



# Full wwPDB X-ray Structure Validation Report ⓘ

May 21, 2020 – 03:09 am BST

PDB ID : 5NL1  
Title : Shigella IpaA-VBS3/TBS in complex with the Talin VBS1 domain 488-512  
Authors : Bou-Nader, C.; Pecqueur, L.; Valencia-Gallardo, C.; Fontecave, M.; Tran Van Nhieu, G.  
Deposited on : 2017-04-03  
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](mailto: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.

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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

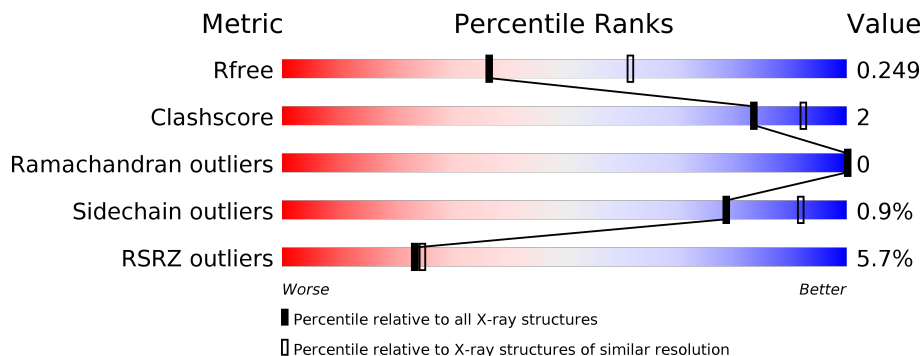
# 1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.50 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.





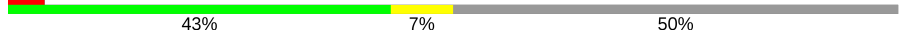



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
$R_{free}$	130704	4661 (2.50-2.50)
Clashscore	141614	5346 (2.50-2.50)
Ramachandran outliers	138981	5231 (2.50-2.50)
Sidechain outliers	138945	5233 (2.50-2.50)
RSRZ outliers	127900	4559 (2.50-2.50)

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 on the lower bar indicate the fraction of residues that contain outliers for  $\geq 3$ , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions  $\leq 5\%$ . The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	156	
1	B	156	
1	C	156	
1	D	156	
1	E	156	
1	F	156	

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Mol	Chain	Length	Quality of chain
2	G	46	 46% 52%
2	H	46	 46% 50%
2	I	46	 4% 43% 7% 50%
2	J	46	 9% 52% 43%
2	K	46	 7% 57% 41%
2	L	46	 43% 52%

## 2 Entry composition [i](#)

There are 6 unique types of molecules in this entry. The entry contains 7396 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 Talin-1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	141	1025	624	180	217	4	0	2	0
1	B	142	1022	625	179	214	4	0	1	0
1	C	140	1013	617	178	213	5	0	1	0
1	D	141	1018	620	179	214	5	0	1	0
1	E	142	1034	630	180	219	5	0	3	0
1	F	142	1037	633	182	217	5	0	2	0

- Molecule 2 is a protein called Invasin IpaA.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
2	G	22	165	105	26	34	0	0	0
2	H	23	170	108	27	35	0	0	0
2	I	23	178	112	29	37	0	1	0
2	J	26	202	127	35	39	1	0	0
2	K	27	207	129	36	41	1	0	0
2	L	22	165	105	26	34	0	0	0

There are 126 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
G	-19	MET	-	initiating methionine	UNP P18010

