wwPDB EM Validation Summary Report

Apr 5, 2026 – 11:18 PM UTC

PDB ID	:	9UNW / pdb_00009unw
EMDB ID	:	EMD-64367
Title	:	mouse PDCD5-TRiC complex
Authors	:	Song, Q.Q.; Cong, Y.
Deposited on	:	2025-04-24
Resolution	:	3.55 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 ⓘ 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 ⓘ) were used in the production of this report:

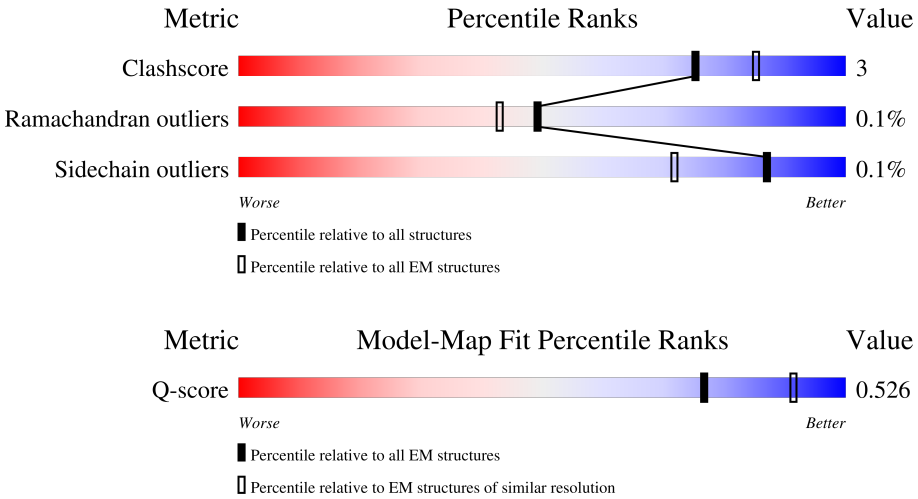
EMDB validation analysis	:	0.0.1.dev132
MolProbity	:	4-5-2 with Phenix2.0
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
EM percentile statistics	:	202505.v01 (Using data in the EMDB archive up until May 2025)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.49

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 3.55 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	12819 (3.05 - 4.05)

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	C	556	38% 6% 56%
2	G	535	41% 55%
3	H	545	37% 6% 57%
4	I	539	40% 5% 55%

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Mol	Chain	Length	Quality of chain
5	F	541	
6	A	531	
7	B	544	
8	E	548	
9	D	171	

2 Entry composition (i)

There are 9 unique types of molecules in this entry. The entry contains 15218 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 T-complex protein 1 subunit alpha.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	C	247	1862	1178	320	359	5	0	0

- Molecule 2 is a protein called T-complex protein 1 subunit beta.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	G	242	1771	1103	312	346	10	0	0

- Molecule 3 is a protein called T-complex protein 1 subunit gamma.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	H	235	1784	1115	310	343	16	0	0

- Molecule 4 is a protein called T-complex protein 1 subunit delta.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	I	242	1799	1120	312	358	9	0	0

- Molecule 5 is a protein called T-complex protein 1 subunit epsilon.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
5	F	240	1811	1117	317	359	18	0	0

- Molecule 6 is a protein called T-complex protein 1 subunit zeta.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
6	A	243	1800	1138	308	345	9	0	0

- Molecule 7 is a protein called T-complex protein 1 subunit eta.

Mol	Chain	Residues	Atoms					AltConf	Trace
7	B	239	Total	C	N	O	S	0	0
			1822	1149	321	345	7		

- Molecule 8 is a protein called T-complex protein 1 subunit theta.

Mol	Chain	Residues	Atoms					AltConf	Trace
8	E	237	Total	C	N	O	S	0	0
			1823	1158	303	352	10		

- Molecule 9 is a protein called Programmed cell death protein 5.

Mol	Chain	Residues	Atoms					AltConf	Trace
9	D	95	Total	C	N	O	S	0	0
			746	459	140	145	2		

There are 45 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
D	-33	MET	-	initiating methionine	UNP P56812
D	-32	GLY	-	expression tag	UNP P56812
D	-31	SER	-	expression tag	UNP P56812
D	-30	SER	-	expression tag	UNP P56812
D	-29	HIS	-	expression tag	UNP P56812
D	-28	HIS	-	expression tag	UNP P56812
D	-27	HIS	-	expression tag	UNP P56812
D	-26	HIS	-	expression tag	UNP P56812
D	-25	HIS	-	expression tag	UNP P56812
D	-24	HIS	-	expression tag	UNP P56812
D	-23	SER	-	expression tag	UNP P56812
D	-22	SER	-	expression tag	UNP P56812
D	-21	GLY	-	expression tag	UNP P56812
D	-20	LEU	-	expression tag	UNP P56812
D	-19	VAL	-	expression tag	UNP P56812
D	-18	PRO	-	expression tag	UNP P56812
D	-17	ARG	-	expression tag	UNP P56812
D	-16	GLY	-	expression tag	UNP P56812
D	-15	SER	-	expression tag	UNP P56812
D	-14	HIS	-	expression tag	UNP P56812
D	-13	MET	-	expression tag	UNP P56812
D	-12	ALA	-	expression tag	UNP P56812
D	-11	SER	-	expression tag	UNP P56812

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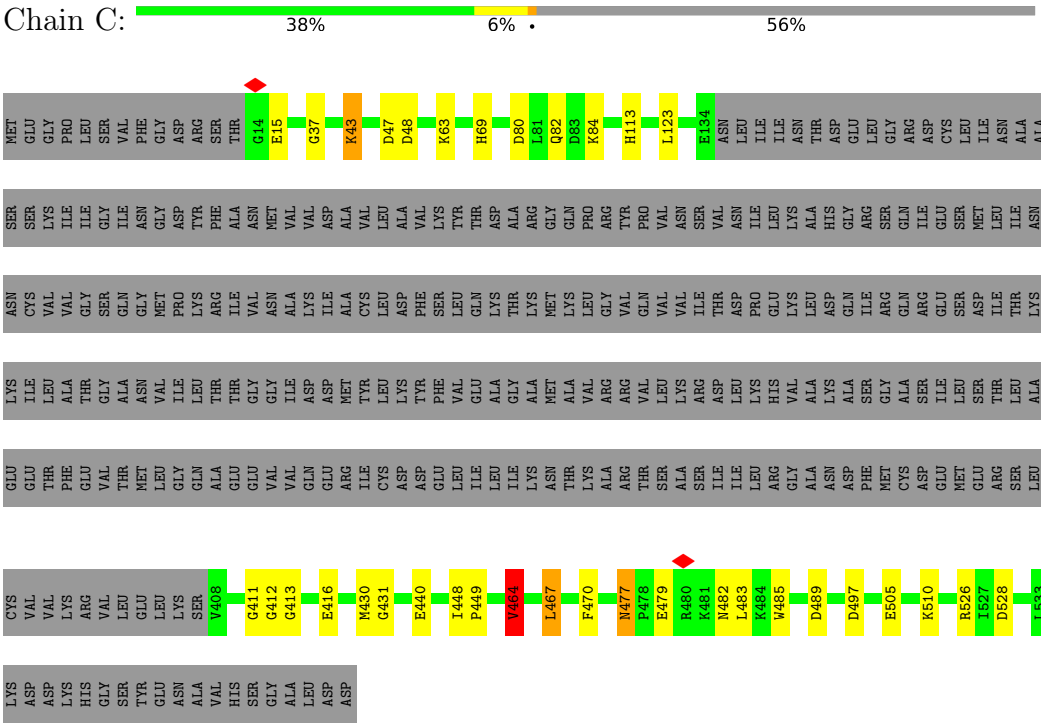
Chain	Residue	Modelled	Actual	Comment	Reference
D	-10	MET	-	expression tag	UNP P56812
D	-9	THR	-	expression tag	UNP P56812
D	-8	GLY	-	expression tag	UNP P56812
D	-7	GLY	-	expression tag	UNP P56812
D	-6	GLN	-	expression tag	UNP P56812
D	-5	GLN	-	expression tag	UNP P56812
D	-4	MET	-	expression tag	UNP P56812
D	-3	GLY	-	expression tag	UNP P56812
D	-2	ARG	-	expression tag	UNP P56812
D	-1	GLY	-	expression tag	UNP P56812
D	0	SER	-	expression tag	UNP P56812
D	127	GLY	-	expression tag	UNP P56812
D	128	SER	-	expression tag	UNP P56812
D	129	GLY	-	expression tag	UNP P56812
D	130	ASP	-	expression tag	UNP P56812
D	131	TYR	-	expression tag	UNP P56812
D	132	LYS	-	expression tag	UNP P56812
D	133	ASP	-	expression tag	UNP P56812
D	134	ASP	-	expression tag	UNP P56812
D	135	ASP	-	expression tag	UNP P56812
D	136	ASP	-	expression tag	UNP P56812
D	137	LYS	-	expression tag	UNP P56812

