



Full wwPDB X-ray Structure Validation Report ⓘ

Feb 1, 2016 – 03:55 PM GMT

PDB ID : 4DVL
Title : Crystal structure of the glycoprotein Erns from the pestivirus BVDV-1 in complex with 2'-3'-cyclo-UMP
Authors : Krey, T.; Bontems, F.; Vonnrhein, C.; Vaney, M.-C.; Bricogne, G.; Ruemenapf, T.; Rey, F.A.
Deposited on : 2012-02-23
Resolution : 2.75 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 : 1.7 (RC4), CSD as536be (2015)
Xtriage (Phenix) : 1.9-1692
EDS : rb-20026688
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) : trunk26865

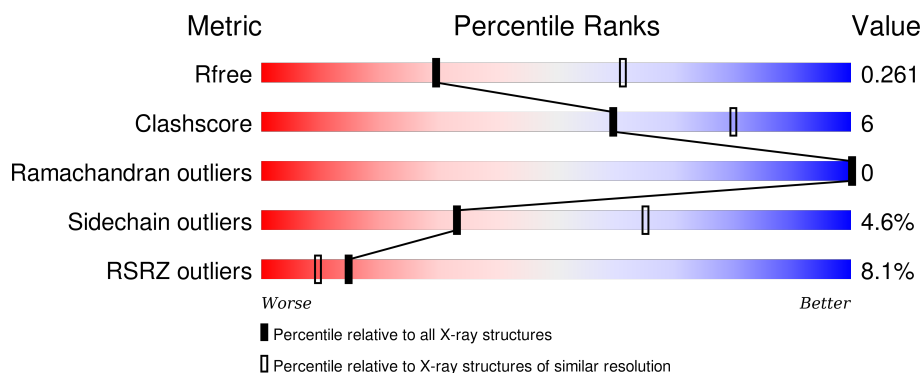
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.75 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	3340 (2.80-2.72)
Clashscore	102246	3829 (2.80-2.72)
Ramachandran outliers	100387	3767 (2.80-2.72)
Sidechain outliers	100360	3770 (2.80-2.72)
RSRZ outliers	91569	3352 (2.80-2.72)

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	167	
1	B	167	

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
3	NAG	B	1111	-	-	-	X
4	NAG	A	1108	-	-	-	X
6	SO4	A	1115	-	X	-	-
6	SO4	A	1116	-	X	-	-
6	SO4	B	1112	-	X	-	-
6	SO4	B	1113	-	X	-	-

2 Entry composition

There are 10 unique types of molecules in this entry. The entry contains 3012 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 E(rns) glycoprotein.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	161	Total	C	N	O	S	0	6	0
			1300	809	234	239	18			
1	B	161	Total	C	N	O	S	0	6	0
			1300	809	234	239	18			

There are 4 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	1	ARG	-	EXPRESSION TAG	UNP Q96662
A	2	SER	-	EXPRESSION TAG	UNP Q96662
B	1	ARG	-	EXPRESSION TAG	UNP Q96662
B	2	SER	-	EXPRESSION TAG	UNP Q96662

- Molecule 2 is a polymer of unknown type called SUGAR (5-MER).

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
2	A	5	Total	C	N	O	0	0
			61	34	2	25		

- Molecule 3 is SUGAR (N-ACETYL-D-GLUCOSAMINE) (three-letter code: NAG) (formula: $C_8H_{15}NO_6$).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
3	A	1	Total	C	N	O	0	0
			14	8	1	5		
3	A	1	Total	C	N	O	0	0
			14	8	1	5		
3	B	1	Total	C	N	O	0	0
			14	8	1	5		
3	B	1	Total	C	N	O	0	0
			14	8	1	5		
3	B	1	Total	C	N	O	0	0
			14	8	1	5		

- Molecule 4 is a polymer of unknown type called SUGAR (3-MER).

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
4	A	3	Total	C	N	O	0	0
			39	22	2	15		

- Molecule 5 is a polymer of unknown type called SUGAR (4-MER).

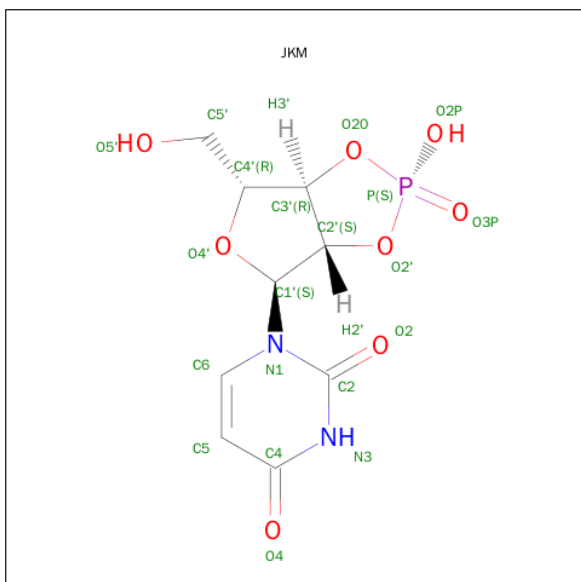
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
5	A	4	Total	C	N	O	0	0
			50	28	2	20		

- Molecule 6 is SULFATE ION (three-letter code: SO4) (formula: O₄S).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
6	A	1	Total	O	S	0	0
			5	4	1		
6	A	1	Total	O	S	0	0
			5	4	1		
6	B	1	Total	O	S	0	0
			5	4	1		
6	B	1	Total	O	S	0	0
			5	4	1		

- Molecule 7 is 1-[(2S,3AS,4S,6R,6AR)-2-HYDROXY-6-(HYDROXYMETHYL)-2-OXIDOTETRAHYDROFURO[3,4-D][1,3,2]DIOXAPHOSPHOL-4-YL]PYRIMIDINE-2,4(1H,3H)-DIONE (three-letter code: JKM) (formula: C₉H₁₁N₂O₈P).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
7	A	1	Total	C	N	O	P	0	0
			20	9	2	8	1		
7	B	1	Total	C	N	O	P	0	0
			20	9	2	8	1		

- Molecule 8 is a polymer of unknown type called SUGAR (6-MER).

