



# wwPDB X-ray Structure Validation Summary Report ⓘ

Nov 29, 2022 – 12:21 AM EST

PDB ID : 7T1X  
Title : Crystal structure of human Fab A194-01 in complex with its synthetic heptasaccharide Ara6-Man epitope (BSI110888)  
Authors : Seattle Structural Genomics Center for Infectious Disease (SSGCID)  
Deposited on : 2021-12-02  
Resolution : 2.60 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>.

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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 : 1.8.5 (274361), CSD as541be (2020)  
Xtriage (Phenix) : 1.13  
EDS : 2.31.2  
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) : 2.31.2

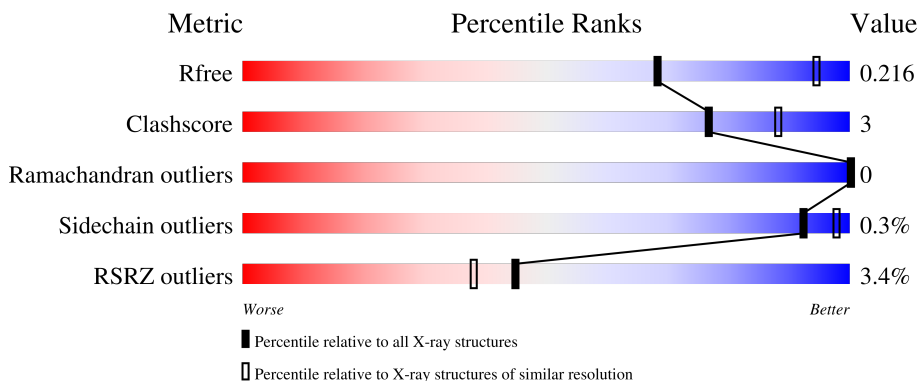
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.60 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



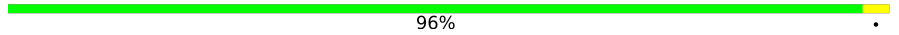


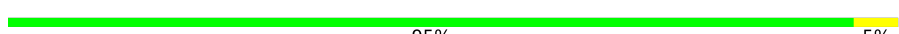


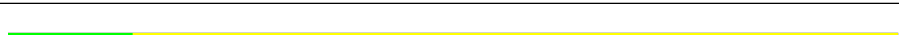
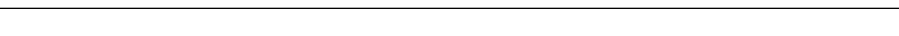
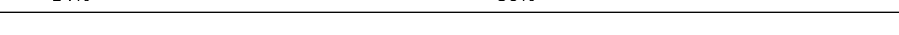
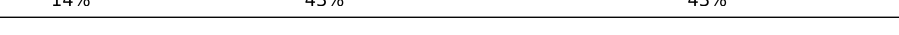
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
$R_{free}$	130704	3163 (2.60-2.60)
Clashscore	141614	3518 (2.60-2.60)
Ramachandran outliers	138981	3455 (2.60-2.60)
Sidechain outliers	138945	3455 (2.60-2.60)
RSRZ outliers	127900	3104 (2.60-2.60)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for  $\geq 3$ , 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	228	 86% 8% 5%
1	H2	228	 88% 7% 5%
1	H3	228	 83% 11% 6%
1	H4	228	 86% 10% 5%
1	H5	228	 83% 11% 6%

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Mol	Chain	Length	Quality of chain
2	L	213	 96%
2	L2	213	 92%
2	L3	213	 93%
2	L4	213	 95%
2	L5	213	 92%
3	A	7	 29%
3	B	7	 14%
3	C	7	 14%
3	D	7	 14%
3	E	7	 14%

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
3	BXY	A	1	-	-	-	X
3	BXY	D	1	-	-	-	X
3	MAN	D	5	-	-	-	X

## 2 Entry composition i

There are 5 unique types of molecules in this entry. The entry contains 17365 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.

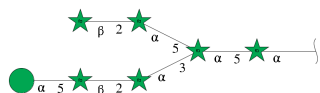
- Molecule 1 is a protein called Fab A194-01 heavy chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	H	216	Total 1638	C 1037	N 277	O 317	S 7	0	2	0
1	H2	217	Total 1612	C 1021	N 269	O 315	S 7	0	0	0
1	H3	215	Total 1590	C 1006	N 265	O 312	S 7	0	0	0
1	H4	217	Total 1631	C 1031	N 276	O 317	S 7	0	0	0
1	H5	215	Total 1614	C 1021	N 272	O 314	S 7	0	1	0

- Molecule 2 is a protein called Fab A194-01 light chain.

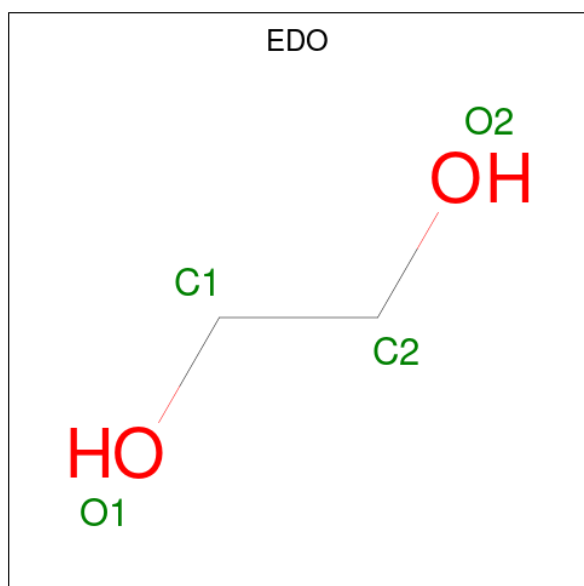
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	L	212	Total 1619	C 1013	N 279	O 322	S 5	0	0	0
2	L2	213	Total 1616	C 1010	N 279	O 322	S 5	0	0	0
2	L3	212	Total 1592	C 996	N 275	O 316	S 5	0	1	0
2	L4	212	Total 1609	C 1005	N 277	O 322	S 5	0	0	0
2	L5	212	Total 1613	C 1008	N 279	O 321	S 5	0	1	0

- Molecule 3 is an oligosaccharide called alpha-D-mannopyranose-(1-5)-beta-D-arabinofuranose-(1-2)-alpha-D-arabinofuranose-(1-3)-[beta-D-arabinofuranose-(1-2)-alpha-D-arabinofuranose-(1-5)]alpha-D-arabinofuranose-(1-5)-alpha-D-arabinofuranose.



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf	Trace
3	A	7	Total	C	O	0	0	0
			66	36	30			
3	B	7	Total	C	O	0	0	0
			66	36	30			
3	C	7	Total	C	O	0	0	0
			66	36	30			
3	D	7	Total	C	O	0	0	0
			66	36	30			
3	E	7	Total	C	O	0	0	0
			66	36	30			

- Molecule 4 is 1,2-ETHANEDIOL (three-letter code: EDO) (formula: C<sub>2</sub>H<sub>6</sub>O<sub>2</sub>).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	H	1	Total	C	O	0	0
			4	2	2		
4	H	1	Total	C	O	0	0
			4	2	2		
4	L	1	Total	C	O	0	0
			4	2	2		
4	L3	1	Total	C	O	0	0
			4	2	2		
4	H4	1	Total	C	O	0	0
			4	2	2		
4	H5	1	Total	C	O	0	0
			4	2	2		

- Molecule 5 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	H	109	Total 111	O 111	0	2
5	L	130	Total 131	O 131	0	1
5	H2	62	Total 62	O 62	0	0
5	L2	68	Total 68	O 68	0	0
5	H3	50	Total 50	O 50	0	0
5	L3	92	Total 92	O 92	0	0
5	H4	128	Total 128	O 128	0	0
5	L4	91	Total 91	O 91	0	0
5	H5	85	Total 85	O 85	0	0
5	L5	58	Total 59	O 59	0	1

