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)

Dec 1, 2021 – 12:15 pm GMT

PDB ID	:	7PTY
EMDB ID	:	EMD-13643
Title	:	Delta-latroinsectotoxin dimer
Authors	:	Chen, M.; Gatsogiannis, C.
Deposited on	:	2021-09-27
Resolution	:	4.63 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.

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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 4.63 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		25
Ramachandran outliers		0
Sidechain outliers		0.1%

Worse *Better*

∎ Percentile relative to all structures
⬚ Percentile relative to all EM structures
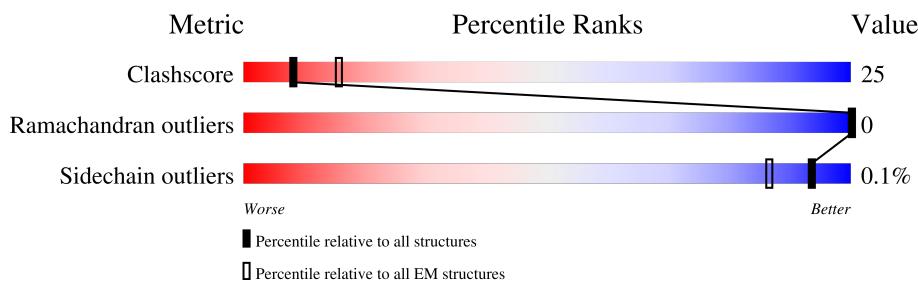
Metric	Whole archive (#Entries)	EM structures (#Entries)
Clashscore	158937	4297
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826

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	1296	17% 36% 29% 34%
1	B	1296	10% 35% 32% 33%
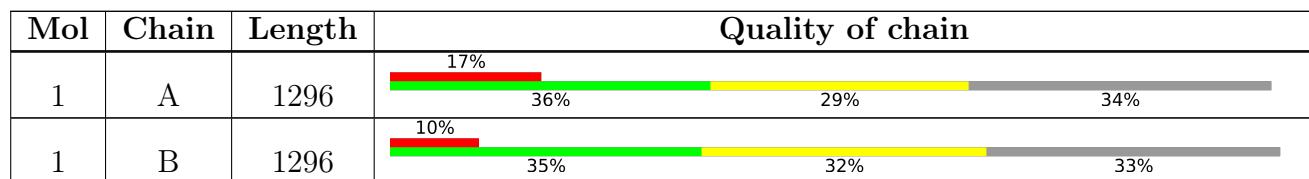
2 Entry composition ⓘ

There is only 1 type of molecule in this entry. The entry contains 13433 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 Delta-latroinsectotoxin-Lt1a.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	850	Total 6663	C 4229	N 1125	O 1293	S 16	0	0
1	B	865	Total 6770	C 4293	N 1142	O 1318	S 17	0	0

There are 164 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-62	MET	-	initiating methionine	UNP Q25338
A	-61	LYS	-	expression tag	UNP Q25338
A	-60	PHE	-	expression tag	UNP Q25338
A	-59	LEU	-	expression tag	UNP Q25338
A	-58	VAL	-	expression tag	UNP Q25338
A	-57	ASN	-	expression tag	UNP Q25338
A	-56	VAL	-	expression tag	UNP Q25338
A	-55	ALA	-	expression tag	UNP Q25338
A	-54	LEU	-	expression tag	UNP Q25338
A	-53	VAL	-	expression tag	UNP Q25338
A	-52	PHE	-	expression tag	UNP Q25338
A	-51	MET	-	expression tag	UNP Q25338
A	-50	VAL	-	expression tag	UNP Q25338
A	-49	VAL	-	expression tag	UNP Q25338
A	-48	TYR	-	expression tag	UNP Q25338
A	-47	ILE	-	expression tag	UNP Q25338
A	-46	SER	-	expression tag	UNP Q25338
A	-45	TYR	-	expression tag	UNP Q25338
A	-44	ILE	-	expression tag	UNP Q25338
A	-43	TYR	-	expression tag	UNP Q25338
A	-42	ALA	-	expression tag	UNP Q25338
A	-41	MET	-	expression tag	UNP Q25338
A	-40	TRP	-	expression tag	UNP Q25338
A	-39	SER	-	expression tag	UNP Q25338
A	-38	HIS	-	expression tag	UNP Q25338
A	-37	PRO	-	expression tag	UNP Q25338

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Chain	Residue	Modelled	Actual	Comment	Reference
A	-36	GLN	-	expression tag	UNP Q25338
A	-35	PHE	-	expression tag	UNP Q25338
A	-34	GLU	-	expression tag	UNP Q25338
A	-33	LYS	-	expression tag	UNP Q25338
A	-32	GLY	-	expression tag	UNP Q25338
A	-31	SER	-	expression tag	UNP Q25338
A	-30	ALA	-	expression tag	UNP Q25338
A	-29	GLY	-	expression tag	UNP Q25338
A	-28	SER	-	expression tag	UNP Q25338
A	-27	ALA	-	expression tag	UNP Q25338
A	-26	ALA	-	expression tag	UNP Q25338
A	-25	GLY	-	expression tag	UNP Q25338
A	-24	SER	-	expression tag	UNP Q25338
A	-23	GLY	-	expression tag	UNP Q25338
A	-22	ALA	-	expression tag	UNP Q25338
A	-21	GLY	-	expression tag	UNP Q25338
A	-20	TRP	-	expression tag	UNP Q25338
A	-19	SER	-	expression tag	UNP Q25338
A	-18	HIS	-	expression tag	UNP Q25338
A	-17	PRO	-	expression tag	UNP Q25338
A	-16	GLN	-	expression tag	UNP Q25338
A	-15	PHE	-	expression tag	UNP Q25338
A	-14	GLU	-	expression tag	UNP Q25338
A	-13	LYS	-	expression tag	UNP Q25338
A	-12	GLY	-	expression tag	UNP Q25338
A	-11	ALA	-	expression tag	UNP Q25338
A	-10	GLY	-	expression tag	UNP Q25338
A	-9	LEU	-	expression tag	UNP Q25338
A	-8	GLU	-	expression tag	UNP Q25338
A	-7	VAL	-	expression tag	UNP Q25338
A	-6	LEU	-	expression tag	UNP Q25338
A	-5	PHE	-	expression tag	UNP Q25338
A	-4	GLN	-	expression tag	UNP Q25338
A	-3	GLY	-	expression tag	UNP Q25338
A	-2	PRO	-	expression tag	UNP Q25338
A	-1	PRO	-	expression tag	UNP Q25338
A	0	TRP	-	expression tag	UNP Q25338
A	1215	LEU	-	expression tag	UNP Q25338
A	1216	GLU	-	expression tag	UNP Q25338
A	1217	SER	-	expression tag	UNP Q25338
A	1218	SER	-	expression tag	UNP Q25338
A	1219	GLY	-	expression tag	UNP Q25338

