



wwPDB EM Validation Summary Report ⓘ

Mar 6, 2026 – 11:46 PM UTC

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:

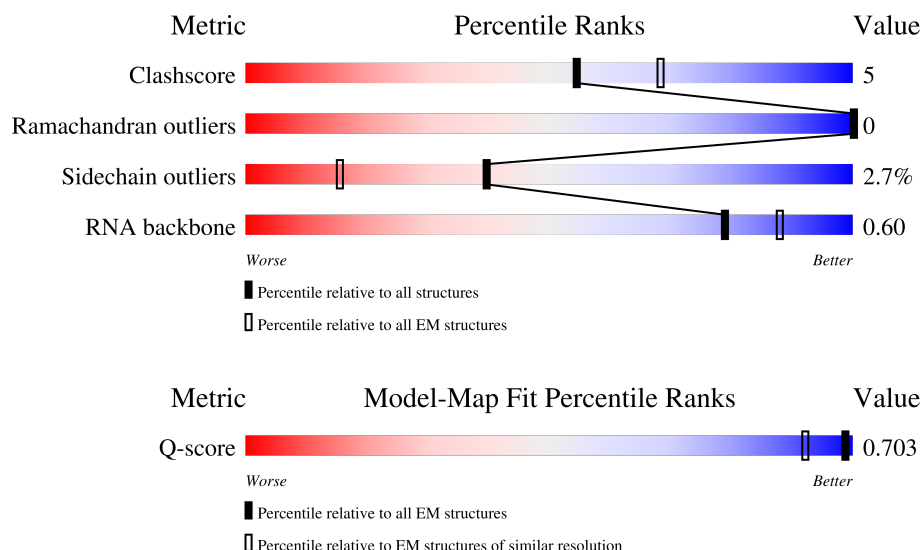
EMDB validation analysis : 0.0.1.dev132
Mogul : 2022.3.0, CSD as543be (2022)
MolProbity : 4-5-2 with Phenix2.0
Buster-report : wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
EM percentile statistics : 202505.v01 (Using data 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) : 2.49

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)	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	3231 (1.71 - 2.71)

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	

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Mol	Chain	Length	Quality of chain
4	4	37	
5	B	115	
6	C	277	
7	D	220	
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	

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Mol	Chain	Length	Quality of chain
29	11	15	
30	A	2923	
31	Ae	166	
32	Af	98	
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	

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Mol	Chain	Length	Quality of chain
54	13	84	27% 64% 32%

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	0
			1477	935	275	266	1		

- 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	0
			845	526	168	150	1		

- 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	0
			759	467	146	144	2		

- 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	0
			1032	652	183	193	4		

- 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	0
			1502	954	283	263	2		

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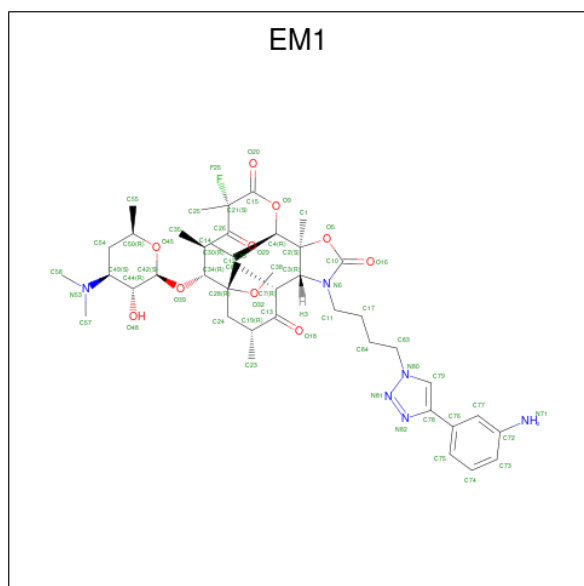
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Mol	Chain	Residues	Atoms		AltConf
55	An	1	Total	Zn	0
			1	1	

- 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

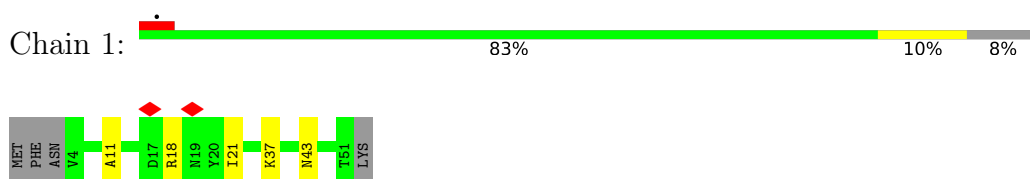
- Molecule 59 is water.

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

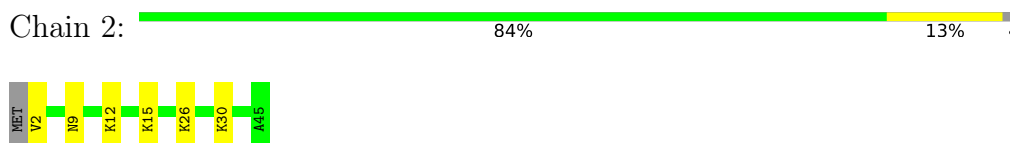
3 Residue-property plots [i](#)

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.

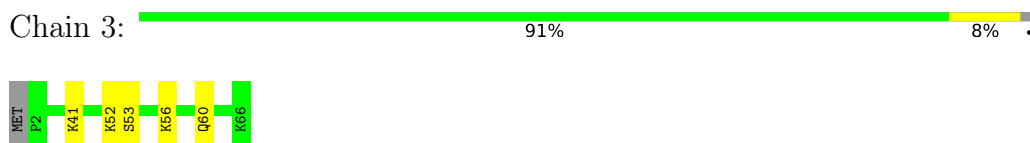
- Molecule 1: Large ribosomal subunit protein bL33A



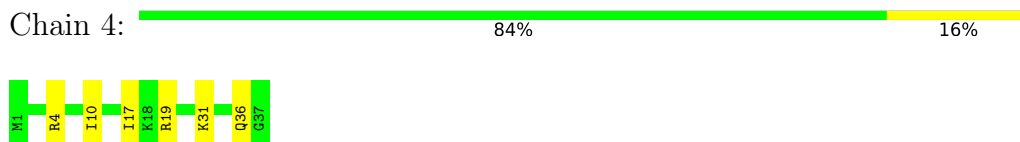
- Molecule 2: Large ribosomal subunit protein bL34



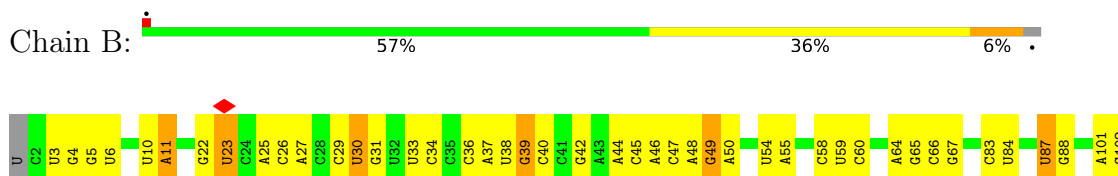
- Molecule 3: Large ribosomal subunit protein bL35

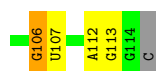


- Molecule 4: Large ribosomal subunit protein bL36



- 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%



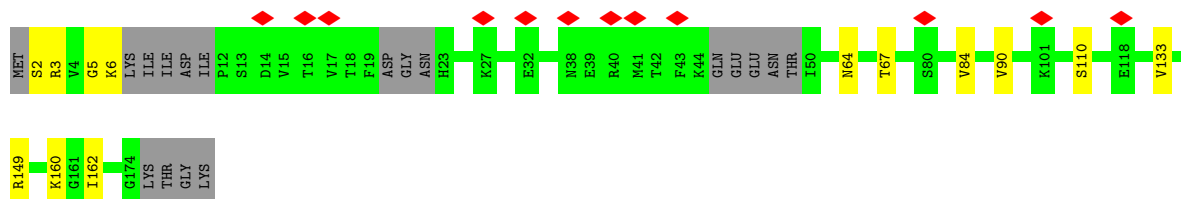
- Molecule 8: Large ribosomal subunit protein uL4

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%

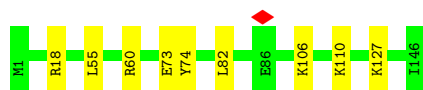


- Molecule 11: Large ribosomal subunit protein uL14

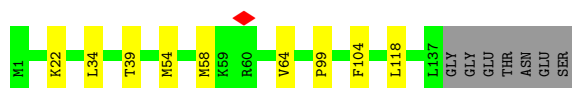
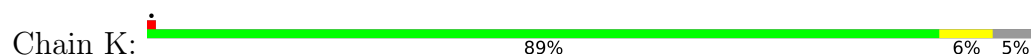
Chain I: 88% 12%



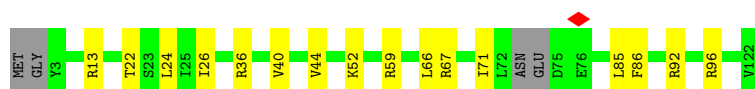
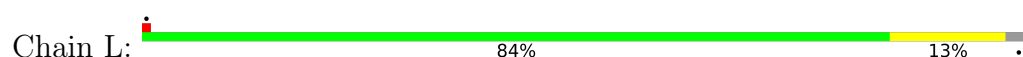
- Molecule 12: Large ribosomal subunit protein uL15



