



wwPDB X-ray Structure Validation Summary Report ⓘ

Feb 6, 2024 – 10:37 PM EST

PDB ID : 2FBM
Title : Acetyltransferase domain of CDY1
Authors : Min, J.R.; Antoshenko, T.; Hong, W.; Loppnau, P.; Weigelt, J.; Sundstrom, M.; Arrowsmith, C.H.; Edwards, A.M.; Bochkarev, A.; Plotnikov, A.N.; Structural Genomics Consortium (SGC)
Deposited on : 2005-12-09
Resolution : 2.28 Å(reported)

This is a wwPDB X-ray Structure Validation Summary 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 : 2.36
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) : 2.36

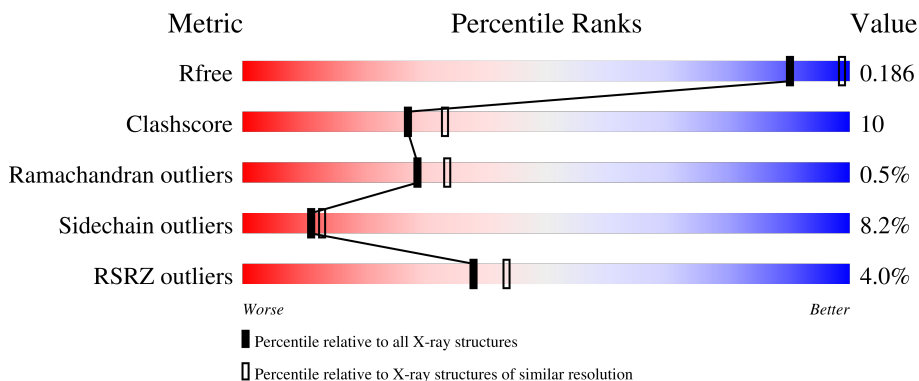
1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.28 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	6980 (2.30-2.26)
Clashscore	141614	7711 (2.30-2.26)
Ramachandran outliers	138981	7597 (2.30-2.26)
Sidechain outliers	138945	7598 (2.30-2.26)
RSRZ outliers	127900	6849 (2.30-2.26)

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	291	<div style="display: flex; align-items: center;"> <div style="width: 3%; height: 10px; background-color: red; margin-right: 5px;"></div> <div style="width: 67%; height: 10px; background-color: green; margin-right: 5px;"></div> <div style="width: 16%; height: 10px; background-color: yellow; margin-right: 5px;"></div> <div style="width: 14%; height: 10px; background-color: grey; margin-right: 5px;"></div> </div> <p style="margin-left: 30px;">3% 67% 16% • 14%</p>
1	B	291	<div style="display: flex; align-items: center;"> <div style="width: 2%; height: 10px; background-color: red; margin-right: 5px;"></div> <div style="width: 62%; height: 10px; background-color: green; margin-right: 5px;"></div> <div style="width: 21%; height: 10px; background-color: yellow; margin-right: 5px;"></div> <div style="width: 14%; height: 10px; background-color: grey; margin-right: 5px;"></div> </div> <p style="margin-left: 30px;">2% 62% 21% • 14%</p>
1	C	291	<div style="display: flex; align-items: center;"> <div style="width: 6%; height: 10px; background-color: red; margin-right: 5px;"></div> <div style="width: 69%; height: 10px; background-color: green; margin-right: 5px;"></div> <div style="width: 13%; height: 10px; background-color: yellow; margin-right: 5px;"></div> <div style="width: 14%; height: 10px; background-color: grey; margin-right: 5px;"></div> </div> <p style="margin-left: 30px;">6% 69% 13% • 14%</p>

2 Entry composition i

There are 3 unique types of molecules in this entry. The entry contains 6076 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 Y chromosome chromodomain protein 1, telomeric isoform b.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	251	1913	1221	316	362	14	0	0	0
1	B	250	1894	1208	313	359	14	0	0	0
1	C	250	1911	1219	319	359	14	0	0	0