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Chain	Residue	Modelled	Actual	Comment	Reference
A	1220	LEU	-	expression tag	UNP Q25338
A	1221	VAL	-	expression tag	UNP Q25338
A	1222	PRO	-	expression tag	UNP Q25338
A	1223	ARG	-	expression tag	UNP Q25338
A	1224	GLY	-	expression tag	UNP Q25338
A	1225	SER	-	expression tag	UNP Q25338
A	1226	HIS	-	expression tag	UNP Q25338
A	1227	HIS	-	expression tag	UNP Q25338
A	1228	HIS	-	expression tag	UNP Q25338
A	1229	HIS	-	expression tag	UNP Q25338
A	1230	HIS	-	expression tag	UNP Q25338
A	1231	HIS	-	expression tag	UNP Q25338
A	1232	HIS	-	expression tag	UNP Q25338
A	1233	HIS	-	expression tag	UNP Q25338
B	-62	MET	-	initiating methionine	UNP Q25338
B	-61	LYS	-	expression tag	UNP Q25338
B	-60	PHE	-	expression tag	UNP Q25338
B	-59	LEU	-	expression tag	UNP Q25338
B	-58	VAL	-	expression tag	UNP Q25338
B	-57	ASN	-	expression tag	UNP Q25338
B	-56	VAL	-	expression tag	UNP Q25338
B	-55	ALA	-	expression tag	UNP Q25338
B	-54	LEU	-	expression tag	UNP Q25338
B	-53	VAL	-	expression tag	UNP Q25338
B	-52	PHE	-	expression tag	UNP Q25338
B	-51	MET	-	expression tag	UNP Q25338
B	-50	VAL	-	expression tag	UNP Q25338
B	-49	VAL	-	expression tag	UNP Q25338
B	-48	TYR	-	expression tag	UNP Q25338
B	-47	ILE	-	expression tag	UNP Q25338
B	-46	SER	-	expression tag	UNP Q25338
B	-45	TYR	-	expression tag	UNP Q25338
B	-44	ILE	-	expression tag	UNP Q25338
B	-43	TYR	-	expression tag	UNP Q25338
B	-42	ALA	-	expression tag	UNP Q25338
B	-41	MET	-	expression tag	UNP Q25338
B	-40	TRP	-	expression tag	UNP Q25338
B	-39	SER	-	expression tag	UNP Q25338
B	-38	HIS	-	expression tag	UNP Q25338
B	-37	PRO	-	expression tag	UNP Q25338
B	-36	GLN	-	expression tag	UNP Q25338
B	-35	PHE	-	expression tag	UNP Q25338

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Chain	Residue	Modelled	Actual	Comment	Reference
B	-34	GLU	-	expression tag	UNP Q25338
B	-33	LYS	-	expression tag	UNP Q25338
B	-32	GLY	-	expression tag	UNP Q25338
B	-31	SER	-	expression tag	UNP Q25338
B	-30	ALA	-	expression tag	UNP Q25338
B	-29	GLY	-	expression tag	UNP Q25338
B	-28	SER	-	expression tag	UNP Q25338
B	-27	ALA	-	expression tag	UNP Q25338
B	-26	ALA	-	expression tag	UNP Q25338
B	-25	GLY	-	expression tag	UNP Q25338
B	-24	SER	-	expression tag	UNP Q25338
B	-23	GLY	-	expression tag	UNP Q25338
B	-22	ALA	-	expression tag	UNP Q25338
B	-21	GLY	-	expression tag	UNP Q25338
B	-20	TRP	-	expression tag	UNP Q25338
B	-19	SER	-	expression tag	UNP Q25338
B	-18	HIS	-	expression tag	UNP Q25338
B	-17	PRO	-	expression tag	UNP Q25338
B	-16	GLN	-	expression tag	UNP Q25338
B	-15	PHE	-	expression tag	UNP Q25338
B	-14	GLU	-	expression tag	UNP Q25338
B	-13	LYS	-	expression tag	UNP Q25338
B	-12	GLY	-	expression tag	UNP Q25338
B	-11	ALA	-	expression tag	UNP Q25338
B	-10	GLY	-	expression tag	UNP Q25338
B	-9	LEU	-	expression tag	UNP Q25338
B	-8	GLU	-	expression tag	UNP Q25338
B	-7	VAL	-	expression tag	UNP Q25338
B	-6	LEU	-	expression tag	UNP Q25338
B	-5	PHE	-	expression tag	UNP Q25338
B	-4	GLN	-	expression tag	UNP Q25338
B	-3	GLY	-	expression tag	UNP Q25338
B	-2	PRO	-	expression tag	UNP Q25338
B	-1	PRO	-	expression tag	UNP Q25338
B	0	TRP	-	expression tag	UNP Q25338
B	1215	LEU	-	expression tag	UNP Q25338
B	1216	GLU	-	expression tag	UNP Q25338
B	1217	SER	-	expression tag	UNP Q25338
B	1218	SER	-	expression tag	UNP Q25338
B	1219	GLY	-	expression tag	UNP Q25338
B	1220	LEU	-	expression tag	UNP Q25338
B	1221	VAL	-	expression tag	UNP Q25338

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Chain	Residue	Modelled	Actual	Comment	Reference
B	1222	PRO	-	expression tag	UNP Q25338
B	1223	ARG	-	expression tag	UNP Q25338
B	1224	GLY	-	expression tag	UNP Q25338
B	1225	SER	-	expression tag	UNP Q25338
B	1226	HIS	-	expression tag	UNP Q25338
B	1227	HIS	-	expression tag	UNP Q25338
B	1228	HIS	-	expression tag	UNP Q25338
B	1229	HIS	-	expression tag	UNP Q25338
B	1230	HIS	-	expression tag	UNP Q25338
B	1231	HIS	-	expression tag	UNP Q25338
B	1232	HIS	-	expression tag	UNP Q25338
B	1233	HIS	-	expression tag	UNP Q25338

