



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 15, 2026 – 01:27 AM UTC

PDB ID : 3D37 / pdb_00003d37
Title : The crystal structure of the tail protein from Neisseria meningitidis MC58
Authors : Zhang, R.; Li, H.; Bargassa, M.; Joachimiak, A.; Midwest Center for Structural Genomics (MCSG)
Deposited on : 2008-05-09
Resolution : 2.10 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
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

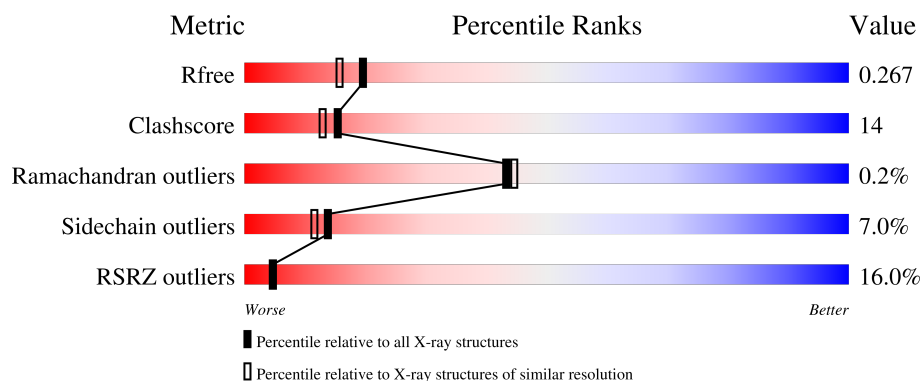
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.10 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	6658 (2.10-2.10)
Clashscore	190562	7164 (2.10-2.10)
Ramachandran outliers	187476	7099 (2.10-2.10)
Sidechain outliers	187428	7100 (2.10-2.10)
RSRZ outliers	180081	6662 (2.10-2.10)

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	381	11% 66% 17% • 14%
1	B	381	16% 64% 16% •• 17%

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	CL	A	382	-	-	X	-
2	CL	B	383	-	-	X	-

2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 5398 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 Tail protein, 43 kDa.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	326	Total	C	N	O	S	0	0	0
			2549	1613	449	476	11			
1	B	316	Total	C	N	O	S	0	0	0
			2480	1575	432	462	11			

- Molecule 2 is CHLORIDE ION (CCD ID: CL) (formula: Cl).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	3	Total	Cl	0	0
			3	3		
2	B	3	Total	Cl	0	0
			3	3		

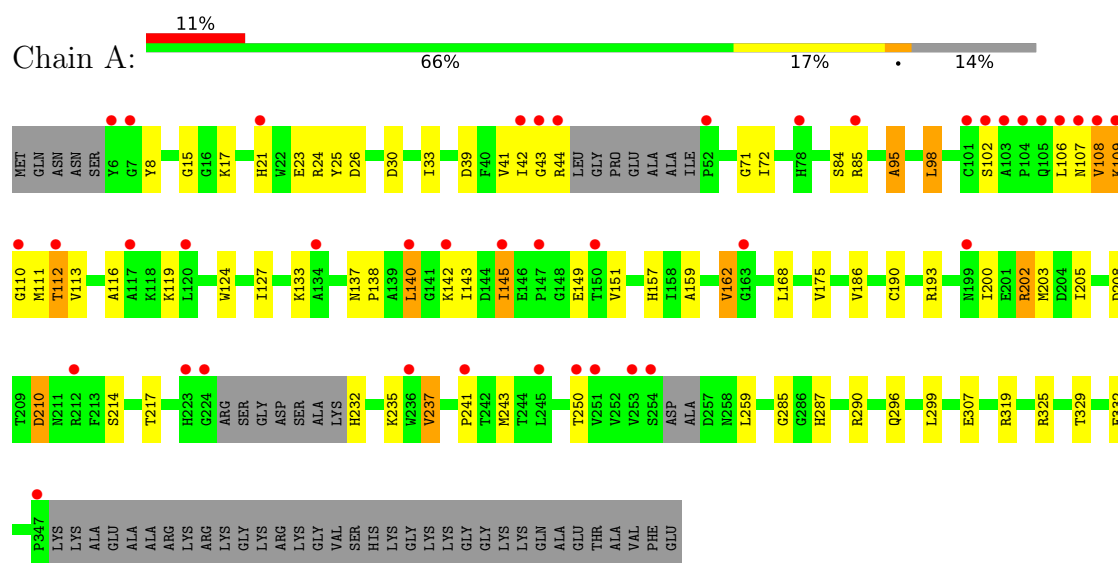
- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	188	Total	O	0	0
			188	188		
3	B	175	Total	O	0	0
			175	175		

