



wwPDB X-ray Structure Validation Summary Report ⓘ

Mar 6, 2026 – 09:08 PM UTC

PDB ID : 6QP8 / pdb_00006qp8
Title : Drosophila Semaphorin 2b
Authors : Robinson, R.A.; Rozbesky, D.; Harlos, K.; Siebold, C.; Jones, E.Y.
Deposited on : 2019-02-13
Resolution : 2.33 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

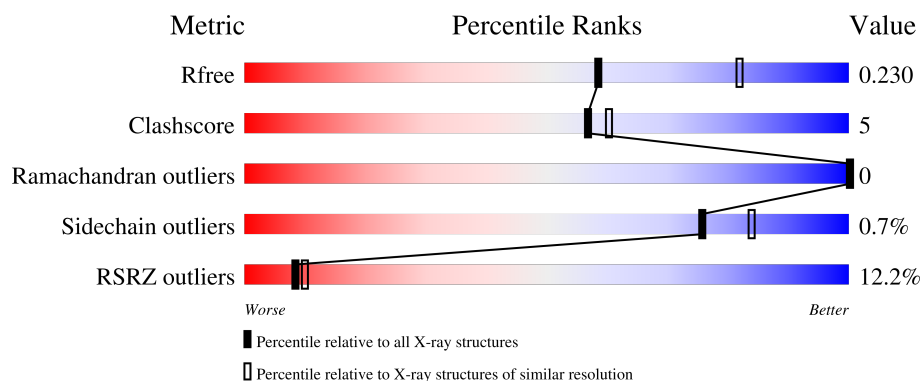
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.33 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	3031 (2.36-2.32)
Clashscore	190562	3127 (2.36-2.32)
Ramachandran outliers	187476	3095 (2.36-2.32)
Sidechain outliers	187428	3095 (2.36-2.32)
RSRZ outliers	180081	3033 (2.36-2.32)

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	657	10% 84% 10% 5%
1	B	657	13% 84% 10% 6%
2	C	2	100%
2	D	2	100%
2	I	2	100%

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Mol	Chain	Length	Quality of chain
2	J	2	100%
3	E	5	60% 40%
4	F	9	33% 67%
5	G	6	50% 50%
6	H	4	75% 25%
6	K	4	75% 25%
7	L	8	12% 62% 25%
8	M	4	25% 75%
9	N	3	67% 33%

2 Entry composition

There are 13 unique types of molecules in this entry. The entry contains 11335 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 IP13724p.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	622	Total	C	N	O	S	0	0	0
			4974	3151	862	929	32			
1	B	620	Total	C	N	O	S	0	0	0
			4959	3142	858	927	32			

There are 24 discrepancies between the modelled and reference sequences:

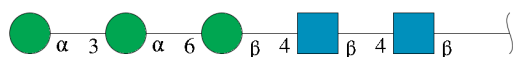
Chain	Residue	Modelled	Actual	Comment	Reference
A	32	GLU	-	expression tag	UNP Q29QV5
A	33	THR	-	expression tag	UNP Q29QV5
A	34	GLY	-	expression tag	UNP Q29QV5
A	680	GLY	-	expression tag	UNP Q29QV5
A	681	THR	-	expression tag	UNP Q29QV5
A	682	LYS	-	expression tag	UNP Q29QV5
A	683	HIS	-	expression tag	UNP Q29QV5
A	684	HIS	-	expression tag	UNP Q29QV5
A	685	HIS	-	expression tag	UNP Q29QV5
A	686	HIS	-	expression tag	UNP Q29QV5
A	687	HIS	-	expression tag	UNP Q29QV5
A	688	HIS	-	expression tag	UNP Q29QV5
B	32	GLU	-	expression tag	UNP Q29QV5
B	33	THR	-	expression tag	UNP Q29QV5
B	34	GLY	-	expression tag	UNP Q29QV5
B	680	GLY	-	expression tag	UNP Q29QV5
B	681	THR	-	expression tag	UNP Q29QV5
B	682	LYS	-	expression tag	UNP Q29QV5
B	683	HIS	-	expression tag	UNP Q29QV5
B	684	HIS	-	expression tag	UNP Q29QV5
B	685	HIS	-	expression tag	UNP Q29QV5
B	686	HIS	-	expression tag	UNP Q29QV5
B	687	HIS	-	expression tag	UNP Q29QV5
B	688	HIS	-	expression tag	UNP Q29QV5

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



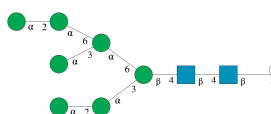
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
2	C	2	Total	C	N	O	0	0	0
			28	16	2	10			
2	D	2	Total	C	N	O	0	0	0
			28	16	2	10			
2	I	2	Total	C	N	O	0	0	0
			28	16	2	10			
2	J	2	Total	C	N	O	0	0	0
			28	16	2	10			

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



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
3	E	5	Total	C	N	O	0	0	0
			61	34	2	25			

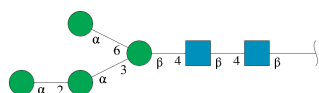
- Molecule 4 is an oligosaccharide called alpha-D-mannopyranose-(1-2)-alpha-D-mannopyranose-(1-6)-[alpha-D-mannopyranose-(1-3)]alpha-D-mannopyranose-(1-6)-[alpha-D-mannopyranose-(1-2)-alpha-D-mannopyranose-(1-3)]beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
4	F	9	Total	C	N	O	0	0	0
			105	58	2	45			

- Molecule 5 is an oligosaccharide called 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.



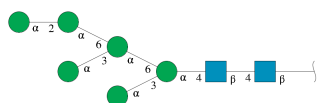
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
5	G	6	Total	C	N	O	0	0	0
			72	40	2	30			

- Molecule 6 is an oligosaccharide called 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.



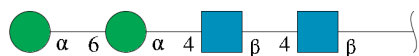
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
6	H	4	Total	C	N	O	0	0	0
			50	28	2	20			
6	K	4	Total	C	N	O	0	0	0
			50	28	2	20			

- Molecule 7 is an oligosaccharide called alpha-D-mannopyranose-(1-2)-alpha-D-mannopyranose-(1-6)-[alpha-D-mannopyranose-(1-3)]alpha-D-mannopyranose-(1-6)-[alpha-D-mannopyranose-(1-3)]alpha-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.



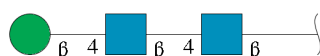
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
7	L	8	Total	C	N	O	0	0	0
			94	52	2	40			

- Molecule 8 is an oligosaccharide called alpha-D-mannopyranose-(1-6)-alpha-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.



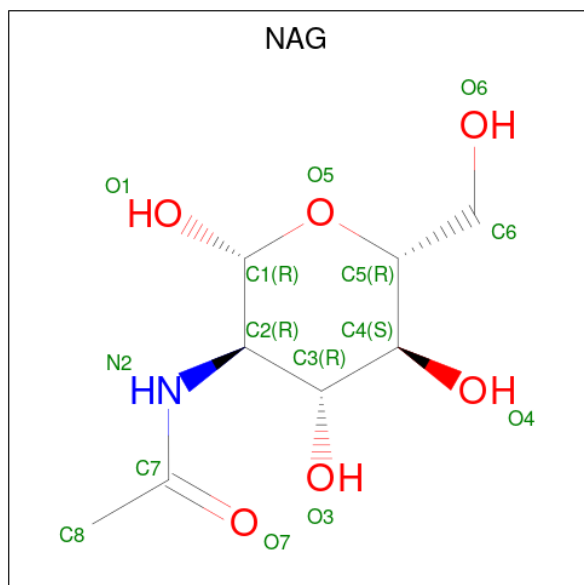
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
8	M	4	Total	C	N	O	0	0	0
			50	28	2	20			

- Molecule 9 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.



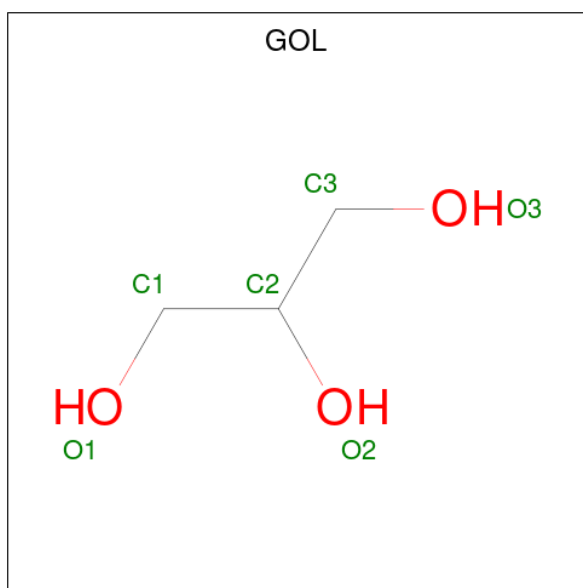
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
9	N	3	Total	C	N	O	0	0	0
			39	22	2	15			

- Molecule 10 is 2-acetamido-2-deoxy-beta-D-glucopyranose (CCD ID: NAG) (formula: $C_8H_{15}NO_6$).



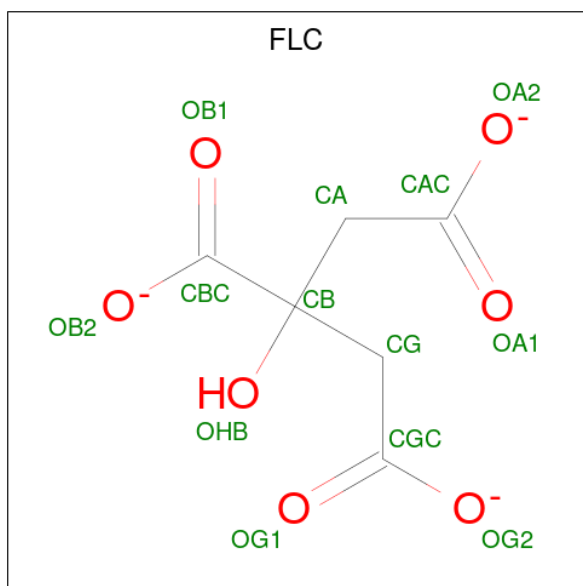
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
10	A	1	Total	C	N	O	0	0
			14	8	1	5		
10	B	1	Total	C	N	O	0	0
			14	8	1	5		

- Molecule 11 is GLYCEROL (CCD ID: GOL) (formula: $C_3H_8O_3$).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
11	A	1	Total	C	O	0	0
			6	3	3		
11	B	1	Total	C	O	0	0
			6	3	3		
11	B	1	Total	C	O	0	0
			6	3	3		

- Molecule 12 is CITRATE ANION (CCD ID: FLC) (formula: $C_6H_5O_7$).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
12	B	1	Total	C	O	0	0
			13	6	7		

- Molecule 13 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
13	A	357	Total	O	0	0
			357	357		
13	B	353	Total	O	0	0
			353	353		

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

Chain C:  100%

WAG1
WAG2

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

Chain D:  100%

WAG1
WAG2

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

Chain I:  100%

WAG1
WAG2

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

Chain J:  100%

WAG1
WAG2

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

Chain E:  60% 40%

WAG1
WAG2
BMA3
MAN4
MAN5

- Molecule 4: alpha-D-mannopyranose-(1-2)-alpha-D-mannopyranose-(1-6)-[alpha-D-mannopyranose-(1-3)]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

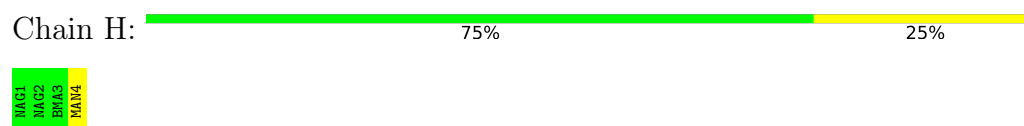
Chain F:  33% 67%

WAG1
WAG2
BMA3
MAN4
MAN5
MAN6
MAN7
MAN8
MAN9

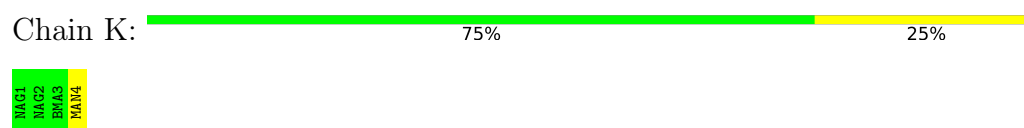
- Molecule 5: alpha-D-mannopyranose-(1-2)-alpha-D-mannopyranose-(1-3)-[alpha-D-mannopyranose-(1-6)]beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose



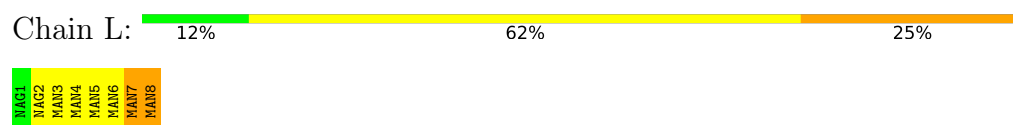
- Molecule 6: alpha-D-mannopyranose-(1-6)-beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose



- Molecule 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



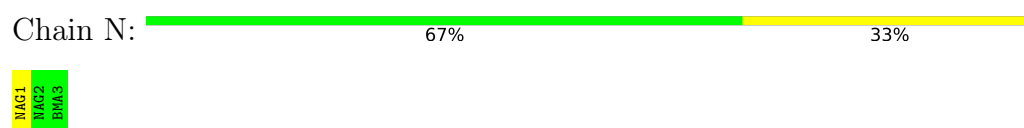
- Molecule 7: alpha-D-mannopyranose-(1-2)-alpha-D-mannopyranose-(1-6)-[alpha-D-mannopyranose-(1-3)]alpha-D-mannopyranose-(1-6)-[alpha-D-mannopyranose-(1-3)]alpha-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose



- Molecule 8: alpha-D-mannopyranose-(1-6)-alpha-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose



- Molecule 9: beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose



4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	107.99Å 145.58Å 152.20Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	65.67 – 2.33 65.67 – 2.33	Depositor EDS
% Data completeness (in resolution range)	98.4 (65.67-2.33) 98.4 (65.67-2.33)	Depositor EDS
R_{merge}	0.18	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.55 (at 2.32Å)	Xtriage
Refinement program	PHENIX (dev_3386: ???)	Depositor
R, R_{free}	0.195 , 0.228 0.199 , 0.230	Depositor DCC
R_{free} test set	5076 reflections (4.93%)	wwPDB-VP
Wilson B-factor (Å ²)	40.7	Xtriage
Anisotropy	0.304	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.33 , 47.2	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	0.001 for -h,l,k	Xtriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	11335	wwPDB-VP
Average B, all atoms (Å ²)	57.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.16% 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

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: MAN, GOL, NAG, FLC, BMA

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	0.14	0/5095	0.36	0/6902
1	B	0.12	0/5079	0.35	0/6880
All	All	0.13	0/10174	0.35	0/13782

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts

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	4974	0	4815	49	0
1	B	4959	0	4803	44	0
2	C	28	0	25	0	0
2	D	28	0	25	0	0
2	I	28	0	25	0	0
2	J	28	0	25	0	0
3	E	61	0	52	0	0
4	F	105	0	88	0	0
5	G	72	0	61	0	0
6	H	50	0	43	0	0
6	K	50	0	43	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
7	L	94	0	79	2	0
8	M	50	0	43	1	0
9	N	39	0	34	1	0
10	A	14	0	13	0	0
10	B	14	0	13	0	0
11	A	6	0	8	1	0
11	B	12	0	16	0	0
12	B	13	0	5	0	0
13	A	357	0	0	14	1
13	B	353	0	0	20	1
All	All	11335	0	10216	95	1

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 5.

The worst 5 of 95 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:B:312:TRP:O	13:B:802:HOH:O	1.89	0.89
1:B:456:ARG:NH1	13:B:805:HOH:O	2.06	0.87
1:B:151:LYS:O	13:B:803:HOH:O	2.00	0.79
1:A:134:GLU:N	13:A:804:HOH:O	2.15	0.79
1:A:220:ALA:O	13:A:801:HOH:O	2.01	0.78

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

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
13:A:1045:HOH:O	13:B:1061:HOH:O[2_675]	2.05	0.15

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	618/657 (94%)	594 (96%)	24 (4%)	0	100	100
1	B	616/657 (94%)	594 (96%)	22 (4%)	0	100	100
All	All	1234/1314 (94%)	1188 (96%)	46 (4%)	0	100	100

There are no Ramachandran outliers to report.

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	549/580 (95%)	546 (100%)	3 (0%)	81	88
1	B	548/580 (94%)	543 (99%)	5 (1%)	70	80
All	All	1097/1160 (95%)	1089 (99%)	8 (1%)	76	84

5 of 8 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	B	590	TYR
1	B	433	HIS
1	B	165	TYR
1	B	40	ASN
1	B	247	LYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 9 such sidechains are listed below:

Mol	Chain	Res	Type
1	B	481	GLN
1	B	616	HIS
1	A	523	HIS
1	B	40	ASN
1	B	63	HIS

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 ⓘ

51 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	0.30	0	17,19,21	0.48	0
2	NAG	C	2	2	14,14,15	0.25	0	17,19,21	0.41	0
2	NAG	D	1	1,2	14,14,15	0.42	0	17,19,21	0.50	0
2	NAG	D	2	2	14,14,15	0.28	0	17,19,21	0.41	0
3	NAG	E	1	3,1	14,14,15	0.19	0	17,19,21	0.40	0
3	NAG	E	2	3	14,14,15	0.21	0	17,19,21	0.39	0
3	BMA	E	3	3	11,11,12	0.68	0	15,15,17	0.69	0
3	MAN	E	4	3	11,11,12	0.58	0	15,15,17	1.09	2 (13%)
3	MAN	E	5	3	11,11,12	0.59	0	15,15,17	1.00	2 (13%)
4	NAG	F	1	1,4	14,14,15	0.28	0	17,19,21	0.47	0
4	NAG	F	2	4	14,14,15	0.14	0	17,19,21	0.42	0
4	BMA	F	3	4	11,11,12	0.51	0	15,15,17	0.66	0
4	MAN	F	4	4	11,11,12	0.62	0	15,15,17	1.10	2 (13%)
4	MAN	F	5	4	11,11,12	0.75	0	15,15,17	0.96	2 (13%)
4	MAN	F	6	4	11,11,12	0.72	0	15,15,17	0.94	2 (13%)
4	MAN	F	7	4	11,11,12	0.78	0	15,15,17	0.97	2 (13%)
4	MAN	F	8	4	11,11,12	0.64	0	15,15,17	0.96	2 (13%)
4	MAN	F	9	4	11,11,12	0.65	0	15,15,17	1.02	2 (13%)
5	NAG	G	1	1,5	14,14,15	0.31	0	17,19,21	0.42	0
5	NAG	G	2	5	14,14,15	0.28	0	17,19,21	0.41	0
5	BMA	G	3	5	11,11,12	0.66	0	15,15,17	0.71	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
5	MAN	G	4	5	11,11,12	0.68	0	15,15,17	0.98	2 (13%)
5	MAN	G	5	5	11,11,12	0.71	0	15,15,17	0.96	2 (13%)
5	MAN	G	6	5	11,11,12	0.57	0	15,15,17	1.03	2 (13%)
6	NAG	H	1	1,6	14,14,15	0.23	0	17,19,21	0.59	0
6	NAG	H	2	6	14,14,15	0.22	0	17,19,21	0.59	0
6	BMA	H	3	6	11,11,12	0.59	0	15,15,17	0.72	0
6	MAN	H	4	6	11,11,12	0.70	0	15,15,17	1.00	2 (13%)
2	NAG	I	1	1,2	14,14,15	0.29	0	17,19,21	0.47	0
2	NAG	I	2	2	14,14,15	0.29	0	17,19,21	0.38	0
2	NAG	J	1	1,2	14,14,15	0.33	0	17,19,21	0.48	0
2	NAG	J	2	2	14,14,15	0.29	0	17,19,21	0.39	0
6	NAG	K	1	1,6	14,14,15	0.21	0	17,19,21	0.34	0
6	NAG	K	2	6	14,14,15	0.25	0	17,19,21	0.37	0
6	BMA	K	3	6	11,11,12	0.66	0	15,15,17	0.81	0
6	MAN	K	4	6	11,11,12	0.69	0	15,15,17	0.96	2 (13%)
7	NAG	L	1	7,1	14,14,15	0.33	0	17,19,21	0.43	0
7	NAG	L	2	7	14,14,15	0.57	1 (7%)	17,19,21	0.47	0
7	MAN	L	3	7	11,11,12	0.45	0	15,15,17	1.18	2 (13%)
7	MAN	L	4	7	11,11,12	0.82	1 (9%)	15,15,17	0.99	2 (13%)
7	MAN	L	5	7	11,11,12	0.71	0	15,15,17	0.91	1 (6%)
7	MAN	L	6	7	11,11,12	0.72	0	15,15,17	0.96	2 (13%)
7	MAN	L	7	7	11,11,12	0.71	0	15,15,17	1.03	2 (13%)
7	MAN	L	8	7	11,11,12	0.78	0	15,15,17	1.03	2 (13%)
8	NAG	M	1	1,8	14,14,15	0.40	0	17,19,21	0.38	0
8	NAG	M	2	8	14,14,15	0.29	0	17,19,21	0.36	0
8	MAN	M	3	8	11,11,12	0.74	0	15,15,17	0.94	2 (13%)
8	MAN	M	4	8	11,11,12	0.88	0	15,15,17	1.09	1 (6%)
9	NAG	N	1	1,9	14,14,15	0.34	0	17,19,21	0.47	0
9	NAG	N	2	9	14,14,15	0.24	0	17,19,21	0.40	0
9	BMA	N	3	9	11,11,12	0.69	0	15,15,17	0.70	0

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	NAG	C	1	1,2	-	0/6/23/26	0/1/1/1
2	NAG	C	2	2	-	2/6/23/26	0/1/1/1

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

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
7	MAN	L	7	7	-	2/2/19/22	0/1/1/1
7	MAN	L	8	7	-	1/2/19/22	0/1/1/1
8	NAG	M	1	1,8	-	0/6/23/26	0/1/1/1
8	NAG	M	2	8	-	2/6/23/26	0/1/1/1
8	MAN	M	3	8	-	2/2/19/22	0/1/1/1
8	MAN	M	4	8	-	2/2/19/22	0/1/1/1
9	NAG	N	1	1,9	-	0/6/23/26	0/1/1/1
9	NAG	N	2	9	-	0/6/23/26	0/1/1/1
9	BMA	N	3	9	-	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)
7	L	4	MAN	O5-C1	-2.20	1.40	1.43
7	L	2	NAG	O5-C1	-2.03	1.40	1.43

The worst 5 of 40 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
7	L	3	MAN	C1-O5-C5	3.22	116.50	112.19
3	E	4	MAN	C1-O5-C5	2.99	116.19	112.19
7	L	7	MAN	C1-O5-C5	2.76	115.88	112.19
4	F	9	MAN	C1-O5-C5	2.71	115.82	112.19
5	G	6	MAN	C1-O5-C5	2.67	115.77	112.19

There are no chirality outliers.

5 of 35 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
8	M	4	MAN	O5-C5-C6-O6
8	M	2	NAG	O5-C5-C6-O6
2	D	2	NAG	O5-C5-C6-O6
4	F	9	MAN	O5-C5-C6-O6
2	C	2	NAG	O5-C5-C6-O6

There are no ring outliers.