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
8	B	6	Total	C	N	O	0	0
			72	40	2	30		

- Molecule 9 is a polymer of unknown type called SUGAR (2-MER).

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
9	B	2	Total	C	N	O	0	0
			28	16	2	10		

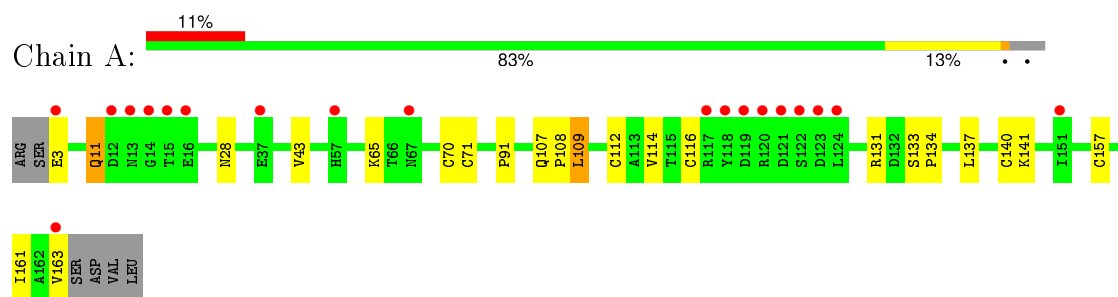
- Molecule 10 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
10	A	23	Total	O	0	0
			23	23		
10	B	9	Total	O	0	0
			9	9		

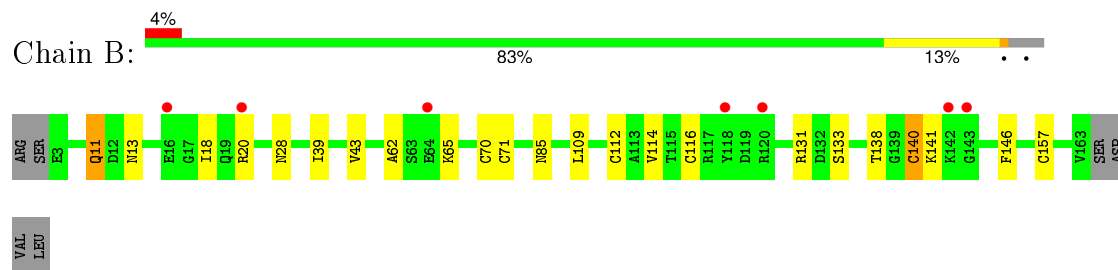
3 Residue-property plots [i](#)

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: E(rns) glycoprotein



- Molecule 1: E(rns) glycoprotein



4 Data and refinement statistics

Property	Value	Source
Space group	P 2 ₁ 2 ₁ 2	Depositor
Cell constants a, b, c, α , β , γ	70.52Å 105.93Å 63.41Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	35.26 – 2.75 35.26 – 2.75	Depositor EDS
% Data completeness (in resolution range)	90.5 (35.26-2.75) 91.0 (35.26-2.75)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.49 (at 2.76Å)	Xtriage
Refinement program	BUSTER 2.9.2	Depositor
R, R_{free}	0.197 , 0.249 0.212 , 0.261	Depositor DCC
R_{free} test set	960 reflections (8.97%)	DCC
Wilson B-factor (Å ²)	53.9	Xtriage
Anisotropy	0.768	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.38 , 61.6	EDS
Estimated twinning fraction	No twinning to report.	Xtriage
L-test for twinning ²	$\langle L \rangle = 0.47$, $\langle L^2 \rangle = 0.31$	Xtriage
Outliers	0 of 11659 reflections	Xtriage
F_o, F_c correlation	0.93	EDS
Total number of atoms	3012	wwPDB-VP
Average B, all atoms (Å ²)	62.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 7.28% of the height of the origin peak. No significant pseudotranslation is detected.*

¹ Intensities estimated from amplitudes.

