



wwPDB X-ray Structure Validation Summary Report ⓘ

Mar 5, 2026 – 09:56 AM UTC

PDB ID : 8D53 / pdb_00008d53
Title : Crystal Structure of Mosaic HIV-1 Envelope (MosM3.3) in Complex with antibodies PGT124 and 35O22 at 3.25 Angstrom
Authors : Xian, Y.; Wilson, I.A.
Deposited on : 2022-06-03
Resolution : 3.24 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

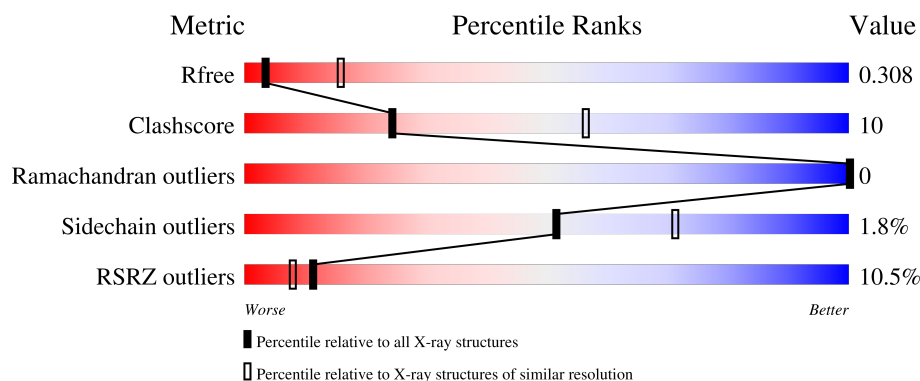
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 3.24 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	2153 (3.28-3.20)
Clashscore	190562	2275 (3.28-3.20)
Ramachandran outliers	187476	2233 (3.28-3.20)
Sidechain outliers	187428	2232 (3.28-3.20)
RSRZ outliers	180081	2153 (3.28-3.20)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments 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	G	446	<div> <div>14%</div> <div>70%</div> <div>29%</div> </div>
2	B	132	<div> <div>19%</div> <div>78%</div> <div>22%</div> </div>
3	L	212	<div> <div>5%</div> <div>79%</div> <div>21%</div> </div>
4	H	229	<div> <div>4%</div> <div>76%</div> <div>23%</div> </div>
5	D	117	<div> <div>11%</div> <div>76%</div> <div>24%</div> </div>

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Mol	Chain	Length	Quality of chain
6	E	107	
7	A	2	
7	C	2	
7	K	2	
7	M	2	
7	Q	2	
7	R	2	
8	F	9	
9	I	3	
9	P	3	
9	S	3	
10	J	4	
11	N	6	
12	O	5	

2 Entry composition

There are 13 unique types of molecules in this entry. The entry contains 10333 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 Envelope glycoprotein gp120.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	G	446	Total	C	N	O	S	0	0	0
			3540	2233	622	658	27			

- Molecule 2 is a protein called Envelope glycoprotein gp41.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	132	Total	C	N	O	S	0	0	0
			1069	675	183	205	6			

- Molecule 3 is a protein called PGT124 Fab Light Chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	L	212	Total	C	N	O	S	0	0	0
			1611	1013	272	320	6			

- Molecule 4 is a protein called PGT124 Fab Heavy Chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
4	H	229	Total	C	N	O	S	0	0	0
			1744	1107	292	340	5			

- Molecule 5 is a protein called 35O22scFV Heavy chain variable.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
5	D	117	Total	C	N	O	S	0	0	0
			908	578	148	177	5			

- Molecule 6 is a protein called 35O22scFv Light Chain Variable.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
6	E	107	Total	C	N	O	S	0	0	0
			818	514	135	163	6			

- Molecule 7 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
7	A	2	Total	C	N	O	14	0	0
			28	16	2	10			
7	C	2	Total	C	N	O	14	0	0
			28	16	2	10			
7	K	2	Total	C	N	O	14	0	0
			28	16	2	10			
7	M	2	Total	C	N	O	28	0	0
			28	16	2	10			
7	Q	2	Total	C	N	O	0	0	0
			28	16	2	10			
7	R	2	Total	C	N	O	28	0	0
			28	16	2	10			

- Molecule 8 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
8	F	9	Total	C	N	O	105	0	0
			105	58	2	45			

- 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	I	3	Total	C	N	O	14	0	0
			39	22	2	15			
9	P	3	Total	C	N	O	0	0	0
			39	22	2	15			
9	S	3	Total	C	N	O	0	0	0
			39	22	2	15			

- Molecule 10 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
10	J	4	Total	C	N	O	28	0	0
			50	28	2	20			

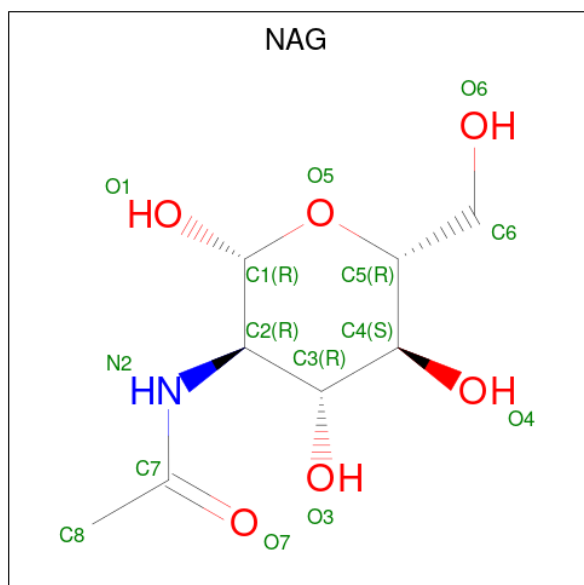
- Molecule 11 is an oligosaccharide called alpha-D-mannopyranose-(5-4)-alpha-D-mannopyranose-(1-6)-[alpha-D-mannopyranose-(1-3)]beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
11	N	6	Total	C	N	O	39	0	0
			72	40	2	30			

- Molecule 12 is an oligosaccharide called alpha-D-mannopyranose-(1-3)-beta-D-mannopyranose-(1-4)-alpha-D-mannopyranose-(6-3)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.

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

- Molecule 13 is 2-acetamido-2-deoxy-beta-D-glucopyranose (CCD ID: NAG) (formula: $C_8H_{15}NO_6$).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
13	G	1	Total	C	N	O	14	0
			14	8	1	5		
13	G	1	Total	C	N	O	0	0
			14	8	1	5		
13	G	1	Total	C	N	O	0	0
			14	8	1	5		
13	G	1	Total	C	N	O	0	0
			14	8	1	5		

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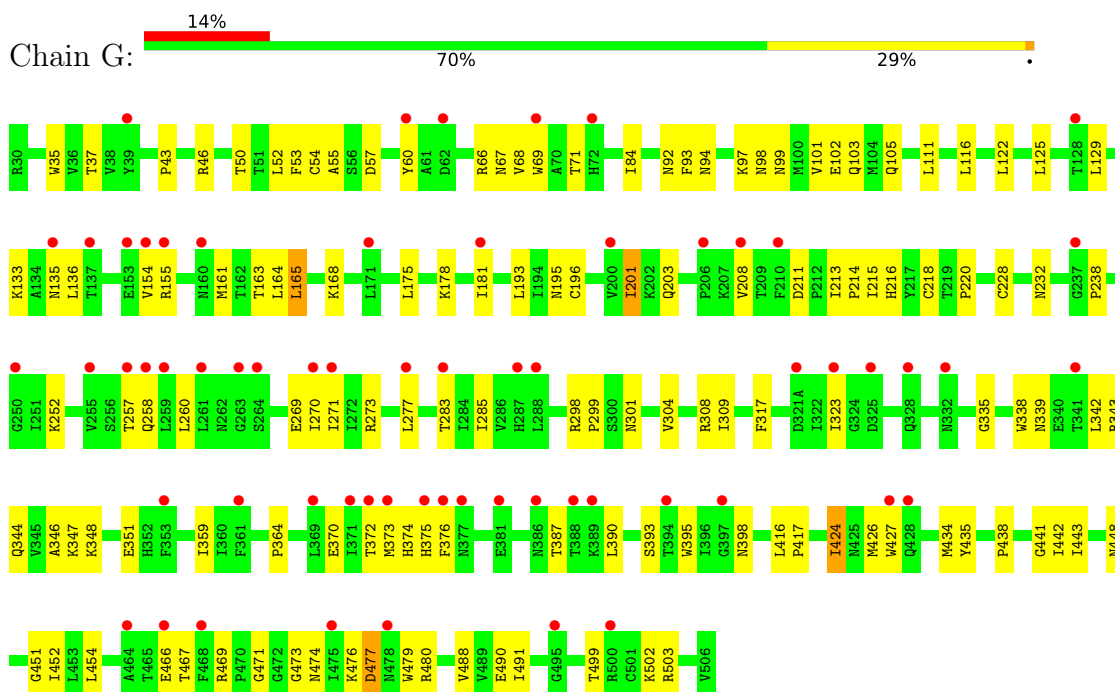
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Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
13	B	1	Total	C	N	O	14	0
			14	8	1	5		

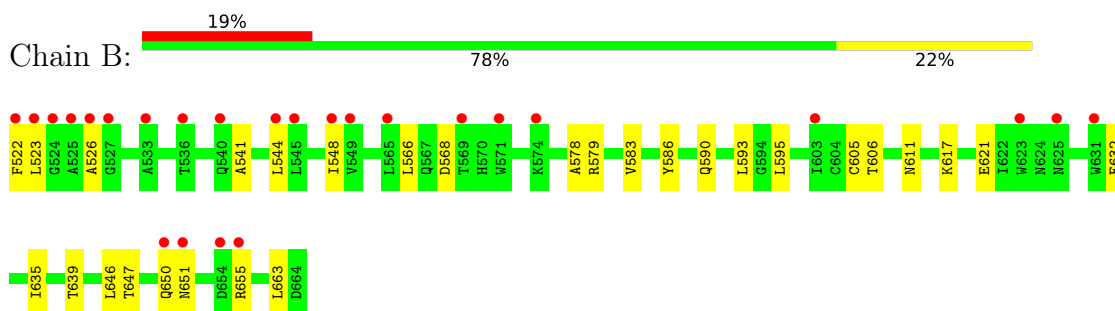
3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red dot above a residue indicates a poor fit to the electron density ($RSRZ > 2$). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

- Molecule 1: Envelope glycoprotein gp120

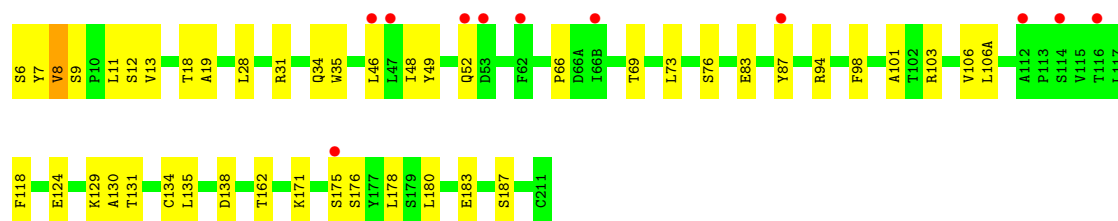


- Molecule 2: Envelope glycoprotein gp41

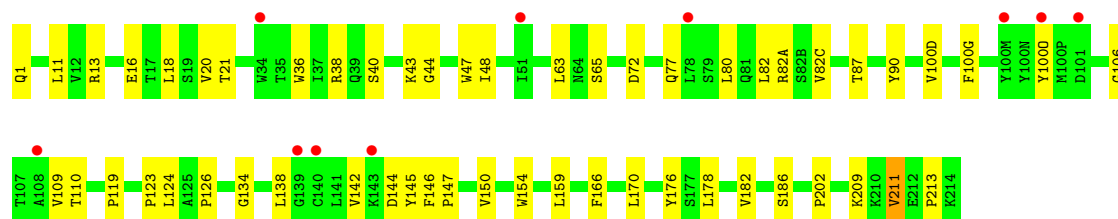
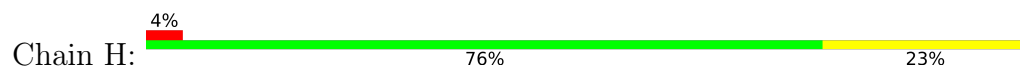


- Molecule 3: PGT124 Fab Light Chain

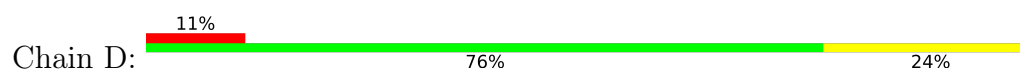




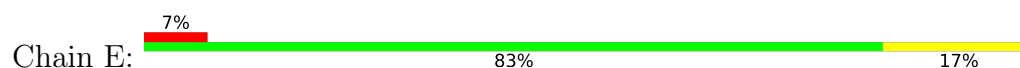
• Molecule 4: PGT124 Fab Heavy Chain



• Molecule 5: 35O22scFV Heavy chain variable



• Molecule 6: 35O22scFv Light Chain Variable



• Molecule 7: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose



• Molecule 7: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose





- Molecule 7: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain K:



- Molecule 7: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain M:



- Molecule 7: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain Q:



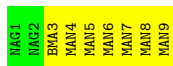
- Molecule 7: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain R:



- Molecule 8: 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:



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

Chain I:



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

Chain P:  67% 33%


NAG1
NAG2
BMA3

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

Chain S:  33% 67%


NAG1
NAG2
BMA3

- Molecule 10: 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 J:  25% 50% 25%


NAG1
NAG2
BMA3
MAN4

- Molecule 11: alpha-D-mannopyranose-(5-4)-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 N:  17% 67% 17%


NAG1
NAG2
BMA3
MAN4
MAN5
MAN6

- Molecule 12: alpha-D-mannopyranose-(1-3)-beta-D-mannopyranose-(1-4)-alpha-D-mannopyranose-(6-3)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain O:  40% 60%