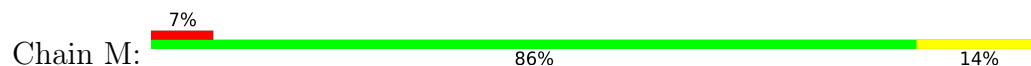
- Molecule 13: Large ribosomal subunit protein uL16



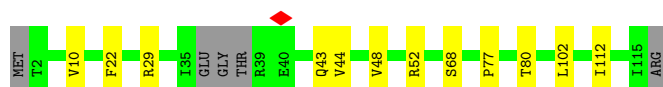
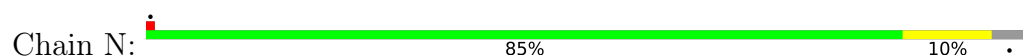
- Molecule 14: Large ribosomal subunit protein bL17



- Molecule 15: Large ribosomal subunit protein uL18



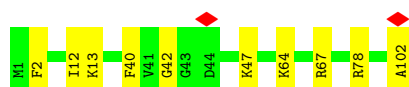
- Molecule 16: Large ribosomal subunit protein bL19



- 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%



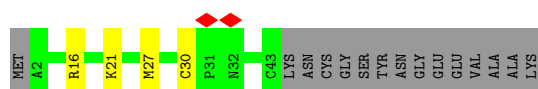
- Molecule 26: Large ribosomal subunit protein uL30

Chain X:  92% 7%



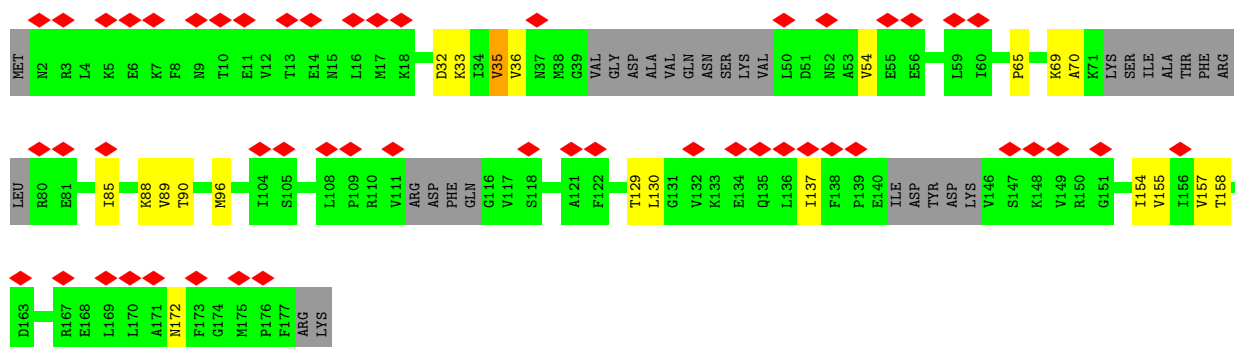
- Molecule 27: Large ribosomal subunit protein bL32

Chain Z:  67% 7% 26%



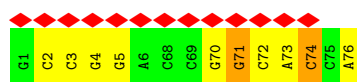
- Molecule 28: Large ribosomal subunit protein uL5

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	U569	G422	G319	U233	A126
A1577	A	U1512	G1369	U1238	A1073	G	U830	U576	A423	U320	U238	C127
A1578	C	A1513	C1370	U1239	U1077	G	C831	A577	C429	U321		C128
A1579	A	A1514	U1389	U1240	G1078	U	G837	G578		A324	A247	A130
A1580	U	A1517	A1390	A1241	U1083	A	C841	U579	G432	G327	G248	A136
A1581	U	G1518	U1391	A1242	U1084	C	U842	C580	A437	G328	C949	
A1582	G	U1519	G1392	U1252	U1085	C	G850	A583	C441	A332	G250	A145
A1583	A	G1520	A1402	G1257	C1088	G	G857	U590	C442	A333	G251	U146
A1584	U	G1521	U1416	G1261	C	A	C858	U593	G445	A339	A260	G153
A1585	C	G1522	C1423	U1269	A	U947	C859	G594		C340	A266	A156
A1586	G	U1595	A1424	U1270	U954	A	U860	U701	C450	G341	U267	U157
A1587	A	G	U955	C1277	A956	C	U872	A702			A268	G158
A1588	U	U	A957	U1280	C957	A	U873	U703	G453	A346	G269	U159
A1589	U	A	A962	U1281	A	A	U874	U704		U347	G160	G160
A1590	U	G	A963	U1282	C	C	U875	A725	G457	C348	C272	A161
A1591	U	A	U970	U1283	A	U	C877	G726	A458	U349		
A1592	U	G	U971	U1284	A	A	C878	U731	C459	G350	A275	A164
A1593	U	A	U972	U1285	A	A	U879	G613	C460			
A1594	U	G	A973	U1286	U	U	U884	G616	C461	A354	A279	G169
A1595	U	A	A977	U1287	G	G	U885	A617	U462	A363	C280	
A1596	U	G	A978	U1288	U	U	C886	A618	U463	A364	A	U172
A1597	U	A	A979	U1289	A	A	U887	U619	U464	A365	A	A173
A1598	U	G	A980	U1290	C	C	U888	G620	C465		G	U174
A1599	U	A	A981	U1291	U	U	U892	A621	G470	U371	C	C175
A1600	U	G	A982	U1292	C	C	G901	G624	A474	A372	U	A176
A1601	U	A	A983	U1293	U	U	A902	G625	A475	A373	G	G177
A1602	U	G	A984	U1294	A	A	G903	G626	U477	G381	C	G184
A1603	U	A	A985	U1295	U	U	G904	G630			U	A185
A1604	U	G	A986	U1296	C	C	U905	U631	A389	A390	G291	G192
A1605	U	A	A987	U1297	U	U	A906	U632	C481	A391	U292	A193
A1606	U	G	A988	U1298	A	A	G907	A633	U482	U392	U293	A194
A1607	U	A	A989	U1299	C	C	A908			G393	G294	C195
A1608	U	G	A990	U1300	U	U	U909	A636	A524	U394	G295	A199
A1609	U	A	A991	U1301	A	A	C910	U637	A526	G395	G296	A200
A1610	U	G	A992	U1302	C	C	A911	U638	G527	U396	G297	C201
A1611	U	A	U1002	U1303	U	U	G919	U639		U397	A202	A202
A1612	U	G	U1003	U1304	A	A	A920	G640	A537	C398	G300	
A1613	U	A	U1004	U1305	U	U	A921	A646	G538	U399	U	G214
A1614	U	G	U1005	U1306	C	C	G922		G539	C400	A302	G215
A1615	U	A	U1006	U1307	A	A	A	U650		U401	G303	A216
A1616	U	G	U1007	U1308	U	U	G	A651	U544	C402	G304	G217
A1617	U	A	U1008	U1309	U	U	G	A652	G545	U403	A307	G218
A1618	U	G	U1009	U1310	A	A	U	U653		U404	C	A219
A1619	U	A	U1010	U1311	U	U	G	U654	U549	G	U	A220
A1620	U	G	U1011	U1312	C	C	U	G805	A550	A	C	G221
A1621	U	A	U1012	U1313	U	U	G	A806	G551	U	U	A225
A1622	U	G	U1013	U1314	U	U	C	A807	A552	G	U	A226
A1623	U	A	U1014	U1315	U	U	C	A808	A553			
A1624	U	G	U1015	U1316	U	U	C	A809	G557	A411	A	A229
A1625	U	A	U1016	U1317	U	U	C	G820		U412	C	A230
A1626	U	G	U1017	U1318	U	U	C	A827	G567	G	G	A231
A1627	U	A	U1018	U1319	C	C	U	A828	C568	A318	U	
A1628	U	G	U1019	U1320	G	G						
A1629	U	A	U1020	U1321	U	U						
A1630	U	G	U1021	U1322	U	U						
A1631	U	A	U1022	U1323	U	U						
A1632	U	G	U1023	U1324	U	U						
A1633	U	A	U1024	U1325	U	U						
A1634	U	G	U1025	U1326	U	U						
A1635	U	A	U1026	U1327	U	U						
A1636	U	G	U1027	U1328	U	U						
A1637	U	A	U1028	U1329	U	U						
A1638	U	G	U1029	U1330	U	U						
A1639	U	A	U1030	U1331	U	U						
A1640	U	G	U1031	U1332	U	U						
A1641	U	A	U1032	U1333	U	U						
A1642	U	G	U1033	U1334	U	U						
A1643	U	A	U1034	U1335	U	U						
A1644	U	G	U1035	U1336	U	U						
A1645	U	A	U1036	U1337	U	U						
A1646	U	G	U1037	U1338	U	U						
A1647	U	A	U1038	U1339	U	U						
A1648	U	G	U1039	U1340	U	U						
A1649	U	A	U1040	U1341	U	U						
A1650	U	G	U1041	U1342	U	U						
A1651	U	A	U1042	U1343	U	U						
A1652	U	G	U1043	U1344	U	U						
A1653	U	A	U1044	U1345	U	U						
A1654	U	G	U1045	U1346	U	U						
A1655	U	A	U1046	U1347	U	U						
A1656	U	G	U1047	U1348	U	U						
A1657	U	A	U1048	U1349	U	U						
A1658	U	G	U1049	U1350	U	U						
A1659	U	A	U1050	U1351	U	U						
A1660	U	G	U1051	U1352	U	U						
A1661	U	A	U1052	U1353	U	U						
A1662	U	G	U1053	U1354	U	U						
A1663	U	A	U1054	U1355	U	U						
A1664	U	G	U1055	U1356	U	U						
A1665	U	A	U1056	U1357	U	U						
A1666	U	G	U1057	U1358	U	U						
A1667	U	A	U1058	U1359	U	U						
A1668	U	G	U1059	U1360	U	U						
A1669	U	A	U1060	U1361	U	U						
A1670	U	G	U1061	U1362	U	U						
A1671	U	A	U1062	U1363	U	U						
A1672	U	G	U1063	U1364	U	U						
A1673	U	A	U1064	U1365	U	U						
A1674	U	G	U1065	U1366	U	U						
A1675	U	A	U1066	U1367	U	U						
A1676	U	G	U1067	U1368	U	U						
A1677	U	A	U1068	U1369	U	U						
A1678	U	G	U1069	U1370	U	U						
A1679	U	A	U1070	U1371	U	U						
A1680	U	G	U1071	U1372	U	U						
A1681	U	A	U1072	U1373	U	U						
A1682	U	G	U1073	U1374	U	U						
A1683	U	A	U1074	U1375	U	U						
A1684	U	G	U1075	U1376	U	U						
A1685	U	A	U1076	U1377	U	U						
A1686	U	G	U1077	U1378	U	U						
A1687	U	A	U1078	U1379	U	U						
A1688	U	G	U1079	U1380	U	U						
A1689	U	A	U1080	U1381	U	U						
A1690	U	G	U1081	U1382	U	U						
A1691	U	A	U1082	U1383	U	U						
A1692	U	G	U1083	U1384	U	U						
A1693	U	A	U1084	U1385	U	U						
A1694	U	G	U1085	U1386	U	U						
A1695	U	A	U1086	U1387	U	U						
A1696	U	G	U1087	U1388	U	U						
A1697	U	A	U1088	U1389	U	U						
A1698	U	G	U1089	U1390	U	U						
A1699	U	A	U1090	U1391	U	U						
A1700	U	G	U1091	U1392	U	U						
A1701	U	A	U1092	U1393	U	U						
A1702	U	G	U1093	U1394	U	U						
A1703	U	A	U1094	U1395	U	U						
A1704	U	G	U1095	U1396	U	U						
A1705	U	A	U1096	U1397	U	U						
A1706	U	G	U1097	U1398	U	U						
A1707	U	A	U1098	U1399	U	U						
A1708	U	G	U1099	U1400	U	U						
A1709	U	A	U1100	U1401	U	U						
A1710	U	G	U1101	U1402	U	U						
A1711	U	A	U1102	U1403	U	U						
A1712	U	G	U1103	U1404	U	U						
A1713	U	A	U1104	U1405	U	U						



