



wwPDB X-ray Structure Validation Summary Report ⓘ

Jan 23, 2024 – 02:21 PM EST

PDB ID : 8FUH
Title : Rubrerythrin from *B. pseudomallei*: apo form
Authors : Monteiro, D.C.F.; Snell, M.E.; Budziszewski, G.R.; Bowman, S.E.J.
Deposited on : 2023-01-17
Resolution : 1.85 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
Mogul : 1.8.5 (274361), CSD as541be (2020)
Xtrriage (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

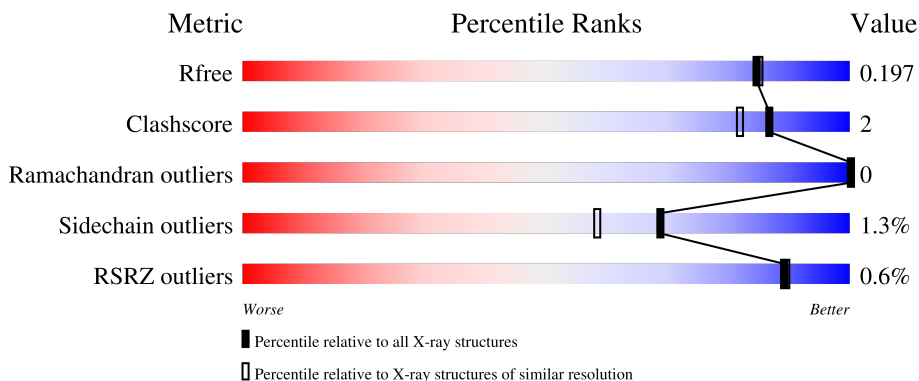
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.85 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	2469 (1.86-1.86)
Clashscore	141614	2625 (1.86-1.86)
Ramachandran outliers	138981	2592 (1.86-1.86)
Sidechain outliers	138945	2592 (1.86-1.86)
RSRZ outliers	127900	2436 (1.86-1.86)

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	5	169	 78% 5% 18%
1	A	169	 78% 5% 18%
1	B	169	 75% 8% 18%
1	M	169	 77% 5% 18%
1	S	169	 76% 6% 18%

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Mol	Chain	Length	Quality of chain
1	Y	169	 <p>A horizontal bar chart representing the quality of chain. The bar is divided into three segments: a green segment on the left labeled '78%', a yellow segment in the middle, and a grey segment on the right labeled '18%'. A small red square is at the very beginning of the bar, and a '%' symbol is above it. Two dots are located between the yellow and grey segments.</p>

2 Entry composition [i](#)

There are 3 unique types of molecules in this entry. The entry contains 13649 atoms, of which 6151 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 Rubrerythrin.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
			Total	C	H	N	O	S			
1	A	139	2098	671	1015	189	221	2	70	1	0
1	B	139	2120	678	1028	190	222	2	70	2	0
1	M	139	2121	677	1029	192	221	2	72	2	0
1	S	139	2101	672	1017	189	221	2	70	1	0
1	Y	139	2118	676	1027	192	221	2	72	2	0
1	5	139	2098	671	1015	189	221	2	70	1	0

There are 174 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-28	MET	-	initiating methionine	UNP Q3JK21
A	-27	GLY	-	expression tag	UNP Q3JK21
A	-26	SER	-	expression tag	UNP Q3JK21
A	-25	SER	-	expression tag	UNP Q3JK21
A	-24	HIS	-	expression tag	UNP Q3JK21
A	-23	HIS	-	expression tag	UNP Q3JK21
A	-22	HIS	-	expression tag	UNP Q3JK21
A	-21	HIS	-	expression tag	UNP Q3JK21
A	-20	HIS	-	expression tag	UNP Q3JK21
A	-19	HIS	-	expression tag	UNP Q3JK21
A	-18	SER	-	expression tag	UNP Q3JK21
A	-17	SER	-	expression tag	UNP Q3JK21
A	-16	GLY	-	expression tag	UNP Q3JK21
A	-15	LEU	-	expression tag	UNP Q3JK21
A	-14	VAL	-	expression tag	UNP Q3JK21
A	-13	PRO	-	expression tag	UNP Q3JK21
A	-12	ARG	-	expression tag	UNP Q3JK21

