



# Full wwPDB X-ray Structure Validation Report ⓘ

Feb 1, 2016 – 04:40 PM GMT

PDB ID : 4FO2  
Title : Heat-labile enterotoxin LT-IIb-B5(T13I) mutant  
Authors : Cody, V.; Pace, J.; Nawar, H.; Liang, S.; Connell, T.; Hajishengallis, G.  
Deposited on : 2012-06-20  
Resolution : 1.50 Å(reported)

This is a Full wwPDB X-ray Structure Validation Report for a publicly released PDB entry.  
We welcome your comments at [validation@mail.wwpdb.org](mailto:validation@mail.wwpdb.org)  
A user guide is available at  
<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

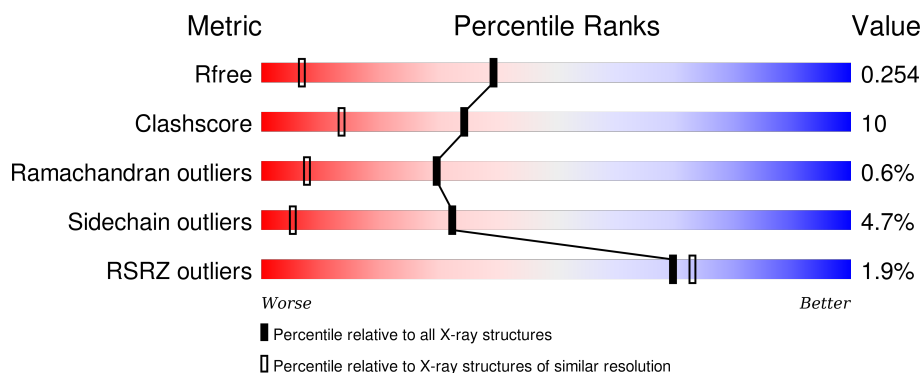
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

## *X-RAY DIFFRACTION*

The reported resolution of this entry is 1.50 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
$R_{free}$	91344	2072 (1.50-1.50)
Clashscore	102246	2274 (1.50-1.50)
Ramachandran outliers	100387	2218 (1.50-1.50)
Sidechain outliers	100360	2216 (1.50-1.50)
RSRZ outliers	91569	2075 (1.50-1.50)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments on the lower bar indicate the fraction of residues that contain outliers for  $\geq 3$ , 2, 1 and 0 types of geometric quality criteria. 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	98	<div> <div>4%</div> <div>73%</div> <div>26%</div> <div>.</div> </div>
1	B	98	<div> <div>%</div> <div>82%</div> <div>15%</div> <div>..</div> </div>
1	C	98	<div> <div>81%</div> <div>18%</div> <div>.</div> </div>
1	D	98	<div> <div>6%</div> <div>72%</div> <div>19%</div> <div>7%</div> <div>.</div> </div>
1	E	98	<div> <div>3%</div> <div>76%</div> <div>19%</div> <div>5%</div> </div>

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Mol	Chain	Length	Quality of chain
1	F	98	
1	G	98	
1	H	98	
1	I	98	
1	J	98	
1	K	98	
1	L	98	
1	M	98	
1	N	98	
1	O	98	
1	P	98	
1	Q	98	
1	R	98	
1	S	98	
1	T	98	

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
2	NA	B	101	-	-	-	X
2	NA	L	101	-	-	-	X
3	ACT	N	101	-	-	X	X
3	ACT	Q	102	-	-	X	-

## 2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 15396 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 Heat-labile enterotoxin IIB, B chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	D	98	Total	C	N	O	S	0	2	0
			757	469	131	148	9			
1	E	98	Total	C	N	O	S	0	0	0
			741	460	128	145	8			
1	F	98	Total	C	N	O	S	0	1	0
			749	465	129	146	9			
1	G	98	Total	C	N	O	S	0	1	0
			749	465	129	146	9			
1	H	98	Total	C	N	O	S	0	1	0
			749	465	129	146	9			
1	A	98	Total	C	N	O	S	0	0	0
			741	460	128	145	8			
1	B	98	Total	C	N	O	S	0	2	0
			760	471	133	147	9			
1	C	98	Total	C	N	O	S	0	1	0
			749	465	129	146	9			
1	I	98	Total	C	N	O	S	0	1	0
			749	465	129	146	9			
1	J	98	Total	C	N	O	S	0	1	0
			749	465	129	146	9			
1	K	98	Total	C	N	O	S	0	0	0
			741	460	128	145	8			
1	L	98	Total	C	N	O	S	0	1	0
			749	466	129	146	8			
1	M	98	Total	C	N	O	S	0	3	0
			765	475	131	148	11			
1	N	98	Total	C	N	O	S	0	1	0
			749	465	129	146	9			
1	O	98	Total	C	N	O	S	0	0	0
			735	457	125	145	8			
1	P	98	Total	C	N	O	S	0	1	0
			749	465	129	146	9			

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Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	Q	98	Total	C	N	O	S	0	1	0
			749	464	129	148	8			
1	R	98	Total	C	N	O	S	0	2	0
			757	470	130	147	10			
1	S	98	Total	C	N	O	S	0	1	0
			749	465	129	146	9			
1	T	98	Total	C	N	O	S	0	1	0
			749	465	129	146	9			

There are 20 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
D	13	ILE	THR	ENGINEERED MUTATION	UNP P43529
E	13	ILE	THR	ENGINEERED MUTATION	UNP P43529
F	13	ILE	THR	ENGINEERED MUTATION	UNP P43529
G	13	ILE	THR	ENGINEERED MUTATION	UNP P43529
H	13	ILE	THR	ENGINEERED MUTATION	UNP P43529
A	13	ILE	THR	ENGINEERED MUTATION	UNP P43529
B	13	ILE	THR	ENGINEERED MUTATION	UNP P43529
C	13	ILE	THR	ENGINEERED MUTATION	UNP P43529
I	13	ILE	THR	ENGINEERED MUTATION	UNP P43529
J	13	ILE	THR	ENGINEERED MUTATION	UNP P43529
K	13	ILE	THR	ENGINEERED MUTATION	UNP P43529
L	13	ILE	THR	ENGINEERED MUTATION	UNP P43529
M	13	ILE	THR	ENGINEERED MUTATION	UNP P43529
N	13	ILE	THR	ENGINEERED MUTATION	UNP P43529
O	13	ILE	THR	ENGINEERED MUTATION	UNP P43529
P	13	ILE	THR	ENGINEERED MUTATION	UNP P43529
Q	13	ILE	THR	ENGINEERED MUTATION	UNP P43529
R	13	ILE	THR	ENGINEERED MUTATION	UNP P43529
S	13	ILE	THR	ENGINEERED MUTATION	UNP P43529
T	13	ILE	THR	ENGINEERED MUTATION	UNP P43529

- Molecule 2 is SODIUM ION (three-letter code: NA) (formula: Na).

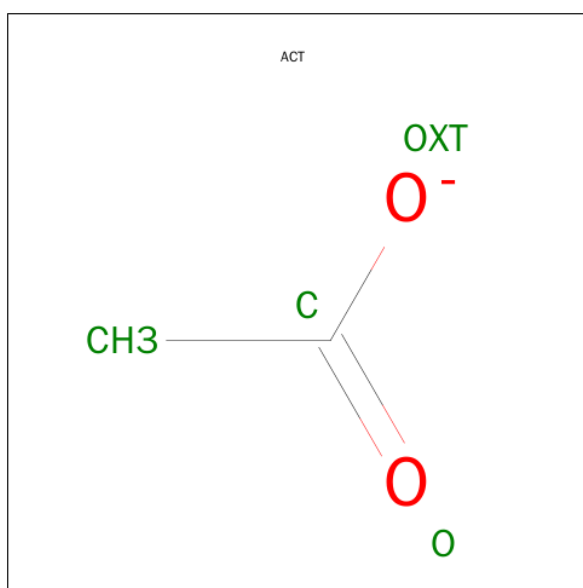
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	Q	1	Total	Na	0	0
			1	1		
2	E	1	Total	Na	0	0
			1	1		
2	B	1	Total	Na	0	0
			1	1		

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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	C	1	Total	Na	0	0
			1	1		
2	R	1	Total	Na	0	0
			1	1		
2	L	1	Total	Na	0	0
			1	1		
2	F	1	Total	Na	0	0
			1	1		
2	M	1	Total	Na	0	0
			1	1		

- Molecule 3 is ACETATE ION (three-letter code: ACT) (formula: C<sub>2</sub>H<sub>3</sub>O<sub>2</sub>).



