



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 10, 2026 – 07:17 AM UTC

PDB ID : 4U1M / pdb_00004u1m
Title : HLA class I micropolymorphisms determine peptide-HLA landscape and dictate differential HIV-1 escape through identical epitopes
Authors : Rizkallah, P.J.; Cole, D.K.; Fuller, A.; Sewell, A.K.
Deposited on : 2014-07-15
Resolution : 1.18 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 ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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

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

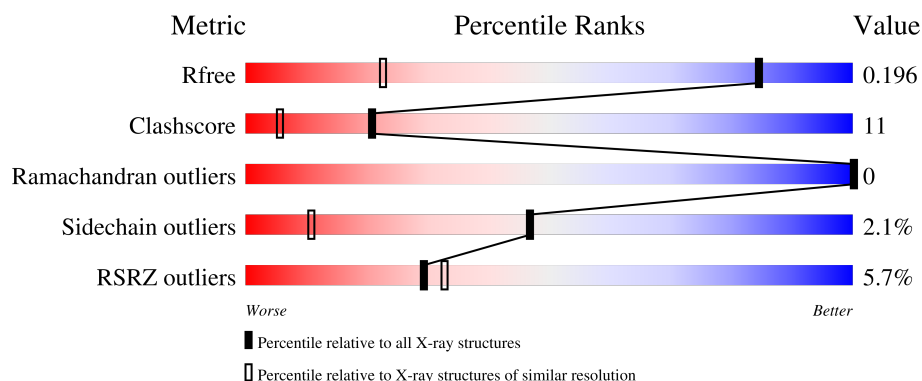
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.18 Å.

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



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	180053	1789 (1.20-1.16)
Clashscore	190562	1845 (1.20-1.16)
Ramachandran outliers	187476	1789 (1.20-1.16)
Sidechain outliers	187428	1789 (1.20-1.16)
RSRZ outliers	180081	1787 (1.20-1.16)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$. The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	277	5% 86% 13% .
2	B	100	5% 86% 13% .
3	C	9	22% 33% 33% 33%

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
4	EDO	A	309	-	-	X	-
5	GOL	A	319	-	-	X	-
5	GOL	B	310	-	-	X	-

2 Entry composition

There are 6 unique types of molecules in this entry. The entry contains 3973 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 HLA class I histocompatibility antigen, B-42 alpha chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	277	Total	C	N	O	S	0	14	0
			2350	1461	422	460	7			

- Molecule 2 is a protein called Beta-2-microglobulin.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	100	Total	C	N	O	S	0	3	0
			855	544	142	164	5			

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	0	MET	-	initiating methionine	UNP P61769

- Molecule 3 is a protein called Protein Nef.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	C	9	Total	C	N	O	S	0	1	0
			85	53	17	13	2			

- Molecule 4 is 1,2-ETHANEDIOL (CCD ID: EDO) (formula: C₂H₆O₂).



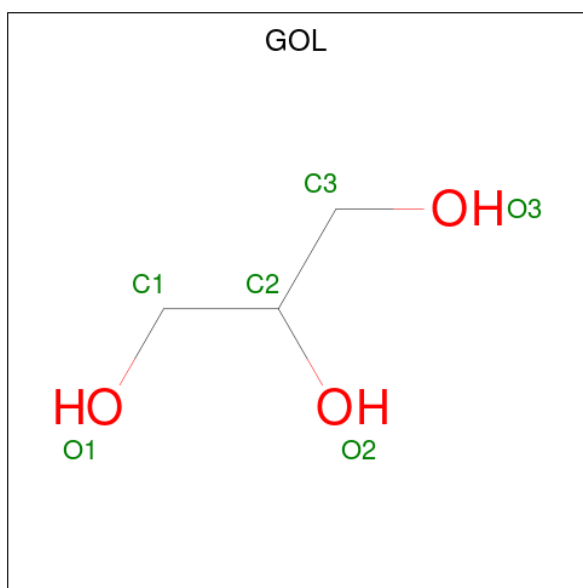
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	A	1	Total	C	O	0	0
			4	2	2		
4	A	1	Total	C	O	0	0
			4	2	2		
4	A	1	Total	C	O	0	0
			4	2	2		
4	A	1	Total	C	O	0	0
			4	2	2		
4	A	1	Total	C	O	0	0
			4	2	2		
4	A	1	Total	C	O	0	0
			4	2	2		
4	A	1	Total	C	O	0	0
			4	2	2		
4	A	1	Total	C	O	0	0
			4	2	2		
4	A	1	Total	C	O	0	0
			4	2	2		
4	A	1	Total	C	O	0	0
			4	2	2		

