wwPDB EM Validation Summary Report (i)

Aug 29, 2026 – 12:22 PM EDT

PDB ID	:	9MIX / pdb_00009mix
EMDB ID	:	EMD-48304
Title	:	Cryo-EM structure of human NBCn2
Authors	:	Yang, S.; Capper, M.J.; Zilberg, G.; Warren, A.L.; Wacker, D.
Deposited on	:	2024-12-13
Resolution	:	2.85 Å(reported)

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

We welcome your comments at *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 (i) symbol.

The types of validation reports are described at
http://www.wwpdb.org/validation/2017/FAQs#types.

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

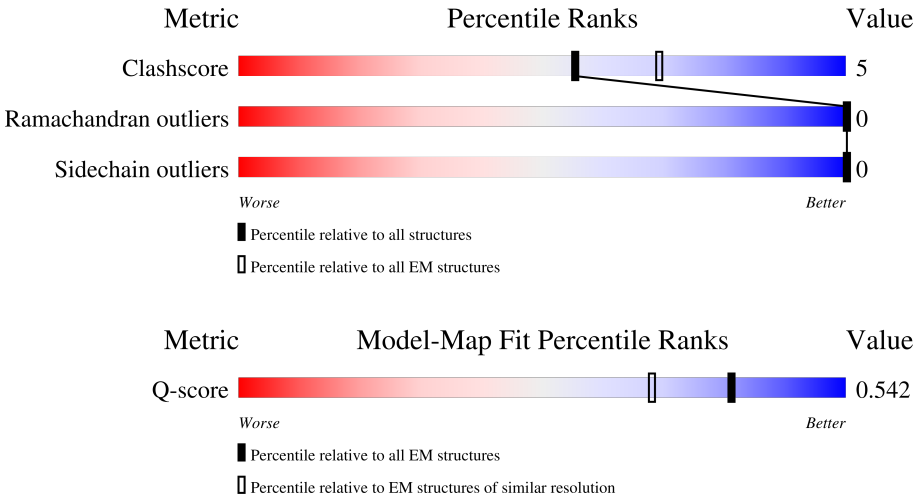
EMDB validation analysis	:	0.0.1.dev133
Mogul	:	2022.3.0, CSD as543be (2022)
MolProbity	:	4-5-2 with Phenix2.0
Buster-report	:	wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
EM percentile statistics	:	202505.v01 (Using data in the EMDB archive up until May 2025)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.50

1 Overall quality at a glance (i)

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

The reported resolution of this entry is 2.85 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)	Similar EM resolution (#Entries, resolution range(Å))
Clashscore	229148	23984	-
Ramachandran outliers	224038	23583	-
Sidechain outliers	223484	23102	-
Q-score	-	25397	11965 (2.35 - 3.35)

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	981	52% 5% 42%
1	B	981	53% 5% 42%

2 Entry composition (i)

There are 3 unique types of molecules in this entry. The entry contains 9120 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 Sodium-driven chloride bicarbonate exchanger.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	567	4406	2924	700	748	34	0	0
1	B	567	4406	2924	700	748	34	0	0

There are 182 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	159	MET	-	initiating methionine	UNP Q6U841
A	?	-	ASN	deletion	UNP Q6U841
A	?	-	ARG	deletion	UNP Q6U841
A	?	-	ILE	deletion	UNP Q6U841
A	?	-	PRO	deletion	UNP Q6U841
A	?	-	ILE	deletion	UNP Q6U841
A	?	-	VAL	deletion	UNP Q6U841
A	?	-	ARG	deletion	UNP Q6U841
A	?	-	SER	deletion	UNP Q6U841
A	?	-	PHE	deletion	UNP Q6U841
A	?	-	ALA	deletion	UNP Q6U841
A	?	-	ASP	deletion	UNP Q6U841
A	?	-	ILE	deletion	UNP Q6U841
A	?	-	GLY	deletion	UNP Q6U841
A	?	-	LYS	deletion	UNP Q6U841
A	?	-	LYS	deletion	UNP Q6U841
A	?	-	GLN	deletion	UNP Q6U841
A	?	-	SER	deletion	UNP Q6U841
A	?	-	GLU	deletion	UNP Q6U841
A	?	-	PRO	deletion	UNP Q6U841
A	?	-	ASN	deletion	UNP Q6U841
A	?	-	SER	deletion	UNP Q6U841
A	?	-	MET	deletion	UNP Q6U841
A	?	-	ASP	deletion	UNP Q6U841
A	?	-	LYS	deletion	UNP Q6U841
A	?	-	ASN	deletion	UNP Q6U841

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Chain	Residue	Modelled	Actual	Comment	Reference
A	?	-	ALA	deletion	UNP Q6U841
A	?	-	GLY	deletion	UNP Q6U841
A	?	-	GLN	deletion	UNP Q6U841
A	?	-	VAL	deletion	UNP Q6U841
A	?	-	VAL	deletion	UNP Q6U841
A	?	-	SER	deletion	UNP Q6U841
A	?	-	PRO	deletion	UNP Q6U841
A	?	-	GLN	deletion	UNP Q6U841
A	?	-	SER	deletion	UNP Q6U841
A	?	-	ALA	deletion	UNP Q6U841
A	?	-	PRO	deletion	UNP Q6U841
A	?	-	ALA	deletion	UNP Q6U841
A	?	-	CYS	deletion	UNP Q6U841
A	?	-	VAL	deletion	UNP Q6U841
A	?	-	GLU	deletion	UNP Q6U841
A	?	-	ASN	deletion	UNP Q6U841
A	?	-	LYS	deletion	UNP Q6U841
A	?	-	ASN	deletion	UNP Q6U841
A	?	-	ASP	deletion	UNP Q6U841
A	?	-	VAL	deletion	UNP Q6U841
A	?	-	SER	deletion	UNP Q6U841
A	?	-	ARG	deletion	UNP Q6U841
A	?	-	GLU	deletion	UNP Q6U841
A	?	-	ASN	deletion	UNP Q6U841
A	?	-	SER	deletion	UNP Q6U841
A	?	-	THR	deletion	UNP Q6U841
A	?	-	VAL	deletion	UNP Q6U841
A	?	-	ASP	deletion	UNP Q6U841
A	?	-	PHE	deletion	UNP Q6U841
A	?	-	SER	deletion	UNP Q6U841
A	?	-	LYS	deletion	UNP Q6U841
A	?	-	GLY	deletion	UNP Q6U841
A	?	-	LEU	deletion	UNP Q6U841
A	?	-	GLY	deletion	UNP Q6U841
A	?	-	GLY	deletion	UNP Q6U841
A	?	-	GLN	deletion	UNP Q6U841
A	?	-	GLN	deletion	UNP Q6U841
A	?	-	LYS	deletion	UNP Q6U841
A	?	-	GLY	deletion	UNP Q6U841
A	?	-	HIS	deletion	UNP Q6U841
A	?	-	THR	deletion	UNP Q6U841
A	?	-	SER	deletion	UNP Q6U841

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Chain	Residue	Modelled	Actual	Comment	Reference
A	?	-	PRO	deletion	UNP Q6U841
A	?	-	CYS	deletion	UNP Q6U841
A	1119	GLY	-	expression tag	UNP Q6U841
A	1120	ARG	-	expression tag	UNP Q6U841
A	1121	PRO	-	expression tag	UNP Q6U841
A	1122	LEU	-	expression tag	UNP Q6U841
A	1123	GLU	-	expression tag	UNP Q6U841
A	1124	VAL	-	expression tag	UNP Q6U841
A	1125	LEU	-	expression tag	UNP Q6U841
A	1126	PHE	-	expression tag	UNP Q6U841
A	1127	GLN	-	expression tag	UNP Q6U841
A	1128	GLY	-	expression tag	UNP Q6U841
A	1129	PRO	-	expression tag	UNP Q6U841
A	1130	HIS	-	expression tag	UNP Q6U841
A	1131	HIS	-	expression tag	UNP Q6U841
A	1132	HIS	-	expression tag	UNP Q6U841
A	1133	HIS	-	expression tag	UNP Q6U841
A	1134	HIS	-	expression tag	UNP Q6U841
A	1135	HIS	-	expression tag	UNP Q6U841
A	1136	HIS	-	expression tag	UNP Q6U841
A	1137	HIS	-	expression tag	UNP Q6U841
A	1138	HIS	-	expression tag	UNP Q6U841
A	1139	HIS	-	expression tag	UNP Q6U841
B	159	MET	-	initiating methionine	UNP Q6U841
B	?	-	ASN	deletion	UNP Q6U841
B	?	-	ARG	deletion	UNP Q6U841
B	?	-	ILE	deletion	UNP Q6U841
B	?	-	PRO	deletion	UNP Q6U841
B	?	-	ILE	deletion	UNP Q6U841
B	?	-	VAL	deletion	UNP Q6U841
B	?	-	ARG	deletion	UNP Q6U841
B	?	-	SER	deletion	UNP Q6U841
B	?	-	PHE	deletion	UNP Q6U841
B	?	-	ALA	deletion	UNP Q6U841
B	?	-	ASP	deletion	UNP Q6U841
B	?	-	ILE	deletion	UNP Q6U841
B	?	-	GLY	deletion	UNP Q6U841
B	?	-	LYS	deletion	UNP Q6U841
B	?	-	LYS	deletion	UNP Q6U841
B	?	-	GLN	deletion	UNP Q6U841
B	?	-	SER	deletion	UNP Q6U841
B	?	-	GLU	deletion	UNP Q6U841

