



# wwPDB X-ray Structure Validation Summary Report ⓘ

Feb 14, 2017 – 06:21 pm GMT

PDB ID : 2PDO  
Title : Crystal Structure of the Putative Acetyltransferase of GNAT Family from *Shigella flexneri*  
Authors : Kim, Y.; Li, H.; Holzle, D.; Joachimiak, A.; Midwest Center for Structural Genomics (MCSG)  
Deposited on : 2007-04-01  
Resolution : 2.00 Å(reported)

This is a wwPDB X-ray Structure Validation Summary 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

<http://wwpdb.org/validation/2016/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	:	1.7.2 (RC1), CSD as538be (2017)
Xtriage (Phenix)	:	1.9-1692
EDS	:	trunk28620
Percentile statistics	:	20161228.v01 (using entries in the PDB archive December 28th 2016)
Refmac	:	5.8.0135
CCP4	:	6.5.0
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	recalc28949

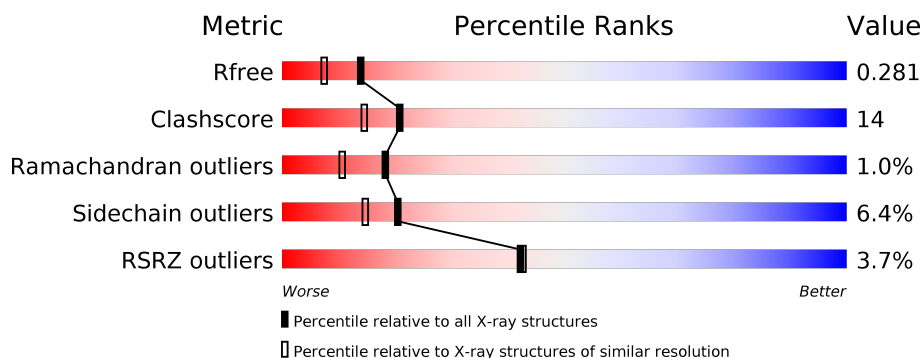
# 1 Overall quality at a glance

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))
$R_{free}$	100719	6609 (2.00-2.00)
Clashscore	112137	7775 (2.00-2.00)
Ramachandran outliers	110173	7679 (2.00-2.00)
Sidechain outliers	110143	7678 (2.00-2.00)
RSRZ outliers	101464	6696 (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  $\geq 3$ , 2, 1 and 0 types of geometric quality criteria. 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	144	<div> <div>2%</div> <div> <div></div> <div>74%</div> <div>23%</div> <div></div> </div> <div></div> </div>
1	B	144	<div> <div>8%</div> <div> <div></div> <div>70%</div> <div>24%</div> <div></div> </div> <div></div> </div>
1	C	144	<div> <div>4%</div> <div> <div></div> <div>71%</div> <div>24%</div> <div></div> </div> <div></div> </div>
1	D	144	<div> <div>3%</div> <div> <div></div> <div>71%</div> <div>24%</div> <div></div> </div> <div></div> </div>
1	E	144	<div> <div>3%</div> <div> <div></div> <div>67%</div> <div>26%</div> <div></div> </div> <div></div> </div>
1	F	144	<div> <div>%</div> <div> <div></div> <div>72%</div> <div>22%</div> <div></div> </div> <div></div> </div>

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Mol	Chain	Length	Quality of chain
1	G	144	
1	H	144	

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
3	EDO	D	608	-	-	X	-
3	EDO	E	614	-	-	-	X
3	EDO	F	609	-	-	X	X
3	EDO	F	612	-	-	-	X
4	ACY	B	607	-	-	X	X

## 2 Entry composition

There are 5 unique types of molecules in this entry. The entry contains 10253 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 Acetyltransferase ypeA.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
1	A	140	Total	C	N	O	S	Se	0	9	0
			1209	755	211	234	2	7			
1	B	141	Total	C	N	O	S	Se	0	9	0
			1229	769	216	236	2	6			
1	C	140	Total	C	N	O	S	Se	0	6	0
			1183	740	211	224	2	6			
1	D	142	Total	C	N	O	S	Se	0	7	0
			1215	759	217	231	2	6			
1	E	140	Total	C	N	O	S	Se	0	4	0
			1167	730	205	224	2	6			
1	F	141	Total	C	N	O	S	Se	0	7	0
			1203	750	218	227	2	6			
1	G	138	Total	C	N	O	S	Se	0	11	0
			1218	758	219	233	2	6			
1	H	140	Total	C	N	O	S	Se	0	8	0
			1201	748	213	232	2	6			

