
				3.4	S-B	OH-NH ₂
	A99	srRNA-I	U54	3.6	B-B	NH ₂ - NH
			C55	3.1	B-B	NH ₂ - NH ₂
R9	G100	srRNA-IV	A44	4.0	S-S	OH-OH
	G101	srRNA-IV	G43	3.9	P-S	O-OH
R10	C103	rRNA-α	A1644	3.4	S-P	OH-O
	A104	rRNA-α	C1645	3.0	S-P	OH-O
	G106	rRNA-α	G1605	Base Stacking	-	-
R11	U107	rRNA-β	A77	3.4	B-S	O-OH
	G108+	rRNA-β	C385+	3.1	S-S	OH-OH
	C109+	rRNA-β	A384+	2.6	S-S	OH-OH

R12	G144	rRNA- α	C1342	Base Pair	cWW	-
			A1343	4.0	S-S	OH-OH
	C145	rRNA- α	U1345	3.8	S-P	OH-O
R13	A171	rRNA- β	G652	3.3	S-P	OH-O
			U1452	Base Pair	tWW	-
			G1453	2.7	B-S	NH ₂ -OH
	C172	rRNA- β	G1453	2.8	P-B	O-NH ₂
			G1454	2.8	B-S	NH ₂ -OH
			G652	Base Stacking	-	-
			G1453			
	C173	rRNA- β	G1454	3.3	P-B	O-NH ₂
	G174	rRNA- β	G1454	2.8	P-B	O-NH ₂
				3.4	P-B	O-NH ₂

Table S1. Details of the 13 RNA/RNA interaction regions within the srRNA-II segment from *Trypanosoma brucei*. These regions allow interaction of this segment with others. “Nucleotide 1” column contains the number of the nucleotide from the srRNA-II that establish interactions with other segments and their respective nucleotides (columns “Segment” and “Nucleotide 2”, respectively). Hydrogen bonding is displayed using its length in Angstroms (“Distance Å / Interaction” column). Structural elements of the nucleotide that are involved in the hydrogen bonding are shown in the “HB / Type” column denoted by capital letters, B for base, S for sugar and P for phosphate. Functional groups involved in the establishment of the hydrogen bond are shown on the last column. Standard and nonstandard base pairs are also shown in the “Distance Å / Interaction” column. Base pair geometry is indicated using Leontis-Westhof nomenclature (Leontis and Westhof 2001) in the “HB / Type” column. A-minor motifs and their specific types are also indicated in the “Distance Å / Interaction” and “HB / Type” columns. Members of Ribose Zipper units are marked with a plus sign (+). *T. brucei* Cryo-EM structure numbering system is used accordingly (PDB ID 4V8M).

<i>T. brucei</i> srRNA-IV						
Region	Nucleotide 1	Segment	Nucleotide 2	Distance Å / Interaction	HB / Type	Functional Groups
R1	U2	srRNA-II	G26	Base Pair	tSW	-
	U135	srRNA-II	A24	Base Pair	cHH	-
R2	C7	rRNA- α	A1630	3.8	S-P	OH-O
	G130	rRNA- α	A1629	2.6	S-S	OH-OH
R3	A15	rRNA- β	A656	A-minor	Type X	-
	A16	rRNA- β	G1449	A-minor	Type X	-
	A17	rRNA- β	G1449	3.3	B-S	N-OH
			G1450	3.0	S-S	OH-OH
	C18	rRNA- β	G1450	2.6	S-P	OH-O
R4	A27	rRNA- β	U1533	2.6	B-S	N-OH
			U1534	3.1	S-B	OH-O
			G1536	2.8	B-S	N-OH
				2.9	B-B	NH ₂ -N
				3.3	B-S	NH ₂ -OH
	A121	rRNA- β	U1534	2.9	P-B	O-NH
				3.2	P-B	O-NH
	U122	rRNA- β	G1535	2.8	B-B	O-NH
				3.1	B-B	O-NH ₂
R5	C40	srRNA-II	G88	2.7	S-S	OH-OH
				3.6	S-B	OH-NH ₂
			C112	3.7	P-S	O-OH
	A41	srRNA-II	G88	3.3	P-B	O-NH ₂
	G113	srRNA-II	G87	3.3	S-S	OH-OH
	A116	srRNA-II	U86	3.6	B-P	NH ₂ -O
				3.8	B-P	NH ₂ -O
R6	G43	srRNA-II	G101	3.9	S-P	OH-O
	A44	srRNA-II	G100	4.0	S-S	OH-OH
R7	A101	rRNA- β	U127	3.8	S-P	OH-O
	C102	rRNA- β	C126	2.2	S-S	OH-OH
	C103	rRNA- β	U379	3.8	S-S	OH-OH

Table S2. Details of the 7 RNA/RNA interaction regions within the srRNA-IV segment from *Trypanosoma brucei*. Colum arrangement and data are presented as described for table S1. *T. brucei* Cryo-EM structure numbering system is used accordingly (PDB ID 4V8M).

<i>L. donovani</i> srRNA-II						
Region	Nucleotide 1	Segment	Nucleotide 2	Distance Å / Interaction	HB / Type	Functional Groups
R2	U8	rRNA- α	G455	Base Pair	cSW	-
	G9	5.8s	C101	3.3	B-P	NH-O
				3.5	B-P	NH ₂ -O
			G100	3.5	B-S	N-OH
		rRNA- α	A1506	3.2	S-S	OH-OH
	U10	rRNA- α	A223	Base Pair	cHH	-
	G11	rRNA- α	C229	Base Pair	cWW	-
	A12	rRNA- α	U228	Base Pair	cWW	-
	A13	rRNA- α	U227	Base Pair	cWW	-
	G14	rRNA- α	C226	Base Pair	cWW	-
	G15	rRNA- α	C225	Base Pair	cWW	-
	G16	rRNA- α	C224	Base Pair	cWW	-
R3	G1	srRNA-III	U2	3.4	B-S	N-OH
	A24	srRNA-III	A3	3.1	P-B	O-NH ₂
				4.0	P-B	O-NH ₂
	U27	srRNA-IV	G1	3.0	S-S	OH-OH
R4	A42	rRNA- β	U1265	2.1	P-S	O-OH
			G1307	3.8	S-B	OH-O
	C133	rRNA- α	U1250	3.5	P-B	O-NH
		rRNA- β	U1283	2.4	B-S	O-OH
				2.9	S-S	OH-OH
	U134	rRNA- β	C1282	2.9	S-S	OH-OH
			G1267	4.0	S-B	OH-NH ₂
	C135	rRNA- β	C1268	2.9	S-S	OH-OH
	A157	rRNA- β	A1266	A-minor	Type I	-
	A158	rRNA- β	A1284	Base Pair	cSW	-
			C1265	3.2	B-B	N-NH
R5	A52	rRNA- β	G1275	2.4	B-S	N-OH
				2.9	B-S	NH ₂ -OH
	C53	rRNA- β	A1274	A-minor	Type II	-
	G56	rRNA- β	A1274	3.4	B-B	O-NH ₂
	A57	rRNA- β	A1274	Base Pair	tWW	-
	G58	rRNA- β	G1275	tSS	tSS	-
	A60	rRNA- β	A1276	3.0	S-P	OH-O
R6	A80	rRNA- β	A79	3.9	S-S	OH-OH
	U81	rRNA- β	C78	3.2	S-B	OH-O

