



Full wwPDB X-ray Structure Validation Report ⓘ

Feb 13, 2017 – 03:04 am GMT

PDB ID : 4DW7
Title : Crystal structure of an active-site mutant of the glycoprotein Erns from the pestivirus BVDV-1 in complex with a CpU dinucleotide
Authors : Krey, T.; Bontems, F.; Vonnrhein, C.; Vaney, M.-C.; Bricogne, G.; Ruemenapf, T.; Rey, F.A.
Deposited on : 2012-02-24
Resolution : 3.08 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 : 1.7.2 (RC1), CSD as538be (2017)
Xtriage (Phenix) : 1.9-1692
EDS : trunk28620
Percentile statistics : 20161228.v01 (using entries in the PDB archive December 28th 2016)
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) : recalc28949

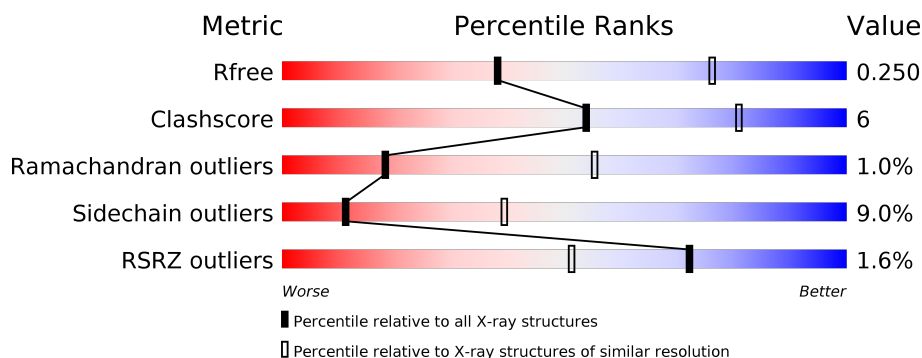
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 3.08 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}	100719	1116 (3.10-3.06)
Clashscore	112137	1220 (3.10-3.06)
Ramachandran outliers	110173	1176 (3.10-3.06)
Sidechain outliers	110143	1176 (3.10-3.06)
RSRZ outliers	101464	1123 (3.10-3.06)

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	<div> <div style="width: 100%; height: 10px; position: relative;"> <div style="position: absolute; top: -10px; left: 0; width: 100%;"></div> <div style="position: absolute; bottom: 0; left: 0; width: 100%; height: 10px;"> <div style="width: 2%; height: 10px; background-color: red;"></div> <div style="width: 75%; height: 10px; background-color: green;"></div> <div style="width: 16%; height: 10px; background-color: yellow;"></div> <div style="width: 5%; height: 10px; background-color: orange;"></div> <div style="width: 2%; height: 10px; background-color: grey;"></div> </div> </div> <div> <div style="width: 2%; height: 10px; background-color: red;"></div> <div style="width: 75%; height: 10px; background-color: green;"></div> <div style="width: 16%; height: 10px; background-color: yellow;"></div> <div style="width: 5%; height: 10px; background-color: orange;"></div> <div style="width: 2%; height: 10px; background-color: grey;"></div> </div> </div>
1	B	167	<div> <div style="width: 100%; height: 10px; position: relative;"> <div style="position: absolute; top: -10px; left: 0; width: 100%;"></div> <div style="position: absolute; bottom: 0; left: 0; width: 100%; height: 10px;"> <div style="width: 2%; height: 10px; background-color: red;"></div> <div style="width: 72%; height: 10px; background-color: green;"></div> <div style="width: 21%; height: 10px; background-color: yellow;"></div> <div style="width: 5%; height: 10px; background-color: orange;"></div> <div style="width: 2%; height: 10px; background-color: grey;"></div> </div> </div> <div> <div style="width: 2%; height: 10px; background-color: red;"></div> <div style="width: 72%; height: 10px; background-color: green;"></div> <div style="width: 21%; height: 10px; background-color: yellow;"></div> <div style="width: 5%; height: 10px; background-color: orange;"></div> <div style="width: 2%; height: 10px; background-color: grey;"></div> </div> </div>

