Full wwPDB EM Validation Report (i)

Sep 8, 2025 – 06:19 PM JST

PDB ID	:	7WJ4 / pdb_00007wj4
EMDB ID	:	EMD-32542
Title	:	Structural basis for ligand binding modes of CTP synthase
Authors	:	Liu, J.L.; Guo, C.J.
Deposited on	:	2022-01-05
Resolution	:	3.15 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*
A user guide is available at
https://www.wwpdb.org/validation/2017/EMValidationReportHelp
with specific help available everywhere you see the (i) symbol.

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

The following versions of software and data (see references (1)) were used in the production of this report:

EMDB validation analysis	:	0.0.1.dev126
Mogul	:	1.8.5 (274361), 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)	:	2.45.1

1 Overall quality at a glance (i)

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

The reported resolution of this entry is 3.15 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 <=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	556	72% 25% •
1	B	556	72% 25% •
1	C	556	72% 25% •
1	D	556	72% 24% •

2 Entry composition (i)

There are 6 unique types of molecules in this entry. The entry contains 17960 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 CTP synthase.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	D	556	4385	2779	770	814	22	0	0
1	A	556	4385	2779	770	814	22	0	0
1	B	556	4385	2779	770	814	22	0	0
1	C	556	4385	2779	770	814	22	0	0

- Molecule 2 is GUANOSINE-5'-TRIPHOSPHATE (CCD ID: GTP) (formula: $C_{10}H_{16}N_5O_{14}P_3$) (labeled as "Ligand of Interest" by depositor).

Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	P	
2	D	1	32	10	5	14	3	0
2	A	1	32	10	5	14	3	0

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Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	P	
2	B	1	32	10	5	14	3	0
			Total	C	N	O	P	
2	C	1	32	10	5	14	3	0

- Molecule 3 is ADENOSINE-5'-TRIPHOSPHATE (CCD ID: ATP) (formula: $C_{10}H_{16}N_5O_{13}P_3$) (labeled as "Ligand of Interest" by depositor).

Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	P	
3	D	1	31	10	5	13	3	0
			Total	C	N	O	P	
3	A	1	31	10	5	13	3	0
			Total	C	N	O	P	
3	B	1	31	10	5	13	3	0
			Total	C	N	O	P	
3	C	1	31	10	5	13	3	0

- Molecule 4 is GAMMA-L-GLUTAMIC ACID (CCD ID: GGL) (formula: $C_5H_9NO_4$) (labeled as "Ligand of Interest" by depositor).

Mol	Chain	Residues	Atoms				AltConf
			Total	C	N	O	
4	D	1	10	5	1	4	0
4	A	1	10	5	1	4	0
4	B	1	10	5	1	4	0
4	C	1	10	5	1	4	0

- Molecule 5 is MAGNESIUM ION (CCD ID: MG) (formula: Mg) (labeled as "Ligand of Interest" by depositor).

Mol	Chain	Residues	Atoms		AltConf
			Total	Mg	
5	D	3	3	3	0
5	A	3	3	3	0
5	B	3	3	3	0
5	C	3	3	3	0

- Molecule 6 is URIDINE 5'-TRIPHOSPHATE (CCD ID: UTP) (formula: $C_9H_{15}N_2O_{15}P_3$) (labeled as "Ligand of Interest" by depositor).

Mol	Chain	Residues	Atoms					AltConf
6	D	1	Total	C	N	O	P	0
			29	9	2	15	3	
6	A	1	Total	C	N	O	P	0
			29	9	2	15	3	
6	B	1	Total	C	N	O	P	0
			29	9	2	15	3	
6	C	1	Total	C	N	O	P	0
			29	9	2	15	3	

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: CTP synthase

Chain D:

• Molecule 1: CTP synthase

Chain A:

• Molecule 1: CTP synthase

Chain B:

• Molecule 1: CTP synthase

Chain C:

4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	437045	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/Å^2$)	50	Depositor
Minimum defocus (nm)	5000	Depositor
Maximum defocus (nm)	20000	Depositor
Magnification	Not provided	
Image detector	GATAN K3 (6k x 4k)	Depositor
Maximum map value	0.250	Depositor
Minimum map value	-0.173	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.007	Depositor
Recommended contour level	0.022	Depositor
Map size (Å)	264.75, 264.75, 264.75	wwPDB
Map dimensions	250, 250, 250	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.059, 1.059, 1.059	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, UTP, GGL, ATP, GTP

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	0.34	0/4474	0.41	0/6055
1	B	0.34	0/4474	0.41	0/6055
1	C	0.34	0/4474	0.41	0/6055
1	D	0.34	0/4474	0.41	0/6055
All	All	0.34	0/17896	0.41	0/24220

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	4385	0	4430	100	0
1	B	4385	0	4430	103	0
1	C	4385	0	4430	100	0
1	D	4385	0	4430	103	0
2	A	32	0	12	1	0
2	B	32	0	12	1	0
2	C	32	0	12	1	0
2	D	32	0	12	2	0
3	A	31	0	12	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	B	31	0	12	0	0
3	C	31	0	12	0	0
3	D	31	0	12	0	0
4	A	10	0	7	1	0
4	B	10	0	7	1	0
4	C	10	0	7	1	0
4	D	10	0	7	1	0
5	A	3	0	0	0	0
5	B	3	0	0	0	0
5	C	3	0	0	0	0
5	D	3	0	0	0	0
6	A	29	0	11	0	0
6	B	29	0	11	1	0
6	C	29	0	11	0	0
6	D	29	0	11	1	0
All	All	17960	0	17888	406	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 11.

All (406) 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:275:MET:HA	1:A:278:ARG:HG2	1.68	0.76
1:C:275:MET:HA	1:C:278:ARG:HG2	1.68	0.76
1:B:275:MET:HA	1:B:278:ARG:HG2	1.68	0.76
1:D:275:MET:HA	1:D:278:ARG:HG2	1.68	0.76
1:A:483:GLU:OE1	1:A:508:ARG:NH1	2.23	0.71
1:C:483:GLU:OE1	1:C:508:ARG:NH1	2.23	0.71
1:D:483:GLU:OE1	1:D:508:ARG:NH1	2.23	0.70
1:B:483:GLU:OE1	1:B:508:ARG:NH1	2.23	0.70
1:A:266:ASN:HD22	1:A:275:MET:HE1	1.57	0.69
1:D:421:THR:HB	1:D:424:ILE:HG12	1.75	0.69
1:C:266:ASN:HD22	1:C:275:MET:HE1	1.57	0.69
1:B:421:THR:HB	1:B:424:ILE:HG12	1.75	0.69
1:D:266:ASN:HD22	1:D:275:MET:HE1	1.57	0.68
1:B:443:GLN:H	1:B:443:GLN:HE21	1.42	0.68
1:D:443:GLN:H	1:D:443:GLN:HE21	1.42	0.68
1:B:266:ASN:HD22	1:B:275:MET:HE1	1.57	0.68
1:A:443:GLN:H	1:A:443:GLN:HE21	1.42	0.68
1:C:443:GLN:HE21	1:C:443:GLN:H	1.42	0.68

