WORLDWIDE wwPDB PROTEIN DATA BANK

Full wwPDB EM Validation Report (i)

Dec 19, 2022 – 04:17 am GMT

PDB ID	:	7BHP
EMDB ID	:	EMD-12189
Title	:	Cryo-EM structure of the human Ebp1 - 80S ribosome
Authors	:	Desogus, J.; Bhaskar, V.; Chao, J.A.
Deposited on	:	2021-01-11
Resolution	:	3.30 Å(reported)
Based on initial models	:	2Q8K, 2V6C, 6Y0G

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 3.30 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		0.1%
Sidechain outliers		0.5%
RNA backbone		0.45

Worse   *Better*

█ Percentile relative to all structures

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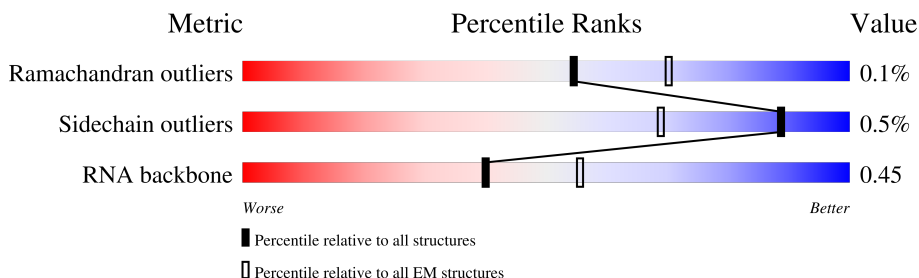
Metric	Whole archive (#Entries)	EM structures (#Entries)
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826
RNA backbone	4643	859

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	L5	5070	50% 22% • 28%
2	L7	120	82% 18%
3	L8	156	77% 22% •
4	LA	257	94% • •
5	LB	403	97% • •
6	LC	427	84% 16%
7	LD	297	98% •
8	LE	288	76% • 23%
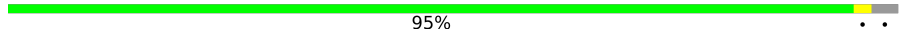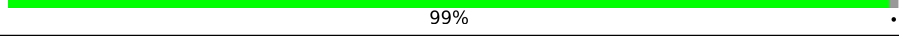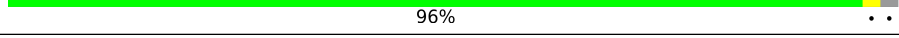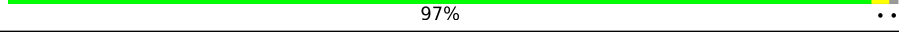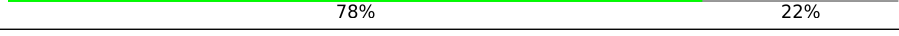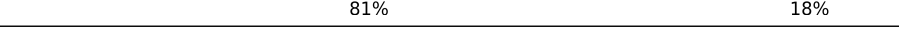
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Mol	Chain	Length	Quality of chain
9	LF	248	90% 9%
10	LG	266	82% 17%
11	LH	192	99%
12	LI	214	94% 5%
13	LJ	178	90% 10%
14	LL	211	94% 6%
15	LM	215	59% 40%
16	LN	204	100%
17	LO	203	98%
18	LP	184	83% 17%
19	LQ	188	97%
20	LR	196	76% 23%
21	LS	176	98%
22	LT	160	98%
23	LU	128	79% 21%
24	LW	157	27% 73%
25	LX	156	75% 25%
26	LY	145	91% 9%
27	LZ	136	95%
28	La	148	99%
29	Lb	159	43% 57%
30	Lc	115	82% 18%
31	Ld	125	86% 14%
32	Le	135	93% 7%
33	Lf	110	98%

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Mol	Chain	Length	Quality of chain
34	Lg	117	87%　12%
35	Lh	123	95%
36	Li	105	91%　8%
37	Lj	97	87%　11%
38	Lk	70	99%
39	Ll	51	96%
40	Lm	128	40%　59%
41	Lo	106	97%
42	Lp	92	78%　22%
43	Lr	137	88%　11%
44	A	394	81%　18%
45	B	36	53%　47%

2 Entry composition ⓘ

There are 48 unique types of molecules in this entry. The entry contains 136812 atoms, of which 0 are hydrogens and 0 are deuteriums.

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

- Molecule 1 is a RNA chain called 28S ribosomal RNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	L5	3644	Total	C	N	O	P	0	0
			78119	34786	14297	25393	3643		

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
L5	2113	C	G	conflict	GB 86475748

- Molecule 2 is a RNA chain called 5S ribosomal RNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	L7	120	Total	C	N	O	P	0	0
			2558	1141	456	842	119		

- Molecule 3 is a RNA chain called 5.8S ribosomal RNA.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	L8	156	Total	C	N	O	P	0	0
			3314	1480	585	1094	155		

- Molecule 4 is a protein called 60S ribosomal protein L8.

Mol	Chain	Residues	Atoms					AltConf	Trace
4	LA	247	Total	C	N	O	S	0	0
			1887	1183	388	310	6		

- Molecule 5 is a protein called 60S ribosomal protein L3.

Mol	Chain	Residues	Atoms					AltConf	Trace
5	LB	395	Total	C	N	O	S	0	0
			3183	2028	600	541	14		

- Molecule 6 is a protein called 60S ribosomal protein L4.

Mol	Chain	Residues	Atoms					AltConf	Trace
6	LC	359	Total 2855	C 1797	N 571	O 472	S 15	0	0

- Molecule 7 is a protein called 60S ribosomal protein L5.

Mol	Chain	Residues	Atoms					AltConf	Trace
7	LD	290	Total 2354	C 1492	N 428	O 420	S 14	0	0

- Molecule 8 is a protein called 60S ribosomal protein L6.

Mol	Chain	Residues	Atoms					AltConf	Trace
8	LE	221	Total 1777	C 1142	N 337	O 294	S 4	0	0

- Molecule 9 is a protein called 60S ribosomal protein L7.

Mol	Chain	Residues	Atoms					AltConf	Trace
9	LF	225	Total 1870	C 1202	N 358	O 301	S 9	0	0

- Molecule 10 is a protein called 60S ribosomal protein L7a.

Mol	Chain	Residues	Atoms					AltConf	Trace
10	LG	220	Total 1780	C 1135	N 343	O 298	S 4	0	0

- Molecule 11 is a protein called 60S ribosomal protein L9.

Mol	Chain	Residues	Atoms					AltConf	Trace
11	LH	190	Total 1518	C 956	N 284	O 272	S 6	0	0

- Molecule 12 is a protein called 60S ribosomal protein L10-like.

Mol	Chain	Residues	Atoms					AltConf	Trace
12	LI	204	Total 1643	C 1042	N 316	O 272	S 13	0	0

- Molecule 13 is a protein called 60S ribosomal protein L11.

Mol	Chain	Residues	Atoms					AltConf	Trace
13	LJ	161	Total 1294	C 815	N 244	O 229	S 6	0	0

- Molecule 14 is a protein called 60S ribosomal protein L13.

Mol	Chain	Residues	Atoms					AltConf	Trace
14	LL	199	Total 1612	C 1011	N 337	O 260	S 4	0	0

- Molecule 15 is a protein called 60S ribosomal protein L14.

Mol	Chain	Residues	Atoms					AltConf	Trace
15	LM	129	Total 1067	C 684	N 205	O 171	S 7	0	0

- Molecule 16 is a protein called 60S ribosomal protein L15.

Mol	Chain	Residues	Atoms					AltConf	Trace
16	LN	203	Total 1701	C 1072	N 359	O 266	S 4	0	0

- Molecule 17 is a protein called 60S ribosomal protein L13a.

Mol	Chain	Residues	Atoms					AltConf	Trace
17	LO	198	Total 1625	C 1048	N 317	O 255	S 5	0	0

- Molecule 18 is a protein called 60S ribosomal protein L17.

Mol	Chain	Residues	Atoms					AltConf	Trace
18	LP	153	Total 1242	C 776	N 241	O 216	S 9	0	0

- Molecule 19 is a protein called 60S ribosomal protein L18.

Mol	Chain	Residues	Atoms					AltConf	Trace
19	LQ	187	Total 1513	C 944	N 314	O 250	S 5	0	0

- Molecule 20 is a protein called 60S ribosomal protein L19.

Mol	Chain	Residues	Atoms					AltConf	Trace
20	LR	151	Total 1264	C 787	N 273	O 195	S 9	0	0

- Molecule 21 is a protein called 60S ribosomal protein L18a.

Mol	Chain	Residues	Atoms					AltConf	Trace
21	LS	175	Total 1453	C 925	N 283	O 235	S 10	0	0

- Molecule 22 is a protein called 60S ribosomal protein L21.

Mol	Chain	Residues	Atoms					AltConf	Trace
22	LT	157	Total 1284	C 815	N 250	O 214	S 5	0	0

- Molecule 23 is a protein called 60S ribosomal protein L22.

Mol	Chain	Residues	Atoms					AltConf	Trace
23	LU	101	Total 821	C 526	N 143	O 150	S 2	0	0

- Molecule 24 is a protein called 60S ribosomal protein L24.

Mol	Chain	Residues	Atoms					AltConf	Trace
24	LW	42	Total 350	C 223	N 69	O 56	S 2	0	0

- Molecule 25 is a protein called 60S ribosomal protein L23a.

Mol	Chain	Residues	Atoms					AltConf	Trace
25	LX	117	Total 946	C 604	N 178	O 163	S 1	0	0

- Molecule 26 is a protein called 60S ribosomal protein L26.

Mol	Chain	Residues	Atoms					AltConf	Trace
26	LY	132	Total 1102	C 692	N 223	O 184	S 3	0	0

- Molecule 27 is a protein called 60S ribosomal protein L27.

Mol	Chain	Residues	Atoms					AltConf	Trace
27	LZ	130	Total 1074	C 697	N 203	O 171	S 3	0	0

- Molecule 28 is a protein called 60S ribosomal protein L27a.

Mol	Chain	Residues	Atoms					AltConf	Trace
28	La	147	Total 1162	C 736	N 237	O 186	S 3	0	0

- Molecule 29 is a protein called 60S ribosomal protein L29.

Mol	Chain	Residues	Atoms					AltConf	Trace
29	Lb	68	Total 559	C 344	N 122	O 90	S 3	0	0

- Molecule 30 is a protein called 60S ribosomal protein L30.

Mol	Chain	Residues	Atoms					AltConf	Trace
30	Lc	94	Total 737	C 468	N 130	O 133	S 6	0	0

- Molecule 31 is a protein called 60S ribosomal protein L31.

Mol	Chain	Residues	Atoms					AltConf	Trace
31	Ld	107	Total 888	C 560	N 171	O 155	S 2	0	0

- Molecule 32 is a protein called 60S ribosomal protein L32.

Mol	Chain	Residues	Atoms					AltConf	Trace
32	Le	126	Total 1043	C 661	N 214	O 163	S 5	0	0

- Molecule 33 is a protein called 60S ribosomal protein L35a.

Mol	Chain	Residues	Atoms					AltConf	Trace
33	Lf	108	Total 870	C 552	N 173	O 142	S 3	0	0

- Molecule 34 is a protein called 60S ribosomal protein L34.

Mol	Chain	Residues	Atoms					AltConf	Trace
34	Lg	103	Total 821	C 513	N 170	O 132	S 6	0	0

- Molecule 35 is a protein called 60S ribosomal protein L35.

Mol	Chain	Residues	Atoms					AltConf	Trace
35	Lh	119	Total 995	C 629	N 201	O 164	S 1	0	0

- Molecule 36 is a protein called 60S ribosomal protein L36.

Mol	Chain	Residues	Atoms					AltConf	Trace
36	Li	97	Total 803	C 503	N 171	O 124	S 5	0	0

- Molecule 37 is a protein called 60S ribosomal protein L37.

Mol	Chain	Residues	Atoms					AltConf	Trace
37	Lj	86	Total 705	C 434	N 155	O 111	S 5	0	0

- Molecule 38 is a protein called 60S ribosomal protein L38.

Mol	Chain	Residues	Atoms					AltConf	Trace
38	Lk	69	Total 569	C 366	N 103	O 99	S 1	0	0

- Molecule 39 is a protein called 60S ribosomal protein L39.

Mol	Chain	Residues	Atoms					AltConf	Trace
39	Ll	50	Total 444	C 281	N 98	O 64	S 1	0	0

- Molecule 40 is a protein called Ubiquitin-60S ribosomal protein L40.

Mol	Chain	Residues	Atoms					AltConf	Trace
40	Lm	52	Total 429	C 266	N 90	O 67	S 6	0	0

- Molecule 41 is a protein called 60S ribosomal protein L36a.

Mol	Chain	Residues	Atoms					AltConf	Trace
41	Lo	105	Total	C	N	O	S	0	0
			862	542	175	139	6		

- Molecule 42 is a protein called 60S ribosomal protein L37a.

Mol	Chain	Residues	Atoms					AltConf	Trace
42	Lp	72	Total	C	N	O	S	0	0
			558	353	107	91	7		

- Molecule 43 is a protein called 60S ribosomal protein L28.

Mol	Chain	Residues	Atoms					AltConf	Trace
43	Lr	122	Total	C	N	O	S	0	0
			980	607	204	165	4		

- Molecule 44 is a protein called Proliferation-associated protein 2G4.

Mol	Chain	Residues	Atoms					AltConf	Trace
44	A	322	Total	C	N	O	S	0	0
			2352	1514	413	412	13		

- Molecule 45 is a RNA chain called Poly GC double helix strand modeled for ES27L density next to EBP1 density.

Mol	Chain	Residues	Atoms					AltConf	Trace
45	B	36	Total	C	N	O	P	0	0
			774	342	144	252	36		

- Molecule 46 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		AltConf
46	L5	33	Total	Mg	0
			33	33	
46	L7	3	Total	Mg	0
			3	3	
46	L8	4	Total	Mg	0
			4	4	
46	Ll	1	Total	Mg	0
			1	1	

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

Mol	Chain	Residues	Atoms		AltConf
47	Lj	1	Total 1	Zn 1	0
47	Lm	1	Total 1	Zn 1	0
47	Lo	1	Total 1	Zn 1	0
47	Lp	1	Total 1	Zn 1	0

- Molecule 48 is water.

