WORLDWIDE PDB
PROTEIN DATA BANK

wwPDB EM Validation Summary Report (i)

Feb 22, 2024 – 02:06 PM EST

PDB ID	:	4V6V
EMDB ID	:	EMD-5562
Title	:	Tetracycline resistance protein Tet(O) bound to the ribosome
Authors	:	Li, W.; Atkinson, G.C.; Thakor, N.S.; Allas, U.; Lu, C.; Chan, K.Y.; Tenson, T.; Schulten, K.; Wilson, K.S.; Hauryliuk, V.; Frank, J.
Deposited on	:	2013-02-25
Resolution	:	9.80 Å(reported)
Based on initial models	:	2I2U, 2I2V

---

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 9.80 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.
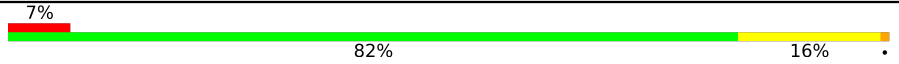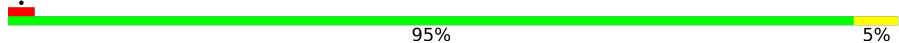
Metric	Percentile Ranks	Value
Ramachandran outliers		1.3%
Sidechain outliers		2.6%
RNA backbone		0.48

Worse   *Better*

∎ Percentile relative to all structures

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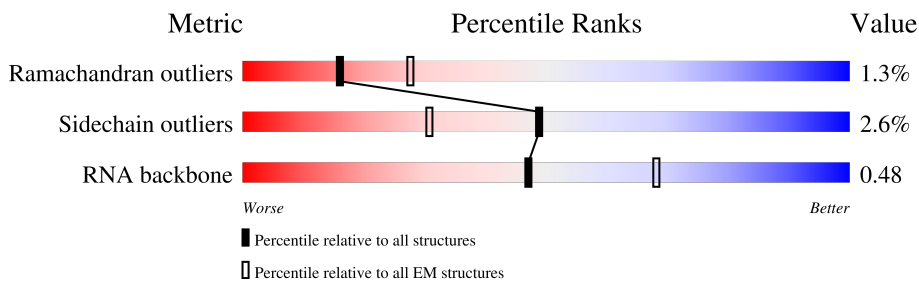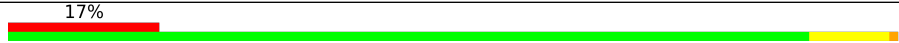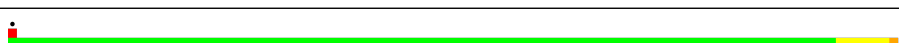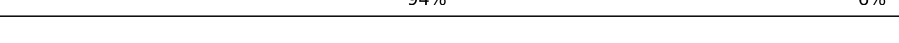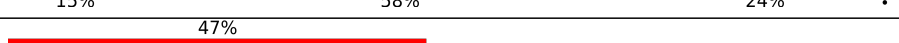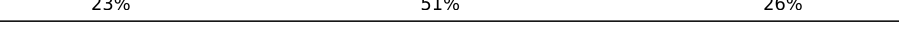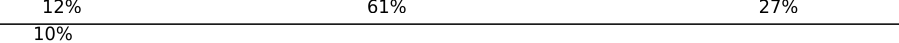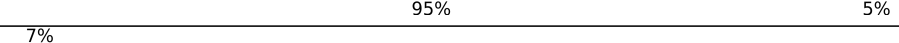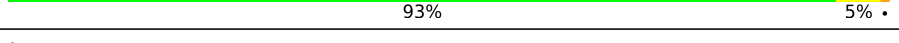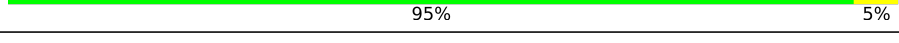
Metric	Whole archive (#Entries)	EM structures (#Entries)
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826
RNA backbone	4643	859

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 <=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	AJ	103	89% 10% •
2	AK	128	8% 91% 8% •
3	AL	123	89% 9% •
4	AM	117	87% 13%
5	AN	100	89% 11%
6	AO	88	91% 7% ••
7	AP	82	88% 11% •
8	AQ	83	93% 6% •
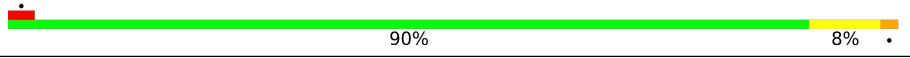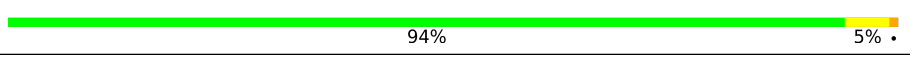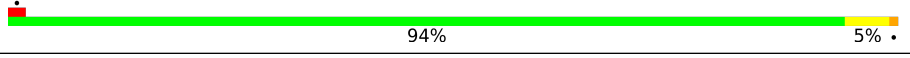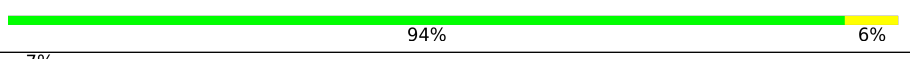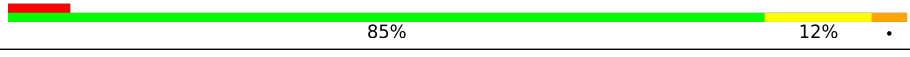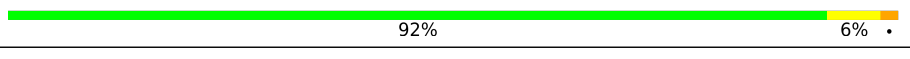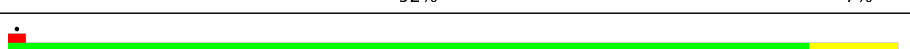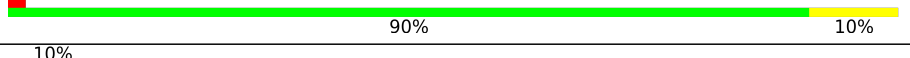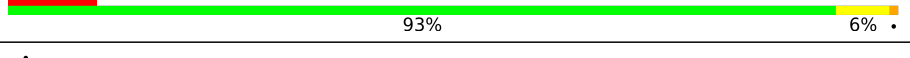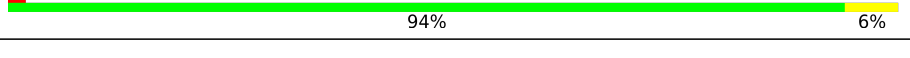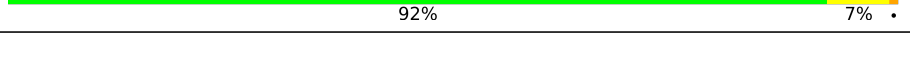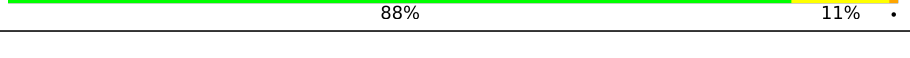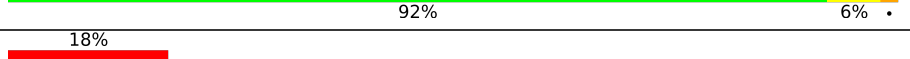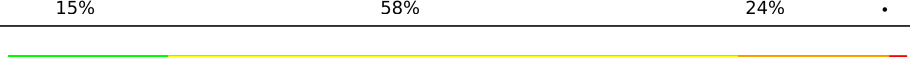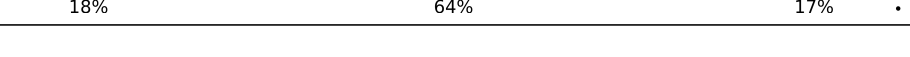
Continued from previous page...

Mol	Chain	Length	Quality of chain
9	AR	74	7% / 82% / 16%
10	AS	91	87% / 13%
11	AB	240	95% / 5%
12	AT	86	93% / 7%
13	AU	70	6% / 77% / 20%
14	AC	232	91% / 9%
15	AD	205	90% / 9%
16	AE	166	92% / 8%
17	AF	135	17% / 90% / 9%
18	AG	178	90% / 9%
19	AH	129	93% / 6%
20	AI	129	87% / 12%
21	A1	639	94% / 6%
22	AA	1542	15% / 58% / 24%
23	A2	47	47% / 23% / 51% / 26%
24	A3	77	12% / 61% / 27%
25	BC	234	10% / 95% / 5%
26	BJ	164	7% / 93% / 5%
27	BK	141	95% / 5%
28	BN	142	87% / 12%
29	BO	123	84% / 13%
30	BP	144	88% / 10%
31	BQ	136	87% / 13%
32	BR	127	84% / 15%
33	BS	117	91% / 9%

Continued on next page...

Continued from previous page...

Mol	Chain	Length	Quality of chain
34	BT	114	89% · 11% ·
35	BD	272	88% · 11% ·
36	BU	117	85% 13% ·
37	BV	103	88% 12%
38	BW	110	90% · 8% ·
39	BX	100	94% 5% ·
40	BY	103	94% · 5% ·
41	BZ	94	94% 6%
42	B0	84	7% 85% 12% ·
43	B1	77	87% · 10% ·
44	B2	63	92% 6% ·
45	BE	209	92% · 7%
46	B3	58	90% · 10%
47	B4	70	10% 93% 6% ·
48	B5	56	82% · 18%
49	B6	54	94% · 6%
50	B7	46	80% 20%
51	B8	64	89% · 9% ·
52	B9	38	87% 13%
53	BF	201	92% 7% ·
54	BG	178	88% 11% ·
55	BH	176	92% 6% ·
56	BL	149	18% 95% 5%
57	BA	2904	15% 58% 24% ·
58	Ba	120	18% 64% 17% ·

2 Entry composition ⓘ

There are 58 unique types of molecules in this entry. The entry contains 154956 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 30S ribosomal protein S10.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	AJ	103	Total 794	C 483	N 158	O 151	S 2	0	0

- Molecule 2 is a protein called 30S ribosomal protein S11.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	AK	128	Total 923	C 553	N 196	O 171	S 3	0	0

- Molecule 3 is a protein called 30S ribosomal protein S12.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	AL	123	Total 923	C 558	N 196	O 165	S 4	0	0

- Molecule 4 is a protein called 30S ribosomal protein S13.

Mol	Chain	Residues	Atoms					AltConf	Trace
4	AM	117	Total 876	C 530	N 183	O 160	S 3	0	0

- Molecule 5 is a protein called 30S ribosomal protein S14.

Mol	Chain	Residues	Atoms					AltConf	Trace
5	AN	100	Total 771	C 465	N 164	O 139	S 3	0	0

- Molecule 6 is a protein called 30S ribosomal protein S15.

Mol	Chain	Residues	Atoms					AltConf	Trace
6	AO	88	Total 690	C 414	N 146	O 129	S 1	0	0

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
AO	79	ARG	GLN	conflict	UNP P0ADZ4

- Molecule 7 is a protein called 30S ribosomal protein S16.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
7	AP	82	620	377	128	114	1	0	0

- Molecule 8 is a protein called 30S ribosomal protein S17.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
8	AQ	83	657	410	124	120	3	0	0

- Molecule 9 is a protein called 30S ribosomal protein S18.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
9	AR	74	603	372	123	107	1	0	0

- Molecule 10 is a protein called 30S ribosomal protein S19.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
10	AS	91	708	445	139	122	2	0	0

- Molecule 11 is a protein called 30S ribosomal protein S2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
11	AB	240	1805	1113	332	352	8	0	0

- Molecule 12 is a protein called 30S ribosomal protein S20.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
12	AT	86	636	380	138	115	3	0	0

- Molecule 13 is a protein called 30S ribosomal protein S21.

Mol	Chain	Residues	Atoms					AltConf	Trace
13	AU	70	Total	C	N	O	S	0	0
			564	340	125	98	1		

- Molecule 14 is a protein called 30S ribosomal protein S3.

Mol	Chain	Residues	Atoms					AltConf	Trace
14	AC	232	Total	C	N	O	S	0	0
			1761	1088	346	323	4		

- Molecule 15 is a protein called 30S ribosomal protein S4.

Mol	Chain	Residues	Atoms					AltConf	Trace
15	AD	205	Total	C	N	O	S	0	0
			1587	970	315	298	4		

- Molecule 16 is a protein called 30S ribosomal protein S5.

Mol	Chain	Residues	Atoms					AltConf	Trace
16	AE	166	Total	C	N	O	S	0	0
			1182	718	232	226	6		

- Molecule 17 is a protein called 30S ribosomal protein S6.

Mol	Chain	Residues	Atoms					AltConf	Trace
17	AF	135	Total	C	N	O	S	0	0
			1061	637	198	219	7		

- Molecule 18 is a protein called 30S ribosomal protein S7.

Mol	Chain	Residues	Atoms					AltConf	Trace
18	AG	178	Total	C	N	O	S	0	0
			1347	821	269	253	4		

- Molecule 19 is a protein called 30S ribosomal protein S8.