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Chain	Residue	Modelled	Actual	Comment	Reference
A	-11	GLY	-	expression tag	UNP Q3JK21
A	-10	SER	-	expression tag	UNP Q3JK21
A	-9	HIS	-	expression tag	UNP Q3JK21
A	-8	MET	-	expression tag	UNP Q3JK21
A	-7	GLU	-	expression tag	UNP Q3JK21
A	-6	ASN	-	expression tag	UNP Q3JK21
A	-5	LEU	-	expression tag	UNP Q3JK21
A	-4	TYR	-	expression tag	UNP Q3JK21
A	-3	PHE	-	expression tag	UNP Q3JK21
A	-2	GLN	-	expression tag	UNP Q3JK21
A	-1	GLY	-	expression tag	UNP Q3JK21
A	0	SER	-	expression tag	UNP Q3JK21
B	-28	MET	-	initiating methionine	UNP Q3JK21
B	-27	GLY	-	expression tag	UNP Q3JK21
B	-26	SER	-	expression tag	UNP Q3JK21
B	-25	SER	-	expression tag	UNP Q3JK21
B	-24	HIS	-	expression tag	UNP Q3JK21
B	-23	HIS	-	expression tag	UNP Q3JK21
B	-22	HIS	-	expression tag	UNP Q3JK21
B	-21	HIS	-	expression tag	UNP Q3JK21
B	-20	HIS	-	expression tag	UNP Q3JK21
B	-19	HIS	-	expression tag	UNP Q3JK21
B	-18	SER	-	expression tag	UNP Q3JK21
B	-17	SER	-	expression tag	UNP Q3JK21
B	-16	GLY	-	expression tag	UNP Q3JK21
B	-15	LEU	-	expression tag	UNP Q3JK21
B	-14	VAL	-	expression tag	UNP Q3JK21
B	-13	PRO	-	expression tag	UNP Q3JK21
B	-12	ARG	-	expression tag	UNP Q3JK21
B	-11	GLY	-	expression tag	UNP Q3JK21
B	-10	SER	-	expression tag	UNP Q3JK21
B	-9	HIS	-	expression tag	UNP Q3JK21
B	-8	MET	-	expression tag	UNP Q3JK21
B	-7	GLU	-	expression tag	UNP Q3JK21
B	-6	ASN	-	expression tag	UNP Q3JK21
B	-5	LEU	-	expression tag	UNP Q3JK21
B	-4	TYR	-	expression tag	UNP Q3JK21
B	-3	PHE	-	expression tag	UNP Q3JK21
B	-2	GLN	-	expression tag	UNP Q3JK21
B	-1	GLY	-	expression tag	UNP Q3JK21
B	0	SER	-	expression tag	UNP Q3JK21
M	-28	MET	-	initiating methionine	UNP Q3JK21

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Chain	Residue	Modelled	Actual	Comment	Reference
M	-27	GLY	-	expression tag	UNP Q3JK21
M	-26	SER	-	expression tag	UNP Q3JK21
M	-25	SER	-	expression tag	UNP Q3JK21
M	-24	HIS	-	expression tag	UNP Q3JK21
M	-23	HIS	-	expression tag	UNP Q3JK21
M	-22	HIS	-	expression tag	UNP Q3JK21
M	-21	HIS	-	expression tag	UNP Q3JK21
M	-20	HIS	-	expression tag	UNP Q3JK21
M	-19	HIS	-	expression tag	UNP Q3JK21
M	-18	SER	-	expression tag	UNP Q3JK21
M	-17	SER	-	expression tag	UNP Q3JK21
M	-16	GLY	-	expression tag	UNP Q3JK21
M	-15	LEU	-	expression tag	UNP Q3JK21
M	-14	VAL	-	expression tag	UNP Q3JK21
M	-13	PRO	-	expression tag	UNP Q3JK21
M	-12	ARG	-	expression tag	UNP Q3JK21
M	-11	GLY	-	expression tag	UNP Q3JK21
M	-10	SER	-	expression tag	UNP Q3JK21
M	-9	HIS	-	expression tag	UNP Q3JK21
M	-8	MET	-	expression tag	UNP Q3JK21
M	-7	GLU	-	expression tag	UNP Q3JK21
M	-6	ASN	-	expression tag	UNP Q3JK21
M	-5	LEU	-	expression tag	UNP Q3JK21
M	-4	TYR	-	expression tag	UNP Q3JK21
M	-3	PHE	-	expression tag	UNP Q3JK21
M	-2	GLN	-	expression tag	UNP Q3JK21
M	-1	GLY	-	expression tag	UNP Q3JK21
M	0	SER	-	expression tag	UNP Q3JK21
S	-28	MET	-	initiating methionine	UNP Q3JK21
S	-27	GLY	-	expression tag	UNP Q3JK21
S	-26	SER	-	expression tag	UNP Q3JK21
S	-25	SER	-	expression tag	UNP Q3JK21
S	-24	HIS	-	expression tag	UNP Q3JK21
S	-23	HIS	-	expression tag	UNP Q3JK21
S	-22	HIS	-	expression tag	UNP Q3JK21
S	-21	HIS	-	expression tag	UNP Q3JK21
S	-20	HIS	-	expression tag	UNP Q3JK21
S	-19	HIS	-	expression tag	UNP Q3JK21
S	-18	SER	-	expression tag	UNP Q3JK21
S	-17	SER	-	expression tag	UNP Q3JK21
S	-16	GLY	-	expression tag	UNP Q3JK21
S	-15	LEU	-	expression tag	UNP Q3JK21

