



# Full wwPDB X-ray Structure Validation Report ⓘ

Oct 6, 2022 – 01:24 PM EDT

PDB ID : 5XRS  
Title : Crystal structure of A/Minnesota/11/2010 (H3N2) influenza virus hemagglutinin in complex with LSTc  
Authors : Zhang, H.; Wilson, I.A.  
Deposited on : 2017-06-09  
Resolution : 2.91 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 : 2.31.2  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
Refmac : 5.8.0158  
CCP4 : 7.0.044 (Gargrove)  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.31.2

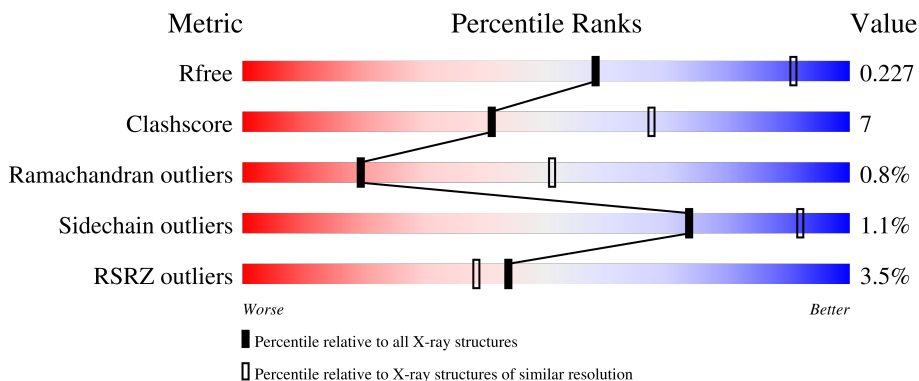
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.91 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	1957 (2.90-2.90)
Clashscore	141614	2172 (2.90-2.90)
Ramachandran outliers	138981	2115 (2.90-2.90)
Sidechain outliers	138945	2117 (2.90-2.90)
RSRZ outliers	127900	1906 (2.90-2.90)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for  $\geq 3$ , 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	 84% 13% .
1	C	329	 86% 10% ..
1	E	329	 88% 8% ..
1	G	329	 3% 82% 14% ..
2	B	174	 89% 9% ..



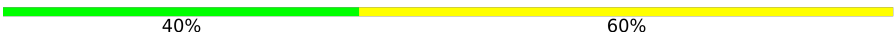
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Mol	Chain	Length	Quality of chain
2	D	174	% 86% 12% ..
2	F	174	% 88% 9% ..
2	H	174	26% 66% 28% ...
3	I	3	33% 67%
4	J	4	25% 50% 25%
4	M	4	100%
5	K	4	50% 25% 25%
5	Q	4	25% 50% 25%
5	R	4	25% 25% 50%
5	W	4	100%
5	c	4	100%
6	L	6	17% 50% 33%
7	N	3	33% 33% 33%
7	b	3	67% 33%
7	e	3	33% 67%
8	O	5	40% 40% 20%
8	V	5	20% 60% 20%
8	g	5	40% 60%
9	P	2	100%
10	S	7	29% 71%
11	T	5	40% 60%
11	X	5	60% 40%
12	U	2	100%
12	Y	2	100%
12	Z	2	100%

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Mol	Chain	Length	Quality of chain
12	a	2	 50% 50%
12	f	2	 50% 50%
13	d	5	 40% 60%

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
11	MAN	T	4	-	-	-	X
11	MAN	T	5	-	-	-	X
12	NAG	Y	2	-	-	-	X
14	NAG	A	522	-	-	-	X
4	BMA	M	3	-	-	-	X

## 2 Entry composition [i](#)

There are 15 unique types of molecules in this entry. The entry contains 16918 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.

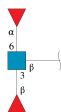
- Molecule 1 is a protein called Hemagglutinin.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	319	2506	1571	438	484	13	0	0	0
1	C	319	2506	1571	438	484	13	0	0	0
1	E	319	2506	1571	438	484	13	0	0	0
1	G	321	2522	1580	441	488	13	0	0	0

- Molecule 2 is a protein called Hemagglutinin.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	B	172	1392	864	249	273	6	0	0	0
2	D	172	1392	864	249	273	6	0	0	0
2	F	172	1392	864	249	273	6	0	0	0
2	H	172	1392	864	249	273	6	0	0	0

- Molecule 3 is an oligosaccharide called 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	I	3	34	20	1	13	0	0	0

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



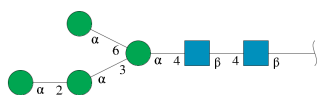
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
4	J	4	50	28	2	20	0	0	0
4	M	4	50	28	2	20	0	0	0

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



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
5	K	4	50	28	2	20	0	0	0
5	Q	4	50	28	2	20	0	0	0
5	R	4	50	28	2	20	0	0	0
5	W	4	50	28	2	20	0	0	0
5	c	4	50	28	2	20	0	0	0

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



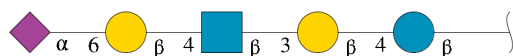
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
6	L	6	72	40	2	30	0	0	0

- Molecule 7 is an oligosaccharide called beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
7	N	3	39	22	2	15	0	0	0
7	b	3	39	22	2	15	0	0	0
7	e	3	39	22	2	15	0	0	0

- Molecule 8 is an oligosaccharide called N-acetyl-alpha-neuraminic acid-(2-6)-beta-D-galactopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-3)-beta-D-galactopyranose-(1-4)-beta-D-glucopyranose.



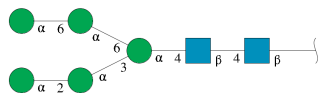
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
8	O	5	68	37	2	29	0	0	0
8	V	5	68	37	2	29	0	0	0
8	g	5	68	37	2	29	0	0	0

- Molecule 9 is an oligosaccharide called beta-L-fucopyranose-(1-3)-2-acetamido-2-deoxy-beta-D-glucopyranose.



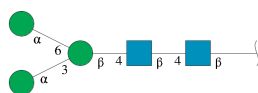
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
9	P	2	24	14	1	9	0	0	0

- Molecule 10 is an oligosaccharide called alpha-D-mannopyranose-(1-2)-alpha-D-mannopyranose-(1-3)-[alpha-D-mannopyranose-(1-6)-alpha-D-mannopyranose-(1-6)]alpha-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.



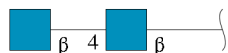
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
10	S	7	83	46	2	35	0	0	0

- Molecule 11 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)-2-acetamido-2-deoxy-beta-D-glucopyranose.



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

- Molecule 12 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			
12	U	2	28	16	2	10	0	0	0
12	Y	2	28	16	2	10	0	0	0

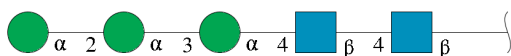
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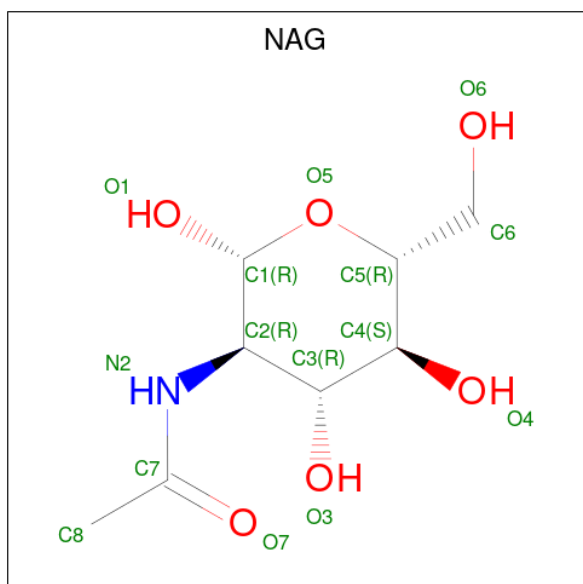
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
12	Z	2	Total	C	N	O	0	0	0
			28	16	2	10			
12	a	2	Total	C	N	O	0	0	0
			28	16	2	10			
12	f	2	Total	C	N	O	0	0	0
			28	16	2	10			

- Molecule 13 is an oligosaccharide called alpha-D-mannopyranose-(1-2)-alpha-D-mannopyranose-(1-3)-alpha-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.



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

- Molecule 14 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>).



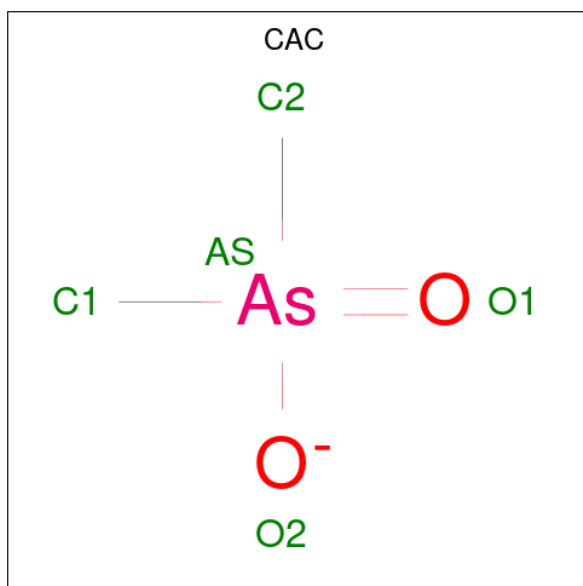
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	N	O		
14	A	1	Total	C	N	O	0	0
			14	8	1	5		

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

- Molecule 15 is CACODYLATE ION (three-letter code: CAC) (formula:  $C_2H_6AsO_2$ ).

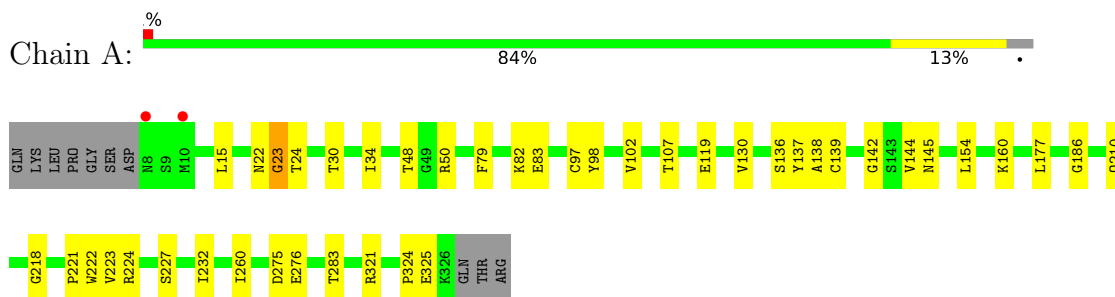


Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
15	D	1	Total	As	C	O	0	0
			5	1	2	2		

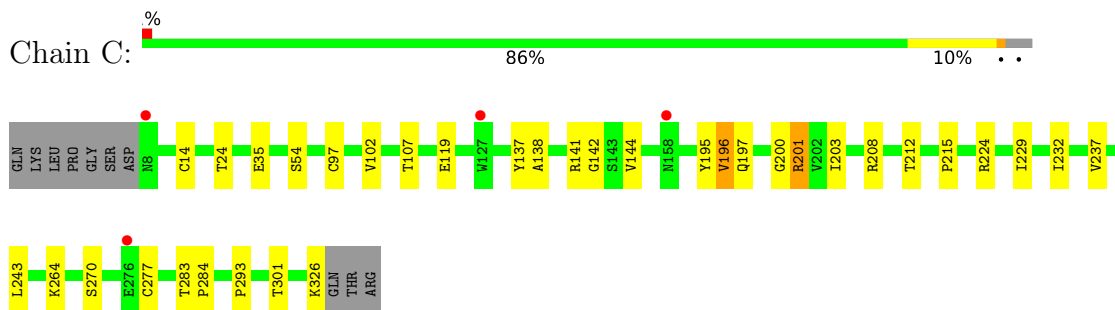
### 3 Residue-property plots [i](#)

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.

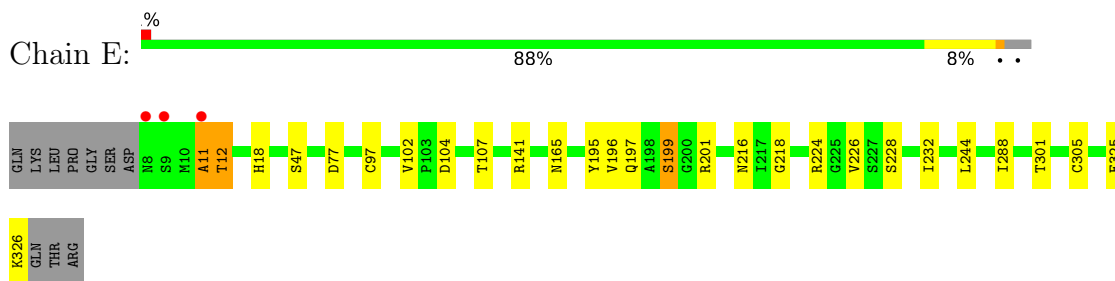
- Molecule 1: Hemagglutinin



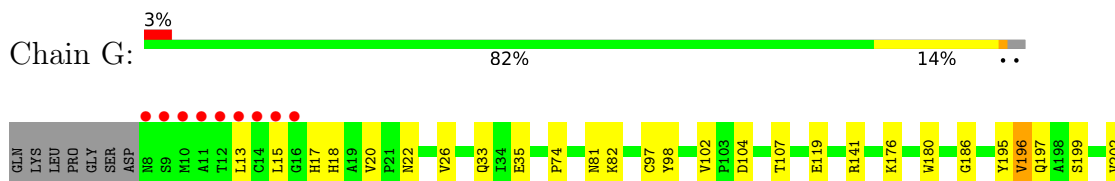
- Molecule 1: Hemagglutinin



- Molecule 1: Hemagglutinin

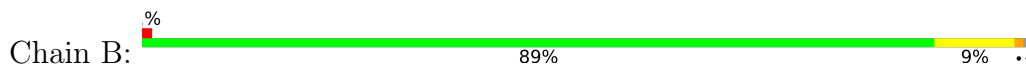


- Molecule 1: Hemagglutinin

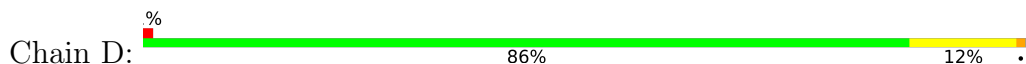




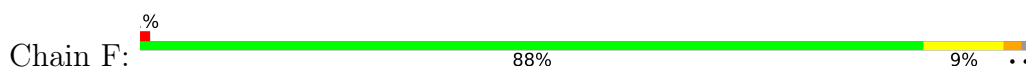
- Molecule 2: Hemagglutinin



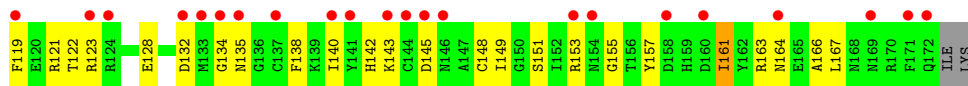
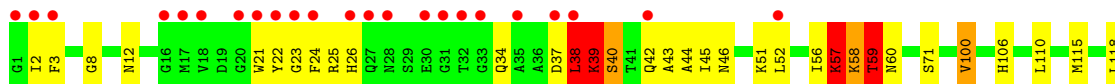
- Molecule 2: Hemagglutinin



- Molecule 2: Hemagglutinin



- Molecule 2: Hemagglutinin



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



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





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

Chain M: 100%



- Molecule 5: alpha-D-mannopyranose-(1-3)-beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain K: 50% 25% 25%



- Molecule 5: alpha-D-mannopyranose-(1-3)-beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain Q: 25% 50% 25%



- Molecule 5: alpha-D-mannopyranose-(1-3)-beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain R: 25% 25% 50%



- Molecule 5: alpha-D-mannopyranose-(1-3)-beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain W: 100%

