



# Full wwPDB X-ray Structure Validation Report ⓘ

Nov 9, 2024 – 09:32 AM EST

PDB ID : 5U81  
Title : Acid ceramidase (ASAH1, aCDase) from naked mole rat, Cys143Ala, un-cleaved  
Authors : Gebai, A.; Gorelik, A.; Illes, K.; Nagar, B.  
Deposited on : 2016-12-13  
Resolution : 1.40 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	:	4.02b-467
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	1.20.1
EDS	:	3.0
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

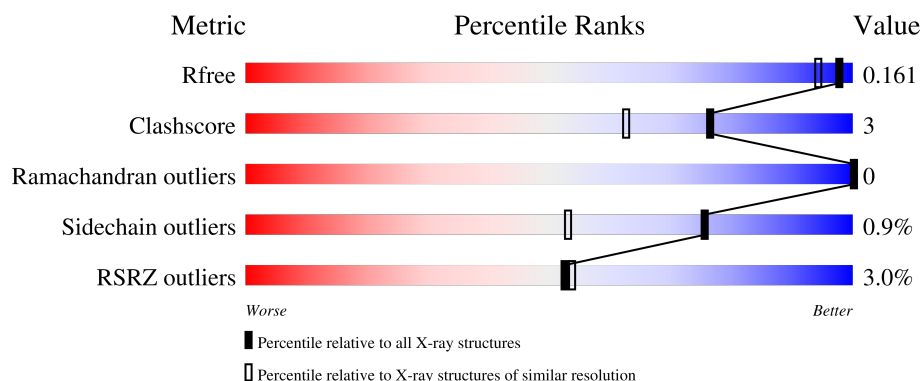
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 1.40 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	2247 (1.40-1.40)
Clashscore	180529	2446 (1.40-1.40)
Ramachandran outliers	177936	2398 (1.40-1.40)
Sidechain outliers	177891	2397 (1.40-1.40)
RSRZ outliers	164620	2246 (1.40-1.40)

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	384	
2	B	6	
3	C	5	
4	D	2	

## 2 Entry composition

There are 9 unique types of molecules in this entry. The entry contains 6821 atoms, of which 3262 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.

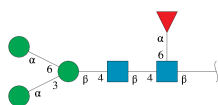
- Molecule 1 is a protein called Acid ceramidase isoform b.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
			Total	C	H	N	O	S			
1	A	369	6110	1988	3057	493	554	18	0	15	0

There are 12 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	12	ASP	-	expression tag	UNP A0A0P6JG37
A	13	ARG	-	expression tag	UNP A0A0P6JG37
A	14	HIS	-	expression tag	UNP A0A0P6JG37
A	15	HIS	-	expression tag	UNP A0A0P6JG37
A	16	HIS	-	expression tag	UNP A0A0P6JG37
A	17	HIS	-	expression tag	UNP A0A0P6JG37
A	18	HIS	-	expression tag	UNP A0A0P6JG37
A	19	HIS	-	expression tag	UNP A0A0P6JG37
A	20	LYS	-	expression tag	UNP A0A0P6JG37
A	21	LEU	-	expression tag	UNP A0A0P6JG37
A	143	ALA	CYS	engineered mutation	UNP A0A0P6JG37
A	348	SER	ASN	engineered mutation	UNP A0A0P6JG37

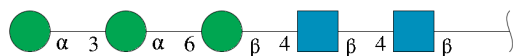
- Molecule 2 is an oligosaccharide called alpha-D-mannopyranose-(1-3)-[alpha-D-mannopyranose-(1-6)]beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-[alpha-L-fucopyranose-(1-6)]2-acetamido-2-deoxy-beta-D-glucopyranose.



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	H	N	O			
2	B	6	137	40	66	2	29	0	0	0

- Molecule 3 is an oligosaccharide called alpha-D-mannopyranose-(1-3)-alpha-D-mannopyran

ose-(1-6)-beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.



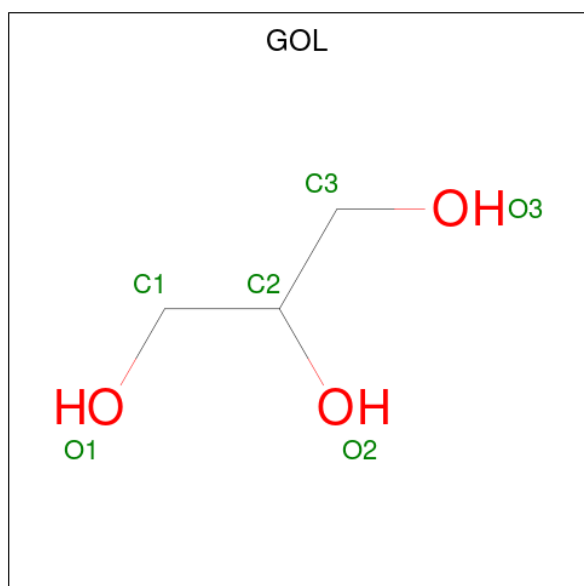
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	C	5	Total	C	H	N	O	0	0	0
			118	34	57	2	25			

