



wwPDB X-ray Structure Validation Summary Report ⓘ

Mar 5, 2026 – 03:38 PM UTC

PDB ID : 8D50 / pdb_00008d50
Title : Crystal Structure of Mosaic HIV-1 Envelope (MosM3.1) in Complex with antibodies PGT124 and 35O22 at 4.3 Angstrom
Authors : Xian, Y.; Wilson, I.A.
Deposited on : 2022-06-03
Resolution : 4.32 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

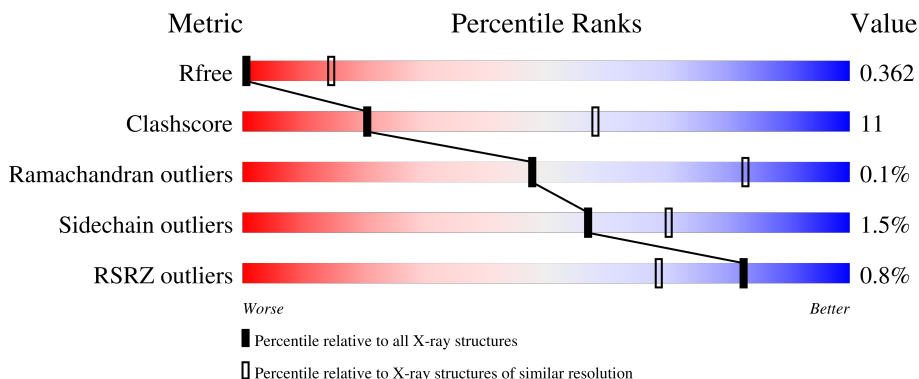
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 4.32 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	1056 (4.72-3.90)
Clashscore	190562	1101 (4.72-3.90)
Ramachandran outliers	187476	1003 (4.72-3.90)
Sidechain outliers	187428	1010 (4.76-3.88)
RSRZ outliers	180081	1053 (4.72-3.90)

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	431	70% 30%
2	B	137	64% 35% . %
3	D	141	81% 19%
4	E	107	87% 13% %
5	L	210	75% 25% %

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Mol	Chain	Length	Quality of chain
6	H	226	 % 70% 29%
7	P	5	 100%
8	A	2	 50% 50%
8	K	2	 100%
8	M	2	 50% 50%
9	C	6	 33% 67%
10	F	4	 75% 25%
11	I	3	 67% 33%
11	J	3	 100%
11	N	3	 33% 33% 33%

2 Entry composition [i](#)

There are 13 unique types of molecules in this entry. The entry contains 10251 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
			Total	C	N	O	S			
1	G	431	3426	2155	610	634	27	0	0	0

- Molecule 2 is a protein called Envelope glycoprotein gp41.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	B	137	1102	696	189	210	7	0	0	0

- Molecule 3 is a protein called 35O22 Fab heavy chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
3	D	141	1097	706	181	204	6	0	0	0

- Molecule 4 is a protein called 35O22 Fab light chain.

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

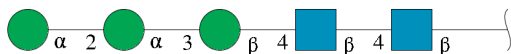
- Molecule 5 is a protein called PGT124 Fab light chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
5	L	210	1595	1005	270	315	5	0	0	0

- Molecule 6 is a protein called PGT124 Fab heavy chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
6	H	226	1720	1093	287	335	5	0	0	0

- Molecule 7 is an oligosaccharide called 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.



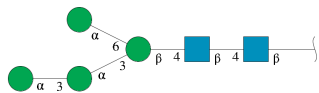
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
7	P	5	61	34	2	25	0	0	0

- Molecule 8 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
			Total	C	N	O			
8	A	2	28	16	2	10	0	0	0
8	K	2	28	16	2	10	0	0	0
8	M	2	28	16	2	10	0	0	0

- Molecule 9 is an oligosaccharide called alpha-D-mannopyranose-(1-3)-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.



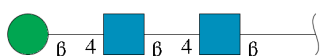
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
9	C	6	72	40	2	30	0	0	0

- Molecule 10 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.



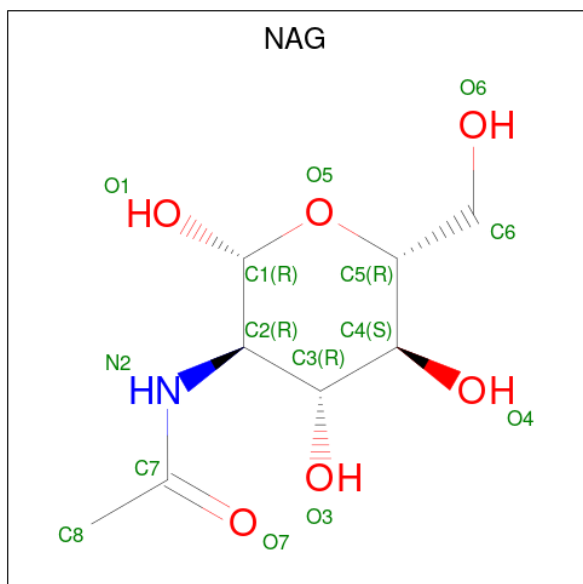
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
10	F	4	50	28	2	20	0	0	0

- Molecule 11 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.



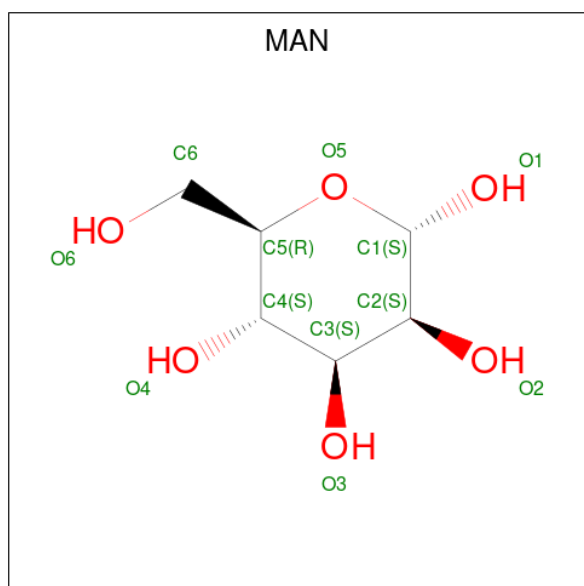
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
11	I	3	39	22	2	15	0	0	0
11	J	3	39	22	2	15	0	0	0
11	N	3	39	22	2	15	0	0	0

- Molecule 12 is 2-acetamido-2-deoxy-beta-D-glucopyranose (CCD ID: NAG) (formula: $C_8H_{15}NO_6$).



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

- Molecule 13 is alpha-D-mannopyranose (CCD ID: MAN) (formula: C₆H₁₂O₆).

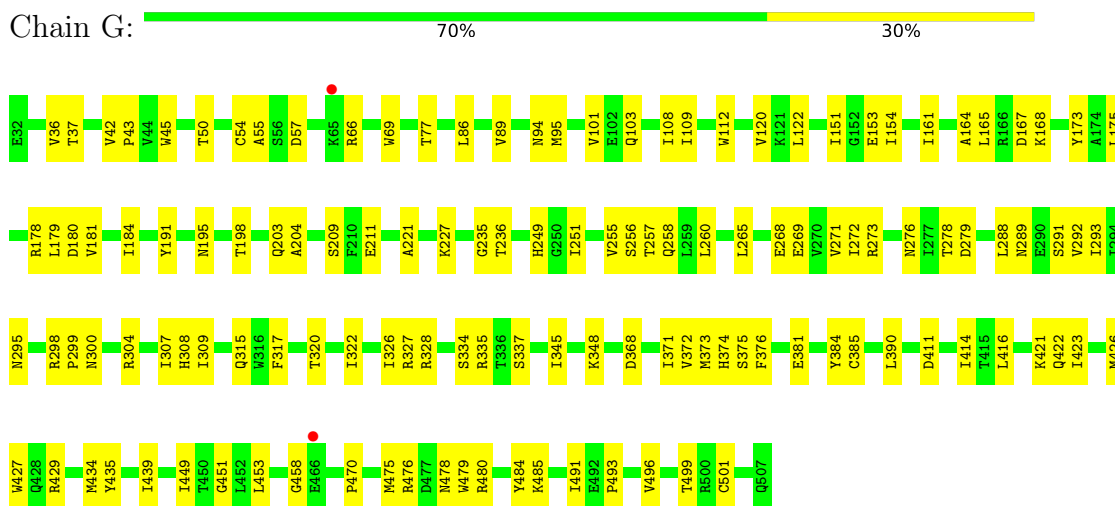


Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
13	G	1	Total	C	O	0	0
			11	6	5		

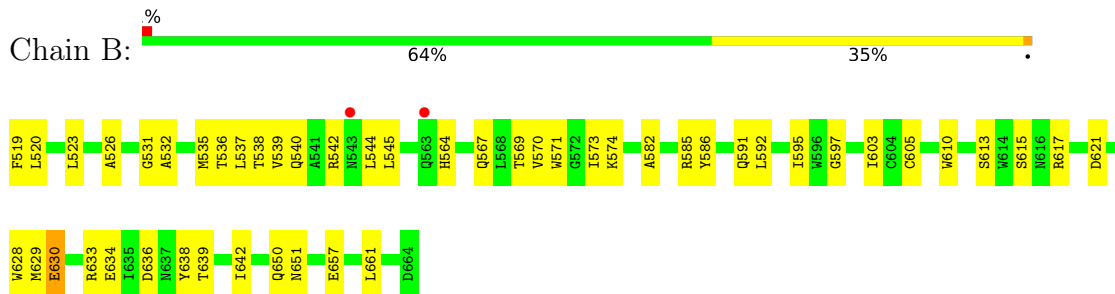
3 Residue-property plots

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

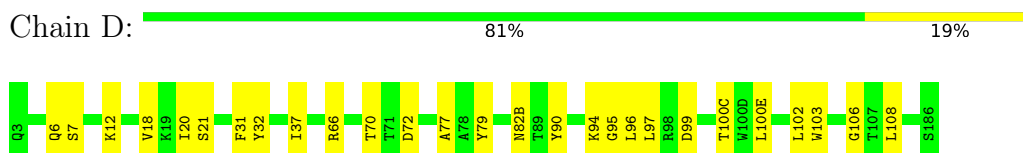
- Molecule 1: Envelope glycoprotein gp120



