



Full wwPDB X-ray Structure Validation Report ⓘ

May 26, 2020 – 12:09 am BST

PDB ID : 6R9R
Title : Crystal structure of Csx1 in complex with cyclic oligoadenylate cOA4 conformation 2
Authors : Molina, R.; Montoya, G.; Sofos, N.; Stella, S.
Deposited on : 2019-04-03
Resolution : 2.70 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 following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

MolProbity	:	4.02b-467
Xtriage (Phenix)	:	1.13
EDS	:	2.11
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.11

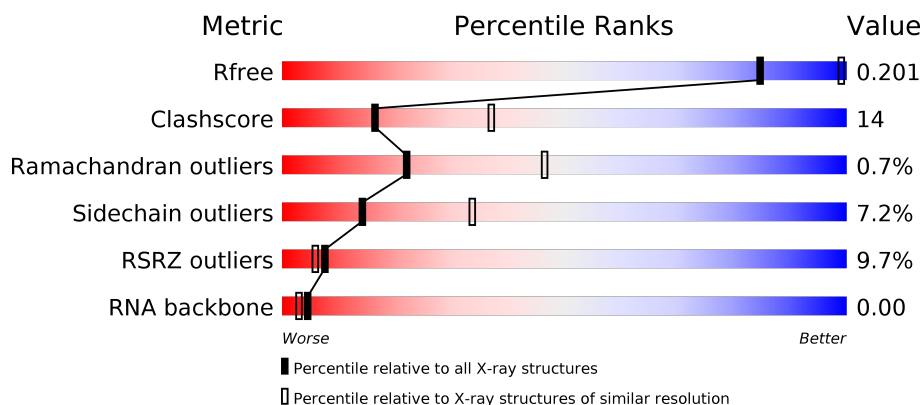
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.70 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.



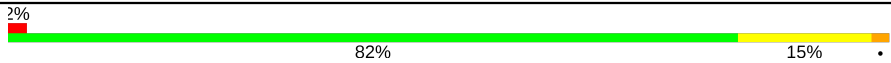
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	2808 (2.70-2.70)
Clashscore	141614	3122 (2.70-2.70)
Ramachandran outliers	138981	3069 (2.70-2.70)
Sidechain outliers	138945	3069 (2.70-2.70)
RSRZ outliers	127900	2737 (2.70-2.70)
RNA backbone	3102	1159 (3.00-2.40)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments on the lower bar indicate the fraction of residues that contain outliers for ≥ 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	D	4	100%
1	E	4	25% 25% 50%
2	A	455	11% 71% 25% .
2	B	455	16% 74% 24% .

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Mol	Chain	Length	Quality of chain
2	C	455	 A horizontal bar chart showing the quality of chain C. The bar is divided into three segments: a small red segment at the beginning labeled '2%', a large green segment in the middle labeled '82%', and a small yellow segment at the end labeled '15%'. A small black dot is located at the far right end of the bar.

2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 11286 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 RNA chain called DNA (5'-R(P*AP*AP*AP*A)-3').

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	D	4	Total	C	N	O	P	0	0	0
			88	40	20	24	4			
1	E	2	Total	C	N	O	P	0	0	0
			44	20	10	12	2			

- Molecule 2 is a protein called CRISPR-associated (Cas) DxTHG family.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	454	Total	C	N	O	S	0	0	0
			3642	2324	607	693	18			
2	A	454	Total	C	N	O	S	0	0	0
			3642	2324	607	693	18			
2	C	454	Total	C	N	O	S	0	0	0
			3642	2324	607	693	18			

There are 3 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	0	SER	-	expression tag	UNP F0NE21
A	0	SER	-	expression tag	UNP F0NE21
C	0	SER	-	expression tag	UNP F0NE21

- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	E	1	Total	O	0	0
			1	1		
3	B	44	Total	O	0	0
			44	44		
3	A	68	Total	O	0	0
			68	68		

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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	C	115	Total	O	0	0
			115	115		

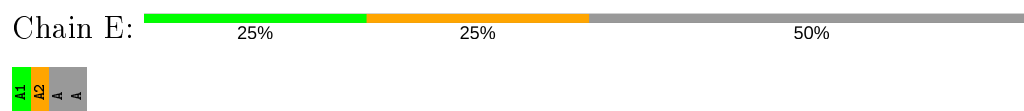
3 Residue-property plots

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

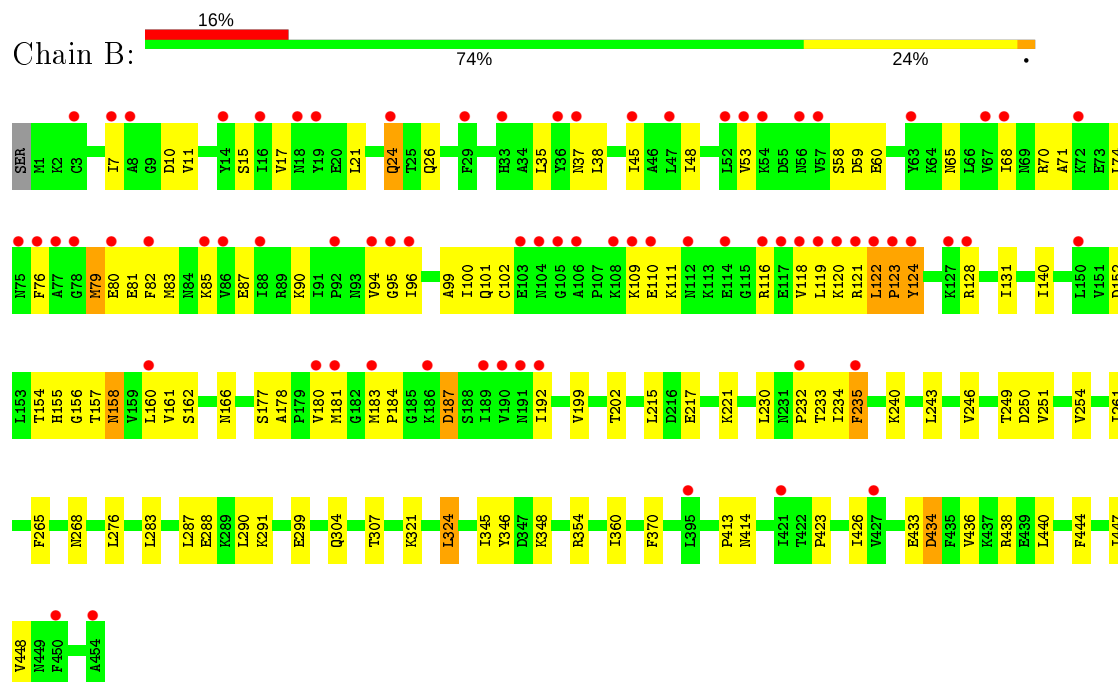
- Molecule 1: DNA (5'-R(P*AP*AP*AP*A)-3')



