Full wwPDB X-ray Structure Validation Report (i)

Nov 24, 2024 – 12:12 am GMT

PDB ID	:	8R6Z
Title	:	Polysaccharide lyase BtPL33HA (BT4410) Apo form 2
Authors	:	Cartmell, A.
Deposited on	:	2023-11-23
Resolution	:	2.03 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:

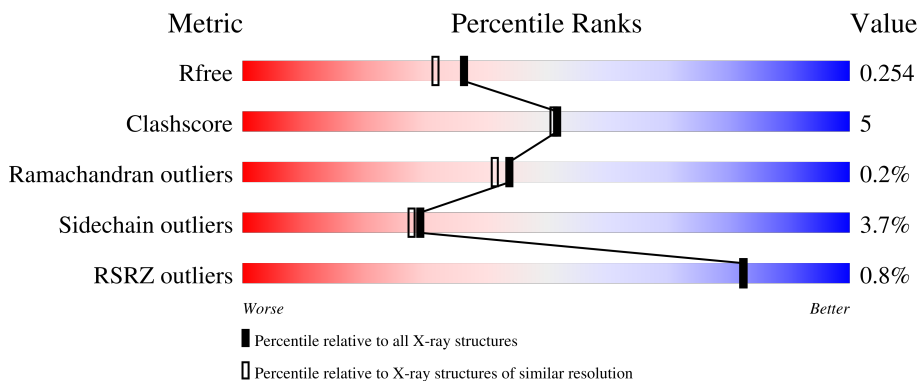|		
MolProbity	:	4.02b-467
Xtriage (Phenix)	:	1.13
EDS	:	3.0
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4	:	9.0.003 (Gargrove)
Density-Fitness	:	1.0.11
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.40

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 2.03 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	Percentile Ranks	Value
Rfree		0.254
Clashscore		5
Ramachandran outliers		0.2%
Sidechain outliers		3.7%
RSRZ outliers		0.8%

Worse   *Better*

▋ Percentile relative to all X-ray structures

▐ Percentile relative to X-ray structures of similar resolution

Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	164625	12358 (2.04-2.00)
Clashscore	180529	13897 (2.04-2.00)
Ramachandran outliers	177936	13770 (2.04-2.00)
Sidechain outliers	177891	13769 (2.04-2.00)
RSRZ outliers	164620	12358 (2.04-2.00)

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 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	644	% 76% 14% ·· 6%
1	B	644	80% 12% ···

2 Entry composition ⓘ

There are 3 unique types of molecules in this entry. The entry contains 10158 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 Heparinase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	B	616	Total	C	N	O	S	0	0	0
			4961	3159	845	923	34			
1	A	604	Total	C	N	O	S	0	1	0
			4862	3095	828	905	34			

There are 46 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	1	MET	-	initiating methionine	UNP Q89ZG7
B	2	GLY	-	expression tag	UNP Q89ZG7
B	3	SER	-	expression tag	UNP Q89ZG7
B	4	SER	-	expression tag	UNP Q89ZG7
B	5	HIS	-	expression tag	UNP Q89ZG7
B	6	HIS	-	expression tag	UNP Q89ZG7
B	7	HIS	-	expression tag	UNP Q89ZG7
B	8	HIS	-	expression tag	UNP Q89ZG7
B	9	HIS	-	expression tag	UNP Q89ZG7
B	10	HIS	-	expression tag	UNP Q89ZG7
B	11	SER	-	expression tag	UNP Q89ZG7
B	12	SER	-	expression tag	UNP Q89ZG7
B	13	GLY	-	expression tag	UNP Q89ZG7
B	14	LEU	-	expression tag	UNP Q89ZG7
B	15	VAL	-	expression tag	UNP Q89ZG7
B	16	PRO	-	expression tag	UNP Q89ZG7
B	17	ARG	-	expression tag	UNP Q89ZG7
B	18	GLY	-	expression tag	UNP Q89ZG7
B	19	SER	-	expression tag	UNP Q89ZG7
B	20	HIS	-	expression tag	UNP Q89ZG7
B	21	MET	-	expression tag	UNP Q89ZG7
B	22	ALA	-	expression tag	UNP Q89ZG7
B	23	SER	-	expression tag	UNP Q89ZG7
A	1	MET	-	initiating methionine	UNP Q89ZG7
A	2	GLY	-	expression tag	UNP Q89ZG7

Continued from previous page...