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: Delta-latroinsectotoxin-Lt1a

• Molecule 1: Delta-latroinsectotoxin-Lt1a

Chain B:

10%
35%　　32%　　33%
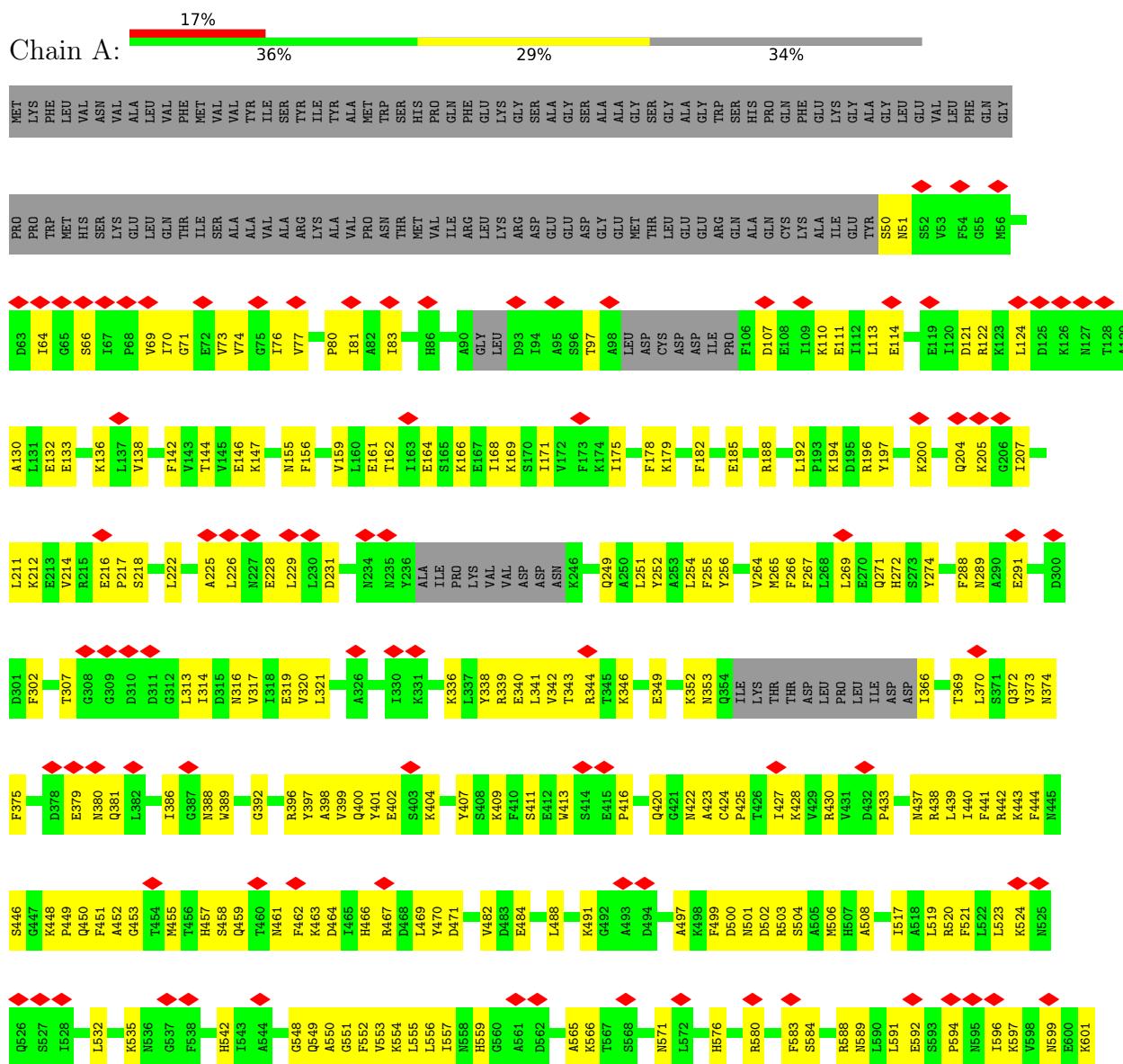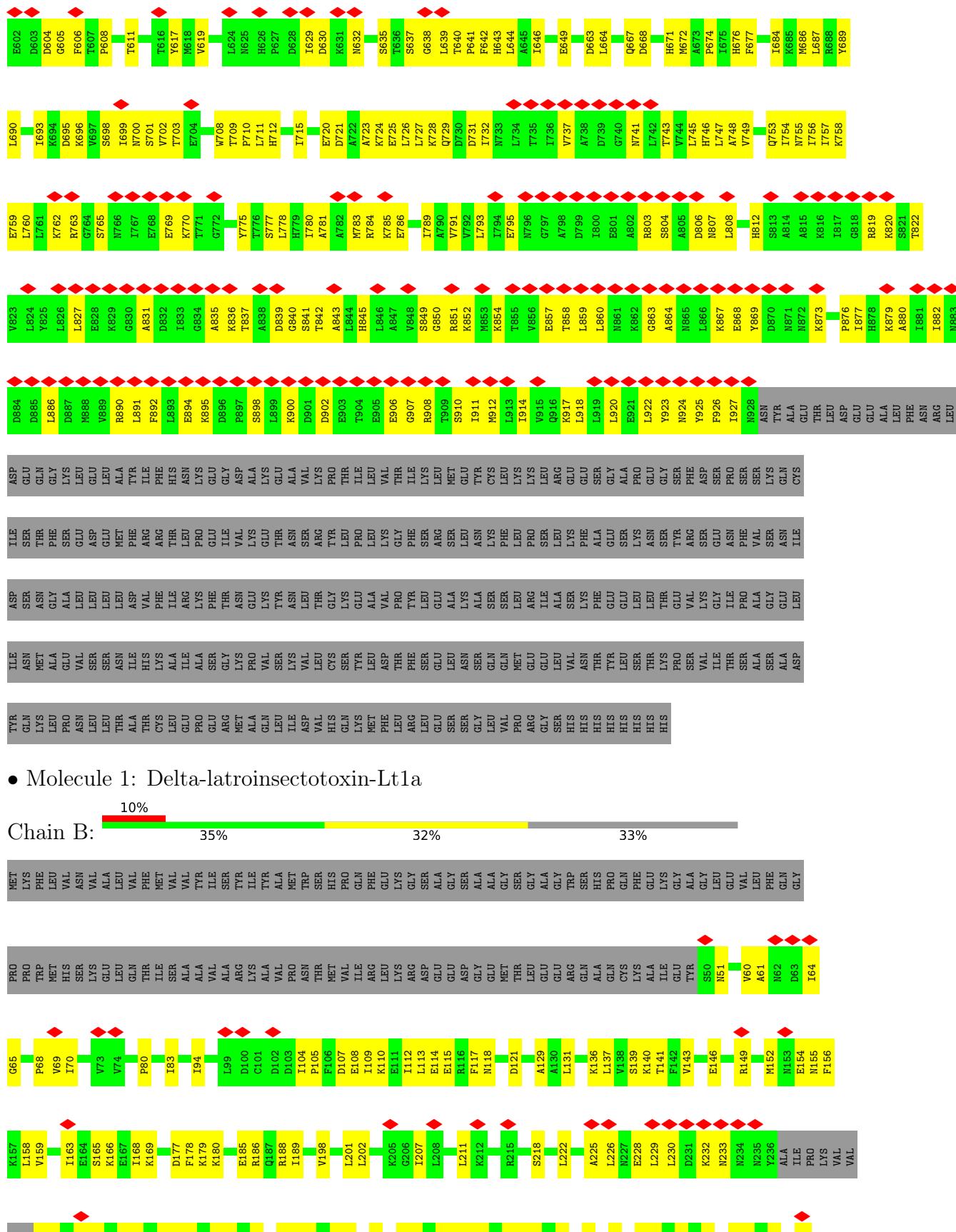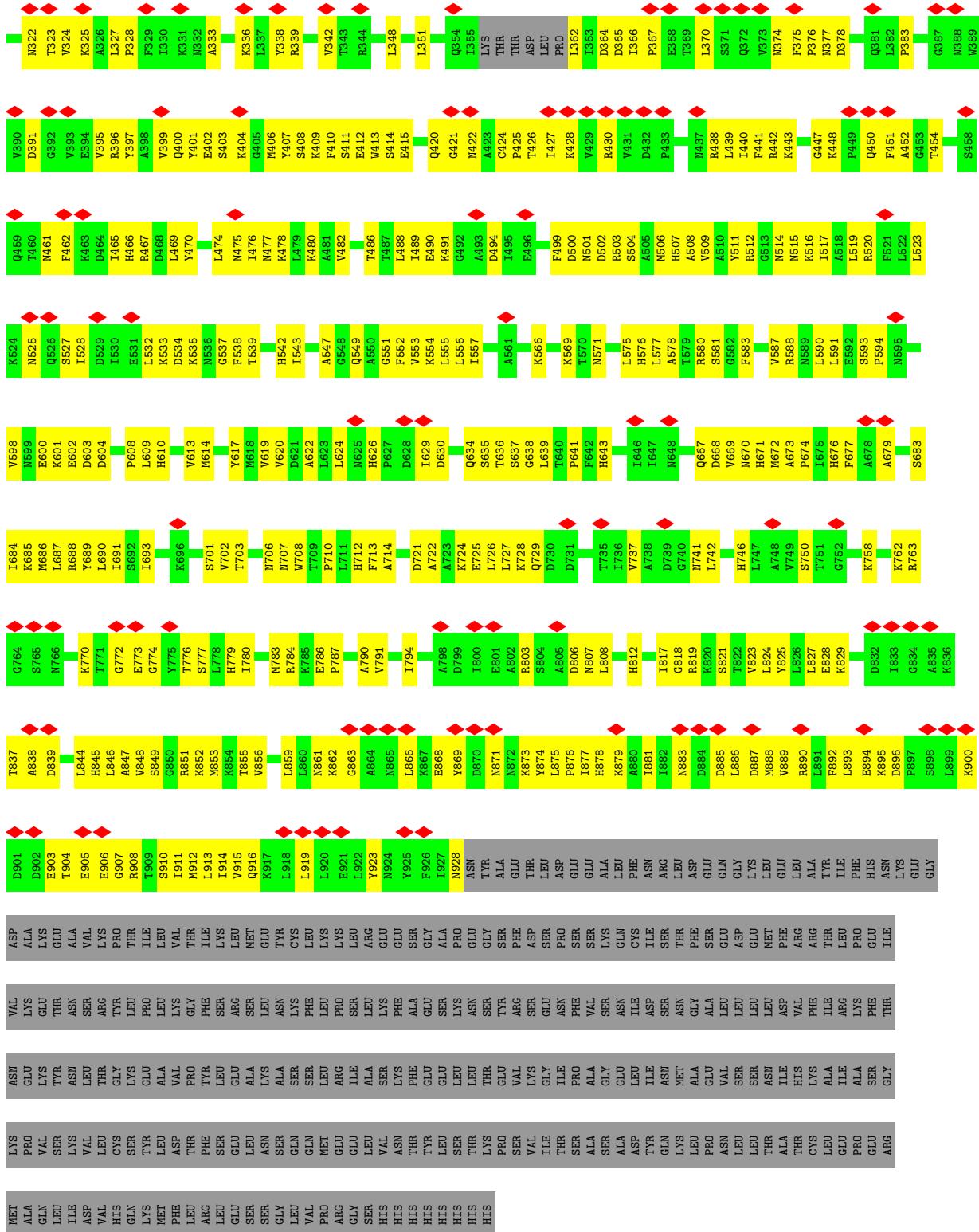
4 Experimental information ⓘ

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	81192	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 $(e^-/\text{Å}^2)$	78.7	Depositor
Minimum defocus (nm)	Not provided	
Maximum defocus (nm)	Not provided	
Magnification	Not provided	
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	0.010	Depositor
Minimum map value	-0.003	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.000	Depositor
Recommended contour level	0.003	Depositor
Map size (Å)	324.0, 324.0, 324.0	wwPDB
Map dimensions	360, 360, 360	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.9, 0.9, 0.9	Depositor

5 Model quality ⓘ

5.1 Standard geometry ⓘ

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	0.28	0/6769	0.49	0/9147
1	B	0.27	0/6878	0.49	0/9300
All	All	0.27	0/13647	0.49	0/18447

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 ⓘ

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	6663	0	6706	329	0
1	B	6770	0	6807	337	0
All	All	13433	0	13513	663	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 25.

