



wwPDB X-ray Structure Validation Summary Report ⓘ

Mar 22, 2026 – 08:15 PM UTC

PDB ID : 4BJ8 / pdb_00004bj8
Title : Zebavidin
Authors : Airenne, T.T.; Parthiban, M.; Niederhauser, B.; Zmurko, J.; Kulomaa, M.S.;
Hytonen, V.P.; Johnson, M.S.
Deposited on : 2013-04-17
Resolution : 2.40 Å(reported)

This is a wwPDB X-ray Structure Validation Summary Report for a publicly released PDB entry.

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A user guide is available at

<https://www.wwpdb.org/validation/2017/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ 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 ⓘ](#)) were used in the production of this report:

MolProbity	:	4-5-2 with Phenix2.0
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	2.0
EDS	:	3.0
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4	:	9.0.010 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.49

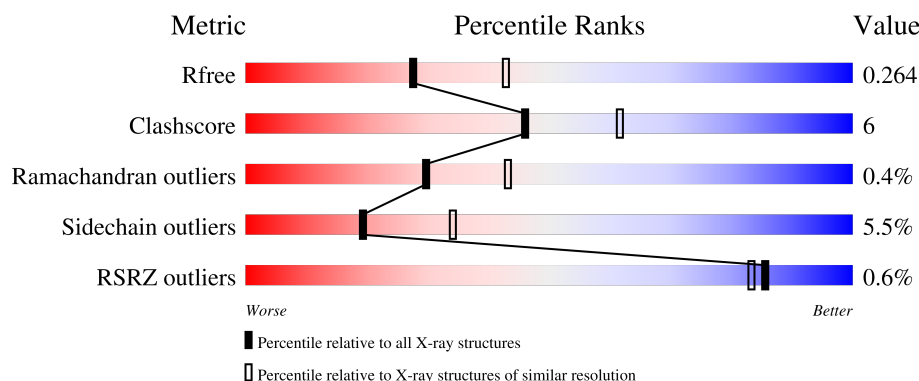
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.40 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}	180053	4912 (2.40-2.40)
Clashscore	190562	5391 (2.40-2.40)
Ramachandran outliers	187476	5320 (2.40-2.40)
Sidechain outliers	187428	5321 (2.40-2.40)
RSRZ outliers	180081	4916 (2.40-2.40)

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 $\leq 5\%$. 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	126	 75% 18% • 6%
1	B	126	 75% 17% • 6%
1	C	126	 77% 15% • 6%
1	D	126	 88% 6% • 6%
1	E	126	 78% 14% • 6%

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Mol	Chain	Length	Quality of chain
1	F	126	 % 79% 15% 6%
1	G	126	 77% 15% • 6%
1	H	126	 % 79% 13% • 6%
1	I	126	 % 79% 13% • 6%
1	J	126	 73% 18% • 6%
1	K	126	 % 78% 14% • 5%
1	L	126	 81% 13% • •
1	M	126	 % 74% 21% • 5%
1	N	126	 % 77% 16% • 6%
1	O	126	 2% 79% 17% • •
1	P	126	 79% 14% • 5%

2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 15389 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 ZEBABIDIN.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	119	Total	C	N	O	S	0	2	0
			913	570	163	172	8			
1	B	118	Total	C	N	O	S	0	3	0
			913	570	163	172	8			
1	C	119	Total	C	N	O	S	0	1	0
			908	566	163	172	7			
1	D	119	Total	C	N	O	S	0	2	0
			914	569	164	174	7			
1	E	119	Total	C	N	O	S	0	2	0
			913	570	163	172	8			
1	F	118	Total	C	N	O	S	0	1	0
			902	563	162	171	6			
1	G	119	Total	C	N	O	S	0	3	0
			917	573	163	173	8			
1	H	118	Total	C	N	O	S	0	1	0
			905	564	163	171	7			
1	I	119	Total	C	N	O	S	0	0	0
			905	564	163	172	6			
1	J	119	Total	C	N	O	S	0	2	0
			915	570	164	174	7			
1	K	120	Total	C	N	O	S	0	1	0
			918	572	165	175	6			
1	L	121	Total	C	N	O	S	0	1	0
			922	574	166	175	7			
1	M	120	Total	C	N	O	S	0	1	0
			912	568	164	173	7			
1	N	118	Total	C	N	O	S	0	3	0
			910	569	162	171	8			
1	O	122	Total	C	N	O	S	0	2	0
			937	583	168	179	7			
1	P	120	Total	C	N	O	S	0	2	0
			920	573	167	173	7			