NAG1
NAG2
MAN3
BMA4
MAN5

4 Data and refinement statistics

Property	Value	Source
Space group	P 3 1 2	Depositor
Cell constants a, b, c, α , β , γ	139.27Å 139.27Å 320.33Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	42.79 – 3.24 42.79 – 3.24	Depositor EDS
% Data completeness (in resolution range)	83.4 (42.79-3.24) 83.6 (42.79-3.24)	Depositor EDS
R_{merge}	0.16	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.68 (at 3.25Å)	Xtriage
Refinement program	PHENIX 1.19.1_4122	Depositor
R, R_{free}	0.317 , 0.331 0.317 , 0.308	Depositor DCC
R_{free} test set	2422 reflections (4.24%)	wwPDB-VP
Wilson B-factor (Å ²)	92.7	Xtriage
Anisotropy	0.704	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.31 , 71.7	EDS
L-test for twinning ²	$\langle L \rangle = 0.46$, $\langle L^2 \rangle = 0.29$	Xtriage
Estimated twinning fraction	0.049 for -h,-k,l	Xtriage
F_o, F_c correlation	0.88	EDS
Total number of atoms	10333	wwPDB-VP
Average B, all atoms (Å ²)	123.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.18% 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: BMA, NAG, MAN

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	G	0.14	0/3614	0.32	0/4910
2	B	0.15	0/1091	0.34	0/1479
3	L	0.10	0/1653	0.30	0/2256
4	H	0.12	0/1787	0.34	0/2438
5	D	0.10	0/932	0.28	0/1268
6	E	0.09	0/842	0.30	0/1151
All	All	0.12	0/9919	0.32	0/13502

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts [i](#)

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	G	3540	0	3495	96	0
2	B	1069	0	1024	19	0
3	L	1611	0	1551	30	0
4	H	1744	0	1715	36	0
5	D	908	0	862	17	0
6	E	818	0	768	11	0
7	A	28	0	25	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
7	C	28	0	25	0	0
7	K	28	0	25	0	0
7	M	28	0	25	0	0
7	Q	28	0	25	0	0
7	R	28	0	23	0	0
8	F	105	0	88	0	0
9	I	39	0	34	0	0
9	P	39	0	34	0	0
9	S	39	0	34	1	0
10	J	50	0	42	1	0
11	N	72	0	60	1	0
12	O	61	0	49	0	0
13	B	14	0	13	0	0
13	G	56	0	52	1	0
All	All	10333	0	9969	195	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 10.

The worst 5 of 195 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)
5:D:19:LYS:HD2	5:D:79:TYR:HB3	1.66	0.79
6:E:85:THR:HG22	6:E:103:LYS:HG2	1.67	0.76
1:G:37:THR:HG22	2:B:605:CYS:HA	1.68	0.76
4:H:134:GLY:HA2	4:H:186:SER:H	1.52	0.74
3:L:52:GLN:HB3	3:L:66:PRO:HB3	1.73	0.70

There are no symmetry-related clashes.

5.3 Torsion angles [i](#)

5.3.1 Protein backbone [i](#)

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the backbone conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	G	438/446 (98%)	411 (94%)	27 (6%)	0	100	100
2	B	128/132 (97%)	126 (98%)	2 (2%)	0	100	100
3	L	208/212 (98%)	200 (96%)	8 (4%)	0	100	100
4	H	225/229 (98%)	216 (96%)	9 (4%)	0	100	100
5	D	111/117 (95%)	102 (92%)	9 (8%)	0	100	100
6	E	105/107 (98%)	95 (90%)	10 (10%)	0	100	100
All	All	1215/1243 (98%)	1150 (95%)	65 (5%)	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	G	403/403 (100%)	392 (97%)	11 (3%)	39	65
2	B	116/116 (100%)	112 (97%)	4 (3%)	32	61
3	L	179/179 (100%)	178 (99%)	1 (1%)	78	83
4	H	197/197 (100%)	194 (98%)	3 (2%)	57	74
5	D	99/99 (100%)	98 (99%)	1 (1%)	68	78
6	E	94/94 (100%)	94 (100%)	0	100	100
All	All	1088/1088 (100%)	1068 (98%)	20 (2%)	51	71

5 of 20 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	B	663	LEU
4	H	21	THR
5	D	80	MET
4	H	211	VAL
1	G	443	ILE

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

Mol	Chain	Res	Type
3	L	167	GLN
3	L	170	ASN
6	E	93	HIS
3	L	197	HIS
1	G	246	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 ⓘ

45 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	$\# Z > 2$
7	NAG	A	1	1,7	14,14,15	0.32	0	17,19,21	0.47	0
7	NAG	A	2	7	14,14,15	0.23	0	17,19,21	0.54	0
7	NAG	C	1	1,7	14,14,15	1.00	1 (7%)	17,19,21	0.88	1 (5%)
7	NAG	C	2	7	14,14,15	0.22	0	17,19,21	0.47	0
8	NAG	F	1	1,8	14,14,15	0.19	0	17,19,21	0.45	0
8	NAG	F	2	8	14,14,15	0.19	0	17,19,21	0.45	0
8	BMA	F	3	8	11,11,12	0.75	0	15,15,17	1.24	2 (13%)
8	MAN	F	4	8	11,11,12	0.61	0	15,15,17	1.24	2 (13%)
8	MAN	F	5	8	11,11,12	1.26	3 (27%)	15,15,17	1.90	2 (13%)
8	MAN	F	6	8	11,11,12	0.70	0	15,15,17	1.18	2 (13%)
8	MAN	F	7	8	11,11,12	0.62	0	15,15,17	0.92	2 (13%)
8	MAN	F	8	8	11,11,12	0.67	0	15,15,17	1.14	2 (13%)
8	MAN	F	9	8	11,11,12	0.71	0	15,15,17	1.33	2 (13%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
9	NAG	I	1	1,9	14,14,15	0.48	0	17,19,21	0.71	0
9	NAG	I	2	9	14,14,15	0.39	0	17,19,21	0.55	0
9	BMA	I	3	9	11,11,12	0.57	0	15,15,17	0.77	0
10	NAG	J	1	10,1	14,14,15	0.42	0	17,19,21	0.42	0
10	NAG	J	2	10	14,14,15	0.37	0	17,19,21	1.04	2 (11%)
10	BMA	J	3	10	11,11,12	0.83	0	15,15,17	1.64	2 (13%)
10	MAN	J	4	10	11,11,12	0.98	1 (9%)	15,15,17	1.45	3 (20%)
7	NAG	K	1	1,7	14,14,15	1.54	2 (14%)	17,19,21	2.65	3 (17%)
7	NAG	K	2	7	14,14,15	0.23	0	17,19,21	0.63	0
7	NAG	M	1	1,7	14,14,15	0.42	0	17,19,21	0.46	0
7	NAG	M	2	7	14,14,15	0.31	0	17,19,21	0.58	0
11	NAG	N	1	1,11	14,14,15	0.35	0	17,19,21	0.47	0
11	NAG	N	2	11	14,14,15	0.40	0	17,19,21	1.42	2 (11%)
11	BMA	N	3	11	11,11,12	1.15	1 (9%)	15,15,17	1.23	1 (6%)
11	MAN	N	4	11	11,11,12	0.96	0	15,15,17	1.80	3 (20%)
11	MAN	N	5	11	11,11,12	0.64	0	15,15,17	1.39	2 (13%)
11	MAN	N	6	11	11,11,12	0.67	0	15,15,17	1.17	2 (13%)
12	NAG	O	1	1,12	14,14,15	0.30	0	17,19,21	0.44	0
12	NAG	O	2	12	14,14,15	0.48	0	17,19,21	0.70	0
12	MAN	O	3	12	11,11,12	1.16	2 (18%)	15,15,17	1.01	1 (6%)
12	BMA	O	4	12	11,11,12	0.70	0	15,15,17	1.22	1 (6%)
12	MAN	O	5	12	11,11,12	0.89	1 (9%)	15,15,17	1.41	2 (13%)
9	NAG	P	1	1,9	14,14,15	0.44	0	17,19,21	0.56	0
9	NAG	P	2	9	14,14,15	0.53	0	17,19,21	0.69	0
9	BMA	P	3	9	11,11,12	0.50	0	15,15,17	0.86	1 (6%)
7	NAG	Q	1	1,7	14,14,15	0.54	0	17,19,21	0.88	1 (5%)
7	NAG	Q	2	7	14,14,15	0.33	0	17,19,21	0.56	0
7	NAG	R	1	2,7	14,14,15	0.58	0	17,19,21	0.82	0
7	NAG	R	2	7	14,14,15	0.20	0	17,19,21	0.48	0
9	NAG	S	1	9	14,14,15	0.22	0	17,19,21	0.73	1 (5%)
9	NAG	S	2	9	14,14,15	0.79	1 (7%)	17,19,21	0.66	0
9	BMA	S	3	9	11,11,12	0.67	0	15,15,17	0.72	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
7	NAG	A	1	1,7	-	0/6/23/26	0/1/1/1
7	NAG	A	2	7	-	4/6/23/26	0/1/1/1
7	NAG	C	1	1,7	-	0/6/23/26	0/1/1/1
7	NAG	C	2	7	-	1/6/23/26	0/1/1/1
8	NAG	F	1	1,8	-	1/6/23/26	0/1/1/1
8	NAG	F	2	8	-	2/6/23/26	0/1/1/1
8	BMA	F	3	8	-	0/2/19/22	0/1/1/1
8	MAN	F	4	8	-	2/2/19/22	0/1/1/1
8	MAN	F	5	8	-	0/2/19/22	0/1/1/1
8	MAN	F	6	8	-	0/2/19/22	1/1/1/1
8	MAN	F	7	8	-	0/2/19/22	0/1/1/1
8	MAN	F	8	8	-	0/2/19/22	0/1/1/1
8	MAN	F	9	8	-	2/2/19/22	1/1/1/1
9	NAG	I	1	1,9	-	2/6/23/26	0/1/1/1
9	NAG	I	2	9	-	2/6/23/26	0/1/1/1
9	BMA	I	3	9	-	0/2/19/22	0/1/1/1
10	NAG	J	1	10,1	-	0/6/23/26	0/1/1/1
10	NAG	J	2	10	-	2/6/23/26	0/1/1/1
10	BMA	J	3	10	-	1/2/19/22	0/1/1/1
10	MAN	J	4	10	-	0/2/19/22	0/1/1/1
7	NAG	K	1	1,7	-	3/6/23/26	0/1/1/1
7	NAG	K	2	7	-	4/6/23/26	0/1/1/1
7	NAG	M	1	1,7	-	0/6/23/26	0/1/1/1
7	NAG	M	2	7	-	4/6/23/26	0/1/1/1
11	NAG	N	1	1,11	-	2/6/23/26	0/1/1/1
11	NAG	N	2	11	-	6/6/23/26	0/1/1/1
11	BMA	N	3	11	-	2/2/19/22	0/1/1/1
11	MAN	N	4	11	-	2/2/19/22	0/1/1/1
11	MAN	N	5	11	-	2/2/19/22	0/1/1/1
11	MAN	N	6	11	-	0/2/19/22	0/1/1/1
12	NAG	O	1	1,12	-	4/6/23/26	0/1/1/1
12	NAG	O	2	12	-	2/6/23/26	0/1/1/1
12	MAN	O	3	12	-	2/2/19/22	0/1/1/1
12	BMA	O	4	12	-	2/2/19/22	0/1/1/1
12	MAN	O	5	12	-	0/2/19/22	0/1/1/1
9	NAG	P	1	1,9	-	4/6/23/26	0/1/1/1
9	NAG	P	2	9	-	3/6/23/26	0/1/1/1
9	BMA	P	3	9	-	1/2/19/22	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
7	NAG	Q	1	1,7	-	4/6/23/26	0/1/1/1
7	NAG	Q	2	7	-	1/6/23/26	0/1/1/1
7	NAG	R	1	2,7	-	2/6/23/26	0/1/1/1
7	NAG	R	2	7	-	3/6/23/26	0/1/1/1
9	NAG	S	1	9	-	2/6/23/26	0/1/1/1
9	NAG	S	2	9	-	2/6/23/26	0/1/1/1
9	BMA	S	3	9	-	0/2/19/22	0/1/1/1

The worst 5 of 12 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
7	K	1	NAG	C1-C2	4.03	1.57	1.52
7	K	1	NAG	O5-C1	3.94	1.50	1.43
7	C	1	NAG	O5-C1	-3.24	1.38	1.43
12	O	5	MAN	C1-C2	2.61	1.58	1.52
9	S	2	NAG	O5-C1	2.48	1.47	1.43

The worst 5 of 42 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
7	K	1	NAG	C2-N2-C7	6.87	132.11	122.90
7	K	1	NAG	C1-O5-C5	6.67	121.13	112.19
8	F	5	MAN	C1-O5-C5	6.48	120.87	112.19
11	N	2	NAG	C2-N2-C7	4.65	129.14	122.90
7	K	1	NAG	C1-C2-N2	4.52	117.56	110.43

There are no chirality outliers.