### 3 Residue-property plots [i](#)

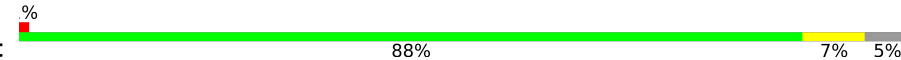
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. 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: Fab A194-01 heavy chain

Chain H:  86% 8% 5%




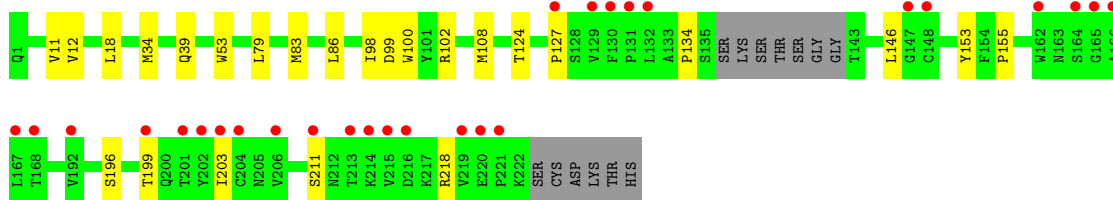
- Molecule 1: Fab A194-01 heavy chain

Chain H2:  88% 7% 5%




- Molecule 1: Fab A194-01 heavy chain

Chain H3:  12% 83% 11% 6%




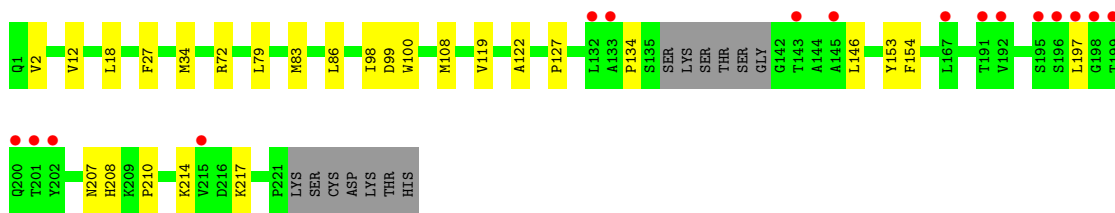
- Molecule 1: Fab A194-01 heavy chain

Chain H4:  86% 10% 5%



- Molecule 1: Fab A194-01 heavy chain

Chain H5:  7% 83% 11% 6%



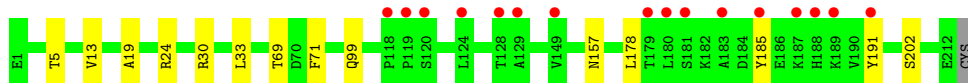
- Molecule 2: Fab A194-01 light chain



- Molecule 2: Fab A194-01 light chain



- Molecule 2: Fab A194-01 light chain



- Molecule 2: Fab A194-01 light chain



- Molecule 2: Fab A194-01 light chain



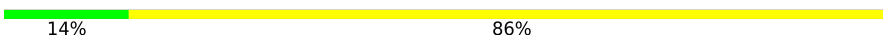
- Molecule 3: alpha-D-mannopyranose-(1-5)-beta-D-arabinofuranose-(1-2)-alpha-D-arabinofuranose-(1-3)-[beta-D-arabinofuranose-(1-2)-alpha-D-arabinofuranose-(1-5)]alpha-D-arabinofuranose-(1-5)-alpha-D-arabinofuranose





BXY1
BXY2
BXY3
BXX4
MAN5
BXY6
BXX7

- Molecule 3: alpha-D-mannopyranose-(1-5)-beta-D-arabinofuranose-(1-2)-alpha-D-arabinofuranose-(1-3)-[beta-D-arabinofuranose-(1-2)-alpha-D-arabinofuranose-(1-5)]alpha-D-arabinofuranose-(1-5)-alpha-D-arabinofuranose

Chain B:  14% 86%

BXY1
BXY2
BXY3
BXX4
MAN5
BXY6
BXX7

- Molecule 3: alpha-D-mannopyranose-(1-5)-beta-D-arabinofuranose-(1-2)-alpha-D-arabinofuranose-(1-3)-[beta-D-arabinofuranose-(1-2)-alpha-D-arabinofuranose-(1-5)]alpha-D-arabinofuranose-(1-5)-alpha-D-arabinofuranose

Chain C:  14% 86%

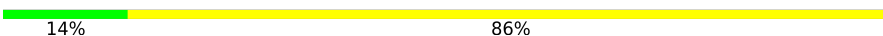
BXY1
BXY2
BXY3
BXX4
MAN5
BXY6
BXX7

- Molecule 3: alpha-D-mannopyranose-(1-5)-beta-D-arabinofuranose-(1-2)-alpha-D-arabinofuranose-(1-3)-[beta-D-arabinofuranose-(1-2)-alpha-D-arabinofuranose-(1-5)]alpha-D-arabinofuranose-(1-5)-alpha-D-arabinofuranose

Chain D:  14% 43% 43%

BXY1
BXY2
BXY3
BXX4
MAN5
BXY6
BXX7

- Molecule 3: alpha-D-mannopyranose-(1-5)-beta-D-arabinofuranose-(1-2)-alpha-D-arabinofuranose-(1-3)-[beta-D-arabinofuranose-(1-2)-alpha-D-arabinofuranose-(1-5)]alpha-D-arabinofuranose-(1-5)-alpha-D-arabinofuranose

Chain E:  14% 86%

BXY1
BXY2
BXY3
BXX4
MAN5
BXY6
BXX7

## 4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	85.93Å 149.26Å 115.36Å 90.00° 99.31° 90.00°	Depositor
Resolution (Å)	28.03 – 2.60 48.48 – 2.60	Depositor EDS
% Data completeness (in resolution range)	99.4 (28.03-2.60) 99.4 (48.48-2.60)	Depositor EDS
$R_{merge}$	0.11	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.88 (at 2.61Å)	Xtrriage
Refinement program	PHENIX 1.18rc1 3776	Depositor
R, $R_{free}$	0.159 , 0.216 0.159 , 0.216	Depositor DCC
$R_{free}$ test set	2039 reflections (2.33%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	37.4	Xtrriage
Anisotropy	0.200	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.32 , 59.6	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.50$ , $\langle L^2 \rangle = 0.34$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
$F_o, F_c$ correlation	0.95	EDS
Total number of atoms	17365	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	48.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.20% 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: MAN, EDO, BXY, BXX

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	0.37	0/1684	0.60	0/2295
1	H2	0.35	0/1652	0.56	0/2255
1	H3	0.33	0/1630	0.57	0/2229
1	H4	0.39	0/1671	0.60	0/2277
1	H5	0.36	0/1657	0.58	0/2261
2	L	0.39	0/1655	0.62	0/2249
2	L2	0.37	0/1652	0.56	0/2248
2	L3	0.37	0/1631	0.60	0/2223
2	L4	0.36	0/1645	0.57	0/2238
2	L5	0.35	0/1652	0.57	0/2248
All	All	0.36	0/16529	0.58	0/22523

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	H	1638	0	1586	10	0
1	H2	1612	0	1533	9	0
1	H3	1590	0	1494	13	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	H4	1631	0	1574	13	0
1	H5	1614	0	1547	17	0
2	L	1619	0	1561	5	0
2	L2	1616	0	1543	9	0
2	L3	1592	0	1502	7	0
2	L4	1609	0	1532	7	0
2	L5	1613	0	1537	8	0
3	A	66	0	54	0	0
3	B	66	0	54	0	0
3	C	66	0	54	0	0
3	D	66	0	54	3	0
3	E	66	0	54	0	0
4	H	8	0	12	0	0
4	H4	4	0	6	1	0
4	H5	4	0	6	0	0
4	L	4	0	6	0	0
4	L3	4	0	6	0	0
5	H	111	0	0	0	0
5	H2	62	0	0	1	0
5	H3	50	0	0	1	0
5	H4	128	0	0	0	0
5	H5	85	0	0	0	0
5	L	131	0	0	1	0
5	L2	68	0	0	0	0
5	L3	92	0	0	1	0
5	L4	91	0	0	1	0
5	L5	59	0	0	0	0
All	All	17365	0	15715	97	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.

