



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 5, 2026 – 08:15 AM UTC

PDB ID : 7ZMK / pdb_00007zmk
Title : Structure of human MFAP4 in complex with the Fab fragment of the AS0326 monoclonal antibody
Authors : Laursen, N.S.; Andersen, G.R.
Deposited on : 2022-04-19
Resolution : 3.40 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

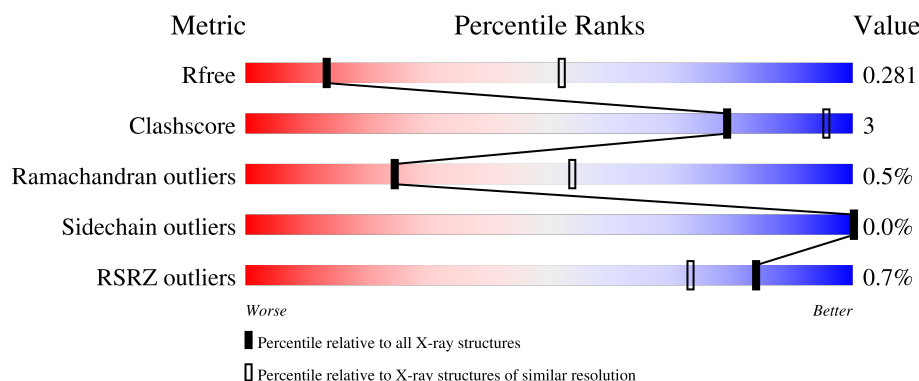
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 3.40 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.



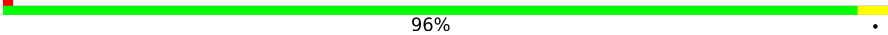
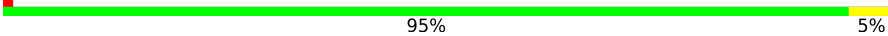
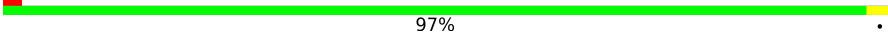
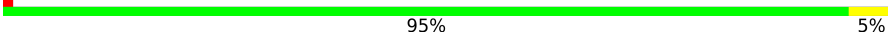
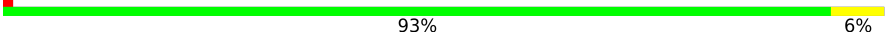
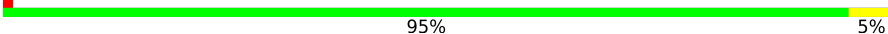
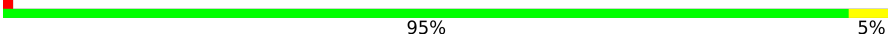
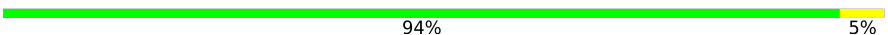
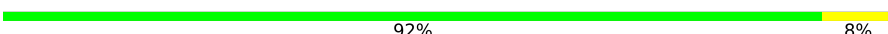
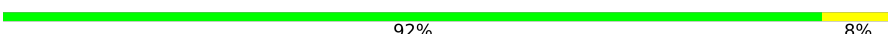
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	180053	1001 (3.44-3.36)
Clashscore	190562	1022 (3.44-3.36)
Ramachandran outliers	187476	1012 (3.44-3.36)
Sidechain outliers	187428	1012 (3.44-3.36)
RSRZ outliers	180081	1001 (3.44-3.36)

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	255	
1	D	255	
1	I	255	
1	L	255	
1	O	255	

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Mol	Chain	Length	Quality of chain
1	R	255	 78%7%14%
1	U	255	 77%9%13%
1	X	255	 78%8%14%
2	B	222	 96%. .
2	E	222	 95%5%
2	G	222	 97%. .
2	J	222	 95%5%
2	M	222	 93%6%
2	P	222	 95%5%
2	S	222	 95%5%
2	V	222	 94%5%
3	C	214	 91%8%
3	F	214	 91%9%
3	H	214	 95%5%
3	K	214	 92%8%
3	N	214	 92%8%
3	Q	214	 92%8%
3	T	214	 90%10%
3	W	214	 92%8%

2 Entry composition

There are 5 unique types of molecules in this entry. The entry contains 80000 atoms, of which 38984 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 Microfibril-associated glycoprotein 4.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
1	A	221	Total	C	H	N	O	S	0	0	0
			3412	1140	1636	294	335	7			
1	D	220	Total	C	H	N	O	S	0	0	0
			3394	1134	1626	293	334	7			
1	I	219	Total	C	H	N	O	S	0	0	0
			3377	1129	1618	291	332	7			
1	L	221	Total	C	H	N	O	S	0	0	0
			3412	1140	1636	294	335	7			
1	O	221	Total	C	H	N	O	S	0	0	0
			3412	1140	1636	294	335	7			
1	R	219	Total	C	H	N	O	S	0	0	0
			3377	1129	1618	291	332	7			
1	U	221	Total	C	H	N	O	S	0	0	0
			3412	1140	1636	294	335	7			
1	X	220	Total	C	H	N	O	S	0	0	0
			3394	1134	1626	293	334	7			

- Molecule 2 is a protein called heavy chain of antibody AS0326.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
2	B	222	Total	C	H	N	O	S	0	0	0
			3361	1076	1654	291	331	9			
2	E	222	Total	C	H	N	O	S	0	0	0
			3361	1076	1654	291	331	9			
2	G	222	Total	C	H	N	O	S	0	0	0
			3361	1076	1654	291	331	9			
2	J	222	Total	C	H	N	O	S	0	0	0
			3361	1076	1654	291	331	9			
2	M	221	Total	C	H	N	O	S	0	0	0
			3354	1071	1654	290	330	9			
2	P	222	Total	C	H	N	O	S	0	0	0
			3361	1076	1654	291	331	9			

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Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
2	S	222	Total	C	H	N	O	S	0	0	0
			3361	1076	1654	291	331	9			
2	V	221	Total	C	H	N	O	S	0	0	0
			3354	1071	1654	290	330	9			

