



# Full wwPDB X-ray Structure Validation Report ⓘ

Sep 10, 2023 – 03:02 PM EDT

PDB ID : 4K3X  
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.

We welcome your comments at [validation@mail.wwpdb.org](mailto: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>.

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

MolProbity : 4.02b-467  
Mogul : 1.8.5 (274361), CSD as541be (2020)  
Xtriage (Phenix) : 1.13  
EDS : 2.35.1  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
Refmac : 5.8.0158  
CCP4 : 7.0.044 (Gargrove)  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.35.1

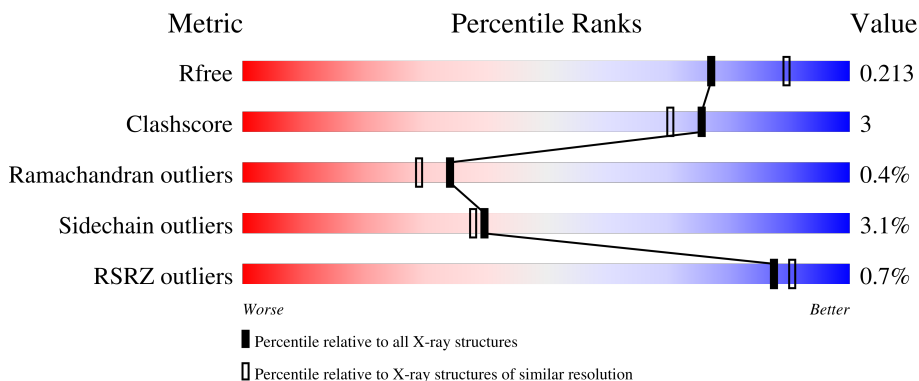
# 1 Overall quality at a glance

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.




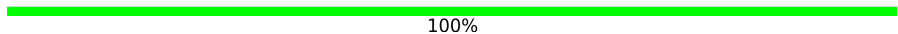

Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
$R_{free}$	130704	2523 (2.16-2.12)
Clashscore	141614	2653 (2.16-2.12)
Ramachandran outliers	138981	2618 (2.16-2.12)
Sidechain outliers	138945	2617 (2.16-2.12)
RSRZ outliers	127900	2485 (2.16-2.12)

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  $\geq 3$ , 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	 2% 87% 9% . .
1	C	329	 90% 7% .
1	E	329	 % 86% 10% . .
2	B	181	 87% 6% . 6%
2	D	181	 % 87% 6% . 6%

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Mol	Chain	Length	Quality of chain
2	F	181	 86% 8% 6%
3	G	7	 29% 57% 14%
3	H	7	 29% 43% 29%
3	K	7	 57% 43%
4	I	4	 25% 75%
5	J	2	 50% 50%
5	M	2	 100%
5	O	2	 50% 50%
5	Q	2	 100%
5	R	2	 100%
6	L	5	 40% 60%
7	N	4	 50% 50%
8	P	3	 67% 33%

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
3	MAN	H	5	-	-	-	X
3	FUL	H	6	-	-	-	X
4	FUL	I	2	-	-	-	X
5	NAG	O	2	-	-	-	X
5	NAG	R	2	-	-	-	X
7	FUL	N	2	-	-	-	X
8	FUL	P	2	-	-	-	X

## 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.

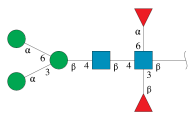
- Molecule 1 is a protein called Hemagglutinin HA1.

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

- Molecule 2 is a protein called Hemagglutinin HA2.

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

- 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.



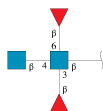
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
3	G	7	Total 81	C 46	N 2	O 33	0	0	0
3	H	7	Total 81	C 46	N 2	O 33	0	0	0

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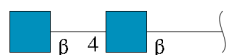
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
3	K	7	81	46	2	33	0	0	0

- 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.



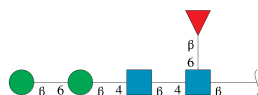
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
4	I	4	48	28	2	18	0	0	0

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



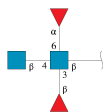
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
5	J	2	28	16	2	10	0	0	0
5	M	2	28	16	2	10	0	0	0
5	O	2	28	16	2	10	0	0	0
5	Q	2	28	16	2	10	0	0	0
5	R	2	28	16	2	10	0	0	0

- 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.



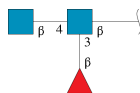
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
6	L	5	60	34	2	24	0	0	0

- 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.



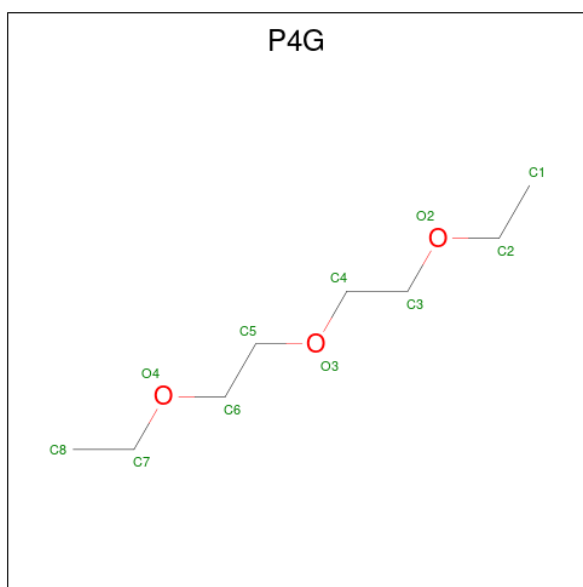
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
7	N	4	48	28	2	18	0	0	0

- 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
			Total	C	N	O			
8	P	3	38	22	2	14	0	0	0

- Molecule 9 is 1-ETHOXY-2-(2-ETHOXYETHOXY)ETHANE (three-letter code: P4G) (formula: C<sub>8</sub>H<sub>18</sub>O<sub>3</sub>).



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

- Molecule 10 is 2-acetamido-2-deoxy-beta-D-glucopyranose (three-letter code: NAG) (formula: C<sub>8</sub>H<sub>15</sub>NO<sub>6</sub>).



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

- Molecule 11 is water.

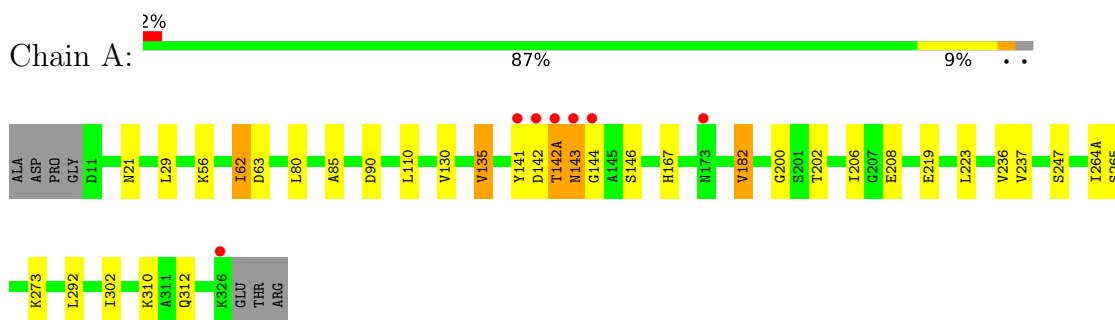
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	O		
11	A	134	134	134	0	0
11	C	201	201	201	0	0
11	E	158	158	158	0	0
11	B	89	89	89	0	0
11	D	76	76	76	0	0
11	F	87	87	87	0	0



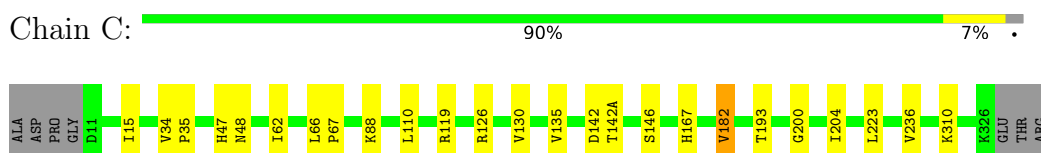
### 3 Residue-property plots [i](#)

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.

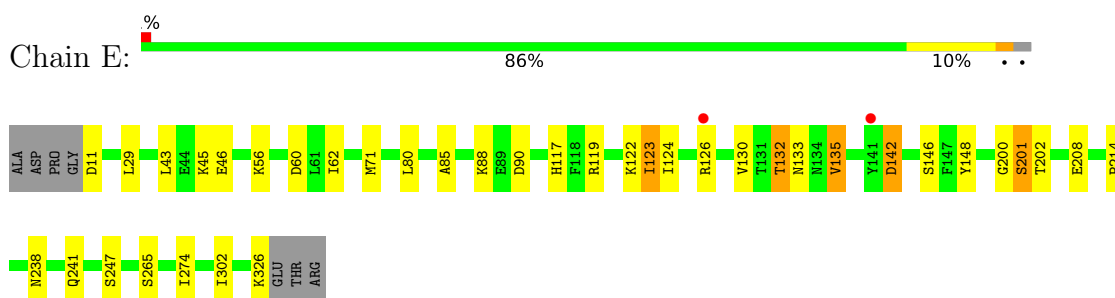
- Molecule 1: Hemagglutinin HA1



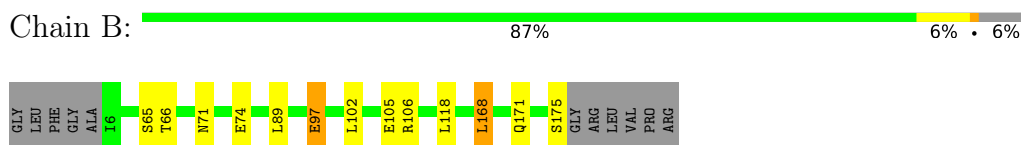
- Molecule 1: Hemagglutinin HA1



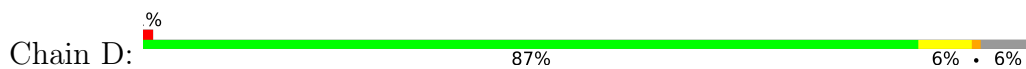
- Molecule 1: Hemagglutinin HA1



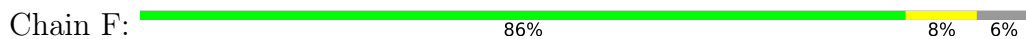
- Molecule 2: Hemagglutinin HA2



- Molecule 2: Hemagglutinin HA2



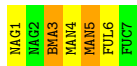
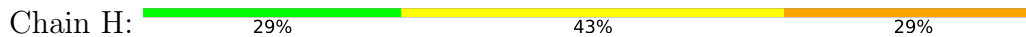
- Molecule 2: Hemagglutinin HA2



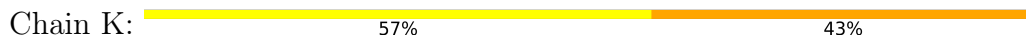
- Molecule 3: alpha-D-mannopyranose-(1-3)-[alpha-D-mannopyranose-(1-6)]beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-[beta-L-fucopyranose-(1-3)][alpha-L-fucopyranose-(1-6)]2-acetamido-2-deoxy-beta-D-glucopyranose



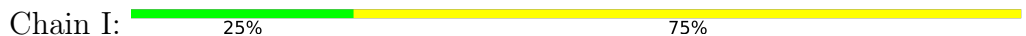
- Molecule 3: alpha-D-mannopyranose-(1-3)-[alpha-D-mannopyranose-(1-6)]beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-[beta-L-fucopyranose-(1-3)][alpha-L-fucopyranose-(1-6)]2-acetamido-2-deoxy-beta-D-glucopyranose



- 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:  50% 50%

MAG1  
MAG2

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

Chain M:  100%

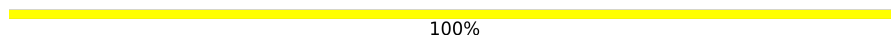
MAG1  
MAG2

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

Chain O:  50% 50%

MAG1  
MAG2

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

Chain Q:  100%

MAG1  
MAG2

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

Chain R:  100%

MAG1  
MAG2

- 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:  40% 60%

MAG1  
MAG2  
BNA3  
BNA4  
FUL5

- 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%



- 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%



## 4 Data and refinement statistics

Property	Value	Source
Space group	I 4 2 2	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	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
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	3.78 (at 2.14Å)	Xtrriage
Refinement program	PHENIX (phenix.refine: 1.7.2_869)	Depositor
R, $R_{free}$	0.183 , 0.220 0.178 , 0.213	Depositor DCC
$R_{free}$ test set	6093 reflections (5.03%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	36.8	Xtrriage
Anisotropy	0.556	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.32 , 43.4	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.49$ , $\langle L^2 \rangle = 0.32$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
$F_o, F_c$ correlation	0.96	EDS
Total number of atoms	13212	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	46.0	wwPDB-VP

Xtrriage'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.*

<sup>1</sup>Intensities estimated from amplitudes.

<sup>2</sup>Theoretical 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: FUC, BMA, MAN, NAG, P4G, FUL

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	0.38	0/2591	0.53	0/3530
1	C	0.40	0/2591	0.54	0/3530
1	E	0.37	0/2591	0.51	0/3530
2	B	0.39	0/1403	0.48	0/1889
2	D	0.42	0/1403	0.50	0/1889
2	F	0.42	0/1403	0.50	0/1889
All	All	0.39	0/11982	0.51	0/16257

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.

There are no bond angle outliers.

