W O R L D W I D E

wwPDB

P R O T E I N   D A T A   B A N K

wwPDB EM Validation Summary Report (i)

Mar 11, 2024 – 12:21 PM JST

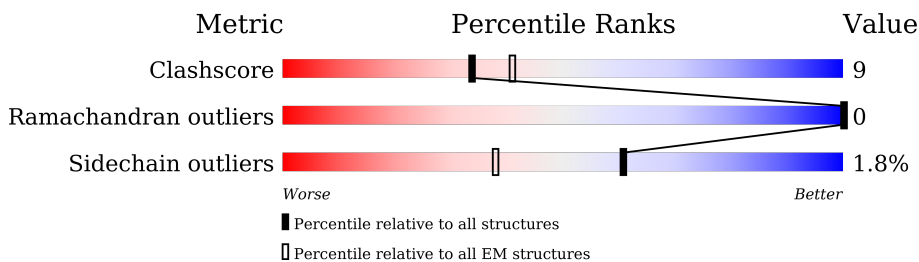|		
PDB ID	:	8X90
EMDB ID	:	EMD-38158
Title	:	P/Q type calcium channel
Authors	:	Yan, N.; Li, Z.; Cong, Y.; Wu, T.; Wang, T.
Deposited on	:	2023-11-29
Resolution	:	2.95 Å(reported)

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 2.95 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
Clashscore		9
Ramachandran outliers		0
Sidechain outliers		1.8%

Worse   *Better*

▮ Percentile relative to all structures
❑ Percentile relative to all EM structures

Metric	Whole archive (#Entries)	EM structures (#Entries)
Clashscore	158937	4297
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826

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	A	2549	43% 10% 46%
2	B	1115	67% 19% 14%
3	C	496	42% / 46% 20% 35%
4	D	3	33% 67%
5	E	2	50% 50%
5	G	2	100%
5	H	2	50% 50%
6	F	4	100%

2 Entity composition (i)

There are 13 unique types of molecules in this entry. The entry contains 22122 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 Voltage-dependent P/Q-type calcium channel subunit alpha-1A.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	1377	11202	7353	1819	1950	80	1	0

There are 43 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-42	MET	-	initiating methionine	UNP O00555
A	-41	ALA	-	expression tag	UNP O00555
A	-40	SER	-	expression tag	UNP O00555
A	-39	TRP	-	expression tag	UNP O00555
A	-38	SER	-	expression tag	UNP O00555
A	-37	HIS	-	expression tag	UNP O00555
A	-36	PRO	-	expression tag	UNP O00555
A	-35	GLN	-	expression tag	UNP O00555
A	-34	PHE	-	expression tag	UNP O00555
A	-33	GLU	-	expression tag	UNP O00555
A	-32	LYS	-	expression tag	UNP O00555
A	-31	GLY	-	expression tag	UNP O00555
A	-30	GLY	-	expression tag	UNP O00555
A	-29	GLY	-	expression tag	UNP O00555
A	-28	ALA	-	expression tag	UNP O00555
A	-27	ARG	-	expression tag	UNP O00555
A	-26	GLY	-	expression tag	UNP O00555
A	-25	GLY	-	expression tag	UNP O00555
A	-24	SER	-	expression tag	UNP O00555
A	-23	GLY	-	expression tag	UNP O00555
A	-22	GLY	-	expression tag	UNP O00555
A	-21	GLY	-	expression tag	UNP O00555
A	-20	SER	-	expression tag	UNP O00555
A	-19	TRP	-	expression tag	UNP O00555
A	-18	SER	-	expression tag	UNP O00555
A	-17	HIS	-	expression tag	UNP O00555
A	-16	PRO	-	expression tag	UNP O00555

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Chain	Residue	Modelled	Actual	Comment	Reference
A	-15	GLN	-	expression tag	UNP O00555
A	-14	PHE	-	expression tag	UNP O00555
A	-13	GLU	-	expression tag	UNP O00555
A	-12	LYS	-	expression tag	UNP O00555
A	-11	GLY	-	expression tag	UNP O00555
A	-10	PHE	-	expression tag	UNP O00555
A	-9	ASP	-	expression tag	UNP O00555
A	-8	TYR	-	expression tag	UNP O00555
A	-7	LYS	-	expression tag	UNP O00555
A	-6	ASP	-	expression tag	UNP O00555
A	-5	ASP	-	expression tag	UNP O00555
A	-4	ASP	-	expression tag	UNP O00555
A	-3	ASP	-	expression tag	UNP O00555
A	-2	LYS	-	expression tag	UNP O00555
A	-1	GLY	-	expression tag	UNP O00555
A	0	THR	-	expression tag	UNP O00555

- Molecule 2 is a protein called Voltage-dependent calcium channel subunit alpha-2/delta-1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	B	964	7695	4879	1289	1493	34	0	0

There are 12 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	1104	LEU	-	expression tag	UNP P54289
B	1105	GLU	-	expression tag	UNP P54289
B	1106	HIS	-	expression tag	UNP P54289
B	1107	HIS	-	expression tag	UNP P54289
B	1108	HIS	-	expression tag	UNP P54289
B	1109	HIS	-	expression tag	UNP P54289
B	1110	HIS	-	expression tag	UNP P54289
B	1111	HIS	-	expression tag	UNP P54289
B	1112	HIS	-	expression tag	UNP P54289
B	1113	HIS	-	expression tag	UNP P54289
B	1114	HIS	-	expression tag	UNP P54289
B	1115	HIS	-	expression tag	UNP P54289

- Molecule 3 is a protein called Voltage-dependent L-type calcium channel subunit beta-3.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	C	324	2575	1619	467	479	10	0	0

There are 12 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
C	485	LEU	-	expression tag	UNP P54284
C	486	GLU	-	expression tag	UNP P54284
C	487	HIS	-	expression tag	UNP P54284
C	488	HIS	-	expression tag	UNP P54284
C	489	HIS	-	expression tag	UNP P54284
C	490	HIS	-	expression tag	UNP P54284
C	491	HIS	-	expression tag	UNP P54284
C	492	HIS	-	expression tag	UNP P54284
C	493	HIS	-	expression tag	UNP P54284
C	494	HIS	-	expression tag	UNP P54284
C	495	HIS	-	expression tag	UNP P54284
C	496	HIS	-	expression tag	UNP P54284

- Molecule 4 is an oligosaccharide called 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
4	D	3	42	24	3	15	0	0

- Molecule 5 is an oligosaccharide called 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.
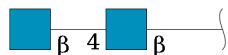
Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
5	E	2	28	16	2	10	0	0
5	G	2	28	16	2	10	0	0

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PROTEIN DATA BANK

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Mol	Chain	Residues	Atoms				AltConf	Trace
5	H	2	Total 28	C 16	N 2	O 10	0	0

- Molecule 6 is an oligosaccharide called 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-a cetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.
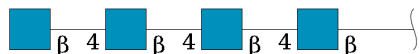
Mol	Chain	Residues	Atoms				AltConf	Trace
6	F	4	Total 56	C 32	N 4	O 20	0	0

- Molecule 7 is 1,2-DIDECANOYL-SN-GLYCERO-3-[PHOSPHO-L-SERINE] (three-letter code: PS1) (formula: $C_{26}H_{49}NO_{10}P$).
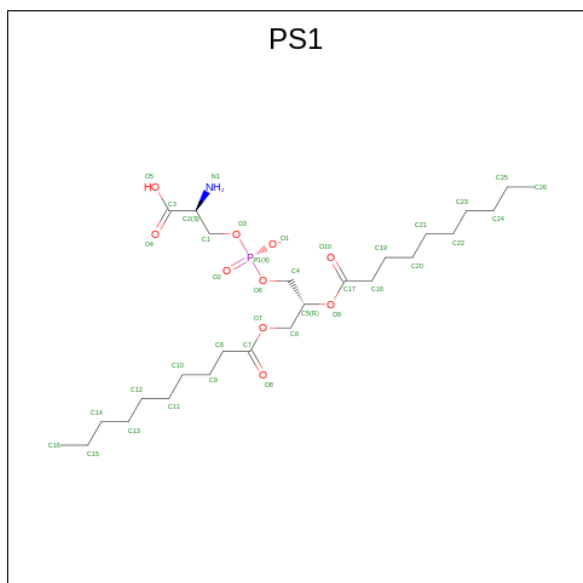
Mol	Chain	Residues	Atoms					AltConf
7	A	1	Total 38	C 26	N 1	O 10	P 1	0

- Molecule 8 is CHOLESTEROL (three-letter code: CLR) (formula: $C_{27}H_{46}O$).

CLR

Mol	Chain	Residues	Atoms			AltConf
8	A	1	Total 28	C 27	O 1	0
8	A	1	Total 28	C 27	O 1	0
8	A	1	Total 28	C 27	O 1	0
8	A	1	Total 28	C 27	O 1	0
8	A	1	Total 28	C 27	O 1	0

- Molecule 9 is [(2R)-1-octadecanoyloxy-3-[oxidanyl-[(1R,2R,3S,4R,5R,6S)-2,3,6-tris(oxidanyl)-4,5-diphosphonooxy-cyclohexyl]oxy-phospho ryl]oxy-propan-2-yl] (8Z)-icosa-5,8,11,14-tetr aenoate (three-letter code: PT5) (formula: $C_{47}H_{85}O_{19}P_3$).

PT5
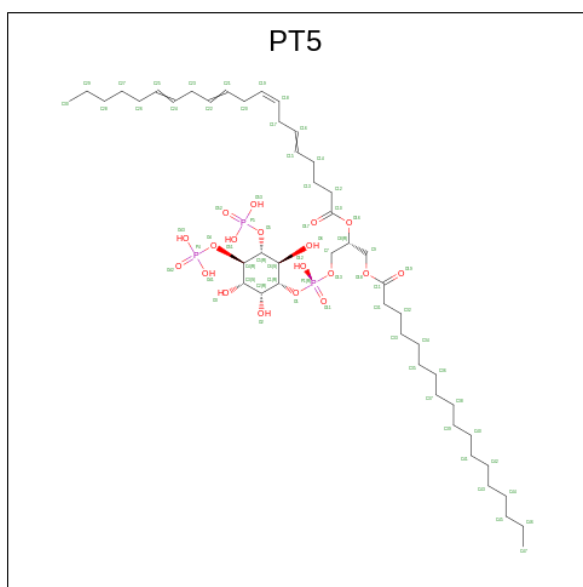
Mol	Chain	Residues	Atoms				AltConf
			Total	C	O	P	
9	A	1	64	42	19	3	0

- Molecule 10 is CALCIUM ION (three-letter code: CA) (formula: Ca).

Mol	Chain	Residues	Atoms		AltConf
			Total	Ca	
10	A	1	1	1	0
			Total	Ca	
10	B	1	1	1	0

- Molecule 11 is 2-acetamido-2-deoxy-beta-D-glucopyranose (three-letter code: NAG) (formula: $C_8H_{15}NO_6$).

Mol	Chain	Residues	Atoms				AltConf
11	A	1	Total	C	N	O	0
			14	8	1	5	
11	B	1	Total	C	N	O	0
			14	8	1	5	

- Molecule 12 is CHOLESTEROL HEMISUCCINATE (three-letter code: Y01) (formula: $C_{31}H_{50}O_4$).
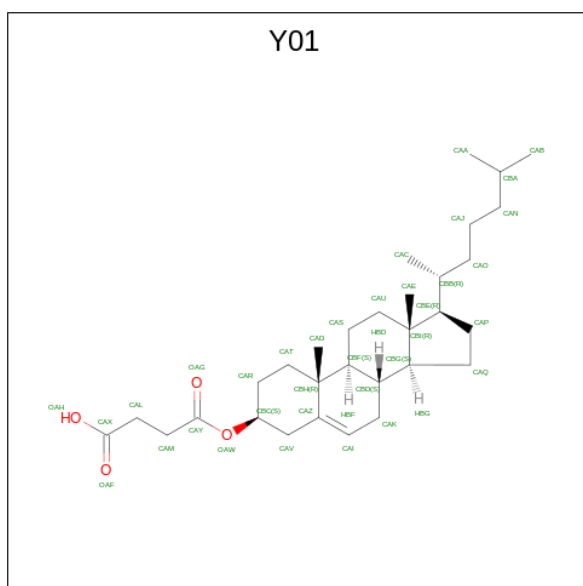
Mol	Chain	Residues	Atoms			AltConf
12	A	1	Total	C	O	0
			35	31	4	

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Mol	Chain	Residues	Atoms			AltConf
12	A	1	Total	C	O	0
			35	31	4	
12	A	1	Total	C	O	0
			35	31	4	

- Molecule 13 is 1,2-Distearoyl-sn-glycerophosphoethanolamine (three-letter code: 3PE) (formula: $C_{41}H_{82}NO_8P$).
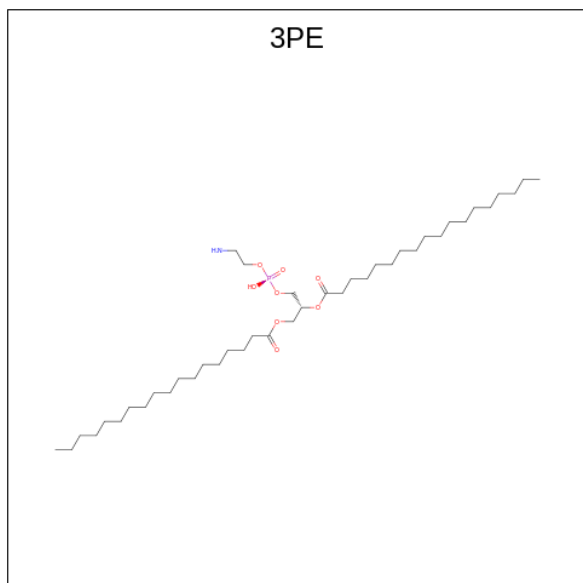
Mol	Chain	Residues	Atoms					AltConf
13	A	1	Total	C	N	O	P	0
			40	30	1	8	1	
13	A	1	Total	C	N	O	P	0
			51	41	1	8	1	

