



wwPDB EM Validation Summary Report ⓘ

Nov 19, 2022 – 05:23 pm GMT

PDB ID : 5NJT
EMDB ID : EMD-3656
Title : Structure of the Bacillus subtilis hibernating 100S ribosome reveals the basis for 70S dimerization.
Authors : Beckert, B.; Abdelshahid, M.; Schaefer, H.; Steinchen, W.; Arenz, S.; Berninghausen, O.; Beckmann, R.; Bange, G.; Turgay, K.; Wilson, D.N.
Deposited on : 2017-03-29
Resolution : 3.80 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:

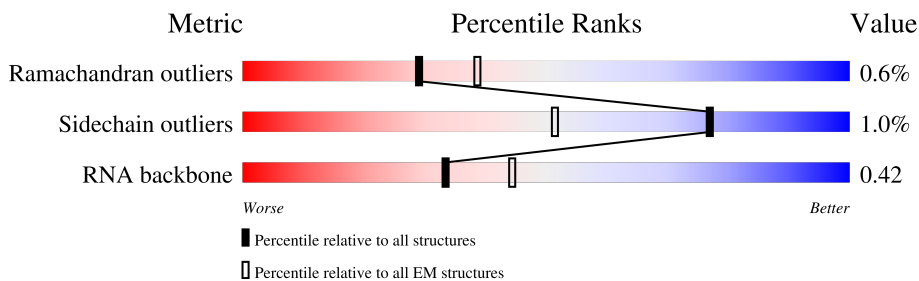
EMDB validation analysis : 0.0.1.dev43
MolProbity : 4.02b-467
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
MapQ : 1.9.9
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.31.2

1 Overall quality at a glance

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

The reported resolution of this entry is 3.80 Å.

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



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

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the bar indicate the fraction of residues that contain outliers for ≥ 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	A	1544	
2	B	224	
3	C	210	
4	D	199	
5	E	165	
6	F	95	
7	G	153	
8	H	131	

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Mol	Chain	Length	Quality of chain
9	I	130	18% 99%
10	J	102	11% 100%
11	K	118	10% 100%
12	L	137	7% 100%
13	M	111	8% 100%
14	N	60	100%
15	O	88	100%
16	P	89	100%
17	Q	86	100%
18	R	71	11% 99%
19	S	80	100%
20	T	86	5% 100%
21	U	2923	57% 36% 7%
22	V	112	50% 42% 8%
23	W	275	12% 99%
24	X	207	12% 99%
25	Y	205	7% 98%
26	Z	178	37% 99%
27	a	175	17% 99%
28	b	123	96% 95% 5%
29	c	142	10% 99%
30	d	122	16% 100%
31	e	146	14% 97%
32	f	138	9% 99%
33	g	119	13% 99%

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Mol	Chain	Length	Quality of chain
34	h	120	24% 98%
35	i	114	20% 100%
36	j	117	7% 97%
37	k	101	11% 91% 8%
38	l	109	14% 99%
39	m	93	24% 99%
40	n	100	18% 96%
41	o	82	23% 99%
42	p	54	9% 100%
43	q	48	15% 100%
44	r	44	9% 98%
45	s	64	9% 100%
46	t	36	14% 100%
47	u	58	55% 98%
48	v	65	20% 100%
49	w	58	12% 100%
50	y	64	73% 97%
51	x	104	56% 91% 9%

2 Entry composition [i](#)

There are 51 unique types of molecules in this entry. The entry contains 133097 atoms, of which 0 are hydrogens and 0 are deuteriums.

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

- Molecule 1 is a RNA chain called 16S ribosomal RNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
1	A	1544	33115	14768	6067	10736	1544	0	0

- Molecule 2 is a protein called 30S ribosomal protein S2.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
2	B	224	896	448	224	224	0	0

- Molecule 3 is a protein called 30S ribosomal protein S3.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
3	C	210	840	420	210	210	0	0

- Molecule 4 is a protein called 30S ribosomal protein S4.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
4	D	199	797	398	199	200	0	0

- Molecule 5 is a protein called 30S ribosomal protein S5.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
5	E	165	661	330	165	166	0	0

- Molecule 6 is a protein called 30S ribosomal protein S6.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
6	F	95	381	190	95	96	0	0

- Molecule 7 is a protein called 30S ribosomal protein S7.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
7	G	153	613	306	153	154	0	0

- Molecule 8 is a protein called 30S ribosomal protein S8.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
8	H	131	525	262	131	132	0	0

- Molecule 9 is a protein called 30S ribosomal protein S9.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
9	I	130	521	260	130	131	0	0

- Molecule 10 is a protein called 30S ribosomal protein S10.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
10	J	102	409	204	102	103	0	0

- Molecule 11 is a protein called 30S ribosomal protein S11.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
11	K	118	472	236	118	118	0	0

- Molecule 12 is a protein called 30S ribosomal protein S12.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
12	L	137	549	274	137	138	0	0

- Molecule 13 is a protein called 30S ribosomal protein S13.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
13	M	111	444	222	111	111	0	0

- Molecule 14 is a protein called 30S ribosomal protein S14.

Mol	Chain	Residues	Atoms				AltConf	Trace
14	N	60	Total	C	N	O	0	0
			241	120	60	61		

- Molecule 15 is a protein called 30S ribosomal protein S15.

Mol	Chain	Residues	Atoms				AltConf	Trace
15	O	88	Total	C	N	O	0	0
			353	176	88	89		

- Molecule 16 is a protein called 30S ribosomal protein S16.

Mol	Chain	Residues	Atoms				AltConf	Trace
16	P	89	Total	C	N	O	0	0
			357	178	89	90		

- Molecule 17 is a protein called 30S ribosomal protein S17.

Mol	Chain	Residues	Atoms				AltConf	Trace
17	Q	86	Total	C	N	O	0	0
			345	172	86	87		

- Molecule 18 is a protein called 30S ribosomal protein S18.

Mol	Chain	Residues	Atoms				AltConf	Trace
18	R	71	Total	C	N	O	0	0
			285	142	71	72		

- Molecule 19 is a protein called 30S ribosomal protein S19.

Mol	Chain	Residues	Atoms				AltConf	Trace
19	S	80	Total	C	N	O	0	0
			320	160	80	80		

- Molecule 20 is a protein called 30S ribosomal protein S20.

Mol	Chain	Residues	Atoms				AltConf	Trace
20	T	86	Total	C	N	O	0	0
			345	172	86	87		

- Molecule 21 is a RNA chain called 23S ribosomal RNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
21	U	2923	62767	28002	11589	20253	2923	0	0

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
U	1558	C	G	conflict	GB 467326

- Molecule 22 is a RNA chain called 5S ribosomal RNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
22	V	112	2395	1068	435	780	112	0	0

- Molecule 23 is a protein called 50S ribosomal protein L2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
23	W	275	2111	1312	416	377	6	0	0

- Molecule 24 is a protein called 50S ribosomal protein L3.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
24	X	207	1575	988	290	292	5	0	0

- Molecule 25 is a protein called 50S ribosomal protein L4.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
25	Y	205	1561	980	289	290	2	0	0

- Molecule 26 is a protein called 50S ribosomal protein L5.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
26	Z	178	1404	893	245	259	7	0	0

- Molecule 27 is a protein called 50S ribosomal protein L6.

Mol	Chain	Residues	Atoms					AltConf	Trace
27	a	175	Total	C	N	O	S	0	0
			1342	835	248	257	2		

- Molecule 28 is a protein called 50S ribosomal protein L10.

Mol	Chain	Residues	Atoms					AltConf	Trace
28	b	123	Total	C	N	O	S	0	0
			955	602	163	189	1		

- Molecule 29 is a protein called 50S ribosomal protein L13.

Mol	Chain	Residues	Atoms					AltConf	Trace
29	c	142	Total	C	N	O	S	0	0
			1123	710	206	202	5		

- Molecule 30 is a protein called 50S ribosomal protein L14.

Mol	Chain	Residues	Atoms					AltConf	Trace
30	d	122	Total	C	N	O	S	0	0
			920	571	173	172	4		

- Molecule 31 is a protein called 50S ribosomal protein L15.

Mol	Chain	Residues	Atoms					AltConf	Trace
31	e	146	Total	C	N	O	S	0	0
			1081	671	207	201	2		

- Molecule 32 is a protein called 50S ribosomal protein L16.

Mol	Chain	Residues	Atoms					AltConf	Trace
32	f	138	Total	C	N	O	S	0	0
			1097	703	208	181	5		

- Molecule 33 is a protein called 50S ribosomal protein L17.

Mol	Chain	Residues	Atoms					AltConf	Trace
33	g	119	Total	C	N	O	S	0	0
			953	583	186	180	4		

- Molecule 34 is a protein called 50S ribosomal protein L18.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
34	h	120	912	564	176	171	1	0	0

- Molecule 35 is a protein called 50S ribosomal protein L19.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
35	i	114	936	595	184	157		0	0

- Molecule 36 is a protein called 50S ribosomal protein L20.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
36	j	117	940	591	189	156	4	0	0

- Molecule 37 is a protein called 50S ribosomal protein L21.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
37	k	101	786	501	139	146		0	0

- Molecule 38 is a protein called 50S ribosomal protein L22.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
38	l	109	842	525	164	150	3	0	0

- Molecule 39 is a protein called 50S ribosomal protein L23.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
39	m	93	752	472	137	139	4	0	0

- Molecule 40 is a protein called 50S ribosomal protein L24.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
40	n	100	754	473	141	137	3	0	0

- Molecule 41 is a protein called 50S ribosomal protein L27.

Mol	Chain	Residues	Atoms				AltConf	Trace
41	o	82	Total	C	N	O	0	0
			630	390	123	117		

- Molecule 42 is a protein called 50S ribosomal protein L32.

Mol	Chain	Residues	Atoms					AltConf	Trace
42	p	54	Total	C	N	O	S	0	0
			426	262	86	71	7		

- Molecule 43 is a protein called 50S ribosomal protein L33 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
43	q	48	Total	C	N	O	S	0	0
			401	244	80	73	4		

- Molecule 44 is a protein called 50S ribosomal protein L34.

Mol	Chain	Residues	Atoms					AltConf	Trace
44	r	44	Total	C	N	O	S	0	0
			367	222	89	54	2		

- Molecule 45 is a protein called 50S ribosomal protein L35.

Mol	Chain	Residues	Atoms					AltConf	Trace
45	s	64	Total	C	N	O	S	0	0
			512	321	107	82	2		

- Molecule 46 is a protein called 50S ribosomal protein L36.

Mol	Chain	Residues	Atoms					AltConf	Trace
46	t	36	Total	C	N	O	S	0	0
			288	181	59	44	4		

- Molecule 47 is a protein called 50S ribosomal protein L28.

Mol	Chain	Residues	Atoms					AltConf	Trace
47	u	58	Total	C	N	O	S	0	0
			444	275	92	75	2		

- Molecule 48 is a protein called 50S ribosomal protein L29.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
48	v	65	530	328	102	98	2	0	0

- Molecule 49 is a protein called 50S ribosomal protein L30.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
49	w	58	455	281	89	84	1	0	0

- Molecule 50 is a protein called 50S ribosomal protein L31.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
50	y	64	503	314	92	92	5	0	0

- Molecule 51 is a protein called Ribosome hibernation promotion factor.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
51	x	104	866	537	159	167	3	0	0

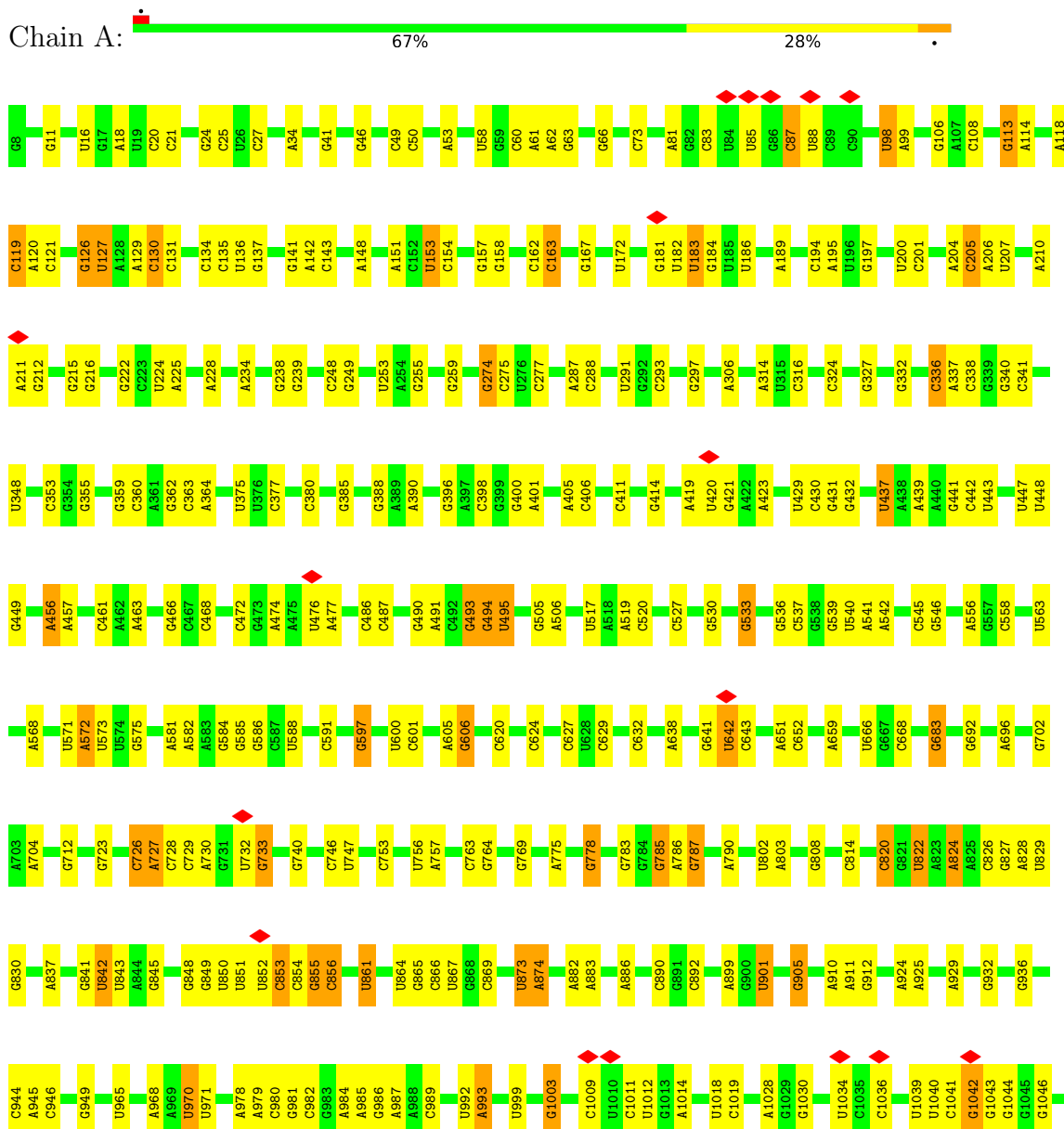
There is a discrepancy between the modelled and reference sequences:

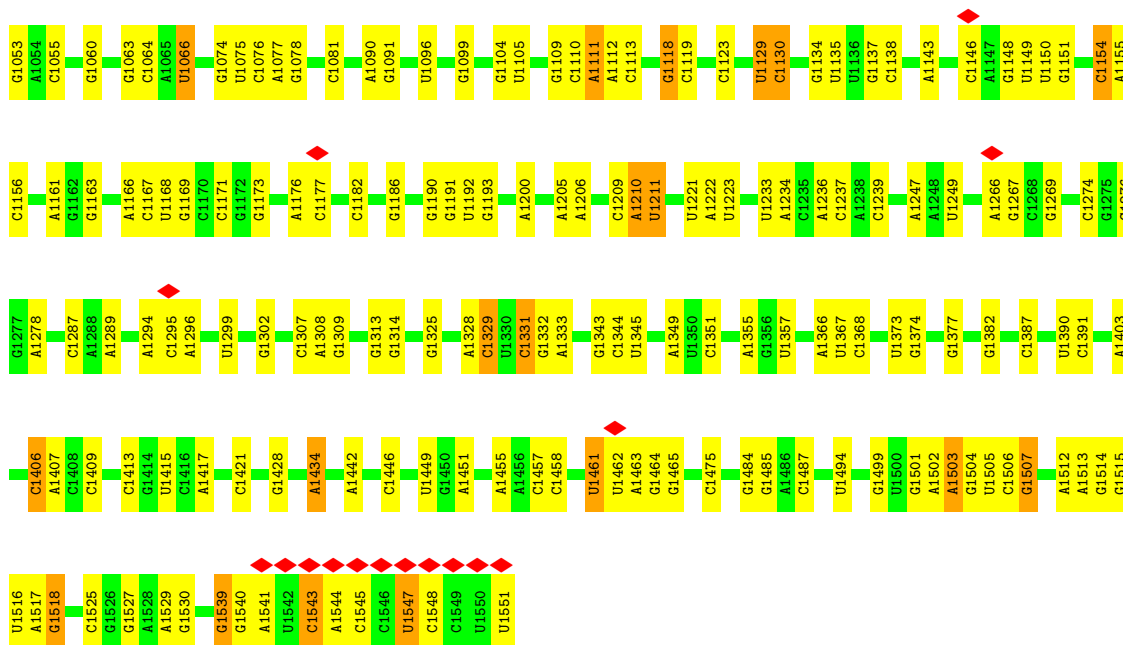
Chain	Residue	Modelled	Actual	Comment	Reference
x	103	GLU	GLY	conflict	UNP P28368

3 Residue-property plots

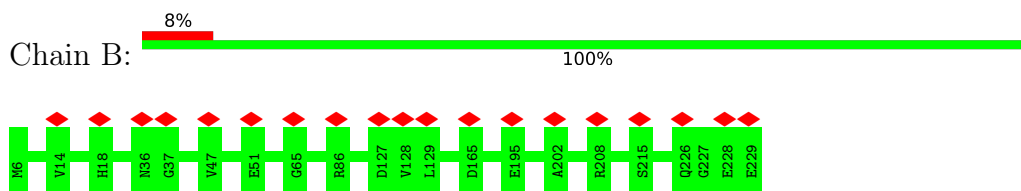
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and atom inclusion 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: 16S ribosomal RNA

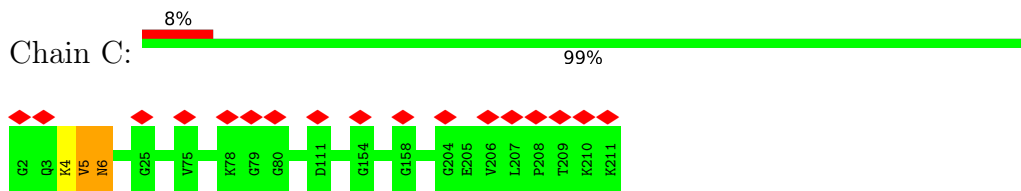




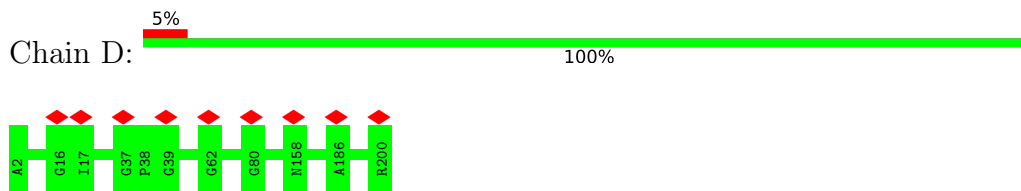
• Molecule 2: 30S ribosomal protein S2



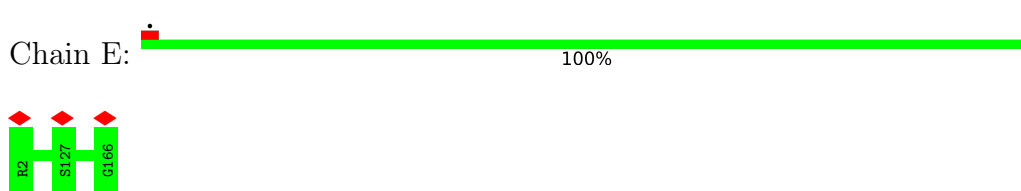
• Molecule 3: 30S ribosomal protein S3



• Molecule 4: 30S ribosomal protein S4

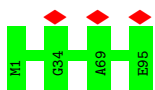


• Molecule 5: 30S ribosomal protein S5



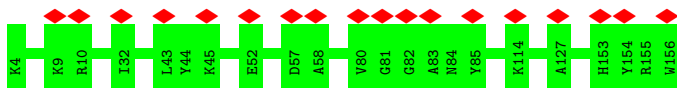
• Molecule 6: 30S ribosomal protein S6

Chain F:  100%



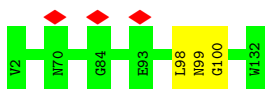
- Molecule 7: 30S ribosomal protein S7

Chain G:  12%  100%



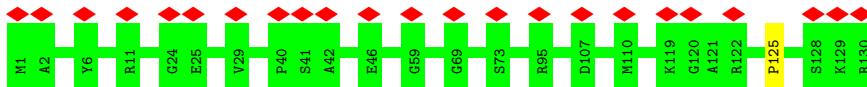
- Molecule 8: 30S ribosomal protein S8

Chain H:  98%



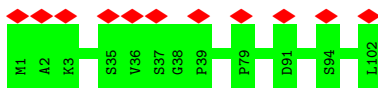
- Molecule 9: 30S ribosomal protein S9

Chain I:  18%  99%



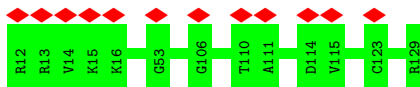
- Molecule 10: 30S ribosomal protein S10

Chain J:  11%  100%



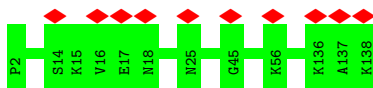
- Molecule 11: 30S ribosomal protein S11

Chain K:  10%  100%

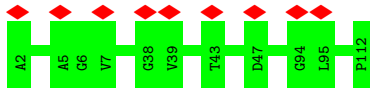


- Molecule 12: 30S ribosomal protein S12

Chain L:  7%  100%



- Molecule 13: 30S ribosomal protein S13

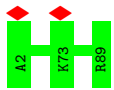


- Molecule 14: 30S ribosomal protein S14

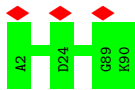


There are no outlier residues recorded for this chain.

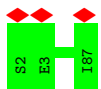
- Molecule 15: 30S ribosomal protein S15



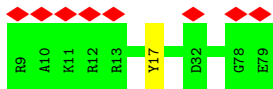
- Molecule 16: 30S ribosomal protein S16



- Molecule 17: 30S ribosomal protein S17



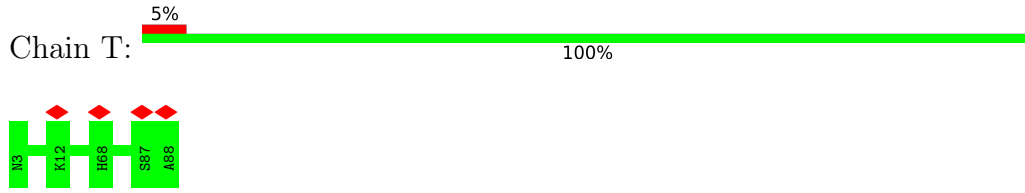
- Molecule 18: 30S ribosomal protein S18



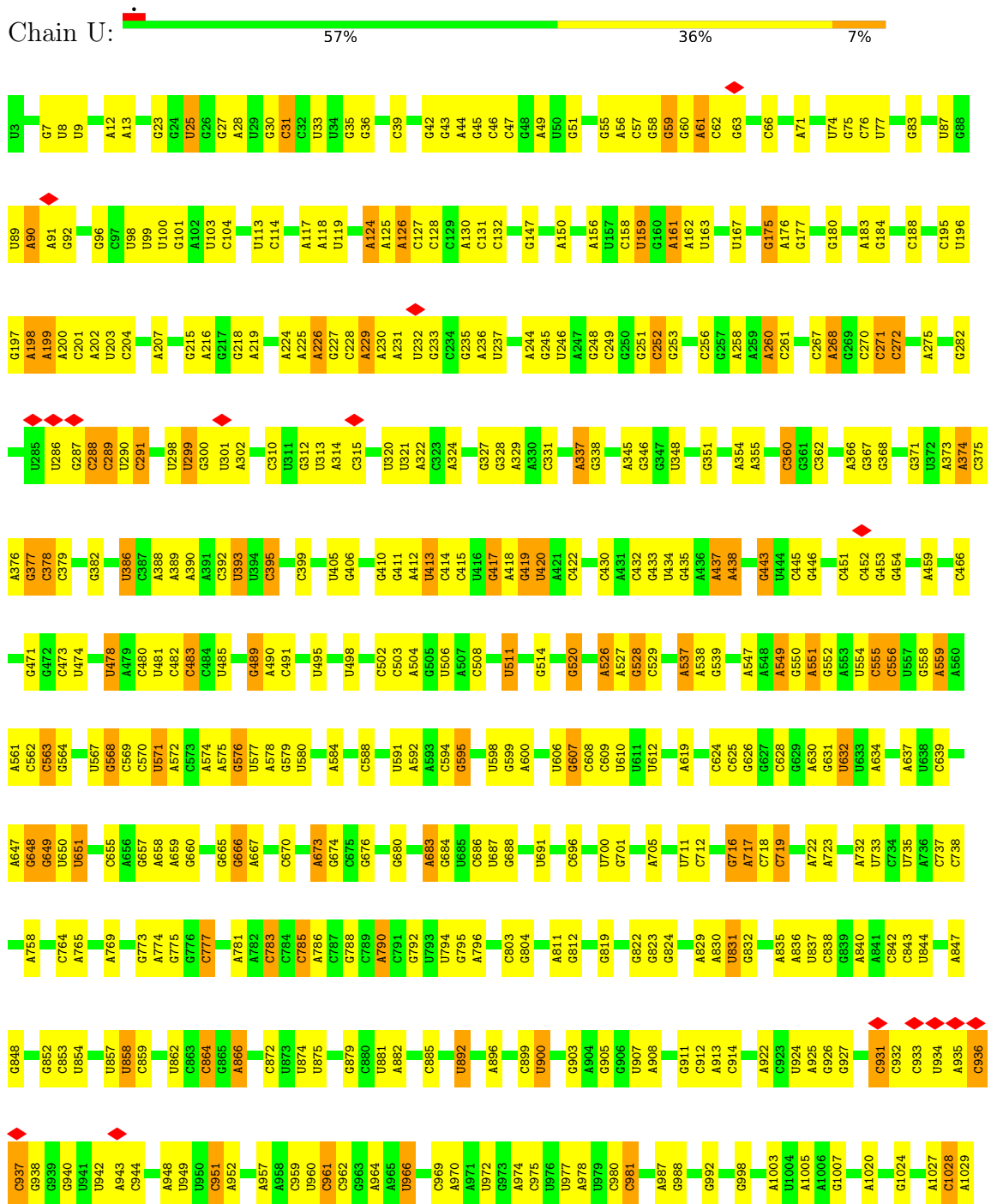
- Molecule 19: 30S ribosomal protein S19

