



wwPDB EM Validation Summary Report ⓘ

Jun 25, 2025 – 03:15 pm BST

PDB ID : 9EXP / pdb_00009exp
EMDB ID : EMD-50043
Title : Wzc-K540M-2YE MgADP C8
Authors : Liu, J.W.; Yang, Y.; Naismith, J.H.
Deposited on : 2024-04-08
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 ⓘ 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.dev118
Mogul : 1.8.4, CSD as541be (2020)
MolProbity : 4-5-2 with Phenix2.0rc1
buster-report : 1.1.7 (2018)
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ : 1.9.13
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.44

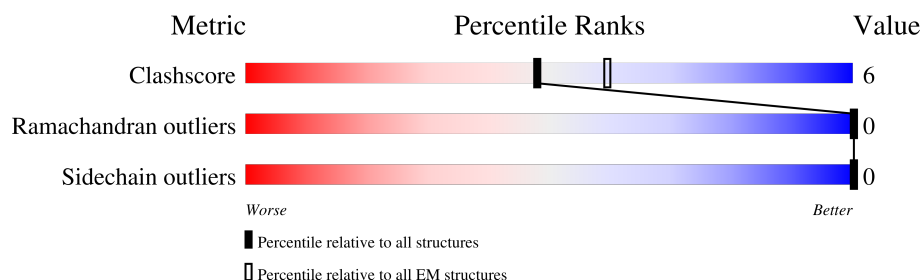
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY






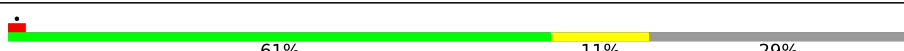
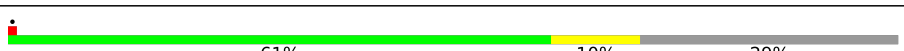
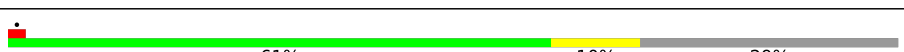
The reported resolution of this entry is 2.85 Å.

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)
Clashscore	210492	15764
Ramachandran outliers	207382	16835
Sidechain outliers	206894	16415

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 $\leq 5\%$. 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	727	
1	B	727	
1	C	727	
1	D	727	
1	E	727	
1	F	727	
1	G	727	
1	H	727	

2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 32064 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 Putative transmembrane protein Wzc.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	517	Total	C	N	O	S	0	0
			3980	2550	670	747	13		
1	B	517	Total	C	N	O	S	0	0
			3980	2550	670	747	13		
1	C	517	Total	C	N	O	S	0	0
			3980	2550	670	747	13		
1	D	517	Total	C	N	O	S	0	0
			3980	2550	670	747	13		
1	E	517	Total	C	N	O	S	0	0
			3980	2550	670	747	13		
1	F	517	Total	C	N	O	S	0	0
			3980	2550	670	747	13		
1	G	517	Total	C	N	O	S	0	0
			3980	2550	670	747	13		
1	H	517	Total	C	N	O	S	0	0
			3980	2550	670	747	13		

There are 112 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	121	GLY	ALA	variant	UNP Q9X4B9
A	126	ARG	GLY	variant	UNP Q9X4B9
A	540	MET	LYS	engineered mutation	UNP Q9X4B9
A	717	GLU	-	expression tag	UNP Q9X4B9
A	718	GLU	-	expression tag	UNP Q9X4B9
A	719	ASP	-	expression tag	UNP Q9X4B9
A	720	LYS	-	expression tag	UNP Q9X4B9
A	721	LYS	-	expression tag	UNP Q9X4B9
A	722	HIS	-	expression tag	UNP Q9X4B9
A	723	HIS	-	expression tag	UNP Q9X4B9
A	724	HIS	-	expression tag	UNP Q9X4B9
A	725	HIS	-	expression tag	UNP Q9X4B9
A	726	HIS	-	expression tag	UNP Q9X4B9
A	727	HIS	-	expression tag	UNP Q9X4B9

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Chain	Residue	Modelled	Actual	Comment	Reference
B	121	GLY	ALA	variant	UNP Q9X4B9
B	126	ARG	GLY	variant	UNP Q9X4B9
B	540	MET	LYS	engineered mutation	UNP Q9X4B9
B	717	GLU	-	expression tag	UNP Q9X4B9
B	718	GLU	-	expression tag	UNP Q9X4B9
B	719	ASP	-	expression tag	UNP Q9X4B9
B	720	LYS	-	expression tag	UNP Q9X4B9
B	721	LYS	-	expression tag	UNP Q9X4B9
B	722	HIS	-	expression tag	UNP Q9X4B9
B	723	HIS	-	expression tag	UNP Q9X4B9
B	724	HIS	-	expression tag	UNP Q9X4B9
B	725	HIS	-	expression tag	UNP Q9X4B9
B	726	HIS	-	expression tag	UNP Q9X4B9
B	727	HIS	-	expression tag	UNP Q9X4B9
C	121	GLY	ALA	variant	UNP Q9X4B9
C	126	ARG	GLY	variant	UNP Q9X4B9
C	540	MET	LYS	engineered mutation	UNP Q9X4B9
C	717	GLU	-	expression tag	UNP Q9X4B9
C	718	GLU	-	expression tag	UNP Q9X4B9
C	719	ASP	-	expression tag	UNP Q9X4B9
C	720	LYS	-	expression tag	UNP Q9X4B9
C	721	LYS	-	expression tag	UNP Q9X4B9
C	722	HIS	-	expression tag	UNP Q9X4B9
C	723	HIS	-	expression tag	UNP Q9X4B9
C	724	HIS	-	expression tag	UNP Q9X4B9
C	725	HIS	-	expression tag	UNP Q9X4B9
C	726	HIS	-	expression tag	UNP Q9X4B9
C	727	HIS	-	expression tag	UNP Q9X4B9
D	121	GLY	ALA	variant	UNP Q9X4B9
D	126	ARG	GLY	variant	UNP Q9X4B9
D	540	MET	LYS	engineered mutation	UNP Q9X4B9
D	717	GLU	-	expression tag	UNP Q9X4B9
D	718	GLU	-	expression tag	UNP Q9X4B9
D	719	ASP	-	expression tag	UNP Q9X4B9
D	720	LYS	-	expression tag	UNP Q9X4B9
D	721	LYS	-	expression tag	UNP Q9X4B9
D	722	HIS	-	expression tag	UNP Q9X4B9
D	723	HIS	-	expression tag	UNP Q9X4B9
D	724	HIS	-	expression tag	UNP Q9X4B9
D	725	HIS	-	expression tag	UNP Q9X4B9
D	726	HIS	-	expression tag	UNP Q9X4B9
D	727	HIS	-	expression tag	UNP Q9X4B9

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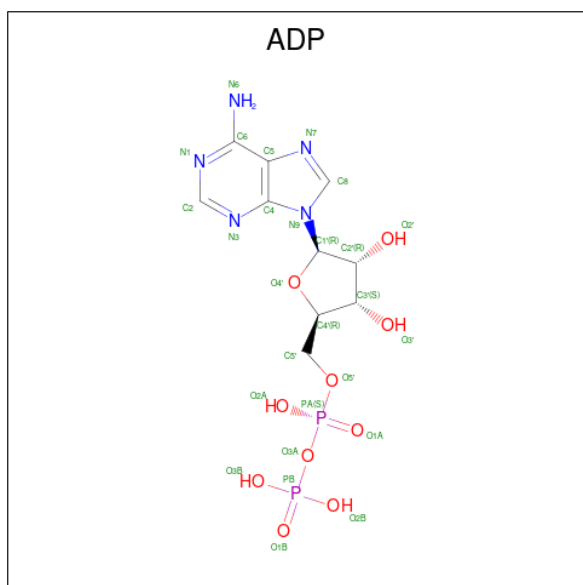
Chain	Residue	Modelled	Actual	Comment	Reference
E	121	GLY	ALA	variant	UNP Q9X4B9
E	126	ARG	GLY	variant	UNP Q9X4B9
E	540	MET	LYS	engineered mutation	UNP Q9X4B9
E	717	GLU	-	expression tag	UNP Q9X4B9
E	718	GLU	-	expression tag	UNP Q9X4B9
E	719	ASP	-	expression tag	UNP Q9X4B9
E	720	LYS	-	expression tag	UNP Q9X4B9
E	721	LYS	-	expression tag	UNP Q9X4B9
E	722	HIS	-	expression tag	UNP Q9X4B9
E	723	HIS	-	expression tag	UNP Q9X4B9
E	724	HIS	-	expression tag	UNP Q9X4B9
E	725	HIS	-	expression tag	UNP Q9X4B9
E	726	HIS	-	expression tag	UNP Q9X4B9
E	727	HIS	-	expression tag	UNP Q9X4B9
F	121	GLY	ALA	variant	UNP Q9X4B9
F	126	ARG	GLY	variant	UNP Q9X4B9
F	540	MET	LYS	engineered mutation	UNP Q9X4B9
F	717	GLU	-	expression tag	UNP Q9X4B9
F	718	GLU	-	expression tag	UNP Q9X4B9
F	719	ASP	-	expression tag	UNP Q9X4B9
F	720	LYS	-	expression tag	UNP Q9X4B9
F	721	LYS	-	expression tag	UNP Q9X4B9
F	722	HIS	-	expression tag	UNP Q9X4B9
F	723	HIS	-	expression tag	UNP Q9X4B9
F	724	HIS	-	expression tag	UNP Q9X4B9
F	725	HIS	-	expression tag	UNP Q9X4B9
F	726	HIS	-	expression tag	UNP Q9X4B9
F	727	HIS	-	expression tag	UNP Q9X4B9
G	121	GLY	ALA	variant	UNP Q9X4B9
G	126	ARG	GLY	variant	UNP Q9X4B9
G	540	MET	LYS	engineered mutation	UNP Q9X4B9
G	717	GLU	-	expression tag	UNP Q9X4B9
G	718	GLU	-	expression tag	UNP Q9X4B9
G	719	ASP	-	expression tag	UNP Q9X4B9
G	720	LYS	-	expression tag	UNP Q9X4B9
G	721	LYS	-	expression tag	UNP Q9X4B9
G	722	HIS	-	expression tag	UNP Q9X4B9
G	723	HIS	-	expression tag	UNP Q9X4B9
G	724	HIS	-	expression tag	UNP Q9X4B9
G	725	HIS	-	expression tag	UNP Q9X4B9
G	726	HIS	-	expression tag	UNP Q9X4B9
G	727	HIS	-	expression tag	UNP Q9X4B9

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Chain	Residue	Modelled	Actual	Comment	Reference
H	121	GLY	ALA	variant	UNP Q9X4B9
H	126	ARG	GLY	variant	UNP Q9X4B9
H	540	MET	LYS	engineered mutation	UNP Q9X4B9
H	717	GLU	-	expression tag	UNP Q9X4B9
H	718	GLU	-	expression tag	UNP Q9X4B9
H	719	ASP	-	expression tag	UNP Q9X4B9
H	720	LYS	-	expression tag	UNP Q9X4B9
H	721	LYS	-	expression tag	UNP Q9X4B9
H	722	HIS	-	expression tag	UNP Q9X4B9
H	723	HIS	-	expression tag	UNP Q9X4B9
H	724	HIS	-	expression tag	UNP Q9X4B9
H	725	HIS	-	expression tag	UNP Q9X4B9
H	726	HIS	-	expression tag	UNP Q9X4B9
H	727	HIS	-	expression tag	UNP Q9X4B9

- Molecule 2 is ADENOSINE-5'-DIPHOSPHATE (CCD ID: ADP) (formula: $C_{10}H_{15}N_5O_{10}P_2$).