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Chain	Residue	Modelled	Actual	Comment	Reference
G	-18	GLY	-	expression tag	UNP P18010
G	-17	SER	-	expression tag	UNP P18010
G	-16	SER	-	expression tag	UNP P18010
G	-15	HIS	-	expression tag	UNP P18010
G	-14	HIS	-	expression tag	UNP P18010
G	-13	HIS	-	expression tag	UNP P18010
G	-12	HIS	-	expression tag	UNP P18010
G	-11	HIS	-	expression tag	UNP P18010
G	-10	HIS	-	expression tag	UNP P18010
G	-9	SER	-	expression tag	UNP P18010
G	-8	SER	-	expression tag	UNP P18010
G	-7	GLY	-	expression tag	UNP P18010
G	-6	LEU	-	expression tag	UNP P18010
G	-5	VAL	-	expression tag	UNP P18010
G	-4	PRO	-	expression tag	UNP P18010
G	-3	ARG	-	expression tag	UNP P18010
G	-2	GLY	-	expression tag	UNP P18010
G	-1	SER	-	expression tag	UNP P18010
G	0	HIS	-	expression tag	UNP P18010
G	1	MET	-	expression tag	UNP P18010
H	-19	MET	-	initiating methionine	UNP P18010
H	-18	GLY	-	expression tag	UNP P18010
H	-17	SER	-	expression tag	UNP P18010
H	-16	SER	-	expression tag	UNP P18010
H	-15	HIS	-	expression tag	UNP P18010
H	-14	HIS	-	expression tag	UNP P18010
H	-13	HIS	-	expression tag	UNP P18010
H	-12	HIS	-	expression tag	UNP P18010
H	-11	HIS	-	expression tag	UNP P18010
H	-10	HIS	-	expression tag	UNP P18010
H	-9	SER	-	expression tag	UNP P18010
H	-8	SER	-	expression tag	UNP P18010
H	-7	GLY	-	expression tag	UNP P18010
H	-6	LEU	-	expression tag	UNP P18010
H	-5	VAL	-	expression tag	UNP P18010
H	-4	PRO	-	expression tag	UNP P18010
H	-3	ARG	-	expression tag	UNP P18010
H	-2	GLY	-	expression tag	UNP P18010
H	-1	SER	-	expression tag	UNP P18010
H	0	HIS	-	expression tag	UNP P18010
H	1	MET	-	expression tag	UNP P18010
I	-19	MET	-	initiating methionine	UNP P18010

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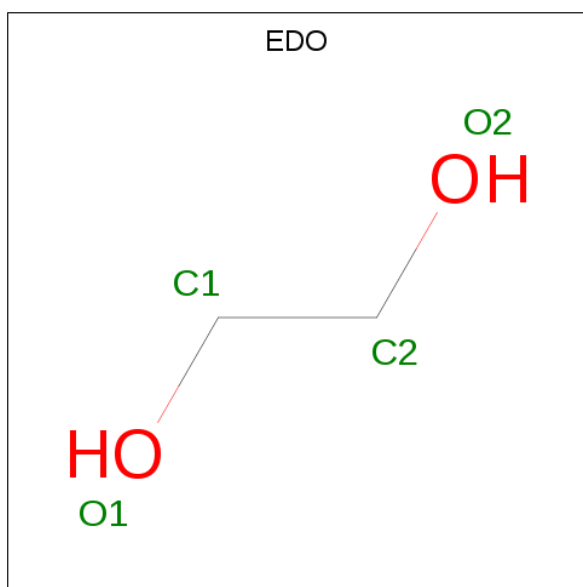
Chain	Residue	Modelled	Actual	Comment	Reference
I	-18	GLY	-	expression tag	UNP P18010
I	-17	SER	-	expression tag	UNP P18010
I	-16	SER	-	expression tag	UNP P18010
I	-15	HIS	-	expression tag	UNP P18010
I	-14	HIS	-	expression tag	UNP P18010
I	-13	HIS	-	expression tag	UNP P18010
I	-12	HIS	-	expression tag	UNP P18010
I	-11	HIS	-	expression tag	UNP P18010
I	-10	HIS	-	expression tag	UNP P18010
I	-9	SER	-	expression tag	UNP P18010
I	-8	SER	-	expression tag	UNP P18010
I	-7	GLY	-	expression tag	UNP P18010
I	-6	LEU	-	expression tag	UNP P18010
I	-5	VAL	-	expression tag	UNP P18010
I	-4	PRO	-	expression tag	UNP P18010
I	-3	ARG	-	expression tag	UNP P18010
I	-2	GLY	-	expression tag	UNP P18010
I	-1	SER	-	expression tag	UNP P18010
I	0	HIS	-	expression tag	UNP P18010
I	1	MET	-	expression tag	UNP P18010
J	-19	MET	-	initiating methionine	UNP P18010
J	-18	GLY	-	expression tag	UNP P18010
J	-17	SER	-	expression tag	UNP P18010
J	-16	SER	-	expression tag	UNP P18010
J	-15	HIS	-	expression tag	UNP P18010
J	-14	HIS	-	expression tag	UNP P18010
J	-13	HIS	-	expression tag	UNP P18010
J	-12	HIS	-	expression tag	UNP P18010
J	-11	HIS	-	expression tag	UNP P18010
J	-10	HIS	-	expression tag	UNP P18010
J	-9	SER	-	expression tag	UNP P18010
J	-8	SER	-	expression tag	UNP P18010
J	-7	GLY	-	expression tag	UNP P18010
J	-6	LEU	-	expression tag	UNP P18010
J	-5	VAL	-	expression tag	UNP P18010
J	-4	PRO	-	expression tag	UNP P18010
J	-3	ARG	-	expression tag	UNP P18010
J	-2	GLY	-	expression tag	UNP P18010
J	-1	SER	-	expression tag	UNP P18010
J	0	HIS	-	expression tag	UNP P18010
J	1	MET	-	expression tag	UNP P18010
K	-19	MET	-	initiating methionine	UNP P18010