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.

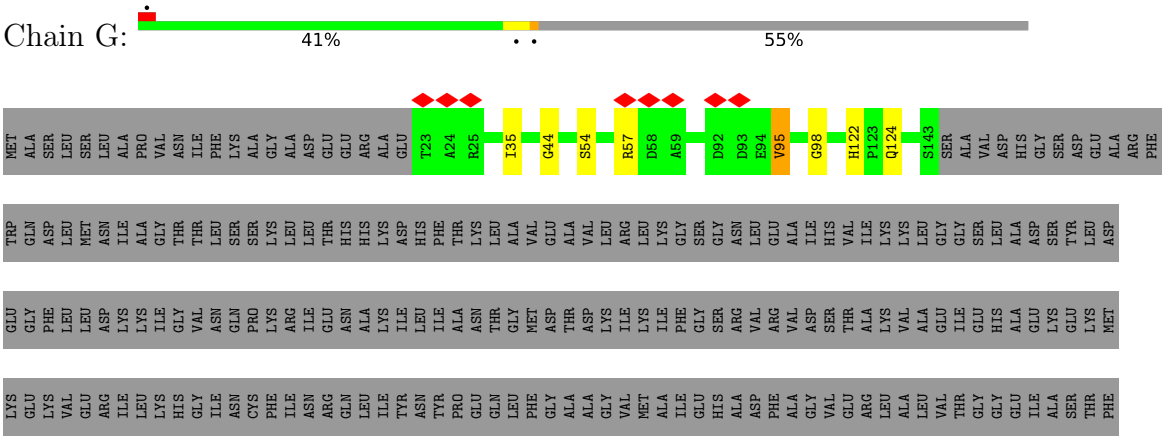
• Molecule 1: T-complex protein 1 subunit alpha

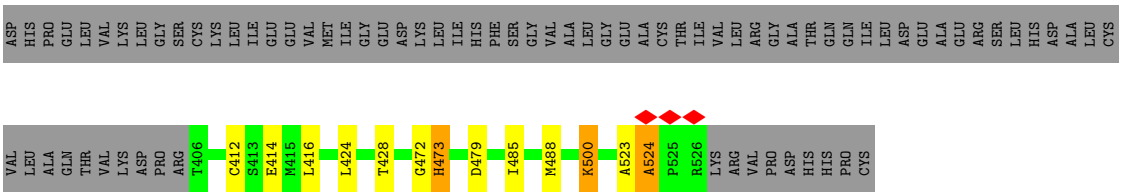
Chain C:



• Molecule 2: T-complex protein 1 subunit beta

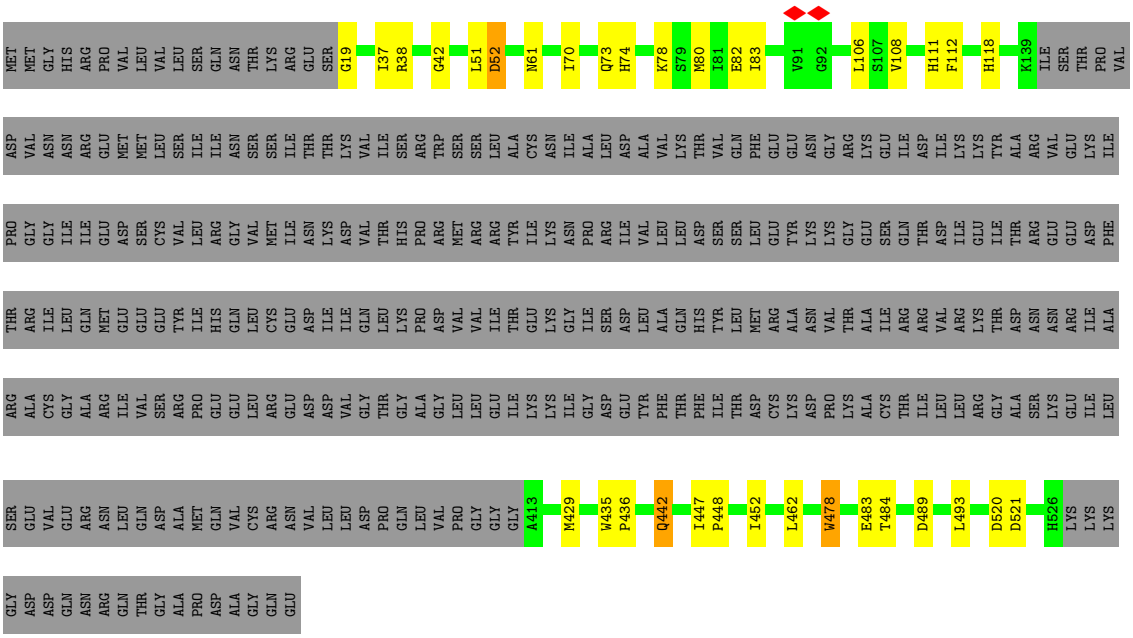
Chain G:





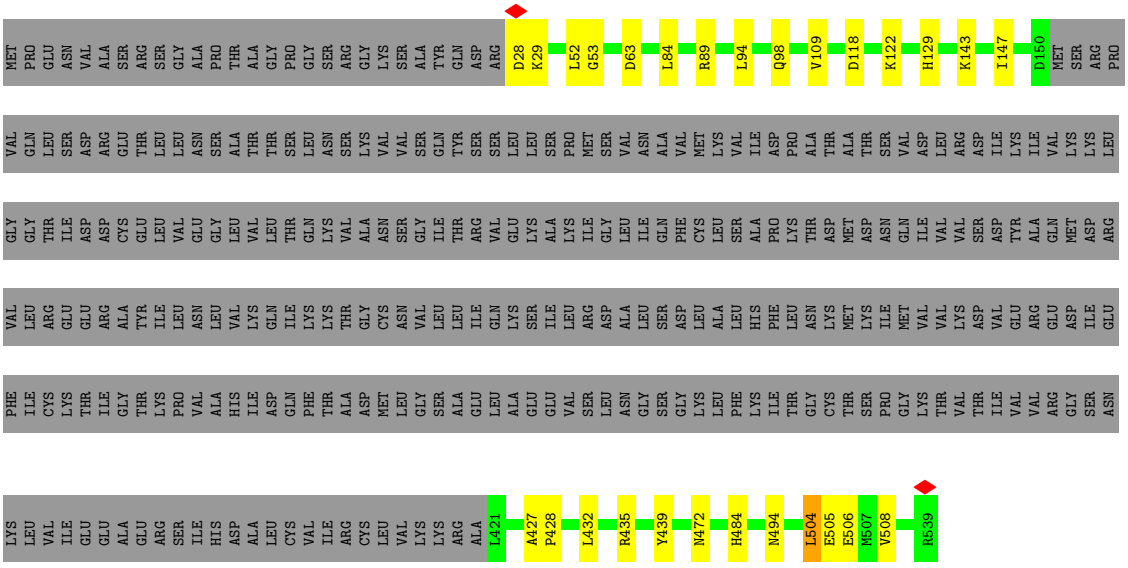
• Molecule 3: T-complex protein 1 subunit gamma