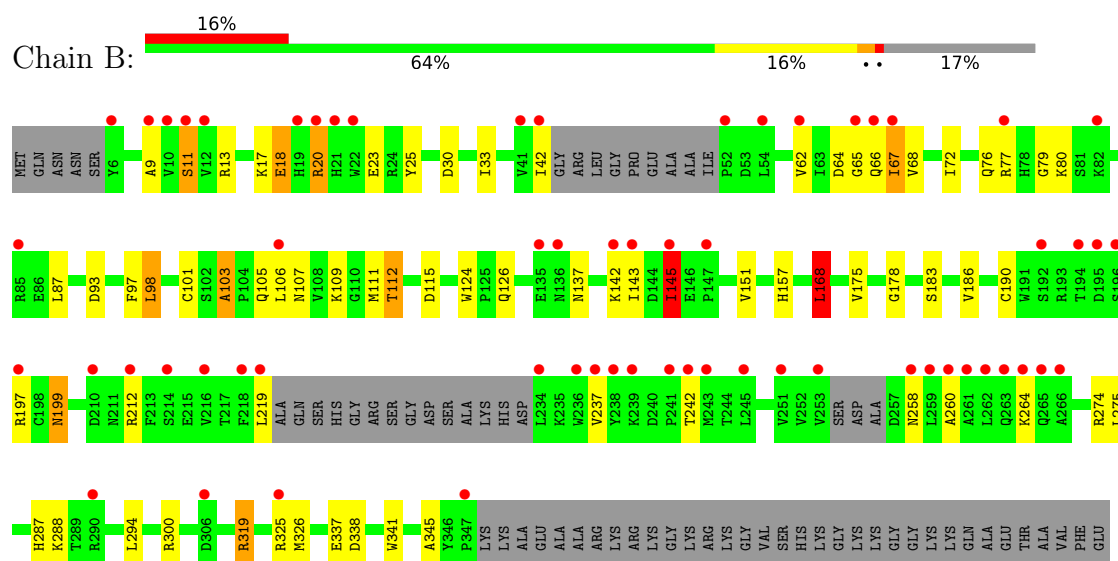
3 Residue-property plots [i](#)

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: Tail protein, 43 kDa



- Molecule 1: Tail protein, 43 kDa



4 Data and refinement statistics

Property	Value	Source
Space group	P 21 3	Depositor
Cell constants a, b, c, α , β , γ	137.46Å 137.46Å 137.46Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	97.13 – 2.10 97.13 – 2.10	Depositor EDS
% Data completeness (in resolution range)	99.8 (97.13-2.10) 99.7 (97.13-2.10)	Depositor EDS
R_{merge}	0.11	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.19 (at 2.10Å)	Xtriage
Refinement program	REFMAC 5.2.0019	Depositor
R, R_{free}	0.220 , 0.273 0.222 , 0.267	Depositor DCC
R_{free} test set	2565 reflections (4.38%)	wwPDB-VP
Wilson B-factor (Å ²)	38.4	Xtriage
Anisotropy	0.000	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.35 , 45.8	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtriage
Estimated twinning fraction	0.030 for l,-k,h	Xtriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	5398	wwPDB-VP
Average B, all atoms (Å ²)	41.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.64% 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: CL