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Chain	Residue	Modelled	Actual	Comment	Reference
K	-18	GLY	-	expression tag	UNP P18010
K	-17	SER	-	expression tag	UNP P18010
K	-16	SER	-	expression tag	UNP P18010
K	-15	HIS	-	expression tag	UNP P18010
K	-14	HIS	-	expression tag	UNP P18010
K	-13	HIS	-	expression tag	UNP P18010
K	-12	HIS	-	expression tag	UNP P18010
K	-11	HIS	-	expression tag	UNP P18010
K	-10	HIS	-	expression tag	UNP P18010
K	-9	SER	-	expression tag	UNP P18010
K	-8	SER	-	expression tag	UNP P18010
K	-7	GLY	-	expression tag	UNP P18010
K	-6	LEU	-	expression tag	UNP P18010
K	-5	VAL	-	expression tag	UNP P18010
K	-4	PRO	-	expression tag	UNP P18010
K	-3	ARG	-	expression tag	UNP P18010
K	-2	GLY	-	expression tag	UNP P18010
K	-1	SER	-	expression tag	UNP P18010
K	0	HIS	-	expression tag	UNP P18010
K	1	MET	-	expression tag	UNP P18010
L	-19	MET	-	initiating methionine	UNP P18010
L	-18	GLY	-	expression tag	UNP P18010
L	-17	SER	-	expression tag	UNP P18010
L	-16	SER	-	expression tag	UNP P18010
L	-15	HIS	-	expression tag	UNP P18010
L	-14	HIS	-	expression tag	UNP P18010
L	-13	HIS	-	expression tag	UNP P18010
L	-12	HIS	-	expression tag	UNP P18010
L	-11	HIS	-	expression tag	UNP P18010
L	-10	HIS	-	expression tag	UNP P18010
L	-9	SER	-	expression tag	UNP P18010
L	-8	SER	-	expression tag	UNP P18010
L	-7	GLY	-	expression tag	UNP P18010
L	-6	LEU	-	expression tag	UNP P18010
L	-5	VAL	-	expression tag	UNP P18010
L	-4	PRO	-	expression tag	UNP P18010
L	-3	ARG	-	expression tag	UNP P18010
L	-2	GLY	-	expression tag	UNP P18010
L	-1	SER	-	expression tag	UNP P18010
L	0	HIS	-	expression tag	UNP P18010
L	1	MET	-	expression tag	UNP P18010

- Molecule 3 is 1,2-ETHANEDIOL (three-letter code: EDO) (formula: C<sub>2</sub>H<sub>6</sub>O<sub>2</sub>).

