



Full wwPDB X-ray Structure Validation Report ⓘ

Nov 7, 2016 – 09:27 PM EST

PDB ID : 5EFY
Title : Apo-form of SCO3201
Authors : Waack, P.; Hinrichs, W.
Deposited on : 2015-10-26
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

<http://wwpdb.org/validation/2016/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
Mogul	:	unknown
Xtriage (Phenix)	:	1.9-1692
EDS	:	rb-20028320
Percentile statistics	:	20151230.v01 (using entries in the PDB archive December 30th 2015)
Refmac	:	5.8.0135
CCP4	:	6.5.0
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	rb-20028320

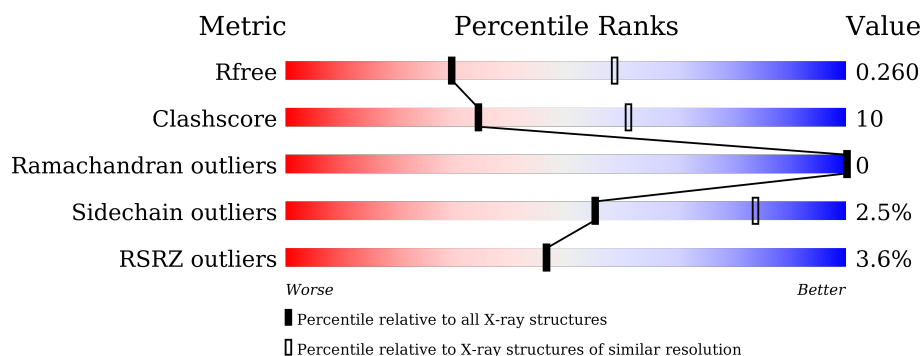
1 Overall quality at a glance

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}	91344	2103 (2.70-2.70)
Clashscore	102246	2422 (2.70-2.70)
Ramachandran outliers	100387	2382 (2.70-2.70)
Sidechain outliers	100360	2382 (2.70-2.70)
RSRZ outliers	91569	2107 (2.70-2.70)

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 on the lower bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria. 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	216	<div> <div>3%</div> <div> <div></div> <div>72%</div> <div>14%</div> <div>•</div> <div>12%</div> </div> </div>
1	B	216	<div> <div>0%</div> <div> <div></div> <div>72%</div> <div>17%</div> <div></div> <div>11%</div> </div> </div>
1	C	216	<div> <div>3%</div> <div> <div></div> <div>74%</div> <div>17%</div> <div>•</div> <div>9%</div> </div> </div>
1	D	216	<div> <div>6%</div> <div> <div></div> <div>69%</div> <div>13%</div> <div></div> <div>18%</div> </div> </div>

2 Entry composition

There are 2 unique types of molecules in this entry. The entry contains 5332 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 Putative tetR-family transcriptional regulator.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	190	Total	C	N	O	S	0	0	0
			1343	856	238	246	3			
1	B	193	Total	C	N	O	S	0	0	0
			1392	883	253	253	3			
1	C	197	Total	C	N	O	S	0	0	0
			1392	873	260	256	3			
1	D	178	Total	C	N	O	S	0	0	0
			1182	757	208	214	3			

There are 8 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	21	HIS	-	cloning artefact	UNP Q9KYU4
A	22	MET	-	cloning artefact	UNP Q9KYU4
B	21	HIS	-	cloning artefact	UNP Q9KYU4
B	22	MET	-	cloning artefact	UNP Q9KYU4
C	21	HIS	-	cloning artefact	UNP Q9KYU4
C	22	MET	-	cloning artefact	UNP Q9KYU4
D	21	HIS	-	cloning artefact	UNP Q9KYU4
D	22	MET	-	cloning artefact	UNP Q9KYU4

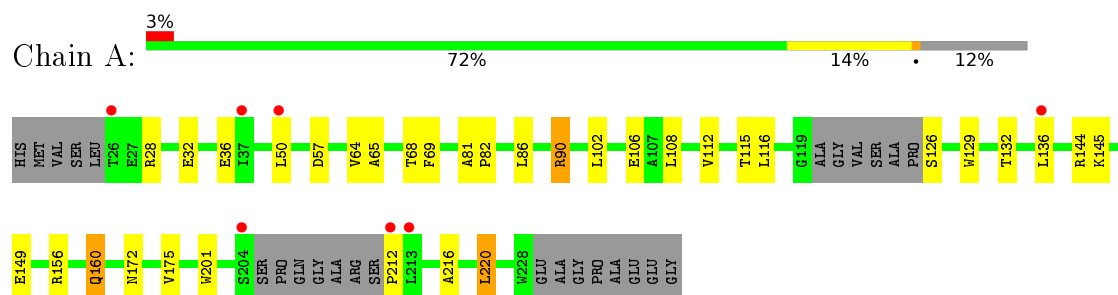
- Molecule 2 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	7	Total	O	0	0
			7	7		
2	B	5	Total	O	0	0
			5	5		
2	C	5	Total	O	0	0
			5	5		
2	D	6	Total	O	0	0
			6	6		