Mol	Chain	Residues	Atoms					AltConf	Trace
19	AH	129	Total	C	N	O	S	0	0
			948	585	173	184	6		

- Molecule 20 is a protein called 30S ribosomal protein S9.

Mol	Chain	Residues	Atoms					AltConf	Trace
20	AI	129	Total 1000	C 606	N 208	O 183	S 3	0	0

- Molecule 21 is a protein called Tetracycline resistance protein TetO.

Mol	Chain	Residues	Atoms					AltConf	Trace
21	A1	639	Total 4989	C 3146	N 850	O 966	S 27	0	0

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A1	227	ILE	THR	conflict	UNP P10952

- Molecule 22 is a RNA chain called 16S ribosomal RNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
22	AA	1542	Total 33089	C 14767	N 6064	O 10717	P 1541	0	0

- Molecule 23 is a RNA chain called mRNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
23	A2	47	Total 993	C 445	N 167	O 335	P 46	0	0

- Molecule 24 is a RNA chain called P-tRNA.

Mol	Chain	Residues	Atoms						AltConf	Trace
24	A3	77	Total 1640	C 734	N 297	O 533	P 75	S 1	0	0

- Molecule 25 is a protein called 50S ribosomal protein L1.

Mol	Chain	Residues	Atoms					AltConf	Trace
25	BC	234	Total 1733	C 1081	N 315	O 330	S 7	0	0

- Molecule 26 is a protein called 50S ribosomal protein L10.

Mol	Chain	Residues	Atoms					AltConf	Trace
26	BJ	164	Total 1233	C 776	N 220	O 231	S 6	0	0

- Molecule 27 is a protein called 50S ribosomal protein L11.

Mol	Chain	Residues	Atoms					AltConf	Trace
27	BK	141	Total 1032	C 651	N 179	O 196	S 6	0	0

- Molecule 28 is a protein called 50S ribosomal protein L13.

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

- Molecule 29 is a protein called 50S ribosomal protein L14.

Mol	Chain	Residues	Atoms					AltConf	Trace
29	BO	123	Total 947	C 593	N 181	O 167	S 6	0	0

- Molecule 30 is a protein called 50S ribosomal protein L15.

Mol	Chain	Residues	Atoms					AltConf	Trace
30	BP	144	Total 1053	C 654	N 207	O 190	S 2	0	0

- Molecule 31 is a protein called 50S ribosomal protein L16.

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

- Molecule 32 is a protein called 50S ribosomal protein L17.

Mol	Chain	Residues	Atoms					AltConf	Trace
32	BR	127	Total 1008	C 621	N 204	O 178	S 5	0	0

- Molecule 33 is a protein called 50S ribosomal protein L18.

Mol	Chain	Residues	Atoms					AltConf	Trace
33	BS	117	Total 900	C 557	N 179	O 163	S 1	0	0

- Molecule 34 is a protein called 50S ribosomal protein L19.

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

- Molecule 35 is a protein called 50S ribosomal protein L2.

Mol	Chain	Residues	Atoms					AltConf	Trace
35	BD	272	Total 2092	C 1294	N 425	O 366	S 7	0	0

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

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

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

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

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

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

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

Mol	Chain	Residues	Atoms					AltConf	Trace
39	BX	100	Total 787	C 496	N 146	O 143	S 2	0	0

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

Mol	Chain	Residues	Atoms				AltConf	Trace
40	BY	103	Total 789	C 498	N 148	O 143	0	0

- Molecule 41 is a protein called 50S ribosomal protein L25.

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

- Molecule 42 is a protein called 50S ribosomal protein L27.

Mol	Chain	Residues	Atoms					AltConf	Trace
42	B0	84	Total 634	C 391	N 129	O 113	S 1	0	0

- Molecule 43 is a protein called 50S ribosomal protein L28.

Mol	Chain	Residues	Atoms					AltConf	Trace
43	B1	77	Total 625	C 388	N 129	O 106	S 2	0	0

- Molecule 44 is a protein called 50S ribosomal protein L29.

Mol	Chain	Residues	Atoms					AltConf	Trace
44	B2	63	Total 509	C 313	N 99	O 95	S 2	0	0

- Molecule 45 is a protein called 50S ribosomal protein L3.

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

- Molecule 46 is a protein called 50S ribosomal protein L30.

Mol	Chain	Residues	Atoms					AltConf	Trace
46	B3	58	Total 449	C 281	N 87	O 79	S 2	0	0

- Molecule 47 is a protein called 50S ribosomal protein L31.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
47	B4	70	549	339	104	100	6	0	0

- Molecule 48 is a protein called 50S ribosomal protein L32.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
48	B5	56	444	269	94	80	1	0	0

- Molecule 49 is a protein called 50S ribosomal protein L33.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
49	B6	54	441	284	81	76	0	0

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

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
50	B7	46	377	228	90	57	2	0	0

- Molecule 51 is a protein called 50S ribosomal protein L35.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
51	B8	64	504	323	105	74	2	0	0

- Molecule 52 is a protein called 50S ribosomal protein L36.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
52	B9	38	302	185	65	48	4	0	0

- Molecule 53 is a protein called 50S ribosomal protein L4.

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

- Molecule 54 is a protein called 50S ribosomal protein L5.

Mol	Chain	Residues	Atoms					AltConf	Trace
54	BG	178	Total 1420	C 905	N 251	O 258	S 6	0	0

- Molecule 55 is a protein called 50S ribosomal protein L6.

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

- Molecule 56 is a protein called 50S ribosomal protein L9.

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

- Molecule 57 is a RNA chain called 23S ribosomal RNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
57	BA	2904	Total 62351	C 27824	N 11469	O 20155	P 2903	0	0

- Molecule 58 is a RNA chain called 5S ribosomal RNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
58	Ba	120	Total 2566	C 1144	N 468	O 835	P 119	0	0

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: 30S ribosomal protein S10
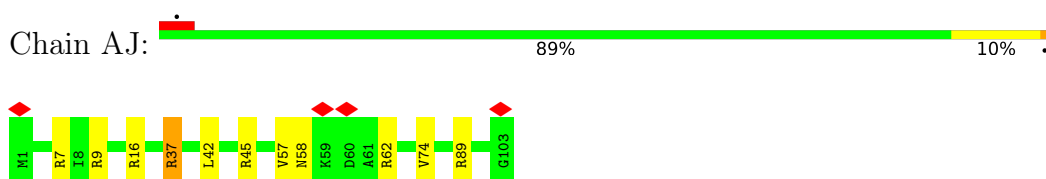
Chain AJ:

- Molecule 2: 30S ribosomal protein S11
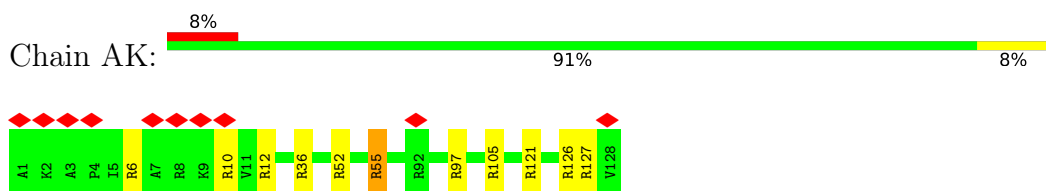
Chain AK:
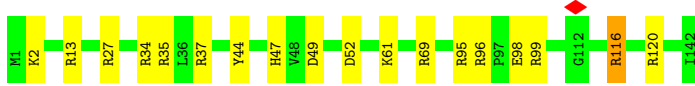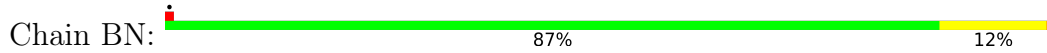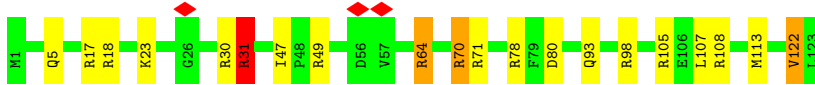
- Molecule 3: 30S ribosomal protein S12
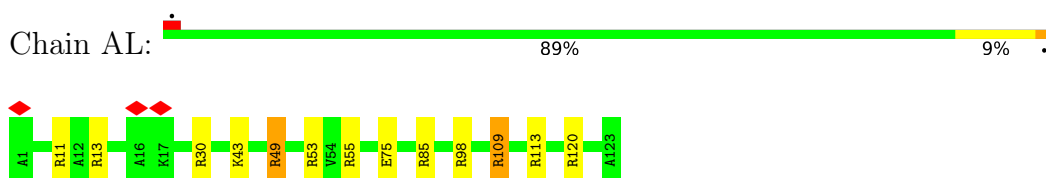
Chain AL:

- Molecule 4: 30S ribosomal protein S13
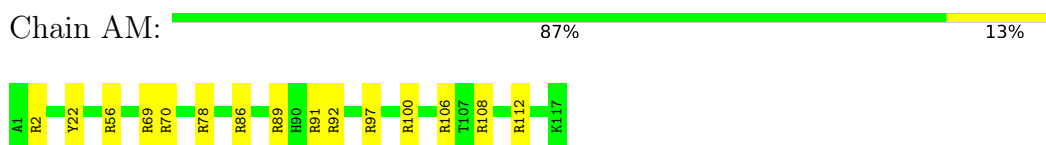
Chain AM:

- Molecule 5: 30S ribosomal protein S14
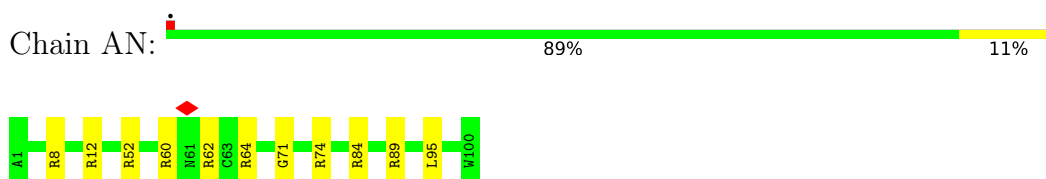
Chain AN:

• Molecule 6: 30S ribosomal protein S15

Chain AO:

• Molecule 7: 30S ribosomal protein S16

Chain AP:
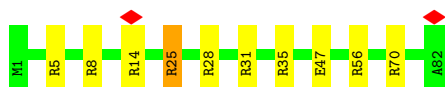
• Molecule 8: 30S ribosomal protein S17

Chain AQ:

• Molecule 9: 30S ribosomal protein S18

Chain AR:
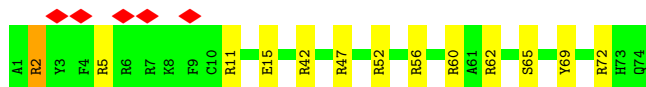
• Molecule 10: 30S ribosomal protein S19

Chain AS:

• Molecule 11: 30S ribosomal protein S2

Chain AB:

• Molecule 12: 30S ribosomal protein S20

Chain AT:

A1 R9 R23 R24 R28 R59 R73 A86

• Molecule 13: 30S ribosomal protein S21

Chain AU:

6%

77% 20%

P1 V2 I3 R6 R16 R17 F18 K19 R20 R32 R33 R34 R44 K45 R46 R54 R65 R66 T67 R68 L69 Y70

• Molecule 14: 30S ribosomal protein S3

Chain AC:

91% 9%

G1 Q2 K3 R10 F28 D35 K48 R53 E57 R58 R64 R126 R130 R135 R142 R155 R163 R171 R178 E187 Q215 P216 P219 A220 A221 Q222 P223 K224 K225 Q226 Q227 R228 R231 K232

• Molecule 15: 30S ribosomal protein S4

Chain AD:

90% 9%

A1 R2 R12 R13 R25 R43 R46 R55 R61 R62 R69 Q70 F71 R72 R80 R110 R114 I131 R145 R153 R164 R183 R187 K205

• Molecule 16: 30S ribosomal protein S5

Chain AE:

92% 8%

A1 H2 I3 E4 K5 Q6 A7 E12 R19 K22 T23 R44 Y49 R53 R67 R68 R92 R111 N121 V122 R137 K166

• Molecule 17: 30S ribosomal protein S6

Chain AF:

17%

90% 9%

M1 R2 I6 R24 R38 R44 E69 R79 R91 E98 R109 R110 E111 R112 R113 D114 D115 F116 A117 N118 E119 T120 A121 D122 D123 A124 E125 A126 G127 D128 S129 E130 E131 E132 E133 E134 E135

• Molecule 18: 30S ribosomal protein S7

Chain AG:

90% 9%

P1 R2 R3 R4 R9 R69 R77 R78 R91 R94 R101 R110 R118 M143 F150 Y153 R154 R159 N178

• Molecule 19: 30S ribosomal protein S8

Chain AH:

93%   6%

S1 R12 I13 R14 M26 F65 E72 R76 R79 R87 R113 R116 A129

• Molecule 20: 30S ribosomal protein S9

Chain AI:

87%   12%

A1 R10 R17 K26 R32 R44 R48 R79 H80 R84 R94 R98 R108 R118 R121 R122 R123 R129

• Molecule 21: Tetracycline resistance protein TetO

Chain A1:

94%   6%

M1 G7 A31 R42 L48 E49 R50 R87 R110 R142 Q174 R206 R207 R228 T242 L249 I256 R263 R269 R278 S284 I289 Q322 E330 R336 R358 D370 L374 M421 E435 V436 P437 P438 N439

