Full wwPDB X-ray Structure Validation Report (i)

Dec 16, 2025 – 11:00 PM JST

PDB ID	:	7F6U / pdb_00007f6u
Title	:	Crystal structure of metal-citrate-binding mutant (Y221A) protein (MctA) of ABC transporter in apo state
Authors	:	Kanaujia, S.P.; Mandal, S.K.
Deposited on	:	2021-06-25
Resolution	:	1.75 Å(reported)

This is a Full wwPDB X-ray Structure 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/XrayValidationReportHelp
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 (i)) were used in the production of this report:

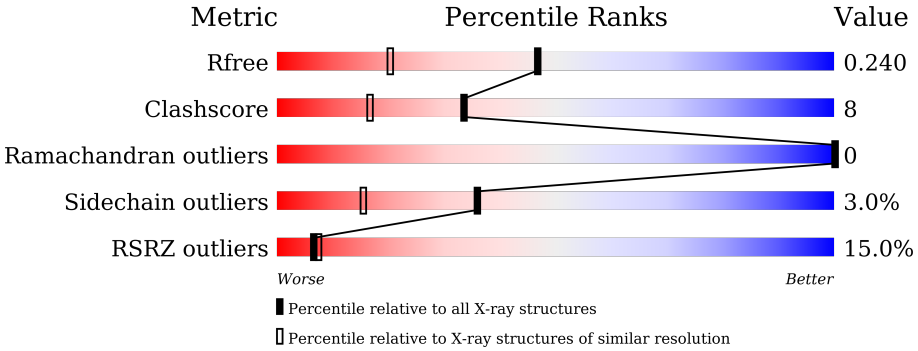
MolProbity	:	4-5-2 with Phenix2.0
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	2.0
EDS	:	3.0
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4	:	9.0.011 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.47

1 Overall quality at a glance (i)

The following experimental techniques were used to determine the structure:
X-RAY DIFFRACTION

The reported resolution of this entry is 1.75 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)	Similar resolution (#Entries, resolution range(Å))
R_{free}	164625	2888 (1.76-1.76)
Clashscore	180529	3097 (1.76-1.76)
Ramachandran outliers	177936	3072 (1.76-1.76)
Sidechain outliers	177891	3072 (1.76-1.76)
RSRZ outliers	164620	2887 (1.76-1.76)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower 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 electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	342	15% 74% 20% 5% •

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
5	EDO	A	408	-	-	X	-
7	BGQ	A	410	-	-	X	-

2 Entry composition (i)

There are 10 unique types of molecules in this entry. The entry contains 3028 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, the ZeroOcc column contains the number of atoms modelled with zero occupancy, 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 Iron ABC transporter, periplasmic iron-binding protein.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	339	2694	1724	469	496	5	0	5	0

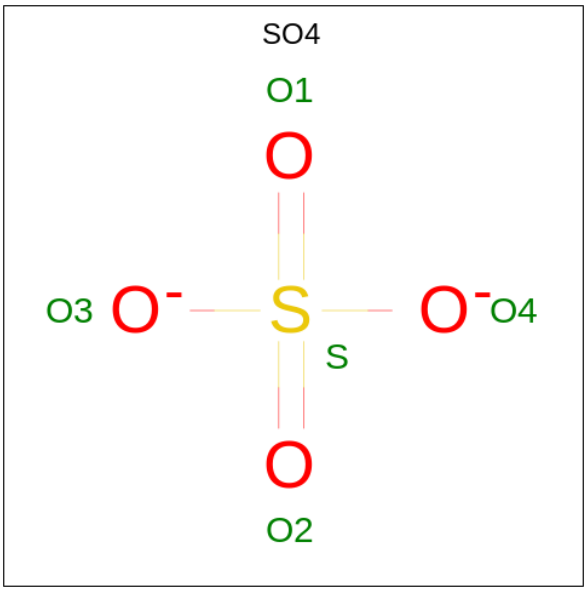
There are 3 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-1	MET	-	initiating methionine	UNP Q53VZ2
A	0	MET	-	expression tag	UNP Q53VZ2
A	221	ALA	TYR	engineered mutation	UNP Q53VZ2

- Molecule 2 is SODIUM ION (CCD ID: NA) (formula: Na).

