



# Full wwPDB EM Validation Report ⓘ

Jun 12, 2024 – 10:22 AM JST

PDB ID : 8JXB  
EMDB ID : EMD-36695  
Title : Cryo-EM structure of rat megalin wingAc  
Authors : Goto, S.; Tsutsumi, A.; Lee, Y.; Hosojima, M.; Kabasawa, H.; Komochi, K.; Yun-san, L.; Nagatoshi, S.; Tsumoto, K.; Nishizawa, T.; Kikkawa, M.; Saito, A.  
Deposited on : 2023-06-30  
Resolution : 3.70 Å(reported)  
Based on initial model : .

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

We welcome your comments at [validation@mail.wwpdb.org](mailto:validation@mail.wwpdb.org)

A user guide is available at

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

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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

EMDB validation analysis : 0.0.1.dev92  
Mogul : 1.8.5 (274361), CSD as541be (2020)  
MolProbity : 4.02b-467  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
MapQ : 1.9.13  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.36.2

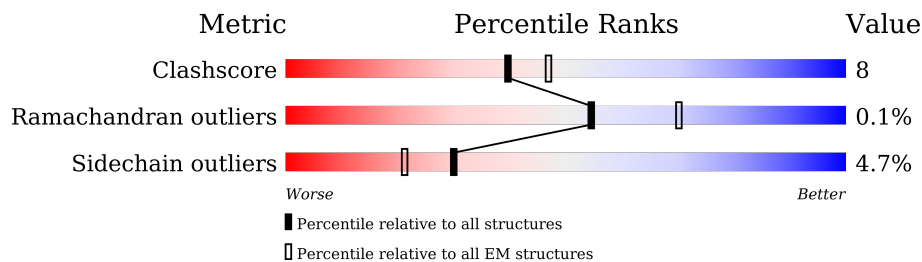
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*ELECTRON MICROSCOPY*

The reported resolution of this entry is 3.70 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	EM structures (#Entries)
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  $\geq 3$ , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions  $\leq 5\%$ . The upper red bar (where present) indicates the fraction of residues that have poor fit to the EM map (all-atom inclusion  $< 40\%$ ). The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	4660	95%
1	B	4660	20% 76%
2	Q	6	100%
3	R	5	80% 20%
4	C	3	33% 100%
5	D	2	100%
5	E	2	50% 100% 50%

## 2 Entry composition [i](#)

There are 8 unique types of molecules in this entry. The entry contains 10971 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 LDL receptor related protein 2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	244	1851	1088	329	398	36	0	0
1	B	1129	8767	5377	1557	1730	103	0	0

- Molecule 2 is a protein called unclear peptide.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
2	Q	6	30	18	6	6	0	0

- Molecule 3 is a protein called unclear peptide.

Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
3	R	5	28	16	6	6	0	0

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



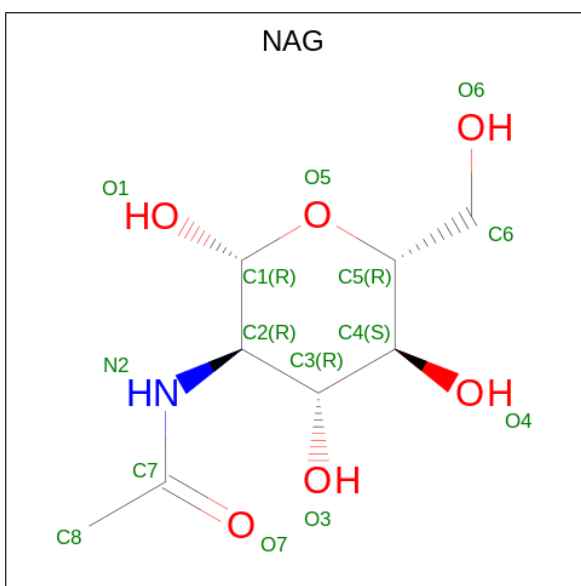
Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
4	C	3	39	22	2	15	0	0

- Molecule 5 is an oligosaccharide called 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.



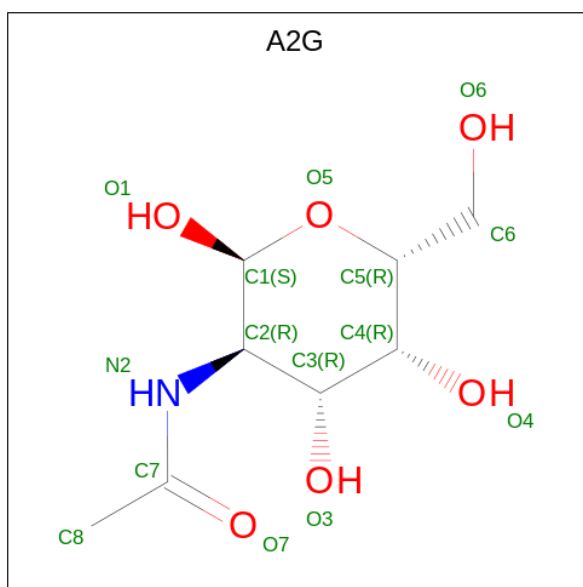
Mol	Chain	Residues	Atoms				AltConf	Trace
			Total	C	N	O		
5	D	2	28	16	2	10	0	0
5	E	2	28	16	2	10	0	0

- Molecule 6 is 2-acetamido-2-deoxy-beta-D-glucopyranose (three-letter code: NAG) (formula:  $C_8H_{15}NO_6$ ).



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

- Molecule 7 is 2-acetamido-2-deoxy-alpha-D-galactopyranose (three-letter code: A2G) (formula:  $C_8H_{15}NO_6$ ).



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

- Molecule 8 is CALCIUM ION (three-letter code: CA) (formula: Ca).

Mol	Chain	Residues	Atoms		AltConf
			Total	Ca	
8	A	6	Total	Ca	0
			6	6	
8	B	12	Total	Ca	0
			12	12	




















There are no outlier residues recorded for this chain.

- Molecule 3: unclear peptide

Chain R:  80% 20%



- Molecule 4: beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain C:  33% 100%



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

Chain D:  100%



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

Chain E:  50% 100% 50%



## 4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	101096	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING ONLY	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ( $e^-/\text{\AA}^2$ )	50	Depositor
Minimum defocus (nm)	800	Depositor
Maximum defocus (nm)	1600	Depositor
Magnification	Not provided	
Image detector	GATAN K3 BIOQUANTUM (6k x 4k)	Depositor
Maximum map value	0.257	Depositor
Minimum map value	-0.137	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.004	Depositor
Recommended contour level	0.04	Depositor
Map size ( $\text{\AA}$ )	366.86002, 366.86002, 366.86002	wwPDB
Map dimensions	260, 260, 260	wwPDB
Map angles ( $^\circ$ )	90.0, 90.0, 90.0	wwPDB
Pixel spacing ( $\text{\AA}$ )	1.411, 1.411, 1.411	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: BMA, A2G, CA, NAG

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	0.26	0/1892	0.52	0/2573
1	B	0.30	0/8979	0.54	0/12184
3	R	0.30	0/7	0.36	0/8
All	All	0.30	0/10878	0.53	0/14765

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	1851	0	1549	43	0
1	B	8767	0	8038	119	0
2	Q	30	0	8	0	0
3	R	28	0	12	2	0
4	C	39	0	34	0	0
5	D	28	0	25	0	0
5	E	28	0	25	1	0
6	A	28	0	26	0	0
6	B	42	0	39	0	0
7	A	14	0	12	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
7	B	98	0	84	0	0
8	A	6	0	0	0	0
8	B	12	0	0	0	0
All	All	10971	0	9852	160	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 8.