P440 R463 Y468 Y490 K493 R517 Q526 R560 Y561 V566 R584 R590 G615 K616 F617 I618 C619 Q620 P621 R622 R623 P624 R627 K630 V631 R632 H636 A639

• Molecule 22: 16S ribosomal RNA

Chain AA:

15%   58%   24%

A1 A2 A3 U4 U5 G6 A7 A8 G9 A10 G11 U12 U13 U14 G15 A16 U17 C18 A19 U20 G21 G22 C23 U24 C25 A26 G27 A28 A32 A33 C34 G35 C36 G37 G38 G39 C40 G41 G42 A43 A44 G45 C46 C47 C48 U49 A50 A51 C52 A53 C54 A55 U56 G57 C58 A59 A60 G61 U62

C63 G64 A65 A66 C67 G68 G69 U70 A71 A72 C73 A74 A77 A78 G79 A80 A81 G82 C83 U84 U85 G86 C87 U88 U89 C90 U91 U92 G93 G94 G95 U96 G97 A98 C99 G100 A101 G102 G105 C106 G107 G108 A109 C110 G111 G112 G113 U114 G115 A116 G117 U118 A119 A120 U121 G122 C123 C124

U125 G126 G127 G128 A129 A130 A131 C132 U133 G134 C135 C136 U137 G138 A139 U140 G141 G142 A143 G144 A149 A150 A151 A152 C153 U154 A155 C156 U157 G158 G159 A160 A161 A162 C163 G164 G165 U166 A167 G168 C169 U170 A171 A172 U173 A174 C175 C176 U177 C178 A179 U180 A181 A182 C183 G184 U185 C186 G187

C188 A189 A190 G191 A192 C193 C194 A195 A196 A197 G198 A199 G200 G201 G202 G203 A204 A205 C206 C207 U208 U209 C210 G211 G212 G213 C214 C215 U216 C217 U218 U219 G220 C221 C222 A223 U224 C225 G226 G227 A228 U229 G230 U231 G232 C233 C234 C235 A236 G237 A238 U239 G242 A243 U244 U245 A246 A247 C248

U249 A250 G251 U252 A253 G254 G255 U256 G257 G258 C259 A262 A263 C264 G265 C266 C267 U268 G269 A270 C271 U272 U273 A274 U275 G276 C277 U278 A279 C280 C281 A282 U283 C284 C285 A286 C287 A288 G289 G290 U291 G292 G293 U294 C295 C296 G297 A298 G299 A300 A303 U304 G305 A306 C307 C308 A309 G310

C311 C312 A313 C314 A315 C316 U317 G318 G319 A320 A321 C322 U323 G324 A325 G326 A327 C328 A329 C330 G331 G332 U333 C334 C335 A336 G337 A338 C339 U340 C341 C342 U343 A344 C345 G346 G347 G348 A349 G350 G351 C352 A353 G354 C355 A356 G357 U358 G359 G362 A363 A364 U365 A366 U367 U368 G369 C370 A371

C372 A373 U374 U375 G376 C377 G378 C379 G380 C381 A382 A383 G384 C385 C386 U387 G388 A389 U390 G391 C392 A393 G394 C395 C396 A397 U398 G399 C400 C401 G402 C403 G404 U405 G406 U407 A408 U409 G410 A411 A412 G413 A414 A415 G416 G417 C418 C419 U420 U421 C422 G423 G424 G425 U426 U427 G428 U429 A430 A431

• Molecule 23: mRNA

Chain A2:

• Molecule 24: P-tRNA

Chain A3:

• Molecule 25: 50S ribosomal protein L1

Chain BC:

• Molecule 26: 50S ribosomal protein L10

Chain BJ:

• Molecule 27: 50S ribosomal protein L11

Chain BK:

• Molecule 28: 50S ribosomal protein L13

Chain BN:

• Molecule 29: 50S ribosomal protein L14

Chain BO:

• Molecule 30: 50S ribosomal protein L15

Chain BP:

• Molecule 31: 50S ribosomal protein L16
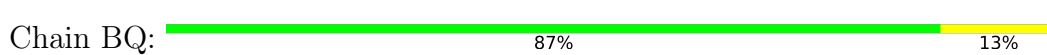
Chain BQ:

• Molecule 32: 50S ribosomal protein L17
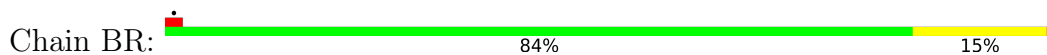
Chain BR:

• Molecule 33: 50S ribosomal protein L18
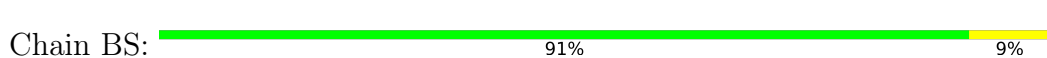
Chain BS:

• Molecule 34: 50S ribosomal protein L19

Chain BT:
89% 11%

S1 K5 R20 V32 R38 R50 N51 R52 N65 G66 R71 R87 R92 R100 E101 R108 I109 K110 E111 R112 L113 N114
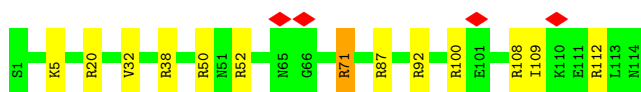
• Molecule 35: 50S ribosomal protein L2

Chain BD:
88% 11%

A1 R12 R13 P31 R42 R47 R51 G56 Y61 R62 R68 V77 R86 R100 R101 L109 R132 V140 R155 Q162 R166 R174 L175 R176 R181 R188 M200 L201 R202 R211 W212 R216 P217 R220 R237

R257 R268 R269 R270 S271 K272
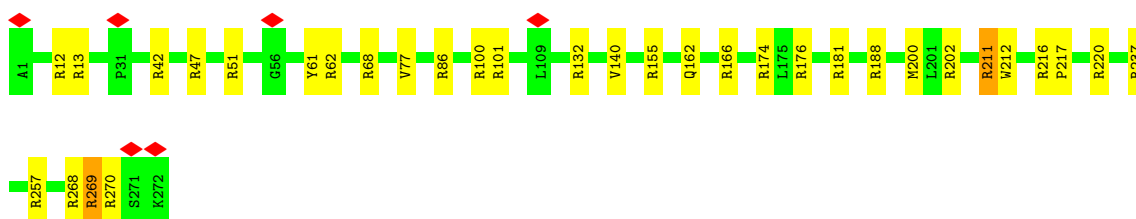
• Molecule 36: 50S ribosomal protein L20

Chain BU:
85% 13%

A1 R2 V3 K4 R5 R12 R27 S28 R29 R32 R49 R50 Q51 R52 K53 R54 R57 R63 R69 E88 R91 D96 K102 A117

• Molecule 37: 50S ribosomal protein L21

Chain BV:
88% 12%

M1 R13 R21 F53 R68 R78 R79 R80 R84 K85 Q86 R90 Q91 I101 S102 A103
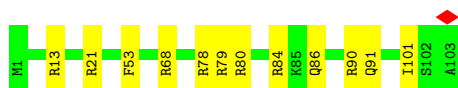
• Molecule 38: 50S ribosomal protein L22

Chain BW:
90% 8%

M1 R8 R11 A21 R25 K28 H60 R84 R88 R92 R95 R99 R110
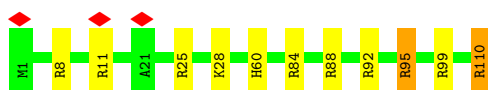
• Molecule 39: 50S ribosomal protein L23

Chain BX:
94% 5%

M1 R12 F51 R69 R73 I74 G75 R76 E100

• Molecule 40: 50S ribosomal protein L24

Chain BY:
94% 5%
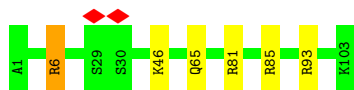
• Molecule 41: 50S ribosomal protein L25

Chain BZ:

• Molecule 42: 50S ribosomal protein L27

Chain B0:
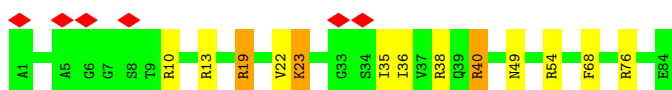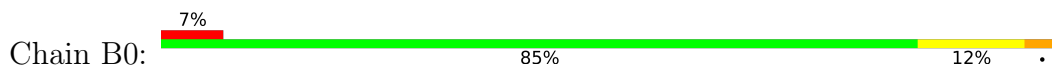
• Molecule 43: 50S ribosomal protein L28

Chain B1:

• Molecule 44: 50S ribosomal protein L29

Chain B2:
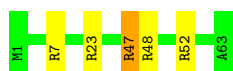
• Molecule 45: 50S ribosomal protein L3

Chain BE:

• Molecule 46: 50S ribosomal protein L30

Chain B3:
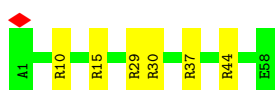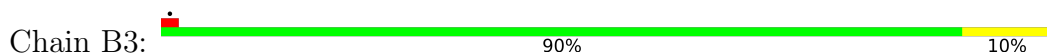
• Molecule 47: 50S ribosomal protein L31

Chain B4:

10%
93%
6%

M1 R25 S38 R49 D50 V51 R56 V57 D58 R59 F60 N61 K62 R63 F64 N65 K70
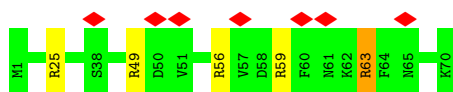
- Molecule 48: 50S ribosomal protein L32

Chain B5:

82%
18%

A1 K6 R9 R12 R15 R16 A23 T32 R39 R49 G50 R51 I54 A55 K56
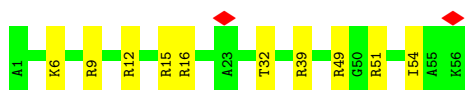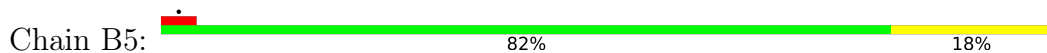
- Molecule 49: 50S ribosomal protein L33

Chain B6:

94%
6%

A1 R5 R27 R43 K54

- Molecule 50: 50S ribosomal protein L34

Chain B7:

80%
20%

M1 K2 R3 R12 N13 R14 R19 R28 R34 R39 A40 R41 K46
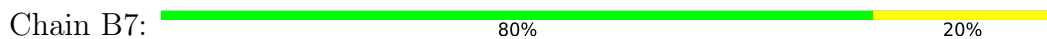
- Molecule 51: 50S ribosomal protein L35

Chain B8:

89%
9%

P1 R7 R12 L28 R29 R39 K40 R41 R44 A64
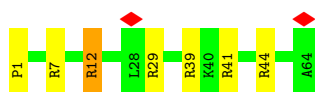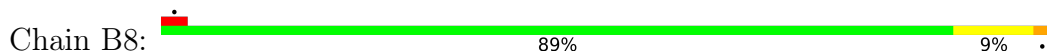
- Molecule 52: 50S ribosomal protein L36

Chain B9:

87%
13%

M1 R4 V7 R12 I16 R24 G38
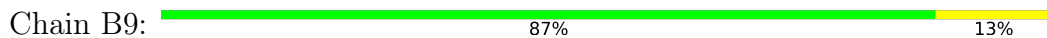
- Molecule 53: 50S ribosomal protein L4

Chain BF:

92%
7%

M1 K6 R21 R44 A45 Q46 R49 W60 R61 Q62 R67 R79 R88 V96 R102 R114 R117 E152 R162 F183 A201

- Molecule 54: 50S ribosomal protein L5

Chain BG:

88%   11% •

A1 R29 T34 L35 L65 R70 R79 Q80 G81 V88 R91 R94 R101 L102 I103 R109 I110 R111 K119 R132 E133 Q134 R147 V148 R149 R166 R177 K178

• Molecule 55: 50S ribosomal protein L6

Chain BH:

92%   6% •

S1 R2 N29 D46 Y57 R68 R94 L104 R148 R151 R152 P153 E154 E166 R169 K175 K176

• Molecule 56: 50S ribosomal protein L9

18%

Chain BL:

95%   5%

M1 K8 K35 K41 K42 N43 R50 R51 L62 N66 A67 R68 A74 A81 S82 K83 A84 G85 D86 R97 D101 E109 V110 A111 K112 R116 L117 P118 N119 G120 V121 L122 R123 S136 E137 V147 A148 E149
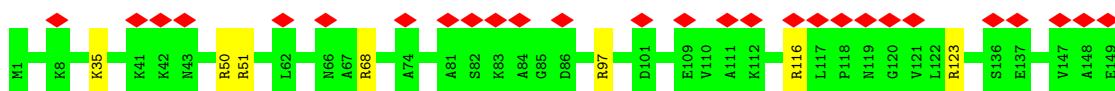
• Molecule 57: 23S ribosomal RNA

Chain BA:

15%   58%   24%   •

G1 G2 U3 U4 A5 A6 G7 C8 G9 A10 C11 U12 A13 A14 G15 C16 G17 U18 A19 C20 A21 C22 G23 G24 U25 G26 G27 A28 U29 G30 C31 C32 C33 U34 G35 G36 C37 A38 G39 U40 C41 A42 G43 A44 G45 G46 C47 G48 A49 U50 G51 A52 A53 G54 G55 A56 C57 G58 U59 G60

C61 U62 A63 A64 U65 C66 C69 G70 A71 U72 A73 A74 G75 C76 G77 U78 C79 G80 G81 U82 A83 A84 G85 G86 U87 G88 A89 U90 A91 U92 G93 A94 A95 C96 C97 G98 U99 U100 A101 A102 A103 A104 C105 C106 G107 G108 C109 G110 A111 U112 U113 U114 C115 C116 G117 A118 A119 U120 G121

G122 G123 G124 A125 A126 A127 C128 C129 C130 A131 G132 U133 G134 U135 U138 U139 C140 G141 A142 C143 A144 C145 A146 C147 U148 A149 U150 C151 A152 U153 U154 A155 A156 C157 U158 G159 A160 A161 U162 C163 C164 A165 U166 A167 G168 G169 U170 U171 U172 A173 U174 U175 A176 G177 C178 C179 G180 A181 A182

C183 C184 G187 G188 G189 A190 A191 C192 U193 G194 A195 A196 A197 C198 A199 U200 C201 U202 A203 A204 G205 U206 A207 C208 C209 C210 C211 G212 A213 G214 A215 A216 A217 A218 A219 G220 A221 A222 A223 U224 C225 A226 A227 C228 C229 G230 A231 G232 A233 U234 U235 C236 C237 C238 C239 C240 A241 G242 U243

A244 G245 C246 G247 G248 C249 G250 A251 G252 C253 G254 A255 A256 C257 G261 A262 G263 C264 A265 C266 C267 C268 C269 A270 G271 A272 G273 C274 C275 U276 G277 A278 A279 U280 C281 A282 G283 U284 G285 C286 G287 C288 A289 C290 G291 U292 U293 A294 G295 C296 G297 C298 A299 A300 G301 C302 G303 U304 C305

U306 G307 G308 A309 A310 A311 G312 G313 C314 G315 C316 G317 C318 G319 A320 U321 A322 C323 A324 G325 G326 G327 A330 C331 A332 G333 C334 C335 C336 C337 G338 U339 A340 C341 A342 C343 A344 A345 A346 A347 A348 U349 G350 C351 A352 C353 A354 U355 G356 C357 U358 G359 U360 G361 A362 G363 C364 U365 C366

G367 A368 G369 G370 A371 G372 U373 A374 G375 G376 C377 C378 G379 G380 G381 A382 A384 C385 G386 C387 U388 G389 U390 A391 A392 C393 C394 U395 C396 U397 C398 U399 G400 A401 A402 U403 A404 U405 G406 G407 G408 G409 G410 A411 A412 C413 C414 A415 U416 C417 U418 U419 C420 C421 A422 A423 G424 G425 C426

U427 A428 A429 A430 U431 A432 C433 U434 C435 C436 U437 G438 A439 C440 U441 G442 A443 C444 C445 G446 A447 U448 A449 G450 U451 G452 A453 A454 C455 C456 A457 G458 U459 A460 C461 C462 G463 U464 G465 A466 G467 G468 G469 A470 A471 A472 G473 G474 C475 A476 A477 A478 A479 A480 G481 A482 A483 C484 C485 C486

C487 G488 A489 C490 G491 A492 G493 G496 A497 G498 U499 G500 A501 A502 A503 A504 A505 G506 A507 A508 C509 C510 U511 G512 A513 A514 A515 C516 C517 G518 U519 G520 U521 A522 C523 G524 U525 A526 C527 A528 A529 G530 C531 A532 G533 U534 G535 G536 G537 A538 G539 C540 A541 G542 G543 C544 U545 A546 A547

• Molecule 58: 5S ribosomal RNA

4　Experimental information ⓘ

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	98000	Depositor
Resolution determination method	FSC	Depositor
CTF correction method	group defocus	Depositor
Microscope	FEI TECNAI F20	Depositor
Voltage (kV)	200	Depositor
Electron dose $(e^-/\text{Å}^2)$	10	Depositor
Minimum defocus (nm)	Not provided	
Maximum defocus (nm)	Not provided	
Magnification	Not provided	
Image detector	Not provided	
Maximum map value	253.190	Depositor
Minimum map value	-113.794	Depositor
Average map value	4.829	Depositor
Map value standard deviation	25.951	Depositor
Recommended contour level	22.0	Depositor
Map size (Å)	365.85, 365.85, 365.85	wwPDB
Map dimensions	135, 135, 135	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	2.71, 2.71, 2.71	Depositor

5   Model quality ⓘ

5.1   Standard geometry ⓘ

Bond lengths and bond angles in the following residue types are not validated in this section: 5MC, 1MG, UR3, 3TD, OMC, H2U, 2MA, OMG, 5MU, 4SU, PSU, 4OC, 2MG, 7MG, 6MZ, MA6, OMU

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	AJ	0.75	0/742	1.26	7/941 (0.7%)
2	AK	0.79	0/856	1.39	14/1069 (1.3%)
3	AL	0.79	0/873	1.30	12/1110 (1.1%)
4	AM	0.79	0/817	1.45	20/1022 (2.0%)
5	AN	0.82	0/715	1.37	10/883 (1.1%)
6	AO	0.76	0/646	1.22	8/813 (1.0%)
7	AP	0.83	0/572	1.39	11/711 (1.5%)
8	AQ	0.72	0/636	1.16	6/822 (0.7%)
9	AR	0.92	0/568	1.46	12/713 (1.7%)
10	AS	0.77	0/687	1.27	10/880 (1.1%)
11	AB	0.74	0/1703	1.07	9/2161 (0.4%)
12	AT	0.75	0/574	1.25	12/694 (1.7%)
13	AU	0.94	0/520	1.61	15/636 (2.4%)
14	AC	0.75	0/1669	1.15	16/2122 (0.8%)
15	AD	0.80	0/1497	1.29	19/1890 (1.0%)
16	AE	0.73	0/1110	1.14	9/1405 (0.6%)
17	AF	0.79	0/1001	1.23	11/1268 (0.9%)
18	AG	0.79	0/1263	1.33	16/1590 (1.0%)
19	AH	0.72	0/896	1.11	7/1141 (0.6%)
20	AI	0.85	0/940	1.37	19/1180 (1.6%)
21	A1	0.76	0/4864	1.12	24/6363 (0.4%)
22	AA	1.47	6/36769 (0.0%)	2.38	2673/57354 (4.7%)
23	A2	1.48	0/1108	2.31	71/1724 (4.1%)
24	A3	1.49	0/1717	2.41	129/2675 (4.8%)
25	BC	0.68	0/1748	0.98	4/2355 (0.2%)
26	BJ	0.73	0/1247	1.15	10/1679 (0.6%)
27	BK	0.67	0/1046	1.00	4/1410 (0.3%)
28	BN	0.75	0/1152	1.11	11/1551 (0.7%)
29	BO	0.74	0/956	1.20	13/1279 (1.0%)
30	BP	0.79	0/1062	1.36	15/1413 (1.1%)
31	BQ	0.78	0/1093	1.24	13/1460 (0.9%)

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	#|Z| >5	RMSZ	#|Z| >5
32	BR	0.79	0/1021	1.35	17/1364 (1.2%)
33	BS	0.76	0/910	1.23	14/1219 (1.1%)
34	BT	0.77	0/929	1.25	10/1242 (0.8%)
35	BD	0.75	0/2131	1.25	32/2863 (1.1%)
36	BU	0.80	0/960	1.29	15/1278 (1.2%)
37	BV	0.76	0/829	1.18	9/1107 (0.8%)
38	BW	0.67	0/864	1.10	12/1156 (1.0%)
39	BX	0.69	0/794	1.10	3/1060 (0.3%)
40	BY	0.69	0/797	1.04	4/1062 (0.4%)
41	BZ	0.73	0/766	1.11	6/1025 (0.6%)
42	B0	0.79	0/642	1.25	8/848 (0.9%)
43	B1	0.79	0/635	1.37	13/848 (1.5%)
44	B2	0.71	0/510	1.17	6/677 (0.9%)
45	BE	0.72	0/1586	1.14	15/2134 (0.7%)
46	B3	0.72	0/453	1.29	9/605 (1.5%)
47	B4	0.75	0/559	1.06	5/745 (0.7%)
48	B5	0.79	0/450	1.38	9/599 (1.5%)
49	B6	0.73	0/448	1.02	3/594 (0.5%)
50	B7	0.84	0/380	1.47	10/498 (2.0%)
51	B8	0.76	0/513	1.28	9/676 (1.3%)
52	B9	0.71	0/303	1.16	3/397 (0.8%)
53	BF	0.71	0/1571	1.09	13/2113 (0.6%)
54	BG	0.77	0/1444	1.18	10/1937 (0.5%)
55	BH	0.72	0/1343	1.08	7/1816 (0.4%)
56	BL	0.70	0/1122	1.05	8/1515 (0.5%)
57	BA	1.47	5/69280 (0.0%)	2.39	5083/108078 (4.7%)
58	Ba	1.46	0/2869	2.35	208/4474 (4.6%)
All	All	1.28	11/165156 (0.0%)	2.11	8751/244244 (3.6%)

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
3	AL	0	1
6	AO	0	1
7	AP	0	1
9	AR	0	1
10	AS	0	1
15	AD	0	1
18	AG	0	2

Continued on next page...

Continued from previous page...

Mol	Chain	#Chirality outliers	#Planarity outliers
21	A1	0	2
22	AA	0	350
23	A2	0	5
24	A3	0	15
26	BJ	0	1
28	BN	0	2
29	BO	0	1
32	BR	0	1
34	BT	0	1
35	BD	0	1
36	BU	0	2
38	BW	0	1
40	BY	0	1
42	B0	0	1
51	B8	0	1
55	BH	0	2
57	BA	0	660
58	Ba	0	15
All	All	0	1070

The worst 5 of 11 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
22	AA	1223	C	C4-N4	-5.72	1.28	1.33
22	AA	1226	C	O3'-P	-5.66	1.54	1.61
22	AA	1432	G	C2-N2	-5.45	1.29	1.34
57	BA	823	C	C4-N4	-5.35	1.29	1.33
22	AA	1497	G	C2-N2	-5.32	1.29	1.34

The worst 5 of 8751 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
16	AE	111	ARG	NE-CZ-NH1	15.27	127.93	120.30
57	BA	1073	A	N1-C6-N6	-14.45	109.93	118.60
26	BJ	55	ARG	NE-CZ-NH1	14.31	127.46	120.30
57	BA	423	A	N1-C6-N6	-14.03	110.18	118.60
7	AP	70	ARG	NE-CZ-NH1	13.34	126.97	120.30

There are no chirality outliers.

5 of 1070 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
3	AL	109	ARG	Sidechain
6	AO	88	ARG	Sidechain
7	AP	25	ARG	Sidechain
9	AR	2	ARG	Sidechain
10	AS	79	TYR	Sidechain

5.2　Too-close contacts ⓘ

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	AJ	794	0	803	0	0
2	AK	923	0	912	0	0
3	AL	923	0	954	0	0
4	AM	876	0	910	0	0
5	AN	771	0	777	0	0
6	AO	690	0	691	0	0
7	AP	620	0	611	0	0
8	AQ	657	0	687	0	0
9	AR	603	0	602	0	0
10	AS	708	0	732	0	0
11	AB	1805	0	1750	0	0
12	AT	636	0	652	0	0
13	AU	564	0	579	0	0
14	AC	1761	0	1793	0	0
15	AD	1587	0	1596	0	0
16	AE	1182	0	1185	0	0
17	AF	1061	0	971	0	0
18	AG	1347	0	1347	0	0
19	AH	948	0	975	0	0
20	AI	1000	0	1011	0	0
21	A1	4989	0	4915	0	0
22	AA	33089	0	16668	0	0
23	A2	993	0	501	0	0
24	A3	1640	0	845	0	0
25	BC	1733	0	1824	0	0
26	BJ	1233	0	1283	0	0
27	BK	1032	0	1088	0	0
28	BN	1129	0	1162	0	0
29	BO	947	0	1023	0	0

Continued on next page...

Continued from previous page...

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
30	BP	1053	0	1129	0	0
31	BQ	1074	0	1157	0	0
32	BR	1008	0	1045	0	0
33	BS	900	0	935	0	0
34	BT	917	0	965	0	0
35	BD	2092	0	2170	0	0
36	BU	947	0	1022	0	0
37	BV	816	0	839	0	0
38	BW	857	0	922	0	0
39	BX	787	0	846	0	0
40	BY	789	0	847	0	0
41	BZ	753	0	780	0	0
42	B0	634	0	656	0	0
43	B1	625	0	655	0	0
44	B2	509	0	543	0	0
45	BE	1565	0	1616	0	0
46	B3	449	0	491	0	0
47	B4	549	0	552	0	0
48	B5	444	0	461	0	0
49	B6	441	0	485	0	0
50	B7	377	0	418	0	0
51	B8	504	0	574	0	0
52	B9	302	0	343	0	0
53	BF	1552	0	1619	0	0
54	BG	1420	0	1460	0	0
55	BH	1323	0	1374	0	0
56	BL	1111	0	1148	0	0
57	BA	62351	0	31378	0	0
58	Ba	2566	0	1302	0	0
All	All	154956	0	106579	0	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). Clashscore could not be calculated for this entry.