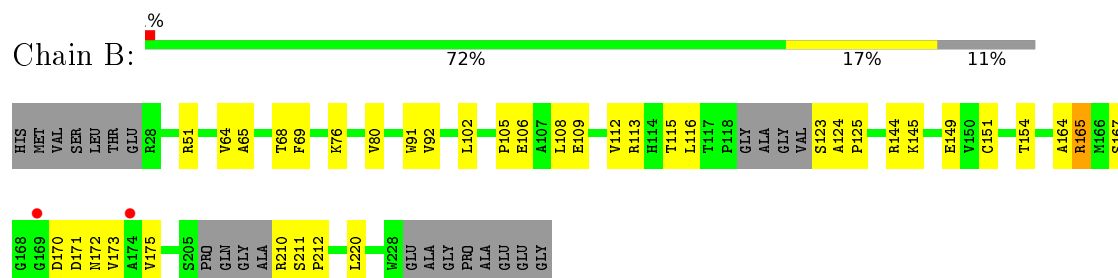
3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA and DNA chains in the entry. The first graphic for a chain summarises the proportions of errors 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.

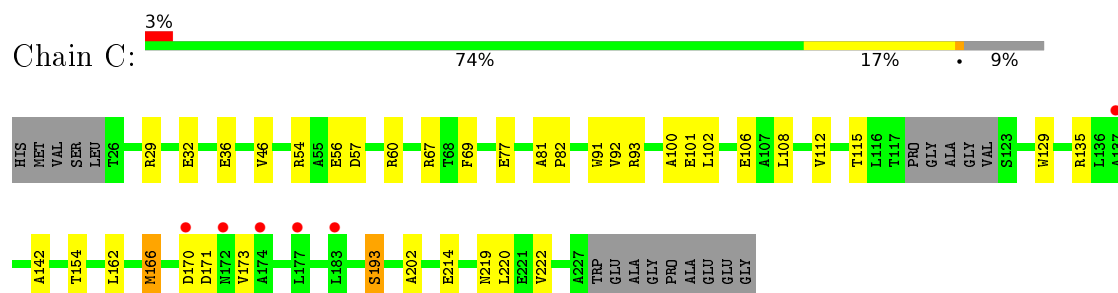
- Molecule 1: Putative tetR-family transcriptional regulator



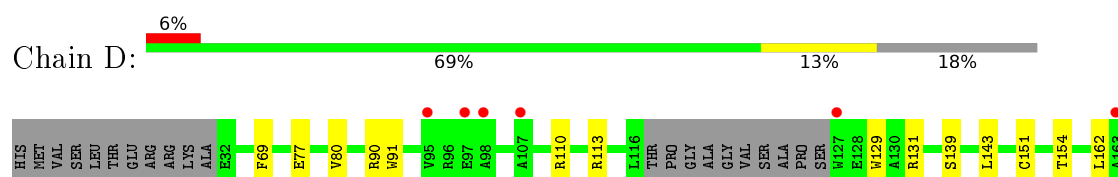
- Molecule 1: Putative tetR-family transcriptional regulator



- Molecule 1: Putative tetR-family transcriptional regulator



- Molecule 1: Putative tetR-family transcriptional regulator



A164	R165	M166	S167	G168	G169	D170	V173	A174	R182	R195	E199	H200	W201	S204	SER	PRO	GLN	GLY	ALA	ARG	SER	PRO	LEU	E214	L218	N219	L220	E221	V222	L223	R224	G225	F226	A227	N228	GLU	ALA	GLY	PRO	ALA	GLU	GLU	GLY
------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	-----	-----	-----	-----	-----	-----	-----	-----	-----	------	------	------	------	------	------	------	------	------	------	------	------	-----	-----	-----	-----	-----	-----	-----	-----