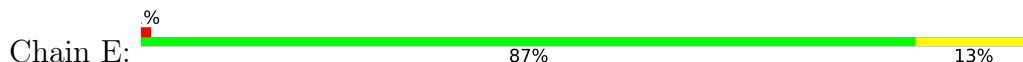
- Molecule 2: Envelope glycoprotein gp41



- Molecule 3: 35O22 Fab heavy chain

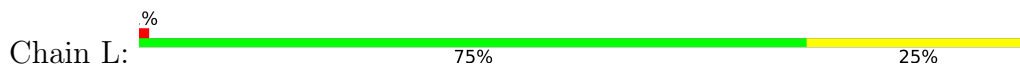


- Molecule 4: 35O22 Fab light chain





- Molecule 5: PGT124 Fab light chain



- Molecule 6: PGT124 Fab heavy chain



- Molecule 7: 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



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



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



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

Chain M:  50% 50%

MAG1
MAG2

- Molecule 9: alpha-D-mannopyranose-(1-3)-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 C:  33% 67%

MAG1
MAG2
BMA3
MAN4
MAN5
MAN6

- Molecule 10: 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 F:  75% 25%

MAG1
MAG2
BMA3
MAN4

- Molecule 11: beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain I:  67% 33%

MAG1
MAG2
BMA3

- Molecule 11: beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain J:  100%

MAG1
MAG2
BMA3

- Molecule 11: beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain N:  33% 33% 33%

MAG1
MAG2
BMA3

4 Data and refinement statistics

Property	Value	Source
Space group	P 63	Depositor
Cell constants a, b, c, α , β , γ	132.19Å 132.19Å 315.42Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	50.27 – 4.32 50.27 – 4.32	Depositor EDS
% Data completeness (in resolution range)	94.1 (50.27-4.32) 94.7 (50.27-4.32)	Depositor EDS
R_{merge}	0.23	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.76 (at 4.29Å)	Xtrriage
Refinement program	PHENIX 1.19.1_4122	Depositor
R, R_{free}	0.323 , 0.369 0.325 , 0.362	Depositor DCC
R_{free} test set	975 reflections (4.65%)	wwPDB-VP
Wilson B-factor (Å ²)	113.8	Xtrriage
Anisotropy	0.690	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.24 , 306.7	EDS
L-test for twinning ²	$\langle L \rangle = 0.37$, $\langle L^2 \rangle = 0.19$	Xtrriage
Estimated twinning fraction	0.196 for h,-h-k,-l	Xtrriage
F_o, F_c correlation	0.89	EDS
Total number of atoms	10251	wwPDB-VP
Average B, all atoms (Å ²)	188.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.21% 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	0.13	0/3495	0.31	0/4745
2	B	0.37	0/1121	0.58	0/1519
3	D	0.32	0/1125	0.53	1/1526 (0.1%)
4	E	0.43	0/842	0.62	1/1151 (0.1%)
5	L	0.22	0/1638	0.61	0/2238
6	H	0.44	0/1763	0.80	3/2407 (0.1%)
All	All	0.30	0/9984	0.56	5/13586 (0.0%)

There are no bond length outliers.

All (5) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	D	37	ILE	N-CA-CB	-8.86	100.16	112.12
6	H	217	VAL	N-CA-C	6.35	117.07	108.17
4	E	41	PRO	N-CA-C	-6.30	103.02	110.70
6	H	40	SER	CA-C-O	-5.27	116.83	120.47
6	H	216	ASN	CB-CA-C	5.15	118.83	110.22

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	3426	0	3367	99	0
2	B	1102	0	1077	37	0
3	D	1097	0	1071	20	0
4	E	818	0	768	10	0
5	L	1595	0	1541	35	0
6	H	1720	0	1686	44	0
7	P	61	0	52	3	0
8	A	28	0	25	2	0
8	K	28	0	25	0	0
8	M	28	0	25	0	0
9	C	72	0	61	1	0
10	F	50	0	43	2	0
11	I	39	0	34	2	0
11	J	39	0	34	4	0
11	N	39	0	34	3	0
12	B	28	0	26	0	0
12	G	70	0	65	2	0
13	G	11	0	10	1	0
All	All	10251	0	9944	226	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 11.

The worst 5 of 226 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)
6:H:171:VAL:HA	6:H:217:VAL:HG12	1.45	0.98
6:H:138:PRO:HB3	6:H:164:TYR:HB3	1.60	0.82
1:G:300:ASN:HB2	1:G:322:ILE:HD11	1.65	0.77
3:D:96:LEU:HB3	3:D:100(E):LEU:HB3	1.68	0.76
2:B:539:VAL:HA	2:B:542:ARG:HE	1.52	0.75

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	417/431 (97%)	391 (94%)	26 (6%)	0	100	100
2	B	133/137 (97%)	127 (96%)	6 (4%)	0	100	100
3	D	131/141 (93%)	122 (93%)	9 (7%)	0	100	100
4	E	105/107 (98%)	98 (93%)	7 (7%)	0	100	100
5	L	208/210 (99%)	199 (96%)	8 (4%)	1 (0%)	24	62
6	H	222/226 (98%)	210 (95%)	12 (5%)	0	100	100
All	All	1216/1252 (97%)	1147 (94%)	68 (6%)	1 (0%)	48	83

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
5	L	115	GLN

5.3.2 Protein sidechains [i](#)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	G	389/389 (100%)	389 (100%)	0	100	100
2	B	120/120 (100%)	114 (95%)	6 (5%)	22	44
3	D	120/120 (100%)	120 (100%)	0	100	100
4	E	94/94 (100%)	94 (100%)	0	100	100
5	L	176/176 (100%)	176 (100%)	0	100	100
6	H	194/194 (100%)	184 (95%)	10 (5%)	21	43
All	All	1093/1093 (100%)	1077 (98%)	16 (2%)	57	70

5 of 16 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
6	H	76	ASN
6	H	71	ARG

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Mol	Chain	Res	Type
6	H	20	VAL
6	H	70	SER
6	H	19	SER

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

Mol	Chain	Res	Type
1	G	315	GLN
2	B	564	HIS
5	L	201	GLN
5	L	37	GLN
1	G	246	GLN

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates [i](#)

30 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	$\# Z > 2$
8	NAG	A	1	8,1	14,14,15	0.91	1 (7%)	17,19,21	0.93	0
8	NAG	A	2	8	14,14,15	0.34	0	17,19,21	0.46	0
9	NAG	C	1	9,1	14,14,15	0.44	0	17,19,21	0.62	0
9	NAG	C	2	9	14,14,15	0.37	0	17,19,21	0.66	0
9	BMA	C	3	9	11,11,12	0.71	0	15,15,17	0.76	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
9	MAN	C	4	9	11,11,12	0.77	0	15,15,17	0.93	2 (13%)
9	MAN	C	5	9	11,11,12	0.81	1 (9%)	15,15,17	1.24	2 (13%)
9	MAN	C	6	9	11,11,12	0.86	0	15,15,17	1.08	2 (13%)
10	NAG	F	1	10,1	14,14,15	0.66	1 (7%)	17,19,21	0.68	0
10	NAG	F	2	10	14,14,15	0.20	0	17,19,21	0.52	0
10	BMA	F	3	10	11,11,12	0.65	0	15,15,17	0.77	0
10	MAN	F	4	10	11,11,12	0.89	1 (9%)	15,15,17	0.87	1 (6%)
11	NAG	I	1	11	14,14,15	0.38	0	17,19,21	0.59	0
11	NAG	I	2	11	14,14,15	0.32	0	17,19,21	0.43	0
11	BMA	I	3	11	11,11,12	0.62	0	15,15,17	0.66	0
11	NAG	J	1	11,1	14,14,15	1.25	1 (7%)	17,19,21	1.29	3 (17%)
11	NAG	J	2	11	14,14,15	0.50	0	17,19,21	1.10	1 (5%)
11	BMA	J	3	11	11,11,12	1.24	2 (18%)	15,15,17	1.21	1 (6%)
8	NAG	K	1	8,1	14,14,15	0.24	0	17,19,21	0.43	0
8	NAG	K	2	8	14,14,15	0.24	0	17,19,21	0.43	0
8	NAG	M	1	8,1	14,14,15	0.99	1 (7%)	17,19,21	1.08	1 (5%)
8	NAG	M	2	8	14,14,15	0.25	0	17,19,21	0.70	0
11	NAG	N	1	11,1	14,14,15	0.84	1 (7%)	17,19,21	1.18	1 (5%)
11	NAG	N	2	11	14,14,15	0.24	0	17,19,21	0.54	0
11	BMA	N	3	11	11,11,12	0.55	0	15,15,17	0.85	0
7	NAG	P	1	7,1	14,14,15	0.25	0	17,19,21	0.52	0
7	NAG	P	2	7	14,14,15	0.24	0	17,19,21	0.66	0
7	BMA	P	3	7	11,11,12	0.56	0	15,15,17	0.83	1 (6%)
7	MAN	P	4	7	11,11,12	1.58	3 (27%)	15,15,17	2.31	4 (26%)
7	MAN	P	5	7	11,11,12	0.71	0	15,15,17	0.92	2 (13%)

