



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 2, 2026 – 04:13 AM UTC

PDB ID : 4K3X / pdb_00004k3x
Title : Crystal structure of a subtype H18 hemagglutinin homologue from A/flat-faced bat/Peru/033/2010 (H18N11)
Authors : Zhu, X.; Wilson, I.A.
Deposited on : 2013-04-11
Resolution : 2.15 Å(reported)

This is a Full wwPDB X-ray Structure Validation Report for a publicly released PDB entry.

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A user guide is available at

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

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

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

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

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

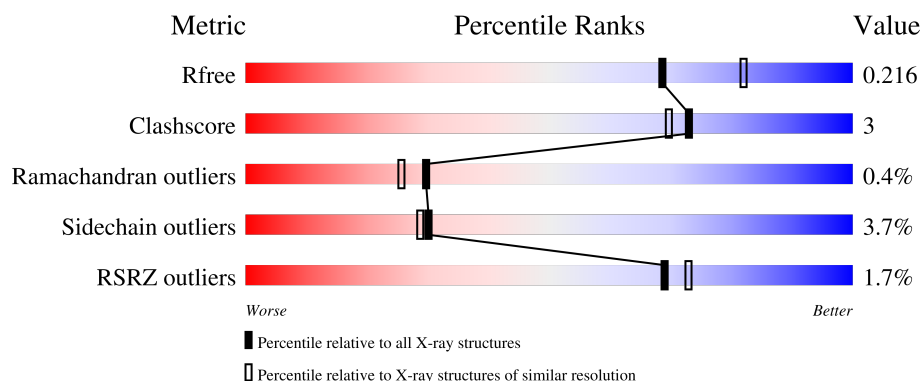
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.15 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	3689 (2.16-2.12)
Clashscore	190562	3812 (2.16-2.12)
Ramachandran outliers	187476	3773 (2.16-2.12)
Sidechain outliers	187428	3772 (2.16-2.12)
RSRZ outliers	180081	3691 (2.16-2.12)

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	329	 3% 87% 9% ..
1	C	329	 % 89% 8% ..
1	E	329	 2% 85% 11% ..
2	B	181	 % 86% 7% 6%
2	D	181	 2% 87% 6% .. 6%

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Mol	Chain	Length	Quality of chain
2	F	181	2% 86% 8% 6%
3	G	7	43% 57%
3	H	7	43% 43% 14%
3	K	7	86% 14%
4	I	4	50% 50%
5	J	2	50% 50%
5	M	2	50% 50%
5	O	2	50% 50%
5	Q	2	100%
5	R	2	100%
6	L	5	60% 40%
7	N	4	50% 50%
8	P	3	67% 33%

2 Entry composition [i](#)

There are 11 unique types of molecules in this entry. The entry contains 13212 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.

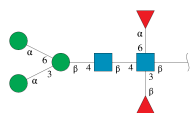
- Molecule 1 is a protein called Hemagglutinin HA1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	322	Total	C	N	O	S	0	0	0
			2533	1595	423	504	11			
1	C	322	Total	C	N	O	S	0	0	0
			2533	1595	423	504	11			
1	E	322	Total	C	N	O	S	0	0	0
			2533	1595	423	504	11			

- Molecule 2 is a protein called Hemagglutinin HA2.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	170	Total	C	N	O	S	0	0	0
			1377	863	236	271	7			
2	D	170	Total	C	N	O	S	0	0	0
			1377	863	236	271	7			
2	F	170	Total	C	N	O	S	0	0	0
			1377	863	236	271	7			

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



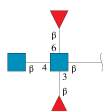
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
3	G	7	Total	C	N	O	0	0	0
			81	46	2	33			
3	H	7	Total	C	N	O	0	0	0
			81	46	2	33			

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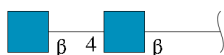
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
3	K	7	Total	C	N	O	0	0	0
			81	46	2	33			

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



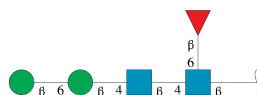
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
4	I	4	Total	C	N	O	0	0	0
			48	28	2	18			

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



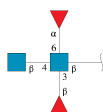
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
5	J	2	Total	C	N	O	0	0	0
			28	16	2	10			
5	M	2	Total	C	N	O	0	0	0
			28	16	2	10			
5	O	2	Total	C	N	O	0	0	0
			28	16	2	10			
5	Q	2	Total	C	N	O	0	0	0
			28	16	2	10			
5	R	2	Total	C	N	O	0	0	0
			28	16	2	10			

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



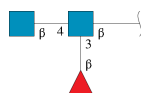
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
6	L	5	Total	C	N	O	0	0	0
			60	34	2	24			

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



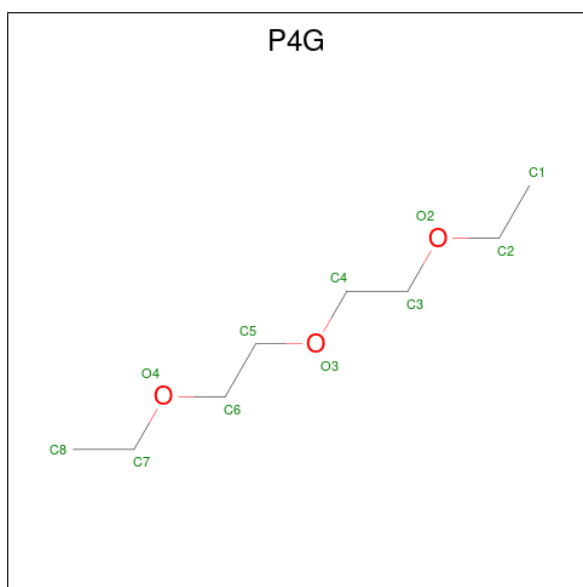
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
7	N	4	Total	C	N	O	0	0	0
			48	28	2	18			

- Molecule 8 is an oligosaccharide called beta-L-fucopyranose-(1-3)-[2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)]2-acetamido-2-deoxy-beta-D-glucopyranose.



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
8	P	3	Total	C	N	O	0	0	0
			38	22	2	14			

- Molecule 9 is 1-ETHOXY-2-(2-ETHOXYETHOXY)ETHANE (CCD ID: P4G) (formula: C₈H₁₈O₃).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
9	A	1	Total	C	O	0	0
			11	8	3		
9	C	1	Total	C	O	0	0
			11	8	3		
9	C	1	Total	C	O	0	0
			11	8	3		
9	C	1	Total	C	O	0	0
			11	8	3		
9	E	1	Total	C	O	0	0
			11	8	3		
9	E	1	Total	C	O	0	0
			11	8	3		
9	B	1	Total	C	O	0	0
			11	8	3		
9	B	1	Total	C	O	0	0
			11	8	3		
9	B	1	Total	C	O	0	0
			11	8	3		
9	D	1	Total	C	O	0	0
			11	8	3		
9	F	1	Total	C	O	0	0
			11	8	3		
9	F	1	Total	C	O	0	0
			11	8	3		

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



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

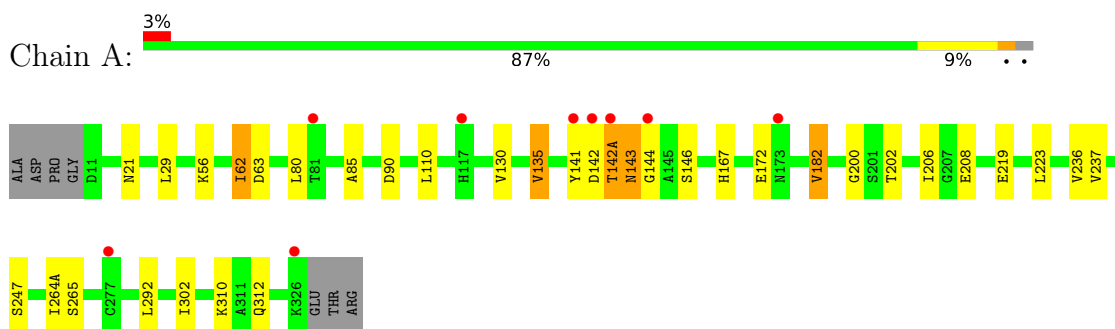
- Molecule 11 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
11	A	134	Total	O	0	0
			134	134		
11	C	201	Total	O	0	0
			201	201		
11	E	158	Total	O	0	0
			158	158		
11	B	89	Total	O	0	0
			89	89		
11	D	76	Total	O	0	0
			76	76		
11	F	87	Total	O	0	0
			87	87		

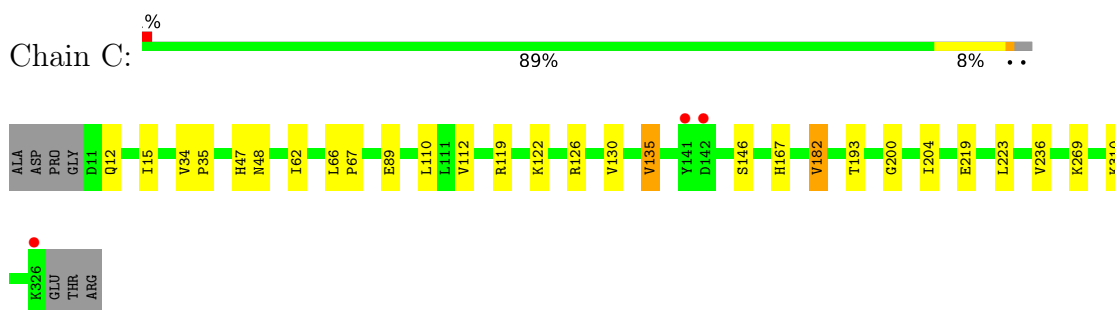
3 Residue-property plots [i](#)

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.

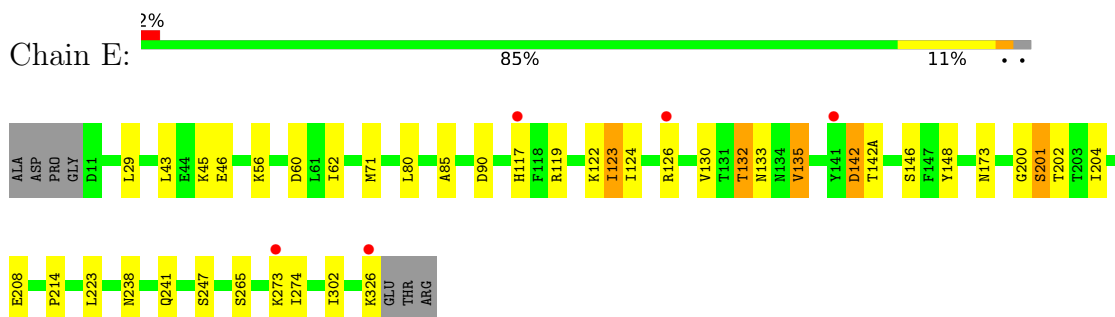
• Molecule 1: Hemagglutinin HA1



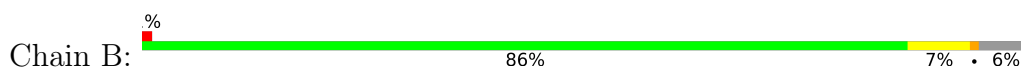
• Molecule 1: Hemagglutinin HA1



• Molecule 1: Hemagglutinin HA1

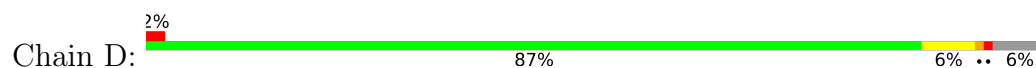


• Molecule 2: Hemagglutinin HA2

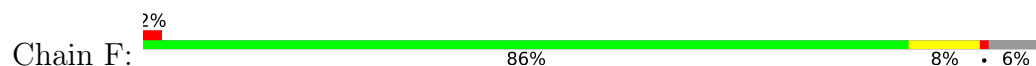




• Molecule 2: Hemagglutinin HA2



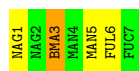
• Molecule 2: Hemagglutinin HA2



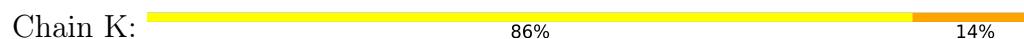
• Molecule 3: alpha-D-mannopyranose-(1-3)-[alpha-D-mannopyranose-(1-6)]beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-[beta-L-fucopyranose-(1-3)][alpha-L-fucopyranose-(1-6)]2-acetamido-2-deoxy-beta-D-glucopyranose



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



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



• Molecule 4: beta-L-fucopyranose-(1-3)-[2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)][beta-L-fucopyranose-(1-6)]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 J:



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

Chain M:



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

Chain O:



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

Chain Q:



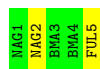
- Molecule 5: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain R:



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

Chain L:



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

Chain N:  50% 50%

MAG1
FUL2
NAG3
FUC4

- Molecule 8: beta-L-fucopyranose-(1-3)-[2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)]2-acetamido-2-deoxy-beta-D-glucopyranose

Chain P:  67% 33%

MAG1
FUL2
NAG3

4 Data and refinement statistics

Property	Value	Source
Space group	I 4 2 2	Depositor
Cell constants a, b, c, α , β , γ	238.88Å 238.88Å 160.78Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	47.94 – 2.15 47.94 – 2.15	Depositor EDS
% Data completeness (in resolution range)	96.8 (47.94-2.15) 96.8 (47.94-2.15)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	0.11	Depositor
$\langle I/\sigma(I) \rangle$ ¹	3.78 (at 2.14Å)	Xtriage
Refinement program	PHENIX (phenix.refine: 1.7.2_869)	Depositor
R, R_{free}	0.183 , 0.220 0.181 , 0.216	Depositor DCC
R_{free} test set	6095 reflections (4.56%)	wwPDB-VP
Wilson B-factor (Å ²)	36.8	Xtriage
Anisotropy	0.556	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.33 , 41.9	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	13212	wwPDB-VP
Average B, all atoms (Å ²)	46.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.40% 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: FUC, P4G, FUL, MAN, BMA, NAG

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	0.46	0/2591	0.80	1/3530 (0.0%)
1	C	0.47	0/2591	0.77	1/3530 (0.0%)
1	E	0.43	0/2591	0.74	0/3530
2	B	0.46	0/1403	0.72	1/1889 (0.1%)
2	D	0.47	0/1403	0.73	1/1889 (0.1%)
2	F	0.48	0/1403	0.76	1/1889 (0.1%)
All	All	0.46	0/11982	0.76	5/16257 (0.0%)

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

There are no bond length outliers.

All (5) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	142(A)	THR	N-CA-C	9.84	123.03	110.24
2	F	127	LYS	CB-CA-C	-7.54	107.86	116.54
2	D	127	LYS	CB-CA-C	-6.32	109.27	116.54
2	B	127	LYS	CB-CA-C	-5.08	110.70	116.54
1	C	112	VAL	N-CA-C	5.00	116.92	112.17

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	142	ASP	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	2533	0	2426	19	0
1	C	2533	0	2427	15	0
1	E	2533	0	2427	18	0
2	B	1377	0	1310	11	0
2	D	1377	0	1310	14	0
2	F	1377	0	1310	12	0
3	G	81	0	70	1	0
3	H	81	0	70	1	0
3	K	81	0	70	4	0
4	I	48	0	43	0	0
5	J	28	0	25	0	0
5	M	28	0	25	0	0
5	O	28	0	25	0	0
5	Q	28	0	25	0	0
5	R	28	0	25	0	0
6	L	60	0	52	0	0
7	N	48	0	43	2	0
8	P	38	0	34	0	0
9	A	11	0	18	1	0
9	B	33	0	54	0	0
9	C	33	0	54	1	0
9	D	11	0	18	0	0
9	E	22	0	36	0	0
9	F	22	0	36	0	0
10	C	14	0	13	0	0
10	E	14	0	13	0	0
11	A	134	0	0	1	0
11	B	89	0	0	0	0
11	C	201	0	0	5	0
11	D	76	0	0	3	0
11	E	158	0	0	2	0
11	F	87	0	0	0	0
All	All	13212	0	11959	77	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 3.

