WORLDWIDE wwPDB PROTEIN DATA BANK

wwPDB X-ray Structure Validation Summary Report ⓘ

Apr 23, 2024 – 10:20 pm BST

PDB ID	:	8OUQ
Title	:	Clr-11 from Rattus norvegicus
Authors	:	Skalova, T.; Blaha, J.; Kalouskova, B.; Skorepa, O.; Vanek, O.; Dohnalek, J.
Deposited on	:	2023-04-24
Resolution	:	1.60 Å(reported)

The following versions of software and data (see references ⓘ) were used in the production of this report:

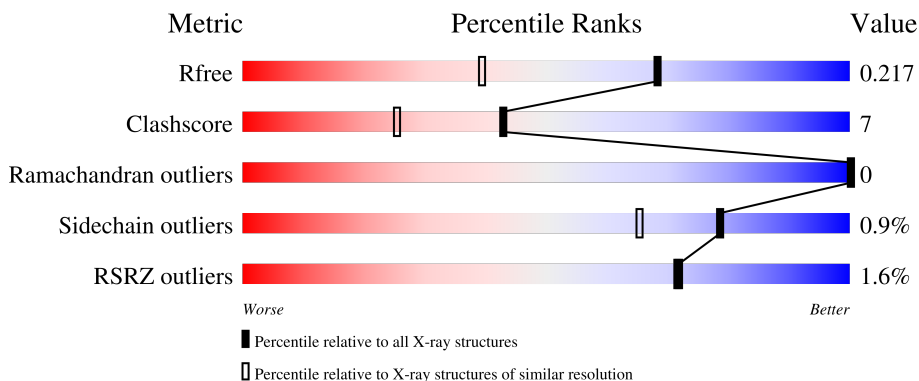|		
MolProbity	:	4.02b-467
Mogul	:	1.8.4, CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.36.2
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.36.2

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 1.60 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	Percentile Ranks	Value
Rfree		0.217
Clashscore		7
Ramachandran outliers		0
Sidechain outliers		0.9%
RSRZ outliers		1.6%

Worse   *Better*

▎ Percentile relative to all X-ray structures

▯ Percentile relative to X-ray structures of similar resolution

Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R$_{free}$	130704	3398 (1.60-1.60)
Clashscore	141614	3665 (1.60-1.60)
Ramachandran outliers	138981	3564 (1.60-1.60)
Sidechain outliers	138945	3563 (1.60-1.60)
RSRZ outliers	127900	3321 (1.60-1.60)

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	AAA	133	2% ▐ 74% 16% · 9%
1	BBB	133	2% ▐ 86% 8% · 5%

2 Entry composition (i)

There are 3 unique types of molecules in this entry. The entry contains 2410 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 C-type lectin domain family 2 member D11.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	AAA	121	Total	C	N	O	S	0	5	0
			1044	664	178	198	4			
1	BBB	126	Total	C	N	O	S	0	3	0
			1062	675	183	200	4			

There are 30 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
AAA	74	ILE	-	expression tag	UNP Q0H8B9
AAA	75	THR	-	expression tag	UNP Q0H8B9
AAA	76	GLY	-	expression tag	UNP Q0H8B9
AAA	192	ARG	LYS	variant	UNP Q0H8B9
AAA	196	GLY	-	expression tag	UNP Q0H8B9
AAA	197	THR	-	expression tag	UNP Q0H8B9
AAA	198	HIS	-	expression tag	UNP Q0H8B9
AAA	199	HIS	-	expression tag	UNP Q0H8B9
AAA	200	HIS	-	expression tag	UNP Q0H8B9
AAA	201	HIS	-	expression tag	UNP Q0H8B9
AAA	202	HIS	-	expression tag	UNP Q0H8B9
AAA	203	HIS	-	expression tag	UNP Q0H8B9
AAA	204	HIS	-	expression tag	UNP Q0H8B9
AAA	205	HIS	-	expression tag	UNP Q0H8B9
AAA	206	GLY	-	expression tag	UNP Q0H8B9
BBB	74	ILE	-	expression tag	UNP Q0H8B9
BBB	75	THR	-	expression tag	UNP Q0H8B9
BBB	76	GLY	-	expression tag	UNP Q0H8B9
BBB	192	ARG	LYS	variant	UNP Q0H8B9
BBB	196	GLY	-	expression tag	UNP Q0H8B9
BBB	197	THR	-	expression tag	UNP Q0H8B9
BBB	198	HIS	-	expression tag	UNP Q0H8B9
BBB	199	HIS	-	expression tag	UNP Q0H8B9
BBB	200	HIS	-	expression tag	UNP Q0H8B9
BBB	201	HIS	-	expression tag	UNP Q0H8B9