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	1	8,1	-	1/6/23/26	0/1/1/1
8	NAG	A	2	8	-	0/6/23/26	0/1/1/1
9	NAG	C	1	9,1	-	0/6/23/26	0/1/1/1
9	NAG	C	2	9	-	2/6/23/26	0/1/1/1
9	BMA	C	3	9	-	1/2/19/22	0/1/1/1
9	MAN	C	4	9	-	2/2/19/22	0/1/1/1
9	MAN	C	5	9	-	1/2/19/22	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
9	MAN	C	6	9	-	0/2/19/22	1/1/1/1
10	NAG	F	1	10,1	-	0/6/23/26	0/1/1/1
10	NAG	F	2	10	-	0/6/23/26	0/1/1/1
10	BMA	F	3	10	-	0/2/19/22	0/1/1/1
10	MAN	F	4	10	-	1/2/19/22	0/1/1/1
11	NAG	I	1	11	-	0/6/23/26	0/1/1/1
11	NAG	I	2	11	-	0/6/23/26	0/1/1/1
11	BMA	I	3	11	-	0/2/19/22	0/1/1/1
11	NAG	J	1	11,1	-	1/6/23/26	0/1/1/1
11	NAG	J	2	11	-	0/6/23/26	0/1/1/1
11	BMA	J	3	11	-	1/2/19/22	0/1/1/1
8	NAG	K	1	8,1	-	0/6/23/26	0/1/1/1
8	NAG	K	2	8	-	0/6/23/26	0/1/1/1
8	NAG	M	1	8,1	-	2/6/23/26	0/1/1/1
8	NAG	M	2	8	-	2/6/23/26	0/1/1/1
11	NAG	N	1	11,1	-	4/6/23/26	0/1/1/1
11	NAG	N	2	11	-	2/6/23/26	0/1/1/1
11	BMA	N	3	11	-	0/2/19/22	0/1/1/1
7	NAG	P	1	7,1	-	2/6/23/26	0/1/1/1
7	NAG	P	2	7	-	2/6/23/26	0/1/1/1
7	BMA	P	3	7	-	0/2/19/22	0/1/1/1
7	MAN	P	4	7	-	0/2/19/22	0/1/1/1
7	MAN	P	5	7	-	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)
11	J	1	NAG	O5-C1	-4.50	1.36	1.43
7	P	4	MAN	C1-C2	3.53	1.60	1.52
8	A	1	NAG	O5-C1	-3.14	1.38	1.43
11	N	1	NAG	O5-C1	-2.96	1.38	1.43
8	M	1	NAG	O5-C1	-2.84	1.38	1.43

The worst 5 of 21 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
7	P	4	MAN	C1-O5-C5	7.49	122.23	112.19
11	J	3	BMA	C3-C4-C5	3.73	116.99	110.23
11	J	1	NAG	C3-C4-C5	3.30	116.21	110.23
9	C	5	MAN	C1-O5-C5	3.25	116.55	112.19
9	C	6	MAN	C1-O5-C5	3.12	116.36	112.19

There are no chirality outliers.

5 of 24 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
8	A	1	NAG	C1-C2-N2-C7
9	C	4	MAN	O5-C5-C6-O6
8	M	1	NAG	O5-C5-C6-O6
9	C	4	MAN	C4-C5-C6-O6
8	M	1	NAG	C4-C5-C6-O6

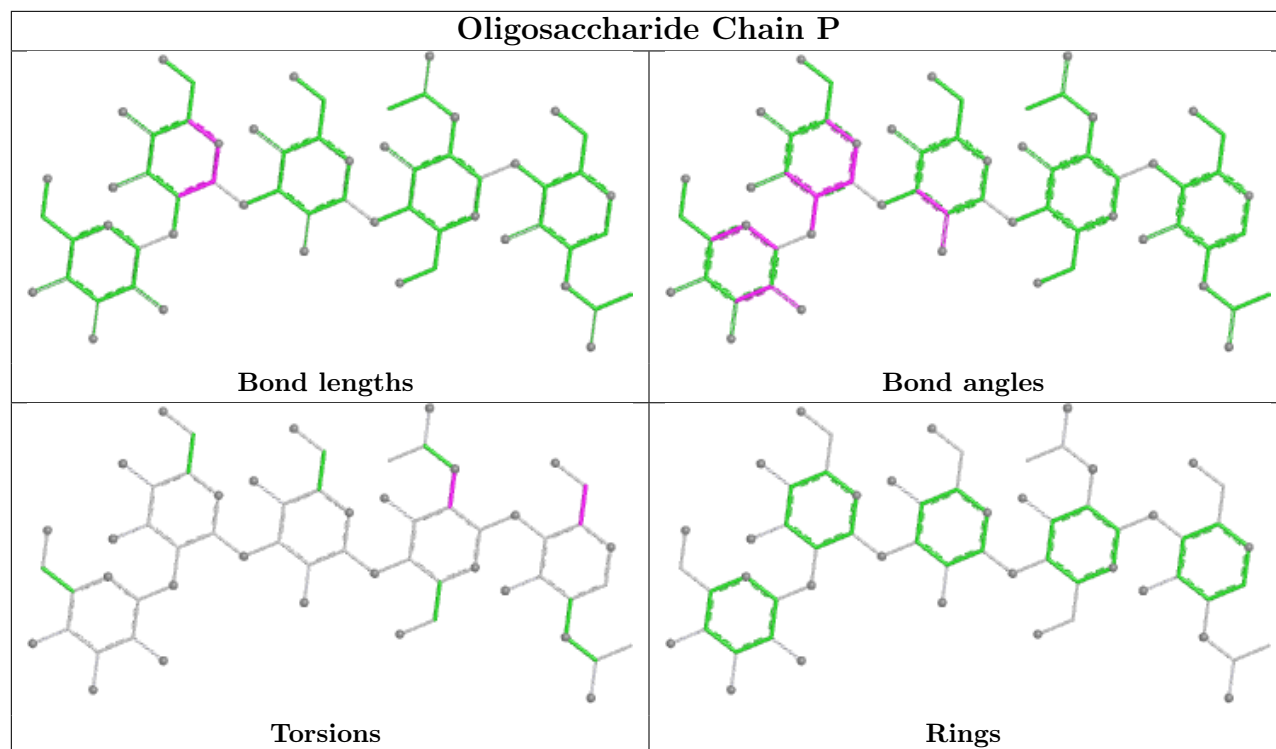
All (1) ring outliers are listed below:

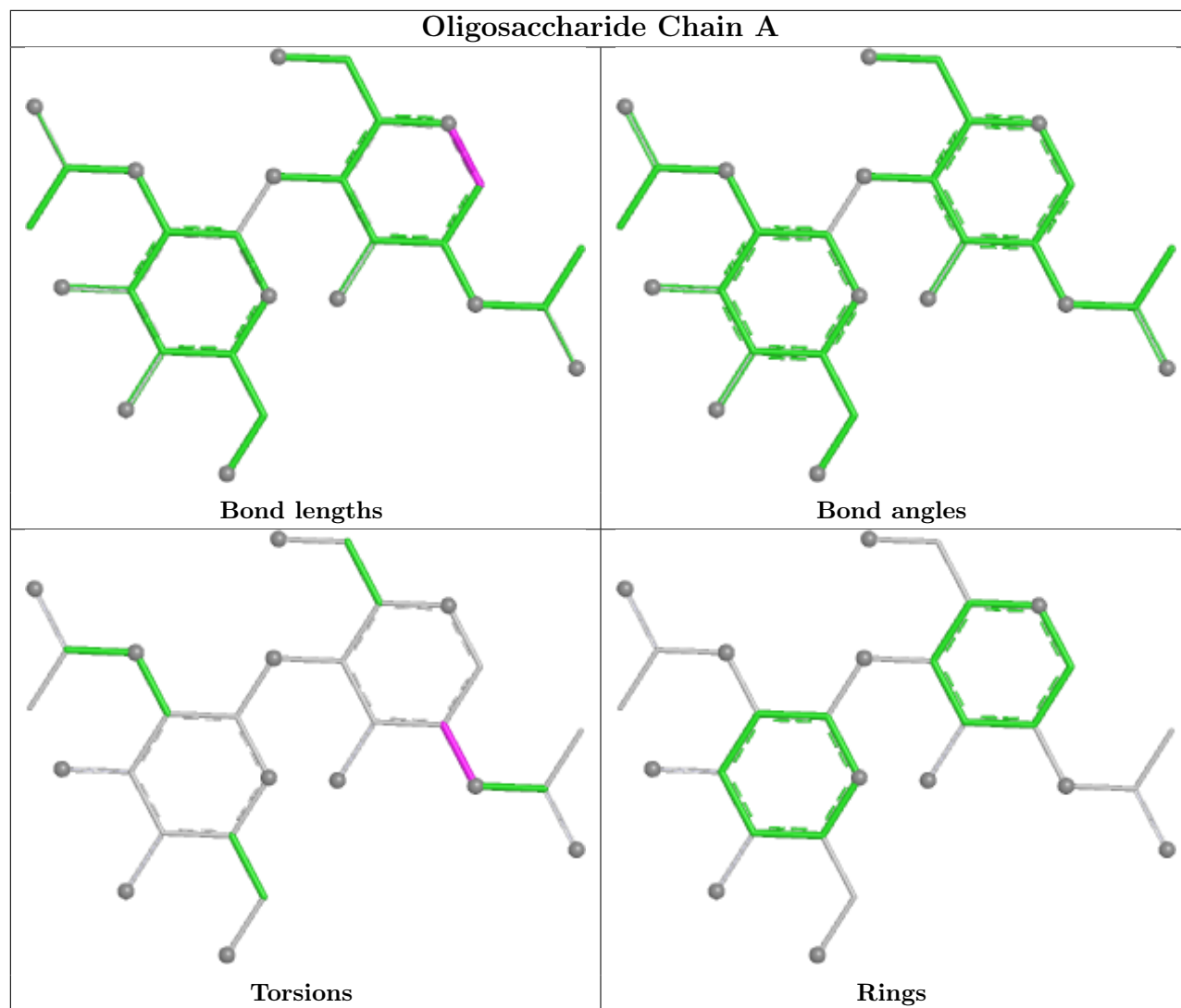
Mol	Chain	Res	Type	Atoms
9	C	6	MAN	C1-C2-C3-C4-C5-O5

