



# wwPDB X-ray Structure Validation Summary Report ⓘ

May 22, 2020 – 02:52 pm BST

PDB ID : 6EHI  
Title : NucT from Helicobacter pylori  
Authors : Celma, L.; Li de la Sierra-Gallay, I.; Quevillon-Cheruel, S.  
Deposited on : 2017-09-13  
Resolution : 1.58 Å(reported)

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

We welcome your comments at [validation@mail.wwpdb.org](mailto:validation@mail.wwpdb.org)

A user guide is available at

<https://www.wwpdb.org/validation/2017/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 : 1.8.5 (274361), CSD as541be (2020)  
Xtriage (Phenix) : 1.13  
EDS : 2.11  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
Refmac : 5.8.0158  
CCP4 : 7.0.044 (Gargrove)  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.11

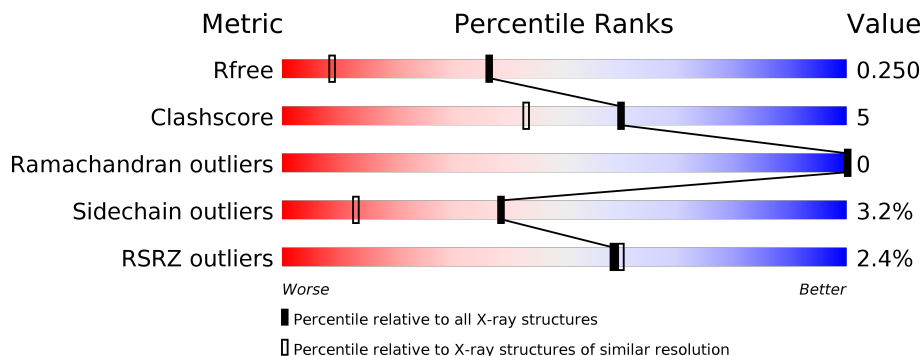
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 1.58 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))
$R_{free}$	130704	5534 (1.60-1.56)
Clashscore	141614	5861 (1.60-1.56)
Ramachandran outliers	138981	5708 (1.60-1.56)
Sidechain outliers	138945	5703 (1.60-1.56)
RSRZ outliers	127900	5431 (1.60-1.56)

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 respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions  $\leq 5\%$ . The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	162	
1	B	162	
1	C	162	
1	D	162	
1	E	162	
1	F	162	

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Mol	Chain	Length	Quality of chain
1	G	162	
1	H	162	
1	I	162	
1	J	162	
1	K	162	
1	L	162	

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

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
3	GOL	E	202	-	-	X	-
3	GOL	J	202	-	-	X	-

## 2 Entry composition [i](#)

There are 5 unique types of molecules in this entry. The entry contains 16401 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 Nuclease NucT.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	159	1276	816	214	241	5	0	1	0
1	B	158	1285	824	214	241	6	0	4	0
1	C	159	1297	830	216	246	5	0	6	0
1	D	160	1287	823	215	243	6	0	2	0
1	E	159	1279	818	214	242	5	0	2	0
1	F	159	1286	823	215	243	5	0	3	0
1	G	158	1267	811	213	238	5	0	1	0
1	H	160	1294	828	216	245	5	0	2	0
1	I	159	1285	823	215	242	5	0	3	0
1	J	159	1289	824	216	244	5	0	4	0
1	K	159	1278	818	214	241	5	0	1	0
1	L	159	1285	822	215	243	5	0	3	0

There are 72 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-5	GLY	-	expression tag	UNP A0A1V3AA65
A	-4	ILE	-	expression tag	UNP A0A1V3AA65
A	-3	SER	-	expression tag	UNP A0A1V3AA65
A	-2	GLU	-	expression tag	UNP A0A1V3AA65
A	-1	PHE	-	expression tag	UNP A0A1V3AA65