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: Voltage-dependent P/Q-type calcium channel subunit alpha-1A
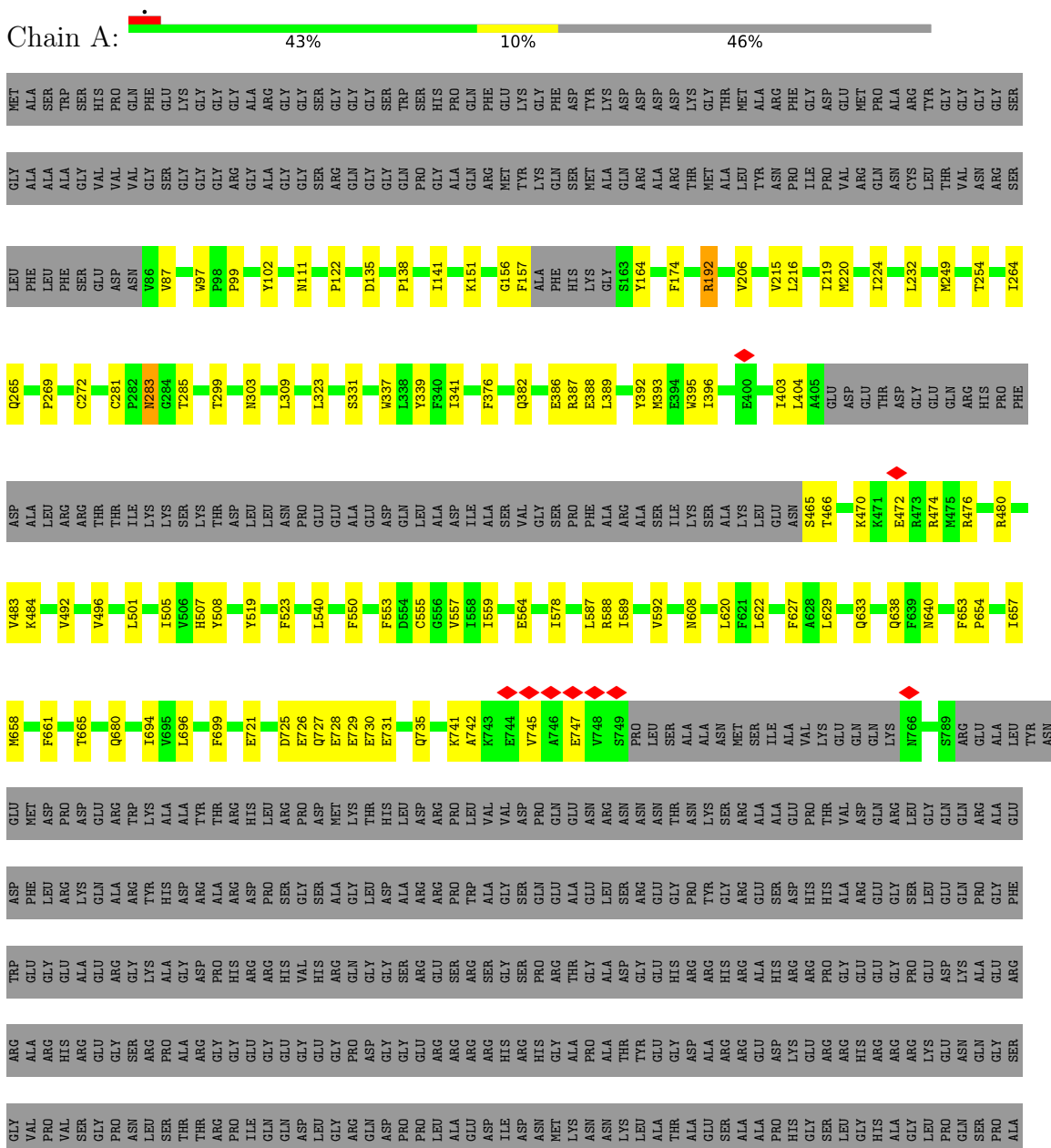
Chain A:

● Molecule 2: Voltage-dependent calcium channel subunit alpha-2/delta-1

Chain B:

67%   19%   •   14%
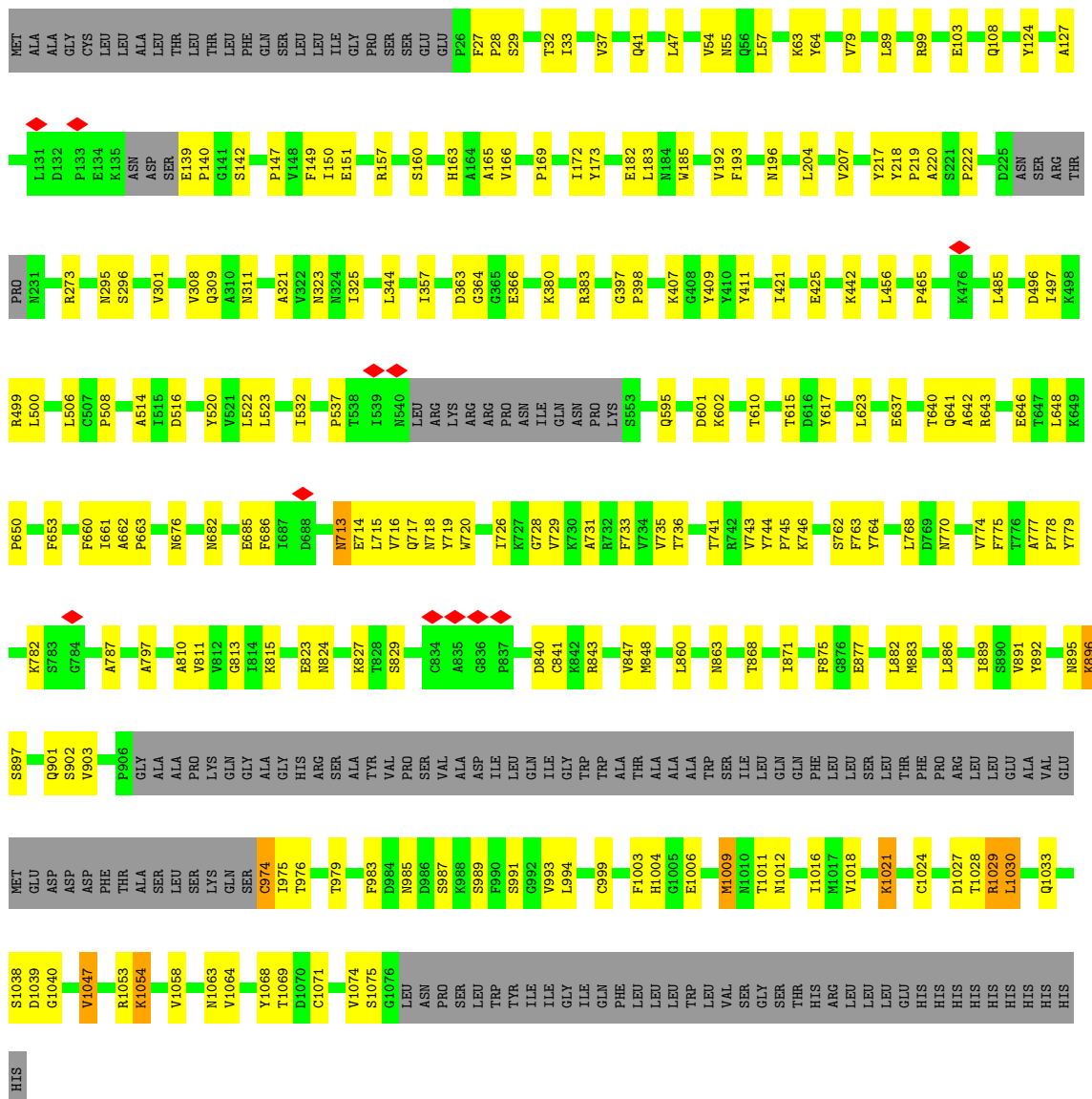
● Molecule 3: Voltage-dependent L-type calcium channel subunit beta-3

Chain C:

42%

46%   20%   35%
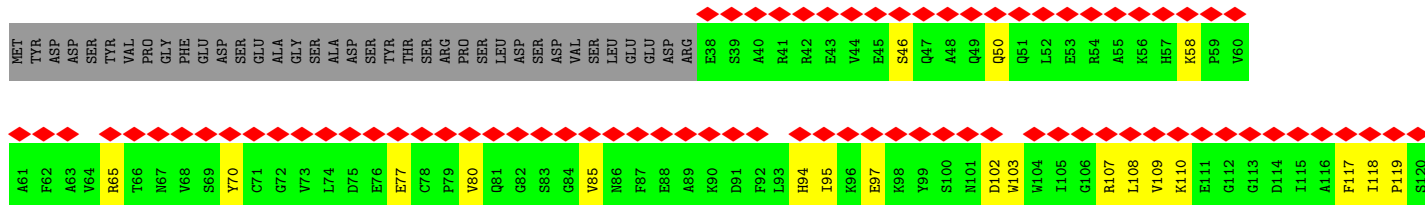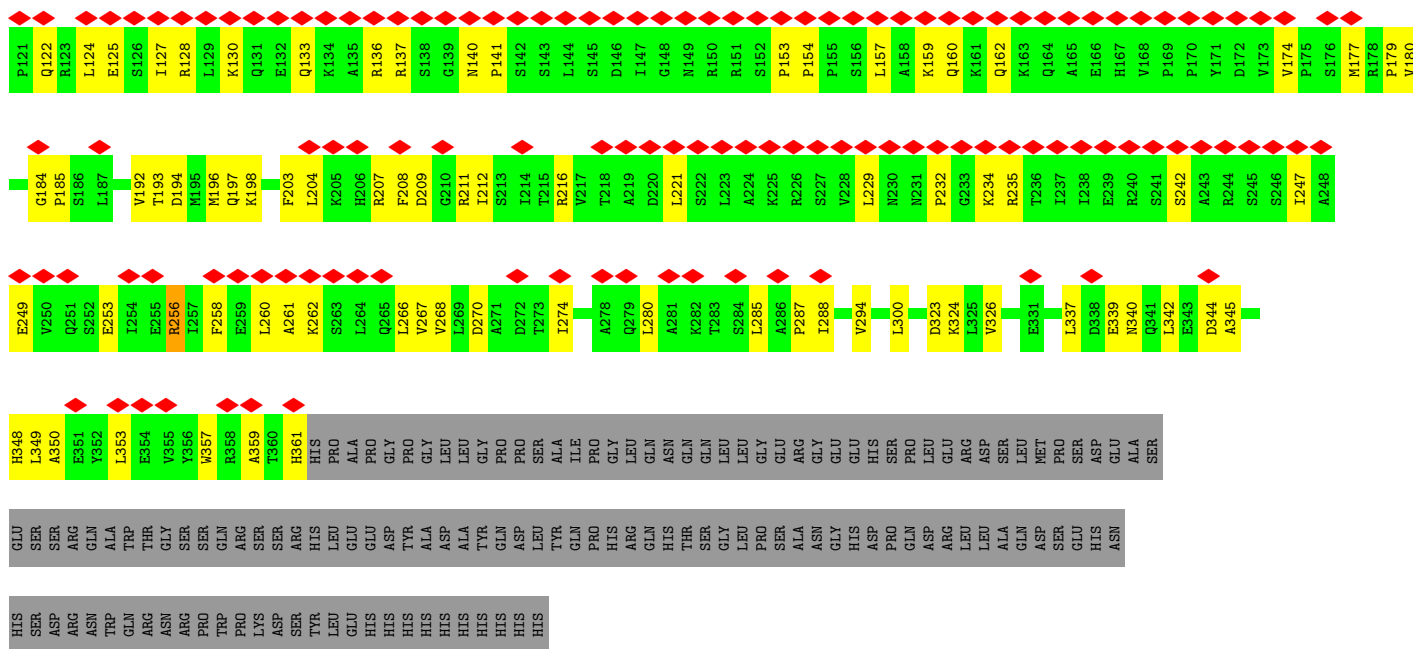
• Molecule 4: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-gluc opyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain D: 33% 67%

• Molecule 5: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-gluc opyranose

Chain E: 50% 50%

• Molecule 5: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-gluc opyranose

Chain G: 100%

• Molecule 5: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-gluc opyranose

Chain H: 50% 50%

• Molecule 6: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-gluc
opyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-gl
ucopyranose

Chain F:⠀⠀⠀⠀⠀⠀⠀⠀⠀⠀⠀⠀⠀⠀⠀⠀⠀⠀⠀⠀⠀⠀100%

NAG1 NAG2 NAG3 NAG4

4 Experimental information ⓘ

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	118997	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 $(e^-/\text{Å}^2)$	50	Depositor
Minimum defocus (nm)	1300	Depositor
Maximum defocus (nm)	1800	Depositor
Magnification	Not provided	
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	2.614	Depositor
Minimum map value	-1.578	Depositor
Average map value	-0.001	Depositor
Map value standard deviation	0.068	Depositor
Recommended contour level	0.26	Depositor
Map size (Å)	351.328, 351.328, 351.328	wwPDB
Map dimensions	320, 320, 320	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.0979, 1.0979, 1.0979	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: PS1, CLR, Y01, PT5, NAG, CA, 3PE

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

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	#$|Z|$>5	RMSZ	#$|Z|$>5
1	A	0.27	0/11478	0.47	0/15531
2	B	0.40	0/7858	0.54	0/10658
3	C	0.25	0/2624	0.54	0/3544
All	All	0.32	0/21960	0.50	0/29733

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts (i)

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	11202	0	11290	200	0
2	B	7695	0	7485	126	0
3	C	2575	0	2619	66	0
4	D	42	0	37	0	0
5	E	28	0	25	0	0
5	G	28	0	25	0	0
5	H	28	0	25	0	0
6	F	56	0	49	0	0
7	A	38	0	48	3	0
8	A	140	0	230	20	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
9	A	64	0	67	4	0
10	A	1	0	0	0	0
10	B	1	0	0	0	0
11	A	14	0	13	0	0
11	B	14	0	13	0	0
12	A	105	0	147	24	0
13	A	91	0	139	15	0
All	All	22122	0	22212	399	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 9.