Mol	Chain	Residues	Atoms		AltConf
48	L5	5	Total 5	O 5	0
48	L7	4	Total 4	O 4	0
48	LI	1	Total 1	O 1	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: 28S ribosomal RNA

Chain L5:
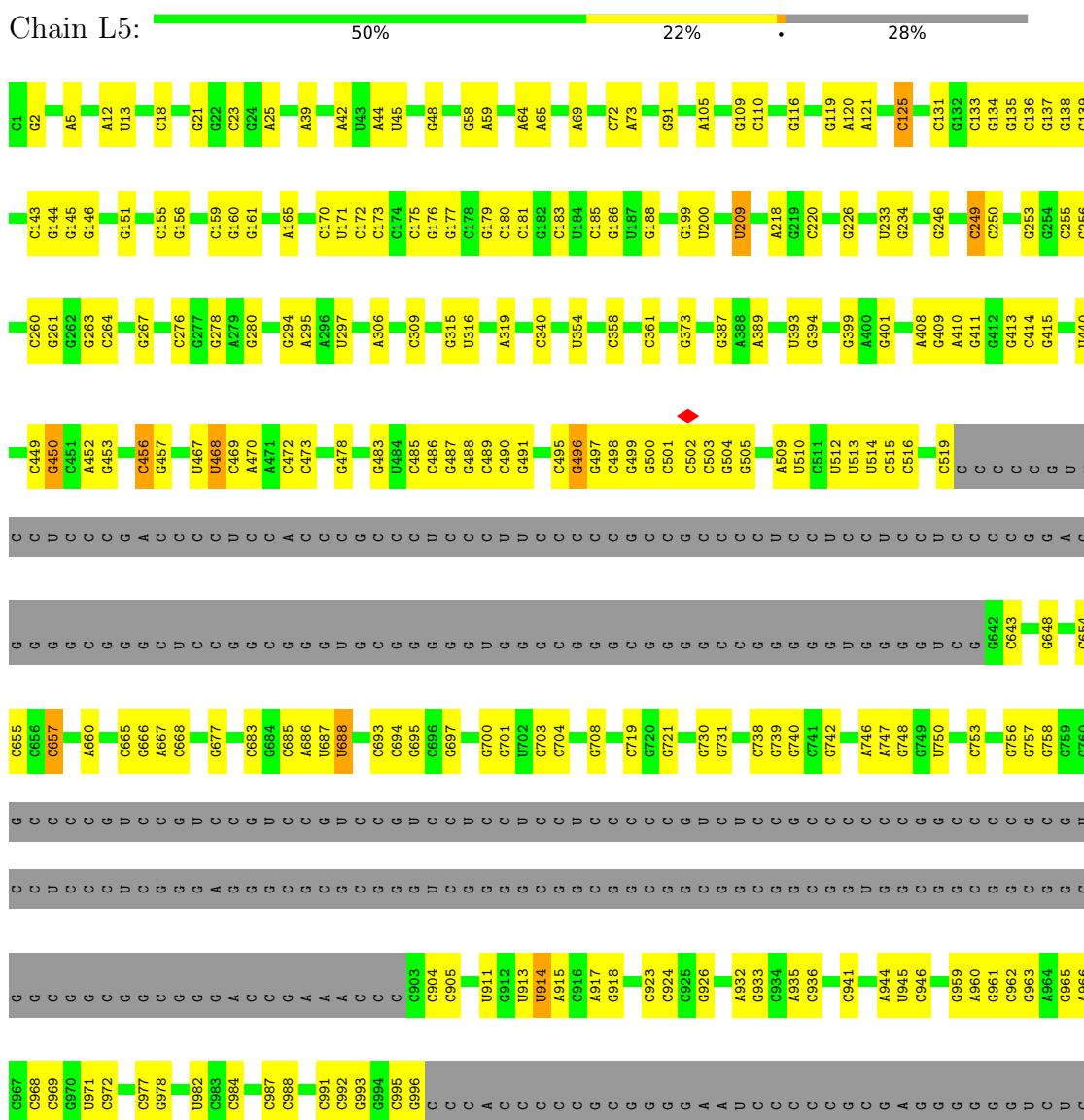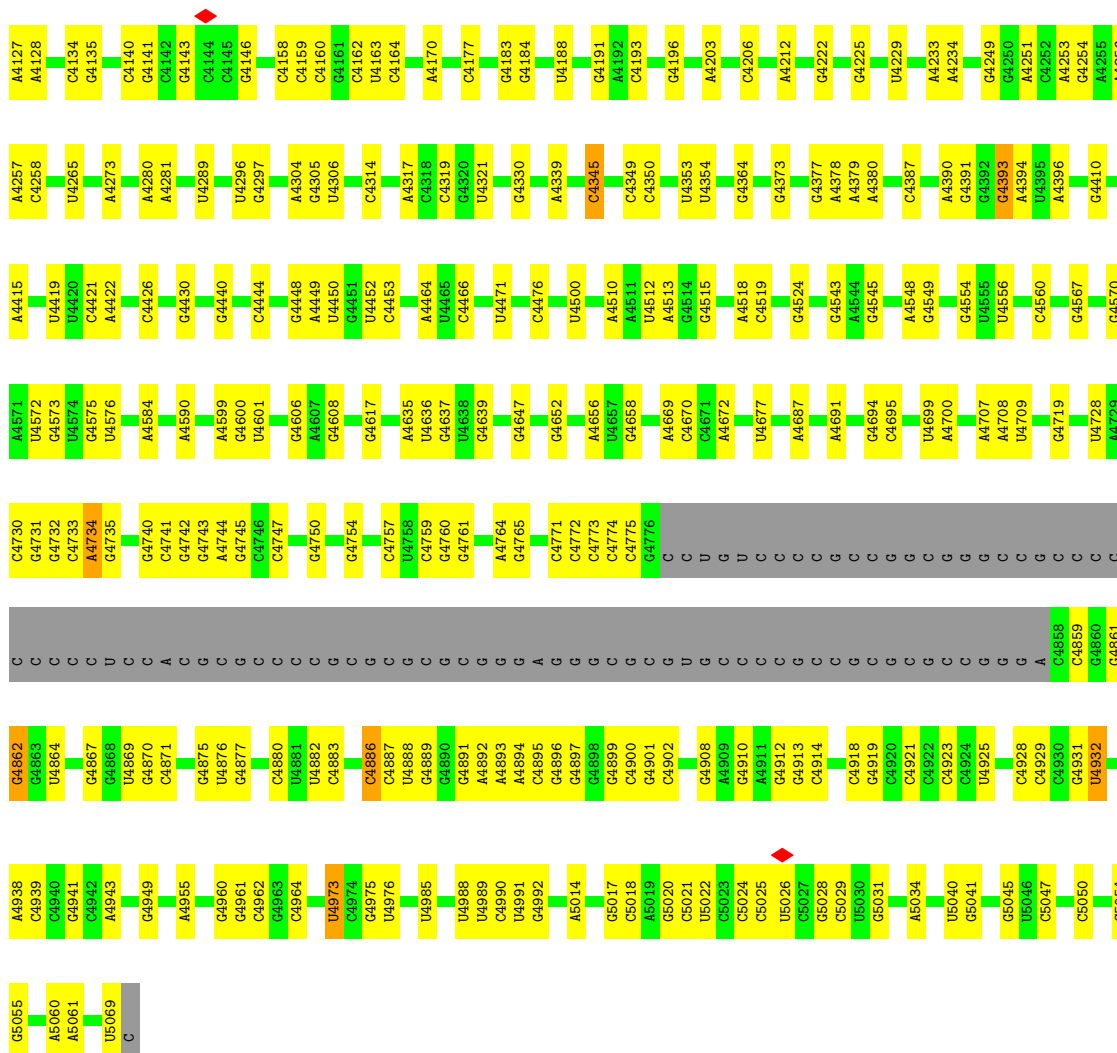
• Molecule 2: 5S ribosomal RNA

Chain L7:

82%   18%
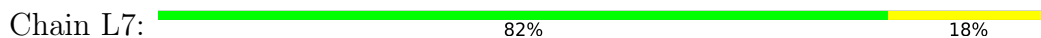
• Molecule 3: 5.8S ribosomal RNA

Chain L8:

77%   22%
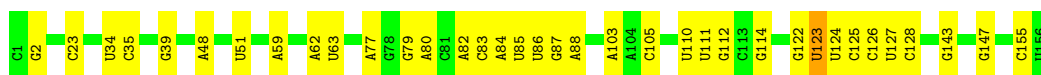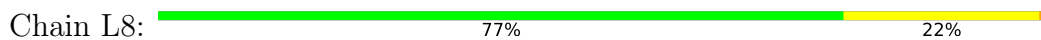
• Molecule 4: 60S ribosomal protein L8

Chain LA:

94%

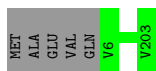• Molecule 5: 60S ribosomal protein L3

Chain LB:
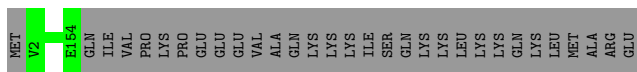

• Molecule 6: 60S ribosomal protein L4

Chain LC:

• Molecule 7: 60S ribosomal protein L5

Chain LD:

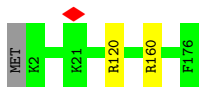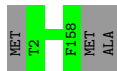• Molecule 8: 60S ribosomal protein L6

Chain LE:

• Molecule 9: 60S ribosomal protein L7

Chain LF:

• Molecule 10: 60S ribosomal protein L7a

Chain LG:

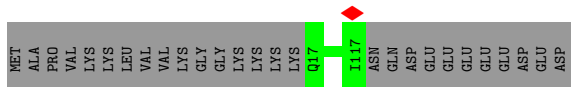MET PRO LYS GLY LYS LYS ALA LYS GLY LYS LYS VAL ALA PRO ALA PRO ALA VAL VAL LYS LYS GLN GLU ALA LYS **K26** **Q85** **E119** LYS LYS ALA ALA GLY LYS GLY ASP VAL PRO THR **K131** **N240** **A256** LYS ALA LYS GLU LEU ALA THR LYS LEU GLY

• Molecule 11: 60S ribosomal protein L9

Chain LH:

99%

M1 **A190** ASP GLU
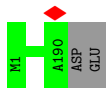
• Molecule 12: 60S ribosomal protein L10-like

Chain LI:

94%　　　　　5%

MET **G2** **R82** **L103** SER CYS ALA GLY ALA ASP ARG LEU GLN **T113** **F176** **K208** **S214**
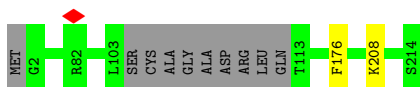
• Molecule 13: 60S ribosomal protein L11

Chain LJ:

90%　　　　　10%

MET ALA GLN ASP GLN GLY GLU **K8** **R58** **I113** ASP LEU GLY ILE LYS TYR **D120** **I174** LEU PRO GLY LYS

• Molecule 14: 60S ribosomal protein L13

Chain LL:

94%　　　　　6%

MET **A2** **R103** **K200** GLU ALA ALA GLU GLN ASP VAL GLU LYS LYS LYS
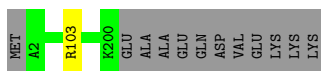
• Molecule 15: 60S ribosomal protein L14

Chain LM:

59%　　　　　40%

MET **V2** **D32** **M118** **L130** GLN LYS ALA ALA LEU LEU LYS LYS ALA SER PRO LYS LYS ALA PRO GLY THR LYS GLY THR ALA ALA ALA ALA ALA ALA ALA ALA LYS VAL PRO ALA LYS LYS ILE THR ALA ALA SER LYS LYS ALA PRO ALA GLN LYS VAL PRO ALA GLN LYS

ALA THR GLY GLN LYS ALA ALA PRO ALA PRO LYS ALA GLN LYS GLY GLN LYS ALA PRO ALA GLN LYS ALA PRO ALA PRO LYS ALA SER GLY LYS LYS ALA
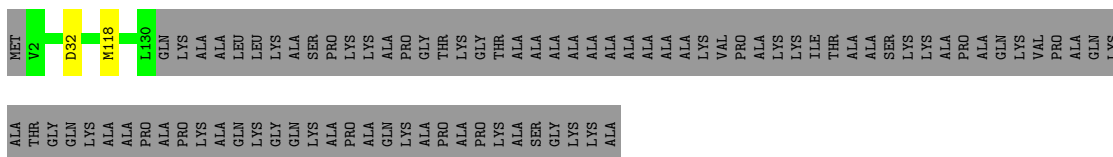
• Molecule 16: 60S ribosomal protein L15

Chain LN:

100%

MET **G2** **R204**

• Molecule 17: 60S ribosomal protein L13a

Chain LO:

98%

MET ALA GLU VAL GLN V6 V203

• Molecule 18: 60S ribosomal protein L17

Chain LP:

83%　　　17%

MET V2 E154 GLN ILE VAL PRO LYS PRO GLU GLU VAL ALA GLN LYS LYS LYS ILE SER GLN LYS LYS LEU LYS LYS GLN LYS LEU MET ALA ARG GLU

• Molecule 19: 60S ribosomal protein L18

Chain LQ:

97%

MET G2 L28 R108 P159 H160 S161 N188

• Molecule 20: 60S ribosomal protein L19

Chain LR:

76%　　　23%

MET S2 M96 R107 K152 LYS LEU LEU ALA ASP GLN ALA GLU ALA ARG ARG SER LYS THR LYS GLU ALA ARG LYS ARG ARG GLU GLU GLU ARG LEU GLN ALA LYS LYS GLU GLU ILE ILE LYS THR LEU SER LYS GLU GLU THR LYS LYS

• Molecule 21: 60S ribosomal protein L18a

Chain LS:

98%

MET K2 K21 R120 R160 F176

• Molecule 22: 60S ribosomal protein L21

Chain LT:

98%

MET T2 F168 MET ALA

• Molecule 23: 60S ribosomal protein L22

Chain LU:

79%　　　21%

MET ALA PRO VAL LYS LYS LEU VAL VAL LYS GLY GLY LYS LYS LYS LYS Q17 I117 ASN GLN ASP GLU GLU GLU GLU GLU ASP GLU ASP

• Molecule 24: 60S ribosomal protein L24

Chain LW:

27%   73%

MET LYS VAL GLU LEU C6 H17 GLY ARG ARG TYR ALA ARG THR ASP GLY LYS VAL PHE GLN PHE LEU N33 G62 GLN SER GLU GLU GLN ILE GLN LYS LYS ARG THR ARG ARG ALA VAL LYS PHE GLN ARG ALA ALA ILE THR GLY ALA SER LEU ALA ASP ILE MET ALA LYS ARG ASN GLN

LYS PRO GLU VAL ARG LYS ALA GLN ARG GLU GLU GLN ALA ILE ARG ALA ALA LYS GLU ALA LYS LYS ALA GLN GLN ALA SER LYS LYS THR ALA MET ALA ALA ALA LYS ALA PRO THR LYS ALA ALA PRO LYS GLN LYS ILE VAL LYS PRO VAL LYS VAL SER ALA PRO ARG VAL GLY GLY LYS

ARG

• Molecule 25: 60S ribosomal protein L23a

Chain LX:

75%   25%

MET ALA PRO LYS ALA LYS LYS GLU ALA PRO ALA PRO PRO LYS ALA GLU ALA LYS ALA LYS ALA LEU LYS ALA LYS LYS ALA VAL LEU LYS GLY VAL HIS SER HIS LYS LYS LYS LYS I40 I156

