Full wwPDB X-ray Structure Validation Report (i)

Nov 30, 2023 – 09:22 AM EST

PDB ID	:	3RUL
Title	:	New strategy to analyze structures of glycopeptide-target complexes
Authors	:	Economou, N.J.; Nahoum, V.; Weeks, S.D.; Grasty, K.C.; Loll, P.J.
Deposited on	:	2011-05-05
Resolution	:	2.50 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*
A user guide is available at
https://www.wwpdb.org/validation/2017/XrayValidationReportHelp
with specific help available everywhere you see the (i) symbol.

The types of validation reports are described at
http://www.wwpdb.org/validation/2017/FAQs#types.

The following versions of software and data (see references (i)) were used in the production of this report:

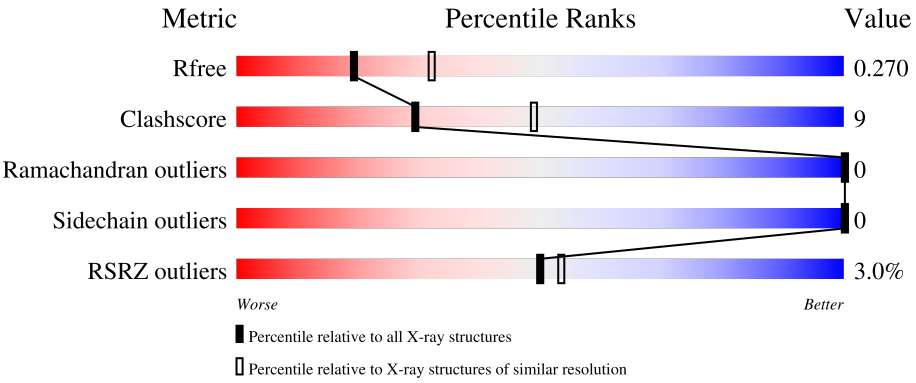
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.36
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.36

1 Overall quality at a glance (i)

The following experimental techniques were used to determine the structure:
X-RAY DIFFRACTION

The reported resolution of this entry is 2.50 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}	130704	4661 (2.50-2.50)
Clashscore	141614	5346 (2.50-2.50)
Ramachandran outliers	138981	5231 (2.50-2.50)
Sidechain outliers	138945	5233 (2.50-2.50)
RSRZ outliers	127900	4559 (2.50-2.50)

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 of the lower bar indicate the fraction of residues that contain outliers for >=3, 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions <=5% The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	79	92% 8%
1	B	79	4% 89% 11%
1	C	79	4% 92% 8%
1	D	79	3% 85% 15%
2	E	7	14% 14% 71%

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Mol	Chain	Length	Quality of chain
2	F	7	43% 57%
2	G	7	43% 57%
2	H	7	29% 71%

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
7	M12	E	10	-	-	X	-
7	M12	G	10	-	-	X	X

2 Entry composition (i)

There are 8 unique types of molecules in this entry. The entry contains 3060 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 Ubiquitin.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	79	Total	C	N	O	S	0	0	0
			623	391	109	121	2			
1	B	79	Total	C	N	O	S	0	0	0
			623	391	109	121	2			
1	C	79	Total	C	N	O	S	0	0	0
			623	391	109	121	2			
1	D	79	Total	C	N	O	S	0	0	0
			623	391	109	121	2			

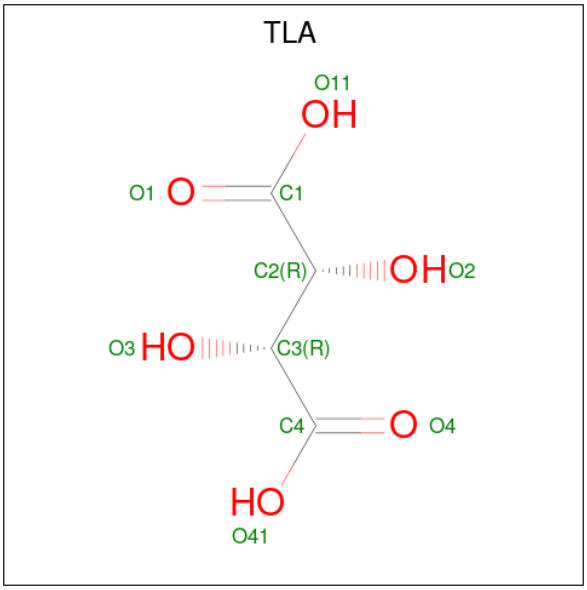
There are 16 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	76	CCS	-	SEE REMARK 999	UNP P0CG48
A	77	LYS	-	SEE REMARK 999	UNP P0CG48
A	78	DAL	-	SEE REMARK 999	UNP P0CG48
A	79	DAL	-	SEE REMARK 999	UNP P0CG48
B	76	CCS	-	SEE REMARK 999	UNP P0CG48
B	77	LYS	-	SEE REMARK 999	UNP P0CG48
B	78	DAL	-	SEE REMARK 999	UNP P0CG48
B	79	DAL	-	SEE REMARK 999	UNP P0CG48
C	76	CCS	-	SEE REMARK 999	UNP P0CG48
C	77	LYS	-	SEE REMARK 999	UNP P0CG48
C	78	DAL	-	SEE REMARK 999	UNP P0CG48
C	79	DAL	-	SEE REMARK 999	UNP P0CG48
D	76	CCS	-	SEE REMARK 999	UNP P0CG48
D	77	LYS	-	SEE REMARK 999	UNP P0CG48
D	78	DAL	-	SEE REMARK 999	UNP P0CG48
D	79	DAL	-	SEE REMARK 999	UNP P0CG48

- Molecule 2 is a protein called Dalbavancin.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	E	7	Total	C	Cl	N	O	0	0	0
			91	64	2	9	16			
2	F	7	Total	C	Cl	N	O	0	0	0
			91	64	2	9	16			
2	G	7	Total	C	Cl	N	O	0	0	0
			91	64	2	9	16			
2	H	7	Total	C	Cl	N	O	0	0	0
			91	64	2	9	16			

- Molecule 3 is L(+)-TARTARIC ACID (three-letter code: TLA) (formula: $C_4H_6O_6$).