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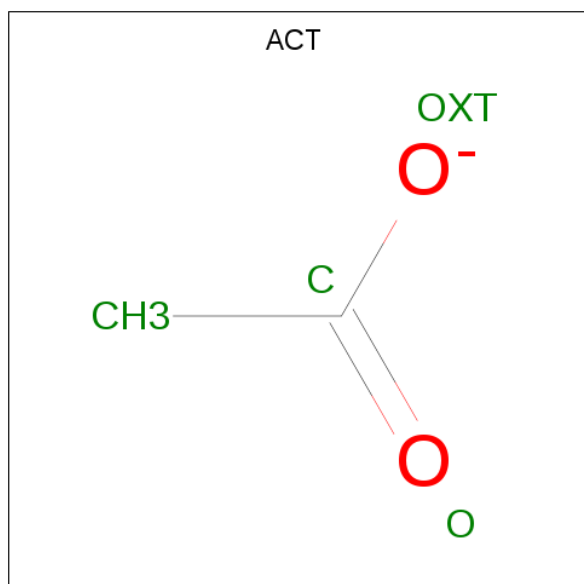
Chain	Residue	Modelled	Actual	Comment	Reference
A	100	ASN	HIS	engineered mutation	UNP A0A1V3AA65
B	-5	GLY	-	expression tag	UNP A0A1V3AA65
B	-4	ILE	-	expression tag	UNP A0A1V3AA65
B	-3	SER	-	expression tag	UNP A0A1V3AA65
B	-2	GLU	-	expression tag	UNP A0A1V3AA65
B	-1	PHE	-	expression tag	UNP A0A1V3AA65
B	100	ASN	HIS	engineered mutation	UNP A0A1V3AA65
C	-5	GLY	-	expression tag	UNP A0A1V3AA65
C	-4	ILE	-	expression tag	UNP A0A1V3AA65
C	-3	SER	-	expression tag	UNP A0A1V3AA65
C	-2	GLU	-	expression tag	UNP A0A1V3AA65
C	-1	PHE	-	expression tag	UNP A0A1V3AA65
C	100	ASN	HIS	engineered mutation	UNP A0A1V3AA65
D	-5	GLY	-	expression tag	UNP A0A1V3AA65
D	-4	ILE	-	expression tag	UNP A0A1V3AA65
D	-3	SER	-	expression tag	UNP A0A1V3AA65
D	-2	GLU	-	expression tag	UNP A0A1V3AA65
D	-1	PHE	-	expression tag	UNP A0A1V3AA65
D	100	ASN	HIS	engineered mutation	UNP A0A1V3AA65
E	-5	GLY	-	expression tag	UNP A0A1V3AA65
E	-4	ILE	-	expression tag	UNP A0A1V3AA65
E	-3	SER	-	expression tag	UNP A0A1V3AA65
E	-2	GLU	-	expression tag	UNP A0A1V3AA65
E	-1	PHE	-	expression tag	UNP A0A1V3AA65
E	100	ASN	HIS	engineered mutation	UNP A0A1V3AA65
F	-5	GLY	-	expression tag	UNP A0A1V3AA65
F	-4	ILE	-	expression tag	UNP A0A1V3AA65
F	-3	SER	-	expression tag	UNP A0A1V3AA65
F	-2	GLU	-	expression tag	UNP A0A1V3AA65
F	-1	PHE	-	expression tag	UNP A0A1V3AA65
F	100	ASN	HIS	engineered mutation	UNP A0A1V3AA65
G	-5	GLY	-	expression tag	UNP A0A1V3AA65
G	-4	ILE	-	expression tag	UNP A0A1V3AA65
G	-3	SER	-	expression tag	UNP A0A1V3AA65
G	-2	GLU	-	expression tag	UNP A0A1V3AA65
G	-1	PHE	-	expression tag	UNP A0A1V3AA65
G	100	ASN	HIS	engineered mutation	UNP A0A1V3AA65
H	-5	GLY	-	expression tag	UNP A0A1V3AA65
H	-4	ILE	-	expression tag	UNP A0A1V3AA65
H	-3	SER	-	expression tag	UNP A0A1V3AA65
H	-2	GLU	-	expression tag	UNP A0A1V3AA65
H	-1	PHE	-	expression tag	UNP A0A1V3AA65

