



wwPDB X-ray Structure Validation Summary Report ⓘ

Mar 6, 2026 – 02:23 PM UTC

PDB ID : 4IIH / pdb_00004iih
Title : Crystal structure of beta-glucosidase 1 from *Aspergillus aculeatus* in complex with thiocellobiose
Authors : Suzuki, K.; Sumitani, J.; Kawaguchi, T.; Fushinobu, S.
Deposited on : 2012-12-20
Resolution : 2.00 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

A user guide is available at

<https://www.wwpdb.org/validation/2017/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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

MolProbity	:	4-5-2 with Phenix2.0
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	2.0
EDS	:	3.0
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4	:	9.0.010 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.49

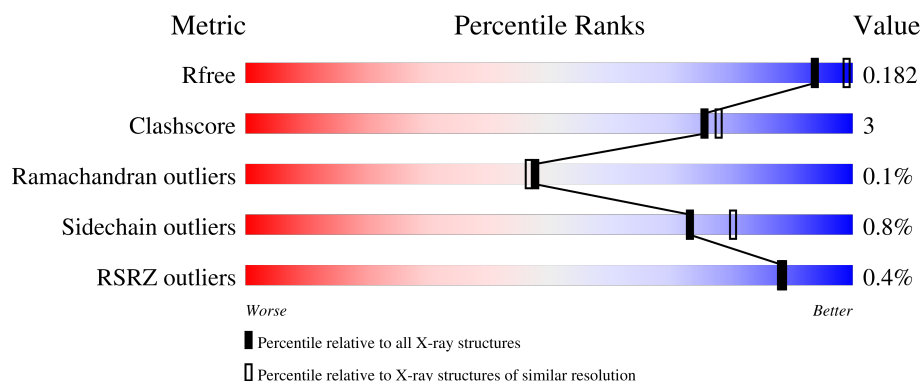
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

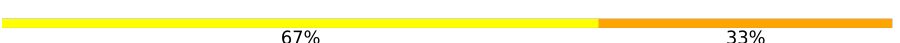
The reported resolution of this entry is 2.00 Å.

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.



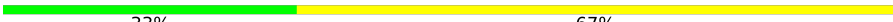
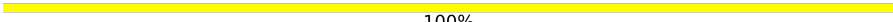
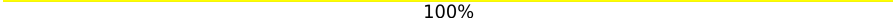
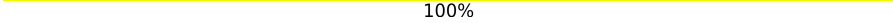
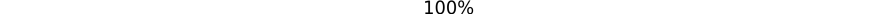
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	180053	10052 (2.00-2.00)
Clashscore	190562	11152 (2.00-2.00)
Ramachandran outliers	187476	11031 (2.00-2.00)
Sidechain outliers	187428	11029 (2.00-2.00)
RSRZ outliers	180081	10067 (2.00-2.00)

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 ≥ 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	841	 89% 10% ..
1	B	841	 88% 10% ..
2	C	7	 86% 14%
2	J	7	 86% 14%
3	D	3	 67% 33%

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Mol	Chain	Length	Quality of chain
3	G	3	 100%
3	L	3	 33% 67%
3	N	3	 100%
4	E	2	 50% 50%
5	F	10	 10% 90%
5	M	10	 100%
6	H	7	 86% 14%
6	O	7	 71% 29%
7	I	7	 100%
8	K	6	 100%
9	P	8	 62% 38%
10	Q	2	 100%
10	R	2	 50% 50%

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
12	MRD	A	943	-	-	X	-

2 Entry composition [i](#)

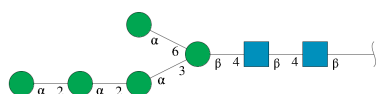
There are 13 unique types of molecules in this entry. The entry contains 15509 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 Beta-glucosidase 1.

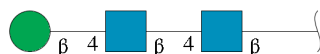
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	833	Total	C	N	O	S	0	0	0
			6382	4028	1096	1240	18			
1	B	832	Total	C	N	O	S	0	0	0
			6375	4023	1095	1239	18			

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



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
2	C	7	Total	C	N	O	0	0	0
			83	46	2	35			
2	J	7	Total	C	N	O	0	0	0
			83	46	2	35			

- Molecule 3 is an oligosaccharide called 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	D	3	Total	C	N	O	0	0	0
			39	22	2	15			
3	G	3	Total	C	N	O	0	0	0
			39	22	2	15			

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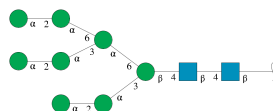
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
3	L	3	Total	C	N	O	0	0	0
			39	22	2	15			
3	N	3	Total	C	N	O	0	0	0
			39	22	2	15			

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



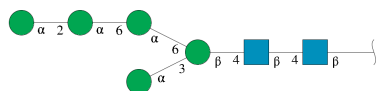
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
4	E	2	Total	C	N	O	0	0	0
			28	16	2	10			

- Molecule 5 is an oligosaccharide called alpha-D-mannopyranose-(1-2)-alpha-D-mannopyranose-(1-3)-[alpha-D-mannopyranose-(1-2)-alpha-D-mannopyranose-(1-6)]alpha-D-mannopyranose-(1-6)-[alpha-D-mannopyranose-(1-2)-alpha-D-mannopyranose-(1-3)]beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.



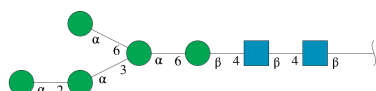
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
5	F	10	Total	C	N	O	0	0	0
			116	64	2	50			
5	M	10	Total	C	N	O	0	0	0
			116	64	2	50			

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



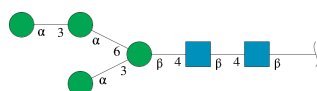
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
6	H	7	Total	C	N	O	0	0	0
			83	46	2	35			
6	O	7	Total	C	N	O	0	0	0
			83	46	2	35			

- Molecule 7 is an oligosaccharide called alpha-D-mannopyranose-(1-2)-alpha-D-mannopyranose-(1-3)-[alpha-D-mannopyranose-(1-6)]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.



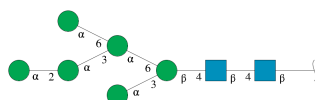
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
7	I	7	Total	C	N	O	0	0	0
			83	46	2	35			

- Molecule 8 is an oligosaccharide called alpha-D-mannopyranose-(1-3)-alpha-D-mannopyranose-(1-6)-[alpha-D-mannopyranose-(1-3)]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
8	K	6	Total	C	N	O	0	0	0
			72	40	2	30			

- Molecule 9 is an oligosaccharide called alpha-D-mannopyranose-(1-2)-alpha-D-mannopyranose-(1-3)-[alpha-D-mannopyranose-(1-6)]alpha-D-mannopyranose-(1-6)-[alpha-D-mannopyranose-(1-3)]beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.

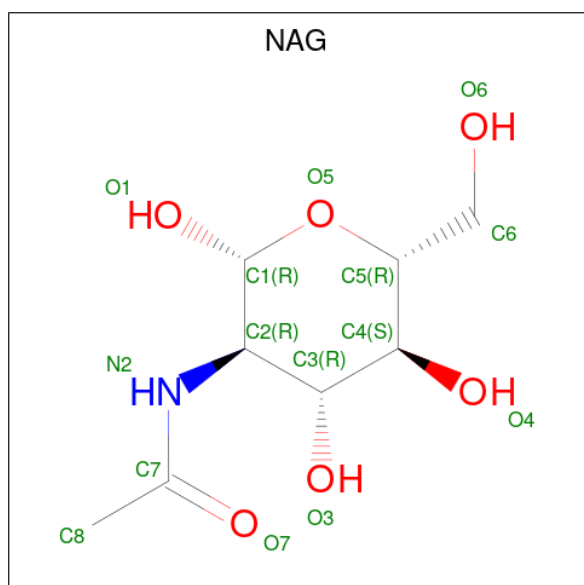


Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
9	P	8	Total	C	N	O	0	0	0
			94	52	2	40			

- Molecule 10 is an oligosaccharide called beta-D-glucopyranose-(1-4)-4-thio-beta-D-glucopyranose.

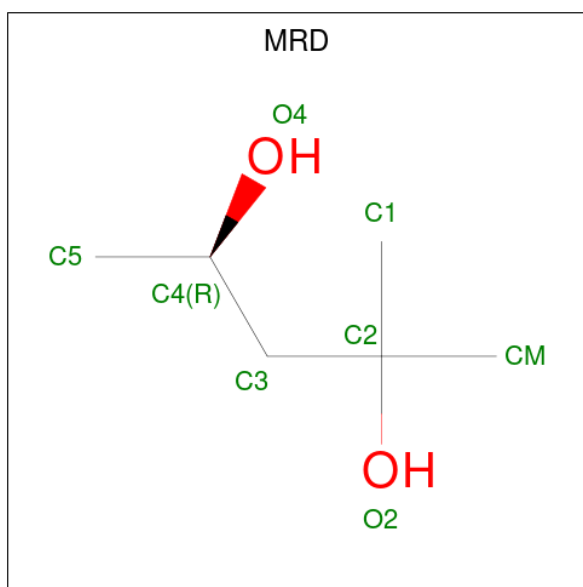
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
10	Q	2	Total	C	O	S	0	0	0
			23	12	10	1			
10	R	2	Total	C	O	S	0	0	0
			23	12	10	1			

- Molecule 11 is 2-acetamido-2-deoxy-beta-D-glucopyranose (CCD ID: NAG) (formula: $C_8H_{15}NO_6$).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
11	A	1	Total	C	N	O	0	0
			14	8	1	5		
11	A	1	Total	C	N	O	0	0
			14	8	1	5		
11	B	1	Total	C	N	O	0	0
			14	8	1	5		
11	B	1	Total	C	N	O	0	0
			14	8	1	5		
11	B	1	Total	C	N	O	0	0
			14	8	1	5		

- Molecule 12 is (4R)-2-METHYLPENTANE-2,4-DIOL (CCD ID: MRD) (formula: $C_6H_{14}O_2$).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
12	A	1	Total	C	O	0	0
			8	6	2		
12	A	1	Total	C	O	0	0
			8	6	2		
12	B	1	Total	C	O	0	0
			8	6	2		
12	B	1	Total	C	O	0	0
			8	6	2		

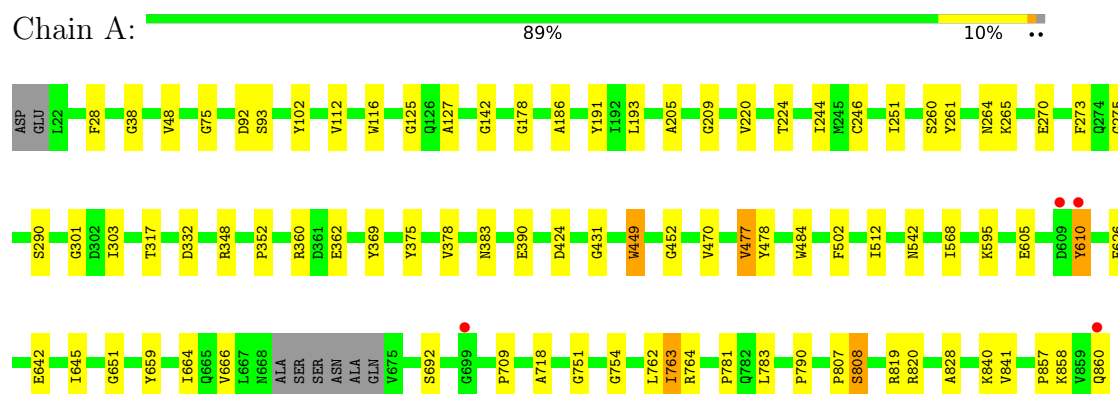
- Molecule 13 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
13	A	748	Total	O	0	0
			748	748		
13	B	859	Total	O	0	0
			859	859		

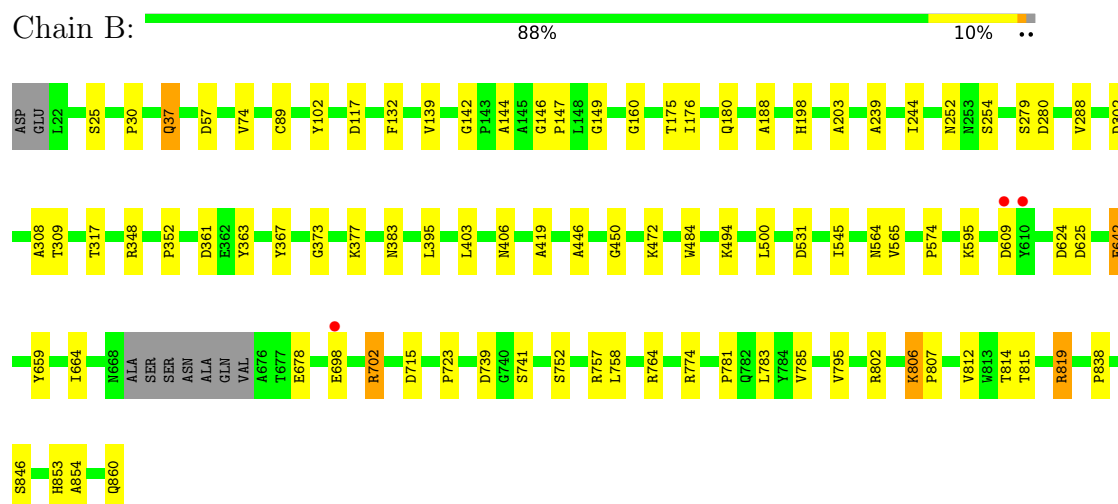
3 Residue-property plots

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.

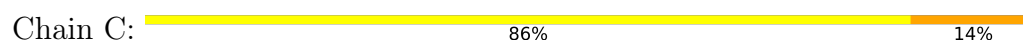
• Molecule 1: Beta-glucosidase 1



• Molecule 1: Beta-glucosidase 1



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





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

Chain J: 86% 14%



- Molecule 3: beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain D: 67% 33%



- Molecule 3: beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain G: 100%



- Molecule 3: beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain L: 33% 67%



- Molecule 3: beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain N: 100%



- Molecule 4: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain E: 50% 50%

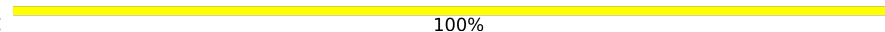


- Molecule 5: α -D-mannopyranose-(1-2)- α -D-mannopyranose-(1-3)-[α -D-mannopyranose-(1-2)- α -D-mannopyranose-(1-6)] α -D-mannopyranose-(1-6)-[α -D-mannopyranose-(1-2)- α -D-mannopyranose-(1-3)] β -D-mannopyranose-(1-4)-2-acetamido-2-deoxy- β -D-glucopyranose-(1-4)-2-acetamido-2-deoxy- β -D-glucopyranose

Chain F:  10% 90%

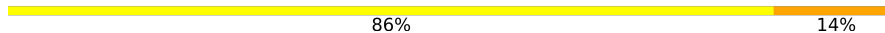
MAN1
MAN2
MAN3
MAN4
MAN5
MAN6
MAN7
MAN8
MAN9
MAN10

- Molecule 5: α -D-mannopyranose-(1-2)- α -D-mannopyranose-(1-3)-[α -D-mannopyranose-(1-2)- α -D-mannopyranose-(1-6)] α -D-mannopyranose-(1-6)-[α -D-mannopyranose-(1-2)- α -D-mannopyranose-(1-3)] β -D-mannopyranose-(1-4)-2-acetamido-2-deoxy- β -D-glucopyranose-(1-4)-2-acetamido-2-deoxy- β -D-glucopyranose

Chain M:  100%

MAN1
MAN2
MAN3
MAN4
MAN5
MAN6
MAN7
MAN8
MAN9
MAN10

- Molecule 6: α -D-mannopyranose-(1-2)- α -D-mannopyranose-(1-6)- α -D-mannopyranose-(1-6)-[α -D-mannopyranose-(1-3)] β -D-mannopyranose-(1-4)-2-acetamido-2-deoxy- β -D-glucopyranose-(1-4)-2-acetamido-2-deoxy- β -D-glucopyranose

Chain H:  86% 14%

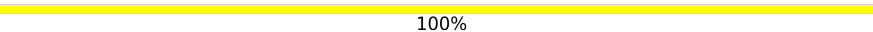
MAN1
MAN2
MAN3
MAN4
MAN5
MAN6
MAN7

- Molecule 6: α -D-mannopyranose-(1-2)- α -D-mannopyranose-(1-6)- α -D-mannopyranose-(1-6)-[α -D-mannopyranose-(1-3)] β -D-mannopyranose-(1-4)-2-acetamido-2-deoxy- β -D-glucopyranose-(1-4)-2-acetamido-2-deoxy- β -D-glucopyranose

Chain O:  71% 29%

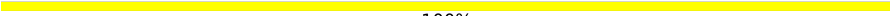
MAN1
MAN2
MAN3
MAN4
MAN5
MAN6
MAN7

- Molecule 7: α -D-mannopyranose-(1-2)- α -D-mannopyranose-(1-3)-[α -D-mannopyranose-(1-6)] α -D-mannopyranose-(1-6)- β -D-mannopyranose-(1-4)-2-acetamido-2-deoxy- β -D-glucopyranose-(1-4)-2-acetamido-2-deoxy- β -D-glucopyranose

Chain I:  100%

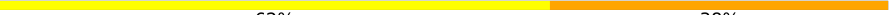
MAN1
MAN2
MAN3
MAN4
MAN5
MAN6
MAN7

- Molecule 8: α -D-mannopyranose-(1-3)- α -D-mannopyranose-(1-6)-[α -D-mannopyranose-(1-3)] β -D-mannopyranose-(1-4)-2-acetamido-2-deoxy- β -D-glucopyranose-(1-4)-2-acetamido-2-deoxy- β -D-glucopyranose

Chain K:  100%

MAG1
MAG2
BMA3
MAN4
MAN5
MAN6

- Molecule 9: alpha-D-mannopyranose-(1-2)-alpha-D-mannopyranose-(1-3)-[alpha-D-mannopyranose-(1-6)]alpha-D-mannopyranose-(1-6)-[alpha-D-mannopyranose-(1-3)]beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain P:  62% 38%