The worst 5 of 399 close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:507:HIS:CE1	12:A:2609:Y01:HAR1	1.86	1.09
1:A:1586:PHE:CD1	8:A:2608:CLR:H21	1.95	1.00
1:A:1658:PHE:HB3	13:A:2614:3PE:H241	1.47	0.97
2:B:41:GLN:HG3	2:B:1009:MET:HB2	1.45	0.95
12:A:2610:Y01:HAA2	13:A:2613:3PE:H3I1	1.47	0.95

There are no symmetry-related clashes.

5.3   Torsion angles ⓘ

5.3.1   Protein backbone ⓘ

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	1368/2549 (54%)	1323 (97%)	45 (3%)	0	100	100
2	B	954/1115 (86%)	902 (94%)	52 (6%)	0	100	100
3	C	322/496 (65%)	312 (97%)	10 (3%)	0	100	100
All	All	2644/4160 (64%)	2537 (96%)	107 (4%)	0	100	100

There are no Ramachandran outliers to report.

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	A	1214/2154 (56%)	1206 (99%)	8 (1%)	84	93
2	B	854/983 (87%)	819 (96%)	35 (4%)	30	64
3	C	287/438 (66%)	286 (100%)	1 (0%)	92	97
All	All	2355/3575 (66%)	2311 (98%)	44 (2%)	61	81

5 of 44 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	B	1030	LEU
2	B	1058	VAL
2	B	1033	GLN
2	B	1047	VAL
2	B	1064	VAL

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 7 such sidechains are listed below:

Mol	Chain	Res	Type
2	B	676	ASN
2	B	1012	ASN
3	C	122	GLN
2	B	1042	ASN
2	B	309	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 ⓘ

13 monosaccharides 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	$\#|Z| > 2$
4	NAG	D	1	4,2	14,14,15	0.54	0	17,19,21	1.93	5 (29%)
4	NAG	D	2	4	14,14,15	0.38	0	17,19,21	1.54	3 (17%)
4	NAG	D	3	4	14,14,15	0.32	0	17,19,21	0.87	0
5	NAG	E	1	2,5	14,14,15	0.62	0	17,19,21	1.30	2 (11%)
5	NAG	E	2	5	14,14,15	0.33	0	17,19,21	0.58	0
6	NAG	F	1	6	14,14,15	0.76	0	17,19,21	1.52	2 (11%)
6	NAG	F	2	6	14,14,15	0.52	0	17,19,21	1.55	3 (17%)
6	NAG	F	3	6	14,14,15	0.42	0	17,19,21	1.96	4 (23%)
6	NAG	F	4	6	14,14,15	0.42	0	17,19,21	1.22	2 (11%)
5	NAG	G	1	2,5	14,14,15	0.66	0	17,19,21	1.31	2 (11%)
5	NAG	G	2	5	14,14,15	0.43	0	17,19,21	0.99	1 (5%)
5	NAG	H	1	2,5	14,14,15	0.49	0	17,19,21	2.04	5 (29%)
5	NAG	H	2	5	14,14,15	0.21	0	17,19,21	0.39	0

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
4	NAG	D	1	4,2	-	0/6/23/26	0/1/1/1
4	NAG	D	2	4	-	5/6/23/26	0/1/1/1
4	NAG	D	3	4	-	5/6/23/26	0/1/1/1
5	NAG	E	1	2,5	-	4/6/23/26	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
5	NAG	E	2	5	-	4/6/23/26	0/1/1/1
6	NAG	F	1	6	-	0/6/23/26	0/1/1/1
6	NAG	F	2	6	-	2/6/23/26	0/1/1/1
6	NAG	F	3	6	-	5/6/23/26	0/1/1/1
6	NAG	F	4	6	-	6/6/23/26	0/1/1/1
5	NAG	G	1	2,5	-	4/6/23/26	0/1/1/1
5	NAG	G	2	5	-	4/6/23/26	0/1/1/1
5	NAG	H	1	2,5	-	3/6/23/26	0/1/1/1
5	NAG	H	2	5	-	1/6/23/26	0/1/1/1

There are no bond length outliers.

The worst 5 of 29 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
6	F	3	NAG	C1-O5-C5	4.68	118.54	112.19
5	H	1	NAG	C4-C3-C2	-4.40	104.57	111.02
6	F	3	NAG	C3-C4-C5	4.20	117.73	110.24
4	D	1	NAG	C1-O5-C5	4.16	117.83	112.19
6	F	1	NAG	O5-C1-C2	-4.00	104.98	111.29

There are no chirality outliers.

5 of 43 torsion outliers are listed below:

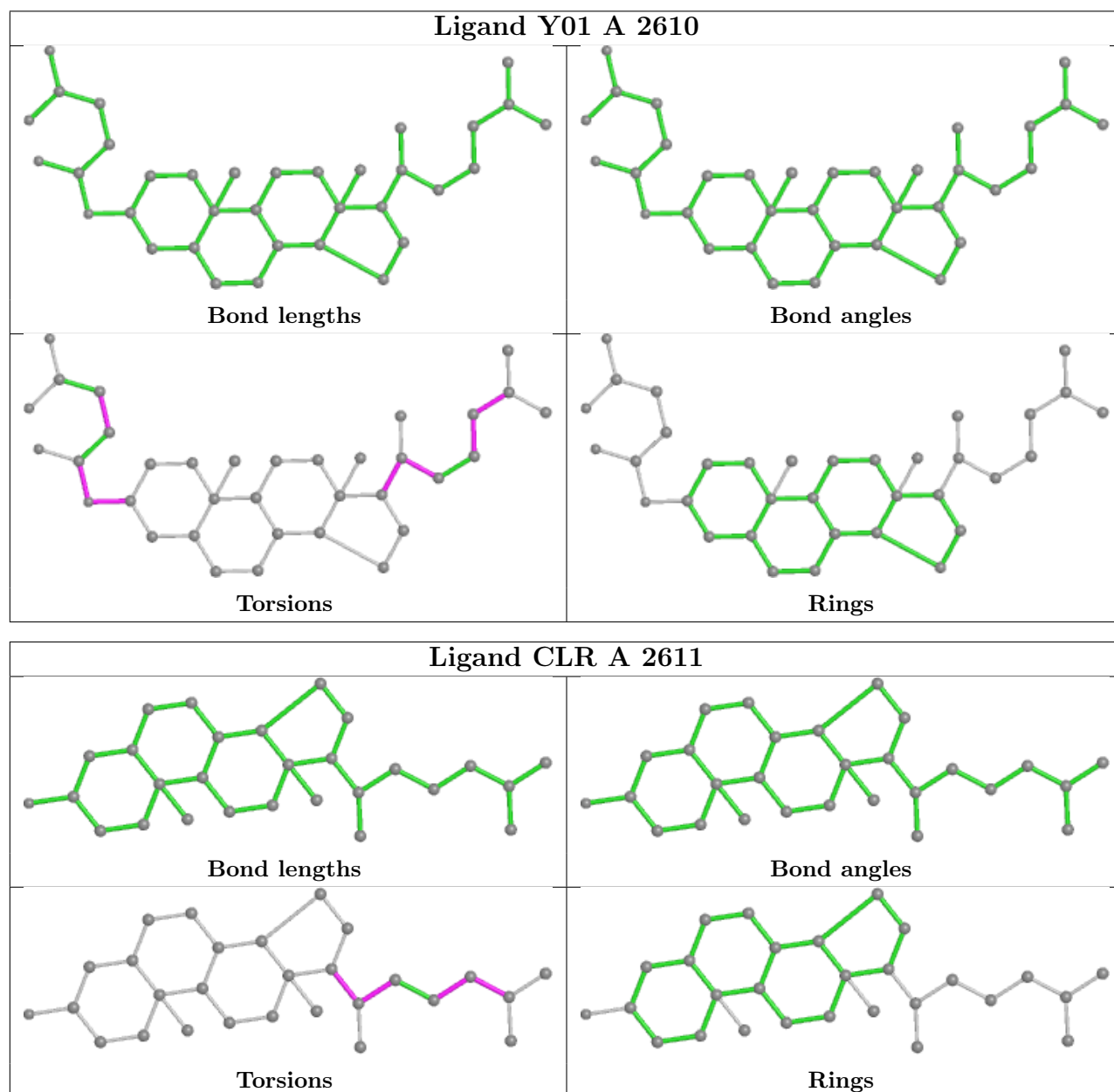| Mol	Chain	Res	Type	Atoms
4	D	2	NAG	C1-C2-N2-C7
4	D	2	NAG	C8-C7-N2-C2
4	D	2	NAG	O7-C7-N2-C2
4	D	3	NAG	C8-C7-N2-C2
4	D	3	NAG	O7-C7-N2-C2

There are no ring outliers.

No monomer is involved in short contacts.

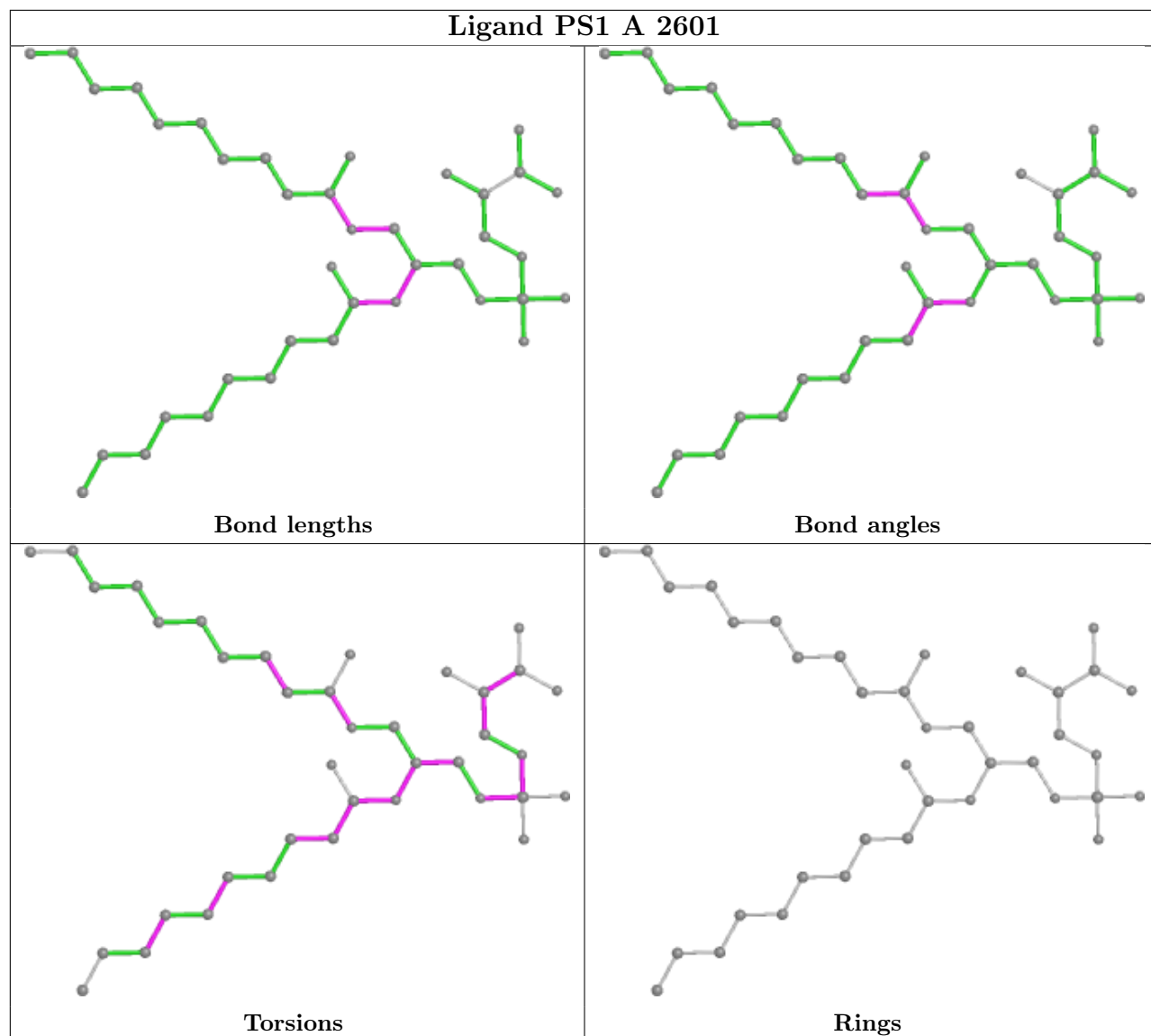The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for oligosaccharide.