Chain Af:  80% 17% .



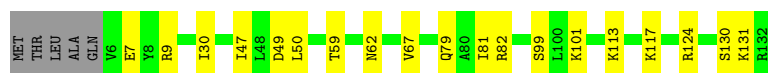
- Molecule 33: Small ribosomal subunit protein uS7

Chain Ag:  88% 10% ..



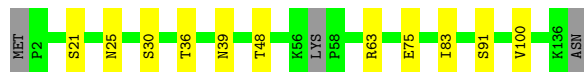
- Molecule 34: Small ribosomal subunit protein uS9

Chain Ai:  82% 14% .



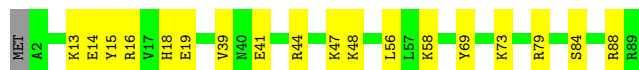
- Molecule 35: Small ribosomal subunit protein uS12

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%

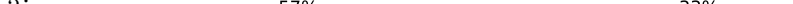


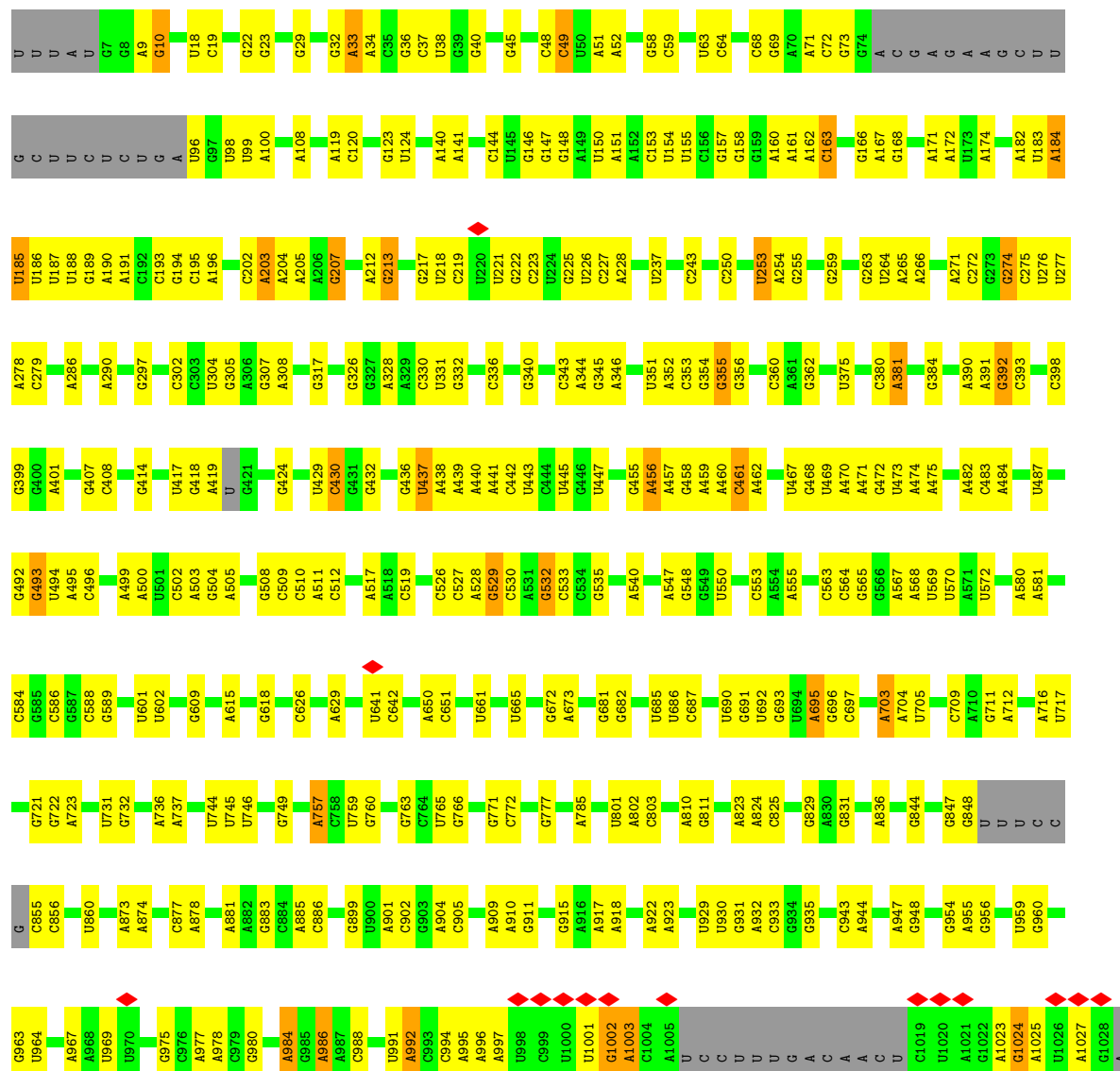
- Molecule 39: Small ribosomal subunit protein bS18

