



Full wwPDB EM Validation Report ⓘ

Feb 23, 2022 – 09:58 pm GMT

PDB ID : 7QH6
EMDB ID : EMD-13965
Title : Cryo-EM structure of the human mtLSU assembly intermediate upon MRM2 depletion - class 1
Authors : Rebelo-Guiomar, P.; Pellegrino, S.; Dent, K.C.; Warren, A.J.; Minczuk, M.
Deposited on : 2021-12-10
Resolution : 3.08 Å (reported)
Based on initial model : 5OOL

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

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

A user guide is available at

<https://www.wwpdb.org/validation/2017/EMValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

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

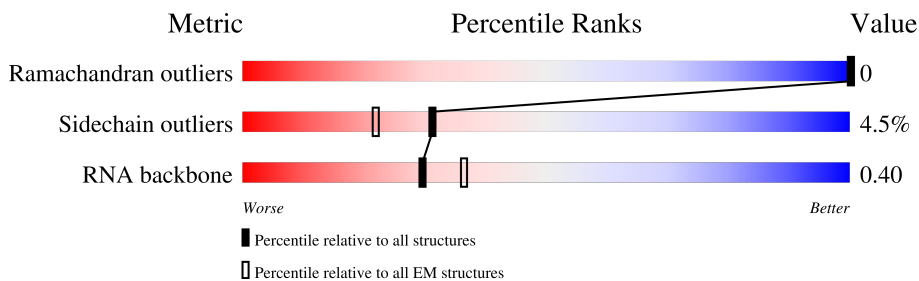
EMDB validation analysis : 0.0.0.dev97
MolProbity : 4.02b-467
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.26

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 3.08 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.





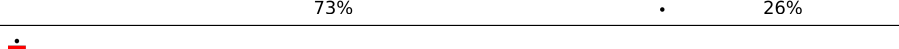
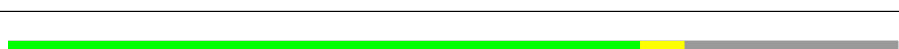



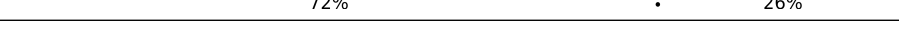



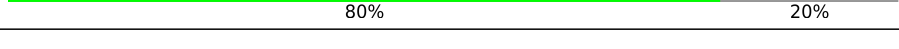

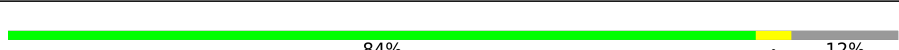


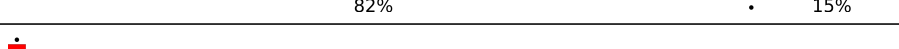







Metric	Whole archive (#Entries)	EM structures (#Entries)
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826
RNA backbone	4643	859

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	D	305	
2	E	348	
3	F	311	
4	H	267	
5	K	178	
6	L	145	
7	M	296	
8	N	251	














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Mol	Chain	Length	Quality of chain
9	O	175	 81% 6% 13%
10	P	180	 73% 6% 22%
11	Q	292	 73% 26%
12	R	149	 92% 6%
13	S	205	 71% 5% 24%
14	T	206	 6% 75% 6% 19%
15	U	153	 5% 88% 9%
16	V	216	 20% 75% 25%
17	W	148	 72% 26%
18	X	256	 91% 5%
19	Y	250	 68% 30%
20	Z	161	 69% 27%
21	0	188	 54% 43%
22	1	65	 80% 20%
23	2	92	 47% 51%
24	3	188	 48% 49%
25	5	423	 84% 12%
26	6	380	 79% 6% 15%
27	7	338	 83% 15%
28	9	137	 82% 15%
29	a	142	 55% 42%
30	b	215	 66% 31%
31	c	332	 81% 17%
32	d	306	 60% 40%
33	g	166	74% 22%

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Mol	Chain	Length	Quality of chain
34	h	158	 61% 37%
35	i	128	 73% 24%
36	j	123	 67% 31%
37	o	102	 85% 11%
38	p	206	 57% 38%
39	q	222	 56% 42%
40	r	196	 63% 34%
41	s	439	 80% 16%
42	u	234	 46% 53%
43	v	70	 13% 96%
44	w	156	 38% 49% 49%
45	A	1559	 48% 24% 27%
46	B	69	 14% 62% 19% 19%

2 Entry composition i

There are 47 unique types of molecules in this entry. The entry contains 83425 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 39S ribosomal protein L2, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	D	174	1349	834	268	240	7	0	0

- Molecule 2 is a protein called 39S ribosomal protein L3, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	E	284	2249	1451	382	405	11	0	0

- Molecule 3 is a protein called 39S ribosomal protein L4, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	F	250	2013	1294	365	348	6	0	0

- Molecule 4 is a protein called 39S ribosomal protein L9, mitochondrial.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
4	H	95	784	498	152	134	0	0

- Molecule 5 is a protein called 39S ribosomal protein L13, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
5	K	177	1451	934	259	251	7	0	0

- Molecule 6 is a protein called 39S ribosomal protein L14, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
6	L	115	889	559	171	154	5	0	0

- Molecule 7 is a protein called 39S ribosomal protein L15, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
7	M	287	2305	1472	425	402	6	0	0

- Molecule 8 is a protein called 39S ribosomal protein L16, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
8	N	205	1654	1056	308	280	10	0	0

- Molecule 9 is a protein called 39S ribosomal protein L17, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
9	O	152	1245	784	239	215	7	0	0

- Molecule 10 is a protein called 39S ribosomal protein L18, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
10	P	141	1148	719	221	203	5	0	0

- Molecule 11 is a protein called 39S ribosomal protein L19, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
11	Q	217	1805	1159	317	320	9	0	0

- Molecule 12 is a protein called 39S ribosomal protein L20, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
12	R	140	1153	732	231	186	4	0	0

- Molecule 13 is a protein called 39S ribosomal protein L21, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
13	S	156	1251	806	222	219	4	0	0

- Molecule 14 is a protein called 39S ribosomal protein L22, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
14	T	166	1368	875	254	232	7	0	0

- Molecule 15 is a protein called 39S ribosomal protein L23, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
15	U	139	1154	734	220	197	3	0	0

- Molecule 16 is a protein called 39S ribosomal protein L24, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
16	V	163	1333	848	231	247	7	0	0

- Molecule 17 is a protein called 39S ribosomal protein L27, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
17	W	109	859	552	162	142	3	0	0

- Molecule 18 is a protein called 39S ribosomal protein L28, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
18	X	243	2035	1317	351	362	5	0	0

- Molecule 19 is a protein called 39S ribosomal protein L47, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
19	Y	176	1517	970	291	252	4	0	0

- Molecule 20 is a protein called 39S ribosomal protein L30, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
20	Z	117	955	610	179	163	3	0	0

- Molecule 21 is a protein called 39S ribosomal protein L32, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
21	0	108	880	545	172	157	6	0	0

- Molecule 22 is a protein called 39S ribosomal protein L33, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
22	1	52	433	278	83	70	2	0	0

- Molecule 23 is a protein called 39S ribosomal protein L34, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
23	2	45	367	227	81	58	1	0	0

- Molecule 24 is a protein called 39S ribosomal protein L35, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
24	3	95	831	539	162	127	3	0	0

- Molecule 25 is a protein called 39S ribosomal protein L37, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
25	5	373	3037	1964	526	536	11	0	0

- Molecule 26 is a protein called 39S ribosomal protein L38, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
26	6	324	2640	1694	470	468	8	0	0

- Molecule 27 is a protein called 39S ribosomal protein L39, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
27	7	287	2334	1495	397	425	17	0	0

- Molecule 28 is a protein called 39S ribosomal protein L41, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
28	9	117	Total	C	N	O	S	0	0
			947	614	163	168	2		

- Molecule 29 is a protein called 39S ribosomal protein L42, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
29	a	82	Total	C	N	O	S	0	0
			686	434	124	123	5		

- Molecule 30 is a protein called 39S ribosomal protein L43, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
30	b	148	Total	C	N	O	S	0	0
			1178	733	229	213	3		

- Molecule 31 is a protein called 39S ribosomal protein L44, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
31	c	275	Total	C	N	O	S	0	0
			2217	1415	383	410	9		

- Molecule 32 is a protein called 39S ribosomal protein L45, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
32	d	185	Total	C	N	O	S	0	0
			1529	989	260	271	9		

- Molecule 33 is a protein called 39S ribosomal protein L49, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
33	g	129	Total	C	N	O	S	0	0
			1067	690	185	190	2		

- Molecule 34 is a protein called 39S ribosomal protein L50, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
34	h	100	Total	C	N	O	S	0	0
			827	524	146	155	2		

- Molecule 35 is a protein called 39S ribosomal protein L51, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
35	i	97	Total	C	N	O	S	0	0
			827	532	165	126	4		

- Molecule 36 is a protein called 39S ribosomal protein L52, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
36	j	85	Total	C	N	O	S	0	0
			684	423	133	126	2		

- Molecule 37 is a protein called Ribosomal protein 63, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
37	o	91	Total	C	N	O	S	0	0
			771	487	156	125	3		

- Molecule 38 is a protein called Peptidyl-tRNA hydrolase ICT1, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
38	p	127	Total	C	N	O	S	0	0
			1058	661	201	192	4		

- Molecule 39 is a protein called Growth arrest and DNA damage-inducible proteins-interacting protein 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
39	q	128	Total	C	N	O	S	0	0
			1076	671	208	192	5		

- Molecule 40 is a protein called 39S ribosomal protein S18a, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
40	r	130	Total	C	N	O	S	0	0
			1075	683	210	174	8		

- Molecule 41 is a protein called 39S ribosomal protein S30, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
41	s	370	Total	C	N	O	S	0	0
			3036	1946	542	534	14		

- Molecule 42 is a protein called Mitochondrial assembly of ribosomal large subunit protein 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
42	u	111	927	595	155	167	10	0	0

- Molecule 43 is a protein called MIEF1 upstream open reading frame protein.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
43	v	69	588	372	116	100	0	0

- Molecule 44 is a protein called Acyl carrier protein, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
44	w	79	638	410	95	128	5	0	0

- Molecule 45 is a RNA chain called 16S ribosomal RNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
45	A	1133	24063	10801	4361	7768	1133	0	0

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	3107	U	UNK	conflict	GB 1025814679

- Molecule 46 is a RNA chain called mitochondrial tRNA^{Val}.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	P		
46	B	56	1191	534	214	387	56	0	0

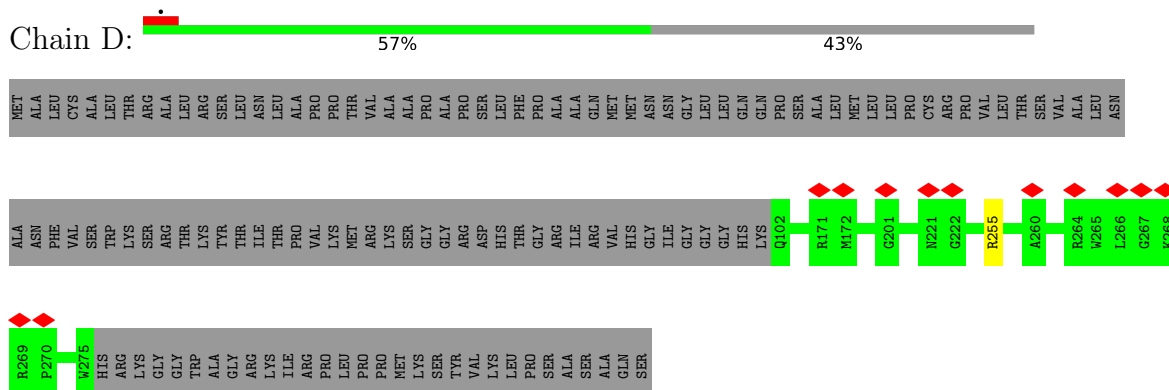
- Molecule 47 is ZINC ION (three-letter code: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		AltConf
47	0	1	Total	Zn	0
			1	1	

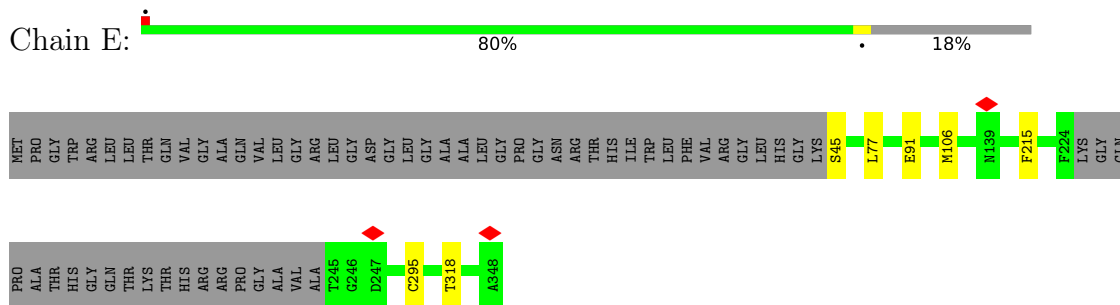
3 Residue-property plots [i](#)

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.