MAG1
MAG2
BMA3
MAN4
MAN5
MAN6
MAN7
MAN8

- Molecule 10: beta-D-glucopyranose-(1-4)-4-thio-beta-D-glucopyranose

Chain Q:  100%

SGC1
BGC2

- Molecule 10: beta-D-glucopyranose-(1-4)-4-thio-beta-D-glucopyranose

Chain R:  50% 50%

SGC1
BGC2

4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	82.08Å 122.39Å 221.61Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	41.07 – 2.00 41.07 – 2.00	Depositor EDS
% Data completeness (in resolution range)	99.6 (41.07-2.00) 99.6 (41.07-2.00)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	0.13	Depositor
$\langle I/\sigma(I) \rangle$ ¹	4.28 (at 2.00Å)	Xtriage
Refinement program	REFMAC 5.7.0029	Depositor
R, R_{free}	0.140 , 0.181 0.141 , 0.182	Depositor DCC
R_{free} test set	7569 reflections (5.02%)	wwPDB-VP
Wilson B-factor (Å ²)	11.9	Xtriage
Anisotropy	0.039	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.35 , 46.3	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	15509	wwPDB-VP
Average B, all atoms (Å ²)	14.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.57% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical 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: SGC, BMA, MAN, MRD, NAG, BGC

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

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	$\# Z > 5$	RMSZ	$\# Z > 5$
1	A	1.57	36/6545 (0.6%)	1.26	9/8923 (0.1%)
1	B	1.62	42/6538 (0.6%)	1.29	17/8913 (0.2%)
All	All	1.60	78/13083 (0.6%)	1.28	26/17836 (0.1%)

The worst 5 of 78 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	352	PRO	CA-C	8.42	1.56	1.51
1	A	75	GLY	N-CA	7.53	1.53	1.45
1	A	275	GLY	N-CA	6.98	1.53	1.45
1	B	795	VAL	N-CA	6.97	1.54	1.46
1	B	280	ASP	CA-C	6.93	1.63	1.53

The worst 5 of 26 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	25	SER	CA-C-N	-7.82	112.32	120.38
1	B	25	SER	C-N-CA	-7.82	112.32	120.38
1	A	790	PRO	CA-C-N	-7.29	111.70	122.86
1	A	790	PRO	C-N-CA	-7.29	111.70	122.86
1	A	610	TYR	N-CA-C	6.99	120.52	110.10

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	6382	0	6092	32	0
1	B	6375	0	6082	34	0
2	C	83	0	70	1	0
2	J	83	0	70	1	0
3	D	39	0	33	2	0
3	G	39	0	34	0	0
3	L	39	0	34	0	0
3	N	39	0	34	0	0
4	E	28	0	25	3	0
5	F	116	0	96	0	0
5	M	116	0	97	0	0
6	H	83	0	70	1	0
6	O	83	0	69	3	0
7	I	83	0	70	0	0
8	K	72	0	61	0	0
9	P	94	0	79	4	0
10	Q	23	0	21	0	0
10	R	23	0	21	4	0
11	A	28	0	26	0	0
11	B	42	0	39	0	0
12	A	16	0	28	9	0
12	B	16	0	28	4	0
13	A	748	0	0	3	0
13	B	859	0	0	12	0
All	All	15509	0	13179	82	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 82 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:819:ARG:HH12	1:A:860:GLN:C	1.51	1.17
1:B:815:THR:HG22	13:B:1525:HOH:O	1.70	0.89
1:A:819:ARG:NH1	1:A:860:GLN:C	2.31	0.88
12:A:942:MRD:H5C2	13:A:1191:HOH:O	1.77	0.84
4:E:2:NAG:H83	4:E:2:NAG:H3	1.63	0.81

There are no symmetry-related clashes.

5.3 Torsion angles

5.3.1 Protein backbone

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	829/841 (99%)	803 (97%)	25 (3%)	1 (0%)	48	46
1	B	828/841 (98%)	804 (97%)	24 (3%)	0	100	100
All	All	1657/1682 (98%)	1607 (97%)	49 (3%)	1 (0%)	48	46

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	38	GLY

5.3.2 Protein sidechains

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	671/677 (99%)	667 (99%)	4 (1%)	78	85
1	B	670/677 (99%)	663 (99%)	7 (1%)	68	75
All	All	1341/1354 (99%)	1330 (99%)	11 (1%)	73	80

5 of 11 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	B	698	GLU
1	B	806	LYS
1	B	853	HIS
1	B	819	ARG
1	B	302	ASP

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 12 such sidechains are listed below:

Mol	Chain	Res	Type
1	B	126	GLN
1	B	219	ASN
1	B	668	ASN
1	B	253	ASN
1	A	371	GLN

5.3.3 RNA ⓘ

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 ⓘ

87 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	C	1	1,2	14,14,15	1.18	2 (14%)	17,19,21	1.45	2 (11%)
2	NAG	C	2	2	14,14,15	1.16	1 (7%)	17,19,21	1.41	3 (17%)
2	BMA	C	3	2	11,11,12	0.71	0	15,15,17	1.80	3 (20%)
2	MAN	C	4	2	11,11,12	0.97	1 (9%)	15,15,17	2.37	6 (40%)
2	MAN	C	5	2	11,11,12	0.87	0	15,15,17	1.99	5 (33%)
2	MAN	C	6	2	11,11,12	1.02	0	15,15,17	1.98	6 (40%)
2	MAN	C	7	2	11,11,12	0.85	0	15,15,17	0.98	0
3	NAG	D	1	1,3	14,14,15	1.06	1 (7%)	17,19,21	1.44	3 (17%)
3	NAG	D	2	3	14,14,15	1.46	2 (14%)	17,19,21	2.03	7 (41%)
3	BMA	D	3	3	11,11,12	1.26	0	15,15,17	2.54	7 (46%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
4	NAG	E	1	1,4	14,14,15	1.32	2 (14%)	17,19,21	1.80	3 (17%)
4	NAG	E	2	4	14,14,15	1.08	2 (14%)	17,19,21	1.83	7 (41%)
5	NAG	F	1	5,1	14,14,15	1.52	3 (21%)	17,19,21	1.30	3 (17%)
5	MAN	F	10	5	11,11,12	1.24	2 (18%)	15,15,17	2.23	5 (33%)
5	NAG	F	2	5	14,14,15	1.07	0	17,19,21	1.51	2 (11%)
5	BMA	F	3	5	11,11,12	0.67	0	15,15,17	1.25	3 (20%)
5	MAN	F	4	5	11,11,12	0.80	0	15,15,17	0.97	0
5	MAN	F	5	5	11,11,12	1.27	2 (18%)	15,15,17	1.16	2 (13%)
5	MAN	F	6	5	11,11,12	0.82	0	15,15,17	1.36	3 (20%)
5	MAN	F	7	5	11,11,12	1.43	3 (27%)	15,15,17	1.43	2 (13%)
5	MAN	F	8	5	11,11,12	0.88	0	15,15,17	0.94	1 (6%)
5	MAN	F	9	5	11,11,12	1.50	4 (36%)	15,15,17	1.95	6 (40%)
3	NAG	G	1	1,3	14,14,15	1.02	1 (7%)	17,19,21	2.07	5 (29%)
3	NAG	G	2	3	14,14,15	0.83	0	17,19,21	1.93	3 (17%)
3	BMA	G	3	3	11,11,12	1.26	2 (18%)	15,15,17	1.93	4 (26%)
6	NAG	H	1	6,1	14,14,15	1.18	1 (7%)	17,19,21	1.53	4 (23%)
6	NAG	H	2	6	14,14,15	0.82	0	17,19,21	1.44	3 (17%)
6	BMA	H	3	6	11,11,12	1.29	1 (9%)	15,15,17	1.59	3 (20%)
6	MAN	H	4	6	11,11,12	0.67	0	15,15,17	1.41	2 (13%)
6	MAN	H	5	6	11,11,12	0.82	0	15,15,17	2.13	4 (26%)
6	MAN	H	6	6	11,11,12	1.60	1 (9%)	15,15,17	1.59	3 (20%)
6	MAN	H	7	6	11,11,12	0.79	0	15,15,17	1.59	2 (13%)
7	NAG	I	1	1,7	14,14,15	1.06	1 (7%)	17,19,21	1.41	2 (11%)
7	NAG	I	2	7	14,14,15	1.33	2 (14%)	17,19,21	1.46	3 (17%)
7	BMA	I	3	7	11,11,12	1.43	1 (9%)	15,15,17	1.67	3 (20%)
7	MAN	I	4	7	11,11,12	1.24	1 (9%)	15,15,17	1.11	0
7	MAN	I	5	7	11,11,12	1.23	0	15,15,17	2.29	6 (40%)
7	MAN	I	6	7	11,11,12	0.97	1 (9%)	15,15,17	1.82	4 (26%)
7	MAN	I	7	7	11,11,12	1.90	2 (18%)	15,15,17	1.12	1 (6%)
2	NAG	J	1	1,2	14,14,15	1.43	3 (21%)	17,19,21	2.17	5 (29%)
2	NAG	J	2	2	14,14,15	0.92	0	17,19,21	2.05	6 (35%)
2	BMA	J	3	2	11,11,12	1.75	2 (18%)	15,15,17	1.73	5 (33%)
2	MAN	J	4	2	11,11,12	0.68	0	15,15,17	1.60	4 (26%)
2	MAN	J	5	2	11,11,12	1.06	1 (9%)	15,15,17	1.03	0
2	MAN	J	6	2	11,11,12	0.88	0	15,15,17	1.29	1 (6%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
2	MAN	J	7	2	11,11,12	0.68	0	15,15,17	1.77	5 (33%)
8	NAG	K	1	1,8	14,14,15	0.92	0	17,19,21	1.71	3 (17%)
8	NAG	K	2	8	14,14,15	1.65	6 (42%)	17,19,21	1.88	6 (35%)
8	BMA	K	3	8	11,11,12	1.11	1 (9%)	15,15,17	1.79	4 (26%)
8	MAN	K	4	8	11,11,12	0.82	0	15,15,17	1.60	2 (13%)
8	MAN	K	5	8	11,11,12	0.83	0	15,15,17	1.97	4 (26%)
8	MAN	K	6	8	11,11,12	1.21	1 (9%)	15,15,17	1.32	2 (13%)
3	NAG	L	1	1,3	14,14,15	0.87	0	17,19,21	0.90	0
3	NAG	L	2	3	14,14,15	0.81	0	17,19,21	1.81	6 (35%)
3	BMA	L	3	3	11,11,12	0.91	0	15,15,17	1.84	5 (33%)
5	NAG	M	1	5,1	14,14,15	1.33	1 (7%)	17,19,21	1.63	3 (17%)
5	MAN	M	10	5	11,11,12	1.14	1 (9%)	15,15,17	2.22	4 (26%)
5	NAG	M	2	5	14,14,15	1.57	2 (14%)	17,19,21	1.54	3 (17%)
5	BMA	M	3	5	11,11,12	1.20	1 (9%)	15,15,17	1.34	2 (13%)
5	MAN	M	4	5	11,11,12	0.86	0	15,15,17	1.26	3 (20%)
5	MAN	M	5	5	11,11,12	0.97	0	15,15,17	1.93	4 (26%)
5	MAN	M	6	5	11,11,12	1.14	0	15,15,17	1.91	6 (40%)
5	MAN	M	7	5	11,11,12	0.83	0	15,15,17	1.91	3 (20%)
5	MAN	M	8	5	11,11,12	1.23	1 (9%)	15,15,17	1.40	1 (6%)
5	MAN	M	9	5	11,11,12	0.89	1 (9%)	15,15,17	2.18	6 (40%)
3	NAG	N	1	1,3	14,14,15	1.16	2 (14%)	17,19,21	1.49	5 (29%)
3	NAG	N	2	3	14,14,15	1.41	3 (21%)	17,19,21	2.80	7 (41%)
3	BMA	N	3	3	11,11,12	1.33	1 (9%)	15,15,17	2.71	8 (53%)
6	NAG	O	1	6,1	14,14,15	1.07	1 (7%)	17,19,21	0.92	1 (5%)
6	NAG	O	2	6	14,14,15	1.18	1 (7%)	17,19,21	1.90	6 (35%)
6	BMA	O	3	6	11,11,12	1.29	2 (18%)	15,15,17	1.93	4 (26%)
6	MAN	O	4	6	11,11,12	0.87	0	15,15,17	1.62	4 (26%)
6	MAN	O	5	6	11,11,12	1.24	1 (9%)	15,15,17	1.66	4 (26%)
6	MAN	O	6	6	11,11,12	0.97	0	15,15,17	1.64	6 (40%)
6	MAN	O	7	6	11,11,12	1.19	2 (18%)	15,15,17	2.19	6 (40%)
9	NAG	P	1	1,9	14,14,15	0.96	1 (7%)	17,19,21	1.93	4 (23%)
9	NAG	P	2	9	14,14,15	0.81	0	17,19,21	1.11	1 (5%)
9	BMA	P	3	9	11,11,12	1.28	2 (18%)	15,15,17	3.37	6 (40%)
9	MAN	P	4	9	11,11,12	1.04	1 (9%)	15,15,17	1.87	4 (26%)
9	MAN	P	5	9	11,11,12	1.10	0	15,15,17	1.76	3 (20%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
9	MAN	P	6	9	11,11,12	0.85	0	15,15,17	3.41	7 (46%)
9	MAN	P	7	9	11,11,12	0.95	1 (9%)	15,15,17	2.67	7 (46%)
9	MAN	P	8	9	11,11,12	1.06	1 (9%)	15,15,17	2.11	6 (40%)
10	SGC	Q	1	10	11,12,12	2.75	2 (18%)	14,17,17	1.98	6 (42%)
10	BGC	Q	2	10	11,11,12	1.52	3 (27%)	15,15,17	1.51	3 (20%)
10	SGC	R	1	10	11,12,12	3.25	4 (36%)	14,17,17	2.12	3 (21%)
10	BGC	R	2	10	11,11,12	1.94	2 (18%)	15,15,17	2.80	6 (40%)

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	C	1	1,2	-	0/6/23/26	0/1/1/1
2	NAG	C	2	2	-	0/6/23/26	0/1/1/1
2	BMA	C	3	2	-	0/2/19/22	0/1/1/1
2	MAN	C	4	2	-	2/2/19/22	0/1/1/1
2	MAN	C	5	2	-	2/2/19/22	0/1/1/1
2	MAN	C	6	2	-	0/2/19/22	0/1/1/1
2	MAN	C	7	2	-	0/2/19/22	0/1/1/1
3	NAG	D	1	1,3	-	0/6/23/26	0/1/1/1
3	NAG	D	2	3	-	1/6/23/26	0/1/1/1
3	BMA	D	3	3	-	0/2/19/22	0/1/1/1
4	NAG	E	1	1,4	-	0/6/23/26	0/1/1/1
4	NAG	E	2	4	-	3/6/23/26	0/1/1/1
5	NAG	F	1	5,1	-	0/6/23/26	0/1/1/1
5	MAN	F	10	5	-	2/2/19/22	0/1/1/1
5	NAG	F	2	5	-	0/6/23/26	0/1/1/1
5	BMA	F	3	5	-	0/2/19/22	0/1/1/1
5	MAN	F	4	5	-	0/2/19/22	0/1/1/1
5	MAN	F	5	5	-	0/2/19/22	0/1/1/1
5	MAN	F	6	5	-	0/2/19/22	0/1/1/1
5	MAN	F	7	5	-	0/2/19/22	0/1/1/1
5	MAN	F	8	5	-	0/2/19/22	0/1/1/1
5	MAN	F	9	5	-	0/2/19/22	0/1/1/1
3	NAG	G	1	1,3	-	0/6/23/26	0/1/1/1
3	NAG	G	2	3	-	2/6/23/26	0/1/1/1
3	BMA	G	3	3	-	2/2/19/22	0/1/1/1
6	NAG	H	1	6,1	-	0/6/23/26	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
6	NAG	H	2	6	-	0/6/23/26	0/1/1/1
6	BMA	H	3	6	-	0/2/19/22	0/1/1/1
6	MAN	H	4	6	-	0/2/19/22	0/1/1/1
6	MAN	H	5	6	-	0/2/19/22	0/1/1/1
6	MAN	H	6	6	-	1/2/19/22	0/1/1/1
6	MAN	H	7	6	-	1/2/19/22	0/1/1/1
7	NAG	I	1	1,7	-	0/6/23/26	0/1/1/1
7	NAG	I	2	7	-	0/6/23/26	0/1/1/1
7	BMA	I	3	7	-	0/2/19/22	0/1/1/1
7	MAN	I	4	7	-	2/2/19/22	0/1/1/1
7	MAN	I	5	7	-	0/2/19/22	0/1/1/1
7	MAN	I	6	7	-	2/2/19/22	0/1/1/1
7	MAN	I	7	7	-	0/2/19/22	0/1/1/1
2	NAG	J	1	1,2	-	0/6/23/26	0/1/1/1
2	NAG	J	2	2	-	0/6/23/26	0/1/1/1
2	BMA	J	3	2	-	0/2/19/22	0/1/1/1
2	MAN	J	4	2	-	1/2/19/22	0/1/1/1
2	MAN	J	5	2	-	2/2/19/22	0/1/1/1
2	MAN	J	6	2	-	1/2/19/22	0/1/1/1
2	MAN	J	7	2	-	0/2/19/22	0/1/1/1
8	NAG	K	1	1,8	-	0/6/23/26	0/1/1/1
8	NAG	K	2	8	-	0/6/23/26	0/1/1/1
8	BMA	K	3	8	-	0/2/19/22	0/1/1/1
8	MAN	K	4	8	-	0/2/19/22	0/1/1/1
8	MAN	K	5	8	-	1/2/19/22	0/1/1/1
8	MAN	K	6	8	-	0/2/19/22	0/1/1/1
3	NAG	L	1	1,3	-	0/6/23/26	0/1/1/1
3	NAG	L	2	3	-	2/6/23/26	0/1/1/1
3	BMA	L	3	3	-	2/2/19/22	0/1/1/1
5	NAG	M	1	5,1	-	0/6/23/26	0/1/1/1
5	MAN	M	10	5	-	2/2/19/22	0/1/1/1
5	NAG	M	2	5	-	0/6/23/26	0/1/1/1
5	BMA	M	3	5	-	0/2/19/22	0/1/1/1
5	MAN	M	4	5	-	0/2/19/22	0/1/1/1
5	MAN	M	5	5	-	0/2/19/22	0/1/1/1
5	MAN	M	6	5	-	0/2/19/22	0/1/1/1
5	MAN	M	7	5	-	0/2/19/22	0/1/1/1
5	MAN	M	8	5	-	0/2/19/22	0/1/1/1
5	MAN	M	9	5	-	0/2/19/22	0/1/1/1
3	NAG	N	1	1,3	-	0/6/23/26	0/1/1/1
3	NAG	N	2	3	-	0/6/23/26	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	BMA	N	3	3	-	0/2/19/22	0/1/1/1
6	NAG	O	1	6,1	-	0/6/23/26	0/1/1/1
6	NAG	O	2	6	-	0/6/23/26	0/1/1/1
6	BMA	O	3	6	-	0/2/19/22	0/1/1/1
6	MAN	O	4	6	-	0/2/19/22	0/1/1/1
6	MAN	O	5	6	-	0/2/19/22	0/1/1/1
6	MAN	O	6	6	-	0/2/19/22	0/1/1/1
6	MAN	O	7	6	-	2/2/19/22	0/1/1/1
9	NAG	P	1	1,9	-	0/6/23/26	0/1/1/1
9	NAG	P	2	9	-	0/6/23/26	0/1/1/1
9	BMA	P	3	9	-	2/2/19/22	0/1/1/1
9	MAN	P	4	9	-	0/2/19/22	0/1/1/1
9	MAN	P	5	9	-	1/2/19/22	0/1/1/1
9	MAN	P	6	9	-	2/2/19/22	0/1/1/1
9	MAN	P	7	9	-	2/2/19/22	0/1/1/1
9	MAN	P	8	9	-	1/2/19/22	0/1/1/1
10	SGC	Q	1	10	-	1/2/22/22	0/1/1/1
10	BGC	Q	2	10	-	0/2/19/22	0/1/1/1
10	SGC	R	1	10	-	1/2/22/22	0/1/1/1
10	BGC	R	2	10	-	1/2/19/22	0/1/1/1

The worst 5 of 90 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
10	R	1	SGC	C5-C4	8.99	1.60	1.53
10	Q	1	SGC	C5-C4	7.64	1.59	1.53
10	R	2	BGC	O5-C1	4.91	1.51	1.43
7	I	7	MAN	O5-C1	-4.87	1.35	1.43
10	R	1	SGC	C6-C5	4.39	1.66	1.51

The worst 5 of 331 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
9	P	6	MAN	C1-O5-C5	10.51	126.27	112.19
9	P	3	BMA	C1-O5-C5	8.47	123.54	112.19
3	N	2	NAG	C1-O5-C5	-8.16	101.25	112.19
9	P	3	BMA	C6-C5-C4	-7.40	94.84	113.02
10	R	2	BGC	C1-O5-C5	7.10	121.71	112.19

There are no chirality outliers.

