



# wwPDB X-ray Structure Validation Summary Report ⓘ

Aug 17, 2020 – 11:26 AM BST

PDB ID : 3ZT6  
Title : GlgE isoform 1 from *Streptomyces coelicolor* with alpha-cyclodextrin and maltose bound  
Authors : Syson, K.; Stevenson, C.E.M.; Rejzek, M.; Fairhurst, S.A.; Nair, A.; Bruton, C.J.; Field, R.A.; Chater, K.F.; Lawson, D.M.; Bornemann, S.  
Deposited on : 2011-07-01  
Resolution : 2.19 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.

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

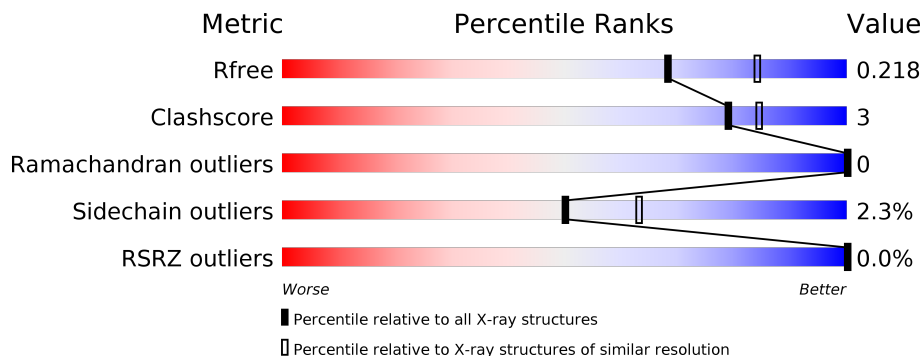
MolProbity : 4.02b-467  
Mogul : 1.8.5 (274361), CSD as541be (2020)  
Xtriage (Phenix) : 1.13  
EDS : 2.13.1  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
Refmac : 5.8.0158  
CCP4 : 7.0.044 (Gargrove)  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.13.1

# 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 2.19 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.



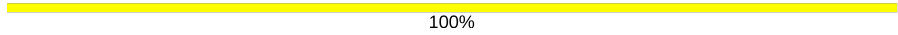
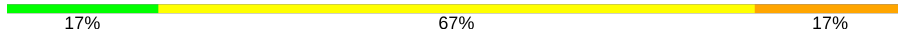



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
$R_{free}$	130704	4898 (2.20-2.20)
Clashscore	141614	5594 (2.20-2.20)
Ramachandran outliers	138981	5503 (2.20-2.20)
Sidechain outliers	138945	5504 (2.20-2.20)
RSRZ outliers	127900	4800 (2.20-2.20)

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 on 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	695	
1	B	695	
1	C	695	
1	D	695	
2	E	6	
2	G	6	

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Mol	Chain	Length	Quality of chain
2	I	6	 100%
2	K	6	 17% 67% 17%
3	F	2	 50% 50%
3	H	2	 50% 50%
3	J	2	 50% 50%
3	L	2	 50% 50%

## 2 Entry composition i

There are 4 unique types of molecules in this entry. The entry contains 21210 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 PUTATIVE GLUCANOHYDROLASE PEP1A.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	649	5105	3228	922	945	10	0	0	0
1	B	649	5093	3222	915	946	10	0	0	0
1	C	649	5102	3228	921	943	10	0	0	0
1	D	649	5095	3222	918	945	10	0	0	0

There are 80 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-19	MET	-	expression tag	UNP Q9L1K2
A	-18	GLY	-	expression tag	UNP Q9L1K2
A	-17	SER	-	expression tag	UNP Q9L1K2
A	-16	SER	-	expression tag	UNP Q9L1K2
A	-15	HIS	-	expression tag	UNP Q9L1K2
A	-14	HIS	-	expression tag	UNP Q9L1K2
A	-13	HIS	-	expression tag	UNP Q9L1K2
A	-12	HIS	-	expression tag	UNP Q9L1K2
A	-11	HIS	-	expression tag	UNP Q9L1K2
A	-10	HIS	-	expression tag	UNP Q9L1K2
A	-9	SER	-	expression tag	UNP Q9L1K2
A	-8	SER	-	expression tag	UNP Q9L1K2
A	-7	GLY	-	expression tag	UNP Q9L1K2
A	-6	LEU	-	expression tag	UNP Q9L1K2
A	-5	VAL	-	expression tag	UNP Q9L1K2
A	-4	PRO	-	expression tag	UNP Q9L1K2
A	-3	ARG	-	expression tag	UNP Q9L1K2
A	-2	GLY	-	expression tag	UNP Q9L1K2
A	-1	SER	-	expression tag	UNP Q9L1K2
A	0	HIS	-	expression tag	UNP Q9L1K2
B	-19	MET	-	expression tag	UNP Q9L1K2

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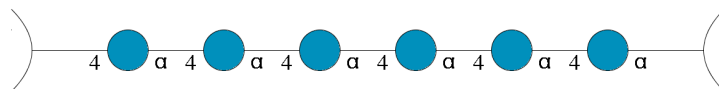
Chain	Residue	Modelled	Actual	Comment	Reference
B	-18	GLY	-	expression tag	UNP Q9L1K2
B	-17	SER	-	expression tag	UNP Q9L1K2
B	-16	SER	-	expression tag	UNP Q9L1K2
B	-15	HIS	-	expression tag	UNP Q9L1K2
B	-14	HIS	-	expression tag	UNP Q9L1K2
B	-13	HIS	-	expression tag	UNP Q9L1K2
B	-12	HIS	-	expression tag	UNP Q9L1K2
B	-11	HIS	-	expression tag	UNP Q9L1K2
B	-10	HIS	-	expression tag	UNP Q9L1K2
B	-9	SER	-	expression tag	UNP Q9L1K2
B	-8	SER	-	expression tag	UNP Q9L1K2
B	-7	GLY	-	expression tag	UNP Q9L1K2
B	-6	LEU	-	expression tag	UNP Q9L1K2
B	-5	VAL	-	expression tag	UNP Q9L1K2
B	-4	PRO	-	expression tag	UNP Q9L1K2
B	-3	ARG	-	expression tag	UNP Q9L1K2
B	-2	GLY	-	expression tag	UNP Q9L1K2
B	-1	SER	-	expression tag	UNP Q9L1K2
B	0	HIS	-	expression tag	UNP Q9L1K2
C	-19	MET	-	expression tag	UNP Q9L1K2
C	-18	GLY	-	expression tag	UNP Q9L1K2
C	-17	SER	-	expression tag	UNP Q9L1K2
C	-16	SER	-	expression tag	UNP Q9L1K2
C	-15	HIS	-	expression tag	UNP Q9L1K2
C	-14	HIS	-	expression tag	UNP Q9L1K2
C	-13	HIS	-	expression tag	UNP Q9L1K2
C	-12	HIS	-	expression tag	UNP Q9L1K2
C	-11	HIS	-	expression tag	UNP Q9L1K2
C	-10	HIS	-	expression tag	UNP Q9L1K2
C	-9	SER	-	expression tag	UNP Q9L1K2
C	-8	SER	-	expression tag	UNP Q9L1K2
C	-7	GLY	-	expression tag	UNP Q9L1K2
C	-6	LEU	-	expression tag	UNP Q9L1K2
C	-5	VAL	-	expression tag	UNP Q9L1K2
C	-4	PRO	-	expression tag	UNP Q9L1K2
C	-3	ARG	-	expression tag	UNP Q9L1K2
C	-2	GLY	-	expression tag	UNP Q9L1K2
C	-1	SER	-	expression tag	UNP Q9L1K2
C	0	HIS	-	expression tag	UNP Q9L1K2
D	-19	MET	-	expression tag	UNP Q9L1K2
D	-18	GLY	-	expression tag	UNP Q9L1K2
D	-17	SER	-	expression tag	UNP Q9L1K2

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Chain	Residue	Modelled	Actual	Comment	Reference
D	-16	SER	-	expression tag	UNP Q9L1K2
D	-15	HIS	-	expression tag	UNP Q9L1K2
D	-14	HIS	-	expression tag	UNP Q9L1K2
D	-13	HIS	-	expression tag	UNP Q9L1K2
D	-12	HIS	-	expression tag	UNP Q9L1K2
D	-11	HIS	-	expression tag	UNP Q9L1K2
D	-10	HIS	-	expression tag	UNP Q9L1K2
D	-9	SER	-	expression tag	UNP Q9L1K2
D	-8	SER	-	expression tag	UNP Q9L1K2
D	-7	GLY	-	expression tag	UNP Q9L1K2
D	-6	LEU	-	expression tag	UNP Q9L1K2
D	-5	VAL	-	expression tag	UNP Q9L1K2
D	-4	PRO	-	expression tag	UNP Q9L1K2
D	-3	ARG	-	expression tag	UNP Q9L1K2
D	-2	GLY	-	expression tag	UNP Q9L1K2
D	-1	SER	-	expression tag	UNP Q9L1K2
D	0	HIS	-	expression tag	UNP Q9L1K2

- Molecule 2 is an oligosaccharide called Cyclohexakis-(1-4)-(alpha-D-glucopyranose).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf	Trace
2	E	6	Total	C	O	0	0	0
			66	36	30			
2	G	6	Total	C	O	0	0	0
			66	36	30			
2	I	6	Total	C	O	0	0	0
			66	36	30			
2	K	6	Total	C	O	0	0	0
			66	36	30			

- Molecule 3 is an oligosaccharide called alpha-D-glucopyranose-(1-4)-alpha-D-glucopyranose.