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Chain	Residue	Modelled	Actual	Comment	Reference
B	?	-	PRO	deletion	UNP Q6U841
B	?	-	ASN	deletion	UNP Q6U841
B	?	-	SER	deletion	UNP Q6U841
B	?	-	MET	deletion	UNP Q6U841
B	?	-	ASP	deletion	UNP Q6U841
B	?	-	LYS	deletion	UNP Q6U841
B	?	-	ASN	deletion	UNP Q6U841
B	?	-	ALA	deletion	UNP Q6U841
B	?	-	GLY	deletion	UNP Q6U841
B	?	-	GLN	deletion	UNP Q6U841
B	?	-	VAL	deletion	UNP Q6U841
B	?	-	VAL	deletion	UNP Q6U841
B	?	-	SER	deletion	UNP Q6U841
B	?	-	PRO	deletion	UNP Q6U841
B	?	-	GLN	deletion	UNP Q6U841
B	?	-	SER	deletion	UNP Q6U841
B	?	-	ALA	deletion	UNP Q6U841
B	?	-	PRO	deletion	UNP Q6U841
B	?	-	ALA	deletion	UNP Q6U841
B	?	-	CYS	deletion	UNP Q6U841
B	?	-	VAL	deletion	UNP Q6U841
B	?	-	GLU	deletion	UNP Q6U841
B	?	-	ASN	deletion	UNP Q6U841
B	?	-	LYS	deletion	UNP Q6U841
B	?	-	ASN	deletion	UNP Q6U841
B	?	-	ASP	deletion	UNP Q6U841
B	?	-	VAL	deletion	UNP Q6U841
B	?	-	SER	deletion	UNP Q6U841
B	?	-	ARG	deletion	UNP Q6U841
B	?	-	GLU	deletion	UNP Q6U841
B	?	-	ASN	deletion	UNP Q6U841
B	?	-	SER	deletion	UNP Q6U841
B	?	-	THR	deletion	UNP Q6U841
B	?	-	VAL	deletion	UNP Q6U841
B	?	-	ASP	deletion	UNP Q6U841
B	?	-	PHE	deletion	UNP Q6U841
B	?	-	SER	deletion	UNP Q6U841
B	?	-	LYS	deletion	UNP Q6U841
B	?	-	GLY	deletion	UNP Q6U841
B	?	-	LEU	deletion	UNP Q6U841
B	?	-	GLY	deletion	UNP Q6U841
B	?	-	GLY	deletion	UNP Q6U841

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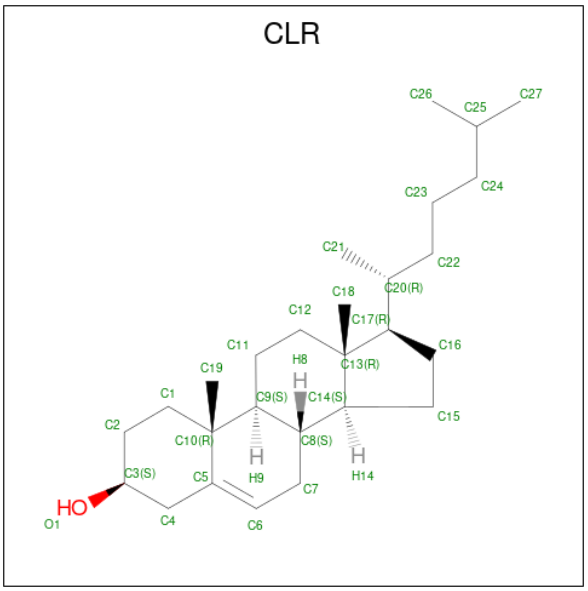
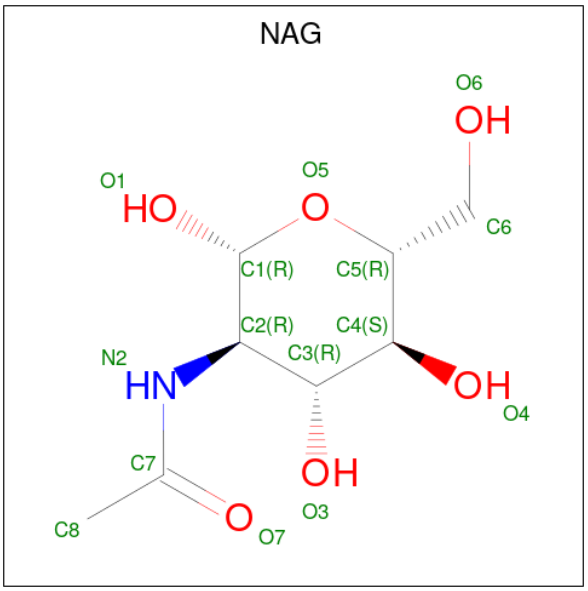
Chain	Residue	Modelled	Actual	Comment	Reference
B	?	-	GLN	deletion	UNP Q6U841
B	?	-	GLN	deletion	UNP Q6U841
B	?	-	LYS	deletion	UNP Q6U841
B	?	-	GLY	deletion	UNP Q6U841
B	?	-	HIS	deletion	UNP Q6U841
B	?	-	THR	deletion	UNP Q6U841
B	?	-	SER	deletion	UNP Q6U841
B	?	-	PRO	deletion	UNP Q6U841
B	?	-	CYS	deletion	UNP Q6U841
B	1119	GLY	-	expression tag	UNP Q6U841
B	1120	ARG	-	expression tag	UNP Q6U841
B	1121	PRO	-	expression tag	UNP Q6U841
B	1122	LEU	-	expression tag	UNP Q6U841
B	1123	GLU	-	expression tag	UNP Q6U841
B	1124	VAL	-	expression tag	UNP Q6U841
B	1125	LEU	-	expression tag	UNP Q6U841
B	1126	PHE	-	expression tag	UNP Q6U841
B	1127	GLN	-	expression tag	UNP Q6U841
B	1128	GLY	-	expression tag	UNP Q6U841
B	1129	PRO	-	expression tag	UNP Q6U841
B	1130	HIS	-	expression tag	UNP Q6U841
B	1131	HIS	-	expression tag	UNP Q6U841
B	1132	HIS	-	expression tag	UNP Q6U841
B	1133	HIS	-	expression tag	UNP Q6U841
B	1134	HIS	-	expression tag	UNP Q6U841
B	1135	HIS	-	expression tag	UNP Q6U841
B	1136	HIS	-	expression tag	UNP Q6U841
B	1137	HIS	-	expression tag	UNP Q6U841
B	1138	HIS	-	expression tag	UNP Q6U841
B	1139	HIS	-	expression tag	UNP Q6U841

- Molecule 2 is CHOLESTEROL (CCD ID: CLR) (formula: $C_{27}H_{46}O$).



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

- Molecule 3 is 2-acetamido-2-deoxy-beta-D-glucopyranose (CCD ID: NAG) (formula: $C_8H_{15}NO_6$).



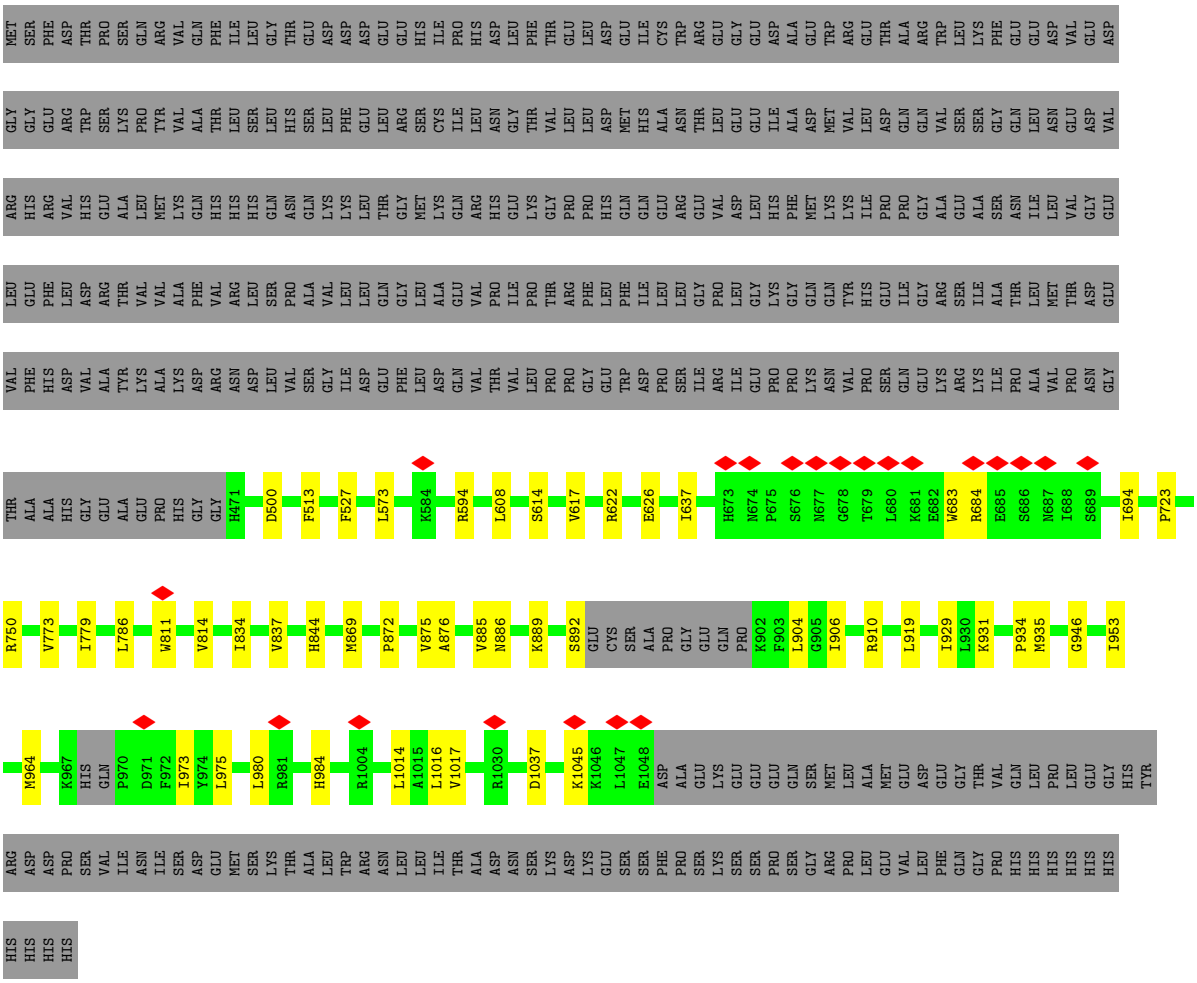
Mol	Chain	Residues	Atoms				AltConf
			Total	C	N	O	
3	A	1	14	8	1	5	0
			Total	C	N	O	
3	B	1	14	8	1	5	0

3 Residue-property plots (i)

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.

