



## wwPDB EM Validation Summary Report ⓘ

Apr 16, 2024 – 06:46 am BST

PDB ID : 7PWO  
EMDB ID : EMD-13683  
Title : Cryo-EM structure of Giardia lamblia ribosome at 2.75 Å resolution  
Authors : Hiregange, D.G.; Rivalta, A.; Bose, T.; Breiner-Goldstein, E.; Samiya, S.; Cimicata, G.; Kulakova, L.; Zimmerman, E.; Bashan, A.; Herzberg, O.; Yonath, A.  
Deposited on : 2021-10-07  
Resolution : 2.75 Å (reported)

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

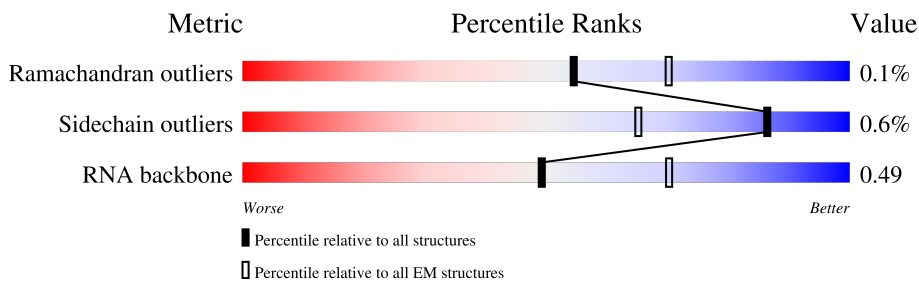
# 1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

*ELECTRON MICROSCOPY*

The reported resolution of this entry is 2.75 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.





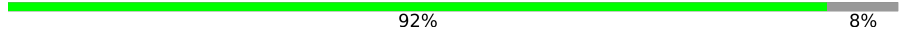


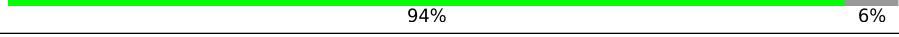


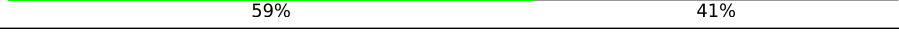

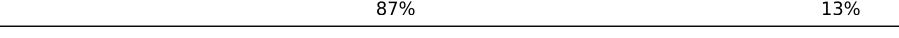
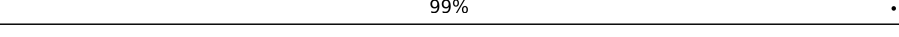
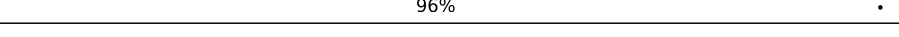
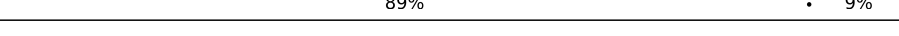


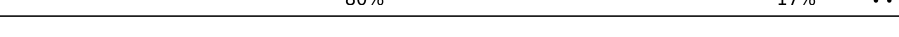

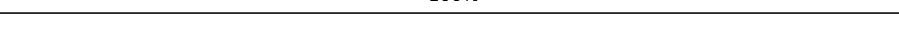






Metric	Whole archive (#Entries)	EM structures (#Entries)
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826
RNA backbone	4643	859

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	T1	139	
2	N1	154	
3	J1	189	
4	D1	217	
5	X1	143	
6	S1	154	
7	Q1	158	
8	C1	242	
9	B1	248	

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Mol	Chain	Length	Quality of chain
10	b1	124	 63% 36%
11	a1	109	 89% 11%
12	V1	89	 92% 8%
13	R1	137	 72% 28%
14	K1	134	 62% 38%
15	I1	174	 94% 6%
16	e1	69	 54% 46%
17	H1	190	 85% 15%
18	n1	41	 59% 41%
19	c1	64	 84% 14%
20	O1	145	 87% 13%
21	W1	130	 99%
22	E1	268	 96%
23	L1	199	 89% 9%
24	U1	126	 59% 41%
25	1	2707	 69% 20% 10%
26	3	120	 80% 17%
27	42	139	 71% 27%
28	A2	251	 100%
29	B2	379	 100%
30	C2	316	 99%
31	D2	297	 89% 10%
32	F2	235	 91% 9%
33	G2	225	 80% 19%
34	H2	185	 99%


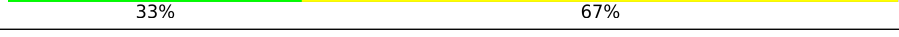
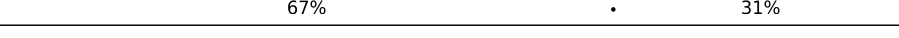
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Mol	Chain	Length	Quality of chain
35	I2	210	95% 5%
36	J2	173	94% 5%
37	L2	234	81% 19%
38	M2	131	97% ..
39	N2	204	100%
40	O2	197	99% .
41	P2	164	94% 6%
42	Q2	179	99% .
43	R2	196	88% . 10%
44	S2	173	99% .
45	T2	159	96% ..
46	U2	171	58% 42%
47	V2	142	97% ..
48	X2	141	82% 18%
49	Y2	135	99% .
50	Z2	135	96% .
51	a2	149	99% .
52	b2	62	90% 10%
53	c2	109	92% 8%
54	d2	106	89% 11%
55	e2	136	93% 7%
56	f2	123	99% .
57	g2	120	82% 18%
58	h2	124	97% .
59	i2	90	94% 6%

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Mol	Chain	Length	Quality of chain
60	j2	89	 98%
61	k2	77	 86% 14%
62	l2	51	 96%
63	m2	127	 39% 60%
64	o2	106	 89% 11%
65	p2	94	 94%
66	w2	14	 29% 57% 14%
67	W2	102	 64% 36%
68	E	3	 33% 67%
69	d1	137	 34% 65%
70	F1	190	 78% 6% 15%
71	Y1	132	 67% 31%
72	G1	248	 73% 24%
73	2	1452	 64% 25% 7%
74	A1	245	 79% 21%

## 2 Entry composition

There are 76 unique types of molecules in this entry. The entry contains 163704 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 protein called Ribosomal protein S19e.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	T1	108	795	503	148	142	2	0	0

- Molecule 2 is a protein called Ribosomal protein S13.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	N1	152	1192	759	227	201	5	0	0

- Molecule 3 is a protein called Ribosomal protein S9.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	J1	166	1322	827	257	232	6	0	0

- Molecule 4 is a protein called Ribosomal protein S3.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	D1	182	1402	890	254	244	14	0	0

- Molecule 5 is a protein called Ribosomal protein S23.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
5	X1	142	1104	697	219	184	4	0	0

- Molecule 6 is a protein called Ribosomal protein S18.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
6	S1	133	1055	651	210	188	6	0	0

- Molecule 7 is a protein called Ribosomal protein S16.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
7	Q1	125	960	603	190	164	3	0	0

- Molecule 8 is a protein called Ribosomal protein S2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
8	C1	212	1641	1043	298	296	4	0	0

- Molecule 9 is a protein called 40S ribosomal protein S3a.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
9	B1	218	1758	1113	323	309	13	0	0

- Molecule 10 is a protein called Ribosomal protein S27.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
10	b1	79	614	389	105	114	6	0	0

- Molecule 11 is a protein called 40S ribosomal protein S26.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
11	a1	97	785	484	162	131	8	0	0

- Molecule 12 is a protein called 40S ribosomal protein S21.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
12	V1	82	605	377	112	110	6	0	0

- Molecule 13 is a protein called Ribosomal protein S17.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
13	R1	99	767	476	141	147	3	0	0

- Molecule 14 is a protein called Ribosomal protein S10B.

Mol	Chain	Residues	Atoms					AltConf	Trace
14	K1	83	Total	C	N	O	S	0	0
			689	446	116	123	4		

- Molecule 15 is a protein called 40S ribosomal protein S8.

Mol	Chain	Residues	Atoms					AltConf	Trace
15	I1	163	Total	C	N	O	S	0	0
			1282	804	246	229	3		

- Molecule 16 is a protein called 40S ribosomal protein S30.

