



wwPDB X-ray Structure Validation Summary Report ⓘ

Jun 11, 2024 – 05:03 PM EDT

PDB ID : 6MSL
Title : Integrin AlphaVBeta3 ectodomain bound to EETI-II 2.5D
Authors : van Agthoven, J.F.; Arnaout, M.A.
Deposited on : 2018-10-16
Resolution : 3.10 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	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.36.2
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.36.2

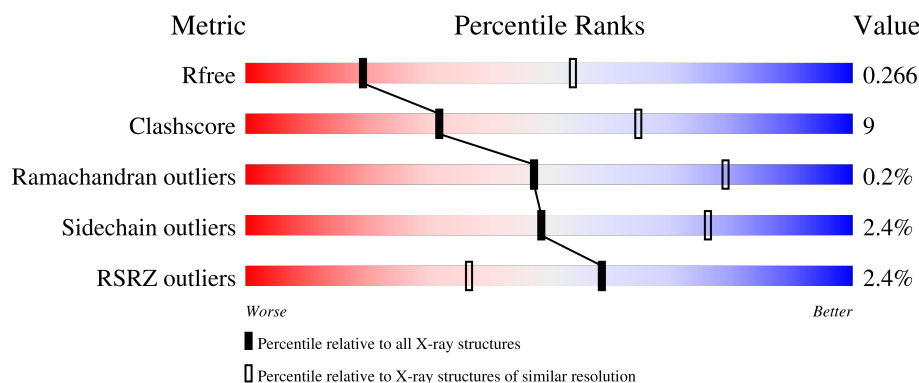
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 3.10 Å.

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



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	1094 (3.10-3.10)
Clashscore	141614	1184 (3.10-3.10)
Ramachandran outliers	138981	1141 (3.10-3.10)
Sidechain outliers	138945	1141 (3.10-3.10)
RSRZ outliers	127900	1067 (3.10-3.10)

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	967	<div> <div>76%</div> <div>19%</div> <div>• •</div> </div>
2	B	695	<div> <div>4%</div> <div>76%</div> <div>22%</div> <div>• •</div> </div>
3	C	32	<div> <div>34%</div> <div>72%</div> <div>28%</div> </div>
4	D	4	<div> <div>50%</div> <div>50%</div> </div>
4	G	4	<div> <div>100%</div> </div>

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Mol	Chain	Length	Quality of chain
5	E	2	 50% 50%
5	H	2	 100%
5	I	2	 50% 50%
5	J	2	 50% 50%
5	K	2	 50% 50%
6	F	6	 33% 17% 50%
7	L	3	 33% 67%

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
5	NAG	E	2	-	-	-	X
8	NAG	B	701	-	-	-	X
9	MN	B	710	-	-	-	X

2 Entry composition [i](#)

There are 10 unique types of molecules in this entry. The entry contains 13129 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 Integrin alpha-V.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	924	Total	C	N	O	S	0	0	0
			7196	4556	1221	1384	35			

- Molecule 2 is a protein called Integrin beta-3.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	690	Total	C	N	O	S	0	0	0
			5294	3250	904	1070	70			

- Molecule 3 is a protein called Cystine Knot Protein 2.5D.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	C	32	Total	C	N	O	S	0	0	0
			220	130	40	44	6			

- Molecule 4 is an oligosaccharide called 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.



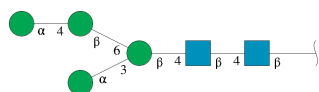
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
4	D	4	Total	C	N	O	0	0	0
			50	28	2	20			
4	G	4	Total	C	N	O	0	0	0
			50	28	2	20			

- Molecule 5 is an oligosaccharide called 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.



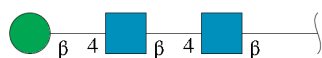
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
5	E	2	Total	C	N	O	0	0	0
			28	16	2	10			
5	H	2	Total	C	N	O	0	0	0
			28	16	2	10			
5	I	2	Total	C	N	O	0	0	0
			28	16	2	10			
5	J	2	Total	C	N	O	0	0	0
			28	16	2	10			
5	K	2	Total	C	N	O	0	0	0
			28	16	2	10			

- Molecule 6 is an oligosaccharide called alpha-D-mannopyranose-(1-4)-beta-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	F	6	Total	C	N	O	0	0	0
			72	40	2	30			

- Molecule 7 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
7	L	3	Total	C	N	O	0	0	0
			39	22	2	15			

- Molecule 8 is 2-acetamido-2-deoxy-beta-D-glucopyranose (three-letter code: NAG) (formula: C₈H₁₅NO₆).



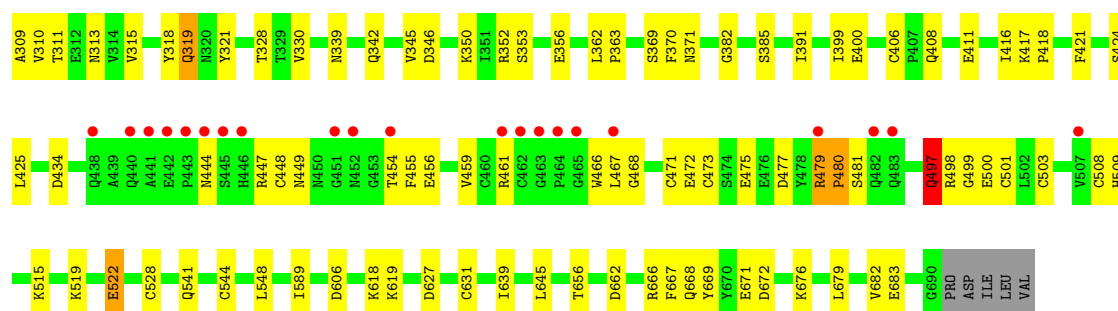
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
8	A	1	Total	C	N	O	0	0
			14	8	1	5		
8	A	1	Total	C	N	O	0	0
			14	8	1	5		
8	B	1	Total	C	N	O	0	0
			14	8	1	5		
8	B	1	Total	C	N	O	0	0
			14	8	1	5		

- Molecule 9 is MANGANESE (II) ION (three-letter code: MN) (formula: Mn).

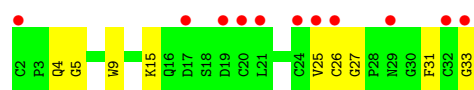
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
9	A	5	Total	Mn	0	0
			5	5		
9	B	3	Total	Mn	0	0
			3	3		

- Molecule 10 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
10	A	1	Total	O	0	0
			1	1		
10	B	3	Total	O	0	0
			3	3		



• Molecule 3: Cystine Knot Protein 2.5D



• Molecule 4: 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



• Molecule 4: 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



• Molecule 5: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose



• Molecule 5: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose



• Molecule 5: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain I:  50% 50%

MAG1
MAG2

- Molecule 5: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain J:  50% 50%


MAG1
MAG2

- Molecule 5: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain K:  50% 50%

MAG1
MAG2

- Molecule 6: alpha-D-mannopyranose-(1-4)-beta-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 F:  33% 17% 50%

MAG1
MAG2
BMA3
BMA4
MAN5
MAN6

- Molecule 7: 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%

MAG1
MAG2
BMA3

4 Data and refinement statistics

Property	Value	Source
Space group	P 32 2 1	Depositor
Cell constants a, b, c, α , β , γ	129.76Å 129.76Å 305.90Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	49.21 – 3.10 49.47 – 3.10	Depositor EDS
% Data completeness (in resolution range)	94.7 (49.21-3.10) 89.7 (49.47-3.10)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.01 (at 3.12Å)	Xtriage
Refinement program	PHENIX 1.13_2998	Depositor
R, R_{free}	0.222 , 0.266 0.222 , 0.266	Depositor DCC
R_{free} test set	2601 reflections (5.01%)	wwPDB-VP
Wilson B-factor (Å ²)	60.5	Xtriage
Anisotropy	0.038	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.31 , 33.3	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtriage
Estimated twinning fraction	0.024 for -h,-k,l	Xtriage
F_o, F_c correlation	0.89	EDS
Total number of atoms	13129	wwPDB-VP
Average B, all atoms (Å ²)	62.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.88% 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, NAG, MN, 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	0.35	0/7352	0.55	0/9967
2	B	0.35	0/5390	0.55	0/7289
3	C	0.34	0/225	0.58	0/304
All	All	0.35	0/12967	0.55	0/17560

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	1
2	B	0	2
All	All	0	3

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (3) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	450	TYR	Peptide
2	B	479	ARG	Peptide
2	B	497	GLN	Peptide

5.2 Too-close contacts ⓘ

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	7196	0	7014	117	0
2	B	5294	0	5024	107	0
3	C	220	0	188	5	0
4	D	50	0	43	0	0
4	G	50	0	43	1	0
5	E	28	0	25	2	0
5	H	28	0	25	0	0
5	I	28	0	25	0	0
5	J	28	0	25	0	0
5	K	28	0	25	1	0
6	F	72	0	61	2	0
7	L	39	0	34	0	0
8	A	28	0	26	0	0
8	B	28	0	26	2	0
9	A	5	0	0	0	0
9	B	3	0	0	0	0
10	A	1	0	0	0	0
10	B	3	0	0	0	0
All	All	13129	0	12584	228	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 9.

