



wwPDB EM Validation Summary Report ⓘ

Jun 10, 2025 – 02:05 pm BST

PDB ID : 9QEG / pdb_00009qeg
EMDB ID : EMD-53066
Title : Cryo-EM structure of the 70S ribosome of a MLSb sensitive S. aureus strain "KES34" in complex with solithromycin
Authors : Rivalta, A.; Yonath, A.
Deposited on : 2025-03-10
Resolution : 2.21 Å(reported)

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

We welcome your comments at validation@mail.wwpdb.org

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.dev118
Mogul : 1.8.4, CSD as541be (2020)
MolProbity : 4-5-2 with Phenix2.0rc1
buster-report : 1.1.7 (2018)
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ : 1.9.13
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.43.1

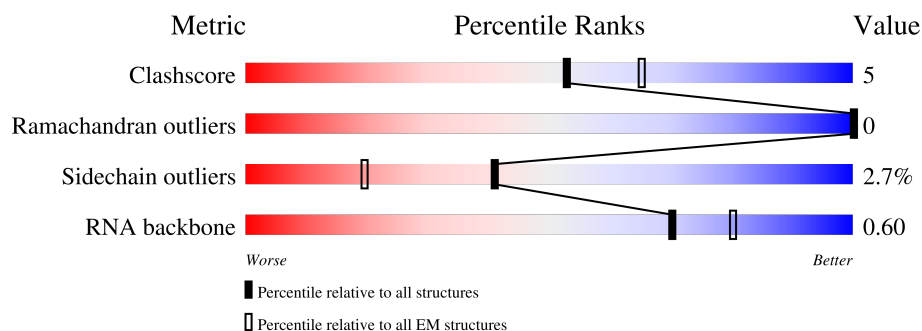
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 2.21 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)
Clashscore	210492	15764
Ramachandran outliers	207382	16835
Sidechain outliers	206894	16415
RNA backbone	6643	2191

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 $\leq 5\%$. 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	1	52	
2	2	45	
3	3	66	
4	4	37	
5	B	115	
6	C	277	
7	D	220	












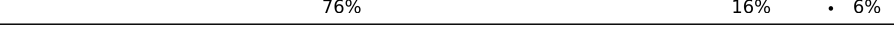







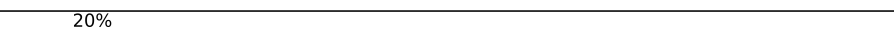

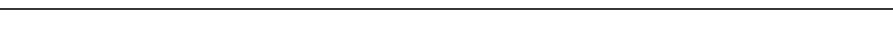
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Mol	Chain	Length	Quality of chain
8	E	207	
9	G	178	
10	H	145	
11	I	122	
12	J	146	
13	K	144	
14	L	122	
15	M	119	
16	N	116	
17	O	118	
18	P	102	
19	Q	117	
20	R	91	
21	S	105	
22	T	217	
23	U	94	
24	V	62	
25	W	73	
26	X	59	
27	Z	57	
28	F	179	
29	11	15	
30	A	2923	
31	Ae	166	
32	Af	98	

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Mol	Chain	Length	Quality of chain
33	Ag	156	
34	Ai	132	
35	Al	137	
36	Ao	89	
37	Ap	91	
38	Aq	87	
39	Ar	80	
40	At	83	
41	Aa	1552	
42	Aj	102	
43	Ac	217	
44	Am	121	
45	Ak	129	
46	Ab	255	
47	Ah	132	
48	Ad	200	
49	An	61	
50	As	92	
51	d	19	
52	8	71	
53	9	5	
54	13	84	

2 Entry composition

There are 59 unique types of molecules in this entry. The entry contains 130300 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 bL33A.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	1	48	Total	C	N	O	S	0	0
			355	218	70	64	3		

- Molecule 2 is a protein called Large ribosomal subunit protein bL34.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	2	44	Total	C	N	O	S	0	0
			368	225	89	53	1		

- Molecule 3 is a protein called Large ribosomal subunit protein bL35.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	3	65	Total	C	N	O	S	0	0
			508	315	108	83	2		

- Molecule 4 is a protein called Large ribosomal subunit protein bL36.

Mol	Chain	Residues	Atoms					AltConf	Trace
4	4	37	Total	C	N	O	S	0	0
			280	175	57	43	5		

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

Mol	Chain	Residues	Atoms					AltConf	Trace
5	B	113	Total	C	N	O	P	0	0
			2408	1076	430	789	113		

- Molecule 6 is a protein called Large ribosomal subunit protein uL2.

Mol	Chain	Residues	Atoms					AltConf	Trace
6	C	274	Total	C	N	O	S	0	0
			2037	1271	406	355	5		

- Molecule 7 is a protein called Large ribosomal subunit protein uL3.

Mol	Chain	Residues	Atoms					AltConf	Trace
7	D	215	Total	C	N	O	S	0	0
			1582	994	296	287	5		

- Molecule 8 is a protein called Large ribosomal subunit protein uL4.

Mol	Chain	Residues	Atoms					AltConf	Trace
8	E	206	Total	C	N	O	S	0	0
			1510	955	282	271	2		

- Molecule 9 is a protein called Large ribosomal subunit protein uL6.

Mol	Chain	Residues	Atoms					AltConf	Trace
9	G	160	Total	C	N	O	S	0	0
			944	572	191	180	1		

- Molecule 10 is a protein called Large ribosomal subunit protein uL13.

Mol	Chain	Residues	Atoms					AltConf	Trace
10	H	145	Total	C	N	O	S	0	0
			1140	712	208	217	3		

- Molecule 11 is a protein called Large ribosomal subunit protein uL14.

Mol	Chain	Residues	Atoms					AltConf	Trace
11	I	122	Total	C	N	O	S	0	0
			865	543	163	156	3		

- Molecule 12 is a protein called Large ribosomal subunit protein uL15.

Mol	Chain	Residues	Atoms					AltConf	Trace
12	J	146	Total	C	N	O	S	0	0
			1057	659	213	184	1		

- Molecule 13 is a protein called Large ribosomal subunit protein uL16.

Mol	Chain	Residues	Atoms					AltConf	Trace
13	K	137	Total	C	N	O	S	0	0
			1024	660	193	168	3		

- Molecule 14 is a protein called Large ribosomal subunit protein bL17.

Mol	Chain	Residues	Atoms					AltConf	Trace
14	L	118	Total	C	N	O	S	0	0
			901	559	179	162	1		

- Molecule 15 is a protein called Large ribosomal subunit protein uL18.

Mol	Chain	Residues	Atoms					AltConf	Trace
15	M	119	Total	C	N	O		0	0
			801	497	162	142			

- Molecule 16 is a protein called Large ribosomal subunit protein bL19.

Mol	Chain	Residues	Atoms					AltConf	Trace
16	N	111	Total	C	N	O		0	0
			800	504	159	137			

- Molecule 17 is a protein called Large ribosomal subunit protein bL20.

Mol	Chain	Residues	Atoms					AltConf	Trace
17	O	116	Total	C	N	O	S	0	0
			943	593	189	157	4		

- Molecule 18 is a protein called Large ribosomal subunit protein bL21.

Mol	Chain	Residues	Atoms					AltConf	Trace
18	P	102	Total	C	N	O	S	0	0
			752	480	138	133	1		

- Molecule 19 is a protein called Large ribosomal subunit protein uL22.

Mol	Chain	Residues	Atoms					AltConf	Trace
19	Q	111	Total	C	N	O	S	0	0
			814	511	158	143	2		

- Molecule 20 is a protein called Large ribosomal subunit protein uL23.

Mol	Chain	Residues	Atoms					AltConf	Trace
20	R	89	Total	C	N	O	S	0	0
			664	422	118	120	4		

- Molecule 21 is a protein called Large ribosomal subunit protein uL24.

Mol	Chain	Residues	Atoms					AltConf	Trace
21	S	93	Total	C	N	O	S	0	0
			635	403	121	110	1		

- Molecule 22 is a protein called 50S ribosomal protein L25.

Mol	Chain	Residues	Atoms				AltConf	Trace
22	T	90	Total	C	N	O	0	0
			600	385	109	106		

- Molecule 23 is a protein called Large ribosomal subunit protein bL27.

Mol	Chain	Residues	Atoms				AltConf	Trace
23	U	79	Total	C	N	O	0	0
			575	356	115	104		

- Molecule 24 is a protein called Large ribosomal subunit protein bL28.

Mol	Chain	Residues	Atoms				AltConf	Trace
24	V	50	Total	C	N	O	0	0
			360	223	76	61		

- Molecule 25 is a protein called Large ribosomal subunit protein uL29.

Mol	Chain	Residues	Atoms				AltConf	Trace
25	W	64	Total	C	N	O	0	0
			473	295	96	82		

- Molecule 26 is a protein called Large ribosomal subunit protein uL30.

Mol	Chain	Residues	Atoms				AltConf	Trace
26	X	58	Total	C	N	O	0	0
			438	273	84	81		

- Molecule 27 is a protein called Large ribosomal subunit protein bL32.

Mol	Chain	Residues	Atoms					AltConf	Trace
27	Z	42	Total	C	N	O	S	0	0
			333	205	71	53	4		

- Molecule 28 is a protein called Large ribosomal subunit protein uL5.

Mol	Chain	Residues	Atoms					AltConf	Trace
28	F	149	Total	C	N	O	S	0	0
			914	580	165	166	3		

- Molecule 29 is a RNA chain called E-site tRNA molecule.

Mol	Chain	Residues	Atoms					AltConf	Trace
29	11	15	Total	C	N	O	P	0	0
			322	143	61	103	15		

- Molecule 30 is a RNA chain called 23S ribosomal RNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
30	A	2586	Total	C	N	O	P	2	0
			55514	24786	10184	17956	2588		

- Molecule 31 is a protein called Small ribosomal subunit protein uS5.

Mol	Chain	Residues	Atoms					AltConf	Trace
31	Ae	156	Total	C	N	O	S	0	0
			1130	716	211	201	2		

- Molecule 32 is a protein called Small ribosomal subunit protein bS6.

Mol	Chain	Residues	Atoms					AltConf	Trace
32	Af	95	Total	C	N	O	S	0	0
			734	466	136	130	2		

- Molecule 33 is a protein called Small ribosomal subunit protein uS7.

Mol	Chain	Residues	Atoms					AltConf	Trace
33	Ag	154	Total	C	N	O	S	0	0
			1222	761	234	223	4		

- Molecule 34 is a protein called Small ribosomal subunit protein uS9.

Mol	Chain	Residues	Atoms					AltConf	Trace
34	Ai	127	Total	C	N	O	S	0	0
			975	606	195	173	1		

- Molecule 35 is a protein called Small ribosomal subunit protein uS12.

Mol	Chain	Residues	Atoms					AltConf	Trace
35	Al	134	Total	C	N	O	S	0	0
			1011	628	204	177	2		

- Molecule 36 is a protein called Small ribosomal subunit protein uS15.

Mol	Chain	Residues	Atoms					AltConf	Trace
36	Ao	88	Total	C	N	O	S	0	0
			727	449	150	127	1		

- Molecule 37 is a protein called Small ribosomal subunit protein bS16.

Mol	Chain	Residues	Atoms					AltConf	Trace
37	Ap	89	Total	C	N	O	S	0	0
			679	428	125	125	1		

- Molecule 38 is a protein called Small ribosomal subunit protein uS17.

Mol	Chain	Residues	Atoms					AltConf	Trace
38	Aq	74	Total	C	N	O		0	0
			551	351	106	94			

- Molecule 39 is a protein called Small ribosomal subunit protein bS18.

Mol	Chain	Residues	Atoms					AltConf	Trace
39	Ar	54	Total	C	N	O	S	0	0
			445	284	86	73	2		

- Molecule 40 is a protein called Small ribosomal subunit protein bS20.

Mol	Chain	Residues	Atoms					AltConf	Trace
40	At	81	Total	C	N	O	S	0	0
			593	363	118	110	2		

- Molecule 41 is a RNA chain called 16S ribosomal RNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
41	Aa	1440	Total	C	N	O	P	0	0
			30880	13790	5653	9997	1440		

- Molecule 42 is a protein called Small ribosomal subunit protein uS10.

Mol	Chain	Residues	Atoms				AltConf	Trace
42	Aj	96	Total	C	N	O	0	0
			720	452	133	135		

- Molecule 43 is a protein called Small ribosomal subunit protein uS3.

Mol	Chain	Residues	Atoms				AltConf	Trace
43	Ac	202	Total	C	N	O	S	0
			1477	935	275	266	1	0

- Molecule 44 is a protein called Small ribosomal subunit protein uS13.

Mol	Chain	Residues	Atoms				AltConf	Trace
44	Am	114	Total	C	N	O	S	0
			845	526	168	150	1	0

- Molecule 45 is a protein called Small ribosomal subunit protein uS11.

Mol	Chain	Residues	Atoms				AltConf	Trace
45	Ak	112	Total	C	N	O	S	0
			759	467	146	144	2	0

- Molecule 46 is a protein called Small ribosomal subunit protein uS2.

Mol	Chain	Residues	Atoms				AltConf	Trace
46	Ab	104	Total	C	N	O	0	0
			629	397	117	115		

- Molecule 47 is a protein called Small ribosomal subunit protein uS8.

Mol	Chain	Residues	Atoms				AltConf	Trace
47	Ah	131	Total	C	N	O	S	0
			1032	652	183	193	4	0

- Molecule 48 is a protein called Small ribosomal subunit protein uS4.

Mol	Chain	Residues	Atoms				AltConf	Trace
48	Ad	199	Total	C	N	O	S	0
			1502	954	283	263	2	0

- Molecule 49 is a protein called Small ribosomal subunit protein uS14B.

Mol	Chain	Residues	Atoms					AltConf	Trace
49	An	60	Total	C	N	O	S	0	0
			502	317	100	80	5		

- Molecule 50 is a protein called Small ribosomal subunit protein uS19.