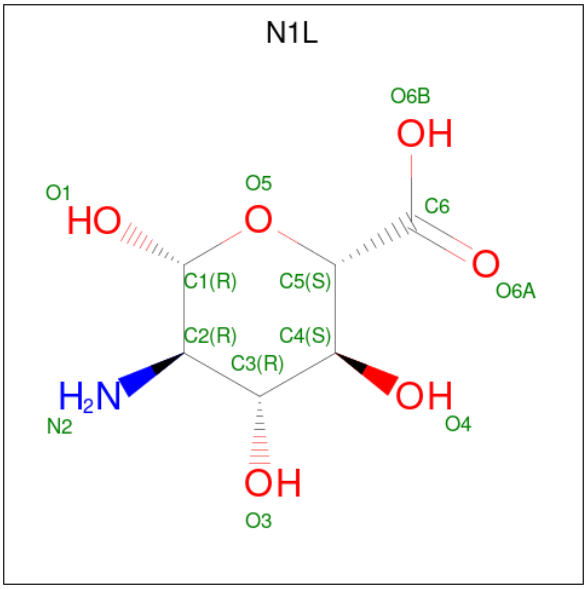


Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	A	1	Total	C	O	0	0
			10	4	6		
3	A	1	Total	C	O	0	0
			10	4	6		
3	B	1	Total	C	O	0	0
			10	4	6		
3	B	1	Total	C	O	0	0
			10	4	6		

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

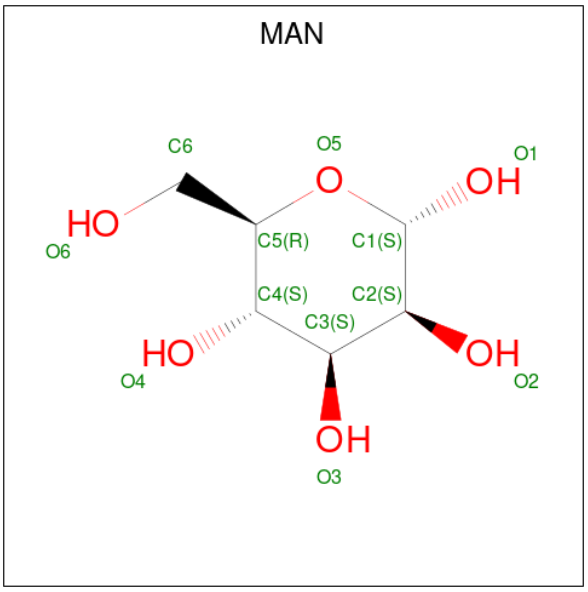
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	B	1	Total	Cl	0	0
			1	1		

- Molecule 5 is 2-amino-2-deoxy-beta-D-glucopyranuronic acid (three-letter code: N1L) (formula: $C_6H_{11}NO_6$).



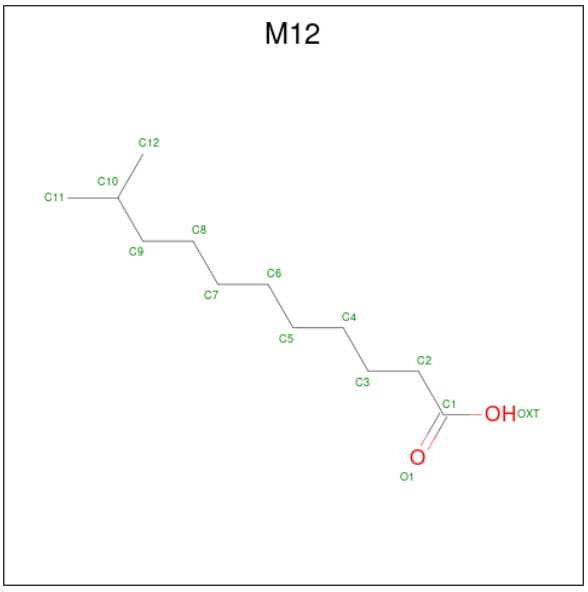
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
5	E	1	Total	C	N	O	0	0
			12	6	1	5		
5	F	1	Total	C	N	O	0	0
			12	6	1	5		
5	G	1	Total	C	N	O	0	0
			12	6	1	5		
5	H	1	Total	C	N	O	0	0
			12	6	1	5		

- Molecule 6 is alpha-D-mannopyranose (three-letter code: MAN) (formula: $C_6H_{12}O_6$).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
6	E	1	Total C O 12 6 6	0	0
6	F	1	Total C O 12 6 6	0	0
6	G	1	Total C O 12 6 6	0	0
6	H	1	Total C O 12 6 6	0	0

- Molecule 7 is 10-METHYLUNDECANOIC ACID (three-letter code: M12) (formula: $C_{12}H_{24}O_2$).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
7	E	1	Total C O 13 12 1	0	0
7	F	1	Total C O 13 12 1	0	0
7	G	1	Total C O 13 12 1	0	0
7	H	1	Total C O 13 12 1	0	0