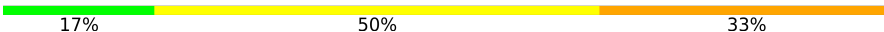


- Molecule 5: alpha-D-mannopyranose-(1-3)-beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain c: 100%

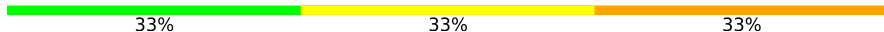


- Molecule 6: alpha-D-mannopyranose-(1-2)-alpha-D-mannopyranose-(1-3)-[alpha-D-mannopyranose-(1-6)]alpha-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain L:  17% 50% 33%



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

Chain N:  33% 33% 33%

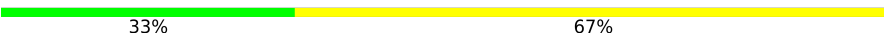


- Molecule 7: beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain b:  67% 33%



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

Chain e:  33% 67%



- Molecule 8: N-acetyl-alpha-neuraminic acid-(2-6)-beta-D-galactopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-3)-beta-D-galactopyranose-(1-4)-beta-D-glucopyranose

Chain O:  40% 40% 20%



- Molecule 8: N-acetyl-alpha-neuraminic acid-(2-6)-beta-D-galactopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-3)-beta-D-galactopyranose-(1-4)-beta-D-glucopyranose

Chain V:  20% 60% 20%



- Molecule 8: N-acetyl-alpha-neuraminic acid-(2-6)-beta-D-galactopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-3)-beta-D-galactopyranose-(1-4)-beta-D-glucopyranose

Chain g:  40% 60%

BGC1  
GAL2  
NAG3  
GAL4  
SIA5

- Molecule 9: beta-L-fucopyranose-(1-3)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain P:  100%

NAG1  
FUC2

- Molecule 10: alpha-D-mannopyranose-(1-2)-alpha-D-mannopyranose-(1-3)-[alpha-D-mannopyranose-(1-6)-alpha-D-mannopyranose-(1-6)]alpha-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain S:  29% 71%

NAG1  
NAG2  
MAN3  
MAN4  
MAN5  
MAN6  
MAN7

- Molecule 11: alpha-D-mannopyranose-(1-3)-[alpha-D-mannopyranose-(1-6)]beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain T:  40% 60%

NAG1  
NAG2  
MAN3  
MAN4  
MAN5

- Molecule 11: alpha-D-mannopyranose-(1-3)-[alpha-D-mannopyranose-(1-6)]beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain X:  60% 40%

NAG1  
NAG2  
MAN3  
MAN4  
MAN5

- Molecule 12: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain U:  100%

NAG1  
NAG2

- Molecule 12: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain Y:  100%

MAG1  
MAG2

- Molecule 12: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain Z:  100%MAG1  
MAG2

- Molecule 12: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain a:  50% 50%MAG1  
MAG2

- Molecule 12: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain f:  50% 50%MAG1  
MAG2

- Molecule 13: alpha-D-mannopyranose-(1-2)-alpha-D-mannopyranose-(1-3)-alpha-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain d:  40% 60%MAG1  
MAG2  
MAN3  
MAN4  
MAN5



## 4 Data and refinement statistics i

Property	Value	Source
Space group	I 21 3	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	292.98Å 292.98Å 292.98Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	46.32 – 2.91 46.32 – 2.91	Depositor EDS
% Data completeness (in resolution range)	100.0 (46.32-2.91) 100.0 (46.32-2.91)	Depositor EDS
$R_{merge}$	0.16	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.53 (at 2.91Å)	Xtrriage
Refinement program	PHENIX (1.10.1_2155: ???)	Depositor
R, $R_{free}$	0.187 , 0.225 0.192 , 0.227	Depositor DCC
$R_{free}$ test set	4471 reflections (4.89%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	78.3	Xtrriage
Anisotropy	0.000	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.28 , 53.9	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.50$ , $\langle L^2 \rangle = 0.33$	Xtrriage
Estimated twinning fraction	0.016 for -l,-k,-h	Xtrriage
$F_o, F_c$ correlation	0.95	EDS
Total number of atoms	16918	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	89.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 1.94% 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: BGC, GAL, NAG, MAN, SIA, FUL, BMA, CAC, FUC

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	0.27	0/2565	0.59	3/3492 (0.1%)
1	C	0.26	0/2565	0.54	3/3492 (0.1%)
1	E	0.26	0/2565	0.52	2/3492 (0.1%)
1	G	0.27	0/2581	0.52	2/3514 (0.1%)
2	B	0.28	0/1416	0.54	0/1902
2	D	0.28	0/1416	0.49	0/1902
2	F	0.26	0/1416	0.63	3/1902 (0.2%)
2	H	0.27	0/1416	0.90	11/1902 (0.6%)
All	All	0.26	0/15940	0.59	24/21598 (0.1%)

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
2	H	0	2

There are no bond length outliers.

All (24) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	F	32	THR	CB-CA-C	-12.62	77.51	111.60
2	H	57	LYS	CB-CA-C	12.30	135.01	110.40
2	F	32	THR	N-CA-C	10.57	139.54	111.00
1	A	22	ASN	N-CA-C	10.51	139.38	111.00
2	H	58	LYS	N-CA-CB	10.10	128.79	110.60
1	A	22	ASN	CB-CA-C	-9.44	91.52	110.40
2	H	39	LYS	N-CA-CB	-9.29	93.88	110.60
2	H	58	LYS	N-CA-C	-8.92	86.92	111.00

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	F	33	GLY	N-CA-C	8.12	133.39	113.10
2	H	38	LEU	CB-CA-C	7.45	124.36	110.20
2	H	59	THR	N-CA-C	-7.23	91.47	111.00
2	H	39	LYS	N-CA-C	7.18	130.39	111.00
2	H	60	ASN	N-CA-CB	-7.12	97.78	110.60
2	H	38	LEU	N-CA-C	-6.99	92.13	111.00
1	C	201	ARG	N-CA-CB	-6.69	98.56	110.60
1	G	247	SER	N-CA-CB	6.29	119.93	110.50
1	C	141	ARG	N-CA-C	-6.13	94.46	111.00
1	E	11	ALA	CB-CA-C	6.09	119.24	110.10
1	A	23	GLY	N-CA-C	5.81	127.63	113.10
2	H	57	LYS	N-CA-C	-5.50	96.15	111.00
1	G	246	ASN	N-CA-C	-5.44	96.32	111.00
1	E	12	THR	N-CA-CB	5.41	120.57	110.30
2	H	40	SER	N-CA-C	-5.24	96.86	111.00
1	C	208	ARG	CB-CA-C	-5.20	100.00	110.40

There are no chirality outliers.

All (2) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
2	H	38	LEU	Peptide
2	H	39	LYS	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	2506	0	2420	31	0
1	C	2506	0	2421	23	0
1	E	2506	0	2422	22	0
1	G	2522	0	2439	47	0
2	B	1392	0	1323	16	0
2	D	1392	0	1323	25	0
2	F	1392	0	1324	20	1
2	H	1392	0	1325	60	0
3	I	34	0	31	2	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
4	J	50	0	43	1	0
4	M	50	0	43	0	0
5	K	50	0	43	1	0
5	Q	50	0	43	1	0
5	R	50	0	43	2	0
5	W	50	0	43	0	0
5	c	50	0	43	0	0
6	L	72	0	61	2	0
7	N	39	0	34	1	0
7	b	39	0	34	0	0
7	e	39	0	34	0	0
8	O	68	0	58	1	0
8	V	68	0	58	1	0
8	g	68	0	58	0	0
9	P	24	0	22	2	0
10	S	83	0	70	0	0
11	T	61	0	52	0	0
11	X	61	0	52	2	0
12	U	28	0	25	2	0
12	Y	28	0	25	3	0
12	Z	28	0	25	0	0
12	a	28	0	25	0	0
12	f	28	0	25	0	0
13	d	61	0	52	0	0
14	A	14	0	13	0	0
14	B	14	0	13	0	0
14	C	14	0	13	0	0
14	D	14	0	13	0	0
14	E	14	0	13	0	0
14	F	14	0	13	0	0
14	G	14	0	13	0	0
15	D	5	0	0	0	0
All	All	16918	0	16130	228	1

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 7.

All (228) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:F:2:ILE:CD1	2:F:3:PHE:CE1	2.00	1.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:F:2:ILE:HD11	2:F:3:PHE:CE1	1.55	1.42
2:F:2:ILE:HD12	2:F:3:PHE:CD1	1.62	1.32
2:F:2:ILE:CD1	2:F:3:PHE:CD1	2.25	1.14
1:G:195:TYR:O	1:G:196:VAL:CG1	1.96	1.14
1:G:196:VAL:HG13	1:G:197:GLN:N	1.60	1.09
2:H:2:ILE:HD11	2:H:3:PHE:HE1	1.10	1.08
2:H:2:ILE:CD1	2:H:3:PHE:HE1	1.66	1.07
2:H:2:ILE:HG13	2:H:3:PHE:CD1	1.91	1.06
2:H:2:ILE:CD1	2:H:3:PHE:CE1	2.38	1.05
1:A:144:VAL:HG22	1:A:145:ASN:H	1.21	1.04
1:G:195:TYR:O	1:G:196:VAL:HG12	1.54	1.04
2:H:2:ILE:HG13	2:H:3:PHE:HD1	1.17	1.03
1:G:196:VAL:CG1	1:G:197:GLN:H	1.65	1.01
2:H:2:ILE:HD11	2:H:3:PHE:CE1	1.96	1.00
2:F:2:ILE:HD11	2:F:3:PHE:HE1	1.18	0.96
1:G:196:VAL:HG13	1:G:197:GLN:H	0.83	0.95
1:G:195:TYR:C	1:G:196:VAL:HG12	1.83	0.95
2:H:161:ILE:CG2	2:H:163:ARG:HB2	1.96	0.95
1:G:195:TYR:O	1:G:196:VAL:HG13	1.72	0.88
5:K:1:NAG:H5	6:L:1:NAG:H82	1.58	0.85
1:A:144:VAL:HG22	1:A:145:ASN:N	1.91	0.84
2:B:58:LYS:O	2:B:58:LYS:HG3	1.82	0.80
1:C:97:CYS:O	1:C:224:ARG:NH1	2.15	0.80
1:C:200:GLY:O	1:C:215:PRO:HD2	1.84	0.76
2:H:39:LYS:HG2	2:H:40:SER:H	1.51	0.76
1:G:17:HIS:HA	2:H:22:TYR:HB2	1.67	0.76
2:D:2:ILE:CD1	2:D:3:PHE:CE1	2.68	0.75
2:H:2:ILE:HD12	2:H:3:PHE:CE1	2.18	0.75
1:G:195:TYR:O	1:G:197:GLN:N	2.17	0.75
1:A:144:VAL:CG2	1:A:145:ASN:H	1.99	0.75
1:G:20:VAL:HG12	1:G:22:ASN:H	1.51	0.75
1:G:97:CYS:O	1:G:224:ARG:NH1	2.19	0.75
1:C:24:THR:HG23	9:P:1:NAG:H81	1.69	0.74
2:H:161:ILE:HG22	2:H:163:ARG:HB2	1.69	0.74
2:F:2:ILE:HD12	2:F:3:PHE:CE1	1.93	0.73
1:A:107:THR:HG23	2:D:75:GLY:HA3	1.71	0.72
1:G:195:TYR:C	1:G:196:VAL:CG1	2.47	0.72
1:E:77:ASP:OD2	1:E:141:ARG:NH1	2.23	0.72
1:E:195:TYR:O	1:E:197:GLN:N	2.20	0.72
1:A:97:CYS:O	1:A:224:ARG:NH1	2.23	0.71
2:H:2:ILE:CG1	2:H:3:PHE:CD1	2.70	0.71

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:150:GLY:O	2:D:154:ASN:HB2	1.92	0.70
1:G:20:VAL:O	1:G:322:ASN:ND2	2.25	0.70
1:C:107:THR:HG23	2:F:75:GLY:HA3	1.73	0.70
2:H:39:LYS:HG2	2:H:40:SER:N	2.07	0.70
2:H:161:ILE:HG21	2:H:163:ARG:HB2	1.74	0.69
1:A:24:THR:HG23	3:I:1:NAG:H81	1.73	0.69
2:H:151:SER:HB2	2:H:157:TYR:HB2	1.74	0.69
2:D:2:ILE:HD11	2:D:3:PHE:CE1	2.27	0.69
1:G:196:VAL:CG1	1:G:197:GLN:CD	2.61	0.69
2:B:2:ILE:CG2	2:B:3:PHE:CD1	2.76	0.67
2:H:39:LYS:HE2	2:H:45:ILE:HB	1.76	0.67
2:B:2:ILE:HG23	2:B:3:PHE:CD1	2.29	0.67
1:E:97:CYS:O	1:E:224:ARG:NH1	2.28	0.66
2:H:145:ASP:H	2:H:148:CYS:HB2	1.60	0.65
2:H:56:ILE:HG22	2:H:57:LYS:H	1.61	0.64
2:H:132:ASP:HB3	2:H:138:PHE:HB3	1.79	0.64
2:H:21:TRP:CD1	2:H:39:LYS:HG3	2.32	0.64
9:P:2:FUL:H4	5:Q:1:NAG:H3	1.80	0.64
1:G:196:VAL:HG11	1:G:197:GLN:NE2	2.13	0.63
2:F:2:ILE:HD13	2:F:3:PHE:CE1	2.28	0.63
1:G:196:VAL:HG13	1:G:197:GLN:CD	2.18	0.63
2:H:149:ILE:O	2:H:153:ARG:N	2.28	0.63
2:D:2:ILE:HD12	2:D:3:PHE:CE1	2.33	0.63
2:H:58:LYS:O	2:H:59:THR:O	2.17	0.62
1:C:200:GLY:O	1:C:215:PRO:CD	2.47	0.62
1:E:102:VAL:HG22	1:E:232:ILE:HB	1.81	0.61
2:B:127:ARG:NH2	2:D:131:GLU:OE1	2.32	0.61
1:G:102:VAL:HG22	1:G:232:ILE:HB	1.82	0.60
1:G:17:HIS:HA	2:H:22:TYR:CB	2.30	0.60
12:Y:2:NAG:O7	12:Y:2:NAG:O3	2.18	0.60
1:G:196:VAL:HG11	1:G:197:GLN:CD	2.22	0.60
1:E:165:ASN:HB3	11:X:1:NAG:H83	1.84	0.60
2:H:21:TRP:CG	2:H:22:TYR:N	2.69	0.59
1:E:11:ALA:O	1:E:12:THR:HG23	2.01	0.59
2:H:163:ARG:O	2:H:166:ALA:O	2.19	0.59
11:X:2:NAG:H3	12:Y:2:NAG:H62	1.85	0.59
1:A:324:PRO:HA	1:A:325:GLU:HB2	1.83	0.59
1:A:221:PRO:HB3	1:E:244:LEU:HD13	1.85	0.58
1:G:18:HIS:HB2	2:H:21:TRP:O	2.03	0.58
2:H:118:LEU:HA	2:H:121:ARG:O	2.03	0.58
1:C:119:GLU:OE2	1:G:82:LYS:HA	2.03	0.57