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf	Trace
3	F	2	Total	C	O	0	0	0
			23	12	11			
3	H	2	Total	C	O	0	0	0
			23	12	11			
3	J	2	Total	C	O	0	0	0
			23	12	11			
3	L	2	Total	C	O	0	0	0
			23	12	11			

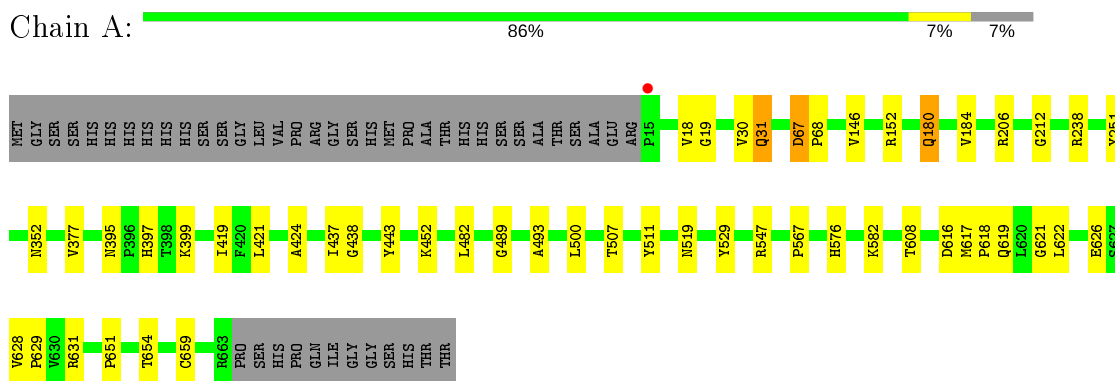
- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	127	Total	O	0	0
			127	127		
4	B	111	Total	O	0	0
			111	111		
4	C	120	Total	O	0	0
			120	120		
4	D	101	Total	O	0	0
			101	101		

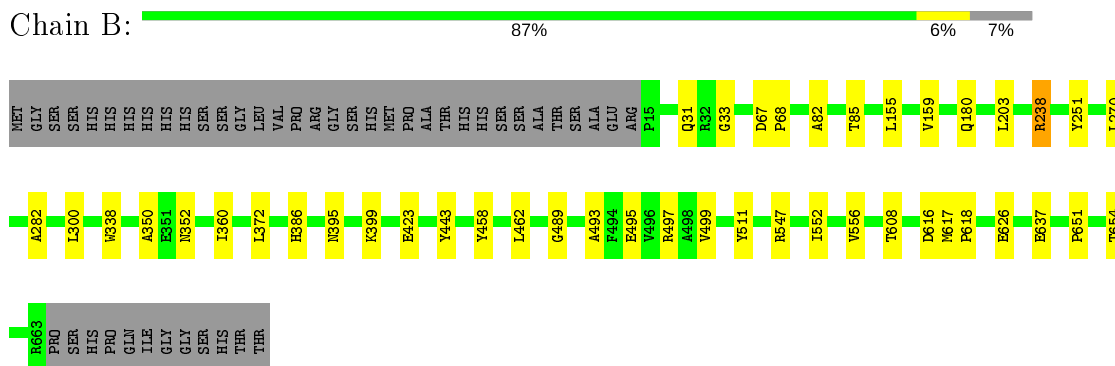
### 3 Residue-property plots [i](#)

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.

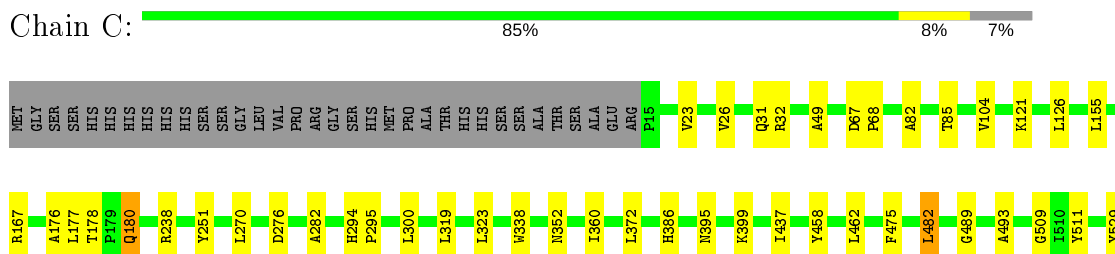
- Molecule 1: PUTATIVE GLUCANOHYDROLASE PEP1A



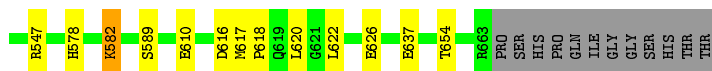
- Molecule 1: PUTATIVE GLUCANOHYDROLASE PEP1A



- Molecule 1: PUTATIVE GLUCANOHYDROLASE PEP1A

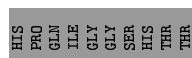
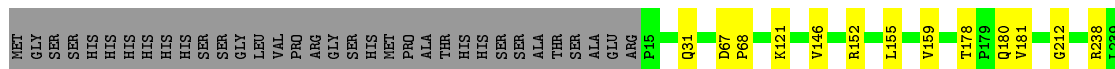






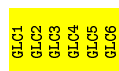
- Molecule 1: PUTATIVE GLUCANOHYDROLASE PEP1A

Chain D: 87% 6% 7%



- Molecule 2: Cyclohexakis-(1-4)-(alpha-D-glucopyranose)

Chain E: 100%



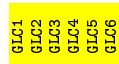
- Molecule 2: Cyclohexakis-(1-4)-(alpha-D-glucopyranose)

Chain G: 100%



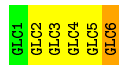
- Molecule 2: Cyclohexakis-(1-4)-(alpha-D-glucopyranose)

Chain I: 100%



- Molecule 2: Cyclohexakis-(1-4)-(alpha-D-glucopyranose)

Chain K: 17% 67% 17%



- Molecule 3: alpha-D-glucopyranose-(1-4)-alpha-D-glucopyranose

Chain F: 50% 50%



- Molecule 3: alpha-D-glucopyranose-(1-4)-alpha-D-glucopyranose

Chain H:  50% 50%

GLC1  
GLC2

- Molecule 3: alpha-D-glucopyranose-(1-4)-alpha-D-glucopyranose

Chain J:  50% 50%

GLC1  
GLC2

- Molecule 3: alpha-D-glucopyranose-(1-4)-alpha-D-glucopyranose

Chain L:  50% 50%

GLC1  
GLC2

## 4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	113.85Å 114.16Å 315.61Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	56.39 – 2.19 56.39 – 2.20	Depositor EDS
% Data completeness (in resolution range)	98.0 (56.39-2.19) 97.9 (56.39-2.20)	Depositor EDS
$R_{merge}$	0.15	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	2.00 (at 2.20Å)	Xtriage
Refinement program	REFMAC 5.6.0101	Depositor
R, $R_{free}$	0.208 , 0.236 0.199 , 0.218	Depositor DCC
$R_{free}$ test set	10320 reflections (5.00%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	30.8	Xtriage
Anisotropy	0.348	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.28 , 0.5	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.35$ , $\langle L^2 \rangle = 0.18$	Xtriage
Estimated twinning fraction	0.457 for k,h,-l	Xtriage
Reported twinning fraction	0.514 for H,K,L 0.486 for K,H,-L	Depositor
Outliers	0 of 206228 reflections	Xtriage
$F_o, F_c$ correlation	0.93	EDS
Total number of atoms	21210	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	33.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.57% 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: GLC

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	0.71	0/5257	0.73	1/7195 (0.0%)
1	B	0.69	0/5244	0.73	1/7178 (0.0%)
1	C	0.72	0/5254	0.75	1/7191 (0.0%)
1	D	0.72	1/5247 (0.0%)	0.74	0/7182
All	All	0.71	1/21002 (0.0%)	0.74	3/28746 (0.0%)

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	D	325	CYS	CB-SG	-8.61	1.67	1.82

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	67	ASP	CB-CG-OD1	5.13	122.92	118.30
1	C	482	LEU	CB-CG-CD2	-5.11	102.31	111.00
1	B	203	LEU	CB-CG-CD2	5.03	119.55	111.00

There are no chirality outliers.

There are no planarity outliers.

### 5.2 Too-close contacts [i](#)

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	5105	0	4917	34	0
1	B	5093	0	4891	25	0
1	C	5102	0	4912	34	0
1	D	5095	0	4889	20	0
2	E	66	0	54	0	0
2	G	66	0	54	0	0
2	I	66	0	54	0	0
2	K	66	0	54	1	0
3	F	23	0	21	1	0
3	H	23	0	21	3	0
3	J	23	0	21	1	0
3	L	23	0	21	1	0
4	A	127	0	0	5	0
4	B	111	0	0	2	0
4	C	120	0	0	3	0
4	D	101	0	0	1	0
All	All	21210	0	19909	113	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 113 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:628:VAL:HG13	1:A:629:PRO:HD2	1.46	0.94
1:B:395:ASN:HD21	3:H:1:GLC:C1	1.86	0.89
1:C:617:MET:CE	1:C:622:LEU:HD12	2.06	0.85
1:A:628:VAL:HG13	1:A:629:PRO:CD	2.07	0.83
1:B:350:ALA:HB3	1:B:360:ILE:CD1	2.13	0.79

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	647/695 (93%)	634 (98%)	13 (2%)	0	100	100
1	B	647/695 (93%)	634 (98%)	13 (2%)	0	100	100
1	C	647/695 (93%)	631 (98%)	16 (2%)	0	100	100
1	D	647/695 (93%)	633 (98%)	14 (2%)	0	100	100
All	All	2588/2780 (93%)	2532 (98%)	56 (2%)	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	530/575 (92%)	520 (98%)	10 (2%)	57	71
1	B	526/575 (92%)	514 (98%)	12 (2%)	50	63
1	C	528/575 (92%)	513 (97%)	15 (3%)	43	56
1	D	526/575 (92%)	514 (98%)	12 (2%)	50	63
All	All	2110/2300 (92%)	2061 (98%)	49 (2%)	50	63