Mol	Chain	Residues	Atoms					AltConf	Trace
50	As	82	Total	C	N	O	S	0	0
			617	399	114	102	2		

- Molecule 51 is a RNA chain called mRNA molecule.

Mol	Chain	Residues	Atoms					AltConf	Trace
51	d	19	Total	C	N	O	P	0	0
			412	184	79	130	19		

- Molecule 52 is a RNA chain called P-site tRNA molecule.

Mol	Chain	Residues	Atoms					AltConf	Trace
52	8	71	Total	C	N	O	P	0	0
			1519	677	279	492	71		

- Molecule 53 is a RNA chain called A-site tRNA molecule.

Mol	Chain	Residues	Atoms					AltConf	Trace
53	9	5	Total	C	N	O	P	0	0
			106	48	20	33	5		

- Molecule 54 is a protein called Large ribosomal subunit protein bL31B.

Mol	Chain	Residues	Atoms				AltConf	Trace
54	13	57	Total	C	N	O	0	0
			382	245	74	63		

- Molecule 55 is ZINC ION (CCD ID: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		AltConf
55	1	1	Total	Zn	0
			1	1	
55	4	1	Total	Zn	0
			1	1	
55	Z	1	Total	Zn	0
			1	1	

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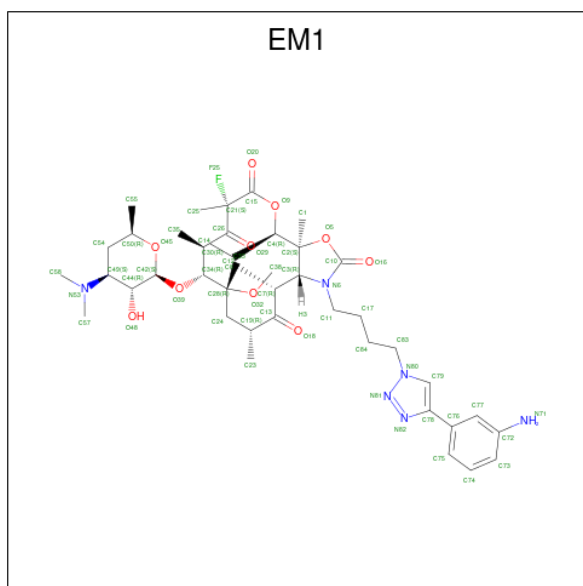
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Mol	Chain	Residues	Atoms		AltConf
55	An	1	Total	Zn	0
			1	1	

- Molecule 56 is MAGNESIUM ION (CCD ID: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		AltConf
56	C	1	Total	Mg	0
			1	1	
56	D	1	Total	Mg	0
			1	1	
56	A	170	Total	Mg	0
			170	170	
56	Aa	59	Total	Mg	0
			59	59	

- Molecule 57 is (3aS,4R,7S,9R,10R,11R,13R,15R,15aR)-1-{4-[4-(3-aminophenyl)-1H-1,2,3-triazol-1-yl]butyl}-4-ethyl-7-fluoro-11-methoxy-3a,7,9,11,13,15-hexamethyl-2,6,8,14-tetraoxotetradecahydro-2H-oxacyclotetradecino[4,3-d][1,3]oxazol-10-yl 3,4,6-trideoxy-3-(dimethylamino)-beta-D-xylo-hexopyranoside (CCD ID: EM1) (formula: C₄₃H₆₅FN₆O₁₀) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms					AltConf
57	A	1	Total	C	F	N	O	0
			60	43	1	6	10	

- Molecule 58 is POTASSIUM ION (CCD ID: K) (formula: K).

Mol	Chain	Residues	Atoms		AltConf
58	A	15	Total 15	K 15	0
58	Aa	3	Total 3	K 3	0

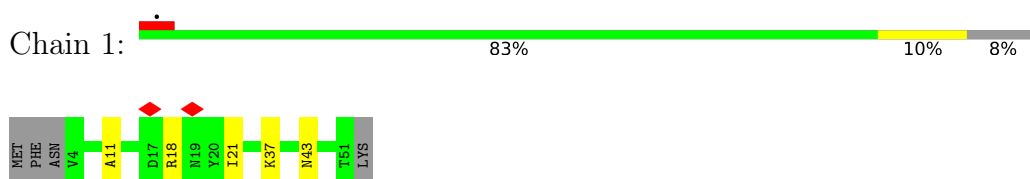
- Molecule 59 is water.

Mol	Chain	Residues	Atoms		AltConf
59	C	16	Total 16	O 16	0
59	D	2	Total 2	O 2	0
59	J	7	Total 7	O 7	0
59	N	3	Total 3	O 3	0
59	O	2	Total 2	O 2	0
59	P	1	Total 1	O 1	0
59	R	1	Total 1	O 1	0
59	A	574	Total 574	O 574	0
59	Aa	15	Total 15	O 15	0

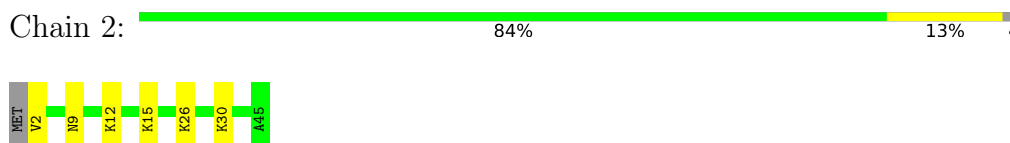
3 Residue-property plots [i](#)

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.

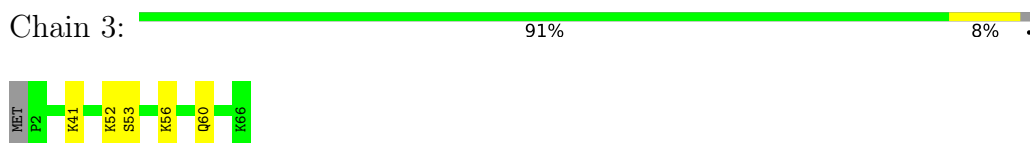
- Molecule 1: Large ribosomal subunit protein bL33A



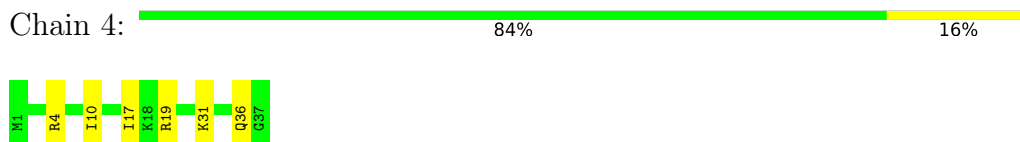
- Molecule 2: Large ribosomal subunit protein bL34



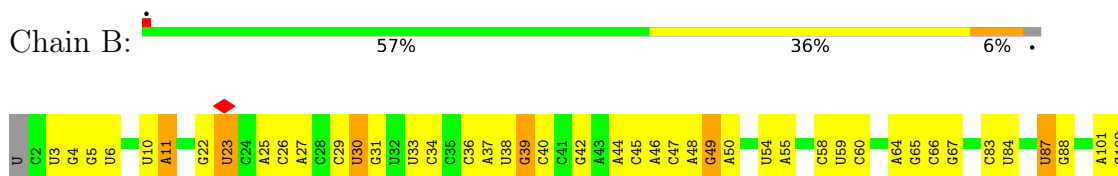
- Molecule 3: Large ribosomal subunit protein bL35

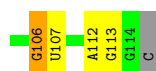


- Molecule 4: Large ribosomal subunit protein bL36



- Molecule 5: 5S ribosomal RNA





- Molecule 6: Large ribosomal subunit protein uL2

Chain C: 92% 7%



- Molecule 7: Large ribosomal subunit protein uL3

Chain D: 89% 9%



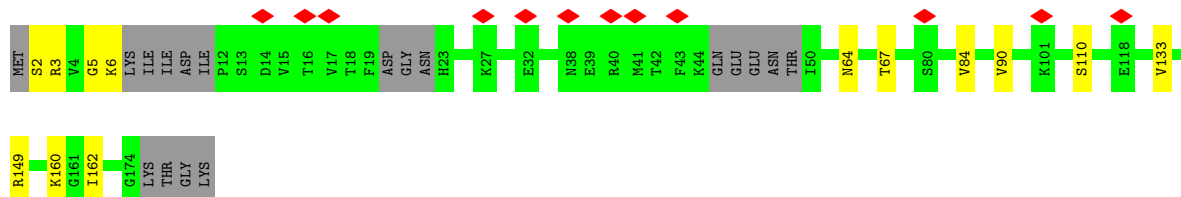
- Molecule 8: Large ribosomal subunit protein uL4

Chain E: 87% 12%



- Molecule 9: Large ribosomal subunit protein uL6

Chain G: 7% 83% 7% 10%



- Molecule 10: Large ribosomal subunit protein uL13

Chain H: 93% 7%

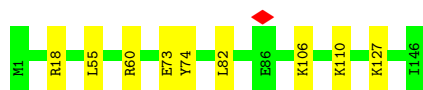


- Molecule 11: Large ribosomal subunit protein uL14

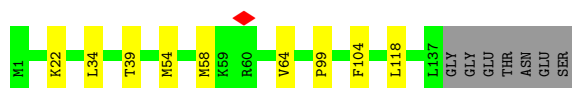
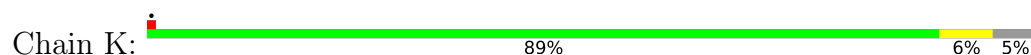
Chain I: 88% 12%



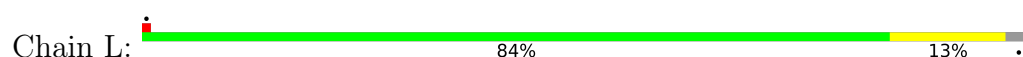
- Molecule 12: Large ribosomal subunit protein uL15



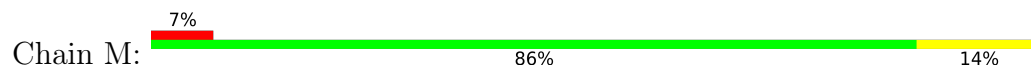
- Molecule 13: Large ribosomal subunit protein uL16



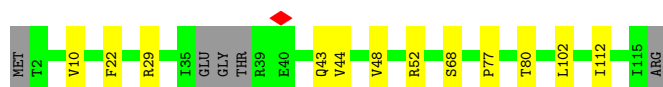
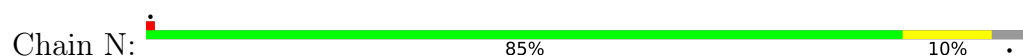
- Molecule 14: Large ribosomal subunit protein bL17



- Molecule 15: Large ribosomal subunit protein uL18



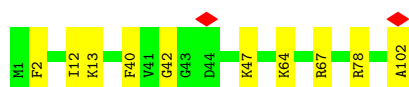
- Molecule 16: Large ribosomal subunit protein bL19




- Molecule 17: Large ribosomal subunit protein bL20



- Molecule 18: Large ribosomal subunit protein bL21



- Molecule 25: Large ribosomal subunit protein uL29

Chain W:  78% 10% 12%



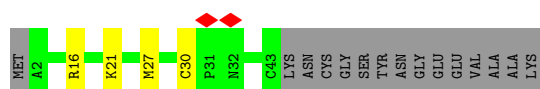
- Molecule 26: Large ribosomal subunit protein uL30

Chain X:  92% 7% .



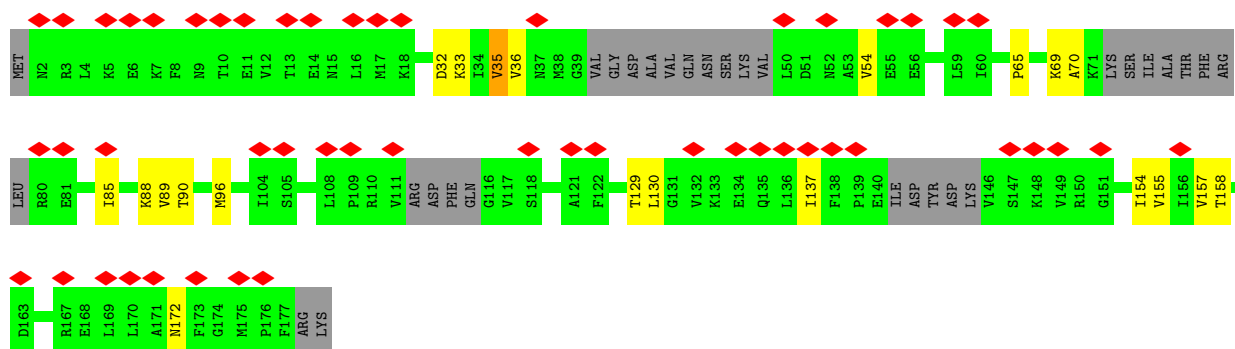
- Molecule 27: Large ribosomal subunit protein bL32

Chain Z:  67% 7% 26%




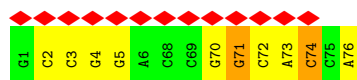
- Molecule 28: Large ribosomal subunit protein uL5