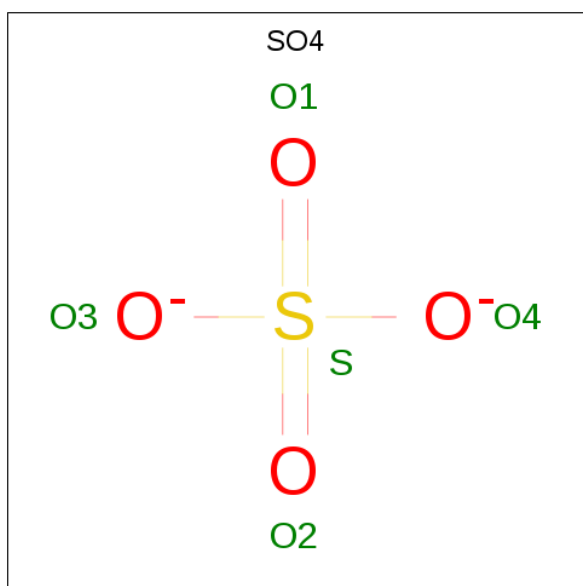


Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	B	1	Total	C O	0	0
			4	2 2		

- Molecule 4 is CHLORIDE ION (three-letter code: CL) (formula: Cl).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	D	1	Total	Cl	0	0
			1	1		

- Molecule 5 is SULFATE ION (three-letter code: SO4) (formula: O<sub>4</sub>S).





Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	E	1	Total O S 5 4 1	0	0
5	F	1	Total O S 5 4 1	0	0
5	F	1	Total O S 5 4 1	0	0

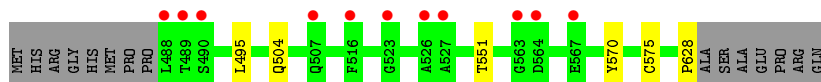
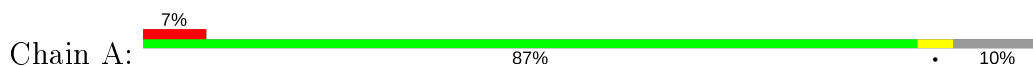
- Molecule 6 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
6	A	23	Total O 23 23	0	0
6	B	24	Total O 24 24	0	0
6	C	31	Total O 31 31	0	0
6	D	20	Total O 20 20	0	0
6	E	12	Total O 12 12	0	0
6	F	11	Total O 11 11	0	0
6	H	1	Total O 1 1	0	0
6	J	8	Total O 8 8	0	0
6	K	8	Total O 8 8	0	0
6	L	2	Total O 2 2	0	0

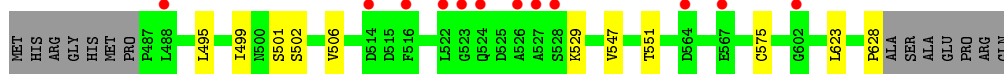
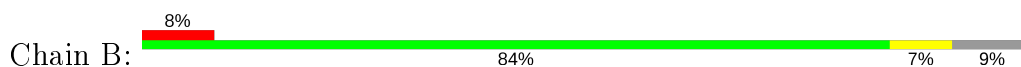
### 3 Residue-property plots [i](#)

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.