5 of 49 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	C	31	GLN
1	C	270	LEU
1	D	616	ASP
1	C	180	GLN
1	C	323	LEU

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 14 such sidechains are listed below:

Mol	Chain	Res	Type
1	B	436	GLN
1	C	180	GLN
1	D	262	HIS

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Mol	Chain	Res	Type
1	B	395	ASN
1	D	180	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](#)

32 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	GLC	E	1	2	11,11,12	0.39	0	15,15,17	1.12	2 (13%)
2	GLC	E	2	2	11,11,12	0.64	0	15,15,17	1.56	3 (20%)
2	GLC	E	3	2	11,11,12	0.47	0	15,15,17	1.14	1 (6%)
2	GLC	E	4	2	11,11,12	0.33	0	15,15,17	1.85	6 (40%)
2	GLC	E	5	2	11,11,12	0.35	0	15,15,17	1.60	2 (13%)
2	GLC	E	6	2	11,11,12	0.64	0	15,15,17	1.17	1 (6%)
3	GLC	F	1	3	12,12,12	1.06	1 (8%)	17,17,17	1.94	6 (35%)
3	GLC	F	2	3	11,11,12	0.84	0	15,15,17	2.36	6 (40%)
2	GLC	G	1	2	11,11,12	0.65	0	15,15,17	1.60	4 (26%)
2	GLC	G	2	2	11,11,12	0.70	0	15,15,17	1.23	1 (6%)
2	GLC	G	3	2	11,11,12	0.83	0	15,15,17	1.75	4 (26%)
2	GLC	G	4	2	11,11,12	0.41	0	15,15,17	2.18	4 (26%)
2	GLC	G	5	2	11,11,12	0.59	0	15,15,17	1.79	4 (26%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
2	GLC	G	6	2	11,11,12	0.79	0	15,15,17	1.53	2 (13%)
3	GLC	H	1	3	12,12,12	0.86	1 (8%)	17,17,17	2.53	8 (47%)
3	GLC	H	2	3	11,11,12	0.50	0	15,15,17	1.39	3 (20%)
2	GLC	I	1	2	11,11,12	0.53	0	15,15,17	1.39	2 (13%)
2	GLC	I	2	2	11,11,12	0.76	0	15,15,17	1.49	3 (20%)
2	GLC	I	3	2	11,11,12	0.43	0	15,15,17	1.71	2 (13%)
2	GLC	I	4	2	11,11,12	0.71	0	15,15,17	1.77	4 (26%)
2	GLC	I	5	2	11,11,12	0.52	0	15,15,17	1.33	3 (20%)
2	GLC	I	6	2	11,11,12	0.89	0	15,15,17	1.37	2 (13%)
3	GLC	J	1	3	12,12,12	1.03	0	17,17,17	2.07	6 (35%)
3	GLC	J	2	3	11,11,12	0.85	0	15,15,17	1.62	2 (13%)
2	GLC	K	1	2	11,11,12	0.42	0	15,15,17	1.10	0
2	GLC	K	2	2	11,11,12	0.65	0	15,15,17	1.09	1 (6%)
2	GLC	K	3	2	11,11,12	0.62	0	15,15,17	1.44	1 (6%)
2	GLC	K	4	2	11,11,12	0.46	0	15,15,17	1.67	4 (26%)
2	GLC	K	5	2	11,11,12	0.49	0	15,15,17	1.05	1 (6%)
2	GLC	K	6	2	11,11,12	0.66	0	15,15,17	1.91	4 (26%)
3	GLC	L	1	3	12,12,12	0.70	0	17,17,17	2.20	6 (35%)
3	GLC	L	2	3	11,11,12	0.74	0	15,15,17	1.66	5 (33%)

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	GLC	E	1	2	-	0/2/19/22	0/1/1/1
2	GLC	E	2	2	-	2/2/19/22	0/1/1/1
2	GLC	E	3	2	-	0/2/19/22	0/1/1/1
2	GLC	E	4	2	-	1/2/19/22	0/1/1/1
2	GLC	E	5	2	-	0/2/19/22	0/1/1/1
2	GLC	E	6	2	-	2/2/19/22	0/1/1/1
3	GLC	F	1	3	-	0/2/22/22	0/1/1/1
3	GLC	F	2	3	-	0/2/19/22	0/1/1/1
2	GLC	G	1	2	-	2/2/19/22	0/1/1/1
2	GLC	G	2	2	-	0/2/19/22	0/1/1/1
2	GLC	G	3	2	-	1/2/19/22	0/1/1/1
2	GLC	G	4	2	-	2/2/19/22	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	GLC	G	5	2	-	1/2/19/22	0/1/1/1
2	GLC	G	6	2	-	0/2/19/22	0/1/1/1
3	GLC	H	1	3	-	2/2/22/22	0/1/1/1
3	GLC	H	2	3	-	2/2/19/22	0/1/1/1
2	GLC	I	1	2	-	2/2/19/22	0/1/1/1
2	GLC	I	2	2	-	1/2/19/22	0/1/1/1
2	GLC	I	3	2	-	2/2/19/22	0/1/1/1
2	GLC	I	4	2	-	2/2/19/22	0/1/1/1
2	GLC	I	5	2	-	0/2/19/22	0/1/1/1
2	GLC	I	6	2	-	2/2/19/22	0/1/1/1
3	GLC	J	1	3	-	2/2/22/22	0/1/1/1
3	GLC	J	2	3	-	2/2/19/22	0/1/1/1
2	GLC	K	1	2	-	2/2/19/22	0/1/1/1
2	GLC	K	2	2	-	2/2/19/22	0/1/1/1
2	GLC	K	3	2	-	0/2/19/22	0/1/1/1
2	GLC	K	4	2	-	0/2/19/22	0/1/1/1
2	GLC	K	5	2	-	2/2/19/22	0/1/1/1
2	GLC	K	6	2	-	2/2/19/22	0/1/1/1
3	GLC	L	1	3	-	0/2/22/22	0/1/1/1
3	GLC	L	2	3	-	0/2/19/22	0/1/1/1

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	H	1	GLC	O3-C3	2.11	1.47	1.43
3	F	1	GLC	O4-C4	-2.04	1.38	1.43

The worst 5 of 103 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	G	4	GLC	C1-O5-C5	6.35	120.80	112.19
3	F	2	GLC	C1-C2-C3	-5.76	102.58	109.67
2	I	3	GLC	C1-O5-C5	5.57	119.74	112.19
3	H	1	GLC	C4-C3-C2	-5.50	101.22	110.82
3	L	1	GLC	O5-C1-C2	-5.10	101.19	110.28

There are no chirality outliers.

5 of 36 torsion outliers are listed below:

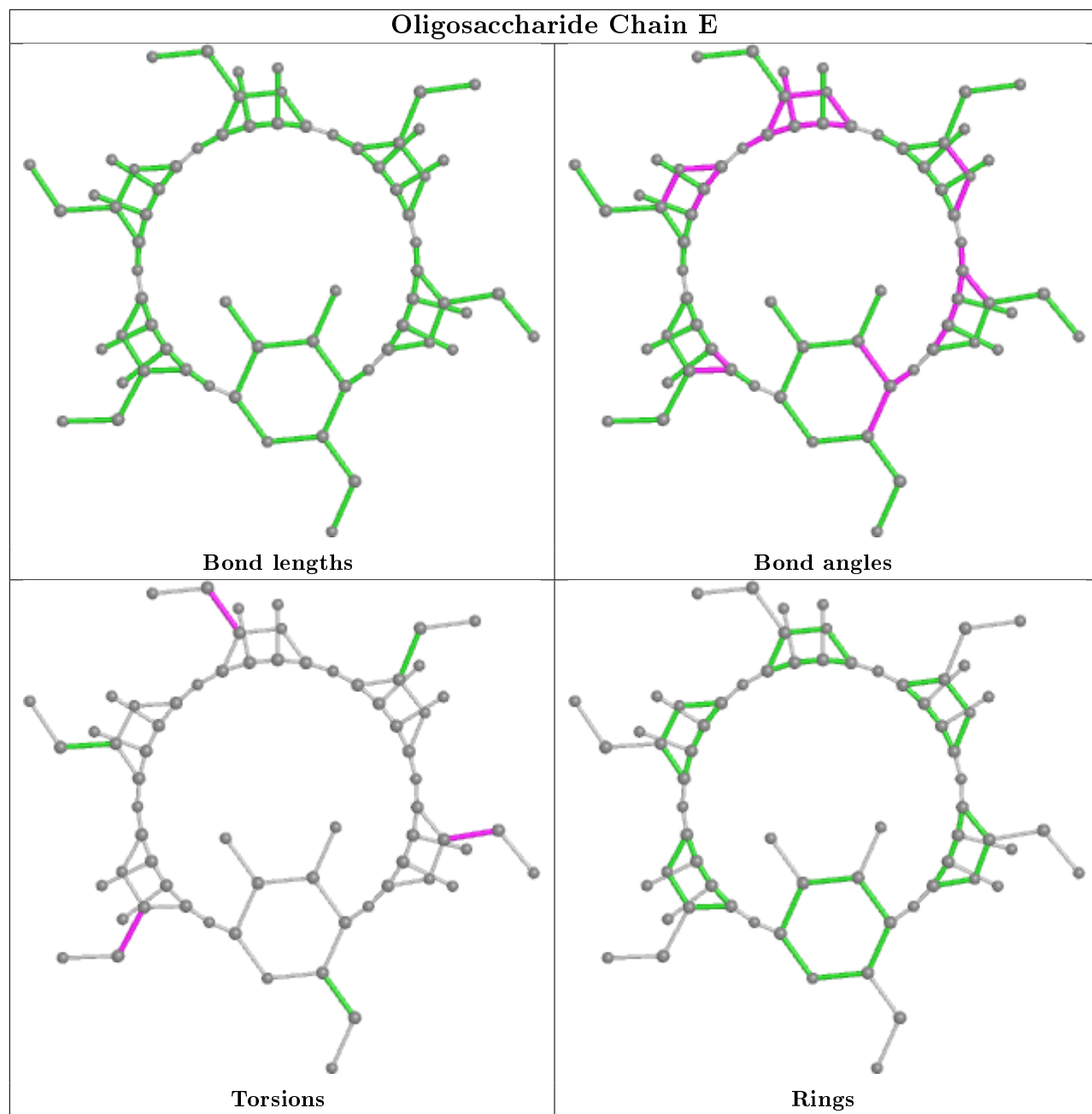
Mol	Chain	Res	Type	Atoms
2	G	1	GLC	O5-C5-C6-O6
2	K	6	GLC	O5-C5-C6-O6
2	I	3	GLC	O5-C5-C6-O6
2	K	2	GLC	O5-C5-C6-O6
2	G	1	GLC	C4-C5-C6-O6

