



## Full wwPDB EM Validation Report ⓘ

Nov 20, 2022 – 11:29 am GMT

PDB ID : 6Q81  
EMDB ID : EMD-4391  
Title : Structure of P-glycoprotein(ABCB1) in the post-hydrolytic state  
Authors : Ford, R.C.; Thonghin, N.; Collins, R.F.; Barbieri, A.; Shafi, T.; Siebert, A.  
Deposited on : 2018-12-13  
Resolution : 7.90 Å(reported)

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

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

A user guide is available at

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

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

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

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

EMDB validation analysis : 0.0.1.dev43  
Mogul : 1.8.4, CSD as541be (2020)  
MolProbity : 4.02b-467  
buster-report : 1.1.7 (2018)  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
MapQ : 1.9.9  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.31.2

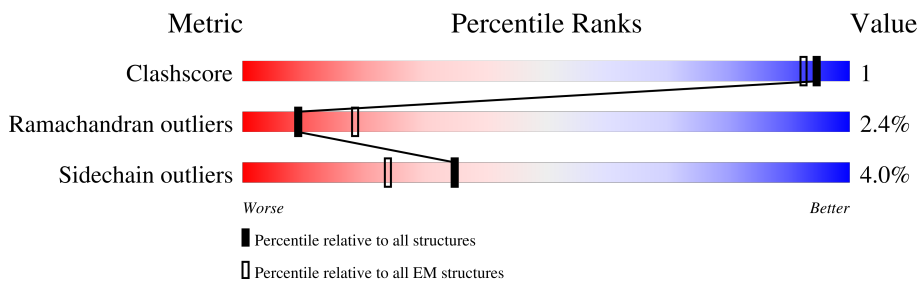
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*ELECTRON MICROSCOPY*

The reported resolution of this entry is 7.90 Å.

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



Metric	Whole archive (#Entries)	EM structures (#Entries)
Clashscore	158937	4297
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the bar indicate the fraction of residues that contain outliers for  $\geq 3$ , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions  $\leq 5\%$ . The upper red bar (where present) indicates the fraction of residues that have poor fit to the EM map (all-atom inclusion  $< 40\%$ ). The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	1276	

## 2 Entry composition [i](#)

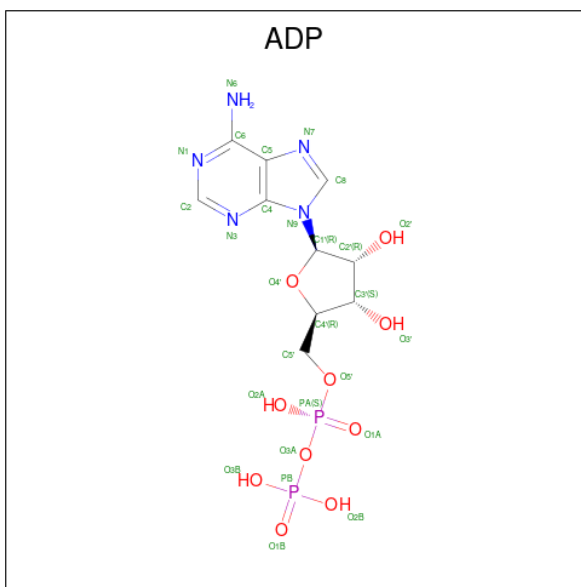
There are 2 unique types of molecules in this entry. The entry contains 9225 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 P-glycoprotein (ABCB1).

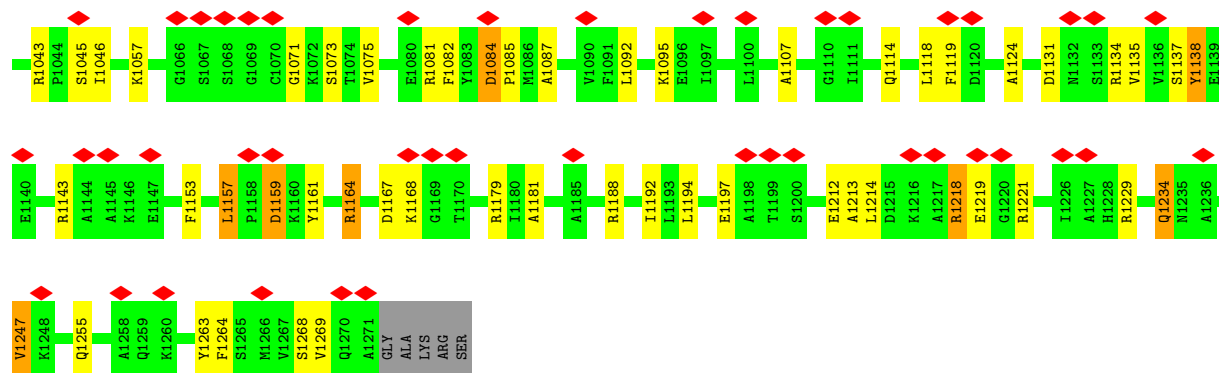
Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	1182	9171	5895	1552	1686	38	0	0

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



Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	P	
2	A	1	54	20	10	20	4	0
2	A	1	54	20	10	20	4	0





## 4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	135357	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING ONLY	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ( $e^-/\text{\AA}^2$ )	70	Depositor
Minimum defocus (nm)	Not provided	
Maximum defocus (nm)	Not provided	
Magnification	Not provided	
Image detector	GATAN K2 SUMMIT (4k x 4k)	Depositor
Maximum map value	0.220	Depositor
Minimum map value	-0.149	Depositor
Average map value	0.003	Depositor
Map value standard deviation	0.013	Depositor
Recommended contour level	0.03	Depositor
Map size ( $\text{\AA}$ )	165.35999, 165.35999, 165.35999	wwPDB
Map dimensions	156, 156, 156	wwPDB
Map angles ( $^\circ$ )	90.0, 90.0, 90.0	wwPDB
Pixel spacing ( $\text{\AA}$ )	1.06, 1.06, 1.06	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: 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	1.69	58/9339 (0.6%)	1.93	215/12626 (1.7%)

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	A	0	25

All (58) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	709	VAL	C-N	7.57	1.46	1.33
1	A	323	SER	CA-CB	7.34	1.64	1.52
1	A	1188	ARG	CD-NE	7.11	1.58	1.46
1	A	827	SER	CA-CB	7.05	1.63	1.52
1	A	954	ARG	CD-NE	7.04	1.58	1.46
1	A	523	ARG	NE-CZ	6.95	1.42	1.33
1	A	425	SER	CB-OG	6.53	1.50	1.42
1	A	1218	ARG	CZ-NH2	6.50	1.41	1.33
1	A	916	TYR	CE2-CZ	6.33	1.46	1.38
1	A	979	PHE	CG-CD1	6.26	1.48	1.38
1	A	1081	ARG	CD-NE	6.20	1.56	1.46
1	A	771	PHE	CG-CD1	6.14	1.48	1.38
1	A	460	ARG	CZ-NH2	6.03	1.40	1.33
1	A	359	TYR	CB-CG	5.98	1.60	1.51
1	A	748	SER	CB-OG	-5.95	1.34	1.42
1	A	176	SER	CA-CB	5.94	1.61	1.52
1	A	359	TYR	CG-CD2	5.86	1.46	1.39
1	A	92	SER	CA-CB	5.83	1.61	1.52