Chain H:



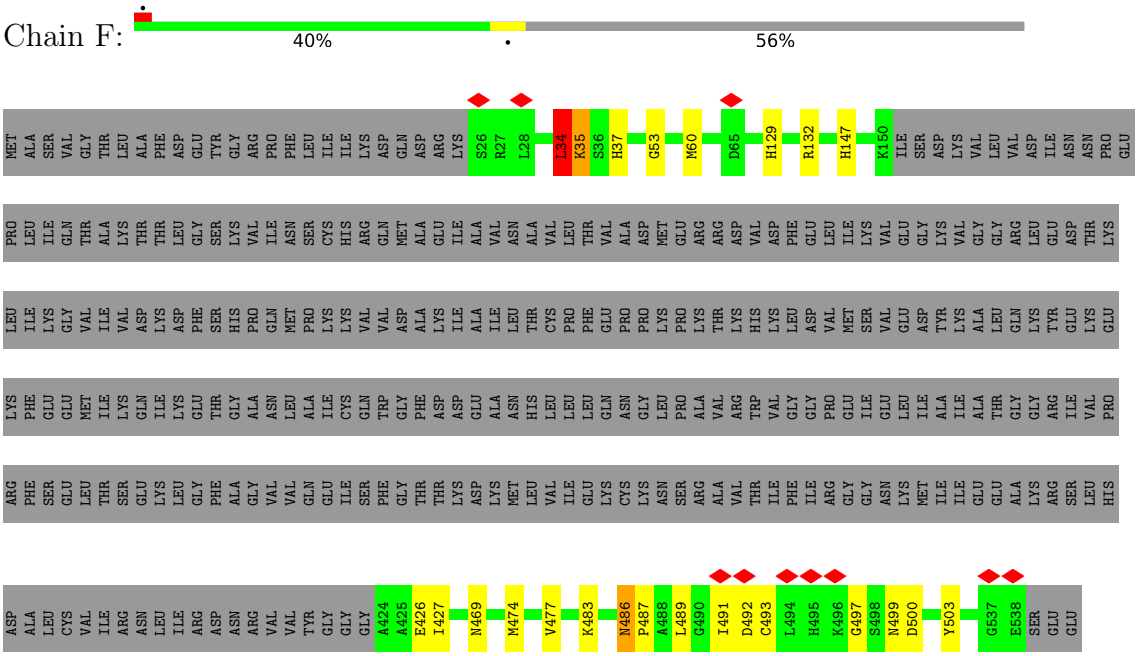
• Molecule 4: T-complex protein 1 subunit delta

Chain I:



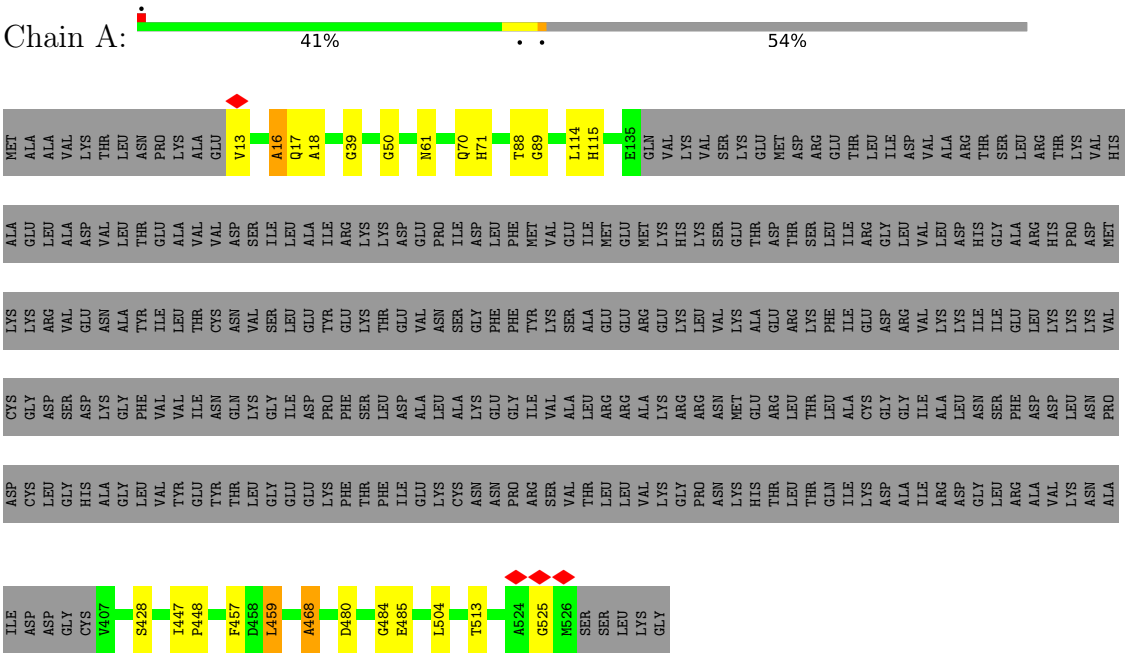
• Molecule 5: T-complex protein 1 subunit epsilon

Chain F:



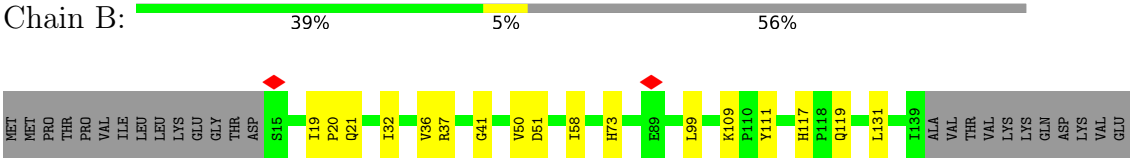
• Molecule 6: T-complex protein 1 subunit zeta