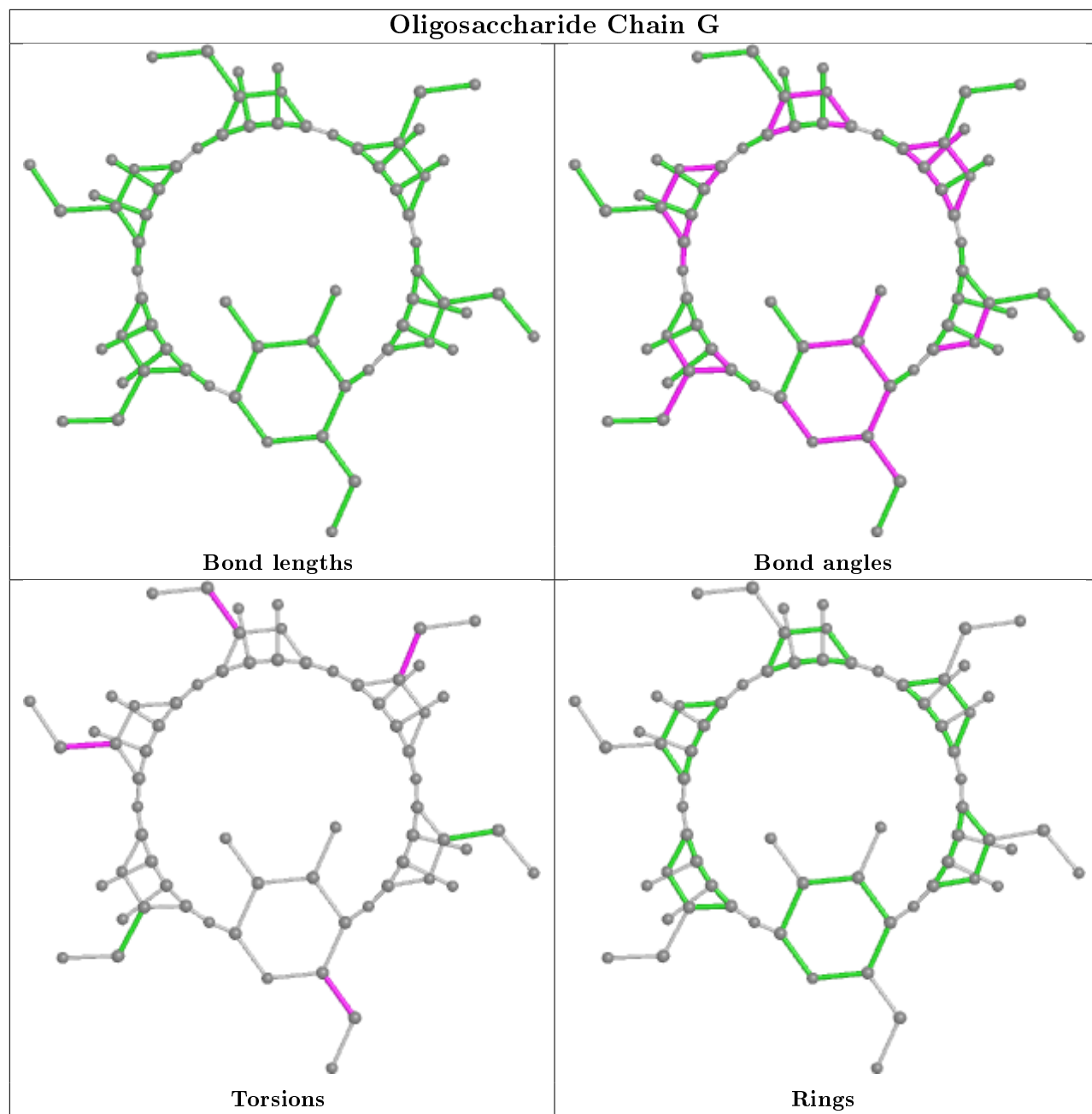
There are no ring outliers.

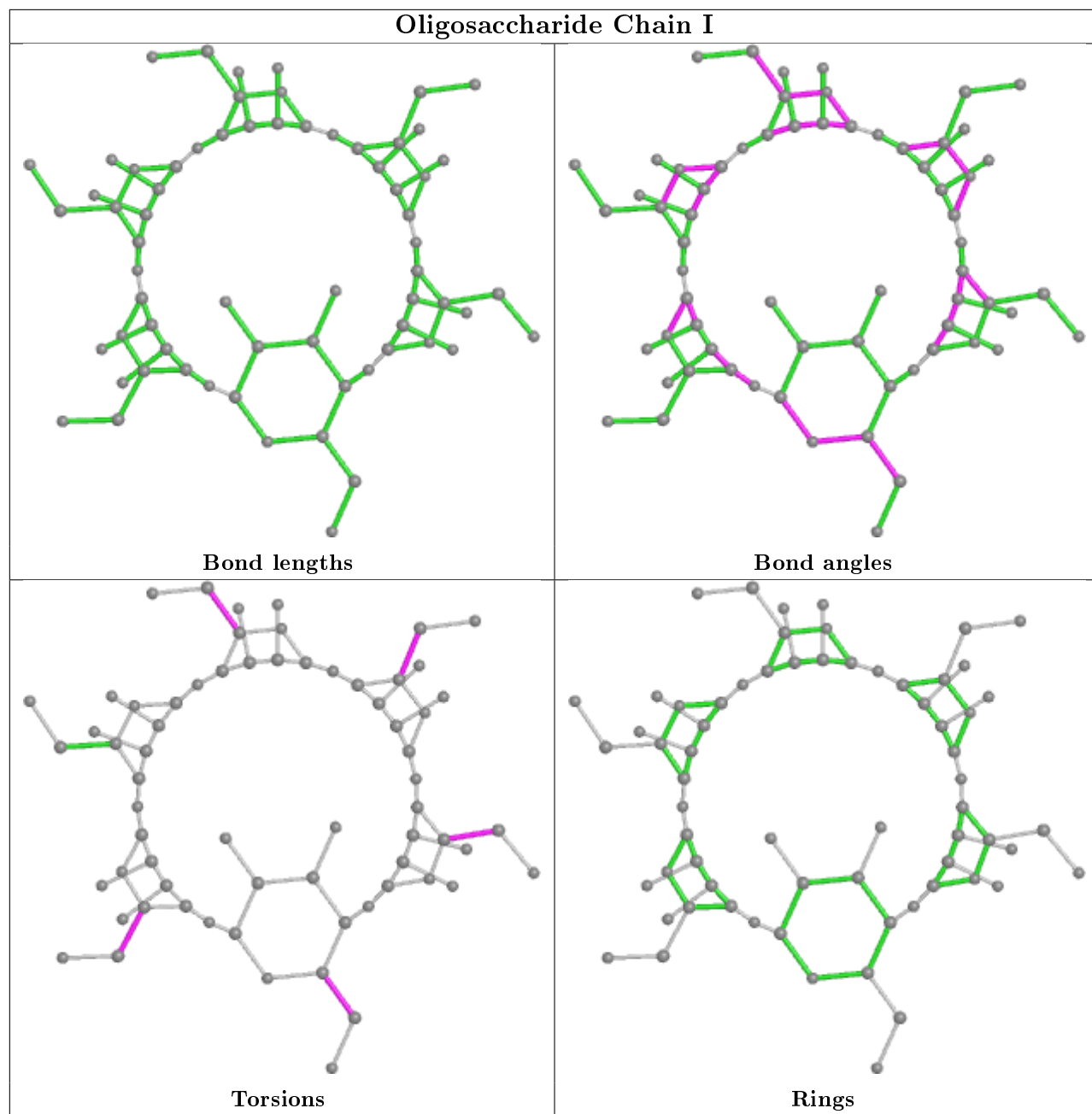
5 monomers are involved in 7 short contacts:

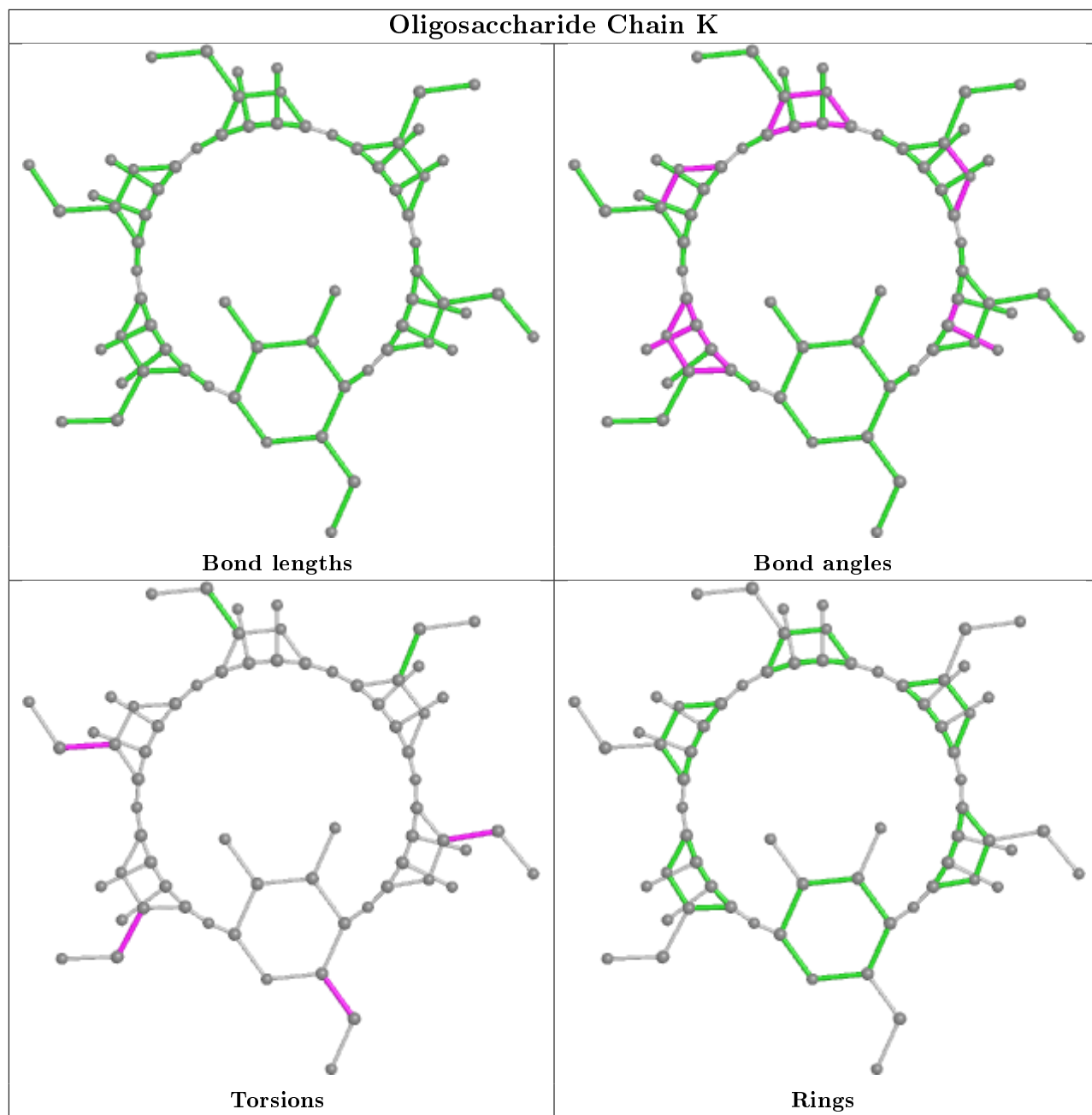
Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	H	1	GLC	3	0
3	F	1	GLC	1	0
3	L	1	GLC	1	0
3	J	1	GLC	1	0
2	K	6	GLC	1	0

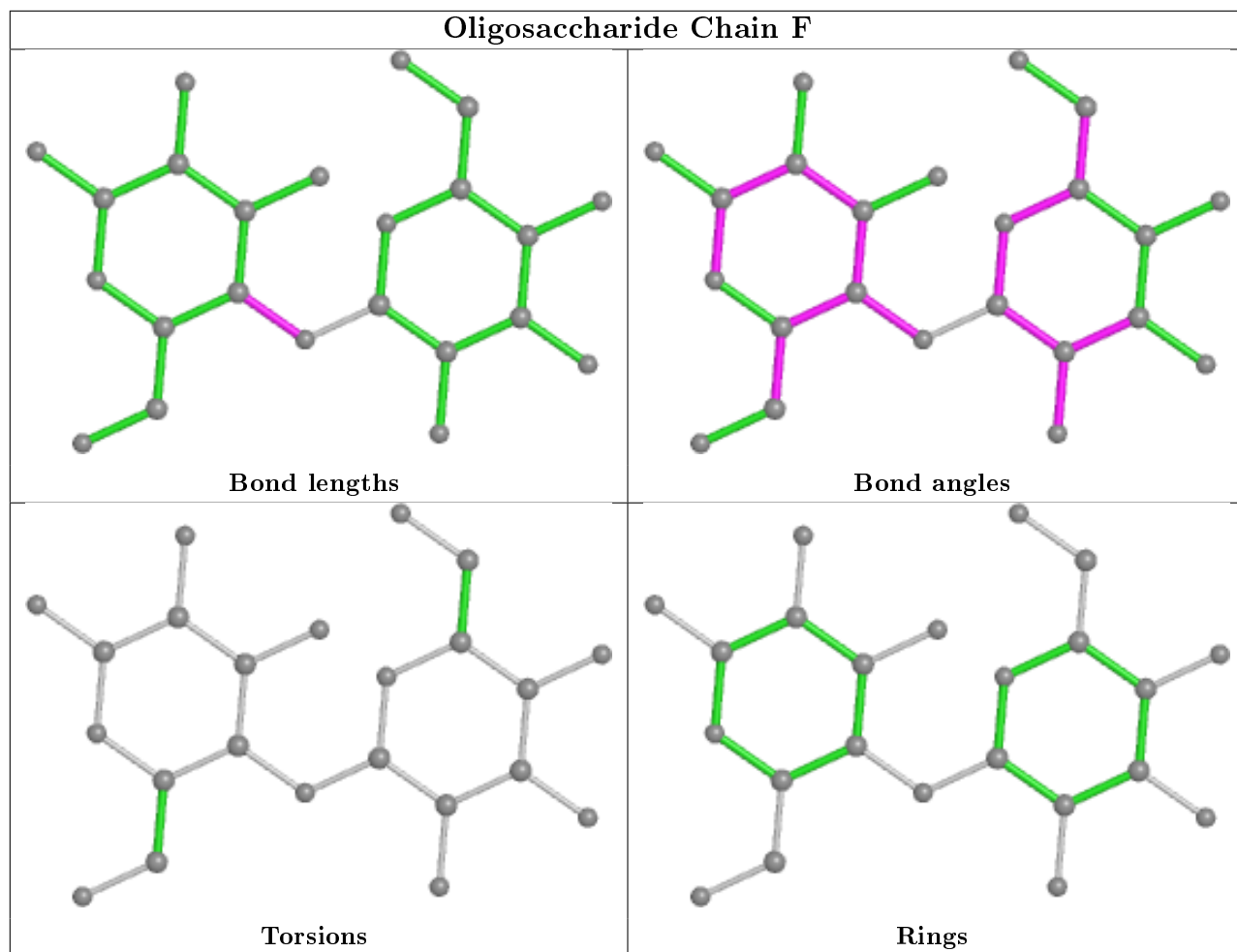
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for oligosaccharide.