4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	51.79Å 98.43Å 89.61Å 90.00° 100.78° 90.00°	Depositor
Resolution (Å)	88.03 – 2.70 48.12 – 2.71	Depositor EDS
% Data completeness (in resolution range)	96.7 (88.03-2.70) 97.0 (48.12-2.71)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	0.94 (at 2.69Å)	Xtriage
Refinement program	REFMAC 5.8.0073	Depositor
R, R_{free}	0.258 , 0.297 0.260 , 0.260	Depositor DCC
R_{free} test set	1155 reflections (5.18%)	DCC
Wilson B-factor (Å ²)	71.0	Xtriage
Anisotropy	0.167	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.30 , 65.9	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.91	EDS
Total number of atoms	5332	wwPDB-VP
Average B, all atoms (Å ²)	82.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.17% 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](#)

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	0.61	0/1371	0.72	2/1876 (0.1%)
1	B	0.66	0/1419	0.81	3/1936 (0.2%)
1	C	0.62	0/1417	0.79	1/1938 (0.1%)
1	D	0.58	0/1203	0.72	0/1651
All	All	0.62	0/5410	0.76	6/7401 (0.1%)

There are no bond length outliers.

All (6) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	144	ARG	NE-CZ-NH1	7.02	123.81	120.30
1	B	220	LEU	CA-CB-CG	5.63	128.26	115.30
1	B	165	ARG	NE-CZ-NH1	5.61	123.11	120.30
1	A	144	ARG	NE-CZ-NH1	5.50	123.05	120.30
1	A	220	LEU	CA-CB-CG	5.17	127.18	115.30
1	C	93	ARG	NE-CZ-NH2	5.05	122.82	120.30

There are no chirality outliers.

There are no planarity outliers.

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	1343	0	1259	26	0
1	B	1392	0	1346	31	0
1	C	1392	0	1323	26	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	D	1182	0	1059	28	0
2	A	7	0	0	0	0
2	B	5	0	0	2	0
2	C	5	0	0	0	0
2	D	6	0	0	0	0
All	All	5332	0	4987	103	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.

All (103) 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:216:ALA:O	1:A:220:LEU:HD23	1.59	1.01
1:C:101:GLU:OE2	1:C:101:GLU:N	2.06	0.88
1:D:131:ARG:CG	1:D:201:TRP:CZ2	2.60	0.83
1:B:64:VAL:HB	1:B:68:THR:HG21	1.61	0.82
1:D:131:ARG:HG2	1:D:201:TRP:CH2	2.15	0.82
1:A:149:GLU:HG3	1:B:145:LYS:HD3	1.65	0.79
1:C:54:ARG:NH1	1:C:56:GLU:HB2	2.01	0.75
1:A:216:ALA:O	1:A:220:LEU:CD2	2.35	0.75
1:B:65:ALA:O	1:B:68:THR:HG22	1.86	0.75
1:D:195:ARG:O	1:D:199:GLU:HG3	1.86	0.74
1:D:131:ARG:HG2	1:D:201:TRP:CZ2	2.21	0.74
1:B:64:VAL:HB	1:B:68:THR:CG2	2.16	0.74
1:B:167:SER:O	1:B:173:VAL:HG11	1.92	0.70
1:D:167:SER:O	1:D:173:VAL:HG11	1.93	0.69
1:D:131:ARG:CG	1:D:201:TRP:CH2	2.76	0.68
1:C:222:VAL:O	1:D:222:VAL:HG13	1.96	0.67
1:B:76:LYS:HE2	2:B:303:HOH:O	1.93	0.66
1:C:92:VAL:CG2	1:C:154:THR:HG23	2.25	0.66
1:B:124:ALA:N	1:B:125:PRO:HD2	2.11	0.66
1:D:164:ALA:O	1:D:167:SER:HB3	1.96	0.65
1:C:135:ARG:NH2	1:C:202:ALA:O	2.30	0.65
1:D:221:GLU:O	1:D:224:ARG:HG2	1.96	0.65
1:D:131:ARG:HG3	1:D:201:TRP:CZ2	2.31	0.65
1:B:105:PRO:O	1:B:109:GLU:HG3	1.97	0.64
1:C:77:GLU:HG3	1:C:142:ALA:HB1	1.78	0.64
1:B:164:ALA:O	1:B:167:SER:HB3	1.98	0.64
1:C:54:ARG:HG2	1:C:57:ASP:OD2	1.99	0.63
1:A:201:TRP:CD2	1:A:212:PRO:HG3	2.34	0.63