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:G:196:VAL:CG1	1:G:197:GLN:OE1	2.52	0.57
2:H:2:ILE:CD1	2:H:3:PHE:CD1	2.87	0.57
2:F:160:ASP:HA	2:F:163:ARG:HB2	1.88	0.56
2:B:2:ILE:CG2	2:B:3:PHE:CE1	2.89	0.56
1:C:54:SER:OG	1:C:277:CYS:O	2.23	0.56
1:A:221:PRO:HB3	1:E:244:LEU:CD1	2.36	0.55
7:N:1:NAG:H3	7:N:1:NAG:H83	1.88	0.55
1:G:74:PRO:HB3	1:G:141:ARG:HB2	1.87	0.55
2:H:2:ILE:CG1	2:H:3:PHE:HD1	2.05	0.55
1:G:104:ASP:OD2	1:G:234:TRP:NE1	2.19	0.55
3:I:2:FUL:H63	4:J:1:NAG:H3	1.89	0.55
2:F:26:HIS:NE2	2:F:33:GLY:HA3	2.23	0.54
2:B:24:PHE:HB2	2:B:153:ARG:HD3	1.91	0.53
2:B:152:ILE:C	2:B:154:ASN:H	2.12	0.53
2:D:2:ILE:HD11	2:D:3:PHE:HE1	1.72	0.53
2:D:58:LYS:HB3	2:D:59:THR:HA	1.90	0.53
12:U:2:NAG:H3	12:U:2:NAG:H83	1.91	0.53
2:D:56:ILE:HG13	2:D:56:ILE:O	2.09	0.52
2:H:106:HIS:O	2:H:110:LEU:HB2	2.08	0.52
1:G:314:LEU:HB3	2:H:100:VAL:HG21	1.91	0.52
12:U:1:NAG:H83	12:U:1:NAG:H3	1.90	0.52
2:H:39:LYS:CG	2:H:40:SER:H	2.21	0.52
2:B:27:GLN:HG3	2:B:32:THR:HG22	1.92	0.52
1:C:293:PRO:HD3	2:D:56:ILE:HG22	1.91	0.52
1:G:237:VAL:HG21	1:G:243:LEU:HB2	1.92	0.52
2:D:149:ILE:HD12	2:D:153:ARG:CZ	2.40	0.51
2:H:58:LYS:O	2:H:59:THR:OG1	2.26	0.51
2:H:39:LYS:CG	2:H:40:SER:N	2.74	0.51
2:F:2:ILE:CD1	2:F:3:PHE:CZ	2.82	0.51
2:H:123:ARG:CZ	2:H:138:PHE:HB2	2.40	0.51
2:D:52:LEU:O	2:D:56:ILE:HG12	2.11	0.50
2:F:2:ILE:HD12	2:F:3:PHE:CG	2.33	0.50
2:D:149:ILE:HD12	2:D:153:ARG:NH2	2.27	0.50
8:O:5:SIA:O10	8:O:5:SIA:O4	2.29	0.50
2:B:3:PHE:CZ	2:D:2:ILE:HB	2.46	0.50
1:G:35:GLU:O	1:G:321:ARG:HA	2.12	0.49
1:E:104:ASP:HB2	1:E:107:THR:HB	1.94	0.49
1:A:83:GLU:OE2	1:A:119:GLU:OE2	2.29	0.49
1:C:203:ILE:HD12	1:E:218:GLY:HA3	1.95	0.49
1:C:264:LYS:HB3	2:D:63:PHE:CG	2.47	0.49
2:H:51:LYS:HG3	2:H:52:LEU:N	2.27	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:15:LEU:HD23	2:B:118:LEU:HG	1.96	0.48
1:G:26:VAL:O	1:G:33:GLN:HA	2.14	0.48
2:H:151:SER:CB	2:H:157:TYR:HB2	2.42	0.48
1:A:275:ASP:OD1	1:A:276:GLU:N	2.47	0.48
2:B:2:ILE:HG22	2:B:3:PHE:CD1	2.49	0.48
2:H:25:ARG:HD3	2:H:34:GLN:HE21	1.77	0.48
2:H:115:MET:O	2:H:119:PHE:N	2.44	0.48
1:G:202:VAL:HG22	1:G:247:SER:HB2	1.95	0.48
1:G:196:VAL:HG13	1:G:197:GLN:OE1	2.13	0.48
2:B:126:LEU:HD21	2:B:152:ILE:HD13	1.97	0.47
1:C:14:CYS:HA	2:D:137:CYS:HA	1.96	0.47
1:A:218:GLY:HA3	1:E:201:ARG:CZ	2.44	0.47
2:F:31:GLY:O	2:F:32:THR:OG1	2.26	0.47
1:G:196:VAL:CG1	1:G:197:GLN:N	2.33	0.47
2:D:150:GLY:CA	2:D:153:ARG:HH21	2.27	0.47
1:G:186:GLY:HA2	1:G:218:GLY:O	2.15	0.47
2:H:37:ASP:O	2:H:39:LYS:N	2.47	0.47
1:A:218:GLY:HA3	1:E:201:ARG:NH2	2.30	0.47
1:C:102:VAL:HG22	1:C:232:ILE:HB	1.96	0.46
1:G:327:GLN:O	1:G:328:THR:O	2.33	0.46
2:H:56:ILE:O	2:H:57:LYS:HG3	2.15	0.46
1:A:137:TYR:C	1:A:139:CYS:H	2.17	0.46
1:G:97:CYS:SG	1:G:98:TYR:N	2.87	0.46
2:B:139:LYS:HZ2	2:F:127:ARG:HH22	1.64	0.46
2:F:160:ASP:OD1	2:F:160:ASP:N	2.40	0.46
1:C:195:TYR:O	1:C:197:GLN:N	2.39	0.46
1:G:301:THR:HB	1:G:305:CYS:SG	2.55	0.46
1:A:34:ILE:HD11	1:A:321:ARG:HD2	1.97	0.46
1:A:102:VAL:HG22	1:A:232:ILE:HB	1.97	0.46
2:H:40:SER:HB2	2:H:43:ALA:HB3	1.96	0.46
1:A:222:TRP:CZ2	1:A:227:SER:HB3	2.51	0.45
1:G:13:LEU:CD2	2:H:26:HIS:HB3	2.46	0.45
1:G:222:TRP:CZ2	1:G:225:GLY:HA2	2.51	0.45
1:A:136:SER:OG	1:A:137:TYR:O	2.26	0.45
1:C:201:ARG:NH2	5:R:1:NAG:O7	2.49	0.45
1:C:270:SER:HB2	1:C:284:PRO:HA	1.99	0.45
1:E:11:ALA:O	1:E:12:THR:CG2	2.64	0.45
1:G:176:LYS:O	1:G:236:ILE:HA	2.16	0.45
5:R:3:BMA:H3	5:R:4:MAN:H2	1.73	0.45
1:E:47:SER:HB2	1:E:288:ILE:HG22	1.98	0.44
2:H:132:ASP:CB	2:H:138:PHE:HB3	2.47	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:H:142:HIS:CG	2:H:143:LYS:H	2.35	0.44
1:C:237:VAL:HG21	1:C:243:LEU:HB2	1.99	0.44
2:F:51:LYS:O	2:F:55:VAL:HG13	2.17	0.44
1:G:15:LEU:HD22	2:H:24:PHE:CD1	2.53	0.44
1:E:226:VAL:HG12	1:E:228:SER:H	1.83	0.44
1:A:48:THR:HG23	1:A:50:ARG:H	1.83	0.44
2:H:39:LYS:HZ1	2:H:45:ILE:HD13	1.83	0.44
1:A:144:VAL:CG2	1:A:145:ASN:N	2.63	0.44
1:G:81:ASN:HA	1:G:119:GLU:HA	1.99	0.44
12:Y:1:NAG:O7	12:Y:1:NAG:O3	2.33	0.44
1:E:12:THR:OG1	2:F:27:GLN:HB3	2.17	0.44
2:F:2:ILE:H	2:F:2:ILE:HG13	1.53	0.44
1:A:79:PHE:HA	1:A:82:LYS:HG3	2.00	0.43
2:B:3:PHE:HZ	2:D:2:ILE:HB	1.83	0.43
2:H:56:ILE:O	2:H:57:LYS:CB	2.66	0.43
2:B:120:GLU:OE1	2:B:123:ARG:NH2	2.52	0.43
2:H:25:ARG:NH1	2:H:25:ARG:HA	2.34	0.43
2:H:51:LYS:HG3	2:H:52:LEU:H	1.82	0.43
1:C:212:THR:HG21	1:E:216:ASN:CG	2.39	0.43
2:D:128:GLU:O	2:D:170:ARG:NH1	2.48	0.43
1:A:97:CYS:SG	1:A:98:TYR:N	2.91	0.43
1:A:218:GLY:HA3	1:E:201:ARG:NH1	2.34	0.43
2:H:121:ARG:HA	2:H:122:THR:HA	1.58	0.43
1:A:324:PRO:CA	1:A:325:GLU:HB2	2.46	0.42
1:C:24:THR:O	1:C:35:GLU:HA	2.19	0.42
1:A:160:LYS:HB3	1:A:160:LYS:HE2	1.91	0.42
2:F:171:PHE:O	2:F:172:GLN:NE2	2.44	0.42
1:G:104:ASP:HB2	1:G:107:THR:HB	2.01	0.42
2:H:58:LYS:C	2:H:59:THR:O	2.57	0.42
1:C:283:THR:HG22	1:C:301:THR:HG22	2.01	0.42
2:D:58:LYS:HB3	2:D:59:THR:HG22	2.00	0.42
1:A:138:ALA:HB1	1:A:224:ARG:HB3	2.02	0.42
2:D:24:PHE:CD1	2:D:153:ARG:HG2	2.53	0.42
2:H:42:GLN:C	2:H:46:ASN:HB2	2.40	0.42
6:L:3:MAN:H62	6:L:6:MAN:H2	1.86	0.42
2:D:145:ASP:O	2:D:148:CYS:SG	2.78	0.42
1:C:137:TYR:N	8:V:5:SIA:O1B	2.44	0.42
1:E:18:HIS:ND1	2:F:21:TRP:HA	2.35	0.42
2:H:40:SER:O	2:H:44:ALA:N	2.45	0.42
1:A:130:VAL:HG11	1:A:154:LEU:HB3	2.01	0.42
1:A:177:LEU:HB2	1:A:260:ILE:HD11	2.00	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:149:ILE:CD1	2:D:153:ARG:NH2	2.82	0.42
1:C:142:GLY:C	1:C:144:VAL:H	2.22	0.42
1:E:195:TYR:C	1:E:197:GLN:H	2.18	0.42
1:G:324:PRO:O	2:H:12:ASN:ND2	2.53	0.42
1:G:180:TRP:HB3	1:G:254:PRO:HD3	2.01	0.41
1:E:301:THR:HB	1:E:305:CYS:SG	2.60	0.41
1:G:13:LEU:CD2	2:H:26:HIS:CB	2.98	0.41
1:A:186:GLY:HA2	1:A:218:GLY:O	2.21	0.41
2:H:25:ARG:HD3	2:H:34:GLN:NE2	2.35	0.41
2:H:134:GLY:O	2:H:135:ASN:HB2	2.20	0.41
2:D:150:GLY:HA2	2:D:153:ARG:HH21	1.86	0.41
2:H:21:TRP:CZ3	2:H:23:GLY:HA2	2.55	0.41
2:B:30:GLU:OE2	2:B:145:ASP:HB2	2.20	0.41
2:D:5:ALA:O	2:D:10:ILE:HG12	2.21	0.41
1:C:326:LYS:HE2	1:C:326:LYS:HB2	1.95	0.41
2:H:164:ASN:O	2:H:167:LEU:HB2	2.21	0.41
1:A:137:TYR:O	1:A:138:ALA:HB3	2.20	0.40
1:C:138:ALA:HB1	1:C:224:ARG:HB3	2.03	0.40
1:G:196:VAL:HG22	1:G:197:GLN:N	2.35	0.40
1:E:325:GLU:HG2	1:E:326:LYS:H	1.86	0.40
1:G:199:SER:HB3	1:G:217:ILE:HD11	2.02	0.40
1:G:320:MET:SD	1:G:321:ARG:N	2.86	0.40

All (1) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:F:25:ARG:NH1	2:F:32:THR:O[14_555]	1.88	0.32

## 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	317/329 (96%)	296 (93%)	19 (6%)	2 (1%)	25	58
1	C	317/329 (96%)	303 (96%)	13 (4%)	1 (0%)	41	71
1	E	317/329 (96%)	300 (95%)	15 (5%)	2 (1%)	25	58
1	G	319/329 (97%)	300 (94%)	16 (5%)	3 (1%)	17	48
2	B	170/174 (98%)	161 (95%)	8 (5%)	1 (1%)	25	58
2	D	170/174 (98%)	163 (96%)	7 (4%)	0	100	100
2	F	170/174 (98%)	160 (94%)	9 (5%)	1 (1%)	25	58
2	H	170/174 (98%)	140 (82%)	24 (14%)	6 (4%)	3	14
All	All	1950/2012 (97%)	1823 (94%)	111 (6%)	16 (1%)	19	51

All (16) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	23	GLY
2	B	58	LYS
1	E	196	VAL
2	H	39	LYS
2	H	57	LYS
1	A	142	GLY
2	F	58	LYS
1	G	324	PRO
1	G	326	LYS
2	H	155	GLY
2	H	161	ILE
1	G	196	VAL
2	H	59	THR
1	E	199	SER
2	H	8	GLY
1	C	196	VAL

### 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	284/293 (97%)	280 (99%)	4 (1%)	67	89
1	C	284/293 (97%)	282 (99%)	2 (1%)	84	95
1	E	284/293 (97%)	283 (100%)	1 (0%)	91	97
1	G	286/293 (98%)	284 (99%)	2 (1%)	84	95
2	B	146/148 (99%)	145 (99%)	1 (1%)	84	95
2	D	146/148 (99%)	144 (99%)	2 (1%)	67	89
2	F	146/148 (99%)	144 (99%)	2 (1%)	67	89
2	H	146/148 (99%)	141 (97%)	5 (3%)	37	71
All	All	1722/1764 (98%)	1703 (99%)	19 (1%)	73	92

All (19) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	30	THR
1	A	210	GLN
1	A	223	VAL
1	A	283	THR
2	B	154	ASN
1	C	196	VAL
1	C	229	ILE
2	D	2	ILE
2	D	160	ASP
1	E	199	SER
2	F	2	ILE
2	F	29	SER
1	G	226	VAL
1	G	328	THR
2	H	38	LEU
2	H	71	SER
2	H	100	VAL
2	H	128	GLU
2	H	140	ILE

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (3) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	216	ASN
1	E	197	GLN
1	G	210	GLN