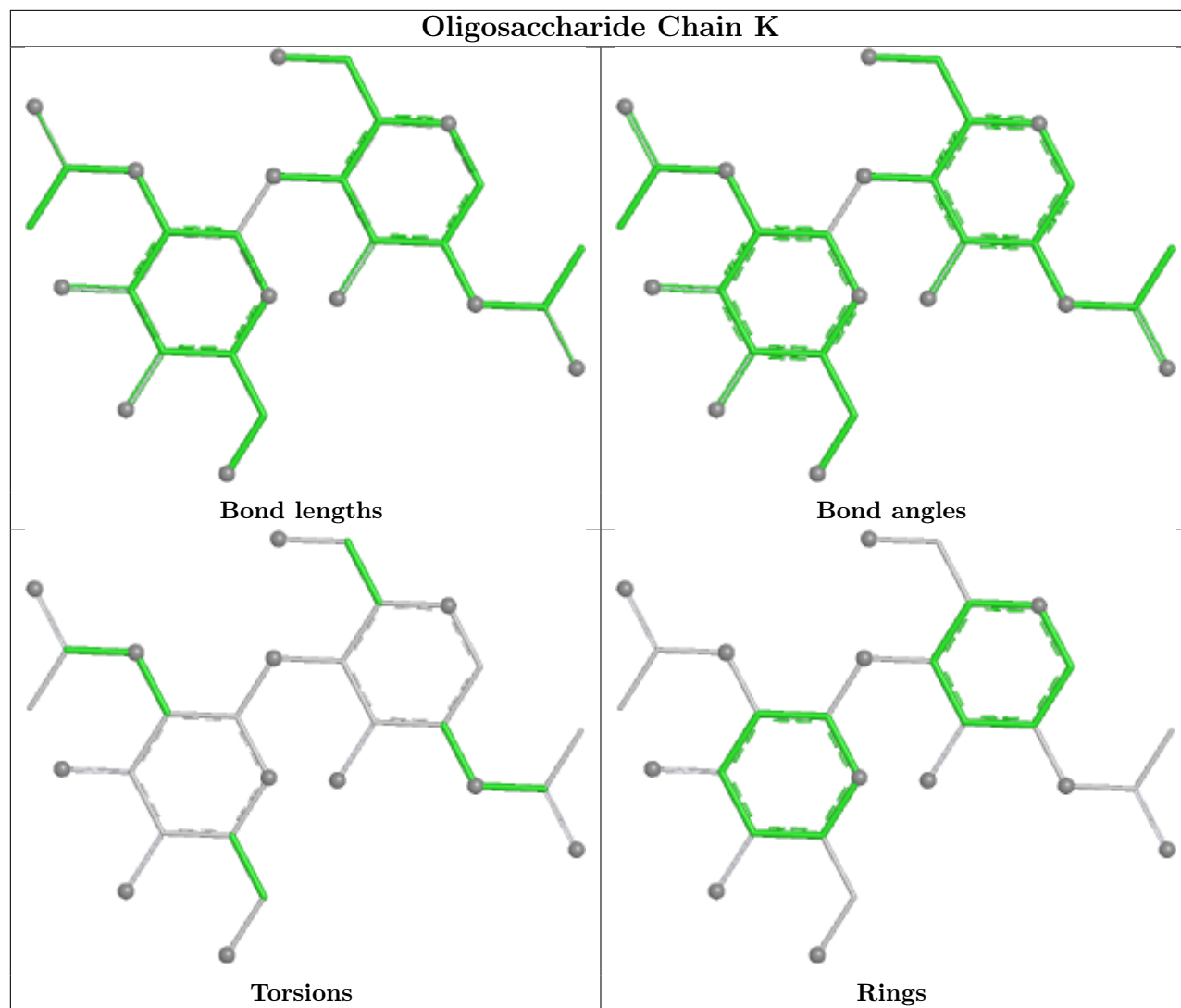
13 monomers are involved in 17 short contacts:

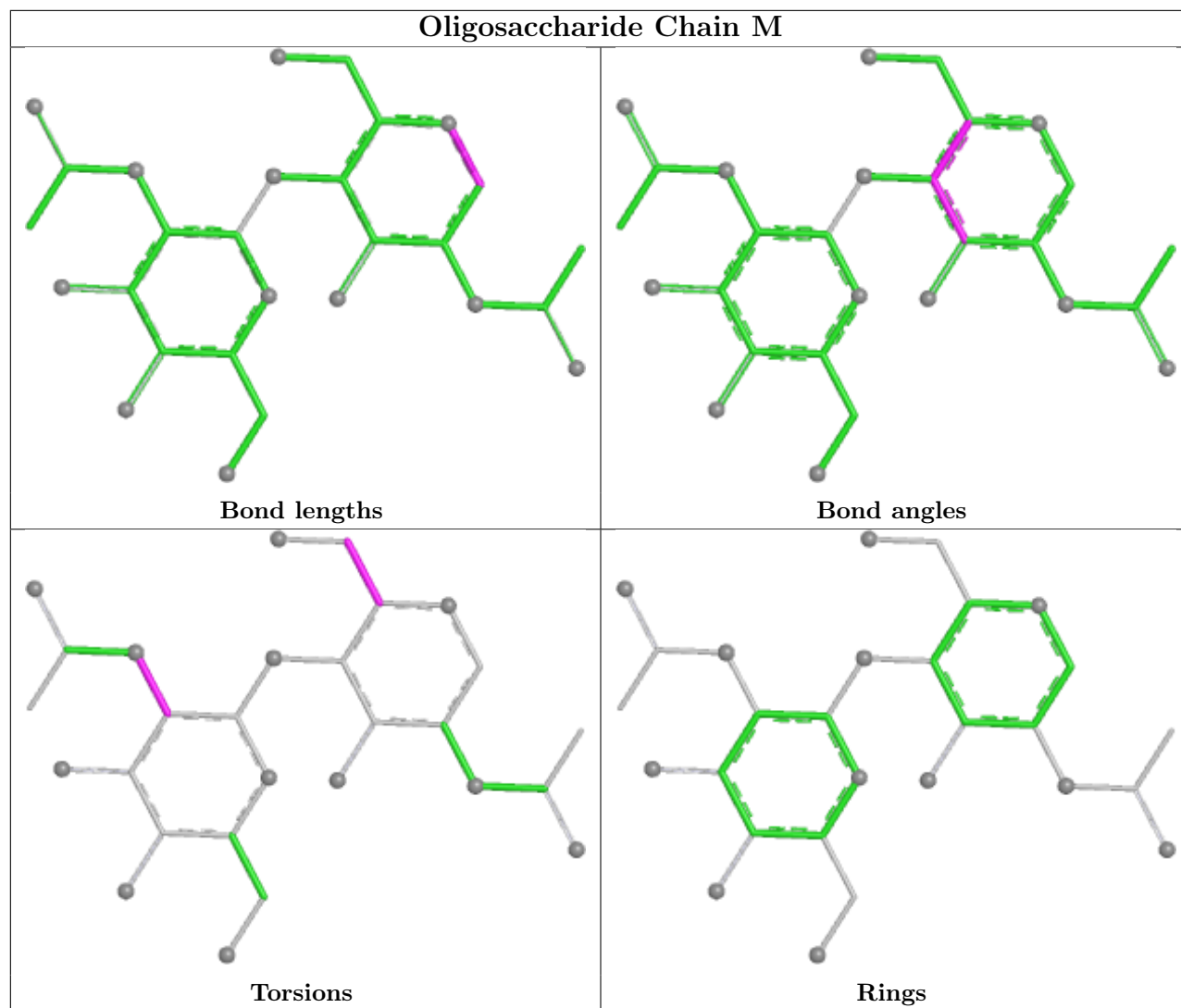
Mol	Chain	Res	Type	Clashes	Symm-Clashes
10	F	4	MAN	1	0
11	I	1	NAG	2	0
7	P	1	NAG	2	0
10	F	2	NAG	1	0
11	J	2	NAG	1	0
9	C	1	NAG	1	0
11	N	2	NAG	1	0
11	J	3	BMA	2	0
10	F	3	BMA	1	0
7	P	2	NAG	1	0
11	J	1	NAG	2	0
8	A	1	NAG	2	0
11	N	1	NAG	3	0

