



# Full wwPDB X-ray Structure Validation Report ⓘ

Feb 1, 2016 – 05:19 PM GMT

PDB ID : 4HW3  
Title : Discovery of potent Mcl-1 inhibitors using fragment-based methods and structure-based design  
Authors : Zhao, B.  
Deposited on : 2012-11-07  
Resolution : 2.40 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  
<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 (RC4), CSD as536be (2015)  
Xtriage (Phenix) : 1.9-1692  
EDS : rb-20026688  
Percentile statistics : 20151230.v01 (using entries in the PDB archive December 30th 2015)  
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) : trunk26865

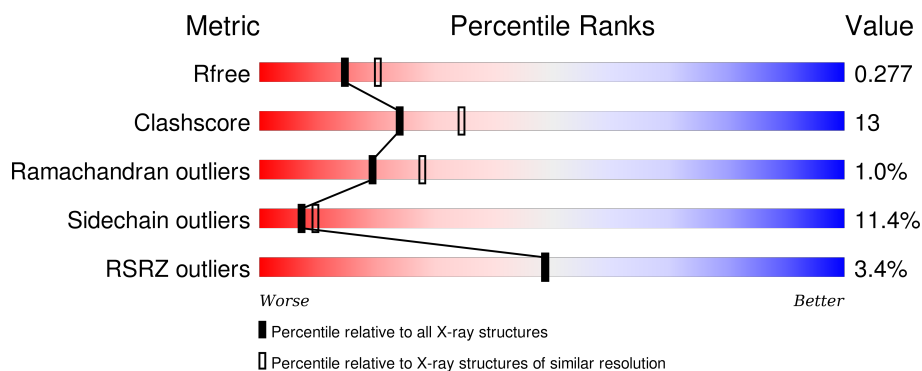
# 1 Overall quality at a glance

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))
$R_{free}$	91344	2919 (2.40-2.40)
Clashscore	102246	3407 (2.40-2.40)
Ramachandran outliers	100387	3351 (2.40-2.40)
Sidechain outliers	100360	3352 (2.40-2.40)
RSRZ outliers	91569	2928 (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 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	153	<div> <div>4%</div> <div>69% 22% 6% ..</div> </div>
1	B	153	<div> <div>%</div> <div>74% 21% ..</div> </div>
1	C	153	<div> <div></div> <div>76% 18% ...</div> </div>
1	D	153	<div> <div>3%</div> <div>67% 27% 5% .</div> </div>
1	E	153	<div> <div>3%</div> <div>63% 29% 7% ..</div> </div>

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Mol	Chain	Length	Quality of chain
1	F	153	<div><div>%</div><div><div></div><div>63%</div><div>33%</div><div></div></div><div></div></div>
1	G	153	<div><div>%</div><div><div></div><div>74%</div><div>20%</div><div>5%</div></div><div></div></div>
1	H	153	<div><div>7%</div><div><div></div><div>61%</div><div>30%</div><div>7%</div></div><div></div></div>
1	I	153	<div><div>4%</div><div><div></div><div>63%</div><div>30%</div><div></div></div><div></div></div>
1	J	153	<div><div>6%</div><div><div></div><div>67%</div><div>26%</div><div>5%</div></div><div></div></div>
1	K	153	<div><div>5%</div><div><div></div><div>64%</div><div>27%</div><div>7%</div></div><div></div></div>
1	L	153	<div><div>7%</div><div><div></div><div>63%</div><div>29%</div><div>5%</div></div><div></div></div>

## 2 Entry composition [i](#)

There are 3 unique types of molecules in this entry. The entry contains 14909 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 Induced myeloid leukemia cell differentiation protein Mcl-1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	150	Total	C	N	O	S	0	0	0
			1193	748	219	222	4			
1	B	151	Total	C	N	O	S	0	0	0
			1212	761	224	223	4			
1	C	150	Total	C	N	O	S	0	0	0
			1199	753	220	222	4			
1	D	153	Total	C	N	O	S	0	0	0
			1210	760	222	224	4			
1	E	151	Total	C	N	O	S	0	0	0
			1208	758	223	223	4			
1	F	151	Total	C	N	O	S	0	0	0
			1212	761	224	223	4			
1	G	151	Total	C	N	O	S	0	0	0
			1206	757	223	222	4			
1	H	150	Total	C	N	O	S	0	0	0
			1184	742	218	221	3			
1	I	147	Total	C	N	O	S	0	0	0
			1167	733	215	216	3			
1	J	150	Total	C	N	O	S	0	0	0
			1192	749	218	221	4			
1	K	151	Total	C	N	O	S	0	0	0
			1208	758	223	223	4			
1	L	149	Total	C	N	O	S	0	0	0
			1167	735	214	214	4			

There are 12 discrepancies between the modelled and reference sequences:

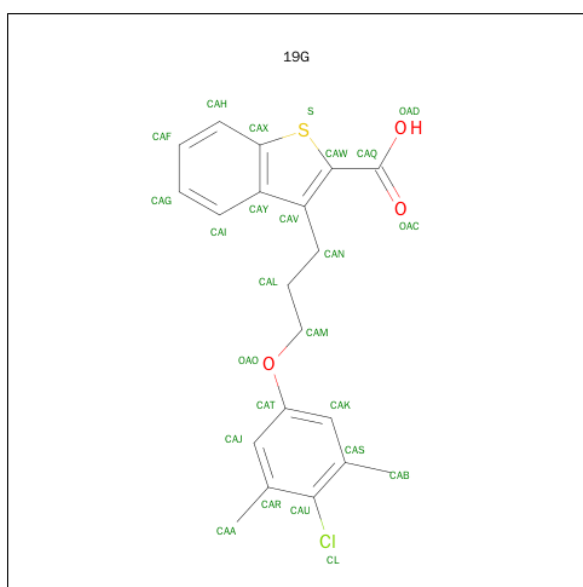
Chain	Residue	Modelled	Actual	Comment	Reference
A	171	GLY	-	EXPRESSION TAG	UNP Q07820
B	171	GLY	-	EXPRESSION TAG	UNP Q07820
C	171	GLY	-	EXPRESSION TAG	UNP Q07820
D	171	GLY	-	EXPRESSION TAG	UNP Q07820
E	171	GLY	-	EXPRESSION TAG	UNP Q07820

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Chain	Residue	Modelled	Actual	Comment	Reference
F	171	GLY	-	EXPRESSION TAG	UNP Q07820
G	171	GLY	-	EXPRESSION TAG	UNP Q07820
H	171	GLY	-	EXPRESSION TAG	UNP Q07820
I	171	GLY	-	EXPRESSION TAG	UNP Q07820
J	171	GLY	-	EXPRESSION TAG	UNP Q07820
K	171	GLY	-	EXPRESSION TAG	UNP Q07820
L	171	GLY	-	EXPRESSION TAG	UNP Q07820

- Molecule 2 is 3-[3-(4-CHLORO-3,5-DIMETHYLPHENOXY)PROPYL]-1-BENZOTHIOPHENE-2-CARBOXYLIC ACID (three-letter code: 19G) (formula: C<sub>20</sub>H<sub>19</sub>ClO<sub>3</sub>S).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	A	1	Total	C	Cl	O	S	0	0
			25	20	1	3	1		
2	B	1	Total	C	Cl	O	S	0	0
			25	20	1	3	1		
2	C	1	Total	C	Cl	O	S	0	0
			25	20	1	3	1		
2	D	1	Total	C	Cl	O	S	0	0
			25	20	1	3	1		
2	E	1	Total	C	Cl	O	S	0	0
			25	20	1	3	1		
2	F	1	Total	C	Cl	O	S	0	0
			25	20	1	3	1		
2	G	1	Total	C	Cl	O	S	0	0
			25	20	1	3	1		

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Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	H	1	Total	C	Cl	O	S	0	0
			25	20	1	3	1		
2	I	1	Total	C	Cl	O	S	0	0
			25	20	1	3	1		
2	J	1	Total	C	Cl	O	S	0	0
			25	20	1	3	1		
2	K	1	Total	C	Cl	O	S	0	0
			25	20	1	3	1		
2	L	1	Total	C	Cl	O	S	0	0
			25	20	1	3	1		

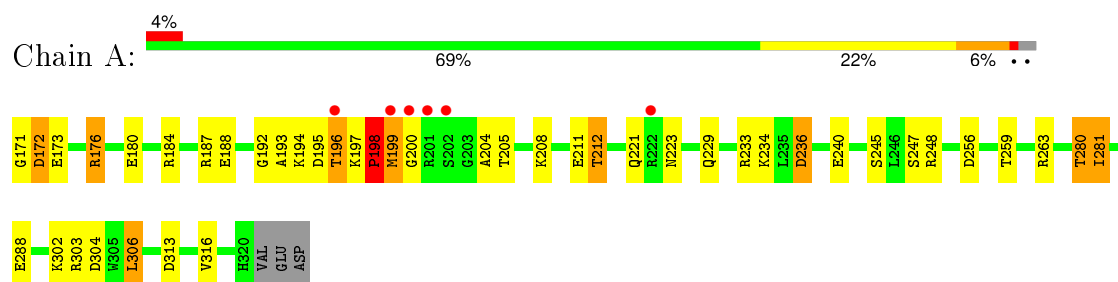
- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	28	Total	O	0	0
			28	28		
3	B	55	Total	O	0	0
			55	55		
3	C	42	Total	O	0	0
			42	42		
3	D	26	Total	O	0	0
			26	26		
3	E	20	Total	O	0	0
			20	20		
3	F	24	Total	O	0	0
			24	24		
3	G	17	Total	O	0	0
			17	17		
3	H	4	Total	O	0	0
			4	4		
3	I	5	Total	O	0	0
			5	5		
3	J	10	Total	O	0	0
			10	10		
3	K	15	Total	O	0	0
			15	15		
3	L	5	Total	O	0	0
			5	5		

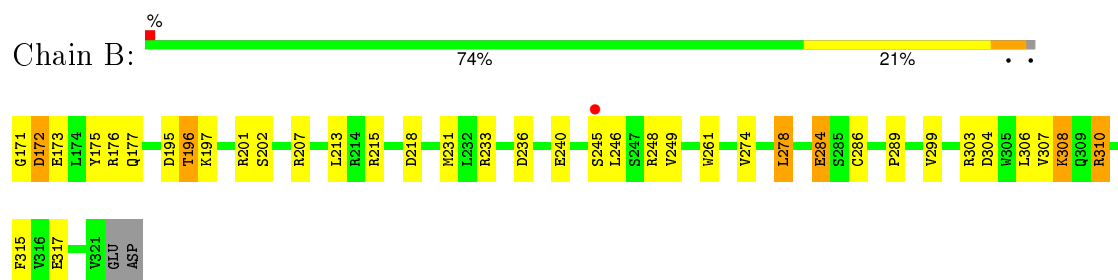
### 3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA and DNA chains in the entry. The first graphic for a chain summarises the proportions of errors 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.