### 5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

### 5.5 Carbohydrates [i](#)

95 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	I	1	3,1	14,14,15	0.26	0	17,19,21	1.16	2 (11%)
3	FUL	I	2	3	10,10,11	2.10	2 (20%)	14,14,16	3.33	7 (50%)
3	FUC	I	3	3	10,10,11	0.81	0	14,14,16	0.91	0
4	NAG	J	1	4,1	14,14,15	0.75	1 (7%)	17,19,21	0.68	0
4	NAG	J	2	4	14,14,15	0.23	0	17,19,21	0.63	0
4	BMA	J	3	4	11,11,12	0.83	1 (9%)	15,15,17	1.49	3 (20%)
4	MAN	J	4	4	11,11,12	0.88	1 (9%)	15,15,17	1.21	2 (13%)
5	NAG	K	1	5,1	14,14,15	0.61	1 (7%)	17,19,21	0.85	0
5	NAG	K	2	5	14,14,15	0.22	0	17,19,21	0.76	0
5	BMA	K	3	5	11,11,12	0.41	0	15,15,17	0.92	0
5	MAN	K	4	5	11,11,12	0.71	1 (9%)	15,15,17	1.15	2 (13%)
6	NAG	L	1	6,1	14,14,15	0.21	0	17,19,21	0.57	0
6	NAG	L	2	6	14,14,15	0.37	0	17,19,21	0.53	0
6	MAN	L	3	6	11,11,12	0.93	1 (9%)	15,15,17	2.27	5 (33%)
6	MAN	L	4	6	11,11,12	1.98	3 (27%)	15,15,17	1.87	4 (26%)
6	MAN	L	5	6	11,11,12	1.22	2 (18%)	15,15,17	1.54	2 (13%)
6	MAN	L	6	6	11,11,12	1.53	3 (27%)	15,15,17	1.89	3 (20%)
4	NAG	M	1	4,1	14,14,15	0.22	0	17,19,21	0.85	1 (5%)
4	NAG	M	2	4	14,14,15	0.42	0	17,19,21	0.79	1 (5%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
4	BMA	M	3	4	11,11,12	1.84	4 (36%)	15,15,17	1.62	4 (26%)
4	MAN	M	4	4	11,11,12	1.19	1 (9%)	15,15,17	1.28	3 (20%)
7	NAG	N	1	7,1	14,14,15	0.41	0	17,19,21	1.23	1 (5%)
7	NAG	N	2	7	14,14,15	0.33	0	17,19,21	0.62	0
7	BMA	N	3	7	11,11,12	1.21	2 (18%)	15,15,17	1.80	4 (26%)
8	BGC	O	1	8	12,12,12	1.79	4 (33%)	17,17,17	1.51	4 (23%)
8	GAL	O	2	8	11,11,12	0.65	0	15,15,17	0.84	0
8	NAG	O	3	8	14,14,15	0.34	0	17,19,21	0.41	0
8	GAL	O	4	8	11,11,12	0.42	0	15,15,17	0.96	1 (6%)
8	SIA	O	5	8	20,20,21	2.09	2 (10%)	24,28,31	1.98	8 (33%)
9	NAG	P	1	9,1	14,14,15	0.71	1 (7%)	17,19,21	0.53	0
9	FUL	P	2	9	10,10,11	2.05	3 (30%)	14,14,16	1.98	4 (28%)
5	NAG	Q	1	5,1	14,14,15	0.84	1 (7%)	17,19,21	0.80	0
5	NAG	Q	2	5	14,14,15	0.44	0	17,19,21	0.60	0
5	BMA	Q	3	5	11,11,12	1.08	0	15,15,17	1.09	2 (13%)
5	MAN	Q	4	5	11,11,12	0.99	1 (9%)	15,15,17	0.94	2 (13%)
5	NAG	R	1	5,1	14,14,15	0.43	0	17,19,21	0.69	0
5	NAG	R	2	5	14,14,15	0.49	0	17,19,21	0.57	0
5	BMA	R	3	5	11,11,12	1.13	2 (18%)	15,15,17	1.27	3 (20%)
5	MAN	R	4	5	11,11,12	1.03	1 (9%)	15,15,17	0.94	1 (6%)
10	NAG	S	1	10,1	14,14,15	0.24	0	17,19,21	0.51	0
10	NAG	S	2	10	14,14,15	0.23	0	17,19,21	0.50	0
10	MAN	S	3	10	11,11,12	0.97	0	15,15,17	1.72	2 (13%)
10	MAN	S	4	10	11,11,12	1.72	2 (18%)	15,15,17	1.68	3 (20%)
10	MAN	S	5	10	11,11,12	1.14	1 (9%)	15,15,17	2.32	5 (33%)
10	MAN	S	6	10	11,11,12	1.13	1 (9%)	15,15,17	1.32	2 (13%)
10	MAN	S	7	10	11,11,12	0.92	1 (9%)	15,15,17	1.47	2 (13%)
11	NAG	T	1	11,1	14,14,15	0.26	0	17,19,21	0.56	0
11	NAG	T	2	11	14,14,15	0.47	0	17,19,21	0.55	0
11	BMA	T	3	11	11,11,12	0.67	0	15,15,17	1.25	1 (6%)
11	MAN	T	4	11	11,11,12	0.97	1 (9%)	15,15,17	1.28	2 (13%)
11	MAN	T	5	11	11,11,12	0.90	0	15,15,17	1.04	1 (6%)
12	NAG	U	1	12,1	14,14,15	0.30	0	17,19,21	1.33	2 (11%)
12	NAG	U	2	12	14,14,15	0.43	0	17,19,21	1.27	1 (5%)
8	BGC	V	1	8	12,12,12	1.41	2 (16%)	17,17,17	1.34	2 (11%)
8	GAL	V	2	8	11,11,12	0.86	0	15,15,17	0.97	1 (6%)
8	NAG	V	3	8	14,14,15	0.32	0	17,19,21	0.49	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
8	GAL	V	4	8	11,11,12	0.99	1 (9%)	15,15,17	1.20	1 (6%)
8	SIA	V	5	8	20,20,21	2.01	2 (10%)	24,28,31	1.62	4 (16%)
5	NAG	W	1	5,1	14,14,15	0.80	1 (7%)	17,19,21	0.64	0
5	NAG	W	2	5	14,14,15	1.60	2 (14%)	17,19,21	1.33	2 (11%)
5	BMA	W	3	5	11,11,12	0.72	0	15,15,17	1.30	2 (13%)
5	MAN	W	4	5	11,11,12	0.78	0	15,15,17	1.00	2 (13%)
11	NAG	X	1	11,1	14,14,15	0.62	0	17,19,21	0.97	2 (11%)
11	NAG	X	2	11	14,14,15	1.01	1 (7%)	17,19,21	1.41	1 (5%)
11	BMA	X	3	11	11,11,12	0.91	0	15,15,17	1.12	1 (6%)
11	MAN	X	4	11	11,11,12	0.68	0	15,15,17	1.07	2 (13%)
11	MAN	X	5	11	11,11,12	1.49	2 (18%)	15,15,17	1.68	3 (20%)
12	NAG	Y	1	12,1	14,14,15	0.46	0	17,19,21	0.49	0
12	NAG	Y	2	12	14,14,15	0.42	0	17,19,21	0.64	0
12	NAG	Z	1	12,1	14,14,15	0.22	0	17,19,21	0.47	0
12	NAG	Z	2	12	14,14,15	0.34	0	17,19,21	0.41	0
12	NAG	a	1	12,1	14,14,15	0.52	0	17,19,21	1.56	3 (17%)
12	NAG	a	2	12	14,14,15	0.50	0	17,19,21	0.64	0
7	NAG	b	1	7,1	14,14,15	0.26	0	17,19,21	0.43	0
7	NAG	b	2	7	14,14,15	1.31	1 (7%)	17,19,21	1.26	3 (17%)
7	BMA	b	3	7	11,11,12	0.69	0	15,15,17	1.05	0
5	NAG	c	1	5,1	14,14,15	0.31	0	17,19,21	0.72	1 (5%)
5	NAG	c	2	5	14,14,15	0.32	0	17,19,21	2.34	1 (5%)
5	BMA	c	3	5	11,11,12	0.86	1 (9%)	15,15,17	1.02	1 (6%)
5	MAN	c	4	5	11,11,12	1.02	1 (9%)	15,15,17	1.86	4 (26%)
13	NAG	d	1	13,1	14,14,15	0.55	0	17,19,21	0.58	0
13	NAG	d	2	13	14,14,15	0.47	0	17,19,21	0.55	0
13	MAN	d	3	13	11,11,12	1.73	3 (27%)	15,15,17	1.60	3 (20%)
13	MAN	d	4	13	11,11,12	2.00	2 (18%)	15,15,17	1.97	4 (26%)
13	MAN	d	5	13	11,11,12	1.12	1 (9%)	15,15,17	1.57	2 (13%)
7	NAG	e	1	7,1	14,14,15	0.78	1 (7%)	17,19,21	1.10	1 (5%)
7	NAG	e	2	7	14,14,15	0.41	0	17,19,21	0.64	0
7	BMA	e	3	7	11,11,12	0.96	0	15,15,17	1.07	2 (13%)
12	NAG	f	1	12,1	14,14,15	1.33	2 (14%)	17,19,21	1.33	2 (11%)
12	NAG	f	2	12	14,14,15	0.38	0	17,19,21	0.48	0
8	BGC	g	1	8	12,12,12	1.61	3 (25%)	17,17,17	1.41	3 (17%)
8	GAL	g	2	8	11,11,12	0.59	0	15,15,17	1.10	1 (6%)
8	NAG	g	3	8	14,14,15	0.24	0	17,19,21	0.50	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
8	GAL	g	4	8	11,11,12	0.61	0	15,15,17	0.80	0
8	SIA	g	5	8	20,20,21	2.00	2 (10%)	24,28,31	1.59	4 (16%)

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	I	1	3,1	-	2/6/23/26	0/1/1/1
3	FUL	I	2	3	-	-	0/1/1/1
3	FUC	I	3	3	-	-	0/1/1/1
4	NAG	J	1	4,1	-	2/6/23/26	0/1/1/1
4	NAG	J	2	4	-	1/6/23/26	0/1/1/1
4	BMA	J	3	4	-	0/2/19/22	0/1/1/1
4	MAN	J	4	4	-	2/2/19/22	0/1/1/1
5	NAG	K	1	5,1	-	4/6/23/26	0/1/1/1
5	NAG	K	2	5	-	1/6/23/26	0/1/1/1
5	BMA	K	3	5	-	2/2/19/22	0/1/1/1
5	MAN	K	4	5	-	1/2/19/22	0/1/1/1
6	NAG	L	1	6,1	-	0/6/23/26	0/1/1/1
6	NAG	L	2	6	-	2/6/23/26	0/1/1/1
6	MAN	L	3	6	-	1/2/19/22	1/1/1/1
6	MAN	L	4	6	-	1/2/19/22	0/1/1/1
6	MAN	L	5	6	-	2/2/19/22	0/1/1/1
6	MAN	L	6	6	-	2/2/19/22	0/1/1/1
4	NAG	M	1	4,1	-	3/6/23/26	0/1/1/1
4	NAG	M	2	4	-	2/6/23/26	0/1/1/1
4	BMA	M	3	4	-	2/2/19/22	0/1/1/1
4	MAN	M	4	4	-	2/2/19/22	0/1/1/1
7	NAG	N	1	7,1	-	3/6/23/26	0/1/1/1
7	NAG	N	2	7	-	0/6/23/26	0/1/1/1
7	BMA	N	3	7	-	0/2/19/22	0/1/1/1
8	BGC	O	1	8	-	2/2/22/22	0/1/1/1
8	GAL	O	2	8	-	2/2/19/22	0/1/1/1
8	NAG	O	3	8	-	0/6/23/26	0/1/1/1
8	GAL	O	4	8	-	0/2/19/22	0/1/1/1
8	SIA	O	5	8	-	3/18/34/38	0/1/1/1
9	NAG	P	1	9,1	-	0/6/23/26	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
9	FUL	P	2	9	-	-	0/1/1/1
5	NAG	Q	1	5,1	-	2/6/23/26	0/1/1/1
5	NAG	Q	2	5	-	2/6/23/26	0/1/1/1
5	BMA	Q	3	5	-	2/2/19/22	0/1/1/1
5	MAN	Q	4	5	-	0/2/19/22	0/1/1/1
5	NAG	R	1	5,1	-	4/6/23/26	0/1/1/1
5	NAG	R	2	5	-	2/6/23/26	0/1/1/1
5	BMA	R	3	5	-	2/2/19/22	0/1/1/1
5	MAN	R	4	5	-	2/2/19/22	0/1/1/1
10	NAG	S	1	10,1	-	2/6/23/26	0/1/1/1
10	NAG	S	2	10	-	0/6/23/26	0/1/1/1
10	MAN	S	3	10	-	2/2/19/22	0/1/1/1
10	MAN	S	4	10	-	2/2/19/22	1/1/1/1
10	MAN	S	5	10	-	0/2/19/22	0/1/1/1
10	MAN	S	6	10	-	0/2/19/22	1/1/1/1
10	MAN	S	7	10	-	2/2/19/22	1/1/1/1
11	NAG	T	1	11,1	-	2/6/23/26	0/1/1/1
11	NAG	T	2	11	-	0/6/23/26	0/1/1/1
11	BMA	T	3	11	-	2/2/19/22	0/1/1/1
11	MAN	T	4	11	-	1/2/19/22	1/1/1/1
11	MAN	T	5	11	-	2/2/19/22	1/1/1/1
12	NAG	U	1	12,1	-	4/6/23/26	0/1/1/1
12	NAG	U	2	12	-	5/6/23/26	0/1/1/1
8	BGC	V	1	8	-	2/2/22/22	0/1/1/1
8	GAL	V	2	8	-	2/2/19/22	0/1/1/1
8	NAG	V	3	8	-	0/6/23/26	0/1/1/1
8	GAL	V	4	8	-	2/2/19/22	0/1/1/1
8	SIA	V	5	8	-	4/18/34/38	0/1/1/1
5	NAG	W	1	5,1	-	4/6/23/26	0/1/1/1
5	NAG	W	2	5	-	1/6/23/26	0/1/1/1
5	BMA	W	3	5	-	0/2/19/22	0/1/1/1
5	MAN	W	4	5	-	2/2/19/22	1/1/1/1
11	NAG	X	1	11,1	-	3/6/23/26	0/1/1/1
11	NAG	X	2	11	-	0/6/23/26	0/1/1/1
11	BMA	X	3	11	-	2/2/19/22	0/1/1/1
11	MAN	X	4	11	-	0/2/19/22	0/1/1/1
11	MAN	X	5	11	-	0/2/19/22	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
12	NAG	Y	1	12,1	-	2/6/23/26	0/1/1/1
12	NAG	Y	2	12	-	4/6/23/26	0/1/1/1
12	NAG	Z	1	12,1	-	0/6/23/26	0/1/1/1
12	NAG	Z	2	12	-	0/6/23/26	0/1/1/1
12	NAG	a	1	12,1	-	3/6/23/26	0/1/1/1
12	NAG	a	2	12	-	2/6/23/26	0/1/1/1
7	NAG	b	1	7,1	-	2/6/23/26	0/1/1/1
7	NAG	b	2	7	-	3/6/23/26	0/1/1/1
7	BMA	b	3	7	-	1/2/19/22	0/1/1/1
5	NAG	c	1	5,1	-	2/6/23/26	0/1/1/1
5	NAG	c	2	5	-	0/6/23/26	0/1/1/1
5	BMA	c	3	5	-	0/2/19/22	0/1/1/1
5	MAN	c	4	5	-	1/2/19/22	0/1/1/1
13	NAG	d	1	13,1	-	2/6/23/26	0/1/1/1
13	NAG	d	2	13	-	4/6/23/26	0/1/1/1
13	MAN	d	3	13	-	2/2/19/22	0/1/1/1
13	MAN	d	4	13	-	1/2/19/22	0/1/1/1
13	MAN	d	5	13	-	2/2/19/22	0/1/1/1
7	NAG	e	1	7,1	-	2/6/23/26	0/1/1/1
7	NAG	e	2	7	-	0/6/23/26	0/1/1/1
7	BMA	e	3	7	-	2/2/19/22	0/1/1/1
12	NAG	f	1	12,1	-	4/6/23/26	0/1/1/1
12	NAG	f	2	12	-	0/6/23/26	0/1/1/1
8	BGC	g	1	8	-	2/2/22/22	0/1/1/1
8	GAL	g	2	8	-	0/2/19/22	0/1/1/1
8	NAG	g	3	8	-	2/6/23/26	0/1/1/1
8	GAL	g	4	8	-	2/2/19/22	0/1/1/1
8	SIA	g	5	8	-	2/18/34/38	0/1/1/1

All (72) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
8	O	5	SIA	C2-C1	7.79	1.59	1.52
8	V	5	SIA	C2-C1	7.67	1.59	1.52
8	g	5	SIA	C2-C1	7.61	1.59	1.52
3	I	2	FUL	O5-C1	5.42	1.52	1.43
9	P	2	FUL	O5-C1	5.07	1.51	1.43
5	W	2	NAG	O5-C1	-5.05	1.35	1.43