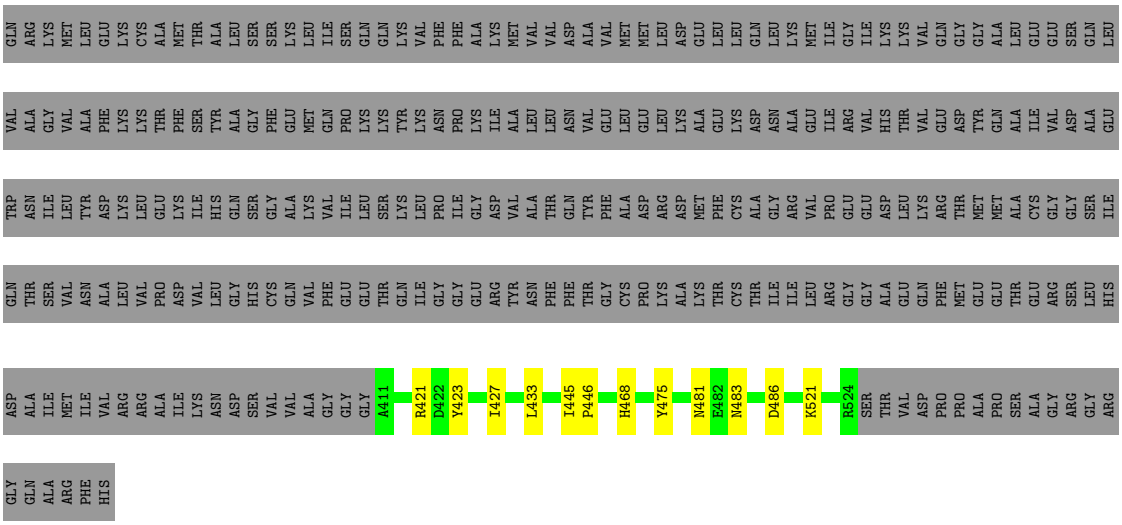
Chain A:



• Molecule 7: T-complex protein 1 subunit eta

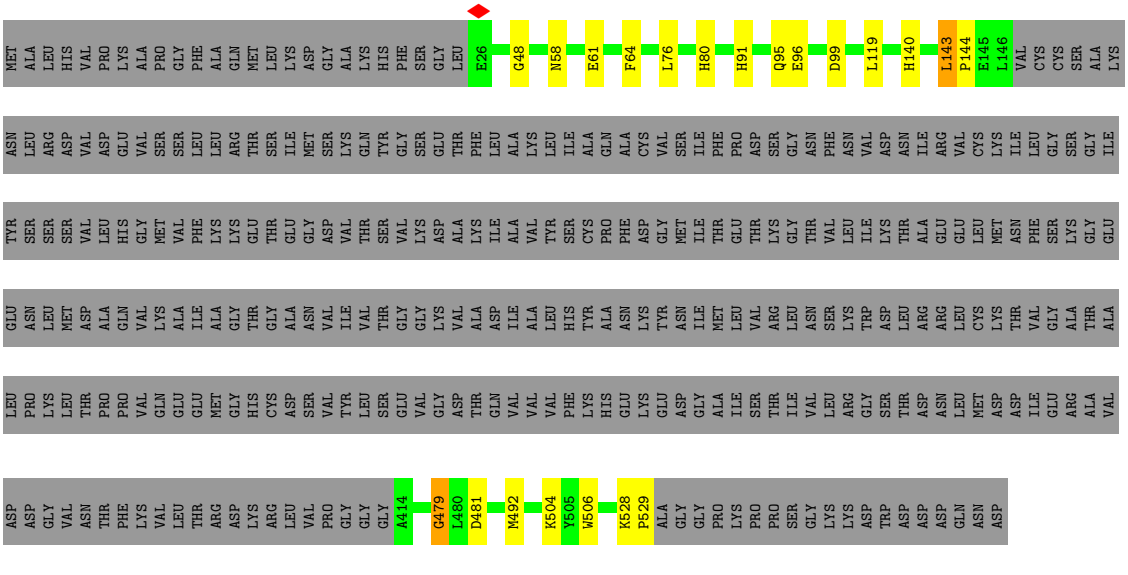
Chain B:





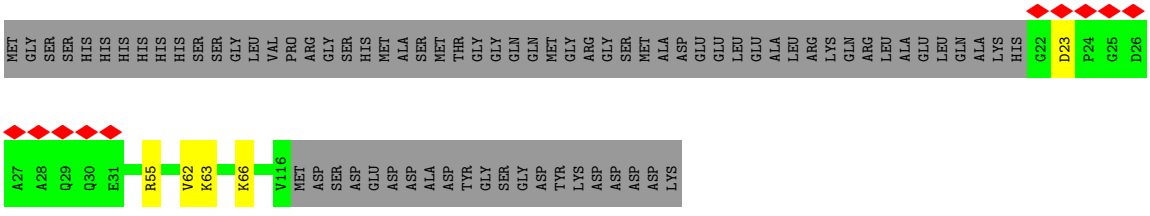
• Molecule 8: T-complex protein 1 subunit theta

Chain E:



• Molecule 9: Programmed cell death protein 5

Chain D:



4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C2	Depositor
Number of particles used	659930	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 ($e^-/Å^2$)	57	Depositor
Minimum defocus (nm)	9000	Depositor
Maximum defocus (nm)	15000	Depositor
Magnification	Not provided	
Image detector	GATAN K3 BIOQUANTUM (6k x 4k)	Depositor
Maximum map value	15.151	Depositor
Minimum map value	0.000	Depositor
Average map value	0.073	Depositor
Map value standard deviation	0.578	Depositor
Recommended contour level	2.56	Depositor
Map size (Å)	348.0, 348.0, 348.0	wwPDB
Map dimensions	400, 400, 400	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	0.87, 0.87, 0.87	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	C	1.66	9/1883 (0.5%)	0.94	11/2552 (0.4%)
2	G	1.65	6/1786 (0.3%)	0.94	8/2413 (0.3%)
3	H	1.68	12/1805 (0.7%)	0.98	8/2440 (0.3%)
4	I	1.62	7/1813 (0.4%)	0.97	9/2449 (0.4%)
5	F	1.69	8/1826 (0.4%)	0.97	13/2458 (0.5%)
6	A	1.67	6/1819 (0.3%)	1.01	10/2462 (0.4%)
7	B	1.68	12/1846 (0.7%)	0.98	11/2502 (0.4%)
8	E	1.61	7/1847 (0.4%)	0.89	7/2498 (0.3%)
9	D	1.54	1/750 (0.1%)	0.89	5/1002 (0.5%)
All	All	1.65	68/15375 (0.4%)	0.96	82/20776 (0.4%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand.A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	C	0	3
3	H	0	7
4	I	0	3
5	F	0	3
6	A	0	3
7	B	0	2
8	E	0	3
All	All	0	24

The worst 5 of 68 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	H	74	HIS	CB-CG	-9.21	1.37	1.50
6	A	71	HIS	CB-CG	-8.58	1.38	1.50
4	I	504	LEU	CB-CG	-7.88	1.37	1.53
5	F	147	HIS	CB-CG	-7.48	1.39	1.50

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	H	112	PHE	CB-CG	-7.10	1.34	1.50

The worst 5 of 82 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
7	B	41	GLY	CA-C-N	8.18	127.82	119.56
7	B	41	GLY	C-N-CA	8.18	127.82	119.56
5	F	491	ILE	N-CA-C	-7.98	106.12	113.71
2	G	44	GLY	CA-C-N	7.63	127.27	119.56
2	G	44	GLY	C-N-CA	7.63	127.27	119.56

There are no chirality outliers.

5 of 24 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	C	412	GLY	Mainchain,Peptide
1	C	464	VAL	Mainchain
3	H	429	MET	Mainchain,Peptide
3	H	442	GLN	Mainchain
3	H	483	GLU	Mainchain

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	C	1862	0	1931	20	0
2	G	1771	0	1834	11	0
3	H	1784	0	1838	18	0
4	I	1799	0	1874	12	0
5	F	1811	0	1844	7	0
6	A	1800	0	1870	11	0
7	B	1822	0	1875	9	0
8	E	1823	0	1859	9	0
9	D	746	0	778	0	0
All	All	15218	0	15703	95	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 3.