Chain	Residue	Modelled	Actual	Comment	Reference
A	3	SER	-	expression tag	UNP Q89ZG7
A	4	SER	-	expression tag	UNP Q89ZG7
A	5	HIS	-	expression tag	UNP Q89ZG7
A	6	HIS	-	expression tag	UNP Q89ZG7
A	7	HIS	-	expression tag	UNP Q89ZG7
A	8	HIS	-	expression tag	UNP Q89ZG7
A	9	HIS	-	expression tag	UNP Q89ZG7
A	10	HIS	-	expression tag	UNP Q89ZG7
A	11	SER	-	expression tag	UNP Q89ZG7
A	12	SER	-	expression tag	UNP Q89ZG7
A	13	GLY	-	expression tag	UNP Q89ZG7
A	14	LEU	-	expression tag	UNP Q89ZG7
A	15	VAL	-	expression tag	UNP Q89ZG7
A	16	PRO	-	expression tag	UNP Q89ZG7
A	17	ARG	-	expression tag	UNP Q89ZG7
A	18	GLY	-	expression tag	UNP Q89ZG7
A	19	SER	-	expression tag	UNP Q89ZG7
A	20	HIS	-	expression tag	UNP Q89ZG7
A	21	MET	-	expression tag	UNP Q89ZG7
A	22	ALA	-	expression tag	UNP Q89ZG7
A	23	SER	-	expression tag	UNP Q89ZG7

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

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	B	1	Total 1	Zn 1	0	0
2	A	1	Total 1	Zn 1	0	0

- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	B	215	Total 215	O 215	0	0
3	A	118	Total 118	O 118	0	0