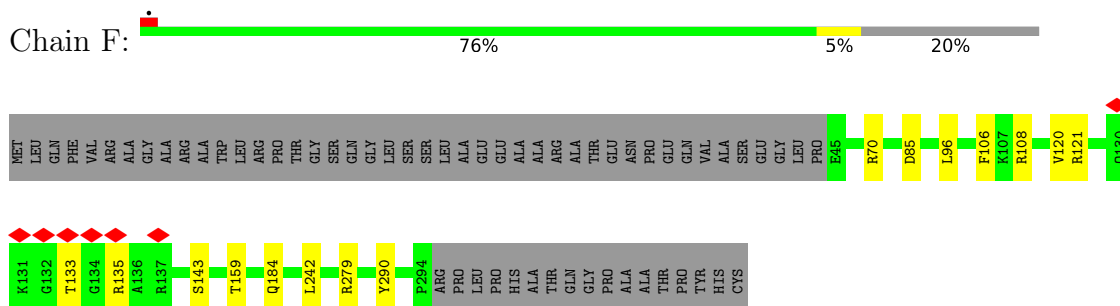
- Molecule 1: 39S ribosomal protein L2, mitochondrial



- Molecule 2: 39S ribosomal protein L3, mitochondrial

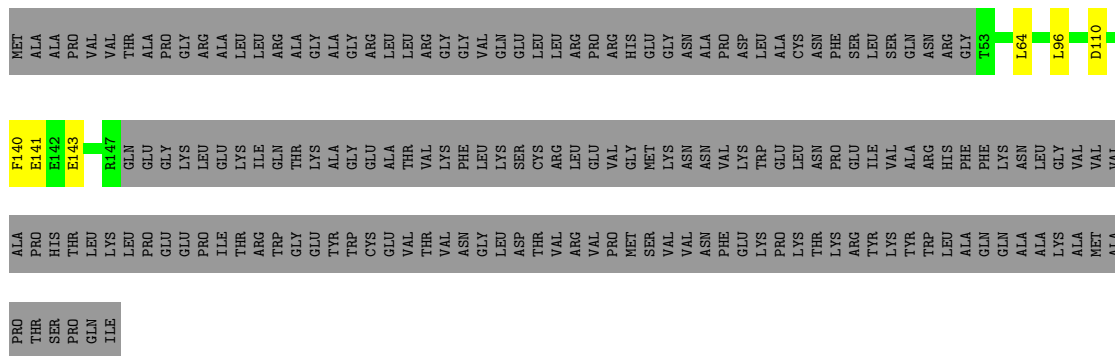


- Molecule 3: 39S ribosomal protein L4, mitochondrial



- Molecule 4: 39S ribosomal protein L9, mitochondrial

Chain H: 33% 64%



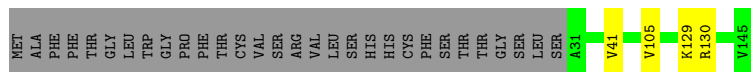
- Molecule 5: 39S ribosomal protein L13, mitochondrial

Chain K: 97%



- Molecule 6: 39S ribosomal protein L14, mitochondrial

Chain L: 77% 21%



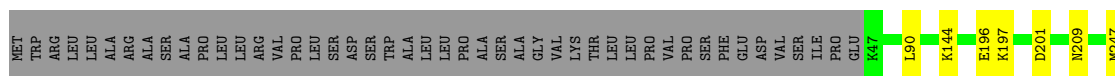
- Molecule 7: 39S ribosomal protein L15, mitochondrial

Chain M: 93%



- Molecule 8: 39S ribosomal protein L16, mitochondrial

Chain N: 79% 18%



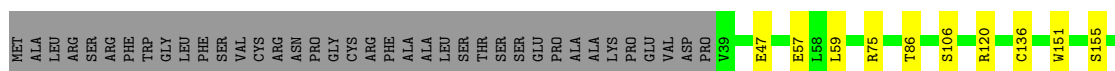
- Molecule 9: 39S ribosomal protein L17, mitochondrial

Chain O: 81% 6% 13%



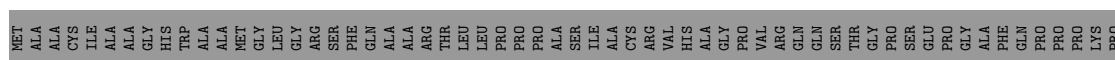
- Molecule 10: 39S ribosomal protein L18, mitochondrial

Chain P: 73% 6% 22%



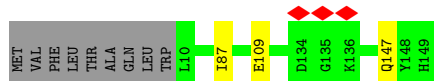
- Molecule 11: 39S ribosomal protein L19, mitochondrial

Chain Q: 73% 26%



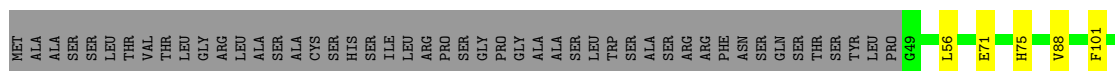
- Molecule 12: 39S ribosomal protein L20, mitochondrial

Chain R: 92% 6%



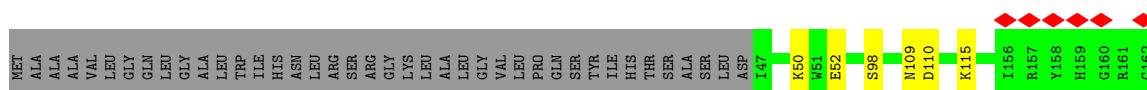
- Molecule 13: 39S ribosomal protein L21, mitochondrial

Chain S: 71% 5% 24%



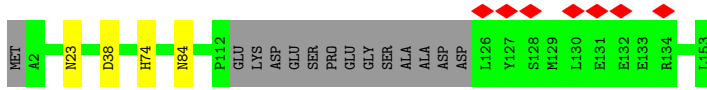
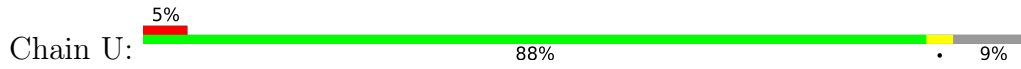
- Molecule 14: 39S ribosomal protein L22, mitochondrial

Chain T: 6% 75% 6% 19%

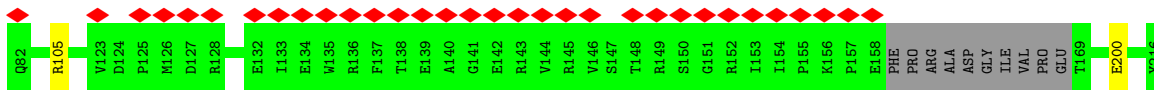
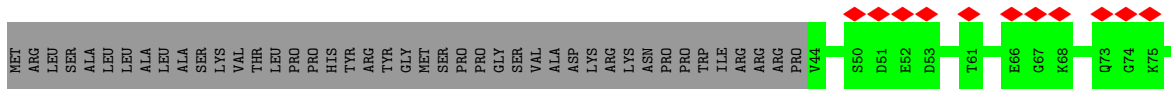
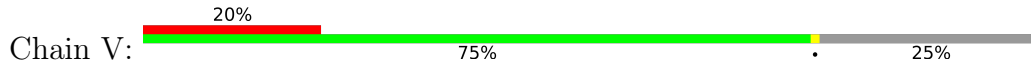




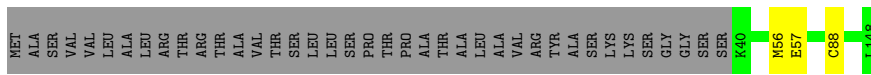
• Molecule 15: 39S ribosomal protein L23, mitochondrial



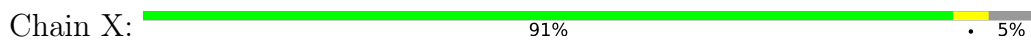
• Molecule 16: 39S ribosomal protein L24, mitochondrial



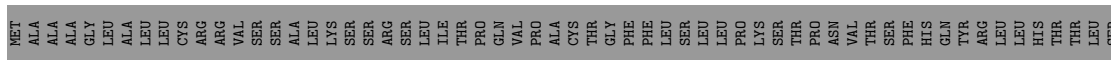
• Molecule 17: 39S ribosomal protein L27, mitochondrial



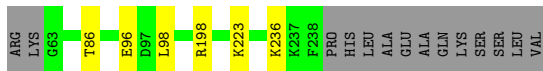
• Molecule 18: 39S ribosomal protein L28, mitochondrial

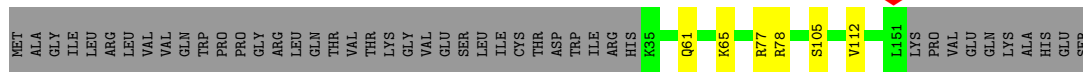


• Molecule 19: 39S ribosomal protein L47, mitochondrial

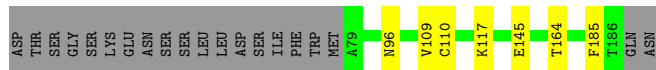


• Molecule 20: 39S ribosomal protein L30, mitochondrial

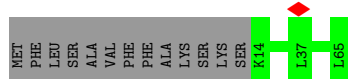
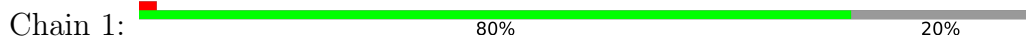




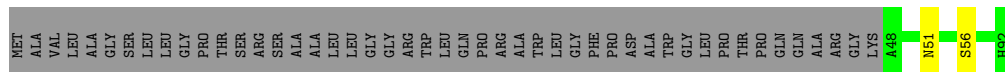
• Molecule 21: 39S ribosomal protein L32, mitochondrial



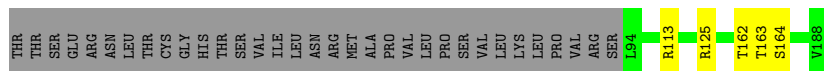
• Molecule 22: 39S ribosomal protein L33, mitochondrial



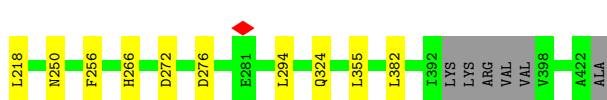
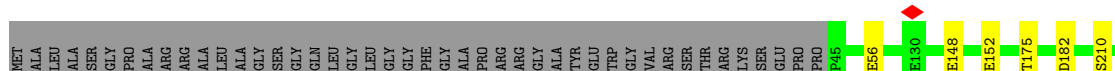
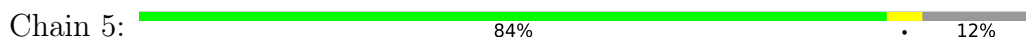
• Molecule 23: 39S ribosomal protein L34, mitochondrial