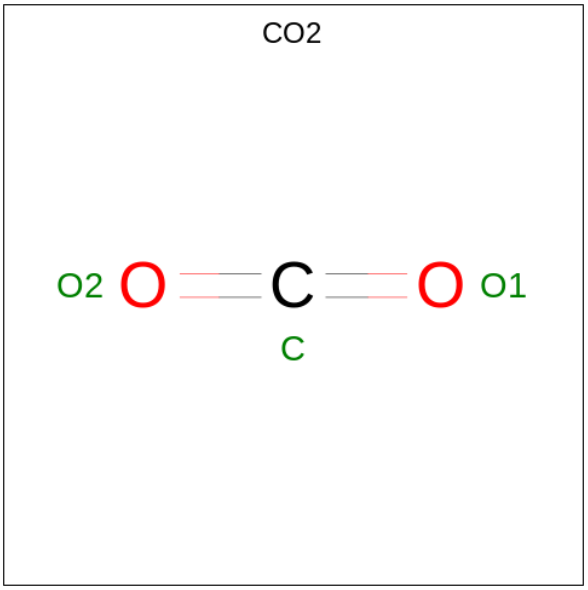
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	Na		
2	A	2	2	2	0	0

- Molecule 3 is SULFATE ION (CCD ID: SO4) (formula: O_4S).



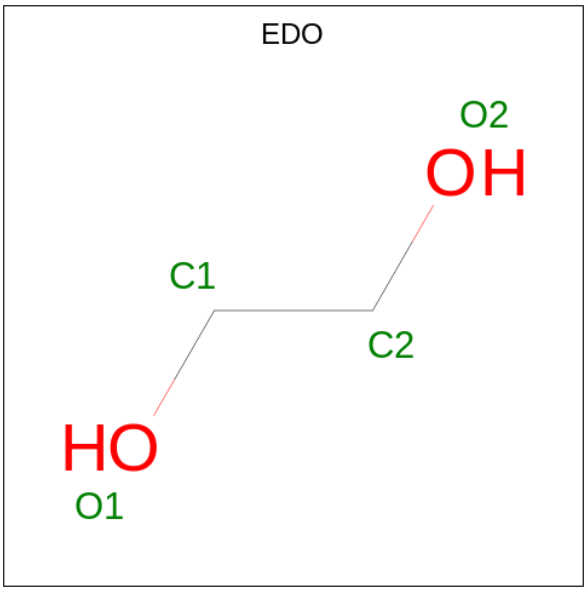
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	1	Total O S 5 4 1	0	0

- Molecule 4 is CARBON DIOXIDE (CCD ID: CO2) (formula: CO_2).



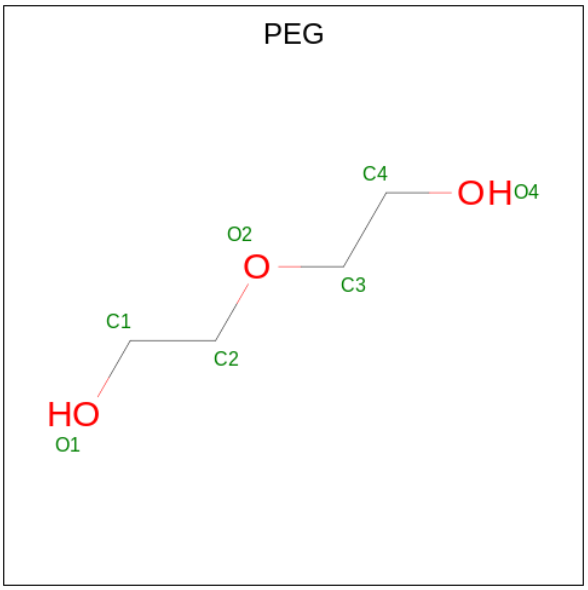
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	1	Total C O 3 1 2	0	0

- Molecule 5 is 1,2-ETHANEDIOL (CCD ID: EDO) (formula: $C_2H_6O_2$).