3 Residue-property plots ⓘ

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: Heparinase
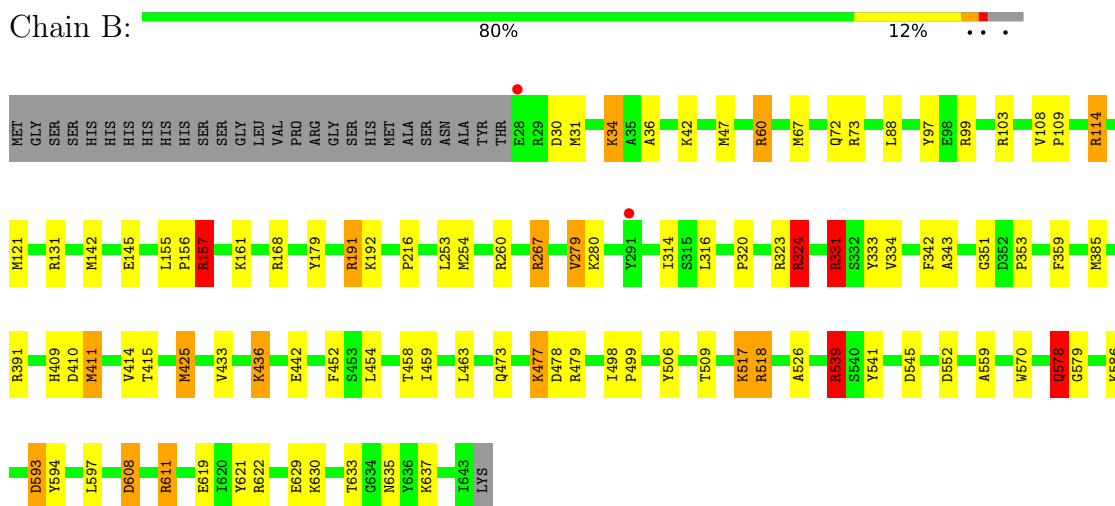
• Molecule 1: Heparinase
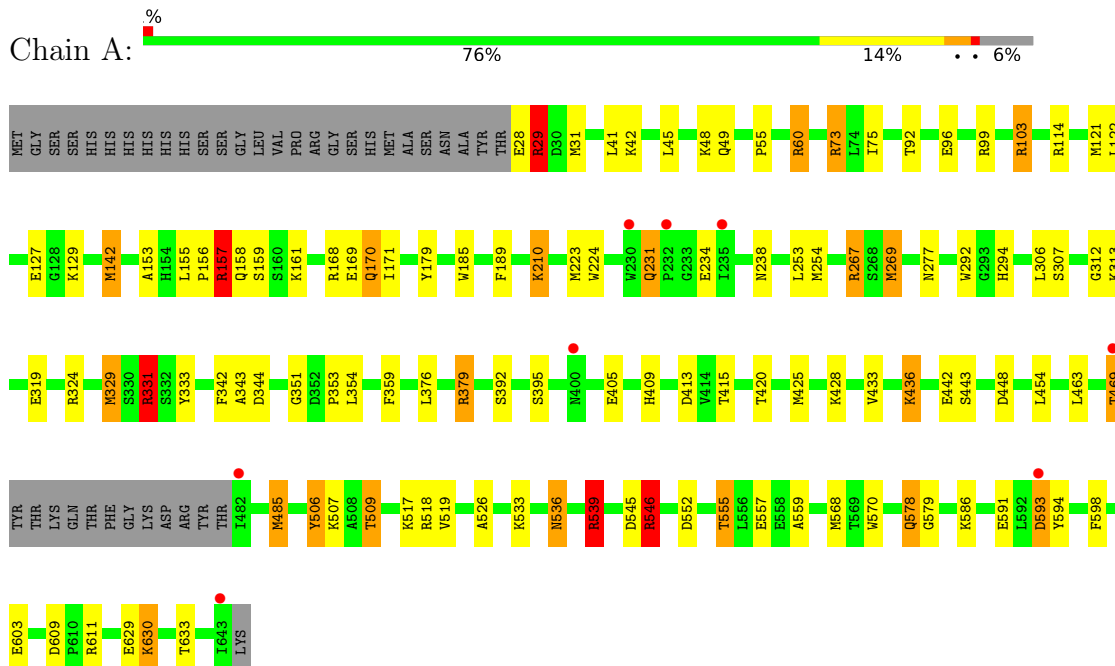
4 Data and refinement statistics ⓘ

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α, β, γ	53.53Å 137.67Å 202.51Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	113.85 – 2.03 113.85 – 2.03	Depositor EDS
% Data completeness (in resolution range)	75.0 (113.85-2.03) 75.1 (113.85-2.03)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.67 (at 2.03Å)	Xtriage
Refinement program	REFMAC 5.8.0419	Depositor
R, R_{free}	0.191 , 0.251 0.198 , 0.254	Depositor DCC
R_{free} test set	3607 reflections (4.92%)	wwPDB-VP
Wilson B-factor (Å^2)	28.8	Xtriage
Anisotropy	0.076	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.36 , 37.2	EDS
L-test for twinning[2]	$< \|L\| > = 0.48, < L^2 > = 0.31$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.94	EDS
Total number of atoms	10158	wwPDB-VP
Average B, all atoms (Å^2)	32.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.49% 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: ZN

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	0.75	1/4980 (0.0%)	1.35	46/6741 (0.7%)
1	B	0.82	6/5083 (0.1%)	1.44	48/6880 (0.7%)
All	All	0.79	7/10063 (0.1%)	1.39	94/13621 (0.7%)

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	11
1	B	0	12
All	All	0	23

All (7) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	611	ARG	NE-CZ	6.59	1.41	1.33
1	B	619	GLU	CD-OE1	6.12	1.32	1.25
1	B	145	GLU	CD-OE2	5.97	1.32	1.25
1	B	619	GLU	CD-OE2	5.49	1.31	1.25
1	B	145	GLU	CD-OE1	5.38	1.31	1.25
1	A	442	GLU	CD-OE2	5.27	1.31	1.25
1	B	442	GLU	CD-OE2	5.09	1.31	1.25