• Molecule 26: 60S ribosomal protein L26

Chain LY:

91%   9%

M1 K132 GLY LYS TYR LYS GLU GLU THR ILE GLU LYS MET GLN GLU

• Molecule 27: 60S ribosomal protein L27

Chain LZ:

95%   • •

MET G2 D30 ASP GLY THR SER ASP R36 R102 F136

• Molecule 28: 60S ribosomal protein L27a

Chain La:

99%   • •

MET P2 K116 A148

• Molecule 29: 60S ribosomal protein L29

Chain Lb:

43%   57%

MET A2 A69 GLU ALA ILE LYS ALA LEU VAL LYS PRO LYS GLU GLU VAL LYS LYS ILE PRO LYS GLY VAL SER ARG LYS LEU ASP ARG LEU ALA TYR ILE ALA HIS PRO LYS LEU GLY LYS ARG ALA ARG ALA ARG ILE ALA LYS GLY LEU ARG LEU CYS ARG PRO LYS ALA LYS ALA

LYS ALA LYS ALA LYS ASP GLN THR LYS ALA GLN ALA ALA ALA PRO ALA SER VAL PRO ALA GLN ALA PRO LYS ARG THR GLN ALA PRO THR LYS ALA SER GLU

• Molecule 30: 60S ribosomal protein L30

Chain Lc:

82%   18%

MET VAL ALA ALA LYS LYS THR LYS LYS SER LEU **E12 S13 I14** C85 GLY K87 R106 SER MET PRO GLU GLN THR GLY GLU LYS

• Molecule 31: 60S ribosomal protein L31

Chain Ld:

86%   14%

MET ALA PRO ALA LYS LYS GLY GLU GLU LYS LYS GLY GLY GLY GLY ARG SER ALA ILE N18 E124 ASN
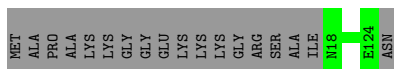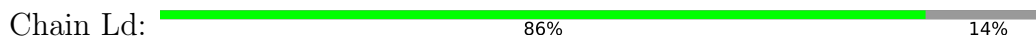
• Molecule 32: 60S ribosomal protein L32

Chain Le:

93%   7%

MET ALA ALA L4 L129 ARG SER GLU GLU ASN GLU

• Molecule 33: 60S ribosomal protein L35a

Chain Lf:

98%   .

MET SER G3 I110

• Molecule 34: 60S ribosomal protein L34

Chain Lg:

87%   .   12%

MET V2 M65 V104 LYS VAL LEU LYS ALA GLN ALA GLN SER GLN LYS ALA LYS
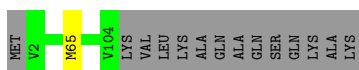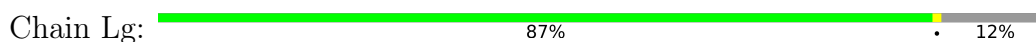
• Molecule 35: 60S ribosomal protein L35

Chain Lh:

95%   . .

MET ALA K3 K25 K74 V121 LYS ALA
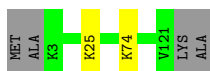
• Molecule 36: 60S ribosomal protein L36

Chain Li:

91%   .   8%

MET ALA L3 K35 K99 ALA ALA LYS LYS ASP
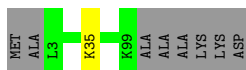
• Molecule 37: 60S ribosomal protein L37

Chain Lj: 87%   11%

MET T2 Y39 R75 K87 ARG ALA ALA VAL ALA SER SER SER
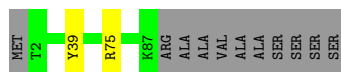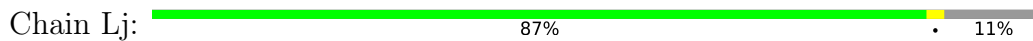
• Molecule 38: 60S ribosomal protein L38

Chain Lk: 99%

MET P2 K70

• Molecule 39: 60S ribosomal protein L39

Chain Ll: 96%

MET S2 R11 L51
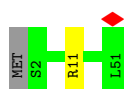
• Molecule 40: Ubiquitin-60S ribosomal protein L40

Chain Lm: 40%   59%

MET GLN ILE PHE VAL LYS THR LEU THR GLY LYS THR ILE THR LEU GLU VAL GLU PRO SER ASP THR ILE GLU ASN VAL LYS ALA LYS ILE GLN ASP LYS GLU GLY ILE PRO PRO ASP GLN GLN ARG LEU ILE PHE ALA GLY LYS GLN LEU GLU ASP GLY ARG THR LEU SER ASP TYR ASN

ILE GLN LYS GLU SER THR LEU HIS LEU VAL LEU ARG LEU ARG GLY GLY I77 R106 K128
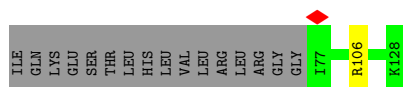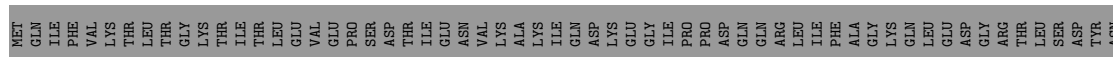
• Molecule 41: 60S ribosomal protein L36a

Chain Lo: 97%

MET V2 R39 V103 F106

• Molecule 42: 60S ribosomal protein L37a

Chain Lp: 78%   22%

MET A2 T73 THR SER ALA VAL THR VAL LYS SER ALA ILE ARG ARG LEU LYS GLU LEU LYS ASP GLN
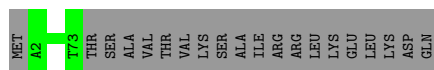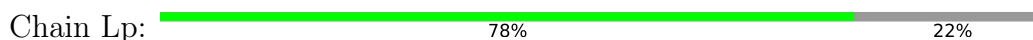
• Molecule 43: 60S ribosomal protein L28

Chain Lr: 88%   11%

MET S2 R107 P123 VAL MET VAL LYS ARG LYS ARG THR ARG PRO THR LYS SER SER
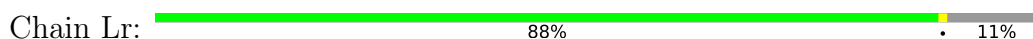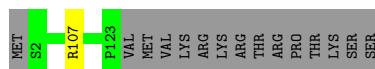
• Molecule 44: Proliferation-associated protein 2G4

Chain A:

81%　　　　18%

MET SER GLY GLU ASP GLU GLN GLN GLU Q10 E67 LYS GLU M70 L92 LYS SER ASP GLN D97 V127 ASP VAL ALA GLN GLY THR Q134 I182 GLU GLY MET LEU SER H188 I195 ASP GLY GLU K199 V226 ASP VAL L229 E234 GLY LYS ALA K238 R243 F283

GLU D285 K311 GLU G313 S345 GLU M347 Q359 SER SER ALA SER ARG LYS THR GLN LYS LYS LYS LYS LYS ALA SER LYS THR ALA GLU ASN ALA THR SER GLY GLU THR LEU GLU GLU ASN GLU ALA GLY ASP
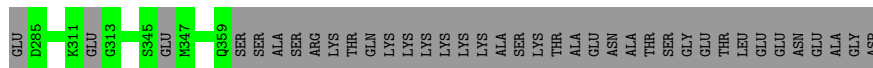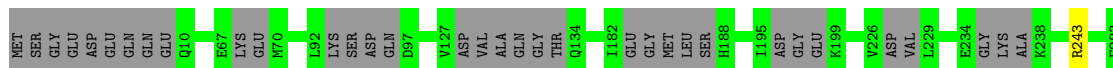
• Molecule 45: Poly GC double helix strand modeled for ES27L density next to EBP1 density

Chain B:

53%　　　　47%

C1 C2 C3 C4 C9 C10 C13 C14 C18 G303 G304 G307 G308 G309 G313 G314 G315 G316 G317
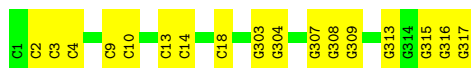
4 Experimental information ⓘ

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	44556	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 $(e^-/\text{Å}^2)$	40	Depositor
Minimum defocus (nm)	Not provided	
Maximum defocus (nm)	Not provided	
Magnification	Not provided	
Image detector	GATAN K2 SUMMIT (4k x 4k)	Depositor
Maximum map value	0.029	Depositor
Minimum map value	-0.008	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.001	Depositor
Recommended contour level	0.004	Depositor
Map size (Å)	516.0, 516.0, 516.0	wwPDB
Map dimensions	600, 600, 600	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.86, 0.86, 0.86	Depositor

5 Model quality ⓘ

5.1 Standard geometry ⓘ

Bond lengths and bond angles in the following residue types are not validated in this section: MG, 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	L5	0.74	1/87379 (0.0%)	0.92	93/136294 (0.1%)
2	L7	0.72	0/2858	0.87	0/4455
3	L8	0.77	1/3701 (0.0%)	0.92	7/5766 (0.1%)
4	LA	0.42	0/1925	0.60	1/2581 (0.0%)
5	LB	0.40	0/3251	0.55	1/4351 (0.0%)
6	LC	0.39	0/2909	0.52	0/3907
7	LD	0.38	0/2400	0.50	0/3215
8	LE	0.36	0/1811	0.51	0/2428
9	LF	0.43	0/1905	0.54	1/2539 (0.0%)
10	LG	0.37	0/1811	0.50	0/2441
11	LH	0.38	0/1537	0.53	0/2066
12	LI	0.41	0/1682	0.52	0/2247
13	LJ	0.34	0/1314	0.53	0/1754
14	LL	0.38	0/1643	0.53	0/2199
15	LM	0.42	0/1089	0.58	2/1457 (0.1%)
16	LN	0.45	0/1746	0.49	0/2338
17	LO	0.41	0/1657	0.52	0/2216
18	LP	0.43	0/1268	0.54	0/1701
19	LQ	0.41	0/1537	0.55	1/2052 (0.0%)
20	LR	0.35	0/1280	0.51	1/1694 (0.1%)
21	LS	0.41	0/1493	0.53	0/2003
22	LT	0.40	0/1312	0.49	0/1753
23	LU	0.34	0/835	0.52	0/1122
24	LW	0.38	0/359	0.49	0/477
25	LX	0.39	0/963	0.55	0/1299
26	LY	0.38	0/1119	0.51	0/1488
27	LZ	0.40	0/1096	0.54	0/1459
28	La	0.41	0/1191	0.52	0/1591
29	Lb	0.39	0/569	0.53	0/750
30	Lc	0.38	0/746	0.53	0/1000
31	Ld	0.39	0/903	0.51	0/1216
32	Le	0.41	0/1061	0.52	0/1415

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	#|Z| >5	RMSZ	#|Z| >5
33	Lf	0.43	0/889	0.54	0/1190
34	Lg	0.41	0/831	0.58	1/1108 (0.1%)
35	Lh	0.35	0/1003	0.55	1/1326 (0.1%)
36	Li	0.36	0/814	0.51	0/1076
37	Lj	0.45	0/720	0.59	0/952
38	Lk	0.36	0/575	0.57	0/761
39	Ll	0.37	0/454	0.60	1/599 (0.2%)
40	Lm	0.34	0/435	0.51	0/575
41	Lo	0.40	0/876	0.58	1/1156 (0.1%)
42	Lp	0.44	0/568	0.53	0/754
43	Lr	0.39	0/995	0.51	0/1334
44	A	0.32	0/2387	0.49	0/3218
45	B	0.45	0/861	1.16	4/1338 (0.3%)
All	All	0.63	2/147758 (0.0%)	0.81	115/218661 (0.1%)

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
5	LB	0	1
8	LE	0	1
9	LF	0	1
12	LI	0	1
19	LQ	0	1
37	Lj	0	1
All	All	0	6

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	L8	62	A	N9-C4	-6.35	1.34	1.37
1	L5	1296	G	N9-C4	-5.16	1.33	1.38

All (115) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	L5	1296	G	N3-C4-N9	-9.46	120.32	126.00
1	L5	1296	G	C4-N9-C1'	-8.94	114.87	126.50
1	L5	1996	C	N1-C2-O2	8.34	123.91	118.90
1	L5	468	U	C5-C6-N1	8.30	126.85	122.70

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	L5	468	U	C2-N1-C1'	8.27	127.62	117.70
1	L5	1296	G	N3-C4-C5	8.22	132.71	128.60
1	L5	1296	G	C8-N9-C1'	7.89	137.26	127.00
1	L5	4886	C	N1-C2-O2	7.80	123.58	118.90
1	L5	2409	U	C2-N1-C1'	7.50	126.70	117.70
9	LF	132	MET	CA-CB-CG	7.36	125.81	113.30
1	L5	1996	C	C2-N1-C1'	7.24	126.77	118.80
35	Lh	25	LYS	CA-CB-CG	7.15	129.12	113.40
1	L5	450	G	N7-C8-N9	7.13	116.67	113.10
3	L8	123	U	N1-C2-O2	7.00	127.70	122.80
1	L5	2563	C	N1-C2-O2	6.97	123.08	118.90
1	L5	657	C	C2-N1-C1'	6.91	126.40	118.80
1	L5	1969	G	N1-C6-O6	-6.85	115.79	119.90
1	L5	1971	C	C2-N1-C1'	6.78	126.25	118.80
1	L5	4886	C	C2-N1-C1'	6.65	126.11	118.80
1	L5	2904	U	C2-N1-C1'	6.59	125.61	117.70
1	L5	138	G	N3-C4-N9	-6.58	122.05	126.00
3	L8	123	U	C2-N1-C1'	6.51	125.51	117.70
1	L5	1296	G	C6-C5-N7	6.50	134.30	130.40
1	L5	1996	C	N3-C2-O2	-6.43	117.40	121.90
1	L5	456	C	O4'-C1'-N1	6.39	113.32	108.20
1	L5	450	G	C8-N9-C4	-6.31	103.88	106.40
1	L5	4990	C	N1-C2-O2	6.30	122.68	118.90
1	L5	2563	C	C2-N1-C1'	6.29	125.72	118.80
39	Ll	11	ARG	CA-CB-CG	6.26	127.16	113.40
1	L5	125	C	C2-N1-C1'	6.23	125.65	118.80
1	L5	260	C	N3-C2-O2	-6.21	117.55	121.90
1	L5	4091	G	C5-C6-O6	-6.19	124.89	128.60
1	L5	914	U	C5-C4-O4	-6.17	122.20	125.90
1	L5	4921	C	N1-C2-O2	6.16	122.60	118.90
1	L5	1082	C	N3-C2-O2	-6.09	117.64	121.90
1	L5	5031	G	N3-C4-N9	-6.08	122.35	126.00
1	L5	1631	A	N1-C2-N3	6.07	132.34	129.30
1	L5	209	U	C2-N1-C1'	6.05	124.97	117.70
1	L5	468	U	C2-N3-C4	6.02	130.61	127.00
45	B	309	G	N1-C6-O6	-5.97	116.32	119.90
1	L5	4091	G	C6-C5-N7	-5.93	126.84	130.40
3	L8	128	C	C2-N1-C1'	5.92	125.31	118.80
1	L5	5031	G	N3-C2-N2	-5.90	115.77	119.90
1	L5	468	U	N1-C2-O2	5.89	126.93	122.80
5	LB	31	SER	C-N-CA	-5.88	107.00	121.70
1	L5	655	C	N3-C2-O2	-5.86	117.80	121.90