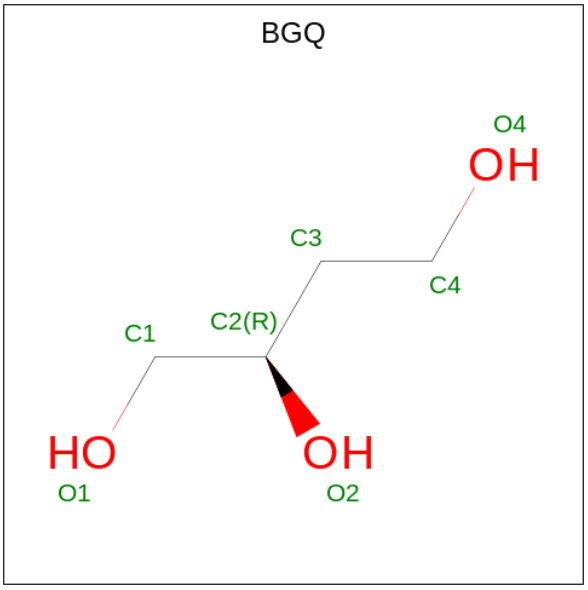
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
			Total	C	O		
5	A	1	4	2	2	0	0
5	A	1	4	2	2	0	0
5	A	1	4	2	2	0	0
5	A	1	4	2	2	0	0

- Molecule 6 is DI(HYDROXYETHYL)ETHER (CCD ID: PEG) (formula: $C_4H_{10}O_3$).



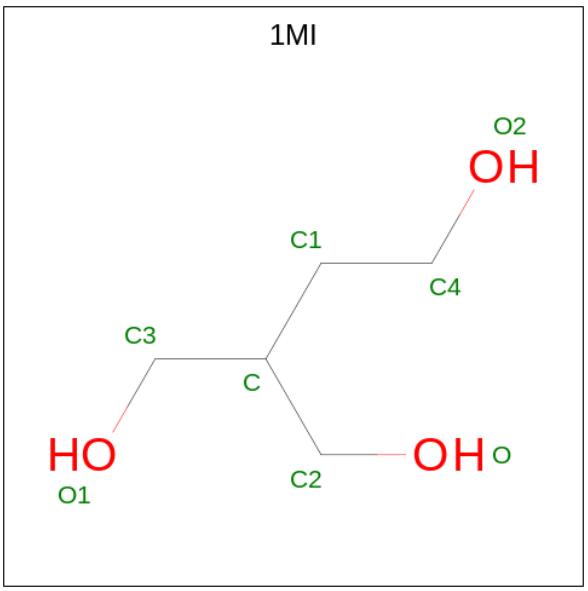
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
			Total	C	O		
6	A	1	7	4	3	0	0

- Molecule 7 is 2-HYDROXY BUTANE-1,4-DIOL (CCD ID: BGQ) (formula: $C_4H_{10}O_3$).



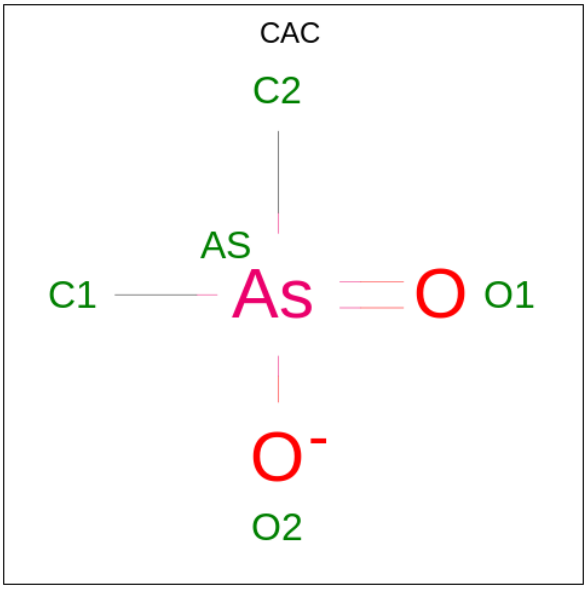
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
			Total	C	O		
7	A	1	7	4	3	0	0

- Molecule 8 is 2-(hydroxymethyl)butane-1,4-diol (CCD ID: 1MI) (formula: $C_5H_{12}O_3$).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
			Total	C	O		
8	A	1	8	5	3	0	0

- Molecule 9 is CACODYLATE ION (CCD ID: CAC) (formula: $C_2H_6AsO_2$).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	As	C	O		
9	A	1	5	1	2	2	0	0

- Molecule 10 is water.