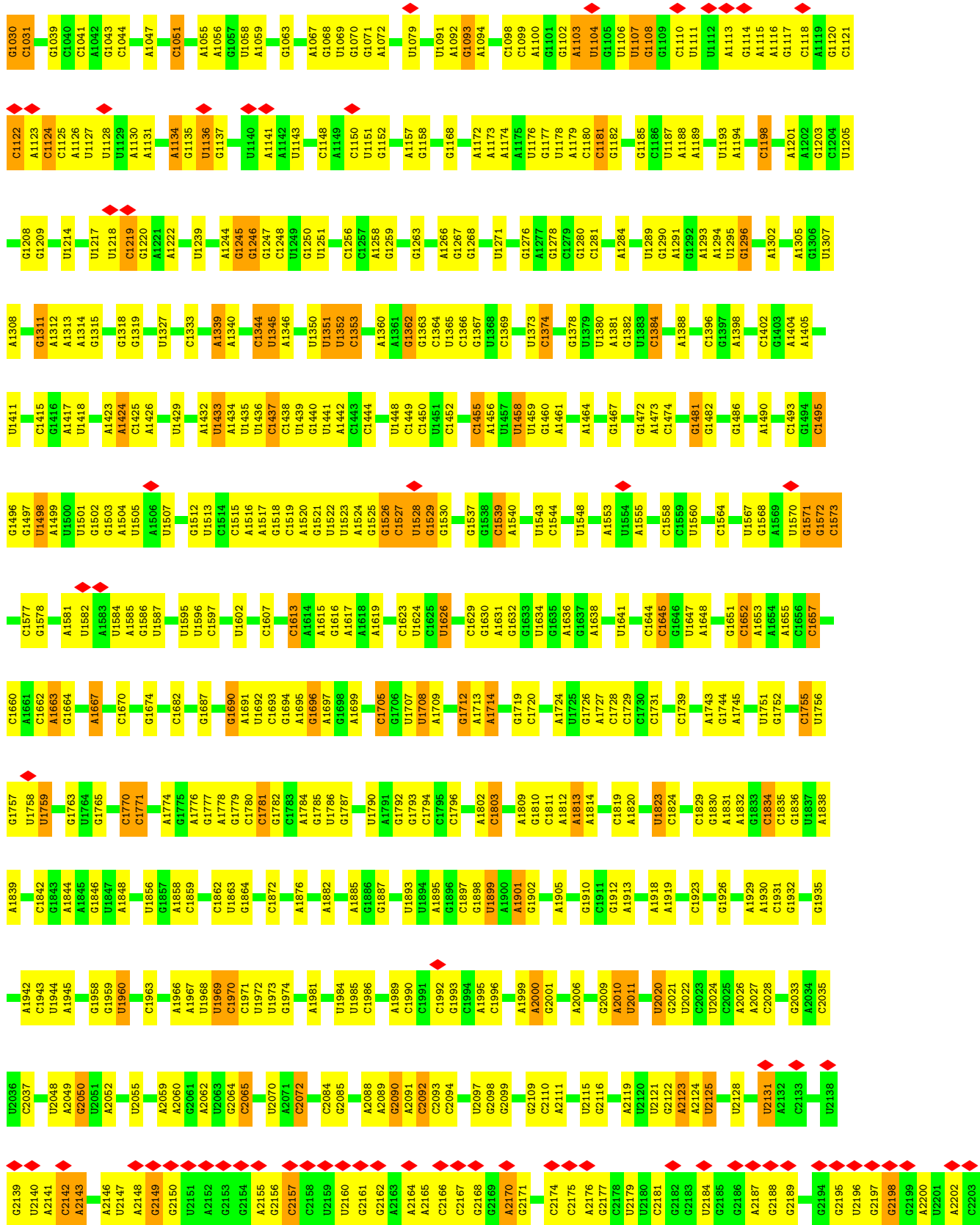


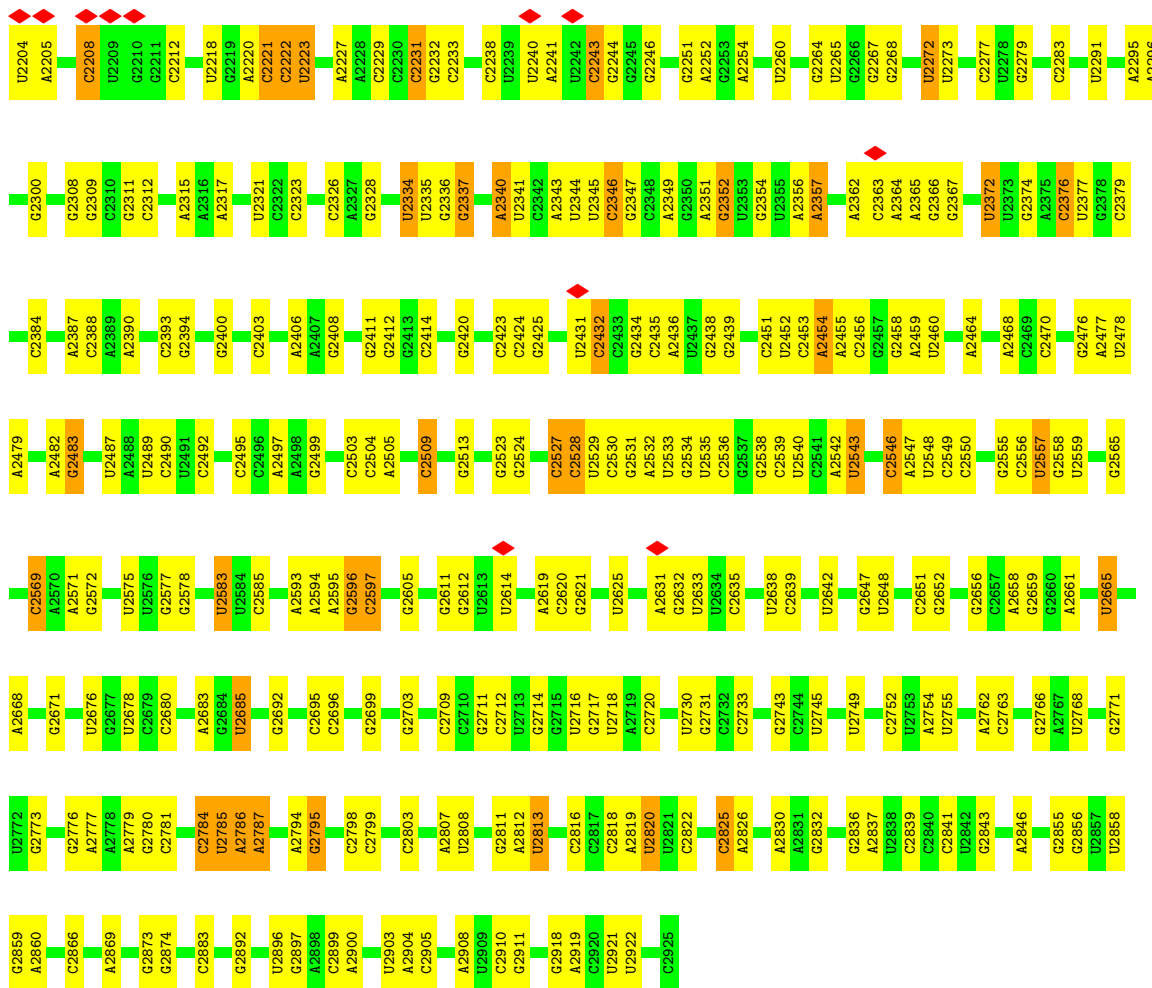
• Molecule 20: 30S ribosomal protein S20