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:135:ARG:NE	1:C:202:ALA:O	2.32	0.62
1:C:101:GLU:CD	1:C:101:GLU:H	1.98	0.62
1:C:193:SER:OG	1:C:219:ASN:HB2	2.02	0.60
1:D:80:VAL:HG21	1:D:143:LEU:HD21	1.82	0.60
1:B:170:ASP:O	1:B:173:VAL:HG12	2.02	0.59
1:A:64:VAL:CG1	1:A:68:THR:HB	2.33	0.59
1:C:162:LEU:O	1:C:166:MET:HG2	2.02	0.59
1:B:116:LEU:HD22	1:B:212:PRO:HB2	1.85	0.59
1:D:170:ASP:O	1:D:173:VAL:HG12	2.02	0.59
1:C:57:ASP:OD1	1:C:60:ARG:NH2	2.38	0.57
1:C:222:VAL:O	1:D:222:VAL:CG1	2.52	0.57
1:A:129:TRP:HA	1:A:132:THR:HG22	1.87	0.56
1:D:223:LEU:O	1:D:226:PHE:N	2.39	0.56
1:C:193:SER:OG	1:C:219:ASN:CB	2.54	0.56
1:A:149:GLU:HG3	1:B:145:LYS:CD	2.35	0.56
1:B:172:ASN:O	1:B:175:VAL:HG12	2.06	0.56
1:A:108:LEU:O	1:A:112:VAL:HG23	2.06	0.55
1:B:165:ARG:HB2	2:B:301:HOH:O	2.05	0.55
1:B:210:ARG:CG	1:B:211:SER:H	2.20	0.55
1:B:91:TRP:HB2	1:B:115:THR:HG21	1.90	0.54
1:B:124:ALA:N	1:B:125:PRO:CD	2.71	0.54
1:B:108:LEU:O	1:B:112:VAL:HG23	2.08	0.53
1:A:172:ASN:O	1:A:175:VAL:HG12	2.08	0.52
1:B:92:VAL:CG2	1:B:154:THR:HG23	2.39	0.52
1:C:170:ASP:HB2	1:C:173:VAL:HB	1.91	0.52
1:C:102:LEU:HD22	1:C:106:GLU:CB	2.40	0.52
1:A:57:ASP:OD1	1:A:57:ASP:N	2.42	0.51
1:C:108:LEU:O	1:C:112:VAL:HG23	2.11	0.51
1:D:220:LEU:O	1:D:220:LEU:HD23	2.10	0.51
1:B:123:SER:C	1:B:125:PRO:HD2	2.32	0.49
1:A:64:VAL:HG12	1:A:68:THR:HB	1.94	0.49
1:D:162:LEU:O	1:D:166:MET:HG2	2.13	0.49
1:A:145:LYS:HG2	1:B:149:GLU:HG3	1.95	0.49
1:B:51:ARG:NH2	1:C:214:GLU:OE2	2.45	0.49
1:B:167:SER:O	1:B:173:VAL:CG1	2.61	0.49
1:C:69:PHE:CD1	1:C:69:PHE:C	2.86	0.49
1:C:91:TRP:HB2	1:C:115:THR:HG21	1.94	0.48
1:C:32:GLU:O	1:C:36:GLU:HG3	2.13	0.48
1:A:32:GLU:O	1:A:36:GLU:HG3	2.13	0.48
1:C:46:VAL:HG21	1:C:129:TRP:CZ3	2.49	0.47
1:A:156:ARG:O	1:A:160:GLN:HG3	2.14	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:29:ARG:NH1	1:C:32:GLU:OE1	2.48	0.46
1:A:86:LEU:O	1:A:90:ARG:HD2	2.15	0.46
1:D:131:ARG:HG2	1:D:201:TRP:CZ3	2.50	0.46
1:B:102:LEU:HD22	1:B:106:GLU:HB3	1.98	0.46
1:B:69:PHE:CD1	1:B:69:PHE:C	2.89	0.46
1:D:167:SER:O	1:D:173:VAL:CG1	2.62	0.46
1:A:28:ARG:O	1:A:32:GLU:N	2.44	0.45
1:B:210:ARG:CG	1:B:211:SER:N	2.80	0.45
1:D:69:PHE:C	1:D:69:PHE:CD1	2.89	0.45
1:A:145:LYS:CG	1:B:149:GLU:HG3	2.47	0.44
1:A:149:GLU:HG3	1:B:145:LYS:CG	2.48	0.44
1:B:151:CYS:O	1:B:154:THR:HB	2.18	0.44
1:B:109:GLU:HB3	1:B:113:ARG:NH2	2.32	0.44
1:A:115:THR:OG1	1:A:116:LEU:N	2.51	0.43
1:A:81:ALA:N	1:A:82:PRO:CD	2.81	0.43
1:D:151:CYS:O	1:D:154:THR:HB	2.18	0.43
1:A:126:SER:O	1:A:129:TRP:HE3	2.01	0.43
1:C:135:ARG:CZ	1:C:202:ALA:O	2.68	0.42
1:D:218:LEU:O	1:D:221:GLU:HB2	2.20	0.42
1:C:81:ALA:N	1:C:82:PRO:CD	2.83	0.42
1:A:69:PHE:CD1	1:A:69:PHE:C	2.93	0.42
1:A:50:LEU:HD13	1:A:136:LEU:HD22	2.00	0.41
1:C:100:ALA:N	1:C:101:GLU:OE2	2.53	0.41
1:A:64:VAL:HG12	1:A:65:ALA:N	2.34	0.41
1:A:50:LEU:HD11	1:A:136:LEU:HD13	2.02	0.41
1:D:162:LEU:O	1:D:166:MET:CG	2.68	0.41
1:D:182:ARG:HG3	1:D:226:PHE:HZ	1.86	0.41
1:D:90:ARG:CG	1:D:91:TRP:N	2.83	0.41
1:D:77:GLU:O	1:D:80:VAL:HG22	2.21	0.40
1:A:102:LEU:HD22	1:A:106:GLU:HB3	2.04	0.40
1:B:80:VAL:O	1:B:80:VAL:HG12	2.21	0.40
1:D:110:ARG:O	1:D:113:ARG:CB	2.70	0.40
1:D:131:ARG:HG3	1:D:201:TRP:CH2	2.51	0.40
1:D:220:LEU:HG	1:D:223:LEU:HD23	2.04	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	
1	A	184/216 (85%)	184 (100%)	0	0	100	100
1	B	187/216 (87%)	187 (100%)	0	0	100	100
1	C	193/216 (89%)	190 (98%)	3 (2%)	0	100	100
1	D	172/216 (80%)	171 (99%)	1 (1%)	0	100	100
All	All	736/864 (85%)	732 (100%)	4 (0%)	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	112/156 (72%)	110 (98%)	2 (2%)	66	89
1	B	121/156 (78%)	120 (99%)	1 (1%)	86	96
1	C	118/156 (76%)	113 (96%)	5 (4%)	36	68
1	D	84/156 (54%)	81 (96%)	3 (4%)	42	73
All	All	435/624 (70%)	424 (98%)	11 (2%)	55	84