All (94) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	B	539	ARG	NE-CZ-NH2	-22.58	109.01	120.30
1	B	324	ARG	NE-CZ-NH2	-21.35	109.62	120.30

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	B	539	ARG	NE-CZ-NH1	17.51	129.06	120.30
1	A	267	ARG	NE-CZ-NH2	-17.28	111.66	120.30
1	A	539	ARG	NE-CZ-NH2	-17.10	111.75	120.30
1	B	324	ARG	NE-CZ-NH1	16.12	128.36	120.30
1	B	142	MET	CG-SD-CE	-15.91	74.74	100.20
1	B	267	ARG	NE-CZ-NH2	-13.77	113.42	120.30
1	B	73	ARG	NE-CZ-NH2	-13.50	113.55	120.30
1	B	539	ARG	CD-NE-CZ	12.80	141.52	123.60
1	A	267	ARG	NE-CZ-NH1	12.57	126.59	120.30
1	B	267	ARG	NE-CZ-NH1	12.42	126.51	120.30
1	A	539	ARG	CD-NE-CZ	12.11	140.56	123.60
1	A	269	MET	CG-SD-CE	-11.33	82.07	100.20
1	A	60	ARG	NE-CZ-NH2	-10.00	115.30	120.30
1	A	568	MET	CG-SD-CE	-9.99	84.22	100.20
1	B	121	MET	CG-SD-CE	-9.52	84.97	100.20
1	A	157	ARG	NE-CZ-NH2	9.48	125.04	120.30
1	B	60	ARG	NE-CZ-NH2	-9.47	115.57	120.30
1	B	168	ARG	NE-CZ-NH1	-9.12	115.74	120.30
1	A	60	ARG	NE-CZ-NH1	9.01	124.81	120.30
1	B	192	LYS	CD-CE-NZ	8.94	132.25	111.70
1	A	539	ARG	NE-CZ-NH1	8.55	124.57	120.30
1	B	324	ARG	CD-NE-CZ	8.29	135.20	123.60
1	A	99	ARG	NE-CZ-NH2	8.14	124.37	120.30
1	B	99	ARG	NE-CZ-NH2	8.13	124.37	120.30
1	B	60	ARG	NE-CZ-NH1	7.76	124.18	120.30
1	B	60	ARG	CD-NE-CZ	7.66	134.32	123.60
1	B	88	LEU	CB-CG-CD1	-7.41	98.41	111.00
1	A	103	ARG	NE-CZ-NH2	7.34	123.97	120.30
1	B	411	MET	CG-SD-CE	-7.31	88.51	100.20
1	A	485	MET	CG-SD-CE	7.29	111.87	100.20
1	A	31	MET	CG-SD-CE	7.26	111.81	100.20
1	A	598	PHE	CB-CA-C	-7.22	95.97	110.40
1	A	142	MET	CG-SD-CE	-7.18	88.71	100.20
1	A	42	LYS	N-CA-CB	-7.08	97.86	110.60
1	B	622	ARG	NE-CZ-NH1	6.96	123.78	120.30
1	B	629	GLU	CB-CA-C	-6.94	96.52	110.40
1	B	425	MET	CG-SD-CE	6.92	111.27	100.20
1	A	319	GLU	CG-CD-OE1	-6.80	104.69	118.30
1	B	578	GLN	CB-CA-C	-6.66	97.08	110.40
1	B	260	ARG	NE-CZ-NH1	6.66	123.63	120.30
1	B	168	ARG	NE-CZ-NH2	6.65	123.63	120.30
1	B	157	ARG	NE-CZ-NH2	-6.40	117.10	120.30