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Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	A	1	Total	C	O	0	0
			4	2	2		
4	A	1	Total	C	O	0	0
			4	2	2		
4	A	1	Total	C	O	0	0
			4	2	2		
4	B	1	Total	C	O	0	0
			4	2	2		
4	B	1	Total	C	O	0	0
			4	2	2		
4	B	1	Total	C	O	0	0
			4	2	2		
4	B	1	Total	C	O	0	0
			4	2	2		
4	B	1	Total	C	O	0	0
			4	2	2		
4	B	1	Total	C	O	0	0
			4	2	2		
4	C	1	Total	C	O	0	0
			4	2	2		

- Molecule 5 is GLYCEROL (CCD ID: GOL) (formula: $C_3H_8O_3$).



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

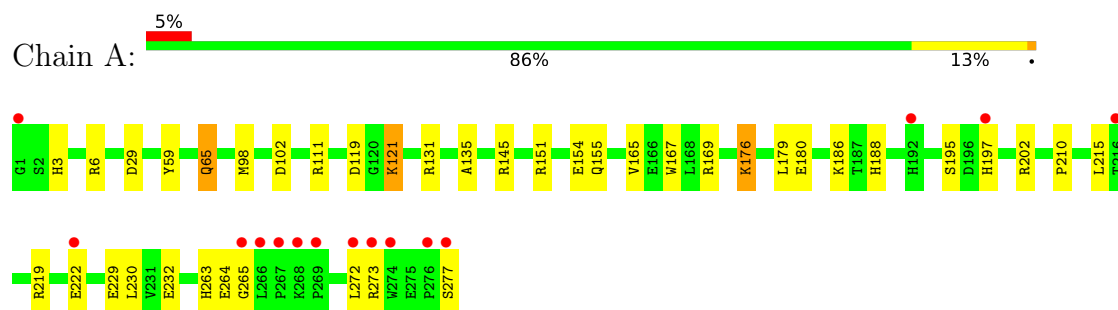
- Molecule 6 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	A	407	Total	O	0	0
			407	407		
6	B	134	Total	O	0	0
			134	134		
6	C	14	Total	O	0	0
			14	14		

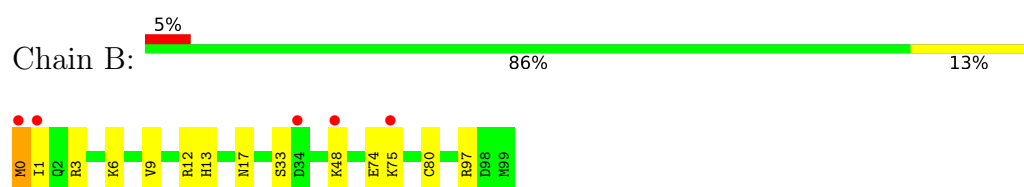
3 Residue-property plots [i](#)

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.

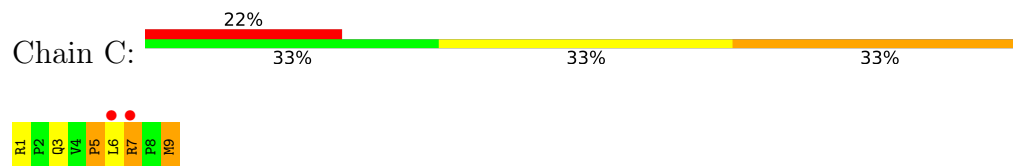
- Molecule 1: HLA class I histocompatibility antigen, B-42 alpha chain



- Molecule 2: Beta-2-microglobulin



- Molecule 3: Protein Nef



4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	51.06Å 81.34Å 110.93Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	55.47 – 1.18 55.47 – 1.18	Depositor EDS
% Data completeness (in resolution range)	99.0 (55.47-1.18) 99.0 (55.47-1.18)	Depositor EDS
R_{merge}	0.05	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.99 (at 1.18Å)	Xtriage
Refinement program	REFMAC 5.8.0049	Depositor
R, R_{free}	0.162 , 0.180 (Not available) , 0.196	Depositor DCC
R_{free} test set	7561 reflections (5.02%)	wwPDB-VP
Wilson B-factor (Å ²)	12.5	Xtriage
Anisotropy	0.250	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.35 , 36.3	EDS
L-test for twinning ²	$\langle L \rangle = 0.48$, $\langle L^2 \rangle = 0.31$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.97	EDS
Total number of atoms	3973	wwPDB-VP
Average B, all atoms (Å ²)	18.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 6.80% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