- Molecule 3 is a protein called Light chain of AS0326.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
3	C	214	Total	C	H	N	O	S	0	0	0
			3239	1033	1590	275	335	6			
3	F	214	Total	C	H	N	O	S	0	0	0
			3239	1033	1590	275	335	6			
3	H	214	Total	C	H	N	O	S	0	0	0
			3239	1033	1590	275	335	6			
3	K	214	Total	C	H	N	O	S	0	0	0
			3239	1033	1590	275	335	6			
3	N	214	Total	C	H	N	O	S	0	0	0
			3239	1033	1590	275	335	6			
3	Q	214	Total	C	H	N	O	S	0	0	0
			3239	1033	1590	275	335	6			
3	T	214	Total	C	H	N	O	S	0	0	0
			3239	1033	1590	275	335	6			
3	W	214	Total	C	H	N	O	S	0	0	0
			3239	1033	1590	275	335	6			

- Molecule 4 is CALCIUM ION (CCD ID: CA) (formula: Ca).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	1	Total	Ca	0	0
			1	1		
4	D	1	Total	Ca	0	0
			1	1		
4	I	1	Total	Ca	0	0
			1	1		
4	L	1	Total	Ca	0	0
			1	1		
4	O	1	Total	Ca	0	0
			1	1		
4	R	1	Total	Ca	0	0
			1	1		
4	U	1	Total	Ca	0	0
			1	1		

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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	X	1	Total	Ca	0	0
			1	1		

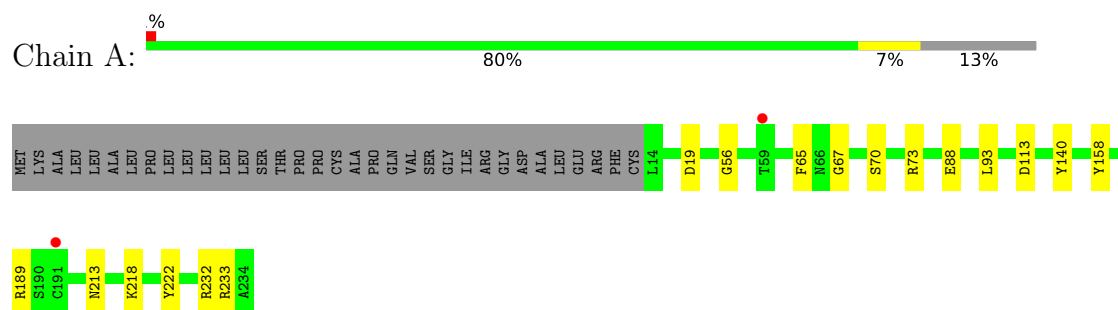
- Molecule 5 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	2	Total	O	0	0
			2	2		
5	D	2	Total	O	0	0
			2	2		
5	I	2	Total	O	0	0
			2	2		
5	L	2	Total	O	0	0
			2	2		
5	O	2	Total	O	0	0
			2	2		
5	R	2	Total	O	0	0
			2	2		
5	U	2	Total	O	0	0
			2	2		
5	X	2	Total	O	0	0
			2	2		

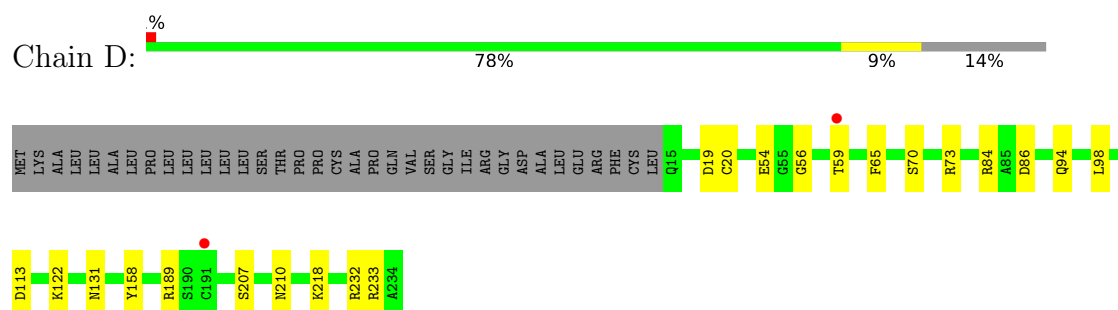
3 Residue-property plots [i](#)

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.

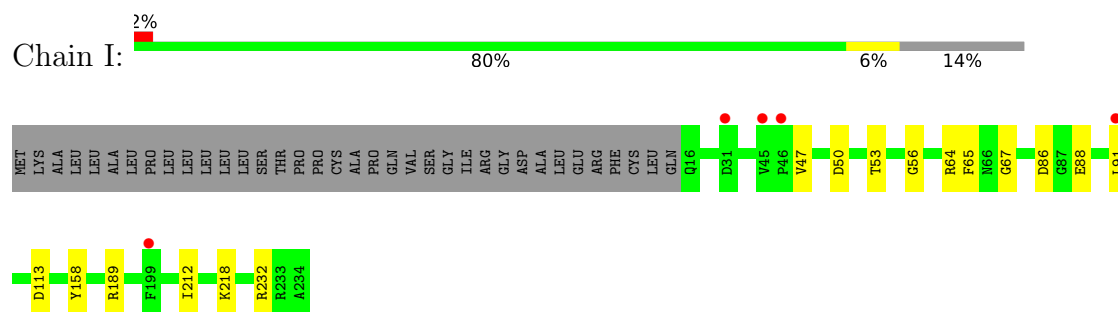
- Molecule 1: Microfibril-associated glycoprotein 4



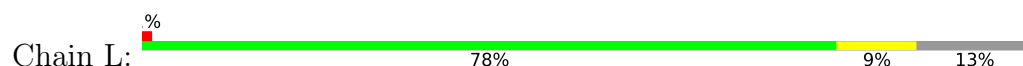
- Molecule 1: Microfibril-associated glycoprotein 4

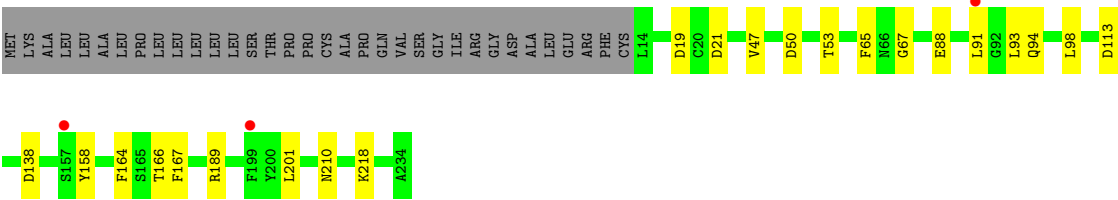


- Molecule 1: Microfibril-associated glycoprotein 4

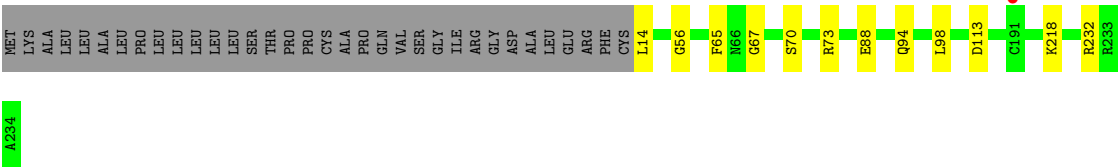
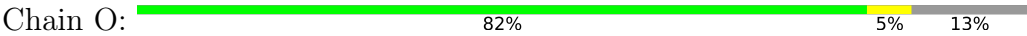


