Full wwPDB EM Validation Report ⓘ

Nov 9, 2026 – 06:14 pm GMT

PDB ID	:	9SE1 / pdb_00009se1
EMDB ID	:	EMD-54798
Title	:	Structure of elongating E.coli 70S ribosome with Gm5CC mRNA codon in A-site , ternary complex of EF-Tu, GDP, Val-tRNA(Val) and P-site tRNA(fMet) in post-GTP hydrolysis state (GH)
Authors	:	Jain, S.; Bock, L.; Petrychenko, V.; Gabrieli, S.; Fischer, N.; Rodnina, M.V.
Deposited on	:	2025-08-15
Resolution	:	3.90 Å(reported)

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

We welcome your comments at *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.

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

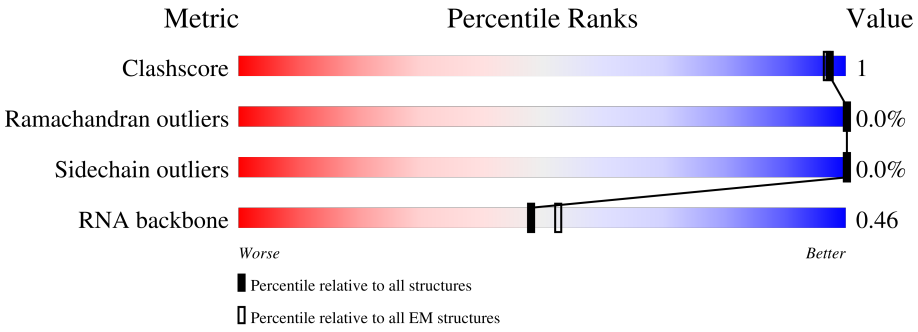
EMDB validation analysis	:	0.0.1.dev133
Mogul	:	1.8.4, CSD as541be (2020)
MolProbity	:	4-5-2 with Phenix2.2
Buster-report	:	wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
EM percentile statistics	:	202505.v01 (Using data in the EMDB archive up until May 2025)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.51

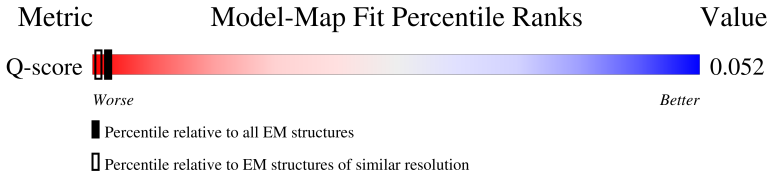
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:
ELECTRON MICROSCOPY

The reported resolution of this entry is 3.90 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)	Similar EM resolution (#Entries, resolution range(Å))
Clashscore	229148	23984	-
Ramachandran outliers	224038	23583	-
Sidechain outliers	223484	23102	-
RNA backbone	8273	3508	-
Q-score	-	25397	8855 (3.40 - 4.40)

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 >=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 <=5% The upper red bar (where present) indicates the fraction of residues that have poor fit to the EM map (all-atom inclusion < 40%). The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	0	56	32% 100%
2	1	50	26% 100%
3	2	46	33% 100%

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Mol	Chain	Length	Quality of chain
4	3	64	25% 100%
5	4	38	24% 100%
6	5	127	72% 100%
7	6	66	44% 100%
8	A	2903	76% 22%
9	B	120	5% 83% 15%
10	C	271	15% 100%
11	D	209	24% 100%
12	E	201	35% 100%
13	F	177	27% 100%
14	G	176	30% 100%
15	H	149	34% 99%
16	I	142	33% 95% 5%
17	J	142	31% 100%
18	K	122	33% 100%
19	L	143	35% 100%
20	M	136	31% 100%
21	N	120	25% 100%
22	O	116	40% 100%
23	P	114	17% 100%
24	Q	117	41% 100%
25	R	103	43% 97%
26	S	110	31% 100%
27	T	93	34% 100%
28	U	102	25% 100%

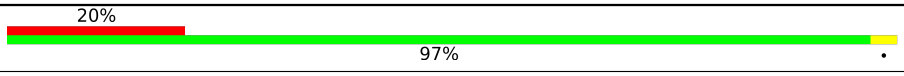
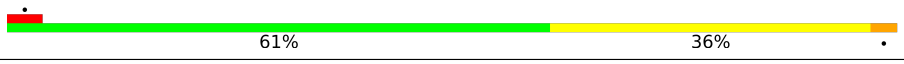
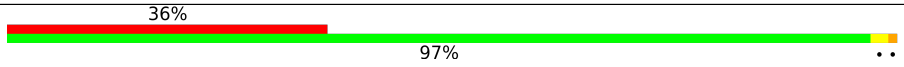
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Mol	Chain	Length	Quality of chain
29	V	94	32% 100%
30	W	75	31% 99%
31	X	77	39% 100%
32	Y	63	35% 100%
33	Z	58	24% 100%
34	a	1540	76% 21%
35	b	218	35% 100%
36	c	206	28% 100%
37	d	205	19% 100%
38	e	157	11% 99%
39	f	100	12% 98%
40	g	151	26% 100%
41	h	129	13% 100%
42	i	127	32% 100%
43	j	98	41% 98%
44	k	116	28% 100%
45	l	123	33% 100%
46	m	114	40% 100%
47	n	101	23% 100%
48	o	88	10% 100%
49	p	82	100%
50	q	80	100%
51	r	65	11% 100%
52	s	82	37% 100%
53	t	85	16% 98%

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Mol	Chain	Length	Quality of chain
54	u	65	
55	v	77	
56	w	77	
57	x	11	
58	z	383	

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
34	UR3	a	1498	-	-	X	-

2 Entry composition (i)

There are 64 unique types of molecules in this entry. The entry contains 150502 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 Large ribosomal subunit protein bL32.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	0	56	444	269	94	80	1	0	0

- Molecule 2 is a protein called Large ribosomal subunit protein bL33.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
2	1	50	409	263	75	71	0	0

- Molecule 3 is a protein called Large ribosomal subunit protein bL34.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	2	46	377	228	90	57	2	0	0

- Molecule 4 is a protein called Large ribosomal subunit protein bL35.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	3	64	504	323	105	74	2	0	0

- Molecule 5 is a protein called Large ribosomal subunit protein bL36A.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
5	4	38	302	185	65	48	4	0	0

- Molecule 6 is a protein called Large ribosomal subunit protein uL10.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
6	5	127	627	373	127	127	0	0

- Molecule 7 is a protein called Large ribosomal subunit protein bL31.

Mol	Chain	Residues	Atoms					AltConf	Trace
7	6	66	Total	C	N	O	S	0	0
			522	323	99	94	6		

- Molecule 8 is a RNA chain called 23S ribosomal RNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
8	A	2903	Total	C	N	O	P	0	0
			62338	27816	11471	20148	2903		

- Molecule 9 is a RNA chain called 5S ribosomal RNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
9	B	120	Total	C	N	O	P	0	0
			2570	1144	468	838	120		

- Molecule 10 is a protein called Large ribosomal subunit protein uL2.

Mol	Chain	Residues	Atoms					AltConf	Trace
10	C	271	Total	C	N	O	S	0	0
			2082	1288	423	364	7		

- Molecule 11 is a protein called 50S ribosomal protein L3.

Mol	Chain	Residues	Atoms					AltConf	Trace
11	D	209	Total	C	N	O	S	0	0
			1565	979	288	294	4		

- Molecule 12 is a protein called Large ribosomal subunit protein uL4.

Mol	Chain	Residues	Atoms					AltConf	Trace
12	E	201	Total	C	N	O	S	0	0
			1552	974	283	290	5		

- Molecule 13 is a protein called Large ribosomal subunit protein uL5.

Mol	Chain	Residues	Atoms					AltConf	Trace
13	F	177	Total	C	N	O	S	0	0
			1410	899	249	256	6		

- Molecule 14 is a protein called Large ribosomal subunit protein uL6.

Mol	Chain	Residues	Atoms					AltConf	Trace
14	G	176	Total	C	N	O	S	0	0
			1323	832	243	246	2		

- Molecule 15 is a protein called Large ribosomal subunit protein bL9.

Mol	Chain	Residues	Atoms					AltConf	Trace
15	H	149	Total	C	N	O	S	0	0
			1111	699	197	214	1		

- Molecule 16 is a protein called Large ribosomal subunit protein uL11.

Mol	Chain	Residues	Atoms				AltConf	Trace
16	I	135	Total	C	N	O	0	0
			664	394	135	135		

- Molecule 17 is a protein called Large ribosomal subunit protein uL13.

Mol	Chain	Residues	Atoms					AltConf	Trace
17	J	142	Total	C	N	O	S	0	0
			1129	714	212	199	4		

- Molecule 18 is a protein called Large ribosomal subunit protein uL14.

Mol	Chain	Residues	Atoms					AltConf	Trace
18	K	122	Total	C	N	O	S	0	0
			938	587	180	165	6		

- Molecule 19 is a protein called Large ribosomal subunit protein uL15.

Mol	Chain	Residues	Atoms					AltConf	Trace
19	L	143	Total	C	N	O	S	0	0
			1045	649	206	189	1		

- Molecule 20 is a protein called 50S ribosomal protein L16.

Mol	Chain	Residues	Atoms					AltConf	Trace
20	M	136	Total	C	N	O	S	0	0
			1074	686	205	177	6		

- Molecule 21 is a protein called Large ribosomal subunit protein bL17.

Mol	Chain	Residues	Atoms					AltConf	Trace
21	N	120	Total	C	N	O	S	0	0
			960	593	196	166	5		

- Molecule 22 is a protein called Large ribosomal subunit protein uL18.

Mol	Chain	Residues	Atoms				AltConf	Trace
22	O	116	Total	C	N	O	0	0
			892	552	178	162		

- Molecule 23 is a protein called Large ribosomal subunit protein bL19.

Mol	Chain	Residues	Atoms					AltConf	Trace
23	P	114	Total	C	N	O	S	0	0
			917	574	179	163	1		

- Molecule 24 is a protein called Large ribosomal subunit protein bL20.

Mol	Chain	Residues	Atoms				AltConf	Trace
24	Q	117	Total	C	N	O	0	0
			947	604	192	151		

- Molecule 25 is a protein called Large ribosomal subunit protein bL21.

Mol	Chain	Residues	Atoms					AltConf	Trace
25	R	103	Total	C	N	O	S	0	0
			816	516	153	145	2		

- Molecule 26 is a protein called Large ribosomal subunit protein uL22.

Mol	Chain	Residues	Atoms					AltConf	Trace
26	S	110	Total	C	N	O	S	0	0
			857	532	166	156	3		

- Molecule 27 is a protein called Large ribosomal subunit protein uL23.

Mol	Chain	Residues	Atoms					AltConf	Trace
27	T	93	Total	C	N	O	S	0	0
			738	466	139	131	2		

- Molecule 28 is a protein called Large ribosomal subunit protein uL24.

Mol	Chain	Residues	Atoms				AltConf	Trace
28	U	102	Total 779	C 492	N 146	O 141	0	0

- Molecule 29 is a protein called Large ribosomal subunit protein bL25.

Mol	Chain	Residues	Atoms					AltConf	Trace
29	V	94	Total 753	C 479	N 137	O 134	S 3	0	0

- Molecule 30 is a protein called Large ribosomal subunit protein bL27.

Mol	Chain	Residues	Atoms					AltConf	Trace
30	W	75	Total 575	C 356	N 116	O 102	S 1	0	0

- Molecule 31 is a protein called Large ribosomal subunit protein bL28.

Mol	Chain	Residues	Atoms					AltConf	Trace
31	X	77	Total 625	C 388	N 129	O 106	S 2	0	0

- Molecule 32 is a protein called Large ribosomal subunit protein uL29.

Mol	Chain	Residues	Atoms					AltConf	Trace
32	Y	63	Total 509	C 313	N 99	O 95	S 2	0	0

- Molecule 33 is a protein called Large ribosomal subunit protein uL30.

Mol	Chain	Residues	Atoms					AltConf	Trace
33	Z	58	Total 449	C 281	N 87	O 79	S 2	0	0

- Molecule 34 is a RNA chain called 16S ribosomal RNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
34	a	1540	Total 33050	C 14748	N 6057	O 10705	P 1540	0	0

- Molecule 35 is a protein called Small ribosomal subunit protein uS2.

Mol	Chain	Residues	Atoms					AltConf	Trace
35	b	218	Total	C	N	O	S	0	0
			1704	1081	305	311	7		

- Molecule 36 is a protein called Small ribosomal subunit protein uS3.

Mol	Chain	Residues	Atoms					AltConf	Trace
36	c	206	Total	C	N	O	S	0	0
			1624	1028	305	288	3		

- Molecule 37 is a protein called Small ribosomal subunit protein uS4.

Mol	Chain	Residues	Atoms					AltConf	Trace
37	d	205	Total	C	N	O	S	0	0
			1643	1026	315	298	4		

- Molecule 38 is a protein called Small ribosomal subunit protein uS5.

Mol	Chain	Residues	Atoms					AltConf	Trace
38	e	157	Total	C	N	O	S	0	0
			1141	709	218	208	6		

- Molecule 39 is a protein called Small ribosomal subunit protein bS6, non-modified isoform.

Mol	Chain	Residues	Atoms					AltConf	Trace
39	f	100	Total	C	N	O	S	0	0
			817	515	148	148	6		

- Molecule 40 is a protein called 30S ribosomal protein S7.

Mol	Chain	Residues	Atoms					AltConf	Trace
40	g	151	Total	C	N	O	S	0	0
			1181	735	227	215	4		

- Molecule 41 is a protein called Small ribosomal subunit protein uS8.

Mol	Chain	Residues	Atoms					AltConf	Trace
41	h	129	Total	C	N	O	S	0	0
			979	616	173	184	6		

- Molecule 42 is a protein called Small ribosomal subunit protein uS9.

Mol	Chain	Residues	Atoms					AltConf	Trace
42	i	127	Total	C	N	O	S	0	0
			1022	634	206	179	3		

- Molecule 43 is a protein called Small ribosomal subunit protein uS10.

Mol	Chain	Residues	Atoms					AltConf	Trace
43	j	98	Total	C	N	O	S	0	0
			786	493	150	142	1		

- Molecule 44 is a protein called Small ribosomal subunit protein uS11.

Mol	Chain	Residues	Atoms					AltConf	Trace
44	k	116	Total	C	N	O	S	0	0
			869	535	173	158	3		

- Molecule 45 is a protein called Small ribosomal subunit protein uS12.

Mol	Chain	Residues	Atoms					AltConf	Trace
45	l	123	Total	C	N	O	S	0	0
			955	590	196	165	4		

- Molecule 46 is a protein called Small ribosomal subunit protein uS13.

Mol	Chain	Residues	Atoms					AltConf	Trace
46	m	114	Total	C	N	O	S	0	0
			883	546	178	156	3		

- Molecule 47 is a protein called Small ribosomal subunit protein uS14.

Mol	Chain	Residues	Atoms					AltConf	Trace
47	n	101	Total	C	N	O	S	0	0
			799	498	165	133	3		

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
n	36	ALA	-	insertion	UNP P0AG59

- Molecule 48 is a protein called Small ribosomal subunit protein uS15.

Mol	Chain	Residues	Atoms					AltConf	Trace
48	o	88	Total	C	N	O	S	0	0
			714	439	144	130	1		

- Molecule 49 is a protein called Small ribosomal subunit protein bS16.

Mol	Chain	Residues	Atoms					AltConf	Trace
49	p	82	Total	C	N	O	S	0	0
			649	406	128	114	1		

- Molecule 50 is a protein called Small ribosomal subunit protein uS17.

Mol	Chain	Residues	Atoms					AltConf	Trace
50	q	80	Total	C	N	O	S	0	0
			648	411	121	113	3		

- Molecule 51 is a protein called Small ribosomal subunit protein bS18.

Mol	Chain	Residues	Atoms					AltConf	Trace
51	r	65	Total	C	N	O	S	0	0
			535	339	100	95	1		

- Molecule 52 is a protein called Small ribosomal subunit protein uS19.

Mol	Chain	Residues	Atoms					AltConf	Trace
52	s	82	Total	C	N	O	S	0	0
			658	421	125	110	2		

- Molecule 53 is a protein called Small ribosomal subunit protein bS20.

Mol	Chain	Residues	Atoms					AltConf	Trace
53	t	85	Total	C	N	O	S	0	0
			665	411	137	114	3		

- Molecule 54 is a protein called Small ribosomal subunit protein bS21.

Mol	Chain	Residues	Atoms					AltConf	Trace
54	u	65	Total	C	N	O	S	0	0
			506	313	105	87	1		

- Molecule 55 is a RNA chain called P-site fMet-tRNA(fMet).

Mol	Chain	Residues	Atoms						AltConf	Trace
55	v	77	Total	C	N	O	P	S	0	0
			1644	733	297	536	77	1		

- Molecule 56 is a RNA chain called Val-tRNA(Val).

Mol	Chain	Residues	Atoms					AltConf	Trace
56	w	77	Total	C	N	O	P	0	0
			1638	731	286	544	77		

- Molecule 57 is a RNA chain called 16S ribosomal RNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
57	x	11	Total	C	N	O	P	0	0
			231	104	37	79	11		

- Molecule 58 is a protein called Elongation factor Tu 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
58	z	383	Total	C	N	O	S	0	0
			2949	1865	507	564	13		

- Molecule 59 is MAGNESIUM ION (CCD ID: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		AltConf
59	0	1	Total	Mg	0
			1	1	
59	A	258	Total	Mg	0
			258	258	
59	B	4	Total	Mg	0
			4	4	
59	C	2	Total	Mg	0
			2	2	
59	E	1	Total	Mg	0
			1	1	
59	O	1	Total	Mg	0
			1	1	
59	P	1	Total	Mg	0
			1	1	
59	a	90	Total	Mg	0
			90	90	
59	m	1	Total	Mg	0
			1	1	

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Mol	Chain	Residues	Atoms	AltConf
59	n	1	Total Mg 1 1	0

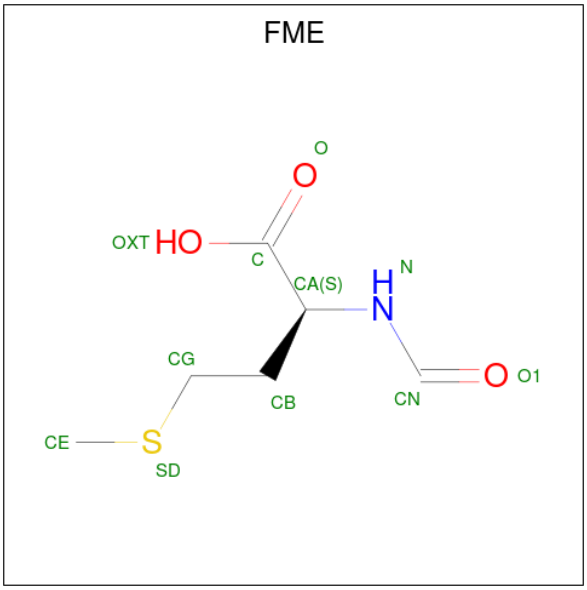
- Molecule 60 is ZINC ION (CCD ID: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms	AltConf
60	4	1	Total Zn 1 1	0
60	6	1	Total Zn 1 1	0

- Molecule 61 is SODIUM ION (CCD ID: NA) (formula: Na).

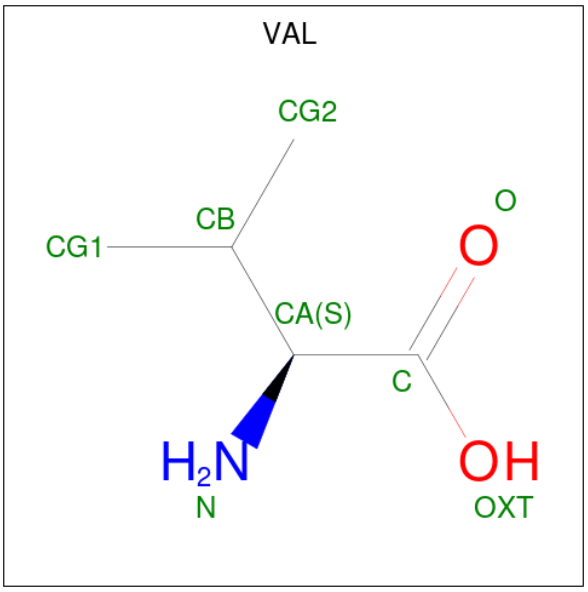
Mol	Chain	Residues	Atoms	AltConf
61	A	1	Total Na 1 1	0
61	B	1	Total Na 1 1	0

- Molecule 62 is N-FORMYLMETHIONINE (CCD ID: FME) (formula: $C_6H_{11}NO_3S$).



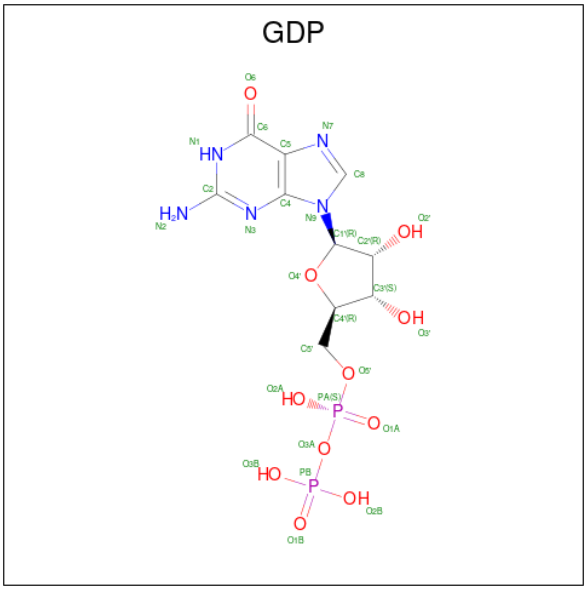
Mol	Chain	Residues	Atoms	AltConf
62	v	1	Total C N O S 10 6 1 2 1	0

- Molecule 63 is VALINE (CCD ID: VAL) (formula: $C_5H_{11}NO_2$).



Mol	Chain	Residues	Atoms				AltConf
			Total	C	N	O	
63	w	1	7	5	1	1	0

- Molecule 64 is GUANOSINE-5'-DIPHOSPHATE (CCD ID: GDP) (formula: $C_{10}H_{15}N_5O_{11}P_2$).



Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	P	
64	z	1	28	10	5	11	2	0

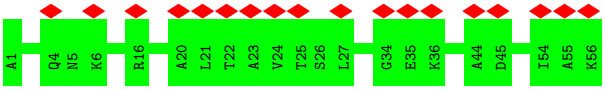
3 Residue-property plots (i)

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 and atom inclusion in map density. 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. A red diamond above a residue indicates a poor fit to the EM map for this residue (all-atom inclusion < 40%). 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: Large ribosomal subunit protein bL32

Chain 0:

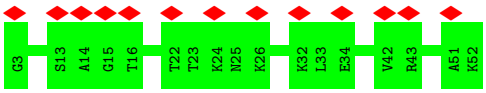




• Molecule 2: Large ribosomal subunit protein bL33

Chain 1:

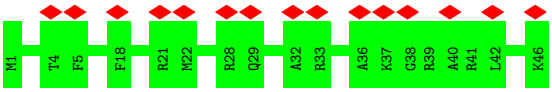




• Molecule 3: Large ribosomal subunit protein bL34

Chain 2:

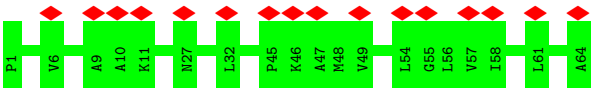




• Molecule 4: Large ribosomal subunit protein bL35

Chain 3:

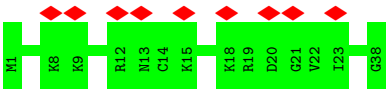




• Molecule 5: Large ribosomal subunit protein bL36A

Chain 4:

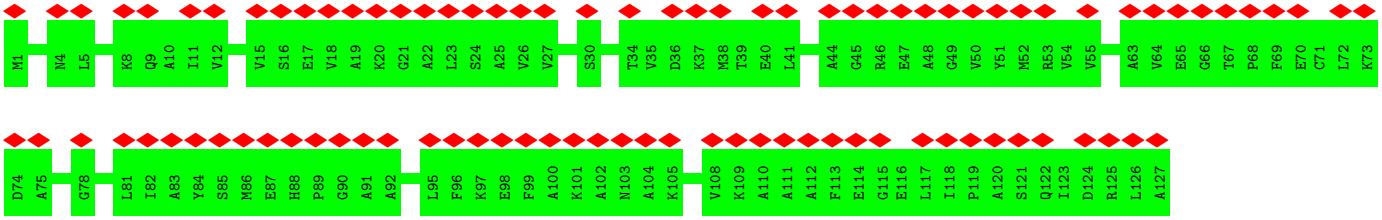




• Molecule 6: Large ribosomal subunit protein uL10

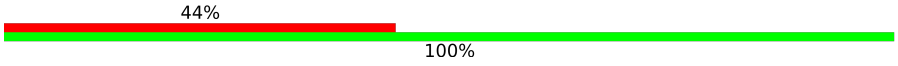
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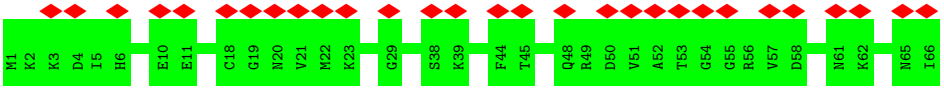




• Molecule 7: Large ribosomal subunit protein bL31

Chain 6:

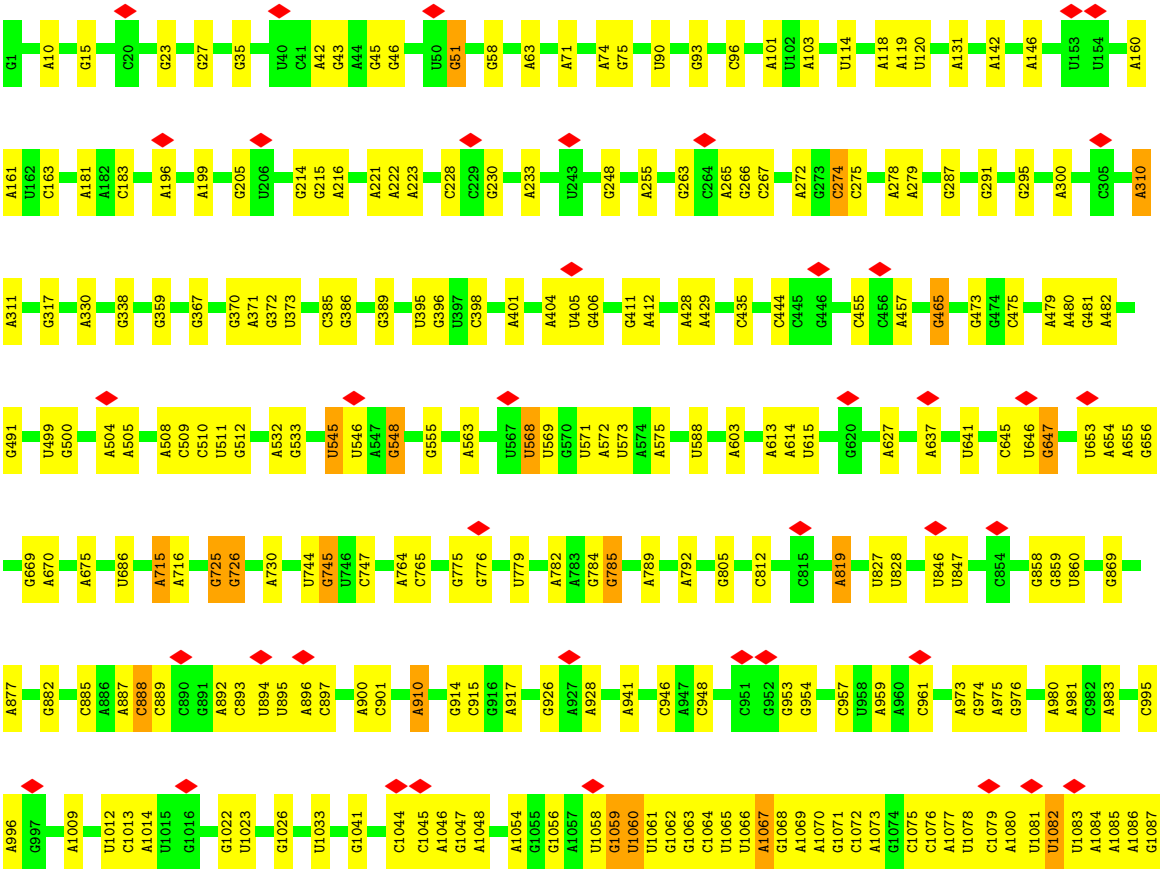


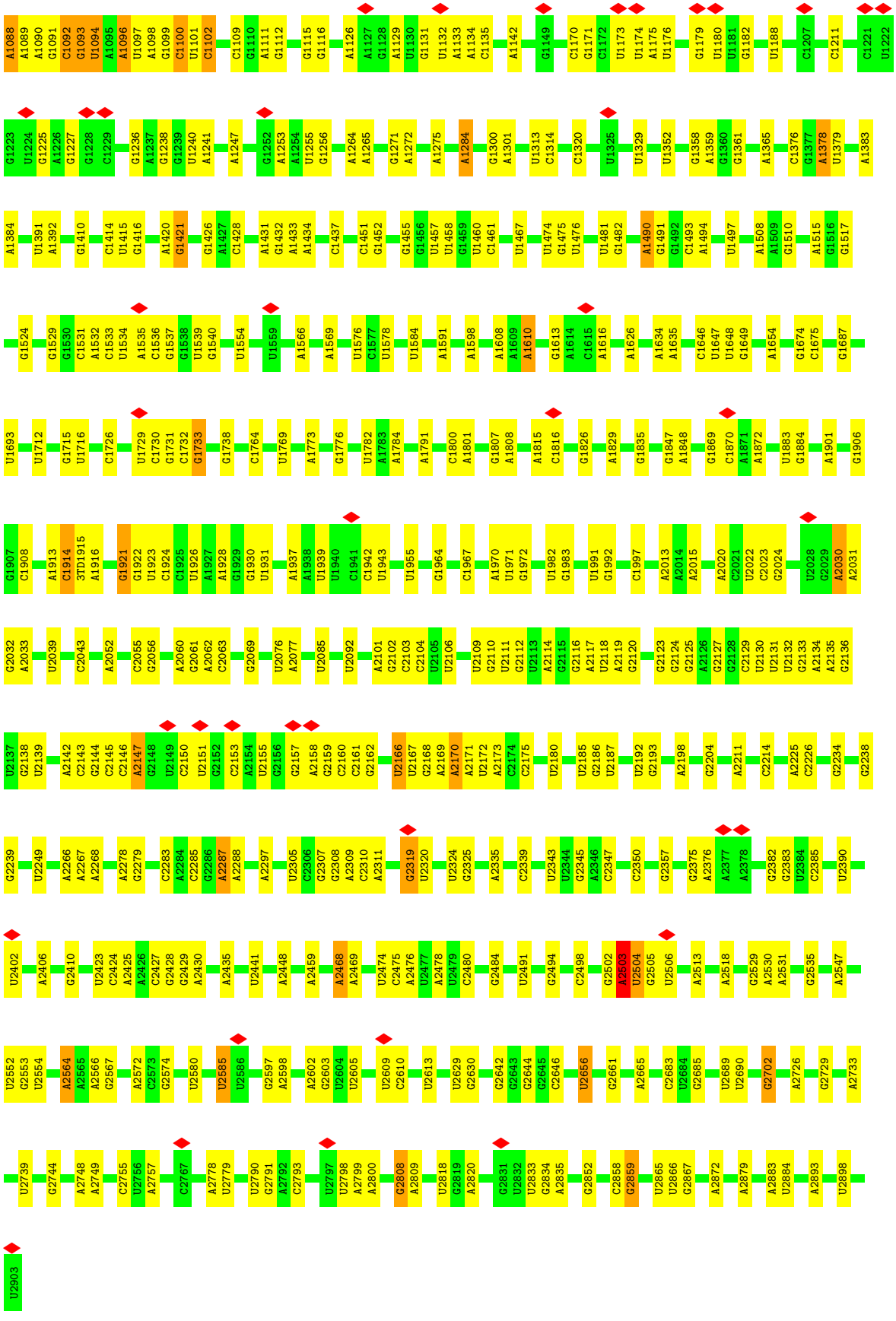


• Molecule 8: 23S ribosomal RNA

Chain A:

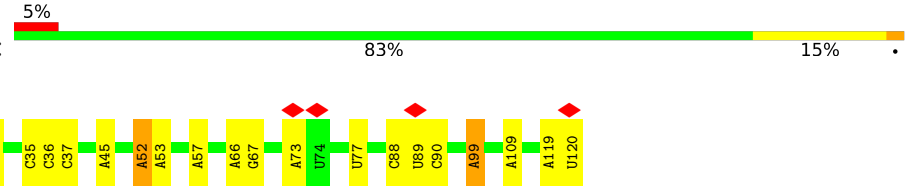





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G2032 A2033 U2039 C2043 A2052 C2055 G2056 A2060 G2061 A2062 C2063 G2069 U2076 A2077 U2085 U2092 A2101 G2102 C2103 C2104 U2105 U2106 U2109 G2110 U2111 G2112 U2113 A2114 G2115 G2116 A2117 U2118 A2119 G2120 G2123 G2124 G2125 A2126 G2127 G2128 C2129 U2130 U2131 U2132 G2133 A2134 A2135 G2136
U2137 G2138 U2139 A2142 C2143 G2144 C2145 C2146 A2147 G2148 U2149 C2150 U2151 G2152 C2153 A2154 U2155 G2156 G2157 A2158 G2159 C2160 C2161 G2162 U2166 U2167 G2168 A2169 A2170 A2171 U2172 A2173 C2174 C2175 U2180 U2185 G2186 U2187 U2192 G2193 A2198 G2204 A2211 C2214 A2225 C2226 G2234 G2238
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U2903

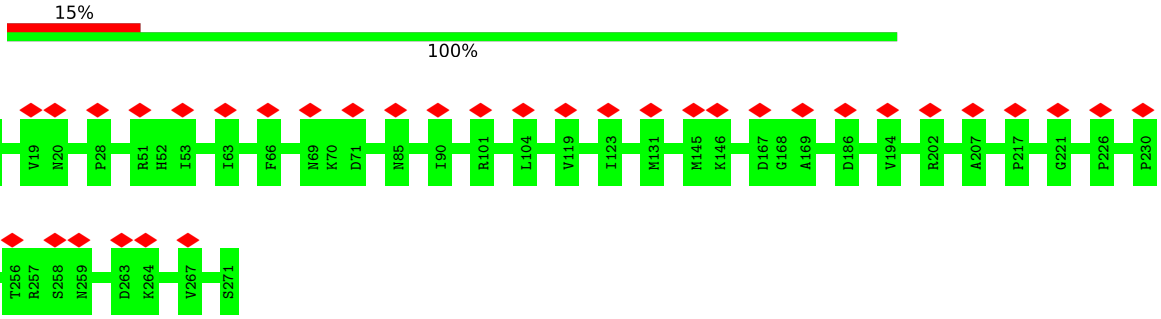
• Molecule 9: 5S ribosomal RNA

Chain B:



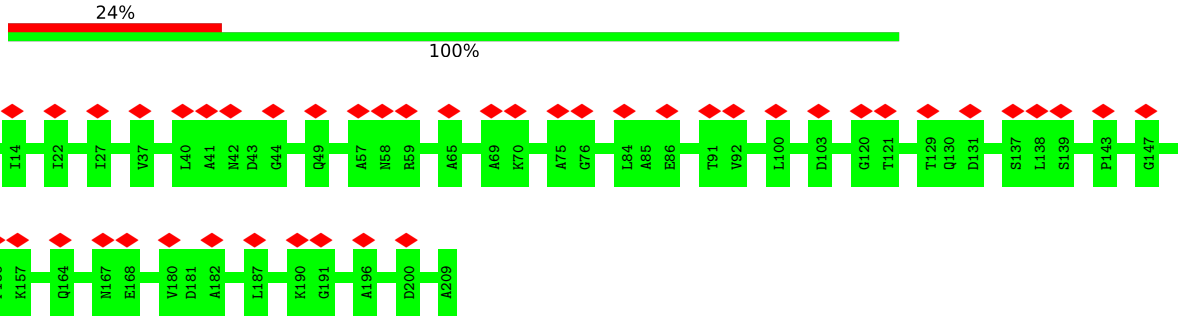
• Molecule 10: Large ribosomal subunit protein uL2

Chain C:



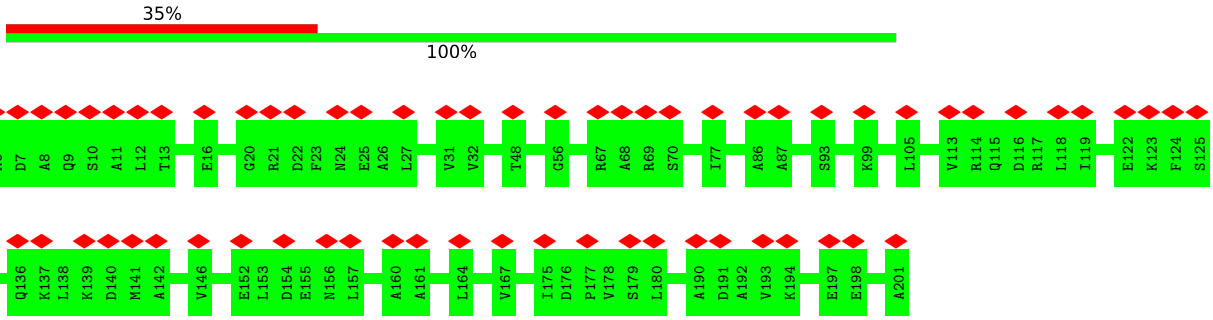
• Molecule 11: 50S ribosomal protein L3

Chain D:



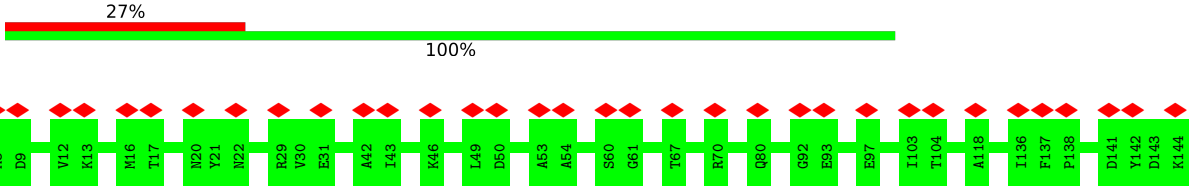
• Molecule 12: Large ribosomal subunit protein uL4

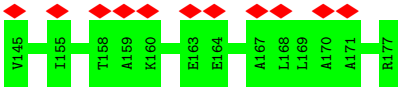
Chain E:



• Molecule 13: Large ribosomal subunit protein uL5

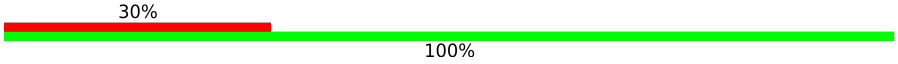
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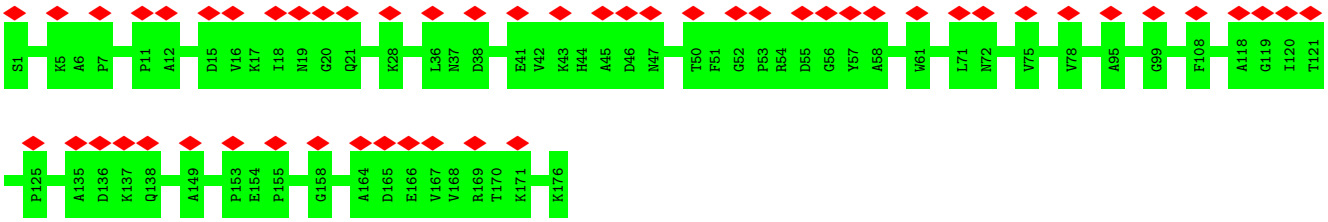




• Molecule 14: Large ribosomal subunit protein uL6

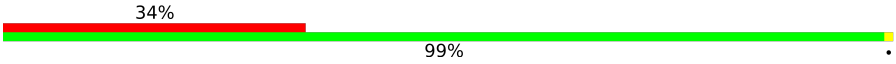
Chain G:

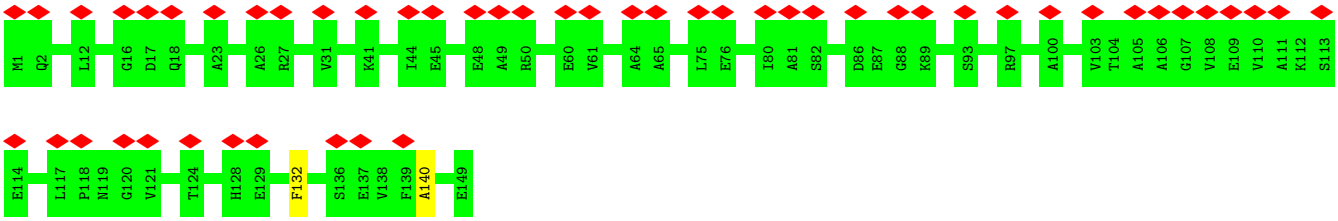




• Molecule 15: Large ribosomal subunit protein bL9

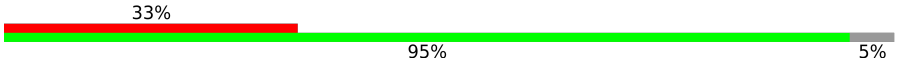
Chain H:

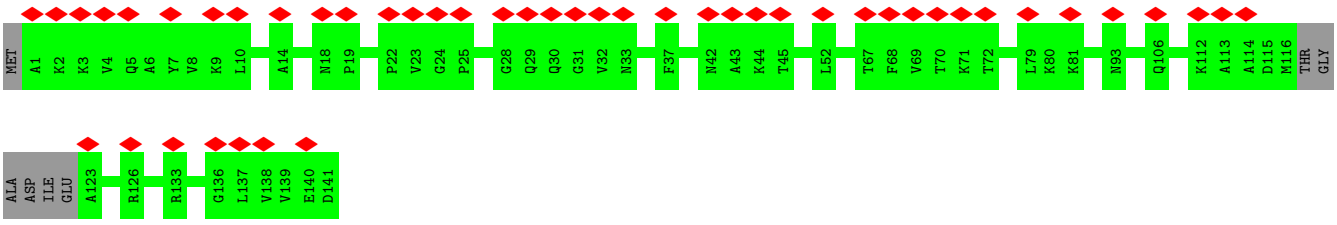




• Molecule 16: Large ribosomal subunit protein uL11

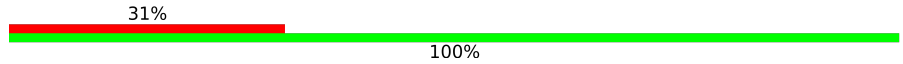
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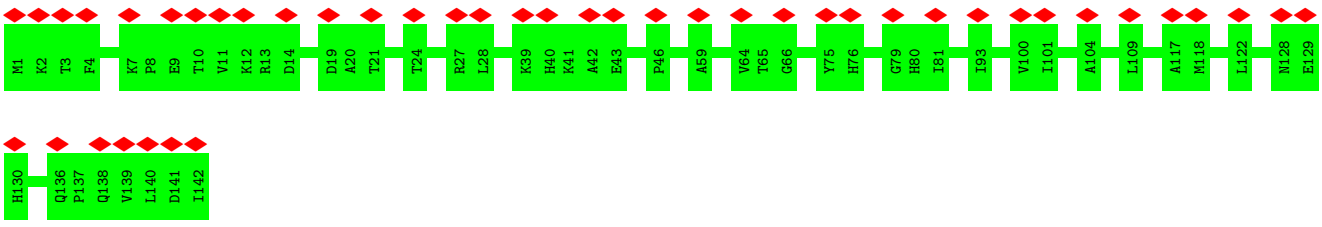




• Molecule 17: Large ribosomal subunit protein uL13

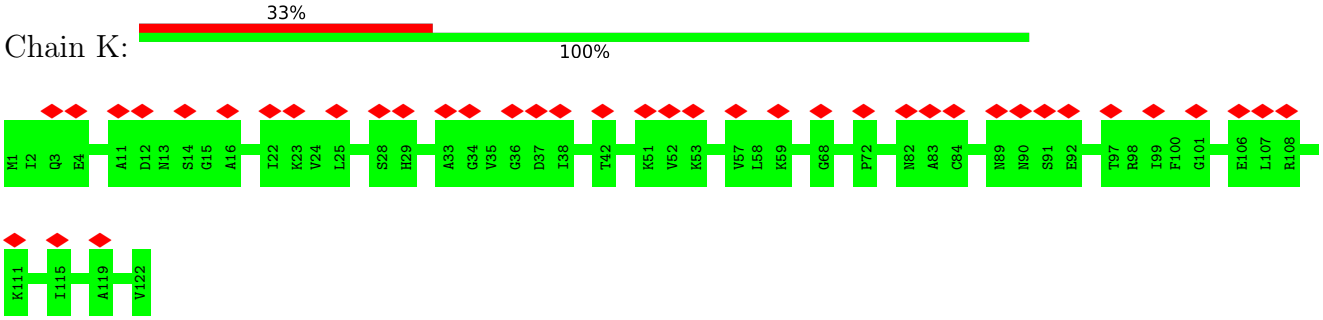
Chain J:





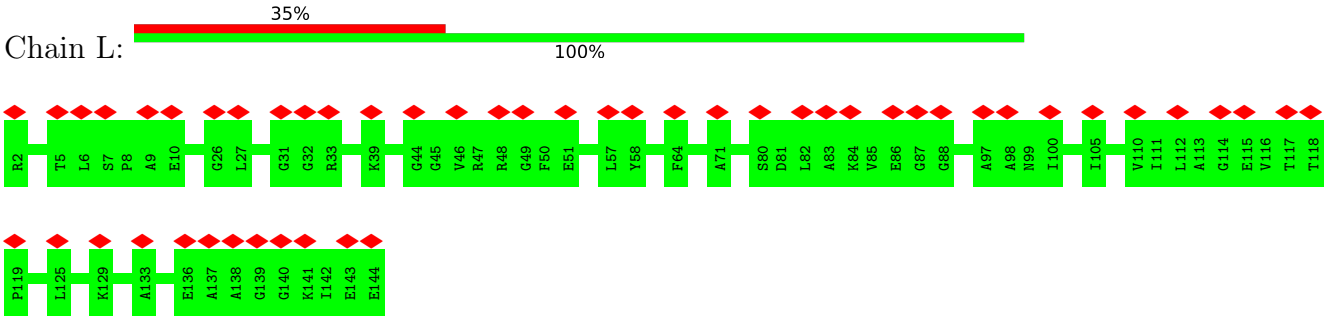
• Molecule 18: Large ribosomal subunit protein uL14

Chain K:



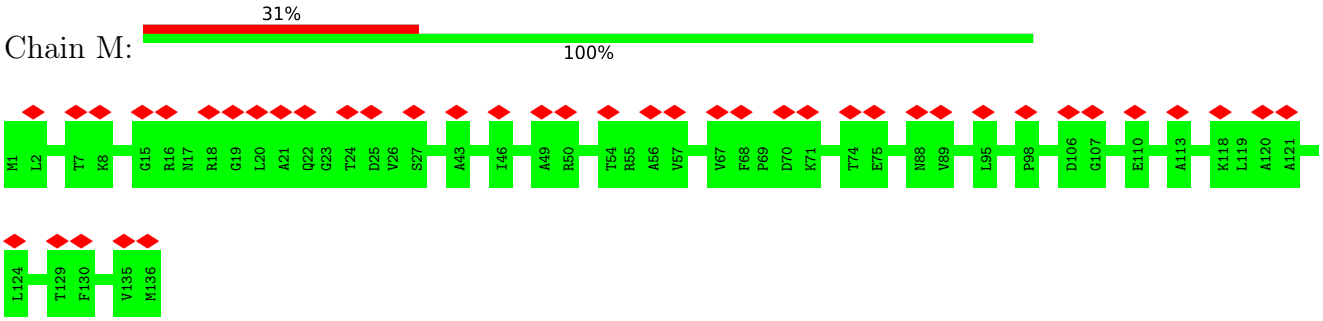
• Molecule 19: Large ribosomal subunit protein uL15

Chain L:



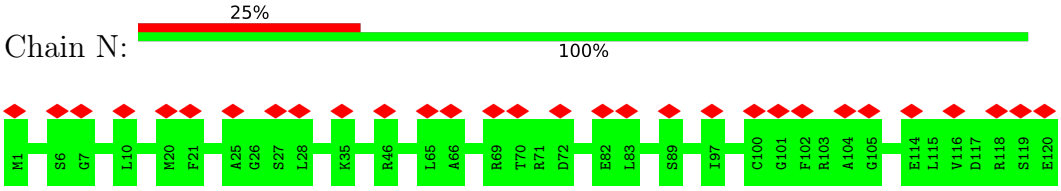
• Molecule 20: 50S ribosomal protein L16

Chain M:



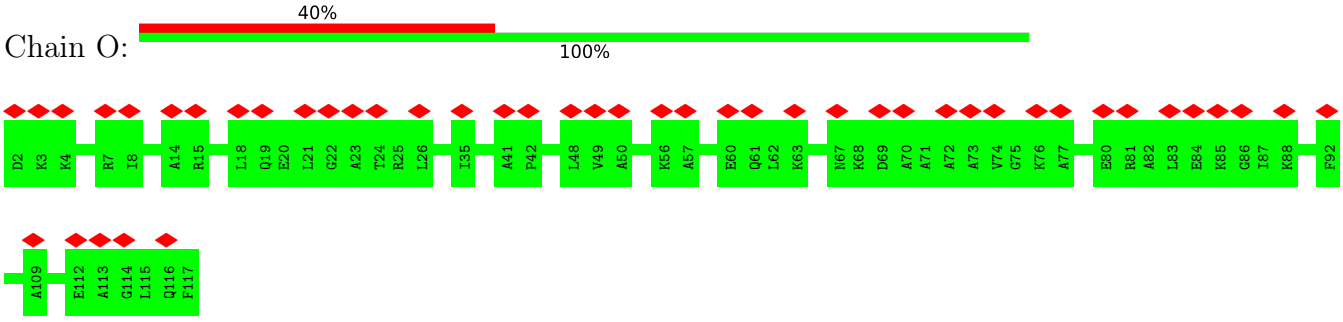
• Molecule 21: Large ribosomal subunit protein bL17

Chain N:



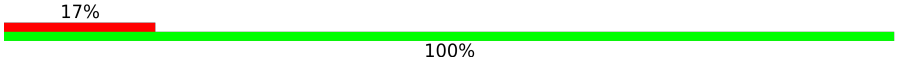
• Molecule 22: Large ribosomal subunit protein uL18

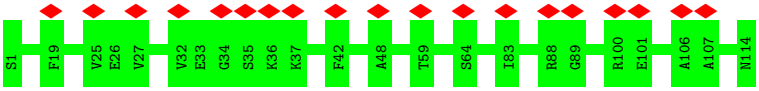
Chain O:



• Molecule 23: Large ribosomal subunit protein bL19

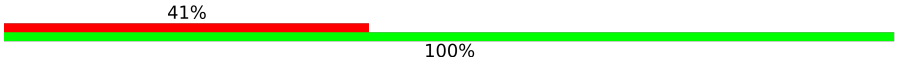
Chain P:

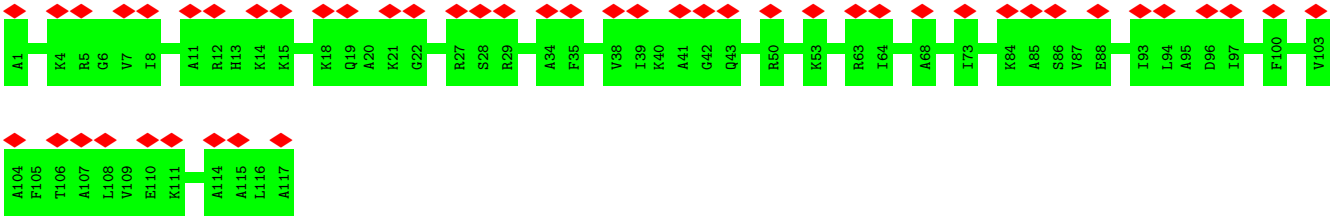




• Molecule 24: Large ribosomal subunit protein bL20

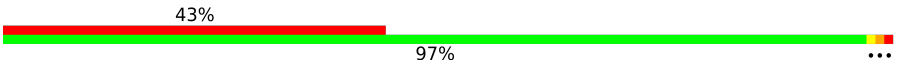
Chain Q:

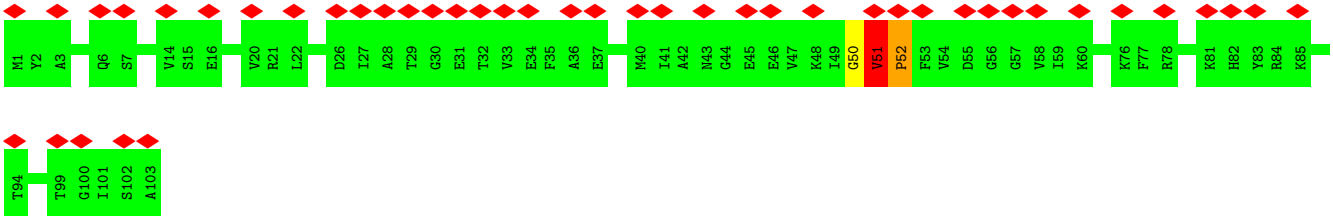




• Molecule 25: Large ribosomal subunit protein bL21

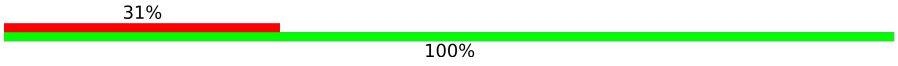
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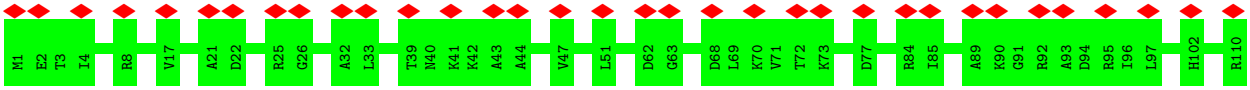




• Molecule 26: Large ribosomal subunit protein uL22

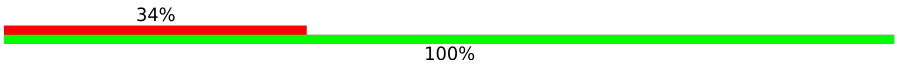
Chain S:

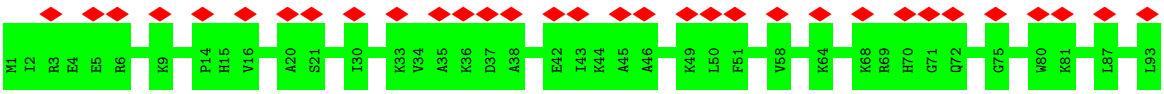




• Molecule 27: Large ribosomal subunit protein uL23

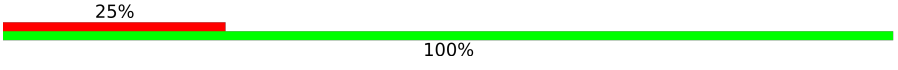
Chain T:

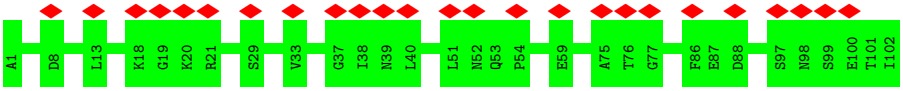




• Molecule 28: Large ribosomal subunit protein uL24

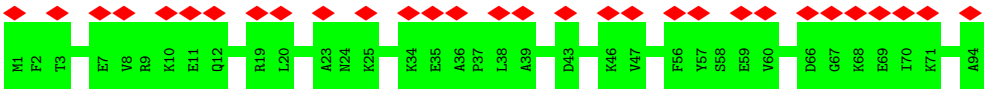
Chain U:





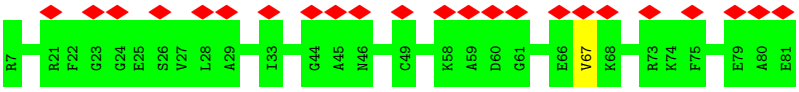
• Molecule 29: Large ribosomal subunit protein bL25





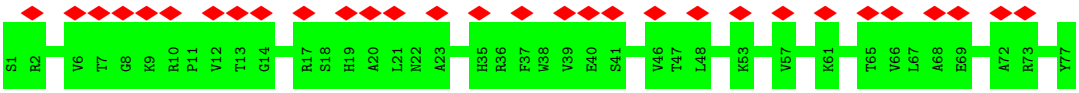
• Molecule 30: Large ribosomal subunit protein bL27





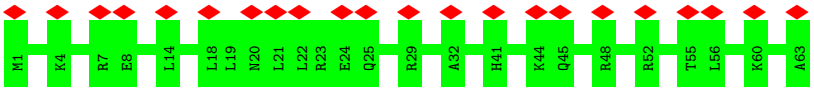
• Molecule 31: Large ribosomal subunit protein bL28





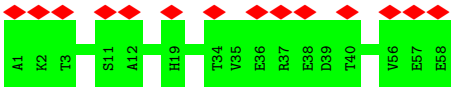
• Molecule 32: Large ribosomal subunit protein uL29



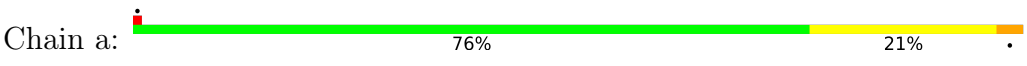


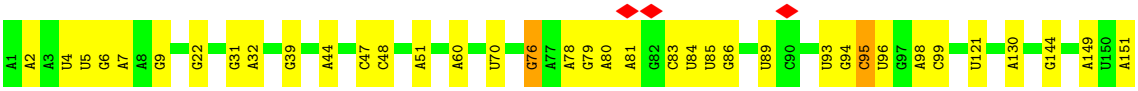
• Molecule 33: Large ribosomal subunit protein uL30

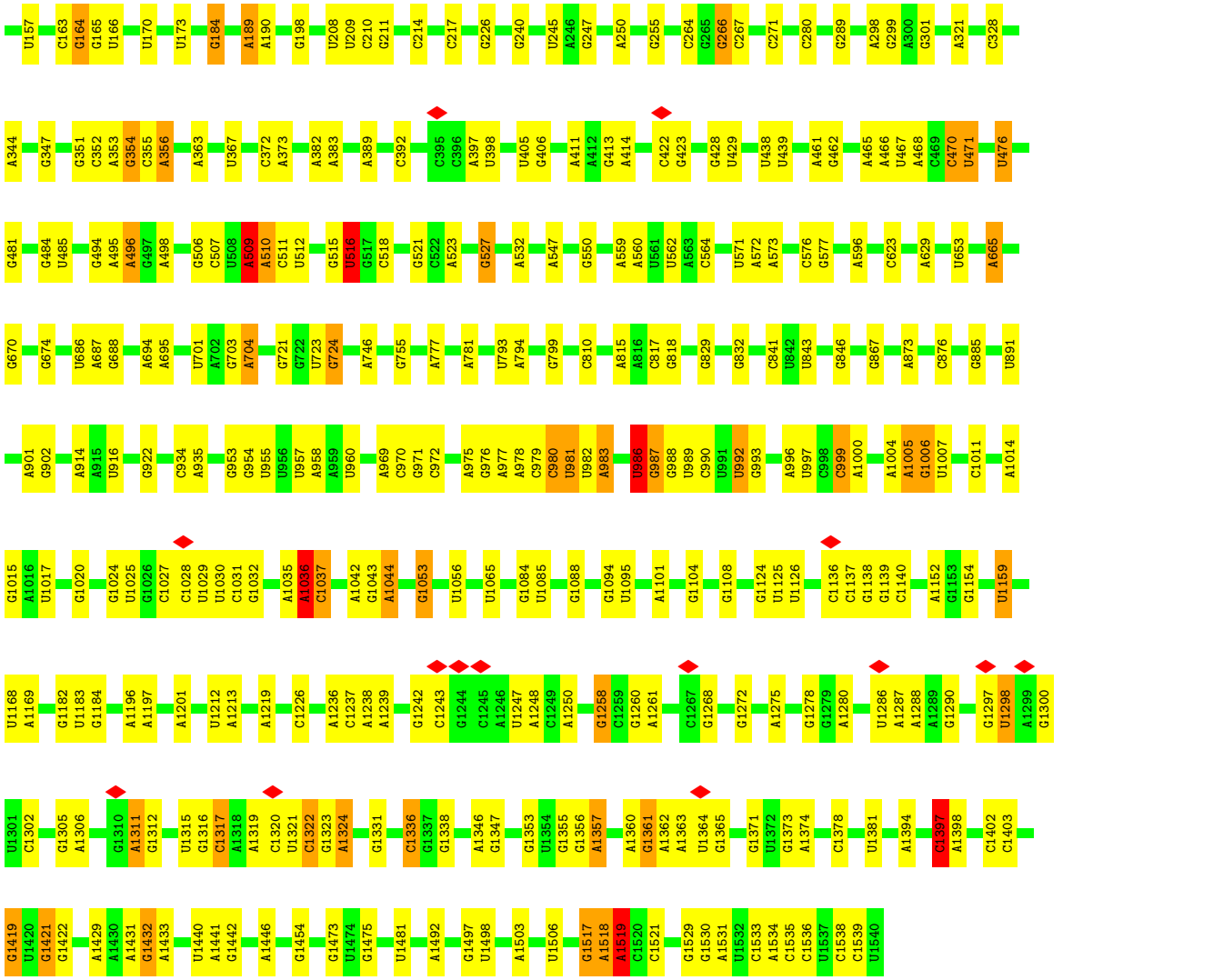




• Molecule 34: 16S ribosomal RNA

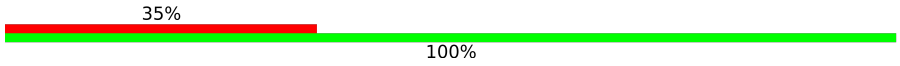


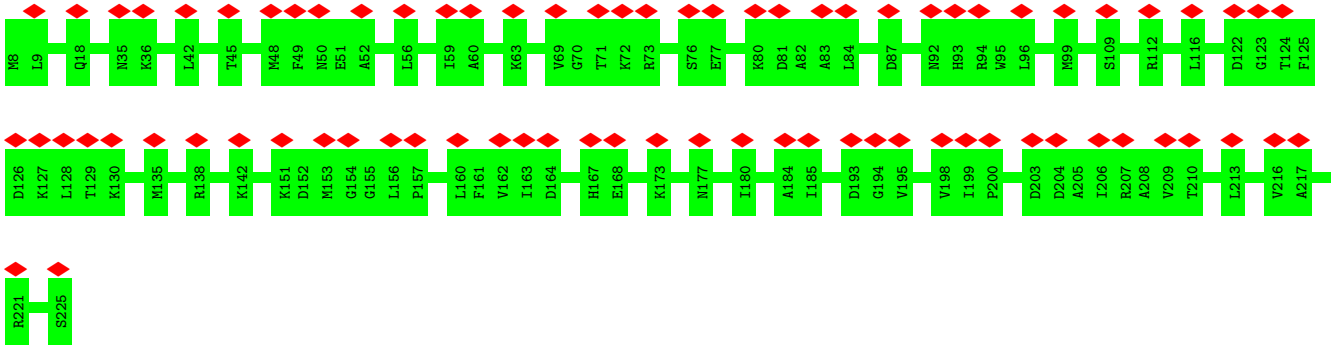




• Molecule 35: Small ribosomal subunit protein uS2

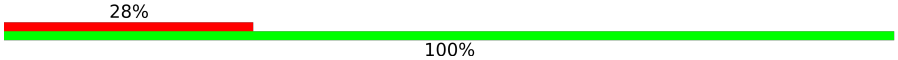
Chain b:

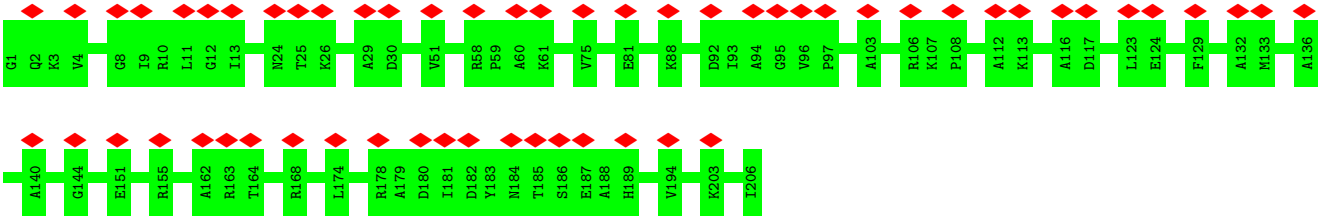




• Molecule 36: Small ribosomal subunit protein uS3

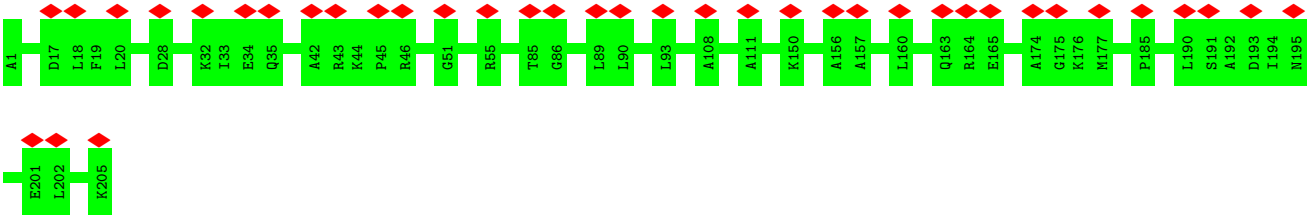
Chain c:





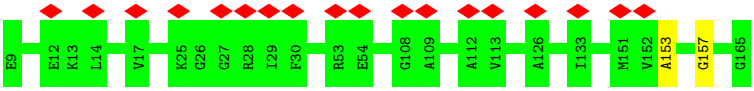
• Molecule 37: Small ribosomal subunit protein uS4





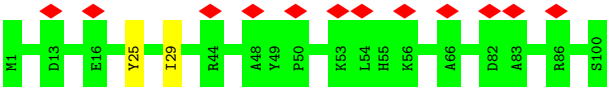
• Molecule 38: Small ribosomal subunit protein uS5





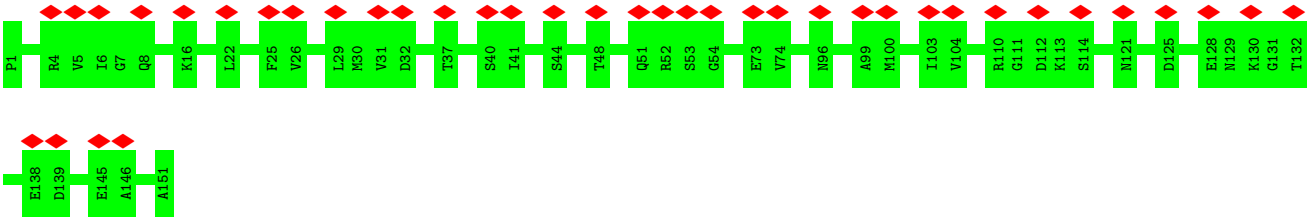
• Molecule 39: Small ribosomal subunit protein bS6, non-modified isoform





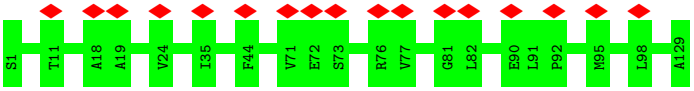
• Molecule 40: 30S ribosomal protein S7





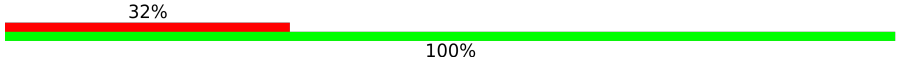
• Molecule 41: Small ribosomal subunit protein uS8

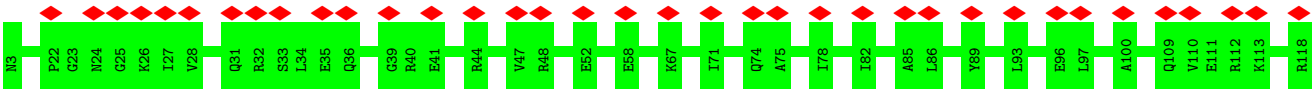


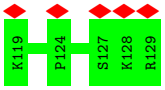


• Molecule 42: Small ribosomal subunit protein uS9

Chain i:

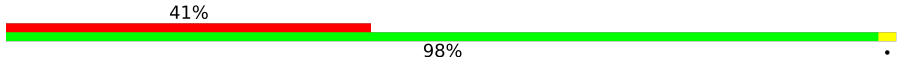


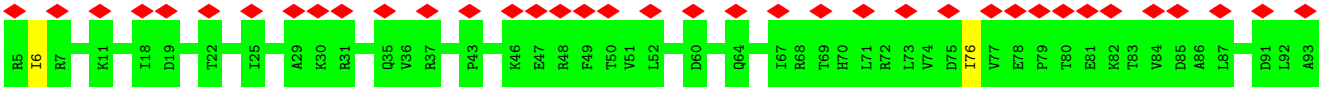


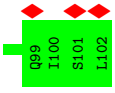


• Molecule 43: Small ribosomal subunit protein uS10

Chain j:

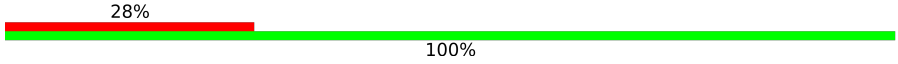


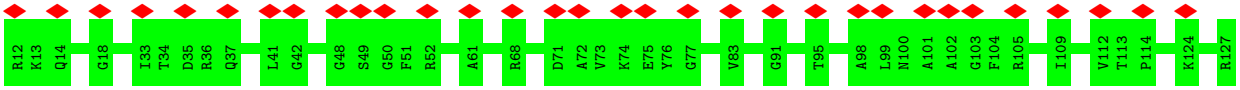




• Molecule 44: Small ribosomal subunit protein uS11

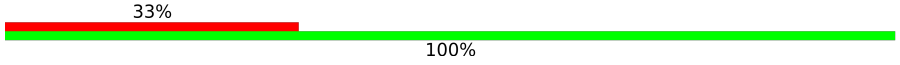
Chain k:

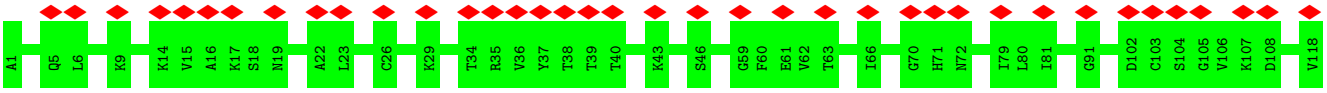




• Molecule 45: Small ribosomal subunit protein uS12

Chain l:

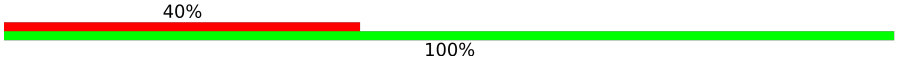


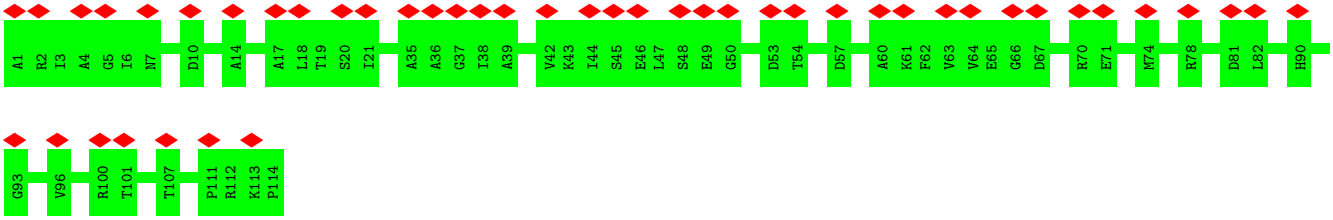




• Molecule 46: Small ribosomal subunit protein uS13

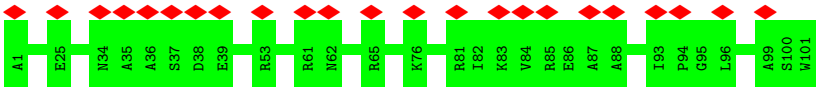
Chain m:





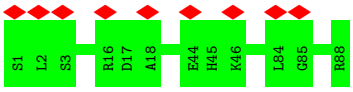
• Molecule 47: Small ribosomal subunit protein uS14





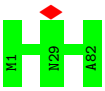
• Molecule 48: Small ribosomal subunit protein uS15





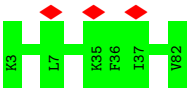
• Molecule 49: Small ribosomal subunit protein bS16





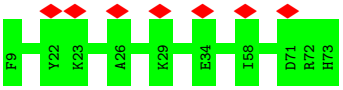
• Molecule 50: Small ribosomal subunit protein uS17





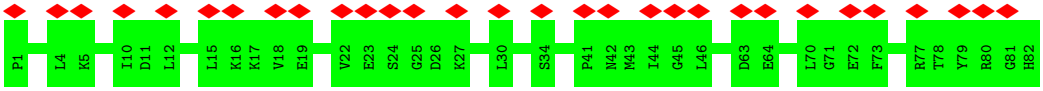
• Molecule 51: Small ribosomal subunit protein bS18