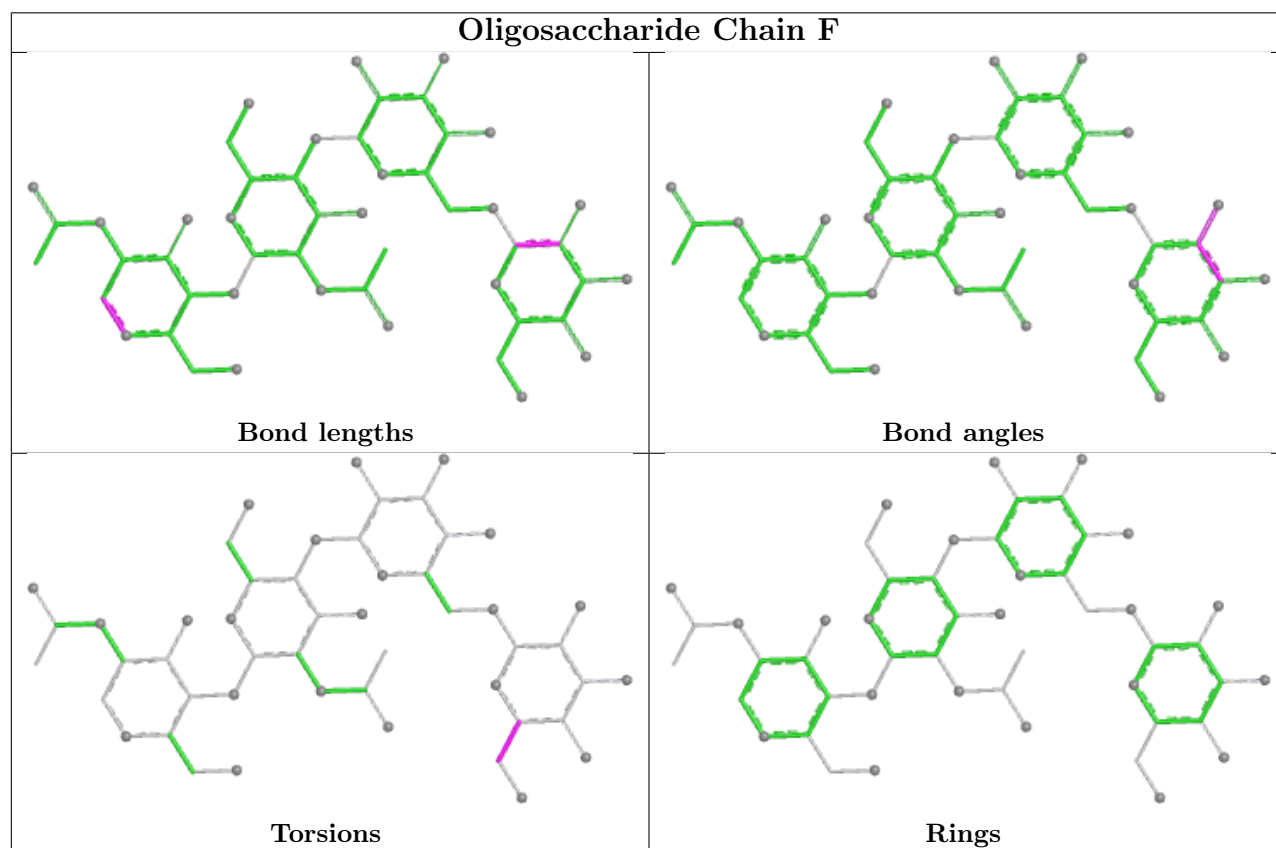
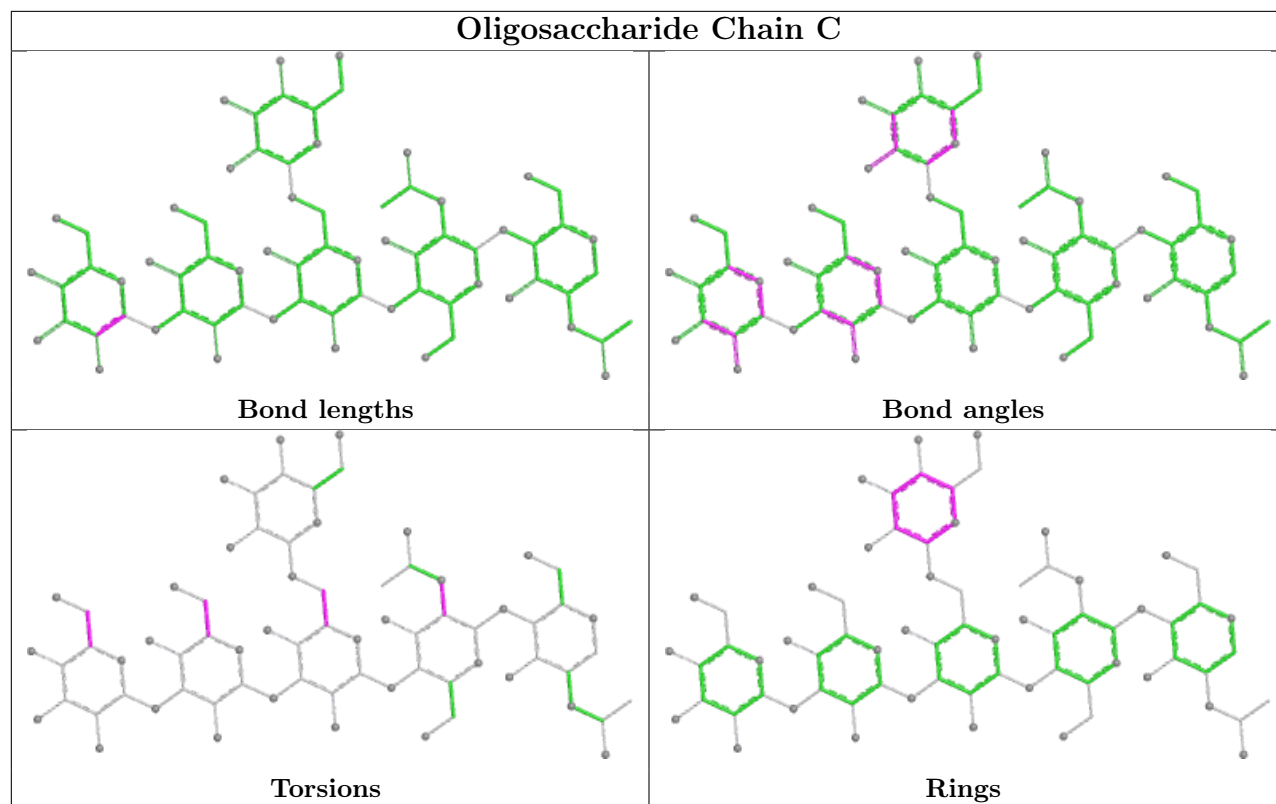
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for oligosaccharide.

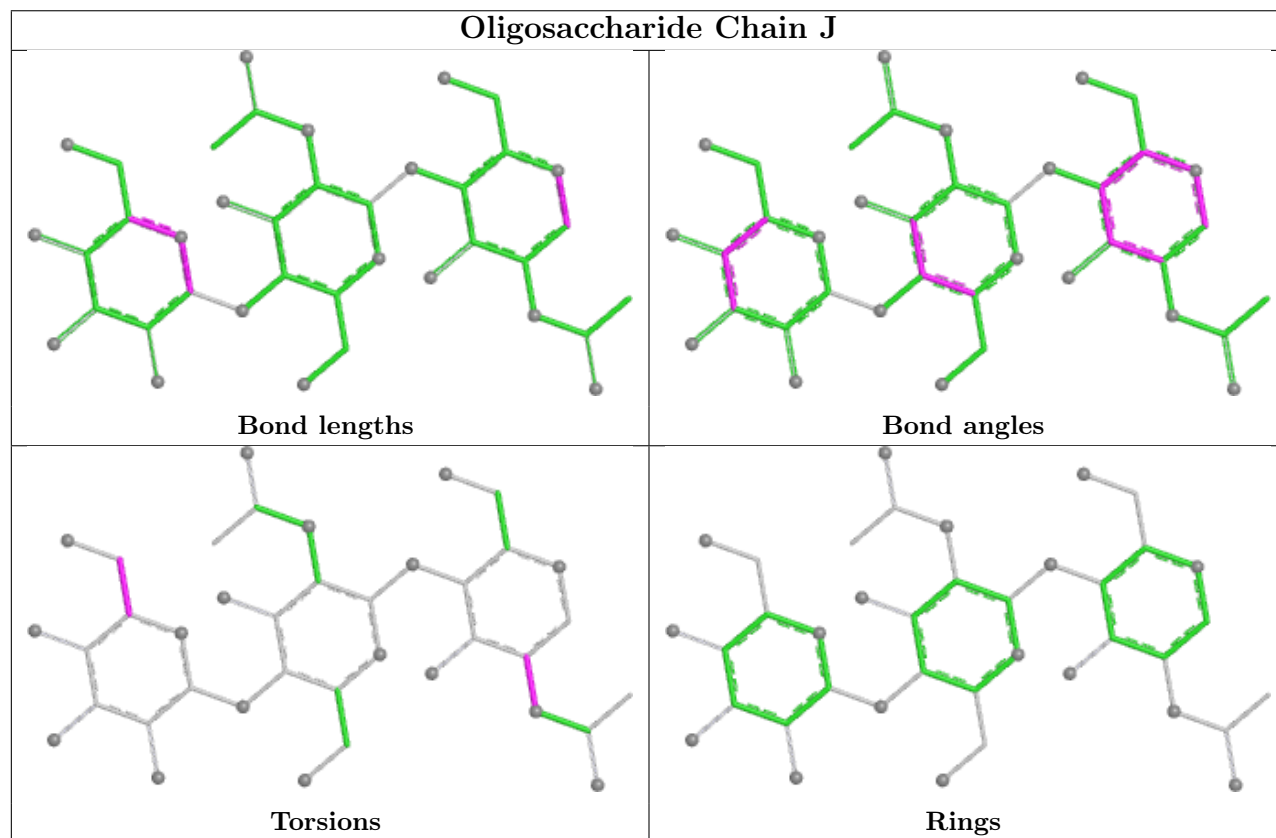
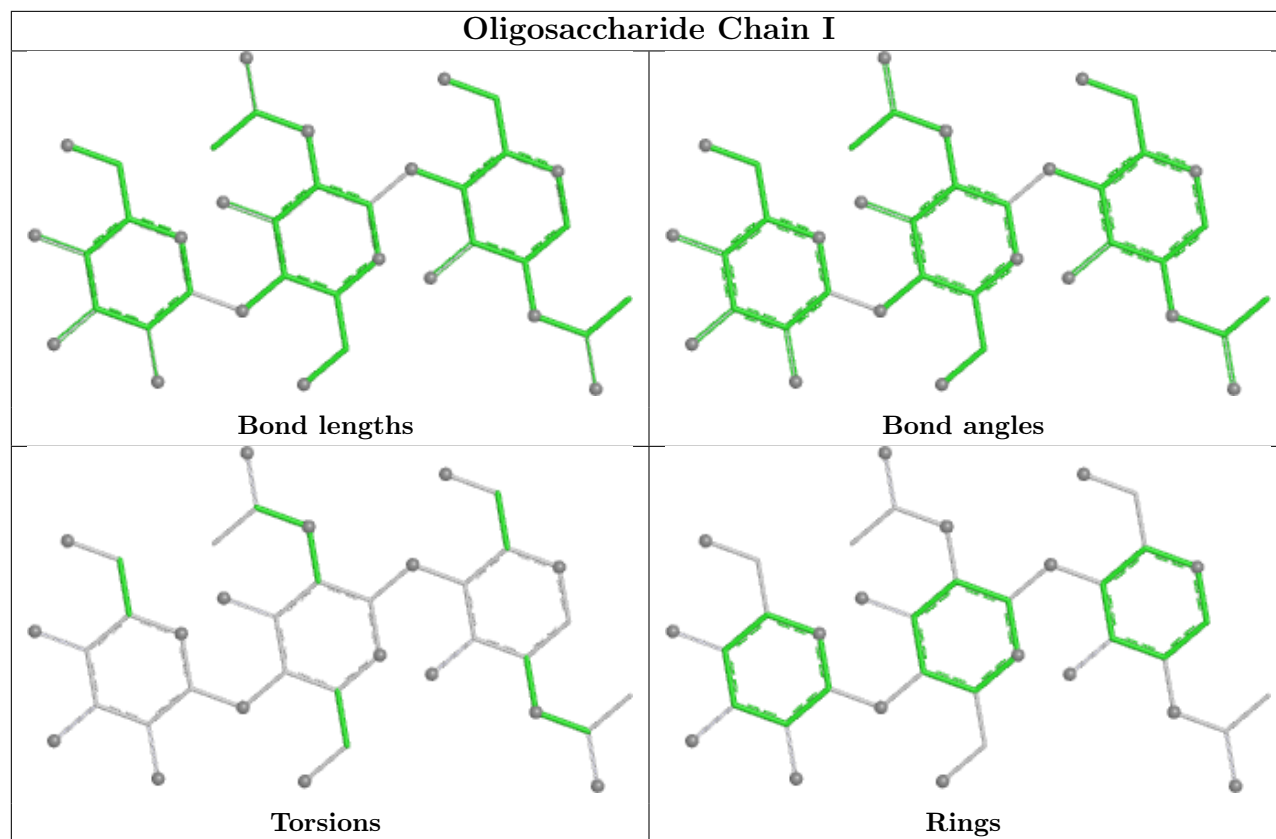