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

- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	D	6	Total	O	0	0
			6	6		
4	E	21	Total	O	0	0
			21	21		

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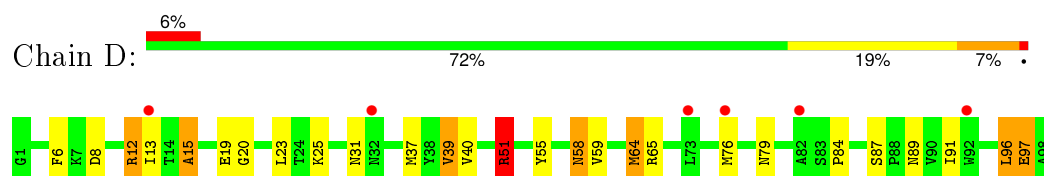
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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	F	34	Total 34	O 34	0	0
4	G	25	Total 25	O 25	0	0
4	H	17	Total 17	O 17	0	0
4	A	9	Total 9	O 9	0	0
4	B	24	Total 24	O 24	0	0
4	C	29	Total 29	O 29	0	0
4	I	25	Total 25	O 25	0	0
4	J	17	Total 17	O 17	0	0
4	K	2	Total 2	O 2	0	0
4	L	16	Total 16	O 16	0	0
4	M	33	Total 33	O 33	0	0
4	N	29	Total 29	O 29	0	0
4	O	11	Total 11	O 11	0	0
4	P	3	Total 3	O 3	0	0
4	Q	13	Total 13	O 13	0	0
4	R	33	Total 33	O 33	0	0
4	S	34	Total 34	O 34	0	0
4	T	14	Total 14	O 14	0	0

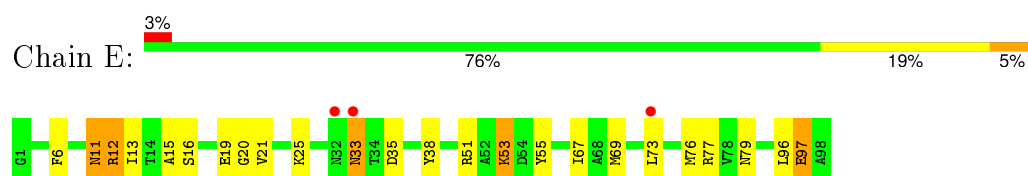
### 3 Residue-property plots [i](#)

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

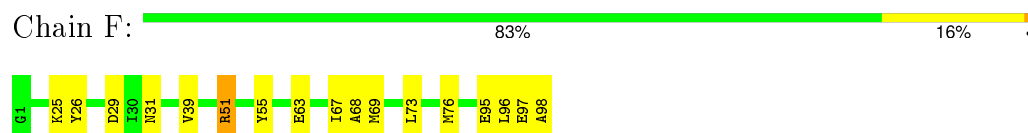
- Molecule 1: Heat-labile enterotoxin IIB, B chain



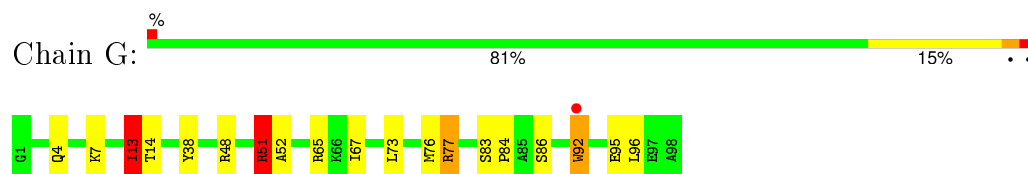
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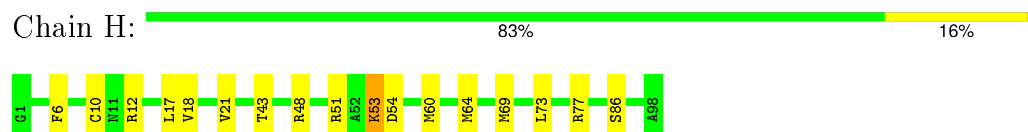
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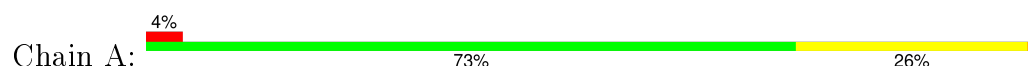
- Molecule 1: Heat-labile enterotoxin IIB, B chain



- Molecule 1: Heat-labile enterotoxin IIB, B chain



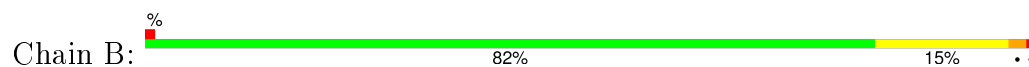
- Molecule 1: Heat-labile enterotoxin IIB, B chain



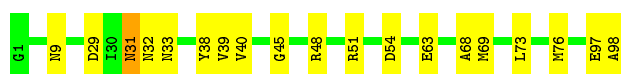
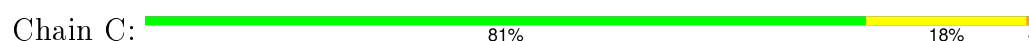




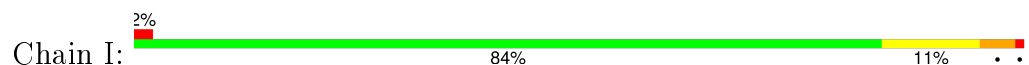
- Molecule 1: Heat-labile enterotoxin IIB, B chain



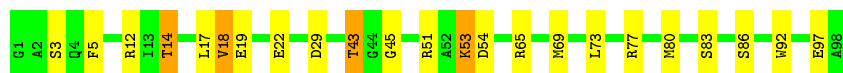
- Molecule 1: Heat-labile enterotoxin IIB, B chain



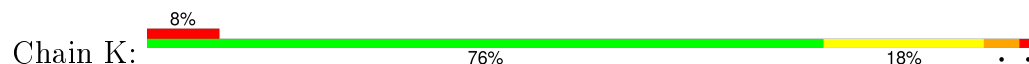
- Molecule 1: Heat-labile enterotoxin IIB, B chain



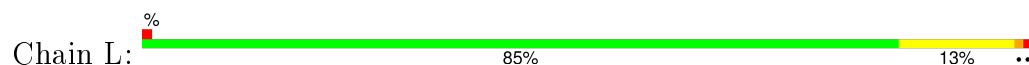
- Molecule 1: Heat-labile enterotoxin IIB, B chain



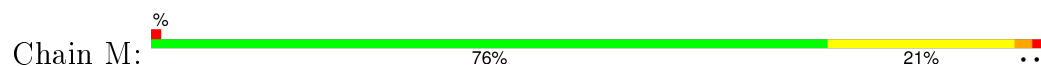
- Molecule 1: Heat-labile enterotoxin IIB, B chain



- Molecule 1: Heat-labile enterotoxin IIB, B chain

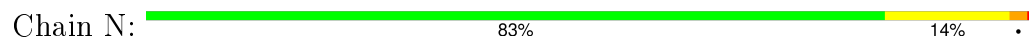


- Molecule 1: Heat-labile enterotoxin IIB, B chain

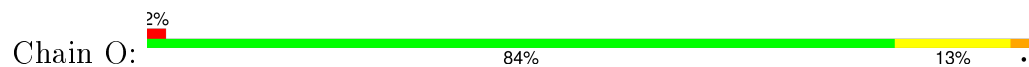




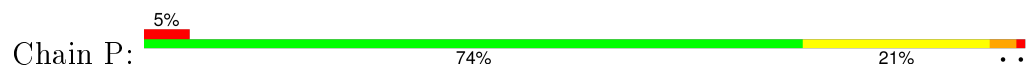
- Molecule 1: Heat-labile enterotoxin IIB, B chain



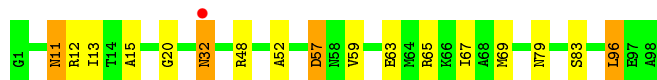
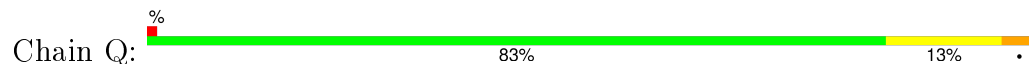
- Molecule 1: Heat-labile enterotoxin IIB, B chain



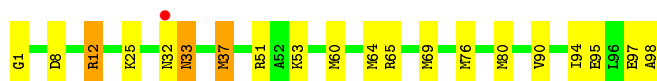
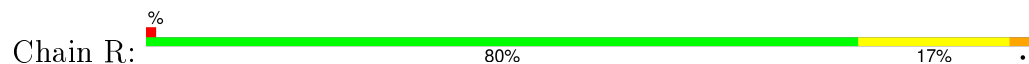
- Molecule 1: Heat-labile enterotoxin IIB, B chain



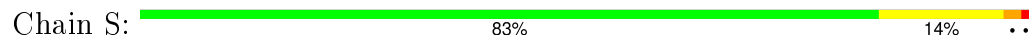
- Molecule 1: Heat-labile enterotoxin IIB, B chain