All (77) 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:105:GLU:CD	2:F:106:ARG:HH22	1.93	0.77
1:C:236:VAL:H	9:C:515:P4G:H71	1.50	0.75
3:K:2:NAG:HO3	3:K:5:MAN:HO2	1.39	0.68
2:D:140:ILE:HD11	2:D:144:CYS:HB2	1.75	0.67
2:D:58:LYS:HD2	2:F:97:GLU:HG2	1.78	0.65
1:C:122:LYS:NZ	11:C:779:HOH:O	2.31	0.63
2:D:106:ARG:HH22	2:F:105:GLU:CD	2.07	0.63
1:A:135:VAL:HG22	1:A:146:SER:HA	1.82	0.62
1:C:135:VAL:HG22	1:C:146:SER:HA	1.82	0.62
1:E:135:VAL:HG22	1:E:146:SER:HA	1.81	0.62
1:E:132:THR:HG23	1:E:133:ASN:OD1	2.00	0.61
1:E:122:LYS:NZ	11:E:694:HOH:O	2.26	0.61
1:C:48:ASN:N	11:C:747:HOH:O	2.33	0.61
2:F:63:PHE:HB2	7:N:1:NAG:H61	1.83	0.59
1:A:310:LYS:HG3	2:B:89:LEU:HD11	1.86	0.58
2:D:164:LYS:NZ	2:F:175:SER:O	2.37	0.57
1:E:142:ASP:OD1	1:E:142:ASP:N	2.37	0.57
2:D:153:LYS:NZ	11:D:653:HOH:O	2.35	0.56
2:B:106:ARG:HH22	2:D:105:GLU:CD	2.14	0.55
1:E:201:SER:HB2	1:E:214:PRO:HA	1.87	0.55
7:N:1:NAG:H5	7:N:4:FUC:H5	1.89	0.54
1:E:202:THR:HG23	1:E:247:SER:HB2	1.89	0.54
3:K:2:NAG:O3	3:K:5:MAN:O2	2.17	0.53
1:E:265:SER:HB2	1:E:302:ILE:HD13	1.90	0.53
2:F:127:LYS:HD3	2:F:159:TYR:CD1	2.45	0.52
2:B:102:LEU:O	2:B:106:ARG:HG3	2.10	0.52
1:C:47:HIS:NE2	11:C:757:HOH:O	2.34	0.52
1:A:110:LEU:HD11	2:D:76:ARG:HA	1.93	0.50
1:A:236:VAL:H	9:A:521:P4G:H12	1.77	0.50
1:A:302:ILE:HD11	2:B:66:THR:HG22	1.94	0.50
2:B:105:GLU:OE2	2:F:106:ARG:NH2	2.44	0.50
2:F:30:GLU:OE1	2:F:145:ASN:HB2	2.13	0.49
1:A:29:LEU:HG	2:F:51:LYS:HG3	1.95	0.48
1:E:43:LEU:HD23	1:E:45:LYS:HD3	1.96	0.47
1:E:123:ILE:HG22	1:E:124:ILE:HG13	1.96	0.47
2:B:106:ARG:NH2	2:D:105:GLU:OE2	2.46	0.47
1:A:202:THR:HG23	1:A:247:SER:HB2	1.98	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:29:LEU:HG	2:D:51:LYS:HG3	1.97	0.46
2:B:97:GLU:HG2	2:F:58:LYS:HD2	1.96	0.46
3:H:3:BMA:H61	3:H:5:MAN:H2	1.42	0.46
1:C:310:LYS:HG3	2:D:89:LEU:HD11	1.98	0.46
1:E:238:ASN:O	1:E:241:GLN:HB2	2.15	0.46
1:E:71:MET:O	1:E:148:TYR:HB3	2.16	0.45
3:K:3:BMA:H61	3:K:5:MAN:H2	1.62	0.45
1:A:56:LYS:HB3	1:A:85:ALA:HB2	1.98	0.44
2:D:127:LYS:HD3	2:D:159:TYR:CD1	2.51	0.44
1:C:167:HIS:HB3	3:K:7:FUC:H62	1.99	0.44
1:A:62:ILE:HB	1:A:63:ASP:H	1.66	0.44
2:D:106:ARG:NE	11:D:661:HOH:O	2.40	0.43
1:C:182:VAL:HG22	11:C:605:HOH:O	2.18	0.43
1:C:47:HIS:HA	11:C:747:HOH:O	2.18	0.43
1:A:142(A):THR:HA	1:A:143:ASN:HA	1.69	0.43
1:C:89:GLU:OE1	1:C:269:LYS:NZ	2.42	0.43
2:D:106:ARG:NH2	11:D:661:HOH:O	2.47	0.42
2:F:98:LEU:HD23	2:F:98:LEU:HA	1.82	0.42
1:A:142(A):THR:HB	1:A:143:ASN:OD1	2.19	0.42
1:C:15:ILE:N	1:C:15:ILE:HD12	2.35	0.42
1:A:206:ILE:HG23	1:A:237:VAL:HG22	2.01	0.41
1:A:265:SER:HB2	1:A:302:ILE:HD13	2.01	0.41
1:C:66:LEU:HB3	1:C:67:PRO:HD3	2.02	0.41
1:E:80:LEU:CD2	11:E:720:HOH:O	2.68	0.41
2:B:168:LEU:O	2:B:171:GLN:HG2	2.20	0.41
1:A:167:HIS:HB3	3:G:7:FUC:H62	2.02	0.41
1:A:182:VAL:HG22	11:A:632:HOH:O	2.19	0.41
1:A:223:LEU:HD21	1:E:208:GLU:HB3	2.03	0.41
1:A:141:TYR:CE2	1:A:146:SER:HB2	2.56	0.41
1:E:56:LYS:HB3	1:E:85:ALA:HB2	2.03	0.41
1:E:117:HIS:CE1	1:E:119:ARG:HE	2.39	0.41
1:C:110:LEU:HD11	2:F:76:ARG:HA	2.03	0.41
1:E:43:LEU:HG	1:E:45:LYS:HG2	2.03	0.41
1:A:143:ASN:HB2	1:A:144:GLY:H	1.46	0.40
2:D:127:LYS:HD3	2:D:159:TYR:CG	2.56	0.40
1:C:34:VAL:HA	1:C:35:PRO:HD3	1.94	0.40
1:C:135:VAL:HG22	1:C:146:SER:CA	2.49	0.40
1:E:60:ASP:HB2	1:E:274:ILE:HD13	2.03	0.40
1:A:264(A):ILE:O	2:B:65:SER:HB2	2.22	0.40
2:B:71:ASN:OD1	2:B:74:GLU:HG3	2.21	0.40

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	320/329 (97%)	311 (97%)	7 (2%)	2 (1%)	21	15
1	C	320/329 (97%)	313 (98%)	5 (2%)	2 (1%)	21	15
1	E	320/329 (97%)	313 (98%)	5 (2%)	2 (1%)	21	15
2	B	168/181 (93%)	165 (98%)	3 (2%)	0	100	100
2	D	168/181 (93%)	166 (99%)	2 (1%)	0	100	100
2	F	168/181 (93%)	167 (99%)	1 (1%)	0	100	100
All	All	1464/1530 (96%)	1435 (98%)	23 (2%)	6 (0%)	30	26

All (6) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	62	ILE
1	A	200	GLY
1	C	62	ILE
1	C	200	GLY
1	E	62	ILE
1	E	200	GLY

5.3.2 Protein sidechains

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	290/295 (98%)	278 (96%)	12 (4%)	27	24
1	C	290/295 (98%)	280 (97%)	10 (3%)	32	32

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	E	290/295 (98%)	275 (95%)	15 (5%)	21	16
2	B	148/155 (96%)	144 (97%)	4 (3%)	39	41
2	D	148/155 (96%)	144 (97%)	4 (3%)	39	41
2	F	148/155 (96%)	145 (98%)	3 (2%)	48	53
All	All	1314/1350 (97%)	1266 (96%)	48 (4%)	30	29

All (48) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	21	ASN
1	A	80	LEU
1	A	90	ASP
1	A	130	VAL
1	A	135	VAL
1	A	143	ASN
1	A	172	GLU
1	A	182	VAL
1	A	208	GLU
1	A	219	GLU
1	A	292	LEU
1	A	312	GLN
1	C	12	GLN
1	C	119	ARG
1	C	126	ARG
1	C	130	VAL
1	C	135	VAL
1	C	182	VAL
1	C	193	THR
1	C	204	ILE
1	C	219	GLU
1	C	223	LEU
1	E	46	GLU
1	E	90	ASP
1	E	123	ILE
1	E	126	ARG
1	E	130	VAL
1	E	132	THR
1	E	135	VAL
1	E	142	ASP
1	E	142(A)	THR
1	E	173	ASN

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Mol	Chain	Res	Type
1	E	201	SER
1	E	204	ILE
1	E	223	LEU
1	E	273	LYS
1	E	326	LYS
2	B	97	GLU
2	B	118	LEU
2	B	168	LEU
2	B	175	SER
2	D	127	LYS
2	D	140	ILE
2	D	164	LYS
2	D	168	LEU
2	F	72	LYS
2	F	127	LYS
2	F	172	LYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (12) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	95	ASN
1	A	198	GLN
1	C	12	GLN
1	C	134	ASN
1	E	24	GLN
1	E	159	ASN
1	E	289	ASN
1	E	312	GLN
2	D	26	HIS
2	D	42	GLN
2	F	60	ASN
2	F	117	ASN

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 ⓘ

47 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$
3	NAG	G	1	3,1	14,14,15	0.56	0	17,19,21	1.28	2 (11%)
3	NAG	G	2	3	14,14,15	0.54	0	17,19,21	0.82	1 (5%)
3	BMA	G	3	3	11,11,12	0.55	0	15,15,17	0.60	0
3	MAN	G	4	3	11,11,12	0.50	0	15,15,17	0.52	0
3	MAN	G	5	3	11,11,12	0.49	0	15,15,17	0.68	0
3	FUL	G	6	3	10,10,11	0.79	0	14,14,16	1.83	2 (14%)
3	FUC	G	7	3	10,10,11	0.58	0	14,14,16	0.70	0
3	NAG	H	1	3,1	14,14,15	0.64	0	17,19,21	1.01	1 (5%)
3	NAG	H	2	3	14,14,15	0.47	0	17,19,21	1.00	0
3	BMA	H	3	3	11,11,12	0.58	0	15,15,17	0.97	1 (6%)
3	MAN	H	4	3	11,11,12	0.54	0	15,15,17	0.75	0
3	MAN	H	5	3	11,11,12	0.53	0	15,15,17	0.64	0
3	FUL	H	6	3	10,10,11	0.68	0	14,14,16	1.02	1 (7%)
3	FUC	H	7	3	10,10,11	0.66	0	14,14,16	0.55	0
4	NAG	I	1	4,1	14,14,15	0.68	0	17,19,21	1.67	3 (17%)
4	FUL	I	2	4	10,10,11	0.69	0	14,14,16	0.61	0
4	NAG	I	3	4	14,14,15	0.59	0	17,19,21	0.90	1 (5%)
4	FUL	I	4	4	10,10,11	0.64	0	14,14,16	0.93	0
5	NAG	J	1	5,1	14,14,15	0.57	0	17,19,21	0.61	0
5	NAG	J	2	5	14,14,15	0.50	0	17,19,21	0.71	1 (5%)
3	NAG	K	1	3,1	14,14,15	0.56	0	17,19,21	1.49	3 (17%)
3	NAG	K	2	3	14,14,15	0.58	0	17,19,21	0.87	2 (11%)
3	BMA	K	3	3	11,11,12	0.63	0	15,15,17	0.80	0
3	MAN	K	4	3	11,11,12	0.50	0	15,15,17	0.77	1 (6%)
3	MAN	K	5	3	11,11,12	0.49	0	15,15,17	0.79	0
3	FUL	K	6	3	10,10,11	0.70	0	14,14,16	1.84	2 (14%)
3	FUC	K	7	3	10,10,11	0.63	0	14,14,16	0.68	0
6	NAG	L	1	6,1	14,14,15	0.58	0	17,19,21	0.88	0
6	NAG	L	2	6	14,14,15	0.57	0	17,19,21	1.63	3 (17%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
6	BMA	L	3	6	11,11,12	0.55	0	15,15,17	0.47	0
6	BMA	L	4	6	11,11,12	0.75	0	15,15,17	1.02	0
6	FUL	L	5	6	10,10,11	0.67	0	14,14,16	1.06	1 (7%)
5	NAG	M	1	5,1	14,14,15	0.48	0	17,19,21	0.83	1 (5%)
5	NAG	M	2	5	14,14,15	0.52	0	17,19,21	0.60	0
7	NAG	N	1	7,1	14,14,15	0.77	0	17,19,21	1.02	1 (5%)
7	FUL	N	2	7	10,10,11	0.66	0	14,14,16	0.48	0
7	NAG	N	3	7	14,14,15	0.58	0	17,19,21	0.72	0
7	FUC	N	4	7	10,10,11	0.61	0	14,14,16	1.42	2 (14%)
5	NAG	O	1	5	14,14,15	0.61	0	17,19,21	1.68	3 (17%)
5	NAG	O	2	5	14,14,15	0.50	0	17,19,21	0.58	0
8	NAG	P	1	2,8	14,14,15	0.55	0	17,19,21	1.48	3 (17%)
8	FUL	P	2	8	10,10,11	0.60	0	14,14,16	0.71	0
8	NAG	P	3	8	14,14,15	0.61	0	17,19,21	0.68	0
5	NAG	Q	1	2,5	14,14,15	0.54	0	17,19,21	0.91	1 (5%)
5	NAG	Q	2	5	14,14,15	0.48	0	17,19,21	1.32	2 (11%)
5	NAG	R	1	2,5	14,14,15	0.61	0	17,19,21	0.71	0
5	NAG	R	2	5	14,14,15	0.55	0	17,19,21	0.81	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
3	NAG	G	1	3,1	-	0/6/23/26	0/1/1/1
3	NAG	G	2	3	-	0/6/23/26	0/1/1/1
3	BMA	G	3	3	-	0/2/19/22	0/1/1/1
3	MAN	G	4	3	-	2/2/19/22	0/1/1/1
3	MAN	G	5	3	-	0/2/19/22	0/1/1/1
3	FUL	G	6	3	-	-	0/1/1/1
3	FUC	G	7	3	-	-	0/1/1/1
3	NAG	H	1	3,1	-	0/6/23/26	0/1/1/1
3	NAG	H	2	3	-	2/6/23/26	0/1/1/1
3	BMA	H	3	3	-	2/2/19/22	0/1/1/1
3	MAN	H	4	3	-	2/2/19/22	0/1/1/1
3	MAN	H	5	3	-	1/2/19/22	0/1/1/1
3	FUL	H	6	3	-	-	0/1/1/1
3	FUC	H	7	3	-	-	0/1/1/1
4	NAG	I	1	4,1	-	2/6/23/26	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	FUL	I	2	4	-	-	0/1/1/1
4	NAG	I	3	4	-	1/6/23/26	0/1/1/1
4	FUL	I	4	4	-	-	0/1/1/1
5	NAG	J	1	5,1	-	2/6/23/26	0/1/1/1
5	NAG	J	2	5	-	4/6/23/26	0/1/1/1
3	NAG	K	1	3,1	-	2/6/23/26	0/1/1/1
3	NAG	K	2	3	-	0/6/23/26	0/1/1/1
3	BMA	K	3	3	-	2/2/19/22	0/1/1/1
3	MAN	K	4	3	-	2/2/19/22	0/1/1/1
3	MAN	K	5	3	-	2/2/19/22	1/1/1/1
3	FUL	K	6	3	-	-	0/1/1/1
3	FUC	K	7	3	-	-	0/1/1/1
6	NAG	L	1	6,1	-	2/6/23/26	0/1/1/1
6	NAG	L	2	6	-	2/6/23/26	0/1/1/1
6	BMA	L	3	6	-	2/2/19/22	0/1/1/1
6	BMA	L	4	6	-	2/2/19/22	0/1/1/1
6	FUL	L	5	6	-	-	0/1/1/1
5	NAG	M	1	5,1	-	0/6/23/26	0/1/1/1
5	NAG	M	2	5	-	2/6/23/26	0/1/1/1
7	NAG	N	1	7,1	-	2/6/23/26	0/1/1/1
7	FUL	N	2	7	-	-	0/1/1/1
7	NAG	N	3	7	-	1/6/23/26	0/1/1/1
7	FUC	N	4	7	-	-	0/1/1/1
5	NAG	O	1	5	-	2/6/23/26	0/1/1/1
5	NAG	O	2	5	-	3/6/23/26	0/1/1/1
8	NAG	P	1	2,8	-	2/6/23/26	0/1/1/1
8	FUL	P	2	8	-	-	0/1/1/1
8	NAG	P	3	8	-	3/6/23/26	0/1/1/1
5	NAG	Q	1	2,5	-	2/6/23/26	0/1/1/1
5	NAG	Q	2	5	-	4/6/23/26	0/1/1/1
5	NAG	R	1	2,5	-	0/6/23/26	0/1/1/1
5	NAG	R	2	5	-	4/6/23/26	0/1/1/1

There are no bond length outliers.