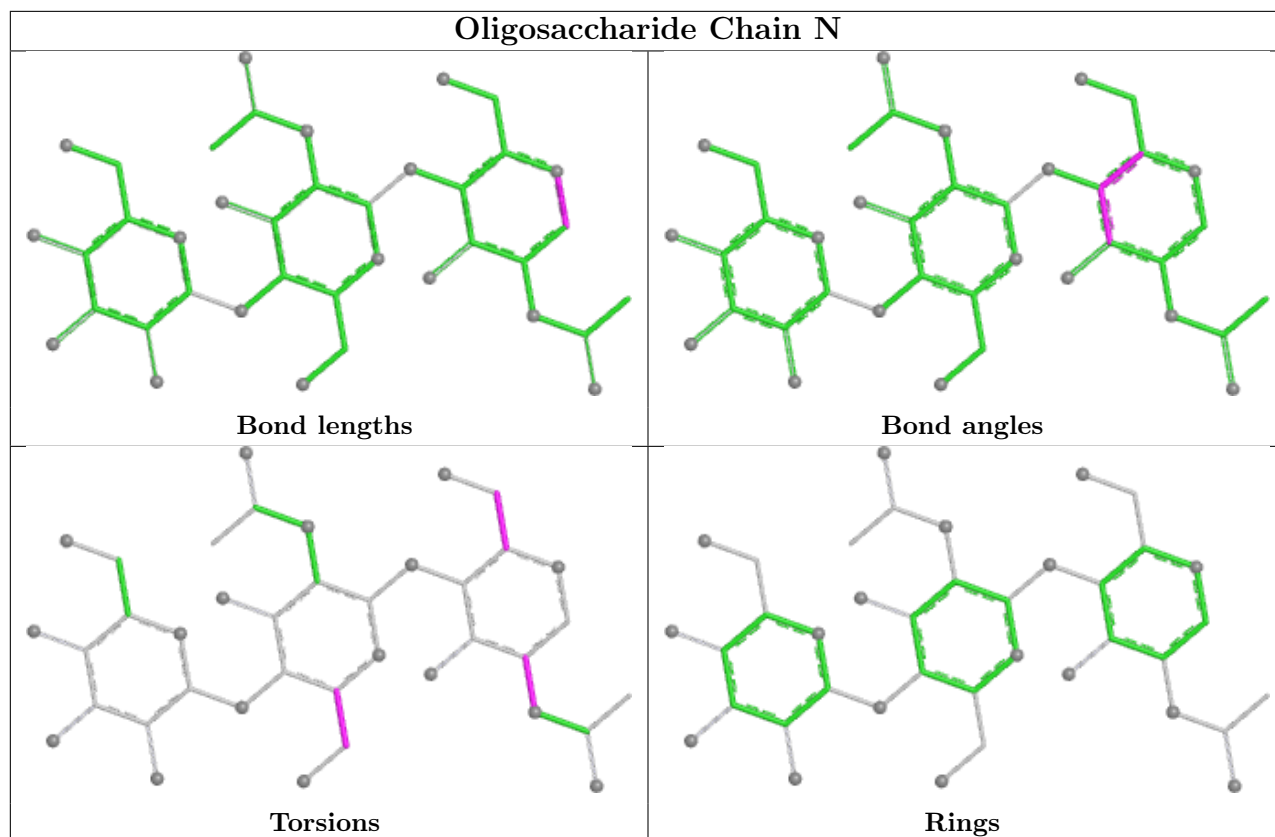












5.6 Ligand geometry [i](#)

8 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
12	NAG	G	605	1	14,14,15	0.23	0	17,19,21	0.44	0
12	NAG	B	701	2	14,14,15	0.29	0	17,19,21	0.49	0
12	NAG	G	603	1	14,14,15	0.20	0	17,19,21	0.42	0
12	NAG	G	601	1	14,14,15	0.61	1 (7%)	17,19,21	0.97	1 (5%)
12	NAG	G	602	-	14,14,15	0.16	0	17,19,21	0.66	0
13	MAN	G	606	-	11,11,12	1.66	3 (27%)	15,15,17	1.37	2 (13%)
12	NAG	B	702	2	14,14,15	0.30	0	17,19,21	0.60	0
12	NAG	G	604	1	14,14,15	0.47	0	17,19,21	0.50	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
12	NAG	G	605	1	-	0/6/23/26	0/1/1/1
12	NAG	B	701	2	-	0/6/23/26	0/1/1/1
12	NAG	G	603	1	-	2/6/23/26	0/1/1/1
12	NAG	G	601	1	-	2/6/23/26	0/1/1/1
12	NAG	G	602	-	-	2/6/23/26	0/1/1/1
13	MAN	G	606	-	-	0/2/19/22	0/1/1/1
12	NAG	B	702	2	-	0/6/23/26	0/1/1/1
12	NAG	G	604	1	-	2/6/23/26	0/1/1/1

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
13	G	606	MAN	O5-C1	-3.72	1.37	1.43
13	G	606	MAN	C2-C3	-2.57	1.48	1.52
13	G	606	MAN	C4-C5	2.40	1.58	1.53
12	G	601	NAG	C1-C2	2.05	1.55	1.52

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
13	G	606	MAN	O2-C2-C3	-3.53	102.83	110.15
12	G	601	NAG	C1-O5-C5	3.48	116.85	112.19
13	G	606	MAN	C1-O5-C5	2.33	115.31	112.19

There are no chirality outliers.

5 of 8 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
12	G	601	NAG	O5-C5-C6-O6
12	G	603	NAG	C8-C7-N2-C2
12	G	603	NAG	O7-C7-N2-C2
12	G	604	NAG	C8-C7-N2-C2
12	G	604	NAG	O7-C7-N2-C2

There are no ring outliers.

2 monomers are involved in 3 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
12	G	602	NAG	2	0
13	G	606	MAN	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	6
3	D	4
6	H	1
2	B	1

The worst 5 of 12 chain breaks are listed below:

Model	Chain	Residue-1	Atom-1	Residue-2	Atom-2	Distance (Å)
1	G	397:ALA	C	410:ALA	N	26.97
1	G	355:ASN	C	368:ASP	N	25.63
1	G	136:GLY	C	146:VAL	N	19.33
1	H	145:PRO	C	151:SER	N	16.96
1	D	54:SER	C	60:ALA	N	15.44

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	431/431 (100%)	-0.47	2 (0%) 87 75	65, 165, 219, 301	0
2	B	137/137 (100%)	-0.41	2 (1%) 72 56	97, 167, 209, 251	0
3	D	141/141 (100%)	-0.54	0 100 100	130, 218, 268, 313	0
4	E	107/107 (100%)	-0.62	1 (0%) 81 66	135, 195, 229, 245	0
5	L	210/210 (100%)	-0.50	3 (1%) 73 58	149, 201, 231, 248	0
6	H	226/226 (100%)	-0.45	2 (0%) 81 66	107, 206, 250, 262	0
All	All	1252/1252 (100%)	-0.49	10 (0%) 82 68	65, 188, 241, 313	0

The worst 5 of 10 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
6	H	7	SER	8.3
1	G	466	GLU	3.1
5	L	135	ASN	2.8
2	B	563	GLN	2.8
5	L	123	THR	2.7

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](#)

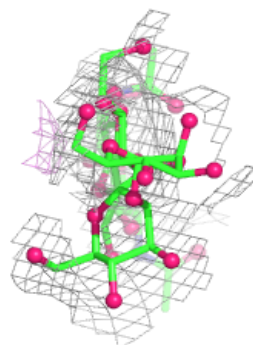
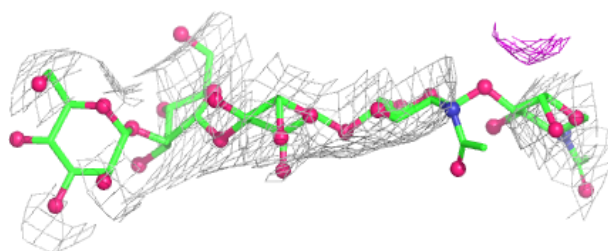
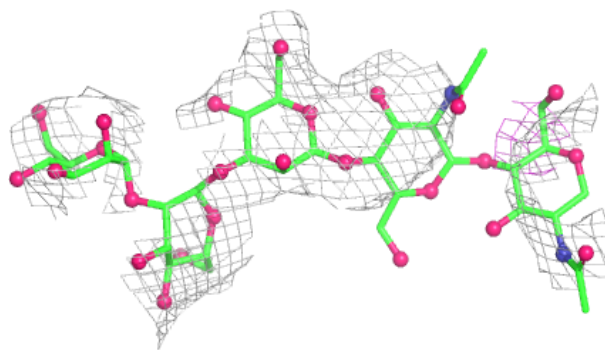
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled ‘Q< 0.9’ lists 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	P	1	14/15	-	-	204,223,227,238	0
7	NAG	P	2	14/15	-	-	182,211,231,239	0
7	BMA	P	3	11/12	-	-	167,184,199,210	0
7	MAN	P	4	11/12	-	-	146,146,146,146	0
7	MAN	P	5	11/12	-	-	169,169,169,169	0
8	NAG	A	1	14/15	-	-	185,185,185,185	0
8	NAG	A	2	14/15	-	-	195,195,195,195	0
8	NAG	M	2	14/15	0.94	0.10	266,266,266,266	0
11	BMA	I	3	11/12	0.94	0.09	211,211,211,211	0
8	NAG	K	1	14/15	0.95	0.07	186,186,186,186	0
11	NAG	I	2	14/15	0.95	0.10	199,199,199,199	0
9	NAG	C	1	14/15	-	-	222,222,222,222	0
9	NAG	C	2	14/15	-	-	244,244,244,244	0
9	BMA	C	3	11/12	-	-	274,274,274,274	0
9	MAN	C	4	11/12	-	-	270,270,270,270	0
9	MAN	C	5	11/12	-	-	273,273,273,273	0
9	MAN	C	6	11/12	-	-	297,297,297,297	0
10	NAG	F	1	14/15	-	-	208,208,208,208	0
10	NAG	F	2	14/15	-	-	218,218,218,218	0
10	BMA	F	3	11/12	-	-	232,232,232,232	0
10	MAN	F	4	11/12	-	-	234,234,234,234	0
8	NAG	K	2	14/15	0.95	0.08	235,235,235,235	0
11	BMA	J	3	11/12	0.96	0.07	262,262,262,262	0
11	NAG	N	1	14/15	0.96	0.10	228,228,228,228	0
8	NAG	M	1	14/15	0.97	0.07	217,217,217,217	0
11	NAG	N	2	14/15	0.97	0.14	241,241,241,241	0
11	NAG	I	1	14/15	0.98	0.11	180,180,180,180	0
11	NAG	J	1	14/15	0.98	0.12	229,229,229,229	0
11	NAG	J	2	14/15	0.98	0.08	260,260,260,260	0
11	BMA	N	3	11/12	-	-	251,251,251,251	0