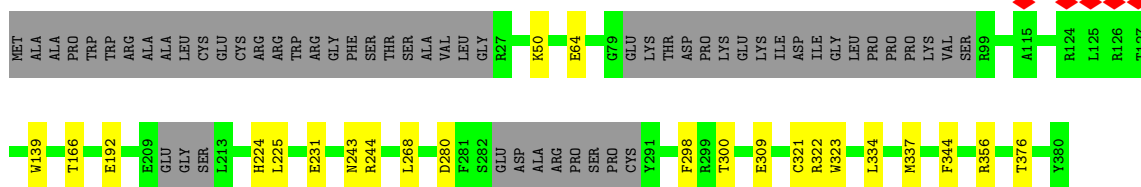
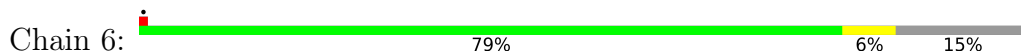
• Molecule 24: 39S ribosomal protein L35, mitochondrial



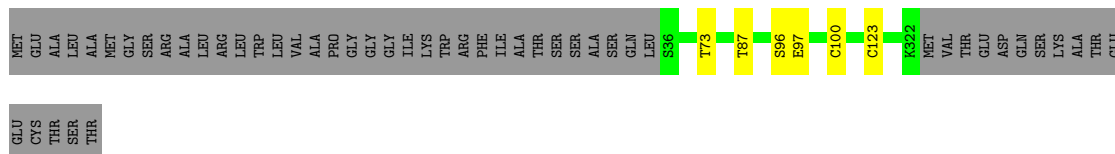
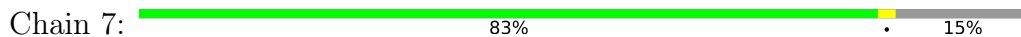
• Molecule 25: 39S ribosomal protein L37, mitochondrial



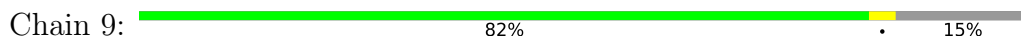
• Molecule 26: 39S ribosomal protein L38, mitochondrial



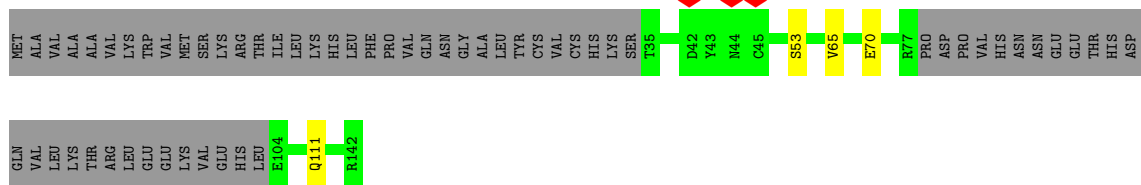
- Molecule 27: 39S ribosomal protein L39, mitochondrial



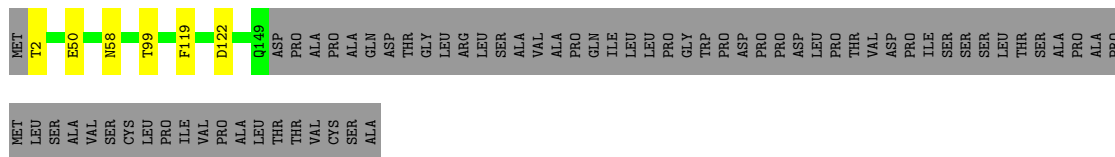
- Molecule 28: 39S ribosomal protein L41, mitochondrial



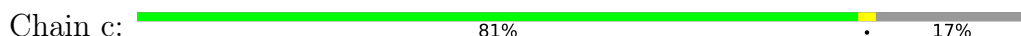
- Molecule 29: 39S ribosomal protein L42, mitochondrial

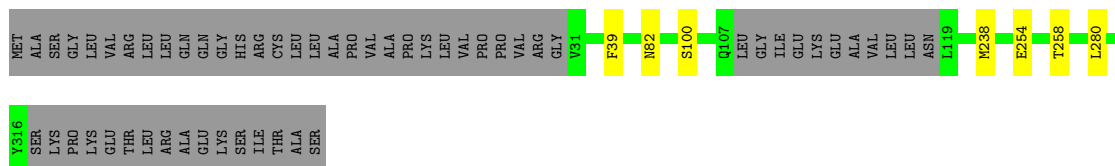


- Molecule 30: 39S ribosomal protein L43, mitochondrial

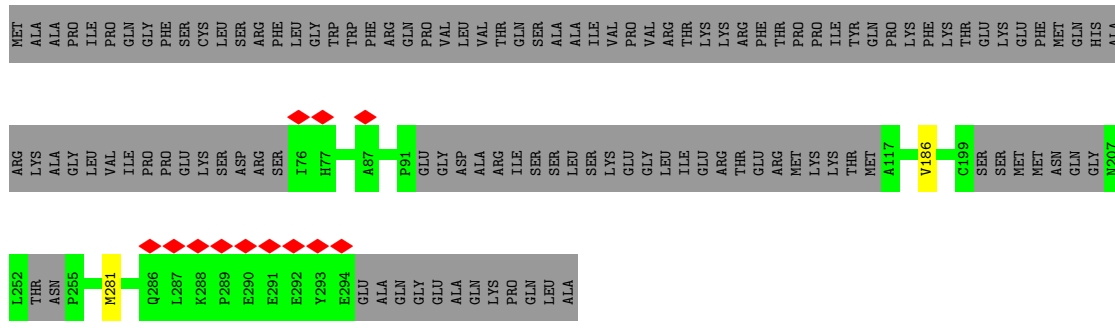


- Molecule 31: 39S ribosomal protein L44, mitochondrial

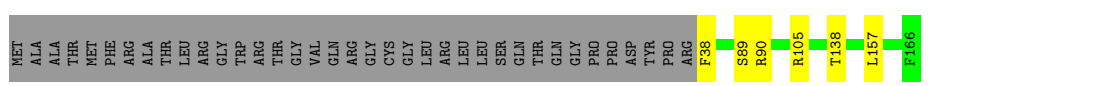
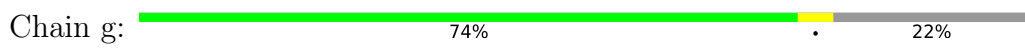




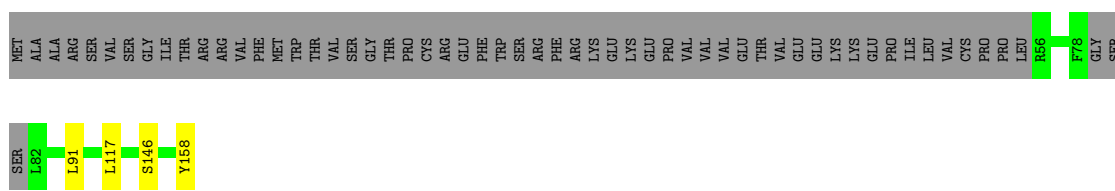
• Molecule 32: 39S ribosomal protein L45, mitochondrial



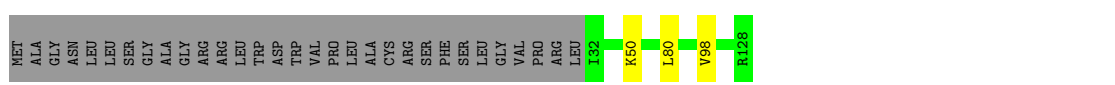
• Molecule 33: 39S ribosomal protein L49, mitochondrial



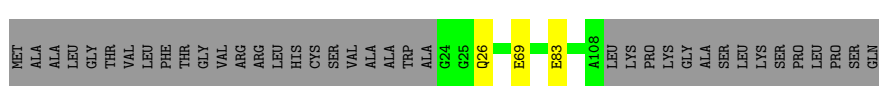
• Molecule 34: 39S ribosomal protein L50, mitochondrial



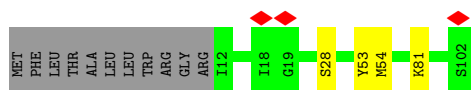
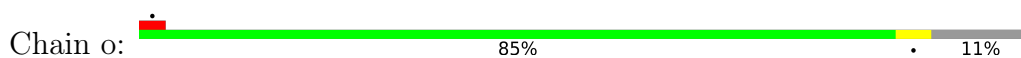
• Molecule 35: 39S ribosomal protein L51, mitochondrial



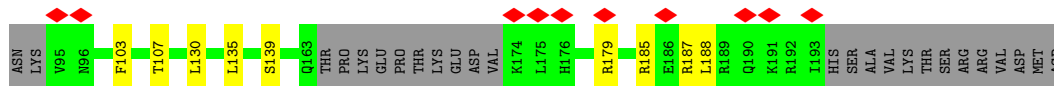
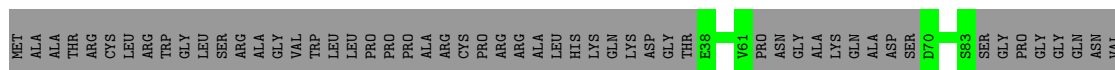
• Molecule 36: 39S ribosomal protein L52, mitochondrial



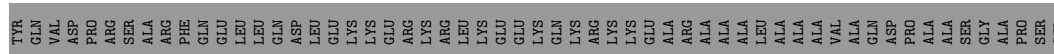
- Molecule 37: Ribosomal protein 63, mitochondrial



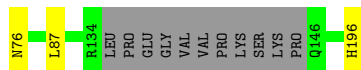
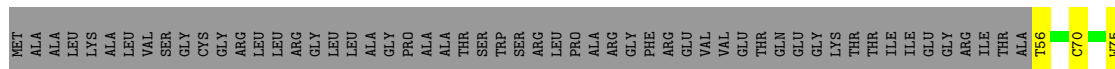
- Molecule 38: Peptidyl-tRNA hydrolase ICT1, mitochondrial



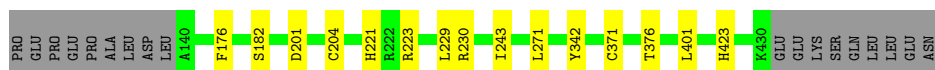
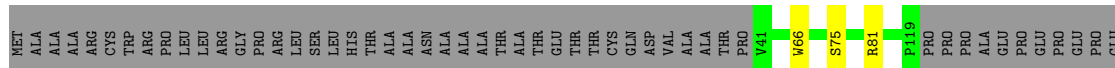
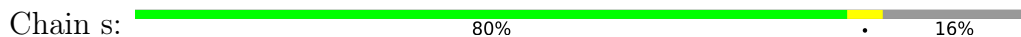
- Molecule 39: Growth arrest and DNA damage-inducible proteins-interacting protein 1