			A524	3.5	B-S	NH ₂ -OH
	U82	rRNA- β	U77	3.1	P-S	O-OH
			G525	3.1	B-S	O-OH
				3.7	S-B	OH-NH ₂
	G116	rRNA- β	G525	3.1	B-S	NH ₂ -OH
	C117	rRNA- β	G525	2.9	S-P	OH-O
	C118	rRNA- β	A524	3.1	S-S	OH-OH
R7	G87	srRNA-IV	A79	Base Stacking	-	-
			G80			
	G88	srRNA-IV	G35	2.9	B-S	NH ₂ -OH
			C98	3.3	S-S	OH-OH
			C36	2.7	S-S	OH-OH
				3.2	S-B	OH-O
			A96	4.0	S-B	OH-N
			C97	2.6	P-S	O-OH
	C112	srRNA-IV	C36	2.2	S-P	OH-O
R8	G113	srRNA-IV	G35	3.2	S-S	OH-OH
	G97	srRNA-I	C58	Base Pair	cWW	-
	A98	srRNA-I	U57	Base Pair	cWW	-
R9	A99	srRNA-I	C58	Base Pair	cWW	-
	A99	srRNA-IV	G41	3.2	S-P	OH-O
	C100	srRNA-IV	A40	4.0	S-S	OH-OH
R10	C103	rRNA- α	A1584	3.5	S-P	OH-O
	A104	rRNA- α	C1585	3.2	S-P	OH-O
	A105	rRNA- α	G1547	2.6	P-B	O-NH ₂
	G106	rRNA- α	G1547	Base Stacking	-	-
R11	U84	rRNA- β	U526	3.9	S-S	OH-OH
	U107	rRNA- β	U527	3.8	B-S	O-OH
	G108	rRNA- β	C300	2.2	S-S	OH-OH
	C109	rRNA- β	A299	2.7	S-S	OH-OH
				2.7	B-S	O-OH
	C110	rRNA- β	U298	3.2	S-P	OH-O
			U297	2.8	S-S	OH-OH
R12	C143	rRNA- α	U1270	Base Pair	tWW	-
R13	G170	rRNA- α	G461	2.7	B-B	NH ₂ -NH ₂
				2.7	B-B	NH ₂ -NH
				3.5	B-B	NH-NH ₂
		rRNA- β	G1369	Base Pair	tWH	-

	C172	rRNA- β	G568	Base Stacking	-	-
			G1369			
			G1370			
			A1371			
	A174	rRNA- β	A1371	3.4	P-B	O-NH ₂
			G13386	Base Stacking	-	-
			A1385			
			A1384			
			A1382			

Table S3. Details of the RNA/RNA interaction regions within the srRNA-II segment from *Leishmania donovani*. Colum arrangement and data are presented as described for table S1. *L. donovani* Cryo-EM structure numbering system is used accordingly (PDB ID 5T2A).

<i>L. donovani</i> srRNA-IV						
Region	Nucleotide 1	Segment	Nucleotide 2	Distance Å / Interaction	HB / Type	Functional Groups
R1	G1	srRNA-II	U27	3.0	S-S	OH-OH
R2	C5	rRNA- α	A1570	A-minor	Type I	-
	G123					
	C121	rRNA- α	A1567	4.0	P-B	O-NH ₂
			A1568	3.5	P-B	O-NH ₂
	A122	rRNA- α	C1566	2.3	B-S	NH ₂ -OH
R3	A13	rRNA- β	A572	A-minor	Type X	-
	C14	rRNA- β	A572	3.7	B-S	O-OH
			A1365	3.4	B-S	NH ₂ -OH
			A68	Base Stacking	-	-
			A69			
			G70			
	G15	rRNA- β	A1365	2.5	B-S	N-OH
			G1366	3.1	S-S	OH-OH
	A16	rRNA- β	G1366	2.7	S-P	OH-O
	A102	rRNA- β	A67	Base Stacking	-	-
R4	U107	rRNA- β	U1450	3.5	S-S	OH-OH
R5	G35	srRNA-II	G113	3.2	S-S	OH-OH
	C36	srRNA-II	G88	2.7	S-S	OH-OH
				3.1	S-B	OH-N
	A37	srRNA-II	G88	3.8	P-B	O-NH ₂
	C97	srRNA-II	G88	2.6	S-P	OH-O
	C98	srRNA-II	G87	3.3	S-S	OH-OH
R6	U100	srRNA-II	A115	4.0	B-S	NH-OH
	A40	srRNA-II	C100	4.0	S-S	OH-OH
R7	G41	srRNA-II	A99	3.2	P-S	O-OH
	A69	rRNA- β	C124	A-minor	Type I	-
			A292			
	G70	rRNA- β	U125	3.1	S-S	OH-OH
				3.9	B-S	NH ₂ -OH
	G71	rRNA- β	C126	2.8	S-P	OH-O
	G86	rRNA- β	C124	3.5	S-S	OH-OH
			U125	3.9	S-P	OH-O
	A87	rRNA- β	G123	A-minor	Type I	-
			C293			
R7	G88	rRNA- β	U294	2.6	S-S	OH-OH

Table S4. Details of the RNA/RNA interaction regions within the srRNA-IV segment from *Leishmania donovani*. Column arrangement and data are presented as described for table S1. *L. donovani* Cryo-EM structure numbering system is used accordingly (PDB ID 5T2A).

T. cruzi srRNA-II						
Region	Nucleotide 1	Segment	Nucleotide 2	Distance Å / Interaction	HB / Type	Functional Groups
R3	G21	srRNA-IV	A3	Base Pair	t.W	-
				A-minor	Type X	-
	G22	srRNA-IV	C4	Base Pair	tSW	-
	U23	srRNA-IV	G5	2.6	S-S	OH-OH
	C176	srRNA-IV	A3	2.4	S-B	OH-N
				3.2	S-S	OH-OH
	C175	srRNA-IV	C4	2.8	S-S	OH-OH
R4	U37	rRNA-β	G1483	3.7	S-S	OH-OH
	A38	rRNA-β	G1503	3.5	S-B	OH-O
			G1482	3.6	P-B	O-NH ₂
	C39	rRNA-β	G1503	3.5	S-P	OH-O
	G155	rRNA-β	A1481	3.4	S-P	OH-O
			G1482	3.6	P-S	O-OH
R6	G76	rRNA-β	A80	3.5	S-S	OH-OH
	G77	rRNA-β	C79	3.2	S-S	OH-OH
	U78	rRNA-β	U78	2.2	P-S	O-OH
	G112	rRNA-β	G688	3.1	B-S	NH ₂ -OH
	C113	rRNA-β	G688	2.8	S-P	OH-O
	U114	rRNA-β	A687	2.2	S-S	OH-OH
	C117	rRNA-β	A80	Base Stacking	-	-
			G81			
R7	C81	srRNA-IV	G106	3.4	S-B	OH-O
				3.9	S-B	OH-NH
	G83	srRNA-IV	C103	3.0	S-S	OH-OH
			G39	3.3	B-S	NH ₂ -OH
	G84	srRNA-IV	C102	2.9	P-S	O-OH
			C40	2.3	S-S	OH-OH
			A41	3.2	B-P	NH ₂ -O
	C108	srRNA-IV	C40	2.7	S-P	OH-O
G109	srRNA-IV	G39	3.1	S-S	OH-OH	
A110	srRNA-IV	G38	3.6	S-S	OH-OH	
R8	G93	srRNA-I	C57	Base Pair	cWW	-
	A94	srRNA-I	U56	Base Pair	cWW	-
	A95	srRNA-I	U55	Base Pair	cWW	-
R9	A95	srRNA-IV	G45	3.3	S-P	OH-O
R10	C99	rRNA-α	A1717	4.0	S-P	OH-O

