



## wwPDB EM Validation Summary Report ⓘ

Apr 16, 2024 – 04:32 am BST

PDB ID : 7QGG  
EMDB ID : EMD-13954  
Title : Neuronal RNA granules are ribosome complexes stalled at the pre-translocation state  
Authors : Pulk, A.; Kipper, K.; Mansour, A.  
Deposited on : 2021-12-08  
Resolution : 2.86 Å(reported)  
Based on initial model : 6OLE

This is a wwPDB EM Validation Summary Report for a publicly released PDB entry.

We welcome your comments at [validation@mail.wwpdb.org](mailto:validation@mail.wwpdb.org)

A user guide is available at

<https://www.wwpdb.org/validation/2017/EMValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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The following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

EMDB validation analysis : 0.0.1.dev92  
Mogul : 1.8.4, CSD as541be (2020)  
MolProbity : 4.02b-467  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
MapQ : **FAILED**  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.36

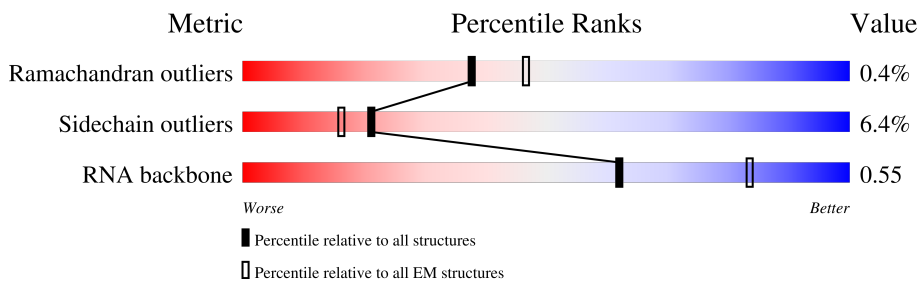
# 1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

*ELECTRON MICROSCOPY*

The reported resolution of this entry is 2.86 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	EM structures (#Entries)
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826
RNA backbone	4643	859

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the bar indicate the fraction of residues that contain outliers for  $\geq 3$ , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions  $\leq 5\%$ .

Mol	Chain	Length	Quality of chain
1	S2	1872	
2	SA	295	
3	SB	264	
4	SD	243	
5	SE	263	
6	SF	204	
7	SH	194	
8	SI	208	
9	SK	165	

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Mol	Chain	Length	Quality of chain
10	SL	158	87% 7% 5%
11	SP	145	84% 5% 10%
12	SQ	146	92% 7%
13	SR	135	94% 5%
14	SS	152	88% 7% 5%
15	ST	145	93% 6%
16	SU	119	83% 13%
17	SV	83	87% 11%
18	SX	143	95%
19	Sa	115	84% 5% 10%
20	Sc	69	83% 10% 7%
21	Sd	56	93% 5%
22	Sg	317	89% 9%
23	SC	293	71% 5% 23%
24	SG	249	90% 6% 5%
25	SJ	194	86% 9% 5%
26	SM	132	82% 8% 11%
27	SN	151	96%
28	SO	151	83% 7% 9%
29	SW	130	92% 8%
30	SY	133	92% 7%
31	SZ	125	54% 5% 42%
32	Sb	84	89% 8%
33	Se	59	86% 10%
34	Sf	156	42% 57%



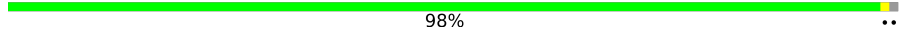




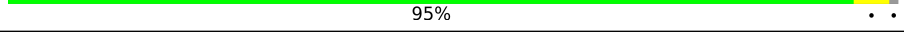
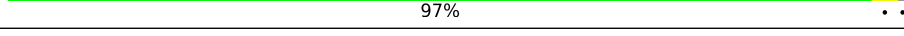
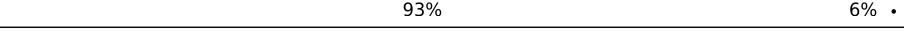
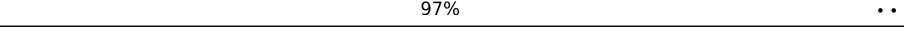
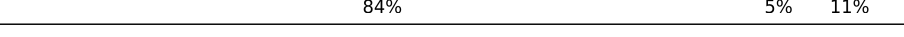
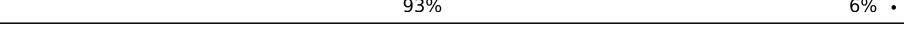
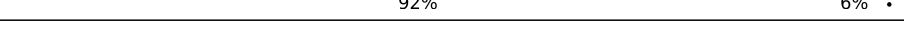

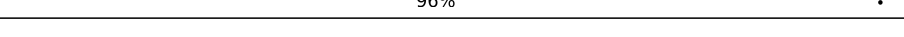
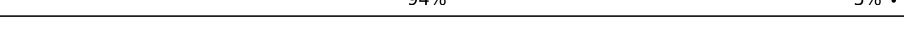

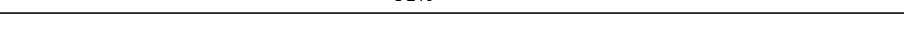






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Mol	Chain	Length	Quality of chain
35	A	257	94%
36	B	403	95%
37	C	421	80%
38	D	157	79%
39	E	121	88%
40	F	297	95%
41	G	298	79%
42	H	260	83%
43	I	266	85%
44	J	192	93%
45	K	214	91%
46	L	178	87%
47	M	211	90%
48	N	214	63%
49	O	204	95%
50	P	203	91%
51	Q	184	82%
52	R	188	95%
53	S	196	89%
54	T	176	96%
55	U	160	90%
56	V	128	66%
57	W	140	91%
58	X	157	37%
59	Y	156	74%

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Mol	Chain	Length	Quality of chain
60	Z	145	 86% 7% 8%
61	a	136	 90% 8%
62	b	148	 98%
63	c	156	 57% 39%
64	d	115	 81% 7% 12%
65	e	125	 81% 15%
66	f	135	 91%
67	g	110	 95%
68	h	117	 97%
69	i	123	 93% 6%
70	j	105	 97%
71	k	97	 84% 5% 11%
72	l	70	 93% 6%
73	m	51	 92% 6%
74	n	128	 38% 61%
75	o	25	 96%
76	p	106	 94% 5%
77	q	92	 89% 10%
78	r	137	 91%
79	t	4803	 61% 15% 23%
80	u	76	 70% 29%
81	v	76	 61% 36%
82	w	20	 55% 45%
83	Cz	217	 88% 11%
84	y	4	 100%

## 2 Entry composition [i](#)

There are 87 unique types of molecules in this entry. The entry contains 218574 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, the AltConf column contains the number of residues with at least one atom in alternate conformation and the Trace column contains the number of residues modelled with at most 2 atoms.

- Molecule 1 is a RNA chain called RNA (1872-MER).

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
1	S2	1714	36502	16306	6533	11950	1713	0	0

- Molecule 2 is a protein called 40S ribosomal protein SA.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	SA	214	1693	1076	297	312	8	0	0

- Molecule 3 is a protein called 40S ribosomal protein S3a.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	SB	214	1738	1103	310	311	14	0	0

- Molecule 4 is a protein called 40S ribosomal protein S3.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	SD	226	1756	1119	316	314	7	0	0

- Molecule 5 is a protein called 40S ribosomal protein S4, X isoform.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
5	SE	259	2059	1316	383	352	8	0	0

- Molecule 6 is a protein called 40S ribosomal protein S5.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
6	SF	189	1495	934	284	270	7	0	0

- Molecule 7 is a protein called 40S ribosomal protein S7.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
7	SH	186	1497	956	274	266	1	0	0

- Molecule 8 is a protein called 40S ribosomal protein S8.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
8	SI	204	1673	1050	329	289	5	0	0

- Molecule 9 is a protein called 40S ribosomal protein S10.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
9	SK	98	827	539	148	134	6	0	0

- Molecule 10 is a protein called 40S ribosomal protein S11.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
10	SL	150	1220	776	228	210	6	0	0

- Molecule 11 is a protein called 40S ribosomal protein S15.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
11	SP	130	1073	681	205	180	7	0	0

- Molecule 12 is a protein called Rps16 protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
12	SQ	146	1158	736	218	200	4	0	0

- Molecule 13 is a protein called 40S ribosomal protein S17.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
13	SR	134	1079	676	201	198	4	0	0

- Molecule 14 is a protein called 40S ribosomal protein S18.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
14	SS	145	1198	751	242	203	2	0	0

- Molecule 15 is a protein called 40S ribosomal protein S19.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
15	ST	143	1115	698	217	198	2	0	0

- Molecule 16 is a protein called 40S ribosomal protein S20.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
16	SU	104	822	514	156	148	4	0	0

- Molecule 17 is a protein called 40S ribosomal protein S21.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
17	SV	82	626	382	118	121	5	0	0

- Molecule 18 is a protein called 40S ribosomal protein S23.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
18	SX	141	1098	693	219	183	3	0	0

- Molecule 19 is a protein called 40S ribosomal protein S26.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
19	Sa	103	826	515	172	134	5	0	0

- Molecule 20 is a protein called 40S ribosomal protein S28.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
20	Sc	64	506	308	102	94	2	0	0

- Molecule 21 is a protein called 40S ribosomal protein S29.



Mol	Chain	Residues	Atoms					AltConf	Trace
21	Sd	55	Total	C	N	O	S	0	0
			459	286	94	74	5		

- Molecule 22 is a protein called Receptor of activated protein C kinase 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
22	Sg	312	Total	C	N	O	S	0	0
			2429	1531	423	463	12		

- Molecule 23 is a protein called 40S ribosomal protein S2.