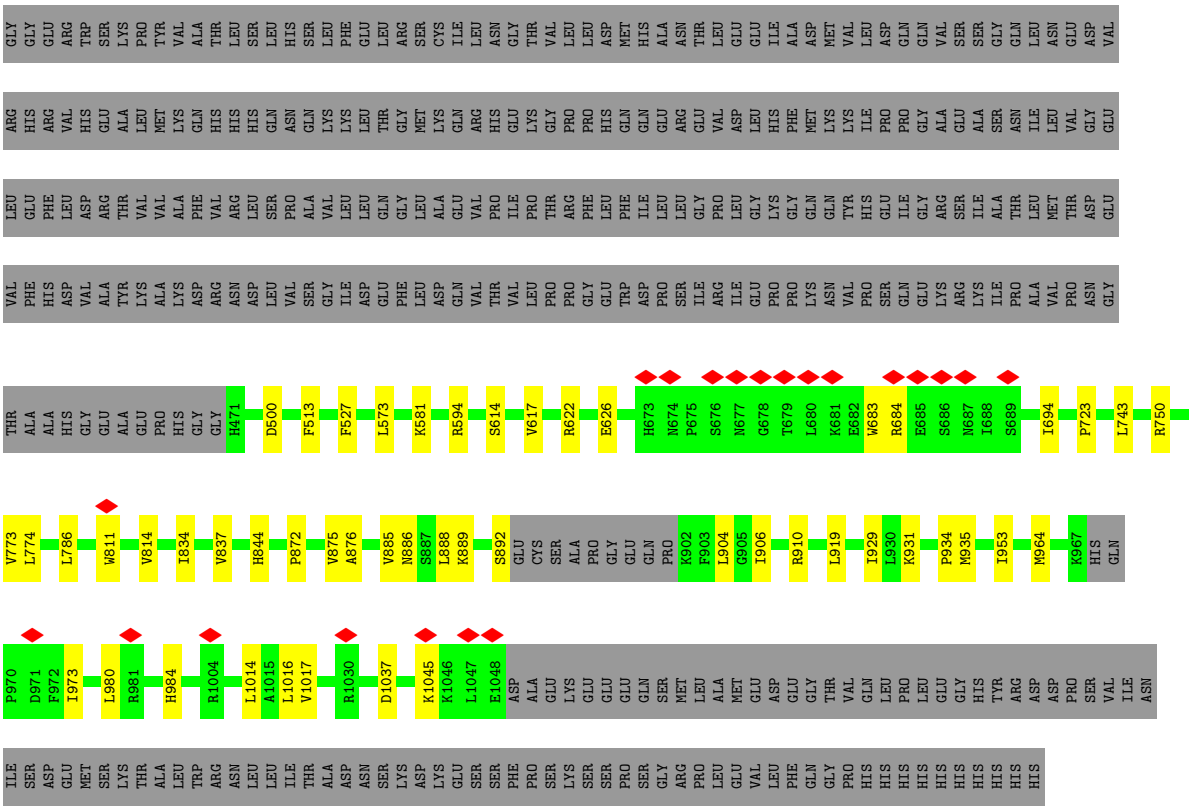
- Molecule 1: Sodium-driven chloride bicarbonate exchanger

Chain A:



- Molecule 1: Sodium-driven chloride bicarbonate exchanger

Chain B:


GLY GLY GLU ARG TRP SER LYS PRO TYR VAL ALA THR LEU SER LEU HIS SER LEU PHE GLU LEU ARG SER CYS ILE LEU ASN GLY THR VAL LEU LEU ASP MET HIS ALA ASN THR LEU GLU GLU ILE ALA ASP MET VAL LEU ASP GLN GLN VAL SER SER GLY GLN LEU ASN GLU VAL
ARG HIS ARG VAL HIS GLU ALA LEU MET LYS GLN HIS HIS HIS GLN ASN GLN LYS LYS LEU THR GLY MET LYS GLN ARG HIS GLU LYS GLY PRO PRO HIS GLN GLN GLU ARG GLU VAL ASP LEU HIS PHE MET LYS LYS ILE PRO PRO GLY ALA GLU ALA SER ASN ILE LEU VAL GLY GLU
LEU GLU PHE LEU ASP ARG THR VAL VAL ALA PHE VAL ARG LEU SER PRO ALA VAL LEU LEU GLN GLY LEU ALA GLU VAL PRO ILE PRO THR ARG PHE LEU PHE ILE LEU LEU GLY PRO LEU GLY LYS GLY PRO LYS ASN VAL PRO SER GLN GLU ILE GLY ARG SER ILE ALA THR LEU MET THR ASP GLU
VAL PHE HIS ASP VAL ALA TYR LYS ALA LYS ASP ARG ASN ASP LEU VAL SER GLY ILE ASP GLU PHE LEU ASP GLN VAL THR VAL LEU PRO PRO GLY GLU TRP ASP PRO SER ILE ARG ILE GLU PRO PRO LYS ASN VAL PRO SER GLN GLU LYS ARG LYS ILE PRO ALA VAL PRO ASN GLY
THR ALA ALA HIS GLY GLU ALA GLU PRO HIS GLY GLY H471 D500 F513 F527 L573 K581 R594 S614 V617 R622 E626 H673 N674 P675 S676 N677 G678 T679 L680 K681 E682 W683 R684 E685 S686 N687 I688 S689 I694 P723 L743 R750
V773 L774 L786 W811 V814 I834 V837 H844 P872 V875 A876 V885 N886 S887 L888 K889 S892 GLU CYS SER ALA PRO GLY GLU GLN PRO K902 F903 L904 G905 I906 R910 L919 I929 L930 K931 P934 M935 I953 M964 K967 HIS GLN
P970 D971 F972 I973 L980 R981 H984 R1004 L1014 A1015 L1016 V1017 R1030 D1037 K1045 K1046 L1047 E1048 ASP ALA GLU LYS GLU GLU GLU GLN SER MET LEU ALA MET GLU ASP GLU GLY THR VAL GLN LEU PRO LEU GLU GLY HIS TYR ARG ASP ASP PRO SER VAL ILE ASN
ILE SER ASP GLU MET SER LYS THR ALA LEU TRP ARG ASN LEU LEU ILE THR ALA ASP ASN SER LYS ASP LYS GLU SER SER PHE PRO SER LYS SER SER PRO SER GLY ARG PRO LEU GLU VAL LEU PHE GLN GLY PRO HIS HIS HIS HIS HIS HIS HIS HIS HIS HIS

4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C2	Depositor
Number of particles used	536488	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	TFS KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/Å^2$)	61.36	Depositor
Minimum defocus (nm)	500	Depositor
Maximum defocus (nm)	1800	Depositor
Magnification	Not provided	
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	1.331	Depositor
Minimum map value	-0.907	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.020	Depositor
Recommended contour level	0.125	Depositor
Map size (Å)	319.872, 319.872, 319.872	wwPDB
Map dimensions	384, 384, 384	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.833, 0.833, 0.833	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: CLR, 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	0.41	0/4520	0.57	0/6143
1	B	0.41	0/4520	0.57	0/6143
All	All	0.41	0/9040	0.57	0/12286

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	4406	0	4491	47	0
1	B	4406	0	4491	47	0
2	A	140	0	230	2	0
2	B	140	0	230	3	0
3	A	14	0	13	3	0
3	B	14	0	13	2	0
All	All	9120	0	9468	93	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 5.

The worst 5 of 93 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:513:PHE:HZ	1:A:919:LEU:HD11	1.31	0.93
1:B:513:PHE:HZ	1:B:919:LEU:HD11	1.31	0.93
1:A:513:PHE:CZ	1:A:919:LEU:HD11	2.19	0.78
1:B:980:LEU:HD21	1:B:984:HIS:CE1	2.19	0.77
1:A:980:LEU:HD21	1:A:984:HIS:CE1	2.19	0.77

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	561/981 (57%)	543 (97%)	18 (3%)	0	100	100
1	B	561/981 (57%)	543 (97%)	18 (3%)	0	100	100
All	All	1122/1962 (57%)	1086 (97%)	36 (3%)	0	100	100

There are no Ramachandran outliers to report.

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	476/865 (55%)	476 (100%)	0	100	100
1	B	476/865 (55%)	476 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
All	All	952/1730 (55%)	952 (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 11 such sidechains are listed below:

Mol	Chain	Res	Type
1	B	664	GLN
1	B	833	GLN
1	B	984	HIS
1	B	840	ASN
1	A	909	GLN

5.3.3 RNA (i)

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)

There are no oligosaccharides in this entry.