- Molecule 1: DNA (5'-R(P*AP*AP*AP*A)-3')

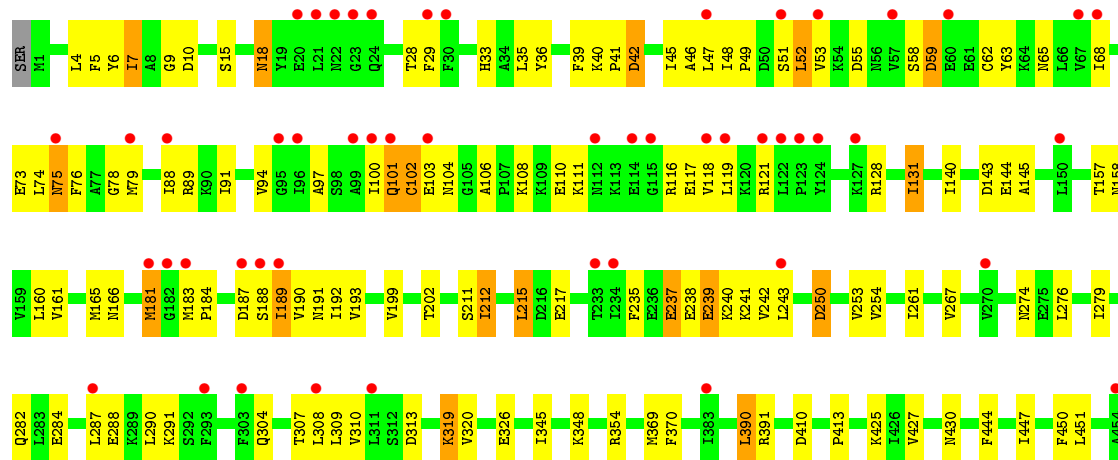


- Molecule 2: CRISPR-associated (Cas) DxTHG family

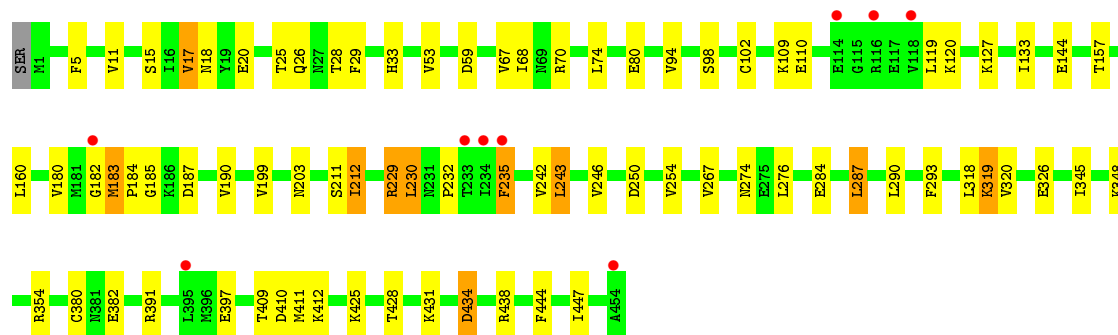
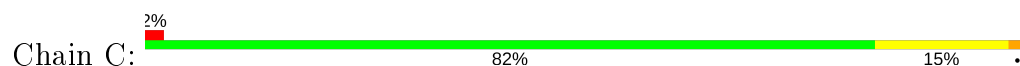


- Molecule 2: CRISPR-associated (Cas) DxTHG family





• Molecule 2: CRISPR-associated (Cas) DxTHG family



4 Data and refinement statistics

Property	Value	Source
Space group	I 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	104.48Å 119.52Å 358.10Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	52.24 – 2.70 52.24 – 2.70	Depositor EDS
% Data completeness (in resolution range)	71.8 (52.24-2.70) 71.9 (52.24-2.70)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.17 (at 2.69Å)	Xtriage
Refinement program	BUSTER 2.10.3	Depositor
R, R_{free}	0.192 , 0.225 0.206 , 0.201	Depositor DCC
R_{free} test set	2218 reflections (5.00%)	wwPDB-VP
Wilson B-factor (Å ²)	87.6	Xtriage
Anisotropy	0.055	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.33 , 84.4	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	11286	wwPDB-VP
Average B, all atoms (Å ²)	108.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.51% 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

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	D	0.52	0/99	1.03	0/152
1	E	1.12	0/49	1.51	0/74
2	A	0.47	0/3703	0.69	0/4990
2	B	0.48	0/3703	0.70	0/4990
2	C	0.47	0/3703	0.67	0/4990
All	All	0.48	0/11257	0.70	0/15196

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	D	88	0	44	19	0
1	E	44	0	23	2	0
2	A	3642	0	3675	158	0
2	B	3642	0	3675	124	0
2	C	3642	0	3675	58	0
3	A	68	0	0	0	0
3	B	44	0	0	1	0
3	C	115	0	0	7	0
3	E	1	0	0	0	0
All	All	11286	0	11092	317	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 14.