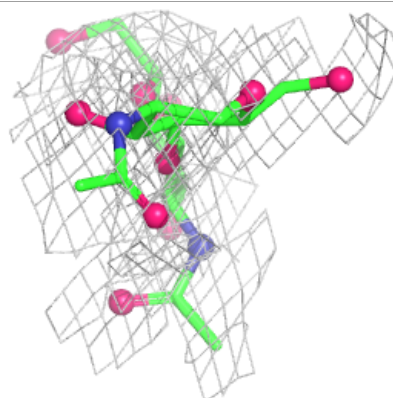
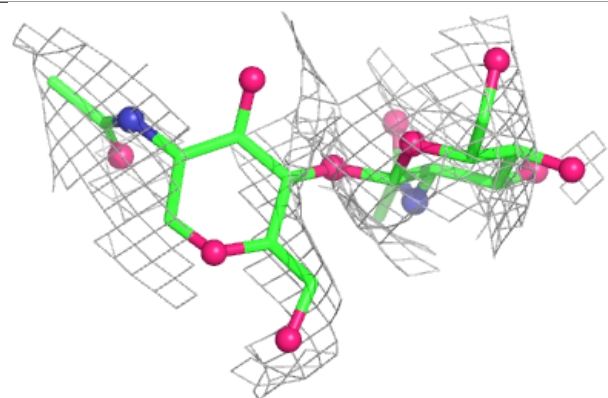
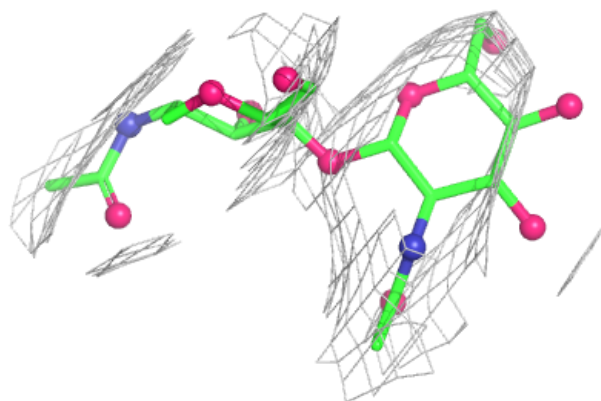
The following is a graphical depiction of the model fit to experimental electron density for oligosaccharide. Each fit is shown from different orientation to approximate a three-dimensional view.

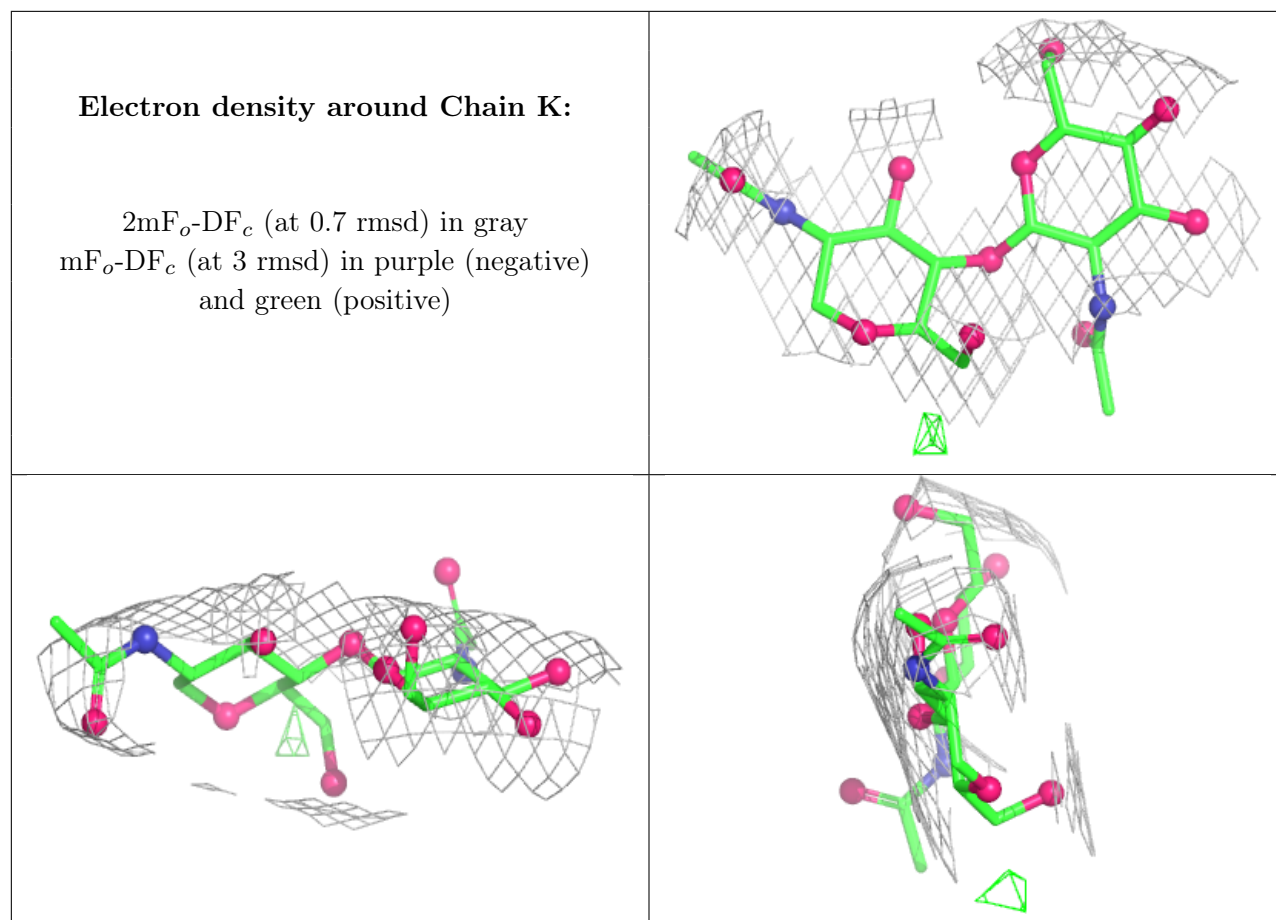
Electron density around Chain P:

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

**Electron density around Chain A:**

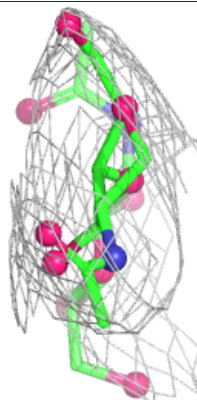
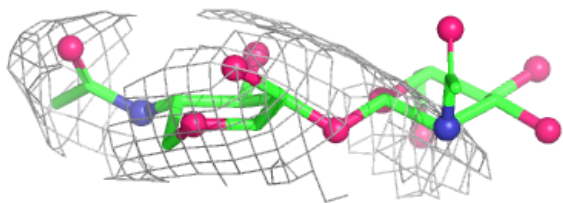
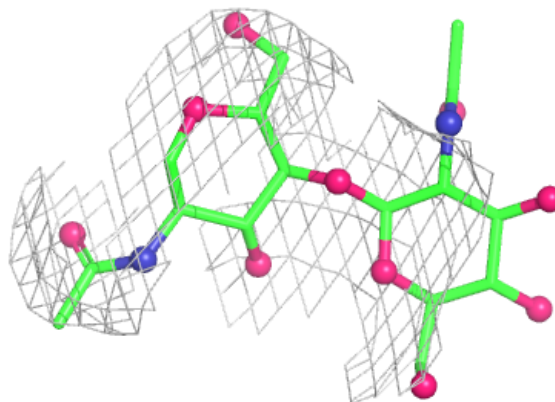
$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



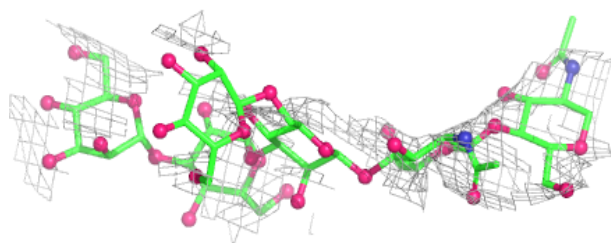
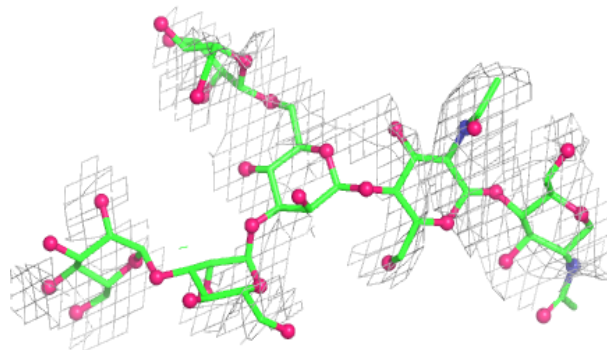