Mol	Chain	Residues	Atoms					AltConf
2	A	1	Total	C	N	O	P	0
			27	10	5	10	2	
2	B	1	Total	C	N	O	P	0
			27	10	5	10	2	
2	C	1	Total	C	N	O	P	0
			27	10	5	10	2	
2	D	1	Total	C	N	O	P	0
			27	10	5	10	2	

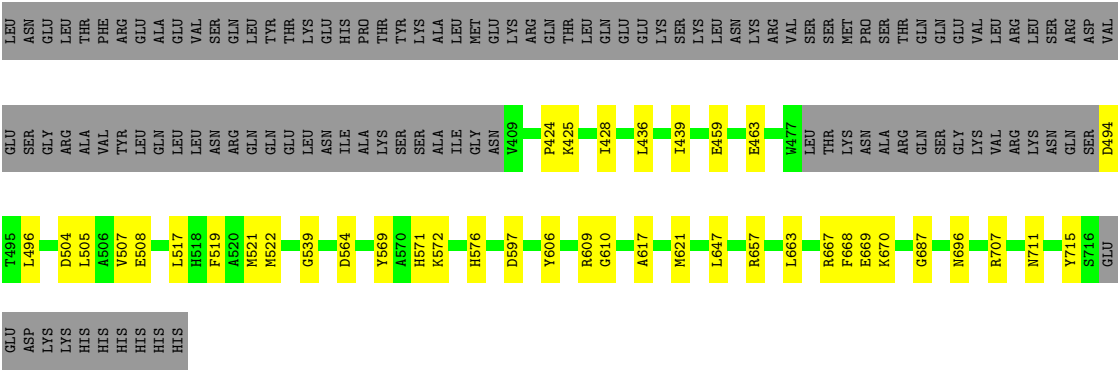
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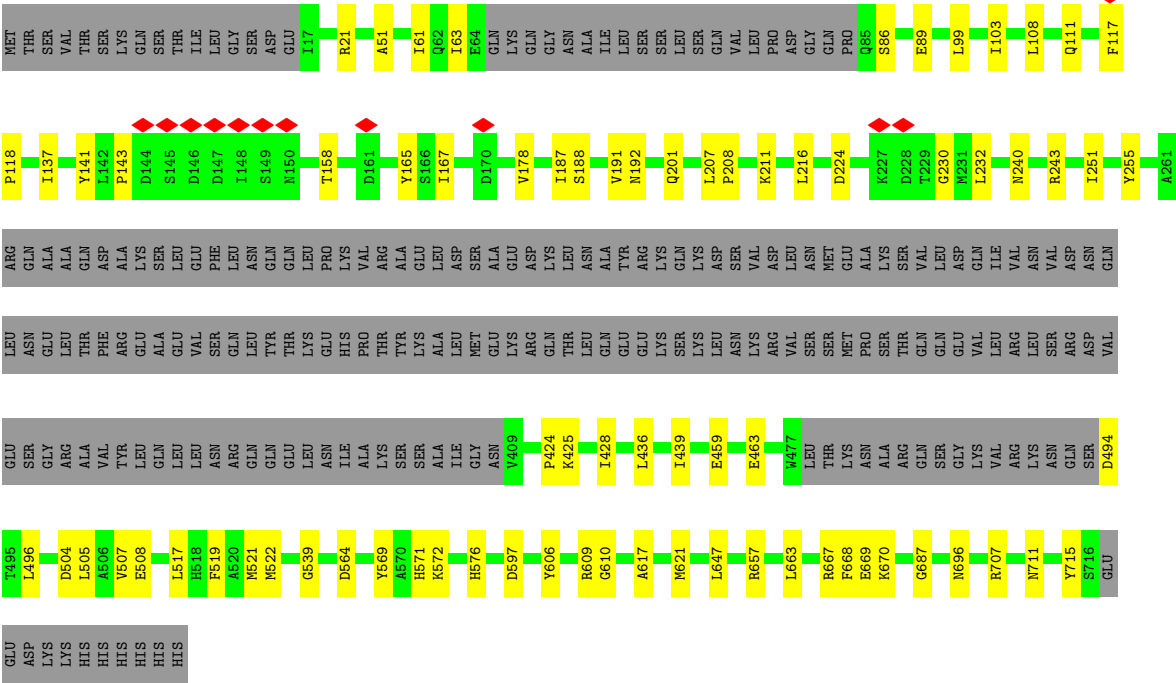
Mol	Chain	Residues	Atoms					AltConf
2	E	1	Total	C	N	O	P	0
			27	10	5	10	2	
2	F	1	Total	C	N	O	P	0
			27	10	5	10	2	
2	G	1	Total	C	N	O	P	0
			27	10	5	10	2	
2	H	1	Total	C	N	O	P	0
			27	10	5	10	2	

- Molecule 3 is MAGNESIUM ION (CCD ID: MG) (formula: Mg).

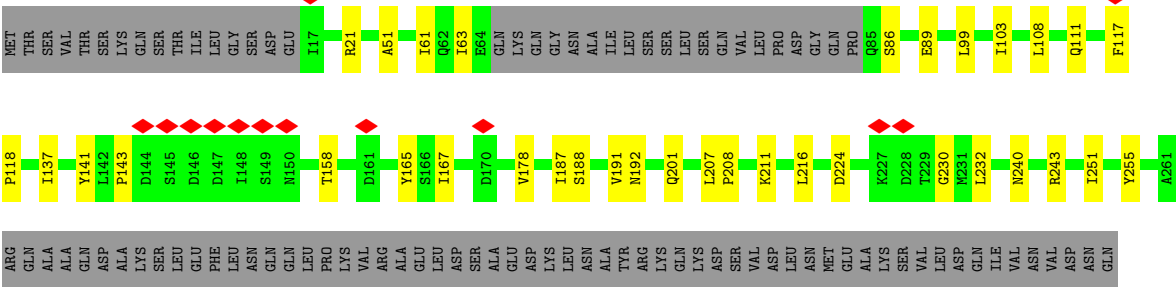
Mol	Chain	Residues	Atoms		AltConf
3	A	1	Total	Mg	0
			1	1	
3	B	1	Total	Mg	0
			1	1	
3	C	1	Total	Mg	0
			1	1	
3	D	1	Total	Mg	0
			1	1	
3	E	1	Total	Mg	0
			1	1	
3	F	1	Total	Mg	0
			1	1	
3	G	1	Total	Mg	0
			1	1	
3	H	1	Total	Mg	0
			1	1	