The worst 5 of 95 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)
3:H:462:LEU:C	3:H:462:LEU:HD23	2.13	0.73
4:I:504:LEU:HD12	4:I:504:LEU:O	1.89	0.72
6:A:17:GLN:OE1	6:A:17:GLN:N	2.22	0.69
5:F:426:GLU:N	5:F:426:GLU:OE1	2.28	0.66
1:C:416:GLU:N	1:C:416:GLU:OE1	2.25	0.65

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	C	243/556 (44%)	238 (98%)	5 (2%)	0	100	100
2	G	238/535 (44%)	235 (99%)	3 (1%)	0	100	100
3	H	231/545 (42%)	217 (94%)	14 (6%)	0	100	100
4	I	238/539 (44%)	236 (99%)	2 (1%)	0	100	100
5	F	236/541 (44%)	230 (98%)	5 (2%)	1 (0%)	30	61
6	A	239/531 (45%)	231 (97%)	8 (3%)	0	100	100
7	B	235/544 (43%)	230 (98%)	5 (2%)	0	100	100
8	E	233/548 (42%)	229 (98%)	4 (2%)	0	100	100
9	D	93/171 (54%)	93 (100%)	0	0	100	100
All	All	1986/4510 (44%)	1939 (98%)	46 (2%)	1 (0%)	49	79

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
5	F	497	GLY

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	C	201/463 (43%)	201 (100%)	0	100 100
2	G	185/426 (43%)	184 (100%)	1 (0%)	81 80
3	H	196/471 (42%)	196 (100%)	0	100 100
4	I	199/457 (44%)	199 (100%)	0	100 100
5	F	197/456 (43%)	197 (100%)	0	100 100
6	A	191/441 (43%)	191 (100%)	0	100 100
7	B	194/448 (43%)	194 (100%)	0	100 100
8	E	193/453 (43%)	193 (100%)	0	100 100
9	D	80/141 (57%)	79 (99%)	1 (1%)	61 72
All	All	1636/3756 (44%)	1634 (100%)	2 (0%)	87 87

All (2) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	G	500	LYS
9	D	66	LYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (2) such sidechains are listed below:

Mol	Chain	Res	Type
7	B	86	GLN
7	B	459	ASN

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)

There are no ligands in this entry.

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.

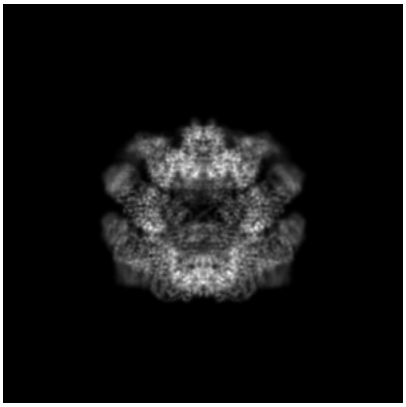
6 Map visualisation

This section contains visualisations of the EMDB entry EMD-64367. These allow visual inspection of the internal detail of the map and identification of artifacts.

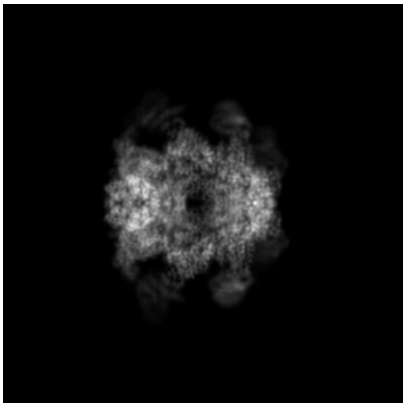
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

6.1 Orthogonal projections

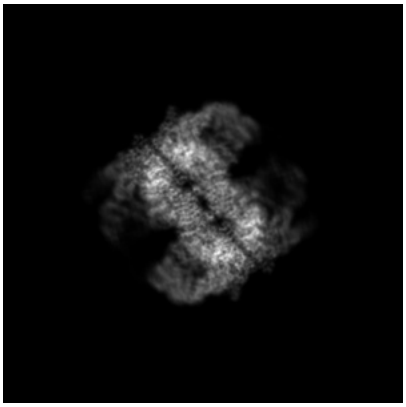
6.1.1 Primary map



X



Y

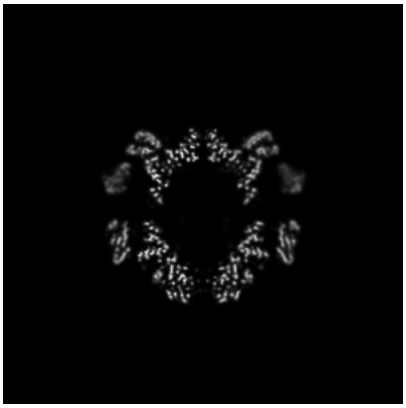


Z

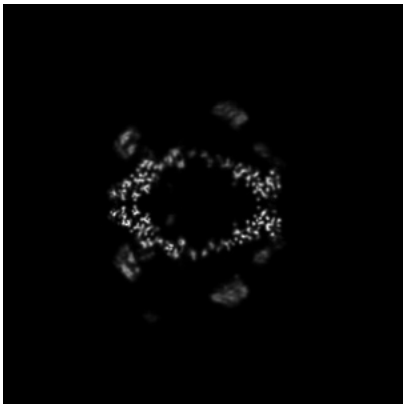
The images above show the map projected in three orthogonal directions.

6.2 Central slices

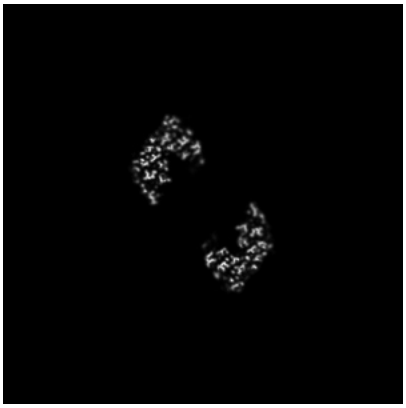
6.2.1 Primary map



X Index: 200



Y Index: 200

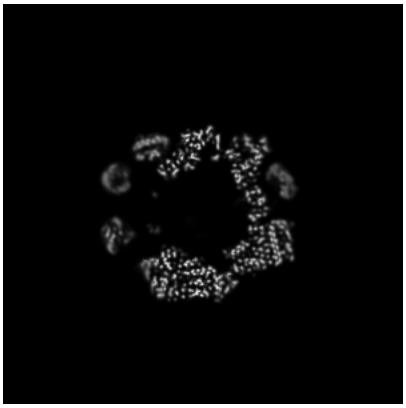


Z Index: 200

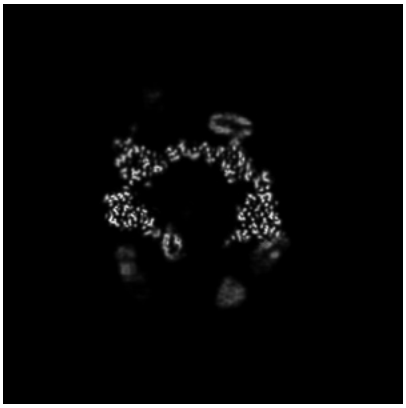
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices (i)