² Theoretical values of $\langle |L| \rangle$, $\langle L^2 \rangle$ for acentric reflections are 0.5, 0.375 respectively for untwinned datasets, and 0.333, 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: MAN, JKM, BMA, NAG, 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	0.46	0/1348	0.68	0/1828
1	B	0.47	0/1348	0.67	0/1828
All	All	0.46	0/2696	0.67	0/3656

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	1300	0	1254	17	0
1	B	1300	0	1253	16	0
2	A	61	0	52	1	0
3	A	28	0	26	1	0
3	B	42	0	39	0	0
4	A	39	0	34	0	0
5	A	50	0	43	0	0
6	A	10	0	0	0	0
6	B	10	0	0	0	0
7	A	20	0	10	0	0
7	B	20	0	10	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
8	B	72	0	61	1	0
9	B	28	0	25	0	0
10	A	23	0	0	0	0
10	B	9	0	0	0	0
All	All	3012	0	2807	31	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 (31) 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:70[B]:CYS:HB2	1:B:71[B]:CYS:SG	1.84	1.15
1:A:70[B]:CYS:HB3	1:A:71[B]:CYS:SG	1.92	1.08
1:A:116[B]:CYS:HG	1:A:140[B]:CYS:HG	1.20	0.82
1:B:116[B]:CYS:HG	1:B:140[B]:CYS:HG	1.15	0.81
1:A:137:LEU:HB3	1:A:140[A]:CYS:SG	2.32	0.70
1:A:70[B]:CYS:CB	1:A:71[B]:CYS:SG	2.77	0.67
1:B:112[B]:CYS:HB3	1:B:157[B]:CYS:SG	2.40	0.62
1:A:116[B]:CYS:HB2	1:A:140[B]:CYS:SG	2.41	0.61
1:A:91:PRO:HG3	2:A:1105:MAN:H62	1.83	0.60
1:B:116[B]:CYS:HB2	1:B:140[B]:CYS:SG	2.42	0.59
1:A:112[B]:CYS:HB3	1:A:157[B]:CYS:SG	2.42	0.59
1:B:140[A]:CYS:SG	1:B:146:PHE:CE1	2.98	0.57
1:A:141:LYS:HE2	1:B:138:THR:HG23	1.89	0.54
1:B:11:GLN:HG2	1:B:28:ASN:HA	1.91	0.52
1:A:11:GLN:HG2	1:A:28:ASN:HA	1.90	0.52
1:A:116[B]:CYS:CB	1:A:140[B]:CYS:SG	2.98	0.52
1:B:116[B]:CYS:CB	1:B:140[B]:CYS:SG	2.99	0.51
1:A:65:LYS:HD3	1:A:65:LYS:H	1.75	0.51
1:B:65:LYS:H	1:B:65:LYS:HD3	1.75	0.51
1:A:28:ASN:HD22	3:A:1106:NAG:H83	1.77	0.50
1:A:134:PRO:HB2	1:B:39:ILE:HB	1.94	0.50
1:B:116[B]:CYS:CB	1:B:140[B]:CYS:HG	2.26	0.48
1:B:13:ASN:O	1:B:20:ARG:HD3	2.16	0.46
1:A:70[B]:CYS:CB	1:A:71[B]:CYS:HG	2.26	0.43
1:B:140[A]:CYS:SG	1:B:146:PHE:HE1	2.39	0.42
1:B:114:VAL:CG2	1:B:131:ARG:HG2	2.49	0.42
1:A:114:VAL:CG2	1:A:131:ARG:HG2	2.49	0.42
1:A:109:LEU:HD12	1:A:109:LEU:HA	1.93	0.41
1:A:107:GLN:HA	1:A:108:PRO:HD3	1.95	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:85:ASN:HB3	8:B:1101:NAG:C6	2.51	0.40
1:B:18:ILE:HB	1:B:62:ALA:HA	2.03	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	165/167 (99%)	158 (96%)	7 (4%)	0	100	100
1	B	165/167 (99%)	159 (96%)	6 (4%)	0	100	100
All	All	330/334 (99%)	317 (96%)	13 (4%)	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	146/146 (100%)	139 (95%)	7 (5%)	31	63
1	B	146/146 (100%)	139 (95%)	7 (5%)	31	63
All	All	292/292 (100%)	278 (95%)	14 (5%)	33	63

All (14) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	3	GLU
1	A	11	GLN
1	A	43	VAL
1	A	109	LEU
1	A	133	SER
1	A	161	ILE
1	A	163	VAL
1	B	11	GLN
1	B	43	VAL
1	B	109	LEU
1	B	133	SER
1	B	140[A]	CYS
1	B	140[B]	CYS
1	B	141	LYS

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (2) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	88	ASN
1	B	57	HIS

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](#)

20 carbohydrates 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	NAG	A	1101	1,2	14,14,15	1.33	2 (14%)	15,19,21	2.30	7 (46%)
2	NAG	A	1102	2	14,14,15	1.02	1 (7%)	15,19,21	1.24	2 (13%)
2	BMA	A	1103	2	11,11,12	0.89	0	14,15,17	1.92	4 (28%)
2	BMA	A	1104	2	11,11,12	2.01	5 (45%)	14,15,17	2.16	4 (28%)
2	MAN	A	1105	2	11,11,12	1.76	4 (36%)	14,15,17	2.65	4 (28%)
4	NAG	A	1108	1,4	14,14,15	1.50	3 (21%)	15,19,21	2.35	5 (33%)
4	NAG	A	1109	4	14,14,15	2.56	8 (57%)	15,19,21	2.94	5 (33%)
4	MAN	A	1110	4	11,11,12	1.98	3 (27%)	14,15,17	3.12	7 (50%)
5	NAG	A	1111	1,5	14,14,15	1.01	0	15,19,21	1.34	3 (20%)
5	NAG	A	1112	5	14,14,15	1.08	1 (7%)	15,19,21	2.73	5 (33%)
5	BMA	A	1113	5	11,11,12	0.75	0	14,15,17	1.77	3 (21%)
5	MAN	A	1114	5	11,11,12	1.44	1 (9%)	14,15,17	3.11	8 (57%)
8	NAG	B	1101	1,8	14,14,15	0.99	0	15,19,21	1.73	4 (26%)
8	NAG	B	1102	8	14,14,15	0.90	0	15,19,21	1.82	3 (20%)
8	BMA	B	1103	8	11,11,12	1.38	2 (18%)	14,15,17	2.59	5 (35%)
8	MAN	B	1104	8	11,11,12	1.76	4 (36%)	14,15,17	2.54	7 (50%)
8	MAN	B	1105	8	11,11,12	1.00	0	14,15,17	1.99	3 (21%)
8	BMA	B	1106	8	11,11,12	1.87	4 (36%)	14,15,17	2.56	6 (42%)
9	NAG	B	1107	9,1	14,14,15	1.59	3 (21%)	15,19,21	3.59	8 (53%)
9	NAG	B	1108	9	14,14,15	1.73	1 (7%)	15,19,21	2.23	3 (20%)