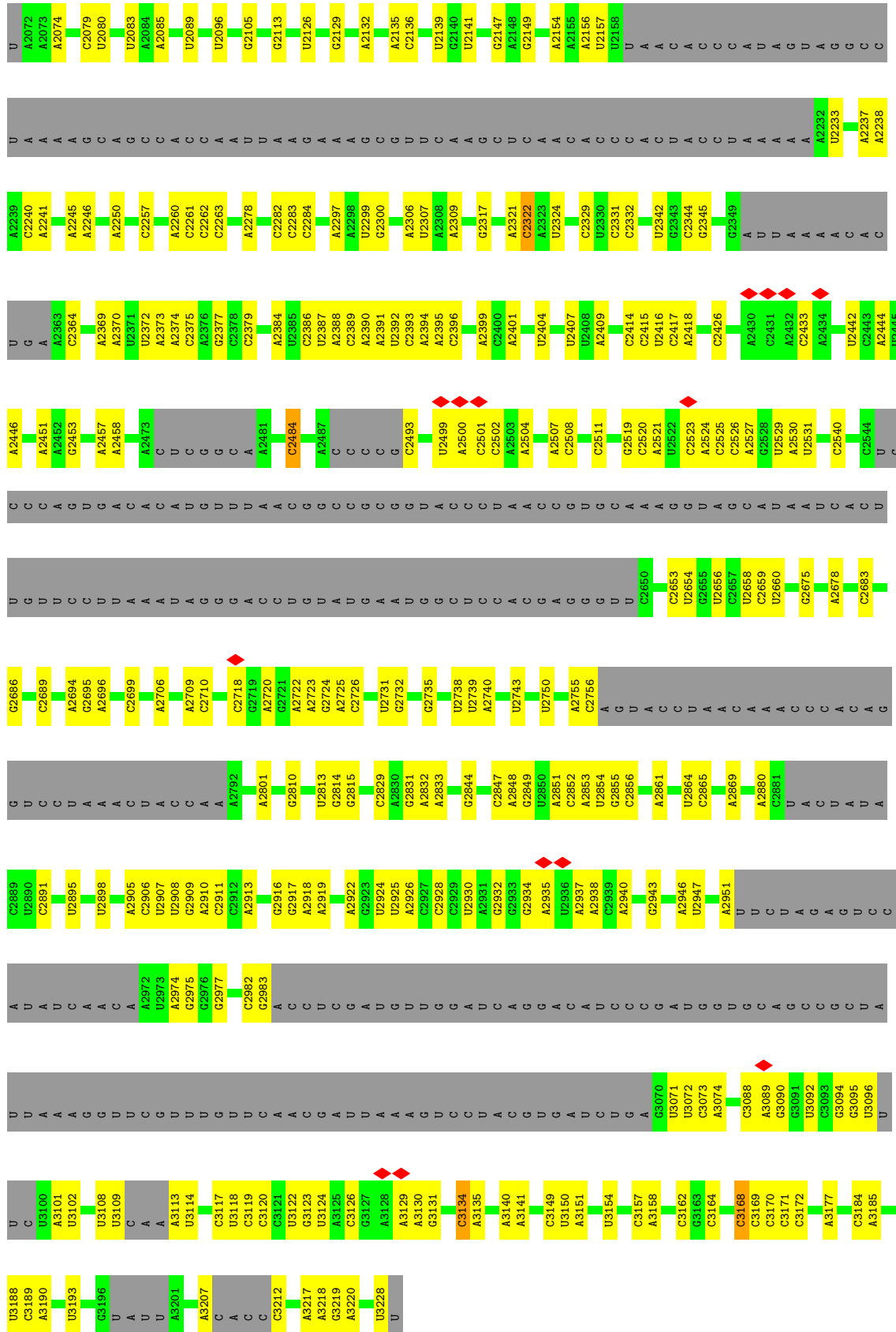
- Molecule 40: 39S ribosomal protein S18a, mitochondrial



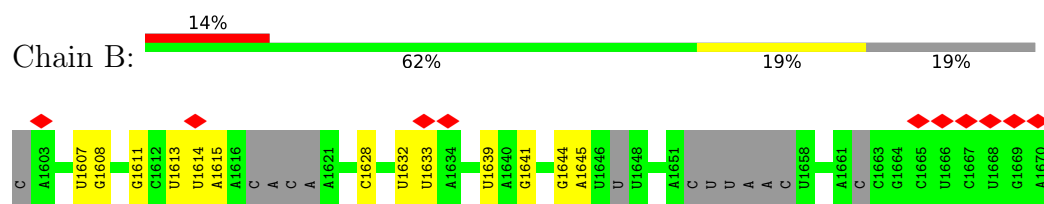
- Molecule 41: 39S ribosomal protein S30, mitochondrial



- Molecule 42: Mitochondrial assembly of ribosomal large subunit protein 1



● Molecule 46: mitochondrial tRNAVal



4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	119341	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 ($e^-/\text{\AA}^2$)	52.5	Depositor
Minimum defocus (nm)	-1000	Depositor
Maximum defocus (nm)	-2600	Depositor
Magnification	Not provided	
Image detector	FEI FALCON III (4k x 4k)	Depositor
Maximum map value	0.060	Depositor
Minimum map value	-0.020	Depositor
Average map value	-0.000	Depositor
Map value standard deviation	0.004	Depositor
Recommended contour level	0.01	Depositor
Map size (\AA)	381.59998, 381.59998, 381.59998	wwPDB
Map dimensions	360, 360, 360	wwPDB
Map angles ($^\circ$)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (\AA)	1.06, 1.06, 1.06	Depositor

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section:
ZN

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	D	0.26	0/1371	0.54	0/1848
2	E	0.33	0/2313	0.50	0/3137
3	F	0.42	0/2071	0.55	0/2817
4	H	0.35	0/798	0.60	0/1073
5	K	0.39	0/1495	0.51	0/2029
6	L	0.27	0/904	0.56	0/1218
7	M	0.39	0/2359	0.58	0/3185
8	N	0.31	0/1697	0.52	0/2281
9	O	0.36	0/1269	0.56	0/1708
10	P	0.30	0/1173	0.55	0/1588
11	Q	0.31	0/1846	0.56	0/2487
12	R	0.42	0/1174	0.56	0/1572
13	S	0.38	0/1276	0.61	1/1729 (0.1%)
14	T	0.41	0/1402	0.56	0/1886
15	U	0.36	0/1183	0.55	0/1600
16	V	0.28	0/1362	0.48	0/1842
17	W	0.40	0/881	0.56	0/1188
18	X	0.35	0/2090	0.51	0/2825
19	Y	0.36	0/1552	0.51	0/2079
20	Z	0.34	0/979	0.53	0/1321
21	0	0.34	0/895	0.59	0/1201
22	1	0.27	0/438	0.55	0/583
23	2	0.43	0/373	0.61	0/496
24	3	0.47	0/852	0.57	0/1136
25	5	0.29	0/3126	0.51	0/4259
26	6	0.34	0/2726	0.53	0/3715
27	7	0.31	0/2391	0.49	0/3234
28	9	0.35	0/972	0.53	0/1306
29	a	0.38	0/709	0.56	0/963
30	b	0.39	0/1202	0.60	0/1626
31	c	0.34	0/2264	0.51	0/3059
32	d	0.27	0/1573	0.50	0/2134

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
33	g	0.40	0/1102	0.55	0/1503
34	h	0.31	0/847	0.51	0/1150
35	i	0.47	0/849	0.59	0/1135
36	j	0.37	0/698	0.59	0/940
37	o	0.38	0/792	0.58	0/1064
38	p	0.29	0/1071	0.55	0/1433
39	q	0.33	0/1107	0.52	0/1498
40	r	0.33	0/1110	0.55	0/1504
41	s	0.34	0/3114	0.53	0/4225
42	u	0.26	0/949	0.47	0/1281
43	v	0.26	0/597	0.50	0/796
44	w	0.25	0/647	0.44	0/871
45	A	0.62	0/26912	0.93	27/41848 (0.1%)
46	B	0.22	0/1328	0.83	0/2056
All	All	0.45	0/87839	0.70	28/124429 (0.0%)

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
13	S	0	1

There are no bond length outliers.

All (28) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
45	A	2484	C	C2-N1-C1'	8.06	127.66	118.80
45	A	2484	C	N1-C2-O2	6.99	123.09	118.90
45	A	1833	C	C6-N1-C2	-6.12	117.85	120.30
45	A	2493	C	N1-C2-O2	6.07	122.54	118.90
45	A	3134	C	C6-N1-C2	-6.02	117.89	120.30
45	A	2484	C	N3-C2-O2	-5.84	117.81	121.90
45	A	3149	C	C6-N1-C2	-5.75	118.00	120.30
45	A	2484	C	C6-N1-C1'	-5.64	114.03	120.80
13	S	144	LEU	CA-CB-CG	5.62	128.24	115.30
45	A	2499	U	C2-N1-C1'	5.55	124.36	117.70
45	A	3164	C	C6-N1-C2	-5.53	118.09	120.30
45	A	3212	C	C6-N1-C2	-5.50	118.10	120.30
45	A	2136	C	C6-N1-C2	-5.48	118.11	120.30
45	A	3149	C	N3-C2-O2	-5.48	118.07	121.90

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
45	A	3212	C	N3-C2-O2	-5.46	118.08	121.90
45	A	2738	U	N3-C4-O4	5.44	123.21	119.40
45	A	3212	C	N1-C2-O2	5.41	122.14	118.90
45	A	2738	U	C5-C4-O4	-5.31	122.71	125.90
45	A	2493	C	C6-N1-C2	-5.30	118.18	120.30
45	A	3168	C	P-O3'-C3'	5.29	126.05	119.70
45	A	2898	U	N3-C2-O2	-5.27	118.51	122.20
45	A	2493	C	N3-C2-O2	-5.27	118.21	121.90
45	A	2079	C	C2-N1-C1'	5.17	124.49	118.80
45	A	3212	C	C2-N1-C1'	5.15	124.47	118.80
45	A	2322	C	C6-N1-C2	-5.15	118.24	120.30
45	A	2240	C	C2-N1-C1'	5.09	124.40	118.80
45	A	2149	G	C4-N9-C1'	5.01	133.01	126.50
45	A	2484	C	C6-N1-C2	-5.00	118.30	120.30

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
13	S	101	PHE	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	
1	D	172/305 (56%)	158 (92%)	14 (8%)	0	100	100
2	E	280/348 (80%)	262 (94%)	18 (6%)	0	100	100
3	F	248/311 (80%)	230 (93%)	18 (7%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
4	H	93/267 (35%)	86 (92%)	7 (8%)	0	100	100
5	K	175/178 (98%)	161 (92%)	14 (8%)	0	100	100
6	L	113/145 (78%)	105 (93%)	8 (7%)	0	100	100
7	M	285/296 (96%)	265 (93%)	20 (7%)	0	100	100
8	N	203/251 (81%)	189 (93%)	14 (7%)	0	100	100
9	O	150/175 (86%)	142 (95%)	8 (5%)	0	100	100
10	P	139/180 (77%)	132 (95%)	7 (5%)	0	100	100
11	Q	215/292 (74%)	198 (92%)	17 (8%)	0	100	100
12	R	138/149 (93%)	128 (93%)	10 (7%)	0	100	100
13	S	154/205 (75%)	144 (94%)	10 (6%)	0	100	100
14	T	164/206 (80%)	152 (93%)	12 (7%)	0	100	100
15	U	135/153 (88%)	128 (95%)	7 (5%)	0	100	100
16	V	159/216 (74%)	150 (94%)	9 (6%)	0	100	100
17	W	107/148 (72%)	100 (94%)	7 (6%)	0	100	100
18	X	241/256 (94%)	229 (95%)	12 (5%)	0	100	100
19	Y	174/250 (70%)	165 (95%)	9 (5%)	0	100	100
20	Z	115/161 (71%)	107 (93%)	8 (7%)	0	100	100
21	0	106/188 (56%)	102 (96%)	4 (4%)	0	100	100
22	1	50/65 (77%)	45 (90%)	5 (10%)	0	100	100
23	2	43/92 (47%)	36 (84%)	7 (16%)	0	100	100
24	3	93/188 (50%)	89 (96%)	4 (4%)	0	100	100
25	5	369/423 (87%)	342 (93%)	27 (7%)	0	100	100
26	6	316/380 (83%)	290 (92%)	26 (8%)	0	100	100
27	7	285/338 (84%)	262 (92%)	23 (8%)	0	100	100
28	9	113/137 (82%)	107 (95%)	6 (5%)	0	100	100
29	a	78/142 (55%)	72 (92%)	6 (8%)	0	100	100
30	b	146/215 (68%)	132 (90%)	14 (10%)	0	100	100
31	c	271/332 (82%)	258 (95%)	13 (5%)	0	100	100
32	d	177/306 (58%)	166 (94%)	11 (6%)	0	100	100
33	g	127/166 (76%)	120 (94%)	7 (6%)	0	100	100
34	h	96/158 (61%)	90 (94%)	6 (6%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
35	i	95/128 (74%)	85 (90%)	10 (10%)	0	100	100
36	j	83/123 (68%)	79 (95%)	4 (5%)	0	100	100
37	o	89/102 (87%)	81 (91%)	8 (9%)	0	100	100
38	p	119/206 (58%)	112 (94%)	7 (6%)	0	100	100
39	q	126/222 (57%)	119 (94%)	7 (6%)	0	100	100
40	r	126/196 (64%)	118 (94%)	8 (6%)	0	100	100
41	s	366/439 (83%)	340 (93%)	26 (7%)	0	100	100
42	u	109/234 (47%)	98 (90%)	11 (10%)	0	100	100
43	v	67/70 (96%)	62 (92%)	5 (8%)	0	100	100
44	w	77/156 (49%)	67 (87%)	10 (13%)	0	100	100
All	All	6987/9498 (74%)	6503 (93%)	484 (7%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains [i](#)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	D	140/245 (57%)	139 (99%)	1 (1%)	84	92
2	E	245/290 (84%)	238 (97%)	7 (3%)	42	70
3	F	217/262 (83%)	202 (93%)	15 (7%)	15	44
4	H	86/228 (38%)	80 (93%)	6 (7%)	15	43
5	K	155/156 (99%)	151 (97%)	4 (3%)	46	72
6	L	98/124 (79%)	94 (96%)	4 (4%)	30	62
7	M	245/249 (98%)	232 (95%)	13 (5%)	22	53
8	N	172/211 (82%)	165 (96%)	7 (4%)	30	62
9	O	133/150 (89%)	122 (92%)	11 (8%)	11	37
10	P	123/155 (79%)	113 (92%)	10 (8%)	11	37
11	Q	199/256 (78%)	195 (98%)	4 (2%)	55	78