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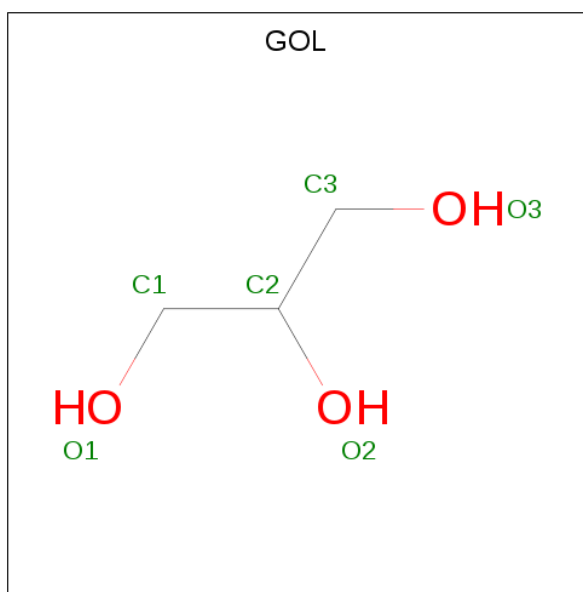
Chain	Residue	Modelled	Actual	Comment	Reference
H	100	ASN	HIS	engineered mutation	UNP A0A1V3AA65
I	-5	GLY	-	expression tag	UNP A0A1V3AA65
I	-4	ILE	-	expression tag	UNP A0A1V3AA65
I	-3	SER	-	expression tag	UNP A0A1V3AA65
I	-2	GLU	-	expression tag	UNP A0A1V3AA65
I	-1	PHE	-	expression tag	UNP A0A1V3AA65
I	100	ASN	HIS	engineered mutation	UNP A0A1V3AA65
J	-5	GLY	-	expression tag	UNP A0A1V3AA65
J	-4	ILE	-	expression tag	UNP A0A1V3AA65
J	-3	SER	-	expression tag	UNP A0A1V3AA65
J	-2	GLU	-	expression tag	UNP A0A1V3AA65
J	-1	PHE	-	expression tag	UNP A0A1V3AA65
J	100	ASN	HIS	engineered mutation	UNP A0A1V3AA65
K	-5	GLY	-	expression tag	UNP A0A1V3AA65
K	-4	ILE	-	expression tag	UNP A0A1V3AA65
K	-3	SER	-	expression tag	UNP A0A1V3AA65
K	-2	GLU	-	expression tag	UNP A0A1V3AA65
K	-1	PHE	-	expression tag	UNP A0A1V3AA65
K	100	ASN	HIS	engineered mutation	UNP A0A1V3AA65
L	-5	GLY	-	expression tag	UNP A0A1V3AA65
L	-4	ILE	-	expression tag	UNP A0A1V3AA65
L	-3	SER	-	expression tag	UNP A0A1V3AA65
L	-2	GLU	-	expression tag	UNP A0A1V3AA65
L	-1	PHE	-	expression tag	UNP A0A1V3AA65
L	100	ASN	HIS	engineered mutation	UNP A0A1V3AA65

- Molecule 2 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
2	A	1	Total C O 4 2 2	0	0
2	B	1	Total C O 4 2 2	0	0
2	C	1	Total C O 4 2 2	0	0
2	D	1	Total C O 4 2 2	0	0
2	E	1	Total C O 4 2 2	0	0
2	F	1	Total C O 4 2 2	0	0
2	G	1	Total C O 4 2 2	0	0
2	H	1	Total C O 4 2 2	0	0
2	I	1	Total C O 4 2 2	0	0
2	J	1	Total C O 4 2 2	0	0
2	K	1	Total C O 4 2 2	0	0
2	L	1	Total C O 4 2 2	0	0

- Molecule 3 is GLYCEROL (three-letter code: GOL) (formula: C<sub>3</sub>H<sub>8</sub>O<sub>3</sub>).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	1	Total C O 6 3 3	0	0
3	B	1	Total C O 6 3 3	0	0
3	C	1	Total C O 6 3 3	0	0
3	D	1	Total C O 6 3 3	0	0
3	E	1	Total C O 6 3 3	0	0
3	F	1	Total C O 6 3 3	0	0
3	G	1	Total C O 6 3 3	0	0
3	H	1	Total C O 6 3 3	0	0
3	I	1	Total C O 6 3 3	0	0
3	J	1	Total C O 6 3 3	0	0
3	K	1	Total C O 6 3 3	0	0
3	L	1	Total C O 6 3 3	0	0

- Molecule 4 is CHLORIDE ION (three-letter code: CL) (formula: Cl).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	K	1	Total Cl 1 1	0	0
4	E	1	Total Cl 1 1	0	0
4	I	1	Total Cl 1 1	0	0
4	C	1	Total Cl 1 1	0	0
4	A	1	Total Cl 1 1	0	0
4	F	1	Total Cl 1 1	0	0

- Molecule 5 is water.



<b>Mol</b>	<b>Chain</b>	<b>Residues</b>	<b>Atoms</b>	<b>ZeroOcc</b>	<b>AltConf</b>
5	A	89	Total O 89 89	0	0
5	B	65	Total O 65 65	0	0
5	C	71	Total O 71 71	0	0
5	D	57	Total O 58 58	0	1
5	E	72	Total O 73 73	0	1
5	F	75	Total O 75 75	0	0
5	G	69	Total O 69 69	0	0
5	H	83	Total O 84 84	0	1
5	I	79	Total O 80 80	0	1
5	J	63	Total O 63 63	0	0
5	K	59	Total O 59 59	0	0
5	L	81	Total O 81 81	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 the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red dot above a residue indicates a poor fit to the electron density ( $RSRZ > 2$ ). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