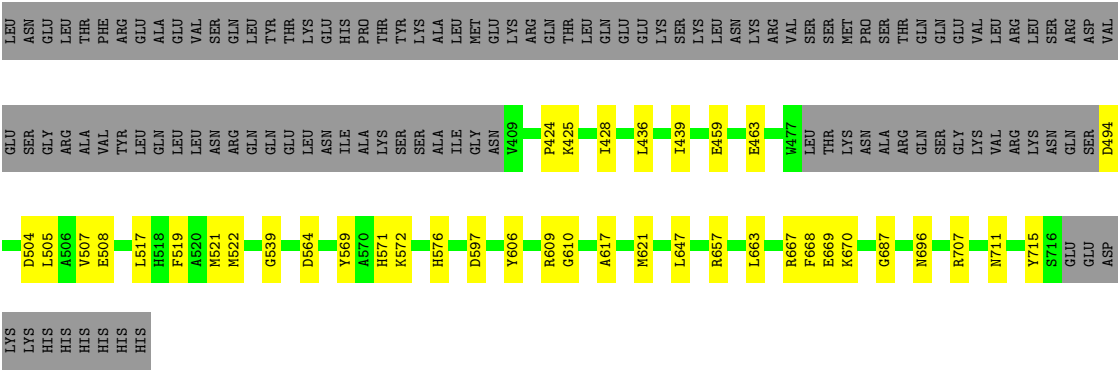


● Molecule 1: Putative transmembrane protein Wzc

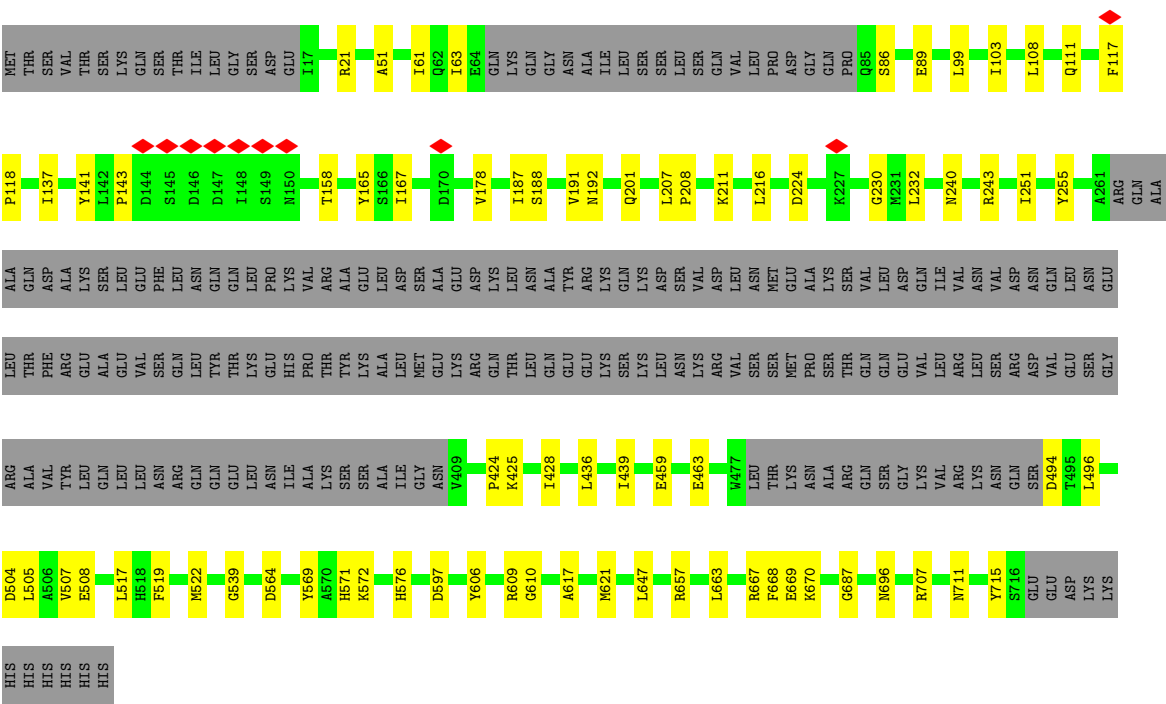


● Molecule 1: Putative transmembrane protein Wzc

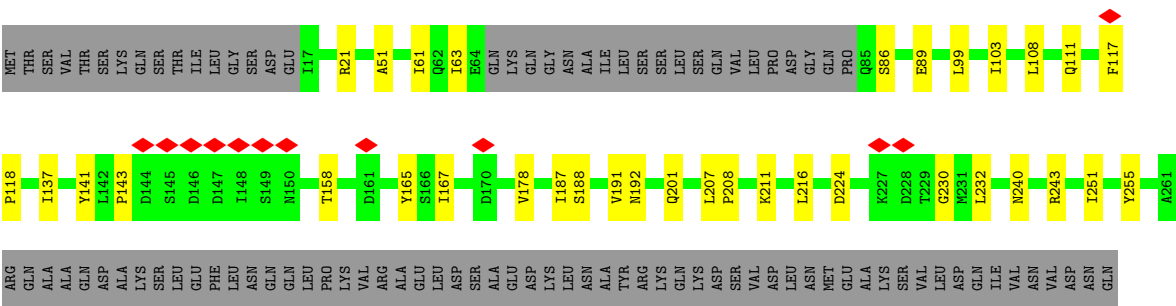


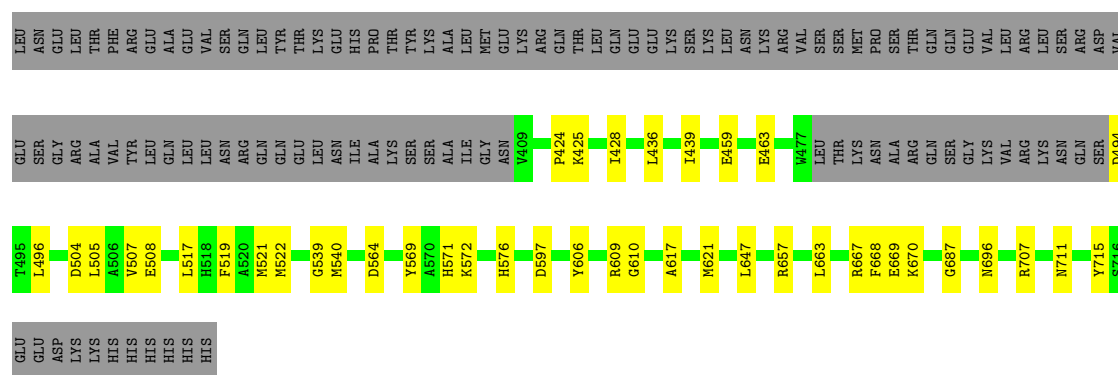


● Molecule 1: Putative transmembrane protein Wzc

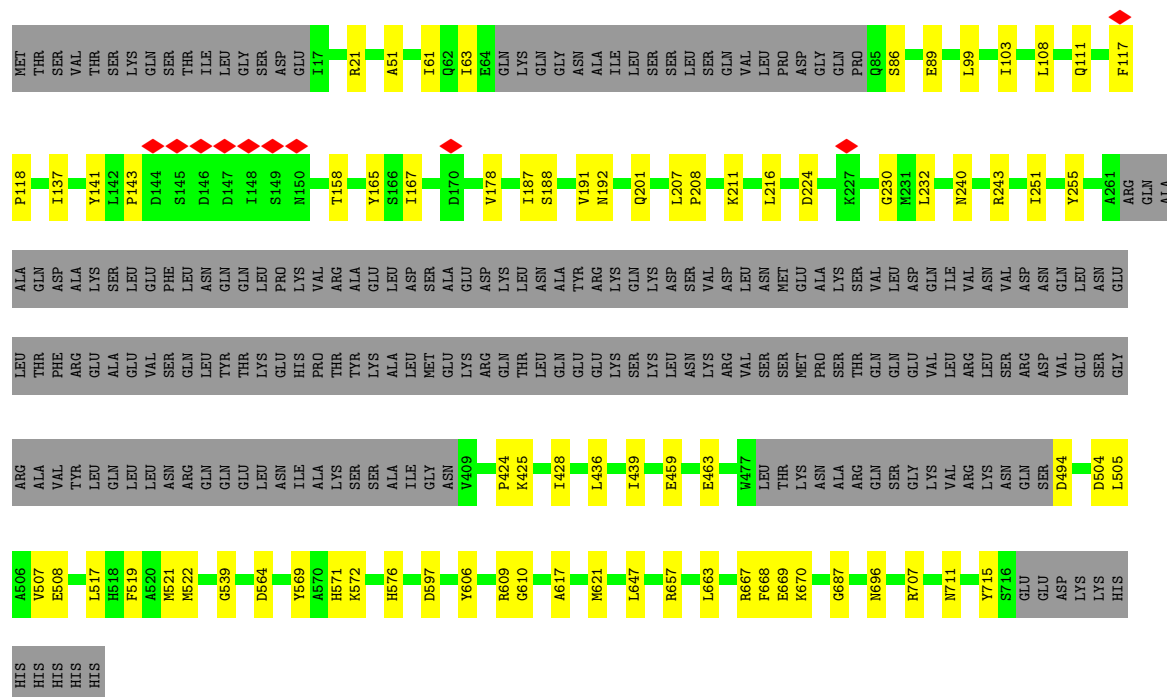


● Molecule 1: Putative transmembrane protein Wzc

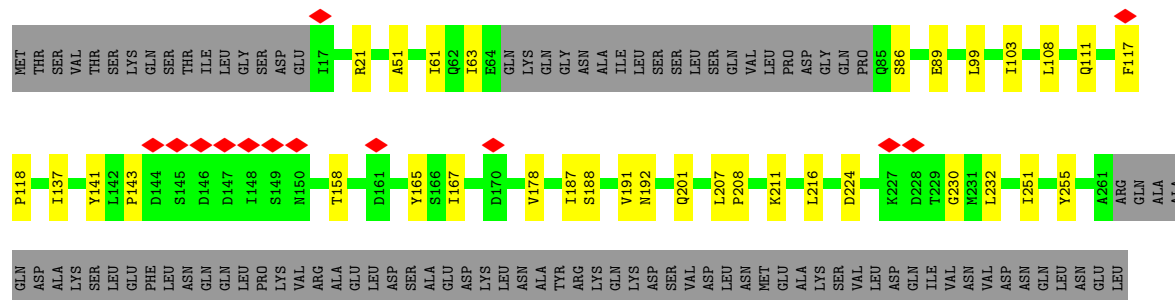




- Molecule 1: Putative transmembrane protein Wzc



- Molecule 1: Putative transmembrane protein Wzc



THR	ALA	L505	LYS	THR
PHE	VAL	AS06	HIS	PHE
ARG	TYR	V507	HIS	ARG
GLU	LEU		HIS	GLU
ALA	GLN	L517	HIS	ALA
GLU	LEU	H518	HIS	GLU
VAL	LEU	F519	HIS	VAL
SER	ASN	AS20	HIS	SER
GLN	ARG	M521	HIS	GLN
LEU	GLN	M522	HIS	LEU
TYR	GLN		HIS	TYR
THR	GLU	G539	HIS	THR
LYS	LEU		HIS	LYS
GLU	ASN	D564	HIS	GLU
HIS	ILE		HIS	HIS
PRO	ALA	Y569	HIS	PRO
THR	LYS	AS70	HIS	THR
TYR	SER	H571	HIS	TYR
LYS	SER	K572	HIS	LYS
ALA	ALA		HIS	ALA
LEU	ILE	H576	HIS	LEU
MET	GLY		HIS	MET
GLU	ASN	D597	HIS	GLU
LYS	V409	Y606	HIS	LYS
ARG			HIS	ARG
GLN	P424	R609	HIS	GLN
THR	K425	G610	HIS	THR
LEU			HIS	LEU
GLN	T428	N615	HIS	GLN
GLU		P616	HIS	GLU
LYS	L436	A617	HIS	LYS
SER			HIS	SER
LYS	T439	M621	HIS	LYS
LEU			HIS	LEU
ASN	E459	L647	HIS	ASN
LYS			HIS	LYS
ARG	E463	R657	HIS	ARG
VAL	W477	L663	HIS	VAL
SER	LEU		HIS	SER
THR	THR	R667	HIS	THR
MET	LYS	F668	HIS	MET
PRO	ASN	E669	HIS	PRO
SER	ALA	K670	HIS	SER
THR	ARG		HIS	THR
GLN	GLN	G687	HIS	GLN
GLU	SER		HIS	GLU
VAL	GLY	N696	HIS	VAL
LEU	LYS		HIS	LEU
ARG	VAL	R707	HIS	ARG
LEU	ARG		HIS	LEU
SER	LYS	N711	HIS	SER
ASN	ASN		HIS	ASN
GLN	GLN		HIS	GLN
ASP	SER	Y715	HIS	ASP
VAL	VAL	S716	HIS	VAL
GLU	D494	GLU	HIS	GLU
SER	T495	GLU	HIS	SER
GLY	L496	ASP	HIS	GLY
ARG		LYS	HIS	ARG
	D504		HIS	

4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	528899	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	NONE	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	40.3	Depositor
Minimum defocus (nm)	800	Depositor
Maximum defocus (nm)	2000	Depositor
Magnification	Not provided	
Image detector	FEI FALCON IV (4k x 4k)	Depositor
Maximum map value	1.749	Depositor
Minimum map value	-0.981	Depositor
Average map value	0.003	Depositor
Map value standard deviation	0.046	Depositor
Recommended contour level	0.1	Depositor
Map size (\AA)	277.112, 277.112, 277.112	wwPDB
Map dimensions	376, 376, 376	wwPDB
Map angles ($^\circ$)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (\AA)	0.737, 0.737, 0.737	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: MG, ADP

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	0.17	0/4042	0.30	0/5478
1	B	0.17	0/4042	0.30	0/5478
1	C	0.17	0/4042	0.30	0/5478
1	D	0.17	0/4042	0.30	0/5478
1	E	0.17	0/4042	0.30	0/5478
1	F	0.17	0/4042	0.30	0/5478
1	G	0.17	0/4042	0.30	0/5478
1	H	0.17	0/4042	0.30	0/5478
All	All	0.17	0/32336	0.30	0/43824

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	3980	0	4113	48	0
1	B	3980	0	4113	48	0
1	C	3980	0	4113	48	0
1	D	3980	0	4113	49	0
1	E	3980	0	4113	48	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	F	3980	0	4113	50	0
1	G	3980	0	4113	48	0
1	H	3980	0	4113	47	0
2	A	27	0	12	1	0
2	B	27	0	12	1	0
2	C	27	0	12	1	0
2	D	27	0	12	1	0
2	E	27	0	12	1	0
2	F	27	0	12	2	0
2	G	27	0	12	1	0
2	H	27	0	12	1	0
3	A	1	0	0	0	0
3	B	1	0	0	0	0
3	C	1	0	0	0	0
3	D	1	0	0	0	0
3	E	1	0	0	0	0
3	F	1	0	0	0	0
3	G	1	0	0	0	0
3	H	1	0	0	0	0
All	All	32064	0	33000	370	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 6.

The worst 5 of 370 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:F:517:LEU:HD21	1:F:663:LEU:HD11	1.71	0.73
1:E:517:LEU:HD21	1:E:663:LEU:HD11	1.71	0.73
1:G:517:LEU:HD21	1:G:663:LEU:HD11	1.71	0.72
1:D:517:LEU:HD21	1:D:663:LEU:HD11	1.71	0.72
1:A:517:LEU:HD21	1:A:663:LEU:HD11	1.71	0.71

There are no symmetry-related clashes.

5.3 Torsion angles

5.3.1 Protein backbone

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	509/727 (70%)	489 (96%)	20 (4%)	0	100	100
1	B	509/727 (70%)	490 (96%)	19 (4%)	0	100	100
1	C	509/727 (70%)	489 (96%)	20 (4%)	0	100	100
1	D	509/727 (70%)	490 (96%)	19 (4%)	0	100	100
1	E	509/727 (70%)	490 (96%)	19 (4%)	0	100	100
1	F	509/727 (70%)	489 (96%)	20 (4%)	0	100	100
1	G	509/727 (70%)	489 (96%)	20 (4%)	0	100	100
1	H	509/727 (70%)	490 (96%)	19 (4%)	0	100	100
All	All	4072/5816 (70%)	3916 (96%)	156 (4%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	439/629 (70%)	439 (100%)	0	100	100
1	B	439/629 (70%)	439 (100%)	0	100	100
1	C	439/629 (70%)	439 (100%)	0	100	100
1	D	439/629 (70%)	439 (100%)	0	100	100
1	E	439/629 (70%)	439 (100%)	0	100	100
1	F	439/629 (70%)	439 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	G	439/629 (70%)	439 (100%)	0	100	100
1	H	439/629 (70%)	439 (100%)	0	100	100
All	All	3512/5032 (70%)	3512 (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 18 such sidechains are listed below:

Mol	Chain	Res	Type
1	G	259	ASN
1	H	259	ASN
1	H	192	ASN
1	E	94	GLN
1	G	94	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](#)

Of 16 ligands modelled in this entry, 8 are monoatomic - leaving 8 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
2	ADP	C	1000	3	24,29,29	4.86	9 (37%)	29,45,45	2.43	6 (20%)
2	ADP	A	1000	3	24,29,29	4.87	9 (37%)	29,45,45	2.43	6 (20%)
2	ADP	B	1000	3	24,29,29	4.88	9 (37%)	29,45,45	2.43	6 (20%)
2	ADP	E	1000	3	24,29,29	4.86	9 (37%)	29,45,45	2.44	6 (20%)
2	ADP	F	1000	3	24,29,29	4.86	9 (37%)	29,45,45	2.43	6 (20%)
2	ADP	H	1000	3	24,29,29	4.86	9 (37%)	29,45,45	2.44	6 (20%)
2	ADP	G	1000	3	24,29,29	4.87	9 (37%)	29,45,45	2.43	6 (20%)
2	ADP	D	1000	3	24,29,29	4.88	9 (37%)	29,45,45	2.43	6 (20%)

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	ADP	C	1000	3	-	1/12/32/32	0/3/3/3
2	ADP	A	1000	3	-	1/12/32/32	0/3/3/3
2	ADP	B	1000	3	-	1/12/32/32	0/3/3/3
2	ADP	E	1000	3	-	1/12/32/32	0/3/3/3
2	ADP	F	1000	3	-	1/12/32/32	0/3/3/3
2	ADP	H	1000	3	-	1/12/32/32	0/3/3/3
2	ADP	G	1000	3	-	1/12/32/32	0/3/3/3
2	ADP	D	1000	3	-	1/12/32/32	0/3/3/3

The worst 5 of 72 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	1000	ADP	C2'-C1'	-16.63	1.28	1.53
2	D	1000	ADP	C2'-C1'	-16.61	1.28	1.53
2	G	1000	ADP	C2'-C1'	-16.59	1.28	1.53
2	A	1000	ADP	C2'-C1'	-16.58	1.28	1.53
2	E	1000	ADP	C2'-C1'	-16.57	1.28	1.53

The worst 5 of 48 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	G	1000	ADP	C1'-N9-C4	-6.69	114.89	126.64
2	E	1000	ADP	C1'-N9-C4	-6.67	114.92	126.64
2	H	1000	ADP	C1'-N9-C4	-6.66	114.94	126.64
2	F	1000	ADP	C1'-N9-C4	-6.66	114.94	126.64

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	C	1000	ADP	C1'-N9-C4	-6.65	114.95	126.64

There are no chirality outliers.

5 of 8 torsion outliers are listed below:

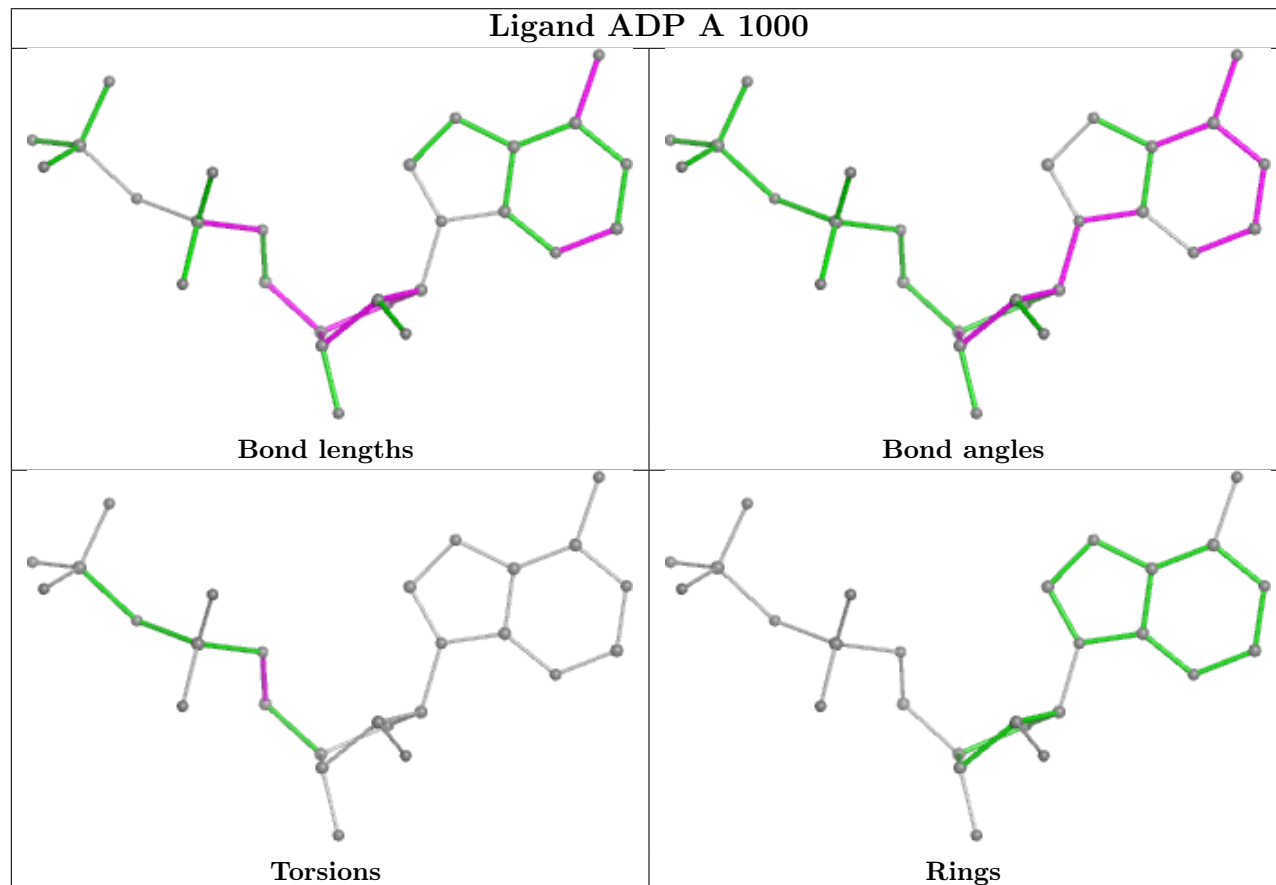
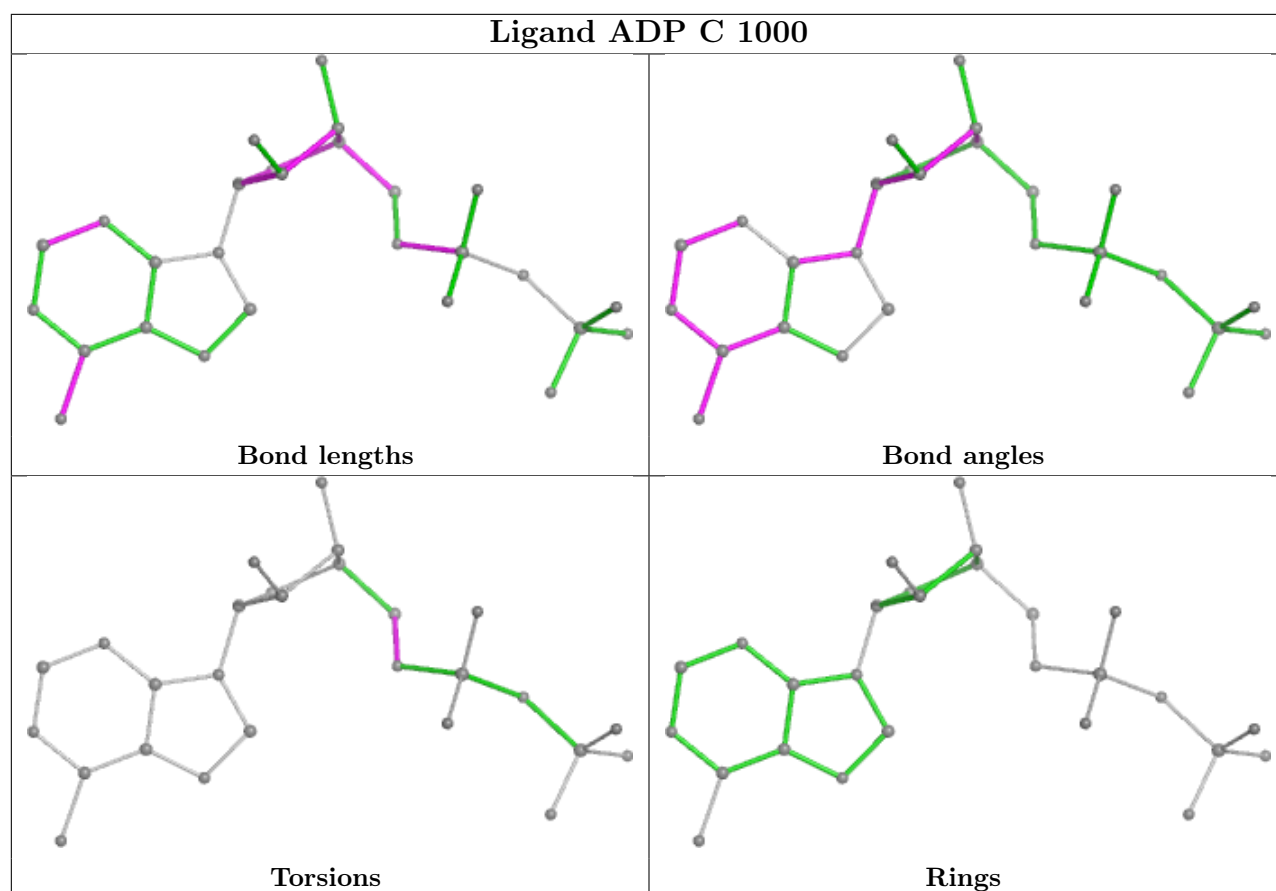
Mol	Chain	Res	Type	Atoms
2	A	1000	ADP	C4'-C5'-O5'-PA
2	B	1000	ADP	C4'-C5'-O5'-PA
2	C	1000	ADP	C4'-C5'-O5'-PA
2	D	1000	ADP	C4'-C5'-O5'-PA
2	E	1000	ADP	C4'-C5'-O5'-PA

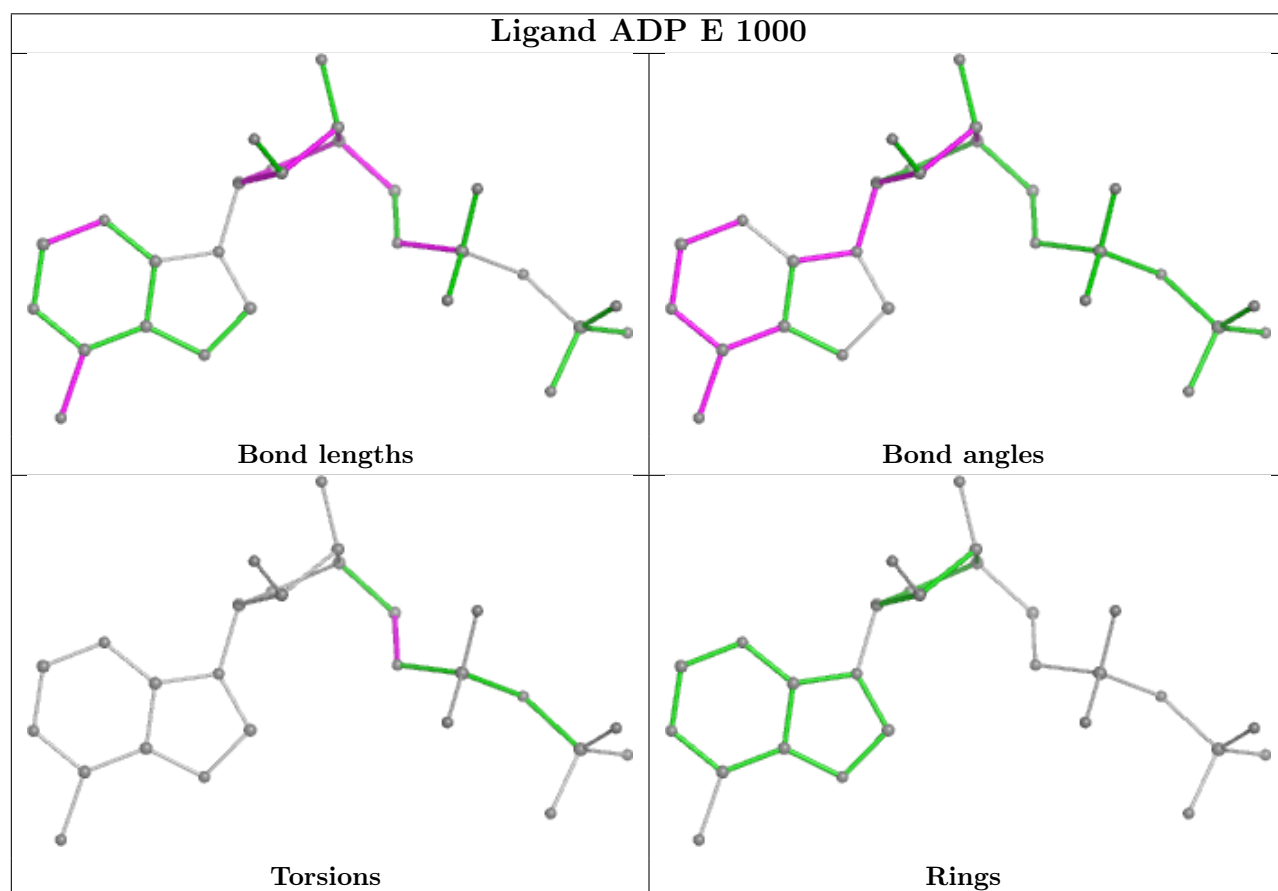
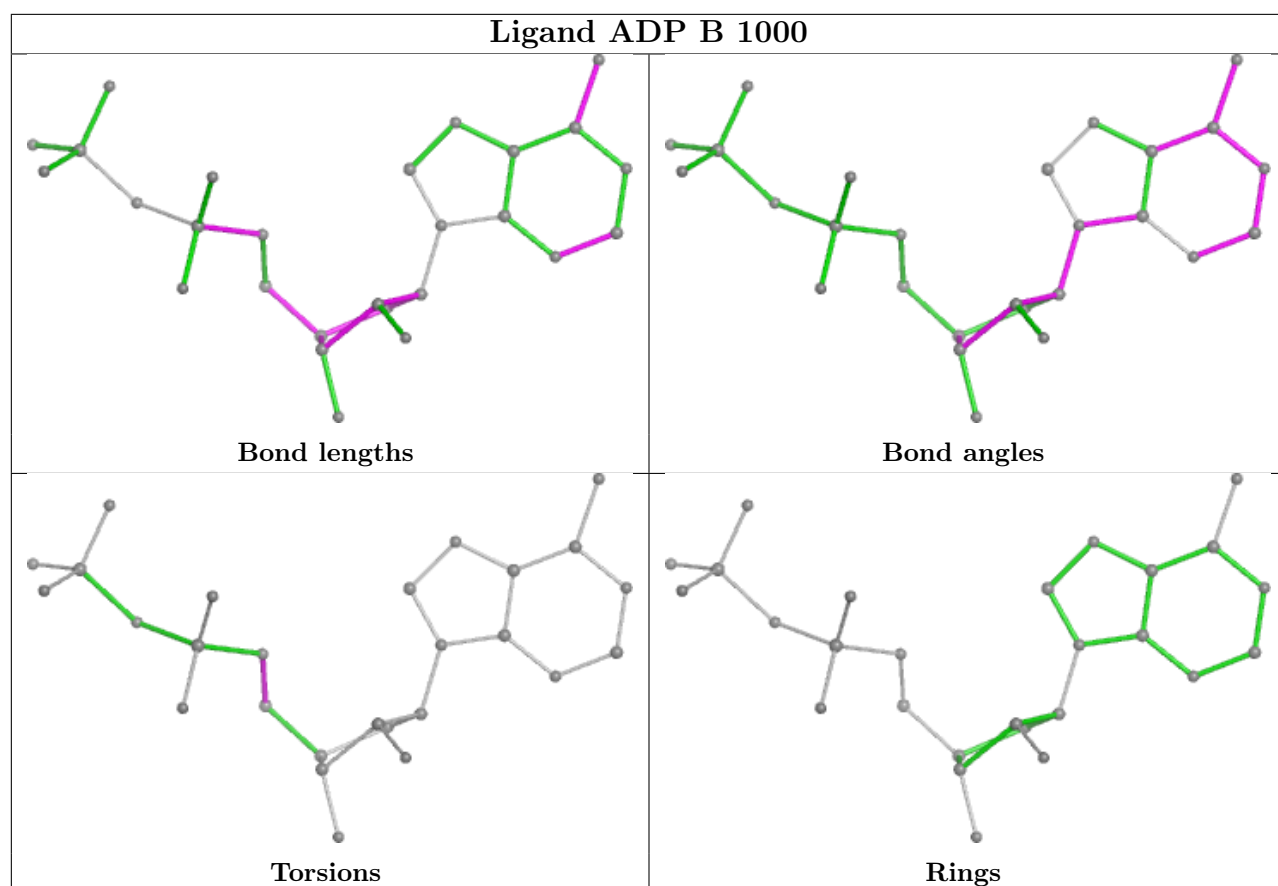
There are no ring outliers.