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
6	L	4	MAN	C2-C3	4.95	1.59	1.52
13	d	4	MAN	C2-C3	4.12	1.58	1.52
7	b	2	NAG	O5-C1	-4.11	1.37	1.43
13	d	4	MAN	O2-C2	4.03	1.51	1.43
12	f	1	NAG	O5-C1	-3.90	1.37	1.43
4	M	3	BMA	C4-C5	3.83	1.61	1.53
10	S	4	MAN	C2-C3	3.76	1.58	1.52
11	X	2	NAG	O5-C1	3.62	1.49	1.43
11	X	5	MAN	C2-C3	3.43	1.57	1.52
8	O	1	BGC	C4-C3	3.35	1.60	1.52
13	d	5	MAN	C1-C2	3.28	1.59	1.52
13	d	3	MAN	C4-C5	3.21	1.59	1.53
10	S	4	MAN	O2-C2	3.20	1.50	1.43
10	S	5	MAN	C1-C2	3.15	1.59	1.52
6	L	4	MAN	O2-C2	3.13	1.50	1.43
6	L	6	MAN	C1-C2	3.12	1.59	1.52
11	X	5	MAN	C1-C2	3.11	1.59	1.52
5	Q	1	NAG	O5-C1	-3.06	1.38	1.43
8	O	5	SIA	O6-C2	3.03	1.47	1.43
4	M	3	BMA	C1-C2	3.01	1.59	1.52
6	L	6	MAN	O5-C1	2.95	1.48	1.43
5	W	1	NAG	O5-C1	-2.89	1.39	1.43
9	P	2	FUL	C2-C3	-2.86	1.48	1.52
8	V	5	SIA	O6-C2	2.81	1.47	1.43
13	d	3	MAN	C2-C3	2.78	1.56	1.52
5	c	4	MAN	C1-C2	2.75	1.58	1.52
4	J	1	NAG	O5-C1	-2.72	1.39	1.43
7	N	3	BMA	C1-C2	2.69	1.58	1.52
8	g	5	SIA	O6-C2	2.64	1.47	1.43
8	O	1	BGC	C3-C2	2.63	1.59	1.52
6	L	5	MAN	C1-C2	2.63	1.58	1.52
13	d	3	MAN	O5-C5	2.61	1.48	1.43
8	g	1	BGC	C4-C3	2.61	1.59	1.52
6	L	6	MAN	O5-C5	2.59	1.48	1.43
12	f	1	NAG	C1-C2	2.54	1.56	1.52
4	M	3	BMA	O5-C5	2.54	1.48	1.43
6	L	5	MAN	C2-C3	2.54	1.56	1.52
8	g	1	BGC	C3-C2	2.52	1.58	1.52
3	I	2	FUL	O5-C5	2.50	1.48	1.43
7	N	3	BMA	C2-C3	2.49	1.56	1.52
8	V	1	BGC	C4-C5	2.47	1.58	1.53
5	W	2	NAG	C1-C2	2.45	1.56	1.52

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	R	4	MAN	C1-C2	2.45	1.57	1.52
4	M	3	BMA	C4-C3	2.39	1.58	1.52
4	M	4	MAN	C4-C3	2.33	1.58	1.52
8	O	1	BGC	C4-C5	2.31	1.57	1.53
8	O	1	BGC	O5-C5	-2.30	1.38	1.44
4	J	4	MAN	C1-C2	2.28	1.57	1.52
9	P	1	NAG	O5-C1	-2.27	1.40	1.43
10	S	6	MAN	O5-C5	2.25	1.48	1.43
8	g	1	BGC	C1-C2	2.22	1.57	1.52
5	c	3	BMA	C1-C2	2.21	1.57	1.52
4	J	3	BMA	O5-C1	-2.19	1.40	1.43
7	e	1	NAG	O5-C1	-2.18	1.40	1.43
9	P	2	FUL	O5-C5	2.16	1.48	1.43
8	V	4	GAL	C2-C3	2.16	1.55	1.52
5	K	4	MAN	C1-C2	2.12	1.57	1.52
10	S	7	MAN	C1-C2	2.11	1.57	1.52
5	K	1	NAG	O5-C1	-2.09	1.40	1.43
5	Q	4	MAN	C1-C2	2.07	1.56	1.52
5	R	3	BMA	C4-C3	2.06	1.57	1.52
6	L	4	MAN	C4-C3	2.06	1.57	1.52
5	R	3	BMA	O5-C1	-2.05	1.40	1.43
8	V	1	BGC	C4-C3	2.05	1.57	1.52
6	L	3	MAN	O5-C5	2.04	1.47	1.43
11	T	4	MAN	C1-C2	2.04	1.56	1.52

All (148) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	c	2	NAG	C1-O5-C5	9.06	124.47	112.19
3	I	2	FUL	C1-C2-C3	7.18	118.49	109.67
10	S	5	MAN	C1-O5-C5	5.93	120.23	112.19
11	X	2	NAG	C1-O5-C5	5.59	119.77	112.19
13	d	4	MAN	C1-O5-C5	5.49	119.63	112.19
6	L	6	MAN	C1-O5-C5	5.41	119.53	112.19
3	I	2	FUL	O5-C5-C4	5.06	118.60	109.52
6	L	3	MAN	C1-O5-C5	4.93	118.87	112.19
5	c	4	MAN	C1-O5-C5	4.77	118.66	112.19
6	L	4	MAN	C1-O5-C5	4.70	118.56	112.19
11	X	5	MAN	C1-C2-C3	4.70	115.44	109.67
12	a	1	NAG	C2-N2-C7	4.56	129.40	122.90
10	S	3	MAN	C1-O5-C5	4.55	118.36	112.19
12	U	1	NAG	C2-N2-C7	4.40	129.16	122.90

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
12	U	2	NAG	C2-N2-C7	4.35	129.10	122.90
10	S	5	MAN	O5-C1-C2	4.33	117.45	110.77
10	S	4	MAN	C1-O5-C5	4.31	118.03	112.19
3	I	2	FUL	C2-C3-C4	4.27	118.29	110.89
7	N	1	NAG	C2-N2-C7	4.24	128.94	122.90
7	N	3	BMA	C1-C2-C3	4.15	114.77	109.67
9	P	2	FUL	C3-C4-C5	4.14	116.23	109.77
10	S	7	MAN	C1-O5-C5	4.07	117.71	112.19
8	g	5	SIA	O1A-C1-C2	-4.01	113.10	122.57
10	S	6	MAN	C1-O5-C5	3.99	117.60	112.19
3	I	2	FUL	O5-C1-C2	3.98	116.91	110.77
11	T	3	BMA	C1-O5-C5	3.98	117.58	112.19
8	V	5	SIA	O1A-C1-C2	-3.96	113.21	122.57
5	W	2	NAG	C4-C3-C2	3.93	116.78	111.02
3	I	2	FUL	C1-O5-C5	3.93	121.67	112.78
6	L	5	MAN	C1-C2-C3	3.91	114.47	109.67
8	O	5	SIA	O1A-C1-C2	-3.83	113.53	122.57
12	f	1	NAG	C2-N2-C7	3.81	128.33	122.90
6	L	3	MAN	O5-C5-C6	3.81	113.18	107.20
11	T	4	MAN	C1-O5-C5	3.73	117.25	112.19
3	I	2	FUL	C3-C4-C5	3.63	115.42	109.77
13	d	5	MAN	C1-O5-C5	3.62	117.09	112.19
7	b	2	NAG	C4-C3-C2	3.57	116.25	111.02
8	O	5	SIA	C6-O6-C2	3.49	118.80	111.34
10	S	5	MAN	C1-C2-C3	3.49	113.95	109.67
9	P	2	FUL	C1-C2-C3	3.43	113.88	109.67
4	M	3	BMA	O5-C1-C2	-3.41	105.51	110.77
7	e	1	NAG	C3-C4-C5	3.31	116.15	110.24
8	g	5	SIA	C6-O6-C2	3.25	118.29	111.34
8	O	5	SIA	C5-N5-C10	3.22	131.01	123.18
4	J	3	BMA	C1-O5-C5	3.22	116.56	112.19
8	V	5	SIA	C6-O6-C2	3.21	118.22	111.34
8	O	5	SIA	C3-C4-C5	-3.19	107.60	111.46
13	d	5	MAN	C1-C2-C3	3.15	113.54	109.67
8	O	5	SIA	C4-C5-N5	3.15	116.60	110.38
13	d	3	MAN	O3-C3-C2	3.11	115.95	109.99
6	L	6	MAN	O2-C2-C3	-3.10	103.92	110.14
13	d	3	MAN	C1-O5-C5	3.08	116.36	112.19
7	N	3	BMA	C1-O5-C5	3.07	116.35	112.19
9	P	2	FUL	O5-C5-C4	3.03	114.96	109.52
13	d	3	MAN	C3-C4-C5	2.99	115.58	110.24
5	c	4	MAN	O5-C1-C2	2.98	115.36	110.77

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
8	V	4	GAL	C1-C2-C3	2.97	113.32	109.67
11	X	4	MAN	C1-O5-C5	2.95	116.18	112.19
8	g	1	BGC	C6-C5-C4	-2.94	106.12	113.00
8	O	5	SIA	C4-C3-C2	2.94	115.07	109.81
6	L	4	MAN	O2-C2-C3	2.92	116.00	110.14
11	T	5	MAN	C1-O5-C5	2.91	116.14	112.19
9	P	2	FUL	C1-O5-C5	2.90	119.36	112.78
8	g	5	SIA	C4-C3-C2	2.89	114.98	109.81
8	O	1	BGC	C6-C5-C4	-2.88	106.27	113.00
3	I	1	NAG	O3-C3-C4	2.87	116.98	110.35
12	a	1	NAG	C1-C2-N2	2.86	115.38	110.49
10	S	4	MAN	O2-C2-C3	2.86	115.87	110.14
5	R	3	BMA	C1-C2-C3	2.86	113.18	109.67
6	L	3	MAN	O6-C6-C5	-2.86	101.50	111.29
6	L	3	MAN	C1-C2-C3	2.84	113.16	109.67
10	S	4	MAN	O3-C3-C2	2.84	115.43	109.99
7	N	3	BMA	O5-C1-C2	2.84	115.15	110.77
5	W	3	BMA	C1-C2-C3	2.83	113.15	109.67
13	d	4	MAN	O3-C3-C2	2.83	115.41	109.99
5	c	4	MAN	C1-C2-C3	2.78	113.08	109.67
5	K	4	MAN	C1-O5-C5	2.77	115.95	112.19
4	M	3	BMA	C3-C4-C5	2.77	115.19	110.24
13	d	4	MAN	O2-C2-C3	2.77	115.69	110.14
6	L	3	MAN	O3-C3-C4	-2.76	103.96	110.35
10	S	3	MAN	C3-C4-C5	2.74	115.13	110.24
5	W	4	MAN	C1-O5-C5	2.73	115.89	112.19
8	V	2	GAL	C1-C2-C3	2.72	113.01	109.67
8	O	1	BGC	C1-O5-C5	-2.63	108.71	113.66
4	M	3	BMA	O2-C2-C3	-2.62	104.89	110.14
10	S	5	MAN	O2-C2-C3	-2.61	104.91	110.14
11	X	3	BMA	C3-C4-C5	2.59	114.86	110.24
8	g	1	BGC	C1-O5-C5	-2.56	108.84	113.66
5	W	2	NAG	C1-O5-C5	-2.56	108.73	112.19
8	V	5	SIA	C4-C3-C2	2.54	114.36	109.81
12	f	1	NAG	C4-C3-C2	2.53	114.72	111.02
3	I	2	FUL	C6-C5-C4	-2.52	108.42	113.07
4	M	2	NAG	O4-C4-C3	2.51	116.15	110.35
8	g	2	GAL	C1-C2-C3	2.44	112.66	109.67
6	L	4	MAN	C2-C3-C4	2.42	115.09	110.89
6	L	4	MAN	O3-C3-C2	2.40	114.60	109.99
5	Q	3	BMA	C1-C2-C3	2.40	112.61	109.67
4	M	4	MAN	C3-C4-C5	2.37	114.47	110.24

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
8	O	1	BGC	O1-C1-C2	-2.36	102.38	109.03
4	M	4	MAN	C2-C3-C4	2.36	114.98	110.89
4	J	4	MAN	C1-O5-C5	2.36	115.38	112.19
8	V	5	SIA	O1B-C1-O1A	2.33	129.37	124.09
5	c	3	BMA	C1-C2-C3	2.32	112.52	109.67
5	c	4	MAN	O2-C2-C3	-2.32	105.49	110.14
7	b	2	NAG	C1-O5-C5	-2.32	109.05	112.19
8	V	1	BGC	O1-C1-C2	-2.30	102.55	109.03
4	M	1	NAG	C2-N2-C7	2.30	126.18	122.90
7	N	3	BMA	O5-C5-C4	-2.30	105.24	110.83
4	M	3	BMA	C1-C2-C3	-2.27	106.87	109.67
8	g	5	SIA	O1B-C1-O1A	2.27	129.24	124.09
8	O	5	SIA	O10-C10-N5	2.24	126.07	121.95
5	Q	4	MAN	C1-O5-C5	2.24	115.23	112.19
8	O	1	BGC	C4-C3-C2	2.23	114.72	110.82
10	S	7	MAN	O2-C2-C3	-2.23	105.67	110.14
12	U	1	NAG	C1-C2-N2	2.22	114.29	110.49
6	L	6	MAN	C1-C2-C3	2.22	112.39	109.67
11	X	1	NAG	C3-C4-C5	2.20	114.17	110.24
7	b	2	NAG	C3-C4-C5	2.19	114.14	110.24
3	I	1	NAG	O3-C3-C2	2.18	113.97	109.47
11	X	4	MAN	O2-C2-C3	-2.17	105.80	110.14
4	J	3	BMA	C3-C4-C5	2.16	114.10	110.24
5	W	3	BMA	O5-C1-C2	2.16	114.11	110.77
8	O	5	SIA	O1B-C1-O1A	2.15	128.98	124.09
5	Q	4	MAN	O2-C2-C3	-2.14	105.86	110.14
6	L	5	MAN	O5-C1-C2	2.13	114.06	110.77
4	M	4	MAN	O2-C2-C3	-2.12	105.89	110.14
10	S	6	MAN	O2-C2-C3	-2.12	105.89	110.14
11	X	5	MAN	O5-C1-C2	2.12	114.04	110.77
5	K	4	MAN	O2-C2-C3	-2.11	105.91	110.14
7	e	3	BMA	C2-C3-C4	2.10	114.53	110.89
5	Q	3	BMA	C1-O5-C5	2.08	115.02	112.19
11	T	4	MAN	O2-C2-C3	-2.08	105.98	110.14
12	a	1	NAG	C4-C3-C2	-2.07	107.99	111.02
5	R	4	MAN	O2-C2-C3	-2.06	106.01	110.14
5	c	1	NAG	O4-C4-C5	-2.06	104.19	109.30
5	W	4	MAN	O2-C2-C3	-2.05	106.04	110.14
10	S	5	MAN	C3-C4-C5	-2.04	106.60	110.24
8	g	1	BGC	O1-C1-C2	-2.04	103.30	109.03
5	R	3	BMA	O2-C2-C3	-2.04	106.06	110.14
8	O	4	GAL	C1-O5-C5	2.03	114.95	112.19

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
8	V	1	BGC	C3-C4-C5	-2.03	106.61	110.24
5	R	3	BMA	C3-C4-C5	2.03	113.86	110.24
11	X	5	MAN	C2-C3-C4	2.02	114.39	110.89
4	J	4	MAN	O2-C2-C3	-2.01	106.10	110.14
13	d	4	MAN	O5-C1-C2	2.01	113.88	110.77
4	J	3	BMA	O2-C2-C3	-2.01	106.12	110.14
11	X	1	NAG	C1-O5-C5	2.00	114.91	112.19
7	e	3	BMA	O2-C2-C3	-2.00	106.13	110.14

There are no chirality outliers.