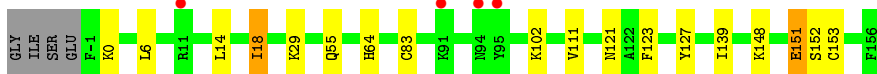
- Molecule 1: Nuclease NucT

Chain A: 




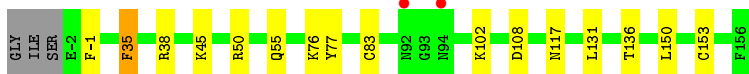
- Molecule 1: Nuclease NucT

Chain B: 

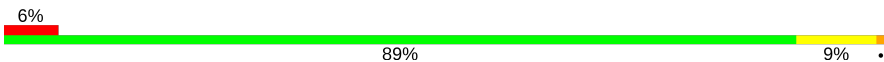


- Molecule 1: Nuclease NucT

Chain C: 




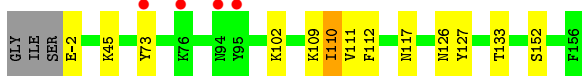
- Molecule 1: Nuclease NucT

Chain D: 

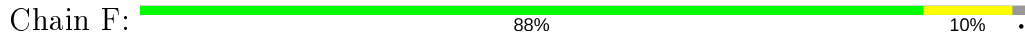


- Molecule 1: Nuclease NucT

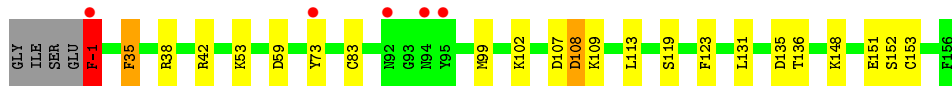
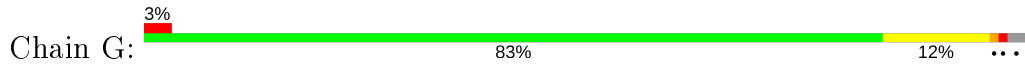
Chain E: 



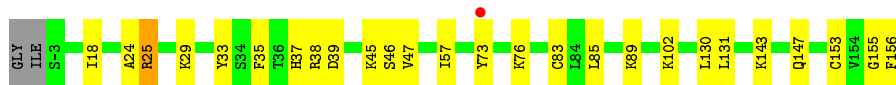
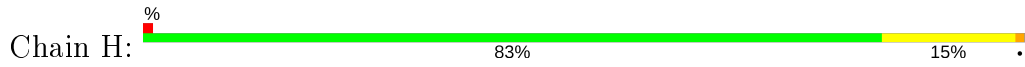
- Molecule 1: Nuclease NucT



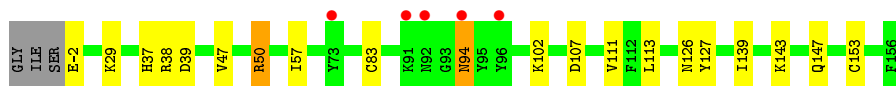
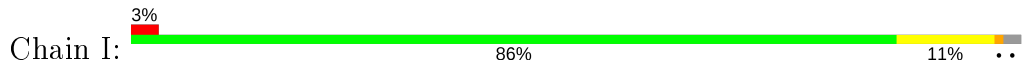
• Molecule 1: Nuclease NucT



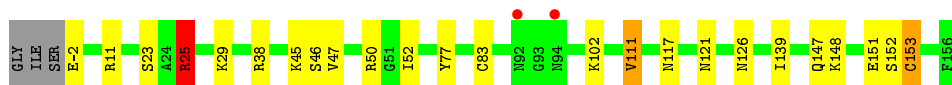
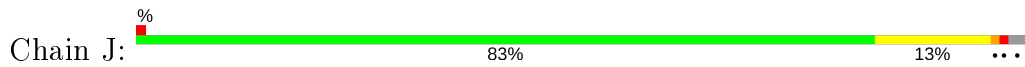
• Molecule 1: Nuclease NucT



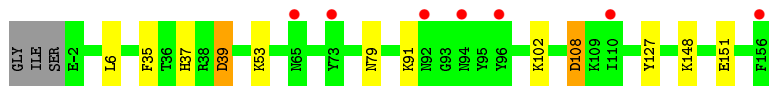
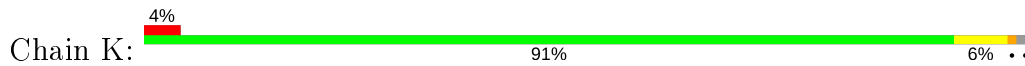
• Molecule 1: Nuclease NucT