Chain F:  28% 72% 11% 17%



- Molecule 29: E-site tRNA molecule

Chain 11:  33% 87% 53% 13%

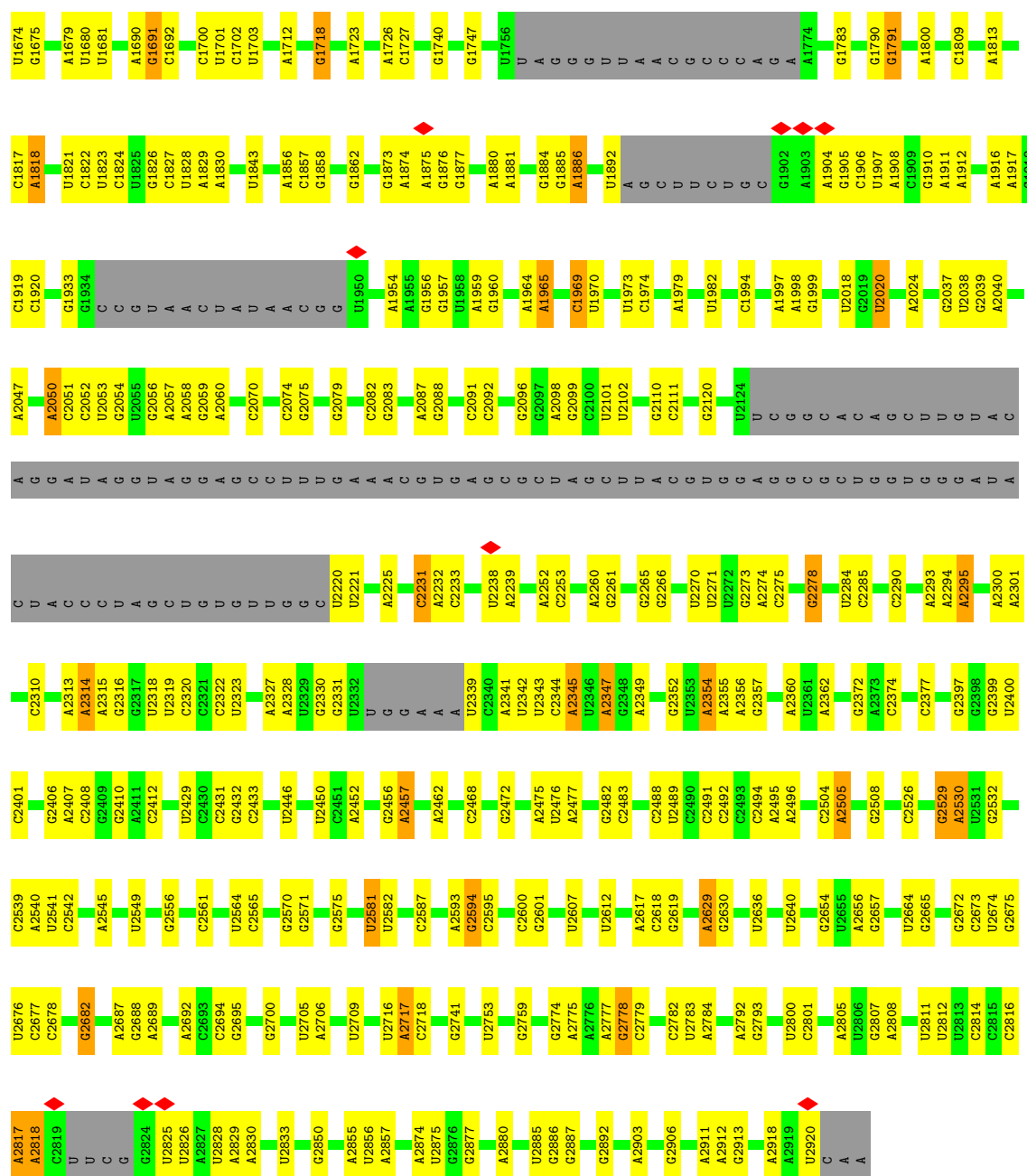


- Molecule 30: 23S ribosomal RNA

Chain A:  62% 24% 12%

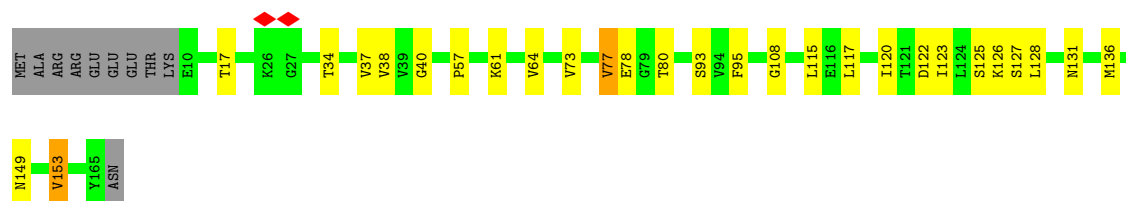


A1576	G	A1511	C1368	U1237	A1072	G	U829	A682	U569	G422	G319	U233	A126
A1577	A	U1512	G1369	U1238	A1073	G	U830	G683	U576	A423	U320	U238	C127
A1578	C	A1513	C1370	U1239	U1077	G	C831	U684	A577	C429	U321		C128
A1579	A	A1514	U1389	U1240	G1078	U	G837	G686	G578		A324	A247	A130
A1580	U	A1517	A1390	A1241	U1079	A	C841	U687	U579	G432	G327	G248	A136
A1581	U	G1518	A1391	A1242	G1083	C	U842	A688	C580	A437	G328	C949	
A1582	G	U1519	U1392	U1252	U1084	C	G850	A689	A583	C441	A332	G250	A145
A1583	A	A1520	A1402	G1257	U1085	G	G857	U690	U590	C442	A333	G251	U146
A1584	U	G1521	U1416	G1261	C1088	A	C858	A691		G445	A339	A259	G153
A1585	C	U1522	A1423	U1269	C	U947	U859	U699	U593		A340	A260	
A1586	G	U1523	A1424	U1270	A	A954	C860	A700	G594	A266	G341	A266	A156
A1587	A	U1524	U1442	U1277	C	A955	U860	G701	U597	G267	G342	A267	U157
A1588	U	A1525	C1443	U1280	A	C957	U872	A702	G598	G453	A346	A268	G158
A1589	U	U1526	A1449	U1281	C	A962	U873	U704	G606	G457	U347	G269	U159
A1590	G	U1527	A	U1282	C	U970	U877	A725		A458	C348	C272	G160
A1591	A	U1528	U1156	U1283	U	U971	C878	G726	G613	A461	U349	C273	A161
A1592	U	U1529	U1157	U1284	A	U972	U879	U731		A462	G350	A275	A164
A1593	U	U1530	U1158	U1285	C	A973	U884	U734	G616	U463	A354	A279	G169
A1594	U	U1531	U1159	U1286	C	U973	C885	A735	A617	U464	A363	C280	U172
A1595	U	U1532	U1160	U1287	C	A977	A886	C736	A618	U465	A364	A	A173
A1596	U	U1533	U1161	U1288	C	U977	U887	C737	U619	G470	A365	A	U174
A1597	U	U1534	U1162	U1289	C	U977	U888	U738	G620	A471	U371	C	C175
A1598	U	U1535	U1163	U1290	C	U977	U889	U739	G621	A472	A372	U	G177
A1599	U	U1536	U1164	U1291	C	U977	U890	U740	G622	A473	A373	U	C184
A1600	U	U1537	U1165	U1292	C	U977	U891	U741	G623	A474	U372	U	A185
A1601	U	U1538	U1166	U1293	C	U977	U892	U742	G624	A475	A373	U	
A1602	U	U1539	U1167	U1294	C	U977	U893	U743	G625	A476	U374	U	
A1603	U	U1540	U1168	U1295	C	U977	U894	U744	G626	U477	U375	U	
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A1605	U	U1542	U1170	U1297	C	U977	U896	U746	G628	U479	U377	U	
A1606	U	U1543	U1171	U1298	C	U977	U897	U747	G629	U480	U378	U	
A1607	U	U1544	U1172	U1299	C	U977	U898	U748	G630	U481	U379	U	
A1608	U	U1545	U1173	U1300	C	U977	U899	U749	G631	U482	U380	U	
A1609	U	U1546	U1174	U1301	C	U977	U900	U750	G632	U483	U381	U	
A1610	U	U1547	U1175	U1302	C	U977	U901	U751	G633	U484	U382	U	
A1611	U	U1548	U1176	U1303	C	U977	U902	U752	G634	U485	U383	U	
A1612	U	U1549	U1177	U1304	C	U977	U903	U753	G635	U486	U384	U	
A1613	U	U1550	U1178	U1305	C	U977	U904	U754	G636	U487	U385	U	
A1614	U	U1551	U1179	U1306	C	U977	U905	U755	G637	U488	U386	U	
A1615	U	U1552	U1180	U1307	C	U977	U906	U756	G638	U489	U387	U	
A1616	U	U1553	U1181	U1308	C	U977	U907	U757	G639	U490	U388	U	
A1617	U	U1554	U1182	U1309	C	U977	U908	U758	G640	U491	U389	U	
A1618	U	U1555	U1183	U1310	C	U977	U909	U759	G641	U492	U390	U	
A1619	U	U1556	U1184	U1311	C	U977	U910	U760	G642	U493	U391	U	
A1620	U	U1557	U1185	U1312	C	U977	U911	U761	G643	U494	U392	U	
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A1622	U	U1559	U1187	U1314	C	U977	U913	U763	G645	U496	U394	U	
A1623	U	U1560	U1188	U1315	C	U977	U914	U764	G646	U497	U395	U	
A1624	U	U1561	U1189	U1316	C	U977	U915	U765	G647	U498	U396	U	
A1625	U	U1562	U1190	U1317	C	U977	U916	U766	G648	U499	U397	U	
A1626	U	U1563	U1191	U1318	C	U977	U917	U767	G649	U500	U398	U	
A1627	U	U1564	U1192	U1319	C	U977	U918	U768	G650	U501	U399	U	
A1628	U	U1565	U1193	U1320	C	U977	U919	U769	G651	U502	U400	U	
A1629	U	U1566	U1194	U1321	C	U977	U920	U770	G652	U503	U401	U	
A1630	U	U1567	U1195	U1322	C	U977	U921	U771	G653	U504	U402	U	
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A1641	U	U1578	U1206	U1333	C	U977	U932	U782	G664	U515	U413	U	
A1642	U	U1579	U1207	U1334	C	U977	U933	U783	G665	U516	U414	U	
A1643	U	U1580	U1208	U1335	C	U977	U934	U784	G666	U517	U415	U	
A1644	U	U1581	U1209	U1336	C	U977	U935	U785	G667	U518	U416	U	
A1645	U	U1582	U1210	U1337	C	U977	U936	U786	G668	U519	U417	U	
A1646	U	U1583	U1211	U1338	C	U977	U937	U787	G669	U520	U418	U	
A1647	U	U1584	U1212	U1339	C	U977	U938	U788	G670	U521	U419	U	
A1648	U	U1585	U1213	U1340	C	U977	U939	U789	G671	U522	U420	U	
A1649	U	U1586	U1214	U1341	C	U977	U940	U790	G672	U523	U421	U	
A1650	U	U1587	U1215	U1342	C	U977	U941	U791	G673	U524	U422	U	
A1651	U	U1588	U1216	U1343	C	U977	U942	U792	G674	U525	U423	U	
A1652	U	U1589	U1217	U1344	C	U977	U943	U793	G675	U526	U424	U	
A1653	U	U1590	U1218	U1345	C	U977	U944	U794	G676	U527	U425	U	
A1654	U	U1591	U1219	U1346	C	U977	U945	U795	G677	U528	U426	U	
A1655	U	U1592	U1220	U1347	C	U977	U946	U796	G678	U529	U427	U	
A1656	U	U1593	U1221	U1348	C	U977	U947	U797	G679	U530	U428	U	
A1657	U	U1594	U1222	U1349	C	U977	U948	U798	G680	U531	U429	U	
A1658	U	U1595	U1223	U1350	C	U977	U949	U799	G681	U532	U430	U	
A1659	U	U1596	U1224	U1351	C	U977	U950	U800	G682	U533	U431	U	
A1660	U	U1597	U1225	U1352	C	U977	U951	U801	G683	U534	U432	U	
A1661	U	U1598	U1226	U1353	C	U977	U952	U802	G684	U535	U433	U	
A1662	U	U1599	U1227	U1354	C	U977	U953	U803	G685	U536	U434	U	
A1663	U	U1600	U1228	U1355	C	U977	U954	U804	G686	U537	U435	U	
A1664	U	U1601	U1229	U1356	C	U977	U955	U805	G687	U538	U436	U	
A1665	U	U1602	U1230	U1357	C	U977	U956	U806	G688	U539	U437	U	
A1666	U	U1603	U1231	U1358	C	U977	U957	U807	G689	U540	U438	U	
A1667	U	U1604	U1232	U1359	C	U977	U958	U808	G690	U541	U439	U	
A1668	U	U1605	U1233	U1360	C	U977	U959	U809	G691	U542	U440	U	
A1669	U	U1606	U1234	U1361	C	U977	U960	U810	G692	U543	U441	U	
A1670	U	U1607	U1235	U1362	C	U977	U961	U811	G693	U544	U442	U	
A1671	U	U1608	U1236	U1363	C	U977	U962	U812	G694	U545	U443	U	
A1672	U	U1609	U1237	U1364	C	U977	U963	U813	G695	U546	U444	U	
A1673	U	U1610	U1238	U1365	C	U977	U964	U814	G696	U547	U445	U	
A1674	U	U1611	U1239	U1366	C	U977	U965	U815	G697	U548	U446	U	
A1675	U	U1612	U1240	U1367	C	U977	U966	U816	G698	U549	U447	U	
A1676	U	U1613	U1241	U1368	C	U977	U967	U817	G699	U550	U448	U	
A1677	U	U1614	U1242	U1369	C	U977	U968	U818	G700	U551	U449	U	
A1678	U	U1615	U1243	U1370	C	U977	U969	U819	G701	U552	U450	U	
A1679	U	U1616	U1244	U1371	C	U977	U970	U820	G702	U553	U451	U	
A1680	U	U1617	U1245	U1372	C	U977	U971						




- Molecule 31: Small ribosomal subunit protein uS5

Chain Ae: 77% 16% 6%




- Molecule 32: Small ribosomal subunit protein bS6

Chain Af:  80% 17% .