There are 57 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	262	MET	-	cloning artifact	UNP Q9Y6F8
A	263	GLY	-	cloning artifact	UNP Q9Y6F8
A	264	SER	-	cloning artifact	UNP Q9Y6F8
A	265	SER	-	cloning artifact	UNP Q9Y6F8
A	266	HIS	-	insertion	UNP Q9Y6F8
A	267	HIS	-	insertion	UNP Q9Y6F8
A	268	HIS	-	insertion	UNP Q9Y6F8
A	269	HIS	-	insertion	UNP Q9Y6F8
A	270	HIS	-	insertion	UNP Q9Y6F8
A	271	HIS	-	insertion	UNP Q9Y6F8
A	272	SER	-	cloning artifact	UNP Q9Y6F8
A	273	SER	-	cloning artifact	UNP Q9Y6F8
A	274	GLY	-	cloning artifact	UNP Q9Y6F8
A	275	LEU	-	cloning artifact	UNP Q9Y6F8
A	276	VAL	-	cloning artifact	UNP Q9Y6F8
A	277	PRO	-	cloning artifact	UNP Q9Y6F8
A	278	ARG	-	cloning artifact	UNP Q9Y6F8
A	279	GLY	-	cloning artifact	UNP Q9Y6F8
A	280	SER	-	cloning artifact	UNP Q9Y6F8
B	262	MET	-	cloning artifact	UNP Q9Y6F8
B	263	GLY	-	cloning artifact	UNP Q9Y6F8
B	264	SER	-	cloning artifact	UNP Q9Y6F8
B	265	SER	-	cloning artifact	UNP Q9Y6F8

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Chain	Residue	Modelled	Actual	Comment	Reference
B	266	HIS	-	insertion	UNP Q9Y6F8
B	267	HIS	-	insertion	UNP Q9Y6F8
B	268	HIS	-	insertion	UNP Q9Y6F8
B	269	HIS	-	insertion	UNP Q9Y6F8
B	270	HIS	-	insertion	UNP Q9Y6F8
B	271	HIS	-	insertion	UNP Q9Y6F8
B	272	SER	-	cloning artifact	UNP Q9Y6F8
B	273	SER	-	cloning artifact	UNP Q9Y6F8
B	274	GLY	-	cloning artifact	UNP Q9Y6F8
B	275	LEU	-	cloning artifact	UNP Q9Y6F8
B	276	VAL	-	cloning artifact	UNP Q9Y6F8
B	277	PRO	-	cloning artifact	UNP Q9Y6F8
B	278	ARG	-	cloning artifact	UNP Q9Y6F8
B	279	GLY	-	cloning artifact	UNP Q9Y6F8
B	280	SER	-	cloning artifact	UNP Q9Y6F8
C	262	MET	-	cloning artifact	UNP Q9Y6F8
C	263	GLY	-	cloning artifact	UNP Q9Y6F8
C	264	SER	-	cloning artifact	UNP Q9Y6F8
C	265	SER	-	cloning artifact	UNP Q9Y6F8
C	266	HIS	-	insertion	UNP Q9Y6F8
C	267	HIS	-	insertion	UNP Q9Y6F8
C	268	HIS	-	insertion	UNP Q9Y6F8
C	269	HIS	-	insertion	UNP Q9Y6F8
C	270	HIS	-	insertion	UNP Q9Y6F8
C	271	HIS	-	insertion	UNP Q9Y6F8
C	272	SER	-	cloning artifact	UNP Q9Y6F8
C	273	SER	-	cloning artifact	UNP Q9Y6F8
C	274	GLY	-	cloning artifact	UNP Q9Y6F8
C	275	LEU	-	cloning artifact	UNP Q9Y6F8
C	276	VAL	-	cloning artifact	UNP Q9Y6F8
C	277	PRO	-	cloning artifact	UNP Q9Y6F8
C	278	ARG	-	cloning artifact	UNP Q9Y6F8
C	279	GLY	-	cloning artifact	UNP Q9Y6F8
C	280	SER	-	cloning artifact	UNP Q9Y6F8

- Molecule 2 is CHLORIDE ION (three-letter code: CL) (formula: Cl).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	A	1	Total Cl 1 1	0	0
2	B	1	Total Cl 1 1	0	0

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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	C	1	Total	Cl	0	0
			1	1		

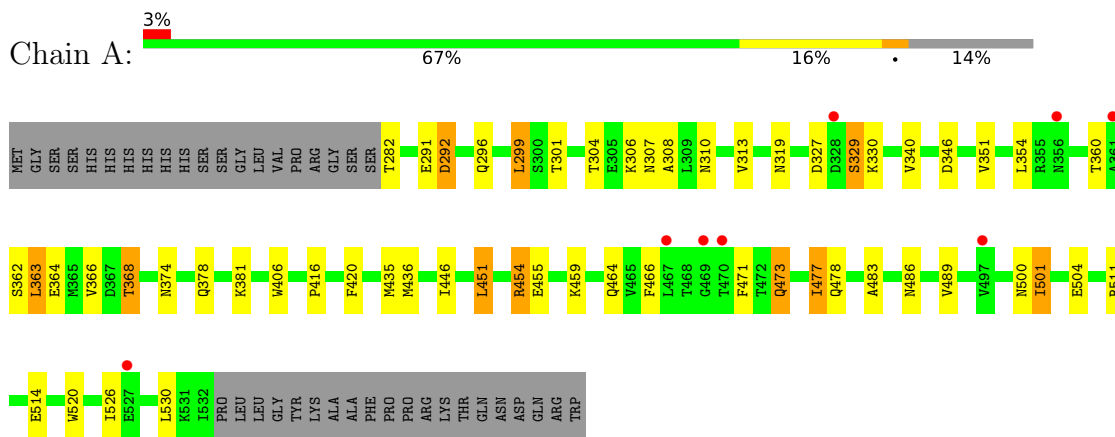
- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	134	Total	O	0	0
			134	134		
3	B	104	Total	O	0	0
			104	104		
3	C	117	Total	O	0	0
			117	117		

