



Full wwPDB X-ray Structure Validation Report ⓘ

Oct 5, 2024 – 04:11 pm BST

PDB ID : 6HRO
Title : Crystal structure of Ebolavirus glycoprotein in complex with inhibitor 118a
Authors : Ren, J.; Zhao, Y.; Stuart, D.I.
Deposited on : 2018-09-27
Resolution : 2.30 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

<https://www.wwpdb.org/validation/2017/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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

MolProbity : 4.02b-467
Mogul : 1.8.4, CSD as541be (2020)
Xtriage (Phenix) : 1.13
EDS : 3.0
buster-report : 1.1.7 (2018)
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4 : 9.0.003 (Gargrove)
Density-Fitness : 1.0.11
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.39

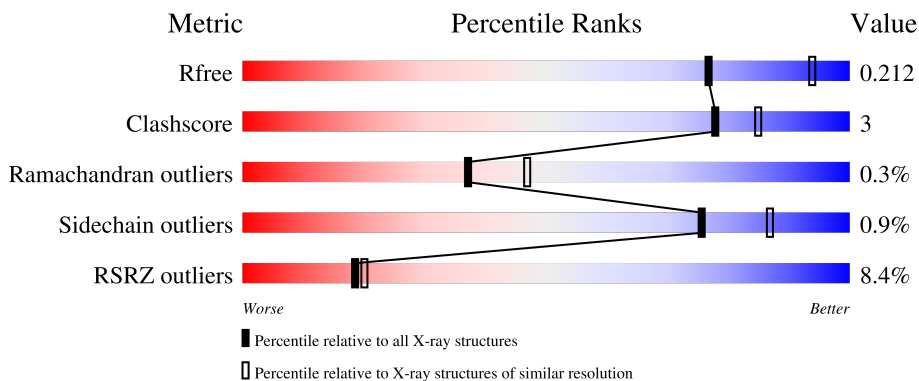
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.30 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}	164625	5963 (2.30-2.30)
Clashscore	180529	6698 (2.30-2.30)
Ramachandran outliers	177936	6640 (2.30-2.30)
Sidechain outliers	177891	6640 (2.30-2.30)
RSRZ outliers	164620	5963 (2.30-2.30)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$. The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	331	 6% 73% 5% 22%
2	B	168	 8% 70% 7% 23%
3	C	5	 60% 40%

2 Entry composition [i](#)

There are 8 unique types of molecules in this entry. The entry contains 3390 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 Envelope glycoprotein, Envelope glycoprotein, Envelope glycoprotein.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	258	2002	1276	340	381	5	0	1	0

There are 13 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	28	GLU	-	expression tag	UNP Q05320
A	29	THR	-	expression tag	UNP Q05320
A	30	GLY	-	expression tag	UNP Q05320
A	31	ARG	-	expression tag	UNP Q05320
A	42	ALA	THR	engineered mutation	UNP Q05320
A	471	UNK	-	linker	UNP Q05320
A	472	UNK	-	linker	UNP Q05320
A	473	UNK	-	linker	UNP Q05320
A	474	UNK	-	linker	UNP Q05320
A	475	UNK	-	linker	UNP Q05320
A	476	UNK	-	linker	UNP Q05320
A	477	UNK	-	linker	UNP Q05320
A	478	UNK	-	linker	UNP Q05320

- Molecule 2 is a protein called Envelope glycoprotein.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	B	130	1027	656	176	189	6	0	0	0

There are 38 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	613	ALA	HIS	engineered mutation	UNP Q05320
B	633	GLY	-	expression tag	UNP Q05320

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Chain	Residue	Modelled	Actual	Comment	Reference
B	634	SER	-	expression tag	UNP Q05320
B	635	GLY	-	expression tag	UNP Q05320
B	636	TYR	-	expression tag	UNP Q05320
B	637	ILE	-	expression tag	UNP Q05320
B	638	PRO	-	expression tag	UNP Q05320
B	639	GLU	-	expression tag	UNP Q05320
B	640	ALA	-	expression tag	UNP Q05320
B	641	PRO	-	expression tag	UNP Q05320
B	642	ARG	-	expression tag	UNP Q05320
B	643	ASP	-	expression tag	UNP Q05320
B	644	GLY	-	expression tag	UNP Q05320
B	645	GLN	-	expression tag	UNP Q05320
B	646	ALA	-	expression tag	UNP Q05320
B	647	TYR	-	expression tag	UNP Q05320
B	648	VAL	-	expression tag	UNP Q05320
B	649	ARG	-	expression tag	UNP Q05320
B	650	LYS	-	expression tag	UNP Q05320
B	651	ASP	-	expression tag	UNP Q05320
B	652	GLY	-	expression tag	UNP Q05320
B	653	GLU	-	expression tag	UNP Q05320
B	654	TRP	-	expression tag	UNP Q05320
B	655	VAL	-	expression tag	UNP Q05320
B	656	LEU	-	expression tag	UNP Q05320
B	657	LEU	-	expression tag	UNP Q05320
B	658	SER	-	expression tag	UNP Q05320
B	659	THR	-	expression tag	UNP Q05320
B	660	PHE	-	expression tag	UNP Q05320
B	661	LEU	-	expression tag	UNP Q05320
B	662	GLY	-	expression tag	UNP Q05320
B	663	THR	-	expression tag	UNP Q05320
B	664	HIS	-	expression tag	UNP Q05320
B	665	HIS	-	expression tag	UNP Q05320
B	666	HIS	-	expression tag	UNP Q05320
B	667	HIS	-	expression tag	UNP Q05320
B	668	HIS	-	expression tag	UNP Q05320
B	669	HIS	-	expression tag	UNP Q05320

- Molecule 3 is an oligosaccharide called alpha-D-mannopyranose-(1-3)-[alpha-D-mannopyranose-(1-6)]beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.