All (317) 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)
2:B:235:PHE:CE2	2:B:243:LEU:HD22	1.52	1.43
2:B:181:MET:SD	2:A:97:ALA:HB2	1.61	1.38
2:A:103:GLU:CA	2:A:108:LYS:HE3	1.59	1.30
2:B:235:PHE:CZ	2:B:243:LEU:HD22	1.78	1.19
2:A:6:TYR:CE1	2:A:46:ALA:HB2	1.77	1.18
2:C:110:GLU:OE1	2:C:120:LYS:HE3	1.51	1.10
2:B:180:VAL:HG21	2:B:184:PRO:HG3	1.31	1.08
2:B:235:PHE:CE2	2:B:243:LEU:CD2	2.37	1.08
2:B:154:THR:HG22	2:B:178:ALA:H	1.19	1.06
2:A:103:GLU:HA	2:A:108:LYS:CE	1.83	1.06
2:B:109:LYS:NZ	2:B:118:VAL:HG22	1.72	1.05
2:B:53:VAL:HG22	2:B:102:CYS:SG	1.97	1.04
2:C:428:THR:OG1	2:C:431:LYS:HB2	1.59	1.03
2:A:101:GLN:HG3	2:A:121:ARG:NH2	1.74	1.02
2:A:157:THR:HG22	2:A:160:LEU:HD12	1.43	1.00
1:E:2:A:O2'	2:C:180:VAL:HG22	1.61	1.00
2:B:157:THR:HG22	2:B:160:LEU:HD12	1.43	0.98
1:D:3:A:H8	2:A:10:ASP:N	1.61	0.97
2:A:103:GLU:CB	2:A:108:LYS:CE	2.42	0.96
2:C:157:THR:HG22	2:C:160:LEU:HD12	1.48	0.96
2:B:235:PHE:HE2	2:B:243:LEU:HD22	1.17	0.95
2:A:103:GLU:CB	2:A:108:LYS:HE2	1.95	0.95
1:D:3:A:C8	2:A:10:ASP:HB2	2.03	0.94
2:B:181:MET:SD	2:A:97:ALA:CB	2.55	0.90
2:A:103:GLU:CA	2:A:108:LYS:CE	2.45	0.90
2:C:235:PHE:HZ	2:C:243:LEU:HD13	1.37	0.90
2:A:103:GLU:HB2	2:A:108:LYS:HE2	1.54	0.90
2:B:53:VAL:CG2	2:B:102:CYS:SG	2.59	0.89
1:D:3:A:C8	2:A:10:ASP:N	2.40	0.89
2:A:101:GLN:HB2	2:A:121:ARG:NE	1.88	0.88
2:A:103:GLU:HA	2:A:108:LYS:HE3	0.89	0.87
2:A:73:GLU:O	2:A:74:LEU:HG	1.74	0.87
2:B:109:LYS:CE	2:B:118:VAL:HG22	2.05	0.87
2:A:103:GLU:HB2	2:A:108:LYS:CE	2.03	0.87
1:D:1:A:H2	2:A:181:MET:HA	1.40	0.86
2:A:53:VAL:HG11	2:A:62:CYS:HB3	1.56	0.86
2:A:75:ASN:ND2	2:A:75:ASN:O	2.08	0.85

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:154:THR:HG22	2:B:178:ALA:N	1.91	0.85
2:C:110:GLU:OE1	2:C:120:LYS:CE	2.25	0.85
2:A:6:TYR:CE1	2:A:46:ALA:CB	2.60	0.84
2:B:178:ALA:HB2	2:B:192:ILE:HG12	1.58	0.84
2:A:103:GLU:CG	2:A:108:LYS:HE2	2.08	0.84
1:D:3:A:H8	2:A:10:ASP:CB	1.90	0.84
1:D:3:A:C8	2:A:10:ASP:CB	2.61	0.83
2:B:180:VAL:CG2	2:B:184:PRO:HG3	2.08	0.83
2:B:235:PHE:HE2	2:B:243:LEU:CD2	1.83	0.83
2:C:11:VAL:HG12	2:C:70:ARG:HG2	1.58	0.83
2:C:94:VAL:HG23	2:C:133:ILE:HD11	1.59	0.82
2:A:110:GLU:CB	2:A:119:LEU:HD13	2.11	0.81
2:A:35:LEU:HD22	2:A:39:PHE:HE2	1.44	0.81
1:D:3:A:H8	2:A:10:ASP:H	1.25	0.79
2:A:6:TYR:CZ	2:A:46:ALA:HB2	2.17	0.79
2:B:17:VAL:HG13	2:B:187:ASP:O	1.82	0.79
2:A:94:VAL:CG1	2:A:128:ARG:HB2	2.13	0.79
2:C:235:PHE:CE2	2:C:243:LEU:HD22	2.18	0.79
2:B:24:GLN:HB3	2:B:38:LEU:HD21	1.64	0.78
2:A:110:GLU:HB3	2:A:119:LEU:HD13	1.66	0.78
2:A:103:GLU:CB	2:A:108:LYS:HE3	2.10	0.77
2:A:45:ILE:CD1	2:A:144:GLU:HG2	2.15	0.77
1:D:1:A:C2	2:A:181:MET:HA	2.21	0.76
1:D:4:A:H2'	1:D:4:A:N3	2.00	0.75
2:A:101:GLN:HG3	2:A:121:ARG:HH21	1.50	0.75
2:B:109:LYS:HG2	2:B:119:LEU:H	1.50	0.75
2:B:99:ALA:HB3	2:B:121:ARG:HD2	1.69	0.74
2:A:103:GLU:HG3	2:A:108:LYS:HE2	1.69	0.74
2:B:122:LEU:HB3	2:B:123:PRO:HD3	1.68	0.73
1:D:3:A:H8	2:A:10:ASP:CA	2.00	0.73
2:A:94:VAL:HG12	2:A:128:ARG:H	1.52	0.73
2:C:28:THR:HG22	2:C:29:PHE:H	1.54	0.72
2:B:157:THR:CG2	2:B:160:LEU:HD12	2.17	0.72
2:B:166:ASN:HB3	2:A:202:THR:HG21	1.71	0.72
2:C:235:PHE:CZ	2:C:243:LEU:HD13	2.23	0.71
2:A:157:THR:CG2	2:A:160:LEU:HD12	2.18	0.71
2:B:109:LYS:HE2	2:B:118:VAL:HG22	1.73	0.71
2:B:99:ALA:O	2:B:121:ARG:HB3	1.89	0.70
2:A:28:THR:HG22	2:A:29:PHE:H	1.55	0.70
2:A:6:TYR:CZ	2:A:46:ALA:CB	2.75	0.70
2:A:103:GLU:N	2:A:108:LYS:HG3	2.07	0.70