There are 48 discrepancies between the modelled and reference sequences:

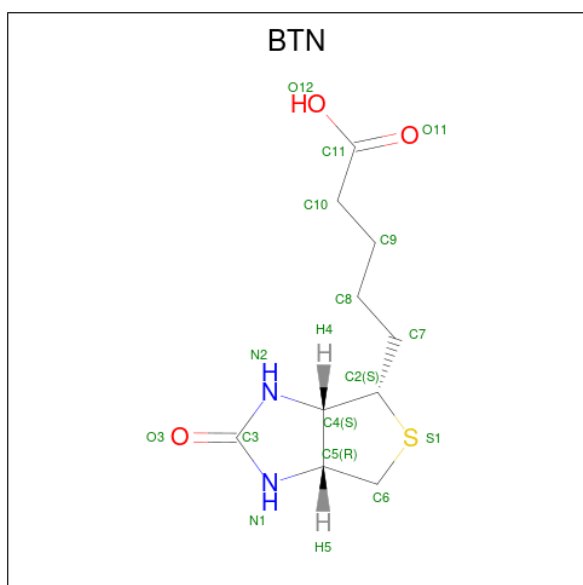
Chain	Residue	Modelled	Actual	Comment	Reference
A	1	GLN	-	expression tag	UNP E7F650
A	2	THR	-	expression tag	UNP E7F650
A	41	ARG	HIS	conflict	UNP E7F650
B	1	GLN	-	expression tag	UNP E7F650
B	2	THR	-	expression tag	UNP E7F650
B	41	ARG	HIS	conflict	UNP E7F650
C	1	GLN	-	expression tag	UNP E7F650
C	2	THR	-	expression tag	UNP E7F650
C	41	ARG	HIS	conflict	UNP E7F650
D	1	GLN	-	expression tag	UNP E7F650
D	2	THR	-	expression tag	UNP E7F650
D	41	ARG	HIS	conflict	UNP E7F650
E	1	GLN	-	expression tag	UNP E7F650
E	2	THR	-	expression tag	UNP E7F650
E	41	ARG	HIS	conflict	UNP E7F650
F	1	GLN	-	expression tag	UNP E7F650
F	2	THR	-	expression tag	UNP E7F650
F	41	ARG	HIS	conflict	UNP E7F650
G	1	GLN	-	expression tag	UNP E7F650
G	2	THR	-	expression tag	UNP E7F650
G	41	ARG	HIS	conflict	UNP E7F650
H	1	GLN	-	expression tag	UNP E7F650
H	2	THR	-	expression tag	UNP E7F650
H	41	ARG	HIS	conflict	UNP E7F650
I	1	GLN	-	expression tag	UNP E7F650
I	2	THR	-	expression tag	UNP E7F650
I	41	ARG	HIS	conflict	UNP E7F650
J	1	GLN	-	expression tag	UNP E7F650
J	2	THR	-	expression tag	UNP E7F650
J	41	ARG	HIS	conflict	UNP E7F650
K	1	GLN	-	expression tag	UNP E7F650
K	2	THR	-	expression tag	UNP E7F650
K	41	ARG	HIS	conflict	UNP E7F650
L	1	GLN	-	expression tag	UNP E7F650
L	2	THR	-	expression tag	UNP E7F650
L	41	ARG	HIS	conflict	UNP E7F650
M	1	GLN	-	expression tag	UNP E7F650
M	2	THR	-	expression tag	UNP E7F650
M	41	ARG	HIS	conflict	UNP E7F650
N	1	GLN	-	expression tag	UNP E7F650
N	2	THR	-	expression tag	UNP E7F650
N	41	ARG	HIS	conflict	UNP E7F650