2 Entry composition

There are 9 unique types of molecules in this entry. The entry contains 2905 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	159	Total	C	N	O	S	0	1	0
			1274	791	233	238	12			
1	B	158	Total	C	N	O	S	0	0	0
			1258	781	230	235	12			

There are 6 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
A	32	LYS	HIS	ENGINEERED MUTATION	UNP Q96662
B	1	ARG	-	EXPRESSION TAG	UNP Q96662
B	2	SER	-	EXPRESSION TAG	UNP Q96662
B	32	LYS	HIS	ENGINEERED MUTATION	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: C₈H₁₅NO₆).

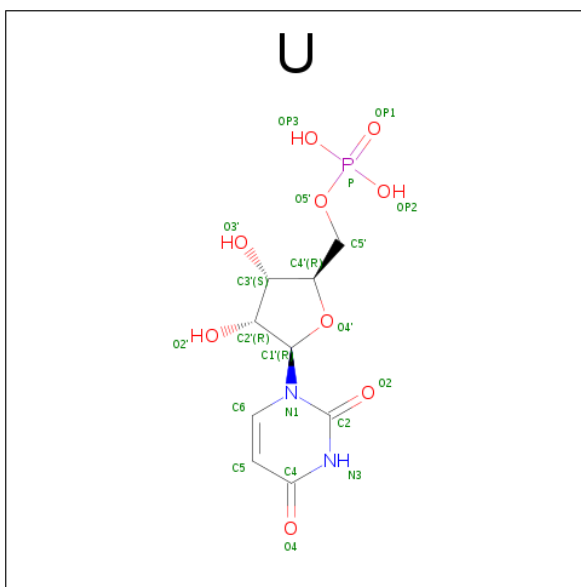


Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
3	A	1	Total	C	N	O	0	0
			14	8	1	5		
3	A	1	Total	C	N	O	0	0
			14	8	1	5		

- Molecule 4 is a polymer of unknown type called SUGAR (2-MER).

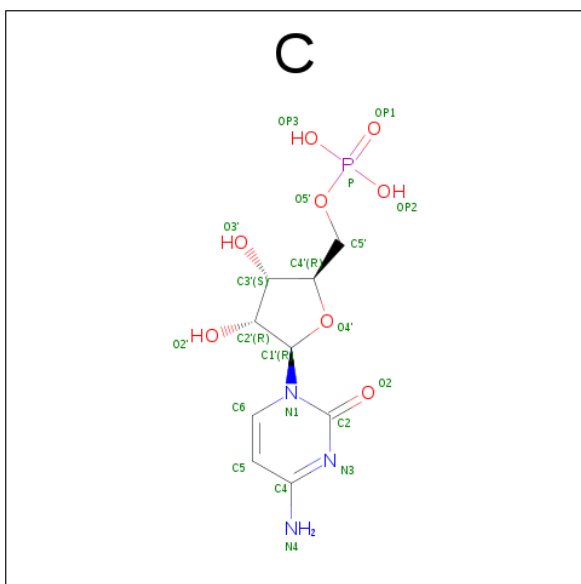
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
4	A	2	Total	C	N	O	0	0
			28	16	2	10		
4	B	2	Total	C	N	O	0	0
			28	16	2	10		
4	B	2	Total	C	N	O	0	0
			28	16	2	10		

- Molecule 5 is URIDINE-5'-MONOPHOSPHATE (three-letter code: U) (formula: C₉H₁₃N₂O₉P).



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

- Molecule 6 is CYTIDINE-5'-MONOPHOSPHATE (three-letter code: C) (formula: $C_9H_{14}N_3O_8P$).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
6	A	1	Total	C	N	O	0	0
			17	9	3	5		

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Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
6	B	1	Total	C	N	O	0	0
			17	9	3	5		

- Molecule 7 is SULFATE ION (three-letter code: SO4) (formula: O₄S).