The worst 5 of 663 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:288:PHE:CE1	1:A:409:LYS:HD2	1.37	1.58
1:A:288:PHE:CE1	1:A:409:LYS:CD	2.25	1.19

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:288:PHE:CD1	1:A:409:LYS:HD2	1.89	1.07
1:A:407:TYR:CE2	1:A:409:LYS:HE3	1.91	1.04
1:A:130:ALA:HB3	1:A:409:LYS:HZ1	1.27	0.98

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	840/1296 (65%)	761 (91%)	79 (9%)	0	100	100
1	B	859/1296 (66%)	753 (88%)	106 (12%)	0	100	100
All	All	1699/2592 (66%)	1514 (89%)	185 (11%)	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	732/1127 (65%)	731 (100%)	1 (0%)	93	96
1	B	745/1127 (66%)	745 (100%)	0	100	100
All	All	1477/2254 (66%)	1476 (100%)	1 (0%)	93	96

All (1) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	580	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (3) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	420	GLN
1	B	249	GLN
1	B	916	GLN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates ⓘ

There are no monosaccharides in this entry.

5.6 Ligand geometry ⓘ

There are no ligands in this entry.

5.7 Other polymers ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues ⓘ

There are no chain breaks in this entry.

6 Map visualisation ⓘ

This section contains visualisations of the EMDB entry EMD-13643. These allow visual inspection of the internal detail of the map and identification of artifacts.

No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

6.1 Orthogonal projections ⓘ

6.1.1 Primary map

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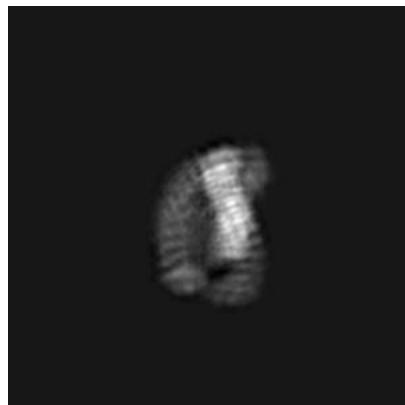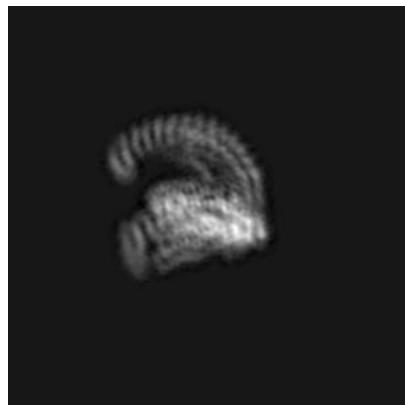
The images above show the map projected in three orthogonal directions.

6.2 Central slices ⓘ
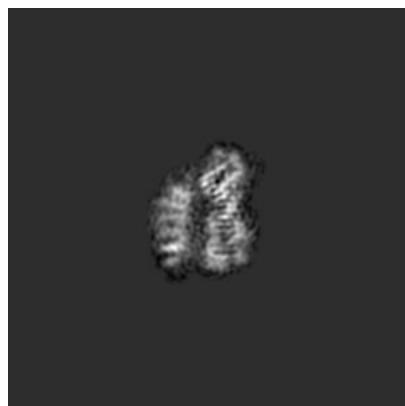
6.2.1 Primary map
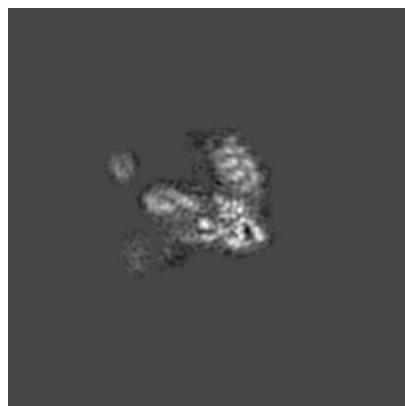
| X Index: 180 | Y Index: 180 | Z Index: 180 |
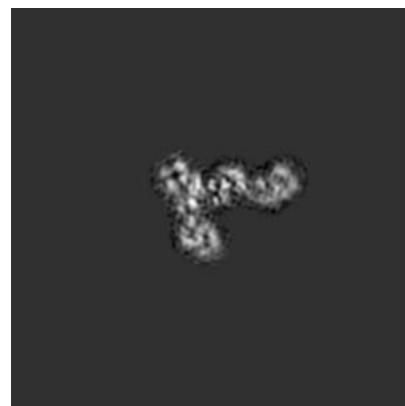
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices ⓘ

6.3.1 Primary map

| X Index: 157 | Y Index: 202 | Z Index: 204 |
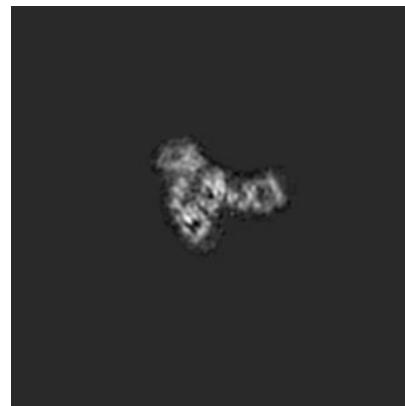
The images above show the largest variance slices of the map in three orthogonal directions.

