Full wwPDB X-ray Structure Validation Report ⓘ

May 22, 2020 – 12:41 am BST

PDB ID	:	5V8D
Title	:	Structure of Bacillus cereus PatB1 with sulfonyl adduct
Authors	:	Sychantha, D.; Little, D.J.; Chapman, R.N.; Boons, G.J.; Robinson, H.; Howell, P.L.; Clarke, A.J.
Deposited on	:	2017-03-21
Resolution	:	2.00 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 ⓘ symbol.

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

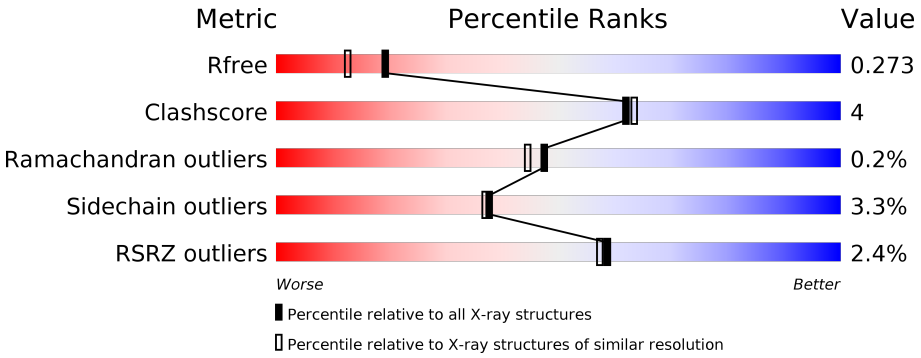
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.11
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.11

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 2.00 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	8085 (2.00-2.00)
Clashscore	141614	9178 (2.00-2.00)
Ramachandran outliers	138981	9054 (2.00-2.00)
Sidechain outliers	138945	9053 (2.00-2.00)
RSRZ outliers	127900	7900 (2.00-2.00)

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 on 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	364	2% 71% 9% • 20%
1	B	364	2% 70% 12% 18%
2	C	364	2% 72% 9% • 18%
2	D	364	2% 73% 9% • 18%

2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 10237 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 Bacillus cereus PatB1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	290	Total	C	N	O	S	0	0	0
			2321	1491	374	446	10			
1	B	298	Total	C	N	O	S	0	0	0
			2374	1523	385	456	10			

There are 12 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	232	ALA	LYS	engineered mutation	UNP Q73CU0
A	233	ALA	LYS	engineered mutation	UNP Q73CU0
A	234	ALA	GLU	engineered mutation	UNP Q73CU0
A	300	ALA	LYS	engineered mutation	UNP Q73CU0
A	301	ALA	GLN	engineered mutation	UNP Q73CU0
A	302	ALA	LYS	engineered mutation	UNP Q73CU0
B	232	ALA	LYS	engineered mutation	UNP Q73CU0
B	233	ALA	LYS	engineered mutation	UNP Q73CU0
B	234	ALA	GLU	engineered mutation	UNP Q73CU0
B	300	ALA	LYS	engineered mutation	UNP Q73CU0
B	301	ALA	GLN	engineered mutation	UNP Q73CU0
B	302	ALA	LYS	engineered mutation	UNP Q73CU0

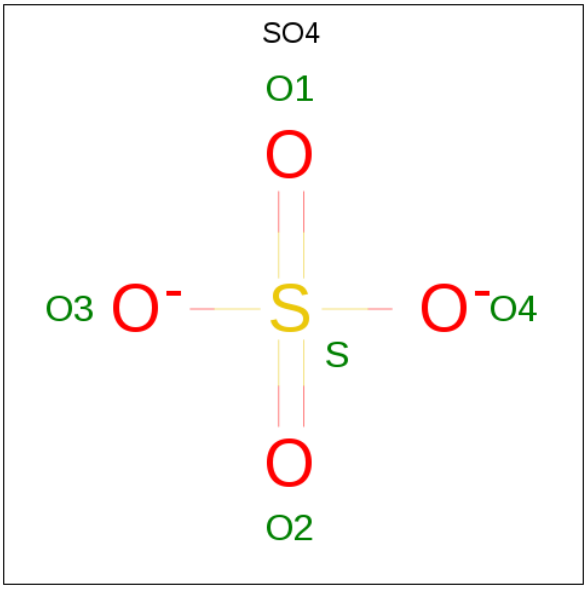
- Molecule 2 is a protein called Bacillus cereus PatB1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	C	299	Total	C	N	O	S	0	0	0
			2396	1533	390	464	9			
2	D	300	Total	C	N	O	S	0	0	0
			2397	1535	391	462	9			