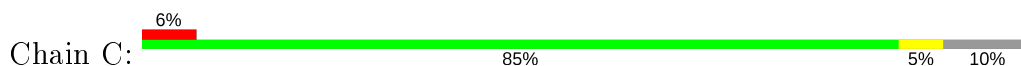
- Molecule 1: Talin-1



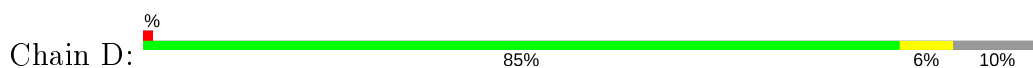
- Molecule 1: Talin-1



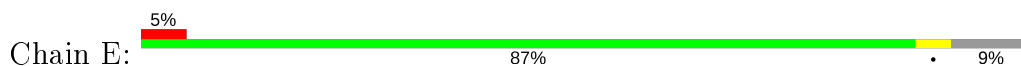
- Molecule 1: Talin-1



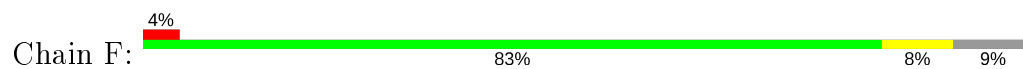
- Molecule 1: Talin-1



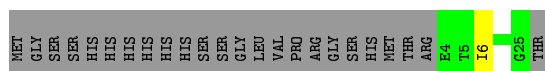
- Molecule 1: Talin-1



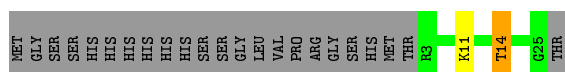
- Molecule 1: Talin-1



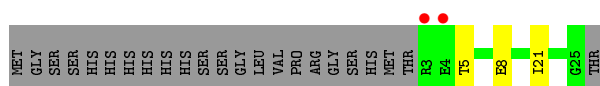
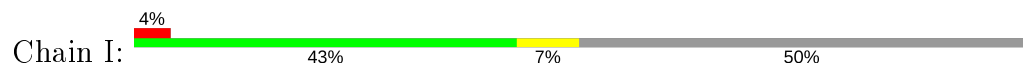
- Molecule 2: Invasin IpaA



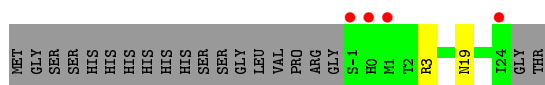
- Molecule 2: Invasin IpaA



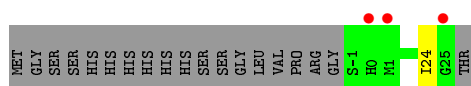
- Molecule 2: Invasin IpaA



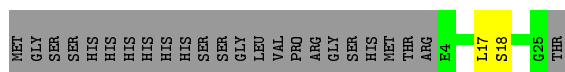
- Molecule 2: Invasin IpaA



- Molecule 2: Invasin IpaA



- Molecule 2: Invasin IpaA



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	66.26Å 96.36Å 175.69Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	36.33 – 2.50 48.18 – 2.50	Depositor EDS
% Data completeness (in resolution range)	99.3 (36.33-2.50) 99.3 (48.18-2.50)	Depositor EDS
$R_{merge}$	0.08	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.77 (at 2.51Å)	Xtrriage
Refinement program	BUSTER 2.10.3	Depositor
R, $R_{free}$	0.196 , 0.228 0.211 , 0.249	Depositor DCC
$R_{free}$ test set	1971 reflections (5.00%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	50.2	Xtrriage
Anisotropy	0.072	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.32 , 52.0	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.49$ , $\langle L^2 \rangle = 0.33$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
$F_o, F_c$ correlation	0.95	EDS
Total number of atoms	7396	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	68.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.85% of the height of the origin peak. No significant pseudotranslation is detected.*

<sup>1</sup>Intensities estimated from amplitudes.