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	NAG	A	1101	1,2	-	0/6/23/26	0/1/1/1
2	NAG	A	1102	2	-	0/6/23/26	0/1/1/1
2	BMA	A	1103	2	-	0/2/19/22	0/1/1/1
2	BMA	A	1104	2	-	0/2/19/22	1/1/1/1
2	MAN	A	1105	2	-	0/2/19/22	0/1/1/1
4	NAG	A	1108	1,4	-	0/6/23/26	0/1/1/1
4	NAG	A	1109	4	-	0/6/23/26	0/1/1/1
4	MAN	A	1110	4	-	0/2/19/22	1/1/1/1
5	NAG	A	1111	1,5	-	0/6/23/26	0/1/1/1
5	NAG	A	1112	5	-	0/6/23/26	0/1/1/1
5	BMA	A	1113	5	-	0/2/19/22	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
5	MAN	A	1114	5	-	0/2/19/22	0/1/1/1
8	NAG	B	1101	1,8	-	0/6/23/26	0/1/1/1
8	NAG	B	1102	8	-	0/6/23/26	0/1/1/1
8	BMA	B	1103	8	-	0/2/19/22	0/1/1/1
8	MAN	B	1104	8	-	0/2/19/22	0/1/1/1
8	MAN	B	1105	8	-	0/2/19/22	0/1/1/1
8	BMA	B	1106	8	-	0/2/19/22	0/1/1/1
9	NAG	B	1107	9,1	-	0/6/23/26	0/1/1/1
9	NAG	B	1108	9	-	0/6/23/26	0/1/1/1

All (42) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	A	1110	MAN	O3-C3	2.00	1.47	1.43
2	A	1102	NAG	C1-C2	2.01	1.55	1.52
4	A	1108	NAG	O4-C4	2.02	1.47	1.43
2	A	1101	NAG	O5-C5	2.04	1.47	1.43
2	A	1105	MAN	O3-C3	2.04	1.47	1.43
4	A	1109	NAG	C2-N2	2.09	1.50	1.46
2	A	1104	BMA	C4-C5	2.11	1.57	1.53
8	B	1106	BMA	O5-C1	2.12	1.47	1.43
8	B	1106	BMA	O4-C4	2.16	1.48	1.43
4	A	1108	NAG	C1-C2	2.16	1.55	1.52
2	A	1104	BMA	O2-C2	2.19	1.48	1.43
8	B	1103	BMA	C4-C3	2.28	1.58	1.52
8	B	1104	MAN	C2-C3	2.29	1.55	1.52
5	A	1112	NAG	C1-C2	2.35	1.55	1.52
9	B	1107	NAG	O5-C5	2.37	1.48	1.43
8	B	1104	MAN	C4-C3	2.38	1.58	1.52
4	A	1109	NAG	C4-C3	2.49	1.58	1.52
4	A	1109	NAG	O4-C4	2.51	1.49	1.43
8	B	1106	BMA	O5-C5	2.54	1.49	1.43
4	A	1110	MAN	O2-C2	2.55	1.49	1.43
4	A	1109	NAG	C7-N2	2.60	1.44	1.34
2	A	1101	NAG	O7-C7	2.60	1.29	1.23
2	A	1104	BMA	O5-C1	2.61	1.48	1.43
2	A	1105	MAN	O2-C2	2.61	1.49	1.43
8	B	1103	BMA	C4-C5	2.62	1.58	1.53
8	B	1104	MAN	O5-C5	2.62	1.49	1.43
2	A	1105	MAN	C4-C3	2.63	1.59	1.52
4	A	1109	NAG	O5-C5	2.67	1.49	1.43
5	A	1114	MAN	O5-C1	2.75	1.48	1.43

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	1104	BMA	O5-C5	2.78	1.49	1.43
8	B	1106	BMA	C4-C5	2.98	1.59	1.53
9	B	1107	NAG	C1-C2	2.98	1.56	1.52
8	B	1104	MAN	O5-C1	3.07	1.48	1.43
4	A	1109	NAG	C3-C2	3.10	1.59	1.52
4	A	1108	NAG	C4-C5	3.17	1.59	1.53
2	A	1105	MAN	C2-C3	3.38	1.57	1.52
9	B	1107	NAG	O5-C1	3.55	1.49	1.43
2	A	1104	BMA	C1-C2	3.63	1.60	1.52
4	A	1109	NAG	O5-C1	4.13	1.50	1.43
9	B	1108	NAG	C1-C2	4.23	1.58	1.52
4	A	1110	MAN	C2-C3	4.64	1.58	1.52
4	A	1109	NAG	C1-C2	4.70	1.59	1.52

