Full wwPDB X-ray Structure Validation Report ⓘ

Sep 2, 2024 – 02:12 PM JST

PDB ID	:	8W9K
Title	:	Structure of apo RvY_06210
Authors	:	Kato, S.; Fukuda, Y.; Inoue, T.
Deposited on	:	2023-09-05
Resolution	:	1.70 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 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:

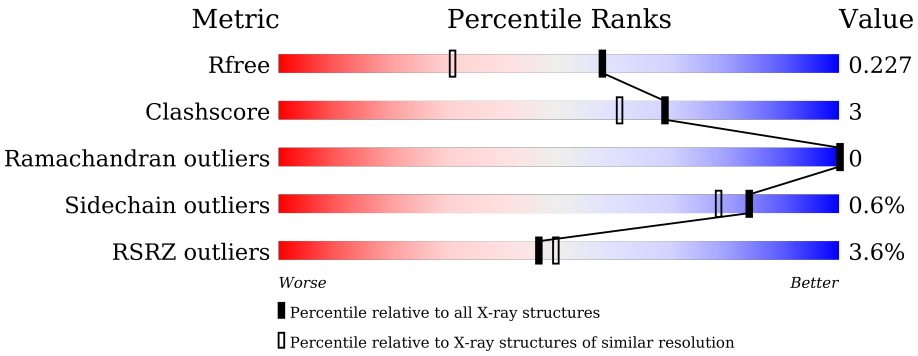
MolProbity	:	4.02b-467
Xtriage (Phenix)	:	1.13
EDS	:	3.0
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4	:	9.0.002 (Gargrove)
Density-Fitness	:	1.0.11
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.38.2

1 Overall quality at a glance (i)

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

The reported resolution of this entry is 1.70 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}	164625	5161 (1.70-1.70)
Clashscore	180529	5671 (1.70-1.70)
Ramachandran outliers	177936	5594 (1.70-1.70)
Sidechain outliers	177891	5594 (1.70-1.70)
RSRZ outliers	164620	5159 (1.70-1.70)

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

Mol	Chain	Length	Quality of chain
1	A	313	3% 82% 6% 12%
1	B	313	2% 83% · 12%
1	C	313	5% 84% · 12%
1	D	313	3% 78% 8% 13%

2 Entry composition (i)

There are 2 unique types of molecules in this entry. The entry contains 9486 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 RvY_06210.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	275	Total	C	N	O	S	0	6	0
			2087	1317	363	394	13			
1	B	274	Total	C	N	O	S	0	8	0
			2088	1320	357	400	11			
1	C	275	Total	C	N	O	S	0	5	0
			2076	1312	356	398	10			
1	D	272	Total	C	N	O	S	0	6	0
			2067	1309	353	394	11			

There are 64 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-16	MET	-	initiating methionine	UNP A0A1D1V463
A	-15	GLY	-	expression tag	UNP A0A1D1V463
A	-14	SER	-	expression tag	UNP A0A1D1V463
A	-13	SER	-	expression tag	UNP A0A1D1V463
A	-12	HIS	-	expression tag	UNP A0A1D1V463
A	-11	HIS	-	expression tag	UNP A0A1D1V463
A	-10	HIS	-	expression tag	UNP A0A1D1V463
A	-9	HIS	-	expression tag	UNP A0A1D1V463
A	-8	HIS	-	expression tag	UNP A0A1D1V463
A	-7	HIS	-	expression tag	UNP A0A1D1V463
A	-6	GLU	-	expression tag	UNP A0A1D1V463
A	-5	ASN	-	expression tag	UNP A0A1D1V463
A	-4	LEU	-	expression tag	UNP A0A1D1V463
A	-3	GLN	-	expression tag	UNP A0A1D1V463
A	-2	PHE	-	expression tag	UNP A0A1D1V463
A	-1	GLN	-	expression tag	UNP A0A1D1V463
B	-16	MET	-	initiating methionine	UNP A0A1D1V463
B	-15	GLY	-	expression tag	UNP A0A1D1V463
B	-14	SER	-	expression tag	UNP A0A1D1V463
B	-13	SER	-	expression tag	UNP A0A1D1V463
B	-12	HIS	-	expression tag	UNP A0A1D1V463