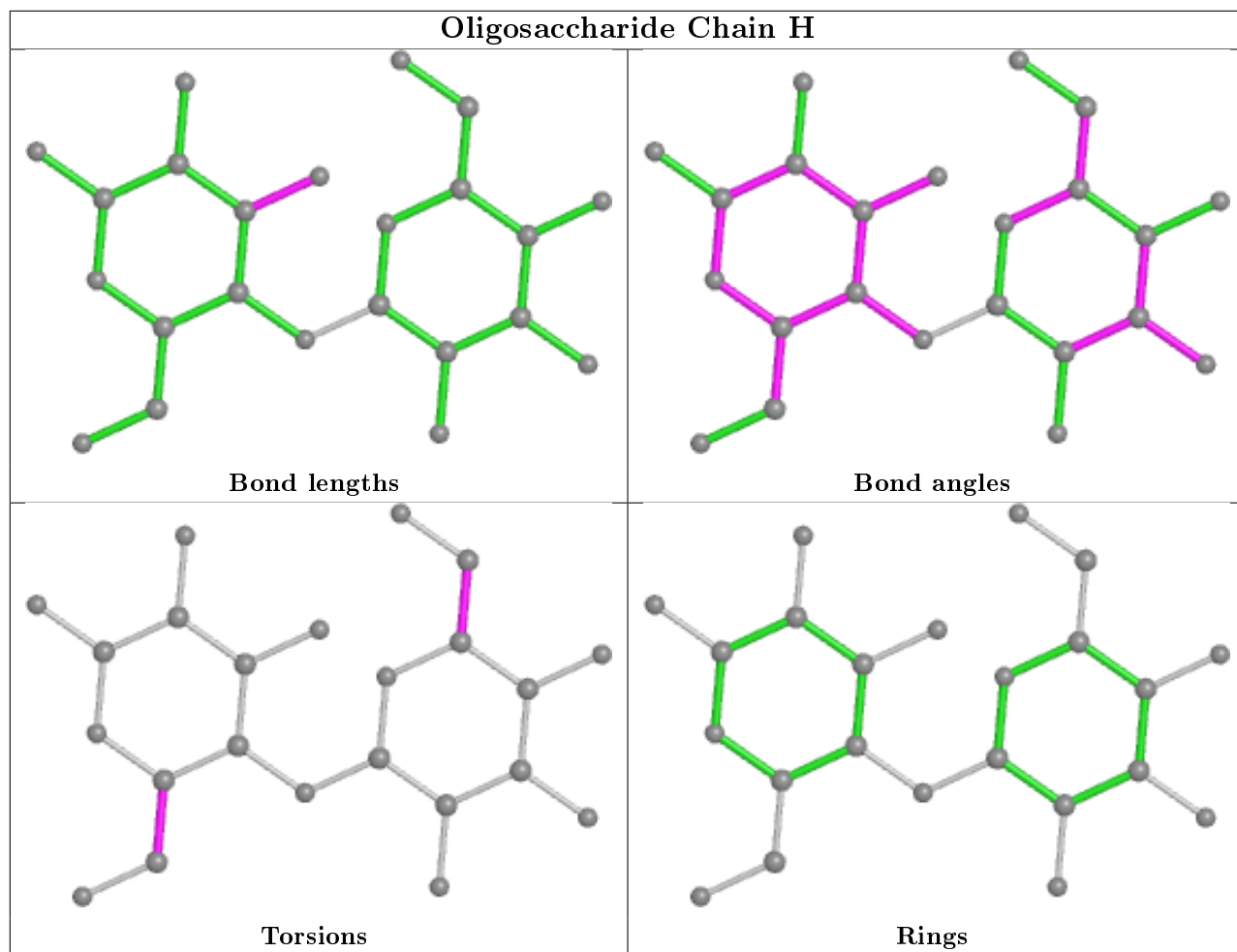




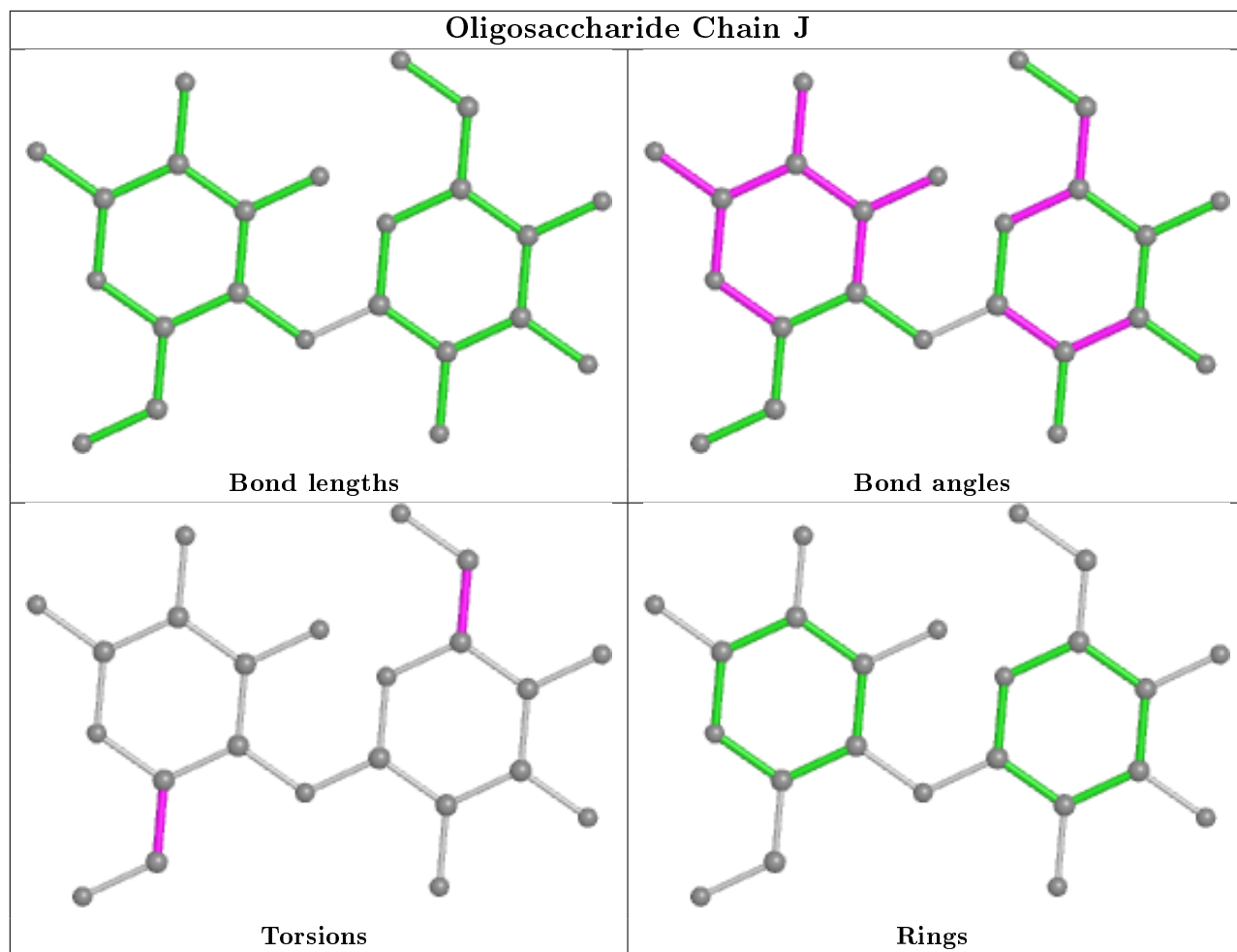


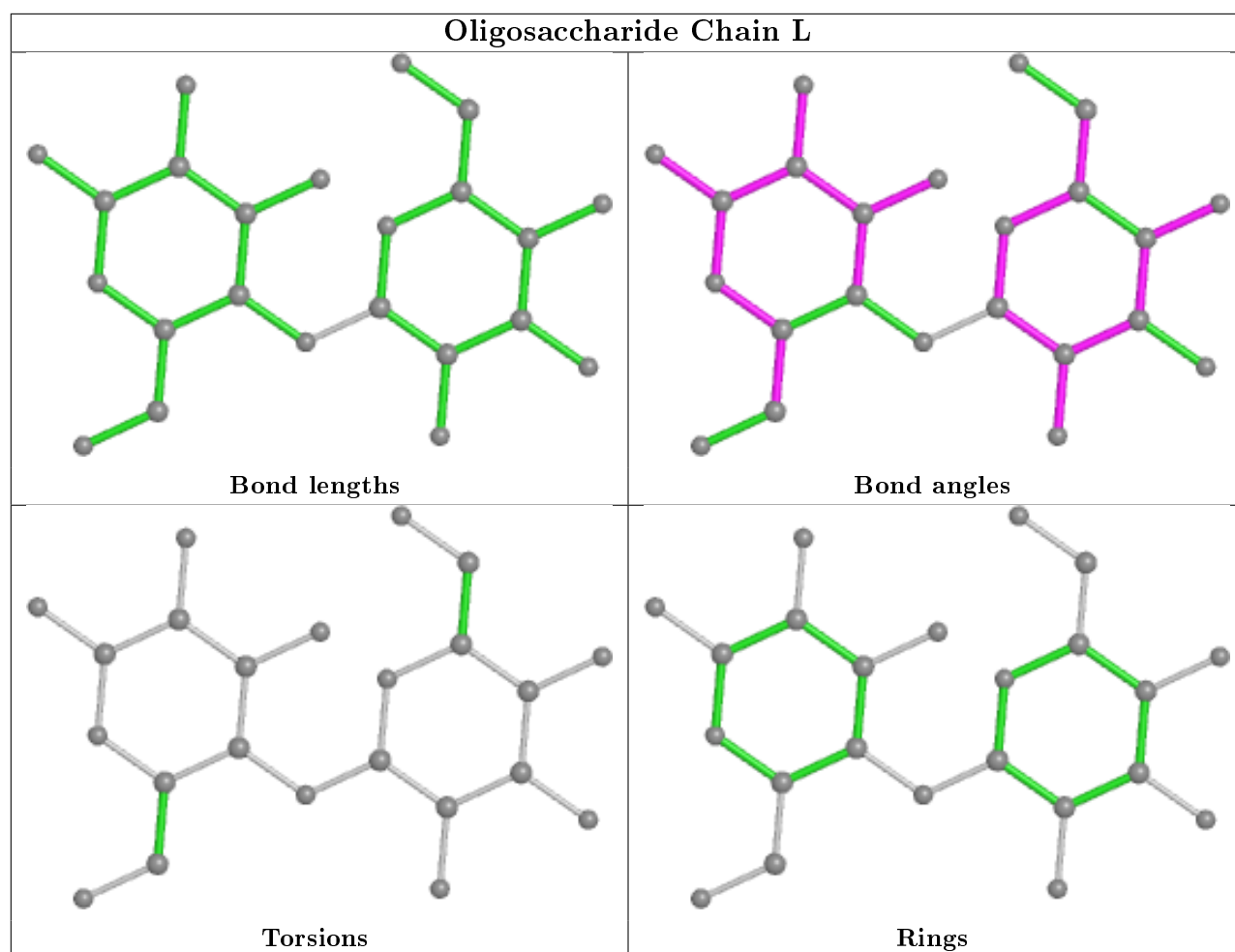












## 5.6 Ligand geometry [i](#)

There are no ligands in this entry.

## 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	649/695 (93%)	-0.58	1 (0%) 95   94	21, 31, 51, 69	0
1	B	649/695 (93%)	-0.55	0 100   100	17, 29, 56, 82	0
1	C	649/695 (93%)	-0.52	0 100   100	18, 32, 51, 70	0
1	D	649/695 (93%)	-0.51	0 100   100	18, 31, 55, 66	0
All	All	2596/2780 (93%)	-0.54	1 (0%) 100   100	17, 31, 54, 82	0

All (1) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	15	PRO	2.4

### 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	GLC	K	3	11/12	0.76	0.31	98,118,123,124	0
2	GLC	G	3	11/12	0.79	0.19	54,74,77,84	0
2	GLC	K	4	11/12	0.80	0.34	97,109,117,121	0
2	GLC	K	2	11/12	0.82	0.22	71,89,92,96	0
2	GLC	I	4	11/12	0.82	0.21	80,85,92,93	0
2	GLC	E	6	11/12	0.85	0.16	47,54,61,63	0