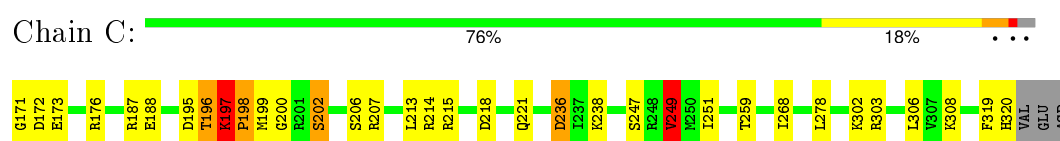
- Molecule 1: Induced myeloid leukemia cell differentiation protein Mcl-1



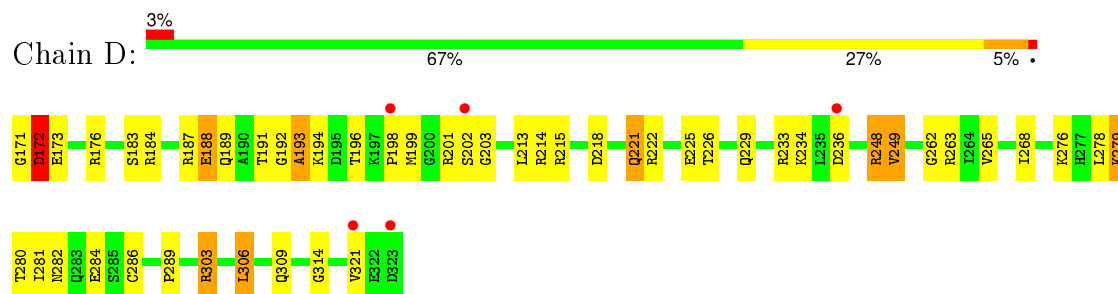
- Molecule 1: Induced myeloid leukemia cell differentiation protein Mcl-1



- Molecule 1: Induced myeloid leukemia cell differentiation protein Mcl-1

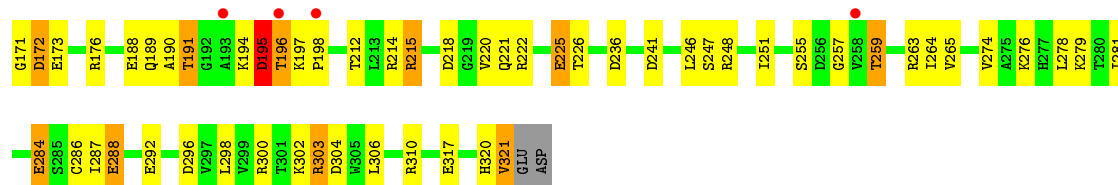


- Molecule 1: Induced myeloid leukemia cell differentiation protein Mcl-1



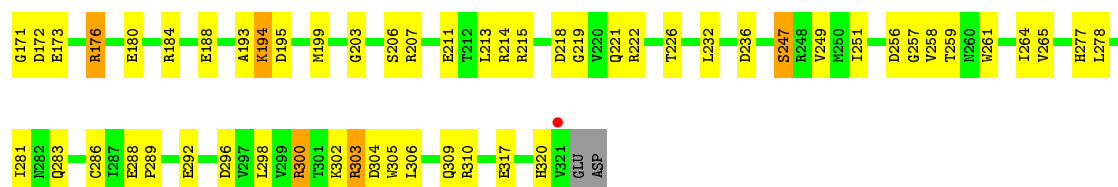
- Molecule 1: Induced myeloid leukemia cell differentiation protein Mcl-1

Chain E: 




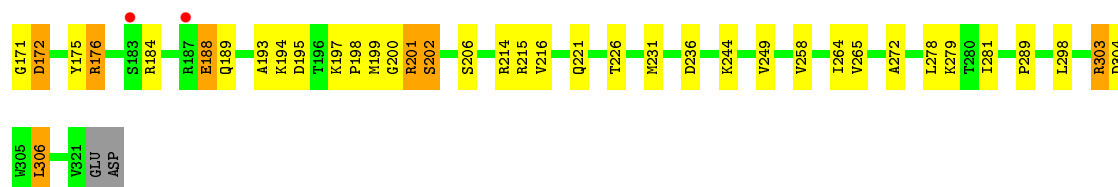
- Molecule 1: Induced myeloid leukemia cell differentiation protein Mcl-1

Chain F: 



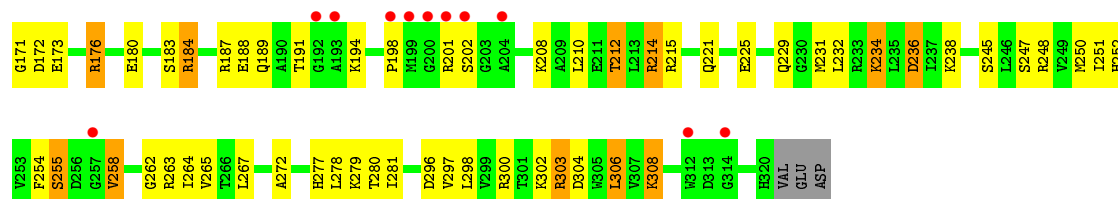
- Molecule 1: Induced myeloid leukemia cell differentiation protein Mcl-1

Chain G: 



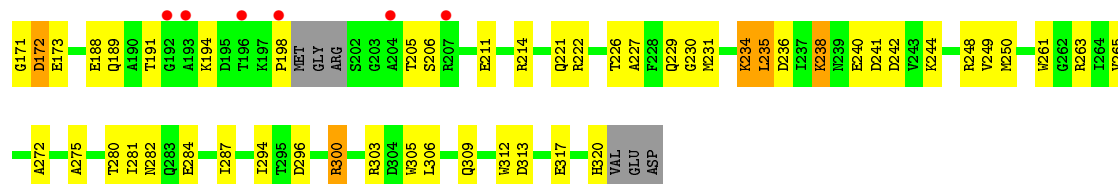
- Molecule 1: Induced myeloid leukemia cell differentiation protein Mcl-1

Chain H: 



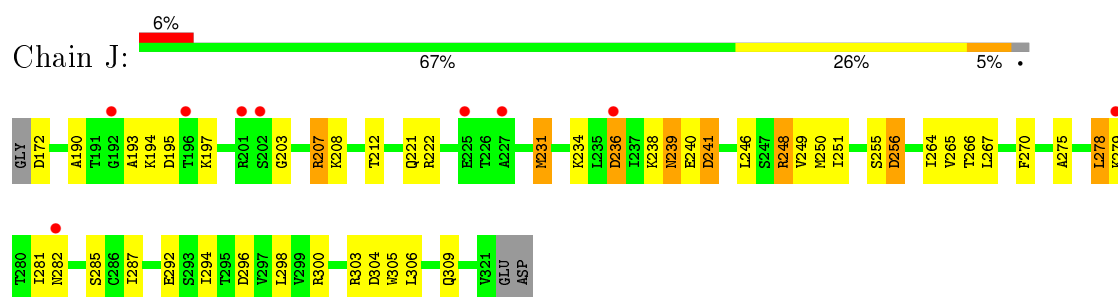
- Molecule 1: Induced myeloid leukemia cell differentiation protein Mcl-1

Chain I: 

