WORLDWIDE wwPDB PROTEIN DATA BANK

wwPDB EM Validation Summary Report (i)

Nov 24, 2024 – 02:21 AM JST

PDB ID	:	8IB6
EMDB ID	:	EMD-35333
Title	:	Respiratory complex Membrane domain of CI, focus-refined of type IA, Wild type mouse under cold temperature
Authors	:	Shin, Y.-C.; Liao, M.
Deposited on	:	2023-02-09
Resolution	:	3.30 Å(reported)

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

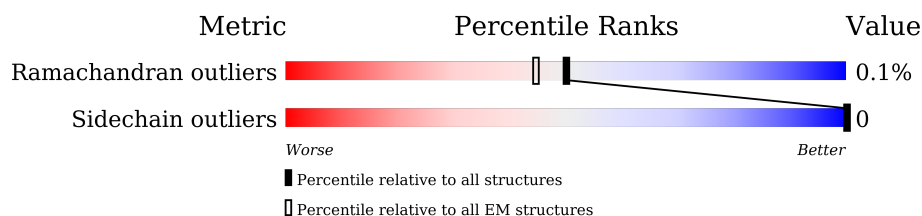|		
EMDB validation analysis	:	0.0.1.dev113
Mogul	:	1.8.5 (274361), CSD as541be (2020)
MolProbity	:	4.02b-467
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.40

1 Overall quality at a glance ⓘ

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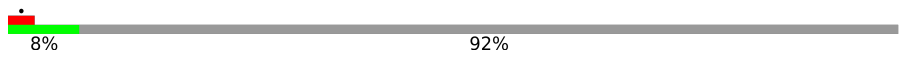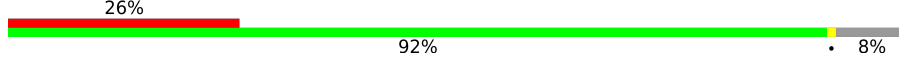*ELECTRON MICROSCOPY*

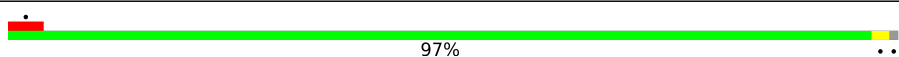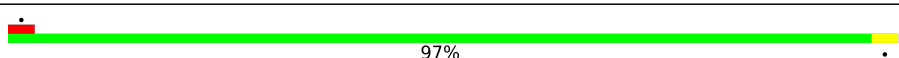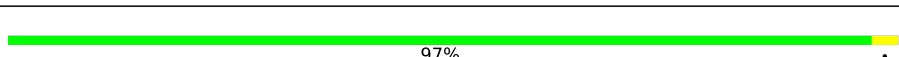The reported resolution of this entry is 3.30 Å.

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

Worse   *Better*

▌Percentile relative to all structures

▯Percentile relative to all EM structures

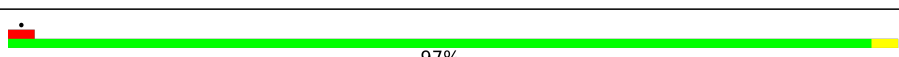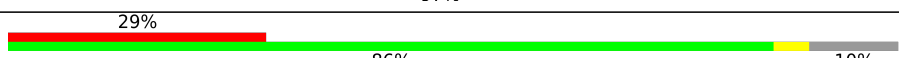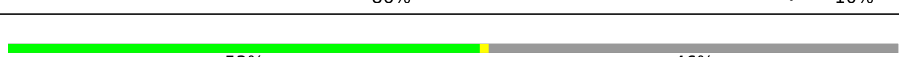| Metric	Whole archive (#Entries)	EM structures (#Entries)
Ramachandran outliers	207382	16835
Sidechain outliers	206894	16415

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	D	463	8% 92%
2	J	172	26% / 92% 8%
3	K	98	97%
4	L	607	97%
5	M	459	97%
6	N	345	97%
7	O	355	29% / 86% 10%
8	U	156	53% 46%
9	X	172	15% 84%

Continued from previous page...

Mol	Chain	Length	Quality of chain
10	Y	143	12% 97%
11	c	76	16% 59% 38%
12	d	120	10% 97%
13	e	106	14% 98%
14	f	57	21% 91% 5%
15	g	151	7% 66% 32%
16	h	189	71% 28%
17	i	128	7% 72% 27%
18	j	105	60% 38%
19	k	104	67% 32%
20	l	186	83% 15%
21	m	129	98%
22	n	179	97%
23	o	137	12% 86% 12%
24	p	176	95%

2 Entity composition ⓘ

There are 28 unique types of molecules in this entry. The entry contains 31822 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 NADH dehydrogenase [ubiquinone] iron-sulfur protein 2, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	D	38	320	208	53	58	1	0	0

- Molecule 2 is a protein called NADH-ubiquinone oxidoreductase chain 6.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	J	159	1205	814	171	205	15	0	0

- Molecule 3 is a protein called NADH-ubiquinone oxidoreductase chain 4L.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	K	97	729	473	111	135	10	0	0

- Molecule 4 is a protein called NADH-ubiquinone oxidoreductase chain 5.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	L	606	4798	3181	746	826	45	0	0

- Molecule 5 is a protein called NADH-ubiquinone oxidoreductase chain 4.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
5	M	458	3622	2402	566	615	39	0	0

- Molecule 6 is a protein called NADH-ubiquinone oxidoreductase chain 2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
6	N	344	2694	1790	416	451	37	0	0

- Molecule 7 is a protein called NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 10, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
7	O	319	Total	C	N	O	S	0	0
			2599	1668	430	491	10		

- Molecule 8 is a protein called Acyl carrier protein, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
8	U	84	Total	C	N	O	S	0	0
			678	438	100	135	5		

- Molecule 9 is a protein called NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 8.

Mol	Chain	Residues	Atoms				AltConf	Trace
9	X	27	Total	C	N	O	0	0
			221	146	39	36		

- Molecule 10 is a protein called NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 11.

Mol	Chain	Residues	Atoms					AltConf	Trace
10	Y	139	Total	C	N	O	S	0	0
			1030	657	174	191	8		

- Molecule 11 is a protein called NADH dehydrogenase [ubiquinone] 1 subunit C1, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
11	c	47	Total	C	N	O	S	0	0
			389	255	67	66	1		

- Molecule 12 is a protein called NADH dehydrogenase [ubiquinone] 1 subunit C2.

Mol	Chain	Residues	Atoms					AltConf	Trace
12	d	119	Total	C	N	O	S	0	0
			988	646	170	164	8		

- Molecule 13 is a protein called NADH dehydrogenase [ubiquinone] iron-sulfur protein 5.

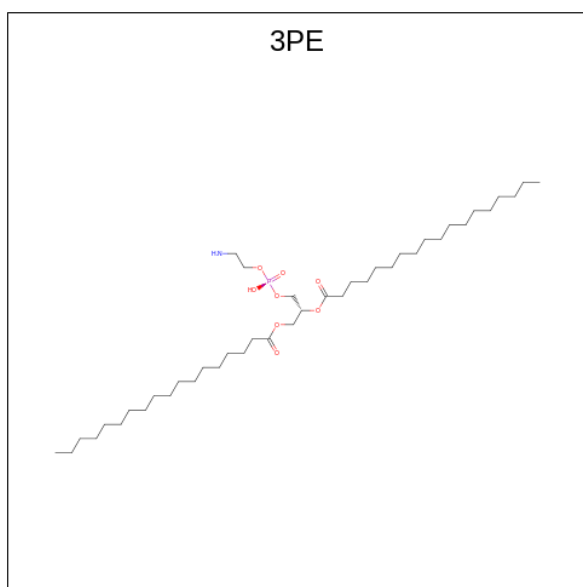| Mol	Chain	Residues	Atoms					AltConf	Trace
13	e	104	Total 863	C 546	N 158	O 151	S 8	0	0

- Molecule 14 is a protein called NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 1.

Mol	Chain	Residues	Atoms					AltConf	Trace
14	f	55	Total 475	C 310	N 84	O 79	S 2	0	0

- Molecule 15 is a protein called NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 11, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
15	g	102	Total 858	C 553	N 137	O 164	S 4	0	0

- Molecule 16 is a protein called NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 5, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
16	h	136	Total 1146	C 754	N 191	O 198	S 3	0	0

- Molecule 17 is a protein called NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 6.

Mol	Chain	Residues	Atoms					AltConf	Trace
17	i	94	Total 796	C 520	N 139	O 134	S 3	0	0

- Molecule 18 is a protein called NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 2, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
18	j	65	Total 563	C 369	N 93	O 100	S 1	0	0

- Molecule 19 is a protein called NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 3.

Mol	Chain	Residues	Atoms					AltConf	Trace
19	k	71	Total	C	N	O	S	0	0
			569	375	99	93	2		

- Molecule 20 is a protein called NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 8, mitochondrial.

Mol	Chain	Residues	Atoms					AltConf	Trace
20	l	158	Total	C	N	O	S	0	0
			1328	858	221	238	11		

- Molecule 21 is a protein called NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 4.

Mol	Chain	Residues	Atoms				AltConf	Trace
21	m	127	Total	C	N	O	0	0
			1054	678	190	186		

- Molecule 22 is a protein called NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 9.

Mol	Chain	Residues	Atoms					AltConf	Trace
22	n	178	Total	C	N	O	S	0	0
			1541	985	276	269	11		

- Molecule 23 is a protein called NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 7.

Mol	Chain	Residues	Atoms					AltConf	Trace
23	o	120	Total	C	N	O	S	0	0
			1027	647	192	179	9		

- Molecule 24 is a protein called NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 10.

Mol	Chain	Residues	Atoms					AltConf	Trace
24	p	170	Total	C	N	O	S	0	0
			1438	904	258	268	8		

- Molecule 25 is 1,2-Distearoyl-sn-glycerophosphoethanolamine (three-letter code: 3PE) (formula: $C_{41}H_{82}NO_8P$) (labeled as "Ligand of Interest" by depositor).

3PE

Mol	Chain	Residues	Atoms					AltConf
25	J	1	Total	C	N	O	P	0
			46	36	1	8	1	
25	L	1	Total	C	N	O	P	0
			42	32	1	8	1	
25	L	1	Total	C	N	O	P	0
			40	30	1	8	1	
25	L	1	Total	C	N	O	P	0
			51	41	1	8	1	
25	L	1	Total	C	N	O	P	0
			47	37	1	8	1	
25	L	1	Total	C	N	O	P	0
			45	35	1	8	1	
25	M	1	Total	C	N	O	P	0
			51	41	1	8	1	
25	M	1	Total	C	N	O	P	0
			51	41	1	8	1	
25	M	1	Total	C	N	O	P	0
			51	41	1	8	1	
25	N	1	Total	C	N	O	P	0
			37	27	1	8	1	
25	O	1	Total	C	N	O	P	0
			31	21	1	8	1	
25	Y	1	Total	C	N	O	P	0
			40	30	1	8	1	

- Molecule 26 is CARDIOLIPIN (three-letter code: CDL) (formula: $C_{81}H_{156}O_{17}P_2$) (labeled as "Ligand of Interest" by depositor).