Mol	Chain	Residues	Atoms					AltConf	Trace
23	SC	225	Total	C	N	O	S	1	0
			1755	1134	303	309	9		

- Molecule 24 is a protein called 40S ribosomal protein S6.

Mol	Chain	Residues	Atoms					AltConf	Trace
24	SG	237	Total	C	N	O	S	0	0
			1923	1200	387	329	7		

- Molecule 25 is a protein called 40S ribosomal protein S9.

Mol	Chain	Residues	Atoms					AltConf	Trace
25	SJ	185	Total	C	N	O	S	1	0
			1533	974	309	248	2		

- Molecule 26 is a protein called 40S ribosomal protein S12.

Mol	Chain	Residues	Atoms					AltConf	Trace
26	SM	118	Total	C	N	O	S	0	0
			912	574	160	171	7		

- Molecule 27 is a protein called 40S ribosomal protein S13.

Mol	Chain	Residues	Atoms					AltConf	Trace
27	SN	150	Total	C	N	O	S	0	0
			1208	773	229	205	1		

- Molecule 28 is a protein called 40S ribosomal protein S14.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
28	SO	137	1024	627	200	191	6	0	0

- Molecule 29 is a protein called 40S ribosomal protein S15a.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
29	SW	129	1034	659	193	176	6	0	0

- Molecule 30 is a protein called 40S ribosomal protein S24.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
30	SY	131	1073	678	212	178	5	1	0

- Molecule 31 is a protein called 40S ribosomal protein S25.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
31	SZ	73	579	372	106	100	1	0	0

- Molecule 32 is a protein called 40S ribosomal protein S27.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
32	Sb	82	640	402	118	113	7	0	0

- Molecule 33 is a protein called Ubiquitin-like domain-containing protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
33	Se	57	452	281	99	71	1	0	0

- Molecule 34 is a protein called Ubiquitin-40S ribosomal protein S27a.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
34	Sf	67	547	345	102	93	7	0	0

- Molecule 35 is a protein called 60S ribosomal protein L8.

Mol	Chain	Residues	Atoms					AltConf	Trace
35	A	252	Total	C	N	O	S	0	0
			1930	1209	395	320	6		

- Molecule 36 is a protein called 60S ribosomal protein L3.

Mol	Chain	Residues	Atoms					AltConf	Trace
36	B	397	Total	C	N	O	S	0	0
			3204	2041	603	546	14		

- Molecule 37 is a protein called 60S ribosomal protein L4.

Mol	Chain	Residues	Atoms					AltConf	Trace
37	C	363	Total	C	N	O	S	0	0
			2889	1817	575	481	16		

- Molecule 38 is a RNA chain called RNA (157-MER).

Mol	Chain	Residues	Atoms					AltConf	Trace
38	D	157	Total	C	N	O	P	0	0
			3337	1489	587	1104	157		

- Molecule 39 is a RNA chain called RNA (121-MER).

Mol	Chain	Residues	Atoms					AltConf	Trace
39	E	119	Total	C	N	O	P	0	0
			2541	1132	454	836	119		

- Molecule 40 is a protein called 60S ribosomal protein L5.

Mol	Chain	Residues	Atoms					AltConf	Trace
40	F	294	Total	C	N	O	S	0	0
			2399	1511	442	432	14		

- Molecule 41 is a protein called 60S ribosomal protein L6.

Mol	Chain	Residues	Atoms					AltConf	Trace
41	G	243	Total	C	N	O	S	0	0
			1960	1251	375	330	4		

- Molecule 42 is a protein called 60S ribosomal protein L7.

Mol	Chain	Residues	Atoms					AltConf	Trace
42	H	225	Total	C	N	O	S	0	0
			1865	1199	357	301	8		

- Molecule 43 is a protein called 60S ribosomal protein L7a.

Mol	Chain	Residues	Atoms					AltConf	Trace
43	I	241	Total	C	N	O	S	0	0
			1935	1232	372	327	4		

- Molecule 44 is a protein called 60S ribosomal protein L9.

Mol	Chain	Residues	Atoms					AltConf	Trace
44	J	191	Total	C	N	O	S	0	0
			1528	961	285	276	6		

- Molecule 45 is a protein called 60S ribosomal protein L10.

Mol	Chain	Residues	Atoms					AltConf	Trace
45	K	208	Total	C	N	O	S	0	0
			1692	1074	327	278	13		

- Molecule 46 is a protein called 60S ribosomal protein L11.

Mol	Chain	Residues	Atoms					AltConf	Trace
46	L	170	Total	C	N	O	S	0	0
			1362	861	254	241	6		

- Molecule 47 is a protein called 60S ribosomal protein L13.

Mol	Chain	Residues	Atoms					AltConf	Trace
47	M	205	Total	C	N	O	S	0	0
			1659	1036	342	276	5		

- Molecule 48 is a protein called 60S ribosomal protein L14.

Mol	Chain	Residues	Atoms					AltConf	Trace
48	N	139	Total	C	N	O	S	0	0
			1142	732	221	182	7		

- Molecule 49 is a protein called Ribosomal protein L15.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
49	O	203	1701	1072	359	266	4	0	0

- Molecule 50 is a protein called 60S ribosomal protein L13a.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
50	P	197	1611	1038	316	252	5	0	0

- Molecule 51 is a protein called 60S ribosomal protein L17.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
51	Q	158	1282	804	248	221	9	0	0

- Molecule 52 is a protein called 60S ribosomal protein L18.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
52	R	187	1516	949	314	249	4	0	0

- Molecule 53 is a protein called Ribosomal protein L19.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
53	S	188	1572	974	337	252	9	0	0

- Molecule 54 is a protein called 60S ribosomal protein L18a.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
54	T	176	1458	929	284	234	11	0	0

- Molecule 55 is a protein called 60S ribosomal protein L21.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
55	U	158	1293	821	251	215	6	0	0

- Molecule 56 is a protein called 60S ribosomal protein L22.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
56	V	99	808	518	141	147	2	0	0

- Molecule 57 is a protein called 60S ribosomal protein L23.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
57	W	134	993	625	187	176	5	0	0

- Molecule 58 is a protein called 60S ribosomal protein L24.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
58	X	61	511	327	100	82	2	0	0

- Molecule 59 is a protein called 60S ribosomal protein L23a.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
59	Y	120	984	630	185	168	1	0	0

- Molecule 60 is a protein called 60S ribosomal protein L26.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
60	Z	134	1116	700	227	186	3	0	0

- Molecule 61 is a protein called 60S ribosomal protein L27.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
61	a	134	1103	712	207	181	3	0	0

- Molecule 62 is a protein called 60S ribosomal protein L27a.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
62	b	147	1165	736	240	185	4	0	0

- Molecule 63 is a protein called 60S ribosomal protein L29.

Mol	Chain	Residues	Atoms					AltConf	Trace
63	c	95	Total	C	N	O	S	0	0
			781	487	171	120	3		

- Molecule 64 is a protein called 60S ribosomal protein L30.

Mol	Chain	Residues	Atoms					AltConf	Trace
64	d	101	Total	C	N	O	S	0	0
			785	498	138	142	7		

- Molecule 65 is a protein called 60S ribosomal protein L31.

Mol	Chain	Residues	Atoms					AltConf	Trace
65	e	106	Total	C	N	O	S	0	0
			879	555	170	152	2		

- Molecule 66 is a protein called 60S ribosomal protein L32.

Mol	Chain	Residues	Atoms					AltConf	Trace
66	f	129	Total	C	N	O	S	0	0
			1064	673	220	166	5		

- Molecule 67 is a protein called 60S ribosomal protein L35a.

Mol	Chain	Residues	Atoms					AltConf	Trace
67	g	109	Total	C	N	O	S	0	0
			876	555	174	143	4		

- Molecule 68 is a protein called 60S ribosomal protein L34.

Mol	Chain	Residues	Atoms					AltConf	Trace
68	h	116	Total	C	N	O	S	0	0
			920	575	190	149	6		

- Molecule 69 is a protein called 60S ribosomal protein L35.

Mol	Chain	Residues	Atoms					AltConf	Trace
69	i	122	Total	C	N	O	S	0	0
			1015	643	204	167	1		

- Molecule 70 is a protein called 60S ribosomal protein L36.

Mol	Chain	Residues	Atoms					AltConf	Trace
70	j	104	Total	C	N	O	S	0	0
			849	531	180	133	5		

- Molecule 71 is a protein called Ribosomal protein L37.

Mol	Chain	Residues	Atoms					AltConf	Trace
71	k	86	Total	C	N	O	S	0	0
			705	434	155	111	5		

- Molecule 72 is a protein called 60S ribosomal protein L38.

Mol	Chain	Residues	Atoms					AltConf	Trace
72	l	69	Total	C	N	O	S	0	0
			569	366	103	99	1		

- Molecule 73 is a protein called 60S ribosomal protein L39.

Mol	Chain	Residues	Atoms					AltConf	Trace
73	m	50	Total	C	N	O	S	0	0
			444	281	98	64	1		

- Molecule 74 is a protein called Ubiquitin-60S ribosomal protein L40.

Mol	Chain	Residues	Atoms					AltConf	Trace
74	n	50	Total	C	N	O	S	0	0
			411	254	87	64	6		

- Molecule 75 is a protein called 60S ribosomal protein L41.