The worst 5 of 97 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:H5:134:PRO:HG3	1:H5:146:LEU:HB3	1.60	0.83
1:H:134:PRO:HG3	1:H:146:LEU:HB3	1.63	0.81
1:H3:11:VAL:HG22	1:H3:155:PRO:HG3	1.61	0.80
2:L4:1:GLU:N	5:L4:301:HOH:O	2.15	0.78
1:H3:134:PRO:HG3	1:H3:146:LEU:HB3	1.71	0.73

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	H	214/228 (94%)	208 (97%)	6 (3%)	0	100	100
1	H2	213/228 (93%)	208 (98%)	5 (2%)	0	100	100
1	H3	211/228 (92%)	208 (99%)	3 (1%)	0	100	100
1	H4	213/228 (93%)	209 (98%)	4 (2%)	0	100	100
1	H5	212/228 (93%)	207 (98%)	5 (2%)	0	100	100
2	L	210/213 (99%)	203 (97%)	7 (3%)	0	100	100
2	L2	211/213 (99%)	206 (98%)	5 (2%)	0	100	100
2	L3	211/213 (99%)	204 (97%)	7 (3%)	0	100	100
2	L4	210/213 (99%)	203 (97%)	7 (3%)	0	100	100
2	L5	211/213 (99%)	204 (97%)	7 (3%)	0	100	100
All	All	2116/2205 (96%)	2060 (97%)	56 (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	H	180/192 (94%)	180 (100%)	0	100	100
1	H2	174/192 (91%)	173 (99%)	1 (1%)	86	95

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	H3	170/192 (88%)	170 (100%)	0	100	100
1	H4	179/192 (93%)	179 (100%)	0	100	100
1	H5	176/192 (92%)	175 (99%)	1 (1%)	86	95
2	L	178/183 (97%)	178 (100%)	0	100	100
2	L2	176/183 (96%)	175 (99%)	1 (1%)	86	95
2	L3	170/183 (93%)	169 (99%)	1 (1%)	86	95
2	L4	175/183 (96%)	175 (100%)	0	100	100
2	L5	175/183 (96%)	174 (99%)	1 (1%)	86	95
All	All	1753/1875 (94%)	1748 (100%)	5 (0%)	92	98

All (5) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	H2	89	GLU
2	L2	24	ARG
2	L3	202	SER
1	H5	217	LYS
2	L5	146	GLN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (3) such sidechains are listed below:

Mol	Chain	Res	Type
1	H3	3	GLN
1	H3	39	GLN
1	H3	57	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

35 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	BXY	A	1	3	10,10,10	0.67	0	13,14,14	2.80	5 (38%)
3	BXY	A	2	3	9,9,10	0.64	0	10,12,14	1.83	3 (30%)
3	BXY	A	3	3	9,9,10	0.59	0	10,12,14	2.01	3 (30%)
3	BXX	A	4	3	9,9,10	0.44	0	10,12,14	0.82	0
3	MAN	A	5	3	11,11,12	0.45	0	15,15,17	0.84	0
3	BXY	A	6	3	9,9,10	1.01	1 (11%)	10,12,14	2.58	3 (30%)
3	BXX	A	7	3	9,9,10	0.54	0	10,12,14	1.03	1 (10%)
3	BXY	B	1	3	10,10,10	0.68	0	13,14,14	4.00	4 (30%)
3	BXY	B	2	3	9,9,10	0.59	0	10,12,14	1.69	3 (30%)
3	BXY	B	3	3	9,9,10	0.48	0	10,12,14	1.35	1 (10%)
3	BXX	B	4	3	9,9,10	0.46	0	10,12,14	0.82	0
3	MAN	B	5	3	11,11,12	0.57	0	15,15,17	1.32	1 (6%)
3	BXY	B	6	3	9,9,10	0.99	1 (11%)	10,12,14	2.64	4 (40%)
3	BXX	B	7	3	9,9,10	0.44	0	10,12,14	0.99	1 (10%)
3	BXY	C	1	3	10,10,10	0.64	0	13,14,14	1.84	3 (23%)
3	BXY	C	2	3	9,9,10	0.85	0	10,12,14	1.66	3 (30%)
3	BXY	C	3	3	9,9,10	0.40	0	10,12,14	1.24	1 (10%)
3	BXX	C	4	3	9,9,10	0.44	0	10,12,14	0.88	0
3	MAN	C	5	3	11,11,12	0.63	0	15,15,17	0.96	1 (6%)
3	BXY	C	6	3	9,9,10	1.04	1 (11%)	10,12,14	3.98	3 (30%)
3	BXX	C	7	3	9,9,10	0.59	0	10,12,14	1.01	1 (10%)
3	BXY	D	1	3	10,10,10	0.65	0	13,14,14	2.17	3 (23%)
3	BXY	D	2	3	9,9,10	0.78	0	10,12,14	1.68	3 (30%)
3	BXY	D	3	3	9,9,10	0.55	0	10,12,14	1.68	1 (10%)
3	BXX	D	4	3	9,9,10	0.46	0	10,12,14	0.98	1 (10%)
3	MAN	D	5	3	11,11,12	0.81	0	15,15,17	1.00	1 (6%)
3	BXY	D	6	3	9,9,10	0.92	1 (11%)	10,12,14	1.83	2 (20%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
3	BXX	D	7	3	9,9,10	0.48	0	10,12,14	0.70	0
3	BXY	E	1	3	10,10,10	0.74	0	13,14,14	3.54	6 (46%)
3	BXY	E	2	3	9,9,10	0.55	0	10,12,14	1.47	2 (20%)
3	BXY	E	3	3	9,9,10	0.66	0	10,12,14	1.90	1 (10%)
3	BXX	E	4	3	9,9,10	0.54	0	10,12,14	0.88	0
3	MAN	E	5	3	11,11,12	0.62	0	15,15,17	1.09	2 (13%)
3	BXY	E	6	3	9,9,10	1.07	2 (22%)	10,12,14	3.56	5 (50%)
3	BXX	E	7	3	9,9,10	0.50	0	10,12,14	1.08	1 (10%)