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

- Molecule 4 is 2-acetamido-2-deoxy-beta-D-glucopyranose (three-letter code: NAG) (formula: $C_8H_{15}NO_6$).



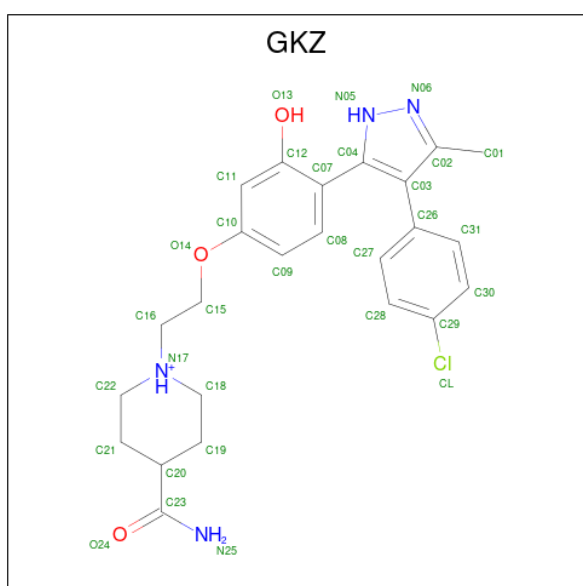
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	N	O		
4	A	1	14	8	1	5	0	0
4	A	1	14	8	1	5	0	0
4	A	1	14	8	1	5	0	0
4	A	1	14	8	1	5	0	0
4	B	1	14	8	1	5	0	0

- Molecule 5 is GLYCEROL (three-letter code: GOL) (formula: $C_3H_8O_3$).



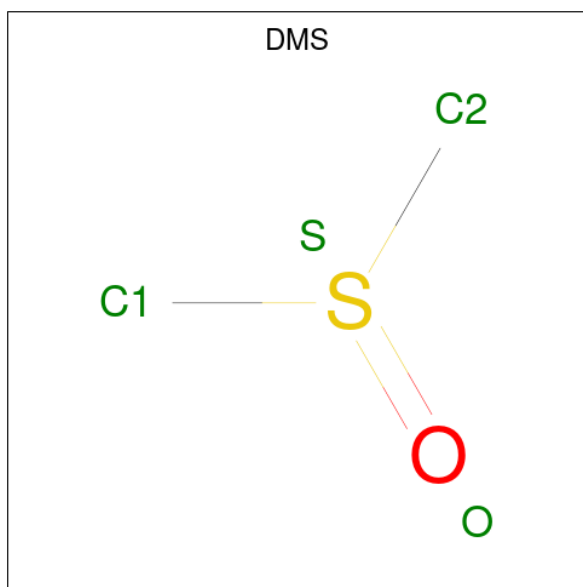
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	A	1	Total C O 6 3 3	0	0
5	A	1	Total C O 6 3 3	0	0
5	B	1	Total C O 6 3 3	0	0
5	B	1	Total C O 6 3 3	0	0

- Molecule 6 is 1-[2-[4-[4-(4-chlorophenyl)-3-methyl-1 {H}-pyrazol-5-yl]-3-oxidanyl-phenoxy]ethyl]piperidin-1-ium-4-carboxamide (three-letter code: GKZ) (formula: C₂₄H₂₈ClN₄O₃).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	
			Total	C	Cl	N			O
6	A	1	32	24	1	4	3	0	0
6	B	1	32	24	1	4	3	0	0

- Molecule 7 is DIMETHYL SULFOXIDE (three-letter code: DMS) (formula: C₂H₆OS).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	O	S		
7	A	1	4	2	1	1	0	0

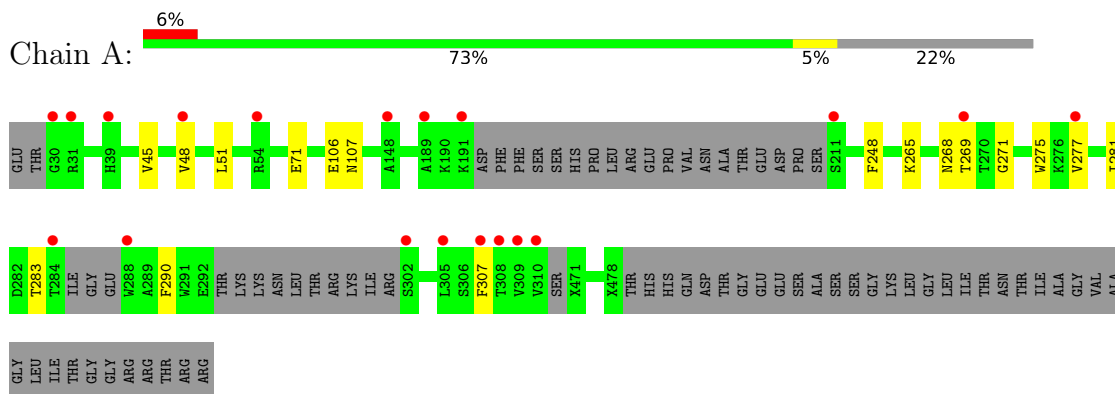
- Molecule 8 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	O		
8	A	84	84	84	0	0
8	B	54	54	54	0	0