- Molecule 1: Heat-labile enterotoxin IIB, B chain

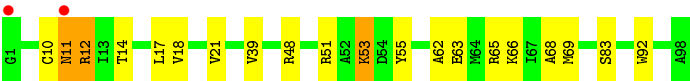


- Molecule 1: Heat-labile enterotoxin IIB, B chain



- Molecule 1: Heat-labile enterotoxin IIB, B chain





## 4 Data and refinement statistics

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	119.31Å 119.98Å 142.45Å 90.00° 90.05° 90.00°	Depositor
Resolution (Å)	45.74 – 1.50 45.75 – 1.50	Depositor EDS
% Data completeness (in resolution range)	97.9 (45.74-1.50) 97.6 (45.75-1.50)	Depositor EDS
$R_{merge}$	0.06	Depositor
$R_{sym}$	0.04	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.40 (at 1.50Å)	Xtriage
Refinement program	REFMAC 5.5.0088	Depositor
R, $R_{free}$	0.223 , 0.259 0.220 , 0.254	Depositor DCC
$R_{free}$ test set	15748 reflections (5.31%)	DCC
Wilson B-factor (Å <sup>2</sup> )	22.3	Xtriage
Anisotropy	0.041	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	(Not available) , (Not available)	EDS
Estimated twinning fraction	0.032 for k,h,-l 0.029 for -k,-h,-l 0.477 for -h,-k,l	Xtriage
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.49$ , $\langle L^2 \rangle = 0.32$	Xtriage
Outliers	0 of 312536 reflections	Xtriage
$F_o, F_c$ correlation	0.96	EDS
Total number of atoms	15396	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	24.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.55% 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: NA, ACT

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	1.09	0/752	1.02	2/1018 (0.2%)
1	B	1.22	0/771	1.07	1/1042 (0.1%)
1	C	1.35	3/760 (0.4%)	1.23	4/1028 (0.4%)
1	D	1.11	2/768 (0.3%)	1.03	4/1039 (0.4%)
1	E	1.27	2/752 (0.3%)	1.21	6/1018 (0.6%)
1	F	1.38	4/760 (0.5%)	1.22	1/1028 (0.1%)
1	G	1.41	5/760 (0.7%)	1.76	10/1028 (1.0%)
1	H	1.28	4/760 (0.5%)	1.20	2/1028 (0.2%)
1	I	1.63	9/760 (1.2%)	1.77	4/1028 (0.4%)
1	J	1.23	2/760 (0.3%)	1.23	6/1028 (0.6%)
1	K	1.11	0/752	1.06	3/1018 (0.3%)
1	L	1.21	2/760 (0.3%)	1.15	4/1029 (0.4%)
1	M	1.29	4/776 (0.5%)	1.32	5/1048 (0.5%)
1	N	1.40	6/760 (0.8%)	1.58	10/1028 (1.0%)
1	O	1.28	2/746 (0.3%)	1.16	2/1011 (0.2%)
1	P	1.08	0/760	1.04	2/1028 (0.2%)
1	Q	1.20	3/760 (0.4%)	1.17	5/1029 (0.5%)
1	R	1.26	2/768 (0.3%)	1.24	8/1038 (0.8%)
1	S	1.41	2/760 (0.3%)	1.30	6/1028 (0.6%)
1	T	1.24	1/760 (0.1%)	1.23	6/1028 (0.6%)
All	All	1.28	53/15205 (0.3%)	1.27	91/20570 (0.4%)

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	K	0	2
1	T	0	1
All	All	0	3

All (53) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	I	92	TRP	CB-CG	-18.96	1.16	1.50
1	G	51	ARG	CG-CD	10.58	1.78	1.51
1	I	51	ARG	CG-CD	9.13	1.74	1.51
1	M	35	ASP	CB-CG	-8.99	1.32	1.51
1	G	51	ARG	CZ-NH1	8.54	1.44	1.33
1	I	92	TRP	CZ3-CH2	-8.42	1.26	1.40
1	N	48	ARG	CZ-NH1	8.05	1.43	1.33
1	I	51	ARG	CZ-NH1	8.02	1.43	1.33
1	S	51	ARG	CG-CD	6.82	1.69	1.51
1	O	63	GLU	CB-CG	6.75	1.65	1.52
1	R	97	GLU	CB-CG	-6.46	1.39	1.52
1	G	92	TRP	CB-CG	-6.44	1.38	1.50
1	C	51	ARG	CB-CG	-6.35	1.35	1.52
1	I	77	ARG	CG-CD	6.20	1.67	1.51
1	I	92	TRP	CE3-CZ3	-6.14	1.28	1.38
1	H	10	CYS	CB-SG	-6.11	1.71	1.82
1	S	10	CYS	CB-SG	6.08	1.92	1.82
1	N	65	ARG	CZ-NH2	6.06	1.41	1.33
1	L	35	ASP	CB-CG	-6.05	1.39	1.51
1	F	26	TYR	CD2-CE2	5.99	1.48	1.39
1	I	97	GLU	CB-CG	-5.98	1.40	1.52
1	F	51	ARG	CB-CG	-5.79	1.36	1.52
1	R	51	ARG	CB-CG	-5.76	1.36	1.52
1	E	15	ALA	CA-CB	5.74	1.64	1.52
1	N	6	PHE	CE2-CZ	5.69	1.48	1.37
1	T	48	ARG	CZ-NH1	5.64	1.40	1.33
1	Q	15	ALA	CA-CB	5.53	1.64	1.52
1	M	97	GLU	CB-CG	-5.50	1.41	1.52
1	F	97	GLU	CB-CG	-5.47	1.41	1.52
1	M	95	GLU	CB-CG	5.41	1.62	1.52
1	O	47	TRP	CE3-CZ3	5.41	1.47	1.38
1	Q	83	SER	CB-OG	5.35	1.49	1.42
1	H	86	SER	CB-OG	5.35	1.49	1.42
1	N	97	GLU	CB-CG	-5.35	1.42	1.52
1	I	38	TYR	CE1-CZ	5.35	1.45	1.38
1	C	97	GLU	CB-CG	-5.28	1.42	1.52
1	D	6	PHE	CE1-CZ	5.27	1.47	1.37
1	J	5	PHE	CG-CD2	5.25	1.46	1.38
1	Q	63	GLU	CG-CD	5.23	1.59	1.51
1	N	25	LYS	CB-CG	5.19	1.66	1.52
1	D	51	ARG	CG-CD	5.18	1.64	1.51
1	C	38	TYR	CD2-CE2	5.17	1.47	1.39

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	I	59	VAL	CB-CG1	5.15	1.63	1.52
1	E	38	TYR	CG-CD2	5.15	1.45	1.39
1	M	38	TYR	CD2-CE2	5.14	1.47	1.39
1	H	48	ARG	CZ-NH1	5.12	1.39	1.33
1	F	95	GLU	CB-CG	5.10	1.61	1.52
1	J	86	SER	CB-OG	5.10	1.48	1.42
1	L	26	TYR	CD2-CE2	5.08	1.47	1.39
1	H	6	PHE	CE1-CZ	5.06	1.47	1.37
1	G	95	GLU	CG-CD	5.06	1.59	1.51
1	N	25	LYS	CD-CE	5.06	1.63	1.51
1	G	38	TYR	CD1-CE1	5.03	1.46	1.39

