



# wwPDB X-ray Structure Validation Summary Report

Jan 8, 2024 – 12:31 am GMT

PDB ID : 5M63  
Title : Crystal structure of group B Streptococcus type III DP2 oligosaccharide bound to Fab NVS-1-19-5  
Authors : Carboni, F.; Adamo, R.; Veggi, D.; Rappuoli, R.; Malito, E.; Margarit, I.R.; Berti, F.  
Deposited on : 2016-10-24  
Resolution : 2.74 Å(reported)

This is a wwPDB X-ray Structure Validation Summary 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>.

---

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  
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

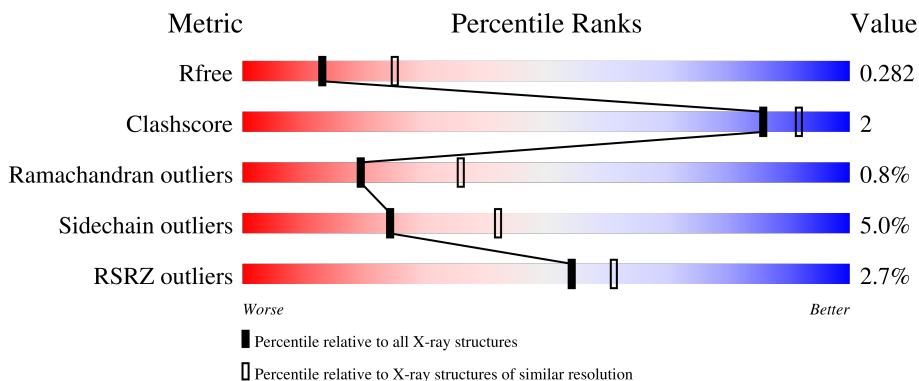
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.74 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.



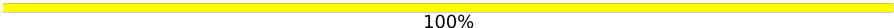
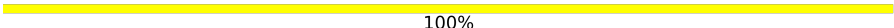
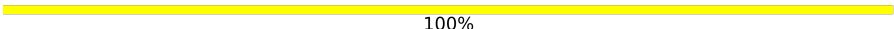
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
$R_{free}$	130704	1271 (2.76-2.72)
Clashscore	141614	1322 (2.76-2.72)
Ramachandran outliers	138981	1297 (2.76-2.72)
Sidechain outliers	138945	1298 (2.76-2.72)
RSRZ outliers	127900	1243 (2.76-2.72)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments 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	H	248	
1	M	248	
2	L	239	
2	N	239	
3	A	2	

Continued on next page...

*Continued from previous page...*

Mol	Chain	Length	Quality of chain
3	C	2	 100%
4	B	7	 100%
4	D	7	 100%

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

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
4	BGC	B	6	-	-	-	X
4	GAL	B	7	-	-	-	X
4	SIA	D	5	-	-	-	X

## 2 Entry composition [i](#)

There are 7 unique types of molecules in this entry. The entry contains 6930 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.

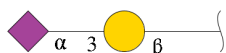
- Molecule 1 is a protein called H chain of Fab NVS-1-19-5.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	H	222	Total 1639	C 1037	N 269	O 323	S 10	0	0	0
1	M	226	Total 1664	C 1050	N 273	O 330	S 11	0	0	0

- Molecule 2 is a protein called L chain of Fab NVS-1-19-5.

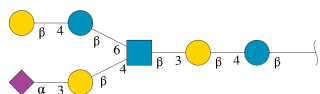
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	L	215	Total 1586	C 985	N 261	O 333	S 7	0	0	0
2	N	216	Total 1591	C 988	N 262	O 334	S 7	0	0	0

- Molecule 3 is an oligosaccharide called N-acetyl-alpha-neuraminic acid-(2-3)-beta-D-galactopyranose.



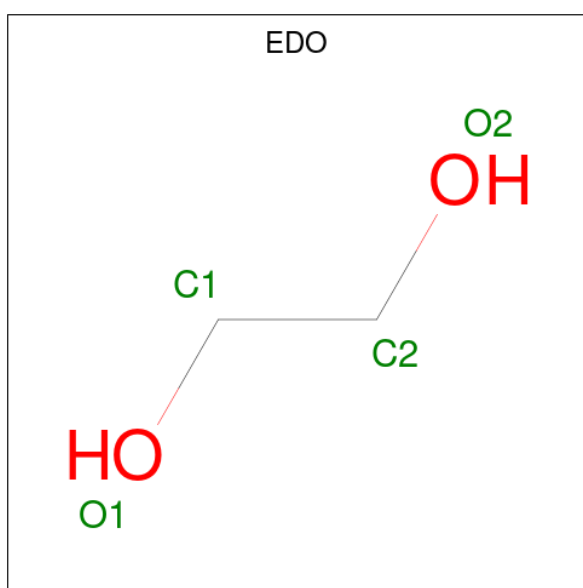
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
3	A	2	Total 31	C 17	N 1	O 13	0	0	0
3	C	2	Total 31	C 17	N 1	O 13	0	0	0

- Molecule 4 is an oligosaccharide called N-acetyl-alpha-neuraminic acid-(2-3)-beta-D-galactopyranose-(1-4)-[beta-D-galactopyranose-(1-4)-beta-D-glucopyranose-(1-6)]2-acetamido-2-deoxy-beta-D-glucopyranose-(1-3)-beta-D-galactopyranose-(1-4)-beta-D-glucopyranose.



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
4	B	7	Total	C	N	O	0	0	0
			89	49	2	38			
4	D	7	Total	C	N	O	0	0	0
			89	49	2	38			

- Molecule 5 is 1,2-ETHANEDIOL (three-letter code: EDO) (formula:  $C_2H_6O_2$ ).