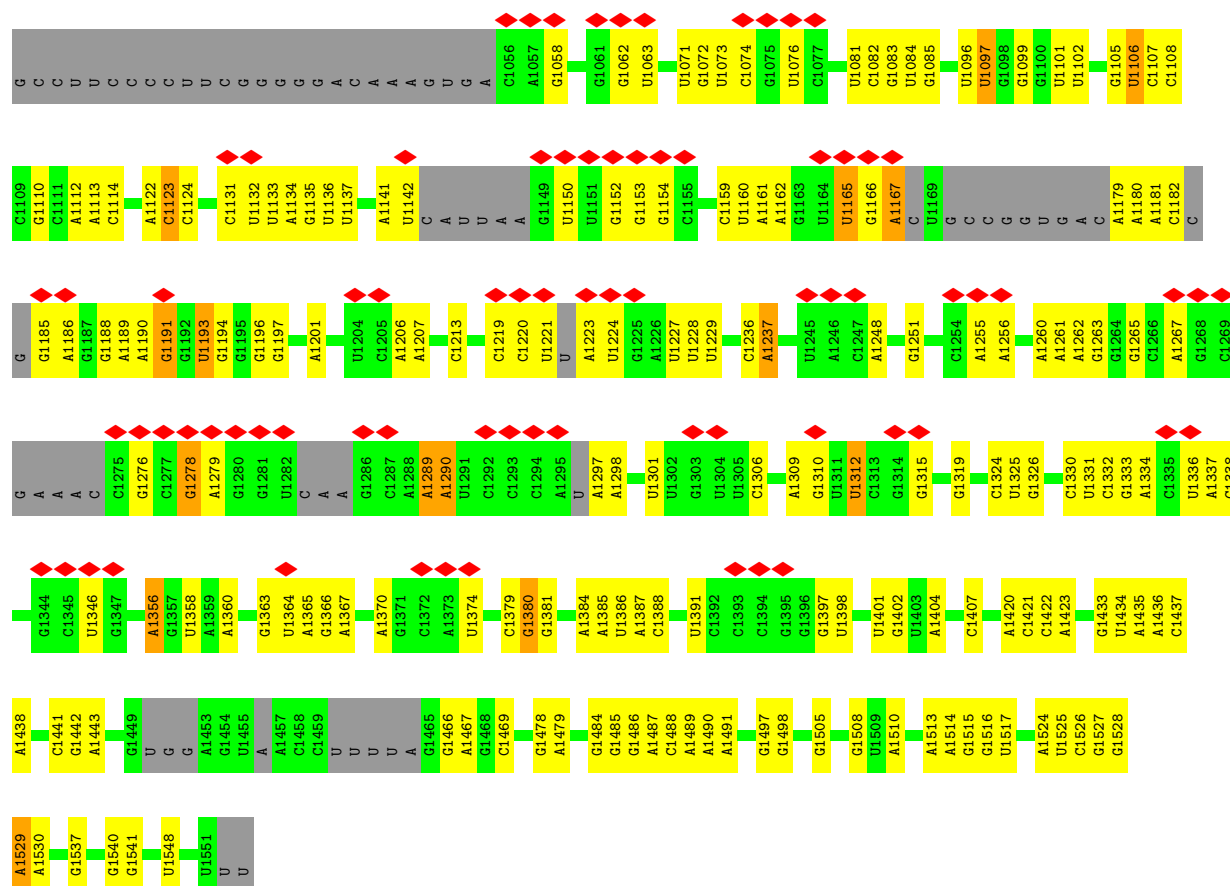


- Chain At: 84% 12% ..



- Chain Aa: 





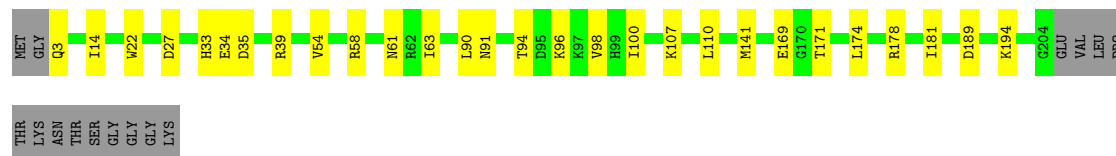
- Molecule 42: Small ribosomal subunit protein uS10

Chain Aj: 78% 15% 6%



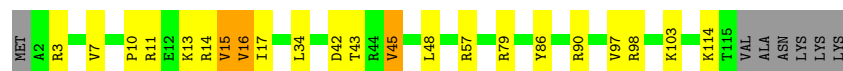
- Molecule 43: Small ribosomal subunit protein uS3

Chain Ac: 80% 13% 7%



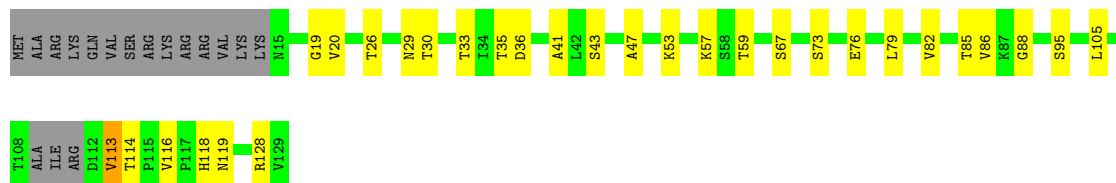
- Molecule 44: Small ribosomal subunit protein uS13

Chain Am: 76% 16% 6%



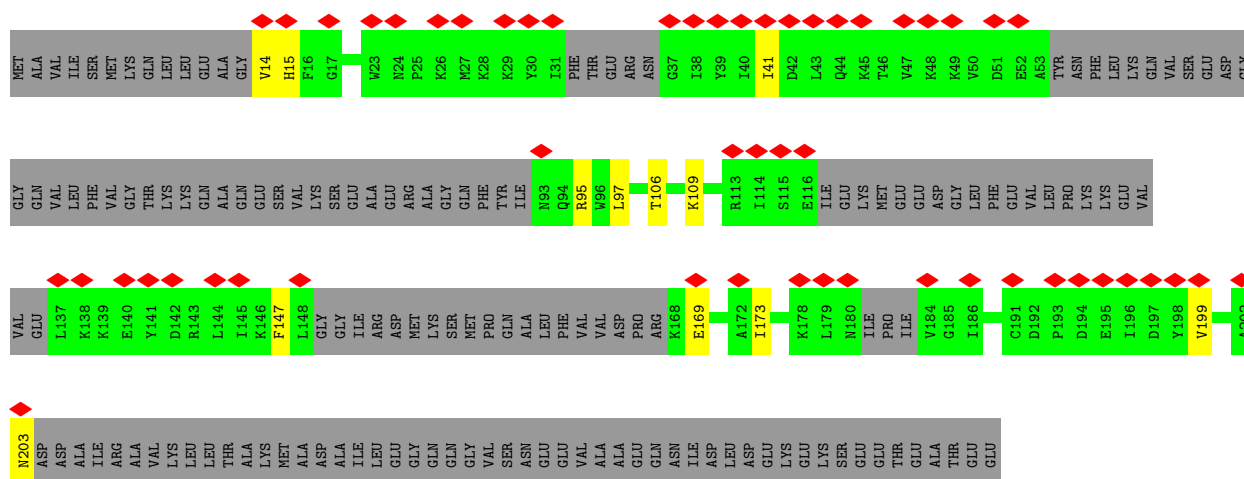
- Molecule 45: Small ribosomal subunit protein uS11

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%



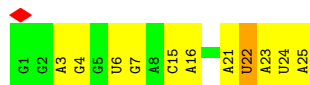
- Molecule 50: Small ribosomal subunit protein uS19

Chain As:  79% 10% 11%



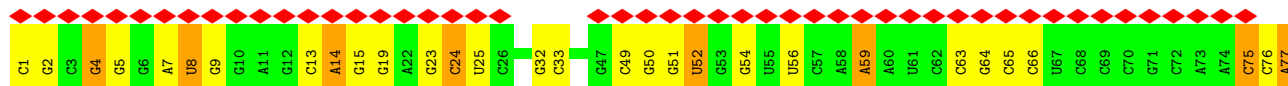
- Molecule 51: mRNA molecule

Chain d:  5% 42% 53% 5%



- Molecule 52: P-site tRNA molecule

Chain 8:  69% 58% 31% 11%



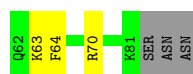
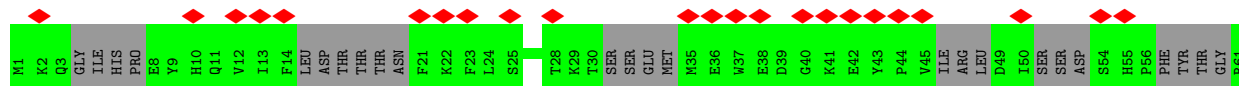
- Molecule 53: A-site tRNA molecule

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 ($\text{\AA}$)	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 ($\text{\AA}$)	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: OMG, MA6, EM1, 2MG, G7M, MG, UR3, 5MU, ZN, H2U, 2MA, K, 5MC, PSU, 4OC

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

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
1	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

Continued on next page...

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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%)	81	89
7	D	160/177 (90%)	158 (99%)	2 (1%)	61	75
8	E	150/169 (89%)	148 (99%)	2 (1%)	61	75
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%)	65	78
15	M	57/95 (60%)	56 (98%)	1 (2%)	51	66
16	N	73/102 (72%)	72 (99%)	1 (1%)	59	73
17	O	96/98 (98%)	96 (100%)	0	100	100
18	P	73/86 (85%)	72 (99%)	1 (1%)	59	73
19	Q	80/94 (85%)	79 (99%)	1 (1%)	61	75
20	R	66/82 (80%)	66 (100%)	0	100	100
21	S	54/90 (60%)	51 (94%)	3 (6%)	19	22
22	T	49/190 (26%)	48 (98%)	1 (2%)	48	63
23	U	53/75 (71%)	53 (100%)	0	100	100
24	V	32/52 (62%)	29 (91%)	3 (9%)	8	8
25	W	42/66 (64%)	41 (98%)	1 (2%)	43	56
26	X	49/53 (92%)	49 (100%)	0	100	100
27	Z	37/50 (74%)	35 (95%)	2 (5%)	20	23