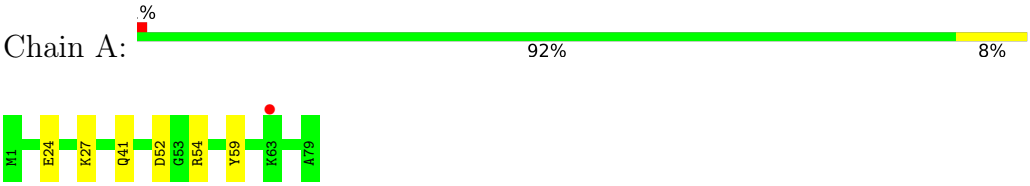
- Molecule 8 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
8	A	4	Total O 4 4	0	0
8	B	2	Total O 2 2	0	0
8	C	2	Total O 2 2	0	0
8	D	3	Total O 3 3	0	0
8	G	1	Total O 1 1	0	0
8	H	3	Total O 3 3	0	0

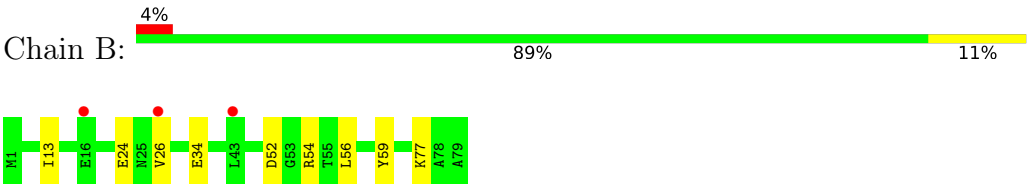
3 Residue-property plots (i)

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

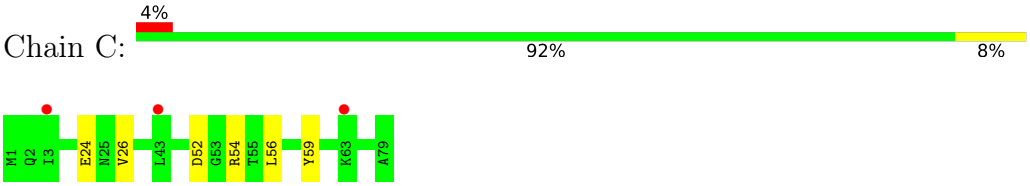
• Molecule 1: Ubiquitin



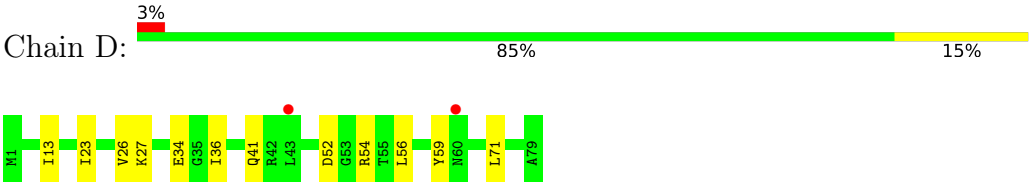
• Molecule 1: Ubiquitin



• Molecule 1: Ubiquitin



• Molecule 1: Ubiquitin



• Molecule 2: Dalbavancin

• Molecule 2: Dalbavancin

Chain F:

• Molecule 2: Dalbavancin

Chain G:

• Molecule 2: Dalbavancin

Chain H:

4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α, β, γ	53.30Å 86.25Å 107.19Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	19.60 – 2.50 19.60 – 2.50	Depositor EDS
% Data completeness (in resolution range)	99.9 (19.60-2.50) 99.9 (19.60-2.50)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	4.03 (at 2.50Å)	Xtriage
Refinement program	PHENIX 1.6.2_432	Depositor
R, R_{free}	0.243 , 0.277 0.240 , 0.270	Depositor DCC
R_{free} test set	908 reflections (5.15%)	wwPDB-VP
Wilson B-factor (Å^2)	50.8	Xtriage
Anisotropy	0.843	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.30 , 40.3	EDS
L-test for twinning[2]	$< \|L\| > = 0.49$, $< L^2 > = 0.32$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.94	EDS
Total number of atoms	3060	wwPDB-VP
Average B, all atoms (Å^2)	70.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.31% of the height of the origin peak. No significant pseudotranslation is detected.*

[1] Intensities estimated from amplitudes.

[2] Theoretical values of $< |L| >$, $< L^2 >$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: MAN, OMY, GHP, CL, HCL, DAL, CCS, M12, HGM, HG7, TLA, DTY, N1L

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	0.34	0/611	0.48	0/819
1	B	0.33	0/611	0.48	0/819
1	C	0.31	0/611	0.46	0/819
1	D	0.30	0/611	0.47	0/819
All	All	0.32	0/2444	0.47	0/3276

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
2	G	0	1

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
2	G	5	GHP	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	623	0	650	4	0
1	B	623	0	650	6	0
1	C	623	0	650	3	0
1	D	623	0	650	6	0
2	E	91	0	48	5	0
2	F	91	0	48	6	0
2	G	91	0	47	6	0
2	H	91	0	49	8	0
3	A	20	0	8	0	0
3	B	20	0	8	0	0
4	B	1	0	0	0	0
5	E	12	0	7	0	0
5	F	12	0	6	0	0
5	G	12	0	6	0	0
5	H	12	0	6	0	0
6	E	12	0	11	1	0
6	F	12	0	11	0	0
6	G	12	0	11	0	0
6	H	12	0	11	0	0
7	E	13	0	23	8	0
7	F	13	0	23	4	0
7	G	13	0	23	8	0
7	H	13	0	23	6	0
8	A	4	0	0	0	0
8	B	2	0	0	0	0
8	C	2	0	0	0	0
8	D	3	0	0	0	0
8	G	1	0	0	0	0
8	H	3	0	0	0	0
All	All	3060	0	2969	57	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 9.