5.6 Ligand geometry (i)

12 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	$\#\|Z\| > 2$
2	CLR	B	1201	-	31,31,31	0.28	0	48,48,48	0.39	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
3	NAG	A	1206	1	14,14,15	0.32	0	17,19,21	0.68	0
2	CLR	A	1201	-	31,31,31	0.28	0	48,48,48	0.39	0
2	CLR	A	1205	-	31,31,31	0.29	0	48,48,48	0.38	0
3	NAG	B	1206	1	14,14,15	0.32	0	17,19,21	0.68	0
2	CLR	B	1202	-	31,31,31	0.30	0	48,48,48	0.39	0
2	CLR	A	1202	-	31,31,31	0.30	0	48,48,48	0.39	0
2	CLR	A	1204	-	31,31,31	0.27	0	48,48,48	0.43	0
2	CLR	B	1203	-	31,31,31	0.28	0	48,48,48	0.38	0
2	CLR	B	1205	-	31,31,31	0.28	0	48,48,48	0.38	0
2	CLR	A	1203	-	31,31,31	0.29	0	48,48,48	0.38	0
2	CLR	B	1204	-	31,31,31	0.27	0	48,48,48	0.42	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
2	CLR	B	1201	-	-	0/10/68/68	0/4/4/4
3	NAG	A	1206	1	-	3/6/23/26	0/1/1/1
2	CLR	A	1201	-	-	0/10/68/68	0/4/4/4
2	CLR	A	1205	-	-	0/10/68/68	0/4/4/4
3	NAG	B	1206	1	-	3/6/23/26	0/1/1/1
2	CLR	B	1202	-	-	0/10/68/68	0/4/4/4
2	CLR	A	1202	-	-	0/10/68/68	0/4/4/4
2	CLR	A	1204	-	-	5/10/68/68	0/4/4/4
2	CLR	B	1203	-	-	1/10/68/68	0/4/4/4
2	CLR	B	1205	-	-	0/10/68/68	0/4/4/4
2	CLR	A	1203	-	-	1/10/68/68	0/4/4/4
2	CLR	B	1204	-	-	5/10/68/68	0/4/4/4

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

5 of 18 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	1206	NAG	C3-C2-N2-C7
3	A	1206	NAG	C8-C7-N2-C2
3	A	1206	NAG	O7-C7-N2-C2

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Mol	Chain	Res	Type	Atoms
3	B	1206	NAG	C3-C2-N2-C7
3	B	1206	NAG	C8-C7-N2-C2

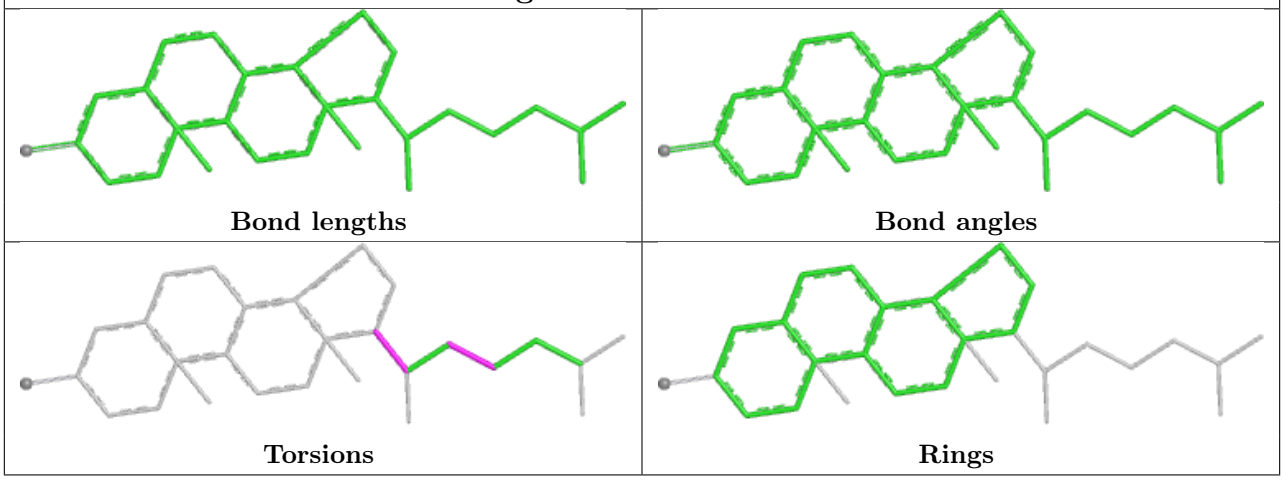
There are no ring outliers.

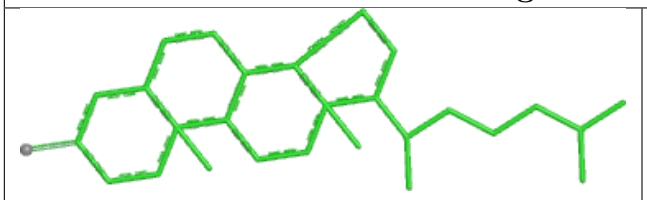
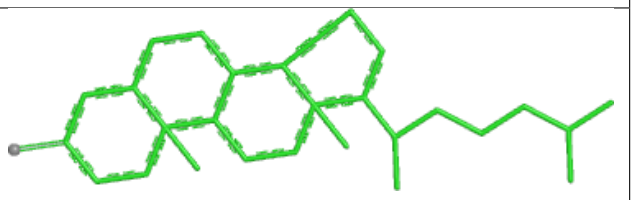
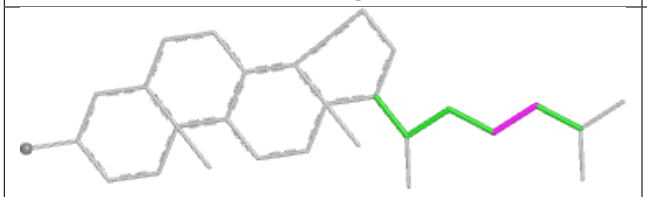
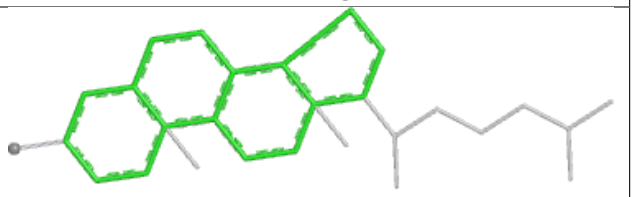
5 monomers are involved in 10 short contacts:

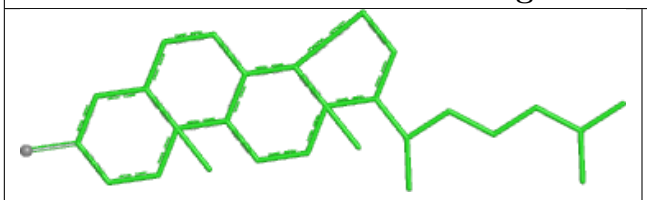
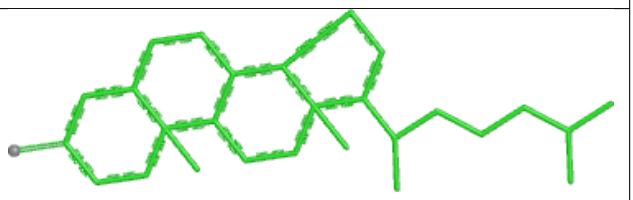
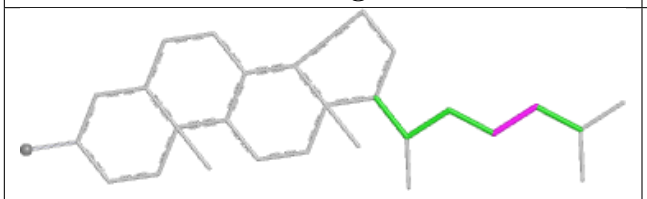
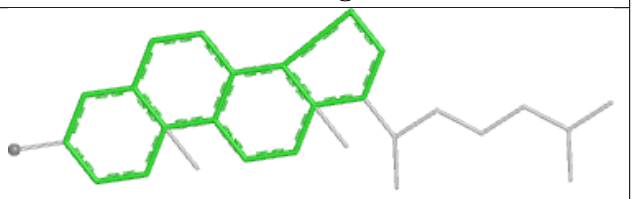
Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	1206	NAG	3	0
3	B	1206	NAG	2	0
2	A	1204	CLR	2	0
2	B	1203	CLR	1	0
2	B	1204	CLR	2	0

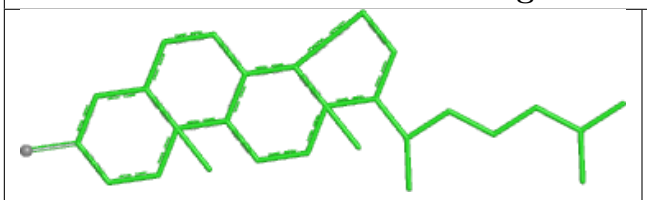
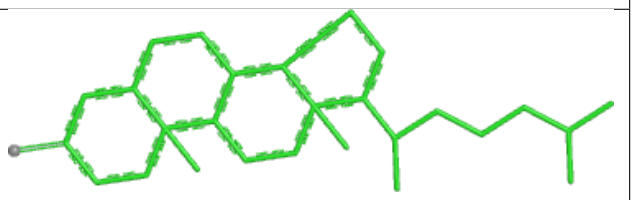
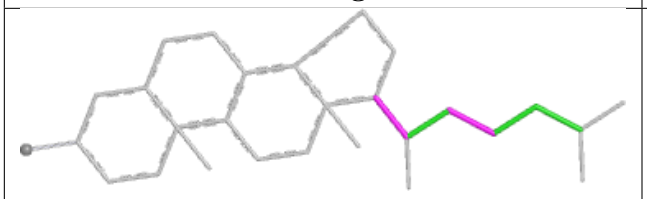
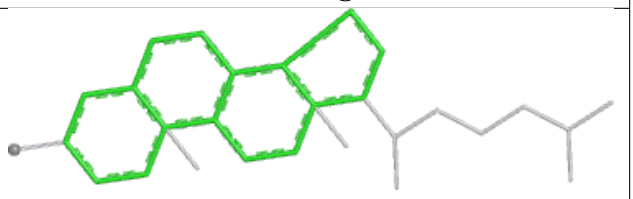
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. 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 CLR A 1204



Ligand CLR B 1203	
 Bond lengths	 Bond angles
 Torsions	 Rings

Ligand CLR A 1203	
 Bond lengths	 Bond angles
 Torsions	 Rings

Ligand CLR B 1204	
 Bond lengths	 Bond angles
 Torsions	 Rings

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.