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

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: GOL, EDO

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	1.41	7/2434 (0.3%)	1.17	9/3307 (0.3%)
2	B	1.23	1/884 (0.1%)	1.15	0/1194
3	C	2.02	2/86 (2.3%)	1.88	3/111 (2.7%)
All	All	1.39	10/3404 (0.3%)	1.19	12/4612 (0.3%)

All (10) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	65	GLN	CD-OE1	6.87	1.36	1.23
1	A	197	HIS	CA-CB	6.68	1.64	1.53
3	C	7	ARG	CZ-NH1	5.87	1.41	1.32
1	A	195	SER	C-O	5.66	1.29	1.24
1	A	102	ASP	C-O	5.45	1.30	1.24
1	A	121	LYS	CA-CB	-5.39	1.44	1.53
2	B	33	SER	CB-OG	-5.28	1.31	1.42
1	A	179	LEU	C-N	-5.10	1.27	1.33
1	A	111	ARG	NE-CZ	-5.04	1.27	1.33
3	C	5	PRO	C-O	-5.02	1.18	1.23

All (12) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	C	7	ARG	CG-CD-NE	7.94	129.47	112.00
1	A	219	ARG	NE-CZ-NH2	7.05	125.54	119.20
1	A	145	ARG	CG-CD-NE	6.99	127.38	112.00
1	A	131	ARG	NE-CZ-NH2	6.37	124.94	119.20
1	A	202	ARG	NE-CZ-NH2	6.17	124.75	119.20
1	A	111	ARG	NE-CZ-NH1	-6.13	115.37	121.50
1	A	215	LEU	CB-CA-C	-5.92	100.32	110.16
1	A	65	GLN	CB-CG-CD	5.92	122.66	112.60

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	C	9[A]	MET	CA-CB-CG	-5.56	102.99	114.10
3	C	9[B]	MET	CA-CB-CG	-5.56	102.99	114.10
1	A	176	LYS	CA-CB-CG	5.52	125.14	114.10
1	A	111	ARG	N-CA-CB	5.02	119.20	111.56

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	2350	0	2200	44	0
2	B	855	0	818	23	0
3	C	85	0	95	10	0
4	A	68	0	102	16	0
4	B	32	0	48	3	0
4	C	4	0	6	2	0
5	A	12	0	16	5	0
5	B	12	0	16	5	0
6	A	407	0	0	23	1
6	B	134	0	0	2	0
6	C	14	0	0	1	0
All	All	3973	0	3301	75	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 11.

All (75) 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)
3:C:9[A]:MET:CG	3:C:9[A]:MET:CB	1.75	1.58
3:C:9[A]:MET:CB	3:C:9[A]:MET:SD	2.29	1.21
1:A:98[B]:MET:CE	6:A:688:HOH:O	2.13	0.97
1:A:121:LYS:HE2	6:A:700:HOH:O	1.68	0.94
3:C:9[A]:MET:SD	3:C:9[A]:MET:HB3	2.11	0.87