5 of 44 torsion outliers are listed below:

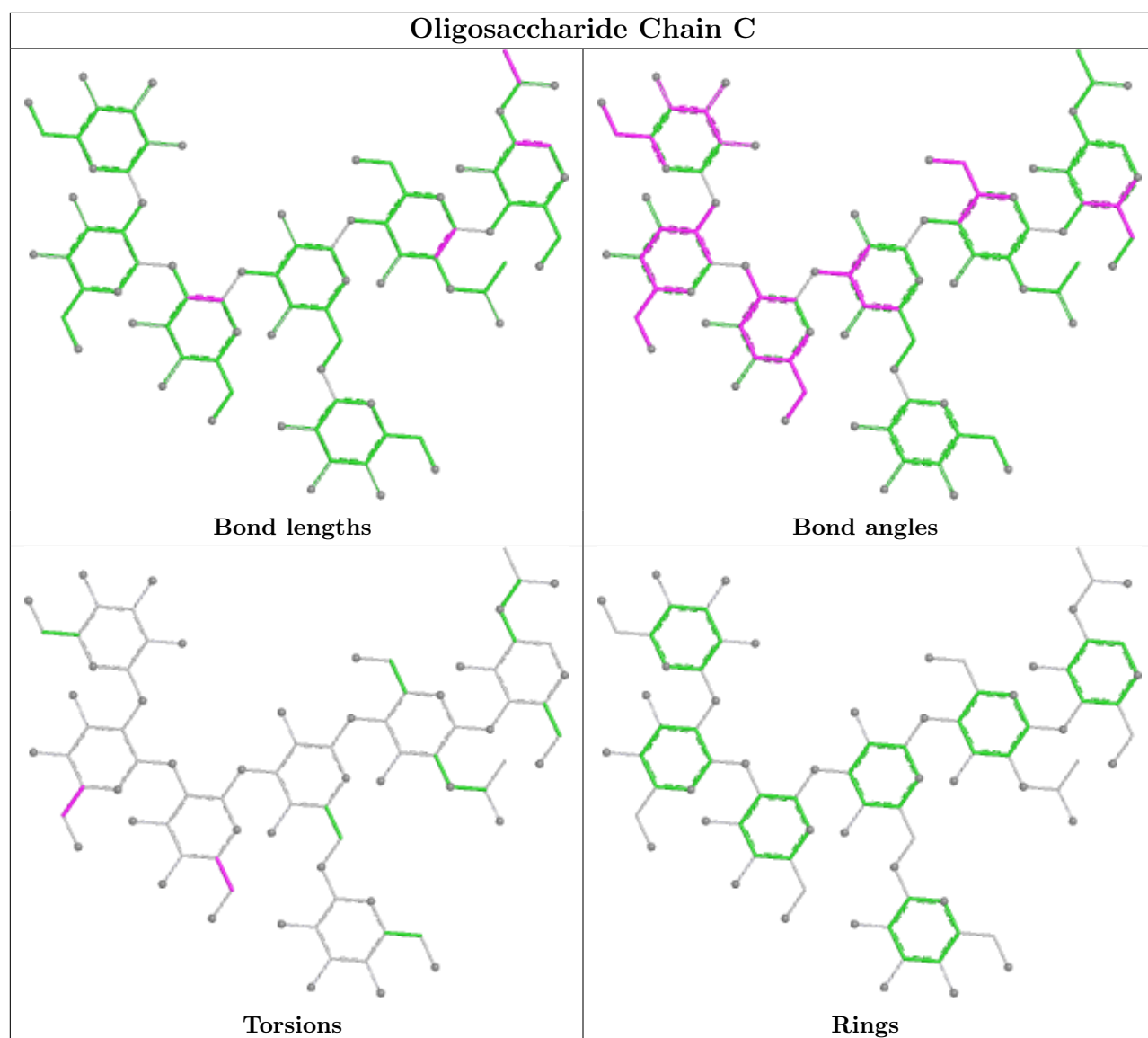
Mol	Chain	Res	Type	Atoms
2	C	5	MAN	C4-C5-C6-O6
2	J	5	MAN	O5-C5-C6-O6
7	I	6	MAN	O5-C5-C6-O6
7	I	4	MAN	O5-C5-C6-O6
9	P	7	MAN	O5-C5-C6-O6

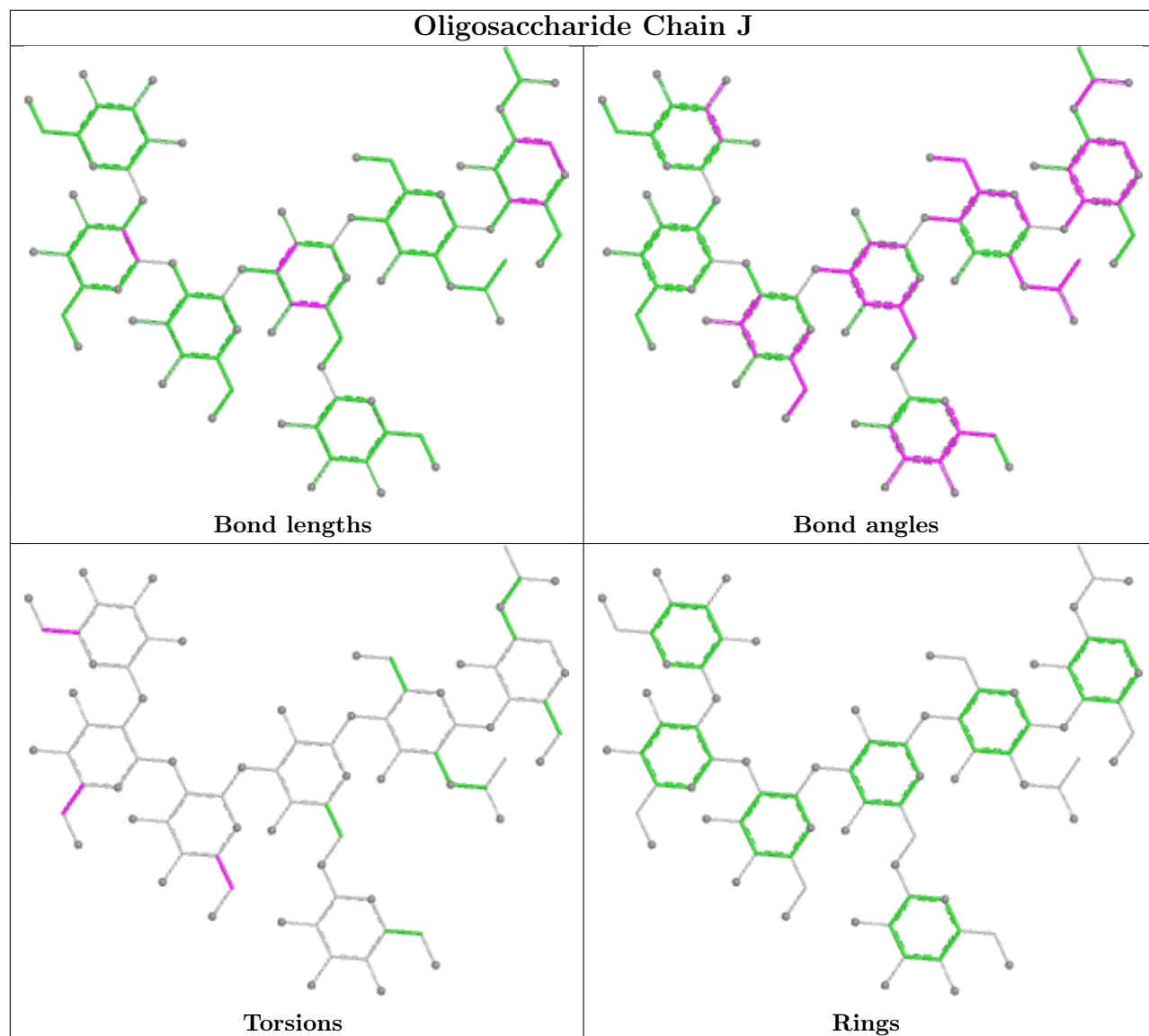
There are no ring outliers.

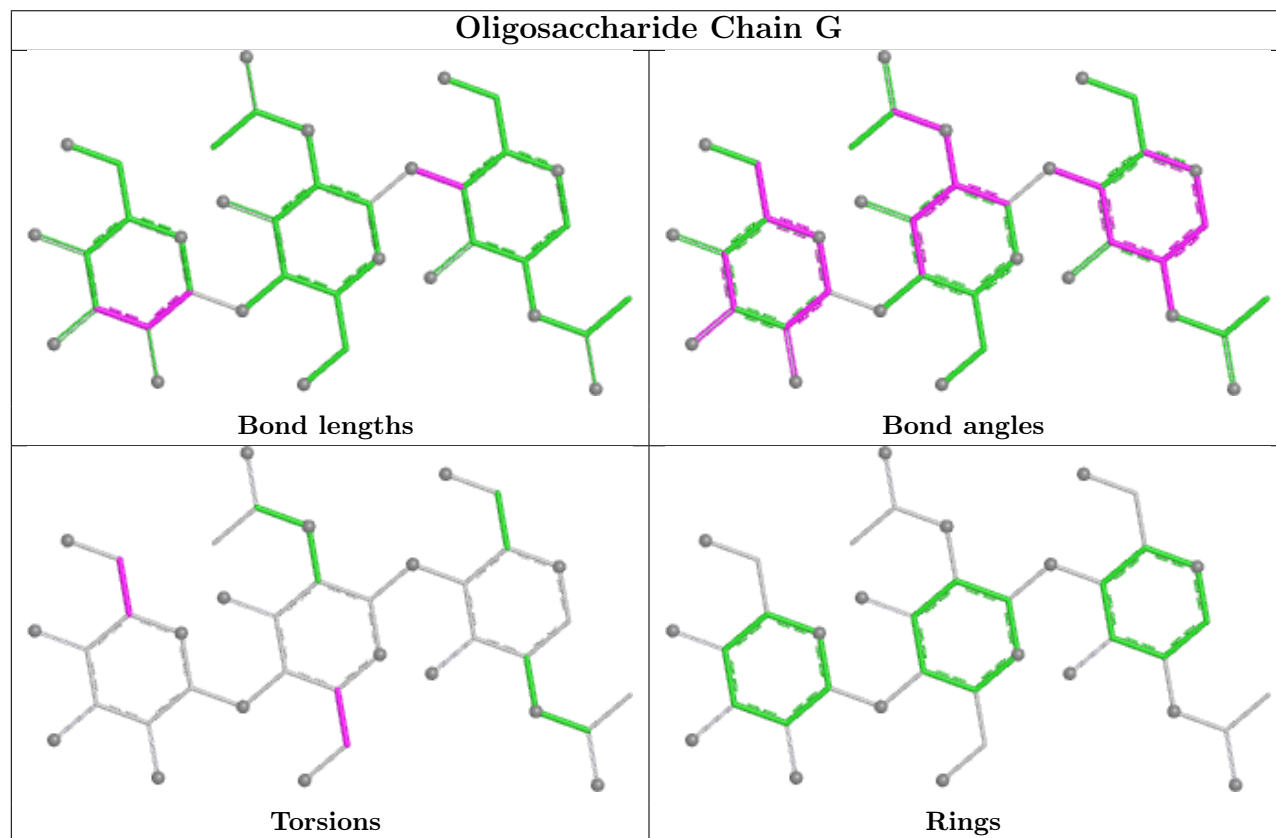
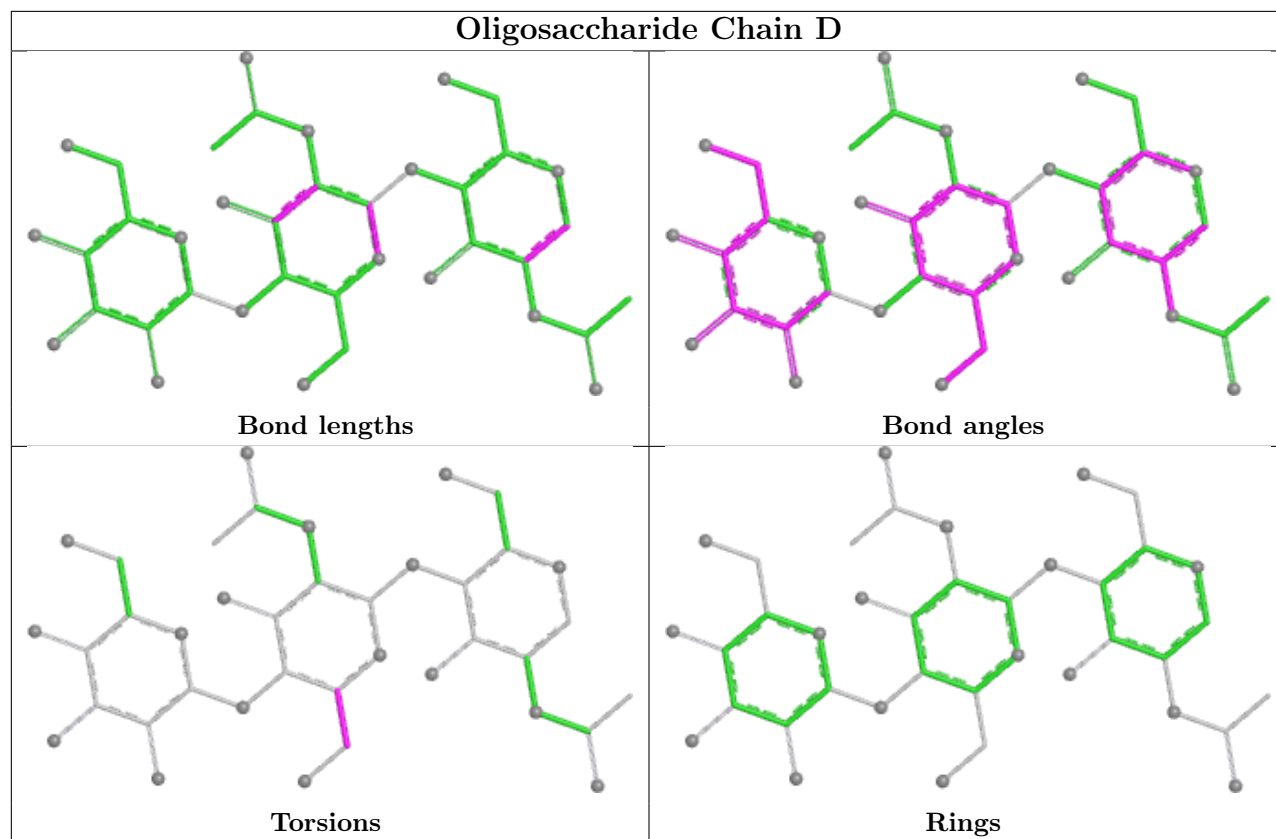
12 monomers are involved in 19 short contacts:

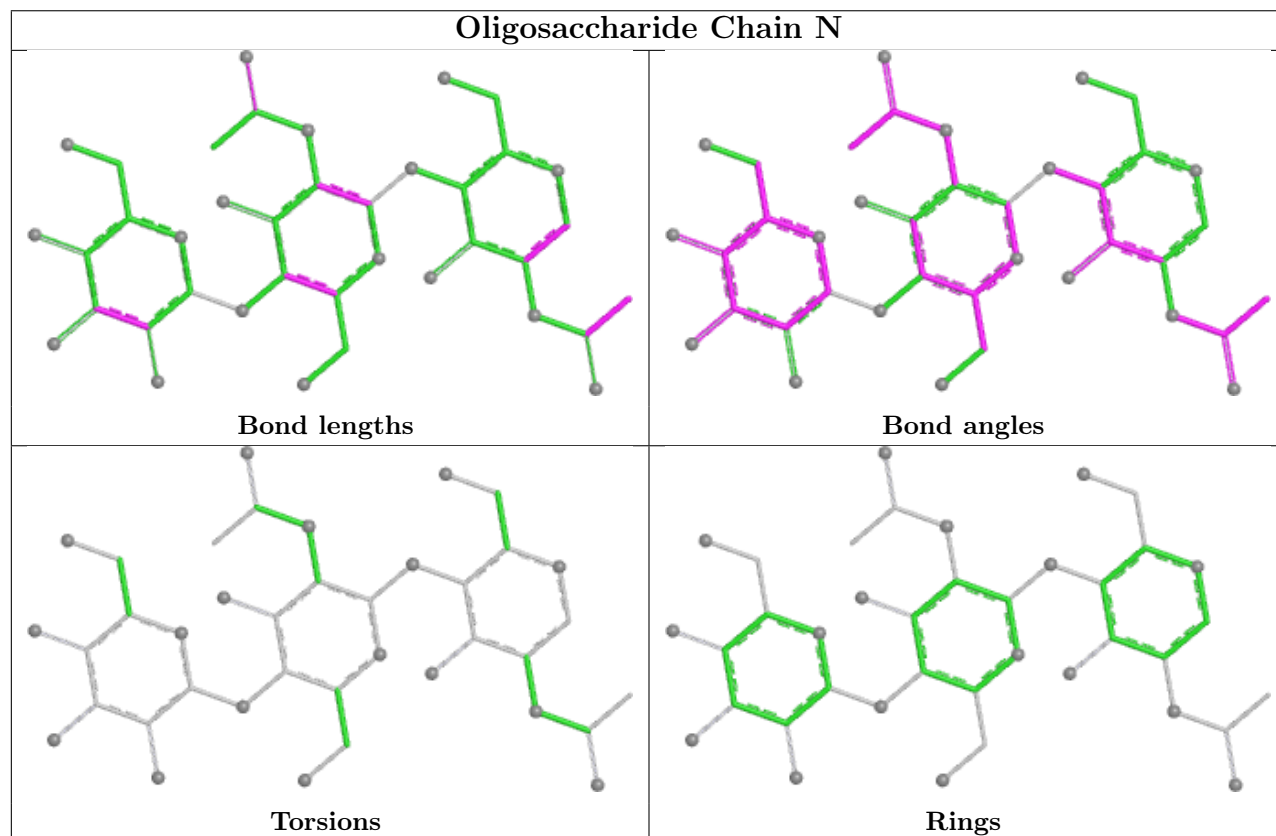
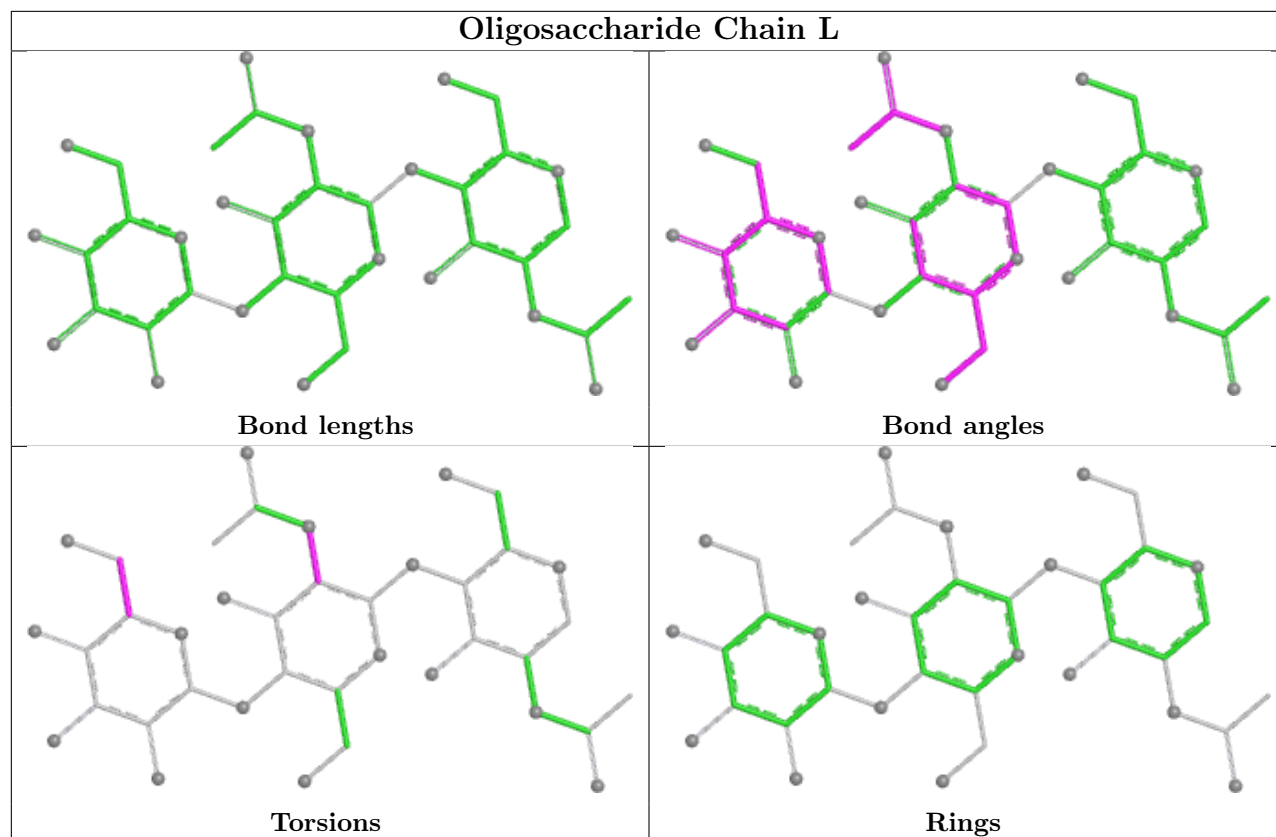
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	C	3	BMA	1	0
2	C	7	MAN	1	0
6	O	3	BMA	3	0
9	P	4	MAN	2	0
9	P	7	MAN	1	0
10	R	2	BGC	4	0
6	O	4	MAN	1	0
6	H	3	BMA	1	0
9	P	3	BMA	3	0
2	J	2	NAG	1	0
3	D	1	NAG	2	0
4	E	2	NAG	3	0

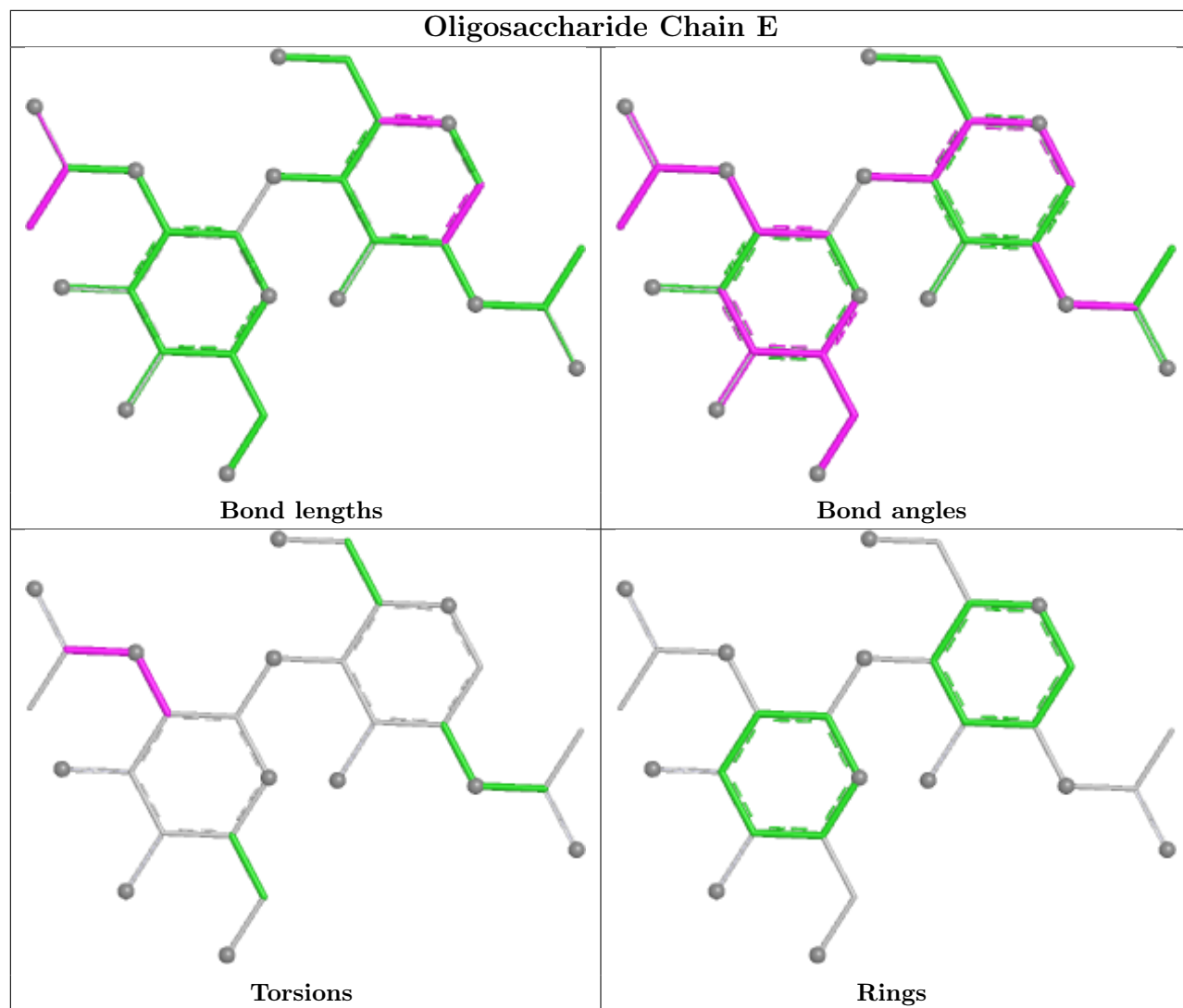
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for oligosaccharide.