- Molecule 1: Microfibril-associated glycoprotein 4

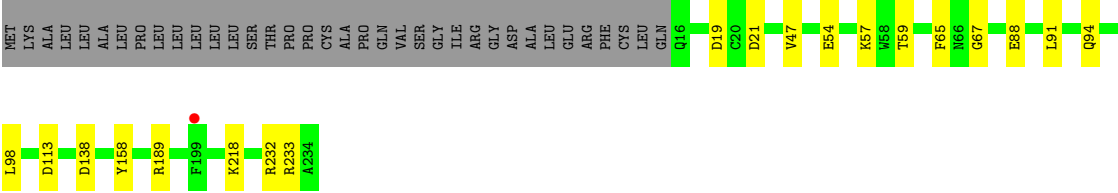
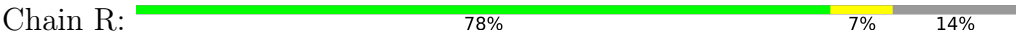




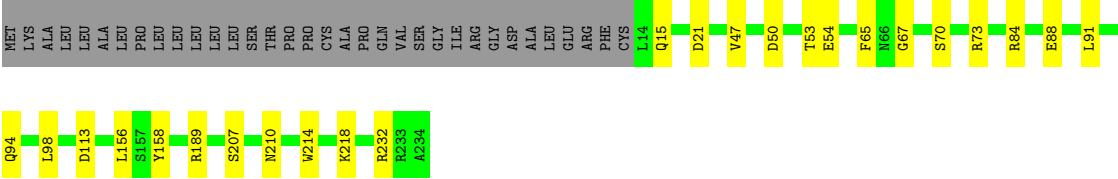
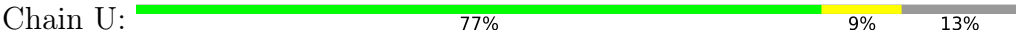
● Molecule 1: Microfibril-associated glycoprotein 4



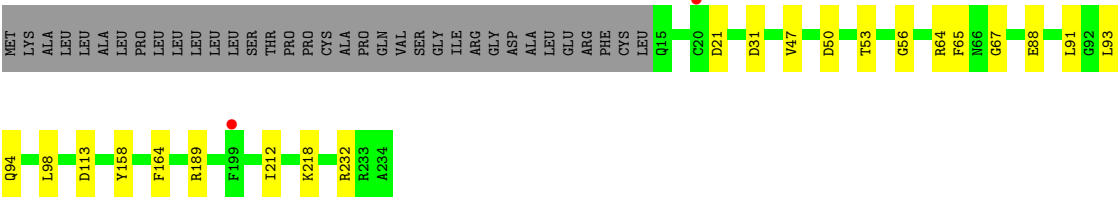
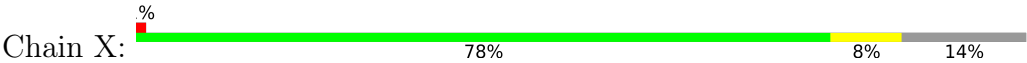
● Molecule 1: Microfibril-associated glycoprotein 4



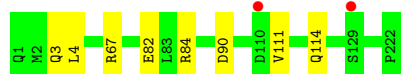
● Molecule 1: Microfibril-associated glycoprotein 4



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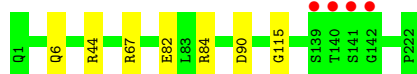
● Molecule 2: heavy chain of antibody AS0326



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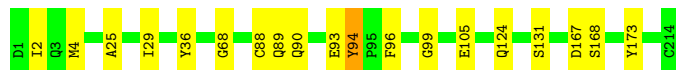
- Molecule 2: heavy chain of antibody AS0326

Chain V:  94% 5%



- Molecule 3: Light chain of AS0326

Chain C:  91% 8%



- Molecule 3: Light chain of AS0326

Chain F:  91% 9%



- Molecule 3: Light chain of AS0326

Chain H:  95% 5%

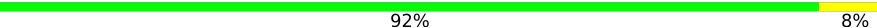


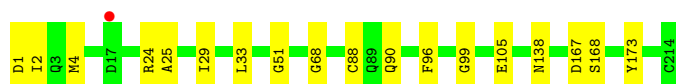
- Molecule 3: Light chain of AS0326

Chain K:  92% 8%



- Molecule 3: Light chain of AS0326

Chain N:  92% 8%

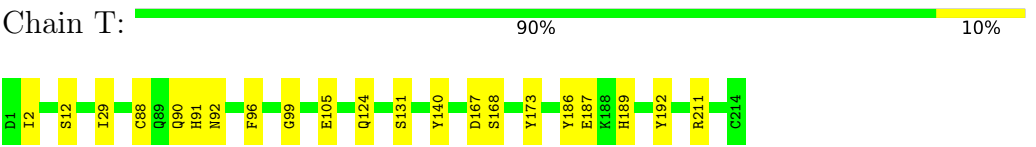


- Molecule 3: Light chain of AS0326

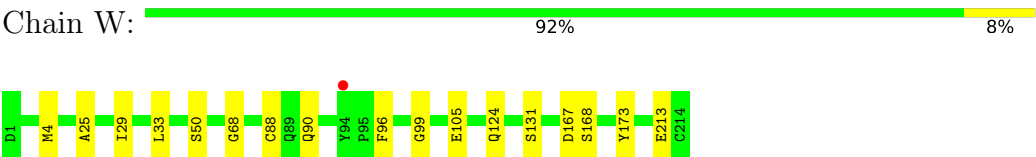
Chain Q:  92% 8%



● Molecule 3: Light chain of AS0326



● Molecule 3: Light chain of AS0326



4 Data and refinement statistics

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α , β , γ	317.32Å 126.60Å 187.55Å 90.00° 98.86° 90.00°	Depositor
Resolution (Å)	48.85 – 3.40 48.85 – 3.40	Depositor EDS
% Data completeness (in resolution range)	99.7 (48.85-3.40) 99.8 (48.85-3.40)	Depositor EDS
R_{merge}	0.23	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.15 (at 3.40Å)	Xtriage
Refinement program	PHENIX 1.16_3549	Depositor
R, R_{free}	0.239 , 0.277 0.243 , 0.281	Depositor DCC
R_{free} test set	2000 reflections (1.98%)	wwPDB-VP
Wilson B-factor (Å ²)	100.8	Xtriage
Anisotropy	0.651	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.34 , 80.7	EDS
L-test for twinning ²	$\langle L \rangle = 0.44$, $\langle L^2 \rangle = 0.27$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.92	EDS
Total number of atoms	80000	wwPDB-VP
Average B, all atoms (Å ²)	145.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.46% 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:
CA