Mol	Chain	Residues	Atoms					AltConf	Trace
75	o	25	Total	C	N	O	S	0	0
			240	145	64	28	3		

- Molecule 76 is a protein called Ribosomal protein L36a.

Mol	Chain	Residues	Atoms					AltConf	Trace
76	p	105	Total	C	N	O	S	0	0
			863	542	175	140	6		

- Molecule 77 is a protein called 60S ribosomal protein L37a.



Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
77	q	91	708	444	135	122	7	0	0

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
q	87	GLU	LYS	conflict	UNP A0A6J2LF66

- Molecule 78 is a protein called 60S ribosomal protein L28.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
78	r	131	1059	655	224	175	5	0	0

- Molecule 79 is a RNA chain called RNA (4803-MER).

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
79	t	3679	78855	35119	14410	25647	3679	0	0

- Molecule 80 is a RNA chain called RNA (76-MER).

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
80	u	76	1613	720	283	535	75	0	0

There are 4 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
u	34	C	G	conflict	GB 1851728667
u	35	C	A	conflict	GB 1851728667
u	36	G	A	conflict	GB 1851728667
u	37	U	A	conflict	GB 1851728667

- Molecule 81 is a RNA chain called RNA (76-MER).

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
81	v	76	1618	721	287	534	76	0	0

There are 7 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
v	?	-	A	deletion	GB 1879656365
v	12	C	U	conflict	GB 1879656365
v	14	C	A	conflict	GB 1879656365
v	16	A	U	conflict	GB 1879656365
v	34	C	G	conflict	GB 1879656365
v	35	C	A	conflict	GB 1879656365
v	36	G	A	conflict	GB 1879656365

- Molecule 82 is a RNA chain called RNA (5'-D(P\*()P\*()P\*()P\*()-R(P\*UP\*UP\*AP\*CP\*G P\*GP\*CP\*GP\*GP\*UP\*()P\*()P\*()P\*()P\*()-3').

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
82	w	20	423	189	72	142	20	0	0

- Molecule 83 is a protein called 60S ribosomal protein L10a.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
83	Cz	217	1741	1113	312	307	9	0	0

- Molecule 84 is a protein called ALA-ALA-LYS-ALA.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
84	y	4	24	15	5	4	0	0

- Molecule 85 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		AltConf
85	S2	3	Total	Mg	0
			3	3	
85	B	1	Total	Mg	0
			1	1	
85	D	6	Total	Mg	0
			6	6	
85	E	9	Total	Mg	0
			9	9	
85	Z	1	Total	Mg	0
			1	1	
85	t	13	Total	Mg	0
			13	13	

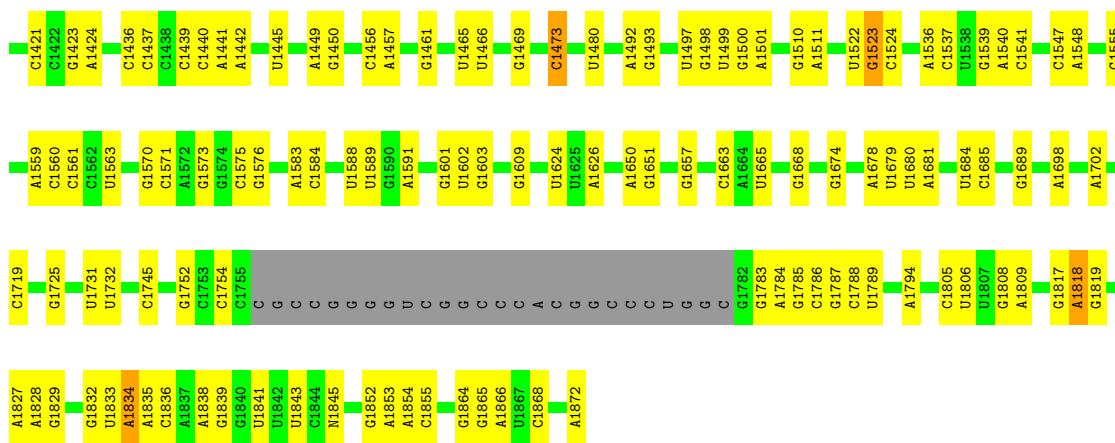
- Molecule 86 is ZINC ION (three-letter code: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		AltConf
86	S2	1	Total 1	Zn 1	0
86	Sa	1	Total 1	Zn 1	0
86	Sf	1	Total 1	Zn 1	0
86	k	1	Total 1	Zn 1	0
86	p	1	Total 1	Zn 1	0
86	q	1	Total 1	Zn 1	0

- Molecule 87 is water.

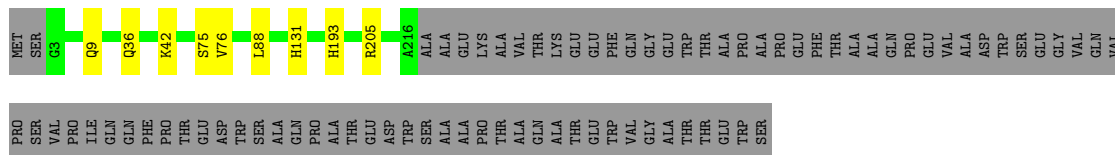
Mol	Chain	Residues	Atoms		AltConf
87	S2	5	Total 5	O 5	0
87	SS	1	Total 1	O 1	0
87	Sf	1	Total 1	O 1	0
87	u	1	Total 1	O 1	0





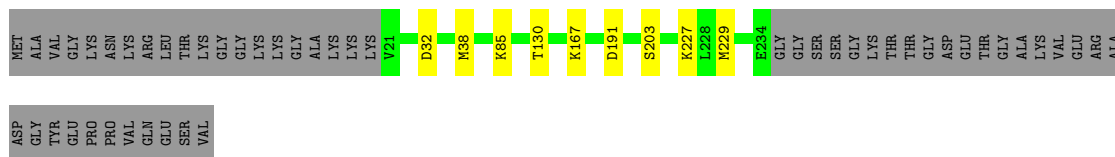
- Molecule 2: 40S ribosomal protein SA

Chain SA: 69% 27%



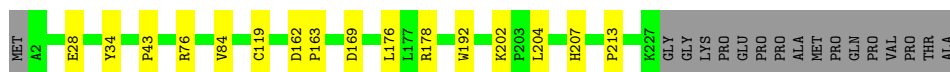
- Molecule 3: 40S ribosomal protein S3a

Chain SB: 78% 19%



- Molecule 4: 40S ribosomal protein S3

Chain SD: 86% 7% 7%



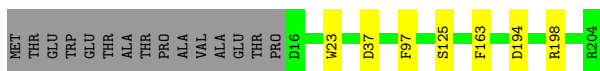
- Molecule 5: 40S ribosomal protein S4, X isoform

Chain SE: 92% 6%

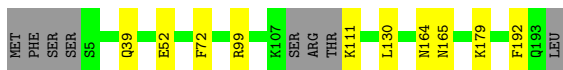


- Molecule 6: 40S ribosomal protein S5

Chain SF: 89% 7%



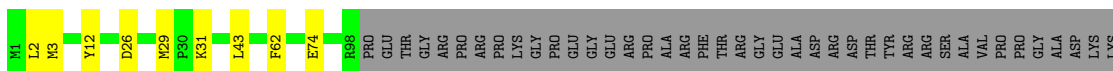
- Molecule 7: 40S ribosomal protein S7



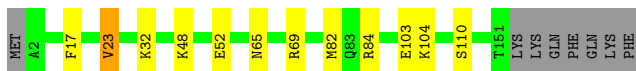
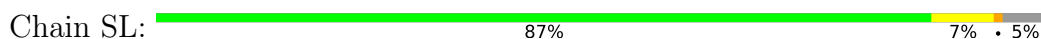
- Molecule 8: 40S ribosomal protein S8



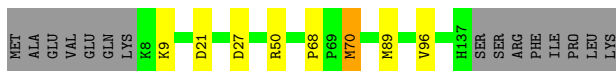
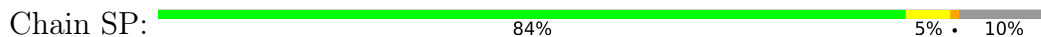
- Molecule 9: 40S ribosomal protein S10



- Molecule 10: 40S ribosomal protein S11



- Molecule 11: 40S ribosomal protein S15



- Molecule 12: Rps16 protein




- Molecule 13: 40S ribosomal protein S17

Chain SR:  94% 5%



- Molecule 14: 40S ribosomal protein S18

Chain SS:  88% 7% 5%




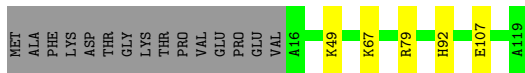
- Molecule 15: 40S ribosomal protein S19

Chain ST:  93% 6%




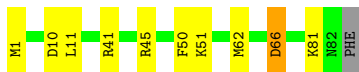
- Molecule 16: 40S ribosomal protein S20

Chain SU:  83% 13%



- Molecule 17: 40S ribosomal protein S21

Chain SV:  87% 11%




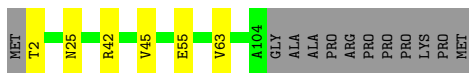
- Molecule 18: 40S ribosomal protein S23