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 [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	A	2533	0	2426	19	0
1	C	2533	0	2427	12	0
1	E	2533	0	2427	19	0
2	B	1377	0	1310	11	0
2	D	1377	0	1310	14	0
2	F	1377	0	1310	13	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	3	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	75	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 (75) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:236:VAL:H	9:C:515:P4G:H71	1.50	0.75
2:B:105:GLU:CD	2:F:106:ARG:HH22	1.93	0.73
3:K:2:NAG:HO3	3:K:5:MAN:HO2	1.40	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: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:D:153:LYS:NZ	11:D:653:HOH:O	2.35	0.60
2:F:63:PHE:HB2	7:N:1:NAG:H61	1.83	0.59
2:D:106:ARG:HH22	2:F:105:GLU:CD	2.07	0.58
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
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
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
3:K:2:NAG:O3	3:K:5:MAN:O2	2.17	0.52
1:A:110:LEU:HD11	2:D:76:ARG:HA	1.93	0.50
2:B:106:ARG:HH22	2:D:105:GLU:CD	2.14	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
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

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
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
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:E:11:ASP:N	2:F:139:LYS:HZ2	2.19	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 [i](#)

### 5.3.1 Protein backbone [i](#)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	320/329 (97%)	311 (97%)	7 (2%)	2 (1%)	25	17
1	C	320/329 (97%)	313 (98%)	5 (2%)	2 (1%)	25	17
1	E	320/329 (97%)	313 (98%)	5 (2%)	2 (1%)	25	17
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%)	34	29

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 [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	A	290/295 (98%)	277 (96%)	13 (4%)	27	23
1	C	290/295 (98%)	280 (97%)	10 (3%)	37	34

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	E	290/295 (98%)	279 (96%)	11 (4%)	33	30
2	B	148/155 (96%)	144 (97%)	4 (3%)	44	43
2	D	148/155 (96%)	145 (98%)	3 (2%)	55	57
2	F	148/155 (96%)	148 (100%)	0	100	100
All	All	1314/1350 (97%)	1273 (97%)	41 (3%)	40	38

All (41) 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	142(A)	THR
1	A	143	ASN
1	A	182	VAL
1	A	208	GLU
1	A	219	GLU
1	A	273	LYS
1	A	292	LEU
1	A	312	GLN
1	C	88	LYS
1	C	119	ARG
1	C	126	ARG
1	C	130	VAL
1	C	142	ASP
1	C	142(A)	THR
1	C	182	VAL
1	C	193	THR
1	C	204	ILE
1	C	223	LEU
1	E	46	GLU
1	E	88	LYS
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

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Mol	Chain	Res	Type
1	E	201	SER
1	E	326	LYS
2	B	97	GLU
2	B	118	LEU
2	B	168	LEU
2	B	175	SER
2	D	140	ILE
2	D	164	LYS
2	D	168	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (2) such sidechains are listed below:

Mol	Chain	Res	Type
1	E	289	ASN
2	B	95	ASN

### 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](#)

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	1,3	14,14,15	0.58	0	17,19,21	1.26	2 (11%)
3	NAG	G	2	3	14,14,15	0.55	0	17,19,21	0.83	1 (5%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
3	BMA	G	3	3	11,11,12	0.56	0	15,15,17	0.69	0
3	MAN	G	4	3	11,11,12	0.52	0	15,15,17	0.64	0
3	MAN	G	5	3	11,11,12	0.51	0	15,15,17	0.94	2 (13%)
3	FUL	G	6	3	10,10,11	0.80	0	14,14,16	2.06	2 (14%)
3	FUC	G	7	3	10,10,11	0.59	0	14,14,16	0.88	1 (7%)
3	NAG	H	1	1,3	14,14,15	0.64	0	17,19,21	1.04	1 (5%)
3	NAG	H	2	3	14,14,15	0.49	0	17,19,21	1.03	0
3	BMA	H	3	3	11,11,12	0.60	0	15,15,17	0.99	1 (6%)
3	MAN	H	4	3	11,11,12	0.55	0	15,15,17	0.95	1 (6%)
3	MAN	H	5	3	11,11,12	0.55	0	15,15,17	0.85	1 (6%)
3	FUL	H	6	3	10,10,11	0.69	0	14,14,16	1.19	1 (7%)
3	FUC	H	7	3	10,10,11	0.67	0	14,14,16	0.65	0
4	NAG	I	1	1,4	14,14,15	0.69	0	17,19,21	1.64	3 (17%)
4	FUL	I	2	4	10,10,11	0.69	0	14,14,16	0.71	0
4	NAG	I	3	4	14,14,15	0.60	0	17,19,21	0.89	1 (5%)
4	FUL	I	4	4	10,10,11	0.65	0	14,14,16	1.05	1 (7%)
5	NAG	J	1	5,1	14,14,15	0.58	0	17,19,21	0.64	0
5	NAG	J	2	5	14,14,15	0.51	0	17,19,21	0.75	1 (5%)
3	NAG	K	1	1,3	14,14,15	0.57	0	17,19,21	1.46	3 (17%)
3	NAG	K	2	3	14,14,15	0.60	0	17,19,21	0.88	1 (5%)
3	BMA	K	3	3	11,11,12	0.64	0	15,15,17	0.86	0
3	MAN	K	4	3	11,11,12	0.51	0	15,15,17	0.87	1 (6%)
3	MAN	K	5	3	11,11,12	0.51	0	15,15,17	0.97	1 (6%)
3	FUL	K	6	3	10,10,11	0.72	0	14,14,16	2.10	3 (21%)
3	FUC	K	7	3	10,10,11	0.65	0	14,14,16	0.88	1 (7%)
6	NAG	L	1	1,6	14,14,15	0.59	0	17,19,21	0.87	0
6	NAG	L	2	6	14,14,15	0.56	0	17,19,21	1.71	3 (17%)
6	BMA	L	3	6	11,11,12	0.57	0	15,15,17	0.61	0
6	BMA	L	4	6	11,11,12	0.77	0	15,15,17	1.18	2 (13%)
6	FUL	L	5	6	10,10,11	0.68	0	14,14,16	1.23	2 (14%)
5	NAG	M	1	5,1	14,14,15	0.49	0	17,19,21	0.86	0
5	NAG	M	2	5	14,14,15	0.52	0	17,19,21	0.63	0
7	NAG	N	1	7,1	14,14,15	0.77	0	17,19,21	1.01	1 (5%)
7	FUL	N	2	7	10,10,11	0.66	0	14,14,16	0.52	0
7	NAG	N	3	7	14,14,15	0.58	0	17,19,21	0.76	0
7	FUC	N	4	7	10,10,11	0.62	0	14,14,16	1.62	2 (14%)
5	NAG	O	1	5	14,14,15	0.63	0	17,19,21	1.70	3 (17%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
5	NAG	O	2	5	14,14,15	0.52	0	17,19,21	0.65	0
8	NAG	P	1	2,8	14,14,15	0.56	0	17,19,21	1.47	3 (17%)
8	FUL	P	2	8	10,10,11	0.61	0	14,14,16	0.81	0
8	NAG	P	3	8	14,14,15	0.62	0	17,19,21	0.69	0
5	NAG	Q	1	2,5	14,14,15	0.56	0	17,19,21	0.96	2 (11%)
5	NAG	Q	2	5	14,14,15	0.50	0	17,19,21	1.34	2 (11%)
5	NAG	R	1	2,5	14,14,15	0.63	0	17,19,21	0.74	0
5	NAG	R	2	5	14,14,15	0.57	0	17,19,21	0.84	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	1,3	-	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	1,3	-	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	1,4	-	2/6/23/26	0/1/1/1
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	1,3	-	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

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
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	1,6	-	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	-	2/6/23/26	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 (49) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	K	6	FUL	C1-C2-C3	-5.96	102.34	109.67
3	G	6	FUL	C1-C2-C3	-5.61	102.77	109.67
6	L	2	NAG	C1-O5-C5	4.80	118.69	112.19
5	O	1	NAG	C3-C4-C5	4.78	118.77	110.24
7	N	4	FUC	C1-C2-C3	4.43	115.11	109.67
3	G	6	FUL	C1-O5-C5	-4.10	103.49	112.78
3	K	6	FUL	C1-O5-C5	-3.96	103.80	112.78
5	Q	2	NAG	C1-O5-C5	3.70	117.20	112.19
4	I	1	NAG	C2-N2-C7	-3.60	117.78	122.90
3	K	1	NAG	C2-N2-C7	-3.54	117.87	122.90
4	I	1	NAG	O5-C1-C2	-3.52	105.74	111.29

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
6	L	2	NAG	O5-C5-C6	3.49	112.67	107.20
3	G	1	NAG	O3-C3-C2	-3.45	102.33	109.47
4	I	1	NAG	C4-C3-C2	3.13	115.60	111.02
3	H	6	FUL	C1-C2-C3	-3.05	105.92	109.67
6	L	5	FUL	C1-C2-C3	-2.98	106.00	109.67
3	G	1	NAG	O5-C1-C2	-2.87	106.75	111.29
3	H	3	BMA	C1-O5-C5	2.85	116.05	112.19
8	P	1	NAG	O5-C1-C2	-2.84	106.81	111.29
8	P	1	NAG	C3-C4-C5	2.79	115.22	110.24
5	Q	2	NAG	C3-C4-C5	2.75	115.14	110.24
7	N	4	FUC	C1-O5-C5	2.72	118.94	112.78
8	P	1	NAG	C4-C3-C2	2.71	114.99	111.02
5	O	1	NAG	O5-C1-C2	-2.71	107.01	111.29
4	I	3	NAG	C2-N2-C7	-2.63	119.15	122.90
3	K	1	NAG	C1-O5-C5	2.61	115.72	112.19
3	K	7	FUC	O5-C1-C2	-2.60	106.76	110.77
3	H	4	MAN	O5-C5-C6	2.58	111.25	107.20
3	G	5	MAN	O5-C1-C2	-2.57	106.80	110.77
3	G	7	FUC	O5-C1-C2	-2.42	107.04	110.77
6	L	4	BMA	O5-C1-C2	-2.35	107.14	110.77
6	L	4	BMA	C1-C2-C3	2.28	112.47	109.67
3	K	5	MAN	O5-C5-C6	2.27	110.76	107.20
3	G	2	NAG	C2-N2-C7	-2.26	119.69	122.90
5	Q	1	NAG	C2-N2-C7	-2.24	119.71	122.90
6	L	2	NAG	C3-C4-C5	2.24	114.23	110.24
3	H	5	MAN	O5-C1-C2	-2.15	107.45	110.77
3	K	2	NAG	O3-C3-C2	-2.15	105.01	109.47
3	K	1	NAG	O3-C3-C2	-2.15	105.02	109.47
4	I	4	FUL	C1-C2-C3	-2.15	107.03	109.67
7	N	1	NAG	O5-C1-C2	-2.13	107.92	111.29
6	L	5	FUL	O5-C1-C2	-2.07	107.57	110.77
5	Q	1	NAG	O5-C5-C6	2.07	110.44	107.20
5	O	1	NAG	C4-C3-C2	2.06	114.04	111.02
5	J	2	NAG	C2-N2-C7	-2.04	120.00	122.90
3	K	4	MAN	O5-C5-C6	2.02	110.38	107.20
3	G	5	MAN	O5-C5-C6	2.01	110.36	107.20
3	K	6	FUL	O5-C1-C2	-2.00	107.68	110.77
3	H	1	NAG	C4-C3-C2	2.00	113.95	111.02

There are no chirality outliers.

All (58) 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	3	BMA	O5-C5-C6-O6
3	H	4	MAN	O5-C5-C6-O6
4	I	1	NAG	O5-C5-C6-O6
3	G	4	MAN	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
5	Q	1	NAG	C8-C7-N2-C2
5	Q	2	NAG	C8-C7-N2-C2
7	N	1	NAG	O5-C5-C6-O6
6	L	1	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
6	L	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
3	G	4	MAN	C4-C5-C6-O6
5	Q	1	NAG	O7-C7-N2-C2
5	Q	2	NAG	O7-C7-N2-C2
6	L	2	NAG	O5-C5-C6-O6
3	K	5	MAN	O5-C5-C6-O6
3	H	3	BMA	C4-C5-C6-O6
5	Q	2	NAG	C4-C5-C6-O6
3	K	4	MAN	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	J	2	NAG	C4-C5-C6-O6
5	O	1	NAG	C8-C7-N2-C2

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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
5	J	2	NAG	O5-C5-C6-O6
3	H	5	MAN	O5-C5-C6-O6
7	N	3	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
3	K	1	NAG	O5-C5-C6-O6
3	K	1	NAG	C4-C5-C6-O6
8	P	1	NAG	C4-C5-C6-O6

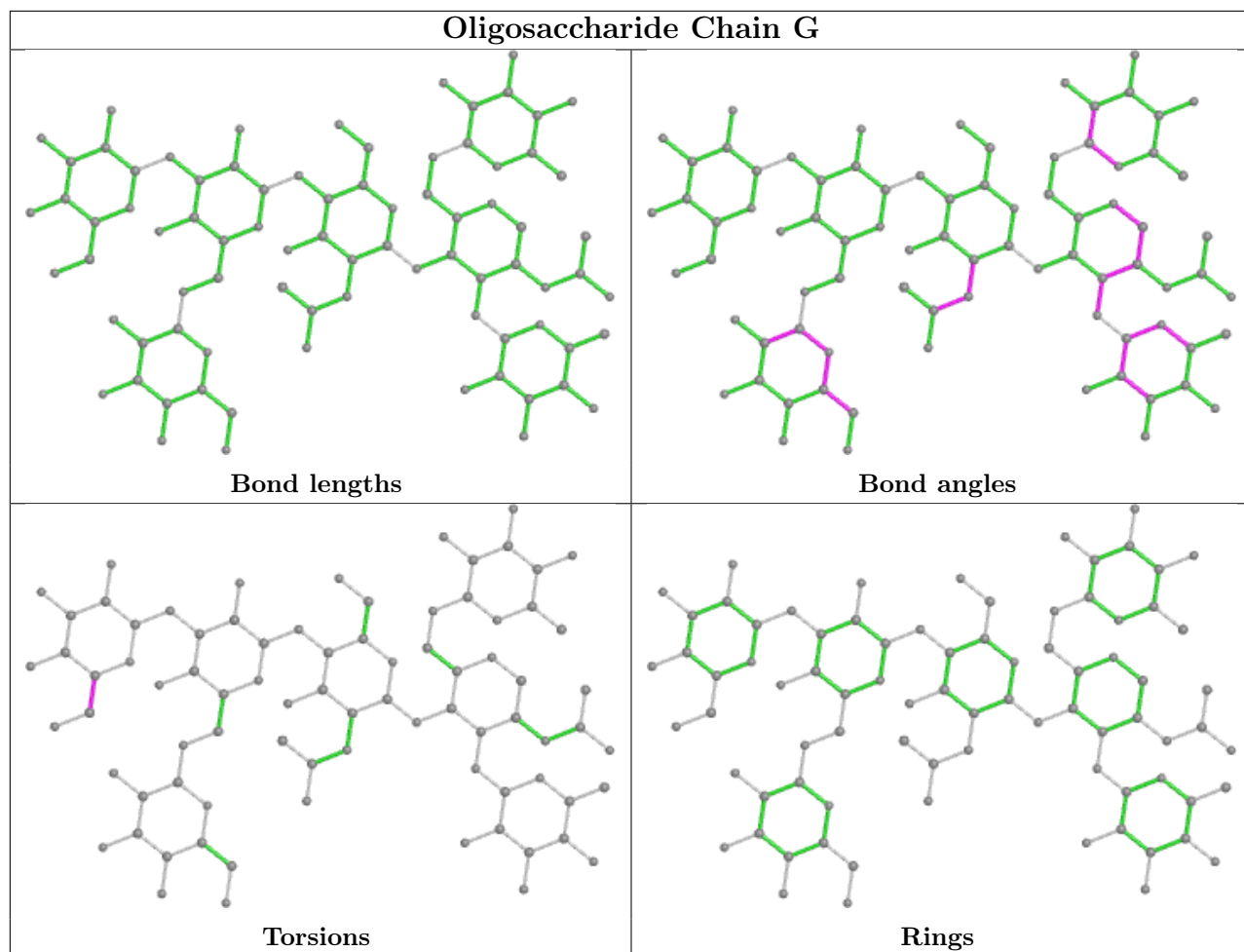
All (1) ring outliers are listed below:

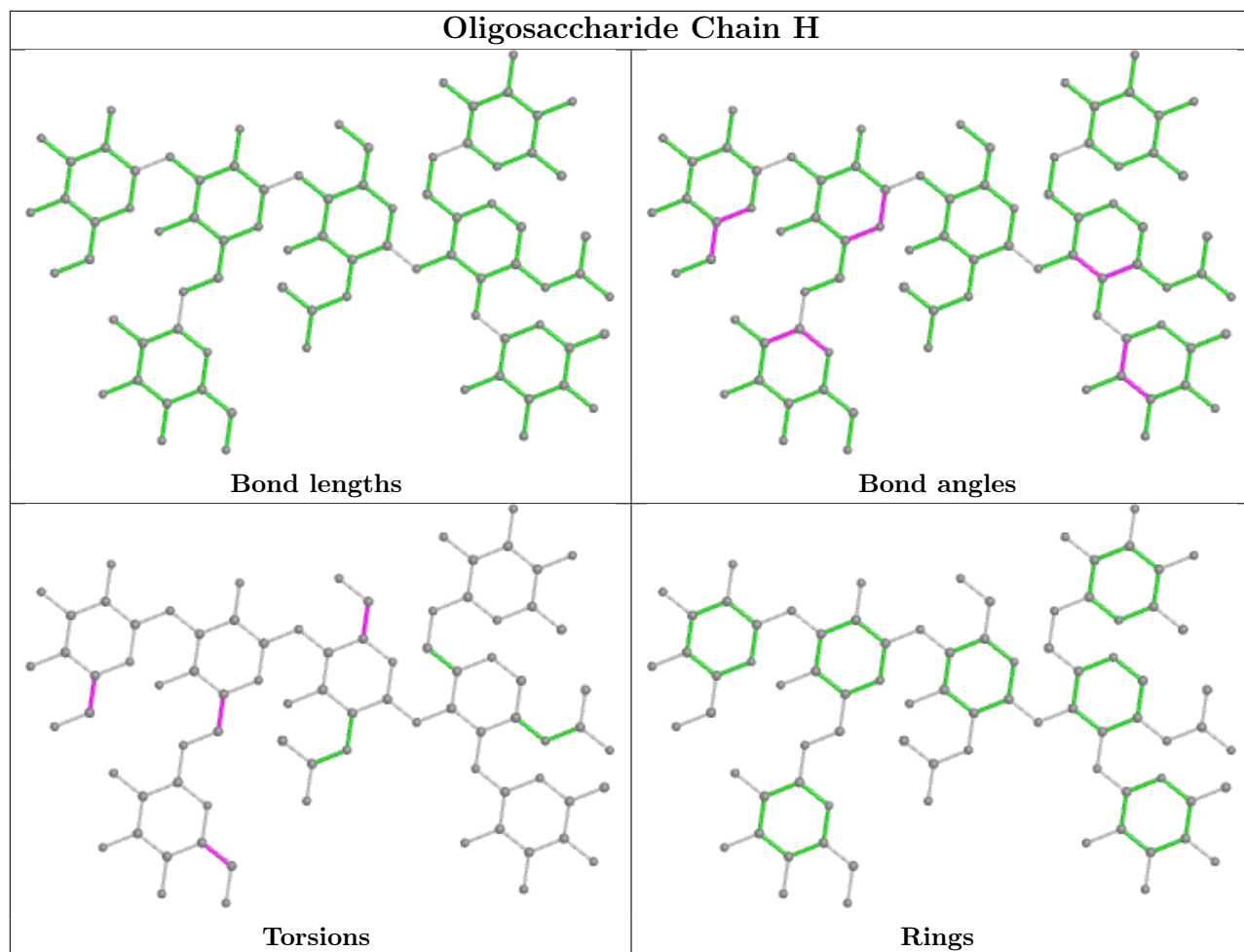
Mol	Chain	Res	Type	Atoms
3	K	5	MAN	C1-C2-C3-C4-C5-O5

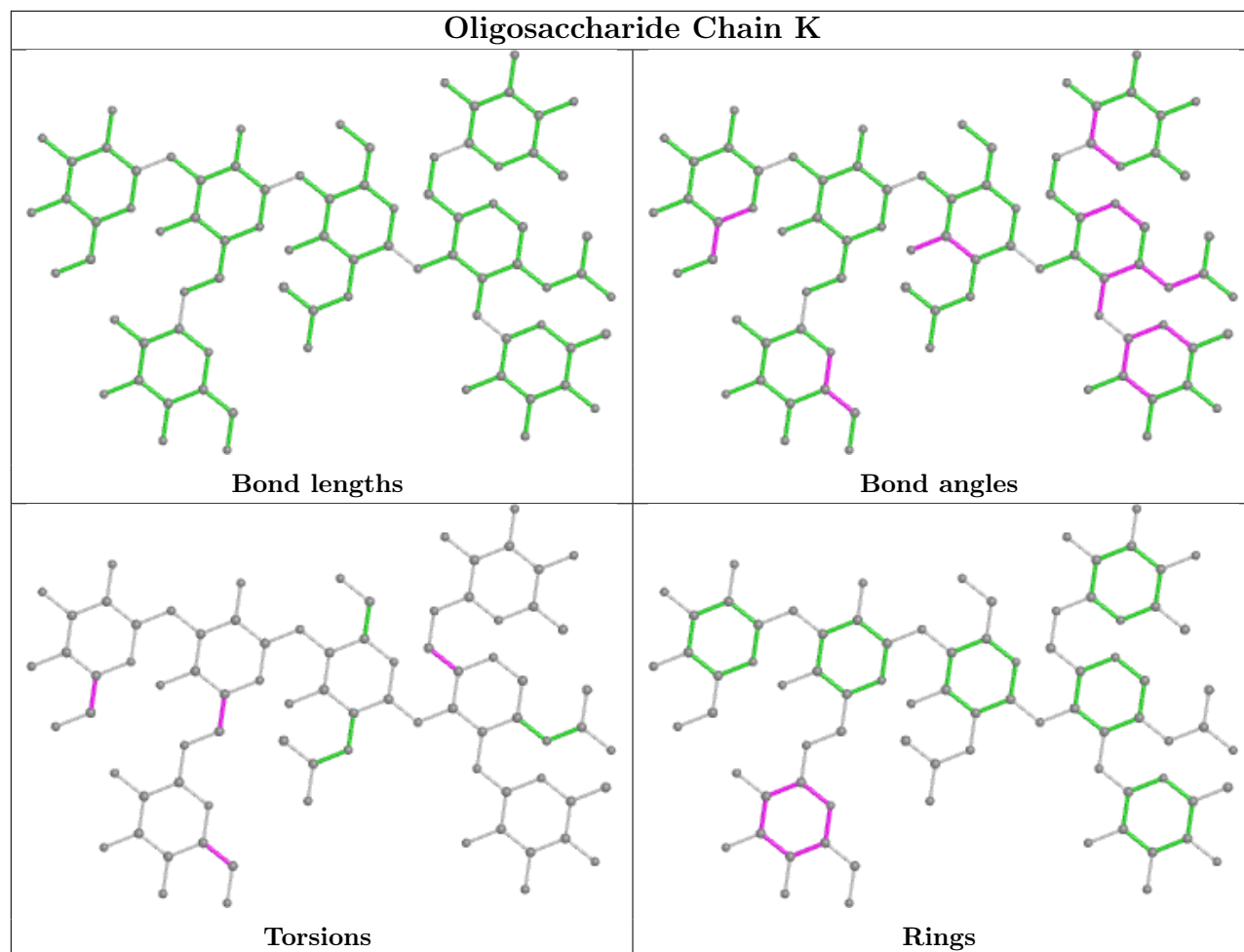
9 monomers are involved in 8 short contacts:

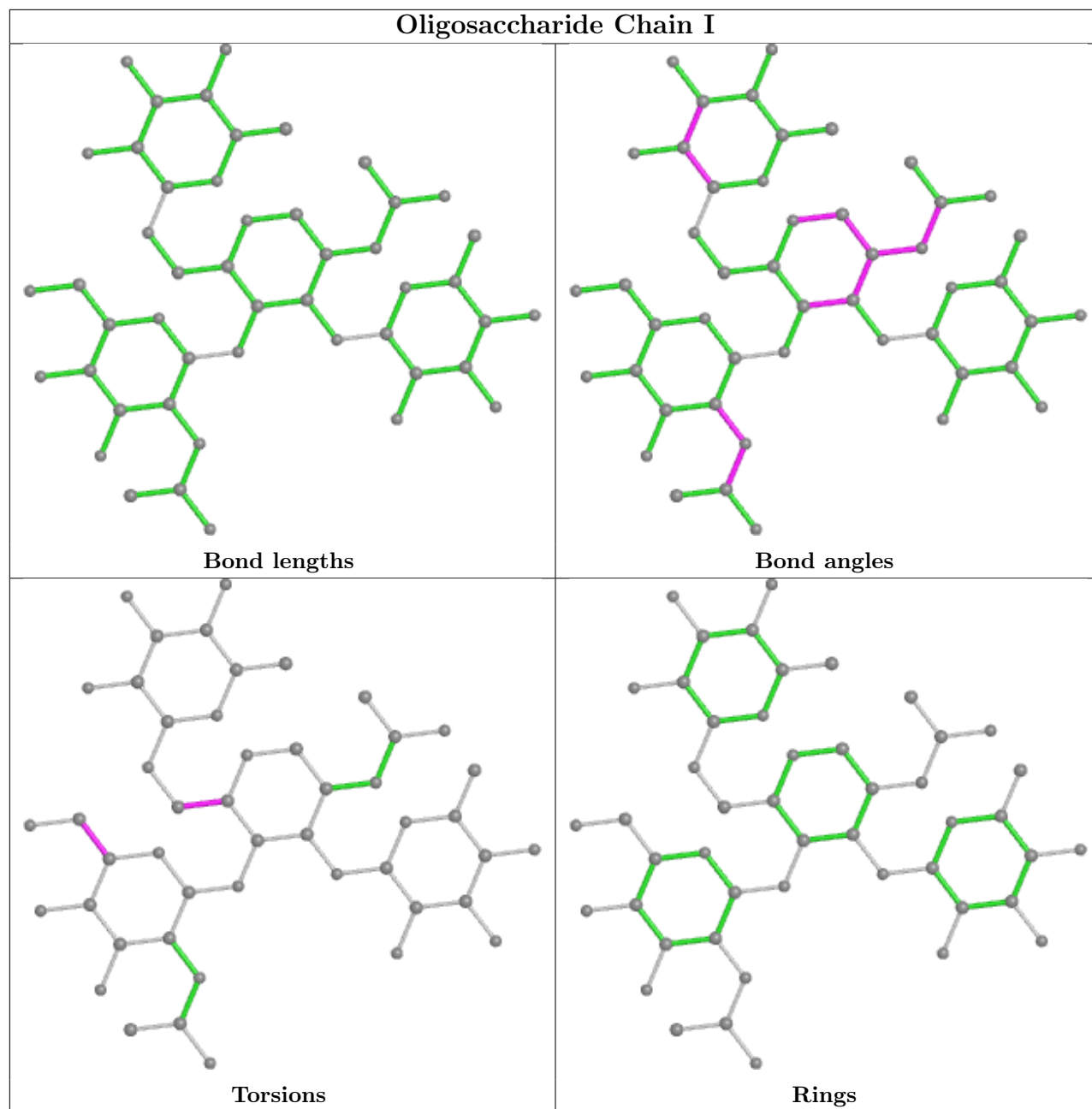
Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	K	7	FUC	1	0
7	N	4	FUC	1	0
3	H	5	MAN	1	0
3	G	7	FUC	1	0
3	K	5	MAN	3	0
7	N	1	NAG	2	0
3	K	3	BMA	1	0
3	H	3	BMA	1	0
3	K	2	NAG	2	0