Mol	Chain	Residues	Atoms					AltConf	Trace
16	e1	37	Total	C	N	O	S	0	0
			291	185	59	46	1		

- Molecule 17 is a protein called 40S ribosomal protein S7.

Mol	Chain	Residues	Atoms					AltConf	Trace
17	H1	162	Total	C	N	O	S	0	0
			1195	773	210	207	5		

- Molecule 18 is a protein called Ribosomal protein eL41.

Mol	Chain	Residues	Atoms					AltConf	Trace
18	n1	24	Total	C	N	O	S	0	0
			217	134	55	25	3		

- Molecule 19 is a protein called Ribosomal protein S28.

Mol	Chain	Residues	Atoms					AltConf	Trace
19	c1	55	Total	C	N	O	S	0	0
			439	269	89	80	1		

- Molecule 20 is a protein called Ribosomal protein S14.

Mol	Chain	Residues	Atoms					AltConf	Trace
20	O1	126	Total	C	N	O	S	0	0
			935	572	189	170	4		

- Molecule 21 is a protein called Ribosomal protein S15A.



Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
21	W1	129	1031	659	192	177	3	0	0

- Molecule 22 is a protein called 40S ribosomal protein S4.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
22	E1	258	2062	1320	378	352	12	0	0

- Molecule 23 is a protein called SSU ribosomal protein S17P.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
23	L1	181	1487	936	296	248	7	0	0

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
L1	12	SER	GLY	conflict	UNP V6TVJ7

- Molecule 24 is a protein called Ribosomal protein S20.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
24	U1	74	609	394	111	102	2	0	0

- Molecule 25 is a RNA chain called rRNA 28S.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
25	1	2448	52571	23373	9743	17007	2448	0	0

- Molecule 26 is a RNA chain called rRNA 5S.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
26	3	117	2501	1116	458	810	117	0	0

- Molecule 27 is a RNA chain called rRNA 5.8S.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
27	42	138	2958	1315	553	952	138	0	0

- Molecule 28 is a protein called Ribosomal protein L2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
28	A2	250	1873	1157	383	320	13	0	0

- Molecule 29 is a protein called Ribosomal protein L3.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
29	B2	378	2987	1886	566	514	21	0	0

- Molecule 30 is a protein called Ribosomal protein L4.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
30	C2	314	2446	1539	474	424	9	0	0

- Molecule 31 is a protein called Ribosomal protein L5.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
31	D2	266	2115	1341	391	375	8	0	0

- Molecule 32 is a protein called Ribosomal protein L7.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
32	F2	214	1730	1100	315	310	5	0	0

- Molecule 33 is a protein called 60S ribosomal protein L7a.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
33	G2	182	1446	921	264	255	6	0	0

- Molecule 34 is a protein called Ribosomal protein L6.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
34	H2	184	1442	912	263	257	10	0	0

- Molecule 35 is a protein called Ribosomal protein L10.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
35	I2	200	1621	1019	321	273	8	0	0

- Molecule 36 is a protein called Ribosomal protein L11.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
36	J2	164	1305	821	246	233	5	0	0

- Molecule 37 is a protein called 60S ribosomal protein L13.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
37	L2	189	1512	942	309	255	6	0	0

- Molecule 38 is a protein called Ribosomal protein L14.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
38	M2	128	990	626	178	181	5	0	0

- Molecule 39 is a protein called Ribosomal protein L15.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
39	N2	204	1712	1083	358	265	6	0	0

- Molecule 40 is a protein called Ribosomal protein L13a.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
40	O2	195	1587	997	310	267	13	0	0

- Molecule 41 is a protein called Ribosomal protein L17.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
41	P2	154	1235	781	239	211	4	0	0

- Molecule 42 is a protein called Ribosomal protein L18.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
42	Q2	178	1402	871	279	243	9	0	0

- Molecule 43 is a protein called Ribosomal protein L19.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
43	R2	177	1463	902	313	243	5	0	0

- Molecule 44 is a protein called 60S ribosomal protein L18a.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
44	S2	173	1418	895	274	240	9	0	0

- Molecule 45 is a protein called Ribosomal protein L21.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
45	T2	153	1226	766	252	201	7	0	0

- Molecule 46 is a protein called Ribosomal protein eL22.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
46	U2	100	820	524	141	153	2	0	0

- Molecule 47 is a protein called Ribosomal protein L23.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
47	V2	139	1063	668	207	183	5	0	0

- Molecule 48 is a protein called Ribosomal protein L23A.

Mol	Chain	Residues	Atoms					AltConf	Trace
48	X2	116	Total	C	N	O	S	0	0
			936	601	169	163	3		

- Molecule 49 is a protein called Ribosomal protein L26.

Mol	Chain	Residues	Atoms					AltConf	Trace
49	Y2	133	Total	C	N	O	S	0	0
			1076	665	219	184	8		

- Molecule 50 is a protein called 60S ribosomal protein L27.

Mol	Chain	Residues	Atoms					AltConf	Trace
50	Z2	129	Total	C	N	O	S	0	0
			980	623	179	173	5		

- Molecule 51 is a protein called Ribosomal protein L27a.

Mol	Chain	Residues	Atoms					AltConf	Trace
51	a2	148	Total	C	N	O	S	0	0
			1201	759	240	199	3		

- Molecule 52 is a protein called 60S ribosomal protein L29.

Mol	Chain	Residues	Atoms					AltConf	Trace
52	b2	56	Total	C	N	O	S	0	0
			463	280	104	77	2		

- Molecule 53 is a protein called Ribosomal protein L30.

Mol	Chain	Residues	Atoms					AltConf	Trace
53	c2	100	Total	C	N	O	S	0	0
			750	470	132	144	4		

- Molecule 54 is a protein called Ribosomal protein L31B.

Mol	Chain	Residues	Atoms				AltConf	Trace
54	d2	94	Total	C	N	O	0	0
			752	482	149	121		

- Molecule 55 is a protein called Ribosomal protein L32.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
55	e2	126	1039	661	207	165	6	0	0

- Molecule 56 is a protein called Ribosomal protein L35a.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
56	f2	123	974	619	180	171	4	0	0

- Molecule 57 is a protein called Ribosomal protein L34.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
57	g2	99	798	493	167	134	4	0	0

- Molecule 58 is a protein called Ribosomal protein L35.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
58	h2	120	960	610	185	160	5	0	0

- Molecule 59 is a protein called Ribosomal protein L36-1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
59	i2	85	691	438	138	111	4	0	0

- Molecule 60 is a protein called Ribosomal protein L37.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
60	j2	87	692	423	146	116	7	0	0

- Molecule 61 is a protein called Ribosomal L38e.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
61	k2	66	504	320	86	94	4	0	0

- Molecule 62 is a protein called Ribosomal protein L39.

Mol	Chain	Residues	Atoms				AltConf	Trace
62	l2	50	Total	C	N	O	0	0
			434	278	91	65		

- Molecule 63 is a protein called Ubiquitin/Ribosomal protein L40e.

Mol	Chain	Residues	Atoms					AltConf	Trace
63	m2	51	Total	C	N	O	S	0	0
			421	257	88	69	7		

- Molecule 64 is a protein called Ribosomal protein L44.

Mol	Chain	Residues	Atoms					AltConf	Trace
64	o2	94	Total	C	N	O	S	0	0
			762	474	157	126	5		

- Molecule 65 is a protein called Ribosomal protein L37a.

Mol	Chain	Residues	Atoms					AltConf	Trace
65	p2	91	Total	C	N	O	S	0	0
			708	436	144	122	6		

- Molecule 66 is a RNA chain called E-site tRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
66	w2	14	Total	C	N	O	P	0	0
			299	133	56	96	14		

- Molecule 67 is a protein called Ribosomal protein L24A.

Mol	Chain	Residues	Atoms					AltConf	Trace
67	W2	65	Total	C	N	O	S	0	0
			540	343	110	85	2		

- Molecule 68 is a RNA chain called P-site tRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
68	E	3	Total	C	N	O	P	0	0
			62	28	11	20	3		

- Molecule 69 is a protein called Ribosomal protein S29A.