All (91) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	I	51	ARG	NE-CZ-NH2	-32.92	103.84	120.30
1	G	51	ARG	NE-CZ-NH2	-30.16	105.22	120.30
1	G	51	ARG	NE-CZ-NH1	21.37	130.99	120.30
1	I	51	ARG	NE-CZ-NH1	21.26	130.93	120.30
1	N	48	ARG	NE-CZ-NH1	19.71	130.16	120.30
1	N	48	ARG	NE-CZ-NH2	-17.18	111.71	120.30
1	M	35	ASP	CB-CG-OD1	-13.39	106.25	118.30
1	N	12	ARG	NE-CZ-NH2	-11.77	114.41	120.30
1	L	35	ASP	CB-CA-C	-10.74	88.91	110.40
1	J	51	ARG	NE-CZ-NH2	-10.49	115.05	120.30
1	H	51	ARG	NE-CZ-NH2	-9.81	115.40	120.30
1	N	51	ARG	NE-CZ-NH2	9.71	125.15	120.30
1	E	35	ASP	N-CA-CB	-9.64	93.25	110.60
1	R	12	ARG	NE-CZ-NH2	-8.89	115.85	120.30
1	E	51	ARG	NE-CZ-NH1	8.86	124.73	120.30
1	I	51	ARG	CD-NE-CZ	8.82	135.95	123.60
1	E	51	ARG	NE-CZ-NH2	-8.29	116.15	120.30
1	N	51	ARG	NE-CZ-NH1	-8.23	116.19	120.30
1	D	65	ARG	NE-CZ-NH2	-8.18	116.21	120.30
1	G	51	ARG	CD-NE-CZ	8.08	134.91	123.60
1	Q	48	ARG	NE-CZ-NH2	-7.70	116.45	120.30
1	T	51	ARG	NE-CZ-NH2	-7.51	116.55	120.30
1	M	7	LYS	CD-CE-NZ	-7.50	94.45	111.70
1	S	12	ARG	NE-CZ-NH1	-7.47	116.57	120.30
1	N	8	ASP	CB-CG-OD2	-7.33	111.70	118.30
1	L	35	ASP	CB-CG-OD1	-7.14	111.87	118.30
1	T	65	ARG	NE-CZ-NH2	-7.08	116.76	120.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	N	51	ARG	CD-NE-CZ	6.93	133.30	123.60
1	I	92	TRP	CB-CA-C	-6.80	96.80	110.40
1	T	12	ARG	N-CA-C	-6.76	92.74	111.00
1	O	51	ARG	NE-CZ-NH2	-6.75	116.92	120.30
1	S	51	ARG	NE-CZ-NH2	6.59	123.60	120.30
1	Q	48	ARG	NE-CZ-NH1	6.36	123.48	120.30
1	K	85	ALA	N-CA-C	6.29	127.98	111.00
1	R	12	ARG	NH1-CZ-NH2	6.26	126.29	119.40
1	M	35	ASP	N-CA-CB	-6.23	99.38	110.60
1	N	51	ARG	CG-CD-NE	6.21	124.84	111.80
1	G	48	ARG	NE-CZ-NH1	6.20	123.40	120.30
1	T	10	CYS	C-N-CA	-6.19	106.23	121.70
1	Q	96	LEU	CB-CG-CD2	-6.17	100.51	111.00
1	K	96	LEU	CA-CB-CG	6.16	129.46	115.30
1	G	7	LYS	CD-CE-NZ	-6.15	97.56	111.70
1	B	12	ARG	CG-CD-NE	6.14	124.69	111.80
1	J	51	ARG	NE-CZ-NH1	6.09	123.34	120.30
1	R	65	ARG	NE-CZ-NH2	-6.08	117.26	120.30
1	E	35	ASP	CB-CG-OD2	-5.93	112.96	118.30
1	E	6	PHE	CB-CG-CD1	-5.92	116.66	120.80
1	L	96	LEU	CB-CG-CD2	-5.89	100.99	111.00
1	P	29	ASP	CB-CG-OD1	5.87	123.58	118.30
1	Q	12	ARG	NE-CZ-NH2	-5.84	117.38	120.30
1	C	48	ARG	NE-CZ-NH2	-5.74	117.43	120.30
1	R	80	MET	CG-SD-CE	-5.71	91.06	100.20
1	G	77	ARG	NE-CZ-NH1	5.69	123.15	120.30
1	S	96	LEU	CB-CG-CD2	-5.69	101.32	111.00
1	C	63	GLU	OE1-CD-OE2	-5.67	116.49	123.30
1	F	63	GLU	OE1-CD-OE2	-5.64	116.53	123.30
1	G	95	GLU	OE1-CD-OE2	5.61	130.03	123.30
1	T	51	ARG	NE-CZ-NH1	5.60	123.10	120.30
1	M	8	ASP	CB-CG-OD1	5.57	123.31	118.30
1	G	77	ARG	NE-CZ-NH2	-5.54	117.53	120.30
1	J	29	ASP	CB-CG-OD2	5.52	123.27	118.30
1	J	65	ARG	NE-CZ-NH2	-5.50	117.55	120.30
1	D	96	LEU	CB-CG-CD2	5.49	120.33	111.00
1	N	48	ARG	CD-NE-CZ	5.49	131.28	123.60
1	P	29	ASP	CB-CG-OD2	-5.49	113.36	118.30
1	N	19	GLU	OE1-CD-OE2	5.48	129.87	123.30
1	H	51	ARG	NE-CZ-NH1	5.42	123.01	120.30
1	A	69	MET	CG-SD-CE	-5.41	91.54	100.20
1	L	57	ASP	CB-CG-OD2	-5.39	113.45	118.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	S	69[A]	MET	CG-SD-CE	-5.38	91.59	100.20
1	S	69[B]	MET	CG-SD-CE	-5.38	91.59	100.20
1	G	13	ILE	CB-CA-C	-5.36	100.88	111.60
1	R	95	GLU	OE1-CD-OE2	-5.36	116.87	123.30
1	G	77	ARG	CG-CD-NE	5.34	123.02	111.80
1	Q	48	ARG	CD-NE-CZ	5.34	131.07	123.60
1	K	65	ARG	NE-CZ-NH2	-5.33	117.63	120.30
1	O	8	ASP	CB-CG-OD2	5.29	123.06	118.30
1	A	80	MET	CG-SD-CE	-5.28	91.75	100.20
1	R	69	MET	CG-SD-CE	-5.26	91.78	100.20
1	C	51	ARG	N-CA-CB	-5.25	101.15	110.60
1	E	21	VAL	CG1-CB-CG2	-5.22	102.55	110.90
1	T	63	GLU	OE1-CD-OE2	-5.18	117.08	123.30
1	D	51	ARG	NE-CZ-NH1	5.17	122.89	120.30
1	C	54	ASP	CB-CG-OD1	-5.17	113.65	118.30
1	J	14	THR	OG1-CB-CG2	5.17	121.89	110.00
1	M	32	ASN	N-CA-C	5.15	124.90	111.00
1	R	12	ARG	NE-CZ-NH1	-5.13	117.74	120.30
1	D	64	MET	CG-SD-CE	-5.12	92.00	100.20
1	J	14	THR	N-CA-CB	-5.08	100.64	110.30
1	S	32	ASN	C-N-CA	-5.06	109.05	121.70
1	R	8	ASP	CB-CG-OD1	5.05	122.85	118.30

There are no chirality outliers.

All (3) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	K	83	SER	Peptide
1	K	85	ALA	Peptide
1	T	11	ASN	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	741	0	733	22	0
1	B	760	0	753	21	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	C	749	0	741	10	0
1	D	757	0	746	23	0
1	E	741	0	733	25	0
1	F	749	0	741	16	0
1	G	749	0	741	18	1
1	H	749	0	741	14	0
1	I	749	0	741	18	0
1	J	749	0	741	16	0
1	K	741	0	733	24	0
1	L	749	0	743	11	0
1	M	765	0	757	14	0
1	N	749	0	741	13	0
1	O	735	0	722	13	0
1	P	749	0	741	20	0
1	Q	749	0	736	15	0
1	R	757	0	749	14	1
1	S	749	0	741	10	0
1	T	749	0	741	22	0
2	B	1	0	0	0	0
2	C	1	0	0	0	0
2	E	1	0	0	0	0
2	F	1	0	0	0	0
2	L	1	0	0	0	0
2	M	1	0	0	0	0
2	Q	1	0	0	0	0
2	R	1	0	0	0	0
3	N	4	0	3	4	0
3	Q	4	0	3	3	0
4	A	9	0	0	2	0
4	B	24	0	0	1	0
4	C	29	0	0	2	0
4	D	6	0	0	2	0
4	E	21	0	0	0	0
4	F	34	0	0	3	0
4	G	25	0	0	1	0
4	H	17	0	0	0	0
4	I	25	0	0	1	0
4	J	17	0	0	0	0
4	K	2	0	0	0	0
4	L	16	0	0	3	0
4	M	33	0	0	3	0
4	N	29	0	0	3	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
4	O	11	0	0	0	0
4	P	3	0	0	0	0
4	Q	13	0	0	3	0
4	R	33	0	0	4	0
4	S	34	0	0	4	0
4	T	14	0	0	0	0
All	All	15396	0	14821	299	1

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 10.

All (299) 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:I:51:ARG:CG	1:I:51:ARG:CD	1.74	1.62
1:G:51:ARG:CG	1:G:51:ARG:CD	1.78	1.59
1:T:11:ASN:CB	1:T:12:ARG:HA	1.54	1.24
1:H:53:LYS:HD2	1:H:53:LYS:N	1.55	1.20
1:H:53:LYS:H	1:H:53:LYS:CD	1.56	1.16
1:T:11:ASN:HB3	1:T:12:ARG:CA	1.78	1.14
1:O:53:LYS:HE2	1:O:53:LYS:H	1.04	1.09
1:J:53:LYS:CD	1:J:53:LYS:H	1.64	1.09
1:J:53:LYS:HD2	1:J:53:LYS:N	1.67	1.08
1:K:49:ILE:HG23	1:K:64:MET:HE2	1.35	1.04
1:T:11:ASN:CB	1:T:12:ARG:CA	2.36	1.04
1:B:77:ARG:HH11	1:B:77:ARG:HG2	1.23	1.03
1:R:90:VAL:HG23	4:R:209:HOH:O	1.59	1.01
1:D:64:MET:HE1	1:D:91:ILE:HG22	1.41	1.00
1:J:53:LYS:HD2	1:J:53:LYS:H	0.82	0.97
1:R:90:VAL:CG2	4:R:209:HOH:O	2.11	0.94
1:P:49:ILE:HG23	1:P:64:MET:HE2	1.49	0.92
1:T:53:LYS:HE2	1:T:53:LYS:H	1.35	0.91
1:M:90:VAL:HG23	4:M:203:HOH:O	1.72	0.89
1:I:83:SER:HB2	1:I:92:TRP:CZ2	2.08	0.88
1:T:11:ASN:HB3	1:T:12:ARG:HA	0.89	0.87
1:O:53:LYS:HE2	1:O:53:LYS:N	1.89	0.87
4:I:122:HOH:O	1:J:69[B]:MET:HE3	1.73	0.87
1:E:12:ARG:HH11	1:E:12:ARG:HG2	1.41	0.86
1:M:90:VAL:CG2	4:M:203:HOH:O	2.23	0.85
1:I:35:ASP:O	1:I:48:ARG:NH2	2.09	0.85
1:S:86:SER:HB2	4:S:215:HOH:O	1.75	0.85

