



# Full wwPDB X-ray Structure Validation Report ⓘ

Mar 30, 2026 – 10:42 am BST

PDB ID : 9R18 / pdb\_00009r18  
Title : Structure of Sortilin ECD in complex with TNFa-targeting SORTAC  
Authors : Gustafsen, C.; Larsen, C.; Glerup, S.  
Deposited on : 2025-04-25  
Resolution : 2.80 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](mailto: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>.

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

MolProbity : 4-5-2 with Phenix2.0  
Mogul : 1.8.4, CSD as541be (2020)  
Xtriage (Phenix) : 2.0  
EDS : 3.0  
buster-report : 1.1.7 (2018)  
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)  
CCP4 : 9.0.010 (Gargrove)  
Density-Fitness : 1.0.12  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.48.1

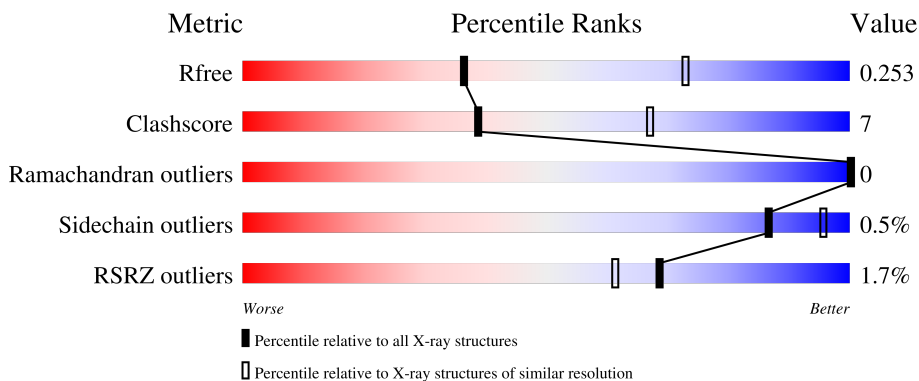
# 1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.80 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	3657 (2.80-2.80)
Clashscore	180529	4123 (2.80-2.80)
Ramachandran outliers	177936	4071 (2.80-2.80)
Sidechain outliers	177891	4073 (2.80-2.80)
RSRZ outliers	164620	3659 (2.80-2.80)

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  $\geq 3$ , 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	762	 % 70% 15% • 14%
2	B	2	 100%
2	C	2	 100%

## 2 Entry composition [i](#)

There are 5 unique types of molecules in this entry. The entry contains 10547 atoms, of which 5122 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 Sortilin.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
			Total	C	H	N	O	S			
1	A	658	10166	3273	4986	868	1010	29	171	0	0

There are 7 discrepancies between the modelled and reference sequences:

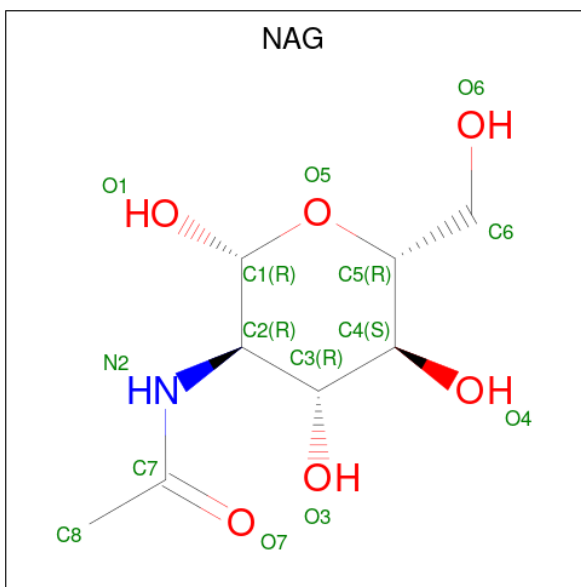
Chain	Residue	Modelled	Actual	Comment	Reference
A	650	MET	VAL	conflict	UNP Q99523
A	757	HIS	-	expression tag	UNP Q99523
A	758	HIS	-	expression tag	UNP Q99523
A	759	HIS	-	expression tag	UNP Q99523
A	760	HIS	-	expression tag	UNP Q99523
A	761	HIS	-	expression tag	UNP Q99523
A	762	HIS	-	expression tag	UNP Q99523

- Molecule 2 is an oligosaccharide called 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.



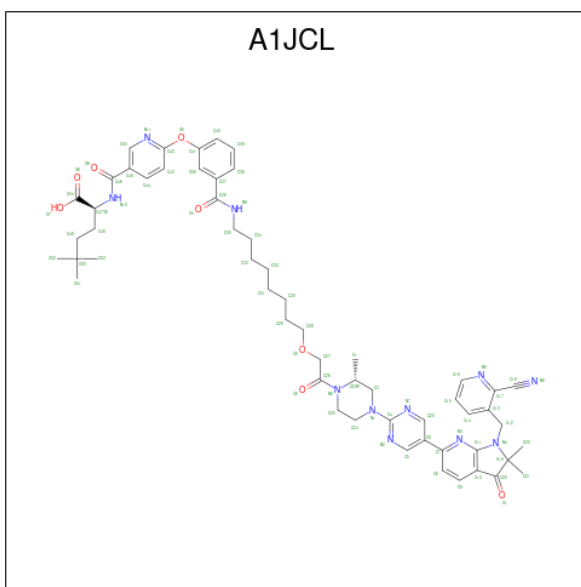
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	H	N	O			
2	C	2	56	16	28	2	10	13	0	0
2	B	2	56	16	28	2	10	13	0	0