4 monomers are involved in 4 short contacts:

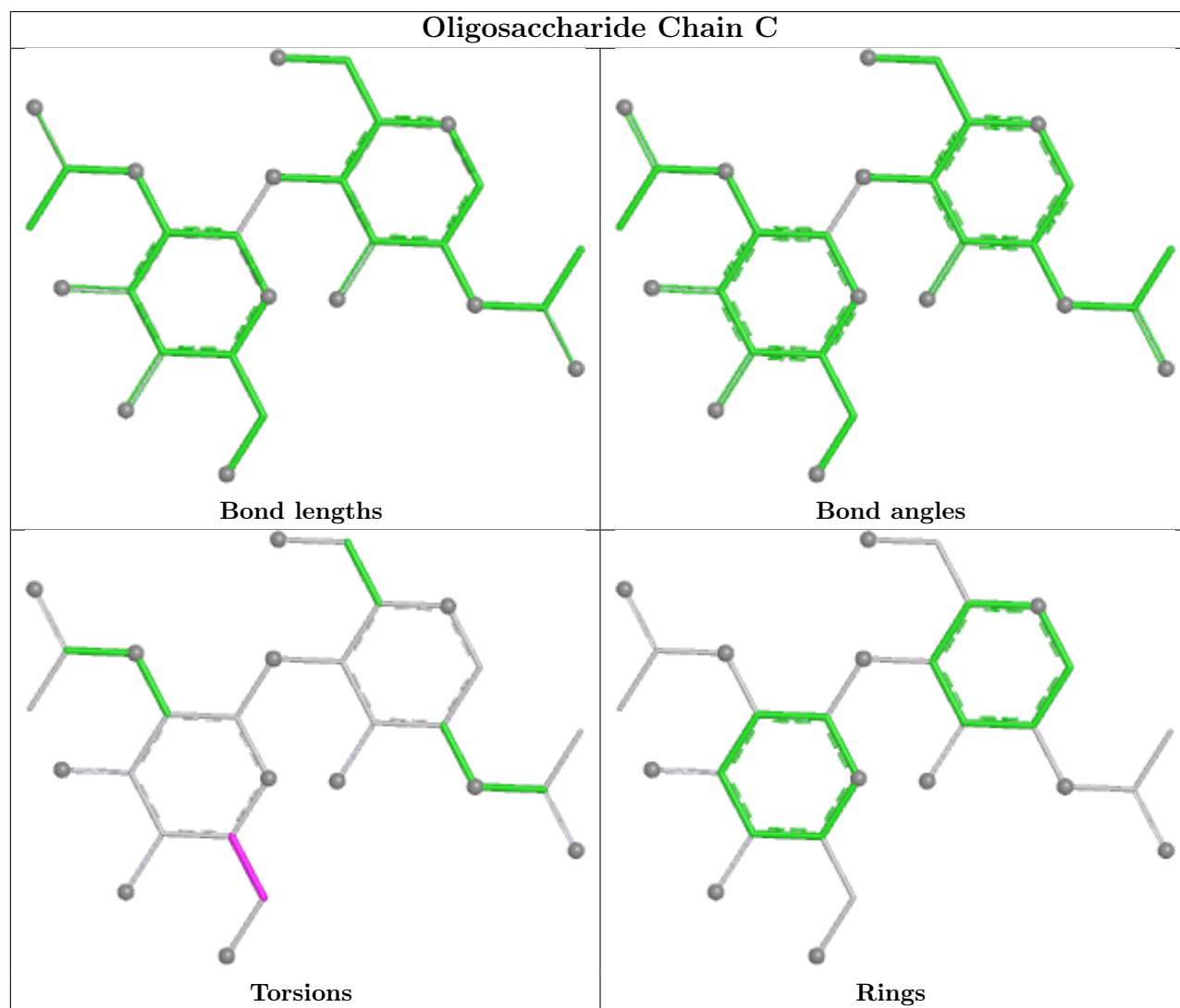
Mol	Chain	Res	Type	Clashes	Symm-Clashes
8	M	1	NAG	1	0

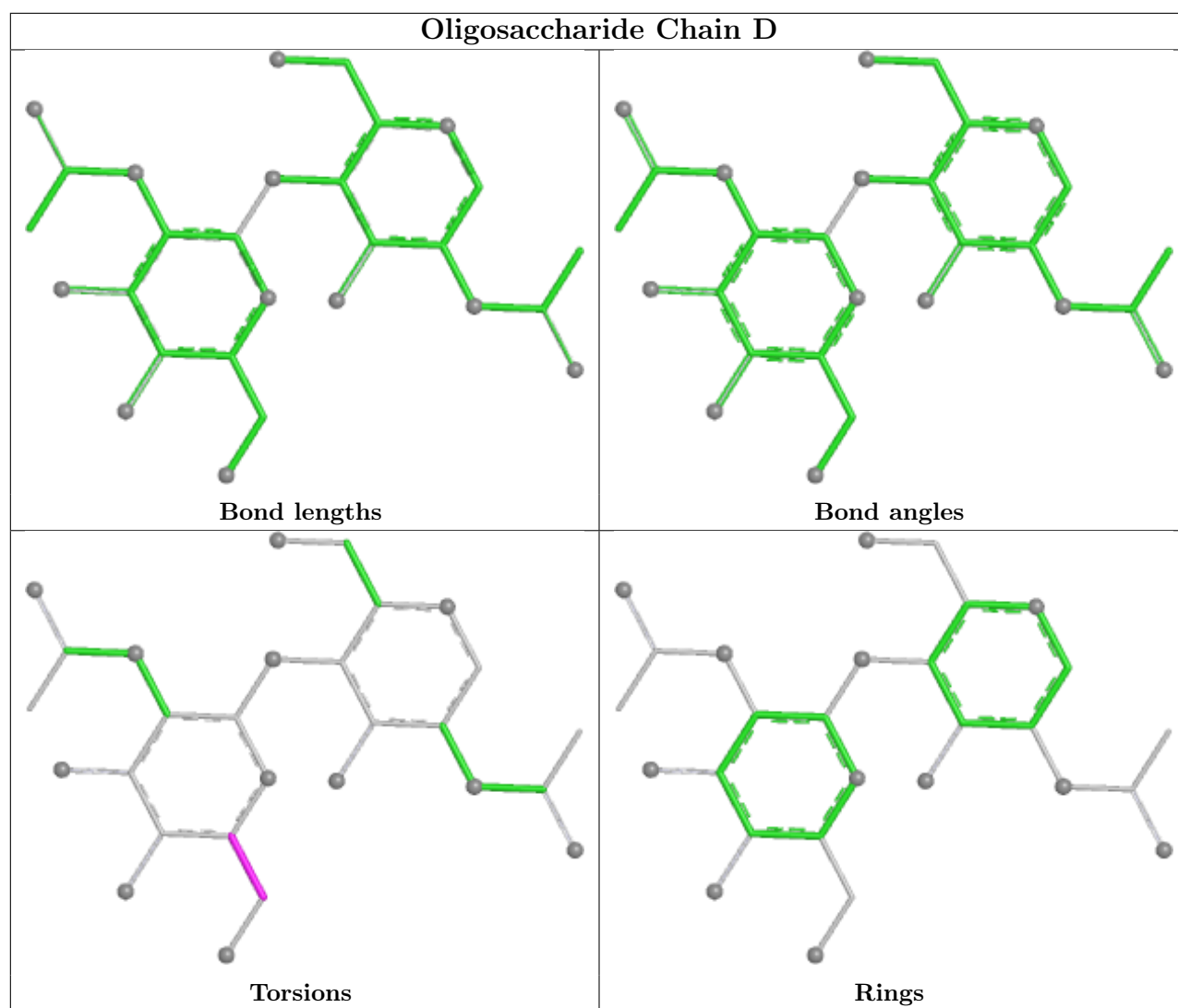
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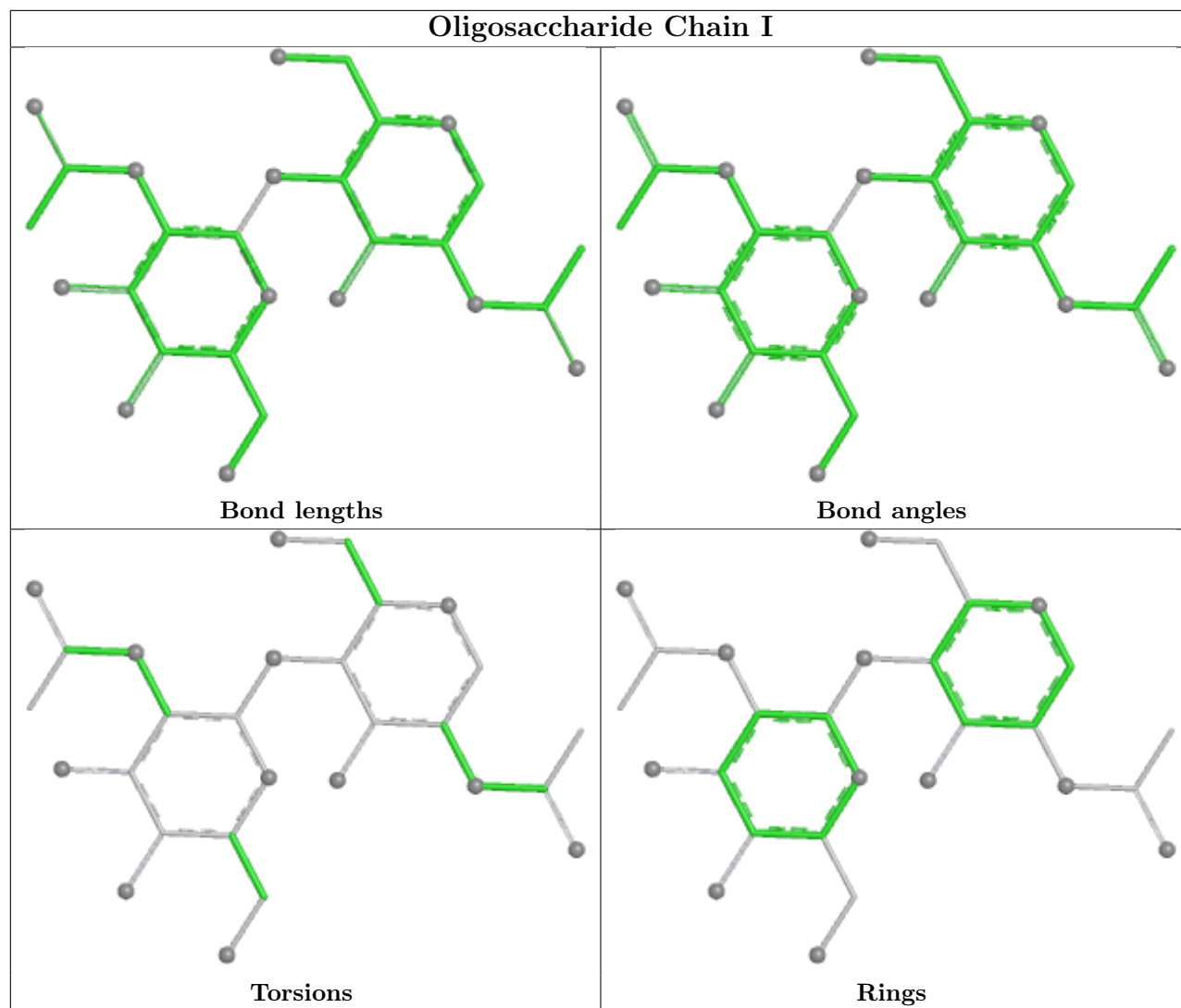
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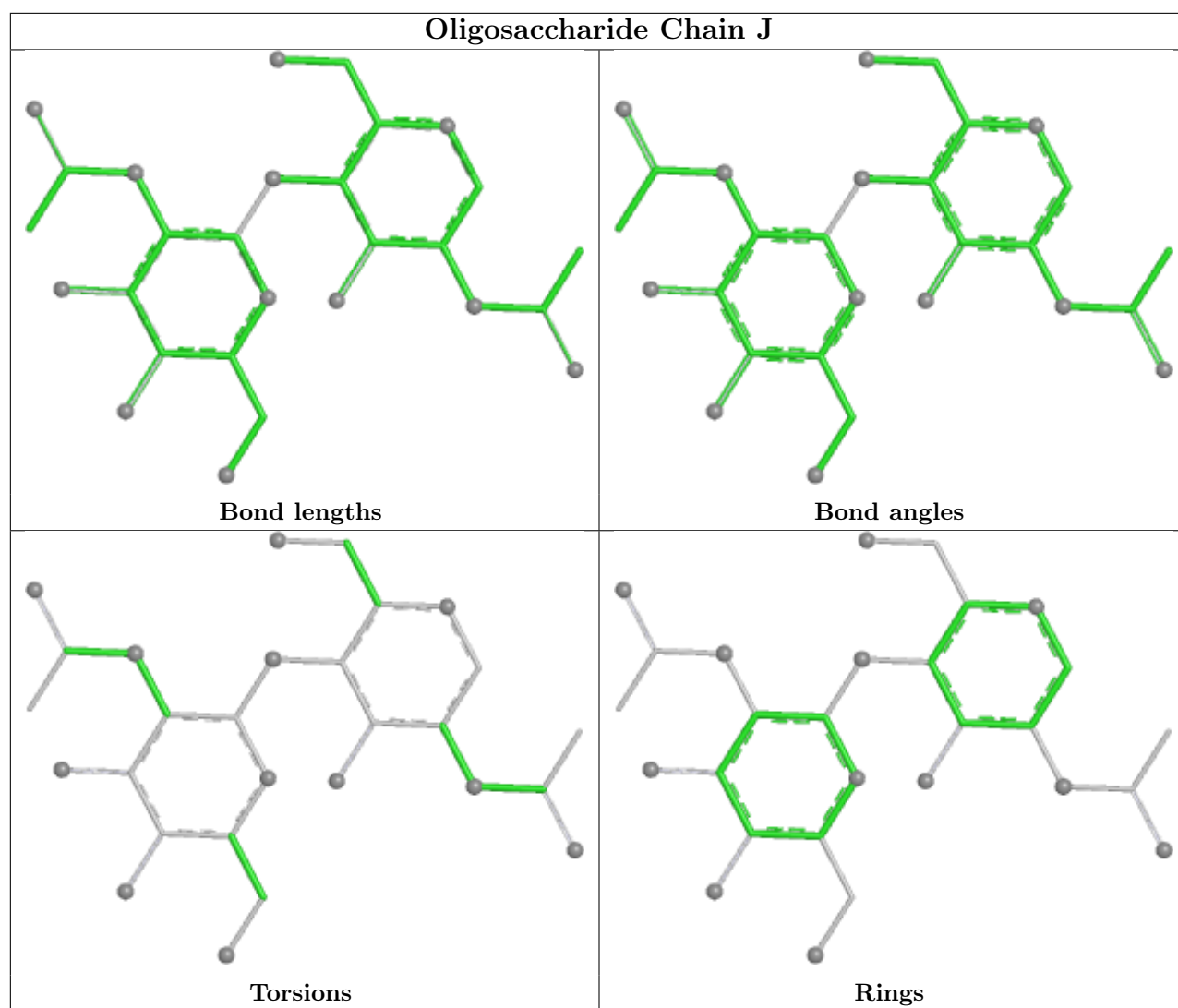
Mol	Chain	Res	Type	Clashes	Symm-Clashes
7	L	8	MAN	1	0
9	N	1	NAG	1	0
7	L	7	MAN	1	0