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:367:ILE:HD12	1:A:388:ALA:HB2	1.76	0.67
1:A:421:THR:HB	1:A:424:ILE:HG12	1.75	0.67
1:C:367:ILE:HD12	1:C:388:ALA:HB2	1.76	0.67
1:B:367:ILE:HD12	1:B:388:ALA:HB2	1.76	0.67
1:C:421:THR:HB	1:C:424:ILE:HG12	1.75	0.67
1:D:367:ILE:HD12	1:D:388:ALA:HB2	1.76	0.67
1:D:38:LYS:NZ	1:D:40:ASP:OD2	2.29	0.66
1:B:38:LYS:NZ	1:B:40:ASP:OD2	2.29	0.66
1:A:38:LYS:NZ	1:A:40:ASP:OD2	2.29	0.64
1:C:38:LYS:NZ	1:C:40:ASP:OD2	2.29	0.64
1:D:101:GLU:OE1	1:B:44:ASN:ND2	2.31	0.64
1:A:44:ASN:ND2	1:C:101:GLU:OE1	2.31	0.64
1:D:44:ASN:ND2	1:B:101:GLU:OE1	2.31	0.64
1:A:101:GLU:OE1	1:C:44:ASN:ND2	2.31	0.64
1:A:354:TYR:OH	1:A:383:ARG:NH2	2.31	0.64
1:A:74:TYR:OH	1:A:145:GLU:OE1	2.16	0.63
1:C:74:TYR:OH	1:C:145:GLU:OE1	2.16	0.63
1:C:354:TYR:OH	1:C:383:ARG:NH2	2.31	0.63
1:B:74:TYR:OH	1:B:145:GLU:OE1	2.16	0.63
1:D:74:TYR:OH	1:D:145:GLU:OE1	2.16	0.63
1:D:211:ASP:OD1	1:D:268:ARG:NE	2.27	0.63
1:D:458:SER:N	1:D:500:VAL:O	2.29	0.63
1:D:354:TYR:OH	1:D:383:ARG:NH2	2.31	0.63
1:B:458:SER:N	1:B:500:VAL:O	2.29	0.63
1:B:211:ASP:OD1	1:B:268:ARG:NE	2.27	0.62
1:B:354:TYR:OH	1:B:383:ARG:NH2	2.31	0.62
1:D:230:SER:OG	1:D:235:VAL:O	2.16	0.62
1:B:230:SER:OG	1:B:235:VAL:O	2.16	0.62
1:D:439:HIS:HB3	1:D:446:GLY:HA3	1.81	0.61
1:B:439:HIS:HB3	1:B:446:GLY:HA3	1.81	0.61
1:A:439:HIS:HB3	1:A:446:GLY:HA3	1.81	0.61
1:C:439:HIS:HB3	1:C:446:GLY:HA3	1.81	0.61
1:A:211:ASP:OD1	1:A:268:ARG:NE	2.27	0.60
1:C:230:SER:OG	1:C:235:VAL:O	2.16	0.60
1:C:211:ASP:OD1	1:C:268:ARG:NE	2.27	0.60
1:A:230:SER:OG	1:A:235:VAL:O	2.16	0.60
1:B:40:ASP:HB2	1:B:89:THR:HG22	1.83	0.59
1:D:40:ASP:HB2	1:D:89:THR:HG22	1.83	0.59
1:D:297:ARG:HG3	1:D:330:ARG:HH11	1.67	0.59
1:A:40:ASP:HB2	1:A:89:THR:HG22	1.83	0.59
1:C:40:ASP:HB2	1:C:89:THR:HG22	1.83	0.59