- Molecule 3 is 2-acetamido-2-deoxy-beta-D-glucopyranose (CCD ID: NAG) (formula: C<sub>8</sub>H<sub>15</sub>NO<sub>6</sub>).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	H	N	O		
3	A	1	28	8	14	1	5	6	0

- Molecule 4 is (2 {S})-2-[[6-[3-[8-[2-[(2 {R})-4-[5-[1-[(2-cyanopyridin-3-yl)methyl]-2,2-dimethyl-3-oxidanylidene-pyrrolo[2,3-b]pyridin-6-yl]pyrimidin-2-yl]-2-methyl-piperazin-1-yl]-2-oxidanylidene-ethoxy]octylcarbamoyl]phenoxy]pyridin-3-yl]carbonylamino]-5,5-dimethyl-hexanoic acid (CCD ID: A1JCL) (formula: C<sub>56</sub>H<sub>67</sub>N<sub>11</sub>O<sub>8</sub>) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	H	N	O		
4	A	1	141	56	66	11	8	89	0

- Molecule 5 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	100	Total 100	O 100	0	0



## 4 Data and refinement statistics

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	161.77Å 75.62Å 110.20Å 90.00° 127.39° 90.00°	Depositor
Resolution (Å)	79.88 – 2.80 79.88 – 2.80	Depositor EDS
% Data completeness (in resolution range)	95.9 (79.88-2.80) 95.9 (79.88-2.80)	Depositor EDS
$R_{merge}$	0.21	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.75 (at 2.82Å)	Xtrriage
Refinement program	REFMAC 5.8.0430 (refmacat 0.4.100)	Depositor
R, $R_{free}$	0.212 , 0.253 0.212 , 0.253	Depositor DCC
$R_{free}$ test set	1228 reflections (4.69%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	63.8	Xtrriage
Anisotropy	0.658	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.41 , 88.0	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.49$ , $\langle L^2 \rangle = 0.32$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
$F_o, F_c$ correlation	0.94	EDS
Total number of atoms	10547	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	97.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.65% of the height of the origin peak. No significant pseudotranslation is detected.*

<sup>1</sup>Intensities estimated from amplitudes.

<sup>2</sup>Theoretical 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: A1JCL, 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	0.62	0/5302	1.12	14/7184 (0.2%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	1

There are no bond length outliers.

All (14) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	561	THR	CA-CB-OG1	-7.13	98.90	109.60
1	A	371	THR	CA-CB-OG1	-6.11	100.44	109.60
1	A	402	THR	CA-CB-OG1	-6.09	100.46	109.60
1	A	744	PHE	CA-CB-CG	5.82	119.62	113.80
1	A	168	THR	CA-CB-OG1	-5.68	101.08	109.60
1	A	423	ASN	CA-CB-CG	-5.64	106.96	112.60
1	A	526	THR	CA-CB-OG1	-5.39	101.52	109.60
1	A	298	THR	CA-CB-OG1	-5.22	101.76	109.60
1	A	264	ASP	CA-CB-CG	5.22	117.82	112.60
1	A	449	ASP	CA-CB-CG	5.09	117.69	112.60
1	A	362	PHE	CA-CB-CG	5.04	118.84	113.80
1	A	404	PHE	N-CA-CB	5.04	117.47	109.71
1	A	331	THR	CA-CB-OG1	-5.01	102.08	109.60
1	A	266	THR	CA-CB-OG1	-5.00	102.10	109.60

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	311	ARG	Sidechain

## 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	5180	4986	4967	68	0
2	B	28	28	25	0	0
2	C	28	28	25	0	0
3	A	14	14	13	1	0
4	A	75	66	0	0	0
5	A	100	0	0	2	0
All	All	5425	5122	5030	69	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.