	A100	rRNA- α	C1718	3.4	S-P	OH-O
	G102	rRNA- α	G1680	Base Stacking	-	-
R11	U80	rRNA- β	U689	3.7	S-S	OH-OH
	U89	rRNA- β	G52	3.3	S-B	OH-NH ₂
	G90	rRNA- β	C53	2.1	S-S	OH-OH
	U103	rRNA- β	U690	3.5	B-S	O-OH
	G104	rRNA- β	C463	2.9	S-S	OH-OH
			G464	3.8	S-P	OH-O
	C105	rRNA- β	A462	2.9	S-S	OH-OH
	U106	rRNA- β	U460	3.1	S-S	OH-OH
			U461	3.4	S-P	OH-O
R13	G166	rRNA- β	G1565	Base Pair	tWH	-
			A1569	Base Stacking	-	-
	C168	rRNA- β	G731	Base Stacking	-	-
			G1565			
			G1566			
			A1567			
	C169	rRNA- β	A1567	4.0	P-B	O-NH ₂

Table S5. Details of the RNA/RNA interaction regions within the srRNA-II segment from *Trypanosoma cruzi*. Column arrangement and data are presented as described for table S1. *T. cruzi* Cryo-EM structure numbering system is used accordingly (PDB ID 5T5H).

<i>T. cruzi</i> srRNA-IV						
Region	Nucleotide 1	Segment	Nucleotide 2	Distance Å / Interaction	HB / Type	Functional Groups
R1	C2	srRNA-II	A178	Base Stacking	-	-
	A3	srRNA-II	G21	Base Pair	t.W	-
			C176	A-minor	Type X	-
	C4	srRNA-II	G22	Base Pair	tSW	-
			C175	2.8	S-S	OH-OH
	G5	srRNA-II	U23	2.6	S-S	OH-OH
R3	A17	rRNA-β	A735	A-minor	Type X	-
	C18	rRNA-β	A1561	2.9	B-S	NH ₂ -OH
				3.8	B-S	N-OH
			A69	Base Stacking	-	-
			A70			
			G71			
	G19	rRNA-β	A1561	2.4	B-S	N-OH
			G1562	3.6	S-S	OH-OH
			A69	Base Stacking	-	-
			A70			
			G71			
	A20	rRNA-β	G1562	3.4	S-P	OH-O
			A69	Base Stacking	-	-
			A70			
			G71			
	A107	rRNA-β	A69	2.5	B-P	NH ₂ -O
R5	G38	srRNA-II	A110	3.6	S-S	OH-OH
	G39	srRNA-II	G109	3.1	S-S	OH-OH
	C40	srRNA-II	G84	2.3	S-S	OH-OH
			C108	2.7	P-S	O-OH
	C102	srRNA-II	G84	2.9	S-P	OH-O
	C103	srRNA-II	G83	3.0	S-S	OH-OH
	G106	srRNA-II	C81	3.4	B-S	N-OH
				3.9	B-S	O-OH
R6	G45	srRNA-II	A95	3.3	P-S	O-OH
R7	U64	rRNA-β	A455	Base Pair	cWS	-
			C125	3.8	B-S	O-OH
	G65	rRNA-β	U126	2.5	B-S	N-OH
				3.4	S-S	OH-OH
			C127	3.0	B-P	NH ₂ -O
				4.0	S-S	OH-OH

	G66	rRNA- β	C127	2.5	S-P	OH-O
	G91	rRNA- β	C125	3.7	S-S	OH-OH
	A92	rRNA- β	C124	A-minor	Type I	-
			G456			
	G93	rRNA- β	U457	3.3	S-S	OH-OH
			G458	4.0	S-P	OH-O

Table S6. Details of the RNA/RNA interaction regions within the srRNA-IV segment from *Trypanosoma cruzi*. Column arrangement and data are presented as described for table S1. *T. cruzi* Cryo-EM structure numbering system is used accordingly (PDB ID 5T5H).

<i>Euglena gracilis</i> srRNA-II					
Region	Nucleotide 1	Nucleotide 2	Distance Å / Interaction	HB / Type	Functional Groups
R3	J.C3589	M.C3913	2.9	S-S	OH-OH
	J.C3746	M.A3911	3.9	S-B	OH-N
R4	J.C3603	I.G3499	3.8	S-B	OH-NH ₂
	J.A3604	I.U3477	2.2	P-S	O-OH
		I.A3520	3.1	S-B	OH-N
			3.6	S-B	OH-NH ₂
	J.C3605	I.A3521	2.8	S-P	OH-O
	J.A3695+	I.C3479	A-minor	Type X	-
		I.G3496+	2.7	S-S	OH-OH
	J.C3696+	I.G3495+	2.6	S-S	OH-OH
	J.U3697	I.A3481	2.6	S-S	OH-OH
	J.A3720	I.C3478	A-minor	Type X	-
		I.G3496			
	J.A3721	I.A3497	Base Pair	cSW	-
		I.G3499	Base Stacking	-	-
	J.U3722	I.A3498	3.7	S-P	OH-O
R5	J.A3614	I.G3488	2.3	B-S	N-OH
	J.C3615	I.A3487	Base Pair	cSS	-
	J.G3618	I.A3487	Base Pair	cWH	-
	J.A3619	I.A3487	Base Pair	tWW	-
	J.G3620	I.G3488	Base Pair	tSS	-
	J.G3621	I.G3488	3.3	S-S	OH-OH
	J.A3622	I.G3489	3.3	S-P	OH-O
R6	J.G3642	H.A2354	3.8	S-S	OH-OH
	J.G3643	H.A2353	3.1	S-S	OH-OH
	J.U3644	H.U2352	3.2	P-S	O-OH
	J.U3645	H.U2352	3.1	P-S	O-OH
	J.U3646	H.C2832	3.5	S-P	OH-O
	J.G3678	H.G2830	3.2	B-S	NH ₂ -OH
	J.C3679	H.G2830	2.8	S-P	OH-O
	J.U3680	H.A2829	3.0	S-S	OH-OH
	J.C3683	H.G2354	Base Stacking	-	-
		H.A2355			
R7	J.C3650	M.U3947	2.5	S-S	OH-OH
			2.8	B-S	O-OH
			3.1	S-B	OH-O
		N.G3982	3.1	S-B	OH-NH ₂

		N.C3983	2.6	P-S	O-OH
	J.G3673	M.G3948	3.5	B-P	NH ₂ -O
	J.U3674	M.U3947	2.3	S-P	OH-O
	J.G3675	M.G3946	2.9	S-S	OH-OH
R8	J.G3659	G.C2122	Base Pair	cWW	-
	J.A3660	G.U2121	Base Pair	cWW	-
	J.G3661	G.C2120	Base Pair	cWW	-
R9	J.G3661	M.G3952	3.1	S-P	OH-O
R10	J.A3655	H.U2326	3.8	S-B	OH-O
	J.G3656	H.C2327	2.5	S-S	OH-OH
		H.A2318	2.4	P-S	O-OH
	J.C3665	F.A1891	2.3	S-P	OH-O
	J.U3666	F.C1892	2.7	S-P	OH-O
	J.G3667	F.U1840	2.7	P-B	O-NH
	J.G3668	E.U1187	Base Stacking	-	-
		F.U1840			
R11	J.U3653	H.G2604	3.5	S-S	OH-OH
	J.G3654	H.U2605	3.6	S-B	OH-O
	J.U3669	H.G2350	3.3	B-B	O-NH ₂
R12	J.C3705	F.U1580	3.0	B-B	NH ₂ -O
	J.U3712	F.U1580	3.4	B-S	O-OH
			3.5	B-S	NH-OH
	J.A3713	F.G1581	3.8	P-S	O-OH
R13	J.U3736	L.U3835	Base Stacking	-	-