- Molecule 4 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
4	D	2	Total	C	H	N	O	0	0	0
			55	16	27	2	10			

- Molecule 5 is GLYCEROL (three-letter code: GOL) (formula: C<sub>3</sub>H<sub>8</sub>O<sub>3</sub>).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
5	A	1	Total	C	H	O	0	0
			13	3	7	3		

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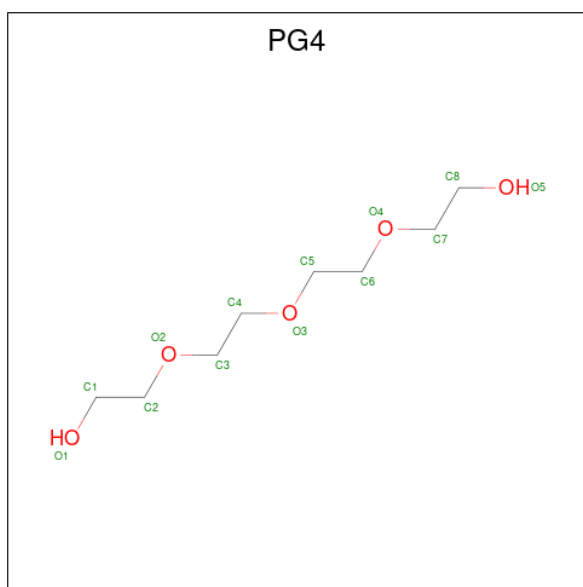
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Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
5	A	1	Total	C	H	O	0	0
			14	3	8	3		

- Molecule 6 is CHLORIDE ION (three-letter code: CL) (formula: Cl).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	A	2	Total	Cl	0	0
			2	2		

- Molecule 7 is TETRAETHYLENE GLYCOL (three-letter code: PG4) (formula: C<sub>8</sub>H<sub>18</sub>O<sub>5</sub>).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
7	A	1	Total	C	H	O	0	0
			31	8	18	5		

- Molecule 8 is PENTAETHYLENE GLYCOL (three-letter code: 1PE) (formula: C<sub>10</sub>H<sub>22</sub>O<sub>6</sub>).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
8	A	1	Total	C	H	O	0	0
			38	10	22	6		

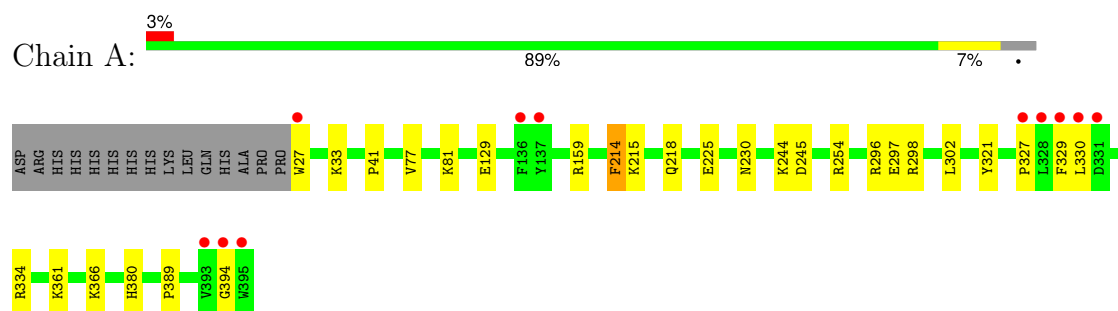
- Molecule 9 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
9	A	303	Total	O	0	0
			303	303		

### 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.

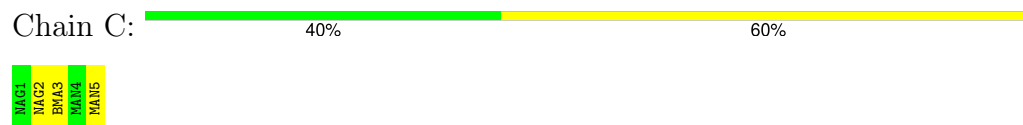
- Molecule 1: Acid ceramidase isoform b



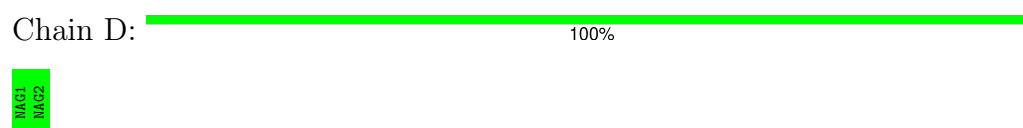
- Molecule 2: alpha-D-mannopyranose-(1-3)-[alpha-D-mannopyranose-(1-6)]beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-[alpha-L-fucopyranose-(1-6)]2-acetamido-2-deoxy-beta-D-glucopyranose