<sup>2</sup>Theoretical values of  $\langle |L| \rangle$ ,  $\langle L^2 \rangle$  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: CL, EDO, 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	0.50	0/1035	0.61	0/1407
1	B	0.46	0/1033	0.60	0/1404
1	C	0.46	0/1023	0.59	0/1390
1	D	0.46	0/1028	0.59	0/1397
1	E	0.47	0/1045	0.59	0/1421
1	F	0.46	0/1048	0.58	0/1424
2	G	0.43	0/165	0.58	0/221
2	H	0.56	0/170	0.69	0/228
2	I	0.48	0/178	0.59	0/239
2	J	0.46	0/203	0.63	0/272
2	K	0.47	0/208	0.63	0/278
2	L	0.47	0/165	0.64	0/221
All	All	0.47	0/7301	0.60	0/9902

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	1025	0	1012	5	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	B	1022	0	1018	9	0
1	C	1013	0	1003	6	0
1	D	1018	0	1005	6	0
1	E	1034	0	1013	5	0
1	F	1037	0	1029	7	0
2	G	165	0	175	0	0
2	H	170	0	177	1	0
2	I	178	0	182	2	0
2	J	202	0	213	2	0
2	K	207	0	219	1	0
2	L	165	0	175	1	0
3	B	4	0	6	0	0
4	D	1	0	0	0	0
5	E	5	0	0	0	0
5	F	10	0	0	0	0
6	A	23	0	0	0	0
6	B	24	0	0	0	0
6	C	31	0	0	0	0
6	D	20	0	0	0	0
6	E	12	0	0	0	0
6	F	11	0	0	0	0
6	H	1	0	0	0	0
6	J	8	0	0	0	0
6	K	8	0	0	0	0
6	L	2	0	0	0	0
All	All	7396	0	7227	35	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 2.