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:94:VAL:HG21	2:A:193:VAL:HG21	1.74	0.69
2:A:103:GLU:HB2	2:A:108:LYS:CG	2.23	0.69
2:C:157:THR:CG2	2:C:160:LEU:HD12	2.22	0.69
2:A:101:GLN:HB2	2:A:121:ARG:CZ	2.23	0.68
2:A:42:ASP:OD1	2:A:42:ASP:N	2.21	0.68
2:A:94:VAL:HG12	2:A:128:ARG:HB2	1.75	0.68
2:B:24:GLN:HB3	2:B:38:LEU:CD2	2.24	0.68
2:B:109:LYS:HZ3	2:B:118:VAL:HG22	1.57	0.67
2:A:100:ILE:HG23	2:A:118:VAL:CG2	2.24	0.67
2:B:109:LYS:HE2	2:B:118:VAL:HG13	1.77	0.67
2:A:4:LEU:HB2	2:A:41:PRO:HG3	1.78	0.66
2:A:238:GLU:HG2	2:A:241:LYS:HD2	1.78	0.66
2:B:235:PHE:CZ	2:B:243:LEU:CD2	2.69	0.66
2:C:203:ASN:HB3	3:C:565:HOH:O	1.96	0.66
2:B:360:ILE:HD13	2:B:448:VAL:HG22	1.78	0.66
2:C:187:ASP:HB2	3:C:585:HOH:O	1.96	0.66
2:A:103:GLU:HB2	2:A:108:LYS:HG2	1.76	0.65
2:A:110:GLU:HB2	2:A:119:LEU:HD13	1.77	0.64
2:C:229:ARG:HG2	2:C:229:ARG:O	1.96	0.64
2:A:36:TYR:O	2:A:40:LYS:HA	1.98	0.64
2:C:185:GLY:N	3:C:501:HOH:O	2.29	0.64
2:B:109:LYS:HE2	2:B:118:VAL:HA	1.78	0.64
2:C:182:GLY:HA3	3:C:573:HOH:O	1.96	0.63
2:A:29:PHE:CE1	2:A:79:MET:HE3	2.33	0.63
2:A:40:LYS:HG2	2:A:40:LYS:O	1.99	0.63
2:B:128:ARG:HG3	2:A:304:GLN:HB2	1.80	0.63
2:C:235:PHE:HE2	2:C:243:LEU:HD22	1.63	0.63
2:B:265:PHE:CG	2:A:427:VAL:HG21	2.34	0.62
2:C:185:GLY:CA	3:C:501:HOH:O	2.47	0.62
2:B:178:ALA:HB2	2:B:192:ILE:CG1	2.30	0.61
2:B:181:MET:HB2	2:A:97:ALA:HA	1.83	0.61
2:A:18:ASN:HD21	2:A:188:SER:N	1.99	0.61
2:B:95:GLY:HA2	2:A:191:ASN:HD22	1.65	0.61
2:B:158:ASN:HA	2:B:161:VAL:HG22	1.82	0.61
2:A:29:PHE:CE1	2:A:79:MET:CE	2.83	0.61
2:B:291:LYS:HD2	2:A:143:ASP:OD2	2.01	0.61
2:A:158:ASN:HA	2:A:161:VAL:HG22	1.82	0.60
2:B:109:LYS:HZ1	2:B:118:VAL:HG22	1.60	0.60
2:A:140:ILE:O	2:A:144:GLU:HB2	2.01	0.60
2:B:99:ALA:C	2:B:121:ARG:HB3	2.22	0.60
2:A:101:GLN:O	2:A:101:GLN:HG2	2.00	0.60