6.4 Orthogonal surface views ⓘ
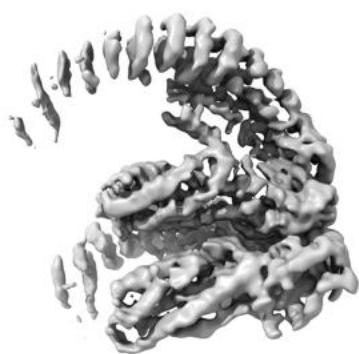
6.4.1 Primary map

| X | Y | Z |
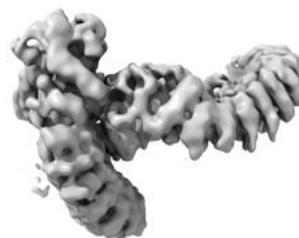
The images above show the 3D surface view of the map at the recommended contour level 0.003. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

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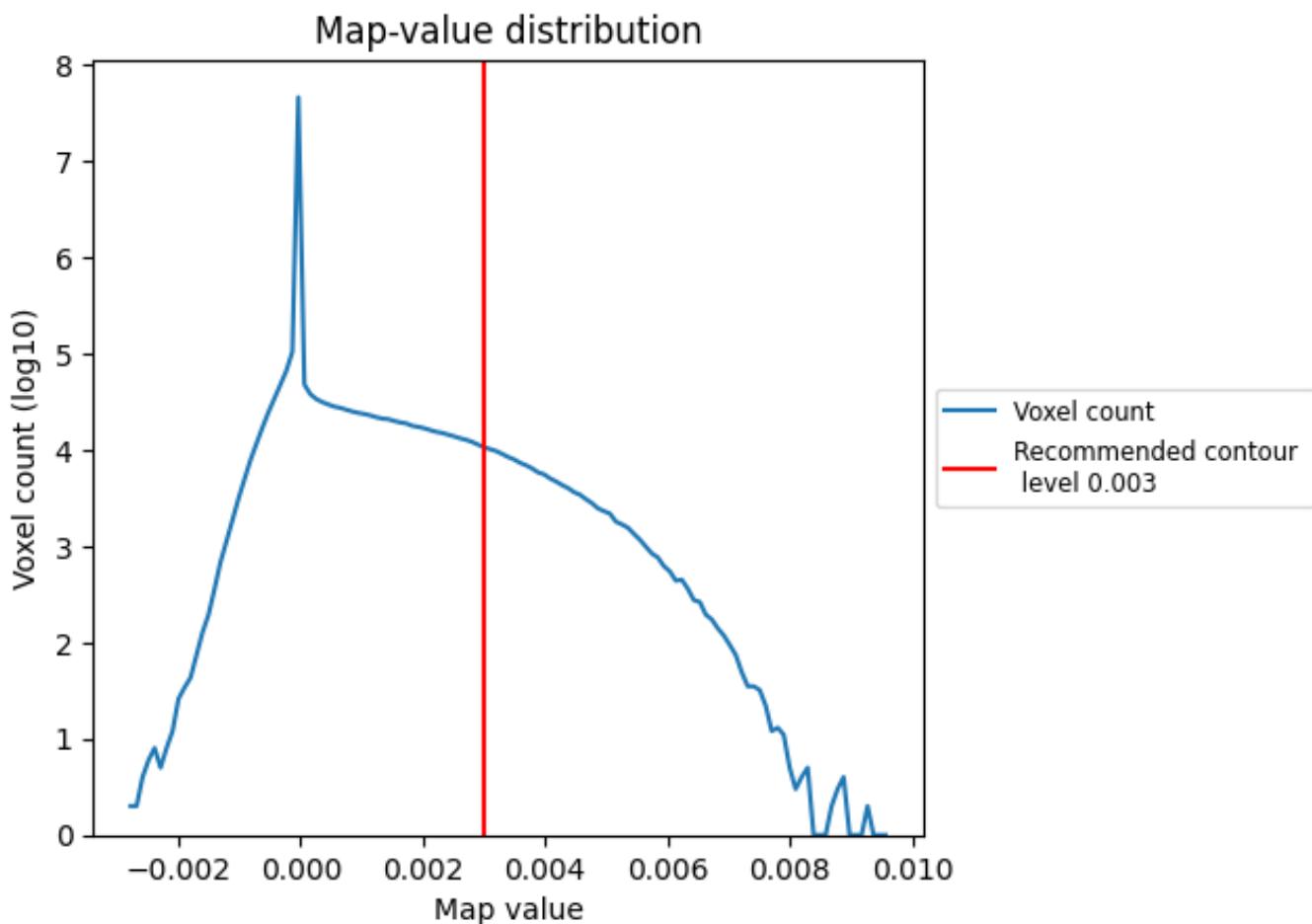
The map-value distribution is plotted in 128 intervals along the x-axis. The y-axis is logarithmic. A spike in this graph at zero usually indicates that the volume has been masked.