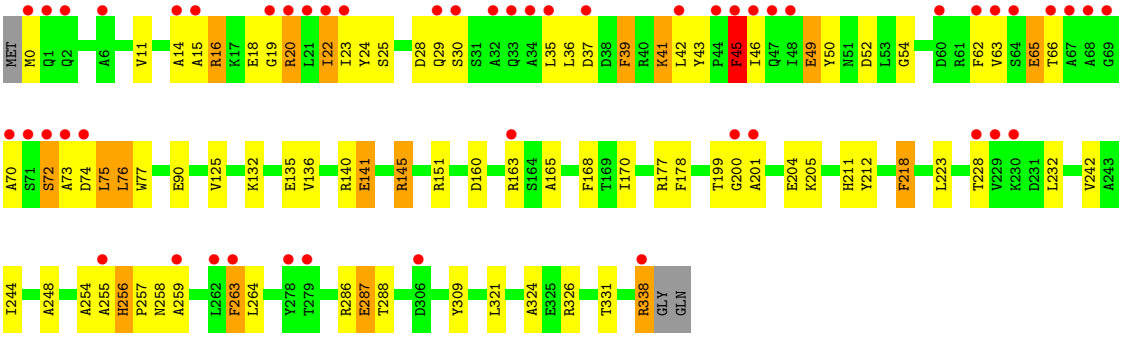
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	O		
10	A	281	281	281	0	0

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 electron 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 dot above a residue indicates a poor fit to the electron density (RSRZ > 2). 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: Iron ABC transporter, periplasmic iron-binding protein

Chain A: 15% 74% 20% 5%



4 Data and refinement statistics (i)

Property	Value	Source
Space group	I 2 2 2	Depositor
Cell constants a, b, c, α, β, γ	44.42Å 108.61Å 163.17Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	48.68 – 1.75 48.68 – 1.75	Depositor EDS
% Data completeness (in resolution range)	100.0 (48.68-1.75) 100.0 (48.68-1.75)	Depositor EDS
R_{merge}	0.09	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	2.26 (at 1.75Å)	Xtriage
Refinement program	REFMAC 5.8.0267	Depositor
R, R_{free}	0.204 , 0.236 0.212 , 0.240	Depositor DCC
R_{free} test set	1985 reflections (4.91%)	wwPDB-VP
Wilson B-factor (Å^2)	23.0	Xtriage
Anisotropy	0.272	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.35 , 40.7	EDS
L-test for twinning[2]	$< \|L\| > = 0.50$, $< L^2 > = 0.34$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.95	EDS
Total number of atoms	3028	wwPDB-VP
Average B, all atoms (Å^2)	29.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 6.31% of the height of the origin peak. No significant pseudotranslation is detected.*

[1]Intensities estimated from amplitudes.

[2]Theoretical values of $< |L| >$, $< L^2 >$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

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: EDO, SO4, NA, 1MI, CAC, BGQ, PEG, CO2

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	51/2767 (1.8%)	1.59	39/3752 (1.0%)

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	2

All (51) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	42	LEU	C-O	-15.26	1.05	1.24
1	A	259	ALA	C-O	12.45	1.39	1.24
1	A	37	ASP	CG-OD1	12.33	1.48	1.25
1	A	46	ILE	C-O	-11.33	1.11	1.24
1	A	263	PHE	N-CA	11.03	1.59	1.46
1	A	18	GLU	C-O	-10.92	1.11	1.24
1	A	11	VAL	C-O	-10.51	1.12	1.24
1	A	45	PHE	C-O	9.23	1.36	1.24
1	A	15	ALA	C-O	8.84	1.34	1.24
1	A	37	ASP	CG-OD2	8.78	1.42	1.25
1	A	135	GLU	CD-OE1	8.54	1.41	1.25
1	A	14	ALA	C-O	8.26	1.33	1.24
1	A	62	PHE	CA-C	8.00	1.63	1.52
1	A	201	ALA	N-CA	7.91	1.56	1.46
1	A	151	ARG	NE-CZ	7.78	1.41	1.33
1	A	254	ALA	C-O	7.43	1.32	1.23
1	A	49[A]	GLU	C-O	7.23	1.32	1.23
1	A	49[B]	GLU	C-O	7.23	1.32	1.23