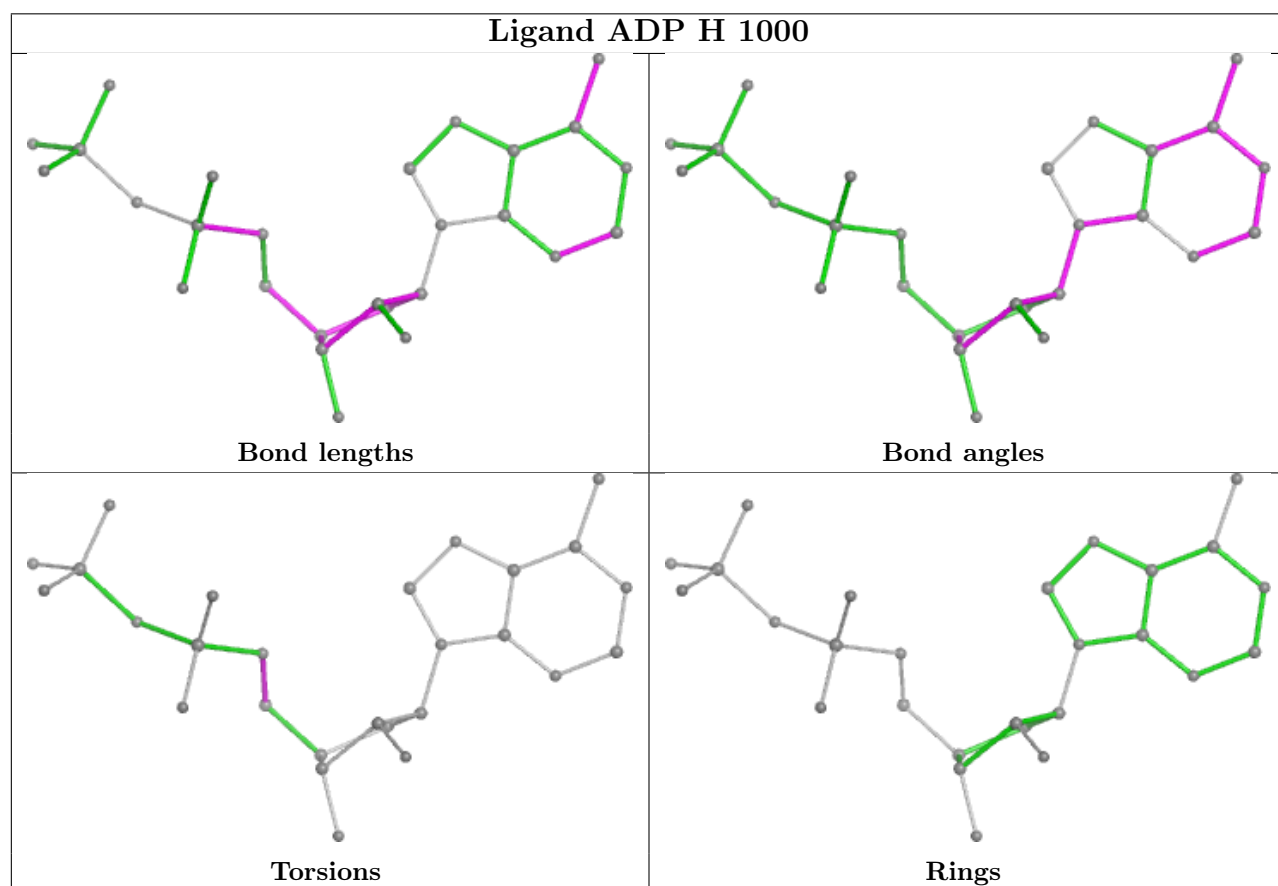
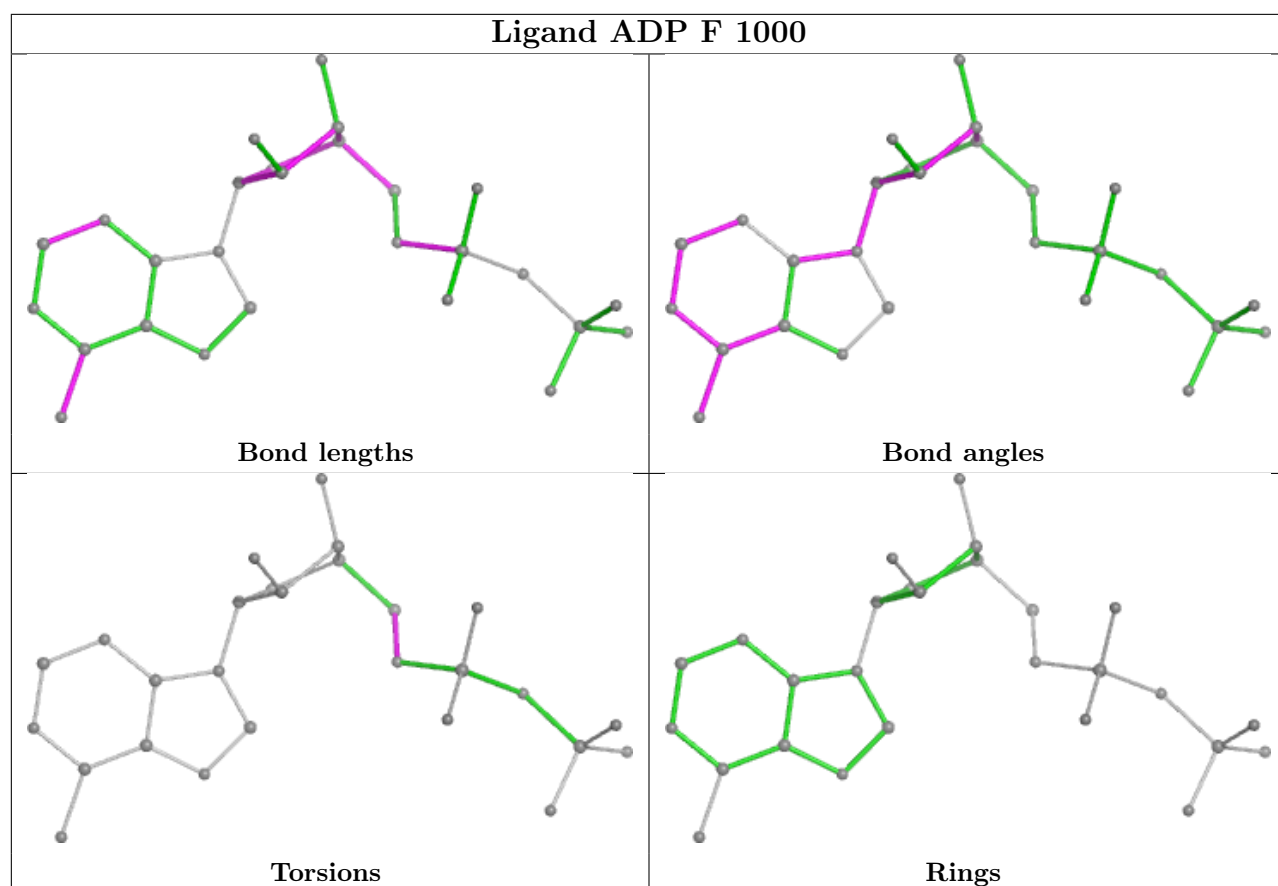
8 monomers are involved in 9 short contacts:

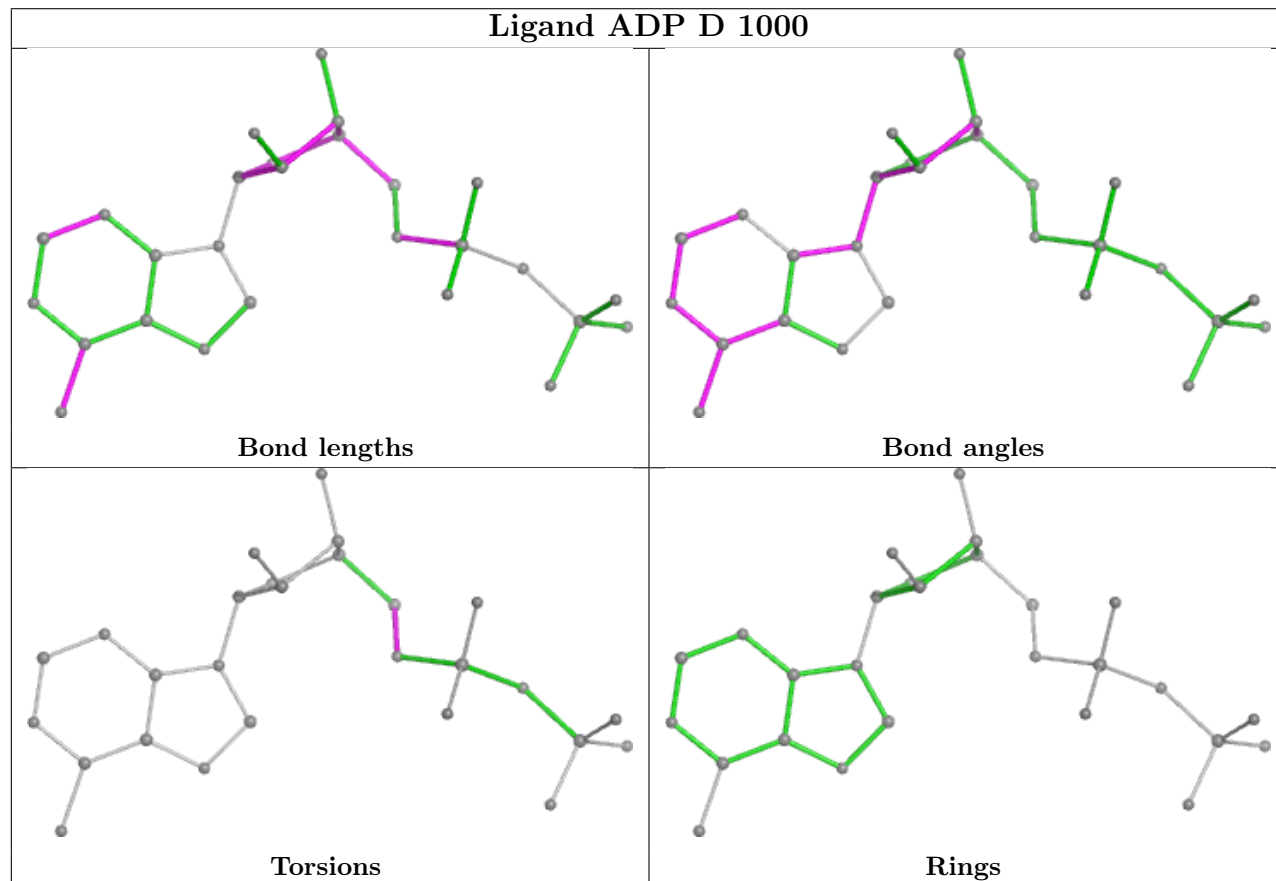
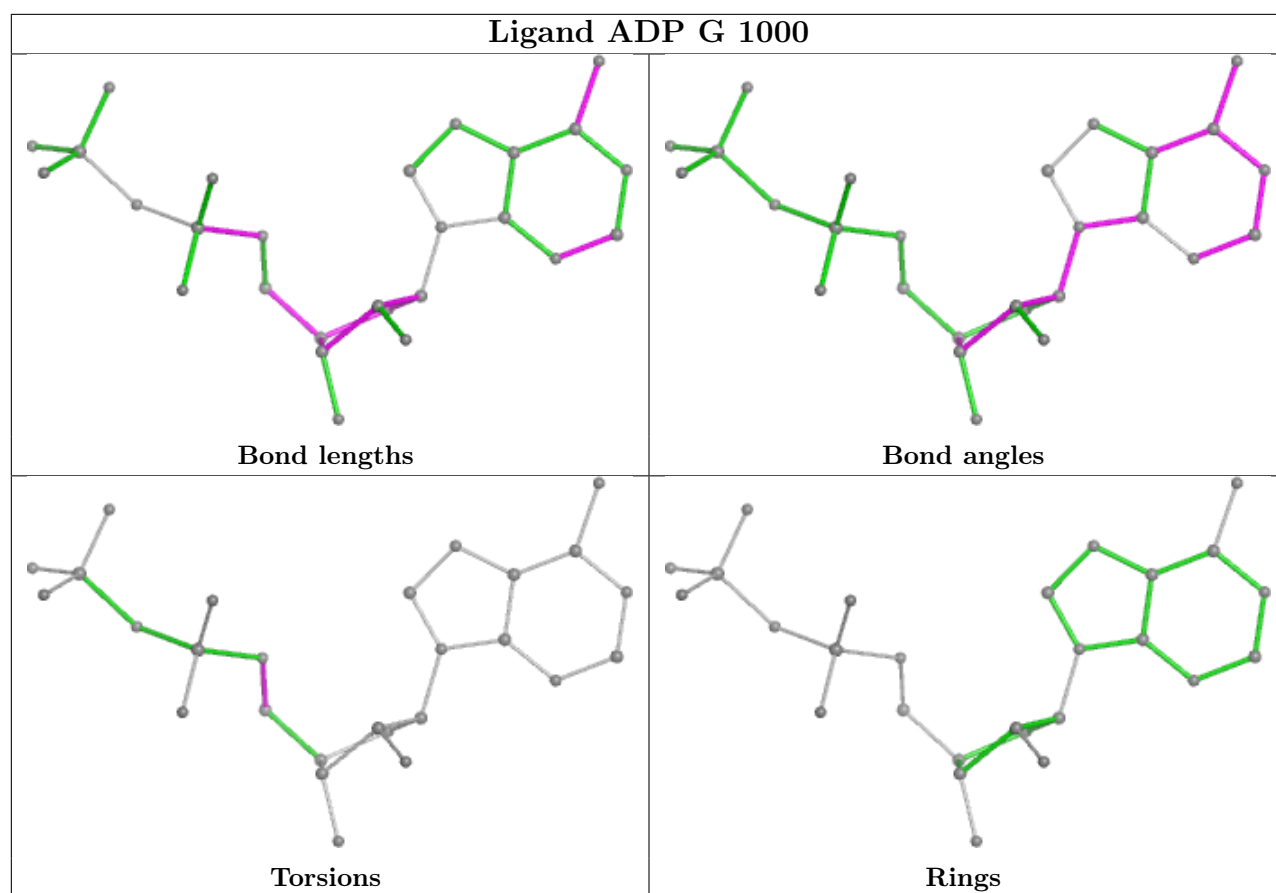
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	C	1000	ADP	1	0
2	A	1000	ADP	1	0
2	B	1000	ADP	1	0
2	E	1000	ADP	1	0
2	F	1000	ADP	2	0
2	H	1000	ADP	1	0
2	G	1000	ADP	1	0
2	D	1000	ADP	1	0

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









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.