All (160) 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:B:1232:HIS:HB2	1:B:1235:GLU:HG3	1.57	0.85
1:B:711:LEU:HD22	1:B:745:ILE:HD13	1.65	0.77
1:B:914:HIS:NE2	3:R:2:ASN:OD1	2.17	0.76
1:A:2801:CYS:SG	1:A:2818:CYS:N	2.68	0.66
1:A:2852:GLY:O	1:A:2856:ASN:ND2	2.29	0.66
1:B:830:ILE:HG13	1:B:841:LEU:HB3	1.78	0.64
1:B:976:THR:O	1:B:977:THR:OG1	2.13	0.63
1:A:2847:ASN:ND2	1:A:2854:ASP:OD2	2.33	0.62
1:B:1273:SER:OG	1:B:1276:HIS:ND1	2.30	0.61
1:B:504:ILE:HG22	1:B:508:LEU:HD11	1.82	0.61
1:A:2843:CYS:H	1:A:2855:GLU:HA	1.65	0.61
1:B:297:GLU:O	1:B:304:ARG:NH2	2.33	0.61
1:A:2747:PHE:CE2	1:A:2760:ARG:HD3	2.35	0.60
1:B:380:ARG:NH1	1:B:382:GLN:OE1	2.35	0.59
1:B:816:SER:HB3	1:B:1000:PRO:HG3	1.85	0.59
1:B:294:GLY:O	1:B:304:ARG:NH2	2.36	0.58
1:A:2824:PRO:HG2	1:A:2827:PHE:HB2	1.84	0.58
1:B:846:ARG:O	1:B:846:ARG:NH1	2.37	0.58
1:B:254:ASP:HB3	1:B:588:ILE:CG2	2.33	0.58
1:B:527:ASP:N	1:B:527:ASP:OD1	2.36	0.58
1:B:1302:ASP:OD1	1:B:1302:ASP:N	2.38	0.57
1:B:846:ARG:HB3	1:B:847:PRO:HD3	1.87	0.56
1:B:1139:SER:O	1:B:1142:LYS:NZ	2.38	0.56
1:B:912:MET:HE2	1:B:927:ILE:HG21	1.87	0.56
1:B:1153:THR:HG22	1:B:1165:PRO:HG3	1.87	0.56
1:B:953:ILE:HG13	1:B:953:ILE:O	2.05	0.55
1:B:257:GLU:N	1:B:257:GLU:OE2	2.39	0.55
1:A:2839:ARG:HA	1:A:2842:LEU:HD13	1.87	0.54
1:B:254:ASP:HB3	1:B:588:ILE:HG23	1.89	0.54
1:B:766:LYS:HD2	1:B:777:ILE:HD11	1.89	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:2870:PHE:HE1	1:A:2881:SER:HA	1.71	0.54
1:B:394:SER:O	1:B:650:TYR:N	2.39	0.54
1:A:2760:ARG:HH21	1:B:978:HIS:HD2	1.54	0.54
1:A:2786:GLU:HB2	1:A:2794:CYS:HB2	1.88	0.54
1:A:2844:ASP:HB2	1:A:2877:ARG:HH21	1.72	0.53
1:B:608:LEU:HB3	1:B:613:VAL:HG12	1.91	0.53
1:B:361:CYS:SG	1:B:362:GLU:N	2.80	0.53
1:B:1029:SER:OG	1:B:1037:CYS:SG	2.67	0.53
1:B:380:ARG:HH11	1:B:382:GLN:HB3	1.73	0.53
1:B:700:GLU:HB3	1:B:701:HIS:ND1	2.23	0.53
1:B:1140:ASP:OD1	1:B:1141:GLU:HG2	2.08	0.53
1:A:2809:ASP:N	1:A:2809:ASP:OD1	2.33	0.53
1:B:308:MET:HE1	1:B:311:CYS:HB2	1.91	0.52
1:B:882:ARG:NH2	1:B:902:ASP:OD2	2.43	0.52
1:B:735:VAL:HG11	1:B:756:TYR:CZ	2.45	0.52
1:A:2724:ASN:OD1	1:A:2729:GLY:N	2.41	0.52
1:B:872:ASN:OD1	3:R:2:ASN:ND2	2.42	0.52
1:A:2702:ASN:H	1:A:2705:GLN:HE21	1.57	0.51
1:B:1161:ARG:NH2	1:B:1174:ASP:O	2.36	0.51
1:A:2710:ASN:HB2	1:A:2712:HIS:CE1	2.45	0.51
1:B:626:ALA:HB1	1:B:631:GLU:HG3	1.92	0.51
1:B:743:VAL:HG21	1:B:759:LEU:HD22	1.91	0.51
1:B:1160:HIS:CD2	1:B:1161:ARG:HG2	2.46	0.51
1:B:487:VAL:HG23	1:B:489:ARG:HE	1.75	0.50
1:A:2869:GLU:HG2	1:A:2880:PRO:HA	1.94	0.50
1:B:202:CYS:N	1:B:213:ASP:OD1	2.41	0.50
1:B:245:ASP:N	1:B:245:ASP:OD1	2.45	0.50
1:B:798:TYR:HH	1:B:855:SER:HG	1.59	0.50
1:B:494:ASN:ND2	1:B:499:GLN:OE1	2.41	0.49
1:A:2887:GLY:O	1:A:2919:ARG:NH1	2.46	0.49
1:B:948:VAL:HG21	1:B:951:ARG:HH21	1.77	0.49
1:B:1188:CYS:SG	1:B:1194:LYS:HB2	2.52	0.49
1:B:811:ARG:HB2	1:B:986:PHE:CE1	2.47	0.49
1:B:466:ASP:OD1	1:B:736:THR:OG1	2.25	0.49
1:B:584:THR:HG22	1:B:588:ILE:H	1.78	0.49
1:A:2890:ASP:N	1:A:2896:ASP:OD2	2.43	0.48
1:B:380:ARG:HG2	1:B:380:ARG:O	2.13	0.48
1:B:971:ASN:HD21	1:B:973:CYS:HB2	1.78	0.48
1:B:308:MET:CE	1:B:311:CYS:HB2	2.43	0.48
1:B:360:LYS:H	1:B:360:LYS:HZ3	1.62	0.48
1:A:2807:CYS:SG	1:A:2814:ASP:HB2	2.54	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:986:PHE:HB2	1:B:998:GLY:O	2.14	0.48
1:B:1135:CYS:SG	1:B:1140:ASP:HB3	2.54	0.48
1:A:2795:ILE:HD13	1:A:2799:TYR:HB2	1.95	0.48
1:B:745:ILE:HD11	1:B:960:LYS:HB2	1.96	0.48
1:B:483:VAL:HG22	1:B:490:ILE:HG12	1.96	0.47
1:B:895:HIS:CE1	1:B:904:LYS:HB2	2.48	0.47
1:B:999:CYS:HB2	1:B:1000:PRO:HD3	1.96	0.47
1:A:2704:LEU:O	1:A:2716:GLN:HG3	2.14	0.47
1:B:380:ARG:NH2	1:B:383:HIS:HB2	2.29	0.47
1:B:929:ASP:OD1	1:B:930:TRP:N	2.48	0.47
1:B:398:SER:HB3	1:B:645:HIS:HB2	1.97	0.47
1:B:581:GLU:CD	1:B:590:ARG:HE	2.18	0.47
1:B:1207:ARG:NH1	1:B:1219:ASP:O	2.43	0.47
1:A:2843:CYS:N	1:A:2855:GLU:HA	2.30	0.47
1:B:931:ARG:HH21	1:B:1211:VAL:HB	1.79	0.47
1:B:1215:ARG:O	1:B:1215:ARG:NE	2.40	0.47
1:A:2763:TYR:CD2	1:A:2793:ARG:HD3	2.49	0.46
1:A:2815:GLU:HG2	1:A:2835:ILE:HD11	1.98	0.46
1:B:459:GLU:OE2	1:B:462:ASN:ND2	2.41	0.46
1:A:2830:CYS:HB3	1:A:2852:GLY:HA3	1.97	0.46
1:A:2938:ASP:N	1:A:2938:ASP:OD1	2.43	0.46
1:B:424:MET:HG2	1:B:443:MET:HG3	1.98	0.46
1:B:526:SER:HB3	1:B:561:ILE:HD11	1.98	0.46
1:A:2760:ARG:HH21	1:B:978:HIS:CD2	2.33	0.46
1:B:1006:GLN:HG3	1:B:1007:ARG:H	1.81	0.46
1:A:2806:ASN:N	1:A:2814:ASP:OD2	2.46	0.45
1:B:939:ARG:CZ	1:B:944:GLY:HA2	2.46	0.45
1:B:1279:CYS:SG	1:B:1301:SER:OG	2.75	0.45
1:B:452:ILE:HD12	1:B:452:ILE:H	1.82	0.45
1:B:807:VAL:HG13	1:B:821:ILE:HB	1.99	0.45
1:A:2715:ASN:OD1	1:A:2716:GLN:N	2.50	0.44
1:B:316:CYS:HB2	1:B:329:CYS:HB2	1.61	0.44
1:B:599:LEU:HG	1:B:634:PRO:HD3	1.99	0.44
1:A:2817:ASN:OD1	1:A:2834:ASN:N	2.49	0.44
1:B:983:CYS:HB3	1:B:997:CYS:HB3	1.77	0.44
1:A:2869:GLU:HB3	1:A:2878:CYS:SG	2.58	0.44
1:B:844:TRP:HB2	1:B:870:TRP:HA	1.98	0.44
1:B:1063:ASN:HD21	5:E:1:NAG:C1	2.31	0.44
1:A:2844:ASP:HA	1:A:2877:ARG:HA	2.00	0.43
1:A:2817:ASN:HB3	1:A:2819:PRO:HD3	1.99	0.43
1:B:1005:LEU:HD12	1:B:1011:THR:O	2.18	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:2703:GLN:NE2	1:A:2704:LEU:HB3	2.33	0.43
1:B:759:LEU:HD12	1:B:759:LEU:HA	1.85	0.43
1:B:720:GLY:HA3	1:B:732:MET:HG2	2.00	0.43
1:B:747:PHE:HA	1:B:754:VAL:HA	2.01	0.43
1:B:210:ASP:OD1	1:B:211:ASN:N	2.52	0.43
1:B:588:ILE:HG22	1:B:589:GLN:HG3	2.00	0.43
1:B:1032:CYS:SG	1:B:1037:CYS:HA	2.59	0.43
1:A:2706:PHE:N	1:A:2714:ILE:O	2.50	0.42
1:B:517:ASP:OD2	1:B:585:TYR:OH	2.22	0.42
1:B:356:ILE:O	1:B:382:GLN:NE2	2.28	0.42
1:B:824:LEU:HD22	1:B:851:MET:HE1	2.01	0.42
1:A:2863:HIS:C	1:A:2865:CYS:H	2.22	0.42
1:B:555:VAL:HG12	1:B:558:PRO:HD3	2.01	0.42
1:B:441:ASP:OD2	1:B:444:GLN:NE2	2.28	0.42
1:B:1139:SER:HA	1:B:1142:LYS:HE3	2.02	0.42
1:A:2831:GLN:HG3	1:A:2832:THR:H	1.85	0.41
1:B:272:CYS:SG	1:B:295:ASP:HB2	2.60	0.41
1:B:984:SER:O	1:B:985:HIS:HB2	2.19	0.41
1:B:346:ILE:HD12	1:B:346:ILE:HA	1.93	0.41
1:B:681:ASN:HD22	1:B:687:ARG:CZ	2.34	0.41
1:B:460:ILE:HG22	1:B:461:LEU:HG	2.02	0.41
1:B:471:LEU:HD21	1:B:480:LEU:HD11	2.02	0.41
1:B:1093:LEU:HD12	1:B:1093:LEU:HA	1.78	0.41
1:B:378:LEU:HD21	1:B:381:GLY:HA2	2.02	0.41
1:B:574:ASP:OD1	1:B:575:SER:N	2.54	0.41
1:B:380:ARG:CZ	1:B:383:HIS:HB2	2.51	0.41
1:A:2871:GLN:OE1	1:A:2873:LEU:HD23	2.21	0.41
1:B:425:VAL:HG22	1:B:439:TRP:CD1	2.56	0.41
1:B:1024:GLN:NE2	1:B:1035:GLY:O	2.54	0.41
1:A:2789:CYS:HB3	1:A:2807:CYS:HB3	1.96	0.41
1:A:2797:LEU:O	1:A:2800:VAL:HG12	2.20	0.41
1:A:2833:THR:O	1:A:2835:ILE:N	2.52	0.41
1:A:2865:CYS:SG	1:A:2866:ARG:N	2.92	0.41
1:B:433:GLN:HA	1:B:433:GLN:OE1	2.21	0.41
1:B:999:CYS:HB2	1:B:1000:PRO:CD	2.50	0.41
1:B:810:LEU:HA	1:B:816:SER:O	2.21	0.41
1:A:2831:GLN:CG	1:A:2832:THR:H	2.34	0.40
1:B:422:ARG:NH2	1:B:1091:ASP:OD2	2.50	0.40
1:B:465:VAL:O	1:B:465:VAL:HG23	2.21	0.40
1:B:503:LEU:HD13	1:B:543:ASP:HA	2.04	0.40
1:B:601:PRO:HD2	1:B:617:ASP:OD2	2.21	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:840:PHE:CZ	1:B:898:LEU:HD22	2.56	0.40
1:B:252:ASP:OD1	1:B:253:GLU:HG2	2.21	0.40
1:B:583:VAL:HB	1:B:587:GLY:HA2	2.03	0.40
1:B:968:THR:HG22	1:B:969:GLY:N	2.36	0.40
1:B:308:MET:SD	1:B:309:GLY:N	2.94	0.40
1:B:878:TRP:CD2	1:B:966:LEU:HD11	2.56	0.40
1:B:1272:CYS:SG	1:B:1276:HIS:HB2	2.62	0.40

There are no symmetry-related clashes.

