Full wwPDB X-ray Structure Validation Report (i)

Jun 17, 2024 – 08:44 PM EDT

PDB ID	:	3NE9
Title	:	Chronobacterium ammoiniagenes apo-ACPS structure
Authors	:	Gokulan, K.; Mycobacterium Tuberculosis Structural Proteomics Project (XMTB)
Deposited on	:	2010-06-08
Resolution	:	2.50 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:

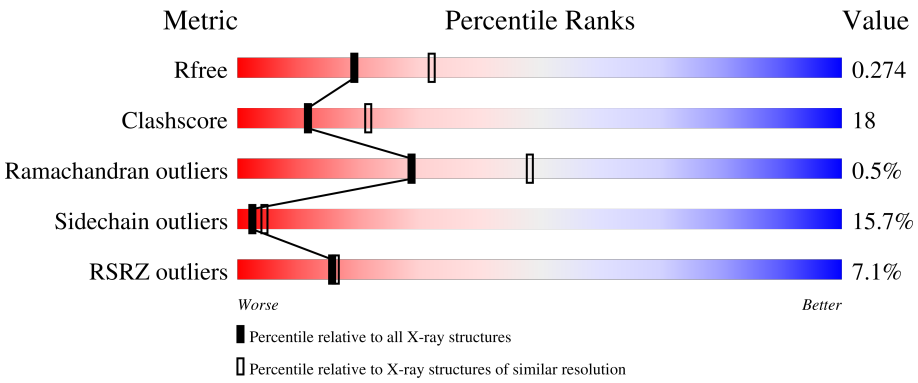
MolProbity	:	4.02b-467
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	1.20.1
EDS	:	2.37.1
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.37.1

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 2.50 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}	130704	4661 (2.50-2.50)
Clashscore	141614	5346 (2.50-2.50)
Ramachandran outliers	138981	5231 (2.50-2.50)
Sidechain outliers	138945	5233 (2.50-2.50)
RSRZ outliers	127900	4559 (2.50-2.50)

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	153	3%, 62%, 22%, 5%, •, 10%
1	B	153	7%, 62%, 19%, 7%, •, 10%
1	C	153	9%, 50%, 28%, 7%, •, 13%

2 Entry composition (i)

There are 3 unique types of molecules in this entry. The entry contains 3318 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.

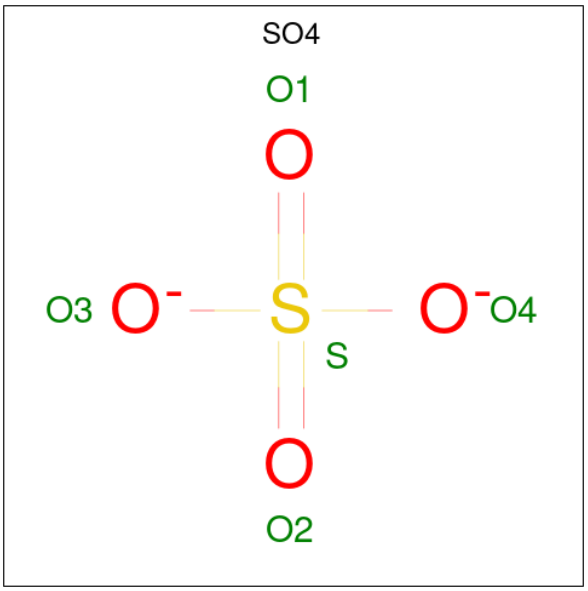
- Molecule 1 is a protein called Phosphopantetheine protein transferase, Ppt1p.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
			Total	C	N	O	S	Se			
1	A	138	1087	688	198	199	1	1	0	0	0
1	B	138	1088	688	198	200	1	1	0	0	0
1	C	133	1050	668	187	193	1	1	0	0	0

There are 6 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	48	SER	ASP	SEE REMARK 999	UNP O31302
A	146	LEU	GLN	SEE REMARK 999	UNP O31302
B	48	SER	ASP	SEE REMARK 999	UNP O31302
B	146	LEU	GLN	SEE REMARK 999	UNP O31302
C	48	SER	ASP	SEE REMARK 999	UNP O31302
C	146	LEU	GLN	SEE REMARK 999	UNP O31302

- Molecule 2 is SULFATE ION (three-letter code: SO4) (formula: O_4S).