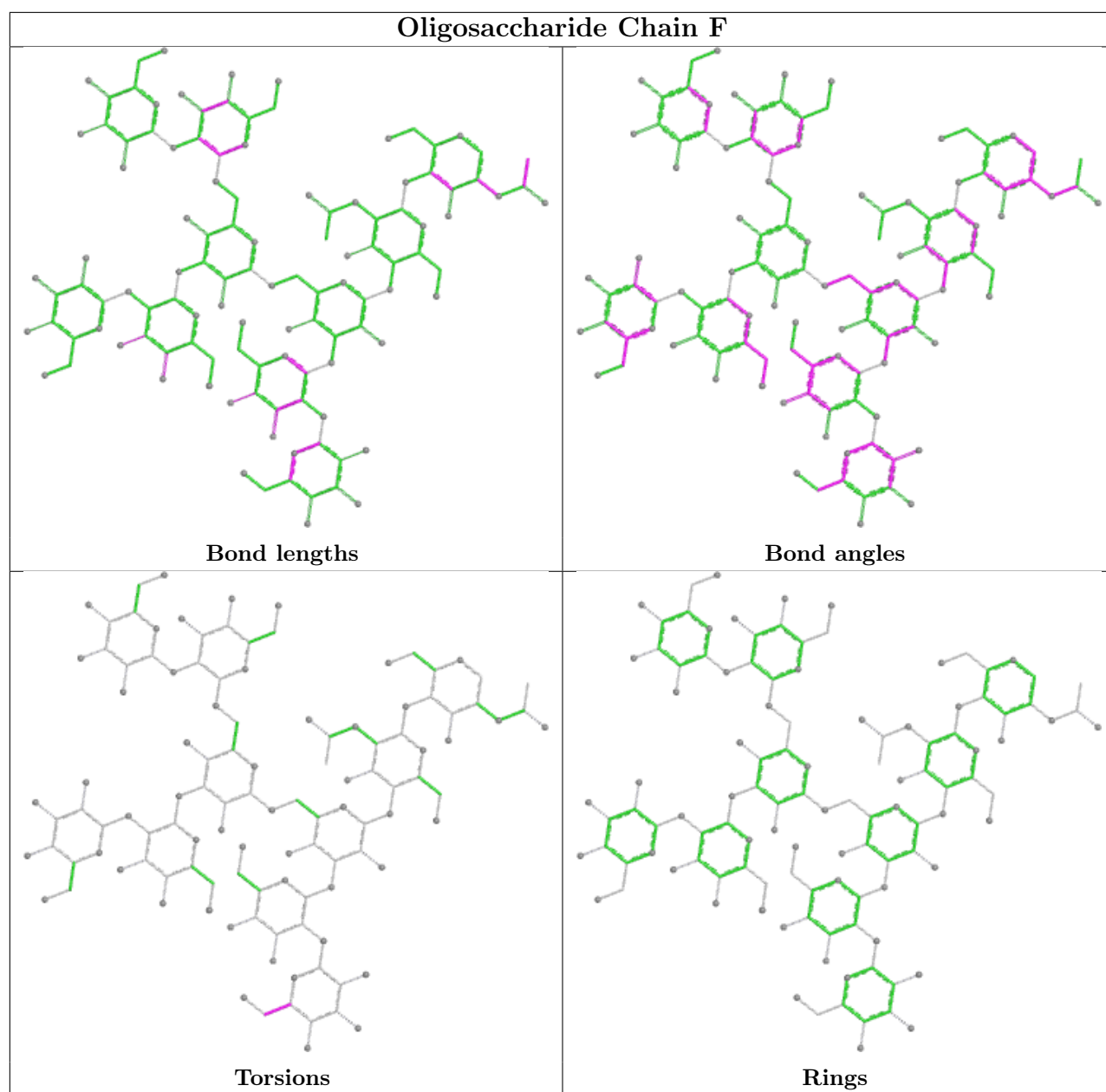


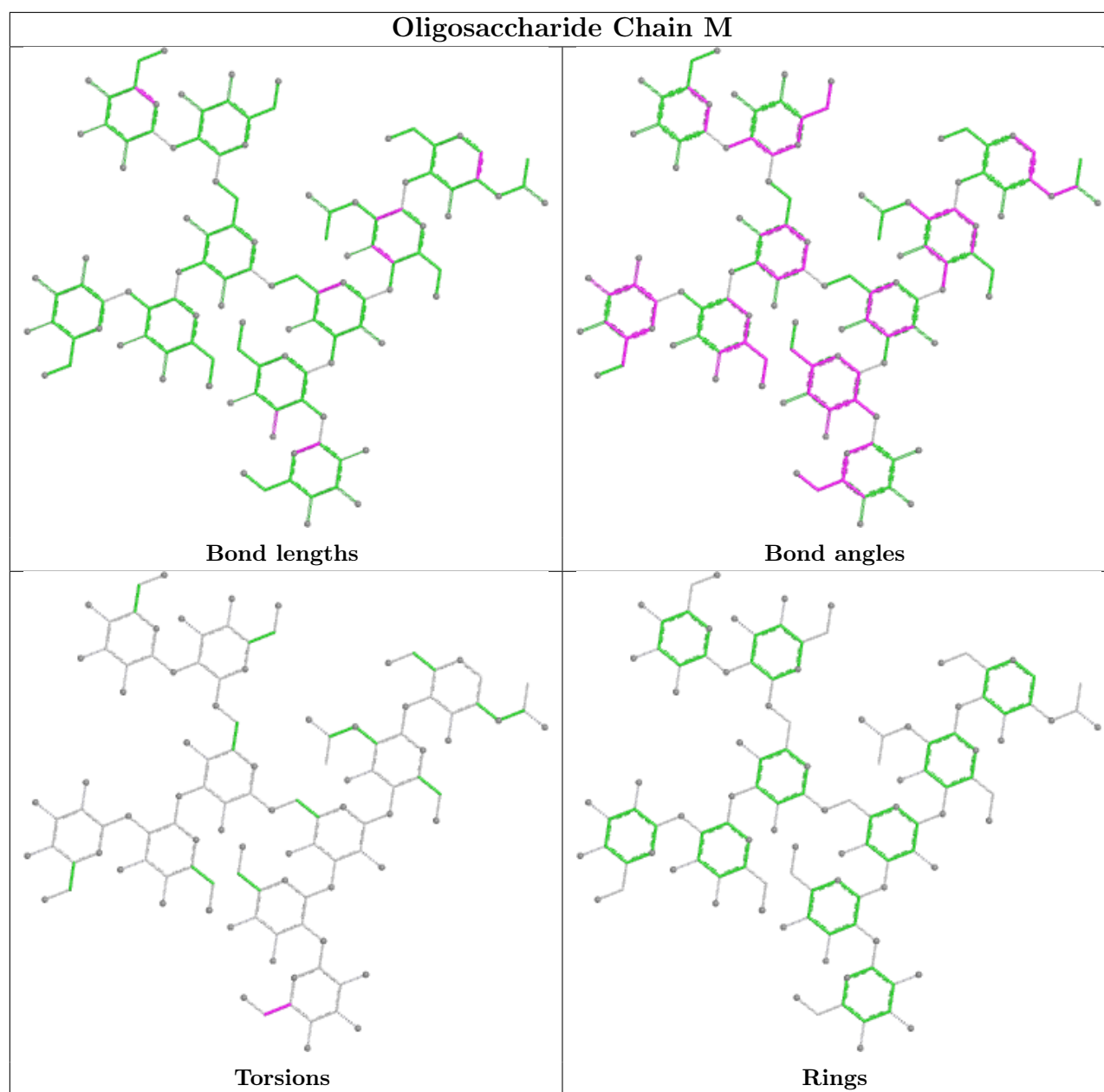


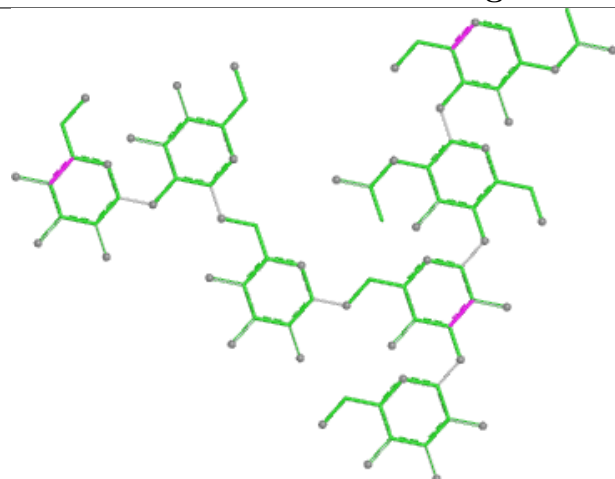
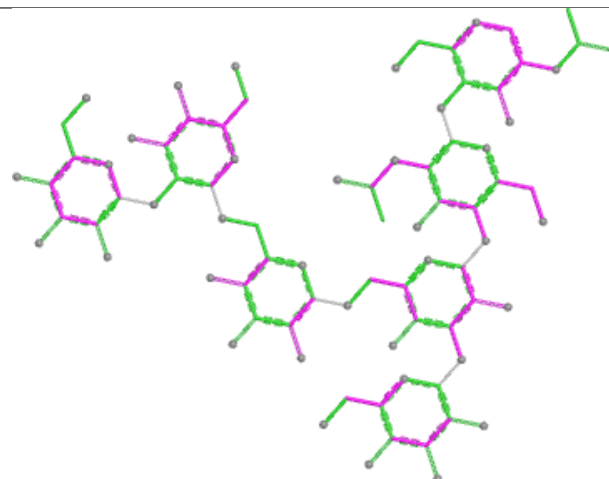
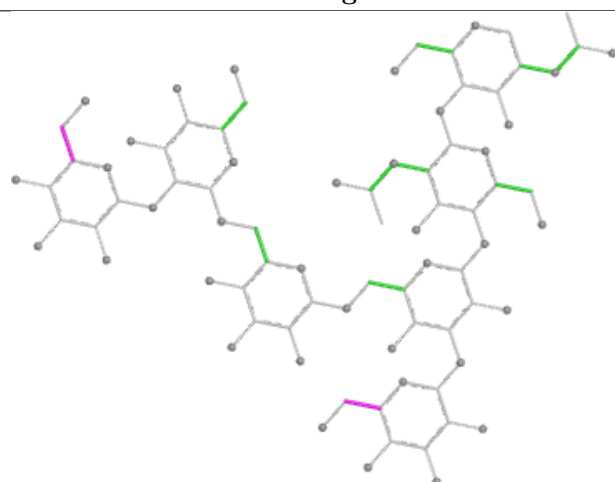
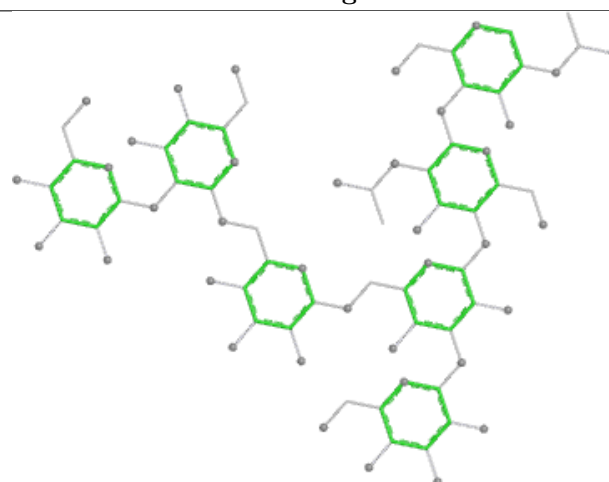