All (38) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	K	6	FUL	C1-C2-C3	-5.02	102.34	109.64

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
6	L	2	NAG	C1-O5-C5	4.85	118.69	112.19
3	G	6	FUL	C1-C2-C3	-4.72	102.77	109.64
5	O	1	NAG	C3-C4-C5	4.71	118.77	110.23
3	G	6	FUL	C1-O5-C5	-4.01	103.49	112.97
3	K	6	FUL	C1-O5-C5	-3.88	103.80	112.97
4	I	1	NAG	C2-N2-C7	-3.82	117.78	122.90
3	K	1	NAG	C2-N2-C7	-3.76	117.87	122.90
7	N	4	FUC	C1-C2-C3	3.75	115.11	109.64
5	Q	2	NAG	C1-O5-C5	3.74	117.20	112.19
4	I	1	NAG	O5-C1-C2	-3.59	105.74	111.29
3	G	1	NAG	O3-C3-C2	-3.40	102.33	109.40
4	I	1	NAG	C4-C3-C2	3.13	115.60	111.02
3	G	1	NAG	O5-C1-C2	-2.93	106.75	111.29
8	P	1	NAG	O5-C1-C2	-2.90	106.81	111.29
3	H	3	BMA	C1-O5-C5	2.88	116.05	112.19
4	I	3	NAG	C2-N2-C7	-2.80	119.15	122.90
5	O	1	NAG	O5-C1-C2	-2.76	107.01	111.29
8	P	1	NAG	C3-C4-C5	2.75	115.22	110.23
8	P	1	NAG	C4-C3-C2	2.71	114.99	111.02
5	Q	2	NAG	C3-C4-C5	2.70	115.14	110.23
3	K	1	NAG	C1-O5-C5	2.64	115.72	112.19
6	L	2	NAG	O5-C5-C6	2.57	112.67	107.66
3	H	6	FUL	C1-C2-C3	-2.56	105.92	109.64
7	N	4	FUC	C1-O5-C5	2.53	118.94	112.97
6	L	5	FUL	C1-C2-C3	-2.50	106.00	109.64
3	G	2	NAG	C2-N2-C7	-2.40	119.69	122.90
5	Q	1	NAG	C2-N2-C7	-2.38	119.71	122.90
6	L	2	NAG	C3-C4-C5	2.21	114.23	110.23
7	N	1	NAG	O5-C1-C2	-2.18	107.92	111.29
5	J	2	NAG	C2-N2-C7	-2.16	120.00	122.90
3	K	2	NAG	O3-C3-C2	-2.11	105.01	109.40
3	K	1	NAG	O3-C3-C2	-2.11	105.02	109.40
5	O	1	NAG	C4-C3-C2	2.06	114.04	111.02
3	K	4	MAN	C1-O5-C5	2.03	114.90	112.19
3	K	2	NAG	C2-N2-C7	-2.02	120.19	122.90
5	M	1	NAG	C1-O5-C5	2.01	114.88	112.19
3	H	1	NAG	C4-C3-C2	2.00	113.95	111.02

There are no chirality outliers.

All (59) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
5	O	2	NAG	C1-C2-N2-C7
5	O	2	NAG	C8-C7-N2-C2
5	O	2	NAG	O7-C7-N2-C2
5	J	1	NAG	C8-C7-N2-C2
5	J	1	NAG	O7-C7-N2-C2
5	R	2	NAG	C8-C7-N2-C2
5	R	2	NAG	O7-C7-N2-C2
5	M	2	NAG	O5-C5-C6-O6
3	H	4	MAN	O5-C5-C6-O6
4	I	1	NAG	O5-C5-C6-O6
3	H	3	BMA	O5-C5-C6-O6
5	Q	2	NAG	O5-C5-C6-O6
5	J	2	NAG	C8-C7-N2-C2
5	J	2	NAG	O7-C7-N2-C2
3	G	4	MAN	O5-C5-C6-O6
7	N	1	NAG	O5-C5-C6-O6
6	L	1	NAG	C4-C5-C6-O6
6	L	2	NAG	C4-C5-C6-O6
3	K	3	BMA	O5-C5-C6-O6
6	L	4	BMA	O5-C5-C6-O6
5	M	2	NAG	C4-C5-C6-O6
3	H	4	MAN	C4-C5-C6-O6
4	I	1	NAG	C4-C5-C6-O6
3	K	4	MAN	O5-C5-C6-O6
6	L	1	NAG	O5-C5-C6-O6
5	Q	1	NAG	C8-C7-N2-C2
5	Q	2	NAG	C8-C7-N2-C2
5	Q	2	NAG	O7-C7-N2-C2
3	G	4	MAN	C4-C5-C6-O6
6	L	2	NAG	O5-C5-C6-O6
3	H	3	BMA	C4-C5-C6-O6
3	K	5	MAN	O5-C5-C6-O6
5	Q	1	NAG	O7-C7-N2-C2
3	K	4	MAN	C4-C5-C6-O6
5	Q	2	NAG	C4-C5-C6-O6
6	L	3	BMA	O5-C5-C6-O6
3	K	3	BMA	C4-C5-C6-O6
6	L	3	BMA	C4-C5-C6-O6
5	R	2	NAG	O5-C5-C6-O6
5	R	2	NAG	C4-C5-C6-O6
7	N	1	NAG	C4-C5-C6-O6
5	O	1	NAG	C8-C7-N2-C2
5	J	2	NAG	C4-C5-C6-O6

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Mol	Chain	Res	Type	Atoms
8	P	3	NAG	C8-C7-N2-C2
3	H	2	NAG	C4-C5-C6-O6
6	L	4	BMA	C4-C5-C6-O6
5	O	1	NAG	O7-C7-N2-C2
4	I	3	NAG	O5-C5-C6-O6
3	H	2	NAG	O5-C5-C6-O6
3	H	5	MAN	O5-C5-C6-O6
7	N	3	NAG	O5-C5-C6-O6
5	J	2	NAG	O5-C5-C6-O6
8	P	3	NAG	O7-C7-N2-C2
3	K	5	MAN	C4-C5-C6-O6
8	P	1	NAG	O5-C5-C6-O6
8	P	3	NAG	C1-C2-N2-C7
3	K	1	NAG	O5-C5-C6-O6
3	K	1	NAG	C4-C5-C6-O6
8	P	1	NAG	C4-C5-C6-O6

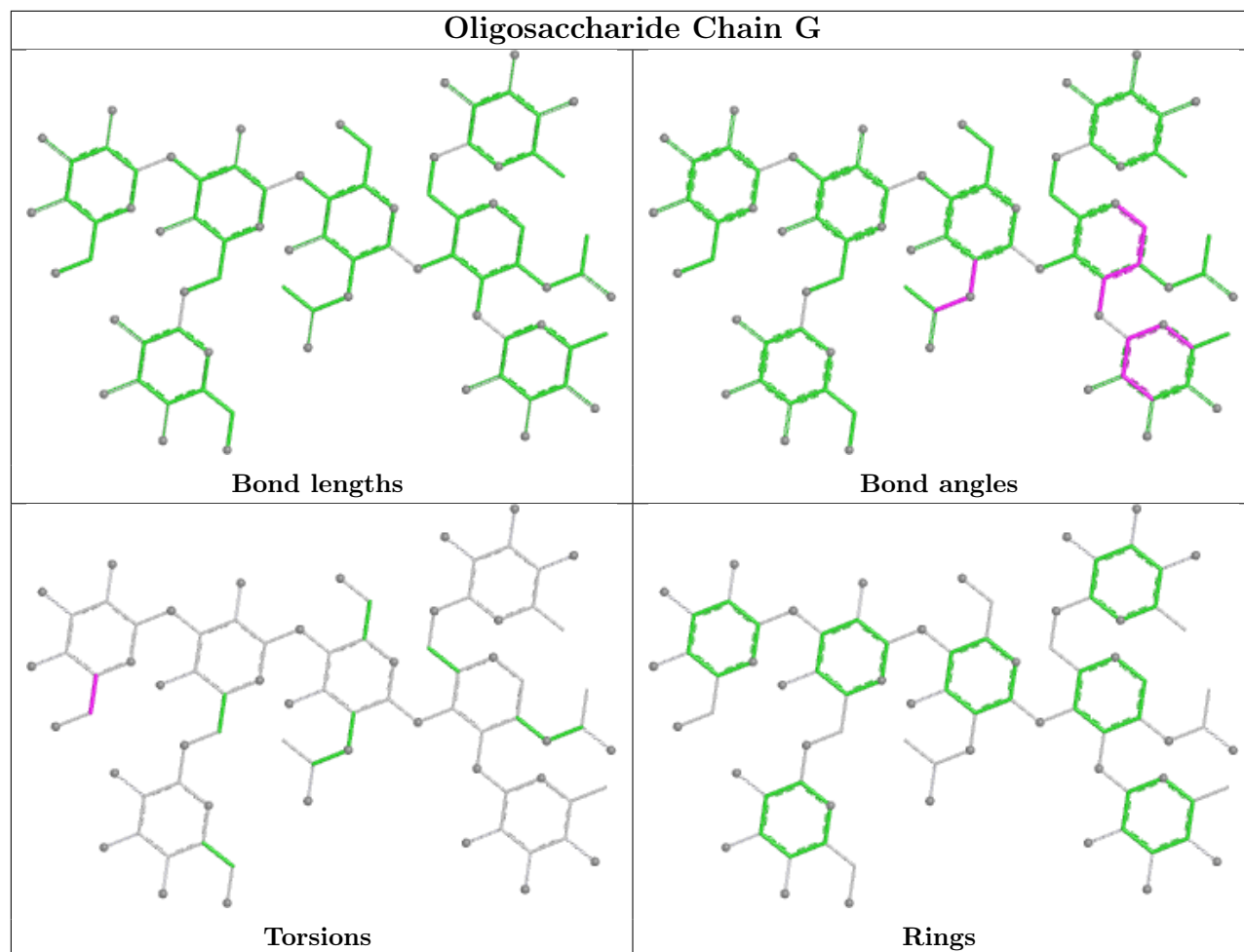
All (1) ring outliers are listed below:

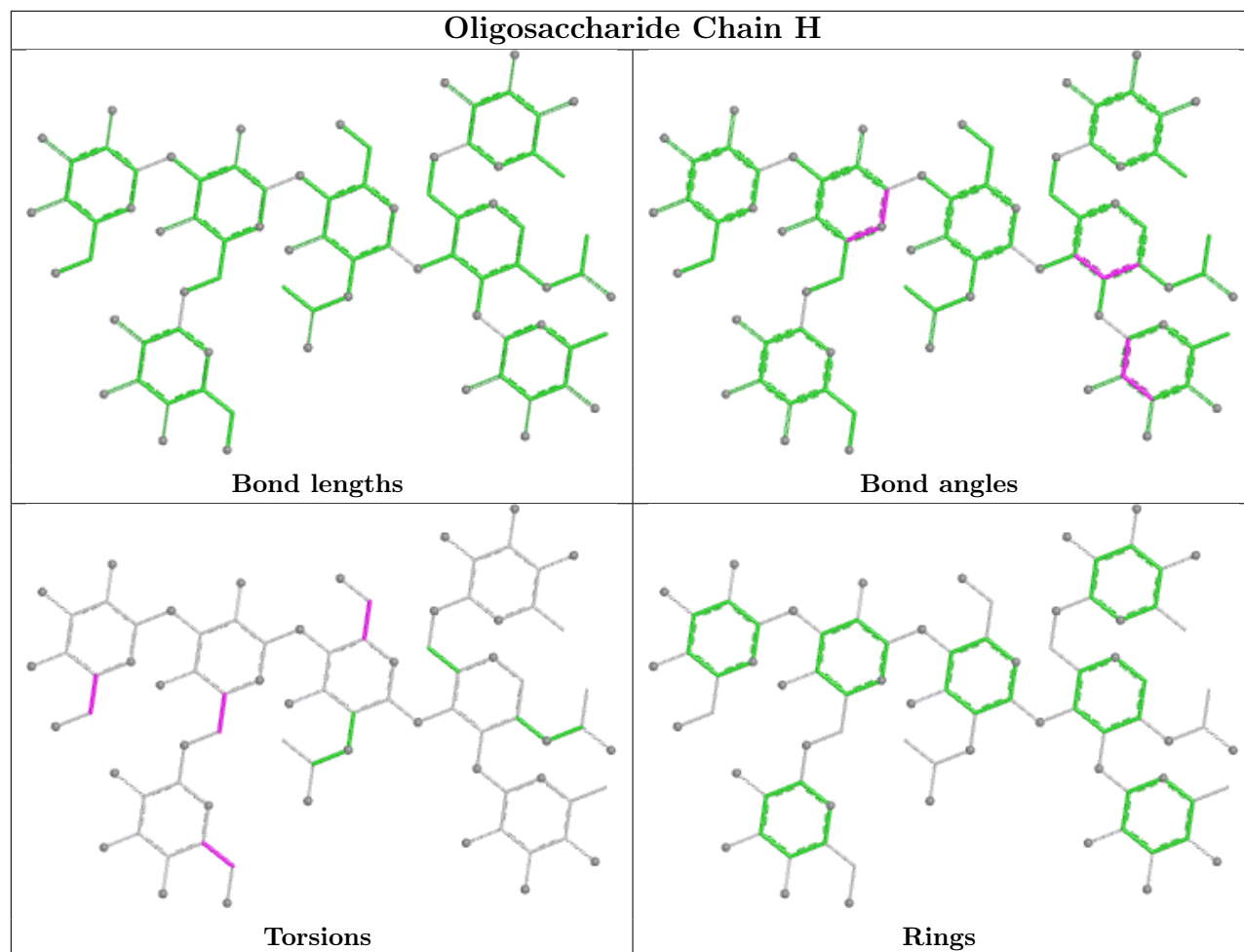
Mol	Chain	Res	Type	Atoms
3	K	5	MAN	C1-C2-C3-C4-C5-O5