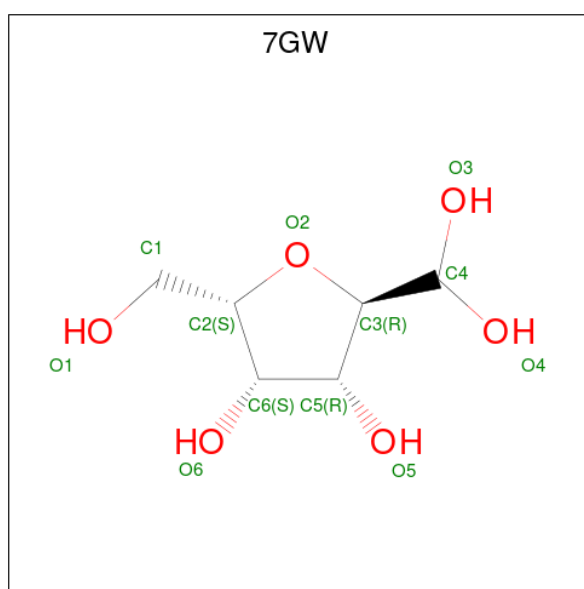
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
5	H	1	Total	C	O	0	0
			4	2	2		
5	H	1	Total	C	O	0	0
			4	2	2		
5	H	1	Total	C	O	0	0
			4	2	2		
5	L	1	Total	C	O	0	0
			4	2	2		
5	L	1	Total	C	O	0	0
			4	2	2		
5	L	1	Total	C	O	0	0
			4	2	2		

*Continued on next page...*

Continued from previous page...

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	M	1	Total C O 4 2 2	0	0
5	M	1	Total C O 4 2 2	0	0
5	N	1	Total C O 4 2 2	0	0
5	N	1	Total C O 4 2 2	0	0
5	N	1	Total C O 4 2 2	0	0
5	N	1	Total C O 4 2 2	0	0

- Molecule 6 is (2 {R},3 {R},4 {S},5 {S})-2-[bis(oxidanyl)methyl]-5-(hydroxymethyl)oxolane-3,4-diol (three-letter code: 7GW) (formula: C<sub>6</sub>H<sub>12</sub>O<sub>6</sub>).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
6	H	1	Total C O 12 6 6	0	0
6	M	1	Total C O 12 6 6	0	0

- Molecule 7 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
7	H	27	Total O 27 27	0	0


Continued on next page...

*Continued from previous page...*

<b>Mol</b>	<b>Chain</b>	<b>Residues</b>	<b>Atoms</b>	<b>ZeroOcc</b>	<b>AltConf</b>
7	L	27	Total O 27 27	0	0
7	M	45	Total O 45 45	0	0
7	N	35	Total O 35 35	0	0





Chain A:  100%

GAL1  
SIA2

- Molecule 3: N-acetyl-alpha-neuraminic acid-(2-3)-beta-D-galactopyranose

Chain C:  100%


GAL1  
SIA2

- Molecule 4: N-acetyl-alpha-neuraminic acid-(2-3)-beta-D-galactopyranose-(1-4)-[beta-D-galactopyranose-(1-4)-beta-D-glucopyranose-(1-6)]2-acetamido-2-deoxy-beta-D-glucopyranose-(1-3)-beta-D-galactopyranose-(1-4)-beta-D-glucopyranose

Chain B:  100%

BGC1  
GAL2  
MAG3  
GAL4  
SIA5  
BGC6  
GAL7

- Molecule 4: N-acetyl-alpha-neuraminic acid-(2-3)-beta-D-galactopyranose-(1-4)-[beta-D-galactopyranose-(1-4)-beta-D-glucopyranose-(1-6)]2-acetamido-2-deoxy-beta-D-glucopyranose-(1-3)-beta-D-galactopyranose-(1-4)-beta-D-glucopyranose

Chain D:  100%

BGC1  
GAL2  
MAG3  
GAL4  
SIA5  
BGC6  
GAL7

## 4 Data and refinement statistics

Property	Value	Source
Space group	C 2 2 21	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	135.34Å 142.23Å 144.73Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	49.02 – 2.74 49.02 – 2.74	Depositor EDS
% Data completeness (in resolution range)	99.2 (49.02-2.74) 99.2 (49.02-2.74)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	0.08	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.35 (at 2.73Å)	Xtrriage
Refinement program	REFMAC 5.8.0155	Depositor
R, $R_{free}$	0.236 , 0.282 0.236 , 0.282	Depositor DCC
$R_{free}$ test set	1834 reflections (5.00%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	67.7	Xtrriage
Anisotropy	0.441	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.33 , 43.2	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.41$ , $\langle L^2 \rangle = 0.24$	Xtrriage
Estimated twinning fraction	0.056 for -k,-h,-l	Xtrriage
$F_o, F_c$ correlation	0.93	EDS
Total number of atoms	6930	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	71.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 32.64 % 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 9.0901e-04.*

<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: NAG, SIA, EDO, 7GW, GAL, BGC

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	H	0.52	1/1680 (0.1%)	0.72	0/2298
1	M	0.58	1/1705 (0.1%)	0.76	1/2332 (0.0%)
2	L	0.54	1/1616 (0.1%)	0.66	0/2212
2	N	0.53	0/1621	0.66	0/2219
All	All	0.54	3/6622 (0.0%)	0.70	1/9061 (0.0%)

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	H	0	1
1	M	0	1
All	All	0	2

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	L	115	TYR	CE1-CZ	-7.09	1.29	1.38
1	M	28	ASP	CB-CG	6.90	1.66	1.51
1	H	28	ASP	CB-CG	5.43	1.63	1.51

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	M	28	ASP	CB-CG-OD1	5.20	122.98	118.30

There are no chirality outliers.

All (2) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	H	220	GLN	Peptide
1	M	220	GLN	Peptide

## 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	H	1639	0	1606	11	0
1	M	1664	0	1627	9	1
2	L	1586	0	1529	8	0
2	N	1591	0	1533	6	0
3	A	31	0	26	0	0
3	C	31	0	26	0	0
4	B	89	0	74	0	0
4	D	89	0	74	0	0
5	H	12	0	18	0	0
5	L	16	0	24	0	0
5	M	8	0	12	0	0
5	N	16	0	24	0	0
6	H	12	0	0	0	0
6	M	12	0	0	0	0
7	H	27	0	0	0	0
7	L	27	0	0	0	0
7	M	45	0	0	0	0
7	N	35	0	0	0	0
All	All	6930	0	6573	30	1

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 2.