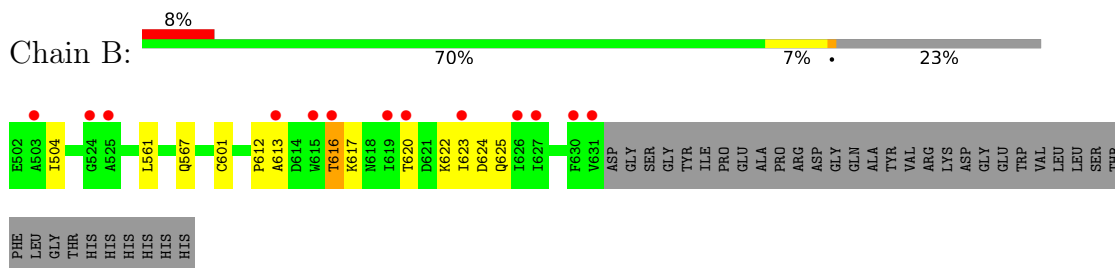
3 Residue-property plots [i](#)

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: Envelope glycoprotein,Envelope glycoprotein,Envelope glycoprotein



- Molecule 2: Envelope glycoprotein



- Molecule 3: alpha-D-mannopyranose-(1-3)-[alpha-D-mannopyranose-(1-6)]beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose



4 Data and refinement statistics

Property	Value	Source
Space group	H 3 2	Depositor
Cell constants a, b, c, α , β , γ	115.12Å 115.12Å 308.86Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	83.76 – 2.30 83.76 – 2.30	Depositor EDS
% Data completeness (in resolution range)	99.9 (83.76-2.30) 100.0 (83.76-2.30)	Depositor EDS
R_{merge}	0.10	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.73 (at 2.29Å)	Xtrriage
Refinement program	PHENIX (1.14_3260: ???)	Depositor
R, R_{free}	0.180 , 0.212 0.180 , 0.212	Depositor DCC
R_{free} test set	1696 reflections (4.79%)	wwPDB-VP
Wilson B-factor (Å ²)	63.6	Xtrriage
Anisotropy	0.357	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.33 , 78.4	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.33$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	3390	wwPDB-VP
Average B, all atoms (Å ²)	94.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.34% 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: GOL, MAN, DMS, BMA, GKZ, 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	A	0.26	0/2012	0.47	0/2733
2	B	0.25	0/1052	0.44	0/1434
All	All	0.26	0/3064	0.46	0/4167

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	2002	0	1901	10	0
2	B	1027	0	996	9	0
3	C	61	0	52	0	0
4	A	56	0	52	0	0
4	B	14	0	13	0	0
5	A	12	0	16	0	0
5	B	12	0	16	1	0
6	A	32	0	0	0	0
6	B	32	0	0	0	0
7	A	4	0	6	0	0
8	A	84	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
8	B	54	0	0	0	0
All	All	3390	0	3052	17	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 3.

All (17) 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)
2:B:617:LYS:HA	2:B:620:THR:HG22	1.66	0.78
1:A:277:VAL:HG12	1:A:281:ILE:HG12	1.80	0.63
1:A:269:THR:HG22	1:A:271:GLY:H	1.65	0.62
1:A:45:VAL:HG13	2:B:504:ILE:HG12	1.81	0.61
1:A:48:VAL:HA	1:A:51:LEU:HD12	1.88	0.55
1:A:106:GLU:HG3	1:A:290:PHE:CD1	2.43	0.53
1:A:45:VAL:HG12	2:B:561:LEU:HD13	1.92	0.52
2:B:623:ILE:HG13	2:B:624:ASP:N	2.26	0.50
1:A:248:PHE:HA	1:A:283:THR:HG21	1.94	0.49
1:A:71:GLU:OE2	1:A:107:ASN:N	2.48	0.47
2:B:620:THR:O	2:B:623:ILE:HG12	2.14	0.47
2:B:567:GLN:HB2	5:B:702:GOL:H11	1.98	0.46
2:B:613:ALA:O	2:B:616:THR:OG1	2.31	0.45
2:B:620:THR:HA	2:B:623:ILE:HG23	2.01	0.42
2:B:622:LYS:NZ	2:B:625:GLN:HG2	2.35	0.41
1:A:265:LYS:HG2	1:A:307:PHE:CG	2.56	0.41
1:A:275:TRP:CH2	1:A:307:PHE:HB3	2.56	0.41

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	243/331 (73%)	238 (98%)	5 (2%)	0	100	100
2	B	128/168 (76%)	122 (95%)	5 (4%)	1 (1%)	16	20
All	All	371/499 (74%)	360 (97%)	10 (3%)	1 (0%)	37	47

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	B	612	PRO

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	211/273 (77%)	210 (100%)	1 (0%)	86	93
2	B	108/139 (78%)	106 (98%)	2 (2%)	52	69
All	All	319/412 (77%)	316 (99%)	3 (1%)	75	87

All (3) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	268	ASN
2	B	601	CYS
2	B	616	THR

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

Mol	Chain	Res	Type
1	A	188	GLN

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains [i](#)

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

5.5 Carbohydrates [i](#)

5 monosaccharides 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	C	1	2,3	14,14,15	0.23	0	17,19,21	0.54	0
3	NAG	C	2	3	14,14,15	0.28	0	17,19,21	0.58	0
3	BMA	C	3	3	11,11,12	0.75	0	15,15,17	0.92	0
3	MAN	C	4	3	11,11,12	0.70	0	15,15,17	1.08	2 (13%)
3	MAN	C	5	3	11,11,12	0.81	0	15,15,17	1.31	2 (13%)

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. '2' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	NAG	C	1	2,3	-	0/6/23/26	0/1/1/1
3	NAG	C	2	3	-	0/6/23/26	0/1/1/1
3	BMA	C	3	3	-	0/2/19/22	0/1/1/1
3	MAN	C	4	3	-	0/2/19/22	0/1/1/1
3	MAN	C	5	3	-	0/2/19/22	1/1/1/1

There are no bond length outliers.