- 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



- Molecule 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	C 1 2 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	160.77Å 53.91Å 48.80Å 90.00° 104.41° 90.00°	Depositor
Resolution (Å)	37.39 – 1.40 37.39 – 1.40	Depositor EDS
% Data completeness (in resolution range)	87.0 (37.39-1.40) 83.2 (37.39-1.40)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	2.58 (at 1.40Å)	Xtriage
Refinement program	PHENIX 1.10.1_2155	Depositor
R, $R_{free}$	0.122 , 0.158 0.124 , 0.161	Depositor DCC
$R_{free}$ test set	3983 reflections (5.04%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	13.6	Xtriage
Anisotropy	0.062	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.44 , 48.9	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.49$ , $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
$F_o, F_c$ correlation	0.98	EDS
Total number of atoms	6821	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	26.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 7.80% 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

### 5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: GOL, BMA, PG4, 1PE, NAG, CL, FUC, MAN

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with  $|Z| > 5$  is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	$\# Z  > 5$	RMSZ	$\# Z  > 5$
1	A	0.41	0/3179	0.67	1/4316 (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	A	0	1

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed( $^{\circ}$ )	Ideal( $^{\circ}$ )
1	A	214	PHE	CB-CG-CD2	5.40	124.58	120.80

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	296	ARG	Peptide

### 5.2 Too-close contacts

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	3053	3057	3080	18	0
2	B	71	66	61	0	0
3	C	61	57	52	0	0
4	D	28	27	25	0	0
5	A	12	15	16	1	0
6	A	2	0	0	0	0
7	A	13	18	18	0	0
8	A	16	22	22	0	0
9	A	303	0	0	4	0
All	All	3559	3262	3274	18	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 (18) 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:27:TRP:HD1	1:A:361:LYS:HZ1	1.51	0.59
1:A:297:GLU:HG2	1:A:302[B]:LEU:HG	1.89	0.54
1:A:77[B]:VAL:CG1	1:A:129:GLU:OE2	2.57	0.53
1:A:27:TRP:HD1	1:A:361:LYS:NZ	2.08	0.51
1:A:334:ARG:NE	9:A:507:HOH:O	2.43	0.51
1:A:230:ASN:OD1	1:A:298:ARG:NH2	2.43	0.50
1:A:380:HIS:HD1	5:A:414:GOL:C1	2.23	0.50
1:A:215:LYS:HD3	1:A:218[B]:GLN:OE1	2.14	0.47
1:A:77[B]:VAL:HG11	1:A:129:GLU:OE2	2.15	0.46
1:A:244:LYS:NZ	9:A:502:HOH:O	2.47	0.46
1:A:329:PHE:CD2	1:A:330:LEU:HD23	2.51	0.45
1:A:321[A]:TYR:CZ	1:A:327:PRO:HB3	2.52	0.44
1:A:366:LYS:HB2	1:A:394:GLY:HA2	1.99	0.44
1:A:33:LYS:HE2	9:A:625:HOH:O	2.16	0.44
1:A:225:GLU:OE1	1:A:225:GLU:HA	2.19	0.41
1:A:41:PRO:HB2	1:A:389:PRO:HG3	2.04	0.40
1:A:81:LYS:HE3	9:A:679:HOH:O	2.20	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	382/384 (100%)	372 (97%)	10 (3%)	0	100	100

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	344/343 (100%)	341 (99%)	3 (1%)	75	53