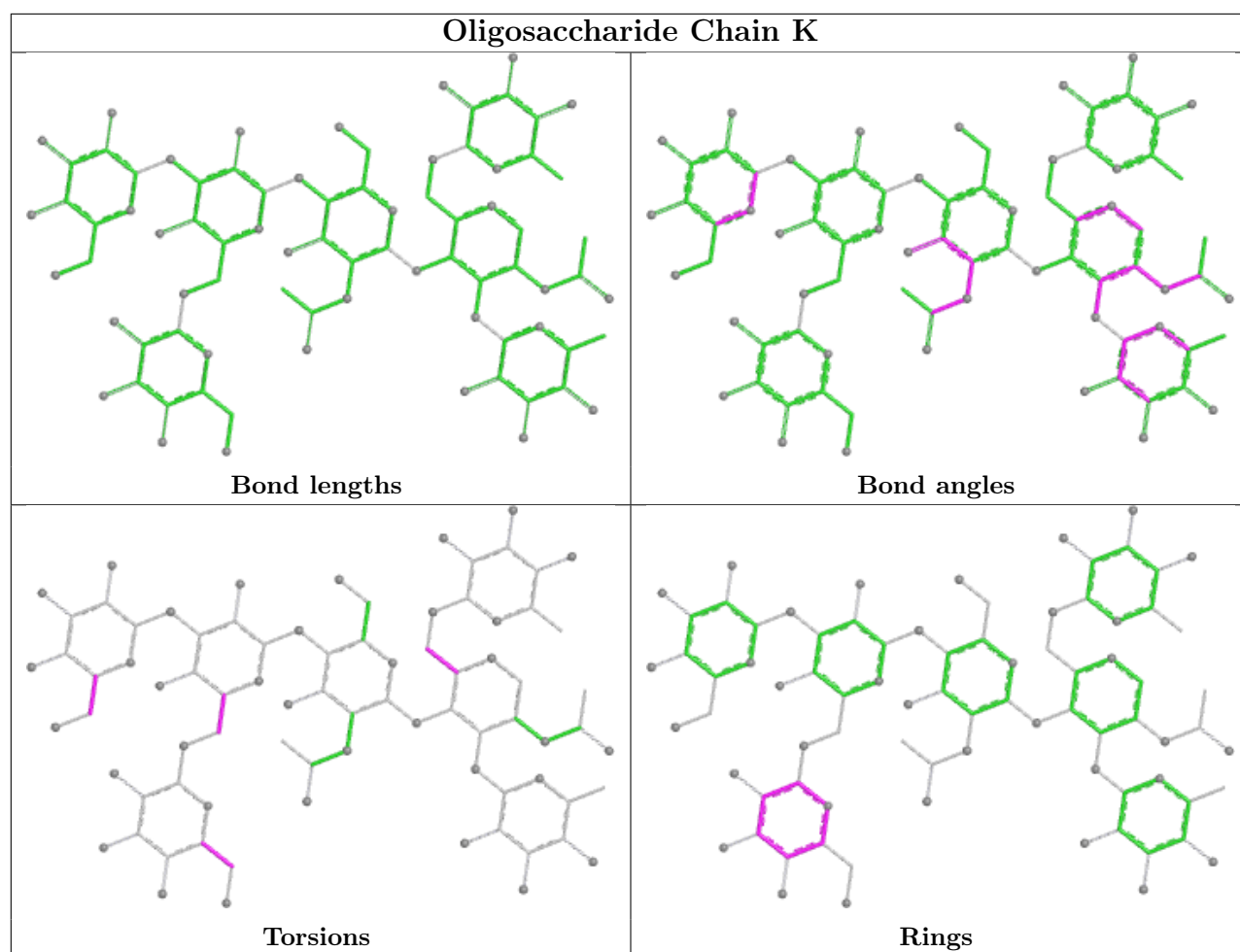
9 monomers are involved in 8 short contacts:

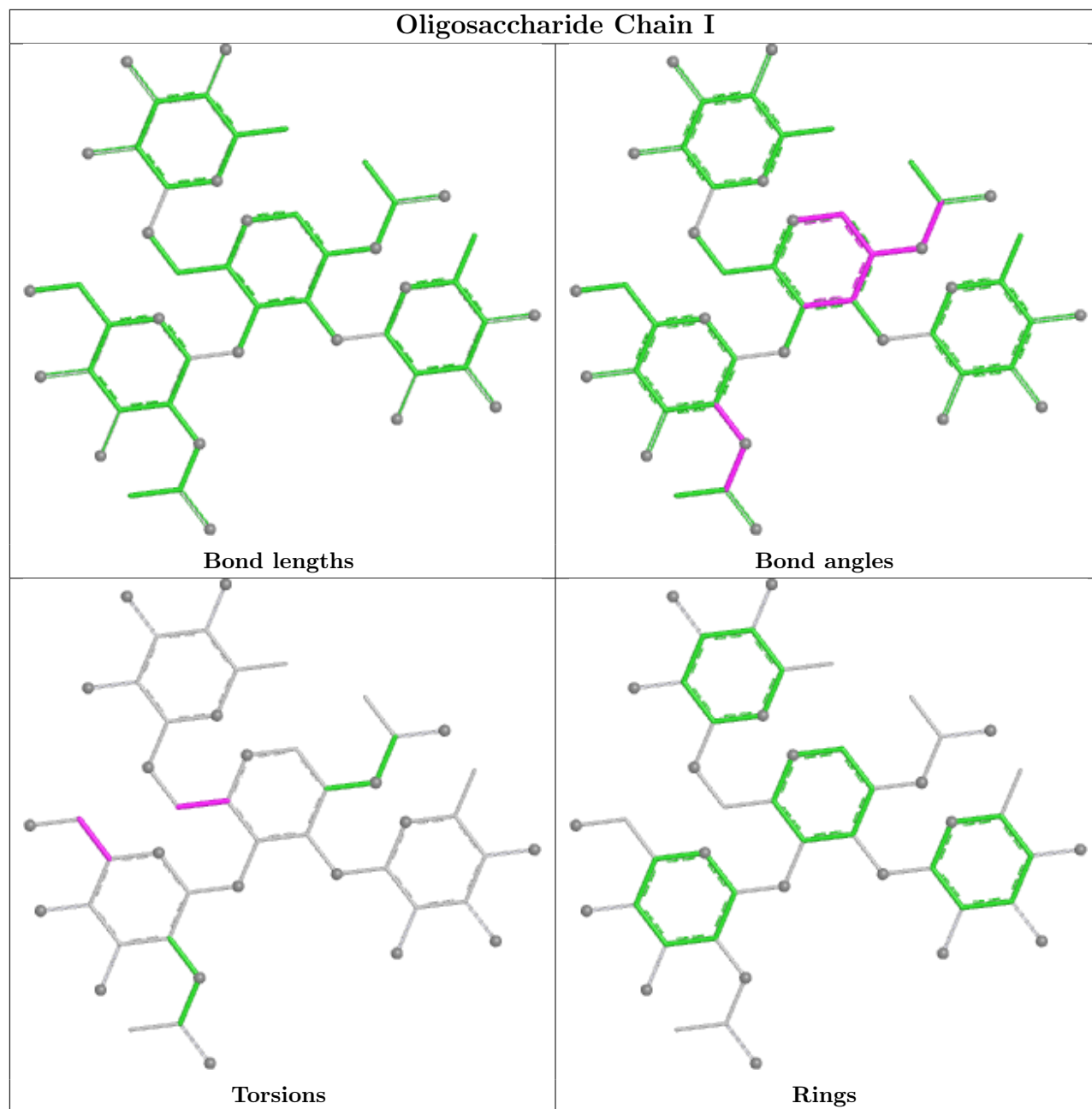
Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	K	7	FUC	1	0
7	N	4	FUC	1	0
7	N	1	NAG	2	0
3	K	3	BMA	1	0
3	H	5	MAN	1	0
3	H	3	BMA	1	0
3	K	5	MAN	3	0
3	K	2	NAG	2	0
3	G	7	FUC	1	0

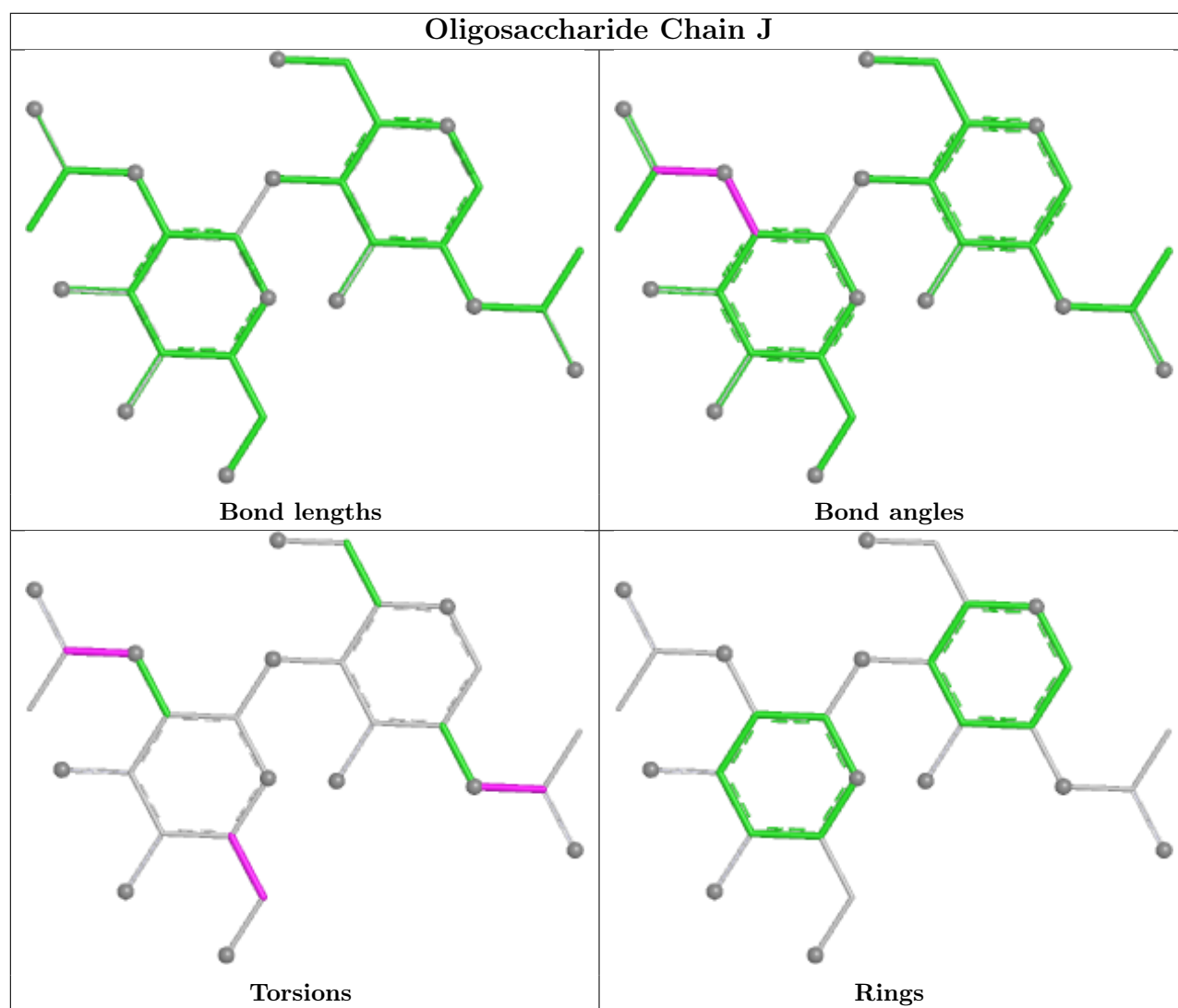
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for oligosaccharide.