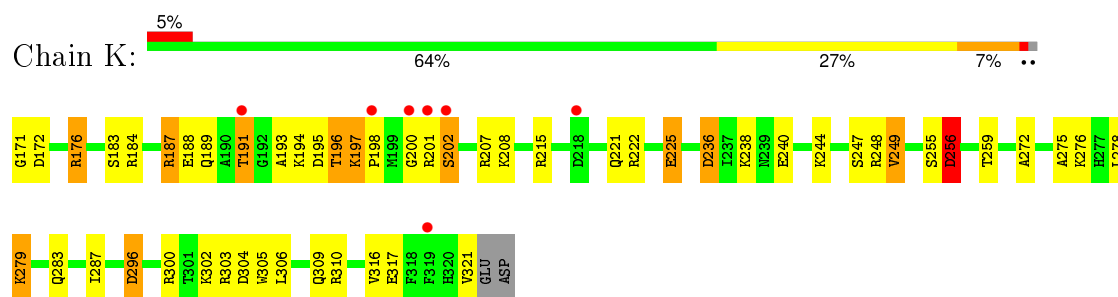


- Molecule 1: Induced myeloid leukemia cell differentiation protein Mcl-1

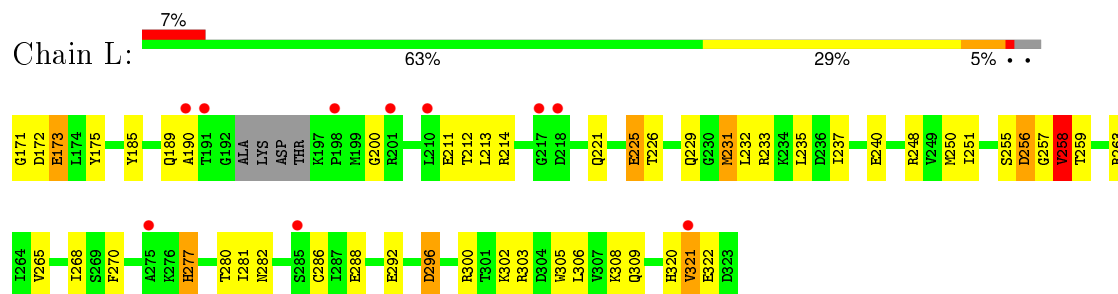




- Molecule 1: Induced myeloid leukemia cell differentiation protein Mcl-1



- Molecule 1: Induced myeloid leukemia cell differentiation protein Mcl-1



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	139.45Å 58.76Å 140.68Å 90.00° 90.71° 90.00°	Depositor
Resolution (Å)	29.98 – 2.40 49.82 – 2.40	Depositor EDS
% Data completeness (in resolution range)	98.2 (29.98-2.40) 97.7 (49.82-2.40)	Depositor EDS
$R_{merge}$	0.05	Depositor
$R_{sym}$	0.04	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	3.27 (at 2.39Å)	Xtriage
Refinement program	PHENIX (phenix.refine: 1.8_1069)	Depositor
R, $R_{free}$	0.215 , 0.263 0.230 , 0.277	Depositor DCC
$R_{free}$ test set	2001 reflections (2.33%)	DCC
Wilson B-factor (Å <sup>2</sup> )	39.0	Xtriage
Anisotropy	0.040	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.33 , 52.5	EDS
Estimated twinning fraction	0.025 for l,k,-h 0.024 for h,-k,-l 0.017 for l,-k,h	Xtriage
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.48$ , $\langle L^2 \rangle = 0.30$	Xtriage
Outliers	3 of 88507 reflections (0.003%)	Xtriage
$F_o, F_c$ correlation	0.93	EDS
Total number of atoms	14909	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	55.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.50% 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, 0.375 respectively for untwinned datasets, and 0.333, 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: 19G

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	0.68	0/1212	0.82	3/1630 (0.2%)
1	B	0.73	0/1232	0.80	3/1656 (0.2%)
1	C	0.73	1/1219 (0.1%)	0.78	3/1639 (0.2%)
1	D	0.61	0/1230	0.77	3/1656 (0.2%)
1	E	0.58	0/1228	0.78	3/1652 (0.2%)
1	F	0.60	0/1232	0.74	2/1656 (0.1%)
1	G	0.56	0/1226	0.72	3/1649 (0.2%)
1	H	0.49	0/1203	0.68	3/1620 (0.2%)
1	I	0.47	0/1185	0.67	2/1594 (0.1%)
1	J	0.54	0/1212	0.67	1/1633 (0.1%)
1	K	0.57	0/1228	0.70	1/1652 (0.1%)
1	L	0.51	0/1186	0.68	2/1598 (0.1%)
All	All	0.60	1/14593 (0.0%)	0.74	29/19635 (0.1%)

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	2
1	E	0	1
1	F	0	1
All	All	0	4

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	C	198	PRO	N-CD	5.06	1.54	1.47

All (29) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	L	200	GLY	N-CA-C	8.85	135.21	113.10
1	B	172	ASP	CB-CG-OD1	6.22	123.90	118.30
1	H	198	PRO	N-CA-CB	5.79	110.25	103.30
1	D	172	ASP	CB-CG-OD1	5.70	123.43	118.30
1	F	213	LEU	CA-CB-CG	5.69	128.39	115.30
1	C	197	LYS	C-N-CD	5.67	140.31	128.40
1	I	198	PRO	N-CA-CB	5.58	110.00	103.30
1	C	249	VAL	CB-CA-C	-5.51	100.93	111.40
1	B	213	LEU	CA-CB-CG	5.50	127.94	115.30
1	L	282	ASN	N-CA-C	5.37	125.49	111.00
1	G	226	THR	N-CA-C	5.30	125.33	111.00
1	G	236	ASP	CB-CG-OD2	5.27	123.05	118.30
1	A	236	ASP	CB-CG-OD2	5.24	123.02	118.30
1	H	236	ASP	CB-CG-OD2	5.24	123.02	118.30
1	D	236	ASP	CB-CG-OD2	5.23	123.01	118.30
1	J	236	ASP	CB-CG-OD2	5.21	122.99	118.30
1	E	236	ASP	CB-CG-OD2	5.21	122.98	118.30
1	K	236	ASP	CB-CG-OD2	5.20	122.98	118.30
1	C	236	ASP	CB-CG-OD2	5.19	122.97	118.30
1	I	236	ASP	CB-CG-OD2	5.19	122.97	118.30
1	B	236	ASP	CB-CG-OD2	5.18	122.97	118.30
1	H	255	SER	N-CA-C	-5.18	97.00	111.00
1	F	236	ASP	CB-CG-OD2	5.16	122.94	118.30
1	G	306	LEU	CA-CB-CG	5.09	127.01	115.30
1	D	306	LEU	CA-CB-CG	5.06	126.93	115.30
1	A	306	LEU	CA-CB-CG	5.05	126.91	115.30
1	E	172	ASP	CB-CG-OD1	5.04	122.84	118.30
1	E	196	THR	N-CA-C	5.02	124.55	111.00
1	A	198	PRO	N-CA-CB	5.02	109.32	103.30

There are no chirality outliers.

All (4) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	197	LYS	Peptide
1	A	198	PRO	Peptide
1	E	195	ASP	Peptide
1	F	193	ALA	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	1193	0	1186	42	0
1	B	1212	0	1223	23	0
1	C	1199	0	1203	20	0
1	D	1210	0	1200	39	0
1	E	1208	0	1212	56	0
1	F	1212	0	1223	28	0
1	G	1206	0	1207	23	0
1	H	1184	0	1163	37	0
1	I	1167	0	1153	27	0
1	J	1192	0	1182	30	0
1	K	1208	0	1212	44	0
1	L	1167	0	1139	36	0
2	A	25	0	18	0	0
2	B	25	0	18	1	0
2	C	25	0	18	0	0
2	D	25	0	18	1	0
2	E	25	0	18	2	0
2	F	25	0	18	0	0
2	G	25	0	18	1	0
2	H	25	0	18	2	0
2	I	25	0	18	1	0
2	J	25	0	18	5	0
2	K	25	0	18	0	0
2	L	25	0	18	1	0
3	A	28	0	0	2	0
3	B	55	0	0	6	0
3	C	42	0	0	4	0
3	D	26	0	0	1	0
3	E	20	0	0	0	0
3	F	24	0	0	0	0
3	G	17	0	0	0	0
3	H	4	0	0	1	0
3	I	5	0	0	1	0
3	J	10	0	0	1	0
3	K	15	0	0	1	0
3	L	5	0	0	1	0
All	All	14909	0	14519	381	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 13.

All (381) 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:E:197:LYS:HG3	1:E:198:PRO:HD2	1.20	1.16
1:A:171:GLY:HA2	1:A:303:ARG:HH22	1.09	1.08
1:D:196:THR:O	1:D:198:PRO:HD3	1.57	1.03
1:C:236:ASP:OD1	1:C:238:LYS:HE2	1.61	1.01
1:E:196:THR:N	1:E:197:LYS:HB2	1.76	1.00
1:E:197:LYS:CG	1:E:198:PRO:HD2	1.93	0.98
1:D:279:LYS:HD3	1:D:284:GLU:HG3	1.44	0.97
1:A:171:GLY:HA2	1:A:303:ARG:NH2	1.81	0.96
1:D:171:GLY:HA3	1:D:303:ARG:HH22	1.34	0.91
1:E:259:THR:CG2	1:E:302:LYS:NZ	2.36	0.88
1:D:248:ARG:HH11	1:D:248:ARG:HG3	1.37	0.88
1:K:196:THR:OG1	1:K:198:PRO:HD2	1.76	0.86
1:H:171:GLY:HA2	1:H:303:ARG:HH22	1.42	0.85
1:A:192:GLY:HA3	1:A:193:ALA:HB2	1.58	0.84
1:A:180:GLU:OE1	1:A:199:MET:HG3	1.78	0.84
1:E:259:THR:HG23	1:E:302:LYS:NZ	1.93	0.83
1:E:197:LYS:HG3	1:E:198:PRO:CD	2.07	0.83
1:L:257:GLY:HA2	1:L:258:VAL:HG23	1.61	0.82
1:E:259:THR:HG23	1:E:302:LYS:HZ1	1.41	0.82
1:D:171:GLY:HA3	1:D:303:ARG:NH2	1.96	0.80
1:A:172:ASP:HB2	1:B:303:ARG:HB3	1.67	0.76
1:I:250:MET:HE1	1:I:294:ILE:HA	1.67	0.76
1:J:190:ALA:O	1:J:279:LYS:HD2	1.85	0.75
1:E:263:ARG:NE	2:E:400:19G:OAC	2.20	0.75
1:E:197:LYS:NZ	1:E:198:PRO:HD2	2.02	0.74
1:E:259:THR:HG21	1:E:302:LYS:NZ	2.01	0.74
1:C:213:LEU:HD21	1:C:268:ILE:HG21	1.68	0.74
1:A:199:MET:O	1:A:199:MET:SD	2.46	0.74
1:A:171:GLY:CA	1:A:303:ARG:HH22	1.96	0.73
1:C:215:ARG:NH2	1:C:319:PHE:O	2.22	0.73
1:E:259:THR:HG21	1:E:302:LYS:CE	2.18	0.73
1:E:191:THR:HG22	1:E:279:LYS:HD3	1.71	0.72
1:G:171:GLY:HA3	1:G:175:TYR:HB2	1.70	0.72
1:I:189:GLN:HG3	1:I:272:ALA:HB1	1.69	0.72
1:J:236:ASP:OD2	1:J:238:LYS:HE3	1.90	0.72
1:I:248:ARG:NH1	3:I:502:HOH:O	2.22	0.72
1:K:196:THR:OG1	1:K:197:LYS:N	2.17	0.71