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Chain	Residue	Modelled	Actual	Comment	Reference
O	1	GLN	-	expression tag	UNP E7F650
O	2	THR	-	expression tag	UNP E7F650
O	41	ARG	HIS	conflict	UNP E7F650
P	1	GLN	-	expression tag	UNP E7F650
P	2	THR	-	expression tag	UNP E7F650
P	41	ARG	HIS	conflict	UNP E7F650

- Molecule 2 is BIOTIN (CCD ID: BTN) (formula: $C_{10}H_{16}N_2O_3S$).



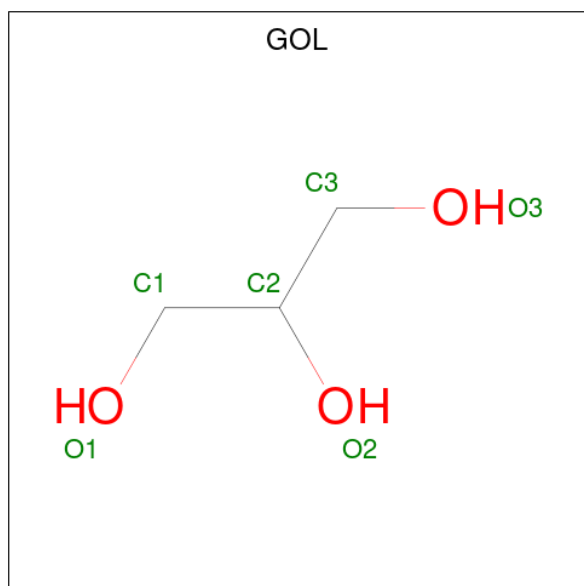
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	A	1	Total	C	N	O	S	0	0
			16	10	2	3	1		
2	B	1	Total	C	N	O	S	0	0
			16	10	2	3	1		
2	C	1	Total	C	N	O	S	0	0
			16	10	2	3	1		
2	D	1	Total	C	N	O	S	0	0
			16	10	2	3	1		
2	E	1	Total	C	N	O	S	0	0
			16	10	2	3	1		
2	F	1	Total	C	N	O	S	0	0
			16	10	2	3	1		
2	G	1	Total	C	N	O	S	0	0
			16	10	2	3	1		
2	H	1	Total	C	N	O	S	0	0
			16	10	2	3	1		

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Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	I	1	Total	C	N	O	S	0	0
			16	10	2	3	1		
2	J	1	Total	C	N	O	S	0	0
			16	10	2	3	1		
2	K	1	Total	C	N	O	S	0	0
			16	10	2	3	1		
2	L	1	Total	C	N	O	S	0	0
			16	10	2	3	1		
2	M	1	Total	C	N	O	S	0	0
			16	10	2	3	1		
2	N	1	Total	C	N	O	S	0	0
			16	10	2	3	1		
2	O	1	Total	C	N	O	S	0	0
			16	10	2	3	1		
2	P	1	Total	C	N	O	S	0	0
			16	10	2	3	1		

- Molecule 3 is GLYCEROL (CCD ID: GOL) (formula: $C_3H_8O_3$).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	L	1	Total	C	O	0	0
			6	3	3		

- Molecule 4 is water.

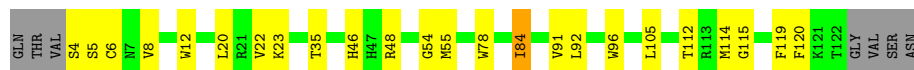
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	39	Total 39	O 39	0	0
4	B	36	Total 36	O 36	0	0
4	C	38	Total 38	O 38	0	0
4	D	32	Total 32	O 32	0	0
4	E	21	Total 21	O 21	0	0
4	F	20	Total 20	O 20	0	0
4	G	30	Total 30	O 30	0	0
4	H	24	Total 24	O 24	0	0
4	I	47	Total 47	O 47	0	0
4	J	34	Total 34	O 34	0	0
4	K	35	Total 35	O 35	0	0
4	L	35	Total 35	O 35	0	0
4	M	33	Total 33	O 33	0	0
4	N	23	Total 23	O 23	0	0
4	O	31	Total 31	O 31	0	0
4	P	25	Total 25	O 25	0	0