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

Mol	Chain	Res	Type
1	A	159	ARG
1	A	214	PHE
1	A	254	ARG

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

### 5.3.3 RNA [i](#)

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 ⓘ

13 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	2,1	14,14,15	0.90	1 (7%)	17,19,21	0.89	1 (5%)
2	NAG	B	2	2	14,14,15	0.41	0	17,19,21	0.83	0
2	BMA	B	3	2	11,11,12	0.71	0	15,15,17	1.12	1 (6%)
2	MAN	B	4	2	11,11,12	0.64	0	15,15,17	0.99	1 (6%)
2	MAN	B	5	2	11,11,12	0.77	0	15,15,17	0.99	1 (6%)
2	FUC	B	6	2	10,10,11	0.48	0	14,14,16	0.88	0
3	NAG	C	1	1,3	14,14,15	0.22	0	17,19,21	0.65	0
3	NAG	C	2	3	14,14,15	0.57	1 (7%)	17,19,21	0.66	0
3	BMA	C	3	3	11,11,12	0.78	1 (9%)	15,15,17	0.84	0
3	MAN	C	4	3	11,11,12	0.45	0	15,15,17	1.00	0
3	MAN	C	5	3	11,11,12	0.53	0	15,15,17	0.88	1 (6%)
4	NAG	D	1	1,4	14,14,15	0.66	0	17,19,21	0.41	0
4	NAG	D	2	4	14,14,15	0.40	0	17,19,21	0.36	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	2,1	-	0/6/23/26	0/1/1/1
2	NAG	B	2	2	-	0/6/23/26	0/1/1/1
2	BMA	B	3	2	-	0/2/19/22	0/1/1/1
2	MAN	B	4	2	-	1/2/19/22	0/1/1/1
2	MAN	B	5	2	-	0/2/19/22	0/1/1/1

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

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	1	NAG	C1-C2	2.76	1.56	1.52
3	C	2	NAG	O5-C1	-2.03	1.40	1.43
3	C	3	BMA	O5-C1	-2.02	1.40	1.43

All (5) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	5	MAN	C1-O5-C5	3.23	116.51	112.19
2	B	4	MAN	C1-O5-C5	3.01	116.22	112.19
2	B	3	BMA	C1-O5-C5	2.32	115.29	112.19
2	B	1	NAG	C3-C4-C5	-2.31	106.04	110.23
3	C	5	MAN	O2-C2-C3	-2.13	105.73	110.15

There are no chirality outliers.

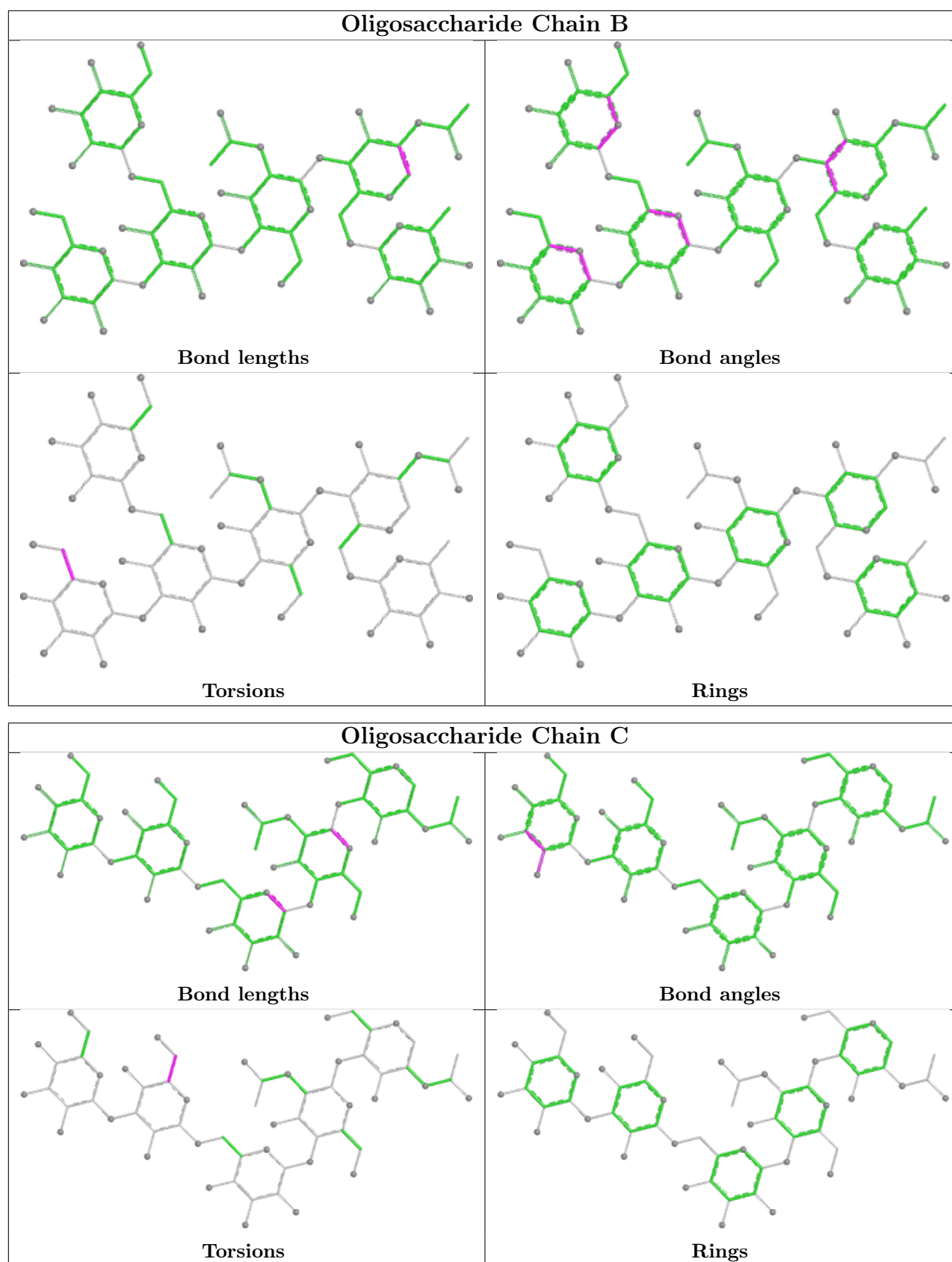
All (5) torsion outliers are listed below:

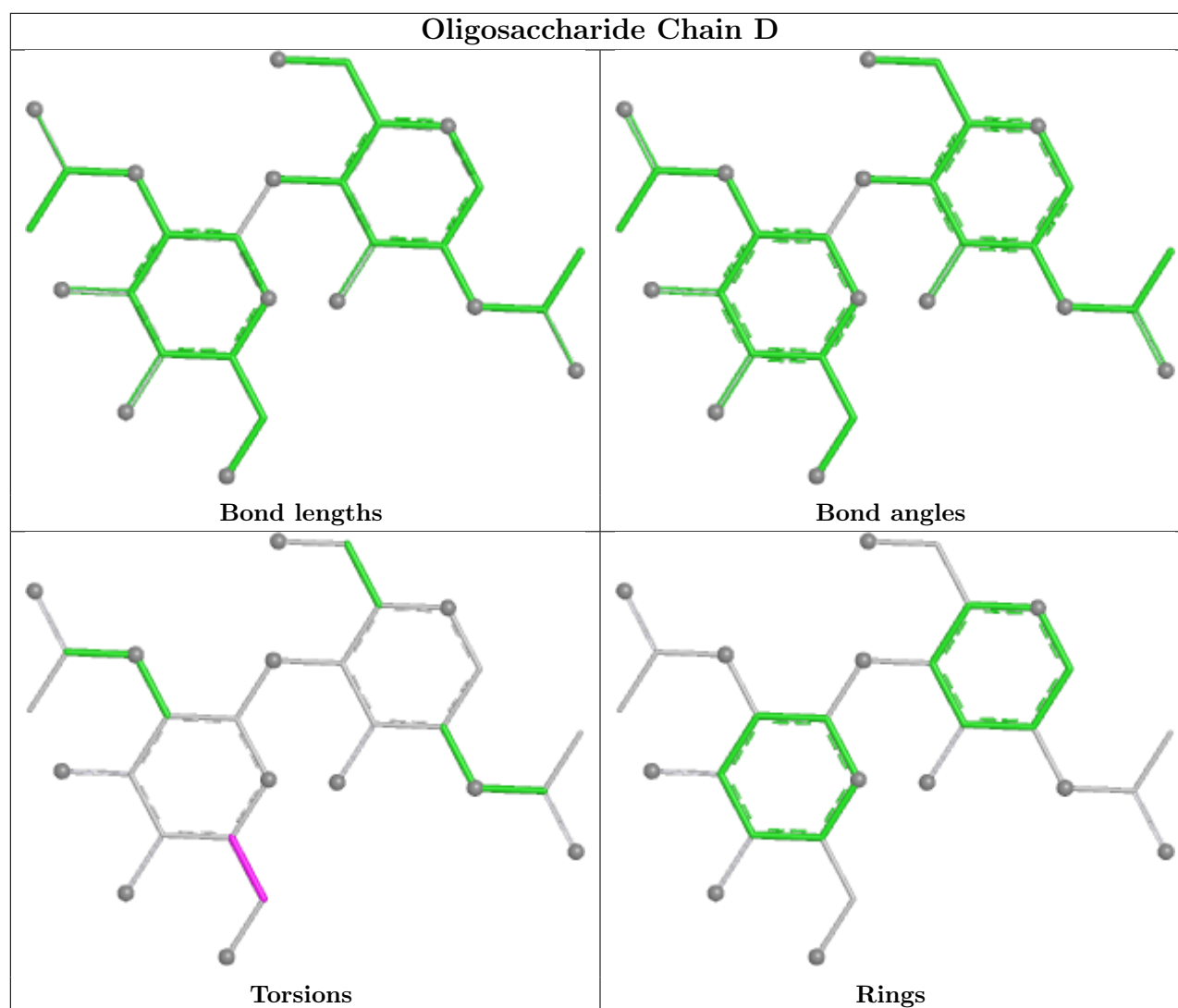
Mol	Chain	Res	Type	Atoms
4	D	2	NAG	C4-C5-C6-O6
3	C	4	MAN	C4-C5-C6-O6
4	D	2	NAG	O5-C5-C6-O6
3	C	4	MAN	O5-C5-C6-O6
2	B	4	MAN	C4-C5-C6-O6