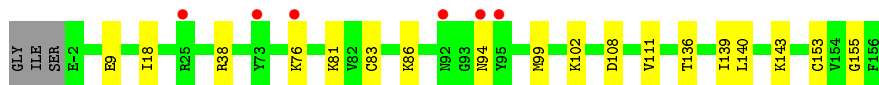
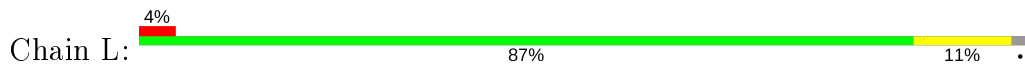
• Molecule 1: Nuclease NucT



• Molecule 1: Nuclease NucT



• Molecule 1: Nuclease NucT



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	61.35Å 71.37Å 110.47Å 81.36° 74.30° 82.33°	Depositor
Resolution (Å)	47.41 – 1.58 47.41 – 1.58	Depositor EDS
% Data completeness (in resolution range)	93.0 (47.41-1.58) 93.0 (47.41-1.58)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	0.06	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.14 (at 1.58Å)	Xtrriage
Refinement program	REFMAC 5.8.0158	Depositor
R, $R_{free}$	0.201 , 0.246 0.208 , 0.250	Depositor DCC
$R_{free}$ test set	11391 reflections (5.00%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	20.2	Xtrriage
Anisotropy	0.546	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.36 , 41.6	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.46$ , $\langle L^2 \rangle = 0.29$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
$F_o, F_c$ correlation	0.96	EDS
Total number of atoms	16401	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	26.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 64.25 % of the origin peak, indicating pseudo-translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo-translational symmetry is equal to 8.5338e-06. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

<sup>1</sup>Intensities estimated from amplitudes.

<sup>2</sup>Theoretical values of  $\langle |L| \rangle$ ,  $\langle L^2 \rangle$  for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

## 5 Model quality i

### 5.1 Standard geometry i

Bond lengths and bond angles in the following residue types are not validated in this section: GOL, CL, 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	1.04	0/1301	1.02	1/1751 (0.1%)
1	B	1.02	1/1322 (0.1%)	1.06	1/1780 (0.1%)
1	C	1.06	0/1337	1.02	3/1800 (0.2%)
1	D	1.04	2/1315 (0.2%)	1.03	2/1769 (0.1%)
1	E	1.05	1/1307 (0.1%)	1.02	0/1759
1	F	1.09	0/1317	1.13	2/1773 (0.1%)
1	G	1.07	1/1292 (0.1%)	1.12	5/1739 (0.3%)
1	H	1.13	1/1320 (0.1%)	1.01	2/1777 (0.1%)
1	I	1.08	1/1316 (0.1%)	1.08	2/1770 (0.1%)
1	J	1.02	0/1323	1.13	5/1781 (0.3%)
1	K	1.00	0/1303	0.97	1/1753 (0.1%)
1	L	1.06	1/1316 (0.1%)	1.03	0/1771
All	All	1.06	8/15769 (0.1%)	1.05	24/21223 (0.1%)

The worst 5 of 8 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	L	9	GLU	CD-OE1	-5.56	1.19	1.25
1	I	127	TYR	CE1-CZ	-5.56	1.31	1.38
1	B	123	PHE	CE1-CZ	5.53	1.47	1.37
1	D	-3	SER	C-N	-5.25	1.22	1.34
1	H	33	TYR	CE2-CZ	5.16	1.45	1.38

The worst 5 of 24 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	J	25	ARG	NE-CZ-NH2	10.74	125.67	120.30
1	I	38	ARG	NE-CZ-NH1	8.63	124.62	120.30
1	A	38	ARG	NE-CZ-NH1	7.94	124.27	120.30
1	I	50	ARG	NE-CZ-NH2	7.81	124.20	120.30
1	C	50	ARG	NE-CZ-NH1	6.62	123.61	120.30

There are no chirality outliers.

There are no planarity outliers.