There are 72 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-2	SER	-	CLONING ARTIFACT	UNP P63422
A	-1	ASN	-	CLONING ARTIFACT	UNP P63422
A	0	ALA	-	CLONING ARTIFACT	UNP P63422
A	1	MSE	MET	MODIFIED RESIDUE	UNP P63422
A	32	MSE	MET	MODIFIED RESIDUE	UNP P63422
A	38	MSE	MET	MODIFIED RESIDUE	UNP P63422
A	59	MSE	MET	MODIFIED RESIDUE	UNP P63422
A	113	MSE	MET	MODIFIED RESIDUE	UNP P63422
A	117	MSE	MET	MODIFIED RESIDUE	UNP P63422
B	-2	SER	-	CLONING ARTIFACT	UNP P63422
B	-1	ASN	-	CLONING ARTIFACT	UNP P63422
B	0	ALA	-	CLONING ARTIFACT	UNP P63422
B	1	MSE	MET	MODIFIED RESIDUE	UNP P63422

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Chain	Residue	Modelled	Actual	Comment	Reference
B	32	MSE	MET	MODIFIED RESIDUE	UNP P63422
B	38	MSE	MET	MODIFIED RESIDUE	UNP P63422
B	59	MSE	MET	MODIFIED RESIDUE	UNP P63422
B	113	MSE	MET	MODIFIED RESIDUE	UNP P63422
B	117	MSE	MET	MODIFIED RESIDUE	UNP P63422
C	-2	SER	-	CLONING ARTIFACT	UNP P63422
C	-1	ASN	-	CLONING ARTIFACT	UNP P63422
C	0	ALA	-	CLONING ARTIFACT	UNP P63422
C	1	MSE	MET	MODIFIED RESIDUE	UNP P63422
C	32	MSE	MET	MODIFIED RESIDUE	UNP P63422
C	38	MSE	MET	MODIFIED RESIDUE	UNP P63422
C	59	MSE	MET	MODIFIED RESIDUE	UNP P63422
C	113	MSE	MET	MODIFIED RESIDUE	UNP P63422
C	117	MSE	MET	MODIFIED RESIDUE	UNP P63422
D	-2	SER	-	CLONING ARTIFACT	UNP P63422
D	-1	ASN	-	CLONING ARTIFACT	UNP P63422
D	0	ALA	-	CLONING ARTIFACT	UNP P63422
D	1	MSE	MET	MODIFIED RESIDUE	UNP P63422
D	32	MSE	MET	MODIFIED RESIDUE	UNP P63422
D	38	MSE	MET	MODIFIED RESIDUE	UNP P63422
D	59	MSE	MET	MODIFIED RESIDUE	UNP P63422
D	113	MSE	MET	MODIFIED RESIDUE	UNP P63422
D	117	MSE	MET	MODIFIED RESIDUE	UNP P63422
E	-2	SER	-	CLONING ARTIFACT	UNP P63422
E	-1	ASN	-	CLONING ARTIFACT	UNP P63422
E	0	ALA	-	CLONING ARTIFACT	UNP P63422
E	1	MSE	MET	MODIFIED RESIDUE	UNP P63422
E	32	MSE	MET	MODIFIED RESIDUE	UNP P63422
E	38	MSE	MET	MODIFIED RESIDUE	UNP P63422
E	59	MSE	MET	MODIFIED RESIDUE	UNP P63422
E	113	MSE	MET	MODIFIED RESIDUE	UNP P63422
E	117	MSE	MET	MODIFIED RESIDUE	UNP P63422
F	-2	SER	-	CLONING ARTIFACT	UNP P63422
F	-1	ASN	-	CLONING ARTIFACT	UNP P63422
F	0	ALA	-	CLONING ARTIFACT	UNP P63422
F	1	MSE	MET	MODIFIED RESIDUE	UNP P63422
F	32	MSE	MET	MODIFIED RESIDUE	UNP P63422
F	38	MSE	MET	MODIFIED RESIDUE	UNP P63422
F	59	MSE	MET	MODIFIED RESIDUE	UNP P63422
F	113	MSE	MET	MODIFIED RESIDUE	UNP P63422
F	117	MSE	MET	MODIFIED RESIDUE	UNP P63422
G	-2	SER	-	CLONING ARTIFACT	UNP P63422