All (96) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	A	1110	MAN	C1-C2-C3	-6.14	102.27	109.54
2	A	1105	MAN	C1-C2-C3	-5.31	103.26	109.54
9	B	1107	NAG	C4-C3-C2	-5.03	103.42	111.23
8	B	1104	MAN	C1-C2-C3	-4.69	103.99	109.54
2	A	1103	BMA	C1-C2-C3	-4.60	104.10	109.54
2	A	1101	NAG	C8-C7-N2	-4.04	108.38	116.11
8	B	1103	BMA	C1-C2-C3	-3.99	104.82	109.54
5	A	1112	NAG	O4-C4-C3	-3.97	101.39	110.34
8	B	1101	NAG	C8-C7-N2	-3.88	108.69	116.11
5	A	1112	NAG	O4-C4-C5	-3.74	99.34	109.24
8	B	1102	NAG	C6-C5-C4	-3.70	103.89	113.02
4	A	1110	MAN	O5-C1-C2	-3.41	105.32	110.86
4	A	1108	NAG	C8-C7-N2	-3.30	109.80	116.11
2	A	1101	NAG	C3-C4-C5	-3.14	104.73	110.20
5	A	1114	MAN	C3-C4-C5	-3.09	104.82	110.20
5	A	1112	NAG	C8-C7-N2	-3.03	110.31	116.11
8	B	1103	BMA	O3-C3-C2	-2.91	104.73	110.00
9	B	1107	NAG	C2-N2-C7	-2.88	119.33	123.04
5	A	1114	MAN	C1-C2-C3	-2.82	106.20	109.54
2	A	1103	BMA	O5-C1-C2	-2.65	106.55	110.86
8	B	1104	MAN	C6-C5-C4	-2.43	107.02	113.02
8	B	1106	BMA	O4-C4-C3	-2.41	104.92	110.34
2	A	1101	NAG	O6-C6-C5	-2.37	103.51	111.33
2	A	1101	NAG	C6-C5-C4	-2.36	107.20	113.02
8	B	1105	MAN	O3-C3-C2	-2.35	105.76	110.00

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	A	1113	BMA	C1-C2-C3	-2.23	106.90	109.54
8	B	1101	NAG	O4-C4-C5	-2.17	103.48	109.24
8	B	1101	NAG	C6-C5-C4	-2.17	107.66	113.02
2	A	1102	NAG	O3-C3-C2	-2.17	104.82	109.11
9	B	1107	NAG	C3-C4-C5	-2.11	106.52	110.20
5	A	1111	NAG	C1-O5-C5	-2.04	109.66	112.25
4	A	1108	NAG	O7-C7-C8	2.13	125.97	122.06
8	B	1104	MAN	O4-C4-C5	2.14	114.91	109.24
4	A	1110	MAN	O4-C4-C5	2.22	115.13	109.24
5	A	1111	NAG	C3-C4-C5	2.23	114.08	110.20
2	A	1104	BMA	O3-C3-C4	2.26	115.42	110.34
2	A	1103	BMA	C2-C3-C4	2.27	114.91	111.04
2	A	1102	NAG	C4-C3-C2	2.29	114.78	111.23
8	B	1105	MAN	O3-C3-C4	2.30	115.51	110.34
8	B	1106	BMA	O5-C1-C2	2.37	114.70	110.86
9	B	1108	NAG	O3-C3-C2	2.38	113.83	109.11
8	B	1104	MAN	C3-C4-C5	2.49	114.54	110.20
8	B	1106	BMA	C3-C4-C5	2.51	114.56	110.20
9	B	1107	NAG	O3-C3-C2	2.51	114.08	109.11
4	A	1110	MAN	C1-O5-C5	2.51	115.44	112.25
5	A	1114	MAN	O3-C3-C2	2.52	114.56	110.00
2	A	1103	BMA	C1-O5-C5	2.53	115.46	112.25
9	B	1108	NAG	O4-C4-C5	2.58	116.07	109.24
8	B	1104	MAN	O4-C4-C3	2.58	116.14	110.34
9	B	1107	NAG	O4-C4-C3	2.63	116.25	110.34
2	A	1104	BMA	C1-O5-C5	2.76	115.75	112.25
5	A	1111	NAG	C4-C3-C2	2.78	115.55	111.23
8	B	1103	BMA	O3-C3-C4	2.79	116.62	110.34
8	B	1103	BMA	C6-C5-C4	2.95	120.30	113.02
8	B	1106	BMA	O2-C2-C1	2.97	115.16	109.21
5	A	1113	BMA	C1-O5-C5	3.01	116.07	112.25
9	B	1107	NAG	C3-C2-N2	3.02	117.79	110.56
5	A	1114	MAN	O3-C3-C4	3.03	117.17	110.34
2	A	1101	NAG	O3-C3-C2	3.04	115.13	109.11
5	A	1112	NAG	O5-C5-C6	3.04	113.92	107.35
4	A	1109	NAG	O7-C7-N2	3.04	128.06	121.86
4	A	1109	NAG	C3-C2-N2	3.05	117.86	110.56
8	B	1101	NAG	O7-C7-C8	3.09	127.74	122.06
4	A	1109	NAG	O4-C4-C3	3.12	117.36	110.34
8	B	1102	NAG	C1-O5-C5	3.19	116.30	112.25
5	A	1113	BMA	O2-C2-C1	3.22	115.66	109.21
8	B	1106	BMA	O3-C3-C2	3.31	115.97	110.00