The worst 5 of 30 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:M:182:THR:HG22	1:M:227:ALA:HB3	1.71	0.72
1:H:182:THR:HG22	1:H:227:ALA:HB3	1.74	0.69
1:H:128:GLY:HA2	2:L:115:TYR:CD2	2.27	0.68
2:N:176:VAL:HG22	2:N:181:GLN:HE21	1.60	0.66

*Continued on next page...*

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:H:27:GLY:HA2	1:H:36:LEU:HD21	1.81	0.62

All (1) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:M:50:TYR:OH	1:M:50:TYR:OH[3_655]	1.65	0.55

## 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	H	220/248 (89%)	211 (96%)	7 (3%)	2 (1%)	17	32
1	M	224/248 (90%)	214 (96%)	8 (4%)	2 (1%)	17	32
2	L	213/239 (89%)	196 (92%)	16 (8%)	1 (0%)	29	48
2	N	214/239 (90%)	196 (92%)	16 (8%)	2 (1%)	17	32
All	All	871/974 (89%)	817 (94%)	47 (5%)	7 (1%)	19	36

5 of 7 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	H	217	SER
1	M	217	SER
2	L	76	SER
2	N	76	SER
2	N	165	LYS

### 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	H	186/209 (89%)	174 (94%)	12 (6%)	17	30
1	M	190/209 (91%)	177 (93%)	13 (7%)	16	28
2	L	181/199 (91%)	174 (96%)	7 (4%)	32	53
2	N	181/199 (91%)	176 (97%)	5 (3%)	43	63
All	All	738/816 (90%)	701 (95%)	37 (5%)	24	42

5 of 37 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	M	215	VAL
2	N	183	THR
1	M	221	PRO
2	N	53	ASN
2	L	24	VAL

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

Mol	Chain	Res	Type
2	N	181	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](#)

18 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	GAL	A	1	3,6	11,11,12	0.70	0	15,15,17	1.37	2 (13%)
3	SIA	A	2	3	20,20,21	0.85	1 (5%)	24,28,31	1.64	4 (16%)
4	BGC	B	1	4,6	11,11,12	0.55	0	15,15,17	1.61	3 (20%)
4	GAL	B	2	4	11,11,12	0.62	0	15,15,17	1.70	4 (26%)
4	NAG	B	3	4	14,14,15	0.66	0	17,19,21	1.48	2 (11%)
4	GAL	B	4	4	11,11,12	0.80	0	15,15,17	1.22	1 (6%)
4	SIA	B	5	4	20,20,21	0.65	0	24,28,31	1.33	4 (16%)
4	BGC	B	6	4	11,11,12	0.91	0	15,15,17	1.75	5 (33%)
4	GAL	B	7	4	11,11,12	0.84	0	15,15,17	1.56	4 (26%)
3	GAL	C	1	3,6	11,11,12	0.48	0	15,15,17	1.60	4 (26%)
3	SIA	C	2	3	20,20,21	0.80	0	24,28,31	1.67	5 (20%)
4	BGC	D	1	4,6	11,11,12	0.66	0	15,15,17	1.84	4 (26%)
4	GAL	D	2	4	11,11,12	0.63	0	15,15,17	1.90	3 (20%)
4	NAG	D	3	4	14,14,15	0.47	0	17,19,21	1.17	2 (11%)
4	GAL	D	4	4	11,11,12	0.55	0	15,15,17	1.22	2 (13%)
4	SIA	D	5	4	20,20,21	0.85	1 (5%)	24,28,31	1.39	4 (16%)
4	BGC	D	6	4	11,11,12	0.68	0	15,15,17	1.16	2 (13%)
4	GAL	D	7	4	11,11,12	0.72	0	15,15,17	1.46	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. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	GAL	A	1	3,6	-	2/2/19/22	0/1/1/1
3	SIA	A	2	3	-	2/18/34/38	0/1/1/1
4	BGC	B	1	4,6	-	1/2/19/22	0/1/1/1
4	GAL	B	2	4	-	2/2/19/22	0/1/1/1
4	NAG	B	3	4	-	0/6/23/26	0/1/1/1

Continued on next page...

Continued from previous page...

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	GAL	B	4	4	-	2/2/19/22	0/1/1/1
4	SIA	B	5	4	-	3/18/34/38	0/1/1/1
4	BGC	B	6	4	-	1/2/19/22	0/1/1/1
4	GAL	B	7	4	-	0/2/19/22	0/1/1/1
3	GAL	C	1	3,6	-	2/2/19/22	0/1/1/1
3	SIA	C	2	3	-	1/18/34/38	0/1/1/1
4	BGC	D	1	4,6	-	1/2/19/22	0/1/1/1
4	GAL	D	2	4	-	0/2/19/22	0/1/1/1
4	NAG	D	3	4	-	2/6/23/26	0/1/1/1
4	GAL	D	4	4	-	1/2/19/22	0/1/1/1
4	SIA	D	5	4	-	10/18/34/38	0/1/1/1
4	BGC	D	6	4	-	1/2/19/22	0/1/1/1
4	GAL	D	7	4	-	1/2/19/22	0/1/1/1

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	D	5	SIA	C2-C1	2.30	1.54	1.52
3	A	2	SIA	C2-C1	2.12	1.54	1.52

The worst 5 of 57 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	D	2	GAL	C1-C2-C3	5.05	115.87	109.67
4	B	3	NAG	O5-C5-C6	4.27	113.91	107.20
3	A	2	SIA	O6-C2-C3	-4.27	104.58	110.46
3	C	2	SIA	O6-C2-C3	-4.17	104.72	110.46
3	A	1	GAL	C1-C2-C3	4.02	114.61	109.67

There are no chirality outliers.

5 of 32 torsion outliers are listed below:

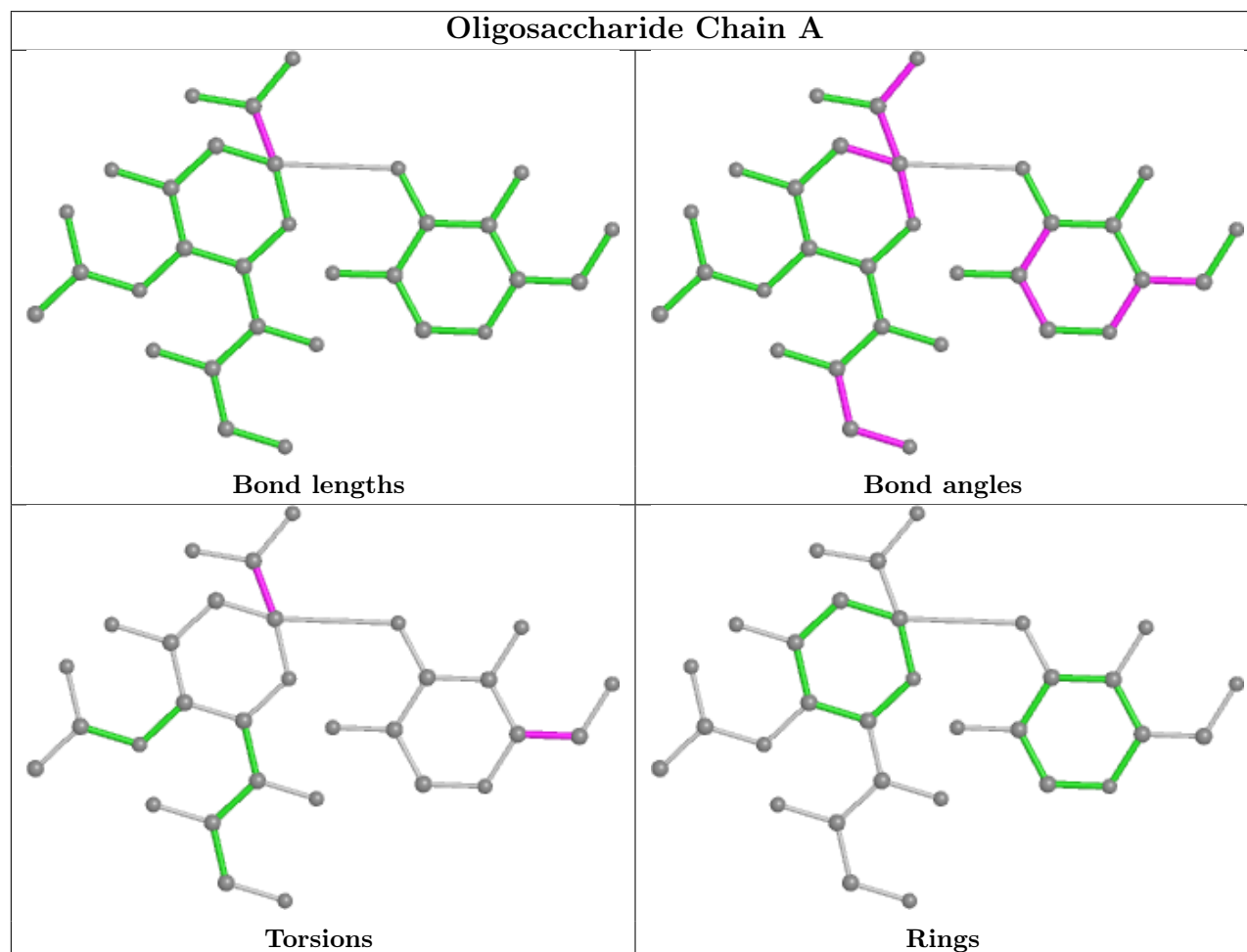
Mol	Chain	Res	Type	Atoms
3	A	2	SIA	O1A-C1-C2-O6
4	D	5	SIA	C5-C6-C7-O7
4	D	5	SIA	O6-C6-C7-O7
4	D	3	NAG	C4-C5-C6-O6
4	D	3	NAG	O5-C5-C6-O6

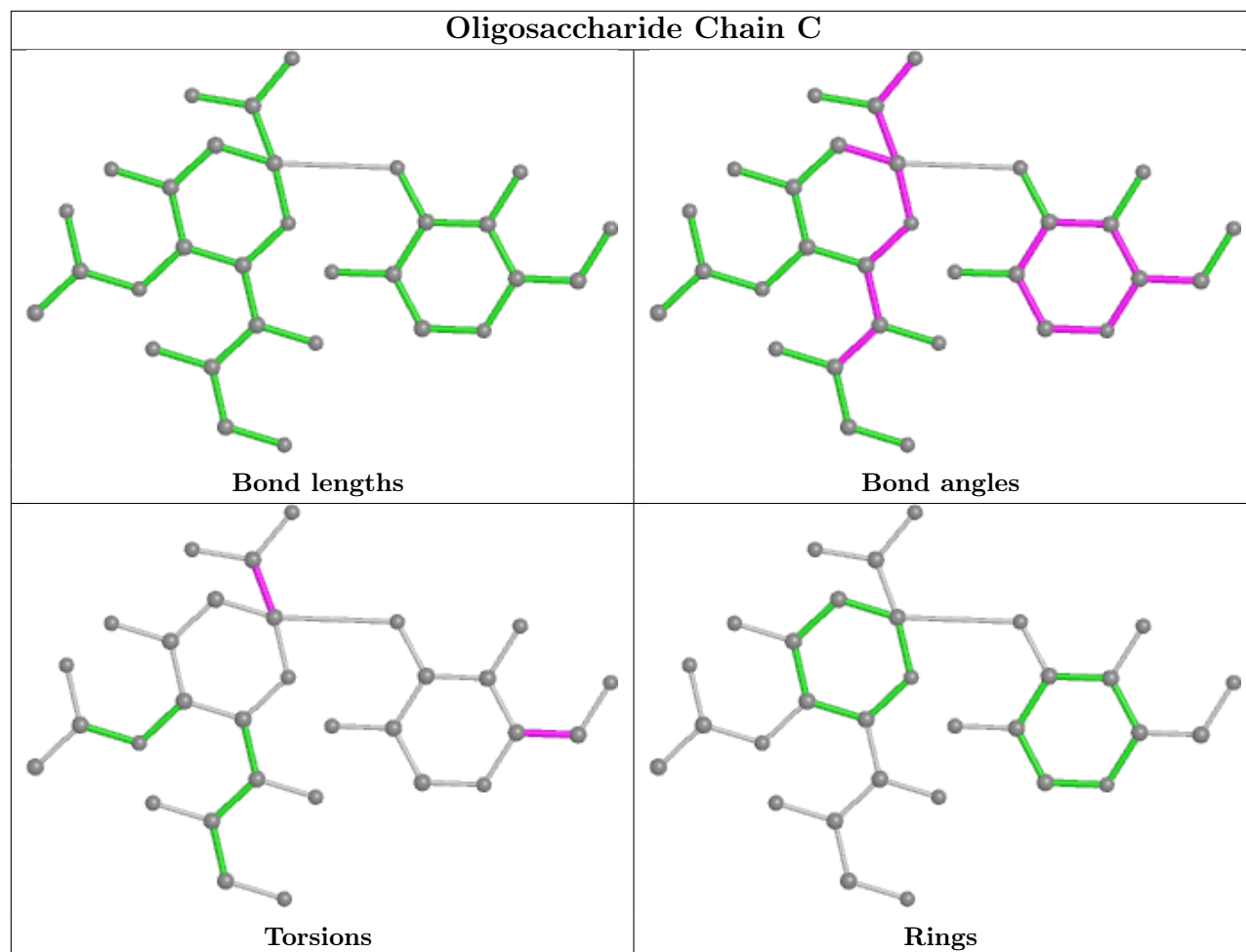
There are no ring outliers.