• Molecule 52: Small ribosomal subunit protein uS19

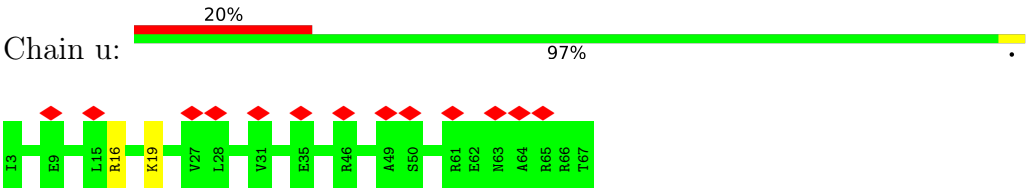




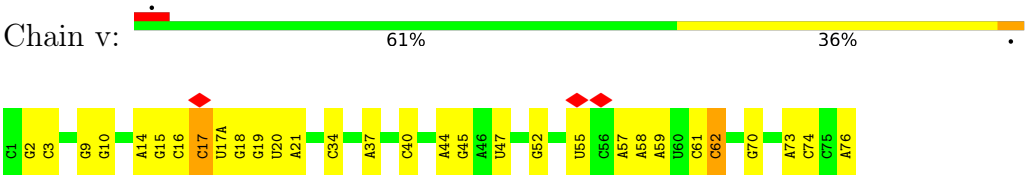
• Molecule 53: Small ribosomal subunit protein bS20



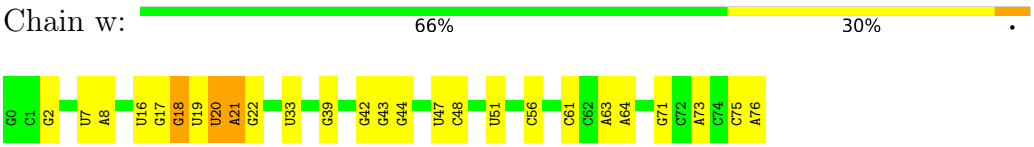
• Molecule 54: Small ribosomal subunit protein bS21



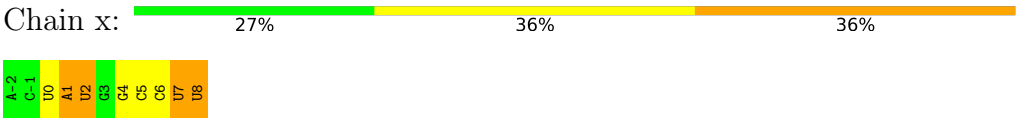
• Molecule 55: P-site fMet-tRNA(fMet)



• Molecule 56: Val-tRNA(Val)

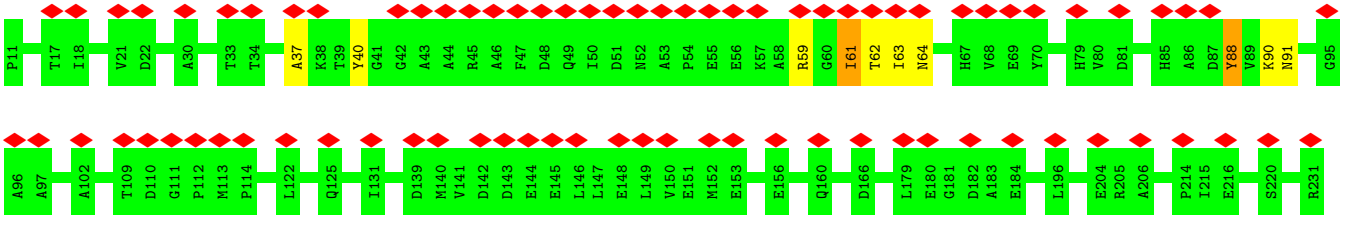


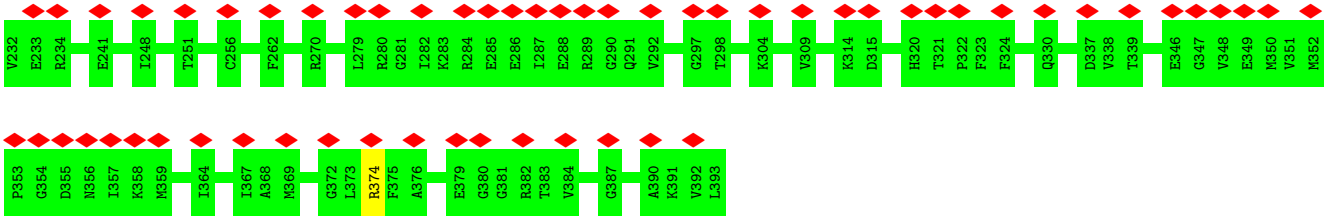
• Molecule 57: 16S ribosomal RNA



• Molecule 58: Elongation factor Tu 1






V232
E233
R234
E241
I248
T251
C256
F262
R270
L279
R280
G281
I282
K283
R284
E285
E286
I287
E288
R289
G290
Q291
V292
G297
T298
K304
V309
K314
D315
H320
T321
P322
F323
F324
Q330
D337
V338
T339
E346
G347
V348
E349
M350
V351
M352
P353
G354
D355
N356
I357
K358
M359
T364
T367
A368
M369
G372
L373
R374
F375
A376
E379
G380
G381
R382
T383
V384
G387
A390
K391
V392
L393

4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	3921	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	TFS KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/Å^2$)	40	Depositor
Minimum defocus (nm)	200	Depositor
Maximum defocus (nm)	2000	Depositor
Magnification	81000	Depositor
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	2.194	Depositor
Minimum map value	-0.729	Depositor
Average map value	0.045	Depositor
Map value standard deviation	0.211	Depositor
Recommended contour level	0.43	Depositor
Map size (Å)	336.0, 336.0, 336.0	wwPDB
Map dimensions	320, 320, 320	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.05, 1.05, 1.05	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: 2MA, MA6, FME, 4SU, H2U, 5MC, MG, 4OC, 2MG, OMU, UR3, GDP, 6MZ, 5MU, 1MG, OMG, OMC, NA, ZN, PSU, G7M, 3TD

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	0	0.20	0/450	0.42	0/599
2	1	0.19	0/416	0.45	0/554
3	2	0.20	0/380	0.40	0/498
4	3	0.17	0/513	0.43	0/676
5	4	0.24	0/303	0.47	0/397
6	5	0.16	0/626	0.44	0/870
7	6	0.17	0/531	0.47	0/709
8	A	0.41	0/69266	0.88	62/108055 (0.1%)
9	B	0.37	0/2873	0.84	2/4478 (0.0%)
10	C	0.17	0/2121	0.42	0/2852
11	D	0.19	0/1586	0.44	0/2134
12	E	0.18	0/1571	0.40	0/2113
13	F	0.21	0/1434	0.49	0/1926
14	G	0.18	0/1343	0.42	0/1816
15	H	0.20	0/1122	0.51	0/1515
16	I	0.17	0/662	0.50	0/917
17	J	0.18	0/1152	0.40	0/1551
18	K	0.18	0/947	0.41	0/1268
19	L	0.21	0/1054	0.47	0/1403
20	M	0.18	0/1093	0.41	0/1460
21	N	0.20	0/973	0.45	0/1301
22	O	0.16	0/902	0.38	0/1209
23	P	0.17	0/929	0.39	0/1242
24	Q	0.19	0/960	0.40	0/1278
25	R	0.27	0/829	0.68	2/1107 (0.2%)
26	S	0.19	0/864	0.43	0/1156
27	T	0.19	0/744	0.43	0/994
28	U	0.18	0/787	0.42	0/1051
29	V	0.20	0/766	0.45	0/1025
30	W	0.19	0/582	0.44	0/769
31	X	0.18	0/635	0.38	0/848

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	#|Z| >5	RMSZ	#|Z| >5
32	Y	0.19	0/510	0.40	0/677
33	Z	0.22	0/453	0.50	0/605
34	a	0.41	0/36725	0.91	69/57285 (0.1%)
35	b	0.20	0/1735	0.52	0/2338
36	c	0.19	0/1651	0.40	0/2225
37	d	0.19	0/1665	0.47	0/2227
38	e	0.19	0/1154	0.42	0/1554
39	f	0.21	0/835	0.45	0/1128
40	g	0.18	0/1195	0.40	0/1602
41	h	0.19	0/989	0.40	0/1326
42	i	0.19	0/1034	0.46	0/1375
43	j	0.22	0/796	0.56	0/1077
44	k	0.17	0/885	0.41	0/1195
45	l	0.20	0/969	0.45	0/1300
46	m	0.19	0/892	0.47	0/1193
47	n	0.20	0/811	0.44	0/1081
48	o	0.18	0/722	0.40	0/964
49	p	0.20	0/659	0.42	0/884
50	q	0.18	0/657	0.45	0/881
51	r	0.20	0/544	0.43	0/731
52	s	0.19	0/675	0.45	0/908
53	t	0.20	0/671	0.45	0/888
54	u	0.17	0/512	0.40	0/683
55	v	0.41	0/1747	0.95	3/2721 (0.1%)
56	w	0.38	0/1829	1.01	3/2848 (0.1%)
57	x	0.66	0/233	0.83	0/360
58	z	0.26	0/3004	0.62	3/4069 (0.1%)
All	All	0.36	0/161966	0.80	144/241896 (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
58	z	0	2

There are no bond length outliers.

All (144) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
25	R	51	VAL	N-CA-CB	12.24	118.72	110.52

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
34	a	980	C	C6-N1-C2	-10.12	116.25	120.30
34	a	980	C	N3-C2-O2	-9.71	115.11	121.90
34	a	980	C	C2-N1-C1'	9.44	129.19	118.80
34	a	980	C	N1-C2-O2	8.85	124.21	118.90
34	a	1006	G	O4'-C1'-N9	8.68	115.15	108.20
25	R	51	VAL	N-CA-C	-8.32	102.28	112.67
34	a	1317	C	C6-N1-C2	-8.25	117.00	120.30
34	a	979	C	C6-N1-C2	-7.56	117.28	120.30
55	v	17	C	C6-N1-C2	-7.55	117.28	120.30
8	A	917	A	O5'-C5'-C4'	7.38	115.30	109.40
34	a	982	U	N3-C2-O2	-7.33	117.07	122.20
34	a	980	C	O4'-C1'-N1	7.28	113.59	108.50
8	A	1313	U	C2-N1-C1'	7.05	126.16	117.70
8	A	1421	G	O5'-C5'-C4'	7.02	115.01	109.40
8	A	1100	C	N3-C2-O2	-6.99	117.00	121.90
8	A	2585	U	C2-N1-C1'	6.85	125.92	117.70
34	a	1324	A	N1-C6-N6	6.81	122.69	118.60
8	A	888	C	O5'-C5'-C4'	6.70	114.76	109.40
34	a	1298	U	N1-C2-O2	6.70	127.49	122.80
34	a	509	A	P-O3'-C3'	6.69	127.72	119.70
34	a	476	U	N3-C2-O2	-6.63	117.56	122.20
34	a	1036	A	O4'-C1'-N9	6.62	113.50	108.20
55	v	47	U	O5'-C5'-C4'	6.61	114.69	109.40
34	a	1298	U	N3-C2-O2	-6.55	117.62	122.20
8	A	2858	C	N1-C1'-C2'	6.54	119.20	112.00
8	A	2168	G	O5'-C5'-C4'	6.47	114.58	109.40
8	A	2468	A	P-O3'-C3'	6.46	127.45	119.70
34	a	982	U	C2-N1-C1'	6.44	125.43	117.70
34	a	982	U	C6-N1-C2	-6.43	117.14	121.00
8	A	1675	C	N1-C2-O2	6.40	122.74	118.90
8	A	1126	A	N1-C6-N6	6.36	122.42	118.60
9	B	99	A	O5'-C5'-C4'	6.33	114.46	109.40
34	a	980	C	O5'-C5'-C4'	6.30	114.44	109.40
34	a	1006	G	O5'-C5'-C4'	6.29	114.43	109.40
34	a	1037	C	O5'-C5'-C4'	6.27	114.42	109.40
8	A	1675	C	N3-C2-O2	-6.26	117.52	121.90
8	A	1320	C	C6-N1-C2	-6.23	117.81	120.30
8	A	274	C	P-O3'-C3'	6.20	127.14	119.70
34	a	405	U	O5'-C5'-C4'	6.19	114.35	109.40
34	a	184	G	O5'-C5'-C4'	6.19	114.35	109.40
34	a	701	U	O5'-C5'-C4'	6.18	114.34	109.40
8	A	310	A	O4'-C1'-N9	6.12	112.78	108.50

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
34	a	1311	A	P-O3'-C3'	6.08	126.99	119.70
34	a	981	U	O4'-C1'-N1	-6.05	104.26	108.50
8	A	548	G	O5'-C5'-C4'	6.03	114.22	109.40
34	a	438	U	O4'-C1'-N1	6.02	113.01	108.20
34	a	471	U	N3-C2-O2	-6.00	118.00	122.20
8	A	2319	G	P-O3'-C3'	5.99	126.89	119.70
8	A	2102	G	O5'-C5'-C4'	5.98	114.19	109.40
34	a	354	G	O5'-C5'-C4'	5.97	114.18	109.40
34	a	1432	G	O4'-C1'-N9	5.95	112.96	108.20
8	A	465	G	N1-C6-O6	-5.94	116.33	119.90
56	w	56	C	O5'-C5'-C4'	5.93	114.14	109.40
8	A	2749	A	O5'-C5'-C4'	5.93	114.14	109.40
34	a	979	C	N3-C4-C5	-5.91	119.54	121.90
34	a	1324	A	C8-N9-C4	-5.88	103.45	105.80
8	A	2585	U	N3-C2-O2	-5.87	118.09	122.20
8	A	1712	U	O5'-C5'-C4'	5.87	114.10	109.40
34	a	1317	C	N3-C2-O2	-5.86	117.80	121.90
34	a	1355	G	P-O3'-C3'	5.86	126.73	119.70
9	B	52	A	P-O3'-C3'	5.80	126.66	119.70
34	a	982	U	N1-C2-O2	5.76	126.83	122.80
34	a	1005	A	O4'-C1'-N9	5.71	112.77	108.20
34	a	980	C	C6-N1-C1'	-5.65	114.02	120.80
8	A	2859	G	N1-C6-O6	-5.64	116.52	119.90
34	a	471	U	N1-C2-O2	5.63	126.74	122.80
8	A	1092	C	O5'-C5'-C4'	5.61	113.89	109.40
8	A	2585	U	N1-C2-O2	5.61	126.73	122.80
34	a	507	C	O5'-C5'-C4'	5.61	113.89	109.40
34	a	1421	G	O5'-C5'-C4'	5.61	113.88	109.40
34	a	1108	G	N3-C2-N2	-5.58	116.00	119.90
55	v	62	C	O5'-C5'-C4'	5.58	113.86	109.40
8	A	2757	A	O5'-C5'-C4'	5.58	113.86	109.40
8	A	910	A	N1-C6-N6	-5.57	115.26	118.60
8	A	465	G	C5-C6-O6	5.56	131.94	128.60
8	A	2859	G	O4'-C1'-N9	-5.55	104.61	108.50
34	a	476	U	N1-C2-O2	5.54	126.68	122.80
34	a	1432	G	C8-N9-C4	-5.54	104.18	106.40
34	a	1336	C	O5'-C5'-C4'	5.53	113.83	109.40
8	A	2287	A	P-O3'-C3'	5.52	126.33	119.70
34	a	1036	A	C4-N9-C1'	5.52	136.24	126.30
56	w	18	G	O5'-C5'-C4'	5.52	113.81	109.40
8	A	1914	C	N1-C2-O2	5.50	122.20	118.90
34	a	1258	G	N9-C4-C5	5.47	107.59	105.40

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
34	a	470	C	N3-C2-O2	-5.47	118.07	121.90
8	A	1610	A	O5'-C5'-C4'	5.45	113.76	109.40
8	A	1126	A	C5-C6-N6	-5.44	119.35	123.70
34	a	986	U	O5'-C5'-C4'	5.42	113.74	109.40
8	A	2285	C	O5'-C5'-C4'	5.42	113.74	109.40
8	A	1102	C	N3-C4-N4	-5.42	114.21	118.00
34	a	982	U	C5-C6-N1	5.41	125.41	122.70
8	A	1490	A	P-O3'-C3'	5.41	126.19	119.70
8	A	2147	A	O5'-C5'-C4'	5.38	113.70	109.40
8	A	161	A	O5'-C5'-C4'	5.36	113.69	109.40
34	a	1324	A	N7-C8-N9	5.35	116.48	113.80
8	A	1426	G	O5'-C5'-C4'	5.35	113.68	109.40
34	a	983	A	O5'-C5'-C4'	5.34	113.67	109.40
8	A	274	C	O5'-C5'-C4'	5.29	113.64	109.40
34	a	979	C	N3-C4-N4	5.29	121.70	118.00
34	a	1219	A	N1-C6-N6	5.29	121.77	118.60
34	a	687	A	C8-N9-C4	-5.27	103.69	105.80
34	a	981	U	N1-C1'-C2'	5.26	117.79	112.00
8	A	1675	C	C6-N1-C2	-5.26	118.19	120.30
8	A	1082	U	P-O3'-C3'	5.26	126.01	119.70
8	A	1060	U	C2-N1-C1'	5.26	124.01	117.70
58	z	62	THR	N-CA-C	5.25	116.95	108.34
34	a	95	C	P-O3'-C3'	5.24	125.99	119.70
58	z	61	ILE	CB-CA-C	5.24	116.97	110.73
34	a	1338	G	O4'-C1'-N9	-5.24	104.83	108.50
8	A	2376	A	O4'-C1'-N9	-5.21	104.85	108.50
8	A	2564	A	O4'-C1'-N9	-5.21	104.85	108.50
34	a	1397	C	C6-N1-C2	-5.21	118.22	120.30
8	A	214	G	O5'-C5'-C4'	5.20	113.56	109.40
8	A	889	C	C2-N1-C1'	5.19	124.51	118.80
34	a	496	A	C2-N3-C4	5.19	113.20	110.60
8	A	1100	C	O5'-C5'-C4'	5.18	113.54	109.40
34	a	674	G	N7-C8-N9	5.17	115.69	113.10
8	A	715	A	P-O3'-C3'	5.17	125.90	119.70
34	a	694	A	O5'-C5'-C4'	5.17	113.53	109.40
34	a	481	G	C4-N9-C1'	5.16	133.21	126.50
8	A	51	G	O4'-C1'-N9	5.15	112.32	108.20
8	A	948	C	C6-N1-C2	-5.11	118.25	120.30
34	a	1182	G	P-O3'-C3'	5.10	125.83	119.70
8	A	1096	A	P-O3'-C3'	5.10	125.82	119.70
34	a	999	C	C2-N1-C1'	5.10	124.41	118.80
8	A	1067	A	O5'-C5'-C4'	5.08	113.46	109.40

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
8	A	1284	A	O5'-C5'-C4'	5.07	113.45	109.40
34	a	1361	G	P-O3'-C3'	5.05	125.76	119.70
34	a	1317	C	N1-C2-O2	5.05	121.93	118.90
34	a	189	A	O5'-C5'-C4'	5.05	113.44	109.40
8	A	90	U	O5'-C5'-C4'	5.04	113.43	109.40
8	A	1921	G	P-O3'-C3'	5.03	125.73	119.70
8	A	1100	C	N1-C2-O2	5.02	121.91	118.90
8	A	1733	G	O5'-C5'-C4'	5.02	113.42	109.40
8	A	2147	A	N1-C6-N6	5.02	121.61	118.60
34	a	970	C	C2-N1-C1'	5.02	124.32	118.80
8	A	1392	A	O4'-C1'-N9	-5.01	104.99	108.50
34	a	1053	G	O5'-C5'-C4'	5.01	113.41	109.40
34	a	1159	U	O5'-C5'-C4'	5.01	113.41	109.40
56	w	18	G	C8-N9-C1'	5.01	133.51	127.00
58	z	88	TYR	CA-CB-CG	5.00	122.91	113.90
8	A	901	C	N1-C2-O2	5.00	121.90	118.90
8	A	2808	G	P-O3'-C3'	5.00	125.70	119.70

There are no chirality outliers.

All (2) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
58	z	374	ARG	Sidechain
58	z	59	ARG	Sidechain

5.2 Too-close contacts (i)

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	0	444	0	461	0	0
2	1	409	0	440	0	0
3	2	377	0	418	0	0
4	3	504	0	574	0	0
5	4	302	0	340	0	0
6	5	627	0	329	0	0
7	6	522	0	521	0	0
8	A	62338	0	31354	39	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
9	B	2570	0	1301	1	0
10	C	2082	0	2157	0	0
11	D	1565	0	1616	0	0
12	E	1552	0	1619	0	0
13	F	1410	0	1447	0	0
14	G	1323	0	1374	0	0
15	H	1111	0	1148	1	0
16	I	664	0	330	0	0
17	J	1129	0	1162	0	0
18	K	938	0	1012	0	0
19	L	1045	0	1117	0	0
20	M	1074	0	1157	0	0
21	N	960	0	1000	0	0
22	O	892	0	923	0	0
23	P	917	0	965	0	0
24	Q	947	0	1022	0	0
25	R	816	0	839	3	0
26	S	857	0	922	0	0
27	T	738	0	807	0	0
28	U	779	0	834	0	0
29	V	753	0	780	0	0
30	W	575	0	592	1	0
31	X	625	0	655	0	0
32	Y	509	0	543	0	0
33	Z	449	0	491	0	0
34	a	33050	0	16652	48	0
35	b	1704	0	1732	0	0
36	c	1624	0	1699	0	0
37	d	1643	0	1710	0	0
38	e	1141	0	1170	1	0
39	f	817	0	808	1	0
40	g	1181	0	1240	0	0
41	h	979	0	1034	0	0
42	i	1022	0	1070	0	0
43	j	786	0	828	1	0
44	k	869	0	878	0	0
45	l	955	0	1019	0	0
46	m	883	0	944	0	0
47	n	799	0	841	0	0
48	o	714	0	737	0	0
49	p	649	0	666	0	0
50	q	648	0	691	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
51	r	535	0	552	0	0
52	s	658	0	685	0	0
53	t	665	0	714	1	0
54	u	506	0	502	1	0
55	v	1644	0	839	0	0
56	w	1638	0	826	1	0
57	x	231	0	120	22	0
58	z	2949	0	2960	5	0
59	0	1	0	0	0	0
59	A	258	0	0	0	0
59	B	4	0	0	0	0
59	C	2	0	0	0	0
59	E	1	0	0	0	0
59	O	1	0	0	0	0
59	P	1	0	0	0	0
59	a	90	0	0	0	0
59	m	1	0	0	0	0
59	n	1	0	0	0	0
60	4	1	0	0	0	0
60	6	1	0	0	0	0
61	A	1	0	0	0	0
61	B	1	0	0	0	0
62	v	10	0	10	0	0
63	w	7	0	8	0	0
64	z	28	0	12	0	0
All	All	150502	0	101197	111	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 1.