Mol	Chain	Residues	Atoms					AltConf	Trace
69	d1	48	Total	C	N	O	S	0	0
			392	250	72	65	5		

- Molecule 70 is a protein called Ribosomal protein S5.

Mol	Chain	Residues	Atoms					AltConf	Trace
70	F1	161	Total	C	N	O	S	0	0
			1246	771	240	227	8		

- Molecule 71 is a protein called Ribosomal protein S24.

Mol	Chain	Residues	Atoms					AltConf	Trace
71	Y1	91	Total	C	N	O	S	0	0
			713	454	126	127	6		

- Molecule 72 is a protein called 40S ribosomal protein S6.

Mol	Chain	Residues	Atoms					AltConf	Trace
72	G1	189	Total	C	N	O	S	0	0
			1453	914	280	249	10		

- Molecule 73 is a RNA chain called rRNA 18S.

Mol	Chain	Residues	Atoms					AltConf	Trace
73	2	1355	Total	C	N	O	P	0	0
			29096	12946	5388	9407	1355		

- Molecule 74 is a protein called 40S ribosomal protein SA.

Mol	Chain	Residues	Atoms					AltConf	Trace
74	A1	194	Total	C	N	O	S	0	0
			1546	998	269	271	8		

- Molecule 75 is POTASSIUM ION (three-letter code: K) (formula: K).

Mol	Chain	Residues	Atoms		AltConf
75	N1	3	Total	K	0
			3	3	
75	X1	1	Total	K	0
			1	1	
75	S1	2	Total	K	0
			2	2	

*Continued on next page...*



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Mol	Chain	Residues	Atoms		AltConf
75	b1	2	Total 2	K 2	0
75	a1	1	Total 1	K 1	0
75	I1	2	Total 2	K 2	0
75	O1	5	Total 5	K 5	0
75	W1	1	Total 1	K 1	0
75	E1	4	Total 4	K 4	0
75	L1	4	Total 4	K 4	0
75	U1	1	Total 1	K 1	0
75	1	181	Total 181	K 181	0
75	3	1	Total 1	K 1	0
75	42	2	Total 2	K 2	0
75	A2	4	Total 4	K 4	0
75	B2	3	Total 3	K 3	0
75	C2	4	Total 4	K 4	0
75	I2	1	Total 1	K 1	0
75	L2	1	Total 1	K 1	0
75	N2	2	Total 2	K 2	0
75	V2	1	Total 1	K 1	0
75	a2	2	Total 2	K 2	0
75	e2	1	Total 1	K 1	0
75	j2	1	Total 1	K 1	0

*Continued on next page...*

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Mol	Chain	Residues	Atoms		AltConf
75	o2	1	Total 1	K 1	0
75	G1	1	Total 1	K 1	0
75	2	222	Total 222	K 222	0
75	A1	1	Total 1	K 1	0


- Molecule 76 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

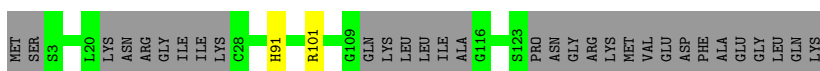
Mol	Chain	Residues	Atoms		AltConf
76	N1	1	Total 1	Mg 1	0
76	E1	1	Total 1	Mg 1	0
76	L1	1	Total 1	Mg 1	0
76	1	71	Total 71	Mg 71	0
76	42	1	Total 1	Mg 1	0
76	C2	1	Total 1	Mg 1	0
76	F2	1	Total 1	Mg 1	0
76	P2	1	Total 1	Mg 1	0
76	V2	1	Total 1	Mg 1	0
76	b2	1	Total 1	Mg 1	0
76	o2	1	Total 1	Mg 1	0
76	G1	1	Total 1	Mg 1	0
76	2	19	Total 19	Mg 19	0

### 3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

- Molecule 1: Ribosomal protein S19e

Chain T1:  76% 22%




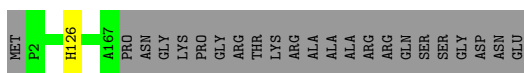
- Molecule 2: Ribosomal protein S13

Chain N1:  98%



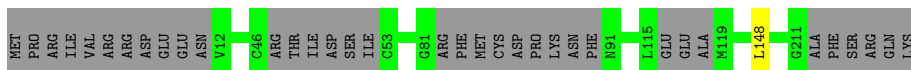
- Molecule 3: Ribosomal protein S9

Chain J1:  87% 12%



- Molecule 4: Ribosomal protein S3

Chain D1:  83% 16%




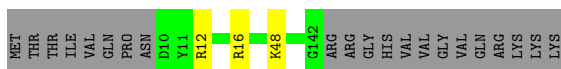
- Molecule 5: Ribosomal protein S23

Chain X1:  99%

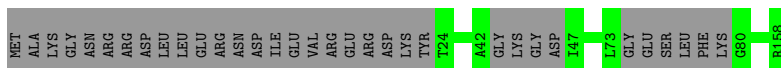
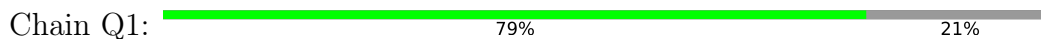


- Molecule 6: Ribosomal protein S18

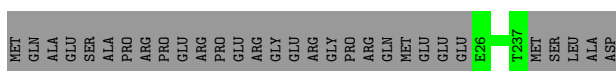
Chain S1:  84% 14%



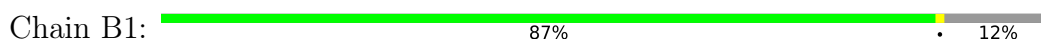
- Molecule 7: Ribosomal protein S16



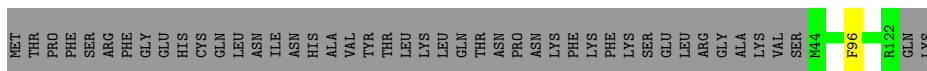
- Molecule 8: Ribosomal protein S2



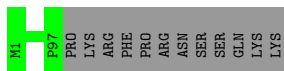
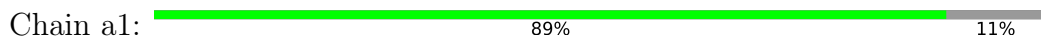
- Molecule 9: 40S ribosomal protein S3a



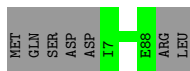
- Molecule 10: Ribosomal protein S27



- Molecule 11: 40S ribosomal protein S26



- Molecule 12: 40S ribosomal protein S21

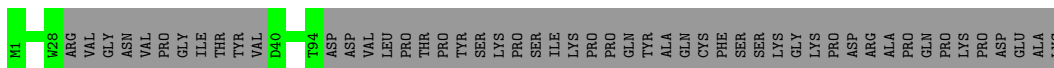


- Molecule 13: Ribosomal protein S17

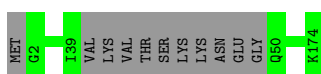




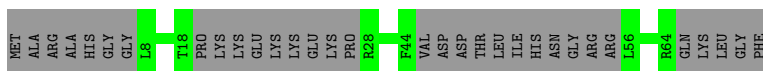
- Molecule 14: Ribosomal protein S10B



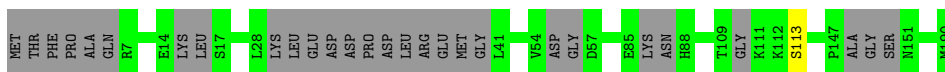
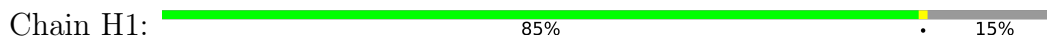
- Molecule 15: 40S ribosomal protein S8



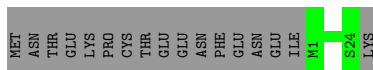
- Molecule 16: 40S ribosomal protein S30



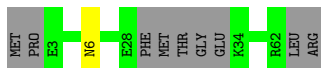
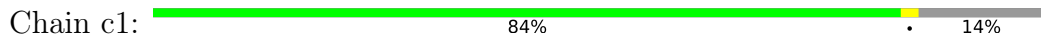
- Molecule 17: 40S ribosomal protein S7



