W O R L D W I D E
wwPDB
PROTEIN DATA BANK

Full wwPDB X-ray Structure Validation Report ⓘ

Sep 16, 2023 – 07:27 PM EDT

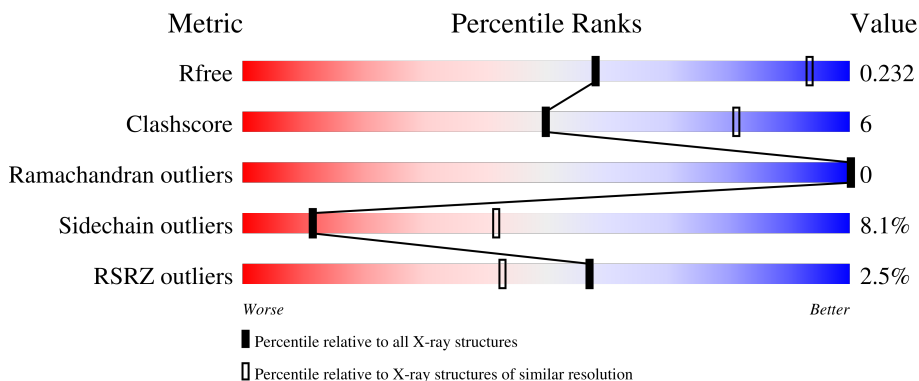|		
PDB ID	:	4RV6
Title	:	Human ARTD1 (PARP1) catalytic domain in complex with inhibitor Ruca-parib
Authors	:	Karlberg, T.; Thorsell, A.G.; Schuler, H.
Deposited on	:	2014-11-25
Resolution	:	3.19 Å(reported)

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 3.19 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	1133 (3.20-3.20)
Clashscore	141614	1253 (3.20-3.20)
Ramachandran outliers	138981	1234 (3.20-3.20)
Sidechain outliers	138945	1233 (3.20-3.20)
RSRZ outliers	127900	1095 (3.20-3.20)

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	352	% 76% 21% ••
1	B	352	% 78% 20% ••
1	C	352	4% 79% 19% ••
1	D	352	4% 80% 18% ••

2 Entry composition (i)

There are 4 unique types of molecules in this entry. The entry contains 11027 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 Poly [ADP-ribose] polymerase 1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	347	Total	C	N	O	S	0	0	0
			2730	1739	462	518	11			
1	B	349	Total	C	N	O	S	0	0	0
			2744	1746	464	523	11			
1	C	347	Total	C	N	O	S	0	0	0
			2728	1738	462	517	11			
1	D	349	Total	C	N	O	S	0	0	0
			2744	1746	464	523	11			

There are 12 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	660	SER	-	EXPRESSION TAG	UNP P09874
A	661	MET	-	EXPRESSION TAG	UNP P09874
A	762	ALA	VAL	variant	UNP P09874
B	660	SER	-	EXPRESSION TAG	UNP P09874
B	661	MET	-	EXPRESSION TAG	UNP P09874
B	762	ALA	VAL	variant	UNP P09874
C	660	SER	-	EXPRESSION TAG	UNP P09874
C	661	MET	-	EXPRESSION TAG	UNP P09874
C	762	ALA	VAL	variant	UNP P09874
D	660	SER	-	EXPRESSION TAG	UNP P09874
D	661	MET	-	EXPRESSION TAG	UNP P09874
D	762	ALA	VAL	variant	UNP P09874

- Molecule 2 is SULFATE ION (three-letter code: SO4) (formula: O_4S).

Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	A	1	Total 5	O 4	S 1	0	0
2	A	1	Total 5	O 4	S 1	0	0
2	B	1	Total 5	O 4	S 1	0	0
2	B	1	Total 5	O 4	S 1	0	0
2	C	1	Total 5	O 4	S 1	0	0
2	D	1	Total 5	O 4	S 1	0	0

- Molecule 3 is Rucaparib (three-letter code: RPB) (formula: $C_{19}H_{18}FN_3O$).

RPB

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
3	A	1	Total	C	F	N	O	0	0
			24	19	1	3	1		
3	B	1	Total	C	F	N	O	0	0
			24	19	1	3	1		

• Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	B	1	Total	O	0	0
			1	1		
4	C	1	Total	O	0	0
			1	1		
4	D	1	Total	O	0	0
			1	1		

3 Residue-property plots ⓘ

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: Poly [ADP-ribose] polymerase 1

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K819 N820 T821 H822 A823 T824 T825 H826 N827 I834 K838 C845 Q846 R847 F851 K852 Q853 L860 S864 R878 Y889 G892 I895 M900 V901 S902 G917 L921 V924 N928 M929 Y930 E931 L932 K933 H934 A935 L941 K945 V948 L951

G952 K953 D957 N961 I962 D965 V969 P970 L971 I975 V979 N980 D981 T982 S983 L984 I994 A995 Q996 V997 Y1001 K1006 K1010 THR

• Molecule 1: Poly [ADP-ribose] polymerase 1

Chain D:

4%

80% 18%

SER MET K662 P668 I676 Y689 E690 M696 P697 L698 G699 K700 L701 S702 K703 R704 A708 Q728 D731 L739 I740 P741 M746 K747 L751 V758 V773 L769 L777 G780 D783 D784 S785 K796 L797 V803 V804 D805 R806 D807 S808 E809

E812 I813 I814 V818 T821 T825 H826 I834 K838 R847 F851 K852 Q853 L854 H855 S864 I872 L877 R878 I895 M900 V901 S902 Q912 L921 N928 M929 Y930 E931 L932 K933 L941 K945 V948 L951 G952 K953 T954 D957

N961 I962 D965 V969 P970 L971 I975 V979 N980 D981 T982 S983 L984 I994 A995 Q996 Y1001 K1006 K1010 THR

4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 1 2 1	Depositor
Cell constants a, b, c, α, β, γ	93.63Å 85.10Å 101.94Å 90.00° 100.97° 90.00°	Depositor
Resolution (Å)	37.94 – 3.19 47.95 – 3.19	Depositor EDS
% Data completeness (in resolution range)	99.9 (37.94-3.19) 99.8 (47.95-3.19)	Depositor EDS
R_{merge}	0.19	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	2.23 (at 3.19Å)	Xtriage
Refinement program	BUSTER 2.11.5	Depositor
R, R_{free}	0.181 , 0.212 0.203 , 0.232	Depositor DCC
R_{free} test set	1325 reflections (5.00%)	wwPDB-VP
Wilson B-factor (Å^2)	65.4	Xtriage
Anisotropy	0.562	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.32 , 77.2	EDS
L-test for twinning[2]	$< |L| > = 0.45$, $< L^2 > = 0.28$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.93	EDS
Total number of atoms	11027	wwPDB-VP
Average B, all atoms (Å^2)	83.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.63% of the height of the origin peak. No significant pseudotranslation is detected.*

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[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 ⓘ

Bond lengths and bond angles in the following residue types are not validated in this section: RPB, SO4

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	0.53	0/2781	0.70	0/3751
1	B	0.51	0/2796	0.70	0/3773
1	C	0.49	0/2779	0.69	0/3748
1	D	0.48	0/2796	0.67	0/3773
All	All	0.50	0/11152	0.69	0/15045

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	2730	0	2774	41	0
1	B	2744	0	2784	32	0
1	C	2728	0	2775	27	0
1	D	2744	0	2784	28	0
2	A	10	0	0	0	0
2	B	10	0	0	0	0
2	C	5	0	0	0	0
2	D	5	0	0	1	0
3	A	24	0	18	4	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	B	24	0	18	3	0
4	B	1	0	0	0	0
4	C	1	0	0	0	0
4	D	1	0	0	0	0
All	All	11027	0	11153	129	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 6.