All (69) 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:109:ARG:HH21	1:A:141:GLN:HE22	1.41	0.68
1:A:288:ARG:NH1	1:A:333:GLN:O	2.30	0.65
1:A:108:LEU:HA	1:A:128:THR:HG21	1.81	0.63
3:A:801:NAG:O7	3:A:801:NAG:C1	2.46	0.62
1:A:129:THR:HG23	1:A:165:PHE:CE1	2.36	0.60
1:A:643:LEU:HD12	1:A:660:THR:HG21	1.83	0.59
1:A:134:LEU:HG	1:A:135:VAL:H	1.67	0.58
1:A:420:SER:OG	1:A:422:ASP:OD1	2.13	0.58
1:A:547:ILE:HD12	1:A:585:ILE:HD11	1.86	0.58
1:A:172:MET:HG2	1:A:184:LEU:CD2	2.35	0.56
1:A:420:SER:HB3	1:A:426:GLN:HE21	1.70	0.56
1:A:131:HIS:HD2	1:A:140:GLY:HA2	1.70	0.55
1:A:569:PHE:HZ	1:A:572:LEU:HG	1.71	0.55
1:A:239:LEU:HB2	1:A:256:VAL:HG21	1.88	0.54
1:A:354:LEU:HB3	1:A:404:PHE:CD2	2.42	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:546:VAL:HG22	1:A:561:THR:HG22	1.90	0.53
1:A:477:ALA:HB1	1:A:478:PRO:CD	2.39	0.53
1:A:291:ASP:CG	1:A:294:LYS:HB2	2.34	0.52
1:A:679:TYR:CD1	1:A:714:GLY:HA2	2.45	0.52
1:A:636:LEU:O	1:A:721:ASP:HA	2.11	0.51
1:A:529:ASP:O	1:A:530:SER:C	2.53	0.51
1:A:115:SER:OG	1:A:172:MET:HE3	2.11	0.50
1:A:379:SER:HB3	1:A:386:TYR:CE2	2.47	0.50
1:A:142:SER:OG	1:A:164:THR:O	2.29	0.49
1:A:477:ALA:HB1	1:A:478:PRO:HD2	1.93	0.49
1:A:367:GLU:CD	1:A:368:PRO:HD2	2.40	0.47
1:A:443:PRO:O	1:A:446:SER:HB3	2.14	0.46
1:A:319:ALA:HB3	1:A:322:ASP:HB2	1.97	0.46
1:A:172:MET:HG2	1:A:184:LEU:HD22	1.97	0.46
1:A:360:MET:HB3	1:A:360:MET:HE3	1.58	0.45
1:A:379:SER:O	1:A:719:PRO:HG2	2.17	0.45
1:A:537:ILE:HG21	1:A:569:PHE:CD1	2.51	0.45
1:A:198:PHE:CE1	1:A:209:GLN:HG2	2.53	0.44
1:A:108:LEU:HD12	1:A:597:TRP:CB	2.46	0.44
1:A:229:TYR:CE2	1:A:292:LEU:HD11	2.52	0.44
1:A:419:LEU:HD11	1:A:423:ASN:HA	1.99	0.44
1:A:416:THR:HG22	1:A:437:TRP:CZ3	2.53	0.44
1:A:631:GLU:OE1	1:A:666:CYS:HB3	2.18	0.43
1:A:131:HIS:HB3	1:A:138:THR:CG2	2.48	0.43
1:A:270:THR:HG23	1:A:306:PHE:CD1	2.54	0.43
1:A:724:GLN:HG2	5:A:968:HOH:O	2.17	0.43
1:A:158:THR:O	1:A:161:ILE:HG12	2.18	0.43
1:A:392:ARG:O	1:A:418:VAL:HA	2.19	0.43
1:A:675:CYS:SG	1:A:681:ARG:HG3	2.59	0.43
1:A:121:THR:HG21	1:A:203:PHE:CE2	2.54	0.43
1:A:440:LEU:N	1:A:440:LEU:HD12	2.34	0.43
1:A:131:HIS:HA	1:A:139:PHE:O	2.19	0.42
1:A:653:ASN:HB3	1:A:657:TYR:CD1	2.53	0.42
1:A:469:SER:C	1:A:471:LYS:H	2.26	0.42
1:A:436:ARG:NH2	1:A:438:THR:HG21	2.35	0.42
1:A:129:THR:HG23	1:A:165:PHE:CZ	2.54	0.42
1:A:181:LYS:HB3	1:A:245:PHE:CE1	2.55	0.42
1:A:537:ILE:HG13	1:A:572:LEU:HD21	2.02	0.42
1:A:89:VAL:HG11	1:A:607:ILE:HD12	2.01	0.41
1:A:116:TRP:CH2	1:A:124:ILE:HD11	2.56	0.41
1:A:570:THR:HG23	1:A:587:GLY:HA2	2.02	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:371:THR:HB	1:A:373:PHE:CE2	2.55	0.41
1:A:475:PRO:HD2	1:A:491:HIS:CE1	2.55	0.41
1:A:717:LYS:O	1:A:718:ILE:C	2.63	0.41
1:A:291:ASP:OD2	1:A:294:LYS:HB2	2.20	0.41
1:A:658:VAL:HA	5:A:931:HOH:O	2.19	0.41
1:A:114:LEU:HD23	1:A:115:SER:N	2.35	0.41
1:A:463:HIS:CD2	1:A:492:GLY:HA2	2.56	0.41
1:A:199:ARG:HD2	1:A:245:PHE:O	2.21	0.41
1:A:410:LEU:HD22	1:A:511:GLY:HA3	2.03	0.41
1:A:393:HIS:NE2	1:A:416:THR:OG1	2.50	0.40
1:A:312:PHE:HD1	1:A:331:THR:HG22	1.86	0.40
1:A:117:VAL:HG22	1:A:174:ILE:HD12	2.03	0.40
1:A:314:PHE:CZ	1:A:361:VAL:HG21	2.56	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	654/762 (86%)	630 (96%)	24 (4%)	0	<b>100</b> <b>100</b>

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	575/655 (88%)	572 (100%)	3 (0%)	86 95