## 5.3 Torsion angles [i](#)

### 5.3.1 Protein backbone [i](#)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	242/4660 (5%)	220 (91%)	22 (9%)	0	100	100
1	B	1127/4660 (24%)	1038 (92%)	88 (8%)	1 (0%)	51	83
3	R	1/5 (20%)	0	1 (100%)	0	100	100
All	All	1370/9325 (15%)	1258 (92%)	111 (8%)	1 (0%)	54	83

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	985	HIS

### 5.3.2 Protein sidechains [i](#)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	216/4089 (5%)	199 (92%)	17 (8%)	12	42
1	B	992/4089 (24%)	953 (96%)	39 (4%)	32	60
3	R	1/1 (100%)	0	1 (100%)	0	0
All	All	1209/8179 (15%)	1152 (95%)	57 (5%)	30	56

All (57) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	2700	ARG
1	A	2703	GLN
1	A	2710	ASN
1	A	2712	HIS
1	A	2767	CYS
1	A	2772	ASP
1	A	2779	ARG
1	A	2794	CYS
1	A	2809	ASP
1	A	2829	LYS
1	A	2834	ASN
1	A	2847	ASN
1	A	2854	ASP
1	A	2870	PHE
1	A	2877	ARG
1	A	2882	TYR
1	A	2916	ASP
1	B	213	ASP
1	B	218	ASN
1	B	245	ASP
1	B	264	ARG
1	B	268	ARG
1	B	290	ASP
1	B	329	CYS
1	B	358	ASP
1	B	361	CYS
1	B	371	LEU
1	B	395	VAL
1	B	424	MET
1	B	447	VAL
1	B	452	ILE
1	B	527	ASP
1	B	570	VAL
1	B	572	TRP

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Mol	Chain	Res	Type
1	B	616	THR
1	B	631	GLU
1	B	632	THR
1	B	665	ASN
1	B	686	TYR
1	B	700	GLU
1	B	728	GLN
1	B	741	PHE
1	B	785	VAL
1	B	807	VAL
1	B	846	ARG
1	B	861	MET
1	B	887	ASP
1	B	899	ASP
1	B	918	LEU
1	B	995	ARG
1	B	1075	ARG
1	B	1104	HIS
1	B	1129	CYS
1	B	1184	CYS
1	B	1215	ARG
1	B	1289	TRP
3	R	2	ASN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (9) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	2705	GLN
1	A	2808	HIS
1	B	409	HIS
1	B	681	ASN
1	B	895	HIS
1	B	971	ASN
1	B	1033	ASN
1	B	1104	HIS
1	B	1259	HIS

### 5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

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

## 5.5 Carbohydrates [i](#)

7 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	C	1	1,4	14,14,15	0.29	0	17,19,21	0.52	0
4	NAG	C	2	4	14,14,15	0.33	0	17,19,21	0.57	0
4	BMA	C	3	4	11,11,12	0.25	0	15,15,17	0.87	0
5	NAG	D	1	5	14,14,15	0.39	0	17,19,21	0.75	0
5	NAG	D	2	5	14,14,15	0.26	0	17,19,21	0.98	0
5	NAG	E	1	5	14,14,15	0.33	0	17,19,21	0.82	0
5	NAG	E	2	5	14,14,15	0.32	0	17,19,21	0.70	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	C	1	1,4	-	1/6/23/26	0/1/1/1
4	NAG	C	2	4	-	0/6/23/26	0/1/1/1
4	BMA	C	3	4	-	0/2/19/22	0/1/1/1
5	NAG	D	1	5	-	0/6/23/26	0/1/1/1
5	NAG	D	2	5	-	1/6/23/26	0/1/1/1
5	NAG	E	1	5	-	0/6/23/26	0/1/1/1
5	NAG	E	2	5	-	1/6/23/26	0/1/1/1

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.



All (3) torsion outliers are listed below:

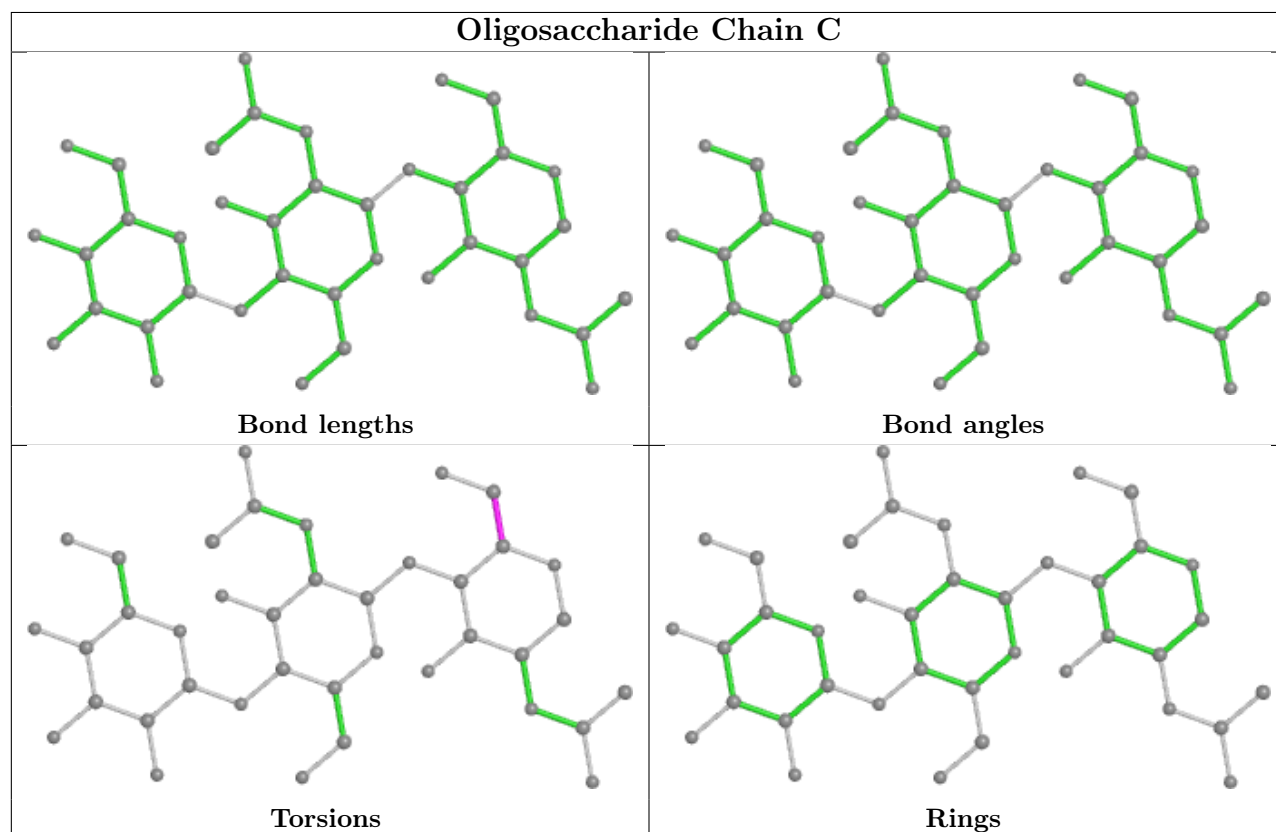
Mol	Chain	Res	Type	Atoms
4	C	1	NAG	O5-C5-C6-O6
5	D	2	NAG	C3-C2-N2-C7
5	E	2	NAG	C8-C7-N2-C2

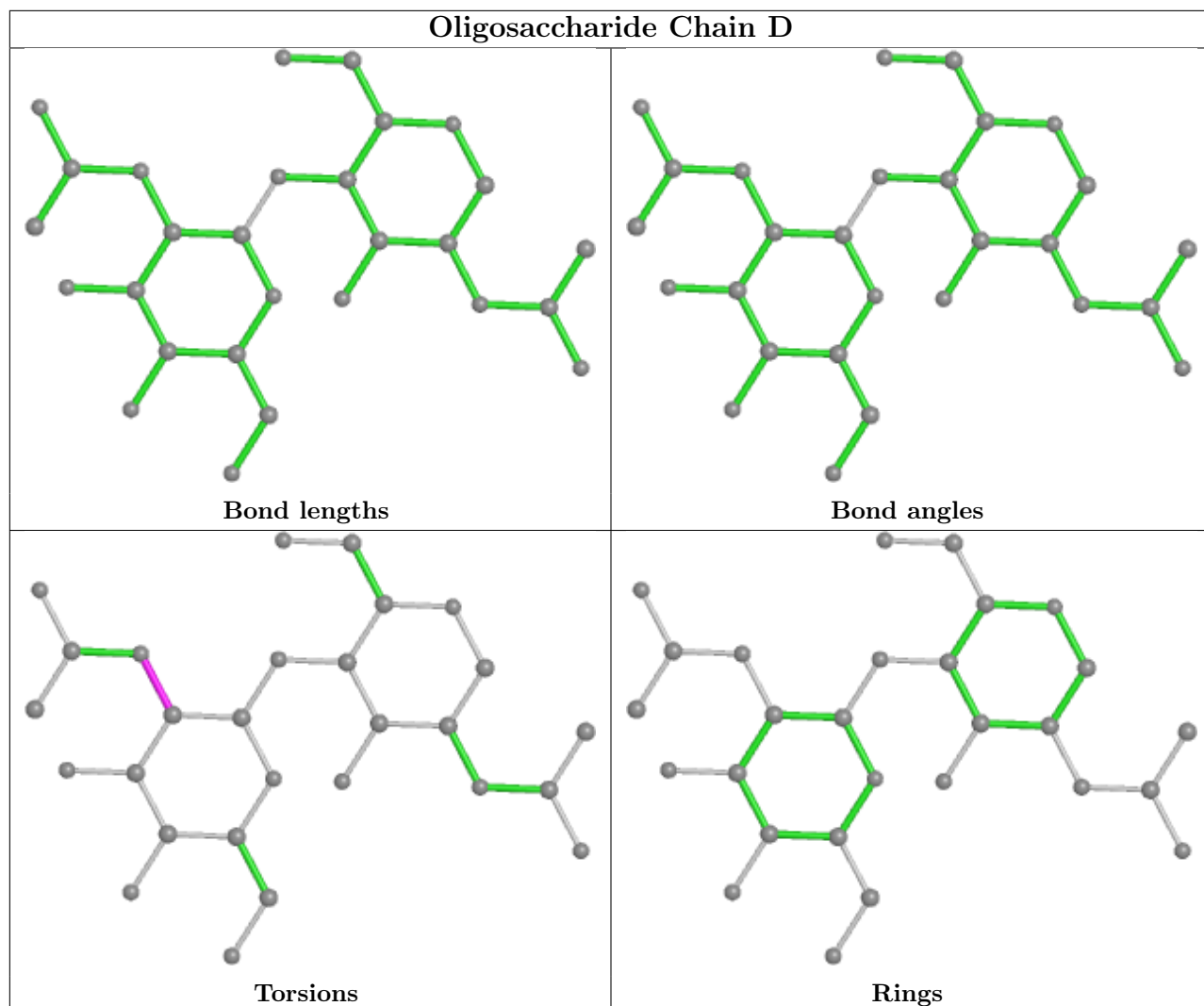
There are no ring outliers.