There are no clashes within the asymmetric unit.

There are no symmetry-related clashes.

5.3　Torsion angles ⓘ

5.3.1　Protein backbone ⓘ

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	AJ	44/103 (43%)	40 (91%)	1 (2%)	3 (7%)	1	15
2	AK	57/128 (44%)	52 (91%)	5 (9%)	0	100	100
3	AL	64/123 (52%)	54 (84%)	8 (12%)	2 (3%)	4	27
4	AM	56/117 (48%)	51 (91%)	4 (7%)	1 (2%)	8	40
5	AN	41/100 (41%)	37 (90%)	3 (7%)	1 (2%)	6	33
6	AO	44/88 (50%)	43 (98%)	1 (2%)	0	100	100
7	AP	34/82 (42%)	31 (91%)	3 (9%)	0	100	100
8	AQ	52/83 (63%)	48 (92%)	4 (8%)	0	100	100
9	AR	36/74 (49%)	34 (94%)	2 (6%)	0	100	100
10	AS	54/91 (59%)	53 (98%)	1 (2%)	0	100	100
11	AB	123/240 (51%)	114 (93%)	7 (6%)	2 (2%)	9	44
12	AT	32/86 (37%)	30 (94%)	2 (6%)	0	100	100
13	AU	24/70 (34%)	18 (75%)	3 (12%)	3 (12%)	0	5
14	AC	126/232 (54%)	122 (97%)	4 (3%)	0	100	100
15	AD	107/205 (52%)	102 (95%)	5 (5%)	0	100	100
16	AE	89/166 (54%)	84 (94%)	4 (4%)	1 (1%)	14	52
17	AF	65/135 (48%)	61 (94%)	4 (6%)	0	100	100
18	AG	84/178 (47%)	79 (94%)	5 (6%)	0	100	100
19	AH	77/129 (60%)	70 (91%)	7 (9%)	0	100	100
20	AI	69/129 (54%)	63 (91%)	6 (9%)	0	100	100
21	A1	434/639 (68%)	390 (90%)	38 (9%)	6 (1%)	11	46
25	BC	232/234 (99%)	213 (92%)	18 (8%)	1 (0%)	34	72
26	BJ	162/164 (99%)	158 (98%)	3 (2%)	1 (1%)	25	66
27	BK	139/141 (99%)	133 (96%)	6 (4%)	0	100	100
28	BN	140/142 (99%)	131 (94%)	9 (6%)	0	100	100

Continued on next page...

Continued from previous page...

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
29	BO	121/123 (98%)	107 (88%)	11 (9%)	3 (2%)	5	32
30	BP	142/144 (99%)	127 (89%)	13 (9%)	2 (1%)	11	46
31	BQ	134/136 (98%)	126 (94%)	6 (4%)	2 (2%)	10	46
32	BR	125/127 (98%)	112 (90%)	11 (9%)	2 (2%)	9	44
33	BS	115/117 (98%)	115 (100%)	0	0	100	100
34	BT	112/114 (98%)	107 (96%)	3 (3%)	2 (2%)	8	40
35	BD	270/272 (99%)	252 (93%)	15 (6%)	3 (1%)	14	52
36	BU	115/117 (98%)	108 (94%)	5 (4%)	2 (2%)	9	42
37	BV	101/103 (98%)	94 (93%)	4 (4%)	3 (3%)	4	28
38	BW	108/110 (98%)	103 (95%)	4 (4%)	1 (1%)	17	57
39	BX	98/100 (98%)	83 (85%)	12 (12%)	3 (3%)	4	27
40	BY	101/103 (98%)	97 (96%)	4 (4%)	0	100	100
41	BZ	92/94 (98%)	90 (98%)	2 (2%)	0	100	100
42	B0	82/84 (98%)	72 (88%)	6 (7%)	4 (5%)	2	20
43	B1	75/77 (97%)	69 (92%)	5 (7%)	1 (1%)	12	48
44	B2	61/63 (97%)	54 (88%)	7 (12%)	0	100	100
45	BE	207/209 (99%)	181 (87%)	20 (10%)	6 (3%)	4	29
46	B3	56/58 (97%)	53 (95%)	3 (5%)	0	100	100
47	B4	68/70 (97%)	62 (91%)	6 (9%)	0	100	100
48	B5	54/56 (96%)	50 (93%)	3 (6%)	1 (2%)	8	38
49	B6	52/54 (96%)	51 (98%)	1 (2%)	0	100	100
50	B7	44/46 (96%)	42 (96%)	2 (4%)	0	100	100
51	B8	62/64 (97%)	61 (98%)	1 (2%)	0	100	100
52	B9	36/38 (95%)	31 (86%)	3 (8%)	2 (6%)	2	19
53	BF	199/201 (99%)	186 (94%)	7 (4%)	6 (3%)	4	28
54	BG	176/178 (99%)	155 (88%)	15 (8%)	6 (3%)	3	26
55	BH	174/176 (99%)	157 (90%)	14 (8%)	3 (2%)	9	42
56	BL	147/149 (99%)	133 (90%)	13 (9%)	1 (1%)	22	63
All	All	5512/7062 (78%)	5089 (92%)	349 (6%)	74 (1%)	16	48

5 of 74 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
21	A1	242	THR
21	A1	493	LYS
32	BR	13	ASN
35	BD	140	VAL
42	B0	40	ARG

5.3.2   Protein sidechains ⓘ

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	AJ	90/90 (100%)	88 (98%)	2 (2%)	52	71
2	AK	98/98 (100%)	97 (99%)	1 (1%)	76	86
3	AL	103/103 (100%)	102 (99%)	1 (1%)	76	86
4	AM	95/95 (100%)	95 (100%)	0	100	100
5	AN	83/83 (100%)	82 (99%)	1 (1%)	71	83
6	AO	76/76 (100%)	74 (97%)	2 (3%)	46	66
7	AP	65/65 (100%)	64 (98%)	1 (2%)	65	80
8	AQ	77/77 (100%)	75 (97%)	2 (3%)	46	66
9	AR	64/64 (100%)	62 (97%)	2 (3%)	40	62
10	AS	78/78 (100%)	74 (95%)	4 (5%)	24	48
11	AB	198/198 (100%)	196 (99%)	2 (1%)	76	86
12	AT	65/65 (100%)	65 (100%)	0	100	100
13	AU	60/60 (100%)	58 (97%)	2 (3%)	38	61
14	AC	189/189 (100%)	181 (96%)	8 (4%)	30	54
15	AD	172/172 (100%)	168 (98%)	4 (2%)	50	70
16	AE	125/125 (100%)	119 (95%)	6 (5%)	25	51
17	AF	116/116 (100%)	111 (96%)	5 (4%)	29	53
18	AG	146/146 (100%)	143 (98%)	3 (2%)	53	72
19	AH	104/104 (100%)	101 (97%)	3 (3%)	42	64
20	AI	106/106 (100%)	102 (96%)	4 (4%)	33	57

Continued on next page...

Continued from previous page...

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
21	A1	568/568 (100%)	559 (98%)	9 (2%)	62	79
25	BC	181/181 (100%)	174 (96%)	7 (4%)	32	56
26	BJ	122/122 (100%)	120 (98%)	2 (2%)	62	79
27	BK	109/109 (100%)	106 (97%)	3 (3%)	43	65
28	BN	116/116 (100%)	110 (95%)	6 (5%)	23	48
29	BO	104/104 (100%)	95 (91%)	9 (9%)	10	31
30	BP	103/103 (100%)	96 (93%)	7 (7%)	16	41
31	BQ	109/109 (100%)	105 (96%)	4 (4%)	34	58
32	BR	103/103 (100%)	100 (97%)	3 (3%)	42	64
33	BS	87/87 (100%)	86 (99%)	1 (1%)	73	84
34	BT	99/99 (100%)	97 (98%)	2 (2%)	55	74
35	BD	217/217 (100%)	212 (98%)	5 (2%)	50	70
36	BU	89/89 (100%)	86 (97%)	3 (3%)	37	60
37	BV	84/84 (100%)	83 (99%)	1 (1%)	71	83
38	BW	93/93 (100%)	90 (97%)	3 (3%)	39	61
39	BX	84/84 (100%)	83 (99%)	1 (1%)	71	83
40	BY	84/84 (100%)	82 (98%)	2 (2%)	49	69
41	BZ	78/78 (100%)	77 (99%)	1 (1%)	69	81
42	B0	62/62 (100%)	56 (90%)	6 (10%)	8	27
43	B1	67/67 (100%)	66 (98%)	1 (2%)	65	80
44	B2	55/55 (100%)	54 (98%)	1 (2%)	59	77
45	BE	164/164 (100%)	163 (99%)	1 (1%)	86	92
46	B3	48/48 (100%)	48 (100%)	0	100	100
47	B4	62/62 (100%)	61 (98%)	1 (2%)	62	79
48	B5	47/47 (100%)	45 (96%)	2 (4%)	29	53
49	B6	48/48 (100%)	48 (100%)	0	100	100
50	B7	38/38 (100%)	37 (97%)	1 (3%)	46	66
51	B8	51/51 (100%)	51 (100%)	0	100	100
52	B9	34/34 (100%)	34 (100%)	0	100	100
53	BF	165/165 (100%)	161 (98%)	4 (2%)	49	69
54	BG	149/149 (100%)	141 (95%)	8 (5%)	22	47

Continued from previous page...

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
55	BH	137/137 (100%)	132 (96%)	5 (4%)	35	59
56	BL	114/114 (100%)	114 (100%)	0	100	100
All	All	5781/5781 (100%)	5629 (97%)	152 (3%)	49	66

5 of 152 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
38	BW	60	HIS
54	BG	103	ILE
40	BY	46	LYS
45	BE	128	ARG
55	BH	154	GLU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. There are no such sidechains identified.

5.3.3 RNA ⓘ

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
22	AA	1538/1542 (99%)	194 (12%)	57 (3%)
23	A2	46/47 (97%)	13 (28%)	1 (2%)
24	A3	75/77 (97%)	12 (16%)	2 (2%)
57	BA	2899/2904 (99%)	404 (13%)	115 (3%)
58	Ba	119/120 (99%)	11 (9%)	0
All	All	4677/4690 (99%)	634 (13%)	175 (3%)

5 of 634 RNA backbone outliers are listed below:

Mol	Chain	Res	Type
22	AA	2	A
22	AA	3	A
22	AA	5	U
22	AA	6	G
22	AA	7	A

5 of 175 RNA pucker outliers are listed below:

Mol	Chain	Res	Type
57	BA	1325	U
57	BA	2062	A

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
57	BA	1393	A
57	BA	1653	G
57	BA	2248	C

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

39 non-standard protein/DNA/RNA residues are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	#|Z| > 2	Counts	RMSZ	#|Z| > 2
22	UR3	AA	1498	22	19,22,23	0.71	0	26,32,35	1.01	2 (7%)
24	PSU	A3	56	24	18,21,22	0.84	0	22,30,33	1.12	2 (9%)
24	4SU	A3	8	24	18,21,22	1.39	1 (5%)	26,30,33	1.16	2 (7%)
57	5MU	BA	1939	57	19,22,23	0.72	0	28,32,35	1.31	3 (10%)
57	PSU	BA	2504	57	18,21,22	0.78	0	22,30,33	1.15	2 (9%)
24	OMC	A3	33	24	19,22,23	0.70	0	26,31,34	1.09	1 (3%)
57	6MZ	BA	2030	57	18,25,26	0.92	1 (5%)	16,36,39	1.41	2 (12%)
57	PSU	BA	955	57	18,21,22	0.80	0	22,30,33	1.08	2 (9%)
57	6MZ	BA	1618	57	18,25,26	0.93	0	16,36,39	1.47	2 (12%)
57	PSU	BA	1911	57	18,21,22	0.83	0	22,30,33	1.03	2 (9%)
57	2MA	BA	2503	57	17,25,26	1.21	3 (17%)	17,37,40	1.60	3 (17%)
57	7MG	BA	2069	57	22,26,27	4.62	2 (9%)	29,39,42	1.41	1 (3%)
57	PSU	BA	2605	57	18,21,22	0.87	0	22,30,33	1.27	3 (13%)
22	2MG	AA	1207	22	18,26,27	1.01	2 (11%)	16,38,41	1.11	2 (12%)
57	2MG	BA	2445	57	18,26,27	0.96	2 (11%)	16,38,41	1.31	2 (12%)
57	H2U	BA	2449	57	18,21,22	1.14	2 (11%)	21,30,33	1.07	0
22	5MC	AA	1407	22	18,22,23	0.59	0	26,32,35	1.38	4 (15%)
57	5MC	BA	1962	57	18,22,23	0.57	0	26,32,35	1.51	5 (19%)
24	5MU	A3	55	24	19,22,23	0.67	0	28,32,35	1.33	4 (14%)
57	3TD	BA	1915	57	18,22,23	0.83	0	22,32,35	1.42	3 (13%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	#|Z| > 2	Counts	RMSZ	#|Z| > 2
57	OMG	BA	2251	57	18,26,27	1.01	1 (5%)	19,38,41	1.32	3 (15%)
24	H2U	A3	21	24	18,21,22	1.04	2 (11%)	21,30,33	0.83	0
57	OMU	BA	2552	57	19,22,23	0.60	0	26,31,34	0.91	1 (3%)
22	PSU	AA	516	22	18,21,22	0.81	0	22,30,33	1.24	2 (9%)
57	1MG	BA	745	57	18,26,27	1.08	2 (11%)	19,39,42	1.10	1 (5%)
22	5MC	AA	967	22	18,22,23	0.61	0	26,32,35	1.44	4 (15%)
57	PSU	BA	2457	57	18,21,22	0.79	0	22,30,33	1.14	2 (9%)
22	2MG	AA	1516	22	18,26,27	0.93	1 (5%)	16,38,41	1.14	2 (12%)
57	5MU	BA	747	57	19,22,23	0.72	0	28,32,35	1.34	3 (10%)
57	PSU	BA	746	57	18,21,22	0.80	0	22,30,33	1.22	3 (13%)
22	MA6	AA	1519	22	19,26,27	0.95	2 (10%)	18,38,41	0.93	0
57	PSU	BA	2580	57	18,21,22	0.82	0	22,30,33	1.50	4 (18%)
22	7MG	AA	527	22	22,26,27	4.55	2 (9%)	29,39,42	1.47	2 (6%)
57	2MG	BA	1835	57	18,26,27	0.98	1 (5%)	16,38,41	1.15	2 (12%)
22	MA6	AA	1518	22	19,26,27	0.94	1 (5%)	18,38,41	0.89	0
22	2MG	AA	966	22	18,26,27	1.00	2 (11%)	16,38,41	1.28	2 (12%)
22	4OC	AA	1402	22	20,23,24	0.65	0	26,32,35	1.22	2 (7%)
57	PSU	BA	1917	57	18,21,22	0.78	0	22,30,33	1.13	2 (9%)
57	OMC	BA	2498	57	19,22,23	0.76	0	26,31,34	1.25	1 (3%)