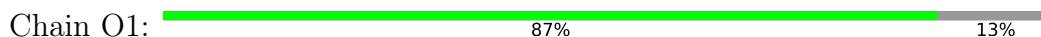
- Molecule 18: Ribosomal protein eL41

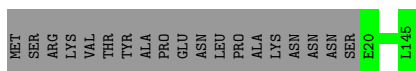


- Molecule 19: Ribosomal protein S28



- Molecule 20: Ribosomal protein S14

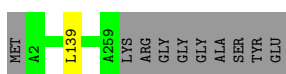




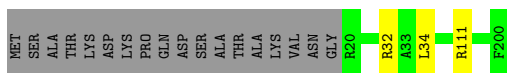
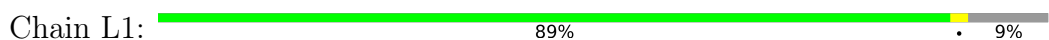
- Molecule 21: Ribosomal protein S15A



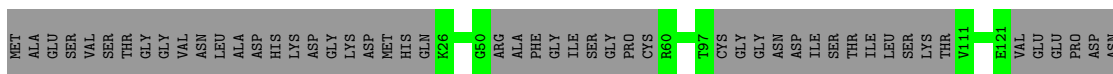
- Molecule 22: 40S ribosomal protein S4



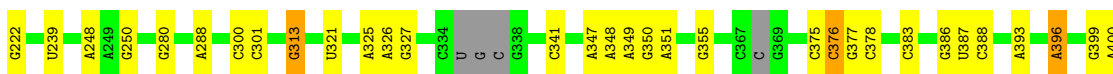
- Molecule 23: SSU ribosomal protein S17P



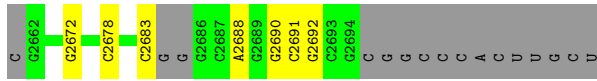
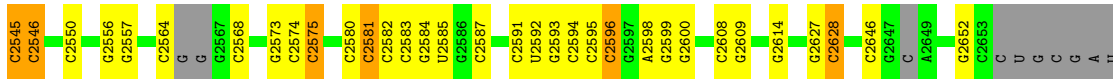
- Molecule 24: Ribosomal protein S20



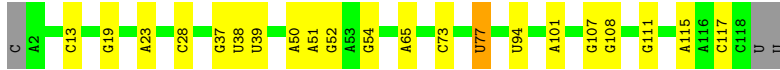
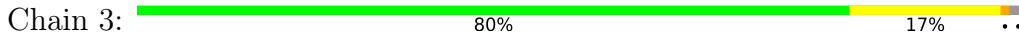
- Molecule 25: rRNA 28S



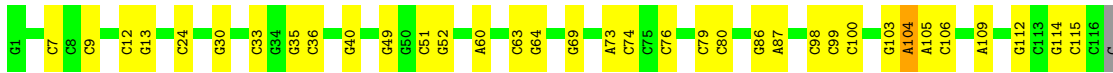
G2411	U282	G2163	G2029	G1731	A1539	C1388	G1241	C1050	C886	G570
C2415	C2289	G2175	G2030	G1732	A1540	G1405	G1244	C1061	C889	G573
G2418	C2292	G2176	G2037	G1733	G1542	G1411	C1245	G1066	C896	A574
C2422	G2293	A1860	U2040	G1736	C1543	G1412	G1246	G1066	C896	G575
A2423	A2294	C1861	G2041	G1737	G1544	G1413	U1247	G1072	C	G576
G2429	U2295	G1862	G2042	G1738	G1545	C	G1248	G1073	C	C577
C2433	G2296	G1863	G2049	A1739	C1546	C	C1252	G1074	U	G685
G2434	C2297	G1864	C2050	U1741	G1565	G1416	C1253	G900	U	C589
G2443	C2298	C1865	G2050	A1742	G1566	G1417	C1254	G906	C	U590
A	C2299	G1866	C2059	C	G1579	G1418	A1254	G907	C	C
G2445	C2300	C1871	A2060	U	G	A1439	G1255	G908	C	C
G2446	C2301	C1872	G2074	A1746	C	C1452	A1259	G911	U	C
C2466	U2304	G1880	U2075	G1759	C	G	C1260	G912	C	G611
C2467	C2309	G1881	C2078	G1760	C	C	A1261	G915	C	A612
C2468	C2310	G1882	A2079	C	C	G	G1285	G	C	G623
G2494	C2321	G1883	G2088	C1765	C	G	A1277	U	C	G624
G	A2333	C1884	G2091	A1766	G1587	G1468	C1280	C	C	A630
A2496	U2345	A1888	C2092	A1767	G1588	G1472	C1280	C	C	A631
G2499	C2350	G1890	G2096	U1769	G1589	A1473	G1281	C	C	G632
C2504	C2350	A1891	A2097	G1775	G1599	C1477	G1292	C	C	A633
C2506	U2354	C1894	G	C1791	A1600	A1478	C	C	C	A637
G2507	C2355	U1896	G	U	A1601	G	C	C	C	U638
G2508	A2356	U1897	G	G1792	C1602	C1480	C	C	C	C639
G2509	C2357	U1898	A	U	C1606	A1481	C	C	C	G640
G2513	U2228	U1903	G2096	G1794	C1609	G1482	C	C	C	A641
G2514	U2229	U1904	A2097	G1795	G1610	G1483	G1288	G1158	G	G653
G2515	A2230	G1905	G	U	G1619	A1484	C	G1159	A	U638
C2519	C2232	C1906	G	G1797	A1619	U1486	C	A1160	A	G656
G2522	C2233	C1907	G	G1799	C1620	U1487	C	C1161	G	G657
C2523	C2234	U1908	G	U	U1628	G1488	G1310	G1162	U	U658
G2524	C2235	G1922	G	G1812	A1646	G1489	C	G1163	U	U659
C2525	A2241	G1924	G	U1813	G1647	G1490	C1314	G1164	G	G660
C2526	A2242	G1931	G	U1814	U1683	G1491	C1322	G1165	C	U637
C2527	C2243	G1932	G	U1815	U1684	C1501	C1326	G1166	C	U637
C2528	U2251	C	G	C1816	U1685	U1502	C1330	G1167	C	U637
C2529	U2252	C	G	U1821	A1675	G1508	G1330	U1178	C	U637
G2530	U2253	C	G	U1822	C1684	C1509	G1331	C1179	C	U637
C2531	U2254	C	G	U1823	A1691	G1510	C1337	C1179	C	U637
C2532	U2255	C	G	C1824	C	G1515	C1349	G1186	C	U637
U2526	U2256	C	G	C1824	G1693	G1516	G1358	G1186	C	U637
C2528	U2257	C	G	C1831	A1694	G1520	G1358	G1186	C	U637
G2529	U2258	C	G	C1832	C1695	G1529	C1381	G1203	C	U637
G2530	U2259	C	G	C1833	C1696	G1529	C1381	G1204	C	U637
C2531	U2260	C	G	C1849	U1712	A1532	G1382	U1205	C	U637
C2532	U2261	C	G	A1850	A1719	G1537	C1383	C1208	C	U637
U2526	U2262	C	G	C1852	A1719	C1538	C1384	C1208	C	U637
C2533	U2263	C	G	C1852	A1719	C1538	C1384	C1208	C	U637
U2526	U2264	C	G	C1852	A1719	C1538	C1384	C1208	C	U637
C2534	U2265	C	G	C1852	A1719	C1538	C1384	C1208	C	U637
C2535	U2266	C	G	C1852	A1719	C1538	C1384	C1208	C	U637
C2536	U2267	C	G	C1852	A1719	C1538	C1384	C1208	C	U637
C2537	U2268	C	G	C1852	A1719	C1538	C1384	C1208	C	U637
C2538	U2269	C	G	C1852	A1719	C1538	C1384	C1208	C	U637
C2539	U2270	C	G	C1852	A1719	C1538	C1384	C1208	C	U637
C2540	U2271	C	G	C1852	A1719	C1538	C1384	C1208	C	U637
C2541	U2272	C	G	C1852	A1719	C1538	C1384	C1208	C	U637
C2542	U2273	C	G	C1852	A1719	C1538	C1384	C1208	C	U637
C2543	U2274	C	G	C1852	A1719	C1538	C1384	C1208	C	U637
C2544	U2275	C	G	C1852	A1719	C1538	C1384	C1208	C	U637