The worst 5 of 228 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)
2:B:39:ASP:HB3	2:B:44:LEU:HD12	1.63	0.79
2:B:10:VAL:HG21	2:B:519:LYS:HD2	1.65	0.78
3:C:25:VAL:HG12	3:C:33:GLY:HA2	1.67	0.75
2:B:8:ARG:NH1	2:B:544:CYS:SG	2.61	0.74
2:B:121:SER:CB	2:B:220:GLU:OE1	2.35	0.74

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	920/967 (95%)	838 (91%)	82 (9%)	0	100	100
2	B	688/695 (99%)	605 (88%)	79 (12%)	4 (1%)	25	59
3	C	30/32 (94%)	17 (57%)	13 (43%)	0	100	100
All	All	1638/1694 (97%)	1460 (89%)	174 (11%)	4 (0%)	47	79

All (4) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	B	448	CYS
2	B	480	PRO
2	B	497	GLN
2	B	498	ARG

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	784/821 (96%)	768 (98%)	16 (2%)	55	80
2	B	612/617 (99%)	595 (97%)	17 (3%)	43	73
3	C	24/24 (100%)	23 (96%)	1 (4%)	30	62
All	All	1420/1462 (97%)	1386 (98%)	34 (2%)	49	76

5 of 34 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	B	411	GLU
2	B	503	CYS
2	B	662	ASP
1	A	702	HIS
1	A	660	ASN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 7 such sidechains are listed below:

Mol	Chain	Res	Type
2	B	141	GLN
2	B	339	ASN
2	B	541	GLN
2	B	440	GLN
2	B	106	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 ⓘ

27 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	$\# Z > 2$
4	NAG	D	1	1,4	14,14,15	0.45	0	17,19,21	0.75	0
4	NAG	D	2	4	14,14,15	0.32	0	17,19,21	0.38	0
4	BMA	D	3	4	11,11,12	1.19	1 (9%)	15,15,17	1.22	2 (13%)
4	MAN	D	4	4	11,11,12	1.54	2 (18%)	15,15,17	1.08	1 (6%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
5	NAG	E	1	1,5	14,14,15	0.29	0	17,19,21	1.42	2 (11%)
5	NAG	E	2	5	14,14,15	0.61	0	17,19,21	0.67	1 (5%)
6	NAG	F	1	1,6	14,14,15	0.20	0	17,19,21	0.61	0
6	NAG	F	2	6	14,14,15	0.51	0	17,19,21	0.59	0
6	BMA	F	3	6	11,11,12	0.66	0	15,15,17	1.06	1 (6%)
6	BMA	F	4	6	11,11,12	1.78	3 (27%)	15,15,17	1.24	3 (20%)
6	MAN	F	5	6	11,11,12	1.80	2 (18%)	15,15,17	1.62	3 (20%)
6	MAN	F	6	6	11,11,12	1.27	1 (9%)	15,15,17	1.09	0
4	NAG	G	1	1,4	14,14,15	0.48	0	17,19,21	0.68	0
4	NAG	G	2	4	14,14,15	0.61	0	17,19,21	0.42	0
4	BMA	G	3	4	11,11,12	1.37	3 (27%)	15,15,17	1.22	2 (13%)
4	MAN	G	4	4	11,11,12	1.24	1 (9%)	15,15,17	1.24	2 (13%)
5	NAG	H	1	1,5	14,14,15	0.44	0	17,19,21	0.62	0
5	NAG	H	2	5	14,14,15	0.50	0	17,19,21	0.62	0
5	NAG	I	1	1,5	14,14,15	0.43	0	17,19,21	0.47	0
5	NAG	I	2	5	14,14,15	0.82	1 (7%)	17,19,21	1.26	1 (5%)
5	NAG	J	1	1,5	14,14,15	0.52	0	17,19,21	0.63	1 (5%)
5	NAG	J	2	5	14,14,15	0.52	0	17,19,21	0.52	0
5	NAG	K	1	5,2	14,14,15	0.42	0	17,19,21	0.79	1 (5%)
5	NAG	K	2	5	14,14,15	0.39	0	17,19,21	0.86	1 (5%)
7	NAG	L	1	7,2	14,14,15	0.22	0	17,19,21	0.48	0
7	NAG	L	2	7	14,14,15	0.80	1 (7%)	17,19,21	1.30	1 (5%)
7	BMA	L	3	7	11,11,12	1.90	4 (36%)	15,15,17	1.41	1 (6%)

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

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

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

The worst 5 of 19 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
7	L	3	BMA	O5-C5	3.82	1.51	1.43
6	F	5	MAN	C1-C2	3.75	1.60	1.52
6	F	5	MAN	C2-C3	3.57	1.57	1.52
6	F	4	BMA	C4-C5	3.24	1.59	1.53
5	I	2	NAG	O5-C1	2.90	1.48	1.43

The worst 5 of 23 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	I	2	NAG	C1-O5-C5	4.84	118.75	112.19
7	L	2	NAG	C1-O5-C5	4.79	118.68	112.19
5	E	1	NAG	C2-N2-C7	4.65	129.52	122.90
6	F	5	MAN	C1-C2-C3	3.73	114.25	109.67
7	L	3	BMA	C1-O5-C5	3.48	116.90	112.19

There are no chirality outliers.

5 of 43 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	D	4	MAN	O5-C5-C6-O6
4	G	2	NAG	O5-C5-C6-O6
5	I	2	NAG	C4-C5-C6-O6
5	E	1	NAG	O5-C5-C6-O6
5	K	2	NAG	O5-C5-C6-O6

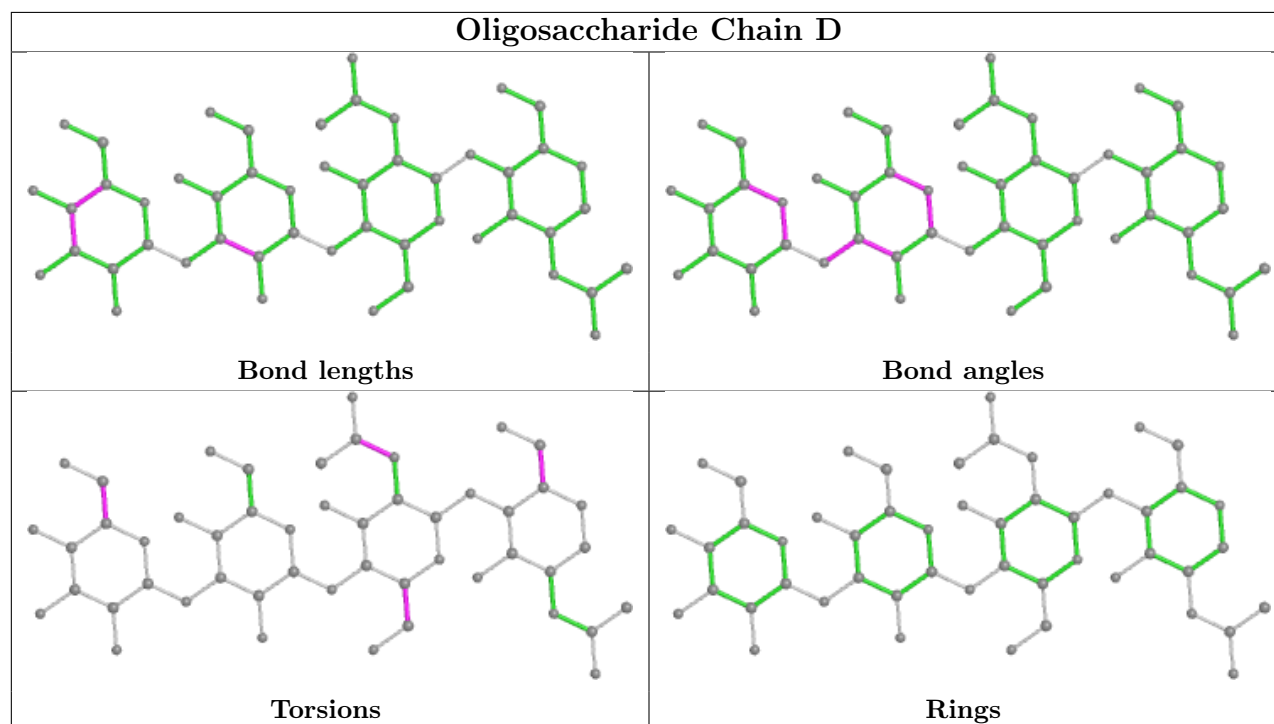
All (2) ring outliers are listed below:

Mol	Chain	Res	Type	Atoms
7	L	3	BMA	C1-C2-C3-C4-C5-O5
4	G	4	MAN	C1-C2-C3-C4-C5-O5

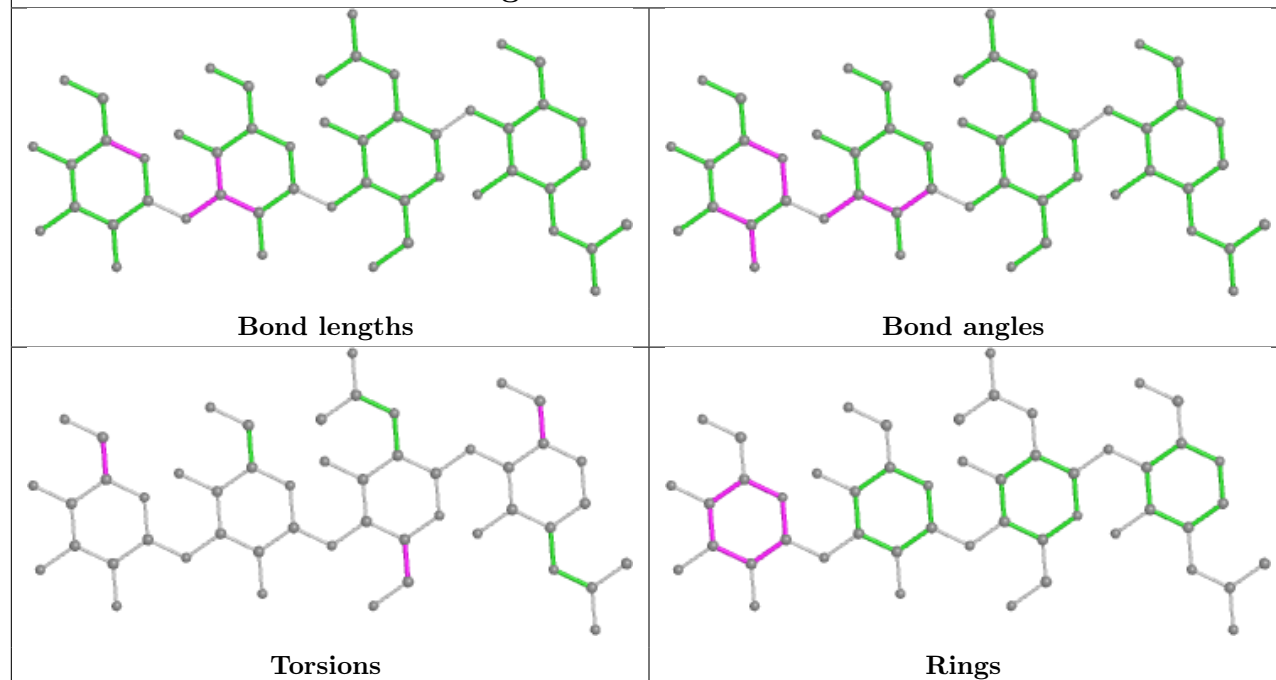
7 monomers are involved in 6 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	K	1	NAG	1	0
6	F	5	MAN	1	0
4	G	1	NAG	1	0
6	F	4	BMA	2	0
4	G	2	NAG	1	0
6	F	3	BMA	1	0
5	E	1	NAG	2	0

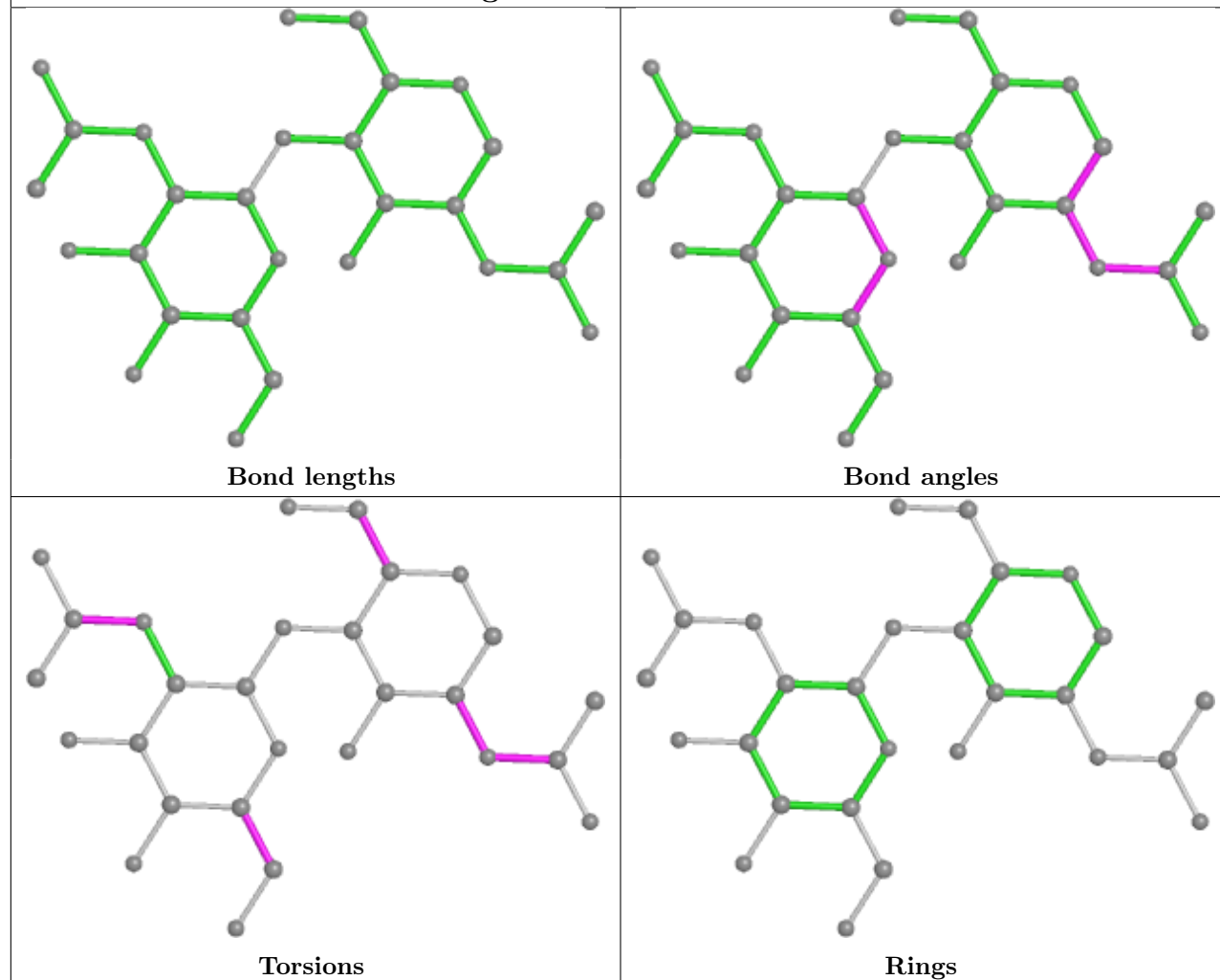
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for oligosaccharide.