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Chain	Residue	Modelled	Actual	Comment	Reference
B	-11	HIS	-	expression tag	UNP A0A1D1V463
B	-10	HIS	-	expression tag	UNP A0A1D1V463
B	-9	HIS	-	expression tag	UNP A0A1D1V463
B	-8	HIS	-	expression tag	UNP A0A1D1V463
B	-7	HIS	-	expression tag	UNP A0A1D1V463
B	-6	GLU	-	expression tag	UNP A0A1D1V463
B	-5	ASN	-	expression tag	UNP A0A1D1V463
B	-4	LEU	-	expression tag	UNP A0A1D1V463
B	-3	GLN	-	expression tag	UNP A0A1D1V463
B	-2	PHE	-	expression tag	UNP A0A1D1V463
B	-1	GLN	-	expression tag	UNP A0A1D1V463
C	-16	MET	-	initiating methionine	UNP A0A1D1V463
C	-15	GLY	-	expression tag	UNP A0A1D1V463
C	-14	SER	-	expression tag	UNP A0A1D1V463
C	-13	SER	-	expression tag	UNP A0A1D1V463
C	-12	HIS	-	expression tag	UNP A0A1D1V463
C	-11	HIS	-	expression tag	UNP A0A1D1V463
C	-10	HIS	-	expression tag	UNP A0A1D1V463
C	-9	HIS	-	expression tag	UNP A0A1D1V463
C	-8	HIS	-	expression tag	UNP A0A1D1V463
C	-7	HIS	-	expression tag	UNP A0A1D1V463
C	-6	GLU	-	expression tag	UNP A0A1D1V463
C	-5	ASN	-	expression tag	UNP A0A1D1V463
C	-4	LEU	-	expression tag	UNP A0A1D1V463
C	-3	GLN	-	expression tag	UNP A0A1D1V463
C	-2	PHE	-	expression tag	UNP A0A1D1V463
C	-1	GLN	-	expression tag	UNP A0A1D1V463
D	-16	MET	-	initiating methionine	UNP A0A1D1V463
D	-15	GLY	-	expression tag	UNP A0A1D1V463
D	-14	SER	-	expression tag	UNP A0A1D1V463
D	-13	SER	-	expression tag	UNP A0A1D1V463
D	-12	HIS	-	expression tag	UNP A0A1D1V463
D	-11	HIS	-	expression tag	UNP A0A1D1V463
D	-10	HIS	-	expression tag	UNP A0A1D1V463
D	-9	HIS	-	expression tag	UNP A0A1D1V463
D	-8	HIS	-	expression tag	UNP A0A1D1V463
D	-7	HIS	-	expression tag	UNP A0A1D1V463
D	-6	GLU	-	expression tag	UNP A0A1D1V463
D	-5	ASN	-	expression tag	UNP A0A1D1V463
D	-4	LEU	-	expression tag	UNP A0A1D1V463
D	-3	GLN	-	expression tag	UNP A0A1D1V463
D	-2	PHE	-	expression tag	UNP A0A1D1V463

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Chain	Residue	Modelled	Actual	Comment	Reference
D	-1	GLN	-	expression tag	UNP A0A1D1V463

- Molecule 2 is water.