## 5.2 Too-close contacts

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	1276	0	1293	8	0
1	B	1285	0	1313	17	0
1	C	1297	0	1324	7	0
1	D	1287	0	1306	6	0
1	E	1279	0	1298	7	0
1	F	1286	0	1307	8	0
1	G	1267	0	1287	18	0
1	H	1294	0	1306	24	0
1	I	1285	0	1311	18	0
1	J	1289	0	1310	18	0
1	K	1278	0	1297	5	0
1	L	1285	0	1306	11	0
2	A	4	0	3	0	0
2	B	4	0	3	0	0
2	C	4	0	3	0	0
2	D	4	0	3	0	0
2	E	4	0	3	0	0
2	F	4	0	3	0	0
2	G	4	0	3	0	0
2	H	4	0	3	1	0
2	I	4	0	3	0	0
2	J	4	0	3	0	0
2	K	4	0	3	0	0
2	L	4	0	3	0	0
3	A	6	0	8	1	0
3	B	6	0	7	0	0
3	C	6	0	8	3	0
3	D	6	0	8	1	0
3	E	6	0	8	4	0
3	F	6	0	8	0	0
3	G	6	0	8	1	0
3	H	6	0	8	0	0
3	I	6	0	8	3	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	J	6	0	8	6	0
3	K	6	0	8	2	0
3	L	6	0	8	0	0
4	A	1	0	0	0	0
4	C	1	0	0	0	0
4	E	1	0	0	0	0
4	F	1	0	0	0	0
4	I	1	0	0	1	0
4	K	1	0	0	0	0
5	A	89	0	0	4	0
5	B	65	0	0	2	0
5	C	71	0	0	3	0
5	D	58	0	0	2	0
5	E	73	0	0	1	0
5	F	75	0	0	0	0
5	G	69	0	0	6	0
5	H	84	0	0	3	0
5	I	80	0	0	3	0
5	J	63	0	0	1	0
5	K	59	0	0	2	0
5	L	81	0	0	3	0
All	All	16401	0	15789	142	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 5.

The worst 5 of 142 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:G:151:GLU:HB2	1:L:155:GLY:O	1.57	1.05
3:K:202:GOL:H32	5:K:313:HOH:O	1.63	0.99
1:I:107:ASP:O	1:I:143:LYS:NZ	2.05	0.90
1:J:117:ASN:HB2	3:J:202:GOL:O1	1.72	0.89
1:I:111:VAL:HG23	1:I:139:ILE:HG12	1.56	0.86

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	158/162 (98%)	152 (96%)	6 (4%)	0	100	100
1	B	161/162 (99%)	155 (96%)	6 (4%)	0	100	100
1	C	163/162 (101%)	158 (97%)	5 (3%)	0	100	100
1	D	160/162 (99%)	155 (97%)	5 (3%)	0	100	100
1	E	159/162 (98%)	154 (97%)	5 (3%)	0	100	100
1	F	160/162 (99%)	154 (96%)	6 (4%)	0	100	100
1	G	157/162 (97%)	152 (97%)	5 (3%)	0	100	100
1	H	160/162 (99%)	154 (96%)	6 (4%)	0	100	100
1	I	160/162 (99%)	154 (96%)	6 (4%)	0	100	100
1	J	161/162 (99%)	157 (98%)	4 (2%)	0	100	100
1	K	158/162 (98%)	154 (98%)	4 (2%)	0	100	100
1	L	160/162 (99%)	154 (96%)	6 (4%)	0	100	100
All	All	1917/1944 (99%)	1853 (97%)	64 (3%)	0	100	100

There are no Ramachandran outliers to report.

### 5.3.2 Protein sidechains [i](#)

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	141/142 (99%)	139 (99%)	2 (1%)	67	45
1	B	144/142 (101%)	141 (98%)	3 (2%)	53	27

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	C	146/142 (103%)	142 (97%)	4 (3%)	44	18
1	D	143/142 (101%)	139 (97%)	4 (3%)	43	17
1	E	142/142 (100%)	137 (96%)	5 (4%)	36	11
1	F	143/142 (101%)	136 (95%)	7 (5%)	25	5
1	G	140/142 (99%)	134 (96%)	6 (4%)	29	7
1	H	143/142 (101%)	137 (96%)	6 (4%)	30	7
1	I	143/142 (101%)	141 (99%)	2 (1%)	67	45
1	J	144/142 (101%)	141 (98%)	3 (2%)	53	27
1	K	141/142 (99%)	136 (96%)	5 (4%)	36	11
1	L	143/142 (101%)	136 (95%)	7 (5%)	25	5
All	All	1713/1704 (100%)	1659 (97%)	54 (3%)	39	13

5 of 54 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	F	153[B]	CYS
1	G	148	LYS
1	L	76	LYS
1	G	-1	PHE
1	G	42	ARG

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 14 such sidechains are listed below:

Mol	Chain	Res	Type
1	H	147	GLN
1	I	94	ASN
1	K	79	ASN
1	D	147	GLN
1	J	147	GLN

### 5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

## 5.4 Non-standard residues in protein, DNA, RNA chains [i](#)

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

## 5.5 Carbohydrates [i](#)

There are no carbohydrates in this entry.