• Molecule 26: rRNA 5S



• Molecule 27: rRNA 5.8S



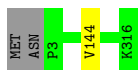
• Molecule 28: Ribosomal protein L2



• Molecule 29: Ribosomal protein L3



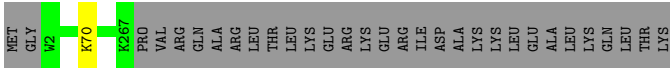
• Molecule 30: Ribosomal protein L4



• Molecule 31: Ribosomal protein L5



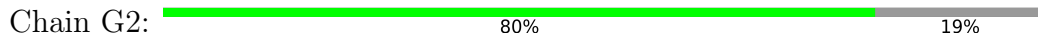




• Molecule 32: Ribosomal protein L7



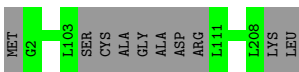
• Molecule 33: 60S ribosomal protein L7a



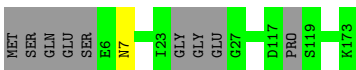
• Molecule 34: Ribosomal protein L6



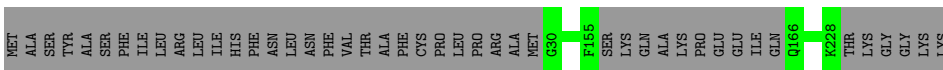
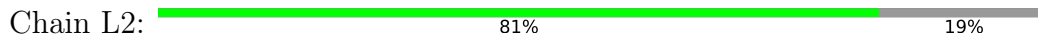
• Molecule 35: Ribosomal protein L10



• Molecule 36: Ribosomal protein L11



• Molecule 37: 60S ribosomal protein L13



• Molecule 38: Ribosomal protein L14





- Molecule 39: Ribosomal protein L15

Chain N2: 100%



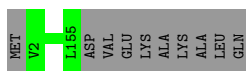
- Molecule 40: Ribosomal protein L13a

Chain O2: 99%



- Molecule 41: Ribosomal protein L17

Chain P2: 94% 6%



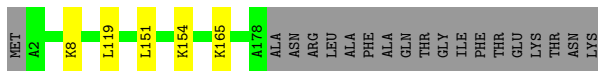
- Molecule 42: Ribosomal protein L18

Chain Q2: 99%



- Molecule 43: Ribosomal protein L19

Chain R2: 88% 10%



- Molecule 44: 60S ribosomal protein L18a

Chain S2: 99%

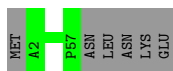


- Molecule 45: Ribosomal protein L21

Chain T2: 96%

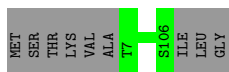


Chain b2:  90% 10%



- Molecule 53: Ribosomal protein L30

Chain c2:  92% 8%



- Molecule 54: Ribosomal protein L31B

Chain d2:  89% 11%



- Molecule 55: Ribosomal protein L32

Chain e2:  93% 7%




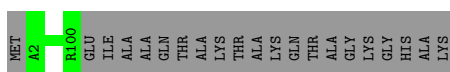
- Molecule 56: Ribosomal protein L35a

Chain f2:  99%



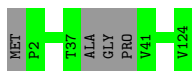
- Molecule 57: Ribosomal protein L34

Chain g2:  82% 18%



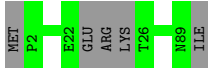
- Molecule 58: Ribosomal protein L35

Chain h2:  97%



- Molecule 59: Ribosomal protein L36-1

Chain i2:  94% 6%




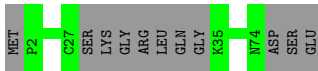
- Molecule 60: Ribosomal protein L37

Chain j2:  98%



- Molecule 61: Ribosomal L38e

Chain k2:  86% 14%



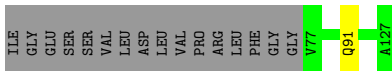
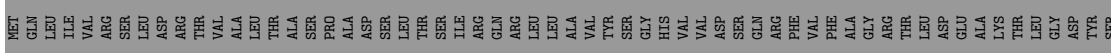
- Molecule 62: Ribosomal protein L39

Chain l2:  96%



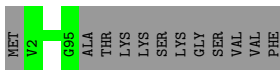
- Molecule 63: Ubiquitin/Ribosomal protein L40e

Chain m2:  39% 60%



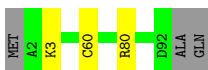
- Molecule 64: Ribosomal protein L44

Chain o2:  89% 11%




- Molecule 65: Ribosomal protein L37a

Chain p2:  94%







Chain A1:  79% 21%

MET	SER	THR	GLU	LYS	THR	SER	GLN	ALA	SER	LYS	GLU	TYR	GLN	LEU	LYS	E17	R38	L210	PRO	GLU	GLU	ILE	PRO	ASP	GLU	GLU	GLU	SER	GLU	ASP	PHE	TYR	ASP	ASP	ASP	GLU	GLU	GLU	ASP	GLU	PHE	SER	ALA	GLY	ASN	GLY	ASN	LEU	PHE	ASP	GLU	TYR
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	------	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----



## 4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	91058	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ( $e^-/\text{\AA}^2$ )	1	Depositor
Minimum defocus (nm)	500	Depositor
Maximum defocus (nm)	1500	Depositor
Magnification	Not provided	
Image detector	GATAN K3 (6k x 4k)	Depositor

## 5 Model quality

### 5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: M7A, 4AC, 7MG, OMU, C4J, OMC, MG, K, OMG, 5MC, MA6, A2M, 4OC

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	T1	0.33	0/812	0.56	0/1098
2	N1	0.35	0/1215	0.59	1/1634 (0.1%)
3	J1	0.34	0/1340	0.63	0/1796
4	D1	0.37	0/1422	0.60	1/1909 (0.1%)
5	X1	0.34	0/1119	0.63	0/1498
6	S1	0.33	0/1070	0.68	0/1435
7	Q1	0.35	0/968	0.64	0/1295
8	C1	0.36	0/1674	0.59	0/2259
9	B1	0.36	0/1793	0.61	1/2419 (0.0%)
10	b1	0.38	0/628	0.78	1/852 (0.1%)
11	a1	0.34	0/797	0.54	0/1072
12	V1	0.41	0/613	0.61	0/823
13	R1	0.38	0/773	0.61	0/1037
14	K1	0.34	0/707	0.64	0/957
15	I1	0.33	0/1302	0.59	0/1746
16	e1	0.31	0/294	0.53	0/392
17	H1	0.34	0/1211	0.55	0/1640
18	n1	0.36	0/219	0.64	0/280
19	c1	0.47	0/439	0.63	0/585
20	O1	0.34	0/947	0.59	0/1273
21	W1	0.37	0/1048	0.59	0/1412
22	E1	0.33	0/2108	0.60	1/2845 (0.0%)
23	L1	0.35	0/1520	0.63	1/2037 (0.0%)
24	U1	0.35	0/619	0.64	0/833
25	1	0.78	0/58145	1.10	239/90686 (0.3%)
26	3	0.61	0/2797	1.00	7/4359 (0.2%)
27	42	0.75	0/3277	1.03	4/5109 (0.1%)
28	A2	0.39	0/1906	0.63	0/2561
29	B2	0.38	0/3058	0.59	0/4129
30	C2	0.40	0/2498	0.61	0/3388
31	D2	0.35	0/2157	0.56	0/2899
32	F2	0.39	0/1760	0.59	0/2374