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

- Molecule 8 is a polymer of unknown type called SUGAR (7-MER).

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
8	B	7	Total	C	N	O	0	0
			83	46	2	35		

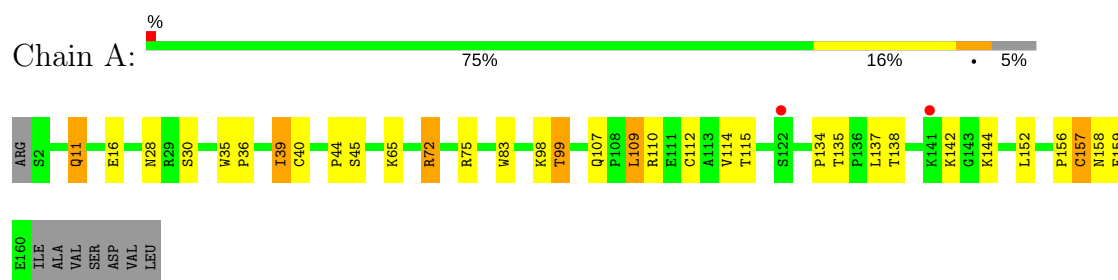
- Molecule 9 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
9	A	11	Total 11	O 11	0	0
9	B	7	Total 7	O 7	0	0

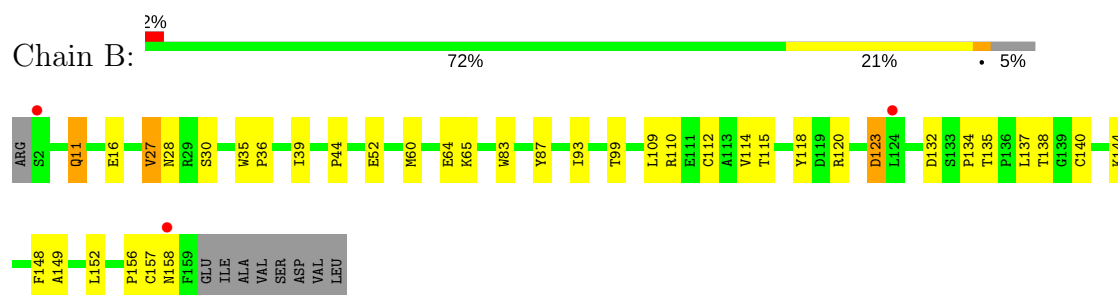
3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA and DNA chains in the entry. The first graphic for a chain summarises the proportions of 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: E(rns) glycoprotein



• Molecule 1: E(rns) glycoprotein



4 Data and refinement statistics

Property	Value	Source
Space group	P 65 2 2	Depositor
Cell constants a, b, c, α , β , γ	105.90Å 105.90Å 211.79Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	45.85 – 3.08 45.85 – 3.08	Depositor EDS
% Data completeness (in resolution range)	84.9 (45.85-3.08) 84.8 (45.85-3.08)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.26 (at 3.06Å)	Xtriage
Refinement program	BUSTER 2.9.2	Depositor
R, R_{free}	0.197 , 0.245 0.212 , 0.250	Depositor DCC
R_{free} test set	572 reflections (5.19%)	DCC
Wilson B-factor (Å ²)	75.3	Xtriage
Anisotropy	0.515	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.35 , 90.8	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.92	EDS
Total number of atoms	2905	wwPDB-VP
Average B, all atoms (Å ²)	78.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 7.83% 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: SO4, BMA, NAG, MAN

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	0.59	0/1307	0.78	0/1771
1	B	0.54	0/1287	0.76	0/1744
All	All	0.57	0/2594	0.77	0/3515