## 5.6 Ligand geometry [i](#)

Of 30 ligands modelled in this entry, 6 are monoatomic - leaving 24 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	GOL	H	202	-	5,5,5	0.49	0	5,5,5	0.77	0
2	ACT	I	201	-	1,3,3	1.28	0	0,3,3	0.00	-
3	GOL	B	202	-	5,5,5	1.32	1 (20%)	5,5,5	1.46	1 (20%)
2	ACT	A	201	-	1,3,3	1.24	0	0,3,3	0.00	-
3	GOL	E	202	-	5,5,5	0.46	0	5,5,5	0.61	0
3	GOL	F	202	-	5,5,5	1.12	1 (20%)	5,5,5	1.11	1 (20%)
3	GOL	K	202	-	5,5,5	0.58	0	5,5,5	1.17	1 (20%)
2	ACT	J	201	-	1,3,3	1.09	0	0,3,3	0.00	-
2	ACT	D	201	-	1,3,3	1.09	0	0,3,3	0.00	-
2	ACT	G	201	-	1,3,3	0.02	0	0,3,3	0.00	-
3	GOL	G	202	-	5,5,5	0.86	0	5,5,5	0.55	0
2	ACT	E	201	-	1,3,3	1.12	0	0,3,3	0.00	-
3	GOL	L	202	-	5,5,5	0.57	0	5,5,5	0.97	0
2	ACT	L	201	-	1,3,3	3.93	1 (100%)	0,3,3	0.00	-
2	ACT	K	201	-	1,3,3	0.84	0	0,3,3	0.00	-
3	GOL	D	202	-	5,5,5	0.39	0	5,5,5	0.98	0
3	GOL	I	202	-	5,5,5	0.39	0	5,5,5	1.87	1 (20%)
2	ACT	C	201	-	1,3,3	1.18	0	0,3,3	0.00	-
2	ACT	B	201	-	1,3,3	3.62	1 (100%)	0,3,3	0.00	-
3	GOL	C	202	-	5,5,5	0.59	0	5,5,5	1.06	1 (20%)
3	GOL	J	202	-	5,5,5	0.97	0	5,5,5	1.29	1 (20%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
2	ACT	H	201	-	1,3,3	3.60	1 (100%)	0,3,3	0.00	-
2	ACT	F	201	-	1,3,3	2.11	1 (100%)	0,3,3	0.00	-
3	GOL	A	202	-	5,5,5	0.60	0	5,5,5	0.59	0

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	GOL	H	202	-	-	2/4/4/4	-
3	GOL	J	202	-	-	0/4/4/4	-
3	GOL	L	202	-	-	2/4/4/4	-
3	GOL	B	202	-	-	2/4/4/4	-
3	GOL	D	202	-	-	0/4/4/4	-
3	GOL	I	202	-	-	4/4/4/4	-
3	GOL	F	202	-	-	2/4/4/4	-
3	GOL	K	202	-	-	4/4/4/4	-
3	GOL	A	202	-	-	2/4/4/4	-
3	GOL	C	202	-	-	4/4/4/4	-
3	GOL	E	202	-	-	0/4/4/4	-
3	GOL	G	202	-	-	2/4/4/4	-

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

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	L	201	ACT	CH3-C	3.93	1.53	1.48
2	B	201	ACT	CH3-C	3.62	1.53	1.48
2	H	201	ACT	CH3-C	3.60	1.53	1.48
3	B	202	GOL	O2-C2	-2.79	1.35	1.43
3	F	202	GOL	O2-C2	-2.15	1.37	1.43

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

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	I	202	GOL	O1-C1-C2	-3.76	92.16	110.20
3	B	202	GOL	O2-C2-C3	-2.68	97.33	109.12
3	F	202	GOL	O1-C1-C2	-2.35	98.91	110.20
3	K	202	GOL	O3-C3-C2	2.33	121.36	110.20
3	J	202	GOL	O1-C1-C2	-2.04	100.40	110.20

There are no chirality outliers.

5 of 24 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	H	202	GOL	C1-C2-C3-O3
3	B	202	GOL	O1-C1-C2-C3
3	K	202	GOL	O1-C1-C2-C3
3	K	202	GOL	C1-C2-C3-O3
3	G	202	GOL	C1-C2-C3-O3

There are no ring outliers.

9 monomers are involved in 22 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	E	202	GOL	4	0
3	K	202	GOL	2	0
3	G	202	GOL	1	0
3	D	202	GOL	1	0
3	I	202	GOL	3	0
3	C	202	GOL	3	0
3	J	202	GOL	6	0
2	H	201	ACT	1	0
3	A	202	GOL	1	0

## 5.7 Other polymers [i](#)

There are no such residues in this entry.