All (11) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	90	ARG
1	A	160	GLN

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Mol	Chain	Res	Type
1	B	171	ASP
1	C	67	ARG
1	C	166	MET
1	C	171	ASP
1	C	193	SER
1	C	220	LEU
1	D	129	TRP
1	D	139	SER
1	D	166	MET

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. There are no such sidechains identified.

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 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	A	190/216 (87%)	0.10	7 (3%) 45 45	47, 79, 118, 144	0
1	B	193/216 (89%)	0.01	2 (1%) 84 85	38, 71, 115, 138	0
1	C	197/216 (91%)	0.08	6 (3%) 54 54	52, 81, 133, 168	0
1	D	178/216 (82%)	0.36	12 (6%) 21 19	57, 90, 156, 176	0
All	All	758/864 (87%)	0.13	27 (3%) 46 46	38, 79, 134, 176	0

All (27) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	D	95	VAL	5.0
1	D	164	ALA	4.7
1	C	174	ALA	4.7
1	D	168	GLY	3.6
1	A	204	SER	3.5
1	C	172	ASN	3.2
1	D	98	ALA	3.0
1	D	107	ALA	3.0
1	D	127	TRP	2.8
1	A	213	LEU	2.8
1	A	212	PRO	2.8
1	A	26	THR	2.7
1	C	177	LEU	2.6
1	A	136	LEU	2.6
1	D	174	ALA	2.4
1	C	170	ASP	2.3
1	A	37	ILE	2.2
1	D	163	ALA	2.2
1	D	167	SER	2.2
1	C	183	LEU	2.2
1	D	169	GLY	2.2

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Mol	Chain	Res	Type	RSRZ
1	A	50	LEU	2.2
1	C	137	ALA	2.2
1	D	173	VAL	2.1
1	B	169	GLY	2.1
1	D	97	GLU	2.1
1	B	174	ALA	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 carbohydrates 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.