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	20	ARG	C-O	6.84	1.32	1.23
1	A	63	VAL	N-CA	6.83	1.54	1.46
1	A	19	GLY	CA-C	6.82	1.61	1.51
1	A	257	PRO	C-O	6.78	1.32	1.24
1	A	212	TYR	C-N	6.73	1.42	1.33
1	A	29	GLN	CA-C	6.65	1.61	1.52
1	A	22	ILE	N-CA	6.63	1.54	1.46
1	A	264	LEU	C-O	6.49	1.31	1.24
1	A	75	LEU	C-O	6.43	1.31	1.23
1	A	65	GLU	CD-OE1	6.39	1.37	1.25
1	A	258	ASN	C-O	6.38	1.31	1.24
1	A	14	ALA	C-N	6.29	1.42	1.33
1	A	248	ALA	C-O	-6.23	1.16	1.24
1	A	211	HIS	CE1-NE2	6.20	1.38	1.32
1	A	22	ILE	C-O	6.10	1.30	1.24
1	A	205	LYS	C-O	5.91	1.31	1.24
1	A	35	LEU	C-O	-5.90	1.16	1.24
1	A	324	ALA	N-CA	5.88	1.53	1.46
1	A	16	ARG	C-O	5.84	1.30	1.24
1	A	263	PHE	C-O	5.75	1.30	1.24
1	A	43	TYR	N-CA	5.69	1.53	1.46
1	A	255	ALA	CA-C	5.64	1.60	1.52
1	A	223	LEU	N-CA	5.55	1.53	1.46
1	A	45	PHE	C-N	5.46	1.40	1.33
1	A	75	LEU	N-CA	5.46	1.52	1.46
1	A	70	ALA	C-O	5.45	1.30	1.23
1	A	141	GLU	C-O	5.40	1.30	1.24
1	A	62	PHE	C-O	-5.20	1.18	1.24
1	A	264	LEU	N-CA	5.13	1.52	1.46
1	A	63	VAL	C-O	5.11	1.30	1.24
1	A	52	ASP	C-O	5.09	1.30	1.24
1	A	205	LYS	N-CA	5.05	1.52	1.46
1	A	39	PHE	C-O	5.01	1.29	1.24

All (39) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	20	ARG	CA-C-O	-11.44	108.48	121.40
1	A	201	ALA	N-CA-C	-10.74	99.65	111.36
1	A	20	ARG	O-C-N	10.12	135.42	123.17
1	A	19	GLY	CA-C-O	-9.15	108.87	119.02
1	A	50	TYR	CB-CA-C	8.95	125.58	110.81