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	BXY	A	1	3	-	2/2/18/18	0/1/1/1
3	BXY	A	2	3	-	0/2/15/18	0/1/1/1
3	BXY	A	3	3	-	2/2/15/18	0/1/1/1
3	BXX	A	4	3	-	0/2/15/18	0/1/1/1
3	MAN	A	5	3	-	2/2/19/22	0/1/1/1
3	BXY	A	6	3	-	0/2/15/18	0/1/1/1
3	BXX	A	7	3	-	0/2/15/18	0/1/1/1
3	BXY	B	1	3	-	2/2/18/18	0/1/1/1
3	BXY	B	2	3	-	0/2/15/18	0/1/1/1
3	BXY	B	3	3	-	2/2/15/18	0/1/1/1
3	BXX	B	4	3	-	0/2/15/18	0/1/1/1
3	MAN	B	5	3	-	2/2/19/22	0/1/1/1
3	BXY	B	6	3	-	0/2/15/18	0/1/1/1
3	BXX	B	7	3	-	0/2/15/18	0/1/1/1
3	BXY	C	1	3	-	0/2/18/18	0/1/1/1
3	BXY	C	2	3	-	1/2/15/18	0/1/1/1
3	BXY	C	3	3	-	2/2/15/18	0/1/1/1
3	BXX	C	4	3	-	0/2/15/18	0/1/1/1
3	MAN	C	5	3	-	2/2/19/22	0/1/1/1
3	BXY	C	6	3	-	0/2/15/18	0/1/1/1
3	BXX	C	7	3	-	0/2/15/18	0/1/1/1
3	BXY	D	1	3	-	0/2/18/18	0/1/1/1
3	BXY	D	2	3	-	0/2/15/18	0/1/1/1
3	BXY	D	3	3	-	2/2/15/18	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	BXX	D	4	3	-	0/2/15/18	0/1/1/1
3	MAN	D	5	3	-	2/2/19/22	0/1/1/1
3	BXY	D	6	3	-	0/2/15/18	0/1/1/1
3	BXX	D	7	3	-	0/2/15/18	0/1/1/1
3	BXY	E	1	3	-	2/2/18/18	0/1/1/1
3	BXY	E	2	3	-	1/2/15/18	0/1/1/1
3	BXY	E	3	3	-	2/2/15/18	0/1/1/1
3	BXX	E	4	3	-	0/2/15/18	0/1/1/1
3	MAN	E	5	3	-	2/2/19/22	0/1/1/1
3	BXY	E	6	3	-	0/2/15/18	0/1/1/1
3	BXX	E	7	3	-	2/2/15/18	0/1/1/1

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

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	6	BXY	O2-C2	-2.57	1.37	1.43
3	C	6	BXY	O2-C2	-2.53	1.38	1.43
3	B	6	BXY	O2-C2	-2.51	1.38	1.43
3	D	6	BXY	O2-C2	-2.35	1.38	1.43
3	E	6	BXY	O2-C2	-2.25	1.38	1.43

The worst 5 of 69 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	B	1	BXY	O5-C5-C4	12.93	155.66	111.29
3	C	6	BXY	O2-C2-C3	9.85	129.93	111.27
3	E	1	BXY	O5-C5-C4	9.69	144.55	111.29
3	A	1	BXY	O5-C5-C4	8.08	139.02	111.29
3	C	6	BXY	O2-C2-C1	-7.13	89.70	110.97

There are no chirality outliers.

5 of 30 torsion outliers are listed below:

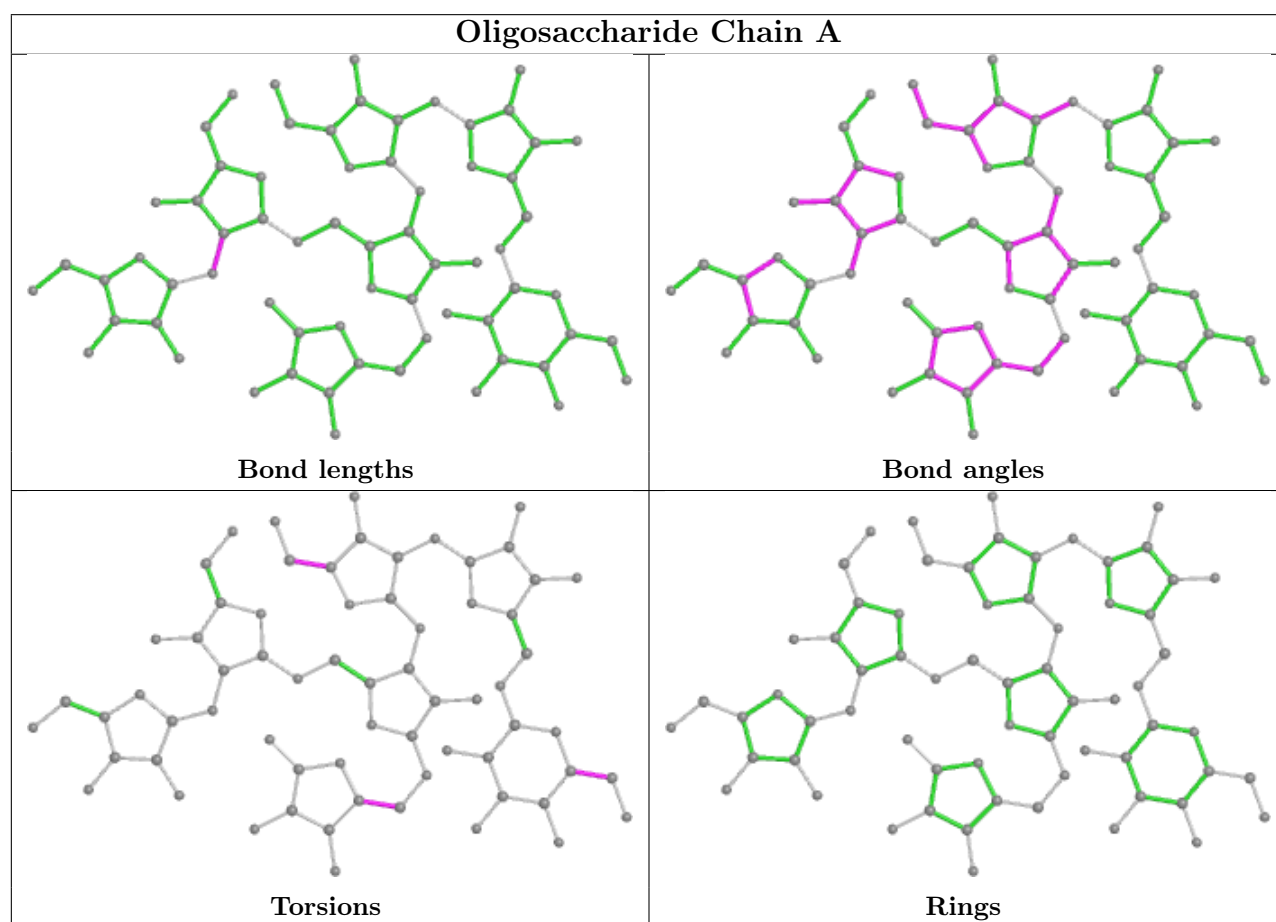
Mol	Chain	Res	Type	Atoms
3	E	3	BXY	C3-C4-C5-O5
3	A	3	BXY	C3-C4-C5-O5
3	D	5	MAN	O5-C5-C6-O6
3	D	5	MAN	C4-C5-C6-O6
3	A	3	BXY	O4-C4-C5-O5