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:180:GLU:CG	6:A:415:HOH:O	2.24	0.86
1:A:119:ASP:HB3	2:B:0:MET:HB3	1.58	0.83
1:A:180:GLU:CD	6:A:415:HOH:O	2.25	0.79
1:A:98[B]:MET:HE3	6:A:688:HOH:O	1.76	0.77
2:B:12:ARG:HH11	5:B:310:GOL:H12	1.51	0.76
1:A:98[B]:MET:HE2	6:A:688:HOH:O	1.78	0.74
1:A:180:GLU:HG2	6:A:415:HOH:O	1.84	0.72
1:A:3:HIS:HD2	1:A:29:ASP:OD2	1.72	0.72
1:A:188:HIS:HD2	6:A:598:HOH:O	1.73	0.72
6:A:757:HOH:O	2:B:0:MET:HE1	1.91	0.70
1:A:232[A]:GLU:HG3	6:A:698:HOH:O	1.92	0.69
1:A:263:HIS:CD2	1:A:265:GLY:H	2.09	0.69
1:A:165:VAL:HG12	1:A:169:ARG:NH1	2.08	0.69
1:A:263:HIS:HD2	1:A:265:GLY:H	1.41	0.69
1:A:232[A]:GLU:OE2	2:B:6:LYS:HD2	1.93	0.68
1:A:232[A]:GLU:CG	6:A:698:HOH:O	2.43	0.65
2:B:1:ILE:HD13	2:B:3:ARG:HE	1.64	0.61
2:B:6:LYS:NZ	6:B:402:HOH:O	2.33	0.61
2:B:0:MET:HE3	2:B:0:MET:N	2.16	0.60
1:A:59:TYR:HA	4:A:307:EDO:H11	1.82	0.59
1:A:151:ARG:HA	4:A:309:EDO:H22	1.83	0.59
1:A:135:ALA:HB3	4:A:313:EDO:H12	1.85	0.58
1:A:232[A]:GLU:OE2	2:B:6:LYS:NZ	2.37	0.57
1:A:121:LYS:CE	6:A:700:HOH:O	2.41	0.57
1:A:222:GLU:HG3	6:A:737:HOH:O	2.04	0.56
5:A:319:GOL:C3	3:C:6:LEU:HD12	2.36	0.56
5:A:319:GOL:H31	3:C:6:LEU:HD12	1.90	0.54
2:B:9:VAL:HG22	2:B:80[B]:CYS:SG	2.50	0.52
1:A:155:GLN:NE2	6:A:402:HOH:O	2.31	0.52
5:A:319:GOL:H31	4:C:101:EDO:O2	2.10	0.52
1:A:273:ARG:O	4:A:316:EDO:H11	2.12	0.50
1:A:272:LEU:HD23	4:A:316:EDO:H12	1.94	0.50
1:A:165:VAL:CG1	1:A:169:ARG:NH1	2.74	0.50
1:A:232[A]:GLU:OE2	2:B:6:LYS:CE	2.59	0.50
1:A:229:GLU:HB2	4:A:306:EDO:H21	1.94	0.49
4:A:309:EDO:C2	6:A:586:HOH:O	2.60	0.49
4:A:309:EDO:H22	6:A:586:HOH:O	2.12	0.49
1:A:232[A]:GLU:OE2	2:B:6:LYS:CD	2.59	0.48
1:A:3:HIS:HE1	6:A:415:HOH:O	1.94	0.48
1:A:186:LYS:HD2	6:A:418:HOH:O	2.14	0.48
2:B:13:HIS:NE2	5:B:310:GOL:H11	2.29	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:A:311:EDO:H12	3:C:5:PRO:HB2	1.97	0.47
1:A:176:LYS:HG2	6:A:637:HOH:O	2.13	0.47
2:B:17:ASN:ND2	2:B:97:ARG:HH12	2.13	0.47
2:B:12:ARG:HH11	5:B:310:GOL:C1	2.25	0.47
1:A:119:ASP:O	2:B:1:ILE:HG13	2.15	0.47
1:A:176:LYS:HE3	6:A:433:HOH:O	2.15	0.46
5:A:319:GOL:O3	4:C:101:EDO:C2	2.64	0.46
1:A:154:GLU:HG3	4:A:309:EDO:O2	2.16	0.46
1:A:230[B]:LEU:HD21	6:A:452:HOH:O	2.16	0.46
2:B:1:ILE:HD13	2:B:3:ARG:NE	2.31	0.45
1:A:232[A]:GLU:CD	2:B:6:LYS:HZ2	2.24	0.45
3:C:3:GLN:NE2	6:C:201:HOH:O	2.39	0.45
2:B:1:ILE:CD1	2:B:3:ARG:HE	2.29	0.45
4:A:307:EDO:C2	3:C:1:ARG:HH22	2.29	0.45
1:A:264[B]:GLU:OE2	5:A:318:GOL:H31	2.16	0.44
1:A:188:HIS:HE1	6:A:747:HOH:O	2.01	0.44
2:B:17:ASN:HB3	4:B:305:EDO:H12	2.00	0.44
1:A:6:ARG:HD2	1:A:98[A]:MET:SD	2.57	0.43
1:A:229:GLU:CB	4:A:306:EDO:H21	2.48	0.43
4:A:307:EDO:H22	3:C:1:ARG:HH22	1.84	0.42
1:A:210:PRO:O	1:A:263:HIS:HE1	2.01	0.42
1:A:232[A]:GLU:CD	2:B:6:LYS:NZ	2.77	0.42
4:A:309:EDO:H12	6:A:603:HOH:O	2.19	0.42
4:B:308:EDO:O2	6:B:401:HOH:O	2.22	0.42
2:B:12:ARG:CD	5:B:310:GOL:H12	2.50	0.42
2:B:12:ARG:HD2	5:B:310:GOL:H12	2.02	0.41
2:B:17:ASN:HB3	4:B:305:EDO:C1	2.50	0.41
1:A:167:TRP:HE1	4:A:305:EDO:H12	1.86	0.41
4:A:315:EDO:H11	3:C:9[A]:MET:HG2	2.02	0.41