All (129) 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)
3:B:1103:RPB:H14	3:B:1103:RPB:H92C	1.50	0.94
1:C:860:LEU:HD12	1:C:924:VAL:HG11	1.58	0.86
3:A:1103:RPB:H14	3:A:1103:RPB:H92C	1.59	0.84
1:A:860:LEU:HD12	1:A:924:VAL:HG11	1.60	0.83
1:B:895:ILE:HD11	1:B:994:ILE:HG22	1.62	0.81
1:A:895:ILE:HD11	1:A:994:ILE:HG22	1.63	0.80
1:C:895:ILE:HD11	1:C:994:ILE:HG22	1.66	0.76
1:B:826:HIS:ND1	1:B:902:SER:HB3	2.02	0.74
1:A:826:HIS:ND1	1:A:902:SER:HB3	2.03	0.73
1:D:826:HIS:ND1	1:D:902:SER:HB3	2.03	0.73
1:C:826:HIS:ND1	1:C:902:SER:HB3	2.03	0.73
1:D:895:ILE:HD11	1:D:994:ILE:HG22	1.72	0.72
3:B:1103:RPB:H14	3:B:1103:RPB:C9	2.22	0.69
1:A:962:ILE:HD13	1:A:971:LEU:HD11	1.78	0.65
3:B:1103:RPB:H92C	3:B:1103:RPB:C14	2.17	0.65
1:B:962:ILE:HD13	1:B:971:LEU:HD11	1.78	0.63
1:C:962:ILE:HD13	1:C:971:LEU:HD11	1.80	0.62
1:D:962:ILE:HD13	1:D:971:LEU:HD11	1.80	0.62
1:D:872:ILE:HG23	1:D:877:LEU:HD12	1.83	0.60
1:C:931:GLU:HB3	1:C:951:LEU:HD11	1.88	0.56
3:A:1103:RPB:H14	3:A:1103:RPB:C9	2.32	0.56
1:D:931:GLU:HB3	1:D:951:LEU:HD11	1.87	0.56
1:B:806:ARG:CZ	1:B:807:ASP:OD2	2.55	0.55
3:A:1103:RPB:H92C	3:A:1103:RPB:C14	2.24	0.55
1:A:931:GLU:HB3	1:A:951:LEU:HD11	1.89	0.54
1:A:780:GLY:HA2	1:D:780:GLY:HA2	1.90	0.54
1:A:851:PHE:CD2	1:A:996:GLN:HG2	2.41	0.54
1:C:860:LEU:HD12	1:C:924:VAL:CG1	2.32	0.54
1:D:872:ILE:HG23	1:D:877:LEU:CD1	2.37	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:676:ILE:HD11	1:B:797:LEU:HD11	1.90	0.53
1:A:860:LEU:HD12	1:A:924:VAL:CG1	2.34	0.52
1:C:696:MET:HB2	1:C:741:PRO:HG2	1.91	0.52
1:C:809:GLU:O	1:C:813:ILE:HG12	2.10	0.52
1:C:676:ILE:HD11	1:C:797:LEU:HD11	1.92	0.51
1:C:838:LYS:HG2	1:C:1001:TYR:CE1	2.45	0.51
1:D:809:GLU:O	1:D:813:ILE:HG12	2.10	0.51
1:B:931:GLU:HB3	1:B:951:LEU:HD11	1.93	0.51
1:A:769:LEU:O	1:A:773:VAL:HG23	2.10	0.51
1:B:809:GLU:O	1:B:813:ILE:HG12	2.10	0.51
1:A:827:ASN:OD1	1:B:725:SER:HB3	2.11	0.51
1:D:696:MET:HB2	1:D:741:PRO:HG2	1.92	0.51
1:A:676:ILE:HD11	1:A:797:LEU:HD11	1.92	0.51
1:D:769:LEU:O	1:D:773:VAL:HG23	2.11	0.51
1:A:737:TYR:CE2	1:A:752:LEU:HD11	2.46	0.50
1:D:838:LYS:HG2	1:D:1001:TYR:CE1	2.46	0.50
1:A:838:LYS:HG2	1:A:1001:TYR:CE1	2.46	0.50
1:A:696:MET:HB2	1:A:741:PRO:HG2	1.92	0.50
1:B:780:GLY:HA2	1:C:780:GLY:HA2	1.94	0.50
1:D:676:ILE:HD11	1:D:797:LEU:HD11	1.92	0.50
1:B:696:MET:HB2	1:B:741:PRO:HG2	1.93	0.50
1:B:821:THR:HB	1:B:900:MET:HA	1.94	0.50
1:A:809:GLU:O	1:A:813:ILE:HG12	2.12	0.49
1:A:834:ILE:HD11	1:A:1006:LYS:HB2	1.94	0.49
1:C:769:LEU:O	1:C:773:VAL:HG23	2.13	0.49
1:A:737:TYR:CZ	1:A:752:LEU:HD11	2.48	0.49
1:C:928:ASN:HB3	1:C:945:LYS:HA	1.95	0.49
1:B:921:LEU:HB2	1:B:1001:TYR:HB2	1.94	0.49
1:C:921:LEU:HB2	1:C:1001:TYR:HB2	1.94	0.48
1:A:821:THR:HB	1:A:900:MET:HA	1.95	0.48
1:A:847:ARG:NH1	1:A:994:ILE:HD12	2.28	0.48
1:B:697:PRO:HD2	1:B:700:LYS:HB2	1.95	0.48
1:C:957:ASP:HA	1:C:975:ILE:HG12	1.96	0.48
1:A:752:LEU:HD12	1:A:752:LEU:N	2.29	0.48
1:D:957:ASP:HA	1:D:975:ILE:HG12	1.96	0.48