All (57) 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)
7:E:10:M12:H62C	7:E:10:M12:H10	1.45	0.98
7:G:10:M12:H61C	7:H:10:M12:H71C	1.57	0.85
7:G:10:M12:H122	7:G:10:M12:H62C	1.68	0.74
7:E:10:M12:H10	7:E:10:M12:C6	2.17	0.74
7:E:10:M12:H112	7:F:10:M12:H51C	1.72	0.72

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:H:4:GHP:HA	7:H:10:M12:H112	1.72	0.72
7:E:10:M12:H91C	7:F:10:M12:H52C	1.73	0.69
2:F:2:DTY:HE2	7:F:10:M12:H81C	1.74	0.68
2:G:2:DTY:CE2	2:G:4:GHP:HC2	2.27	0.64
7:E:10:M12:H112	7:F:10:M12:C5	2.29	0.63
2:F:2:DTY:CE2	2:F:4:GHP:HC2	2.29	0.62
2:G:6:OMY:N	2:G:6:OMY:CD2	2.57	0.61
1:D:36:ILE:HD13	1:D:71:LEU:HD21	1.82	0.61
7:G:10:M12:H113	7:H:10:M12:C7	2.31	0.60
2:H:2:DTY:CE2	2:H:4:GHP:HC2	2.32	0.59
1:C:24:GLU:HG2	1:C:52:ASP:HB3	1.89	0.55
1:B:24:GLU:HG2	1:B:52:ASP:HB3	1.91	0.52
1:B:77:LYS:O	2:F:6:OMY:HA	2.10	0.52
1:D:13:ILE:HD11	1:D:34:GLU:HG3	1.92	0.52
2:E:1:HGM:C2	2:E:3:HCL:C5	2.86	0.51
2:F:6:OMY:CD2	2:F:6:OMY:N	2.70	0.51
2:G:6:OMY:HE2	7:G:10:M12:H91C	1.93	0.49
2:E:1:HGM:C2	2:E:3:HCL:H5	2.43	0.49
2:F:1:HGM:C5	2:F:1:HGM:HH3A	2.43	0.49
1:C:26:VAL:HG21	1:C:56:LEU:HD11	1.94	0.48
2:G:1:HGM:HH3A	2:G:1:HGM:C5	2.43	0.48
7:G:10:M12:H113	7:H:10:M12:H72C	1.96	0.48
1:B:13:ILE:HD11	1:B:34:GLU:HG3	1.95	0.47
7:E:10:M12:C6	7:E:10:M12:C10	2.92	0.47
2:H:1:HGM:C5	2:H:1:HGM:HH3A	2.45	0.47
7:G:10:M12:H122	7:G:10:M12:C6	2.40	0.47
2:E:7:HG7:H4	6:E:9:MAN:O5	2.14	0.47
2:H:1:HGM:C2	2:H:3:HCL:C5	2.93	0.47
1:A:24:GLU:HG2	1:A:52:ASP:HB3	1.96	0.46
7:G:10:M12:C6	7:H:10:M12:H71C	2.38	0.46
1:D:27:LYS:HA	1:D:41:GLN:HE22	1.81	0.46
2:H:4:GHP:HA	7:H:10:M12:C11	2.44	0.45
1:D:23:ILE:HB	1:D:52:ASP:HA	2.00	0.44
1:A:27:LYS:HA	1:A:41:GLN:HE22	1.82	0.43
1:A:27:LYS:HG2	1:A:41:GLN:NE2	2.33	0.43
2:E:6:OMY:N	2:E:6:OMY:CD2	2.80	0.43
2:G:2:DTY:CE2	2:G:4:GHP:C2	2.95	0.42
7:G:10:M12:H62C	7:G:10:M12:C12	2.46	0.42
1:D:54:ARG:HD3	1:D:59:TYR:OH	2.20	0.42
2:H:1:HGM:HH3A	2:H:1:HGM:H5	2.01	0.42
2:E:4:GHP:C5	7:E:10:M12:H121	2.50	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
7:E:10:M12:H31C	7:E:10:M12:H61C	1.76	0.42
1:B:26:VAL:HG21	1:B:56:LEU:HD11	2.00	0.42
1:D:26:VAL:HG21	1:D:56:LEU:HD11	2.03	0.41
2:G:1:HGM:C2	2:G:3:HCL:C5	2.95	0.41
1:A:54:ARG:HD3	1:A:59:TYR:OH	2.21	0.41
2:H:1:HGM:C2	2:H:3:HCL:H5	2.51	0.41
2:H:5:GHP:HA	2:H:6:OMY:HA	1.94	0.41
1:C:54:ARG:HD3	1:C:59:TYR:OH	2.21	0.40
1:B:54:ARG:HD3	1:B:59:TYR:OH	2.22	0.40
2:F:1:HGM:C2	2:F:3:HCL:C5	2.99	0.40
1:B:24:GLU:CG	1:B:52:ASP:HB3	2.51	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	75/79 (95%)	75 (100%)	0	0	100	100
1	B	75/79 (95%)	75 (100%)	0	0	100	100
1	C	75/79 (95%)	75 (100%)	0	0	100	100
1	D	75/79 (95%)	75 (100%)	0	0	100	100
All	All	300/316 (95%)	300 (100%)	0	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	69/69 (100%)	69 (100%)	0	100	100
1	B	69/69 (100%)	69 (100%)	0	100	100
1	C	69/69 (100%)	69 (100%)	0	100	100
1	D	69/69 (100%)	69 (100%)	0	100	100
All	All	276/276 (100%)	276 (100%)	0	100	100

There are no protein residues with a non-rotameric sidechain to report.