5 of 76 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
7	K	1	NAG	C1-C2-N2-C7
9	I	2	NAG	O5-C5-C6-O6
9	I	1	NAG	O5-C5-C6-O6
8	F	4	MAN	O5-C5-C6-O6
8	F	2	NAG	O5-C5-C6-O6

All (2) ring outliers are listed below:

Mol	Chain	Res	Type	Atoms
8	F	6	MAN	C1-C2-C3-C4-C5-O5

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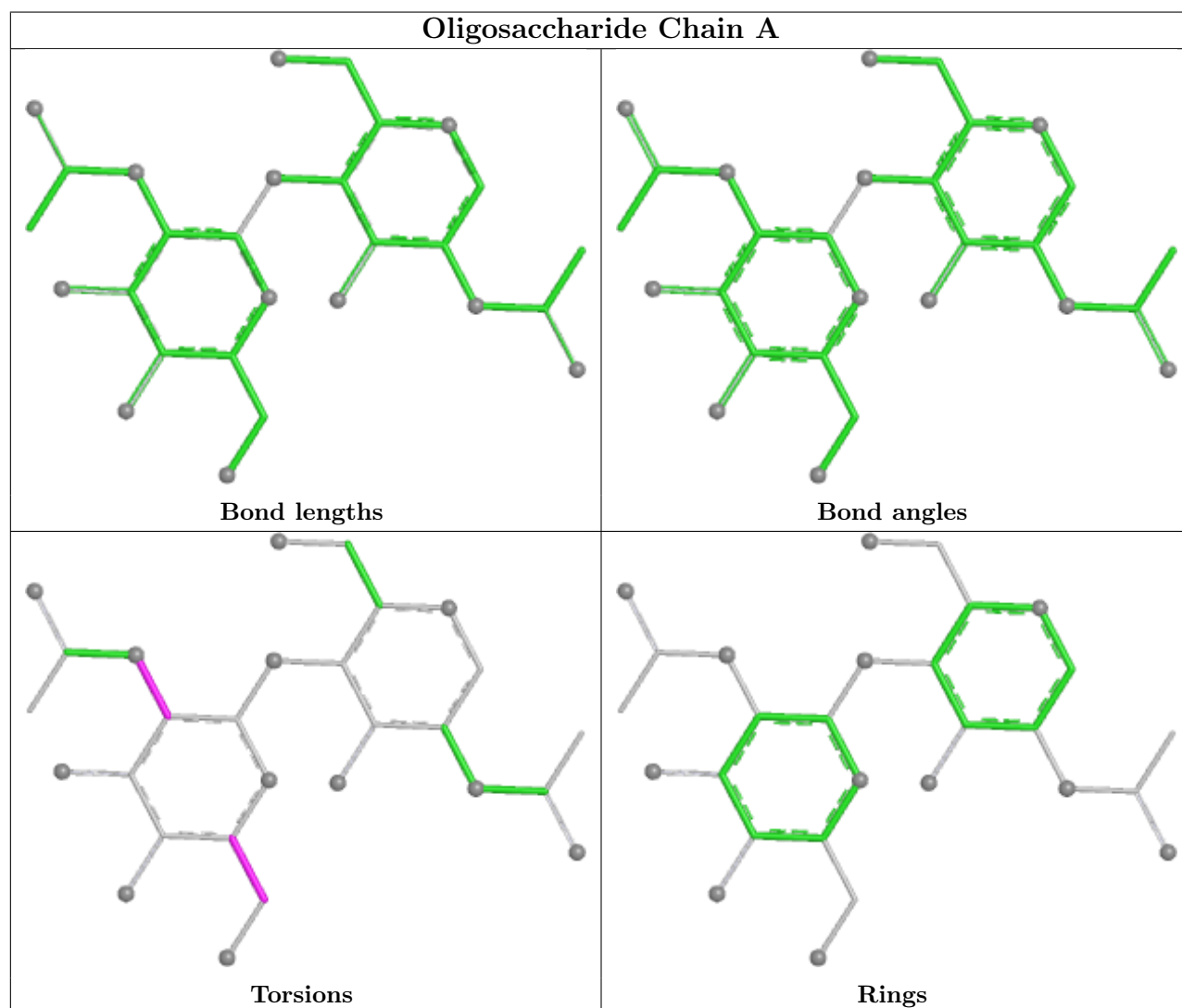
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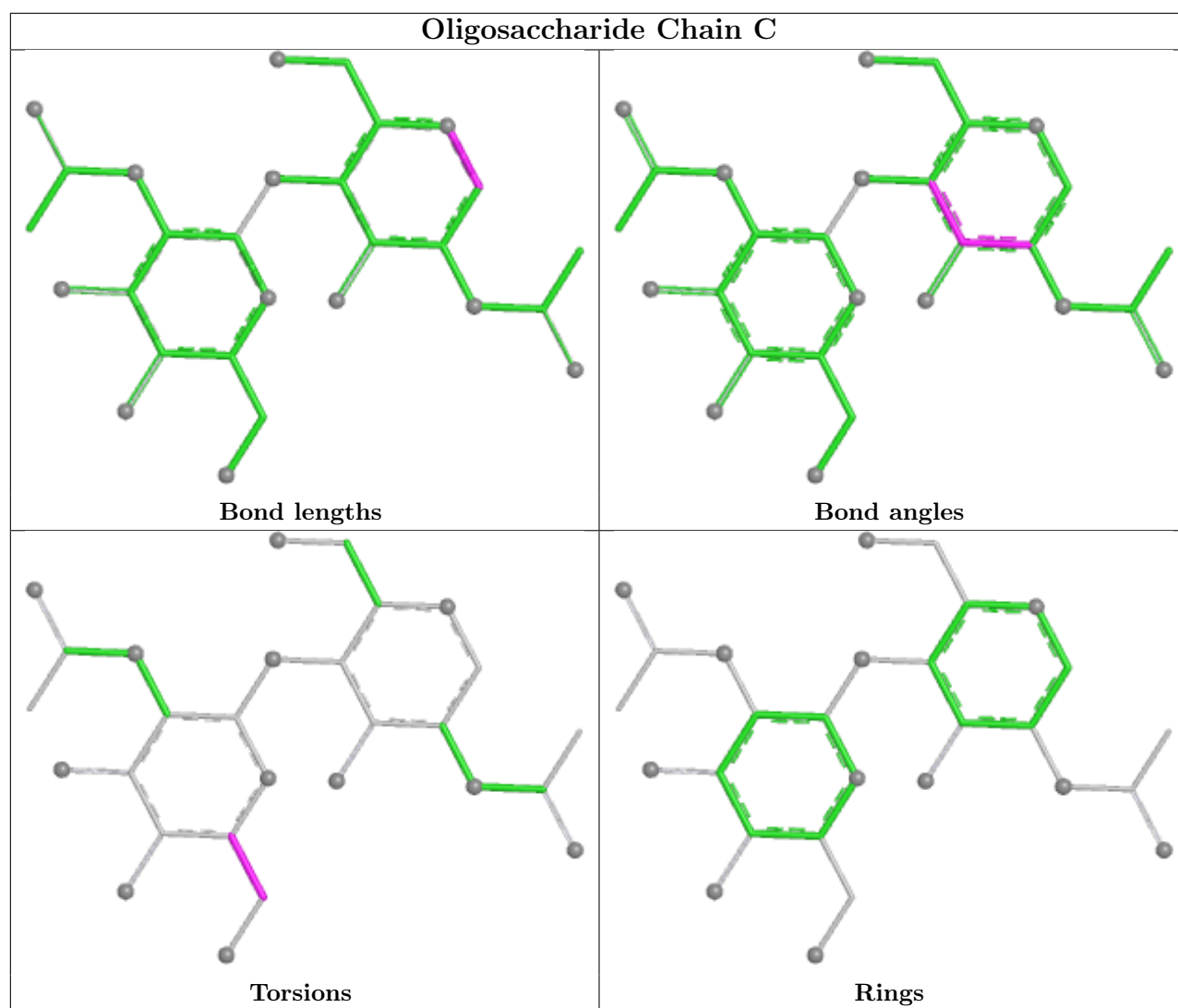
Mol	Chain	Res	Type	Atoms
8	F	9	MAN	C1-C2-C3-C4-C5-O5

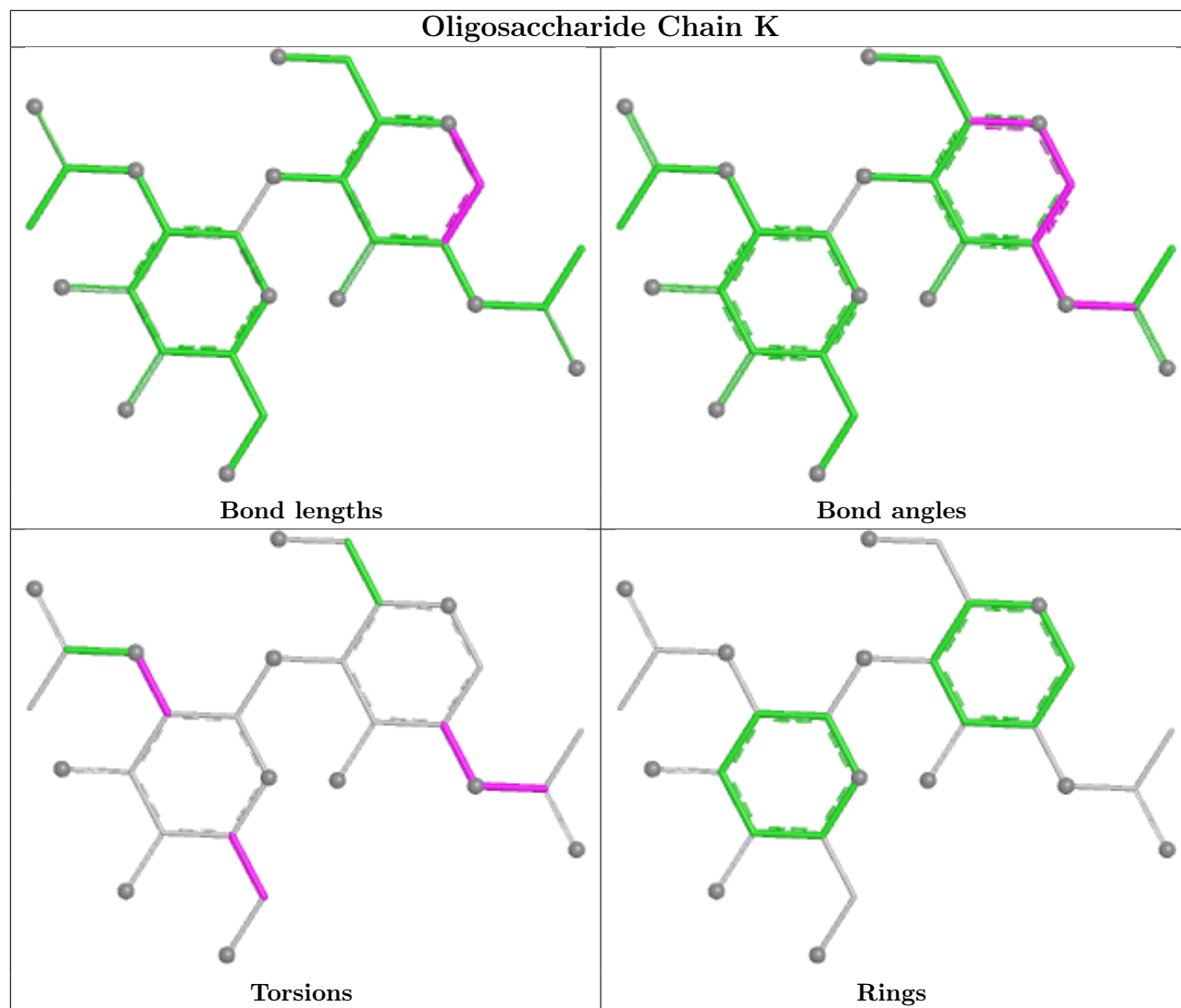
4 monomers are involved in 3 short contacts:

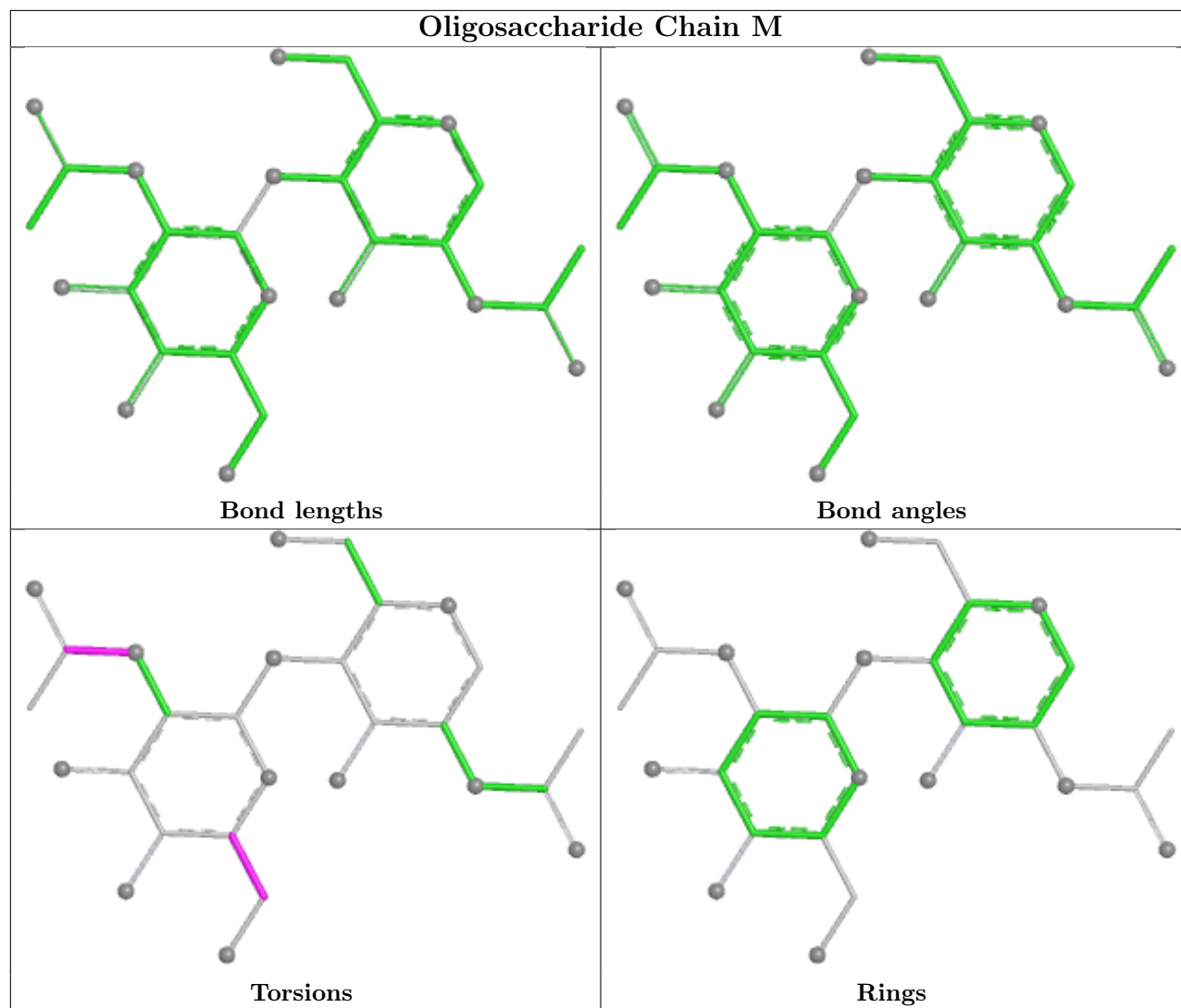
Mol	Chain	Res	Type	Clashes	Symm-Clashes
9	S	2	NAG	1	0
9	S	1	NAG	1	0
11	N	6	MAN	1	0
10	J	4	MAN	1	0