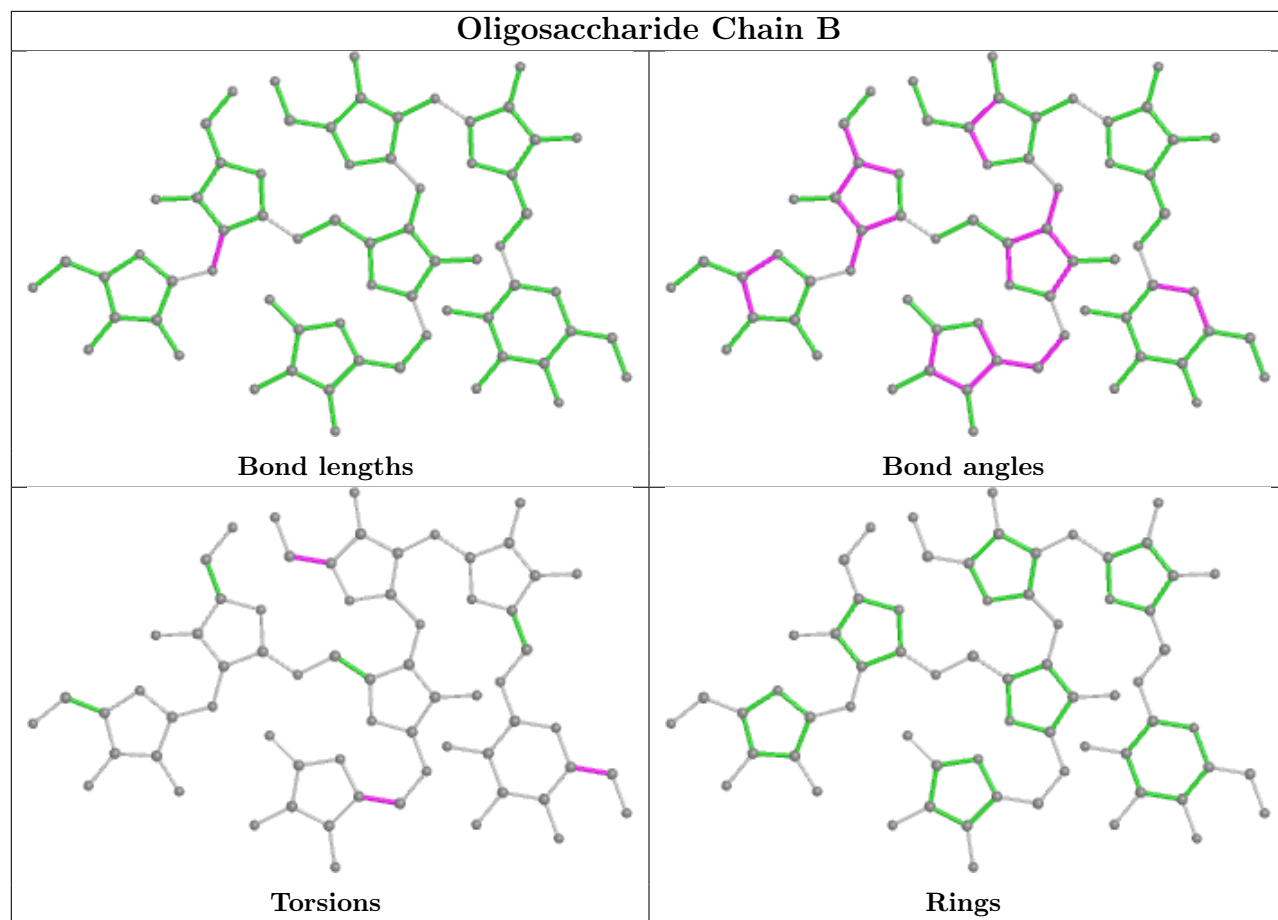
There are no ring outliers.

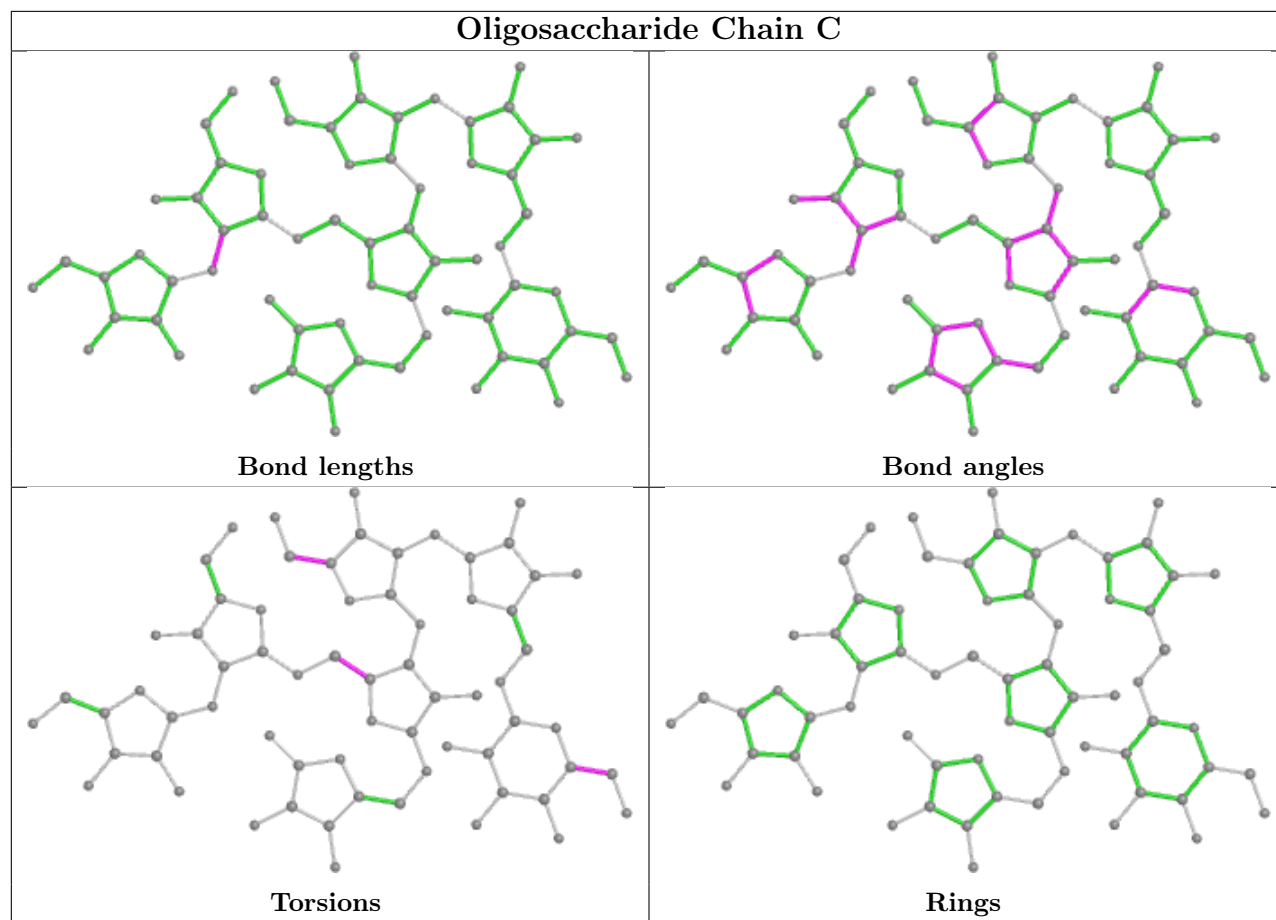
3 monomers are involved in 3 short contacts:

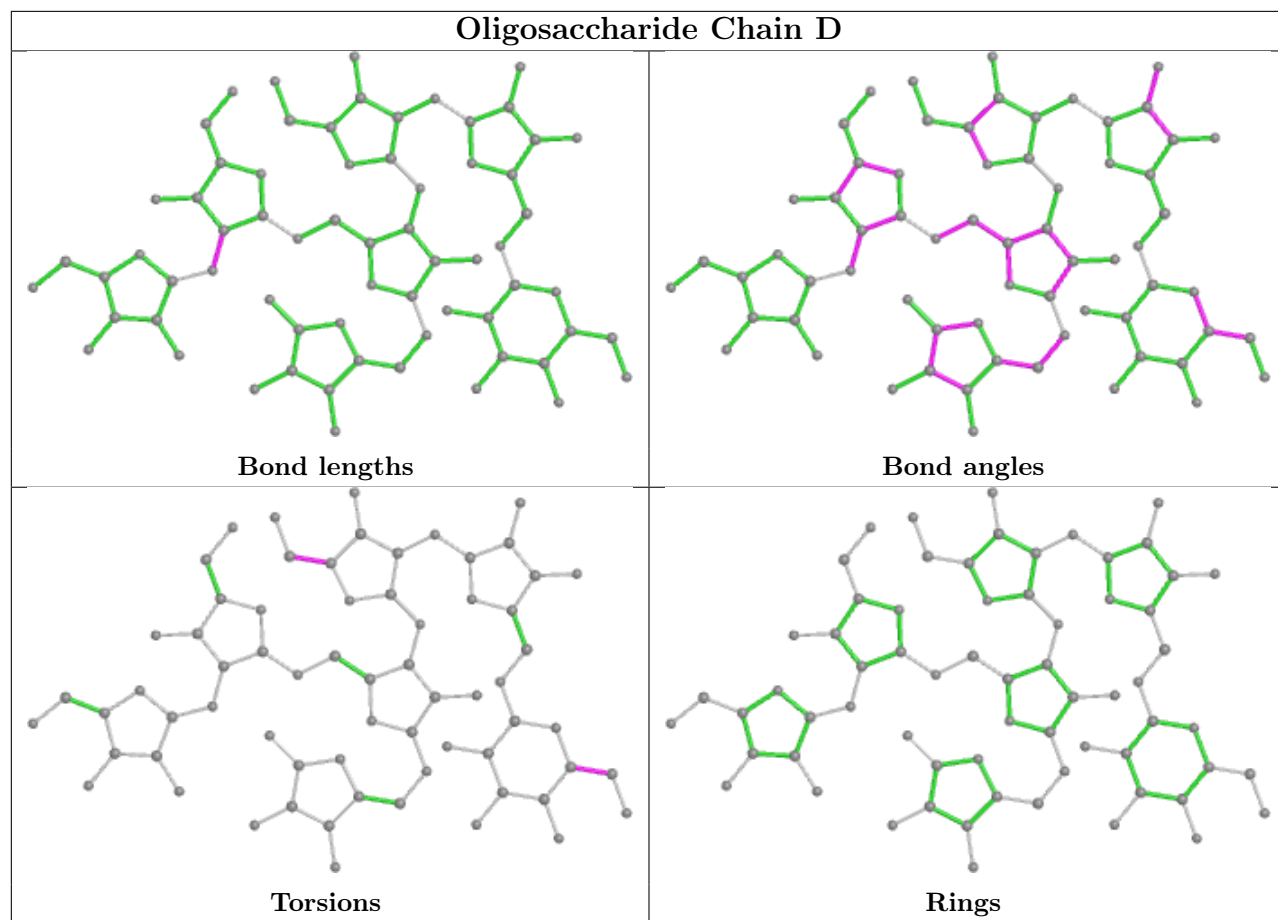
Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	D	2	BXY	1	0
3	D	1	BXY	2	0
3	D	3	BXY	1	0

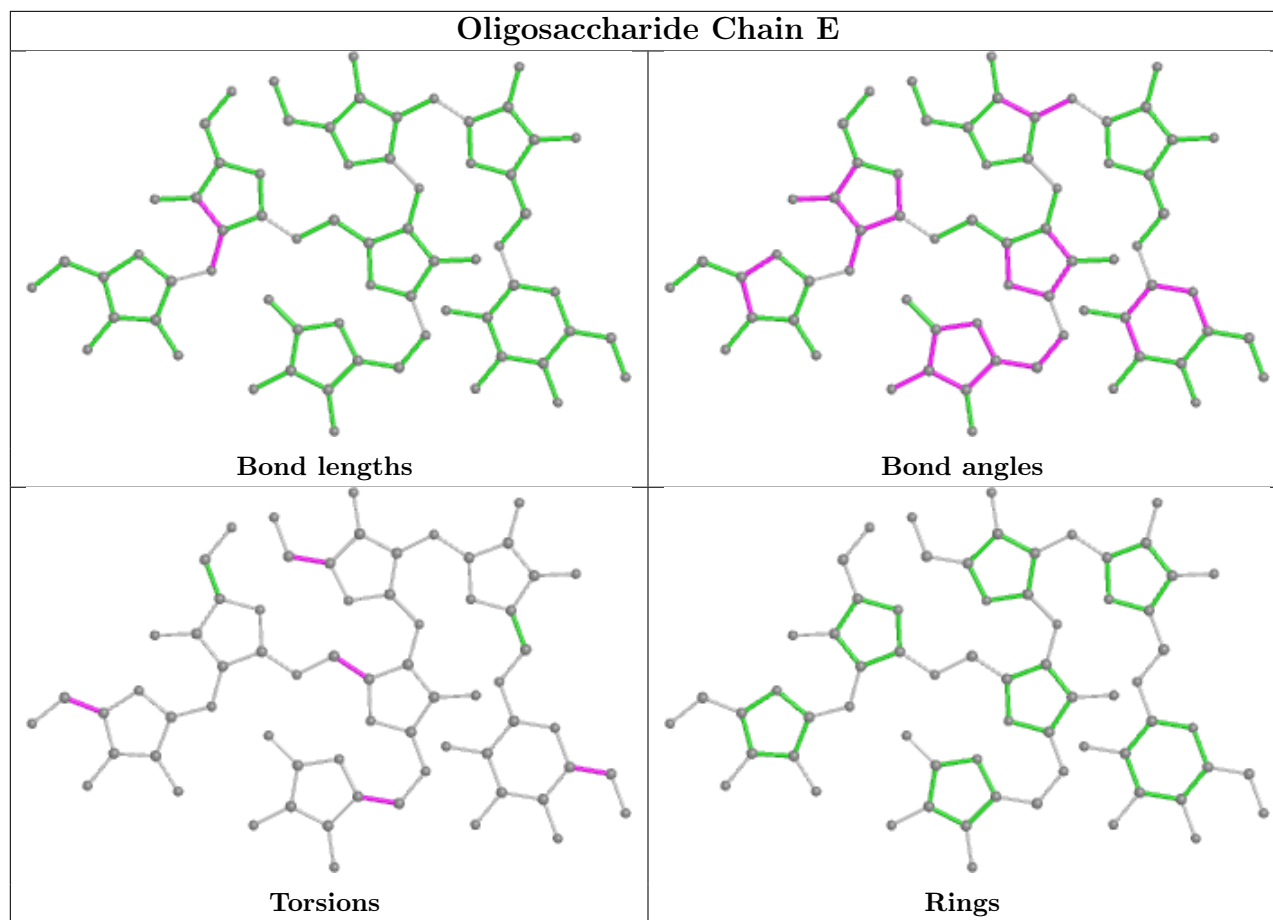
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for oligosaccharide.











## 5.6 Ligand geometry [i](#)

6 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	$\# Z  > 2$
4	EDO	L3	301	-	3,3,3	0.51	0	2,2,2	0.30	0
4	EDO	L	301	-	3,3,3	0.53	0	2,2,2	0.17	0
4	EDO	H	502	-	3,3,3	0.50	0	2,2,2	0.48	0
4	EDO	H4	501	-	3,3,3	0.51	0	2,2,2	0.32	0
4	EDO	H5	501	-	3,3,3	0.54	0	2,2,2	0.23	0
4	EDO	H	501	-	3,3,3	0.50	0	2,2,2	0.22	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
4	EDO	L3	301	-	-	0/1/1/1	-
4	EDO	L	301	-	-	0/1/1/1	-
4	EDO	H	502	-	-	1/1/1/1	-
4	EDO	H4	501	-	-	1/1/1/1	-
4	EDO	H5	501	-	-	0/1/1/1	-
4	EDO	H	501	-	-	0/1/1/1	-

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (2) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	H4	501	EDO	O1-C1-C2-O2
4	H	502	EDO	O1-C1-C2-O2