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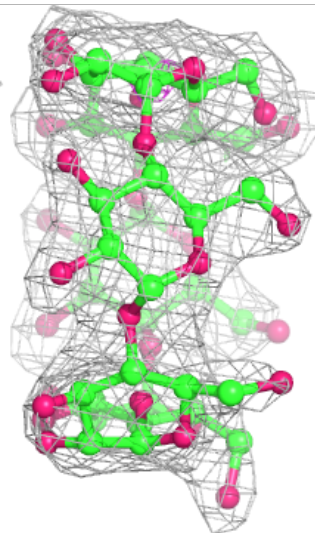
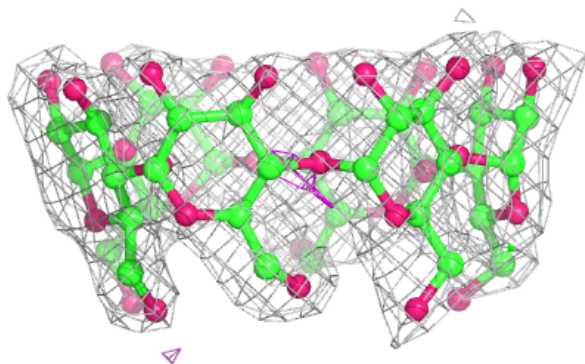
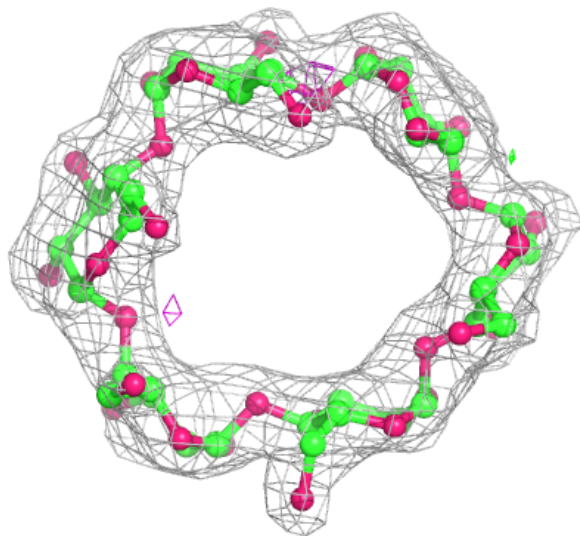
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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors( $\text{\AA}^2$ )	Q<0.9
2	GLC	I	3	11/12	0.86	0.20	77,83,87,89	0
2	GLC	I	2	11/12	0.86	0.14	61,67,74,83	0
2	GLC	K	5	11/12	0.88	0.24	64,75,85,86	0
2	GLC	K	6	11/12	0.90	0.21	49,58,63,68	0
2	GLC	K	1	11/12	0.90	0.15	50,61,67,78	0
2	GLC	I	6	11/12	0.91	0.19	41,54,58,59	0
2	GLC	E	1	11/12	0.91	0.12	41,45,50,59	0
2	GLC	E	5	11/12	0.91	0.13	63,69,71,73	0
2	GLC	I	1	11/12	0.92	0.12	44,50,54,63	0
2	GLC	I	5	11/12	0.92	0.14	56,65,70,74	0
2	GLC	G	4	11/12	0.93	0.18	59,66,72,73	0
2	GLC	E	3	11/12	0.93	0.17	69,76,80,81	0
2	GLC	E	2	11/12	0.93	0.15	52,65,73,75	0
3	GLC	L	1	12/12	0.94	0.10	25,32,38,42	0
3	GLC	H	1	12/12	0.94	0.10	25,29,31,33	0
2	GLC	G	6	11/12	0.94	0.09	37,43,45,46	0
2	GLC	G	5	11/12	0.94	0.11	38,50,60,65	0
3	GLC	J	1	12/12	0.95	0.09	24,29,34,36	0
2	GLC	G	2	11/12	0.95	0.18	55,57,71,73	0
2	GLC	G	1	11/12	0.95	0.09	36,40,43,52	0
2	GLC	E	4	11/12	0.95	0.18	72,78,83,84	0
3	GLC	F	1	12/12	0.96	0.10	23,31,34,35	0
3	GLC	J	2	11/12	0.97	0.09	22,24,26,27	0
3	GLC	L	2	11/12	0.97	0.08	22,23,25,27	0
3	GLC	F	2	11/12	0.98	0.06	25,27,31,34	0
3	GLC	H	2	11/12	0.98	0.07	21,21,24,25	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.

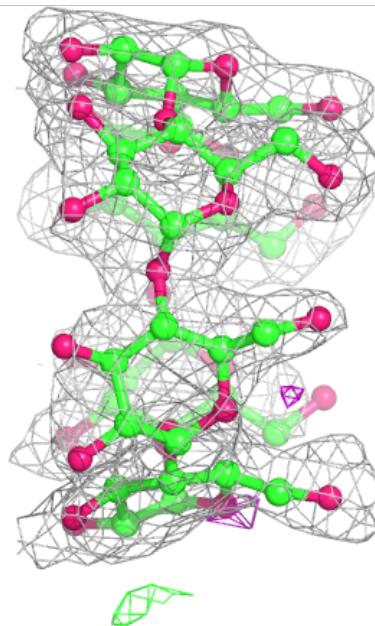
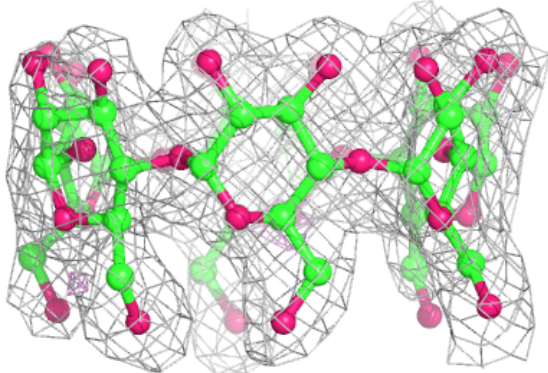
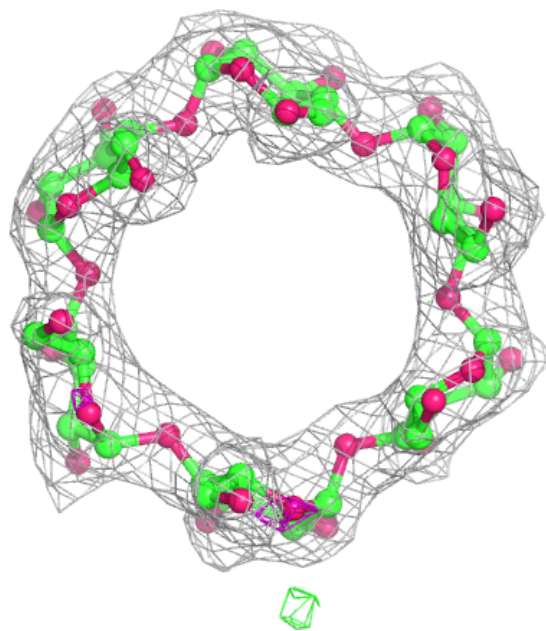
**Electron density around Chain E:**

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



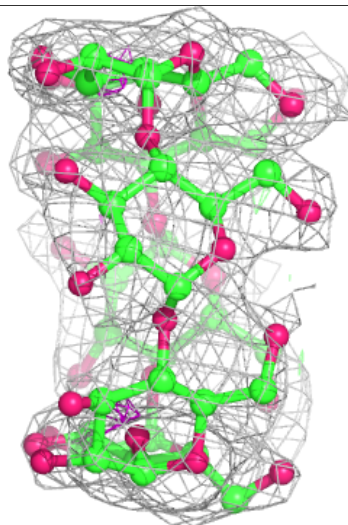
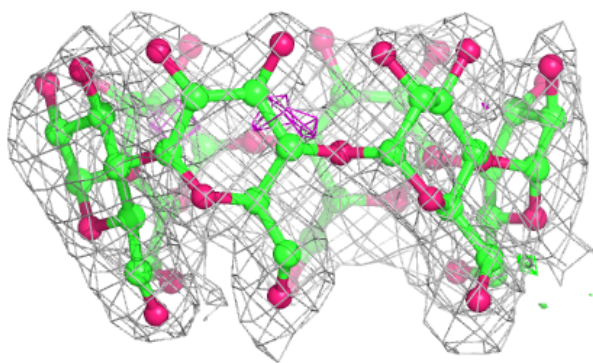
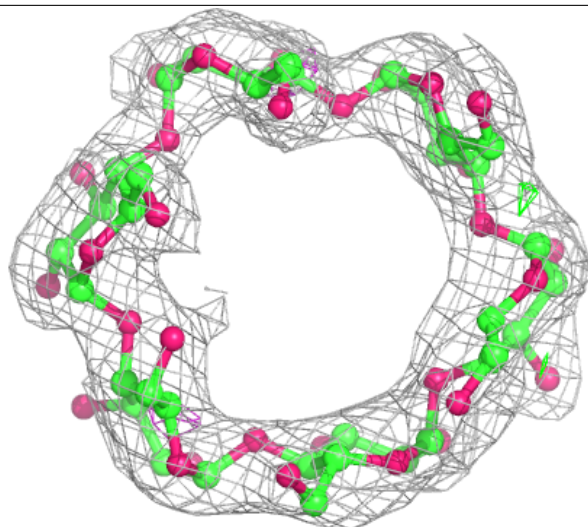
**Electron density around Chain G:**