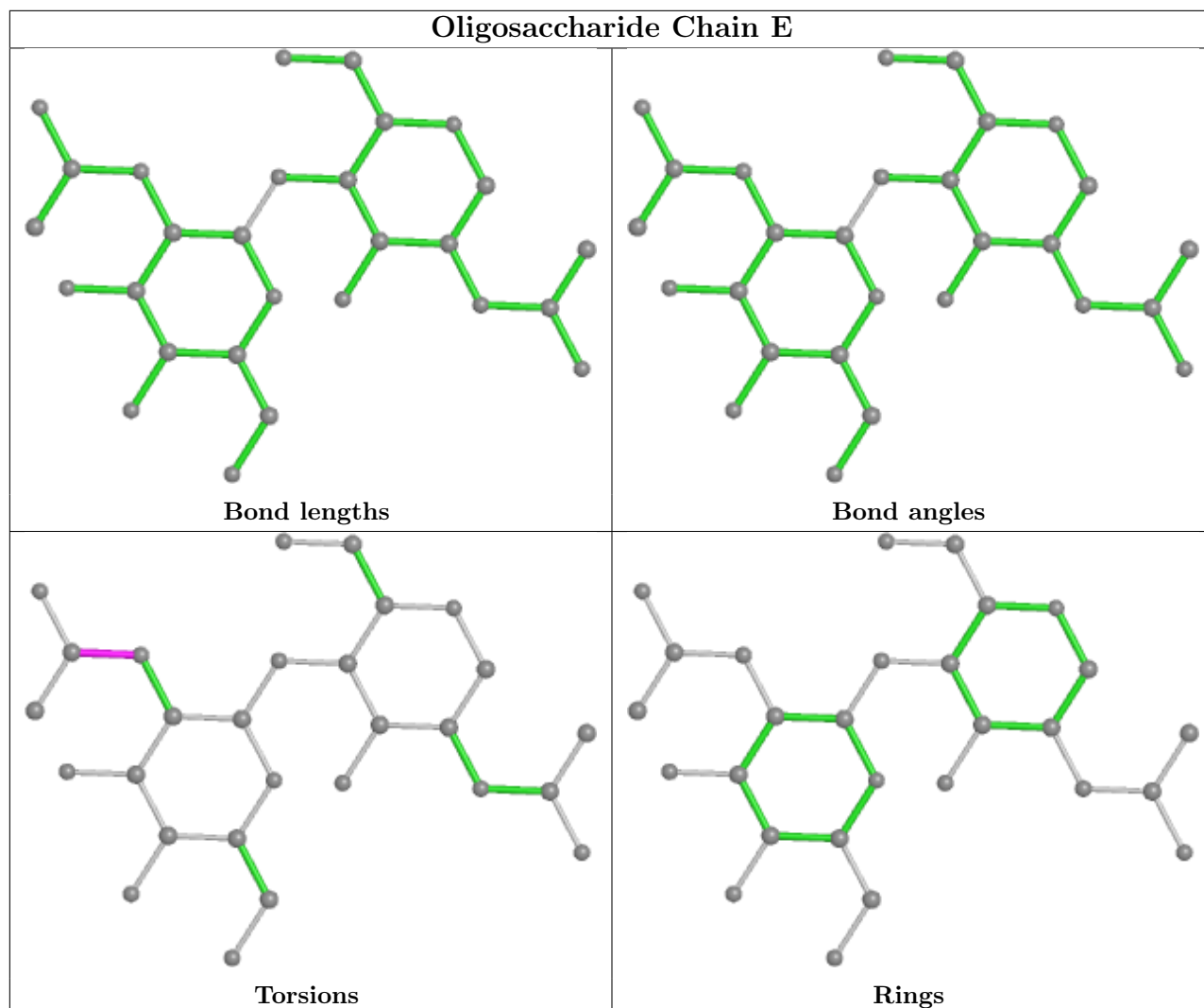
1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	E	1	NAG	1	0

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







## 5.6 Ligand geometry [i](#)

Of 31 ligands modelled in this entry, 18 are monoatomic - leaving 13 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	$\# Z  > 2$
6	NAG	A	4702	1	14,14,15	0.27	0	17,19,21	0.85	0
7	A2G	B	4706	1	14,14,15	0.38	0	17,19,21	0.38	0
7	A2G	B	4710	1	14,14,15	0.39	0	17,19,21	0.55	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
6	NAG	A	4701	1	14,14,15	0.28	0	17,19,21	0.99	1 (5%)
6	NAG	B	4701	1	14,14,15	0.29	0	17,19,21	0.62	0
7	A2G	B	4705	-	14,14,15	0.39	0	17,19,21	0.42	0
7	A2G	A	4703	1	14,14,15	0.38	0	17,19,21	0.58	0
7	A2G	B	4709	1	14,14,15	0.42	0	17,19,21	0.57	0
7	A2G	B	4704	1	14,14,15	0.39	0	17,19,21	0.38	0
6	NAG	B	4703	1	14,14,15	0.31	0	17,19,21	0.68	0
7	A2G	B	4708	1	14,14,15	0.37	0	17,19,21	0.68	0
6	NAG	B	4702	1	14,14,15	0.29	0	17,19,21	0.77	0
7	A2G	B	4707	1	14,14,15	0.40	0	17,19,21	0.67	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
6	NAG	A	4702	1	-	0/6/23/26	0/1/1/1
7	A2G	B	4706	1	-	2/6/23/26	0/1/1/1
7	A2G	B	4710	1	-	0/6/23/26	0/1/1/1
6	NAG	A	4701	1	-	2/6/23/26	0/1/1/1
6	NAG	B	4701	1	-	2/6/23/26	0/1/1/1
7	A2G	B	4705	-	-	1/6/23/26	0/1/1/1
7	A2G	A	4703	1	-	0/6/23/26	0/1/1/1
7	A2G	B	4709	1	-	0/6/23/26	0/1/1/1
7	A2G	B	4704	1	-	0/6/23/26	0/1/1/1
6	NAG	B	4703	1	-	3/6/23/26	0/1/1/1
7	A2G	B	4708	1	-	0/6/23/26	0/1/1/1
6	NAG	B	4702	1	-	3/6/23/26	0/1/1/1
7	A2G	B	4707	1	-	0/6/23/26	0/1/1/1

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
6	A	4701	NAG	C1-O5-C5	3.51	116.94	112.19

There are no chirality outliers.

All (13) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
6	B	4702	NAG	C8-C7-N2-C2
6	B	4702	NAG	O7-C7-N2-C2
6	B	4703	NAG	C8-C7-N2-C2
6	B	4703	NAG	O7-C7-N2-C2
6	B	4702	NAG	C1-C2-N2-C7
6	B	4703	NAG	C1-C2-N2-C7
6	A	4701	NAG	O5-C5-C6-O6
7	B	4706	A2G	O5-C5-C6-O6
6	B	4701	NAG	C4-C5-C6-O6
7	B	4705	A2G	C3-C2-N2-C7
7	B	4706	A2G	C1-C2-N2-C7
6	B	4701	NAG	O5-C5-C6-O6
6	A	4701	NAG	C8-C7-N2-C2

There are no ring outliers.

No monomer is involved in short contacts.

## 5.7 Other polymers [i](#)

There are no such residues in this entry.

## 5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

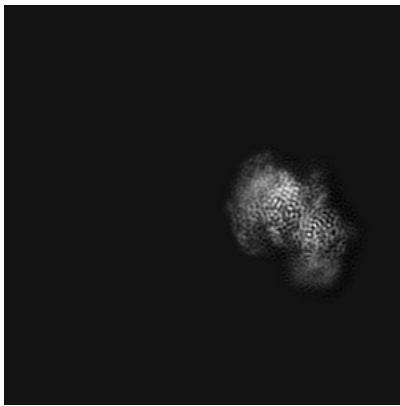
## 6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-36695. These allow visual inspection of the internal detail of the map and identification of artifacts.