Table S7. Details of the RNA/RNA interaction regions within the srRNA-II equivalent segment from *Euglena gracilis* (LSU-10). These regions allow interaction of this segment with others. “Nucleotide 1” column contains the number of the nucleotide from the srRNA-II that establish interactions with other segments and their respective nucleotides (“Nucleotide 2”). Each nucleotide denomination starts with segment designation for the RNA chain within the Cryo-EM structure. Hydrogen bonding is displayed using its length in Angstroms (“Distance Å / Interaction” column). Structural elements of the nucleotide that are involved in the hydrogen bonding are shown in the “HB / Type” column denoted by capital letters, B for base, S for sugar and P for phosphate. Functional groups involved in the establishment of the hydrogen bond are shown on the last column. Standard and nonstandard base pairs are also shown in the “Distance Å / Interaction” column. Base pair geometry is indicated using Leontis-Westhof nomenclature (Leontis and Westhof 2001) in the “HB / Type” column. A-minor motifs and their specific types

are also indicated in the “Distance Å / Interaction” and “HB / Type” columns. Members of Ribose Zipper units are marked with a plus sign (+). *E. gracilis* Cryo-EM structure numbering system is used accordingly (PDB ID 6ZJ3).

<i>Euglena gracilis</i> srRNA-IV					
Region	Nucleotide 1	Nucleotide 2	Distance Å / Interaction	HB / Type	Functional Groups
R1	M.A3911	J.C3746	3.9	B-S	N-OH
	M.C3913	J.C3589	2.9	S-S	OH-OH
R3	M.A3925	H.C2877	A-minor	Type X	-
		I.G3577			
		H.U2837	2.5	S-S	OH-OH
		H.A2344	Base Stacking	-	-
		H.A2345			
		H.U2346			
	M.C3926	I.C3578	3.7	B-S	NH ₂ -OH
		H.A2344	Base Stacking	-	-
		H.A2345			
		H.U2346			
	M.C3927	H.A2344	Base Stacking	-	-
		H.A2345			
		H.U2346			
	M.A3928	I.C3579	2.4	S-P	OH-O
		H.A2344	Base Stacking	-	-
		H.A2345			
		H.U2346			
	M.G3929	H.A2344	Base Stacking	-	-
		H.A2345			
		H.U2346			
R5	M.G3946	J.G3675	2.9	S-S	OH-OH
		J.A3649	3.5	B-S	NH ₂ -OH
	M.U3947	J.U3674	2.3	P-S	O-OH
		J.C3650	2.5	S-S	OH-OH
	M.G3948	J.G3673	3.5	P-B	O-NH ₂
	N.G3982	J.C3650	3.1	B-S	NH ₂ -OH
	N.C3983	J.C3650	2.6	S-P	OH-O
	N.C3986	J.A3677	3.7	B-S	NH ₂ -OH
	N.A3988	H.G2342	3.1	B-S	N-OH
			3.3	B-S	N-OH
		H.C2832	2.9	B-P	NH ₂ -O
	N.G3989	J.G3678	3.3	B-S	O-OH
		J.C3679	3.1	B-P	NH ₂ -O
R6	M.G3952	J.G3661	3.1	P-S	O-OH

R7	M.A3960	H.C2399	A-minor	Type I	-
		H.A2595			
	M.G3961	H.U2400	2.9	S-S	OH-OH
			3.9	B-S	NH ₂ -OH
	M.G3962	H.C2401	3.4	S-P	OH-O
	N.G3972+	H.C2399+	2.6	S-S	OH-OH
	N.A3973+	H.G2398+	A-minor	Type I	-
		H.C2596			
	N.U3974	H.U2597	2.7	S-S	OH-OH

Table S8. Details of the RNA/RNA interaction regions within the srRNA-IV equivalent segments from *Euglena gracilis* (LSU-13 and LSU-14). Column arrangement and data are presented as described for table S7. *E. gracilis* Cryo-EM structure numbering system is used accordingly (PDB ID 6ZJ3).

<i>Saccharomyces cerevisiae</i> srRNA-II					
Region	Nucleotide 1	Nucleotide 2	Distance Å / Interaction	HB / Type	Functional Groups
R3	G2997	U3396	Base Stacking	-	-
	U2998	U3394	3.4	S-S	OH-OH
	U2999	A3295	3.1	S-S	OH-OH
	A3150	A3294	2.4	S-S	OH-OH
	U3151	A3294	3.5	S-B	OH-N
R4	U3014	U2891	2.8	P-S	O-OH
		G2912	3.2	P-B	O-NH ₂
	U3105+	U2909+	2.8	S-S	OH-OH
	A3106+	C2893	A-minor	Type I	-
		G2908+			
			2.8	S-S	OH-OH
	U3107	C2894	3.0	S-S	OH-OH
	A3129	A2892	A-minor	Type I	-
	A3130	A2910	Base Pair	cWS	-
		A2892	Base Stacking	-	-
		G2912			
		C2913			
R5	A3024	G2901	3.2	B-S	NH ₂ -OH
			3.3	B-S	N-OH
	C3025	A2900	A-minor	Type II	-
	A3029	A2900	Base Pair	tWW	-
	G3030	G2901	Base Pair	tSS	-
	A3032	A2902	3.3	S-P	OH-O
R6	G3053	A1895	3.0	S-S	OH-OH
	U3054	U1894	2.5	P-S	O-OH
		U2342	2.7	S-B	OH-O
			2.7	S-S	OH-OH
	G3088	U2342	3.5	B-S	NH ₂ -OH
	C3089	U2342	2.5	S-P	OH-O
	U3090	A2341	2.9	S-S	OH-OH
	C3093	A1896	Base Stacking	-	-
		G1897			
R7	U3057	U3331	3.7	B-S	O-OH
	G3059	U3331	3.4	B-S	NH ₂ -OH
		U3373	3.6	S-B	OH-O
	C3060	U3332	2.7	B-S	O-OH

			2.9	S-S	OH-OH
			3.3	S-B	OH-O
		G3371	2.9	S-B	O-NH ₂
		A3372	2.6	P-S	O-OH
	G3083	G3333	3.2	B-P	NH ₂ -O
	C3084	U3332	3.0	S-P	OH-O
	G3085+	U3331+	2.8	S-S	OH-OH
	A3086+	A3330+	2.8	S-S	OH-OH
R8	G3069	C1685	Base Pair	cWW	-
		U1686	Base Stacking	-	-
	A3070	U1684	Base Pair	cWW	-
	U3071	A1683	Base Pair	cWW	-
R9	A3073	A3335	4.0	P-S	O-OH
R10	U3064	A2117	A-minor	Type X	-
	G3065	G1861	3.0	S-B	OH-NH ₂
	U3066	G1861	2.7	P-S	O-OH
		C1870	2.5	S-S	OH-OH
	C3067	G1860	3.3	P-B	O-NH ₂
	G3075	A1477	2.2	S-P	OH-O
	C3076	C1478	2.8	S-P	OH-O
R11	U3078	U1455	Base Stacking	-	-
	C3063	G2116	3.0	S-S	OH-OH
	U3079	G1892	Base Pair	cHS	-
R12	G3080	A2117	2.7	S-S	OH-OH
	C3115	U1208	Base Pair	tWW	-
		C1224	Base Pair	cWW	-
		A1225	Base Stacking	-	-
13	A3142	G1226			
		U2992	Base Stacking	-	-
		G2993			
		A2994	Base Pair	tHH	-
		A2995	Base Pair	tHW	-
	C3143	G420	Base Stacking	-	-
		G2382			
		C2383			
		A2384			
		G2385			