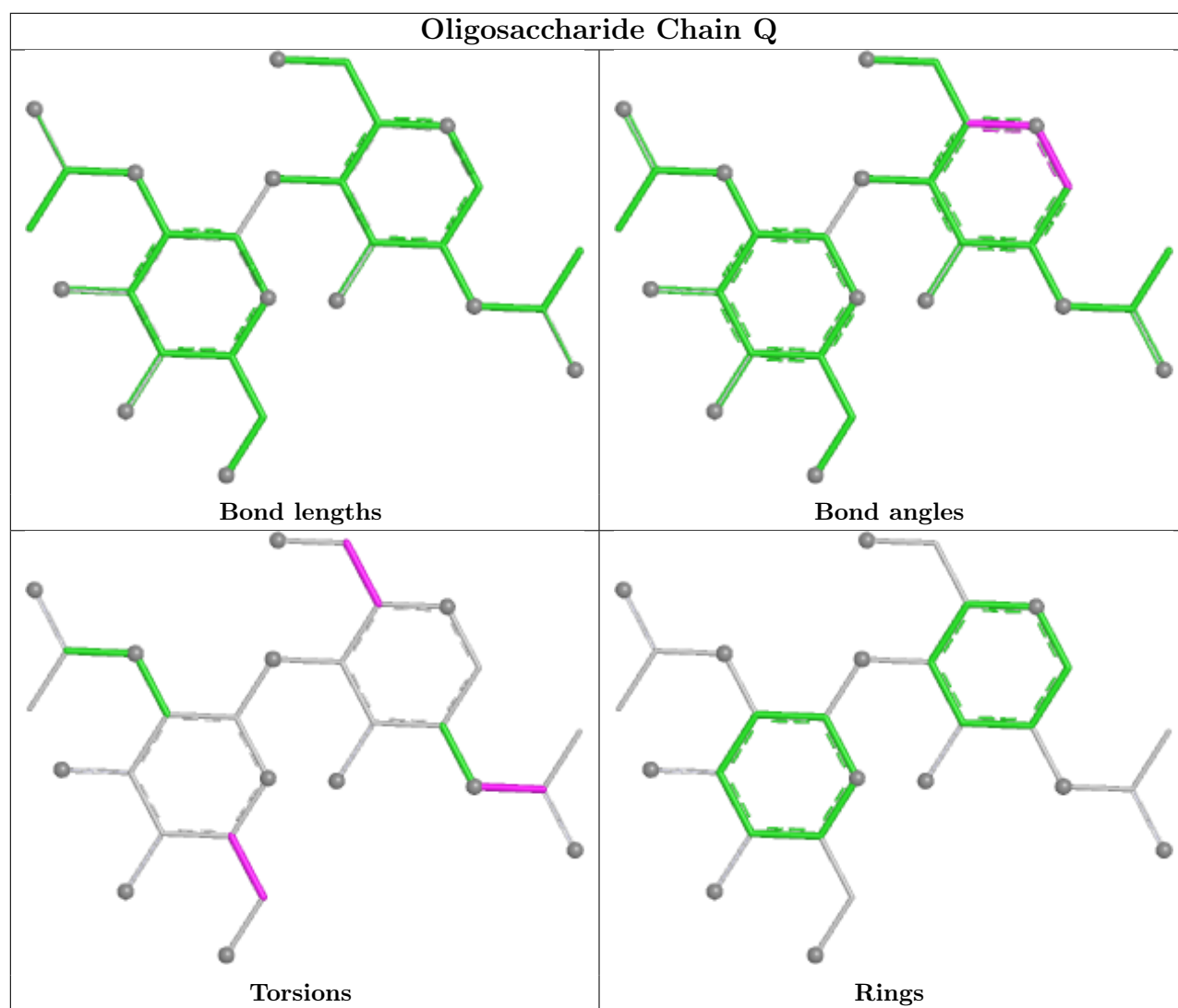
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for oligosaccharide.