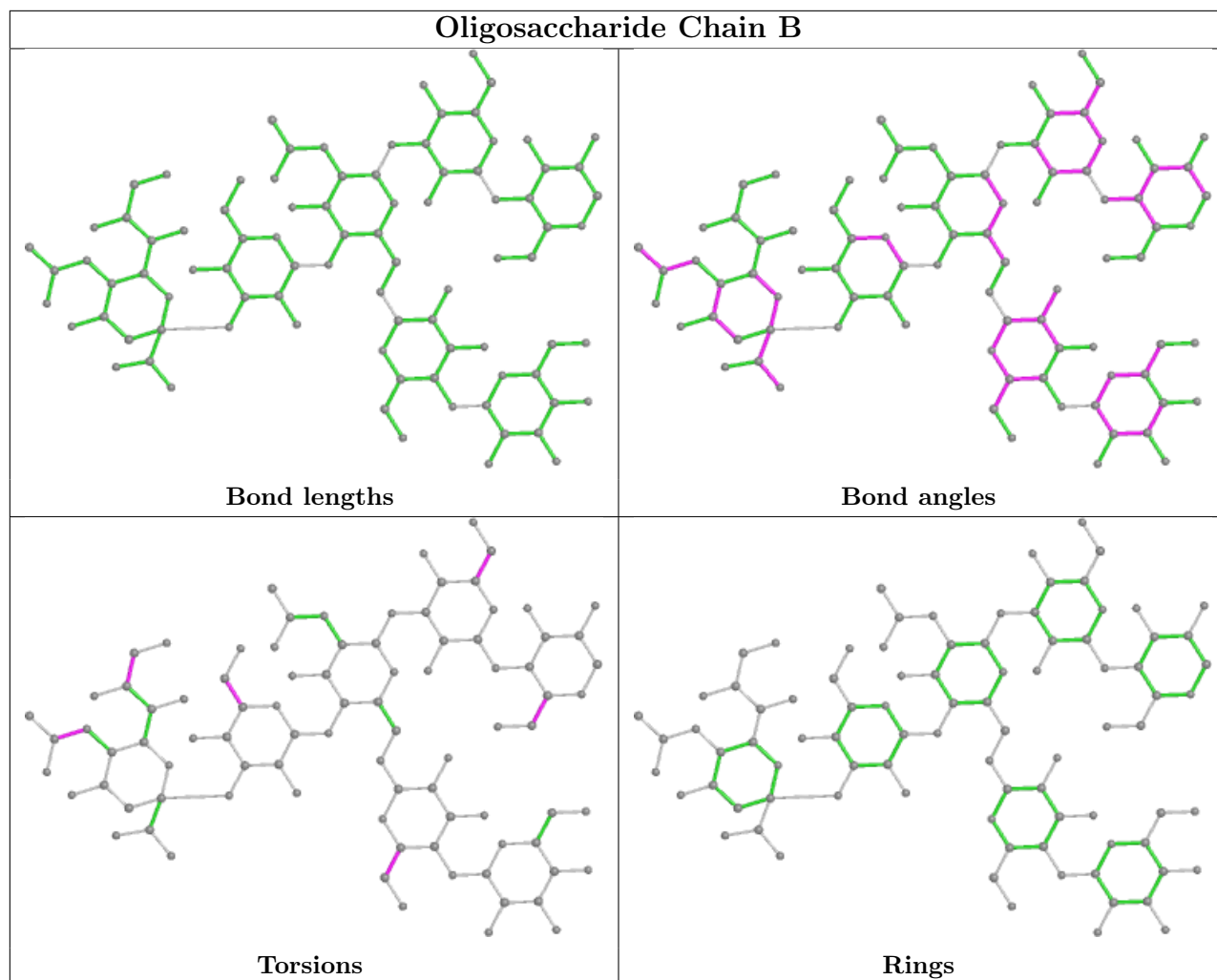


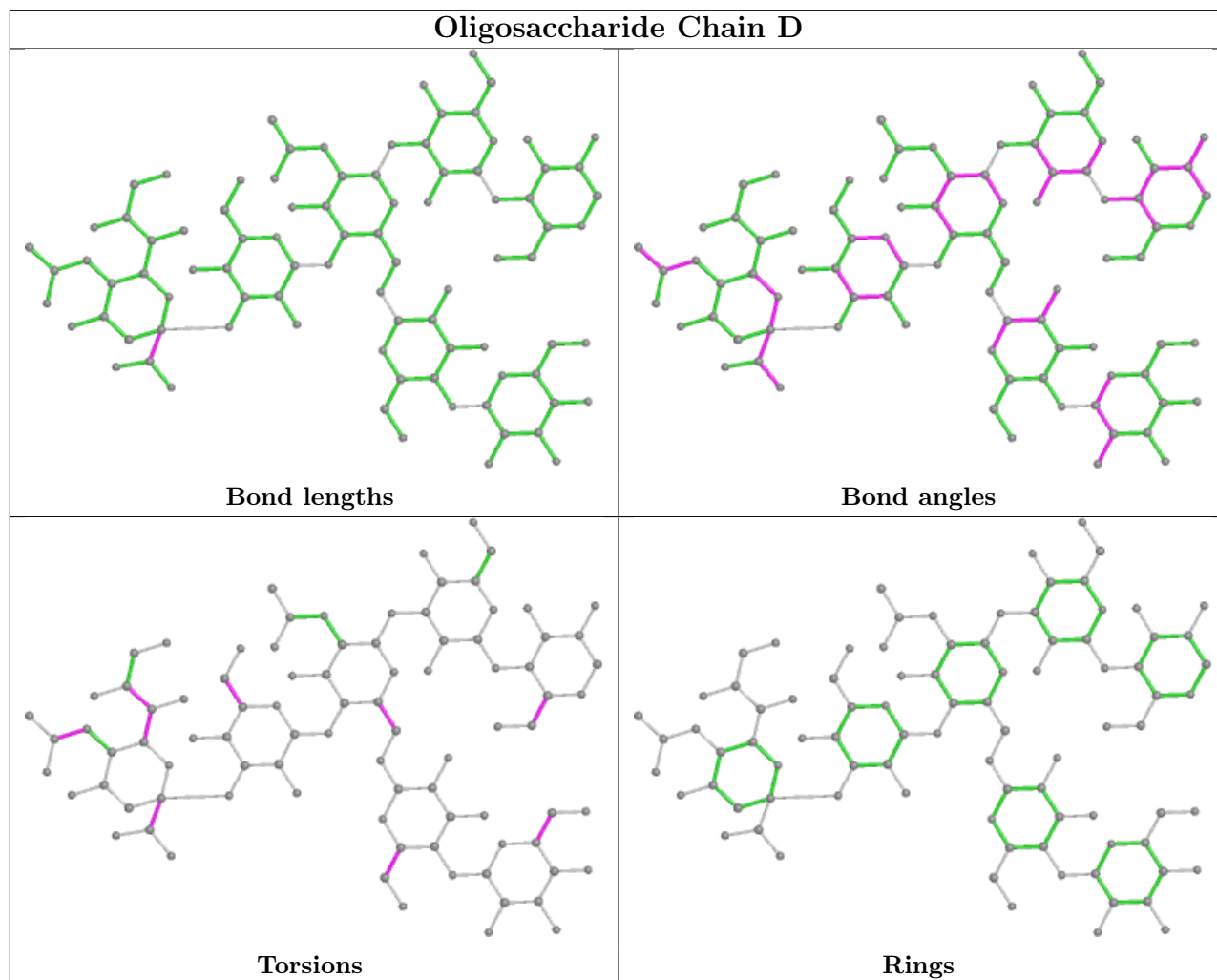
No monomer is involved in short contacts.