1:A:957:ASP:HA	1:A:975:ILE:HG12	1.94	0.48
1:B:957:ASP:HA	1:B:975:ILE:HG12	1.95	0.48
1:B:834:ILE:HD11	1:B:1006:LYS:HB2	1.95	0.47
1:C:851:PHE:CD1	1:C:996:GLN:HG2	2.49	0.47
1:D:834:ILE:HD11	1:D:1006:LYS:HB2	1.95	0.47
1:B:847:ARG:NH1	1:B:994:ILE:HD12	2.29	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:851:PHE:CD1	1:B:996:GLN:HG2	2.50	0.47
1:D:921:LEU:HB2	1:D:1001:TYR:HB2	1.95	0.47
1:A:928:ASN:HB3	1:A:945:LYS:HA	1.97	0.47
1:C:821:THR:HB	1:C:900:MET:HA	1.97	0.47
1:C:834:ILE:HD11	1:C:1006:LYS:HB2	1.95	0.47
1:D:928:ASN:HB3	1:D:945:LYS:HA	1.95	0.47
1:C:941:LEU:HD11	1:C:948:VAL:HG23	1.97	0.47
1:D:962:ILE:HG22	1:D:969:VAL:HB	1.97	0.47
1:B:769:LEU:O	1:B:773:VAL:HG23	2.15	0.47
1:D:851:PHE:CD1	1:D:996:GLN:HG2	2.49	0.47
1:A:921:LEU:HB2	1:A:1001:TYR:HB2	1.95	0.47
1:B:928:ASN:HB3	1:B:945:LYS:HA	1.97	0.47
1:D:941:LEU:HD11	1:D:948:VAL:HG23	1.96	0.46
1:A:941:LEU:HD11	1:A:948:VAL:HG23	1.97	0.46
1:A:962:ILE:HG22	1:A:969:VAL:HB	1.98	0.46
1:B:962:ILE:HG22	1:B:969:VAL:HB	1.98	0.46
1:A:911:SER:HB2	1:B:748:LYS:NZ	2.30	0.46
1:D:697:PRO:HD2	1:D:700:LYS:HB2	1.98	0.45
1:B:938:ILE:HG21	1:B:941:LEU:HD12	1.98	0.45
1:D:702:SER:HB2	2:D:1101:SO4:O3	2.15	0.45
1:D:821:THR:HB	1:D:900:MET:HA	1.98	0.45
1:B:838:LYS:HG2	1:B:1001:TYR:CE2	2.52	0.45
1:B:668:PRO:HG2	1:B:803:VAL:HG21	1.99	0.44
1:C:962:ILE:HG22	1:C:969:VAL:HB	1.98	0.44
1:C:697:PRO:HD2	1:C:700:LYS:HB2	1.98	0.44
1:A:697:PRO:HD2	1:A:700:LYS:HB2	2.00	0.44
1:C:847:ARG:NH1	1:C:994:ILE:HD12	2.32	0.44
1:B:941:LEU:HD11	1:B:948:VAL:HG23	2.00	0.44
1:A:752:LEU:N	1:A:752:LEU:CD1	2.81	0.44
1:A:668:PRO:HG2	1:A:803:VAL:HG21	2.00	0.43
1:D:668:PRO:HG2	1:D:803:VAL:HG21	2.01	0.43
1:B:676:ILE:HD12	1:B:870:ALA:HA	2.02	0.42
1:D:847:ARG:NH1	1:D:994:ILE:HD12	2.34	0.42
1:A:814:ILE:O	1:A:818:VAL:HG23	2.20	0.42
1:C:668:PRO:HG2	1:C:803:VAL:HG21	2.02	0.42
1:A:763:GLU:HG3	3:A:1103:RPB:H191	2.02	0.42
1:C:814:ILE:O	1:C:818:VAL:HG23	2.19	0.42
1:B:689:TYR:O	1:B:690:GLU:HB2	2.20	0.41
1:D:814:ILE:O	1:D:818:VAL:HG23	2.19	0.41
1:A:827:ASN:ND2	1:B:727:SER:HB3	2.36	0.41
1:A:924:VAL:HG23	1:A:997:VAL:HG22	2.01	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:708:ALA:HB3	1:A:739:LEU:HD21	2.02	0.41
1:A:889:TYR:HB3	1:A:892:GLY:O	2.20	0.41
1:B:706:ILE:HG23	1:B:765:LEU:HD22	2.02	0.41
1:A:737:TYR:OH	1:A:750:PRO:HG2	2.21	0.41
1:C:924:VAL:HG23	1:C:997:VAL:HG22	2.03	0.41
1:B:889:TYR:HB3	1:B:892:GLY:O	2.21	0.41
1:A:744:PHE:CZ	1:A:750:PRO:HD2	2.56	0.41
1:D:777:LEU:HD22	1:D:796:LYS:HB3	2.03	0.41
1:A:938:ILE:HG21	1:A:941:LEU:HD12	2.01	0.41
1:D:708:ALA:HB3	1:D:739:LEU:HD21	2.03	0.41
1:B:708:ALA:HB3	1:B:739:LEU:HD21	2.03	0.41
1:D:689:TYR:O	1:D:690:GLU:HB2	2.20	0.41
1:A:754:ASN:ND2	1:A:757:SER:H	2.19	0.40
1:B:814:ILE:O	1:B:818:VAL:HG23	2.21	0.40
1:C:889:TYR:HB3	1:C:892:GLY:O	2.21	0.40
1:A:737:TYR:CE2	1:A:752:LEU:CD1	3.04	0.40
1:A:676:ILE:HD12	1:A:870:ALA:HA	2.02	0.40
1:C:708:ALA:HB3	1:C:739:LEU:HD21	2.03	0.40