Oligosaccharide Chain D

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain E

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain G

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain H

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain F

Bond lengths

Bond angles

Torsions

Rings
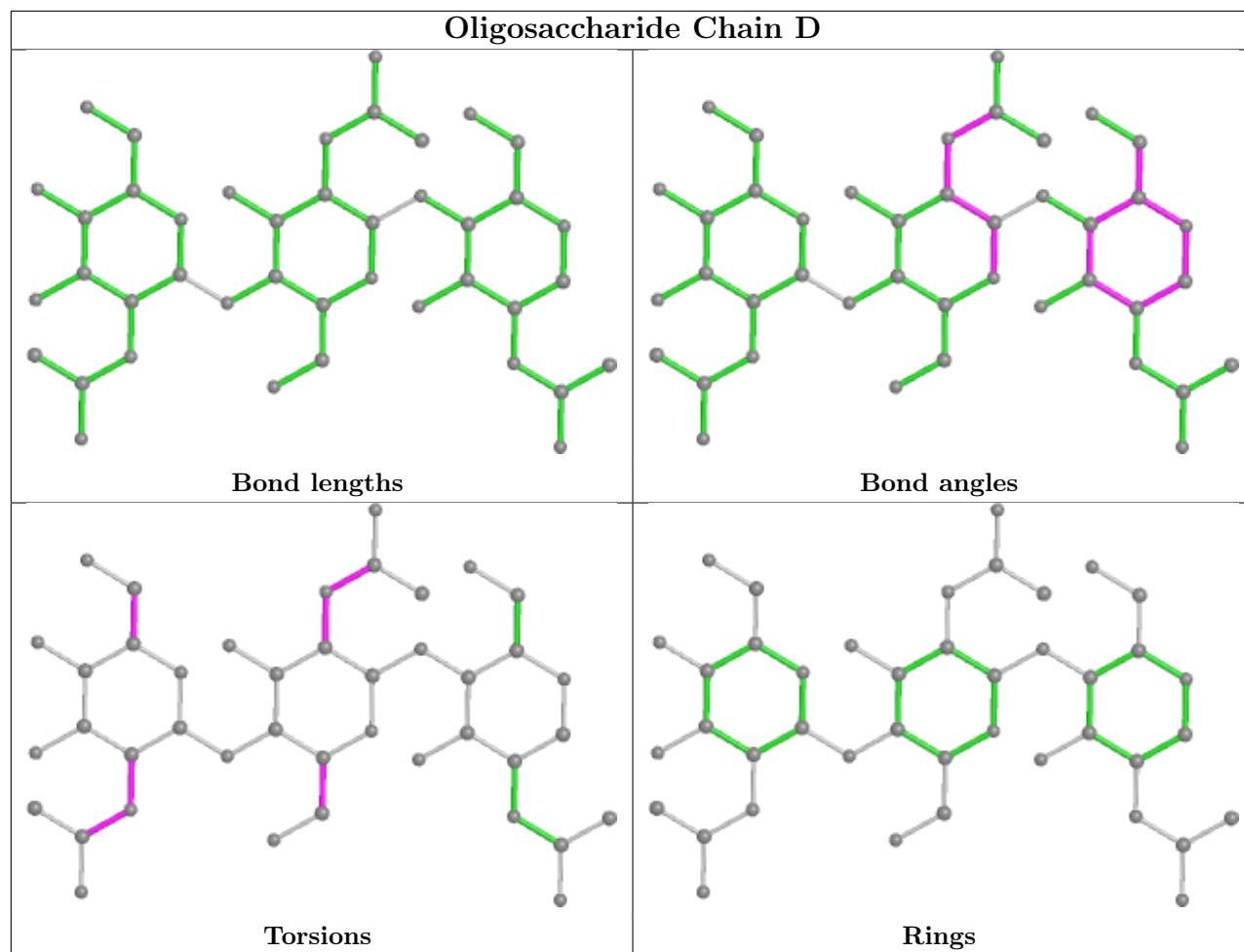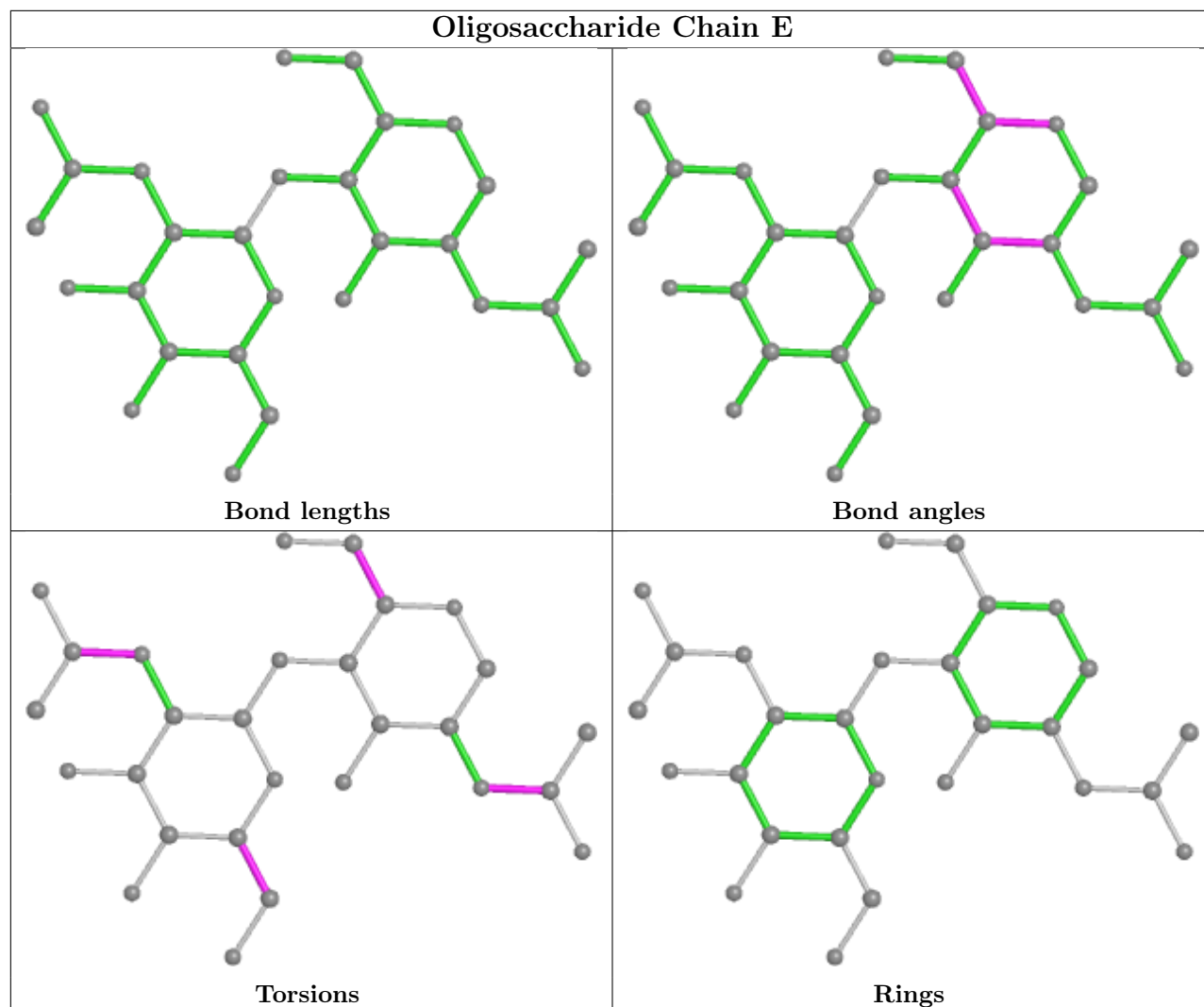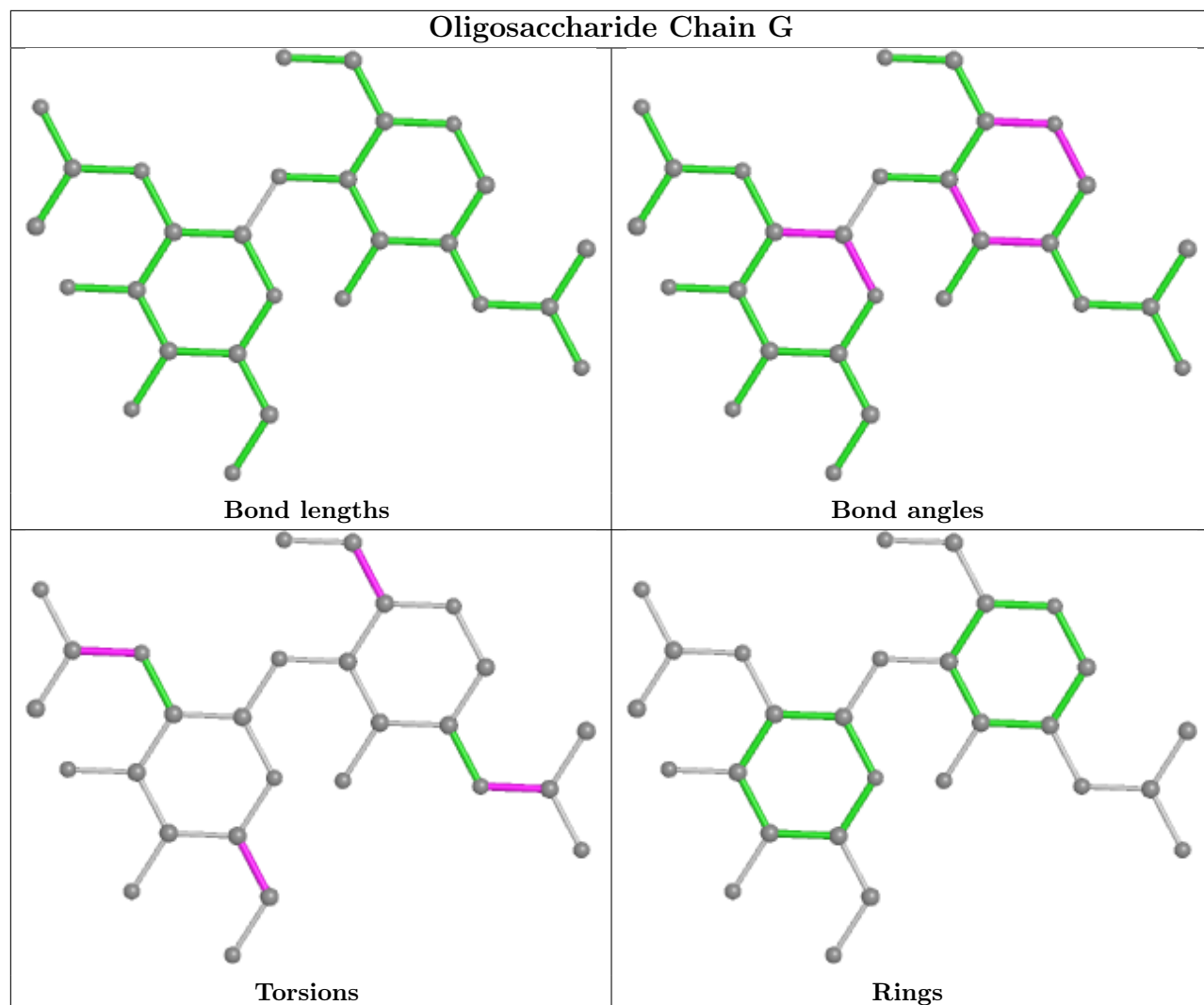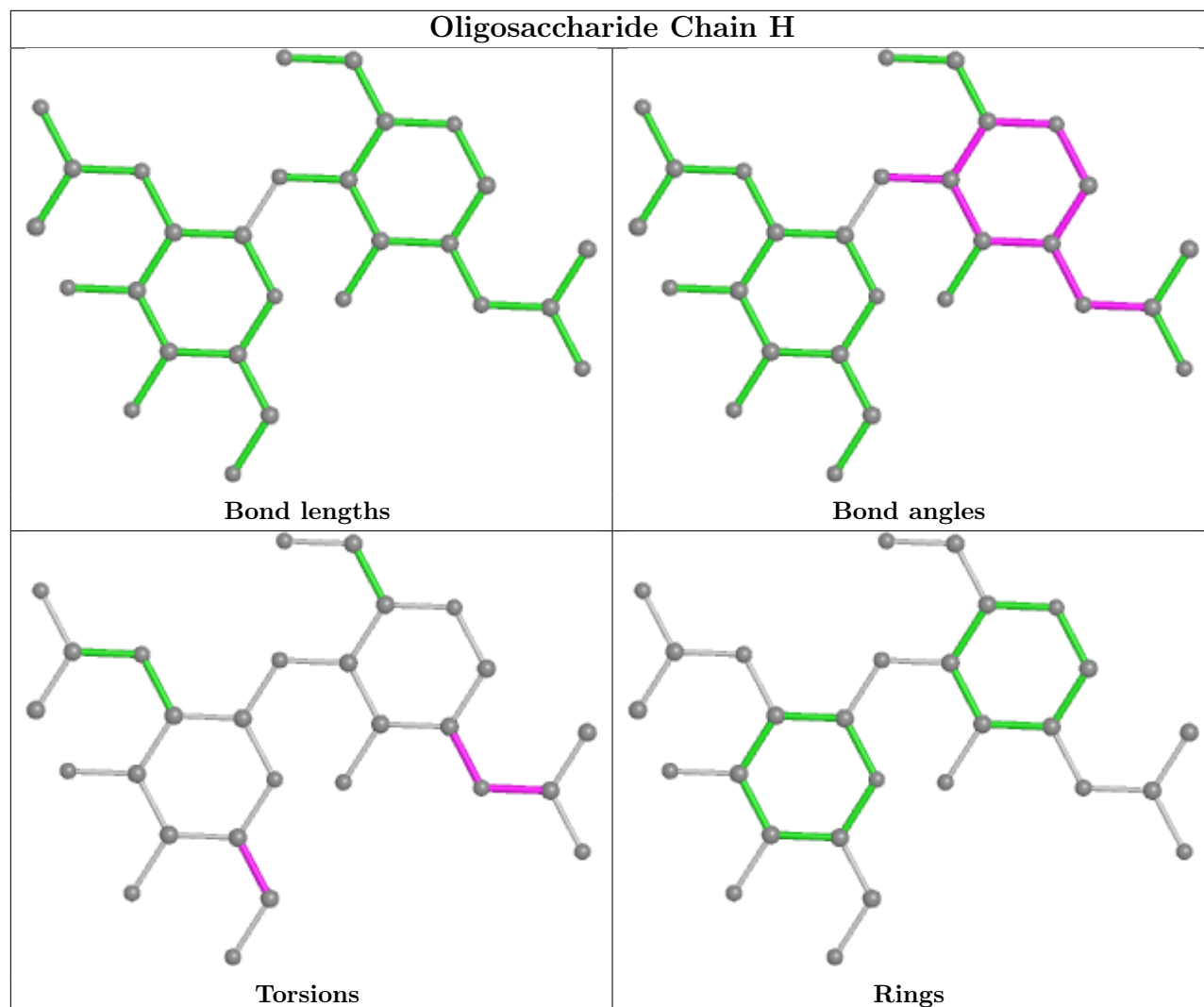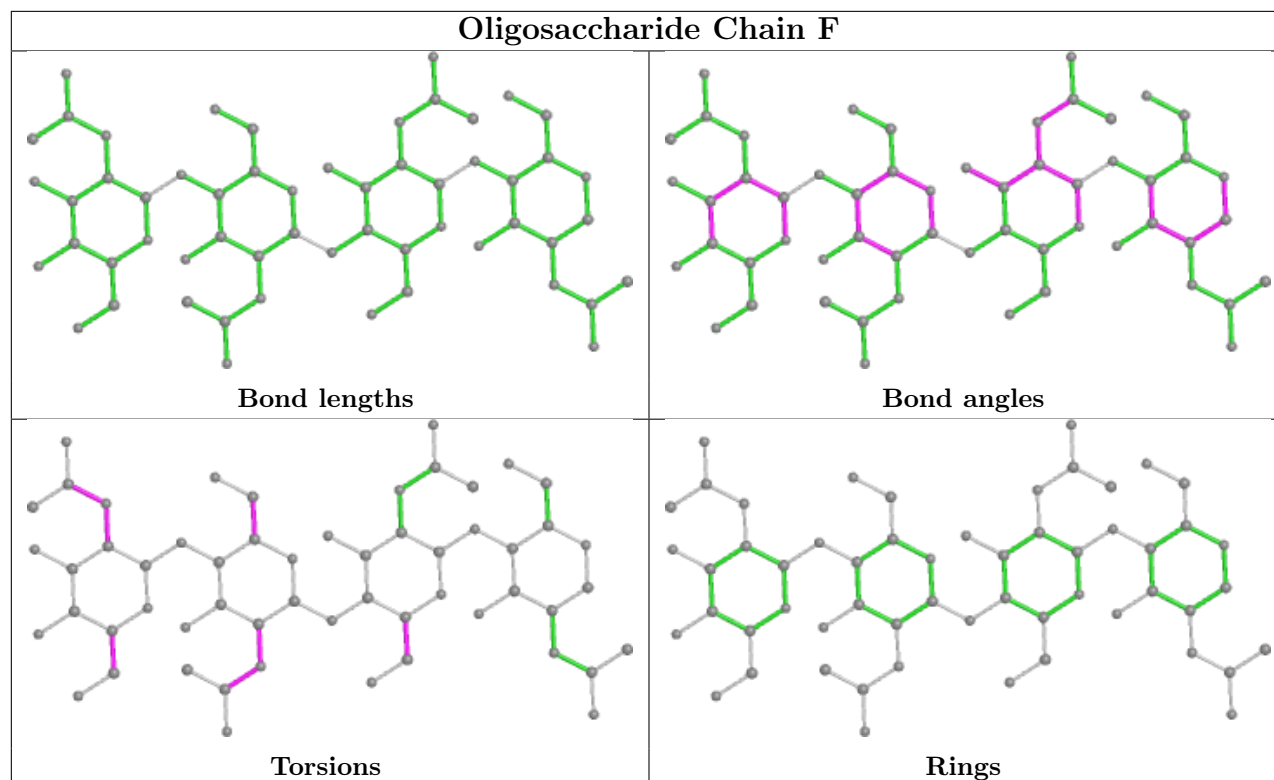
5.6　Ligand geometry ⓘ