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
12	R	118/126 (94%)	115 (98%)	3 (2%)	47	74
13	S	141/180 (78%)	131 (93%)	10 (7%)	14	43
14	T	146/176 (83%)	134 (92%)	12 (8%)	11	37
15	U	124/135 (92%)	120 (97%)	4 (3%)	39	68
16	V	146/191 (76%)	144 (99%)	2 (1%)	67	84
17	W	89/119 (75%)	86 (97%)	3 (3%)	37	67
18	X	219/229 (96%)	209 (95%)	10 (5%)	27	58
19	Y	159/223 (71%)	153 (96%)	6 (4%)	33	64
20	Z	108/147 (74%)	102 (94%)	6 (6%)	21	51
21	0	97/164 (59%)	90 (93%)	7 (7%)	14	42
22	1	49/60 (82%)	49 (100%)	0	100	100
23	2	39/72 (54%)	37 (95%)	2 (5%)	24	54
24	3	88/166 (53%)	83 (94%)	5 (6%)	20	50
25	5	335/368 (91%)	319 (95%)	16 (5%)	25	57
26	6	265/332 (80%)	242 (91%)	23 (9%)	10	35
27	7	263/303 (87%)	257 (98%)	6 (2%)	50	75
28	9	99/112 (88%)	95 (96%)	4 (4%)	31	63
29	a	78/133 (59%)	74 (95%)	4 (5%)	24	54
30	b	130/186 (70%)	124 (95%)	6 (5%)	27	58
31	c	241/288 (84%)	234 (97%)	7 (3%)	42	70
32	d	170/274 (62%)	168 (99%)	2 (1%)	71	87
33	g	119/148 (80%)	113 (95%)	6 (5%)	24	55
34	h	95/148 (64%)	91 (96%)	4 (4%)	30	61
35	i	86/110 (78%)	83 (96%)	3 (4%)	36	67
36	j	68/97 (70%)	65 (96%)	3 (4%)	28	59
37	o	78/87 (90%)	74 (95%)	4 (5%)	24	54
38	p	117/181 (65%)	108 (92%)	9 (8%)	13	40
39	q	110/178 (62%)	106 (96%)	4 (4%)	35	66
40	r	119/169 (70%)	113 (95%)	6 (5%)	24	55
41	s	326/381 (86%)	308 (94%)	18 (6%)	21	52
42	u	105/200 (52%)	102 (97%)	3 (3%)	42	70

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
43	v	59/60 (98%)	57 (97%)	2 (3%)	37	67
44	w	73/136 (54%)	71 (97%)	2 (3%)	44	72
All	All	6272/8205 (76%)	5988 (96%)	284 (4%)	31	59

All (284) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	D	255	ARG
2	E	45	SER
2	E	77	LEU
2	E	91	GLU
2	E	106	MET
2	E	215	PHE
2	E	295	CYS
2	E	318	THR
3	F	70	ARG
3	F	85	ASP
3	F	96	LEU
3	F	106	PHE
3	F	108	ARG
3	F	120	VAL
3	F	121	ARG
3	F	133	THR
3	F	135	ARG
3	F	143	SER
3	F	159	THR
3	F	184	GLN
3	F	242	LEU
3	F	279	ARG
3	F	290	TYR
4	H	64	LEU
4	H	96	LEU
4	H	110	ASP
4	H	140	PHE
4	H	141	GLU
4	H	143	GLU
5	K	43	HIS
5	K	115	ASN
5	K	154	ARG
5	K	157	GLU
6	L	41	VAL

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Mol	Chain	Res	Type
6	L	105	VAL
6	L	129	LYS
6	L	130	ARG
7	M	17	ARG
7	M	44	ARG
7	M	56	GLU
7	M	64	ARG
7	M	74	PHE
7	M	85	GLU
7	M	118	LEU
7	M	134	ARG
7	M	160	SER
7	M	187	VAL
7	M	222	TYR
7	M	257	CYS
7	M	288	GLU
8	N	90	LEU
8	N	144	LYS
8	N	196	GLU
8	N	197	LYS
8	N	201	ASP
8	N	209	ASN
8	N	247	MET
9	O	25	ARG
9	O	33	LEU
9	O	42	ILE
9	O	61	ASP
9	O	67	ASP
9	O	70	GLU
9	O	99	ASP
9	O	101	THR
9	O	150	GLN
9	O	155	ASP
9	O	157	ARG
10	P	47	GLU
10	P	57	GLU
10	P	59	LEU
10	P	75	ARG
10	P	86	THR
10	P	106	SER
10	P	120	ARG
10	P	136	CYS

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Mol	Chain	Res	Type
10	P	151	TRP
10	P	155	SER
11	Q	87	THR
11	Q	199	THR
11	Q	270	MET
11	Q	273	TYR
12	R	87	ILE
12	R	109	GLU
12	R	147	GLN
13	S	56	LEU
13	S	71	GLU
13	S	75	HIS
13	S	88	VAL
13	S	108	VAL
13	S	124	CYS
13	S	134	LEU
13	S	144	LEU
13	S	171	ILE
13	S	197	SER
14	T	50	LYS
14	T	52	GLU
14	T	98	SER
14	T	109	ASN
14	T	110	ASP
14	T	115	LYS
14	T	176	VAL
14	T	187	GLU
14	T	191	THR
14	T	195	HIS
14	T	197	LYS
14	T	207	THR
15	U	23	ASN
15	U	38	ASP
15	U	74	HIS
15	U	84	ASN
16	V	105	ARG
16	V	200	GLU
17	W	56	MET
17	W	57	GLU
17	W	88	CYS
18	X	36	ARG
18	X	95	ASP

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Mol	Chain	Res	Type
18	X	101	LEU
18	X	137	GLU
18	X	154	CYS
18	X	182	GLU
18	X	200	GLU
18	X	207	THR
18	X	218	LEU
18	X	220	GLU
19	Y	86	THR
19	Y	96	GLU
19	Y	98	LEU
19	Y	198	ARG
19	Y	223	LYS
19	Y	236	LYS
20	Z	61	GLN
20	Z	65	LYS
20	Z	77	ARG
20	Z	78	ARG
20	Z	105	SER
20	Z	112	VAL
21	0	96	ASN
21	0	109	VAL
21	0	110	CYS
21	0	117	LYS
21	0	145	GLU
21	0	164	THR
21	0	185	PHE
23	2	51	ASN
23	2	56	SER
24	3	113	ARG
24	3	125	ARG
24	3	162	THR
24	3	163	THR
24	3	164	SER
25	5	56	GLU
25	5	148	GLU
25	5	152	GLU
25	5	175	THR
25	5	182	ASP
25	5	210	SER
25	5	218	LEU
25	5	250	ASN

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Mol	Chain	Res	Type
25	5	256	PHE
25	5	266	HIS
25	5	272	ASP
25	5	276	ASP
25	5	294	LEU
25	5	324	GLN
25	5	355	LEU
25	5	382	LEU
26	6	50	LYS
26	6	64	GLU
26	6	139	TRP
26	6	166	THR
26	6	192	GLU
26	6	224	HIS
26	6	225	LEU
26	6	231	GLU
26	6	243	ASN
26	6	244	ARG
26	6	268	LEU
26	6	280	ASP
26	6	298	PHE
26	6	300	THR
26	6	309	GLU
26	6	321	CYS
26	6	322	ARG
26	6	323	TRP
26	6	334	LEU
26	6	337	MET
26	6	344	PHE
26	6	356	ARG
26	6	376	THR
27	7	73	THR
27	7	87	THR
27	7	96	SER
27	7	97	GLU
27	7	100	CYS
27	7	123	CYS
28	9	29	SER
28	9	39	LYS
28	9	52	GLN
28	9	59	GLU
29	a	53	SER

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Mol	Chain	Res	Type
29	a	65	VAL
29	a	70	GLU
29	a	111	GLN
30	b	2	THR
30	b	50	GLU
30	b	58	ASN
30	b	99	THR
30	b	119	PHE
30	b	122	ASP
31	c	39	PHE
31	c	82	ASN
31	c	100	SER
31	c	238	MET
31	c	254	GLU
31	c	258	THR
31	c	280	LEU
32	d	186	VAL
32	d	281	MET
33	g	38	PHE
33	g	89	SER
33	g	90	ARG
33	g	105	ARG
33	g	138	THR
33	g	157	LEU
34	h	91	LEU
34	h	117	LEU
34	h	146	SER
34	h	158	TYR
35	i	50	LYS
35	i	80	LEU
35	i	98	VAL
36	j	26	GLN
36	j	69	GLU
36	j	83	GLU
37	o	28	SER
37	o	53	TYR
37	o	54	MET
37	o	81	LYS
38	p	103	PHE
38	p	107	THR
38	p	130	LEU
38	p	135	LEU

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Mol	Chain	Res	Type
38	p	139	SER
38	p	179	ARG
38	p	185	ARG
38	p	187	ARG
38	p	188	LEU
39	q	39	TRP
39	q	46	LEU
39	q	49	ARG
39	q	74	SER
40	r	56	THR
40	r	70	CYS
40	r	75	TRP
40	r	76	ASN
40	r	87	LEU
40	r	196	HIS
41	s	66	TRP
41	s	75	SER
41	s	81	ARG
41	s	176	PHE
41	s	182	SER
41	s	201	ASP
41	s	204	CYS
41	s	221	HIS
41	s	223	ARG
41	s	229	LEU
41	s	230	ARG
41	s	243	ILE
41	s	271	LEU
41	s	342	TYR
41	s	371	CYS
41	s	376	THR
41	s	401	LEU
41	s	423	HIS
42	u	153	ARG
42	u	158	LYS
42	u	167	TRP
43	v	28	ARG
43	v	68	ARG
44	w	115	GLN
44	w	126	PHE

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (8) such sidechains are listed below:

Mol	Chain	Res	Type
6	L	104	ASN
10	P	121	ASN
10	P	142	ASN
11	Q	158	GLN
14	T	125	GLN
19	Y	110	ASN
29	a	44	ASN
38	p	184	ASN

5.3.3 RNA [i](#)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
45	A	1113/1559 (71%)	358 (32%)	15 (1%)
46	B	51/69 (73%)	13 (25%)	0
All	All	1164/1628 (71%)	371 (31%)	15 (1%)

All (371) RNA backbone outliers are listed below:

Mol	Chain	Res	Type
45	A	1679	U
45	A	1680	A
45	A	1681	G
45	A	1685	C
45	A	1689	C
45	A	1698	C
45	A	1700	U
45	A	1703	C
45	A	1704	U
45	A	1707	C
45	A	1708	A
45	A	1713	A
45	A	1716	U
45	A	1717	U
45	A	1718	A
45	A	1720	C
45	A	1724	A
45	A	1727	A
45	A	1728	U
45	A	1731	A
45	A	1732	C
45	A	1748	G
45	A	1750	G