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

- Molecule 3 is water.

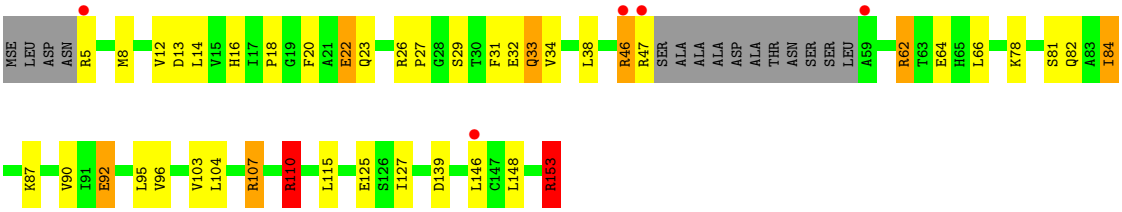
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	25	Total O 25 25	0	0
3	B	30	Total O 30 30	0	0
3	C	18	Total O 18 18	0	0

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.

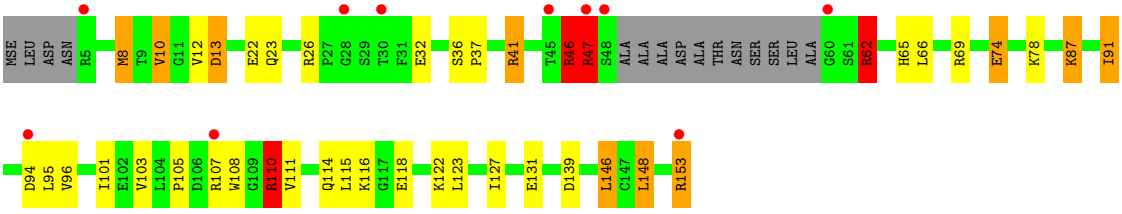
• Molecule 1: Phosphopantetheine protein transferase, Ppt1p

Chain A:



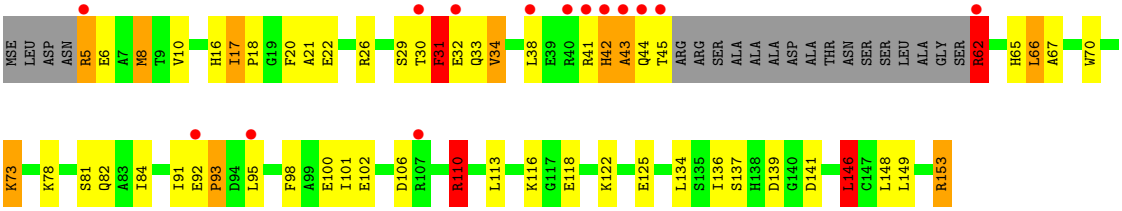
• Molecule 1: Phosphopantetheine protein transferase, Ppt1p

Chain B:



• Molecule 1: Phosphopantetheine protein transferase, Ppt1p

Chain C:



4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α, β, γ	51.40Å 59.00Å 153.56Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	30.00 – 2.50 26.36 – 2.48	Depositor EDS
% Data completeness (in resolution range)	98.4 (30.00-2.50) 98.0 (26.36-2.48)	Depositor EDS
R_{merge}	0.05	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	4.04 (at 2.47Å)	Xtriage
Refinement program	REFMAC 5.1.24	Depositor
R, R_{free}	0.205 , 0.268 0.215 , 0.274	Depositor DCC
R_{free} test set	853 reflections (5.08%)	wwPDB-VP
Wilson B-factor (Å^2)	20.7	Xtriage
Anisotropy	0.454	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.35 , 35.4	EDS
L-test for twinning[2]	$< \|L\| > = 0.49$, $< L^2 > = 0.32$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.90	EDS
Total number of atoms	3318	wwPDB-VP
Average B, all atoms (Å^2)	31.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.32% 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: SO4