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	63	VAL	N-CA-C	-8.66	101.98	110.72
1	A	66	THR	CA-CB-OG1	-6.32	100.12	109.60
1	A	18	GLU	CA-C-O	6.17	127.25	120.90
1	A	218	PHE	CA-CB-CG	-6.16	107.64	113.80
1	A	45	PHE	CA-C-N	-6.15	114.89	123.13
1	A	45	PHE	C-N-CA	-6.15	114.89	123.13
1	A	39	PHE	CA-C-O	-6.07	114.11	120.55
1	A	140	ARG	CA-C-O	-6.03	114.16	120.55
1	A	254	ALA	CA-C-N	5.98	129.41	120.31
1	A	254	ALA	C-N-CA	5.98	129.41	120.31
1	A	19	GLY	O-C-N	5.96	129.97	122.39
1	A	255	ALA	CA-C-O	5.87	126.72	119.97
1	A	36	LEU	O-C-N	5.68	128.15	122.08
1	A	36	LEU	CA-C-O	-5.66	114.84	121.07
1	A	66	THR	CA-C-N	5.63	127.75	120.44
1	A	66	THR	C-N-CA	5.63	127.75	120.44
1	A	66	THR	O-C-N	5.53	129.41	122.23
1	A	18	GLU	N-CA-C	-5.50	104.92	111.03
1	A	331	THR	CB-CA-C	-5.46	102.31	110.88
1	A	50	TYR	N-CA-C	-5.45	99.63	108.41
1	A	62	PHE	N-CA-C	-5.44	104.58	111.11
1	A	287	GLU	CB-CG-CD	5.38	121.75	112.60
1	A	29	GLN	O-C-N	5.37	127.68	122.09
1	A	178	PHE	CA-C-O	5.35	124.65	119.62
1	A	204	GLU	CB-CA-C	-5.25	102.07	110.79
1	A	29	GLN	CA-C-O	-5.23	115.31	120.90
1	A	90	GLU	CB-CG-CD	5.15	121.35	112.60
1	A	22	ILE	CA-C-N	-5.12	116.84	123.19
1	A	22	ILE	C-N-CA	-5.12	116.84	123.19
1	A	49[A]	GLU	CA-C-N	-5.12	115.62	122.42
1	A	49[A]	GLU	C-N-CA	-5.12	115.62	122.42
1	A	49[B]	GLU	CA-C-N	-5.12	115.62	122.42
1	A	49[B]	GLU	C-N-CA	-5.12	115.62	122.42
1	A	256	HIS	CA-CB-CG	-5.05	108.75	113.80

There are no chirality outliers.

All (2) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	23	ILE	Peptide
1	A	45	PHE	Mainchain

5.2 Too-close contacts (i)

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	2694	0	2715	39	0
2	A	2	0	0	0	0
3	A	5	0	0	0	0
4	A	3	0	0	0	0
5	A	16	0	24	5	0
6	A	7	0	10	2	0
7	A	7	0	9	6	0
8	A	8	0	0	0	0
9	A	5	0	0	0	0
10	A	281	0	0	8	3
All	All	3028	0	2758	42	3

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 8.

All (42) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:288:THR:HG21	7:A:410:BGQ:H32C	1.48	0.94
1:A:20:ARG:NH2	1:A:49[A]:GLU:OE1	2.03	0.91
1:A:287:GLU:HG3	10:A:578:HOH:O	1.87	0.73
1:A:286:ARG:HH11	7:A:410:BGQ:H41C	1.55	0.72
1:A:41:LYS:NZ	10:A:501:HOH:O	2.22	0.72
1:A:160:ASP:OD2	1:A:163:ARG:NH2	2.23	0.71
7:A:410:BGQ:O1	7:A:410:BGQ:C4	2.44	0.64
1:A:287:GLU:CG	10:A:578:HOH:O	2.45	0.63
1:A:338:ARG:C	10:A:683:HOH:O	2.44	0.61
1:A:244:ILE:HD11	6:A:409:PEG:C1	2.30	0.61
1:A:168:PHE:HB2	5:A:408:EDO:H21	1.85	0.58
1:A:326:ARG:HH12	5:A:408:EDO:H22	1.71	0.54
1:A:125[B]:VAL:CG1	1:A:232:LEU:HD11	2.38	0.54
1:A:288:THR:CG2	7:A:410:BGQ:H32C	2.29	0.53
1:A:177[B]:ARG:HD3	1:A:309:TYR:CG	2.44	0.53
1:A:160:ASP:OD2	1:A:163:ARG:CZ	2.59	0.51
1:A:24:TYR:OH	1:A:65:GLU:OE1	2.23	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:74:ASP:CG	1:A:256:HIS:HD1	2.19	0.50
1:A:76:LEU:HD22	1:A:76:LEU:N	2.26	0.50
1:A:39:PHE:CE1	1:A:263:PHE:HA	2.47	0.50
1:A:168:PHE:CB	5:A:408:EDO:H21	2.42	0.49
1:A:28[A]:ASP:OD2	1:A:30:SER:OG	2.26	0.49
1:A:228:THR:HG22	10:A:771:HOH:O	2.14	0.48
7:A:410:BGQ:O1	7:A:410:BGQ:H42C	2.12	0.48
1:A:75:LEU:C	1:A:76:LEU:HD22	2.39	0.48
1:A:25:SER:HA	1:A:77:TRP:O	2.14	0.47
1:A:199:THR:O	1:A:200:GLY:C	2.56	0.47
1:A:65:GLU:OE1	1:A:72:SER:OG	2.19	0.47
1:A:141:GLU:O	1:A:145:ARG:HG3	2.15	0.46
1:A:165:ALA:HA	5:A:408:EDO:H12	1.98	0.46
1:A:218:PHE:HD2	6:A:409:PEG:H31	1.82	0.45
1:A:326:ARG:HD2	10:A:502:HOH:O	2.17	0.45
7:A:410:BGQ:H12C	10:A:710:HOH:O	2.16	0.45
1:A:22:ILE:HG22	1:A:73:ALA:HA	1.99	0.44
1:A:54:GLY:HA3	10:A:632:HOH:O	2.18	0.43
1:A:170:ILE:CD1	1:A:242[A]:VAL:HG12	2.49	0.43
1:A:170:ILE:HD12	1:A:170:ILE:HA	1.82	0.43
1:A:132:LYS:O	1:A:136:VAL:HG23	2.20	0.41
1:A:45:PHE:C	1:A:45:PHE:CD1	2.99	0.41
1:A:218:PHE:CE1	1:A:244:ILE:HG12	2.56	0.41
1:A:326:ARG:HH12	5:A:408:EDO:C1	2.33	0.41
1:A:22:ILE:CG2	1:A:73:ALA:HA	2.51	0.40