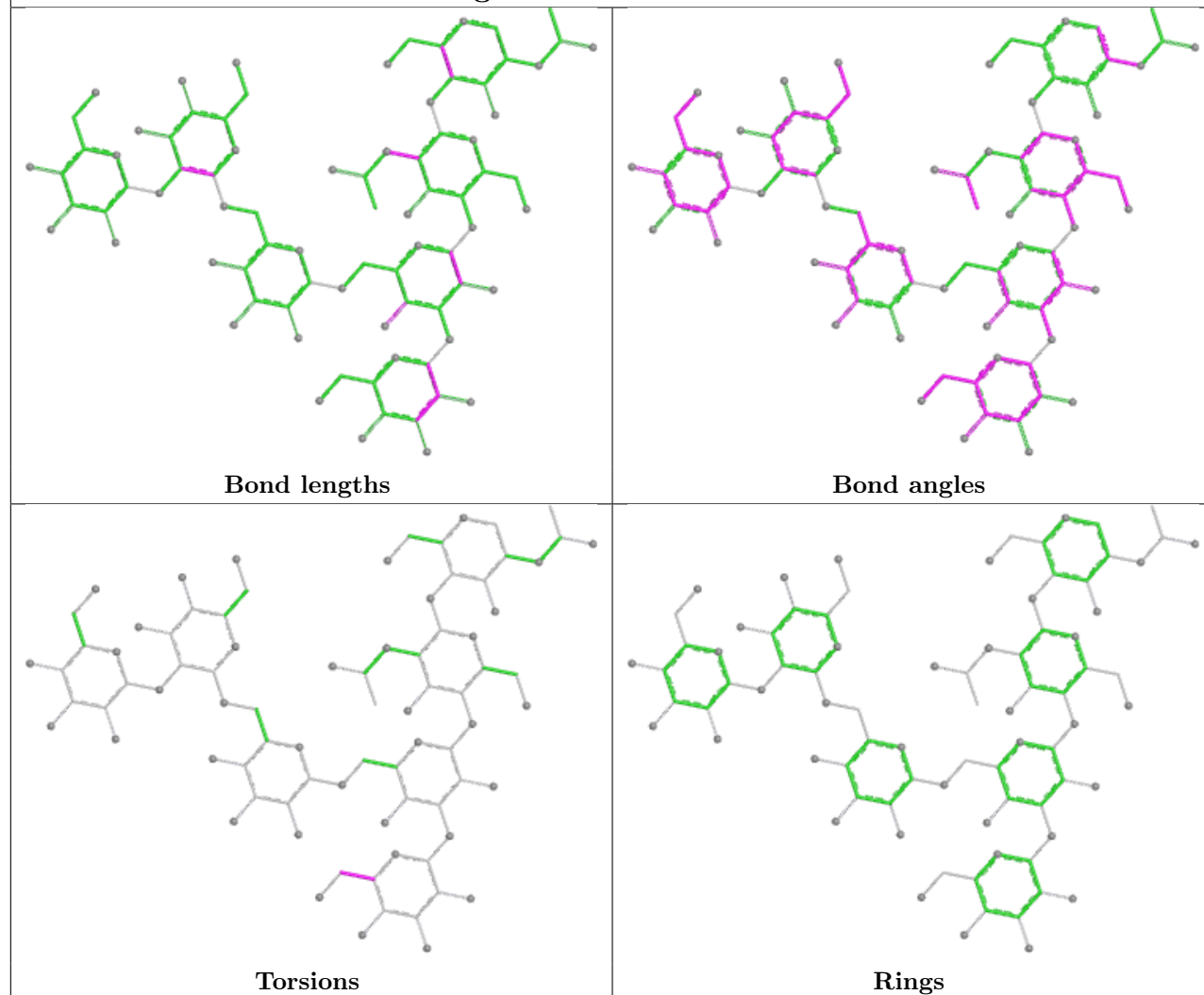


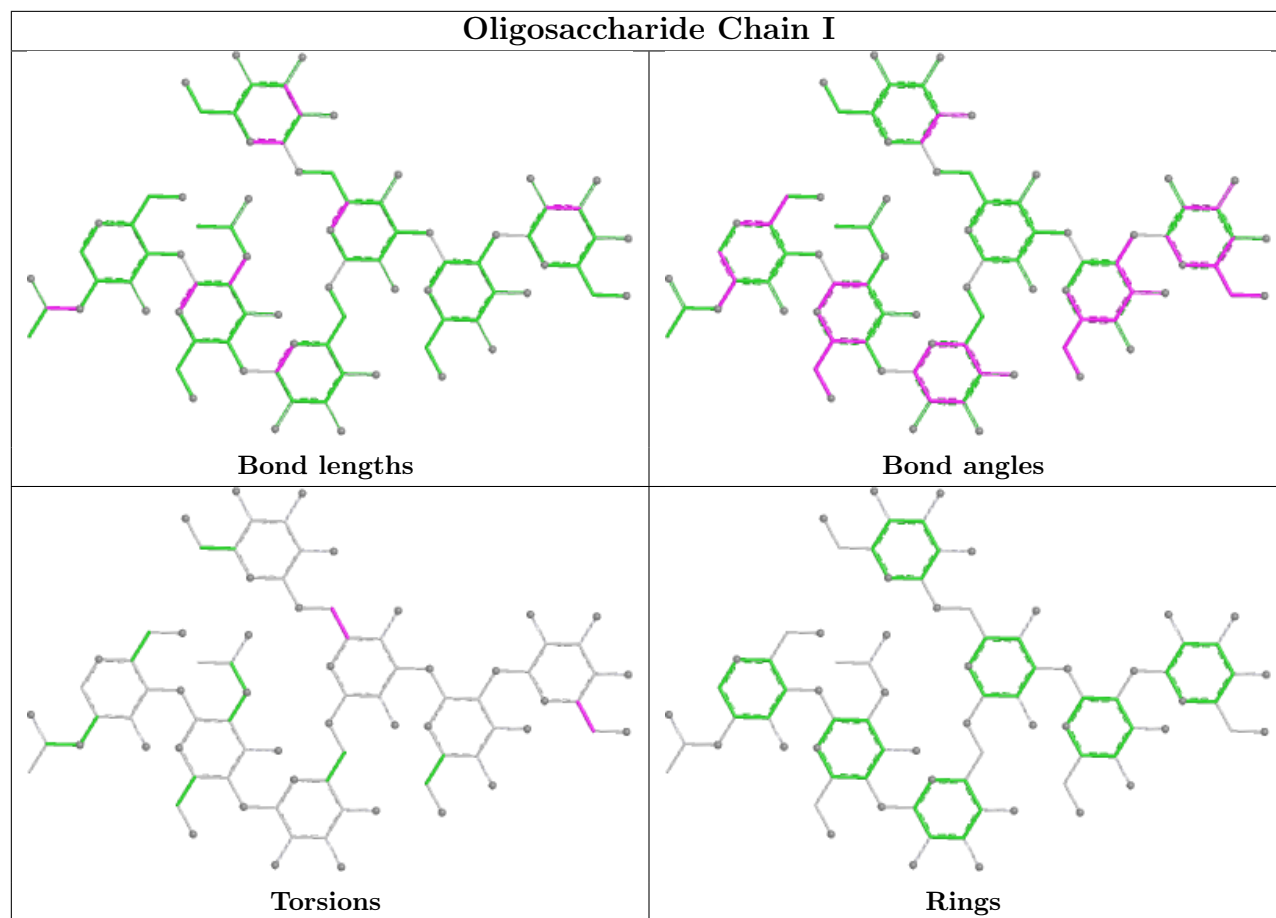


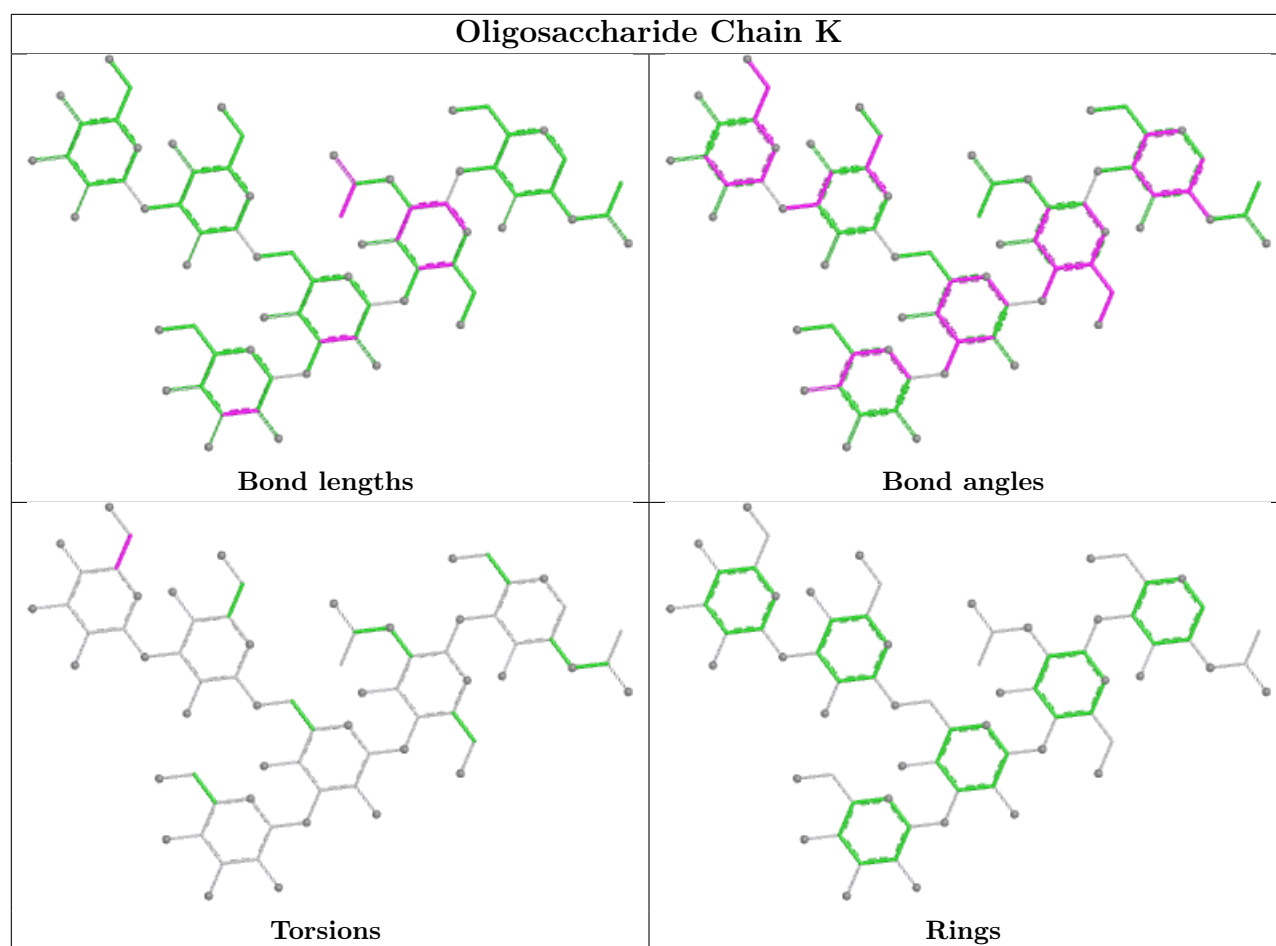


Oligosaccharide Chain H**Bond lengths****Bond angles****Torsions****Rings**

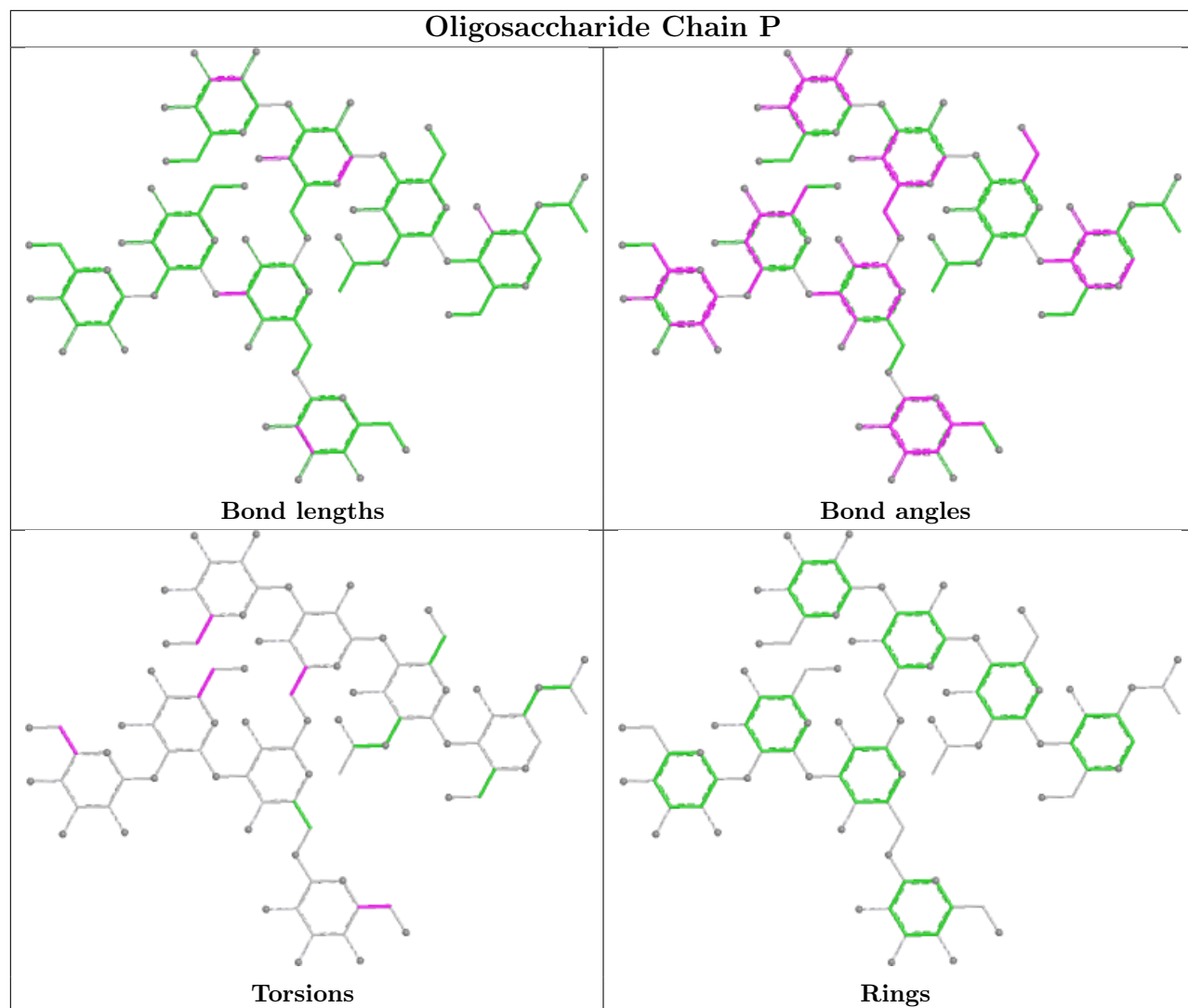
Oligosaccharide Chain O

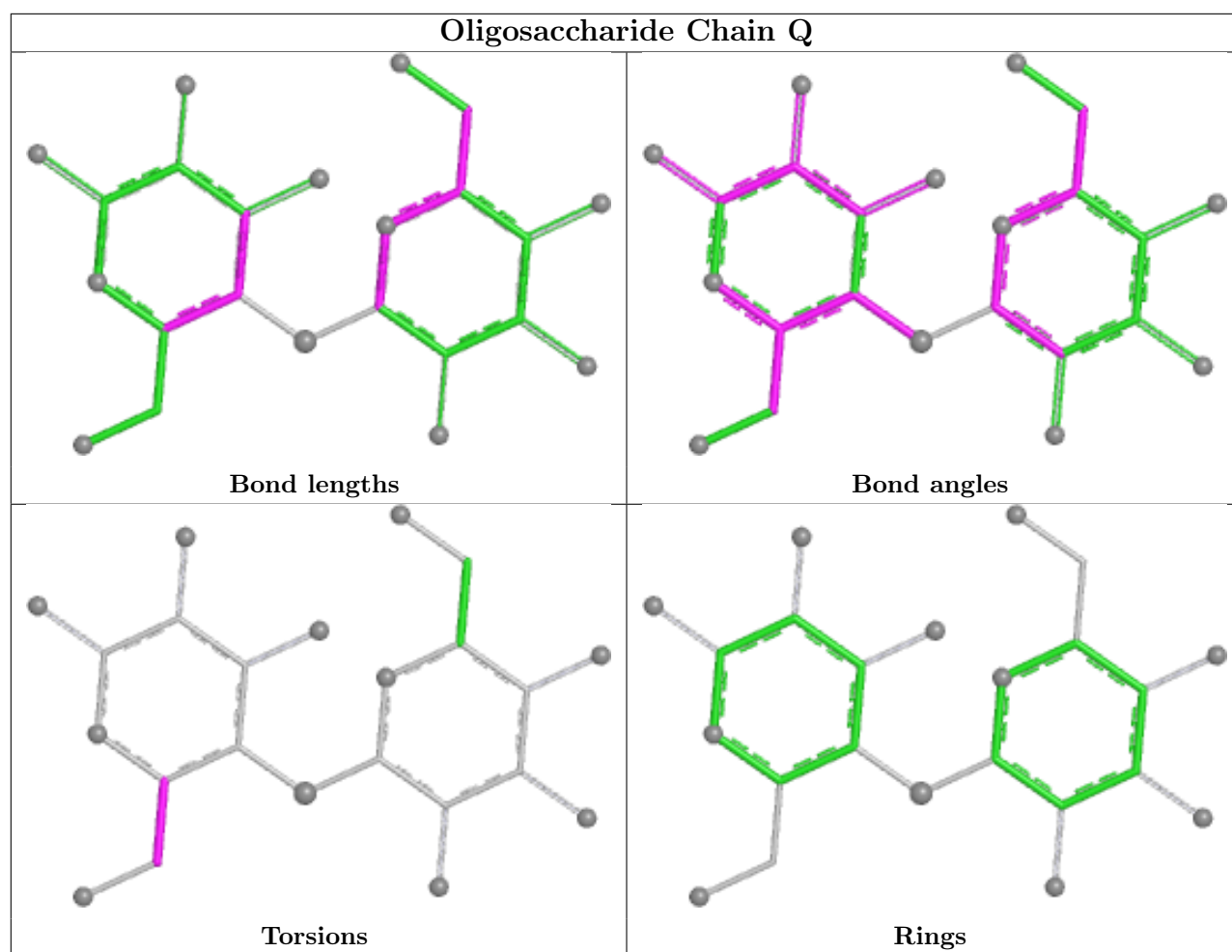


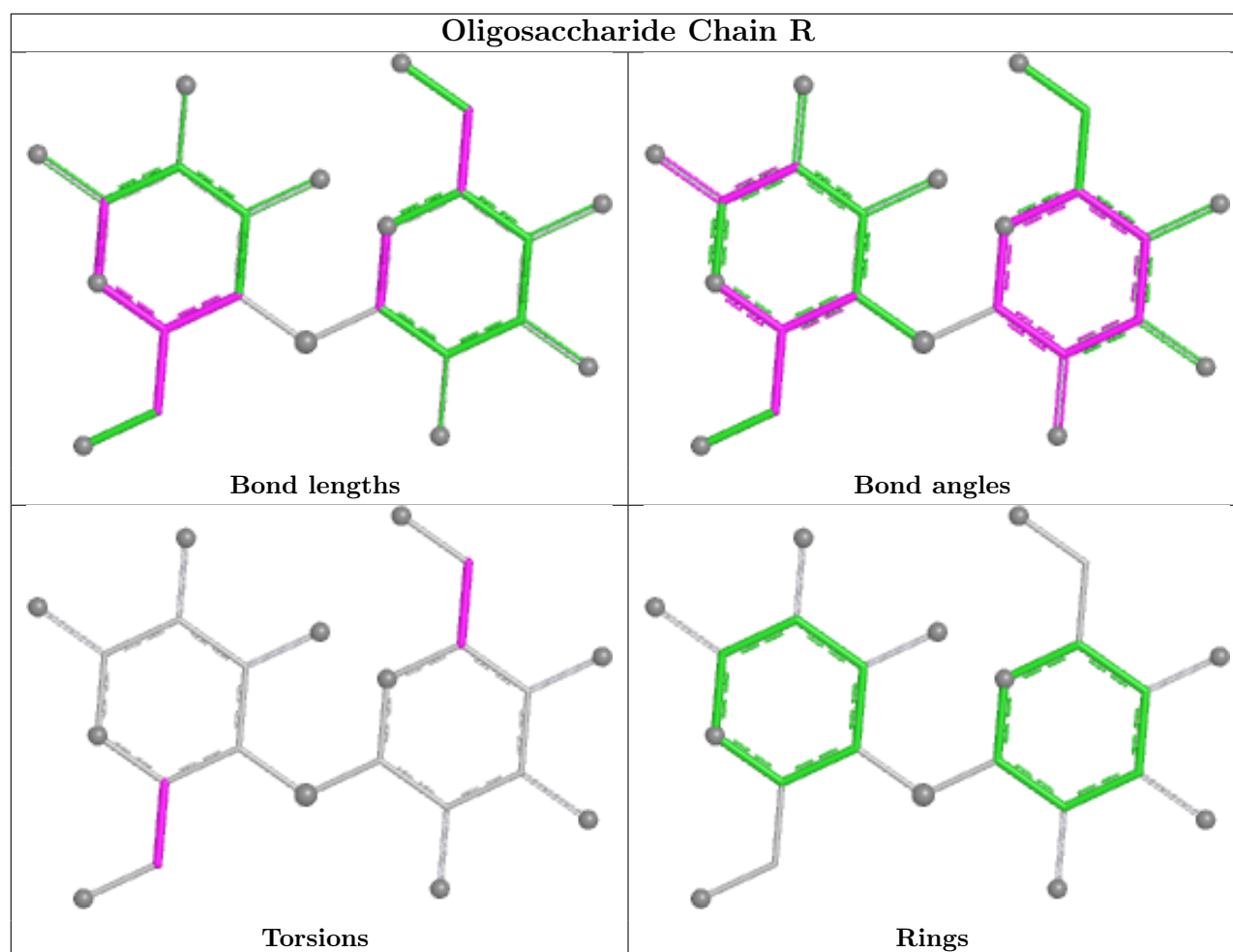




Oligosaccharide Chain P







5.6 Ligand geometry [i](#)

9 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$
11	NAG	A	908	1	14,14,15	1.14	1 (7%)	17,19,21	1.56	3 (17%)
11	NAG	A	941	1	14,14,15	0.87	0	17,19,21	2.23	8 (47%)
12	MRD	A	942	-	7,7,7	1.50	2 (28%)	9,10,10	1.17	0
11	NAG	B	908	1	14,14,15	1.10	2 (14%)	17,19,21	3.56	9 (52%)
12	MRD	B	948	-	7,7,7	0.77	0	9,10,10	1.34	2 (22%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
12	MRD	B	949	-	7,7,7	1.13	1 (14%)	9,10,10	0.94	0
11	NAG	B	947	1	14,14,15	0.86	0	17,19,21	1.24	0
12	MRD	A	943	-	7,7,7	0.92	0	9,10,10	1.27	2 (22%)
11	NAG	B	946	1	14,14,15	1.17	2 (14%)	17,19,21	1.95	5 (29%)

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
11	NAG	A	908	1	-	0/6/23/26	0/1/1/1
11	NAG	A	941	1	-	0/6/23/26	0/1/1/1
12	MRD	A	942	-	-	1/5/5/5	-
11	NAG	B	908	1	-	2/6/23/26	0/1/1/1
12	MRD	B	948	-	-	2/5/5/5	-
12	MRD	B	949	-	-	4/5/5/5	-
11	NAG	B	947	1	-	0/6/23/26	0/1/1/1
12	MRD	A	943	-	-	3/5/5/5	-
11	NAG	B	946	1	-	2/6/23/26	0/1/1/1

The worst 5 of 8 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
11	A	908	NAG	O5-C1	-2.93	1.38	1.43
11	B	908	NAG	O5-C1	-2.75	1.39	1.43
12	B	949	MRD	O2-C2	-2.59	1.38	1.44
12	A	942	MRD	C1-C2	2.50	1.59	1.52
11	B	946	NAG	O5-C5	-2.49	1.38	1.43

The worst 5 of 29 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
11	B	908	NAG	C4-C3-C2	-7.33	100.27	111.02
11	B	908	NAG	O5-C1-C2	-6.70	100.92	111.29
11	B	908	NAG	C2-N2-C7	6.19	131.20	122.90
11	B	908	NAG	C6-C5-C4	-4.01	103.17	113.02
11	A	908	NAG	O5-C1-C2	-3.89	105.28	111.29

There are no chirality outliers.

5 of 14 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
12	B	948	MRD	C2-C3-C4-O4
12	B	948	MRD	C2-C3-C4-C5
12	B	949	MRD	C2-C3-C4-O4
12	B	949	MRD	C2-C3-C4-C5
11	B	946	NAG	O5-C5-C6-O6

There are no ring outliers.

4 monomers are involved in 13 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
12	A	942	MRD	3	0
12	B	948	MRD	2	0
12	B	949	MRD	2	0
12	A	943	MRD	6	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, 95th 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 ²)	Q<0.9
1	A	833/841 (99%)	-0.90	4 (0%) 87 87	5, 12, 24, 50	0
1	B	832/841 (98%)	-1.03	3 (0%) 88 88	4, 9, 20, 52	0
All	All	1665/1682 (98%)	-0.96	7 (0%) 88 88	4, 10, 23, 52	0

The worst 5 of 7 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	610	TYR	3.6
1	B	610	TYR	3.5
1	B	609	ASP	3.1
1	A	609	ASP	3.1
1	A	699	GLY	2.9

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, 95th 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 ²)	Q<0.9
6	MAN	O	7	11/12	0.65	0.16	56,65,71,77	0
6	MAN	H	7	11/12	0.71	0.15	52,58,67,68	0
2	BMA	C	3	11/12	0.71	0.17	35,60,65,67	0
9	MAN	P	8	11/12	0.72	0.15	51,60,65,66	0
9	MAN	P	7	11/12	0.73	0.17	48,54,66,71	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
3	BMA	G	3	11/12	0.73	0.17	45,66,75,79	0
2	MAN	C	4	11/12	0.74	0.15	52,58,63,65	0
2	MAN	C	5	11/12	0.75	0.16	55,60,62,63	0
2	MAN	C	7	11/12	0.76	0.15	45,53,59,60	0
7	MAN	I	7	11/12	0.76	0.16	49,53,62,70	0
3	BMA	L	3	11/12	0.77	0.16	45,59,70,74	0
9	MAN	P	6	11/12	0.78	0.16	44,50,62,64	0
3	BMA	N	3	11/12	0.78	0.16	42,51,62,68	0
3	NAG	G	2	14/15	0.78	0.16	40,48,59,62	0
10	SGC	R	1	12/12	0.79	0.17	40,53,60,60	0
3	BMA	D	3	11/12	0.81	0.12	25,34,40,46	0
8	MAN	K	6	11/12	0.82	0.13	37,42,50,51	0
7	MAN	I	6	11/12	0.84	0.12	36,39,46,47	0
2	MAN	C	6	11/12	0.85	0.14	32,38,48,51	0
8	MAN	K	5	11/12	0.86	0.12	37,39,46,54	0
10	SGC	Q	1	12/12	0.86	0.15	43,54,56,57	0
9	BMA	P	3	11/12	0.86	0.12	25,31,38,45	0
7	BMA	I	3	11/12	0.88	0.11	21,29,41,45	0
8	MAN	K	4	11/12	0.88	0.09	33,35,41,41	0
3	NAG	N	2	14/15	0.89	0.11	25,32,36,44	0
6	MAN	O	4	11/12	0.89	0.09	27,28,38,40	0
6	MAN	O	6	11/12	0.89	0.12	23,31,39,40	0
6	MAN	H	4	11/12	0.89	0.10	27,31,39,43	0
6	MAN	O	5	11/12	0.91	0.10	22,27,31,34	0
9	MAN	P	4	11/12	0.92	0.09	22,24,33,45	0
5	MAN	M	10	11/12	0.92	0.09	22,32,38,39	0
8	BMA	K	3	11/12	0.92	0.08	22,25,29,33	0
10	BGC	R	2	11/12	0.92	0.11	16,31,41,45	0
7	MAN	I	4	11/12	0.93	0.08	17,23,28,38	0
6	MAN	H	5	11/12	0.93	0.09	20,26,34,48	0
6	MAN	H	6	11/12	0.93	0.12	23,29,41,44	0
4	NAG	E	2	14/15	0.93	0.08	15,23,32,33	0
5	MAN	F	10	11/12	0.93	0.10	25,32,46,53	0
3	NAG	G	1	14/15	0.94	0.08	19,25,34,42	0
9	NAG	P	2	14/15	0.94	0.07	17,22,28,29	0
2	MAN	J	5	11/12	0.94	0.08	16,23,32,37	0
2	MAN	J	7	11/12	0.94	0.07	20,27,30,31	0
9	MAN	P	5	11/12	0.94	0.07	23,23,30,38	0
7	MAN	I	5	11/12	0.94	0.06	19,24,30,32	0
5	MAN	F	6	11/12	0.94	0.07	22,24,28,31	0
6	BMA	O	3	11/12	0.94	0.07	23,26,31,41	0
3	NAG	L	2	14/15	0.94	0.07	13,17,28,32	0

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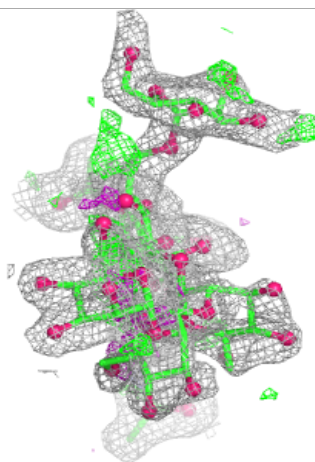
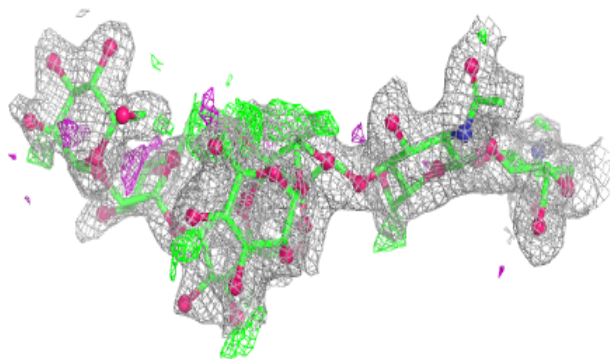
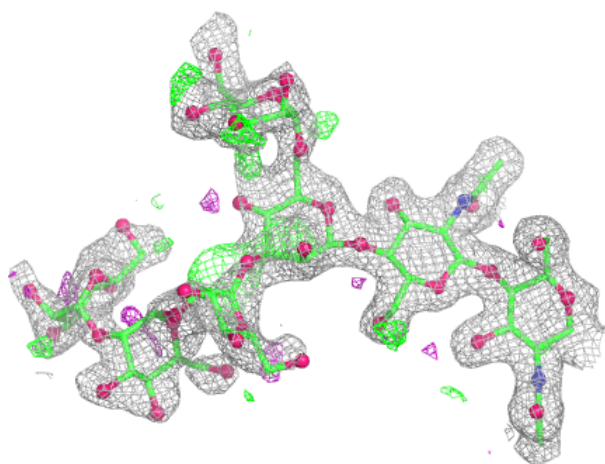
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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
10	BGC	Q	2	11/12	0.94	0.10	23,36,44,46	0
2	MAN	J	4	11/12	0.94	0.07	18,25,31,32	0
6	BMA	H	3	11/12	0.94	0.07	20,24,31,40	0
2	MAN	J	6	11/12	0.95	0.07	15,17,21,28	0
5	MAN	F	9	11/12	0.95	0.06	16,18,23,24	0
2	NAG	C	2	14/15	0.95	0.07	15,22,31,33	0
3	NAG	D	2	14/15	0.95	0.07	16,21,23,29	0
6	NAG	H	2	14/15	0.95	0.06	15,19,23,26	0
5	MAN	F	5	11/12	0.96	0.06	17,19,24,31	0
5	MAN	M	5	11/12	0.96	0.05	12,14,18,24	0
8	NAG	K	1	14/15	0.96	0.06	10,12,13,14	0
5	MAN	M	6	11/12	0.96	0.06	19,21,25,26	0
3	NAG	N	1	14/15	0.96	0.06	16,20,30,32	0
7	NAG	I	2	14/15	0.96	0.06	14,18,24,29	0
6	NAG	H	1	14/15	0.96	0.07	12,16,35,39	0
6	NAG	O	2	14/15	0.96	0.06	14,17,23,24	0
2	BMA	J	3	11/12	0.96	0.06	12,17,19,20	0
9	NAG	P	1	14/15	0.97	0.04	12,14,15,16	0
8	NAG	K	2	14/15	0.97	0.06	12,16,24,25	0
3	NAG	D	1	14/15	0.97	0.05	13,14,16,16	0
2	NAG	C	1	14/15	0.97	0.05	13,14,15,15	0
6	NAG	O	1	14/15	0.97	0.06	12,15,29,30	0
5	NAG	F	1	14/15	0.97	0.05	15,17,20,21	0
5	MAN	F	8	11/12	0.98	0.04	13,14,15,19	0
7	NAG	I	1	14/15	0.98	0.05	13,15,17,18	0
5	NAG	F	2	14/15	0.98	0.04	12,13,14,14	0
5	BMA	F	3	11/12	0.98	0.04	14,15,17,18	0
5	NAG	M	1	14/15	0.98	0.05	9,11,14,15	0
5	NAG	M	2	14/15	0.98	0.05	8,9,10,11	0
5	MAN	M	4	11/12	0.98	0.04	9,9,10,12	0
5	MAN	F	4	11/12	0.98	0.04	13,14,16,18	0
2	NAG	J	2	14/15	0.98	0.04	9,12,15,21	0
5	MAN	M	7	11/12	0.98	0.04	9,10,11,11	0
5	MAN	M	9	11/12	0.98	0.04	12,14,18,19	0
4	NAG	E	1	14/15	0.98	0.04	12,13,17,18	0
5	MAN	F	7	11/12	0.98	0.04	12,13,15,15	0
5	BMA	M	3	11/12	0.99	0.03	10,11,12,13	0
3	NAG	L	1	14/15	0.99	0.03	8,10,11,12	0
5	MAN	M	8	11/12	0.99	0.04	11,11,14,17	0
2	NAG	J	1	14/15	0.99	0.03	8,9,10,10	0