CDL
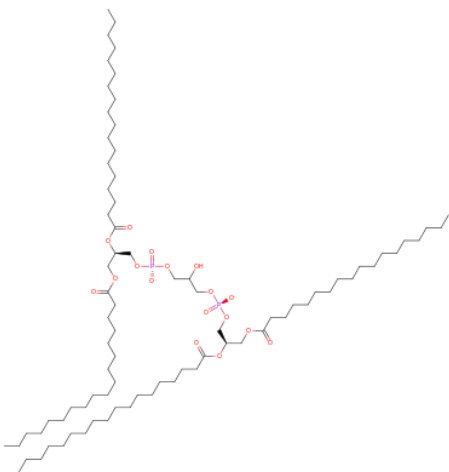
Mol	Chain	Residues	Atoms				AltConf
26	L	1	Total	C	O	P	0
			77	58	17	2	
26	L	1	Total	C	O	P	0
			86	67	17	2	
26	X	1	Total	C	O	P	0
			67	48	17	2	
26	h	1	Total	C	O	P	0
			70	51	17	2	

- Molecule 27 is ADENOSINE-5'-DIPHOSPHATE (three-letter code: ADP) (formula: $C_{10}H_{15}N_5O_{10}P_2$) (labeled as "Ligand of Interest" by depositor).

ADP
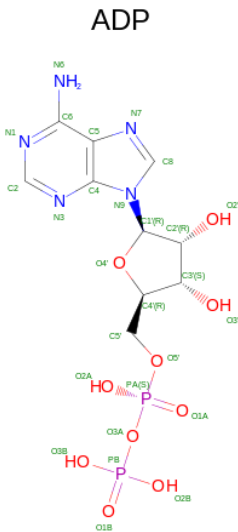
Mol	Chain	Residues	Atoms					AltConf
27	O	1	Total	C	N	O	P	0
			27	10	5	10	2	

- Molecule 28 is {S}-[2-[3-[[(2 {R})-3,3-dimethyl-2-oxidanyl-4-phosphonooxy-butanoyl]amino]propanoylamino]ethyl] (3 {S})-3-oxidanyltetradecanethioate (three-letter code: EHZ) (formula: $C_{25}H_{49}N_2O_9PS$) (labeled as "Ligand of Interest" by depositor).

EHZ
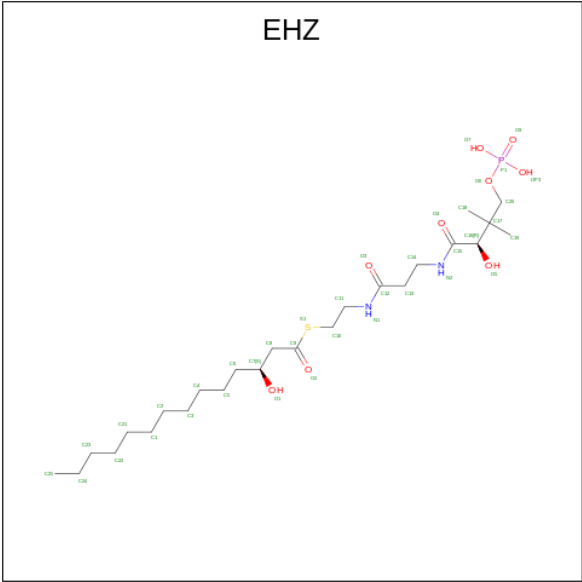
Mol	Chain	Residues	Atoms						AltConf
28	n	1	Total	C	N	O	P	S	0
			32	19	2	9	1	1	

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: NADH dehydrogenase [ubiquinone] iron-sulfur protein 2, mitochondrial
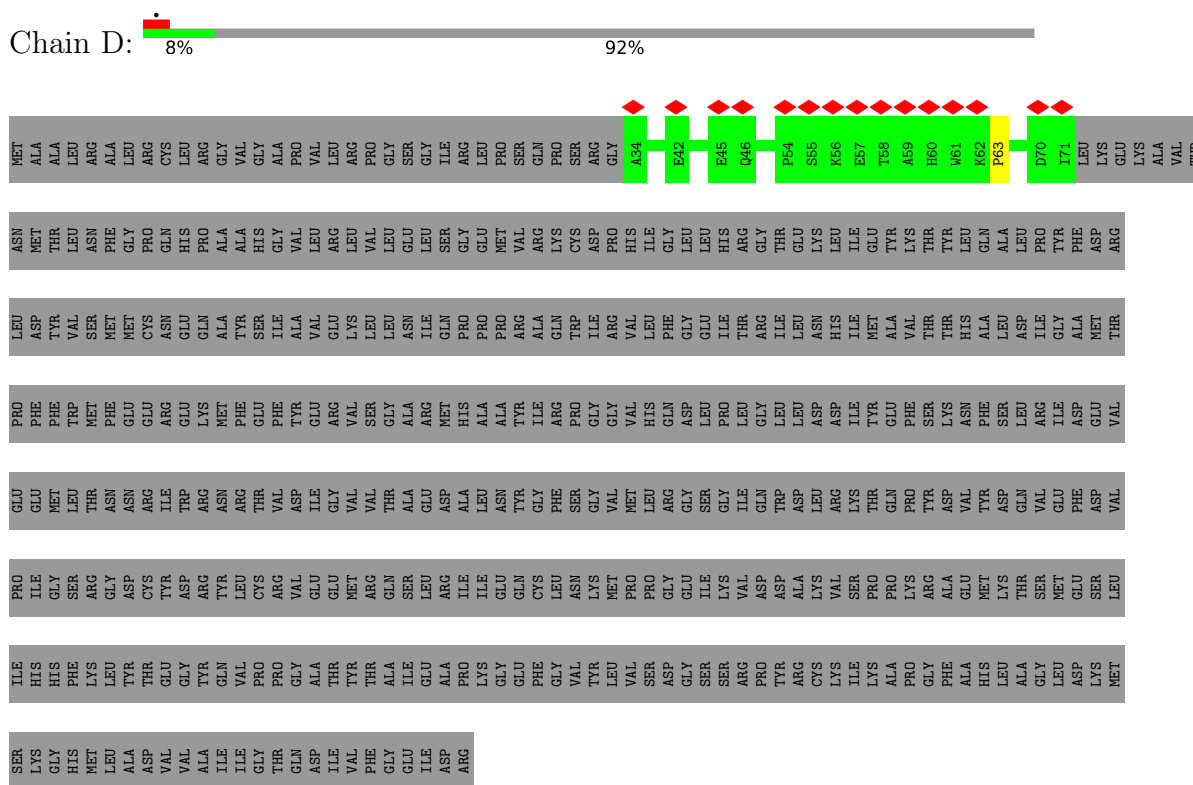
Chain D:

• Molecule 2: NADH-ubiquinone oxidoreductase chain 6
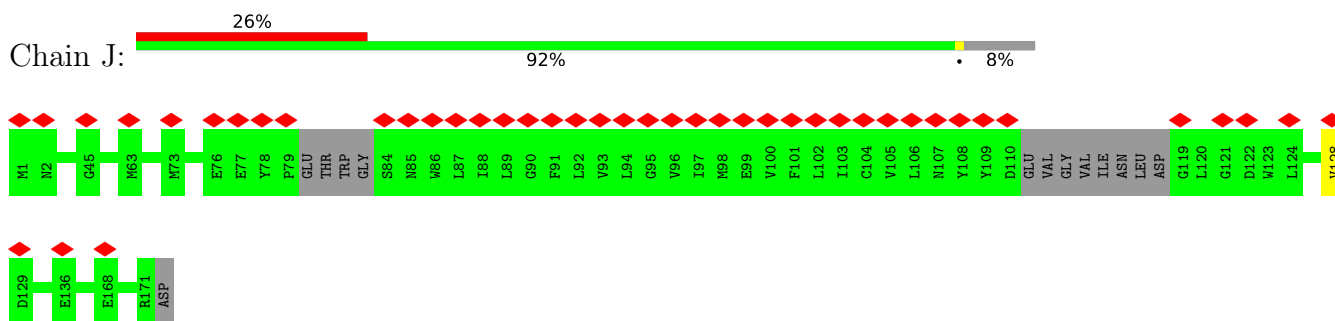
Chain J:

• Molecule 3: NADH-ubiquinone oxidoreductase chain 4L

Chain K:

97%

M1 P2 S3 E70 N83 Q91 N92 Q97 CYS
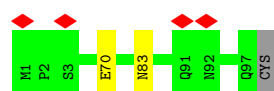
• Molecule 4: NADH-ubiquinone oxidoreductase chain 5

Chain L:

97%

M1 E60 P112 S151 D163 D179 N194 P212 P231 P234 L247 H248 P265 N269 T276 M277 P384 A415 P483 W484 F485 A516 N517 P518 Y519 L526 D554 L576 N579 Q580 K581 G582 L583 I584 I604 N605 L606 GLU

• Molecule 5: NADH-ubiquinone oxidoreductase chain 4

Chain M:

97%

M1 P20 H83 F151 P208 H213 A223 D251 P252 C276 A330 P370 M423 I424 T455 T458 MET

• Molecule 6: NADH-ubiquinone oxidoreductase chain 2

Chain N:

97%

M1 K47 L81 Q89 A109 P123 P147 A218 N222 N223 S224 M225 N228 P238 P255 R295 K319 T320 K321 L324 I344 THR
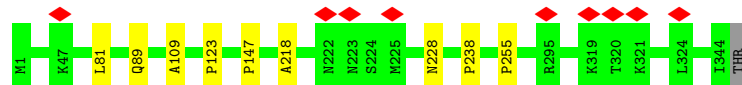
• Molecule 7: NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 10, mitochondrial

Chain O:

29%

86%   10%

MET ALA LEU ARG LEU LEU ARG LEU VAL PRO ALA SER ALA PRO ALA ARG GLY LEU ALA ALA GLY ALA GLN ARG VAL GLY ARG ILE HIS THR SER VAL HIS CYS LYS LEU R37 L40 L41 I44 L45 G46 D47 K48 H54 E55 Y56 D63 A74 K75 A78 Q79 Q80 L81