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 [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	1274	0	1218	18	0
1	B	1258	0	1206	16	0
2	A	61	0	52	0	0
3	A	28	0	26	0	0
4	A	28	0	25	2	0
4	B	56	0	50	0	0
5	A	20	0	11	0	0
5	B	20	0	11	0	0
6	A	17	0	12	0	0
6	B	17	0	12	2	0
7	A	15	0	0	2	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
7	B	10	0	0	0	0
8	B	83	0	70	0	0
9	A	11	0	0	0	0
9	B	7	0	0	0	0
All	All	2905	0	2693	34	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 (34) 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:110:ARG:HB3	1:A:159:PHE:CE2	2.24	0.73
1:A:72:ARG:NH1	7:A:1113:SO4:O3	2.28	0.66
1:A:45:SER:HG	1:A:83:TRP:HE3	1.46	0.62
1:A:114:VAL:HG22	1:A:135:THR:HG21	1.83	0.59
1:A:115:THR:HG22	1:A:138:THR:HB	1.88	0.56
1:B:115:THR:HG22	1:B:138:THR:HB	1.89	0.55
1:A:98:LYS:HB3	4:A:1108:NAG:H82	1.88	0.54
1:B:114:VAL:HG22	1:B:135:THR:HG21	1.90	0.53
1:B:44:PRO:HA	1:B:83:TRP:CD2	2.44	0.53
1:A:75:ARG:NH2	7:A:1112:SO4:O2	2.42	0.52
1:A:99:THR:HG23	4:A:1108:NAG:H81	1.92	0.51
1:A:157:CYS:SG	1:A:159:PHE:CE2	3.05	0.50
1:B:11:GLN:HG2	1:B:28:ASN:HA	1.95	0.48
1:B:137:LEU:HD11	1:B:156:PRO:HB3	1.95	0.48
1:B:65:LYS:HE3	6:B:213:C:H41	1.78	0.48
1:A:39:ILE:HD12	1:A:40:CYS:N	2.29	0.47
1:A:11:GLN:HG2	1:A:28:ASN:HA	1.96	0.47
1:B:112:CYS:SG	1:B:134:PRO:HA	2.55	0.46
1:A:44:PRO:HA	1:A:83:TRP:CD2	2.51	0.45
1:B:137:LEU:HB3	1:B:140:CYS:SG	2.57	0.45
1:A:72:ARG:HA	1:A:72:ARG:HH21	1.82	0.44
1:A:35:TRP:HA	1:A:36:PRO:HD3	1.89	0.44
1:A:112:CYS:SG	1:A:134:PRO:HA	2.59	0.43
1:A:137:LEU:HD11	1:A:156:PRO:HB3	2.01	0.42
1:B:123:ASP:HB3	1:B:144:LYS:NZ	2.35	0.42
1:A:45:SER:OG	1:A:83:TRP:HE3	2.02	0.42
1:B:52:GLU:O	1:B:93:ILE:HD12	2.20	0.41
1:B:118:TYR:HE1	1:B:120:ARG:HA	1.86	0.41
1:B:27:VAL:HG11	1:B:60:MET:SD	2.61	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:114:VAL:HG12	1:A:115:THR:HG23	2.03	0.41
1:B:64:GLU:HB3	6:B:213:C:H42	1.86	0.40
1:B:148:PHE:HZ	1:B:156:PRO:O	2.04	0.40
1:B:110:ARG:O	1:B:132:ASP:HA	2.21	0.40
1:B:35:TRP:HA	1:B:36:PRO:HD3	1.88	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	158/167 (95%)	147 (93%)	10 (6%)	1 (1%)	28	66
1	B	156/167 (93%)	143 (92%)	11 (7%)	2 (1%)	14	47
All	All	314/334 (94%)	290 (92%)	21 (7%)	3 (1%)	18	55

All (3) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	149	ALA
1	A	109	LEU
1	B	87	TYR

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	140/146 (96%)	126 (90%)	14 (10%)	9	32
1	B	138/146 (94%)	127 (92%)	11 (8%)	14	46
All	All	278/292 (95%)	253 (91%)	25 (9%)	11	39