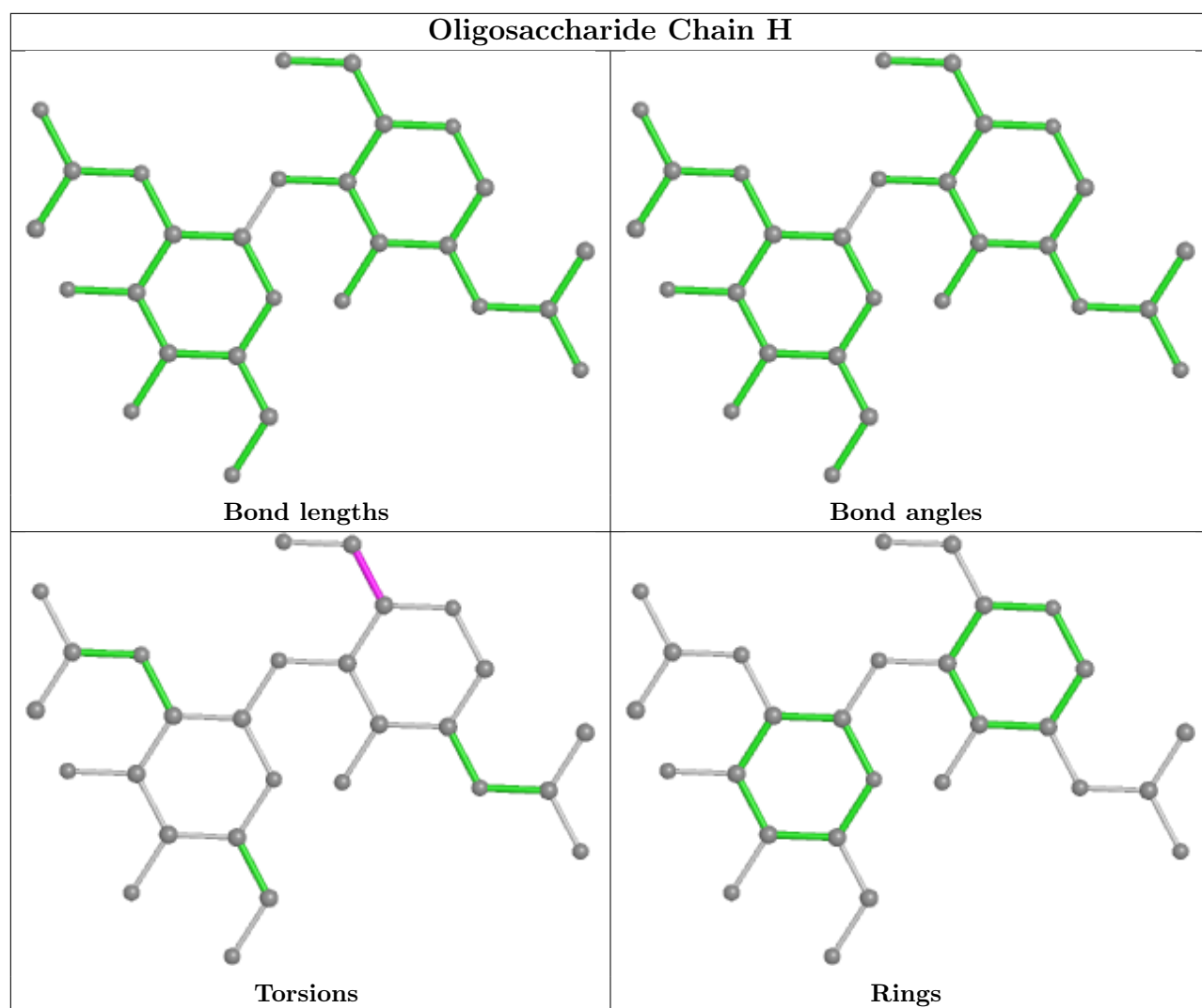


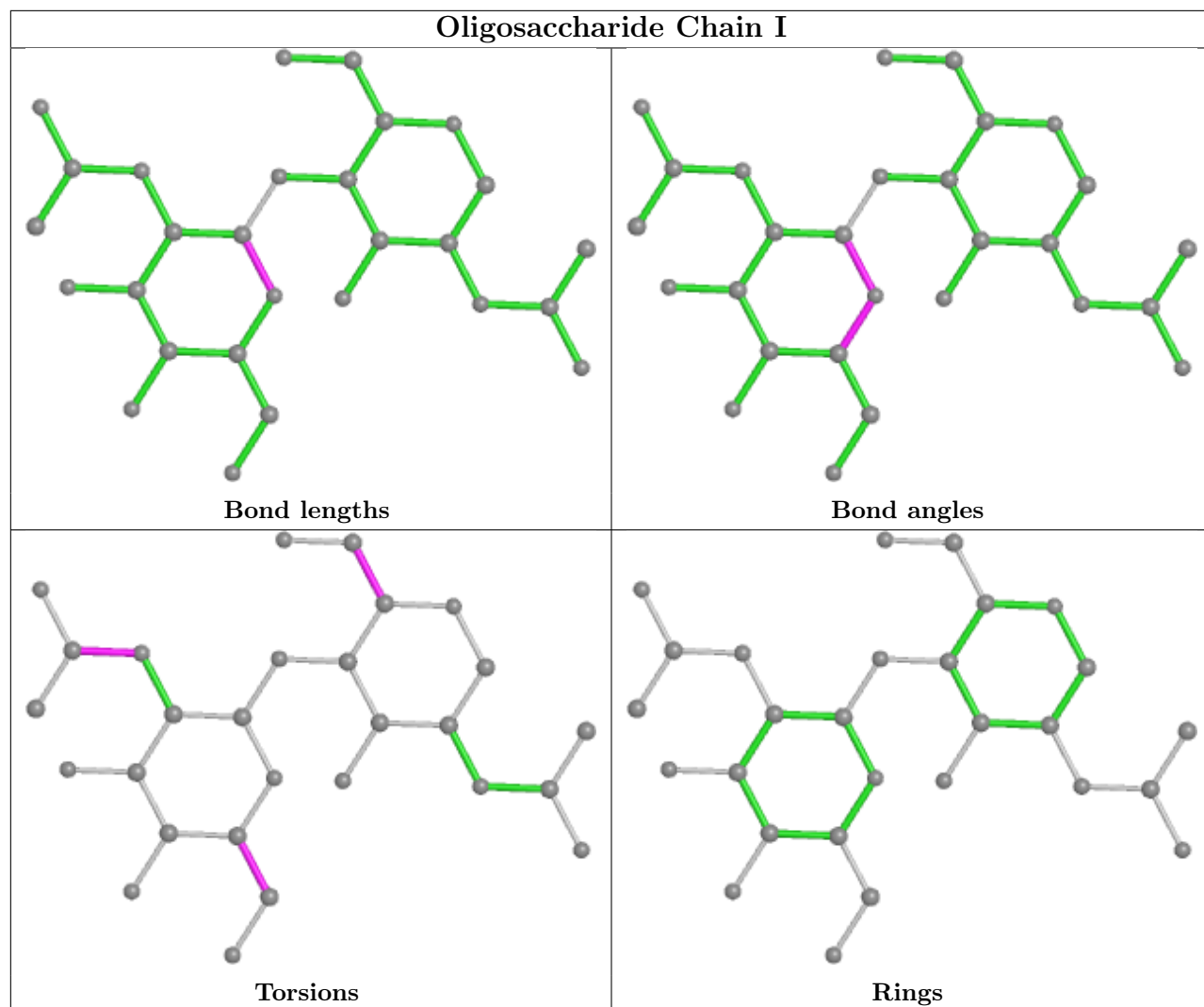
Oligosaccharide Chain G

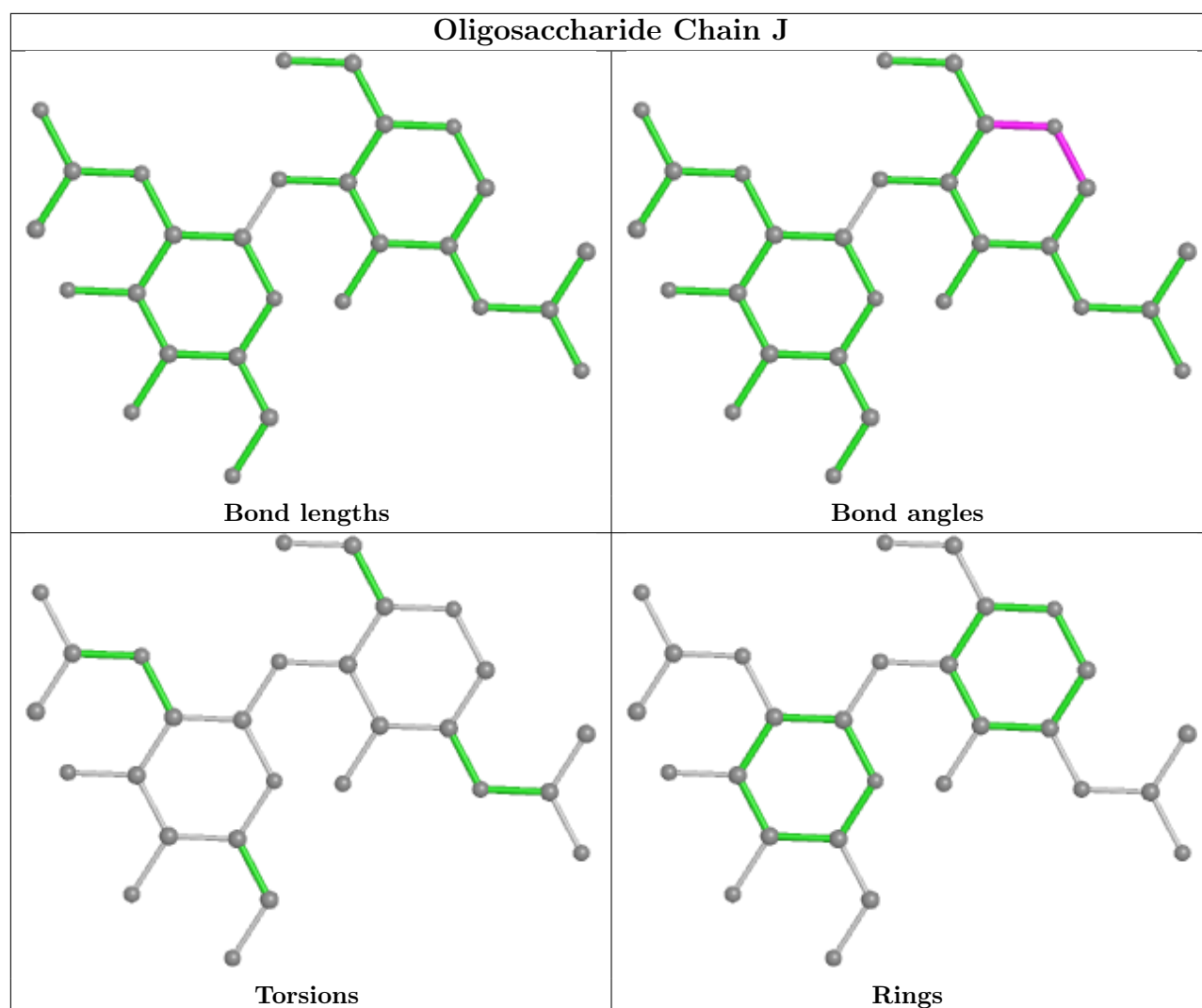