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Chain	Residue	Modelled	Actual	Comment	Reference
S	-14	VAL	-	expression tag	UNP Q3JK21
S	-13	PRO	-	expression tag	UNP Q3JK21
S	-12	ARG	-	expression tag	UNP Q3JK21
S	-11	GLY	-	expression tag	UNP Q3JK21
S	-10	SER	-	expression tag	UNP Q3JK21
S	-9	HIS	-	expression tag	UNP Q3JK21
S	-8	MET	-	expression tag	UNP Q3JK21
S	-7	GLU	-	expression tag	UNP Q3JK21
S	-6	ASN	-	expression tag	UNP Q3JK21
S	-5	LEU	-	expression tag	UNP Q3JK21
S	-4	TYR	-	expression tag	UNP Q3JK21
S	-3	PHE	-	expression tag	UNP Q3JK21
S	-2	GLN	-	expression tag	UNP Q3JK21
S	-1	GLY	-	expression tag	UNP Q3JK21
S	0	SER	-	expression tag	UNP Q3JK21
Y	-28	MET	-	initiating methionine	UNP Q3JK21
Y	-27	GLY	-	expression tag	UNP Q3JK21
Y	-26	SER	-	expression tag	UNP Q3JK21
Y	-25	SER	-	expression tag	UNP Q3JK21
Y	-24	HIS	-	expression tag	UNP Q3JK21
Y	-23	HIS	-	expression tag	UNP Q3JK21
Y	-22	HIS	-	expression tag	UNP Q3JK21
Y	-21	HIS	-	expression tag	UNP Q3JK21
Y	-20	HIS	-	expression tag	UNP Q3JK21
Y	-19	HIS	-	expression tag	UNP Q3JK21
Y	-18	SER	-	expression tag	UNP Q3JK21
Y	-17	SER	-	expression tag	UNP Q3JK21
Y	-16	GLY	-	expression tag	UNP Q3JK21
Y	-15	LEU	-	expression tag	UNP Q3JK21
Y	-14	VAL	-	expression tag	UNP Q3JK21
Y	-13	PRO	-	expression tag	UNP Q3JK21
Y	-12	ARG	-	expression tag	UNP Q3JK21
Y	-11	GLY	-	expression tag	UNP Q3JK21
Y	-10	SER	-	expression tag	UNP Q3JK21
Y	-9	HIS	-	expression tag	UNP Q3JK21
Y	-8	MET	-	expression tag	UNP Q3JK21
Y	-7	GLU	-	expression tag	UNP Q3JK21
Y	-6	ASN	-	expression tag	UNP Q3JK21
Y	-5	LEU	-	expression tag	UNP Q3JK21
Y	-4	TYR	-	expression tag	UNP Q3JK21
Y	-3	PHE	-	expression tag	UNP Q3JK21
Y	-2	GLN	-	expression tag	UNP Q3JK21