Electron density around Chain M:

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

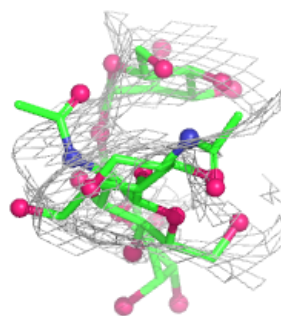
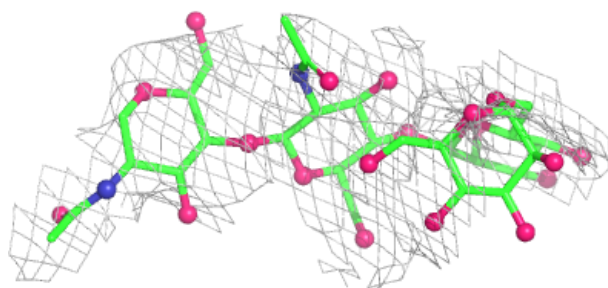
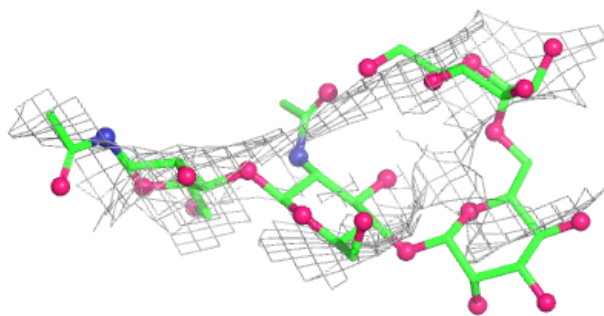
**Electron density around Chain C:**

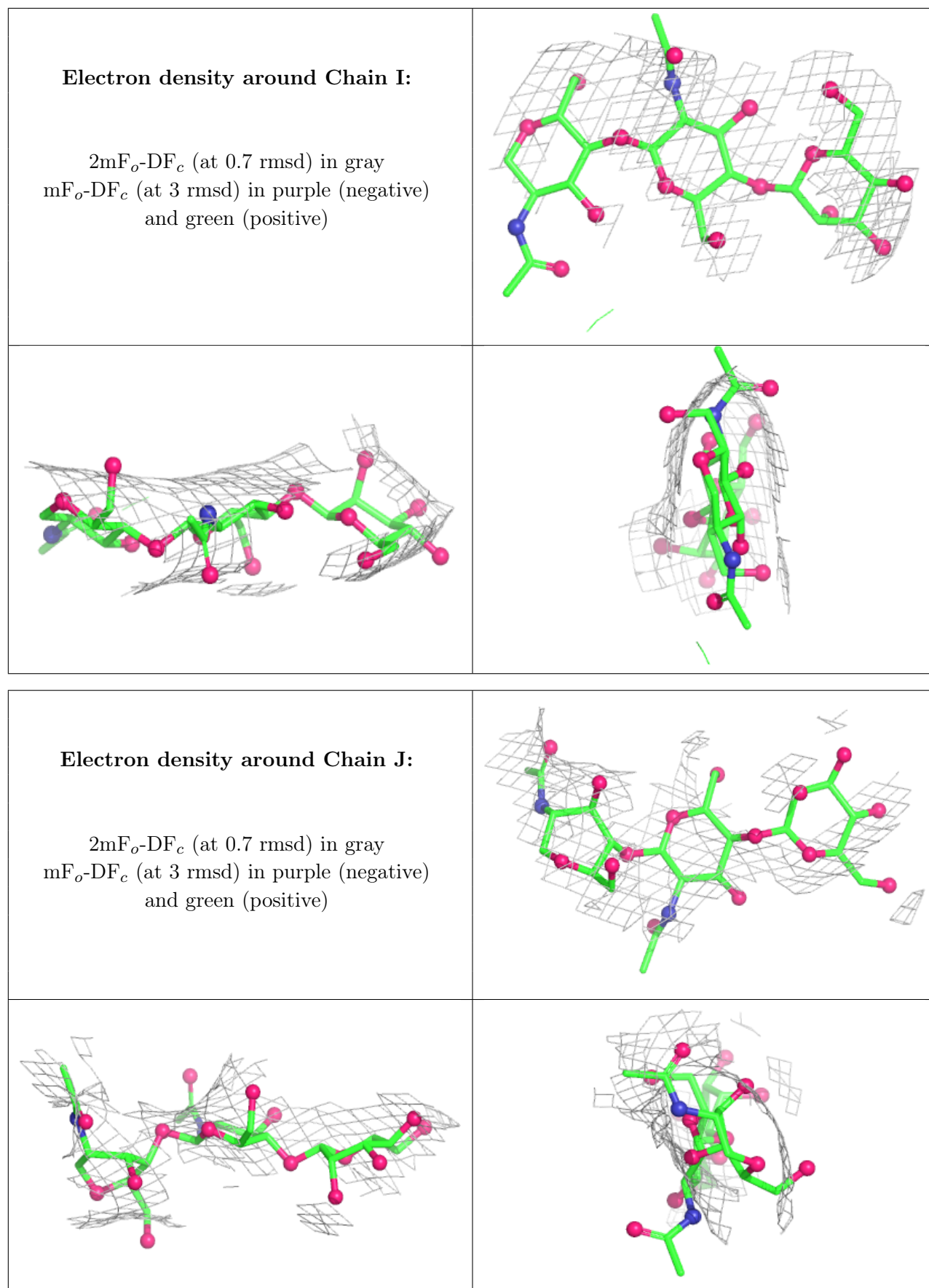
$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)

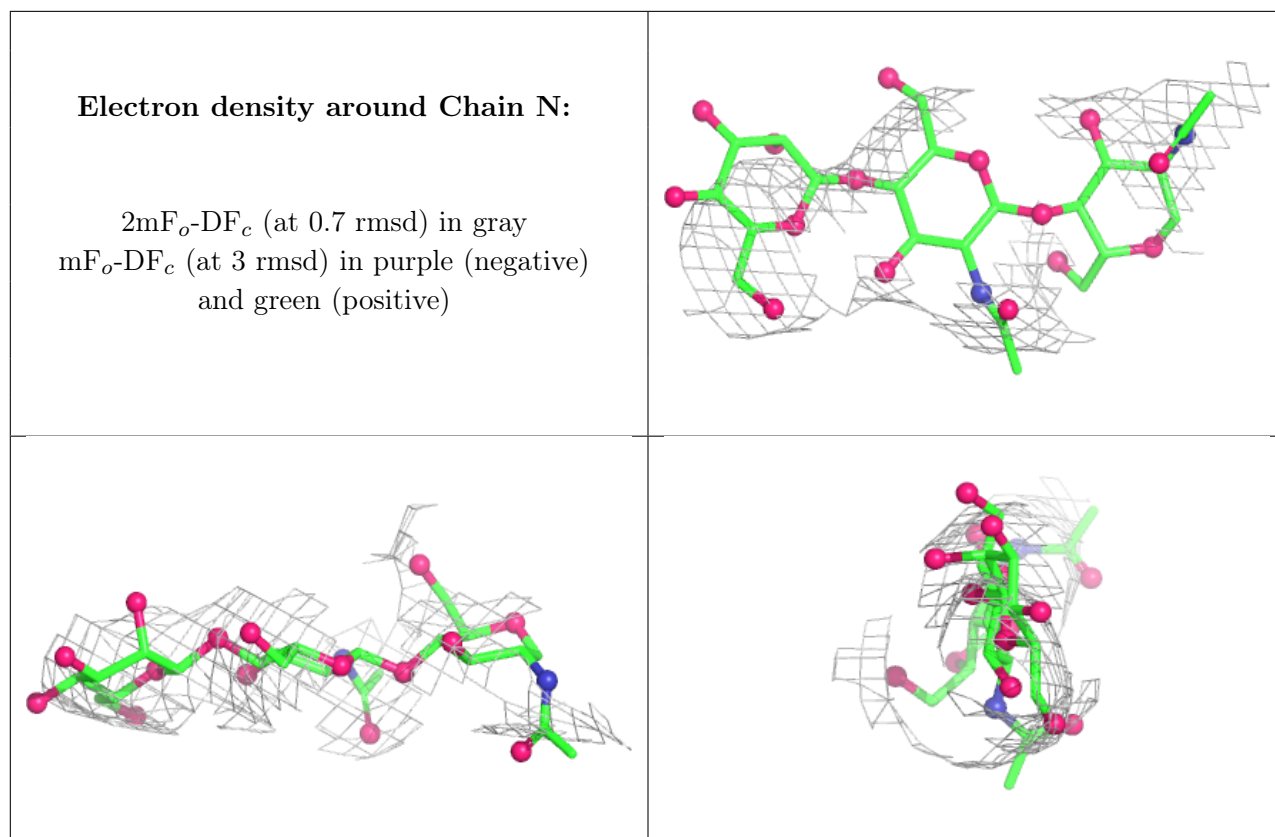


Electron density around Chain F:

$2mF_o-DF_c$ (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(Å ²)	Q<0.9
12	NAG	G	605	14/15	0.93	0.07	192,192,192,192	0
12	NAG	G	601	14/15	0.94	0.10	204,204,204,204	0
13	MAN	G	606	11/12	0.94	0.07	264,264,264,264	0
12	NAG	G	602	14/15	0.96	0.12	195,195,195,195	0
12	NAG	G	603	14/15	0.96	0.10	180,180,180,180	0
12	NAG	B	701	14/15	0.97	0.05	226,226,226,226	0
12	NAG	G	604	14/15	0.97	0.08	183,183,183,183	0
12	NAG	B	702	14/15	0.98	0.11	227,227,227,227	0

6.5 Other polymers [i](#)

There are no such residues in this entry.