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	1.15	3/2608 (0.1%)	1.07	3/3537 (0.1%)
1	B	1.19	3/2537 (0.1%)	1.07	6/3442 (0.2%)
All	All	1.17	6/5145 (0.1%)	1.07	9/6979 (0.1%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	2

All (6) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	168	LEU	CG-CD1	9.04	1.82	1.52
1	B	67	ILE	CA-CB	6.14	1.60	1.54
1	B	145	ILE	CA-CB	6.11	1.61	1.54
1	A	159	ALA	CA-CB	5.69	1.62	1.53
1	A	95	ALA	C-O	-5.46	1.17	1.24
1	A	127	ILE	CA-CB	5.03	1.58	1.53

All (9) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	111	MET	CA-C-N	5.96	129.17	120.71
1	B	111	MET	C-N-CA	5.96	129.17	120.71
1	A	202	ARG	CG-CD-NE	-5.87	99.09	112.00
1	A	202	ARG	CB-CA-C	5.57	119.30	109.89
1	B	80	LYS	N-CA-C	5.43	117.51	108.99

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	103	ALA	N-CA-C	-5.35	103.04	109.83
1	A	285	GLY	N-CA-C	-5.26	105.00	112.37
1	B	103	ALA	CA-C-N	5.03	125.04	120.21
1	B	103	ALA	C-N-CA	5.03	125.04	120.21

There are no chirality outliers.

All (2) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	109	LYS	Peptide
1	A	110	GLY	Peptide

5.2 Too-close contacts [i](#)

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	2549	0	2501	71	0
1	B	2480	0	2447	67	1
2	A	3	0	0	2	0
2	B	3	0	0	3	0
3	A	188	0	0	11	0
3	B	175	0	0	10	1
All	All	5398	0	4948	135	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 14.

All (135) 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:B:168:LEU:CG	1:B:168:LEU:CD1	1.82	1.52
1:B:11:SER:HB3	1:B:18:GLU:OE2	1.41	1.16
1:A:26:ASP:HB3	3:A:553:HOH:O	1.52	1.10
1:A:112:THR:HG23	1:A:137:ASN:OD1	1.51	1.10
1:B:62:VAL:HB	3:B:608:HOH:O	1.65	0.96

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:42:ILE:HD11	1:A:44:ARG:NE	1.84	0.92
1:A:108:VAL:CG2	1:A:116:ALA:HB2	2.01	0.91
1:A:108:VAL:CG2	1:A:116:ALA:CB	2.51	0.89
1:B:11:SER:CB	1:B:18:GLU:OE2	2.20	0.88
1:A:113:VAL:HA	1:A:140:LEU:HD21	1.57	0.84
1:A:107:ASN:OD1	1:A:109:LYS:HG3	1.79	0.82
1:A:108:VAL:HG22	1:A:116:ALA:HB2	1.61	0.79
1:A:23:GLU:OE2	1:A:24:ARG:NH2	2.17	0.78
1:A:42:ILE:HD11	1:A:44:ARG:HE	1.47	0.78
1:A:113:VAL:O	3:A:557:HOH:O	2.01	0.78
1:A:116:ALA:HB3	3:A:557:HOH:O	1.83	0.77
1:B:112:THR:HG22	1:B:115:ASP:H	1.51	0.76
1:B:93:ASP:HB2	1:B:168:LEU:HD12	1.67	0.76
1:A:85:ARG:NH1	3:A:558:HOH:O	2.21	0.73
1:B:199:ASN:HD22	1:B:199:ASN:H	1.35	0.73
1:A:143:ILE:HG23	1:A:157:HIS:HD2	1.55	0.71
1:A:112:THR:HG23	1:A:137:ASN:CG	2.15	0.70
1:A:290:ARG:NH2	1:B:197:ARG:HE	1.91	0.69
1:A:145:ILE:HG22	1:A:149:GLU:OE1	1.93	0.69
1:B:168:LEU:HD23	3:B:589:HOH:O	1.91	0.69
1:B:199:ASN:H	1:B:199:ASN:ND2	1.89	0.69
1:A:112:THR:CG2	1:A:137:ASN:OD1	2.37	0.68
1:A:332:GLU:OE1	3:A:552:HOH:O	2.10	0.68
1:B:20:ARG:NH2	2:B:382:CL:CL	2.64	0.68
1:B:157:HIS:HB2	3:B:612:HOH:O	1.95	0.67
1:B:326:MET:HE3	3:B:542:HOH:O	1.94	0.67
1:A:25:TYR:OH	1:A:287:HIS:HE1	1.78	0.67
1:B:25:TYR:OH	1:B:287:HIS:HE1	1.78	0.66
1:B:112:THR:CG2	1:B:137:ASN:HD21	2.09	0.66
1:A:108:VAL:HG21	1:A:116:ALA:CB	2.24	0.66
1:A:200:ILE:HD13	1:A:203:MET:CE	2.27	0.65
1:A:108:VAL:CG2	1:A:116:ALA:HB1	2.25	0.65
1:A:186:VAL:HG11	1:A:299:LEU:HD22	1.80	0.64
1:B:112:THR:HG21	1:B:137:ASN:HD21	1.63	0.64
1:A:133:LYS:HB2	1:A:175:VAL:CG1	2.28	0.63
1:B:30:ASP:O	2:B:383:CL:CL	2.53	0.63
1:B:66:GLN:HB2	1:B:294:LEU:HD12	1.81	0.62
1:A:108:VAL:HG21	1:A:116:ALA:HB1	1.81	0.61
1:B:168:LEU:CG	3:B:589:HOH:O	2.49	0.61
1:B:64:ASP:CB	1:B:288:LYS:NZ	2.64	0.61
1:B:157:HIS:HD2	3:B:528:HOH:O	1.83	0.60