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

Mol	Chain	Res	Type
1	A	41	GLN
1	B	40	GLN
1	B	41	GLN
1	C	40	GLN
1	C	41	GLN
1	D	40	GLN
1	D	41	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)

40 non-standard protein/DNA/RNA residues 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	HCL	H	3	2	12,13,14	0.84	1 (8%)	13,18,20	0.72	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\|>2$	Counts	RMSZ	$\#\|Z\|>2$
2	OMY	F	6	2	12,14,15	0.64	0	17,19,21	2.84	2 (11%)
2	HCL	E	3	2	12,13,14	1.15	1 (8%)	13,18,20	0.94	0
2	GHP	G	4	5,2	10,11,12	1.15	0	11,14,16	0.71	0
1	CCS	D	76	-	4,5,10	0.69	0	1,5,12	0.48	0
1	CCS	A	76	-	4,5,10	0.69	0	1,5,12	0.62	0
2	GHP	H	4	5,2	10,11,12	1.52	1 (10%)	11,14,16	0.49	0
2	HG7	E	7	6,2	16,18,18	0.51	0	20,23,23	1.57	3 (15%)
2	HGM	H	1	2	12,12,13	1.36	1 (8%)	11,15,17	1.21	2 (18%)
2	GHP	E	5	2	10,11,12	1.08	1 (10%)	11,14,16	0.79	0
2	OMY	E	6	2	12,14,15	0.66	0	17,19,21	2.00	1 (5%)
1	CCS	C	76	-	4,5,10	0.60	0	1,5,12	0.68	0
2	HGM	F	1	2	12,12,13	1.29	1 (8%)	11,15,17	0.72	0
2	GHP	H	5	2	10,11,12	0.65	0	11,14,16	1.17	2 (18%)
2	HG7	G	7	6,2	16,18,18	1.01	1 (6%)	20,23,23	1.69	3 (15%)
2	HGM	E	1	2	12,12,13	1.07	1 (8%)	11,15,17	0.68	0
1	CCS	B	76	-	4,5,10	0.82	0	1,5,12	0.26	0
2	GHP	F	4	5,2	10,11,12	1.67	1 (10%)	11,14,16	0.39	0
2	GHP	E	4	5,2	10,11,12	1.53	1 (10%)	11,14,16	0.32	0
2	GHP	F	5	2	10,11,12	0.57	0	11,14,16	1.37	3 (27%)
2	OMY	H	6	2	12,14,15	0.55	0	17,19,21	2.30	1 (5%)
2	HGM	G	1	2	12,12,13	1.44	1 (8%)	11,15,17	0.83	0
2	HG7	F	7	6,2	16,18,18	0.80	1 (6%)	20,23,23	1.67	3 (15%)
2	HCL	G	3	2	12,13,14	0.93	1 (8%)	13,18,20	1.12	1 (7%)
2	GHP	G	5	2	10,11,12	0.71	0	11,14,16	1.68	3 (27%)
2	HCL	F	3	2	12,13,14	0.92	0	13,18,20	1.06	1 (7%)
2	HG7	H	7	6,2	16,18,18	0.74	0	20,23,23	1.60	3 (15%)
2	OMY	G	6	2	12,14,15	0.92	1 (8%)	17,19,21	2.59	1 (5%)

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	HCL	H	3	2	-	0/3/6/8	0/1/1/1
2	OMY	F	6	2	-	1/9/10/12	0/1/1/1
2	HCL	E	3	2	-	0/3/6/8	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	GHP	G	4	5,2	-	2/4/6/8	0/1/1/1
1	CCS	D	76	-	-	0/1/4/10	-
1	CCS	A	76	-	-	0/1/4/10	-
2	GHP	H	4	5,2	-	2/4/6/8	0/1/1/1
2	HG7	E	7	6,2	-	0/15/15/15	0/1/1/1
2	HGM	H	1	2	-	4/5/8/10	0/1/1/1
2	GHP	E	5	2	-	0/4/6/8	0/1/1/1
2	OMY	E	6	2	-	1/9/10/12	0/1/1/1
1	CCS	C	76	-	-	0/1/4/10	-
2	HGM	F	1	2	-	4/5/8/10	0/1/1/1
2	GHP	H	5	2	-	0/4/6/8	0/1/1/1
2	HG7	G	7	6,2	-	0/15/15/15	0/1/1/1
2	HGM	E	1	2	-	4/5/8/10	0/1/1/1
1	CCS	B	76	-	-	0/1/4/10	-
2	GHP	F	4	5,2	-	2/4/6/8	0/1/1/1
2	GHP	E	4	5,2	-	2/4/6/8	0/1/1/1
2	GHP	F	5	2	-	0/4/6/8	0/1/1/1
2	OMY	H	6	2	-	1/9/10/12	0/1/1/1
2	HGM	G	1	2	-	4/5/8/10	0/1/1/1
2	HG7	F	7	6,2	-	0/15/15/15	0/1/1/1
2	HCL	G	3	2	-	0/3/6/8	0/1/1/1
2	GHP	G	5	2	-	0/4/6/8	0/1/1/1
2	HCL	F	3	2	-	0/3/6/8	0/1/1/1
2	HG7	H	7	6,2	-	2/15/15/15	0/1/1/1
2	OMY	G	6	2	-	2/9/10/12	0/1/1/1