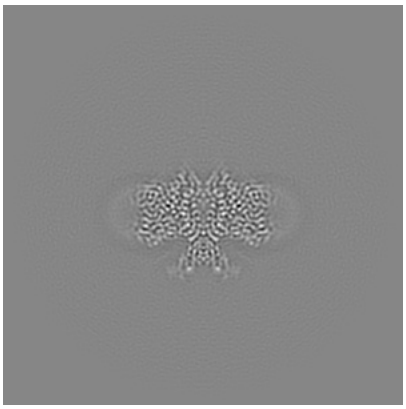
6 Map visualisation (i)

This section contains visualisations of the EMDB entry EMD-48304. These allow visual inspection of the internal detail of the map and identification of artifacts.

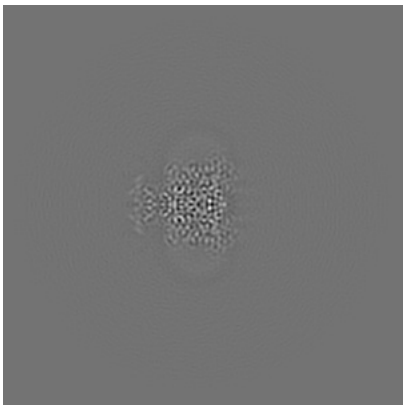
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections (i)

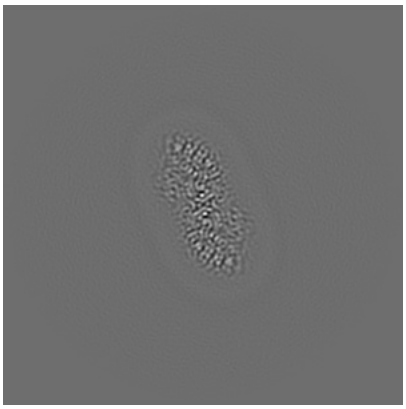
6.1.1 Primary map



X

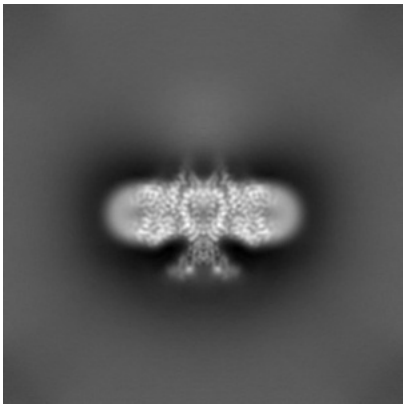


Y

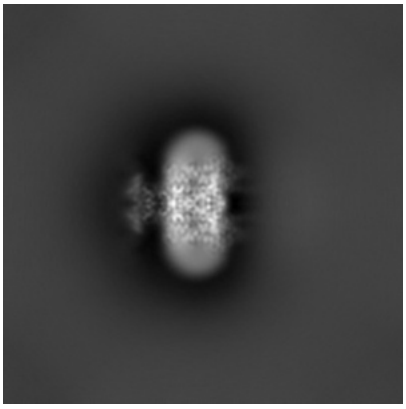


Z

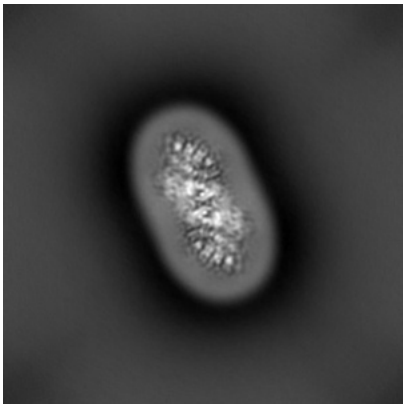
6.1.2 Raw map



X



Y

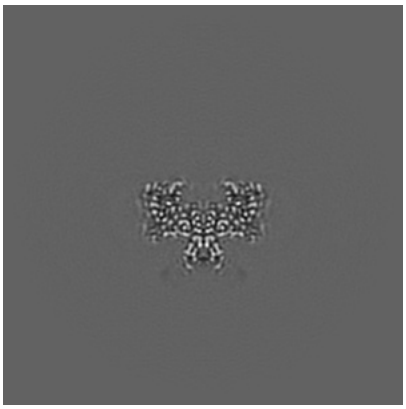


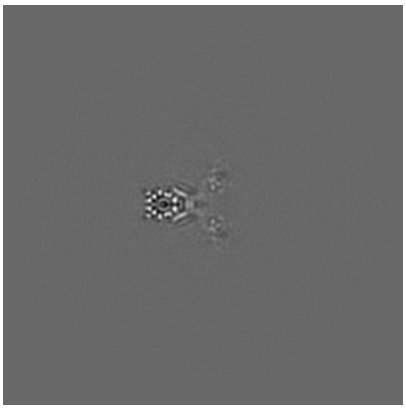
Z

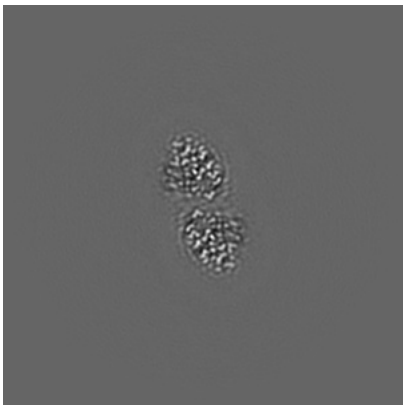
The images above show the map projected in three orthogonal directions.

6.2 Central slices (i)

6.2.1 Primary map

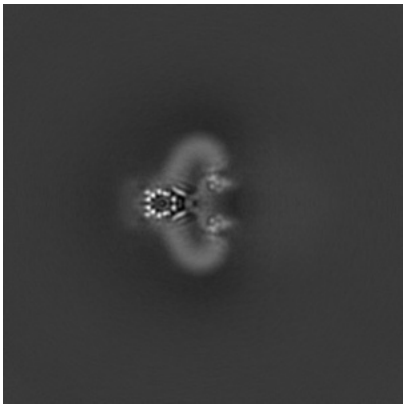

X Index: 192

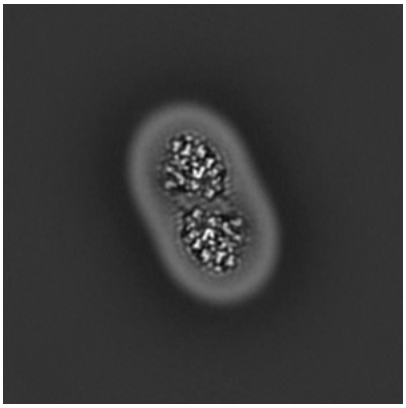

Y Index: 192


Z Index: 192

6.2.2 Raw map

X Index: 192


Y Index: 192

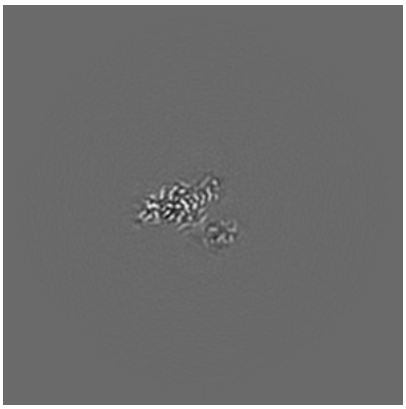

Z Index: 192

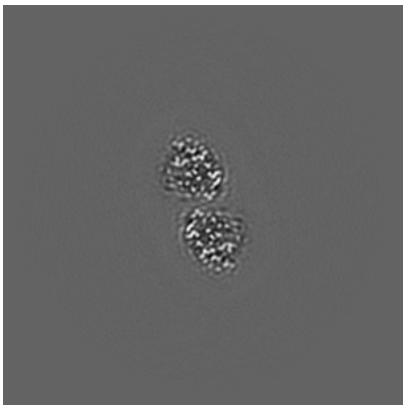
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices (i)

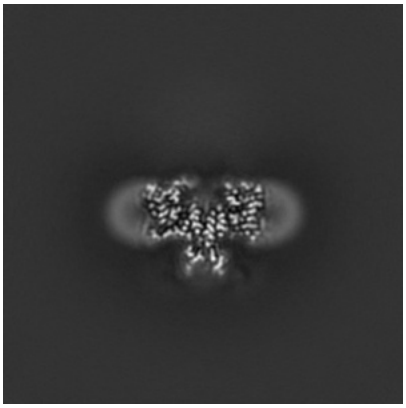
6.3.1 Primary map

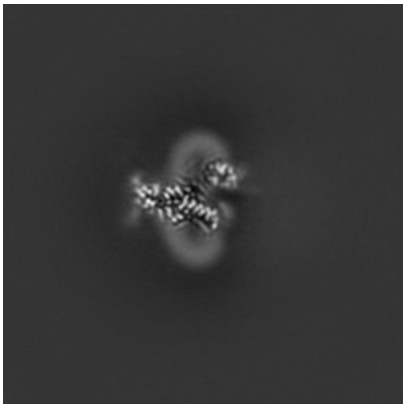
X Index: 190

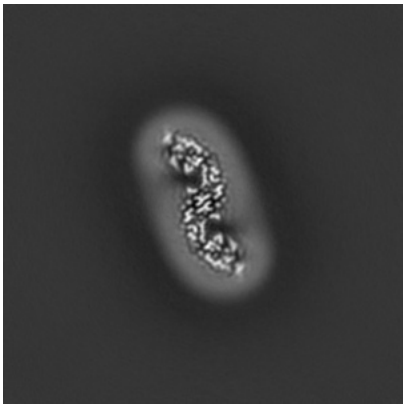

Y Index: 201


Z Index: 191

6.3.2 Raw map


X Index: 190

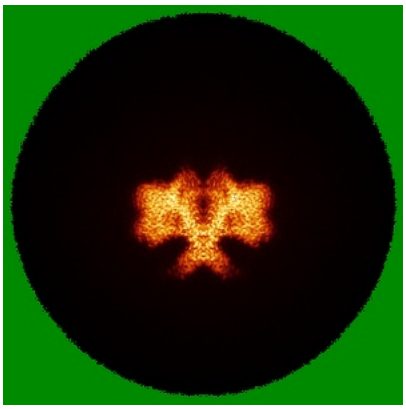

Y Index: 182

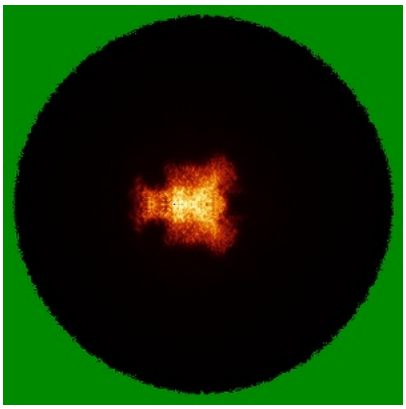

Z Index: 164

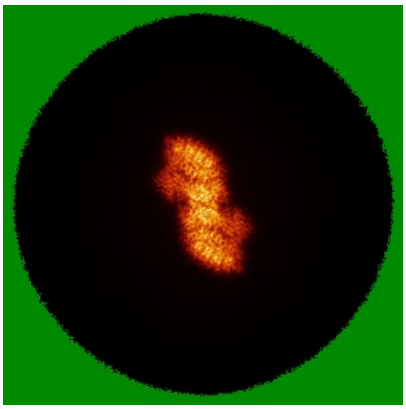
The images above show the largest variance slices of the map in three orthogonal directions.