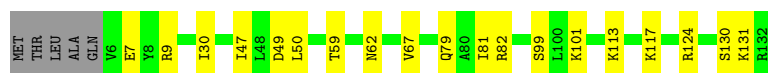
- Molecule 33: Small ribosomal subunit protein uS7

Chain Ag:  88% 10% ..



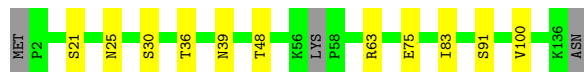
- Molecule 34: Small ribosomal subunit protein uS9

Chain Ai:  82% 14% .




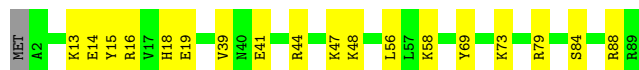
- Molecule 35: Small ribosomal subunit protein uS12

Chain Al:  90% 8% .




- Molecule 36: Small ribosomal subunit protein uS15

Chain Ao:  79% 20% .



- Molecule 37: Small ribosomal subunit protein bS16

Chain Ap:  82% 15% .



- Molecule 38: Small ribosomal subunit protein uS17

Chain Aq:  67% 18% 15%



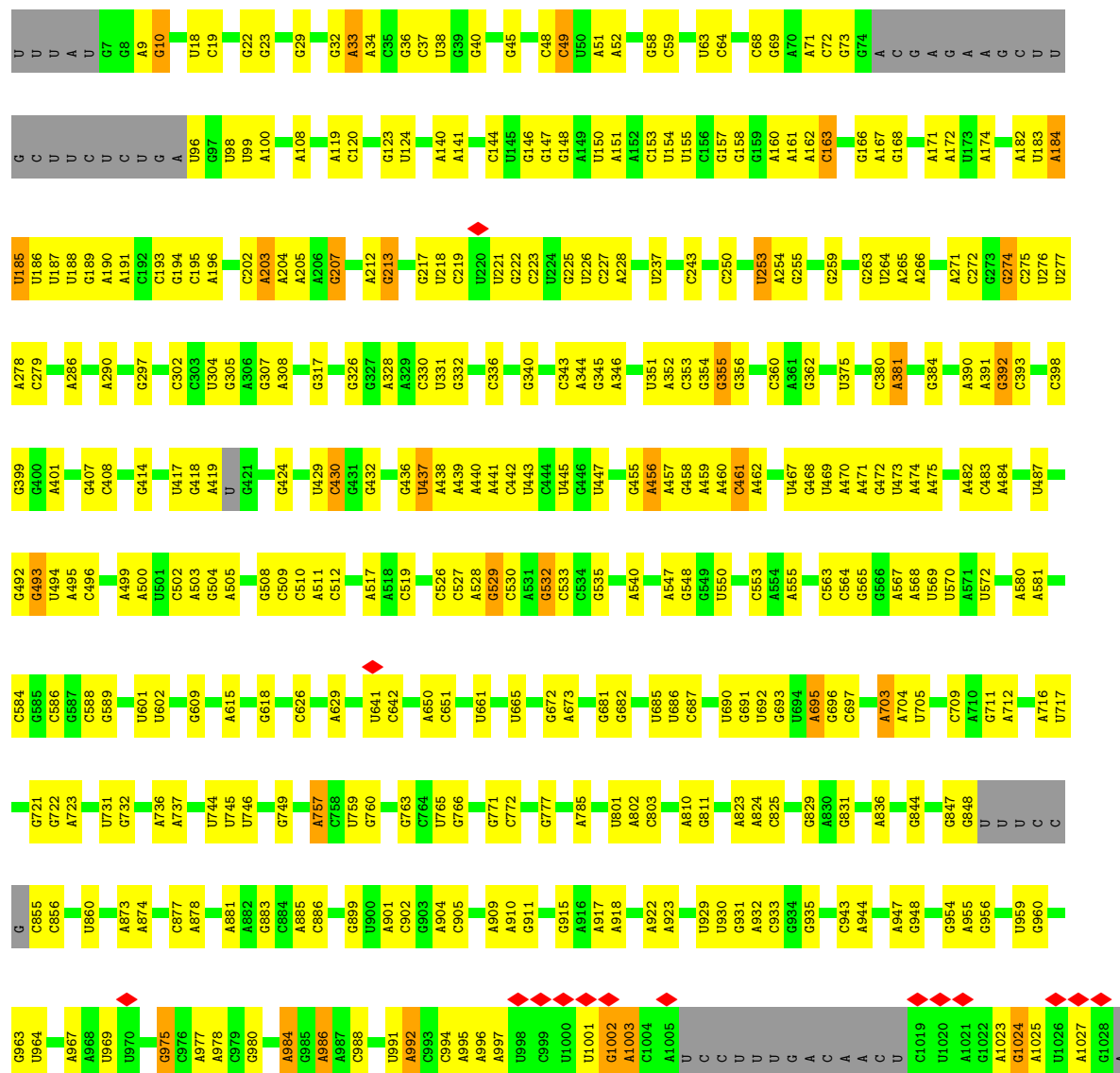
- Molecule 39: Small ribosomal subunit protein bS18

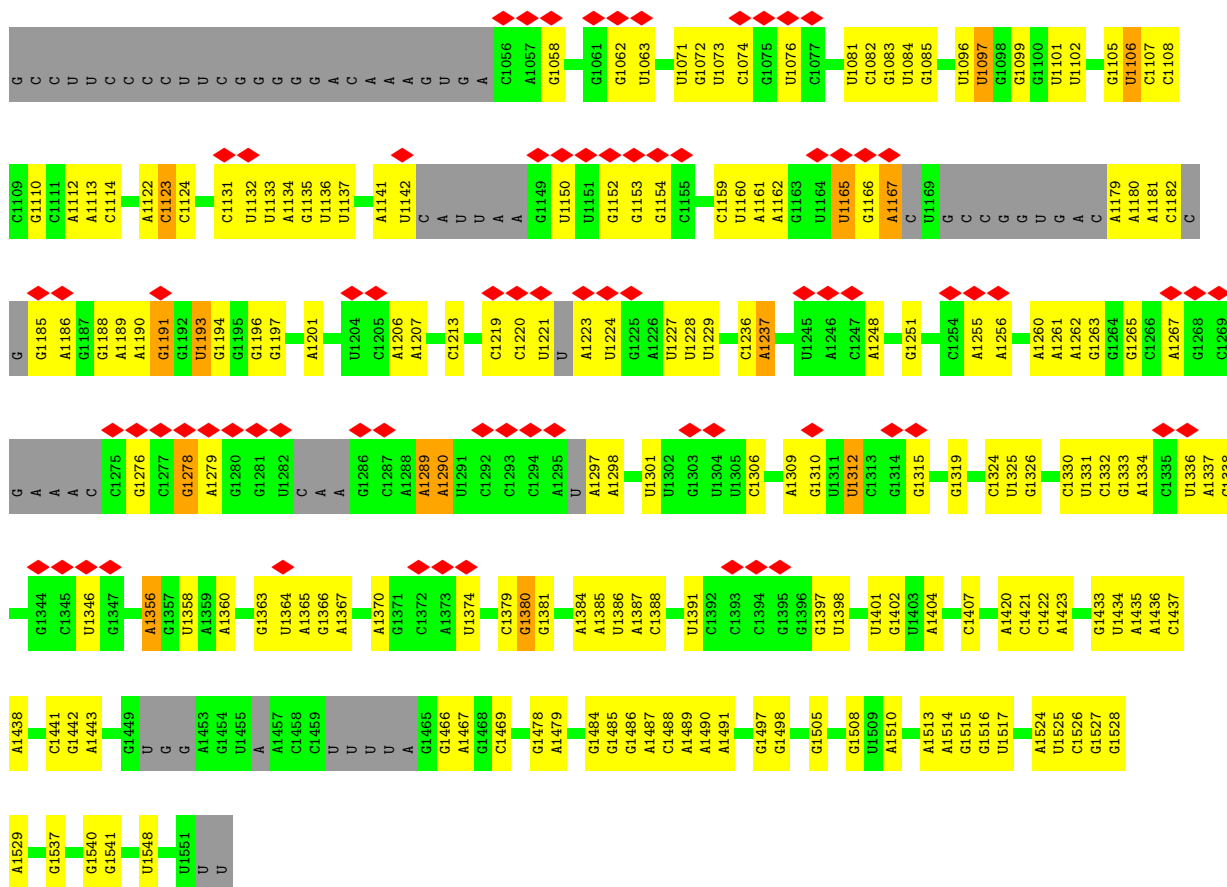


- Chain At:  84% 12% ..



- Chain Aa: 





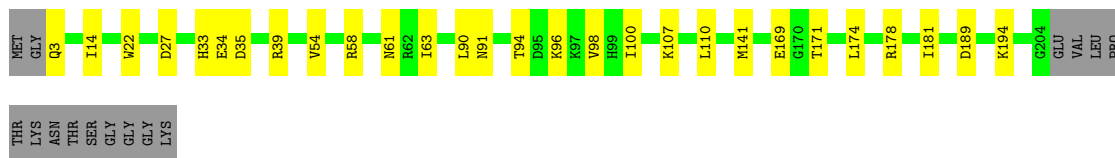
- Molecule 42: Small ribosomal subunit protein uS10

Chain Aj: 78% 15% 6%



- Molecule 43: Small ribosomal subunit protein uS3

Chain Ac: 80% 13% 7%



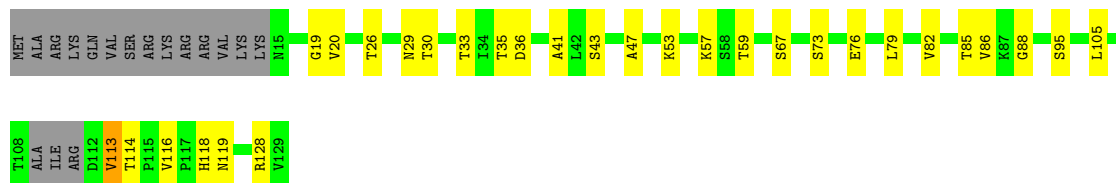
- Molecule 44: Small ribosomal subunit protein uS13

Chain Am: 76% 16% 6%




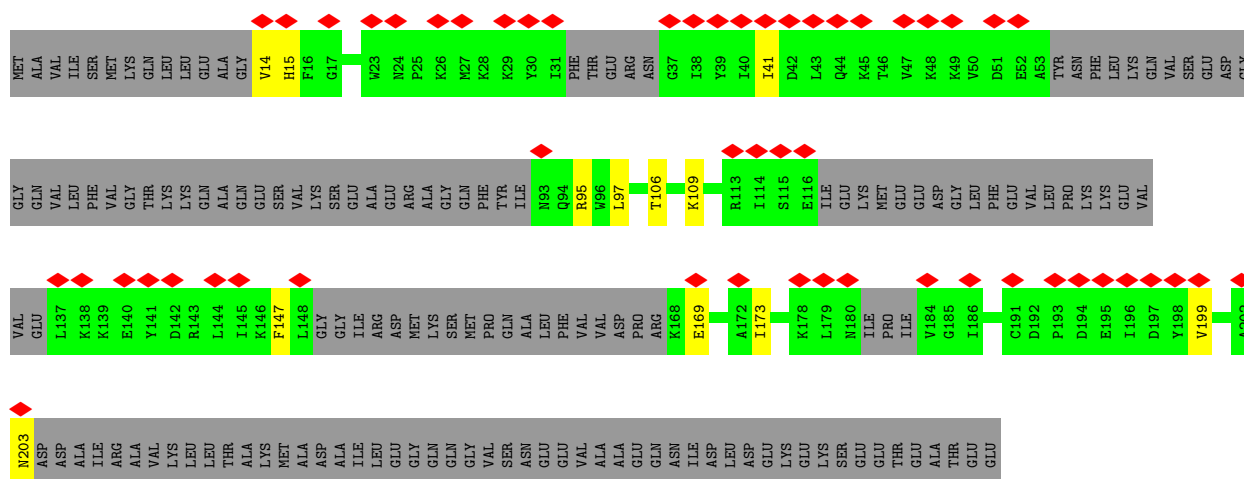
- Molecule 45: Small ribosomal subunit protein uS11

Chain Ak:  64% 22% 13%




- Molecule 46: Small ribosomal subunit protein uS2

Chain Ab:  21% 36% 5% 59%




- Molecule 47: Small ribosomal subunit protein uS8

Chain Ah:  82% 16% 2%




- Molecule 48: Small ribosomal subunit protein uS4

Chain Ad:  86% 13% 1%




- Molecule 49: Small ribosomal subunit protein uS14B

Chain An:  84% 15% 1%



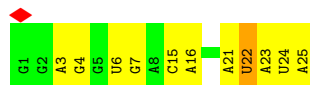
- Molecule 50: Small ribosomal subunit protein uS19

Chain As:  79% 10% 11%



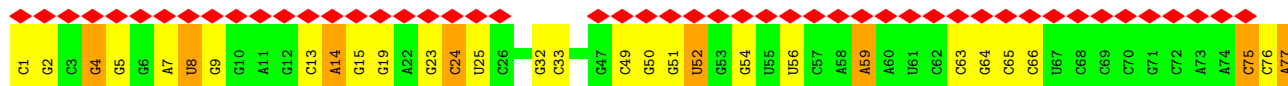
- Molecule 51: mRNA molecule

Chain d:  5% 42% 53% 5%



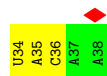
- Molecule 52: P-site tRNA molecule

Chain 8:  69% 58% 31% 11%



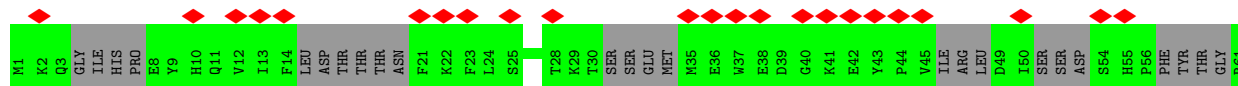
- Molecule 53: A-site tRNA molecule

Chain 9:  20% 40% 60%



- Molecule 54: Large ribosomal subunit protein bL31B

Chain 13:  27% 64% 32%



4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	408831	Depositor
Resolution determination method	OTHER	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	TFS KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	1.00	Depositor
Minimum defocus (nm)	500	Depositor
Maximum defocus (nm)	1800	Depositor
Magnification	Not provided	
Image detector	GATAN K3 BIOQUANTUM (6k x 4k)	Depositor
Maximum map value	67.143	Depositor
Minimum map value	-30.208	Depositor
Average map value	0.061	Depositor
Map value standard deviation	1.435	Depositor
Recommended contour level	3	Depositor
Map size (\AA)	362.56, 362.56, 362.56	wwPDB
Map dimensions	440, 440, 440	wwPDB
Map angles ($^\circ$)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (\AA)	0.824, 0.824, 0.824	Depositor