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:J:278:LEU:HD12	1:J:281:ILE:HD11	1.71	0.71
1:E:171:GLY:HA2	1:E:303:ARG:HH22	1.56	0.70
1:G:171:GLY:HA2	1:G:303:ARG:HH12	1.56	0.70
1:F:173:GLU:OE2	1:F:176:ARG:NH2	2.24	0.70
1:H:171:GLY:HA2	1:H:303:ARG:NH2	2.06	0.70
1:I:238:LYS:HG3	1:I:242:ASP:OD2	1.91	0.69
1:E:259:THR:CG2	1:E:302:LYS:HZ2	2.05	0.69
1:L:237:ILE:O	1:L:237:ILE:HG13	1.91	0.69
1:K:221:GLN:OE1	1:K:276:LYS:NZ	2.25	0.69
1:C:199:MET:CE	1:C:206:SER:HB3	2.23	0.68
1:L:288:GLU:N	1:L:288:GLU:OE1	2.27	0.68
1:A:173:GLU:OE2	1:A:176:ARG:NH2	2.27	0.68
1:D:303:ARG:NH1	3:D:515:HOH:O	2.22	0.68
1:B:233:ARG:NH2	3:B:519:HOH:O	2.26	0.68
1:J:241:ASP:N	1:J:241:ASP:OD1	2.26	0.67
1:A:194:LYS:HG2	1:A:196:THR:HG22	1.77	0.67
1:L:237:ILE:HD11	1:L:277:HIS:ND1	2.10	0.67
1:D:196:THR:C	1:D:198:PRO:HD3	2.15	0.67
1:B:284:GLU:HG3	3:B:530:HOH:O	1.94	0.67
1:E:320:HIS:O	1:E:321:VAL:HG12	1.95	0.66
1:K:310:ARG:NH2	1:K:317:GLU:OE1	2.28	0.66
1:K:296:ASP:OD2	1:K:300:ARG:NH1	2.28	0.66
1:B:303:ARG:NH2	3:B:503:HOH:O	2.26	0.66
1:D:280:THR:C	1:D:282:ASN:H	1.99	0.66
1:L:173:GLU:HA	1:L:173:GLU:OE2	1.95	0.65
1:J:195:ASP:O	1:J:197:LYS:N	2.21	0.65
1:K:191:THR:O	1:K:193:ALA:N	2.27	0.65
1:F:317:GLU:O	1:F:320:HIS:ND1	2.25	0.64
1:E:196:THR:H	1:E:197:LYS:HB2	1.61	0.64
1:D:248:ARG:HG3	1:D:248:ARG:NH1	2.10	0.64
1:A:192:GLY:CA	1:A:193:ALA:HB2	2.25	0.64
1:E:172:ASP:HB3	1:G:304:ASP:OD2	1.98	0.64
1:L:263:ARG:NH2	2:L:400:19G:OAC	2.22	0.64
1:H:189:GLN:HG3	1:H:272:ALA:HB1	1.79	0.64
1:K:197:LYS:H	1:K:198:PRO:CD	2.11	0.64
1:J:250:MET:HE1	1:J:294:ILE:HA	1.80	0.64
1:J:266:THR:HG22	2:J:400:19G:H6	1.79	0.63
1:C:188:GLU:OE2	1:C:214:ARG:NH2	2.25	0.63
1:A:195:ASP:O	1:A:196:THR:HG23	1.99	0.62
1:E:197:LYS:CD	1:E:198:PRO:HD2	2.29	0.62
1:H:296:ASP:O	1:H:300:ARG:HB2	1.99	0.62

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:H:188:GLU:HG2	1:H:194:LYS:H	1.65	0.62
1:D:279:LYS:HD3	1:D:284:GLU:CG	2.25	0.62
1:H:236:ASP:OD1	1:H:238:LYS:NZ	2.33	0.62
1:L:257:GLY:HA3	1:L:258:VAL:O	2.00	0.61
1:K:197:LYS:H	1:K:198:PRO:HD2	1.64	0.61
1:C:259:THR:OG1	1:C:302:LYS:NZ	2.32	0.61
1:C:198:PRO:O	1:C:199:MET:HB2	2.00	0.61
1:I:230:GLY:O	1:I:234:LYS:HD3	2.01	0.61
1:D:189:GLN:O	1:D:276:LYS:NZ	2.34	0.61
1:H:254:PHE:O	1:H:263:ARG:NH2	2.33	0.60
1:G:188:GLU:OE2	1:G:214:ARG:NE	2.27	0.60
1:E:197:LYS:HZ3	1:E:198:PRO:CD	2.13	0.60
1:C:303:ARG:NE	3:C:515:HOH:O	2.30	0.60
1:G:184:ARG:HH11	1:G:195:ASP:HB3	1.67	0.60
1:L:292:GLU:O	1:L:296:ASP:HB2	2.01	0.60
1:B:248:ARG:NH2	3:B:548:HOH:O	2.34	0.60
1:J:267:LEU:HD12	2:J:400:19G:H11	1.83	0.60
1:E:246:LEU:HD13	2:E:400:19G:CL	2.39	0.59
1:F:180:GLU:HG2	1:F:199:MET:HG2	1.83	0.59
1:A:199:MET:N	1:A:199:MET:SD	2.75	0.59
1:L:213:LEU:HD21	1:L:268:ILE:HG21	1.83	0.59
1:A:192:GLY:HA3	1:A:193:ALA:CB	2.25	0.58
1:E:171:GLY:HA2	1:E:303:ARG:NH2	2.18	0.58
1:L:257:GLY:CA	1:L:258:VAL:HG23	2.33	0.58
1:K:171:GLY:CA	1:K:303:ARG:HH22	2.16	0.58
1:F:188:GLU:OE2	1:F:214:ARG:NE	2.28	0.58
1:H:234:LYS:HG3	1:J:256:ASP:OD2	2.03	0.58
1:E:317:GLU:O	1:E:320:HIS:CD2	2.56	0.58
1:J:203:GLY:O	1:J:207:ARG:HG2	2.04	0.57
1:G:171:GLY:HA2	1:G:303:ARG:NH1	2.19	0.57
1:F:184:ARG:NH1	1:F:195:ASP:HB3	2.20	0.57
1:A:234:LYS:HE3	1:K:256:ASP:OD1	2.05	0.57
1:D:184:ARG:O	1:D:188:GLU:HB3	2.05	0.57
1:F:264:ILE:HD13	1:F:298:LEU:HD11	1.87	0.57
1:J:296:ASP:OD2	1:J:300:ARG:NH1	2.38	0.56
1:J:250:MET:HE1	1:J:294:ILE:HG12	1.88	0.56
1:H:264:ILE:HD13	1:H:298:LEU:HD11	1.86	0.56
1:E:310:ARG:NH2	1:E:317:GLU:OE1	2.29	0.56
1:L:211:GLU:HG2	1:L:214:ARG:NH1	2.20	0.56
1:A:229:GLN:O	1:A:233:ARG:HG3	2.06	0.56
1:E:188:GLU:OE2	1:E:214:ARG:NE	2.31	0.56