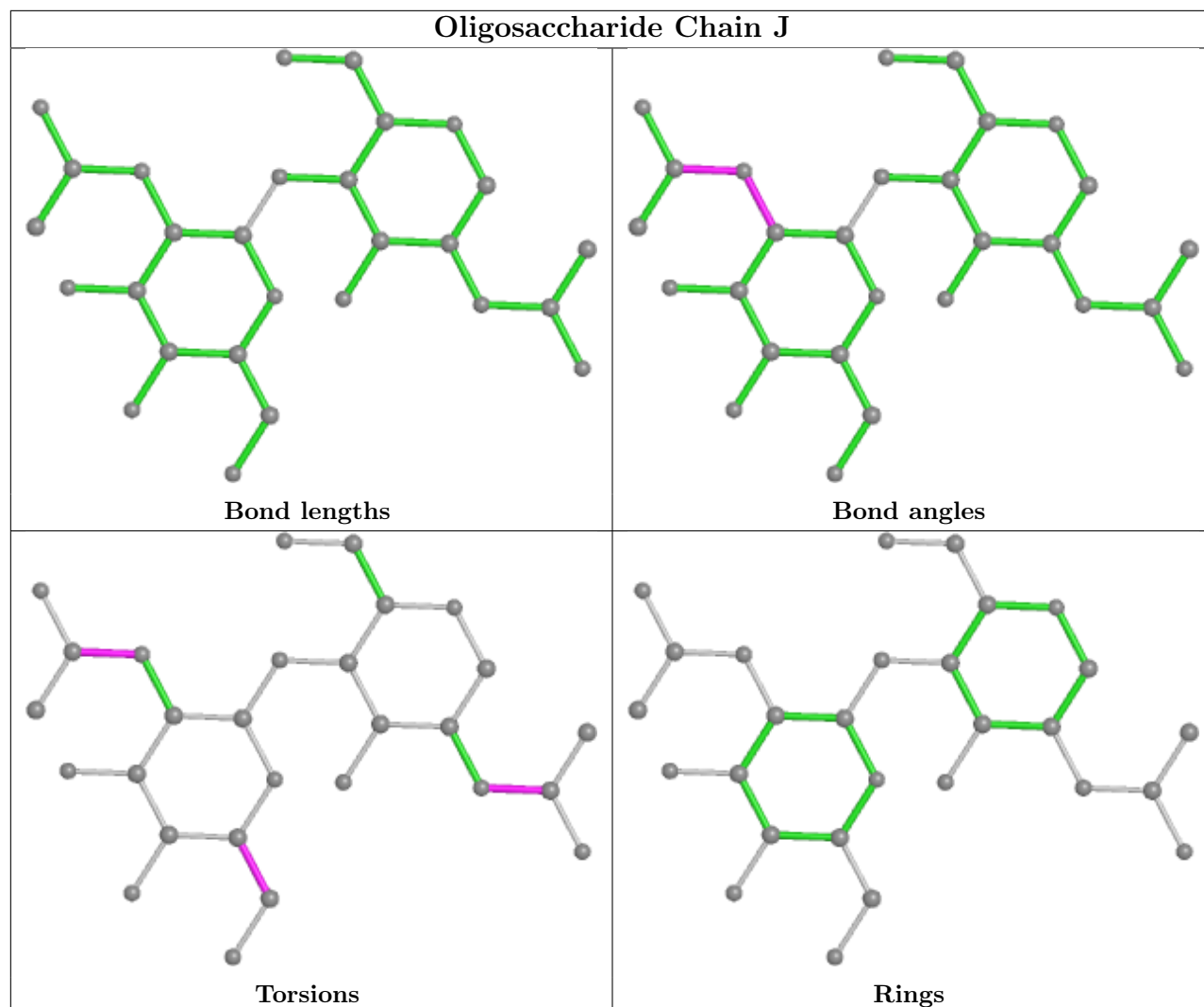
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for oligosaccharide.