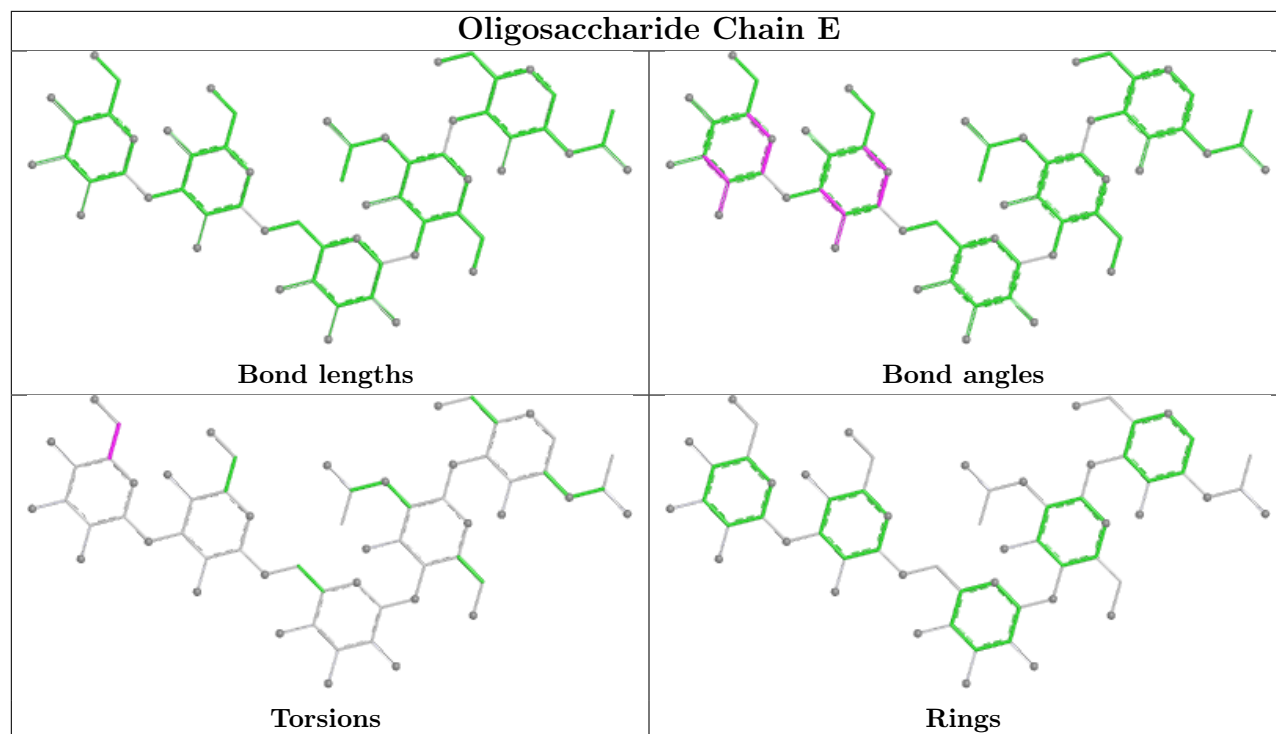
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for oligosaccharide.