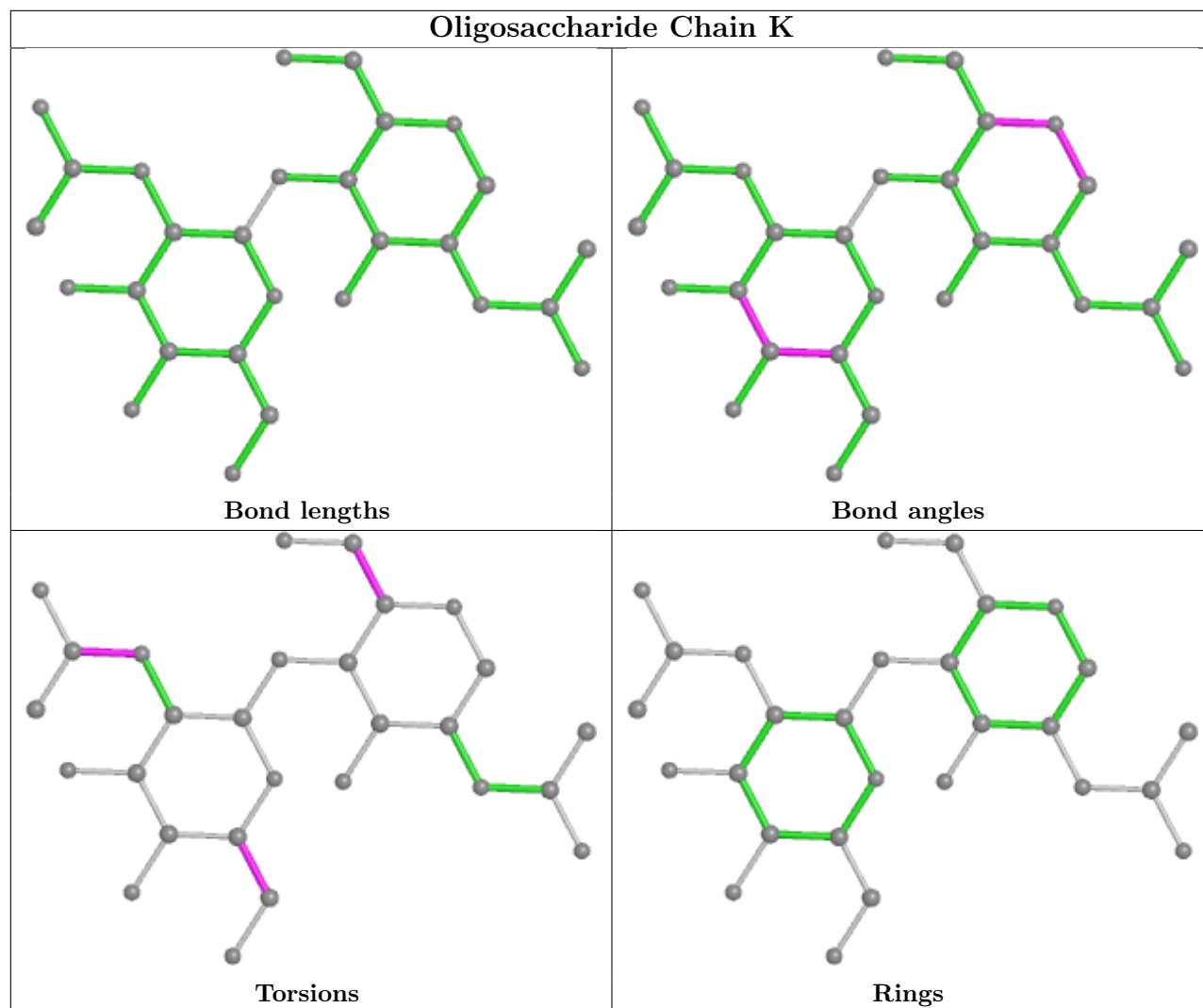
Oligosaccharide Chain E

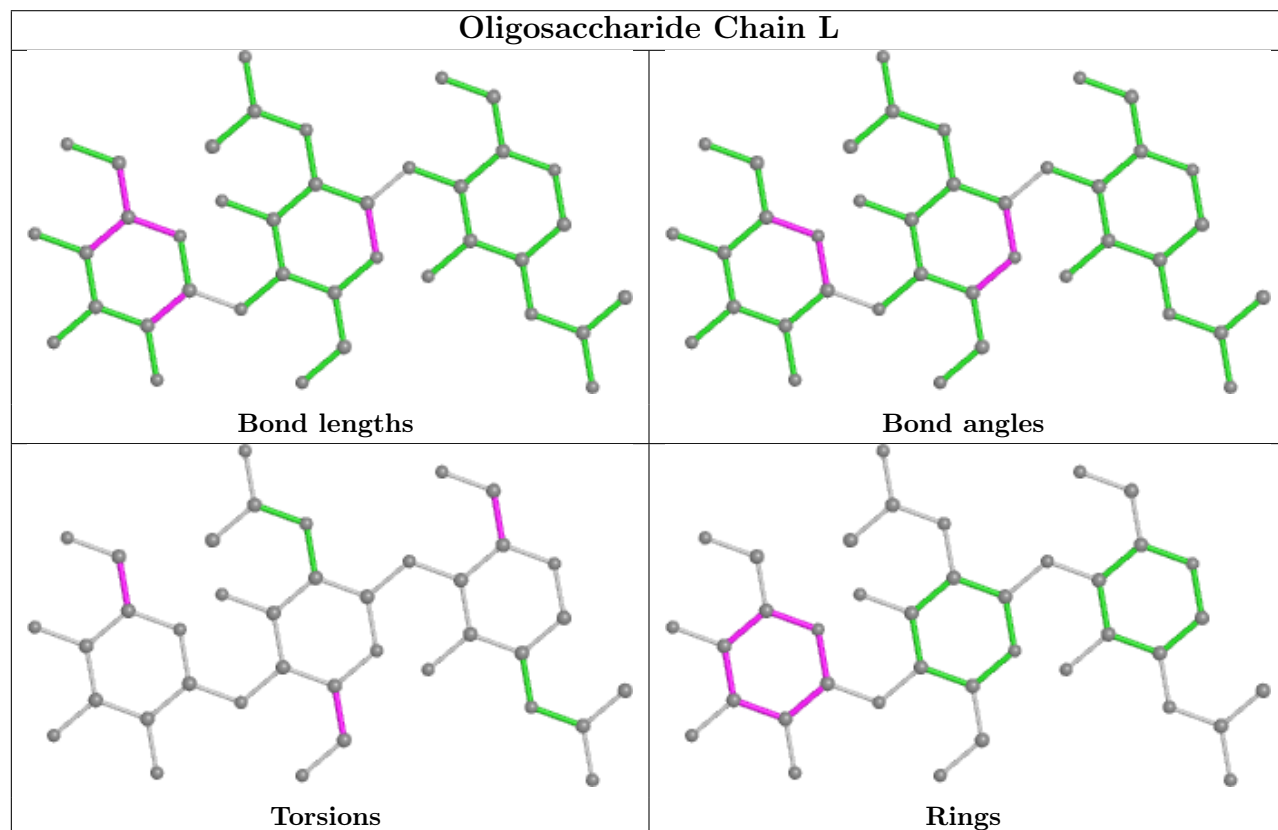
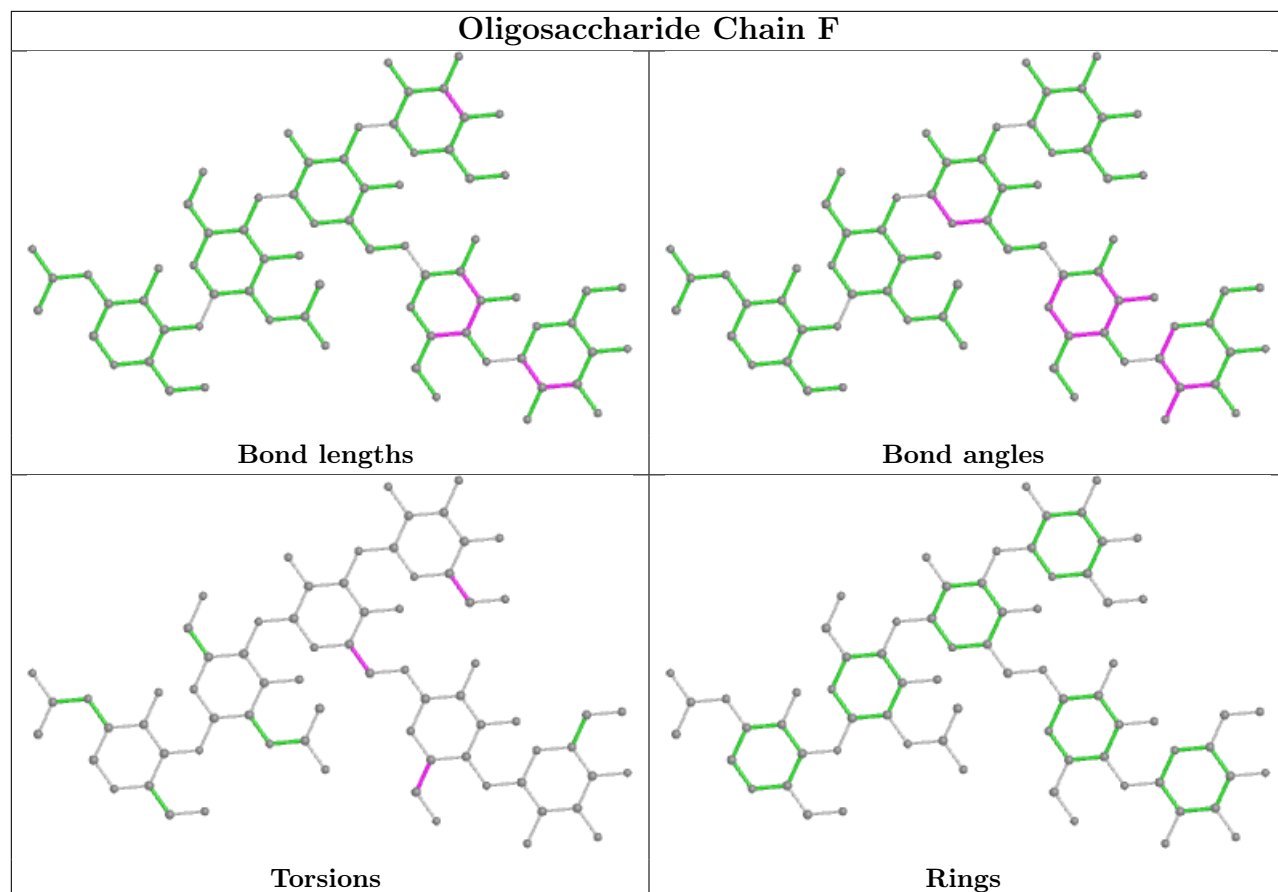