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Chain	Residue	Modelled	Actual	Comment	Reference
BBB	202	HIS	-	expression tag	UNP Q0H8B9
BBB	203	HIS	-	expression tag	UNP Q0H8B9
BBB	204	HIS	-	expression tag	UNP Q0H8B9
BBB	205	HIS	-	expression tag	UNP Q0H8B9
BBB	206	GLY	-	expression tag	UNP Q0H8B9

- Molecule 2 is 2-acetamido-2-deoxy-beta-D-glucopyranose (three-letter code: NAG) (formula: $C_8H_{15}NO_6$) (labeled as "Ligand of Interest" by depositor).
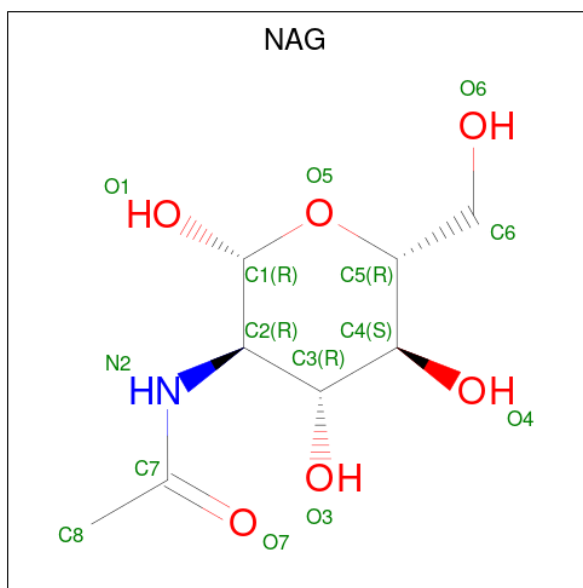
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
2	AAA	1	Total 14	C 8	N 1	O 5	0	0
2	BBB	1	Total 14	C 8	N 1	O 5	0	0

- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	AAA	139	Total 139	O 139	0	0
3	BBB	137	Total 137	O 137	0	0

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: C-type lectin domain family 2 member D11
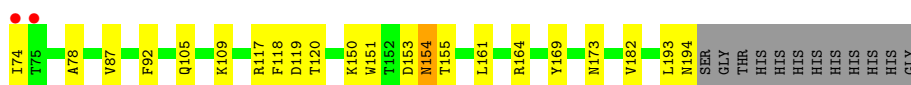
- Molecule 1: C-type lectin domain family 2 member D11

4 Data and refinement statistics ⓘ

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α, β, γ	30.86Å 69.35Å 62.47Å 90.00° 96.85° 90.00°	Depositor
Resolution (Å)	46.23 – 1.60 46.23 – 1.60	Depositor EDS
% Data completeness (in resolution range)	98.7 (46.23-1.60) 98.7 (46.23-1.60)	Depositor EDS
R_{merge}	0.12	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	3.27 (at 1.60Å)	Xtriage
Refinement program	REFMAC 5.8.0267	Depositor
R, R_{free}	0.190 , 0.235 0.199 , 0.217	Depositor DCC
R_{free} test set	986 reflections (2.89%)	wwPDB-VP
Wilson B-factor (Å^2)	15.9	Xtriage
Anisotropy	0.942	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.34 , 43.7	EDS
L-test for twinning[2]	$< |L| > = 0.50$, $< L^2 > = 0.34$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.96	EDS
Total number of atoms	2410	wwPDB-VP
Average B, all atoms (Å^2)	22.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 53.46 % of the origin peak, indicating pseudo-translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo-translational symmetry is equal to 4.2037e-05. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