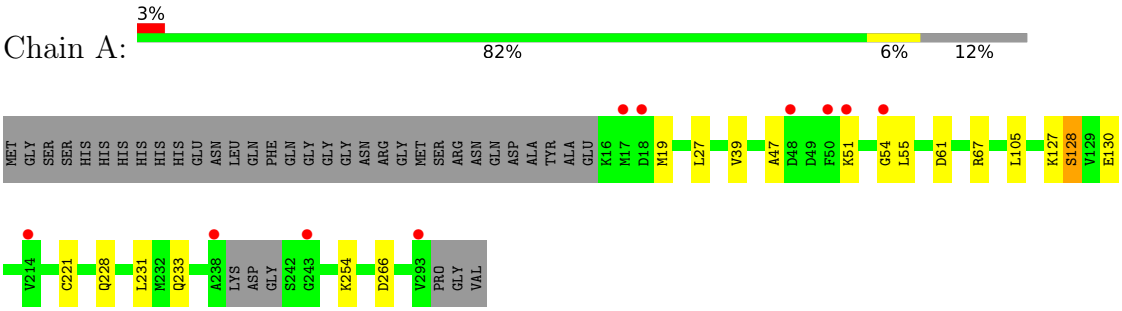
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	A	278	Total O 287 287	0	9
2	B	315	Total O 326 326	0	10
2	C	258	Total O 268 268	0	9
2	D	276	Total O 287 287	0	10

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.

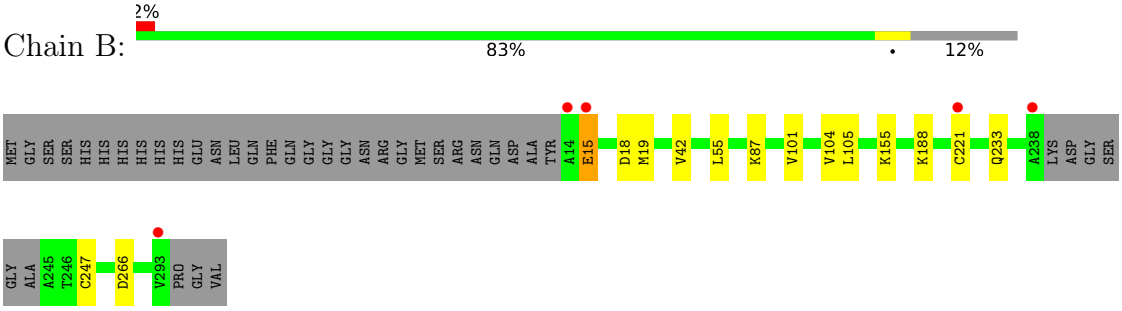
• Molecule 1: RvY_06210

Chain A:



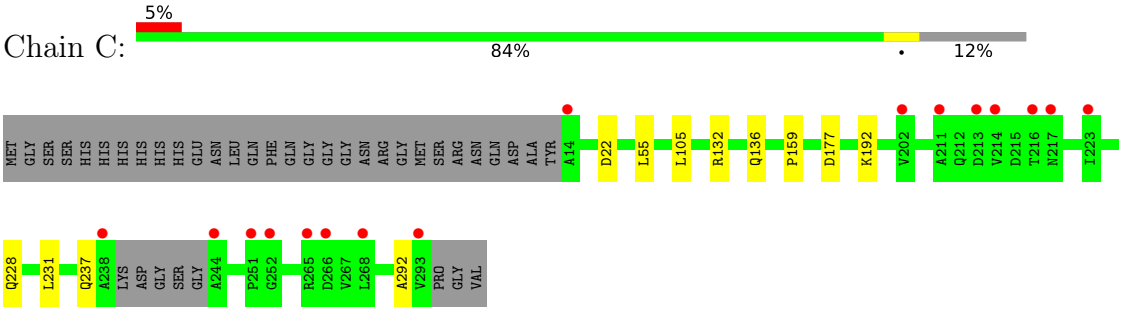
• Molecule 1: RvY_06210

Chain B:



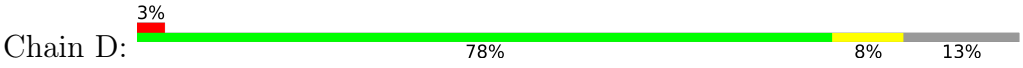
• Molecule 1: RvY_06210

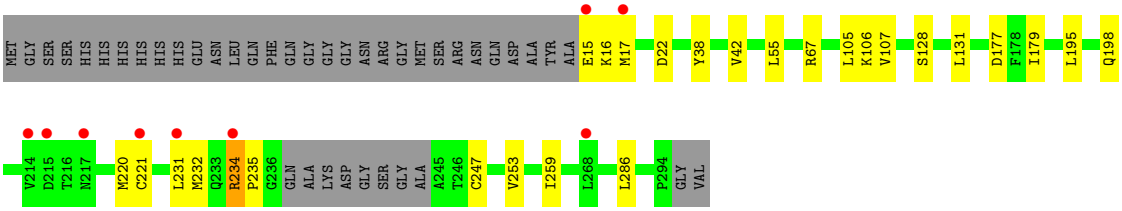
Chain C:



• Molecule 1: RvY_06210

Chain D:




MET GLY SER SER HIS HIS HIS HIS HIS HIS GLU ASN LEU GLN PHE GLN GLY GLY GLY ASN ARG GLY MET SER ARG ASN GLN ASP ALA TYR ALA E15 K16 M17 D22 Y38 V42 L55 R67 L105 K106 V107 S128 L131 D177 F178 I179 L195 Q198
V214 D215 T216 N217 M220 C221 L231 M232 Q233 R234 P235 G236 GLN ALA LYS ASP GLY SER GLY ALA A245 T246 C247 V253 I259 L268 L286 P294 GLY VAL

4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α, β, γ	61.27Å 80.81Å 105.55Å 90.00° 91.26° 90.00°	Depositor
Resolution (Å)	40.40 – 1.70 40.40 – 1.70	Depositor EDS
% Data completeness (in resolution range)	90.0 (40.40-1.70) 90.4 (40.40-1.70)	Depositor EDS
R_{merge}	0.10	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	3.32 (at 1.70Å)	Xtriage
Refinement program	PHENIX 1.20.1_4487	Depositor
R, R_{free}	0.184 , 0.228 0.183 , 0.227	Depositor DCC
R_{free} test set	5573 reflections (4.91%)	wwPDB-VP
Wilson B-factor (Å^2)	16.6	Xtriage
Anisotropy	0.082	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.31 , 45.6	EDS
L-test for twinning[2]	$< \|L\| > = 0.49$, $< L^2 > = 0.33$	Xtriage
Estimated twinning fraction	0.136 for h,-k,-l	Xtriage
F_o,F_c correlation	0.93	EDS
Total number of atoms	9486	wwPDB-VP
Average B, all atoms (Å^2)	19.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.12% of the height of the origin peak. No significant pseudotranslation is detected.*

[1] Intensities estimated from amplitudes.

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

5 Model quality

5.1 Standard geometry

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	0.38	0/2130	0.59	0/2903
1	B	0.39	0/2131	0.61	0/2907
1	C	0.36	0/2119	0.57	0/2892
1	D	0.37	0/2111	0.58	0/2882
All	All	0.38	0/8491	0.59	0/11584