5.6 Ligand geometry

Of 12 ligands modelled in this entry, 8 are monoatomic - leaving 4 for Mogul analysis.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\# Z > 2$	Counts	RMSZ	$\# Z > 2$
8	NAG	A	1020	1	14,14,15	0.40	0	17,19,21	0.56	0
8	NAG	B	701	2	14,14,15	1.29	2 (14%)	17,19,21	1.09	1 (5%)
8	NAG	A	1017	1	14,14,15	0.32	0	17,19,21	0.56	0
8	NAG	B	702	2	14,14,15	0.49	0	17,19,21	0.65	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
8	NAG	A	1020	1	-	2/6/23/26	0/1/1/1
8	NAG	B	701	2	-	2/6/23/26	0/1/1/1
8	NAG	A	1017	1	-	2/6/23/26	0/1/1/1
8	NAG	B	702	2	-	2/6/23/26	0/1/1/1

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
8	B	701	NAG	O5-C1	4.12	1.50	1.43
8	B	701	NAG	C1-C2	2.43	1.56	1.52

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
8	B	701	NAG	C1-O5-C5	4.24	117.94	112.19

There are no chirality outliers.

5 of 8 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
8	A	1020	NAG	O5-C5-C6-O6
8	A	1017	NAG	O5-C5-C6-O6
8	A	1020	NAG	C4-C5-C6-O6
8	A	1017	NAG	C4-C5-C6-O6
8	B	701	NAG	O5-C5-C6-O6

There are no ring outliers.

1 monomer is involved in 2 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
8	B	702	NAG	2	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	924/967 (95%)	-0.07	3 (0%) 94 88	23, 53, 92, 109	0
2	B	690/695 (99%)	0.10	25 (3%) 42 22	23, 61, 120, 146	1 (0%)
3	C	32/32 (100%)	1.61	11 (34%) 0 0	33, 101, 127, 143	0
All	All	1646/1694 (97%)	0.03	39 (2%) 59 37	23, 57, 109, 146	1 (0%)

The worst 5 of 39 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	B	452	ASN	7.2
2	B	446	HIS	6.9
3	C	33	GLY	6.8
3	C	20	CYS	5.0
2	B	444	ASN	4.9

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
5	NAG	I	2	14/15	0.66	0.39	65,107,123,126	0
4	MAN	G	4	11/12	0.70	0.34	69,106,117,119	0
7	BMA	L	3	11/12	0.75	0.16	63,84,94,99	0

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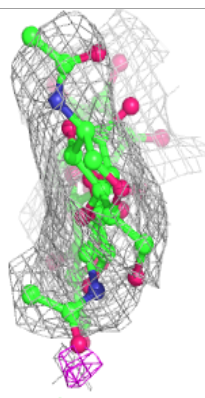
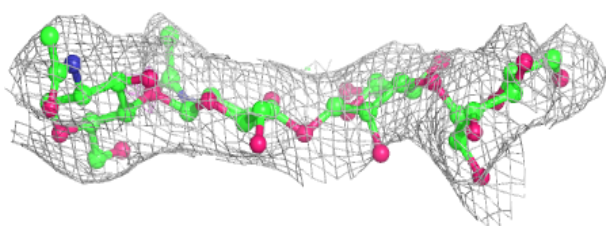
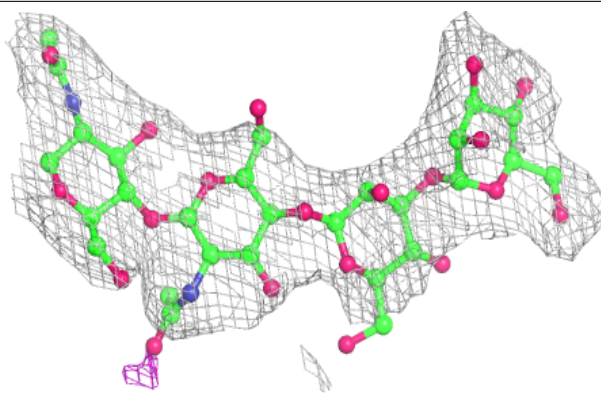
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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
4	MAN	D	4	11/12	0.77	0.22	77,99,118,118	0
5	NAG	E	2	14/15	0.77	0.45	73,100,114,126	0
5	NAG	K	2	14/15	0.78	0.17	66,87,114,119	0
5	NAG	J	2	14/15	0.78	0.38	68,94,106,113	0
6	BMA	F	4	11/12	0.79	0.19	68,86,94,96	0
5	NAG	H	1	14/15	0.83	0.20	75,99,111,111	0
4	BMA	G	3	11/12	0.84	0.50	96,100,115,131	0
5	NAG	I	1	14/15	0.86	0.26	69,89,95,115	0
4	NAG	G	2	14/15	0.86	0.34	70,95,109,111	0
5	NAG	H	2	14/15	0.86	0.17	65,94,104,108	0
6	MAN	F	6	11/12	0.88	0.14	72,86,92,92	0
5	NAG	K	1	14/15	0.88	0.21	70,82,96,109	0
4	BMA	D	3	11/12	0.90	0.33	83,102,108,111	0
4	NAG	D	2	14/15	0.90	0.18	38,76,87,93	0
5	NAG	E	1	14/15	0.91	0.24	65,82,92,100	0
6	BMA	F	3	11/12	0.92	0.12	69,75,85,98	0
7	NAG	L	2	14/15	0.92	0.22	71,84,96,98	0
4	NAG	G	1	14/15	0.92	0.20	60,77,86,109	0
6	MAN	F	5	11/12	0.93	0.17	65,84,93,95	0
7	NAG	L	1	14/15	0.94	0.19	55,72,79,80	0
4	NAG	D	1	14/15	0.95	0.17	37,47,58,59	0
6	NAG	F	2	14/15	0.95	0.16	34,46,62,81	0
5	NAG	J	1	14/15	0.95	0.13	49,68,79,80	0
6	NAG	F	1	14/15	0.97	0.17	25,40,55,58	0

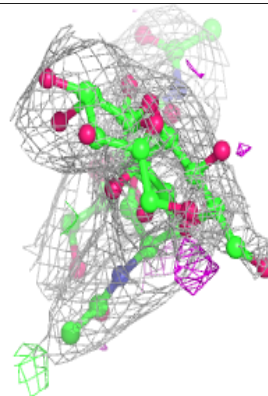
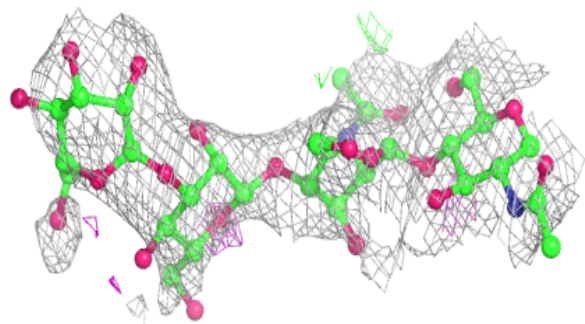
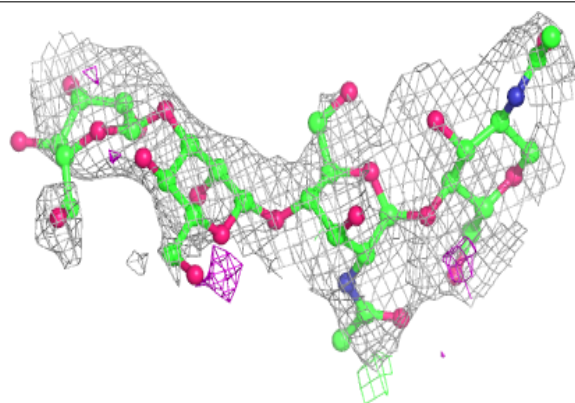
The following is a graphical depiction of the model fit to experimental electron density for oligosaccharide. Each fit is shown from different orientation to approximate a three-dimensional view.