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	331	ARG	CG-CD-NE	6.36	125.14	111.80
1	B	611	ARG	NE-CZ-NH2	6.34	123.47	120.30
1	A	586	LYS	CB-CA-C	6.34	123.07	110.40
1	A	329	MET	CG-SD-CE	6.14	110.02	100.20
1	A	168	ARG	CD-NE-CZ	6.10	132.13	123.60
1	A	598	PHE	N-CA-CB	6.09	121.56	110.60
1	A	170	GLN	N-CA-CB	-6.09	99.64	110.60
1	B	88	LEU	CB-CG-CD2	5.96	121.12	111.00
1	B	97	TYR	CB-CG-CD1	-5.95	117.43	121.00
1	A	630	LYS	CD-CE-NZ	-5.87	98.20	111.70
1	B	114	ARG	NE-CZ-NH1	-5.83	117.39	120.30
1	A	630	LYS	N-CA-CB	-5.77	100.21	110.60
1	B	611	ARG	CG-CD-NE	5.75	123.87	111.80
1	A	231	GLN	CB-CA-C	-5.65	99.10	110.40
1	B	593	ASP	CB-CG-OD1	5.63	123.37	118.30
1	A	603	GLU	CB-CA-C	5.63	121.67	110.40
1	B	518	ARG	NE-CZ-NH1	-5.63	117.48	120.30
1	A	545	ASP	CB-CG-OD2	-5.61	113.25	118.30
1	A	103	ARG	NH1-CZ-NH2	-5.60	113.24	119.40
1	B	608	ASP	CB-CA-C	-5.58	99.23	110.40
1	B	34	LYS	N-CA-CB	5.57	120.62	110.60
1	A	506	TYR	CB-CA-C	5.50	121.40	110.40
1	A	586	LYS	N-CA-CB	-5.48	100.74	110.60
1	B	42	LYS	CB-CA-C	-5.45	99.50	110.40
1	A	92	THR	CA-CB-OG1	-5.44	97.58	109.00
1	A	546	ARG	NE-CZ-NH2	-5.43	117.58	120.30
1	B	260	ARG	CD-NE-CZ	5.43	131.20	123.60
1	A	331	ARG	CG-CD-NE	5.40	123.15	111.80
1	A	103	ARG	CA-CB-CG	5.39	125.25	113.40
1	A	593	ASP	CB-CG-OD2	5.38	123.14	118.30
1	B	145	GLU	OE1-CD-OE2	5.37	129.74	123.30
1	A	42	LYS	CB-CA-C	5.35	121.10	110.40
1	A	96	GLU	CG-CD-OE2	5.31	128.92	118.30
1	A	73	ARG	N-CA-CB	-5.30	101.05	110.60
1	A	157	ARG	CD-NE-CZ	5.27	130.98	123.60
1	B	191	ARG	CG-CD-NE	-5.26	100.74	111.80
1	B	391	ARG	NE-CZ-NH1	5.25	122.93	120.30
1	B	436	LYS	CD-CE-NZ	5.24	123.76	111.70
1	A	60	ARG	CD-NE-CZ	5.24	130.94	123.60
1	B	633	THR	CA-CB-OG1	-5.22	98.03	109.00
1	A	420[A]	THR	CA-CB-OG1	-5.18	98.12	109.00
1	A	420[B]	THR	CA-CB-OG1	-5.18	98.12	109.00

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	B	509	THR	OG1-CB-CG2	-5.14	98.17	110.00
1	A	598	PHE	CB-CG-CD1	-5.13	117.21	120.80
1	B	279	VAL	N-CA-CB	-5.09	100.30	111.50
1	B	545	ASP	CB-CG-OD1	5.09	122.88	118.30
1	A	157	ARG	NE-CZ-NH1	-5.07	117.76	120.30
1	B	67	MET	CG-SD-CE	5.04	108.26	100.20
1	A	210	LYS	CD-CE-NZ	-5.02	100.16	111.70
1	B	103	ARG	CD-NE-CZ	5.00	130.60	123.60

There are no chirality outliers.