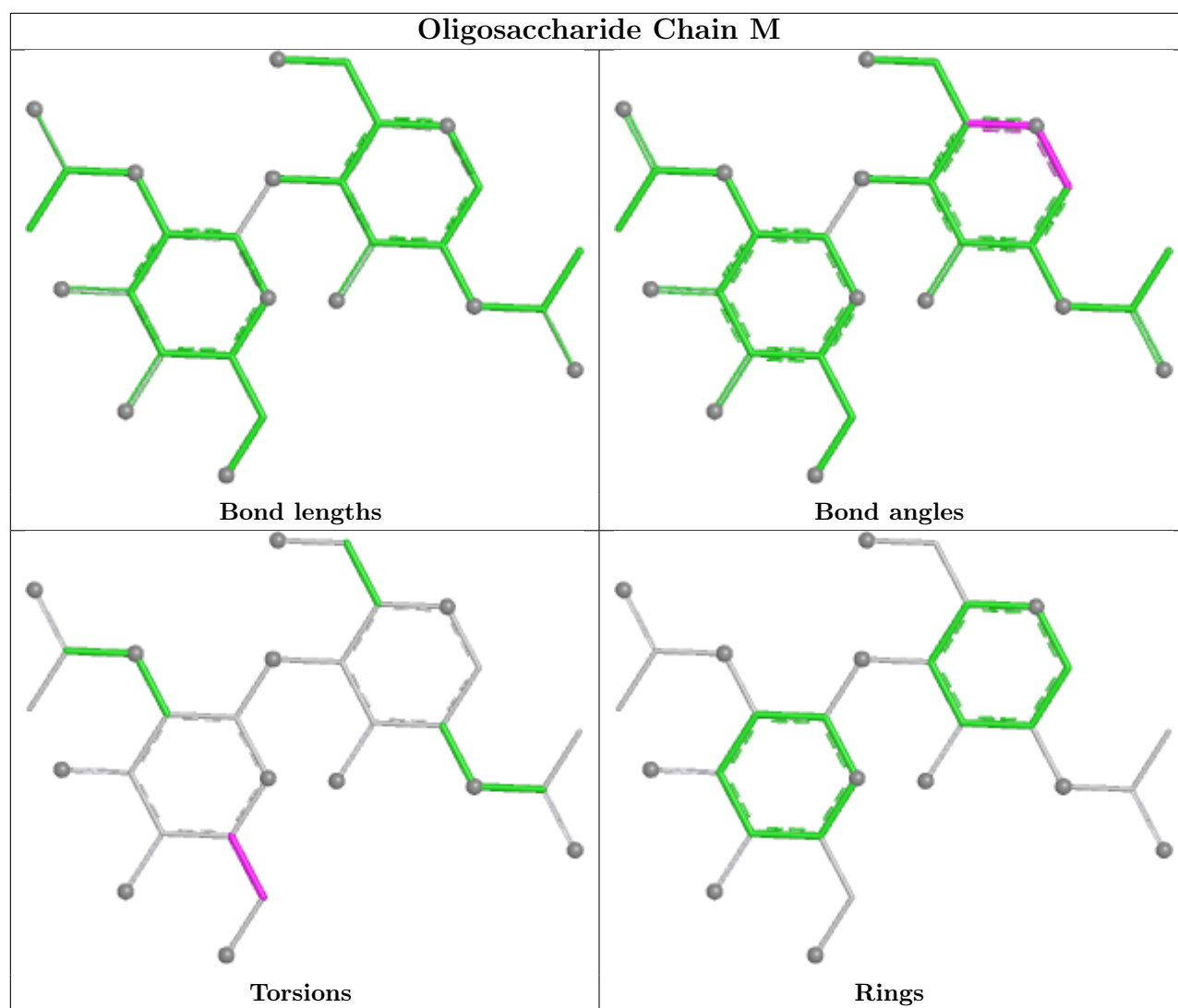


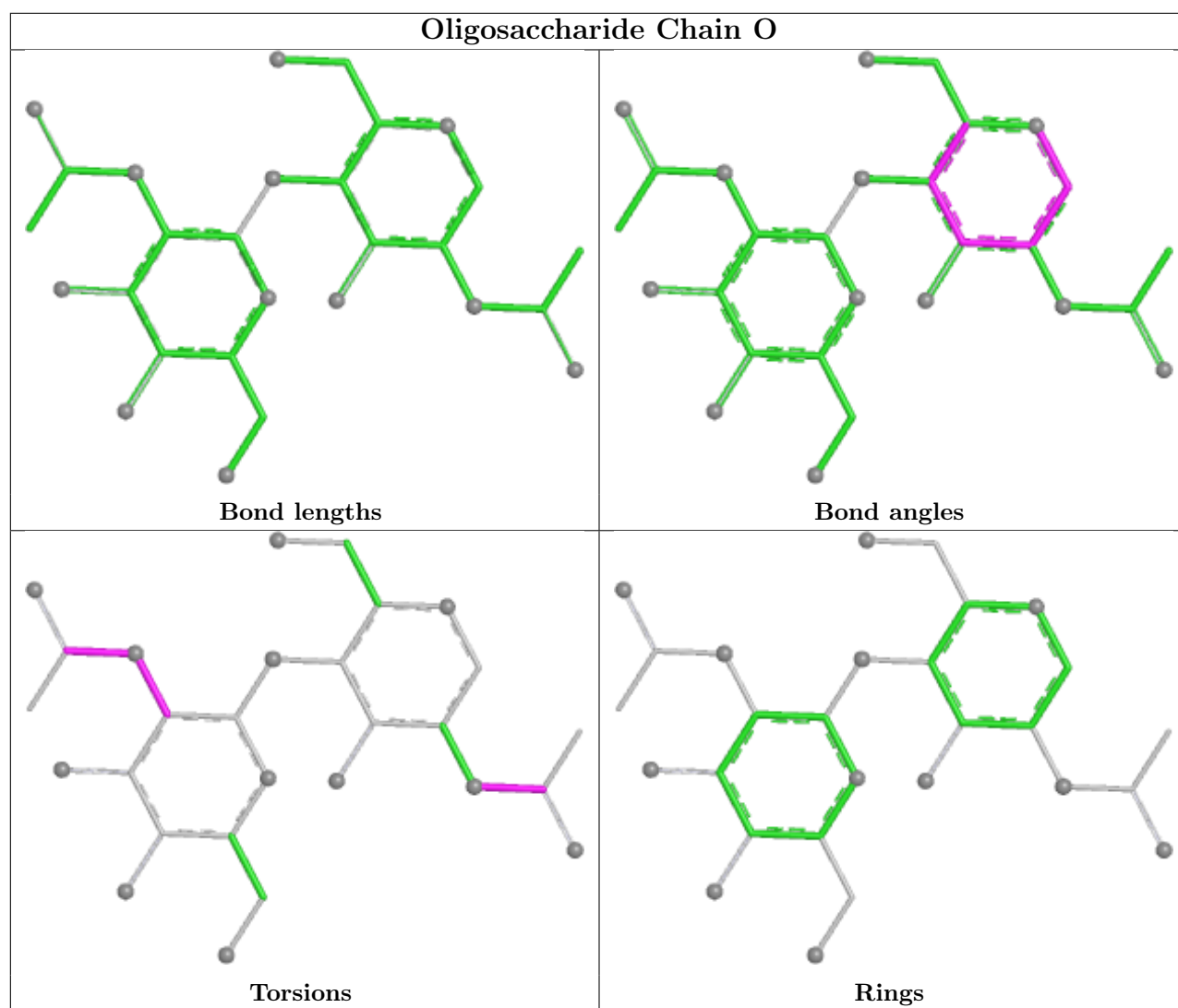


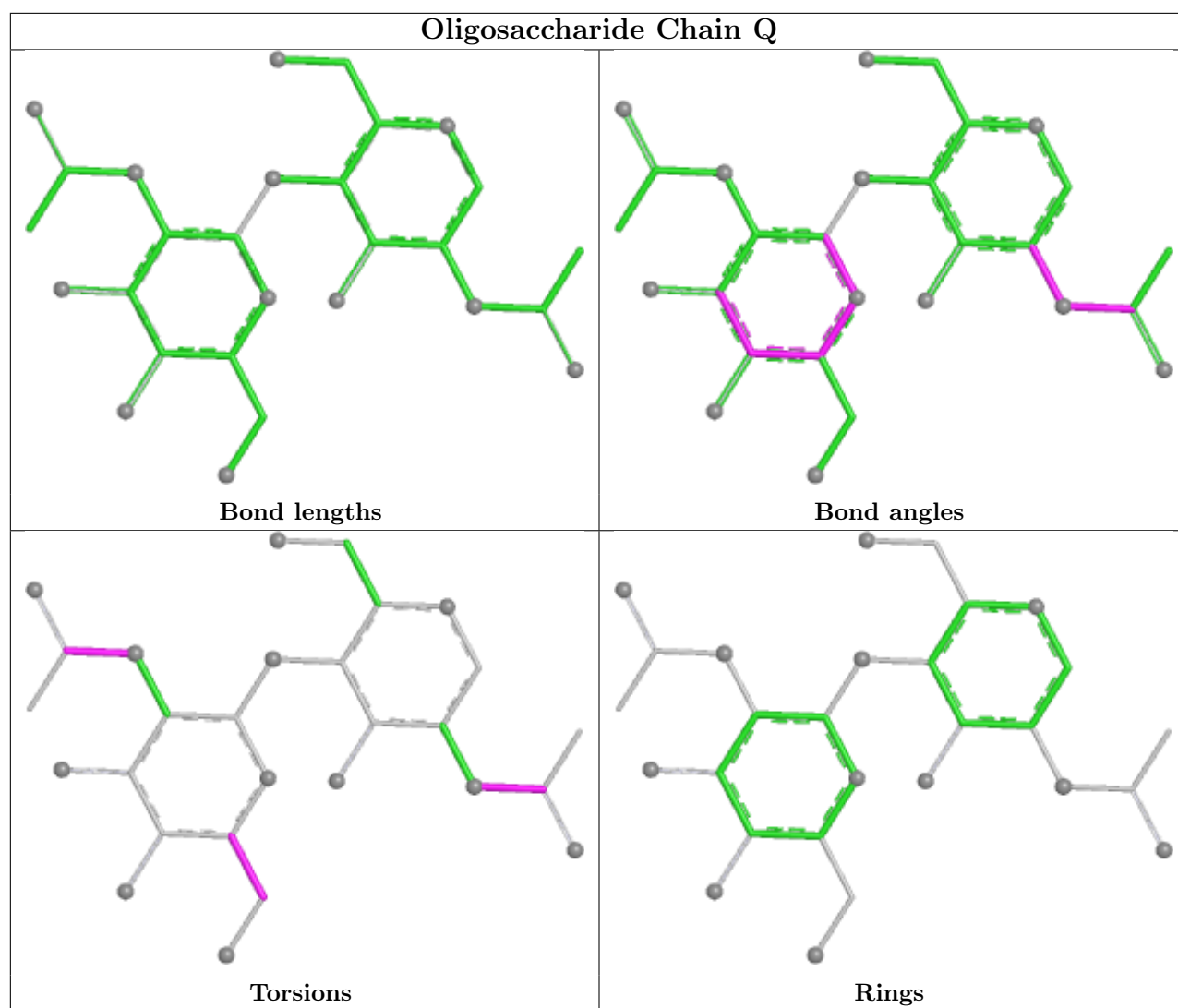


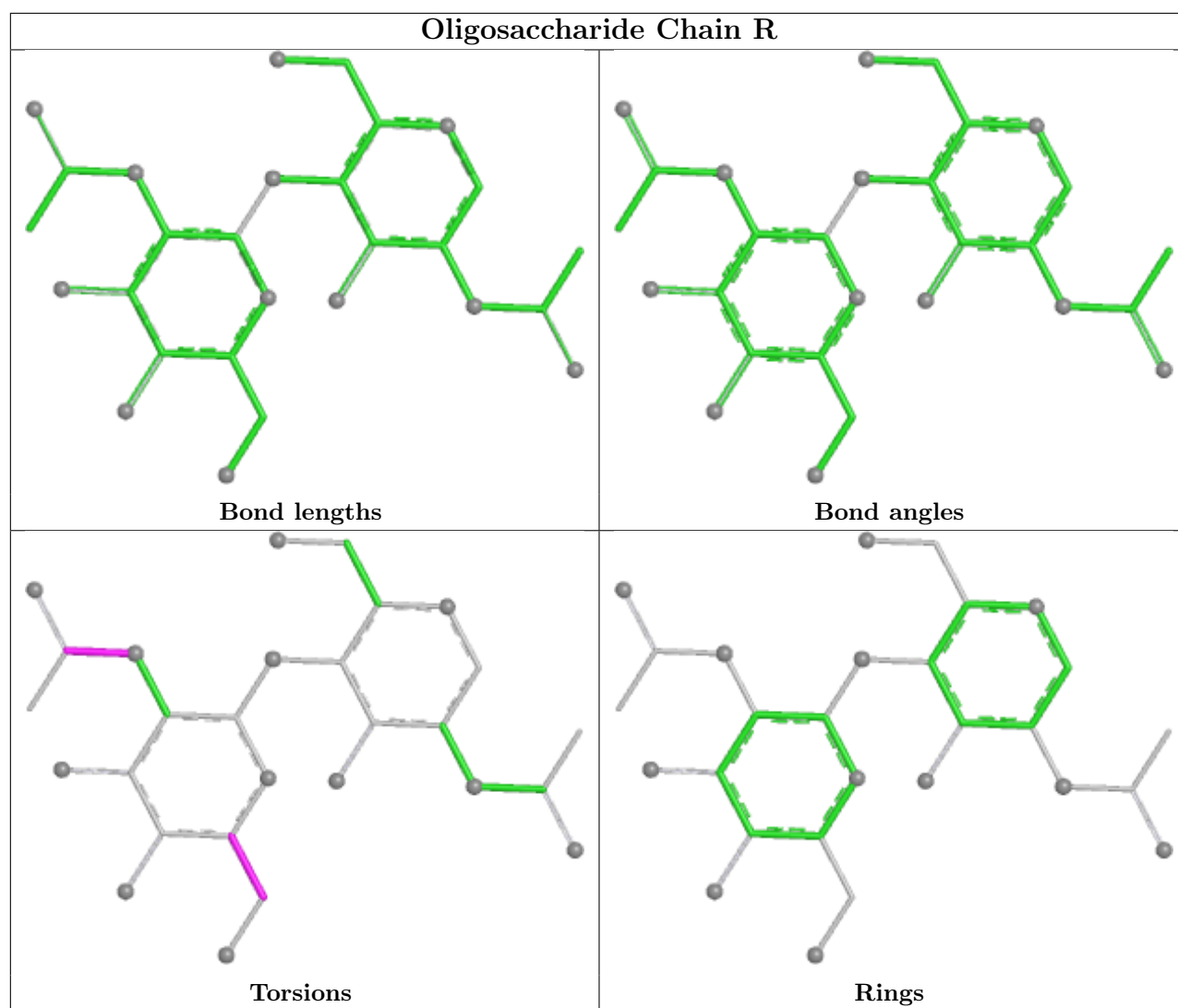


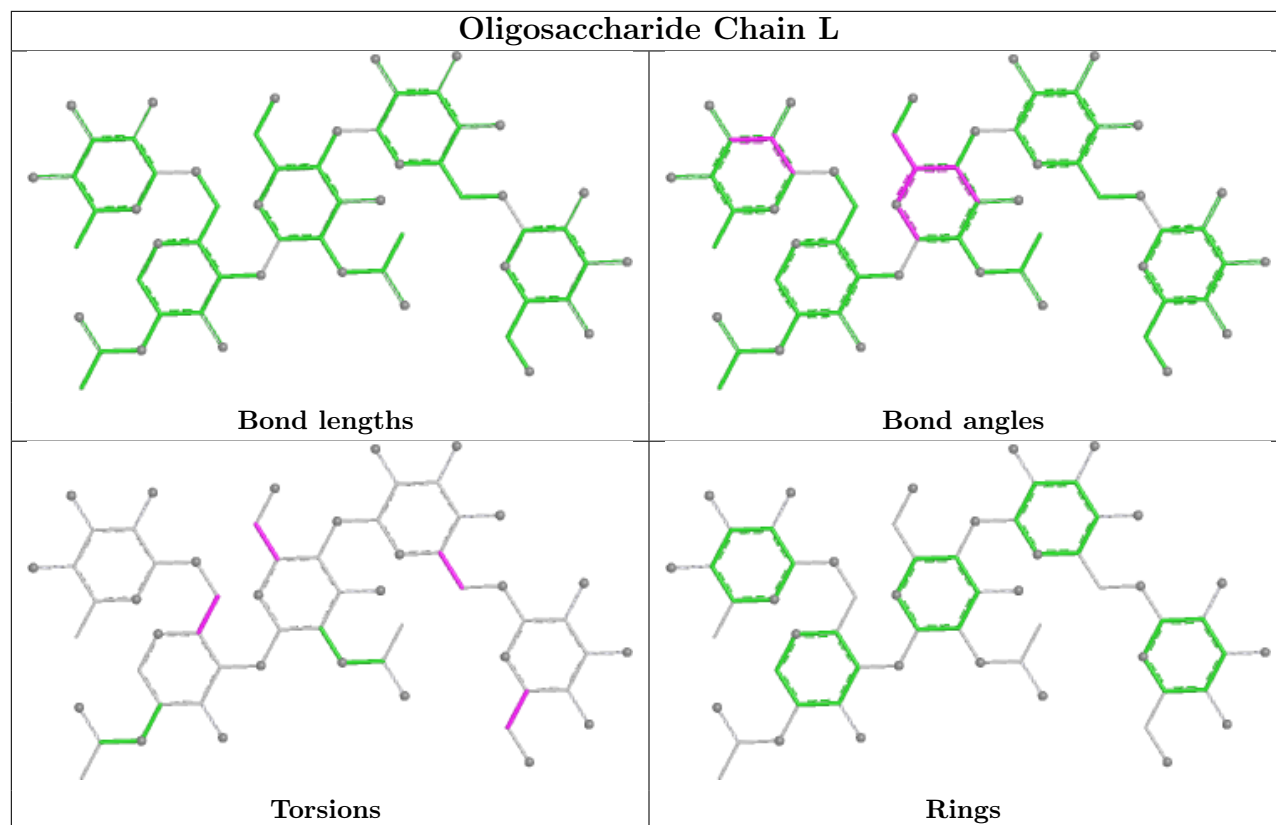


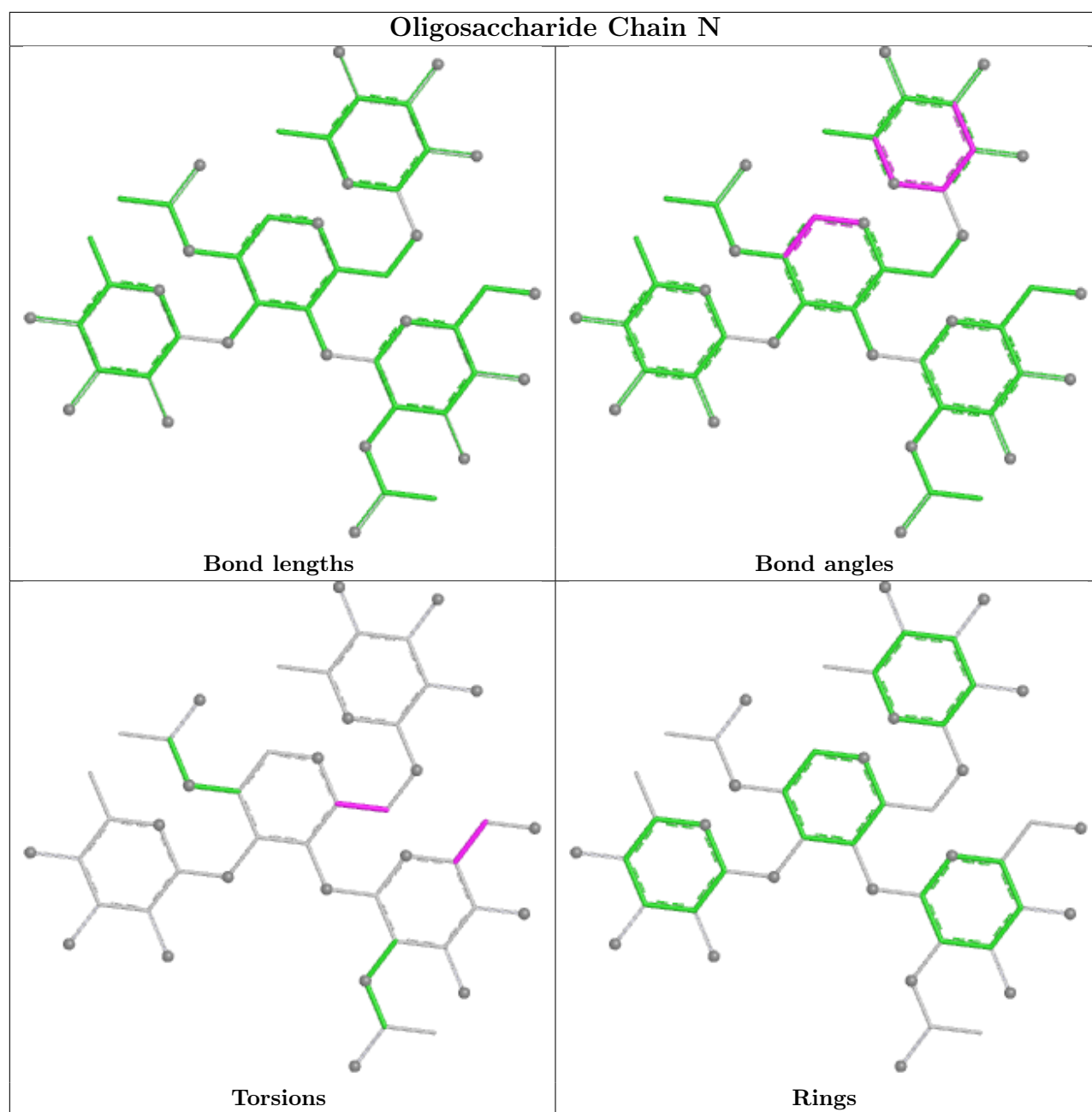


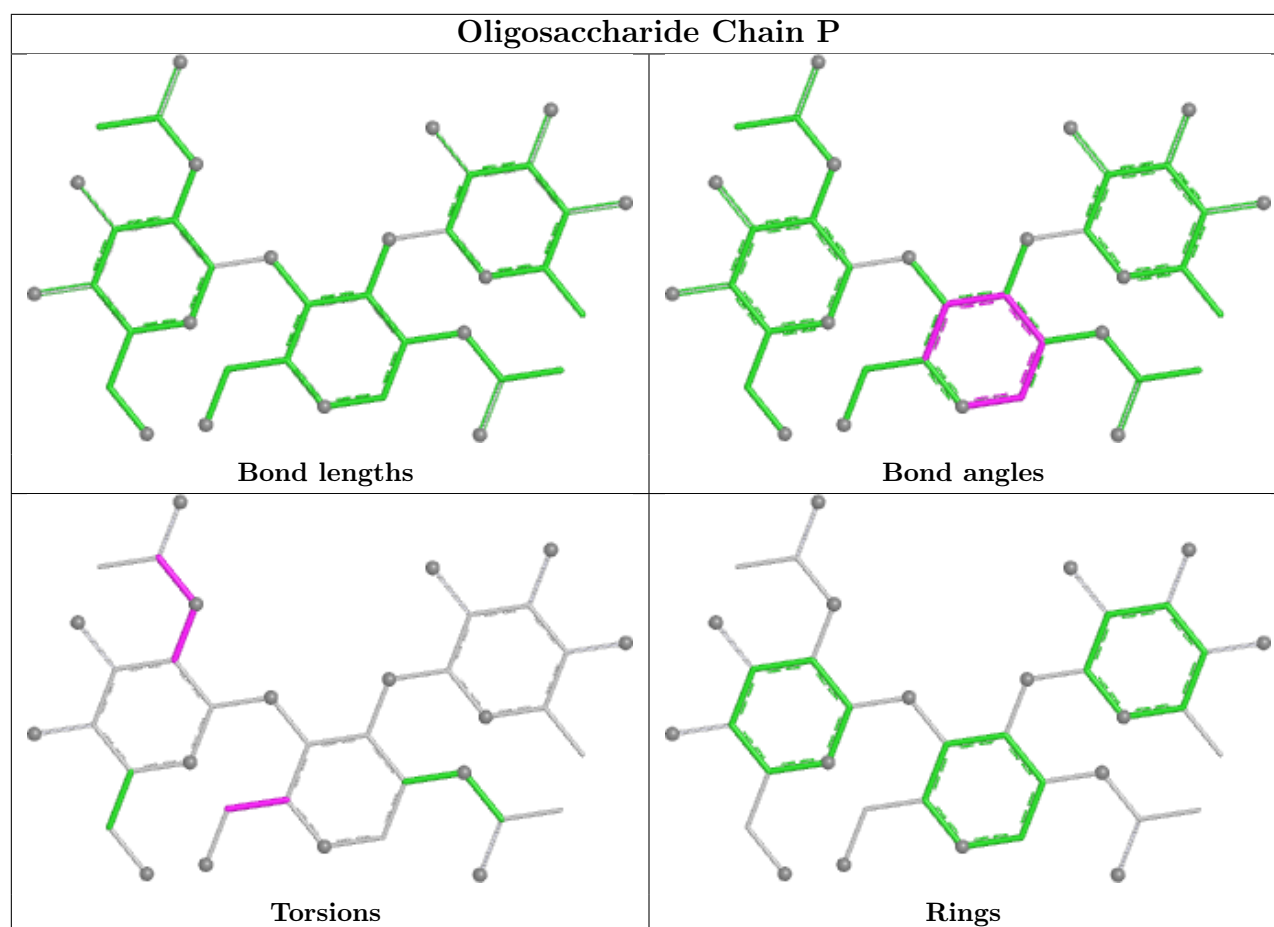












5.6 Ligand geometry [i](#)

14 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	$\# Z > 2$
9	P4G	D	503	-	10,10,10	0.69	0	9,9,9	1.45	1 (11%)
9	P4G	E	510	-	10,10,10	0.69	0	9,9,9	1.41	1 (11%)
9	P4G	B	506	-	10,10,10	0.68	0	9,9,9	1.63	2 (22%)
9	P4G	C	514	-	10,10,10	0.69	0	9,9,9	1.43	1 (11%)
9	P4G	B	504	-	10,10,10	0.66	0	9,9,9	1.50	1 (11%)
9	P4G	F	504	-	10,10,10	0.67	0	9,9,9	1.46	1 (11%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
9	P4G	A	521	-	10,10,10	0.69	0	9,9,9	1.33	0
9	P4G	E	511	-	10,10,10	0.68	0	9,9,9	1.57	2 (22%)
9	P4G	F	503	-	10,10,10	0.69	0	9,9,9	1.53	2 (22%)
10	NAG	C	513	1	14,14,15	0.51	0	17,19,21	0.87	2 (11%)
9	P4G	C	515	-	10,10,10	0.72	0	9,9,9	1.48	0
9	P4G	C	516	-	10,10,10	0.67	0	9,9,9	1.41	0
10	NAG	E	503	1	14,14,15	0.47	0	17,19,21	0.72	0
9	P4G	B	505	-	10,10,10	0.70	0	9,9,9	1.58	2 (22%)

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
9	P4G	D	503	-	-	5/8/8/8	-
9	P4G	E	510	-	-	6/8/8/8	-
9	P4G	B	506	-	-	5/8/8/8	-
9	P4G	C	514	-	-	5/8/8/8	-
9	P4G	B	504	-	-	4/8/8/8	-
9	P4G	F	504	-	-	5/8/8/8	-
9	P4G	A	521	-	-	5/8/8/8	-
9	P4G	E	511	-	-	3/8/8/8	-
9	P4G	F	503	-	-	4/8/8/8	-
10	NAG	C	513	1	-	2/6/23/26	0/1/1/1
9	P4G	C	515	-	-	6/8/8/8	-
9	P4G	C	516	-	-	5/8/8/8	-
10	NAG	E	503	1	-	4/6/23/26	0/1/1/1
9	P4G	B	505	-	-	3/8/8/8	-

There are no bond length outliers.

All (15) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
9	F	503	P4G	C7-O4-C6	2.52	121.90	113.06
9	E	511	P4G	C4-O3-C5	2.29	123.28	113.26
9	B	505	P4G	C2-O2-C3	2.29	121.08	113.06
10	C	513	NAG	C1-O5-C5	2.27	115.23	112.19

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
9	B	504	P4G	C7-O4-C6	2.25	120.97	113.06
9	B	505	P4G	C7-O4-C6	2.24	120.90	113.06
9	E	511	P4G	C7-O4-C6	2.20	120.77	113.06
9	D	503	P4G	C2-O2-C3	2.19	120.74	113.06
9	B	506	P4G	C2-O2-C3	2.14	120.58	113.06
9	F	503	P4G	C2-O2-C3	2.10	120.43	113.06
9	B	506	P4G	O4-C6-C5	2.07	119.79	110.35
10	C	513	NAG	C2-N2-C7	-2.03	120.17	122.90
9	E	510	P4G	C7-O4-C6	2.02	120.16	113.06
9	C	514	P4G	C7-O4-C6	2.01	120.11	113.06
9	F	504	P4G	C2-O2-C3	2.00	120.09	113.06

There are no chirality outliers.

All (62) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
10	C	513	NAG	C8-C7-N2-C2
10	C	513	NAG	O7-C7-N2-C2
9	C	514	P4G	O2-C3-C4-O3
10	E	503	NAG	C8-C7-N2-C2
10	E	503	NAG	O7-C7-N2-C2
10	E	503	NAG	C4-C5-C6-O6
9	F	504	P4G	C1-C2-O2-C3
9	B	504	P4G	C8-C7-O4-C6
9	E	510	P4G	C6-C5-O3-C4
9	C	514	P4G	C8-C7-O4-C6
9	C	516	P4G	O3-C5-C6-O4
9	B	506	P4G	O2-C3-C4-O3
9	C	515	P4G	O2-C3-C4-O3
9	E	510	P4G	C1-C2-O2-C3
9	B	506	P4G	O3-C5-C6-O4
10	E	503	NAG	O5-C5-C6-O6
9	D	503	P4G	O2-C3-C4-O3
9	F	504	P4G	O2-C3-C4-O3
9	F	504	P4G	O3-C5-C6-O4
9	C	515	P4G	O3-C5-C6-O4
9	A	521	P4G	O2-C3-C4-O3
9	B	504	P4G	O3-C5-C6-O4
9	C	516	P4G	O2-C3-C4-O3
9	B	505	P4G	O3-C5-C6-O4
9	A	521	P4G	C1-C2-O2-C3
9	F	503	P4G	C1-C2-O2-C3

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Mol	Chain	Res	Type	Atoms
9	B	506	P4G	C1-C2-O2-C3