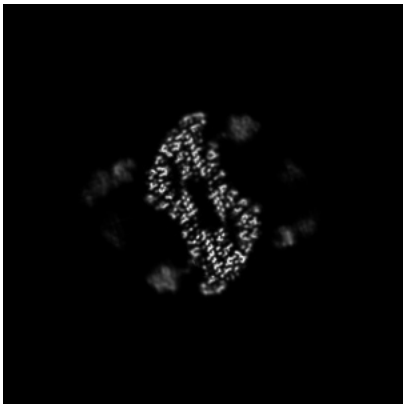
6.3.1 Primary map



X Index: 191



Y Index: 186

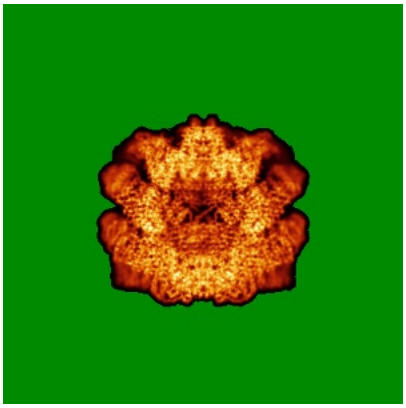


Z Index: 144

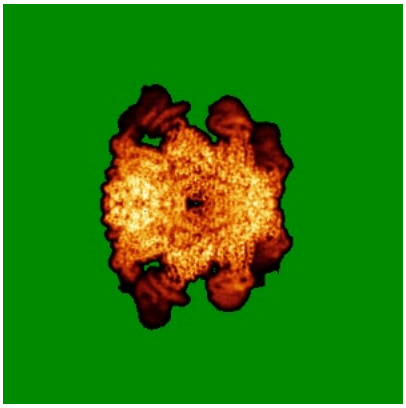
The images above show the largest variance slices of the map in three orthogonal directions.

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

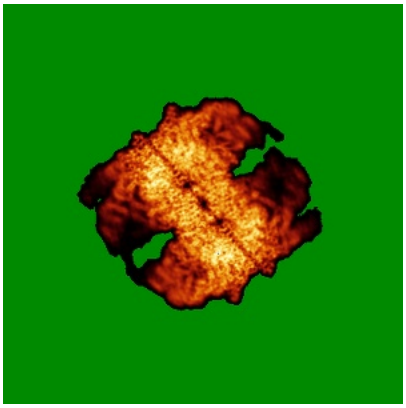
6.4.1 Primary map



X



Y

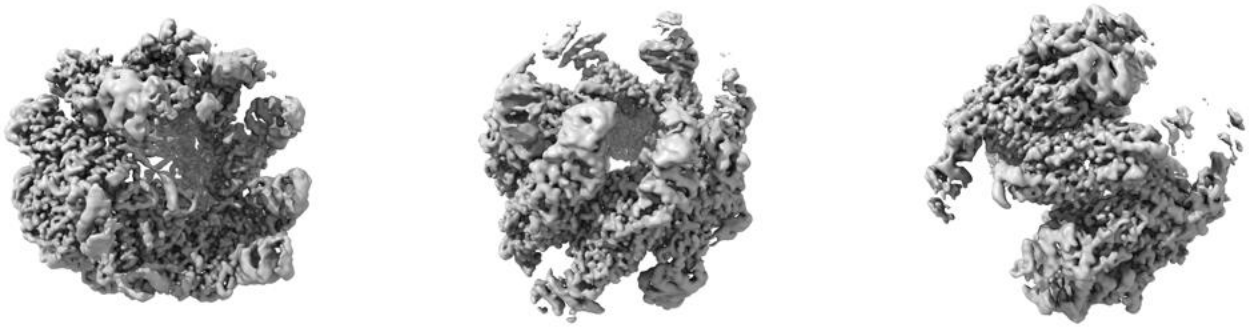


Z

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

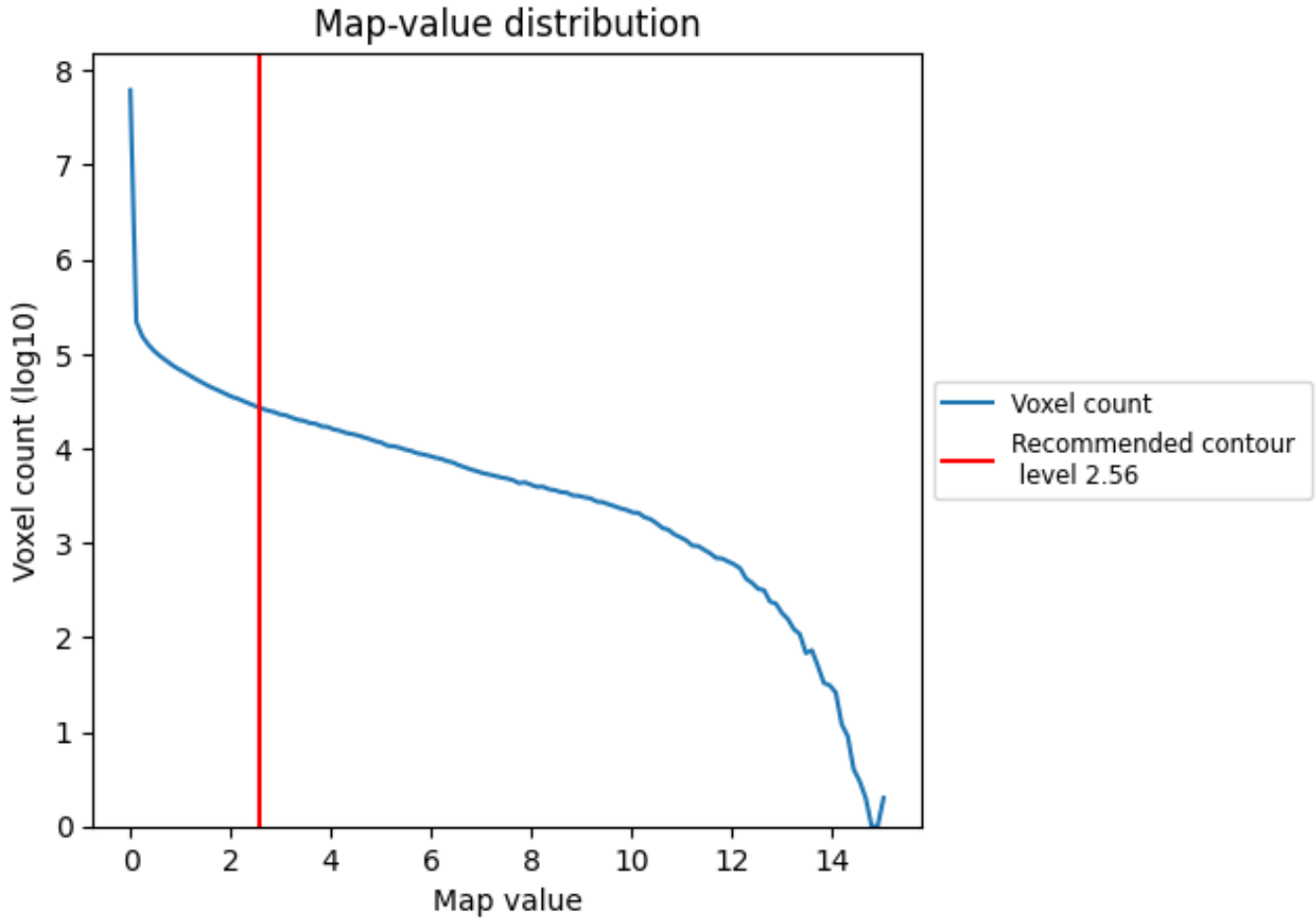
6.6 Mask visualisation (i)