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:I:205:THR:OG1	1:I:313:ASP:OD1	2.23	0.56
1:B:261:TRP:CH2	1:B:315:PHE:HB2	2.41	0.56
1:B:171:GLY:HA3	1:B:175:TYR:HB2	1.87	0.55
1:G:189:GLN:HG3	1:G:272:ALA:HB1	1.88	0.55
1:C:200:GLY:O	1:C:202:SER:N	2.38	0.55
1:H:214:ARG:HH11	1:H:214:ARG:CG	2.20	0.55
1:I:171:GLY:CA	1:I:303:ARG:HH22	2.20	0.55
1:I:261:TRP:O	1:I:265:VAL:HG12	2.06	0.55
1:L:296:ASP:O	1:L:300:ARG:HB2	2.07	0.55
1:D:249:VAL:CG2	1:L:248:ARG:HB2	2.36	0.55
1:L:251:ILE:O	1:L:255:SER:HB3	2.07	0.55
1:D:249:VAL:HG22	1:L:248:ARG:HB2	1.89	0.55
1:I:231:MET:O	1:I:235:LEU:HD22	2.07	0.55
1:K:171:GLY:HA2	1:K:303:ARG:HH22	1.71	0.55
1:H:277:HIS:O	1:H:280:THR:OG1	2.21	0.54
1:L:225:GLU:HG3	1:L:225:GLU:O	2.06	0.54
1:D:280:THR:O	1:D:282:ASN:N	2.39	0.54
1:H:252:HIS:O	1:J:234:LYS:NZ	2.38	0.54
1:J:281:ILE:O	1:J:282:ASN:HB2	2.08	0.54
1:I:173:GLU:OE1	1:I:173:GLU:HA	2.06	0.54
1:B:308:LYS:NZ	3:B:553:HOH:O	2.40	0.54
1:E:259:THR:HG21	1:E:302:LYS:CD	2.38	0.54
1:L:231:MET:O	1:L:235:LEU:HG	2.07	0.54
1:D:191:THR:O	1:D:193:ALA:N	2.41	0.54
1:E:259:THR:CG2	1:E:302:LYS:HZ1	2.06	0.54
1:L:259:THR:OG1	1:L:302:LYS:NZ	2.38	0.54
1:F:172:ASP:HB3	1:J:304:ASP:OD2	2.07	0.54
1:H:214:ARG:NH1	1:H:214:ARG:HG2	2.22	0.54
1:A:256:ASP:N	3:A:525:HOH:O	2.31	0.54
1:B:261:TRP:CZ3	1:B:315:PHE:HB2	2.43	0.53
1:E:197:LYS:HZ3	1:E:198:PRO:HD2	1.70	0.53
1:F:219:GLY:O	1:F:222:ARG:HG2	2.07	0.53
1:D:198:PRO:CB	1:D:199:MET:HB2	2.39	0.53
1:F:286:CYS:HA	1:F:289:PRO:HG2	1.90	0.53
1:I:227:ALA:HB2	1:K:321:VAL:HG13	1.90	0.53
1:H:267:LEU:HD12	2:H:400:19G:H11	1.91	0.53
1:G:216:VAL:HG12	1:G:265:VAL:HG11	1.91	0.53
1:A:187:ARG:NH1	1:A:195:ASP:OD2	2.43	0.52
1:G:171:GLY:HA2	1:G:303:ARG:HH22	1.74	0.52
1:I:241:ASP:O	1:I:244:LYS:HB2	2.09	0.52
1:D:229:GLN:HG3	1:D:233:ARG:CZ	2.40	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:205:THR:HA	3:A:523:HOH:O	2.09	0.52
1:J:208:LYS:O	1:J:212:THR:HG23	2.09	0.52
1:H:173:GLU:OE2	1:H:176:ARG:NH2	2.30	0.52
1:K:236:ASP:OD2	1:K:238:LYS:HE2	2.10	0.52
1:K:171:GLY:HA2	1:K:303:ARG:NH2	2.25	0.52
1:K:201:ARG:HG3	1:K:202:SER:N	2.25	0.52
1:L:256:ASP:N	3:L:501:HOH:O	2.36	0.52
1:E:197:LYS:CG	1:E:198:PRO:CD	2.76	0.51
1:E:196:THR:CA	1:E:197:LYS:HB2	2.40	0.51
1:D:218:ASP:OD1	1:D:222:ARG:HD3	2.09	0.51
1:D:278:LEU:HD13	1:D:286:CYS:HB2	1.91	0.51
1:C:236:ASP:OD1	1:C:238:LYS:CE	2.47	0.51
1:E:259:THR:HG21	1:E:302:LYS:HZ2	1.72	0.51
1:K:189:GLN:HG2	1:K:272:ALA:HB1	1.92	0.51
1:H:245:SER:HB2	1:J:248:ARG:HG2	1.92	0.51
1:C:187:ARG:NH1	3:C:534:HOH:O	2.43	0.51
2:J:400:19G:H10	2:J:400:19G:H5	1.93	0.51
1:G:202:SER:OG	1:G:206:SER:N	2.39	0.51
1:K:275:ALA:HB1	1:K:287:ILE:HD13	1.92	0.51
1:A:304:ASP:OD2	1:B:172:ASP:HB3	2.11	0.51
1:G:264:ILE:HD13	1:G:298:LEU:HD11	1.93	0.51
1:H:172:ASP:HB3	1:K:304:ASP:OD2	2.11	0.51
1:F:172:ASP:HB3	1:J:304:ASP:CG	2.32	0.50
1:L:185:TYR:O	1:L:189:GLN:HG2	2.11	0.50
1:E:197:LYS:HZ3	1:E:198:PRO:CG	2.25	0.50
1:H:180:GLU:O	1:H:184:ARG:HB2	2.12	0.50
1:D:279:LYS:HE3	1:D:284:GLU:OE1	2.12	0.50
1:A:180:GLU:OE1	1:A:199:MET:CG	2.54	0.50
1:L:296:ASP:HB3	1:L:300:ARG:HH21	1.75	0.50
1:D:191:THR:OG1	1:D:191:THR:O	2.28	0.50
1:F:296:ASP:O	1:F:300:ARG:HB2	2.11	0.50
1:F:259:THR:HB	1:F:302:LYS:NZ	2.27	0.50
1:J:239:ASN:N	1:J:239:ASN:OD1	2.43	0.50
1:J:246:LEU:HD13	2:J:400:19G:CL	2.49	0.50
1:A:313:ASP:O	1:A:316:VAL:HG22	2.11	0.49
1:B:248:ARG:HB3	1:F:249:VAL:CG2	2.43	0.49
1:L:257:GLY:CA	1:L:263:ARG:NH1	2.76	0.49
1:I:191:THR:O	1:I:191:THR:OG1	2.28	0.49
1:E:197:LYS:NZ	1:E:198:PRO:CD	2.72	0.48
1:E:212:THR:HG22	1:E:215:ARG:NH2	2.27	0.48
1:D:248:ARG:CG	1:D:248:ARG:NH1	2.73	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:234:LYS:HE3	1:L:255:SER:OG	2.13	0.48
1:D:198:PRO:HB2	1:D:199:MET:HB2	1.95	0.48
1:A:188:GLU:HA	1:A:193:ALA:HB3	1.96	0.48
1:K:310:ARG:HH22	1:K:317:GLU:CD	2.17	0.48
1:H:188:GLU:HG2	1:H:194:LYS:N	2.28	0.48
1:D:188:GLU:OE2	1:D:214:ARG:NE	2.43	0.48
1:L:231:MET:HG3	1:L:270:PHE:CZ	2.49	0.48
1:E:296:ASP:O	1:E:300:ARG:HB2	2.13	0.48
1:E:279:LYS:HD2	1:E:284:GLU:HG2	1.96	0.48
1:A:180:GLU:HG3	1:A:184:ARG:HE	1.78	0.48
1:L:257:GLY:HA3	1:L:258:VAL:C	2.34	0.48
1:E:222:ARG:O	1:E:225:GLU:HB2	2.13	0.48
1:L:281:ILE:O	1:L:281:ILE:HG13	2.13	0.48
1:E:279:LYS:NZ	1:E:284:GLU:OE2	2.41	0.47
1:F:171:GLY:HA3	1:F:303:ARG:HH22	1.79	0.47
1:E:191:THR:OG1	1:E:191:THR:O	2.30	0.47
1:J:264:ILE:HD13	1:J:298:LEU:HD11	1.97	0.47
1:E:172:ASP:HB3	1:E:173:GLU:H	1.61	0.47
1:F:172:ASP:HB3	1:F:173:GLU:H	1.61	0.47
1:H:210:LEU:O	1:H:214:ARG:HG3	2.14	0.47
1:L:240:GLU:HG3	1:L:286:CYS:SG	2.54	0.47
1:H:258:VAL:O	1:H:263:ARG:NH1	2.48	0.47
1:B:195:ASP:OD1	1:B:196:THR:N	2.48	0.47
1:K:197:LYS:O	1:K:207:ARG:NH1	2.41	0.47
1:K:188:GLU:O	1:K:191:THR:O	2.32	0.47
1:J:193:ALA:O	1:J:194:LYS:CB	2.63	0.46
1:A:248:ARG:HB3	1:K:249:VAL:HG21	1.95	0.46
1:E:304:ASP:OD2	1:G:172:ASP:HB3	2.15	0.46
1:A:196:THR:OG1	1:A:196:THR:O	2.28	0.46
1:H:208:LYS:O	1:H:212:THR:HG23	2.14	0.46
1:D:183:SER:O	1:D:187:ARG:HB2	2.15	0.46
1:F:257:GLY:HA3	1:F:258:VAL:C	2.35	0.46
1:L:172:ASP:HB3	1:L:173:GLU:H	1.63	0.46
1:L:235:LEU:HD23	1:L:235:LEU:HA	1.77	0.46
1:I:171:GLY:HA3	1:I:303:ARG:HH22	1.80	0.46
1:I:188:GLU:OE2	1:I:214:ARG:NE	2.47	0.46
1:G:184:ARG:NH2	1:G:198:PRO:O	2.49	0.46
1:L:232:LEU:O	1:L:235:LEU:HB2	2.15	0.46
1:J:275:ALA:HB1	1:J:287:ILE:HD13	1.98	0.46
1:B:310:ARG:HH22	1:B:317:GLU:CD	2.18	0.46
1:E:195:ASP:OD1	1:E:197:LYS:HG2	2.16	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:K:195:ASP:O	1:K:196:THR:HG23	2.16	0.46
1:C:199:MET:HE1	1:C:206:SER:HB3	1.95	0.46
1:G:197:LYS:HA	1:G:198:PRO:HD3	1.82	0.46
1:H:247:SER:O	1:H:251:ILE:HG13	2.16	0.46
1:D:201:ARG:HA	1:D:202:SER:HA	1.56	0.46
1:I:317:GLU:O	1:I:320:HIS:ND1	2.48	0.46
1:K:184:ARG:NH2	1:K:198:PRO:O	2.49	0.46
1:A:173:GLU:CD	1:A:176:ARG:HH21	2.19	0.46
1:K:305:TRP:CZ2	1:K:309:GLN:HG3	2.51	0.46
1:B:177:GLN:NE2	1:B:202:SER:HB3	2.31	0.45
1:A:303:ARG:HB3	1:B:172:ASP:HB2	1.98	0.45
1:H:302:LYS:HB2	1:H:306:LEU:HD22	1.99	0.45