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:12:ARG:HH11	1:E:12:ARG:CG	1.90	0.85
1:B:77:ARG:CG	1:B:77:ARG:HH11	1.89	0.85
1:H:53:LYS:H	1:H:53:LYS:HD2	0.70	0.83
1:K:84:PRO:HD2	1:K:86:SER:HB2	1.60	0.83
1:O:11:ASN:O	1:O:12:ARG:CB	2.24	0.83
1:R:60:MET:O	1:R:64[B]:MET:HG2	1.79	0.82
1:H:77:ARG:HG2	1:H:77:ARG:HH11	1.45	0.81
1:O:53:LYS:CE	1:O:53:LYS:H	1.91	0.80
4:B:223:HOH:O	1:C:69[A]:MET:HE3	1.82	0.79
1:S:35:ASP:O	1:S:48:ARG:NH2	2.16	0.79
1:D:64:MET:CE	1:D:91:ILE:HG22	2.12	0.78
1:Q:65:ARG:HH22	3:Q:102:ACT:CH3	1.96	0.78
1:A:87:SER:HA	1:A:88:PRO:C	2.02	0.78
1:K:48:ARG:HG2	1:K:48:ARG:HH11	1.49	0.78
1:K:84:PRO:HB2	1:K:85:ALA:C	2.03	0.77
1:S:77:ARG:NE	1:S:77:ARG:H	1.83	0.77
1:D:84:PRO:HA	1:D:89:ASN:HD22	1.49	0.77
1:B:77:ARG:NH1	1:B:77:ARG:HG2	1.94	0.76
1:Q:65:ARG:HH22	3:Q:102:ACT:H3	1.50	0.75
1:A:64:MET:HE1	1:A:91:ILE:HG22	1.66	0.75
1:I:83:SER:HB2	1:I:92:TRP:HZ2	1.49	0.74
1:R:76:MET:HE3	1:R:98:ALA:HA	1.69	0.73
1:P:26:TYR:CE2	1:P:69[B]:MET:HG2	2.23	0.73
1:P:76:MET:HE2	1:P:96:LEU:HD22	1.71	0.73
1:T:11:ASN:HB2	1:T:12:ARG:HD3	1.71	0.72
1:S:77:ARG:NH2	1:S:97:GLU:O	2.23	0.71
1:G:76:MET:SD	1:H:73:LEU:HD23	2.31	0.71
1:M:76:MET:HE3	1:M:98:ALA:HA	1.70	0.71
1:M:60:MET:O	1:M:64[B]:MET:HG3	1.91	0.70
1:A:64:MET:CE	1:A:91:ILE:HG22	2.21	0.70
1:I:51:ARG:HD3	1:I:65:ARG:NH1	2.07	0.70
1:T:11:ASN:HB2	1:T:12:ARG:HA	1.69	0.70
1:N:65:ARG:HH22	3:N:101:ACT:H3	1.56	0.70
1:R:64[B]:MET:SD	1:R:94:ILE:HG22	2.32	0.69
1:I:51:ARG:HD3	1:I:65:ARG:HH12	1.57	0.68
1:I:51:ARG:NE	1:I:51:ARG:CG	2.54	0.68
1:B:12:ARG:NE	1:B:12:ARG:H	1.92	0.68
1:A:64:MET:HE1	1:A:91:ILE:CG2	2.24	0.67
1:O:11:ASN:ND2	1:O:13:ILE:H	1.93	0.67
1:L:69:MET:CE	4:L:203:HOH:O	2.43	0.67
1:G:51:ARG:HD3	1:G:65:ARG:HH12	1.59	0.66

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:O:83:SER:HB2	1:O:92:TRP:CZ2	2.30	0.65
1:A:64:MET:CE	1:A:91:ILE:CG2	2.75	0.65
1:G:51:ARG:HD3	1:G:65:ARG:NH1	2.12	0.65
1:N:51:ARG:NH2	4:N:219:HOH:O	2.30	0.64
1:T:18:VAL:HG23	1:T:21:VAL:CG2	2.26	0.64
1:N:32:ASN:O	1:N:33:ASN:HB2	1.97	0.64
1:M:85:ALA:O	1:M:89:ASN:OD1	2.16	0.64
1:D:84:PRO:HA	1:D:89:ASN:ND2	2.12	0.64
1:K:76:MET:CE	1:K:96:LEU:HD22	2.27	0.63
1:J:22:GLU:HB2	1:J:77:ARG:NH1	2.12	0.63
1:K:84:PRO:HB2	1:K:85:ALA:O	1.97	0.63
1:K:48:ARG:HG2	1:K:48:ARG:NH1	2.10	0.63
1:K:25:LYS:HB2	1:K:40:VAL:HB	1.81	0.63
1:D:31:ASN:ND2	1:H:12:ARG:HH22	1.97	0.63
1:G:83:SER:HB2	1:G:92:TRP:CZ2	2.34	0.63
1:D:37:MET:H	1:D:51:ARG:NH2	1.97	0.62
1:P:14:THR:CG2	1:P:15:ALA:H	2.13	0.61
1:D:64:MET:CE	1:D:91:ILE:CG2	2.77	0.61
1:P:14:THR:CG2	1:P:15:ALA:N	2.63	0.61
1:D:64:MET:HE1	1:D:91:ILE:CG2	2.24	0.61
1:T:83:SER:HB2	1:T:92:TRP:CZ2	2.37	0.60
1:I:76:MET:SD	1:J:73:LEU:HD23	2.41	0.60
1:Q:32:ASN:C	1:Q:32:ASN:HD22	2.04	0.60
1:T:12:ARG:HB2	1:T:14:THR:H	1.66	0.60
1:D:55:TYR:CE1	1:E:53:LYS:HB3	2.35	0.60
1:E:67:ILE:HG13	1:F:69[B]:MET:HE3	1.83	0.60
1:D:31:ASN:HD22	1:H:12:ARG:HH22	1.50	0.59
1:A:31:ASN:ND2	1:J:12:ARG:HH12	2.00	0.59
1:K:84:PRO:HD2	1:K:86:SER:N	2.18	0.59
1:G:67:ILE:HG23	1:G:96:LEU:HB2	1.85	0.59
1:R:90:VAL:HG22	4:R:209:HOH:O	1.91	0.58
1:F:69[A]:MET:CE	4:F:218:HOH:O	2.51	0.58
1:H:77:ARG:CG	1:H:77:ARG:HH11	2.15	0.58
1:B:35:ASP:O	1:B:48[A]:ARG:NH2	2.37	0.58
1:P:14:THR:HG22	1:P:15:ALA:H	1.69	0.58
1:E:67:ILE:HA	1:F:69[B]:MET:HE1	1.86	0.57
1:G:51:ARG:NH1	1:G:65:ARG:HH22	2.02	0.57
1:P:26:TYR:CE2	1:P:69[B]:MET:CG	2.87	0.57
1:L:69:MET:HE2	4:L:203:HOH:O	2.02	0.57
1:K:76:MET:HE2	1:K:96:LEU:HD22	1.87	0.57
1:Q:69:MET:CE	4:Q:204:HOH:O	2.52	0.57