All (23) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	114	ARG	Sidechain
1	A	157	ARG	Sidechain
1	A	267	ARG	Sidechain
1	A	29	ARG	Sidechain
1	A	324	ARG	Sidechain
1	A	331	ARG	Sidechain
1	A	379	ARG	Sidechain
1	A	539	ARG	Sidechain
1	A	546	ARG	Sidechain
1	A	578	GLN	Peptide
1	A	60	ARG	Sidechain
1	B	114	ARG	Sidechain
1	B	131	ARG	Sidechain
1	B	157	ARG	Sidechain
1	B	191	ARG	Sidechain
1	B	267	ARG	Sidechain
1	B	323	ARG	Sidechain
1	B	324	ARG	Sidechain
1	B	331	ARG	Sidechain
1	B	518	ARG	Sidechain
1	B	539	ARG	Sidechain
1	B	578	GLN	Peptide
1	B	60	ARG	Sidechain

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	4862	0	4754	63	0
1	B	4961	0	4851	37	0
2	A	1	0	0	0	0
2	B	1	0	0	0	0
3	A	118	0	0	3	0
3	B	215	0	0	5	0
All	All	10158	0	9605	98	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 5.

All (98) 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:B:31:MET:HE3	1:B:316:LEU:HD13	1.51	0.90
1:A:254:MET:HE2	3:A:901:HOH:O	1.74	0.87
1:A:28:GLU:HG2	1:A:28:GLU:O	1.77	0.84
1:B:31:MET:CE	1:B:316:LEU:HD13	2.08	0.82
1:B:254:MET:HE2	3:B:889:HOH:O	1.79	0.82
1:A:28:GLU:O	1:A:28:GLU:CG	2.38	0.72
1:A:436:LYS:HE3	1:A:448:ASP:OD1	1.90	0.71
1:A:254:MET:CE	3:A:901:HOH:O	2.32	0.71
1:A:536:ASN:ND2	1:A:555:THR:OG1	2.26	0.68
1:B:539:ARG:HD3	1:B:552:ASP:OD1	1.93	0.68
1:A:539:ARG:HD3	1:A:552:ASP:OD1	1.94	0.68
1:A:611:ARG:NH2	1:A:611:ARG:HG2	2.09	0.67
1:B:254:MET:CE	3:B:889:HOH:O	2.36	0.67
1:B:459:ILE:HD13	1:B:586:LYS:HB2	1.79	0.65
1:A:292:TRP:CD2	1:A:329:MET:HG2	2.34	0.62
1:A:331:ARG:HG3	1:A:415:THR:HG21	1.83	0.61
1:B:608:ASP:OD1	1:A:517:LYS:NZ	2.35	0.59
1:A:121:MET:HE1	1:A:185:TRP:HB3	1.86	0.58
1:A:121:MET:CE	1:A:185:TRP:HB3	2.34	0.58
1:A:559:ALA:HB1	1:A:630:LYS:HG2	1.86	0.57
1:A:425:MET:HE2	1:A:518:ARG:HA	1.87	0.57
1:A:171:ILE:HA	1:A:223:MET:HE1	1.87	0.57
1:A:333:TYR:O	1:A:409:HIS:HE1	1.89	0.56
1:B:331:ARG:HG3	1:B:415:THR:HG21	1.89	0.55
1:A:313:LYS:HA	1:A:313:LYS:HE2	1.88	0.55