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	C	5	MAN	C1-O5-C5	3.59	117.06	112.19
3	C	4	MAN	C1-O5-C5	2.66	115.80	112.19
3	C	4	MAN	O2-C2-C3	-2.25	105.64	110.14
3	C	5	MAN	O2-C2-C3	-2.19	105.75	110.14

There are no chirality outliers.

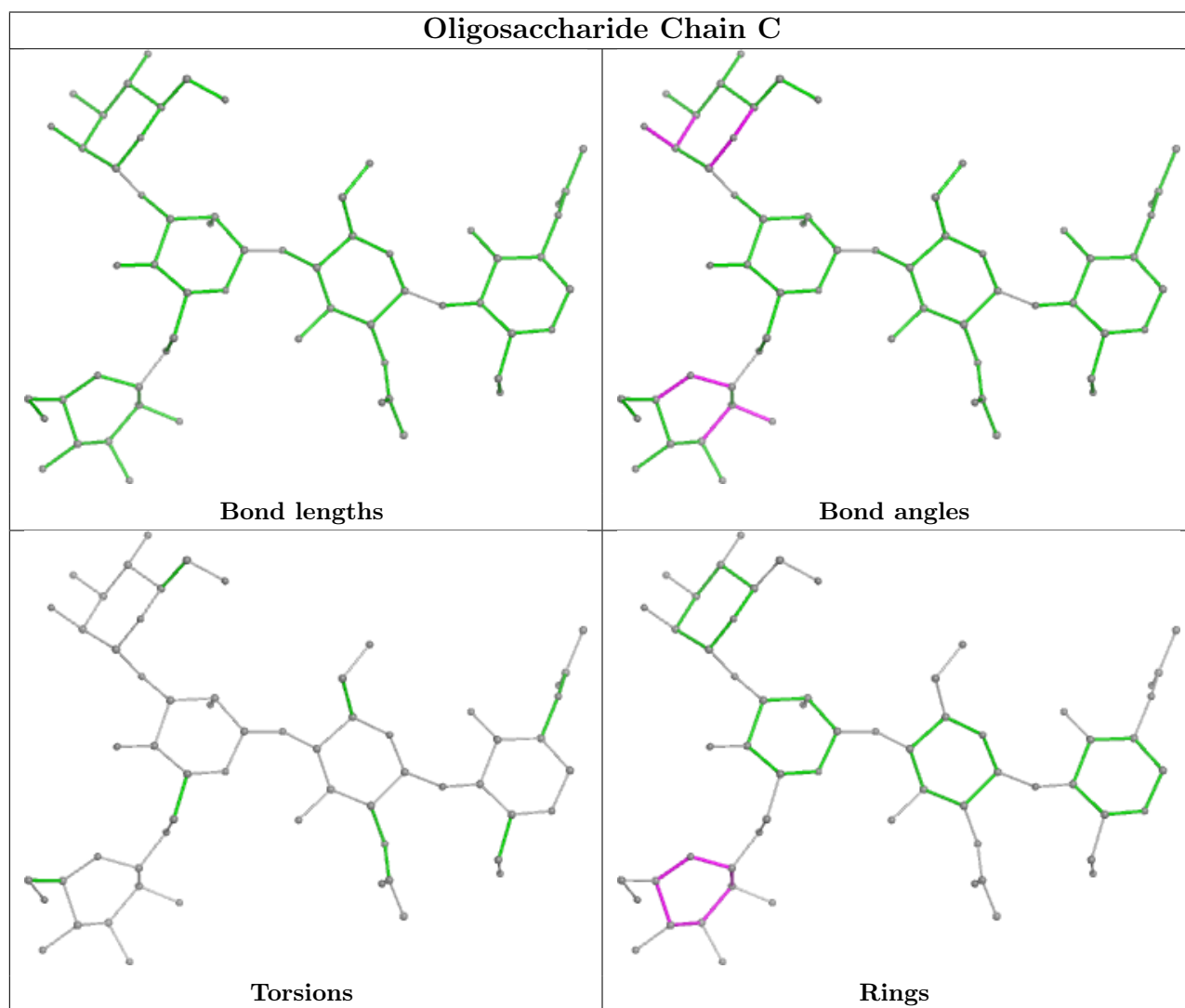
There are no torsion outliers.

All (1) ring outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	C	5	MAN	C1-C2-C3-C4-C5-O5

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 oligosaccharide.



5.6 Ligand geometry [i](#)

12 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
5	GOL	B	702	-	5,5,5	0.86	0	5,5,5	1.06	0
4	NAG	B	701	2	14,14,15	0.43	0	17,19,21	0.46	0
4	NAG	A	602	1	14,14,15	0.31	0	17,19,21	0.51	0
5	GOL	B	703	-	5,5,5	0.91	0	5,5,5	0.99	0
4	NAG	A	604	1	14,14,15	0.30	0	17,19,21	0.48	0
6	GKZ	A	607	-	33,35,35	3.29	11 (33%)	43,49,49	1.22	4 (9%)
5	GOL	A	606	-	5,5,5	0.87	0	5,5,5	1.02	0
6	GKZ	B	709	-	33,35,35	3.24	11 (33%)	43,49,49	1.22	5 (11%)
4	NAG	A	601	1	14,14,15	0.23	0	17,19,21	0.51	0
4	NAG	A	603	1	14,14,15	0.89	1 (7%)	17,19,21	1.04	1 (5%)
5	GOL	A	605	-	5,5,5	0.89	0	5,5,5	1.02	0
7	DMS	A	608	-	3,3,3	0.66	0	3,3,3	0.50	0