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	813	ARG	CZ-NH1	5.83	1.40	1.33
1	A	413	VAL	CA-CB	-5.72	1.42	1.54
1	A	345	SER	CA-CB	5.70	1.61	1.52
1	A	707	PHE	CG-CD2	5.69	1.47	1.38
1	A	92	SER	CB-OG	-5.69	1.34	1.42
1	A	615	LYS	N-CA	-5.60	1.35	1.46
1	A	561	SER	N-CA	5.58	1.57	1.46
1	A	508	PHE	CB-CG	5.53	1.60	1.51
1	A	717	ASN	C-N	5.47	1.42	1.33
1	A	782	LYS	N-CA	-5.46	1.35	1.46
1	A	1135	VAL	CA-C	-5.42	1.38	1.52
1	A	1137	SER	CA-CB	5.36	1.60	1.52
1	A	1219	GLU	C-N	5.35	1.42	1.33
1	A	1212	GLU	CD-OE2	5.33	1.31	1.25
1	A	271	GLU	CD-OE2	5.33	1.31	1.25
1	A	349	GLU	CD-OE1	5.32	1.31	1.25
1	A	833	PHE	CG-CD2	5.32	1.46	1.38
1	A	113	TYR	CD1-CE1	5.31	1.47	1.39
1	A	582	ALA	CA-CB	5.28	1.63	1.52
1	A	613	ARG	CZ-NH1	5.18	1.39	1.33
1	A	263	PHE	C-N	5.18	1.42	1.33
1	A	144	ARG	CD-NE	5.18	1.55	1.46
1	A	263	PHE	CG-CD1	5.16	1.46	1.38
1	A	124	VAL	CB-CG1	5.14	1.63	1.52
1	A	1188	ARG	NE-CZ	5.12	1.39	1.33
1	A	362	PHE	C-N	5.11	1.45	1.34
1	A	589	ARG	CD-NE	5.09	1.55	1.46
1	A	523	ARG	C-N	5.09	1.42	1.33
1	A	992	PRO	CA-CB	5.09	1.63	1.53
1	A	440	TYR	CZ-OH	5.08	1.46	1.37
1	A	846	SER	CA-CB	-5.06	1.45	1.52
1	A	467	GLY	N-CA	-5.06	1.38	1.46
1	A	733	GLY	CA-C	-5.05	1.43	1.51
1	A	461	TYR	CG-CD1	5.04	1.45	1.39
1	A	924	TYR	CG-CD2	5.04	1.45	1.39
1	A	197	PHE	CE1-CZ	5.04	1.47	1.37
1	A	473	PRO	CA-CB	5.04	1.63	1.53
1	A	1134	ARG	NE-CZ	5.03	1.39	1.33
1	A	745	ARG	CZ-NH1	5.03	1.39	1.33
1	A	33	VAL	CB-CG1	5.02	1.63	1.52

All (215) bond angle outliers are listed below:



Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	1164	ARG	NE-CZ-NH2	-16.40	112.10	120.30
1	A	745	ARG	NE-CZ-NH1	16.16	128.38	120.30
1	A	1164	ARG	NE-CZ-NH1	14.53	127.56	120.30
1	A	745	ARG	NE-CZ-NH2	-12.86	113.87	120.30
1	A	794	ARG	NE-CZ-NH1	12.03	126.31	120.30
1	A	170	ARG	NE-CZ-NH2	-12.01	114.30	120.30
1	A	592	ASP	CB-CG-OD2	11.78	128.90	118.30
1	A	1081	ARG	NE-CZ-NH2	-11.71	114.45	120.30
1	A	695	ARG	NE-CZ-NH1	-11.67	114.47	120.30
1	A	206	ARG	NE-CZ-NH2	11.58	126.09	120.30
1	A	306	TYR	CB-CG-CD1	-11.45	114.13	121.00
1	A	40	ARG	NE-CZ-NH1	11.22	125.91	120.30
1	A	785	ARG	NE-CZ-NH2	-11.16	114.72	120.30
1	A	1143	ARG	NE-CZ-NH1	11.10	125.85	120.30
1	A	1043	ARG	NE-CZ-NH1	-10.98	114.81	120.30
1	A	908	ARG	NE-CZ-NH2	10.49	125.54	120.30
1	A	312	TYR	CB-CG-CD2	10.41	127.25	121.00
1	A	813	ARG	NE-CZ-NH1	10.30	125.45	120.30
1	A	1159	ASP	CB-CG-OD1	10.11	127.40	118.30
1	A	584	ARG	NE-CZ-NH1	10.03	125.32	120.30
1	A	460	ARG	NE-CZ-NH2	-9.91	115.34	120.30
1	A	400	ARG	NE-CZ-NH1	9.89	125.24	120.30
1	A	534	ARG	NE-CZ-NH2	9.79	125.19	120.30
1	A	273	TYR	CB-CG-CD1	-9.76	115.15	121.00
1	A	440	TYR	CB-CG-CD1	-9.49	115.31	121.00
1	A	440	TYR	CG-CD1-CE1	-9.43	113.76	121.30
1	A	1040	TYR	CB-CG-CD1	-9.40	115.36	121.00
1	A	100	PHE	CB-CG-CD1	9.38	127.37	120.80
1	A	584	ARG	NE-CZ-NH2	-9.27	115.67	120.30
1	A	994	TYR	CB-CG-CD2	-9.05	115.57	121.00
1	A	1221	ARG	NE-CZ-NH1	9.05	124.83	120.30
1	A	994	TYR	CB-CG-CD1	9.04	126.43	121.00
1	A	1153	PHE	CB-CG-CD1	-9.02	114.49	120.80
1	A	1119	PHE	CB-CG-CD2	9.00	127.10	120.80
1	A	461	TYR	CG-CD2-CE2	-8.96	114.13	121.30
1	A	589	ARG	NE-CZ-NH1	8.92	124.76	120.30
1	A	506	TYR	CB-CG-CD2	-8.90	115.66	121.00
1	A	306	TYR	CB-CG-CD2	8.89	126.33	121.00
1	A	813	ARG	NH1-CZ-NH2	-8.89	109.62	119.40
1	A	979	PHE	CB-CG-CD1	8.88	127.02	120.80
1	A	1084	ASP	CB-CG-OD2	-8.78	110.40	118.30
1	A	400	ARG	NE-CZ-NH2	-8.73	115.94	120.30
1	A	882	ASP	CB-CG-OD2	-8.51	110.64	118.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	312	TYR	CB-CG-CD1	-8.42	115.95	121.00
1	A	950	ALA	N-CA-CB	8.42	121.89	110.10
1	A	849	TYR	CG-CD1-CE1	-8.32	114.64	121.30
1	A	516	PHE	CB-CG-CD1	8.32	126.62	120.80
1	A	390	PHE	CB-CG-CD1	-8.19	115.06	120.80
1	A	958	TYR	CG-CD1-CE1	-8.17	114.76	121.30
1	A	461	TYR	CZ-CE2-CD2	8.05	127.05	119.80
1	A	1161	TYR	CB-CG-CD2	7.96	125.78	121.00
1	A	1138	TYR	CD1-CE1-CZ	7.95	126.96	119.80
1	A	1269	VAL	CG1-CB-CG2	7.84	123.45	110.90
1	A	455	ARG	NE-CZ-NH2	-7.83	116.39	120.30
1	A	478	THR	CA-CB-CG2	-7.83	101.44	112.40
1	A	95	ASP	CB-CG-OD2	7.79	125.31	118.30
1	A	882	ASP	CB-CG-OD1	7.78	125.30	118.30
1	A	1084	ASP	CB-CG-OD1	7.67	125.21	118.30
1	A	1119	PHE	CB-CG-CD1	-7.61	115.47	120.80
1	A	735	PHE	CZ-CE2-CD2	-7.59	110.99	120.10
1	A	107	MET	CG-SD-CE	-7.55	88.11	100.20
1	A	40	ARG	NE-CZ-NH2	-7.44	116.58	120.30
1	A	695	ARG	NE-CZ-NH2	7.42	124.01	120.30
1	A	144	ARG	NE-CZ-NH1	7.37	123.98	120.30
1	A	807	THR	CA-CB-CG2	-7.33	102.14	112.40
1	A	1022	LEU	CB-CG-CD1	7.31	123.42	111.00
1	A	1194	LEU	CB-CG-CD1	7.29	123.40	111.00
1	A	110	TYR	CZ-CE2-CD2	7.27	126.34	119.80
1	A	506	TYR	CB-CG-CD1	7.27	125.36	121.00
1	A	751	PHE	CB-CG-CD1	-7.25	115.72	120.80
1	A	707	PHE	CB-CG-CD1	7.25	125.87	120.80
1	A	41	TYR	CB-CG-CD1	7.19	125.31	121.00
1	A	1213	ALA	N-CA-CB	7.19	120.17	110.10
1	A	159	PHE	CB-CG-CD1	-7.18	115.77	120.80
1	A	110	TYR	CB-CG-CD1	7.18	125.31	121.00
1	A	1006	ARG	NE-CZ-NH1	-7.12	116.74	120.30
1	A	503	ALA	N-CA-CB	7.12	120.06	110.10
1	A	47	ARG	NE-CZ-NH2	-7.11	116.75	120.30
1	A	573	ARG	NE-CZ-NH2	-7.05	116.77	120.30
1	A	924	TYR	CG-CD1-CE1	-7.03	115.67	121.30
1	A	924	TYR	CB-CG-CD2	-7.01	116.79	121.00
1	A	455	ARG	NE-CZ-NH1	7.01	123.81	120.30
1	A	592	ASP	CB-CG-OD1	-6.95	112.05	118.30
1	A	473	PRO	N-CD-CG	6.87	113.50	103.20
1	A	196	PHE	CB-CG-CD1	-6.84	116.01	120.80