Chain SX:  95%

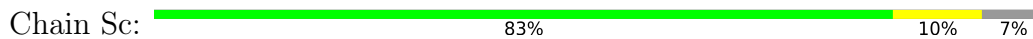


- Molecule 19: 40S ribosomal protein S26

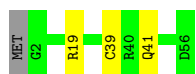
Chain Sa:  84% 5% 10%



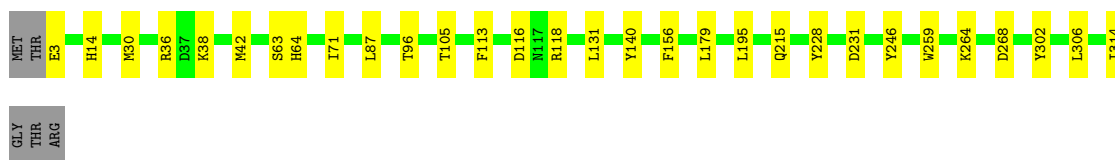
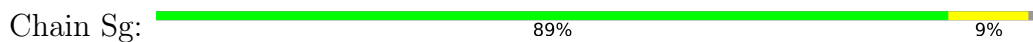
- Molecule 20: 40S ribosomal protein S28



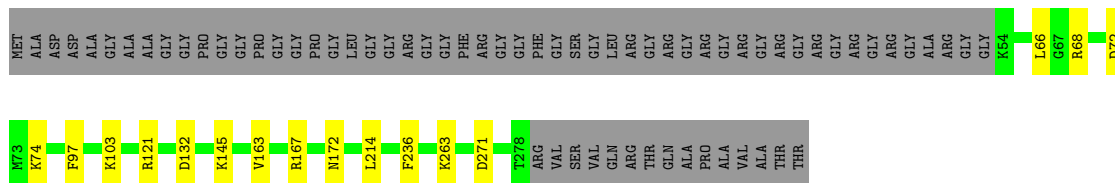
• Molecule 21: 40S ribosomal protein S29



• Molecule 22: Receptor of activated protein C kinase 1



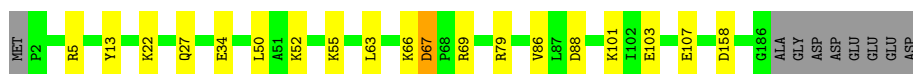
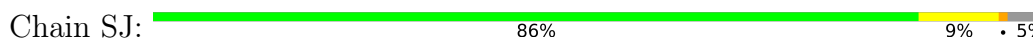
• Molecule 23: 40S ribosomal protein S2



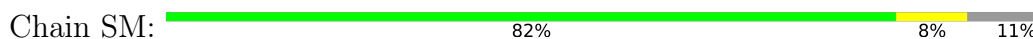
• Molecule 24: 40S ribosomal protein S6



• Molecule 25: 40S ribosomal protein S9



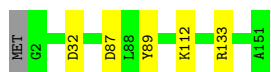
• Molecule 26: 40S ribosomal protein S12



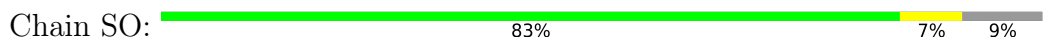




- Molecule 27: 40S ribosomal protein S13



- Molecule 28: 40S ribosomal protein S14



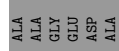
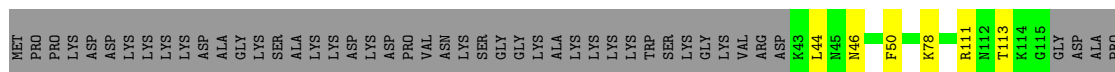
- Molecule 29: 40S ribosomal protein S15a



- Molecule 30: 40S ribosomal protein S24



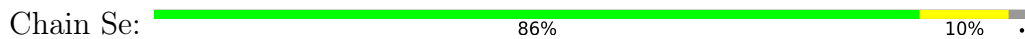
- Molecule 31: 40S ribosomal protein S25



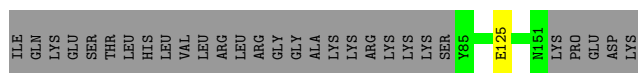
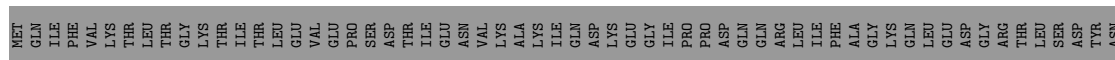
- Molecule 32: 40S ribosomal protein S27



- Molecule 33: Ubiquitin-like domain-containing protein



• Molecule 34: Ubiquitin-40S ribosomal protein S27a



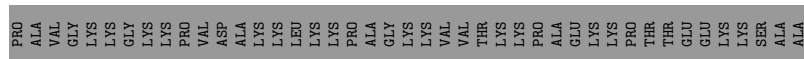
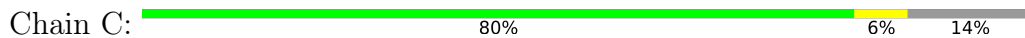
• Molecule 35: 60S ribosomal protein L8



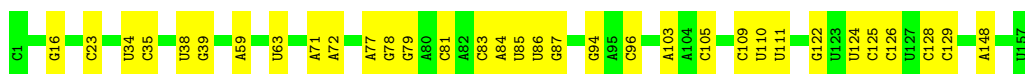
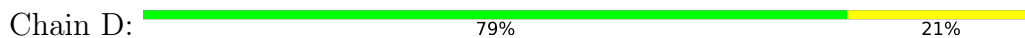
• Molecule 36: 60S ribosomal protein L3



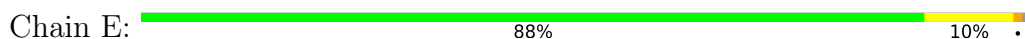
• Molecule 37: 60S ribosomal protein L4



• Molecule 38: RNA (157-MER)



• Molecule 39: RNA (121-MER)





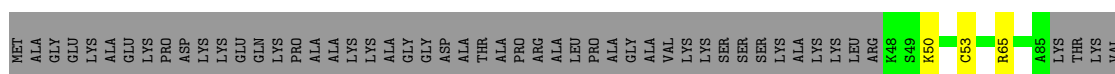
- Molecule 40: 60S ribosomal protein L5

Chain F: 95%



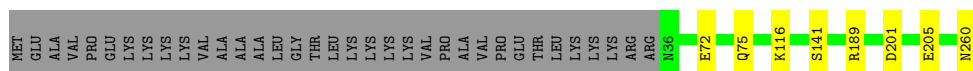
- Molecule 41: 60S ribosomal protein L6

Chain G: 79%



- Molecule 42: 60S ribosomal protein L7

Chain H: 83%



- Molecule 43: 60S ribosomal protein L7a

Chain I: 85%



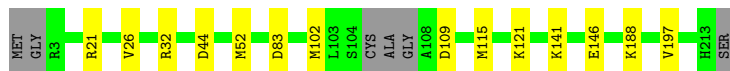
- Molecule 44: 60S ribosomal protein L9

Chain J: 93%




- Molecule 45: 60S ribosomal protein L10

Chain K: 91%



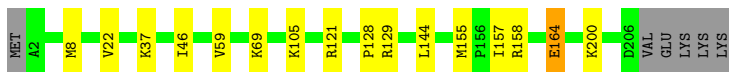
- Molecule 46: 60S ribosomal protein L11

Chain L:  87% 8%



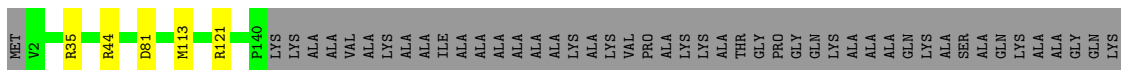
- Molecule 47: 60S ribosomal protein L13

Chain M:  90% 7%



- Molecule 48: 60S ribosomal protein L14

Chain N:  63% 35%



- Molecule 49: Ribosomal protein L15

Chain O:  95% 5%




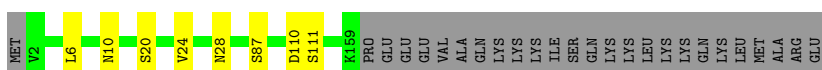
- Molecule 50: 60S ribosomal protein L13a

Chain P:  91% 6%



- Molecule 51: 60S ribosomal protein L17

Chain Q:  82% 14%

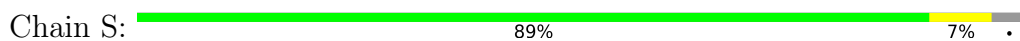


- Molecule 52: 60S ribosomal protein L18

Chain R:  95% 5%



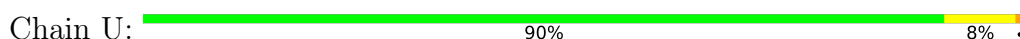
• Molecule 53: Ribosomal protein L19



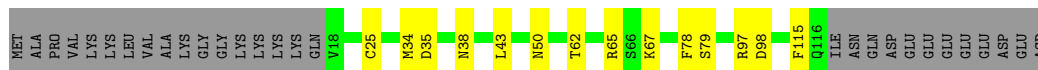
• Molecule 54: 60S ribosomal protein L18a



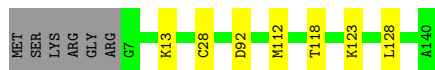
• Molecule 55: 60S ribosomal protein L21



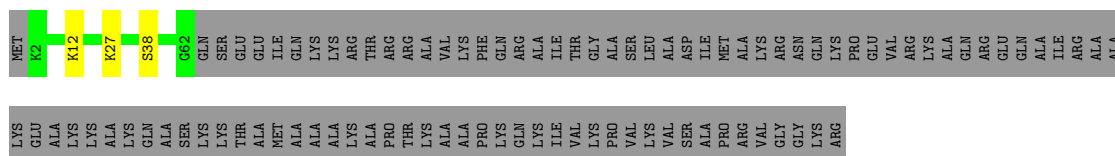
• Molecule 56: 60S ribosomal protein L22