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:21:HIS:O	1:A:42:ILE:HD13	2.03	0.59
1:A:133:LYS:HB2	1:A:175:VAL:HG13	1.85	0.59
1:A:138:PRO:CG	1:A:162:VAL:HG11	2.34	0.57
1:A:290:ARG:NH2	1:B:197:ARG:NE	2.52	0.57
1:B:105:GLN:CD	1:B:145:ILE:HD11	2.29	0.57
1:A:98:LEU:N	1:A:98:LEU:HD23	2.19	0.57
1:B:33:ILE:O	2:B:383:CL:CL	2.60	0.57
1:A:217:THR:HG22	1:A:237:VAL:HB	1.85	0.56
1:A:193:ARG:HD3	1:A:307:GLU:OE2	2.05	0.56
1:B:112:THR:HG23	1:B:137:ASN:OD1	2.05	0.56
1:B:168:LEU:HG	3:B:589:HOH:O	2.03	0.56
1:B:105:GLN:HA	1:B:145:ILE:HD11	1.89	0.55
1:B:319:ARG:HD2	1:B:319:ARG:C	2.31	0.55
1:B:112:THR:HG23	1:B:137:ASN:CG	2.32	0.54
1:B:112:THR:HG23	1:B:137:ASN:ND2	2.23	0.54
1:B:124:TRP:HB3	1:B:126:GLN:OE1	2.07	0.54
1:B:199:ASN:ND2	1:B:199:ASN:N	2.56	0.54
1:B:64:ASP:CB	1:B:288:LYS:HZ3	2.21	0.53
1:A:24:ARG:HG2	1:A:41:VAL:HB	1.90	0.53
1:B:109:LYS:HD2	1:B:142:LYS:HG2	1.91	0.53
1:A:95:ALA:HB2	1:A:168:LEU:HD23	1.91	0.53
1:A:113:VAL:HA	1:A:140:LEU:CD2	2.34	0.53
1:A:208:ASP:OD1	1:A:210:ASP:HB2	2.09	0.53
1:B:112:THR:CG2	1:B:137:ASN:ND2	2.72	0.53
1:B:168:LEU:CD1	1:B:168:LEU:CB	2.81	0.53
1:A:241:PRO:HA	3:A:456:HOH:O	2.10	0.52
1:B:64:ASP:HB2	1:B:288:LYS:NZ	2.25	0.52
1:A:143:ILE:HG23	1:A:157:HIS:CD2	2.41	0.51
1:B:11:SER:HB2	1:B:62:VAL:CG2	2.40	0.51
1:B:258:ASN:ND2	1:B:260:ALA:HB3	2.25	0.51
1:A:108:VAL:HG13	1:A:140:LEU:CB	2.41	0.51
1:A:296:GLN:NE2	1:A:319:ARG:HH21	2.09	0.50
1:B:62:VAL:HG12	1:B:67:ILE:HA	1.93	0.50
1:B:105:GLN:NE2	1:B:145:ILE:HD11	2.27	0.50
1:A:296:GLN:HE22	1:A:319:ARG:HH21	1.60	0.49
1:B:190:CYS:H	1:B:199:ASN:ND2	2.10	0.49
1:A:42:ILE:HD12	1:A:43:GLY:H	1.76	0.49
1:B:143:ILE:HG23	1:B:157:HIS:CE1	2.46	0.49
1:A:30:ASP:O	2:A:382:CL:CL	2.68	0.49
1:A:71:GLY:C	1:A:72:ILE:HD12	2.38	0.49
1:A:200:ILE:HD13	1:A:203:MET:HE3	1.92	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:9:ALA:N	1:B:64:ASP:OD1	2.44	0.49
1:A:33:ILE:O	2:A:382:CL:CL	2.68	0.48
1:B:77:ARG:NH1	1:B:79:GLY:HA3	2.29	0.48
1:B:66:GLN:HB2	1:B:294:LEU:CD1	2.43	0.48