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	L5	125	C	N1-C2-O2	5.81	122.38	118.90
1	L5	4091	G	N3-C4-N9	5.80	129.48	126.00
1	L5	4091	G	C8-N9-C1'	-5.78	119.48	127.00
1	L5	693	C	N3-C2-O2	-5.76	117.86	121.90
1	L5	657	C	C6-N1-C1'	-5.75	113.90	120.80
1	L5	1252	C	C2-N1-C1'	5.71	125.08	118.80
3	L8	51	U	N3-C2-O2	-5.71	118.20	122.20
1	L5	468	U	C6-N1-C1'	-5.70	113.22	121.20
1	L5	657	C	C5-C4-N4	-5.70	116.21	120.20
1	L5	914	U	N3-C4-O4	5.69	123.38	119.40
1	L5	450	G	C6-C5-N7	-5.68	126.99	130.40
15	LM	32	ASP	CB-CG-OD2	5.67	123.41	118.30
1	L5	4734	A	O4'-C1'-N9	5.65	112.72	108.20
1	L5	4886	C	N3-C2-O2	-5.65	117.95	121.90
3	L8	123	U	N3-C2-O2	-5.64	118.25	122.20
1	L5	3598	C	N1-C2-O2	5.62	122.27	118.90
1	L5	2904	U	N1-C2-O2	5.61	126.73	122.80
1	L5	488	G	C4-N9-C1'	5.60	133.78	126.50
1	L5	1996	C	C6-N1-C1'	-5.60	114.08	120.80
1	L5	4091	G	C4-C5-N7	5.58	113.03	110.80
1	L5	4393	G	C2-N3-C4	-5.58	109.11	111.90
1	L5	4973	U	C2-N1-C1'	5.58	124.39	117.70
1	L5	2904	U	N3-C2-O2	-5.58	118.30	122.20
1	L5	4921	C	C2-N1-C1'	5.57	124.92	118.80
15	LM	118	MET	CG-SD-CE	-5.56	91.31	100.20
1	L5	4091	G	N9-C4-C5	-5.54	103.19	105.40
1	L5	2563	C	N3-C2-O2	-5.53	118.03	121.90
1	L5	3816	A	OP2-P-O3'	5.51	117.33	105.20
1	L5	5018	C	C2-N3-C4	-5.49	117.15	119.90
1	L5	1816	C	C6-N1-C2	-5.44	118.12	120.30
4	LA	96	LEU	CA-CB-CG	5.41	127.74	115.30
1	L5	138	G	N9-C4-C5	5.41	107.56	105.40
1	L5	4773	C	C2-N1-C1'	5.41	124.75	118.80
1	L5	496	G	C5-C6-O6	-5.39	125.36	128.60
1	L5	4091	G	C4-N9-C1'	5.38	133.49	126.50
20	LR	96	MET	CA-CB-CG	5.36	122.42	113.30
45	B	9	C	N1-C2-O2	5.34	122.11	118.90
1	L5	4345	C	C2-N1-C1'	5.34	124.67	118.80
1	L5	1438	U	C2-N1-C1'	5.33	124.10	117.70
34	Lg	65	MET	CB-CG-SD	-5.33	96.41	112.40
1	L5	138	G	C5-C6-O6	5.31	131.78	128.60
1	L5	488	G	C6-C5-N7	-5.30	127.22	130.40

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	L5	4862	G	N9-C4-C5	-5.30	103.28	105.40
45	B	10	C	C6-N1-C2	-5.30	118.18	120.30
3	L8	51	U	N1-C2-O2	5.26	126.48	122.80
1	L5	1703	C	C2-N1-C1'	5.25	124.58	118.80
41	Lo	39	ARG	CG-CD-NE	-5.25	100.78	111.80
1	L5	294	G	C2-N3-C4	5.22	114.51	111.90
1	L5	2409	U	N1-C2-O2	5.20	126.44	122.80
19	LQ	28	LEU	CA-CB-CG	5.18	127.22	115.30
1	L5	4886	C	C6-N1-C1'	-5.17	114.59	120.80
1	L5	131	C	C6-N1-C2	-5.17	118.23	120.30
1	L5	2501	C	N1-C2-O2	5.17	122.00	118.90
1	L5	688	U	N3-C2-O2	-5.16	118.59	122.20
1	L5	2409	U	C6-N1-C1'	-5.15	113.99	121.20
45	B	9	C	N3-C2-O2	-5.15	118.29	121.90
1	L5	1971	C	C6-N1-C1'	-5.14	114.63	120.80
1	L5	2738	C	C2-N1-C1'	-5.14	113.15	118.80
1	L5	4862	G	C4-C5-N7	5.12	112.85	110.80
1	L5	4193	C	N1-C2-O2	5.12	121.97	118.90
1	L5	5031	G	N9-C4-C5	5.11	107.44	105.40
1	L5	2096	G	C4-N9-C1'	5.10	133.12	126.50
1	L5	4932	U	C2-N1-C1'	5.08	123.79	117.70
1	L5	249	C	C2-N1-C1'	5.08	124.38	118.80
3	L8	128	C	N1-C2-O2	5.07	121.94	118.90
1	L5	491	G	N3-C4-N9	-5.06	122.97	126.00
1	L5	4932	U	N1-C2-O2	5.02	126.32	122.80
1	L5	1521	C	O5'-P-OP2	-5.01	101.19	105.70
1	L5	2487	G	N3-C4-N9	-5.01	123.00	126.00

There are no chirality outliers.

All (6) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
5	LB	390	GLY	Peptide
8	LE	130	LYS	Peptide
9	LF	162	ILE	Peptide
12	LI	176	PHE	Peptide
19	LQ	161	SER	Peptide
37	Lj	39	TYR	Peptide

5.2 Too-close contacts ⓘ

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

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	
4	LA	245/257 (95%)	205 (84%)	39 (16%)	1 (0%)	34	66
5	LB	393/403 (98%)	339 (86%)	54 (14%)	0	100	100
6	LC	357/427 (84%)	316 (88%)	41 (12%)	0	100	100
7	LD	288/297 (97%)	262 (91%)	26 (9%)	0	100	100
8	LE	215/288 (75%)	183 (85%)	32 (15%)	0	100	100
9	LF	223/248 (90%)	210 (94%)	13 (6%)	0	100	100
10	LG	216/266 (81%)	191 (88%)	25 (12%)	0	100	100
11	LH	188/192 (98%)	168 (89%)	20 (11%)	0	100	100
12	LI	200/214 (94%)	165 (82%)	35 (18%)	0	100	100
13	LJ	157/178 (88%)	138 (88%)	19 (12%)	0	100	100
14	LL	197/211 (93%)	178 (90%)	19 (10%)	0	100	100
15	LM	127/215 (59%)	115 (91%)	12 (9%)	0	100	100
16	LN	201/204 (98%)	190 (94%)	11 (6%)	0	100	100
17	LO	196/203 (97%)	180 (92%)	16 (8%)	0	100	100
18	LP	151/184 (82%)	140 (93%)	11 (7%)	0	100	100
19	LQ	185/188 (98%)	172 (93%)	11 (6%)	2 (1%)	14	45
20	LR	149/196 (76%)	140 (94%)	9 (6%)	0	100	100
21	LS	173/176 (98%)	147 (85%)	26 (15%)	0	100	100
22	LT	155/160 (97%)	137 (88%)	18 (12%)	0	100	100
23	LU	99/128 (77%)	89 (90%)	10 (10%)	0	100	100
24	LW	38/157 (24%)	33 (87%)	5 (13%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
25	LX	115/156 (74%)	99 (86%)	16 (14%)	0	100	100
26	LY	130/145 (90%)	117 (90%)	13 (10%)	0	100	100
27	LZ	126/136 (93%)	114 (90%)	12 (10%)	0	100	100
28	La	145/148 (98%)	129 (89%)	16 (11%)	0	100	100
29	Lb	66/159 (42%)	56 (85%)	10 (15%)	0	100	100
30	Lc	90/115 (78%)	83 (92%)	7 (8%)	0	100	100
31	Ld	105/125 (84%)	99 (94%)	6 (6%)	0	100	100
32	Le	124/135 (92%)	114 (92%)	10 (8%)	0	100	100
33	Lf	106/110 (96%)	93 (88%)	13 (12%)	0	100	100
34	Lg	101/117 (86%)	87 (86%)	14 (14%)	0	100	100
35	Lh	117/123 (95%)	108 (92%)	9 (8%)	0	100	100
36	Li	95/105 (90%)	90 (95%)	5 (5%)	0	100	100
37	Lj	84/97 (87%)	71 (84%)	13 (16%)	0	100	100
38	Lk	67/70 (96%)	60 (90%)	7 (10%)	0	100	100
39	Ll	48/51 (94%)	42 (88%)	6 (12%)	0	100	100
40	Lm	50/128 (39%)	46 (92%)	4 (8%)	0	100	100
41	Lo	103/106 (97%)	87 (84%)	15 (15%)	1 (1%)	15	46
42	Lp	70/92 (76%)	61 (87%)	9 (13%)	0	100	100
43	Lr	120/137 (88%)	104 (87%)	16 (13%)	0	100	100
44	A	300/394 (76%)	265 (88%)	35 (12%)	0	100	100
All	All	6315/7441 (85%)	5623 (89%)	688 (11%)	4 (0%)	54	81

All (4) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
4	LA	247	ARG
19	LQ	160	HIS
41	Lo	103	VAL
19	LQ	159	PRO

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	
4	LA	188/199 (94%)	185 (98%)	3 (2%)	62	79
5	LB	342/349 (98%)	339 (99%)	3 (1%)	78	87
6	LC	298/348 (86%)	296 (99%)	2 (1%)	84	90
7	LD	243/250 (97%)	243 (100%)	0	100	100
8	LE	195/252 (77%)	193 (99%)	2 (1%)	76	86
9	LF	194/215 (90%)	194 (100%)	0	100	100
10	LG	190/223 (85%)	188 (99%)	2 (1%)	73	85
11	LH	169/171 (99%)	169 (100%)	0	100	100
12	LI	172/181 (95%)	171 (99%)	1 (1%)	86	91
13	LJ	136/149 (91%)	135 (99%)	1 (1%)	84	90
14	LL	167/177 (94%)	166 (99%)	1 (1%)	86	91
15	LM	111/161 (69%)	111 (100%)	0	100	100
16	LN	171/172 (99%)	171 (100%)	0	100	100
17	LO	170/174 (98%)	170 (100%)	0	100	100
18	LP	134/163 (82%)	134 (100%)	0	100	100
19	LQ	164/165 (99%)	163 (99%)	1 (1%)	86	91
20	LR	135/175 (77%)	134 (99%)	1 (1%)	84	90
21	LS	156/157 (99%)	154 (99%)	2 (1%)	69	82
22	LT	138/140 (99%)	138 (100%)	0	100	100
23	LU	90/115 (78%)	90 (100%)	0	100	100
24	LW	37/126 (29%)	37 (100%)	0	100	100
25	LX	102/133 (77%)	102 (100%)	0	100	100
26	LY	123/135 (91%)	123 (100%)	0	100	100
27	LZ	113/118 (96%)	112 (99%)	1 (1%)	78	87
28	La	120/121 (99%)	119 (99%)	1 (1%)	81	89
29	Lb	58/126 (46%)	58 (100%)	0	100	100
30	Lc	80/97 (82%)	80 (100%)	0	100	100
31	Ld	98/110 (89%)	98 (100%)	0	100	100
32	Le	114/121 (94%)	114 (100%)	0	100	100
33	Lf	87/89 (98%)	87 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
34	Lg	89/100 (89%)	89 (100%)	0	100	100
35	Lh	108/110 (98%)	107 (99%)	1 (1%)	78	87
36	Li	85/89 (96%)	84 (99%)	1 (1%)	71	83
37	Lj	73/80 (91%)	72 (99%)	1 (1%)	67	82
38	Lk	64/65 (98%)	64 (100%)	0	100	100
39	Ll	47/48 (98%)	47 (100%)	0	100	100
40	Lm	48/116 (41%)	47 (98%)	1 (2%)	53	75
41	Lo	93/94 (99%)	93 (100%)	0	100	100
42	Lp	57/75 (76%)	57 (100%)	0	100	100
43	Lr	106/121 (88%)	105 (99%)	1 (1%)	78	87
44	A	223/336 (66%)	222 (100%)	1 (0%)	91	95
All	All	5488/6346 (86%)	5461 (100%)	27 (0%)	89	93

All (27) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
4	LA	163	ARG
4	LA	193	ARG
4	LA	242	ARG
5	LB	238	LYS
5	LB	261	ARG
5	LB	358	ARG
6	LC	188	ARG
6	LC	286	ASN
8	LE	56	ARG
8	LE	158	ARG
10	LG	85	GLN
10	LG	240	ASN
12	LI	208	LYS
13	LJ	58	ARG
14	LL	103	ARG
19	LQ	108	ARG
20	LR	107	ARG
21	LS	120	ARG
21	LS	160	ARG
27	LZ	102	ARG
28	La	116	LYS
35	Lh	74	LYS

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Mol	Chain	Res	Type
36	Li	35	LYS
37	Lj	75	ARG
40	Lm	106	ARG
43	Lr	107	ARG
44	A	243	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (28) such sidechains are listed below:

Mol	Chain	Res	Type
6	LC	61	GLN
7	LD	39	GLN
7	LD	202	GLN
7	LD	203	ASN
7	LD	225	GLN
9	LF	110	GLN
9	LF	131	ASN
9	LF	226	HIS
10	LG	85	GLN
10	LG	108	GLN
10	LG	112	GLN
10	LG	159	HIS
11	LH	8	GLN
12	LI	133	GLN
12	LI	144	ASN
13	LJ	97	ASN
14	LL	111	GLN
14	LL	115	GLN
16	LN	91	GLN
17	LO	63	ASN
17	LO	173	GLN
18	LP	80	GLN
22	LT	54	HIS
25	LX	108	GLN
28	La	120	GLN
30	Lc	40	GLN
30	Lc	72	HIS
36	Li	26	HIS

5.3.3 RNA ⓘ

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
1	L5	3627/5070 (71%)	1096 (30%)	32 (0%)
2	L7	119/120 (99%)	22 (18%)	0
3	L8	155/156 (99%)	33 (21%)	2 (1%)
45	B	33/36 (91%)	14 (42%)	0
All	All	3934/5382 (73%)	1165 (29%)	34 (0%)