3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red dot above a residue indicates a poor fit to the electron density ($RSRZ > 2$). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

• Molecule 1: ZEBAVIDIN

Chain A: 



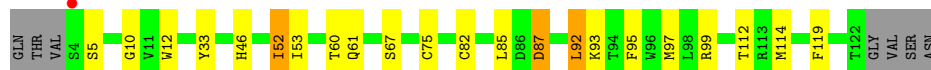
• Molecule 1: ZEBAVIDIN

Chain B: 



• Molecule 1: ZEBAVIDIN

Chain C: 



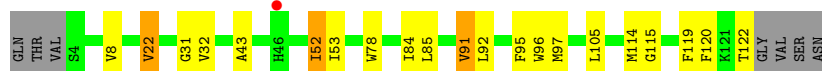
• Molecule 1: ZEBAVIDIN

Chain D: 



• Molecule 1: ZEBAVIDIN

Chain E: 



• Molecule 1: ZEBAVIDIN

Chain F: 



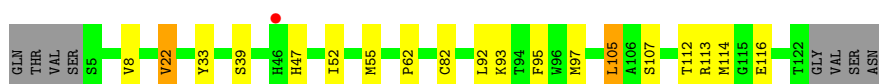
• Molecule 1: ZEBAVIDIN

Chain G: 77% 15% 6%



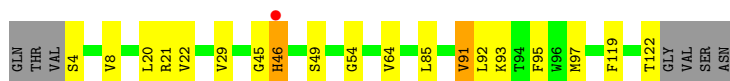
• Molecule 1: ZEBAVIDIN

Chain H: 79% 13% 6%



• Molecule 1: ZEBAVIDIN

Chain I: 79% 13% 6%



• Molecule 1: ZEBAVIDIN

Chain J: 73% 18% 6%



• Molecule 1: ZEBAVIDIN

Chain K: 78% 14% 5%



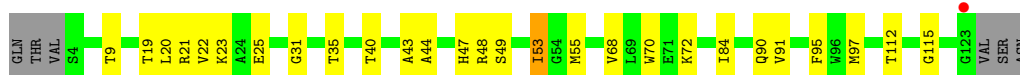
• Molecule 1: ZEBAVIDIN

Chain L: 81% 13% . .

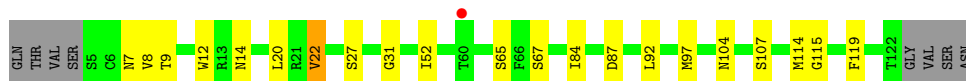
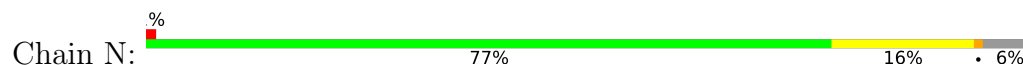