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
28	F	54/158 (34%)	48 (89%)	6 (11%)	6	5
31	Ae	114/131 (87%)	107 (94%)	7 (6%)	17	19
32	Af	68/86 (79%)	66 (97%)	2 (3%)	37	49
33	Ag	129/132 (98%)	125 (97%)	4 (3%)	35	46
34	Ai	97/109 (89%)	94 (97%)	3 (3%)	35	46
35	Al	106/119 (89%)	99 (93%)	7 (7%)	15	17
36	Ao	78/81 (96%)	74 (95%)	4 (5%)	21	26
37	Ap	69/77 (90%)	68 (99%)	1 (1%)	59	73
38	Aq	50/82 (61%)	47 (94%)	3 (6%)	17	20
39	Ar	48/68 (71%)	43 (90%)	5 (10%)	7	6
40	At	61/69 (88%)	56 (92%)	5 (8%)	10	11
42	Aj	72/91 (79%)	69 (96%)	3 (4%)	26	34
43	Ac	135/175 (77%)	134 (99%)	1 (1%)	76	86
44	Am	82/104 (79%)	77 (94%)	5 (6%)	17	19
45	Ak	70/104 (67%)	58 (83%)	12 (17%)	2	1
46	Ab	32/221 (14%)	30 (94%)	2 (6%)	16	18
47	Ah	112/113 (99%)	109 (97%)	3 (3%)	39	52
48	Ad	142/175 (81%)	136 (96%)	6 (4%)	26	34
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%)	40	52

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
30	PSU	A	2607	30	18,21,22	0.58	1 (5%)	21,30,33	0.76	1 (4%)
30	PSU	A	2632	30	18,21,22	0.44	0	21,30,33	0.61	0
41	4OC	Aa	1412	41	20,23,24	0.27	0	25,32,35	0.51	0
41	MA6	Aa	1529	41	23,26,27	0.26	0	33,38,41	0.65	1 (3%)
41	5MC	Aa	976	41	19,22,23	0.30	0	26,32,35	0.40	0
30	2MG	A	2472	30	23,26,27	0.28	0	33,38,41	0.39	0
41	2MG	Aa	975	41	23,26,27	0.25	0	33,38,41	0.33	0
30	5MU	A	792	30	19,22,23	0.41	0	27,32,35	0.65	0
30	OMG	A	2278	30,52	23,26,27	0.26	0	32,38,41	0.37	0
41	G7M	Aa	535	41	23,26,27	0.30	0	34,39,42	0.51	0
30	H2U	A	2476	30	18,21,22	0.47	0	19,30,33	0.88	1 (5%)
30	2MA	A	2530	56,30	22,25,26	1.01	1 (4%)	32,37,40	1.38	3 (9%)
30	PSU	A	2484	30	18,21,22	0.48	0	21,30,33	0.59	0
30	G7M	A	2601	56,30	23,26,27	0.27	0	34,39,42	0.42	0
41	UR3	Aa	1509	41	19,22,23	0.26	0	26,32,35	0.35	0
30	5MU	A	1966	30	19,22,23	0.48	0	27,32,35	0.47	0
41	MA6	Aa	1530	41	23,26,27	0.28	0	33,38,41	0.62	1 (3%)

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
30	PSU	A	2607	30	-	0/7/25/26	0/2/2/2
30	PSU	A	2632	30	-	0/7/25/26	0/2/2/2
41	4OC	Aa	1412	41	-	0/9/29/30	0/2/2/2
41	MA6	Aa	1529	41	-	0/11/29/30	0/3/3/3
41	5MC	Aa	976	41	-	0/7/25/26	0/2/2/2
30	2MG	A	2472	30	-	0/9/27/28	0/3/3/3
41	2MG	Aa	975	41	-	0/9/27/28	0/3/3/3
30	5MU	A	792	30	-	0/7/25/26	0/2/2/2
30	OMG	A	2278	30,52	-	1/9/27/28	0/3/3/3
41	G7M	Aa	535	41	-	2/7/25/26	0/3/3/3
30	H2U	A	2476	30	-	0/7/38/39	0/2/2/2
30	2MA	A	2530	56,30	-	1/7/25/26	0/3/3/3

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
30	PSU	A	2484	30	-	0/7/25/26	0/2/2/2
30	G7M	A	2601	56,30	-	0/7/25/26	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
41	MA6	Aa	1530	41	-	2/11/29/30	0/3/3/3

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
30	A	2530	2MA	C6-N6	-3.48	1.25	1.34
30	A	2607	PSU	O4'-C1'	-2.18	1.40	1.43

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

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
30	A	2530	2MA	N6-C6-N1	5.07	123.87	117.03
30	A	2530	2MA	C5-C6-N1	-3.75	113.06	118.90
30	A	2530	2MA	C2-N1-C6	3.64	123.70	118.10
30	A	2607	PSU	O4'-C1'-C2'	2.61	108.77	105.15
30	A	2476	H2U	C5-C4-N3	-2.53	114.00	116.69

There are no chirality outliers.

5 of 6 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
41	Aa	535	G7M	O4'-C4'-C5'-O5'
30	A	2278	OMG	C1'-C2'-O2'-CM2
41	Aa	535	G7M	C3'-C4'-C5'-O5'
41	Aa	1530	MA6	O4'-C4'-C5'-O5'
30	A	2530	2MA	C4'-C5'-O5'-P

There are no ring outliers.

5 monomers are involved in 5 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
41	Aa	1529	MA6	1	0
41	Aa	975	2MG	1	0
30	A	2278	OMG	1	0
30	A	2530	2MA	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	-	60,64,64	0.31	0	78,97,97	0.37	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	-	-	2/75/112/112	0/4/5/5

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (2) torsion outliers are listed below:

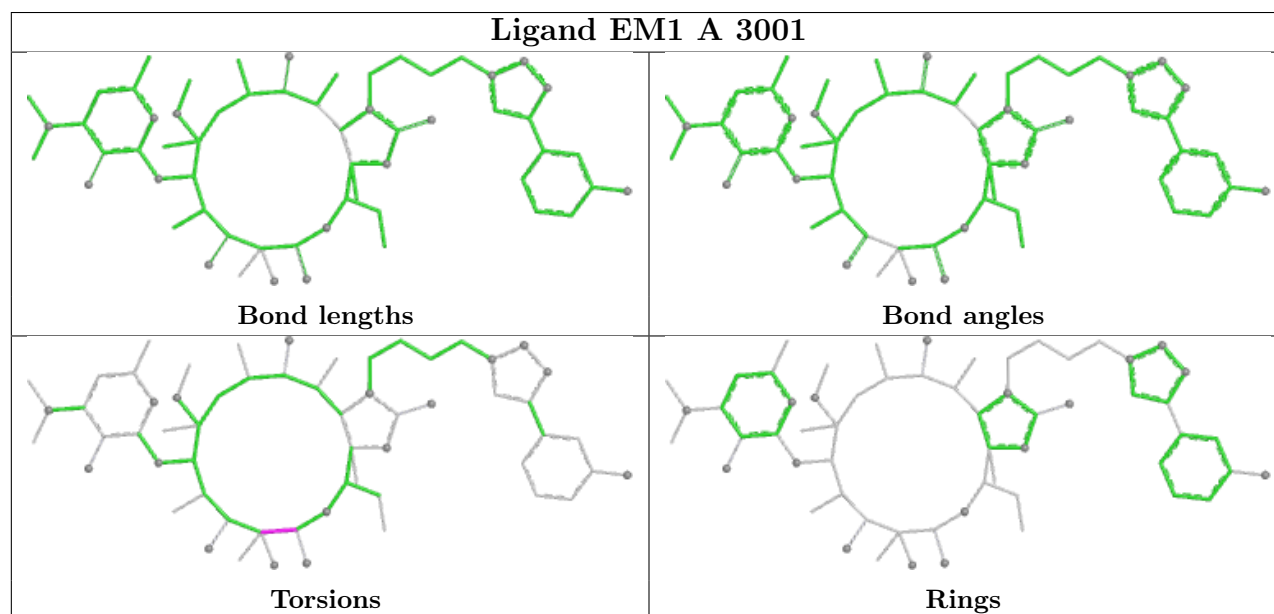
Mol	Chain	Res	Type	Atoms
57	A	3001	EM1	O9-C15-C21-C26
57	A	3001	EM1	O20-C15-C21-C26

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

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Model	Chain	Residue-1	Atom-1	Residue-2	Atom-2	Distance (Å)
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

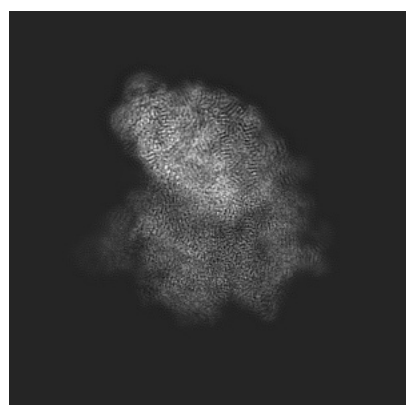
6 Map visualisation [i](#)

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.