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	0.27	0/1830	0.53	0/2475
1	D	0.26	0/1822	0.51	0/2464
1	I	0.24	0/1813	0.48	0/2452
1	L	0.28	0/1830	0.53	0/2475
1	O	0.25	0/1830	0.49	0/2475
1	R	0.24	0/1813	0.49	0/2452
1	U	0.25	0/1830	0.50	0/2475
1	X	0.26	0/1822	0.52	0/2464
2	B	0.21	0/1753	0.47	0/2389
2	E	0.20	0/1753	0.46	0/2389
2	G	0.20	0/1753	0.45	0/2389
2	J	0.20	0/1753	0.44	0/2389
2	M	0.19	0/1745	0.43	0/2377
2	P	0.20	0/1753	0.43	0/2389
2	S	0.19	0/1753	0.44	0/2389
2	V	0.20	0/1745	0.44	0/2377
3	C	0.24	0/1684	0.48	0/2282
3	F	0.25	0/1684	0.49	0/2282
3	H	0.21	0/1684	0.45	0/2282
3	K	0.21	0/1684	0.46	0/2282
3	N	0.21	0/1684	0.46	0/2282
3	Q	0.21	0/1684	0.47	0/2282
3	T	0.21	0/1684	0.48	0/2282
3	W	0.21	0/1684	0.46	0/2282
All	All	0.23	0/42070	0.47	0/57076

There are no bond length outliers.

There are no bond angle outliers.

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	1776	1636	1637	8	0
1	D	1768	1626	1626	12	0
1	I	1759	1618	1618	9	0
1	L	1776	1636	1637	13	0
1	O	1776	1636	1637	7	0
1	R	1759	1618	1618	9	0
1	U	1776	1636	1637	12	0
1	X	1768	1626	1626	11	0
2	B	1707	1654	1661	5	0
2	E	1707	1654	1661	8	0
2	G	1707	1654	1661	4	0
2	J	1707	1654	1661	5	0
2	M	1700	1654	1654	7	1
2	P	1707	1654	1661	6	0
2	S	1707	1654	1661	6	0
2	V	1700	1654	1654	6	0
3	C	1649	1590	1603	15	0
3	F	1649	1590	1603	14	0
3	H	1649	1590	1603	5	0
3	K	1649	1590	1603	14	0
3	N	1649	1590	1603	13	0
3	Q	1649	1590	1603	9	1
3	T	1649	1590	1603	10	0
3	W	1649	1590	1603	12	0
4	A	1	0	0	0	0
4	D	1	0	0	0	0
4	I	1	0	0	0	0
4	L	1	0	0	0	0
4	O	1	0	0	0	0
4	R	1	0	0	0	0
4	U	1	0	0	0	0
4	X	1	0	0	0	0
5	A	2	0	0	0	0
5	D	2	0	0	0	0
5	I	2	0	0	0	0
5	L	2	0	0	0	0
5	O	2	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
5	R	2	0	0	0	0
5	U	2	0	0	0	0
5	X	2	0	0	0	0
All	All	41016	38984	39134	213	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 3.

All (213) 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:A:113:ASP:OD2	1:A:218:LYS:NZ	2.01	0.93
1:D:113:ASP:OD2	1:D:218:LYS:NZ	2.01	0.93
3:K:4:MET:CE	3:K:25:ALA:HA	2.06	0.86
1:I:113:ASP:OD2	1:I:218:LYS:NZ	2.08	0.86
1:X:113:ASP:OD2	1:X:218:LYS:NZ	2.09	0.85
1:U:113:ASP:OD2	1:U:218:LYS:NZ	2.09	0.85
1:O:113:ASP:OD2	1:O:218:LYS:NZ	2.09	0.83
1:R:113:ASP:OD2	1:R:218:LYS:NZ	2.12	0.83
3:T:189:HIS:O	3:T:211:ARG:NH1	2.13	0.82
1:L:113:ASP:OD2	1:L:218:LYS:NZ	2.14	0.81
3:W:4:MET:HE2	3:W:4:MET:HA	1.65	0.78
3:K:4:MET:HE2	3:K:4:MET:HA	1.64	0.78
3:Q:105:GLU:OE1	3:Q:173:TYR:OH	2.00	0.77
3:N:4:MET:CE	3:N:25:ALA:HA	2.15	0.77
1:I:67:GLY:N	1:I:88:GLU:OE2	2.17	0.77
3:N:105:GLU:OE1	3:N:173:TYR:OH	2.03	0.75
3:N:4:MET:HE2	3:N:4:MET:HA	1.69	0.74
2:S:82:GLU:OE2	2:S:84:ARG:NH1	2.21	0.73
1:L:201:LEU:HD11	1:L:210:ASN:HD21	1.53	0.73
2:P:82:GLU:OE2	2:P:84:ARG:NH1	2.21	0.73
3:W:105:GLU:OE1	3:W:173:TYR:OH	2.06	0.72
3:K:105:GLU:OE1	3:K:173:TYR:OH	2.06	0.72
3:K:4:MET:HE1	3:K:25:ALA:HA	1.71	0.72
3:W:4:MET:CE	3:W:25:ALA:HA	2.19	0.72
2:B:82:GLU:OE2	2:B:84:ARG:NH1	2.24	0.71
3:H:105:GLU:OE1	3:H:173:TYR:OH	2.08	0.70
2:J:82:GLU:OE2	2:J:84:ARG:NH1	2.25	0.70
3:T:105:GLU:OE1	3:T:173:TYR:OH	2.10	0.70
3:F:105:GLU:OE1	3:F:173:TYR:OH	2.09	0.69
1:L:67:GLY:N	1:L:88:GLU:OE2	2.25	0.69