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:233:THR:HB	2:B:234:ILE:HD12	1.83	0.59
2:A:94:VAL:HG13	2:A:128:ARG:HB2	1.83	0.58
2:B:265:PHE:CE1	2:A:427:VAL:HG23	2.38	0.58
2:A:94:VAL:HG12	2:A:128:ARG:N	2.18	0.58
2:C:187:ASP:CB	3:C:585:HOH:O	2.52	0.58
2:A:235:PHE:HB2	2:A:240:LYS:HB3	1.85	0.58
2:B:265:PHE:CD2	2:A:427:VAL:HG21	2.38	0.58
2:C:212:ILE:HG12	2:C:319:LYS:HB3	1.84	0.58
2:A:53:VAL:CG1	2:A:62:CYS:HB3	2.30	0.57
2:A:18:ASN:HD21	2:A:187:ASP:C	2.08	0.57
2:A:45:ILE:HD11	2:A:144:GLU:CG	2.35	0.56
2:A:18:ASN:HD22	2:A:188:SER:C	2.08	0.56
2:B:94:VAL:CG2	2:A:193:VAL:HG21	2.35	0.56
2:B:99:ALA:O	2:B:121:ARG:N	2.32	0.56
2:B:265:PHE:CZ	2:A:427:VAL:HG23	2.41	0.56
2:B:109:LYS:CD	2:B:118:VAL:HA	2.36	0.56
2:C:20:GLU:HG2	2:C:25:THR:HG22	1.88	0.56
2:A:212:ILE:HG12	2:A:319:LYS:HB3	1.87	0.55
2:C:428:THR:OG1	2:C:431:LYS:CB	2.47	0.55
2:A:103:GLU:HG3	2:A:108:LYS:CE	2.35	0.55
2:A:450:PHE:HD1	2:A:451:LEU:HD22	1.71	0.55
2:A:7:ILE:HD13	2:A:91:ILE:HD11	1.89	0.55
2:B:109:LYS:HE2	2:B:118:VAL:CB	2.37	0.55
2:B:109:LYS:HG2	2:B:118:VAL:HA	1.89	0.55
2:A:101:GLN:HG3	2:A:121:ARG:CZ	2.35	0.54
2:A:239:GLU:O	2:A:239:GLU:HG3	2.07	0.54
2:C:11:VAL:HG12	2:C:70:ARG:CG	2.35	0.54
2:C:180:VAL:O	2:C:180:VAL:HG23	2.06	0.54
1:E:2:A:HO2'	2:C:180:VAL:HG22	1.70	0.54
2:A:103:GLU:H	2:A:108:LYS:HG3	1.73	0.54
2:A:29:PHE:CZ	2:A:79:MET:HE3	2.43	0.54
2:A:48:ILE:HG13	2:A:48:ILE:O	2.08	0.53
2:A:284:GLU:O	2:A:288:GLU:HG2	2.08	0.53
2:B:53:VAL:HG21	2:B:102:CYS:SG	2.46	0.53
2:B:24:GLN:CB	2:B:38:LEU:CD2	2.85	0.53
2:B:58:SER:OG	2:B:60:GLU:HG2	2.08	0.53
2:B:11:VAL:HG12	2:B:70:ARG:HG2	1.89	0.53
2:C:246:VAL:HG21	2:C:290:LEU:HD11	1.91	0.53
2:A:36:TYR:O	2:A:40:LYS:N	2.43	0.52
2:A:45:ILE:CD1	2:A:144:GLU:CG	2.86	0.52
2:A:47:LEU:HD22	2:A:91:ILE:CG2	2.39	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:A:103:GLU:HG2	2:A:104:ASN:HD22	1.73	0.52
2:A:157:THR:HG22	2:A:160:LEU:CD1	2.30	0.52
2:C:183:MET:SD	2:C:184:PRO:HD3	2.50	0.52
2:A:55:ASP:OD2	2:A:58:SER:N	2.42	0.52
2:B:307:THR:HA	2:A:131:ILE:HG12	1.91	0.52
2:C:230:LEU:HG	2:C:230:LEU:O	2.10	0.52
2:A:250:ASP:O	2:A:253:VAL:HG22	2.10	0.51
2:B:109:LYS:HE2	2:B:118:VAL:CG2	2.38	0.51
2:A:101:GLN:CB	2:A:121:ARG:CZ	2.88	0.51
2:A:35:LEU:CD2	2:A:39:PHE:HE2	2.20	0.51
2:B:157:THR:HG23	2:B:160:LEU:H	1.76	0.51
2:A:157:THR:HG23	2:A:160:LEU:H	1.75	0.51
2:B:154:THR:HG22	2:B:177:SER:HA	1.93	0.50
2:B:99:ALA:O	2:B:121:ARG:CB	2.58	0.50
2:B:232:PRO:HG2	2:B:235:PHE:CZ	2.46	0.50
2:B:246:VAL:HG21	2:B:290:LEU:HD11	1.92	0.50
2:A:47:LEU:HD22	2:A:91:ILE:HG21	1.93	0.50
2:B:109:LYS:HG2	2:B:119:LEU:N	2.21	0.50
2:C:28:THR:HG21	2:C:33:HIS:HB3	1.93	0.50
2:A:310:VAL:HG13	2:A:313:ASP:CG	2.32	0.50
2:B:109:LYS:CE	2:B:118:VAL:HA	2.40	0.50
2:B:202:THR:HG21	2:A:166:ASN:HD22	1.77	0.49
2:A:28:THR:HG21	2:A:33:HIS:HB3	1.94	0.49
2:A:36:TYR:O	2:A:40:LYS:CA	2.59	0.49
2:C:157:THR:HG23	2:C:160:LEU:H	1.76	0.49
2:A:73:GLU:C	2:A:74:LEU:HG	2.31	0.49
1:D:2:A:H2'	1:D:2:A:N3	2.27	0.49
2:A:18:ASN:ND2	2:A:188:SER:C	2.66	0.49
2:B:235:PHE:HD2	2:B:240:LYS:HD3	1.78	0.49
2:B:162:SER:HB2	2:A:165:MET:HE3	1.93	0.49
2:A:94:VAL:CG1	2:A:128:ARG:CB	2.89	0.49
2:B:109:LYS:HE2	2:B:118:VAL:CG1	2.40	0.49
2:A:94:VAL:HG11	2:A:128:ARG:O	2.13	0.48
2:B:7:ILE:HD11	2:B:161:VAL:HG13	1.95	0.48
1:D:2:A:N3	1:D:2:A:C2'	2.75	0.48
2:B:304:GLN:HB2	2:A:128:ARG:HG3	1.96	0.48
2:A:35:LEU:HD21	2:A:192:ILE:HG21	1.96	0.48
2:A:215:LEU:HG	2:A:261:ILE:HG21	1.94	0.48
2:A:6:TYR:HE1	2:A:46:ALA:HB2	1.65	0.48
2:A:390:LEU:HD13	2:A:391:ARG:HG2	1.94	0.48
2:B:249:THR:HG21	2:B:283:LEU:HD13	1.95	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:360:ILE:HD13	2:B:448:VAL:CG2	2.43	0.48
2:C:28:THR:HG22	2:C:29:PHE:N	2.26	0.48
1:D:3:A:N7	2:A:10:ASP:HB2	2.27	0.47
2:B:101:GLN:HA	2:B:121:ARG:HH12	1.78	0.47
2:A:29:PHE:CE1	2:A:79:MET:HE2	2.50	0.47
2:B:7:ILE:HD12	2:B:156:GLY:HA3	1.95	0.47
2:B:234:ILE:HD12	2:B:234:ILE:N	2.29	0.47
2:B:48:ILE:HG13	2:B:90:LYS:HA	1.96	0.47
2:C:157:THR:HG22	2:C:160:LEU:CD1	2.34	0.47
2:C:11:VAL:CG1	2:C:70:ARG:HG2	2.36	0.47
2:B:124:TYR:CD2	2:B:124:TYR:C	2.87	0.47
2:B:181:MET:CB	2:A:97:ALA:CB	2.92	0.47
2:B:345:ILE:HG22	2:B:348:LYS:HB2	1.97	0.47
2:B:152:ASP:OD1	2:B:154:THR:HG23	2.14	0.47
2:B:80:GLU:O	2:B:80:GLU:HG3	2.14	0.46
2:B:96:ILE:O	2:B:96:ILE:HG22	2.15	0.46
2:A:29:PHE:HE1	2:A:79:MET:HE2	1.81	0.46
2:A:6:TYR:CZ	2:A:46:ALA:HB1	2.49	0.46
2:B:76:PHE:H	2:B:76:PHE:HD2	1.62	0.46
2:B:157:THR:HG22	2:B:160:LEU:CD1	2.30	0.46