All (14) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	G	1	HGM	C1-CA	-4.49	1.48	1.52
2	H	1	HGM	C1-CA	-4.32	1.48	1.52
2	F	4	GHP	C1-CA	4.05	1.56	1.52
2	F	1	HGM	C1-CA	-3.96	1.48	1.52
2	E	4	GHP	C1-CA	3.89	1.56	1.52
2	H	4	GHP	C1-CA	3.73	1.56	1.52
2	G	7	HG7	C1-CA	3.17	1.56	1.52
2	E	1	HGM	C1-CA	-3.01	1.49	1.52
2	E	3	HCL	CA-C	2.96	1.57	1.51
2	E	5	GHP	CA-C	2.46	1.56	1.51
2	G	6	OMY	CG-CB	2.45	1.55	1.51

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	G	3	HCL	CA-C	2.08	1.55	1.51
2	H	3	HCL	C1-CA	2.03	1.55	1.52
2	F	7	HG7	C1-CA	2.00	1.54	1.52

All (29) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	F	6	OMY	CG-CB-CA	-10.86	96.95	111.49
2	G	6	OMY	CG-CB-CA	-10.24	97.78	111.49
2	H	6	OMY	CG-CB-CA	-8.37	100.28	111.49
2	E	6	OMY	CG-CB-CA	-7.67	101.22	111.49
2	G	7	HG7	C2A-N1A-C	-5.21	113.29	122.59
2	F	7	HG7	C2A-N1A-C	-5.09	113.50	122.59
2	H	7	HG7	C2A-N1A-C	-4.92	113.81	122.59
2	E	7	HG7	C2A-N1A-C	-4.84	113.95	122.59
2	G	5	GHP	C1-CA-N	3.84	121.60	112.40
2	G	7	HG7	CA-C-N1A	3.39	119.34	115.57
2	E	7	HG7	C5-C6-C1	-2.83	117.15	120.65
2	F	7	HG7	CA-C-N1A	2.49	118.34	115.57
2	H	5	GHP	C5-C6-C1	-2.46	118.72	121.20
2	F	7	HG7	C5-C6-C1	-2.45	117.62	120.65
2	G	3	HCL	C1-CA-N	-2.41	106.37	112.10
2	H	7	HG7	CA-C-N1A	2.41	118.25	115.57
2	F	5	GHP	C1-CA-N	2.38	118.10	112.40
2	G	5	GHP	C6-C1-C2	2.36	121.24	118.29
2	G	5	GHP	C5-C6-C1	-2.35	118.83	121.20
2	E	7	HG7	CA-C-N1A	2.33	118.16	115.57
2	H	7	HG7	C5-C6-C1	-2.30	117.81	120.65
2	H	1	HGM	C3-C2-C1	-2.29	118.89	121.20
2	F	3	HCL	C1-CA-N	-2.25	106.74	112.10
2	F	5	GHP	C2-C1-CA	-2.21	117.09	120.65
2	H	1	HGM	C1-CA-N	-2.18	106.47	112.57
2	G	7	HG7	C5-C6-C1	-2.17	117.96	120.65
2	F	6	OMY	ODE-CB-CA	2.14	111.81	107.28
2	F	5	GHP	C5-C6-C1	-2.06	119.13	121.20
2	H	5	GHP	C6-C1-C2	2.02	120.81	118.29

There are no chirality outliers.

All (31) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	E	6	OMY	O-C-CA-CB

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Mol	Chain	Res	Type	Atoms
2	F	6	OMY	O-C-CA-CB
2	G	6	OMY	N-CA-CB-CG
2	H	6	OMY	O-C-CA-CB
2	E	4	GHP	C2-C1-CA-C
2	E	4	GHP	C6-C1-CA-C
2	H	4	GHP	C2-C1-CA-C
2	H	4	GHP	C6-C1-CA-C
2	E	1	HGM	C2-C1-CA-C
2	E	1	HGM	C5-C1-CA-C
2	F	1	HGM	C2-C1-CA-C
2	F	1	HGM	C5-C1-CA-C
2	G	1	HGM	C2-C1-CA-C
2	G	1	HGM	C5-C1-CA-C
2	H	1	HGM	C2-C1-CA-C
2	H	1	HGM	C5-C1-CA-C
2	E	1	HGM	C5-C1-CA-N
2	E	1	HGM	C2-C1-CA-N
2	F	1	HGM	C2-C1-CA-N
2	H	1	HGM	C5-C1-CA-N
2	H	7	HG7	C2-C1-CA-C
2	F	1	HGM	C5-C1-CA-N
2	G	1	HGM	C2-C1-CA-N
2	H	1	HGM	C2-C1-CA-N
2	G	1	HGM	C5-C1-CA-N
2	F	4	GHP	C2-C1-CA-C
2	F	4	GHP	C6-C1-CA-C
2	G	4	GHP	C2-C1-CA-C
2	G	6	OMY	O-C-CA-CB
2	G	4	GHP	C6-C1-CA-C
2	H	7	HG7	C6-C1-CA-C

There are no ring outliers.

18 monomers are involved in 24 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	H	3	HCL	2	0
2	F	6	OMY	2	0
2	E	3	HCL	2	0
2	G	4	GHP	2	0
2	H	4	GHP	3	0
2	E	7	HG7	1	0
2	H	1	HGM	4	0

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Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	E	6	OMY	1	0
2	F	1	HGM	2	0
2	H	5	GHP	1	0
2	E	1	HGM	2	0
2	F	4	GHP	1	0
2	E	4	GHP	1	0
2	H	6	OMY	1	0
2	G	1	HGM	2	0
2	G	3	HCL	1	0
2	F	3	HCL	1	0
2	G	6	OMY	2	0

5.5 Carbohydrates (i)

There are no monosaccharides in this entry.