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:297:ARG:HG3	1:B:330:ARG:HH11	1.67	0.59
1:C:297:ARG:HG3	1:C:330:ARG:HH11	1.67	0.59
1:A:297:ARG:HG3	1:A:330:ARG:HH11	1.67	0.59
1:A:458:SER:N	1:A:500:VAL:O	2.29	0.59
1:C:458:SER:N	1:C:500:VAL:O	2.29	0.59
1:A:546:ALA:HB2	1:A:551:LEU:HD22	1.85	0.58
1:C:546:ALA:HB2	1:C:551:LEU:HD22	1.85	0.58
1:D:546:ALA:HB2	1:D:551:LEU:HD22	1.85	0.58
1:B:546:ALA:HB2	1:B:551:LEU:HD22	1.85	0.57
1:A:503:ASP:OD2	1:A:503:ASP:N	2.36	0.57
1:D:461:PRO:O	1:D:498:ARG:NH2	2.38	0.56
1:B:461:PRO:O	1:B:498:ARG:NH2	2.38	0.56
1:C:503:ASP:OD2	1:C:503:ASP:N	2.36	0.56
1:A:461:PRO:O	1:A:498:ARG:NH2	2.38	0.56
1:A:484:VAL:HG11	1:A:509:MET:HB2	1.88	0.56
1:C:484:VAL:HG11	1:C:509:MET:HB2	1.88	0.56
1:C:461:PRO:O	1:C:498:ARG:NH2	2.38	0.56
1:B:18:VAL:O	1:B:22:SER:OG	2.25	0.55
1:B:484:VAL:HG11	1:B:509:MET:HB2	1.88	0.55
1:D:317:VAL:HG22	1:D:528:GLU:OE1	2.07	0.55
1:D:484:VAL:HG11	1:D:509:MET:HB2	1.88	0.55
1:B:317:VAL:HG22	1:B:528:GLU:OE1	2.07	0.55
1:D:223:LEU:O	1:D:227:GLU:HG2	2.07	0.55
1:B:223:LEU:O	1:B:227:GLU:HG2	2.07	0.55
1:D:439:HIS:H	1:D:439:HIS:CD2	2.23	0.54
1:D:455:THR:OG1	1:D:510:GLU:OE1	2.18	0.54
1:A:317:VAL:HG22	1:A:528:GLU:OE1	2.07	0.54
1:C:317:VAL:HG22	1:C:528:GLU:OE1	2.07	0.54
1:B:439:HIS:CD2	1:B:439:HIS:H	2.23	0.54
1:B:455:THR:OG1	1:B:510:GLU:OE1	2.18	0.54
1:A:66:GLU:OE2	1:A:66:GLU:N	2.39	0.54
1:A:223:LEU:O	1:A:227:GLU:HG2	2.07	0.54
1:C:66:GLU:OE2	1:C:66:GLU:N	2.39	0.54
1:C:223:LEU:O	1:C:227:GLU:HG2	2.07	0.54
1:A:18:VAL:O	1:A:22:SER:OG	2.25	0.53
1:C:439:HIS:H	1:C:439:HIS:CD2	2.23	0.53
1:D:170:LYS:O	1:D:172:GLU:N	2.41	0.53
1:A:439:HIS:H	1:A:439:HIS:CD2	2.23	0.53
1:B:170:LYS:O	1:B:172:GLU:N	2.41	0.53
1:C:18:VAL:O	1:C:22:SER:OG	2.25	0.53
1:C:170:LYS:O	1:C:172:GLU:N	2.41	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:170:LYS:O	1:A:172:GLU:N	2.41	0.53
1:D:514:LEU:HB2	1:D:520:PHE:HB3	1.91	0.52
1:C:369:VAL:HG23	1:C:397:GLY:HA2	1.91	0.52
1:A:369:VAL:HG23	1:A:397:GLY:HA2	1.91	0.52
1:B:443:GLN:H	1:B:443:GLN:NE2	2.06	0.52
1:B:456:VAL:N	1:B:502:THR:O	2.42	0.52
1:B:514:LEU:HB2	1:B:520:PHE:HB3	1.91	0.52
1:C:418:ASP:HB3	1:C:430:ASN:HB2	1.91	0.52
1:D:443:GLN:H	1:D:443:GLN:NE2	2.06	0.52
1:D:456:VAL:N	1:D:502:THR:O	2.42	0.52
1:A:418:ASP:HB3	1:A:430:ASN:HB2	1.91	0.52
1:B:352:SER:OG	1:B:353:LYS:NZ	2.43	0.52
1:D:352:SER:OG	1:D:353:LYS:NZ	2.43	0.52
1:C:203:LEU:HD23	1:C:210:PRO:HG3	1.91	0.52
1:A:203:LEU:HD23	1:A:210:PRO:HG3	1.91	0.52
1:D:35:THR:OG1	1:D:36:SER:N	2.43	0.52
1:D:433:VAL:HG12	1:D:484:VAL:HA	1.92	0.52
1:A:433:VAL:HG12	1:A:484:VAL:HA	1.92	0.52
1:A:443:GLN:H	1:A:443:GLN:NE2	2.06	0.52
1:A:514:LEU:HB2	1:A:520:PHE:HB3	1.91	0.52
1:B:35:THR:OG1	1:B:36:SER:N	2.43	0.52
1:B:433:VAL:HG12	1:B:484:VAL:HA	1.92	0.52
1:C:126:GLU:OE1	1:C:168:ARG:NH2	2.33	0.52
1:C:433:VAL:HG12	1:C:484:VAL:HA	1.92	0.52
1:C:443:GLN:H	1:C:443:GLN:NE2	2.06	0.52
1:C:514:LEU:HB2	1:C:520:PHE:HB3	1.91	0.51
1:D:418:ASP:HB3	1:D:430:ASN:HB2	1.91	0.51
1:B:418:ASP:HB3	1:B:430:ASN:HB2	1.91	0.51
1:B:478:HIS:HB3	1:B:480:HIS:CD2	2.45	0.51
1:D:478:HIS:HB3	1:D:480:HIS:CD2	2.45	0.51
1:A:478:HIS:HB3	1:A:480:HIS:CD2	2.45	0.51
1:C:478:HIS:HB3	1:C:480:HIS:CD2	2.45	0.51
1:D:203:LEU:HD23	1:D:210:PRO:HG3	1.91	0.51
1:D:369:VAL:HG23	1:D:397:GLY:HA2	1.91	0.51
1:A:42:TYR:CD1	1:A:44:ASN:HB2	2.46	0.51
1:A:126:GLU:OE1	1:A:168:ARG:NH2	2.33	0.51
1:B:203:LEU:HD23	1:B:210:PRO:HG3	1.91	0.51
1:B:369:VAL:HG23	1:B:397:GLY:HA2	1.91	0.51
1:C:42:TYR:CD1	1:C:44:ASN:HB2	2.46	0.51
1:A:35:THR:OG1	1:A:36:SER:N	2.43	0.51
1:A:243:ILE:HG23	1:A:255:LEU:HD23	1.93	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:191:PRO:HG2	1:D:225:VAL:HG21	1.93	0.51
1:C:35:THR:OG1	1:C:36:SER:N	2.43	0.51
1:C:243:ILE:HG23	1:C:255:LEU:HD23	1.93	0.51
1:D:422:THR:OG1	1:D:435:ASP:OD1	2.22	0.51
1:D:42:TYR:CD1	1:D:44:ASN:HB2	2.46	0.50
1:A:191:PRO:HG2	1:A:225:VAL:HG21	1.93	0.50
1:B:191:PRO:HG2	1:B:225:VAL:HG21	1.93	0.50
1:A:352:SER:OG	1:A:353:LYS:NZ	2.43	0.50
1:B:42:TYR:CD1	1:B:44:ASN:HB2	2.46	0.50
1:B:422:THR:OG1	1:B:435:ASP:OD1	2.22	0.50
1:C:191:PRO:HG2	1:C:225:VAL:HG21	1.93	0.50
1:C:352:SER:OG	1:C:353:LYS:NZ	2.43	0.50
1:C:36:SER:O	1:C:86:ASN:ND2	2.38	0.50
1:C:456:VAL:N	1:C:502:THR:O	2.42	0.50
1:A:456:VAL:N	1:A:502:THR:O	2.42	0.50
1:A:36:SER:O	1:A:86:ASN:ND2	2.38	0.50
1:A:82:LEU:HD23	1:A:133:VAL:HG21	1.94	0.50
1:C:82:LEU:HD23	1:C:133:VAL:HG21	1.94	0.50
1:D:82:LEU:HD23	1:D:133:VAL:HG21	1.94	0.50
1:A:409:PHE:HD2	1:A:492:LEU:HD22	1.77	0.50
1:B:82:LEU:HD23	1:B:133:VAL:HG21	1.94	0.50
1:C:409:PHE:HD2	1:C:492:LEU:HD22	1.77	0.50
1:D:66:GLU:OE2	1:D:66:GLU:N	2.39	0.49
1:D:18:VAL:O	1:D:22:SER:OG	2.25	0.49
1:D:243:ILE:HG23	1:D:255:LEU:HD23	1.93	0.49
1:A:413:LYS:O	1:A:495:GLN:NE2	2.43	0.49
1:B:66:GLU:OE2	1:B:66:GLU:N	2.39	0.49
1:C:388:ALA:O	1:C:517:HIS:NE2	2.37	0.49
1:A:435:ASP:N	1:A:435:ASP:OD1	2.45	0.49
1:A:388:ALA:O	1:A:517:HIS:NE2	2.37	0.49
1:B:243:ILE:HG23	1:B:255:LEU:HD23	1.93	0.49
1:C:413:LYS:O	1:C:495:GLN:NE2	2.43	0.49
1:C:435:ASP:OD1	1:C:435:ASP:N	2.45	0.49
1:B:409:PHE:HD2	1:B:492:LEU:HD22	1.77	0.49
1:C:304:VAL:HG12	1:C:337:ILE:HB	1.95	0.49
1:A:7:THR:HG22	1:A:146:LEU:HD23	1.95	0.48