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Chain	Residue	Modelled	Actual	Comment	Reference
Y	-1	GLY	-	expression tag	UNP Q3JK21
Y	0	SER	-	expression tag	UNP Q3JK21
5	-28	MET	-	initiating methionine	UNP Q3JK21
5	-27	GLY	-	expression tag	UNP Q3JK21
5	-26	SER	-	expression tag	UNP Q3JK21
5	-25	SER	-	expression tag	UNP Q3JK21
5	-24	HIS	-	expression tag	UNP Q3JK21
5	-23	HIS	-	expression tag	UNP Q3JK21
5	-22	HIS	-	expression tag	UNP Q3JK21
5	-21	HIS	-	expression tag	UNP Q3JK21
5	-20	HIS	-	expression tag	UNP Q3JK21
5	-19	HIS	-	expression tag	UNP Q3JK21
5	-18	SER	-	expression tag	UNP Q3JK21
5	-17	SER	-	expression tag	UNP Q3JK21
5	-16	GLY	-	expression tag	UNP Q3JK21
5	-15	LEU	-	expression tag	UNP Q3JK21
5	-14	VAL	-	expression tag	UNP Q3JK21
5	-13	PRO	-	expression tag	UNP Q3JK21
5	-12	ARG	-	expression tag	UNP Q3JK21
5	-11	GLY	-	expression tag	UNP Q3JK21
5	-10	SER	-	expression tag	UNP Q3JK21
5	-9	HIS	-	expression tag	UNP Q3JK21
5	-8	MET	-	expression tag	UNP Q3JK21
5	-7	GLU	-	expression tag	UNP Q3JK21
5	-6	ASN	-	expression tag	UNP Q3JK21
5	-5	LEU	-	expression tag	UNP Q3JK21
5	-4	TYR	-	expression tag	UNP Q3JK21
5	-3	PHE	-	expression tag	UNP Q3JK21
5	-2	GLN	-	expression tag	UNP Q3JK21
5	-1	GLY	-	expression tag	UNP Q3JK21
5	0	SER	-	expression tag	UNP Q3JK21


- Molecule 2 is DI(HYDROXYETHYL)ETHER (three-letter code: PEG) (formula: C₄H₁₀O₃).

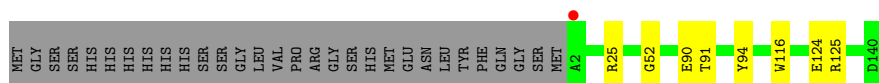


Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
2	A	1	Total	C	H	O	1	0
			17	4	10	3		
2	S	1	Total	C	H	O	1	0
			17	4	10	3		

- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	153	Total	O	0	4
			157	157		
3	B	168	Total	O	0	6
			174	174		
3	M	169	Total	O	0	5
			174	174		
3	S	144	Total	O	0	3
			147	147		
3	Y	153	Total	O	0	1
			154	154		
3	5	149	Total	O	0	4
			153	153		

Chain 5:  %



4 Data and refinement statistics i

Property	Value	Source
Space group	H 3	Depositor
Cell constants a, b, c, α , β , γ	202.37Å 202.37Å 70.33Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	28.75 – 1.85 101.19 – 1.85	Depositor EDS
% Data completeness (in resolution range)	99.4 (28.75-1.85) 90.0 (101.19-1.85)	Depositor EDS
R_{merge}	0.10	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	0.68 (at 1.86Å)	Xtrriage
Refinement program	REFMAC 5.8.0352	Depositor
R, R_{free}	0.150 , 0.188 0.161 , 0.197	Depositor DCC
R_{free} test set	5014 reflections (5.48%)	wwPDB-VP
Wilson B-factor (Å ²)	20.8	Xtrriage
Anisotropy	0.446	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.38 , 45.6	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.33$	Xtrriage
Estimated twinning fraction	0.023 for h,-h-k,-l	Xtrriage
F_o, F_c correlation	0.97	EDS
Total number of atoms	13649	wwPDB-VP
Average B, all atoms (Å ²)	28.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.28% 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: PEG

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	5	0.48	0/1108	0.69	0/1494
1	A	0.51	0/1108	0.76	3/1494 (0.2%)
1	B	0.50	0/1117	0.78	3/1506 (0.2%)
1	M	0.50	0/1120	0.73	1/1509 (0.1%)
1	S	0.47	0/1109	0.76	0/1495
1	Y	0.47	0/1119	0.72	0/1508
All	All	0.49	0/6681	0.74	7/9006 (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	M	0	1
1	S	0	1
All	All	0	2

There are no bond length outliers.

The worst 5 of 7 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	130	ARG	NE-CZ-NH2	-6.48	117.06	120.30
1	A	80	ARG	NE-CZ-NH2	-6.43	117.08	120.30
1	B	130	ARG	NE-CZ-NH1	5.67	123.14	120.30
1	A	80	ARG	NE-CZ-NH1	5.62	123.11	120.30
1	M	25	ARG	NE-CZ-NH2	-5.43	117.59	120.30

There are no chirality outliers.