1:B:64:ASP:CG	1:B:288:LYS:HZ1	2.20	0.48
1:A:287:HIS:CE1	1:A:329:THR:HG23	2.49	0.47
1:B:98:LEU:HD13	1:B:151:VAL:CG1	2.44	0.47
1:B:145:ILE:O	1:B:145:ILE:HD13	2.14	0.47
1:A:112:THR:HG21	1:A:137:ASN:HD21	1.80	0.46
1:B:13:ARG:HG3	1:B:18:GLU:HG2	1.97	0.46
1:B:168:LEU:CB	3:B:589:HOH:O	2.63	0.46
1:A:325:ARG:HG3	3:A:400:HOH:O	2.14	0.46
1:A:214:SER:HB3	1:A:243:MET:HE3	1.97	0.46
1:B:11:SER:HB2	1:B:62:VAL:HG22	1.97	0.46
1:B:300:ARG:HD2	1:B:338:ASP:OD1	2.16	0.46
1:A:143:ILE:CG2	1:A:157:HIS:HD2	2.24	0.45
1:B:76:GLN:HE21	1:B:87:LEU:HD11	1.81	0.45
1:A:42:ILE:CD1	1:A:44:ARG:HE	2.25	0.45
1:A:290:ARG:HH21	1:B:197:ARG:HE	1.62	0.45
1:B:64:ASP:CB	1:B:288:LYS:HZ1	2.30	0.45
1:A:112:THR:CG2	1:A:137:ASN:CG	2.86	0.45
1:A:190:CYS:C	1:A:200:ILE:HD12	2.41	0.45
1:B:274:ARG:NH2	1:B:337:GLU:OE2	2.50	0.45
1:B:13:ARG:NH2	1:B:62:VAL:HG21	2.32	0.45
1:A:325:ARG:HD2	3:A:523:HOH:O	2.16	0.44
1:A:232:HIS:N	3:A:445:HOH:O	2.51	0.44
1:A:124:TRP:CH2	1:A:151:VAL:HG21	2.53	0.44
1:A:109:LYS:CD	1:A:142:LYS:HA	2.48	0.43
1:A:138:PRO:HG2	1:A:162:VAL:HG11	2.00	0.43
1:A:200:ILE:HD13	1:A:203:MET:HE1	1.98	0.43
1:A:200:ILE:HG21	1:A:203:MET:HE3	2.00	0.43
1:B:275:LEU:HD11	1:B:341:TRP:HB2	2.01	0.43
1:A:108:VAL:HG13	1:A:140:LEU:HB3	2.00	0.43
1:A:23:GLU:HB3	3:A:555:HOH:O	2.19	0.42
1:B:72:ILE:HD11	1:B:97:PHE:CE2	2.55	0.42
1:B:98:LEU:HD13	1:B:151:VAL:HG11	2.01	0.42
1:A:15:GLY:C	1:A:17:LYS:H	2.27	0.42
1:B:107:ASN:HD21	1:B:142:LYS:HD3	1.84	0.42
1:A:106:LEU:HD13	1:A:119:LYS:HG2	2.02	0.42
1:B:103:ALA:HA	1:B:151:VAL:HG22	2.02	0.42
1:A:112:THR:HG21	1:A:137:ASN:ND2	2.35	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:72:ILE:CD1	1:B:97:PHE:CE2	3.03	0.42
1:A:85:ARG:HD2	3:A:559:HOH:O	2.20	0.41
1:A:111:MET:HE2	1:A:111:MET:HB3	1.93	0.41
1:B:65:GLY:C	3:B:608:HOH:O	2.64	0.41
1:A:8:TYR:CD2	1:A:329:THR:HG21	2.55	0.41
1:B:66:GLN:N	3:B:608:HOH:O	2.52	0.40
1:B:178:GLY:HA3	1:B:345:ALA:HB2	2.03	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:B:101:CYS:SG	3:B:591:HOH:O[10_545]	2.16	0.04