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Chain	Residue	Modelled	Actual	Comment	Reference
G	-1	ASN	-	CLONING ARTIFACT	UNP P63422
G	0	ALA	-	CLONING ARTIFACT	UNP P63422
G	1	MSE	MET	MODIFIED RESIDUE	UNP P63422
G	32	MSE	MET	MODIFIED RESIDUE	UNP P63422
G	38	MSE	MET	MODIFIED RESIDUE	UNP P63422
G	59	MSE	MET	MODIFIED RESIDUE	UNP P63422
G	113	MSE	MET	MODIFIED RESIDUE	UNP P63422
G	117	MSE	MET	MODIFIED RESIDUE	UNP P63422
H	-2	SER	-	CLONING ARTIFACT	UNP P63422
H	-1	ASN	-	CLONING ARTIFACT	UNP P63422
H	0	ALA	-	CLONING ARTIFACT	UNP P63422
H	1	MSE	MET	MODIFIED RESIDUE	UNP P63422
H	32	MSE	MET	MODIFIED RESIDUE	UNP P63422
H	38	MSE	MET	MODIFIED RESIDUE	UNP P63422
H	59	MSE	MET	MODIFIED RESIDUE	UNP P63422
H	113	MSE	MET	MODIFIED RESIDUE	UNP P63422
H	117	MSE	MET	MODIFIED RESIDUE	UNP P63422

- Molecule 2 is ZINC ION (three-letter code: ZN) (formula: Zn).

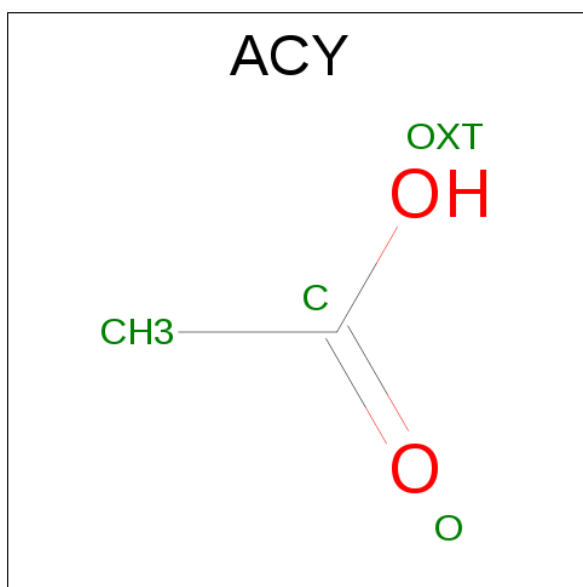
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	H	1	Total Zn 1 1	0	0
2	G	1	Total Zn 1 1	0	0
2	B	2	Total Zn 2 2	0	0
2	E	1	Total Zn 1 1	0	0

- 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	D	1	Total	C	O	0	0
			4	2	2		
3	F	1	Total	C	O	0	0
			4	2	2		
3	F	1	Total	C	O	0	0
			4	2	2		
3	H	1	Total	C	O	0	0
			4	2	2		
3	F	1	Total	C	O	0	0
			4	2	2		
3	H	1	Total	C	O	0	0
			4	2	2		
3	E	1	Total	C	O	0	0
			4	2	2		

- Molecule 4 is ACETIC ACID (three-letter code: ACY) (formula: C<sub>2</sub>H<sub>4</sub>O<sub>2</sub>).



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

- Molecule 5 is water.

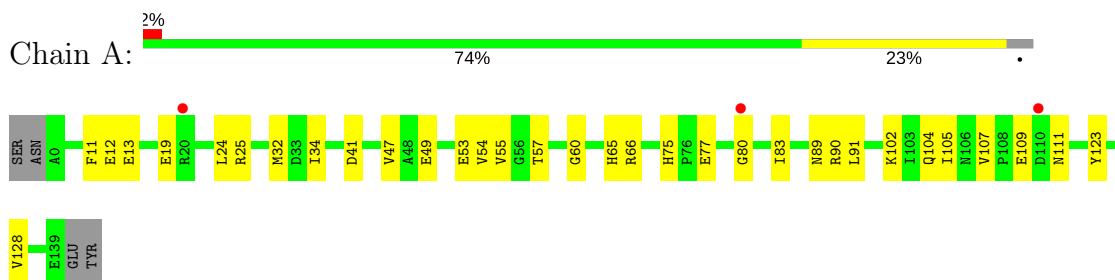
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	76	Total	O	0	0
			76	76		
5	B	73	Total	O	0	0
			73	73		
5	C	64	Total	O	0	0
			64	64		
5	D	73	Total	O	0	0
			73	73		
5	E	66	Total	O	0	0
			66	66		
5	F	74	Total	O	0	0
			74	74		
5	G	67	Total	O	0	0
			67	67		
5	H	94	Total	O	0	0
			94	94		