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	2087	0	2078	17	0
1	B	2088	0	2071	16	0
1	C	2076	0	2059	7	0
1	D	2067	0	2052	18	0
2	A	287	0	0	5	1
2	B	326	0	0	5	1
2	C	268	0	0	3	0
2	D	287	0	0	5	0
All	All	9486	0	8260	57	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 (57) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:87:LYS:NZ	2:B:301:HOH:O	2.04	0.89
1:D:42[B]:VAL:HG21	1:D:67:ARG:HD3	1.55	0.88
1:D:198:GLN:NE2	2:D:303:HOH:O	2.23	0.67
1:C:159:PRO:O	2:C:301:HOH:O	2.15	0.65
1:D:253:VAL:HG23	1:D:286:LEU:HD21	1.79	0.65
1:A:130:GLU:OE1	2:A:301:HOH:O	2.14	0.64
1:D:177:ASP:OD1	2:D:301:HOH:O	2.15	0.63
1:A:54:GLY:HA2	1:D:232:MET:O	1.99	0.62
1:B:266:ASP:OD2	2:B:302:HOH:O	2.16	0.61
1:A:67[A]:ARG:NH1	2:A:304:HOH:O	2.33	0.61
1:D:221:CYS:SG	1:D:247[B]:CYS:HB3	2.41	0.60
1:B:15:GLU:O	1:B:19:MET:HG3	2.02	0.60
1:B:221:CYS:SG	1:B:247[B]:CYS:HB3	2.44	0.56
1:A:61:ASP:OD2	2:A:302:HOH:O	2.18	0.55
1:A:47:ALA:O	1:A:51:LYS:HG2	2.07	0.55
1:D:179:ILE:O	2:D:319[C]:HOH:O	2.18	0.54
1:A:19:MET:CE	1:A:127:LYS:HE3	2.39	0.53
1:B:42:VAL:O	2:B:303[A]:HOH:O	2.19	0.52
1:D:38:TYR:O	1:D:42[B]:VAL:HG22	2.11	0.51
1:B:18:ASP:OD1	2:B:304:HOH:O	2.19	0.50
1:C:55:LEU:HD11	1:C:105:LEU:HD11	1.92	0.50
1:C:292:ALA:O	2:C:302:HOH:O	2.18	0.50
1:A:128:SER:OG	1:A:130:GLU:HG2	2.12	0.49
1:D:42[B]:VAL:CG2	1:D:67:ARG:HD3	2.34	0.49
1:C:177:ASP:OD2	1:C:192:LYS:NZ	2.40	0.49
1:A:55:LEU:HD11	1:A:105:LEU:HD11	1.95	0.48
1:C:22[B]:ASP:OD2	2:C:303:HOH:O	2.20	0.48
1:B:101:VAL:HA	1:B:104:VAL:HG12	1.94	0.48
1:B:221:CYS:HB2	1:B:233:GLN:HG3	1.96	0.47
1:B:87:LYS:O	1:B:87:LYS:HD3	2.16	0.46
1:D:220:MET:HA	1:D:235:PRO:HD3	1.98	0.46
1:A:67[B]:ARG:NH2	2:A:311:HOH:O	2.48	0.46
1:D:15:GLU:HG2	1:D:16:LYS:N	2.31	0.46
1:C:132:ARG:O	1:C:136:GLN:HG3	2.17	0.45
1:A:254:LYS:HE2	2:B:350:HOH:O	2.16	0.45
1:D:128:SER:HB3	1:D:131:LEU:HD12	1.98	0.45
1:A:221[A]:CYS:HB2	1:A:233:GLN:HG2	1.99	0.45
1:A:228:GLN:OE1	1:A:231:LEU:HD11	2.17	0.44
1:A:39:VAL:HG22	1:A:67[B]:ARG:HH11	1.83	0.43
1:C:228:GLN:HE21	1:C:231:LEU:HD11	1.83	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:55:LEU:HD11	1:D:105:LEU:HD11	2.01	0.43
1:A:51:LYS:HG2	1:A:51:LYS:H	1.72	0.43
1:A:27:LEU:HD23	1:A:27:LEU:HA	1.83	0.42
1:D:234:ARG:HD3	1:D:235:PRO:HD2	2.01	0.42
1:D:195:LEU:HD13	1:D:259:ILE:HD12	1.99	0.42
1:A:51:LYS:HA	1:A:55:LEU:O	2.20	0.42
1:D:22:ASP:HB2	2:D:510:HOH:O	2.20	0.42
1:B:188:LYS:HE2	1:B:188:LYS:HB2	1.61	0.42
1:B:55:LEU:HD11	1:B:105:LEU:HD11	2.01	0.42
1:D:106:LYS:HE2	1:D:107:VAL:N	2.35	0.41
1:D:231:LEU:HD12	2:D:321:HOH:O	2.19	0.41
1:B:155:LYS:HA	1:B:155:LYS:HD2	1.95	0.41
1:A:266:ASP:HB2	2:A:409:HOH:O	2.21	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:A:498:HOH:O	2:B:589:HOH:O[2_646]	2.06	0.14