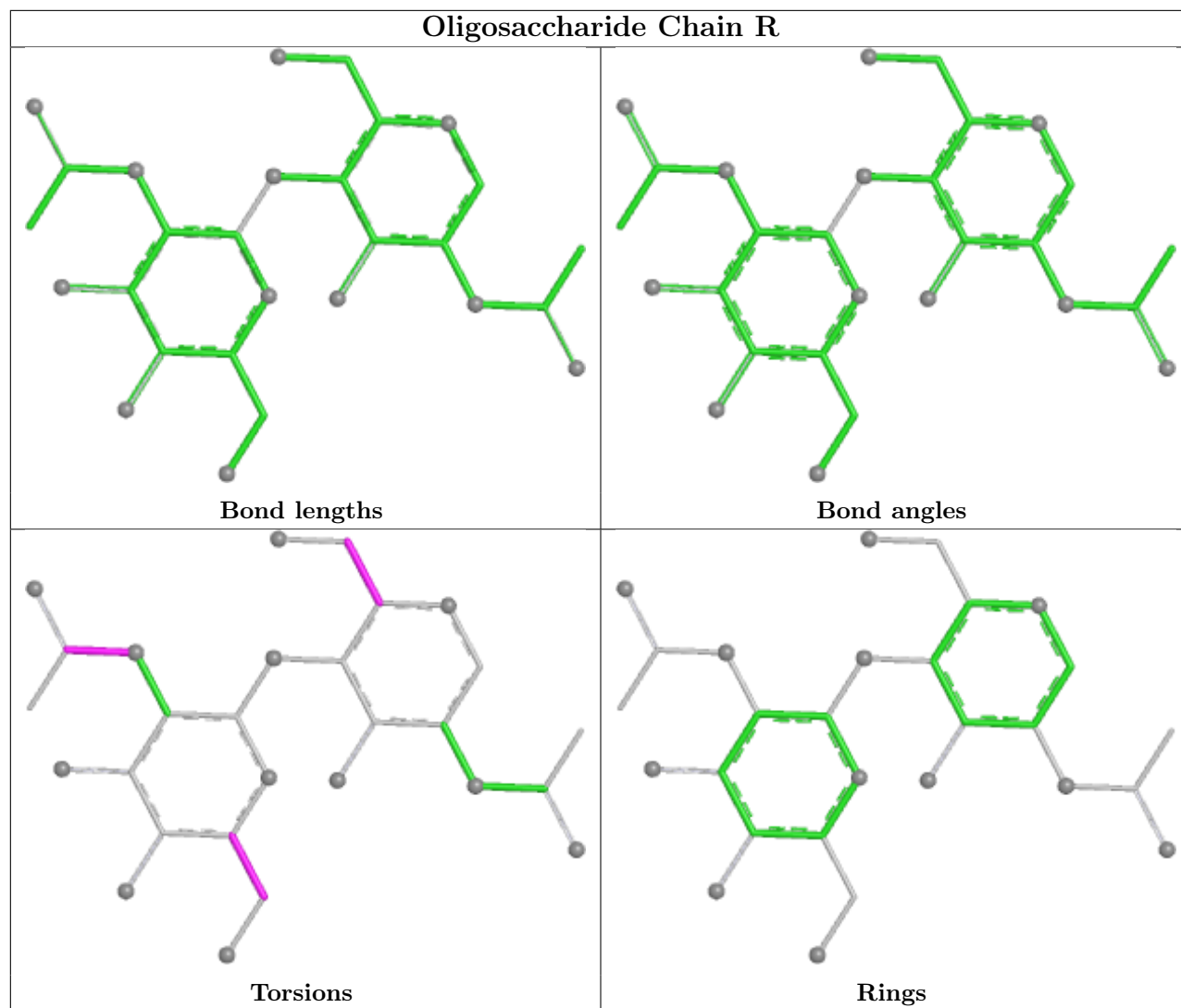


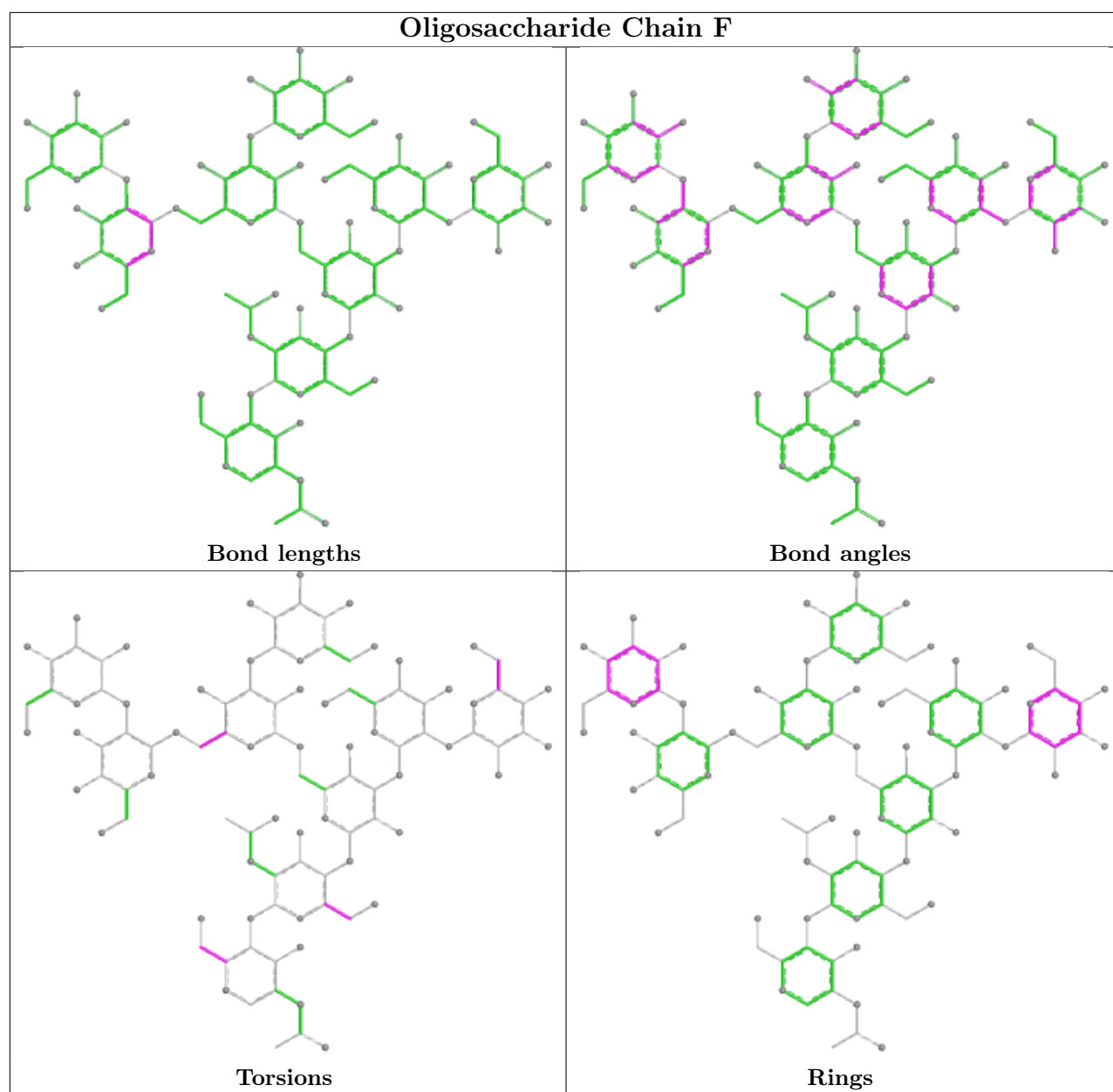


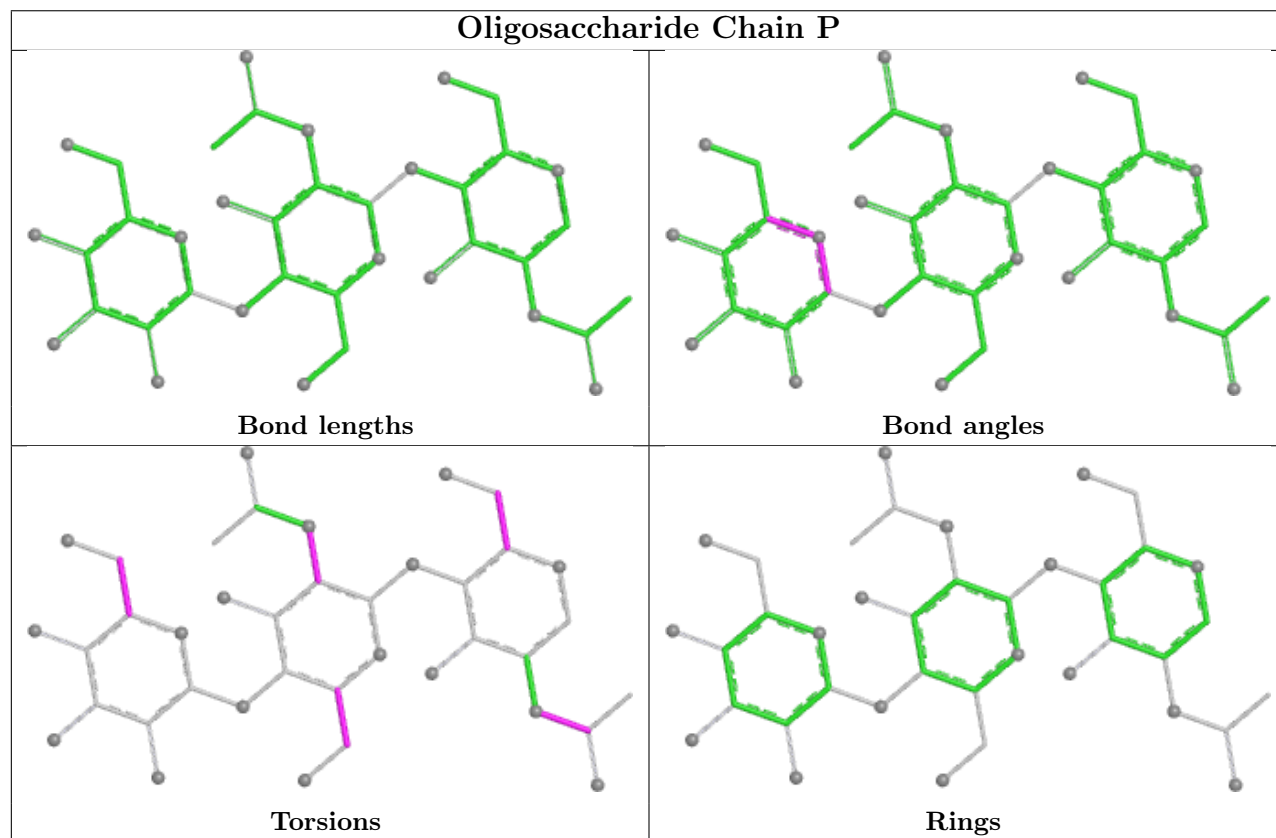
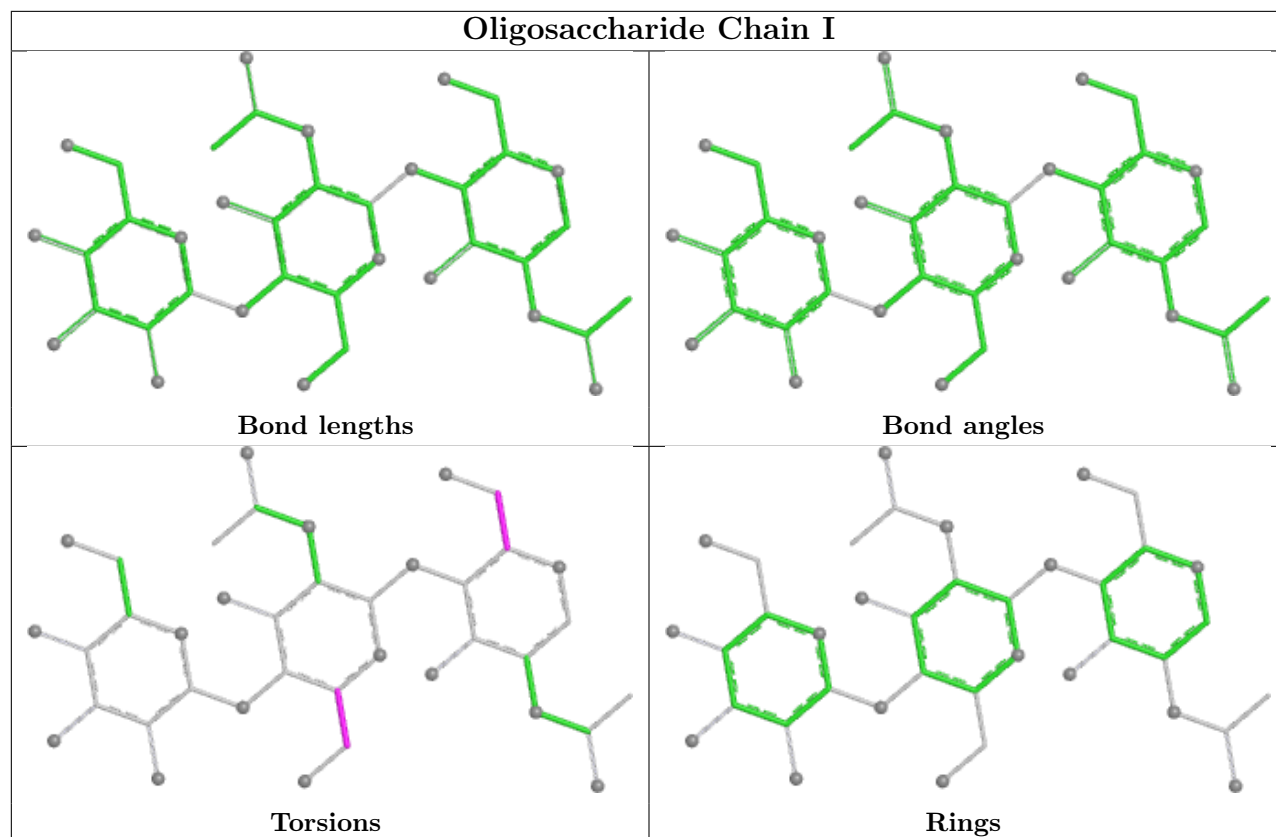


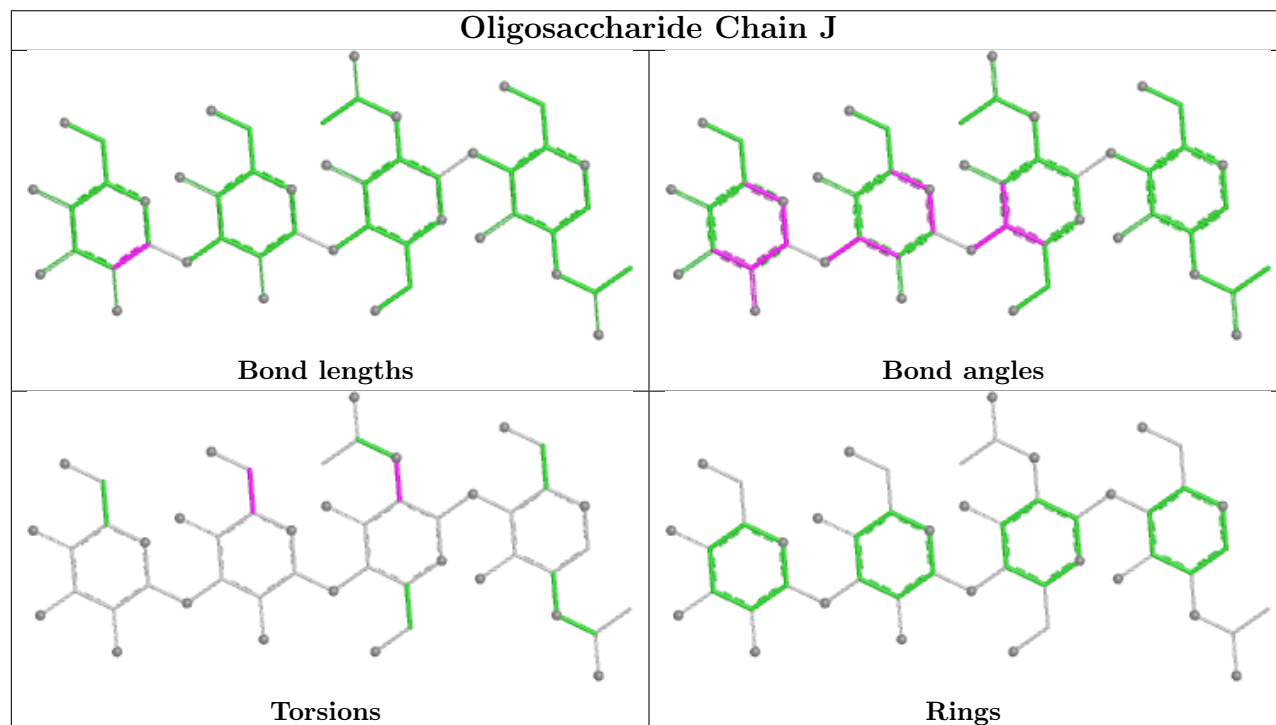
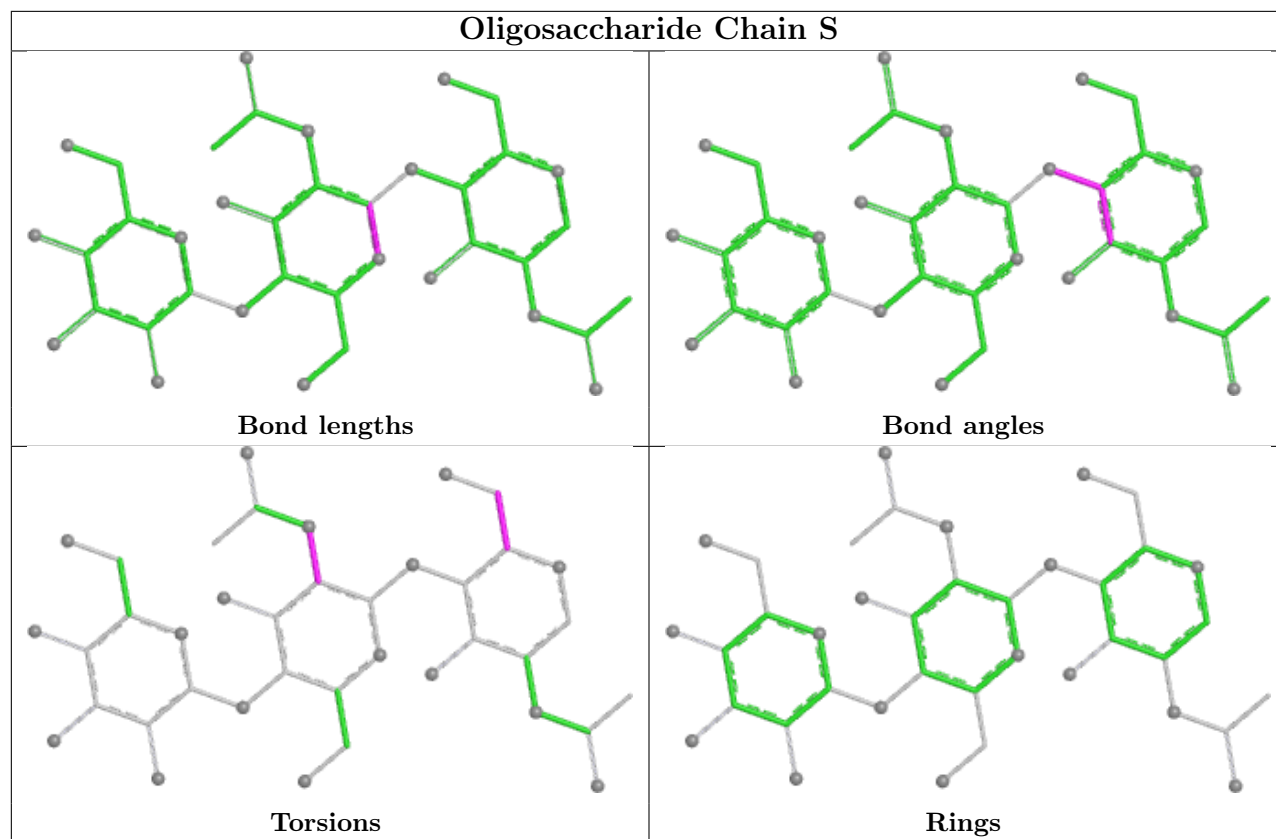