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

Mol	Chain	Res	Type
1	A	322	ASP
1	A	713	ASN
1	A	744	PHE

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (12) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	103	HIS
1	A	131	HIS
1	A	141	GLN
1	A	163	ASN
1	A	206	ASN
1	A	426	GLN
1	A	433	GLN
1	A	439	HIS
1	A	473	ASN
1	A	684	ASN
1	A	691	GLN
1	A	728	ASN

### 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](#)

4 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
2	NAG	B	1	1,2	14,14,15	0.38	0	17,19,21	0.61	0
2	NAG	B	2	2	14,14,15	0.40	0	17,19,21	0.34	0
2	NAG	C	1	1,2	14,14,15	0.40	0	17,19,21	0.62	0
2	NAG	C	2	2	14,14,15	0.42	0	17,19,21	0.37	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
2	NAG	B	1	1,2	-	0/6/23/26	0/1/1/1
2	NAG	B	2	2	-	0/6/23/26	0/1/1/1
2	NAG	C	1	1,2	-	1/6/23/26	0/1/1/1
2	NAG	C	2	2	-	2/6/23/26	0/1/1/1

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

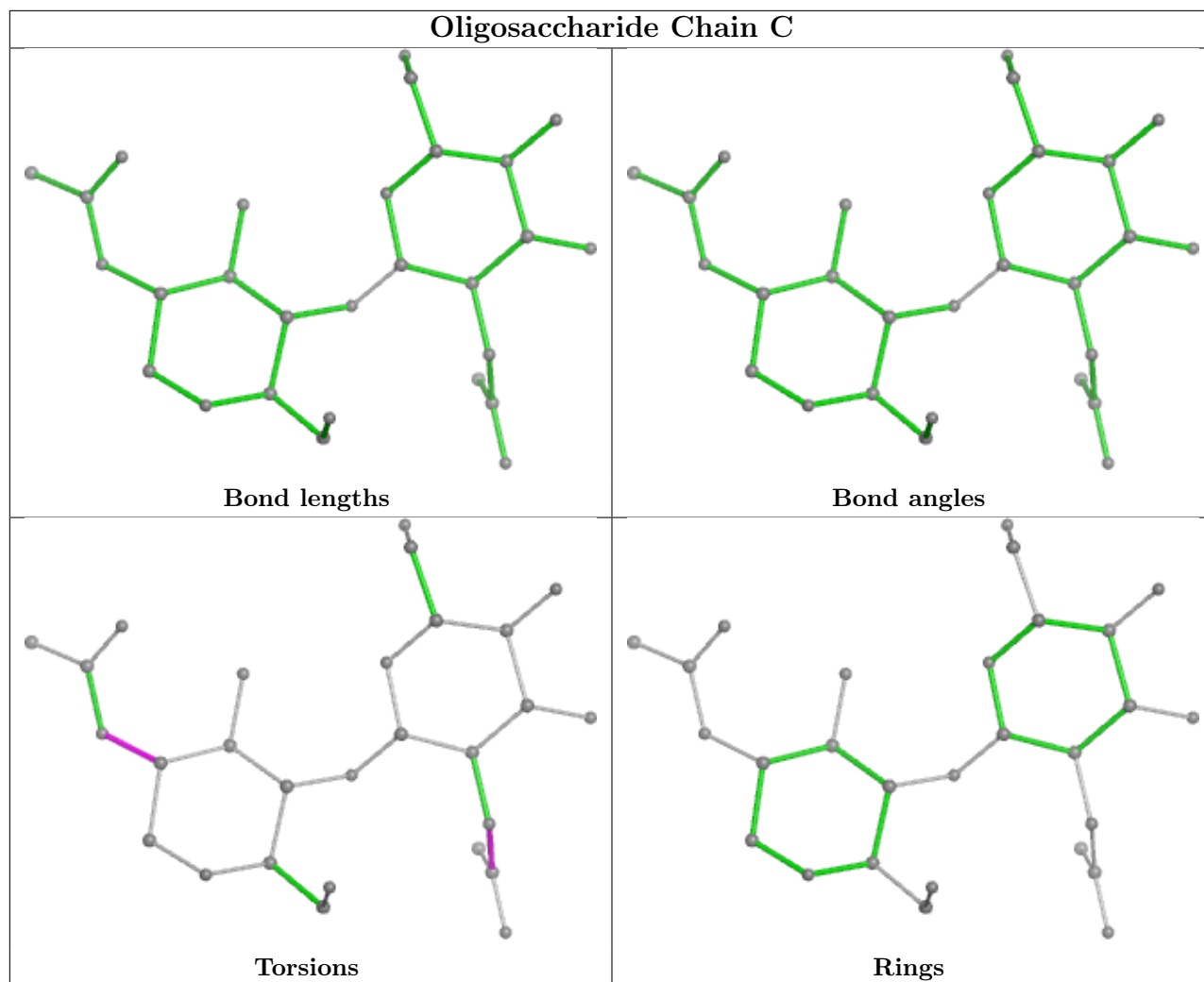
All (3) torsion outliers are listed below:

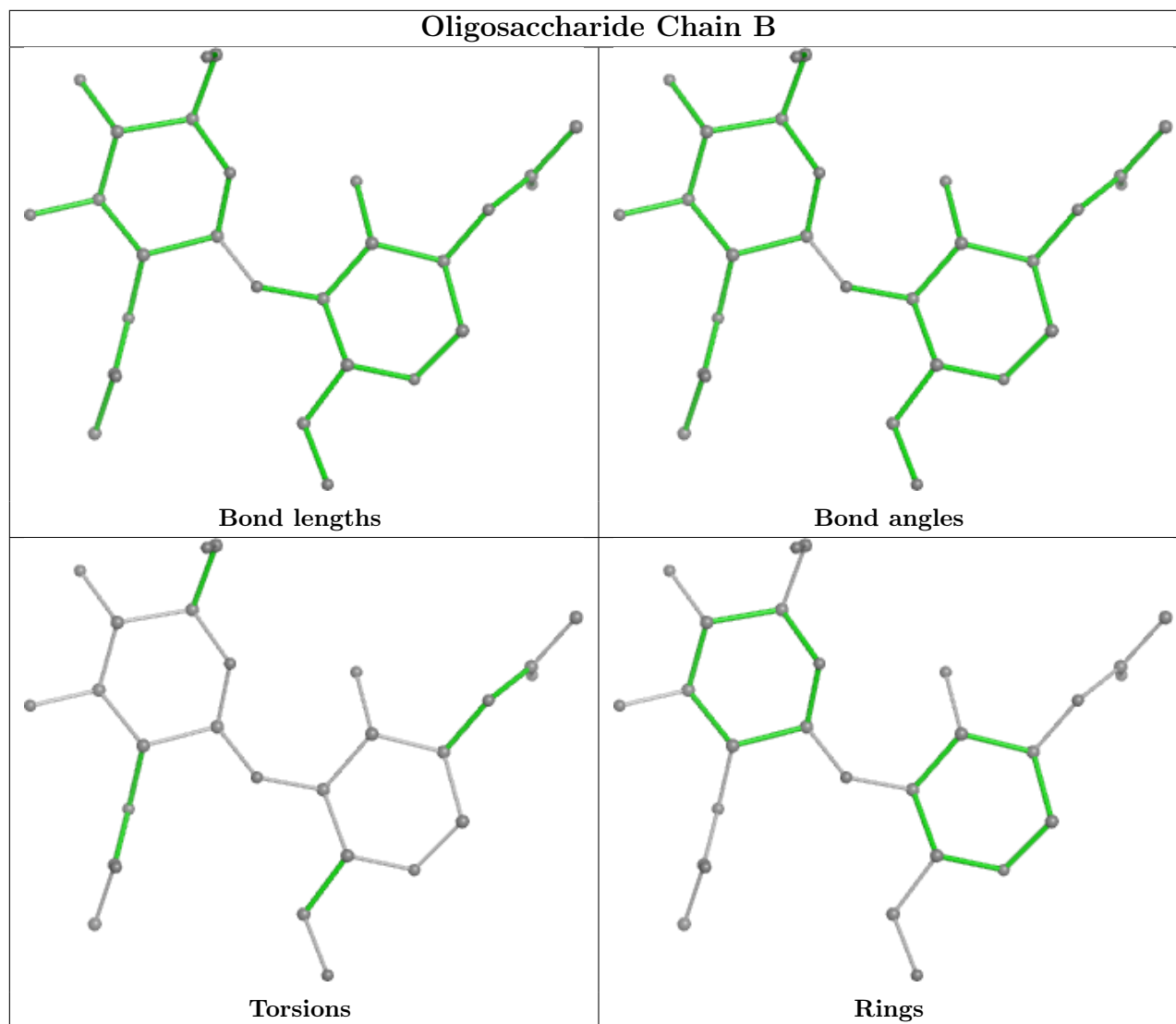
Mol	Chain	Res	Type	Atoms
2	C	2	NAG	C8-C7-N2-C2
2	C	2	NAG	O7-C7-N2-C2
2	C	1	NAG	C1-C2-N2-C7

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 oligosaccharide.





## 5.6 Ligand geometry [i](#)

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	$\# Z  > 2$
3	NAG	A	801	1	14,14,15	0.74	0	17,19,21	1.28	2 (11%)
4	A1JCL	A	802	-	79,81,81	1.14	1 (1%)	105,114,114	1.48	9 (8%)

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	801	1	-	1/6/23/26	0/1/1/1
4	A1JCL	A	802	-	-	5/56/91/91	0/7/7/7

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	A	802	A1JCL	C35-N9	-9.22	1.25	1.46

All (11) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	A	802	A1JCL	C35-N9-C36	9.99	144.87	122.08
4	A	802	A1JCL	C34-C35-N9	6.25	130.08	112.21
3	A	801	NAG	C1-O5-C5	3.87	117.44	112.19
4	A	802	A1JCL	C11-C10-C22	3.12	109.36	105.01
4	A	802	A1JCL	C10-C11-N3	-2.85	124.86	126.71
4	A	802	A1JCL	C48-C47-N10	-2.66	105.51	110.88
4	A	802	A1JCL	C9-C10-C22	2.43	132.26	128.98
4	A	802	A1JCL	C19-N4-C11	2.20	112.35	108.95
4	A	802	A1JCL	C9-C10-C11	2.18	118.38	116.60
4	A	802	A1JCL	C54-C47-N10	2.16	115.66	110.55
3	A	801	NAG	O5-C1-C2	2.04	114.51	111.29

There are no chirality outliers.