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
8	B	1102	NAG	C2-N2-C7	3.33	127.31	123.04
2	A	1101	NAG	O7-C7-C8	3.38	128.26	122.06
2	A	1101	NAG	C1-O5-C5	3.42	116.59	112.25
4	A	1108	NAG	C3-C4-C5	3.42	116.16	110.20
5	A	1114	MAN	O2-C2-C3	3.56	117.28	110.12
5	A	1114	MAN	O4-C4-C5	3.62	118.83	109.24
8	B	1104	MAN	C1-O5-C5	3.79	117.06	112.25
2	A	1105	MAN	O3-C3-C4	3.91	119.14	110.34
4	A	1110	MAN	O2-C2-C3	4.07	118.31	110.12
2	A	1104	BMA	C1-C2-C3	4.09	114.39	109.54
2	A	1105	MAN	C1-O5-C5	4.17	117.55	112.25
8	B	1104	MAN	C2-C3-C4	4.22	118.20	111.04
4	A	1108	NAG	C4-C3-C2	4.22	117.79	111.23
5	A	1114	MAN	O5-C1-C2	4.51	118.18	110.86
4	A	1110	MAN	O2-C2-C1	4.89	119.01	109.21
4	A	1110	MAN	O3-C3-C2	5.10	119.21	110.00
2	A	1105	MAN	O2-C2-C3	5.19	120.56	110.12
2	A	1104	BMA	O2-C2-C1	5.31	119.86	109.21
4	A	1108	NAG	C1-O5-C5	5.50	119.23	112.25
8	B	1105	MAN	C1-O5-C5	5.54	119.28	112.25
4	A	1109	NAG	C2-N2-C7	6.44	131.32	123.04
4	A	1109	NAG	C1-O5-C5	6.61	120.64	112.25
5	A	1112	NAG	C1-O5-C5	6.72	120.78	112.25
8	B	1106	BMA	C1-O5-C5	6.74	120.80	112.25
8	B	1103	BMA	C1-O5-C5	6.89	120.99	112.25
9	B	1107	NAG	O4-C4-C5	6.91	127.55	109.24
9	B	1108	NAG	C1-O5-C5	6.93	121.04	112.25
5	A	1114	MAN	C1-O5-C5	7.06	121.21	112.25
9	B	1107	NAG	C1-O5-C5	8.85	123.48	112.25

There are no chirality outliers.

There are no torsion outliers.

All (2) ring outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	A	1110	MAN	C1-C2-C3-C4-C5-O5
2	A	1104	BMA	C1-C2-C3-C4-C5-O5

2 monomers are involved in 2 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	1105	MAN	1	0
8	B	1101	NAG	1	0

5.6 Ligand geometry

11 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
3	NAG	A	1106	1	14,14,15	1.67	3 (21%)	15,19,21	2.89	6 (40%)
3	NAG	A	1107	1	14,14,15	1.52	2 (14%)	15,19,21	2.36	7 (46%)
6	SO4	A	1115	-	4,4,4	4.37	4 (100%)	6,6,6	0.96	0
6	SO4	A	1116	-	4,4,4	3.03	4 (100%)	6,6,6	0.63	0
7	JKM	A	1117	-	14,22,22	2.32	6 (42%)	19,34,34	2.25	8 (42%)
3	NAG	B	1109	1	14,14,15	1.58	4 (28%)	15,19,21	1.86	5 (33%)
3	NAG	B	1110	1	14,14,15	1.51	3 (21%)	15,19,21	2.28	5 (33%)
3	NAG	B	1111	1	14,14,15	1.85	4 (28%)	15,19,21	1.95	3 (20%)
6	SO4	B	1112	-	4,4,4	3.65	4 (100%)	6,6,6	0.37	0
6	SO4	B	1113	-	4,4,4	3.76	4 (100%)	6,6,6	0.52	0
7	JKM	B	1114	-	14,22,22	2.10	5 (35%)	19,34,34	2.62	7 (36%)

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	NAG	A	1106	1	-	0/6/23/26	0/1/1/1
3	NAG	A	1107	1	-	0/6/23/26	0/1/1/1
6	SO4	A	1115	-	-	0/0/0/0	0/0/0/0
6	SO4	A	1116	-	-	0/0/0/0	0/0/0/0
7	JKM	A	1117	-	-	0/2/32/32	0/3/3/3
3	NAG	B	1109	1	-	0/6/23/26	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	NAG	B	1110	1	-	0/6/23/26	0/1/1/1
3	NAG	B	1111	1	-	0/6/23/26	0/1/1/1
6	SO4	B	1112	-	-	0/0/0/0	0/0/0/0
6	SO4	B	1113	-	-	0/0/0/0	0/0/0/0
7	JKM	B	1114	-	-	0/2/32/32	0/3/3/3