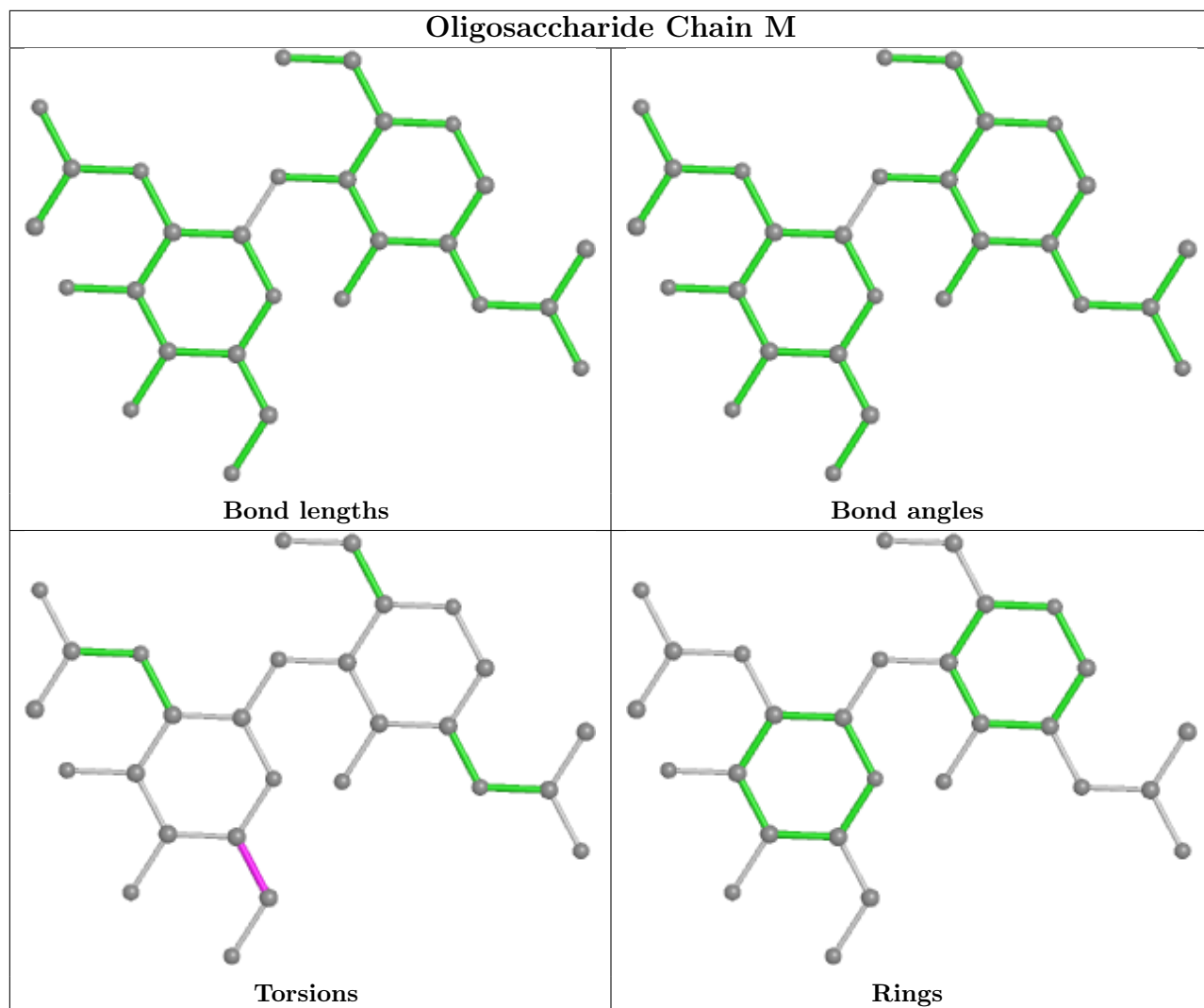




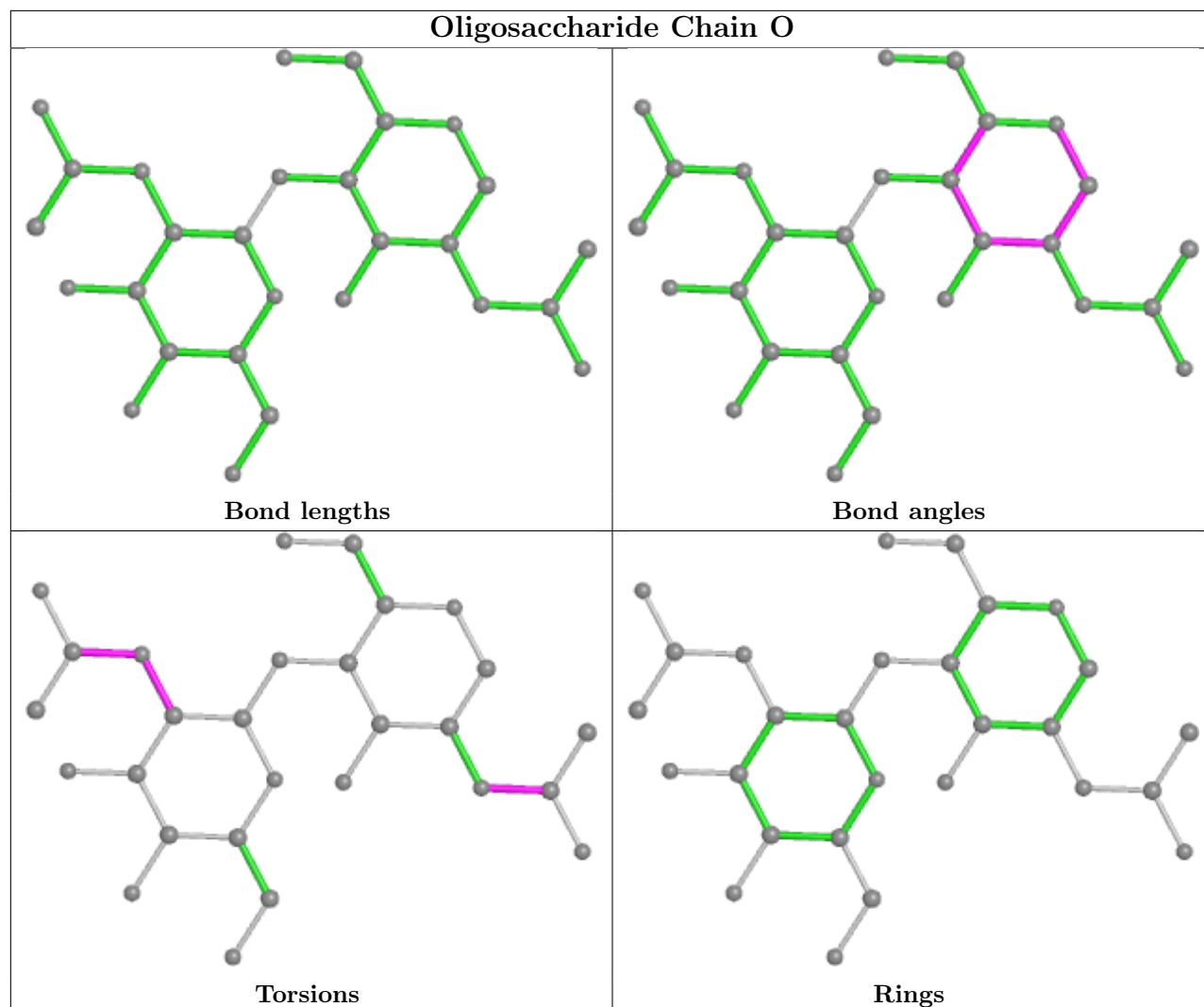


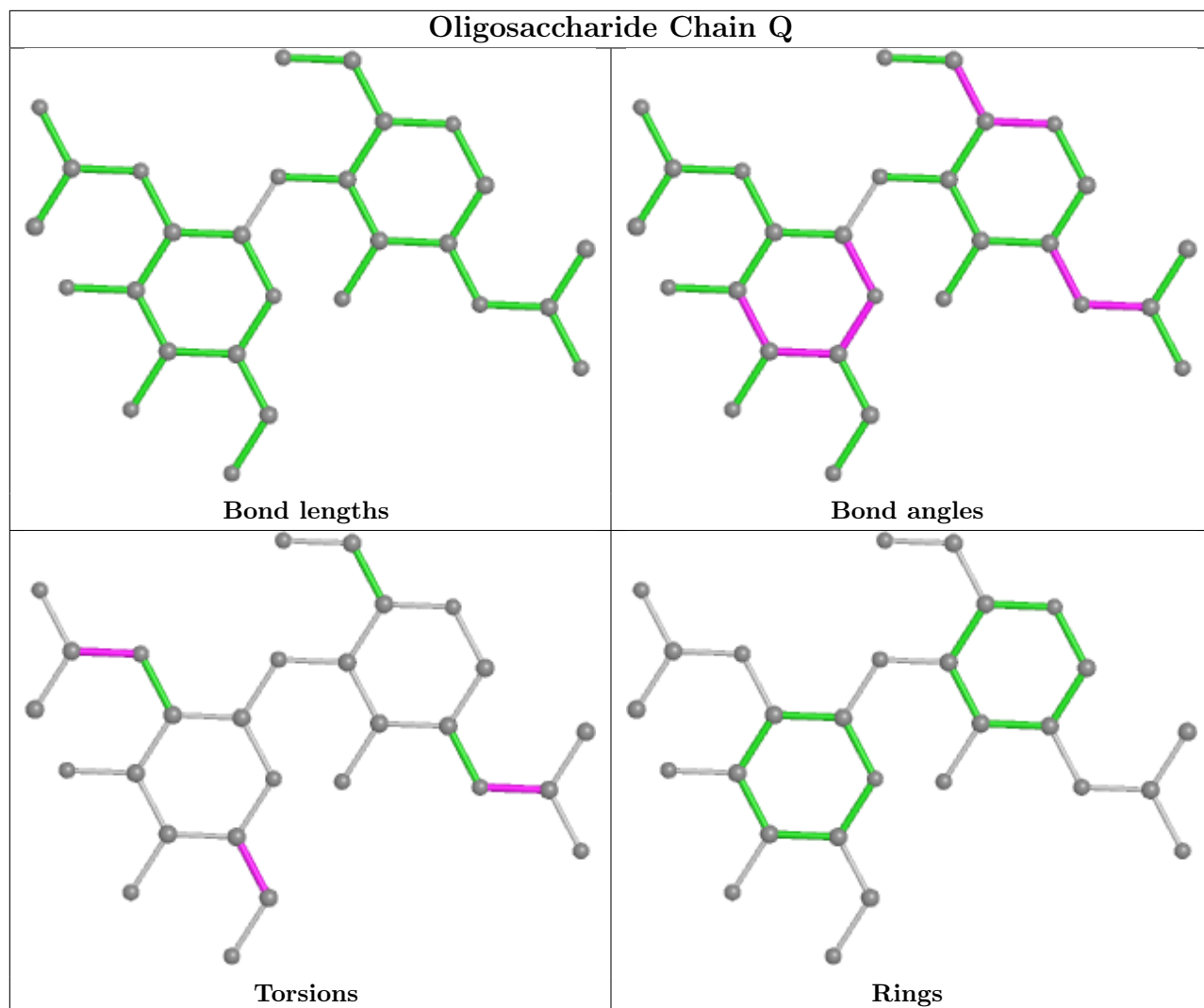


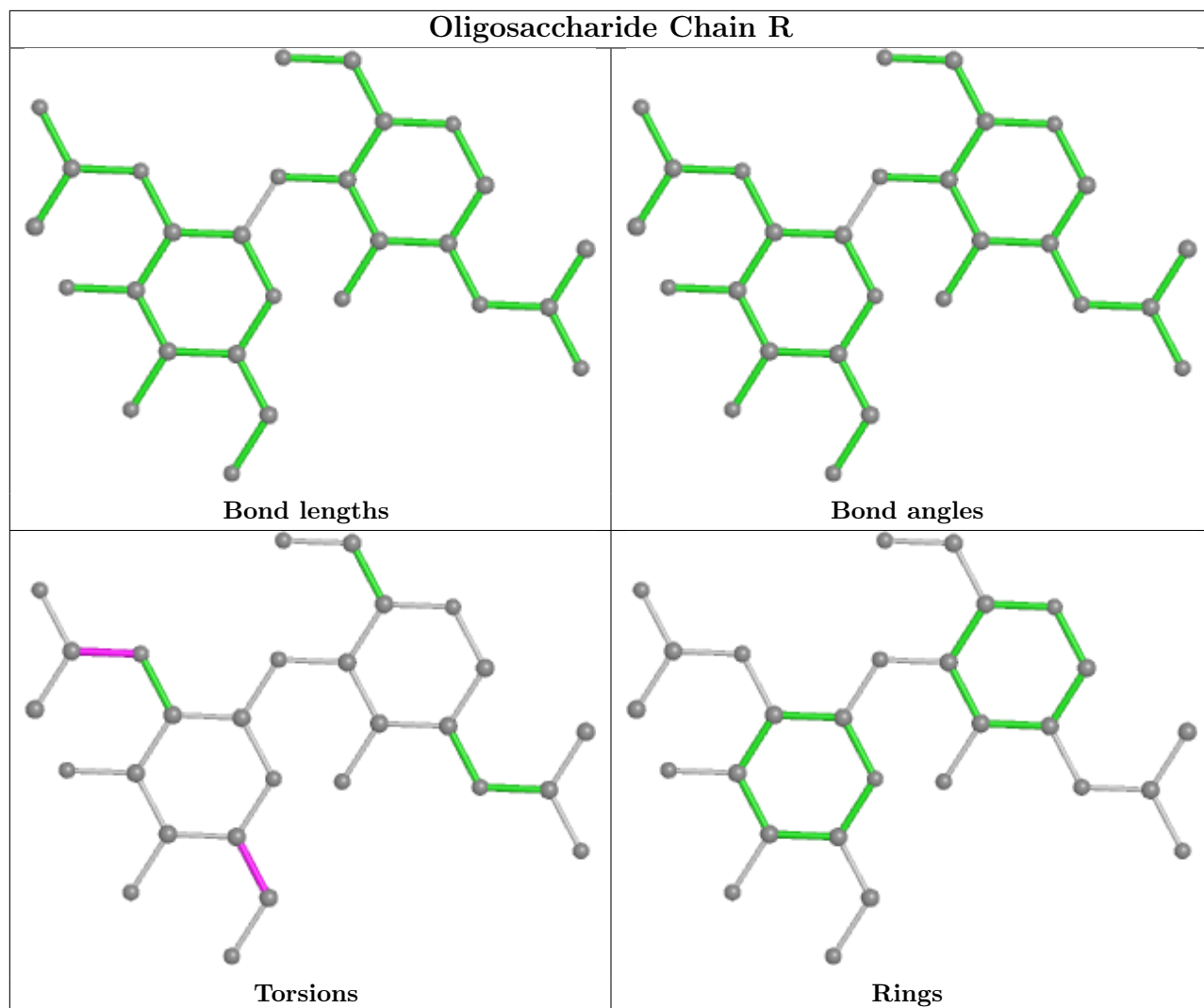


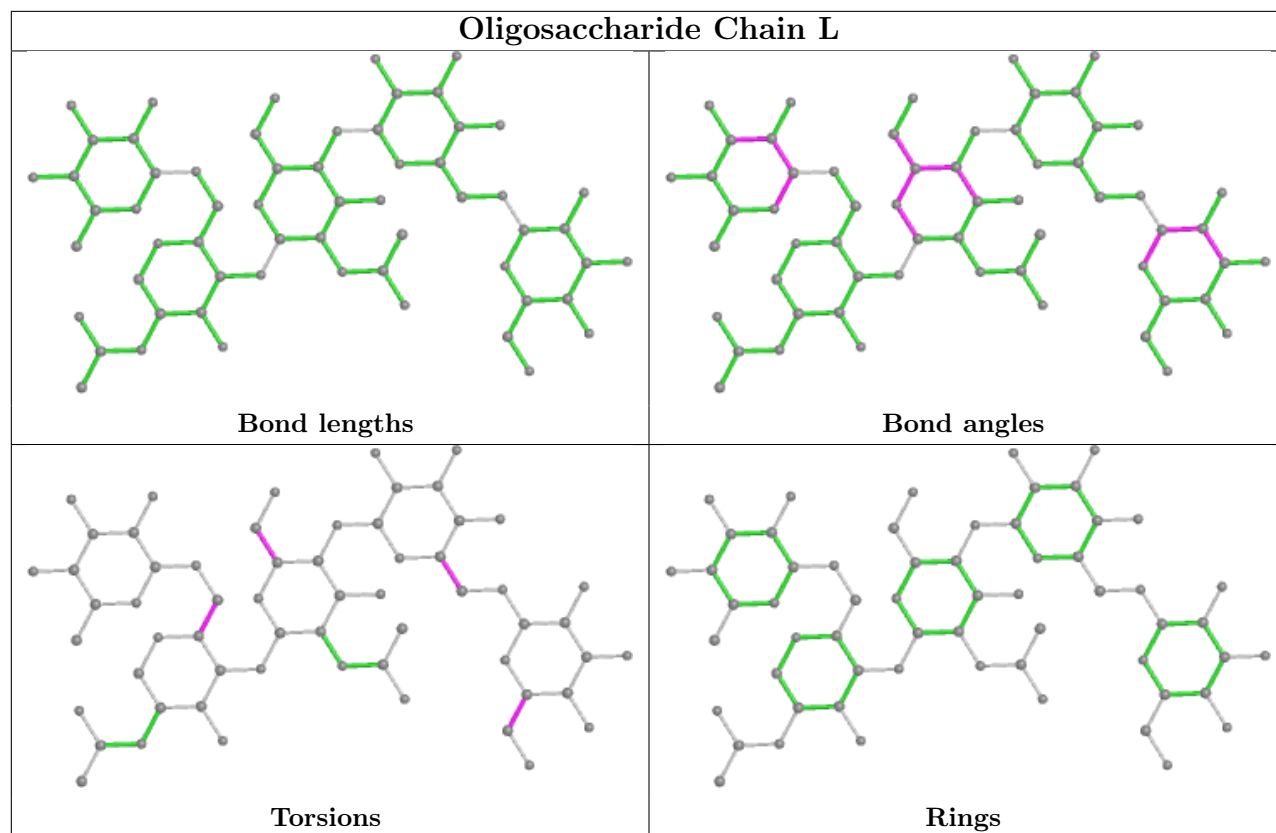


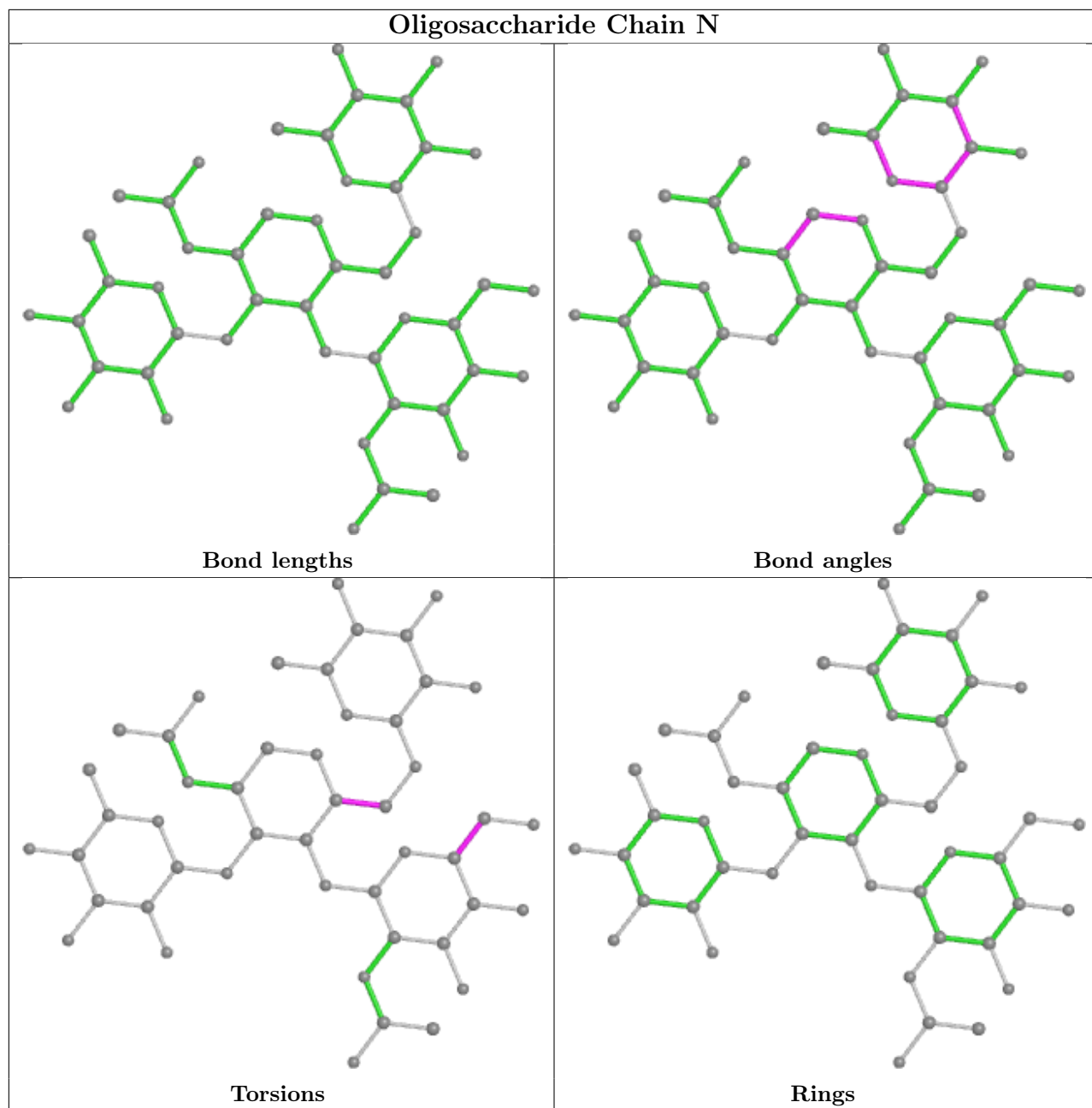


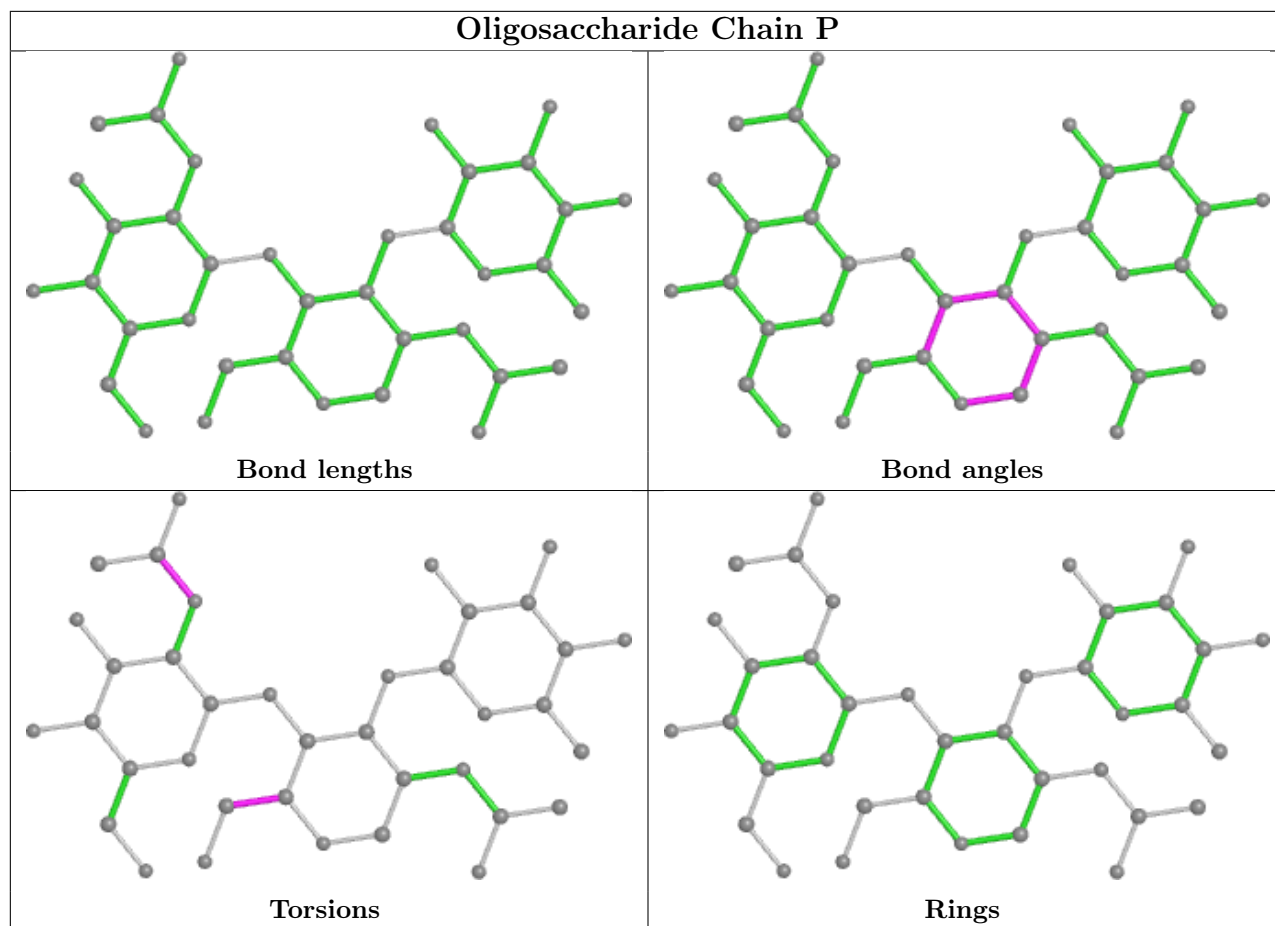












## 5.6 Ligand geometry [i](#)

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	C	514	-	10,10,10	0.68	0	9,9,9	1.43	1 (11%)
9	P4G	B	505	-	10,10,10	0.69	0	9,9,9	1.58	2 (22%)
10	NAG	E	503	1	14,14,15	0.47	0	17,19,21	0.76	0
9	P4G	E	511	-	10,10,10	0.67	0	9,9,9	1.57	2 (22%)
9	P4G	B	504	-	10,10,10	0.65	0	9,9,9	1.50	1 (11%)
9	P4G	C	516	-	10,10,10	0.66	0	9,9,9	1.41	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
9	P4G	B	506	-	10,10,10	0.67	0	9,9,9	1.63	2 (22%)
9	P4G	C	515	-	10,10,10	0.71	0	9,9,9	1.48	0
9	P4G	A	521	-	10,10,10	0.69	0	9,9,9	1.33	0
9	P4G	D	503	-	10,10,10	0.68	0	9,9,9	1.45	1 (11%)
9	P4G	F	503	-	10,10,10	0.68	0	9,9,9	1.53	2 (22%)
9	P4G	F	504	-	10,10,10	0.66	0	9,9,9	1.46	1 (11%)
9	P4G	E	510	-	10,10,10	0.68	0	9,9,9	1.41	1 (11%)
10	NAG	C	513	1	14,14,15	0.51	0	17,19,21	0.86	1 (5%)

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

There are no bond length outliers.