Table S9. Details of the RNA/RNA interaction regions within the artificial srRNA-II segment from *Saccharomyces cerevisiae*. These regions allow interaction of this segment with the rest of

the LSU rRNA. “Nucleotide 1” column contains the number of the nucleotide from the artificial srRNA-II that establish interactions with the rest of rRNA and its respective nucleotides (“Nucleotide 2”). Hydrogen bonding is displayed using its length in Angstroms (“Distance Å / Interaction” column). Structural elements of the nucleotide that are involved in the hydrogen bonding are shown in the “HB / Type” column denoted by capital letters, B for base, S for sugar and P for phosphate. Functional groups involved in the establishment of the hydrogen bond are shown on the last column. Standard and nonstandard base pairs are also shown in the “Distance Å / Interaction” column. Base pair geometry is indicated using Leontis-Westhof nomenclature (Leontis and Westhof 2001) in the “HB / Type” column. A-minor motifs and their specific types are also indicated in the “Distance Å / Interaction” and “HB / Type” columns. Members of Ribose Zipper units are marked with a plus sign (+). *E. gracilis* Cryo-EM structure numbering system is used accordingly (PDB ID 6ZJ3).

<i>Saccharomyces cerevisiae</i> srRNA-IV					
Region	Nucleotide 1	Nucleotide 2	Distance Å / Interaction	HB / Type	Functional Groups
R1	A3294	U3152	Base Stacking	-	-
		A3150	2.4	S-S	OH-OH
	A3295	U2999	3.1	S-S	OH-OH
	U3394	U2998	3.4	S-S	OH-OH
	G3395	U3152	Base Stacking	-	-
R3	A3307	C2389	A-minor	Type X	-
		U2349	2.7	S-S	OH-OH
		G2990	3.6	B-B	NH ₂ -NH ₂
		A1886	3.7	P-S	O-OH
	C3308	A2991	3.0	B-S	NH ₂ -OH
		A1886	Base Stacking	-	-
		A1887			
		U1888			
		G1889			
	G3309	A2991	2.9	B-S	N-OH
		U2992	3.1	S-S	OH-OH
		A1886	Base Stacking	-	-
		A1887			
		U1888			
		G1889			
	A3310	U2992	2.5	S-P	OH-O
		A1886	Base Stacking	-	-
		A1887			
		U1888			
		G1889			
	C3311	A1886	Base Stacking	-	-
		A1887			
		U1888			
		G1889			
	U3312	A1886	Base Stacking	-	-
		A1887			
		U1888			
		G1889			
R5	A3330+	A3086+	2.8	S-S	OH-OH
	U3331+	G3085+	2.8	S-S	OH-OH
	U3332	C3060	2.7	S-B	OH-O
			2.9	S-S	OH-OH

			3.3	B-S	O-OH
		C3084	3.0	P-S	O-OH
	G3333	G3083	3.2	P-B	O-NH ₂
	G3371	C3060	2.9	B-S	NH ₂ -OH
	A3372	C3060	2.6	S-P	OH-O
	U3373	G3059	3.6	B-S	O-OH
	A3375	A3086	3.6	B-B	NH ₂ -N
		A3087	3.2	B-S	N-OH
	G3377	C3089	3.5	B-P	NH ₂ -O
R6	G3337	U3071	3.5	P-S	O-OH
R7	C3343	C2108	3.9	S-S	OH-OH
	A3344	C1941	Base Pair	tSH	-
		A2107	Base Pair	cWH	-
	G3345	U1942	2.3	S-S	OH-OH
	U3346	C1943	3.9	S-P	OH-O
	G3361	C1941	3.8	S-S	OH-OH
	A3362	G1940	Base Pair	cSH	-
		C2108	Base Pair	tSH	-
	U3363	U2109	2.9	S-S	OH-OH

Table S10. Details of the RNA/RNA interaction regions within the artificial srRNA-IV segment from *Saccharomyces cerevisiae*. Colum arrangement and data are presented as described for table S9. *S. cerevisiae* X-ray crystallographic structure numbering system is used accordingly (PDB ID 4V88).

<i>Escherichia coli</i> srRNA-II					
Region	Nucleotide 1	Nucleotide 2	Distance Å / Interaction	HB / Type	Functional Groups
R3	G2630	G2894	Base Stacking	-	-
	G2631	A2810+	A-minor	Type I	-
	C2787+				
	A2632	G2811	2.3	S-S	OH-OH
	C2788+	A2809+	A-minor	Type II	-
		U2790	Base Stacking	-	-
		A2893			
	C2789	G2892	3.3	S-S	OH-OH
		G2894	Base Pair	cWW	-
		U2790	Base Stacking	-	-
		A2893			
R4	G2645	G2543	3.0	S-S	OH-OH
	C2646	A2564	Base Pair	tSW	-
	U2647	U2522	2.7	P-S	O-OH
		G2543	3.7	P-B	O-NH ₂
	A2740+	C2540+	A-minor	Type II	-
	A2741+	C2539+	A-minor	Type X	-
		G2524			
	G2742	G2525	2.9	S-S	OH-OH
	G2763	G2524	3.9	S-S	OH-OH
	A2764	G2523	2.9	S-S	OH-OH
			3.3	B-B	N-NH ₂
	A2765	A2541	Base Pair	cWS	-
	A2766	A2542	2.7	S-P	OH-O
R5	A2657	G2532	2.7	B-S	N-OH
			3.0	B-S	NH ₂ -OH
	C2658	A2531	A-minor	Type X	-
	G2661	A2531	3.2	B-B	O-NH ₂
	A2662	A2531	Base Pair	tWW	-
	G2663	G2532	Base Pair	tSS	-
	G2664	G2532	3.4	S-S	OH-OH
R6	G2686	G1663	3.5	S-S	OH-OH
		A1998	3.6	B-S	NH ₂ -OH
		C1999	3.7	B-S	NH ₂ -OH
	U2687	U1662	3.0	P-S	O-OH

		C1999	2.6	S-B	OH-O
			2.9	S-S	OH-OH
			2.9	B-S	O-OH
	G2688	G1661	3.2	P-B	O-NH ₂
		U1662	3.7	P-S	O-OH
		A2873	3.5	S-B	OH-NH ₂
	U2689	G1660	Base Pair	c.S	-
	G2722	C1999	3.3	S-S	OH-OH
		C2000	3.9	S-P	OH-O
		A2872	Base Stacking	-	-
	C2723	C1999	2.6	S-P	OH-O
	U2724	A1998	3.1	S-S	OH-OH
R7	U2690	A2872	3.0	S-B	OH-N
		A2873	3.2	B-B	NH-N
	C2691	U2871	2.4	S-S	OH-OH
	G2692	U2847	2.8	S-S	OH-OH
			3.3	B-S	NH ₂ -OH
		G2848	3.8	B-P	NH ₂ -O
		C2870	2.6	P-S	O-OH
	G2718	U2847	2.5	S-P	OH-O
	G2719	G2846	3.2	S-S	OH-OH
		A2872	Base Pair	tSW	-
	U2720	G2844	3.6	S-B	OH-NH ₂
		A2873	Base Pair	cWH	-
		A2872	Base Stacking	-	-
	A2721	A2873	3.0	S-S	OH-OH
		A2872	Base Stacking	-	-
	G2722	A2872	Base Stacking	-	-
R8	G2702	C1462	2.8	S-S	OH-OH
			3.9	B-S	N-OH
		U1457	Base Pair	cWW	-
		G1452	Base Stacking	-	-
	C2703	G1456	Base Pair	cWW	-
R9	A2705	G2852	3.0	S-P	OH-O
			3.3	S-P	OH-O
	U2707	A2850	3.9	P-S	O-OH
R10	G2697	A1637	3.3	B-S	NH ₂ -OH