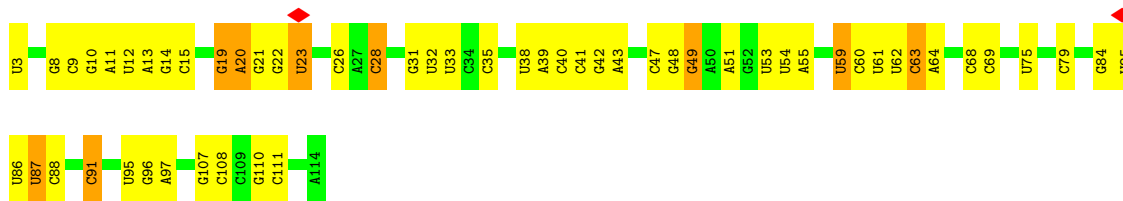
• Molecule 21: 23S ribosomal RNA



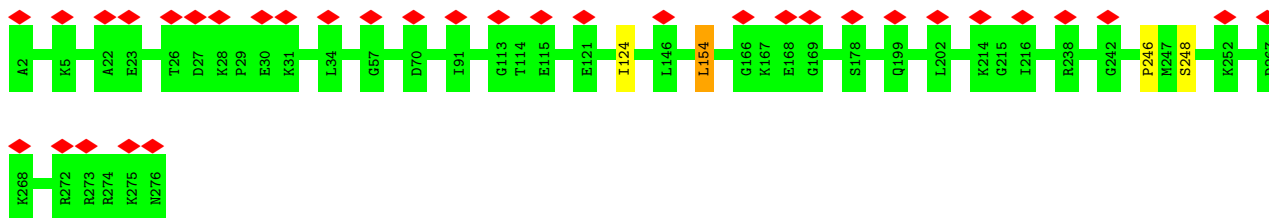




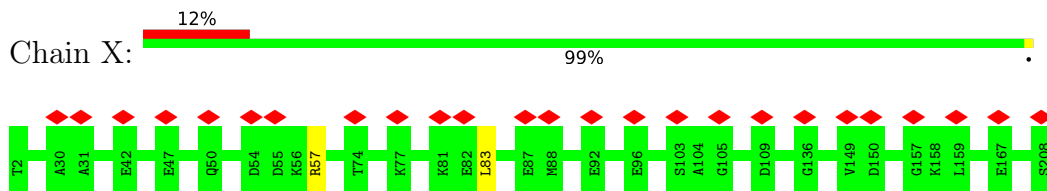
• Molecule 22: 5S ribosomal RNA



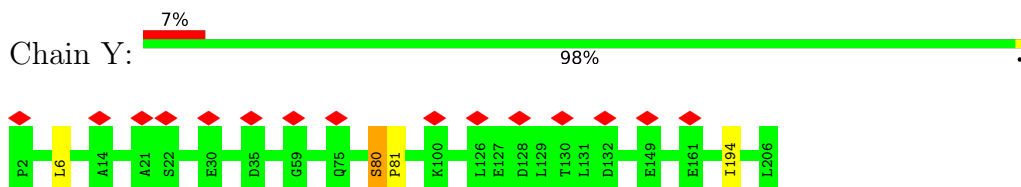
• Molecule 23: 50S ribosomal protein L2



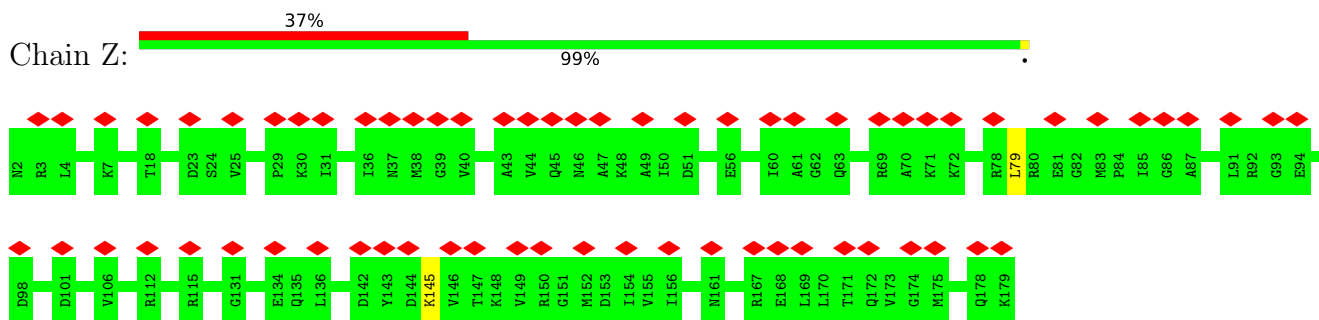
- Molecule 24: 50S ribosomal protein L3



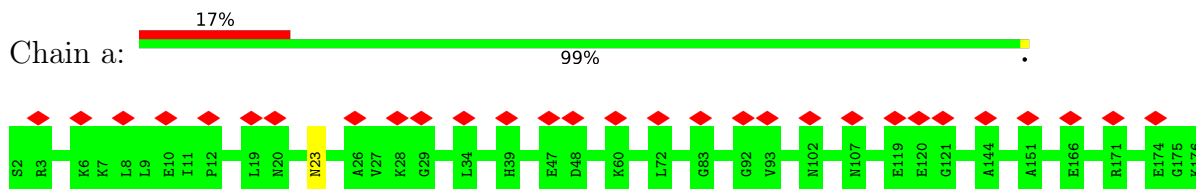
- Molecule 25: 50S ribosomal protein L4



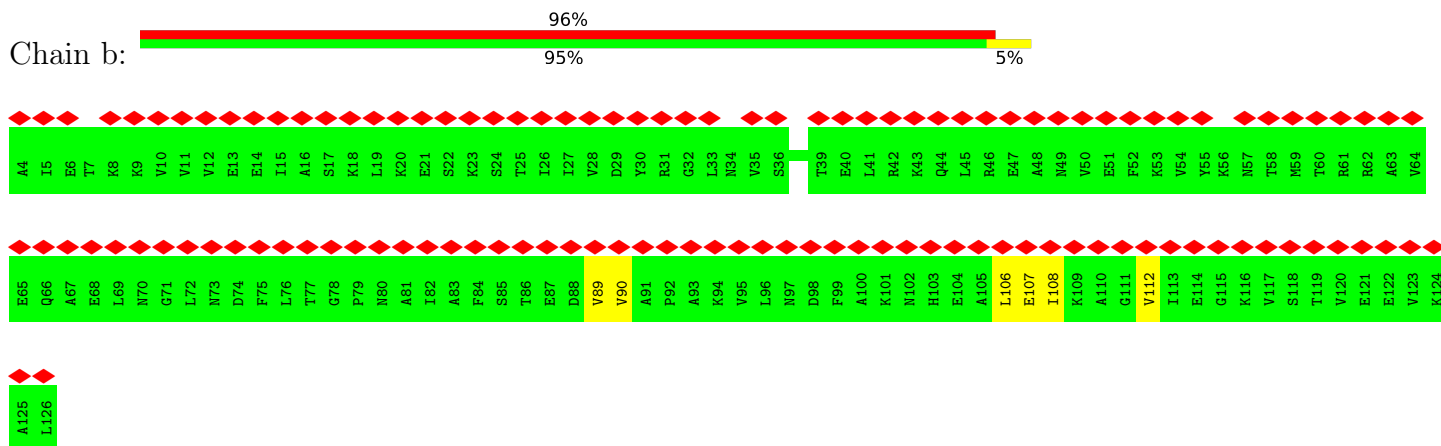
- Molecule 26: 50S ribosomal protein L5



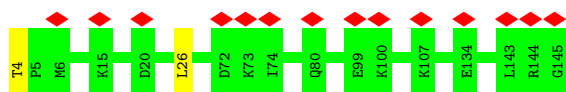
- Molecule 27: 50S ribosomal protein L6



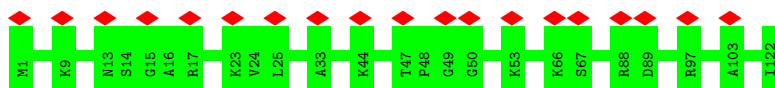
- Molecule 28: 50S ribosomal protein L10



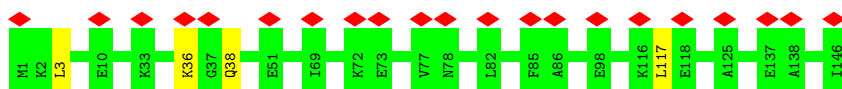
- Molecule 29: 50S ribosomal protein L13



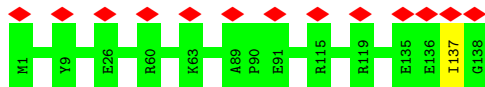
- Molecule 30: 50S ribosomal protein L14



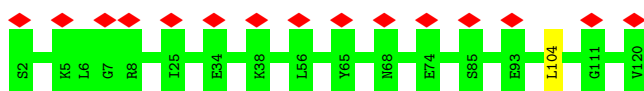
- Molecule 31: 50S ribosomal protein L15



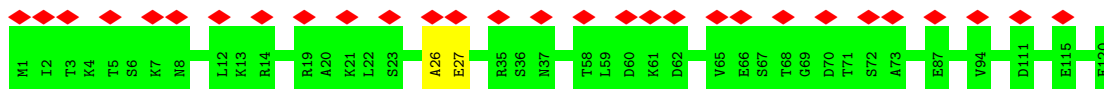
- Molecule 32: 50S ribosomal protein L16



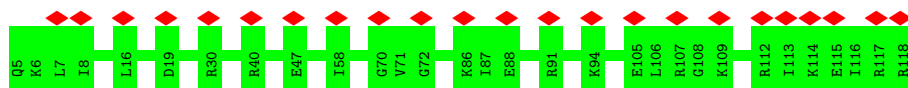
- Molecule 33: 50S ribosomal protein L17



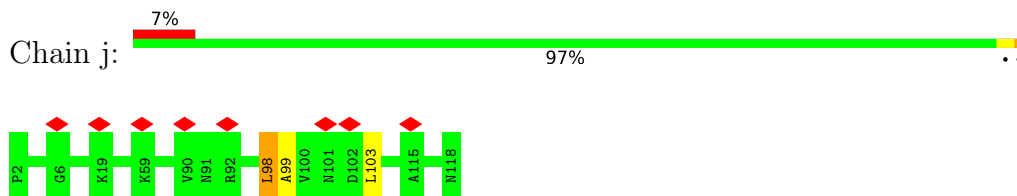
- Molecule 34: 50S ribosomal protein L18



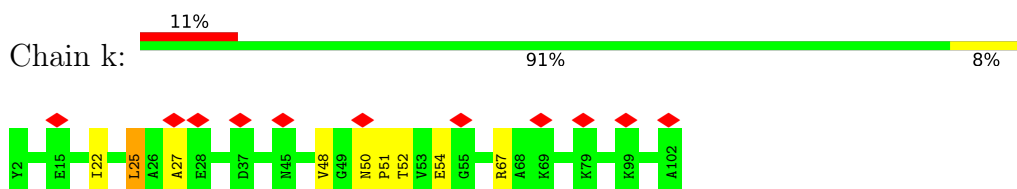
- Molecule 35: 50S ribosomal protein L19



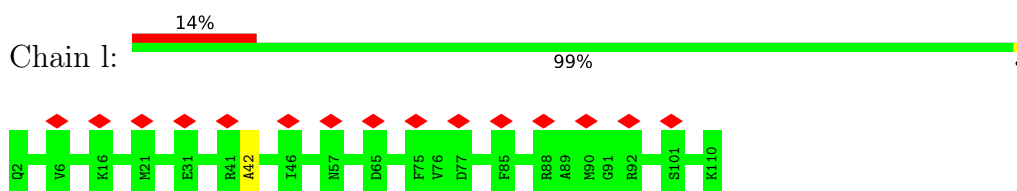
- Molecule 36: 50S ribosomal protein L20



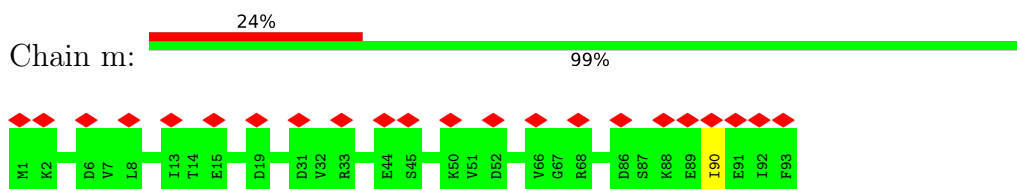
- Molecule 37: 50S ribosomal protein L21



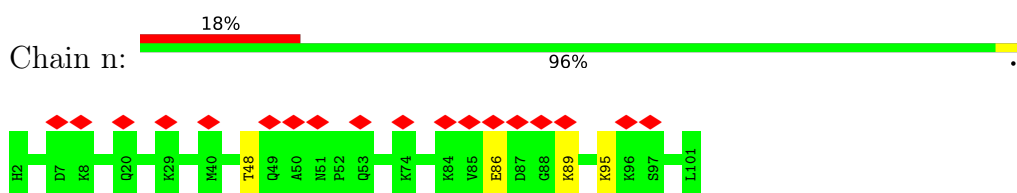
- Molecule 38: 50S ribosomal protein L22



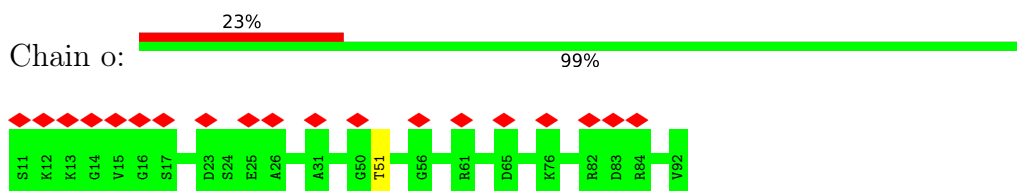
- Molecule 39: 50S ribosomal protein L23



- Molecule 40: 50S ribosomal protein L24

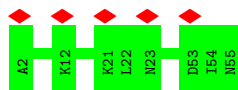


- Molecule 41: 50S ribosomal protein L27

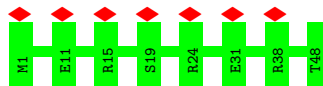


- Molecule 42: 50S ribosomal protein L32

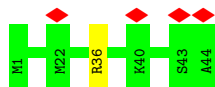




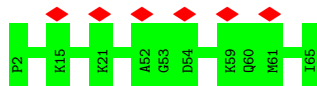
- Molecule 43: 50S ribosomal protein L33 1



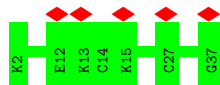
- Molecule 44: 50S ribosomal protein L34



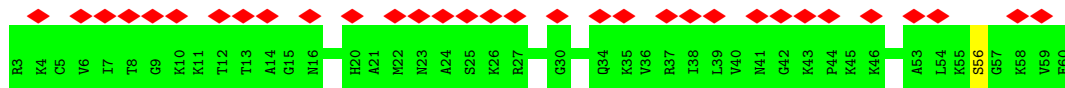
- Molecule 45: 50S ribosomal protein L35



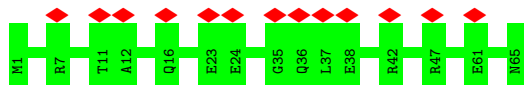
- Molecule 46: 50S ribosomal protein L36



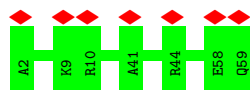
- Molecule 47: 50S ribosomal protein L28



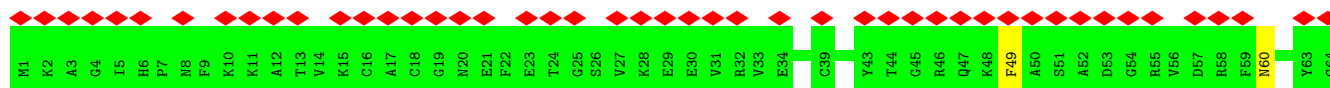
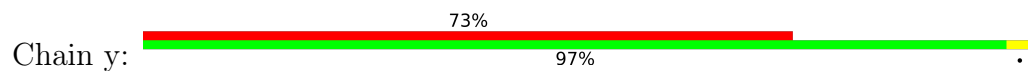
- Molecule 48: 50S ribosomal protein L29



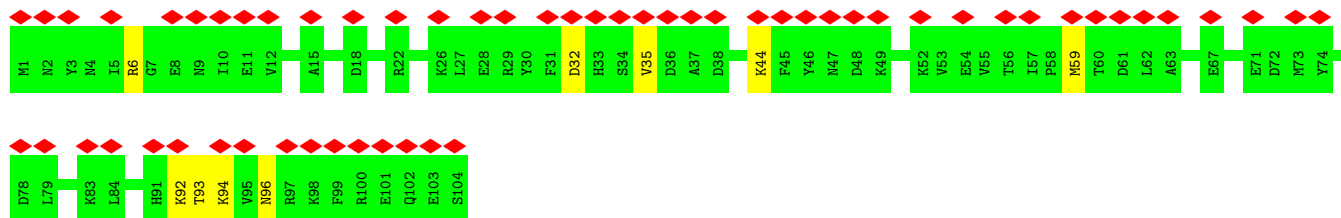
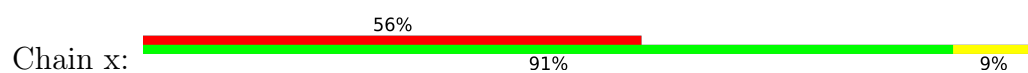
- Molecule 49: 50S ribosomal protein L30



- Molecule 50: 50S ribosomal protein L31



- Molecule 51: Ribosome hibernation promotion factor



4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	24546	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	2.5	Depositor
Minimum defocus (nm)	Not provided	
Maximum defocus (nm)	Not provided	
Magnification	Not provided	
Image detector	FEI FALCON II (4k x 4k)	Depositor
Maximum map value	55.100	Depositor
Minimum map value	-33.631	Depositor
Average map value	0.128	Depositor
Map value standard deviation	2.386	Depositor
Recommended contour level	11.0	Depositor
Map size (Å)	487.8, 487.8, 487.8	wwPDB
Map dimensions	450, 450, 450	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.084, 1.084, 1.084	Depositor