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	1.47	6/1109 (0.5%)	1.37	11/1498 (0.7%)
1	B	1.47	7/1110 (0.6%)	1.37	13/1499 (0.9%)
1	C	1.46	6/1072 (0.6%)	1.42	14/1450 (1.0%)
All	All	1.47	19/3291 (0.6%)	1.38	38/4447 (0.9%)

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	B	0	2
1	C	0	1
All	All	0	3

All (19) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	22	GLU	CD-OE1	7.03	1.33	1.25
1	B	153	ARG	C-OXT	6.87	1.36	1.23
1	B	74	GLU	CD-OE2	6.71	1.33	1.25
1	C	32	GLU	CG-CD	6.57	1.61	1.51
1	A	29	SER	CB-OG	-6.45	1.33	1.42
1	A	32	GLU	CG-CD	6.10	1.61	1.51
1	B	32	GLU	CG-CD	5.90	1.60	1.51
1	A	103	VAL	CB-CG2	-5.72	1.40	1.52
1	A	92	GLU	CD-OE1	5.64	1.31	1.25
1	B	108	TRP	CB-CG	-5.63	1.40	1.50
1	A	22	GLU	CD-OE1	-5.57	1.19	1.25
1	C	100	GLU	CD-OE1	5.31	1.31	1.25
1	B	118	GLU	CD-OE2	5.29	1.31	1.25

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	C	81	SER	CA-CB	-5.25	1.45	1.52
1	C	93	PRO	N-CD	5.20	1.55	1.47
1	B	153	ARG	C-O	5.19	1.33	1.23
1	A	64	GLU	CD-OE2	5.16	1.31	1.25
1	C	81	SER	CB-OG	-5.05	1.35	1.42
1	C	21	ALA	CA-CB	5.03	1.63	1.52

All (38) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	C	139	ASP	CB-CG-OD2	9.68	127.01	118.30
1	A	110	ARG	NE-CZ-NH1	9.54	125.07	120.30
1	A	62	ARG	NE-CZ-NH1	9.34	124.97	120.30
1	B	41	ARG	NE-CZ-NH2	-8.86	115.87	120.30
1	C	92	GLU	C-N-CD	8.70	146.67	128.40
1	A	13	ASP	CB-CG-OD1	8.03	125.53	118.30
1	C	73	LYS	CD-CE-NZ	-7.93	93.47	111.70
1	C	110	ARG	NE-CZ-NH2	-7.92	116.34	120.30
1	B	94	ASP	CB-CG-OD2	7.33	124.90	118.30
1	B	139	ASP	CB-CG-OD2	7.22	124.80	118.30
1	C	110	ARG	NE-CZ-NH1	7.19	123.90	120.30
1	C	146	LEU	CA-CB-CG	7.14	131.72	115.30
1	A	153	ARG	NE-CZ-NH1	7.07	123.84	120.30
1	C	110	ARG	CG-CD-NE	-6.79	97.55	111.80
1	B	62	ARG	NE-CZ-NH1	6.76	123.68	120.30
1	C	153	ARG	NE-CZ-NH1	6.63	123.61	120.30
1	B	110	ARG	NE-CZ-NH2	-6.43	117.09	120.30
1	B	110	ARG	CA-CB-CG	6.36	127.40	113.40
1	B	110	ARG	CB-CG-CD	6.34	128.09	111.60
1	B	110	ARG	CG-CD-NE	-6.32	98.54	111.80
1	B	78	LYS	CD-CE-NZ	-5.98	97.94	111.70
1	A	139	ASP	CB-CG-OD1	5.96	123.66	118.30
1	C	149	LEU	CB-CG-CD1	-5.95	100.89	111.00
1	A	14	LEU	CB-CG-CD2	-5.93	100.92	111.00
1	B	13	ASP	CB-CG-OD1	5.84	123.56	118.30
1	A	110	ARG	CB-CG-CD	5.80	126.67	111.60
1	A	153	ARG	NE-CZ-NH2	-5.73	117.44	120.30
1	A	110	ARG	NE-CZ-NH2	-5.71	117.44	120.30
1	C	93	PRO	CA-N-CD	-5.69	103.53	111.50
1	B	148	LEU	CB-CG-CD1	-5.67	101.36	111.00
1	C	141	ASP	CB-CG-OD2	5.50	123.25	118.30
1	B	110	ARG	NE-CZ-NH1	5.39	123.00	120.30