G82 M83 P87 G99 D100 G101 R102 P103 S111 K116 F117 Y118 D119 D120 P121 K122 S123 N124 D125 D145 S152 T153 V157 E160 E171 N175 Q176 G177 R180 K181 D185 R192 E197 Y206 I207 D208 V209 P210 V211 P212 E213 V214 Q215 S216 R217

I218 Q219 K220 K221 G222 D223 P224 H225 E226 M227 K228 V229 T230 S231 A232 Y233 L234 Q235 D236 I237 E238 N239 K242 K243 T244 F245 L246 P247 E251 M252 D259 S260 W261 E262 A263 E264 D265 K268 V269 V270 E271 D272 I273 E274 Y275 L276 K277 Y278 N279 K280 G281 K285 Q286 D287 D288

R295 Q299 D300 P315 I319 G320 R332 E333 L334 P335 G336 E346 V347 G348 D349 K355

• Molecule 8: Acyl carrier protein, mitochondrial

Chain U: 53% 46%

MET ALA SER ARG VAL LEU CYS ALA CYS VAL ARG ARG LEU PRO ALA ALA PHE ALA PRO LEU PRO ARG LEU PRO THR LEU ALA LEU ALA ARG PRO LEU SER THR THR LEU CYS PRO GLU ILE ARG ARG PRO GLY ALA LEU GLN SER ALA LEU ALA LEU ALA GLN VAL PRO GLY THR

VAL THR HIS LEU CYS ARG GLN TYR SER ASP ALA P72 D150 D153 V154 Y155 GLU
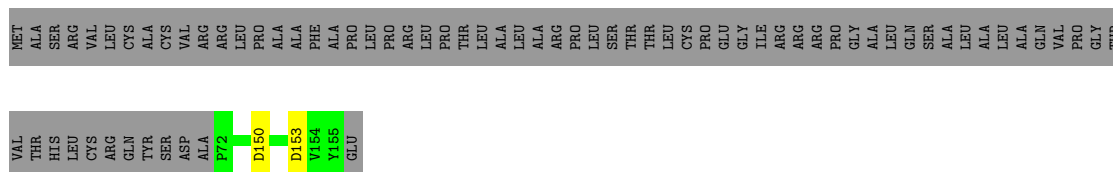
• Molecule 9: NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 8

Chain X: 15% 84%

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

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

ASP LEU GLY GLN LEU SER LYS VAL THR LYS VAL LYS THR ASP ARG LEU PRO GLU ASN PRO TYR HIS SER ARG A146 P152 G156 D157 V172

• Molecule 10: NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 11

12%

Chain Y: 97%

MET ALA MET VAL K5 R6 F7 F8 E9 E13 V14 P15 D16 Q19 C20 H21 D49 I52 E84 D87 D88 P89 L90 G111 K142 V143
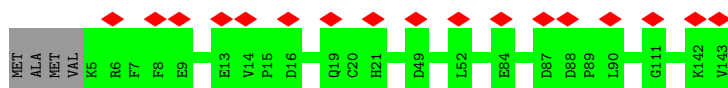
• Molecule 11: NADH dehydrogenase [ubiquinone] 1 subunit C1, mitochondrial

16%

Chain c: 59% 38%

MET ALA PRO SER VAL VAL LEU ARG SER PHE SER ARG LEU LEU ALA PRO ALA ARG LEU PRO SER CYS SER SER THR ARG SER LYS F29 Y30 V31 R32 E33 P34 V35 N36 A37 K38 P39 L42 L46 S47 R71 G74 L75 GLU
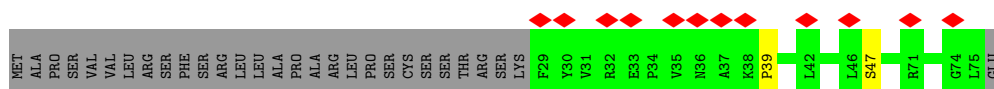
• Molecule 12: NADH dehydrogenase [ubiquinone] 1 subunit C2

10%

Chain d: 97%

MET M2 N3 G4 R5 P6 G7 H8 E9 P10 L11 P15 R55 E103 K104 E105 L113 E114 P115 R120
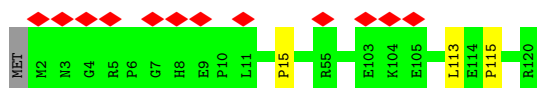
• Molecule 13: NADH dehydrogenase [ubiquinone] iron-sulfur protein 5

14%

Chain e: 98%

MET P2 R16 D61 R74 M87 K88 E89 Y92 P96 H97 H98 S99 G100 R101 E102 P104 R105 PRO
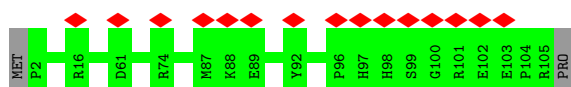
• Molecule 14: NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 1

Chain f:
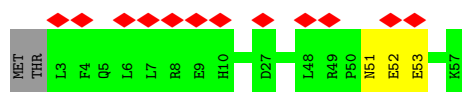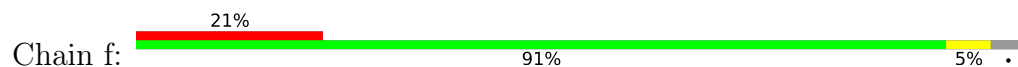
• Molecule 15: NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 11, mitochondrial

Chain g:
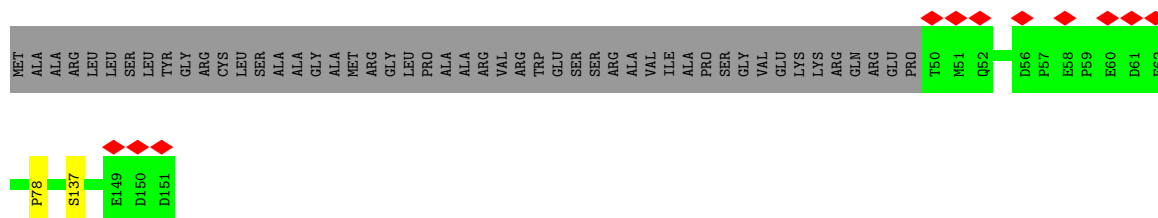
• Molecule 16: NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 5, mitochondrial

Chain h:
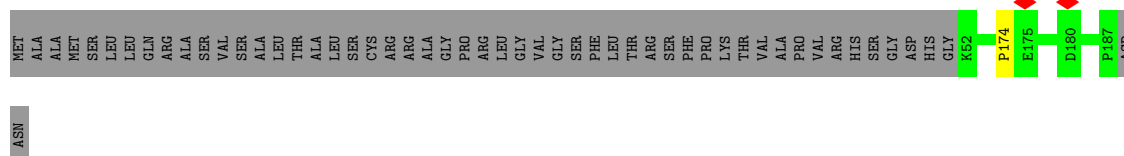
• Molecule 17: NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 6

Chain i:
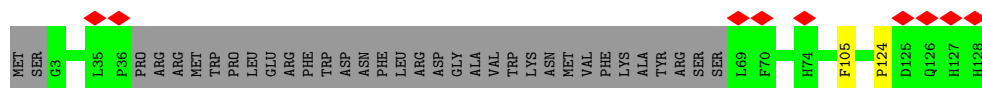
• Molecule 18: NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 2, mitochondrial

Chain j:
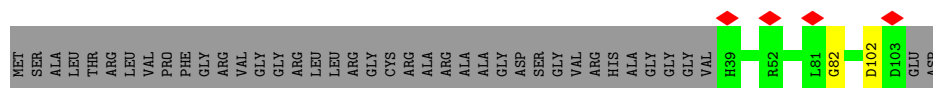
• Molecule 19: NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 3

Chain k:

MET ALA ALA GLY HIS GLY HIS GLU HIS GLY HIS GLU HIS GLY HIS GLY HIS GLY LYS M20 Y59 K78 A90 GLU TYR PHE LEU ASP SER GLN ASN GLY ASP LYS LYS HIS HIS

• Molecule 20: NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 8, mitochondrial

Chain l: 83% 15%

MET ALA ALA ARG ALA ALA ALA LEU GLY VAL ARG TRP LEU GLN ARG THR THR ARG GLY VAL VAL PRO LEU GLU ALA ARG A29 F30 H31 D35 P45 P104 T119 K176 I186
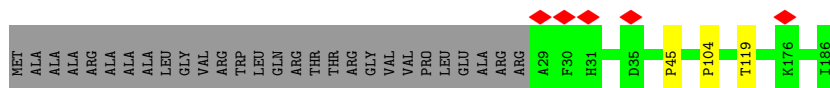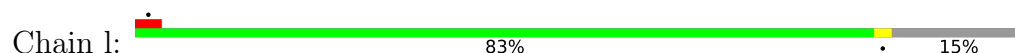
• Molecule 21: NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 4

Chain m: 98%

MET SER G3 S4 L88 Y129
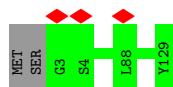
• Molecule 22: NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 9

Chain n: 97%

MET A2 Y115 R135 E136 S145 P146 D147 G148 P155 P156 E160 P165 T179
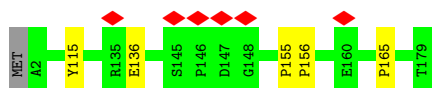
• Molecule 23: NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 7

Chain o: 12% 86% 12%

M1 H4 Y9 L10 W11 D12 V15 D28 L29 K35 K113 R114 L117 K118 E119 A120 ARG VAL ALA GLN GLY GLN GLY GLU GLY GLU VAL GLY PRO GLU VAL ALA LEU
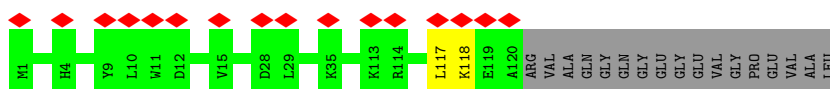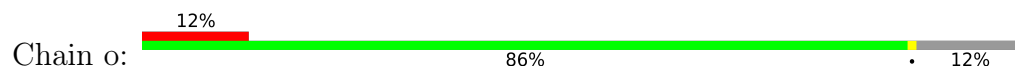
• Molecule 24: NADH dehydrogenase [ubiquinone] 1 beta subcomplex subunit 10

Chain p: 95%

MET PRO ASP SER W5 D6 K7 R60 R93 R94 E128 D145 E166 Q172 E173 A174 ALA ALA
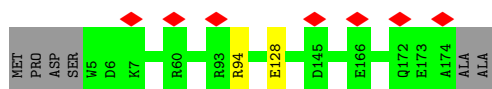
4 Experimental information ⓘ