2:B:215:LEU:HG	2:B:261:ILE:HG21	1.97	0.46
2:B:436:VAL:HA	2:B:440:LEU:HB2	1.98	0.46
1:D:3:A:N1	2:B:181:MET:HB3	2.31	0.46
2:B:109:LYS:HE2	2:B:118:VAL:CA	2.43	0.46
2:C:183:MET:HB3	3:C:575:HOH:O	2.15	0.46
2:C:411:MET:O	2:C:425:LYS:HB2	2.15	0.46
2:A:101:GLN:HB2	2:A:121:ARG:CD	2.45	0.45
2:A:28:THR:HG22	2:A:29:PHE:N	2.26	0.45
2:B:181:MET:HB3	2:A:97:ALA:HB1	1.98	0.45
2:A:100:ILE:HG23	2:A:118:VAL:HG21	1.95	0.45
2:A:65:ASN:HA	2:A:68:ILE:HG13	1.97	0.45
2:B:71:ALA:HB1	2:B:76:PHE:CB	2.46	0.45
1:D:2:A:H61	2:B:15:SER:H	1.64	0.45
2:B:100:ILE:HG22	2:B:120:LYS:HA	1.99	0.45
2:C:287:LEU:HD13	2:C:318:LEU:HD11	1.98	0.45
2:A:254:VAL:HG13	2:A:320:VAL:HG21	1.98	0.45
2:C:17:VAL:HG13	2:C:190:VAL:HG12	1.97	0.45
2:B:157:THR:CG2	2:B:160:LEU:CD1	2.91	0.45
2:C:444:PHE:HA	2:C:447:ILE:HD12	1.99	0.45
2:B:251:VAL:HA	2:B:254:VAL:HG13	1.98	0.45
2:A:103:GLU:CG	2:A:108:LYS:CE	2.83	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:A:345:ILE:HG22	2:A:348:LYS:HB2	1.98	0.45
2:A:63:TYR:HD2	2:A:88:ILE:HD12	1.81	0.45
2:A:410:ASP:O	2:A:425:LYS:HE2	2.17	0.45
2:A:157:THR:CG2	2:A:160:LEU:CD1	2.92	0.45
2:C:232:PRO:HG2	2:C:235:PHE:CE1	2.52	0.45
2:B:413:PRO:HD2	2:A:370:PHE:HB2	1.99	0.44
2:B:232:PRO:HG2	2:B:235:PHE:CE1	2.52	0.44
2:C:345:ILE:HG22	2:C:348:LYS:HB2	1.99	0.44
2:C:11:VAL:HG21	2:C:67:VAL:HG22	1.98	0.44
1:D:2:A:C8	2:B:155:HIS:CE1	3.06	0.44
2:A:111:LYS:O	2:A:111:LYS:HG3	2.18	0.44
2:B:346:TYR:OH	2:B:433:GLU:HG2	2.18	0.44
2:A:102:CYS:HB3	2:A:106:ALA:C	2.38	0.43
2:B:444:PHE:HA	2:B:447:ILE:HD12	1.99	0.43
2:A:18:ASN:O	2:A:189:ILE:HA	2.18	0.43
2:B:221:LYS:NZ	3:B:501:HOH:O	2.51	0.43
2:C:68:ILE:HD12	2:C:80:GLU:HA	2.01	0.43
2:C:94:VAL:CG2	2:C:133:ILE:HD11	2.41	0.43
2:C:157:THR:CG2	2:C:160:LEU:CD1	2.94	0.43
2:A:102:CYS:HB3	2:A:106:ALA:O	2.19	0.43
2:B:235:PHE:HZ	2:B:243:LEU:HD22	1.66	0.43
2:B:321:LYS:HA	2:B:324:LEU:HD22	2.00	0.43
2:A:290:LEU:HD21	2:A:309:LEU:HD11	2.00	0.43
1:D:4:A:H61	2:A:15:SER:H	1.65	0.43
2:A:5:PHE:CE2	2:A:45:ILE:HD12	2.53	0.43
2:B:181:MET:CE	2:A:94:VAL:O	2.67	0.43
2:B:154:THR:CG2	2:B:177:SER:HA	2.49	0.42
2:B:79:MET:HG3	2:B:83:MET:HB2	2.01	0.42
2:C:242:VAL:HG11	2:C:293:PHE:CE2	2.55	0.42
2:C:70:ARG:NH2	2:C:74:LEU:HD21	2.34	0.42
2:A:444:PHE:HA	2:A:447:ILE:HD12	2.01	0.42
2:B:109:LYS:CG	2:B:118:VAL:HA	2.49	0.42
2:C:434:ASP:O	2:C:438:ARG:HB2	2.19	0.42
2:B:26:GLN:HE22	2:B:37:ASN:HB2	1.85	0.42
2:C:409:THR:O	2:C:412:LYS:HG3	2.20	0.42
2:B:370:PHE:HB2	2:A:413:PRO:HD2	2.02	0.42
2:A:76:PHE:HD2	2:A:78:GLY:H	1.67	0.42
2:C:109:LYS:HZ1	2:C:119:LEU:HD11	1.84	0.42
2:C:18:ASN:HD22	2:C:187:ASP:HA	1.84	0.42
2:B:181:MET:HE1	2:A:94:VAL:O	2.20	0.42
2:B:101:GLN:HA	2:B:121:ARG:NH1	2.35	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:24:GLN:HG2	2:B:38:LEU:HD23	2.02	0.42
2:B:65:ASN:HA	2:B:68:ILE:HG12	2.01	0.42
2:B:71:ALA:O	2:B:76:PHE:HB3	2.20	0.42
2:B:45:ILE:HD12	2:B:87:GLU:OE1	2.19	0.41
2:C:183:MET:SD	2:C:184:PRO:CD	3.08	0.41
2:C:254:VAL:HG13	2:C:320:VAL:HG21	2.01	0.41
2:B:414:ASN:HD22	2:A:369:MET:HB2	1.85	0.41
2:A:55:ASP:OD1	2:A:59:ASP:N	2.53	0.41
2:B:268:ASN:ND2	2:B:268:ASN:H	2.18	0.41
2:A:217:GLU:H	2:A:217:GLU:HG3	1.66	0.41
2:B:434:ASP:O	2:B:438:ARG:HB2	2.20	0.41
2:A:49:PRO:C	2:A:51:SER:N	2.74	0.41
2:B:79:MET:CG	2:B:83:MET:HB2	2.51	0.41
2:A:287:LEU:HD23	2:A:291:LYS:HE2	2.03	0.41
2:B:131:ILE:HG12	2:A:307:THR:HA	2.02	0.41
1:D:4:A:N3	1:D:4:A:C2'	2.79	0.41
2:A:18:ASN:ND2	2:A:188:SER:N	2.66	0.40
2:A:250:ASP:HB2	2:A:279:ILE:HD12	2.02	0.40
2:B:35:LEU:HD21	2:B:192:ILE:HG21	2.03	0.40
2:C:232:PRO:HG2	2:C:235:PHE:CZ	2.56	0.40
2:A:100:ILE:HD12	2:A:118:VAL:HG21	2.04	0.40
2:A:282:GLN:HB3	2:A:282:GLN:HE21	1.67	0.40
2:B:111:LYS:HA	2:B:116:ARG:HA	2.02	0.40
2:C:183:MET:HA	2:C:184:PRO:HD3	1.95	0.40
1:D:3:A:H1'	2:A:9:GLY:CA	2.51	0.40
2:B:96:ILE:HG13	2:A:189:ILE:O	2.20	0.40
2:B:423:PRO:HG3	2:A:267:VAL:HG12	2.02	0.40
2:A:63:TYR:CD2	2:A:88:ILE:HD12	2.56	0.40
2:A:94:VAL:HG12	2:A:128:ARG:CB	2.47	0.40
2:B:235:PHE:HD1	2:B:235:PHE:HA	1.77	0.40
2:C:5:PHE:CZ	2:C:144:GLU:HG3	2.57	0.40
2:C:5:PHE:HZ	2:C:144:GLU:HG3	1.87	0.40
2:C:284:GLU:HG3	2:C:318:LEU:HD22	2.04	0.40
2:A:7:ILE:HD12	2:A:47:LEU:O	2.22	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	
2	A	452/455 (99%)	426 (94%)	22 (5%)	4 (1%)	17	40
2	B	452/455 (99%)	417 (92%)	30 (7%)	5 (1%)	14	34
2	C	452/455 (99%)	444 (98%)	8 (2%)	0	100	100
All	All	1356/1365 (99%)	1287 (95%)	60 (4%)	9 (1%)	22	46