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z  >5	RMSZ	# Z  >5
33	G2	0.37	0/1472	0.59	0/1989
34	H2	0.37	0/1469	0.61	1/1985 (0.1%)
35	I2	0.36	0/1657	0.61	0/2219
36	J2	0.35	0/1325	0.59	0/1776
37	L2	0.38	0/1533	0.59	0/2052
38	M2	0.36	0/1002	0.59	0/1349
39	N2	0.40	0/1755	0.62	0/2353
40	O2	0.41	0/1618	0.58	0/2169
41	P2	0.40	0/1261	0.63	0/1688
42	Q2	0.34	0/1425	0.59	0/1907
43	R2	0.60	0/1478	0.64	0/1954
44	S2	0.38	0/1452	0.57	0/1955
45	T2	0.37	0/1251	0.59	1/1682 (0.1%)
46	U2	0.41	0/836	0.59	0/1124
47	V2	0.35	0/1083	0.58	0/1458
48	X2	0.35	0/956	0.60	0/1293
49	Y2	0.36	0/1091	0.61	0/1454
50	Z2	0.37	0/997	0.54	0/1352
51	a2	0.40	0/1231	0.60	0/1647
52	b2	0.34	0/471	0.56	0/624
53	c2	0.33	0/758	0.64	0/1025
54	d2	0.36	0/764	0.62	0/1026
55	e2	0.39	0/1063	0.56	0/1418
56	f2	0.37	0/994	0.61	1/1338 (0.1%)
57	g2	0.34	0/813	0.54	0/1092
58	h2	0.36	0/971	0.61	0/1295
59	i2	0.36	0/700	0.55	0/927
60	j2	0.38	0/708	0.59	0/941
61	k2	0.33	0/507	0.57	0/679
62	l2	0.34	0/445	0.64	0/594
63	m2	0.34	0/426	0.56	0/568
64	o2	0.40	0/773	0.62	0/1023
65	p2	0.39	0/717	0.71	1/956 (0.1%)
66	w2	0.93	1/332 (0.3%)	1.40	7/511 (1.4%)
67	W2	0.37	0/551	0.58	0/738
68	E	0.43	0/68	1.11	1/103 (1.0%)
69	d1	0.45	0/400	0.60	0/532
70	F1	0.65	0/1264	0.63	0/1697
71	Y1	0.45	0/724	0.67	0/971
72	G1	0.42	0/1466	0.67	0/1956
73	2	0.62	0/32117	1.10	172/50066 (0.3%)
74	A1	0.31	0/1580	0.50	0/2149
All	All	0.60	1/173740 (0.0%)	0.93	440/254267 (0.2%)

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
66	w2	1	A	OP3-P	-10.48	1.48	1.61

The worst 5 of 440 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
73	2	155	C	P-O3'-C3'	-10.72	106.83	119.70
73	2	595	G	P-O3'-C3'	-10.62	106.96	119.70
73	2	138	G	P-O3'-C3'	-10.38	107.24	119.70
73	2	606	G	P-O3'-C3'	-10.24	107.41	119.70
10	b1	96	PHE	C-N-CA	10.16	147.09	121.70

There are no chirality outliers.

There are no planarity outliers.

## 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	
1	T1	102/139 (73%)	97 (95%)	5 (5%)	0	100	100
2	N1	150/154 (97%)	142 (95%)	8 (5%)	0	100	100
3	J1	164/189 (87%)	153 (93%)	11 (7%)	0	100	100
4	D1	174/217 (80%)	163 (94%)	11 (6%)	0	100	100
5	X1	140/143 (98%)	130 (93%)	10 (7%)	0	100	100
6	S1	131/154 (85%)	113 (86%)	18 (14%)	0	100	100
7	Q1	119/158 (75%)	108 (91%)	11 (9%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
8	C1	210/242 (87%)	195 (93%)	15 (7%)	0	100	100
9	B1	216/248 (87%)	207 (96%)	9 (4%)	0	100	100
10	b1	77/124 (62%)	71 (92%)	6 (8%)	0	100	100
11	a1	95/109 (87%)	90 (95%)	5 (5%)	0	100	100
12	V1	80/89 (90%)	72 (90%)	8 (10%)	0	100	100
13	R1	93/137 (68%)	87 (94%)	6 (6%)	0	100	100
14	K1	79/134 (59%)	70 (89%)	9 (11%)	0	100	100
15	I1	159/174 (91%)	147 (92%)	12 (8%)	0	100	100
16	e1	31/69 (45%)	29 (94%)	2 (6%)	0	100	100
17	H1	148/190 (78%)	133 (90%)	15 (10%)	0	100	100
18	n1	22/41 (54%)	22 (100%)	0	0	100	100
19	c1	51/64 (80%)	47 (92%)	4 (8%)	0	100	100
20	O1	124/145 (86%)	121 (98%)	3 (2%)	0	100	100
21	W1	127/130 (98%)	117 (92%)	10 (8%)	0	100	100
22	E1	256/268 (96%)	234 (91%)	22 (9%)	0	100	100
23	L1	179/199 (90%)	169 (94%)	10 (6%)	0	100	100
24	U1	68/126 (54%)	63 (93%)	5 (7%)	0	100	100
28	A2	248/251 (99%)	237 (96%)	11 (4%)	0	100	100
29	B2	376/379 (99%)	357 (95%)	19 (5%)	0	100	100
30	C2	312/316 (99%)	295 (95%)	17 (5%)	0	100	100
31	D2	264/297 (89%)	247 (94%)	17 (6%)	0	100	100
32	F2	212/235 (90%)	209 (99%)	3 (1%)	0	100	100
33	G2	178/225 (79%)	173 (97%)	5 (3%)	0	100	100
34	H2	182/185 (98%)	172 (94%)	10 (6%)	0	100	100
35	I2	196/210 (93%)	187 (95%)	9 (5%)	0	100	100
36	J2	158/173 (91%)	144 (91%)	14 (9%)	0	100	100
37	L2	185/234 (79%)	183 (99%)	2 (1%)	0	100	100
38	M2	126/131 (96%)	115 (91%)	11 (9%)	0	100	100
39	N2	202/204 (99%)	192 (95%)	10 (5%)	0	100	100
40	O2	193/197 (98%)	186 (96%)	7 (4%)	0	100	100
41	P2	152/164 (93%)	143 (94%)	9 (6%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
42	Q2	176/179 (98%)	169 (96%)	7 (4%)	0	100	100
43	R2	175/196 (89%)	166 (95%)	9 (5%)	0	100	100
44	S2	171/173 (99%)	165 (96%)	6 (4%)	0	100	100
45	T2	149/159 (94%)	145 (97%)	4 (3%)	0	100	100
46	U2	98/171 (57%)	90 (92%)	8 (8%)	0	100	100
47	V2	137/142 (96%)	133 (97%)	4 (3%)	0	100	100
48	X2	114/141 (81%)	109 (96%)	5 (4%)	0	100	100
49	Y2	131/135 (97%)	126 (96%)	5 (4%)	0	100	100
50	Z2	125/135 (93%)	115 (92%)	10 (8%)	0	100	100
51	a2	146/149 (98%)	136 (93%)	10 (7%)	0	100	100
52	b2	54/62 (87%)	54 (100%)	0	0	100	100
53	c2	98/109 (90%)	97 (99%)	1 (1%)	0	100	100
54	d2	90/106 (85%)	81 (90%)	9 (10%)	0	100	100
55	e2	124/136 (91%)	119 (96%)	5 (4%)	0	100	100
56	f2	121/123 (98%)	114 (94%)	7 (6%)	0	100	100
57	g2	97/120 (81%)	94 (97%)	3 (3%)	0	100	100
58	h2	116/124 (94%)	114 (98%)	2 (2%)	0	100	100
59	i2	81/90 (90%)	76 (94%)	5 (6%)	0	100	100
60	j2	85/89 (96%)	83 (98%)	2 (2%)	0	100	100
61	k2	62/77 (80%)	60 (97%)	2 (3%)	0	100	100
62	l2	48/51 (94%)	46 (96%)	2 (4%)	0	100	100
63	m2	49/127 (39%)	46 (94%)	3 (6%)	0	100	100
64	o2	92/106 (87%)	90 (98%)	2 (2%)	0	100	100
65	p2	89/94 (95%)	85 (96%)	4 (4%)	0	100	100
67	W2	63/102 (62%)	59 (94%)	4 (6%)	0	100	100
69	d1	46/137 (34%)	40 (87%)	6 (13%)	0	100	100
70	F1	157/190 (83%)	127 (81%)	27 (17%)	3 (2%)	8	14
71	Y1	87/132 (66%)	76 (87%)	10 (12%)	1 (1%)	14	25
72	G1	177/248 (71%)	134 (76%)	37 (21%)	6 (3%)	3	5
74	A1	192/245 (78%)	185 (96%)	7 (4%)	0	100	100
All	All	9329/10892 (86%)	8754 (94%)	565 (6%)	10 (0%)	54	75