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
5	GOL	B	702	-	-	2/4/4/4	-
4	NAG	B	701	2	-	1/6/23/26	0/1/1/1
4	NAG	A	602	1	-	2/6/23/26	0/1/1/1
5	GOL	B	703	-	-	2/4/4/4	-
4	NAG	A	604	1	-	1/6/23/26	0/1/1/1
6	GKZ	A	607	-	-	8/16/28/28	0/4/4/4
5	GOL	A	606	-	-	2/4/4/4	-
6	GKZ	B	709	-	-	3/16/28/28	0/4/4/4
4	NAG	A	601	1	-	2/6/23/26	0/1/1/1
4	NAG	A	603	1	-	2/6/23/26	0/1/1/1
5	GOL	A	605	-	-	0/4/4/4	-

All (23) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
6	A	607	GKZ	C07-C04	-10.57	1.38	1.49
6	A	607	GKZ	C16-N17	-10.26	1.23	1.47
6	B	709	GKZ	C07-C04	-10.15	1.39	1.49
6	B	709	GKZ	C16-N17	-10.14	1.24	1.47
6	B	709	GKZ	C23-N25	6.44	1.49	1.32
6	A	607	GKZ	C23-N25	6.41	1.49	1.32
6	B	709	GKZ	C01-C02	3.62	1.56	1.50
6	A	607	GKZ	C19-C20	-3.61	1.43	1.53
6	B	709	GKZ	C19-C20	-3.59	1.43	1.53
6	A	607	GKZ	C01-C02	3.55	1.56	1.50
6	A	607	GKZ	C20-C23	3.55	1.58	1.52
6	A	607	GKZ	C03-C26	-3.53	1.43	1.50
6	B	709	GKZ	O13-C12	3.46	1.43	1.36
6	A	607	GKZ	O13-C12	3.44	1.43	1.36
6	B	709	GKZ	C20-C23	3.42	1.58	1.52
6	B	709	GKZ	C03-C26	-3.30	1.44	1.50
4	A	603	NAG	O5-C1	2.96	1.48	1.43
6	B	709	GKZ	C21-C20	-2.70	1.46	1.53
6	A	607	GKZ	C21-C20	-2.67	1.46	1.53
6	B	709	GKZ	C16-C15	2.33	1.58	1.50
6	A	607	GKZ	O24-C23	-2.27	1.19	1.23
6	B	709	GKZ	O24-C23	-2.25	1.19	1.23
6	A	607	GKZ	C16-C15	2.21	1.57	1.50

All (10) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	A	603	NAG	C1-O5-C5	4.03	117.65	112.19
6	A	607	GKZ	C01-C02-N06	3.27	126.84	119.65
6	A	607	GKZ	C07-C04-N05	3.22	126.30	120.78
6	B	709	GKZ	C01-C02-N06	2.95	126.13	119.65
6	A	607	GKZ	C22-C21-C20	2.71	114.92	110.41
6	B	709	GKZ	C22-C21-C20	2.69	114.89	110.41
6	B	709	GKZ	C19-C20-C21	2.64	115.55	109.97
6	B	709	GKZ	C18-C19-C20	2.25	114.16	110.41
6	B	709	GKZ	C20-C23-N25	2.16	120.02	116.54
6	A	607	GKZ	C12-C07-C04	-2.12	119.14	121.38

There are no chirality outliers.

All (25) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
5	A	606	GOL	O1-C1-C2-O2

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Mol	Chain	Res	Type	Atoms
5	B	702	GOL	O1-C1-C2-C3
5	B	703	GOL	C1-C2-C3-O3
6	B	709	GKZ	C19-C20-C23-N25
6	B	709	GKZ	C19-C20-C23-O24
4	A	602	NAG	O5-C5-C6-O6
4	A	602	NAG	C4-C5-C6-O6
6	A	607	GKZ	C16-C15-O14-C10
5	A	606	GOL	O1-C1-C2-C3
6	B	709	GKZ	O14-C15-C16-N17
6	A	607	GKZ	O14-C15-C16-N17
5	B	703	GOL	O2-C2-C3-O3
4	A	603	NAG	C4-C5-C6-O6
4	A	601	NAG	C4-C5-C6-O6
5	B	702	GOL	O1-C1-C2-O2
6	A	607	GKZ	C09-C10-O14-C15
6	A	607	GKZ	C11-C10-O14-C15
6	A	607	GKZ	C15-C16-N17-C18
4	A	601	NAG	O5-C5-C6-O6
4	A	603	NAG	O5-C5-C6-O6
6	A	607	GKZ	C15-C16-N17-C22
4	A	604	NAG	O5-C5-C6-O6
4	B	701	NAG	C1-C2-N2-C7
6	A	607	GKZ	C04-C03-C26-C31
6	A	607	GKZ	C02-C03-C26-C27