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:M:82:GLU:OE2	2:M:84:ARG:NH1	2.26	0.69
3:N:88:CYS:O	3:N:99:GLY:N	2.26	0.69
3:Q:88:CYS:O	3:Q:99:GLY:N	2.26	0.69
1:O:67:GLY:N	1:O:88:GLU:OE2	2.26	0.68
3:F:88:CYS:O	3:F:99:GLY:N	2.27	0.68
2:G:82:GLU:OE2	2:G:84:ARG:NH1	2.26	0.67
3:T:88:CYS:O	3:T:99:GLY:N	2.27	0.67
1:O:14:LEU:HD23	1:O:14:LEU:O	1.95	0.67
1:U:54:GLU:O	1:U:232:ARG:NH2	2.28	0.66
1:O:70:SER:O	1:O:73:ARG:NH1	2.29	0.66
1:U:207:SER:OG	1:U:210:ASN:ND2	2.29	0.65
3:W:4:MET:HE1	3:W:25:ALA:HA	1.78	0.65
1:A:70:SER:O	1:A:73:ARG:NH1	2.30	0.64
3:N:4:MET:HE1	3:N:25:ALA:HA	1.79	0.64
1:R:67:GLY:N	1:R:88:GLU:OE2	2.30	0.64
3:C:167:ASP:OD1	3:C:168:SER:N	2.31	0.64
2:V:82:GLU:OE2	2:V:84:ARG:NH1	2.31	0.63
3:K:167:ASP:OD1	3:K:168:SER:N	2.31	0.63
2:E:82:GLU:OE2	2:E:84:ARG:NH1	2.32	0.63
3:W:88:CYS:O	3:W:99:GLY:N	2.31	0.62
3:C:36:TYR:OH	3:C:89:GLN:OE1	2.07	0.62
3:K:4:MET:HE1	3:K:25:ALA:CA	2.30	0.62
3:K:4:MET:HE2	3:K:24:ARG:O	1.99	0.62
3:C:105:GLU:OE1	3:C:173:TYR:OH	2.11	0.62
3:F:167:ASP:OD1	3:F:168:SER:N	2.34	0.61
3:H:88:CYS:O	3:H:99:GLY:N	2.33	0.61
1:I:50:ASP:OD2	1:I:53:THR:OG1	2.16	0.61
2:S:197:SER:OG	2:S:203:TYR:OH	2.13	0.61
1:L:201:LEU:HD11	1:L:210:ASN:ND2	2.15	0.60
3:F:90:GLN:OE1	3:F:92:ASN:N	2.34	0.60
3:K:186:TYR:O	3:K:192:TYR:OH	2.19	0.60
3:Q:186:TYR:O	3:Q:192:TYR:OH	2.19	0.59
2:B:114:GLN:OE1	2:B:114:GLN:N	2.35	0.59
3:H:167:ASP:OD1	3:H:168:SER:N	2.35	0.59
1:D:207:SER:OG	1:D:210:ASN:ND2	2.36	0.59
1:I:158:TYR:O	1:I:189:ARG:NH1	2.36	0.59
2:P:212:SER:OG	2:P:214:THR:OG1	2.20	0.59
2:B:67:ARG:NH2	2:B:90:ASP:OD2	2.35	0.59
3:N:29:ILE:HD11	3:N:90:GLN:HG2	1.84	0.59
3:W:167:ASP:OD1	3:W:168:SER:N	2.36	0.58
3:Q:167:ASP:OD1	3:Q:168:SER:N	2.36	0.58