All (111) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
34:a:1498:UR3:C4	57:x:2:U:H5'	1.58	1.31
34:a:1498:UR3:C4	57:x:2:U:C5'	2.21	1.19
57:x:1:A:H2'	57:x:2:U:C6	1.82	1.14
34:a:1498:UR3:N3	57:x:2:U:H5'	1.70	1.07
34:a:1498:UR3:C3U	57:x:2:U:H5'	1.97	0.95
34:a:1498:UR3:O4	57:x:2:U:H5'	1.66	0.93
57:x:1:A:H2'	57:x:2:U:H6	1.35	0.91
8:A:1532:A:N1	8:A:1540:G:C6	2.41	0.87

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
34:a:1498:UR3:N3	57:x:2:U:C5'	2.34	0.84
8:A:1531:C:N4	8:A:1532:A:N6	2.26	0.84
34:a:1498:UR3:C4	57:x:2:U:H5"	2.14	0.78
57:x:1:A:C2'	57:x:2:U:C6	2.67	0.77
34:a:665:A:N7	34:a:724:G:O6	2.18	0.76
34:a:1402:4OC:H2'	34:a:1403:C:O4'	1.85	0.76
8:A:545:U:O2	8:A:548:G:O6	2.03	0.76
8:A:1532:A:C2	8:A:1540:G:C2	2.75	0.74
34:a:1518:MA6:H2'	34:a:1519:MA6:H8	1.70	0.73
34:a:76:G:O6	34:a:93:U:O2	2.08	0.71
34:a:1247:U:O2	34:a:1290:G:O6	2.10	0.70
8:A:1474:U:O2	8:A:1517:G:O6	2.10	0.69
8:A:1532:A:C2	8:A:1540:G:N1	2.60	0.69
8:A:1532:A:N1	8:A:1540:G:N1	2.41	0.69
8:A:882:G:O6	8:A:894:U:O2	2.12	0.67
8:A:1481:U:O2	8:A:1510:G:O6	2.13	0.67
34:a:1498:UR3:C3U	57:x:2:U:C5'	2.72	0.66
8:A:2166:U:O2	8:A:2170:A:N7	2.31	0.64
57:x:1:A:C2'	57:x:2:U:H6	2.10	0.63
8:A:545:U:C2	8:A:548:G:O6	2.53	0.61
8:A:2085:U:O2	8:A:2234:G:O6	2.18	0.61
58:z:63:ILE:HG22	58:z:64:ASN:H	1.65	0.61
57:x:2:U:C2'	57:x:2:U:O2	2.47	0.61
8:A:1457:U:O2	8:A:2702:G:O6	2.20	0.59
8:A:641:U:O2	8:A:647:G:O6	2.21	0.58
34:a:1498:UR3:H3U2	57:x:2:U:H5'	1.83	0.58
34:a:1498:UR3:H3U2	57:x:2:U:C5'	2.34	0.58
8:A:819:A:N7	8:A:1188:U:O4	2.38	0.57
8:A:1059:G:O6	8:A:1088:A:C6	2.59	0.55
8:A:1769:U:O2	8:A:1983:G:O6	2.25	0.55
57:x:2:U:O2	57:x:2:U:H2'	2.06	0.55
34:a:1357:A:N1	34:a:1365:G:O6	2.40	0.54
8:A:1915:3TD:H2'	8:A:1916:A:O4'	2.08	0.54
8:A:2656:U:O2	8:A:2665:A:N7	2.42	0.53
34:a:1517:G:O2'	34:a:1518:MA6:H5'	2.09	0.53
34:a:151:A:N7	34:a:170:U:O2	2.42	0.53
34:a:157:U:O2	34:a:164:G:O6	2.27	0.53
8:A:2503:2MA:H4'	8:A:2504:PSU:OP1	2.09	0.52
8:A:1531:C:C4	8:A:1532:A:N6	2.78	0.52
34:a:1402:4OC:HM43	34:a:1403:C:O2	2.10	0.52
8:A:779:U:O2	8:A:785:G:O6	2.28	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
8:A:1532:A:C2	8:A:1540:G:C6	2.99	0.51
8:A:571:U:C5	8:A:2030:6MZ:H9	2.46	0.50
58:z:88:TYR:CE2	58:z:91:ASN:HB2	2.45	0.50
34:a:1498:UR3:N3	57:x:2:U:O5'	2.44	0.49
8:A:725:G:H4'	8:A:726:G:OP1	2.13	0.49
34:a:255:G:O6	34:a:266:G:O6	2.30	0.49
34:a:1518:MA6:H8	34:a:1518:MA6:O5'	2.13	0.48
34:a:1498:UR3:O4	57:x:2:U:C5'	2.40	0.48
53:t:7:LYS:O	53:t:11:ILE:HD12	2.13	0.48
34:a:1497:G:O2'	34:a:1498:UR3:H5'	2.13	0.48
34:a:1419:G:O6	34:a:1481:U:O2	2.31	0.48
34:a:1397:C:N4	57:x:7:U:OP2	2.47	0.47
34:a:986:U:H2'	34:a:987:G:O4'	2.15	0.47
8:A:1093:G:O3'	8:A:1094:U:H4'	2.14	0.47
57:x:7:U:H2'	57:x:8:U:H4'	1.96	0.47
8:A:2552:OMU:H5'	8:A:2553:G:OP2	2.16	0.46
25:R:51:VAL:HG22	25:R:52:PRO:HD3	1.97	0.46
8:A:568:U:O2	8:A:2030:6MZ:H9C1	2.16	0.46
34:a:1497:G:C2'	34:a:1498:UR3:H5'	2.46	0.46
34:a:1498:UR3:C2	57:x:2:U:O5'	2.63	0.46
25:R:50:GLY:O	25:R:51:VAL:C	2.57	0.46
8:A:1352:U:O2	8:A:1378:A:N7	2.49	0.46
34:a:523:A:C2	34:a:527:G7M:HN71	2.51	0.45
8:A:571:U:C4	8:A:2030:6MZ:H9	2.52	0.45
34:a:1517:G:H2'	34:a:1518:MA6:H8	1.99	0.45
34:a:1518:MA6:H93	34:a:1519:MA6:C10	2.47	0.45
34:a:992:U:O2	34:a:1044:A:N7	2.50	0.45
34:a:1519:MA6:H8	34:a:1519:MA6:OP2	2.17	0.44
9:B:77:U:O2	9:B:99:A:N7	2.50	0.44
8:A:882:G:C6	8:A:894:U:O2	2.70	0.44
34:a:1035:A:HO2'	34:a:1036:A:C5'	2.31	0.44
8:A:2852:G:O6	8:A:2865:U:O2	2.36	0.44
43:j:6:ILE:HG13	43:j:76:ILE:HG23	1.99	0.44
15:H:132:PHE:HB2	15:H:140:ALA:HB3	2.00	0.43
8:A:1533:C:N3	8:A:1539:U:O4	2.51	0.43
58:z:63:ILE:HB	58:z:88:TYR:CD1	2.53	0.43
39:f:25:TYR:O	39:f:29:ILE:HD12	2.19	0.43
8:A:1433:A:H2'	8:A:1434:A:O4'	2.18	0.43
34:a:1321:U:H3'	34:a:1322:C:H2'	2.01	0.43
34:a:1518:MA6:C6	34:a:1519:MA6:H93	2.48	0.43
8:A:2024:G:O6	8:A:2039:U:O2	2.37	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
34:a:686:U:O2	34:a:704:A:N7	2.52	0.43
58:z:37:ALA:HA	58:z:40:TYR:O	2.18	0.43
34:a:980:C:H2'	34:a:980:C:O2	2.19	0.42
34:a:509:A:H2'	34:a:510:A:C5	2.55	0.42
8:A:641:U:C2	8:A:647:G:O6	2.72	0.42
58:z:61:ILE:HD12	58:z:90:LYS:HD3	2.00	0.42
54:u:16:ARG:HE	54:u:19:LYS:HD3	1.83	0.42
34:a:1498:UR3:C5	57:x:2:U:H5"	2.50	0.42
34:a:355:C:H2'	34:a:356:A:O4'	2.20	0.41
34:a:76:G:C6	34:a:93:U:O2	2.73	0.41
8:A:2656:U:C2	8:A:2665:A:N7	2.88	0.41
34:a:1518:MA6:H2'	34:a:1519:MA6:C8	2.44	0.41
25:R:51:VAL:HG13	25:R:52:PRO:HD3	2.02	0.41
56:w:20:U:H3'	56:w:21:A:H5"	2.03	0.41
8:A:499:U:H2'	8:A:500:G:O4'	2.21	0.41
34:a:151:A:N7	34:a:170:U:C2	2.89	0.41
38:e:153:ALA:O	38:e:157:GLY:HA2	2.21	0.41
8:A:744:U:O2'	8:A:745:1MG:H5'	2.21	0.40
30:W:67:VAL:O	30:W:67:VAL:HG12	2.22	0.40
34:a:98:A:H2'	34:a:99:C:O4'	2.20	0.40
34:a:515:G:O2'	34:a:516:PSU:H6	2.05	0.40

There are no symmetry-related clashes.

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	0	54/56 (96%)	50 (93%)	4 (7%)	0	100	100
2	1	48/50 (96%)	46 (96%)	2 (4%)	0	100	100
3	2	44/46 (96%)	42 (96%)	2 (4%)	0	100	100
4	3	62/64 (97%)	59 (95%)	3 (5%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
5	4	36/38 (95%)	34 (94%)	2 (6%)	0	100	100
6	5	125/127 (98%)	113 (90%)	12 (10%)	0	100	100
7	6	64/66 (97%)	60 (94%)	4 (6%)	0	100	100
10	C	269/271 (99%)	252 (94%)	17 (6%)	0	100	100
11	D	207/209 (99%)	194 (94%)	13 (6%)	0	100	100
12	E	199/201 (99%)	194 (98%)	5 (2%)	0	100	100
13	F	175/177 (99%)	162 (93%)	13 (7%)	0	100	100
14	G	174/176 (99%)	170 (98%)	4 (2%)	0	100	100
15	H	147/149 (99%)	125 (85%)	22 (15%)	0	100	100
16	I	131/142 (92%)	108 (82%)	23 (18%)	0	100	100
17	J	140/142 (99%)	135 (96%)	5 (4%)	0	100	100
18	K	120/122 (98%)	111 (92%)	9 (8%)	0	100	100
19	L	141/143 (99%)	137 (97%)	4 (3%)	0	100	100
20	M	134/136 (98%)	128 (96%)	6 (4%)	0	100	100
21	N	118/120 (98%)	109 (92%)	9 (8%)	0	100	100
22	O	114/116 (98%)	112 (98%)	2 (2%)	0	100	100
23	P	112/114 (98%)	108 (96%)	4 (4%)	0	100	100
24	Q	115/117 (98%)	111 (96%)	4 (4%)	0	100	100
25	R	101/103 (98%)	96 (95%)	4 (4%)	1 (1%)	12	45
26	S	108/110 (98%)	105 (97%)	3 (3%)	0	100	100
27	T	91/93 (98%)	89 (98%)	2 (2%)	0	100	100
28	U	100/102 (98%)	94 (94%)	6 (6%)	0	100	100
29	V	92/94 (98%)	89 (97%)	3 (3%)	0	100	100
30	W	73/75 (97%)	69 (94%)	4 (6%)	0	100	100
31	X	75/77 (97%)	73 (97%)	2 (3%)	0	100	100
32	Y	61/63 (97%)	59 (97%)	2 (3%)	0	100	100
33	Z	56/58 (97%)	55 (98%)	1 (2%)	0	100	100
35	b	216/218 (99%)	196 (91%)	20 (9%)	0	100	100
36	c	204/206 (99%)	200 (98%)	4 (2%)	0	100	100
37	d	203/205 (99%)	196 (97%)	7 (3%)	0	100	100
38	e	155/157 (99%)	143 (92%)	12 (8%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
39	f	98/100 (98%)	94 (96%)	4 (4%)	0	100	100
40	g	149/151 (99%)	143 (96%)	6 (4%)	0	100	100
41	h	127/129 (98%)	122 (96%)	5 (4%)	0	100	100
42	i	125/127 (98%)	120 (96%)	5 (4%)	0	100	100
43	j	96/98 (98%)	87 (91%)	9 (9%)	0	100	100
44	k	114/116 (98%)	104 (91%)	10 (9%)	0	100	100
45	l	121/123 (98%)	110 (91%)	11 (9%)	0	100	100
46	m	112/114 (98%)	103 (92%)	9 (8%)	0	100	100
47	n	99/101 (98%)	96 (97%)	3 (3%)	0	100	100
48	o	86/88 (98%)	80 (93%)	6 (7%)	0	100	100
49	p	80/82 (98%)	77 (96%)	3 (4%)	0	100	100
50	q	78/80 (98%)	74 (95%)	4 (5%)	0	100	100
51	r	63/65 (97%)	63 (100%)	0	0	100	100
52	s	80/82 (98%)	77 (96%)	3 (4%)	0	100	100
53	t	83/85 (98%)	81 (98%)	2 (2%)	0	100	100
54	u	63/65 (97%)	60 (95%)	3 (5%)	0	100	100
58	z	381/383 (100%)	350 (92%)	31 (8%)	0	100	100
All	All	6219/6332 (98%)	5865 (94%)	353 (6%)	1 (0%)	100	100

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
25	R	52	PRO

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	0	47/47 (100%)	47 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
2	1	45/45 (100%)	45 (100%)	0	100	100
3	2	38/38 (100%)	38 (100%)	0	100	100
4	3	51/51 (100%)	51 (100%)	0	100	100
5	4	34/34 (100%)	34 (100%)	0	100	100
7	6	59/59 (100%)	59 (100%)	0	100	100
10	C	216/216 (100%)	216 (100%)	0	100	100
11	D	164/164 (100%)	164 (100%)	0	100	100
12	E	165/165 (100%)	165 (100%)	0	100	100
13	F	148/148 (100%)	148 (100%)	0	100	100
14	G	137/137 (100%)	137 (100%)	0	100	100
15	H	114/114 (100%)	114 (100%)	0	100	100
17	J	116/116 (100%)	116 (100%)	0	100	100
18	K	103/103 (100%)	103 (100%)	0	100	100
19	L	102/102 (100%)	102 (100%)	0	100	100
20	M	109/109 (100%)	109 (100%)	0	100	100
21	N	100/100 (100%)	100 (100%)	0	100	100
22	O	86/86 (100%)	86 (100%)	0	100	100
23	P	99/99 (100%)	99 (100%)	0	100	100
24	Q	89/89 (100%)	89 (100%)	0	100	100
25	R	84/84 (100%)	83 (99%)	1 (1%)	63	72
26	S	93/93 (100%)	93 (100%)	0	100	100
27	T	80/80 (100%)	80 (100%)	0	100	100
28	U	83/83 (100%)	83 (100%)	0	100	100
29	V	78/78 (100%)	78 (100%)	0	100	100
30	W	57/57 (100%)	57 (100%)	0	100	100
31	X	67/67 (100%)	67 (100%)	0	100	100
32	Y	55/55 (100%)	55 (100%)	0	100	100
33	Z	48/48 (100%)	48 (100%)	0	100	100
35	b	180/180 (100%)	180 (100%)	0	100	100
36	c	170/170 (100%)	170 (100%)	0	100	100
37	d	172/172 (100%)	172 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
38	e	114/119 (96%)	114 (100%)	0	100	100
39	f	87/87 (100%)	87 (100%)	0	100	100
40	g	124/124 (100%)	124 (100%)	0	100	100
41	h	104/104 (100%)	104 (100%)	0	100	100
42	i	105/105 (100%)	105 (100%)	0	100	100
43	j	86/86 (100%)	86 (100%)	0	100	100
44	k	89/89 (100%)	89 (100%)	0	100	100
45	l	103/103 (100%)	103 (100%)	0	100	100
46	m	92/92 (100%)	92 (100%)	0	100	100
47	n	79/83 (95%)	79 (100%)	0	100	100
48	o	76/76 (100%)	76 (100%)	0	100	100
49	p	65/65 (100%)	65 (100%)	0	100	100
50	q	74/74 (100%)	74 (100%)	0	100	100
51	r	56/56 (100%)	56 (100%)	0	100	100
52	s	72/72 (100%)	72 (100%)	0	100	100
53	t	65/65 (100%)	65 (100%)	0	100	100
54	u	46/55 (84%)	46 (100%)	0	100	100
58	z	316/316 (100%)	316 (100%)	0	100	100
All	All	4942/4960 (100%)	4941 (100%)	1 (0%)	100	100

All (1) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
25	R	51	VAL

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (37) such sidechains are listed below:

Mol	Chain	Res	Type
1	0	4	GLN
3	2	16	HIS
3	2	26	ASN
5	4	13	ASN
7	6	20	ASN
7	6	61	ASN
10	C	52	HIS

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Mol	Chain	Res	Type
10	C	133	ASN
10	C	142	ASN
10	C	152	GLN
10	C	162	GLN
10	C	225	ASN
11	D	164	GLN
12	E	41	GLN
17	J	47	HIS
17	J	76	HIS
17	J	135	GLN
17	J	138	GLN
18	K	5	GLN
19	L	104	GLN
20	M	97	GLN
23	P	55	HIS
25	R	12	HIS
27	T	72	GLN
31	X	15	ASN
35	b	17	HIS
35	b	93	HIS
35	b	176	ASN
38	e	69	ASN
41	h	37	ASN
42	i	31	GLN
44	k	14	GLN
45	l	76	HIS
47	n	3	GLN
47	n	43	ASN
53	t	77	ASN
58	z	291	GLN

5.3.3 RNA (i)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
34	a	1539/1540 (99%)	330 (21%)	0
55	v	76/77 (98%)	28 (36%)	0
56	w	76/77 (98%)	25 (32%)	0
57	x	10/11 (90%)	7 (70%)	0
8	A	2902/2903 (99%)	595 (20%)	47 (1%)
9	B	119/120 (99%)	18 (15%)	3 (2%)
All	All	4722/4728 (99%)	1003 (21%)	50 (1%)

All (1003) RNA backbone outliers are listed below:

Mol	Chain	Res	Type
8	A	10	A
8	A	15	G
8	A	23	G
8	A	27	G
8	A	35	G
8	A	42	A
8	A	43	G
8	A	45	G
8	A	46	G
8	A	51	G
8	A	58	G
8	A	63	A
8	A	71	A
8	A	74	A
8	A	75	G
8	A	93	G
8	A	96	C
8	A	101	A
8	A	103	A
8	A	114	U
8	A	118	A
8	A	119	A
8	A	120	U
8	A	131	A
8	A	142	A
8	A	146	A
8	A	160	A
8	A	163	C
8	A	181	A
8	A	196	A
8	A	199	A
8	A	205	G
8	A	215	G
8	A	216	A
8	A	221	A
8	A	222	A
8	A	223	A
8	A	228	C
8	A	230	G
8	A	233	A
8	A	248	G
8	A	255	A

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Mol	Chain	Res	Type
8	A	263	G
8	A	265	A
8	A	266	G
8	A	267	C
8	A	272	A
8	A	275	C
8	A	278	A
8	A	279	A
8	A	287	G
8	A	291	G
8	A	295	G
8	A	300	A
8	A	310	A
8	A	311	A
8	A	317	G
8	A	330	A
8	A	338	G
8	A	359	G
8	A	367	G
8	A	370	G
8	A	371	A
8	A	372	G
8	A	373	U
8	A	385	C
8	A	386	G
8	A	389	G
8	A	395	U
8	A	396	G
8	A	398	C
8	A	401	A
8	A	404	A
8	A	405	U
8	A	406	G
8	A	411	G
8	A	412	A
8	A	428	A
8	A	429	A
8	A	435	C
8	A	444	C
8	A	455	C
8	A	457	A
8	A	465	G

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Mol	Chain	Res	Type
8	A	473	G
8	A	475	C
8	A	479	A
8	A	480	A
8	A	481	G
8	A	482	A
8	A	491	G
8	A	504	A
8	A	505	A
8	A	508	A
8	A	509	C
8	A	510	C
8	A	512	G
8	A	532	A
8	A	533	G
8	A	545	U
8	A	546	U
8	A	555	G
8	A	563	A
8	A	568	U
8	A	569	U
8	A	572	A
8	A	573	U
8	A	575	A
8	A	588	U
8	A	603	A
8	A	613	A
8	A	614	A
8	A	615	U
8	A	627	A
8	A	637	A
8	A	645	C
8	A	646	U
8	A	647	G
8	A	653	U
8	A	654	A
8	A	655	A
8	A	656	G
8	A	669	G
8	A	670	A
8	A	675	A
8	A	686	U

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Mol	Chain	Res	Type
8	A	716	A
8	A	726	G
8	A	730	A
8	A	747	5MC
8	A	764	A
8	A	765	C
8	A	775	G
8	A	776	G
8	A	782	A
8	A	784	G
8	A	785	G
8	A	789	A
8	A	792	A
8	A	805	G
8	A	812	C
8	A	819	A
8	A	827	U
8	A	828	U
8	A	846	U
8	A	847	U
8	A	858	G
8	A	859	G
8	A	860	U
8	A	869	G
8	A	877	A
8	A	885	C
8	A	887	A
8	A	888	C
8	A	892	A
8	A	893	C
8	A	895	U
8	A	896	A
8	A	897	C
8	A	900	A
8	A	910	A
8	A	914	G
8	A	915	C
8	A	926	G
8	A	928	A
8	A	941	A
8	A	946	C
8	A	953	G

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Mol	Chain	Res	Type
8	A	957	C
8	A	959	A
8	A	961	C
8	A	973	A
8	A	974	G
8	A	975	A
8	A	981	A
8	A	983	A
8	A	995	C
8	A	996	A
8	A	1009	A
8	A	1012	U
8	A	1013	C
8	A	1022	G
8	A	1026	G
8	A	1033	U
8	A	1041	G
8	A	1044	C
8	A	1045	C
8	A	1046	A
8	A	1047	G
8	A	1048	A
8	A	1054	A
8	A	1056	G
8	A	1058	U
8	A	1059	G
8	A	1060	U
8	A	1061	U
8	A	1062	G
8	A	1063	G
8	A	1064	C
8	A	1065	U
8	A	1066	U
8	A	1067	A
8	A	1068	G
8	A	1069	A
8	A	1070	A
8	A	1071	G
8	A	1072	C
8	A	1073	A
8	A	1075	C
8	A	1076	C

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Mol	Chain	Res	Type
8	A	1077	A
8	A	1078	U
8	A	1079	C
8	A	1080	A
8	A	1081	U
8	A	1083	U
8	A	1084	A
8	A	1085	A
8	A	1086	A
8	A	1087	G
8	A	1088	A
8	A	1089	A
8	A	1090	A
8	A	1091	G
8	A	1092	C
8	A	1093	G
8	A	1094	U
8	A	1096	A
8	A	1097	U
8	A	1098	A
8	A	1099	G
8	A	1100	C
8	A	1101	U
8	A	1102	C
8	A	1109	C
8	A	1111	A
8	A	1112	G
8	A	1115	G
8	A	1116	G
8	A	1129	A
8	A	1131	G
8	A	1132	U
8	A	1133	A
8	A	1134	A
8	A	1135	C
8	A	1142	A
8	A	1170	C
8	A	1171	G
8	A	1173	U
8	A	1174	U
8	A	1175	A
8	A	1176	U

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Mol	Chain	Res	Type
8	A	1179	G
8	A	1180	U
8	A	1211	C
8	A	1225	G
8	A	1227	G
8	A	1236	G
8	A	1238	G
8	A	1241	A
8	A	1247	A
8	A	1253	A
8	A	1255	U
8	A	1256	G
8	A	1264	A
8	A	1265	A
8	A	1271	G
8	A	1272	A
8	A	1275	A
8	A	1284	A
8	A	1300	G
8	A	1301	A
8	A	1314	C
8	A	1329	U
8	A	1359	A
8	A	1365	A
8	A	1376	C
8	A	1378	A
8	A	1379	U
8	A	1383	A
8	A	1384	A
8	A	1391	U
8	A	1410	G
8	A	1414	C
8	A	1415	U
8	A	1416	G
8	A	1420	A
8	A	1421	G
8	A	1428	C
8	A	1437	C
8	A	1452	G
8	A	1455	G
8	A	1458	U
8	A	1460	U

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Mol	Chain	Res	Type
8	A	1461	C
8	A	1467	U
8	A	1475	G
8	A	1476	U
8	A	1482	G
8	A	1490	A
8	A	1491	G
8	A	1493	C
8	A	1494	A
8	A	1497	U
8	A	1508	A
8	A	1515	A
8	A	1524	G
8	A	1529	G
8	A	1534	U
8	A	1535	A
8	A	1536	C
8	A	1537	G
8	A	1554	U
8	A	1566	A
8	A	1569	A
8	A	1576	U
8	A	1578	U
8	A	1584	U
8	A	1591	A
8	A	1598	A
8	A	1608	A
8	A	1610	A
8	A	1613	G
8	A	1616	A
8	A	1626	A
8	A	1634	A
8	A	1635	A
8	A	1646	C
8	A	1647	U
8	A	1648	U
8	A	1649	G
8	A	1654	A
8	A	1674	G
8	A	1687	G
8	A	1693	U
8	A	1715	G

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Mol	Chain	Res	Type
8	A	1716	U
8	A	1726	C
8	A	1729	U
8	A	1730	C
8	A	1731	G
8	A	1732	C
8	A	1733	G
8	A	1738	G
8	A	1764	C
8	A	1773	A
8	A	1776	G
8	A	1782	U
8	A	1784	A
8	A	1791	A
8	A	1800	C
8	A	1801	A
8	A	1807	G
8	A	1808	A
8	A	1815	A
8	A	1816	C
8	A	1826	G
8	A	1829	A
8	A	1835	2MG
8	A	1847	G
8	A	1848	A
8	A	1869	G
8	A	1870	C
8	A	1872	A
8	A	1883	U
8	A	1884	G
8	A	1901	A
8	A	1906	G
8	A	1908	C
8	A	1913	A
8	A	1914	C
8	A	1922	G
8	A	1923	U
8	A	1924	C
8	A	1926	U
8	A	1928	A
8	A	1930	G
8	A	1931	U

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Mol	Chain	Res	Type
8	A	1937	A
8	A	1939	5MU
8	A	1943	U
8	A	1955	U
8	A	1964	G
8	A	1967	C
8	A	1970	A
8	A	1971	U
8	A	1972	G
8	A	1982	U
8	A	1991	U
8	A	1992	G
8	A	1997	C
8	A	2013	A
8	A	2015	A
8	A	2020	A
8	A	2022	U
8	A	2023	C
8	A	2030	6MZ
8	A	2031	A
8	A	2032	G
8	A	2033	A
8	A	2043	C
8	A	2052	A
8	A	2055	C
8	A	2056	G
8	A	2060	A
8	A	2061	G
8	A	2062	A
8	A	2063	C
8	A	2069	G7M
8	A	2076	U
8	A	2077	A
8	A	2092	U
8	A	2101	A
8	A	2103	C
8	A	2104	C
8	A	2106	U
8	A	2109	U
8	A	2110	G
8	A	2111	U
8	A	2112	G

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Mol	Chain	Res	Type
8	A	2114	A
8	A	2116	G
8	A	2117	A
8	A	2118	U
8	A	2119	A
8	A	2120	G
8	A	2123	G
8	A	2124	G
8	A	2125	G
8	A	2127	G
8	A	2129	C
8	A	2130	U
8	A	2131	U
8	A	2132	U
8	A	2133	G
8	A	2134	A
8	A	2135	A
8	A	2136	G
8	A	2138	G
8	A	2139	U
8	A	2142	A
8	A	2143	C
8	A	2144	G
8	A	2145	C
8	A	2146	C
8	A	2147	A
8	A	2151	U
8	A	2153	C
8	A	2155	U
8	A	2157	G
8	A	2159	G
8	A	2160	C
8	A	2161	C
8	A	2162	G
8	A	2166	U
8	A	2167	U
8	A	2169	A
8	A	2170	A
8	A	2171	A
8	A	2172	U
8	A	2173	A
8	A	2175	C