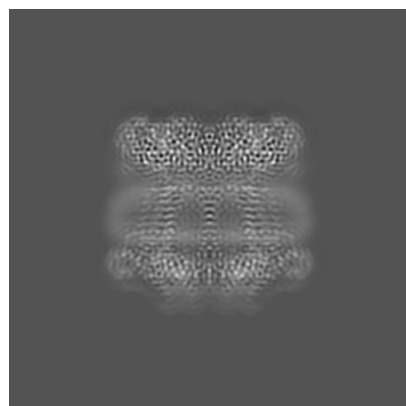
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-50043. These allow visual inspection of the internal detail of the map and identification of artifacts.

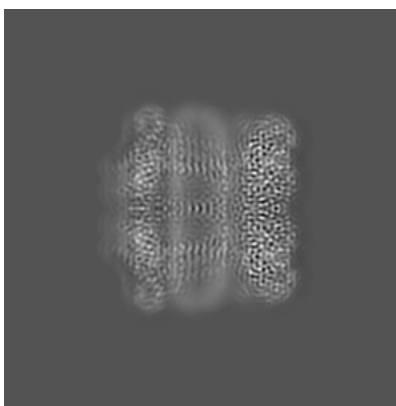
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

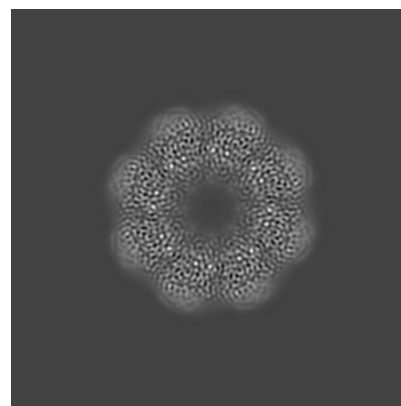
6.1.1 Primary map



X

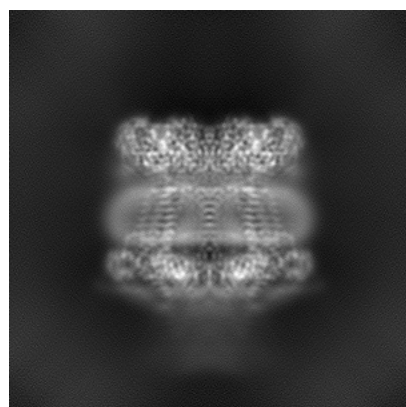


Y

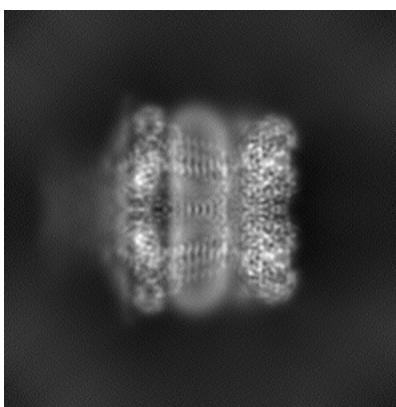


Z

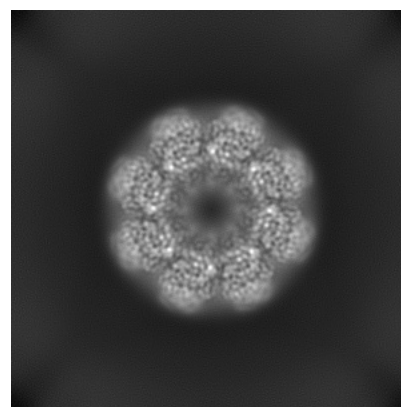
6.1.2 Raw map



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: 188

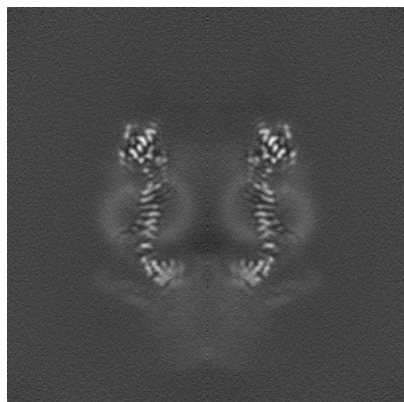


Y Index: 188

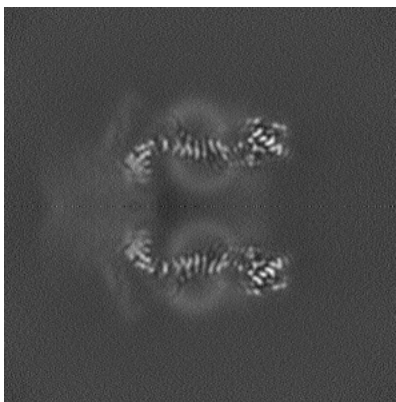


Z Index: 188

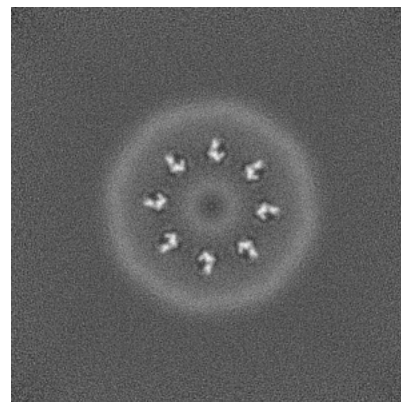
6.2.2 Raw map



X Index: 188



Y Index: 188



Z Index: 188

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

6.3 Largest variance slices [i](#)

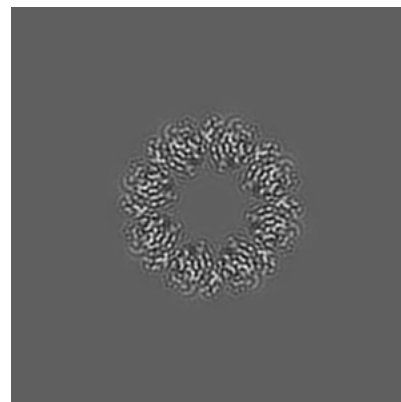
6.3.1 Primary map



X Index: 241

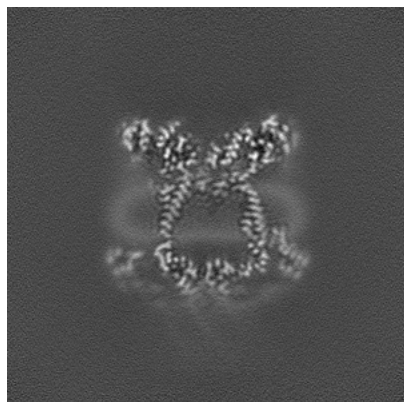


Y Index: 241

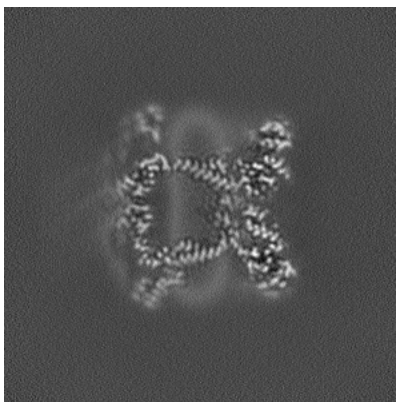


Z Index: 240

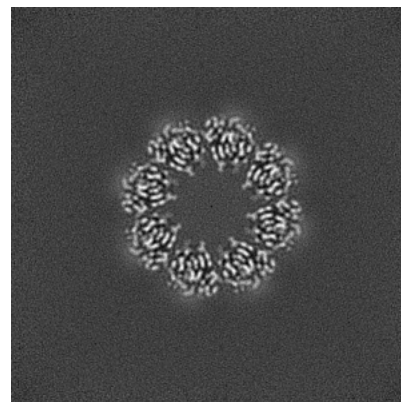
6.3.2 Raw map



X Index: 148



Y Index: 148

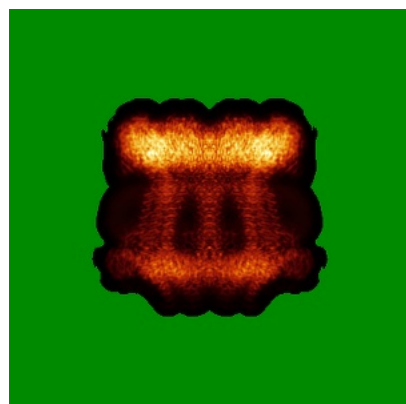


Z Index: 241

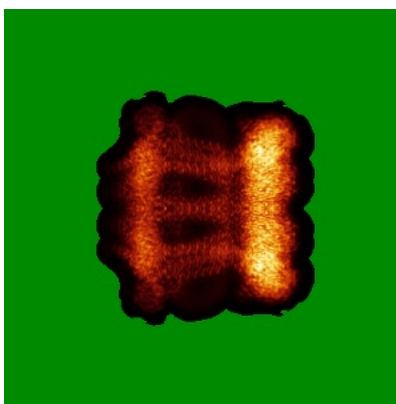
The images above show the largest variance slices of the map in three orthogonal directions.

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

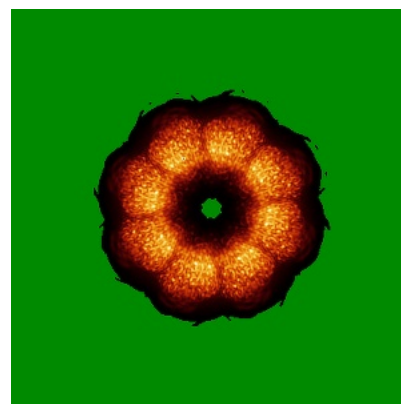
6.4.1 Primary map



X

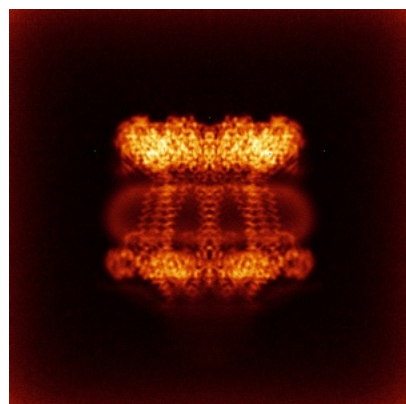


Y

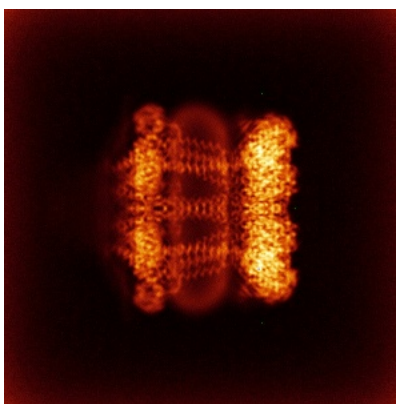


Z

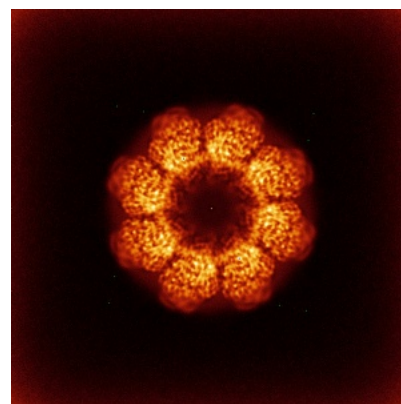
6.4.2 Raw map



X



Y

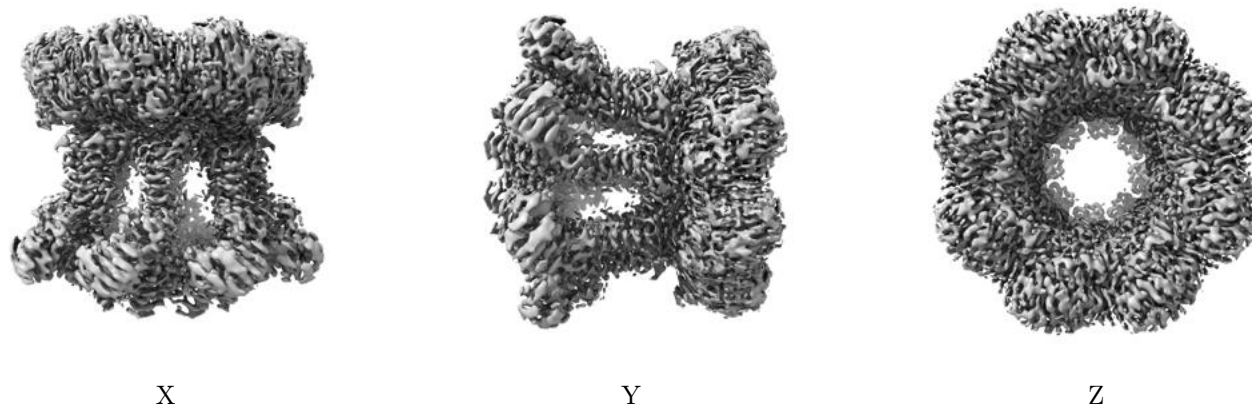


Z

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.