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Mol	Chain	Res	Type
45	A	1751	A
45	A	1752	U
45	A	1770	G
45	A	1777	A
45	A	1779	A
45	A	1781	A
45	A	1782	G
45	A	1788	C
45	A	1794	A
45	A	1799	U
45	A	1800	G
45	A	1803	A
45	A	1804	A
45	A	1805	A
45	A	1812	C
45	A	1817	C
45	A	1820	A
45	A	1821	A
45	A	1822	U
45	A	1823	A
45	A	1824	U
45	A	1827	C
45	A	1828	A
45	A	1829	A
45	A	1832	A
45	A	1836	A
45	A	1844	A
45	A	1849	C
45	A	1853	A
45	A	1854	U
45	A	1855	A
45	A	1856	A
45	A	1867	A
45	A	1869	A
45	A	1870	A
45	A	1871	A
45	A	1872	U
45	A	1873	A
45	A	1877	U
45	A	1878	U
45	A	1882	A
45	A	1883	G

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Mol	Chain	Res	Type
45	A	1886	G
45	A	1887	A
45	A	1893	A
45	A	1903	C
45	A	1912	A
45	A	1914	A
45	A	1918	G
45	A	1930	C
45	A	1933	C
45	A	1934	U
45	A	1972	A
45	A	1974	A
45	A	1985	G
45	A	1986	A
45	A	1987	G
45	A	1992	C
45	A	1993	A
45	A	1994	A
45	A	1995	A
45	A	2000	C
45	A	2002	G
45	A	2003	A
45	A	2015	G
45	A	2016	C
45	A	2017	U
45	A	2019	G
45	A	2022	G
45	A	2025	C
45	A	2028	G
45	A	2029	A
45	A	2030	U
45	A	2031	A
45	A	2032	G
45	A	2034	A
45	A	2036	C
45	A	2037	U
45	A	2039	A
45	A	2053	U
45	A	2055	U
45	A	2059	C
45	A	2060	A
45	A	2065	A

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Mol	Chain	Res	Type
45	A	2066	C
45	A	2074	A
45	A	2080	U
45	A	2083	U
45	A	2085	A
45	A	2089	U
45	A	2096	U
45	A	2105	G
45	A	2113	G
45	A	2126	U
45	A	2129	G
45	A	2132	A
45	A	2135	A
45	A	2139	U
45	A	2141	U
45	A	2147	G
45	A	2154	A
45	A	2156	A
45	A	2157	U
45	A	2233	U
45	A	2237	A
45	A	2238	A
45	A	2241	A
45	A	2245	A
45	A	2246	A
45	A	2250	A
45	A	2257	C
45	A	2260	A
45	A	2261	C
45	A	2262	C
45	A	2263	C
45	A	2278	A
45	A	2282	C
45	A	2283	C
45	A	2284	C
45	A	2297	A
45	A	2299	U
45	A	2300	G
45	A	2306	A
45	A	2307	U
45	A	2309	A
45	A	2317	G

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Mol	Chain	Res	Type
45	A	2321	A
45	A	2322	C
45	A	2324	U
45	A	2329	C
45	A	2331	C
45	A	2332	C
45	A	2342	U
45	A	2344	C
45	A	2345	G
45	A	2364	C
45	A	2369	A
45	A	2370	A
45	A	2372	U
45	A	2373	A
45	A	2374	A
45	A	2375	C
45	A	2377	G
45	A	2379	C
45	A	2384	A
45	A	2386	C
45	A	2387	U
45	A	2388	A
45	A	2389	C
45	A	2390	A
45	A	2391	A
45	A	2392	U
45	A	2393	C
45	A	2394	A
45	A	2395	A
45	A	2396	C
45	A	2399	A
45	A	2401	A
45	A	2404	U
45	A	2407	U
45	A	2409	A
45	A	2415	C
45	A	2416	U
45	A	2417	C
45	A	2418	A
45	A	2426	C
45	A	2433	C
45	A	2442	U

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Mol	Chain	Res	Type
45	A	2444	A
45	A	2446	A
45	A	2451	A
45	A	2453	G
45	A	2458	A
45	A	2484	C
45	A	2500	A
45	A	2501	C
45	A	2502	C
45	A	2504	A
45	A	2508	C
45	A	2511	C
45	A	2519	G
45	A	2520	C
45	A	2521	A
45	A	2523	C
45	A	2524	A
45	A	2525	C
45	A	2526	C
45	A	2527	A
45	A	2529	U
45	A	2531	U
45	A	2540	C
45	A	2654	U
45	A	2656	U
45	A	2658	U
45	A	2659	C
45	A	2660	U
45	A	2675	G
45	A	2678	A
45	A	2683	C
45	A	2686	G
45	A	2689	C
45	A	2694	A
45	A	2695	G
45	A	2696	A
45	A	2699	C
45	A	2706	A
45	A	2709	A
45	A	2710	C
45	A	2718	C
45	A	2720	A

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Mol	Chain	Res	Type
45	A	2722	A
45	A	2723	A
45	A	2724	G
45	A	2725	A
45	A	2726	C
45	A	2731	U
45	A	2732	G
45	A	2735	G
45	A	2739	U
45	A	2740	A
45	A	2743	U
45	A	2750	U
45	A	2755	A
45	A	2756	C
45	A	2801	A
45	A	2810	G
45	A	2813	U
45	A	2814	G
45	A	2815	G
45	A	2829	C
45	A	2831	G
45	A	2832	A
45	A	2833	A
45	A	2844	G
45	A	2847	C
45	A	2848	A
45	A	2849	G
45	A	2851	A
45	A	2852	C
45	A	2853	A
45	A	2854	U
45	A	2855	G
45	A	2856	C
45	A	2861	A
45	A	2864	U
45	A	2865	C
45	A	2869	A
45	A	2880	A
45	A	2891	C
45	A	2895	U
45	A	2906	C
45	A	2907	U

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Mol	Chain	Res	Type
45	A	2908	U
45	A	2909	G
45	A	2910	A
45	A	2911	C
45	A	2913	A
45	A	2916	G
45	A	2917	G
45	A	2918	A
45	A	2919	A
45	A	2922	A
45	A	2924	U
45	A	2925	U
45	A	2926	A
45	A	2928	C
45	A	2930	U
45	A	2932	G
45	A	2934	G
45	A	2935	A
45	A	2937	A
45	A	2938	A
45	A	2940	A
45	A	2943	G
45	A	2946	A
45	A	2947	U
45	A	2951	A
45	A	2974	A
45	A	2975	G
45	A	2977	G
45	A	2982	C
45	A	2983	G
45	A	3071	U
45	A	3072	U
45	A	3073	C
45	A	3074	A
45	A	3088	C
45	A	3089	A
45	A	3090	G
45	A	3092	U
45	A	3094	G
45	A	3095	G
45	A	3096	U
45	A	3101	A

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Mol	Chain	Res	Type
45	A	3102	U
45	A	3108	U
45	A	3109	U
45	A	3114	U
45	A	3118	U
45	A	3119	C
45	A	3120	C
45	A	3122	U
45	A	3123	G
45	A	3124	U
45	A	3126	C
45	A	3129	A
45	A	3131	G
45	A	3134	C
45	A	3135	A
45	A	3140	A
45	A	3141	A
45	A	3150	U
45	A	3151	A
45	A	3154	U
45	A	3157	C
45	A	3158	A
45	A	3162	C
45	A	3168	C
45	A	3169	C
45	A	3170	C
45	A	3171	C
45	A	3172	C
45	A	3177	A
45	A	3184	C
45	A	3185	A
45	A	3188	U
45	A	3189	C
45	A	3190	A
45	A	3193	U
45	A	3207	A
45	A	3217	A
45	A	3218	A
45	A	3219	G
45	A	3220	A
45	A	3228	U
46	B	1607	U

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Mol	Chain	Res	Type
46	B	1608	G
46	B	1611	G
46	B	1613	U
46	B	1614	U
46	B	1615	A
46	B	1628	C
46	B	1632	U
46	B	1633	U
46	B	1639	U
46	B	1641	G
46	B	1644	G
46	B	1645	A

All (15) RNA pucker outliers are listed below:

Mol	Chain	Res	Type
45	A	2030	U
45	A	2245	A
45	A	2344	C
45	A	2414	C
45	A	2457	A
45	A	2507	A
45	A	2530	A
45	A	2653	C
45	A	2905	A
45	A	2925	U
45	A	3113	A
45	A	3117	C
45	A	3123	G
45	A	3130	A
45	A	3168	C

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

Of 1 ligands modelled in this entry, 1 is monoatomic - leaving 0 for Mogul analysis.

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

5.7 Other polymers

There are no such residues in this entry.

5.8 Polymer linkage issues

There are no chain breaks in this entry.

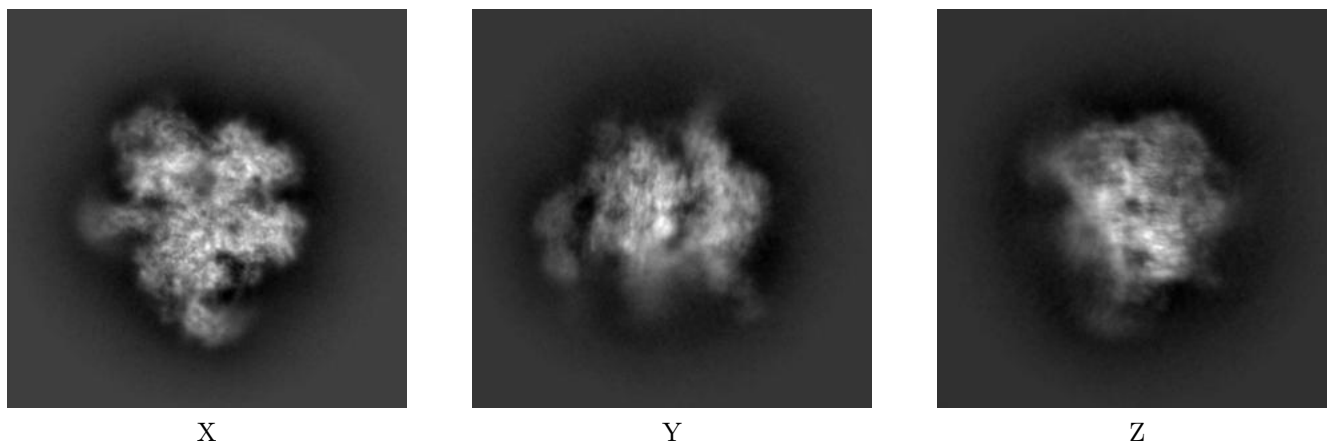
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-13965. 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](#)

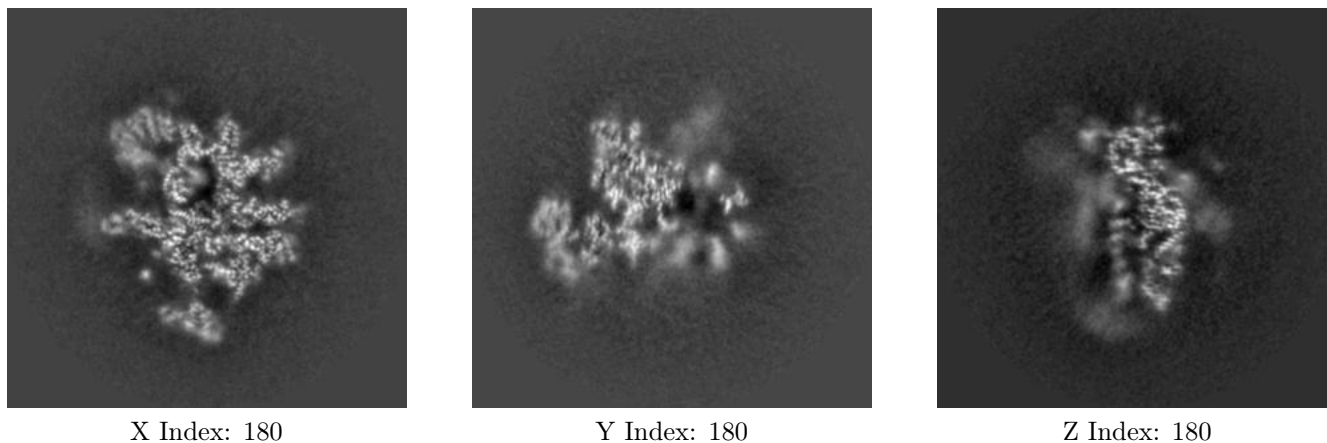
6.1.1 Primary map



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

6.2 Central slices [i](#)

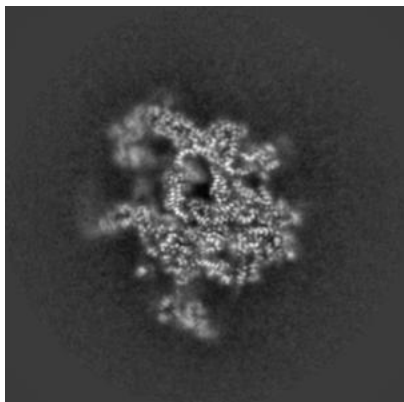
6.2.1 Primary map



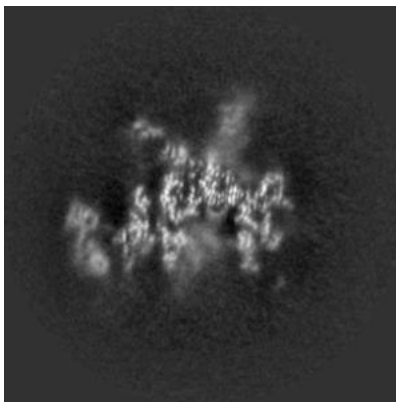
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