All (14) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
9	F	503	P4G	C7-O4-C6	2.51	121.90	112.90
9	E	511	P4G	C4-O3-C5	2.31	123.28	113.29
9	B	505	P4G	C2-O2-C3	2.28	121.08	112.90

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
9	B	504	P4G	C7-O4-C6	2.25	120.97	112.90
10	C	513	NAG	C1-O5-C5	2.24	115.23	112.19
9	B	505	P4G	C7-O4-C6	2.23	120.90	112.90
9	E	511	P4G	C7-O4-C6	2.20	120.77	112.90
9	D	503	P4G	C2-O2-C3	2.19	120.74	112.90
9	B	506	P4G	C2-O2-C3	2.14	120.58	112.90
9	F	503	P4G	C2-O2-C3	2.10	120.43	112.90
9	B	506	P4G	O4-C6-C5	2.08	119.79	110.39
9	E	510	P4G	C7-O4-C6	2.03	120.16	112.90
9	C	514	P4G	C7-O4-C6	2.01	120.11	112.90
9	F	504	P4G	C2-O2-C3	2.01	120.09	112.90

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
10	E	503	NAG	C8-C7-N2-C2
9	C	514	P4G	O2-C3-C4-O3
10	E	503	NAG	O7-C7-N2-C2
10	E	503	NAG	C4-C5-C6-O6
9	E	510	P4G	C6-C5-O3-C4
9	F	504	P4G	C1-C2-O2-C3
9	B	504	P4G	C8-C7-O4-C6
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	B	506	P4G	O3-C5-C6-O4
9	C	515	P4G	O2-C3-C4-O3
9	E	510	P4G	C1-C2-O2-C3
10	E	503	NAG	O5-C5-C6-O6
9	F	504	P4G	O2-C3-C4-O3
9	D	503	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	D	503	P4G	O3-C5-C6-O4
9	A	521	P4G	C8-C7-O4-C6
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	C	515	P4G	C8-C7-O4-C6
9	F	503	P4G	C6-C5-O3-C4
9	A	521	P4G	O3-C5-C6-O4
9	E	511	P4G	C8-C7-O4-C6
9	E	511	P4G	O2-C3-C4-O3
9	D	503	P4G	C6-C5-O3-C4
9	C	516	P4G	C5-C6-O4-C7
9	C	516	P4G	C3-C4-O3-C5
9	F	504	P4G	C6-C5-O3-C4
9	E	511	P4G	C4-C3-O2-C2
9	C	515	P4G	C6-C5-O3-C4
9	E	510	P4G	C3-C4-O3-C5
9	C	515	P4G	C5-C6-O4-C7
9	C	514	P4G	C4-C3-O2-C2
9	C	514	P4G	O3-C5-C6-O4
9	B	504	P4G	C5-C6-O4-C7
9	E	510	P4G	C5-C6-O4-C7
9	A	521	P4G	C3-C4-O3-C5
9	F	503	P4G	C4-C3-O2-C2
9	C	515	P4G	C1-C2-O2-C3
9	F	504	P4G	C4-C3-O2-C2
9	C	516	P4G	C1-C2-O2-C3
9	D	503	P4G	C8-C7-O4-C6
9	C	514	P4G	C3-C4-O3-C5
9	E	510	P4G	O3-C5-C6-O4
9	B	506	P4G	C4-C3-O2-C2
9	E	510	P4G	C4-C3-O2-C2
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	C	515	P4G	1	0

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Mol	Chain	Res	Type	Clashes	Symm-Clashes
9	A	521	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 [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, 95<sup>th</sup> 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 <sup>2</sup> )	Q<0.9
1	A	322/329 (97%)	-0.16	7 (2%) 62 68	30, 45, 70, 110	0
1	C	322/329 (97%)	-0.42	0 100 100	26, 38, 56, 95	0
1	E	322/329 (97%)	-0.36	2 (0%) 89 91	28, 43, 69, 94	0
2	B	170/181 (93%)	-0.18	0 100 100	27, 40, 62, 84	0
2	D	170/181 (93%)	-0.12	1 (0%) 89 91	27, 43, 69, 79	0
2	F	170/181 (93%)	-0.20	0 100 100	26, 40, 62, 77	0
All	All	1476/1530 (96%)	-0.26	10 (0%) 87 90	26, 42, 67, 110	0

All (10) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	142(A)	THR	3.6
1	A	173	ASN	3.3
1	A	326	LYS	2.7
1	A	142	ASP	2.7
1	A	143	ASN	2.3
1	A	141	TYR	2.1
1	E	126	ARG	2.1
1	A	144	GLY	2.1
1	E	141	TYR	2.1
2	D	73	ILE	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, 95<sup>th</sup> 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.

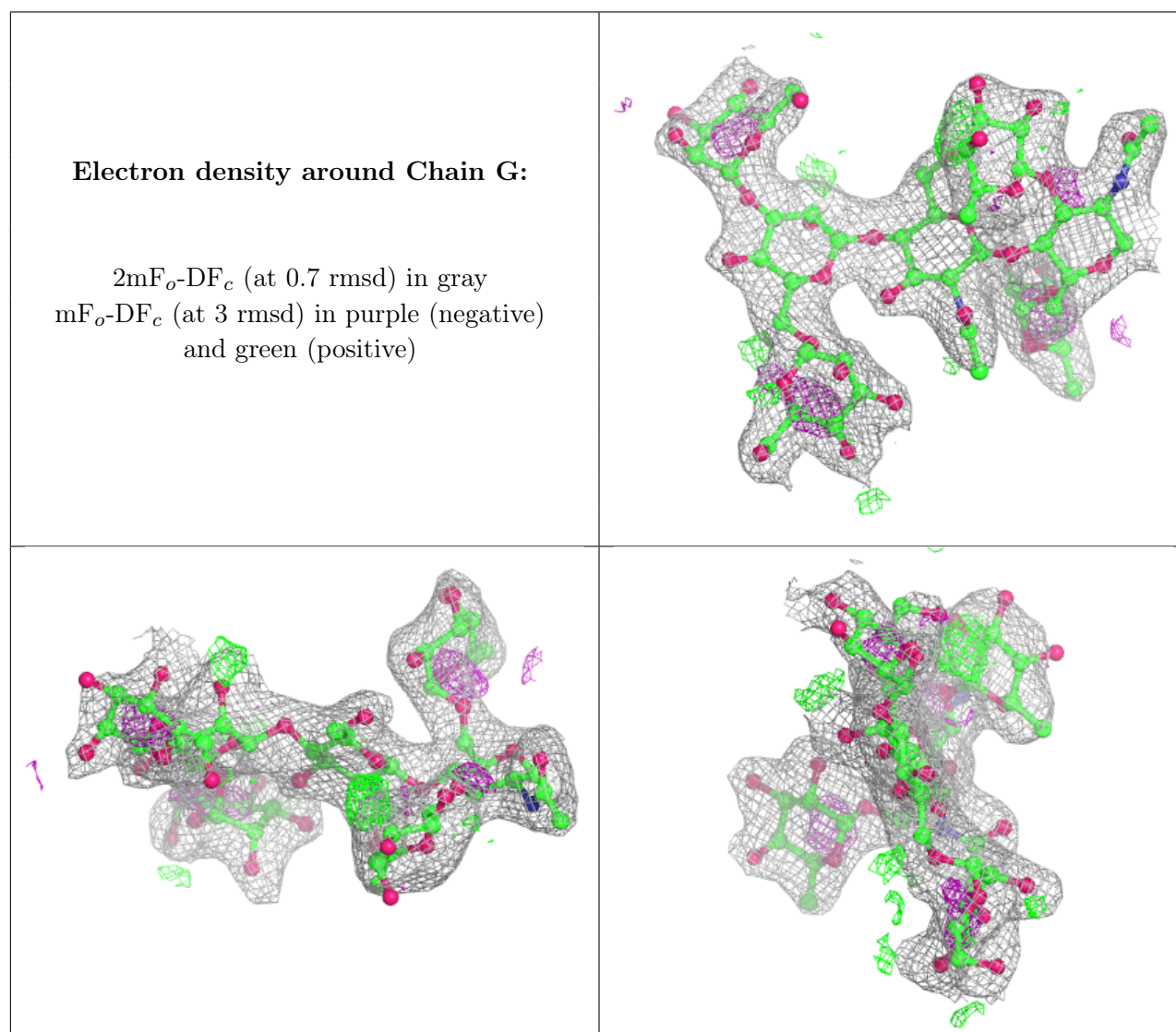
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å <sup>2</sup> )	Q<0.9
5	NAG	O	2	14/15	0.62	0.41	126,131,140,142	0
3	MAN	H	5	11/12	0.63	0.50	98,109,113,114	0
7	FUC	N	4	10/11	0.63	0.33	60,85,92,92	0
6	BMA	L	4	11/12	0.64	0.21	92,103,110,115	0
8	FUL	P	2	10/11	0.64	0.54	116,119,123,124	0
3	FUL	H	6	10/11	0.65	0.49	101,109,119,121	0
5	NAG	M	2	14/15	0.66	0.40	114,124,129,129	0
5	NAG	O	1	14/15	0.66	0.22	90,102,111,121	0
3	MAN	K	4	11/12	0.69	0.34	105,118,122,122	0
6	BMA	L	3	11/12	0.70	0.16	100,104,108,109	0
3	MAN	K	5	11/12	0.71	0.27	68,94,104,108	0
7	FUL	N	2	10/11	0.72	0.42	110,122,126,128	0
5	NAG	J	2	14/15	0.75	0.35	118,124,127,128	0
4	FUL	I	2	10/11	0.75	0.41	95,103,114,116	0
4	NAG	I	3	14/15	0.75	0.24	72,98,112,113	0
5	NAG	R	2	14/15	0.77	0.46	118,130,134,135	0
7	NAG	N	3	14/15	0.77	0.28	71,85,96,97	0
8	NAG	P	1	14/15	0.78	0.17	75,84,97,108	0
3	BMA	K	3	11/12	0.80	0.16	72,74,84,85	0
8	NAG	P	3	14/15	0.80	0.37	95,103,110,114	0
5	NAG	M	1	14/15	0.81	0.28	81,94,105,117	0
6	NAG	L	2	14/15	0.81	0.17	59,74,85,92	0
3	FUL	K	6	10/11	0.81	0.18	74,79,90,97	0
5	NAG	Q	1	14/15	0.81	0.18	77,99,111,112	0
5	NAG	Q	2	14/15	0.81	0.27	118,123,127,128	0
5	NAG	J	1	14/15	0.82	0.18	69,79,91,106	0
3	MAN	G	4	11/12	0.82	0.31	78,85,97,100	0
4	FUL	I	4	10/11	0.83	0.19	82,92,94,97	0
3	MAN	H	4	11/12	0.85	0.38	72,83,90,90	0
3	BMA	H	3	11/12	0.85	0.25	60,67,71,81	0
3	FUC	H	7	10/11	0.86	0.38	95,105,109,109	0
3	BMA	G	3	11/12	0.86	0.11	52,63,68,70	0
7	NAG	N	1	14/15	0.86	0.16	60,69,89,89	0
3	MAN	G	5	11/12	0.88	0.17	52,59,65,69	0
3	FUL	G	6	10/11	0.88	0.16	67,77,82,92	0
3	NAG	H	1	14/15	0.88	0.23	59,74,82,92	0
5	NAG	R	1	14/15	0.88	0.20	83,99,106,116	0

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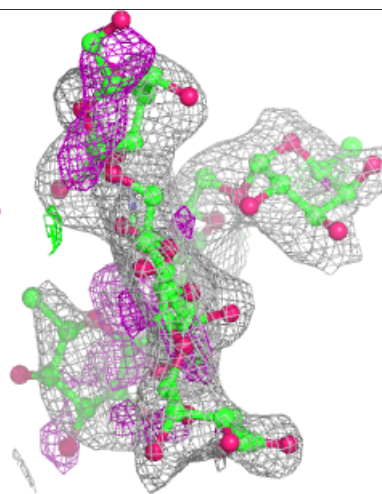
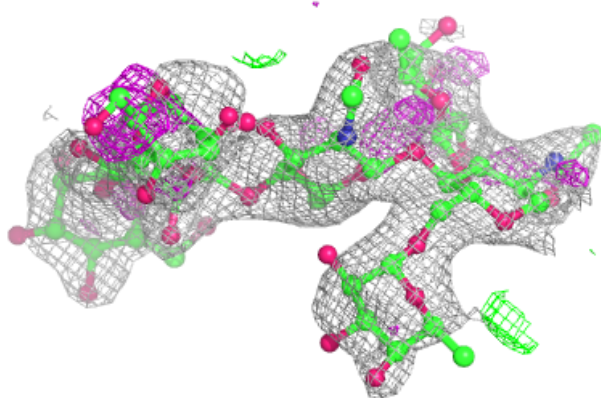
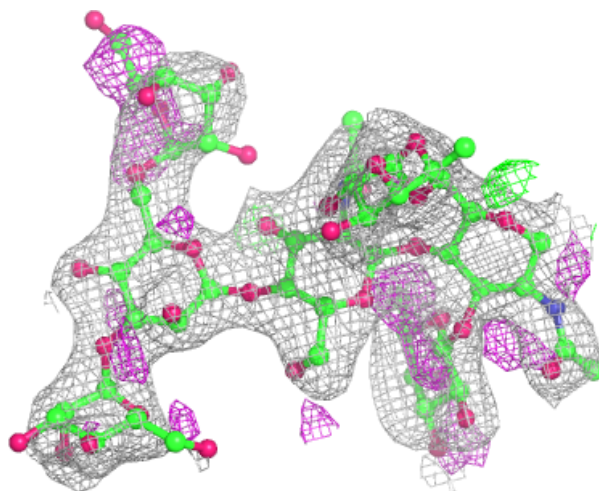
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors( $\text{\AA}^2$ )	Q<0.9
4	NAG	I	1	14/15	0.88	0.15	51,68,85,92	0
3	FUC	G	7	10/11	0.89	0.16	55,65,69,74	0
3	NAG	K	1	14/15	0.90	0.08	39,45,54,60	0
3	FUC	K	7	10/11	0.90	0.15	62,66,70,71	0
3	NAG	H	2	14/15	0.92	0.18	63,66,75,86	0
6	NAG	L	1	14/15	0.92	0.12	47,57,74,77	0
6	FUL	L	5	10/11	0.93	0.16	45,77,80,80	0
3	NAG	K	2	14/15	0.94	0.09	44,56,72,74	0
3	NAG	G	1	14/15	0.94	0.12	39,45,55,56	0
3	NAG	G	2	14/15	0.97	0.11	54,62,66,67	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.