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)
6:A:474:HOH:O	6:A:503:HOH:O[3_554]	0.75	1.45

5.3 Torsion angles

5.3.1 Protein backbone

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	289/277 (104%)	283 (98%)	6 (2%)	0	100	100
2	B	101/100 (101%)	100 (99%)	1 (1%)	0	100	100
3	C	7/9 (78%)	6 (86%)	1 (14%)	0	100	100
All	All	397/386 (103%)	389 (98%)	8 (2%)	0	100	100

There are no Ramachandran outliers to report.

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	249/235 (106%)	247 (99%)	2 (1%)	73	43
2	B	98/95 (103%)	94 (96%)	4 (4%)	27	2
3	C	10/9 (111%)	9 (90%)	1 (10%)	7	0
All	All	357/339 (105%)	350 (98%)	7 (2%)	47	12

All (7) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	65	GLN
1	A	277	SER
2	B	0	MET
2	B	48	LYS
2	B	74	GLU

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Mol	Chain	Res	Type
2	B	75	LYS
3	C	7	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (10) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	3	HIS
1	A	70	GLN
1	A	155	GLN
1	A	174	ASN
1	A	188	HIS
1	A	224	GLN
1	A	263	HIS
2	B	17	ASN
2	B	24	ASN
2	B	89	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 oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