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	151188	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	NONE	Depositor
Microscope	FEI TALOS ARCTICA	Depositor
Voltage (kV)	200	Depositor
Electron dose $(e^-/\text{Å}^2)$	46.1, 45.9	Depositor
Minimum defocus (nm)	1000	Depositor
Maximum defocus (nm)	2200	Depositor
Magnification	Not provided	
Image detector	GATAN K3 (6k x 4k), GATAN K3 (6k x 4k)	Depositor
Maximum map value	2.877	Depositor
Minimum map value	-1.712	Depositor
Average map value	0.001	Depositor
Map value standard deviation	0.089	Depositor
Recommended contour level	0.55	Depositor
Map size (Å)	422.40002, 422.40002, 422.40002	wwPDB
Map dimensions	384, 384, 384	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.1, 1.1, 1.1	Depositor

5 Model quality (i)

5.1 Standard geometry (i)

Bond lengths and bond angles in the following residue types are not validated in this section: 3PE, EHZ, CDL, ADP

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

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	#$|Z|$ >5	RMSZ	#$|Z|$ >5
1	D	0.52	1/335 (0.3%)	0.74	0/461
2	J	0.53	0/1233	0.77	1/1672 (0.1%)
3	K	0.59	0/740	0.83	2/1005 (0.2%)
4	L	0.69	5/4921 (0.1%)	0.91	19/6696 (0.3%)
5	M	0.69	4/3709 (0.1%)	0.89	10/5052 (0.2%)
6	N	0.71	4/2756 (0.1%)	0.91	8/3751 (0.2%)
7	O	0.78	7/2666 (0.3%)	0.92	18/3615 (0.5%)
8	U	0.61	0/690	0.90	3/931 (0.3%)
9	X	0.85	1/230 (0.4%)	0.86	2/313 (0.6%)
10	Y	0.53	0/1054	0.59	0/1429
11	c	0.81	1/400 (0.2%)	0.95	3/544 (0.6%)
12	d	0.77	2/1020 (0.2%)	0.74	5/1377 (0.4%)
13	e	0.44	0/885	0.60	0/1178
14	f	0.59	0/488	0.81	3/657 (0.5%)
15	g	0.67	1/886 (0.1%)	0.92	3/1207 (0.2%)
16	h	0.54	1/1181 (0.1%)	0.79	0/1599
17	i	0.52	0/823	0.76	1/1119 (0.1%)
18	j	0.56	0/588	0.82	2/805 (0.2%)
19	k	0.58	0/587	0.80	1/794 (0.1%)
20	l	0.68	2/1384 (0.1%)	0.76	2/1889 (0.1%)
21	m	0.54	0/1083	0.73	0/1468
22	n	0.62	1/1596 (0.1%)	0.79	3/2162 (0.1%)
23	o	0.52	0/1052	0.72	3/1411 (0.2%)
24	p	0.50	0/1471	0.73	3/1988 (0.2%)
All	All	0.65	30/31778 (0.1%)	0.83	92/43123 (0.2%)

The worst 5 of 30 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
7	O	247	PRO	N-CD	16.59	1.71	1.47
12	d	115	PRO	N-CD	-14.05	1.28	1.47

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	L	265	PRO	N-CD	13.77	1.67	1.47
6	N	255	PRO	N-CD	-13.61	1.28	1.47
11	c	39	PRO	N-CD	-13.39	1.29	1.47

The worst 5 of 92 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
7	O	83	MET	O-C-N	11.12	140.50	122.70
6	N	255	PRO	CA-N-CD	9.91	125.58	111.70
7	O	206	TYR	N-CA-CB	-9.89	92.81	110.60
12	d	115	PRO	CA-N-CD	9.56	125.08	111.70
7	O	247	PRO	N-CA-CB	9.16	114.29	103.30

There are no chirality outliers.

There are no planarity outliers.

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	
1	D	36/463 (8%)	34 (94%)	2 (6%)	0	100	100
2	J	153/172 (89%)	144 (94%)	9 (6%)	0	100	100
3	K	95/98 (97%)	90 (95%)	5 (5%)	0	100	100
4	L	604/607 (100%)	573 (95%)	30 (5%)	1 (0%)	44	71
5	M	456/459 (99%)	438 (96%)	18 (4%)	0	100	100
6	N	342/345 (99%)	330 (96%)	11 (3%)	1 (0%)	37	66

Continued on next page...

Continued from previous page...

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
7	O	317/355 (89%)	303 (96%)	14 (4%)	0	100	100
8	U	82/156 (53%)	76 (93%)	6 (7%)	0	100	100
9	X	25/172 (14%)	24 (96%)	1 (4%)	0	100	100
10	Y	137/143 (96%)	133 (97%)	4 (3%)	0	100	100
11	c	45/76 (59%)	44 (98%)	1 (2%)	0	100	100
12	d	117/120 (98%)	115 (98%)	2 (2%)	0	100	100
13	e	102/106 (96%)	97 (95%)	5 (5%)	0	100	100
14	f	53/57 (93%)	50 (94%)	3 (6%)	0	100	100
15	g	100/151 (66%)	93 (93%)	7 (7%)	0	100	100
16	h	134/189 (71%)	127 (95%)	7 (5%)	0	100	100
17	i	90/128 (70%)	76 (84%)	13 (14%)	1 (1%)	12	40
18	j	63/105 (60%)	58 (92%)	5 (8%)	0	100	100
19	k	69/104 (66%)	67 (97%)	2 (3%)	0	100	100
20	l	156/186 (84%)	143 (92%)	13 (8%)	0	100	100
21	m	125/129 (97%)	117 (94%)	8 (6%)	0	100	100
22	n	176/179 (98%)	162 (92%)	13 (7%)	1 (1%)	22	53
23	o	118/137 (86%)	109 (92%)	9 (8%)	0	100	100
24	p	168/176 (96%)	153 (91%)	15 (9%)	0	100	100
All	All	3763/4813 (78%)	3556 (94%)	203 (5%)	4 (0%)	50	76

All (4) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
6	N	109	ALA
17	i	124	PRO
22	n	156	PRO
4	L	518	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	
1	D	33/395 (8%)	33 (100%)	0	100	100
2	J	127/138 (92%)	127 (100%)	0	100	100
3	K	87/88 (99%)	87 (100%)	0	100	100
4	L	549/550 (100%)	549 (100%)	0	100	100
5	M	414/415 (100%)	414 (100%)	0	100	100
6	N	307/308 (100%)	307 (100%)	0	100	100
7	O	283/309 (92%)	283 (100%)	0	100	100
8	U	78/135 (58%)	78 (100%)	0	100	100
9	X	23/154 (15%)	23 (100%)	0	100	100
10	Y	104/107 (97%)	104 (100%)	0	100	100
11	c	41/67 (61%)	41 (100%)	0	100	100
12	d	106/107 (99%)	106 (100%)	0	100	100
13	e	91/94 (97%)	91 (100%)	0	100	100
14	f	51/53 (96%)	51 (100%)	0	100	100
15	g	93/129 (72%)	93 (100%)	0	100	100
16	h	121/162 (75%)	121 (100%)	0	100	100
17	i	89/120 (74%)	89 (100%)	0	100	100
18	j	61/87 (70%)	61 (100%)	0	100	100
19	k	54/78 (69%)	54 (100%)	0	100	100
20	l	142/161 (88%)	142 (100%)	0	100	100
21	m	112/114 (98%)	112 (100%)	0	100	100
22	n	163/164 (99%)	163 (100%)	0	100	100
23	o	110/121 (91%)	110 (100%)	0	100	100
24	p	154/158 (98%)	154 (100%)	0	100	100
All	All	3393/4214 (80%)	3393 (100%)	0	100	100

There are no protein residues with a non-rotameric sidechain to report.

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 82 such sidechains are listed below:

Mol	Chain	Res	Type
12	d	59	HIS
20	l	106	HIS
14	f	5	GLN

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
17	i	83	HIS
22	n	13	GLN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates ⓘ

There are no oligosaccharides in this entry.

5.6 Ligand geometry ⓘ

18 ligands 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	$\#|Z| > 2$
25	3PE	L	701	-	41,41,50	0.99	2 (4%)	44,46,55	1.03	2 (4%)
25	3PE	M	503	-	50,50,50	0.93	2 (4%)	53,55,55	1.11	3 (5%)
26	CDL	L	705	-	76,76,99	1.02	4 (5%)	82,88,111	1.17	5 (6%)
27	ADP	O	402	-	24,29,29	0.98	1 (4%)	29,45,45	1.42	4 (13%)
28	EHZ	n	201	-	27,31,37	1.90	7 (25%)	37,41,47	1.85	11 (29%)
25	3PE	L	704	-	46,46,50	0.95	2 (4%)	49,51,55	1.08	3 (6%)
25	3PE	M	502	-	50,50,50	0.89	2 (4%)	53,55,55	1.15	4 (7%)
26	CDL	h	201	-	69,69,99	1.08	4 (5%)	75,81,111	1.21	6 (8%)
25	3PE	N	401	-	36,36,50	1.06	2 (5%)	39,41,55	1.18	4 (10%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	#|Z| > 2	Counts	RMSZ	#|Z| > 2
25	3PE	M	501	-	50,50,50	0.91	2 (4%)	53,55,55	1.11	4 (7%)
26	CDL	L	706	-	85,85,99	0.99	4 (4%)	91,97,111	1.13	5 (5%)
25	3PE	O	401	-	30,30,50	1.16	2 (6%)	33,35,55	1.27	3 (9%)
26	CDL	X	201	-	66,66,99	1.09	4 (6%)	72,78,111	1.26	6 (8%)
25	3PE	Y	201	-	39,39,50	1.02	2 (5%)	42,44,55	1.14	3 (7%)
25	3PE	L	702	-	39,39,50	1.03	2 (5%)	42,44,55	1.10	4 (9%)
25	3PE	J	201	-	45,45,50	0.96	2 (4%)	48,50,55	1.06	3 (6%)
25	3PE	L	703	-	50,50,50	0.90	2 (4%)	53,55,55	1.12	3 (5%)
25	3PE	L	707	-	44,44,50	0.96	2 (4%)	47,49,55	1.08	3 (6%)

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
25	3PE	L	701	-	-	13/45/45/54	-
25	3PE	M	503	-	-	17/54/54/54	-
26	CDL	L	705	-	-	24/87/87/110	-
27	ADP	O	402	-	-	4/12/32/32	0/3/3/3
28	EHZ	n	201	-	-	21/39/39/45	-
25	3PE	L	704	-	-	13/50/50/54	-
25	3PE	M	502	-	-	14/54/54/54	-
26	CDL	h	201	-	-	23/80/80/110	-
25	3PE	N	401	-	-	8/40/40/54	-
25	3PE	M	501	-	-	15/54/54/54	-
26	CDL	L	706	-	-	27/96/96/110	-
25	3PE	O	401	-	-	10/34/34/54	-
26	CDL	X	201	-	-	27/77/77/110	-
25	3PE	Y	201	-	-	5/43/43/54	-
25	3PE	L	702	-	-	8/43/43/54	-
25	3PE	J	201	-	-	12/49/49/54	-
25	3PE	L	703	-	-	13/54/54/54	-
25	3PE	L	707	-	-	13/48/48/54	-

The worst 5 of 48 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
28	n	201	EHZ	C15-N2	5.37	1.45	1.33
28	n	201	EHZ	C12-N1	5.19	1.45	1.33
25	M	503	3PE	O31-C31	4.31	1.45	1.33
25	J	201	3PE	O31-C31	4.26	1.45	1.33
26	L	706	CDL	OB8-CB7	4.26	1.45	1.33

The worst 5 of 76 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
28	n	201	EHZ	C8-C9-S1	6.30	121.43	113.63
26	X	201	CDL	OA6-CA5-C11	5.01	122.30	111.50
25	M	503	3PE	O21-C21-C22	4.50	121.20	111.50
26	h	201	CDL	OB6-CB5-C51	4.46	121.11	111.50
25	N	401	3PE	O21-C21-C22	4.37	120.92	111.50

There are no chirality outliers.