There are no symmetry-related clashes.

5.3 Torsion angles ⓘ

5.3.1 Protein backbone ⓘ

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	343/352 (97%)	330 (96%)	13 (4%)	0	100	100
1	B	347/352 (99%)	332 (96%)	15 (4%)	0	100	100
1	C	343/352 (97%)	329 (96%)	14 (4%)	0	100	100
1	D	347/352 (99%)	332 (96%)	15 (4%)	0	100	100
All	All	1380/1408 (98%)	1323 (96%)	57 (4%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains ⓘ

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	304/309 (98%)	280 (92%)	24 (8%)	12	43
1	B	306/309 (99%)	281 (92%)	25 (8%)	11	41
1	C	304/309 (98%)	279 (92%)	25 (8%)	11	41
1	D	306/309 (99%)	281 (92%)	25 (8%)	11	41
All	All	1220/1236 (99%)	1121 (92%)	99 (8%)	11	42

All (99) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	662	LYS
1	A	667	LYS
1	A	680	GLU
1	A	698	LEU
1	A	704	ARG
1	A	718	GLN
1	A	728	GLN
1	A	731	ASP
1	A	739	LEU
1	A	747	LYS
1	A	751	LEU
1	A	752	LEU
1	A	758	VAL
1	A	783	ASP
1	A	786	SER
1	A	812	GLU
1	A	853	GLN
1	A	864	SER
1	A	878	ARG
1	A	912	GLN
1	A	962	ILE
1	A	975	ILE
1	A	981	ASP
1	A	984	LEU

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Mol	Chain	Res	Type
1	B	662	LYS
1	B	698	LEU
1	B	718	GLN
1	B	728	GLN
1	B	739	LEU
1	B	746	MET
1	B	747	LYS
1	B	751	LEU
1	B	758	VAL
1	B	769	LEU
1	B	779	ARG
1	B	783	ASP
1	B	806	ARG
1	B	812	GLU
1	B	846	GLN
1	B	853	GLN
1	B	864	SER
1	B	878	ARG
1	B	912	GLN
1	B	939	SER
1	B	962	ILE
1	B	964	LEU
1	B	975	ILE
1	B	981	ASP
1	B	984	LEU
1	C	698	LEU
1	C	718	GLN
1	C	728	GLN
1	C	731	ASP
1	C	739	LEU
1	C	746	MET
1	C	747	LYS
1	C	751	LEU
1	C	758	VAL
1	C	777	LEU
1	C	778	LEU
1	C	805	ASP
1	C	812	GLU
1	C	819	LYS
1	C	827	ASN
1	C	845	CYS
1	C	853	GLN

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Mol	Chain	Res	Type
1	C	864	SER
1	C	878	ARG
1	C	961	ASN
1	C	962	ILE
1	C	965	ASP
1	C	975	ILE
1	C	981	ASP
1	C	984	LEU
1	D	698	LEU
1	D	704	ARG
1	D	728	GLN
1	D	731	ASP
1	D	739	LEU
1	D	746	MET
1	D	747	LYS
1	D	751	LEU
1	D	758	VAL
1	D	769	LEU
1	D	777	LEU
1	D	783	ASP
1	D	805	ASP
1	D	807	ASP
1	D	812	GLU
1	D	853	GLN
1	D	864	SER
1	D	878	ARG
1	D	912	GLN
1	D	961	ASN
1	D	962	ILE
1	D	965	ASP
1	D	975	ILE
1	D	981	ASP
1	D	984	LEU

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	705	GLN
1	A	906	ASN
1	B	705	GLN
1	C	705	GLN
1	D	705	GLN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains ⓘ

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

5.5 Carbohydrates ⓘ

There are no monosaccharides in this entry.

5.6 Ligand geometry ⓘ

8 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	SO4	A	1102	-	4,4,4	0.15	0	6,6,6	0.24	0
3	RPB	A	1103	-	25,27,27	5.86	10 (40%)	28,39,39	2.57	6 (21%)
2	SO4	B	1102	-	4,4,4	0.28	0	6,6,6	0.38	0
2	SO4	D	1101	-	4,4,4	0.35	0	6,6,6	0.37	0
2	SO4	C	1101	-	4,4,4	0.25	0	6,6,6	0.40	0
2	SO4	B	1101	-	4,4,4	0.40	0	6,6,6	0.53	0
2	SO4	A	1101	-	4,4,4	0.34	0	6,6,6	0.97	0
3	RPB	B	1103	-	25,27,27	6.28	11 (44%)	28,39,39	2.39	6 (21%)

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
3	RPB	A	1103	-	-	2/6/17/17	0/3/4/4

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	RPB	B	1103	-	-	2/6/17/17	0/3/4/4

All (21) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	B	1103	RPB	C9-C10	-15.71	1.36	1.51
3	B	1103	RPB	F1-C2	-15.53	0.98	1.36
3	A	1103	RPB	C9-C10	-14.97	1.37	1.51
3	B	1103	RPB	C12-C11	-14.19	1.32	1.49
3	A	1103	RPB	C12-C11	-13.39	1.33	1.49
3	A	1103	RPB	F1-C2	-12.99	1.04	1.36
3	A	1103	RPB	C4-C7	-12.88	1.37	1.49
3	B	1103	RPB	C4-C7	-12.51	1.38	1.49
3	B	1103	RPB	C1-C6	-7.11	1.30	1.41
3	A	1103	RPB	C1-C6	-6.37	1.31	1.41
3	B	1103	RPB	C18-C16	-5.72	1.39	1.51
3	A	1103	RPB	C18-C16	-5.65	1.39	1.51
3	B	1103	RPB	C4-C5	-4.67	1.32	1.41
3	A	1103	RPB	C4-C5	-4.47	1.32	1.41
3	B	1103	RPB	C11-N2	-3.50	1.30	1.37
3	A	1103	RPB	C11-N2	-3.18	1.31	1.37
3	B	1103	RPB	C10-C5	-2.76	1.32	1.40
3	A	1103	RPB	C10-C5	-2.51	1.33	1.40
3	B	1103	RPB	C6-N2	-2.39	1.31	1.38
3	A	1103	RPB	C6-N2	-2.29	1.31	1.38
3	B	1103	RPB	C7-N1	2.26	1.36	1.33