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	446	MET	CG-SD-CE	-6.81	89.30	100.20
1	A	619	PHE	CB-CG-CD2	-6.76	116.06	120.80
1	A	232	LEU	CB-CG-CD2	6.73	122.44	111.00
1	A	588	VAL	CA-CB-CG2	-6.70	100.84	110.90
1	A	516	PHE	CB-CG-CD2	-6.70	116.11	120.80
1	A	1161	TYR	CB-CG-CD1	-6.70	116.98	121.00
1	A	558	ASP	CB-CG-OD1	6.58	124.22	118.30
1	A	751	PHE	CB-CG-CD2	6.57	125.40	120.80
1	A	833	PHE	CB-CG-CD1	6.57	125.40	120.80
1	A	62	VAL	CA-CB-CG2	-6.56	101.06	110.90
1	A	1159	ASP	CB-CG-OD2	-6.55	112.41	118.30
1	A	282	ARG	NE-CZ-NH1	6.54	123.57	120.30
1	A	258	ARG	NE-CZ-NH2	-6.53	117.04	120.30
1	A	450	ASP	CB-CG-OD1	6.49	124.14	118.30
1	A	794	ARG	NE-CZ-NH2	-6.48	117.06	120.30
1	A	523	ARG	NE-CZ-NH1	-6.46	117.07	120.30
1	A	366	ASP	CB-CG-OD2	-6.40	112.54	118.30
1	A	1082	PHE	CB-CG-CD2	-6.38	116.33	120.80
1	A	1218	ARG	NE-CZ-NH1	6.34	123.47	120.30
1	A	551	ASP	CB-CG-OD2	-6.32	112.61	118.30
1	A	849	TYR	CB-CG-CD2	-6.30	117.22	121.00
1	A	619	PHE	CB-CG-CD1	6.29	125.20	120.80
1	A	49	TYR	CB-CG-CD1	-6.29	117.23	121.00
1	A	851	TRP	CD1-NE1-CE2	6.28	114.65	109.00
1	A	993	ASP	CB-CG-OD1	-6.28	112.65	118.30
1	A	303	TYR	CB-CG-CD1	6.26	124.76	121.00
1	A	735	PHE	CG-CD2-CE2	6.25	127.67	120.80
1	A	950	ALA	CB-CA-C	-6.23	100.75	110.10
1	A	159	PHE	CB-CG-CD2	6.22	125.15	120.80
1	A	1036	VAL	CA-CB-CG2	-6.21	101.59	110.90
1	A	687	ASP	CB-CG-OD1	-6.19	112.73	118.30
1	A	197	PHE	CB-CG-CD2	-6.19	116.47	120.80
1	A	1221	ARG	NE-CZ-NH2	-6.17	117.22	120.30
1	A	444	ASP	CB-CG-OD1	-6.14	112.77	118.30
1	A	100	PHE	CB-CG-CD2	-6.11	116.52	120.80
1	A	1138	TYR	CG-CD1-CE1	-6.10	116.42	121.30
1	A	934	PHE	CB-CG-CD2	-6.06	116.56	120.80
1	A	687	ASP	N-CA-C	-6.03	94.71	111.00
1	A	189	PHE	CB-CA-C	6.02	122.45	110.40
1	A	821	VAL	CG1-CB-CG2	6.00	120.49	110.90
1	A	704	TRP	CD1-NE1-CE2	5.99	114.39	109.00
1	A	235	PHE	CB-CG-CD2	5.96	124.97	120.80

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	1168	LYS	N-CA-CB	5.94	121.30	110.60
1	A	579	ILE	N-CA-C	-5.93	95.00	111.00
1	A	190	PHE	CB-CG-CD2	5.91	124.94	120.80
1	A	783	ARG	NE-CZ-NH2	-5.88	117.36	120.30
1	A	1229	ARG	NE-CZ-NH2	5.87	123.23	120.30
1	A	1214	LEU	CB-CG-CD2	5.87	120.98	111.00
1	A	1157	LEU	N-CA-CB	5.87	122.13	110.40
1	A	463	ARG	NE-CZ-NH1	5.79	123.20	120.30
1	A	503	ALA	CB-CA-C	-5.79	101.41	110.10
1	A	35	VAL	CG1-CB-CG2	-5.79	101.64	110.90
1	A	1167	ASP	CB-CG-OD1	-5.78	113.10	118.30
1	A	707	PHE	N-CA-CB	5.77	120.99	110.60
1	A	945	MET	CG-SD-CE	-5.76	90.98	100.20
1	A	79	ALA	N-CA-CB	5.76	118.16	110.10
1	A	488	ARG	NE-CZ-NH2	5.75	123.17	120.30
1	A	858	LEU	CB-CG-CD1	5.74	120.75	111.00
1	A	273	TYR	CG-CD2-CE2	-5.73	116.72	121.30
1	A	243	TYR	CB-CG-CD1	5.73	124.44	121.00
1	A	943	ALA	N-CA-CB	5.72	118.11	110.10
1	A	244	ALA	N-CA-CB	5.72	118.11	110.10
1	A	813	ARG	O-C-N	-5.69	113.60	122.70
1	A	41	TYR	CG-CD1-CE1	5.67	125.84	121.30
1	A	989	SER	CB-CA-C	5.66	120.86	110.10
1	A	107	MET	O-C-N	-5.66	113.65	122.70
1	A	979	PHE	CG-CD2-CE2	5.66	127.02	120.80
1	A	581	ILE	N-CA-C	-5.65	95.75	111.00
1	A	332	PHE	CB-CG-CD2	-5.63	116.86	120.80
1	A	287	LYS	N-CA-CB	5.61	120.71	110.60
1	A	374	PHE	CD1-CE1-CZ	-5.59	113.39	120.10
1	A	395	PHE	CB-CG-CD2	-5.57	116.90	120.80
1	A	901	ARG	CB-CG-CD	5.56	126.07	111.60
1	A	813	ARG	NE-CZ-NH2	5.56	123.08	120.30
1	A	1124	ALA	C-N-CA	5.56	135.60	121.70
1	A	528	SER	N-CA-CB	5.54	118.81	110.50
1	A	1181	ALA	N-CA-CB	5.53	117.84	110.10
1	A	474	VAL	CA-CB-CG2	-5.51	102.64	110.90
1	A	299	PHE	N-CA-CB	5.44	120.40	110.60
1	A	39	PHE	CB-CG-CD2	-5.44	116.99	120.80
1	A	834	GLN	CA-CB-CG	5.44	125.36	113.40
1	A	246	ALA	N-CA-CB	5.43	117.70	110.10
1	A	1073	SER	N-CA-CB	5.42	118.63	110.50
1	A	71	PHE	CB-CG-CD1	-5.41	117.01	120.80

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	618	TYR	CB-CG-CD1	-5.39	117.76	121.00
1	A	397	TYR	CG-CD1-CE1	5.39	125.61	121.30
1	A	508	PHE	CB-CG-CD1	5.38	124.57	120.80
1	A	359	TYR	N-CA-CB	5.37	120.27	110.60
1	A	815	ALA	CB-CA-C	-5.36	102.06	110.10
1	A	60	HIS	CA-CB-CG	5.36	122.72	113.60
1	A	1134	ARG	NE-CZ-NH2	-5.36	117.62	120.30
1	A	889	SER	O-C-N	-5.36	114.09	123.20
1	A	126	TYR	CZ-CE2-CD2	5.35	124.62	119.80
1	A	450	ASP	CB-CG-OD2	-5.35	113.48	118.30
1	A	771	PHE	CB-CG-CD1	-5.34	117.06	120.80
1	A	1033	PHE	CB-CG-CD2	5.34	124.54	120.80
1	A	612	MET	CG-SD-CE	-5.33	91.67	100.20
1	A	124	VAL	CA-CB-CG1	-5.33	102.91	110.90
1	A	815	ALA	N-CA-CB	5.33	117.56	110.10
1	A	957	ALA	N-CA-CB	5.33	117.56	110.10
1	A	461	TYR	CB-CG-CD2	-5.32	117.81	121.00
1	A	112	TYR	CB-CG-CD2	-5.32	117.81	121.00
1	A	195	THR	N-CA-CB	5.29	120.35	110.30
1	A	833	PHE	CD1-CG-CD2	-5.28	111.44	118.30
1	A	174	ASP	CB-CG-OD2	-5.27	113.56	118.30
1	A	508	PHE	CB-CG-CD2	-5.26	117.12	120.80
1	A	518	THR	CA-CB-CG2	-5.24	105.06	112.40
1	A	816	ASN	CA-CB-CG	-5.24	101.87	113.40
1	A	47	ARG	NH1-CZ-NH2	5.23	125.15	119.40
1	A	797	VAL	N-CA-CB	5.22	122.98	111.50
1	A	1118	LEU	CB-CG-CD1	5.22	119.87	111.00
1	A	206	ARG	NE-CZ-NH1	-5.19	117.71	120.30
1	A	377	SER	N-CA-CB	5.18	118.28	110.50
1	A	1229	ARG	N-CA-C	-5.17	97.03	111.00
1	A	786	TYR	CD1-CE1-CZ	5.17	124.45	119.80
1	A	1040	TYR	CD1-CE1-CZ	-5.16	115.16	119.80
1	A	550	LEU	CB-CG-CD2	5.16	119.77	111.00
1	A	339	PHE	CB-CG-CD1	5.16	124.41	120.80
1	A	696	ILE	C-N-CA	5.16	134.59	121.70
1	A	1107	ALA	CB-CA-C	-5.13	102.40	110.10
1	A	397	TYR	CB-CG-CD2	5.12	124.08	121.00
1	A	934	PHE	CB-CG-CD1	5.10	124.37	120.80
1	A	1017	TYR	CG-CD2-CE2	-5.09	117.23	121.30
1	A	62	VAL	CA-CB-CG1	5.09	118.53	110.90
1	A	799	TRP	CD1-NE1-CE2	5.08	113.57	109.00
1	A	1247	VAL	CA-CB-CG1	5.06	118.49	110.90