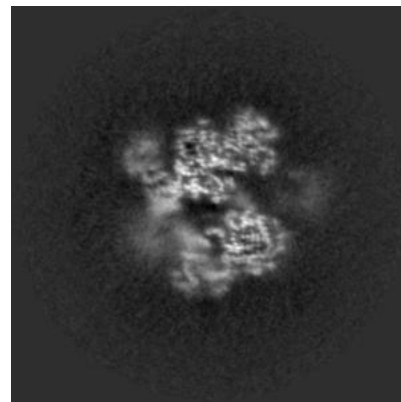
6.3.1 Primary map



X Index: 186



Y Index: 191



Z Index: 221

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

6.4 Orthogonal surface views [i](#)

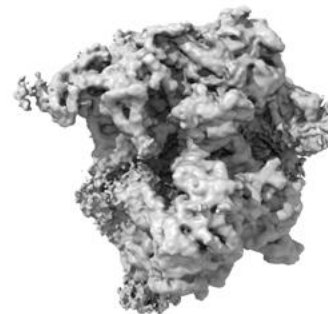
6.4.1 Primary map



X



Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.01. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

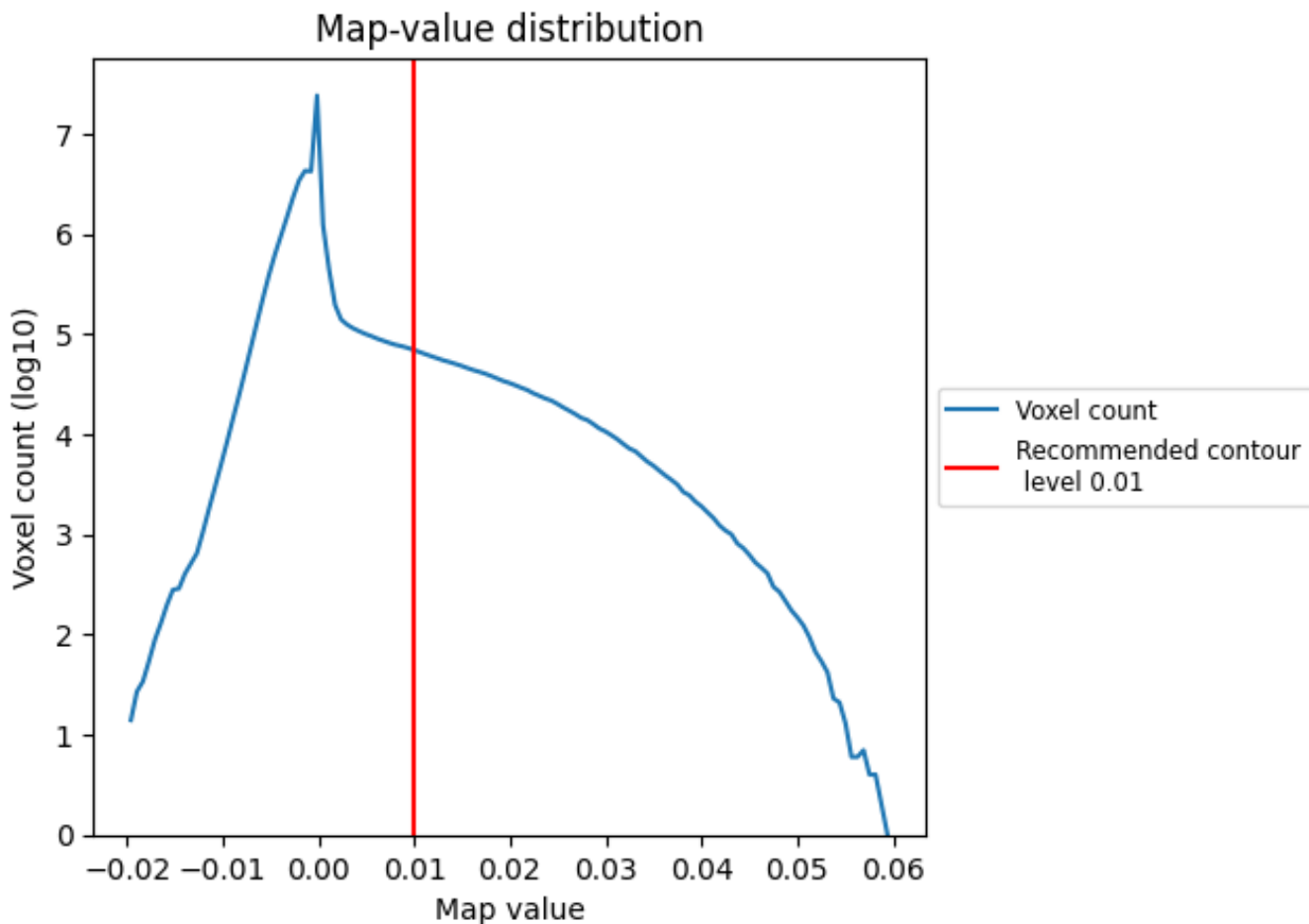
6.5 Mask visualisation

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

7 Map analysis [i](#)

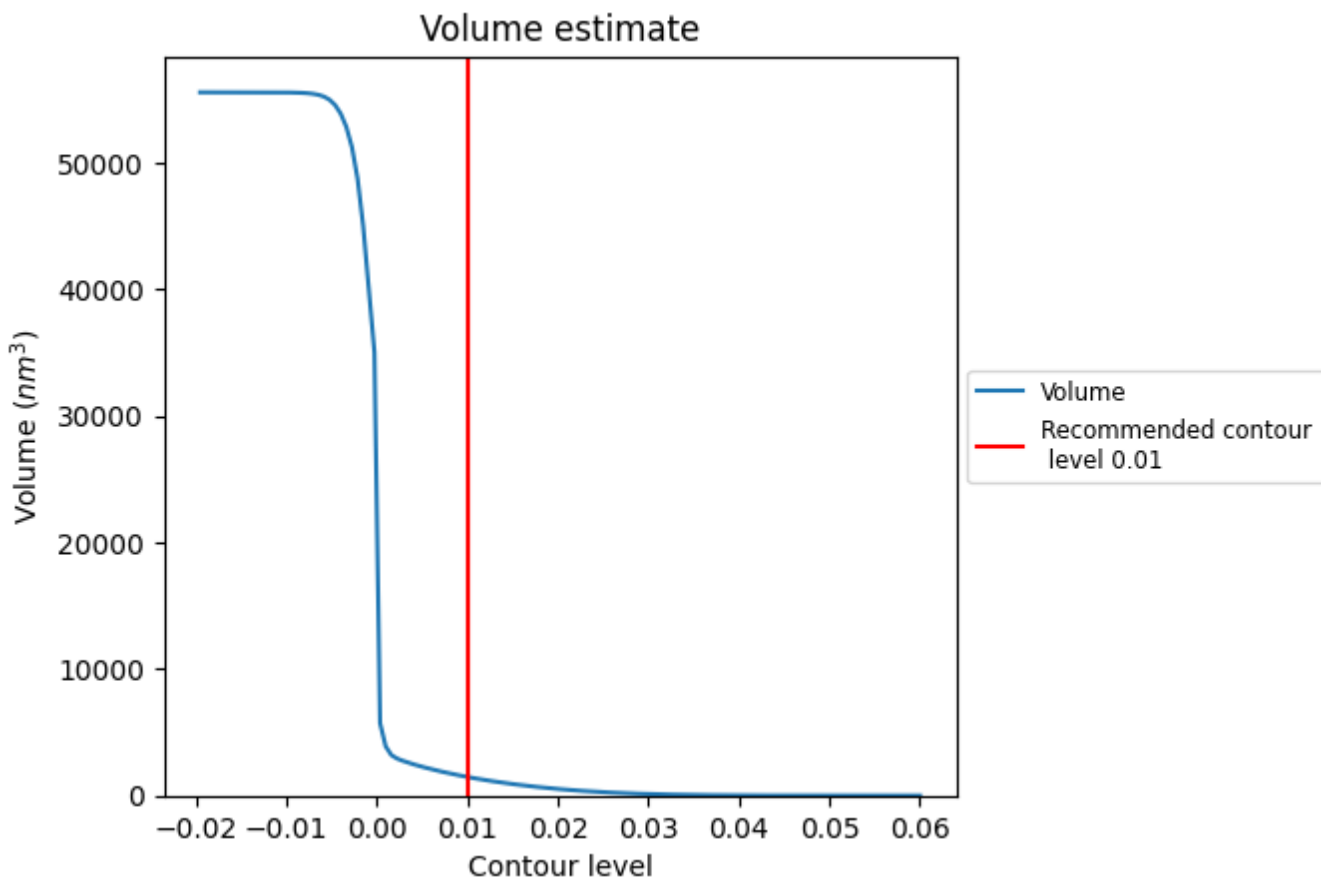
This section contains the results of statistical analysis of the map.

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.

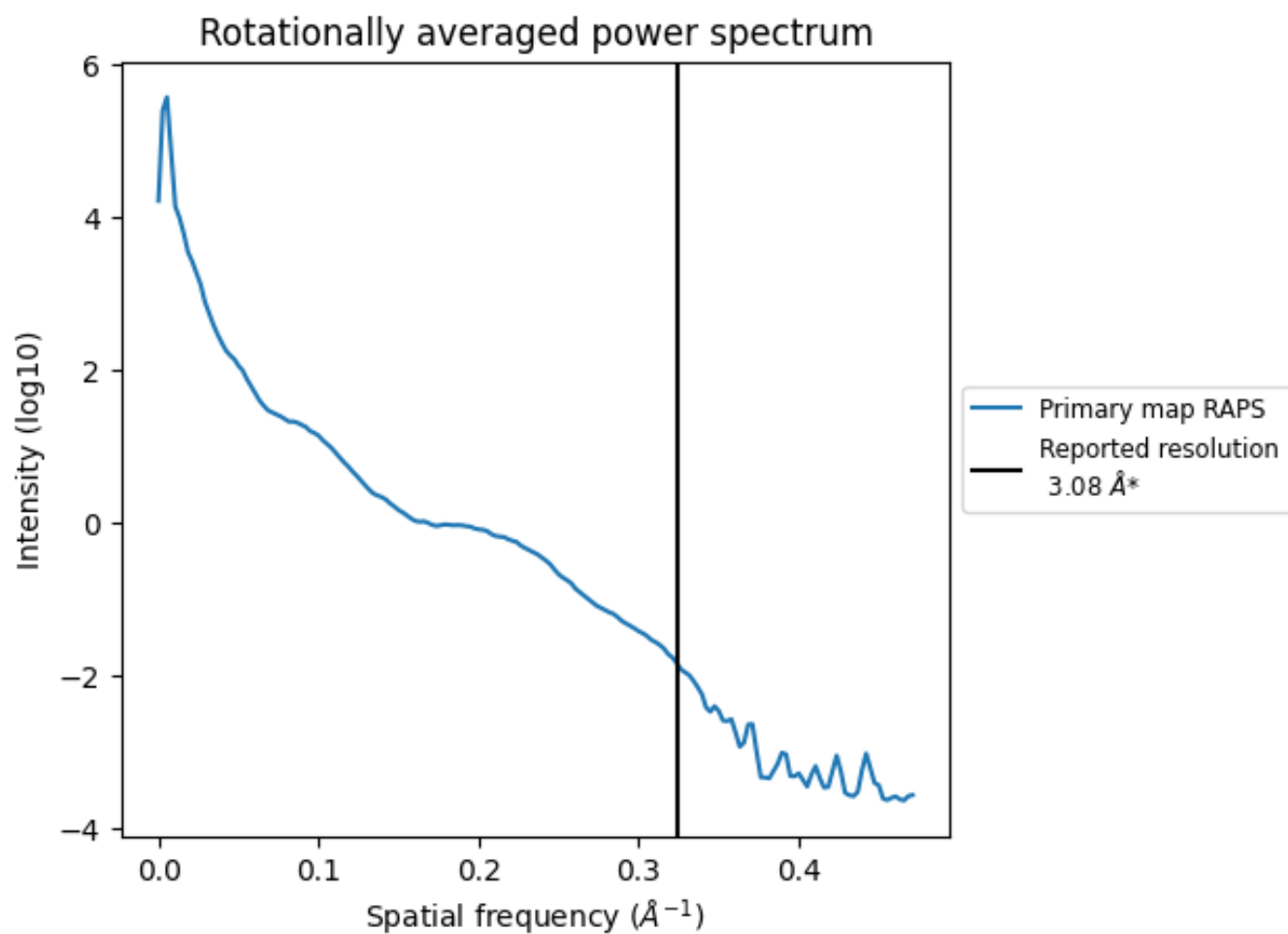
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 1470 nm³; this corresponds to an approximate mass of 1328 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