There are 12 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
C	232	ALA	LYS	engineered mutation	UNP Q73CU0
C	233	ALA	LYS	engineered mutation	UNP Q73CU0
C	234	ALA	GLU	engineered mutation	UNP Q73CU0
C	300	ALA	LYS	engineered mutation	UNP Q73CU0
C	301	ALA	GLN	engineered mutation	UNP Q73CU0
C	302	ALA	LYS	engineered mutation	UNP Q73CU0
D	232	ALA	LYS	engineered mutation	UNP Q73CU0
D	233	ALA	LYS	engineered mutation	UNP Q73CU0
D	234	ALA	GLU	engineered mutation	UNP Q73CU0
D	300	ALA	LYS	engineered mutation	UNP Q73CU0
D	301	ALA	GLN	engineered mutation	UNP Q73CU0
D	302	ALA	LYS	engineered mutation	UNP Q73CU0

- Molecule 3 is SULFATE ION (three-letter code: SO4) (formula: O_4S).



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

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

- Molecule 4 is water.

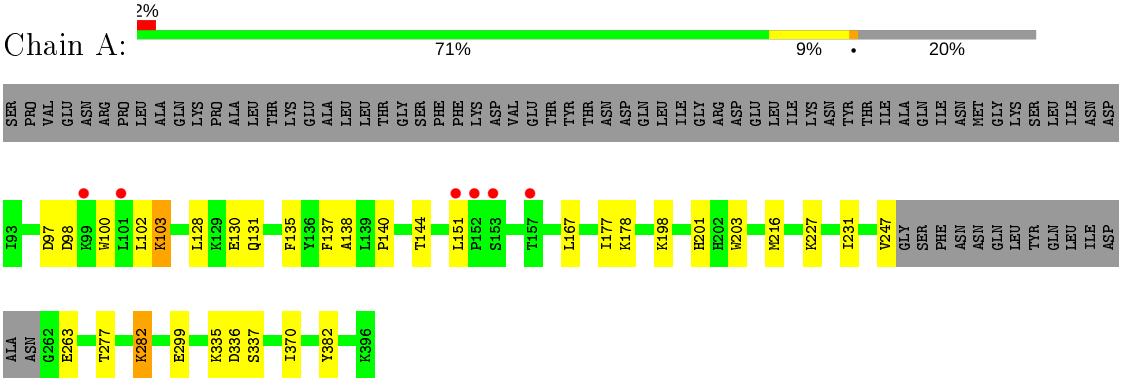
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	184	Total O 184 184	0	0
4	B	170	Total O 170 170	0	0
4	C	169	Total O 169 169	0	0
4	D	171	Total O 171 171	0	0

3 Residue-property plots (i)

These plots are drawn for all protein, RNA and DNA 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.

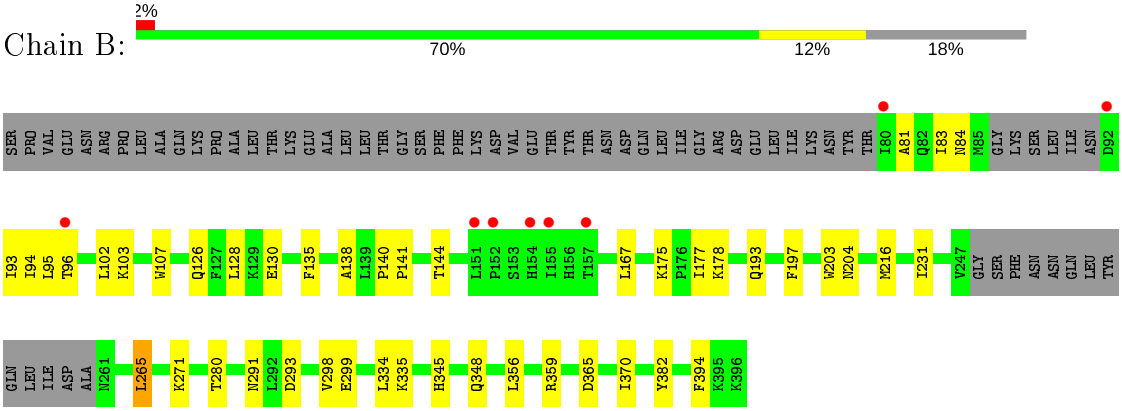
- Molecule 1: Bacillus cereus PatB1

Chain A:



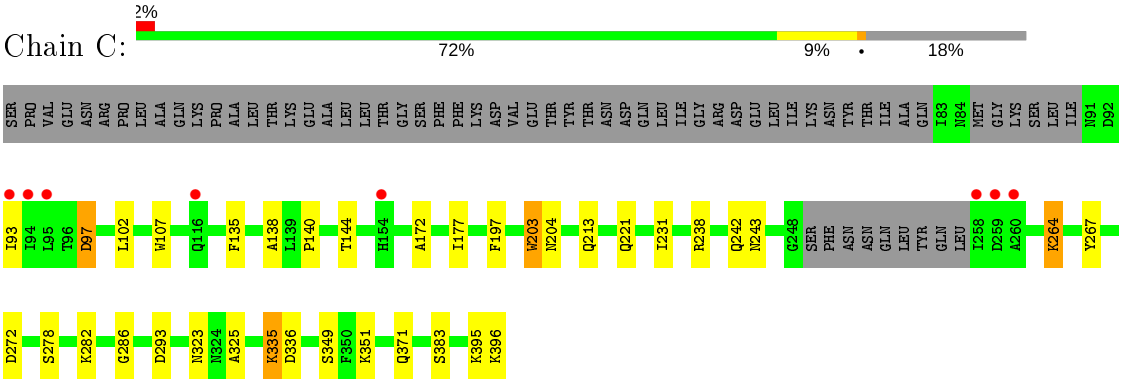
- Molecule 1: Bacillus cereus PatB1

Chain B:



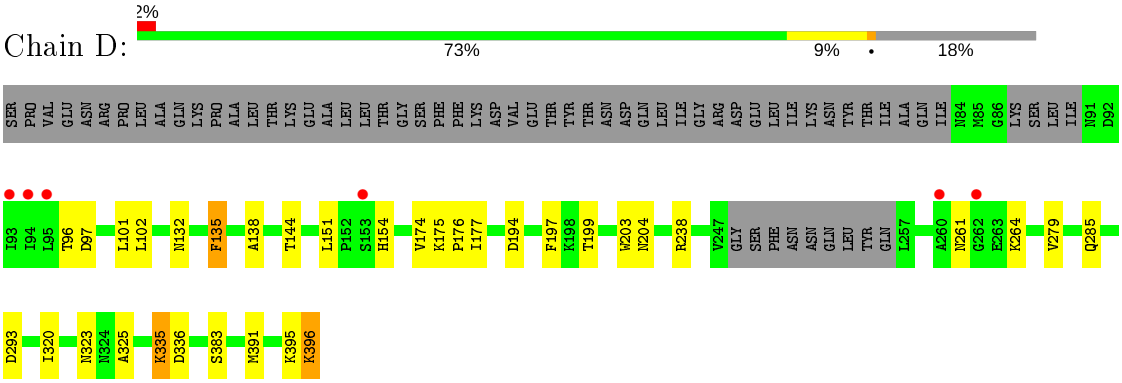
- Molecule 2: Bacillus cereus PatB1

Chain C:



• Molecule 2: Bacillus cereus PatB1

Chain D:



4 Data and refinement statistics (i)

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α, β, γ	125.47Å 110.47Å 99.16Å 90.00° 108.15° 90.00°	Depositor
Resolution (Å)	47.65 – 2.00 47.65 – 2.00	Depositor EDS
% Data completeness (in resolution range)	99.6 (47.65-2.00) 93.5 (47.65-2.00)	Depositor EDS
R_{merge}	0.14	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.36 (at 2.00Å)	Xtriage
Refinement program	PHENIX 1.9_1692	Depositor
R, R_{free}	0.221 , 0.272 0.226 , 0.273	Depositor DCC
R_{free} test set	2000 reflections (2.32%)	wwPDB-VP
Wilson B-factor (Å^2)	26.6	Xtriage
Anisotropy	0.112	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.35 , 56.6	EDS
L-test for twinning[2]	$< \|L\| > = 0.48$, $< L^2 > = 0.32$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.93	EDS
Total number of atoms	10237	wwPDB-VP
Average B, all atoms (Å^2)	33.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 35.11 % of the origin peak, indicating pseudo-translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo-translational symmetry is equal to 6.1368e-04. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

[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

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: OSE, 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	0.43	0/2370	0.57	0/3220
1	B	0.43	0/2423	0.56	1/3291 (0.0%)
2	C	0.42	0/2456	0.54	0/3337
2	D	0.43	0/2457	0.55	0/3338
All	All	0.43	0/9706	0.56	1/13186 (0.0%)

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	B	265	LEU	CA-CB-CG	5.03	126.87	115.30

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	2321	0	2170	24	0
1	B	2374	0	2211	25	0
2	C	2396	0	2233	20	0
2	D	2397	0	2236	17	0
3	A	15	0	0	0	0
3	B	15	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	C	15	0	0	0	0
3	D	10	0	0	0	0
4	A	184	0	0	4	1
4	B	170	0	0	4	1
4	C	169	0	0	4	1
4	D	171	0	0	4	1
All	All	10237	0	8850	80	2

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 4.