5 of 267 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
25	L	701	3PE	C1-O11-P-O12
25	L	701	3PE	C1-O11-P-O13
25	L	701	3PE	C1-O11-P-O14
25	L	702	3PE	C11-O13-P-O14
25	L	703	3PE	C1-O11-P-O14

There are no ring outliers.

No monomer is involved in short contacts.

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less then 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

Ligand 3PE L 701

Bond lengths

Bond angles

Torsions

Rings

Ligand 3PE M 503

Bond lengths

Bond angles

Torsions

Rings

Ligand CDL L 705

Bond lengths

Bond angles

Torsions

Rings

Ligand ADP O 402

Bond lengths

Bond angles

Torsions

Rings

Ligand EHZ n 201

Bond lengths

Bond angles

Torsions

Rings

Ligand 3PE L 704

Bond lengths

Bond angles

Torsions

Rings

Ligand 3PE M 502

Bond lengths

Bond angles

Torsions

Rings

Ligand CDL h 201

Bond lengths

Bond angles

Torsions

Rings

Ligand 3PE N 401

Bond lengths

Bond angles

Torsions

Rings

Ligand 3PE M 501

Bond lengths

Bond angles

Torsions

Rings

Ligand CDL L 706	
Bond lengths	Bond angles
Torsions	Rings

Ligand 3PE O 401	
Bond lengths	Bond angles
Torsions	Rings

Ligand CDL X 201

Bond lengths

Bond angles

Torsions

Rings

Ligand 3PE Y 201

Bond lengths

Bond angles

Torsions

Rings

Ligand 3PE L 702

Bond lengths

Bond angles

Torsions

Rings

Ligand 3PE J 201

Bond lengths

Bond angles

Torsions

Rings

Ligand 3PE L 703

Bond lengths

Bond angles

Torsions

Rings

Ligand 3PE L 707

Bond lengths

Bond angles

Torsions

Rings

5.7 Other polymers ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues ⓘ

There are no chain breaks in this entry.

6   Map visualisation ⓘ

This section contains visualisations of the EMDB entry EMD-35333. These allow visual inspection of the internal detail of the map and identification of artifacts.

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

6.1   Orthogonal projections ⓘ
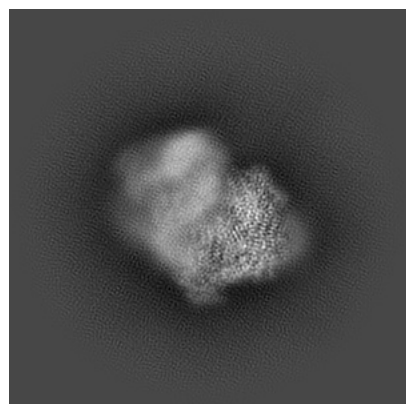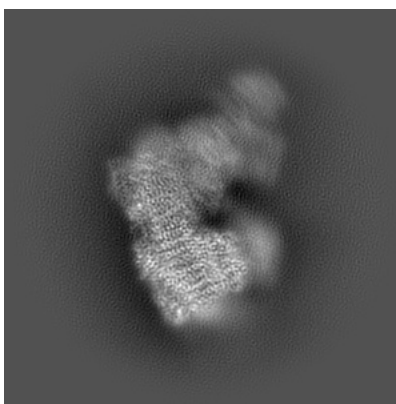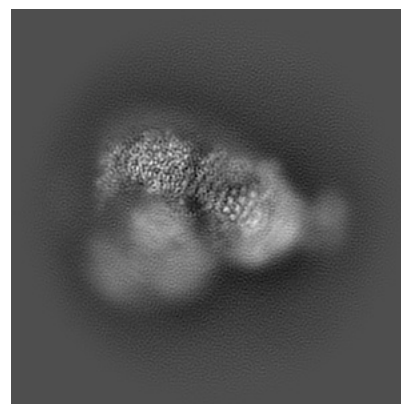
6.1.1   Primary map

| X | Y | Z |

6.1.2   Raw map

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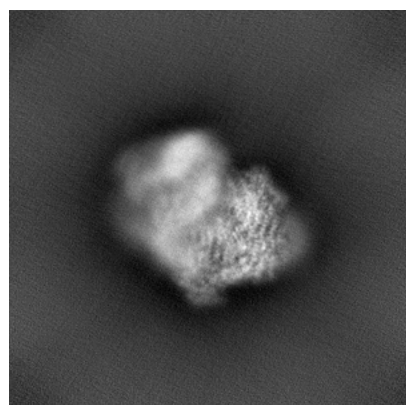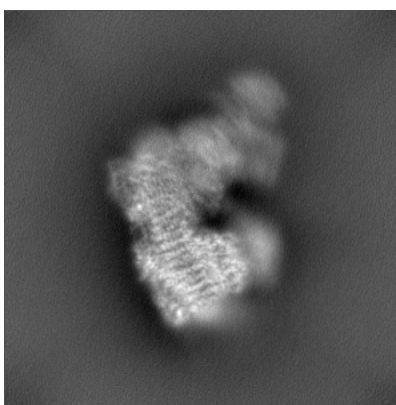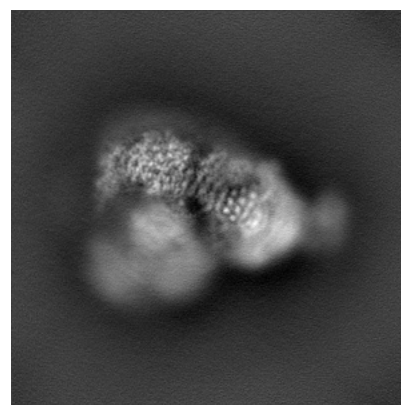
The images above show the map projected in three orthogonal directions.

6.2 Central slices (i)

6.2.1 Primary map
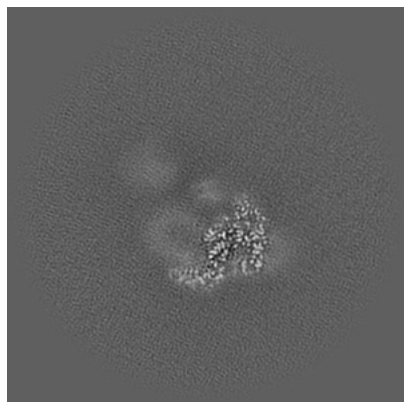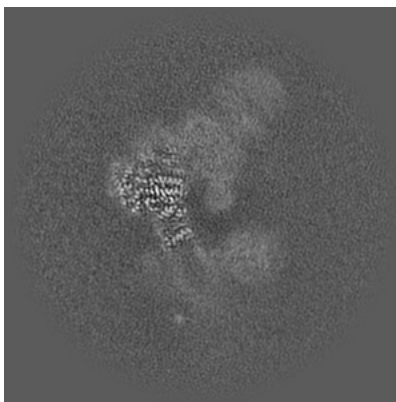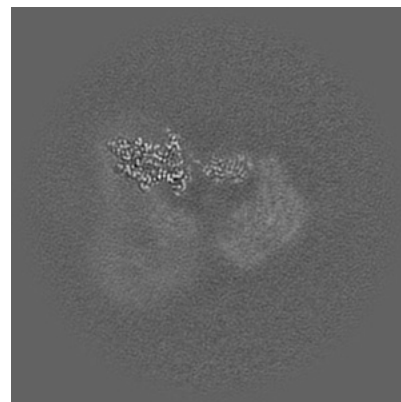
X Index: 192   Y Index: 192   Z Index: 192

6.2.2 Raw map
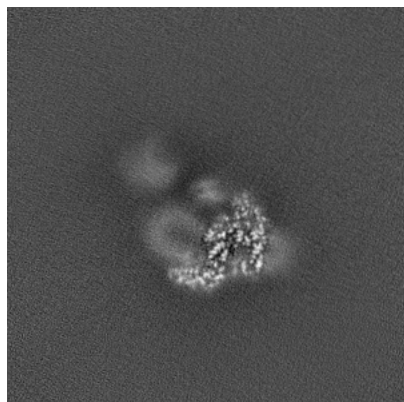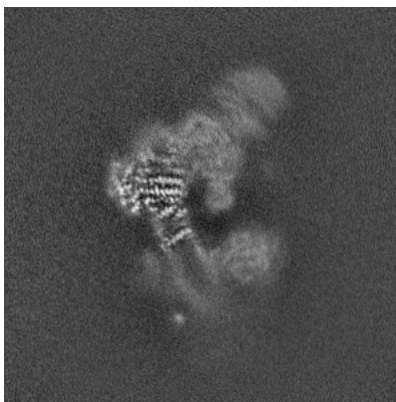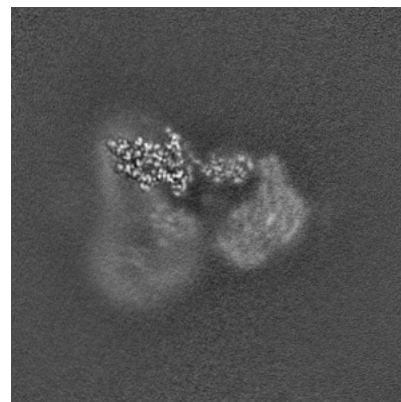
X Index: 192   Y Index: 192   Z Index: 192