Of 16 ligands modelled in this entry, 2 are monoatomic - leaving 14 for Mogul analysis.

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	$\#|Z| > 2$
11	NAG	A	2605	1	14,14,15	0.35	0	17,19,21	1.33	3 (17%)
12	Y01	A	2610	-	38,38,38	0.45	0	57,57,57	0.48	0
11	NAG	B	1202	2	14,14,15	0.47	0	17,19,21	1.22	2 (11%)
8	CLR	A	2611	-	31,31,31	0.30	0	48,48,48	0.38	0
13	3PE	A	2613	-	39,39,50	0.35	0	42,44,55	0.36	0
8	CLR	A	2612	-	31,31,31	0.33	0	48,48,48	0.55	0
9	PT5	A	2603	-	64,64,69	0.86	2 (3%)	78,82,87	1.26	7 (8%)
7	PS1	A	2601	10	36,37,37	1.05	4 (11%)	40,44,44	0.99	2 (5%)
12	Y01	A	2609	-	38,38,38	0.45	0	57,57,57	0.66	0
13	3PE	A	2614	-	50,50,50	0.29	0	53,55,55	0.33	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	#|Z| > 2	Counts	RMSZ	#|Z| > 2
8	CLR	A	2607	-	31,31,31	0.31	0	48,48,48	0.46	0
8	CLR	A	2608	-	31,31,31	0.35	0	48,48,48	0.57	0
8	CLR	A	2602	-	31,31,31	1.27	5 (16%)	48,48,48	3.08	21 (43%)
12	Y01	A	2606	-	38,38,38	0.46	0	57,57,57	0.51	0

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
11	NAG	A	2605	1	-	1/6/23/26	0/1/1/1
12	Y01	A	2610	-	-	13/19/77/77	0/4/4/4
11	NAG	B	1202	2	-	4/6/23/26	0/1/1/1
8	CLR	A	2611	-	-	9/10/68/68	0/4/4/4
13	3PE	A	2613	-	-	25/43/43/54	-
8	CLR	A	2612	-	-	9/10/68/68	0/4/4/4
9	PT5	A	2603	-	-	26/61/85/90	0/1/1/1
7	PS1	A	2601	10	-	22/43/43/43	-
12	Y01	A	2609	-	-	10/19/77/77	0/4/4/4
13	3PE	A	2614	-	-	16/54/54/54	-
8	CLR	A	2607	-	-	6/10/68/68	0/4/4/4
8	CLR	A	2608	-	-	10/10/68/68	0/4/4/4
8	CLR	A	2602	-	-	6/10/68/68	0/4/4/4
12	Y01	A	2606	-	-	8/19/77/77	0/4/4/4

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

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
9	A	2603	PT5	O18-C11	4.27	1.45	1.33
9	A	2603	PT5	O16-C10	3.75	1.44	1.34
8	A	2602	CLR	C13-C14	-3.18	1.48	1.55
8	A	2602	CLR	C8-C14	-2.76	1.48	1.53
8	A	2602	CLR	C10-C9	-2.47	1.51	1.56

The worst 5 of 35 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
8	A	2602	CLR	C14-C8-C9	-12.13	92.85	109.09

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
8	A	2602	CLR	C19-C10-C9	-7.52	102.72	111.68
8	A	2602	CLR	C1-C10-C9	5.82	116.86	108.73
8	A	2602	CLR	C19-C10-C5	5.24	116.82	108.34
8	A	2602	CLR	C8-C7-C6	-4.74	105.92	112.73

There are no chirality outliers.

5 of 165 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
7	A	2601	PS1	C4-O6-P1-O1
7	A	2601	PS1	C4-O6-P1-O2
8	A	2611	CLR	C13-C17-C20-C21
8	A	2611	CLR	C16-C17-C20-C22
9	A	2603	PT5	C7-O13-P1-O11

There are no ring outliers.

12 monomers are involved in 62 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
12	A	2610	Y01	5	0
8	A	2611	CLR	5	0
13	A	2613	3PE	9	0
8	A	2612	CLR	1	0
9	A	2603	PT5	4	0
7	A	2601	PS1	3	0
12	A	2609	Y01	8	0
13	A	2614	3PE	6	0
8	A	2607	CLR	1	0
8	A	2608	CLR	6	0
8	A	2602	CLR	7	0
12	A	2606	Y01	11	0

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 Y01 A 2610

Bond lengths

Bond angles

Torsions

Rings

Ligand CLR A 2611

Bond lengths

Bond angles

Torsions

Rings

Ligand 3PE A 2613

Bond lengths

Bond angles

Torsions

Rings

Ligand CLR A 2612

Bond lengths

Bond angles

Torsions

Rings

Ligand PT5 A 2603

Bond lengths

Bond angles

Torsions

Rings

Ligand PS1 A 2601

Bond lengths

Bond angles

Torsions

Rings

Ligand Y01 A 2609

Bond lengths

Bond angles

Torsions

Rings

Ligand 3PE A 2614

Bond lengths

Bond angles

Torsions

Rings

Ligand CLR A 2607

Bond lengths

Bond angles

Torsions

Rings

Ligand CLR A 2608

Bond lengths

Bond angles

Torsions

Rings

Ligand CLR A 2602

Bond lengths

Bond angles

Torsions

Rings

Ligand Y01 A 2606

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 (i)

This section contains visualisations of the EMDB entry EMD-38158. These allow visual inspection of the internal detail of the map and identification of artifacts.

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

6.1   Orthogonal projections (i)

6.1.1   Primary map
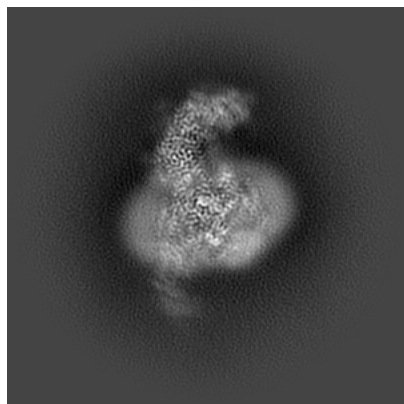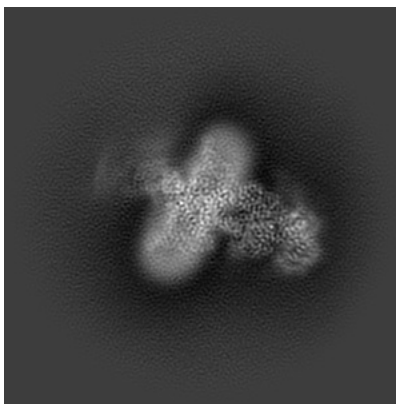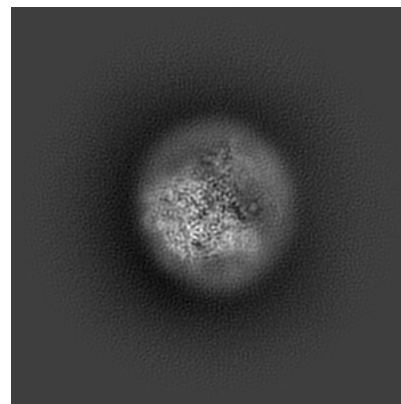
X   Y   Z

6.1.2   Raw map

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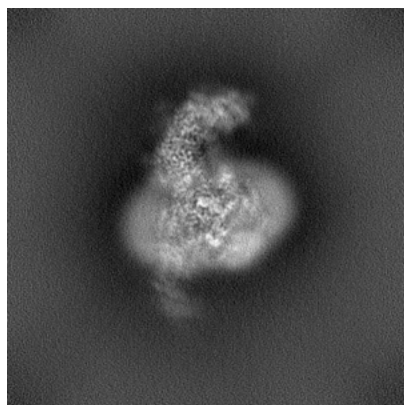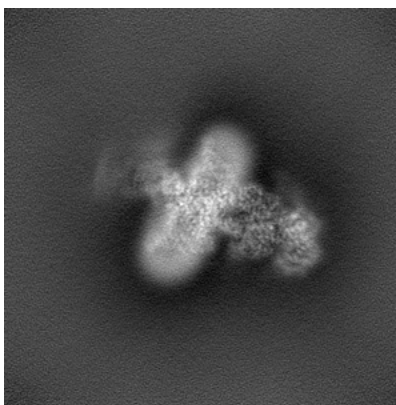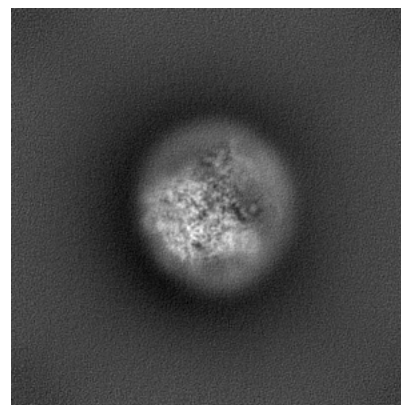
The images above show the map projected in three orthogonal directions.