30 ligands are modelled in this entry.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
5	GOL	A	318	-	5,5,5	1.21	1 (20%)	5,5,5	0.84	0
4	EDO	B	308	-	3,3,3	0.38	0	2,2,2	0.37	0
4	EDO	A	317	-	3,3,3	0.82	0	2,2,2	0.73	0
5	GOL	A	319	-	5,5,5	0.95	0	5,5,5	1.03	0
4	EDO	B	301	-	3,3,3	0.24	0	2,2,2	0.54	0
4	EDO	A	311	-	3,3,3	0.62	0	2,2,2	0.14	0
4	EDO	A	312	-	3,3,3	0.37	0	2,2,2	0.65	0
4	EDO	A	302	-	3,3,3	0.48	0	2,2,2	0.30	0
4	EDO	A	310	-	3,3,3	1.11	0	2,2,2	1.08	0
4	EDO	B	303	-	3,3,3	0.40	0	2,2,2	1.16	0
4	EDO	A	313	-	3,3,3	0.64	0	2,2,2	0.95	0
4	EDO	B	304	-	3,3,3	0.52	0	2,2,2	0.34	0
4	EDO	A	315	-	3,3,3	0.95	0	2,2,2	0.42	0
4	EDO	C	101	-	3,3,3	0.59	0	2,2,2	2.22	1 (50%)
4	EDO	A	314	-	3,3,3	0.54	0	2,2,2	0.21	0
4	EDO	A	301	-	3,3,3	0.89	0	2,2,2	1.70	1 (50%)
4	EDO	B	307	-	3,3,3	0.82	0	2,2,2	0.68	0
4	EDO	A	308	-	3,3,3	0.30	0	2,2,2	0.81	0
4	EDO	A	316	-	3,3,3	0.43	0	2,2,2	0.37	0
4	EDO	A	307	-	3,3,3	0.36	0	2,2,2	0.70	0
5	GOL	B	310	-	5,5,5	1.29	0	5,5,5	3.65	2 (40%)
4	EDO	B	302	-	3,3,3	0.39	0	2,2,2	0.42	0
4	EDO	B	306	-	3,3,3	0.73	0	2,2,2	0.52	0
4	EDO	A	309	-	3,3,3	1.05	0	2,2,2	2.09	1 (50%)
5	GOL	B	309	-	5,5,5	0.44	0	5,5,5	1.37	0
4	EDO	A	305	-	3,3,3	0.37	0	2,2,2	0.63	0
4	EDO	A	303	-	3,3,3	0.68	0	2,2,2	0.23	0
4	EDO	B	305	-	3,3,3	0.71	0	2,2,2	0.32	0
4	EDO	A	304	-	3,3,3	0.38	0	2,2,2	0.68	0
4	EDO	A	306	-	3,3,3	0.41	0	2,2,2	0.51	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
5	GOL	A	318	-	-	2/4/4/4	-
4	EDO	B	308	-	-	1/1/1/1	-
4	EDO	A	317	-	-	1/1/1/1	-
5	GOL	A	319	-	-	2/4/4/4	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	EDO	B	301	-	-	0/1/1/1	-
4	EDO	A	311	-	-	1/1/1/1	-
4	EDO	A	312	-	-	1/1/1/1	-
4	EDO	A	302	-	-	0/1/1/1	-
4	EDO	A	310	-	-	0/1/1/1	-
4	EDO	B	303	-	-	1/1/1/1	-
4	EDO	A	313	-	-	1/1/1/1	-
4	EDO	B	304	-	-	1/1/1/1	-
4	EDO	A	315	-	-	0/1/1/1	-
4	EDO	C	101	-	-	1/1/1/1	-
4	EDO	A	314	-	-	0/1/1/1	-
4	EDO	A	301	-	-	0/1/1/1	-
4	EDO	B	307	-	-	0/1/1/1	-
4	EDO	A	308	-	-	0/1/1/1	-
4	EDO	A	316	-	-	1/1/1/1	-
4	EDO	A	307	-	-	1/1/1/1	-
5	GOL	B	310	-	-	3/4/4/4	-
4	EDO	B	302	-	-	1/1/1/1	-
4	EDO	B	306	-	-	1/1/1/1	-
4	EDO	A	309	-	-	0/1/1/1	-
5	GOL	B	309	-	-	2/4/4/4	-
4	EDO	A	305	-	-	1/1/1/1	-
4	EDO	A	303	-	-	0/1/1/1	-
4	EDO	B	305	-	-	1/1/1/1	-
4	EDO	A	304	-	-	0/1/1/1	-
4	EDO	A	306	-	-	0/1/1/1	-

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	A	318	GOL	O1-C1	2.17	1.51	1.42

All (5) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	B	310	GOL	O3-C3-C2	6.95	141.68	110.38
5	B	310	GOL	C3-C2-C1	3.95	126.28	111.80
4	C	101	EDO	O1-C1-C2	-3.13	88.52	112.39
4	A	309	EDO	O2-C2-C1	2.70	132.93	112.39
4	A	301	EDO	O2-C2-C1	2.40	130.66	112.39

There are no chirality outliers.

All (23) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
5	B	309	GOL	O1-C1-C2-C3
5	B	310	GOL	C1-C2-C3-O3
5	B	310	GOL	O2-C2-C3-O3
5	B	309	GOL	O1-C1-C2-O2
5	A	318	GOL	O1-C1-C2-C3
5	A	319	GOL	C1-C2-C3-O3
4	A	311	EDO	O1-C1-C2-O2
4	A	313	EDO	O1-C1-C2-O2
4	B	305	EDO	O1-C1-C2-O2
4	A	305	EDO	O1-C1-C2-O2
4	A	307	EDO	O1-C1-C2-O2
4	A	316	EDO	O1-C1-C2-O2
4	A	317	EDO	O1-C1-C2-O2
4	B	302	EDO	O1-C1-C2-O2
4	B	303	EDO	O1-C1-C2-O2
4	C	101	EDO	O1-C1-C2-O2
5	B	310	GOL	O1-C1-C2-O2
4	B	306	EDO	O1-C1-C2-O2
4	A	312	EDO	O1-C1-C2-O2
4	B	304	EDO	O1-C1-C2-O2
5	A	318	GOL	O1-C1-C2-O2
4	B	308	EDO	O1-C1-C2-O2
5	A	319	GOL	O2-C2-C3-O3

There are no ring outliers.