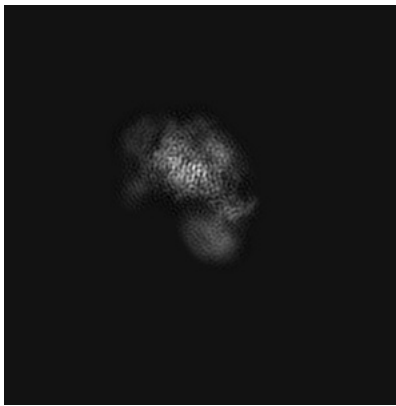
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

### 6.1 Orthogonal projections [i](#)

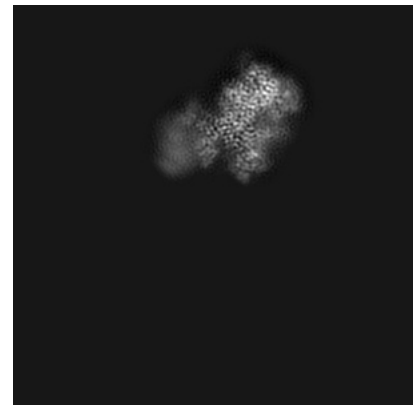
#### 6.1.1 Primary map



X

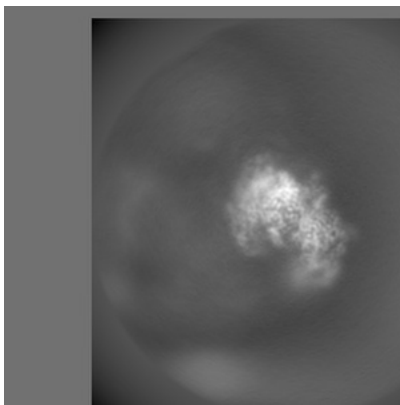


Y

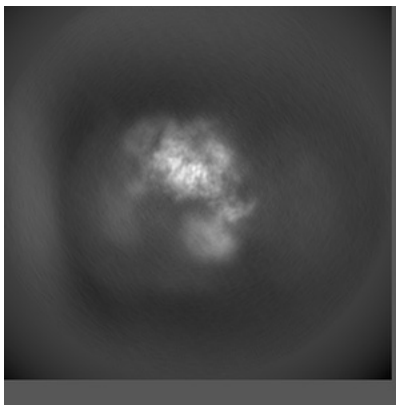


Z

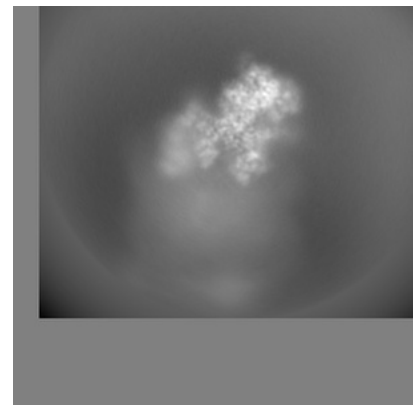
#### 6.1.2 Raw map



X



Y

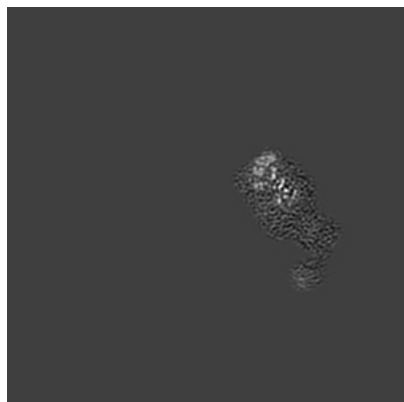


Z

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

## 6.2 Central slices [i](#)

### 6.2.1 Primary map



X Index: 130

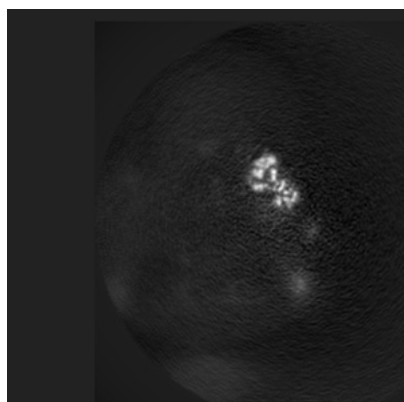


Y Index: 130

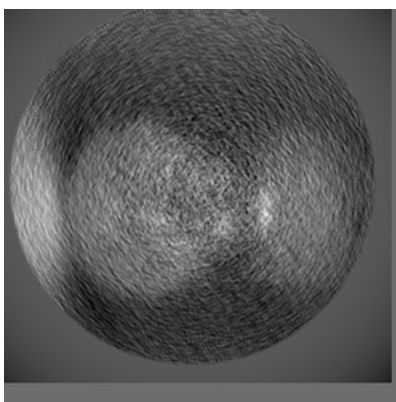


Z Index: 130

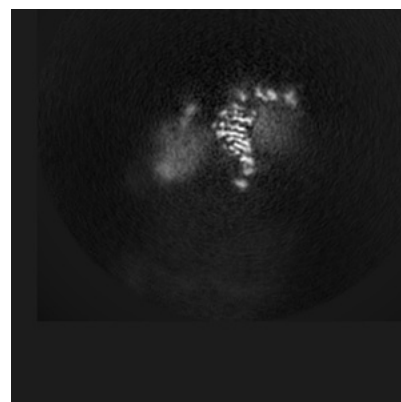
### 6.2.2 Raw map



X Index: 130



Y Index: 130

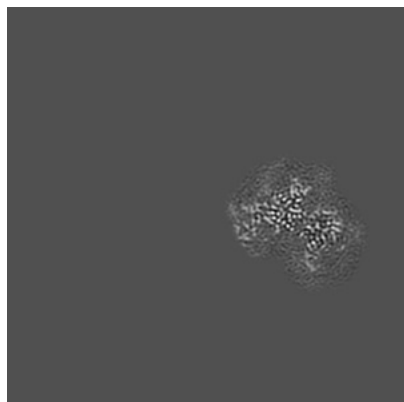


Z Index: 130

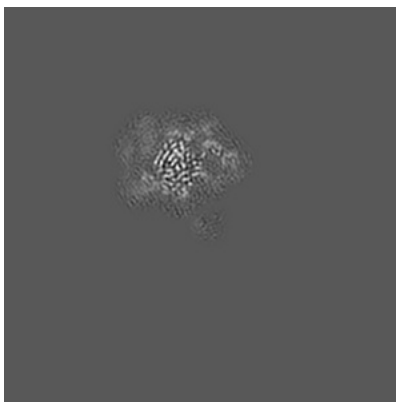
The images above show central slices of the map in three orthogonal directions.

## 6.3 Largest variance slices [i](#)

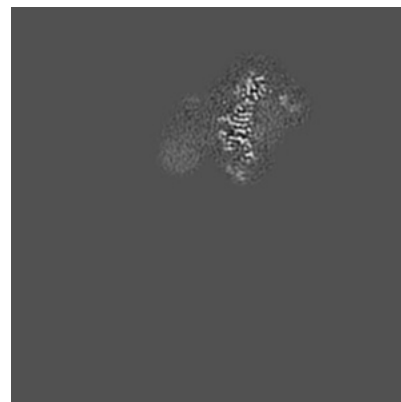
### 6.3.1 Primary map



X Index: 152

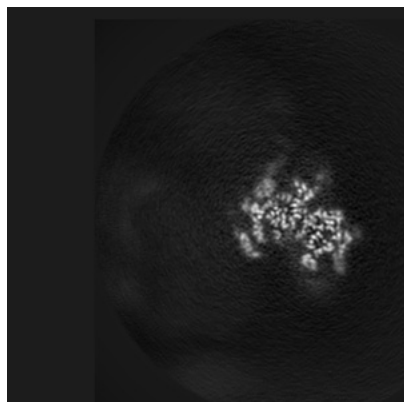


Y Index: 202

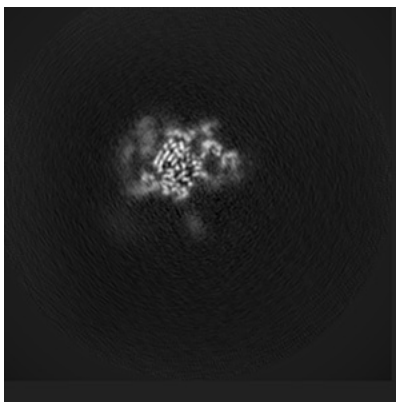


Z Index: 123

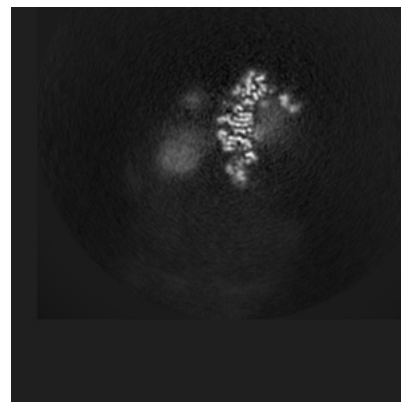
### 6.3.2 Raw map



X Index: 155



Y Index: 202



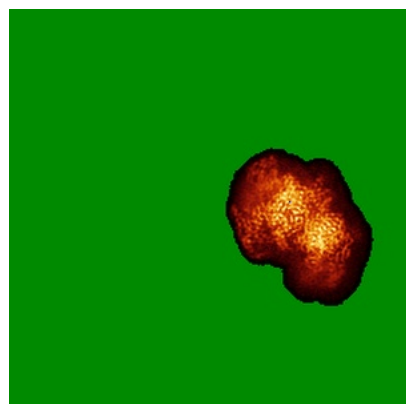
Z Index: 123

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

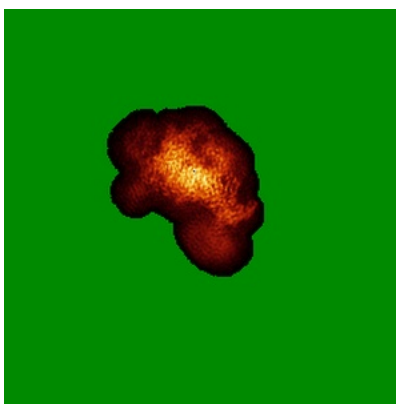


## 6.4 Orthogonal standard-deviation projections (False-color) [i](#)

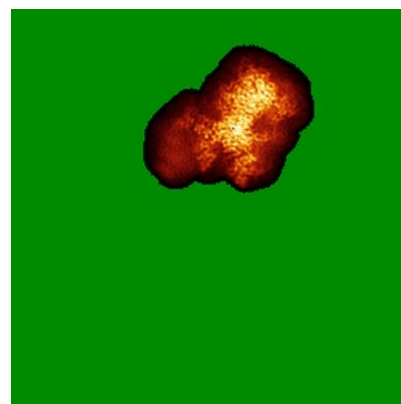
### 6.4.1 Primary map



X

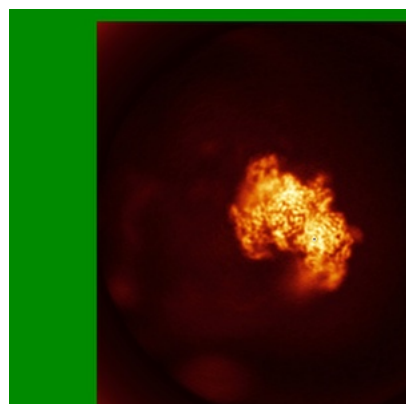


Y

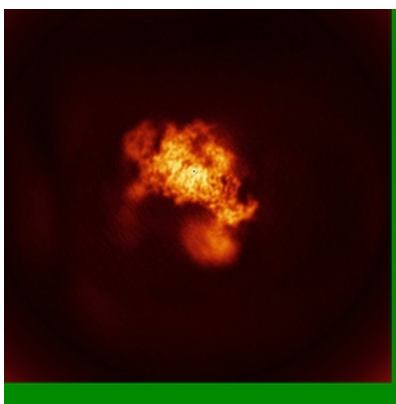


Z

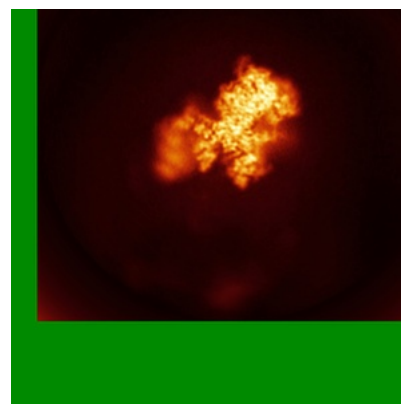
### 6.4.2 Raw map



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.