5.6 Ligand geometry (i)

Of 17 ligands modelled in this entry, 1 is monoatomic - leaving 16 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	$\#\|Z\| > 2$
5	N1L	F	8	2,7	12,12,13	1.00	0	11,17,19	1.03	1 (9%)
7	M12	E	10	5	12,12,13	0.44	0	12,12,14	1.09	1 (8%)
6	MAN	E	9	2	12,12,12	0.74	0	17,17,17	0.73	0
5	N1L	H	8	2,7	12,12,13	0.88	0	11,17,19	1.30	1 (9%)
5	N1L	E	8	2,7	12,12,13	0.75	0	11,17,19	1.02	1 (9%)
6	MAN	H	9	2	12,12,12	0.52	0	17,17,17	1.04	0
7	M12	F	10	5	12,12,13	0.30	0	12,12,14	1.03	0
3	TLA	B	102	-	9,9,9	1.36	1 (11%)	12,12,12	0.96	0
3	TLA	A	101	-	9,9,9	1.04	0	12,12,12	1.30	1 (8%)
7	M12	H	10	5	12,12,13	0.38	0	12,12,14	1.08	0
5	N1L	G	8	2,7	12,12,13	1.18	1 (8%)	11,17,19	0.89	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\|>2$	Counts	RMSZ	$\#\|Z\|>2$
3	TLA	A	102	-	9,9,9	1.06	0	12,12,12	1.30	0
6	MAN	G	9	2	12,12,12	0.69	0	17,17,17	0.74	0
3	TLA	B	101	-	9,9,9	1.04	0	12,12,12	1.06	1 (8%)
7	M12	G	10	5	12,12,13	0.57	0	12,12,14	0.98	0
6	MAN	F	9	2	12,12,12	0.68	0	17,17,17	1.02	2 (11%)

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
5	N1L	F	8	2,7	-	1/4/21/24	0/1/1/1
7	M12	E	10	5	-	0/9/10/11	-
6	MAN	E	9	2	-	1/2/22/22	0/1/1/1
5	N1L	H	8	2,7	-	1/4/21/24	0/1/1/1
5	N1L	E	8	2,7	-	2/4/21/24	0/1/1/1
6	MAN	H	9	2	-	0/2/22/22	0/1/1/1
7	M12	F	10	5	-	0/9/10/11	-
3	TLA	B	102	-	-	6/12/12/12	-
3	TLA	A	101	-	-	4/12/12/12	-
7	M12	H	10	5	-	1/9/10/11	-
5	N1L	G	8	2,7	-	0/4/21/24	0/1/1/1
3	TLA	A	102	-	-	8/12/12/12	-
6	MAN	G	9	2	-	1/2/22/22	0/1/1/1
3	TLA	B	101	-	-	0/12/12/12	-
7	M12	G	10	5	-	0/9/10/11	-
6	MAN	F	9	2	-	1/2/22/22	0/1/1/1

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	G	8	N1L	C1-C2	2.90	1.55	1.52
3	B	102	TLA	C3-C4	2.42	1.55	1.52

All (8) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
5	H	8	N1L	C3-C2-N2	-2.63	105.76	110.97
5	E	8	N1L	C4-C3-C2	-2.37	107.36	111.37
7	E	10	M12	C3-C2-C1	-2.36	103.76	114.26

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
6	F	9	MAN	O1-C1-O5	-2.29	103.52	110.38
3	A	101	TLA	O4-C4-C3	-2.17	115.93	121.63
6	F	9	MAN	O3-C3-C4	-2.07	105.55	110.35
5	F	8	N1L	O3-C3-C4	-2.06	105.58	110.35
3	B	101	TLA	O4-C4-C3	-2.04	116.28	121.63

There are no chirality outliers.

All (26) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	101	TLA	O1-C1-C2-O2
3	A	101	TLA	O3-C3-C4-O4
3	A	102	TLA	O1-C1-C2-O2
3	A	102	TLA	O11-C1-C2-O2
3	B	102	TLA	O3-C3-C4-O4
3	A	101	TLA	O11-C1-C2-O2
3	A	101	TLA	O3-C3-C4-O41
3	A	102	TLA	O3-C3-C4-O4
3	A	102	TLA	O3-C3-C4-O41
3	B	102	TLA	O3-C3-C4-O41
3	A	102	TLA	O1-C1-C2-C3
3	A	102	TLA	O11-C1-C2-C3
3	A	102	TLA	C2-C3-C4-O4
3	A	102	TLA	C2-C3-C4-O41
3	B	102	TLA	O11-C1-C2-O2
6	G	9	MAN	O5-C5-C6-O6
3	B	102	TLA	O1-C1-C2-O2
6	F	9	MAN	O5-C5-C6-O6
6	E	9	MAN	O5-C5-C6-O6
3	B	102	TLA	O1-C1-C2-C3
5	H	8	N1L	O5-C5-C6-O6A
3	B	102	TLA	O11-C1-C2-C3
7	H	10	M12	C3-C4-C5-C6
5	E	8	N1L	O5-C5-C6-O6B
5	E	8	N1L	O5-C5-C6-O6A
5	F	8	N1L	O5-C5-C6-O6B

There are no ring outliers.