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	62	ARG	NE-CZ-NH2	-5.37	117.62	120.30
1	C	84	ILE	CA-CB-CG2	5.34	121.57	110.90
1	B	146	LEU	CB-CG-CD1	5.30	120.02	111.00
1	C	106	ASP	CB-CG-OD1	5.11	122.90	118.30
1	C	62	ARG	NE-CZ-NH1	5.10	122.85	120.30
1	A	32	GLU	OE1-CD-OE2	-5.07	117.22	123.30

There are no chirality outliers.

All (3) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	B	46	ARG	Peptide
1	B	47	ARG	Peptide
1	C	43	ALA	Peptide

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	1087	0	1081	52	0
1	B	1088	0	1081	52	0
1	C	1050	0	1042	47	0
2	A	10	0	0	2	0
2	B	10	0	0	2	0
3	A	25	0	0	0	0
3	B	30	0	0	0	0
3	C	18	0	0	0	0
All	All	3318	0	3204	113	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 18.

All (113) 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:12:VAL:HG12	1:A:146:LEU:CD2	1.23	1.59

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:146:LEU:HD12	1:B:12:VAL:CG1	1.40	1.50
1:A:12:VAL:CG1	1:A:146:LEU:CD2	2.12	1.25
1:A:146:LEU:CD1	1:B:12:VAL:CG1	2.19	1.21
1:A:146:LEU:CD1	1:B:12:VAL:HG11	1.72	1.20
1:C:8:MSE:HE3	1:C:148:LEU:HD11	1.22	1.17
1:A:146:LEU:CD1	1:B:146:LEU:HD23	1.80	1.11
1:C:8:MSE:HE3	1:C:148:LEU:CD1	1.80	1.10
1:A:12:VAL:HG12	1:A:146:LEU:HD23	1.04	1.04
1:A:12:VAL:HG12	1:A:146:LEU:HD22	1.29	1.03
1:C:8:MSE:CE	1:C:148:LEU:HD11	1.89	1.03
1:A:146:LEU:HD12	1:B:12:VAL:HG13	1.35	1.01
1:A:146:LEU:HD12	1:B:12:VAL:HG11	1.25	1.01
2:B:233:SO4:O3	1:C:78:LYS:NZ	1.97	0.98
1:B:111:VAL:H	1:C:82:GLN:HE22	1.09	0.93
1:A:146:LEU:CD1	1:B:146:LEU:CD2	2.50	0.89
1:A:146:LEU:HD13	1:B:146:LEU:CD2	2.03	0.88
1:A:12:VAL:HG12	1:A:146:LEU:HD21	1.55	0.86
1:B:148:LEU:CD2	1:C:8:MSE:HE2	2.06	0.85
1:C:62:ARG:HE	1:C:66:LEU:HD21	1.43	0.82
1:C:42:HIS:ND1	1:C:45:THR:OG1	2.14	0.81
1:A:12:VAL:CG1	1:A:146:LEU:HD21	2.09	0.80
1:B:146:LEU:HD12	1:C:10:VAL:HG21	1.63	0.79
1:C:62:ARG:HE	1:C:66:LEU:CD2	1.97	0.76
1:B:148:LEU:HD21	1:C:8:MSE:HE2	1.68	0.74
1:B:46:ARG:NH2	2:B:234:SO4:O2	2.22	0.73
1:B:47:ARG:HA	1:B:62:ARG:HB3	1.69	0.73
1:A:146:LEU:HD13	1:B:146:LEU:HD21	1.71	0.73
1:A:12:VAL:CG1	1:A:146:LEU:HD22	2.02	0.72
1:A:12:VAL:CG1	1:A:146:LEU:HD23	1.94	0.71
1:C:20:PHE:CD1	1:C:67:ALA:HB2	2.25	0.70
1:B:47:ARG:HB2	1:B:62:ARG:HD3	1.74	0.70
1:A:146:LEU:CG	1:B:12:VAL:HG11	2.20	0.70
1:A:146:LEU:HD13	1:B:146:LEU:HD23	1.63	0.70
1:C:8:MSE:CE	1:C:148:LEU:CD1	2.57	0.69
1:A:146:LEU:HD12	1:B:12:VAL:HG12	1.63	0.69
1:A:146:LEU:CD1	1:B:12:VAL:HG12	2.22	0.69
1:B:111:VAL:N	1:C:82:GLN:HE22	1.88	0.68
1:A:8:MSE:CE	1:A:148:LEU:HD11	2.24	0.67
1:A:148:LEU:HD21	1:B:8:MSE:HE2	1.78	0.65
1:C:91:ILE:HD11	1:C:122:LYS:HG3	1.79	0.64
1:A:146:LEU:HD12	1:B:146:LEU:HD23	1.75	0.64