All (1165) RNA backbone outliers are listed below:

Mol	Chain	Res	Type
1	L5	2	G
1	L5	5	A
1	L5	13	U
1	L5	18	C
1	L5	21	G
1	L5	23	C
1	L5	25	A
1	L5	39	A
1	L5	42	A
1	L5	45	U
1	L5	48	G
1	L5	58	G
1	L5	59	A
1	L5	64	A
1	L5	65	A
1	L5	69	A
1	L5	72	C
1	L5	73	A
1	L5	91	G
1	L5	105	A
1	L5	109	G
1	L5	110	C
1	L5	116	G
1	L5	119	G
1	L5	120	A
1	L5	121	A
1	L5	125	C
1	L5	133	C
1	L5	134	G
1	L5	135	G
1	L5	136	C
1	L5	137	G
1	L5	139	G
1	L5	144	G

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Mol	Chain	Res	Type
1	L5	145	G
1	L5	146	G
1	L5	151	G
1	L5	155	C
1	L5	156	G
1	L5	159	C
1	L5	160	G
1	L5	161	G
1	L5	165	A
1	L5	170	C
1	L5	171	U
1	L5	172	C
1	L5	173	C
1	L5	175	C
1	L5	176	G
1	L5	177	G
1	L5	179	G
1	L5	180	C
1	L5	181	C
1	L5	183	C
1	L5	185	C
1	L5	186	G
1	L5	188	G
1	L5	199	G
1	L5	200	U
1	L5	209	U
1	L5	218	A
1	L5	220	C
1	L5	226	G
1	L5	233	U
1	L5	234	G
1	L5	246	G
1	L5	249	C
1	L5	250	C
1	L5	253	G
1	L5	255	C
1	L5	256	G
1	L5	261	G
1	L5	263	G
1	L5	264	C
1	L5	267	G
1	L5	276	C

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Mol	Chain	Res	Type
1	L5	278	G
1	L5	280	G
1	L5	295	A
1	L5	297	U
1	L5	306	A
1	L5	309	C
1	L5	315	G
1	L5	316	U
1	L5	319	A
1	L5	340	C
1	L5	354	U
1	L5	358	C
1	L5	361	C
1	L5	373	G
1	L5	387	G
1	L5	389	A
1	L5	393	U
1	L5	394	G
1	L5	399	G
1	L5	401	G
1	L5	408	A
1	L5	409	G
1	L5	410	A
1	L5	411	G
1	L5	413	G
1	L5	414	C
1	L5	415	G
1	L5	440	U
1	L5	449	C
1	L5	450	G
1	L5	452	A
1	L5	453	G
1	L5	456	C
1	L5	457	G
1	L5	467	U
1	L5	468	U
1	L5	469	C
1	L5	470	A
1	L5	472	C
1	L5	473	C
1	L5	478	G
1	L5	483	G

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Mol	Chain	Res	Type
1	L5	485	C
1	L5	486	C
1	L5	487	G
1	L5	489	C
1	L5	490	C
1	L5	495	C
1	L5	496	G
1	L5	497	G
1	L5	498	C
1	L5	499	G
1	L5	500	G
1	L5	501	C
1	L5	502	C
1	L5	503	C
1	L5	504	G
1	L5	505	G
1	L5	509	A
1	L5	510	U
1	L5	512	U
1	L5	513	U
1	L5	514	U
1	L5	515	C
1	L5	516	C
1	L5	519	C
1	L5	643	C
1	L5	648	G
1	L5	654	C
1	L5	657	C
1	L5	660	A
1	L5	665	C
1	L5	666	G
1	L5	667	A
1	L5	668	C
1	L5	677	G
1	L5	683	C
1	L5	685	C
1	L5	686	A
1	L5	687	U
1	L5	688	U
1	L5	694	C
1	L5	695	G
1	L5	697	G

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Mol	Chain	Res	Type
1	L5	700	G
1	L5	701	G
1	L5	703	G
1	L5	704	C
1	L5	708	G
1	L5	719	C
1	L5	721	G
1	L5	730	G
1	L5	731	G
1	L5	738	C
1	L5	739	G
1	L5	740	G
1	L5	742	G
1	L5	746	A
1	L5	747	A
1	L5	748	G
1	L5	750	U
1	L5	753	C
1	L5	756	G
1	L5	757	G
1	L5	758	G
1	L5	904	C
1	L5	905	C
1	L5	911	U
1	L5	913	U
1	L5	914	U
1	L5	915	A
1	L5	917	A
1	L5	918	G
1	L5	923	C
1	L5	924	C
1	L5	926	G
1	L5	932	A
1	L5	933	G
1	L5	935	A
1	L5	936	C
1	L5	941	C
1	L5	944	A
1	L5	945	U
1	L5	946	C
1	L5	959	G
1	L5	960	A

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Mol	Chain	Res	Type
1	L5	961	G
1	L5	962	C
1	L5	963	G
1	L5	965	G
1	L5	966	A
1	L5	968	C
1	L5	969	C
1	L5	971	U
1	L5	972	C
1	L5	977	C
1	L5	978	G
1	L5	982	U
1	L5	984	C
1	L5	987	C
1	L5	988	C
1	L5	991	C
1	L5	992	C
1	L5	993	G
1	L5	995	C
1	L5	996	G
1	L5	1066	G
1	L5	1070	G
1	L5	1071	C
1	L5	1072	C
1	L5	1074	G
1	L5	1075	G
1	L5	1080	C
1	L5	1082	C
1	L5	1083	U
1	L5	1084	C
1	L5	1100	U
1	L5	1168	G
1	L5	1169	G
1	L5	1172	C
1	L5	1173	G
1	L5	1174	G
1	L5	1178	G
1	L5	1179	U
1	L5	1180	C
1	L5	1181	C
1	L5	1183	C
1	L5	1184	A

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Mol	Chain	Res	Type
1	L5	1191	C
1	L5	1193	C
1	L5	1194	G
1	L5	1196	G
1	L5	1198	G
1	L5	1200	G
1	L5	1202	C
1	L5	1203	G
1	L5	1204	C
1	L5	1205	G
1	L5	1210	C
1	L5	1211	G
1	L5	1212	G
1	L5	1214	C
1	L5	1215	C
1	L5	1216	C
1	L5	1217	G
1	L5	1218	G
1	L5	1219	G
1	L5	1220	G
1	L5	1222	A
1	L5	1241	C
1	L5	1244	G
1	L5	1245	C
1	L5	1249	C
1	L5	1251	C
1	L5	1253	G
1	L5	1258	G
1	L5	1260	G
1	L5	1261	G
1	L5	1262	G
1	L5	1266	G
1	L5	1267	C
1	L5	1269	G
1	L5	1270	A
1	L5	1271	G
1	L5	1272	C
1	L5	1275	G
1	L5	1277	G
1	L5	1280	C
1	L5	1284	G
1	L5	1285	U

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Mol	Chain	Res	Type
1	L5	1287	G
1	L5	1289	C
1	L5	1290	G
1	L5	1294	A
1	L5	1301	C
1	L5	1314	C
1	L5	1316	G
1	L5	1318	C
1	L5	1320	U
1	L5	1323	A
1	L5	1324	A
1	L5	1326	A
1	L5	1328	G
1	L5	1337	A
1	L5	1338	G
1	L5	1344	C
1	L5	1345	A
1	L5	1353	G
1	L5	1354	A
1	L5	1358	G
1	L5	1359	G
1	L5	1364	U
1	L5	1365	C
1	L5	1366	G
1	L5	1367	C
1	L5	1377	G
1	L5	1378	C
1	L5	1379	C
1	L5	1381	U
1	L5	1385	G
1	L5	1387	A
1	L5	1388	A
1	L5	1394	G
1	L5	1397	A
1	L5	1399	G
1	L5	1401	C
1	L5	1402	C
1	L5	1403	G
1	L5	1406	G
1	L5	1408	G
1	L5	1409	C
1	L5	1410	U

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Mol	Chain	Res	Type
1	L5	1411	C
1	L5	1414	C
1	L5	1415	G
1	L5	1417	C
1	L5	1418	C
1	L5	1419	G
1	L5	1420	A
1	L5	1421	G
1	L5	1425	G
1	L5	1439	C
1	L5	1441	C
1	L5	1442	C
1	L5	1443	A
1	L5	1444	G
1	L5	1447	C
1	L5	1457	G
1	L5	1472	C
1	L5	1473	U
1	L5	1480	C
1	L5	1481	C
1	L5	1482	G
1	L5	1483	C
1	L5	1497	A
1	L5	1498	G
1	L5	1502	G
1	L5	1516	G
1	L5	1518	A
1	L5	1520	C
1	L5	1521	C
1	L5	1523	A
1	L5	1525	A
1	L5	1534	A
1	L5	1547	A
1	L5	1560	A
1	L5	1564	A
1	L5	1566	C
1	L5	1571	G
1	L5	1578	U
1	L5	1581	G
1	L5	1585	C
1	L5	1591	U
1	L5	1596	U

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Mol	Chain	Res	Type
1	L5	1597	G
1	L5	1613	A
1	L5	1624	G
1	L5	1625	G
1	L5	1631	A
1	L5	1632	A
1	L5	1633	G
1	L5	1634	A
1	L5	1654	G
1	L5	1659	U
1	L5	1661	C
1	L5	1676	C
1	L5	1677	U
1	L5	1679	A
1	L5	1680	G
1	L5	1686	C
1	L5	1691	G
1	L5	1697	G
1	L5	1698	C
1	L5	1699	A
1	L5	1701	A
1	L5	1702	C
1	L5	1705	G
1	L5	1706	A
1	L5	1707	C
1	L5	1715	C
1	L5	1716	G
1	L5	1718	C
1	L5	1719	A
1	L5	1731	C
1	L5	1734	G
1	L5	1741	G
1	L5	1742	A
1	L5	1750	G
1	L5	1751	A
1	L5	1752	G
1	L5	1755	C
1	L5	1757	U
1	L5	1758	G
1	L5	1760	G
1	L5	1763	C
1	L5	1765	A

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Mol	Chain	Res	Type
1	L5	1766	A
1	L5	1785	C
1	L5	1786	A
1	L5	1787	A
1	L5	1797	G
1	L5	1804	A
1	L5	1805	A
1	L5	1806	G
1	L5	1810	G
1	L5	1812	C
1	L5	1820	C
1	L5	1821	G
1	L5	1822	U
1	L5	1823	G
1	L5	1829	G
1	L5	1830	G
1	L5	1832	C
1	L5	1833	G
1	L5	1835	G
1	L5	1836	G
1	L5	1837	A
1	L5	1842	G
1	L5	1851	G
1	L5	1855	G
1	L5	1856	C
1	L5	1869	G
1	L5	1881	C
1	L5	1891	A
1	L5	1893	C
1	L5	1899	G
1	L5	1901	C
1	L5	1910	G
1	L5	1918	U
1	L5	1919	G
1	L5	1920	C
1	L5	1921	C
1	L5	1922	G
1	L5	1924	C
1	L5	1926	C
1	L5	1931	C
1	L5	1932	A
1	L5	1935	C

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Mol	Chain	Res	Type
1	L5	1936	C
1	L5	1938	C
1	L5	1940	G
1	L5	1942	A
1	L5	1945	G
1	L5	1948	G
1	L5	1949	U
1	L5	1954	U
1	L5	1959	U
1	L5	1960	A
1	L5	1961	G
1	L5	1962	A
1	L5	1965	G
1	L5	1967	A
1	L5	1969	G
1	L5	1970	A
1	L5	1971	C
1	L5	1974	U
1	L5	1975	G
1	L5	1976	G
1	L5	1977	C
1	L5	1984	A
1	L5	1985	G
1	L5	1986	U
1	L5	1995	G
1	L5	1996	C
1	L5	1997	U
1	L5	1998	A
1	L5	1999	A
1	L5	2001	G
1	L5	2002	A
1	L5	2003	G
1	L5	2006	U
1	L5	2007	G
1	L5	2008	U
1	L5	2009	A
1	L5	2010	A
1	L5	2011	C
1	L5	2012	A
1	L5	2013	A
1	L5	2014	C
1	L5	2015	U

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Mol	Chain	Res	Type
1	L5	2016	C
1	L5	2017	A
1	L5	2018	C
1	L5	2021	G
1	L5	2022	C
1	L5	2023	C
1	L5	2025	A
1	L5	2026	A
1	L5	2028	C
1	L5	2034	G
1	L5	2044	U
1	L5	2046	G
1	L5	2048	U
1	L5	2052	G
1	L5	2055	G
1	L5	2056	G
1	L5	2069	A
1	L5	2084	C
1	L5	2085	G
1	L5	2089	G
1	L5	2093	A
1	L5	2094	G
1	L5	2095	A
1	L5	2096	G
1	L5	2097	U
1	L5	2098	G
1	L5	2099	G
1	L5	2100	A
1	L5	2101	C
1	L5	2102	G
1	L5	2103	G
1	L5	2105	A
1	L5	2106	G
1	L5	2107	C
1	L5	2108	G
1	L5	2109	G
1	L5	2116	C
1	L5	2117	G
1	L5	2118	G
1	L5	2119	C
1	L5	2120	G
1	L5	2121	C

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Mol	Chain	Res	Type
1	L5	2123	C
1	L5	2128	G
1	L5	2130	G
1	L5	2131	C
1	L5	2251	G
1	L5	2252	G
1	L5	2253	A
1	L5	2254	G
1	L5	2255	C
1	L5	2256	C
1	L5	2257	C
1	L5	2258	C
1	L5	2259	G
1	L5	2261	G
1	L5	2263	A
1	L5	2264	C
1	L5	2266	C
1	L5	2269	C
1	L5	2282	A
1	L5	2284	G
1	L5	2288	G
1	L5	2289	C
1	L5	2294	G
1	L5	2300	A
1	L5	2301	G
1	L5	2306	G
1	L5	2307	A
1	L5	2308	A
1	L5	2313	A
1	L5	2316	G
1	L5	2322	G
1	L5	2328	G
1	L5	2333	G
1	L5	2344	U
1	L5	2346	C
1	L5	2347	A
1	L5	2348	G
1	L5	2349	A
1	L5	2350	U
1	L5	2351	C
1	L5	2352	U
1	L5	2357	G

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Mol	Chain	Res	Type
1	L5	2360	A
1	L5	2379	A
1	L5	2381	A
1	L5	2383	C
1	L5	2384	U
1	L5	2389	A
1	L5	2396	A
1	L5	2397	G
1	L5	2402	G
1	L5	2404	A
1	L5	2410	C
1	L5	2414	G
1	L5	2417	A
1	L5	2421	G
1	L5	2422	C
1	L5	2424	G
1	L5	2425	U
1	L5	2437	C
1	L5	2441	C
1	L5	2447	U
1	L5	2450	G
1	L5	2453	A
1	L5	2460	A
1	L5	2463	G
1	L5	2464	C
1	L5	2465	C
1	L5	2470	C
1	L5	2474	G
1	L5	2475	G
1	L5	2479	G
1	L5	2483	G
1	L5	2484	A
1	L5	2488	C
1	L5	2489	C
1	L5	2490	U
1	L5	2491	C
1	L5	2493	G
1	L5	2494	U
1	L5	2500	U
1	L5	2502	G
1	L5	2503	G
1	L5	2504	C