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](#)

15 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	EDO	N	311	-	3,3,3	0.54	0	2,2,2	0.22	0
6	7GW	M	302	3,4	12,12,12	4.85	7 (58%)	15,17,17	1.35	1 (6%)
5	EDO	H	301	-	3,3,3	0.54	0	2,2,2	0.30	0
5	EDO	L	311	-	3,3,3	0.49	0	2,2,2	0.32	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
5	EDO	M	305	-	3,3,3	0.60	0	2,2,2	0.31	0
5	EDO	L	308	-	3,3,3	0.57	0	2,2,2	0.08	0
5	EDO	N	308	-	3,3,3	0.76	0	2,2,2	0.10	0
5	EDO	N	310	-	3,3,3	0.56	0	2,2,2	0.21	0
6	7GW	H	304	3,4	12,12,12	4.97	7 (58%)	15,17,17	1.30	1 (6%)
5	EDO	M	301	-	3,3,3	0.42	0	2,2,2	0.44	0
5	EDO	N	309	-	3,3,3	0.52	0	2,2,2	0.21	0
5	EDO	L	310	-	3,3,3	0.55	0	2,2,2	0.11	0
5	EDO	L	309	-	3,3,3	0.59	0	2,2,2	0.08	0
5	EDO	H	302	-	3,3,3	0.64	0	2,2,2	0.10	0
5	EDO	H	303	-	3,3,3	0.52	0	2,2,2	0.19	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. '2' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
5	EDO	N	311	-	-	1/1/1/1	-
6	7GW	M	302	3,4	-	0/6/22/22	0/1/1/1
5	EDO	H	301	-	-	1/1/1/1	-
5	EDO	L	311	-	-	0/1/1/1	-
5	EDO	M	305	-	-	0/1/1/1	-
5	EDO	L	308	-	-	1/1/1/1	-
5	EDO	N	308	-	-	1/1/1/1	-
5	EDO	N	310	-	-	1/1/1/1	-
6	7GW	H	304	3,4	-	2/6/22/22	0/1/1/1
5	EDO	M	301	-	-	0/1/1/1	-
5	EDO	N	309	-	-	1/1/1/1	-
5	EDO	L	310	-	-	0/1/1/1	-
5	EDO	L	309	-	-	1/1/1/1	-
5	EDO	H	302	-	-	1/1/1/1	-
5	EDO	H	303	-	-	1/1/1/1	-

The worst 5 of 14 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
6	H	304	7GW	O2-C3	-10.38	1.28	1.44
6	M	302	7GW	O2-C3	-10.24	1.29	1.44
6	H	304	7GW	C6-C5	-9.01	1.28	1.53
6	M	302	7GW	C6-C5	-8.39	1.30	1.53
6	M	302	7GW	C5-C3	6.92	1.68	1.52

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
6	H	304	7GW	C6-C5-C3	4.10	108.37	102.45
6	M	302	7GW	C6-C5-C3	3.83	107.97	102.45

There are no chirality outliers.

5 of 11 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
6	H	304	7GW	O1-C1-C2-O2
5	H	301	EDO	O1-C1-C2-O2
5	H	302	EDO	O1-C1-C2-O2
5	H	303	EDO	O1-C1-C2-O2
5	L	308	EDO	O1-C1-C2-O2

There are no ring outliers.

No monomer is involved in short contacts.

## 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	H	222/248 (89%)	0.43	7 (3%) 47 54	47, 67, 110, 132	0
1	M	226/248 (91%)	0.25	4 (1%) 68 74	39, 62, 101, 130	0
2	L	215/239 (89%)	0.40	5 (2%) 60 67	52, 73, 112, 123	0
2	N	216/239 (90%)	0.32	8 (3%) 41 46	44, 63, 102, 135	0
All	All	879/974 (90%)	0.35	24 (2%) 54 61	39, 66, 107, 135	0

The worst 5 of 24 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	N	238	CYS	7.6
2	N	239	ALA	5.0
2	L	210	THR	3.7
2	N	210	THR	3.6
2	N	207	LEU	3.2