There are no ring outliers.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	H4	501	EDO	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	H	216/228 (94%)	-0.37	1 (0%) 91 89	19, 36, 70, 103	0
1	H2	217/228 (95%)	-0.23	2 (0%) 84 82	31, 45, 83, 110	0
1	H3	215/228 (94%)	0.37	28 (13%) 3 2	29, 59, 113, 138	0
1	H4	217/228 (95%)	-0.43	0 100 100	20, 36, 83, 101	0
1	H5	215/228 (94%)	0.06	16 (7%) 14 10	23, 46, 98, 130	0
2	L	212/213 (99%)	-0.49	0 100 100	20, 34, 62, 87	0
2	L2	213/213 (100%)	-0.26	2 (0%) 84 82	29, 46, 75, 98	0
2	L3	212/213 (99%)	0.07	16 (7%) 14 10	21, 42, 93, 114	0
2	L4	212/213 (99%)	-0.20	1 (0%) 91 89	20, 40, 88, 105	0
2	L5	212/213 (99%)	0.01	7 (3%) 46 39	28, 50, 90, 104	0
All	All	2141/2205 (97%)	-0.15	73 (3%) 45 38	19, 44, 92, 138	0

The worst 5 of 73 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	H3	167	LEU	6.0
1	H3	219	VAL	5.1
2	L3	183	ALA	5.0
1	H3	215	VAL	5.0
2	L3	191	TYR	4.6

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

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



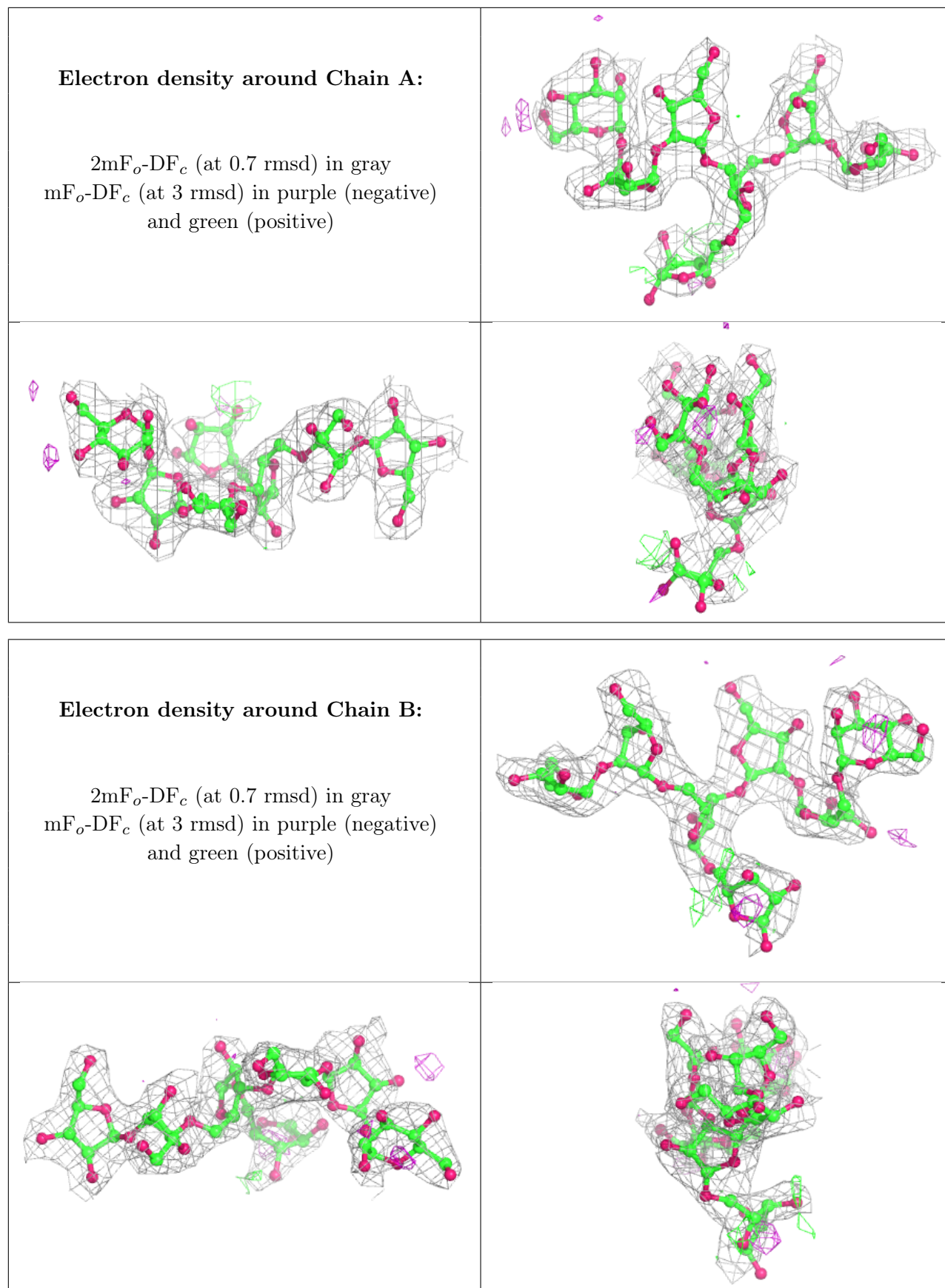
### 6.3 Carbohydrates [i](#)

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
3	MAN	D	5	11/12	0.62	0.50	113,117,121,122	0
3	BXY	C	1	10/10	0.73	0.35	77,108,114,114	0
3	BXY	D	1	10/10	0.74	0.62	88,115,122,125	0
3	BXY	B	1	10/10	0.75	0.36	82,105,112,116	0
3	BXY	A	1	10/10	0.78	0.41	79,109,113,119	0
3	BXX	D	4	9/10	0.80	0.33	109,114,116,118	0
3	MAN	E	5	11/12	0.81	0.41	79,91,100,101	0
3	BXY	E	1	10/10	0.83	0.29	78,101,106,108	0
3	MAN	C	5	11/12	0.85	0.40	86,95,99,101	0
3	MAN	B	5	11/12	0.88	0.35	61,70,75,84	0
3	BXX	C	4	9/10	0.89	0.25	88,95,102,103	0
3	BXX	B	4	9/10	0.92	0.28	77,81,83,88	0
3	BXX	E	4	9/10	0.93	0.29	78,84,88,90	0
3	BXY	E	3	9/10	0.93	0.13	59,69,74,74	0
3	BXY	C	3	9/10	0.94	0.19	77,83,85,87	0
3	BXY	D	3	9/10	0.94	0.15	59,72,83,90	0
3	BXY	C	2	9/10	0.95	0.15	45,64,71,74	0
3	BXY	B	3	9/10	0.95	0.18	53,58,67,72	0
3	MAN	A	5	11/12	0.95	0.21	43,58,64,65	0
3	BXY	E	2	9/10	0.96	0.13	42,46,54,59	0
3	BXX	A	4	9/10	0.96	0.16	51,53,57,66	0
3	BXY	B	2	9/10	0.97	0.13	53,58,68,68	0
3	BXX	C	7	9/10	0.97	0.16	30,38,43,44	0
3	BXY	A	2	9/10	0.97	0.11	33,43,50,56	0
3	BXY	D	2	9/10	0.97	0.18	28,48,66,69	0
3	BXY	D	6	9/10	0.98	0.17	24,27,36,38	0
3	BXY	B	6	9/10	0.98	0.12	29,36,45,49	0
3	BXX	B	7	9/10	0.98	0.14	32,38,40,41	0
3	BXY	A	6	9/10	0.98	0.11	25,27,32,33	0
3	BXY	C	6	9/10	0.98	0.12	30,41,44,45	0
3	BXY	A	3	9/10	0.98	0.12	47,50,56,56	0
3	BXY	E	6	9/10	0.98	0.16	19,34,39,44	0
3	BXX	A	7	9/10	0.99	0.15	23,26,35,36	0
3	BXX	D	7	9/10	0.99	0.13	21,25,27,33	0
3	BXX	E	7	9/10	0.99	0.15	25,27,34,34	0