1:G:171:GLY:CA	1:G:303:ARG:HH22	2.29	0.45
1:H:232:LEU:HD21	1:H:277:HIS:HB2	1.98	0.45
1:I:284:GLU:HA	1:I:287:ILE:HG13	1.98	0.45
1:A:198:PRO:O	1:A:199:MET:C	2.54	0.45
1:K:279:LYS:HG3	1:K:279:LYS:HZ3	1.58	0.45
1:K:197:LYS:N	1:K:198:PRO:CD	2.72	0.45
1:B:299:VAL:O	1:B:303:ARG:HB2	2.17	0.45
1:H:184:ARG:HG2	1:H:210:LEU:HD21	1.98	0.45
1:F:283:GLN:HG3	1:F:286:CYS:SG	2.56	0.45
1:I:305:TRP:CZ2	1:I:309:GLN:HG3	2.52	0.45
1:H:263:ARG:NE	2:H:400:19G:OAC	2.33	0.45
1:I:275:ALA:HB1	1:I:287:ILE:HD13	1.99	0.45
1:H:191:THR:O	1:H:191:THR:OG1	2.30	0.45
1:G:244:LYS:NZ	1:G:289:PRO:HB3	2.31	0.45
1:I:263:ARG:HG2	2:I:400:19G:OAD	2.16	0.45
1:C:195:ASP:OD2	1:C:197:LYS:HD2	2.17	0.45
1:E:259:THR:HG21	1:E:302:LYS:HD2	1.99	0.44
1:H:214:ARG:HH11	1:H:214:ARG:HG2	1.80	0.44
1:H:214:ARG:NH1	1:H:214:ARG:CG	2.77	0.44
1:F:171:GLY:CA	1:F:303:ARG:HH22	2.30	0.44
1:J:251:ILE:O	1:J:255:SER:HB2	2.17	0.44
1:A:195:ASP:C	1:A:196:THR:CG2	2.86	0.44
1:G:176:ARG:HD3	1:G:201:ARG:HH12	1.82	0.44
1:D:263:ARG:NH2	2:D:400:19G:OAD	2.46	0.44
1:J:285:SER:HA	3:J:509:HOH:O	2.18	0.44
1:L:305:TRP:CH2	1:L:309:GLN:HG3	2.52	0.44
1:K:195:ASP:C	1:K:196:THR:CG2	2.85	0.44
1:A:180:GLU:CD	1:A:199:MET:HG3	2.36	0.44
1:D:286:CYS:HA	1:D:289:PRO:HG2	1.99	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:K:240:GLU:O	1:K:244:LYS:HD3	2.18	0.44
1:L:320:HIS:CD2	1:L:321:VAL:O	2.70	0.44
1:H:231:MET:HE1	3:H:503:HOH:O	2.17	0.44
1:E:197:LYS:HZ2	1:E:198:PRO:HD2	1.81	0.44
1:J:249:VAL:HB	2:J:400:19G:H14	1.98	0.44
1:F:207:ARG:O	1:F:211:GLU:HG3	2.18	0.44
1:E:264:ILE:HD13	1:E:298:LEU:HD11	1.98	0.44
1:C:172:ASP:HB3	1:C:173:GLU:H	1.64	0.44
1:F:304:ASP:OD2	1:J:172:ASP:HB3	2.18	0.44
1:K:183:SER:O	1:K:187:ARG:HB2	2.18	0.44
1:A:172:ASP:HB3	1:A:173:GLU:H	1.59	0.43
1:E:212:THR:HG22	1:E:215:ARG:HH21	1.82	0.43
1:F:261:TRP:O	1:F:265:VAL:HG12	2.18	0.43
1:C:188:GLU:OE1	1:C:214:ARG:NE	2.38	0.43
1:G:171:GLY:HA2	1:G:303:ARG:NH2	2.33	0.43
1:D:183:SER:OG	1:D:187:ARG:NH2	2.48	0.43
1:K:305:TRP:CH2	1:K:309:GLN:HG3	2.53	0.43
1:J:231:MET:HG3	1:J:270:PHE:CZ	2.54	0.43
1:J:239:ASN:ND2	1:J:241:ASP:OD1	2.52	0.43
1:C:247:SER:O	1:C:251:ILE:HG13	2.18	0.43
1:E:197:LYS:HA	1:E:197:LYS:HD2	1.95	0.43
1:G:199:MET:HB2	1:G:200:GLY:HA2	2.00	0.43
1:D:309:GLN:O	1:D:314:GLY:HA3	2.19	0.43
1:B:246:LEU:HD13	2:B:400:19G:CL	2.56	0.43
1:K:208:LYS:HB3	1:K:316:VAL:HG11	1.99	0.43
1:I:240:GLU:HG2	1:I:240:GLU:H	1.49	0.43
1:J:305:TRP:CH2	1:J:309:GLN:HG3	2.53	0.43
1:A:205:THR:HG21	1:A:313:ASP:OD1	2.19	0.43
1:E:247:SER:O	1:E:251:ILE:HG13	2.19	0.43
1:A:172:ASP:HB3	1:B:304:ASP:OD2	2.18	0.42
1:I:305:TRP:O	1:I:309:GLN:HG2	2.18	0.42
1:D:202:SER:HA	1:D:203:GLY:HA3	1.61	0.42
1:E:220:VAL:HG21	1:E:265:VAL:CG2	2.49	0.42
1:C:259:THR:HA	3:C:537:HOH:O	2.19	0.42
1:H:262:GLY:HA2	1:H:265:VAL:HG12	2.01	0.42
1:B:274:VAL:HG12	1:B:278:LEU:HD22	2.02	0.42
1:I:296:ASP:OD1	1:I:300:ARG:HG3	2.19	0.42
1:C:171:GLY:N	3:C:539:HOH:O	2.51	0.42
1:A:204:ALA:O	1:A:208:LYS:HD3	2.19	0.42
1:H:304:ASP:O	1:H:308:LYS:HB2	2.19	0.42
1:L:257:GLY:HA2	1:L:258:VAL:CG2	2.39	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:F:203:GLY:O	1:F:207:ARG:HB2	2.20	0.42
1:E:255:SER:O	1:E:257:GLY:N	2.52	0.42
1:F:305:TRP:O	1:F:309:GLN:HG2	2.20	0.42
1:I:280:THR:C	1:I:282:ASN:H	2.23	0.42
1:D:172:ASP:HB3	1:D:173:GLU:H	1.59	0.42
1:D:225:GLU:O	1:D:229:GLN:HB2	2.19	0.42
1:C:195:ASP:OD2	1:C:196:THR:N	2.52	0.42
1:B:286:CYS:HA	1:B:289:PRO:HG2	2.02	0.42
1:E:278:LEU:HD22	1:E:286:CYS:SG	2.59	0.42
1:L:173:GLU:OE2	1:L:173:GLU:CA	2.66	0.42
1:A:234:LYS:HE3	1:K:256:ASP:CG	2.40	0.42
1:F:203:GLY:HA2	1:F:206:SER:HB2	2.02	0.42
1:E:189:GLN:HG3	1:E:276:LYS:HE3	2.02	0.42
1:B:171:GLY:HA2	1:B:303:ARG:NH1	2.35	0.42
1:K:176:ARG:HH12	1:K:201:ARG:H	1.68	0.42
1:L:171:GLY:HA3	1:L:175:TYR:HB2	2.02	0.42
1:H:250:MET:HE3	1:H:297:VAL:HG21	2.01	0.41
1:I:205:THR:HG21	1:I:312:TRP:HB3	2.02	0.41
1:A:205:THR:CG2	1:A:313:ASP:OD1	2.69	0.41
1:G:193:ALA:O	1:G:194:LYS:HB3	2.20	0.41
1:D:196:THR:O	1:D:198:PRO:CD	2.48	0.41
1:K:259:THR:OG1	1:K:302:LYS:NZ	2.46	0.41
1:K:195:ASP:C	1:K:196:THR:HG23	2.40	0.41
1:E:190:ALA:O	1:E:279:LYS:HG2	2.21	0.41
1:A:280:THR:HG22	1:A:281:ILE:N	2.35	0.41
1:C:249:VAL:HG22	1:E:248:ARG:HB2	2.03	0.41
1:A:223:ASN:HB3	1:E:222:ARG:HG2	2.03	0.41
1:B:172:ASP:HB3	1:B:173:GLU:H	1.46	0.41
1:G:244:LYS:HA	1:G:244:LYS:HD3	1.87	0.41
1:A:208:LYS:O	1:A:212:THR:HG22	2.21	0.41
1:E:274:VAL:O	1:E:278:LEU:HG	2.20	0.41
1:D:262:GLY:HA2	1:D:265:VAL:HG22	2.02	0.41
1:B:307:VAL:HG21	3:B:554:HOH:O	2.20	0.41
1:I:189:GLN:HA	1:I:189:GLN:NE2	2.35	0.41
1:F:288:GLU:O	1:F:292:GLU:HG3	2.21	0.41
1:K:247:SER:OG	3:K:505:HOH:O	2.22	0.41
1:A:245:SER:O	1:K:248:ARG:HD2	2.21	0.41
1:D:213:LEU:HD21	1:D:268:ILE:HG21	2.03	0.40
1:H:183:SER:O	1:H:187:ARG:HG3	2.21	0.40
1:H:201:ARG:HA	1:H:202:SER:C	2.40	0.40
1:A:259:THR:OG1	1:A:302:LYS:NZ	2.43	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:288:GLU:O	1:E:292:GLU:HG3	2.21	0.40
1:G:184:ARG:O	1:G:188:GLU:HB3	2.21	0.40
1:K:200:GLY:O	1:K:201:ARG:C	2.59	0.40
1:F:232:LEU:HD11	1:F:277:HIS:CE1	2.56	0.40
1:A:199:MET:HA	1:A:200:GLY:HA3	1.89	0.40
1:D:221:GLN:OE1	1:D:276:LYS:HE2	2.22	0.40
1:I:172:ASP:HB3	1:I:173:GLU:H	1.65	0.40
1:K:222:ARG:O	1:K:225:GLU:HB2	2.22	0.40
1:F:247:SER:O	1:F:251:ILE:HG13	2.21	0.40
1:L:257:GLY:CA	1:L:263:ARG:HH12	2.34	0.40
1:K:255:SER:O	1:K:256:ASP:CB	2.69	0.40
1:H:304:ASP:OD2	1:K:172:ASP:HB3	2.21	0.40
1:G:231:MET:CE	2:G:400:19G:H15	2.52	0.40
1:K:189:GLN:HG3	1:K:276:LYS:HE3	2.04	0.40
1:F:278:LEU:HD22	1:F:286:CYS:HB2	2.02	0.40
1:K:176:ARG:C	1:K:176:ARG:HE	2.25	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	148/153 (97%)	142 (96%)	5 (3%)	1 (1%)	26	38
1	B	149/153 (97%)	143 (96%)	6 (4%)	0	100	100
1	C	148/153 (97%)	145 (98%)	3 (2%)	0	100	100
1	D	151/153 (99%)	145 (96%)	3 (2%)	3 (2%)	9	11
1	E	149/153 (97%)	139 (93%)	8 (5%)	2 (1%)	15	21
1	F	149/153 (97%)	140 (94%)	7 (5%)	2 (1%)	15	21
1	G	149/153 (97%)	145 (97%)	3 (2%)	1 (1%)	26	38