All (80) 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)
2:C:325:ALA:O	4:C:501:HOH:O	2.01	0.77
1:A:167:LEU:HD13	1:A:178:LYS:HE2	1.67	0.75
1:B:167:LEU:HD13	1:B:178:LYS:HE2	1.73	0.71
2:C:323:ASN:O	4:C:501:HOH:O	2.12	0.68
2:D:279:VAL:HG22	2:D:320:ILE:HG12	1.75	0.67
1:B:126:GLN:NE2	2:C:221:GLN:OE1	2.18	0.66
2:C:282:LYS:HE2	2:C:286:GLY:HA2	1.78	0.65
2:C:102:LEU:HB3	2:C:144:THR:HG22	1.78	0.64
2:D:102:LEU:HB3	2:D:144:THR:HG22	1.80	0.63
1:B:271:LYS:O	4:B:501:HOH:O	2.15	0.63
1:B:93:ILE:HG21	1:B:107:TRP:HE1	1.63	0.62
2:D:101:LEU:HD23	2:D:199:THR:HG22	1.86	0.58
1:A:299:GLU:OE2	2:C:242:GLN:HG2	2.06	0.55
1:A:247:VAL:HG21	2:C:243:ASN:HD21	1.71	0.55
1:A:263:GLU:OE1	4:A:501:HOH:O	2.18	0.55
1:B:94:ILE:HD11	1:B:103:LYS:HG2	1.86	0.55
1:A:247:VAL:HG21	2:C:243:ASN:ND2	2.22	0.55
1:A:282:LYS:NZ	4:A:506:HOH:O	2.30	0.54
1:B:216:MET:HB2	1:B:231:ILE:HD11	1.91	0.53
1:B:216:MET:HB2	1:B:231:ILE:CD1	2.39	0.53
1:A:103:LYS:HE2	1:A:201:HIS:CD2	2.43	0.52
2:D:238:ARG:HH22	2:D:264:LYS:NZ	2.08	0.52
1:A:140:PRO:HD2	1:A:382:TYR:O	2.10	0.52
2:C:371:GLN:NE2	4:C:509:HOH:O	2.36	0.51
1:A:216:MET:HB2	1:A:231:ILE:CD1	2.41	0.51
1:B:84:ASN:O	1:B:93:ILE:HD12	2.11	0.51
1:B:175:LYS:N	4:B:511:HOH:O	2.45	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:102:LEU:HD12	1:A:151:LEU:HD21	1.95	0.49
1:B:298:VAL:HG23	1:B:299:GLU:HG3	1.94	0.48
1:A:138:ALA:HA	1:A:177:ILE:HB	1.94	0.48
2:D:323:ASN:O	4:D:502:HOH:O	2.20	0.48
2:D:325:ALA:O	4:D:502:HOH:O	2.20	0.48
1:A:130:GLU:OE1	1:A:131:GLN:NE2	2.44	0.47
2:D:391:MET:HG3	4:D:645:HOH:O	2.14	0.47
2:D:197:PHE:CE2	2:D:204:ASN:HA	2.50	0.47
2:D:135:PHE:CD2	2:D:174:VAL:HG22	2.49	0.47
2:C:172:ALA:N	4:C:515:HOH:O	2.48	0.46
2:C:138:ALA:HA	2:C:177:ILE:HB	1.98	0.45
2:C:238:ARG:HA	2:C:267:TYR:O	2.15	0.45
1:A:100:TRP:NE1	1:A:198:LYS:HE2	2.30	0.45
1:A:128:LEU:HD21	1:A:370:ILE:HD13	1.99	0.45
1:B:345:HIS:O	1:B:348:GLN:HB2	2.17	0.45
1:B:334:LEU:HD23	1:B:356:LEU:HB2	1.99	0.45
2:C:140:PRO:HB3	2:C:203:TRP:CZ3	2.52	0.45
1:B:83:ILE:HG12	1:B:95:LEU:HG	1.99	0.45
2:D:194:ASP:OD1	4:D:503:HOH:O	2.20	0.45
1:B:81:ALA:HB1	1:B:96:THR:O	2.17	0.44
2:D:138:ALA:HA	2:D:177:ILE:HB	1.99	0.44
1:B:102:LEU:HB3	1:B:144:THR:HG22	2.00	0.44
2:D:151:LEU:HA	2:D:151:LEU:HD23	1.83	0.44
2:C:213:GLN:HG3	2:C:231:ILE:HB	1.99	0.44
1:A:97:ASP:OD1	1:A:100:TRP:HB2	2.18	0.44
1:B:138:ALA:HA	1:B:177:ILE:HB	2.00	0.44
1:B:140:PRO:HD2	1:B:382:TYR:O	2.17	0.43
2:C:93:ILE:HG21	2:C:107:TRP:HZ2	1.84	0.42
1:B:280:THR:N	4:B:505:HOH:O	2.45	0.42
1:A:216:MET:HB2	1:A:231:ILE:HD12	2.00	0.42
1:A:277:THR:HG21	2:D:132:ASN:HB2	2.01	0.42
1:A:227:LYS:HD2	1:A:227:LYS:HA	1.75	0.42
1:A:336:ASP:HB2	1:A:337:OSE:O2S	2.20	0.42
1:B:130:GLU:HG3	2:C:221:GLN:HA	2.01	0.42
1:B:140:PRO:HA	1:B:141:PRO:HD3	1.93	0.42
1:B:197:PHE:CE2	1:B:204:ASN:HA	2.54	0.42
2:C:264:LYS:HB3	2:C:264:LYS:HE3	1.95	0.42
1:A:102:LEU:HB3	1:A:144:THR:HG22	2.01	0.42
1:B:291:ASN:OD1	1:B:293:ASP:HB2	2.20	0.42
2:C:197:PHE:CE2	2:C:204:ASN:HA	2.55	0.42
1:A:98:ASP:N	1:A:98:ASP:OD1	2.52	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:359:ARG:NH1	4:B:510:HOH:O	2.36	0.41
1:B:365:ASP:HB2	1:B:394:PHE:O	2.20	0.41
2:D:175:LYS:HE2	2:D:176:PRO:O	2.21	0.41
1:A:216:MET:HB2	1:A:231:ILE:HD11	2.03	0.41
1:B:128:LEU:HD21	1:B:370:ILE:HD13	2.02	0.41
2:D:396:LYS:O	2:D:396:LYS:HG3	2.20	0.41
1:A:131:GLN:HG2	4:A:540:HOH:O	2.21	0.41
1:A:137:PHE:N	4:A:520:HOH:O	2.54	0.40
2:C:140:PRO:HB3	2:C:203:TRP:CH2	2.57	0.40
2:D:285:GLN:N	2:D:285:GLN:OE1	2.54	0.40
2:C:335:LYS:HE2	2:C:336:ASP:O	2.21	0.40
2:D:335:LYS:HE2	2:D:336:ASP:O	2.21	0.40