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

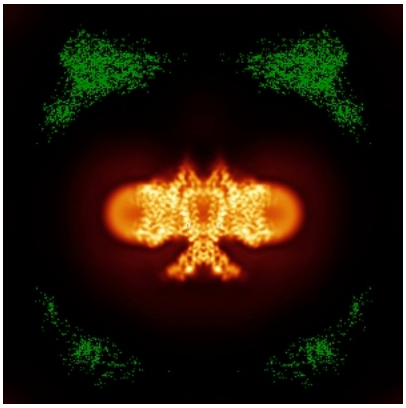
6.4.1 Primary map

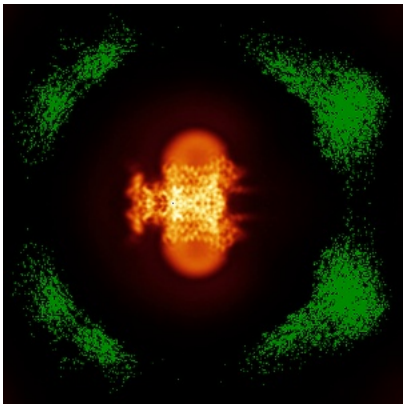

X

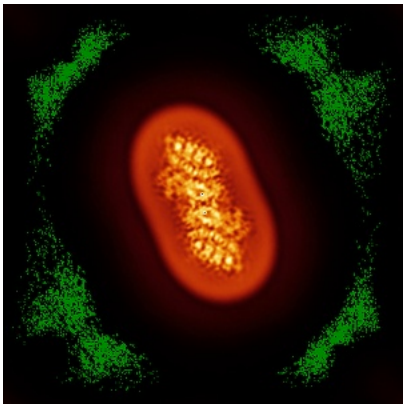

Y


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.

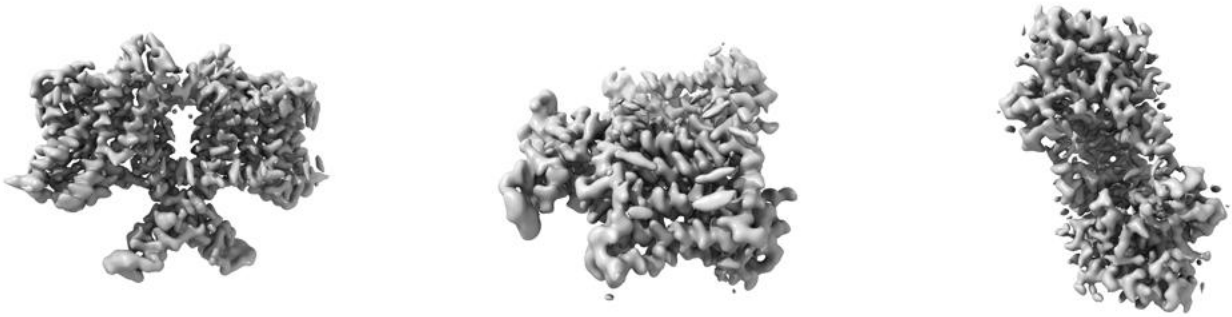
6.5 Orthogonal surface views (i)

6.5.1 Primary map

X Y Z

The images above show the 3D surface view of the map at the recommended contour level 0.125. 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.

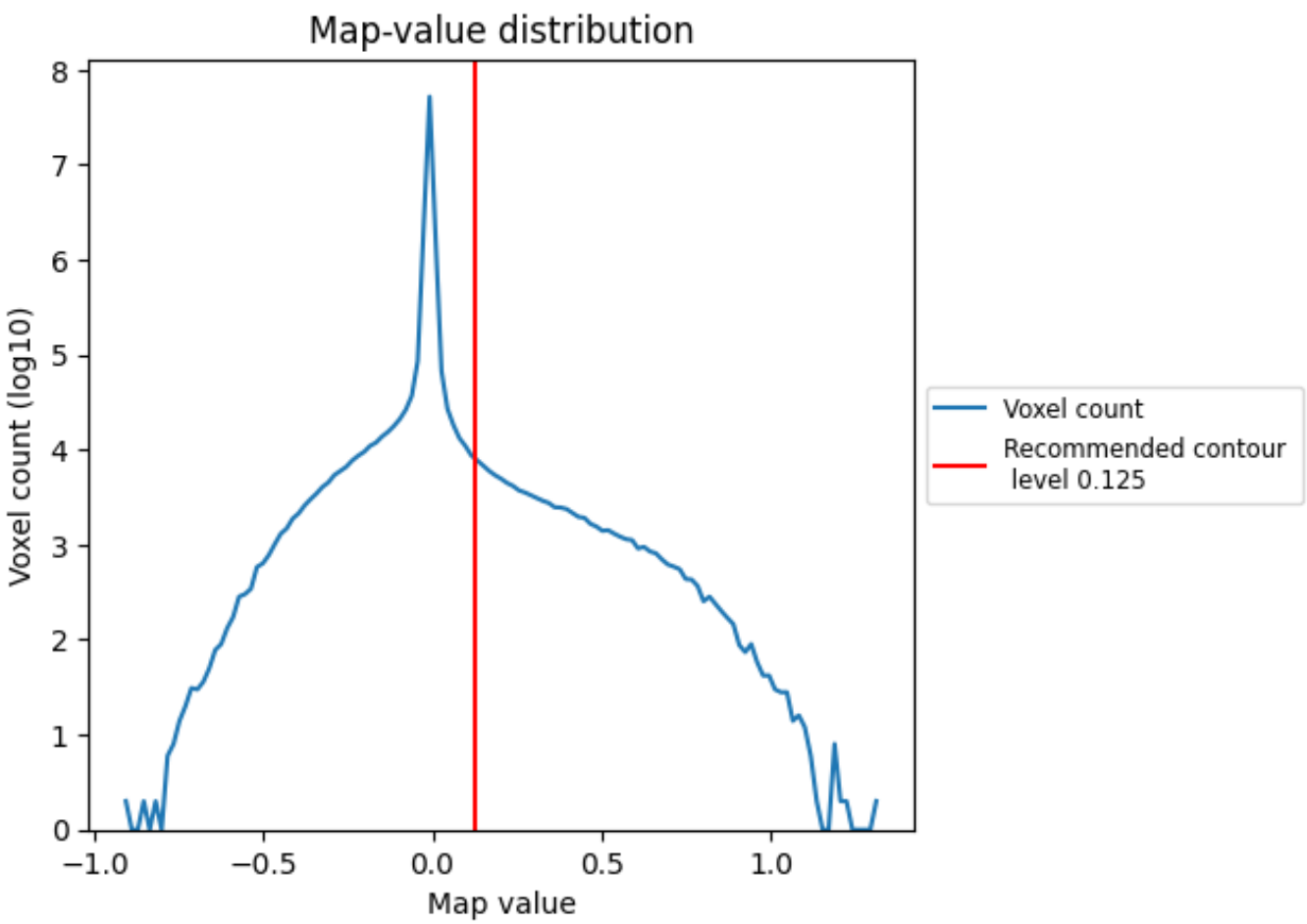
6.6 Mask visualisation (i)