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	1268	SER	N-CA-CB	5.04	118.06	110.50
1	A	1057	LYS	N-CA-C	-5.03	97.43	111.00
1	A	523	ARG	CD-NE-CZ	5.02	130.63	123.60
1	A	800	PHE	CB-CG-CD2	5.00	124.30	120.80

There are no chirality outliers.

All (25) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	110	TYR	Sidechain
1	A	112	TYR	Sidechain
1	A	1138	TYR	Sidechain
1	A	1179	ARG	Sidechain
1	A	1218	ARG	Sidechain
1	A	1263	TYR	Sidechain
1	A	1264	PHE	Sidechain
1	A	170	ARG	Sidechain
1	A	197	PHE	Sidechain
1	A	322	TYR	Sidechain
1	A	359	TYR	Sidechain
1	A	39	PHE	Sidechain
1	A	41	TYR	Sidechain
1	A	440	TYR	Sidechain
1	A	460	ARG	Sidechain
1	A	486	TYR	Sidechain
1	A	49	TYR	Sidechain
1	A	523	ARG	Sidechain
1	A	618	TYR	Sidechain
1	A	693	PHE	Sidechain
1	A	706	TYR	Sidechain
1	A	783	ARG	Sidechain
1	A	849	TYR	Sidechain
1	A	938	PHE	Sidechain
1	A	958	TYR	Sidechain

## 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	9171	0	9344	21	0
2	A	54	0	24	0	0
All	All	9225	0	9368	21	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 1.

All (21) 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:33:VAL:HG23	1:A:34:SER:H	1.66	0.60
1:A:405:ILE:HD13	1:A:405:ILE:H	1.69	0.58
1:A:64:LEU:HD22	1:A:64:LEU:H	1.68	0.57
1:A:421:LEU:HD12	1:A:581:ILE:HG12	1.93	0.50
1:A:395:PHE:O	1:A:404:GLN:HA	2.15	0.47
1:A:813:ARG:HA	1:A:813:ARG:HE	1.80	0.46
1:A:167:LEU:HD23	1:A:170:ARG:HH21	1.79	0.46
1:A:771:PHE:CZ	1:A:775:LYS:HD2	2.51	0.46
1:A:1084:ASP:HB3	1:A:1085:PRO:HD2	1.98	0.46
1:A:36:LEU:HD23	1:A:36:LEU:H	1.82	0.45
1:A:356:GLY:HA2	1:A:359:TYR:CZ	2.51	0.45
1:A:894:THR:HA	1:A:897:ILE:HG12	1.99	0.44
1:A:352:ALA:HA	1:A:355:ARG:HH21	1.81	0.44
1:A:1037:VAL:HG22	1:A:1087:ALA:HB3	2.00	0.43
1:A:696:ILE:HD12	1:A:696:ILE:H	1.85	0.41
1:A:624:THR:HB	1:A:625:GLN:HE21	1.86	0.41
1:A:63:ALA:HB1	1:A:117:ILE:HG23	2.03	0.41
1:A:394:HIS:HB3	1:A:404:GLN:HE22	1.85	0.41
1:A:1071:GLY:O	1:A:1075:VAL:HG23	2.21	0.41
1:A:40:ARG:HH12	1:A:351:PHE:HZ	1.69	0.41
1:A:420:ALA:CB	1:A:588:VAL:HG13	2.51	0.40

There are no symmetry-related clashes.

## 5.3 Torsion angles [i](#)

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

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	1178/1276 (92%)	1079 (92%)	71 (6%)	28 (2%)	6	33

All (28) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	41	TYR
1	A	514	HIS
1	A	705	PRO
1	A	707	PHE
1	A	1016	SER
1	A	1028	GLU
1	A	43	GLY
1	A	372	ASP
1	A	375	SER
1	A	797	VAL
1	A	1045	SER
1	A	1131	ASP
1	A	1197	GLU
1	A	1234	GLN
1	A	367	ASN
1	A	438	ARG
1	A	490	ASP
1	A	574	GLU
1	A	599	GLY
1	A	1046	ILE
1	A	1157	LEU
1	A	1159	ASP
1	A	802	ASP
1	A	957	ALA
1	A	1092	LEU
1	A	1040	TYR
1	A	371	ILE
1	A	1024	PRO

### 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	976/1057 (92%)	937 (96%)	39 (4%)	31	55

All (39) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	50	MET
1	A	64	LEU
1	A	91	MET
1	A	153	ASN
1	A	167	LEU
1	A	195	THR
1	A	210	LEU
1	A	259	THR
1	A	300	LEU
1	A	324	ILE
1	A	351	PHE
1	A	405	ILE
1	A	407	LYS
1	A	471	GLN
1	A	476	PHE
1	A	478	THR
1	A	542	VAL
1	A	551	ASP
1	A	559	THR
1	A	579	ILE
1	A	598	ASP
1	A	706	TYR
1	A	744	GLN
1	A	813	ARG
1	A	834	GLN
1	A	903	VAL
1	A	906	LEU
1	A	920	LEU
1	A	937	THR
1	A	954	ARG
1	A	961	THR
1	A	968	GLU
1	A	1095	LYS
1	A	1114	GLN
1	A	1164	ARG

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Mol	Chain	Res	Type
1	A	1192	ILE
1	A	1234	GLN
1	A	1247	VAL
1	A	1255	GLN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (12) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	83	ASN
1	A	404	GLN
1	A	417	GLN
1	A	608	HIS
1	A	625	GLN
1	A	717	ASN
1	A	834	GLN
1	A	921	GLN
1	A	1032	GLN
1	A	1039	ASN
1	A	1149	ASN
1	A	1151	HIS

### 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 monosaccharides in this entry.

## 5.6 Ligand geometry [i](#)

2 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	ADP	A	2000	-	24,29,29	1.54	5 (20%)	29,45,45	1.50	7 (24%)
2	ADP	A	2001	-	24,29,29	1.71	4 (16%)	29,45,45	1.41	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	A	2000	-	-	7/12/32/32	0/3/3/3
2	ADP	A	2001	-	-	1/12/32/32	0/3/3/3

All (9) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	2001	ADP	C2'-C1'	4.39	1.60	1.53
2	A	2001	ADP	C8-N7	-3.72	1.28	1.34
2	A	2001	ADP	O4'-C1'	3.43	1.45	1.41
2	A	2000	ADP	O4'-C1'	3.18	1.45	1.41
2	A	2000	ADP	C2-N3	3.10	1.37	1.32
2	A	2000	ADP	PB-O1B	2.29	1.57	1.50
2	A	2000	ADP	PB-O3B	-2.26	1.46	1.54
2	A	2001	ADP	C2-N3	2.07	1.35	1.32
2	A	2000	ADP	C8-N7	-2.01	1.31	1.34

All (13) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	2000	ADP	C4-C5-N7	3.32	112.86	109.40
2	A	2001	ADP	N6-C6-N1	2.82	124.44	118.57
2	A	2001	ADP	C5-C6-N1	-2.81	113.99	120.35
2	A	2000	ADP	C3'-C2'-C1'	2.70	105.04	100.98
2	A	2000	ADP	C5-C6-N6	2.56	124.24	120.35
2	A	2000	ADP	C5-C6-N1	-2.31	115.11	120.35
2	A	2000	ADP	C1'-N9-C4	-2.31	122.59	126.64
2	A	2001	ADP	C2-N1-C6	2.27	122.64	118.75

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	2001	ADP	O4'-C4'-C5'	2.16	116.50	109.37
2	A	2000	ADP	O4'-C1'-C2'	-2.12	103.83	106.93
2	A	2000	ADP	C2'-C3'-C4'	-2.04	98.67	102.64
2	A	2001	ADP	N3-C2-N1	-2.02	125.52	128.68
2	A	2001	ADP	O4'-C1'-C2'	-2.00	104.00	106.93

There are no chirality outliers.