All (2) 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)
4:A:547:HOH:O	4:C:595:HOH:O[3_445]	2.11	0.09
4:B:580:HOH:O	4:D:534:HOH:O[4_957]	2.18	0.02

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	285/364 (78%)	272 (95%)	13 (5%)	0	100	100
1	B	291/364 (80%)	279 (96%)	12 (4%)	0	100	100
2	C	293/364 (80%)	278 (95%)	14 (5%)	1 (0%)	41	37
2	D	294/364 (81%)	276 (94%)	17 (6%)	1 (0%)	41	37
All	All	1163/1456 (80%)	1105 (95%)	56 (5%)	2 (0%)	47	44

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	C	97	ASP
2	D	261	ASN

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	242/323 (75%)	237 (98%)	5 (2%)	53	57
1	B	246/323 (76%)	241 (98%)	5 (2%)	55	58
2	C	253/324 (78%)	240 (95%)	13 (5%)	24	19
2	D	252/324 (78%)	242 (96%)	10 (4%)	31	29
All	All	993/1294 (77%)	960 (97%)	33 (3%)	38	37

All (33) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	103	LYS
1	A	135	PHE
1	A	203	TRP
1	A	282	LYS
1	A	335	LYS
1	B	135	PHE
1	B	193	GLN
1	B	203	TRP
1	B	265	LEU
1	B	335	LYS
2	C	97	ASP
2	C	135	PHE
2	C	203	TRP
2	C	264	LYS
2	C	272	ASP
2	C	278	SER
2	C	293	ASP
2	C	335	LYS
2	C	349	SER
2	C	351	LYS

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Mol	Chain	Res	Type
2	C	383	SER
2	C	395	LYS
2	C	396	LYS
2	D	96	THR
2	D	97	ASP
2	D	135	PHE
2	D	154	HIS
2	D	203	TRP
2	D	293	ASP
2	D	335	LYS
2	D	383	SER
2	D	395	LYS
2	D	396	LYS

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (4) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	160	GLN
1	A	348	GLN
1	B	242	GLN
2	C	348	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)

2 non-standard protein/DNA/RNA residues 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	$\#\|Z\| > 2$
1	OSE	B	337	1	8,9,10	2.51	5 (62%)	5,12,14	2.83	1 (20%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\|>2$	Counts	RMSZ	$\#\|Z\|>2$
1	OSE	A	337	1	8,9,10	2.53	5 (62%)	5,12,14	2.79	2 (40%)

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
1	OSE	B	337	1	-	3/4/8/10	-
1	OSE	A	337	1	-	3/4/8/10	-

All (10) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	337	OSE	OG-S	4.37	1.68	1.56
1	B	337	OSE	OG-S	4.29	1.68	1.56
1	B	337	OSE	O1S-S	3.94	1.62	1.45
1	A	337	OSE	O1S-S	3.83	1.61	1.45
1	A	337	OSE	O3S-S	-2.28	1.36	1.50
1	B	337	OSE	O3S-S	-2.23	1.37	1.50
1	A	337	OSE	CB-CA	2.18	1.58	1.52
1	A	337	OSE	O2S-S	-2.17	1.36	1.45
1	B	337	OSE	O2S-S	-2.14	1.36	1.45
1	B	337	OSE	CB-CA	2.11	1.58	1.52

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	B	337	OSE	O3S-S-O2S	5.75	128.49	108.49
1	A	337	OSE	O3S-S-O2S	5.52	127.67	108.49
1	A	337	OSE	OG-S-O1S	-2.34	99.79	106.88

There are no chirality outliers.

All (6) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
1	A	337	OSE	CA-CB-OG-S
1	B	337	OSE	CB-OG-S-O3S
1	A	337	OSE	CB-OG-S-O3S
1	B	337	OSE	CA-CB-OG-S

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Mol	Chain	Res	Type	Atoms
1	A	337	OSE	CB-OG-S-O1S
1	B	337	OSE	CB-OG-S-O1S

There are no ring outliers.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
1	A	337	OSE	1	0

5.5 Carbohydrates (i)

There are no carbohydrates in this entry.