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:N:167:ASP:OD1	3:N:168:SER:N	2.37	0.58
1:R:54:GLU:O	1:R:232:ARG:NH2	2.33	0.58
2:J:67:ARG:NH2	2:J:90:ASP:OD2	2.37	0.58
1:X:67:GLY:N	1:X:88:GLU:OE2	2.37	0.57
3:F:36:TYR:OH	3:F:89:GLN:OE1	2.06	0.57
1:D:158:TYR:O	1:D:189:ARG:NH1	2.37	0.56
2:S:67:ARG:NH2	2:S:90:ASP:OD2	2.39	0.56
1:X:47:VAL:HG12	1:X:91:LEU:HD13	1.88	0.56
2:P:44:ARG:HG3	3:Q:100:GLN:HA	1.89	0.55
1:D:19:ASP:OD2	1:D:233:ARG:NH1	2.38	0.55
2:E:138:LYS:NZ	3:F:208:SER:O	2.36	0.55
3:C:2:ILE:HD11	3:C:93:GLU:OE1	2.07	0.54
3:T:124:GLN:OE1	3:T:131:SER:N	2.40	0.54
3:C:2:ILE:HG22	3:C:2:ILE:O	2.07	0.54
1:L:50:ASP:OD2	1:L:53:THR:OG1	2.22	0.54
1:U:67:GLY:N	1:U:88:GLU:OE2	2.41	0.54
1:A:158:TYR:O	1:A:189:ARG:NH1	2.40	0.54
1:D:56:GLY:O	1:D:232:ARG:NH2	2.41	0.54
2:J:212:SER:OG	2:J:214:THR:OG1	2.26	0.54
2:V:106:SER:OG	2:V:107:TRP:N	2.40	0.54
1:A:19:ASP:OD2	1:A:233:ARG:NH1	2.38	0.53
1:U:50:ASP:OD2	1:U:53:THR:OG1	2.23	0.53
1:O:14:LEU:O	1:O:14:LEU:CD2	2.57	0.53
3:C:4:MET:HE1	3:C:25:ALA:HB2	1.91	0.53
3:C:2:ILE:HG21	3:C:90:GLN:CG	2.39	0.53
3:C:88:CYS:O	3:C:99:GLY:N	2.42	0.52
2:M:212:SER:OG	2:M:214:THR:OG1	2.27	0.52
3:W:33:LEU:O	3:W:50:SER:N	2.42	0.52
1:R:21:ASP:OD1	1:R:57:LYS:O	2.28	0.52
1:U:158:TYR:O	1:U:189:ARG:NH1	2.41	0.52
3:F:124:GLN:OE1	3:F:131:SER:N	2.42	0.52
2:S:114:GLN:OE1	2:S:114:GLN:N	2.42	0.52
1:D:84:ARG:NH2	1:L:138:ASP:OD1	2.40	0.52
3:K:88:CYS:O	3:K:99:GLY:N	2.41	0.51
1:D:94:GLN:O	1:D:98:LEU:HD22	2.10	0.51
1:X:158:TYR:O	1:X:189:ARG:NH1	2.42	0.51
3:Q:29:ILE:HD11	3:Q:90:GLN:O	2.11	0.51
1:U:70:SER:O	1:U:73:ARG:NH1	2.44	0.51
2:V:6:GLN:OE1	2:V:115:GLY:N	2.42	0.51
2:M:98:ARG:HB3	2:M:111:VAL:HG12	1.92	0.51
3:W:124:GLN:OE1	3:W:131:SER:N	2.44	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:M:114:GLN:N	2:M:114:GLN:OE1	2.45	0.50
3:C:4:MET:CE	3:C:25:ALA:HA	2.42	0.50
2:V:67:ARG:NH2	2:V:90:ASP:OD2	2.43	0.50
3:F:4:MET:CE	3:F:25:ALA:HA	2.41	0.50
3:K:4:MET:HE1	3:K:25:ALA:CB	2.41	0.50
1:L:93:LEU:HD11	1:L:164:PHE:CD2	2.46	0.50
1:I:47:VAL:HG12	1:I:91:LEU:HD13	1.94	0.50
1:A:213:ASN:ND2	1:A:222:TYR:O	2.45	0.50
3:C:29:ILE:HD11	3:C:90:GLN:O	2.12	0.50
3:T:167:ASP:OD1	3:T:168:SER:N	2.45	0.50
3:W:4:MET:HE1	3:W:25:ALA:CA	2.41	0.49
1:I:56:GLY:O	1:I:232:ARG:NH2	2.43	0.49
1:O:56:GLY:O	1:O:232:ARG:NH2	2.45	0.49
2:G:6:GLN:OE1	2:G:115:GLY:N	2.45	0.49
1:L:94:GLN:O	1:L:98:LEU:HD22	2.13	0.49
3:F:4:MET:HE2	3:F:4:MET:HA	1.94	0.49
2:S:6:GLN:OE1	2:S:115:GLY:N	2.44	0.49
1:R:47:VAL:HG12	1:R:91:LEU:HD13	1.95	0.49
3:N:4:MET:HE1	3:N:25:ALA:CB	2.43	0.49
2:P:6:GLN:OE1	2:P:115:GLY:N	2.43	0.49
3:N:4:MET:HE1	3:N:25:ALA:CA	2.41	0.49
3:W:4:MET:HE1	3:W:25:ALA:CB	2.43	0.49
1:R:138:ASP:OD2	1:U:84:ARG:NH2	2.45	0.48
3:K:29:ILE:HD11	3:K:90:GLN:HG2	1.95	0.48
3:T:187:GLU:O	3:T:211:ARG:NH1	2.47	0.48
1:X:56:GLY:O	1:X:232:ARG:NH2	2.46	0.48
3:Q:29:ILE:HG22	3:Q:68:GLY:O	2.12	0.48
2:E:67:ARG:NH2	2:E:90:ASP:OD2	2.46	0.48
1:U:156:LEU:HD23	1:U:214:TRP:CH2	2.48	0.47
2:G:44:ARG:HG3	3:H:100:GLN:HA	1.96	0.47
3:K:90:GLN:OE1	3:K:92:ASN:N	2.44	0.47
3:W:29:ILE:HD11	3:W:90:GLN:O	2.13	0.47
1:A:67:GLY:N	1:A:88:GLU:OE2	2.47	0.47
2:J:6:GLN:OE1	2:J:115:GLY:N	2.42	0.47
3:H:29:ILE:HD11	3:H:90:GLN:O	2.14	0.47
1:L:47:VAL:HG12	1:L:91:LEU:HD13	1.96	0.47
1:A:56:GLY:O	1:A:232:ARG:NH2	2.46	0.47
1:R:158:TYR:O	1:R:189:ARG:NH1	2.46	0.47
2:G:67:ARG:NH2	2:G:90:ASP:OD2	2.48	0.47
3:C:2:ILE:HD11	3:C:93:GLU:CD	2.40	0.47
3:Q:124:GLN:OE1	3:Q:131:SER:N	2.48	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:M:6:GLN:OE1	2:M:115:GLY:N	2.47	0.46
3:C:4:MET:HE2	3:C:25:ALA:HA	1.97	0.46
1:X:94:GLN:O	1:X:98:LEU:HD22	2.16	0.46
1:D:70:SER:O	1:D:73:ARG:NH1	2.48	0.46
1:X:93:LEU:HD11	1:X:164:PHE:CD2	2.51	0.46
3:F:3:GLN:O	3:F:4:MET:HE2	2.16	0.46
3:N:1:ASP:HB2	3:N:2:ILE:HD12	1.97	0.46
3:N:33:LEU:O	3:N:51:GLY:N	2.43	0.45
3:K:4:MET:HE1	3:K:25:ALA:HB2	1.98	0.45
1:U:47:VAL:HG12	1:U:91:LEU:HD13	1.98	0.45
2:V:61:ASN:OD1	2:V:62:GLU:N	2.50	0.45
3:C:2:ILE:HG21	3:C:90:GLN:HG3	1.99	0.44
3:T:29:ILE:HD11	3:T:90:GLN:HG2	1.99	0.44
3:Q:108:ARG:NE	3:Q:170:ASP:O	2.50	0.44
1:L:19:ASP:OD1	1:L:21:ASP:N	2.51	0.44
3:W:29:ILE:HG22	3:W:68:GLY:O	2.18	0.44
3:C:29:ILE:HG22	3:C:68:GLY:O	2.18	0.43
1:L:158:TYR:O	1:L:189:ARG:NH1	2.48	0.43
1:D:86:ASP:OD1	1:D:86:ASP:N	2.52	0.43
2:J:61:ASN:OD1	2:J:62:GLU:N	2.51	0.43
3:N:4:MET:HE2	3:N:24:ARG:O	2.19	0.43
1:X:50:ASP:OD2	1:X:53:THR:OG1	2.35	0.43
1:O:94:GLN:O	1:O:98:LEU:HD22	2.19	0.42
2:E:3:GLN:C	2:E:4:LEU:HD22	2.44	0.42
2:V:212:SER:OG	2:V:214:THR:OG1	2.37	0.42
1:X:64:ARG:NH1	1:X:212:ILE:HG23	2.34	0.42
3:F:4:MET:HE2	3:F:25:ALA:HA	1.99	0.42
1:I:64:ARG:NH1	1:I:212:ILE:HG23	2.33	0.42
1:X:21:ASP:OD1	1:X:21:ASP:N	2.53	0.42
3:T:12:SER:OG	3:T:140:TYR:OH	2.35	0.42
3:F:186:TYR:O	3:F:192:TYR:OH	2.32	0.42
3:N:29:ILE:HG22	3:N:68:GLY:O	2.19	0.42
1:D:20:CYS:CB	1:D:59:THR:HG22	2.50	0.42
1:L:21:ASP:N	1:L:21:ASP:OD1	2.52	0.42
2:S:4:LEU:HD23	2:S:111:VAL:CG1	2.50	0.42
1:U:94:GLN:O	1:U:98:LEU:HD22	2.20	0.41
2:B:3:GLN:C	2:B:4:LEU:HD22	2.45	0.41
2:E:4:LEU:HD23	2:E:111:VAL:HG12	2.01	0.41
2:P:4:LEU:HD23	2:P:111:VAL:CG1	2.51	0.41
1:R:94:GLN:O	1:R:98:LEU:HD22	2.20	0.41
2:M:61:ASN:OD1	2:M:62:GLU:N	2.53	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:P:61:ASN:OD1	2:P:62:GLU:N	2.54	0.41
1:U:21:ASP:OD1	1:U:21:ASP:N	2.53	0.41
3:F:4:MET:HE1	3:F:25:ALA:CB	2.51	0.41
1:R:19:ASP:OD2	1:R:233:ARG:NH1	2.52	0.41
1:D:131:ASN:ND2	1:I:86:ASP:OD1	2.54	0.41
2:M:67:ARG:NH2	2:M:90:ASP:OD2	2.54	0.41
2:E:212:SER:OG	2:E:214:THR:OG1	2.34	0.41
3:T:90:GLN:OE1	3:T:92:ASN:N	2.53	0.41
3:C:124:GLN:OE1	3:C:131:SER:N	2.54	0.41
1:L:166:THR:HG22	1:L:167:PHE:N	2.36	0.41
1:D:54:GLU:OE1	1:D:122:LYS:NZ	2.41	0.40
3:T:186:TYR:O	3:T:192:TYR:OH	2.36	0.40
2:E:107:TRP:CZ2	3:F:94:TYR:HE2	2.39	0.40
1:X:31:ASP:N	1:X:31:ASP:OD1	2.52	0.40
1:A:93:LEU:HD12	1:A:140:TYR:HB3	2.02	0.40
2:B:4:LEU:HD23	2:B:111:VAL:HG12	2.04	0.40
2:E:114:GLN:N	2:E:114:GLN:OE1	2.55	0.40
1:I:64:ARG:NH1	1:I:212:ILE:CG2	2.85	0.40
3:K:4:MET:CE	3:K:4:MET:HA	2.44	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)
2:M:144:THR:OG1	3:Q:202:SER:OG[3_555]	1.98	0.22