All (9) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	B	122	LEU
2	A	237	GLU
2	B	85	LYS
2	B	74	LEU
2	B	123	PRO
2	A	52	LEU
2	A	145	ALA
2	A	184	PRO
2	B	426	ILE

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	
2	A	407/408 (100%)	374 (92%)	33 (8%)	11	27
2	B	407/408 (100%)	382 (94%)	25 (6%)	18	41
2	C	407/408 (100%)	377 (93%)	30 (7%)	13	32

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
All	All	1221/1224 (100%)	1133 (93%)	88 (7%)	14	34

All (88) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	B	10	ASP
2	B	21	LEU
2	B	24	GLN
2	B	59	ASP
2	B	79	MET
2	B	81	GLU
2	B	82	PHE
2	B	110	GLU
2	B	124	TYR
2	B	140	ILE
2	B	158	ASN
2	B	183	MET
2	B	187	ASP
2	B	199	VAL
2	B	217	GLU
2	B	230	LEU
2	B	235	PHE
2	B	250	ASP
2	B	276	LEU
2	B	287	LEU
2	B	288	GLU
2	B	299	GLU
2	B	324	LEU
2	B	354	ARG
2	B	434	ASP
2	A	7	ILE
2	A	18	ASN
2	A	42	ASP
2	A	52	LEU
2	A	59	ASP
2	A	75	ASN
2	A	89	ARG
2	A	101	GLN
2	A	102	CYS
2	A	116	ARG
2	A	117	GLU
2	A	131	ILE

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Mol	Chain	Res	Type
2	A	181	MET
2	A	183	MET
2	A	189	ILE
2	A	190	VAL
2	A	199	VAL
2	A	211	SER
2	A	212	ILE
2	A	215	LEU
2	A	237	GLU
2	A	239	GLU
2	A	242	VAL
2	A	243	LEU
2	A	250	ASP
2	A	274	ASN
2	A	276	LEU
2	A	308	LEU
2	A	319	LYS
2	A	326	GLU
2	A	354	ARG
2	A	390	LEU
2	A	430	ASN
2	C	15	SER
2	C	17	VAL
2	C	26	GLN
2	C	53	VAL
2	C	59	ASP
2	C	98	SER
2	C	102	CYS
2	C	127	LYS
2	C	183	MET
2	C	199	VAL
2	C	211	SER
2	C	212	ILE
2	C	229	ARG
2	C	230	LEU
2	C	235	PHE
2	C	243	LEU
2	C	250	ASP
2	C	267	VAL
2	C	274	ASN
2	C	276	LEU
2	C	287	LEU

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Mol	Chain	Res	Type
2	C	319	LYS
2	C	326	GLU
2	C	354	ARG
2	C	380	CYS
2	C	382	GLU
2	C	391	ARG
2	C	397	GLU
2	C	410	ASP
2	C	434	ASP

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (19) such sidechains are listed below:

Mol	Chain	Res	Type
2	B	26	GLN
2	B	125	ASN
2	B	158	ASN
2	B	200	GLN
2	B	231	ASN
2	B	268	ASN
2	B	400	ASN
2	B	414	ASN
2	A	18	ASN
2	A	166	ASN
2	A	191	ASN
2	A	203	ASN
2	A	282	GLN
2	A	400	ASN
2	A	414	ASN
2	C	18	ASN
2	C	26	GLN
2	C	300	HIS
2	C	404	HIS

5.3.3 RNA ⓘ

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
1	D	4/4 (100%)	3 (75%)	2 (50%)
1	E	1/4 (25%)	1 (100%)	0
All	All	5/8 (62%)	4 (80%)	2 (40%)

All (4) RNA backbone outliers are listed below:

Mol	Chain	Res	Type
1	D	2	A
1	D	3	A
1	D	4	A
1	E	2	A

All (2) RNA pucker outliers are listed below:

Mol	Chain	Res	Type
1	D	1	A
1	D	3	A

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

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

5.5 Carbohydrates [i](#)

There are no carbohydrates in this entry.