All (25) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	11	GLN
1	A	16	GLU
1	A	30	SER
1	A	39	ILE
1	A	65	LYS
1	A	72	ARG
1	A	99	THR
1	A	107	GLN
1	A	109	LEU
1	A	142	LYS
1	A	144	LYS
1	A	152	LEU
1	A	157	CYS
1	A	158	ASN
1	B	11	GLN
1	B	16	GLU
1	B	27	VAL
1	B	30	SER
1	B	39	ILE
1	B	99	THR
1	B	109	LEU
1	B	123	ASP
1	B	152	LEU
1	B	157	CYS
1	B	158	ASN

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

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 ⓘ

18 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	0.33	0	15,19,21	1.47	2 (13%)
2	NAG	A	1102	2	14,14,15	0.42	0	15,19,21	1.23	1 (6%)
2	BMA	A	1103	2	11,11,12	0.40	0	13,15,17	0.63	0
2	BMA	A	1104	2	11,11,12	0.50	0	13,15,17	1.35	2 (15%)
2	BMA	A	1105	2	11,11,12	0.42	0	13,15,17	1.44	2 (15%)
4	NAG	A	1108	1,4	14,14,15	0.28	0	15,19,21	0.84	1 (6%)
4	NAG	A	1109	4	14,14,15	0.29	0	15,19,21	0.95	1 (6%)
8	BMA	B	201	8	11,11,12	0.29	0	13,15,17	0.59	0
8	NAG	B	202	1,8	14,14,15	0.31	0	15,19,21	1.03	2 (13%)
8	NAG	B	203	8	14,14,15	0.35	0	15,19,21	1.30	1 (6%)
8	MAN	B	204	8	11,11,12	0.42	0	13,15,17	1.03	1 (7%)
8	BMA	B	205	8	11,11,12	0.44	0	13,15,17	1.37	2 (15%)
8	BMA	B	206	8	11,11,12	0.48	0	13,15,17	0.90	1 (7%)
8	MAN	B	207	8	11,11,12	0.31	0	13,15,17	0.95	0
4	NAG	B	208	1,4	14,14,15	0.24	0	15,19,21	3.18	4 (26%)
4	NAG	B	209	4	14,14,15	0.23	0	15,19,21	0.95	1 (6%)
4	NAG	B	211	1,4	14,14,15	0.31	0	15,19,21	0.90	0
4	NAG	B	212	4	14,14,15	0.29	0	15,19,21	0.75	1 (6%)

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	BMA	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
8	BMA	B	201	8	-	0/2/19/22	0/1/1/1
8	NAG	B	202	1,8	-	0/6/23/26	0/1/1/1
8	NAG	B	203	8	-	0/6/23/26	0/1/1/1
8	MAN	B	204	8	-	0/2/19/22	0/1/1/1
8	BMA	B	205	8	-	0/2/19/22	0/1/1/1
8	BMA	B	206	8	-	0/2/19/22	0/1/1/1
8	MAN	B	207	8	-	0/2/19/22	0/1/1/1
4	NAG	B	208	1,4	-	0/6/23/26	0/1/1/1
4	NAG	B	209	4	-	0/6/23/26	0/1/1/1
4	NAG	B	211	1,4	-	0/6/23/26	0/1/1/1
4	NAG	B	212	4	-	0/6/23/26	0/1/1/1

There are no bond length outliers.

All (22) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	B	208	NAG	O5-C1-C2	-8.13	100.17	111.47
2	A	1101	NAG	O5-C1-C2	-4.76	104.84	111.47
8	B	203	NAG	O5-C1-C2	-4.05	105.84	111.47
2	A	1102	NAG	O5-C1-C2	-3.49	106.62	111.47
4	B	212	NAG	C1-C2-N2	-2.12	106.86	110.49
8	B	202	NAG	O5-C1-C2	-2.08	108.58	111.47
4	A	1109	NAG	C1-C2-N2	-2.00	107.06	110.49
4	B	208	NAG	C2-N2-C7	2.12	126.04	122.94
4	A	1108	NAG	C1-O5-C5	2.19	115.18	112.17
2	A	1101	NAG	C1-C2-N2	2.23	114.30	110.49
8	B	202	NAG	C1-C2-N2	2.33	114.46	110.49
8	B	206	BMA	C1-C2-C3	2.50	112.81	109.65
8	B	205	BMA	C1-C2-C3	2.58	112.92	109.65
4	B	209	NAG	C1-O5-C5	2.68	115.87	112.17
8	B	204	MAN	C1-O5-C5	2.69	115.87	112.17
2	A	1104	BMA	C1-C2-C3	2.77	113.16	109.65
2	A	1105	BMA	C1-C2-C3	3.24	113.76	109.65
4	B	208	NAG	C1-O5-C5	3.34	116.76	112.17
2	A	1104	BMA	C1-O5-C5	3.39	116.83	112.17
8	B	205	BMA	C1-O5-C5	3.44	116.91	112.17