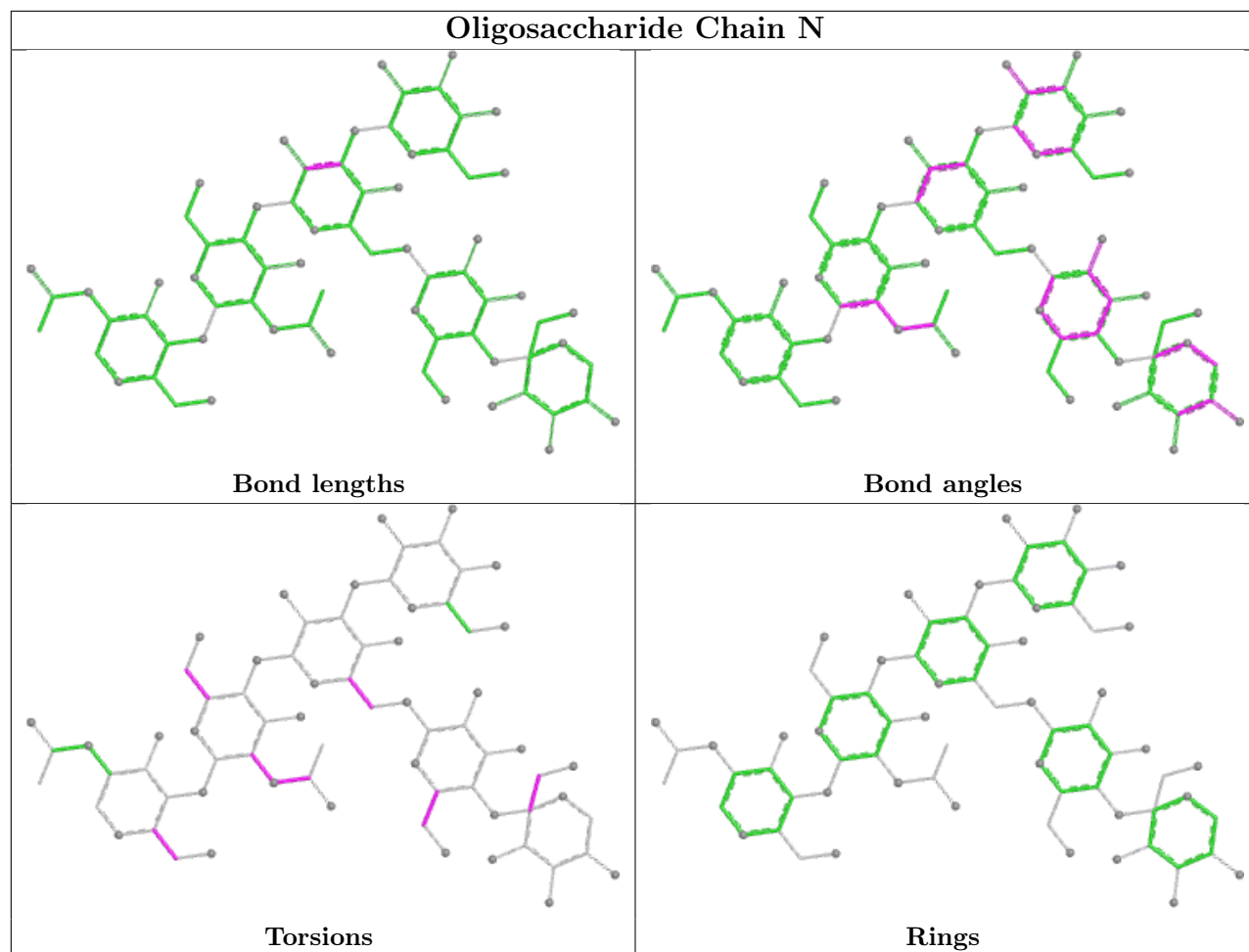


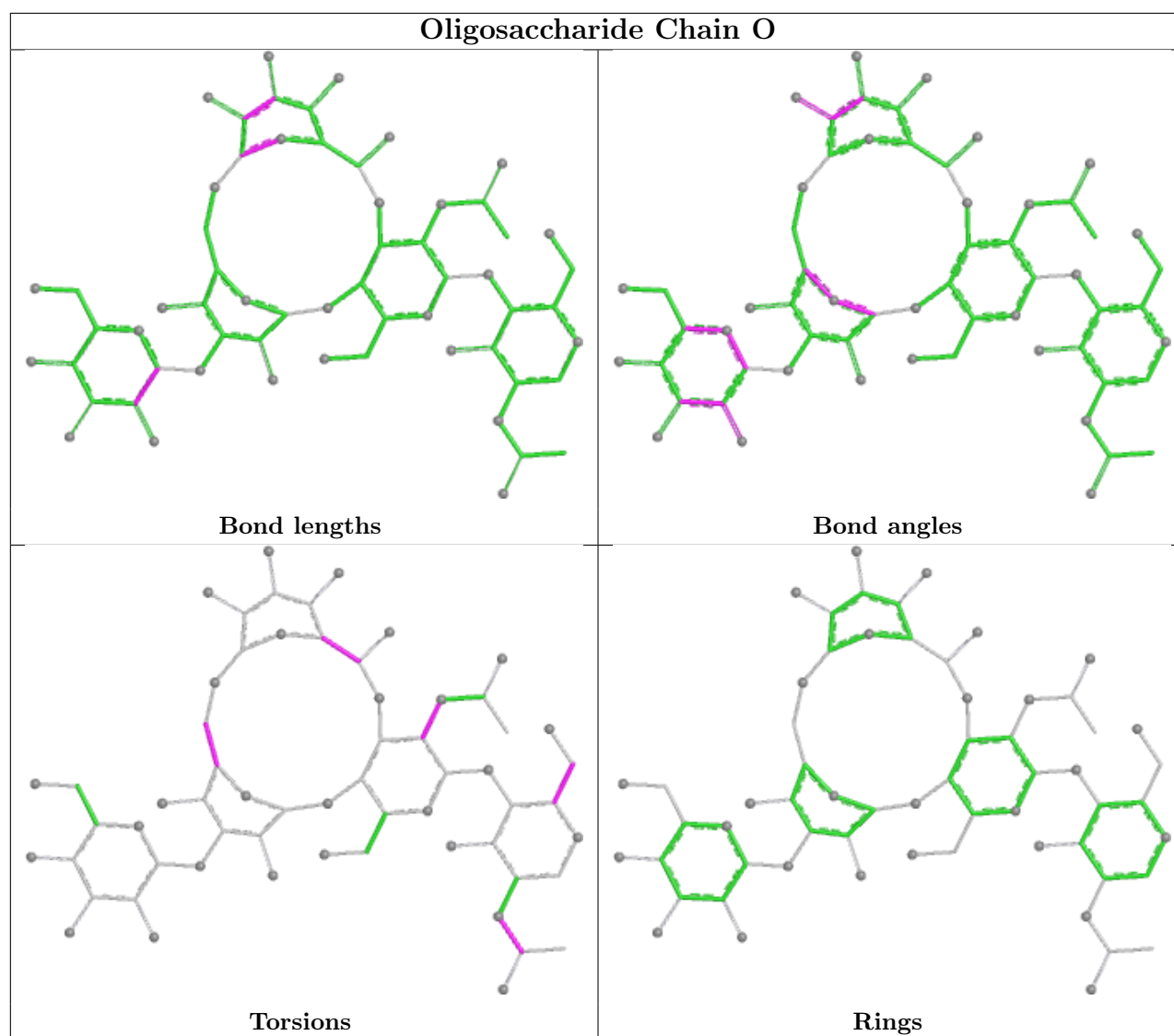












5.6 Ligand geometry [i](#)

5 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	$\# Z > 2$
13	NAG	G	601	1	14,14,15	0.23	0	17,19,21	0.47	0
13	NAG	G	602	1	14,14,15	0.27	0	17,19,21	0.50	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
13	NAG	B	701	2	14,14,15	0.27	0	17,19,21	0.45	0
13	NAG	G	603	1	14,14,15	0.66	1 (7%)	17,19,21	0.62	0
13	NAG	G	604	1	14,14,15	0.32	0	17,19,21	0.42	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
13	NAG	G	601	1	-	2/6/23/26	0/1/1/1
13	NAG	G	602	1	-	2/6/23/26	0/1/1/1
13	NAG	B	701	2	-	2/6/23/26	0/1/1/1
13	NAG	G	603	1	-	3/6/23/26	0/1/1/1
13	NAG	G	604	1	-	2/6/23/26	0/1/1/1

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
13	G	603	NAG	C1-C2	2.30	1.55	1.52

There are no bond angle outliers.

There are no chirality outliers.

5 of 11 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
13	B	701	NAG	C4-C5-C6-O6
13	G	602	NAG	O5-C5-C6-O6
13	B	701	NAG	O5-C5-C6-O6
13	G	602	NAG	C4-C5-C6-O6
13	G	601	NAG	C8-C7-N2-C2

There are no ring outliers.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
13	G	603	NAG	1	0

5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

The following chains have linkage breaks:

Mol	Chain	Number of breaks
1	G	3
5	D	2
2	B	1
4	H	1
3	L	1

The worst 5 of 8 chain breaks are listed below:

Model	Chain	Residue-1	Atom-1	Residue-2	Atom-2	Distance (Å)
1	G	400:THR	C	410:ASN	N	11.90
1	B	550:GLN	C	562:GLN	N	10.54
1	G	185:LYS	C	192:ARG	N	9.20
1	D	81:GLU	C	82(B):ASN	N	9.00
1	G	137:THR	C	151:THR	N	8.62

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	G	446/446 (100%)	0.88	63 (14%) 6 5	97, 126, 163, 182	0
2	B	132/132 (100%)	1.22	25 (18%) 3 3	102, 122, 191, 208	0
3	L	212/212 (100%)	0.41	11 (5%) 33 21	80, 104, 125, 169	0
4	H	229/229 (100%)	0.41	10 (4%) 39 25	72, 94, 122, 135	0
5	D	117/117 (100%)	1.02	13 (11%) 10 7	112, 149, 188, 197	0
6	E	107/107 (100%)	0.72	8 (7%) 20 14	111, 131, 156, 164	0
All	All	1243/1243 (100%)	0.75	130 (10%) 11 8	72, 119, 167, 208	0

The worst 5 of 130 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	B	522	PHE	7.2
1	G	153	GLU	6.0
1	G	72	HIS	5.9
2	B	524	GLY	5.2
2	B	655	ARG	5.2

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.

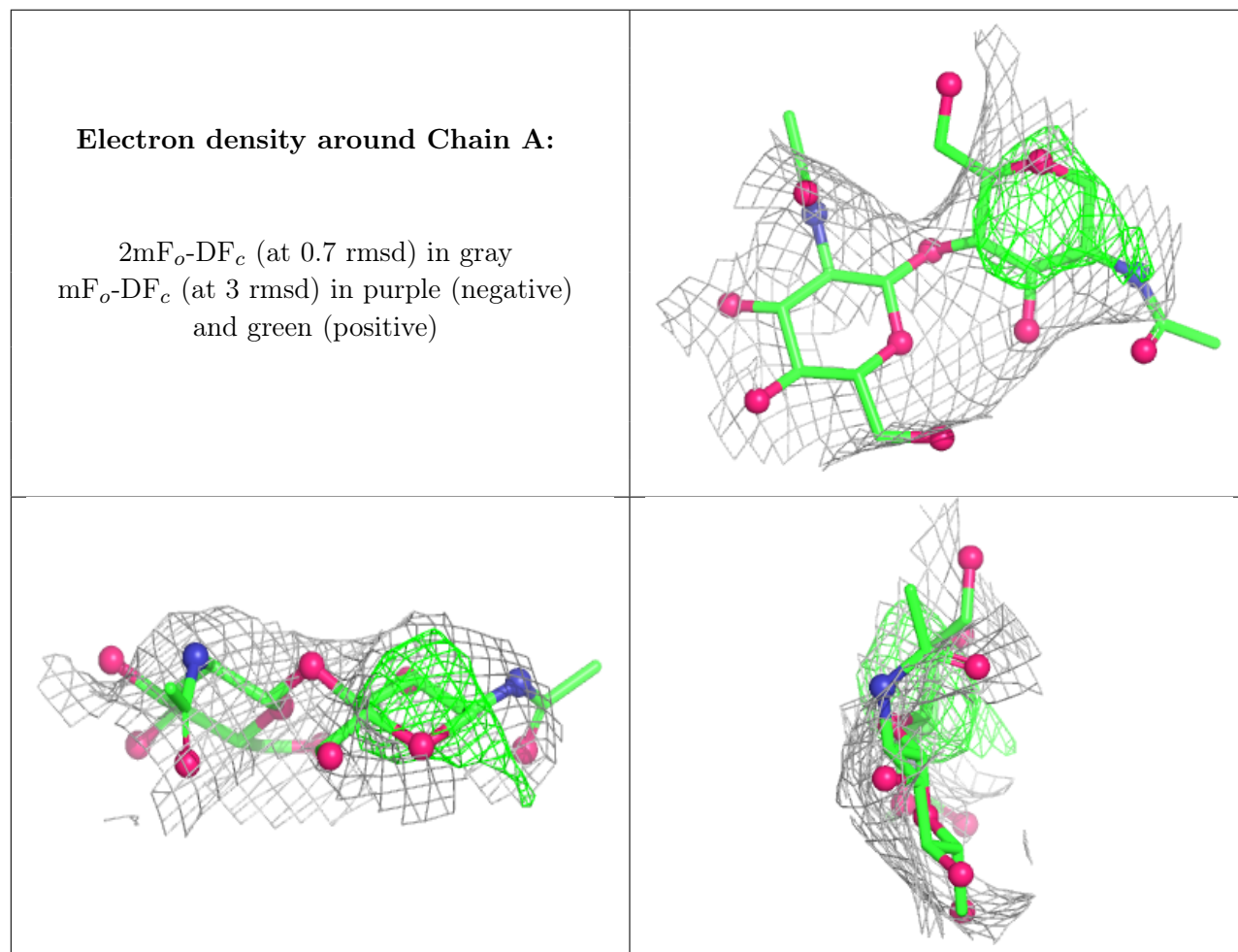
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
7	NAG	A	1	14/15	-	-	139,139,139,139	14
7	NAG	A	2	14/15	-	-	158,158,158,158	0
7	NAG	C	1	14/15	-	-	150,150,150,150	14
7	NAG	C	2	14/15	-	-	163,163,163,163	0
7	NAG	K	1	14/15	-	-	135,135,135,135	14
7	NAG	K	2	14/15	-	-	142,142,142,142	0
7	NAG	M	1	14/15	-	-	104,104,104,104	14
7	NAG	M	2	14/15	-	-	103,103,103,103	14
9	NAG	S	2	14/15	0.38	0.14	184,184,184,184	0
11	MAN	N	6	11/12	0.44	0.17	151,151,151,151	0
7	NAG	R	1	14/15	-	-	127,127,127,127	14
7	NAG	R	2	14/15	-	-	130,130,130,130	14
8	NAG	F	1	14/15	-	-	109,109,109,109	14
8	NAG	F	2	14/15	-	-	103,103,103,103	14
8	BMA	F	3	11/12	-	-	100,100,100,100	11
8	MAN	F	4	11/12	-	-	99,99,99,99	11
8	MAN	F	5	11/12	-	-	99,99,99,99	11
8	MAN	F	6	11/12	-	-	98,98,98,98	11
8	MAN	F	7	11/12	-	-	99,99,99,99	11
8	MAN	F	8	11/12	-	-	101,101,101,101	11
8	MAN	F	9	11/12	-	-	106,106,106,106	11
9	NAG	I	1	14/15	-	-	136,136,136,136	14
9	NAG	I	2	14/15	-	-	155,155,155,155	0
9	BMA	I	3	11/12	-	-	169,169,169,169	0
7	NAG	Q	2	14/15	0.45	0.11	181,181,181,181	0
9	NAG	S	1	14/15	0.47	0.15	168,168,168,168	0
12	MAN	O	3	11/12	0.47	0.12	200,200,200,200	0
12	BMA	O	4	11/12	0.51	0.13	204,204,204,204	0
11	MAN	N	5	11/12	0.52	0.14	169,169,169,169	0
9	BMA	S	3	11/12	0.59	0.11	185,185,185,185	0
10	NAG	J	1	14/15	-	-	122,122,122,122	14
12	MAN	O	5	11/12	0.59	0.11	208,208,208,208	0
9	BMA	P	3	11/12	0.60	0.09	167,167,167,167	0
10	MAN	J	4	11/12	-	-	167,167,167,167	0
11	NAG	N	1	14/15	-	-	132,132,132,132	14
11	NAG	N	2	14/15	-	-	142,142,142,142	14
11	BMA	N	3	11/12	-	-	150,150,150,150	11
10	BMA	J	3	11/12	0.63	0.09	155,155,155,155	0
12	NAG	O	2	14/15	0.64	0.12	192,192,192,192	0
10	NAG	J	2	14/15	0.67	0.12	133,133,133,133	14
12	NAG	O	1	14/15	0.67	0.13	175,175,175,175	0
7	NAG	Q	1	14/15	0.75	0.11	166,166,166,166	0
9	NAG	P	1	14/15	0.77	0.13	143,143,143,143	0