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	318/381 (84%)	306 (96%)	11 (4%)	1 (0%)	36	36
1	B	308/381 (81%)	295 (96%)	13 (4%)	0	100	100
All	All	626/762 (82%)	601 (96%)	24 (4%)	1 (0%)	43	44

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	112	THR

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	274/314 (87%)	259 (94%)	15 (6%)	19	18
1	B	268/314 (85%)	245 (91%)	23 (9%)	10	7
All	All	542/628 (86%)	504 (93%)	38 (7%)	14	11

All (38) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	39	ASP
1	A	84	SER
1	A	98	LEU
1	A	102	SER
1	A	108	VAL
1	A	140	LEU
1	A	145	ILE
1	A	162	VAL
1	A	202	ARG
1	A	205	ILE
1	A	210	ASP
1	A	235	LYS
1	A	237	VAL
1	A	250	THR
1	A	259	LEU
1	B	11	SER
1	B	17	LYS
1	B	18	GLU
1	B	20	ARG
1	B	23	GLU
1	B	42	ILE
1	B	68	VAL
1	B	98	LEU
1	B	106	LEU
1	B	112	THR
1	B	145	ILE
1	B	168	LEU
1	B	175	VAL
1	B	183	SER
1	B	186	VAL
1	B	199	ASN

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Mol	Chain	Res	Type
1	B	212	ARG
1	B	219	LEU
1	B	237	VAL
1	B	242	THR
1	B	264	LYS
1	B	319	ARG
1	B	325	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (12) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	157	HIS
1	A	160	ASN
1	A	269	GLN
1	A	287	HIS
1	A	296	GLN
1	B	105	GLN
1	B	107	ASN
1	B	165	HIS
1	B	199	ASN
1	B	263	GLN
1	B	287	HIS
1	B	330	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](#)

Of 6 ligands modelled in this entry, 6 are monoatomic - leaving 0 for Mogul analysis.