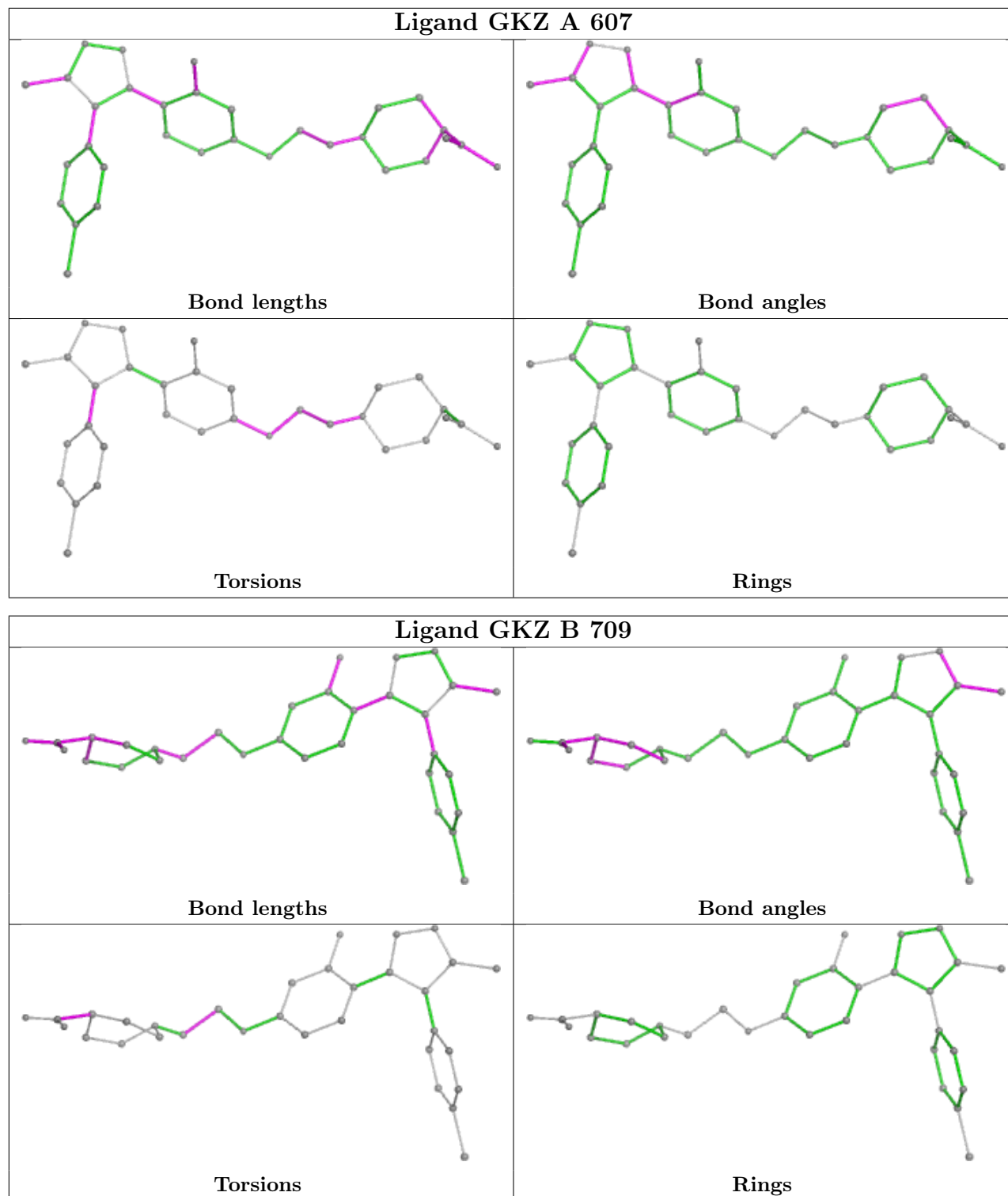
There are no ring outliers.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	B	702	GOL	1	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 than 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.



5.7 Other polymers [\(i\)](#)

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	250/331 (75%)	0.24	19 (7%) 21 23	49, 80, 151, 216	1 (0%)
2	B	130/168 (77%)	0.36	13 (10%) 14 15	54, 75, 198, 228	0
All	All	380/499 (76%)	0.29	32 (8%) 18 20	49, 78, 178, 228	1 (0%)

All (32) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	288	TRP	5.6
2	B	626	ILE	5.5
2	B	631	VAL	5.2
1	A	310	VAL	4.7
2	B	623	ILE	4.6
2	B	627	ILE	4.3
1	A	30	GLY	3.9
1	A	191	LYS	3.8
1	A	284	THR	3.7
2	B	615	TRP	3.2
2	B	630	PHE	3.2
2	B	619	ILE	3.1
1	A	31	ARG	2.9
1	A	48	VAL	2.8
1	A	308	THR	2.8
1	A	269	THR	2.7
1	A	189	ALA	2.7
1	A	302	SER	2.6
1	A	309	VAL	2.6
1	A	305	LEU	2.4
1	A	277	VAL	2.3
2	B	620	THR	2.3
1	A	211	SER	2.3
2	B	525	ALA	2.2

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Mol	Chain	Res	Type	RSRZ
2	B	616	THR	2.2
2	B	503	ALA	2.2
2	B	613	ALA	2.2
1	A	54	ARG	2.2
2	B	524	GLY	2.1
1	A	148	ALA	2.1
1	A	307	PHE	2.0
1	A	39[A]	HIS	2.0