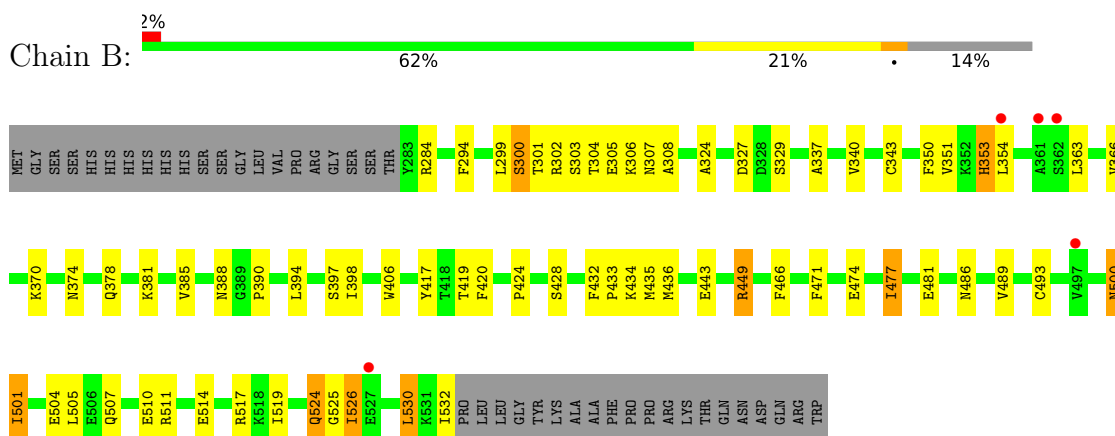
3 Residue-property plots [i](#)

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.

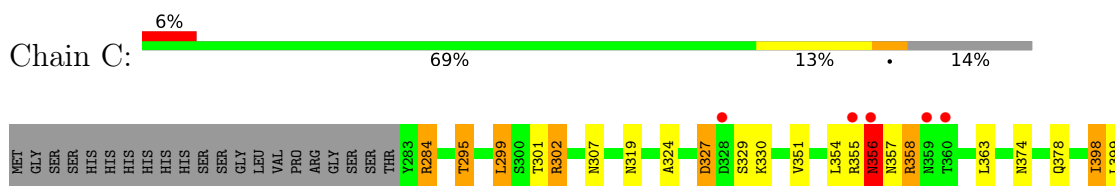
- Molecule 1: Y chromosome chromodomain protein 1, telomeric isoform b

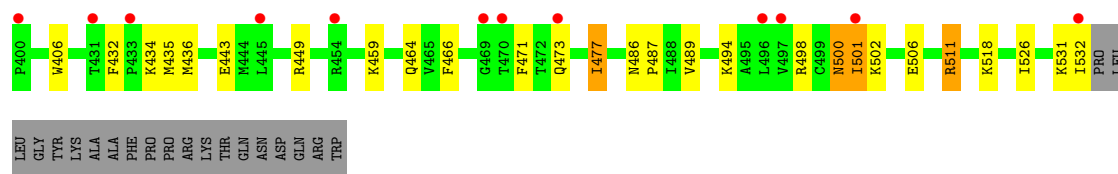


- Molecule 1: Y chromosome chromodomain protein 1, telomeric isoform b



- Molecule 1: Y chromosome chromodomain protein 1, telomeric isoform b





4 Data and refinement statistics

Property	Value	Source
Space group	C 2 2 21	Depositor
Cell constants a, b, c, α , β , γ	115.92Å 133.77Å 122.63Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	87.71 – 2.28 41.25 – 2.28	Depositor EDS
% Data completeness (in resolution range)	95.1 (87.71-2.28) 95.1 (41.25-2.28)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.40 (at 2.29Å)	Xtrriage
Refinement program	REFMAC 5.2.0019	Depositor
R, R_{free}	0.187 , 0.253 0.190 , 0.186	Depositor DCC
R_{free} test set	2052 reflections (4.96%)	wwPDB-VP
Wilson B-factor (Å ²)	33.8	Xtrriage
Anisotropy	0.091	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.32 , 44.2	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.34$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	6076	wwPDB-VP
Average B, all atoms (Å ²)	33.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.32% 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 [i](#)