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: UR3, 2MG, G7M, 4OC, 5MU, H2U, MA6, PSU, ZN, MG, 5MC, K, EM1, OMG, 2MA

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	1	0.13	0/360	0.30	0/489
2	2	0.16	0/372	0.33	0/487
3	3	0.17	0/513	0.35	0/678
4	4	0.15	0/283	0.32	0/376
5	B	0.14	0/2692	0.27	0/4193
6	C	0.15	0/2072	0.33	0/2792
7	D	0.16	0/1606	0.39	0/2159
8	E	0.16	0/1533	0.33	0/2077
9	G	0.14	0/953	0.31	0/1301
10	H	0.19	0/1162	0.38	0/1566
11	I	0.15	0/871	0.33	0/1177
12	J	0.15	0/1071	0.35	0/1433
13	K	0.17	0/1048	0.35	0/1420
14	L	0.18	0/904	0.34	0/1209
15	M	0.15	0/810	0.32	0/1102
16	N	0.13	0/811	0.29	0/1099
17	O	0.19	0/955	0.35	0/1265
18	P	0.14	0/762	0.31	0/1025
19	Q	0.18	0/822	0.37	0/1113
20	R	0.15	0/671	0.33	0/904
21	S	0.14	0/642	0.31	0/868
22	T	0.14	0/606	0.32	0/828
23	U	0.15	0/581	0.34	0/776
24	V	0.13	0/363	0.31	0/489
25	W	0.11	0/474	0.24	0/637
26	X	0.16	0/440	0.34	0/594
27	Z	0.17	0/339	0.36	0/451
28	F	0.13	0/923	0.31	0/1260
29	11	0.13	0/358	0.24	0/552
30	A	0.19	0/61919	0.35	0/96529
31	Ae	0.19	0/1144	0.33	0/1547
32	Af	0.16	0/745	0.30	0/1006

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
33	Ag	0.24	0/1240	0.30	0/1668
34	Ai	0.24	0/991	0.31	0/1334
35	Al	0.21	0/1027	0.33	0/1381
36	Ao	0.18	0/736	0.29	0/984
37	Ap	0.24	0/690	0.38	0/934
38	Aq	0.19	0/558	0.36	0/753
39	Ar	0.19	0/452	0.30	0/604
40	At	0.21	0/593	0.26	0/794
41	Aa	0.26	0/34383	0.32	0/53582
42	Aj	0.23	0/729	0.35	0/986
43	Ac	0.25	0/1499	0.31	0/2036
44	Am	0.21	0/851	0.31	0/1145
45	Ak	0.14	0/772	0.28	0/1050
46	Ab	0.10	0/630	0.24	0/858
47	Ah	0.22	0/1044	0.32	0/1401
48	Ad	0.18	0/1532	0.29	0/2071
49	An	0.25	0/512	0.29	0/678
50	As	0.24	0/634	0.29	0/858
51	d	0.15	0/461	0.31	0/715
52	8	0.14	0/1695	0.27	0/2634
53	9	0.14	0/118	0.31	0/181
54	13	0.13	0/386	0.23	0/515
All	All	0.21	0/140338	0.33	0/210564

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts

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	1	355	0	316	4	0
2	2	368	0	409	5	0
3	3	508	0	544	5	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
4	4	280	0	302	4	0
5	B	2408	0	1217	34	0
6	C	2037	0	2106	11	0
7	D	1582	0	1604	12	0
8	E	1510	0	1533	14	0
9	G	944	0	636	10	0
10	H	1140	0	1130	10	0
11	I	865	0	886	9	0
12	J	1057	0	1084	6	0
13	K	1024	0	1023	8	0
14	L	901	0	942	8	0
15	M	801	0	712	12	0
16	N	800	0	767	7	0
17	O	943	0	1014	7	0
18	P	752	0	761	7	0
19	Q	814	0	854	9	0
20	R	664	0	666	5	0
21	S	635	0	605	6	0
22	T	600	0	540	5	0
23	U	575	0	568	2	0
24	V	360	0	353	4	0
25	W	473	0	472	4	0
26	X	438	0	472	2	0
27	Z	333	0	348	2	0
28	F	914	0	695	12	0
29	11	322	0	167	7	0
30	A	55514	0	27922	397	0
31	Ae	1130	0	1188	15	0
32	Af	734	0	705	10	0
33	Ag	1222	0	1255	12	0
34	Ai	975	0	979	12	0
35	Al	1011	0	1036	4	0
36	Ao	727	0	754	8	0
37	Ap	679	0	684	9	0
38	Aq	551	0	528	10	0
39	Ar	445	0	482	5	0
40	At	593	0	634	5	0
41	Aa	30880	0	15569	314	0
42	Aj	720	0	698	9	0
43	Ac	1477	0	1437	20	0
44	Am	845	0	865	17	0
45	Ak	759	0	706	14	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
46	Ab	629	0	463	6	0
47	Ah	1032	0	1082	13	0
48	Ad	1502	0	1440	16	0
49	An	502	0	523	8	0
50	As	617	0	591	7	0
51	d	412	0	207	5	0
52	8	1519	0	775	18	0
53	9	106	0	55	2	0
54	13	382	0	288	2	0
55	1	1	0	0	0	0
55	4	1	0	0	0	0
55	An	1	0	0	0	0
55	Z	1	0	0	0	0
56	A	170	0	0	0	0
56	Aa	59	0	0	0	0
56	C	1	0	0	0	0
56	D	1	0	0	0	0
57	A	60	0	65	0	0
58	A	15	0	0	0	0
58	Aa	3	0	0	0	0
59	A	574	0	0	1	0
59	Aa	15	0	0	0	0
59	C	16	0	0	0	0
59	D	2	0	0	0	0
59	J	7	0	0	0	0
59	N	3	0	0	0	0
59	O	2	0	0	0	0
59	P	1	0	0	0	0
59	R	1	0	0	0	0
All	All	130300	0	83657	1058	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 5.

The worst 5 of 1058 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)
44:Am:79:ARG:HH12	50:As:69:HIS:HE1	1.20	0.85
7:D:3:LYS:HD2	7:D:109:THR:HG22	1.58	0.85
30:A:788:A:O2'	30:A:1703:U:OP1	1.96	0.82
10:H:126:TYR:HH	10:H:133:HIS:HE2	1.23	0.81

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:B:87:U:H3	30:A:1002:U:H3	1.27	0.79

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	1	46/52 (88%)	45 (98%)	1 (2%)	0	100	100
2	2	42/45 (93%)	42 (100%)	0	0	100	100
3	3	63/66 (96%)	62 (98%)	1 (2%)	0	100	100
4	4	35/37 (95%)	35 (100%)	0	0	100	100
6	C	272/277 (98%)	269 (99%)	3 (1%)	0	100	100
7	D	213/220 (97%)	203 (95%)	10 (5%)	0	100	100
8	E	204/207 (99%)	201 (98%)	3 (2%)	0	100	100
9	G	152/178 (85%)	133 (88%)	19 (12%)	0	100	100
10	H	143/145 (99%)	138 (96%)	5 (4%)	0	100	100
11	I	120/122 (98%)	117 (98%)	3 (2%)	0	100	100
12	J	144/146 (99%)	140 (97%)	4 (3%)	0	100	100
13	K	135/144 (94%)	133 (98%)	2 (2%)	0	100	100
14	L	114/122 (93%)	112 (98%)	2 (2%)	0	100	100
15	M	117/119 (98%)	111 (95%)	6 (5%)	0	100	100
16	N	107/116 (92%)	105 (98%)	2 (2%)	0	100	100
17	O	114/118 (97%)	112 (98%)	2 (2%)	0	100	100
18	P	100/102 (98%)	99 (99%)	1 (1%)	0	100	100
19	Q	109/117 (93%)	108 (99%)	1 (1%)	0	100	100
20	R	87/91 (96%)	85 (98%)	2 (2%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
21	S	89/105 (85%)	83 (93%)	6 (7%)	0	100	100
22	T	86/217 (40%)	83 (96%)	3 (4%)	0	100	100
23	U	77/94 (82%)	75 (97%)	2 (3%)	0	100	100
24	V	46/62 (74%)	46 (100%)	0	0	100	100
25	W	62/73 (85%)	59 (95%)	3 (5%)	0	100	100
26	X	56/59 (95%)	54 (96%)	2 (4%)	0	100	100
27	Z	40/57 (70%)	40 (100%)	0	0	100	100
28	F	139/179 (78%)	130 (94%)	9 (6%)	0	100	100
31	Ae	154/166 (93%)	147 (96%)	7 (4%)	0	100	100
32	Af	93/98 (95%)	89 (96%)	4 (4%)	0	100	100
33	Ag	152/156 (97%)	151 (99%)	1 (1%)	0	100	100
34	Ai	125/132 (95%)	119 (95%)	6 (5%)	0	100	100
35	Al	130/137 (95%)	124 (95%)	6 (5%)	0	100	100
36	Ao	86/89 (97%)	85 (99%)	1 (1%)	0	100	100
37	Ap	87/91 (96%)	82 (94%)	5 (6%)	0	100	100
38	Aq	70/87 (80%)	64 (91%)	6 (9%)	0	100	100
39	Ar	52/80 (65%)	51 (98%)	1 (2%)	0	100	100
40	At	79/83 (95%)	76 (96%)	3 (4%)	0	100	100
42	Aj	90/102 (88%)	86 (96%)	4 (4%)	0	100	100
43	Ac	200/217 (92%)	194 (97%)	6 (3%)	0	100	100
44	Am	112/121 (93%)	109 (97%)	3 (3%)	0	100	100
45	Ak	108/129 (84%)	106 (98%)	2 (2%)	0	100	100
46	Ab	92/255 (36%)	87 (95%)	5 (5%)	0	100	100
47	Ah	129/132 (98%)	124 (96%)	5 (4%)	0	100	100
48	Ad	197/200 (98%)	190 (96%)	7 (4%)	0	100	100
49	An	58/61 (95%)	58 (100%)	0	0	100	100
50	As	80/92 (87%)	79 (99%)	1 (1%)	0	100	100
54	13	43/84 (51%)	42 (98%)	1 (2%)	0	100	100
All	All	5049/5782 (87%)	4883 (97%)	166 (3%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains ⓘ

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	1	33/50 (66%)	33 (100%)	0	100	100
2	2	38/40 (95%)	38 (100%)	0	100	100
3	3	51/57 (90%)	51 (100%)	0	100	100
4	4	31/35 (89%)	31 (100%)	0	100	100
6	C	206/224 (92%)	205 (100%)	1 (0%)	86	93
7	D	160/177 (90%)	158 (99%)	2 (1%)	65	77
8	E	150/169 (89%)	148 (99%)	2 (1%)	65	77
9	G	44/155 (28%)	44 (100%)	0	100	100
10	H	121/123 (98%)	121 (100%)	0	100	100
11	I	85/100 (85%)	85 (100%)	0	100	100
12	J	100/112 (89%)	100 (100%)	0	100	100
13	K	95/119 (80%)	95 (100%)	0	100	100
14	L	88/102 (86%)	87 (99%)	1 (1%)	70	81
15	M	57/95 (60%)	56 (98%)	1 (2%)	54	67
16	N	73/102 (72%)	72 (99%)	1 (1%)	62	75
17	O	96/98 (98%)	96 (100%)	0	100	100
18	P	73/86 (85%)	72 (99%)	1 (1%)	62	75
19	Q	80/94 (85%)	79 (99%)	1 (1%)	65	77
20	R	66/82 (80%)	66 (100%)	0	100	100
21	S	54/90 (60%)	51 (94%)	3 (6%)	17	20
22	T	49/190 (26%)	48 (98%)	1 (2%)	50	63
23	U	53/75 (71%)	53 (100%)	0	100	100
24	V	32/52 (62%)	29 (91%)	3 (9%)	7	6
25	W	42/66 (64%)	41 (98%)	1 (2%)	44	56
26	X	49/53 (92%)	49 (100%)	0	100	100
27	Z	37/50 (74%)	35 (95%)	2 (5%)	18	21

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
28	F	54/158 (34%)	48 (89%)	6 (11%)	5	4
31	Ae	114/131 (87%)	107 (94%)	7 (6%)	15	17
32	Af	68/86 (79%)	66 (97%)	2 (3%)	37	48
33	Ag	129/132 (98%)	125 (97%)	4 (3%)	35	45
34	Ai	97/109 (89%)	94 (97%)	3 (3%)	35	45
35	Al	106/119 (89%)	99 (93%)	7 (7%)	14	15
36	Ao	78/81 (96%)	74 (95%)	4 (5%)	20	24
37	Ap	69/77 (90%)	68 (99%)	1 (1%)	62	75
38	Aq	50/82 (61%)	47 (94%)	3 (6%)	16	18
39	Ar	48/68 (71%)	43 (90%)	5 (10%)	5	5
40	At	61/69 (88%)	56 (92%)	5 (8%)	9	8
42	Aj	72/91 (79%)	69 (96%)	3 (4%)	25	32
43	Ac	135/175 (77%)	134 (99%)	1 (1%)	81	89
44	Am	82/104 (79%)	77 (94%)	5 (6%)	15	17
45	Ak	70/104 (67%)	58 (83%)	12 (17%)	1	1
46	Ab	32/221 (14%)	30 (94%)	2 (6%)	15	16
47	Ah	112/113 (99%)	109 (97%)	3 (3%)	40	51
48	Ad	142/175 (81%)	136 (96%)	6 (4%)	25	32
49	An	52/53 (98%)	52 (100%)	0	100	100
50	As	59/80 (74%)	59 (100%)	0	100	100
54	13	22/75 (29%)	22 (100%)	0	100	100
All	All	3615/4899 (74%)	3516 (97%)	99 (3%)	41	51