6.2 Non-standard residues in protein, DNA, RNA chains [i](#)

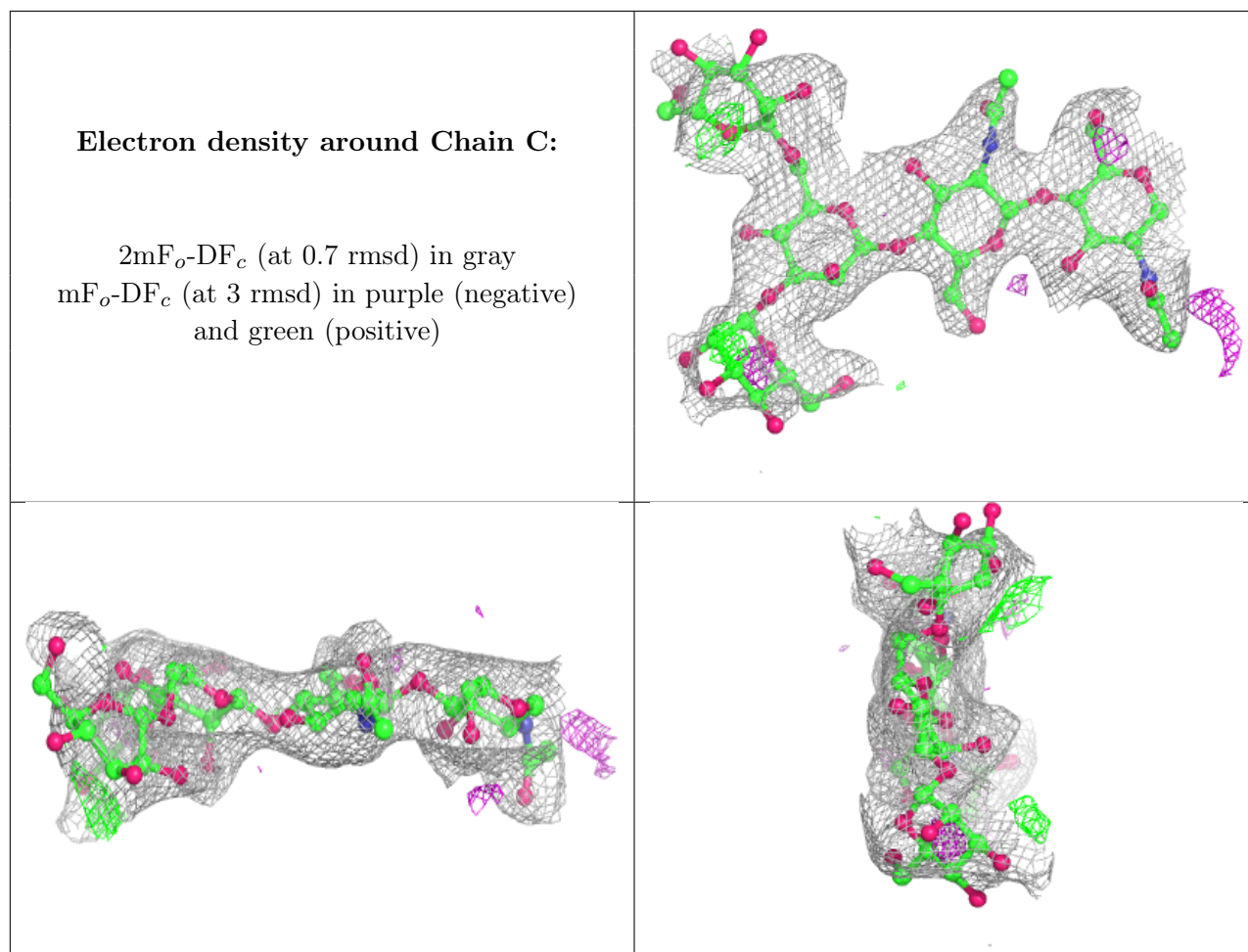
There are no non-standard protein/DNA/RNA residues in this entry.

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. 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
3	MAN	C	5	11/12	0.21	0.15	162,174,191,195	0
3	MAN	C	4	11/12	0.80	0.15	130,161,173,180	0
3	BMA	C	3	11/12	0.80	0.09	132,145,162,167	0
3	NAG	C	2	14/15	0.91	0.14	111,121,135,144	0
3	NAG	C	1	14/15	0.97	0.08	59,71,75,87	0

The following is a graphical depiction of the model fit to experimental electron density for oligosaccharide. Each fit is shown from different orientation to approximate a three-dimensional view.



6.4 Ligands [i](#)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q<0.9' lists the number of atoms with occupancy less than 0.9.

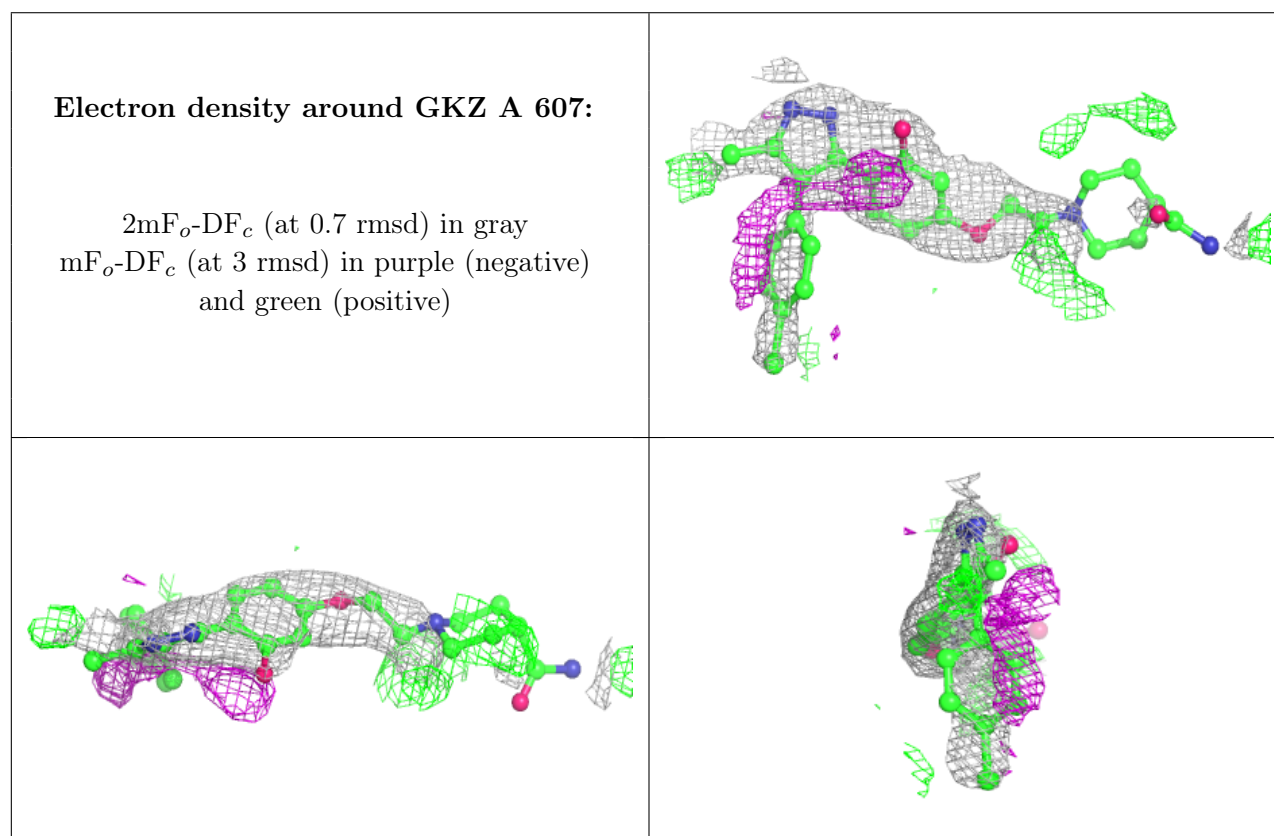
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
4	NAG	A	603	14/15	0.43	0.15	145,171,186,186	0
4	NAG	B	701	14/15	0.48	0.17	169,199,213,214	0
7	DMS	A	608	4/4	0.71	0.30	160,168,173,173	0
4	NAG	A	604	14/15	0.76	0.17	139,157,175,179	0
6	GKZ	A	607	32/32	0.81	0.24	130,161,183,187	0
4	NAG	A	602	14/15	0.87	0.11	115,133,141,142	0
5	GOL	B	703	6/6	0.88	0.16	118,120,123,134	0
5	GOL	A	606	6/6	0.90	0.15	88,107,109,111	0
5	GOL	A	605	6/6	0.90	0.16	86,93,106,116	0
6	GKZ	B	709	32/32	0.92	0.13	65,89,116,123	0
5	GOL	B	702	6/6	0.93	0.13	79,98,105,109	0