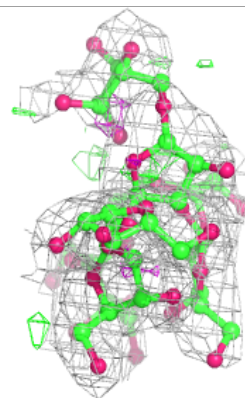
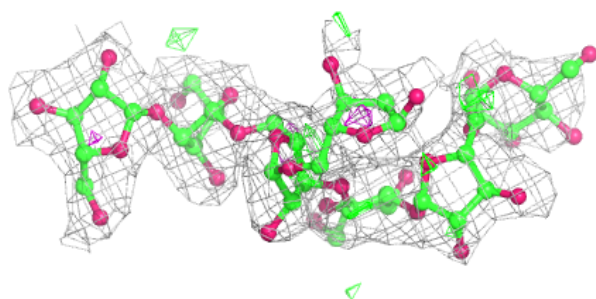
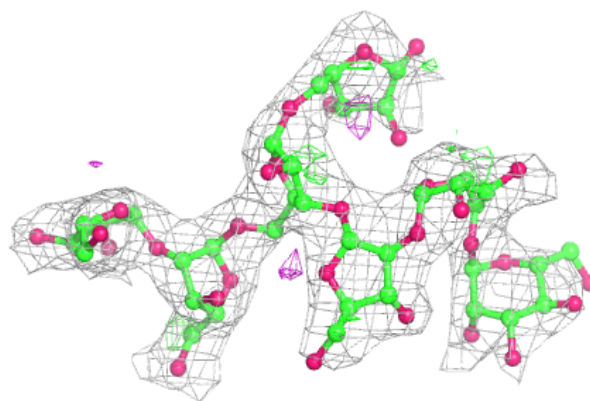
The following is a graphical depiction of the model fit to experimental electron density for oligosac-

charide. Each fit is shown from different orientation to approximate a three-dimensional view.

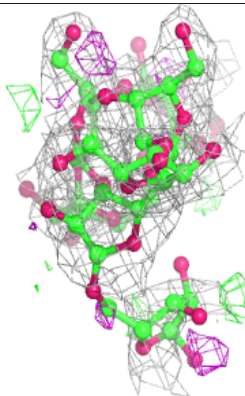
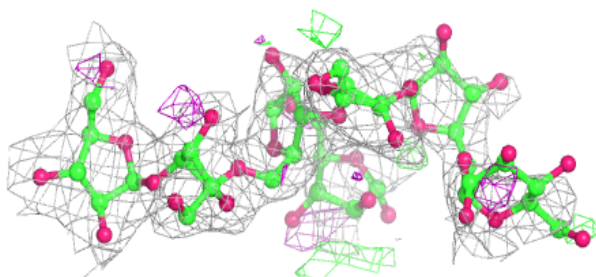
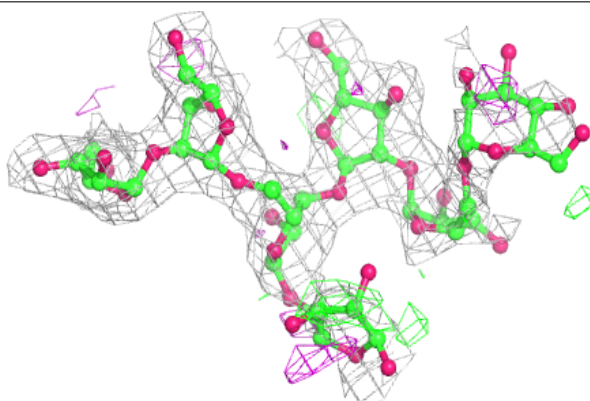


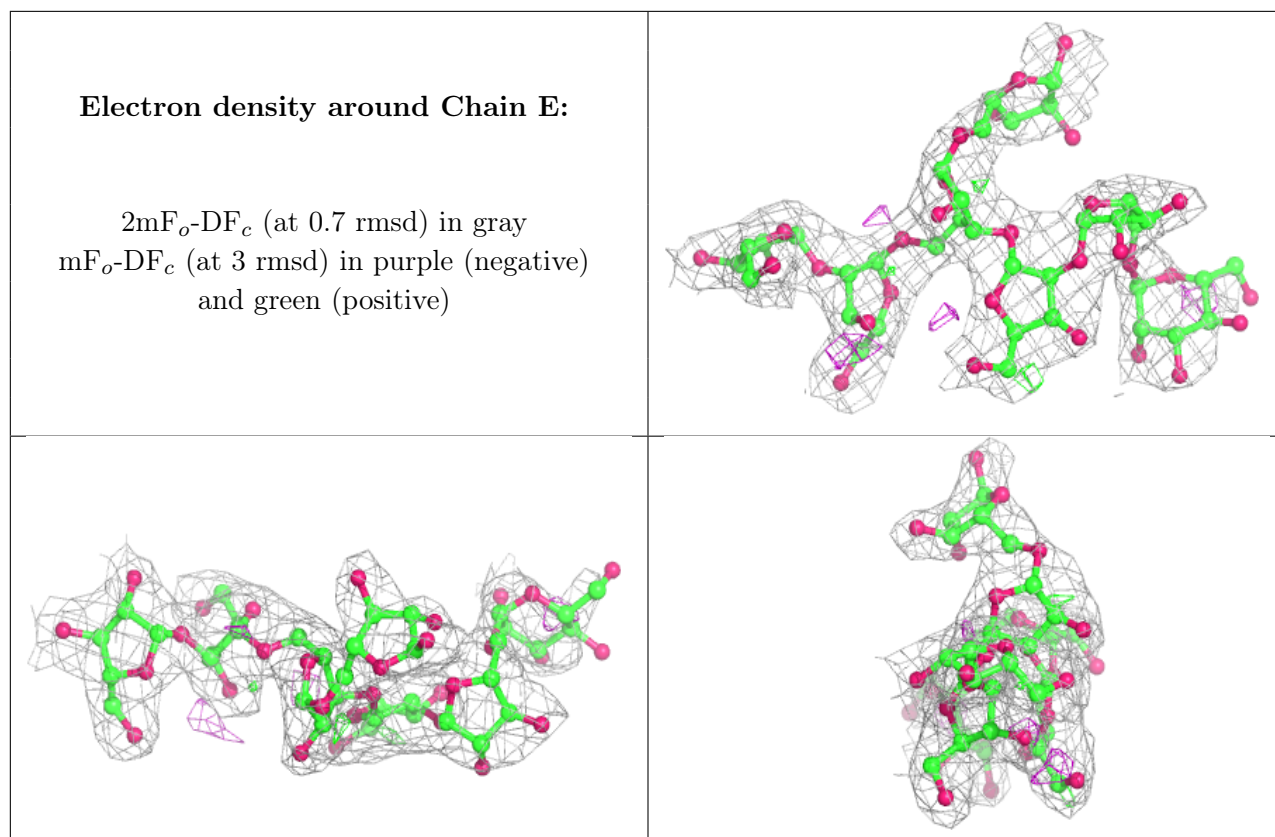
**Electron density around Chain C:**

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

**Electron density around Chain D:**

$2mF_o-DF_c$  (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
4	EDO	L3	301	4/4	0.70	0.38	83,83,83,85	0
4	EDO	H5	501	4/4	0.85	0.29	54,55,55,57	0
4	EDO	H	501	4/4	0.87	0.39	72,72,72,73	0
4	EDO	H	502	4/4	0.87	0.32	71,73,75,76	0
4	EDO	H4	501	4/4	0.89	0.18	62,68,74,76	0
4	EDO	L	301	4/4	0.94	0.19	41,45,45,53	0

## 6.5 Other polymers [i](#)

There are no such residues in this entry.