5.6 Ligand geometry [i](#)

There are no ligands in this entry.

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	D	4/4 (100%)	0.47	0	100 100	166, 166, 167, 169	0
1	E	2/4 (50%)	0.17	0	100 100	65, 65, 65, 71	0
2	A	454/455 (99%)	0.61	51 (11%)	5 4	64, 110, 177, 204	0
2	B	454/455 (99%)	0.84	73 (16%)	1 1	59, 110, 220, 236	0
2	C	454/455 (99%)	0.20	9 (1%)	65 67	54, 85, 122, 154	0
All	All	1368/1373 (99%)	0.55	133 (9%)	7 6	54, 98, 186, 236	0

All (133) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	A	182	GLY	12.1
2	B	95	GLY	10.7
2	B	114	GLU	10.1
2	A	122	LEU	9.1
2	A	189	ILE	8.3
2	B	63	TYR	7.8
2	B	53	VAL	7.2
2	A	181	MET	6.7
2	B	119	LEU	6.6
2	B	121	ARG	6.4
2	B	189	ILE	6.4
2	B	181	MET	5.0
2	A	21	LEU	4.9
2	B	190	VAL	4.8
2	B	122	LEU	4.8
2	B	96	ILE	4.7
2	B	14	TYR	4.6
2	B	118	VAL	4.4
2	C	235	PHE	4.4
2	B	123	PRO	4.3

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Mol	Chain	Res	Type	RSRZ
2	A	101	GLN	4.3
2	B	72	LYS	4.3
2	B	117	GLU	4.2
2	A	454	ALA	4.2
2	B	88	ILE	4.1
2	B	82	PHE	4.0
2	B	128	ARG	4.0
2	A	121	ARG	3.9
2	A	119	LEU	3.9
2	B	235	PHE	3.9
2	B	19	TYR	3.9
2	B	52	LEU	3.8
2	C	118	VAL	3.7
2	A	114	GLU	3.7
2	B	54	LYS	3.7
2	B	36	TYR	3.6
2	A	79	MET	3.6
2	A	67	VAL	3.6
2	A	123	PRO	3.6
2	B	8	ALA	3.5
2	B	78	GLY	3.5
2	C	233	THR	3.5
2	B	109	LYS	3.5
2	A	127	LYS	3.4
2	B	94	VAL	3.4
2	B	57	VAL	3.4
2	B	67	VAL	3.4
2	B	76	PHE	3.3
2	A	24	GLN	3.3
2	B	232	PRO	3.3
2	A	112	ASN	3.2
2	B	180	VAL	3.2
2	A	99	ALA	3.2
2	A	22	ASN	3.2
2	A	100	ILE	3.2
2	B	80	GLU	3.1
2	A	233	THR	3.1
2	B	85	LYS	3.1
2	A	30	PHE	3.1
2	A	303	PHE	3.1
2	A	234	ILE	3.1
2	C	234	ILE	3.1

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Mol	Chain	Res	Type	RSRZ
2	A	287	LEU	3.0
2	B	192	ILE	3.0
2	B	104	ASN	3.0
2	B	47	LEU	3.0
2	B	24	GLN	2.9
2	C	454	ALA	2.9
2	A	75	ASN	2.9
2	B	186	LYS	2.9
2	B	116	ARG	2.9
2	B	427	VAL	2.8
2	C	116	ARG	2.8
2	A	88	ILE	2.7
2	B	86	VAL	2.7
2	B	16	ILE	2.7
2	B	7	ILE	2.7
2	B	18	ASN	2.7
2	B	77	ALA	2.6
2	B	110	GLU	2.6
2	B	124	TYR	2.6
2	B	56	ASN	2.6
2	B	68	ILE	2.6
2	B	108	LYS	2.6
2	B	120	LYS	2.6
2	B	454	ALA	2.6
2	A	308	LEU	2.6
2	A	23	GLY	2.6
2	A	383	ILE	2.5
2	B	127	LYS	2.5
2	A	96	ILE	2.5
2	B	105	GLY	2.5
2	B	112	ASN	2.5
2	B	3	CYS	2.5
2	C	395	LEU	2.4
2	A	47	LEU	2.4
2	B	191	ASN	2.4
2	A	293	PHE	2.4
2	B	45	ILE	2.4
2	B	75	ASN	2.4
2	C	182	GLY	2.3
2	B	395	LEU	2.3
2	A	150	LEU	2.3
2	A	57	VAL	2.3

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Mol	Chain	Res	Type	RSRZ
2	A	51	SER	2.3
2	A	115	GLY	2.3
2	A	183	MET	2.3
2	B	29	PHE	2.3
2	A	20	GLU	2.3
2	A	29	PHE	2.3
2	A	187	ASP	2.3
2	B	183	MET	2.3
2	B	103	GLU	2.2
2	A	311	LEU	2.2
2	B	106	ALA	2.2
2	B	150	LEU	2.2
2	B	421	ILE	2.1
2	A	188	SER	2.1
2	A	68	ILE	2.1
2	A	95	GLY	2.1
2	A	60	GLU	2.1
2	B	160	LEU	2.1
2	A	243	LEU	2.1
2	A	270	VAL	2.1
2	B	33	HIS	2.1
2	C	114	GLU	2.1
2	A	103	GLU	2.1
2	A	118	VAL	2.0
2	B	450	PHE	2.0
2	B	37	ASN	2.0
2	A	124	TYR	2.0
2	B	92	PRO	2.0
2	A	53	VAL	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 ⓘ

There are no carbohydrates in this entry.

6.4 Ligands ⓘ

There are no ligands in this entry.

6.5 Other polymers [i](#)

There are no such residues in this entry.