5 Model quality i

5.1 Standard geometry i

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	A	0.82	1/37074 (0.0%)	1.29	369/57834 (0.6%)
2	B	0.25	0/895	0.48	0/1117
3	C	0.57	4/839 (0.5%)	0.74	5/1047 (0.5%)
4	D	0.25	0/796	0.50	0/992
5	E	0.25	0/660	0.52	0/822
6	F	0.25	0/380	0.56	0/472
7	G	0.24	0/612	0.43	0/762
8	H	0.24	0/524	0.50	0/652
9	I	0.26	0/520	0.63	0/647
10	J	0.25	0/408	0.49	0/507
11	K	0.25	0/471	0.52	0/587
12	L	0.24	0/548	0.61	0/682
13	M	0.25	0/443	0.55	0/552
14	N	0.25	0/240	0.52	0/297
15	O	0.24	0/352	0.43	0/437
16	P	0.27	0/356	0.52	0/442
17	Q	0.22	0/344	0.54	0/427
18	R	0.24	0/284	0.56	0/352
19	S	0.26	0/319	0.62	0/397
20	T	0.24	0/344	0.37	0/427
21	U	0.94	9/70307 (0.0%)	1.39	892/109687 (0.8%)
22	V	0.73	0/2678	1.36	47/4174 (1.1%)
23	W	0.50	0/2148	0.69	1/2881 (0.0%)
24	X	0.46	0/1597	0.69	1/2140 (0.0%)
25	Y	0.45	0/1580	0.68	1/2132 (0.0%)
26	Z	0.37	0/1423	0.70	1/1910 (0.1%)
27	a	0.39	0/1360	0.61	0/1832
28	b	0.30	0/963	0.65	0/1298
29	c	0.47	0/1146	0.72	1/1542 (0.1%)
30	d	0.48	0/927	0.69	0/1245
31	e	0.42	0/1093	0.71	1/1457 (0.1%)
32	f	0.48	0/1120	0.66	1/1496 (0.1%)
33	g	0.47	0/960	0.70	0/1284
34	h	0.38	0/921	0.71	0/1236

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
35	i	0.47	0/949	0.65	0/1269
36	j	0.51	0/952	0.66	1/1266 (0.1%)
37	k	0.49	0/797	0.91	2/1070 (0.2%)
38	l	0.45	0/851	0.73	0/1146
39	m	0.45	0/759	0.66	1/1011 (0.1%)
40	n	0.43	0/764	0.73	1/1022 (0.1%)
41	o	0.52	0/638	0.66	0/847
42	p	0.54	0/433	0.70	0/574
43	q	0.45	0/406	0.65	0/540
44	r	0.46	0/370	0.66	0/483
45	s	0.46	0/519	0.71	0/680
46	t	0.44	0/291	0.61	0/383
47	u	0.42	0/448	0.82	0/596
48	v	0.38	0/531	0.59	0/707
49	w	0.48	0/457	0.67	0/613
50	y	0.27	0/513	0.43	0/683
51	x	0.40	0/878	0.73	0/1178
All	All	0.81	14/145188 (0.0%)	1.24	1325/217834 (0.6%)

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

Mol	Chain	#Chirality outliers	#Planarity outliers
29	c	0	1
40	n	0	1
All	All	0	2

The worst 5 of 14 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	C	5	VAL	C-O	-8.12	1.07	1.23
3	C	6	ASN	N-CA	7.20	1.60	1.46
21	U	559	A	N9-C4	-6.42	1.33	1.37
21	U	1812	A	N9-C4	-6.29	1.34	1.37
3	C	5	VAL	N-CA	5.92	1.58	1.46

The worst 5 of 1325 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
37	k	50	ASN	C-N-CD	-19.04	78.72	120.60

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	1295	C	N1-C2-O2	13.69	127.11	118.90
21	U	1031	C	N1-C2-O2	12.53	126.42	118.90
21	U	1433	U	N1-C2-O2	12.39	131.47	122.80
21	U	1433	U	C2-N1-C1'	12.37	132.55	117.70

There are no chirality outliers.

All (2) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
29	c	4	THR	Peptide
40	n	95	LYS	Peptide

5.2 Too-close contacts [i](#)

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

5.3 Torsion angles [i](#)

5.3.1 Protein backbone [i](#)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
2	B	222/224 (99%)	195 (88%)	27 (12%)	0	100	100
3	C	208/210 (99%)	180 (86%)	25 (12%)	3 (1%)	11	46
4	D	197/199 (99%)	169 (86%)	28 (14%)	0	100	100
5	E	163/165 (99%)	133 (82%)	30 (18%)	0	100	100
6	F	93/95 (98%)	77 (83%)	16 (17%)	0	100	100
7	G	151/153 (99%)	121 (80%)	30 (20%)	0	100	100
8	H	129/131 (98%)	102 (79%)	24 (19%)	3 (2%)	6	38
9	I	128/130 (98%)	95 (74%)	32 (25%)	1 (1%)	19	57
10	J	100/102 (98%)	80 (80%)	20 (20%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
11	K	116/118 (98%)	97 (84%)	19 (16%)	0	100	100
12	L	135/137 (98%)	111 (82%)	24 (18%)	0	100	100
13	M	109/111 (98%)	86 (79%)	23 (21%)	0	100	100
14	N	58/60 (97%)	46 (79%)	12 (21%)	0	100	100
15	O	86/88 (98%)	80 (93%)	6 (7%)	0	100	100
16	P	87/89 (98%)	64 (74%)	23 (26%)	0	100	100
17	Q	84/86 (98%)	72 (86%)	12 (14%)	0	100	100
18	R	69/71 (97%)	54 (78%)	14 (20%)	1 (1%)	11	46
19	S	78/80 (98%)	58 (74%)	20 (26%)	0	100	100
20	T	84/86 (98%)	79 (94%)	5 (6%)	0	100	100
23	W	273/275 (99%)	234 (86%)	36 (13%)	3 (1%)	14	51
24	X	205/207 (99%)	188 (92%)	17 (8%)	0	100	100
25	Y	203/205 (99%)	177 (87%)	24 (12%)	2 (1%)	15	52
26	Z	176/178 (99%)	150 (85%)	26 (15%)	0	100	100
27	a	173/175 (99%)	155 (90%)	18 (10%)	0	100	100
28	b	121/123 (98%)	96 (79%)	22 (18%)	3 (2%)	5	36
29	c	140/142 (99%)	125 (89%)	15 (11%)	0	100	100
30	d	120/122 (98%)	106 (88%)	14 (12%)	0	100	100
31	e	144/146 (99%)	128 (89%)	15 (10%)	1 (1%)	22	60
32	f	136/138 (99%)	120 (88%)	16 (12%)	0	100	100
33	g	117/119 (98%)	108 (92%)	9 (8%)	0	100	100
34	h	118/120 (98%)	104 (88%)	13 (11%)	1 (1%)	19	57
35	i	112/114 (98%)	93 (83%)	19 (17%)	0	100	100
36	j	115/117 (98%)	107 (93%)	6 (5%)	2 (2%)	9	43
37	k	99/101 (98%)	72 (73%)	22 (22%)	5 (5%)	2	23
38	l	107/109 (98%)	88 (82%)	18 (17%)	1 (1%)	17	54
39	m	91/93 (98%)	82 (90%)	9 (10%)	0	100	100
40	n	98/100 (98%)	80 (82%)	18 (18%)	0	100	100
41	o	80/82 (98%)	74 (92%)	6 (8%)	0	100	100
42	p	52/54 (96%)	46 (88%)	6 (12%)	0	100	100
43	q	46/48 (96%)	42 (91%)	4 (9%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
44	r	42/44 (96%)	39 (93%)	3 (7%)	0	100	100
45	s	62/64 (97%)	54 (87%)	8 (13%)	0	100	100
46	t	34/36 (94%)	30 (88%)	4 (12%)	0	100	100
47	u	56/58 (97%)	47 (84%)	9 (16%)	0	100	100
48	v	63/65 (97%)	58 (92%)	5 (8%)	0	100	100
49	w	56/58 (97%)	51 (91%)	5 (9%)	0	100	100
50	y	62/64 (97%)	56 (90%)	4 (6%)	2 (3%)	4	32
51	x	102/104 (98%)	79 (78%)	20 (20%)	3 (3%)	4	34
All	All	5500/5596 (98%)	4688 (85%)	781 (14%)	31 (1%)	29	62

5 of 31 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
3	C	5	VAL
3	C	6	ASN
8	H	98	LEU
23	W	154	LEU
25	Y	80	SER

5.3.2 Protein sidechains [i](#)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
23	W	223/223 (100%)	222 (100%)	1 (0%)	91	95
24	X	168/168 (100%)	167 (99%)	1 (1%)	86	92
25	Y	169/169 (100%)	167 (99%)	2 (1%)	71	84
26	Z	153/153 (100%)	152 (99%)	1 (1%)	84	91
27	a	148/148 (100%)	147 (99%)	1 (1%)	84	91
28	b	105/105 (100%)	102 (97%)	3 (3%)	42	67
29	c	120/120 (100%)	120 (100%)	0	100	100
30	d	101/101 (100%)	101 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
31	e	110/110 (100%)	108 (98%)	2 (2%)	59	77
32	f	111/111 (100%)	111 (100%)	0	100	100
33	g	99/99 (100%)	98 (99%)	1 (1%)	76	86
34	h	93/93 (100%)	92 (99%)	1 (1%)	73	85
35	i	99/99 (100%)	99 (100%)	0	100	100
36	j	96/96 (100%)	95 (99%)	1 (1%)	76	86
37	k	83/83 (100%)	80 (96%)	3 (4%)	35	63
38	l	90/90 (100%)	90 (100%)	0	100	100
39	m	84/84 (100%)	84 (100%)	0	100	100
40	n	84/84 (100%)	82 (98%)	2 (2%)	49	71
41	o	64/64 (100%)	63 (98%)	1 (2%)	62	79
42	p	48/48 (100%)	48 (100%)	0	100	100
43	q	46/46 (100%)	46 (100%)	0	100	100
44	r	39/39 (100%)	38 (97%)	1 (3%)	46	69
45	s	54/54 (100%)	54 (100%)	0	100	100
46	t	34/34 (100%)	34 (100%)	0	100	100
47	u	47/47 (100%)	46 (98%)	1 (2%)	53	74
48	v	56/56 (100%)	56 (100%)	0	100	100
49	w	52/52 (100%)	52 (100%)	0	100	100
50	y	53/53 (100%)	53 (100%)	0	100	100
51	x	97/97 (100%)	91 (94%)	6 (6%)	18	49
All	All	2726/2726 (100%)	2698 (99%)	28 (1%)	77	86

5 of 28 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
37	k	25	LEU
51	x	96	ASN
40	n	86	GLU
51	x	44	LYS
37	k	67	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 45 such sidechains are listed below:

Mol	Chain	Res	Type
38	l	28	GLN
43	q	26	ASN
38	l	37	ASN
42	p	19	HIS
46	t	36	GLN

5.3.3 RNA [i](#)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
1	A	1543/1544 (99%)	367 (23%)	17 (1%)
21	U	2922/2923 (99%)	1017 (34%)	60 (2%)
22	V	111/112 (99%)	46 (41%)	2 (1%)
All	All	4576/4579 (99%)	1430 (31%)	79 (1%)

5 of 1430 RNA backbone outliers are listed below:

Mol	Chain	Res	Type
1	A	11	G
1	A	18	A
1	A	24	G
1	A	34	A
1	A	41	G

5 of 79 RNA pucker outliers are listed below:

Mol	Chain	Res	Type
21	U	1455	C
21	U	2504	C
21	U	1527	C
21	U	1779	G
21	U	2785	U

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

There are no non-standard protein/DNA/RNA residues in this entry.

5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

5.6 Ligand geometry [i](#)

There are no ligands in this entry.

5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

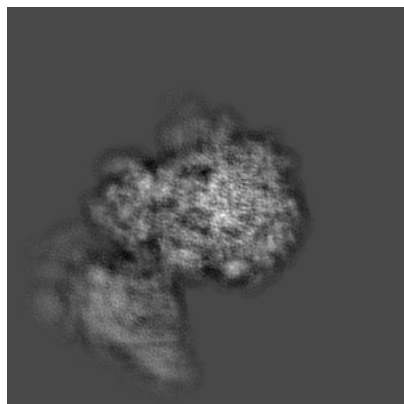
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-3656. These allow visual inspection of the internal detail of the map and identification of artifacts.