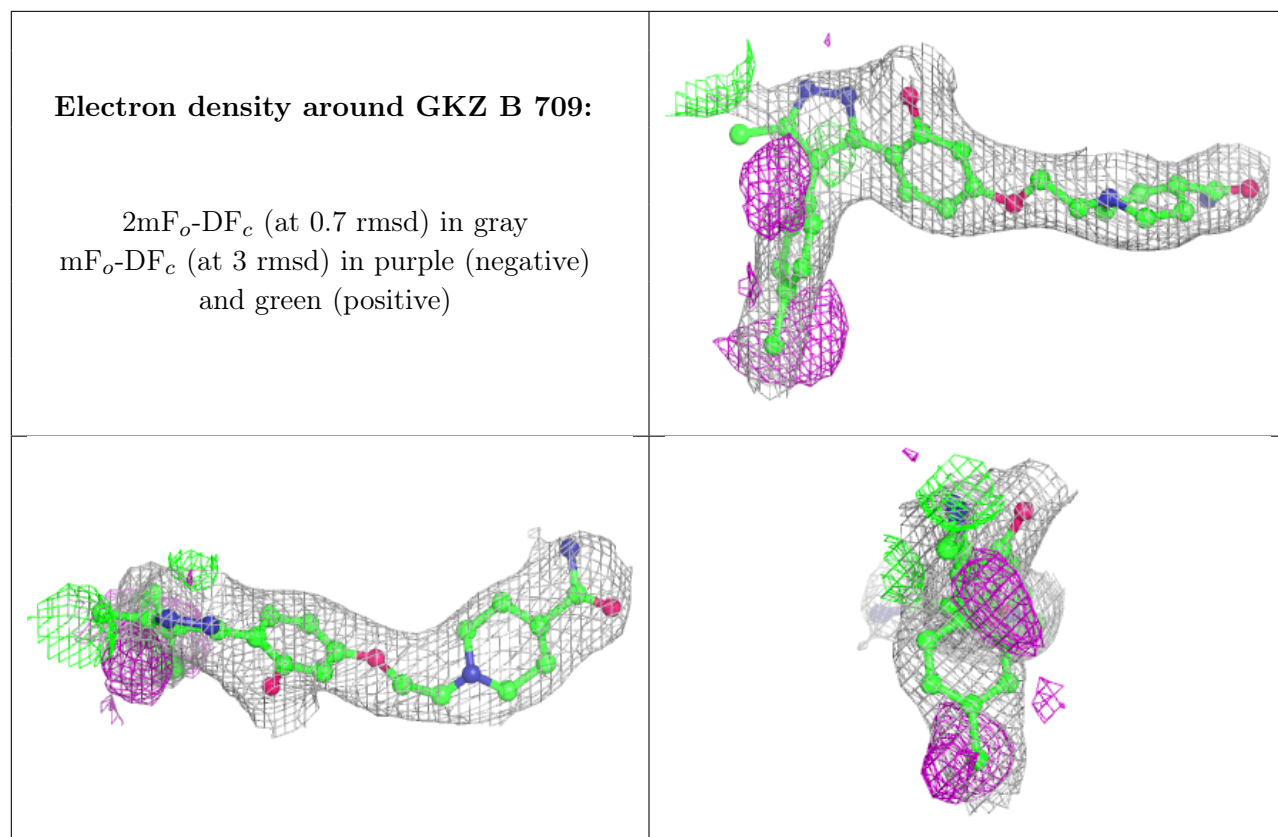
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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
4	NAG	A	601	14/15	0.94	0.09	75,91,98,101	0

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.





6.5 Other polymers [i](#)

There are no such residues in this entry.