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:I:83:SER:CB	1:I:92:TRP:CZ2	2.86	0.57
1:E:11:ASN:HD22	1:E:13:ILE:H	1.51	0.57
1:E:67:ILE:CG1	1:F:69[B]:MET:HE3	2.35	0.56
1:M:90:VAL:HG22	4:M:203:HOH:O	1.97	0.56
1:M:76:MET:SD	1:N:73:LEU:HD23	2.46	0.56
1:K:14:THR:OG1	1:P:14:THR:OG1	2.20	0.56
1:M:46:VAL:HB	1:M:87:SER:HB3	1.86	0.56
1:O:11:ASN:HD22	1:O:14:THR:H	1.53	0.56
1:L:76:MET:SD	1:M:73:LEU:HD23	2.45	0.55
4:A:101:HOH:O	1:B:69[A]:MET:CE	2.54	0.55
1:D:97:GLU:HB3	1:E:25:LYS:HD3	1.89	0.55
1:B:20:GLY:H	1:B:79:ASN:ND2	2.04	0.55
1:Q:52:ALA:HB1	1:Q:57[A]:ASP:HB2	1.88	0.55
1:Q:69:MET:HE2	4:Q:204:HOH:O	2.07	0.55
1:S:77:ARG:CZ	1:S:77:ARG:H	2.19	0.55
1:A:19:GLU:HA	1:A:79:ASN:HD22	1.72	0.55
1:D:37:MET:H	1:D:51:ARG:HH21	1.54	0.54
4:A:101:HOH:O	1:B:69[A]:MET:HE1	2.07	0.54
1:A:76:MET:SD	1:B:73:LEU:HD23	2.47	0.54
1:J:83:SER:HB2	1:J:92:TRP:CZ2	2.42	0.54
1:G:51:ARG:CG	1:G:51:ARG:NE	2.62	0.54
1:S:37:MET:H	1:S:51:ARG:NH1	2.05	0.54
1:B:11:ASN:HD22	1:B:11:ASN:C	2.12	0.53
4:S:223:HOH:O	1:T:69[A]:MET:CE	2.55	0.53
1:E:12:ARG:CG	1:E:12:ARG:NH1	2.57	0.53
1:E:19:GLU:HA	1:E:79:ASN:HD22	1.74	0.53
1:G:51:ARG:CD	1:G:52:ALA:H	2.22	0.53
1:R:76:MET:SD	1:S:73:LEU:HD23	2.48	0.53
1:E:20:GLY:H	1:E:79:ASN:ND2	2.07	0.52
1:S:86:SER:HB3	1:S:88:PRO:O	2.09	0.52
1:G:83:SER:CB	1:G:92:TRP:CZ2	2.93	0.52
1:F:69[A]:MET:HE2	4:F:218:HOH:O	2.09	0.52
1:D:76:MET:SD	1:E:73:LEU:HD23	2.50	0.52
1:Q:20:GLY:H	1:Q:79:ASN:HD22	1.58	0.52
1:T:18:VAL:CG2	1:T:21:VAL:HG21	2.40	0.51
1:D:23:LEU:HD13	1:D:39:VAL:HG11	1.92	0.51
1:T:11:ASN:HB2	1:T:12:ARG:CD	2.39	0.51
1:I:51:ARG:NH1	1:I:65:ARG:HH22	2.09	0.51
1:A:87:SER:HA	1:A:89:ASN:N	2.25	0.51
1:L:69:MET:HE1	4:L:203:HOH:O	2.05	0.51
1:C:76:MET:SD	1:I:73:LEU:HD23	2.51	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:F:76:MET:SD	1:G:73:LEU:HD23	2.51	0.51
1:M:49:ILE:HG23	1:M:64[B]:MET:HE2	1.93	0.50
1:B:11:ASN:HD22	1:B:13:ILE:H	1.59	0.50
1:A:25:LYS:HB2	1:A:40:VAL:HB	1.94	0.50
1:Q:65:ARG:HH22	3:Q:102:ACT:H1	1.73	0.50
1:D:8:ASP:O	1:D:12:ARG:HG2	2.12	0.50
1:J:53:LYS:CD	1:J:53:LYS:N	2.46	0.50
1:B:53:LYS:HG3	1:B:54:ASP:CG	2.32	0.50
1:M:64[A]:MET:HG2	1:M:94:ILE:HG22	1.93	0.50
1:N:67:ILE:HG23	1:N:96:LEU:HB2	1.94	0.50
1:L:76:MET:CE	1:L:98:ALA:HA	2.42	0.49
1:Q:20:GLY:H	1:Q:79:ASN:ND2	2.09	0.49
1:N:65:ARG:HH22	3:N:101:ACT:CH3	2.23	0.49
1:E:76:MET:SD	1:F:73:LEU:HD23	2.52	0.49
4:D:102:HOH:O	1:E:69:MET:CE	2.61	0.49
1:P:14:THR:HG23	1:P:15:ALA:N	2.27	0.49
1:F:76:MET:HE3	1:F:98:ALA:HA	1.94	0.49
1:A:8:ASP:O	1:A:12:ARG:HG3	2.12	0.49
1:D:13:ILE:HD12	1:D:15:ALA:HB3	1.95	0.49
4:G:121:HOH:O	1:H:69[A]:MET:HE1	2.12	0.49
1:B:20:GLY:H	1:B:79:ASN:HD22	1.61	0.49
1:N:69[A]:MET:CE	4:N:214:HOH:O	2.60	0.49
1:N:69[A]:MET:HE1	4:N:214:HOH:O	2.12	0.49
1:C:29:ASP:OD1	1:C:31:ASN:HB2	2.12	0.49
1:Q:11:ASN:C	1:Q:11:ASN:HD22	2.16	0.49
1:G:83:SER:HB2	1:G:92:TRP:CE2	2.47	0.49
1:C:76:MET:HE2	1:C:98:ALA:HA	1.95	0.48
1:F:67:ILE:HG23	1:F:96:LEU:HB2	1.95	0.48
1:K:76:MET:HE1	1:K:96:LEU:HD22	1.93	0.48
1:E:67:ILE:HG23	1:E:96:LEU:HB2	1.94	0.48
1:F:69[A]:MET:HE1	4:F:218:HOH:O	2.13	0.48
1:D:58:ASN:HD22	1:D:59:VAL:N	2.12	0.48
1:B:12:ARG:H	1:B:12:ARG:CD	2.26	0.48
1:R:64[B]:MET:SD	1:R:94:ILE:CG2	3.01	0.48
1:D:12:ARG:HH22	1:E:33:ASN:HB2	1.79	0.48
1:B:77:ARG:CG	1:B:77:ARG:NH1	2.60	0.48
1:K:84:PRO:HD2	1:K:86:SER:H	1.77	0.48
1:D:19:GLU:HA	1:D:79:ASN:HD22	1.79	0.48
1:A:87:SER:CA	1:A:88:PRO:C	2.80	0.47
1:C:69[A]:MET:CE	4:C:220:HOH:O	2.63	0.47
1:P:13:ILE:HD12	1:P:15:ALA:HB3	1.95	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:20:GLY:H	1:A:79:ASN:ND2	2.12	0.47
4:S:223:HOH:O	1:T:69[A]:MET:HE1	2.14	0.47
1:K:58:ASN:HD22	1:K:59:VAL:N	2.12	0.47
1:K:20:GLY:H	1:K:79:ASN:ND2	2.12	0.47
1:D:20:GLY:H	1:D:79:ASN:ND2	2.12	0.47
1:I:77:ARG:CD	1:I:77:ARG:H	2.27	0.47
1:P:4:GLN:HA	1:P:7:LYS:HD2	1.97	0.47
1:C:69[A]:MET:HE1	4:C:220:HOH:O	2.14	0.47
1:R:60:MET:O	1:R:64[B]:MET:CG	2.57	0.47
1:A:53:LYS:HG3	1:A:54:ASP:OD1	2.15	0.47
1:A:97:GLU:HB3	1:B:25:LYS:HD3	1.96	0.47
1:I:51:ARG:CD	1:I:52:ALA:H	2.28	0.46
1:K:14:THR:HG23	1:K:15:ALA:N	2.29	0.46
1:I:51:ARG:CG	1:I:52:ALA:H	2.28	0.46
1:K:20:GLY:H	1:K:79:ASN:HD22	1.63	0.46
1:P:58:ASN:HD22	1:P:59:VAL:N	2.13	0.46
1:N:55:TYR:CE2	1:O:53:LYS:HG3	2.51	0.46
1:T:53:LYS:HE2	1:T:53:LYS:N	2.16	0.46
1:P:20:GLY:H	1:P:79:ASN:HD22	1.64	0.46
1:A:83:SER:HB2	1:A:92:TRP:CE2	2.51	0.46
1:A:64:MET:HE2	1:A:64:MET:HB3	1.82	0.46
1:T:83:SER:HB2	1:T:92:TRP:CH2	2.51	0.46
1:K:49:ILE:CG2	1:K:64:MET:HE2	2.25	0.46
1:J:17:LEU:CD1	1:J:19:GLU:HG3	2.45	0.46
1:P:64:MET:HE1	1:P:91:ILE:HB	1.98	0.45
1:L:23:LEU:HD22	1:L:39:VAL:HB	1.99	0.45
1:P:26:TYR:CD2	1:P:69[B]:MET:HG2	2.51	0.45
1:A:58:ASN:HD22	1:A:59:VAL:N	2.14	0.45
1:H:77:ARG:CG	1:H:77:ARG:NH1	2.79	0.45
1:N:25:LYS:HB2	1:N:40:VAL:HB	1.98	0.45
1:T:18:VAL:HG23	1:T:21:VAL:HG21	1.96	0.45
1:I:77:ARG:H	1:I:77:ARG:NE	2.14	0.45
1:P:25:LYS:HB2	1:P:40:VAL:HB	1.99	0.45
1:T:39:VAL:HG11	1:T:68:ALA:HB1	1.97	0.45
4:S:223:HOH:O	1:T:69[A]:MET:HE2	2.16	0.44
1:B:19:GLU:HA	1:B:79:ASN:HD22	1.82	0.44
1:C:39:VAL:HG11	1:C:68:ALA:HB1	1.98	0.44
1:I:76:MET:SD	1:J:73:LEU:CD2	3.05	0.44
1:E:67:ILE:HG12	1:F:69[B]:MET:CE	2.48	0.44
1:G:67:ILE:HG13	1:H:69[B]:MET:HE1	2.00	0.44
1:K:14:THR:CG2	1:K:15:ALA:H	2.31	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:P:53:LYS:HB2	1:T:55:TYR:CE2	2.52	0.44
1:R:33:ASN:HD22	1:R:33:ASN:C	2.21	0.44
1:J:43:THR:HG22	1:J:45:GLY:H	1.82	0.44
1:P:20:GLY:H	1:P:79:ASN:ND2	2.15	0.44
1:L:59:VAL:HG12	1:M:37[A]:MET:HE1	2.00	0.43
1:Q:96:LEU:O	1:R:25:LYS:HA	2.18	0.43
1:J:17:LEU:HD11	1:J:19:GLU:HG3	2.00	0.43
1:R:1:GLY:O	1:S:25:LYS:HE2	2.18	0.43
1:E:11:ASN:ND2	1:E:13:ILE:H	2.15	0.43
1:I:12:ARG:HA	1:I:12:ARG:NE	2.33	0.43
1:K:76:MET:HB3	1:K:76:MET:HE2	1.57	0.43
1:Q:11:ASN:HD22	1:Q:13:ILE:H	1.64	0.43
1:F:39:VAL:HG11	1:F:68:ALA:HB1	2.00	0.43
1:P:83:SER:HA	1:P:84:PRO:HD3	1.91	0.43
1:N:32:ASN:O	1:N:33:ASN:CB	2.59	0.43
1:E:53:LYS:HZ2	1:E:53:LYS:HG2	1.74	0.43
1:A:64:MET:HE3	1:A:91:ILE:HG22	2.01	0.43
1:K:14:THR:HG23	1:K:15:ALA:H	1.83	0.43
1:C:9:ASN:ND2	1:I:34:THR:HG21	2.34	0.43
1:B:80:MET:HG2	1:B:94:ILE:HG13	2.01	0.43
1:O:11:ASN:ND2	1:O:13:ILE:N	2.65	0.42
1:H:53:LYS:CD	1:H:53:LYS:N	2.39	0.42
1:A:25:LYS:HD2	1:J:3:SER:HB3	2.01	0.42
1:H:18:VAL:HG12	1:H:21:VAL:CG2	2.50	0.42
1:J:22:GLU:HB2	1:J:77:ARG:HH12	1.81	0.42
1:P:40:VAL:HA	1:P:45:GLY:O	2.19	0.42
1:B:76:MET:SD	1:C:73:LEU:HD23	2.59	0.42
1:N:65:ARG:HH12	3:N:101:ACT:CH3	2.32	0.42
1:K:96:LEU:O	1:L:25:LYS:HA	2.20	0.42
1:E:11:ASN:HD22	1:E:11:ASN:C	2.23	0.42
1:L:67:ILE:HG23	1:L:96:LEU:HB2	2.00	0.42
1:O:83:SER:HB2	1:O:92:TRP:CE2	2.54	0.42
1:L:20:GLY:H	1:L:79:ASN:ND2	2.18	0.42
1:D:55:TYR:CD1	1:E:53:LYS:HB3	2.55	0.42
1:A:83:SER:HB2	1:A:92:TRP:CZ2	2.55	0.42
1:Q:59:VAL:HG12	1:R:37[A]:MET:HE1	2.01	0.42
1:F:29:ASP:OD1	1:F:31:ASN:HB2	2.20	0.42
1:R:64[B]:MET:CE	4:R:228:HOH:O	2.67	0.41
4:D:102:HOH:O	1:E:69:MET:HE2	2.17	0.41
1:D:20:GLY:H	1:D:79:ASN:HD22	1.68	0.41
1:M:83:SER:HA	1:M:84:PRO:HD3	1.91	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:O:18:VAL:HG22	1:O:80:MET:HB2	2.01	0.41
1:F:55:TYR:HE1	1:G:51:ARG:HG3	1.85	0.41
1:O:14:THR:HG22	1:O:92:TRP:HZ3	1.85	0.41
1:E:97:GLU:HB3	1:F:25:LYS:HD3	2.02	0.41
1:K:25:LYS:HD2	1:O:3:SER:HB3	2.02	0.41
1:G:13:ILE:H	1:G:13:ILE:HG13	1.69	0.41
1:K:60:MET:O	1:K:64:MET:HG3	2.21	0.41
1:G:83:SER:HB2	1:G:92:TRP:NE1	2.36	0.41
1:E:20:GLY:H	1:E:79:ASN:HD22	1.68	0.41
1:G:51:ARG:HD2	1:G:52:ALA:H	1.85	0.41
1:G:14:THR:O	1:G:84:PRO:HD2	2.21	0.41
1:D:25:LYS:HB2	1:D:40:VAL:HB	2.03	0.41
1:N:65:ARG:HH12	3:N:101:ACT:H1	1.86	0.41
1:A:9:ASN:OD1	1:A:12:ARG:NH1	2.53	0.40
1:B:12:ARG:HD3	1:B:12:ARG:HH21	1.71	0.40
1:C:40:VAL:HA	1:C:45:GLY:O	2.21	0.40
1:H:60:MET:O	1:H:64:MET:HG3	2.20	0.40
1:T:62:ALA:O	1:T:66:LYS:HG3	2.20	0.40
1:B:11:ASN:ND2	1:B:13:ILE:H	2.18	0.40
1:M:27:ILE:O	1:M:37[B]:MET:HE3	2.22	0.40
1:Q:67:ILE:HG23	1:Q:96:LEU:HB2	2.03	0.40
1:J:18:VAL:HG23	1:J:80:MET:HB2	2.03	0.40
1:Q:69:MET:HE1	4:Q:204:HOH:O	2.15	0.40
1:S:55:TYR:CE2	1:T:53:LYS:HG3	2.56	0.40
1:L:20:GLY:H	1:L:79:ASN:HD22	1.69	0.40
1:E:55:TYR:OH	1:F:51:ARG:HG2	2.21	0.40