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:146:LEU:HG	1:C:146:LEU:HD21	1.80	0.64
1:A:5:ARG:O	1:A:153:ARG:HG2	1.98	0.63
1:A:8:MSE:HE3	1:A:148:LEU:HD11	1.80	0.63
1:A:110:ARG:NH2	1:B:87:LYS:O	2.32	0.62
1:B:111:VAL:H	1:C:82:GLN:NE2	1.91	0.62
1:B:123:LEU:HD11	1:B:127:ILE:HD11	1.82	0.61
1:A:78:LYS:HE2	1:C:136:ILE:O	2.02	0.59
1:B:10:VAL:HG23	1:B:148:LEU:HD12	1.84	0.58
1:C:38:LEU:H	1:C:38:LEU:HD12	1.68	0.58
1:A:84:ILE:CD1	1:A:127:ILE:CG2	2.83	0.57
1:B:148:LEU:HD21	1:C:8:MSE:CE	2.33	0.57
1:A:8:MSE:HE2	1:C:148:LEU:HD21	1.87	0.56
1:B:12:VAL:HG12	1:B:146:LEU:HD23	1.87	0.56
1:C:31:PHE:O	1:C:34:VAL:HB	2.06	0.56
1:A:87:LYS:O	1:C:110:ARG:NH2	2.39	0.55
1:A:84:ILE:CD1	1:A:127:ILE:HG23	2.36	0.55
1:B:47:ARG:HG3	1:B:47:ARG:HH11	1.71	0.55
1:A:20:PHE:HA	1:A:23:GLN:HE21	1.71	0.54
1:B:23:GLN:HG2	1:B:26:ARG:NH2	2.22	0.54
1:A:146:LEU:HD11	1:B:146:LEU:HD23	1.82	0.54
1:A:81:SER:HB3	1:C:110:ARG:HD2	1.91	0.53
1:B:47:ARG:HH11	1:B:47:ARG:CG	2.22	0.53
1:C:102:GLU:OE2	1:C:116:LYS:HD3	2.10	0.52
1:A:16:HIS:CD2	1:A:18:PRO:HD2	2.45	0.52
1:B:110:ARG:HB3	1:C:82:GLN:NE2	2.24	0.52
1:B:47:ARG:HB2	1:B:62:ARG:CD	2.40	0.52
1:C:16:HIS:CD2	1:C:18:PRO:HD2	2.44	0.52
1:C:30:THR:HG23	1:C:33:GLN:OE1	2.10	0.51
1:C:43:ALA:HB2	1:C:65:HIS:CD2	2.46	0.51
1:C:62:ARG:NE	1:C:66:LEU:CD2	2.71	0.51
1:B:91:ILE:HD11	1:B:122:LYS:HG3	1.94	0.49
1:A:8:MSE:HE1	1:B:8:MSE:HE1	1.94	0.49
1:C:8:MSE:HE1	1:C:148:LEU:HD11	1.90	0.49
1:A:146:LEU:HG	1:B:12:VAL:HG11	1.91	0.49
1:C:17:ILE:HB	1:C:18:PRO:HD3	1.94	0.48
1:A:12:VAL:HG11	1:A:146:LEU:HD21	1.95	0.47
1:C:20:PHE:CE1	1:C:67:ALA:HB2	2.49	0.47
1:A:8:MSE:HE1	1:C:8:MSE:HE1	1.95	0.47
1:A:146:LEU:HD11	1:B:12:VAL:CG1	2.32	0.47
1:A:146:LEU:HD12	1:B:146:LEU:CD2	2.39	0.46
1:C:62:ARG:O	1:C:65:HIS:HB3	2.15	0.46