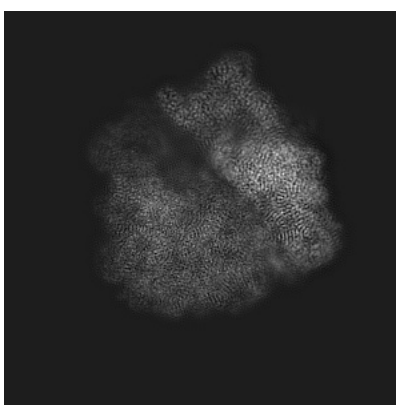
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

6.1 Orthogonal projections [i](#)

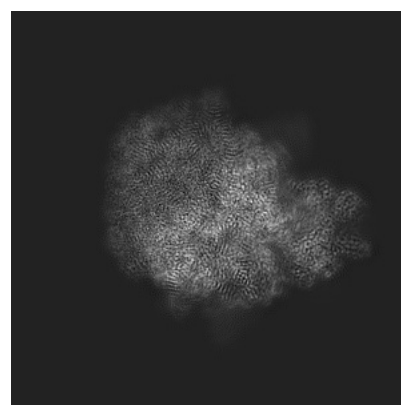
6.1.1 Primary map



X



Y

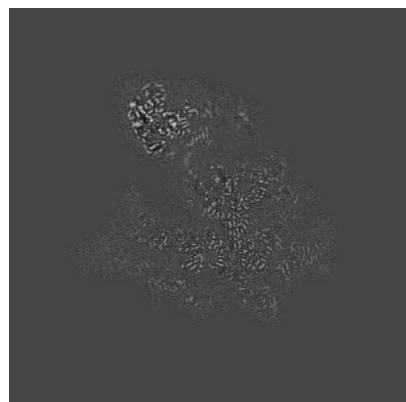


Z

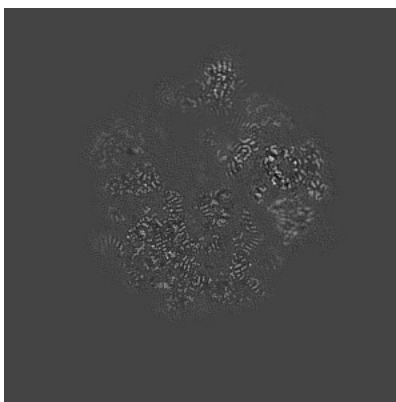
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

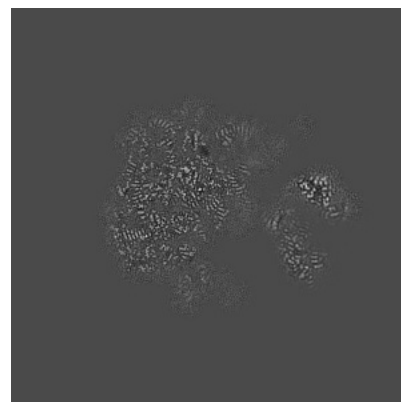
6.2.1 Primary map



X Index: 220



Y Index: 220



Z Index: 220

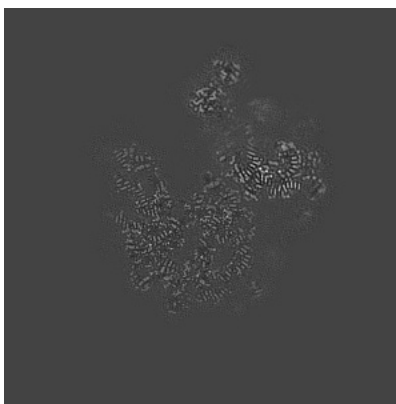
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

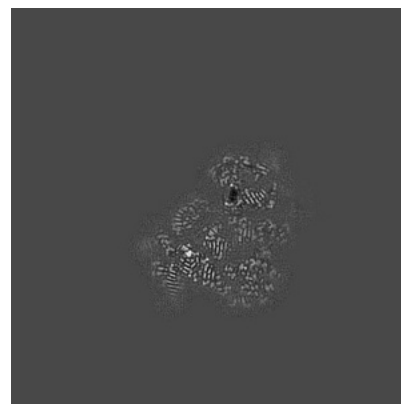
6.3.1 Primary map



X Index: 192



Y Index: 235

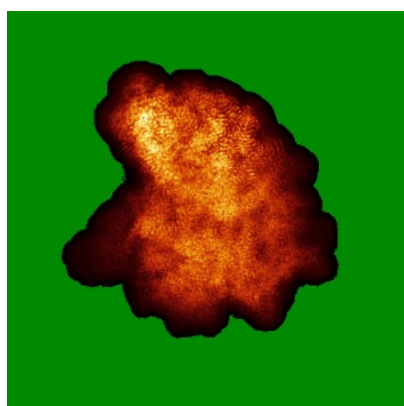


Z Index: 318

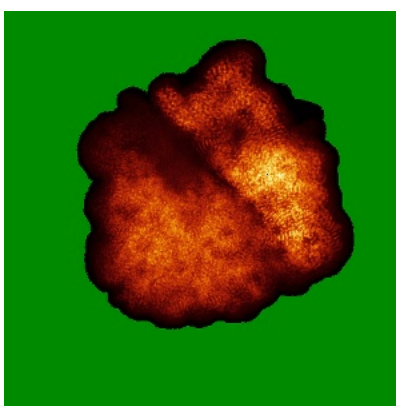
The images above show the largest variance slices of the map in three orthogonal directions.

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

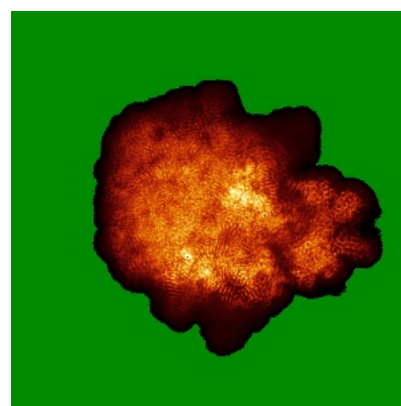
6.4.1 Primary map



X



Y

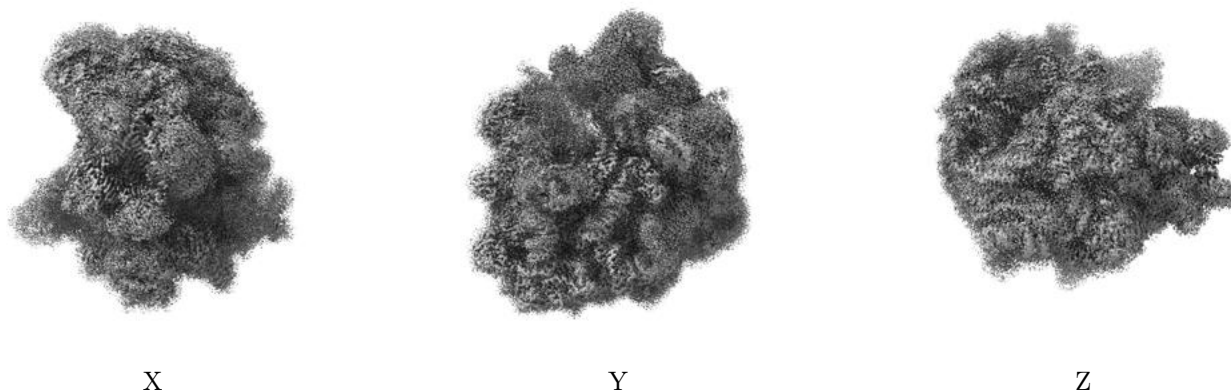


Z

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.

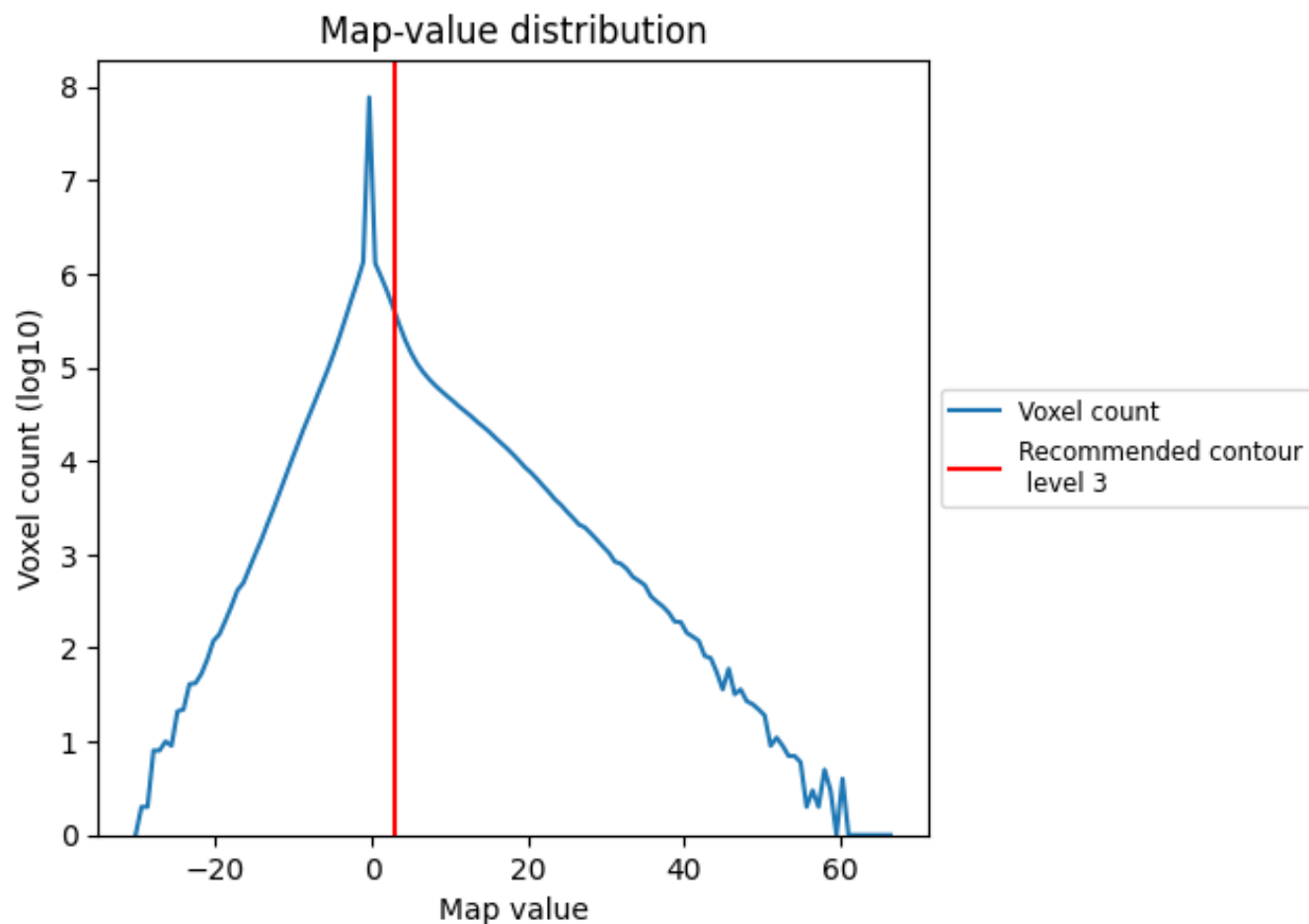
6.6 Mask visualisation [i](#)