• Molecule 1: ZEBAVIDIN

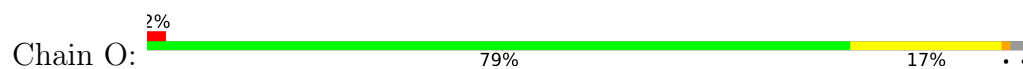
Chain M: 74% 21% 5%



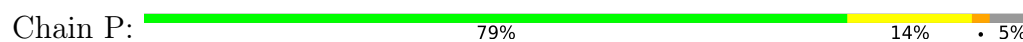
• Molecule 1: ZEBAAIDIN



• Molecule 1: ZEBAAIDIN



• Molecule 1: ZEBAAIDIN



4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 2	Depositor
Cell constants a, b, c, α , β , γ	182.24Å 196.84Å 52.59Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	24.58 – 2.40 24.58 – 2.40	Depositor EDS
% Data completeness (in resolution range)	99.8 (24.58-2.40) 99.8 (24.58-2.40)	Depositor EDS
R_{merge}	0.12	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	3.50 (at 2.41Å)	Xtriage
Refinement program	REFMAC 5.7.0032	Depositor
R, R_{free}	0.192 , 0.266 0.198 , 0.264	Depositor DCC
R_{free} test set	3741 reflections (4.99%)	wwPDB-VP
Wilson B-factor (Å ²)	28.0	Xtriage
Anisotropy	0.100	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.37 , 41.9	EDS
L-test for twinning ²	$\langle L \rangle = 0.45$, $\langle L^2 \rangle = 0.27$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	15389	wwPDB-VP
Average B, all atoms (Å ²)	27.0	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 34.63 % 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 6.6217e-04. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

¹Intensities estimated from amplitudes.

²Theoretical 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: GOL, BTN

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	0.93	0/937	0.98	1/1266 (0.1%)
1	B	0.87	0/937	0.98	1/1266 (0.1%)
1	C	0.95	0/929	1.03	2/1256 (0.2%)
1	D	0.91	0/935	1.01	1/1264 (0.1%)
1	E	0.85	0/937	0.90	0/1266
1	F	0.77	0/923	0.90	0/1248
1	G	0.85	0/944	1.05	2/1276 (0.2%)
1	H	0.85	0/923	0.95	1/1248 (0.1%)
1	I	0.97	0/923	1.06	1/1248 (0.1%)
1	J	0.93	0/936	1.02	1/1266 (0.1%)
1	K	0.89	0/936	1.03	0/1266
1	L	0.88	0/940	1.01	0/1271
1	M	0.86	0/933	0.95	2/1261 (0.2%)
1	N	0.89	0/937	0.99	3/1266 (0.2%)
1	O	0.88	0/958	1.01	0/1296
1	P	0.83	0/944	0.96	1/1275 (0.1%)
All	All	0.88	0/14972	0.99	16/20239 (0.1%)

There are no bond length outliers.

The worst 5 of 16 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	N	31	GLY	N-CA-C	6.48	118.67	110.38
1	P	59	GLY	N-CA-C	6.14	119.56	111.70
1	C	10	GLY	N-CA-C	5.92	118.92	110.46
1	G	10	GLY	N-CA-C	5.74	118.98	110.60
1	A	54	GLY	N-CA-C	5.73	119.50	111.19

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	913	0	891	15	0
1	B	913	0	890	18	0
1	C	908	0	882	15	0
1	D	914	0	886	8	0
1	E	913	0	891	17	0
1	F	902	0	877	11	0
1	G	917	0	898	15	0
1	H	905	0	876	16	0
1	I	905	0	877	9	0
1	J	915	0	888	18	0
1	K	918	0	890	13	0
1	L	922	0	893	8	0
1	M	912	0	885	16	0
1	N	910	0	891	11	0
1	O	937	0	913	16	0
1	P	920	0	898	16	0
2	A	16	0	15	0	0
2	B	16	0	15	0	0
2	C	16	0	15	0	0
2	D	16	0	15	0	0
2	E	16	0	15	0	0
2	F	16	0	15	0	0
2	G	16	0	15	0	0
2	H	16	0	15	1	0
2	I	16	0	15	0	0
2	J	16	0	15	0	0
2	K	16	0	15	0	0
2	L	16	0	15	0	0
2	M	16	0	15	0	0
2	N	16	0	15	0	0
2	O	16	0	15	0	0
2	P	16	0	15	0	0
3	L	6	0	8	0	0
4	A	39	0	0	0	0
4	B	36	0	0	0	0
4	C	38	0	0	0	0
4	D	32	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
4	E	21	0	0	0	0
4	F	20	0	0	0	0
4	G	30	0	0	0	0
4	H	24	0	0	0	0
4	I	47	0	0	1	0
4	J	34	0	0	0	0
4	K	35	0	0	1	0
4	L	35	0	0	0	0
4	M	33	0	0	1	0
4	N	23	0	0	1	0
4	O	31	0	0	1	0
4	P	25	0	0	1	0
All	All	15389	0	14474	169	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 6.