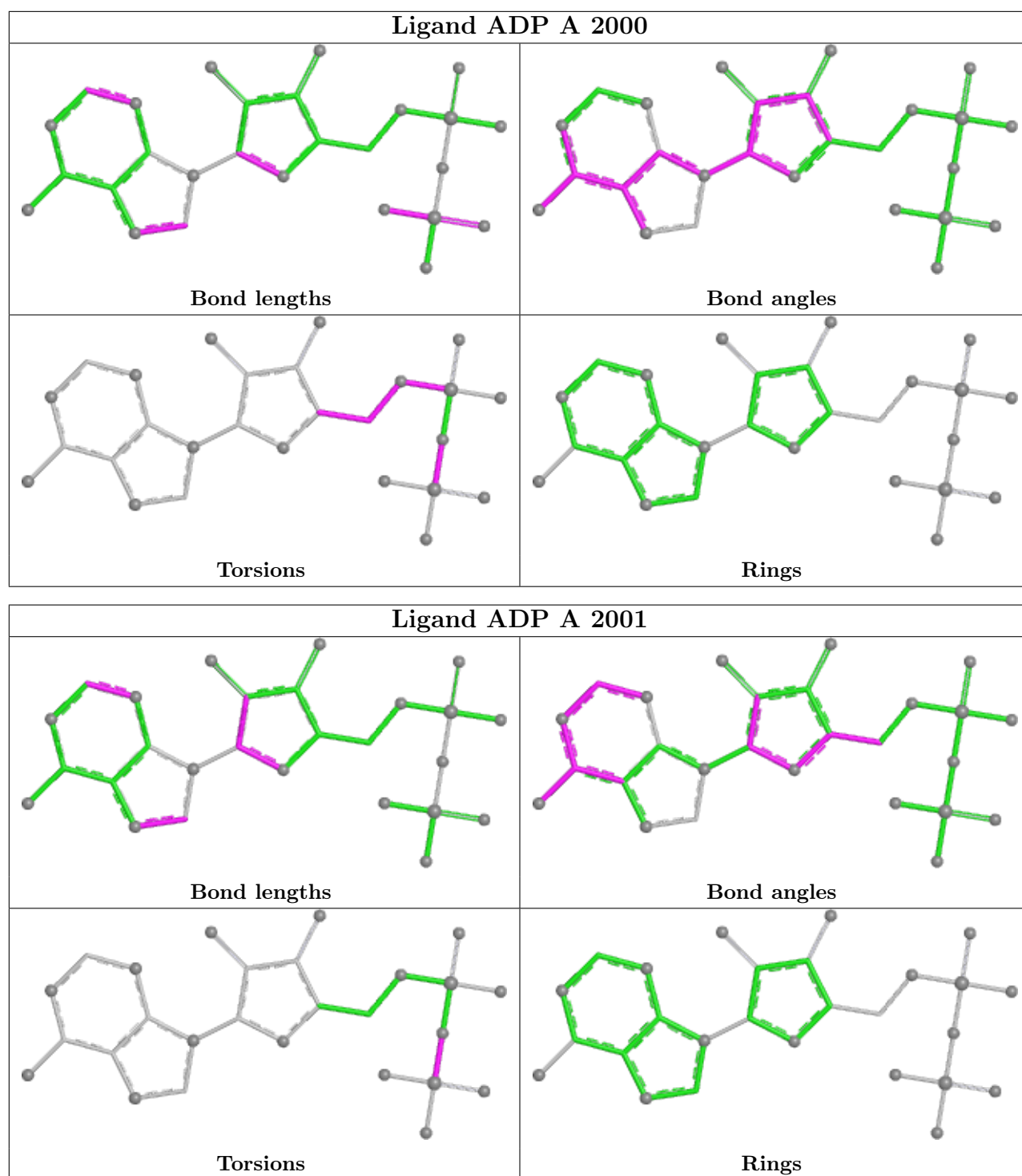
All (8) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	2000	ADP	PA-O3A-PB-O2B
2	A	2000	ADP	C5'-O5'-PA-O1A
2	A	2000	ADP	C5'-O5'-PA-O3A
2	A	2000	ADP	O4'-C4'-C5'-O5'
2	A	2000	ADP	C3'-C4'-C5'-O5'
2	A	2000	ADP	C5'-O5'-PA-O2A
2	A	2000	ADP	C4'-C5'-O5'-PA
2	A	2001	ADP	PA-O3A-PB-O2B

There are no ring outliers.

No monomer is involved in short contacts.

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

There are no chain breaks in this entry.

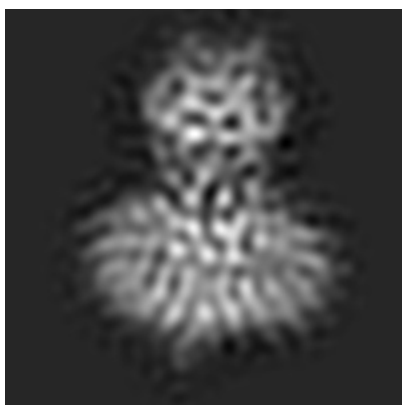
## 6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-4391. These allow visual inspection of the internal detail of the map and identification of artifacts.

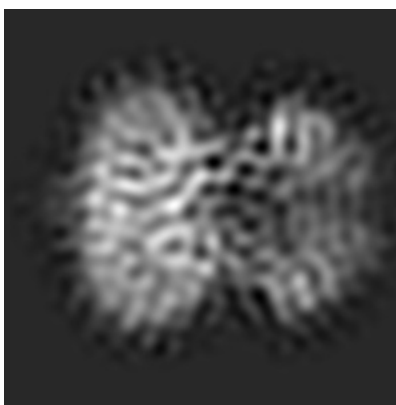
No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

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

#### 6.1.1 Primary map



X



Y



Z

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

### 6.2 Central slices [i](#)

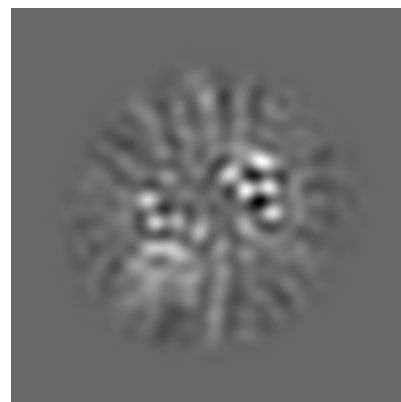
#### 6.2.1 Primary map



X Index: 78



Y Index: 78



Z Index: 78

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: 99



Y Index: 85

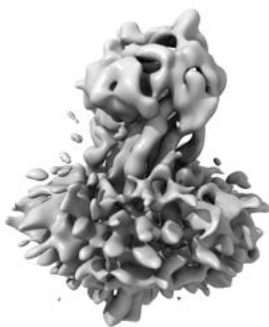


Z Index: 106

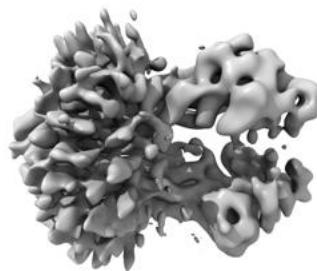
The images above show the largest variance slices of the map in three orthogonal directions.

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

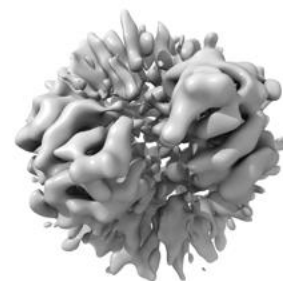
### 6.4.1 Primary map



X



Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.03. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.