	U2698	G1629	2.7	P-S	O-OH
		C1638	2.6	S-B	OH-O
			2.7	S-S	OH-OH
	C2699	G1628	3.2	P-B	O-NH ₂
		C1639	3.8	S-S	OH-OH
	G2709	G1296	2.7	S-P	OH-O
		C1638	3.1	S-S	OH-OH
		C1639	3.0	S-P	OH-O
	C2710	C1297	3.7	S-P	OH-O
		C1638	2.8	S-P	OH-O
	A2711	A1637	3.7	S-S	OH-OH
R11	G2694	A1755	A-minor	Type X	-
	U2695	U1758	3.7	S-B	OH-NH
			3.8	S-B	OH-O
	U2696	A1759	2.7	S-B	OH-NH
	C2712	C1760	3.3	B-P	NH ₂ -O
	G2714	U1758	3.3	B-S	NH ₂ -OH
		A1759	3.7	B-S	N-OH
	C2716	A1754	A-minor	Type X	-
R12	A2750	U1033	3.1	B-S	NH ₂ -OH
			Base Stacking	-	-
	G2751	C1049	Base Pair	cWW	-
		A1050	Base Stacking	-	-
		G1051			
		C1052			
	C2752	A1050	3.6	B-S	O-OH
R13	G2777	C527	2.7	S-B	OH-NH ₂
		C2043	2.4	S-P	OH-O
			3.3	S-S	OH-OH
		C2626	Base Pair	cWW	-
		C2043	Base Stacking	-	-
		G2627			
		C2628			
	U2778+	C527+	2.5	S-S	OH-OH
	U2779	C527	Base Stacking	-	-
		A528			
		A529			
		C2023			

		A2042			
		G2627	Base Pair	tSS	-
		C527	Base Stacking	-	-
	A2781	A528			
		A529			
		C2023			
		A2042			
	G2782	C2628	3.1	P-S	O-OH

Table S11. Details of the RNA/RNA interaction regions within the artificial srRNA-II segment from *Escherichia coli*. Column arrangement and data are presented as described for table S9. *E. coli* X-ray crystallographic structure numbering system is used accordingly (PDB ID 4V9D).

<i>Escherichia coli</i> srRNA-IV					
Region	Nucleotide 1	Nucleotide 2	Distance Å / Interaction	HB / Type	Functional Groups
R1	G2811	A2632	2.3	S-S	OH-OH
		A2809	Base Stacking	-	-
		A2810			
R3	G2822	G1653	2.9	B-P	NH-O
			3.1	B-P	NH ₂ -O
	A2823	C2047	A-minor	Type X	-
		G2621			
		A1654	Base Stacking	-	-
		A1655			
		C1656			
		C2006	2.7	S-S	OH-OH
	C2824	A1652	3.7	P-S	O-OH
		U2622	3.3	B-S	NH ₂ -OH
			3.9	B-S	N-OH
		A1654	Base Stacking	-	-
		A1655			
		C1656			
	G2825	U2622	2.9	B-S	N-OH
		G2623	2.6	S-S	OH-OH
		A1654	Base Stacking	-	-
		A1655			
		C1656			
	A2826	G2623	2.8	S-P	OH-O
		A1654	Base Stacking	-	-
		A1655			
		C1656			
	C2827	A1654	Base Stacking	-	-
		A1655			
		C1656			
R5	G2844	U2720	3.6	B-S	NH ₂ -OH
	G2846	G2718	3.2	S-B	OH-NH ₂
		G2719	3.2	S-S	OH-OH
	U2847	G2692	2.8	S-S	OH-OH
			3.3	S-B	OH-NH ₂
		G2718	2.5	P-S	O-OH
	G2869	G2692	3.4	B-S	NH ₂ -OH

		G2693	3.8	B-P	NH ₂ -O
	C2870	G2692	2.6	S-P	OH-O
	U2871	C2691	2.4	S-S	OH-OH
	A2872	G2690	3.0	B-S	N-OH
		G2719	Base Pair	tWS	-
		U2720	Base Stacking	-	-
		A2721			
		G2722			
	A2873	U2720	Base Pair	cHW	-
		A2721	3.0	S-S	OH-OH
R6	A2850	U2707	3.9	S-P	OH-O
	G2852	G1455	3.8	S-S	OH-OH
		A2705	3.0	P-S	O-OH
			3.3	P-S	O-OH
	C2853	G1455	2.8	P-S	O-OH
			3.5	P-B	O-NH ₂
R7	C2858	G1710	3.0	B-S	N-OH
			3.4	B-S	NH ₂ -OH
	G2859+	U1709+	Base Pair	cSS	-
	A2860+	G1750	A-minor	Type I	-
		C1708+			
	U2861	U1751	2.8	S-S	OH-OH

Table S12. Details of the RNA/RNA interaction regions within the artificial srRNA-IV segment from *Escherichia coli*. Column arrangement and data are presented as described for table S9. *E. coli* X-ray crystallographic structure numbering system is used accordingly (PDB ID 4V9D).

<i>Thermus thermophilus</i> srRNA-II					
Region	Nucleotide 1	Nucleotide 2	Distance Å / Interaction	HB / Type	Functional Groups
R3	G2630+	A2892+	Base Pair	cSS	-
		G2894	Base Stacking	-	-
	G2631+	A2809	A-minor	Type X	-
		A2810	A-minor	Type I	
		G2891+	3.3	S-S	OH-OH
	A2632	G2811	2.4	S-S	OH-OH
	G2633	G2811	3.9	P-S	O-OH
	C2787+	A2810+	A-minor	Type I	-
	C2788+	A2809+	A-minor	Type X	-
	C2789	G2894	Base Pair	cWW	-
R4	G2645	G2543	2.8	S-S	OH-OH
			3.1	B-S	N-OH
	C2646	G2544	3.4	S-B	OH-NH ₂
			3.6	S-B	OH-N
	U2647	U2522	2.2	P-S	O-OH
		A2564	2.9	S-B	OH-N
	C2648	A2564	2.4	S-P	OH-O
	A2740+	C2540+	A-minor	Type II	-
	A2741+	G2524	A-minor	Type I	-
		C2539+			
	C2742	G2525	2.9	S-S	OH-OH
	G2763	G2524	3.7	S-S	OH-OH
	A2764	G2523	A-minor	Type X	-
	A2765	G2523	Base Stacking	-	-
		G2543			
		A2541	Base Pair	cWS	-
	G2766	A2542	3.7	S-P	OH-O
R5	2657	G2532	2.8	B-S	N-OH
			3.0	B-S	NH-OH
	C2658	A2531	A-minor	Type II	-
	G2659	A2531	3.8	S-B	OH-NH ₂
	G2661	A2531	3.1	B-B	O-NH ₂
	A2662	A2531	Base Pair	tWW	-
	G2663	G2532	Base Pair	tSS	-
	G2664	G2532	3.4	S-S	OH-OH
R6	G2685	A1664	3.8	S-S	OH-OH