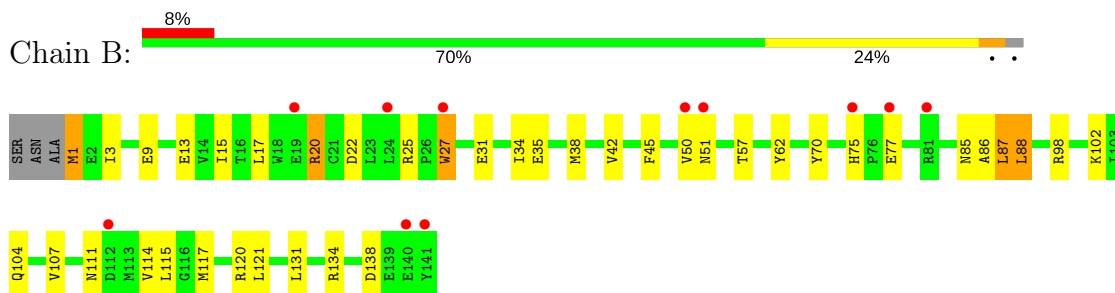
### 3 Residue-property plots [i](#)

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.

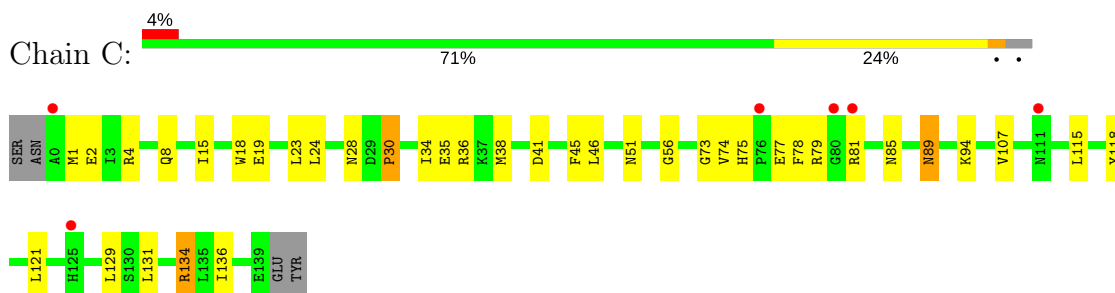
- Molecule 1: Acetyltransferase ypeA



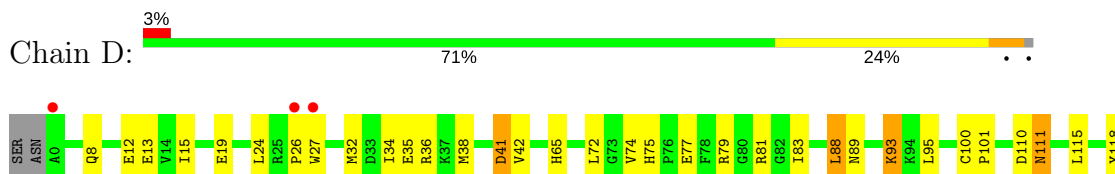
- Molecule 1: Acetyltransferase ypeA



- Molecule 1: Acetyltransferase ypeA

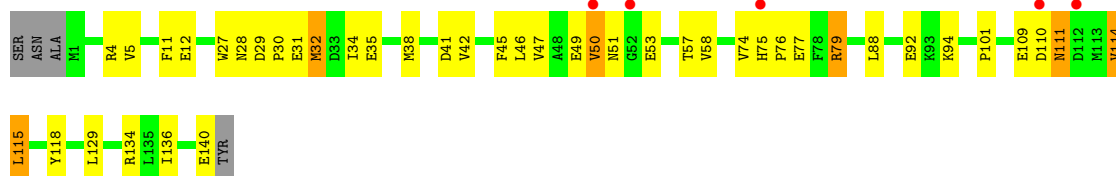


- Molecule 1: Acetyltransferase ypeA

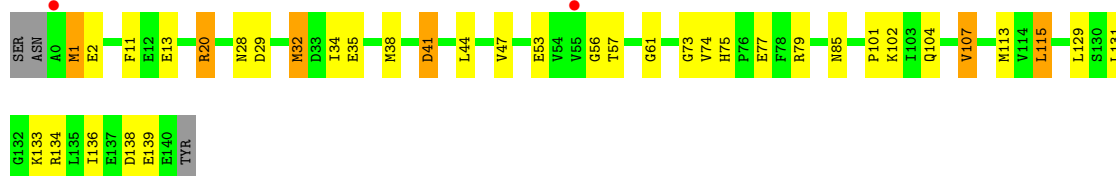




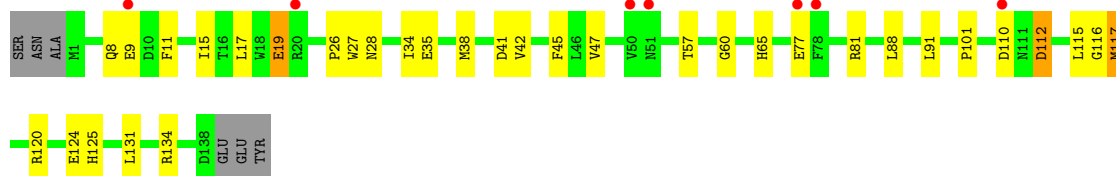
- Molecule 1: Acetyltransferase ypeA



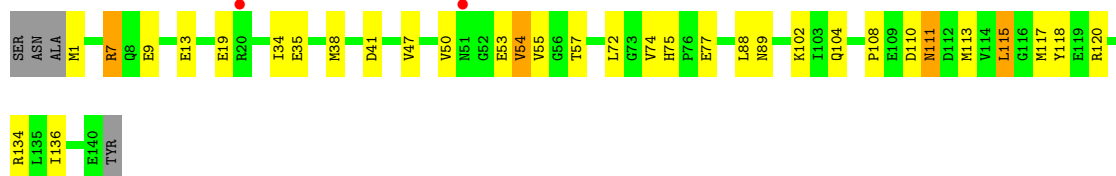
- Molecule 1: Acetyltransferase ypeA



- Molecule 1: Acetyltransferase ypeA



- Molecule 1: Acetyltransferase ypeA



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	64.05Å 134.39Å 70.47Å 90.00° 105.93° 90.00°	Depositor
Resolution (Å)	34.62 – 2.00 34.62 – 2.00	Depositor EDS
% Data completeness (in resolution range)	94.2 (34.62-2.00) 94.2 (34.62-2.00)	Depositor EDS
$R_{merge}$	0.11	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	2.85 (at 2.00Å)	Xtriage
Refinement program	REFMAC 5.2.0000	Depositor
R, $R_{free}$	0.193 , 0.266 0.221 , 0.281	Depositor DCC
$R_{free}$ test set	7352 reflections (10.12%)	DCC