1:A:304:VAL:HG12	1:A:337:ILE:HB	1.95	0.48
1:A:441:THR:CB	1:A:443:GLN:HE22	2.26	0.48
1:D:409:PHE:HD2	1:D:492:LEU:HD22	1.77	0.48
1:C:7:THR:HG22	1:C:146:LEU:HD23	1.95	0.48
1:C:441:THR:CB	1:C:443:GLN:HE22	2.26	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:304:VAL:HG12	1:D:337:ILE:HB	1.95	0.48
1:B:304:VAL:HG12	1:B:337:ILE:HB	1.95	0.48
1:A:107:LEU:HD23	1:A:107:LEU:H	1.78	0.48
1:C:107:LEU:HD23	1:C:107:LEU:H	1.78	0.48
1:D:107:LEU:HD23	1:D:107:LEU:H	1.78	0.48
1:D:435:ASP:OD1	1:D:435:ASP:N	2.45	0.48
1:D:7:THR:HG22	1:D:146:LEU:HD23	1.95	0.47
1:D:441:THR:CB	1:D:443:GLN:HE22	2.26	0.47
1:B:107:LEU:HD23	1:B:107:LEU:H	1.78	0.47
1:B:441:THR:CB	1:B:443:GLN:HE22	2.26	0.47
1:B:7:THR:HG22	1:B:146:LEU:HD23	1.95	0.47
1:B:435:ASP:OD1	1:B:435:ASP:N	2.45	0.47
1:C:330:ARG:HE	1:C:548:VAL:HG21	1.79	0.47
1:A:330:ARG:HE	1:A:548:VAL:HG21	1.79	0.47
1:B:330:ARG:HE	1:B:548:VAL:HG21	1.79	0.47
1:D:330:ARG:HE	1:D:548:VAL:HG21	1.79	0.47
1:B:126:GLU:OE1	1:B:168:ARG:NH2	2.33	0.47
1:D:362:CYS:HA	1:D:387:TRP:CH2	2.50	0.47
1:B:362:CYS:HA	1:B:387:TRP:CH2	2.50	0.47
1:A:22:SER:HA	1:A:25:THR:HG22	1.97	0.47
1:C:22:SER:HA	1:C:25:THR:HG22	1.97	0.47
1:C:421:THR:HG22	1:C:423:GLU:H	1.80	0.47
1:A:421:THR:HG22	1:A:423:GLU:H	1.80	0.47
1:D:126:GLU:OE1	1:D:168:ARG:NH2	2.33	0.47
1:D:288:LEU:HD23	1:D:288:LEU:HA	1.77	0.46
1:A:186:LYS:HE2	1:A:186:LYS:HB3	1.81	0.46
1:A:362:CYS:HA	1:A:387:TRP:CH2	2.50	0.46
1:B:288:LEU:HD23	1:B:288:LEU:HA	1.77	0.46
1:B:421:THR:HG22	1:B:423:GLU:H	1.80	0.46
1:C:362:CYS:HA	1:C:387:TRP:CH2	2.50	0.46
1:C:439:HIS:CG	1:C:440:HIS:H	2.33	0.46
1:D:421:THR:HG22	1:D:423:GLU:H	1.80	0.46
1:A:439:HIS:CG	1:A:440:HIS:H	2.33	0.46
1:B:448:MET:O	1:B:450:LEU:N	2.48	0.46
1:C:507:THR:O	1:C:507:THR:OG1	2.32	0.46
1:D:448:MET:O	1:D:450:LEU:N	2.48	0.46
1:A:507:THR:O	1:A:507:THR:OG1	2.32	0.46
1:C:186:LYS:HE2	1:C:186:LYS:HB3	1.81	0.46
1:D:297:ARG:HG3	1:D:330:ARG:NH1	2.31	0.46
1:C:448:MET:H	1:C:448:MET:HG2	1.56	0.46
1:D:437:PRO:HA	1:D:446:GLY:HA2	1.97	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:443:GLN:HE21	1:D:443:GLN:N	2.11	0.46
1:B:297:ARG:HG3	1:B:330:ARG:NH1	2.31	0.46
1:B:439:HIS:CG	1:B:440:HIS:H	2.33	0.46
1:C:297:ARG:HG3	1:C:330:ARG:NH1	2.31	0.46
1:A:297:ARG:HG3	1:A:330:ARG:NH1	2.31	0.46
1:B:437:PRO:HA	1:B:446:GLY:HA2	1.97	0.46
1:D:439:HIS:CG	1:D:440:HIS:H	2.33	0.46
1:B:443:GLN:HE21	1:B:443:GLN:N	2.11	0.46
1:A:437:PRO:HA	1:A:446:GLY:HA2	1.97	0.45
1:D:22:SER:HA	1:D:25:THR:HG22	1.97	0.45
1:A:448:MET:O	1:A:450:LEU:N	2.48	0.45
1:B:22:SER:HA	1:B:25:THR:HG22	1.97	0.45
1:C:448:MET:O	1:C:450:LEU:N	2.48	0.45
1:D:97:VAL:HG21	1:D:117:ILE:HD13	1.98	0.45
1:B:97:VAL:HG21	1:B:117:ILE:HD13	1.98	0.45
1:C:437:PRO:HA	1:C:446:GLY:HA2	1.97	0.45
1:D:438:GLU:N	1:D:446:GLY:HA2	2.32	0.45
1:A:114:VAL:HA	1:A:115:PRO:HA	1.76	0.45
1:A:448:MET:H	1:A:448:MET:HG2	1.56	0.45
1:B:438:GLU:N	1:B:446:GLY:HA2	2.32	0.45
1:B:453:ARG:HB2	1:B:478:HIS:CE1	2.51	0.45
1:C:347:LEU:O	1:C:351:PRO:HG3	2.17	0.45
1:D:453:ARG:HB2	1:D:478:HIS:CE1	2.51	0.45
1:A:347:LEU:O	1:A:351:PRO:HG3	2.17	0.45
1:A:436:MET:N	1:A:437:PRO:HD3	2.32	0.45
1:C:114:VAL:HA	1:C:115:PRO:HA	1.76	0.45
1:C:436:MET:N	1:C:437:PRO:HD3	2.32	0.45
1:D:485:ASN:HB3	1:D:488:TYR:HD1	1.82	0.45
2:A:603:GTP:H5'	2:A:603:GTP:O1B	2.17	0.45
1:B:485:ASN:HB3	1:B:488:TYR:HD1	1.82	0.45
1:D:347:LEU:O	1:D:351:PRO:HG3	2.17	0.45
1:B:347:LEU:O	1:B:351:PRO:HG3	2.17	0.45
2:C:603:GTP:H5'	2:C:603:GTP:O1B	2.17	0.45
1:C:453:ARG:HB2	1:C:478:HIS:CE1	2.51	0.45
1:D:439:HIS:HB2	1:D:442:GLY:H	1.82	0.45
1:A:439:HIS:HB2	1:A:442:GLY:H	1.82	0.45
1:A:453:ARG:HB2	1:A:478:HIS:CE1	2.51	0.45
1:B:36:SER:O	1:B:86:ASN:ND2	2.38	0.45
1:C:439:HIS:HB2	1:C:442:GLY:H	1.82	0.45
1:A:193:THR:CG2	1:A:229:ILE:HG13	2.47	0.45
1:A:288:LEU:HD23	1:A:288:LEU:HA	1.77	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:438:GLU:N	1:A:446:GLY:HA2	2.32	0.45
1:A:485:ASN:HB3	1:A:488:TYR:HD1	1.82	0.45
1:B:439:HIS:HB2	1:B:442:GLY:H	1.82	0.45
1:B:507:THR:O	1:B:507:THR:OG1	2.32	0.45
1:C:193:THR:CG2	1:C:229:ILE:HG13	2.47	0.45
1:C:288:LEU:HD23	1:C:288:LEU:HA	1.77	0.45
1:C:438:GLU:N	1:C:446:GLY:HA2	2.32	0.45
1:C:485:ASN:HB3	1:C:488:TYR:HD1	1.82	0.44
1:D:413:LYS:O	1:D:495:GLN:NE2	2.43	0.44
1:C:455:THR:OG1	1:C:510:GLU:OE1	2.18	0.44
1:B:413:LYS:O	1:B:495:GLN:NE2	2.43	0.44
2:B:701:GTP:O1B	2:B:701:GTP:H5'	2.17	0.44
1:D:36:SER:O	1:D:86:ASN:ND2	2.38	0.44
1:D:346:THR:HA	1:D:349:SER:OG	2.18	0.44
2:D:701:GTP:H5'	2:D:701:GTP:O1B	2.17	0.44
1:B:388:ALA:O	1:B:517:HIS:NE2	2.37	0.44
1:B:346:THR:HA	1:B:349:SER:OG	2.18	0.44
1:A:339:SER:O	1:A:380:GLY:HA3	2.17	0.44
1:D:193:THR:CG2	1:D:229:ILE:HG13	2.47	0.44
1:D:407:ILE:HD13	1:D:407:ILE:HA	1.85	0.44
1:A:422:THR:OG1	1:A:435:ASP:OD1	2.22	0.44
1:A:455:THR:OG1	1:A:510:GLU:OE1	2.18	0.44
1:A:510:GLU:HB2	1:A:524:GLN:HB3	2.00	0.44
1:B:407:ILE:HD13	1:B:407:ILE:HA	1.85	0.44
1:C:339:SER:O	1:C:380:GLY:HA3	2.17	0.44
1:C:422:THR:OG1	1:C:435:ASP:OD1	2.22	0.44
1:C:510:GLU:HB2	1:C:524:GLN:HB3	2.00	0.44
1:D:388:ALA:O	1:D:517:HIS:NE2	2.37	0.44
1:D:436:MET:N	1:D:437:PRO:HD3	2.32	0.44
1:A:97:VAL:HG21	1:A:117:ILE:HD13	1.98	0.44
1:A:400:LEU:HD13	4:A:605:GGL:HB3	2.00	0.44