5 of 99 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
39	Ar	24	THR
44	Am	7	VAL
39	Ar	31	THR
40	At	51	SER
44	Am	114	LYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 48 such sidechains are listed below:

Mol	Chain	Res	Type
33	Ag	19	ASN
36	Ao	9	ASN
33	Ag	130	ASN
34	Ai	128	GLN
40	At	3	ASN

5.3.3 RNA ⓘ

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
29	11	13/15 (86%)	5 (38%)	0
30	A	2562/2923 (87%)	303 (11%)	9 (0%)
41	Aa	1423/1552 (91%)	171 (12%)	0
5	B	112/115 (97%)	15 (13%)	0
51	d	17/19 (89%)	3 (17%)	0
52	8	67/71 (94%)	13 (19%)	0
53	9	4/5 (80%)	1 (25%)	0
All	All	4198/4700 (89%)	511 (12%)	9 (0%)

5 of 511 RNA backbone outliers are listed below:

Mol	Chain	Res	Type
5	B	10	U
5	B	11	A
5	B	23	U
5	B	30	U
5	B	33	U

5 of 9 RNA pucker outliers are listed below:

Mol	Chain	Res	Type
30	A	1905	G
30	A	2783	U
30	A	793	G
30	A	809	A
30	A	1157	U

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

17 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
41	MA6	Aa	1530	41	18,26,27	0.75	0	19,38,41	0.73	0
30	2MA	A	2530	30,56	19,25,26	1.06	2 (10%)	21,37,40	3.02	4 (19%)
41	MA6	Aa	1529	41	18,26,27	0.77	0	19,38,41	0.75	0
41	UR3	Aa	1509	41	19,22,23	0.30	0	26,32,35	0.37	0
30	5MU	A	1966	30	19,22,23	0.51	0	28,32,35	0.49	0
30	2MG	A	2472	30	18,26,27	0.92	1 (5%)	16,38,41	0.66	0
41	2MG	Aa	975	41	18,26,27	0.98	2 (11%)	16,38,41	0.67	0
30	PSU	A	2632	30	18,21,22	0.48	0	22,30,33	0.61	0
30	PSU	A	2607	30	18,21,22	0.61	1 (5%)	22,30,33	0.75	1 (4%)
30	5MU	A	792	30	19,22,23	0.44	0	28,32,35	0.65	0
30	OMG	A	2278	30,52	18,26,27	0.94	1 (5%)	19,38,41	0.59	0
30	H2U	A	2476	30	18,21,22	0.49	0	21,30,33	0.86	1 (4%)
30	G7M	A	2601	30,56	20,26,27	0.55	0	17,39,42	0.33	0
41	G7M	Aa	535	41	20,26,27	0.59	0	17,39,42	0.48	0
30	PSU	A	2484	30	18,21,22	0.52	0	22,30,33	0.59	0
41	5MC	Aa	976	41	18,22,23	0.28	0	26,32,35	0.43	0
41	4OC	Aa	1412	41	20,23,24	0.32	0	26,32,35	0.54	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
41	MA6	Aa	1530	41	-	2/7/29/30	0/3/3/3
30	2MA	A	2530	30,56	-	2/3/25/26	0/3/3/3
41	MA6	Aa	1529	41	-	0/7/29/30	0/3/3/3
41	UR3	Aa	1509	41	-	0/7/25/26	0/2/2/2
30	5MU	A	1966	30	-	0/7/25/26	0/2/2/2
30	2MG	A	2472	30	-	0/5/27/28	0/3/3/3
41	2MG	Aa	975	41	-	0/5/27/28	0/3/3/3
30	PSU	A	2632	30	-	0/7/25/26	0/2/2/2
30	PSU	A	2607	30	-	0/7/25/26	0/2/2/2
30	5MU	A	792	30	-	0/7/25/26	0/2/2/2
30	OMG	A	2278	30,52	-	1/5/27/28	0/3/3/3

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
30	H2U	A	2476	30	-	0/7/38/39	0/2/2/2
30	G7M	A	2601	30,56	-	0/3/25/26	0/3/3/3
41	G7M	Aa	535	41	-	2/3/25/26	0/3/3/3
30	PSU	A	2484	30	-	0/7/25/26	0/2/2/2
41	5MC	Aa	976	41	-	0/7/25/26	0/2/2/2
41	4OC	Aa	1412	41	-	0/9/29/30	0/2/2/2

The worst 5 of 7 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
41	Aa	975	2MG	C5-C6	-2.51	1.42	1.47
30	A	2530	2MA	C6-N6	-2.35	1.25	1.34
30	A	2278	OMG	C5-C6	-2.32	1.42	1.47
30	A	2607	PSU	O4'-C1'	-2.17	1.40	1.43
30	A	2530	2MA	C6-N1	2.11	1.37	1.33

The worst 5 of 6 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
30	A	2530	2MA	C5-C6-N1	-12.10	113.06	121.01
30	A	2530	2MA	C2-N3-C4	-4.06	112.22	115.52
30	A	2530	2MA	C2-N1-C6	3.60	123.70	118.08
30	A	2607	PSU	O4'-C1'-C2'	2.57	108.77	105.14
30	A	2530	2MA	N6-C6-N1	2.50	123.87	117.07

There are no chirality outliers.

5 of 7 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
41	Aa	535	G7M	O4'-C4'-C5'-O5'
41	Aa	535	G7M	C3'-C4'-C5'-O5'
30	A	2278	OMG	C1'-C2'-O2'-CM2
41	Aa	1530	MA6	O4'-C4'-C5'-O5'
41	Aa	1530	MA6	C3'-C4'-C5'-O5'

There are no ring outliers.

5 monomers are involved in 5 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
30	A	2530	2MA	1	0
41	Aa	1529	MA6	1	0

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Mol	Chain	Res	Type	Clashes	Symm-Clashes
41	Aa	975	2MG	1	0
30	A	2278	OMG	1	0
30	A	2601	G7M	1	0

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 254 ligands modelled in this entry, 253 are monoatomic - leaving 1 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	$\# Z > 2$
57	EM1	A	3001	-	58,64,64	0.51	0	71,97,97	0.42	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
57	EM1	A	3001	-	-	1/71/112/112	0/4/5/5

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

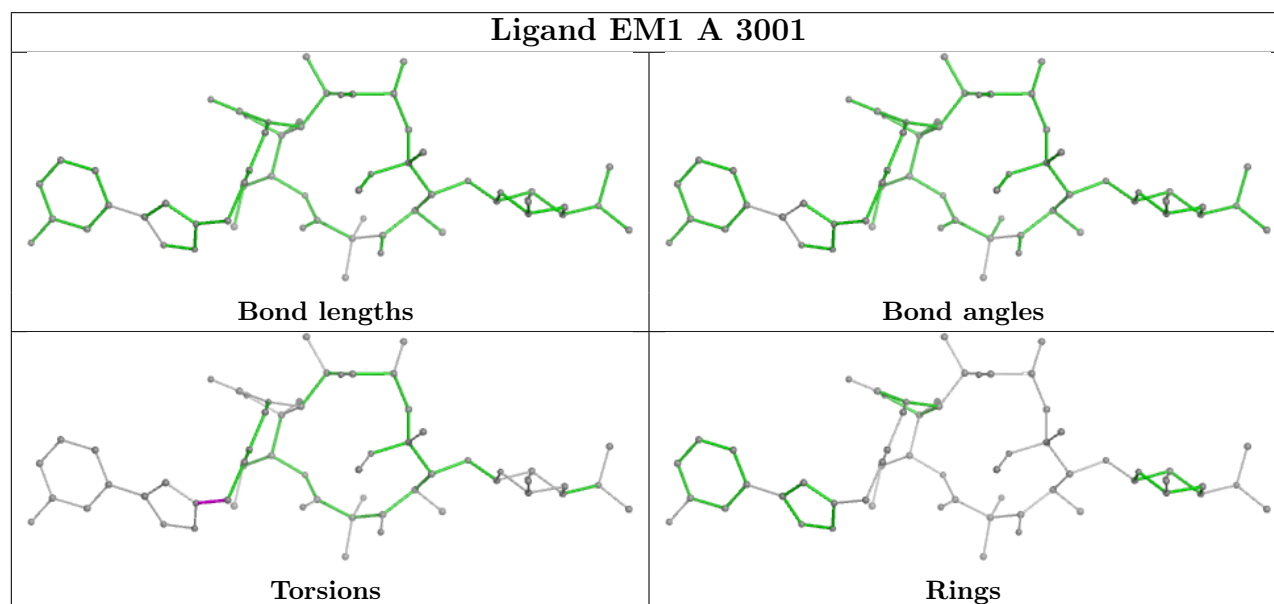
All (1) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
57	A	3001	EM1	C84-C83-N80-N81

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 than 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](#)

The following chains have linkage breaks:

Mol	Chain	Number of breaks
52	8	3
51	d	1
29	11	1

All chain breaks are listed below:

Model	Chain	Residue-1	Atom-1	Residue-2	Atom-2	Distance (Å)
1	d	8:A	O3'	15:C	P	14.91
1	11	6:A	O3'	68:C	P	14.41
1	8	19:G	O3'	22:A	P	10.42
1	8	15:G	O3'	19:G	P	8.49
1	8	47:G	O3'	49:C	P	6.61

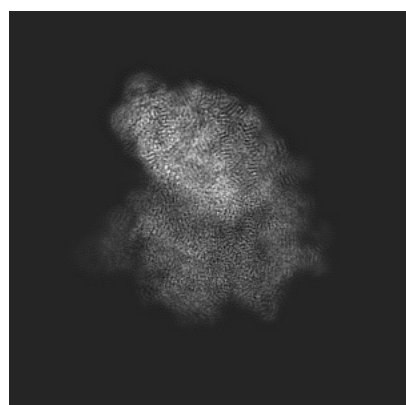
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-53066. These allow visual inspection of the internal detail of the map and identification of artifacts.

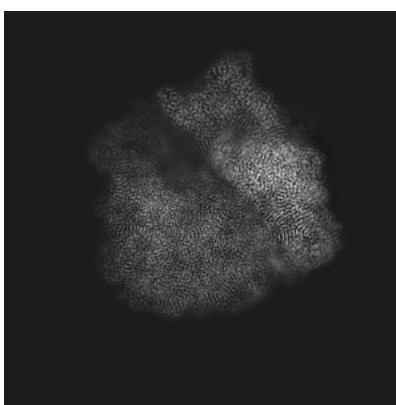
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

6.1 Orthogonal projections [i](#)

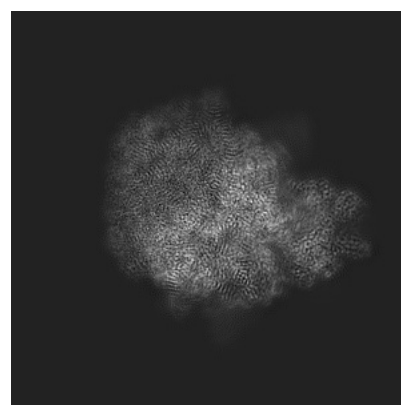
6.1.1 Primary map



X



Y

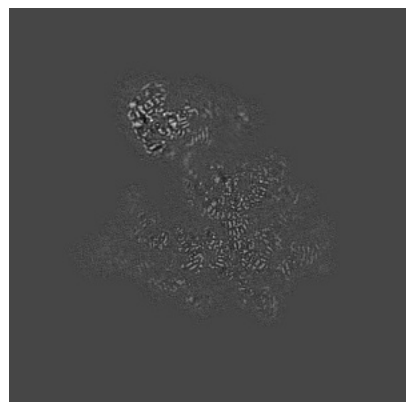


Z

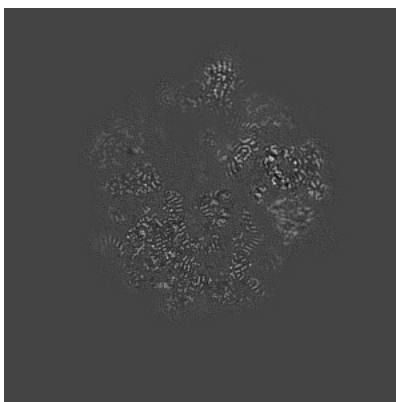
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

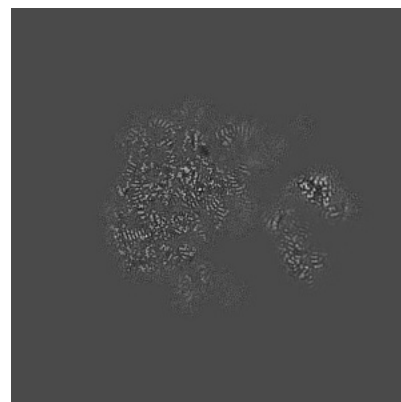
6.2.1 Primary map



X Index: 220



Y Index: 220



Z Index: 220

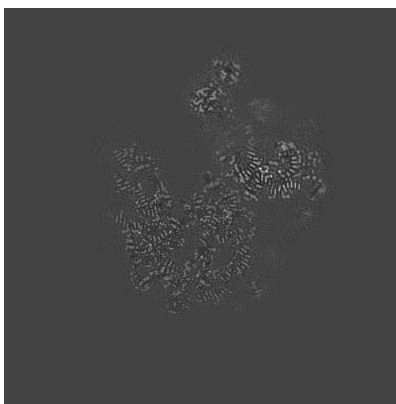
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