All (43) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
7	A	1117	JKM	O2'-C2'	-2.89	1.38	1.45
7	A	1117	JKM	O20-C3'	-2.34	1.40	1.45
7	B	1114	JKM	O2'-C2'	-2.32	1.40	1.45
7	B	1114	JKM	O20-C3'	-2.16	1.40	1.45
3	B	1110	NAG	C3-C2	2.02	1.57	1.52
6	A	1116	SO4	O4-S	2.04	1.54	1.47
6	B	1113	SO4	O2-S	2.07	1.54	1.47
3	B	1109	NAG	C2-N2	2.08	1.50	1.46
3	A	1106	NAG	C4-C3	2.09	1.57	1.52
3	B	1109	NAG	O4-C4	2.17	1.48	1.43
3	B	1109	NAG	C1-C2	2.28	1.55	1.52
3	A	1106	NAG	C3-C2	2.31	1.57	1.52
3	B	1111	NAG	C3-C2	2.38	1.57	1.52
3	B	1109	NAG	C4-C5	2.43	1.58	1.53
7	A	1117	JKM	C2'-C3'	2.47	1.58	1.53
3	B	1111	NAG	C2-N2	2.69	1.51	1.46
3	B	1110	NAG	C1-C2	2.70	1.56	1.52
3	B	1110	NAG	C4-C5	2.71	1.58	1.53
6	B	1112	SO4	O3-S	2.90	1.57	1.47
3	A	1107	NAG	C4-C5	2.99	1.59	1.53
3	B	1111	NAG	C4-C3	3.04	1.60	1.52
6	B	1112	SO4	O4-S	3.12	1.58	1.47
3	A	1107	NAG	C1-C2	3.18	1.56	1.52
6	A	1116	SO4	O2-S	3.22	1.58	1.47
6	A	1116	SO4	O3-S	3.26	1.59	1.47
7	B	1114	JKM	O4-C4	3.36	1.32	1.24
7	A	1117	JKM	O4'-C1'	3.41	1.45	1.41
6	A	1116	SO4	O1-S	3.42	1.58	1.47
6	A	1115	SO4	O4-S	3.75	1.60	1.47
7	B	1114	JKM	O4'-C1'	3.78	1.46	1.41
6	B	1113	SO4	O3-S	3.95	1.61	1.47
6	B	1113	SO4	O4-S	3.96	1.61	1.47
7	A	1117	JKM	O4-C4	3.98	1.34	1.24

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
6	B	1112	SO4	O2-S	4.01	1.60	1.47
3	B	1111	NAG	C1-C2	4.03	1.58	1.52
3	A	1106	NAG	C1-C2	4.07	1.58	1.52
6	A	1115	SO4	O1-S	4.13	1.61	1.47
6	A	1115	SO4	O3-S	4.27	1.62	1.47
7	B	1114	JKM	C6-N1	4.33	1.41	1.35
6	B	1112	SO4	O1-S	4.35	1.62	1.47
6	B	1113	SO4	O1-S	4.57	1.62	1.47
7	A	1117	JKM	C6-N1	4.60	1.42	1.35
6	A	1115	SO4	O2-S	5.19	1.64	1.47

All (41) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	1106	NAG	C1-O5-C5	-7.77	102.39	112.25
3	A	1107	NAG	C3-C4-C5	-4.50	102.34	110.20
7	B	1114	JKM	O2'-C2'-C3'	-4.39	96.85	105.13
3	B	1109	NAG	C2-N2-C7	-3.98	117.93	123.04
7	B	1114	JKM	C5'-C4'-C3'	-3.68	102.41	114.82
7	A	1117	JKM	O2'-C2'-C3'	-3.42	98.68	105.13
3	B	1110	NAG	C8-C7-N2	-3.12	110.14	116.11
3	A	1107	NAG	O7-C7-N2	-3.01	115.72	121.86
7	A	1117	JKM	C5'-C4'-C3'	-2.89	105.07	114.82
3	A	1106	NAG	C3-C4-C5	-2.87	105.20	110.20
7	A	1117	JKM	C3'-C2'-C1'	-2.77	96.25	103.48
7	B	1114	JKM	C6-N1-C2	-2.73	116.86	121.28
3	B	1109	NAG	O4-C4-C3	-2.51	104.68	110.34
7	A	1117	JKM	O2P-P-O20	-2.44	104.10	108.46
7	B	1114	JKM	O2P-P-O20	-2.33	104.31	108.46
7	A	1117	JKM	C6-N1-C2	-2.04	117.97	121.28
3	B	1109	NAG	C3-C4-C5	-2.01	106.69	110.20
3	A	1106	NAG	O3-C3-C4	2.00	114.84	110.34
3	A	1106	NAG	C8-C7-N2	2.06	120.05	116.11
3	B	1110	NAG	O7-C7-C8	2.21	126.11	122.06
3	A	1107	NAG	O7-C7-C8	2.21	126.11	122.06
3	A	1107	NAG	O3-C3-C2	2.43	113.93	109.11
3	B	1111	NAG	O3-C3-C4	2.44	115.83	110.34
3	B	1109	NAG	O4-C4-C5	2.46	115.76	109.24
3	B	1109	NAG	C6-C5-C4	2.74	119.78	113.02
7	A	1117	JKM	C2'-C1'-N1	2.89	121.83	113.53
3	A	1107	NAG	C6-C5-C4	2.99	120.39	113.02
3	B	1110	NAG	C3-C4-C5	3.06	115.53	110.20