All (12) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	B	1103	RPB	O1-C7-N1	-8.45	113.26	122.18
3	A	1103	RPB	O1-C7-N1	-8.35	113.37	122.18
3	A	1103	RPB	C1-C2-C3	-6.97	118.59	124.09
3	B	1103	RPB	C1-C2-C3	-5.69	119.59	124.09
3	B	1103	RPB	O1-C7-C4	3.81	123.53	119.56
3	A	1103	RPB	O1-C7-C4	3.52	123.23	119.56
3	A	1103	RPB	C14-C12-C11	3.41	126.00	120.61
3	A	1103	RPB	C13-C12-C11	-3.27	115.42	120.61
3	B	1103	RPB	C13-C12-C11	-3.08	115.73	120.61
3	B	1103	RPB	C14-C12-C11	2.40	124.41	120.61
3	B	1103	RPB	C8-N1-C7	2.15	129.84	125.34
3	A	1103	RPB	C18-C16-C17	-2.01	116.74	120.91

There are no chirality outliers.
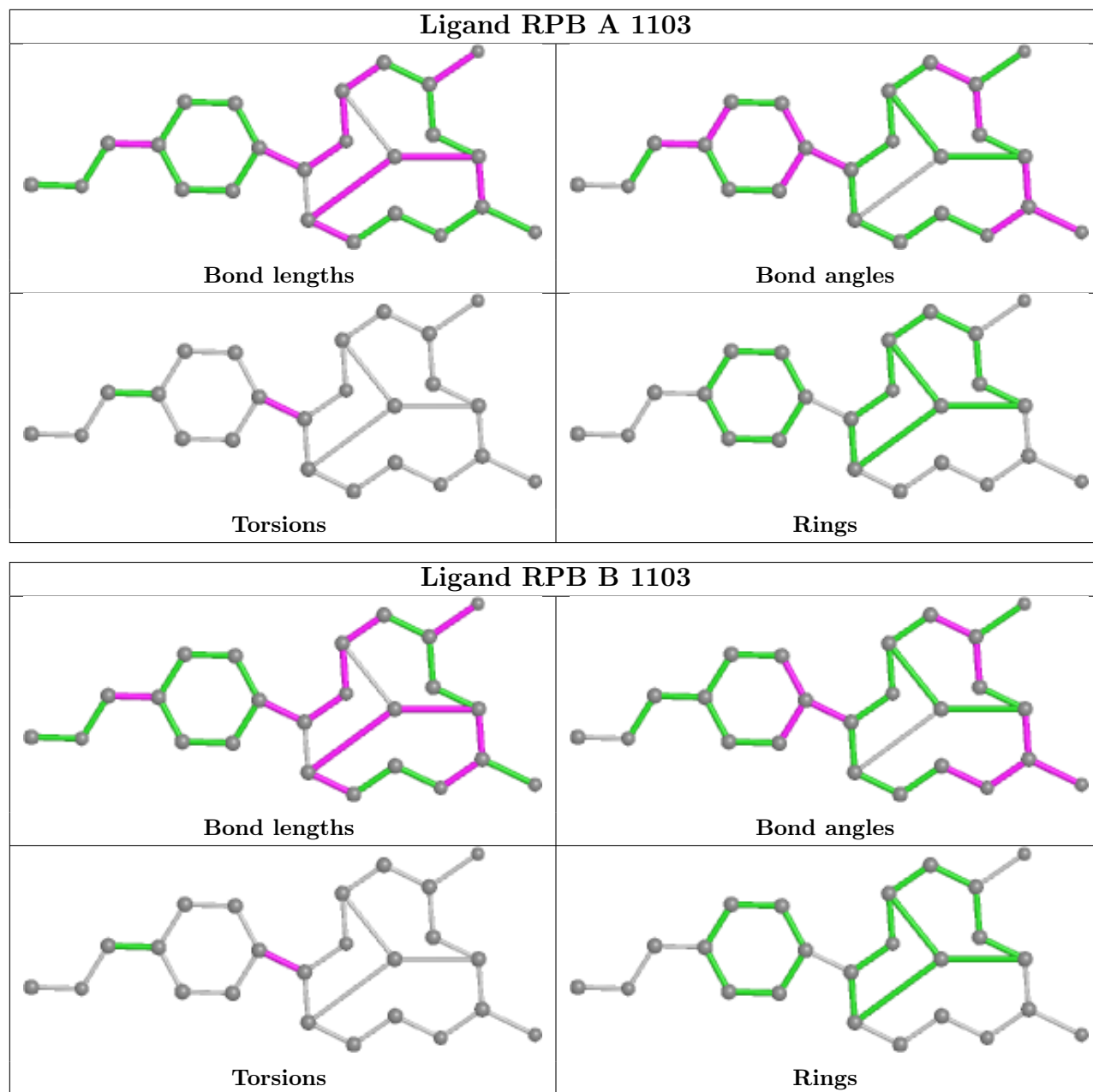
All (4) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	1103	RPB	C10-C11-C12-C14
3	A	1103	RPB	C10-C11-C12-C13
3	B	1103	RPB	C10-C11-C12-C14
3	B	1103	RPB	C10-C11-C12-C13

There are no ring outliers.