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

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	326/381 (85%)	0.76	41 (12%) 8 8	25, 39, 56, 64	0
1	B	316/381 (82%)	1.06	62 (19%) 3 3	25, 41, 64, 76	0
All	All	642/762 (84%)	0.91	103 (16%) 5 5	25, 40, 58, 76	0

All (103) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	261	ALA	5.1
1	B	253	VAL	4.3
1	B	6	TYR	4.2
1	B	259	LEU	4.0
1	B	260	ALA	3.8
1	B	142	LYS	3.8
1	B	218	PHE	3.8
1	B	42	ILE	3.7
1	B	234	LEU	3.6
1	A	101	CYS	3.6
1	B	52	PRO	3.5
1	B	12	VAL	3.5
1	A	145	ILE	3.4
1	A	110	GLY	3.4
1	B	243	MET	3.3
1	A	347	PRO	3.3
1	A	42	ILE	3.3
1	B	85	ARG	3.3
1	A	104	PRO	3.2
1	A	6	TYR	3.2
1	A	52	PRO	3.2
1	B	21	HIS	3.2
1	A	44	ARG	3.1
1	B	212	ARG	3.1

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Mol	Chain	Res	Type	RSRZ
1	A	140	LEU	3.1
1	B	236	TRP	3.1
1	B	238	TYR	3.1
1	A	103	ALA	3.1
1	B	219	LEU	3.1
1	B	262	LEU	3.1
1	A	134	ALA	3.1
1	B	290	ARG	3.0
1	A	43	GLY	2.9
1	B	264	LYS	2.9
1	A	108	VAL	2.9
1	B	145	ILE	2.9
1	B	62	VAL	2.9
1	B	347	PRO	2.9
1	A	251	VAL	2.8
1	B	239	LYS	2.8
1	A	224	GLY	2.8
1	B	67	ILE	2.8
1	B	66	GLN	2.7
1	A	250	THR	2.7
1	A	241	PRO	2.7
1	B	258	ASN	2.7
1	B	135	GLU	2.7
1	B	22	TRP	2.7
1	B	266	ALA	2.7
1	A	147	PRO	2.7
1	A	106	LEU	2.6
1	B	147	PRO	2.6
1	A	253	VAL	2.6
1	B	237	VAL	2.6
1	A	163	GLY	2.6
1	B	19	HIS	2.6
1	B	241	PRO	2.6
1	A	102	SER	2.6
1	B	65	GLY	2.6
1	A	78	HIS	2.5
1	B	106	LEU	2.5
1	B	20	ARG	2.5
1	B	306	ASP	2.5
1	A	254	SER	2.5
1	B	77	ARG	2.5
1	B	9	ALA	2.4

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Mol	Chain	Res	Type	RSRZ
1	A	112	THR	2.4
1	B	194	THR	2.4
1	B	136	ASN	2.4
1	B	10	VAL	2.4
1	B	143	ILE	2.4
1	B	196	SER	2.4
1	B	82	LYS	2.4
1	B	242	THR	2.4
1	A	117	ALA	2.3
1	B	251	VAL	2.3
1	B	11	SER	2.3
1	B	197	ARG	2.3
1	B	210	ASP	2.3
1	A	142	LYS	2.2
1	B	216	VAL	2.2
1	A	223	HIS	2.2
1	B	245	LEU	2.2
1	A	150	THR	2.2
1	A	21	HIS	2.1
1	A	120	LEU	2.1
1	B	192	SER	2.1
1	B	214	SER	2.1
1	B	41	VAL	2.1
1	A	245	LEU	2.1
1	A	199	ASN	2.1
1	B	195	ASP	2.1
1	A	105	GLN	2.1
1	B	265	GLN	2.1
1	A	7	GLY	2.1
1	A	85	ARG	2.1
1	A	212	ARG	2.1
1	A	109	LYS	2.1
1	A	107	ASN	2.1
1	B	263	GLN	2.1
1	B	325	ARG	2.1
1	A	236	TRP	2.0
1	B	54	LEU	2.0

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 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
2	CL	B	384	1/1	0.94	0.07	24,24,24,24	0
2	CL	A	383	1/1	0.95	0.08	37,37,37,37	0
2	CL	B	382	1/1	0.98	0.05	31,31,31,31	0
2	CL	B	383	1/1	0.98	0.09	22,22,22,22	0
2	CL	A	382	1/1	0.98	0.10	27,27,27,27	0
2	CL	A	384	1/1	0.99	0.05	33,33,33,33	0

6.5 Other polymers [i](#)

There are no such residues in this entry.