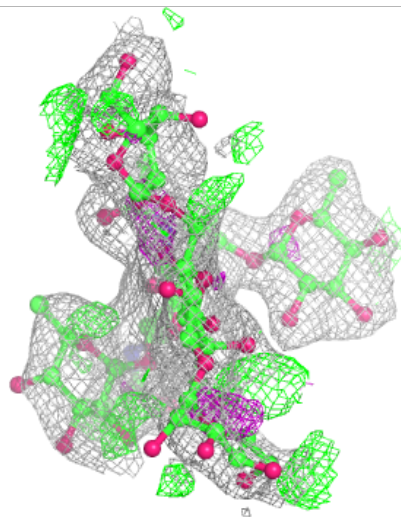
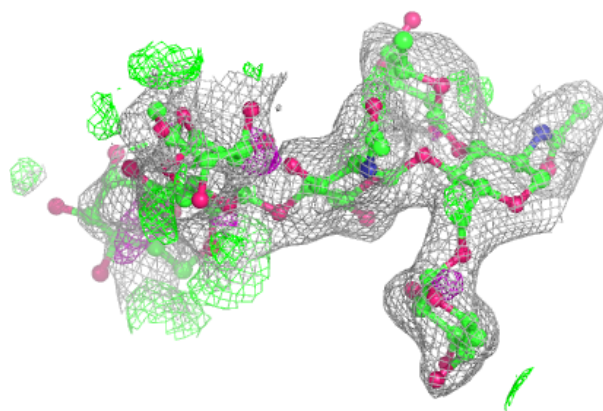
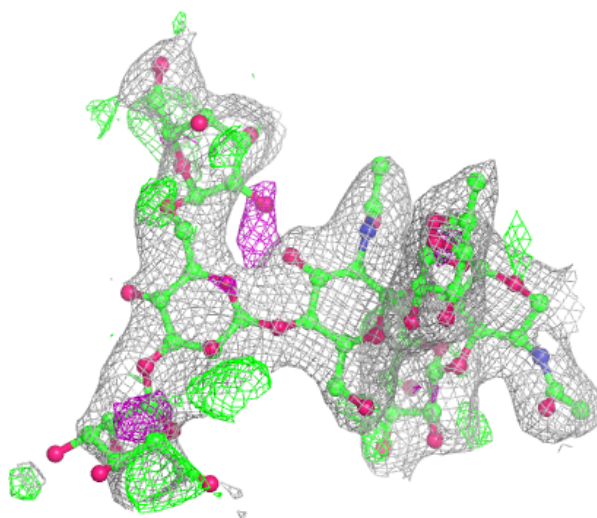
**Electron density around Chain H:**

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



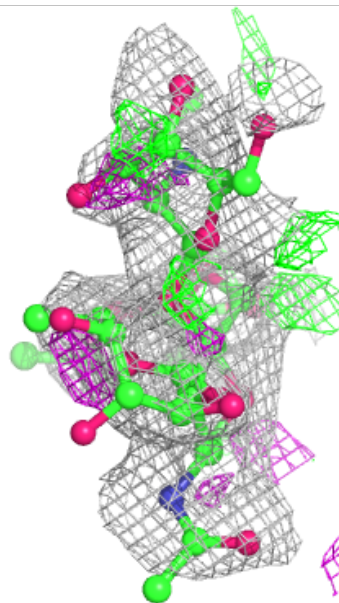
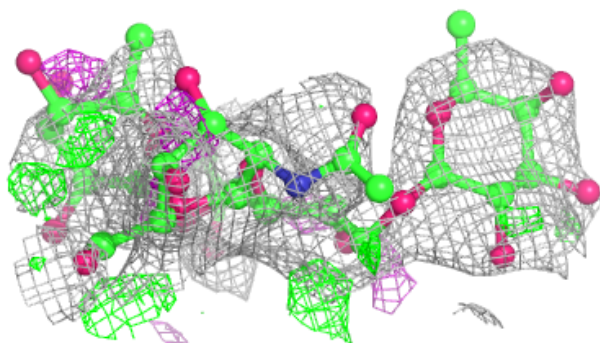
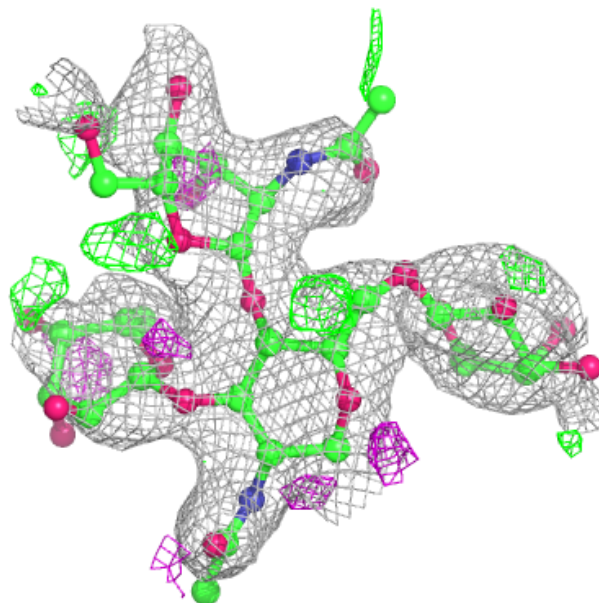
**Electron density around Chain K:**

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



**Electron density around Chain I:**

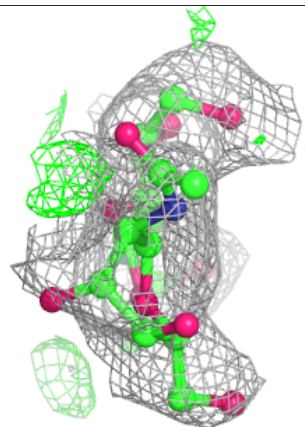
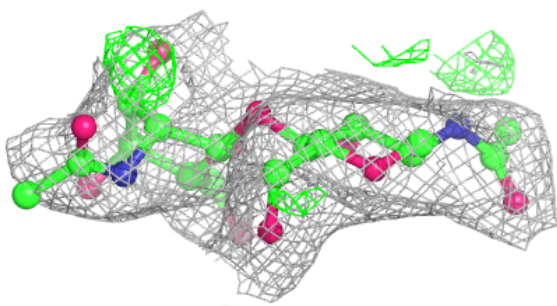
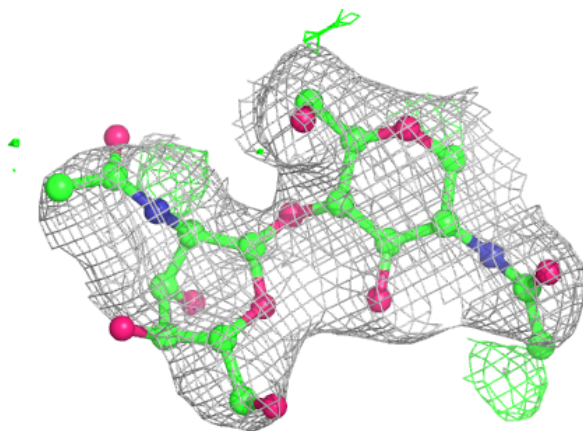
$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)





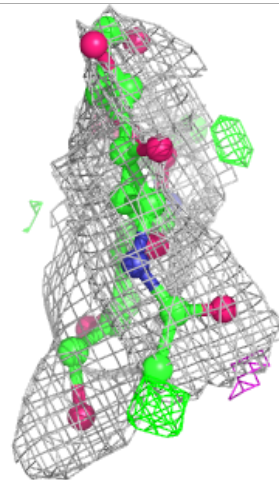
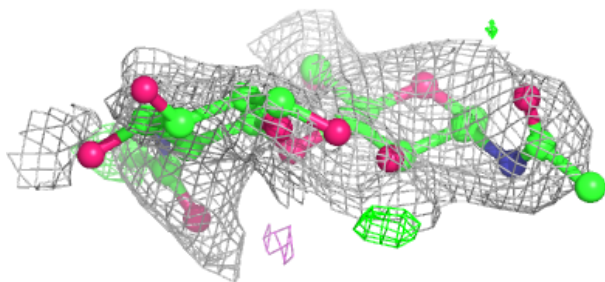
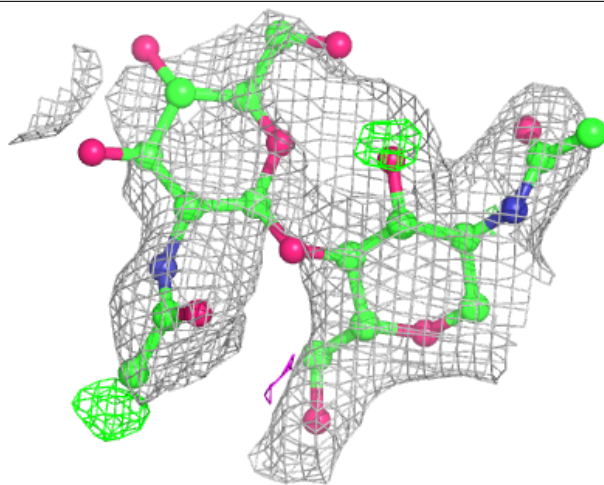
**Electron density around Chain J:**

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



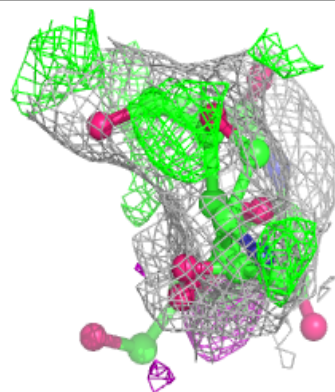
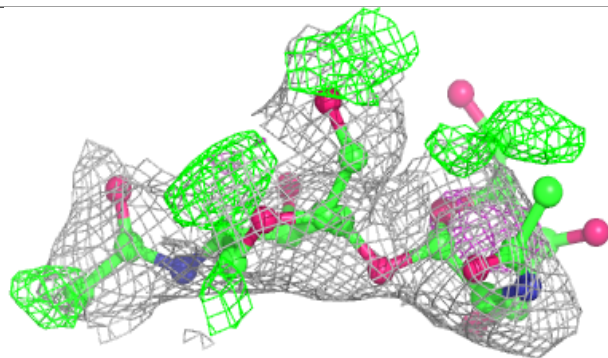
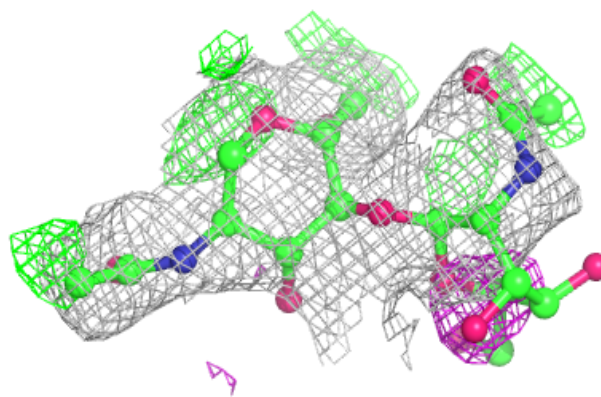
**Electron density around Chain M:**

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



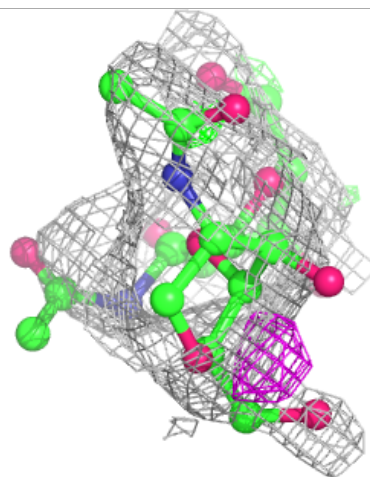
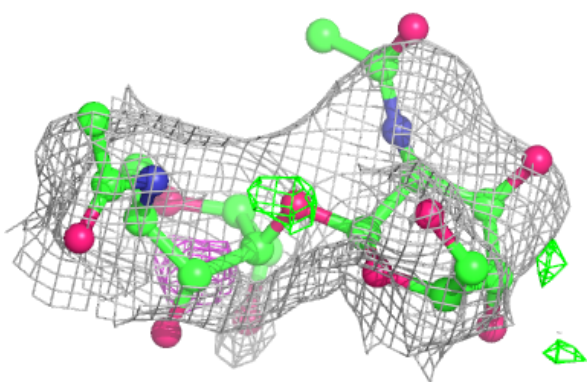
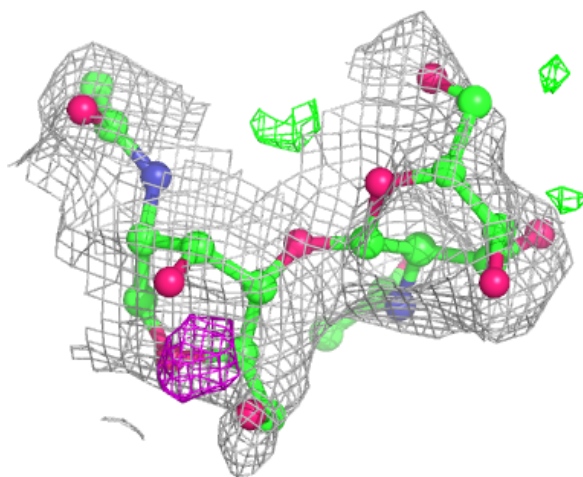
**Electron density around Chain O:**