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

7 Map analysis [i](#)

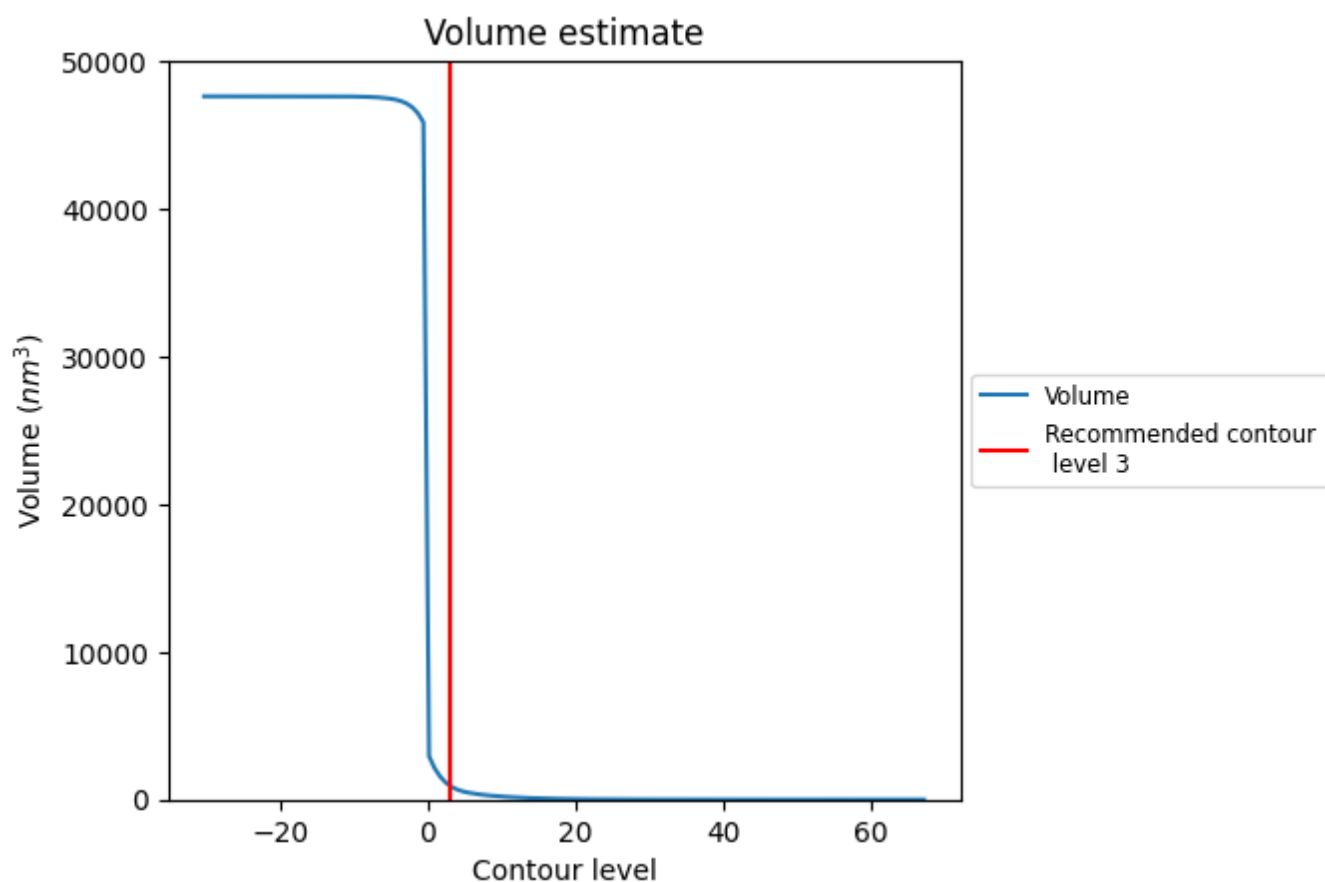
This section contains the results of statistical analysis of the map.

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.

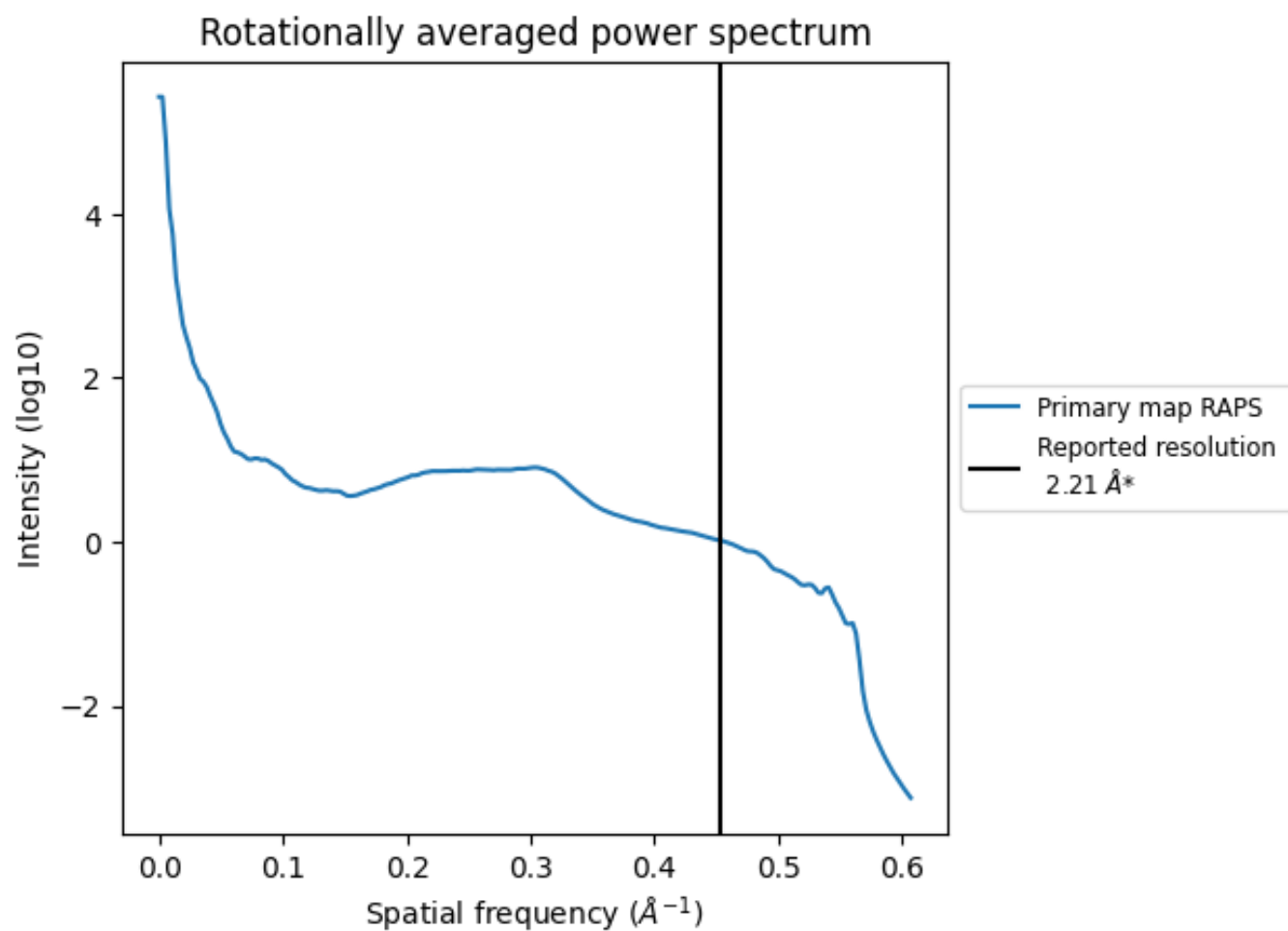
7.2 Volume estimate [i](#)