7.2   Volume estimate ⓘ
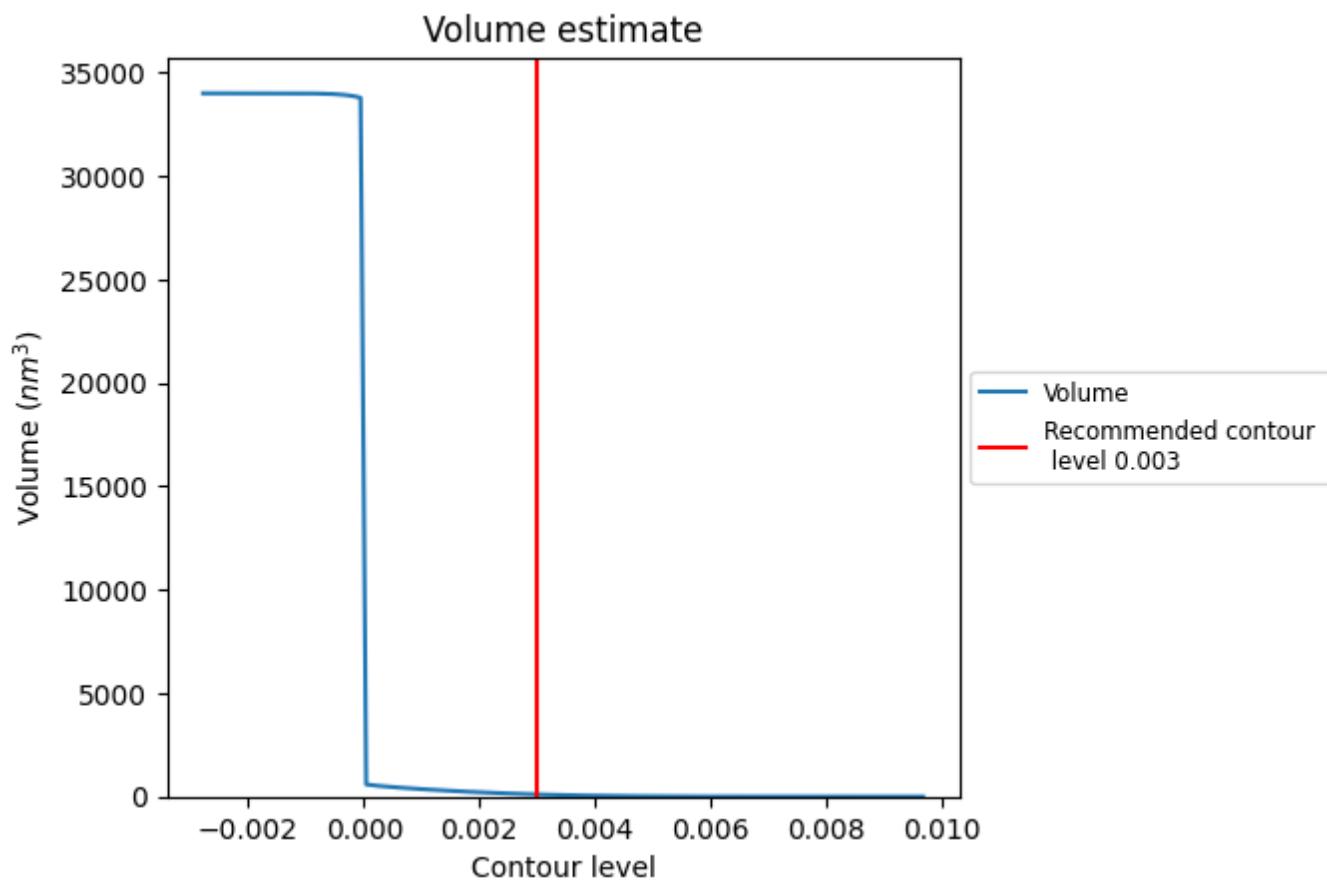
The volume at the recommended contour level is 102 nm^3; this corresponds to an approximate mass of 92 kDa.

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 ⓘ
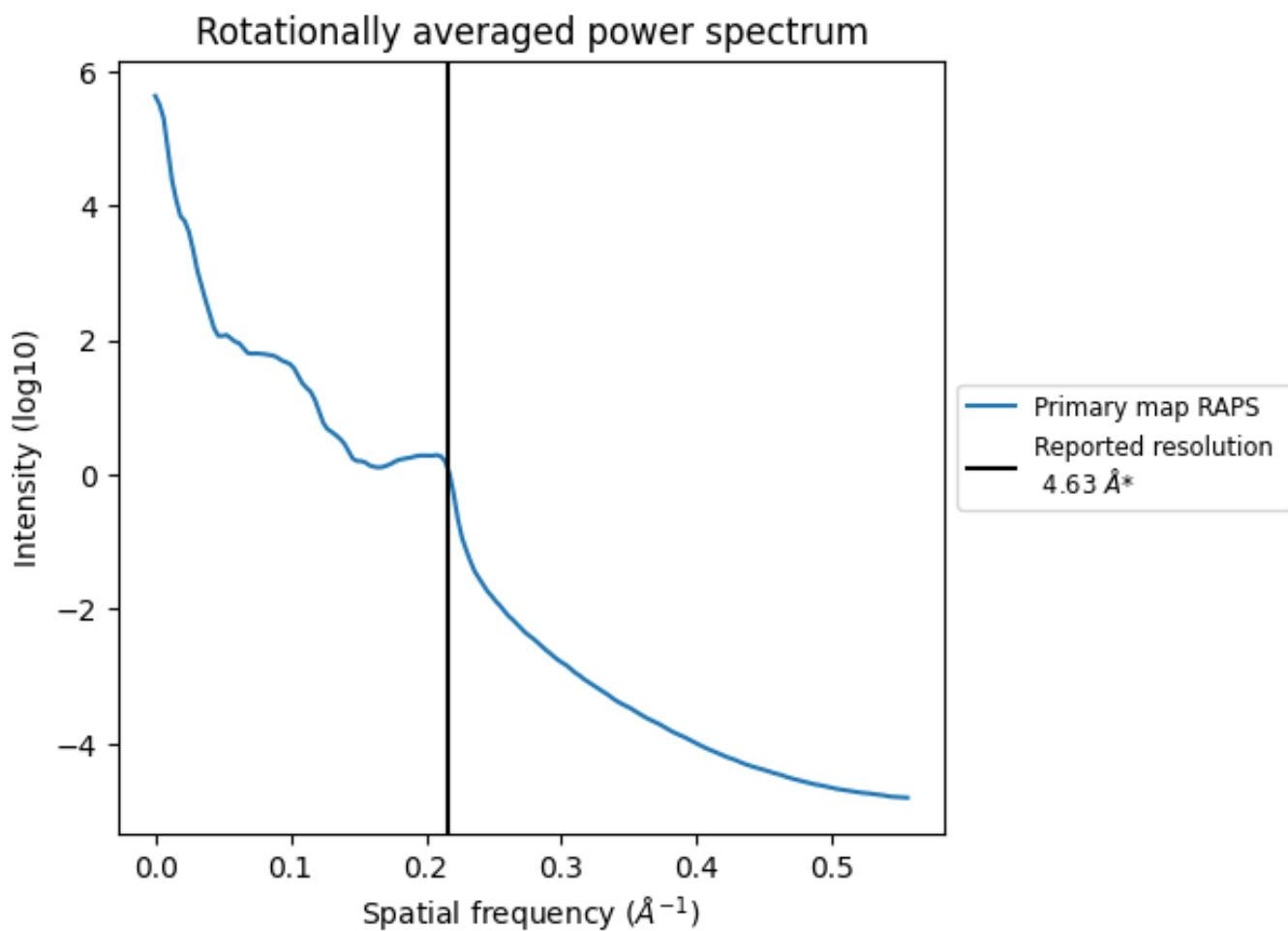
*Reported resolution corresponds to spatial frequency of 0.216 Å^{-1}

8 Fourier-Shell correlation (i)

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

9 Map-model fit (i)

This section contains information regarding the fit between EMDB map EMD-13643 and PDB model 7PTY. Per-residue inclusion information can be found in section 3 on page 8.