5 monomers are involved in 20 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
7	E	10	M12	8	0
6	E	9	MAN	1	0
7	F	10	M12	4	0
7	H	10	M12	6	0
7	G	10	M12	8	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^{th} percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled 'Q< 0.9' lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2			OWAB(Å^2)	Q<0.9
1	A	76/79 (96%)	0.14	1 (1%)	77	79	41, 60, 87, 99	0
1	B	76/79 (96%)	0.22	3 (3%)	39	42	42, 63, 99, 117	0
1	C	76/79 (96%)	0.38	3 (3%)	39	42	44, 73, 109, 115	0
1	D	76/79 (96%)	0.40	2 (2%)	56	59	49, 75, 112, 158	0
2	E	0/7	-	-			-	-
2	F	0/7	-	-			-	-
2	G	0/7	-	-			-	-
2	H	0/7	-	-			-	-
All	All	304/344 (88%)	0.29	9 (2%)	50	53	41, 68, 107, 158	0

All (9) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	3	ILE	2.8
1	C	63	LYS	2.7
1	D	60	ASN	2.6
1	B	26	VAL	2.6
1	C	43	LEU	2.5
1	A	63	LYS	2.4
1	D	43	LEU	2.3
1	B	16	GLU	2.2
1	B	43	LEU	2.1

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

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^{th} percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
1	CCS	C	76	6/11	0.82	0.23	65,78,78,104	0
1	CCS	B	76	6/11	0.83	0.23	65,77,83,98	0
2	HG7	G	7	18/18	0.85	0.28	58,75,125,140	0
1	DAL	B	79	6/6	0.89	0.25	48,56,60,63	0
2	HG7	E	7	18/18	0.90	0.29	57,69,117,118	0
1	CCS	D	76	6/11	0.91	0.14	62,71,75,87	0
2	GHP	H	4	11/12	0.91	0.10	49,56,67,69	0
1	DAL	D	78	5/6	0.92	0.21	48,61,66,72	0
2	OMY	F	6	14/15	0.92	0.13	47,60,68,68	0
2	OMY	G	6	14/15	0.92	0.13	53,61,75,81	0
1	CCS	A	76	6/11	0.92	0.13	60,71,76,85	0
2	GHP	G	4	11/12	0.92	0.12	43,50,54,58	0
2	HG7	H	7	18/18	0.92	0.17	50,68,93,95	0
1	DAL	C	79	6/6	0.93	0.11	44,45,52,52	0
2	HGM	F	1	12/13	0.93	0.14	41,56,64,69	0
2	GHP	E	5	11/12	0.93	0.17	50,56,61,61	0
2	HG7	F	7	18/18	0.93	0.17	46,65,134,139	0
2	GHP	G	5	11/12	0.93	0.12	35,51,64,66	0
2	GHP	H	5	11/12	0.93	0.11	43,53,55,61	0
1	DAL	D	79	6/6	0.94	0.13	48,58,63,63	0
1	DAL	C	78	5/6	0.94	0.13	54,54,62,64	0
2	HGM	H	1	12/13	0.94	0.13	54,63,70,74	0
2	DTY	G	2	12/13	0.94	0.13	39,50,53,54	0
2	DTY	H	2	12/13	0.94	0.12	39,42,51,60	0
2	OMY	E	6	14/15	0.94	0.10	50,58,65,67	0
2	GHP	E	4	11/12	0.95	0.11	43,59,67,69	0
2	HGM	G	1	12/13	0.95	0.12	45,48,57,59	0
1	DAL	A	78	5/6	0.95	0.11	46,46,53,55	0
2	OMY	H	6	14/15	0.95	0.15	41,51,59,68	0
2	DTY	F	2	12/13	0.95	0.15	44,49,58,60	0
2	GHP	F	5	11/12	0.95	0.10	43,45,54,62	0
2	HGM	E	1	12/13	0.95	0.12	41,49,54,63	0
1	DAL	A	79	6/6	0.95	0.16	42,47,52,54	0
2	HCL	F	3	13/14	0.96	0.15	39,50,56,58	0
2	HCL	E	3	13/14	0.96	0.11	46,50,57,65	0
2	DTY	E	2	12/13	0.97	0.11	39,51,57,65	0
2	GHP	F	4	11/12	0.97	0.09	46,53,66,71	0
1	DAL	B	78	5/6	0.97	0.21	49,49,57,58	0
2	HCL	H	3	13/14	0.97	0.12	38,47,56,63	0
2	HCL	G	3	13/14	0.98	0.14	42,48,55,57	0

6.3 Carbohydrates (i)

There are no monosaccharides in this entry.

6.4 Ligands (i)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95^{th} percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
7	M12	G	10	13/14	0.74	0.48	69,101,122,127	0
7	M12	E	10	13/14	0.79	0.38	59,103,121,123	0
3	TLA	A	102	10/10	0.84	0.17	50,70,74,75	0
5	N1L	F	8	12/13	0.84	0.19	50,64,76,77	0
7	M12	H	10	13/14	0.86	0.31	57,85,111,123	0
7	M12	F	10	13/14	0.87	0.38	59,104,122,128	0
3	TLA	A	101	10/10	0.89	0.22	69,76,86,90	0
6	MAN	F	9	12/12	0.89	0.18	49,61,72,76	0
4	CL	B	103	1/1	0.89	0.10	65,65,65,65	0
3	TLA	B	102	10/10	0.90	0.26	48,71,93,99	0
6	MAN	G	9	12/12	0.90	0.13	53,66,73,83	0
5	N1L	G	8	12/13	0.92	0.12	52,69,83,84	0
6	MAN	E	9	12/12	0.92	0.19	53,65,73,91	0
5	N1L	H	8	12/13	0.93	0.15	56,62,69,70	0
5	N1L	E	8	12/13	0.93	0.09	62,69,76,77	0
3	TLA	B	101	10/10	0.96	0.19	49,61,70,70	0
6	MAN	H	9	12/12	0.97	0.12	45,59,65,80	0

6.5 Other polymers (i)

There are no such residues in this entry.