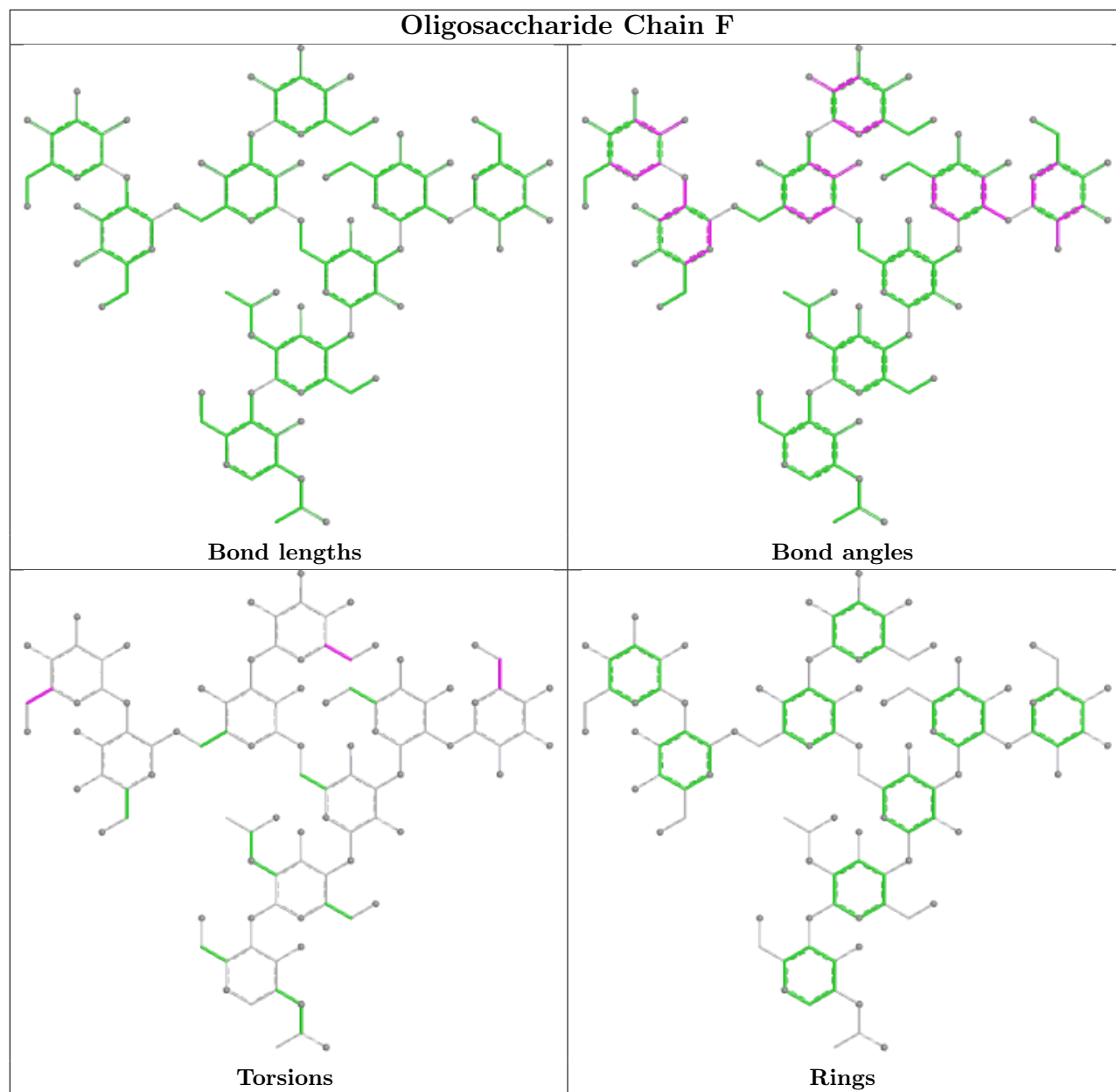


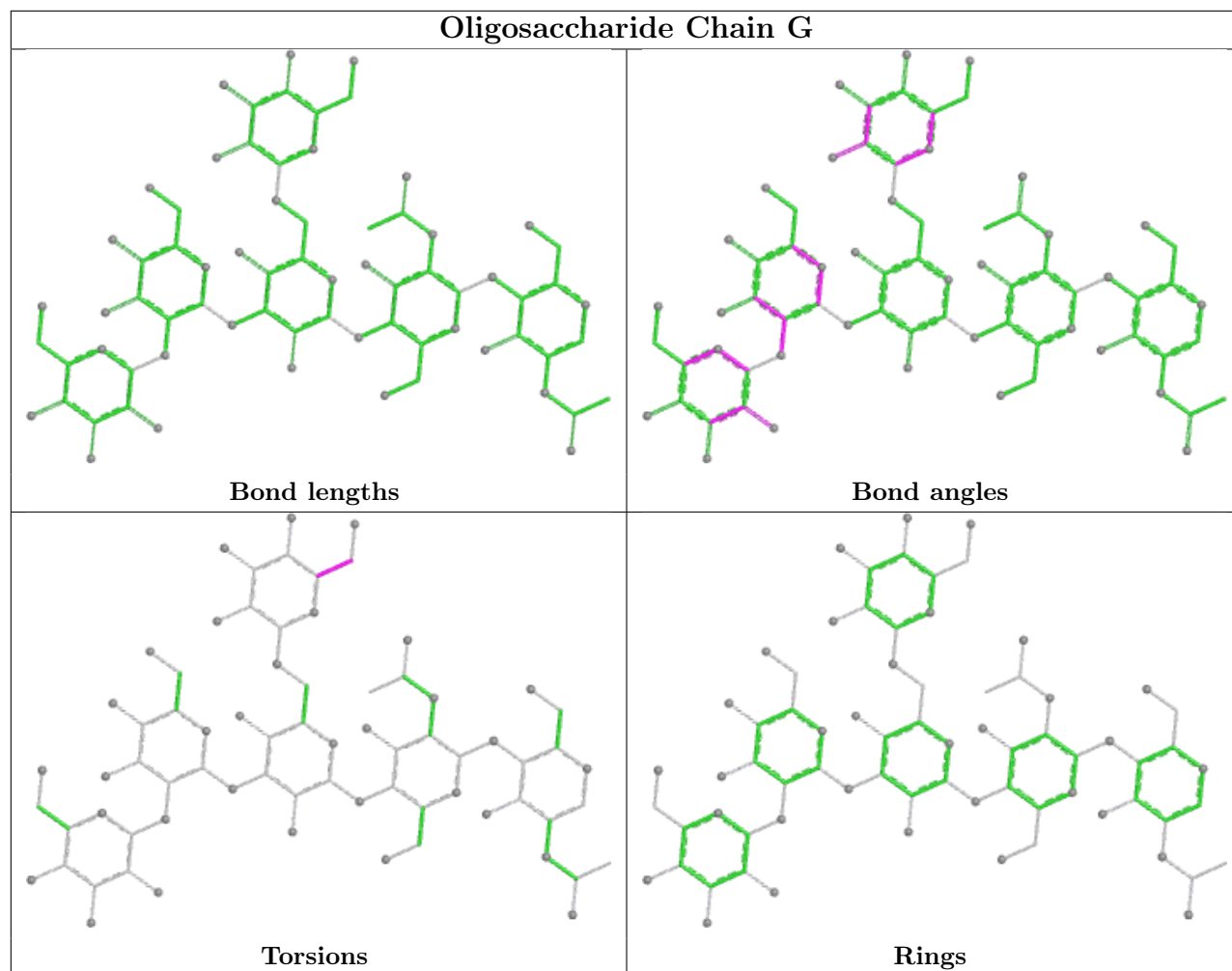


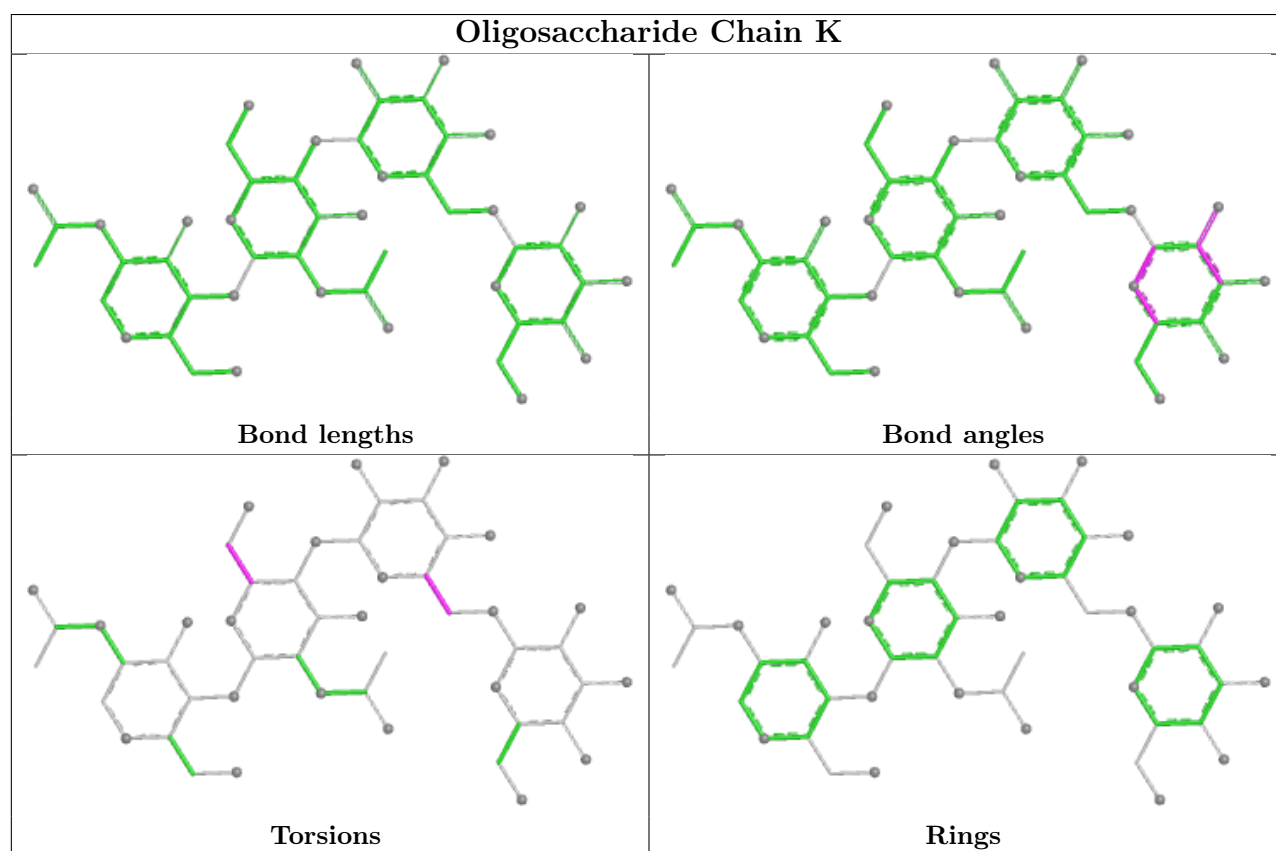
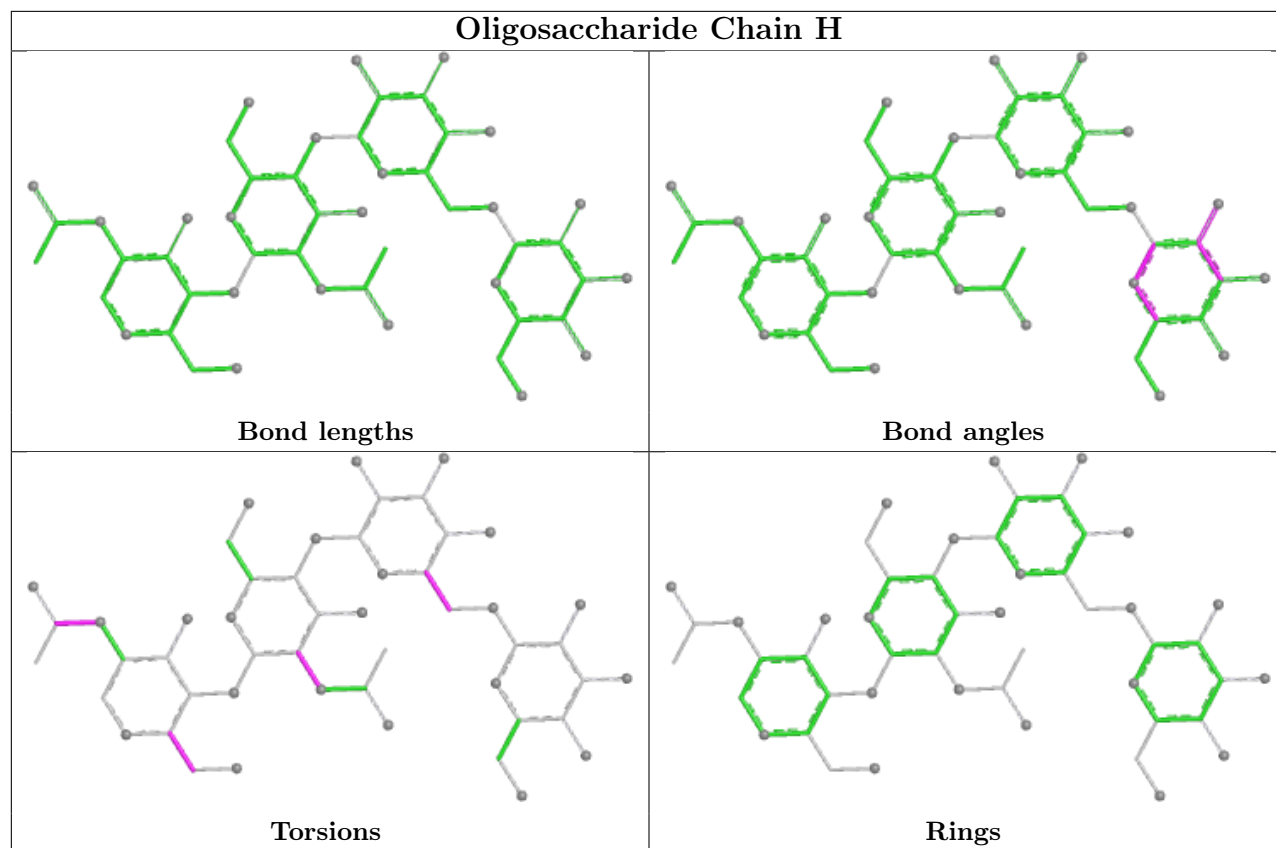