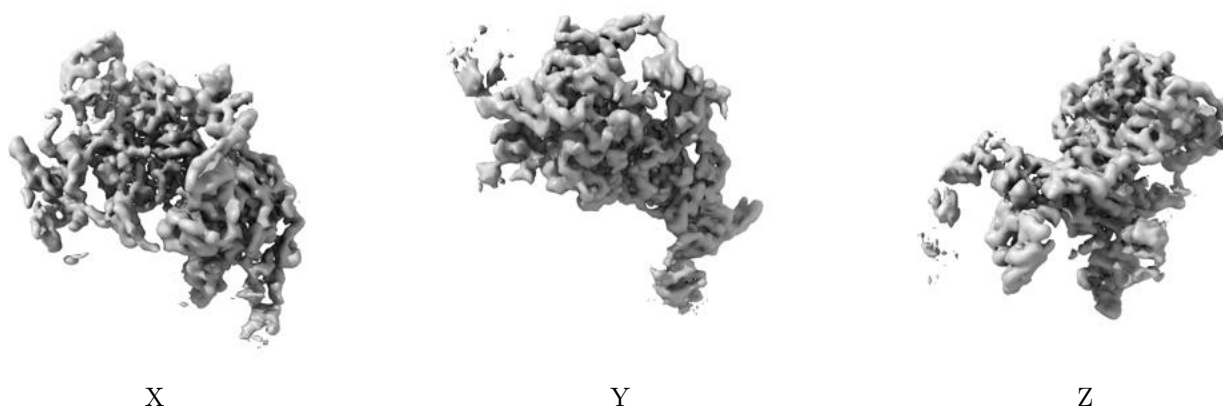
## 6.5 Orthogonal surface views [i](#)

### 6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.04. 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



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.

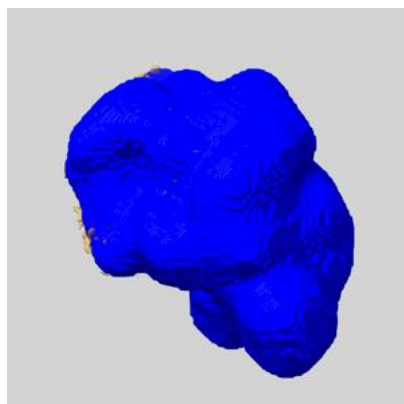
## 6.6 Mask visualisation [i](#)

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

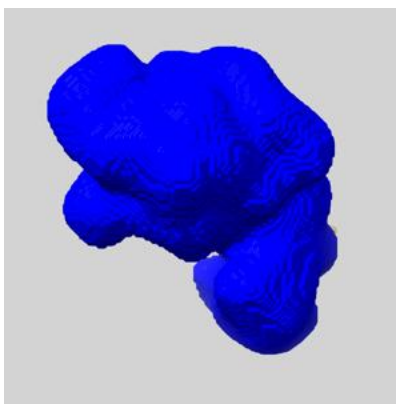
A mask typically either:

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

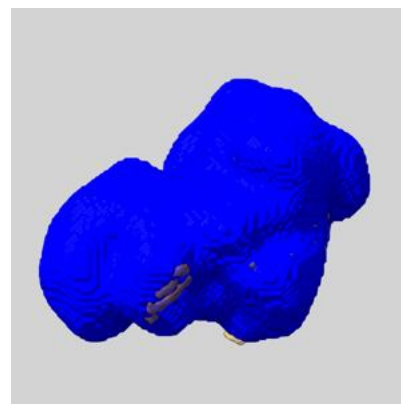
### 6.6.1 emd\_36695\_msk\_1.map [i](#)