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

7 Map analysis (i)

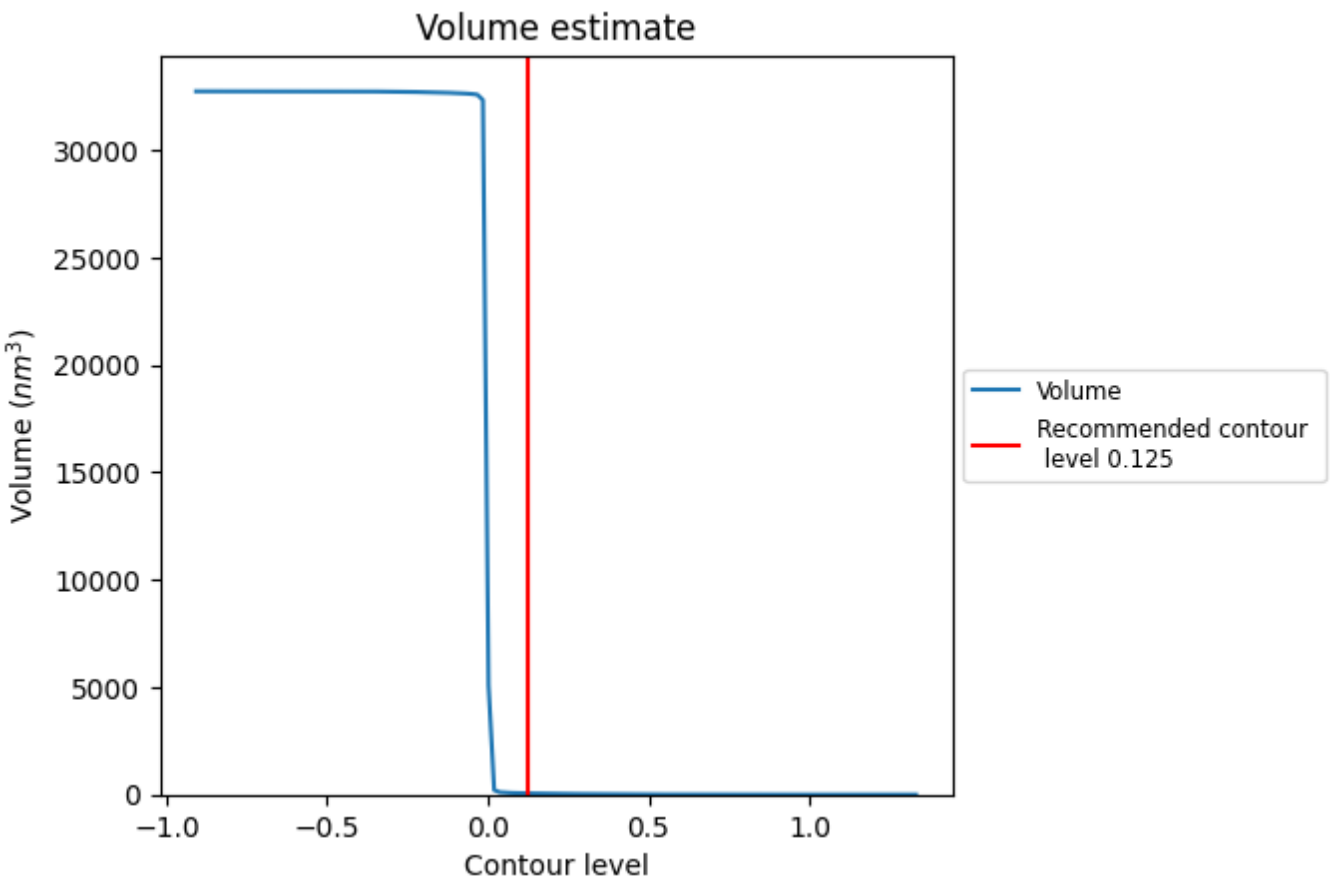
This section contains the results of statistical analysis of the map.

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.

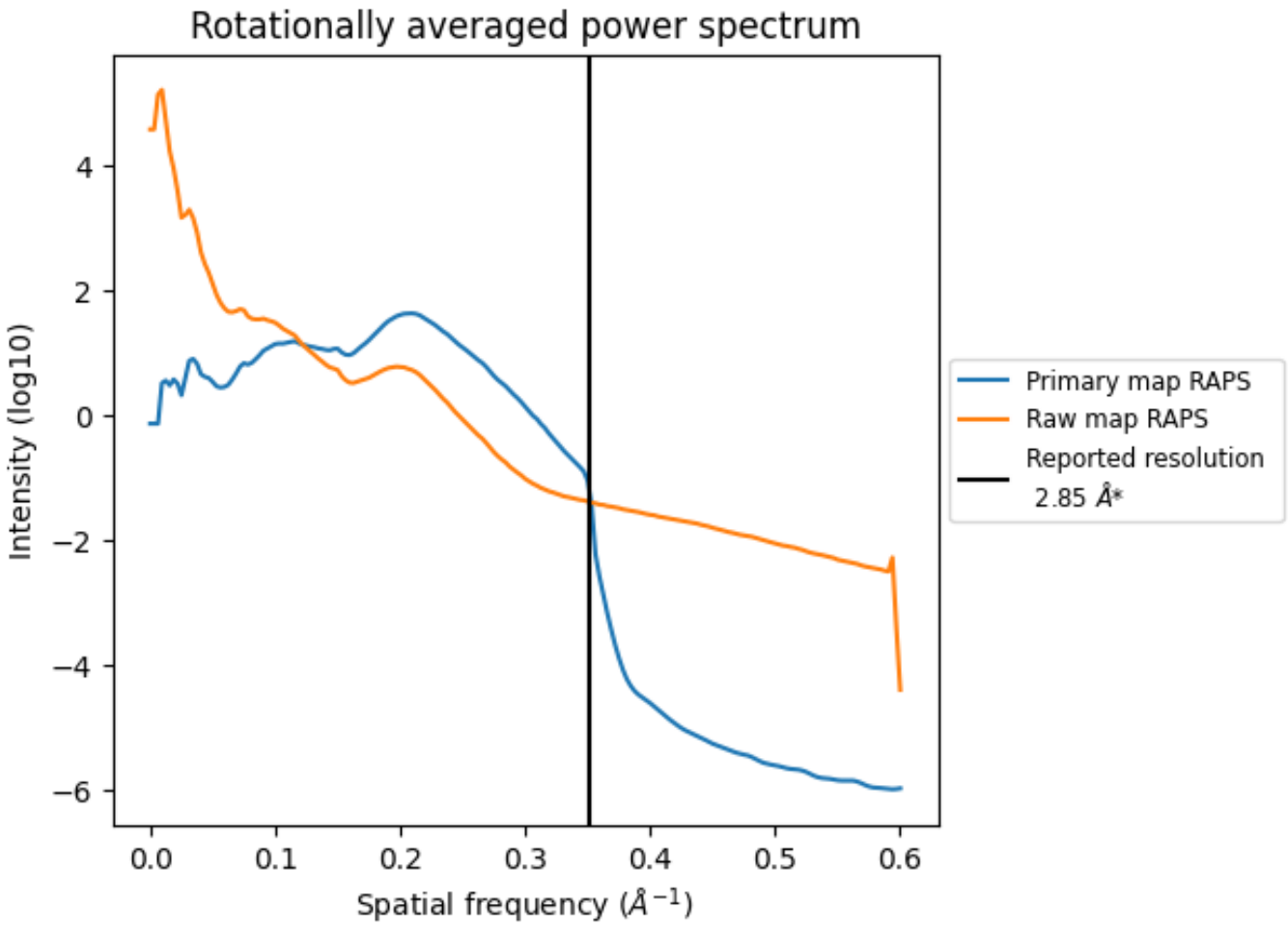
7.2 Volume estimate (i)



The volume at the recommended contour level is 55 nm^3; this corresponds to an approximate mass of 50 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)

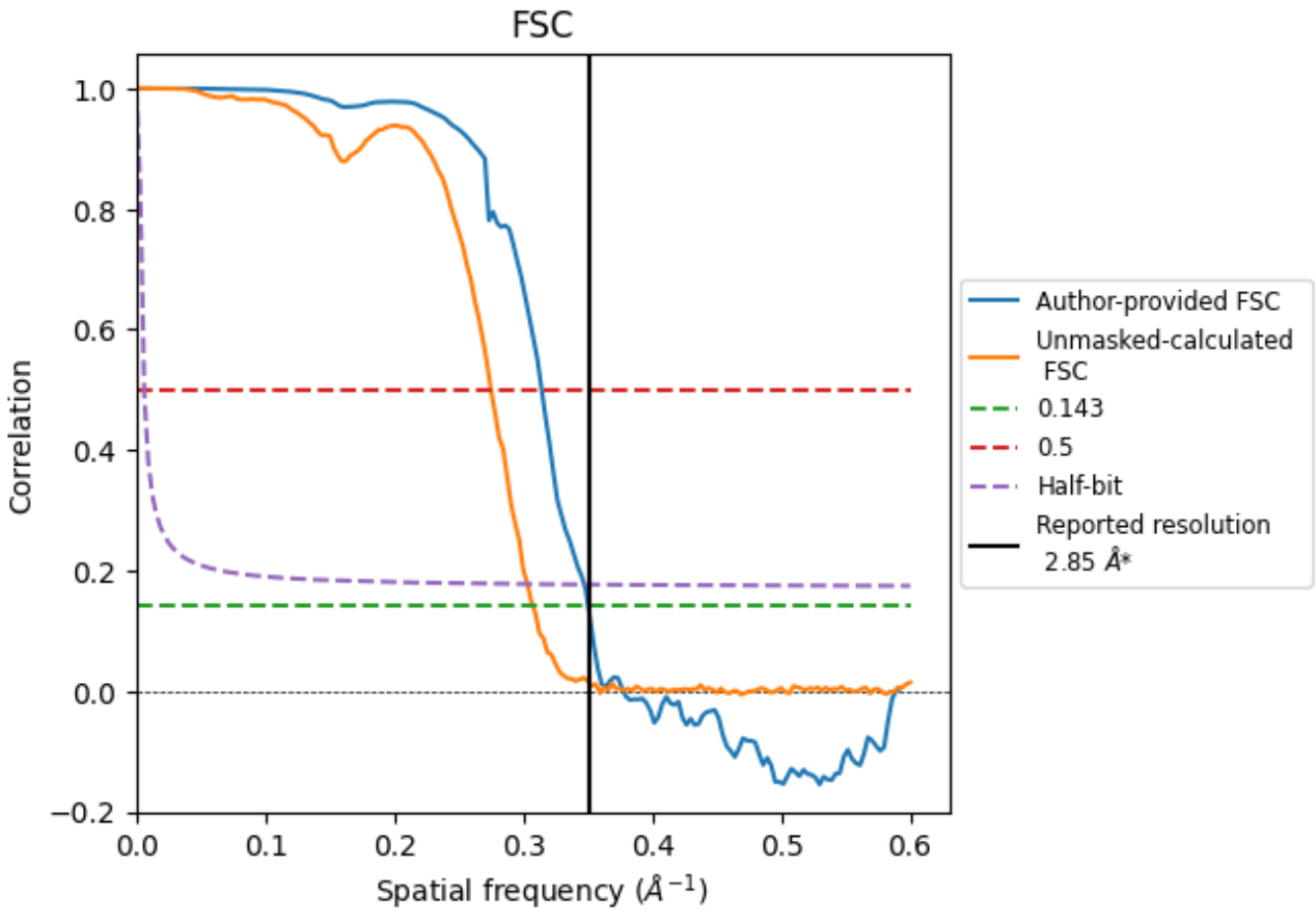


*Reported resolution corresponds to spatial frequency of 0.351 Å^{-1}

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 0.351 Å^{-1}

8.2 Resolution estimates (i)

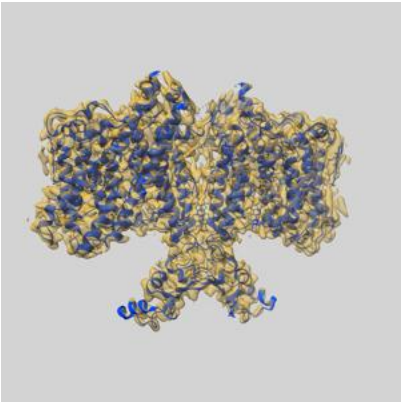
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	2.85	-	-
Author-provided FSC curve	2.85	3.18	2.88
Unmasked-calculated*	3.25	3.64	3.30