All (6) torsion outliers are listed below:

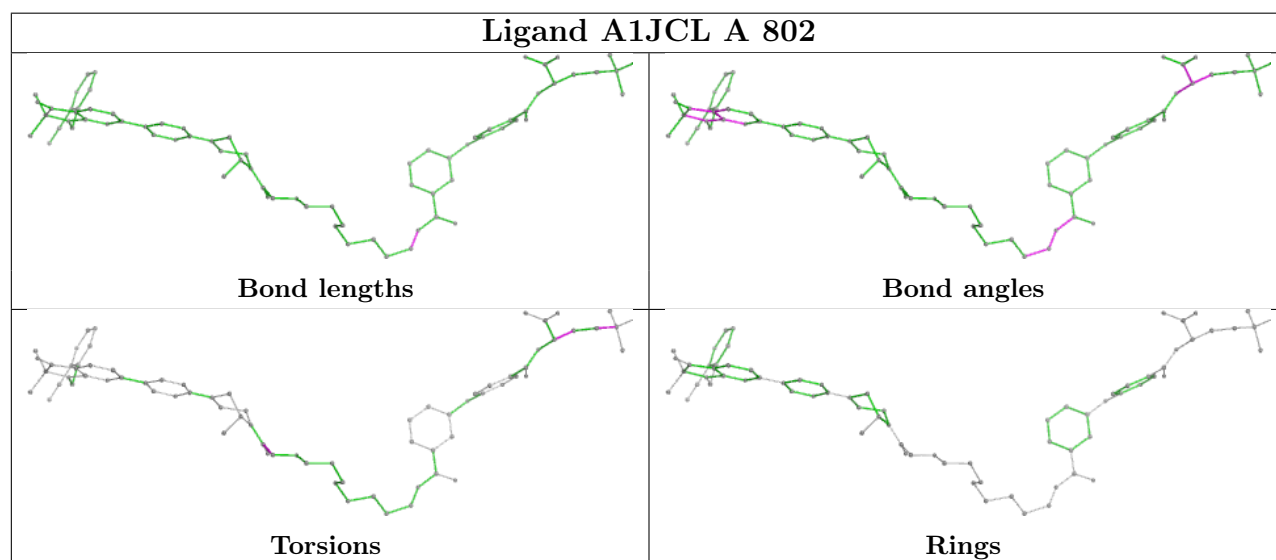
Mol	Chain	Res	Type	Atoms
3	A	801	NAG	C1-C2-N2-C7
4	A	802	A1JCL	N8-C26-C27-O3
4	A	802	A1JCL	O2-C26-C27-O3
4	A	802	A1JCL	N10-C47-C48-C49
4	A	802	A1JCL	C48-C49-C50-C51
4	A	802	A1JCL	C48-C49-C50-C52

There are no ring outliers.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	801	NAG	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 [\(i\)](#)

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, 95<sup>th</sup> 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 <sup>2</sup> )	Q<0.9
1	A	658/762 (86%)	-0.06	11 (1%) 69 61	50, 90, 142, 178	0

All (11) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	171	GLY	3.3
1	A	168	THR	2.9
1	A	185	THR	2.8
1	A	219	GLN	2.5
1	A	494	VAL	2.5
1	A	674	LEU	2.4
1	A	597	TRP	2.3
1	A	710	LEU	2.3
1	A	672	ASP	2.2
1	A	139	PHE	2.1
1	A	136	ILE	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, 95<sup>th</sup> 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.