6.2　Central slices ⓘ
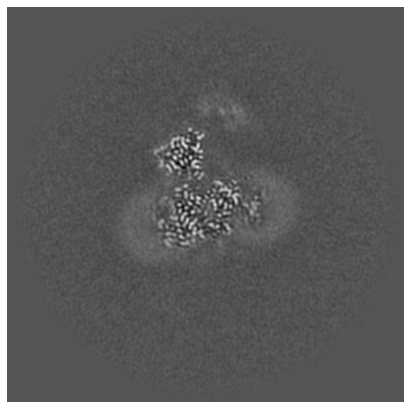
6.2.1　Primary map
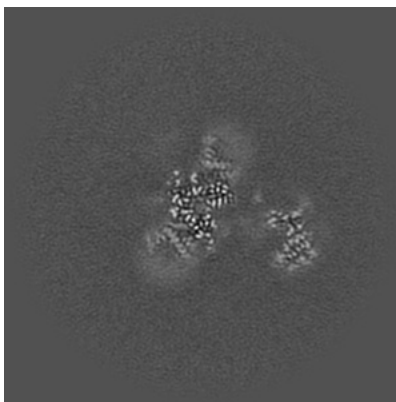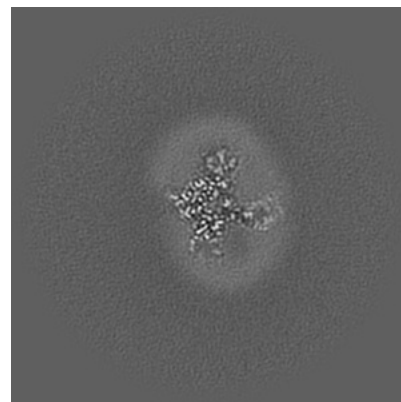
| X Index: 160 | Y Index: 160 | Z Index: 160 |

6.2.2　Raw map
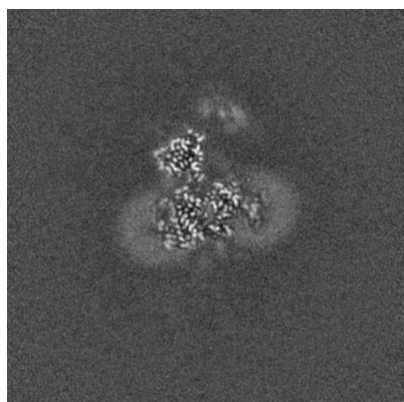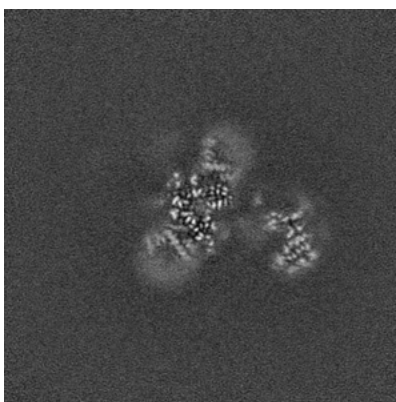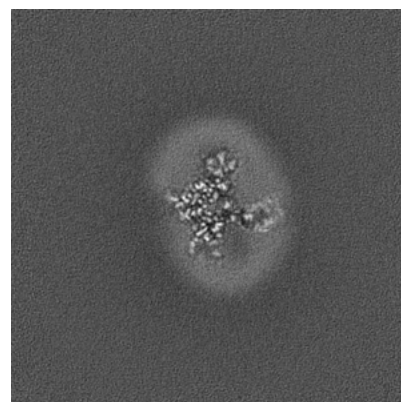
| X Index: 160 | Y Index: 160 | Z Index: 160 |

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

6.3   Largest variance slices   ⓘ

6.3.1   Primary map
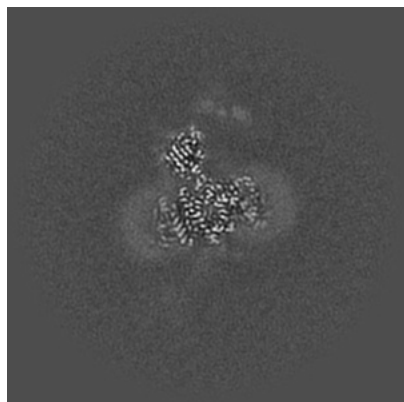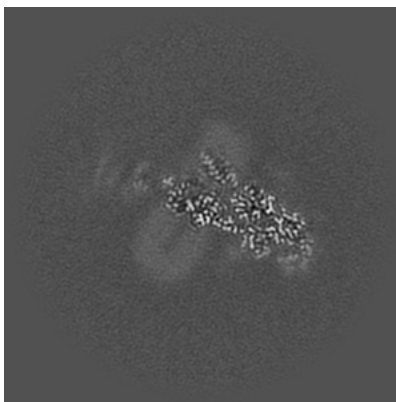
X Index: 163   Y Index: 144   Z Index: 161
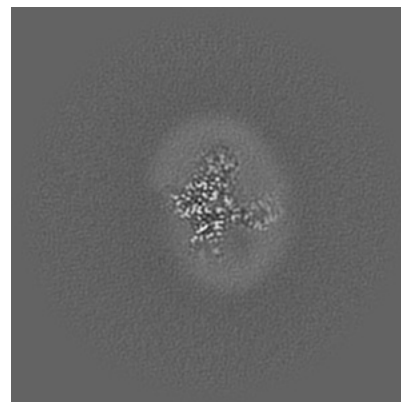
6.3.2   Raw map
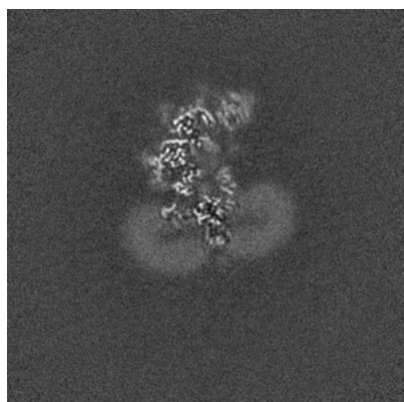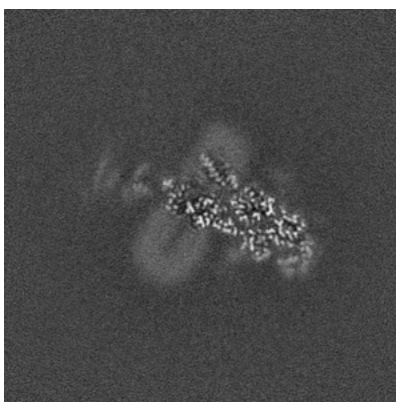
X Index: 144   Y Index: 144   Z Index: 162
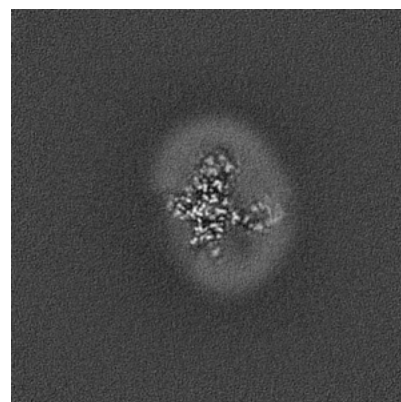
The images above show the largest variance slices of the map in three orthogonal directions.

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

6.4.1 Primary map
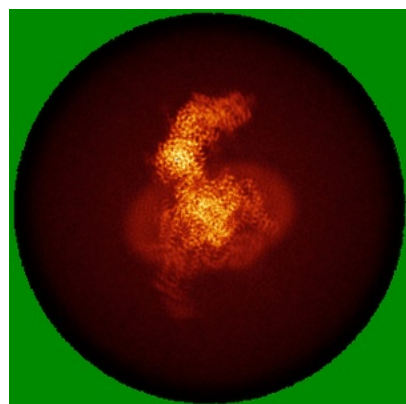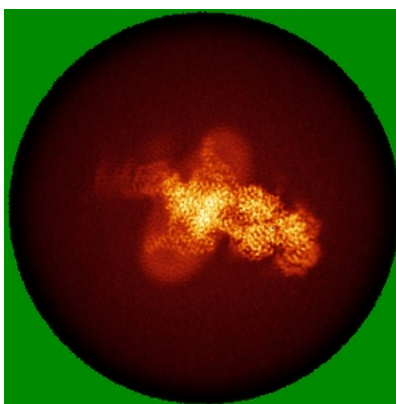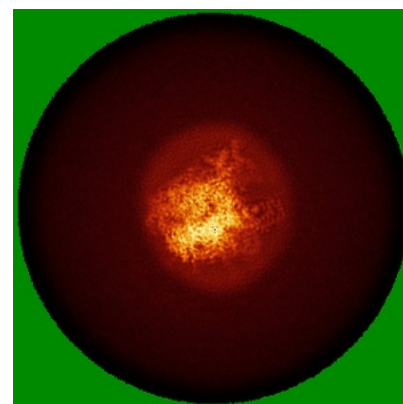
| X | Y | Z |

6.4.2 Raw map

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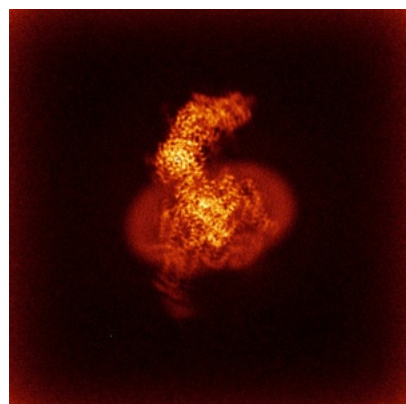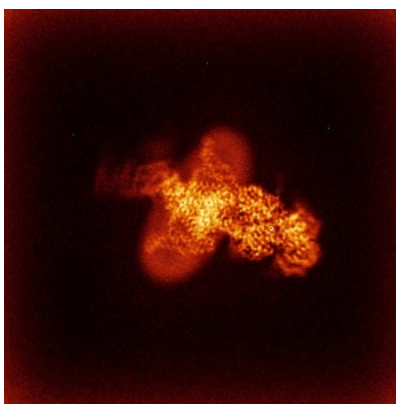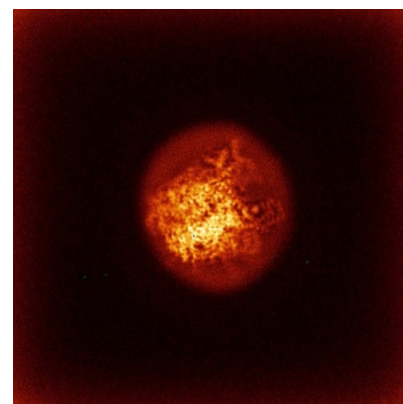
The images above show the map standard deviation projections with false color in three orthogonal directions. Minimum values are shown in green, max in blue, and dark to light orange shades represent small to large values respectively.

6.5 Orthogonal surface views (i)

6.5.1 Primary map

| X | Y | Z |
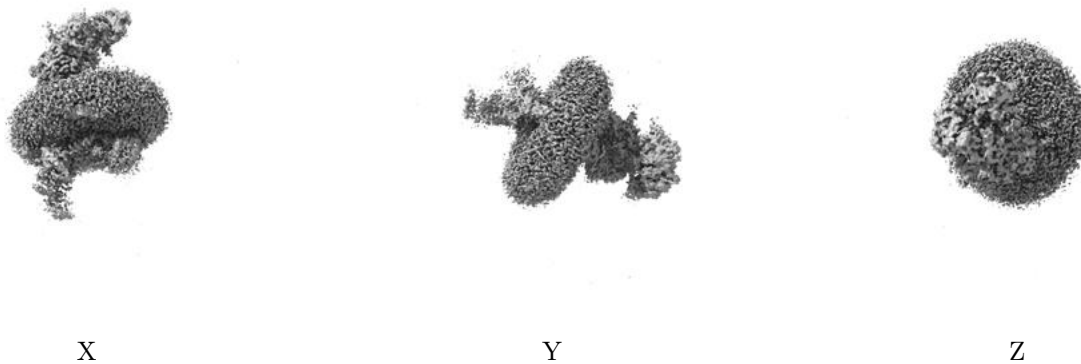
The images above show the 3D surface view of the map at the recommended contour level 0.26. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

6.5.2 Raw map

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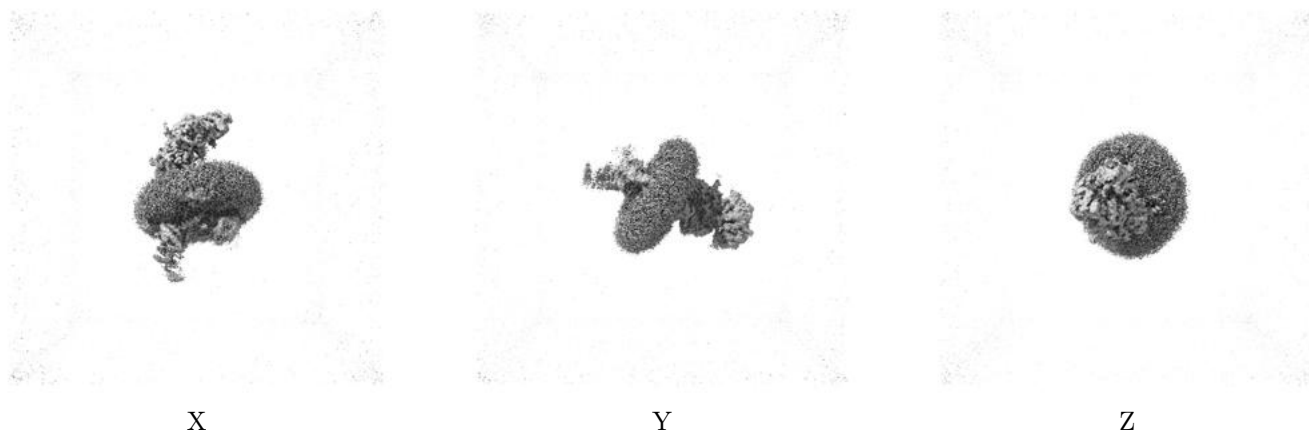
These images show the 3D surface of the raw map. The raw map's contour level was selected so that its surface encloses the same volume as the primary map does at its recommended contour level.