5 of 10 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
72	G1	103	ILE
72	G1	114	ALA
72	G1	106	CYS
70	F1	34	PHE
72	G1	65	GLN

### 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	
1	T1	78/115 (68%)	76 (97%)	2 (3%)	46	66
2	N1	123/130 (95%)	123 (100%)	0	100	100
3	J1	141/164 (86%)	140 (99%)	1 (1%)	84	89
4	D1	142/182 (78%)	142 (100%)	0	100	100
5	X1	113/114 (99%)	113 (100%)	0	100	100
6	S1	112/131 (86%)	109 (97%)	3 (3%)	44	65
7	Q1	101/130 (78%)	101 (100%)	0	100	100
8	C1	176/201 (88%)	176 (100%)	0	100	100
9	B1	196/220 (89%)	195 (100%)	1 (0%)	88	92
10	b1	70/112 (62%)	70 (100%)	0	100	100
11	a1	90/103 (87%)	90 (100%)	0	100	100
12	V1	62/72 (86%)	62 (100%)	0	100	100
13	R1	81/123 (66%)	80 (99%)	1 (1%)	71	82
14	K1	73/119 (61%)	73 (100%)	0	100	100
15	I1	138/148 (93%)	138 (100%)	0	100	100
16	e1	30/58 (52%)	30 (100%)	0	100	100
17	H1	116/170 (68%)	115 (99%)	1 (1%)	78	87
18	n1	21/38 (55%)	21 (100%)	0	100	100
19	c1	49/57 (86%)	48 (98%)	1 (2%)	55	72

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
20	O1	91/113 (80%)	91 (100%)	0	100	100
21	W1	114/115 (99%)	114 (100%)	0	100	100
22	E1	225/232 (97%)	225 (100%)	0	100	100
23	L1	155/173 (90%)	153 (99%)	2 (1%)	69	81
24	U1	68/110 (62%)	68 (100%)	0	100	100
28	A2	189/192 (98%)	189 (100%)	0	100	100
29	B2	312/313 (100%)	312 (100%)	0	100	100
30	C2	261/263 (99%)	260 (100%)	1 (0%)	91	93
31	D2	210/242 (87%)	209 (100%)	1 (0%)	88	92
32	F2	184/204 (90%)	183 (100%)	1 (0%)	88	92
33	G2	159/198 (80%)	158 (99%)	1 (1%)	86	90
34	H2	160/164 (98%)	160 (100%)	0	100	100
35	I2	166/177 (94%)	166 (100%)	0	100	100
36	J2	137/149 (92%)	136 (99%)	1 (1%)	84	89
37	L2	159/197 (81%)	159 (100%)	0	100	100
38	M2	103/111 (93%)	102 (99%)	1 (1%)	76	85
39	N2	174/175 (99%)	173 (99%)	1 (1%)	86	90
40	O2	164/165 (99%)	164 (100%)	0	100	100
41	P2	130/139 (94%)	130 (100%)	0	100	100
42	Q2	154/155 (99%)	154 (100%)	0	100	100
43	R2	149/167 (89%)	144 (97%)	5 (3%)	37	58
44	S2	147/154 (96%)	146 (99%)	1 (1%)	84	89
45	T2	126/133 (95%)	126 (100%)	0	100	100
46	U2	87/153 (57%)	87 (100%)	0	100	100
47	V2	112/114 (98%)	111 (99%)	1 (1%)	78	87
48	X2	104/123 (85%)	104 (100%)	0	100	100
49	Y2	114/115 (99%)	114 (100%)	0	100	100
50	Z2	101/119 (85%)	101 (100%)	0	100	100
51	a2	126/127 (99%)	126 (100%)	0	100	100
52	b2	51/57 (90%)	51 (100%)	0	100	100
53	c2	84/92 (91%)	84 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
54	d2	78/92 (85%)	78 (100%)	0	100	100
55	e2	112/120 (93%)	112 (100%)	0	100	100
56	f2	102/103 (99%)	102 (100%)	0	100	100
57	g2	87/100 (87%)	87 (100%)	0	100	100
58	h2	102/107 (95%)	102 (100%)	0	100	100
59	i2	72/78 (92%)	72 (100%)	0	100	100
60	j2	70/74 (95%)	70 (100%)	0	100	100
61	k2	56/68 (82%)	56 (100%)	0	100	100
62	l2	46/48 (96%)	45 (98%)	1 (2%)	52	70
63	m2	46/110 (42%)	45 (98%)	1 (2%)	52	70
64	o2	81/93 (87%)	81 (100%)	0	100	100
65	p2	71/73 (97%)	69 (97%)	2 (3%)	43	63
67	W2	58/92 (63%)	58 (100%)	0	100	100
69	d1	41/116 (35%)	40 (98%)	1 (2%)	49	68
70	F1	132/157 (84%)	123 (93%)	9 (7%)	16	28
71	Y1	77/113 (68%)	75 (97%)	2 (3%)	46	66
72	G1	153/213 (72%)	152 (99%)	1 (1%)	84	89
74	A1	168/217 (77%)	167 (99%)	1 (1%)	86	90
All	All	7980/9302 (86%)	7936 (99%)	44 (1%)	86	90

5 of 44 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
65	p2	3	LYS
70	F1	67	ARG
65	p2	80	ARG
70	F1	57	ARG
70	F1	125	VAL

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 26 such sidechains are listed below:

Mol	Chain	Res	Type
30	C2	210	ASN
35	I2	51	HIS
70	F1	189	ASN

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Mol	Chain	Res	Type
33	G2	62	ASN
42	Q2	87	ASN

### 5.3.3 RNA [i](#)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
25	1	2419/2707 (89%)	410 (16%)	24 (0%)
26	3	116/120 (96%)	16 (13%)	2 (1%)
27	42	136/139 (97%)	35 (25%)	2 (1%)
66	w2	12/14 (85%)	4 (33%)	0
68	E	2/3 (66%)	1 (50%)	0
73	2	1329/1452 (91%)	304 (22%)	17 (1%)
All	All	4014/4435 (90%)	770 (19%)	45 (1%)

5 of 770 RNA backbone outliers are listed below:

Mol	Chain	Res	Type
25	1	5	G
25	1	21	G
25	1	39	A
25	1	42	A
25	1	48	G

5 of 45 RNA pucker outliers are listed below:

Mol	Chain	Res	Type
73	2	8	U
73	2	600	G
73	2	204	G
73	2	589	G
73	2	835	A

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

40 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$
73	OMC	2	104	73	19,22,23	0.85	0	26,31,34	0.99	1 (3%)
25	OMG	1	1520	25	18,26,27	1.02	1 (5%)	19,38,41	1.20	3 (15%)
25	OMG	1	1882	25,75	18,26,27	1.02	1 (5%)	19,38,41	1.37	3 (15%)
73	MA6	2	1435	73	18,26,27	1.02	1 (5%)	19,38,41	3.68	2 (10%)
73	7MG	2	1261	73	22,26,27	3.75	10 (45%)	29,39,42	2.09	9 (31%)
25	OMG	1	1204	25	18,26,27	2.34	7 (38%)	19,38,41	1.86	7 (36%)
25	OMG	1	1775	25	18,26,27	2.30	8 (44%)	19,38,41	1.46	3 (15%)
25	OMG	1	2074	25	18,26,27	2.30	7 (38%)	19,38,41	1.41	3 (15%)
25	A2M	1	1768	25	18,25,26	3.64	8 (44%)	18,36,39	3.47	6 (33%)
25	OMU	1	1897	25,75	19,22,23	2.90	7 (36%)	26,31,34	1.77	4 (15%)
25	OMC	1	2380	25	19,22,23	2.82	8 (42%)	26,31,34	0.89	1 (3%)
73	A2M	2	87	73,75	18,25,26	3.66	7 (38%)	18,36,39	3.28	4 (22%)
73	OMU	2	1314	73	19,22,23	2.90	8 (42%)	26,31,34	1.74	5 (19%)
27	OMG	42	133	27,25	18,26,27	2.34	8 (44%)	19,38,41	1.36	4 (21%)
25	A2M	1	396	25,75	18,25,26	0.95	1 (5%)	18,36,39	1.27	2 (11%)
73	M7A	2	1390	73	20,25,26	0.42	0	28,37,40	0.69	1 (3%)
25	A2M	1	393	25	18,25,26	3.56	8 (44%)	18,36,39	3.24	4 (22%)
25	OMC	1	1824	25	19,22,23	0.79	0	26,31,34	1.19	1 (3%)
73	A2M	2	348	76,73	18,25,26	3.62	8 (44%)	18,36,39	3.39	3 (16%)
25	OMG	1	313	25	18,26,27	2.33	8 (44%)	19,38,41	1.51	3 (15%)
25	OMG	1	2237	25,75	18,26,27	1.05	1 (5%)	19,38,41	1.06	2 (10%)
73	OMG	2	371	73	18,26,27	1.08	1 (5%)	19,38,41	1.35	3 (15%)
25	OMU	1	1896	25,75	19,22,23	2.89	8 (42%)	26,31,34	1.75	5 (19%)
25	OMU	1	49	25,75	19,22,23	2.94	7 (36%)	26,31,34	1.71	6 (23%)
25	A2M	1	523	25	18,25,26	3.54	8 (44%)	18,36,39	3.47	4 (22%)
25	OMG	1	624	25,75	18,26,27	2.33	7 (38%)	19,38,41	1.70	5 (26%)
73	4AC	2	1426	73,75	21,24,25	4.44	16 (76%)	29,34,37	1.37	3 (10%)
73	MA6	2	1434	73	18,26,27	1.04	1 (5%)	19,38,41	3.44	2 (10%)
25	OMC	1	1684	25,75	19,22,23	2.75	7 (36%)	26,31,34	0.97	1 (3%)
73	OMG	2	1035	73,75	18,26,27	2.44	8 (44%)	19,38,41	1.64	4 (21%)
25	OMU	1	1908	25	19,22,23	4.24	15 (78%)	26,31,34	1.92	7 (26%)
73	OMG	2	868	73	18,26,27	2.35	8 (44%)	19,38,41	1.40	2 (10%)
25	5MC	1	1765	25	18,22,23	3.26	7 (38%)	26,32,35	1.10	3 (11%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
25	OMG	1	1121	25	18,26,27	1.04	1 (5%)	19,38,41	1.45	3 (15%)
25	5MC	1	2292	25,75	18,22,23	3.36	7 (38%)	26,32,35	1.29	3 (11%)
73	OMG	2	1011	73	18,26,27	1.00	1 (5%)	19,38,41	1.18	3 (15%)
73	C4J	2	933	73	24,29,30	3.35	9 (37%)	29,42,45	1.35	4 (13%)
25	OMG	1	386	25	18,26,27	0.98	1 (5%)	19,38,41	1.12	3 (15%)
25	OMG	1	2042	25,68	18,26,27	2.33	8 (44%)	19,38,41	1.41	3 (15%)
73	4OC	2	1325	73	20,23,24	3.04	8 (40%)	26,32,35	0.96	1 (3%)

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
73	OMC	2	104	73	-	1/9/27/28	0/2/2/2
25	OMG	1	1520	25	-	1/5/27/28	0/3/3/3
25	OMG	1	1882	25,75	-	0/5/27/28	0/3/3/3
73	MA6	2	1435	73	-	3/7/29/30	0/3/3/3
73	7MG	2	1261	73	-	0/7/37/38	0/3/3/3
25	OMG	1	1204	25	-	0/5/27/28	0/3/3/3
25	OMG	1	1775	25	-	2/5/27/28	0/3/3/3
25	OMG	1	2074	25	-	1/5/27/28	0/3/3/3
25	A2M	1	1768	25	-	2/5/27/28	0/3/3/3
25	OMU	1	1897	25,75	-	0/9/27/28	0/2/2/2
25	OMC	1	2380	25	-	0/9/27/28	0/2/2/2
73	A2M	2	87	73,75	-	3/5/27/28	0/3/3/3
73	OMU	2	1314	73	-	0/9/27/28	0/2/2/2
27	OMG	42	133	27,25	-	0/5/27/28	0/3/3/3
25	A2M	1	396	25,75	-	1/5/27/28	0/3/3/3
73	M7A	2	1390	73	-	2/7/37/38	0/3/3/3
25	A2M	1	393	25	-	0/5/27/28	0/3/3/3
25	OMC	1	1824	25	-	1/9/27/28	0/2/2/2
73	A2M	2	348	76,73	-	0/5/27/28	0/3/3/3
25	OMG	1	313	25	-	2/5/27/28	0/3/3/3
25	OMG	1	2237	25,75	-	0/5/27/28	0/3/3/3
73	OMG	2	371	73	-	1/5/27/28	0/3/3/3
25	OMU	1	1896	25,75	-	0/9/27/28	0/2/2/2
25	OMU	1	49	25,75	-	1/9/27/28	0/2/2/2
25	A2M	1	523	25	-	1/5/27/28	0/3/3/3
25	OMG	1	624	25,75	-	1/5/27/28	0/3/3/3

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
73	4AC	2	1426	73,75	-	2/11/29/30	0/2/2/2
73	MA6	2	1434	73	-	0/7/29/30	0/3/3/3
25	OMC	1	1684	25,75	-	4/9/27/28	0/2/2/2
73	OMG	2	1035	73,75	-	1/5/27/28	0/3/3/3
25	OMU	1	1908	25	-	2/9/27/28	0/2/2/2
73	OMG	2	868	73	-	3/5/27/28	0/3/3/3
25	5MC	1	1765	25	-	0/7/25/26	0/2/2/2
25	OMG	1	1121	25	-	2/5/27/28	0/3/3/3
25	5MC	1	2292	25,75	-	4/7/25/26	0/2/2/2
73	OMG	2	1011	73	-	1/5/27/28	0/3/3/3
73	C4J	2	933	73	-	6/16/34/35	0/2/2/2
25	OMG	1	386	25	-	0/5/27/28	0/3/3/3
25	OMG	1	2042	25,68	-	0/5/27/28	0/3/3/3
73	4OC	2	1325	73	-	0/9/29/30	0/2/2/2

The worst 5 of 235 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
73	2	933	C4J	C6-C5	12.11	1.52	1.34
25	1	1908	OMU	C3'-C2'	-10.39	1.29	1.52
25	1	2292	5MC	C6-C5	8.97	1.49	1.34
25	1	523	A2M	C3'-C4'	-8.76	1.30	1.53
73	2	87	A2M	C3'-C4'	-8.73	1.30	1.53

The worst 5 of 136 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
73	2	1435	MA6	N1-C6-N6	-14.68	101.61	117.06
73	2	1434	MA6	N1-C6-N6	-13.78	102.55	117.06
25	1	523	A2M	C5-C6-N6	10.88	136.88	120.35
73	2	348	A2M	C5-C6-N6	10.56	136.40	120.35
73	2	87	A2M	C5-C6-N6	10.32	136.03	120.35

There are no chirality outliers.

5 of 48 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
25	1	49	OMU	C1'-C2'-O2'-CM2
25	1	313	OMG	O4'-C4'-C5'-O5'
25	1	396	A2M	C1'-C2'-O2'-CM'

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Mol	Chain	Res	Type	Atoms
25	1	523	A2M	C1'-C2'-O2'-CM'
25	1	624	OMG	C1'-C2'-O2'-CM2

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 556 ligands modelled in this entry, 556 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](#)

The following chains have linkage breaks:

Mol	Chain	Number of breaks
66	w2	1

All chain breaks are listed below:

Model	Chain	Residue-1	Atom-1	Residue-2	Atom-2	Distance (Å)
1	w2	5:G	O3'	68:C	P	17.08

## 6 Map visualisation

This section contains visualisations of the EMDB entry EMD-13683. 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.