3 monomers are involved in 8 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	1103	RPB	4	0
2	D	1101	SO4	1	0
3	B	1103	RPB	3	0

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less then 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

Ligand RPB A 1103

Ligand RPB B 1103

5.7 Other polymers ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues ⓘ

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	347/352 (98%)	-0.21	4 (1%)	79	67	31, 64, 106, 144	0
1	B	349/352 (99%)	-0.18	3 (0%)	84	75	33, 71, 113, 147	0
1	C	347/352 (98%)	-0.00	14 (4%)	38	25	42, 85, 147, 169	0
1	D	349/352 (99%)	0.09	14 (4%)	38	25	40, 93, 158, 179	0
All	All	1392/1408 (98%)	-0.08	35 (2%)	57	43	31, 77, 144, 179	0

All (35) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	D	951	LEU	5.9
1	D	980	ASN	5.2
1	D	933	LYS	5.0
1	C	825	THR	4.4
1	C	826	HIS	4.2
1	D	826	HIS	3.5
1	D	979	VAL	3.4
1	D	785	SER	3.2
1	C	951	LEU	3.0
1	D	954	THR	3.0
1	B	746	MET	2.9
1	A	930	TYR	2.9
1	C	933	LYS	2.8
1	D	952	GLY	2.7
1	D	953	LYS	2.6
1	C	980	ASN	2.6
1	C	979	VAL	2.6
1	C	935	ALA	2.3
1	B	855	HIS	2.3
1	C	917	GLY	2.3
1	C	953	LYS	2.3

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Mol	Chain	Res	Type	RSRZ
1	D	855	HIS	2.3
1	C	982	THR	2.2
1	A	979	VAL	2.2
1	D	931	GLU	2.2
1	D	982	THR	2.2
1	C	823	ALA	2.2
1	C	934	HIS	2.1
1	A	746	MET	2.1
1	D	825	THR	2.1
1	C	824	THR	2.1
1	C	930	TYR	2.1
1	D	930	TYR	2.1
1	A	951	LEU	2.1
1	B	748	LYS	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 ⓘ