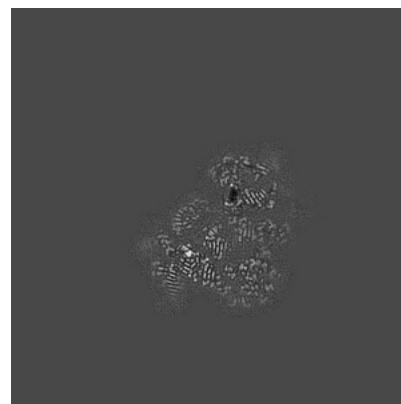
6.3.1 Primary map



X Index: 192



Y Index: 235

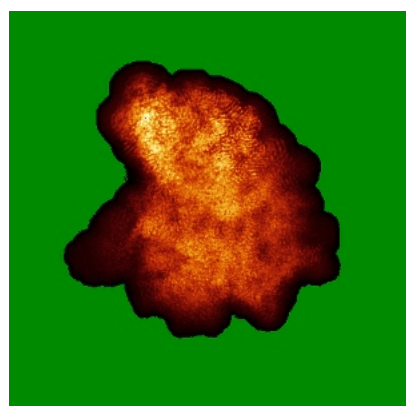


Z Index: 318

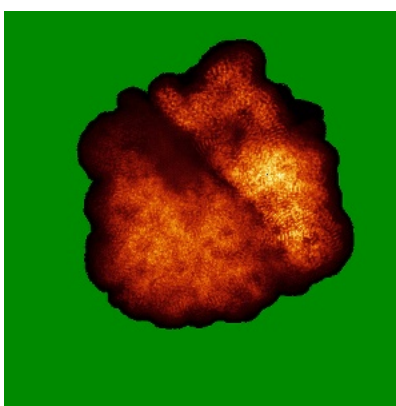
The images above show the largest variance slices of the map in three orthogonal directions.

6.4 Orthogonal standard-deviation projections (False-color) [i](#)

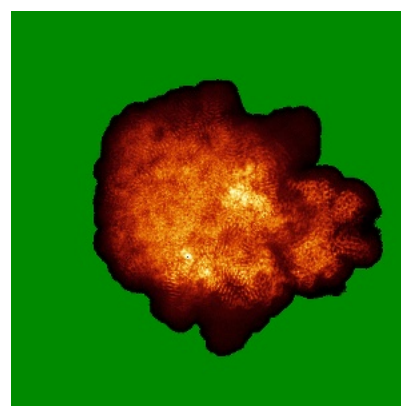
6.4.1 Primary map



X



Y

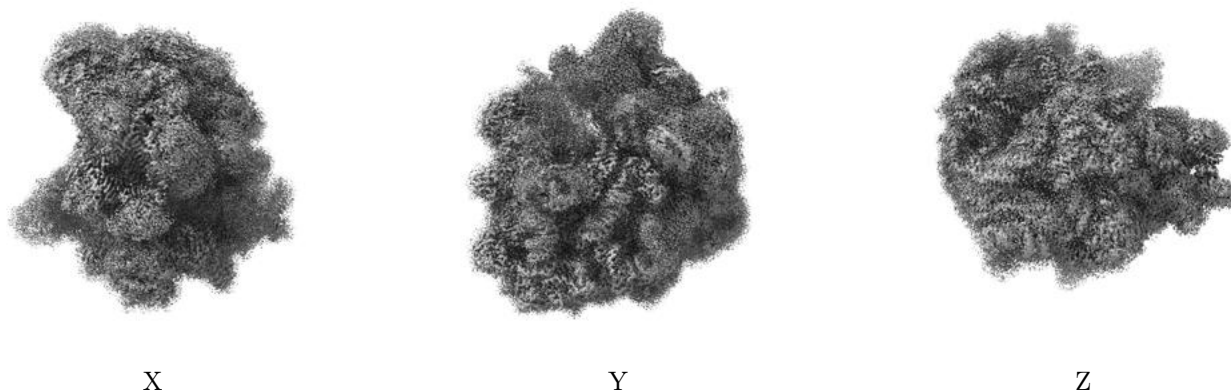


Z

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



The images above show the 3D surface view of the map at the recommended contour level 3.0. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

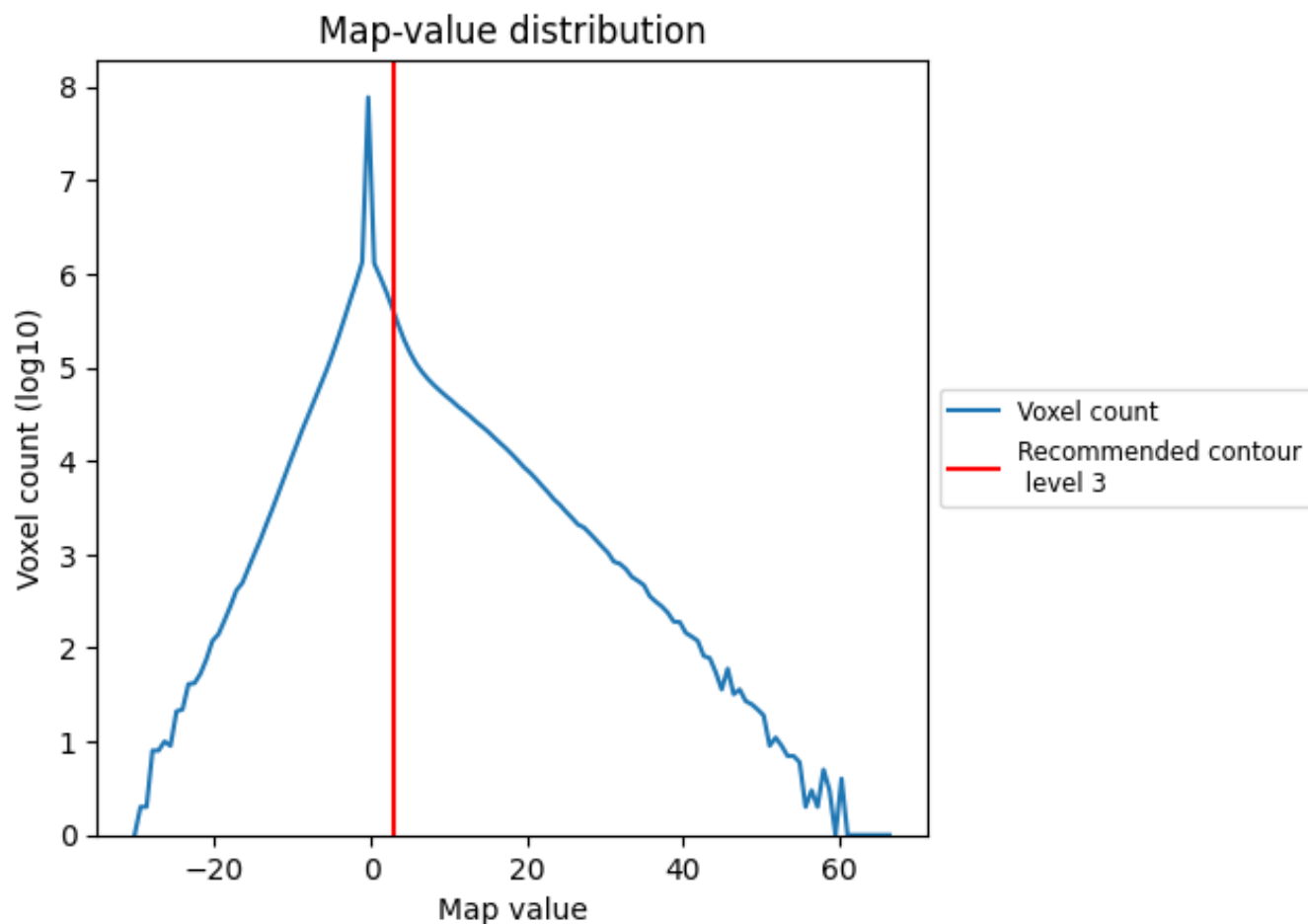
6.6 Mask visualisation [i](#)

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

7 Map analysis [i](#)

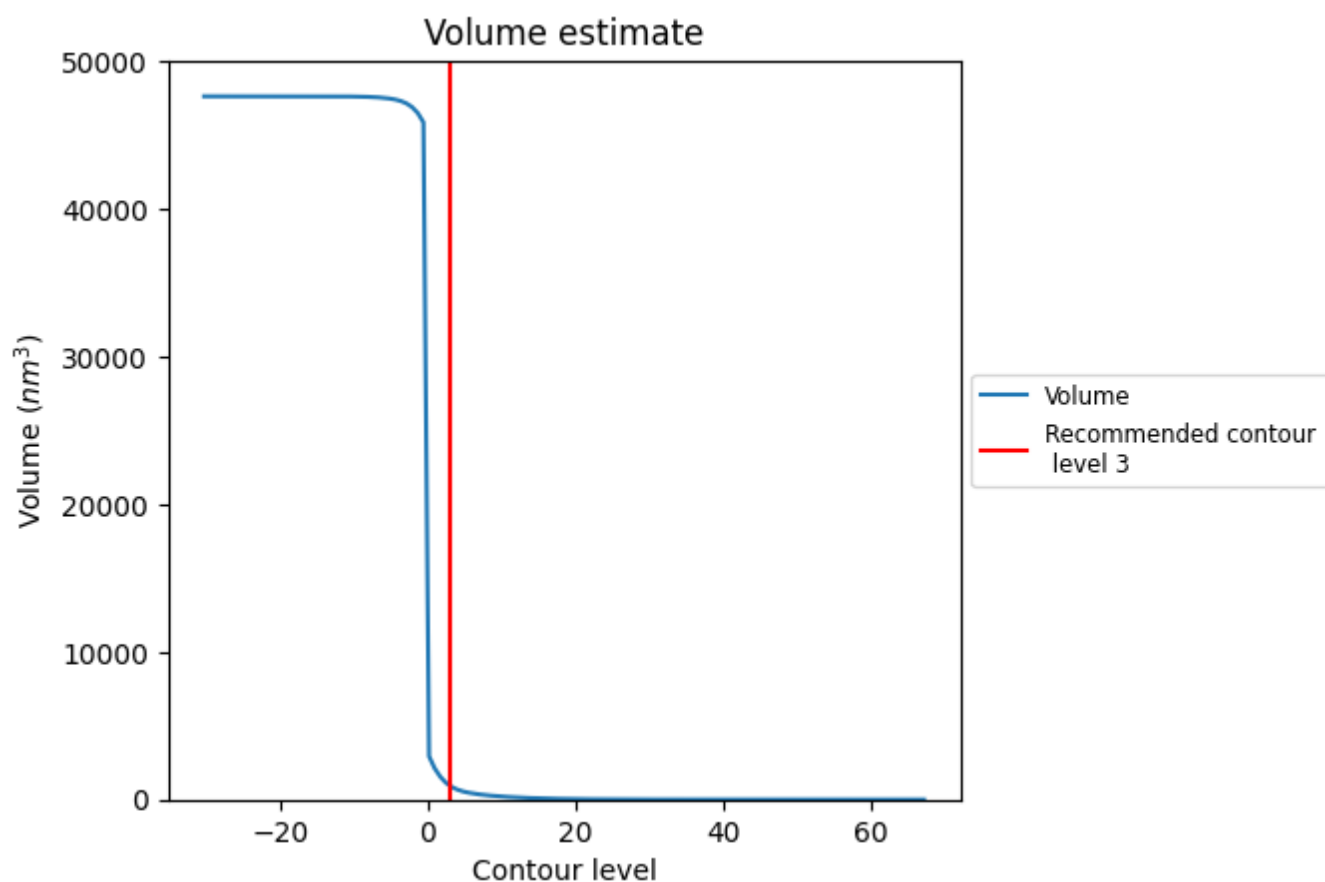
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution [i](#)



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.