All (1) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:G:4:GLN:CG	1:R:12:ARG:NH1[2_655]	1.63	0.57

## 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	96/98 (98%)	93 (97%)	2 (2%)	1 (1%)	19	3
1	B	98/98 (100%)	98 (100%)	0	0	100	100
1	C	97/98 (99%)	92 (95%)	4 (4%)	1 (1%)	19	3
1	D	98/98 (100%)	97 (99%)	0	1 (1%)	19	3
1	E	96/98 (98%)	95 (99%)	1 (1%)	0	100	100
1	F	97/98 (99%)	92 (95%)	5 (5%)	0	100	100
1	G	97/98 (99%)	97 (100%)	0	0	100	100
1	H	97/98 (99%)	94 (97%)	3 (3%)	0	100	100
1	I	97/98 (99%)	97 (100%)	0	0	100	100
1	J	97/98 (99%)	94 (97%)	3 (3%)	0	100	100
1	K	96/98 (98%)	90 (94%)	3 (3%)	3 (3%)	5	0
1	L	97/98 (99%)	96 (99%)	0	1 (1%)	19	3
1	M	99/98 (101%)	93 (94%)	5 (5%)	1 (1%)	19	3
1	N	97/98 (99%)	96 (99%)	1 (1%)	0	100	100
1	O	96/98 (98%)	94 (98%)	1 (1%)	1 (1%)	19	3
1	P	97/98 (99%)	94 (97%)	1 (1%)	2 (2%)	9	1
1	Q	97/98 (99%)	97 (100%)	0	0	100	100
1	R	98/98 (100%)	93 (95%)	4 (4%)	1 (1%)	19	3
1	S	97/98 (99%)	97 (100%)	0	0	100	100
1	T	97/98 (99%)	94 (97%)	3 (3%)	0	100	100
All	All	1941/1960 (99%)	1893 (98%)	36 (2%)	12 (1%)	30	8

All (12) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	85	ALA
1	C	32	ASN
1	K	15	ALA
1	P	15	ALA
1	R	32	ASN
1	K	84	PRO
1	M	32	ASN
1	O	12	ARG

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Mol	Chain	Res	Type
1	P	14	THR
1	D	15	ALA
1	L	35	ASP
1	K	85	ALA

### 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	81/81 (100%)	79 (98%)	2 (2%)	55	20
1	B	83/81 (102%)	79 (95%)	4 (5%)	31	5
1	C	82/81 (101%)	80 (98%)	2 (2%)	57	22
1	D	83/81 (102%)	76 (92%)	7 (8%)	14	1
1	E	81/81 (100%)	74 (91%)	7 (9%)	13	1
1	F	82/81 (101%)	82 (100%)	0	100	100
1	G	82/81 (101%)	78 (95%)	4 (5%)	31	5
1	H	82/81 (101%)	78 (95%)	4 (5%)	31	5
1	I	82/81 (101%)	78 (95%)	4 (5%)	31	5
1	J	82/81 (101%)	76 (93%)	6 (7%)	17	1
1	K	81/81 (100%)	73 (90%)	8 (10%)	10	0
1	L	82/81 (101%)	80 (98%)	2 (2%)	57	22
1	M	84/81 (104%)	79 (94%)	5 (6%)	24	2
1	N	82/81 (101%)	81 (99%)	1 (1%)	78	54
1	O	80/81 (99%)	76 (95%)	4 (5%)	30	5
1	P	82/81 (101%)	77 (94%)	5 (6%)	23	2
1	Q	82/81 (101%)	78 (95%)	4 (5%)	31	5
1	R	83/81 (102%)	79 (95%)	4 (5%)	31	5
1	S	82/81 (101%)	78 (95%)	4 (5%)	31	5
1	T	82/81 (101%)	80 (98%)	2 (2%)	57	22