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:253:LEU:HB3	1:A:254:MET:HE3	1.88	0.54
1:B:517:LYS:N	1:B:517:LYS:HD2	2.23	0.54
1:B:559:ALA:HB1	1:B:630:LYS:HG2	1.90	0.53
1:B:155:LEU:N	1:B:156:PRO:CD	2.72	0.53
1:A:579:GLY:HA2	1:A:594:TYR:CZ	2.45	0.51
1:A:506:TYR:HA	1:A:526:ALA:O	2.09	0.51
1:B:157:ARG:HD2	3:B:1007:HOH:O	2.10	0.51
1:B:579:GLY:HA2	1:B:594:TYR:CZ	2.45	0.51
1:B:333:TYR:O	1:B:409:HIS:HE1	1.94	0.50
1:A:48:LYS:O	1:A:49:GLN:HB2	2.11	0.50
1:A:41:LEU:O	1:A:45:LEU:HG	2.11	0.50
1:A:509:THR:HG23	3:A:844:HOH:O	2.11	0.50
1:A:122:LEU:HD11	1:A:392:SER:HB3	1.94	0.49
1:B:463:LEU:C	1:B:463:LEU:HD12	2.32	0.49
1:A:155:LEU:N	1:A:156:PRO:CD	2.74	0.49
1:A:103:ARG:HG2	1:A:153:ALA:HB2	1.94	0.49
1:B:72:GLN:HG3	3:B:825:HOH:O	2.13	0.48
1:B:36:ALA:CB	1:B:314:ILE:HD13	2.44	0.48
1:A:159:SER:HB2	1:A:169:GLU:OE1	2.15	0.47
1:B:47:MET:HE3	3:B:824:HOH:O	2.14	0.47
1:A:171:ILE:HA	1:A:223:MET:CE	2.45	0.47
1:B:506:TYR:HA	1:B:526:ALA:O	2.15	0.47
1:A:517:LYS:HB2	1:A:519:VAL:HG23	1.97	0.47
1:A:292:TRP:CD2	1:A:329:MET:CG	2.97	0.47
1:A:611:ARG:HG2	1:A:611:ARG:HH21	1.79	0.47
1:A:121:MET:HE2	1:A:189:PHE:HD2	1.80	0.46
1:A:533:LYS:HB3	1:A:557:GLU:HB2	1.97	0.46
1:B:433:VAL:HG22	1:B:454:LEU:HD13	1.95	0.46
1:A:463:LEU:C	1:A:463:LEU:HD12	2.35	0.46
1:A:127:GLU:HG2	1:A:129:LYS:HG3	1.98	0.46
1:B:473:GLN:O	1:B:479:ARG:HA	2.16	0.46
1:B:414:VAL:HG22	1:B:425:MET:HG2	1.98	0.45
1:A:536:ASN:HD22	1:A:555:THR:HG1	1.64	0.45
1:B:498:ILE:HG23	1:B:499:PRO:HD2	1.98	0.45
1:B:30:ASP:O	1:B:34:LYS:HG2	2.18	0.44
1:A:29:ARG:HD3	1:A:277:ASN:HA	1.99	0.44
1:A:155:LEU:O	1:A:158:GLN:HG2	2.17	0.44
1:A:354:LEU:HD23	1:A:395:SER:HB2	1.98	0.44
1:A:469:THR:HG23	1:A:611:ARG:HH21	1.82	0.44
1:B:351:GLY:O	1:B:353:PRO:HD3	2.18	0.44
1:B:108:VAL:N	1:B:109:PRO:HD2	2.32	0.44

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:342:PHE:O	1:B:343:ALA:HB3	2.17	0.44
1:A:376:LEU:O	1:A:379:ARG:HD2	2.18	0.44
1:B:156:PRO:O	1:B:161:LYS:HA	2.17	0.44
1:A:413:ASP:O	1:A:425:MET:HA	2.18	0.44
1:A:231:GLN:HB3	1:A:234:GLU:HG3	1.99	0.43
1:A:292:TRP:CE3	1:A:329:MET:HG3	2.53	0.43
1:A:433:VAL:HG22	1:A:454:LEU:HD13	2.00	0.43
1:A:351:GLY:O	1:A:353:PRO:HD3	2.18	0.43
1:A:307:SER:OG	1:A:312:GLY:HA2	2.18	0.43
1:A:121:MET:CE	1:A:189:PHE:HD2	2.32	0.42
1:A:507:LYS:O	1:A:526:ALA:HB3	2.20	0.42
1:B:452:PHE:CD1	1:B:541:TYR:CE1	3.08	0.42
1:B:477:LYS:O	1:B:478:ASP:HB2	2.18	0.42
1:A:157:ARG:HH11	1:A:224:TRP:HE1	1.67	0.42
1:A:292:TRP:CG	1:A:329:MET:HG2	2.54	0.42
1:A:75:ILE:HG12	1:A:127:GLU:HB2	2.01	0.42
1:B:334:VAL:HG12	1:B:458:THR:HA	2.02	0.42
1:B:320:PRO:HB2	1:B:324:ARG:HH22	1.85	0.41
1:A:425:MET:HE1	1:A:519:VAL:N	2.35	0.41
1:B:477:LYS:O	1:B:478:ASP:CB	2.67	0.41
1:A:342:PHE:O	1:A:343:ALA:HB3	2.21	0.41
1:A:469:THR:N	1:A:609:ASP:OD2	2.53	0.41
1:A:591:GLU:OE2	1:A:593:ASP:OD1	2.38	0.41
1:B:410:ASP:O	1:B:411:MET:HB3	2.21	0.41
1:B:621:TYR:OH	1:A:546:ARG:HD2	2.21	0.40
1:A:156:PRO:O	1:A:161:LYS:HA	2.21	0.40
1:A:269:MET:CE	1:A:306:LEU:HD11	2.51	0.40
1:A:121:MET:HE3	1:A:185:TRP:HB3	2.03	0.40
1:A:238:ASN:HB2	1:A:294:HIS:O	2.20	0.40
1:B:552:ASP:O	1:B:635:ASN:HA	2.21	0.40
1:A:436:LYS:HE3	1:A:448:ASP:CG	2.42	0.40
1:B:253:LEU:O	1:B:254:MET:HE2	2.22	0.40