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	H	148/153 (97%)	136 (92%)	11 (7%)	1 (1%)	26	38
1	I	143/153 (94%)	135 (94%)	6 (4%)	2 (1%)	14	19
1	J	148/153 (97%)	141 (95%)	7 (5%)	0	100	100
1	K	149/153 (97%)	142 (95%)	5 (3%)	2 (1%)	15	21
1	L	145/153 (95%)	136 (94%)	6 (4%)	3 (2%)	9	10
All	All	1776/1836 (97%)	1689 (95%)	70 (4%)	17 (1%)	19	28

All (17) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	D	192	GLY
1	D	193	ALA
1	D	281	ILE
1	F	194	LYS
1	I	194	LYS
1	L	321	VAL
1	L	190	ALA
1	E	194	LYS
1	F	281	ILE
1	I	281	ILE
1	K	197	LYS
1	K	256	ASP
1	H	281	ILE
1	E	281	ILE
1	G	281	ILE
1	A	281	ILE
1	L	258	VAL

### 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	127/133 (96%)	113 (89%)	14 (11%)	8	10

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	B	131/133 (98%)	115 (88%)	16 (12%)	6	7
1	C	129/133 (97%)	117 (91%)	12 (9%)	11	16
1	D	128/133 (96%)	115 (90%)	13 (10%)	9	13
1	E	130/133 (98%)	114 (88%)	16 (12%)	6	7
1	F	131/133 (98%)	119 (91%)	12 (9%)	11	16
1	G	129/133 (97%)	116 (90%)	13 (10%)	9	13
1	H	124/133 (93%)	107 (86%)	17 (14%)	4	5
1	I	123/133 (92%)	110 (89%)	13 (11%)	8	12
1	J	127/133 (96%)	113 (89%)	14 (11%)	8	10
1	K	130/133 (98%)	115 (88%)	15 (12%)	7	9
1	L	120/133 (90%)	101 (84%)	19 (16%)	3	3
All	All	1529/1596 (96%)	1355 (89%)	174 (11%)	7	9

All (174) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	172	ASP
1	A	176	ARG
1	A	196	THR
1	A	199	MET
1	A	211	GLU
1	A	212	THR
1	A	221	GLN
1	A	236	ASP
1	A	240	GLU
1	A	247	SER
1	A	263	ARG
1	A	280	THR
1	A	288	GLU
1	A	306	LEU
1	B	176	ARG
1	B	196	THR
1	B	197	LYS
1	B	201	ARG
1	B	207	ARG
1	B	215	ARG
1	B	218	ASP
1	B	231	MET

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Mol	Chain	Res	Type
1	B	240	GLU
1	B	245	SER
1	B	249	VAL
1	B	278	LEU
1	B	284	GLU
1	B	306	LEU
1	B	308	LYS
1	B	310	ARG
1	C	176	ARG
1	C	196	THR
1	C	197	LYS
1	C	202	SER
1	C	207	ARG
1	C	218	ASP
1	C	221	GLN
1	C	249	VAL
1	C	278	LEU
1	C	306	LEU
1	C	308	LYS
1	C	320	HIS
1	D	172	ASP
1	D	176	ARG
1	D	188	GLU
1	D	194	LYS
1	D	215	ARG
1	D	221	GLN
1	D	226	THR
1	D	248	ARG
1	D	249	VAL
1	D	279	LYS
1	D	303	ARG
1	D	306	LEU
1	D	321	VAL
1	E	176	ARG
1	E	191	THR
1	E	195	ASP
1	E	215	ARG
1	E	218	ASP
1	E	221	GLN
1	E	225	GLU
1	E	226	THR
1	E	241	ASP

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Mol	Chain	Res	Type
1	E	259	THR
1	E	284	GLU
1	E	287	ILE
1	E	288	GLU
1	E	303	ARG
1	E	306	LEU
1	E	321	VAL
1	F	176	ARG
1	F	194	LYS
1	F	215	ARG
1	F	218	ASP
1	F	221	GLN
1	F	226	THR
1	F	247	SER
1	F	256	ASP
1	F	300	ARG
1	F	303	ARG
1	F	306	LEU
1	F	310	ARG
1	G	172	ASP
1	G	176	ARG
1	G	188	GLU
1	G	201	ARG
1	G	202	SER
1	G	215	ARG
1	G	221	GLN
1	G	249	VAL
1	G	258	VAL
1	G	278	LEU
1	G	279	LYS
1	G	303	ARG
1	G	306	LEU
1	H	176	ARG
1	H	184	ARG
1	H	212	THR
1	H	214	ARG
1	H	215	ARG
1	H	221	GLN
1	H	225	GLU
1	H	229	GLN
1	H	234	LYS
1	H	248	ARG

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Mol	Chain	Res	Type
1	H	255	SER
1	H	258	VAL
1	H	278	LEU
1	H	279	LYS
1	H	303	ARG
1	H	306	LEU
1	H	308	LYS
1	I	172	ASP
1	I	206	SER
1	I	211	GLU
1	I	221	GLN
1	I	222	ARG
1	I	226	THR
1	I	229	GLN
1	I	234	LYS
1	I	235	LEU
1	I	238	LYS
1	I	249	VAL
1	I	300	ARG
1	I	306	LEU
1	J	207	ARG
1	J	221	GLN
1	J	222	ARG
1	J	231	MET
1	J	239	ASN
1	J	240	GLU
1	J	241	ASP
1	J	248	ARG
1	J	256	ASP
1	J	265	VAL
1	J	278	LEU
1	J	292	GLU
1	J	303	ARG
1	J	306	LEU
1	K	176	ARG
1	K	187	ARG
1	K	191	THR
1	K	194	LYS
1	K	196	THR
1	K	202	SER
1	K	215	ARG
1	K	225	GLU

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Mol	Chain	Res	Type
1	K	249	VAL
1	K	256	ASP
1	K	278	LEU
1	K	279	LYS
1	K	283	GLN
1	K	296	ASP
1	K	306	LEU
1	L	173	GLU
1	L	212	THR
1	L	221	GLN
1	L	225	GLU
1	L	226	THR
1	L	229	GLN
1	L	231	MET
1	L	233	ARG
1	L	250	MET
1	L	256	ASP
1	L	258	VAL
1	L	265	VAL
1	L	277	HIS
1	L	280	THR
1	L	296	ASP
1	L	303	ARG
1	L	306	LEU
1	L	308	LYS
1	L	322	GLU

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (5) such sidechains are listed below:

Mol	Chain	Res	Type
1	B	252	HIS
1	D	282	ASN
1	E	320	HIS
1	K	223	ASN
1	L	320	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 carbohydrates in this entry.