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	219/255 (86%)	209 (95%)	9 (4%)	1 (0%)	24 54

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	D	218/255 (86%)	209 (96%)	8 (4%)	1 (0%)	24	54
1	I	217/255 (85%)	207 (95%)	9 (4%)	1 (0%)	24	54
1	L	219/255 (86%)	211 (96%)	7 (3%)	1 (0%)	24	54
1	O	219/255 (86%)	209 (95%)	9 (4%)	1 (0%)	24	54
1	R	217/255 (85%)	208 (96%)	8 (4%)	1 (0%)	24	54
1	U	219/255 (86%)	208 (95%)	9 (4%)	2 (1%)	14	42
1	X	218/255 (86%)	208 (95%)	9 (4%)	1 (0%)	24	54
2	B	220/222 (99%)	207 (94%)	13 (6%)	0	100	100
2	E	220/222 (99%)	206 (94%)	14 (6%)	0	100	100
2	G	220/222 (99%)	206 (94%)	14 (6%)	0	100	100
2	J	220/222 (99%)	207 (94%)	13 (6%)	0	100	100
2	M	219/222 (99%)	207 (94%)	12 (6%)	0	100	100
2	P	220/222 (99%)	208 (94%)	12 (6%)	0	100	100
2	S	220/222 (99%)	209 (95%)	11 (5%)	0	100	100
2	V	219/222 (99%)	207 (94%)	12 (6%)	0	100	100
3	C	212/214 (99%)	201 (95%)	9 (4%)	2 (1%)	14	42
3	F	212/214 (99%)	201 (95%)	9 (4%)	2 (1%)	14	42
3	H	212/214 (99%)	201 (95%)	9 (4%)	2 (1%)	14	42
3	K	212/214 (99%)	201 (95%)	8 (4%)	3 (1%)	9	31
3	N	212/214 (99%)	201 (95%)	9 (4%)	2 (1%)	14	42
3	Q	212/214 (99%)	201 (95%)	10 (5%)	1 (0%)	24	54
3	T	212/214 (99%)	201 (95%)	8 (4%)	3 (1%)	9	31
3	W	212/214 (99%)	200 (94%)	10 (5%)	2 (1%)	14	42
All	All	5200/5528 (94%)	4933 (95%)	241 (5%)	26 (0%)	24	54

All (26) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	65	PHE
1	D	65	PHE
1	I	65	PHE
1	L	65	PHE
1	O	65	PHE
1	R	65	PHE

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Mol	Chain	Res	Type
1	U	15	GLN
1	U	65	PHE
3	W	213	GLU
1	X	65	PHE
3	N	96	PHE
3	N	138	ASN
3	T	96	PHE
3	C	96	PHE
3	F	138	ASN
3	H	138	ASN
3	K	138	ASN
3	Q	138	ASN
3	T	91	HIS
3	W	96	PHE
3	K	2	ILE
3	C	94	TYR
3	F	94	TYR
3	H	94	TYR
3	K	94	TYR
3	T	2	ILE