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:107:ARG:CG	1:A:107:ARG:HH21	2.29	0.46
1:B:13:ASP:OD1	1:B:74:GLU:OE2	2.34	0.46
1:C:38:LEU:HD12	1:C:38:LEU:N	2.30	0.45
1:C:42:HIS:CE1	1:C:45:THR:OG1	2.69	0.45
1:B:12:VAL:CG1	1:B:146:LEU:HD23	2.46	0.45
1:C:113:LEU:HG	1:C:134:LEU:HD22	1.97	0.45
1:C:73:LYS:HE2	1:C:98:PHE:O	2.16	0.45
1:A:46:ARG:NH1	2:A:232:SO4:O1	2.50	0.45
1:A:146:LEU:HD11	1:B:12:VAL:HG11	1.86	0.44
1:A:31:PHE:CD1	1:A:34:VAL:HG21	2.51	0.44
1:B:47:ARG:CG	1:B:47:ARG:NH1	2.79	0.44
1:C:62:ARG:NE	1:C:66:LEU:HD21	2.21	0.44
1:B:36:SER:HB2	1:B:37:PRO:HD2	2.00	0.44
1:A:38:LEU:C	1:A:38:LEU:HD23	2.38	0.44
1:C:31:PHE:HZ	1:C:70:TRP:CE2	2.36	0.44
1:C:73:LYS:HE3	1:C:101:ILE:O	2.18	0.43
1:B:101:ILE:HG22	1:B:101:ILE:O	2.17	0.43
1:A:84:ILE:HD11	1:A:127:ILE:HG23	2.01	0.43
1:B:105:PRO:HA	1:B:110:ARG:O	2.19	0.43
1:A:33:GLN:HE21	1:A:33:GLN:HB2	1.61	0.42
1:C:91:ILE:CD1	1:C:122:LYS:HG3	2.49	0.42
2:A:231:SO4:O2	1:C:137:SER:HA	2.20	0.42
1:B:69:ARG:HG3	1:B:103:VAL:HG13	2.02	0.41
1:A:148:LEU:CD2	1:B:8:MSE:HE2	2.49	0.41
1:C:5:ARG:HD3	1:C:6:GLU:H	1.85	0.41
1:C:26:ARG:HG3	1:C:29:SER:HB2	2.02	0.41
1:A:12:VAL:CB	1:A:146:LEU:HD23	2.49	0.41
1:A:26:ARG:HA	1:A:27:PRO:HD3	1.95	0.40
1:B:62:ARG:O	1:B:65:HIS:HB3	2.21	0.40
1:B:131:GLU:OE1	1:C:153:ARG:NH2	2.54	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 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	134/153 (88%)	130 (97%)	4 (3%)	0	100	100
1	B	134/153 (88%)	128 (96%)	5 (4%)	1 (1%)	22	39
1	C	129/153 (84%)	125 (97%)	3 (2%)	1 (1%)	19	35
All	All	397/459 (86%)	383 (96%)	12 (3%)	2 (0%)	29	48

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	C	31	PHE
1	B	46	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 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	111/120 (92%)	93 (84%)	18 (16%)	2	4
1	B	112/120 (93%)	95 (85%)	17 (15%)	3	5
1	C	108/120 (90%)	91 (84%)	17 (16%)	2	4
All	All	331/360 (92%)	279 (84%)	52 (16%)	2	4

All (52) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	22	GLU
1	A	33	GLN
1	A	46	ARG
1	A	47	ARG
1	A	62	ARG
1	A	66	LEU
1	A	82	GLN
1	A	84	ILE