The worst 5 of 169 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:33:TYR:HB2	1:B:52:ILE:HD11	1.39	1.02
1:B:33:TYR:HB2	1:B:52:ILE:CD1	2.04	0.86
1:A:114[A]:MET:HB3	1:B:114[A]:MET:CE	2.15	0.77
1:J:29:VAL:HG12	1:J:52:ILE:CD1	2.21	0.70
1:J:8:VAL:HG12	1:J:22:VAL:HG11	1.73	0.70

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	119/126 (94%)	118 (99%)	1 (1%)	0	100	100
1	B	119/126 (94%)	114 (96%)	4 (3%)	1 (1%)	16	25
1	C	118/126 (94%)	114 (97%)	3 (2%)	1 (1%)	16	25
1	D	119/126 (94%)	117 (98%)	2 (2%)	0	100	100
1	E	119/126 (94%)	114 (96%)	4 (3%)	1 (1%)	16	25
1	F	117/126 (93%)	114 (97%)	2 (2%)	1 (1%)	14	22
1	G	120/126 (95%)	120 (100%)	0	0	100	100
1	H	117/126 (93%)	115 (98%)	2 (2%)	0	100	100
1	I	117/126 (93%)	112 (96%)	4 (3%)	1 (1%)	14	22
1	J	119/126 (94%)	116 (98%)	2 (2%)	1 (1%)	16	25
1	K	119/126 (94%)	118 (99%)	1 (1%)	0	100	100
1	L	120/126 (95%)	120 (100%)	0	0	100	100
1	M	119/126 (94%)	112 (94%)	6 (5%)	1 (1%)	16	25
1	N	119/126 (94%)	114 (96%)	5 (4%)	0	100	100
1	O	122/126 (97%)	120 (98%)	2 (2%)	0	100	100
1	P	120/126 (95%)	118 (98%)	2 (2%)	0	100	100
All	All	1903/2016 (94%)	1856 (98%)	40 (2%)	7 (0%)	30	43

5 of 7 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	87	ASP
1	C	5	SER
1	F	87	ASP
1	I	46	HIS
1	M	25	GLU

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	98/102 (96%)	94 (96%)	4 (4%)	27	46
1	B	98/102 (96%)	91 (93%)	7 (7%)	13	23
1	C	97/102 (95%)	91 (94%)	6 (6%)	16	29
1	D	98/102 (96%)	97 (99%)	1 (1%)	68	84
1	E	98/102 (96%)	93 (95%)	5 (5%)	21	37
1	F	96/102 (94%)	92 (96%)	4 (4%)	26	45
1	G	99/102 (97%)	92 (93%)	7 (7%)	13	23
1	H	96/102 (94%)	92 (96%)	4 (4%)	26	45
1	I	96/102 (94%)	91 (95%)	5 (5%)	21	36
1	J	98/102 (96%)	91 (93%)	7 (7%)	13	23
1	K	98/102 (96%)	90 (92%)	8 (8%)	10	18
1	L	98/102 (96%)	90 (92%)	8 (8%)	10	18
1	M	97/102 (95%)	95 (98%)	2 (2%)	47	69
1	N	98/102 (96%)	91 (93%)	7 (7%)	13	23
1	O	101/102 (99%)	95 (94%)	6 (6%)	18	31
1	P	98/102 (96%)	93 (95%)	5 (5%)	21	37
All	All	1564/1632 (96%)	1478 (94%)	86 (6%)	19	34

5 of 86 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	K	122	THR
1	N	104	ASN
1	L	23	LYS
1	L	124	VAL
1	O	5	SER

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 15 such sidechains are listed below:

Mol	Chain	Res	Type
1	I	104	ASN
1	N	104	ASN
1	J	46	HIS
1	P	46	HIS
1	N	46	HIS

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 ⓘ

17 ligands are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# $ Z > 2$	Counts	RMSZ	# $ Z > 2$
2	BTN	K	1123	-	17,17,17	1.25	1 (5%)	23,23,23	0.84	1 (4%)
2	BTN	J	1123	-	17,17,17	1.27	1 (5%)	23,23,23	1.08	1 (4%)
2	BTN	P	1124	-	17,17,17	1.26	1 (5%)	23,23,23	1.37	3 (13%)
2	BTN	L	1125	-	17,17,17	0.87	0	23,23,23	1.25	3 (13%)
2	BTN	B	1123	-	17,17,17	1.63	2 (11%)	23,23,23	1.14	3 (13%)
2	BTN	E	1123	-	17,17,17	1.22	3 (17%)	23,23,23	1.17	3 (13%)
2	BTN	M	1124	-	17,17,17	1.10	1 (5%)	23,23,23	0.83	0
2	BTN	D	1123	-	17,17,17	1.44	1 (5%)	23,23,23	1.19	3 (13%)
3	GOL	L	1126	-	5,5,5	0.79	0	5,5,5	0.90	0
2	BTN	C	1123	-	17,17,17	0.96	0	23,23,23	1.51	3 (13%)
2	BTN	I	1123	-	17,17,17	0.97	1 (5%)	23,23,23	1.06	1 (4%)
2	BTN	A	1123	-	17,17,17	1.10	1 (5%)	23,23,23	0.91	2 (8%)
2	BTN	G	1123	-	17,17,17	1.07	1 (5%)	23,23,23	1.27	3 (13%)
2	BTN	O	1123	-	17,17,17	1.33	1 (5%)	23,23,23	0.95	1 (4%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
2	BTN	H	1123	-	17,17,17	1.24	2 (11%)	23,23,23	1.25	3 (13%)
2	BTN	F	1123	-	17,17,17	1.27	1 (5%)	23,23,23	0.94	2 (8%)
2	BTN	N	1123	-	17,17,17	1.54	3 (17%)	23,23,23	1.19	3 (13%)

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
2	BTN	K	1123	-	-	0/7/28/28	0/2/2/2
2	BTN	J	1123	-	-	0/7/28/28	0/2/2/2
2	BTN	P	1124	-	-	0/7/28/28	0/2/2/2
2	BTN	L	1125	-	-	0/7/28/28	0/2/2/2
2	BTN	B	1123	-	-	6/7/28/28	0/2/2/2
2	BTN	E	1123	-	-	2/7/28/28	0/2/2/2
2	BTN	M	1124	-	-	2/7/28/28	0/2/2/2
2	BTN	D	1123	-	-	2/7/28/28	0/2/2/2
3	GOL	L	1126	-	-	2/4/4/4	-
2	BTN	C	1123	-	-	0/7/28/28	0/2/2/2
2	BTN	I	1123	-	-	0/7/28/28	0/2/2/2
2	BTN	A	1123	-	-	0/7/28/28	0/2/2/2
2	BTN	G	1123	-	-	0/7/28/28	0/2/2/2
2	BTN	O	1123	-	-	2/7/28/28	0/2/2/2
2	BTN	H	1123	-	-	2/7/28/28	0/2/2/2
2	BTN	F	1123	-	-	2/7/28/28	0/2/2/2
2	BTN	N	1123	-	-	2/7/28/28	0/2/2/2

The worst 5 of 20 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	D	1123	BTN	C2-S1	-4.51	1.75	1.82
2	B	1123	BTN	C2-S1	-4.44	1.75	1.82
2	K	1123	BTN	C2-S1	-4.36	1.75	1.82
2	N	1123	BTN	C2-S1	-4.36	1.75	1.82
2	O	1123	BTN	C2-S1	-4.01	1.76	1.82

The worst 5 of 35 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	C	1123	BTN	C6-C5-N1	-4.03	107.99	113.18
2	J	1123	BTN	C2-C4-N2	3.70	117.25	113.34
2	G	1123	BTN	C2-C4-N2	3.27	116.80	113.34
2	O	1123	BTN	C2-C4-N2	3.26	116.79	113.34
2	L	1125	BTN	C8-C7-C2	-3.03	107.08	114.04

There are no chirality outliers.