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](#)

Of 6 ligands modelled in this entry, 2 are monoatomic - leaving 4 for Mogul analysis.

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	A	415	-	5,5,5	0.37	0	5,5,5	0.34	0
5	GOL	A	414	-	5,5,5	0.57	0	5,5,5	1.42	1 (20%)
8	1PE	A	419	-	15,15,15	0.55	0	14,14,14	0.47	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
7	PG4	A	418	-	12,12,12	0.54	0	11,11,11	0.29	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	A	415	-	-	4/4/4/4	-
5	GOL	A	414	-	-	0/4/4/4	-
8	1PE	A	419	-	-	6/13/13/13	-
7	PG4	A	418	-	-	0/10/10/10	-

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	A	414	GOL	C3-C2-C1	-2.07	104.22	111.80

There are no chirality outliers.

All (10) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
5	A	415	GOL	O1-C1-C2-C3
5	A	415	GOL	C1-C2-C3-O3
5	A	415	GOL	O1-C1-C2-O2
5	A	415	GOL	O2-C2-C3-O3
8	A	419	1PE	OH4-C13-C23-OH3
8	A	419	1PE	OH6-C15-C25-OH5
8	A	419	1PE	C23-C13-OH4-C24
8	A	419	1PE	OH2-C12-C22-OH3
8	A	419	1PE	C12-C22-OH3-C23
8	A	419	1PE	C13-C23-OH3-C22

There are no ring outliers.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	A	414	GOL	1	0



## 5.7 Other polymers [i](#)

There are no such residues in this entry.

## 5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

## 6 Fit of model and data [i](#)

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

In the following table, the column labelled ‘#RSRZ > 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 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	369/384 (96%)	-0.37	11 (2%) 52 54	10, 21, 45, 86	15 (4%)

All (11) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	395	TRP	6.9
1	A	27	TRP	6.2
1	A	328	LEU	5.2
1	A	330	LEU	3.8
1	A	136	PHE	3.6
1	A	394	GLY	3.2
1	A	327	PRO	2.8
1	A	329	PHE	2.8
1	A	393	VAL	2.8
1	A	137	TYR	2.6
1	A	331	ASP	2.3