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
22	UR3	AA	1498	22	-	0/7/25/26	0/2/2/2
24	PSU	A3	56	24	-	2/7/25/26	0/2/2/2
24	4SU	A3	8	24	-	0/7/25/26	0/2/2/2
57	5MU	BA	1939	57	-	0/7/25/26	0/2/2/2
57	PSU	BA	2504	57	-	2/7/25/26	0/2/2/2
24	OMC	A3	33	24	-	0/9/27/28	0/2/2/2
57	6MZ	BA	2030	57	-	1/5/27/28	0/3/3/3
57	PSU	BA	955	57	-	0/7/25/26	0/2/2/2
57	6MZ	BA	1618	57	-	0/5/27/28	0/3/3/3
57	PSU	BA	1911	57	-	0/7/25/26	0/2/2/2
57	2MA	BA	2503	57	-	1/3/25/26	0/3/3/3
57	7MG	BA	2069	57	-	0/7/37/38	0/3/3/3

Continued on next page...

Continued from previous page...

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
57	PSU	BA	2605	57	-	0/7/25/26	0/2/2/2
22	2MG	AA	1207	22	-	0/5/27/28	0/3/3/3
57	2MG	BA	2445	57	-	0/5/27/28	0/3/3/3
57	H2U	BA	2449	57	-	0/7/38/39	0/2/2/2
22	5MC	AA	1407	22	-	0/7/25/26	0/2/2/2
57	5MC	BA	1962	57	-	0/7/25/26	0/2/2/2
24	5MU	A3	55	24	-	0/7/25/26	0/2/2/2
57	3TD	BA	1915	57	-	1/7/25/26	0/2/2/2
57	OMG	BA	2251	57	-	0/5/27/28	0/3/3/3
24	H2U	A3	21	24	-	1/7/38/39	0/2/2/2
57	OMU	BA	2552	57	-	0/9/27/28	0/2/2/2
22	PSU	AA	516	22	-	0/7/25/26	0/2/2/2
57	1MG	BA	745	57	-	0/3/25/26	0/3/3/3
22	5MC	AA	967	22	-	0/7/25/26	0/2/2/2
57	PSU	BA	2457	57	-	0/7/25/26	0/2/2/2
22	2MG	AA	1516	22	-	0/5/27/28	0/3/3/3
57	5MU	BA	747	57	-	0/7/25/26	0/2/2/2
57	PSU	BA	746	57	-	0/7/25/26	0/2/2/2
22	MA6	AA	1519	22	-	0/7/29/30	0/3/3/3
57	PSU	BA	2580	57	-	0/7/25/26	0/2/2/2
22	7MG	AA	527	22	-	1/7/37/38	0/3/3/3
57	2MG	BA	1835	57	-	0/5/27/28	0/3/3/3
22	MA6	AA	1518	22	-	0/7/29/30	0/3/3/3
22	2MG	AA	966	22	-	0/5/27/28	0/3/3/3
22	4OC	AA	1402	22	-	0/9/29/30	0/2/2/2
57	PSU	BA	1917	57	-	0/7/25/26	0/2/2/2
57	OMC	BA	2498	57	-	1/9/27/28	0/2/2/2

The worst 5 of 27 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
57	BA	2069	7MG	C8-N9	-21.38	1.34	1.46
22	AA	527	7MG	C8-N9	-21.04	1.34	1.46
24	A3	8	4SU	C5-C4	-4.96	1.36	1.42
57	BA	2449	H2U	C4-N3	-3.07	1.32	1.37
57	BA	2449	H2U	C2-N3	-2.94	1.32	1.38

The worst 5 of 83 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
57	BA	2069	7MG	N9-C8-N7	6.06	112.04	103.38
22	AA	527	7MG	N9-C8-N7	5.81	111.68	103.38

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
57	BA	2503	2MA	C5-C6-N1	4.24	121.33	114.02
57	BA	1618	6MZ	C9-N6-C6	4.04	126.35	122.87
57	BA	1915	3TD	C6-C5-C4	3.86	120.89	118.22

There are no chirality outliers.

5 of 10 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
24	A3	56	PSU	O4'-C1'-C5-C4
57	BA	2504	PSU	O4'-C1'-C5-C4
57	BA	2504	PSU	O4'-C4'-C5'-O5'
24	A3	56	PSU	O4'-C1'-C5-C6
57	BA	1915	3TD	O4'-C1'-C5-C6

There are no ring outliers.

No monomer is involved in short contacts.

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 ⓘ

This section contains visualisations of the EMDB entry EMD-5562. 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 ⓘ

6.1.1   Primary map

| X | Y | Z |
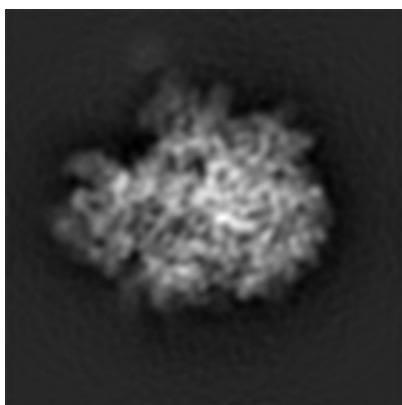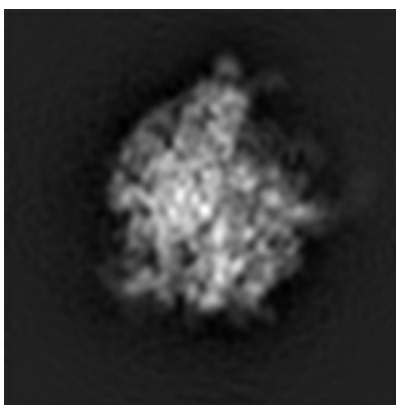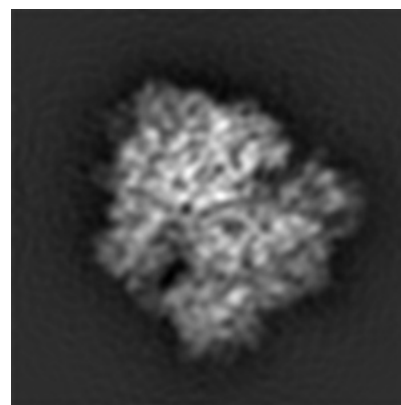
The images above show the map projected in three orthogonal directions.

6.2   Central slices ⓘ
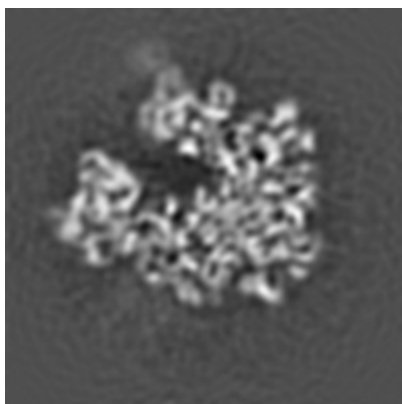
6.2.1   Primary map
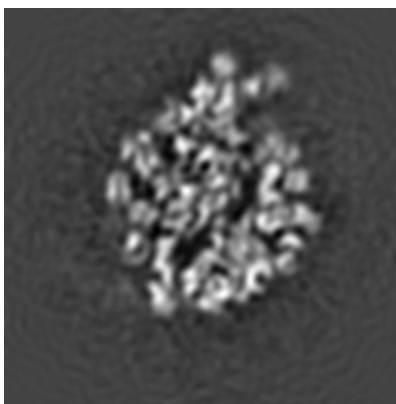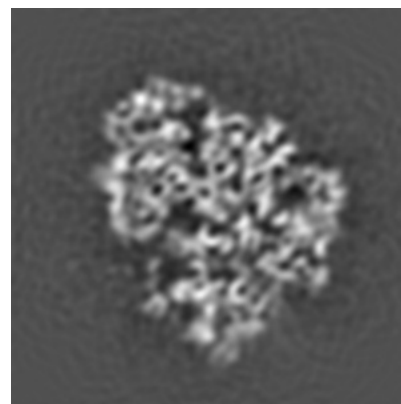
| X Index: 67 | Y Index: 67 | Z Index: 67 |

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

6.3   Largest variance slices ⓘ
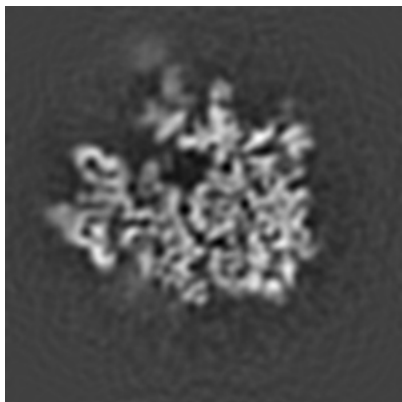
6.3.1   Primary map
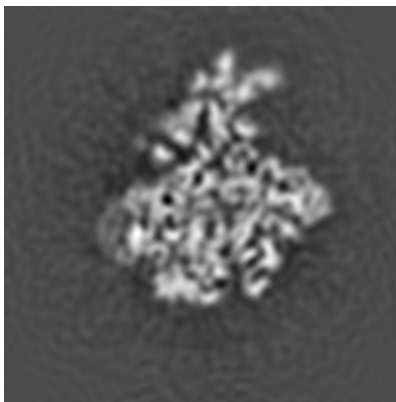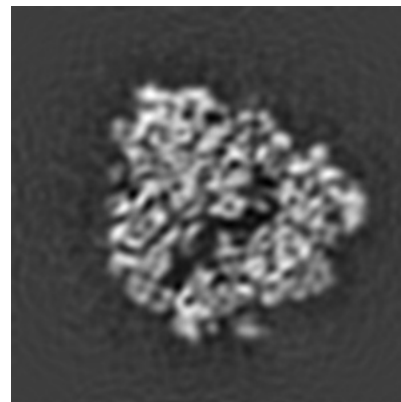
| X Index: 70 | Y Index: 71 | Z Index: 73 |

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

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

6.4.1   Primary map

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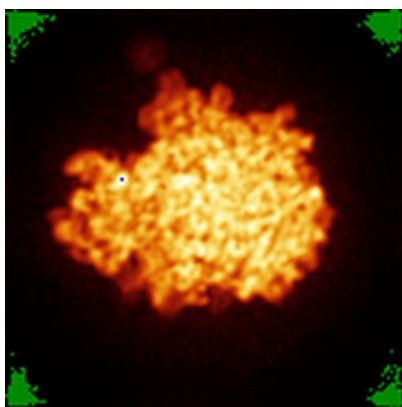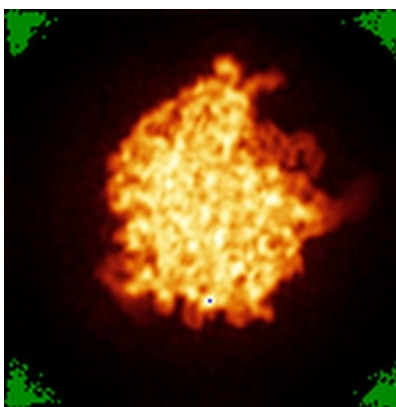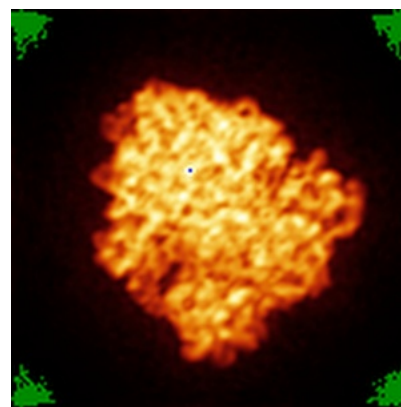
The images above show the map standard deviation projections with false color in three orthogonal directions. Minimum values are shown in green, max in blue, and dark to light orange shades represent small to large values respectively.