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Mol	Chain	Res	Type
1	L5	2505	C
1	L5	2506	G
1	L5	2513	A
1	L5	2517	A
1	L5	2519	U
1	L5	2537	A
1	L5	2542	G
1	L5	2543	A
1	L5	2544	G
1	L5	2546	G
1	L5	2547	G
1	L5	2554	U
1	L5	2555	G
1	L5	2556	G
1	L5	2559	G
1	L5	2563	C
1	L5	2564	G
1	L5	2570	U
1	L5	2573	A
1	L5	2574	G
1	L5	2583	C
1	L5	2586	G
1	L5	2587	A
1	L5	2588	C
1	L5	2589	C
1	L5	2601	A
1	L5	2602	G
1	L5	2611	A
1	L5	2618	G
1	L5	2627	C
1	L5	2638	G
1	L5	2643	G
1	L5	2647	A
1	L5	2653	C
1	L5	2658	G
1	L5	2659	A
1	L5	2661	U
1	L5	2662	G
1	L5	2675	G
1	L5	2676	A
1	L5	2681	G
1	L5	2687	U

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Mol	Chain	Res	Type
1	L5	2694	G
1	L5	2695	A
1	L5	2696	A
1	L5	2708	U
1	L5	2709	C
1	L5	2710	C
1	L5	2711	G
1	L5	2712	G
1	L5	2719	C
1	L5	2721	G
1	L5	2724	G
1	L5	2725	A
1	L5	2726	G
1	L5	2727	C
1	L5	2735	G
1	L5	2739	C
1	L5	2742	G
1	L5	2743	A
1	L5	2754	G
1	L5	2758	G
1	L5	2760	G
1	L5	2761	U
1	L5	2763	U
1	L5	2764	A
1	L5	2769	U
1	L5	2770	C
1	L5	2788	U
1	L5	2790	U
1	L5	2794	C
1	L5	2796	G
1	L5	2806	A
1	L5	2814	C
1	L5	2815	A
1	L5	2825	A
1	L5	2826	U
1	L5	2827	G
1	L5	2835	A
1	L5	2842	G
1	L5	2847	G
1	L5	2855	G
1	L5	2856	C
1	L5	2874	U

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Mol	Chain	Res	Type
1	L5	2877	G
1	L5	2895	A
1	L5	2896	G
1	L5	2897	G
1	L5	2900	U
1	L5	2901	G
1	L5	2902	G
1	L5	2903	G
1	L5	2905	C
1	L5	2907	G
1	L5	2908	U
1	L5	3585	G
1	L5	3587	C
1	L5	3588	C
1	L5	3589	G
1	L5	3590	G
1	L5	3591	C
1	L5	3592	G
1	L5	3594	C
1	L5	3595	U
1	L5	3596	A
1	L5	3597	G
1	L5	3600	G
1	L5	3604	A
1	L5	3605	C
1	L5	3611	A
1	L5	3615	G
1	L5	3618	C
1	L5	3621	A
1	L5	3625	G
1	L5	3626	G
1	L5	3630	A
1	L5	3635	A
1	L5	3643	A
1	L5	3644	U
1	L5	3646	A
1	L5	3648	A
1	L5	3653	A
1	L5	3656	A
1	L5	3662	A
1	L5	3673	C
1	L5	3674	G

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Mol	Chain	Res	Type
1	L5	3678	G
1	L5	3680	U
1	L5	3684	G
1	L5	3685	C
1	L5	3690	U
1	L5	3692	A
1	L5	3696	C
1	L5	3697	U
1	L5	3698	G
1	L5	3699	C
1	L5	3706	C
1	L5	3710	G
1	L5	3711	A
1	L5	3713	U
1	L5	3726	A
1	L5	3727	A
1	L5	3736	A
1	L5	3744	G
1	L5	3746	A
1	L5	3748	A
1	L5	3750	G
1	L5	3752	C
1	L5	3753	G
1	L5	3758	U
1	L5	3759	A
1	L5	3760	A
1	L5	3764	U
1	L5	3765	G
1	L5	3770	U
1	L5	3771	C
1	L5	3775	A
1	L5	3776	G
1	L5	3777	G
1	L5	3778	U
1	L5	3779	A
1	L5	3784	A
1	L5	3786	U
1	L5	3787	G
1	L5	3802	U
1	L5	3810	C
1	L5	3811	G
1	L5	3813	A

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Mol	Chain	Res	Type
1	L5	3814	U
1	L5	3815	G
1	L5	3816	A
1	L5	3817	A
1	L5	3818	U
1	L5	3819	G
1	L5	3823	G
1	L5	3824	A
1	L5	3838	U
1	L5	3839	G
1	L5	3841	C
1	L5	3843	C
1	L5	3851	U
1	L5	3867	A
1	L5	3877	A
1	L5	3878	C
1	L5	3879	G
1	L5	3890	A
1	L5	3892	U
1	L5	3897	G
1	L5	3901	A
1	L5	3905	A
1	L5	3906	A
1	L5	3907	G
1	L5	3908	A
1	L5	3915	U
1	L5	3930	U
1	L5	3938	G
1	L5	3941	G
1	L5	3943	A
1	L5	3944	G
1	L5	3947	A
1	L5	3948	C
1	L5	3949	A
1	L5	4066	U
1	L5	4068	U
1	L5	4070	U
1	L5	4076	G
1	L5	4084	G
1	L5	4085	A
1	L5	4086	G
1	L5	4090	G

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Mol	Chain	Res	Type
1	L5	4091	G
1	L5	4092	G
1	L5	4094	G
1	L5	4097	G
1	L5	4099	G
1	L5	4100	C
1	L5	4101	C
1	L5	4102	C
1	L5	4104	G
1	L5	4105	A
1	L5	4107	G
1	L5	4108	G
1	L5	4113	U
1	L5	4114	C
1	L5	4115	G
1	L5	4116	C
1	L5	4117	U
1	L5	4119	C
1	L5	4120	U
1	L5	4121	G
1	L5	4122	G
1	L5	4127	A
1	L5	4128	A
1	L5	4134	C
1	L5	4135	G
1	L5	4140	C
1	L5	4141	G
1	L5	4143	G
1	L5	4146	G
1	L5	4158	C
1	L5	4159	C
1	L5	4160	C
1	L5	4162	C
1	L5	4163	U
1	L5	4164	C
1	L5	4170	A
1	L5	4177	C
1	L5	4183	G
1	L5	4184	G
1	L5	4188	U
1	L5	4191	G
1	L5	4196	G

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Mol	Chain	Res	Type
1	L5	4203	A
1	L5	4206	C
1	L5	4212	A
1	L5	4222	G
1	L5	4225	G
1	L5	4229	U
1	L5	4233	A
1	L5	4234	A
1	L5	4249	G
1	L5	4251	A
1	L5	4253	A
1	L5	4254	G
1	L5	4256	A
1	L5	4257	A
1	L5	4258	C
1	L5	4265	U
1	L5	4273	A
1	L5	4280	A
1	L5	4281	A
1	L5	4289	U
1	L5	4296	U
1	L5	4297	G
1	L5	4304	A
1	L5	4305	G
1	L5	4306	U
1	L5	4314	C
1	L5	4317	A
1	L5	4319	C
1	L5	4321	U
1	L5	4330	G
1	L5	4339	A
1	L5	4345	C
1	L5	4349	C
1	L5	4350	C
1	L5	4353	U
1	L5	4354	U
1	L5	4364	G
1	L5	4373	G
1	L5	4377	G
1	L5	4378	A
1	L5	4379	A
1	L5	4380	A

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Mol	Chain	Res	Type
1	L5	4387	C
1	L5	4390	A
1	L5	4391	G
1	L5	4393	G
1	L5	4394	A
1	L5	4396	A
1	L5	4410	G
1	L5	4415	A
1	L5	4419	U
1	L5	4421	C
1	L5	4422	A
1	L5	4426	C
1	L5	4430	G
1	L5	4440	G
1	L5	4444	C
1	L5	4448	G
1	L5	4449	A
1	L5	4450	U
1	L5	4452	U
1	L5	4453	C
1	L5	4464	A
1	L5	4466	C
1	L5	4471	U
1	L5	4476	C
1	L5	4500	U
1	L5	4510	A
1	L5	4512	U
1	L5	4513	A
1	L5	4515	G
1	L5	4518	A
1	L5	4519	C
1	L5	4524	G
1	L5	4543	G
1	L5	4545	G
1	L5	4548	A
1	L5	4549	G
1	L5	4554	G
1	L5	4556	U
1	L5	4560	C
1	L5	4567	G
1	L5	4570	G
1	L5	4572	U

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Mol	Chain	Res	Type
1	L5	4573	G
1	L5	4575	G
1	L5	4576	U
1	L5	4584	A
1	L5	4590	A
1	L5	4599	A
1	L5	4600	G
1	L5	4601	U
1	L5	4606	G
1	L5	4608	G
1	L5	4617	G
1	L5	4635	A
1	L5	4636	U
1	L5	4637	G
1	L5	4639	G
1	L5	4647	G
1	L5	4652	G
1	L5	4656	A
1	L5	4658	G
1	L5	4669	A
1	L5	4670	C
1	L5	4672	A
1	L5	4677	U
1	L5	4687	A
1	L5	4691	A
1	L5	4694	G
1	L5	4695	C
1	L5	4700	A
1	L5	4707	A
1	L5	4708	A
1	L5	4709	U
1	L5	4719	G
1	L5	4728	U
1	L5	4730	C
1	L5	4731	G
1	L5	4732	G
1	L5	4733	C
1	L5	4734	A
1	L5	4735	G
1	L5	4740	G
1	L5	4741	C
1	L5	4742	G

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Mol	Chain	Res	Type
1	L5	4743	G
1	L5	4744	A
1	L5	4745	G
1	L5	4747	C
1	L5	4750	G
1	L5	4754	G
1	L5	4757	C
1	L5	4759	C
1	L5	4760	G
1	L5	4761	G
1	L5	4764	A
1	L5	4765	G
1	L5	4771	C
1	L5	4772	C
1	L5	4774	C
1	L5	4775	C
1	L5	4859	C
1	L5	4861	G
1	L5	4862	G
1	L5	4864	U
1	L5	4867	G
1	L5	4870	G
1	L5	4871	C
1	L5	4875	G
1	L5	4876	U
1	L5	4877	G
1	L5	4880	C
1	L5	4882	U
1	L5	4883	C
1	L5	4886	C
1	L5	4887	C
1	L5	4888	U
1	L5	4889	G
1	L5	4891	G
1	L5	4892	A
1	L5	4893	A
1	L5	4894	A
1	L5	4895	C
1	L5	4896	G
1	L5	4897	G
1	L5	4899	G
1	L5	4900	C

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Mol	Chain	Res	Type
1	L5	4901	G
1	L5	4902	C
1	L5	4908	G
1	L5	4910	G
1	L5	4912	G
1	L5	4913	G
1	L5	4914	C
1	L5	4918	C
1	L5	4919	G
1	L5	4923	C
1	L5	4925	U
1	L5	4928	C
1	L5	4929	C
1	L5	4931	G
1	L5	4932	U
1	L5	4938	A
1	L5	4939	C
1	L5	4941	G
1	L5	4943	A
1	L5	4949	G
1	L5	4955	A
1	L5	4960	G
1	L5	4961	G
1	L5	4962	C
1	L5	4964	C
1	L5	4973	U
1	L5	4975	G
1	L5	4976	U
1	L5	4985	U
1	L5	4988	U
1	L5	4989	U
1	L5	4991	U
1	L5	4992	G
1	L5	5014	A
1	L5	5017	G
1	L5	5020	G
1	L5	5021	C
1	L5	5022	U
1	L5	5024	C
1	L5	5025	C
1	L5	5026	U
1	L5	5028	G

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Mol	Chain	Res	Type
1	L5	5029	C
1	L5	5034	A
1	L5	5040	U
1	L5	5041	G
1	L5	5045	G
1	L5	5047	C
1	L5	5050	C
1	L5	5054	C
1	L5	5055	G
1	L5	5060	A
1	L5	5061	A
1	L5	5069	U
2	L7	2	U
2	L7	7	G
2	L7	20	U
2	L7	22	A
2	L7	23	A
2	L7	24	C
2	L7	25	G
2	L7	36	C
2	L7	39	C
2	L7	41	G
2	L7	49	A
2	L7	53	U
2	L7	54	A
2	L7	63	C
2	L7	64	G
2	L7	86	G
2	L7	90	A
2	L7	97	G
2	L7	100	A
2	L7	102	U
2	L7	110	G
2	L7	120	U
3	L8	2	G
3	L8	23	C
3	L8	34	U
3	L8	35	C
3	L8	39	G
3	L8	48	A
3	L8	59	A
3	L8	63	U

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Mol	Chain	Res	Type
3	L8	77	A
3	L8	79	G
3	L8	80	A
3	L8	82	A
3	L8	83	C
3	L8	84	A
3	L8	85	U
3	L8	86	U
3	L8	87	G
3	L8	88	A
3	L8	103	A
3	L8	105	C
3	L8	110	U
3	L8	111	U
3	L8	112	G
3	L8	114	G
3	L8	122	G
3	L8	123	U
3	L8	124	U
3	L8	125	C
3	L8	126	C
3	L8	127	U
3	L8	143	G
3	L8	147	G
3	L8	155	C
45	B	2	C
45	B	3	C
45	B	4	C
45	B	13	C
45	B	14	C
45	B	18	C
45	B	303	G
45	B	304	G
45	B	307	G
45	B	308	G
45	B	313	G
45	B	315	G
45	B	316	G
45	B	317	G

All (34) RNA pucker outliers are listed below:

Mol	Chain	Res	Type
1	L5	12	A
1	L5	44	A
1	L5	143	C
1	L5	504	G
1	L5	914	U
1	L5	1322	A
1	L5	1410	U
1	L5	1522	G
1	L5	1633	G
1	L5	1706	A
1	L5	1959	U
1	L5	2084	C
1	L5	2108	G
1	L5	2281	U
1	L5	2351	C
1	L5	2416	G
1	L5	2474	G
1	L5	2675	G
1	L5	2708	U
1	L5	2760	G
1	L5	2763	U
1	L5	3588	C
1	L5	3604	A
1	L5	3620	G
1	L5	3673	C
1	L5	3816	A
1	L5	4065	G
1	L5	4600	G
1	L5	4699	U
1	L5	4731	G
1	L5	4869	U
1	L5	4913	G
3	L8	86	U
3	L8	87	G

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

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

5.5 Carbohydrates (i)

There are no monosaccharides in this entry.