### 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.

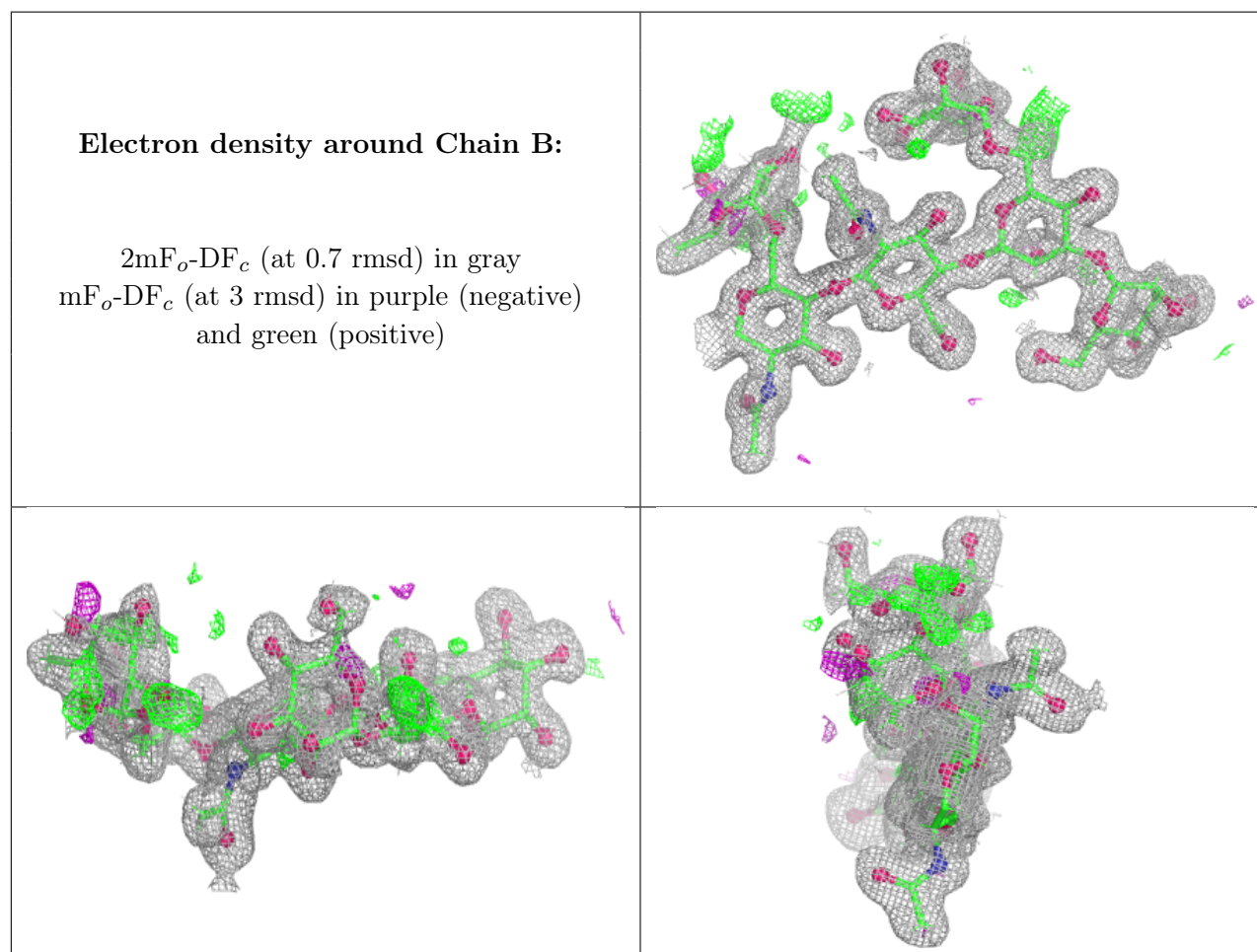
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å <sup>2</sup> )	Q<0.9
4	NAG	D	2	14/15	0.58	0.17	61,73,86,87	0

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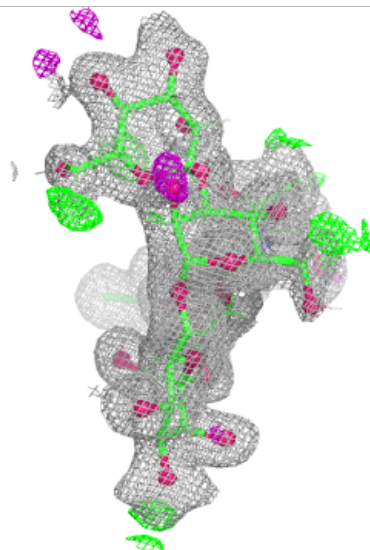
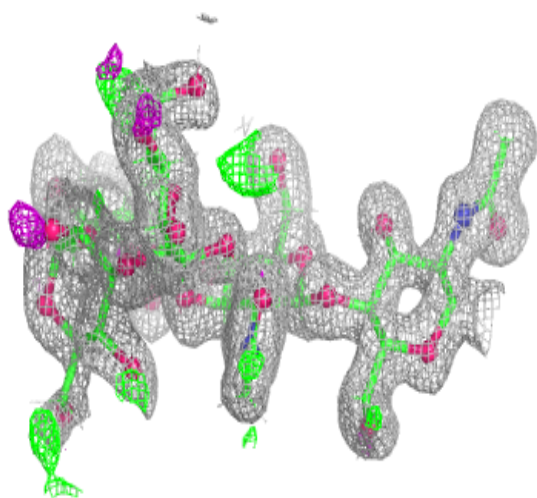
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors( $\text{\AA}^2$ )	Q<0.9
2	FUC	B	6	10/11	0.78	0.15	40,53,62,66	0
3	MAN	C	4	11/12	0.83	0.13	37,51,61,65	0
2	MAN	B	5	11/12	0.90	0.11	28,39,52,58	0
4	NAG	D	1	14/15	0.91	0.10	27,47,59,59	0
3	MAN	C	5	11/12	0.91	0.09	36,42,48,50	0
3	BMA	C	3	11/12	0.94	0.07	31,37,42,46	0
3	NAG	C	2	14/15	0.95	0.08	27,32,37,41	0
2	BMA	B	3	11/12	0.97	0.05	16,20,25,25	0
3	NAG	C	1	14/15	0.97	0.05	17,23,30,36	0
2	MAN	B	4	11/12	0.98	0.05	19,27,32,35	0
2	NAG	B	2	14/15	0.99	0.05	14,19,25,25	0
2	NAG	B	1	14/15	0.99	0.04	15,19,27,29	0