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

6.3 Largest variance slices ⓘ

6.3.1 Primary map
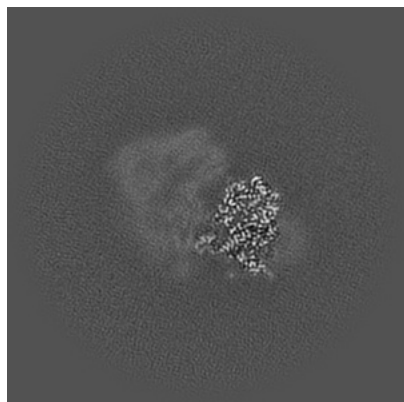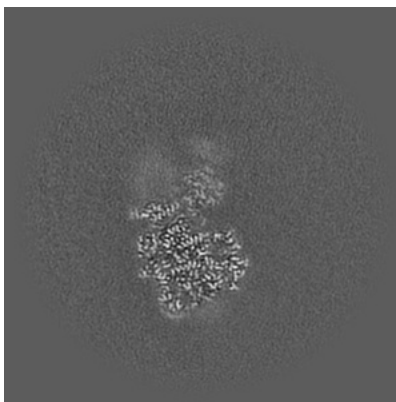
| X Index: 159 | Y Index: 236 | Z Index: 166 |
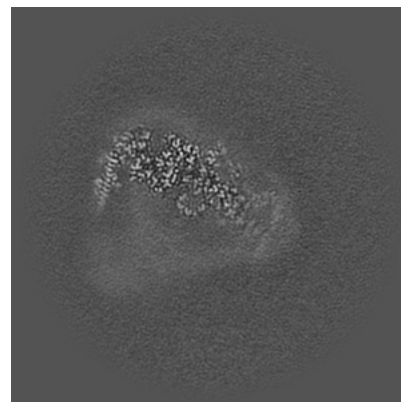
6.3.2 Raw map
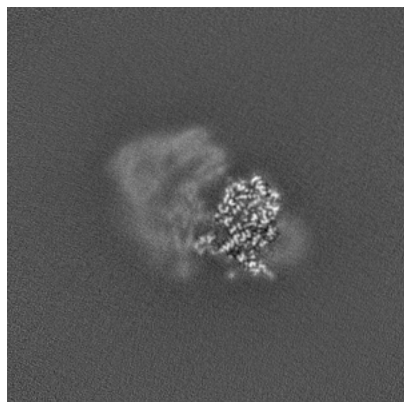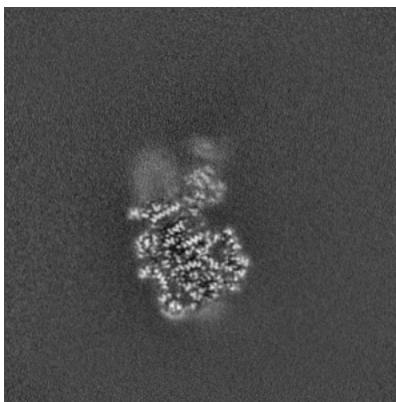
| X Index: 159 | Y Index: 237 | Z Index: 167 |
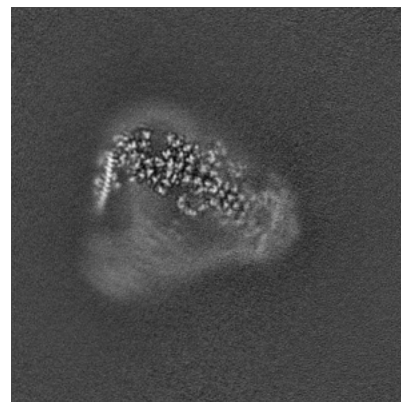
The images above show the largest variance slices of the map in three orthogonal directions.

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

6.4.1 Primary map
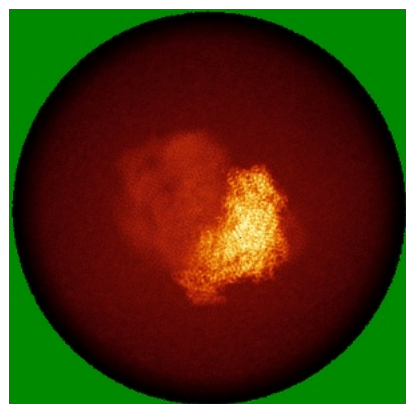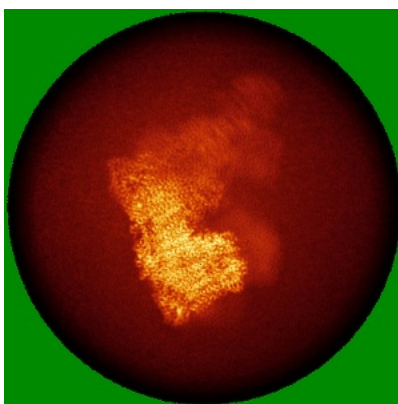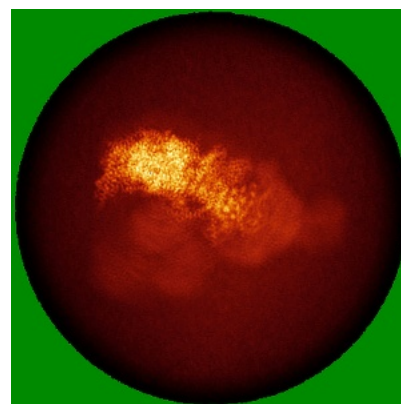
X   Y   Z

6.4.2 Raw map

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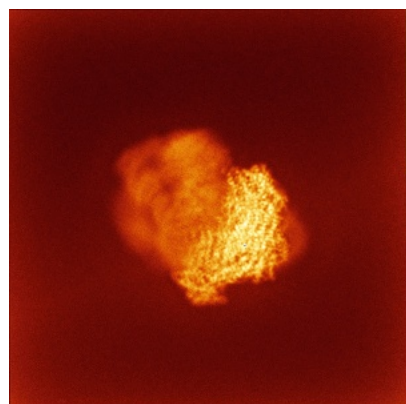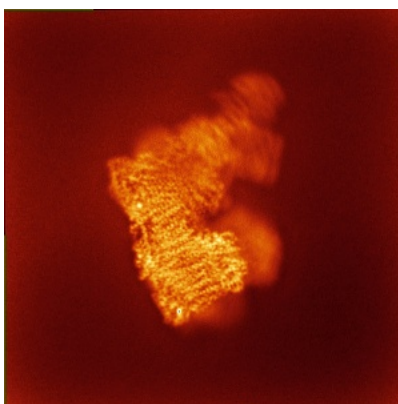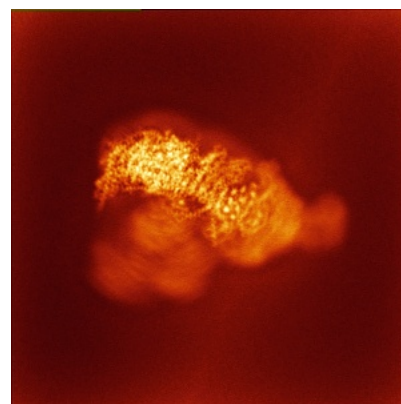
The images above show the map standard deviation projections with false color in three orthogonal directions. Minimum values are shown in green, max in blue, and dark to light orange shades represent small to large values respectively.

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 0.55. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

6.5.2 Raw map
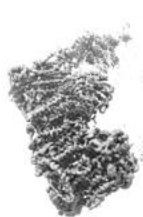
X	Y	Z

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

6.6   Mask visualisation ⓘ

This section shows the 3D surface view of the primary map at 50% transparency overlaid with the specified mask at 0% transparency

A mask typically either:

- Encompasses the whole structure

- Separates out a domain, a functional unit, a monomer or an area of interest from a larger structure

6.6.1   emd_35333_msk_1.map ⓘ

| X | Y | Z |
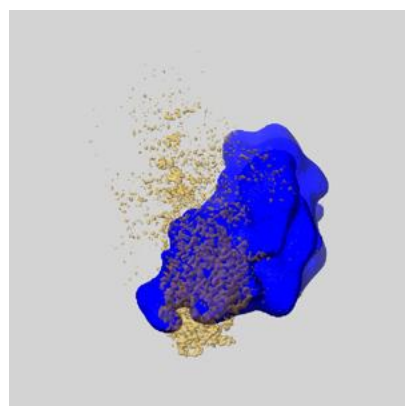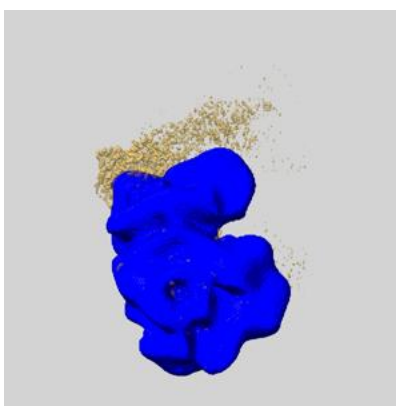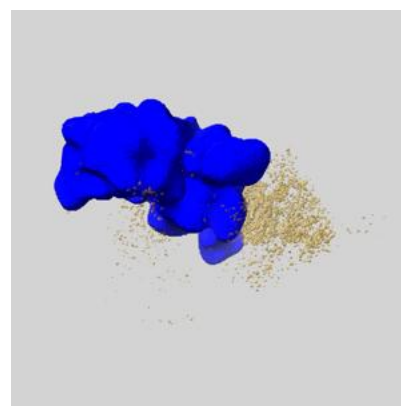
7   Map analysis   ⓘ