Wilson B-factor (Å <sup>2</sup> )	30.1	Xtriage
Anisotropy	0.120	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.34 , 48.9	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.46$ , $\langle L^2 \rangle = 0.29$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
$F_o, F_c$ correlation	0.94	EDS
Total number of atoms	10253	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	33.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.74% 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

### 5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: ZN, ACY, EDO

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	0.79	0/1225	0.86	1/1640 (0.1%)
1	B	0.85	4/1248 (0.3%)	0.83	1/1675 (0.1%)
1	C	0.73	0/1199	0.87	3/1605 (0.2%)
1	D	0.84	0/1231	0.84	0/1649
1	E	0.72	0/1183	0.79	0/1586
1	F	0.80	0/1219	0.83	0/1632
1	G	0.78	0/1234	0.80	1/1652 (0.1%)
1	H	0.81	0/1217	0.85	0/1631
All	All	0.79	4/9756 (0.0%)	0.84	6/13070 (0.0%)

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	1

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	77[A]	GLU	CD-OE2	6.63	1.32	1.25
1	B	77[B]	GLU	CD-OE2	6.63	1.32	1.25
1	B	77[A]	GLU	CG-CD	5.43	1.60	1.51
1	B	77[B]	GLU	CG-CD	5.43	1.60	1.51