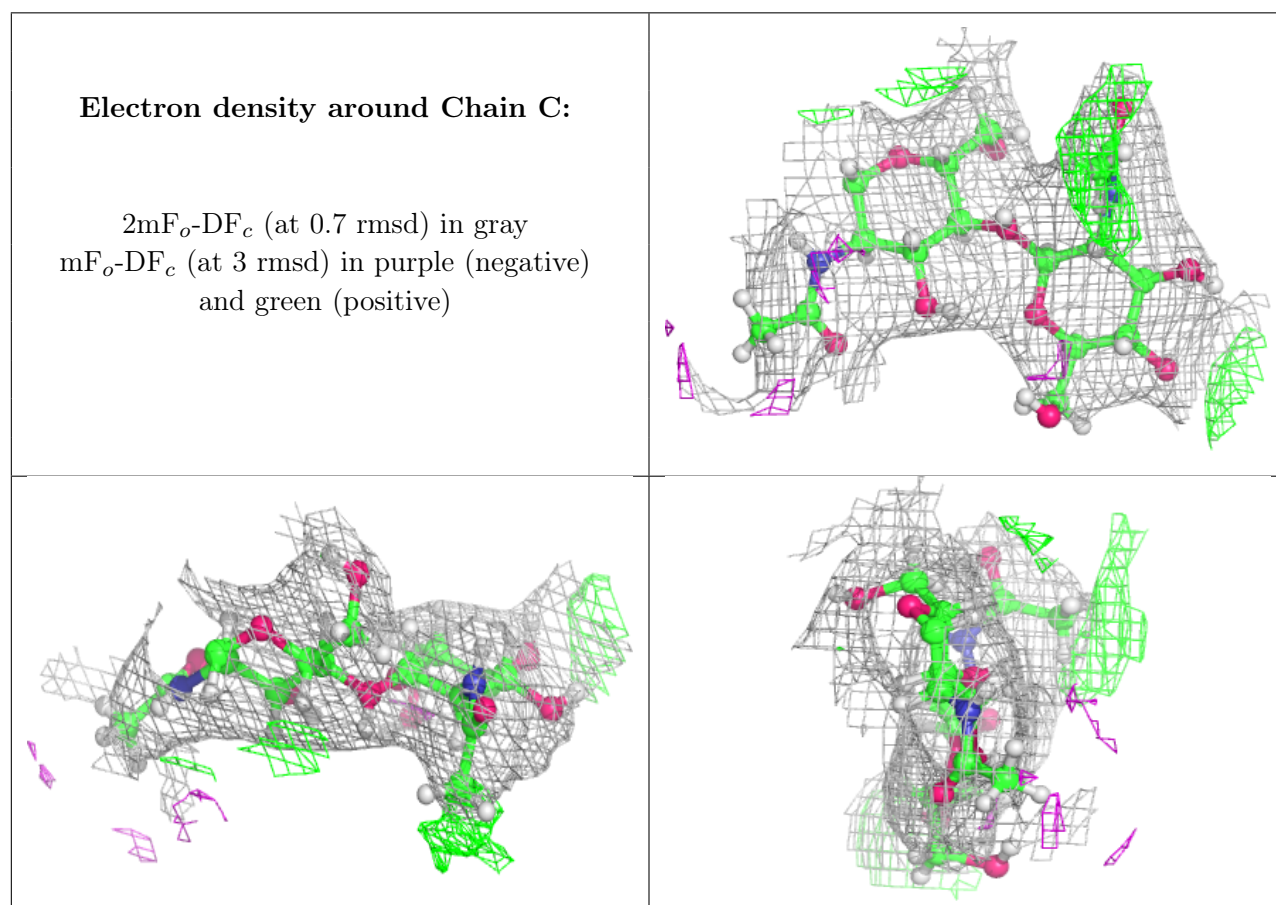
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å <sup>2</sup> )	Q<0.9
2	NAG	B	2	14/15	0.81	0.11	101,120,141,161	7

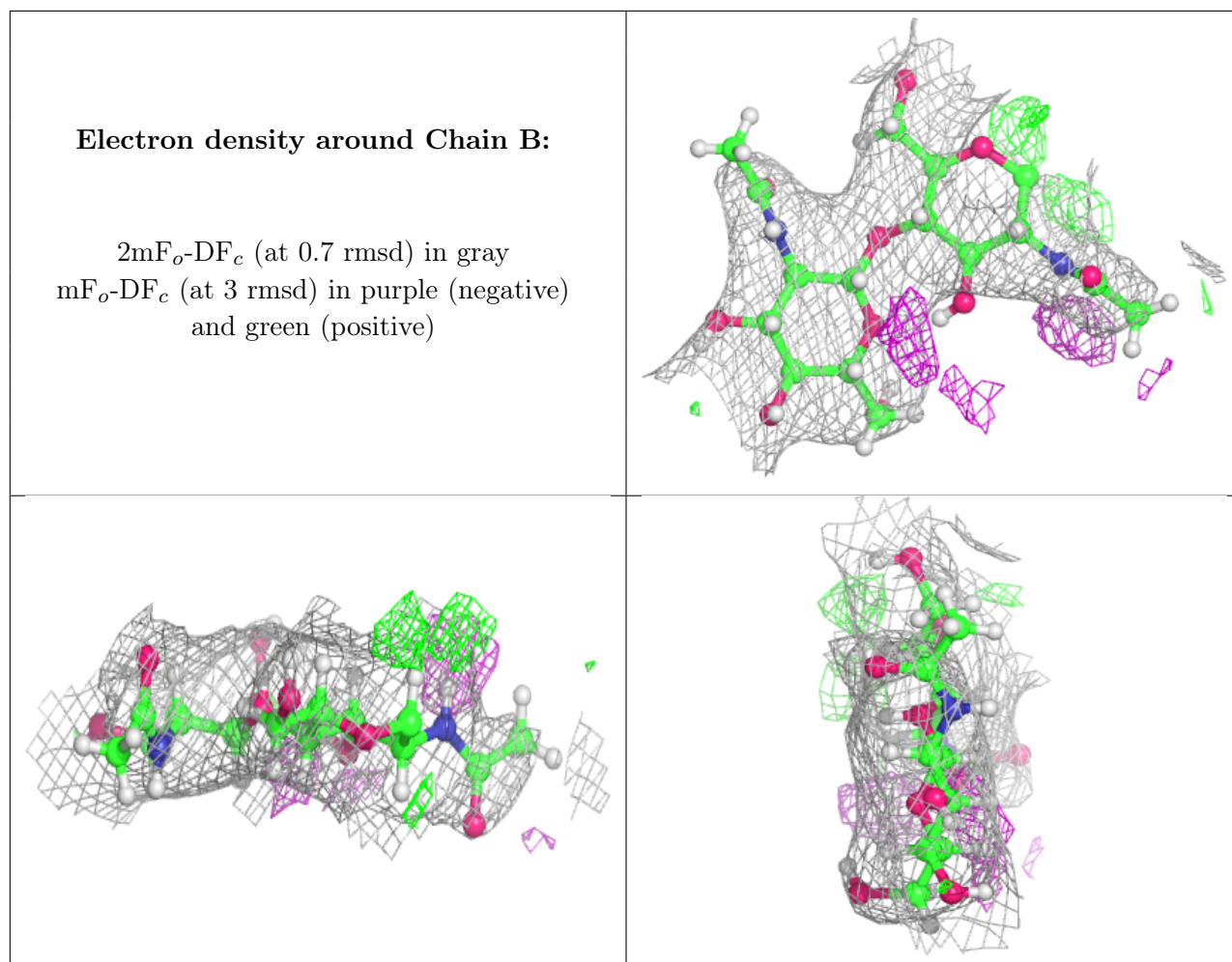
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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors( $\text{\AA}^2$ )	Q<0.9
2	NAG	C	2	14/15	0.83	0.11	62,90,120,141	7
2	NAG	C	1	14/15	0.87	0.13	51,65,91,96	6
2	NAG	B	1	14/15	0.95	0.08	60,100,140,149	6