• Molecule 57: 60S ribosomal protein L23

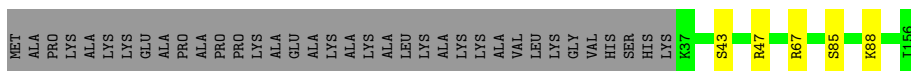


• Molecule 58: 60S ribosomal protein L24

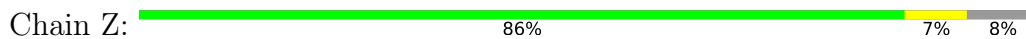


• Molecule 59: 60S ribosomal protein L23a

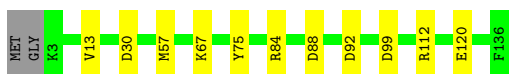
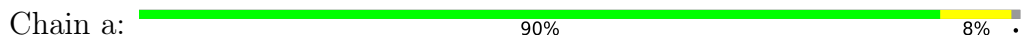




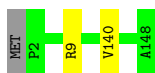
• Molecule 60: 60S ribosomal protein L26



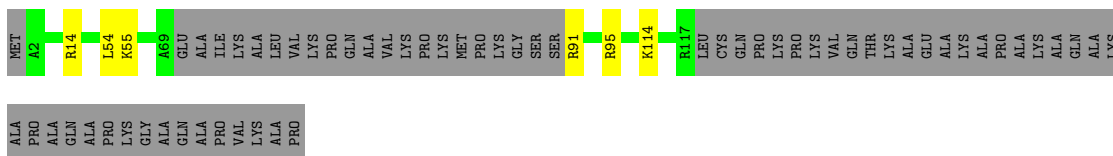
• Molecule 61: 60S ribosomal protein L27



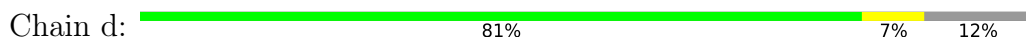
• Molecule 62: 60S ribosomal protein L27a



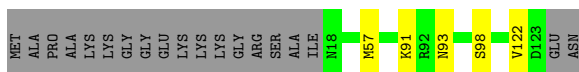
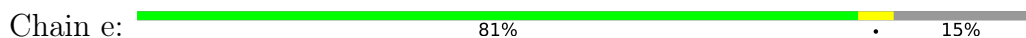
• Molecule 63: 60S ribosomal protein L29



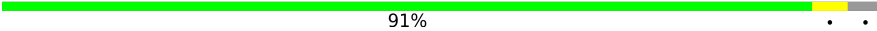
• Molecule 64: 60S ribosomal protein L30



• Molecule 65: 60S ribosomal protein L31



• Molecule 66: 60S ribosomal protein L32

Chain f:  91%



- Molecule 67: 60S ribosomal protein L35a

Chain g:  95%



- Molecule 68: 60S ribosomal protein L34

Chain h:  97%



- Molecule 69: 60S ribosomal protein L35

Chain i:  93% 6%




- Molecule 70: 60S ribosomal protein L36

Chain j:  97%



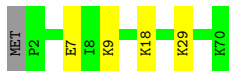
- Molecule 71: Ribosomal protein L37

Chain k:  84% 5% 11%



- Molecule 72: 60S ribosomal protein L38

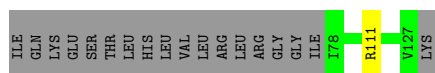
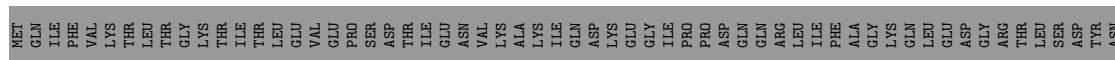
Chain l:  93% 6%



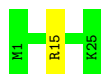
- Molecule 73: 60S ribosomal protein L39



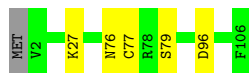
• Molecule 74: Ubiquitin-60S ribosomal protein L40



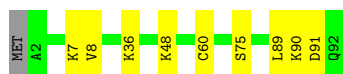
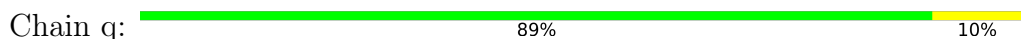
• Molecule 75: 60S ribosomal protein L41



• Molecule 76: Ribosomal protein L36a



• Molecule 77: 60S ribosomal protein L37a



• Molecule 78: 60S ribosomal protein L28



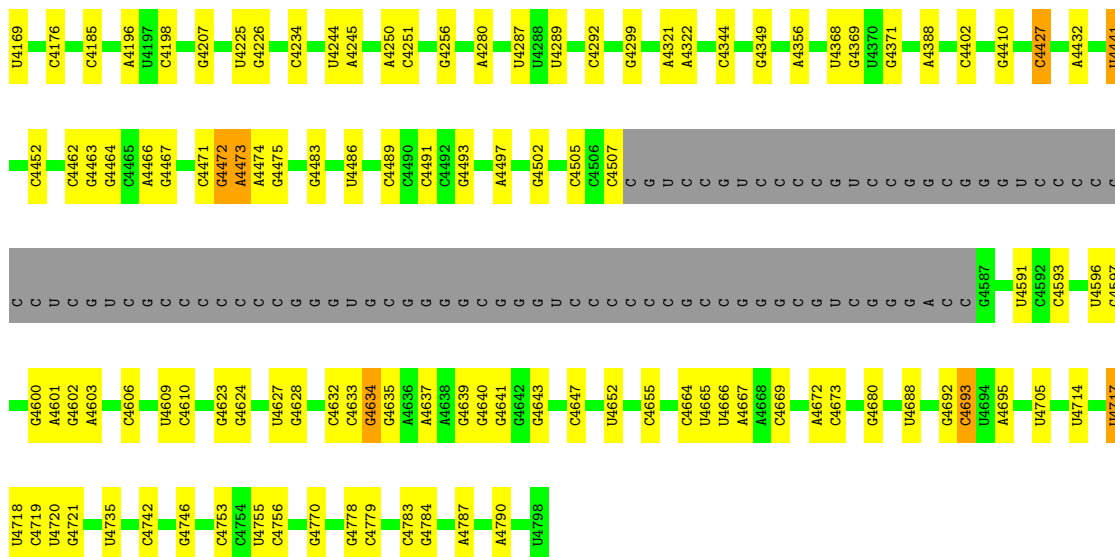
• Molecule 79: RNA (4803-MER)











• Molecule 80: RNA (76-MER)



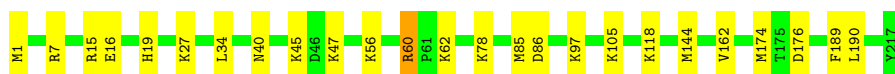
• Molecule 81: RNA (76-MER)



• Molecule 82: RNA (5'-D(P\*( )P\*( )P\*( )P\*( ))-R(P\*UP\*UP\*AP\*CP\*GP\*GP\*CP\*GP\*GP\*UP\*( )P\*( )P\*( )P\*( )P\*( ))-3')



• Molecule 83: 60S ribosomal protein L10a



• Molecule 84: ALA-ALA-LYS-ALA



There are no outlier residues recorded for this chain.

## 4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	62369	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	NONE	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ( $e^-/\text{\AA}^2$ )	30	Depositor
Minimum defocus (nm)	500	Depositor
Maximum defocus (nm)	3000	Depositor
Magnification	59000	Depositor
Image detector	FEI FALCON III (4k x 4k)	Depositor

## 5 Model quality i

### 5.1 Standard geometry i

Bond lengths and bond angles in the following residue types are not validated in this section: 5MC, ZN, UR3, MG, OMU, M7A, 4AC, 6MZ, OMG, B8N, A2M, 5MU, MA6, PSU, OMC, MMX

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with  $|Z| > 5$  is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z  >5	RMSZ	# Z  >5
1	S2	0.24	2/39984 (0.0%)	0.91	101/62292 (0.2%)
2	SA	0.28	0/1730	0.57	0/2350
3	SB	0.31	0/1765	0.61	1/2362 (0.0%)
4	SD	0.41	1/1784 (0.1%)	0.66	2/2402 (0.1%)
5	SE	0.33	1/2101 (0.0%)	0.61	0/2828
6	SF	0.30	0/1516	0.61	0/2037
7	SH	0.32	0/1519	0.59	0/2033
8	SI	0.30	0/1702	0.61	1/2271 (0.0%)
9	SK	0.28	0/851	0.57	0/1147
10	SL	0.32	0/1241	0.62	0/1662
11	SP	0.38	0/1094	0.69	2/1460 (0.1%)
12	SQ	0.38	0/1177	0.70	0/1575
13	SR	0.39	0/1093	0.70	0/1469
14	SS	0.34	0/1216	0.70	1/1628 (0.1%)
15	ST	0.28	0/1134	0.58	1/1519 (0.1%)
16	SU	0.31	0/832	0.62	0/1117
17	SV	0.32	0/632	0.75	2/845 (0.2%)
18	SX	0.31	0/1116	0.66	0/1490
19	Sa	0.28	0/841	0.62	0/1128
20	Sc	0.27	0/508	0.75	1/680 (0.1%)
21	Sd	0.26	0/470	0.58	0/623
22	Sg	0.28	0/2486	0.62	0/3384
23	SC	0.31	0/1795	0.59	1/2424 (0.0%)
24	SG	0.27	0/1946	0.64	1/2590 (0.0%)
25	SJ	0.28	0/1561	0.66	1/2083 (0.0%)
26	SM	0.24	0/922	0.52	0/1237
27	SN	0.24	0/1232	0.53	0/1656
28	SO	0.25	0/1037	0.61	0/1391
29	SW	0.28	0/1051	0.61	0/1406
30	SY	0.27	0/1094	0.59	0/1452
31	SZ	0.33	0/585	0.68	0/785
32	Sb	0.29	0/653	0.59	0/876