The worst 5 of 6 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	90	ARG	NE-CZ-NH2	-6.99	116.80	120.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	G	17	LEU	CA-CB-CG	6.65	130.60	115.30
1	C	4	ARG	NE-CZ-NH2	-6.17	117.22	120.30
1	C	134	ARG	NE-CZ-NH2	5.79	123.20	120.30
1	B	98	ARG	NE-CZ-NH1	5.47	123.04	120.30

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	80	GLY	Peptide

## 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	1209	0	1156	26	0
1	B	1229	0	1172	39	0
1	C	1183	0	1146	27	0
1	D	1215	0	1174	43	0
1	E	1167	0	1128	41	0
1	F	1203	0	1164	44	0
1	G	1218	0	1175	32	0
1	H	1201	0	1155	28	0
2	B	2	0	0	0	0
2	E	1	0	0	0	0
2	G	1	0	0	0	0
2	H	1	0	0	0	0
3	D	4	0	6	6	0
3	E	4	0	6	3	0
3	F	12	0	18	7	0
3	H	8	0	12	2	0
4	B	4	0	3	9	0
4	H	4	0	3	0	0
5	A	76	0	0	10	0
5	B	73	0	0	6	0
5	C	64	0	0	1	0
5	D	73	0	0	8	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
5	E	66	0	0	1	0
5	F	74	0	0	3	0
5	G	67	0	0	4	0
5	H	94	0	0	4	0
All	All	10253	0	9318	263	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 14.

The worst 5 of 263 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:55:VAL:HG23	5:A:191:HOH:O	1.39	1.21
1:D:120:ARG:HG2	5:F:670:HOH:O	1.47	1.13
1:H:34:ILE:HG22	1:H:38:MSE:HE2	1.27	1.12
1:E:34:ILE:HG22	1:E:38:MSE:HE2	1.33	1.10
1:D:34:ILE:HG22	1:D:38:MSE:HE2	1.28	1.08

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	147/144 (102%)	142 (97%)	4 (3%)	1 (1%)	25	18
1	B	148/144 (103%)	140 (95%)	8 (5%)	0	100	100
1	C	144/144 (100%)	139 (96%)	3 (2%)	2 (1%)	13	6
1	D	147/144 (102%)	140 (95%)	6 (4%)	1 (1%)	25	18
1	E	142/144 (99%)	132 (93%)	8 (6%)	2 (1%)	13	6
1	F	146/144 (101%)	136 (93%)	8 (6%)	2 (1%)	13	6

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	G	147/144 (102%)	137 (93%)	7 (5%)	3 (2%)	9	3
1	H	146/144 (101%)	140 (96%)	5 (3%)	1 (1%)	25	18
All	All	1167/1152 (101%)	1106 (95%)	49 (4%)	12 (1%)	18	10

5 of 12 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	C	41	ASP
1	D	41	ASP
1	G	41	ASP
1	A	41	ASP
1	E	41	ASP

### 5.3.2 Protein sidechains ⓘ

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	129/118 (109%)	125 (97%)	4 (3%)	45	44
1	B	131/118 (111%)	121 (92%)	10 (8%)	15	10
1	C	126/118 (107%)	114 (90%)	12 (10%)	10	5
1	D	129/118 (109%)	122 (95%)	7 (5%)	26	20
1	E	125/118 (106%)	114 (91%)	11 (9%)	12	7
1	F	128/118 (108%)	118 (92%)	10 (8%)	15	9
1	G	130/118 (110%)	122 (94%)	8 (6%)	21	16
1	H	129/118 (109%)	120 (93%)	9 (7%)	18	12
All	All	1027/944 (109%)	956 (93%)	71 (7%)	20	12

5 of 71 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	D	141	TYR
1	E	110[A]	ASP

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Mol	Chain	Res	Type
1	H	54	VAL
1	E	32	MSE
1	E	79	ARG

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 19 such sidechains are listed below:

Mol	Chain	Res	Type
1	D	85	ASN
1	E	51	ASN
1	F	104	GLN
1	D	65	HIS
1	G	8	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 carbohydrates in this entry.