All (2) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	M	47	ARG	Sidechain
1	S	47	ARG	Sidechain

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	5	1083	1015	1010	5	0
1	A	1083	1015	1010	4	0
1	B	1092	1028	1022	7	0
1	M	1092	1029	1025	6	0
1	S	1084	1017	1012	6	0
1	Y	1091	1027	1023	6	0
2	A	7	10	10	0	0
2	S	7	10	10	0	0
3	5	153	0	0	1	0
3	A	157	0	0	0	0
3	B	174	0	0	1	0
3	M	174	0	0	1	0
3	S	147	0	0	1	0
3	Y	154	0	0	0	0
All	All	7498	6151	6122	26	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 2.

The worst 5 of 26 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:90:GLU:OE1	1:B:124:GLU:OE1	2.24	0.55
1:A:56:HIS:CD2	1:B:120:LEU:HD22	2.42	0.55
1:M:42:ILE:HD12	1:S:83:LEU:HD11	1.89	0.54
1:B:106:ARG:HD2	3:B:278:HOH:O	2.10	0.51
1:M:3:GLN:N	1:M:3:GLN:OE1	2.45	0.49

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	5	138/169 (82%)	136 (99%)	2 (1%)	0	100	100
1	A	138/169 (82%)	133 (96%)	5 (4%)	0	100	100
1	B	139/169 (82%)	136 (98%)	3 (2%)	0	100	100
1	M	139/169 (82%)	135 (97%)	4 (3%)	0	100	100
1	S	138/169 (82%)	134 (97%)	4 (3%)	0	100	100
1	Y	139/169 (82%)	134 (96%)	5 (4%)	0	100	100
All	All	831/1014 (82%)	808 (97%)	23 (3%)	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	5	106/131 (81%)	105 (99%)	1 (1%)	78	72
1	A	106/131 (81%)	105 (99%)	1 (1%)	78	72
1	B	107/131 (82%)	106 (99%)	1 (1%)	78	72
1	M	107/131 (82%)	106 (99%)	1 (1%)	78	72
1	S	106/131 (81%)	104 (98%)	2 (2%)	57	43
1	Y	107/131 (82%)	105 (98%)	2 (2%)	57	43
All	All	639/786 (81%)	631 (99%)	8 (1%)	69	58

5 of 8 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	5	25	ARG
1	Y	61	LEU
1	S	25	ARG
1	S	5	LYS
1	Y	25	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (1) such sidechains are listed below:

Mol	Chain	Res	Type
1	S	3	GLN

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](#)

2 ligands are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. 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 $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\# Z > 2$	Counts	RMSZ	$\# Z > 2$
2	PEG	A	201	-	6,6,6	0.35	0	5,5,5	0.18	0
2	PEG	S	201	-	6,6,6	0.42	0	5,5,5	0.27	0

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	PEG	A	201	-	-	2/4/4/4	-
2	PEG	S	201	-	-	2/4/4/4	-

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (4) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	201	PEG	O1-C1-C2-O2
2	S	201	PEG	O2-C3-C4-O4
2	S	201	PEG	C4-C3-O2-C2
2	A	201	PEG	O2-C3-C4-O4

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	5	139/169 (82%)	-0.56	1 (0%) 87 88	18, 28, 51, 75	0
1	A	139/169 (82%)	-0.62	1 (0%) 87 88	16, 23, 41, 69	0
1	B	139/169 (82%)	-0.66	0 100 100	17, 22, 42, 69	0
1	M	139/169 (82%)	-0.61	1 (0%) 87 88	17, 23, 44, 87	0
1	S	139/169 (82%)	-0.57	1 (0%) 87 88	17, 26, 47, 73	0
1	Y	139/169 (82%)	-0.62	1 (0%) 87 88	19, 25, 50, 89	0
All	All	834/1014 (82%)	-0.61	5 (0%) 89 89	16, 24, 47, 89	0

All (5) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	M	2	ALA	5.5
1	Y	2	ALA	3.4
1	5	2	ALA	3.2
1	S	2	ALA	2.6
1	A	3	GLN	2.1

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(Å ²)	Q<0.9
2	PEG	S	201	7/7	0.65	0.29	56,67,70,70	1
2	PEG	A	201	7/7	0.69	0.27	45,61,72,82	1

6.5 Other polymers [i](#)

There are no such residues in this entry.