*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 3.25 differs from the reported value 2.85 by more than 10 %

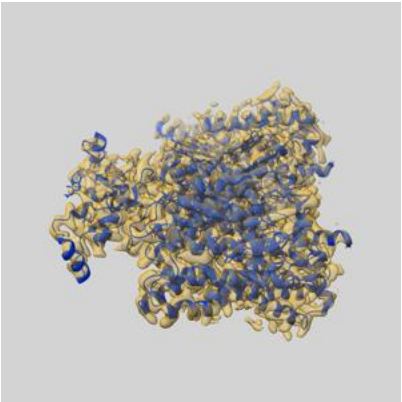
9 Map-model fit (i)

This section contains information regarding the fit between EMDB map EMD-48304 and PDB model 9MIX. Per-residue inclusion information can be found in section 3 on page 10.

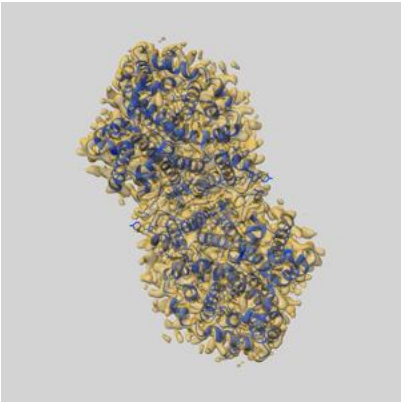
9.1 Map-model overlay (i)



X



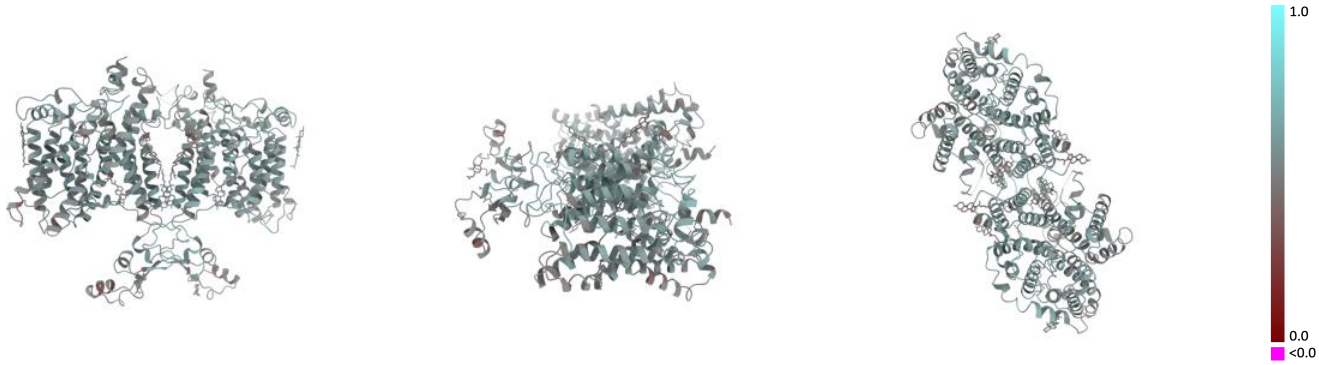
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.125 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.

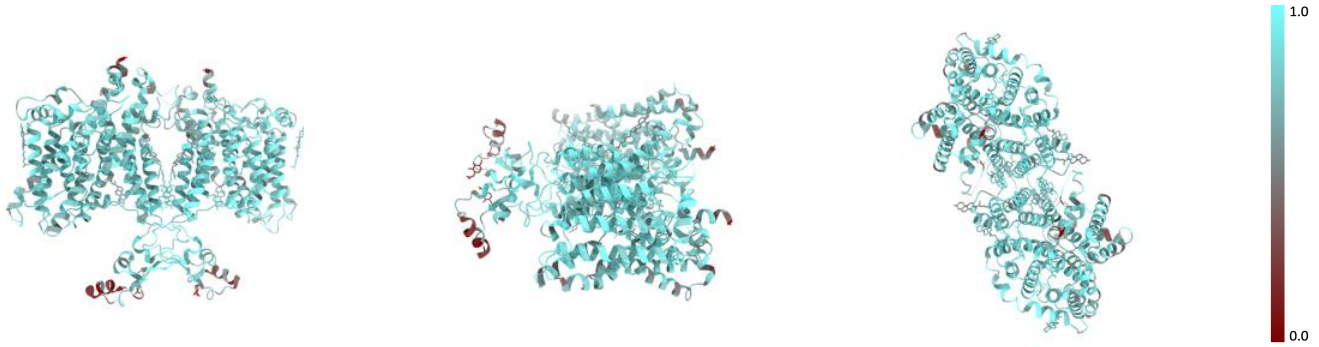
9.2 Q-score mapped to coordinate model (i)



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.

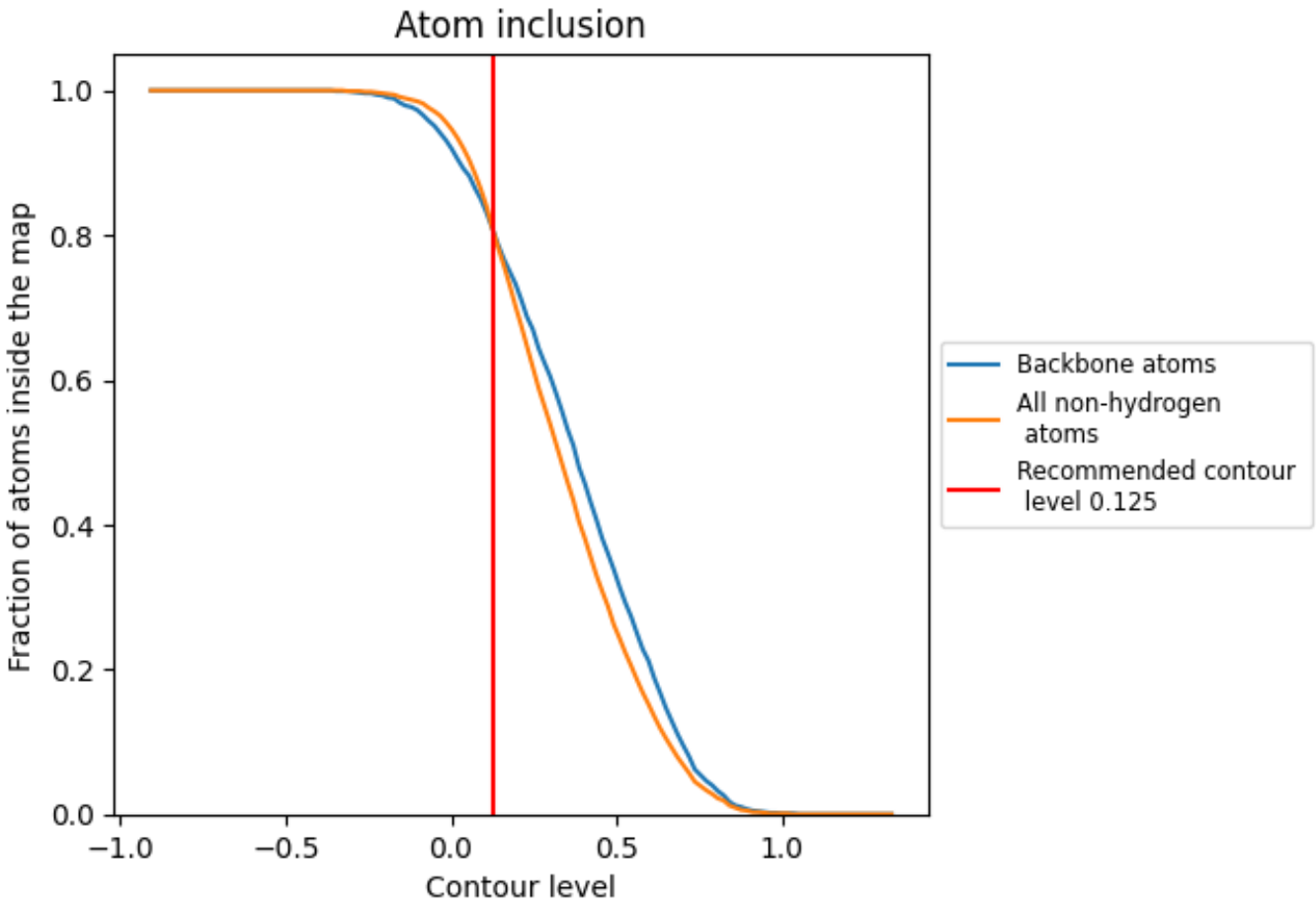
9.3 Atom inclusion mapped to coordinate model (i)



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 (0.125).

9.4 Atom inclusion (i)



At the recommended contour level, 81% of all backbone atoms, 81% of all non-hydrogen atoms, are inside the map.

9.5 Map-model fit summary (i)

The table lists the average atom inclusion at the recommended contour level (0.125) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.8090	0.5420
A	0.8100	0.5420
B	0.8080	0.5420