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	1105	BMA	C1-O5-C5	3.61	117.15	112.17
4	B	208	NAG	C1-C2-N2	8.18	124.45	110.49

There are no chirality outliers.

There are no torsion outliers.

All (1) ring outliers are listed below:

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

1 monomer is involved in 2 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	A	1108	NAG	2	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	0.33	0	15,19,21	3.14	3 (20%)
3	NAG	A	1107	1	14,14,15	0.52	0	15,19,21	2.22	3 (20%)
5	U	A	1110	6	14,21,22	1.53	3 (21%)	15,30,33	4.00	3 (20%)
6	C	A	1111	5	15,18,22	0.88	0	16,26,33	0.98	0
7	SO4	A	1112	-	4,4,4	0.76	0	6,6,6	1.63	1 (16%)
7	SO4	A	1113	-	4,4,4	0.99	0	6,6,6	1.21	1 (16%)
7	SO4	A	1114	-	4,4,4	1.47	1 (25%)	6,6,6	1.00	0
5	U	B	210	6	14,21,22	1.49	2 (14%)	15,30,33	4.15	2 (13%)
6	C	B	213	5	15,18,22	0.89	0	16,26,33	1.23	1 (6%)
7	SO4	B	214	-	4,4,4	1.14	0	6,6,6	1.48	2 (33%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
7	SO4	B	215	-	4,4,4	1.02	0	6,6,6	1.46	1 (16%)

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
5	U	A	1110	6	-	0/3/25/26	0/2/2/2
6	C	A	1111	5	-	0/2/22/26	0/2/2/2
7	SO4	A	1112	-	-	0/0/0/0	0/0/0/0
7	SO4	A	1113	-	-	0/0/0/0	0/0/0/0
7	SO4	A	1114	-	-	0/0/0/0	0/0/0/0
5	U	B	210	6	-	0/3/25/26	0/2/2/2
6	C	B	213	5	-	0/2/22/26	0/2/2/2
7	SO4	B	214	-	-	0/0/0/0	0/0/0/0
7	SO4	B	215	-	-	0/0/0/0	0/0/0/0

All (6) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	A	1110	U	C6-C5	-2.08	1.33	1.38
7	A	1114	SO4	O2-S	2.31	1.58	1.45
5	A	1110	U	C4-N3	2.99	1.38	1.33
5	A	1110	U	C6-N1	3.12	1.40	1.35
5	B	210	U	C6-N1	3.24	1.40	1.35
5	B	210	U	C4-N3	3.71	1.39	1.33

All (17) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	1106	NAG	O5-C1-C2	-7.63	100.85	111.47
3	A	1107	NAG	O5-C1-C2	-6.80	102.01	111.47
5	A	1110	U	C4'-O4'-C1'	-3.39	106.16	109.77
5	B	210	U	C5-C4-N3	-3.16	115.58	123.12
3	A	1107	NAG	C1-O5-C5	-3.04	107.98	112.17
3	A	1107	NAG	C1-C2-N2	-2.63	106.00	110.49
5	A	1110	U	C5-C4-N3	-2.53	117.08	123.12
7	A	1113	SO4	O2-S-O1	-2.46	92.43	109.64
7	B	214	SO4	O3-S-O1	-2.09	97.76	109.26