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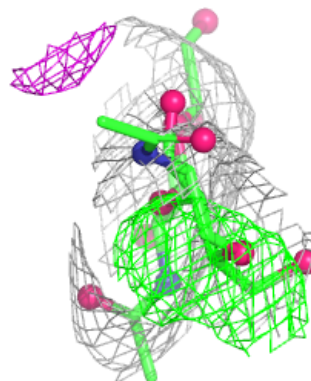
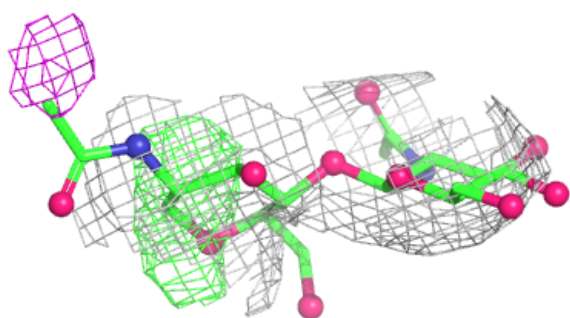
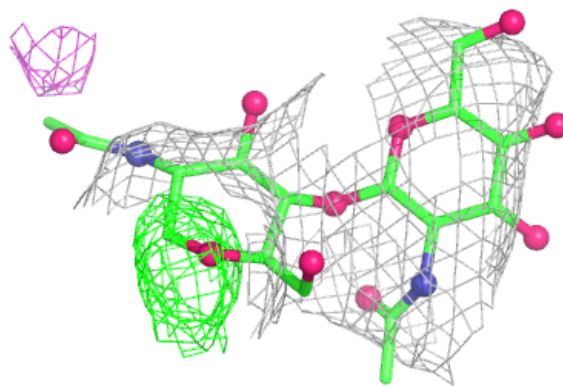
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
11	MAN	N	4	11/12	0.80	0.15	163,163,163,163	0
9	NAG	P	2	14/15	0.88	0.12	156,156,156,156	0

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.



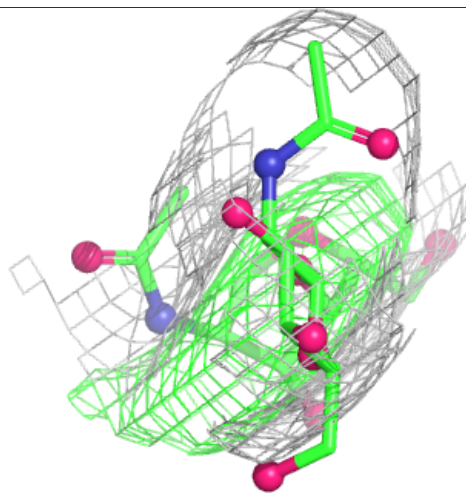
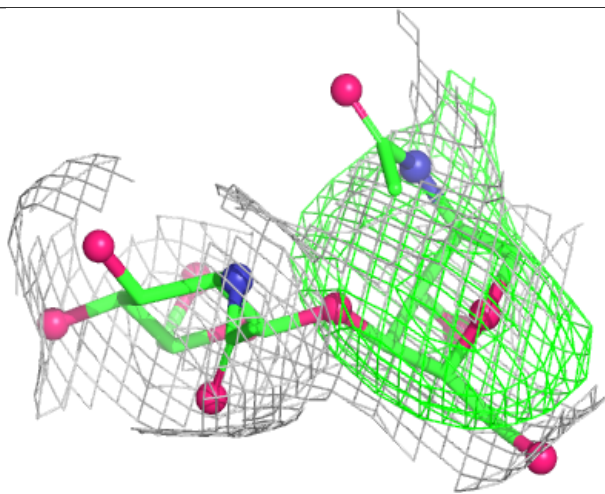
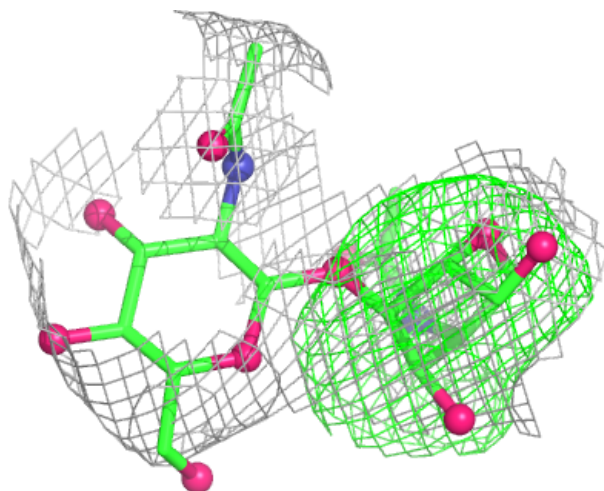
Electron density around Chain C:

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



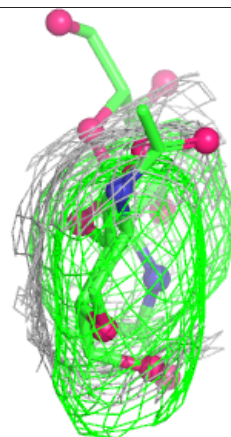
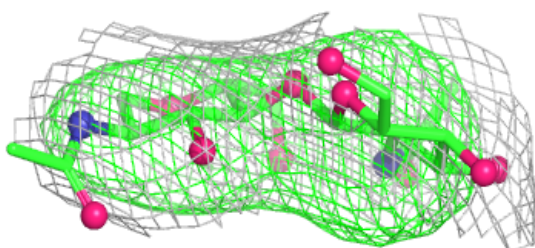
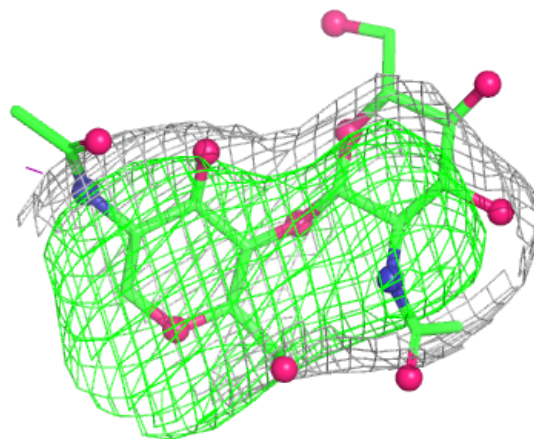
Electron density around Chain K:

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



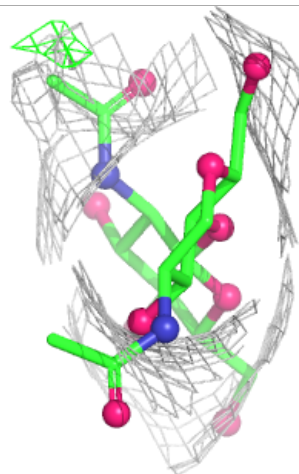
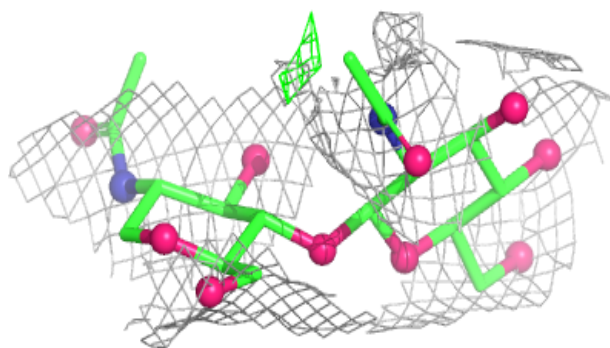
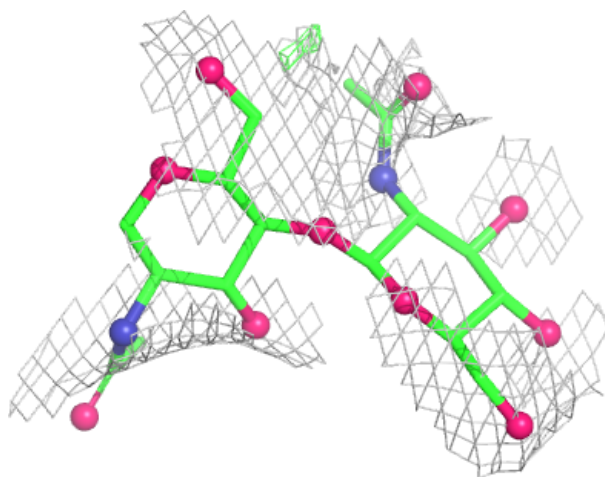
Electron density around Chain M:

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



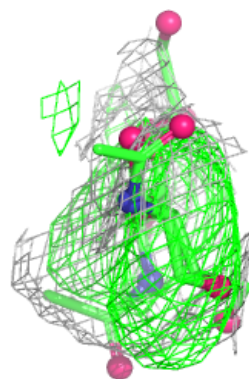
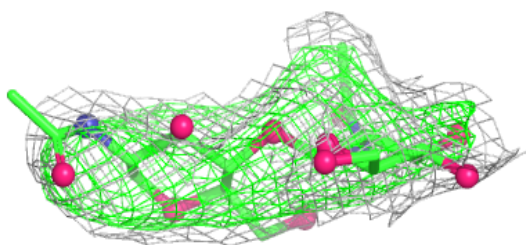
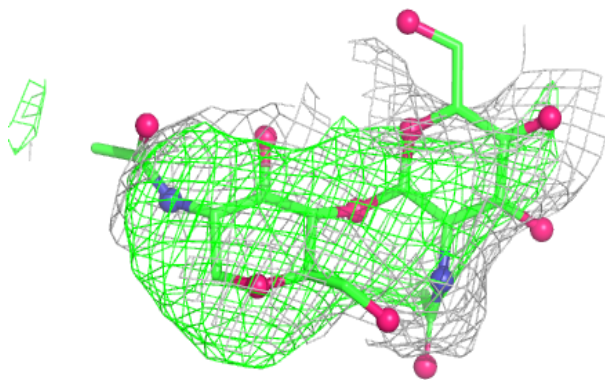
Electron density around Chain Q:

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

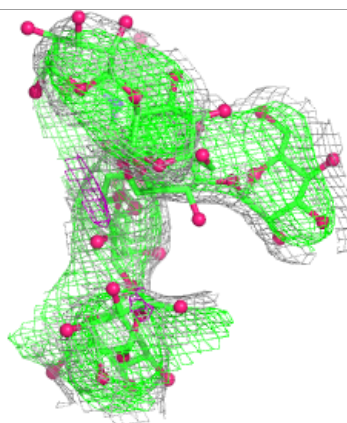
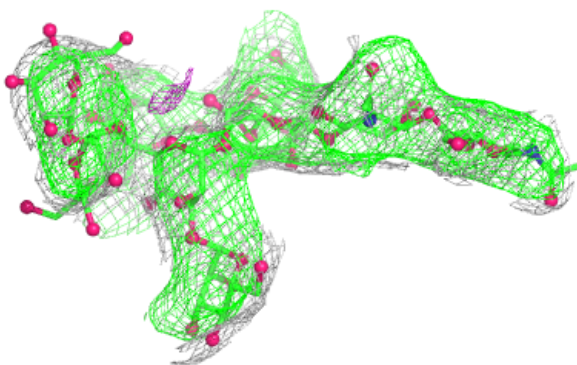
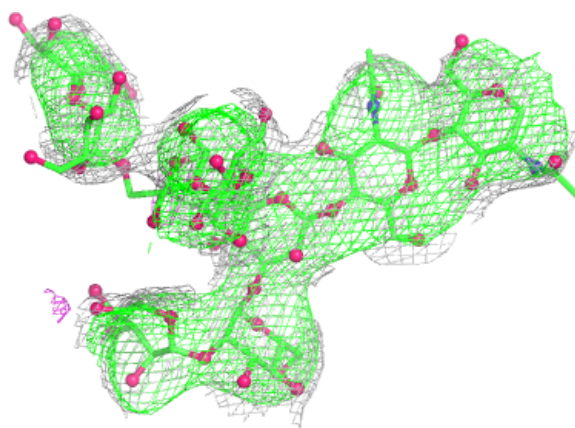


Electron density around Chain R:

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

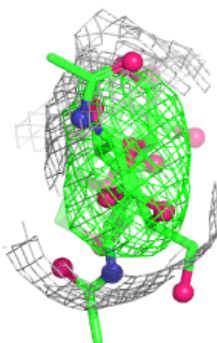
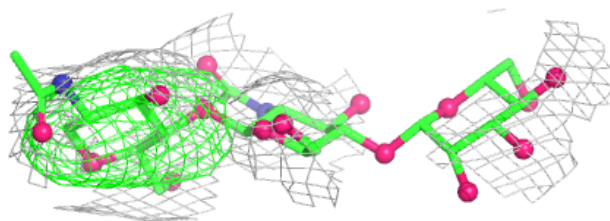
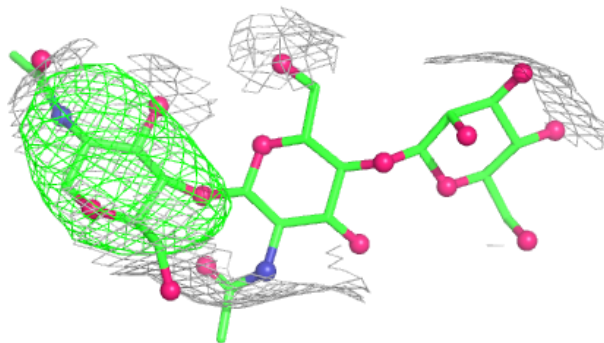
**Electron density around Chain F:**