5 of 22 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	B	1123	BTN	S1-C2-C7-C8
2	B	1123	BTN	C4-C2-C7-C8
2	D	1123	BTN	S1-C2-C7-C8
2	D	1123	BTN	C4-C2-C7-C8
2	E	1123	BTN	S1-C2-C7-C8

There are no ring outliers.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	H	1123	BTN	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 ⓘ

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, 95th percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled ‘Q < 0.9’ lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
1	A	119/126 (94%)	-0.26	0 100 100	12, 22, 41, 50	2 (1%)
1	B	118/126 (93%)	-0.16	1 (0%) 82 80	7, 27, 55, 75	3 (2%)
1	C	119/126 (94%)	-0.29	1 (0%) 82 80	11, 21, 43, 55	1 (0%)
1	D	119/126 (94%)	-0.29	0 100 100	8, 25, 45, 53	2 (1%)
1	E	119/126 (94%)	-0.23	1 (0%) 82 80	11, 26, 48, 72	2 (1%)
1	F	118/126 (93%)	-0.03	1 (0%) 82 80	15, 33, 61, 76	1 (0%)
1	G	119/126 (94%)	-0.20	0 100 100	11, 27, 49, 63	3 (2%)
1	H	118/126 (93%)	-0.14	1 (0%) 82 80	8, 30, 51, 77	1 (0%)
1	I	119/126 (94%)	-0.33	1 (0%) 82 80	11, 20, 42, 78	0
1	J	119/126 (94%)	-0.29	0 100 100	8, 24, 44, 59	2 (1%)
1	K	120/126 (95%)	-0.43	1 (0%) 82 80	8, 20, 41, 61	1 (0%)
1	L	121/126 (96%)	-0.40	0 100 100	5, 19, 38, 55	1 (0%)
1	M	120/126 (95%)	-0.14	1 (0%) 82 80	13, 27, 56, 69	1 (0%)
1	N	118/126 (93%)	-0.08	1 (0%) 82 80	12, 30, 51, 69	3 (2%)
1	O	122/126 (96%)	-0.27	3 (2%) 58 54	10, 24, 51, 71	2 (1%)
1	P	120/126 (95%)	-0.28	0 100 100	10, 24, 50, 65	2 (1%)
All	All	1908/2016 (94%)	-0.24	12 (0%) 85 83	5, 25, 50, 78	27 (1%)

The worst 5 of 12 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	I	46	HIS	3.5
1	M	123	GLY	3.0
1	E	46	HIS	2.8
1	O	1	GLN	2.7
1	C	4	SER	2.7

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 oligosaccharides 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($\text{\AA}^2$)	Q<0.9
3	GOL	L	1126	6/6	0.85	0.14	40,43,46,46	0
2	BTN	F	1123	16/16	0.94	0.07	17,17,18,19	0
2	BTN	G	1123	16/16	0.94	0.08	17,18,21,21	0
2	BTN	C	1123	16/16	0.94	0.08	14,15,17,21	0
2	BTN	A	1123	16/16	0.95	0.07	16,17,22,24	0
2	BTN	B	1123	16/16	0.95	0.07	16,17,19,20	0
2	BTN	I	1123	16/16	0.96	0.07	11,12,15,16	0
2	BTN	J	1123	16/16	0.96	0.06	14,15,16,17	0
2	BTN	K	1123	16/16	0.96	0.07	11,13,15,16	0
2	BTN	M	1124	16/16	0.96	0.07	17,19,23,25	0
2	BTN	N	1123	16/16	0.96	0.06	20,22,24,30	0
2	BTN	O	1123	16/16	0.96	0.06	18,20,21,21	0
2	BTN	E	1123	16/16	0.96	0.07	16,16,17,17	0
2	BTN	D	1123	16/16	0.97	0.05	15,16,18,19	0
2	BTN	L	1125	16/16	0.97	0.06	8,8,9,9	0
2	BTN	P	1124	16/16	0.97	0.06	14,15,16,19	0
2	BTN	H	1123	16/16	0.97	0.05	14,15,17,17	0

6.5 Other polymers [i](#)

There are no such residues in this entry.