6.5 Orthogonal surface views ⓘ

6.5.1 Primary map

X	Y	Z
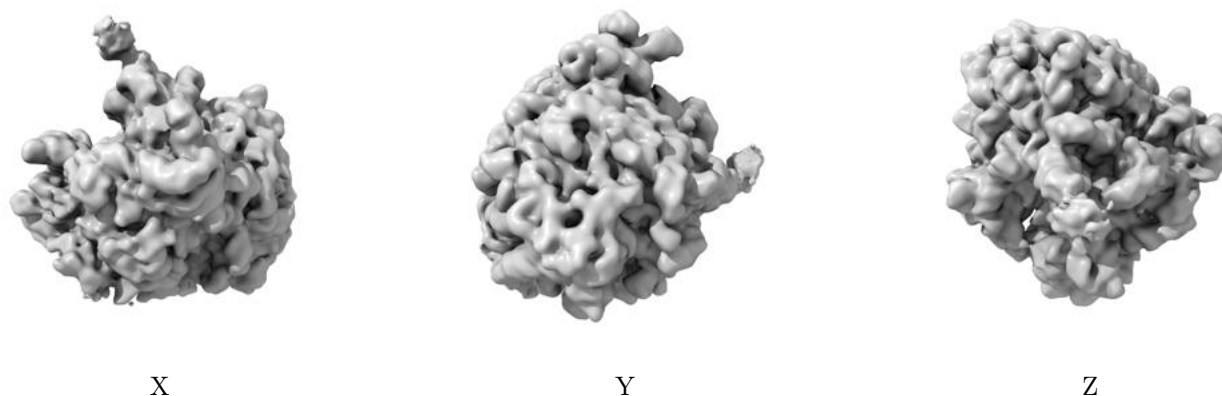
The images above show the 3D surface view of the map at the recommended contour level 22.0. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

6.6 Mask visualisation ⓘ

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

7 Map analysis ⓘ

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

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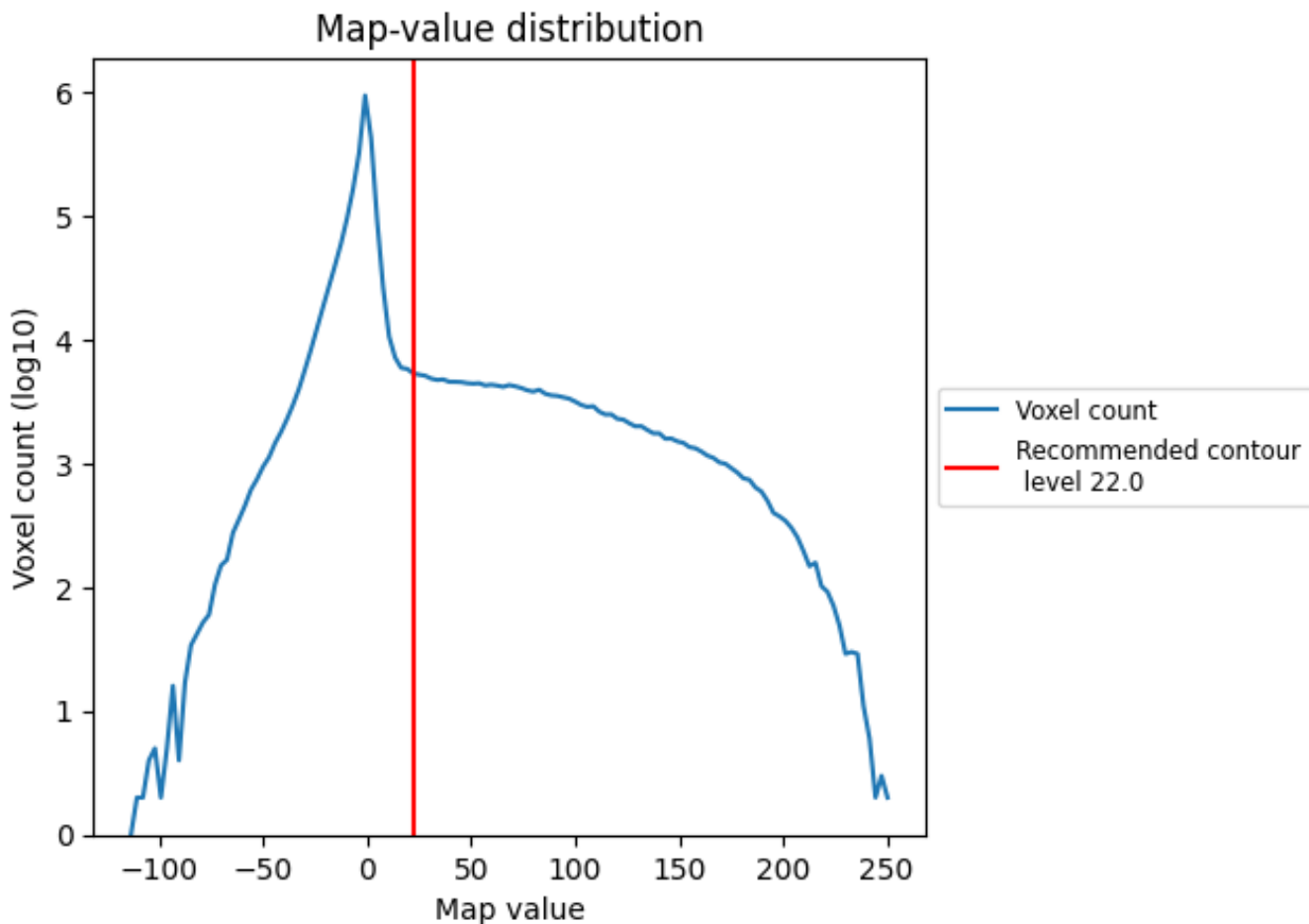
The map-value distribution is plotted in 128 intervals along the x-axis. The y-axis is logarithmic. A spike in this graph at zero usually indicates that the volume has been masked.

7.2 Volume estimate ⓘ
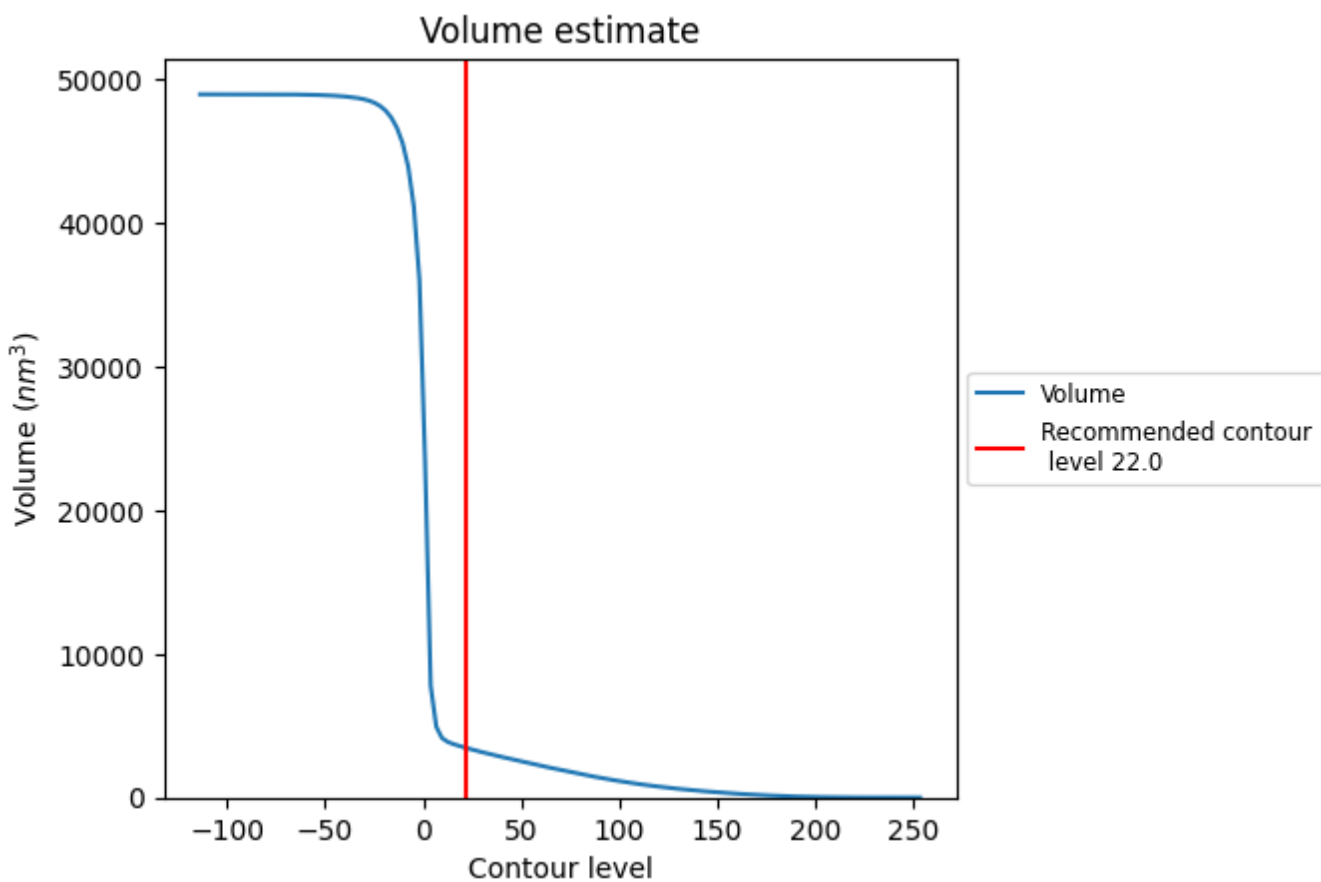
The volume at the recommended contour level is 3450 nm^3; this corresponds to an approximate mass of 3116 kDa.

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

7.3   Rotationally averaged power spectrum   ⓘ
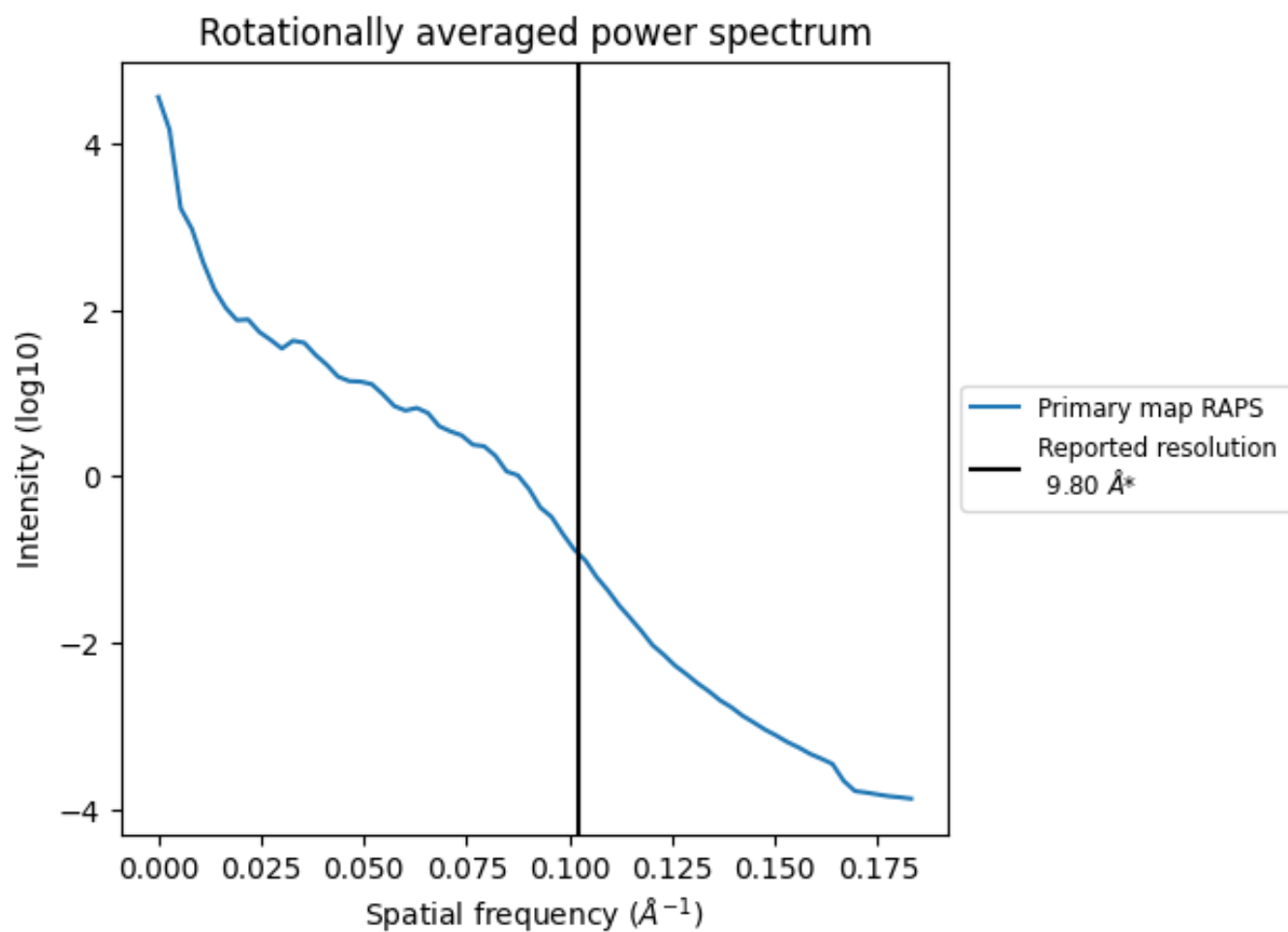
*Reported resolution corresponds to spatial frequency of 0.102 Å^{-1}

8   Fourier-Shell correlation (i)

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

9 Map-model fit ⓘ

This section contains information regarding the fit between EMDB map EMD-5562 and PDB model 4V6V. Per-residue inclusion information can be found in section 3 on page 14.