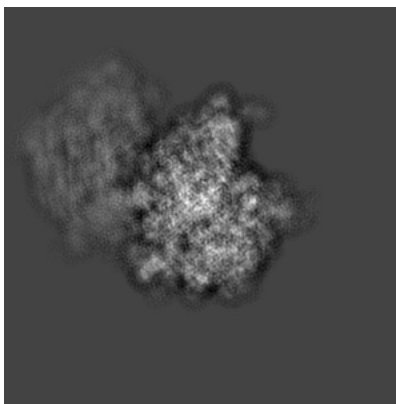
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

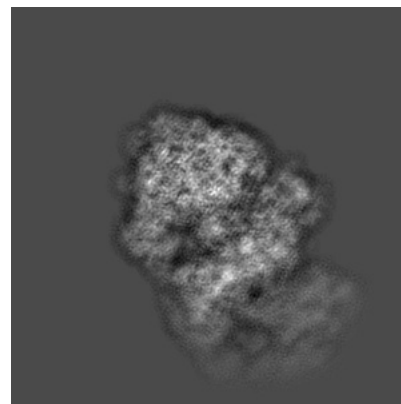
6.1.1 Primary map



X

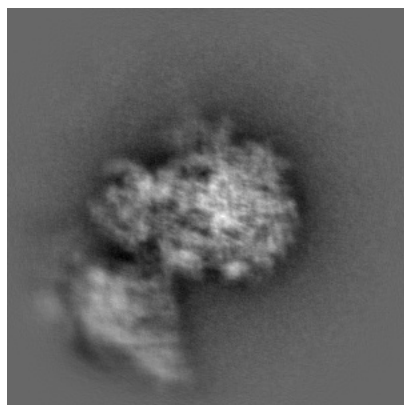


Y

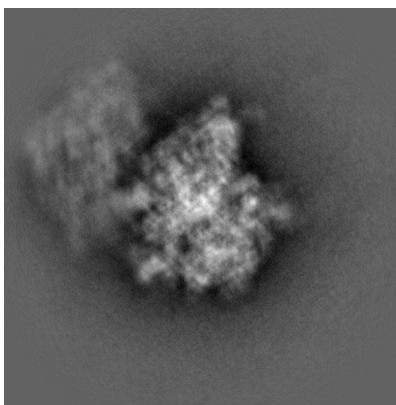


Z

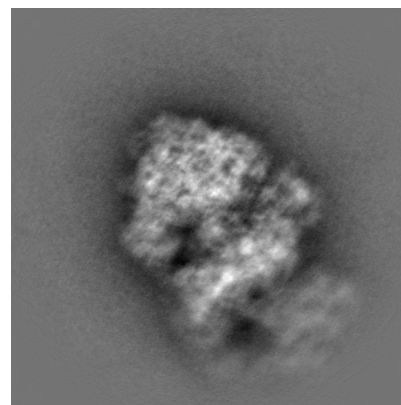
6.1.2 Raw map



X



Y

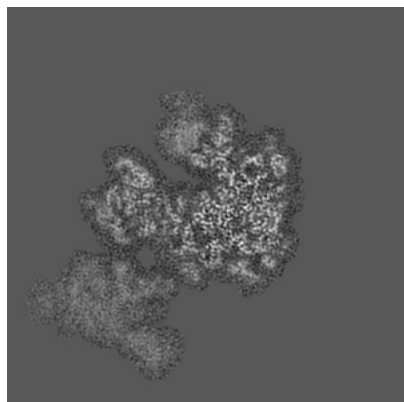


Z

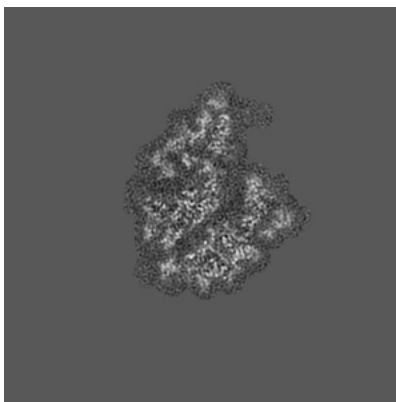
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

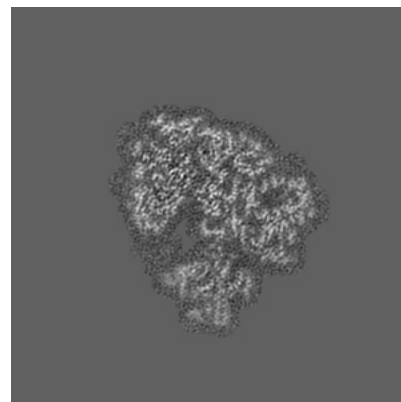
6.2.1 Primary map



X Index: 225

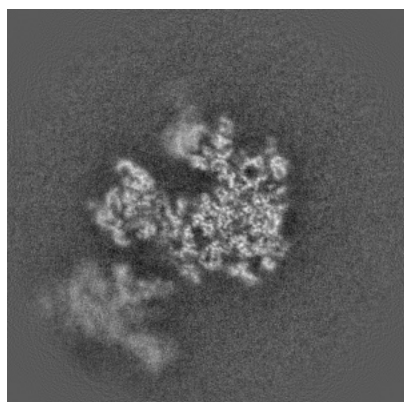


Y Index: 225

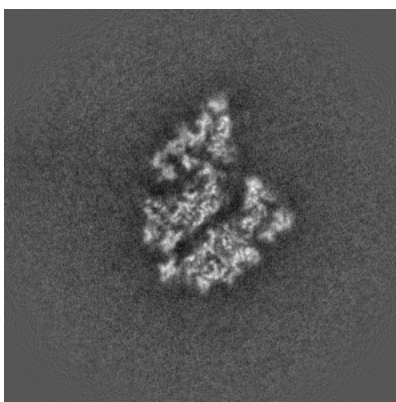


Z Index: 225

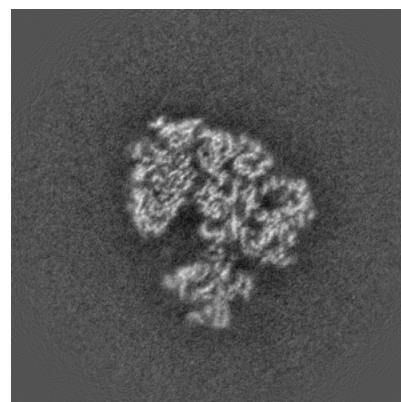
6.2.2 Raw map



X Index: 225



Y Index: 225

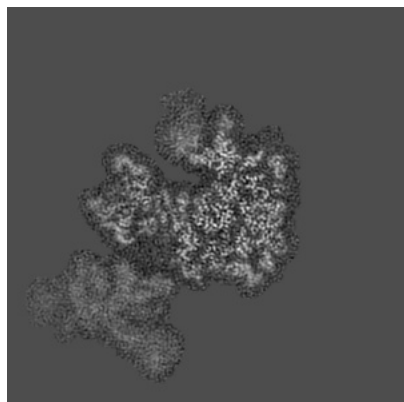


Z Index: 225

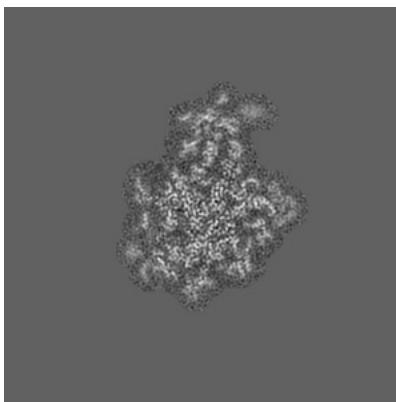
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

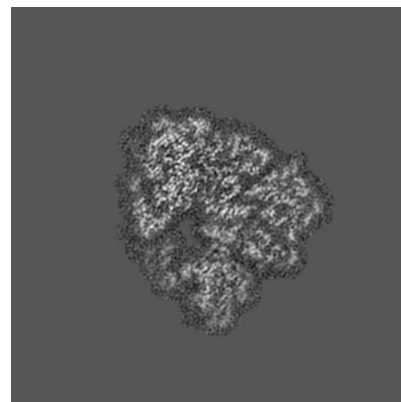
6.3.1 Primary map



X Index: 229

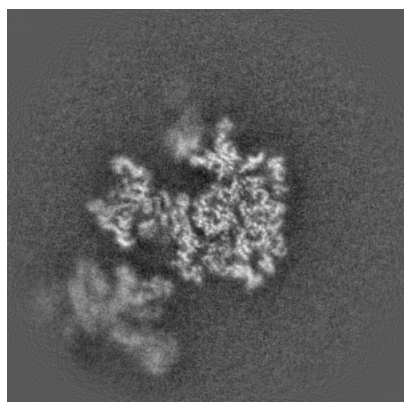


Y Index: 245

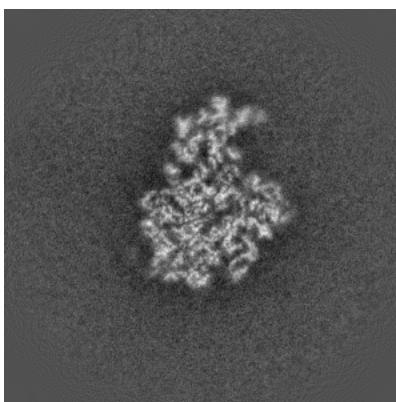


Z Index: 231

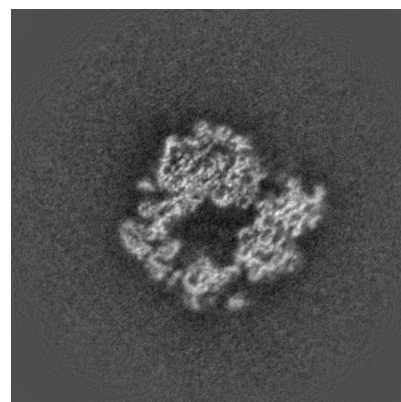
6.3.2 Raw map



X Index: 230



Y Index: 236

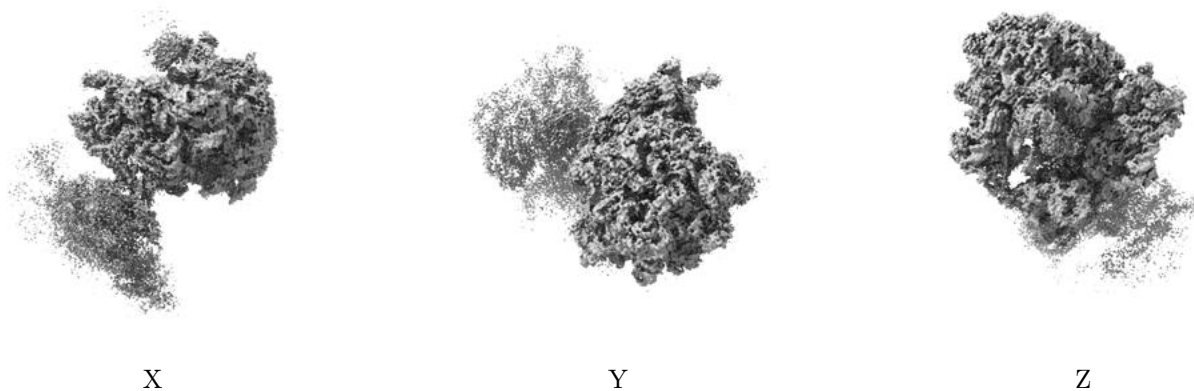


Z Index: 248

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

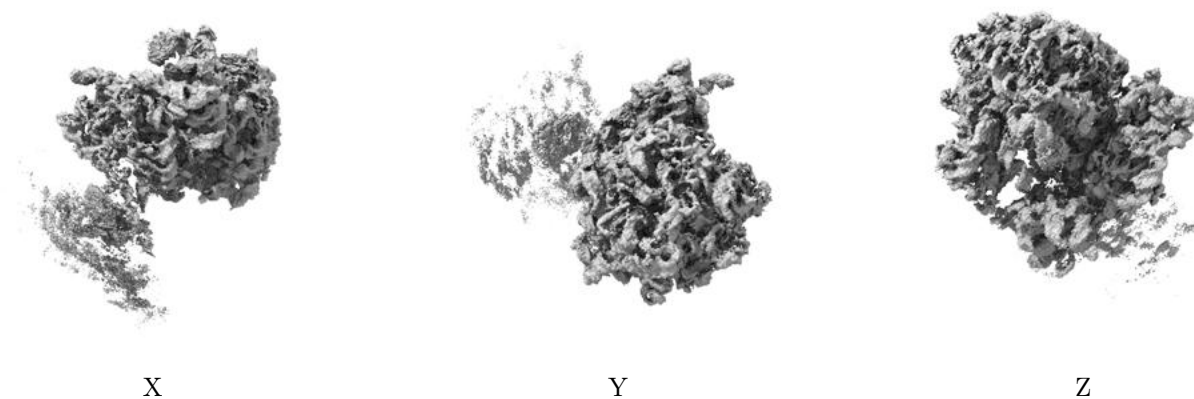
6.4 Orthogonal surface views [i](#)

6.4.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 11.0. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