All (3) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
10:A:695:HOH:O	10:A:695:HOH:O[3_555]	1.67	0.53
10:A:514:HOH:O	10:A:514:HOH:O[2_565]	1.75	0.45
10:A:750:HOH:O	10:A:771:HOH:O[8_455]	2.15	0.05

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 X-ray entries followed by that with respect to entries

of similar resolution.

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	342/342 (100%)	338 (99%)	4 (1%)	0	100 100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains (i)

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

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	276/273 (101%)	268 (97%)	8 (3%)	37 17

All (8) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	0	MET
1	A	16	ARG
1	A	41	LYS
1	A	72	SER
1	A	76	LEU
1	A	145	ARG
1	A	321	LEU
1	A	338	ARG

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

Mol	Chain	Res	Type
1	A	148	GLN
1	A	226	GLN
1	A	258	ASN

5.3.3 RNA (i)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates (i)

There are no oligosaccharides in this entry.

5.6 Ligand geometry (i)

Of 12 ligands modelled in this entry, 2 are monoatomic - leaving 10 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	$\#\|Z\| > 2$
5	EDO	A	406	-	3,3,3	0.13	0	2,2,2	0.25	0
4	CO2	A	404	-	2,2,2	0.36	0	1,1,1	0.76	0
5	EDO	A	407	-	3,3,3	0.05	0	2,2,2	0.16	0
5	EDO	A	408	-	3,3,3	0.36	0	2,2,2	0.54	0
6	PEG	A	409	-	6,6,6	0.40	0	5,5,5	0.34	0
9	CAC	A	412	2	0,4,4	-	-	0,6,6	-	-
3	SO4	A	403	-	4,4,4	0.32	0	6,6,6	0.25	0
8	1MI	A	411	-	7,7,7	0.55	0	6,7,7	0.62	0
7	BGQ	A	410	-	6,6,6	0.37	0	4,6,6	0.77	0
5	EDO	A	405	-	3,3,3	0.26	0	2,2,2	0.52	0

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
5	EDO	A	406	-	-	1/1/1/1	-
5	EDO	A	407	-	-	1/1/1/1	-
5	EDO	A	408	-	-	0/1/1/1	-
6	PEG	A	409	-	-	4/4/4/4	-
8	1MI	A	411	-	-	5/7/7/7	-
7	BGQ	A	410	-	-	3/5/5/5	-
5	EDO	A	405	-	-	0/1/1/1	-