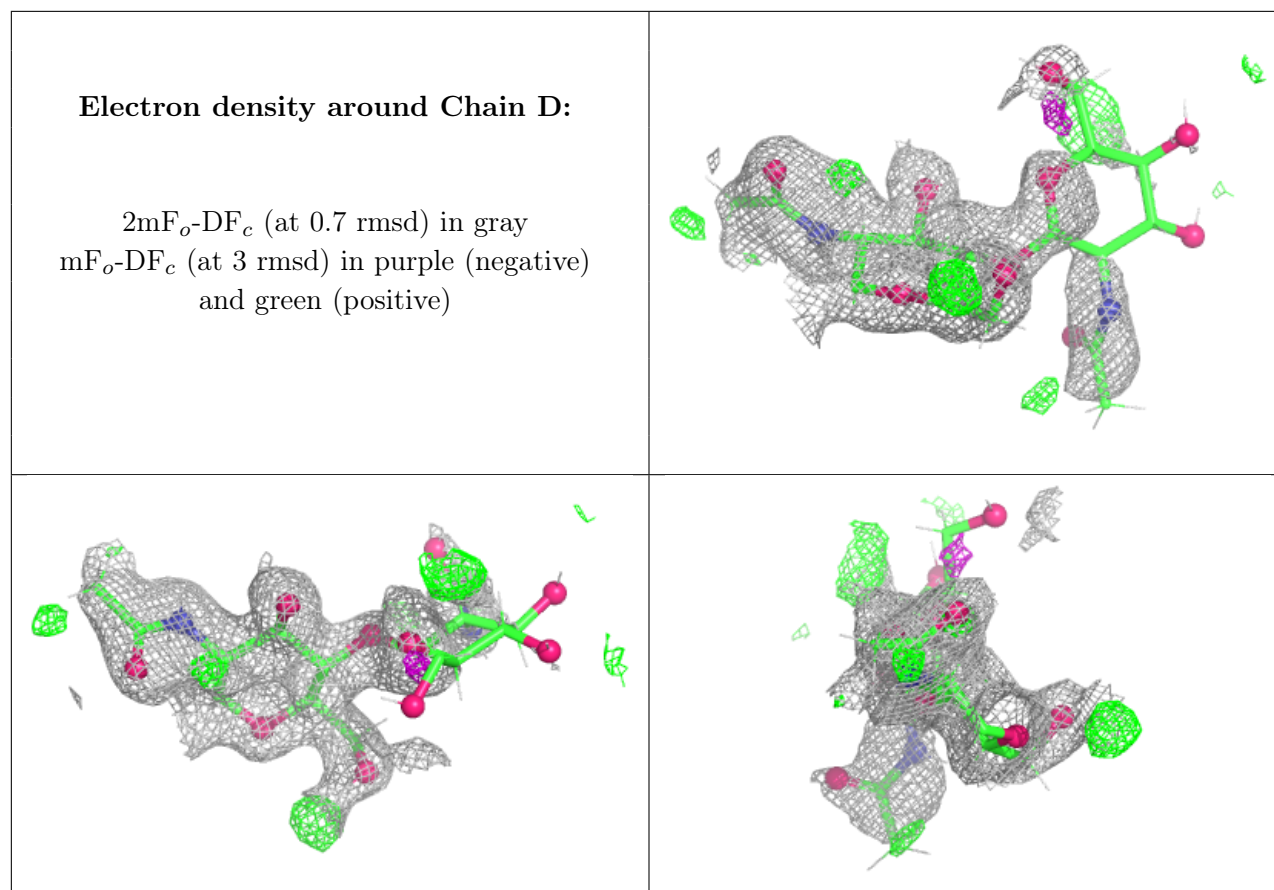
The following is a graphical depiction of the model fit to experimental electron density for oligosaccharide. Each fit is shown from different orientation to approximate a three-dimensional view.



**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)





## 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
8	1PE	A	419	16/16	0.75	0.16	49,63,71,74	0
7	PG4	A	418	13/13	0.80	0.17	46,58,69,72	0
5	GOL	A	415	6/6	0.86	0.15	36,50,59,60	0
5	GOL	A	414	6/6	0.94	0.09	24,38,45,48	0
6	CL	A	416	1/1	1.00	0.09	21,21,21,21	0
6	CL	A	417	1/1	1.00	0.02	20,20,20,20	0

## 6.5 Other polymers [i](#)

There are no such residues in this entry.