All (35) 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:F:542:GLU:HG2	1:F:546[A]:GLN:HE22	1.60	0.66
1:A:495:LEU:HD23	1:A:628:PRO:HG3	1.80	0.64
1:D:495:LEU:HD23	1:D:628:PRO:HG3	1.81	0.61
1:B:547:VAL:HG11	2:I:21:ILE:HD11	1.84	0.60
1:B:501:SER:HA	2:J:19:ASN:OD1	2.03	0.58
1:F:509:ALA:O	1:F:512:THR:HG22	2.06	0.55
1:A:495:LEU:HD22	1:A:570:TYR:HD1	1.71	0.54
1:B:551:THR:HG22	1:D:555:ALA:CB	2.37	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:575:CYS:CB	1:B:575:CYS:HG	2.22	0.52
1:A:575:CYS:SG	1:B:575:CYS:SG	3.07	0.51
1:C:575[B]:CYS:HG	1:E:575[B]:CYS:HG	1.58	0.50
1:F:621:GLU:HG2	1:F:624:ARG:HH22	1.77	0.50
1:B:495:LEU:HD23	1:B:628:PRO:HG3	1.93	0.50
1:F:542:GLU:HG2	1:F:546[A]:GLN:NE2	2.24	0.50
1:E:495:LEU:HD23	1:E:628:PRO:HG3	1.94	0.49
1:F:495:LEU:HD23	1:F:628:PRO:HG3	1.94	0.49
1:C:495:LEU:HD23	1:C:628:PRO:HG3	1.95	0.48
1:E:542:GLU:O	1:E:546[B]:GLN:HG2	2.14	0.47
1:D:599:GLU:HG2	1:D:605:GLY:H	1.81	0.45
1:D:564:ASP:O	1:D:567:GLU:HG2	2.16	0.44
1:A:551:THR:HG22	1:C:555:ALA:CB	2.47	0.44
1:D:540:LYS:HG2	2:K:24:ILE:HG23	2.00	0.44
2:I:5:THR:HB	2:I:8:GLU:HG2	2.01	0.43
1:F:591:VAL:HG11	1:F:612:ALA:HB2	1.99	0.43
1:C:495:LEU:HD22	1:C:570:TYR:HD1	1.84	0.42
1:D:516:PHE:CZ	1:D:599:GLU:HG3	2.55	0.42
1:B:502:SER:O	1:B:506:VAL:HG23	2.20	0.42
1:B:529:LYS:HA	1:B:529:LYS:HD2	1.82	0.42
1:C:627:GLN:OE1	1:C:628:PRO:HD2	2.20	0.41
2:H:11:LYS:HA	2:H:14:THR:OG1	2.20	0.41
1:F:495:LEU:HD22	1:F:570:TYR:HD1	1.84	0.41
1:C:562:ALA:O	2:J:3:ARG:HD3	2.21	0.41
1:E:547:VAL:HG13	2:L:17:LEU:HD22	2.03	0.41
1:E:495:LEU:HD22	1:E:570:TYR:HD1	1.85	0.41
1:B:499:ILE:HG23	1:B:623:LEU:HB3	2.02	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	141/156 (90%)	140 (99%)	1 (1%)	0	100	100
1	B	140/156 (90%)	138 (99%)	2 (1%)	0	100	100
1	C	139/156 (89%)	138 (99%)	1 (1%)	0	100	100
1	D	140/156 (90%)	139 (99%)	1 (1%)	0	100	100
1	E	143/156 (92%)	142 (99%)	1 (1%)	0	100	100
1	F	142/156 (91%)	141 (99%)	1 (1%)	0	100	100
2	G	20/46 (44%)	20 (100%)	0	0	100	100
2	H	21/46 (46%)	21 (100%)	0	0	100	100
2	I	22/46 (48%)	21 (96%)	1 (4%)	0	100	100
2	J	24/46 (52%)	24 (100%)	0	0	100	100
2	K	25/46 (54%)	25 (100%)	0	0	100	100
2	L	20/46 (44%)	20 (100%)	0	0	100	100
All	All	977/1212 (81%)	969 (99%)	8 (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	108/119 (91%)	107 (99%)	1 (1%)	78	92
1	B	108/119 (91%)	108 (100%)	0	100	100
1	C	107/119 (90%)	106 (99%)	1 (1%)	78	92
1	D	107/119 (90%)	107 (100%)	0	100	100
1	E	109/119 (92%)	109 (100%)	0	100	100
1	F	110/119 (92%)	108 (98%)	2 (2%)	59	81
2	G	20/41 (49%)	19 (95%)	1 (5%)	24	46
2	H	20/41 (49%)	19 (95%)	1 (5%)	24	46
2	I	21/41 (51%)	21 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
2	J	24/41 (58%)	24 (100%)	0	100	100
2	K	25/41 (61%)	25 (100%)	0	100	100
2	L	20/41 (49%)	19 (95%)	1 (5%)	24	46
All	All	779/960 (81%)	772 (99%)	7 (1%)	78	92

All (7) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	504	GLN
1	C	510	GLN
1	F	515	ASP
1	F	533	LYS
2	G	6	ILE
2	H	14	THR
2	L	18	SER

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

Mol	Chain	Res	Type
1	B	504	GLN
1	F	504	GLN
2	K	19	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 carbohydrates in this entry.

## 5.6 Ligand geometry [i](#)

Of 5 ligands modelled in this entry, 1 is monoatomic - leaving 4 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	SO4	E	701	-	4,4,4	0.12	0	6,6,6	0.12	0
3	EDO	B	701	-	3,3,3	0.55	0	2,2,2	0.29	0
5	SO4	F	702	-	4,4,4	0.17	0	6,6,6	0.27	0
5	SO4	F	701	-	4,4,4	0.23	0	6,6,6	0.23	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
3	EDO	B	701	-	-	0/1/1/1	-