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



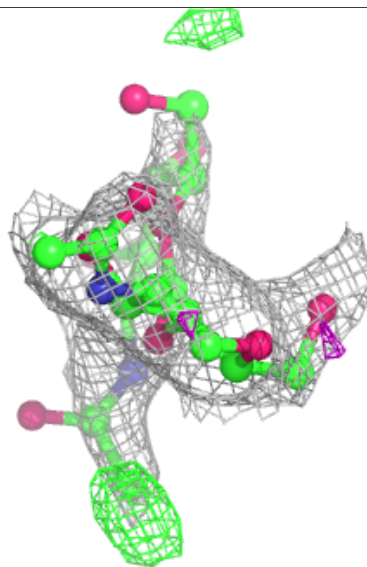
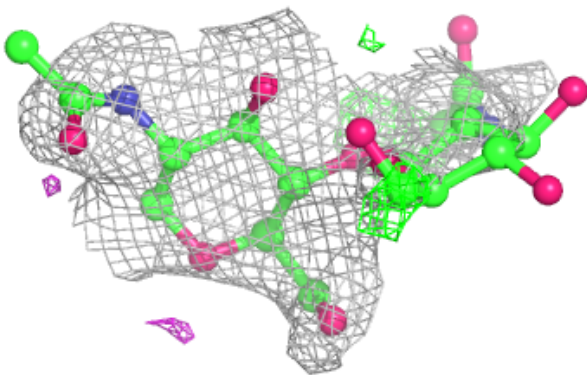
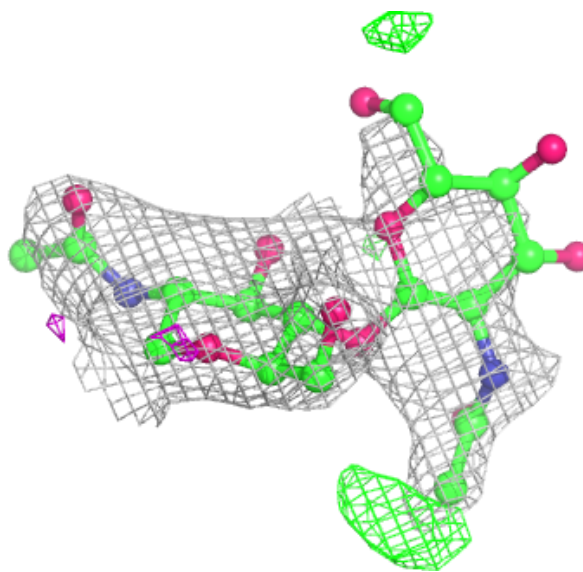
**Electron density around Chain Q:**

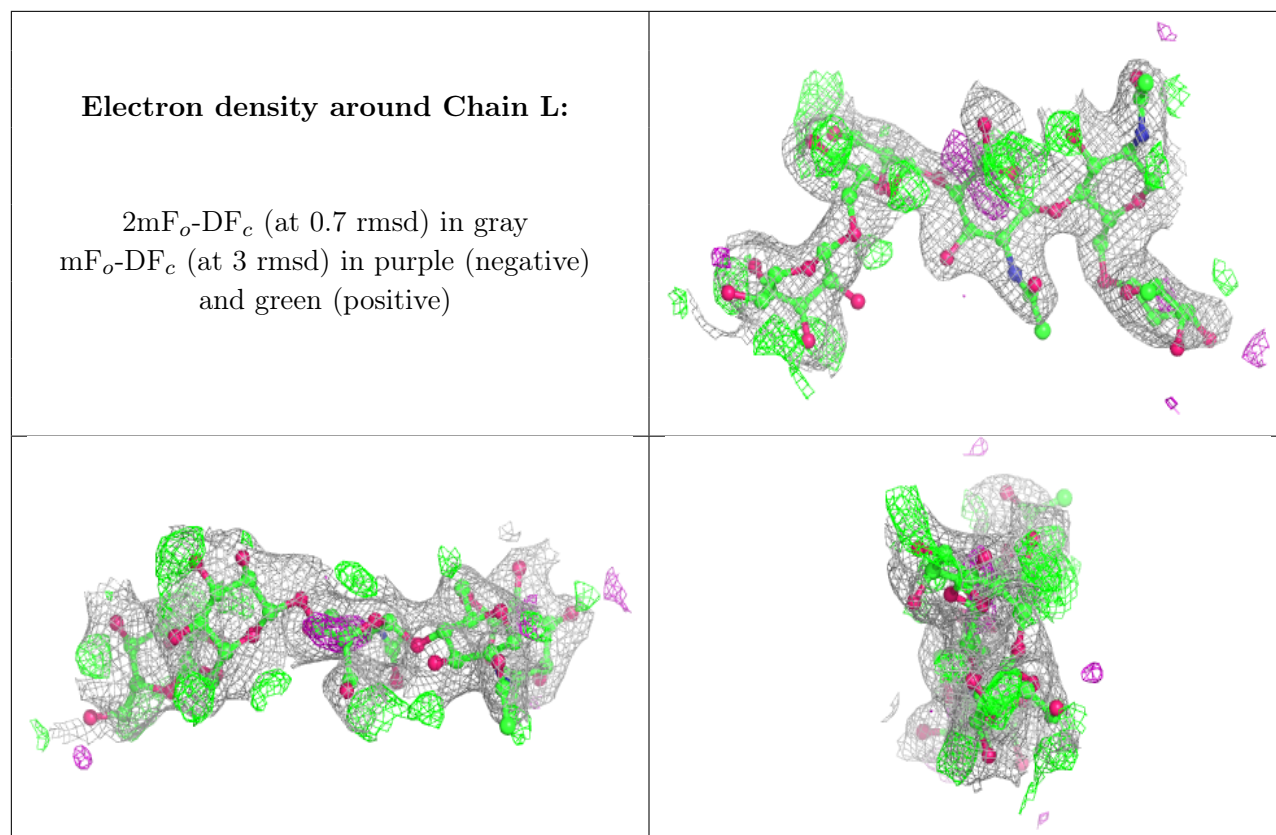
$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)



**Electron density around Chain R:**

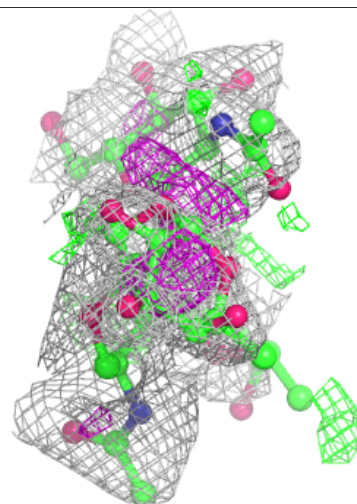
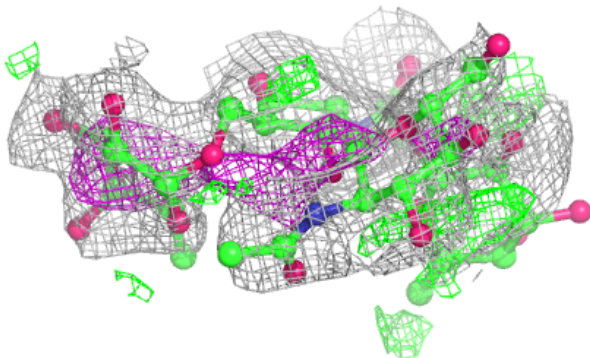
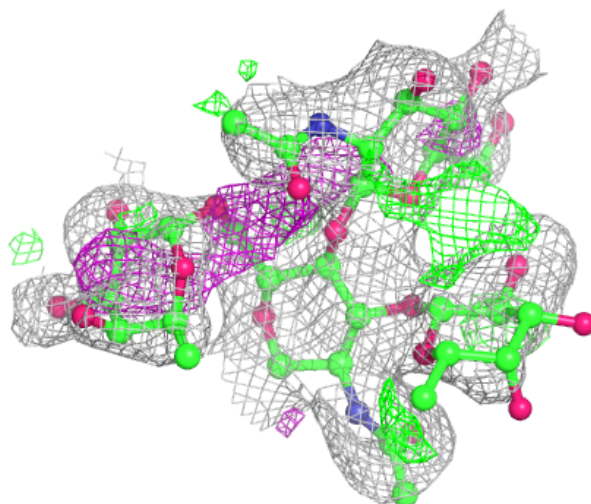
$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)

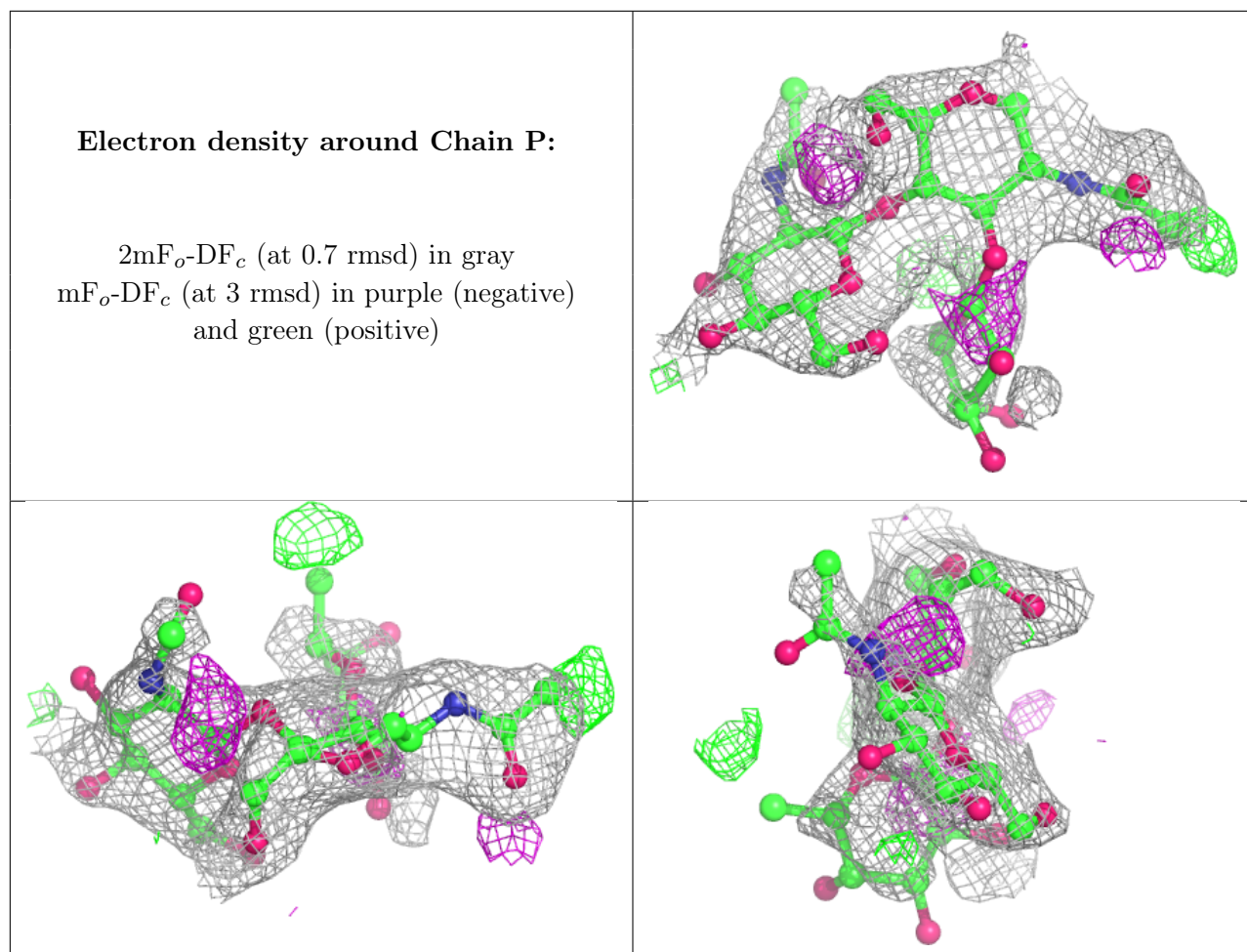




**Electron density around Chain N:**

$2mF_o-DF_c$  (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, 95<sup>th</sup> 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 <sup>2</sup> )	Q<0.9
9	P4G	B	506	11/11	0.62	0.38	74,82,92,92	0
10	NAG	E	503	14/15	0.62	0.30	96,110,117,117	0
9	P4G	F	504	11/11	0.63	0.33	74,81,89,90	0
9	P4G	D	503	11/11	0.79	0.20	64,68,89,90	0
9	P4G	E	511	11/11	0.79	0.17	47,62,74,74	0
9	P4G	C	516	11/11	0.79	0.22	89,97,100,106	0
9	P4G	F	503	11/11	0.80	0.22	60,72,99,101	0
9	P4G	C	515	11/11	0.81	0.24	52,70,88,92	0
9	P4G	A	521	11/11	0.82	0.33	69,81,93,94	0
9	P4G	B	505	11/11	0.84	0.19	61,69,88,91	0
9	P4G	E	510	11/11	0.86	0.17	75,90,98,99	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors( $\text{\AA}^2$ )	Q<0.9
10	NAG	C	513	14/15	0.88	0.17	67,81,90,94	0
9	P4G	C	514	11/11	0.92	0.10	55,62,69,73	0
9	P4G	B	504	11/11	0.94	0.12	35,59,72,74	0

## 6.5 Other polymers [i](#)

There are no such residues in this entry.