5.6 Ligand geometry (i)

11 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	$\#\|Z\| > 2$
3	SO4	D	401	-	4,4,4	0.14	0	6,6,6	0.13	0
3	SO4	B	402	-	4,4,4	0.13	0	6,6,6	0.10	0
3	SO4	B	403	-	4,4,4	0.16	0	6,6,6	0.08	0
3	SO4	A	403	-	4,4,4	0.15	0	6,6,6	0.04	0
3	SO4	C	403	-	4,4,4	0.13	0	6,6,6	0.08	0
3	SO4	C	402	-	4,4,4	0.15	0	6,6,6	0.08	0
3	SO4	A	402	-	4,4,4	0.13	0	6,6,6	0.07	0
3	SO4	C	401	-	4,4,4	0.16	0	6,6,6	0.17	0
3	SO4	A	401	-	4,4,4	0.16	0	6,6,6	0.14	0
3	SO4	B	401	-	4,4,4	0.14	0	6,6,6	0.06	0
3	SO4	D	402	-	4,4,4	0.15	0	6,6,6	0.17	0

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

5.7 Other polymers

There are no such residues in this entry.

5.8 Polymer linkage issues

There are no chain breaks in this entry.

6 Fit of model and data

6.1 Protein, DNA and RNA chains

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, 95^{th} 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	289/364 (79%)	0.07	6 (2%)	63	62	18, 29, 54, 65	0
1	B	297/364 (81%)	0.16	8 (2%)	54	53	19, 31, 60, 84	0
2	C	299/364 (82%)	0.16	8 (2%)	54	53	19, 32, 62, 91	0
2	D	300/364 (82%)	0.11	6 (2%)	65	63	18, 30, 61, 95	0
All	All	1185/1456 (81%)	0.13	28 (2%)	59	57	18, 31, 58, 95	0

All (28) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	D	94	ILE	5.9
2	C	95	LEU	4.7
2	C	94	ILE	4.5
1	B	80	ILE	4.4
2	D	95	LEU	3.9
1	B	151	LEU	3.7
1	B	154	HIS	3.4
1	A	157	THR	3.4
1	A	151	LEU	3.2
1	A	152	PRO	3.1
2	C	154	HIS	2.9
2	D	260	ALA	2.9
2	D	93	ILE	2.9
2	C	258	ILE	2.8
1	B	152	PRO	2.6
2	C	116	GLN	2.5
1	B	92	ASP	2.5
2	D	153	SER	2.4
1	B	155	ILE	2.4
1	A	99	LYS	2.3
2	D	262	GLY	2.2

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Mol	Chain	Res	Type	RSRZ
2	C	93	ILE	2.2
1	A	101	LEU	2.2
1	A	153	SER	2.2
1	B	157	THR	2.2
2	C	259	ASP	2.2
2	C	260	ALA	2.1
1	B	96	THR	2.0

6.2 Non-standard residues in protein, DNA, RNA chains (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, 95^{th} 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
1	OSE	B	337	10/11	0.77	0.16	31,38,44,46	0
1	OSE	A	337	10/11	0.83	0.16	27,37,45,48	0

6.3 Carbohydrates (i)

There are no carbohydrates 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, 95^{th} 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
3	SO4	B	402	5/5	0.72	0.26	66,78,79,86	0
3	SO4	A	402	5/5	0.80	0.15	99,100,102,104	0
3	SO4	C	402	5/5	0.81	0.21	97,98,99,103	0
3	SO4	C	403	5/5	0.87	0.17	80,80,81,84	0
3	SO4	B	403	5/5	0.88	0.12	78,82,83,84	0
3	SO4	A	403	5/5	0.93	0.21	98,99,99,100	0
3	SO4	B	401	5/5	0.95	0.14	55,56,59,61	0
3	SO4	C	401	5/5	0.96	0.13	52,53,59,63	0
3	SO4	A	401	5/5	0.97	0.13	46,48,54,56	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
3	SO4	D	402	5/5	0.97	0.14	46,51,53,58	0
3	SO4	D	401	5/5	0.98	0.12	42,48,56,56	0

6.5 Other polymers (i)

There are no such residues in this entry.