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 [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, 95<sup>th</sup> 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 <sup>2</sup> )	Q<0.9
1	A	141/156 (90%)	0.59	11 (7%) 13 13	37, 58, 100, 121	0
1	B	142/156 (91%)	0.55	12 (8%) 10 10	37, 61, 103, 122	0
1	C	140/156 (89%)	0.25	9 (6%) 19 20	37, 65, 102, 129	0
1	D	141/156 (90%)	0.16	1 (0%) 87 89	38, 61, 92, 103	0
1	E	142/156 (91%)	0.34	8 (5%) 24 25	46, 70, 104, 123	0
1	F	142/156 (91%)	0.29	6 (4%) 36 39	46, 70, 107, 126	1 (0%)
2	G	22/46 (47%)	0.20	0 100 100	59, 68, 83, 111	0
2	H	23/46 (50%)	0.52	0 100 100	49, 62, 101, 108	0
2	I	23/46 (50%)	0.33	2 (8%) 10 10	54, 66, 96, 110	0
2	J	26/46 (56%)	0.51	4 (15%) 2 1	40, 52, 104, 108	0
2	K	27/46 (58%)	0.73	3 (11%) 5 5	38, 52, 99, 105	0
2	L	22/46 (47%)	-0.03	0 100 100	50, 62, 84, 87	0
All	All	991/1212 (81%)	0.37	56 (5%) 23 25	37, 64, 103, 129	1 (0%)

All (56) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	E	516	PHE	8.5
1	E	515	ASP	4.9
1	C	566	ALA	4.5
1	B	564	ASP	4.3
1	A	526	ALA	4.2
1	B	488	LEU	4.2
1	A	489	THR	4.1
1	B	523	GLY	3.8
1	E	604	ASN	3.7
1	B	522	LEU	3.7
1	C	491	ALA	3.6

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>	<b>RSRZ</b>
1	B	526	ALA	3.6
1	C	489	THR	3.5
1	B	527	ALA	3.5
1	A	488	LEU	3.4
2	K	0	HIS	3.4
1	F	526	ALA	3.1
2	K	1	MET	3.0
1	F	566	ALA	2.9
1	A	523	GLY	2.9
1	C	567	GLU	2.9
1	E	597	LEU	2.9
1	B	516	PHE	2.8
1	B	567	GLU	2.7
2	J	1	MET	2.7
1	C	570	TYR	2.7
1	B	514	ASP	2.6
2	J	0	HIS	2.6
1	A	516	PHE	2.5
2	I	3	ARG	2.4
1	E	605	GLY	2.4
2	K	25	GLY	2.4
1	C	490	SER	2.4
1	A	563	GLY	2.3
1	E	534	ASN	2.3
2	I	4	GLU	2.3
1	B	528	SER	2.3
1	B	602	GLY	2.3
1	D	522	LEU	2.2
1	A	490	SER	2.2
2	J	24	ILE	2.2
1	C	511	ALA	2.2
1	C	527	ALA	2.2
1	A	564	ASP	2.2
1	F	489	THR	2.2
1	F	624	ARG	2.1
2	J	-1	SER	2.1
1	A	567	GLU	2.1
1	E	488	LEU	2.1
1	A	507	GLN	2.1
1	F	627	GLN	2.1
1	E	514	ASP	2.1
1	C	493	GLN	2.1

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Mol	Chain	Res	Type	RSRZ
1	A	527	ALA	2.0
1	F	628	PRO	2.0
1	B	524	GLN	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 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<sup>th</sup> 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 <sup>2</sup> )	Q<0.9
5	SO4	E	701	5/5	0.80	0.28	139,139,140,140	0
4	CL	D	701	1/1	0.84	0.20	91,91,91,91	0
5	SO4	F	702	5/5	0.90	0.35	112,114,115,115	0
3	EDO	B	701	4/4	0.94	0.10	76,76,78,79	0
5	SO4	F	701	5/5	0.94	0.19	82,82,83,83	5

## 6.5 Other polymers [i](#)

There are no such residues in this entry.