### 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.

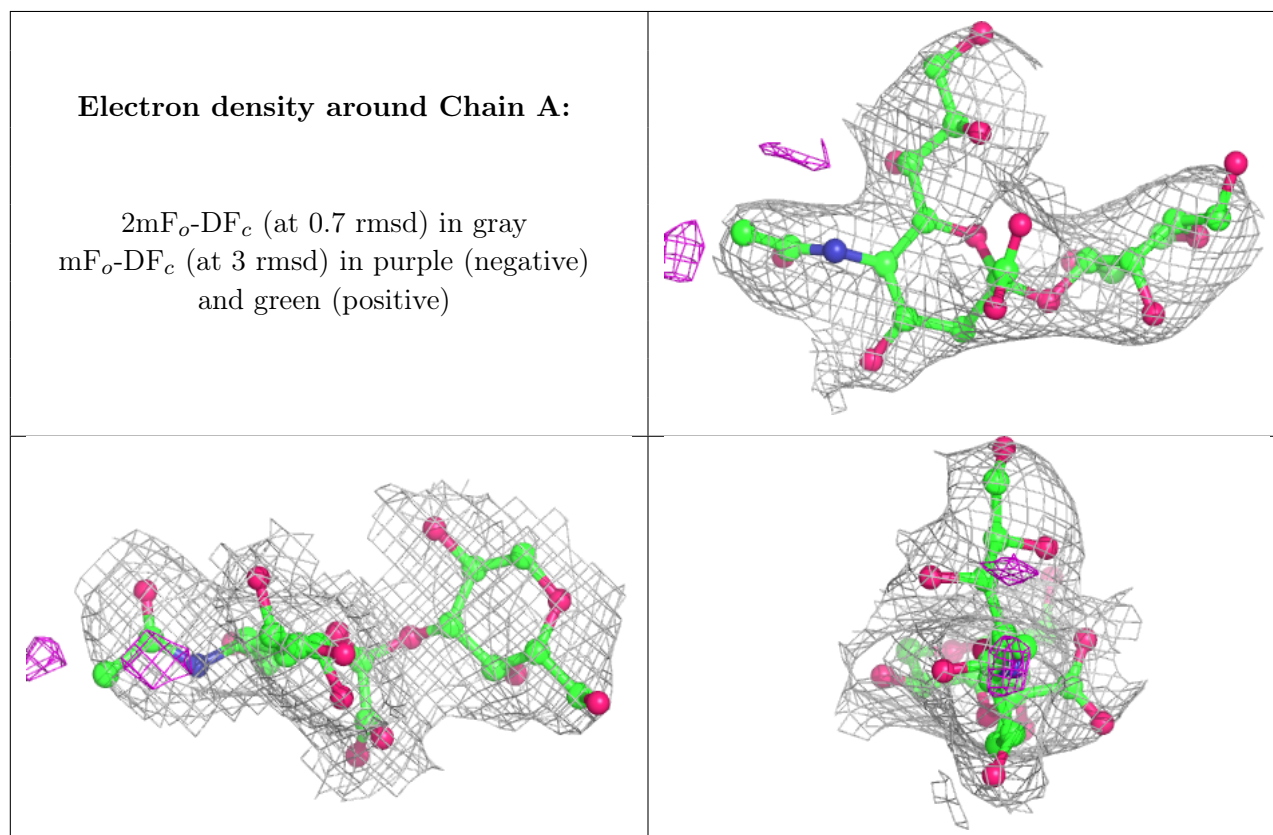
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å <sup>2</sup> )	Q<0.9
4	GAL	B	7	11/12	0.60	0.53	118,123,125,127	0
4	SIA	D	5	20/21	0.77	0.53	121,143,150,152	0

*Continued on next page...*

Continued from previous page...

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å <sup>2</sup> )	Q<0.9
4	GAL	D	7	11/12	0.79	0.35	92,97,100,100	0
4	BGC	B	6	11/12	0.80	0.50	111,115,117,119	0
4	SIA	B	5	20/21	0.81	0.48	146,151,155,155	0
4	GAL	B	4	11/12	0.84	0.22	106,116,124,133	0
4	BGC	D	6	11/12	0.88	0.30	83,86,89,93	0
4	NAG	B	3	14/15	0.91	0.15	76,90,103,106	0
4	GAL	B	2	11/12	0.92	0.20	76,79,81,81	0
3	SIA	A	2	20/21	0.92	0.16	66,72,78,79	0
4	GAL	D	4	11/12	0.92	0.22	92,96,101,109	0
4	GAL	D	2	11/12	0.93	0.16	67,69,71,72	0
4	BGC	D	1	11/12	0.94	0.15	64,64,66,66	0
3	SIA	C	2	20/21	0.94	0.20	56,63,71,74	0
3	GAL	A	1	11/12	0.95	0.12	80,84,86,87	0
4	BGC	B	1	11/12	0.96	0.17	78,79,82,84	0
4	NAG	D	3	14/15	0.96	0.16	67,74,80,84	0
3	GAL	C	1	11/12	0.96	0.12	66,67,68,69	0

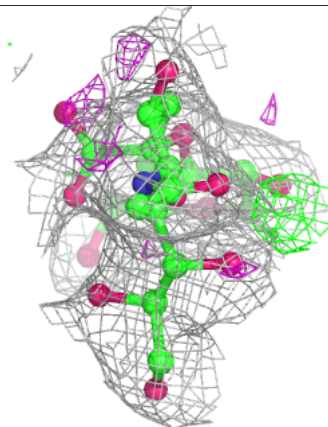
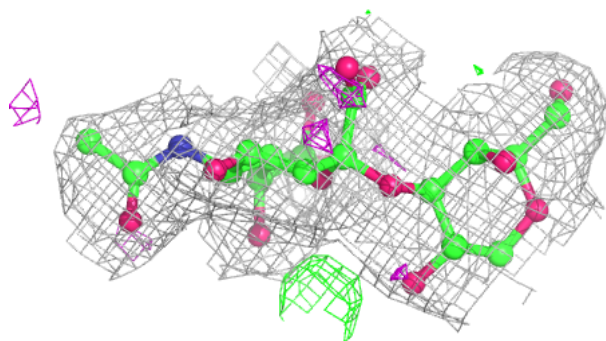
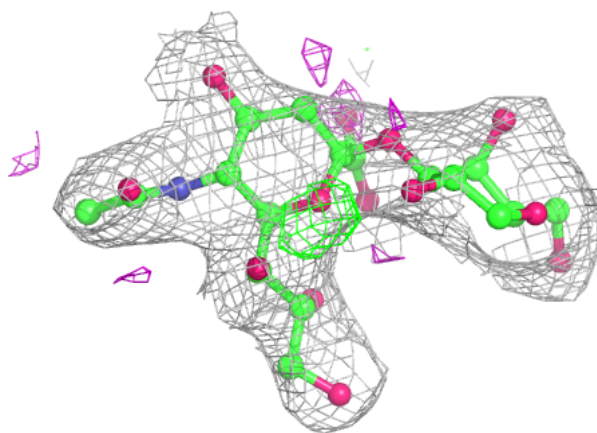
The following is a graphical depiction of the model fit to experimental electron density for oligosaccharide. Each fit is shown from different orientation to approximate a three-dimensional view.