1:B:193:THR:CG2	1:B:229:ILE:HG13	2.47	0.44
1:B:436:MET:N	1:B:437:PRO:HD3	2.32	0.44
1:C:97:VAL:HG21	1:C:117:ILE:HD13	1.98	0.44
1:C:400:LEU:HD13	4:C:605:GGL:HB3	2.00	0.44
1:D:510:GLU:HB2	1:D:524:GLN:HB3	2.00	0.43
1:B:339:SER:O	1:B:380:GLY:HA3	2.17	0.43
1:B:510:GLU:HB2	1:B:524:GLN:HB3	2.00	0.43
1:D:449:ARG:O	1:D:478:HIS:HB2	2.19	0.43
1:A:346:THR:HA	1:A:349:SER:OG	2.18	0.43
1:A:443:GLN:HE21	1:A:443:GLN:N	2.11	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:449:ARG:O	1:B:478:HIS:HB2	2.19	0.43
1:D:339:SER:O	1:D:380:GLY:HA3	2.17	0.43
1:D:490:HIS:O	1:D:494:GLU:HG3	2.19	0.43
1:C:346:THR:HA	1:C:349:SER:OG	2.18	0.43
1:A:553:GLN:N	1:A:553:GLN:OE1	2.51	0.43
1:B:490:HIS:O	1:B:494:GLU:HG3	2.19	0.43
1:C:443:GLN:HE21	1:C:443:GLN:N	2.11	0.43
1:C:553:GLN:N	1:C:553:GLN:OE1	2.51	0.43
1:B:114:VAL:HA	1:B:115:PRO:HA	1.76	0.43
1:B:332:LEU:HD12	1:B:332:LEU:HA	1.88	0.43
1:D:114:VAL:HA	1:D:115:PRO:HA	1.76	0.43
1:B:400:LEU:HD13	4:B:703:GGL:HB3	2.00	0.42
1:D:400:LEU:HD13	4:D:703:GGL:HB3	2.00	0.42
1:B:553:GLN:N	1:B:553:GLN:OE1	2.51	0.42
1:D:122:GLN:HE22	1:D:164:GLN:HB2	1.85	0.42
1:D:186:LYS:HE2	1:D:186:LYS:HB3	1.81	0.42
1:D:553:GLN:N	1:D:553:GLN:OE1	2.51	0.42
1:A:26:LEU:HD22	1:A:262:ILE:HD11	2.02	0.42
1:B:122:GLN:HE22	1:B:164:GLN:HB2	1.85	0.42
1:C:26:LEU:HD22	1:C:262:ILE:HD11	2.02	0.42
1:A:490:HIS:O	1:A:494:GLU:HG3	2.19	0.42
1:B:186:LYS:HE2	1:B:186:LYS:HB3	1.81	0.42
1:B:346:THR:O	1:B:350:GLU:N	2.39	0.42
1:D:346:THR:O	1:D:350:GLU:N	2.39	0.42
1:C:449:ARG:O	1:C:478:HIS:HB2	2.19	0.42
1:C:490:HIS:O	1:C:494:GLU:HG3	2.19	0.42
1:A:449:ARG:O	1:A:478:HIS:HB2	2.19	0.42
1:D:26:LEU:HD22	1:D:262:ILE:HD11	2.02	0.42
6:D:706:UTP:H6	6:D:706:UTP:H2'	1.60	0.42
1:A:297:ARG:HB3	1:A:330:ARG:HD3	2.01	0.42
1:B:26:LEU:HD22	1:B:262:ILE:HD11	2.02	0.42
1:B:297:ARG:HB3	1:B:330:ARG:HD3	2.01	0.42
1:C:122:GLN:HE22	1:C:164:GLN:HB2	1.85	0.42
1:D:468:TYR:CD1	1:D:538:PRO:HG2	2.55	0.42
1:A:122:GLN:HE22	1:A:164:GLN:HB2	1.85	0.42
1:B:468:TYR:CD1	1:B:538:PRO:HG2	2.55	0.42
1:D:236:GLY:H	1:D:239:GLN:HE21	1.68	0.41
1:D:297:ARG:HB3	1:D:330:ARG:HD3	2.01	0.41
1:D:439:HIS:C	1:D:441:THR:H	2.28	0.41
1:D:443:GLN:NE2	1:D:443:GLN:N	2.68	0.41
1:A:468:TYR:CD1	1:A:538:PRO:HG2	2.55	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:236:GLY:H	1:B:239:GLN:HE21	1.68	0.41
1:C:297:ARG:HB3	1:C:330:ARG:HD3	2.01	0.41
1:C:468:TYR:CD1	1:C:538:PRO:HG2	2.55	0.41
1:D:330:ARG:NE	1:D:548:VAL:HG21	2.35	0.41
1:B:443:GLN:NE2	1:B:443:GLN:N	2.68	0.41
1:D:175:CYS:HB2	1:D:269:LEU:HD21	2.02	0.41
1:A:439:HIS:C	1:A:441:THR:H	2.28	0.41
1:B:175:CYS:HB2	1:B:269:LEU:HD21	2.02	0.41
1:B:330:ARG:NE	1:B:548:VAL:HG21	2.35	0.41
1:B:11:ILE:HG22	1:C:195:PRO:HD3	2.03	0.41
6:B:706:UTP:H6	6:B:706:UTP:H2'	1.60	0.41
1:C:439:HIS:C	1:C:441:THR:H	2.28	0.41
1:D:11:ILE:HG22	1:A:195:PRO:HD3	2.03	0.41
1:D:304:VAL:HA	1:D:337:ILE:O	2.21	0.41
1:D:485:ASN:HA	1:D:486:PRO:HD3	1.93	0.41
1:B:439:HIS:C	1:B:441:THR:H	2.28	0.41
1:B:485:ASN:HA	1:B:486:PRO:HD3	1.93	0.41
1:D:538:PRO:HB2	1:D:539:PRO:HD3	2.03	0.41
1:A:330:ARG:NE	1:A:548:VAL:HG21	2.35	0.41
1:A:398:ILE:C	1:A:400:LEU:H	2.29	0.41
1:B:304:VAL:HA	1:B:337:ILE:O	2.21	0.41
1:B:538:PRO:HB2	1:B:539:PRO:HD3	2.03	0.41
1:C:330:ARG:NE	1:C:548:VAL:HG21	2.35	0.41
1:C:398:ILE:C	1:C:400:LEU:H	2.29	0.41
1:C:236:GLY:H	1:C:239:GLN:HE21	1.68	0.41
1:C:538:PRO:HB2	1:C:539:PRO:HD3	2.03	0.41
1:A:236:GLY:H	1:A:239:GLN:HE21	1.68	0.41
1:A:538:PRO:HB2	1:A:539:PRO:HD3	2.03	0.41
1:B:398:ILE:C	1:B:400:LEU:H	2.29	0.41
1:D:398:ILE:C	1:D:400:LEU:H	2.29	0.41
1:A:1:MET:HE1	1:A:129:ALA:HB1	2.03	0.41
1:A:353:LYS:HA	1:A:353:LYS:HD3	1.79	0.41
1:C:1:MET:HE1	1:C:129:ALA:HB1	2.03	0.41
1:C:248:SER:OG	1:C:292:THR:HG21	2.21	0.41
1:C:353:LYS:HA	1:C:353:LYS:HD3	1.79	0.41
1:A:248:SER:OG	1:A:292:THR:HG21	2.21	0.41
1:A:530:LEU:HD23	1:A:530:LEU:HA	1.84	0.40
1:C:175:CYS:HB2	1:C:269:LEU:HD21	2.02	0.40
1:D:408:GLU:O	1:D:409:PHE:C	2.65	0.40
1:A:175:CYS:HB2	1:A:269:LEU:HD21	2.02	0.40
1:B:408:GLU:O	1:B:409:PHE:C	2.65	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:117:ILE:HD13	1:D:117:ILE:HA	1.91	0.40
1:D:353:LYS:HA	1:D:353:LYS:HD3	1.79	0.40
1:D:456:VAL:HG12	1:D:473:SER:HB2	2.03	0.40
1:B:450:LEU:O	1:B:453:ARG:NH2	2.54	0.40
1:B:456:VAL:HG12	1:B:473:SER:HB2	2.03	0.40
1:C:150:ILE:HD13	1:C:150:ILE:HA	1.93	0.40
1:C:465:ARG:NE	1:C:470:ASN:OD1	2.46	0.40
1:D:418:ASP:OD2	1:D:430:ASN:N	2.55	0.40
1:D:450:LEU:O	1:D:453:ARG:NH2	2.54	0.40
1:A:407:ILE:HD13	1:A:407:ILE:HA	1.85	0.40
1:A:450:LEU:O	1:A:453:ARG:NH2	2.54	0.40
1:B:353:LYS:HA	1:B:353:LYS:HD3	1.79	0.40
1:B:418:ASP:OD2	1:B:430:ASN:N	2.55	0.40
1:C:407:ILE:HD13	1:C:407:ILE:HA	1.85	0.40
1:C:450:LEU:O	1:C:453:ARG:NH2	2.54	0.40
1:D:50:PHE:O	2:D:701:GTP:O2'	2.25	0.40
1:D:409:PHE:O	1:D:413:LYS:HB2	2.22	0.40
1:A:465:ARG:NE	1:A:470:ASN:OD1	2.46	0.40
1:B:409:PHE:O	1:B:413:LYS:HB2	2.22	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	554/556 (100%)	501 (90%)	52 (9%)	1 (0%)	44	72
1	B	554/556 (100%)	501 (90%)	52 (9%)	1 (0%)	44	72
1	C	554/556 (100%)	501 (90%)	52 (9%)	1 (0%)	44	72
1	D	554/556 (100%)	501 (90%)	52 (9%)	1 (0%)	44	72
All	All	2216/2224 (100%)	2004 (90%)	208 (9%)	4 (0%)	45	72