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

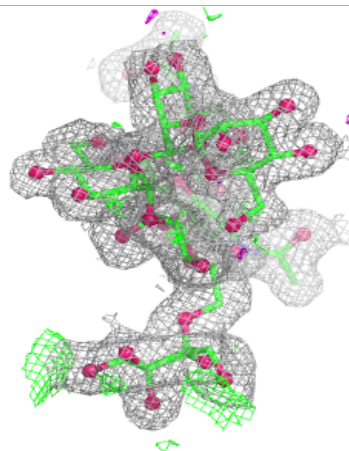
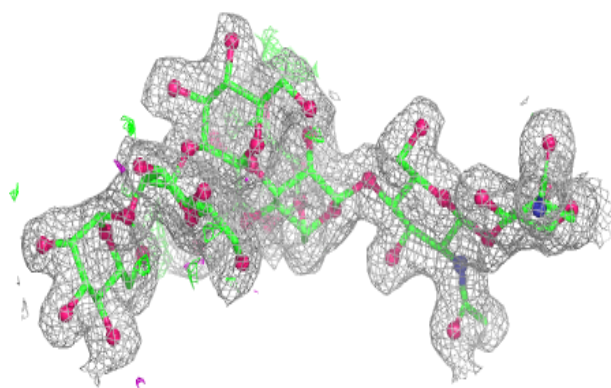
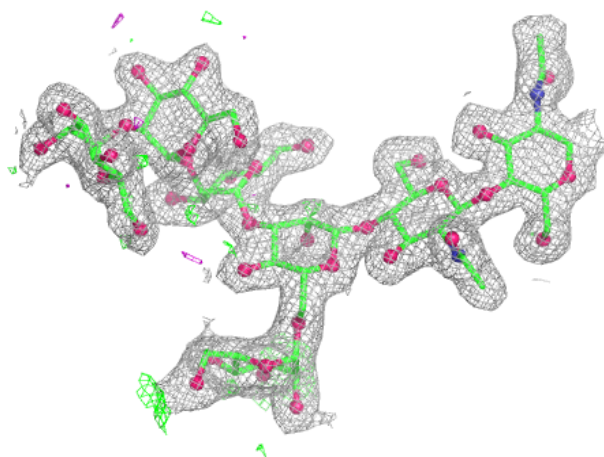
Electron density around Chain C:

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



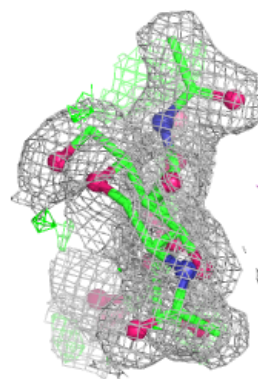
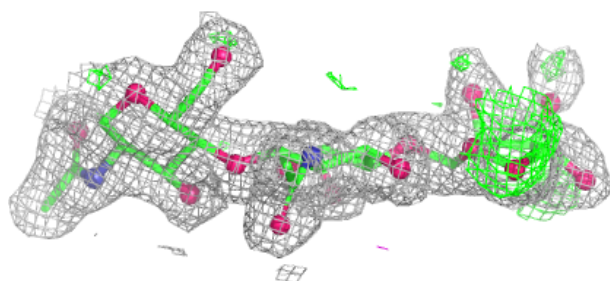
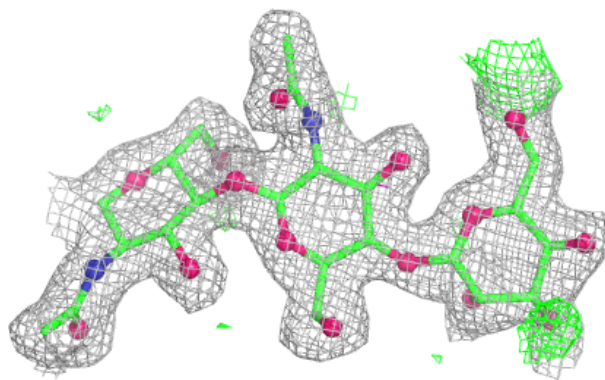
Electron density around Chain J:

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

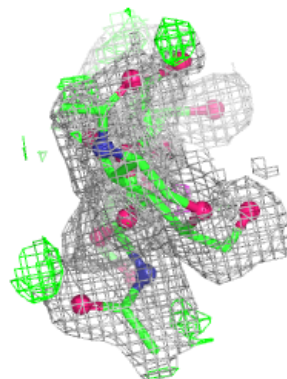
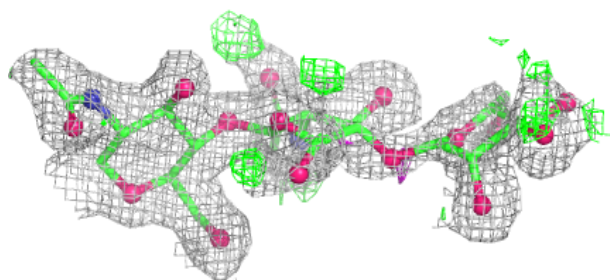
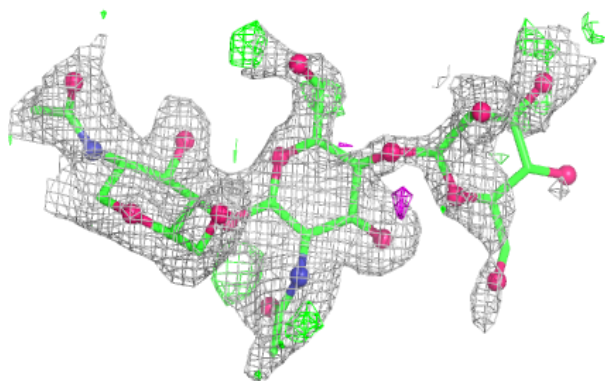


Electron density around Chain D:

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

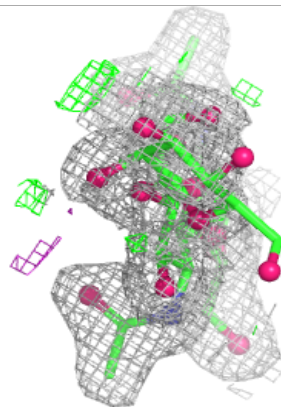
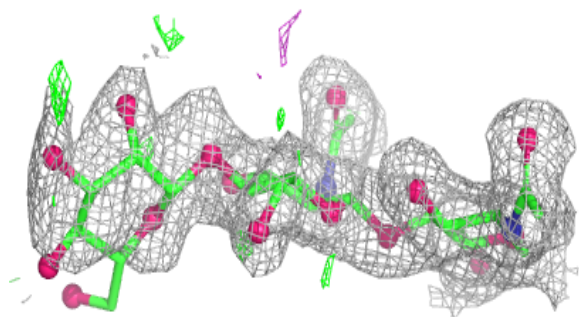
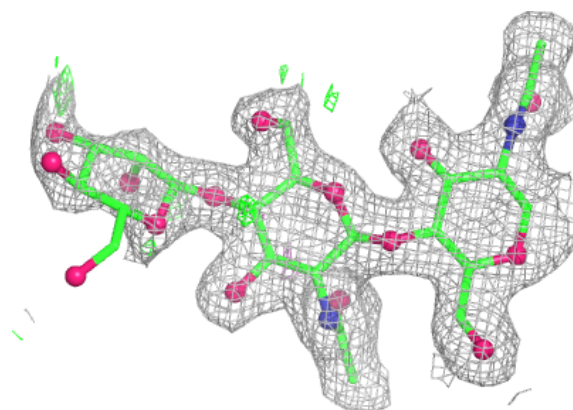
**Electron density around Chain G:**

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



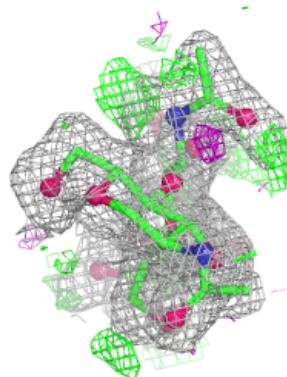
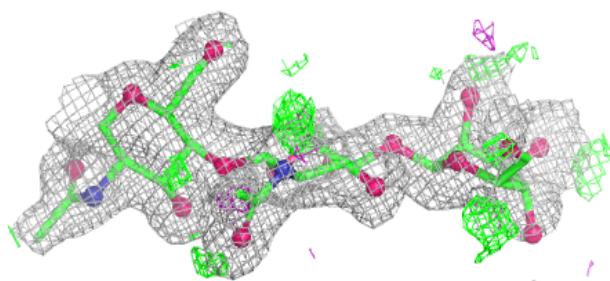
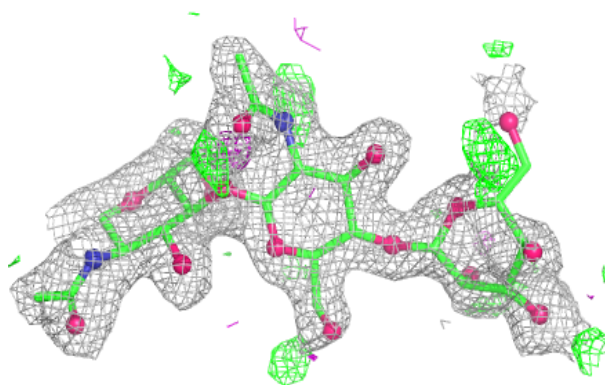
Electron density around Chain L:

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



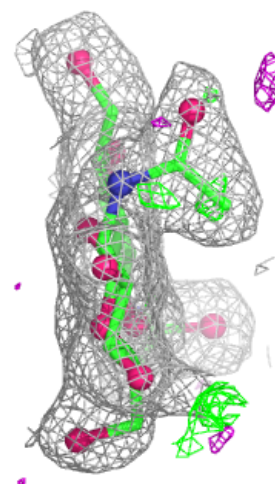
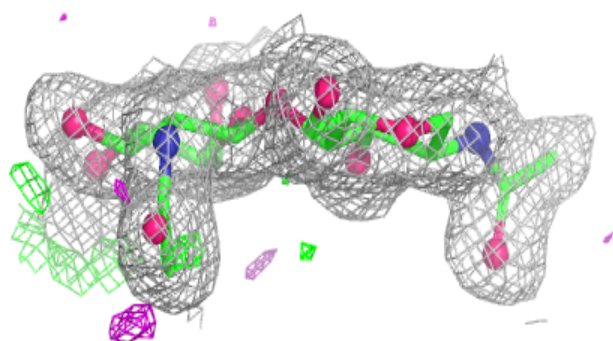
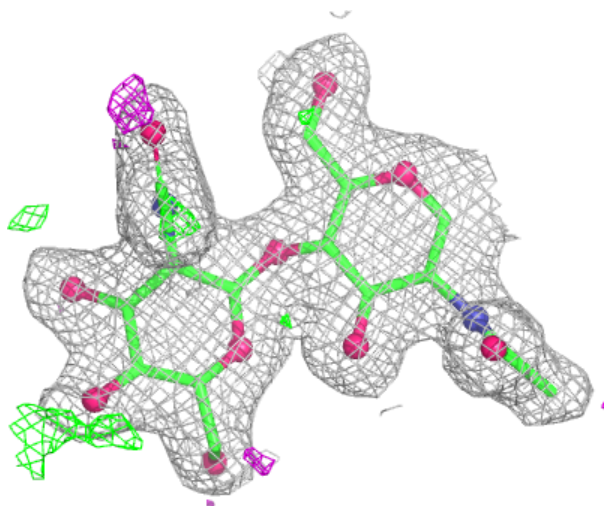
Electron density around Chain N:

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



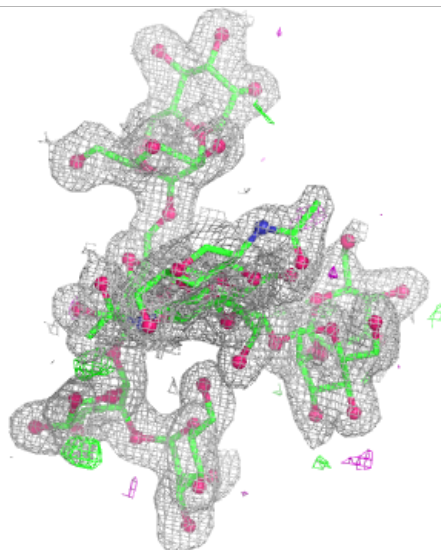
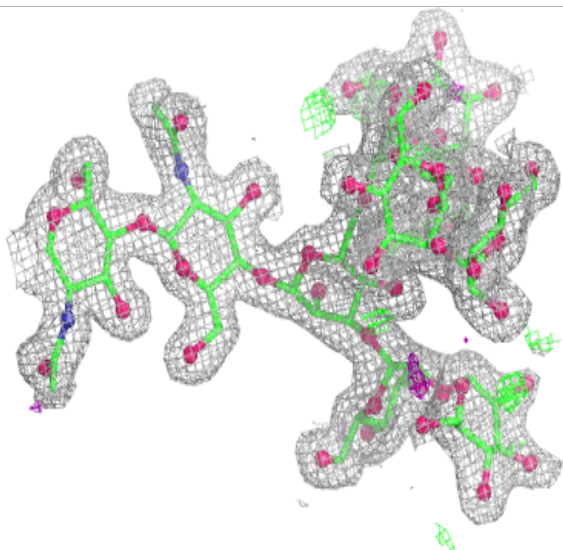
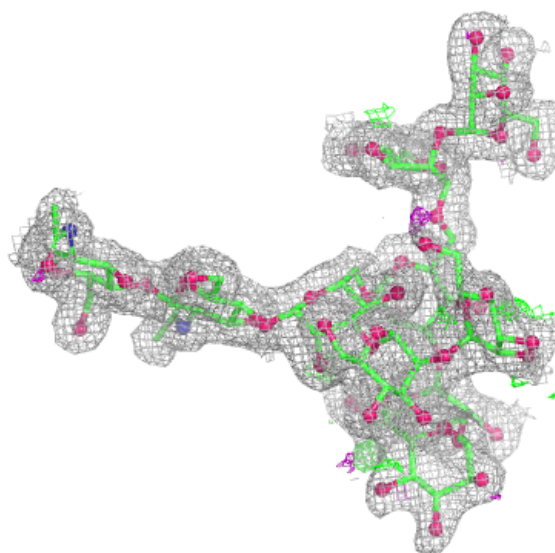
Electron density around Chain E:

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



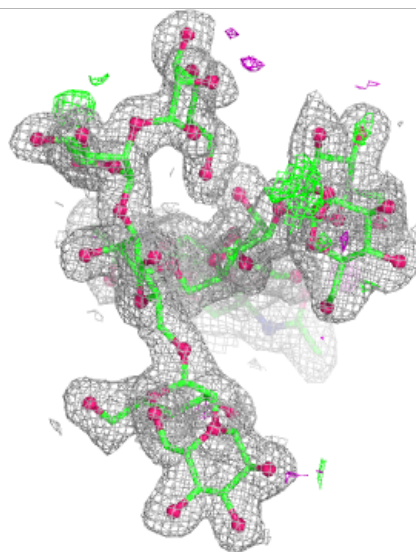
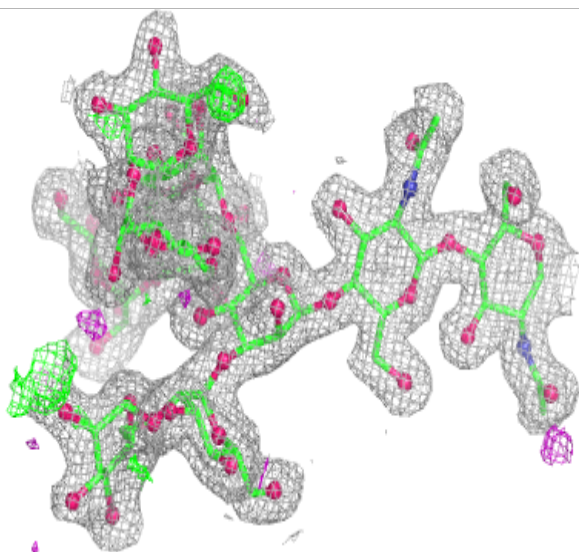
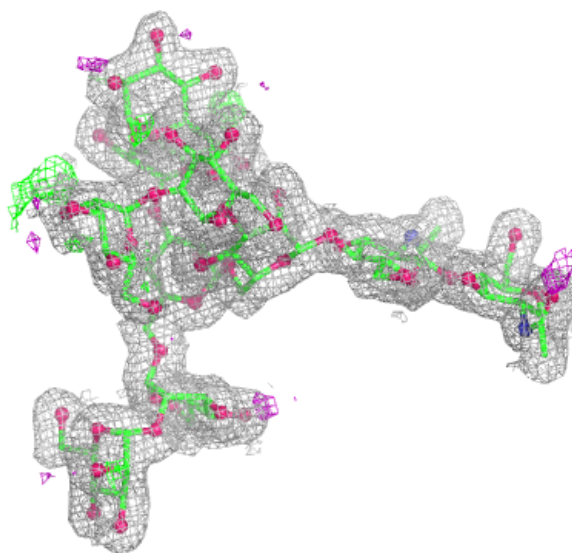
Electron density around Chain F:

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



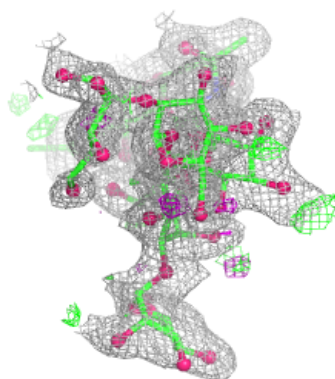
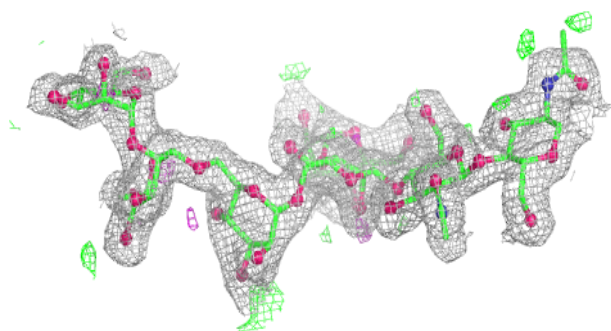
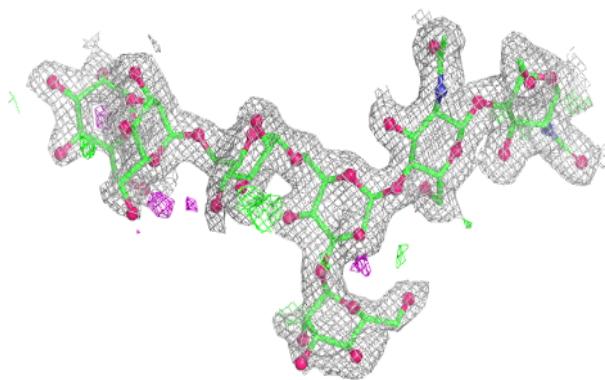
Electron density around Chain M:

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

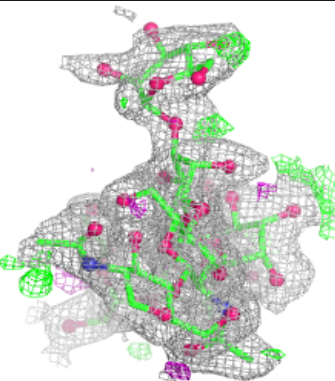
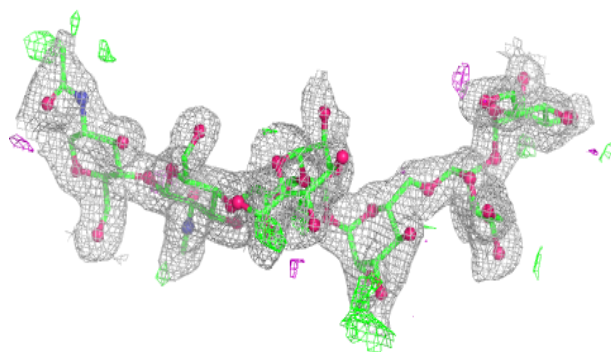
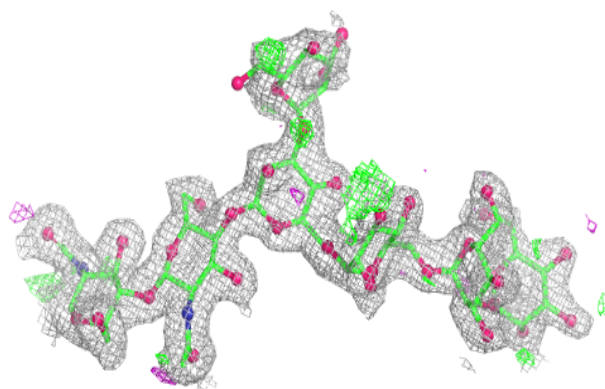


Electron density around Chain H:

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

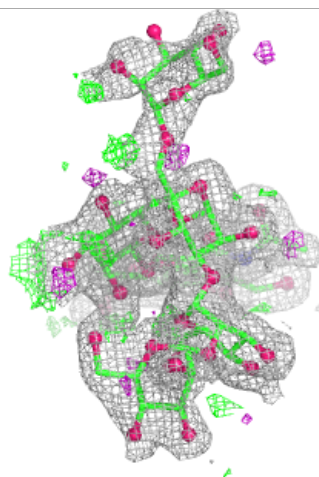
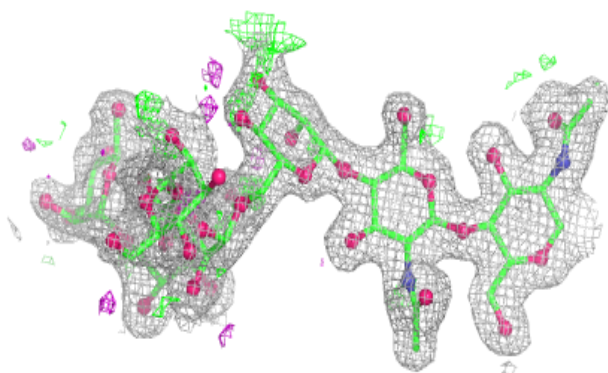
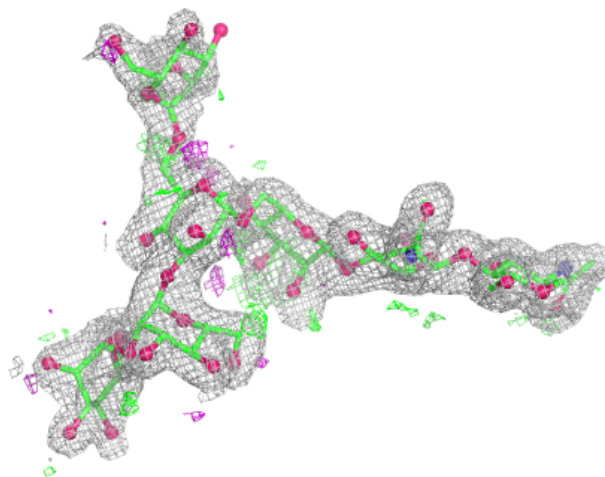
**Electron density around Chain O:**

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



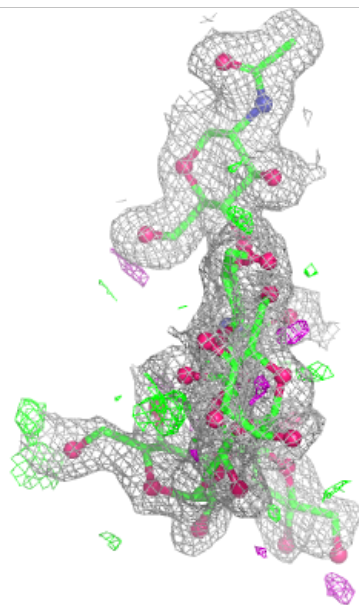
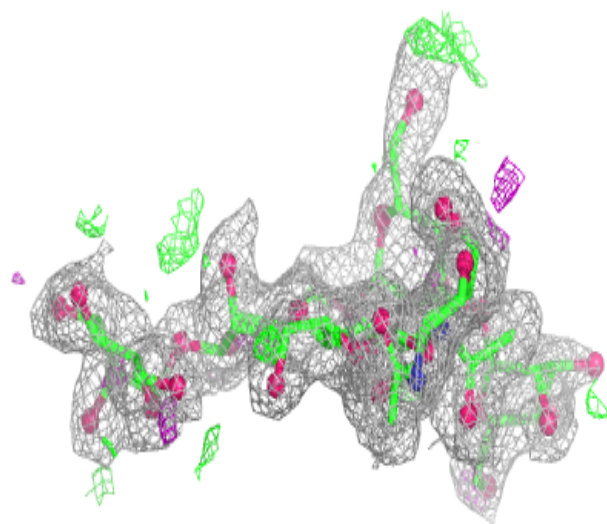
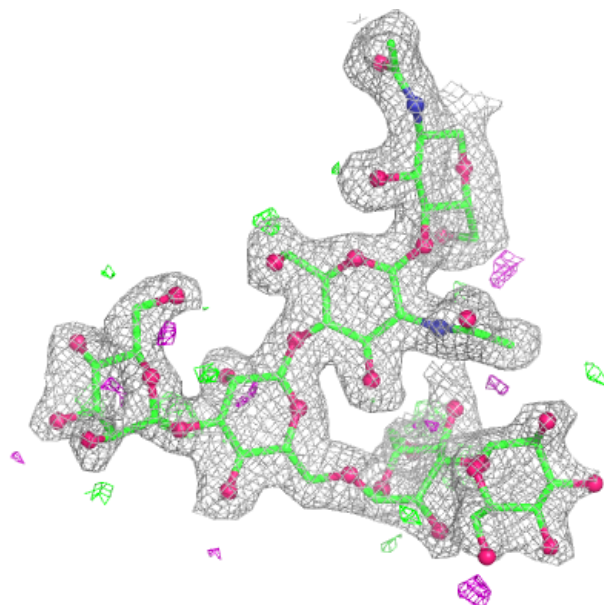
Electron density around Chain I:

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



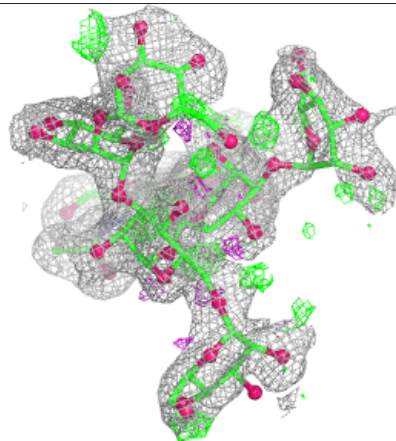
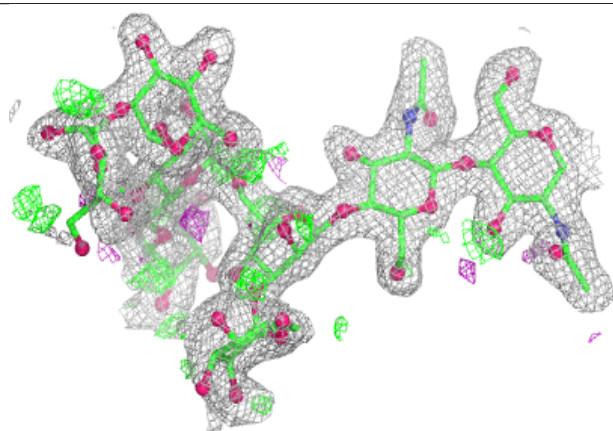
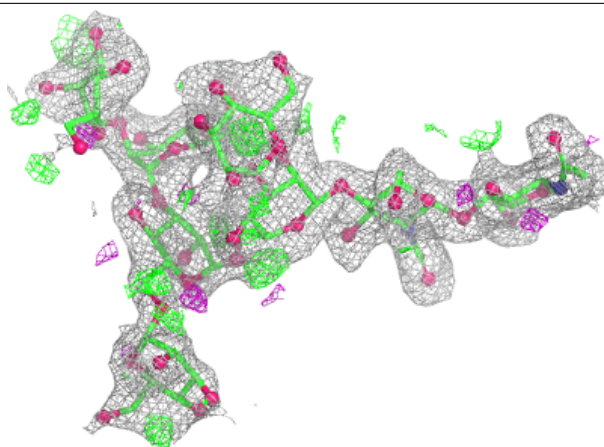
Electron density around Chain K:

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



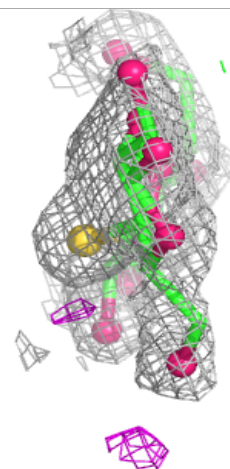
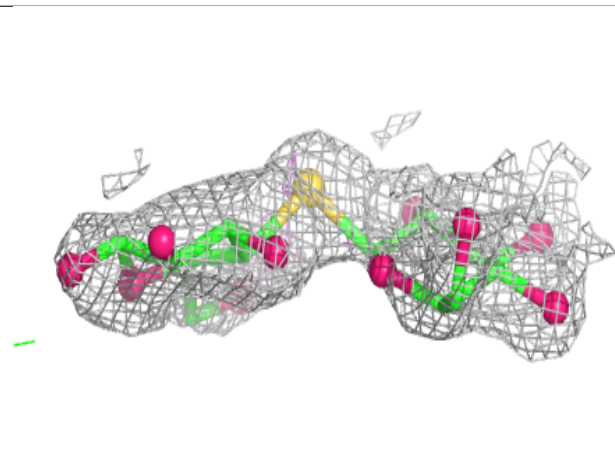
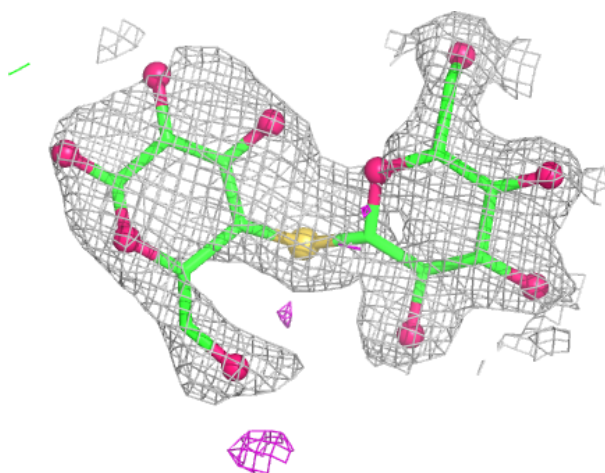
Electron density around Chain P:

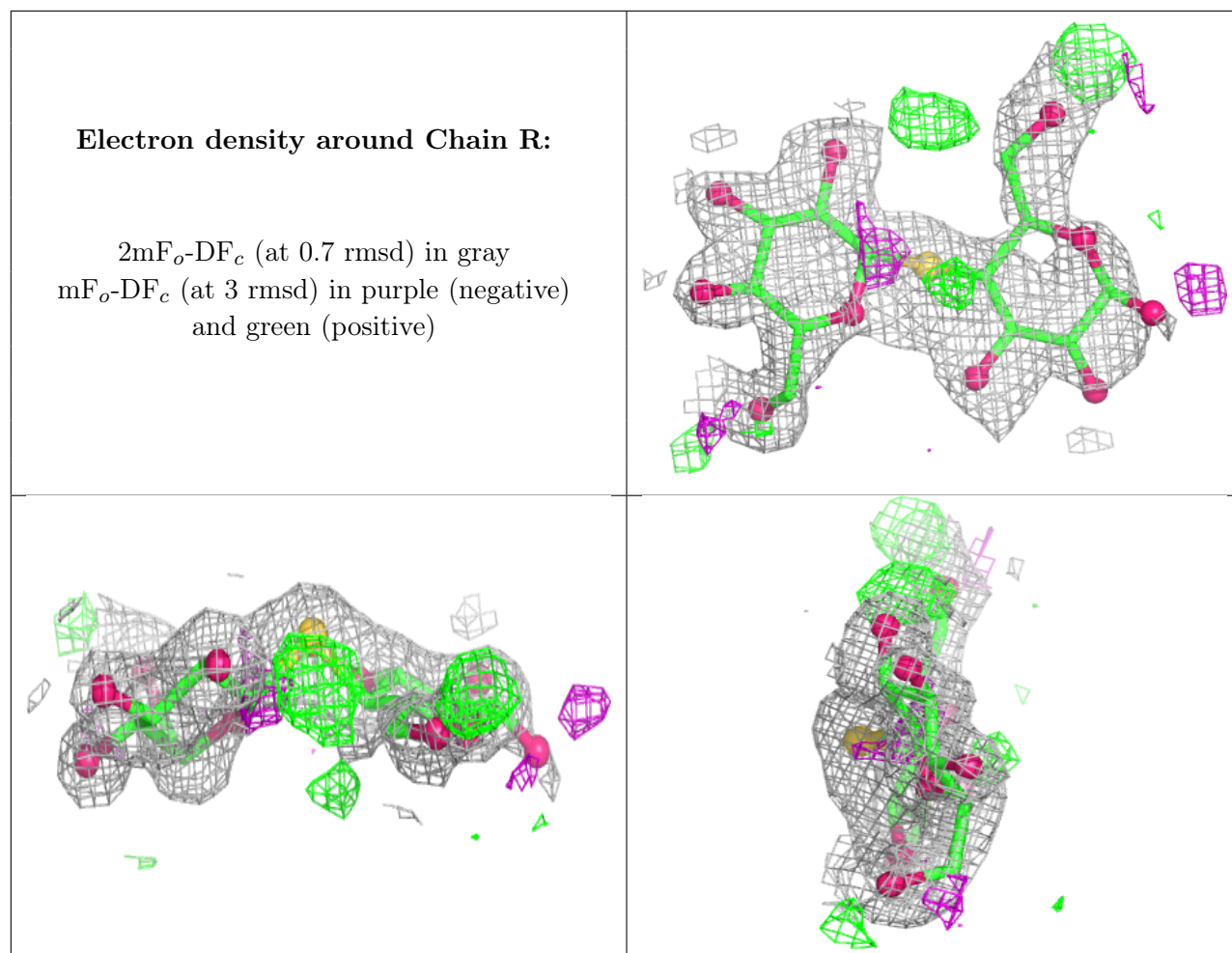
$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



Electron density around Chain Q:

$2mF_o-DF_c$ (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, 95th 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 ²)	Q<0.9
12	MRD	A	943	8/8	0.80	0.17	15,26,33,39	0
11	NAG	A	908	14/15	0.81	0.14	39,53,62,67	0
11	NAG	B	908	14/15	0.85	0.12	34,39,46,46	0
11	NAG	B	946	14/15	0.87	0.12	34,50,55,57	0
12	MRD	B	949	8/8	0.87	0.15	35,39,42,43	0
11	NAG	A	941	14/15	0.92	0.08	24,32,36,36	0
12	MRD	B	948	8/8	0.93	0.10	15,19,33,35	0
12	MRD	A	942	8/8	0.94	0.08	16,17,20,27	0
11	NAG	B	947	14/15	0.95	0.06	22,24,28,31	0

6.5 Other polymers [i](#)

There are no such residues in this entry.