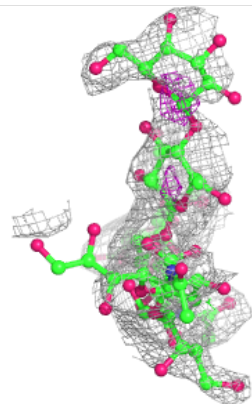
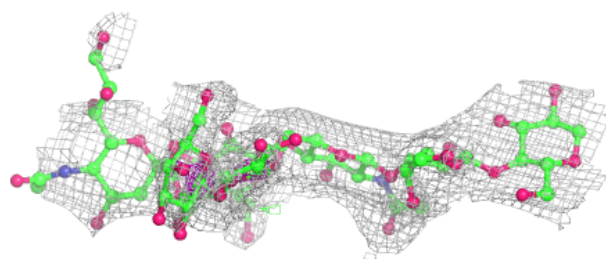
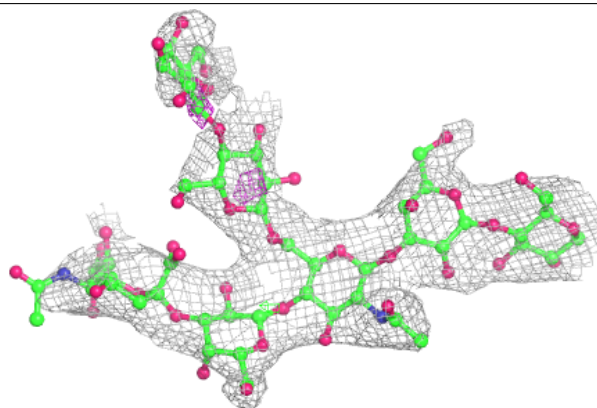


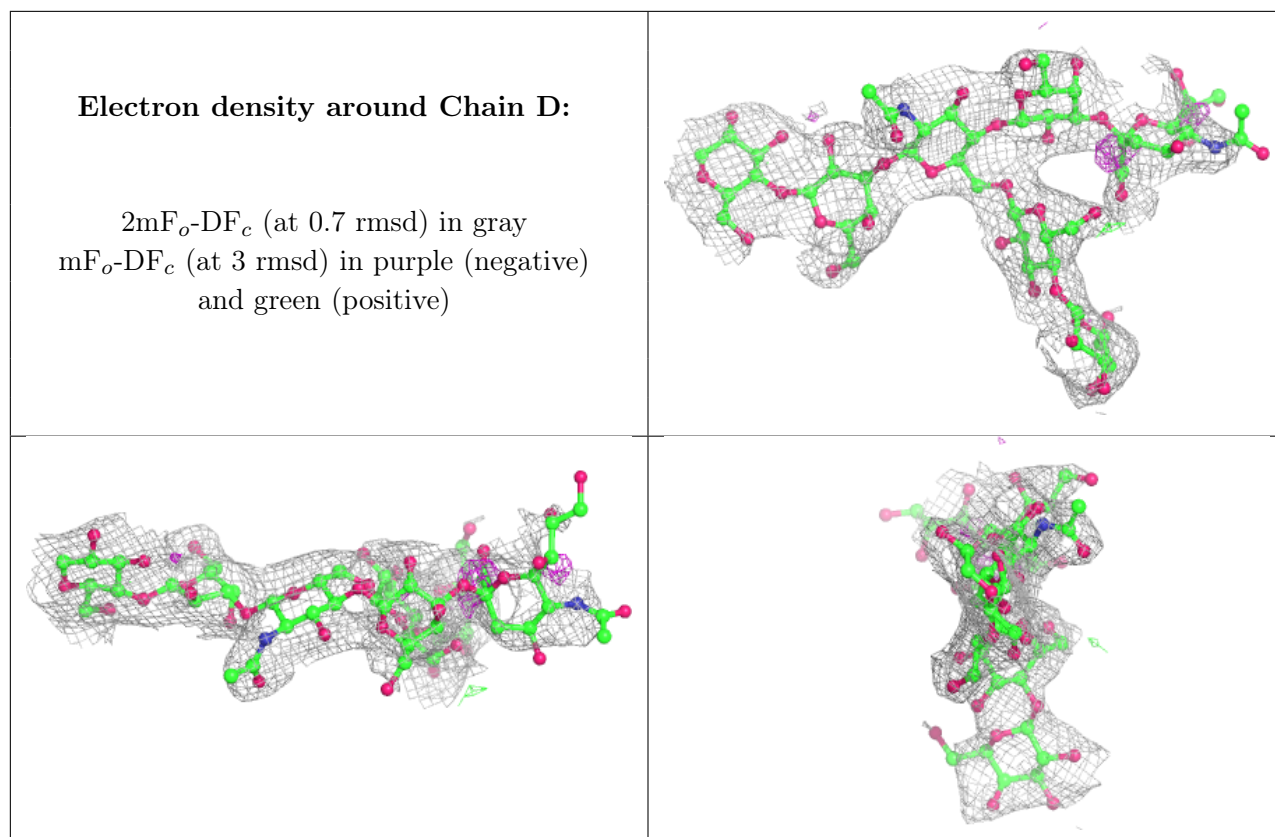
**Electron density around Chain C:**

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

**Electron density around Chain B:**

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





## 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
5	EDO	L	311	4/4	0.64	0.39	92,93,93,94	0
5	EDO	H	302	4/4	0.79	0.28	67,67,68,69	0
5	EDO	M	301	4/4	0.84	0.37	85,85,87,89	0
5	EDO	H	301	4/4	0.86	0.31	61,63,64,66	0
5	EDO	N	310	4/4	0.87	0.15	61,62,63,65	0
5	EDO	N	311	4/4	0.87	0.30	83,85,85,85	0
5	EDO	M	305	4/4	0.89	0.23	54,56,56,57	0
5	EDO	N	309	4/4	0.90	0.19	69,69,69,70	0
5	EDO	L	309	4/4	0.90	0.23	60,62,62,62	0
5	EDO	L	308	4/4	0.90	0.23	52,53,54,55	0
5	EDO	N	308	4/4	0.91	0.24	46,48,49,50	0
6	7GW	H	304	12/12	0.93	0.15	87,96,101,101	0
6	7GW	M	302	12/12	0.93	0.14	66,69,73,74	0
5	EDO	L	310	4/4	0.94	0.22	65,65,65,65	0

*Continued on next page...*

*Continued from previous page...*

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors( $\text{\AA}^2$ )	Q<0.9
5	EDO	H	303	4/4	0.95	0.19	68,68,69,69	0

## 6.5 Other polymers [i](#)

There are no such residues in this entry.