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Mol	Chain	Res	Type
8	A	2180	U
8	A	2185	U
8	A	2186	G
8	A	2187	U
8	A	2193	G
8	A	2198	A
8	A	2204	G
8	A	2211	A
8	A	2214	C
8	A	2225	A
8	A	2226	C
8	A	2238	G
8	A	2239	G
8	A	2249	U
8	A	2266	A
8	A	2267	A
8	A	2268	A
8	A	2278	A
8	A	2279	G
8	A	2283	C
8	A	2287	A
8	A	2288	A
8	A	2297	A
8	A	2305	U
8	A	2307	G
8	A	2309	A
8	A	2310	C
8	A	2311	A
8	A	2320	U
8	A	2325	G
8	A	2335	A
8	A	2339	C
8	A	2343	U
8	A	2345	G
8	A	2347	C
8	A	2350	C
8	A	2357	G
8	A	2375	G
8	A	2382	G
8	A	2383	G
8	A	2385	C
8	A	2390	U

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Mol	Chain	Res	Type
8	A	2402	U
8	A	2406	A
8	A	2410	G
8	A	2423	U
8	A	2424	C
8	A	2425	A
8	A	2427	C
8	A	2428	G
8	A	2429	G
8	A	2430	A
8	A	2435	A
8	A	2441	U
8	A	2448	A
8	A	2459	A
8	A	2469	A
8	A	2475	C
8	A	2476	A
8	A	2478	A
8	A	2480	C
8	A	2484	G
8	A	2491	U
8	A	2494	G
8	A	2498	OMC
8	A	2502	G
8	A	2503	2MA
8	A	2504	PSU
8	A	2505	G
8	A	2506	U
8	A	2513	A
8	A	2518	A
8	A	2529	G
8	A	2530	A
8	A	2531	A
8	A	2535	G
8	A	2547	A
8	A	2554	U
8	A	2564	A
8	A	2566	A
8	A	2567	G
8	A	2572	A
8	A	2574	G
8	A	2585	U

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Mol	Chain	Res	Type
8	A	2597	G
8	A	2598	A
8	A	2602	A
8	A	2603	G
8	A	2609	U
8	A	2610	C
8	A	2613	U
8	A	2629	U
8	A	2630	G
8	A	2642	G
8	A	2644	G
8	A	2646	C
8	A	2656	U
8	A	2661	G
8	A	2683	C
8	A	2685	G
8	A	2689	U
8	A	2690	U
8	A	2702	G
8	A	2726	A
8	A	2729	G
8	A	2733	A
8	A	2739	U
8	A	2744	G
8	A	2748	A
8	A	2755	C
8	A	2778	A
8	A	2779	U
8	A	2790	U
8	A	2791	G
8	A	2793	C
8	A	2798	U
8	A	2799	A
8	A	2800	A
8	A	2809	A
8	A	2818	U
8	A	2820	A
8	A	2833	U
8	A	2834	G
8	A	2835	A
8	A	2859	G
8	A	2866	U

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Mol	Chain	Res	Type
8	A	2867	G
8	A	2872	A
8	A	2879	A
8	A	2883	A
8	A	2884	U
8	A	2893	A
8	A	2898	U
9	B	24	G
9	B	32	U
9	B	35	C
9	B	36	C
9	B	37	C
9	B	45	A
9	B	52	A
9	B	53	A
9	B	57	A
9	B	66	A
9	B	67	G
9	B	73	A
9	B	88	C
9	B	89	U
9	B	90	C
9	B	109	A
9	B	119	A
9	B	120	U
34	a	2	A
34	a	4	U
34	a	5	U
34	a	6	G
34	a	7	A
34	a	9	G
34	a	22	G
34	a	31	G
34	a	32	A
34	a	39	G
34	a	44	A
34	a	47	C
34	a	48	C
34	a	51	A
34	a	60	A
34	a	70	U
34	a	76	G

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Mol	Chain	Res	Type
34	a	78	A
34	a	79	G
34	a	80	A
34	a	81	A
34	a	83	C
34	a	84	U
34	a	85	U
34	a	86	G
34	a	89	U
34	a	94	G
34	a	95	C
34	a	96	U
34	a	121	U
34	a	130	A
34	a	144	G
34	a	149	A
34	a	163	C
34	a	164	G
34	a	165	G
34	a	166	U
34	a	173	U
34	a	184	G
34	a	189	A
34	a	190	A
34	a	198	G
34	a	208	U
34	a	209	U
34	a	210	C
34	a	211	G
34	a	214	C
34	a	217	C
34	a	226	G
34	a	240	G
34	a	245	U
34	a	247	G
34	a	250	A
34	a	264	C
34	a	266	G
34	a	267	C
34	a	271	C
34	a	280	C
34	a	289	G

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Mol	Chain	Res	Type
34	a	298	A
34	a	299	G
34	a	301	G
34	a	321	A
34	a	328	C
34	a	344	A
34	a	347	G
34	a	351	G
34	a	352	C
34	a	353	A
34	a	354	G
34	a	356	A
34	a	363	A
34	a	367	U
34	a	372	C
34	a	373	A
34	a	382	A
34	a	383	A
34	a	389	A
34	a	392	C
34	a	397	A
34	a	398	U
34	a	406	G
34	a	411	A
34	a	413	G
34	a	414	A
34	a	422	C
34	a	423	G
34	a	428	G
34	a	429	U
34	a	439	U
34	a	461	A
34	a	462	G
34	a	465	A
34	a	466	A
34	a	467	U
34	a	468	A
34	a	470	C
34	a	471	U
34	a	476	U
34	a	484	G
34	a	485	U

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Mol	Chain	Res	Type
34	a	494	G
34	a	495	A
34	a	496	A
34	a	498	A
34	a	506	G
34	a	509	A
34	a	510	A
34	a	511	C
34	a	512	U
34	a	516	PSU
34	a	518	C
34	a	521	G
34	a	527	G7M
34	a	532	A
34	a	547	A
34	a	550	G
34	a	559	A
34	a	560	A
34	a	562	U
34	a	564	C
34	a	571	U
34	a	572	A
34	a	573	A
34	a	576	C
34	a	577	G
34	a	596	A
34	a	623	C
34	a	629	A
34	a	653	U
34	a	665	A
34	a	670	G
34	a	688	G
34	a	695	A
34	a	703	G
34	a	704	A
34	a	721	G
34	a	723	U
34	a	724	G
34	a	746	A
34	a	755	G
34	a	777	A
34	a	781	A

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Mol	Chain	Res	Type
34	a	793	U
34	a	794	A
34	a	799	G
34	a	810	C
34	a	815	A
34	a	817	C
34	a	818	G
34	a	829	G
34	a	832	G
34	a	841	C
34	a	843	U
34	a	846	G
34	a	867	G
34	a	873	A
34	a	876	C
34	a	885	G
34	a	891	U
34	a	901	A
34	a	902	G
34	a	914	A
34	a	916	U
34	a	922	G
34	a	934	C
34	a	935	A
34	a	953	G
34	a	954	G
34	a	955	U
34	a	957	U
34	a	958	A
34	a	960	U
34	a	969	A
34	a	971	G
34	a	972	C
34	a	975	A
34	a	976	G
34	a	977	A
34	a	978	A
34	a	981	U
34	a	983	A
34	a	986	U
34	a	987	G
34	a	988	G

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Mol	Chain	Res	Type
34	a	989	U
34	a	990	C
34	a	992	U
34	a	993	G
34	a	996	A
34	a	997	U
34	a	999	C
34	a	1000	A
34	a	1004	A
34	a	1005	A
34	a	1006	G
34	a	1007	U
34	a	1011	C
34	a	1014	A
34	a	1015	G
34	a	1017	U
34	a	1020	G
34	a	1024	G
34	a	1025	U
34	a	1027	C
34	a	1028	C
34	a	1029	U
34	a	1030	U
34	a	1031	C
34	a	1032	G
34	a	1036	A
34	a	1037	C
34	a	1042	A
34	a	1043	G
34	a	1044	A
34	a	1053	G
34	a	1056	U
34	a	1065	U
34	a	1084	G
34	a	1085	U
34	a	1088	G
34	a	1094	G
34	a	1095	U
34	a	1101	A
34	a	1104	G
34	a	1124	G
34	a	1125	U

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Mol	Chain	Res	Type
34	a	1126	U
34	a	1136	C
34	a	1137	C
34	a	1138	G
34	a	1139	G
34	a	1140	C
34	a	1152	A
34	a	1154	G
34	a	1159	U
34	a	1168	U
34	a	1169	A
34	a	1183	U
34	a	1184	G
34	a	1196	A
34	a	1197	A
34	a	1201	A
34	a	1212	U
34	a	1213	A
34	a	1226	C
34	a	1236	A
34	a	1237	C
34	a	1238	A
34	a	1239	A
34	a	1242	G
34	a	1243	C
34	a	1248	A
34	a	1250	A
34	a	1258	G
34	a	1260	G
34	a	1261	A
34	a	1268	G
34	a	1272	G
34	a	1275	A
34	a	1278	G
34	a	1280	A
34	a	1286	U
34	a	1287	A
34	a	1288	A
34	a	1297	G
34	a	1298	U
34	a	1300	G
34	a	1302	C

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Mol	Chain	Res	Type
34	a	1305	G
34	a	1306	A
34	a	1311	A
34	a	1312	G
34	a	1315	U
34	a	1316	G
34	a	1317	C
34	a	1319	A
34	a	1320	C
34	a	1322	C
34	a	1323	G
34	a	1324	A
34	a	1331	G
34	a	1336	C
34	a	1346	A
34	a	1347	G
34	a	1353	G
34	a	1356	G
34	a	1357	A
34	a	1360	A
34	a	1361	G
34	a	1362	A
34	a	1363	A
34	a	1364	U
34	a	1371	G
34	a	1373	G
34	a	1374	A
34	a	1378	C
34	a	1381	U
34	a	1394	A
34	a	1397	C
34	a	1398	A
34	a	1419	G
34	a	1421	G
34	a	1422	G
34	a	1429	A
34	a	1431	A
34	a	1432	G
34	a	1433	A
34	a	1440	U
34	a	1441	A
34	a	1442	G

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Mol	Chain	Res	Type
34	a	1446	A
34	a	1454	G
34	a	1473	G
34	a	1475	G
34	a	1492	A
34	a	1503	A
34	a	1506	U
34	a	1517	G
34	a	1519	MA6
34	a	1521	C
34	a	1529	G
34	a	1530	G
34	a	1531	A
34	a	1533	C
34	a	1534	A
34	a	1535	C
34	a	1536	C
34	a	1538	C
34	a	1539	C
55	v	2	G
55	v	3	C
55	v	9	G
55	v	10	G
55	v	14	A
55	v	15	G
55	v	16	C
55	v	17	C
55	v	17(A)	U
55	v	18	G
55	v	19	G
55	v	20	H2U
55	v	21	A
55	v	34	C
55	v	37	A
55	v	40	C
55	v	44	A
55	v	45	G
55	v	52	G
55	v	57	A
55	v	58	A
55	v	59	A
55	v	61	C

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Mol	Chain	Res	Type
55	v	62	C
55	v	70	G
55	v	73	A
55	v	74	C
55	v	76	A
56	w	2	G
56	w	7	U
56	w	8	A
56	w	16	U
56	w	17	G
56	w	18	G
56	w	19	U
56	w	20	U
56	w	21	A
56	w	22	G
56	w	33	U
56	w	39	G
56	w	42	G
56	w	43	G
56	w	44	G
56	w	47	U
56	w	48	C
56	w	51	U
56	w	61	C
56	w	63	A
56	w	64	A
56	w	71	G
56	w	73	A
56	w	75	C
56	w	76	A
57	x	0	U
57	x	1	A
57	x	2	U
57	x	4	G
57	x	6	C
57	x	7	U
57	x	8	U

All (50) RNA pucker outliers are listed below:

Mol	Chain	Res	Type
8	A	183	C

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Mol	Chain	Res	Type
8	A	274	C
8	A	428	A
8	A	511	U
8	A	545	U
8	A	715	A
8	A	725	G
8	A	784	G
8	A	887	A
8	A	900	A
8	A	954	G
8	A	976	G
8	A	980	A
8	A	1014	A
8	A	1023	U
8	A	1060	U
8	A	1062	G
8	A	1082	U
8	A	1096	A
8	A	1099	G
8	A	1182	G
8	A	1240	U
8	A	1358	G
8	A	1361	G
8	A	1415	U
8	A	1431	A
8	A	1432	G
8	A	1451	C
8	A	1475	G
8	A	1490	A
8	A	1715	G
8	A	1730	C
8	A	1847	G
8	A	1921	G
8	A	1942	C
8	A	2134	A
8	A	2150	C
8	A	2158	A
8	A	2172	U
8	A	2192	U
8	A	2287	A
8	A	2308	G
8	A	2319	G

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Mol	Chain	Res	Type
8	A	2324	U
8	A	2468	A
8	A	2474	U
8	A	2808	G
9	B	36	C
9	B	52	A
9	B	66	A

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

39 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	$\#\|Z\| > 2$
8	6MZ	A	2030	59,8	22,25,26	0.25	0	30,36,39	0.45	0
34	2MG	a	1207	34	23,26,27	0.31	0	32,38,41	0.31	0
34	PSU	a	516	34,59	18,21,22	0.48	0	22,30,33	0.67	1 (4%)
8	PSU	A	2604	8	18,21,22	0.49	0	22,30,33	0.63	0
8	2MG	A	1835	8	23,26,27	0.32	0	32,38,41	0.32	0
55	H2U	v	20	55	18,21,22	0.45	0	21,30,33	0.46	0
8	PSU	A	1911	8	18,21,22	0.49	0	22,30,33	0.56	0
8	PSU	A	2504	8	18,21,22	0.48	0	22,30,33	0.64	0
8	G7M	A	2069	8	23,26,27	0.31	0	35,39,42	0.47	0
34	MA6	a	1519	34	23,26,27	0.30	0	34,38,41	0.64	1 (2%)
34	2MG	a	966	34	23,26,27	0.29	0	32,38,41	0.31	0
55	PSU	v	55	55	18,21,22	0.52	0	22,30,33	0.63	1 (4%)
8	5MC	A	747	8	18,22,23	0.31	0	26,32,35	0.41	0
8	OMG	A	2251	55,59,8	23,26,27	0.36	0	33,38,41	0.44	0
34	MA6	a	1518	34	23,26,27	0.37	0	34,38,41	0.66	1 (2%)
8	1MG	A	745	8	22,26,27	0.30	0	33,39,42	0.62	1 (3%)
8	6MZ	A	1618	8	22,25,26	0.27	0	30,36,39	0.45	0
8	OMU	A	2552	59,8	19,22,23	0.32	0	26,31,34	0.50	0
55	4SU	v	8	55	18,21,22	0.29	0	26,30,33	0.38	0
8	PSU	A	1917	8	18,21,22	0.55	0	22,30,33	0.65	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\|>2$	Counts	RMSZ	$\#\|Z\|>2$
8	OMC	A	2498	59,8	19,22,23	0.29	0	26,31,34	0.39	0
8	PSU	A	2580	8	18,21,22	0.73	1 (5%)	22,30,33	0.93	1 (4%)
34	2MG	a	1516	34	23,26,27	0.31	0	32,38,41	0.32	0
8	5MU	A	1939	59,8	19,22,23	0.28	0	28,32,35	0.39	0
8	2MG	A	2445	8	23,26,27	0.41	0	32,38,41	0.30	0
57	5MC	x	5	57	18,22,23	0.72	1 (5%)	26,32,35	1.08	2 (7%)
34	5MC	a	1407	34	18,22,23	0.32	0	26,32,35	0.42	0
8	PSU	A	746	59,8	18,21,22	0.51	0	22,30,33	0.37	0
8	PSU	A	2605	8	18,21,22	0.52	0	22,30,33	0.64	1 (4%)
8	PSU	A	955	8	18,21,22	0.55	0	22,30,33	0.59	0
34	4OC	a	1402	34	20,23,24	0.32	0	26,32,35	0.46	0
8	3TD	A	1915	8	18,22,23	0.46	0	22,32,35	0.68	0
34	UR3	a	1498	34	19,22,23	0.30	0	26,32,35	0.41	0
8	2MA	A	2503	59,8	22,25,26	0.96	1 (4%)	33,37,40	1.35	3 (9%)
8	PSU	A	2457	8	18,21,22	0.55	0	22,30,33	0.55	0
55	5MU	v	54	55	19,22,23	0.31	0	28,32,35	0.34	0
8	5MC	A	1962	8	18,22,23	0.29	0	26,32,35	0.50	0
34	5MC	a	967	34	18,22,23	0.30	0	26,32,35	0.51	0
34	G7M	a	527	34	23,26,27	0.35	0	35,39,42	0.47	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
8	6MZ	A	2030	59,8	-	4/9/27/28	0/3/3/3
34	2MG	a	1207	34	-	2/9/27/28	0/3/3/3
34	PSU	a	516	34,59	-	0/7/25/26	0/2/2/2
8	PSU	A	2604	8	-	2/7/25/26	0/2/2/2
8	2MG	A	1835	8	-	2/9/27/28	0/3/3/3
55	H2U	v	20	55	-	5/7/38/39	0/2/2/2
8	PSU	A	1911	8	-	0/7/25/26	0/2/2/2
8	PSU	A	2504	8	-	0/7/25/26	0/2/2/2
8	G7M	A	2069	8	-	1/7/25/26	0/3/3/3
34	MA6	a	1519	34	-	2/11/29/30	0/3/3/3
34	2MG	a	966	34	-	0/9/27/28	0/3/3/3
55	PSU	v	55	55	-	2/7/25/26	0/2/2/2
8	5MC	A	747	8	-	0/7/25/26	0/2/2/2
8	OMG	A	2251	55,59,8	-	1/9/27/28	0/3/3/3

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
34	MA6	a	1518	34	-	0/11/29/30	0/3/3/3
8	1MG	A	745	8	-	0/7/25/26	0/3/3/3
8	6MZ	A	1618	8	-	4/9/27/28	0/3/3/3
8	OMU	A	2552	59,8	-	4/9/27/28	0/2/2/2
55	4SU	v	8	55	-	0/7/25/26	0/2/2/2
8	PSU	A	1917	8	-	0/7/25/26	0/2/2/2
8	OMC	A	2498	59,8	-	2/9/27/28	0/2/2/2
8	PSU	A	2580	8	-	0/7/25/26	0/2/2/2
34	2MG	a	1516	34	-	1/9/27/28	0/3/3/3
8	5MU	A	1939	59,8	-	1/7/25/26	0/2/2/2
8	2MG	A	2445	8	-	2/9/27/28	0/3/3/3
57	5MC	x	5	57	-	0/7/25/26	0/2/2/2
34	5MC	a	1407	34	-	0/7/25/26	0/2/2/2
8	PSU	A	746	59,8	-	2/7/25/26	0/2/2/2
8	PSU	A	2605	8	-	0/7/25/26	0/2/2/2
8	PSU	A	955	8	-	0/7/25/26	0/2/2/2
34	4OC	a	1402	34	-	0/9/29/30	0/2/2/2
8	3TD	A	1915	8	-	2/7/25/26	0/2/2/2
34	UR3	a	1498	34	-	2/7/25/26	0/2/2/2
8	2MA	A	2503	59,8	-	1/7/25/26	0/3/3/3
8	PSU	A	2457	8	-	0/7/25/26	0/2/2/2
55	5MU	v	54	55	-	0/7/25/26	0/2/2/2
8	5MC	A	1962	8	-	0/7/25/26	0/2/2/2
34	5MC	a	967	34	-	0/7/25/26	0/2/2/2
34	G7M	a	527	34	-	2/7/25/26	0/3/3/3

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
8	A	2503	2MA	C6-N6	-3.34	1.25	1.34
8	A	2580	PSU	O4'-C1'	-2.80	1.40	1.43
57	x	5	5MC	C4-N3	2.01	1.37	1.34

All (12) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
8	A	2503	2MA	N6-C6-N1	4.54	123.46	117.03
8	A	2503	2MA	C2-N1-C6	3.81	124.02	118.08
8	A	2503	2MA	C5-C6-N1	-3.55	112.88	119.01
57	x	5	5MC	C5-C4-N3	-3.26	118.16	121.67

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
8	A	2580	PSU	O4'-C1'-C2'	3.00	109.37	105.14
57	x	5	5MC	C4-N3-C2	2.71	124.35	120.69
8	A	745	1MG	C6-C5-C4	-2.64	117.05	119.97
34	a	1518	MA6	C2-N1-C6	2.39	117.39	111.75
34	a	1519	MA6	C2-N1-C6	2.35	117.31	111.75
34	a	516	PSU	O4'-C1'-C2'	2.35	108.45	105.14
8	A	2605	PSU	O4'-C1'-C2'	2.19	108.23	105.14
55	v	55	PSU	O4'-C1'-C2'	2.03	108.01	105.14

There are no chirality outliers.

All (44) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
34	a	1207	2MG	N1-C2-N2-CM2
34	a	1207	2MG	N3-C2-N2-CM2
34	a	1516	2MG	N3-C2-N2-CM2
34	a	1519	MA6	C3'-C4'-C5'-O5'
55	v	20	H2U	O4'-C1'-N1-C6
55	v	55	PSU	O4'-C1'-C5-C4
55	v	55	PSU	O4'-C1'-C5-C6
8	A	1618	6MZ	N1-C6-N6-C9
8	A	1835	2MG	N1-C2-N2-CM2
8	A	1835	2MG	N3-C2-N2-CM2
8	A	1915	3TD	O4'-C1'-C5-C4
8	A	1915	3TD	O4'-C1'-C5-C6
8	A	2030	6MZ	C5-C6-N6-C9
8	A	2030	6MZ	N1-C6-N6-C9
8	A	2251	OMG	C1'-C2'-O2'-CM2
8	A	2552	OMU	O4'-C1'-N1-C2
8	A	2604	PSU	C2'-C1'-C5-C6
8	A	2604	PSU	O4'-C1'-C5-C6
8	A	2552	OMU	O4'-C1'-N1-C6
34	a	527	G7M	O4'-C4'-C5'-O5'
34	a	527	G7M	C3'-C4'-C5'-O5'
34	a	1519	MA6	O4'-C4'-C5'-O5'
8	A	2030	6MZ	O4'-C4'-C5'-O5'
8	A	2030	6MZ	C3'-C4'-C5'-O5'
8	A	2498	OMC	O4'-C4'-C5'-O5'
34	a	1498	UR3	O4'-C1'-N1-C2
55	v	20	H2U	C2'-C1'-N1-C6
8	A	2445	2MG	C3'-C4'-C5'-O5'
34	a	1498	UR3	O4'-C1'-N1-C6

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Mol	Chain	Res	Type	Atoms
8	A	2498	OMC	C3'-C4'-C5'-O5'
55	v	20	H2U	C4'-C5'-O5'-P
8	A	1618	6MZ	C5-C6-N6-C9
8	A	2445	2MG	O4'-C4'-C5'-O5'
55	v	20	H2U	C2'-C1'-N1-C2
55	v	20	H2U	O4'-C1'-N1-C2
8	A	2552	OMU	O4'-C4'-C5'-O5'
8	A	2552	OMU	C4'-C5'-O5'-P
8	A	746	PSU	O4'-C1'-C5-C4
8	A	1618	6MZ	C2'-C1'-N9-C8
8	A	2069	G7M	O4'-C4'-C5'-O5'
8	A	746	PSU	O4'-C1'-C5-C6
8	A	2503	2MA	O4'-C4'-C5'-O5'
8	A	1939	5MU	O4'-C4'-C5'-O5'
8	A	1618	6MZ	C4'-C5'-O5'-P

There are no ring outliers.

12 monomers are involved in 35 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
8	A	2030	6MZ	3	0
34	a	516	PSU	1	0
8	A	2504	PSU	1	0
34	a	1519	MA6	5	0
34	a	1518	MA6	7	0
8	A	745	1MG	1	0
8	A	2552	OMU	1	0
34	a	1402	4OC	2	0
8	A	1915	3TD	1	0
34	a	1498	UR3	16	0
8	A	2503	2MA	1	0
34	a	527	G7M	1	0

5.5 Carbohydrates (i)

There are no oligosaccharides in this entry.

5.6 Ligand geometry (i)

Of 367 ligands modelled in this entry, 364 are monoatomic - leaving 3 for Mogul analysis.

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	$\#\|Z\| > 2$
64	GDP	z	401	-	28,30,30	0.42	0	44,47,47	0.73	1 (2%)
62	FME	v	101	55	8,9,10	0.37	0	7,9,11	1.43	2 (28%)
63	VAL	w	101	56	4,6,7	0.50	0	6,7,9	0.92	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
64	GDP	z	401	-	-	0/16/32/32	0/3/3/3
62	FME	v	101	55	-	5/7/9/11	-
63	VAL	w	101	56	-	0/5/6/8	-

There are no bond length outliers.