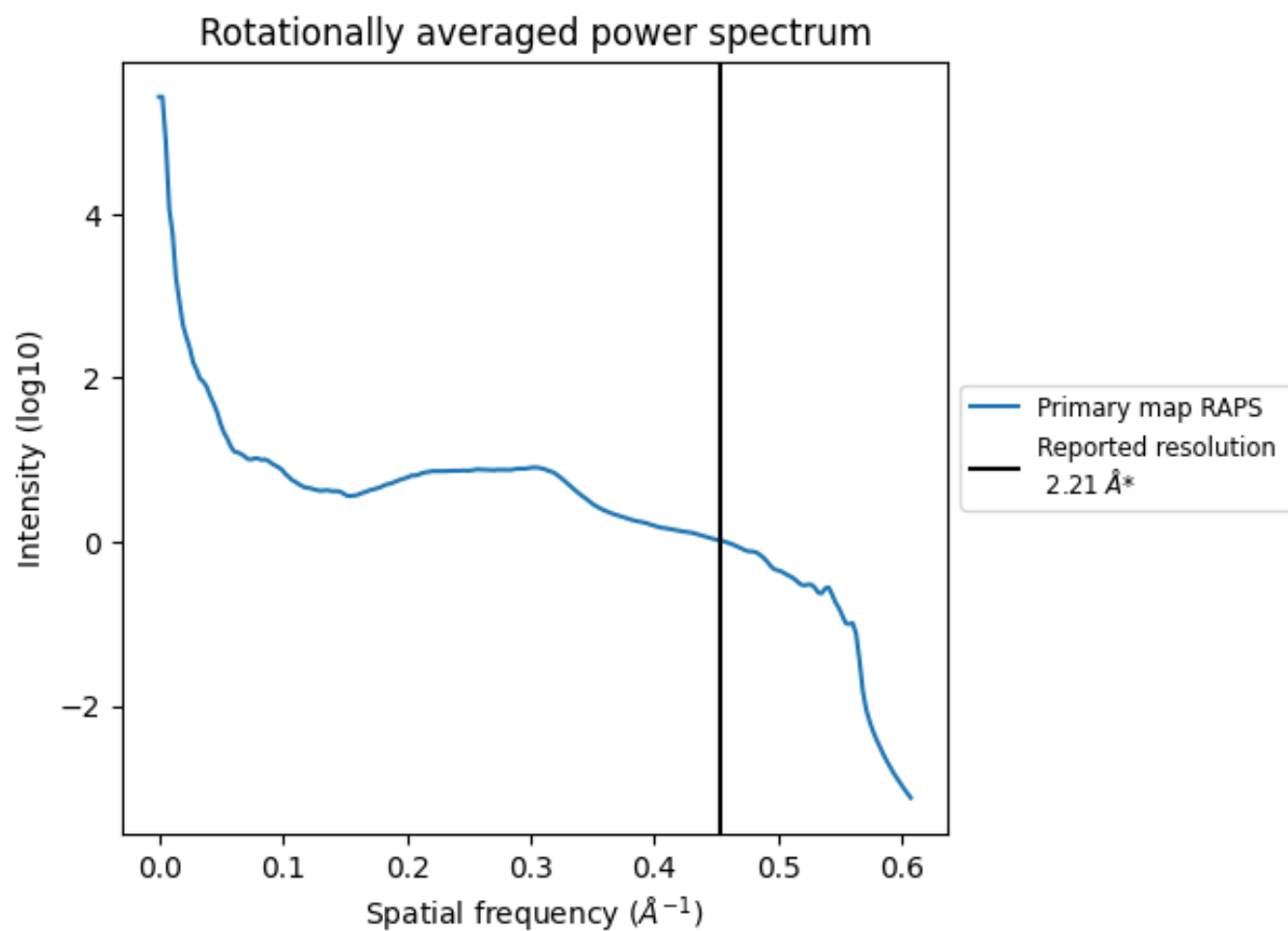
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 955 nm³; this corresponds to an approximate mass of 863 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 ⓘ



*Reported resolution corresponds to spatial frequency of 0.452 Å⁻¹

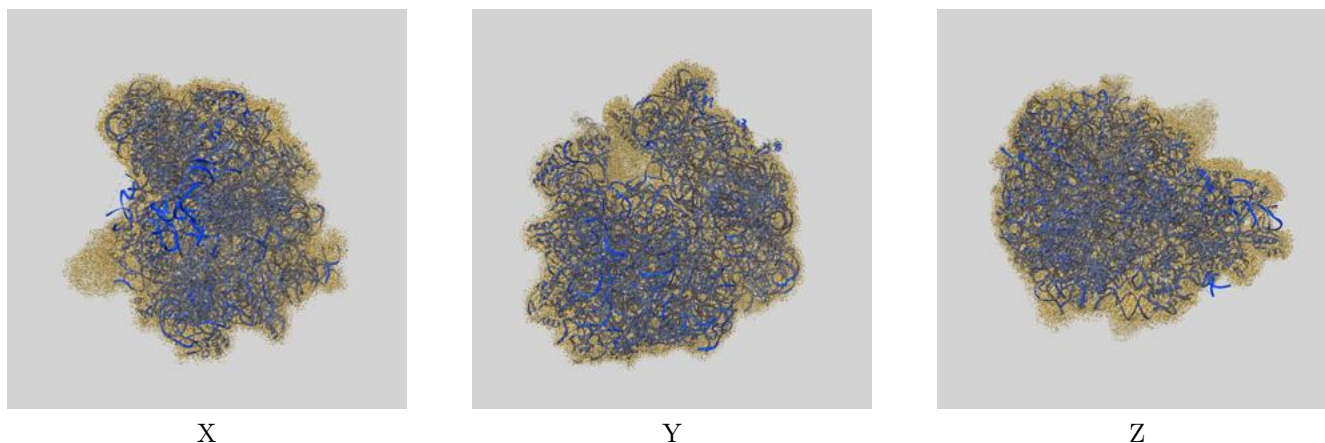
8 Fourier-Shell correlation

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

9 Map-model fit [i](#)

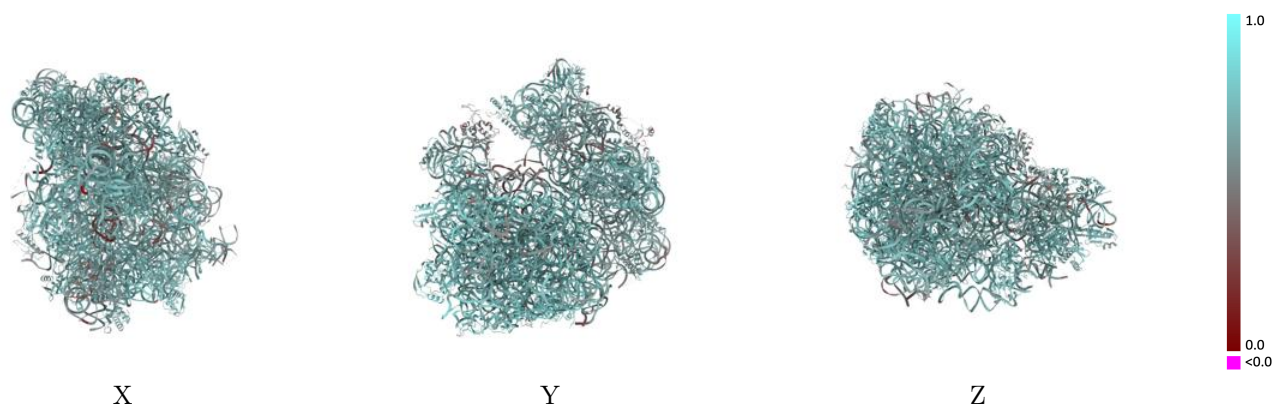
This section contains information regarding the fit between EMDB map EMD-53066 and PDB model 9QEG. Per-residue inclusion information can be found in section [3](#) on page [15](#).

9.1 Map-model overlay [i](#)



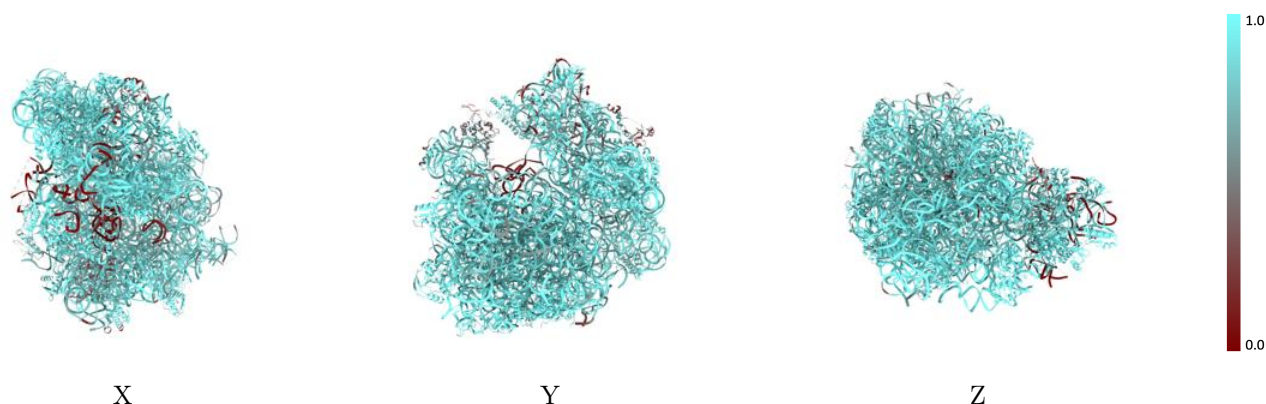
The images above show the 3D surface view of the map at the recommended contour level 3.0 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

9.2 Q-score mapped to coordinate model [i](#)



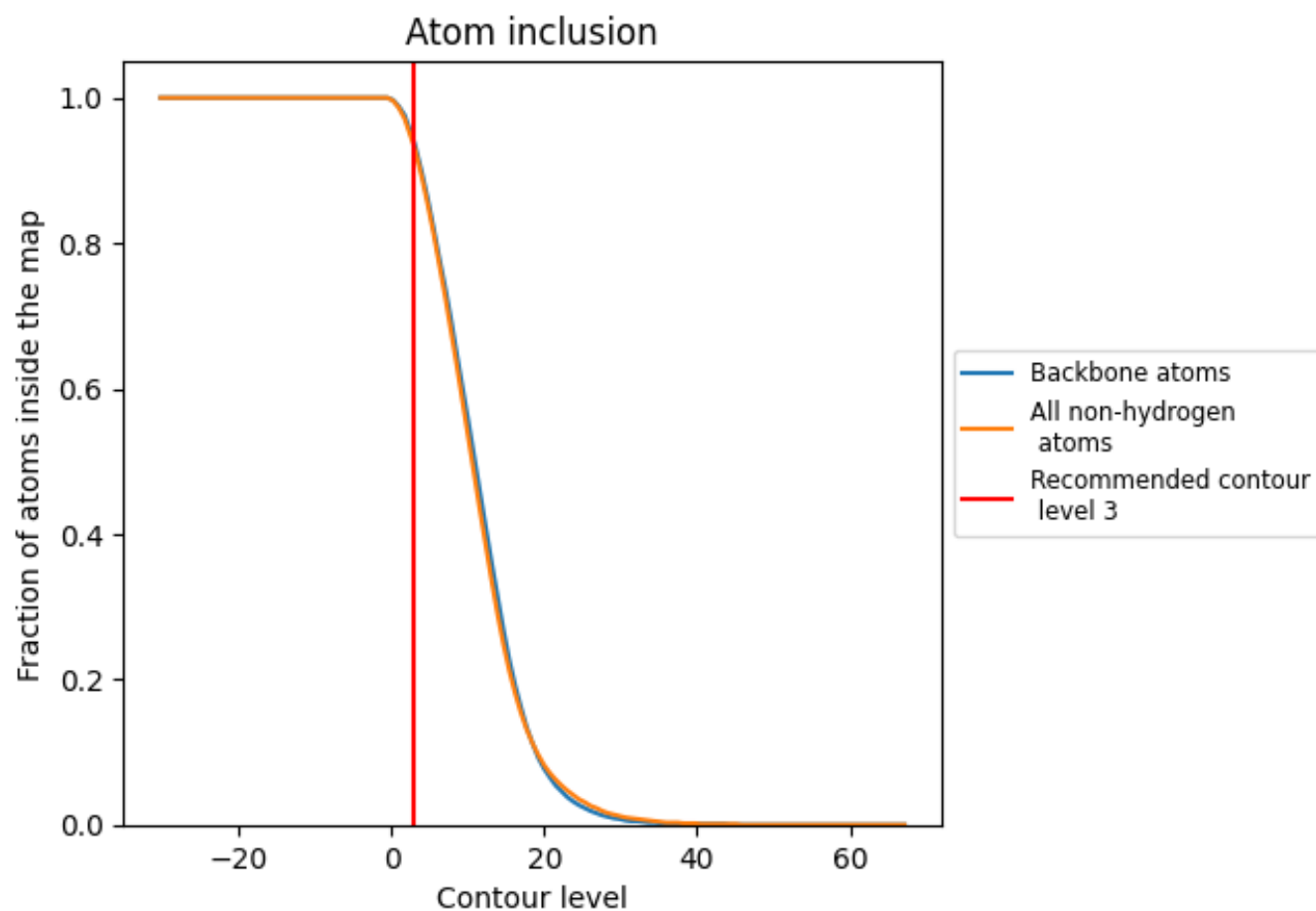
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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](#)



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 (3).







































































9.4 Atom inclusion ⓘ



At the recommended contour level, 94% of all backbone atoms, 93% 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 (3) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.9320	 0.7030
1	 0.8840	 0.6800
11	 0.2360	 0.4530
13	 0.6190	 0.5520
2	 0.9910	 0.8090
3	 0.9960	 0.7950
4	 0.9750	 0.7430
8	 0.3500	 0.4210
9	 0.5470	 0.4800
A	 0.9580	 0.7340
Aa	 0.9110	 0.6620
Ab	 0.4820	 0.5090
Ac	 0.9930	 0.6940
Ad	 0.9880	 0.6740
Ae	 0.9710	 0.6700
Af	 0.9590	 0.6110
Ag	 0.9770	 0.6760
Ah	 0.9850	 0.7030
Ai	 0.9950	 0.7020
Aj	 0.9890	 0.6800
Ak	 0.9560	 0.5860
Al	 0.9910	 0.7080
Am	 0.9900	 0.7040
An	 0.9920	 0.7280
Ao	 0.9800	 0.6920
Ap	 0.9830	 0.7060
Aq	 0.9890	 0.6450
Ar	 0.9910	 0.6890
As	 0.9980	 0.7180
At	 0.9900	 0.6940
B	 0.8760	 0.6300
C	 0.9890	 0.7810
D	 0.9890	 0.7830
E	 0.9670	 0.7630
F	 0.5770	 0.5070



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Chain	Atom inclusion	Q-score
G	 0.7990	 0.6130
H	 0.9750	 0.7770
I	 0.9800	 0.7680
J	 0.9640	 0.7500
K	 0.9810	 0.7680
L	 0.9860	 0.7830
M	 0.8780	 0.6560
N	 0.9760	 0.7650
O	 0.9870	 0.7910
P	 0.9740	 0.7720
Q	 0.9790	 0.7880
R	 0.9680	 0.7520
S	 0.9220	 0.6950
T	 0.8980	 0.6790
U	 0.9780	 0.7810
V	 0.8850	 0.7030
W	 0.9300	 0.7170
X	 0.9650	 0.7680
Z	 0.9350	 0.7500
d	 0.7430	 0.4670