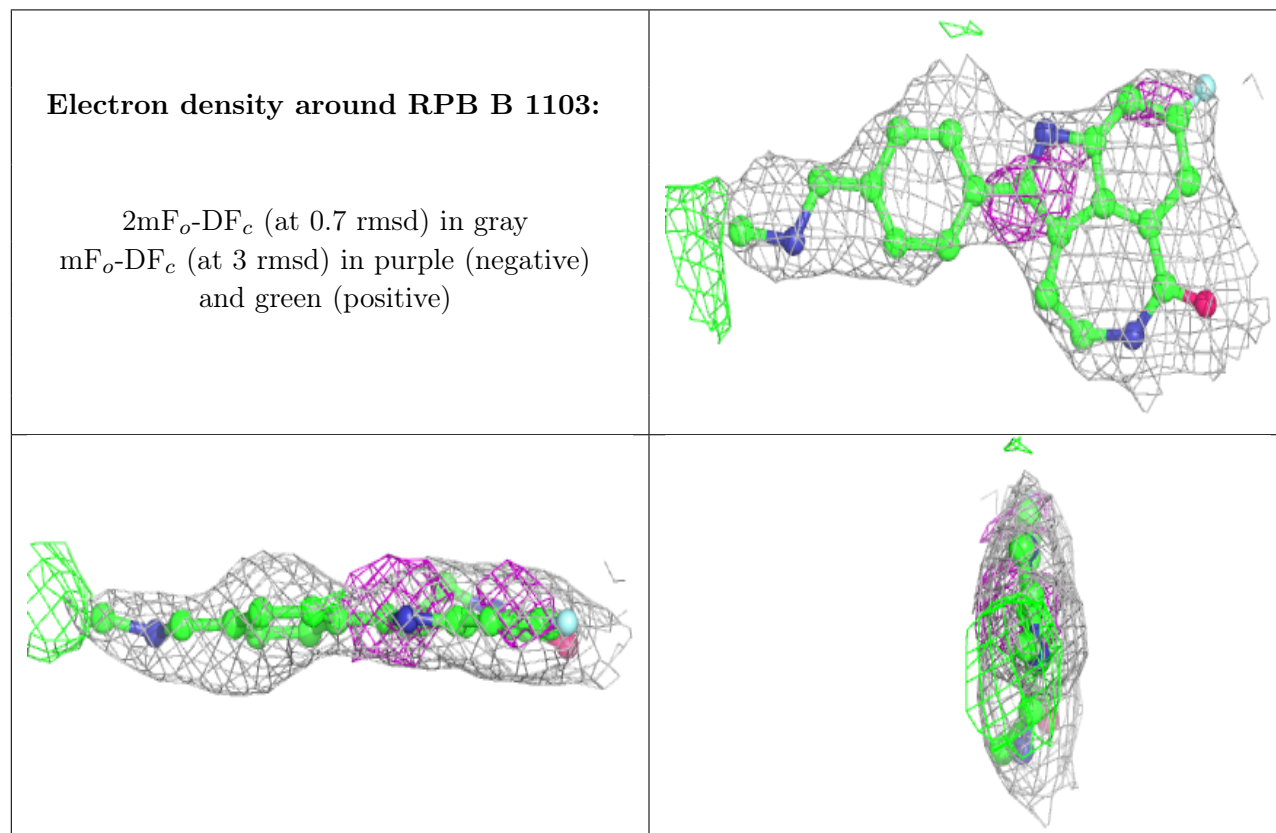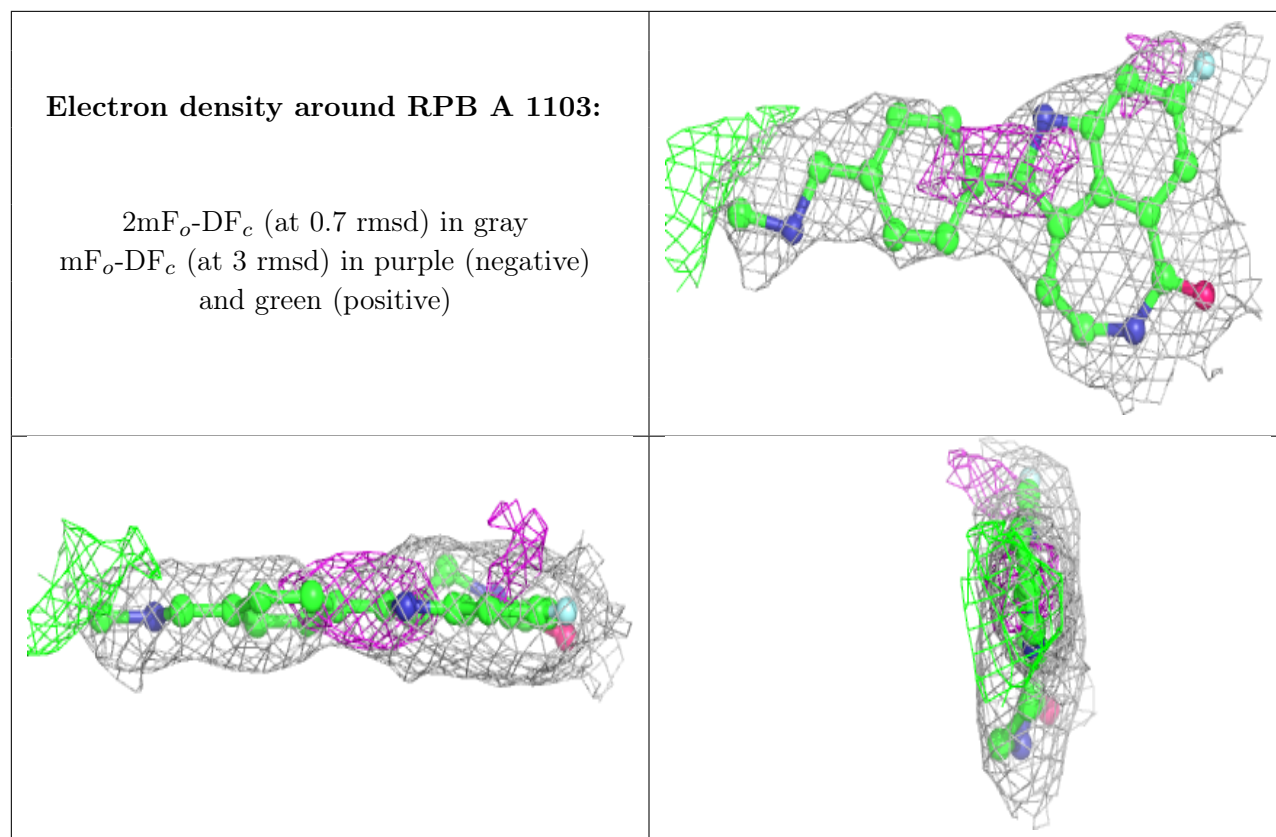There are no monosaccharides in this entry.

6.4 Ligands ⓘ

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	SO4	B	1102	5/5	0.87	0.21	95,97,100,103	0
3	RPB	B	1103	24/24	0.88	0.29	67,84,87,88	0
3	RPB	A	1103	24/24	0.90	0.26	57,66,74,74	0
2	SO4	A	1102	5/5	0.92	0.17	97,99,99,99	0
2	SO4	A	1101	5/5	0.97	0.19	50,51,55,62	0
2	SO4	B	1101	5/5	0.98	0.20	54,57,62,62	0
2	SO4	C	1101	5/5	0.99	0.21	51,52,54,56	0
2	SO4	D	1101	5/5	0.99	0.21	39,42,48,50	0

The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation to approximate a three-dimensional view.

Electron density around RPB B 1103:

$2mF_o\text{-}DF_c$ (at 0.7 rmsd) in gray
$mF_o\text{-}DF_c$ (at 3 rmsd) in purple (negative)
and green (positive)

Electron density around RPB A 1103:

$2mF_o-DF_c$ (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)

6.5 Other polymers ⓘ

There are no such residues in this entry.