9.1 Map-model overlay ⓘ

| X | Y | Z |
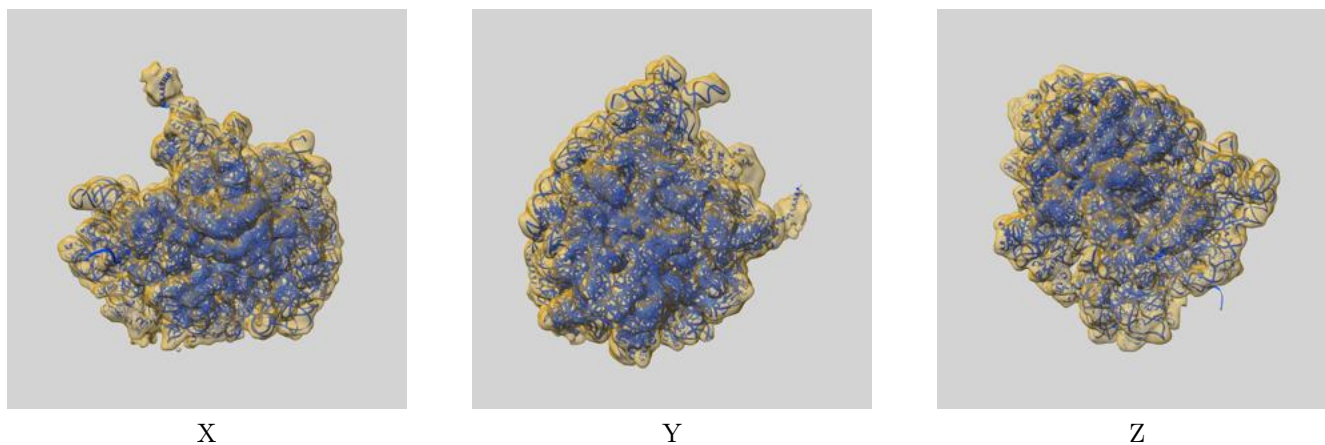
The images above show the 3D surface view of the map at the recommended contour level 22.0 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

9.2   Q-score mapped to coordinate model ⓘ

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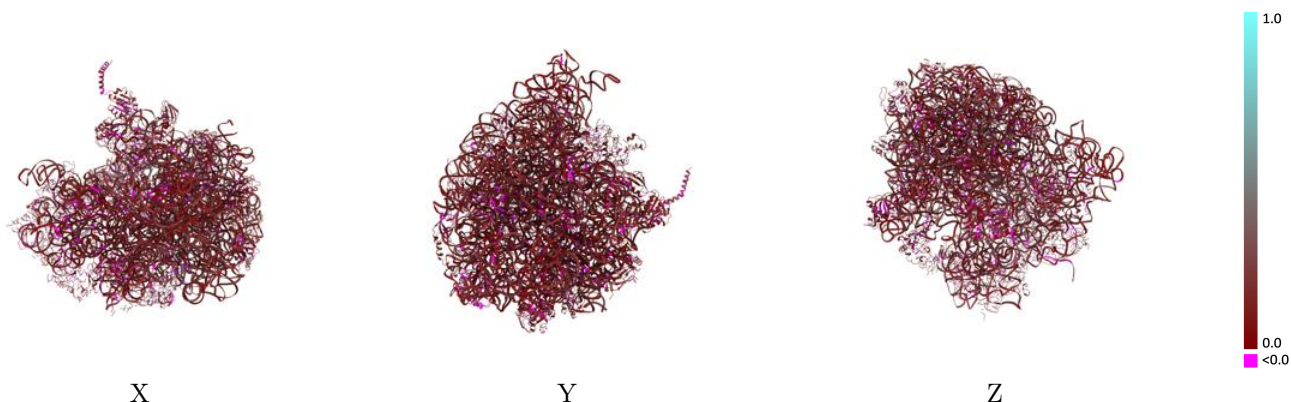
The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions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

9.3   Atom inclusion mapped to coordinate model ⓘ

X   Y   Z
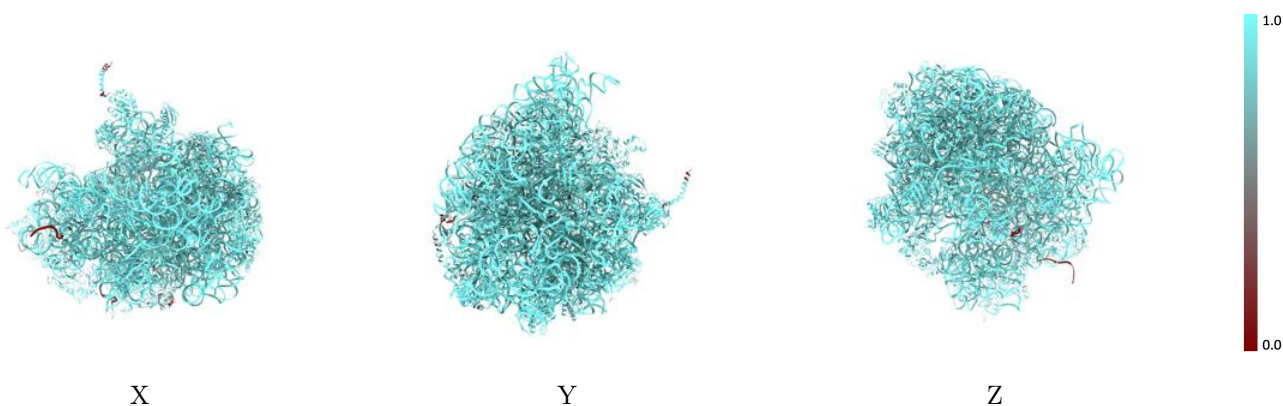
The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (22.0).

9.4　Atom inclusion ⓘ
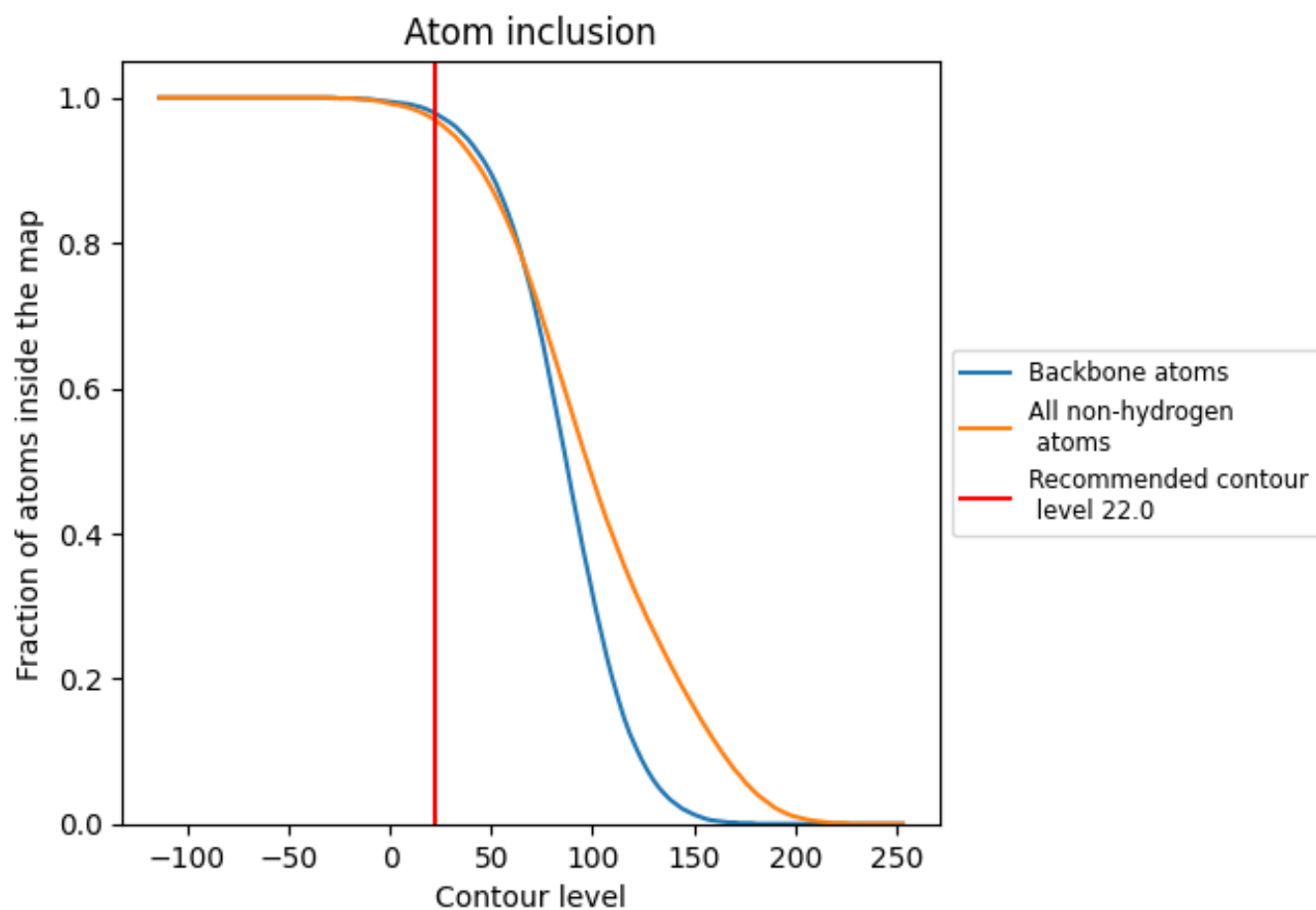
At the recommended contour level, 98% of all backbone atoms, 97% of all non-hydrogen atoms, are inside the map.

9.5 Map-model fit summary (i)

The table lists the average atom inclusion at the recommended contour level (22.0) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.9700	0.1260
A1	0.9130	0.1120
A2	0.4660	0.0110
A3	0.9840	0.1530
AA	0.9950	0.1430
AB	0.9200	0.1050
AC	0.9110	0.0970
AD	0.9760	0.0960
AE	0.8840	0.0850
AF	0.8220	0.0930
AG	0.9590	0.1070
AH	0.9560	0.1020
AI	0.9750	0.0840
AJ	0.9580	0.0780
AK	0.8950	0.0910
AL	0.9260	0.0940
AM	0.9720	0.1100
AN	0.9470	0.0640
AO	0.9800	0.1040
AP	0.9730	0.0620
AQ	0.9630	0.1070
AR	0.9090	0.0770
AS	0.9540	0.0810
AT	0.9610	0.1110
AU	0.8750	0.0990
B0	0.9000	0.0370
B1	0.9550	0.0880
B2	0.9660	0.1380
B3	0.9660	0.1170
B4	0.8850	0.0850
B5	0.9300	0.0630
B6	0.9540	0.0900
B7	0.9270	0.0670
B8	0.9430	0.0620
B9	0.9520	0.0520

1.0

0.0
<0.0

Continued on next page...

Continued from previous page...

Chain	Atom inclusion	Q-score
BA	0.9930	0.1450
BC	0.8760	0.0490
BD	0.9380	0.0750
BE	0.9420	0.0870
BF	0.9720	0.0950
BG	0.9730	0.0890
BH	0.9810	0.1240
BJ	0.8870	0.0810
BK	0.9790	0.0960
BL	0.7430	0.1000
BN	0.9590	0.0980
BO	0.9100	0.0960
BP	0.9510	0.0750
BQ	0.9500	0.0920
BR	0.9520	0.0900
BS	0.9760	0.0940
BT	0.9350	0.1020
BU	0.9660	0.0980
BV	0.9400	0.0990
BW	0.9250	0.0900
BX	0.9600	0.0890
BY	0.9600	0.1060
BZ	0.9730	0.1180
Ba	0.9960	0.1520