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z  >5	RMSZ	# Z  >5
33	Se	0.29	0/458	0.61	0/604
34	Sf	0.27	0/559	0.54	0/743
35	A	0.28	0/1968	0.57	0/2639
36	B	0.26	0/3272	0.59	3/4380 (0.1%)
37	C	0.31	0/2943	0.60	1/3951 (0.0%)
38	D	0.23	0/3726	0.87	1/5804 (0.0%)
39	E	0.24	0/2839	0.94	7/4425 (0.2%)
40	F	0.26	0/2444	0.53	0/3272
41	G	0.27	0/1998	0.58	0/2676
42	H	0.26	0/1900	0.53	0/2534
43	I	0.26	0/1968	0.58	2/2649 (0.1%)
44	J	0.31	0/1547	0.61	1/2080 (0.0%)
45	K	0.26	0/1730	0.60	2/2311 (0.1%)
46	L	0.29	0/1385	0.63	0/1852
47	M	0.27	0/1690	0.64	1/2261 (0.0%)
48	N	0.29	0/1164	0.64	1/1556 (0.1%)
49	O	0.24	0/1746	0.59	0/2338
50	P	0.29	0/1641	0.59	1/2195 (0.0%)
51	Q	0.24	0/1309	0.54	0/1756
52	R	0.26	0/1540	0.62	0/2054
53	S	0.28	0/1588	0.68	1/2099 (0.0%)
54	T	0.26	0/1498	0.62	1/2010 (0.0%)
55	U	0.28	0/1321	0.59	0/1764
56	V	0.34	0/822	0.69	1/1103 (0.1%)
57	W	0.27	0/1007	0.61	1/1350 (0.1%)
58	X	0.31	0/524	0.60	0/698
59	Y	0.26	0/1001	0.58	0/1345
60	Z	0.29	0/1132	0.63	1/1503 (0.1%)
61	a	0.29	0/1126	0.66	3/1502 (0.2%)
62	b	0.24	0/1194	0.55	0/1594
63	c	0.24	0/794	0.55	0/1045
64	d	0.25	0/796	0.54	0/1068
65	e	0.26	0/894	0.57	0/1204
66	f	0.26	0/1082	0.61	1/1443 (0.1%)
67	g	0.26	0/895	0.60	0/1198
68	h	0.25	0/930	0.59	0/1238
69	i	0.26	0/1023	0.56	0/1350
70	j	0.25	0/860	0.63	0/1137
71	k	0.25	0/720	0.60	0/952
72	l	0.30	0/575	0.60	0/761
73	m	0.24	0/454	0.59	0/599
74	n	0.26	0/417	0.58	0/553
75	o	0.27	0/241	0.79	0/305

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z  >5	RMSZ	# Z  >5
76	p	0.30	0/877	0.63	0/1156
77	q	0.25	0/718	0.60	1/954 (0.1%)
78	r	0.25	0/1074	0.65	1/1437 (0.1%)
79	t	0.28	15/88201 (0.0%)	0.94	185/137564 (0.1%)
80	u	0.26	0/1800	1.03	7/2804 (0.2%)
81	v	0.26	0/1806	1.00	12/2813 (0.4%)
82	w	0.19	0/471	0.88	1/731 (0.1%)
83	Cz	0.27	0/1769	0.57	0/2371
84	y	0.20	0/23	0.42	0/29
All	All	0.27	19/234128 (0.0%)	0.83	351/343962 (0.1%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
12	SQ	0	1

The worst 5 of 19 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
79	t	479	G	O3'-P	-11.60	1.47	1.61
1	S2	1833	UR3	O3'-P	-10.51	1.48	1.61
4	SD	163	PRO	C-N	9.23	1.55	1.34
79	t	490	G	O3'-P	7.26	1.69	1.61
79	t	1990	G	O5'-C5'	-6.66	1.32	1.42

The worst 5 of 351 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
79	t	4473	A	O5'-P-OP1	-59.17	39.70	110.70
79	t	3797	G	O5'-P-OP2	-45.67	55.89	110.70
79	t	3797	G	O5'-P-OP1	-34.01	69.89	110.70
79	t	4473	A	O5'-P-OP2	24.62	140.25	110.70
1	S2	115	U	C2-N3-C4	19.48	138.69	127.00

There are no chirality outliers.

All (1) planarity outliers are listed below:



Mol	Chain	Res	Type	Group
12	SQ	75	GLY	Peptide

## 5.2 Too-close contacts [i](#)

Due to software issues we are unable to calculate clashes - this section is therefore empty.

## 5.3 Torsion angles [i](#)

### 5.3.1 Protein backbone [i](#)

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all PDB entries followed by that with respect to all EM entries.

The Analysed column shows the number of residues for which the backbone conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
2	SA	212/295 (72%)	196 (92%)	16 (8%)	0	100	100
3	SB	212/264 (80%)	201 (95%)	9 (4%)	2 (1%)	17	43
4	SD	224/243 (92%)	197 (88%)	23 (10%)	4 (2%)	8	25
5	SE	257/263 (98%)	238 (93%)	16 (6%)	3 (1%)	13	35
6	SF	187/204 (92%)	172 (92%)	15 (8%)	0	100	100
7	SH	182/194 (94%)	169 (93%)	12 (7%)	1 (0%)	29	57
8	SI	202/208 (97%)	183 (91%)	17 (8%)	2 (1%)	15	40
9	SK	96/165 (58%)	87 (91%)	9 (9%)	0	100	100
10	SL	148/158 (94%)	140 (95%)	6 (4%)	2 (1%)	11	31
11	SP	128/145 (88%)	121 (94%)	7 (6%)	0	100	100
12	SQ	144/146 (99%)	133 (92%)	9 (6%)	2 (1%)	11	31
13	SR	132/135 (98%)	115 (87%)	16 (12%)	1 (1%)	19	46
14	SS	143/152 (94%)	127 (89%)	15 (10%)	1 (1%)	22	50
15	ST	141/145 (97%)	134 (95%)	7 (5%)	0	100	100
16	SU	102/119 (86%)	95 (93%)	6 (6%)	1 (1%)	15	40
17	SV	80/83 (96%)	75 (94%)	5 (6%)	0	100	100
18	SX	139/143 (97%)	123 (88%)	16 (12%)	0	100	100
19	Sa	101/115 (88%)	95 (94%)	6 (6%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
20	Sc	62/69 (90%)	51 (82%)	11 (18%)	0	100	100
21	Sd	53/56 (95%)	50 (94%)	3 (6%)	0	100	100
22	Sg	310/317 (98%)	273 (88%)	37 (12%)	0	100	100
23	SC	224/293 (76%)	208 (93%)	16 (7%)	0	100	100
24	SG	235/249 (94%)	217 (92%)	18 (8%)	0	100	100
25	SJ	184/194 (95%)	169 (92%)	14 (8%)	1 (0%)	29	57
26	SM	116/132 (88%)	101 (87%)	15 (13%)	0	100	100
27	SN	148/151 (98%)	145 (98%)	3 (2%)	0	100	100
28	SO	135/151 (89%)	120 (89%)	15 (11%)	0	100	100
29	SW	127/130 (98%)	123 (97%)	4 (3%)	0	100	100
30	SY	130/133 (98%)	118 (91%)	12 (9%)	0	100	100
31	SZ	71/125 (57%)	62 (87%)	9 (13%)	0	100	100
32	Sb	80/84 (95%)	75 (94%)	5 (6%)	0	100	100
33	Se	55/59 (93%)	48 (87%)	7 (13%)	0	100	100
34	Sf	65/156 (42%)	51 (78%)	14 (22%)	0	100	100
35	A	250/257 (97%)	231 (92%)	19 (8%)	0	100	100
36	B	395/403 (98%)	367 (93%)	28 (7%)	0	100	100
37	C	361/421 (86%)	333 (92%)	21 (6%)	7 (2%)	8	24
40	F	292/297 (98%)	275 (94%)	15 (5%)	2 (1%)	22	50
41	G	239/298 (80%)	209 (87%)	28 (12%)	2 (1%)	19	46
42	H	223/260 (86%)	210 (94%)	13 (6%)	0	100	100
43	I	239/266 (90%)	222 (93%)	17 (7%)	0	100	100
44	J	189/192 (98%)	176 (93%)	12 (6%)	1 (0%)	29	57
45	K	204/214 (95%)	193 (95%)	11 (5%)	0	100	100
46	L	168/178 (94%)	159 (95%)	8 (5%)	1 (1%)	25	53
47	M	203/211 (96%)	175 (86%)	25 (12%)	3 (2%)	10	30
48	N	137/214 (64%)	132 (96%)	5 (4%)	0	100	100
49	O	201/204 (98%)	191 (95%)	9 (4%)	1 (0%)	29	57
50	P	195/203 (96%)	189 (97%)	5 (3%)	1 (0%)	29	57
51	Q	156/184 (85%)	151 (97%)	5 (3%)	0	100	100
52	R	185/188 (98%)	172 (93%)	13 (7%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
53	S	186/196 (95%)	180 (97%)	6 (3%)	0	100	100
54	T	174/176 (99%)	160 (92%)	14 (8%)	0	100	100
55	U	156/160 (98%)	149 (96%)	6 (4%)	1 (1%)	25	53
56	V	97/128 (76%)	94 (97%)	3 (3%)	0	100	100
57	W	132/140 (94%)	126 (96%)	6 (4%)	0	100	100
58	X	59/157 (38%)	56 (95%)	3 (5%)	0	100	100
59	Y	118/156 (76%)	114 (97%)	4 (3%)	0	100	100
60	Z	132/145 (91%)	124 (94%)	8 (6%)	0	100	100
61	a	132/136 (97%)	122 (92%)	10 (8%)	0	100	100
62	b	145/148 (98%)	133 (92%)	12 (8%)	0	100	100
63	c	91/156 (58%)	86 (94%)	5 (6%)	0	100	100
64	d	99/115 (86%)	93 (94%)	6 (6%)	0	100	100
65	e	104/125 (83%)	99 (95%)	5 (5%)	0	100	100
66	f	127/135 (94%)	118 (93%)	8 (6%)	1 (1%)	19	46
67	g	107/110 (97%)	102 (95%)	5 (5%)	0	100	100
68	h	114/117 (97%)	106 (93%)	8 (7%)	0	100	100
69	i	120/123 (98%)	113 (94%)	7 (6%)	0	100	100
70	j	102/105 (97%)	95 (93%)	7 (7%)	0	100	100
71	k	84/97 (87%)	79 (94%)	3 (4%)	2 (2%)	6	19
72	l	67/70 (96%)	66 (98%)	1 (2%)	0	100	100
73	m	48/51 (94%)	45 (94%)	3 (6%)	0	100	100
74	n	48/128 (38%)	46 (96%)	2 (4%)	0	100	100
75	o	23/25 (92%)	22 (96%)	1 (4%)	0	100	100
76	p	103/106 (97%)	93 (90%)	9 (9%)	1 (1%)	15	40
77	q	89/92 (97%)	83 (93%)	6 (7%)	0	100	100
78	r	129/137 (94%)	114 (88%)	15 (12%)	0	100	100
83	Cz	215/217 (99%)	183 (85%)	31 (14%)	1 (0%)	29	57
84	y	2/4 (50%)	2 (100%)	0	0	100	100
All	All	11465/12921 (89%)	10600 (92%)	821 (7%)	44 (0%)	38	62