9	A	521	P4G	C8-C7-O4-C6
9	D	503	P4G	O3-C5-C6-O4
9	F	503	P4G	O2-C3-C4-O3
9	B	505	P4G	C5-C6-O4-C7
9	D	503	P4G	C5-C6-O4-C7
9	F	503	P4G	C6-C5-O3-C4
9	C	515	P4G	C8-C7-O4-C6
9	C	516	P4G	C5-C6-O4-C7
9	D	503	P4G	C6-C5-O3-C4
9	E	511	P4G	C8-C7-O4-C6
9	C	516	P4G	C3-C4-O3-C5
9	F	504	P4G	C6-C5-O3-C4
9	C	515	P4G	C6-C5-O3-C4
9	E	511	P4G	O2-C3-C4-O3
9	E	511	P4G	C4-C3-O2-C2
9	E	510	P4G	C3-C4-O3-C5
9	A	521	P4G	O3-C5-C6-O4
9	C	515	P4G	C5-C6-O4-C7
9	C	514	P4G	C4-C3-O2-C2
9	B	504	P4G	C5-C6-O4-C7
9	C	514	P4G	O3-C5-C6-O4
9	A	521	P4G	C3-C4-O3-C5
9	E	510	P4G	C5-C6-O4-C7
9	F	503	P4G	C4-C3-O2-C2
9	C	516	P4G	C1-C2-O2-C3
9	C	515	P4G	C1-C2-O2-C3
9	F	504	P4G	C4-C3-O2-C2
9	D	503	P4G	C8-C7-O4-C6
9	C	514	P4G	C3-C4-O3-C5
9	B	506	P4G	C4-C3-O2-C2
9	E	510	P4G	C4-C3-O2-C2
9	E	510	P4G	O3-C5-C6-O4
9	B	506	P4G	C3-C4-O3-C5
9	B	505	P4G	O2-C3-C4-O3
9	B	504	P4G	O2-C3-C4-O3

There are no ring outliers.

2 monomers are involved in 2 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
9	A	521	P4G	1	0

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Mol	Chain	Res	Type	Clashes	Symm-Clashes
9	C	515	P4G	1	0

5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

6 Fit of model and data

6.1 Protein, DNA and RNA chains

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	322/329 (97%)	0.03	9 (2%)	55	59	30, 45, 70, 110	0
1	C	322/329 (97%)	-0.26	3 (0%)	81	84	26, 38, 56, 95	0
1	E	322/329 (97%)	-0.06	5 (1%)	70	74	28, 43, 69, 94	0
2	B	170/181 (93%)	-0.14	2 (1%)	76	80	27, 40, 62, 84	0
2	D	170/181 (93%)	-0.06	3 (1%)	67	71	27, 43, 69, 79	0
2	F	170/181 (93%)	-0.16	3 (1%)	67	71	26, 40, 62, 77	0
All	All	1476/1530 (96%)	-0.10	25 (1%)	69	73	26, 42, 67, 110	0

All (25) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	D	175	SER	5.7
2	F	6	ILE	5.4
2	D	6	ILE	5.3
2	B	6	ILE	4.6
1	E	326	LYS	4.3
2	B	175	SER	3.7
1	C	326	LYS	3.6
2	F	175	SER	3.6
1	A	142(A)	THR	3.2
2	F	139	LYS	3.2
1	A	141	TYR	3.1
1	C	141	TYR	3.1
1	A	326	LYS	2.9
1	E	273	LYS	2.8
1	E	141	TYR	2.8
1	E	117	HIS	2.6
1	E	126	ARG	2.6
2	D	140	ILE	2.5
1	A	81	THR	2.4

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Mol	Chain	Res	Type	RSRZ
1	A	173	ASN	2.4
1	A	144	GLY	2.4
1	A	142	ASP	2.3
1	C	142	ASP	2.1
1	A	117	HIS	2.0
1	A	277	CYS	2.0

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
7	FUL	N	2	10/11	0.34	0.22	110,122,126,128	0
8	FUL	P	2	10/11	0.36	0.19	116,119,123,124	0
5	NAG	R	2	14/15	0.41	0.18	118,130,134,135	0
6	BMA	L	3	11/12	0.46	0.18	100,104,108,109	0
5	NAG	J	2	14/15	0.53	0.18	118,124,127,128	0
3	MAN	K	4	11/12	0.54	0.26	105,118,122,122	0
6	BMA	L	4	11/12	0.54	0.22	92,103,110,115	0
5	NAG	O	2	14/15	0.57	0.21	126,131,140,142	0
5	NAG	M	2	14/15	0.58	0.16	114,124,129,129	0
4	FUL	I	2	10/11	0.64	0.17	95,103,114,116	0
3	FUL	H	6	10/11	0.66	0.21	101,109,119,121	0
5	NAG	Q	2	14/15	0.67	0.16	118,123,127,128	0
5	NAG	O	1	14/15	0.67	0.20	90,102,111,121	0
3	FUC	H	7	10/11	0.68	0.18	95,105,109,109	0
4	NAG	I	3	14/15	0.68	0.19	72,98,112,113	0
3	MAN	K	5	11/12	0.68	0.24	68,94,104,108	0
7	NAG	N	3	14/15	0.70	0.18	71,85,96,97	0
3	MAN	H	5	11/12	0.70	0.21	98,109,113,114	0
3	FUL	K	6	10/11	0.73	0.18	74,79,90,97	0
3	FUL	G	6	10/11	0.75	0.18	67,77,82,92	0
3	MAN	G	4	11/12	0.75	0.16	78,85,97,100	0
5	NAG	M	1	14/15	0.76	0.14	81,94,105,117	0