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

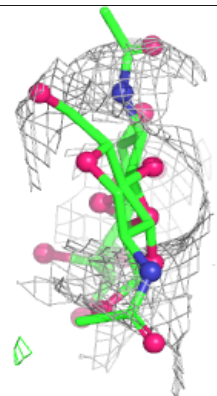
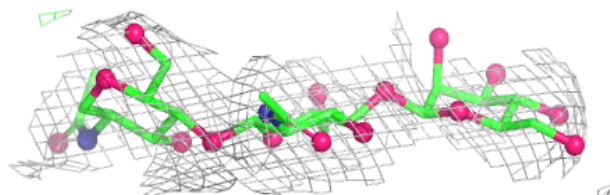
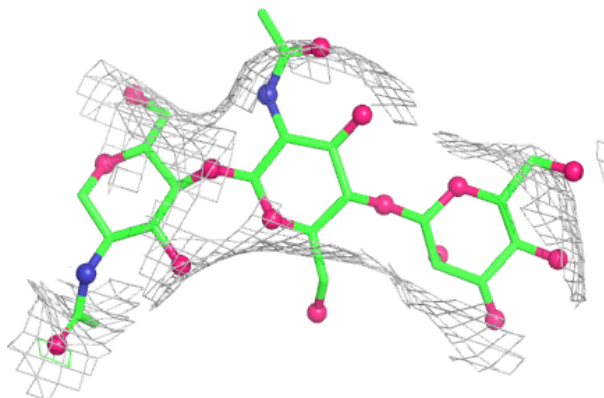


Electron density around Chain I:

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

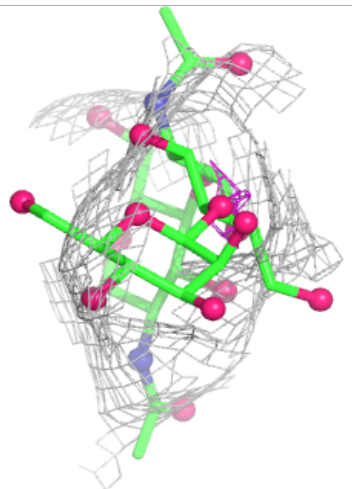
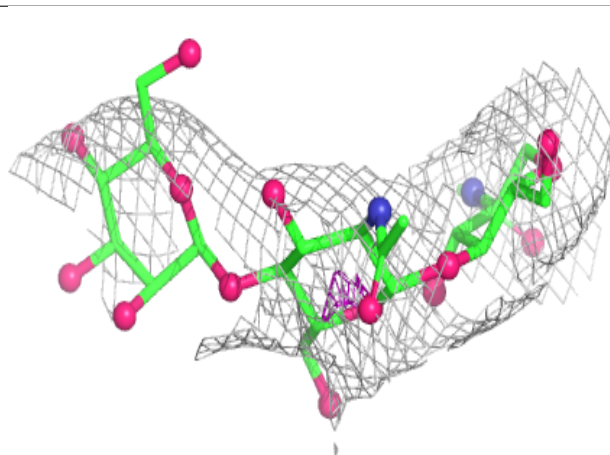
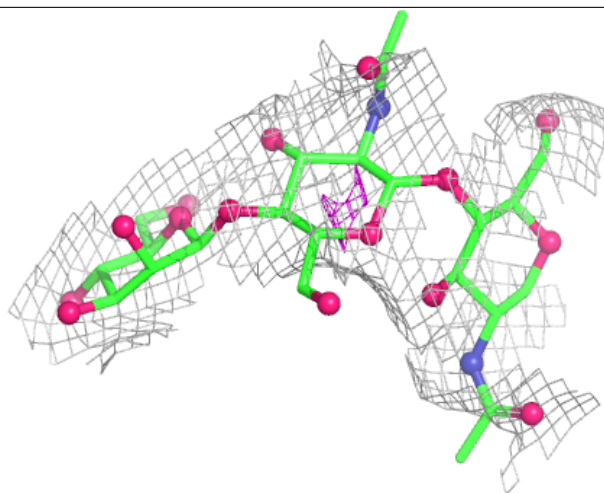
**Electron density around Chain P:**

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



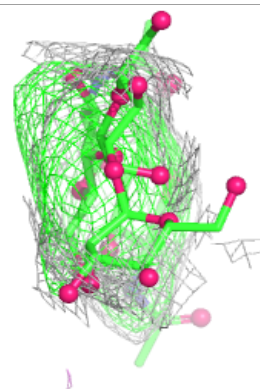
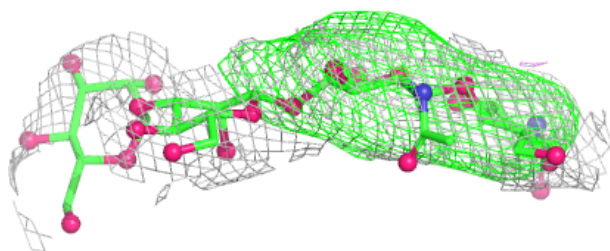
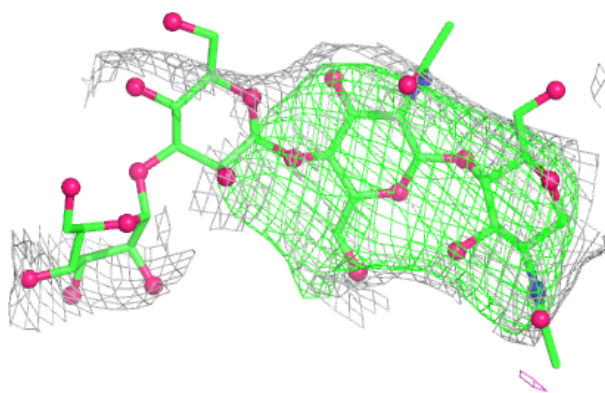
Electron density around Chain S:

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



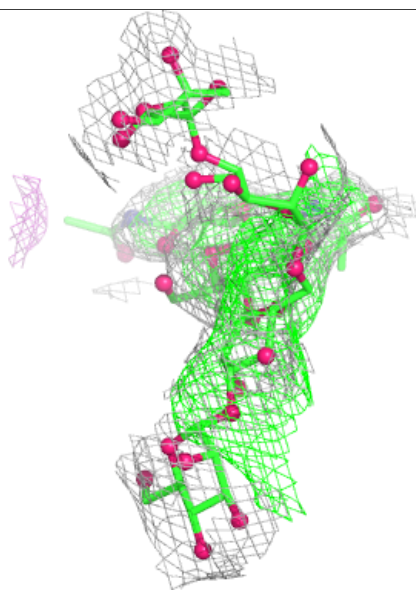
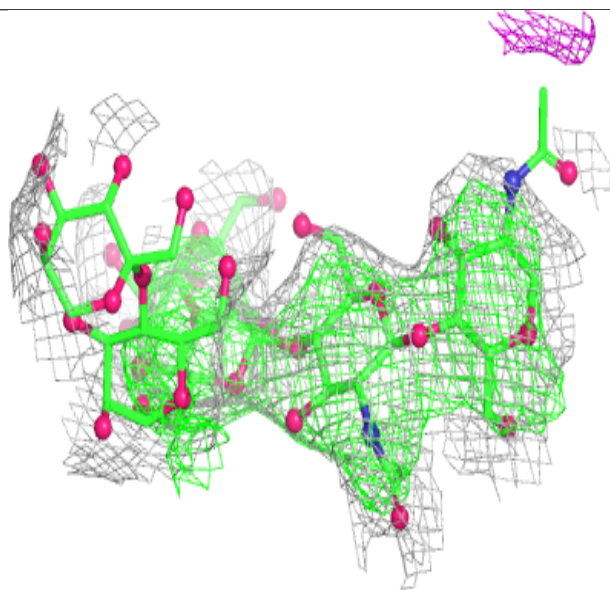
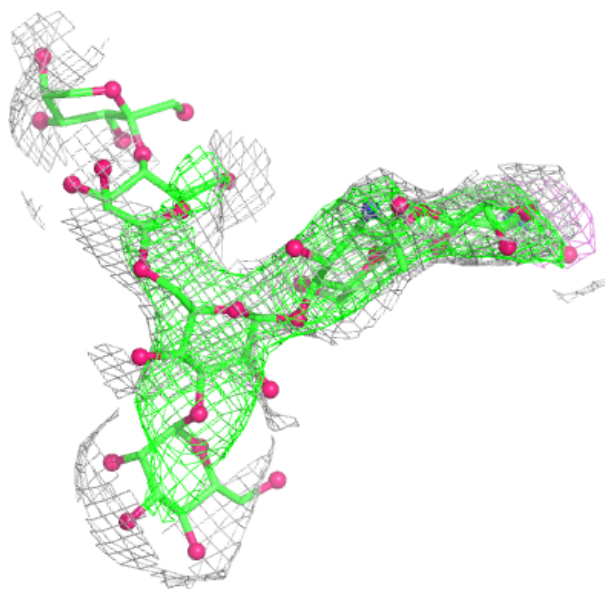
Electron density around Chain J:

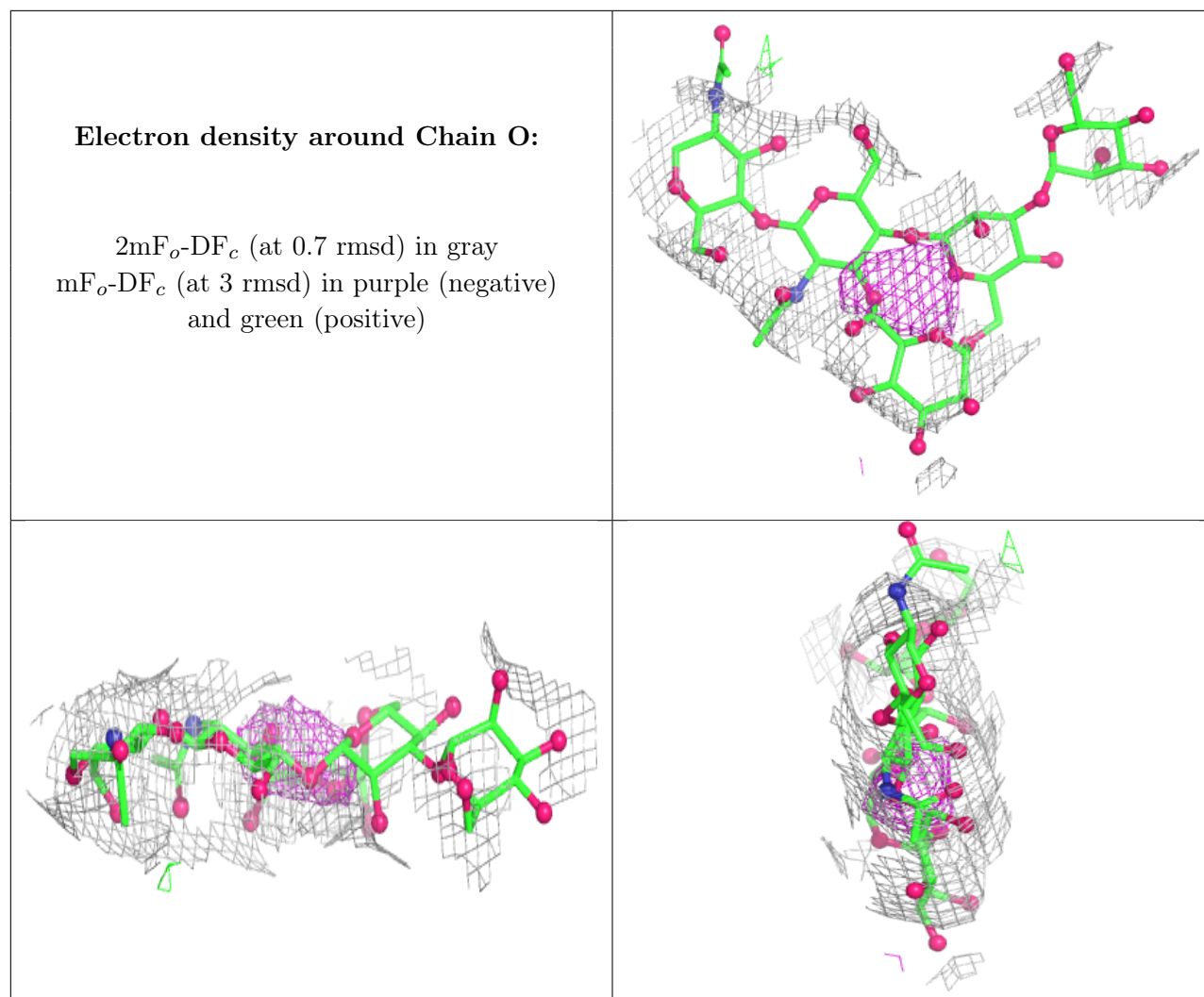
$2mF_o - DF_c$ (at 0.7 rmsd) in gray
 $mF_o - DF_c$ (at 3 rmsd) in purple (negative)
and green (positive)



Electron density around Chain 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 ⓘ

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
13	NAG	G	601	14/15	-	-	130,130,130,130	14
13	NAG	G	604	14/15	0.67	0.12	158,158,158,158	0
13	NAG	G	602	14/15	0.78	0.10	126,126,126,126	0
13	NAG	G	603	14/15	0.82	0.15	117,117,117,117	0
13	NAG	B	701	14/15	-	-	115,115,115,115	14

6.5 Other polymers [i](#)

There are no such residues in this entry.