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
64	z	401	GDP	PA-O3A-PB	3.56	145.03	132.83
62	v	101	FME	CA-N-CN	2.63	126.86	122.82
62	v	101	FME	O-C-CA	-2.12	119.23	124.78

There are no chirality outliers.

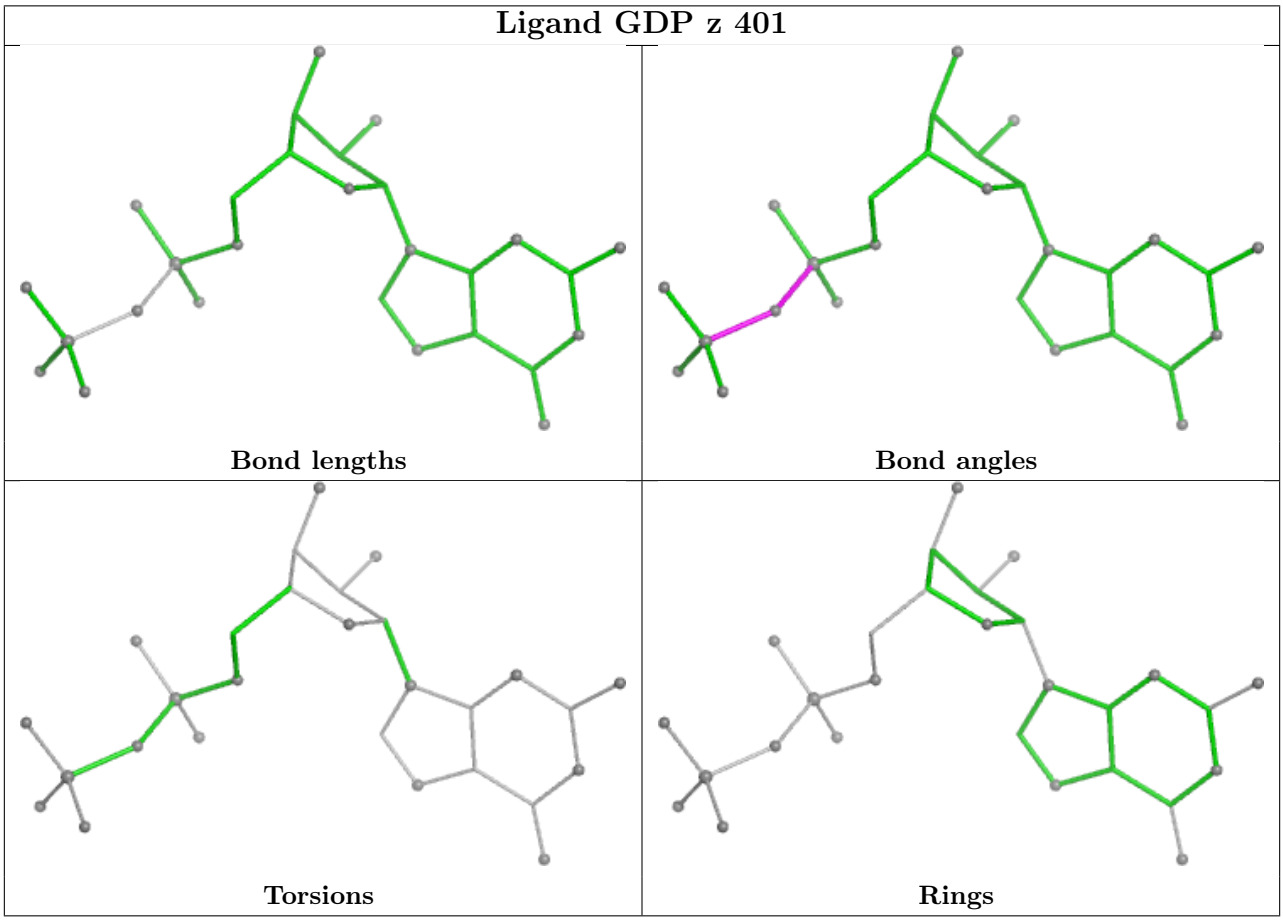
All (5) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
62	v	101	FME	O1-CN-N-CA
62	v	101	FME	CB-CA-N-CN
62	v	101	FME	O-C-CA-CB
62	v	101	FME	CB-CG-SD-CE
62	v	101	FME	CA-CB-CG-SD

There are no ring outliers.

No monomer is involved in short contacts.

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less then 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.



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.

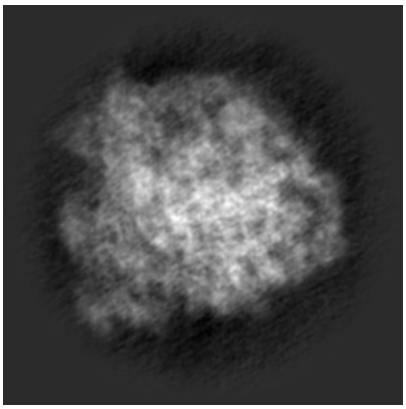
6 Map visualisation

This section contains visualisations of the EMDB entry EMD-54798. These allow visual inspection of the internal detail of the map and identification of artifacts.

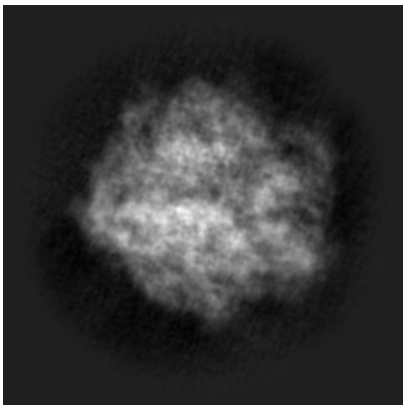
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections

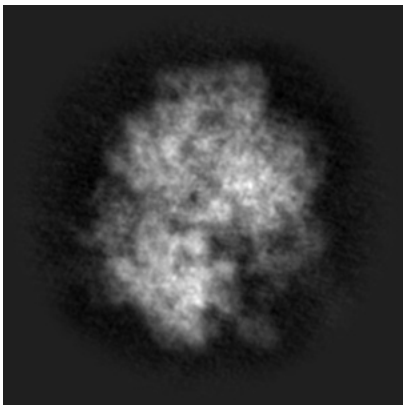
6.1.1 Primary map



X

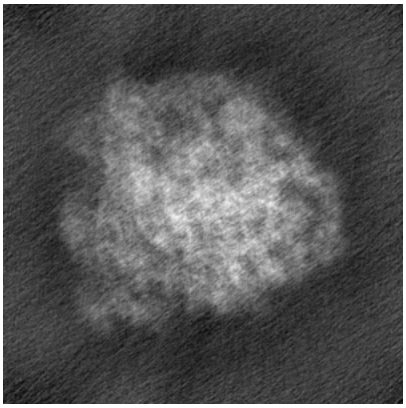


Y

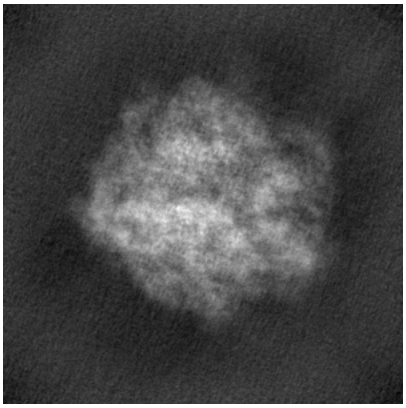


Z

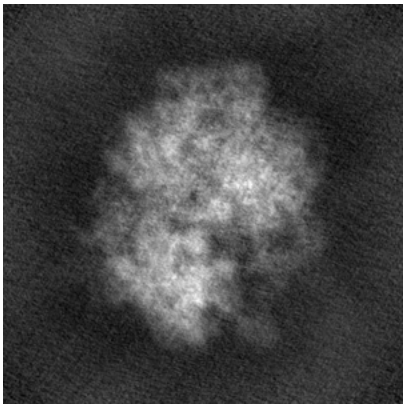
6.1.2 Raw map



X



Y

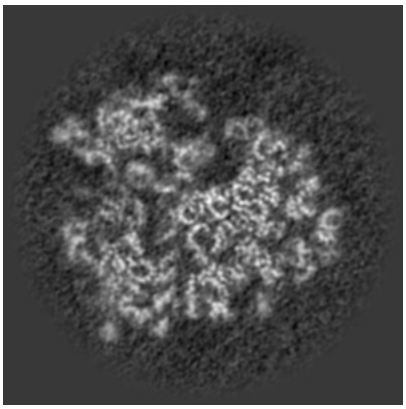


Z

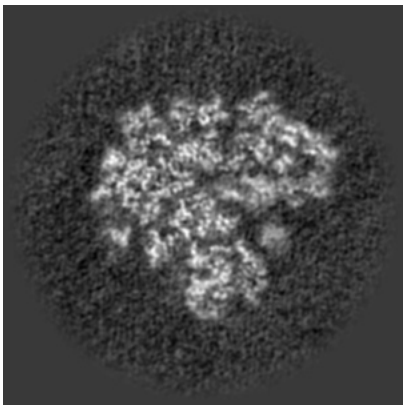
The images above show the map projected in three orthogonal directions.

6.2 Central slices (i)

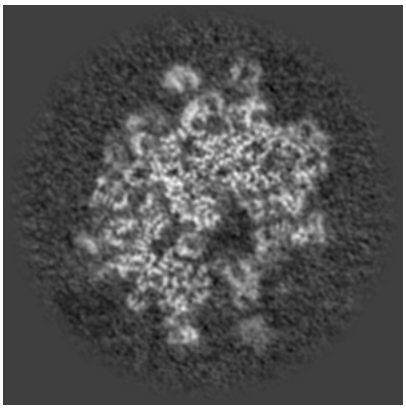
6.2.1 Primary map



X Index: 160

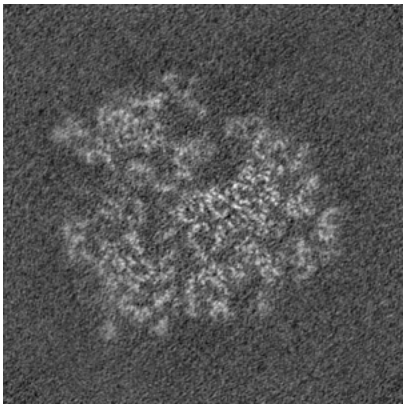


Y Index: 160

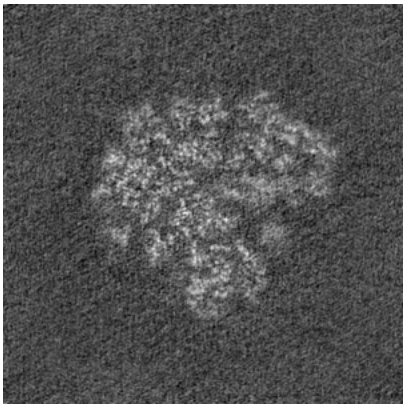


Z Index: 160

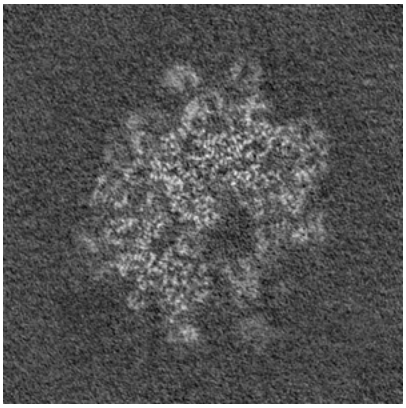
6.2.2 Raw map



X Index: 160



Y Index: 160

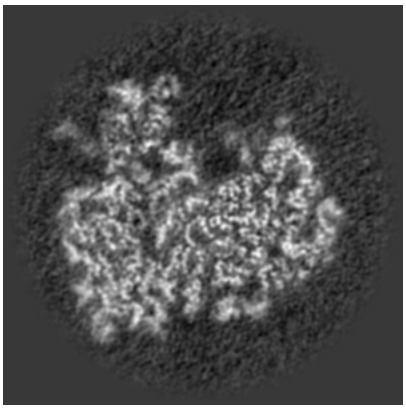


Z Index: 160

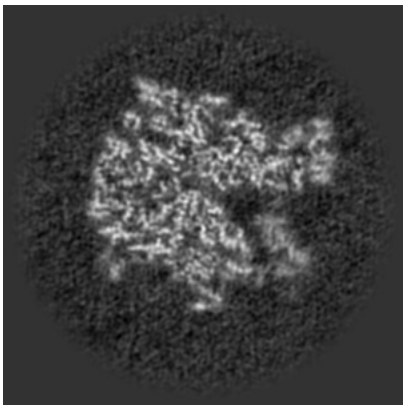
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices (i)

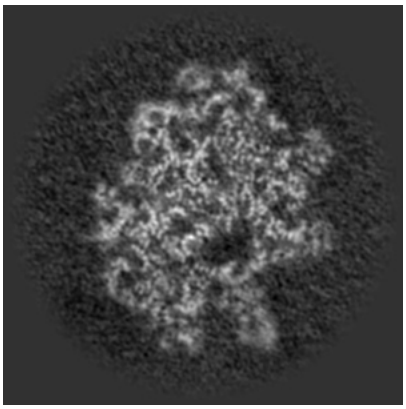
6.3.1 Primary map



X Index: 153

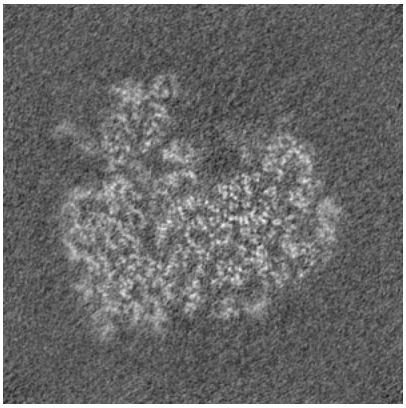


Y Index: 177

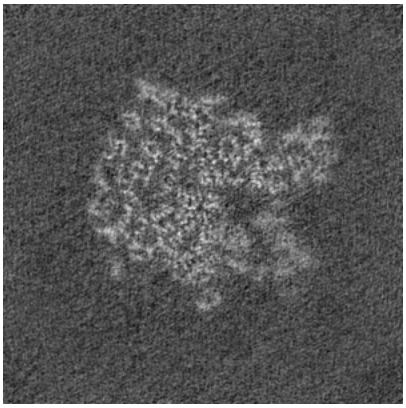


Z Index: 150

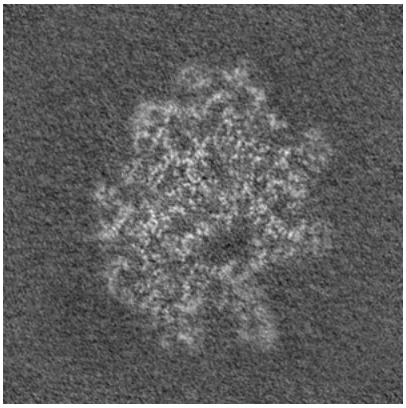
6.3.2 Raw map



X Index: 154



Y Index: 179

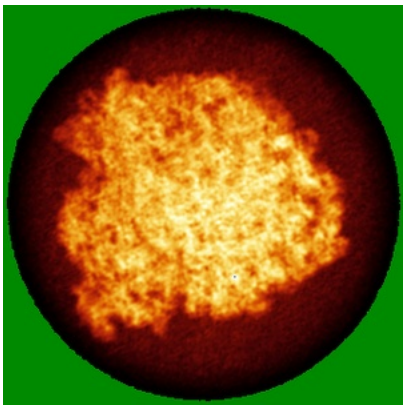


Z Index: 150

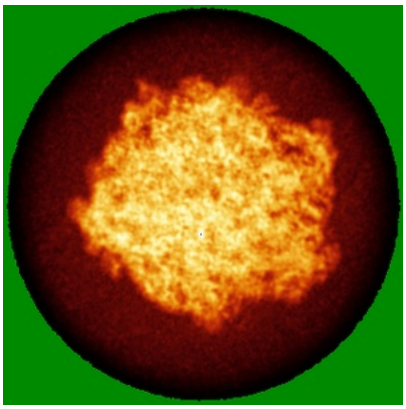
The images above show the largest variance slices of the map in three orthogonal directions.

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

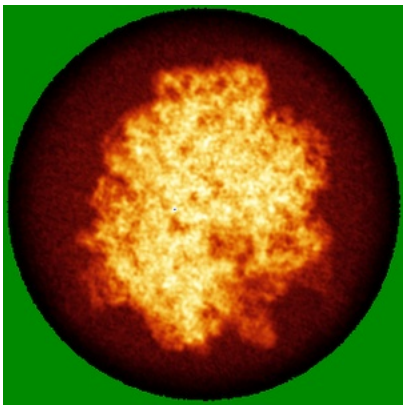
6.4.1 Primary map



X

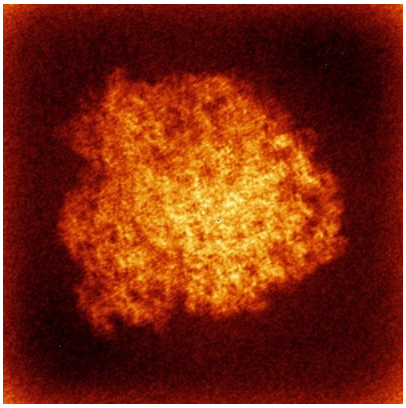


Y

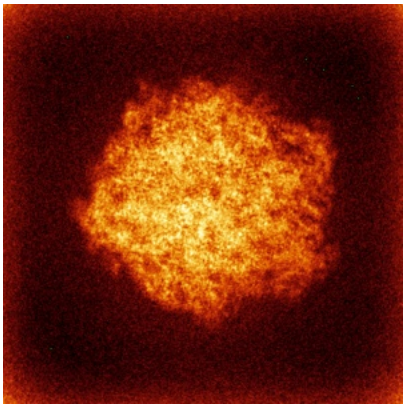


Z

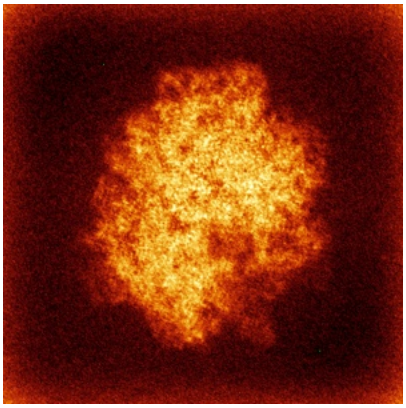
6.4.2 Raw map



X



Y



Z

The images above show the map standard deviation projections with false color in three orthogonal directions. Minimum values are shown in green, max in blue, and dark to light orange shades represent small to large values respectively.

6.5 Orthogonal surface views (i)

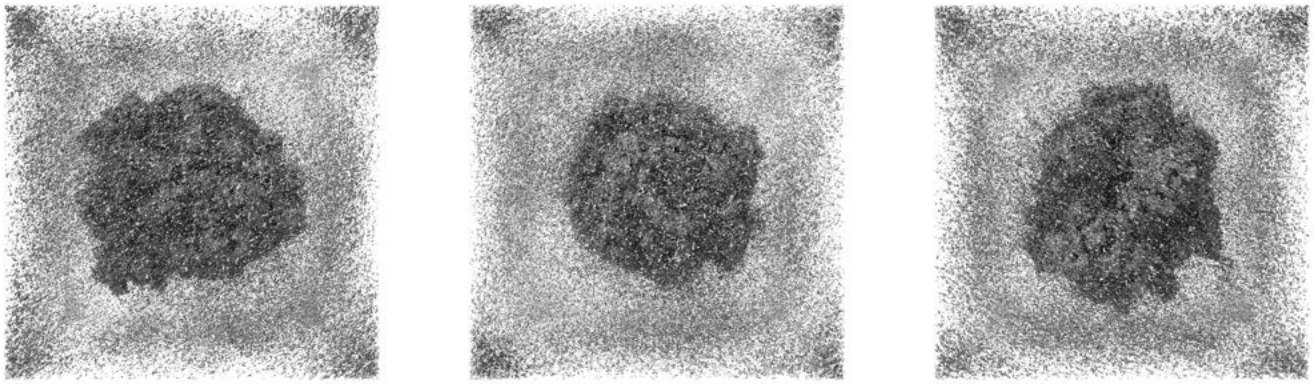
6.5.1 Primary map



X Y Z

The images above show the 3D surface view of the map at the recommended contour level 0.43. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

6.5.2 Raw map



X Y Z

These images show the 3D surface of the raw map. The raw map's contour level was selected so that its surface encloses the same volume as the primary map does at its recommended contour level.

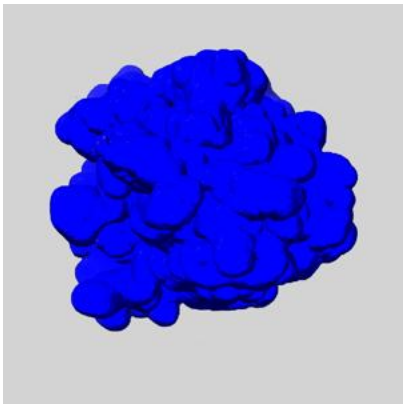
6.6 Mask visualisation (i)

This section shows the 3D surface view of the primary map at 50% transparency overlaid with the specified mask at 0% transparency

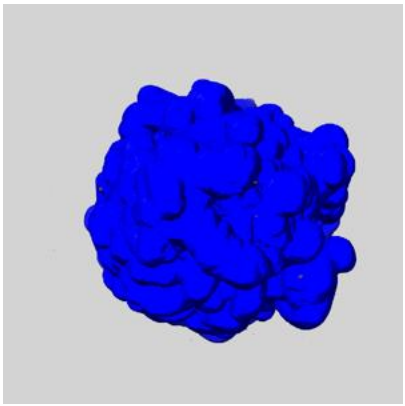
A mask typically either:

- Encompasses the whole structure
- Separates out a domain, a functional unit, a monomer or an area of interest from a larger structure

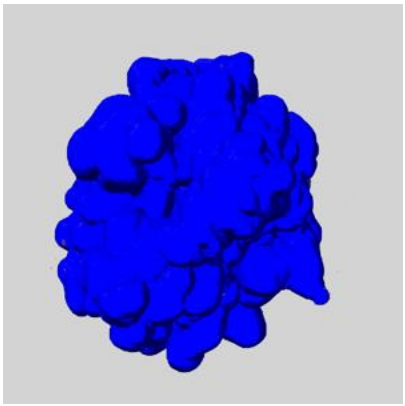
6.6.1 emd_54798_msk_1.map (i)