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

7 Map analysis

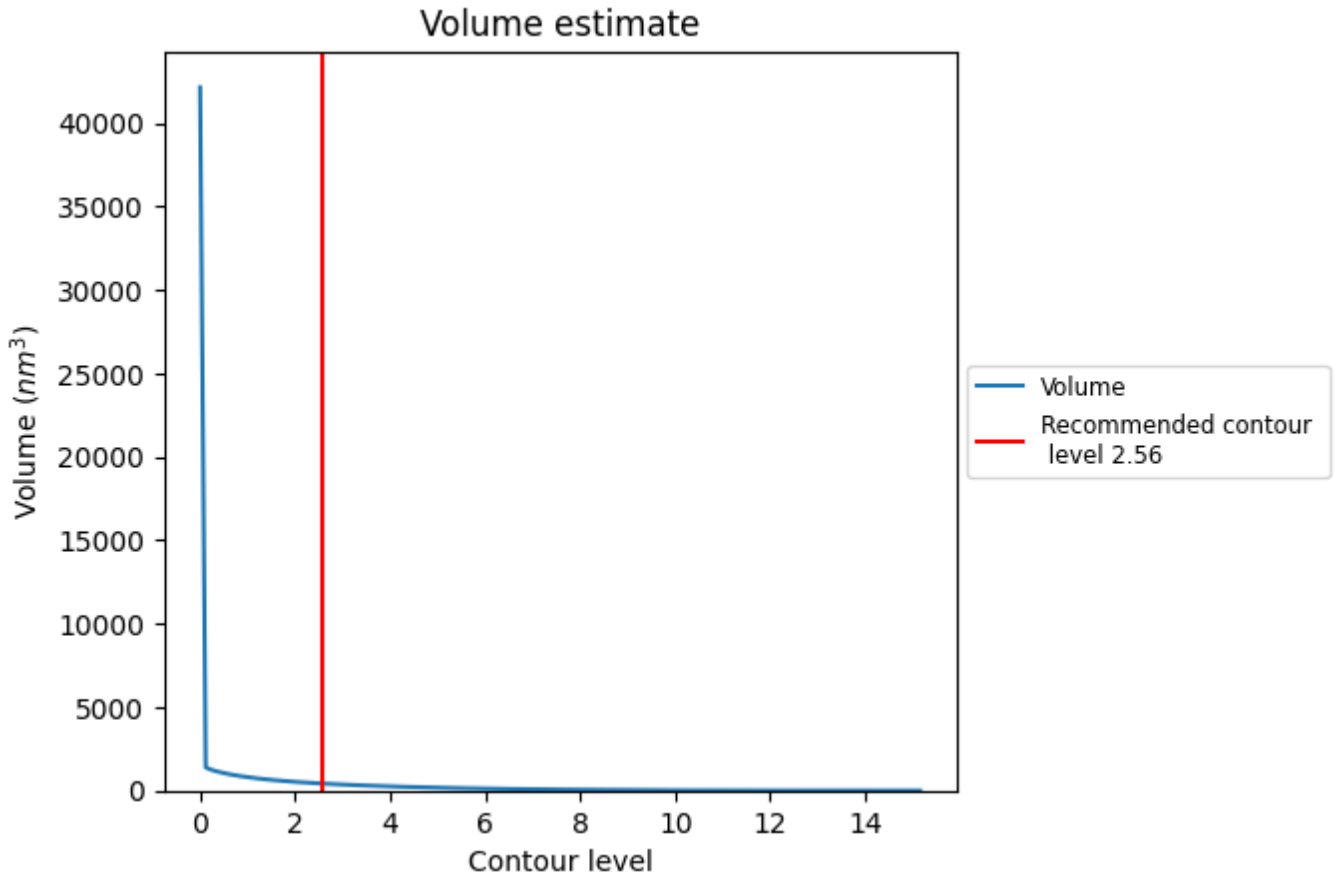
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution



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

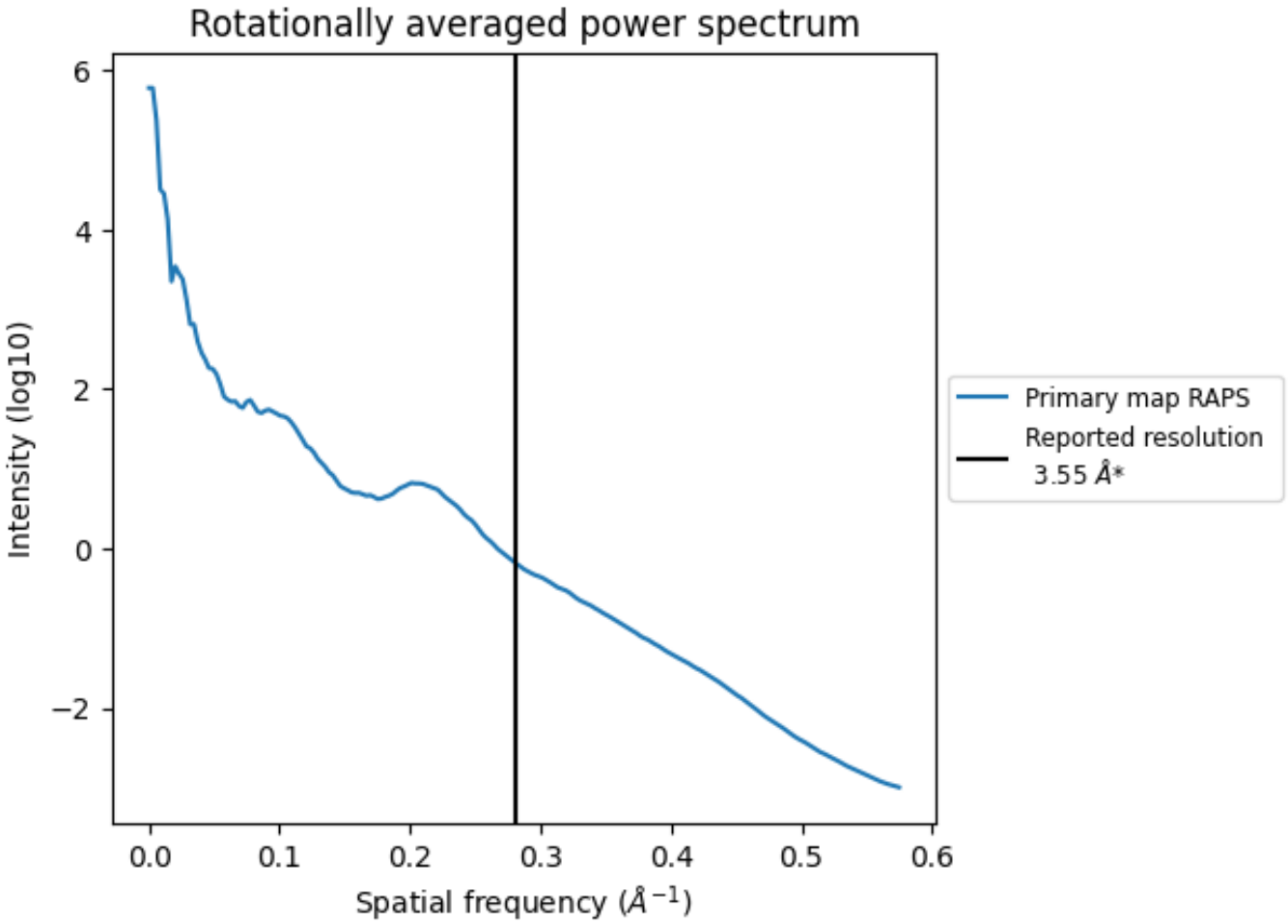
7.2 Volume estimate (i)



The volume at the recommended contour level is 422 nm^3; this corresponds to an approximate mass of 381 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 0.282 Å^{-1}

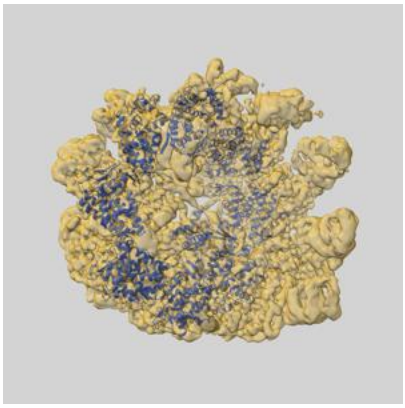
8 Fourier-Shell correlation (i)

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

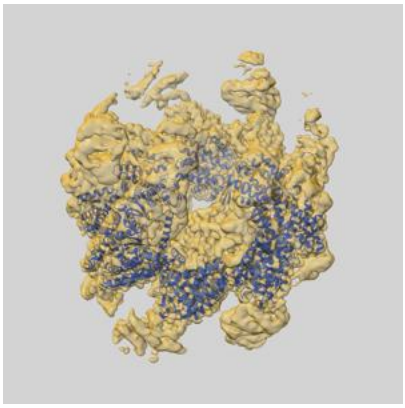
9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-64367 and PDB model 9UNW. Per-residue inclusion information can be found in section 3 on page 7.