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	A	90	VAL
1	A	92	GLU
1	A	95	LEU
1	A	96	VAL
1	A	104	LEU
1	A	107	ARG
1	A	110	ARG
1	A	115	LEU
1	A	125	GLU
1	A	153	ARG
1	B	8	MSE
1	B	10	VAL
1	B	41	ARG
1	B	46	ARG
1	B	47	ARG
1	B	62	ARG
1	B	66	LEU
1	B	87	LYS
1	B	91	ILE
1	B	95	LEU
1	B	96	VAL
1	B	107	ARG
1	B	110	ARG
1	B	114	GLN
1	B	115	LEU
1	B	116	LYS
1	B	153	ARG
1	C	5	ARG
1	C	8	MSE
1	C	17	ILE
1	C	22	GLU
1	C	31	PHE
1	C	34	VAL
1	C	41	ARG
1	C	42	HIS
1	C	44	GLN
1	C	62	ARG
1	C	66	LEU
1	C	93	PRO
1	C	95	LEU
1	C	110	ARG
1	C	118	GLU

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	C	125	GLU
1	C	146	LEU

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	16	HIS
1	A	23	GLN
1	A	33	GLN
1	A	82	GLN
1	A	124	GLN
1	B	33	GLN
1	B	82	GLN
1	B	124	GLN
1	C	16	HIS
1	C	23	GLN
1	C	65	HIS
1	C	82	GLN

5.3.3 RNA (i)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates (i)

There are no monosaccharides in this entry.

5.6 Ligand geometry (i)

4 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	SO4	A	232	-	4,4,4	0.64	0	6,6,6	1.00	0
2	SO4	B	234	-	4,4,4	0.85	0	6,6,6	0.39	0
2	SO4	B	233	-	4,4,4	0.58	0	6,6,6	1.36	1 (16%)
2	SO4	A	231	-	4,4,4	0.78	0	6,6,6	0.57	0

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	B	233	SO4	O3-S-O1	2.03	120.18	109.56

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

4 monomers are involved in 4 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	232	SO4	1	0
2	B	234	SO4	1	0
2	B	233	SO4	1	0
2	A	231	SO4	1	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	137/153 (89%)	-0.06	5 (3%)	42	46	14, 25, 47, 74	4 (2%)
1	B	137/153 (89%)	0.02	10 (7%)	15	15	15, 24, 58, 70	3 (2%)
1	C	132/153 (86%)	0.48	14 (10%)	6	5	18, 32, 64, 87	1 (0%)
All	All	406/459 (88%)	0.14	29 (7%)	16	16	14, 27, 58, 87	8 (1%)

All (29) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	44	GLN	9.6
1	A	47	ARG	7.3
1	C	41	ARG	6.4
1	C	30	THR	5.3
1	C	45	THR	5.3
1	C	42	HIS	5.2
1	C	43	ALA	5.0
1	B	30	THR	5.0
1	C	40	ARG	4.9
1	A	59	ALA	4.8
1	B	5	ARG	4.5
1	C	5	ARG	3.9
1	B	47	ARG	3.8
1	B	28	GLY	3.7
1	C	107	ARG	3.4
1	C	95	LEU	3.3
1	B	60	GLY	3.2
1	A	46	ARG	3.1
1	C	38	LEU	2.9
1	C	62	ARG	2.7
1	B	45	THR	2.6
1	B	153	ARG	2.6
1	C	92	GLU	2.5

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
1	A	5	ARG	2.4
1	B	48	SER	2.4
1	C	32	GLU	2.4
1	B	94	ASP	2.4
1	A	146	LEU	2.2
1	B	107	ARG	2.2

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 monosaccharides 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
2	SO4	A	231	5/5	0.93	0.23	51,60,71,81	0
2	SO4	B	233	5/5	0.93	0.22	54,56,65,66	0
2	SO4	A	232	5/5	0.95	0.20	63,67,70,74	0
2	SO4	B	234	5/5	0.95	0.25	54,56,65,66	0

6.5 Other polymers (i)

There are no such residues in this entry.