## 5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

## 6 Fit of model and data [i](#)

### 6.1 Protein, DNA and RNA chains [i](#)

In the following table, the column labelled ‘#RSRZ> 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95<sup>th</sup> percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled ‘Q< 0.9’ lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å <sup>2</sup> )	Q<0.9
1	A	159/162 (98%)	-0.19	0 <b>100</b> <b>100</b>	13, 21, 37, 48	0
1	B	158/162 (97%)	-0.03	4 (2%) 57 58	14, 22, 46, 66	0
1	C	159/162 (98%)	-0.08	2 (1%) 77 78	12, 22, 41, 53	0
1	D	160/162 (98%)	0.19	9 (5%) 24 24	14, 27, 53, 71	0
1	E	159/162 (98%)	0.01	4 (2%) 57 58	15, 22, 42, 58	0
1	F	159/162 (98%)	0.00	0 <b>100</b> <b>100</b>	14, 23, 42, 49	0
1	G	158/162 (97%)	0.05	5 (3%) 47 49	14, 22, 47, 66	0
1	H	160/162 (98%)	-0.14	1 (0%) 89 90	13, 20, 41, 49	0
1	I	159/162 (98%)	0.03	5 (3%) 49 50	14, 22, 42, 64	0
1	J	159/162 (98%)	0.07	2 (1%) 77 78	14, 25, 43, 60	0
1	K	159/162 (98%)	0.17	7 (4%) 34 34	15, 25, 50, 76	0
1	L	159/162 (98%)	0.09	6 (3%) 40 41	15, 24, 40, 54	0
All	All	1908/1944 (98%)	0.01	45 (2%) 59 60	12, 23, 44, 76	0

The worst 5 of 45 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	D	94	ASN	5.2
1	G	73	TYR	5.0
1	K	73	TYR	4.9
1	D	73	TYR	4.7
1	J	94	ASN	4.0

### 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. 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	B-factors(Å <sup>2</sup> )	Q<0.9
3	GOL	L	202	6/6	0.72	0.16	34,37,41,45	0
3	GOL	C	202	6/6	0.76	0.15	29,34,37,38	0
3	GOL	D	202	6/6	0.81	0.15	37,39,42,42	0
3	GOL	K	202	6/6	0.82	0.12	30,32,36,37	0
3	GOL	G	202	6/6	0.83	0.10	28,37,41,42	0
3	GOL	H	202	6/6	0.85	0.12	33,38,40,42	0
3	GOL	J	202	6/6	0.85	0.19	21,30,38,45	0
3	GOL	F	202	6/6	0.86	0.20	26,37,40,42	0
3	GOL	I	202	6/6	0.86	0.09	28,36,40,42	0
3	GOL	E	202	6/6	0.88	0.11	29,35,42,47	0
3	GOL	A	202	6/6	0.88	0.13	35,37,42,43	0
3	GOL	B	202	6/6	0.89	0.14	27,31,33,36	0
2	ACT	C	201	4/4	0.95	0.07	15,15,15,16	0
2	ACT	K	201	4/4	0.95	0.07	20,20,22,23	0
2	ACT	A	201	4/4	0.95	0.07	15,16,18,18	0
2	ACT	L	201	4/4	0.95	0.07	18,18,20,21	0
2	ACT	E	201	4/4	0.96	0.06	14,17,18,18	0
2	ACT	I	201	4/4	0.97	0.06	17,17,18,19	0
2	ACT	G	201	4/4	0.97	0.07	18,19,19,19	0
2	ACT	H	201	4/4	0.97	0.06	16,16,17,18	0
2	ACT	F	201	4/4	0.97	0.10	19,20,20,21	0
2	ACT	B	201	4/4	0.97	0.10	19,20,20,22	0
2	ACT	J	201	4/4	0.98	0.06	17,18,19,21	0
4	CL	F	203	1/1	0.99	0.06	18,18,18,18	0
4	CL	E	203	1/1	0.99	0.05	20,20,20,20	0
2	ACT	D	201	4/4	0.99	0.05	20,22,24,24	0
4	CL	K	203	1/1	0.99	0.04	19,19,19,19	0
4	CL	A	203	1/1	1.00	0.06	19,19,19,19	0
4	CL	I	203	1/1	1.00	0.07	18,18,18,18	0
4	CL	C	203	1/1	1.00	0.04	19,19,19,19	0

## 6.5 Other polymers

There are no such residues in this entry.