X



Y

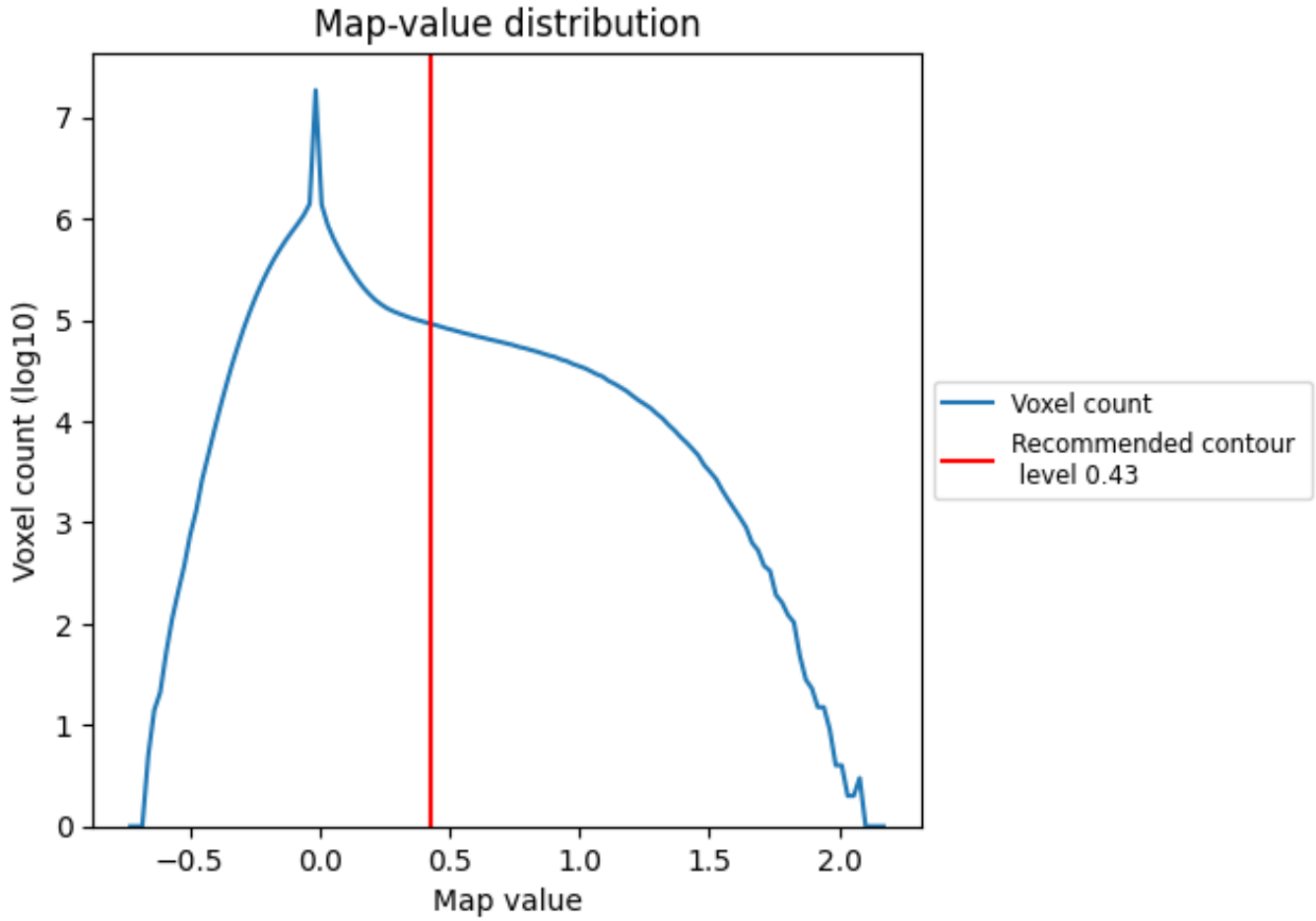


Z

7 Map analysis

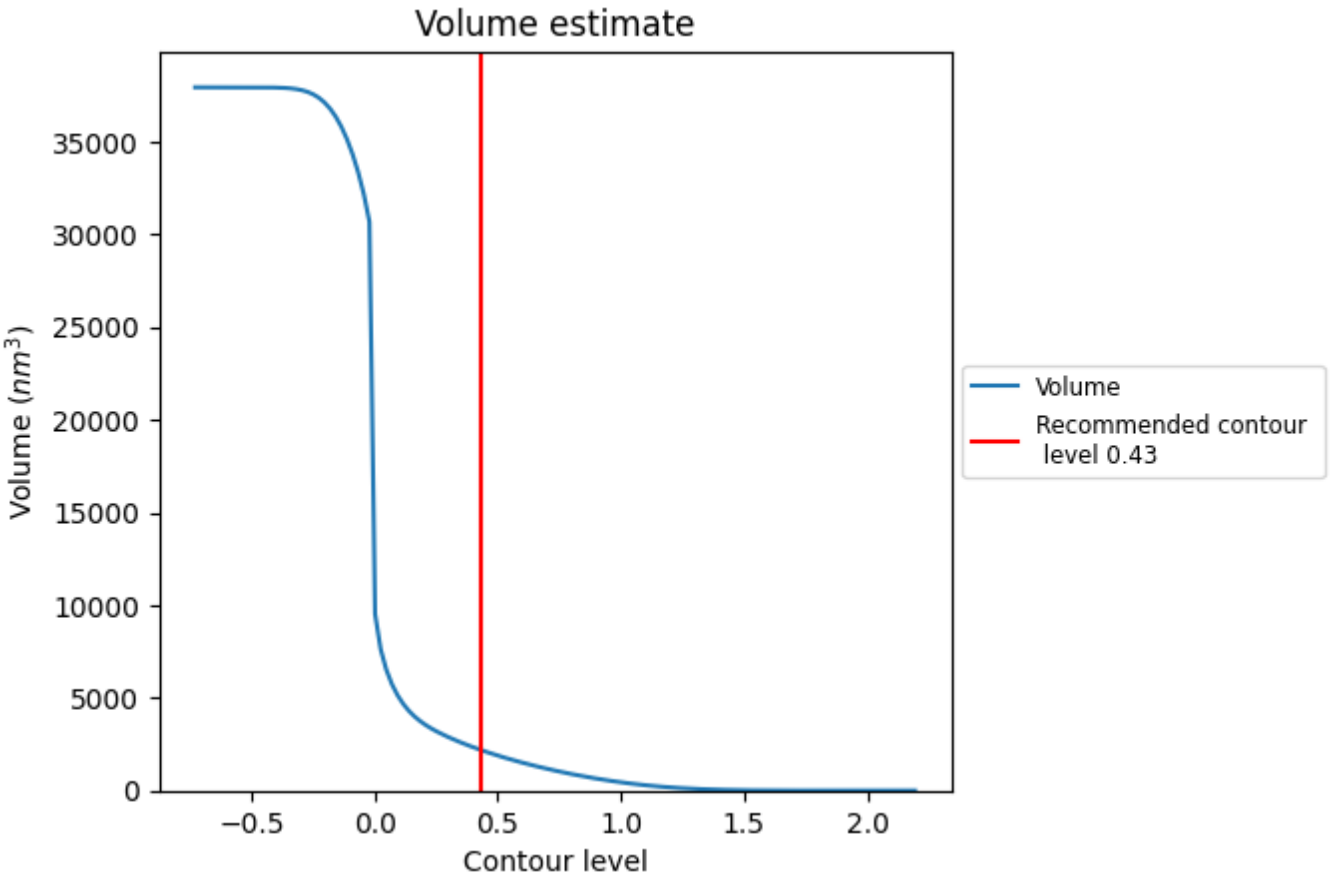
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution



The map-value distribution is plotted in 128 intervals along the x-axis. The y-axis is logarithmic. A spike in this graph at zero usually indicates that the volume has been masked.

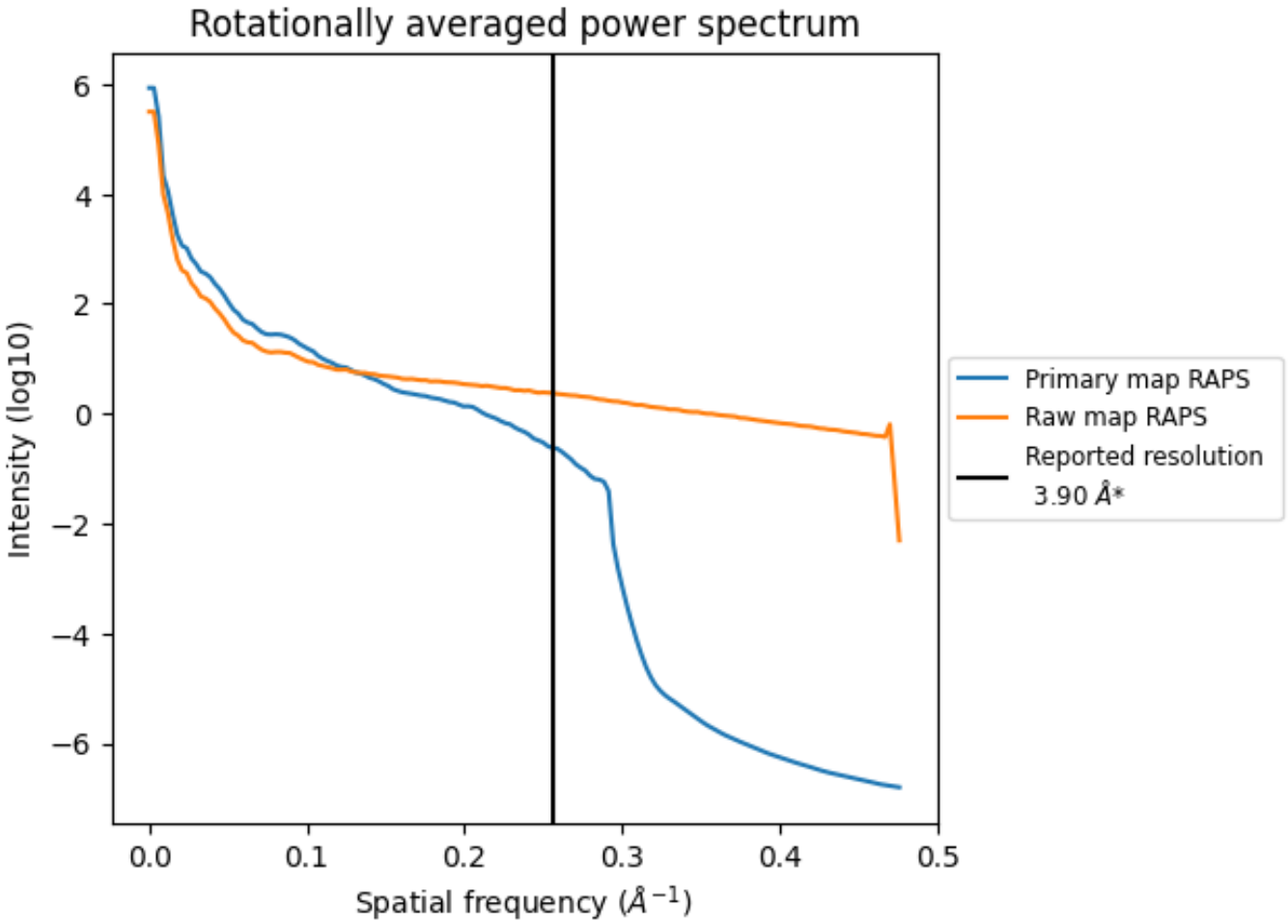
7.2 Volume estimate



The volume at the recommended contour level is 2195 nm^3; this corresponds to an approximate mass of 1983 kDa.

The volume estimate graph shows how the enclosed volume varies with the contour level. The recommended contour level is shown as a vertical line and the intersection between the line and the curve gives the volume of the enclosed surface at the given level.

7.3 Rotationally averaged power spectrum (i)

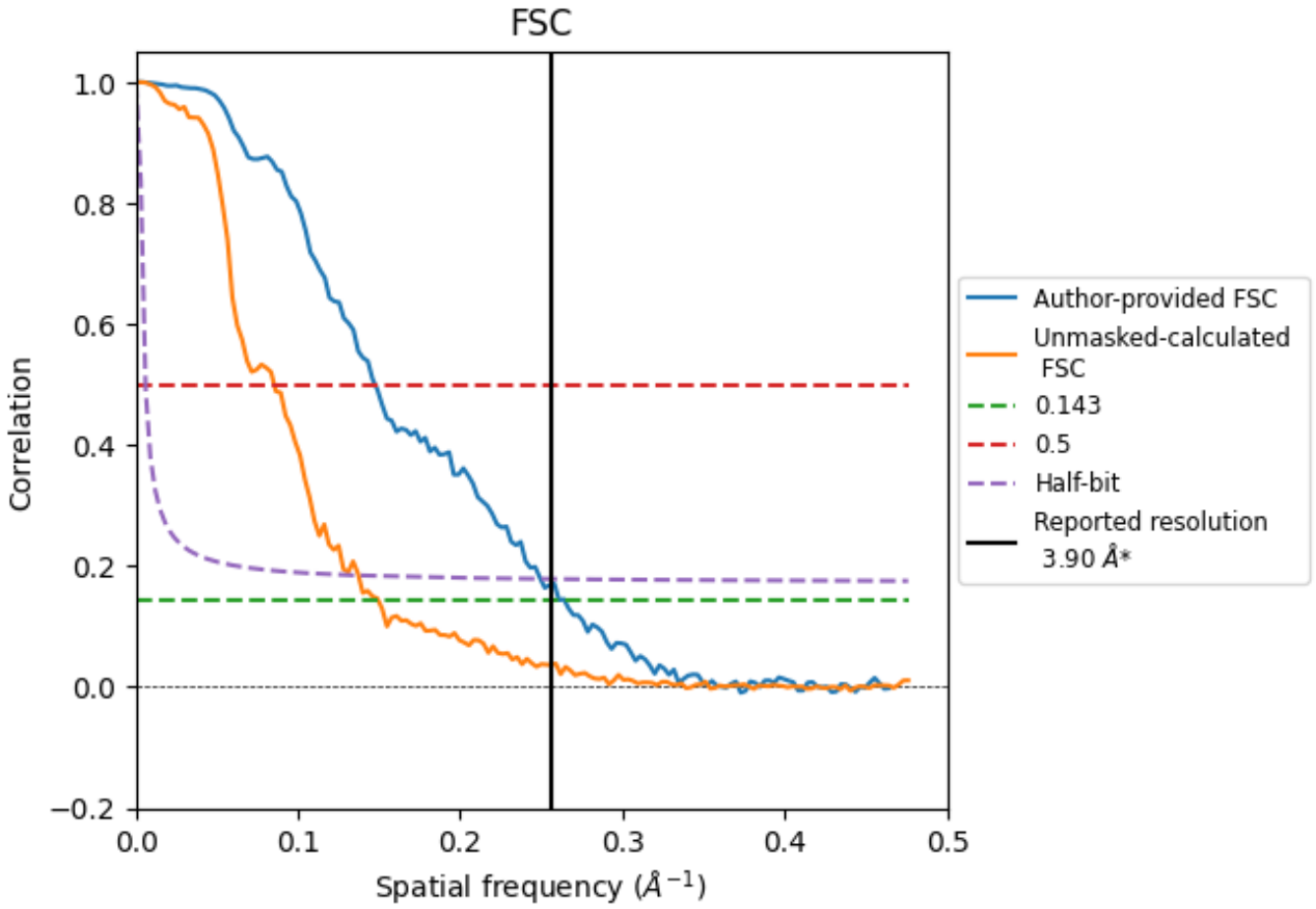


*Reported resolution corresponds to spatial frequency of 0.256 Å^{-1}

8 Fourier-Shell correlation

Fourier-Shell Correlation (FSC) is the most commonly used method to estimate the resolution of single-particle and subtomogram-averaged maps. The shape of the curve depends on the imposed symmetry, mask and whether or not the two 3D reconstructions used were processed from a common reference. The reported resolution is shown as a black line. A curve is displayed for the half-bit criterion in addition to lines showing the 0.143 gold standard cut-off and 0.5 cut-off.

8.1 FSC



*Reported resolution corresponds to spatial frequency of 0.256 Å^{-1}

8.2 Resolution estimates (i)

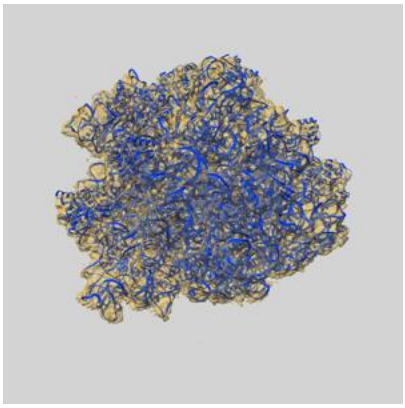
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.90	-	-
Author-provided FSC curve	3.78	6.78	4.01
Unmasked-calculated*	6.69	11.72	7.29

*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 6.69 differs from the reported value 3.9 by more than 10 %

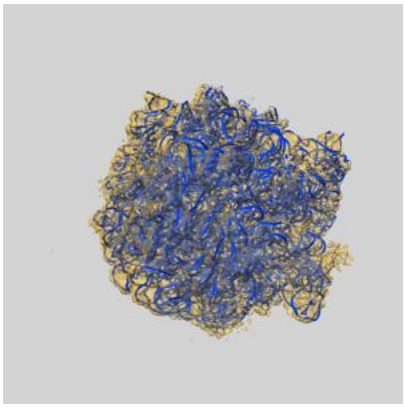
9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-54798 and PDB model 9SE1. Per-residue inclusion information can be found in section 3 on page 17.

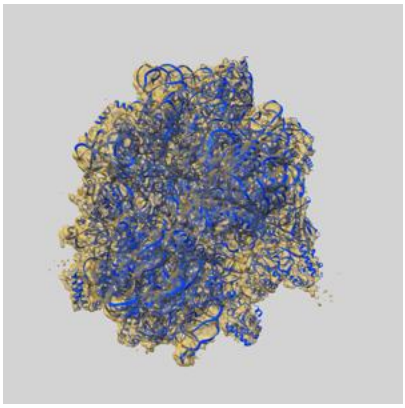
9.1 Map-model overlay



X



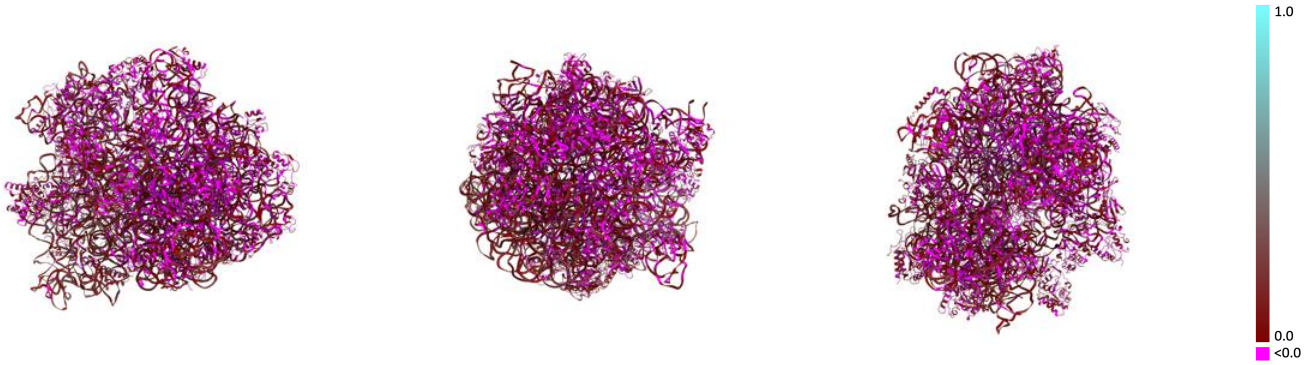
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.43 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

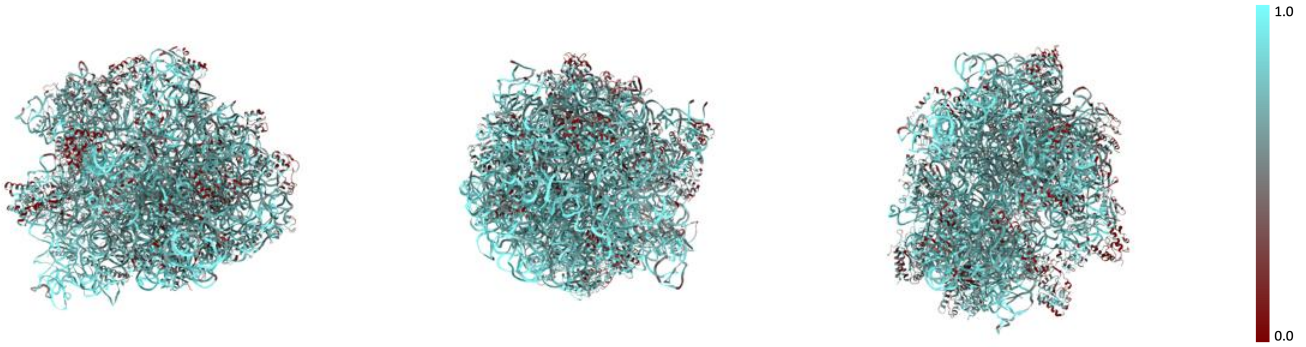
9.2 Q-score mapped to coordinate model (i)



X Y Z

The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions at which atoms can be resolved. Low Q-score values may therefore be expected for many entries.

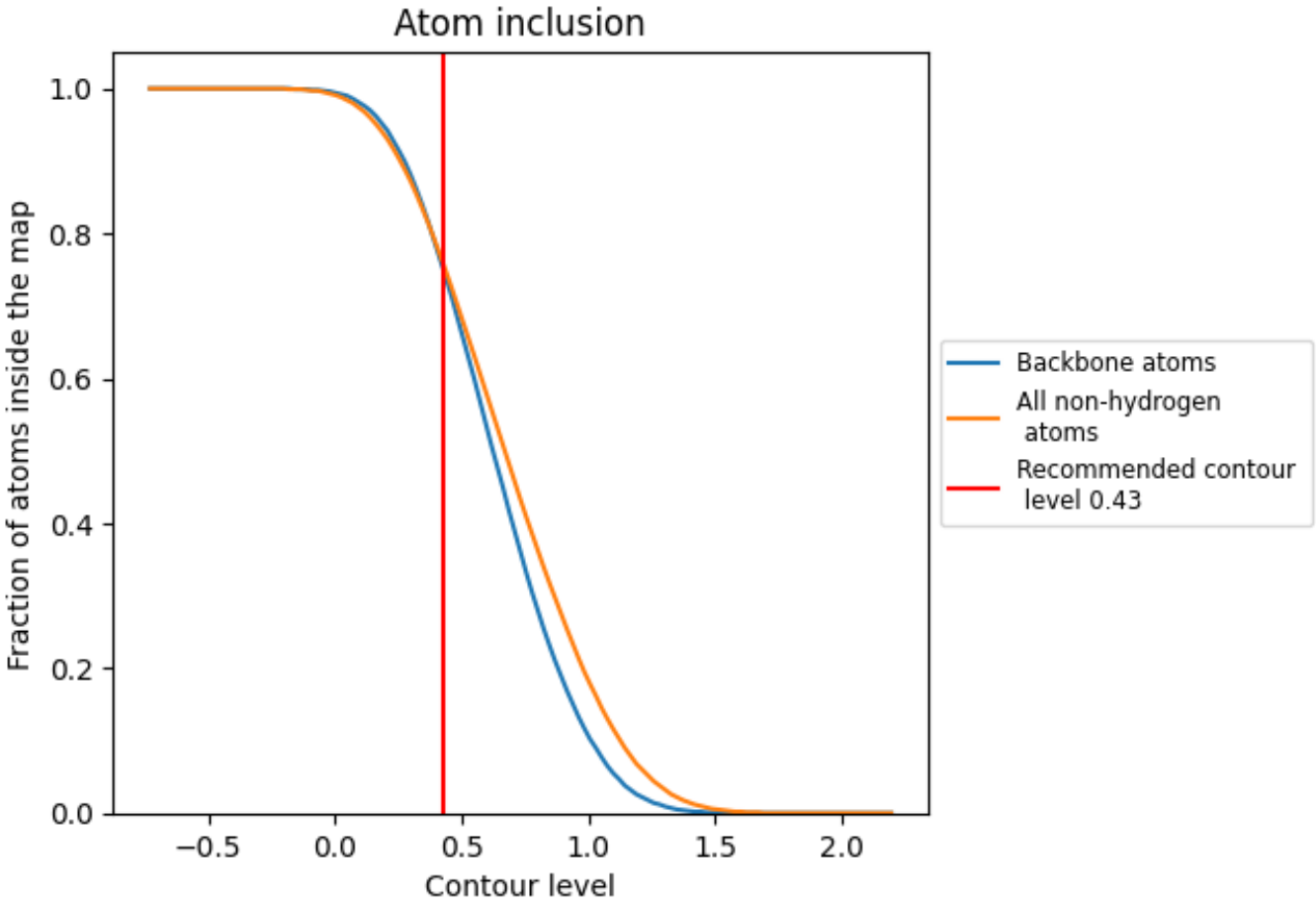
9.3 Atom inclusion mapped to coordinate model (i)



X Y Z

The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.43).

9.4 Atom inclusion (i)



At the recommended contour level, 75% of all backbone atoms, 76% of all non-hydrogen atoms, are inside the map.

9.5 Map-model fit summary

The table lists the average atom inclusion at the recommended contour level (0.43) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.7560	0.0520
0	0.5920	-0.0050
1	0.6380	-0.0010
2	0.5720	-0.0390
3	0.6230	-0.0660
4	0.6010	-0.0380
5	0.2820	0.0220
6	0.4860	0.0510
A	0.8080	0.0410
B	0.7890	0.0330
C	0.7110	-0.0020
D	0.6250	-0.0000
E	0.5560	0.0130
F	0.6690	0.0020
G	0.6100	0.0440
H	0.5630	0.0670
I	0.6180	0.0570
J	0.5860	-0.0190
K	0.5620	0.0200
L	0.5400	-0.0140
M	0.5830	-0.0520
N	0.6420	0.0220
O	0.5760	-0.0120
P	0.6660	0.0400
Q	0.5210	-0.0190
R	0.4930	-0.0110
S	0.5730	0.0340
T	0.5800	0.0180
U	0.6540	0.0410
V	0.5750	-0.0010
W	0.6100	0.0110
X	0.5440	-0.0400
Y	0.5980	0.0290
Z	0.5790	0.0220
a	0.8540	0.0980



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Chain	Atom inclusion	Q-score
b	0.5310	0.0970
c	0.6030	0.0170
d	0.7040	0.1050
e	0.7020	0.1080
f	0.7260	0.1110
g	0.6610	0.0620
h	0.7080	0.1070
i	0.5910	-0.0120
j	0.5410	0.0000
k	0.6330	-0.0050
l	0.5790	0.0510
m	0.5550	0.0340
n	0.6270	0.0110
o	0.7540	0.0830
p	0.8120	0.0920
q	0.8180	0.1320
r	0.7280	0.0910
s	0.5390	0.0220
t	0.7150	0.1420
u	0.6580	0.0890
v	0.8190	0.0550
w	0.8410	0.0990
x	0.8660	0.0340
z	0.5440	0.0600