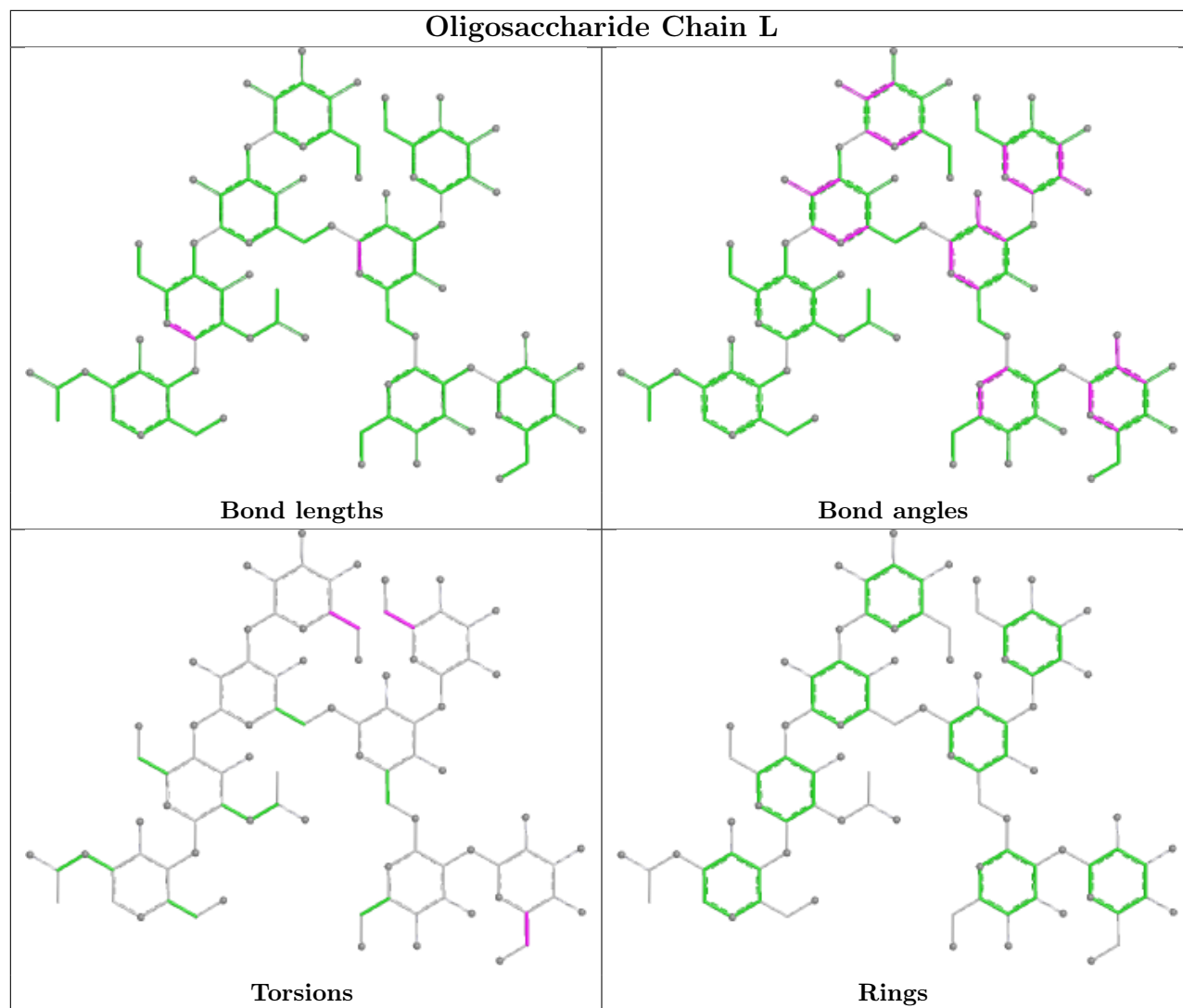


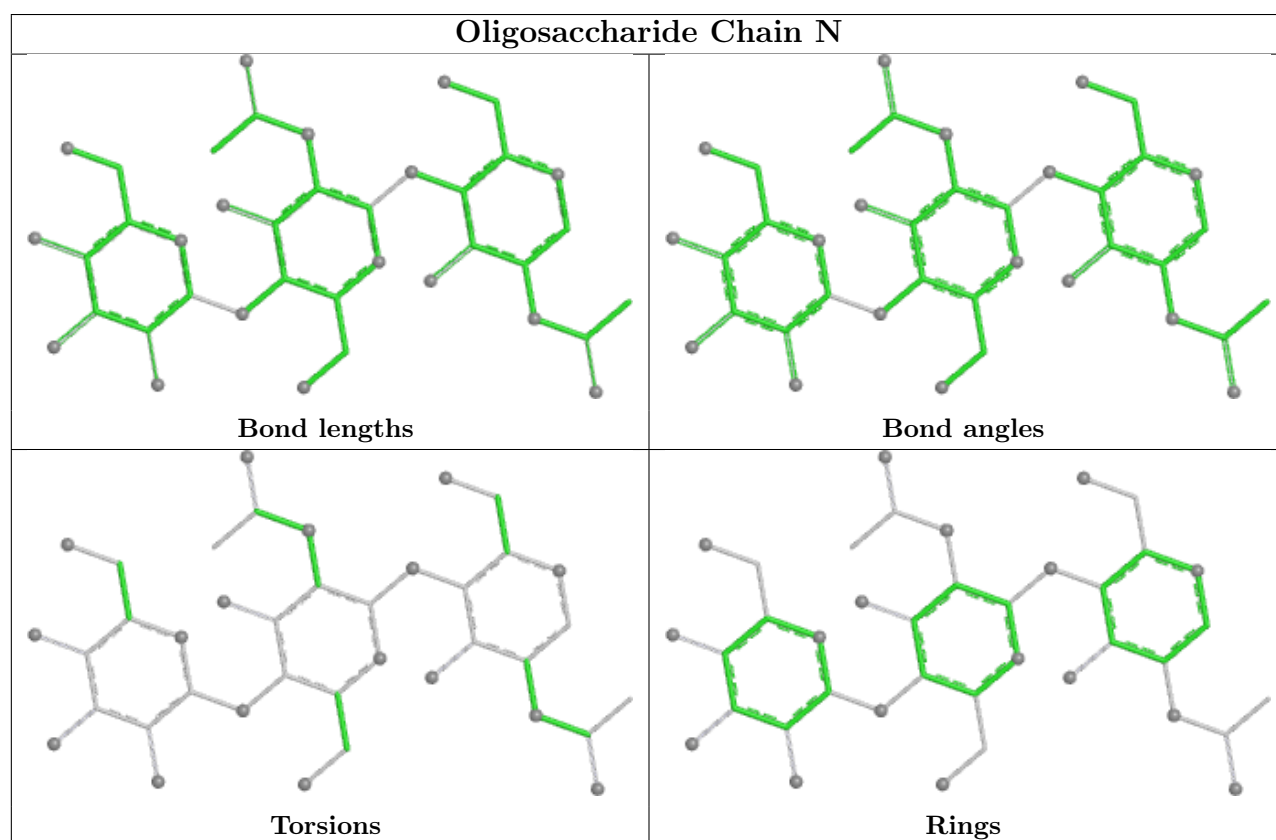
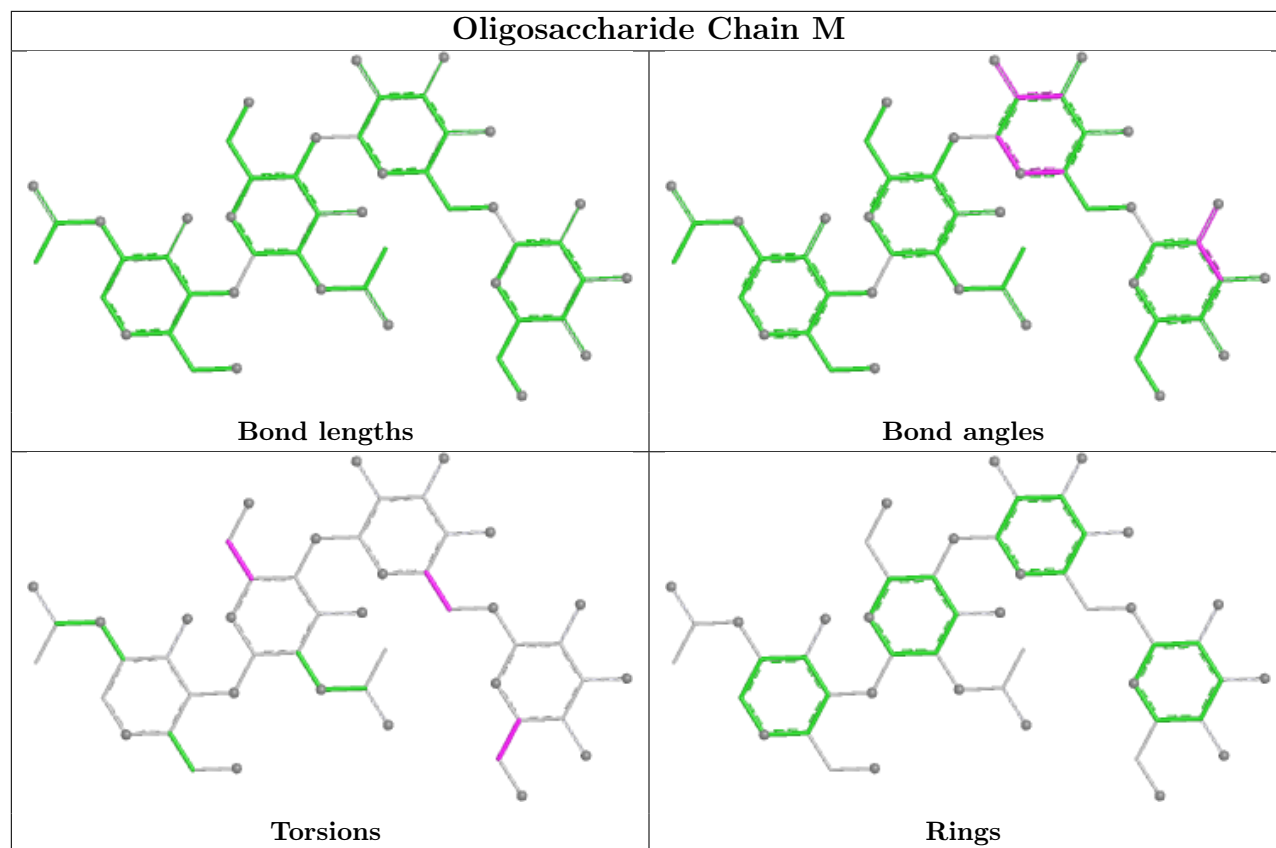












5.6 Ligand geometry

6 ligands are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# $ Z > 2$	Counts	RMSZ	# $ Z > 2$
11	GOL	A	730	-	5,5,5	0.84	0	5,5,5	1.14	1 (20%)
11	GOL	B	725	-	5,5,5	1.09	0	5,5,5	0.99	0
10	NAG	A	725	1	14,14,15	0.31	0	17,19,21	0.50	0
11	GOL	B	726	-	5,5,5	0.93	0	5,5,5	1.10	1 (20%)
10	NAG	B	721	1	14,14,15	0.19	0	17,19,21	0.44	0
12	FLC	B	727	-	12,12,12	1.08	0	17,17,17	1.39	2 (11%)

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	GOL	A	730	-	-	2/4/4/4	-
11	GOL	B	725	-	-	0/4/4/4	-
10	NAG	A	725	1	-	2/6/23/26	0/1/1/1
11	GOL	B	726	-	-	0/4/4/4	-
10	NAG	B	721	1	-	2/6/23/26	0/1/1/1
12	FLC	B	727	-	-	1/16/16/16	-

There are no bond length outliers.

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
12	B	727	FLC	OB2-CBC-CB	3.57	119.98	113.14
12	B	727	FLC	OG2-CGC-CG	2.16	121.17	114.35
11	A	730	GOL	C3-C2-C1	-2.11	104.05	111.80
11	B	726	GOL	C3-C2-C1	-2.03	104.34	111.80

There are no chirality outliers.

5 of 7 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
11	A	730	GOL	C1-C2-C3-O3
10	B	721	NAG	O5-C5-C6-O6
10	B	721	NAG	C4-C5-C6-O6
11	A	730	GOL	O2-C2-C3-O3
10	A	725	NAG	C4-C5-C6-O6

There are no ring outliers.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
11	A	730	GOL	1	0

5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

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

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

In the following table, the column labelled ‘#RSRZ> 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 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	622/657 (94%)	0.40	66 (10%) 11 13	27, 45, 112, 164	0
1	B	620/657 (94%)	0.48	85 (13%) 6 7	27, 48, 116, 158	0
All	All	1242/1314 (94%)	0.44	151 (12%) 8 10	27, 46, 112, 164	0

The worst 5 of 151 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	590	TYR	7.0
1	A	225	ALA	6.3
1	B	222	PHE	6.3
1	A	630	THR	6.2
1	B	587	THR	6.2

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

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

6.3 Carbohydrates [i](#)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 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	H	4	11/12	0.23	0.24	140,146,147,148	0
6	BMA	H	3	11/12	0.30	0.18	125,132,139,142	0
5	MAN	G	6	11/12	0.36	0.17	114,122,131,134	0
2	NAG	D	2	14/15	0.42	0.22	115,125,127,128	0
3	MAN	E	4	11/12	0.52	0.20	113,119,126,131	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
4	MAN	F	9	11/12	0.53	0.18	109,114,117,118	0
6	MAN	K	4	11/12	0.53	0.18	111,117,121,123	0
7	MAN	L	8	11/12	0.53	0.20	93,105,110,112	0
5	BMA	G	3	11/12	0.54	0.18	121,136,152,154	0
2	NAG	C	2	14/15	0.54	0.20	102,111,125,130	0
9	BMA	N	3	11/12	0.54	0.15	114,116,118,118	0
8	MAN	M	3	11/12	0.59	0.19	101,107,118,122	0
2	NAG	J	2	14/15	0.59	0.20	110,118,121,124	0
3	MAN	E	5	11/12	0.64	0.20	110,124,125,127	0
2	NAG	I	2	14/15	0.65	0.17	94,106,112,113	0
6	BMA	K	3	11/12	0.65	0.16	104,109,117,119	0
3	BMA	E	3	11/12	0.66	0.18	119,127,148,157	0
9	NAG	N	2	14/15	0.75	0.16	94,100,107,113	0
5	MAN	G	5	11/12	0.76	0.18	81,90,96,97	0
8	MAN	M	4	11/12	0.76	0.22	95,101,108,111	0
6	NAG	K	2	14/15	0.77	0.18	47,83,100,107	0
6	NAG	H	1	14/15	0.78	0.18	58,70,82,88	0
4	MAN	F	8	11/12	0.79	0.13	87,89,95,101	0
7	MAN	L	7	11/12	0.81	0.16	71,77,86,92	0
6	NAG	H	2	14/15	0.82	0.15	87,93,100,111	0
3	NAG	E	2	14/15	0.83	0.15	43,75,93,111	0
9	NAG	N	1	14/15	0.84	0.15	69,80,92,96	0
2	NAG	J	1	14/15	0.84	0.13	64,76,93,104	0
5	NAG	G	2	14/15	0.84	0.12	58,74,90,108	0
4	MAN	F	7	11/12	0.85	0.13	66,73,74,74	0
8	NAG	M	2	14/15	0.86	0.13	60,69,87,91	0
5	MAN	G	4	11/12	0.86	0.20	78,89,103,106	0
2	NAG	D	1	14/15	0.87	0.11	53,65,82,99	0
2	NAG	C	1	14/15	0.87	0.11	64,80,99,123	0
2	NAG	I	1	14/15	0.87	0.12	80,87,105,127	0
7	MAN	L	3	11/12	0.88	0.12	65,69,80,92	0
4	BMA	F	3	11/12	0.90	0.10	71,86,93,94	0
7	MAN	L	4	11/12	0.90	0.15	64,73,80,84	0
8	NAG	M	1	14/15	0.90	0.11	45,53,58,62	0
5	NAG	G	1	14/15	0.92	0.10	46,53,57,69	0
4	MAN	F	6	11/12	0.92	0.11	48,54,58,61	0
7	MAN	L	6	11/12	0.93	0.12	41,52,56,56	0
4	MAN	F	4	11/12	0.94	0.09	58,64,66,68	0
3	NAG	E	1	14/15	0.94	0.09	36,44,54,65	0
7	NAG	L	2	14/15	0.94	0.09	37,42,52,61	0
6	NAG	K	1	14/15	0.95	0.08	36,42,47,59	0
4	MAN	F	5	11/12	0.96	0.08	43,52,56,60	0

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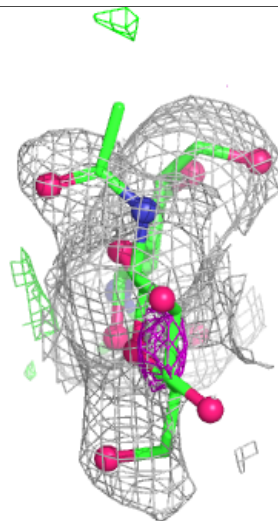
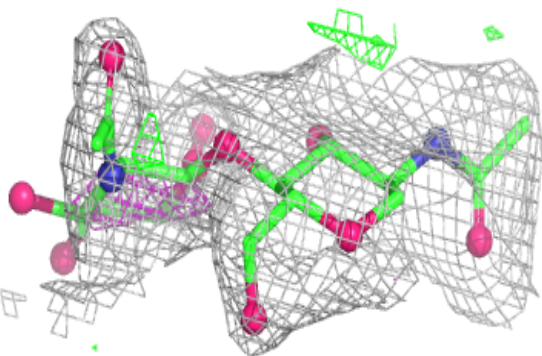
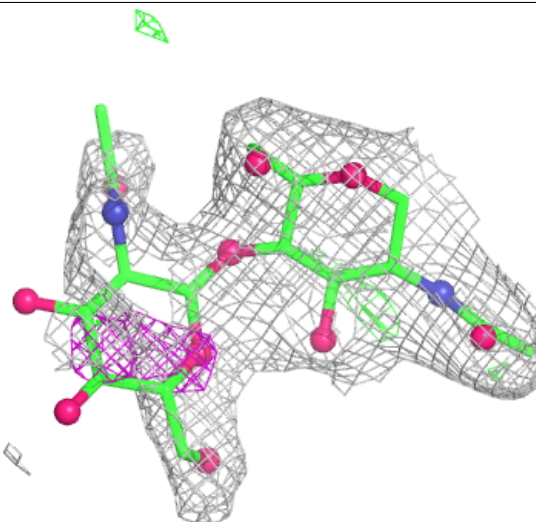
Continued from previous page...