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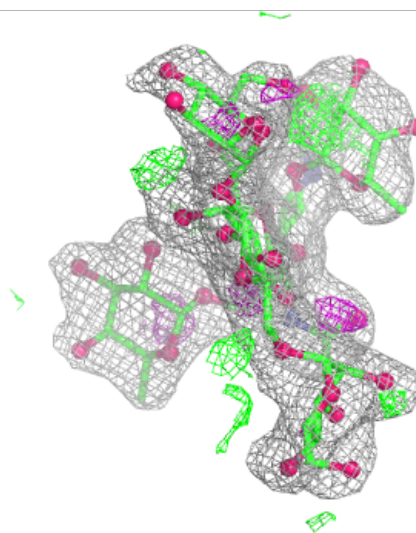
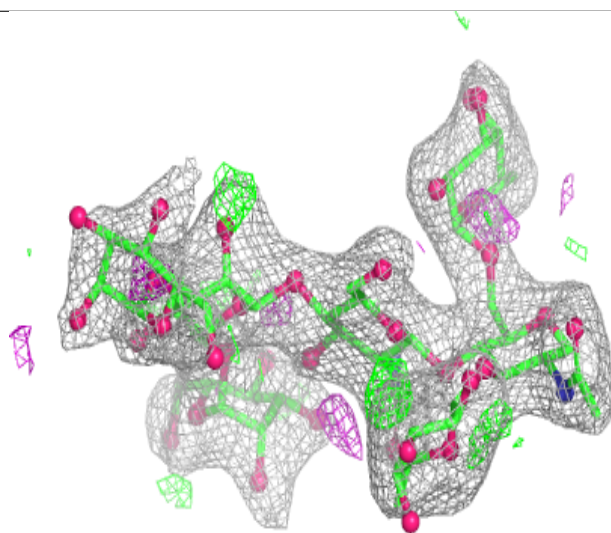
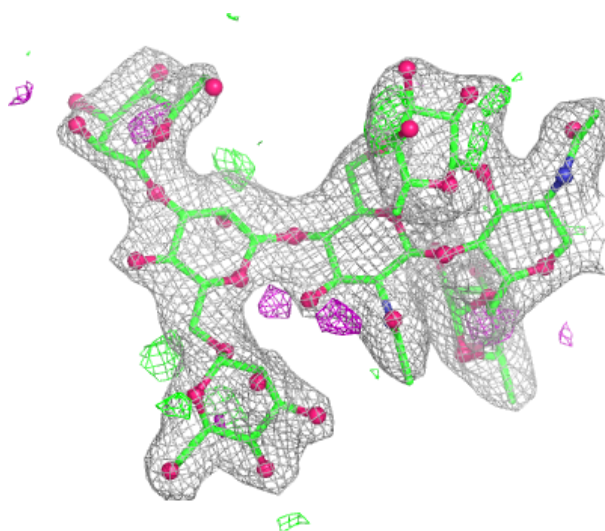
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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
8	NAG	P	1	14/15	0.77	0.14	75,84,97,108	0
8	NAG	P	3	14/15	0.77	0.16	95,103,110,114	0
6	NAG	L	2	14/15	0.78	0.16	59,74,85,92	0
3	BMA	K	3	11/12	0.79	0.16	72,74,84,85	0
3	MAN	H	4	11/12	0.80	0.13	72,83,90,90	0
5	NAG	R	1	14/15	0.81	0.14	83,99,106,116	0
5	NAG	J	1	14/15	0.81	0.14	69,79,91,106	0
4	FUL	I	4	10/11	0.82	0.15	82,92,94,97	0
7	FUC	N	4	10/11	0.83	0.17	60,85,92,92	0
5	NAG	Q	1	14/15	0.83	0.16	77,99,111,112	0
4	NAG	I	1	14/15	0.85	0.14	51,68,85,92	0
7	NAG	N	1	14/15	0.85	0.12	60,69,89,89	0
6	FUL	L	5	10/11	0.87	0.20	45,77,80,80	0
3	BMA	G	3	11/12	0.87	0.11	52,63,68,70	0
6	NAG	L	1	14/15	0.88	0.12	47,57,74,77	0
3	NAG	H	2	14/15	0.88	0.10	63,66,75,86	0
3	FUC	K	7	10/11	0.88	0.12	62,66,70,71	0
3	MAN	G	5	11/12	0.89	0.11	52,59,65,69	0
3	NAG	G	2	14/15	0.90	0.11	54,62,66,67	0
3	BMA	H	3	11/12	0.91	0.09	60,67,71,81	0
3	NAG	H	1	14/15	0.91	0.10	59,74,82,92	0
3	FUC	G	7	10/11	0.91	0.11	55,65,69,74	0
3	NAG	K	2	14/15	0.92	0.10	44,56,72,74	0
3	NAG	K	1	14/15	0.94	0.07	39,45,54,60	0
3	NAG	G	1	14/15	0.95	0.07	39,45,55,56	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.

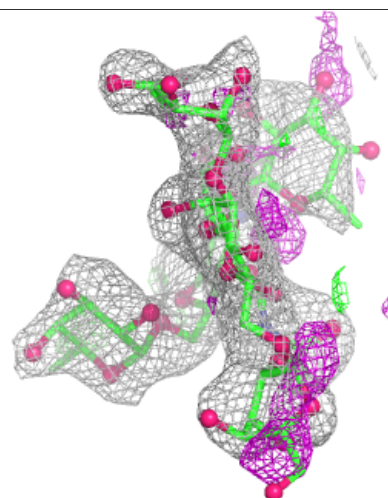
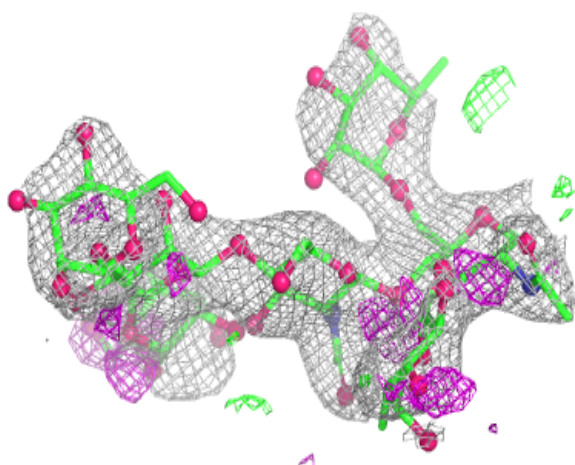
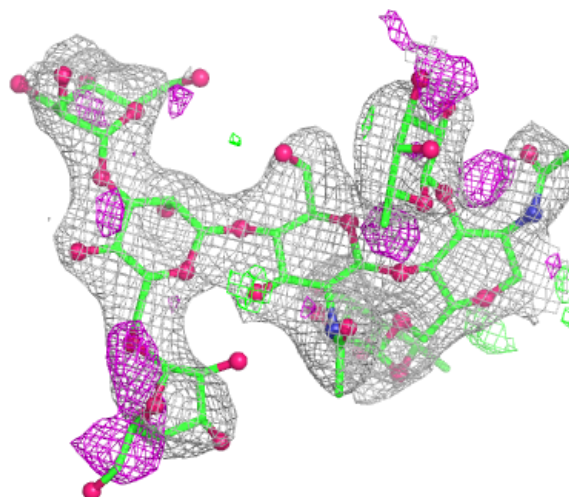
Electron density around Chain G:

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



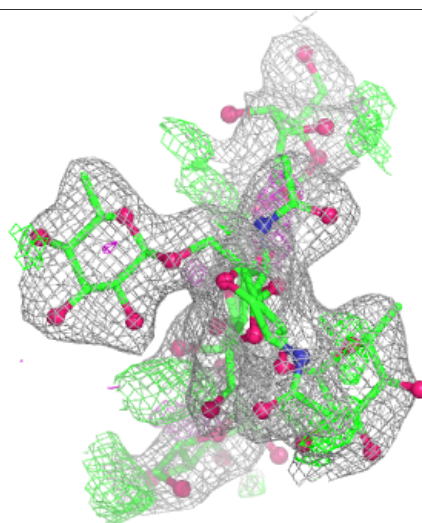
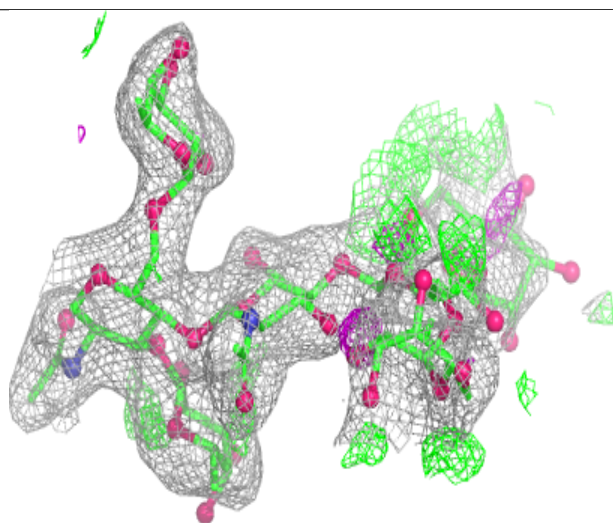
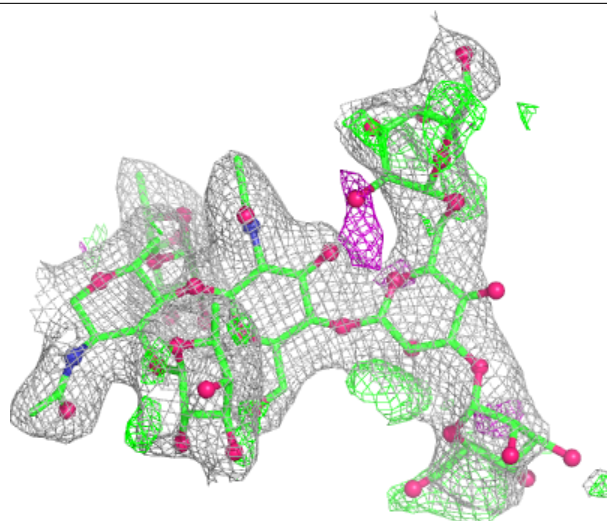
Electron density around Chain H:

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



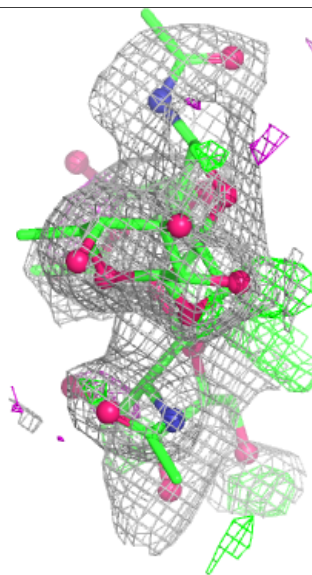
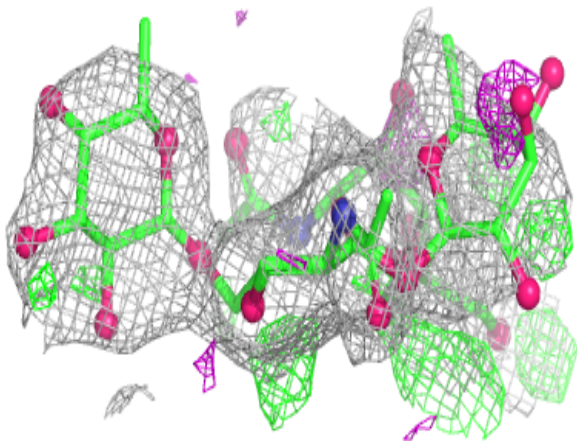
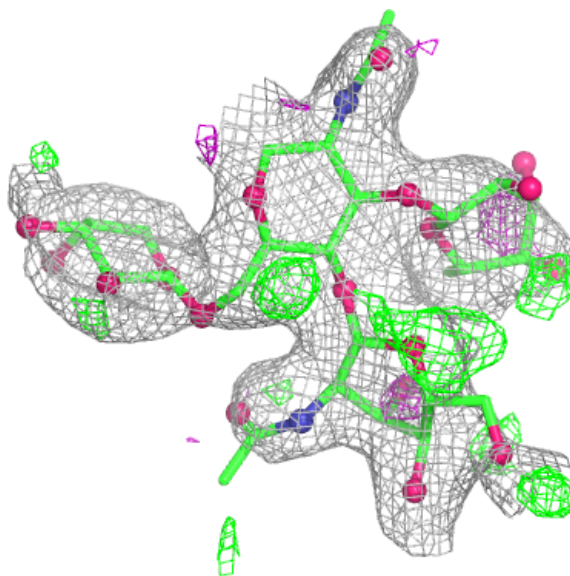
Electron density around Chain K:

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



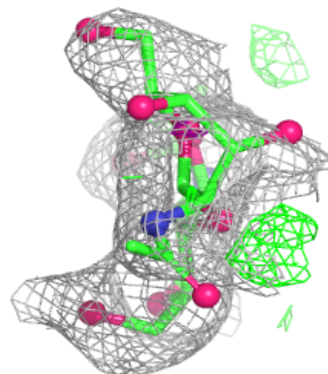
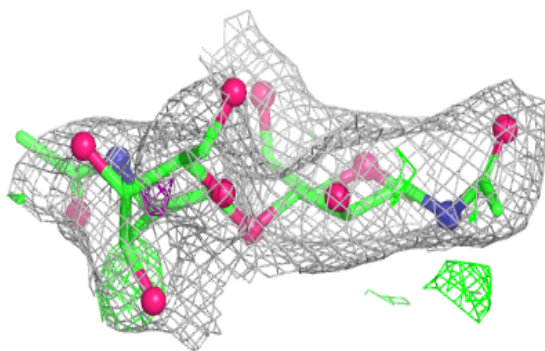
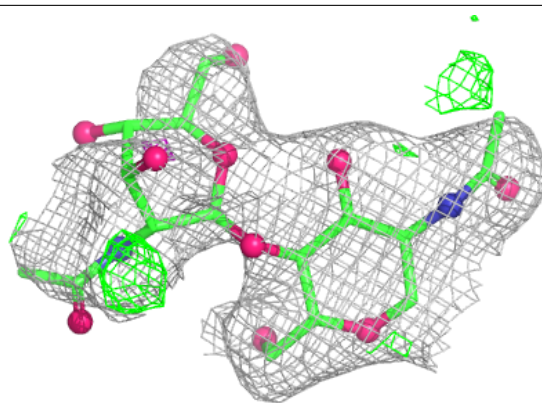
Electron density around Chain I:

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



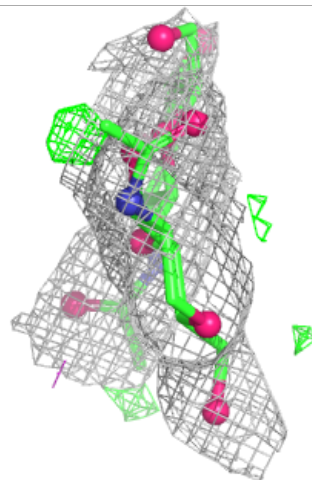
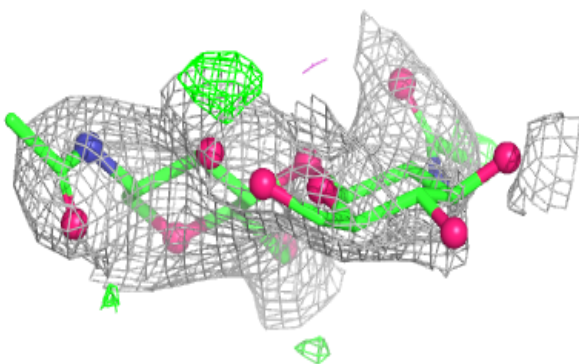
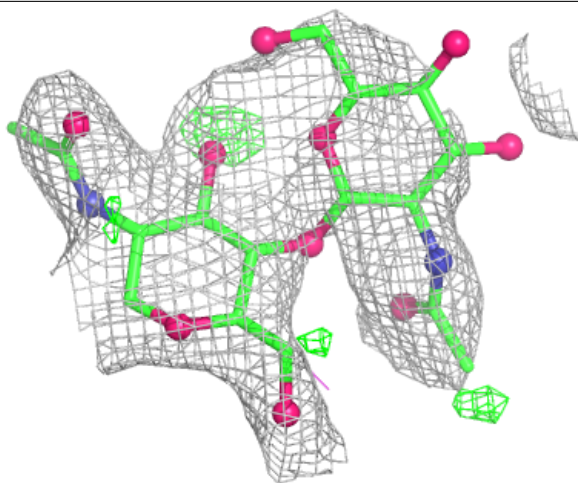
Electron density around Chain J:

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



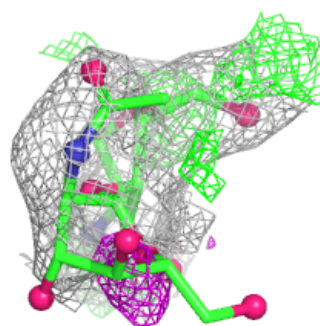
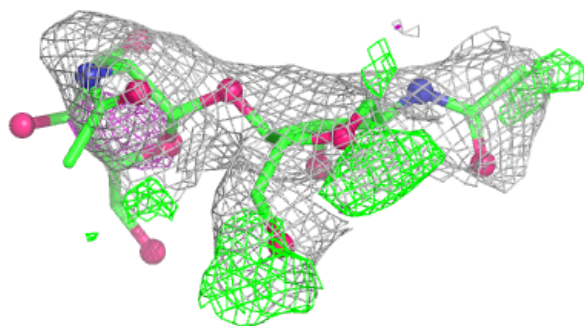
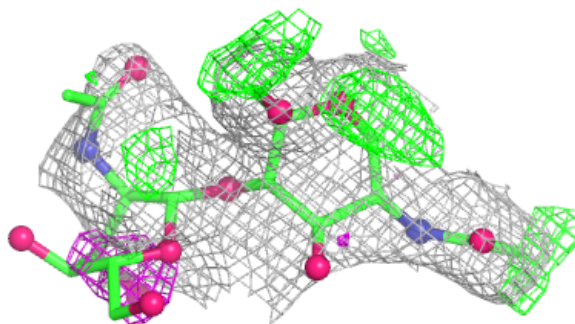
Electron density around Chain M:

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



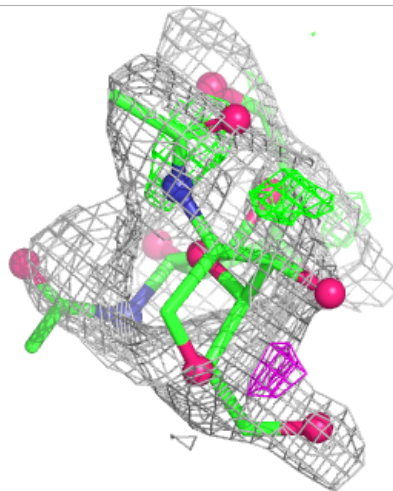
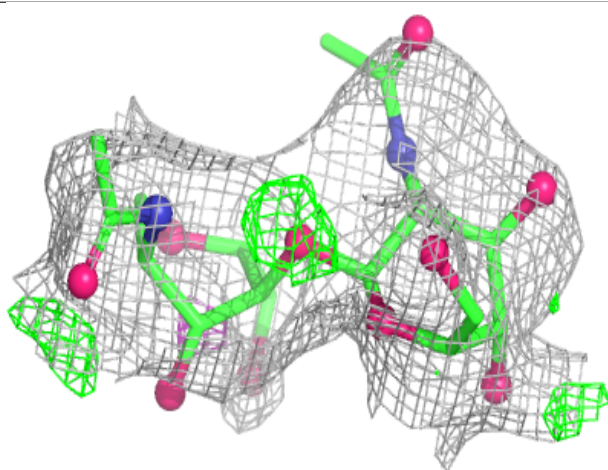
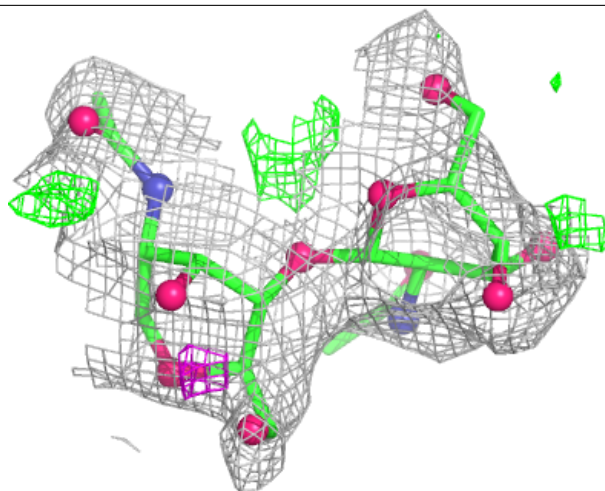
Electron density around Chain O:

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



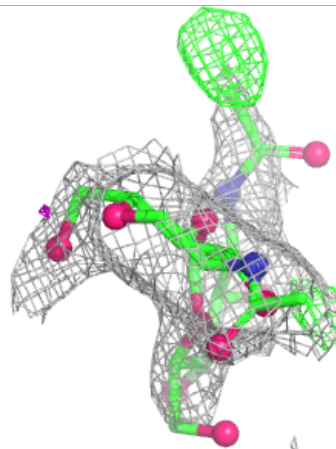
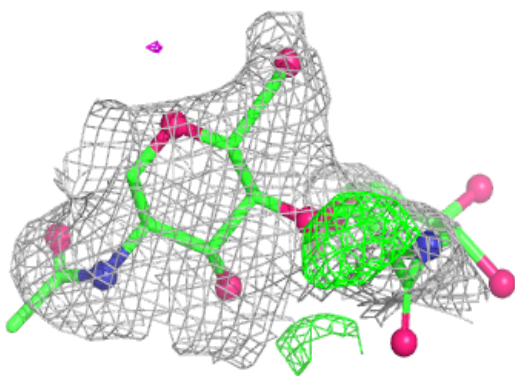
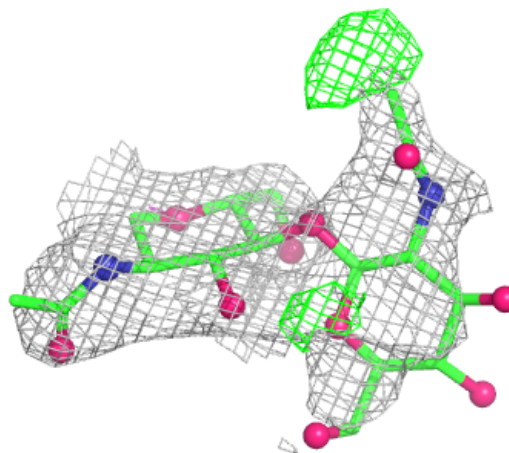
Electron density around Chain Q:

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



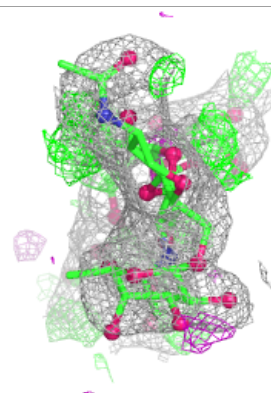
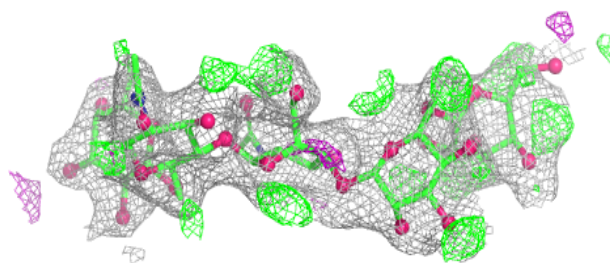
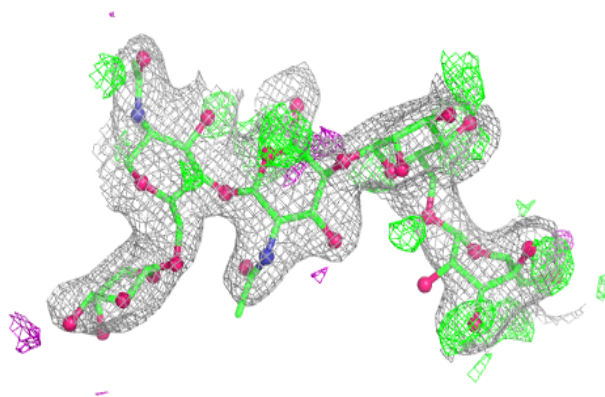
Electron density around Chain R:

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



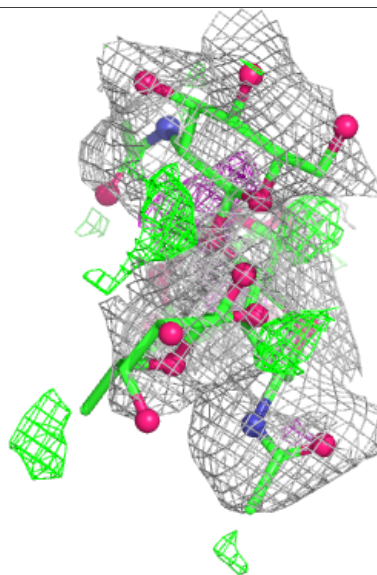
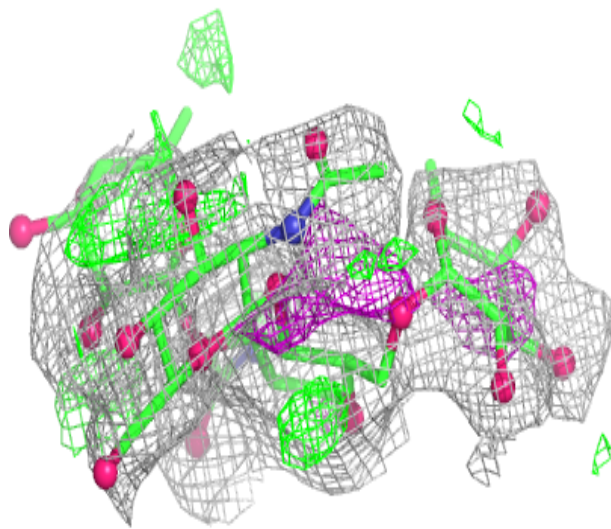
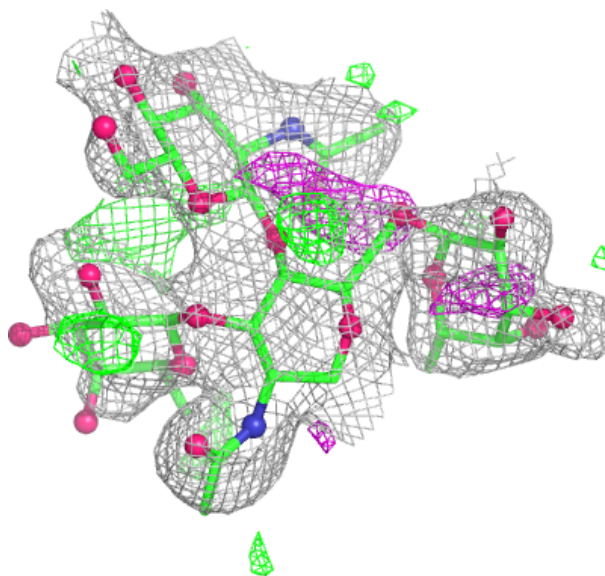
Electron density around Chain L:

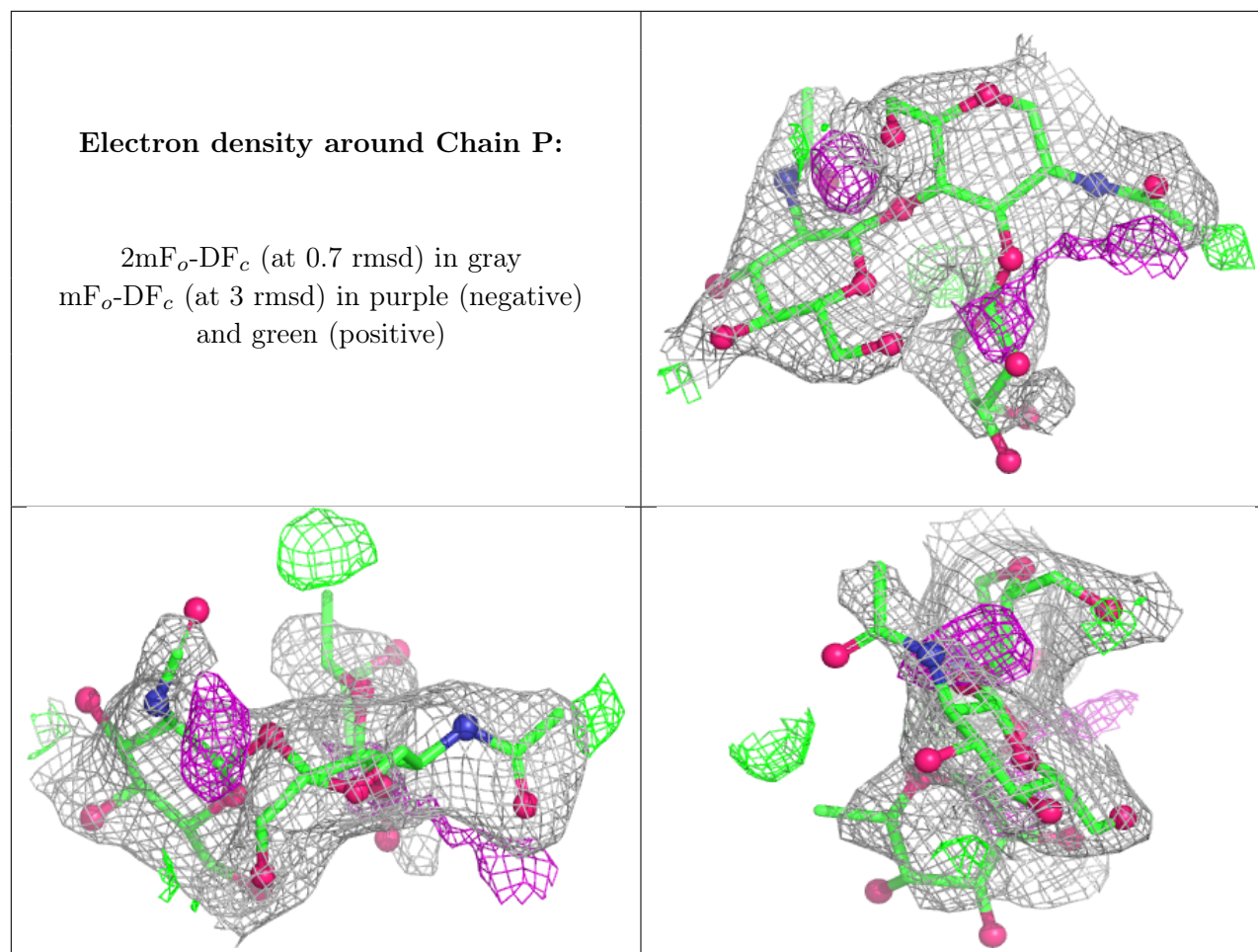
$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



Electron density around Chain N:

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





6.4 Ligands [i](#)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
10	NAG	E	503	14/15	0.52	0.19	96,110,117,117	0
9	P4G	B	506	11/11	0.68	0.34	74,82,92,92	0
9	P4G	F	504	11/11	0.72	0.32	74,81,89,90	0
9	P4G	C	516	11/11	0.74	0.29	89,97,100,106	0
9	P4G	E	511	11/11	0.78	0.23	47,62,74,74	0
9	P4G	F	503	11/11	0.80	0.27	60,72,99,101	0
9	P4G	E	510	11/11	0.80	0.27	75,90,98,99	0
9	P4G	D	503	11/11	0.80	0.27	64,68,89,90	0
9	P4G	A	521	11/11	0.82	0.26	69,81,93,94	0
9	P4G	C	515	11/11	0.83	0.24	52,70,88,92	0
10	NAG	C	513	14/15	0.84	0.12	67,81,90,94	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
9	P4G	B	505	11/11	0.84	0.23	61,69,88,91	0
9	P4G	C	514	11/11	0.90	0.17	55,62,69,73	0
9	P4G	B	504	11/11	0.92	0.14	35,59,72,74	0

6.5 Other polymers [i](#)

There are no such residues in this entry.