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (14) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
7	A	410	BGQ	O1-C1-C2-C3
7	A	410	BGQ	C2-C3-C4-O4
8	A	411	1MI	C3-C-C1-C4
8	A	411	1MI	C2-C-C3-O1
6	A	409	PEG	O2-C3-C4-O4
7	A	410	BGQ	O1-C1-C2-O2
5	A	406	EDO	O1-C1-C2-O2
6	A	409	PEG	C1-C2-O2-C3
8	A	411	1MI	C-C1-C4-O2
8	A	411	1MI	C1-C-C3-O1
8	A	411	1MI	C1-C-C2-O
5	A	407	EDO	O1-C1-C2-O2
6	A	409	PEG	O1-C1-C2-O2
6	A	409	PEG	C4-C3-O2-C2

There are no ring outliers.

3 monomers are involved in 13 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	A	408	EDO	5	0
6	A	409	PEG	2	0
7	A	410	BGQ	6	0

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 Fit of model and data (i)

6.1 Protein, DNA and RNA chains (i)

In the following table, the column labelled '#RSRZ> 2' contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95th percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled 'Q< 0.9' lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å^2)	Q<0.9
1	A	339/342 (99%)	0.72	51 (15%) 6 7	11, 25, 49, 89	5 (1%)

All (51) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	0	MET	6.1
1	A	68	ALA	4.7
1	A	63	VAL	4.4
1	A	1	GLN	3.7
1	A	338	ARG	3.7
1	A	64	SER	3.5
1	A	67	ALA	3.4
1	A	46	ILE	3.3
1	A	66	THR	3.3
1	A	45	PHE	3.3
1	A	70	ALA	3.3
1	A	73	ALA	3.3
1	A	22	ILE	3.2
1	A	42	LEU	3.2
1	A	255	ALA	3.1
1	A	15	ALA	3.0
1	A	30	SER	3.0
1	A	2	GLN	3.0
1	A	34	ALA	3.0
1	A	200	GLY	3.0
1	A	62	PHE	2.9
1	A	23	ILE	2.9
1	A	262	LEU	2.9
1	A	60	ASP	2.9
1	A	48	ILE	2.8
1	A	14	ALA	2.7
1	A	163	ARG	2.7

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Mol	Chain	Res	Type	RSRZ
1	A	72	SER	2.6
1	A	21	LEU	2.6
1	A	259	ALA	2.6
1	A	229	VAL	2.6
1	A	19	GLY	2.5
1	A	29	GLN	2.5
1	A	74	ASP	2.5
1	A	279	THR	2.5
1	A	20	ARG	2.5
1	A	230	LYS	2.4
1	A	263	PHE	2.3
1	A	201	ALA	2.3
1	A	278	TYR	2.3
1	A	47	GLN	2.3
1	A	306	ASP	2.3
1	A	32	ALA	2.3
1	A	35	LEU	2.1
1	A	71	SER	2.1
1	A	37	ASP	2.1
1	A	228	THR	2.1
1	A	33	GLN	2.0
1	A	6	ALA	2.0
1	A	69	GLY	2.0
1	A	44	PRO	2.0

6.2 Non-standard residues in protein, DNA, RNA chains (i)

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

6.3 Carbohydrates (i)

There are no oligosaccharides in this entry.

6.4 Ligands (i)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
6	PEG	A	409	7/7	0.62	0.27	41,47,51,54	0
5	EDO	A	405	4/4	0.67	0.23	49,53,53,54	0
5	EDO	A	408	4/4	0.81	0.23	33,33,34,38	0
5	EDO	A	407	4/4	0.82	0.18	54,54,55,58	0
5	EDO	A	406	4/4	0.83	0.19	58,59,60,61	0
9	CAC	A	412	5/5	0.84	0.22	82,84,86,88	0
7	BGQ	A	410	7/7	0.85	0.14	37,40,44,47	0
8	1MI	A	411	8/8	0.87	0.13	29,34,40,43	0
3	SO4	A	403	5/5	0.89	0.10	37,45,48,48	0
2	NA	A	402	1/1	0.93	0.09	36,36,36,36	0
4	CO2	A	404	3/3	0.93	0.16	34,34,36,42	0
2	NA	A	401	1/1	0.99	0.03	23,23,23,23	0

6.5 Other polymers (i)

There are no such residues in this entry.