All (4) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	D	171	ARG
1	A	171	ARG
1	B	171	ARG
1	C	171	ARG

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	486/486 (100%)	457 (94%)	29 (6%)	16	43
1	B	486/486 (100%)	457 (94%)	29 (6%)	16	43
1	C	486/486 (100%)	457 (94%)	29 (6%)	16	43
1	D	486/486 (100%)	457 (94%)	29 (6%)	16	43
All	All	1944/1944 (100%)	1828 (94%)	116 (6%)	18	43

All (116) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	D	35	THR
1	D	50	PHE
1	D	51	SER
1	D	107	LEU
1	D	110	THR
1	D	133	VAL
1	D	149	THR
1	D	193	THR
1	D	229	ILE
1	D	230	SER
1	D	235	VAL
1	D	257	GLU
1	D	277	LYS
1	D	280	LYS
1	D	281	CYS
1	D	288	LEU

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Mol	Chain	Res	Type
1	D	308	THR
1	D	313	SER
1	D	413	LYS
1	D	435	ASP
1	D	441	THR
1	D	443	GLN
1	D	447	THR
1	D	483	GLU
1	D	484	VAL
1	D	489	VAL
1	D	500	VAL
1	D	507	THR
1	D	528	GLU
1	A	35	THR
1	A	50	PHE
1	A	51	SER
1	A	107	LEU
1	A	110	THR
1	A	133	VAL
1	A	149	THR
1	A	193	THR
1	A	229	ILE
1	A	230	SER
1	A	235	VAL
1	A	257	GLU
1	A	277	LYS
1	A	280	LYS
1	A	281	CYS
1	A	288	LEU
1	A	308	THR
1	A	313	SER
1	A	413	LYS
1	A	435	ASP
1	A	441	THR
1	A	443	GLN
1	A	447	THR
1	A	483	GLU
1	A	484	VAL
1	A	489	VAL
1	A	500	VAL
1	A	507	THR
1	A	528	GLU

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Mol	Chain	Res	Type
1	B	35	THR
1	B	50	PHE
1	B	51	SER
1	B	107	LEU
1	B	110	THR
1	B	133	VAL
1	B	149	THR
1	B	193	THR
1	B	229	ILE
1	B	230	SER
1	B	235	VAL
1	B	257	GLU
1	B	277	LYS
1	B	280	LYS
1	B	281	CYS
1	B	288	LEU
1	B	308	THR
1	B	313	SER
1	B	413	LYS
1	B	435	ASP
1	B	441	THR
1	B	443	GLN
1	B	447	THR
1	B	483	GLU
1	B	484	VAL
1	B	489	VAL
1	B	500	VAL
1	B	507	THR
1	B	528	GLU
1	C	35	THR
1	C	50	PHE
1	C	51	SER
1	C	107	LEU
1	C	110	THR
1	C	133	VAL
1	C	149	THR
1	C	193	THR
1	C	229	ILE
1	C	230	SER
1	C	235	VAL
1	C	257	GLU
1	C	277	LYS

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Mol	Chain	Res	Type
1	C	280	LYS
1	C	281	CYS
1	C	288	LEU
1	C	308	THR
1	C	313	SER
1	C	413	LYS
1	C	435	ASP
1	C	441	THR
1	C	443	GLN
1	C	447	THR
1	C	483	GLU
1	C	484	VAL
1	C	489	VAL
1	C	500	VAL
1	C	507	THR
1	C	528	GLU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (32) such sidechains are listed below:

Mol	Chain	Res	Type
1	D	44	ASN
1	D	122	GLN
1	D	134	GLN
1	D	412	ASN
1	D	439	HIS
1	D	443	GLN
1	D	478	HIS
1	D	480	HIS
1	A	44	ASN
1	A	122	GLN
1	A	134	GLN
1	A	412	ASN
1	A	439	HIS
1	A	443	GLN
1	A	478	HIS
1	A	480	HIS
1	B	44	ASN
1	B	122	GLN
1	B	134	GLN
1	B	412	ASN
1	B	439	HIS
1	B	443	GLN

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Mol	Chain	Res	Type
1	B	478	HIS
1	B	480	HIS
1	C	44	ASN
1	C	122	GLN
1	C	134	GLN
1	C	412	ASN
1	C	439	HIS
1	C	443	GLN
1	C	478	HIS
1	C	480	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 oligosaccharides in this entry.

5.6 Ligand geometry (i)

Of 28 ligands modelled in this entry, 12 are monoatomic - leaving 16 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	GTP	B	701	5	26,34,34	1.16	2 (7%)	32,54,54	1.58	7 (21%)
2	GTP	A	603	5	26,34,34	1.16	2 (7%)	32,54,54	1.58	7 (21%)
2	GTP	C	603	5	26,34,34	1.16	2 (7%)	32,54,54	1.58	7 (21%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
6	UTP	C	601	5	22,30,30	4.27	7 (31%)	27,47,47	1.44	4 (14%)
6	UTP	A	601	5	22,30,30	4.27	7 (31%)	27,47,47	1.44	4 (14%)
3	ATP	B	702	5	26,33,33	0.89	1 (3%)	31,52,52	1.61	5 (16%)
2	GTP	D	701	5	26,34,34	1.16	2 (7%)	32,54,54	1.58	7 (21%)
4	GGL	A	605	-	8,9,9	1.03	0	10,11,11	1.25	0
4	GGL	C	605	-	8,9,9	1.05	0	10,11,11	1.24	0
4	GGL	B	703	-	8,9,9	1.05	0	10,11,11	1.24	0
3	ATP	D	702	5	26,33,33	0.89	1 (3%)	31,52,52	1.61	5 (16%)
4	GGL	D	703	-	8,9,9	1.03	0	10,11,11	1.25	0
3	ATP	C	604	5	26,33,33	0.89	1 (3%)	31,52,52	1.61	5 (16%)
3	ATP	A	604	5	26,33,33	0.89	1 (3%)	31,52,52	1.61	5 (16%)
6	UTP	D	706	5	22,30,30	4.27	7 (31%)	27,47,47	1.44	4 (14%)
6	UTP	B	706	5	22,30,30	4.27	7 (31%)	27,47,47	1.44	4 (14%)

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	GTP	B	701	5	-	4/18/38/38	0/3/3/3
2	GTP	A	603	5	-	4/18/38/38	0/3/3/3
2	GTP	C	603	5	-	4/18/38/38	0/3/3/3
6	UTP	C	601	5	-	6/20/38/38	0/2/2/2
6	UTP	A	601	5	-	7/20/38/38	0/2/2/2
3	ATP	B	702	5	-	2/18/38/38	0/3/3/3
2	GTP	D	701	5	-	4/18/38/38	0/3/3/3
4	GGL	A	605	-	-	4/9/9/9	-
4	GGL	C	605	-	-	4/9/9/9	-
4	GGL	B	703	-	-	4/9/9/9	-
3	ATP	D	702	5	-	2/18/38/38	0/3/3/3
4	GGL	D	703	-	-	4/9/9/9	-
3	ATP	C	604	5	-	2/18/38/38	0/3/3/3
3	ATP	A	604	5	-	2/18/38/38	0/3/3/3
6	UTP	D	706	5	-	7/20/38/38	0/2/2/2
6	UTP	B	706	5	-	6/20/38/38	0/2/2/2