6.6 Mask visualisation (i)

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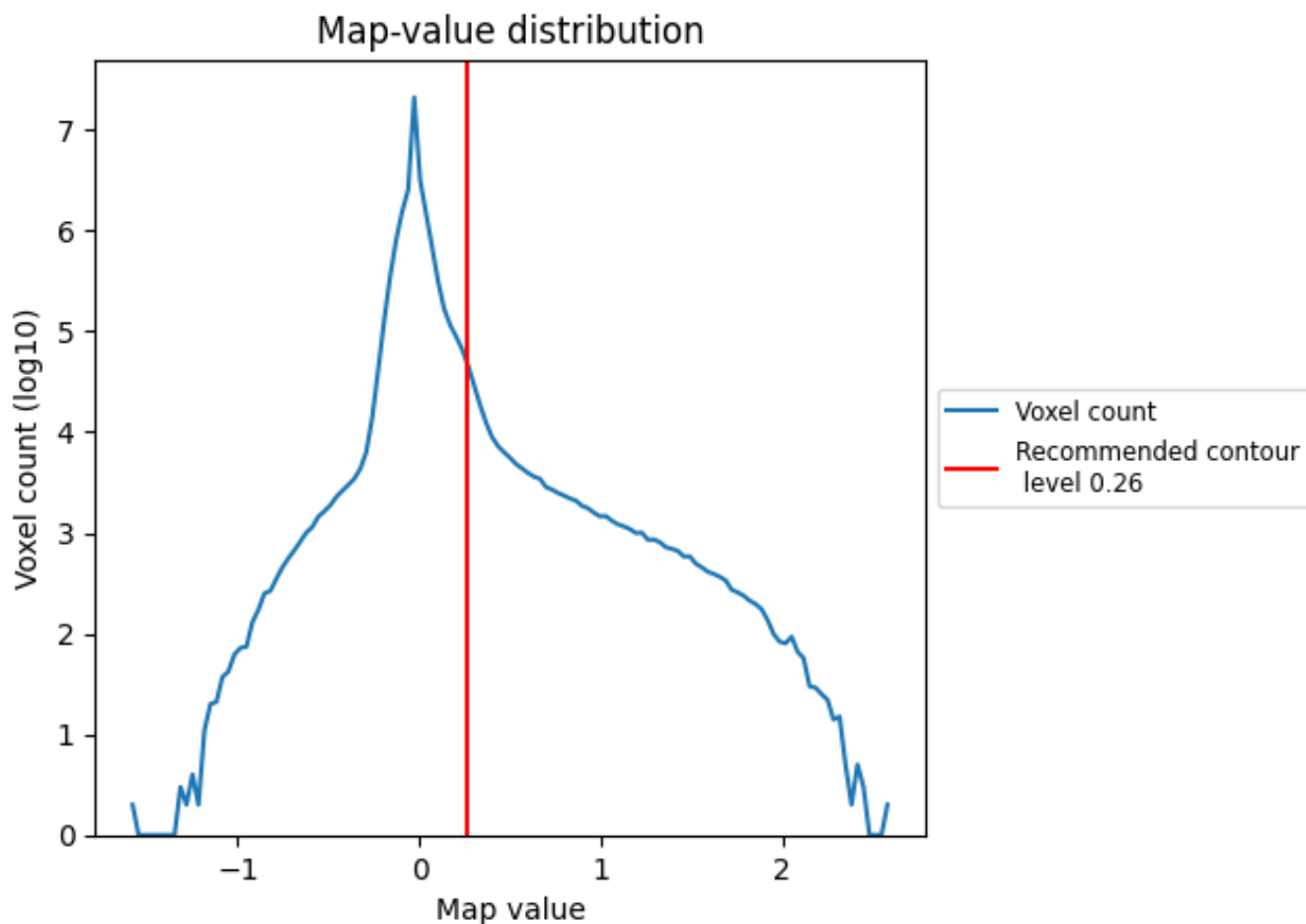
The map-value distribution is plotted in 128 intervals along the x-axis. The y-axis is logarithmic. A spike in this graph at zero usually indicates that the volume has been masked.

7.2   Volume estimate (i)
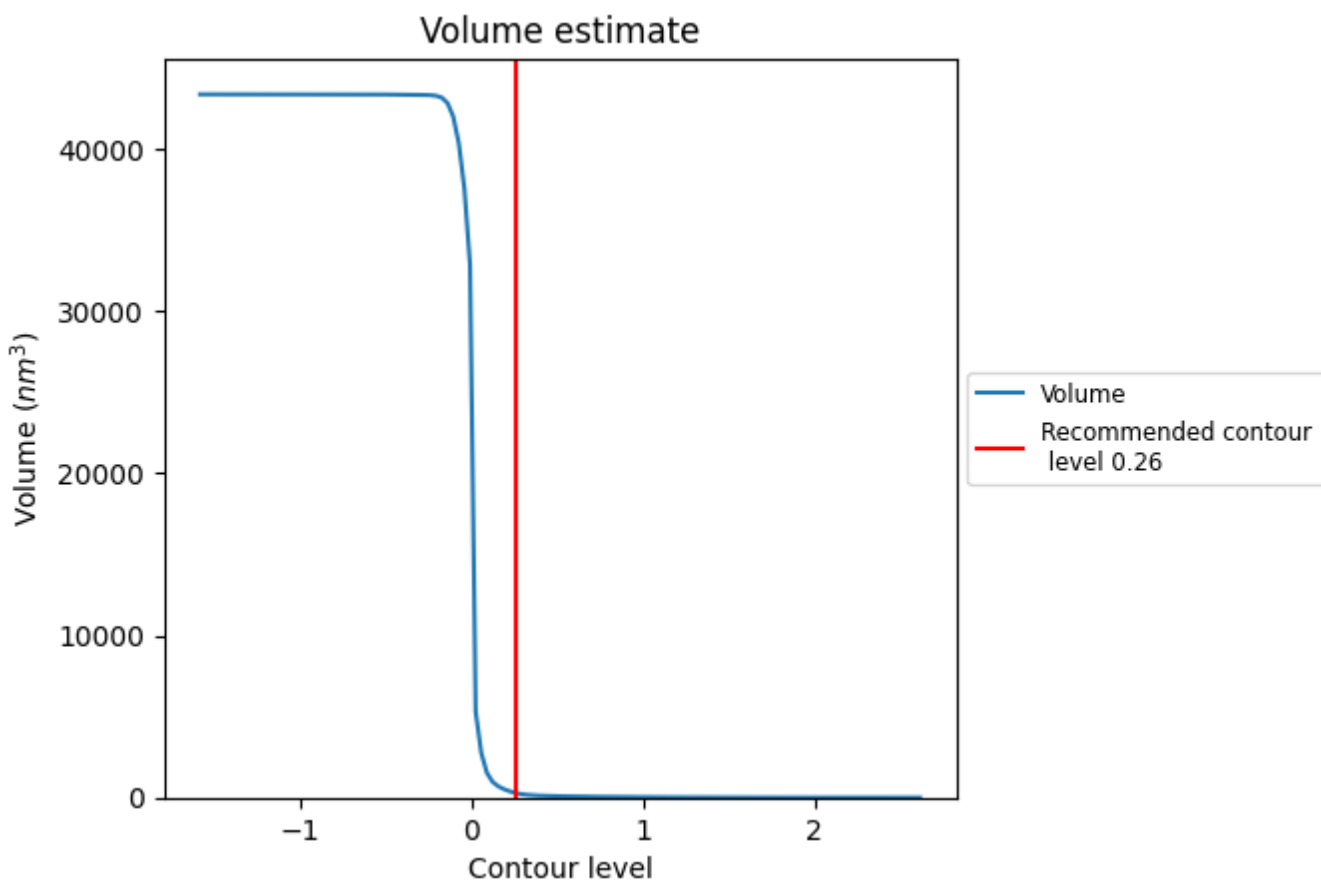
The volume at the recommended contour level is 282 nm^3; this corresponds to an approximate mass of 255 kDa.

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   ⓘ
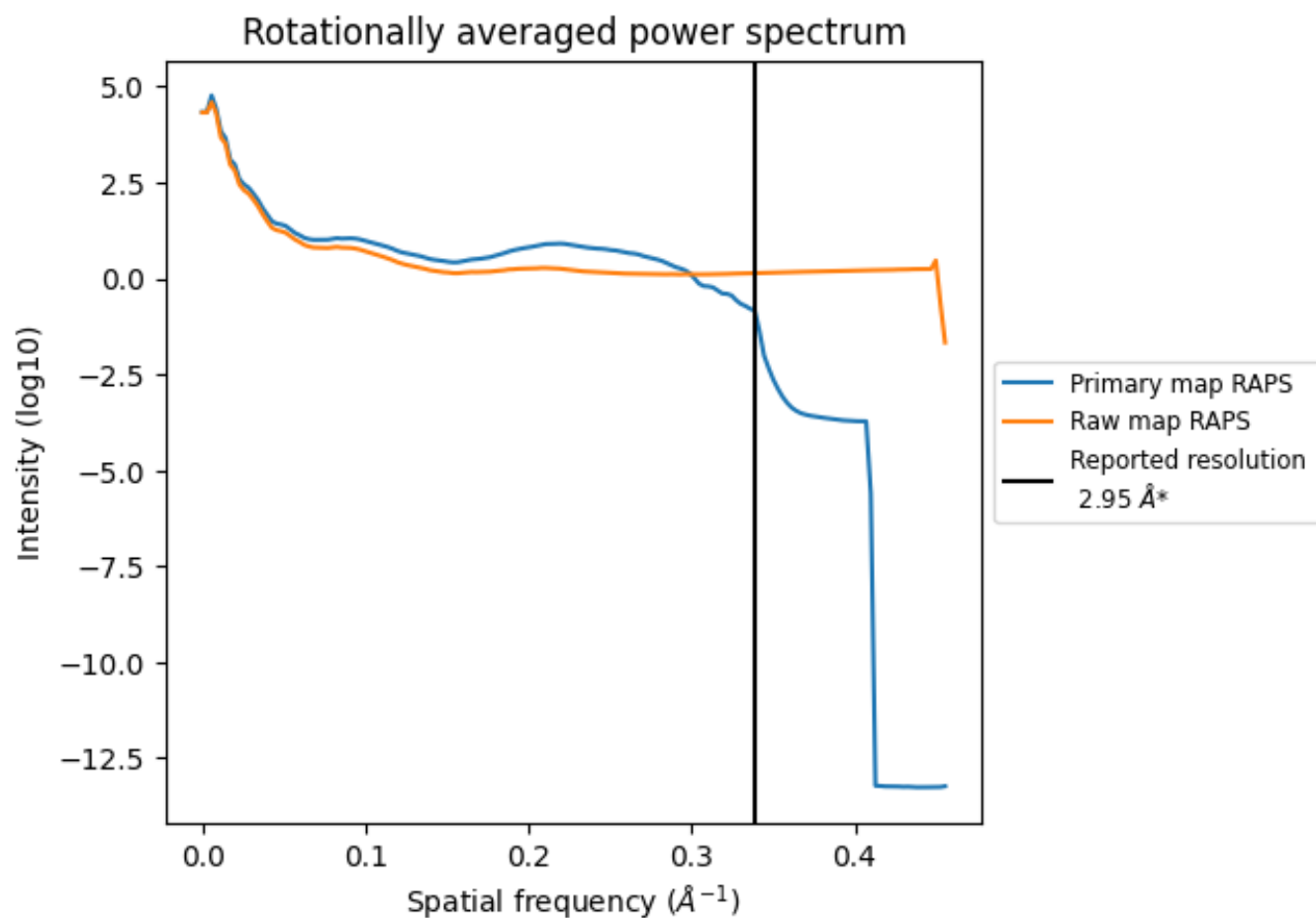
*Reported resolution corresponds to spatial frequency of 0.339 Å^{-1}