5.6 Ligand geometry (i)

Of 45 ligands modelled in this entry, 45 are 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 (i)

There are no such residues in this entry.

5.8 Polymer linkage issues (i)

The following chains have linkage breaks:

Mol	Chain	Number of breaks
45	B	2

All chain breaks are listed below:

Model	Chain	Residue-1	Atom-1	Residue-2	Atom-2	Distance (Å)
1	B	18:C	O3'	300:G	P	15.70
1	B	313:G	O3'	314:G	P	4.54

6 Map visualisation ⓘ

This section contains visualisations of the EMDB entry EMD-12189. 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 |
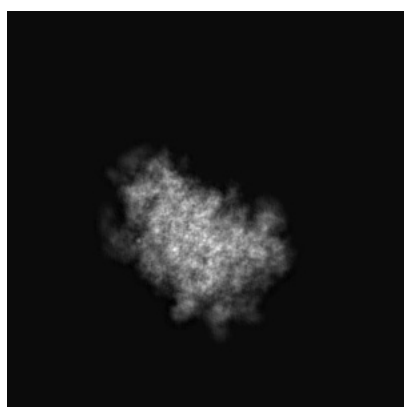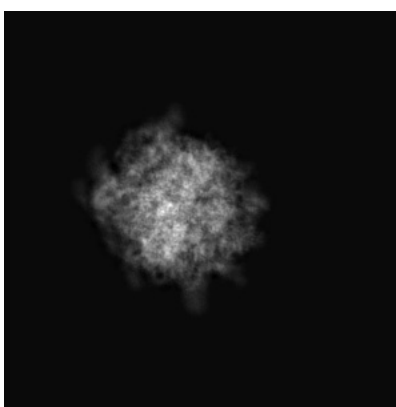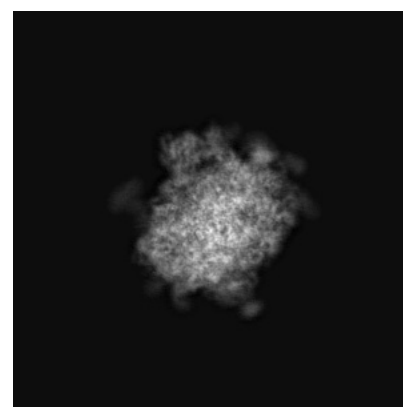
The images above show the map projected in three orthogonal directions.

6.2 Central slices ⓘ
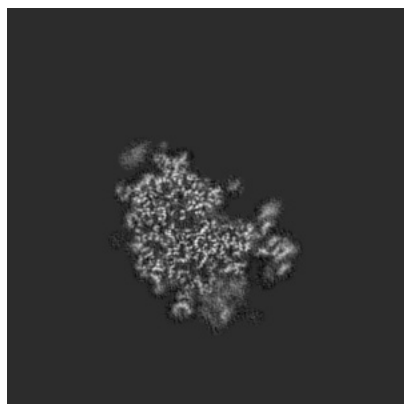
6.2.1 Primary map
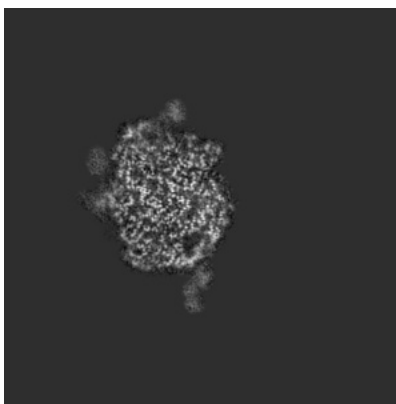
| X Index: 300 | Y Index: 300 | Z Index: 300 |
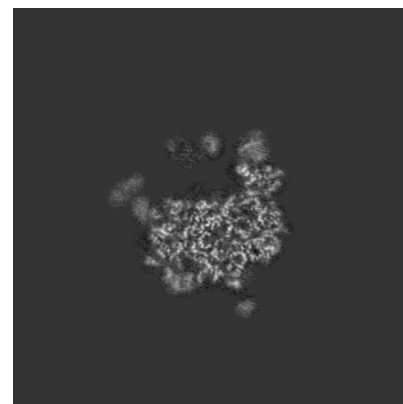
The images above show central slices of the map in three orthogonal directions.

6.3　Largest variance slices ⓘ
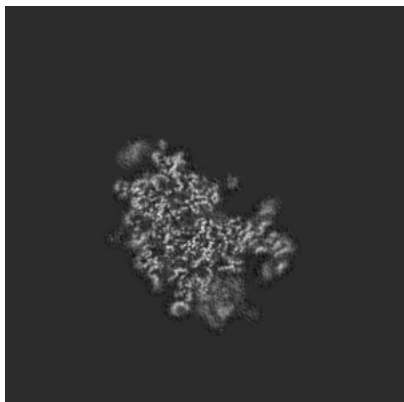
6.3.1　Primary map
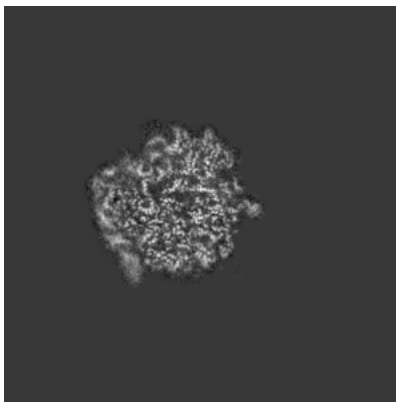
| X Index: 303 | Y Index: 267 | Z Index: 241 |
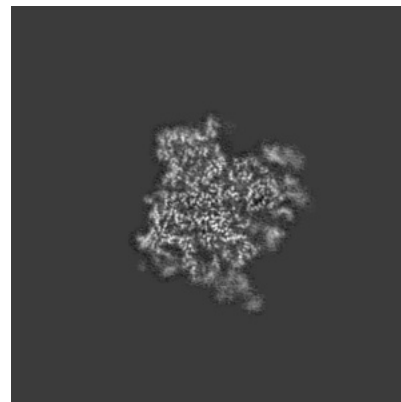
The images above show the largest variance slices of the map in three orthogonal directions.

6.4　Orthogonal surface views ⓘ

6.4.1　Primary map

| X | Y | Z |
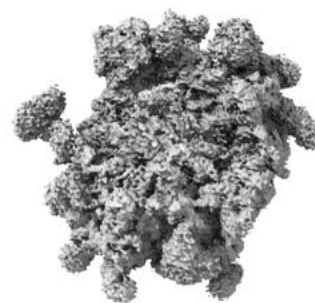
The images above show the 3D surface view of the map at the recommended contour level 0.004. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

6.5 Mask visualisation ⓘ

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

7 Map analysis ⓘ

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

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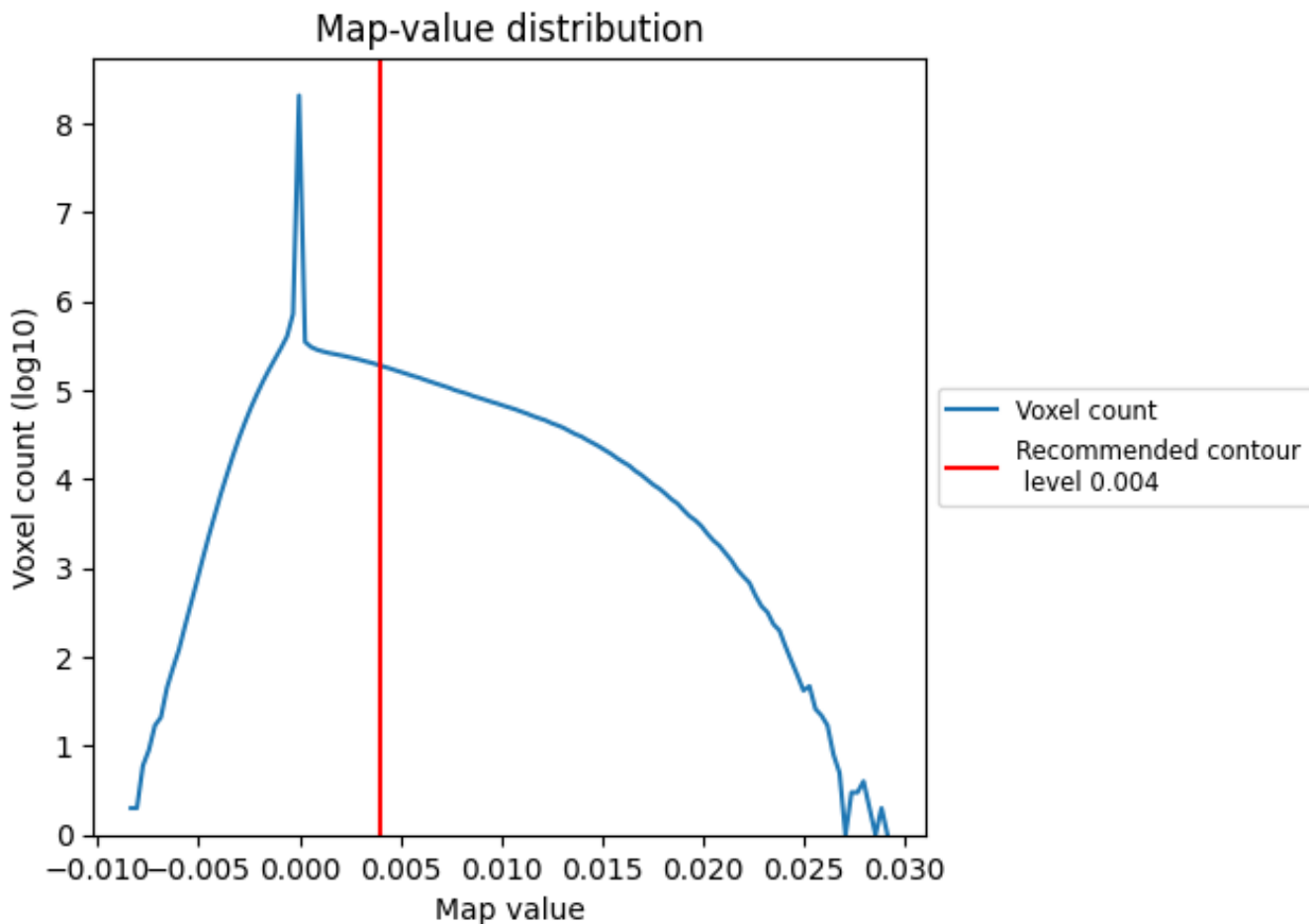
The map-value distribution is plotted in 128 intervals along the x-axis. The y-axis is logarithmic. A spike in this graph at zero usually indicates that the volume has been masked.