5.1 Standard geometry [i](#)

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	0.79	0/1943	0.78	2/2628 (0.1%)
1	B	0.71	0/1924	0.75	0/2599
1	C	0.81	2/1941 (0.1%)	0.85	3/2623 (0.1%)
All	All	0.77	2/5808 (0.0%)	0.80	5/7850 (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	B	0	1
1	C	0	1
All	All	0	2

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	C	356	ASN	CG-OD1	7.97	1.41	1.24
1	C	356	ASN	CB-CG	6.31	1.65	1.51

All (5) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	511	ARG	NE-CZ-NH2	-14.99	112.81	120.30
1	C	511	ARG	NE-CZ-NH1	11.45	126.03	120.30
1	A	511	ARG	NE-CZ-NH2	-7.16	116.72	120.30
1	C	511	ARG	CD-NE-CZ	5.72	131.60	123.60
1	A	363	LEU	CA-CB-CG	5.48	127.90	115.30

There are no chirality outliers.

All (2) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	B	530	LEU	Peptide
1	C	531	LYS	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	1913	0	1937	37	0
1	B	1894	0	1915	43	0
1	C	1911	0	1942	37	0
2	A	1	0	0	0	0
2	B	1	0	0	0	0
2	C	1	0	0	0	0
3	A	134	0	0	7	0
3	B	104	0	0	5	0
3	C	117	0	0	6	0
All	All	6076	0	5794	116	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 10.

The worst 5 of 116 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:500:ASN:HB2	3:B:1367:HOH:O	1.46	1.16
1:B:306:LYS:HB3	1:B:340:VAL:HG11	1.38	1.05
1:C:299:LEU:HD13	1:C:307:ASN:HB3	1.48	0.95
1:A:319:ASN:HB3	3:A:1422:HOH:O	1.68	0.94
1:C:500:ASN:H	1:C:500:ASN:HD22	1.09	0.89

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	
1	A	249/291 (86%)	240 (96%)	9 (4%)	0	100	100
1	B	248/291 (85%)	236 (95%)	11 (4%)	1 (0%)	34	40
1	C	248/291 (85%)	241 (97%)	4 (2%)	3 (1%)	13	12
All	All	745/873 (85%)	717 (96%)	24 (3%)	4 (0%)	29	34

All (4) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	284	ARG
1	C	358	ARG
1	C	327	ASP
1	C	357	ASN

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	209/249 (84%)	192 (92%)	17 (8%)	11	13
1	B	207/249 (83%)	188 (91%)	19 (9%)	9	10
1	C	209/249 (84%)	194 (93%)	15 (7%)	14	17
All	All	625/747 (84%)	574 (92%)	51 (8%)	11	13

5 of 51 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	B	449	ARG
1	B	532	ILE
1	C	501	ILE
1	B	477	ILE
1	B	501	ILE

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 18 such sidechains are listed below:

Mol	Chain	Res	Type
1	C	353	HIS
1	C	500	ASN
1	C	486	ASN
1	B	388	ASN
1	C	322	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 monosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 3 ligands modelled in this entry, 3 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 [i](#)

6.1 Protein, DNA and RNA chains [i](#)

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	251/291 (86%)	0.09	8 (3%) 47 53	19, 27, 42, 45	0
1	B	250/291 (85%)	0.07	5 (2%) 65 70	21, 33, 57, 60	0
1	C	250/291 (85%)	0.37	17 (6%) 17 21	18, 32, 49, 53	0
All	All	751/873 (86%)	0.18	30 (3%) 38 43	18, 31, 49, 60	0

The worst 5 of 30 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	469	GLY	4.1
1	C	356	ASN	4.0
1	C	532	ILE	3.3
1	A	467	LEU	3.1
1	C	501	ILE	3.1

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](#)

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(\AA^2)	Q<0.9
2	CL	B	1268	1/1	0.86	0.09	70,70,70,70	0
2	CL	C	1105	1/1	0.88	0.07	71,71,71,71	0
2	CL	A	1303	1/1	0.91	0.06	64,64,64,64	0

6.5 Other polymers [i](#)

There are no such residues in this entry.