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

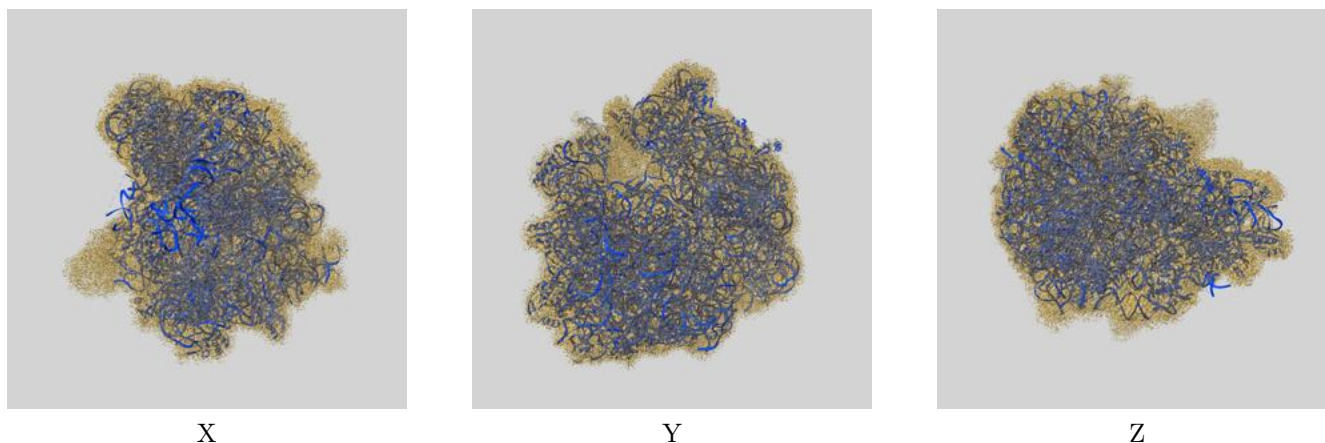
8 Fourier-Shell correlation

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

9 Map-model fit [i](#)

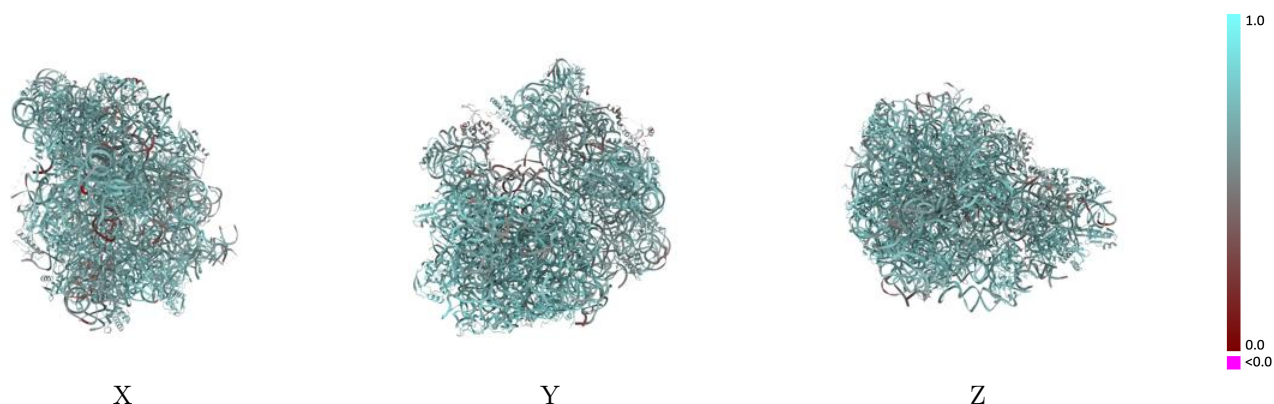
This section contains information regarding the fit between EMDB map EMD-53066 and PDB model 9QEG. Per-residue inclusion information can be found in section [3](#) on page [16](#).

9.1 Map-model overlay [i](#)



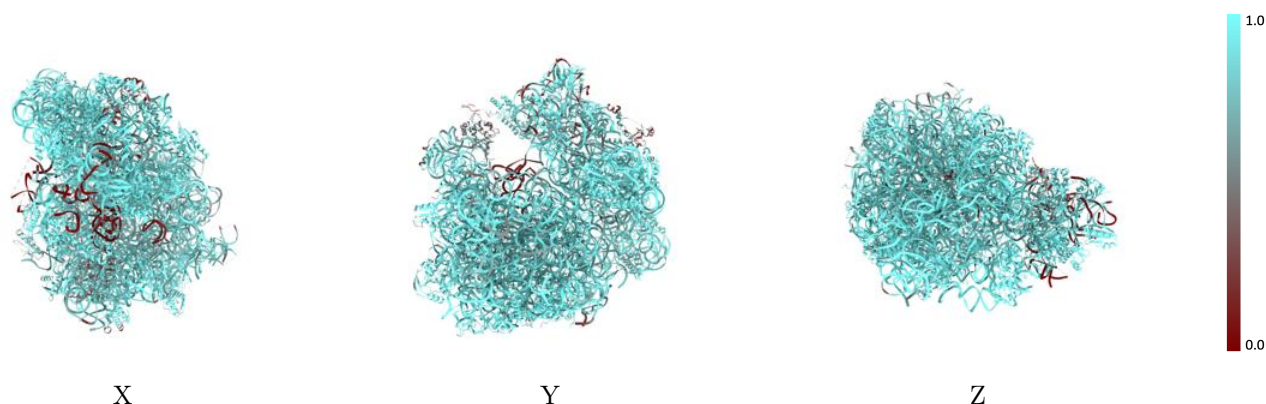
The images above show the 3D surface view of the map at the recommended contour level 3.0 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



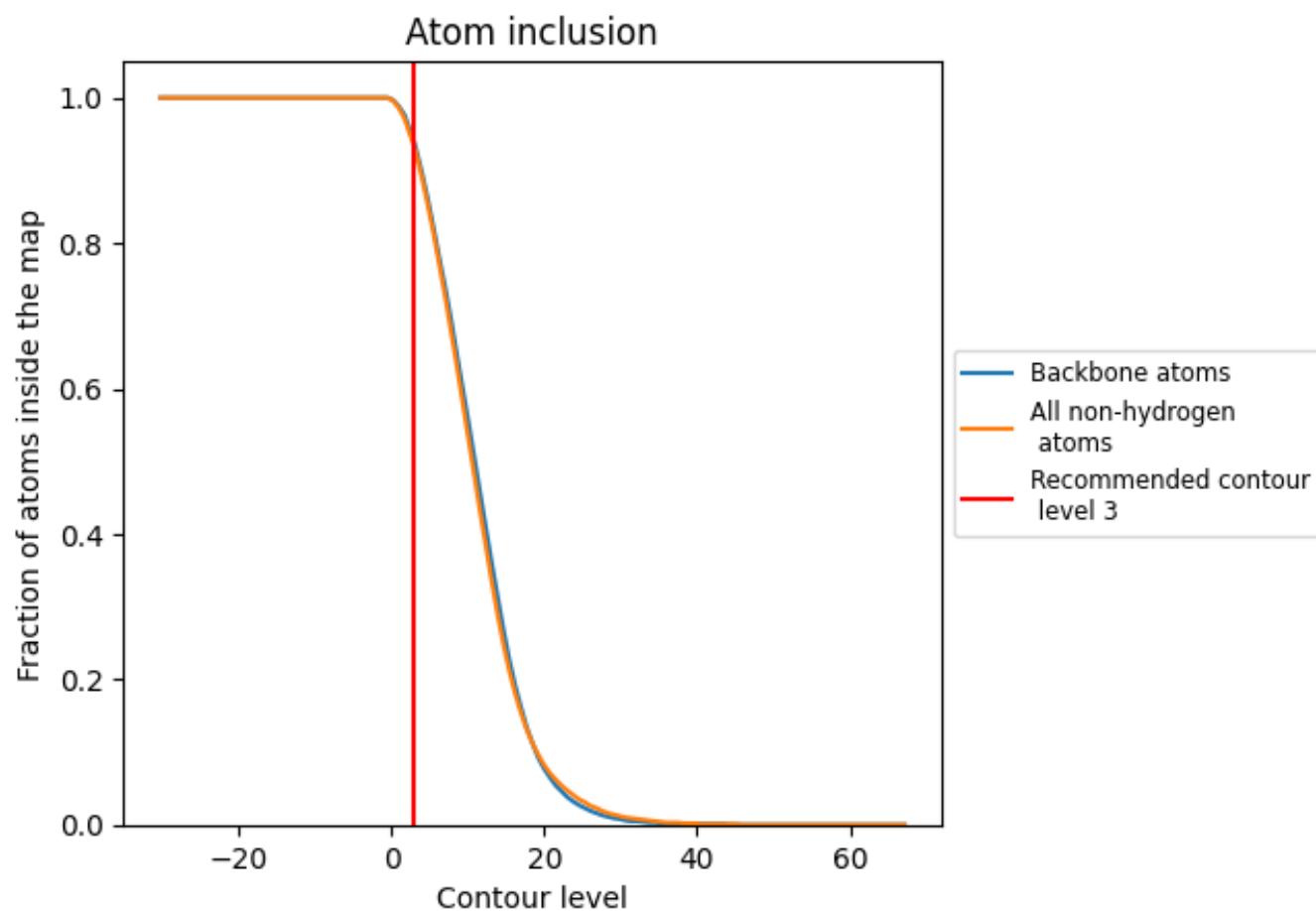
The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions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