7.2   Volume estimate ⓘ
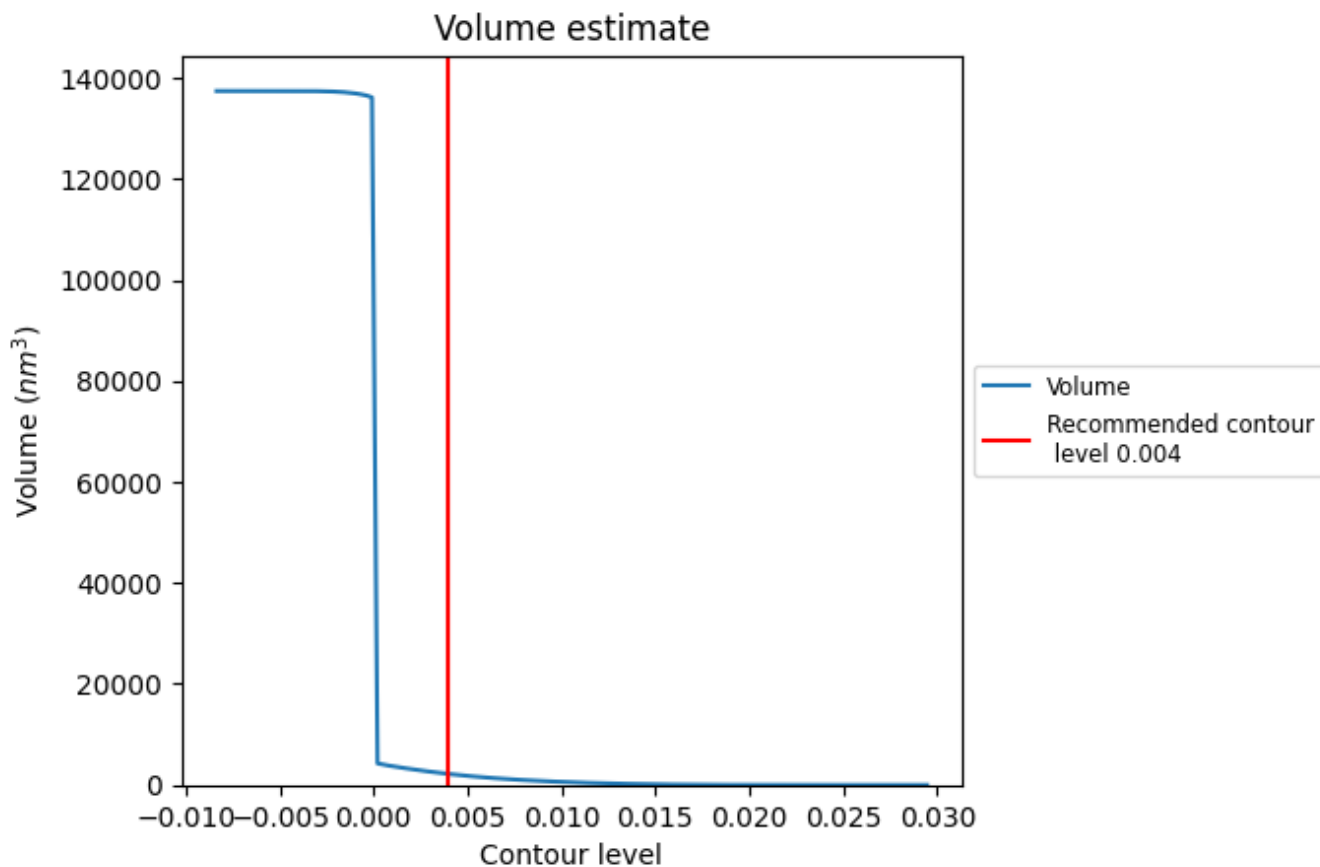
Volume estimate

The volume at the recommended contour level is 2181 nm^3; this corresponds to an approximate mass of 1970 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 ⓘ
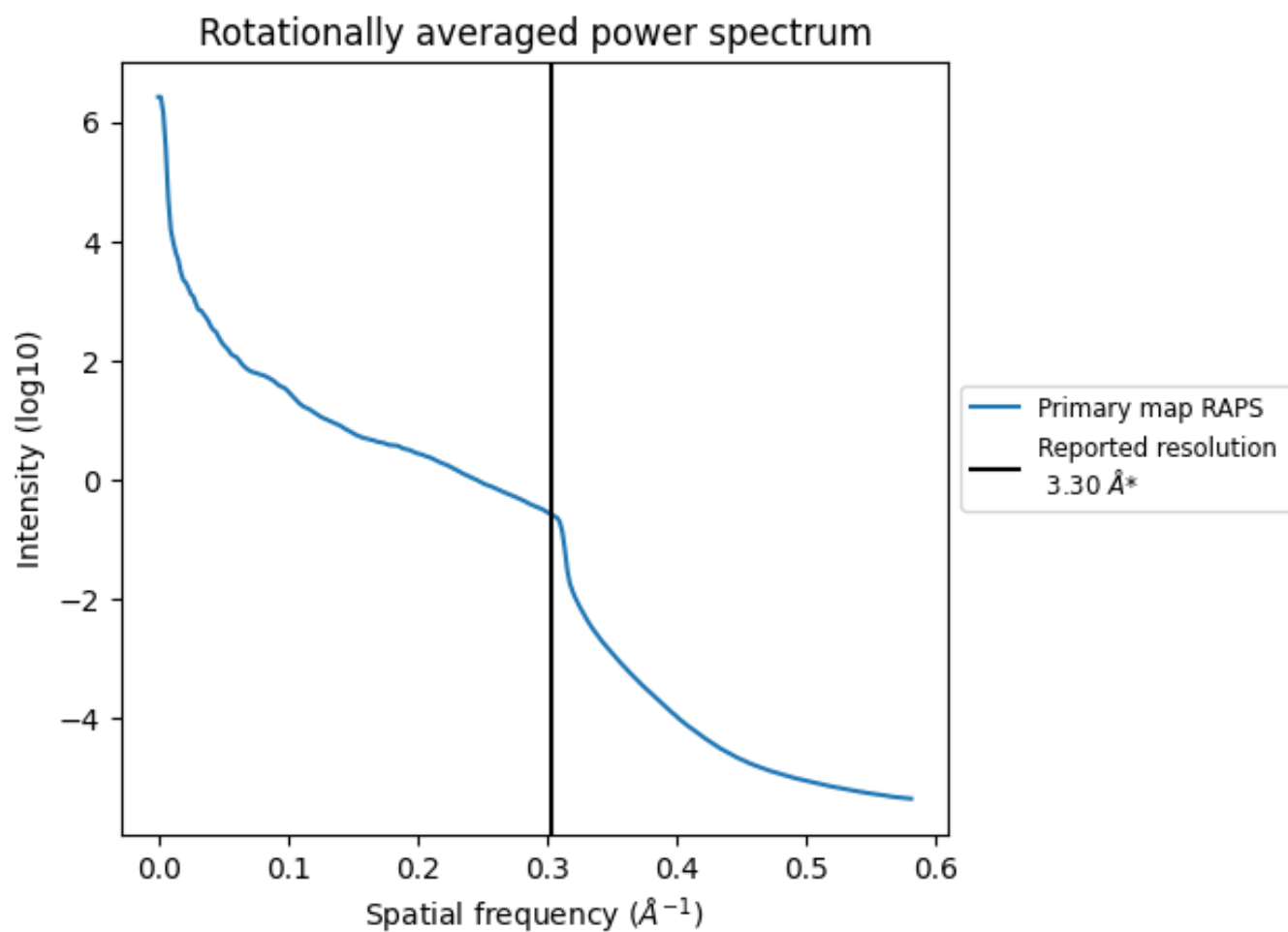
*Reported resolution corresponds to spatial frequency of 0.303 Å^{-1}

8   Fourier-Shell correlation ⓘ

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

9 Map-model fit (i)

This section contains information regarding the fit between EMDB map EMD-12189 and PDB model 7BHP. Per-residue inclusion information can be found in section 3 on page 13.

9.1 Map-model overlay (i)

| X | Y | Z |
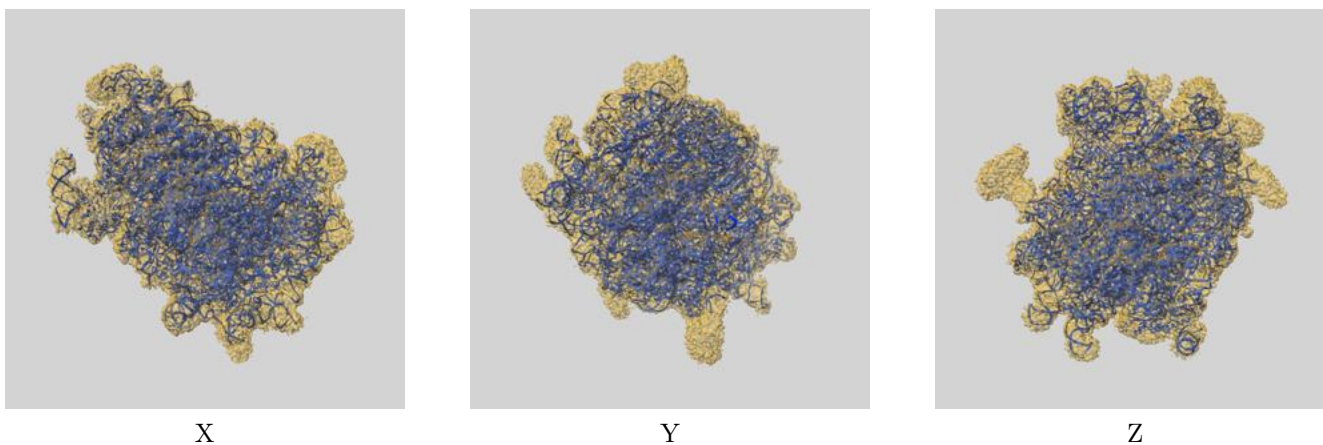
The images above show the 3D surface view of the map at the recommended contour level 0.004 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

9.2　Q-score mapped to coordinate model ⓘ

X　　　　　　　　　　Y　　　　　　　　　　Z
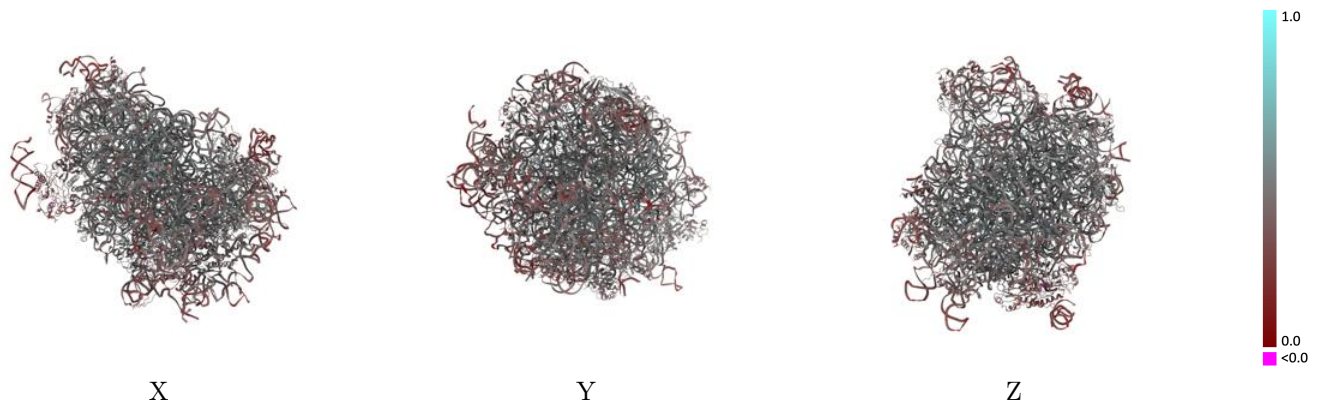
The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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
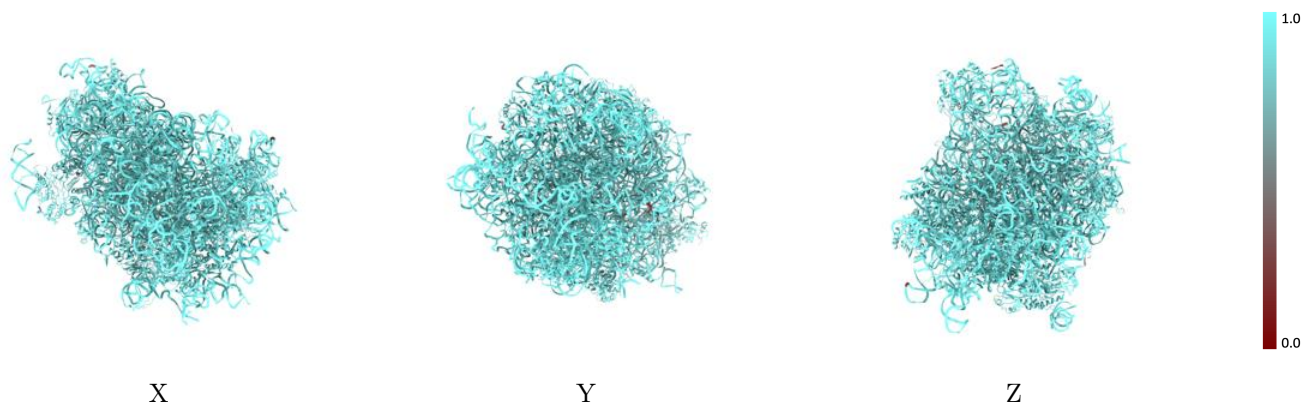
The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.004).

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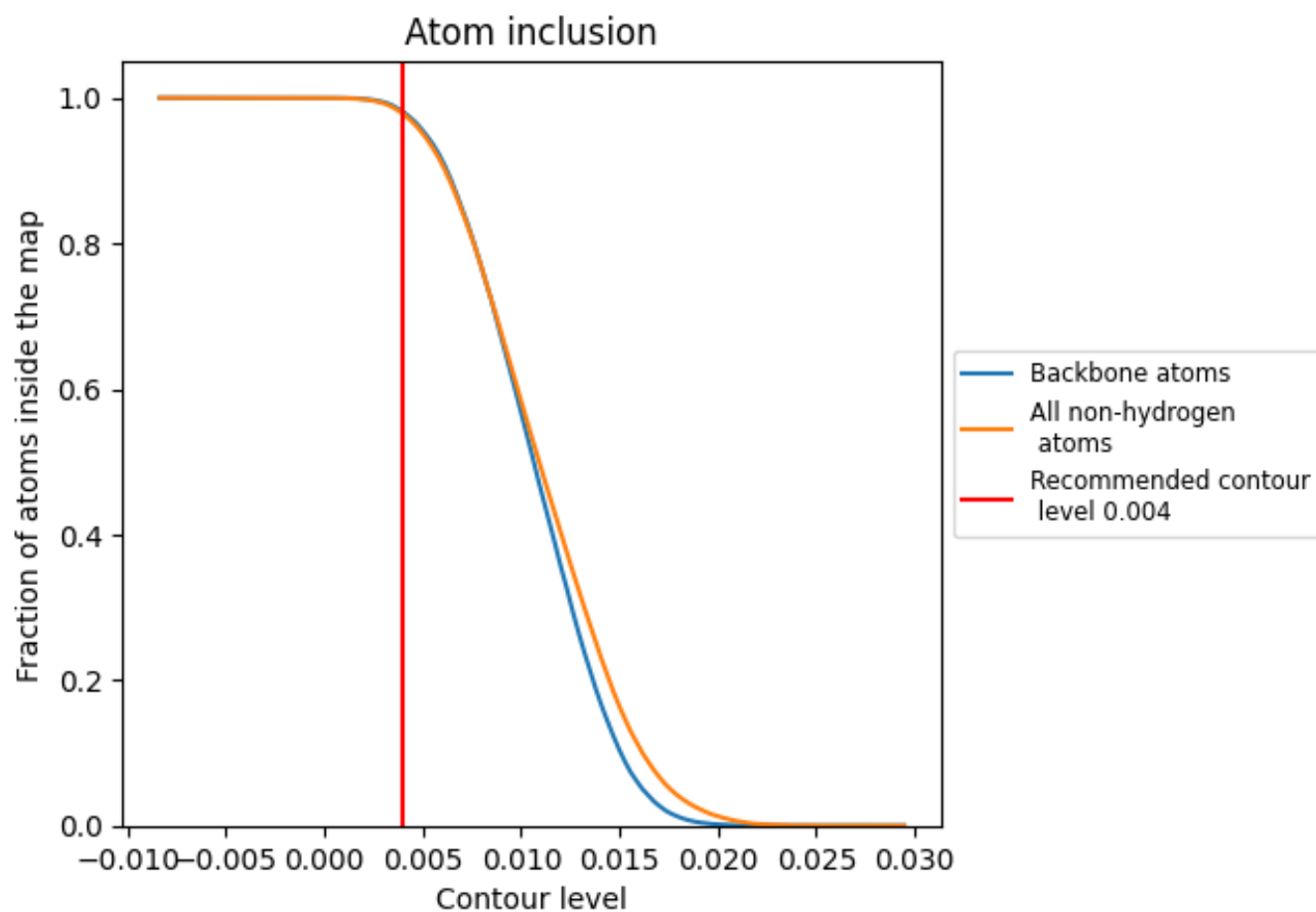
At the recommended contour level, 98% of all backbone atoms, 98% of all non-hydrogen atoms, are inside the map.

## 9.5 Map-model fit summary (i)

The table lists the average atom inclusion at the recommended contour level (0.004) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.9783	0.4390
A	0.9526	0.3530
B	0.9264	0.2410
L5	0.9925	0.4370
L7	0.9992	0.4440
L8	0.9931	0.4510
LA	0.9337	0.4700
LB	0.9491	0.4600
LC	0.9576	0.4730
LD	0.9759	0.4060
LE	0.9572	0.4200
LF	0.9507	0.4530
LG	0.9467	0.4110
LH	0.9642	0.4410
LI	0.9649	0.4400
LJ	0.9665	0.3810
LL	0.9586	0.4390
LM	0.9672	0.4410
LN	0.9599	0.4870
LO	0.9529	0.4540
LP	0.9569	0.4650
LQ	0.9475	0.4740
LR	0.9677	0.4520
LS	0.9586	0.4650
LT	0.9592	0.4600
LU	0.9714	0.3950
LW	0.9320	0.4300
LX	0.9554	0.4550
LY	0.9850	0.4530
LZ	0.9615	0.4250
La	0.9584	0.4760
Lb	0.9595	0.4330
Lc	0.9292	0.4070
Ld	0.9627	0.4640
Le	0.9543	0.4920

1.0

0.0
<0.0

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Chain	Atom inclusion	Q-score
Lf	0.9713	0.4890
Lg	0.9605	0.4730
Lh	0.9417	0.4360
Li	0.9597	0.4340
Lj	0.9866	0.4900
Lk	0.9048	0.3940
Ll	0.9670	0.4550
Lm	0.9591	0.4470
Lo	0.9618	0.4360
Lp	0.9503	0.4780
Lr	0.9681	0.4680