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	1107	NAG	O4-C4-C5	3.23	117.79	109.24
3	B	1111	NAG	C4-C3-C2	3.29	116.34	111.23
7	A	1117	JKM	O4'-C1'-N1	3.52	115.50	108.08
3	A	1106	NAG	C6-C5-C4	3.64	122.00	113.02
7	B	1114	JKM	O4'-C4'-C5'	3.79	117.38	109.17
3	A	1107	NAG	O3-C3-C4	3.84	118.99	110.34
3	A	1106	NAG	C2-N2-C7	4.70	129.08	123.04
3	B	1110	NAG	C4-C3-C2	4.83	118.73	111.23
3	B	1110	NAG	C1-O5-C5	4.94	118.52	112.25
3	B	1111	NAG	C2-N2-C7	5.00	129.47	123.04
7	A	1117	JKM	C4-N3-C2	5.09	119.19	114.14
7	B	1114	JKM	O4'-C1'-N1	5.32	119.30	108.08
7	B	1114	JKM	C4-N3-C2	5.50	119.59	114.14

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	1106	NAG	1	0

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	161/167 (96%)	0.71	19 (11%) 6 4	38, 58, 88, 115	0
1	B	161/167 (96%)	0.35	7 (4%) 39 32	38, 55, 81, 104	0
All	All	322/334 (96%)	0.53	26 (8%) 15 9	38, 57, 86, 115	0

All (26) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	121	ASP	5.2
1	A	16	GLU	4.3
1	A	120	ARG	4.1
1	A	14	GLY	3.7
1	A	122	SER	3.4
1	B	16	GLU	3.4
1	A	119	ASP	3.2
1	A	163	VAL	3.1
1	A	12	ASP	2.9
1	B	142	LYS	2.9
1	B	118	TYR	2.8
1	B	143	GLY	2.7
1	A	37	GLU	2.7
1	B	120	ARG	2.6
1	B	64	GLU	2.6
1	A	118	TYR	2.6
1	A	67	ASN	2.4
1	A	151	ILE	2.3
1	A	117	ARG	2.2
1	A	15	THR	2.2
1	A	124	LEU	2.2
1	A	123	ASP	2.1
1	A	13	ASN	2.0
1	A	57	HIS	2.0

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Mol	Chain	Res	Type	RSRZ
1	A	3	GLU	2.0
1	B	20	ARG	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](#)

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. LLDF column lists the quality of electron density of the group with respect to its neighbouring residues in protein, DNA or RNA chains. 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	LLDF	B-factors(Å ²)	Q<0.9
4	NAG	A	1108	14/15	0.85	0.23	2.10	67,71,73,74	3
4	MAN	A	1110	11/12	0.80	0.30	1.08	81,83,85,85	0
5	NAG	A	1111	14/15	0.90	0.29	0.64	74,78,80,81	4
9	NAG	B	1107	14/15	0.93	0.19	0.62	71,75,77,78	5
8	NAG	B	1101	14/15	0.97	0.18	0.41	43,47,49,50	2
2	NAG	A	1101	14/15	0.95	0.18	-0.63	52,56,58,59	1
5	MAN	A	1114	11/12	0.81	0.31	-	82,84,86,87	0
5	NAG	A	1112	14/15	0.90	0.23	-	79,83,85,85	0
2	BMA	A	1104	11/12	0.89	0.34	-	69,71,73,74	0
5	BMA	A	1113	11/12	0.81	0.18	-	82,84,86,90	6
2	BMA	A	1103	11/12	0.84	0.23	-	64,66,69,70	2
2	NAG	A	1102	14/15	0.93	0.23	-	55,59,62,62	3
8	BMA	B	1103	11/12	0.93	0.20	-	56,59,62,64	3
4	NAG	A	1109	14/15	0.81	0.24	-	77,81,83,84	0
9	NAG	B	1108	14/15	0.83	0.20	-	82,86,88,89	0
8	BMA	B	1106	11/12	0.67	0.24	-	80,84,86,87	0
8	MAN	B	1105	11/12	0.92	0.19	-	68,71,74,75	3
2	MAN	A	1105	11/12	0.90	0.17	-	70,72,75,76	1
8	MAN	B	1104	11/12	0.77	0.29	-	66,68,70,72	5
8	NAG	B	1102	14/15	0.96	0.26	-	46,50,53,53	3

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. LLDF column lists the quality of electron density of the group with respect to its neighbouring residues in protein, DNA or RNA chains. 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	LLDF	B-factors(\AA^2)	Q<0.9
3	NAG	B	1111	14/15	0.67	0.42	1.97	104,108,110,110	0
3	NAG	A	1106	14/15	0.82	0.24	1.49	72,76,79,79	8
3	NAG	A	1107	14/15	0.90	0.25	0.93	59,63,65,65	5
3	NAG	B	1110	14/15	0.82	0.23	0.88	77,81,84,84	5
7	JKM	A	1117	20/20	0.82	0.20	0.33	77,100,114,114	0
3	NAG	B	1109	14/15	0.90	0.20	0.18	64,68,70,70	5
7	JKM	B	1114	20/20	0.79	0.25	0.02	69,101,117,118	0
6	SO4	B	1113	5/5	0.95	0.20	-0.13	73,74,75,75	0
6	SO4	B	1112	5/5	0.97	0.21	-0.26	75,77,77,78	0
6	SO4	A	1115	5/5	0.92	0.16	-1.11	79,80,81,83	0
6	SO4	A	1116	5/5	0.98	0.15	-2.31	70,71,73,73	0

6.5 Other polymers [i](#)

There are no such residues in this entry.