X



Y

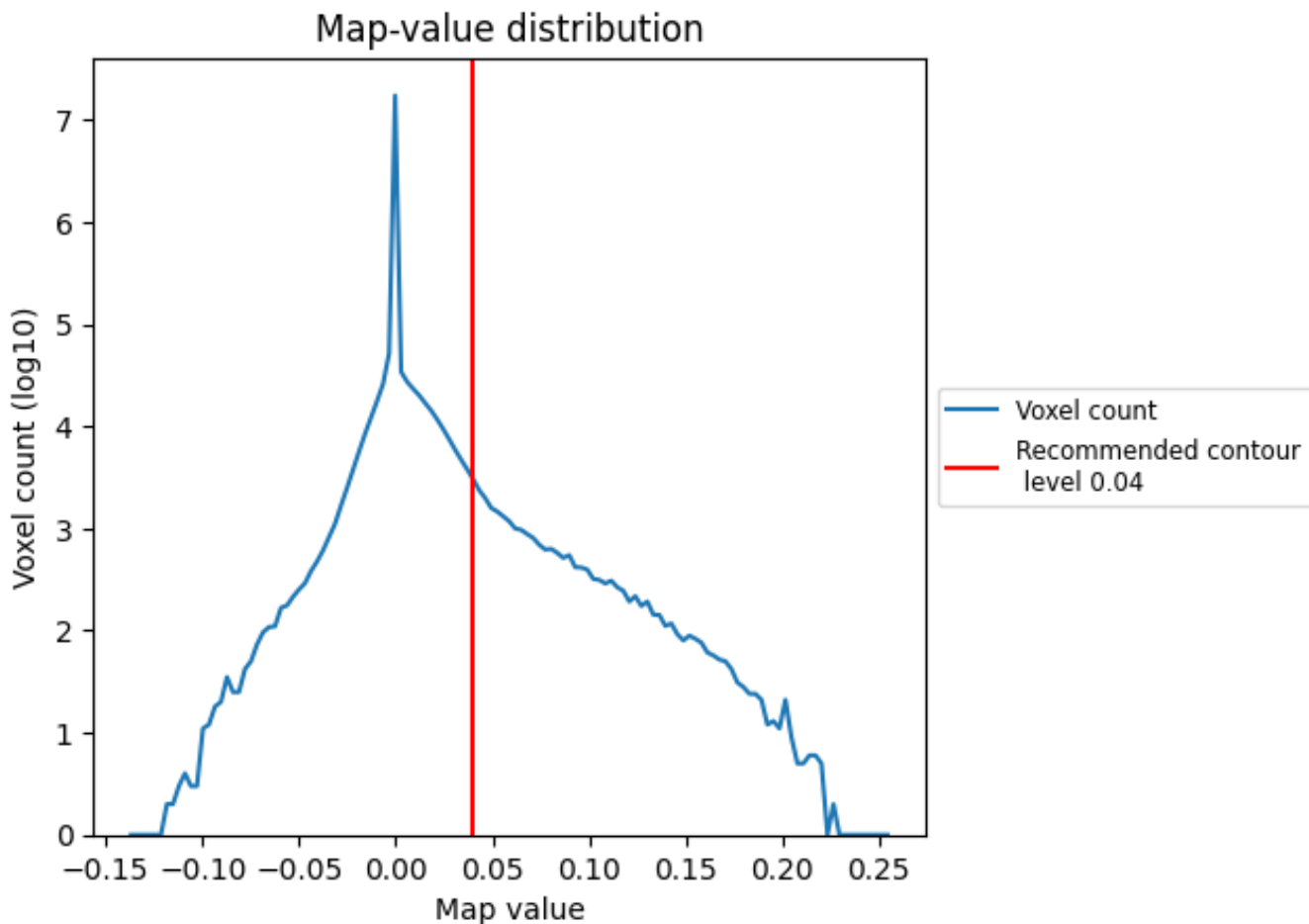


Z

## 7 Map analysis [i](#)

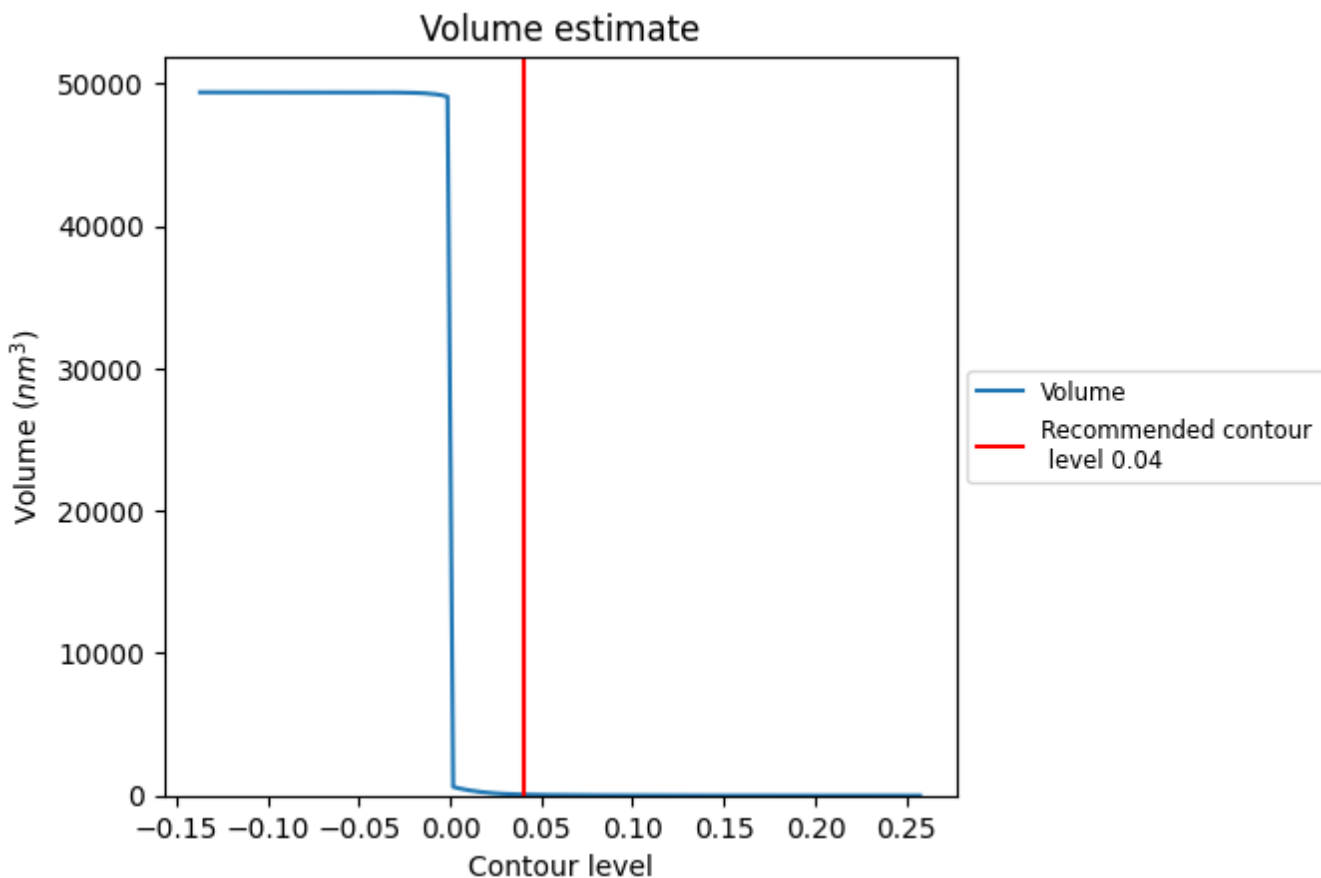
This section contains the results of statistical analysis of the map.

### 7.1 Map-value distribution [i](#)



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

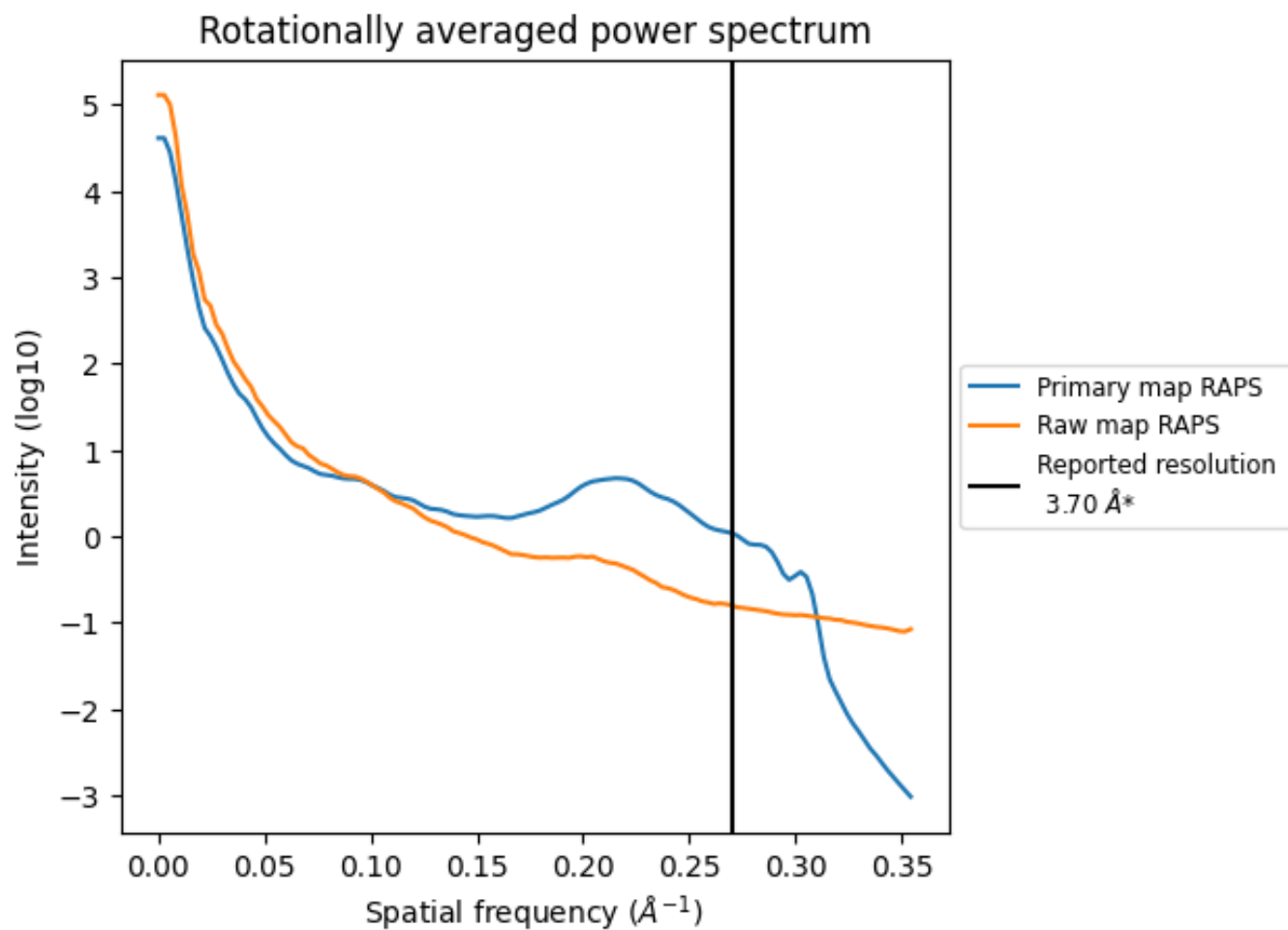
## 7.2 Volume estimate [i](#)



The volume at the recommended contour level is 72 nm<sup>3</sup>; this corresponds to an approximate mass of 65 kDa.

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

### 7.3 Rotationally averaged power spectrum i

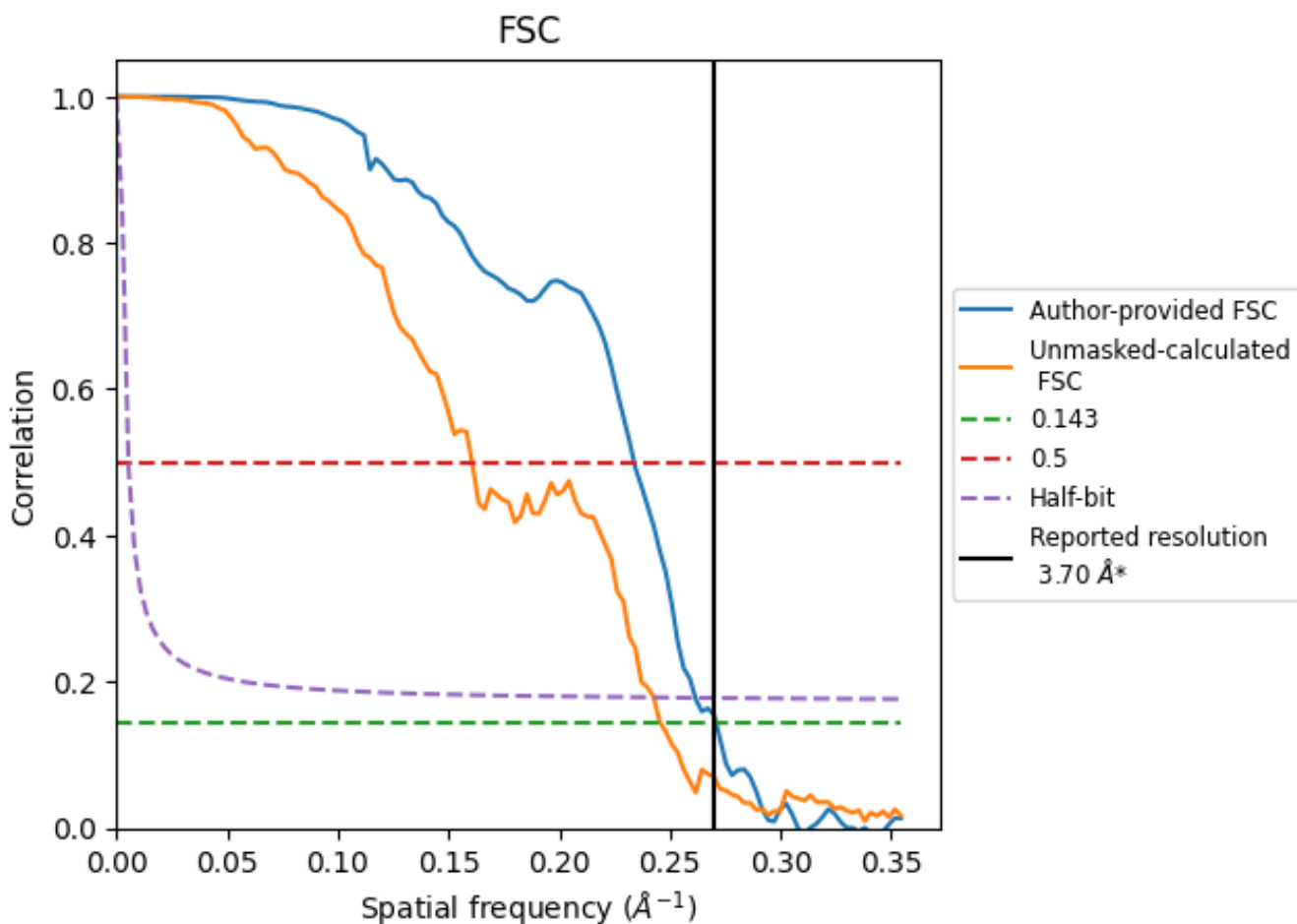


\*Reported resolution corresponds to spatial frequency of 0.270 Å<sup>-1</sup>

## 8 Fourier-Shell correlation [i](#)

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

### 8.1 FSC [i](#)



\*Reported resolution corresponds to spatial frequency of 0.270 Å<sup>-1</sup>

## 8.2 Resolution estimates [i](#)

Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	3.70	-	-
Author-provided FSC curve	3.69	4.28	3.82
Unmasked-calculated*	4.07	6.23	4.12