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	277/313 (88%)	271 (98%)	6 (2%)	0	100	100
1	B	278/313 (89%)	273 (98%)	5 (2%)	0	100	100
1	C	276/313 (88%)	272 (99%)	4 (1%)	0	100	100
1	D	274/313 (88%)	269 (98%)	5 (2%)	0	100	100
All	All	1105/1252 (88%)	1085 (98%)	20 (2%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains (i)

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	226/249 (91%)	225 (100%)	1 (0%)	89	85
1	B	228/249 (92%)	227 (100%)	1 (0%)	89	85
1	C	225/249 (90%)	224 (100%)	1 (0%)	89	85
1	D	226/249 (91%)	224 (99%)	2 (1%)	75	67
All	All	905/996 (91%)	900 (99%)	5 (1%)	84	78

All (5) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	128	SER
1	B	15	GLU
1	C	237	GLN
1	D	17	MET
1	D	234	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (5) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	212	GLN
1	B	212	GLN
1	B	233	GLN
1	C	228	GLN
1	D	217	ASN

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)

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, 95^{th} percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled 'Q< 0.9' lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å^2)	Q<0.9
1	A	275/313 (87%)	0.28	10 (3%) 46 49	8, 15, 32, 48	6 (2%)
1	B	274/313 (87%)	0.27	5 (1%) 67 70	6, 14, 31, 50	8 (2%)
1	C	275/313 (87%)	0.45	16 (5%) 30 31	6, 18, 34, 58	5 (1%)
1	D	272/313 (86%)	0.46	9 (3%) 49 52	8, 18, 33, 52	6 (2%)
All	All	1096/1252 (87%)	0.36	40 (3%) 46 49	6, 16, 34, 58	25 (2%)

All (40) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	268	LEU	5.2
1	C	293	VAL	4.3
1	B	293	VAL	4.0
1	A	54	GLY	3.4
1	C	238	ALA	3.3
1	A	293	VAL	3.2
1	D	268	LEU	3.2
1	A	238	ALA	3.2
1	B	238	ALA	3.0
1	D	17	MET	2.8
1	C	213	ASP	2.8
1	C	244	ALA	2.7
1	D	231	LEU	2.6
1	C	251	PRO	2.6
1	C	211	ALA	2.6
1	A	243	GLY	2.6
1	A	48	ASP	2.5
1	C	214	VAL	2.5
1	D	214	VAL	2.5
1	D	15	GLU	2.5
1	C	217	ASN	2.4

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Mol	Chain	Res	Type	RSRZ
1	A	17	MET	2.4
1	B	15	GLU	2.3
1	D	215	ASP	2.3
1	C	216	THR	2.3
1	D	221	CYS	2.3
1	C	265	ARG	2.3
1	C	14	ALA	2.2
1	B	14	ALA	2.2
1	C	202[A]	VAL	2.2
1	C	266	ASP	2.1
1	D	217	ASN	2.1
1	A	214	VAL	2.1
1	B	221	CYS	2.1
1	C	223	ILE	2.1
1	C	252	GLY	2.1
1	A	18	ASP	2.0
1	A	50	PHE	2.0
1	D	234	ARG	2.0
1	A	51	LYS	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 monosaccharides in this entry.

6.4 Ligands (i)

There are no ligands in this entry.

6.5 Other polymers (i)

There are no such residues in this entry.