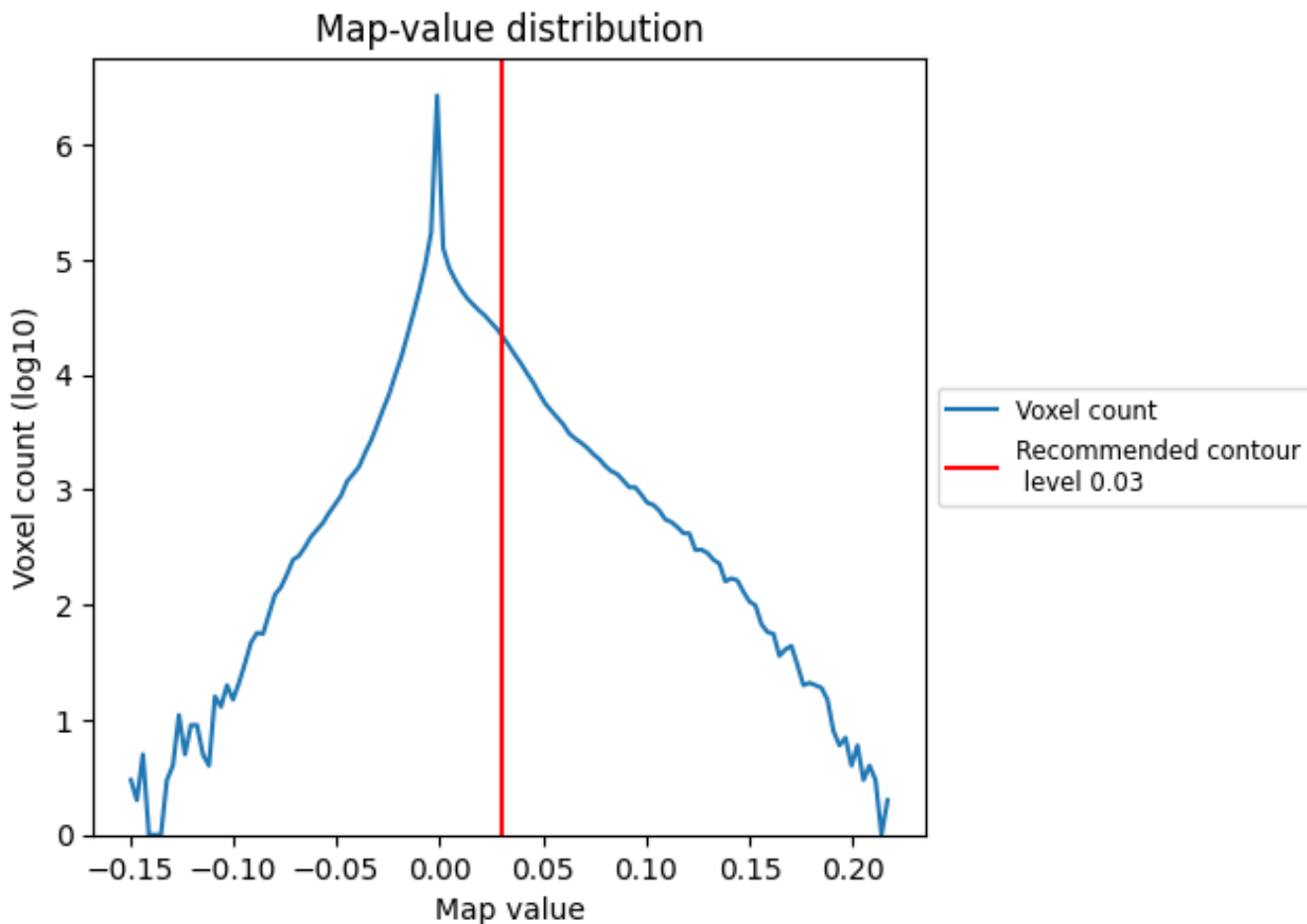
## 6.5 Mask visualisation

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

## 7 Map analysis [i](#)

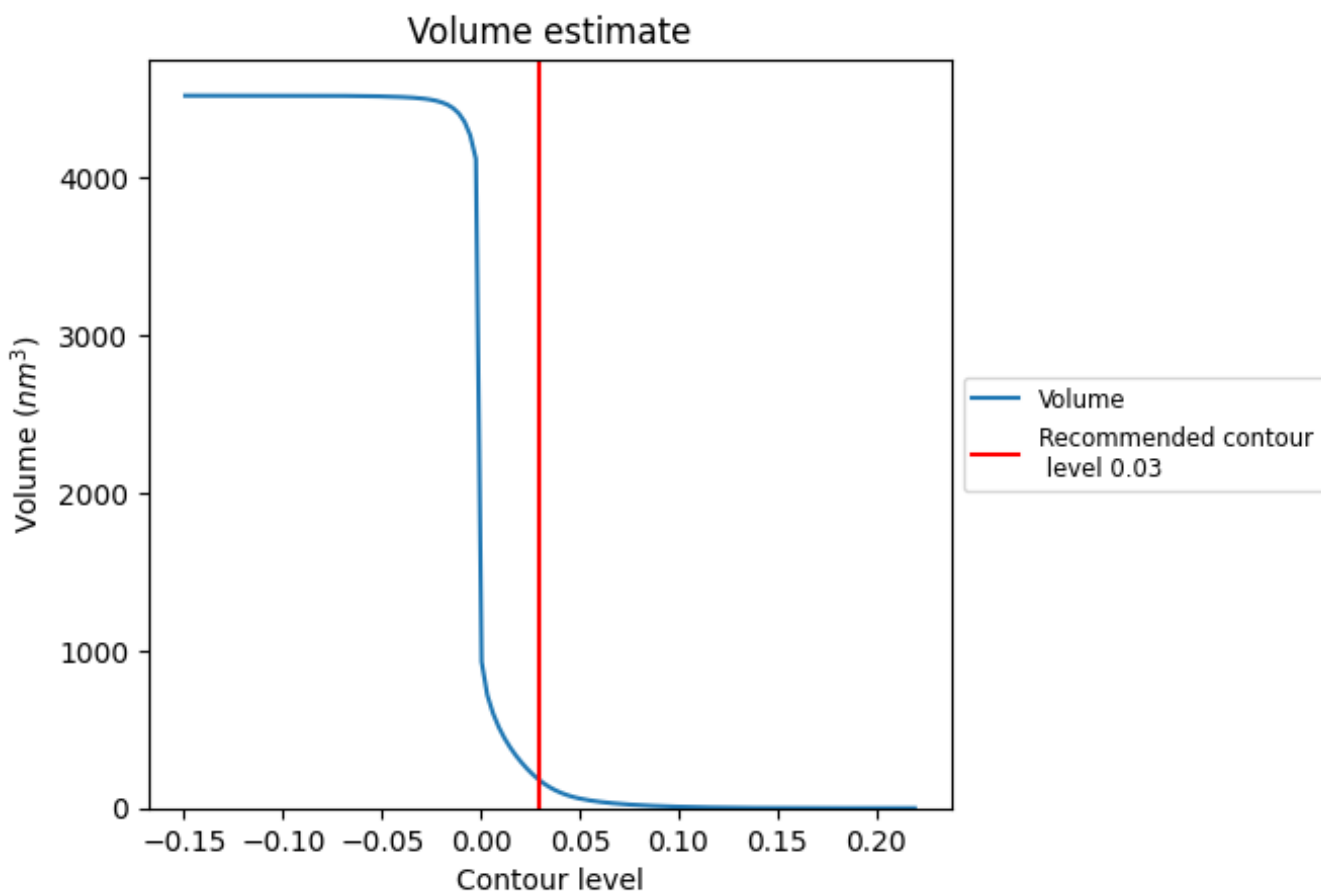
This section contains the results of statistical analysis of the map.