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



**Electron density around Chain I:**

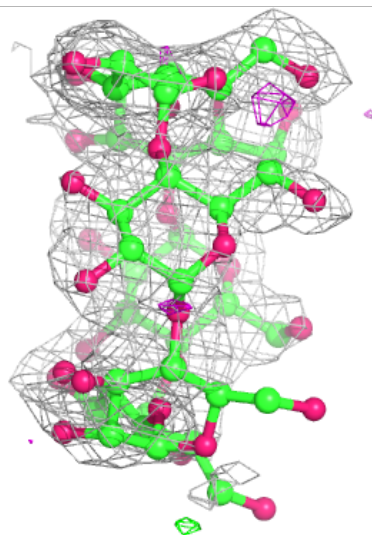
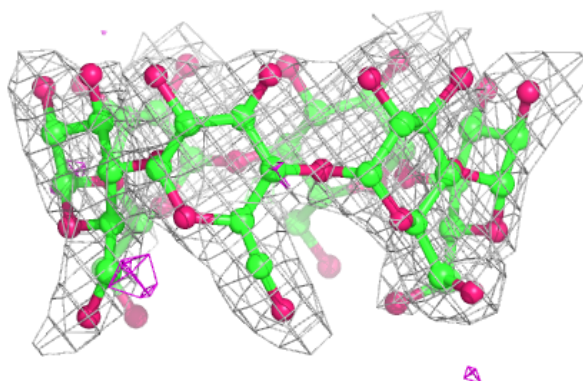
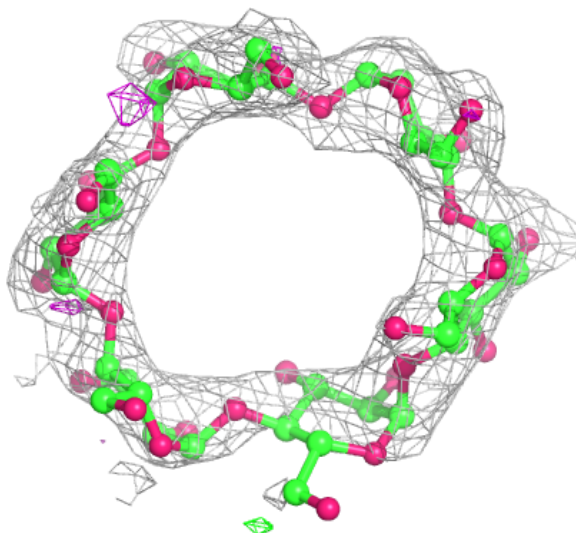
$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)





**Electron density around Chain K:**

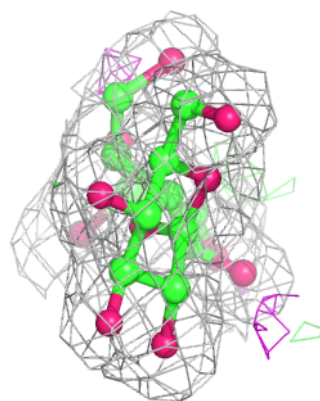
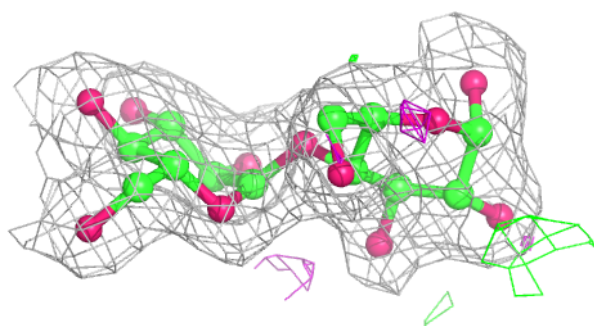
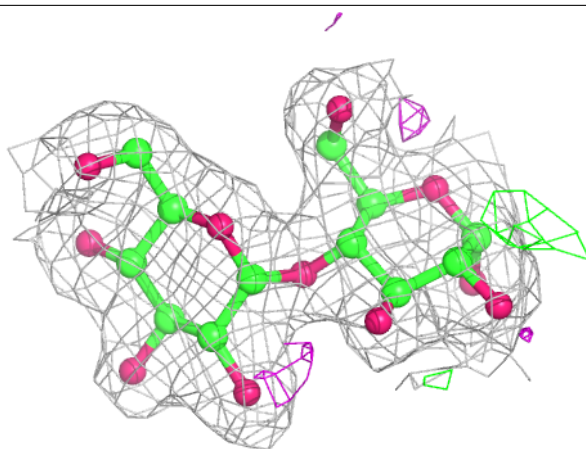
$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)





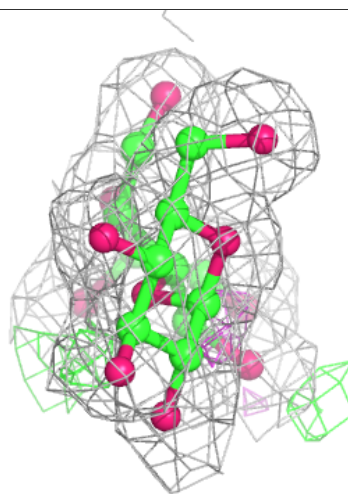
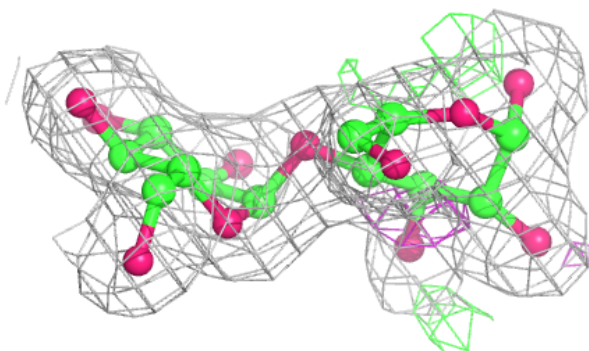
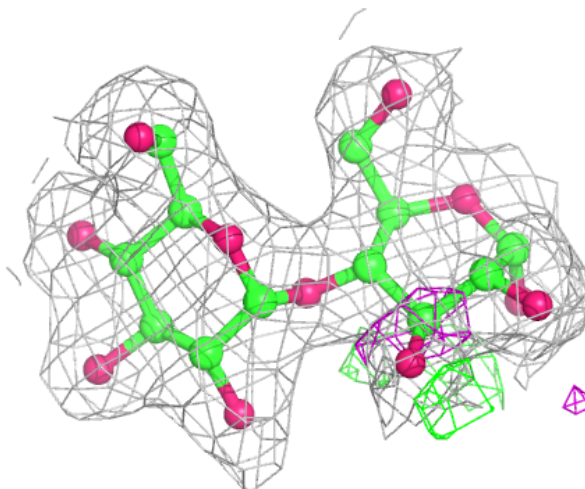
**Electron density around Chain F:**

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



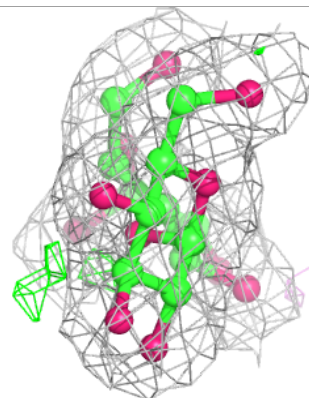
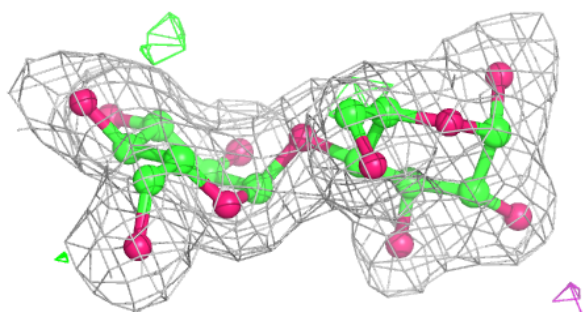
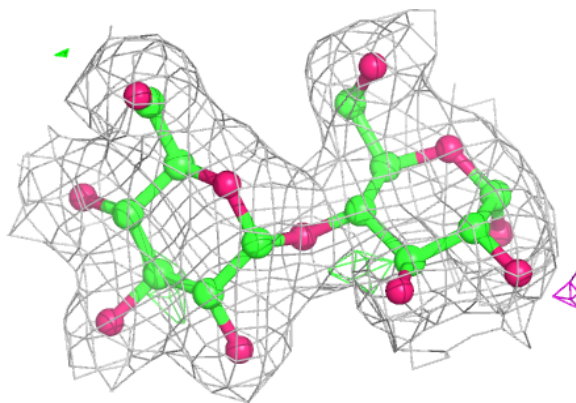
**Electron density around Chain H:**

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

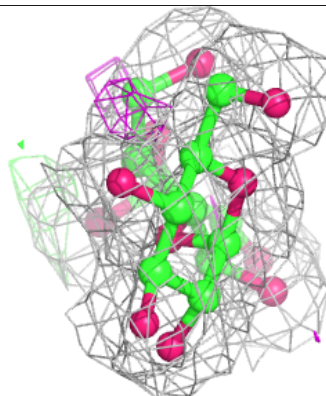
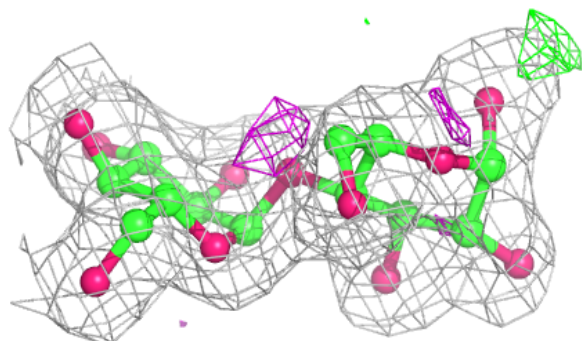
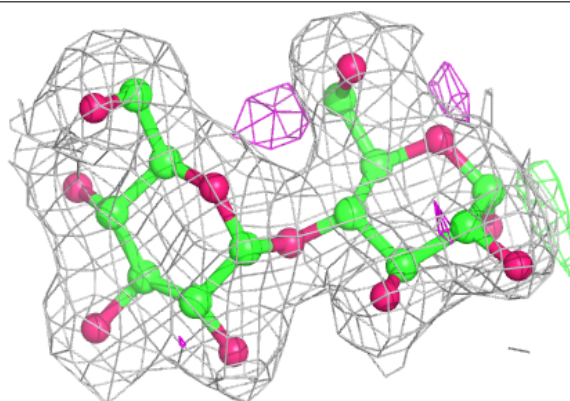


**Electron density around Chain J:**

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

**Electron density around Chain L:**

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



## 6.4 Ligands

There are no ligands in this entry.

## 6.5 Other polymers

There are no such residues in this entry.