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 ⓘ
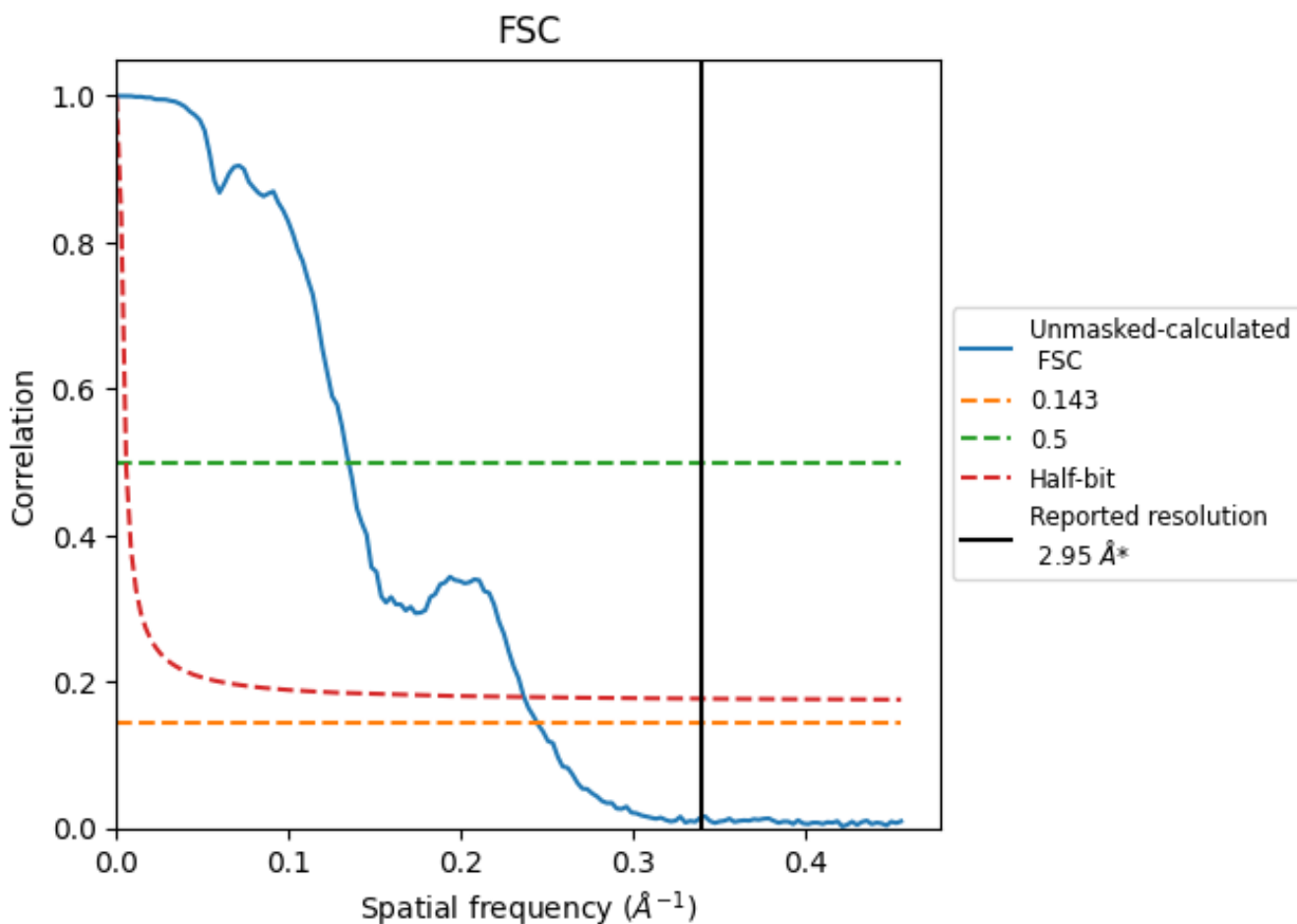
*Reported resolution corresponds to spatial frequency of 0.339 Å^{-1}

8.2   Resolution estimates ⓘ

Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	2.95	-	-
Author-provided FSC curve	-	-	-
Unmasked-calculated*	4.09	7.42	4.23

*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 4.09 differs from the reported value 2.95 by more than 10 %

9 Map-model fit ⓘ

This section contains information regarding the fit between EMDB map EMD-38158 and PDB model 8X90. Per-residue inclusion information can be found in section 3 on page 11.

9.1 Map-model overlay ⓘ

X	Y	Z
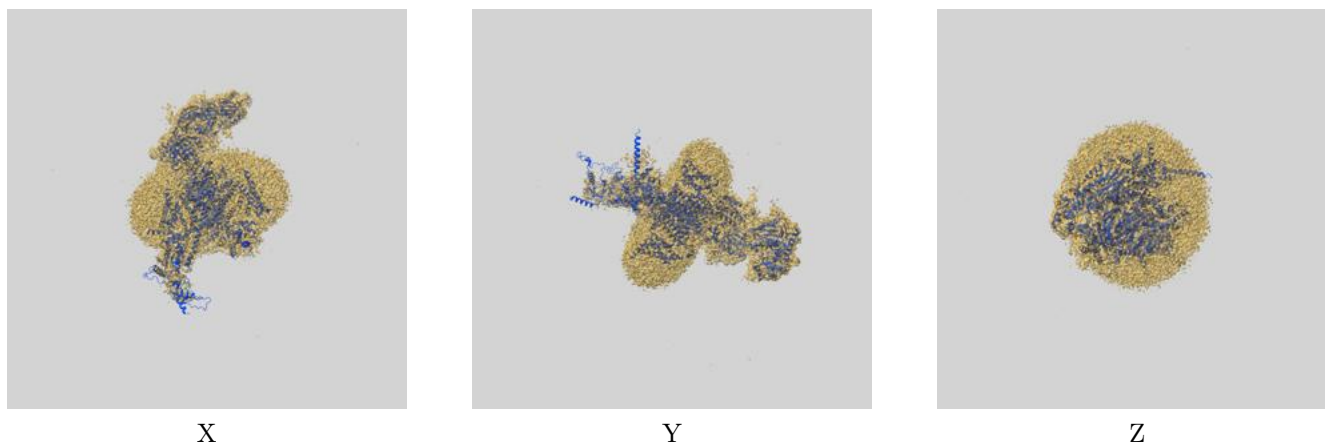
The images above show the 3D surface view of the map at the recommended contour level 0.26 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

9.2   Q-score mapped to coordinate model ⓘ

X   Y   Z
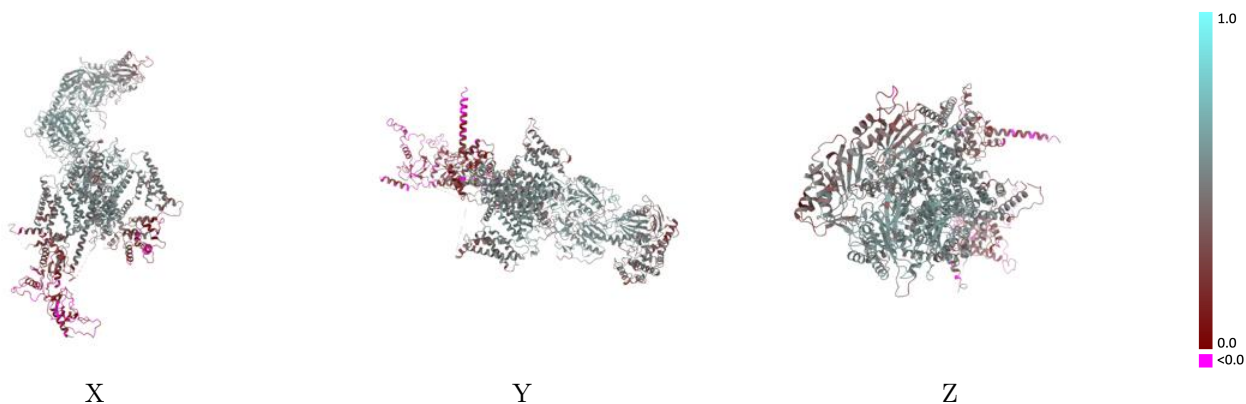
The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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
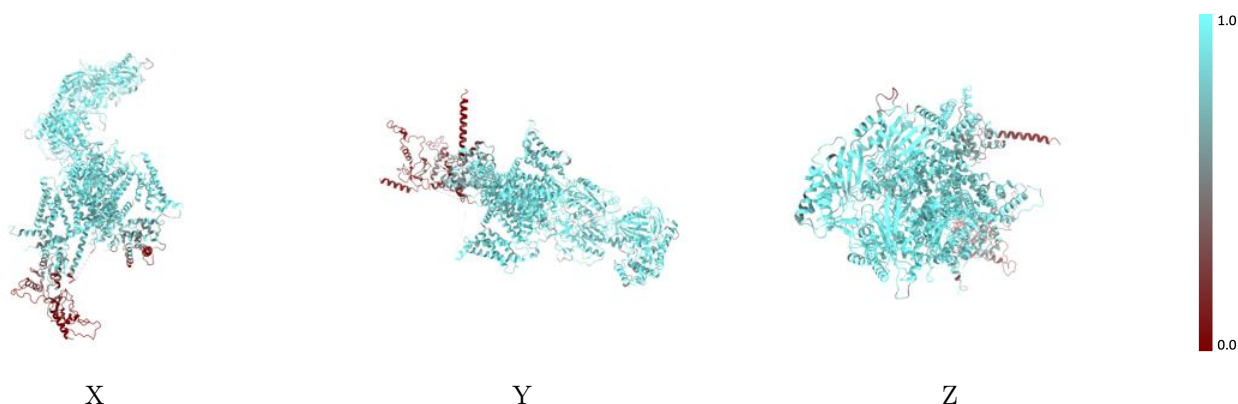
The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.26).

9.4   Atom inclusion ⓘ
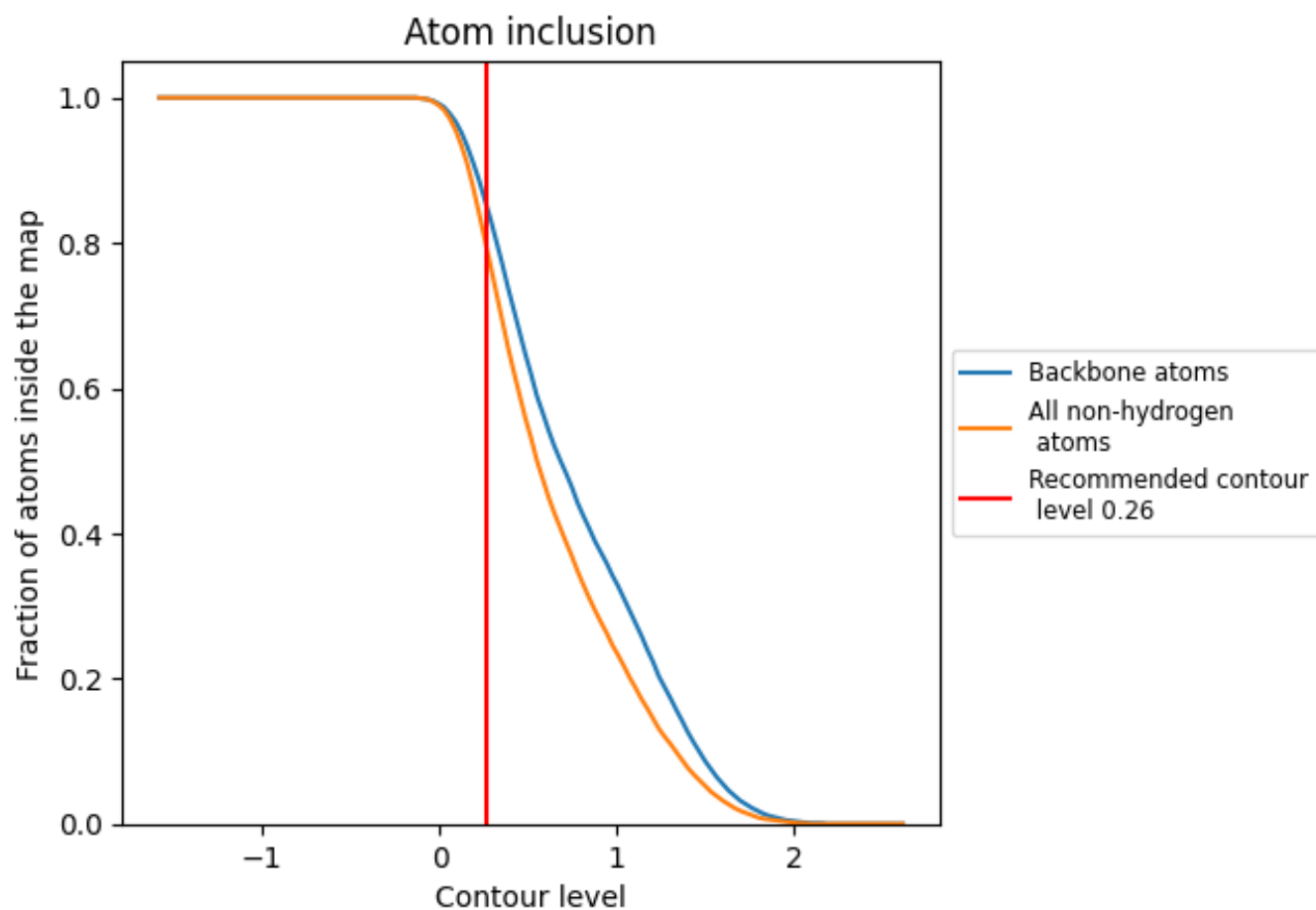
At the recommended contour level, 86% of all backbone atoms, 80% of all non-hydrogen atoms, are inside the map.

9.5   Map-model fit summary ⓘ

The table lists the average atom inclusion at the recommended contour level (0.26) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.8010	0.4390
A	0.8320	0.4610
B	0.9120	0.4960
C	0.3210	0.1640
D	0.8810	0.4880
E	0.8210	0.4630
F	0.9640	0.5470
G	0.8570	0.5440
H	0.9290	0.4840

1.0

0.0
<0.0