### 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.

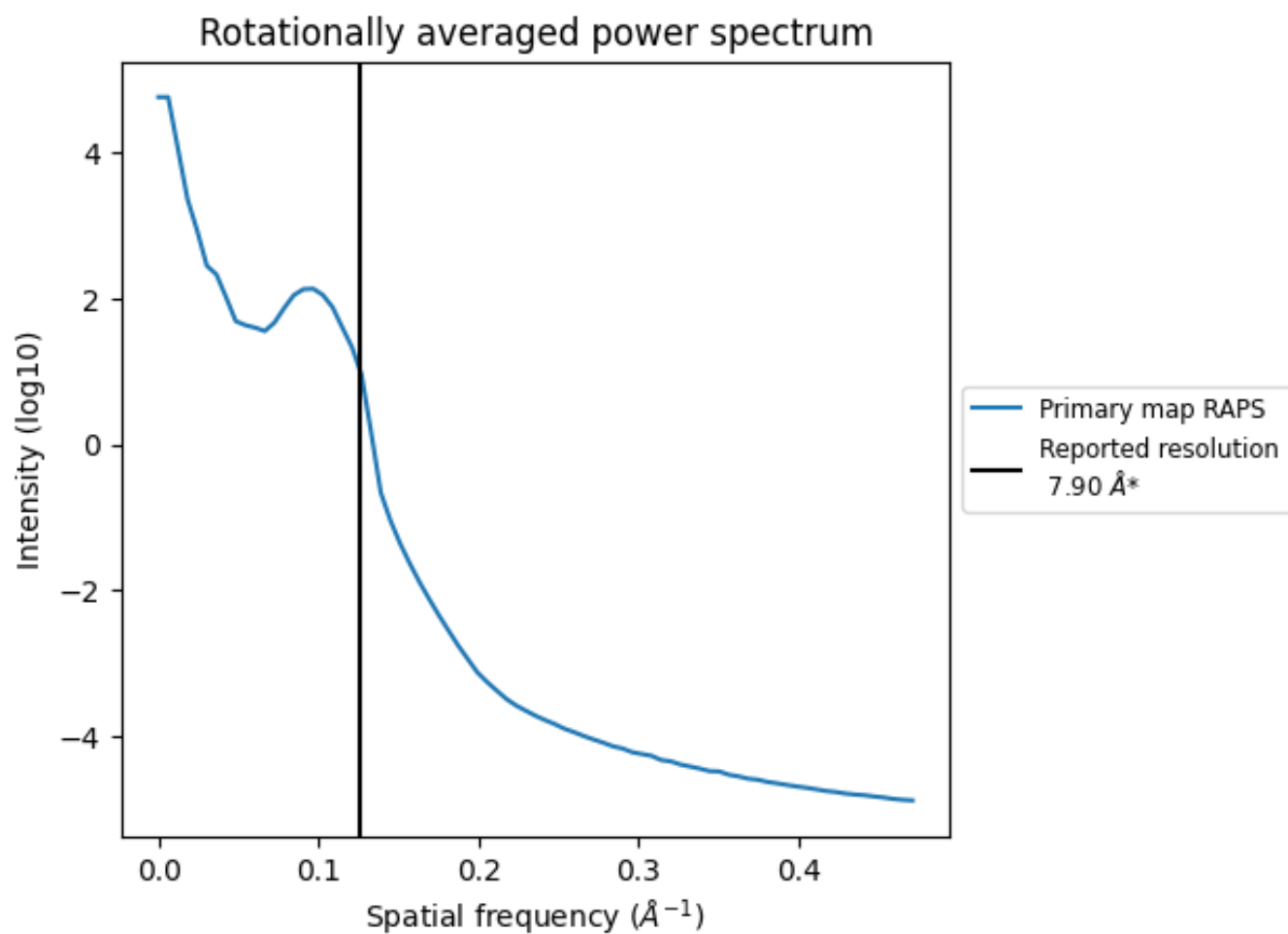
## 7.2 Volume estimate [i](#)



The volume at the recommended contour level is  $176 \text{ nm}^3$ ; this corresponds to an approximate mass of 159 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

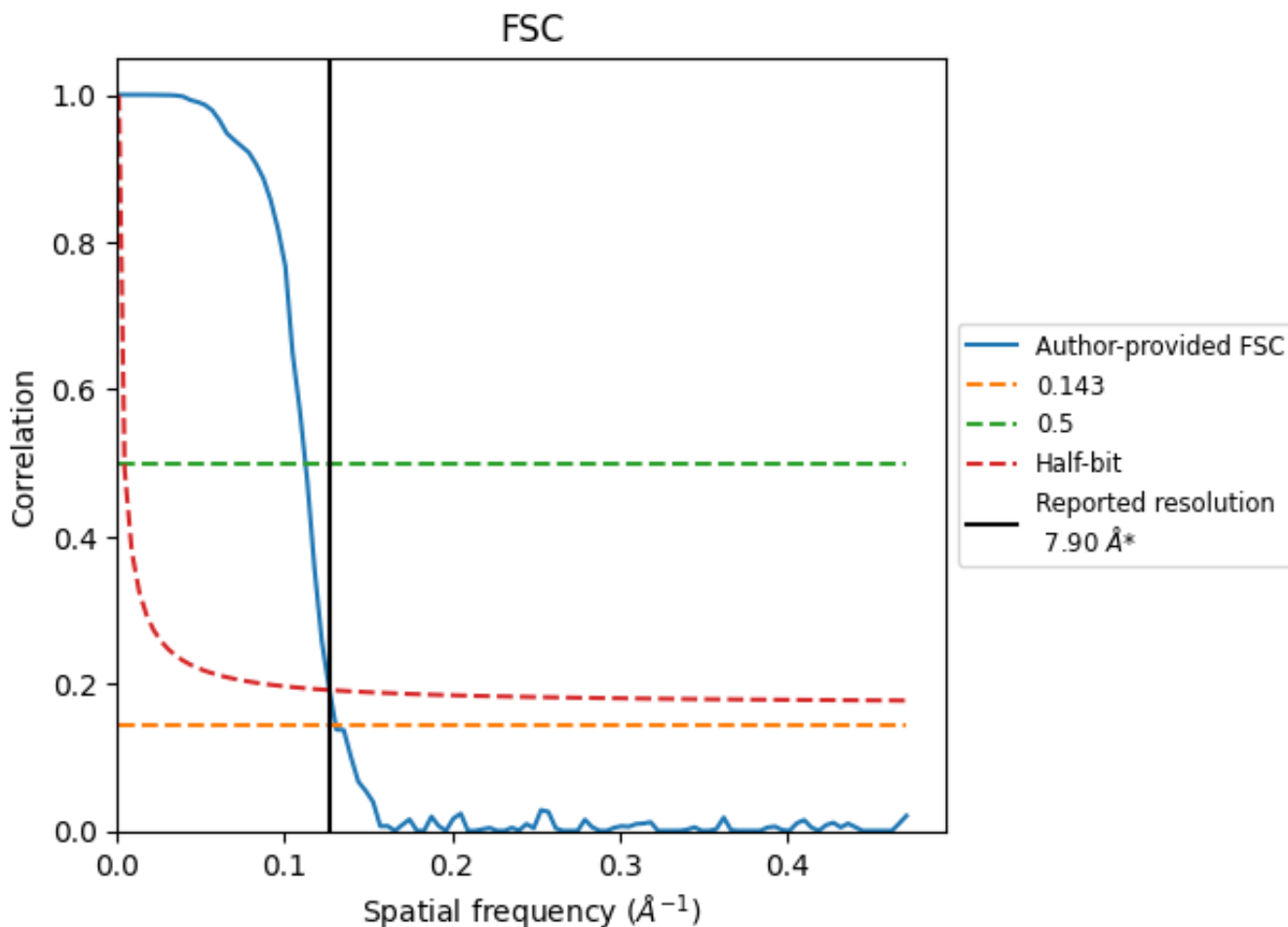


\*Reported resolution corresponds to spatial frequency of 0.127 Å<sup>-1</sup>

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

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

### 8.1 FSC [i](#)



\*Reported resolution corresponds to spatial frequency of 0.127 Å<sup>-1</sup>

## 8.2 Resolution estimates [i](#)

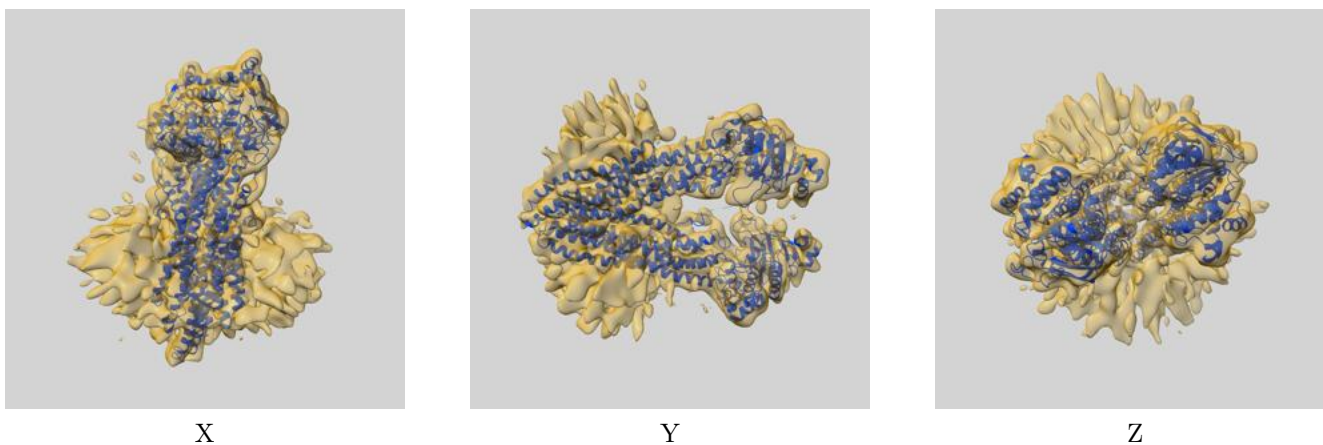
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	7.90	-	-
Author-provided FSC curve	7.66	8.90	7.89
Unmasked-calculated*	-	-	-

\*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps.