There are no symmetry-related clashes.

5.3 Torsion angles ⓘ

5.3.1 Protein backbone ⓘ

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	601/644 (93%)	580 (96%)	21 (4%)	0	100	100
1	B	614/644 (95%)	593 (97%)	19 (3%)	2 (0%)	37	34
All	All	1215/1288 (94%)	1173 (96%)	40 (3%)	2 (0%)	44	41

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	597	LEU
1	B	385	MET

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	519/552 (94%)	494 (95%)	25 (5%)	21	18
1	B	529/552 (96%)	515 (97%)	14 (3%)	41	42
All	All	1048/1104 (95%)	1009 (96%)	39 (4%)	29	28

All (39) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	B	179	TYR
1	B	216	PRO
1	B	279	VAL
1	B	280	LYS
1	B	331	ARG
1	B	359	PHE
1	B	436	LYS
1	B	477	LYS
1	B	517	LYS
1	B	570	TRP

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	B	578	GLN
1	B	593	ASP
1	B	611	ARG
1	B	637	LYS
1	A	29	ARG
1	A	55	PRO
1	A	73	ARG
1	A	142	MET
1	A	157	ARG
1	A	170	GLN
1	A	179	TYR
1	A	210	LYS
1	A	331	ARG
1	A	344	ASP
1	A	359	PHE
1	A	405	GLU
1	A	428	LYS
1	A	436	LYS
1	A	443	SER
1	A	469	THR
1	A	485	MET
1	A	509	THR
1	A	536	ASN
1	A	546	ARG
1	A	555	THR
1	A	570	TRP
1	A	578	GLN
1	A	629	GLU
1	A	633	THR

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (7) such sidechains are listed below:

Mol	Chain	Res	Type
1	B	115	GLN
1	B	231	GLN
1	B	336	ASN
1	B	409	HIS
1	A	348	GLN
1	A	409	HIS
1	A	536	ASN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates ⓘ

There are no oligosaccharides in this entry.

5.6 Ligand geometry ⓘ

Of 2 ligands modelled in this entry, 2 are monoatomic - leaving 0 for Mogul analysis.

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 (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(Å²)	Q<0.9
1	A	604/644 (93%)	0.03	8 (1%)	74	74	15, 35, 57, 74	1 (0%)
1	B	616/644 (95%)	-0.30	2 (0%)	90	90	15, 26, 47, 86	0
All	All	1220/1288 (94%)	-0.14	10 (0%)	82	82	15, 30, 55, 86	1 (0%)

All (10) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	482	ILE	3.8
1	A	232	PRO	3.6
1	A	643	ILE	3.5
1	A	235	ILE	3.1
1	A	469	THR	2.9
1	B	28	GLU	2.9
1	B	291	TYR	2.5
1	A	230	TRP	2.4
1	A	400	ASN	2.1
1	A	593	ASP	2.1

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	ZN	A	701	1/1	0.99	0.04	32,32,32,32	0
2	ZN	B	701	1/1	1.00	0.01	26,26,26,26	0

6.5 Other polymers (i)

There are no such residues in this entry.

WORLDWIDE
wwPDB
PROTEIN DATA BANK