All (151) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
8	O	5	SIA	C4-C5-N5-C10
8	O	5	SIA	O6-C6-C7-O7
8	g	5	SIA	O8-C8-C9-O9
10	S	1	NAG	O5-C5-C6-O6
11	X	3	BMA	C4-C5-C6-O6
8	V	1	BGC	O5-C5-C6-O6
13	d	5	MAN	O5-C5-C6-O6
5	Q	3	BMA	C4-C5-C6-O6
8	g	4	GAL	O5-C5-C6-O6
12	Y	2	NAG	O5-C5-C6-O6
13	d	1	NAG	O5-C5-C6-O6
8	V	4	GAL	O5-C5-C6-O6
8	O	2	GAL	C4-C5-C6-O6
4	J	4	MAN	O5-C5-C6-O6
5	R	3	BMA	O5-C5-C6-O6
7	e	3	BMA	O5-C5-C6-O6
11	X	3	BMA	O5-C5-C6-O6
8	V	1	BGC	C4-C5-C6-O6
4	M	3	BMA	O5-C5-C6-O6
8	g	1	BGC	O5-C5-C6-O6
7	e	1	NAG	C4-C5-C6-O6
11	T	5	MAN	C4-C5-C6-O6
12	U	2	NAG	C4-C5-C6-O6
13	d	5	MAN	C4-C5-C6-O6
3	I	1	NAG	O5-C5-C6-O6
6	L	5	MAN	O5-C5-C6-O6
10	S	3	MAN	O5-C5-C6-O6
11	T	5	MAN	O5-C5-C6-O6
12	a	2	NAG	O5-C5-C6-O6

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Mol	Chain	Res	Type	Atoms
10	S	1	NAG	C4-C5-C6-O6
8	O	2	GAL	O5-C5-C6-O6
4	M	2	NAG	O5-C5-C6-O6
4	M	4	MAN	O5-C5-C6-O6
5	K	3	BMA	O5-C5-C6-O6
11	T	1	NAG	O5-C5-C6-O6
12	Y	2	NAG	C1-C2-N2-C7
10	S	7	MAN	O5-C5-C6-O6
8	g	4	GAL	C4-C5-C6-O6
7	b	1	NAG	O5-C5-C6-O6
4	M	2	NAG	C4-C5-C6-O6
6	L	5	MAN	C4-C5-C6-O6
10	S	7	MAN	C4-C5-C6-O6
11	T	1	NAG	C4-C5-C6-O6
8	V	4	GAL	C4-C5-C6-O6
12	Y	2	NAG	C4-C5-C6-O6
4	J	1	NAG	C8-C7-N2-C2
4	J	1	NAG	O7-C7-N2-C2
5	K	1	NAG	C8-C7-N2-C2
5	K	1	NAG	O7-C7-N2-C2
5	Q	1	NAG	C8-C7-N2-C2
5	Q	1	NAG	O7-C7-N2-C2
5	R	1	NAG	C8-C7-N2-C2
5	R	1	NAG	O7-C7-N2-C2
5	W	1	NAG	C8-C7-N2-C2
5	W	1	NAG	O7-C7-N2-C2
6	L	2	NAG	C8-C7-N2-C2
6	L	2	NAG	O7-C7-N2-C2
7	N	1	NAG	C8-C7-N2-C2
7	N	1	NAG	O7-C7-N2-C2
11	X	1	NAG	C8-C7-N2-C2
11	X	1	NAG	O7-C7-N2-C2
12	U	1	NAG	C8-C7-N2-C2
12	U	1	NAG	O7-C7-N2-C2
12	U	2	NAG	C8-C7-N2-C2
12	U	2	NAG	O7-C7-N2-C2
12	a	1	NAG	C8-C7-N2-C2
12	a	1	NAG	O7-C7-N2-C2
12	f	1	NAG	C8-C7-N2-C2
12	f	1	NAG	O7-C7-N2-C2
13	d	2	NAG	C8-C7-N2-C2
13	d	2	NAG	O7-C7-N2-C2

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Mol	Chain	Res	Type	Atoms
5	K	3	BMA	C4-C5-C6-O6
13	d	1	NAG	C4-C5-C6-O6
5	Q	3	BMA	O5-C5-C6-O6
8	O	1	BGC	O5-C5-C6-O6
4	M	4	MAN	C4-C5-C6-O6
7	e	1	NAG	O5-C5-C6-O6
3	I	1	NAG	C4-C5-C6-O6
7	b	1	NAG	C4-C5-C6-O6
8	g	3	NAG	O5-C5-C6-O6
4	M	3	BMA	C4-C5-C6-O6
11	T	3	BMA	O5-C5-C6-O6
5	R	3	BMA	C4-C5-C6-O6
5	W	4	MAN	O5-C5-C6-O6
10	S	4	MAN	O5-C5-C6-O6
10	S	3	MAN	C4-C5-C6-O6
5	R	4	MAN	O5-C5-C6-O6
8	g	5	SIA	C7-C8-C9-O9
6	L	6	MAN	O5-C5-C6-O6
13	d	2	NAG	O5-C5-C6-O6
12	Y	1	NAG	C1-C2-N2-C7
4	J	4	MAN	C4-C5-C6-O6
13	d	2	NAG	C4-C5-C6-O6
12	U	2	NAG	O5-C5-C6-O6
12	a	2	NAG	C4-C5-C6-O6
13	d	3	MAN	O5-C5-C6-O6
13	d	4	MAN	O5-C5-C6-O6
7	e	3	BMA	C4-C5-C6-O6
8	g	1	BGC	C4-C5-C6-O6
8	V	5	SIA	C6-C7-C8-O8
8	V	2	GAL	C4-C5-C6-O6
7	b	3	BMA	O5-C5-C6-O6
6	L	6	MAN	C4-C5-C6-O6
8	V	2	GAL	O5-C5-C6-O6
8	O	1	BGC	C4-C5-C6-O6
6	L	4	MAN	O5-C5-C6-O6
5	c	1	NAG	C4-C5-C6-O6
8	g	3	NAG	C4-C5-C6-O6
13	d	3	MAN	C4-C5-C6-O6
6	L	3	MAN	O5-C5-C6-O6
11	X	1	NAG	O5-C5-C6-O6
4	M	1	NAG	C3-C2-N2-C7
12	Y	2	NAG	C3-C2-N2-C7

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Mol	Chain	Res	Type	Atoms
8	V	5	SIA	O7-C7-C8-O8
8	V	5	SIA	C6-C7-C8-C9
11	T	3	BMA	C4-C5-C6-O6
5	K	1	NAG	O5-C5-C6-O6
5	W	1	NAG	C4-C5-C6-O6
5	K	1	NAG	C4-C5-C6-O6
5	W	1	NAG	O5-C5-C6-O6
5	c	1	NAG	O5-C5-C6-O6
12	U	1	NAG	C4-C5-C6-O6
11	T	4	MAN	O5-C5-C6-O6
5	R	1	NAG	C4-C5-C6-O6
5	R	4	MAN	C4-C5-C6-O6
5	R	2	NAG	C4-C5-C6-O6
4	M	1	NAG	C4-C5-C6-O6
5	R	1	NAG	O5-C5-C6-O6
5	R	2	NAG	O5-C5-C6-O6
7	b	2	NAG	O5-C5-C6-O6
4	J	2	NAG	C3-C2-N2-C7
5	K	2	NAG	C3-C2-N2-C7
12	U	2	NAG	C3-C2-N2-C7
12	a	1	NAG	C3-C2-N2-C7
7	b	2	NAG	C4-C5-C6-O6
5	Q	2	NAG	C1-C2-N2-C7
5	K	4	MAN	C4-C5-C6-O6
5	W	2	NAG	C1-C2-N2-C7
4	M	1	NAG	O5-C5-C6-O6
5	c	4	MAN	C4-C5-C6-O6
8	V	5	SIA	O7-C7-C8-C9
12	f	1	NAG	C4-C5-C6-O6
5	Q	2	NAG	C3-C2-N2-C7
7	N	1	NAG	C3-C2-N2-C7
7	b	2	NAG	C3-C2-N2-C7
12	U	1	NAG	C3-C2-N2-C7
12	Y	1	NAG	C3-C2-N2-C7
12	f	1	NAG	C3-C2-N2-C7
10	S	4	MAN	C4-C5-C6-O6
8	O	5	SIA	O1A-C1-C2-C3
5	W	4	MAN	C4-C5-C6-O6

All (7) ring outliers are listed below:

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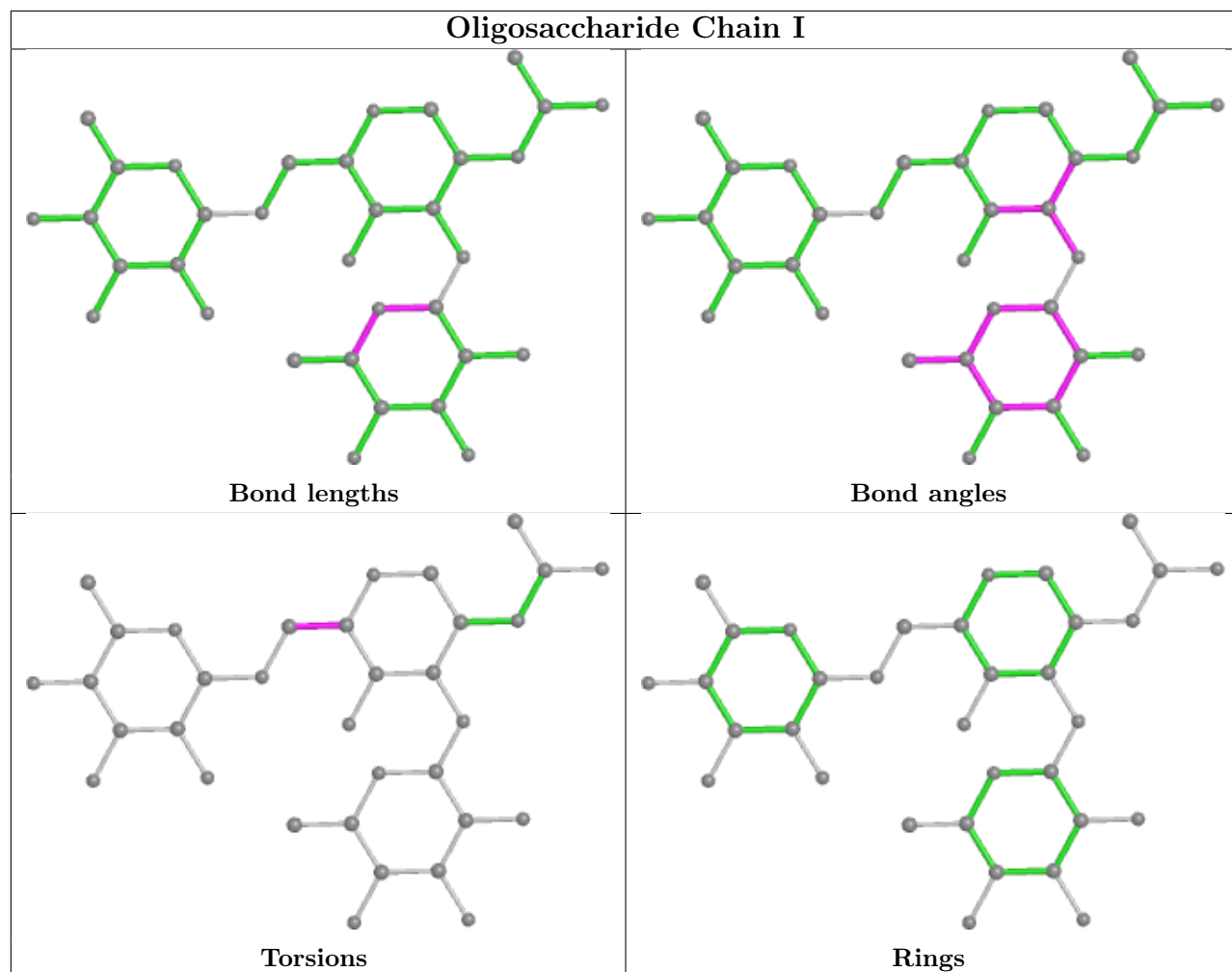
Mol	Chain	Res	Type	Atoms
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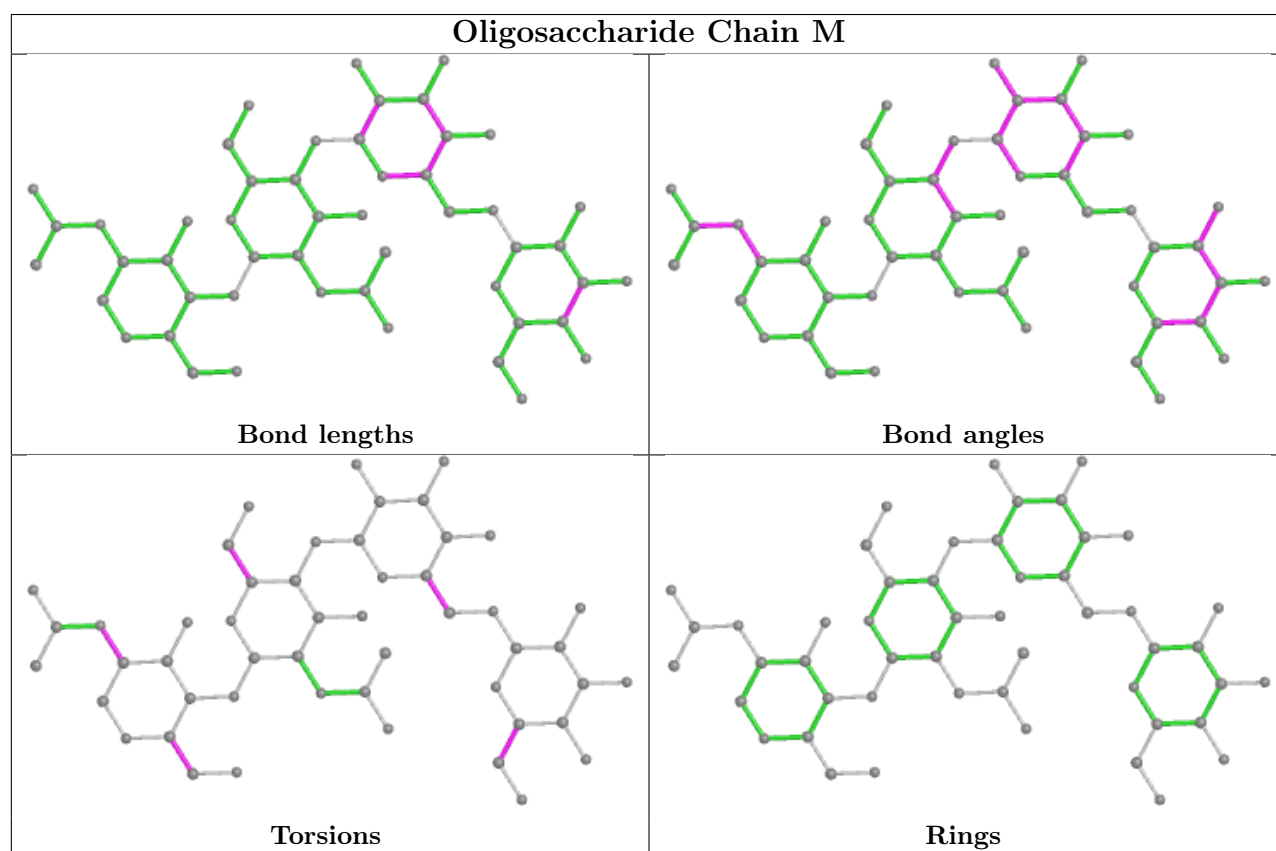
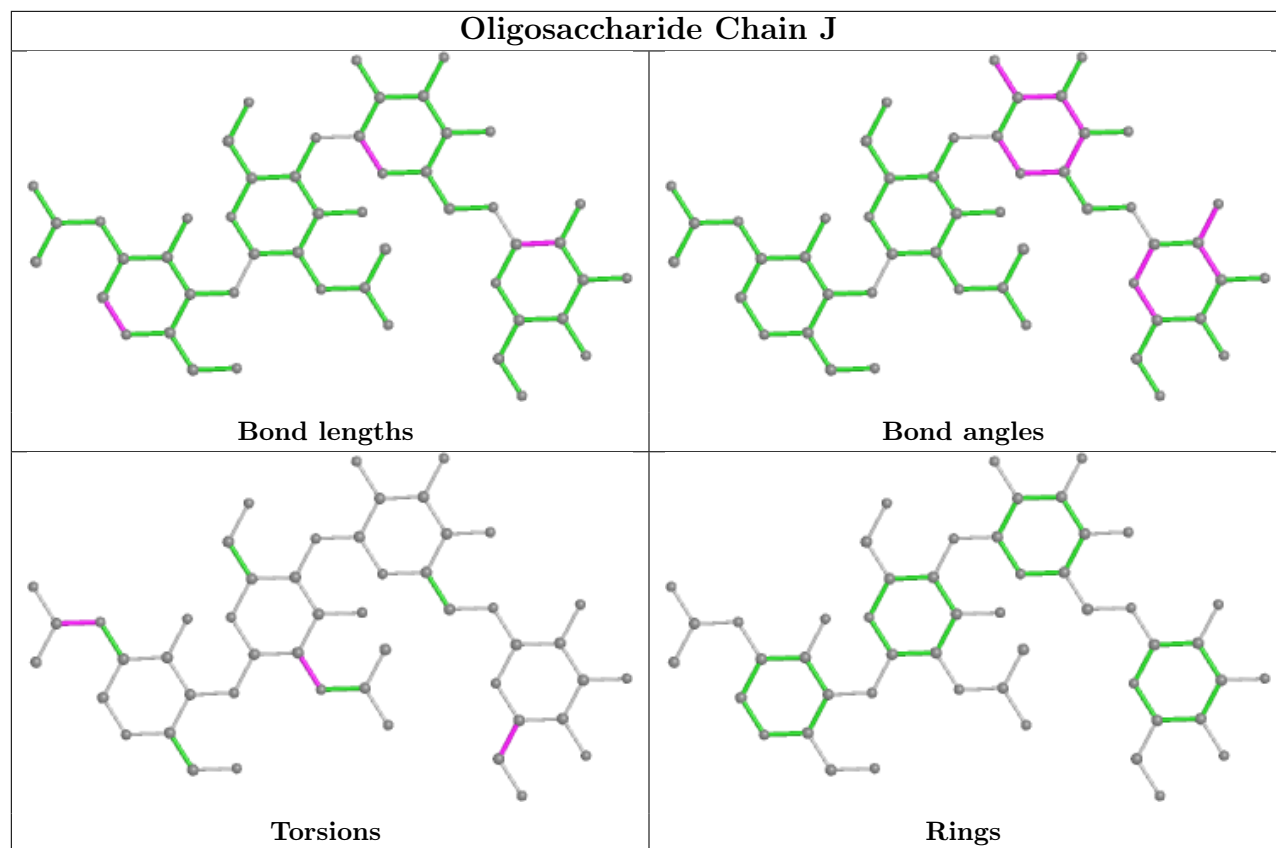
Mol	Chain	Res	Type	Atoms
10	S	7	MAN	C1-C2-C3-C4-C5-O5
6	L	3	MAN	C1-C2-C3-C4-C5-O5
10	S	4	MAN	C1-C2-C3-C4-C5-O5
11	T	5	MAN	C1-C2-C3-C4-C5-O5
5	W	4	MAN	C1-C2-C3-C4-C5-O5
10	S	6	MAN	C1-C2-C3-C4-C5-O5
11	T	4	MAN	C1-C2-C3-C4-C5-O5