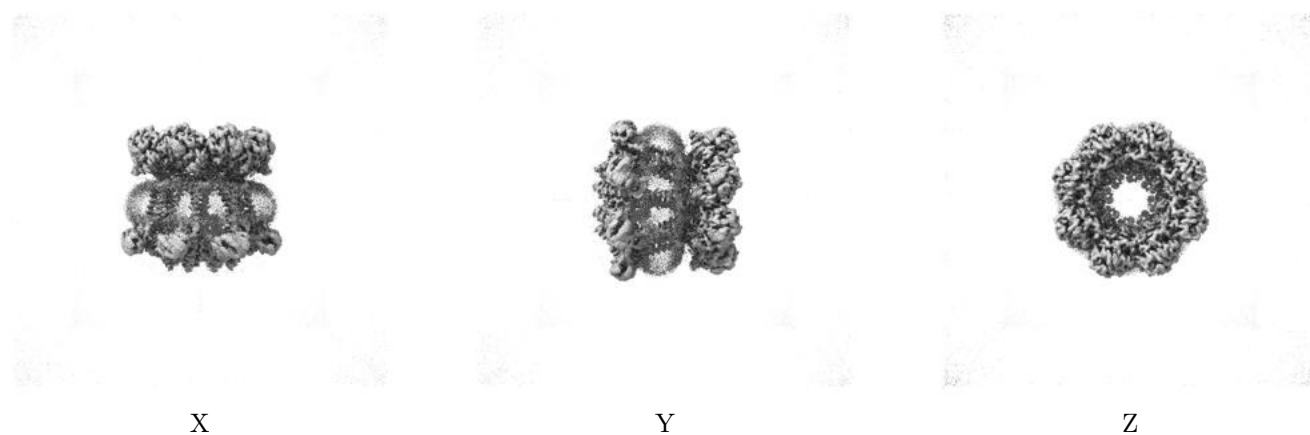
6.5 Orthogonal surface views [i](#)

6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.1. 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.

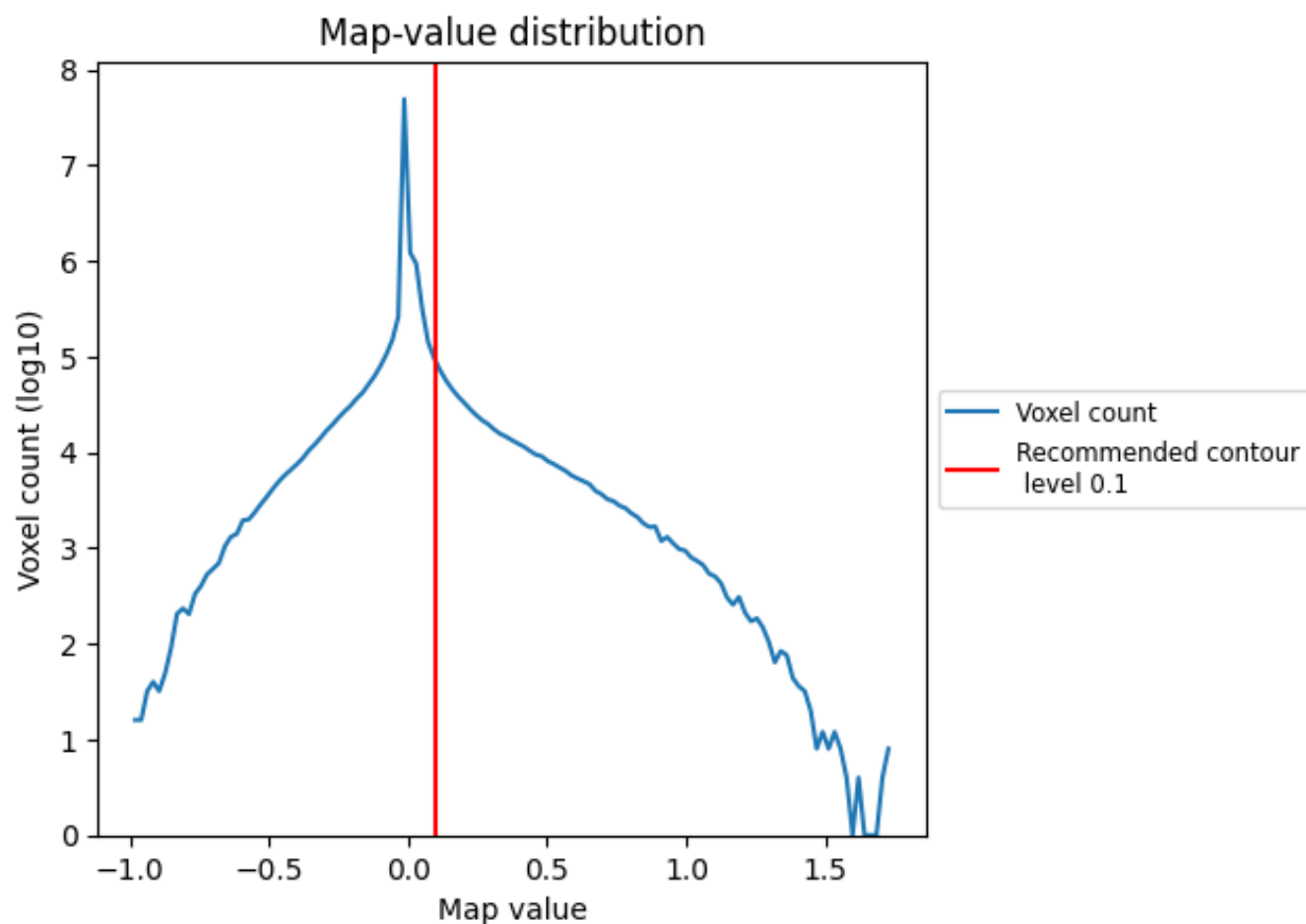
6.6 Mask visualisation [i](#)

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

7 Map analysis [i](#)

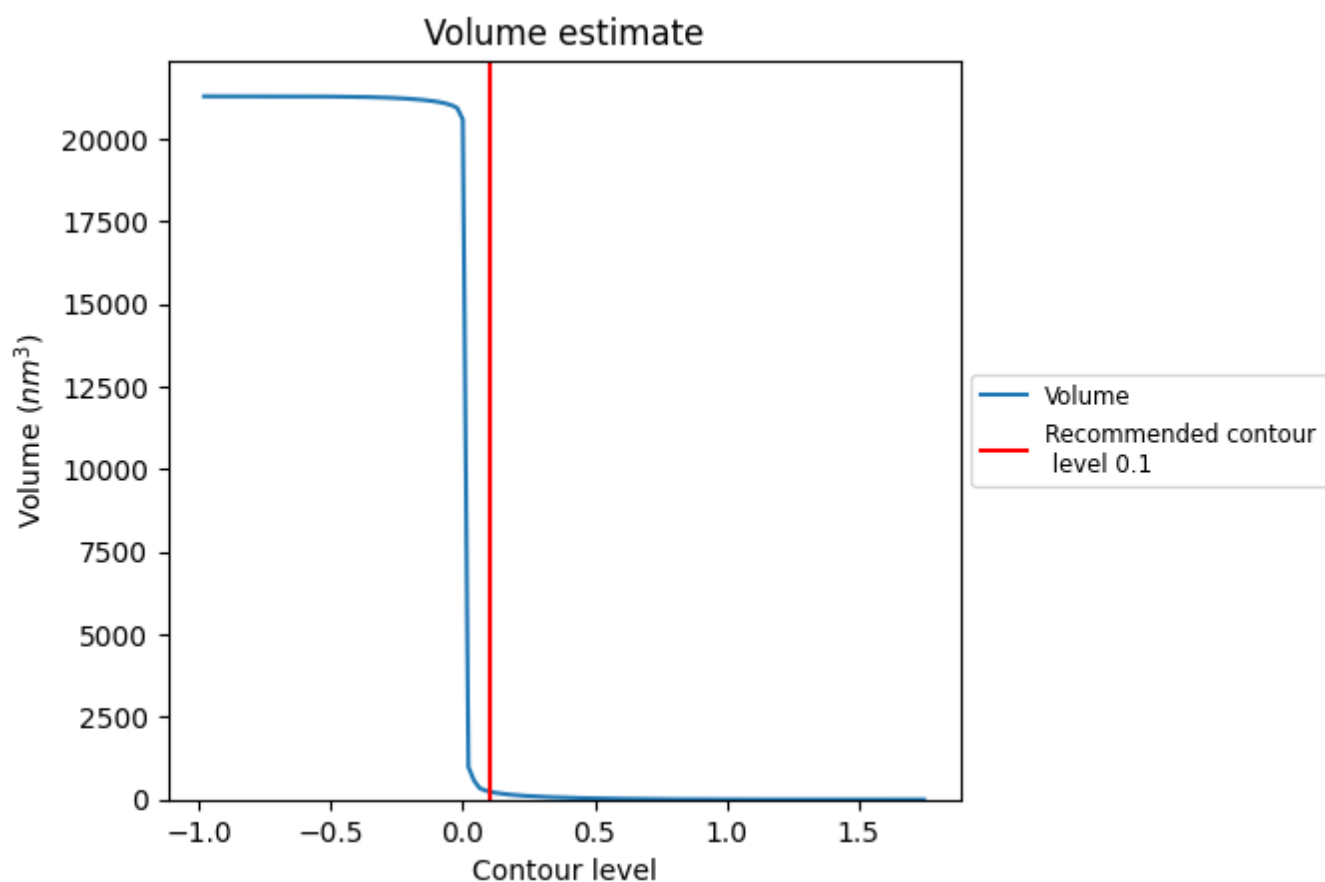
This section contains the results of statistical analysis of the map.

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.

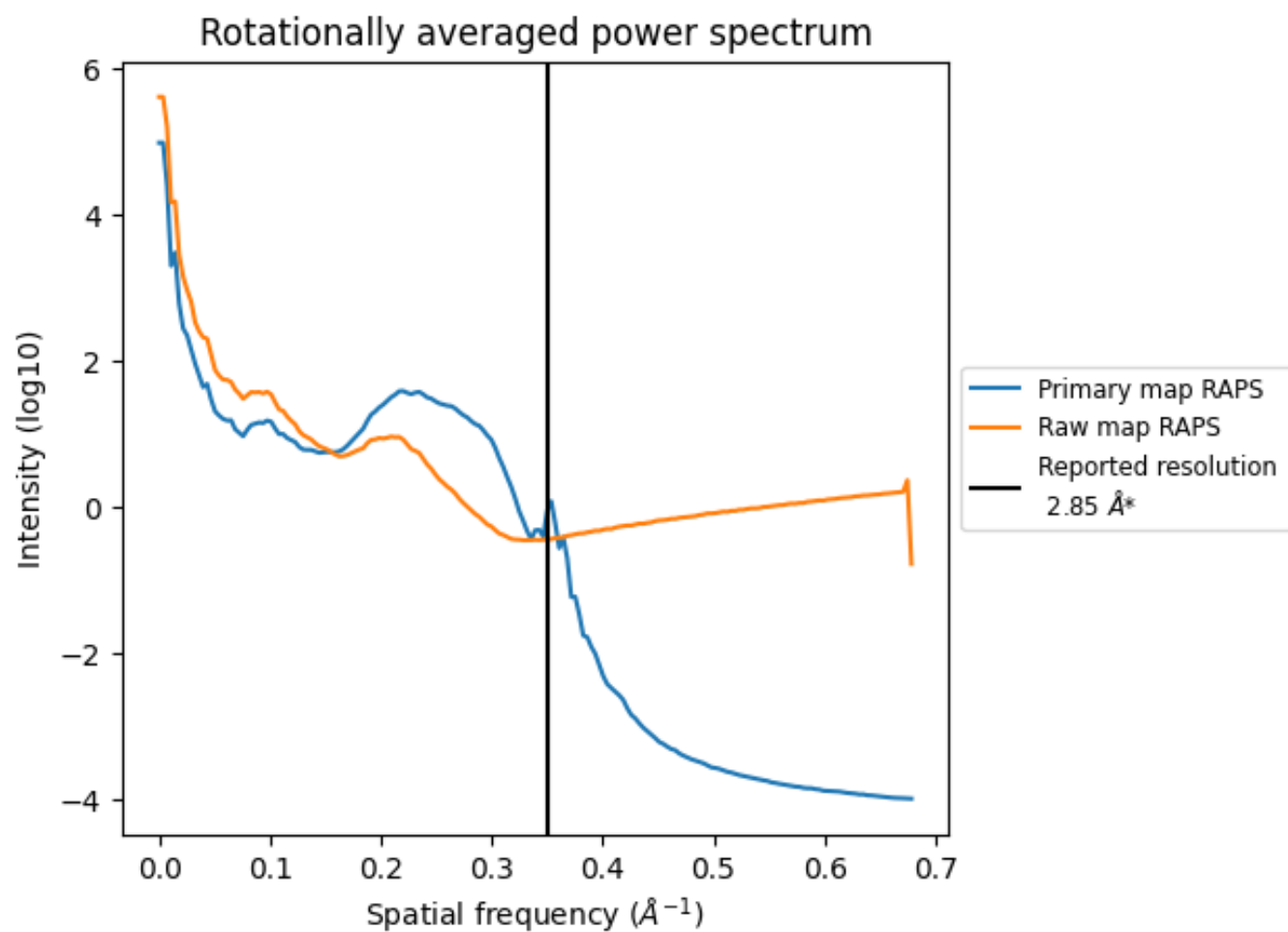
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 245 nm³; this corresponds to an approximate mass of 221 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 ⓘ