9.1 Map-model overlay (i)

| X | Y | Z |
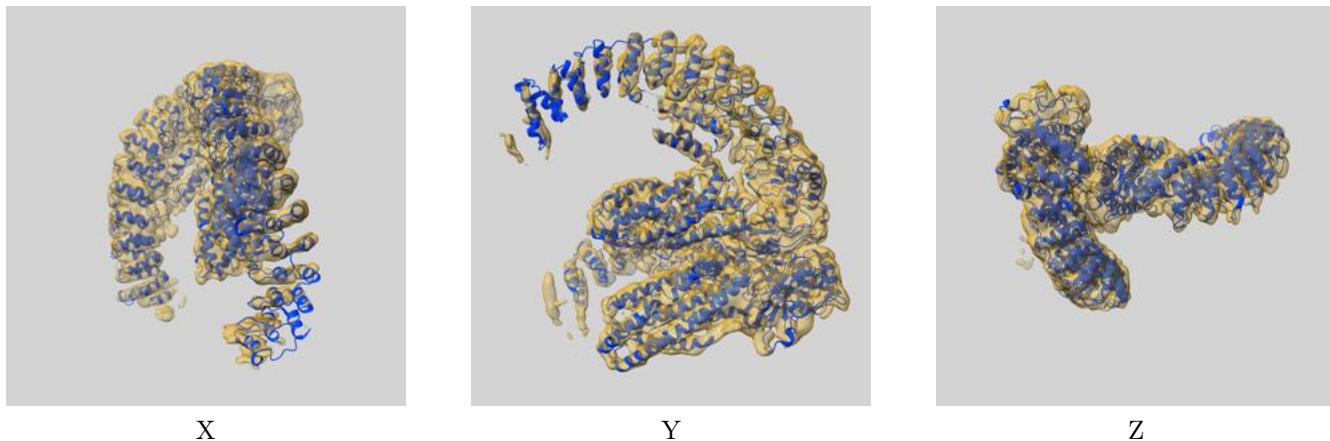
The images above show the 3D surface view of the map at the recommended contour level 0.003 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

9.2   Atom inclusion ⓘ
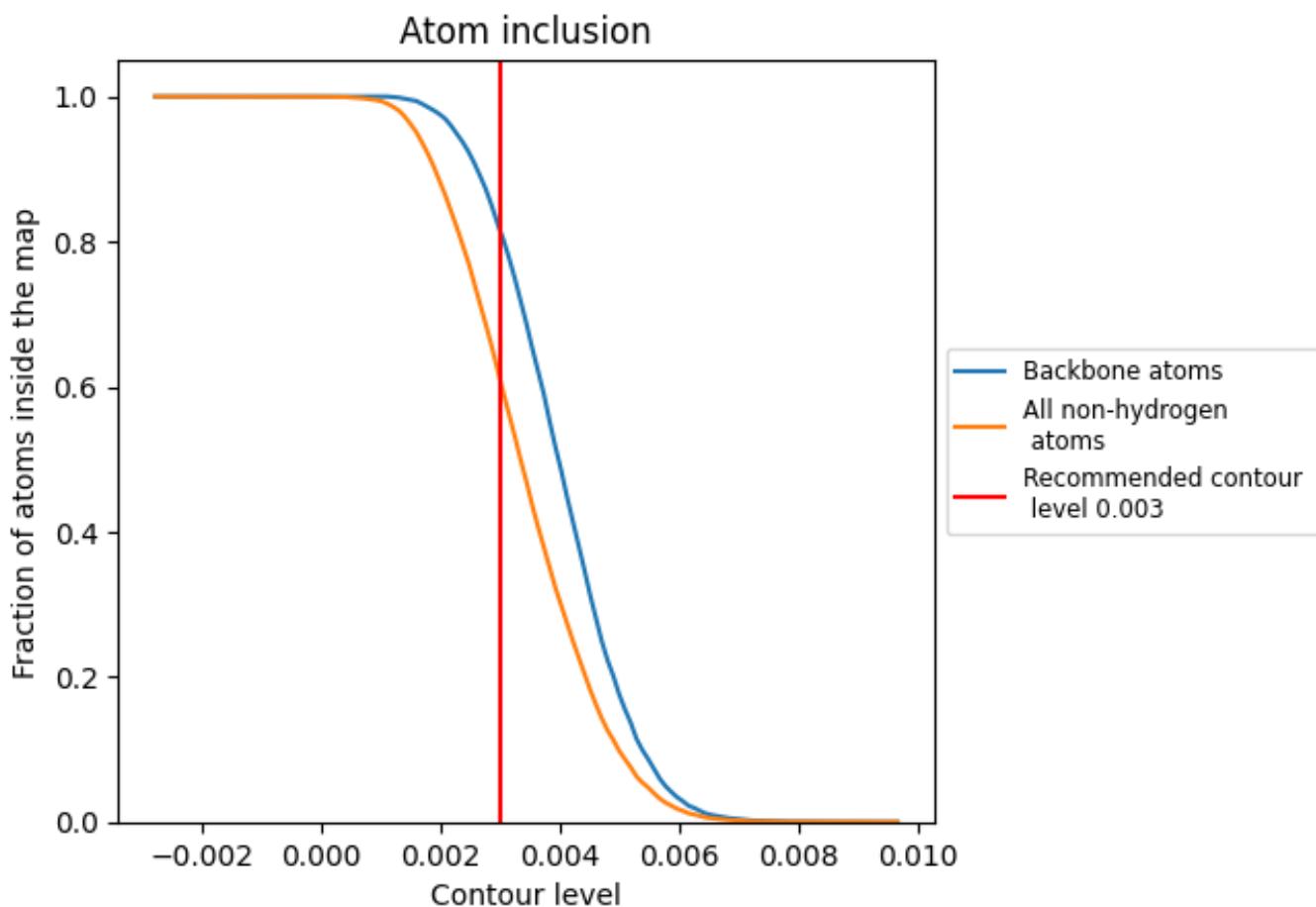
At the recommended contour level, 82% of all backbone atoms, 61% of all non-hydrogen atoms, are inside the map.