All (40) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
6	D	706	UTP	C2'-C1'	-13.19	1.33	1.53
6	A	601	UTP	C2'-C1'	-13.19	1.33	1.53
6	B	706	UTP	C2'-C1'	-13.19	1.33	1.53
6	C	601	UTP	C2'-C1'	-13.19	1.33	1.53
6	D	706	UTP	O4'-C1'	9.41	1.54	1.41
6	A	601	UTP	O4'-C1'	9.41	1.54	1.41
6	B	706	UTP	O4'-C1'	9.41	1.54	1.41
6	C	601	UTP	O4'-C1'	9.41	1.54	1.41
6	D	706	UTP	C3'-C4'	-8.75	1.30	1.53
6	A	601	UTP	C3'-C4'	-8.75	1.30	1.53
6	B	706	UTP	C3'-C4'	-8.75	1.30	1.53
6	C	601	UTP	C3'-C4'	-8.75	1.30	1.53
6	D	706	UTP	O4'-C4'	5.42	1.57	1.45
6	A	601	UTP	O4'-C4'	5.42	1.57	1.45
6	B	706	UTP	O4'-C4'	5.42	1.57	1.45
6	C	601	UTP	O4'-C4'	5.42	1.57	1.45
2	D	701	GTP	C5-C6	-4.07	1.39	1.47
2	A	603	GTP	C5-C6	-4.07	1.39	1.47
2	B	701	GTP	C5-C6	-4.07	1.39	1.47
2	C	603	GTP	C5-C6	-4.07	1.39	1.47
6	D	706	UTP	C3'-C2'	3.45	1.62	1.53
6	A	601	UTP	C3'-C2'	3.45	1.62	1.53
6	B	706	UTP	C3'-C2'	3.45	1.62	1.53
6	C	601	UTP	C3'-C2'	3.45	1.62	1.53
6	D	706	UTP	C6-N1	-2.46	1.32	1.35
6	A	601	UTP	C6-N1	-2.46	1.32	1.35
6	B	706	UTP	C6-N1	-2.46	1.32	1.35
6	C	601	UTP	C6-N1	-2.46	1.32	1.35
3	D	702	ATP	C5-C4	2.07	1.46	1.40
3	A	604	ATP	C5-C4	2.07	1.46	1.40
3	B	702	ATP	C5-C4	2.07	1.46	1.40
3	C	604	ATP	C5-C4	2.07	1.46	1.40
2	D	701	GTP	C2-N3	2.07	1.38	1.33
2	A	603	GTP	C2-N3	2.07	1.38	1.33
2	B	701	GTP	C2-N3	2.07	1.38	1.33
2	C	603	GTP	C2-N3	2.07	1.38	1.33
6	D	706	UTP	O4-C4	-2.02	1.19	1.24
6	A	601	UTP	O4-C4	-2.02	1.19	1.24
6	B	706	UTP	O4-C4	-2.02	1.19	1.24
6	C	601	UTP	O4-C4	-2.02	1.19	1.24

All (64) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
6	D	706	UTP	C3'-C2'-C1'	4.39	107.59	100.98
6	A	601	UTP	C3'-C2'-C1'	4.39	107.59	100.98
6	B	706	UTP	C3'-C2'-C1'	4.39	107.59	100.98
6	C	601	UTP	C3'-C2'-C1'	4.39	107.59	100.98
3	D	702	ATP	PA-O3A-PB	-4.07	118.87	132.83
3	A	604	ATP	PA-O3A-PB	-4.07	118.87	132.83
3	B	702	ATP	PA-O3A-PB	-4.07	118.87	132.83
3	C	604	ATP	PA-O3A-PB	-4.07	118.87	132.83
2	D	701	GTP	PB-O3B-PG	-3.93	119.35	132.83
2	A	603	GTP	PB-O3B-PG	-3.93	119.35	132.83
2	B	701	GTP	PB-O3B-PG	-3.93	119.35	132.83
2	C	603	GTP	PB-O3B-PG	-3.93	119.35	132.83
3	D	702	ATP	PB-O3B-PG	-3.72	120.06	132.83
3	A	604	ATP	PB-O3B-PG	-3.72	120.06	132.83
3	B	702	ATP	PB-O3B-PG	-3.72	120.06	132.83
3	C	604	ATP	PB-O3B-PG	-3.72	120.06	132.83
2	D	701	GTP	C5-C6-N1	3.34	119.86	113.95
2	A	603	GTP	C5-C6-N1	3.34	119.86	113.95
2	B	701	GTP	C5-C6-N1	3.34	119.86	113.95
2	C	603	GTP	C5-C6-N1	3.34	119.86	113.95
6	D	706	UTP	PB-O3A-PA	-3.23	121.73	132.83
6	A	601	UTP	PB-O3A-PA	-3.23	121.73	132.83
6	B	706	UTP	PB-O3A-PA	-3.23	121.73	132.83
6	C	601	UTP	PB-O3A-PA	-3.23	121.73	132.83
2	D	701	GTP	PA-O3A-PB	-3.20	121.83	132.83
2	A	603	GTP	PA-O3A-PB	-3.20	121.83	132.83
2	B	701	GTP	PA-O3A-PB	-3.20	121.83	132.83
2	C	603	GTP	PA-O3A-PB	-3.20	121.83	132.83
3	D	702	ATP	N3-C2-N1	-3.01	123.97	128.68
3	A	604	ATP	N3-C2-N1	-3.01	123.97	128.68
3	B	702	ATP	N3-C2-N1	-3.01	123.97	128.68
3	C	604	ATP	N3-C2-N1	-3.01	123.97	128.68
2	D	701	GTP	C8-N7-C5	3.01	108.73	102.99
2	A	603	GTP	C8-N7-C5	3.01	108.73	102.99
2	B	701	GTP	C8-N7-C5	3.01	108.73	102.99
2	C	603	GTP	C8-N7-C5	3.01	108.73	102.99
2	D	701	GTP	C2-N1-C6	-2.94	119.69	125.10
2	A	603	GTP	C2-N1-C6	-2.94	119.69	125.10
2	B	701	GTP	C2-N1-C6	-2.94	119.69	125.10
2	C	603	GTP	C2-N1-C6	-2.94	119.69	125.10
3	D	702	ATP	C3'-C2'-C1'	2.70	105.05	100.98
3	A	604	ATP	C3'-C2'-C1'	2.70	105.05	100.98
3	B	702	ATP	C3'-C2'-C1'	2.70	105.05	100.98

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	C	604	ATP	C3'-C2'-C1'	2.70	105.05	100.98
6	D	706	UTP	PB-O3B-PG	-2.53	124.15	132.83
6	A	601	UTP	PB-O3B-PG	-2.53	124.15	132.83
6	B	706	UTP	PB-O3B-PG	-2.53	124.15	132.83
6	C	601	UTP	PB-O3B-PG	-2.53	124.15	132.83
3	D	702	ATP	C4-C5-N7	-2.38	106.92	109.40
3	A	604	ATP	C4-C5-N7	-2.38	106.92	109.40
3	B	702	ATP	C4-C5-N7	-2.38	106.92	109.40
3	C	604	ATP	C4-C5-N7	-2.38	106.92	109.40
2	D	701	GTP	C3'-C2'-C1'	2.29	104.43	100.98
2	A	603	GTP	C3'-C2'-C1'	2.29	104.43	100.98
2	B	701	GTP	C3'-C2'-C1'	2.29	104.43	100.98
2	C	603	GTP	C3'-C2'-C1'	2.29	104.43	100.98
2	D	701	GTP	O6-C6-C5	-2.24	119.99	124.37
2	A	603	GTP	O6-C6-C5	-2.24	119.99	124.37
2	B	701	GTP	O6-C6-C5	-2.24	119.99	124.37
2	C	603	GTP	O6-C6-C5	-2.24	119.99	124.37
6	D	706	UTP	O3G-PG-O3B	2.13	111.78	104.64
6	A	601	UTP	O3G-PG-O3B	2.13	111.78	104.64
6	B	706	UTP	O3G-PG-O3B	2.13	111.78	104.64
6	C	601	UTP	O3G-PG-O3B	2.13	111.78	104.64

There are no chirality outliers.