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
7	B	214	SO4	O4-S-O3	2.84	121.77	108.96
3	A	1106	NAG	C1-O5-C5	3.18	116.54	112.17
7	A	1112	SO4	O4-S-O3	3.31	123.89	108.96
7	B	215	SO4	O4-S-O3	3.32	123.90	108.96
6	B	213	C	O4'-C1'-N1	4.17	116.43	108.08
3	A	1106	NAG	C1-C2-N2	8.35	124.75	110.49
5	A	1110	U	C4-N3-C2	14.47	126.56	114.13
5	B	210	U	C4-N3-C2	15.39	127.35	114.13

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

3 monomers are involved in 4 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
7	A	1112	SO4	1	0
7	A	1113	SO4	1	0
6	B	213	C	2	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 [i](#)

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

In the following table, the column labelled ‘#RSRZ> 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95th percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled ‘Q< 0.9’ lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
1	A	159/167 (95%)	-0.02	2 (1%) 77 59	44, 63, 102, 117	0
1	B	158/167 (94%)	0.13	3 (1%) 67 46	50, 81, 116, 134	0
All	All	317/334 (94%)	0.06	5 (1%) 72 51	44, 69, 112, 134	0

All (5) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	158	ASN	2.8
1	A	141	LYS	2.4
1	A	122	SER	2.3
1	B	124	LEU	2.2
1	B	2	SER	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	0.95	0.20	-0.63	62,97,181,182	0
4	NAG	B	208	14/15	0.96	0.17	-1.16	30,93,206,211	0
8	NAG	B	202	14/15	0.97	0.17	-1.78	45,75,121,150	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	LLDF	B-factors(\AA^2)	Q<0.9
2	NAG	A	1101	14/15	0.96	0.14	-1.89	21,47,108,147	0
8	BMA	B	201	11/12	0.97	0.16	-	48,73,107,125	0
2	BMA	A	1103	11/12	0.92	0.23	-	47,68,169,172	0
4	NAG	B	211	14/15	0.73	0.22	-	51,130,222,293	0
8	NAG	B	203	14/15	0.97	0.17	-	25,80,110,133	0
4	NAG	A	1109	14/15	0.92	0.18	-	70,104,220,266	0
8	MAN	B	204	11/12	0.96	0.14	-	47,73,267,276	0
8	MAN	B	207	11/12	0.89	0.17	-	84,131,227,237	0
4	NAG	B	212	14/15	0.82	0.25	-	75,132,233,271	0
2	BMA	A	1104	11/12	0.96	0.18	-	45,73,164,234	0
4	NAG	B	209	14/15	0.89	0.22	-	72,105,264,278	0
8	BMA	B	205	11/12	0.94	0.19	-	55,105,152,167	0
2	BMA	A	1105	11/12	0.92	0.35	-	41,117,222,248	0
8	BMA	B	206	11/12	0.92	0.16	-	60,116,250,285	0
2	NAG	A	1102	14/15	0.96	0.29	-	28,56,150,211	0

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
7	SO4	B	215	5/5	0.90	0.27	1.49	135,139,139,141	0
3	NAG	A	1107	14/15	0.84	0.23	0.37	34,71,139,156	0
5	U	B	210	20/21	0.79	0.29	0.31	161,163,168,168	0
6	C	B	213	17/21	0.76	0.32	0.26	165,167,168,168	0
7	SO4	A	1114	5/5	0.98	0.22	0.03	73,76,77,80	0
7	SO4	B	214	5/5	0.98	0.20	-0.43	77,80,81,83	0
7	SO4	A	1113	5/5	0.99	0.17	-1.34	56,58,61,62	0
6	C	A	1111	17/21	0.96	0.17	-1.49	65,67,69,70	0
5	U	A	1110	20/21	0.96	0.17	-1.94	59,62,63,63	0
7	SO4	A	1112	5/5	0.98	0.19	-	75,77,79,80	5
3	NAG	A	1106	14/15	0.87	0.20	-	40,82,221,236	0

6.5 Other polymers [i](#)

There are no such residues in this entry.