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 ⓘ
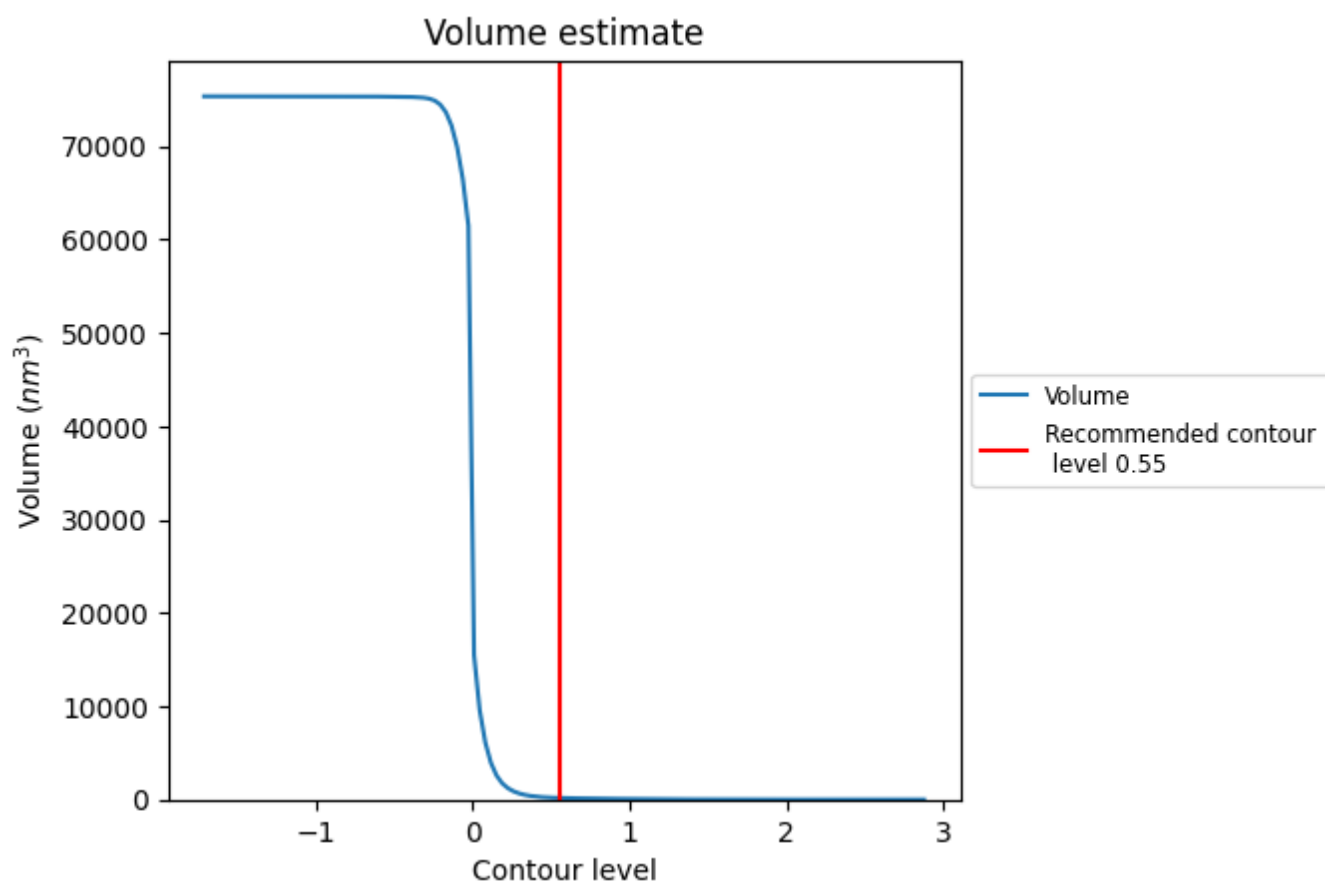
The volume at the recommended contour level is 176 nm^3; this corresponds to an approximate mass of 159 kDa.

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 ⓘ
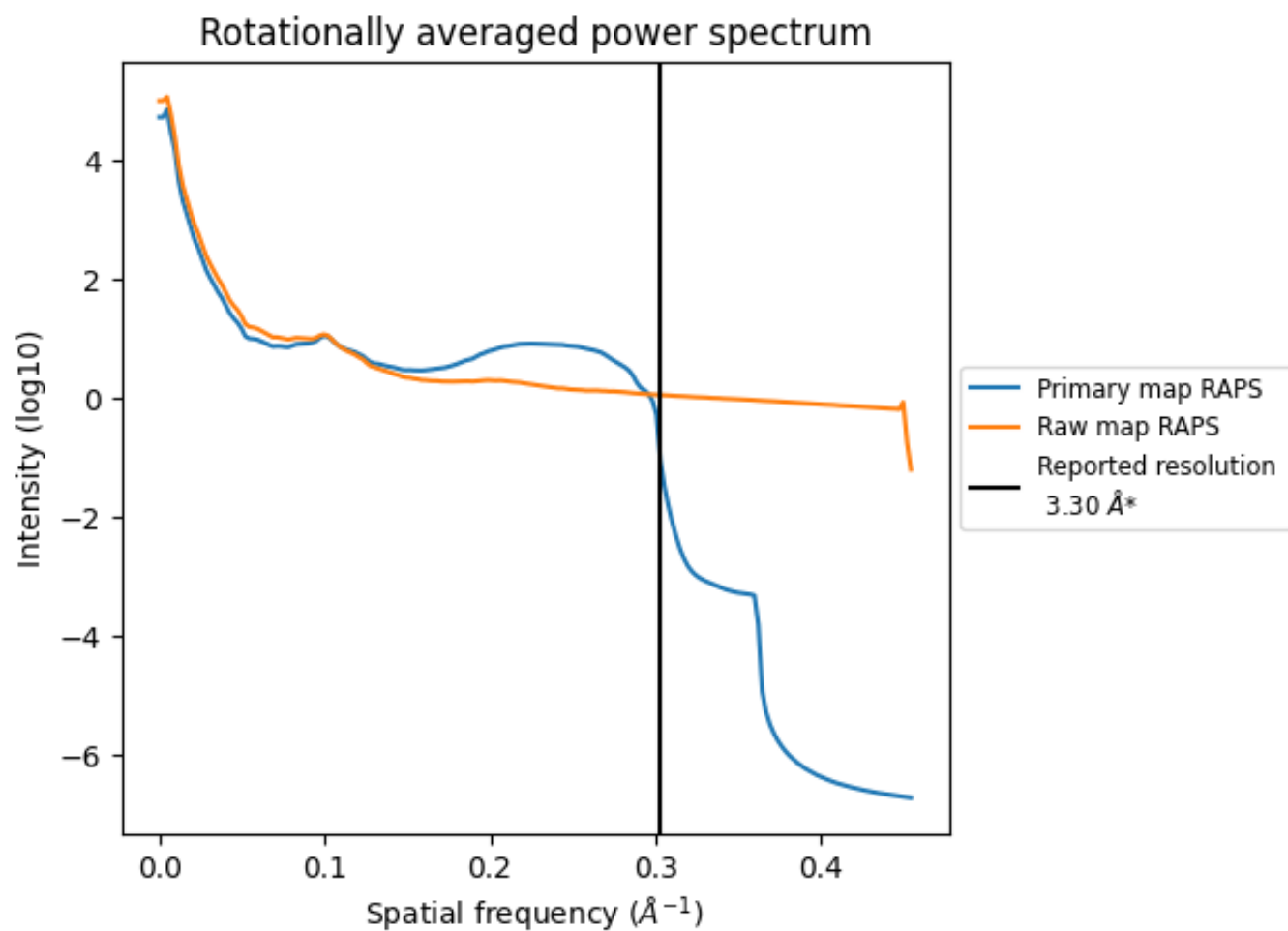
*Reported resolution corresponds to spatial frequency of 0.303 Å^{-1}

8　Fourier-Shell correlation ⓘ

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

8.1　FSC ⓘ
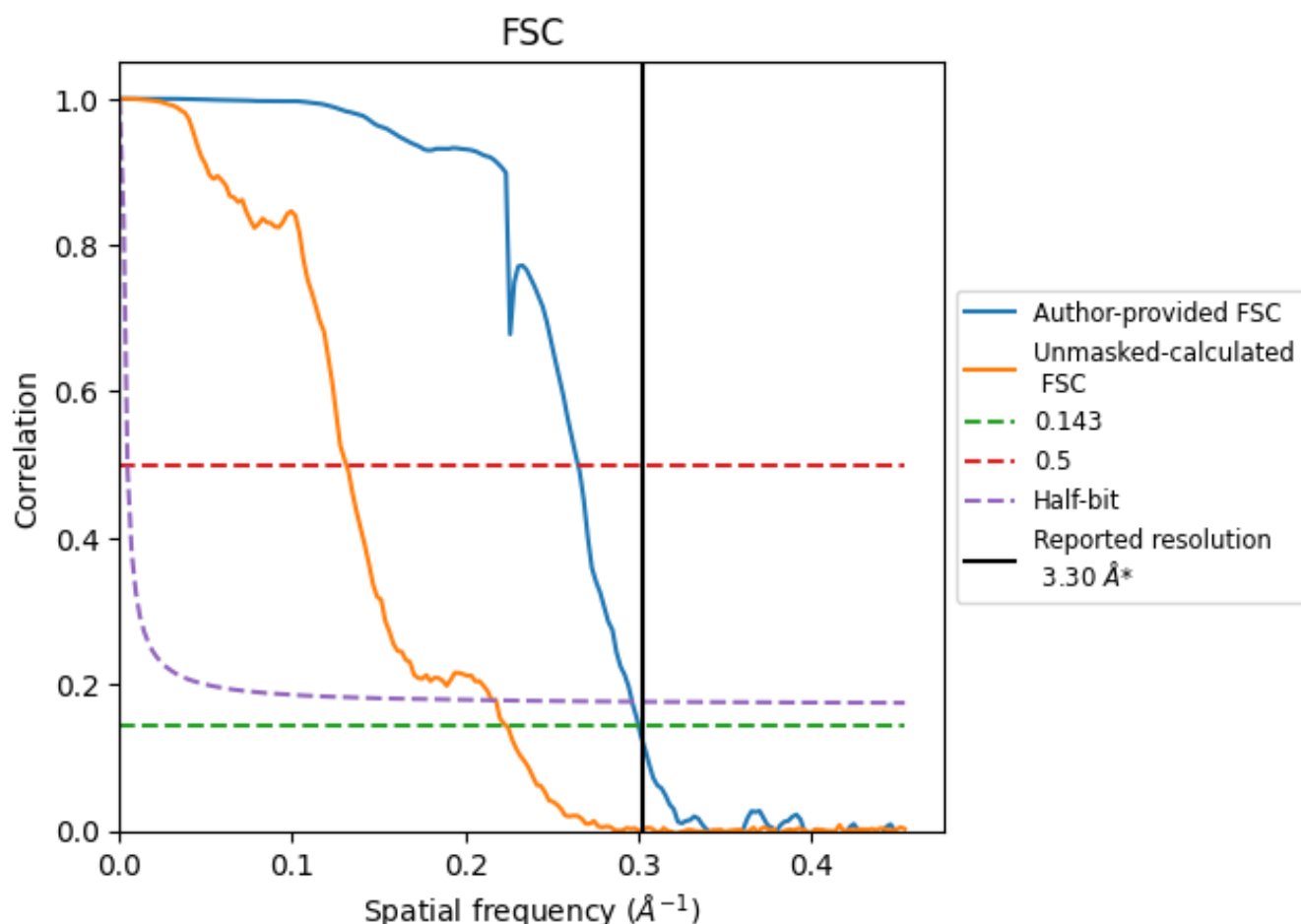
*Reported resolution corresponds to spatial frequency of 0.303 Å^{-1}

8.2 Resolution estimates (i)

Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.30	-	-
Author-provided FSC curve	3.33	3.77	3.37
Unmasked-calculated*	4.47	7.62	4.64

*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 4.47 differs from the reported value 3.3 by more than 10 %

9 Map-model fit ⓘ

This section contains information regarding the fit between EMDB map EMD-35333 and PDB model 8IB6. Per-residue inclusion information can be found in section 3 on page 11.