## 5.6 Ligand geometry ⓘ

12 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	19G	A	400	-	20,27,27	0.79	0	21,38,38	1.38	3 (14%)
2	19G	B	400	-	20,27,27	0.69	0	21,38,38	1.09	0
2	19G	C	400	-	20,27,27	0.76	0	21,38,38	0.96	1 (4%)
2	19G	D	400	-	20,27,27	0.82	0	21,38,38	1.24	2 (9%)
2	19G	E	400	-	20,27,27	0.83	0	21,38,38	1.70	4 (19%)
2	19G	F	400	-	20,27,27	0.90	1 (5%)	21,38,38	1.44	4 (19%)
2	19G	G	400	-	20,27,27	0.86	0	21,38,38	1.31	3 (14%)
2	19G	H	400	-	20,27,27	0.91	0	21,38,38	1.41	5 (23%)
2	19G	I	400	-	20,27,27	0.87	0	21,38,38	1.27	2 (9%)
2	19G	J	400	-	20,27,27	0.97	0	21,38,38	1.80	3 (14%)
2	19G	K	400	-	20,27,27	0.80	0	21,38,38	1.37	2 (9%)
2	19G	L	400	-	20,27,27	0.85	0	21,38,38	1.43	4 (19%)

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	19G	A	400	-	-	0/7/11/11	0/3/3/3
2	19G	B	400	-	-	0/7/11/11	0/3/3/3
2	19G	C	400	-	-	0/7/11/11	0/3/3/3
2	19G	D	400	-	-	0/7/11/11	0/3/3/3
2	19G	E	400	-	-	0/7/11/11	0/3/3/3
2	19G	F	400	-	-	0/7/11/11	0/3/3/3
2	19G	G	400	-	-	0/7/11/11	0/3/3/3
2	19G	H	400	-	-	0/7/11/11	0/3/3/3
2	19G	I	400	-	-	0/7/11/11	0/3/3/3
2	19G	J	400	-	-	0/7/11/11	0/3/3/3
2	19G	K	400	-	-	0/7/11/11	0/3/3/3
2	19G	L	400	-	-	0/7/11/11	0/3/3/3

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	F	400	19G	CAV-CAY	2.04	1.45	1.41

All (33) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	J	400	19G	CAT-CAK-CAS	-2.55	117.95	120.57
2	E	400	19G	CAB-CAS-CAU	-2.26	118.16	122.21
2	E	400	19G	CAA-CAR-CAU	-2.11	118.43	122.21
2	F	400	19G	CAK-CAS-CAU	2.02	120.10	117.84
2	E	400	19G	CAK-CAS-CAU	2.06	120.14	117.84
2	C	400	19G	CAK-CAS-CAU	2.08	120.17	117.84
2	A	400	19G	CAM-OAO-CAT	2.10	123.08	117.91
2	H	400	19G	OAO-CAM-CAL	2.13	116.63	108.39
2	D	400	19G	CAL-CAN-CAV	2.15	115.33	112.16
2	G	400	19G	OAO-CAM-CAL	2.17	116.79	108.39
2	H	400	19G	CAK-CAS-CAU	2.21	120.31	117.84
2	F	400	19G	CAM-OAO-CAT	2.23	123.41	117.91
2	H	400	19G	CAJ-CAR-CAU	2.25	120.36	117.84
2	K	400	19G	CAK-CAS-CAU	2.27	120.39	117.84
2	I	400	19G	CAL-CAN-CAV	2.28	115.52	112.16
2	A	400	19G	CAL-CAN-CAV	2.29	115.54	112.16
2	I	400	19G	CAS-CAU-CL	2.35	122.37	118.79
2	L	400	19G	CAK-CAS-CAU	2.39	120.51	117.84
2	H	400	19G	CAL-CAN-CAV	2.50	115.85	112.16
2	L	400	19G	OAO-CAM-CAL	2.54	118.23	108.39
2	J	400	19G	CAM-OAO-CAT	2.57	124.25	117.91
2	L	400	19G	CAR-CAU-CL	2.60	122.75	118.79

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	G	400	19G	CAL-CAN-CAV	2.61	116.01	112.16
2	F	400	19G	CAJ-CAR-CAU	2.66	120.81	117.84
2	D	400	19G	CAK-CAS-CAU	2.89	121.08	117.84
2	H	400	19G	CAS-CAU-CL	2.92	123.23	118.79
2	G	400	19G	CAJ-CAR-CAU	2.95	121.14	117.84
2	A	400	19G	CAJ-CAR-CAU	3.08	121.29	117.84
2	L	400	19G	CAL-CAN-CAV	3.57	117.43	112.16
2	F	400	19G	CAL-CAN-CAV	3.91	117.92	112.16
2	K	400	19G	CAL-CAN-CAV	3.92	117.94	112.16
2	E	400	19G	CAL-CAN-CAV	5.61	120.43	112.16
2	J	400	19G	CAL-CAN-CAV	6.06	121.10	112.16

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

8 monomers are involved in 14 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	B	400	19G	1	0
2	D	400	19G	1	0
2	E	400	19G	2	0
2	G	400	19G	1	0
2	H	400	19G	2	0
2	I	400	19G	1	0
2	J	400	19G	5	0
2	L	400	19G	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, 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	150/153 (98%)	0.11	6 (4%) 42 43	19, 41, 79, 93	0
1	B	151/153 (98%)	-0.14	1 (0%) 89 88	17, 32, 54, 69	0
1	C	150/153 (98%)	-0.11	0 100 100	20, 39, 63, 75	0
1	D	153/153 (100%)	0.17	5 (3%) 50 50	24, 54, 85, 96	0
1	E	151/153 (98%)	0.11	4 (2%) 59 58	26, 47, 74, 89	0
1	F	151/153 (98%)	-0.06	1 (0%) 89 88	30, 47, 67, 84	0
1	G	151/153 (98%)	0.11	2 (1%) 79 79	38, 56, 81, 86	0
1	H	150/153 (98%)	0.41	11 (7%) 18 18	47, 65, 100, 120	0
1	I	147/153 (96%)	0.41	6 (4%) 41 42	50, 71, 102, 119	0
1	J	150/153 (98%)	0.27	9 (6%) 25 25	31, 58, 91, 96	0
1	K	151/153 (98%)	0.16	7 (4%) 36 37	36, 56, 92, 115	0
1	L	149/153 (97%)	0.61	10 (6%) 21 21	51, 78, 98, 103	0
All	All	1804/1836 (98%)	0.17	62 (3%) 49 49	17, 55, 90, 120	0

All (62) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	H	202	SER	5.8
1	E	193	ALA	4.8
1	J	202	SER	4.7
1	L	190	ALA	4.7
1	L	275	ALA	4.6
1	H	198	PRO	4.4
1	L	198	PRO	4.3
1	A	202	SER	4.0
1	E	196	THR	3.9
1	A	196	THR	3.8
1	H	204	ALA	3.7

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Mol	Chain	Res	Type	RSRZ
1	L	191	THR	3.5
1	D	323	ASP	3.5
1	J	279	LYS	3.5
1	I	192	GLY	3.5
1	H	200	GLY	3.3
1	D	202	SER	3.3
1	L	321	VAL	3.2
1	L	285	SER	3.2
1	K	200	GLY	3.1
1	I	204	ALA	3.1
1	K	202	SER	3.0
1	A	200	GLY	3.0
1	I	198	PRO	2.8
1	H	199	MET	2.7
1	L	217	GLY	2.6
1	K	191	THR	2.6
1	L	210	LEU	2.6
1	J	227	ALA	2.6
1	J	201	ARG	2.5
1	E	258	VAL	2.5
1	I	196	THR	2.5
1	G	183	SER	2.5
1	F	321	VAL	2.5
1	L	218	ASP	2.5
1	J	282	ASN	2.5
1	H	314	GLY	2.4
1	E	198	PRO	2.4
1	G	187	ARG	2.4
1	H	193	ALA	2.4
1	A	222	ARG	2.3
1	I	207	ARG	2.3
1	B	245	SER	2.3
1	A	199	MET	2.3
1	I	193	ALA	2.3
1	K	218	ASP	2.3
1	D	321	VAL	2.2
1	J	236	ASP	2.2
1	K	201	ARG	2.2
1	J	196	THR	2.2
1	D	198	PRO	2.1
1	A	201	ARG	2.1
1	D	236	ASP	2.1

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Mol	Chain	Res	Type	RSRZ
1	K	319	PHE	2.1
1	J	225	GLU	2.1
1	H	201	ARG	2.1
1	H	257	GLY	2.1
1	L	201	ARG	2.1
1	H	312	TRP	2.1
1	H	192	GLY	2.1
1	K	198	PRO	2.1
1	J	192	GLY	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. 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
2	19G	L	400	25/25	0.90	0.20	0.54	61,70,76,81	0
2	19G	D	400	25/25	0.93	0.16	-0.04	40,51,64,74	0
2	19G	H	400	25/25	0.92	0.15	-0.06	41,50,58,61	0
2	19G	F	400	25/25	0.93	0.15	-0.23	32,40,47,50	0
2	19G	J	400	25/25	0.92	0.17	-0.36	46,60,66,66	0
2	19G	I	400	25/25	0.92	0.15	-0.41	42,54,67,72	0
2	19G	A	400	25/25	0.96	0.14	-0.43	25,33,43,51	0
2	19G	E	400	25/25	0.97	0.14	-0.48	28,38,48,52	0
2	19G	C	400	25/25	0.97	0.11	-1.29	18,28,37,45	0
2	19G	G	400	25/25	0.93	0.12	-1.47	40,48,60,61	0
2	19G	B	400	25/25	0.97	0.12	-1.76	20,26,37,48	0
2	19G	K	400	25/25	0.96	0.11	-2.10	37,50,63,64	0

## 6.5 Other polymers

There are no such residues in this entry.