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	182/210 (87%)	182 (100%)	0	100	100
1	D	181/210 (86%)	181 (100%)	0	100	100
1	I	180/210 (86%)	180 (100%)	0	100	100
1	L	182/210 (87%)	182 (100%)	0	100	100
1	O	182/210 (87%)	182 (100%)	0	100	100
1	R	180/210 (86%)	179 (99%)	1 (1%)	78	80
1	U	182/210 (87%)	182 (100%)	0	100	100
1	X	181/210 (86%)	181 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
2	B	194/194 (100%)	194 (100%)	0	100	100
2	E	194/194 (100%)	194 (100%)	0	100	100
2	G	194/194 (100%)	194 (100%)	0	100	100
2	J	194/194 (100%)	194 (100%)	0	100	100
2	M	193/194 (100%)	193 (100%)	0	100	100
2	P	194/194 (100%)	194 (100%)	0	100	100
2	S	194/194 (100%)	194 (100%)	0	100	100
2	V	193/194 (100%)	193 (100%)	0	100	100
3	C	188/188 (100%)	187 (100%)	1 (0%)	81	81
3	F	188/188 (100%)	188 (100%)	0	100	100
3	H	188/188 (100%)	188 (100%)	0	100	100
3	K	188/188 (100%)	188 (100%)	0	100	100
3	N	188/188 (100%)	188 (100%)	0	100	100
3	Q	188/188 (100%)	188 (100%)	0	100	100
3	T	188/188 (100%)	188 (100%)	0	100	100
3	W	188/188 (100%)	188 (100%)	0	100	100
All	All	4504/4736 (95%)	4502 (100%)	2 (0%)	100	100

All (2) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
3	C	94	TYR
1	R	59	THR

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (39) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	29	GLN
1	A	76	ASN
2	B	105	ASN
3	C	79	GLN
1	D	76	ASN
2	E	102	ASN
3	F	79	GLN
3	F	138	ASN

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Mol	Chain	Res	Type
3	F	147	GLN
2	G	43	GLN
2	G	102	ASN
2	G	173	HIS
3	H	79	GLN
3	H	137	ASN
3	H	138	ASN
1	I	76	ASN
2	J	105	ASN
2	J	173	HIS
3	K	79	GLN
3	K	137	ASN
3	K	138	ASN
1	L	76	ASN
1	L	210	ASN
3	N	79	GLN
3	N	138	ASN
1	O	29	GLN
1	O	197	ASN
1	O	213	ASN
2	P	173	HIS
3	Q	79	GLN
3	Q	137	ASN
3	Q	138	ASN
1	R	76	ASN
3	T	79	GLN
1	U	76	ASN
1	U	210	ASN
3	W	79	GLN
3	W	147	GLN
1	X	76	ASN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains ⓘ

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

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 8 ligands modelled in this entry, 8 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	221/255 (86%)	-0.11	2 (0%) 81 68	72, 99, 127, 205	0
1	D	220/255 (86%)	-0.12	2 (0%) 81 68	83, 111, 141, 213	0
1	I	219/255 (85%)	-0.04	5 (2%) 61 46	96, 132, 164, 210	0
1	L	221/255 (86%)	-0.04	3 (1%) 73 59	77, 100, 137, 197	0
1	O	221/255 (86%)	-0.04	1 (0%) 87 78	85, 124, 168, 209	0
1	R	219/255 (85%)	-0.08	1 (0%) 87 78	78, 115, 155, 195	0
1	U	221/255 (86%)	-0.12	0 100 100	86, 119, 153, 201	0
1	X	220/255 (86%)	-0.10	2 (0%) 81 68	76, 102, 135, 221	0
2	B	222/222 (100%)	-0.05	2 (0%) 81 68	118, 152, 201, 323	0
2	E	222/222 (100%)	-0.22	2 (0%) 81 68	99, 135, 195, 284	0
2	G	222/222 (100%)	-0.17	4 (1%) 67 53	94, 140, 187, 405	0
2	J	222/222 (100%)	-0.29	2 (0%) 81 68	91, 140, 196, 292	0
2	M	221/222 (99%)	-0.09	2 (0%) 81 68	132, 173, 219, 355	0
2	P	222/222 (100%)	-0.06	2 (0%) 81 68	95, 157, 221, 381	0
2	S	222/222 (100%)	-0.00	2 (0%) 81 68	109, 181, 303, 385	0
2	V	221/222 (99%)	-0.17	0 100 100	102, 175, 266, 306	0
3	C	214/214 (100%)	-0.24	0 100 100	102, 127, 193, 259	0
3	F	214/214 (100%)	-0.20	0 100 100	96, 123, 154, 191	0
3	H	214/214 (100%)	-0.20	1 (0%) 87 78	95, 145, 185, 230	0
3	K	214/214 (100%)	-0.31	0 100 100	93, 141, 198, 244	0
3	N	214/214 (100%)	-0.04	1 (0%) 87 78	131, 173, 216, 240	0
3	Q	214/214 (100%)	-0.20	1 (0%) 87 78	102, 163, 236, 274	0
3	T	214/214 (100%)	-0.02	0 100 100	126, 201, 268, 340	0
3	W	214/214 (100%)	-0.07	1 (0%) 87 78	106, 209, 270, 309	0

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Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
All	All	5248/5528 (94%)	-0.12	36 (0%) 84 73	72, 138, 232, 405	0

All (36) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	L	157	SER	3.7
2	G	141	SER	3.2
1	R	199	PHE	3.2
1	I	199	PHE	3.1
2	G	142	GLY	3.0
2	M	139	SER	2.9
1	A	191	CYS	2.8
1	L	199	PHE	2.8
1	O	191	CYS	2.8
2	J	139	SER	2.7
1	A	59	THR	2.7
1	X	20	CYS	2.6
2	S	222	PRO	2.6
2	P	222	PRO	2.5
1	X	199	PHE	2.5
1	I	31	ASP	2.5
2	E	222	PRO	2.4
2	G	139	SER	2.4
1	I	91	LEU	2.3
1	D	191	CYS	2.3
1	I	46	PRO	2.3
2	J	222	PRO	2.3
2	P	119	THR	2.3
2	B	110	ASP	2.3
1	D	59	THR	2.2
2	B	129	SER	2.2
1	L	91	LEU	2.2
3	W	94	TYR	2.2
2	M	137	SER	2.2
2	G	140	THR	2.2
3	Q	10	SER	2.2
3	H	118	PHE	2.1
3	N	17	ASP	2.1
2	E	139	SER	2.1
1	I	45	VAL	2.1
2	S	161	VAL	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	CA	U	501	1/1	0.98	0.03	97,97,97,97	0
4	CA	D	501	1/1	0.99	0.04	95,95,95,95	0
4	CA	I	501	1/1	0.99	0.03	129,129,129,129	0
4	CA	L	501	1/1	0.99	0.04	83,83,83,83	0
4	CA	O	501	1/1	0.99	0.03	97,97,97,97	0
4	CA	R	501	1/1	0.99	0.04	111,111,111,111	0
4	CA	A	501	1/1	0.99	0.03	82,82,82,82	0
4	CA	X	501	1/1	0.99	0.03	84,84,84,84	0

6.5 Other polymers [i](#)

There are no such residues in this entry.