	G2686	C1663	3.6	S-S	OH-OH
	U2687	G1661	3.9	S-B	OH-NH ₂
		C1662	2.6	P-S	O-OH
		C1999	2.5	S-S	OH-OH
			2.5	S-B	OH-O
	U2688	G1661	3.3	P-B	O-NH ₂
	U2689	G2000	Base Pair	cWS	-
	G2722	C1999	3.1	B-S	NH ₂ -OH
	C2723	C1999	2.5	S-P	OH-O
	C2724	G1998	2.5	S-S	OH-OH
	U2726	A1664	Base Stacking	-	-
		A1665			
R7	C2691	C2871	3.0	S-S	OH-OH
		G2872	Base Stacking	-	
		A2873			
	C2692	U2847	2.7	S-S	OH-OH
			3.5	S-B	OH-O
		G2869	2.9	S-B	OH-NH ₂
	G2717	G2848	3.3	B-P	NH ₂ -O
	G2718	G2846	2.4	B-S	NH ₂ -OH
		U2847	2.2	S-P	OH-O
	G2719	G2872	Base Pair	tSW	-
	U2720	A2873	Base Pair	cWH	-
	A2721	G2872	Base Stacking	-	-
		A2873			
R8	U2702	A1452	Base Stacking	-	-
	C2703	A1452	Base Pair	tHH	-
		G1456	Base Pair	cWW	-
	C2704	G1455	Base Pair	cWW	-
R9	A2705	G2852	2.6	S-P	OH-O
R10	G2694	A1755	A-minor	Type X	-
	C2695	G1758	3.3	S-S	OH-OH
			3.3	S-B	OH-N
	U2696	A1759	A-minor	Type X	-
	U2698	C1629	3.0	P-S	O-OH
		C1638	2.6	S-S	OH-OH
	G2709	G1296	2.8	S-P	OH-O
		C1638	2.9	S-S	OH-OH

	C2710	C1638	3.1	S-P	OH-O
	A2711	A1637	3.9	S-S	OH-OH
		A1759	3.7	B-S	N-OH
	U2712	C1660	3.7	B-S	N-OH
			3.8	B-S	O-OH
	A2712^A	U1659	A-minor	Type I	-
		G2002	3.4	S-S	OH-OH
R11	A2713	G1661	A-minor	Type X	-
	G2714	A1759	2.8	S-S	OH-OH
R12	U2716	C1754	Base Pair	cSW	-
	A2750	U1033	Base Stacking	-	-
	G2751	C1049	Base Pair	cWW	-
		A1050	Base Stacking	-	-
		G1051			
		C1052			
	C2752	A1050	3.4	B-S	O-OH
R13	G2777	C2043	Base Stacking	-	-
		C2626	Base Pair	cWW	-
	U2779	C527	2.7	B-P	NH-O
		A528	Base Stacking	-	-
		C2040			
		U2041			
		A2042			
	A2781	G2627	Base Pair	tSS	-
		C527	Base Stacking		
		A528			
		C2040			
		U2041			
		A2042			
	G2782	C2628	2.7	P-S	O-OH

Table S13. Details of the RNA/RNA interaction regions within the artificial srRNA-II segment from *Thermus thermophilus*. Colum arrangement and data are presented as described for table S9. *T. thermophilus* X-ray crystallographic structure numbering system is used accordingly (PDB ID 4WPO).

<i>Thermus thermophilus</i> srRNA-IV					
Region	Nucleotide 1	Nucleotide 2	Distance Å / Interaction	HB / Type	Functional Groups
R1	A2810	G2631	A-minor	Type I	-
		C2787			
		A2809	Base Stacking	-	-
		A2892			
		G2893			
	G2811	A2632	2.4	S-S	OH-OH
		A2809	Base Stacking	-	-
		A2892			
		G2893			
	C2889	G2792	Base Stacking	-	-
		G2805			
		G2807			
		U2808			
	G2891	G2631	3.3	S-S	OH-OH
		G2792	Base Stacking	-	-
		G2805			
		G2807			
		U2808			
R3	G2822	G1653	2.5	B-P	NH ₂ -O
			2.9	B-P	NH-O
	A2823	U2047	A-minor	Type X	-
		C2006	2.7	S-S	OH-OH
		A1654	Base Stacking	-	-
		A1655			
		C1656			
	C2824	C2622	3.0	B-S	NH ₂ -OH
		A1654	Base Stacking	-	-
		A1655			
		C1656			
	C2825	G2623	2.8	S-S	OH-OH
		C2622	2.9	B-S	N-OH
			3.0	B-S	O-OH
		A1654	Base Stacking	-	-
		A1655			
	A2826	C1656	Base Stacking	-	-
		G2623			
	A2826	G2623	2.7	S-P	OH-O
		A1654	Base Stacking	-	-

	C2827	A1655	Base Stacking	-	-
		C1656			
		A1654			
		A1655			
R5	G2845	U2720	3.9	S-S	OH-OH
	G2846	G2718	3.2	S-B	OH-NH ₂
		G2719	3.9	S-S	OH-OH
	U2847	C2692	2.6	S-B	OH-O
			2.7	S-S	OH-OH
		G2718	2.6	P-S	O-OH
	G2848	G2717	3.3	P-B	O-NH ₂
	G2869	C2692	2.9	B-S	NH ₂ -OH
	C2871	C2691	3.0	S-S	OH-OH
	G2872	G2719	Base Pair	tWS	-
		C2691	Base Stacking	-	-
		A2721			
		G2722			
	A2873	U2720	Base Pair	cHW	-
		C2691	Base Stacking	-	-
		A2721			
		G2722			
R6	G2852	A2705	2.6	P-S	O-OH
	C2853	G1455	2.6	P-S	O-OH
R7	C2858	C1710	2.8	B-S	N-OH
			3.6	B-S	O-OH
			3.8	B-S	NH ₂ -OH
	G2859+	U1709+	Base Pair	cSS	-
	A2860+	C1708+	A-minor	Type I	-
		G1750			
	G2861	C1751	2.5	S-S	OH-OH

Table S14. Details of the RNA/RNA interaction regions within the artificial srRNA-IV segment from *Thermus thermophilus*. Colum arrangement and data are presented as described for table S9. *T. thermophilus* X-ray crystallographic structure numbering system is used accordingly (PDB ID 4WPO).

<i>Haloarcula marismortui</i> srRNA-II					
Region	Nucleotide 1	Nucleotide 2	Distance Å / Interaction	HB / Type	Functional Groups
R3	G2667	A2827	A-minor	Type I	-
	G2668	G2828	2.9	S-S	OH-OH
	C2822	A2827	3.8	S-S	OH-OH
	G2823	A2914	Base Pair	tWS	-
	C2824	A2914	3.3	B-S	O-OH
			3.8	S-B	OH-N
R4	G2683	G2579	3.6	S-S	OH-OH
	A2684	U2557	2.5	P-S	O-OH
		A2599	3.6	S-B	OH-N
			3.8	S-B	OH-NH ₂
	C2685	A2599	2.7	S-P	OH-O
	A2775+	C2575+	2.9	S-S	OH-OH
	A2776+	G2574+	A-minor	Type I	-
		C2559			
	G2777	C2560	2.9	S-S	OH-OH
	G2798+	C2559+	3.3	S-S	OH-OH
	A2799+	G2558+	A-minor	Type X	-
R5	A2694	G2567	3.0	B-S	N-OH
			3.2	B-S	NH ₂ -OH
	C2695	A2566	Base Pair	cWS	-
	A2699	A2566	Base Pair	tWW	-
	G2700	G2567	Base Pair	tSS	-
	A2702	A2568	2.6	S-P	OH-O
R6	G2723	U1741	3.0	S-S	OH-OH
	U2724	U1740	2.6	P-S	O-OH
		C2040	2.6	S-S	OH-OH
			2.9	S-B	OH-O
	G2725	G1739	3.2	P-B	O-NH ₂
	U2726	G2041	Base Pair	cSH	-
	C2759	C2040	2.6	S-P	OH-O
	C2760	A2039	2.6	S-S	OH-OH
	C2762	A1742	Base stacking	-	-
		G1743			
R7	C2728	C2894	3.2	S-S	OH-OH
	C2729	U2864	2.6	S-S	OH-OH
			3.5	S-B	OH-O