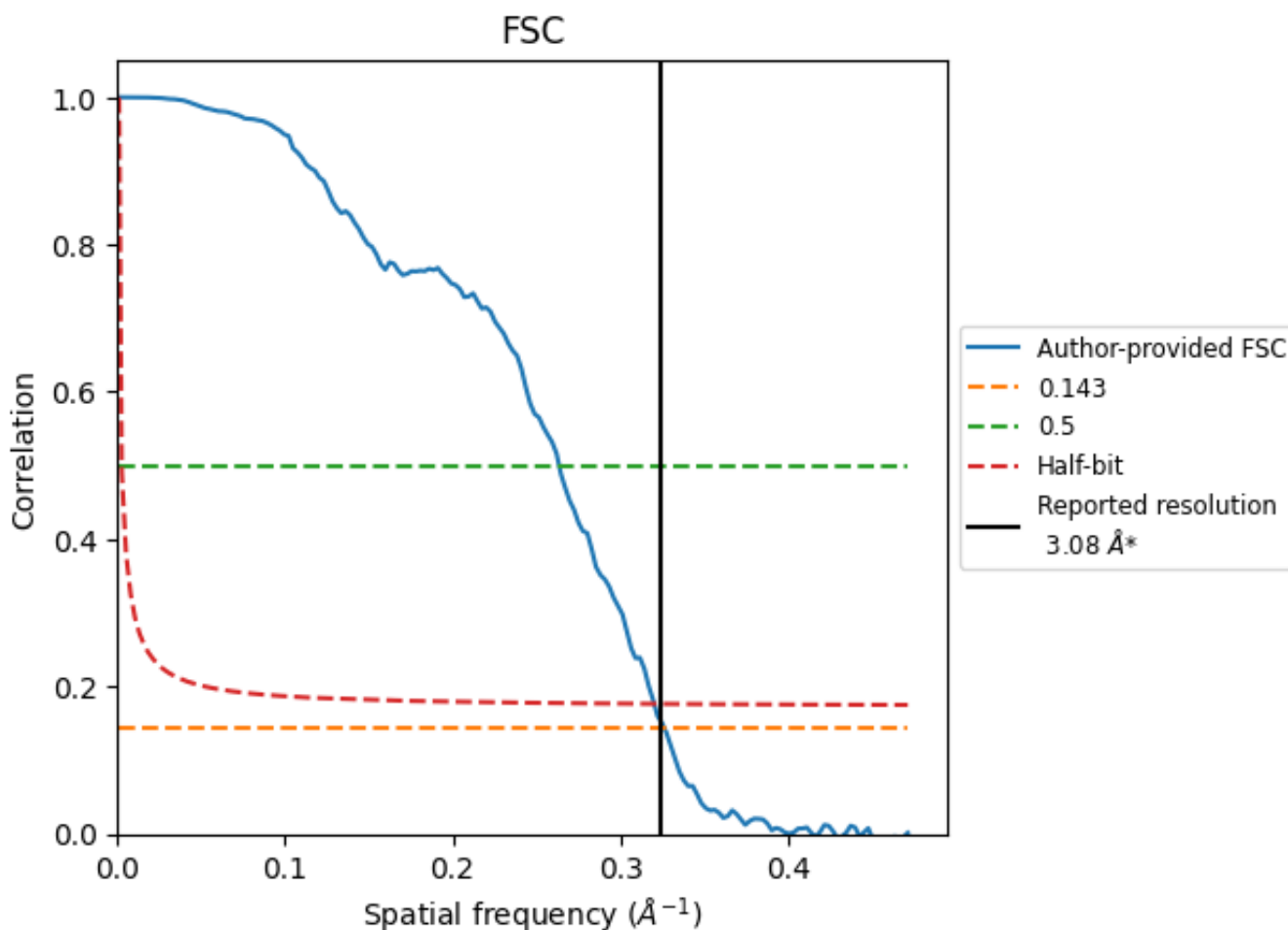


*Reported resolution corresponds to spatial frequency of 0.325 Å⁻¹

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 0.325 Å⁻¹

8.2 Resolution estimates [i](#)

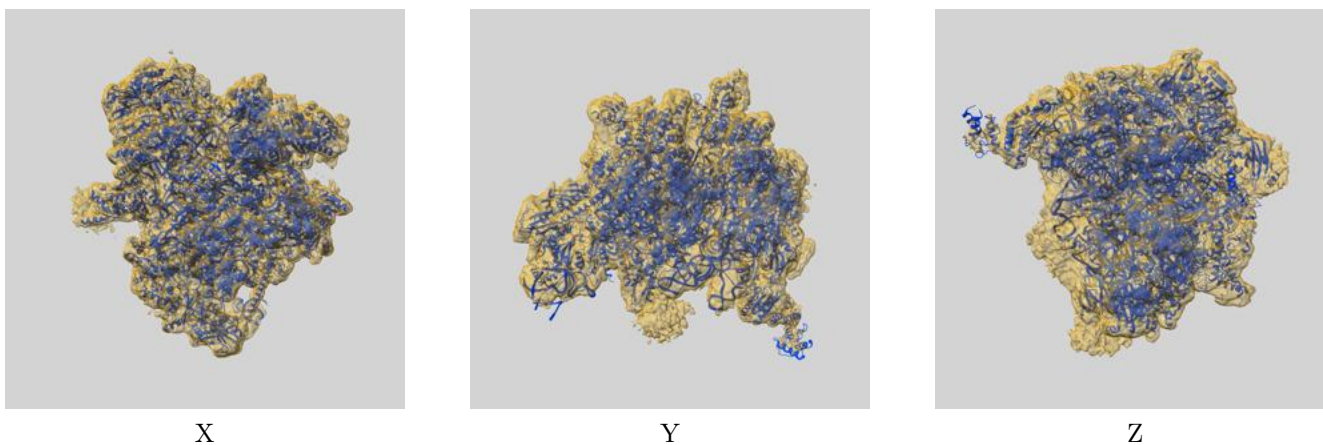
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.08	-	-
Author-provided FSC curve	3.06	3.79	3.12
Unmasked-calculated*	-	-	-

*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps.

9 Map-model fit [i](#)

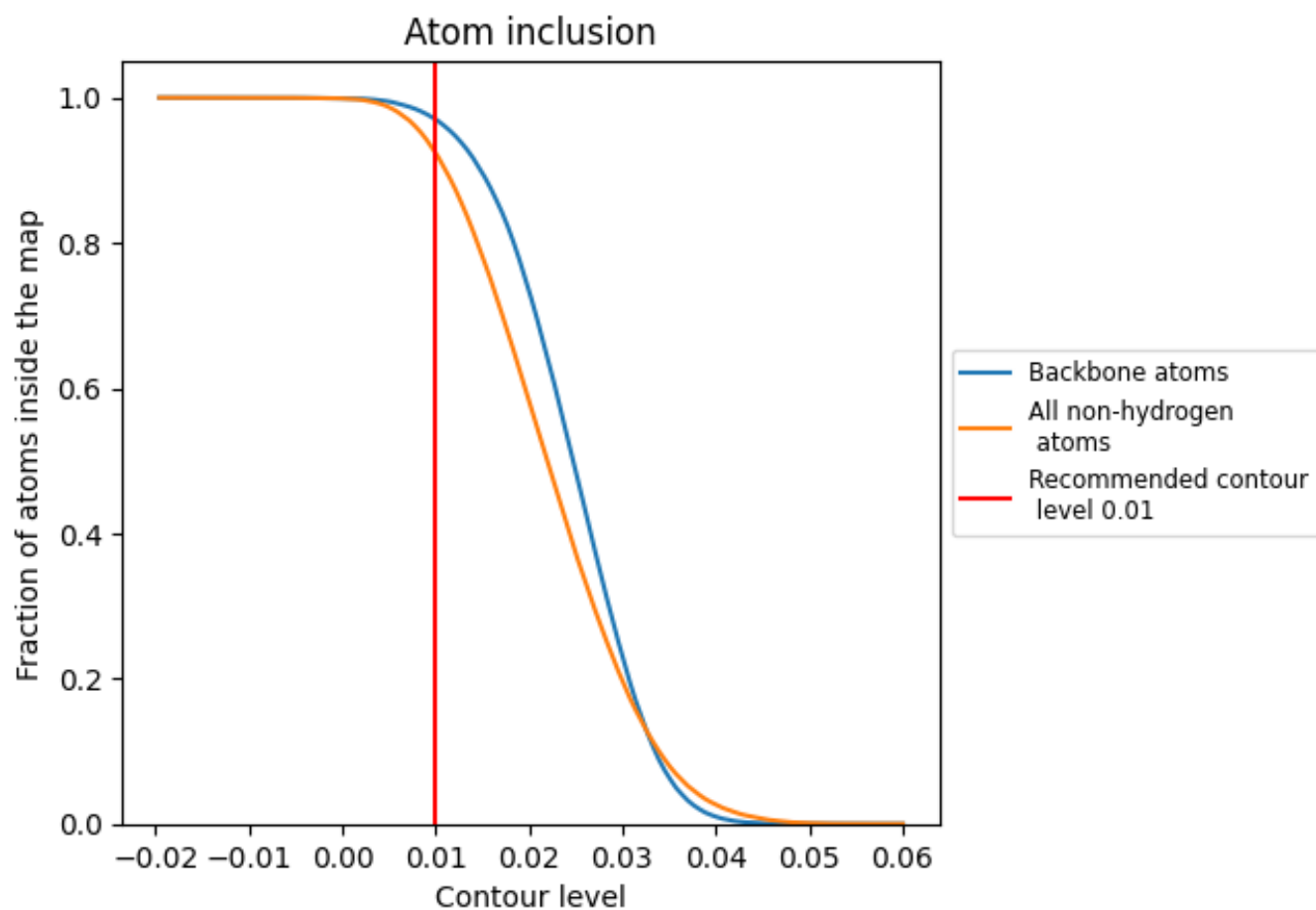
This section contains information regarding the fit between EMDB map EMD-13965 and PDB model 7QH6. Per-residue inclusion information can be found in section 3 on page 12.

9.1 Map-model overlay [i](#)



The images above show the 3D surface view of the map at the recommended contour level 0.01 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 Atom inclusion [i](#)



At the recommended contour level, 97% of all backbone atoms, 92% of all non-hydrogen atoms, are inside the map.