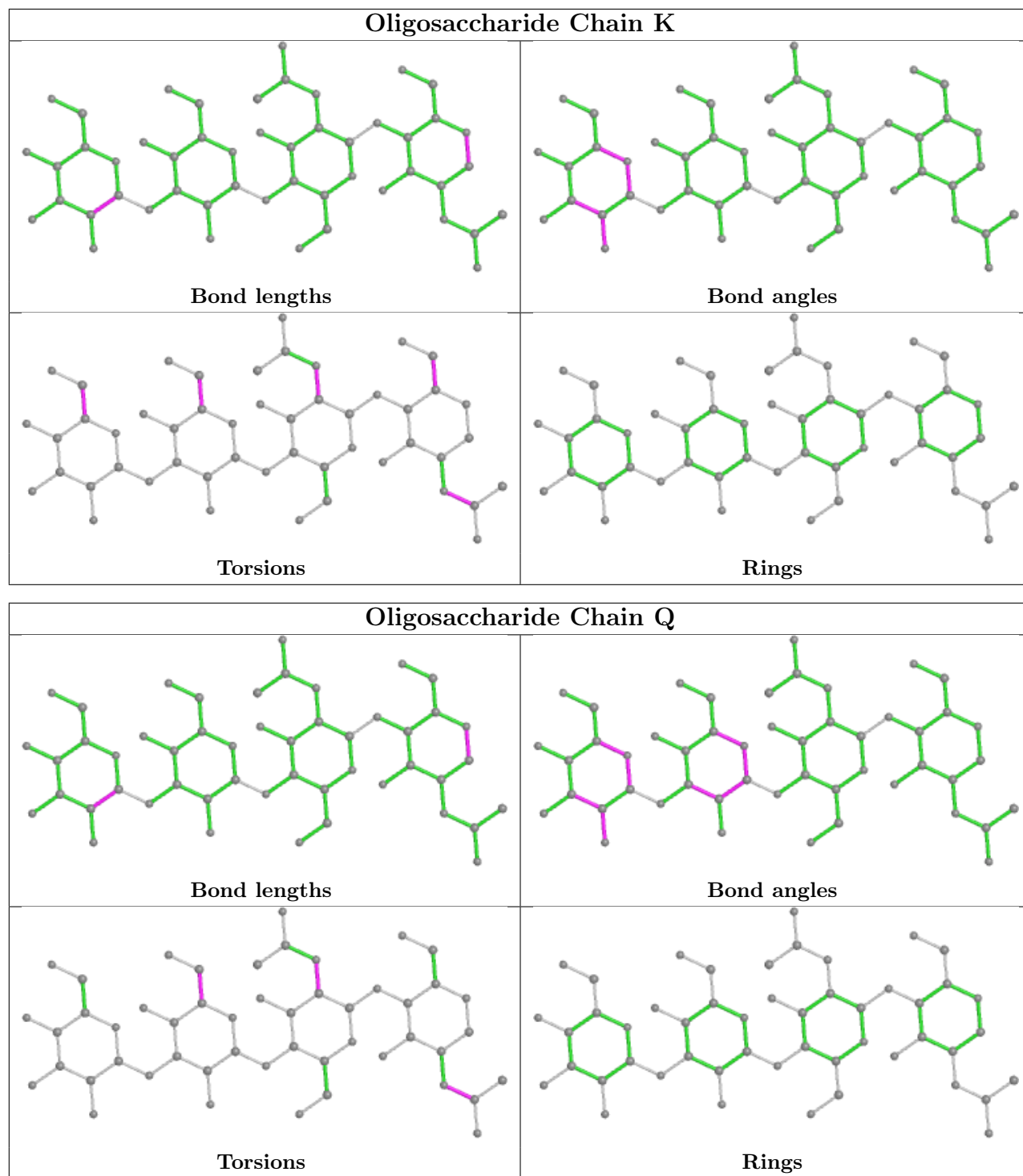
22 monomers are involved in 17 short contacts:

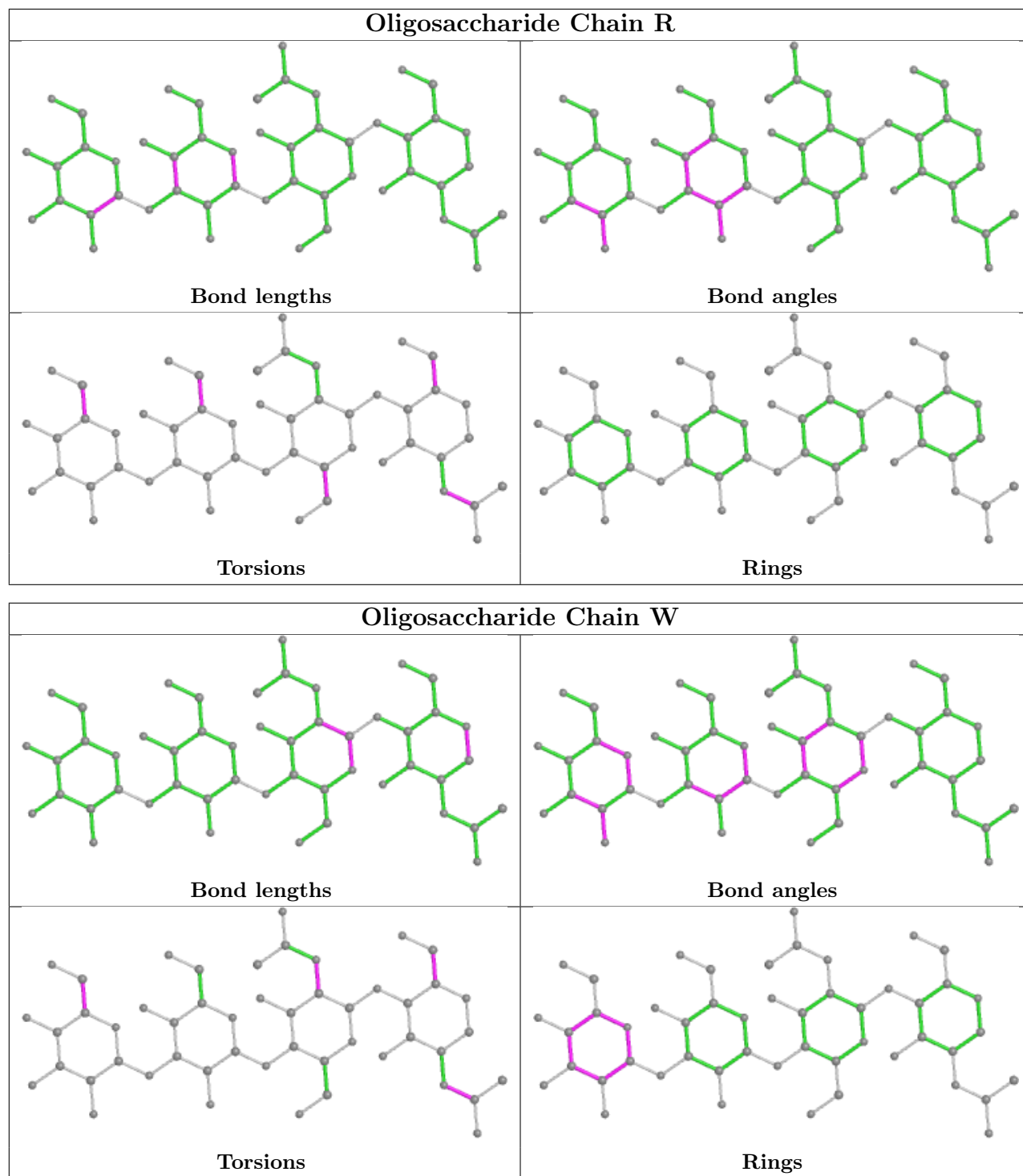
Mol	Chain	Res	Type	Clashes	Symm-Clashes
7	N	1	NAG	1	0
4	J	1	NAG	1	0
8	V	5	SIA	1	0
11	X	2	NAG	1	0
6	L	3	MAN	1	0
12	U	2	NAG	1	0
5	K	1	NAG	1	0
5	R	4	MAN	1	0
11	X	1	NAG	1	0
5	R	3	BMA	1	0
12	U	1	NAG	1	0
6	L	6	MAN	1	0
3	I	1	NAG	1	0
6	L	1	NAG	1	0
12	Y	1	NAG	1	0
9	P	1	NAG	1	0
5	Q	1	NAG	1	0
12	Y	2	NAG	2	0
5	R	1	NAG	1	0
8	O	5	SIA	1	0
3	I	2	FUL	1	0
9	P	2	FUL	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.