5 of 44 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
3	SB	191	ASP
5	SE	165	GLU
10	SL	82	MET
37	C	55	SER
37	C	58	ALA

### 5.3.2 Protein sidechains [i](#)

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all PDB entries followed by that with respect to all EM entries.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
2	SA	179/242 (74%)	170 (95%)	9 (5%)	24	53
3	SB	195/231 (84%)	189 (97%)	6 (3%)	40	71
4	SD	189/202 (94%)	179 (95%)	10 (5%)	22	50
5	SE	222/225 (99%)	210 (95%)	12 (5%)	22	49
6	SF	159/171 (93%)	152 (96%)	7 (4%)	28	58
7	SH	166/174 (95%)	157 (95%)	9 (5%)	22	49
8	SI	177/180 (98%)	165 (93%)	12 (7%)	16	38
9	SK	89/136 (65%)	80 (90%)	9 (10%)	7	20
10	SL	134/142 (94%)	123 (92%)	11 (8%)	11	29
11	SP	116/130 (89%)	109 (94%)	7 (6%)	19	45
12	SQ	121/121 (100%)	112 (93%)	9 (7%)	13	35
13	SR	120/121 (99%)	114 (95%)	6 (5%)	24	53
14	SS	126/132 (96%)	115 (91%)	11 (9%)	10	27
15	ST	113/115 (98%)	106 (94%)	7 (6%)	18	43
16	SU	94/107 (88%)	90 (96%)	4 (4%)	29	59
17	SV	66/67 (98%)	57 (86%)	9 (14%)	3	9
18	SX	113/115 (98%)	108 (96%)	5 (4%)	28	58
19	Sa	89/98 (91%)	83 (93%)	6 (7%)	16	39
20	Sc	57/62 (92%)	51 (90%)	6 (10%)	7	18
21	Sd	48/49 (98%)	45 (94%)	3 (6%)	18	42

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
22	Sg	271/275 (98%)	241 (89%)	30 (11%)	6	16
23	SC	191/224 (85%)	176 (92%)	15 (8%)	12	31
24	SG	207/218 (95%)	194 (94%)	13 (6%)	18	42
25	SJ	162/168 (96%)	144 (89%)	18 (11%)	6	16
26	SM	98/108 (91%)	88 (90%)	10 (10%)	7	20
27	SN	130/131 (99%)	125 (96%)	5 (4%)	33	64
28	SO	107/119 (90%)	96 (90%)	11 (10%)	7	19
29	SW	112/113 (99%)	102 (91%)	10 (9%)	9	26
30	SY	114/115 (99%)	105 (92%)	9 (8%)	12	31
31	SZ	64/103 (62%)	58 (91%)	6 (9%)	8	23
32	Sb	74/76 (97%)	67 (90%)	7 (10%)	8	23
33	Se	46/48 (96%)	40 (87%)	6 (13%)	4	11
34	Sf	60/140 (43%)	59 (98%)	1 (2%)	60	83
35	A	194/199 (98%)	183 (94%)	11 (6%)	20	47
36	B	345/349 (99%)	332 (96%)	13 (4%)	33	64
37	C	304/349 (87%)	286 (94%)	18 (6%)	19	45
40	F	248/250 (99%)	238 (96%)	10 (4%)	31	62
41	G	216/256 (84%)	210 (97%)	6 (3%)	43	73
42	H	195/224 (87%)	187 (96%)	8 (4%)	30	61
43	I	205/223 (92%)	191 (93%)	14 (7%)	16	38
44	J	171/172 (99%)	159 (93%)	12 (7%)	15	37
45	K	178/181 (98%)	166 (93%)	12 (7%)	16	39
46	L	143/149 (96%)	129 (90%)	14 (10%)	8	21
47	M	171/177 (97%)	158 (92%)	13 (8%)	13	33
48	N	118/157 (75%)	114 (97%)	4 (3%)	37	67
49	O	171/172 (99%)	162 (95%)	9 (5%)	22	50
50	P	169/173 (98%)	159 (94%)	10 (6%)	19	45
51	Q	139/163 (85%)	131 (94%)	8 (6%)	20	46
52	R	164/165 (99%)	155 (94%)	9 (6%)	21	49
53	S	167/175 (95%)	154 (92%)	13 (8%)	12	32
54	T	156/156 (100%)	150 (96%)	6 (4%)	33	64

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
55	U	139/140 (99%)	125 (90%)	14 (10%)	7	20
56	V	89/114 (78%)	76 (85%)	13 (15%)	3	8
57	W	102/107 (95%)	96 (94%)	6 (6%)	19	45
58	X	53/126 (42%)	50 (94%)	3 (6%)	20	47
59	Y	108/133 (81%)	103 (95%)	5 (5%)	27	56
60	Z	124/135 (92%)	115 (93%)	9 (7%)	14	35
61	a	117/118 (99%)	109 (93%)	8 (7%)	16	38
62	b	120/121 (99%)	118 (98%)	2 (2%)	60	83
63	c	80/124 (64%)	74 (92%)	6 (8%)	13	34
64	d	86/97 (89%)	78 (91%)	8 (9%)	9	24
65	e	97/110 (88%)	92 (95%)	5 (5%)	23	51
66	f	115/121 (95%)	111 (96%)	4 (4%)	36	67
67	g	88/89 (99%)	84 (96%)	4 (4%)	27	57
68	h	99/100 (99%)	96 (97%)	3 (3%)	41	72
69	i	109/110 (99%)	102 (94%)	7 (6%)	17	41
70	j	88/89 (99%)	86 (98%)	2 (2%)	50	78
71	k	73/80 (91%)	70 (96%)	3 (4%)	30	61
72	l	64/65 (98%)	60 (94%)	4 (6%)	18	42
73	m	47/48 (98%)	44 (94%)	3 (6%)	17	41
74	n	46/116 (40%)	45 (98%)	1 (2%)	52	79
75	o	24/24 (100%)	23 (96%)	1 (4%)	30	60
76	p	93/94 (99%)	89 (96%)	4 (4%)	29	59
77	q	74/75 (99%)	66 (89%)	8 (11%)	6	17
78	r	115/121 (95%)	110 (96%)	5 (4%)	29	59
83	Cz	195/196 (100%)	170 (87%)	25 (13%)	4	11
84	y	1/1 (100%)	1 (100%)	0	100	100
All	All	10009/11002 (91%)	9367 (94%)	642 (6%)	21	41

5 of 642 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
52	R	17	GLU
67	g	95	LYS

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Mol	Chain	Res	Type
53	S	108	ARG
52	R	14	ARG
57	W	123	LYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 76 such sidechains are listed below:

Mol	Chain	Res	Type
59	Y	93	ASN
78	r	23	GLN
61	a	132	GLN
66	f	107	ASN
83	Cz	158	GLN

### 5.3.3 RNA [i](#)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
1	S2	1690/1872 (90%)	391 (23%)	19 (1%)
38	D	156/157 (99%)	32 (20%)	1 (0%)
39	E	118/121 (97%)	11 (9%)	0
79	t	3659/4803 (76%)	687 (18%)	0
80	u	75/76 (98%)	20 (26%)	0
81	v	75/76 (98%)	26 (34%)	0
82	w	19/20 (95%)	8 (42%)	0
All	All	5792/7125 (81%)	1175 (20%)	20 (0%)

5 of 1175 RNA backbone outliers are listed below:

Mol	Chain	Res	Type
1	S2	2	A
1	S2	9	U
1	S2	25	A
1	S2	33	G
1	S2	41	G

5 of 20 RNA pucker outliers are listed below:

Mol	Chain	Res	Type
1	S2	1575	C
1	S2	1818	A
38	D	86	U

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Mol	Chain	Res	Type
1	S2	1827	A
1	S2	561	G

## 5.4 Non-standard residues in protein, DNA, RNA chains [i](#)

33 non-standard protein/DNA/RNA residues are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with  $|Z| > 2$  is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# $ Z  > 2$	Counts	RMSZ	# $ Z  > 2$
1	OMC	S2	1706	1	19,22,23	0.50	0	26,31,34	0.66	0
1	4AC	S2	1845	1	21,24,25	3.56	10 (47%)	29,34,37	1.13	3 (10%)
1	5MU	S2	817	1	19,22,23	0.40	0	28,32,35	0.91	2 (7%)
1	PSU	S2	1084	1	18,21,22	1.06	1 (5%)	22,30,33	1.71	4 (18%)
1	PSU	S2	1246	1	18,21,22	1.08	1 (5%)	22,30,33	1.72	4 (18%)
1	PSU	S2	825	1	18,21,22	1.10	1 (5%)	22,30,33	1.70	4 (18%)
1	OMU	S2	121	1	19,22,23	1.39	3 (15%)	26,31,34	1.96	7 (26%)
1	UR3	S2	1833	1	19,22,23	3.00	7 (36%)	26,32,35	1.65	4 (15%)
1	OMC	S2	520	1	19,22,23	0.52	0	26,31,34	0.77	0
1	4AC	S2	1340	1	21,24,25	3.56	10 (47%)	29,34,37	1.12	3 (10%)
1	OMG	S2	686	1	18,26,27	1.10	2 (11%)	19,38,41	0.85	1 (5%)
1	A2M	S2	1681	1	18,25,26	3.56	8 (44%)	18,36,39	3.34	4 (22%)
1	MMX	S2	571	1	19,23,24	4.00	4 (21%)	22,33,36	2.83	6 (27%)
1	OMU	S2	116	1	19,22,23	3.10	8 (42%)	26,31,34	1.69	5 (19%)
1	M7A	S2	1809	1	20,25,26	2.07	3 (15%)	28,37,40	4.10	8 (28%)
1	B8N	S2	1251	1	24,29,30	3.06	5 (20%)	29,42,45	1.74	5 (17%)
1	6MZ	S2	1835	1	18,25,26	5.58	13 (72%)	16,36,39	5.12	11 (68%)
1	A2M	S2	671	1	18,25,26	3.61	8 (44%)	18,36,39	3.47	6 (33%)
1	A2M	S2	166	1	18,25,26	3.58	8 (44%)	18,36,39	3.36	3 (16%)
1	OMG	S2	512	1	18,26,27	1.11	2 (11%)	19,38,41	0.85	1 (5%)
1	A2M	S2	27	1	18,25,26	3.59	8 (44%)	18,36,39	3.32	4 (22%)



Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
1	A2M	S2	487	1	18,25,26	3.63	8 (44%)	18,36,39	3.41	3 (16%)
1	A2M	S2	159	1	18,25,26	3.61	8 (44%)	18,36,39	3.44	5 (27%)
1	OMC	S2	1713	1	19,22,23	0.51	0	26,31,34	0.67	0
1	MA6	S2	1853	1	18,26,27	1.04	2 (11%)	19,38,41	3.32	2 (10%)
1	A2M	S2	1034	1	18,25,26	3.58	8 (44%)	18,36,39	3.36	4 (22%)
1	PSU	S2	119	1	18,21,22	1.10	1 (5%)	22,30,33	1.71	4 (18%)
1	PSU	S2	615	1	18,21,22	1.02	1 (5%)	22,30,33	1.66	4 (18%)
1	OMG	S2	647	1	18,26,27	1.11	2 (11%)	19,38,41	0.85	1 (5%)
1	PSU	S2	826	1	18,21,22	1.08	1 (5%)	22,30,33	1.66	5 (22%)
1	5MC	S2	1377	1	18,22,23	0.53	0	26,32,35	0.75	0
1	MA6	S2	1854	1	18,26,27	1.03	2 (11%)	19,38,41	3.36	2 (10%)
1	OMC	S2	174	1	19,22,23	0.51	0	26,31,34	0.67	0

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
1	OMC	S2	1706	1	-	0/9/27/28	0/2/2/2
1	4AC	S2	1845	1	-	0/11/29/30	0/2/2/2
1	5MU	S2	817	1	-	0/7/25/26	0/2/2/2
1	PSU	S2	1084	1	-	0/7/25/26	0/2/2/2
1	PSU	S2	1246	1	-	2/7/25/26	0/2/2/2
1	PSU	S2	825	1	-	0/7/25/26	0/2/2/2
1	OMU	S2	121	1	-	1/9/27/28	0/2/2/2
1	UR3	S2	1833	1	-	2/7/25/26	0/2/2/2
1	OMC	S2	520	1	-	2/9/27/28	0/2/2/2
1	4AC	S2	1340	1	-	0/11/29/30	0/2/2/2
1	OMG	S2	686	1	-	2/5/27/28	0/3/3/3
1	A2M	S2	1681	1	-	2/5/27/28	0/3/3/3
1	MMX	S2	571	1	-	4/9/44/45	0/2/2/2
1	OMU	S2	116	1	-	2/9/27/28	0/2/2/2
1	M7A	S2	1809	1	-	1/7/37/38	0/3/3/3
1	B8N	S2	1251	1	-	2/16/34/35	0/2/2/2
1	6MZ	S2	1835	1	-	1/5/27/28	0/3/3/3
1	A2M	S2	671	1	-	1/5/27/28	0/3/3/3
1	A2M	S2	166	1	-	0/5/27/28	0/3/3/3
1	OMG	S2	512	1	-	0/5/27/28	0/3/3/3

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
1	A2M	S2	27	1	-	2/5/27/28	0/3/3/3
1	A2M	S2	487	1	-	0/5/27/28	0/3/3/3
1	A2M	S2	159	1	-	1/5/27/28	0/3/3/3
1	OMC	S2	1713	1	-	0/9/27/28	0/2/2/2
1	MA6	S2	1853	1	-	5/7/29/30	0/3/3/3
1	A2M	S2	1034	1	-	0/5/27/28	0/3/3/3
1	PSU	S2	119	1	-	0/7/25/26	0/2/2/2
1	PSU	S2	615	1	-	0/7/25/26	0/2/2/2
1	OMG	S2	647	1	-	2/5/27/28	0/3/3/3
1	PSU	S2	826	1	-	2/7/25/26	0/2/2/2
1	5MC	S2	1377	1	-	0/7/25/26	0/2/2/2
1	MA6	S2	1854	1	-	6/7/29/30	0/3/3/3
1	OMC	S2	174	1	-	0/9/27/28	0/2/2/2

The worst 5 of 135 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	S2	1835	6MZ	O3'-C3'	11.94	1.71	1.43
1	S2	1835	6MZ	O4'-C1'	-11.56	1.24	1.41
1	S2	571	MMX	C2-N1	10.18	1.50	1.37
1	S2	571	MMX	C4-N3	9.93	1.53	1.45
1	S2	1835	6MZ	C3'-C4'	-8.85	1.30	1.53

The worst 5 of 115 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	S2	1809	M7A	C5-C6-N6	13.86	147.41	123.74
1	S2	1854	MA6	N1-C6-N6	-13.27	103.09	117.06
1	S2	1853	MA6	N1-C6-N6	-13.16	103.21	117.06
1	S2	1809	M7A	N6-C6-N1	-11.78	92.55	118.35
1	S2	671	A2M	C5-C6-N6	10.59	136.44	120.35

There are no chirality outliers.

5 of 40 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
1	S2	27	A2M	C3'-C4'-C5'-O5'
1	S2	116	OMU	C3'-C4'-C5'-O5'
1	S2	116	OMU	O4'-C4'-C5'-O5'
1	S2	121	OMU	C1'-C2'-O2'-CM2

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Mol	Chain	Res	Type	Atoms
1	S2	520	OMC	O4'-C4'-C5'-O5'

There are no ring outliers.

No monomer is involved in short contacts.

## 5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

## 5.6 Ligand geometry [i](#)

Of 39 ligands modelled in this entry, 39 are monoatomic - leaving 0 for Mogul analysis.

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

## 5.7 Other polymers [i](#)

There are no such residues in this entry.

## 5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

## 6 Map visualisation

This section contains visualisations of the EMDB entry EMD-13954. These allow visual inspection of the internal detail of the map and identification of artifacts.

No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

### 6.1 Orthogonal projections

This section was not generated.

### 6.2 Central slices

This section was not generated.

### 6.3 Largest variance slices

This section was not generated.

### 6.4 Orthogonal standard-deviation projections (False-color)

This section was not generated.

### 6.5 Orthogonal surface views

This section was not generated.

### 6.6 Mask visualisation

This section was not generated. No masks/segmentation were deposited.

## 7 Map analysis

This section contains the results of statistical analysis of the map.

### 7.1 Map-value distribution

This section was not generated.

### 7.2 Volume estimate versus contour level

This section was not generated.

### 7.3 Rotationally averaged power spectrum

This section was not generated. The rotationally averaged power spectrum had issues being displayed.

## 8 Fourier-Shell correlation

This section was not generated. No FSC curve or half-maps provided.

## 9 Map-model fit

This section was not generated.