6.4.2 Raw map



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

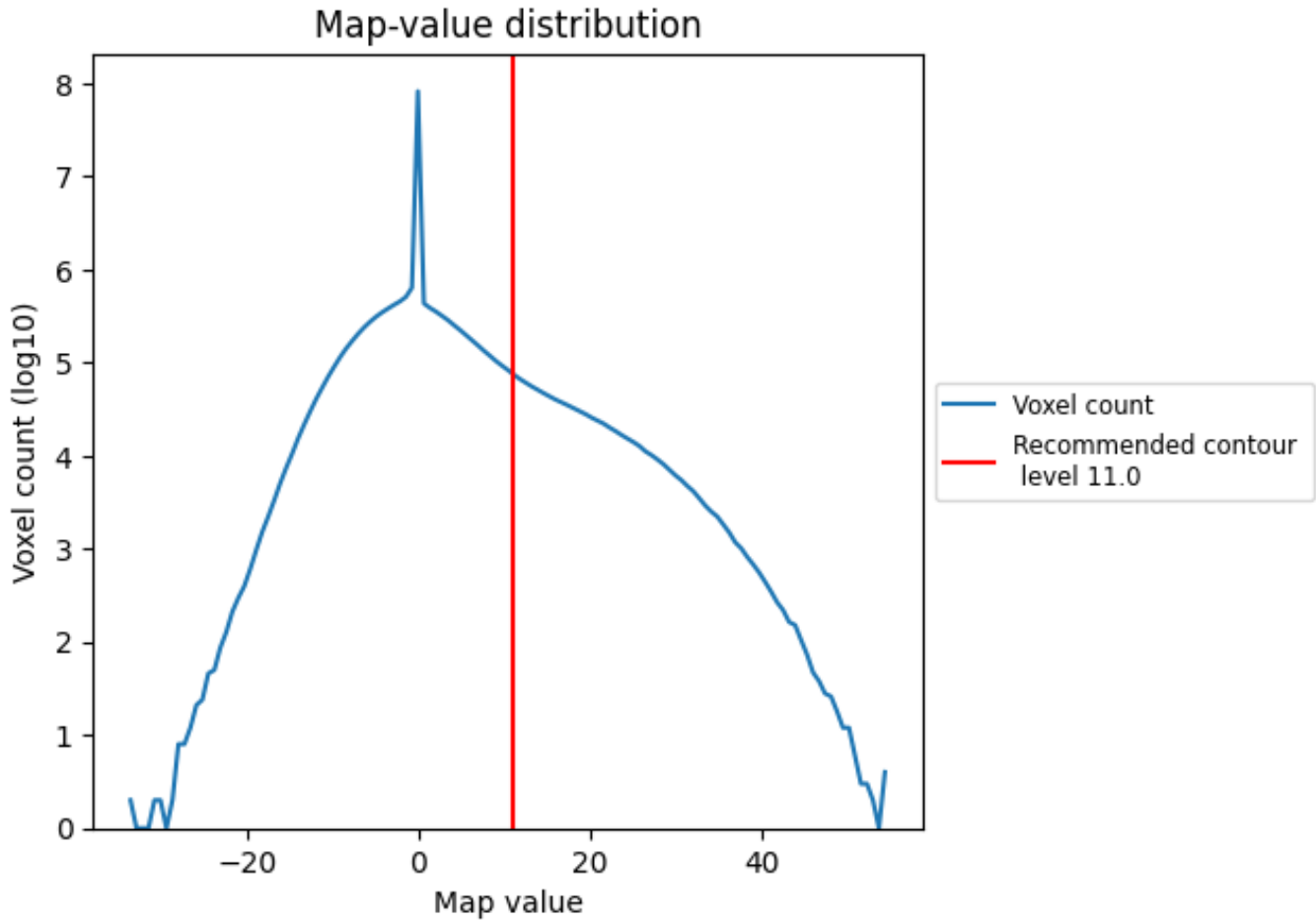
6.5 Mask visualisation [i](#)

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

7 Map analysis [i](#)

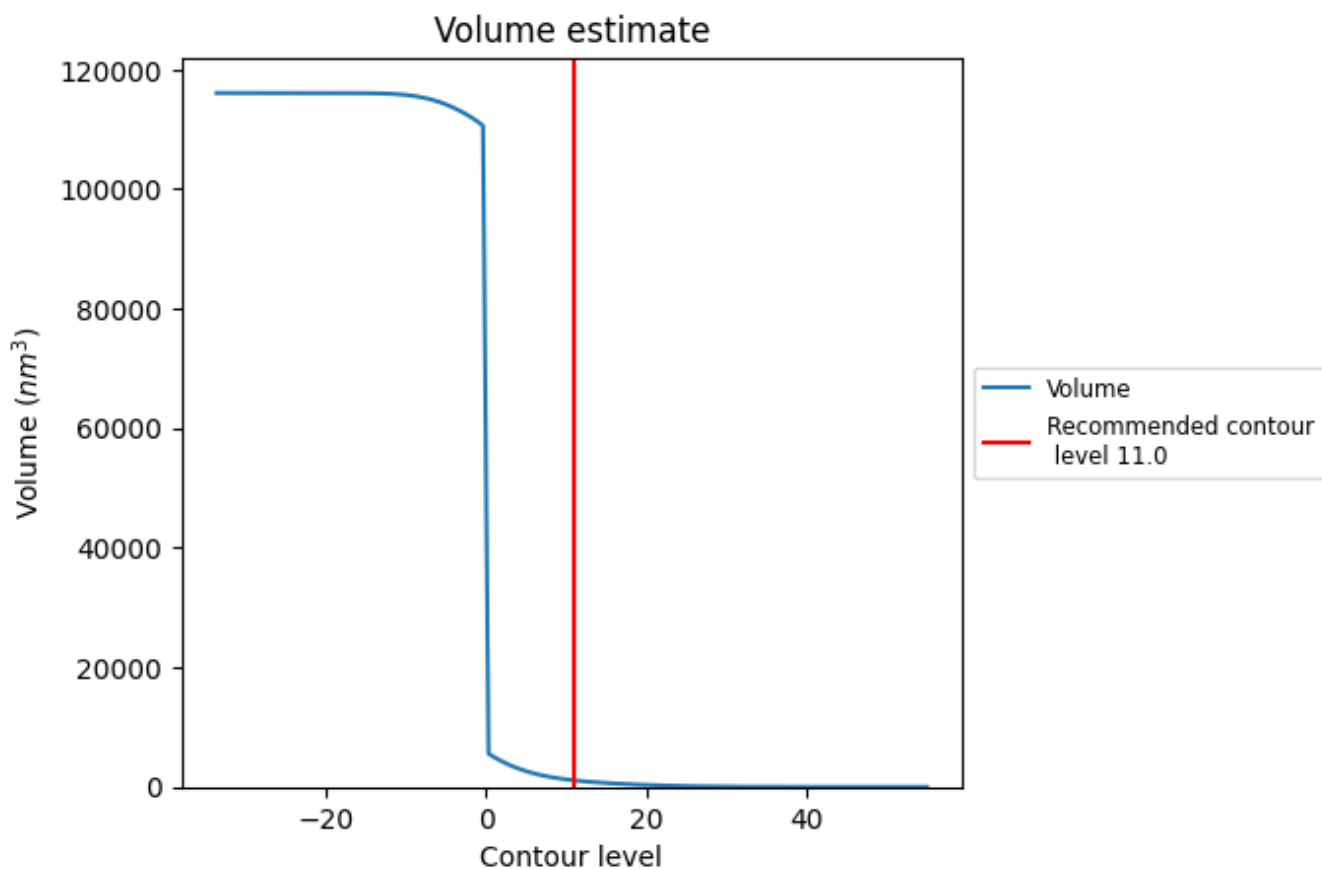
This section contains the results of statistical analysis of the map.

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.

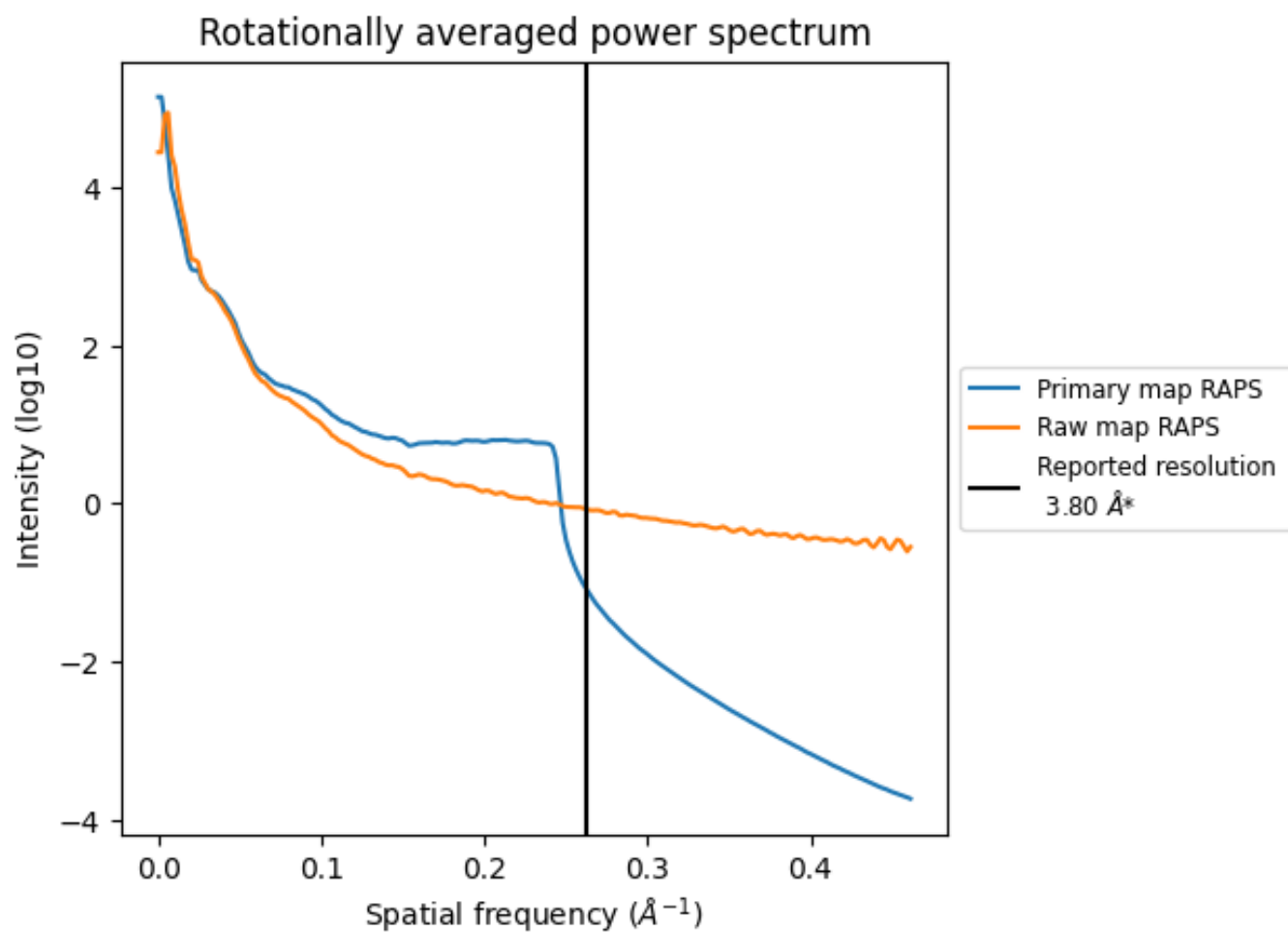
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 1108 nm³; this corresponds to an approximate mass of 1001 kDa.