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

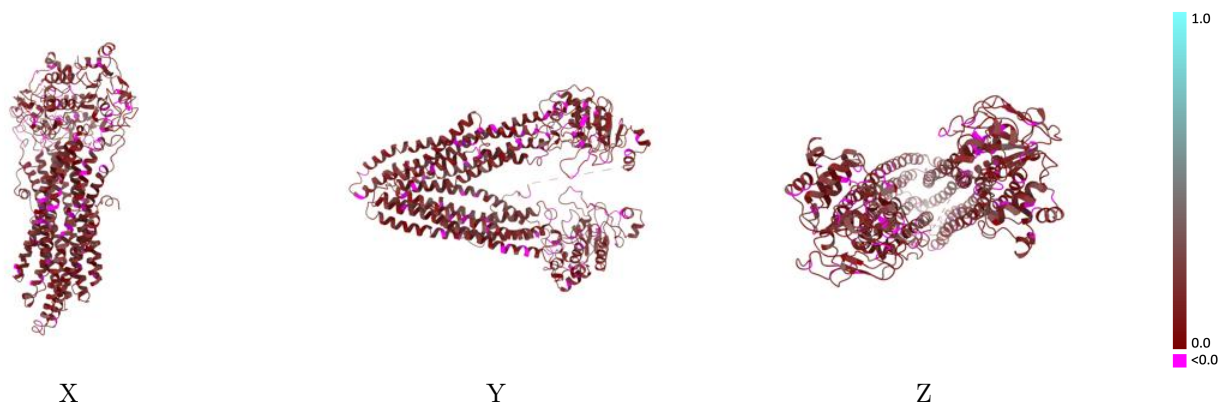
This section contains information regarding the fit between EMDB map EMD-4391 and PDB model 6Q81. Per-residue inclusion information can be found in section 3 on page 4.

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



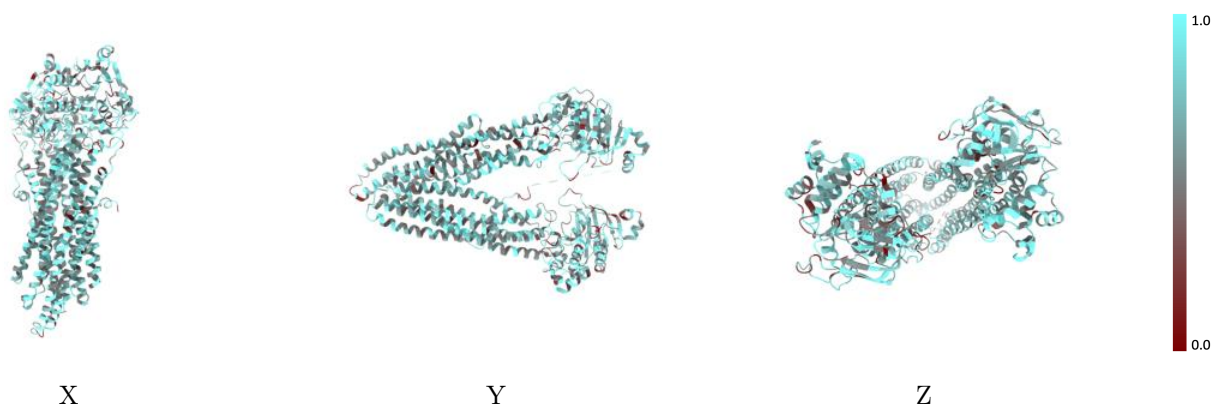
The images above show the 3D surface view of the map at the recommended contour level 0.03 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

## 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.

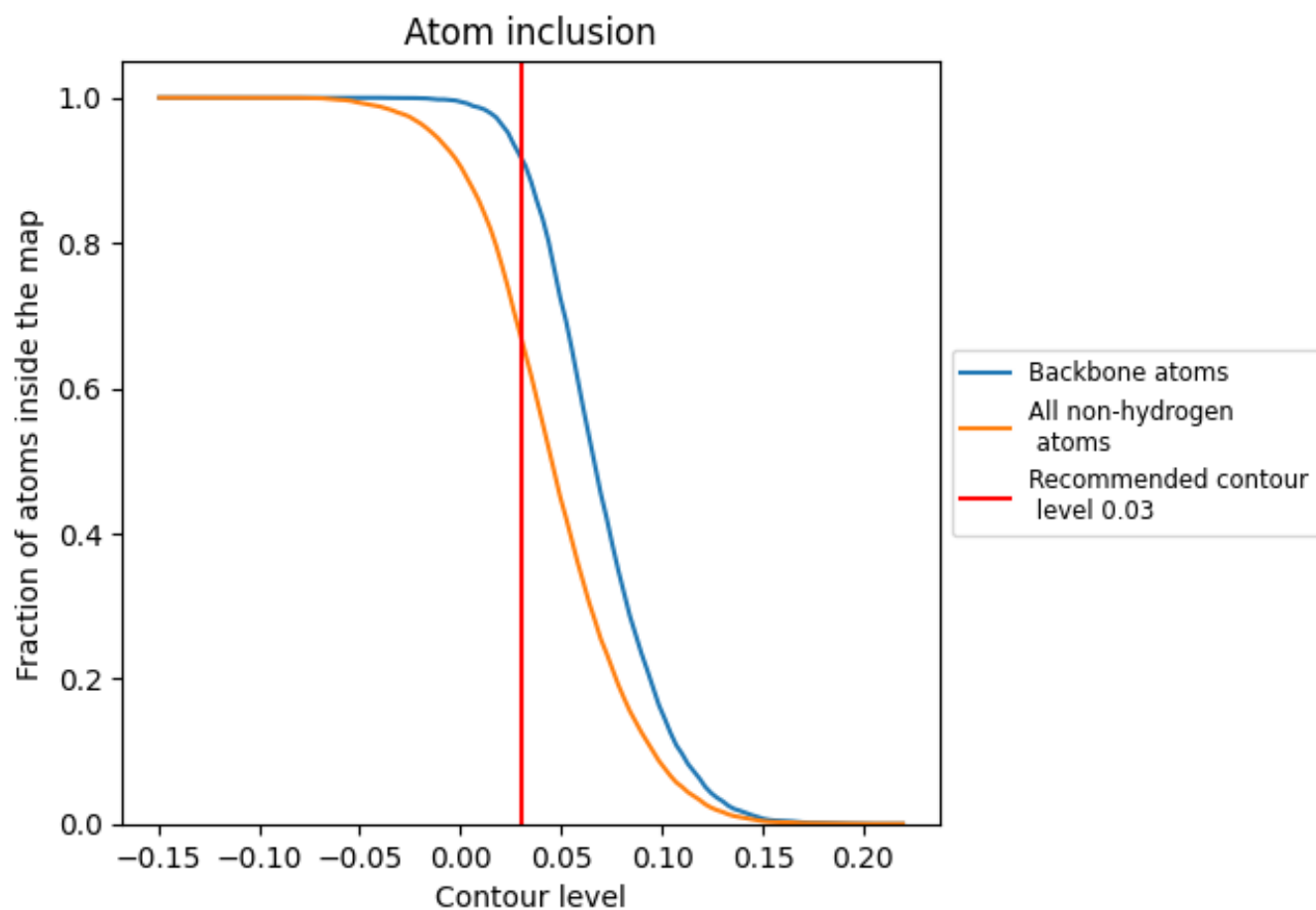
## 9.3 Atom inclusion mapped to coordinate model [\(i\)](#)



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 (0.03).







## 9.4 Atom inclusion [i](#)



At the recommended contour level, 92% of all backbone atoms, 67% of all non-hydrogen atoms, are inside the map.

## 9.5 Map-model fit summary

The table lists the average atom inclusion at the recommended contour level (0.03) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.6714	 0.1390
A	 0.6714	 0.1390