9.1 Map-model overlay ⓘ

| X | Y | Z |
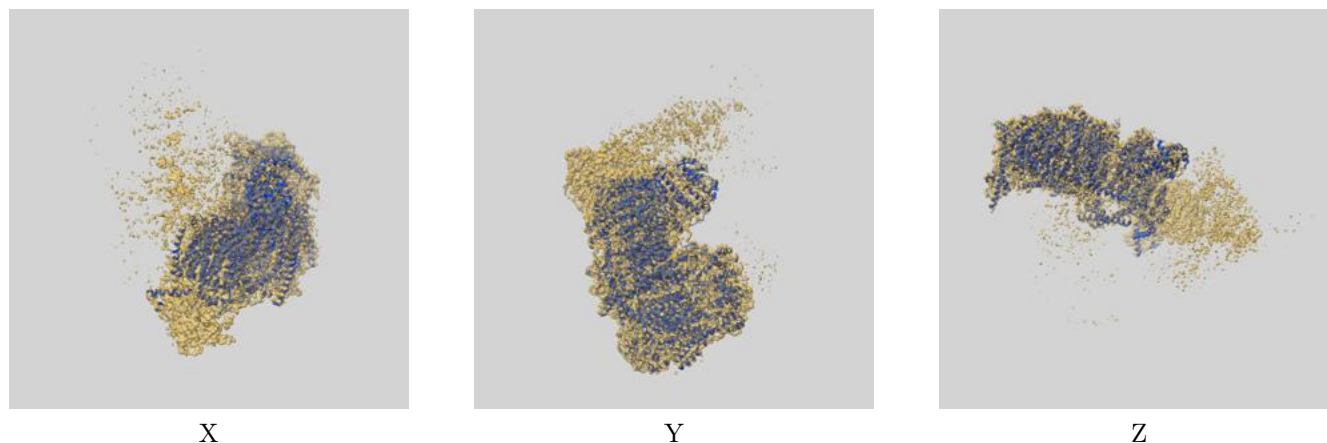
The images above show the 3D surface view of the map at the recommended contour level 0.55 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

9.2   Q-score mapped to coordinate model   ⓘ
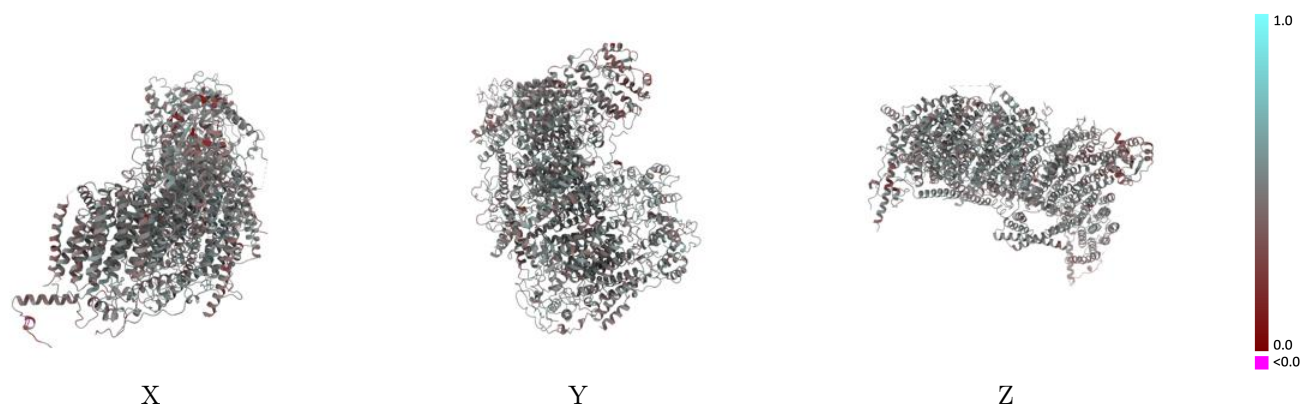
The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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   ⓘ
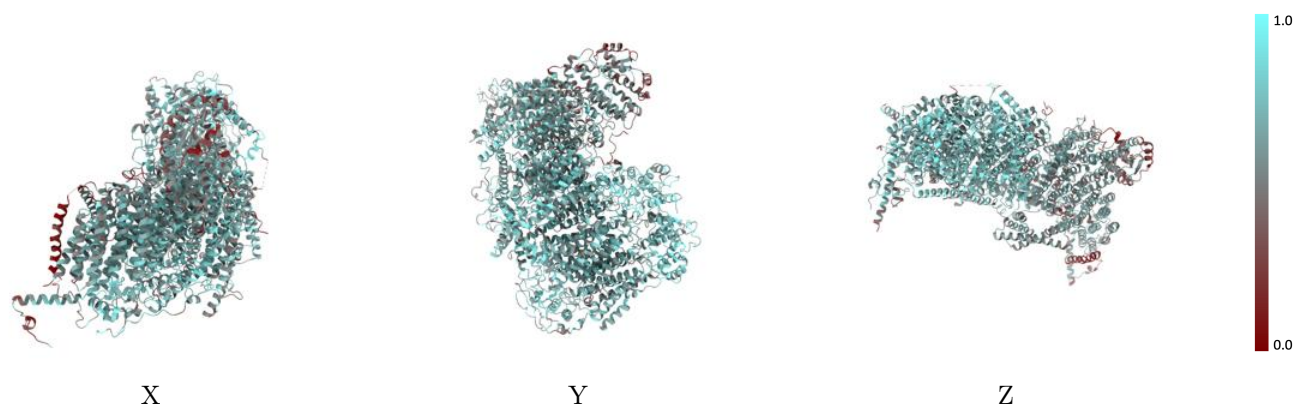
The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.55).

9.4 Atom inclusion ⓘ
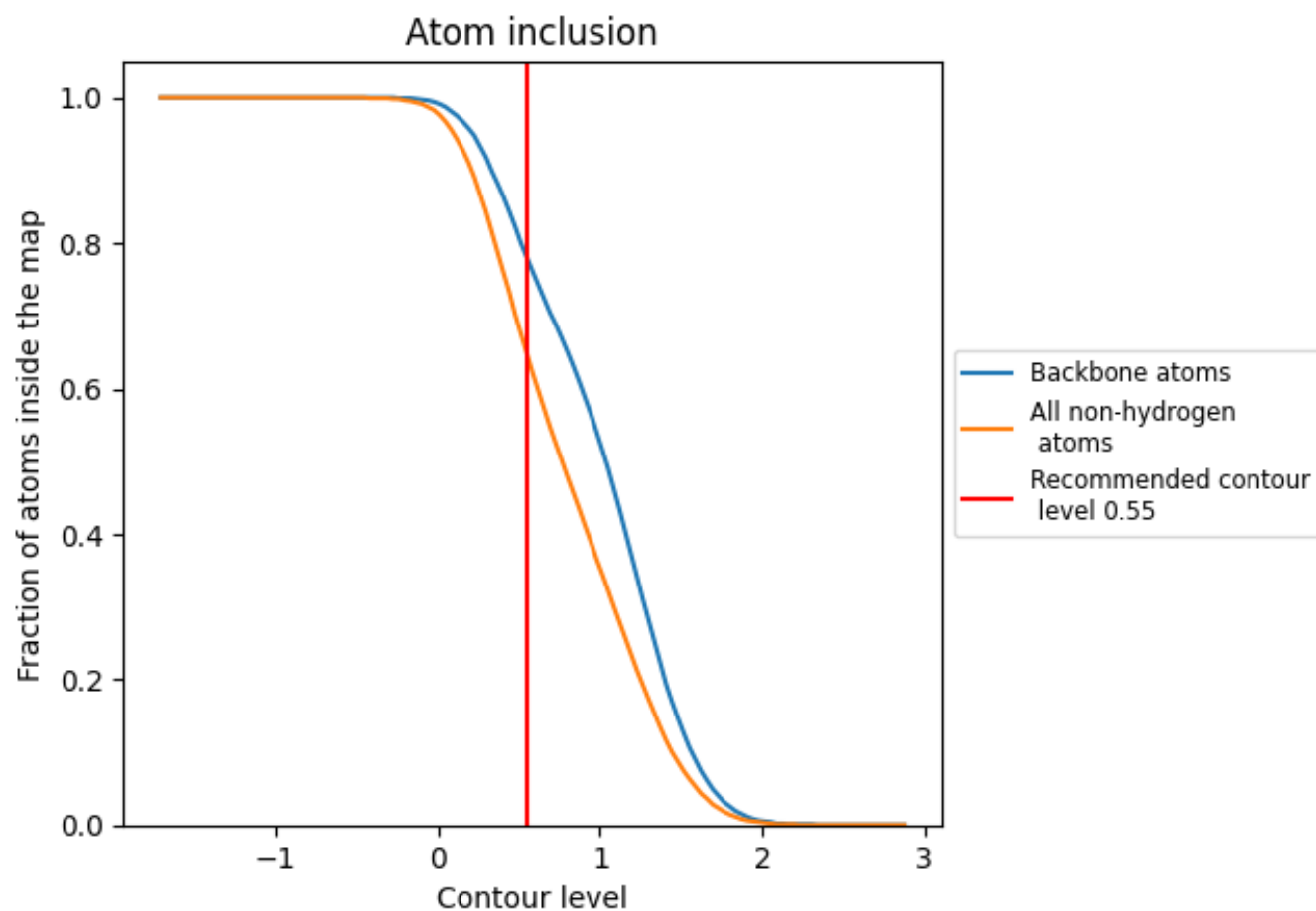
At the recommended contour level, 78% of all backbone atoms, 64% of all non-hydrogen atoms, are inside the map.

9.5 Map-model fit summary ⓘ

The table lists the average atom inclusion at the recommended contour level (0.55) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.6450	0.4730
D	0.4180	0.4860
J	0.4610	0.4320
K	0.6360	0.4730
L	0.6470	0.4810
M	0.6940	0.5030
N	0.6560	0.4770
O	0.4960	0.4230
U	0.7410	0.4930
X	0.6430	0.4920
Y	0.5440	0.4630
c	0.5290	0.4090
d	0.6900	0.5000
e	0.6040	0.4330
f	0.5950	0.4710
g	0.6700	0.4770
h	0.6970	0.4650
i	0.6840	0.4840
j	0.6610	0.4540
k	0.7220	0.4740
l	0.7290	0.4990
m	0.7000	0.4760
n	0.7510	0.4900
o	0.6750	0.4700
p	0.6820	0.4550

1.0

0.0
<0.0