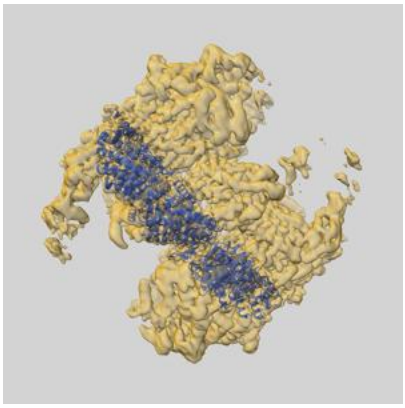
9.1 Map-model overlay



X



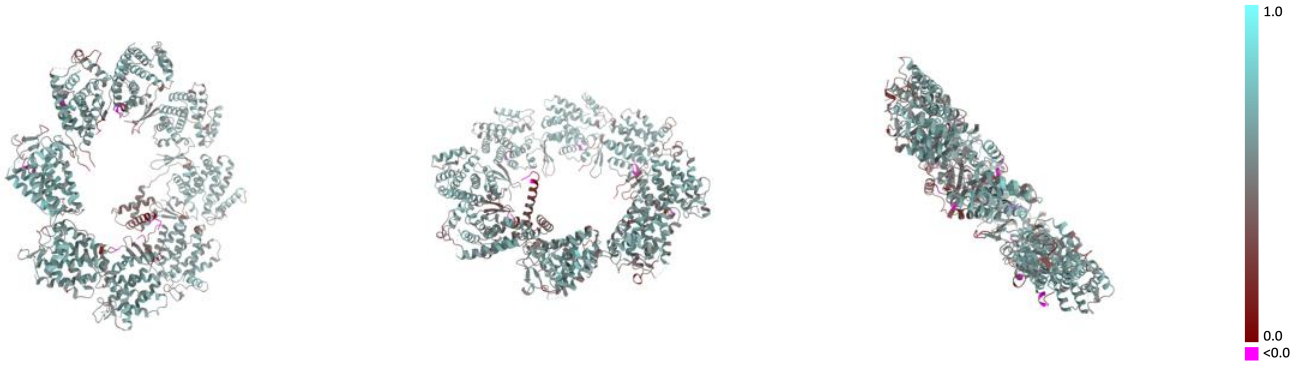
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 2.56 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

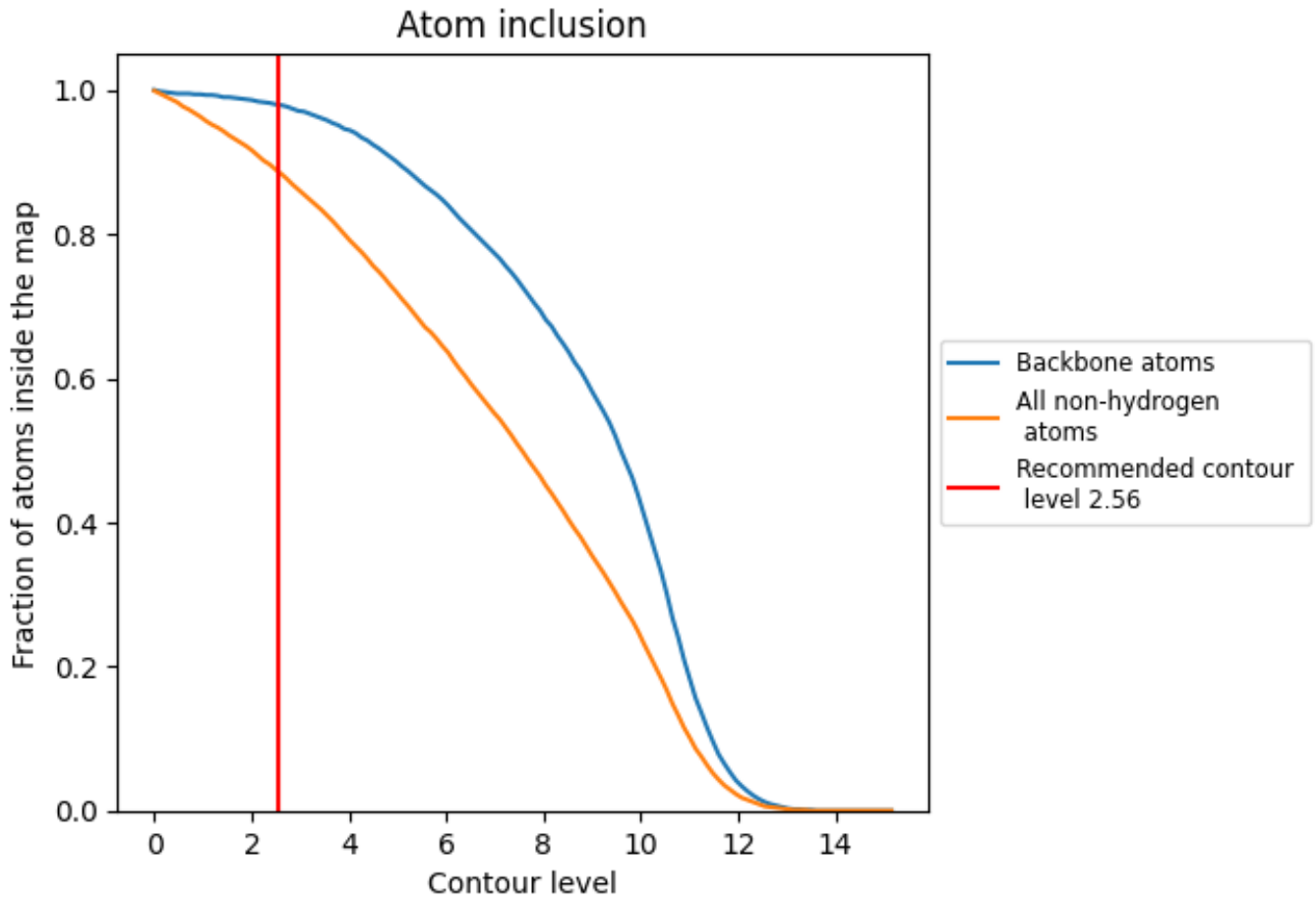
The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (2.56).

9.4 Atom inclusion (i)



At the recommended contour level, 98% of all backbone atoms, 89% 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 (2.56) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.8860	0.5260
A	0.9120	0.5470
B	0.9180	0.5660
C	0.9060	0.5410
D	0.7080	0.3460
E	0.9070	0.5550
F	0.8590	0.5120
G	0.8740	0.5200
H	0.8860	0.5080
I	0.8940	0.5290