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
7	MAN	L	5	11/12	0.96	0.07	33,47,51,54	0
7	NAG	L	1	14/15	0.96	0.07	23,33,36,37	0
4	NAG	F	1	14/15	0.97	0.06	24,33,40,46	0
4	NAG	F	2	14/15	0.97	0.07	39,44,50,62	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.

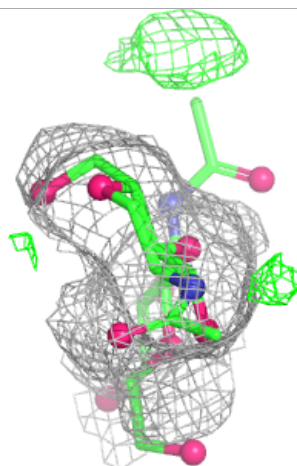
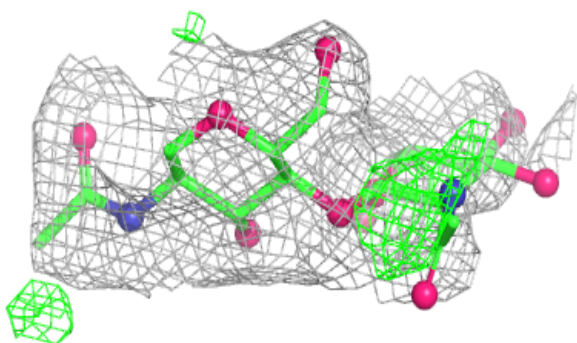
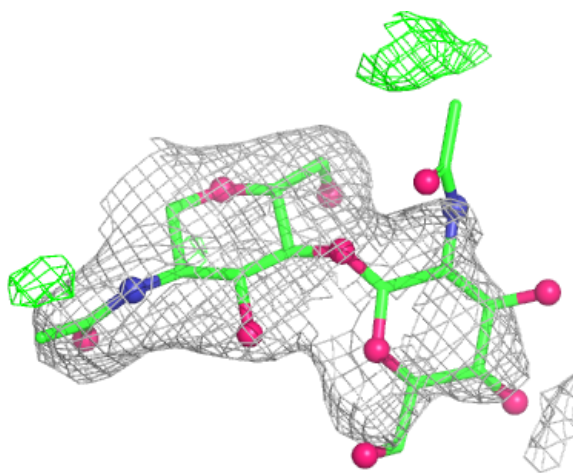
Electron density around Chain C:

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



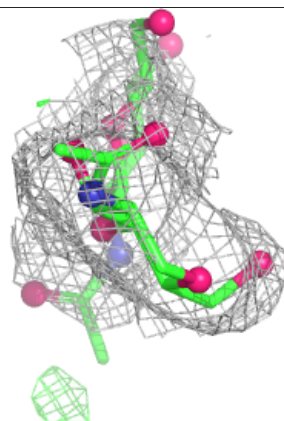
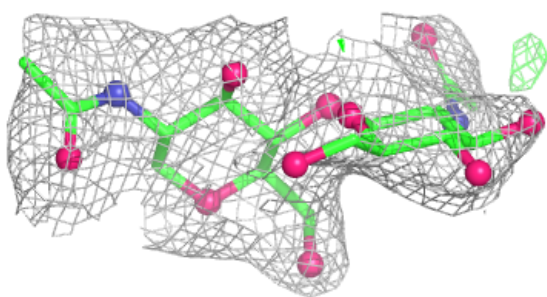
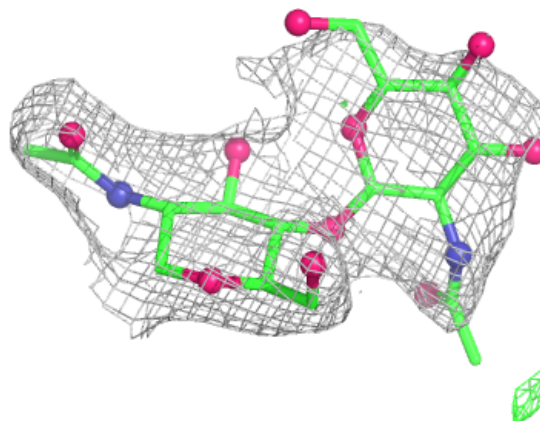
Electron density around Chain D:

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



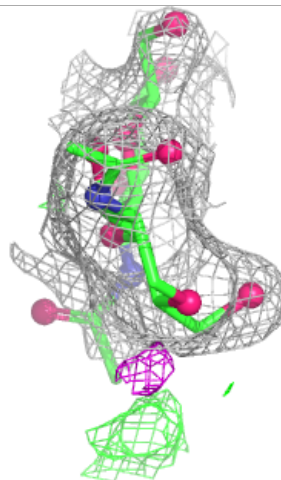
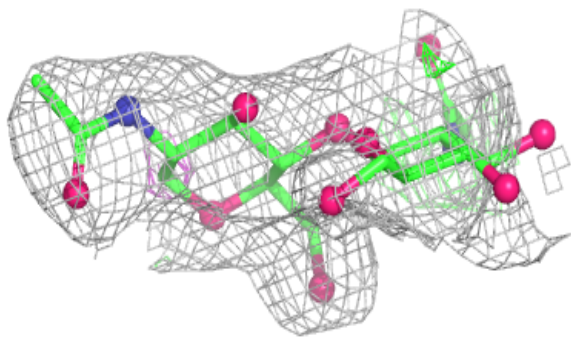
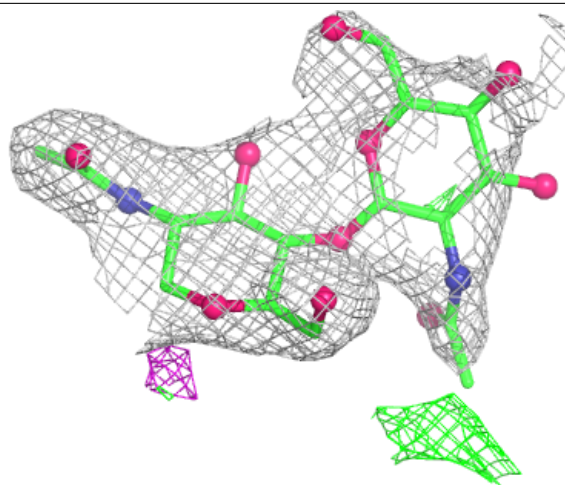
Electron density around Chain I:

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



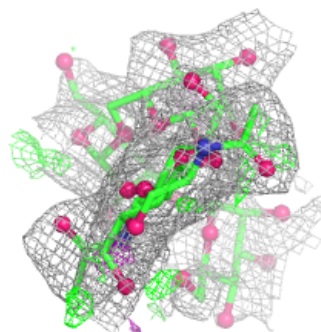
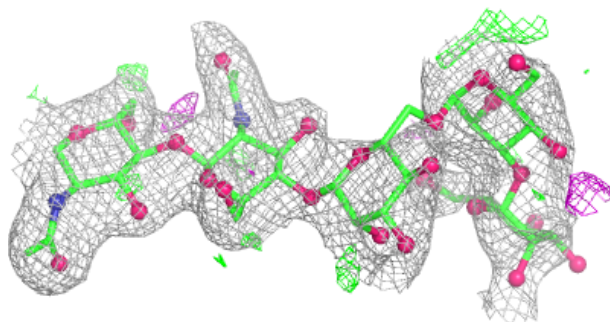
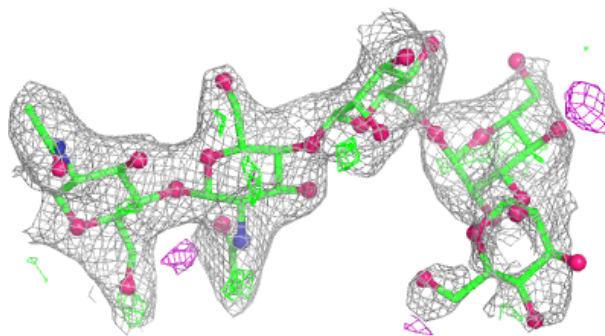
Electron density around Chain J:

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



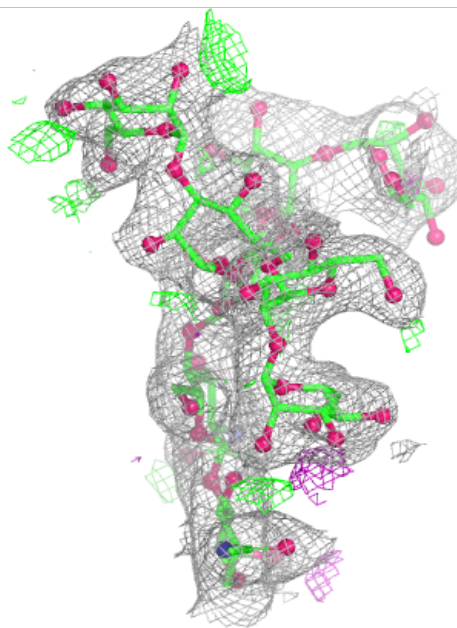
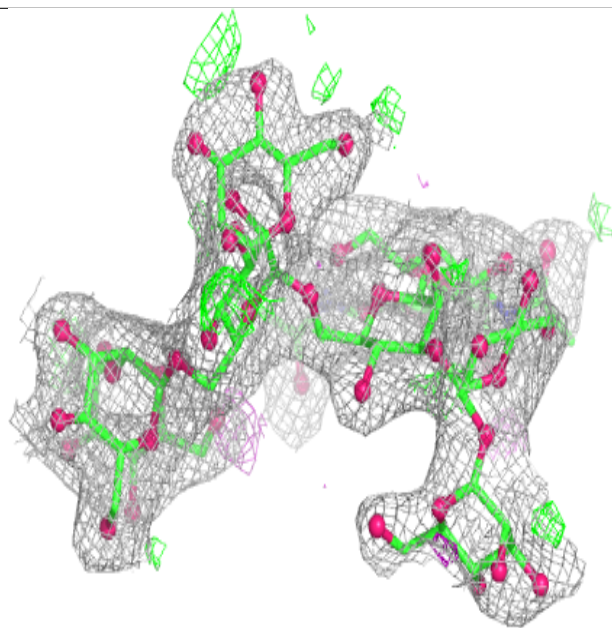
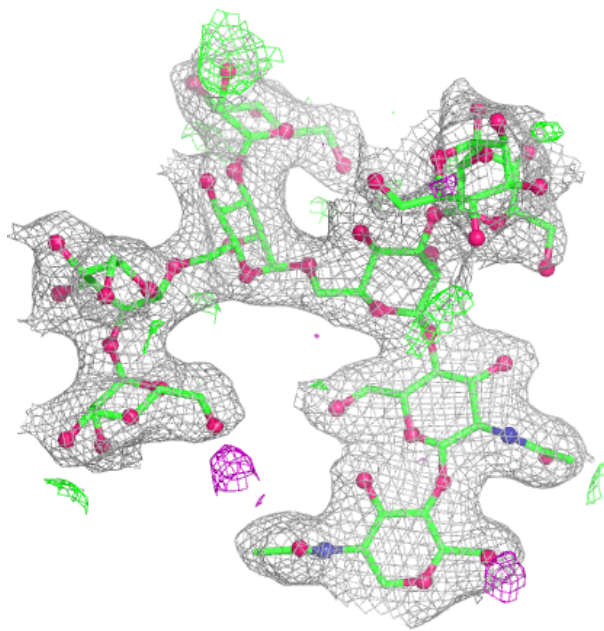
Electron density around Chain E:

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



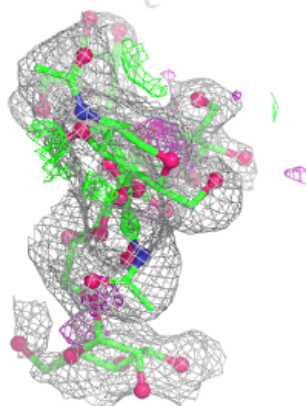
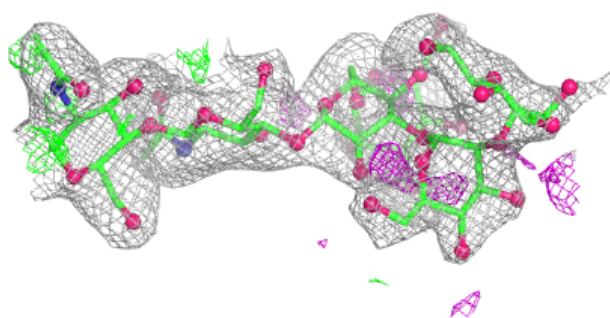
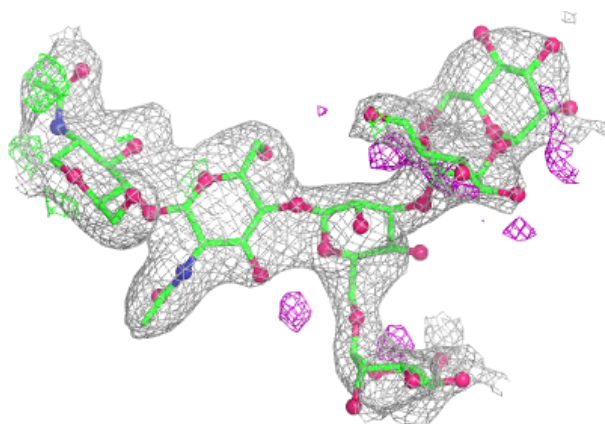
Electron density around Chain F:

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

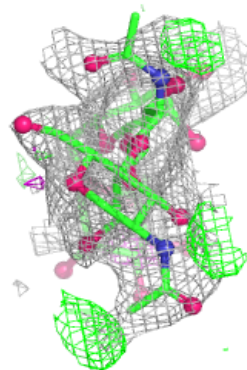
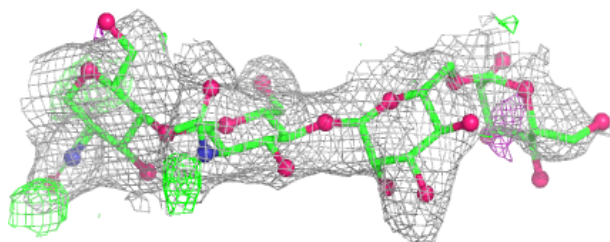
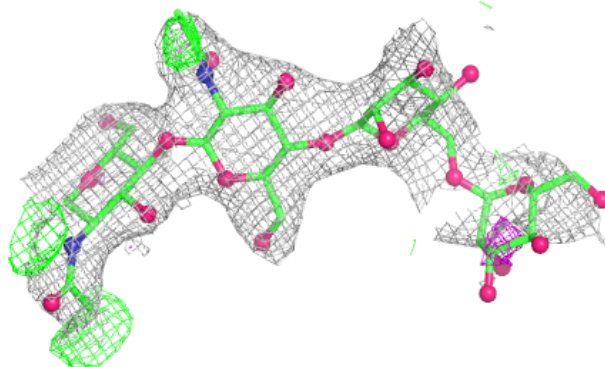


Electron density around Chain G:

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

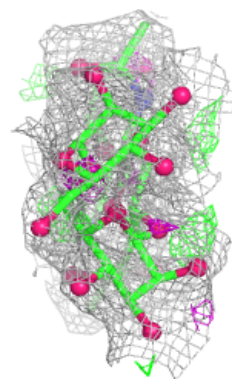
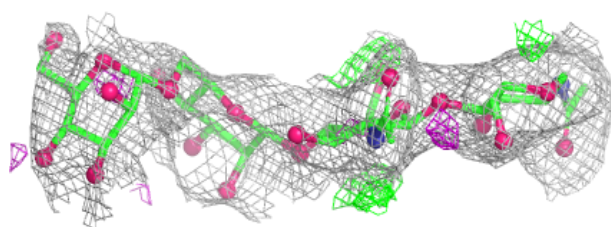
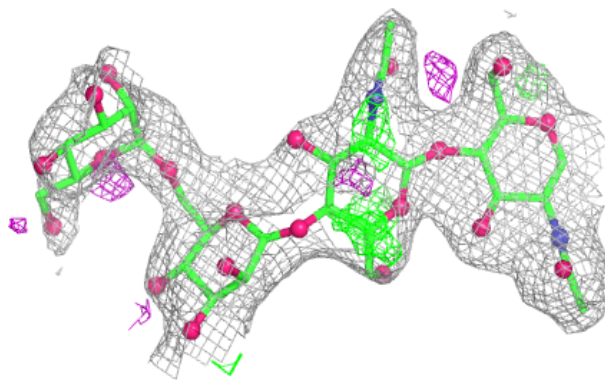
**Electron density around Chain H:**

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



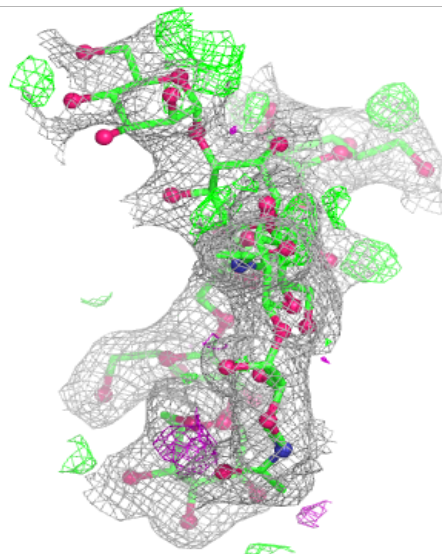
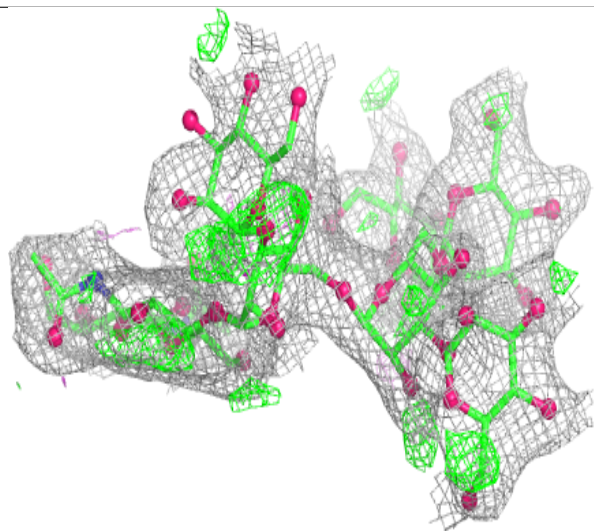
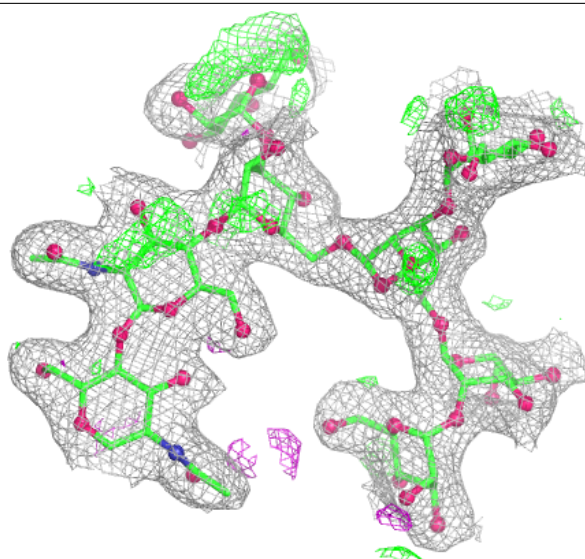
Electron density around Chain K:

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



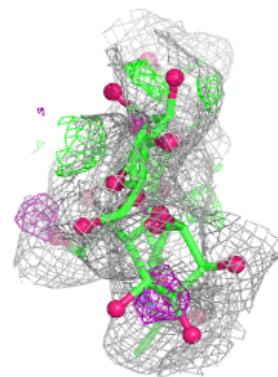
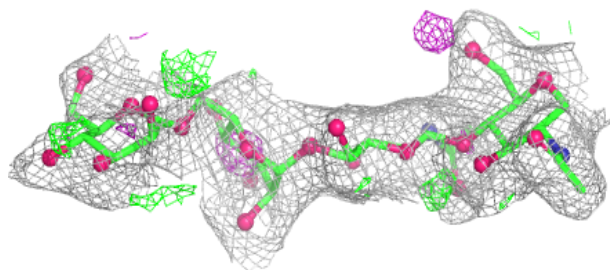
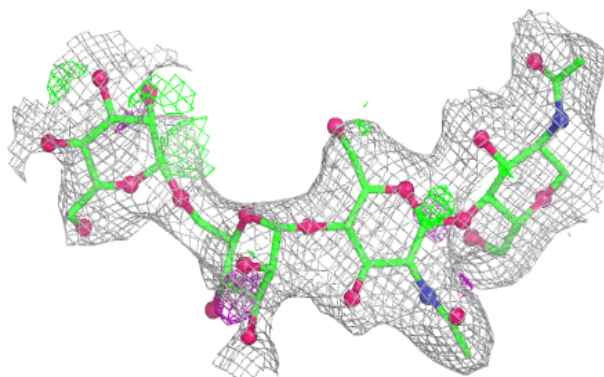
Electron density around Chain L:

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

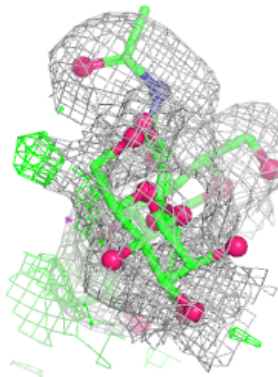
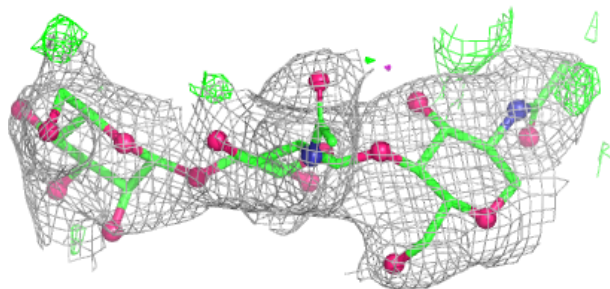
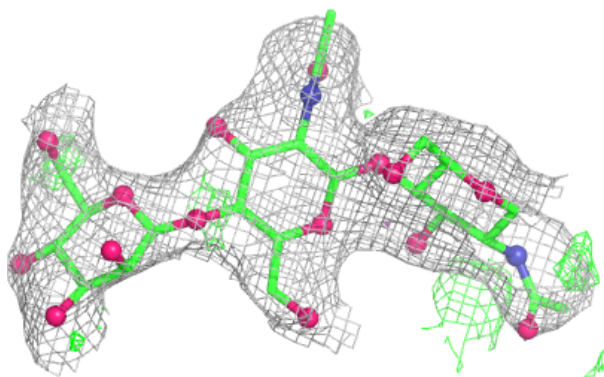


Electron density around Chain M:

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

**Electron density around Chain N:**

$2mF_o-DF_c$ (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($\text{\AA}^2$)	Q<0.9
10	NAG	B	721	14/15	0.60	0.24	82,97,110,111	0
10	NAG	A	725	14/15	0.82	0.17	66,86,95,100	0
11	GOL	A	730	6/6	0.82	0.26	95,96,97,98	0
11	GOL	B	725	6/6	0.82	0.27	54,64,71,75	0
12	FLC	B	727	13/13	0.90	0.13	63,70,80,82	0
11	GOL	B	726	6/6	0.94	0.15	62,68,72,79	0

6.5 Other polymers [i](#)

There are no such residues in this entry.