Electron density around Chain D:

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

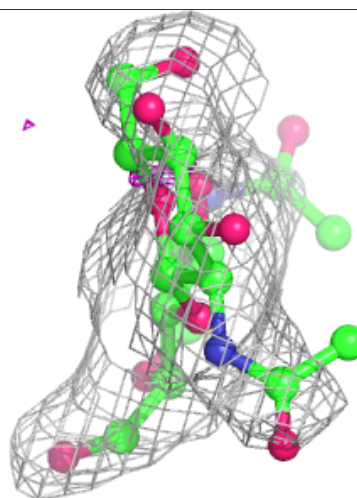
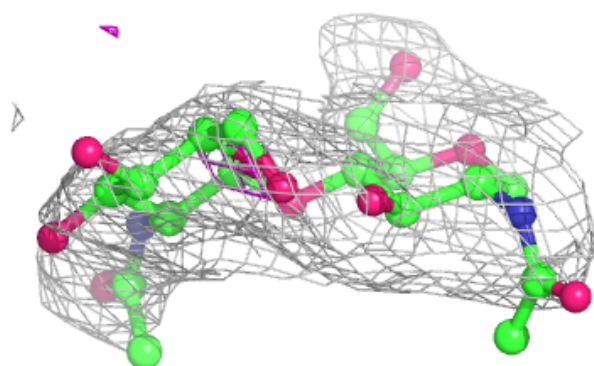
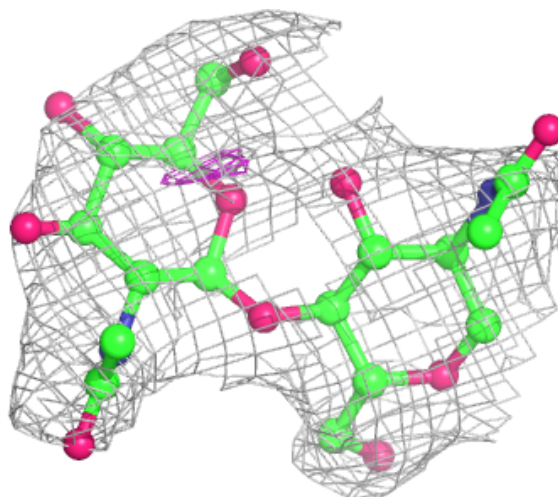
**Electron density around Chain G:**

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



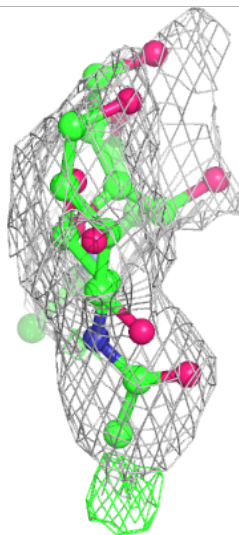
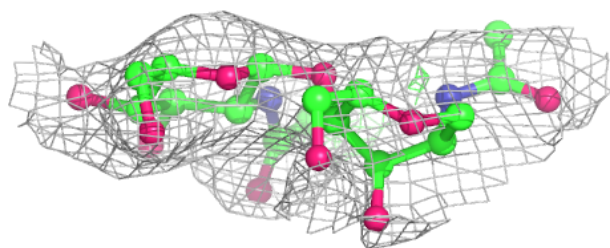
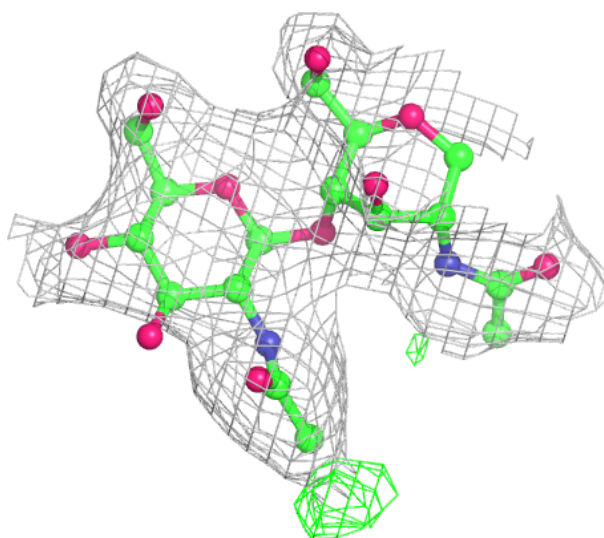
Electron density around Chain E:

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and green (positive)



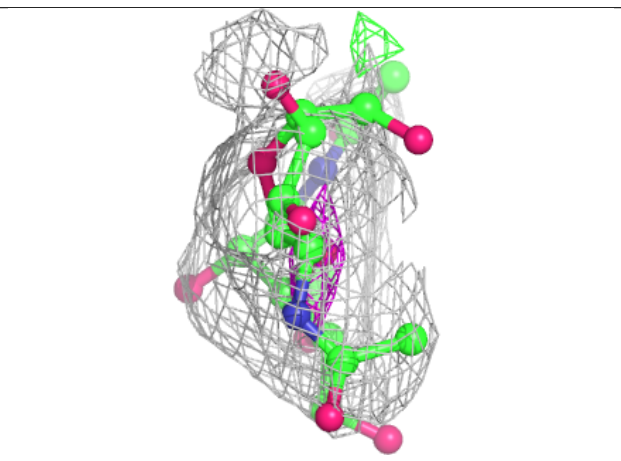
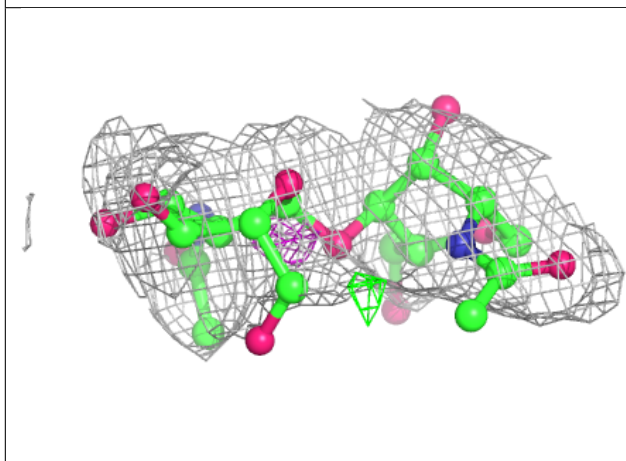
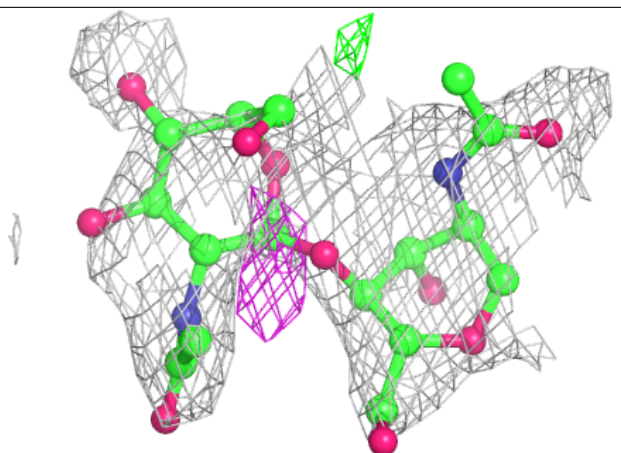
Electron density around Chain H:

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



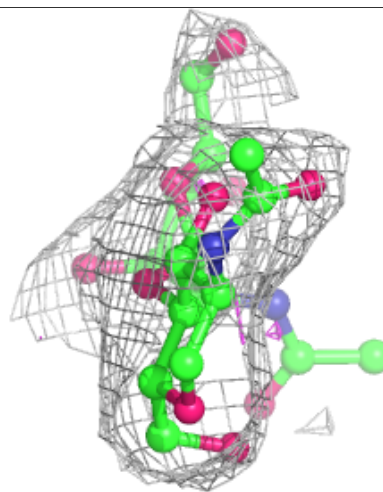
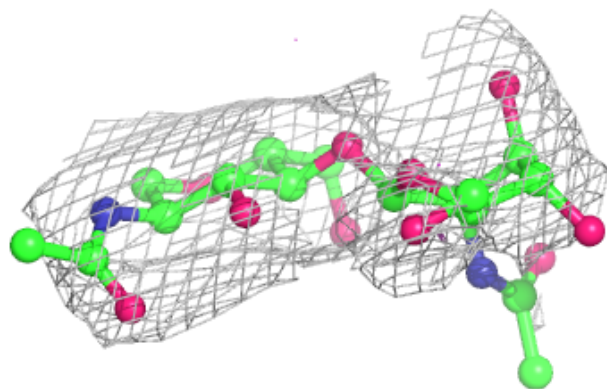
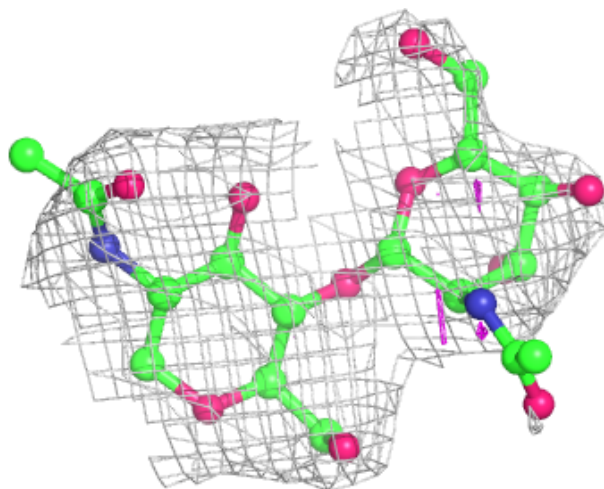
Electron density around Chain I:

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



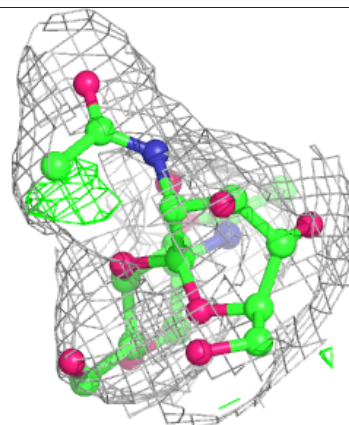
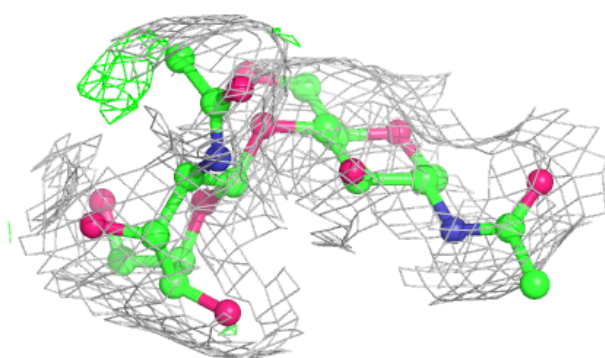
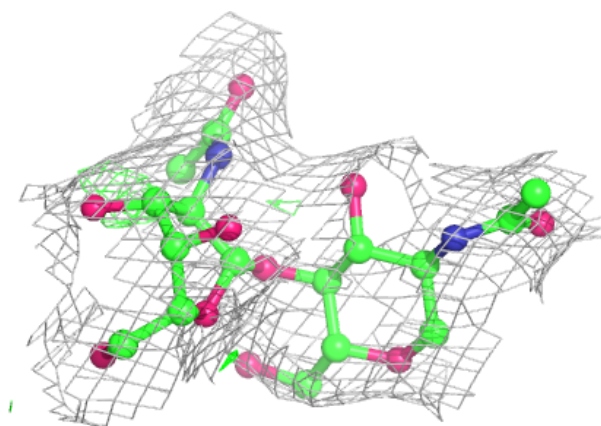
Electron density around Chain J:

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and green (positive)

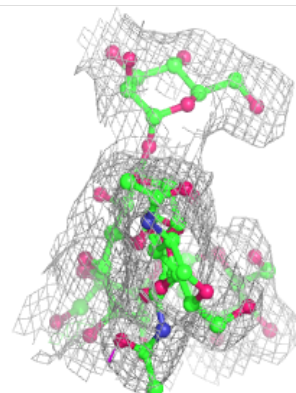
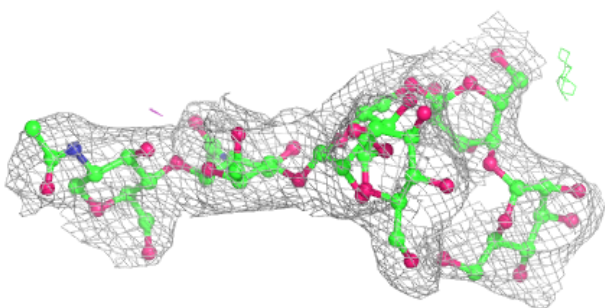
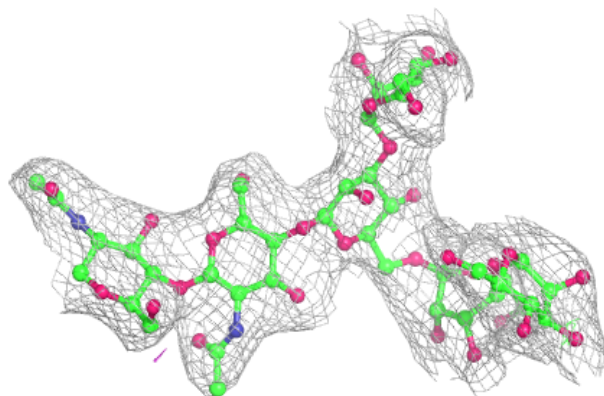


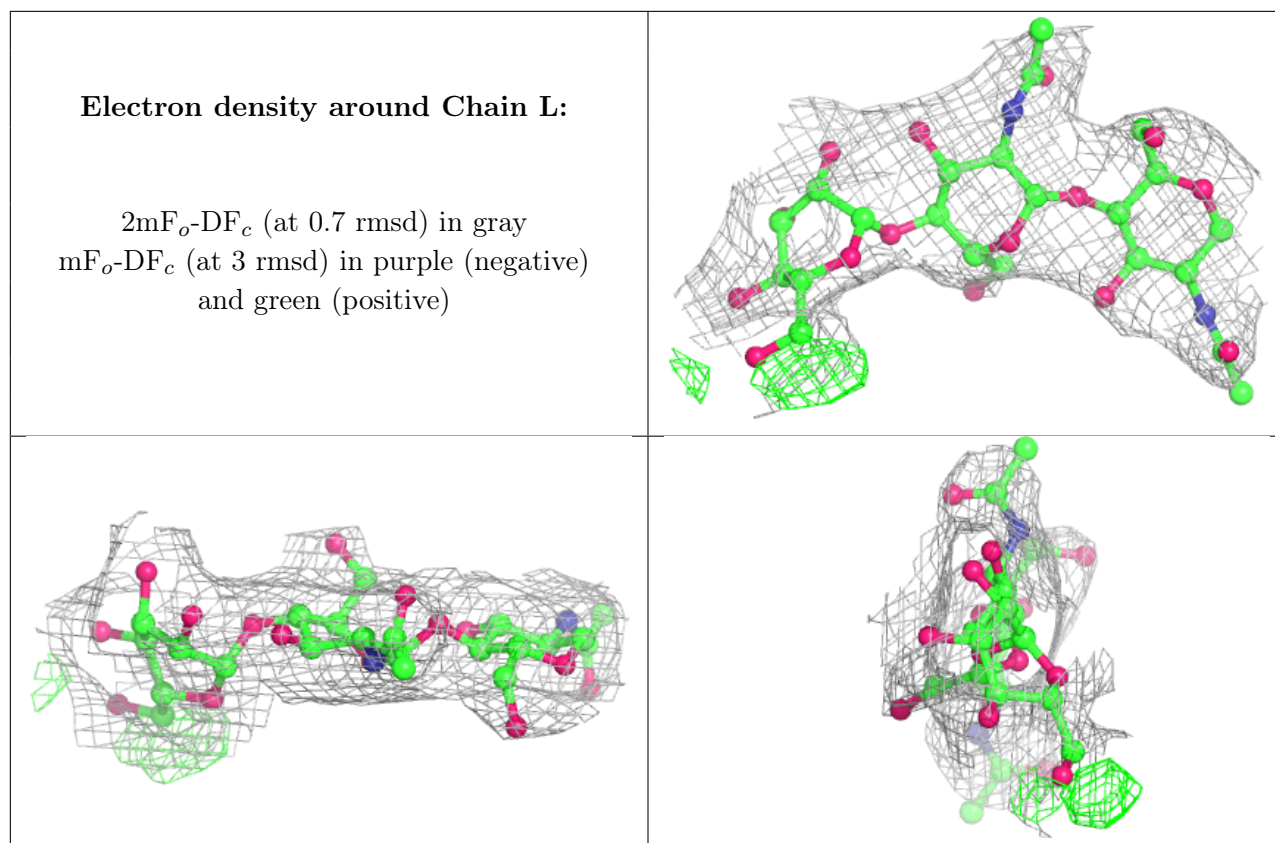
Electron density around Chain K:

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

**Electron density around Chain F:**

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





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(\AA^2)	Q<0.9
8	NAG	B	701	14/15	0.62	0.41	75,107,123,124	0
9	MN	B	710	1/1	0.68	0.44	163,163,163,163	0
8	NAG	A	1017	14/15	0.80	0.39	75,93,110,112	0
8	NAG	A	1020	14/15	0.86	0.20	42,71,88,93	0
9	MN	A	1029	1/1	0.90	0.19	120,120,120,120	0
8	NAG	B	702	14/15	0.90	0.18	54,58,69,72	0
9	MN	B	709	1/1	0.92	0.28	86,86,86,86	0
9	MN	A	1025	1/1	0.93	0.21	202,202,202,202	0
9	MN	A	1028	1/1	0.96	0.08	64,64,64,64	0
9	MN	A	1026	1/1	0.97	0.14	69,69,69,69	0
9	MN	A	1027	1/1	0.98	0.09	74,74,74,74	0
9	MN	B	708	1/1	1.00	0.23	56,56,56,56	0

6.5 Other polymers [i](#)

There are no such residues in this entry.