## 5.6 Ligand geometry [i](#)

Of 14 ligands modelled in this entry, 5 are monoatomic - leaving 9 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	$\# Z  > 2$
4	ACY	B	607	-	1,3,3	1.42	0	0,3,3	0.00	-



Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
3	EDO	D	608	-	3,3,3	0.39	0	2,2,2	0.65	0
3	EDO	E	614	-	3,3,3	0.48	0	2,2,2	0.54	0
3	EDO	F	609	-	3,3,3	0.54	0	2,2,2	0.63	0
3	EDO	F	610	-	3,3,3	0.62	0	2,2,2	0.31	0
3	EDO	F	612	-	3,3,3	0.61	0	2,2,2	0.32	0
4	ACY	H	606	-	1,3,3	2.07	1 (100%)	0,3,3	0.00	-
3	EDO	H	611	-	3,3,3	0.43	0	2,2,2	0.66	0
3	EDO	H	613	-	3,3,3	0.44	0	2,2,2	0.87	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
4	ACY	B	607	-	-	0/0/0/0	0/0/0/0
3	EDO	D	608	-	-	0/1/1/1	0/0/0/0
3	EDO	E	614	-	-	0/1/1/1	0/0/0/0
3	EDO	F	609	-	-	0/1/1/1	0/0/0/0
3	EDO	F	610	-	-	0/1/1/1	0/0/0/0
3	EDO	F	612	-	-	0/1/1/1	0/0/0/0
4	ACY	H	606	-	-	0/0/0/0	0/0/0/0
3	EDO	H	611	-	-	0/1/1/1	0/0/0/0
3	EDO	H	613	-	-	0/1/1/1	0/0/0/0

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	H	606	ACY	CH3-C	2.07	1.51	1.48

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

7 monomers are involved in 27 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	B	607	ACY	9	0
3	D	608	EDO	6	0
3	E	614	EDO	3	0

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Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	F	609	EDO	6	0
3	F	612	EDO	1	0
3	H	611	EDO	1	0
3	H	613	EDO	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, 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	134/144 (93%)	0.18	3 (2%) 62 61	24, 31, 43, 51	0
1	B	135/144 (93%)	0.37	11 (8%) 13 13	22, 32, 45, 53	0
1	C	134/144 (93%)	0.39	6 (4%) 34 34	25, 32, 46, 55	0
1	D	136/144 (94%)	0.20	4 (2%) 52 52	22, 30, 46, 57	0
1	E	134/144 (93%)	0.20	5 (3%) 42 43	25, 31, 45, 49	0
1	F	135/144 (93%)	0.16	2 (1%) 74 73	24, 32, 43, 55	0
1	G	132/144 (91%)	0.34	7 (5%) 27 27	25, 31, 39, 43	0
1	H	134/144 (93%)	0.24	2 (1%) 74 73	25, 32, 42, 50	0
All	All	1074/1152 (93%)	0.26	40 (3%) 42 43	22, 32, 44, 57	0

The worst 5 of 40 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	0	ALA	5.6
1	B	81[A]	ARG	3.5
1	D	0	ALA	3.5
1	B	27[A]	TRP	3.4
1	C	80	GLY	3.4

### 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

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. LLDF column lists the quality of electron density of the group with respect to its neighbouring residues in protein, DNA or RNA chains. 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	LLDF	B-factors(Å <sup>2</sup> )	Q<0.9
3	EDO	F	612	4/4	0.72	0.21	4.72	41,46,46,47	0
4	ACY	B	607	4/4	0.94	0.21	2.89	23,25,28,29	0
3	EDO	E	614	4/4	0.69	0.27	2.14	49,52,54,58	0
3	EDO	F	609	4/4	0.94	0.19	2.12	11,19,22,25	0
3	EDO	D	608	4/4	0.86	0.21	1.18	19,28,34,38	0
3	EDO	H	611	4/4	0.88	0.20	1.01	41,43,43,43	0
3	EDO	H	613	4/4	0.84	0.13	0.21	41,42,42,46	0
3	EDO	F	610	4/4	0.85	0.11	-0.39	43,45,47,47	0
4	ACY	H	606	4/4	0.97	0.11	-1.27	39,39,39,40	0
2	ZN	G	603	1/1	0.99	0.06	-2.57	30,30,30,30	1
2	ZN	B	601	1/1	0.99	0.04	-2.67	34,34,34,34	1
2	ZN	E	602	1/1	0.99	0.05	-3.26	30,30,30,30	1
2	ZN	B	604	1/1	0.98	0.03	-3.94	48,48,48,48	1
2	ZN	H	605	1/1	0.98	0.05	-	35,35,35,35	1

## 6.5 Other polymers

There are no such residues in this entry.