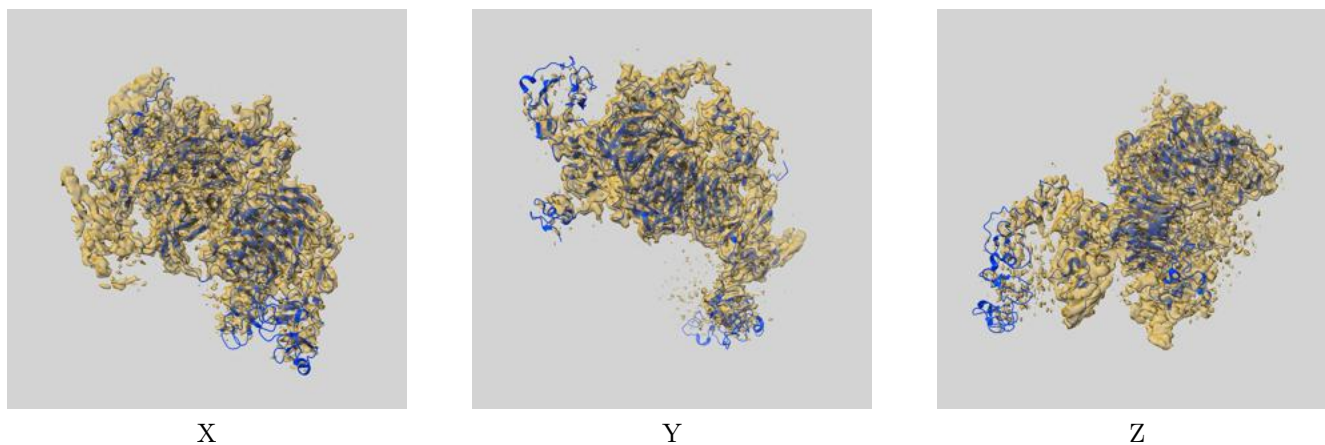
\*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 4.07 differs from the reported value 3.7 by more than 10 %



## 9 Map-model fit [i](#)

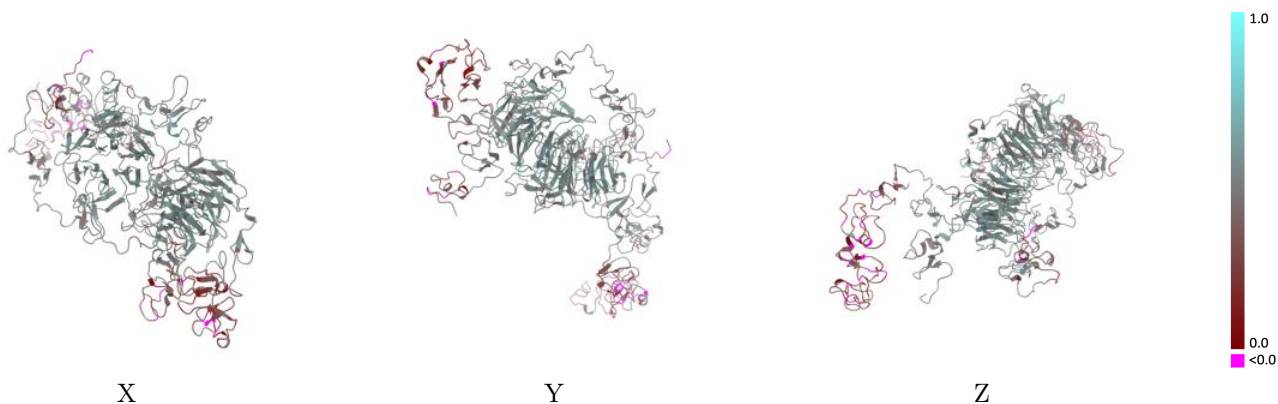
This section contains information regarding the fit between EMDB map EMD-36695 and PDB model 8JXB. Per-residue inclusion information can be found in section 3 on page 6.

### 9.1 Map-model overlay [i](#)



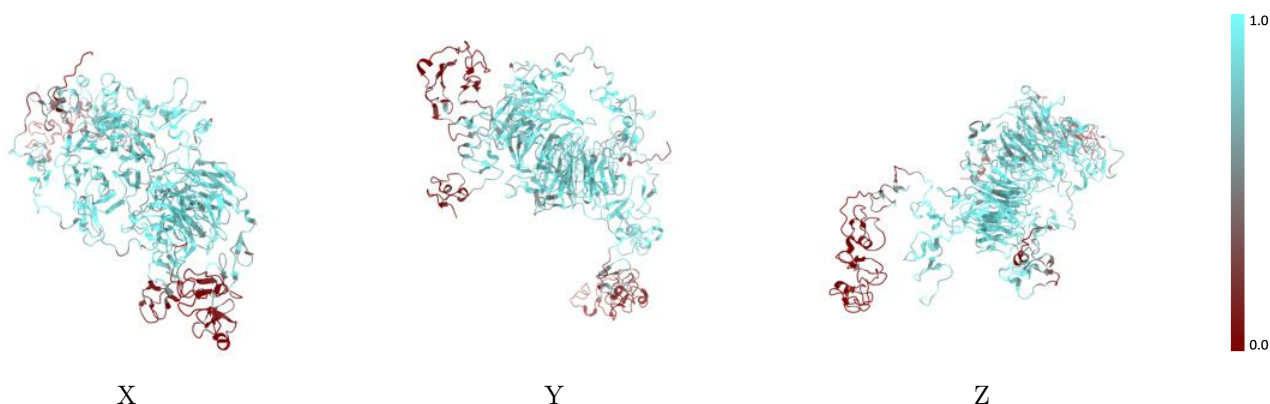
The images above show the 3D surface view of the map at the recommended contour level 0.04 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

## 9.2 Q-score mapped to coordinate model [\(i\)](#)



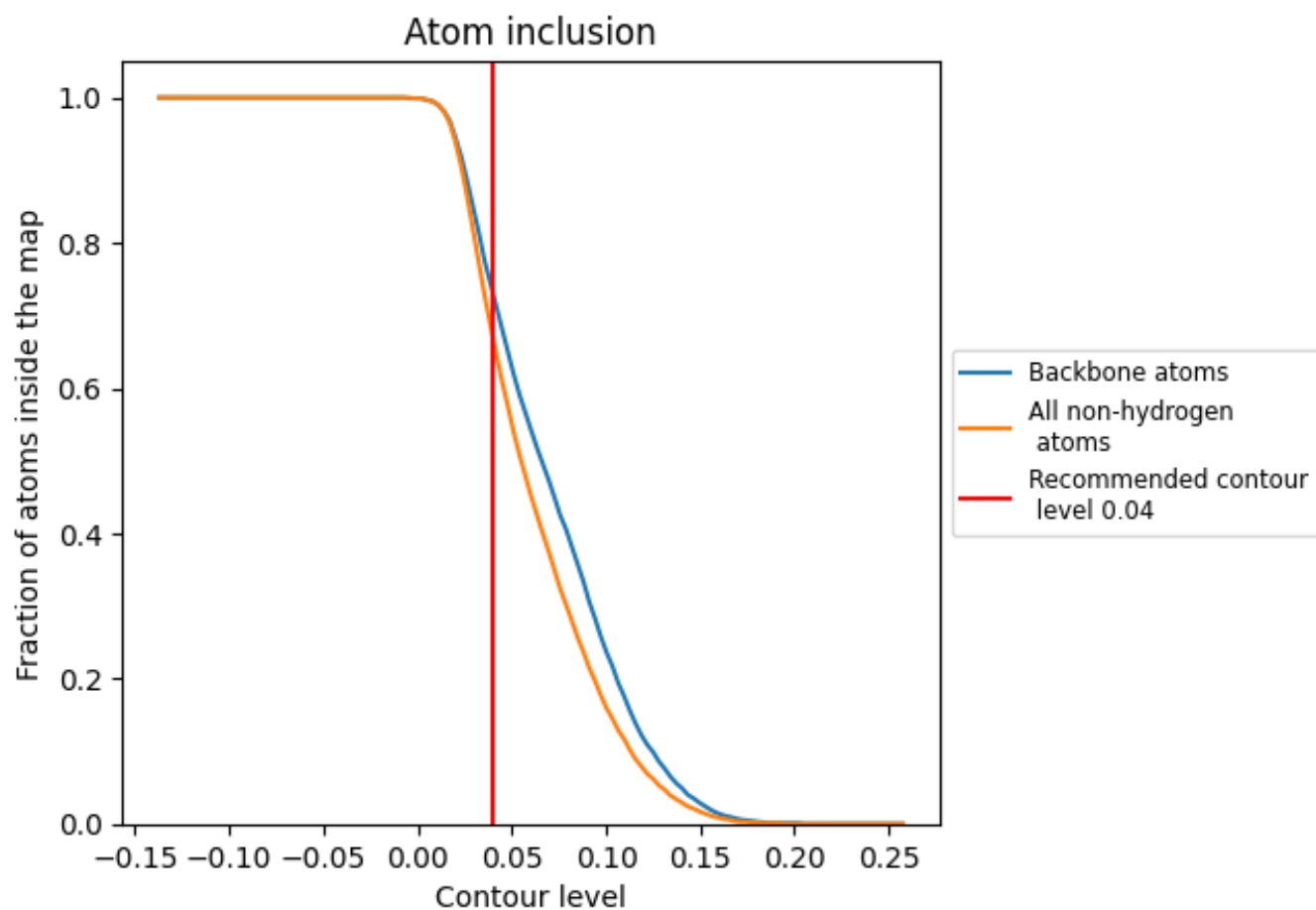
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 [\(i\)](#)



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 (0.04).

















## 9.4 Atom inclusion [i](#)



At the recommended contour level, 73% of all backbone atoms, 67% 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 (0.04) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.6690	 0.4470
A	 0.3850	 0.3160
B	 0.7290	 0.4740
C	 0.6150	 0.4590
D	 0.8570	 0.5160
E	 0.2500	 0.4470
Q	 0.8670	 0.5220
R	 1.0000	 0.5770