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
All	All	1640/1620 (101%)	1561 (95%)	79 (5%)	32 5

All (79) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	D	12	ARG
1	D	39	VAL
1	D	51	ARG
1	D	58	ASN
1	D	87	SER
1	D	96	LEU
1	D	97	GLU
1	E	11	ASN
1	E	12	ARG
1	E	16	SER
1	E	33	ASN
1	E	53	LYS
1	E	77	ARG
1	E	97	GLU
1	G	13	ILE
1	G	51	ARG
1	G	77	ARG
1	G	86	SER
1	H	17	LEU
1	H	43	THR
1	H	53	LYS
1	H	54	ASP
1	A	58	ASN
1	A	96	LEU
1	B	11	ASN
1	B	12	ARG
1	B	51	ARG
1	B	77	ARG
1	C	31	ASN
1	C	33	ASN
1	I	12	ARG
1	I	13	ILE
1	I	77	ARG
1	I	97	GLU
1	J	14	THR
1	J	18	VAL
1	J	43	THR

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Mol	Chain	Res	Type
1	J	53	LYS
1	J	54	ASP
1	J	97	GLU
1	K	16	SER
1	K	22	GLU
1	K	24	THR
1	K	53	LYS
1	K	58	ASN
1	K	86	SER
1	K	96	LEU
1	K	97	GLU
1	L	32	ASN
1	L	35	ASP
1	M	32	ASN
1	M	37[A]	MET
1	M	37[B]	MET
1	M	54	ASP
1	M	97	GLU
1	N	51	ARG
1	O	17	LEU
1	O	18	VAL
1	O	53	LYS
1	O	54	ASP
1	P	14	THR
1	P	22	GLU
1	P	51	ARG
1	P	58	ASN
1	P	96	LEU
1	Q	11	ASN
1	Q	32	ASN
1	Q	57[A]	ASP
1	Q	57[B]	ASP
1	R	33	ASN
1	R	37[A]	MET
1	R	37[B]	MET
1	R	53	LYS
1	S	16	SER
1	S	51	ARG
1	S	77	ARG
1	S	86	SER
1	T	17	LEU
1	T	53	LYS

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (47) such sidechains are listed below:

Mol	Chain	Res	Type
1	D	31	ASN
1	D	58	ASN
1	D	79	ASN
1	D	89	ASN
1	E	4	GLN
1	E	9	ASN
1	E	11	ASN
1	E	79	ASN
1	F	9	ASN
1	F	89	ASN
1	G	9	ASN
1	A	31	ASN
1	A	32	ASN
1	A	58	ASN
1	A	79	ASN
1	B	9	ASN
1	B	11	ASN
1	B	79	ASN
1	C	9	ASN
1	C	32	ASN
1	C	89	ASN
1	I	9	ASN
1	J	11	ASN
1	K	58	ASN
1	K	79	ASN
1	L	32	ASN
1	L	79	ASN
1	M	4	GLN
1	M	9	ASN
1	M	89	ASN
1	N	4	GLN
1	N	9	ASN
1	N	32	ASN
1	O	11	ASN
1	P	58	ASN
1	P	79	ASN
1	Q	9	ASN
1	Q	11	ASN
1	Q	32	ASN
1	Q	79	ASN
1	R	9	ASN

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Mol	Chain	Res	Type
1	R	11	ASN
1	R	32	ASN
1	R	33	ASN
1	R	89	ASN
1	S	4	GLN
1	S	9	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 carbohydrates in this entry.

### 5.6 Ligand geometry ⓘ

Of 10 ligands modelled in this entry, 8 are monoatomic - leaving 2 for Mogul analysis.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\# Z  > 2$	Counts	RMSZ	$\# Z  > 2$
3	ACT	N	101	-	1,3,3	7.86	1 (100%)	0,3,3	0.00	-
3	ACT	Q	102	-	1,3,3	3.42	1 (100%)	0,3,3	0.00	-

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the chemical component dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.



Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	ACT	N	101	-	-	0/0/0/0	0/0/0/0
3	ACT	Q	102	-	-	0/0/0/0	0/0/0/0

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	Q	102	ACT	CH3-C	3.42	1.53	1.48
3	N	101	ACT	CH3-C	7.86	1.59	1.48

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

2 monomers are involved in 7 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	N	101	ACT	4	0
3	Q	102	ACT	3	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	98/98 (100%)	0.39	4 (4%) 41 43	18, 30, 48, 57	1 (1%)
1	B	98/98 (100%)	-0.14	1 (1%) 84 86	15, 22, 36, 44	0
1	C	98/98 (100%)	-0.24	0 100 100	13, 19, 32, 42	0
1	D	98/98 (100%)	0.38	6 (6%) 25 25	18, 30, 48, 53	1 (1%)
1	E	98/98 (100%)	-0.09	3 (3%) 52 55	14, 22, 35, 45	0
1	F	98/98 (100%)	-0.21	0 100 100	13, 19, 30, 40	0
1	G	98/98 (100%)	-0.08	1 (1%) 84 86	14, 21, 35, 42	0
1	H	98/98 (100%)	-0.16	0 100 100	13, 22, 33, 38	0
1	I	98/98 (100%)	-0.03	2 (2%) 68 72	13, 20, 36, 42	0
1	J	98/98 (100%)	-0.09	0 100 100	13, 22, 33, 37	0
1	K	98/98 (100%)	0.67	8 (8%) 14 14	20, 35, 50, 56	1 (1%)
1	L	98/98 (100%)	-0.01	1 (1%) 84 86	16, 24, 37, 45	0
1	M	98/98 (100%)	-0.18	1 (1%) 84 86	13, 19, 31, 46	0
1	N	98/98 (100%)	-0.25	0 100 100	12, 18, 30, 34	0
1	O	98/98 (100%)	0.18	2 (2%) 68 72	15, 26, 39, 46	0
1	P	98/98 (100%)	0.66	5 (5%) 32 33	21, 34, 49, 53	1 (1%)
1	Q	98/98 (100%)	-0.03	1 (1%) 84 86	16, 24, 36, 43	0
1	R	98/98 (100%)	-0.22	1 (1%) 84 86	14, 19, 31, 44	0
1	S	98/98 (100%)	-0.24	0 100 100	13, 18, 30, 33	0
1	T	98/98 (100%)	0.22	2 (2%) 68 72	14, 27, 41, 46	0
All	All	1960/1960 (100%)	0.03	38 (1%) 70 73	12, 23, 41, 57	4 (0%)

All (38) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	G	92	TRP	5.2
1	Q	32	ASN	3.9
1	P	14	THR	3.9
1	K	76	MET	3.8
1	K	14	THR	3.8
1	T	1	GLY	3.7
1	M	32	ASN	3.6
1	A	87	SER	3.5
1	P	76	MET	3.5
1	E	32	ASN	3.5
1	I	92	TRP	3.4
1	K	17	LEU	3.2
1	O	1	GLY	3.1
1	O	53	LYS	3.1
1	K	84	PRO	3.0
1	A	92	TRP	3.0
1	L	32	ASN	2.9
1	B	32	ASN	2.9
1	D	13	ILE	2.8
1	D	76	MET	2.7
1	K	32	ASN	2.7
1	P	92	TRP	2.7
1	I	85	ALA	2.7
1	K	73	LEU	2.7
1	D	82	ALA	2.7
1	P	24	THR	2.7
1	K	92	TRP	2.5
1	A	86	SER	2.5
1	A	76	MET	2.5
1	E	33	ASN	2.5
1	D	92	TRP	2.4
1	K	77	ARG	2.4
1	P	1	GLY	2.4
1	R	32	ASN	2.4
1	T	11	ASN	2.4
1	D	73	LEU	2.2
1	D	32	ASN	2.1
1	E	73	LEU	2.1

## 6.2 Non-standard residues in protein, DNA, RNA chains ⓘ

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( $\text{\AA}^2$ )	Q<0.9
2	NA	L	101	1/1	0.98	0.17	5.87	23,23,23,23	0
3	ACT	N	101	4/4	0.91	0.13	3.38	24,25,25,28	0
2	NA	B	101	1/1	0.96	0.13	2.28	30,30,30,30	0
3	ACT	Q	102	4/4	0.93	0.12	0.47	28,28,30,31	0
2	NA	M	101	1/1	0.99	0.09	0.08	18,18,18,18	0
2	NA	C	101	1/1	0.99	0.04	-0.87	23,23,23,23	0
2	NA	R	101	1/1	0.99	0.06	-1.06	18,18,18,18	0
2	NA	Q	101	1/1	0.99	0.05	-1.44	23,23,23,23	0
2	NA	F	101	1/1	0.98	0.05	-2.01	23,23,23,23	0
2	NA	E	101	1/1	0.96	0.05	-3.01	25,25,25,25	0

### 6.5 Other polymers [i](#)

There are no such residues in this entry.