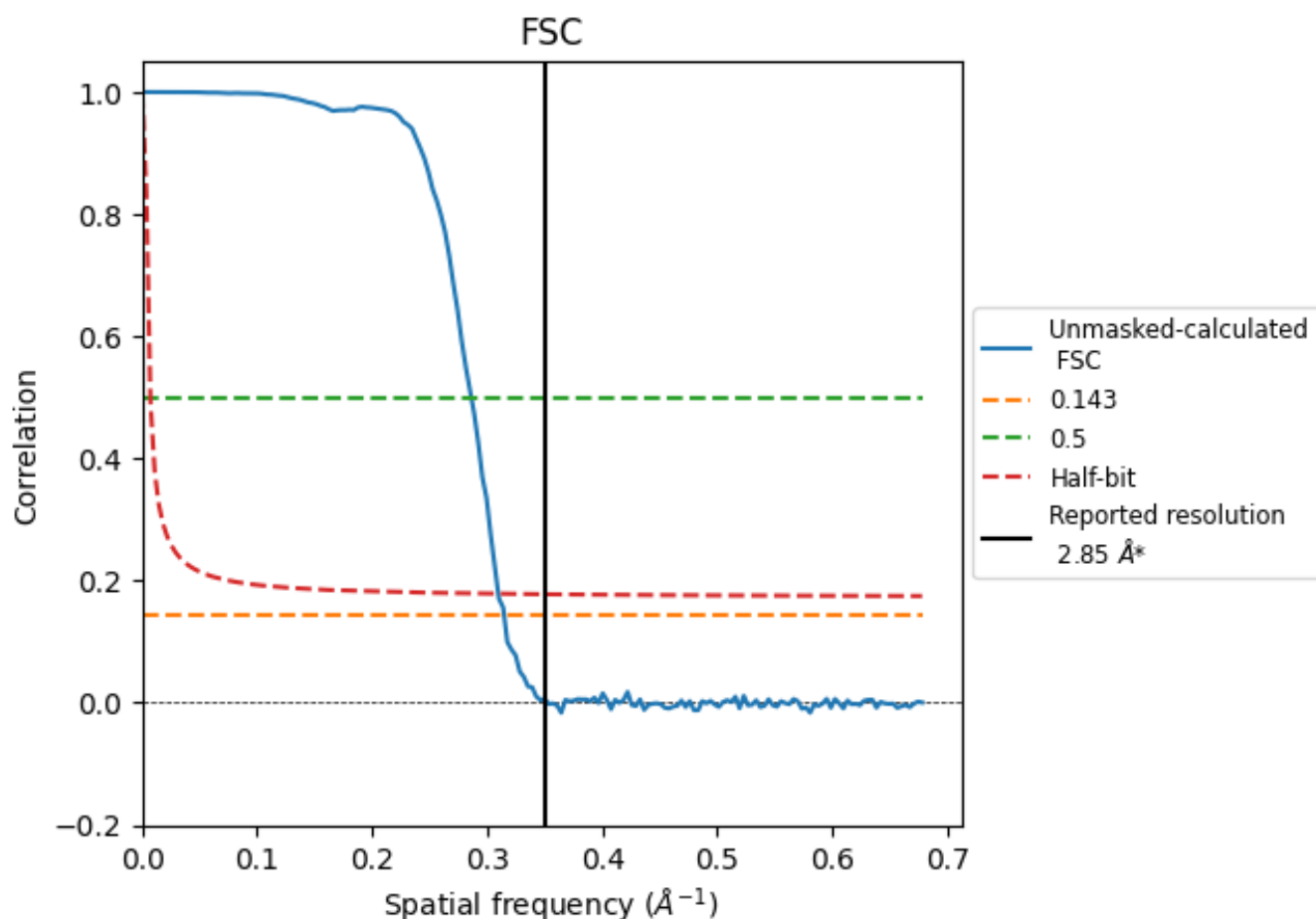


*Reported resolution corresponds to spatial frequency of 0.351 \AA^{-1}

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](#)

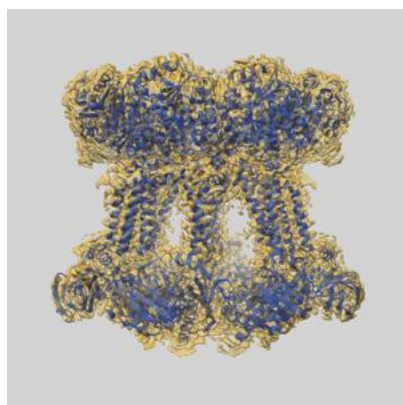
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	2.85	-	-
Author-provided FSC curve	-	-	-
Unmasked-calculated*	3.18	3.50	3.23

*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 3.18 differs from the reported value 2.85 by more than 10 %

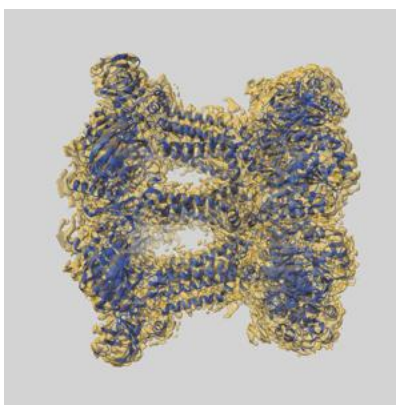
9 Map-model fit [i](#)

This section contains information regarding the fit between EMDB map EMD-50043 and PDB model 9EXP. Per-residue inclusion information can be found in section [3](#) on page [8](#).

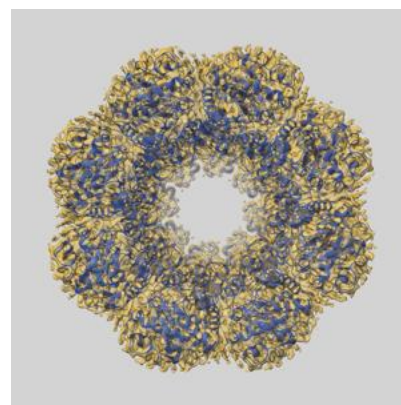
9.1 Map-model overlay [i](#)



X



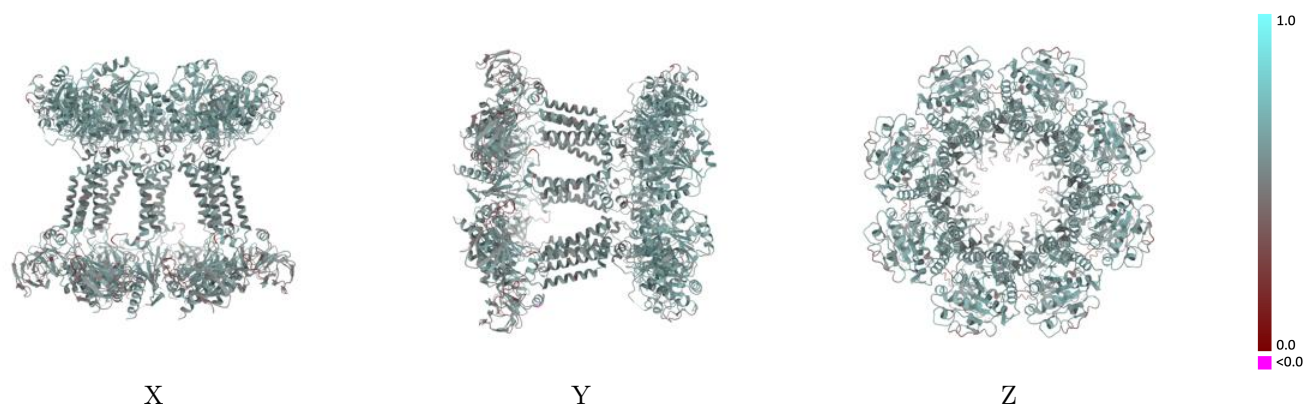
Y



Z

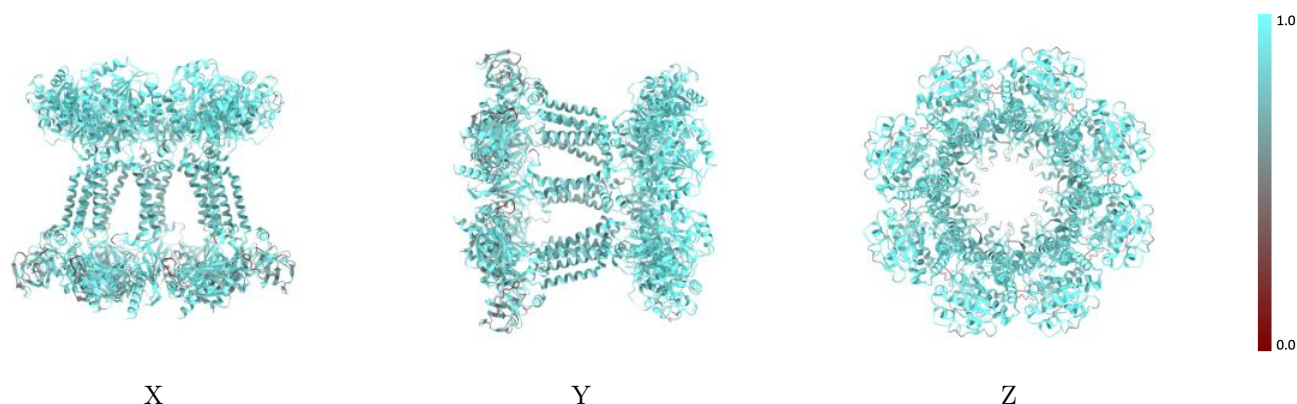
The images above show the 3D surface view of the map at the recommended contour level 0.1 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

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



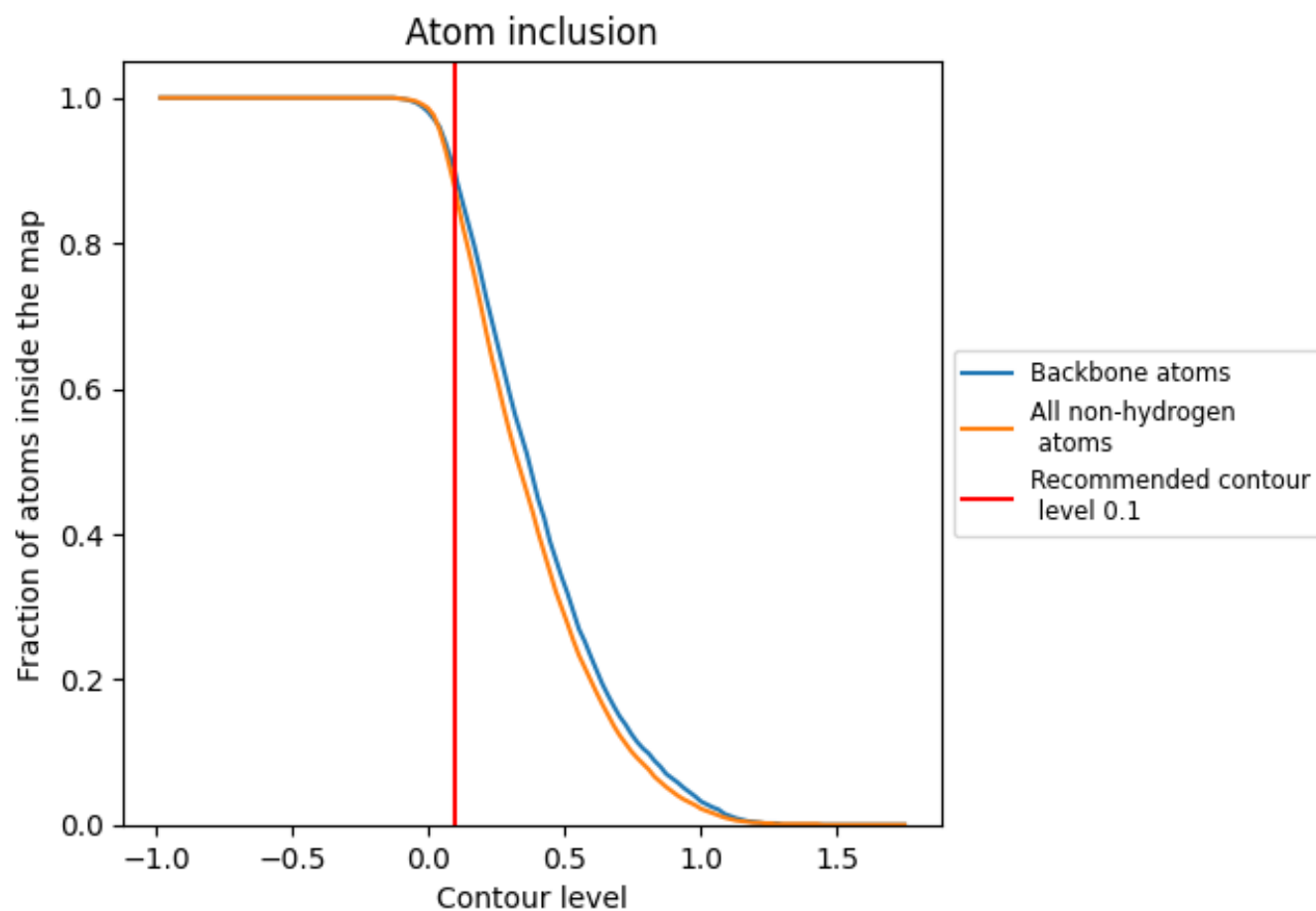
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions 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 (0.1).

9.4 Atom inclusion [i](#)



At the recommended contour level, 90% of all backbone atoms, 87% 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 (0.1) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	<div><div></div></div> 0.8740	<div><div></div></div> 0.5560
A	<div><div></div></div> 0.8750	<div><div></div></div> 0.5570
B	<div><div></div></div> 0.8730	<div><div></div></div> 0.5560
C	<div><div></div></div> 0.8750	<div><div></div></div> 0.5560
D	<div><div></div></div> 0.8730	<div><div></div></div> 0.5560
E	<div><div></div></div> 0.8740	<div><div></div></div> 0.5570
F	<div><div></div></div> 0.8730	<div><div></div></div> 0.5570
G	<div><div></div></div> 0.8740	<div><div></div></div> 0.5570
H	<div><div></div></div> 0.8730	<div><div></div></div> 0.5580

1.0

0.0

<0.0