		G2892	3.2	S-B	OH-NH ₂
		C2893	3.0	P-S	O-OH
	C2752	C1810	Base Pair	cWS	-
	G2753	G2865	3.4	B-P	NH ₂ -O
	G2754	G2863	3.3	B-S	NH ₂ -OH
		U2864	2.5	S-P	OH-O
	U2756	A2896	Base Pair	cWW	-
	A2757	A2896	3.7	S-S	OH-OH
	G2758		Base stacking	-	-
R8	G2738	C1562	Base Pair	cWW	-
		C1564	3.9	S-S	OH-OH
	A2739	U1561	Base Pair	cWW	-
R9	G2740	G2869	3.1	S-P	OH-O
R10	G2734	G1713	2.9	S-S	OH-OH
	U2735	C1705	2.6	P-S	O-OH
		C1714	2.7	S-S	OH-OH
	U2736	G1704	3.1	P-B	O-NH ₂
	G2744	G1402	2.9	S-P	OH-O
		C1714	3.2	B-S	NH ₂ -OH
		C1715	3.6	B-P	NH ₂ -O
	C2745	C1714	2.7	S-P	OH-O
	C2747	G1378	Base Stacking	-	-
	G2748	U1380		-	-
R11	G2731	A1811	A-minor	Type X	-
	U2733	G1814	3.8	S-P	OH-O
		A1815	A-minor	Type X	-
	G2750	A1815	2.6	S-S	OH-OH
	C2752	C1810	Base Pair	cWS	-
R12	G2785	G1137	Base stacking	-	-
	G2786	C1153	Base Pair	cWH	-
		A1154	Base stacking	-	-
		G1155		-	-
R13	A2812	U2661	Base Pair	tWH	-
		C2084	Base stacking	-	-
	A2814	U533	Base stacking	-	-
		C534		-	-
		A2081		-	-

	A2816	G2082			
		A2083			
		G2662			
	G2817	U2663	Base Pair	tSS	-
			2.6	P-S	O-OH

Table S15. Details of the RNA/RNA interaction regions within the artificial srRNA-II segment from *Haloarcula marismortui*. Column arrangement and data are presented as described for table S9. *H. marismortui* X-ray crystallographic structure numbering system is used accordingly (PDB ID 1FFK).

<i>Haloarcula marismortui</i> srRNA-IV					
Region	Nucleotide 1	Nucleotide 2	Distance Å / Interaction	HB / Type	Functional Groups
R1	A2827	G2667	A-minor	Type I	-
		C2822	3.8	S-S	OH-OH
	G2828	G2668	2.9	S-S	OH-OH
		U2669	3.7	S-P	OH-O
	C2912	C2825	Base Stacking	-	-
		G2826			
	A2913	C2825	Base Stacking	-	-
		G2826			
	A2914	G2823	Base Pair	tSW	-
		G2826	Base Pair	tSH	-
R3	A2840	C2088	A-minor	Type X	
	A2841	G2657	A-minor	Type X	-
	G2842	G2657	2.6	B-S	N-OH
			2.7	S-S	OH-OH
	A2843	G2658	2.7	S-P	OH-O
R5	G2862	U2756	3.5	S-S	OH-OH
	G2863	G2754	3.3	S-B	OH-NH ₂
	U2864	c2729	2.6	S-S	OH-OH
			2.6	S-B	OH-O
		G2754	2.5	P-S	O-OH
	G2865	G2753	3.4	P-B	O-NH ₂
	G2892	C2729	3.2	B-S	NH ₂ -OH
	C2893	C2729	3.0	S-P	OH-O
	C2894	C2728	3.2	S-S	OH -OH
	A2896	U2756	Base Pair	cWW	-
		A2757	Base Stacking	-	-
		G2758			
R6	G2869	G2740	3.1	P-S	O-OH
R7	A2875	C1787	A-minor	Type I	-
		G1805			
	G2876	U1788	2.9	S-S	OH-OH
		G1789	3.1	B-P	NH ₂ -O
	A2880	G1789	2.7	B-P	NH ₂ -O
	G2882+	C1787+	2.7	S-S	OH-OH
	A2883+	C1786+	A-minor	Type I	-
		G1806			

	G2884	U1807	3.9	S-S	OH-OH
--	-------	-------	-----	-----	-------

Table S16. Details of the RNA/RNA interaction regions within the artificial srRNA-IV segment from *Haloarcula marismortui*. Column arrangement and data are presented as described for table S9. *H. marismortui* X-ray crystallographic structure numbering system is used accordingly (PDB ID 1FFK).

LSU-10		
Region	<i>E. gracilis</i>	<i>S. cerevisiae</i>
R3	C3589	U2999
	C3746	U3151
R4	C3603	U3013
	A3604	U3014
	C3605	G3015
	A3695	U3105
	C3696	A3106
	U3697	U3107
	A3720	A3129
	A3721	A3130
	U3722	U3131
	A3614	A3024
R5	C3615	C3025
	G3618	G3028
	A3619	A3029
	G3620	G3030
	G3621	G3031
	A3622	A3032
	G3642	G3052
R6	G3643	G3053
	U3644	U3054
	U3645	U3055
	U3646	U3056
	G3678	G3088
	C3679	C3089
	U3680	U3090
	C3683	C3093
	C3650	C3060
R7	G3673	G3083
	U3674	C3084
	G3675	G3085
	G3659	G3069
R8	A3660	A3070
	G3661	U3071
	G3661	U3071
R9	G3661	U3071
R10	A3655	G3065
	G3656	U3066

	C3665	G3075
	U3666	C3076
	G3667	A3077
	G3668	U3078
R11	U3653	C3063
	G3654	U3064
	U3669	U3079
R12	C3705	C3115
	A3713	A3122

Table S17. Corresponding ribonucleotides in the RNA/RNA interaction regions within LSU-10 segment. These were determined by structural alignments of the *E. gracilis* LSU-10 small segment over the *S. cerevisiae* LSU crystallographic structure (PDBID 6ZJ3, Matzov et al. 2020 over PDBID 4V88, Ben-Shem et al. 2011).

LSU-13 and LSU-14		
Region	<i>E. gracilis</i>	<i>S. cerevisiae</i>
R1	C3913	A3295
R3	A3925	A3307
	C3926	C3308
	C3927	G3309
	A3928	A3310
	G3929	C3311
R5	G3946	U3331
	U3947	U3332
	G3948	G3333
	G3982	G3371
	C3983	A3372
	C3986	A3375
	G3989	G3377
R6	G3952	G3337
R7	A3960	A3344
	G3961	G3345
	G3962	U3346
	G3972	G3361
	A3973	A3362
	U3974	U3363

Table S18. Corresponding ribonucleotides in the RNA/RNA interaction regions within LSU-13 and LSU-14 segments. These were determined by structural alignments of the *E. gracilis* LSU-13 and LSU-14 small segments over the *S. cerevisiae* LSU crystallographic structure (PDBID 6ZJ3, Matzov et al. 2020 over PDBID 4V88, Ben-Shem et al. 2011).