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

7.3 Rotationally averaged power spectrum i

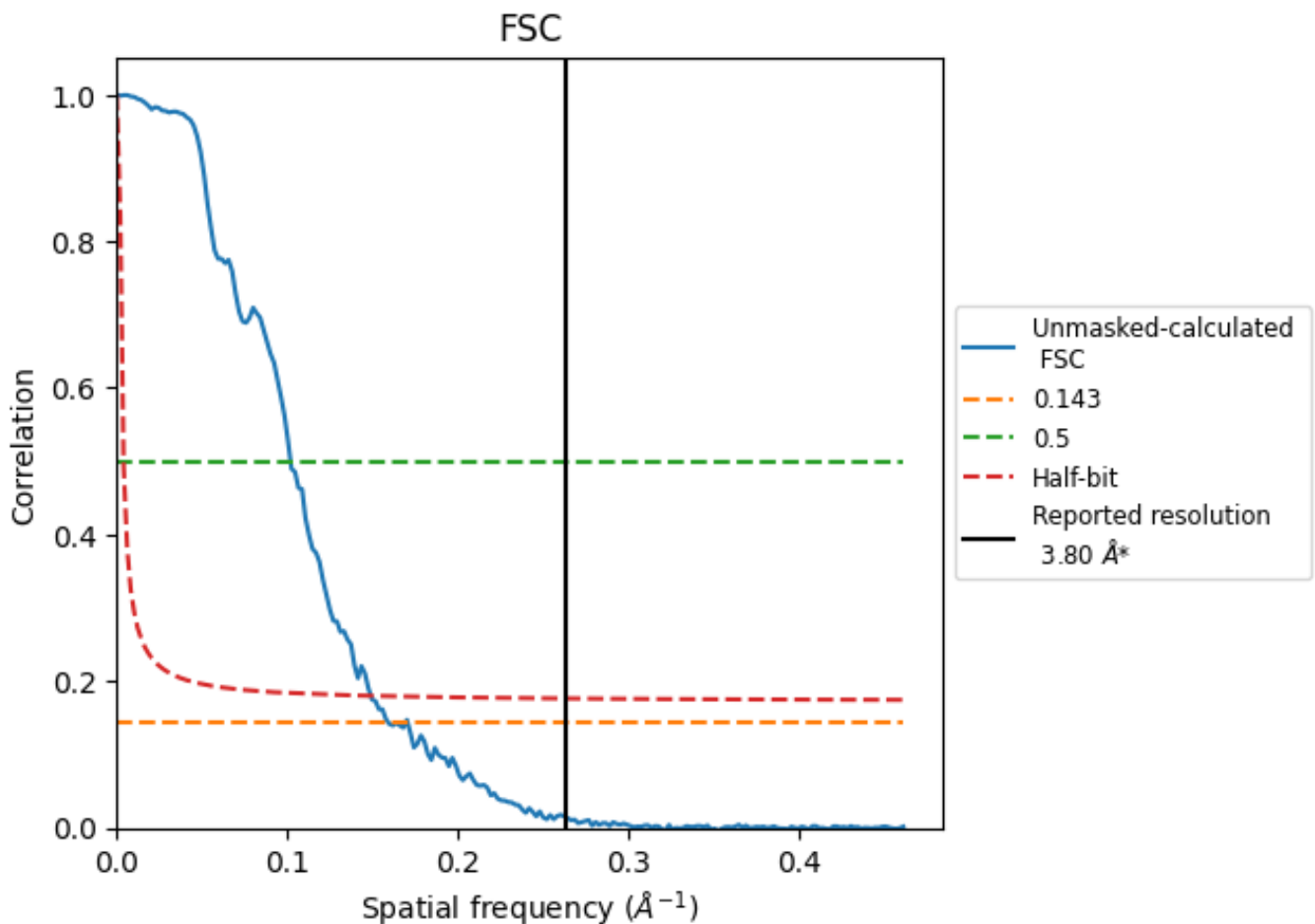


*Reported resolution corresponds to spatial frequency of 0.263 Å⁻¹

8 Fourier-Shell correlation [i](#)

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

8.1 FSC [i](#)



*Reported resolution corresponds to spatial frequency of 0.263 Å⁻¹

8.2 Resolution estimates [i](#)

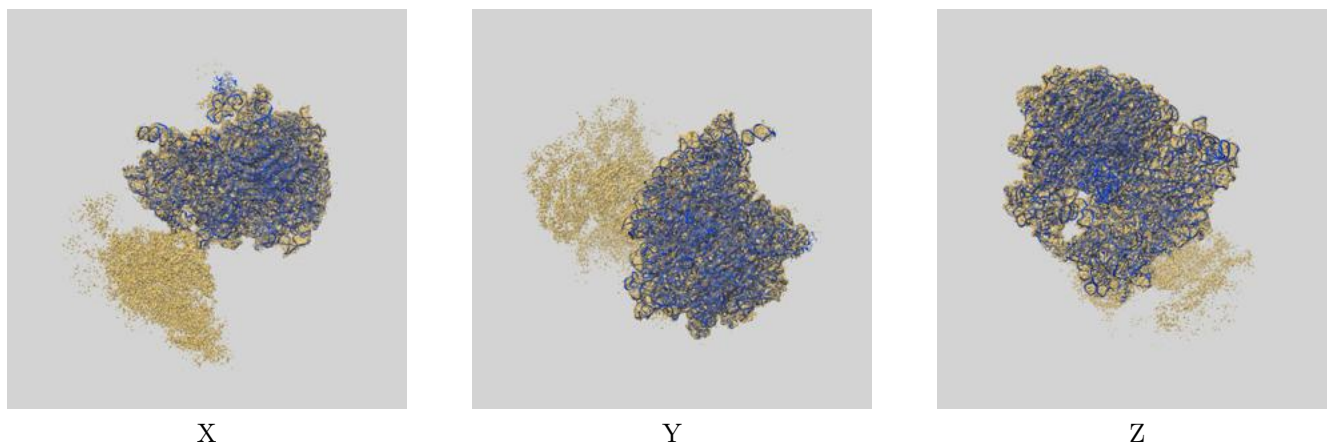
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.80	-	-
Author-provided FSC curve	-	-	-
Unmasked-calculated*	6.27	9.81	6.71

*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 6.27 differs from the reported value 3.8 by more than 10 %

9 Map-model fit [i](#)

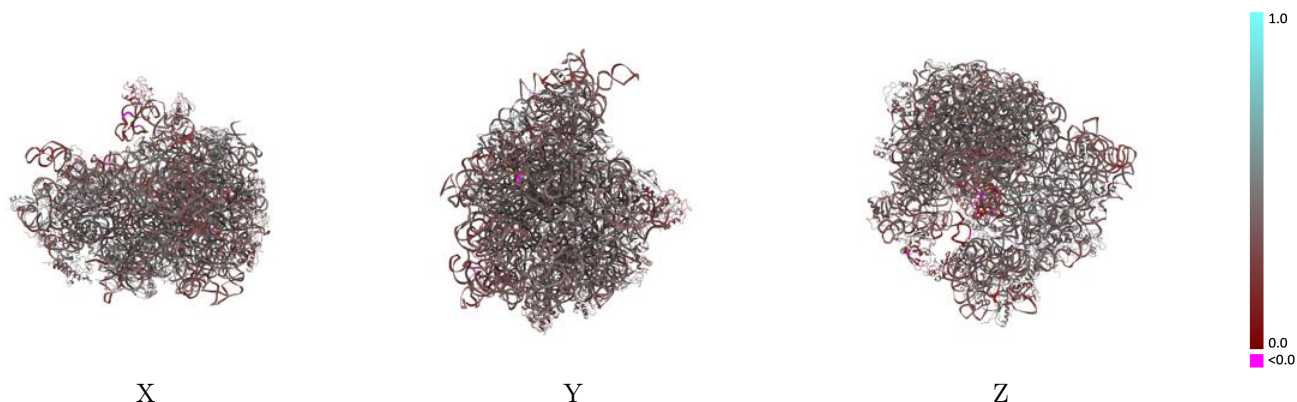
This section contains information regarding the fit between EMDB map EMD-3656 and PDB model 5NJT. Per-residue inclusion information can be found in section 3 on page 13.

9.1 Map-model overlay [i](#)



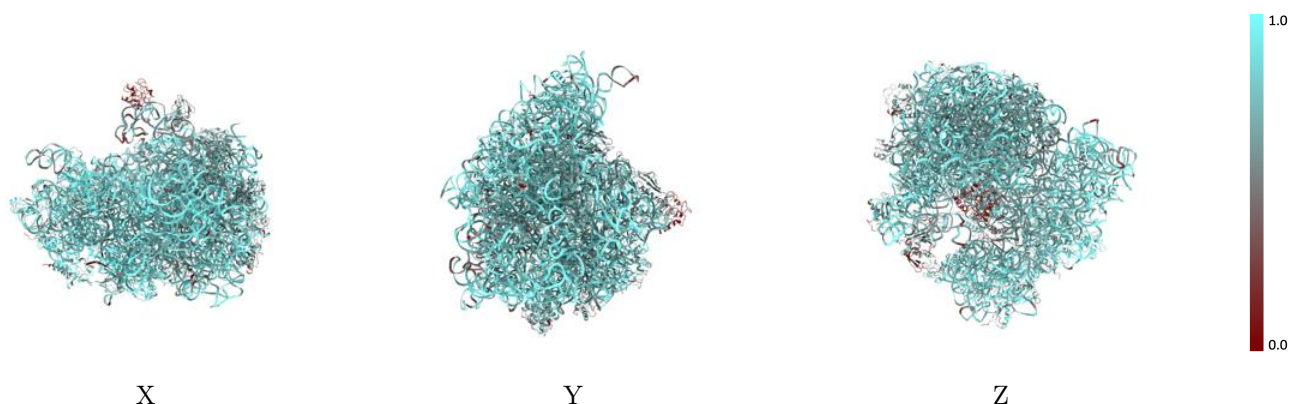
The images above show the 3D surface view of the map at the recommended contour level 11.0 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



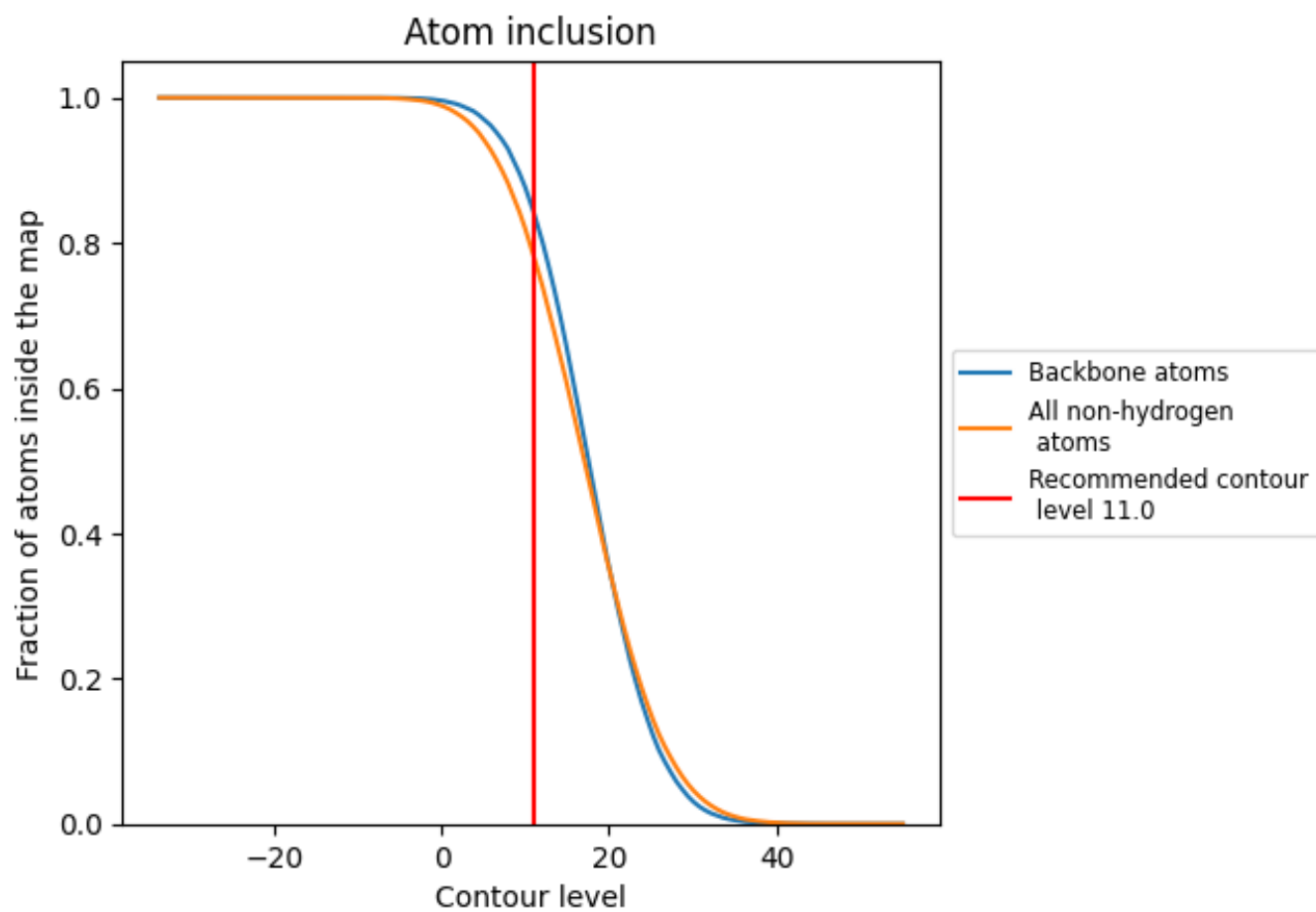
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (11.0).







































































9.4 Atom inclusion [i](#)



At the recommended contour level, 84% of all backbone atoms, 78% 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 (11.0) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.7835	 0.3810
A	 0.8284	 0.3670
B	 0.8025	 0.4200
C	 0.8238	 0.4520
D	 0.8783	 0.4510
E	 0.8608	 0.4810
F	 0.8845	 0.4740
G	 0.7765	 0.4020
H	 0.8990	 0.4820
I	 0.6775	 0.3890
J	 0.7604	 0.4540
K	 0.8178	 0.4350
L	 0.8597	 0.4900
M	 0.7995	 0.3680
N	 0.8921	 0.4450
O	 0.9093	 0.4310
P	 0.8880	 0.4800
Q	 0.8406	 0.4890
R	 0.7719	 0.4560
S	 0.8656	 0.4170
T	 0.8638	 0.3850
U	 0.8322	 0.3800
V	 0.8614	 0.3620
W	 0.6433	 0.4270
X	 0.6227	 0.4240
Y	 0.6512	 0.4010
Z	 0.4916	 0.3010
a	 0.5831	 0.3550
b	 0.0721	 0.2130
c	 0.6594	 0.4140
d	 0.5920	 0.4290
e	 0.6290	 0.4030
f	 0.6472	 0.4150
g	 0.6249	 0.3870
h	 0.5761	 0.3360



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Chain	Atom inclusion	Q-score
i	 0.5757	 0.3920
j	 0.6799	 0.3950
k	 0.6585	 0.4030
l	 0.6142	 0.4220
m	 0.5554	 0.3880
n	 0.6064	 0.3660
o	 0.6026	 0.4050
p	 0.6998	 0.4330
q	 0.6279	 0.3760
r	 0.6580	 0.4320
s	 0.6313	 0.4270
t	 0.6241	 0.4370
u	 0.3796	 0.3920
v	 0.5564	 0.3260
w	 0.5888	 0.4030
x	 0.3901	 0.3300
y	 0.2515	 0.0930