All (66) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	D	701	GTP	C3'-C4'-C5'-O5'
2	A	603	GTP	C3'-C4'-C5'-O5'
2	B	701	GTP	C3'-C4'-C5'-O5'
2	C	603	GTP	C3'-C4'-C5'-O5'
4	D	703	GGL	N-CA-CB-CG
4	D	703	GGL	C-CA-CB-CG
4	A	605	GGL	N-CA-CB-CG
4	A	605	GGL	C-CA-CB-CG
4	B	703	GGL	N-CA-CB-CG
4	B	703	GGL	C-CA-CB-CG
4	C	605	GGL	N-CA-CB-CG
4	C	605	GGL	C-CA-CB-CG
6	D	706	UTP	C5'-O5'-PA-O2A
6	D	706	UTP	C5'-O5'-PA-O3A
6	D	706	UTP	O4'-C1'-N1-C6
6	D	706	UTP	C2'-C1'-N1-C6

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Mol	Chain	Res	Type	Atoms
6	A	601	UTP	C5'-O5'-PA-O2A
6	A	601	UTP	C5'-O5'-PA-O3A
6	A	601	UTP	O4'-C1'-N1-C6
6	A	601	UTP	C2'-C1'-N1-C6
6	B	706	UTP	C5'-O5'-PA-O3A
6	B	706	UTP	O4'-C1'-N1-C6
6	B	706	UTP	C2'-C1'-N1-C6
6	C	601	UTP	C5'-O5'-PA-O3A
6	C	601	UTP	O4'-C1'-N1-C6
6	C	601	UTP	C2'-C1'-N1-C6
2	D	701	GTP	O4'-C4'-C5'-O5'
2	A	603	GTP	O4'-C4'-C5'-O5'
2	B	701	GTP	O4'-C4'-C5'-O5'
2	C	603	GTP	O4'-C4'-C5'-O5'
2	D	701	GTP	PB-O3A-PA-O1A
2	A	603	GTP	PB-O3A-PA-O1A
2	B	701	GTP	PB-O3A-PA-O1A
2	C	603	GTP	PB-O3A-PA-O1A
6	D	706	UTP	PB-O3A-PA-O5'
6	A	601	UTP	PB-O3A-PA-O5'
6	B	706	UTP	PB-O3A-PA-O5'
6	C	601	UTP	PB-O3A-PA-O5'
3	D	702	ATP	PA-O3A-PB-O2B
3	A	604	ATP	PA-O3A-PB-O2B
3	B	702	ATP	PA-O3A-PB-O2B
3	C	604	ATP	PA-O3A-PB-O2B
6	B	706	UTP	C5'-O5'-PA-O1A
6	C	601	UTP	C5'-O5'-PA-O1A
6	D	706	UTP	PA-O3A-PB-O1B
6	A	601	UTP	PA-O3A-PB-O1B
4	B	703	GGL	OE2-CD-CG-CB
4	C	605	GGL	OE2-CD-CG-CB
4	B	703	GGL	OE1-CD-CG-CB
4	C	605	GGL	OE1-CD-CG-CB
4	D	703	GGL	OE1-CD-CG-CB
4	A	605	GGL	OE1-CD-CG-CB
4	D	703	GGL	OE2-CD-CG-CB
4	A	605	GGL	OE2-CD-CG-CB
6	D	706	UTP	O4'-C4'-C5'-O5'
6	A	601	UTP	O4'-C4'-C5'-O5'
6	B	706	UTP	O4'-C4'-C5'-O5'
6	C	601	UTP	O4'-C4'-C5'-O5'

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Mol	Chain	Res	Type	Atoms
2	D	701	GTP	PB-O3A-PA-O2A
2	A	603	GTP	PB-O3A-PA-O2A
2	B	701	GTP	PB-O3A-PA-O2A
2	C	603	GTP	PB-O3A-PA-O2A
3	D	702	ATP	PA-O3A-PB-O1B
3	A	604	ATP	PA-O3A-PB-O1B
3	B	702	ATP	PA-O3A-PB-O1B
3	C	604	ATP	PA-O3A-PB-O1B

There are no ring outliers.

10 monomers are involved in 11 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	B	701	GTP	1	0
2	A	603	GTP	1	0
2	C	603	GTP	1	0
2	D	701	GTP	2	0
4	A	605	GGL	1	0
4	C	605	GGL	1	0
4	B	703	GGL	1	0
4	D	703	GGL	1	0
6	D	706	UTP	1	0
6	B	706	UTP	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 then 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

Ligand GTP B 701

Bond lengths

Bond angles

Torsions

Rings

Ligand GTP A 603

Bond lengths

Bond angles

Torsions

Rings

Ligand GTP C 603

Ligand UTP C 601

Ligand UTP A 601

Bond lengths

Bond angles

Torsions

Rings

Ligand ATP B 702

Bond lengths

Bond angles

Torsions

Rings

Ligand GTP D 701

Ligand GGL A 605

Ligand GGL C 605

Bond lengths

Bond angles

Torsions

Rings

Ligand GGL B 703

Bond lengths

Bond angles

Torsions

Rings

Ligand ATP D 702

Ligand GGL D 703

Ligand ATP C 604

Ligand ATP A 604

Ligand UTP D 706

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-32542. 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: 125

Y Index: 125

Z Index: 125

6.2.2 Raw map

X Index: 125

Y Index: 125

Z Index: 125

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: 103

Y Index: 134

Z Index: 137

6.3.2 Raw map

X Index: 103

Y Index: 121

Z Index: 113

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

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

6.4.1 Primary map

X

Y

Z

6.4.2 Raw map

X

Y

Z

The images above show the map standard deviation projections with false color in three orthogonal directions. Minimum values are shown in green, max in blue, and dark to light orange shades represent small to large values respectively.

6.5 Orthogonal surface views (i)

6.5.1 Primary map

X Y Z

The images above show the 3D surface view of the map at the recommended contour level 0.022. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

6.5.2 Raw map

X Y Z

These images show the 3D surface of the raw map. The raw map's contour level was selected so that its surface encloses the same volume as the primary map does at its recommended contour level.

6.6 Mask visualisation (i)

This section shows the 3D surface view of the primary map at 50% transparency overlaid with the specified mask at 0% transparency

A mask typically either:

- Encompasses the whole structure
- Separates out a domain, a functional unit, a monomer or an area of interest from a larger structure

6.6.1 emd_32542_msk_1.map (i)

X

Y

Z

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 148 nm^3; this corresponds to an approximate mass of 134 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 0.317 Å^{-1}

8 Fourier-Shell correlation (i)

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

9 Map-model fit (i)

This section contains information regarding the fit between EMDB map EMD-32542 and PDB model 7WJ4. Per-residue inclusion information can be found in section 3 on page 7.

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 0.022 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

9.2 Q-score mapped to coordinate model (i)

X Y Z

The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions at which atoms can be resolved. Low Q-score values may therefore be expected for many entries.

9.3 Atom inclusion mapped to coordinate model (i)

X Y Z

The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.022).

9.4 Atom inclusion (i)

At the recommended contour level, 95% of all backbone atoms, 90% of all non-hydrogen atoms, are inside the map.

9.5 Map-model fit summary (i)

The table lists the average atom inclusion at the recommended contour level (0.022) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.9040	0.5170
A	0.9100	0.5200
B	0.9040	0.5140
C	0.9020	0.5150
D	0.9020	0.5180