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.



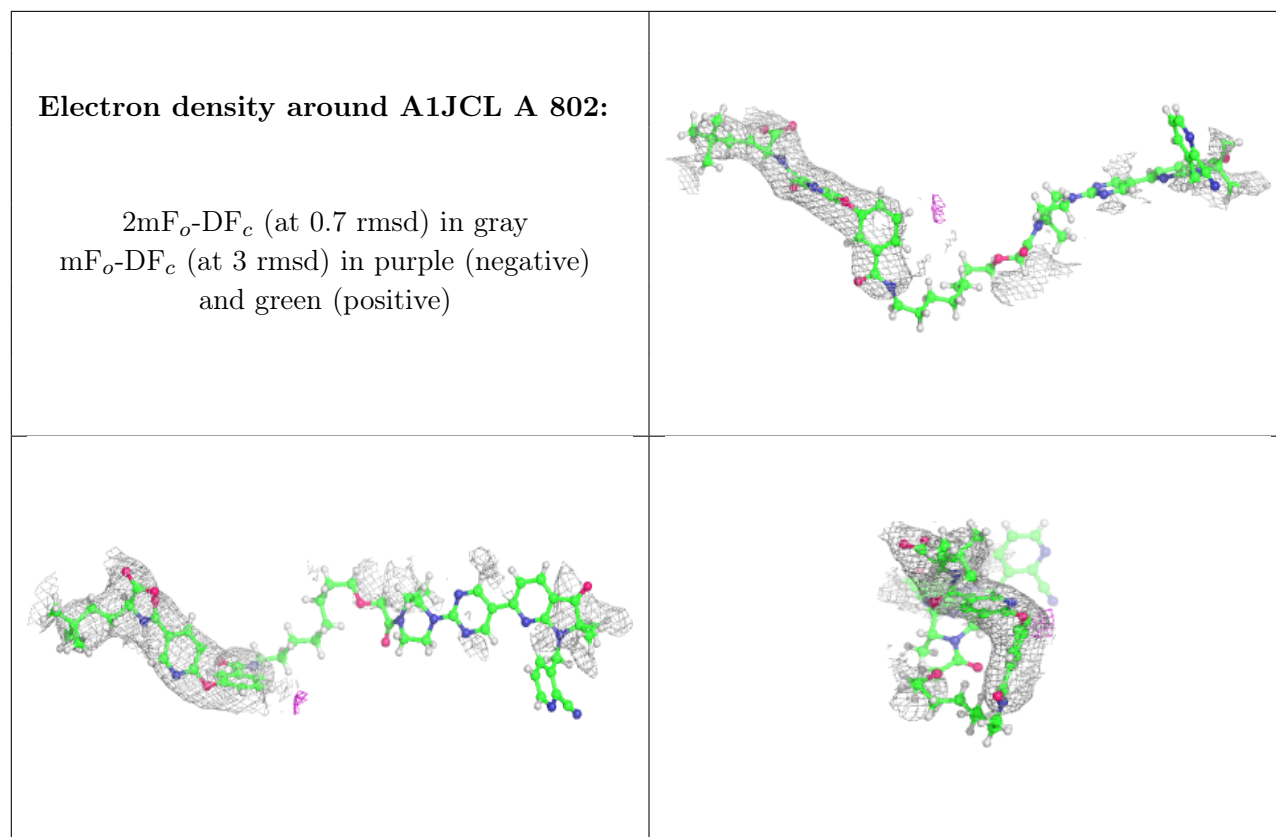


## 6.4 Ligands [i](#)

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, 95<sup>th</sup> 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 <sup>2</sup> )	Q < 0.9
3	NAG	A	801	14/15	0.74	0.12	114,141,155,192	6
4	A1JCL	A	802	75/75	0.96	0.09	70,285,285,285	89

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.