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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 (i)

5.1 Standard geometry (i)

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

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	AAA	0.83	0/1079	0.97	1/1462 (0.1%)
1	BBB	0.82	0/1105	0.94	0/1497
All	All	0.82	0/2184	0.96	1/2959 (0.0%)

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	AAA	155	THR	CB-CA-C	5.12	125.43	111.60

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	AAA	1044	0	952	20	0
1	BBB	1062	0	971	10	0
2	AAA	14	0	13	0	0
2	BBB	14	0	13	0	0
3	AAA	139	0	0	8	0
3	BBB	137	0	0	1	0
All	All	2410	0	1949	28	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 7.

The worst 5 of 28 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:AAA:164:ARG:HH12	1:AAA:173:ASN:HD21	1.20	0.87
1:BBB:164:ARG:HH12	1:BBB:173:ASN:HD21	1.31	0.77
1:AAA:161:LEU:HD22	3:AAA:537:HOH:O	1.87	0.73
1:BBB:174:ASP:HA	3:BBB:487:HOH:O	1.91	0.70
1:AAA:119:ASP:N	3:AAA:402:HOH:O	2.28	0.66

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	AAA	124/133 (93%)	121 (98%)	3 (2%)	0	100	100
1	BBB	127/133 (96%)	125 (98%)	2 (2%)	0	100	100
All	All	251/266 (94%)	246 (98%)	5 (2%)	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	AAA	110/115 (96%)	109 (99%)	1 (1%)	78	65
1	BBB	112/115 (97%)	111 (99%)	1 (1%)	78	65
All	All	222/230 (96%)	220 (99%)	2 (1%)	78	65

All (2) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	AAA	154	ASN
1	BBB	174	ASP

Sometimes 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 ⓘ

There are no monosaccharides in this entry.

5.6   Ligand geometry ⓘ

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	NAG	BBB	301	1	14,14,15	1.00	1 (7%)	17,19,21	1.71	4 (23%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\lvert Z\rvert > 2$	Counts	RMSZ	$\#\lvert Z\rvert > 2$
2	NAG	AAA	301	1	14,14,15	0.85	0	17,19,21	1.25	2 (11%)

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	BBB	301	1	-	0/6/23/26	0/1/1/1
2	NAG	AAA	301	1	-	0/6/23/26	0/1/1/1

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	BBB	301	NAG	O7-C7	2.16	1.28	1.23

The worst 5 of 6 bond angle outliers are listed below:

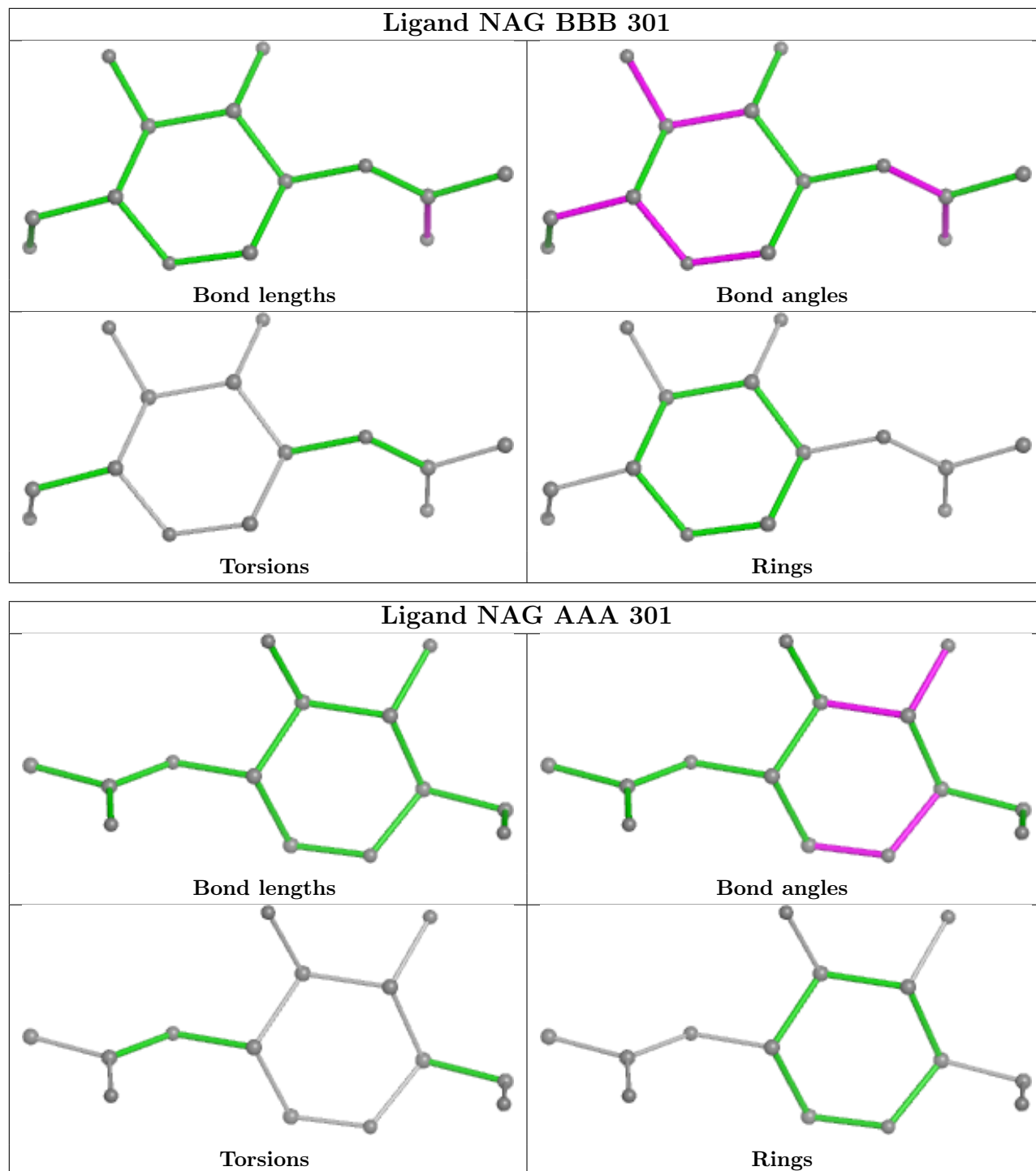| Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	BBB	301	NAG	C1-O5-C5	3.72	117.24	112.19
2	AAA	301	NAG	C1-O5-C5	2.80	115.98	112.19
2	BBB	301	NAG	O7-C7-N2	2.75	127.02	121.95
2	BBB	301	NAG	O4-C4-C3	-2.67	104.17	110.35
2	AAA	301	NAG	O4-C4-C3	-2.40	104.79	110.35

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

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 NAG BBB 301

Bond lengths

Bond angles

Torsions

Rings

Ligand NAG AAA 301

Bond lengths

Bond angles

Torsions

Rings

5.7　Other polymers ⓘ

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(Å²)	Q<0.9
1	AAA	121/133 (90%)	0.03	2 (1%)	70	69	12, 18, 34, 49	0
1	BBB	126/133 (94%)	0.03	2 (1%)	72	71	13, 19, 34, 46	0
All	All	247/266 (92%)	0.03	4 (1%)	72	71	12, 19, 34, 49	0

All (4) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	AAA	74	ILE	4.5
1	BBB	199	HIS	3.4
1	BBB	175	ILE	2.1
1	AAA	75	THR	2.1