14 monomers are involved in 29 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	A	318	GOL	1	0
4	B	308	EDO	1	0
5	A	319	GOL	4	0
4	A	311	EDO	1	0
4	A	313	EDO	1	0
4	A	315	EDO	1	0
4	C	101	EDO	2	0
4	A	316	EDO	2	0
4	A	307	EDO	3	0
5	B	310	GOL	5	0
4	A	309	EDO	5	0
4	A	305	EDO	1	0
4	B	305	EDO	2	0

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Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	A	306	EDO	2	0

5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

6 Fit of model and data

6.1 Protein, DNA and RNA chains

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

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
1	A	277/277 (100%)	0.33	15 (5%) 31 35	4, 13, 26, 64	14 (5%)
2	B	100/100 (100%)	0.76	5 (5%) 34 38	9, 19, 36, 40	3 (3%)
3	C	9/9 (100%)	1.11	2 (22%) 2 4	6, 15, 20, 24	1 (11%)
All	All	386/386 (100%)	0.46	22 (5%) 29 33	4, 14, 31, 64	18 (4%)

All (22) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	B	1	ILE	6.6
2	B	0	MET	4.7
1	A	267	PRO	4.0
1	A	192	HIS	3.0
2	B	48	LYS	2.9
1	A	274	TRP	2.9
2	B	75	LYS	2.9
3	C	6	LEU	2.9
1	A	276	PRO	2.7
1	A	1	GLY	2.7
1	A	268	LYS	2.7
1	A	277	SER	2.6
1	A	269	PRO	2.6
1	A	216	THR	2.6
1	A	272	LEU	2.5
1	A	197	HIS	2.4
2	B	34	ASP	2.3
3	C	7	ARG	2.2
1	A	222	GLU	2.2
1	A	266	LEU	2.1
1	A	273	ARG	2.0
1	A	265	GLY	2.0

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

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

6.3 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

6.4 Ligands [i](#)

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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
4	EDO	A	305	4/4	0.66	0.20	35,43,44,47	0
4	EDO	B	303	4/4	0.71	0.19	34,36,36,41	0
4	EDO	A	304	4/4	0.74	0.19	27,32,38,44	0
4	EDO	C	101	4/4	0.74	0.16	27,28,34,38	0
4	EDO	B	305	4/4	0.76	0.18	43,44,51,51	0
4	EDO	A	312	4/4	0.77	0.16	44,44,47,49	0
5	GOL	B	309	6/6	0.78	0.16	38,43,44,45	0
4	EDO	A	317	4/4	0.79	0.17	16,26,26,36	0
4	EDO	A	309	4/4	0.80	0.16	22,27,31,33	0
4	EDO	B	308	4/4	0.80	0.16	41,41,44,46	0
4	EDO	B	304	4/4	0.81	0.15	26,27,30,38	0
5	GOL	A	318	6/6	0.82	0.19	23,25,31,42	0
4	EDO	A	306	4/4	0.82	0.14	32,35,35,40	0
5	GOL	B	310	6/6	0.82	0.15	15,27,28,35	0
5	GOL	A	319	6/6	0.83	0.13	19,22,27,34	0
4	EDO	A	311	4/4	0.84	0.15	31,35,39,40	0
4	EDO	A	316	4/4	0.85	0.14	21,32,33,41	0
4	EDO	B	302	4/4	0.86	0.13	34,40,40,44	0
4	EDO	A	307	4/4	0.87	0.13	31,35,38,41	0
4	EDO	A	313	4/4	0.87	0.13	27,33,34,38	0
4	EDO	A	303	4/4	0.88	0.12	17,20,21,21	0
4	EDO	A	301	4/4	0.89	0.13	16,16,22,32	0
4	EDO	A	308	4/4	0.90	0.12	18,21,23,36	0
4	EDO	A	314	4/4	0.91	0.11	25,25,25,26	0
4	EDO	B	306	4/4	0.92	0.11	17,25,27,32	0
4	EDO	A	315	4/4	0.93	0.09	11,12,15,21	0
4	EDO	B	301	4/4	0.95	0.09	15,16,18,21	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
4	EDO	A	310	4/4	0.95	0.10	14,17,23,26	0
4	EDO	B	307	4/4	0.95	0.10	16,21,21,23	0
4	EDO	A	302	4/4	0.96	0.07	17,17,19,20	0

6.5 Other polymers [i](#)

There are no such residues in this entry.