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.
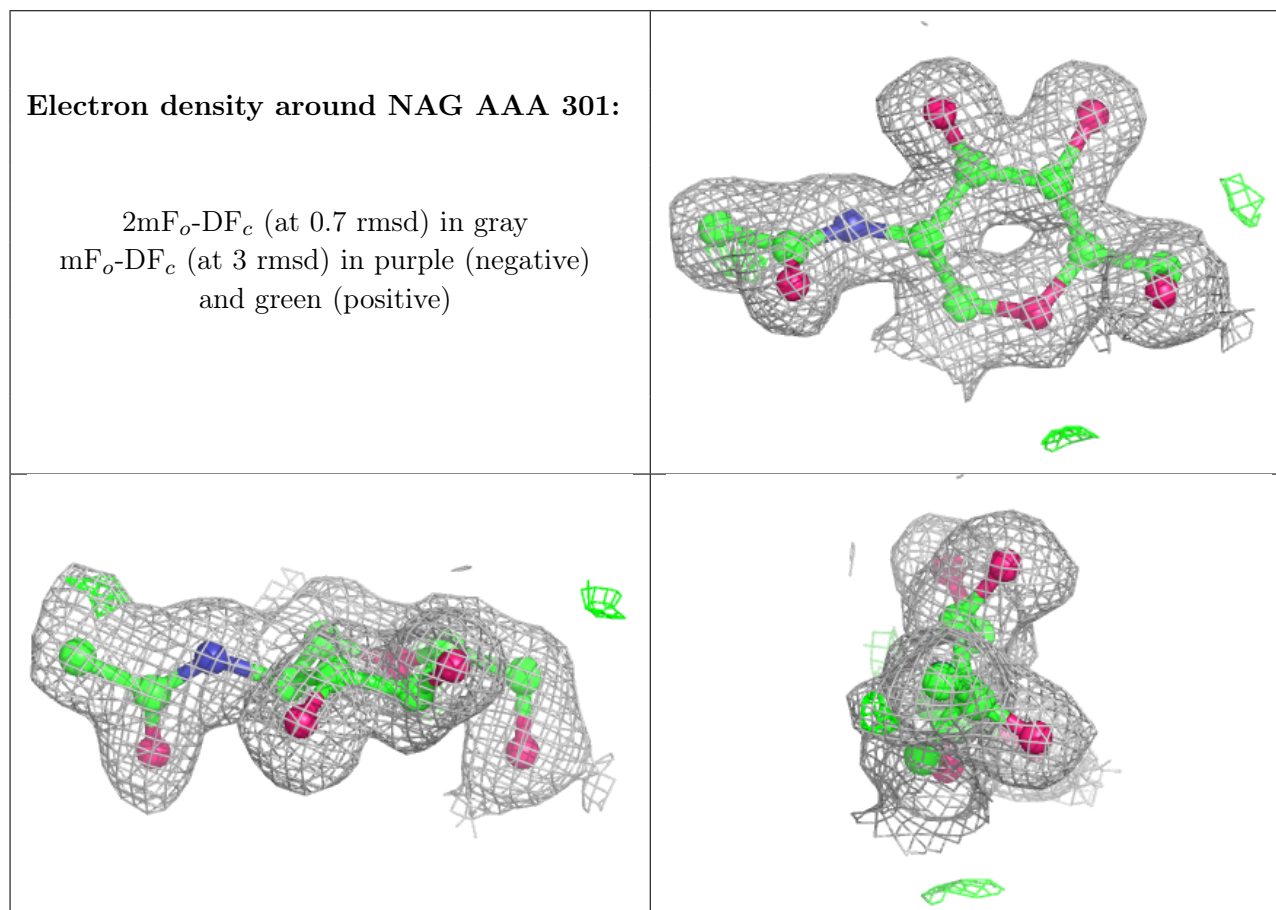
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å²)	Q<0.9
2	NAG	AAA	301	14/15	0.95	0.08	16,18,28,28	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
2	NAG	BBB	301	14/15	0.95	0.07	15,17,25,28	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 NAG AAA 301:

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

Electron density around NAG BBB 301:

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

6.5 Other polymers ⓘ

There are no such residues in this entry.