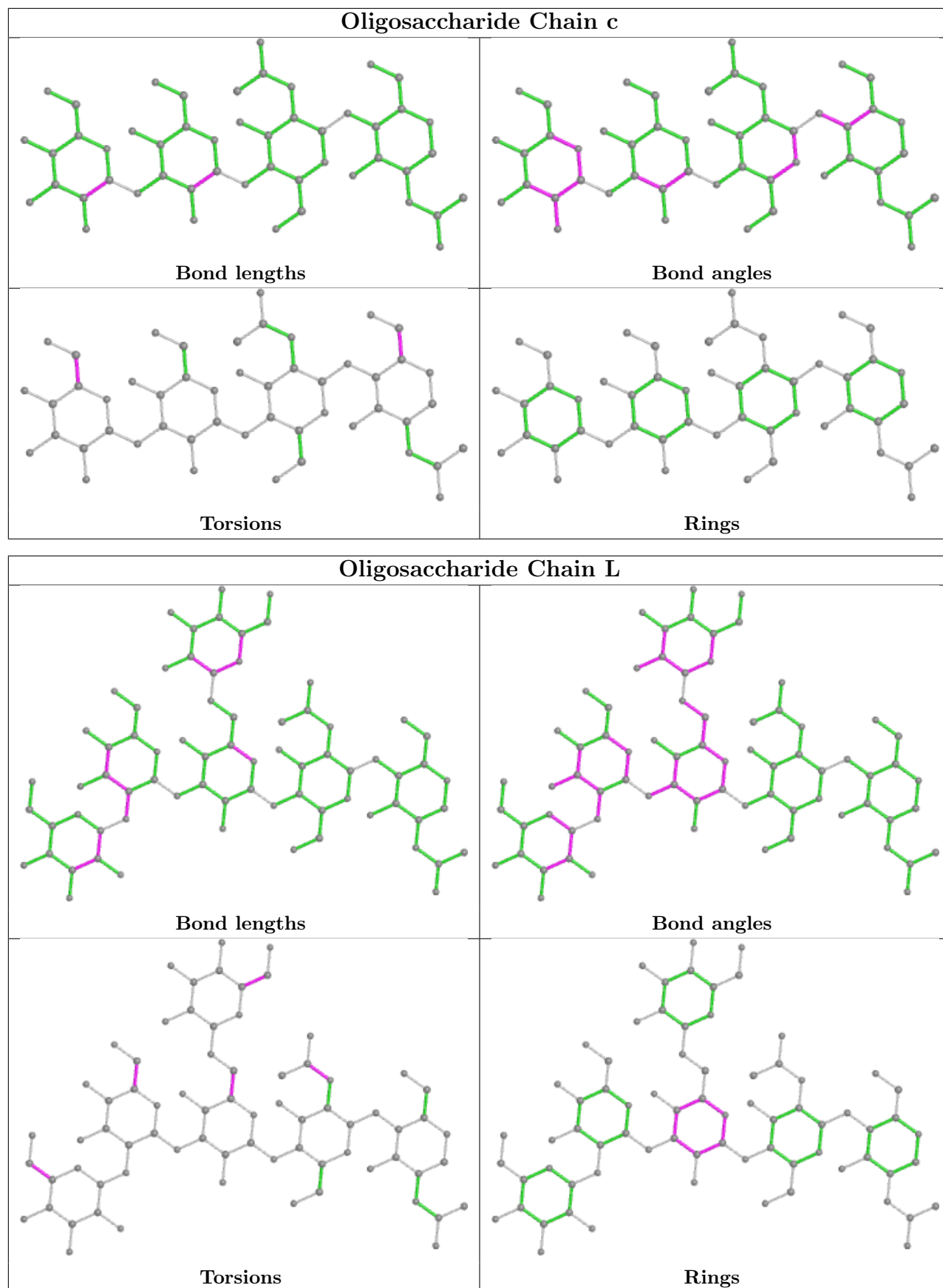


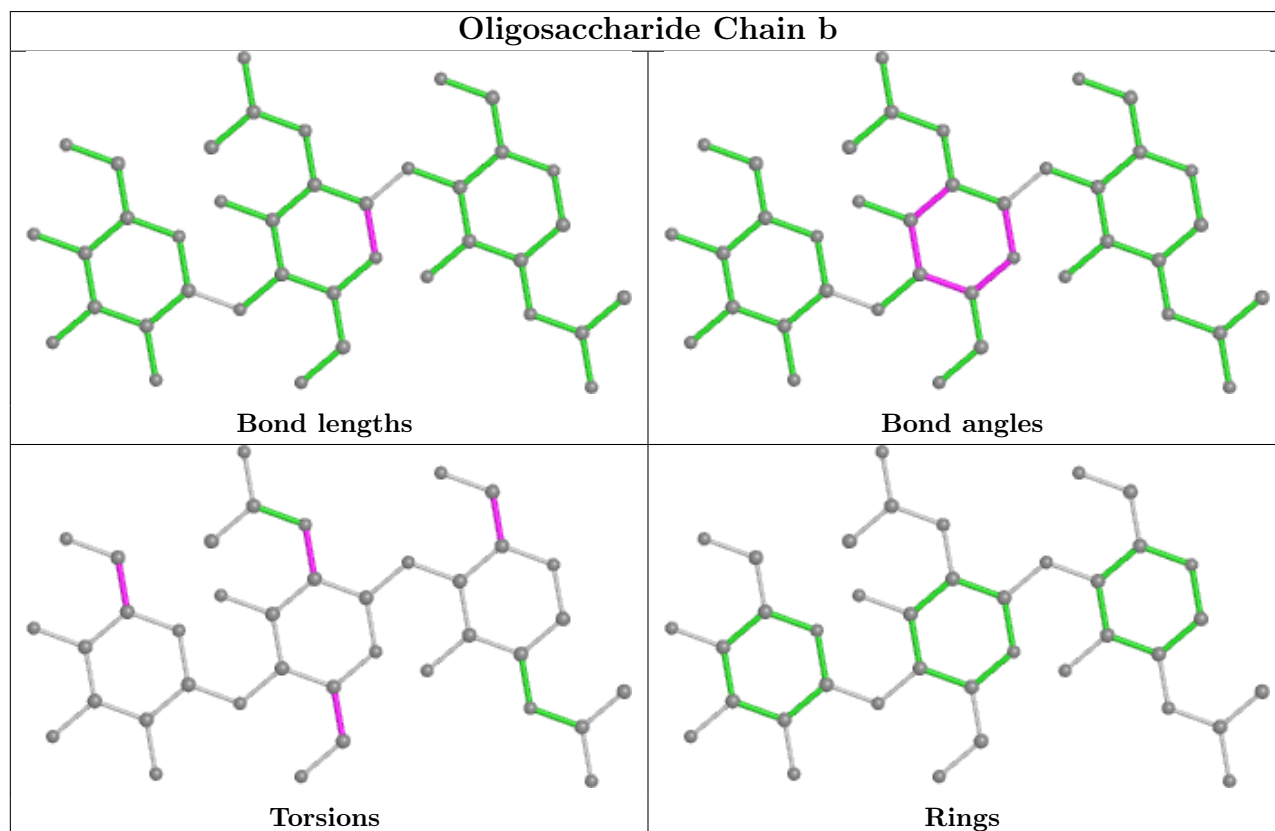
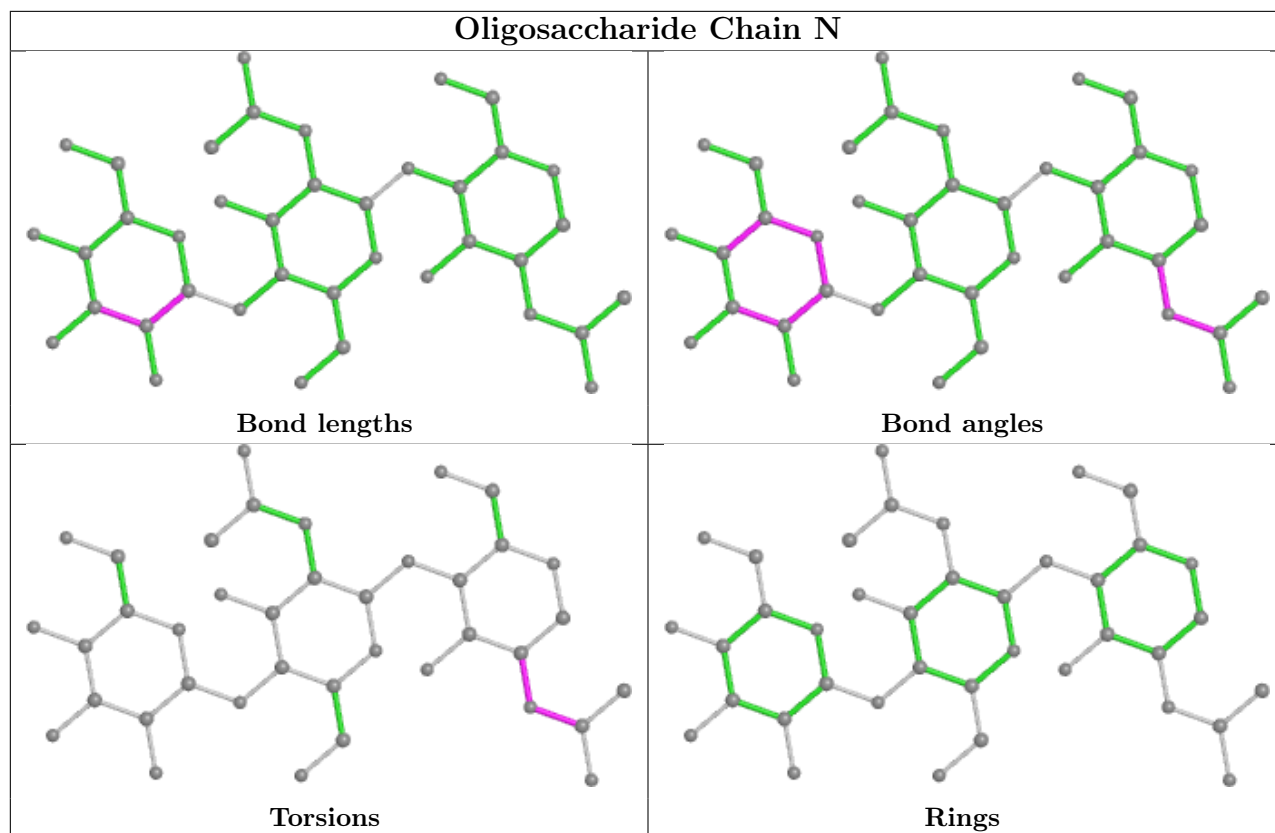


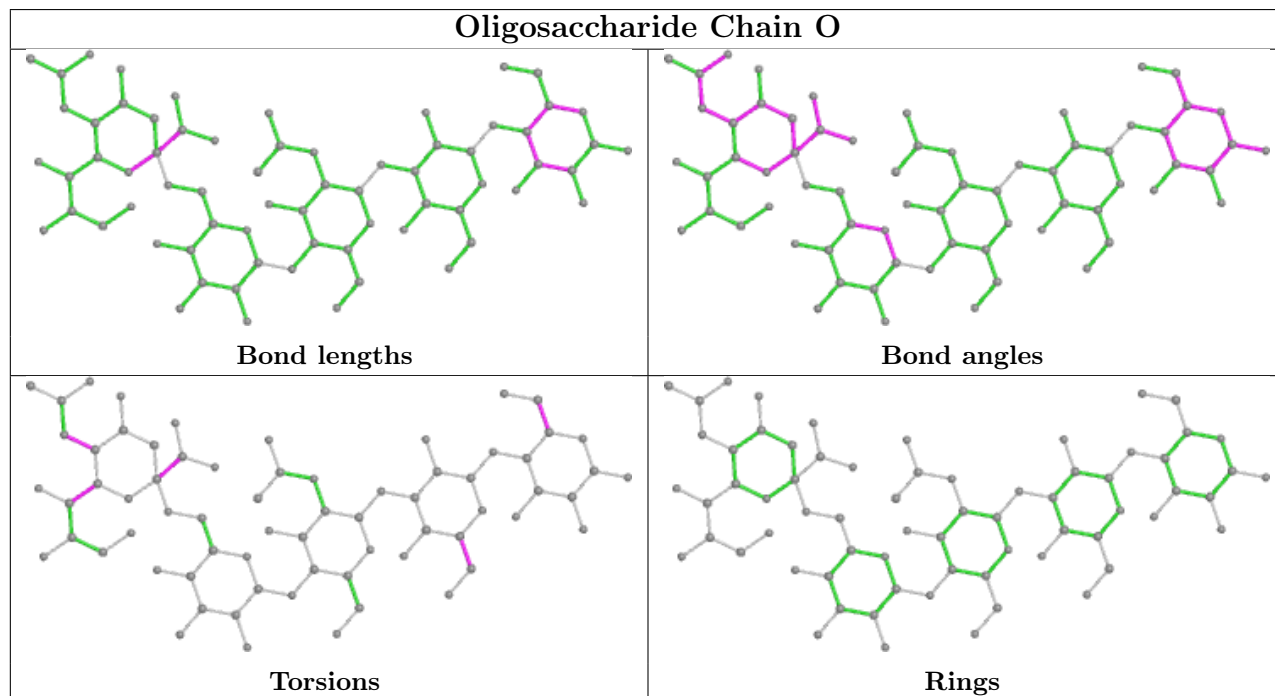
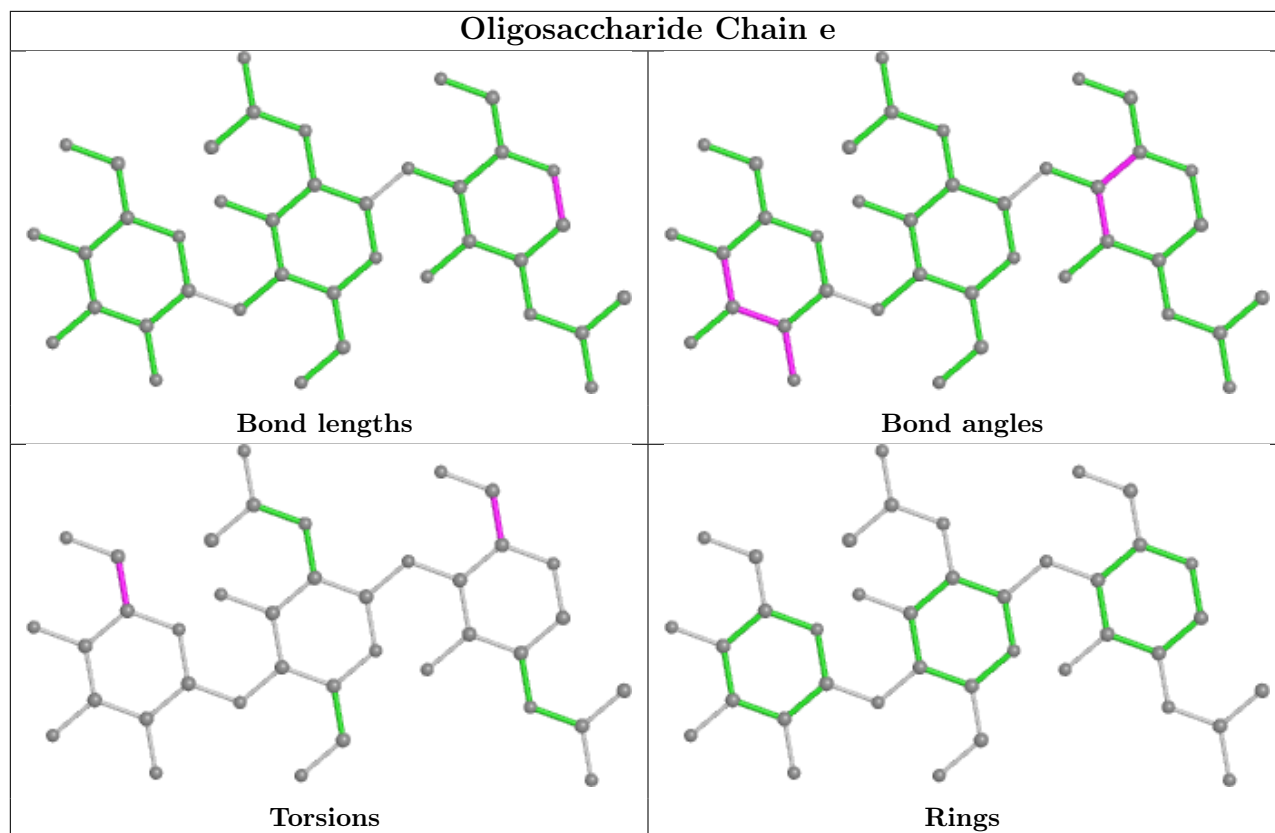


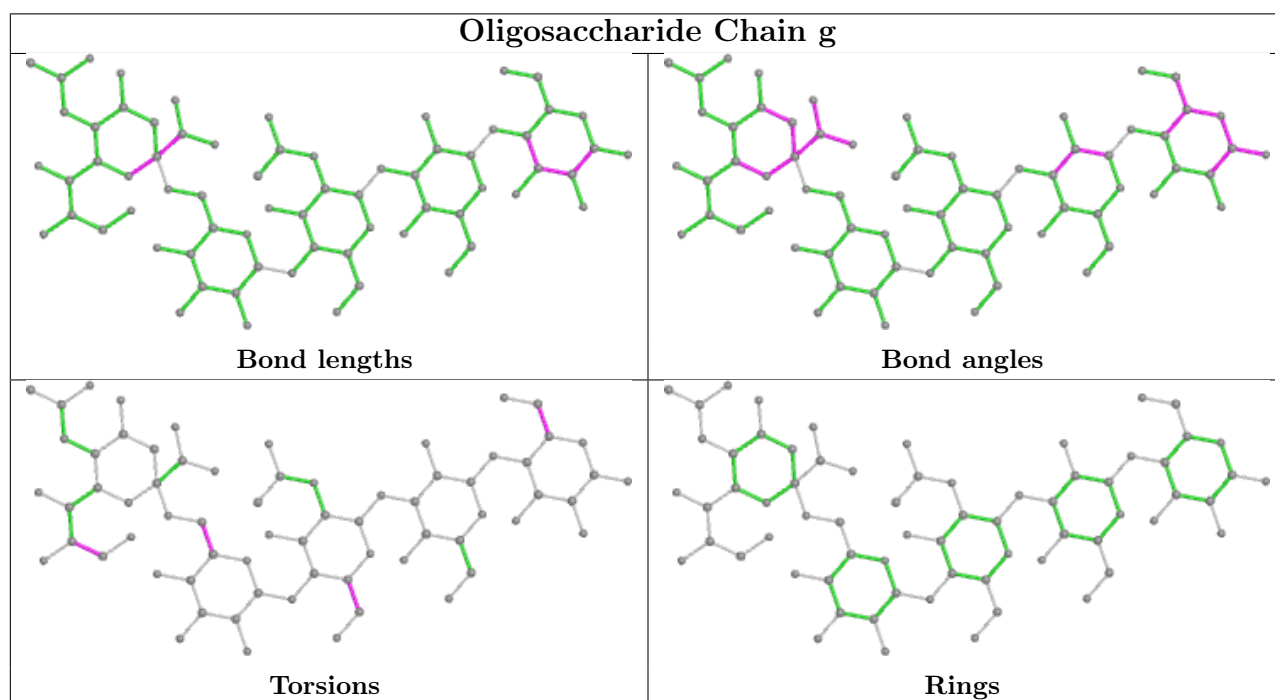
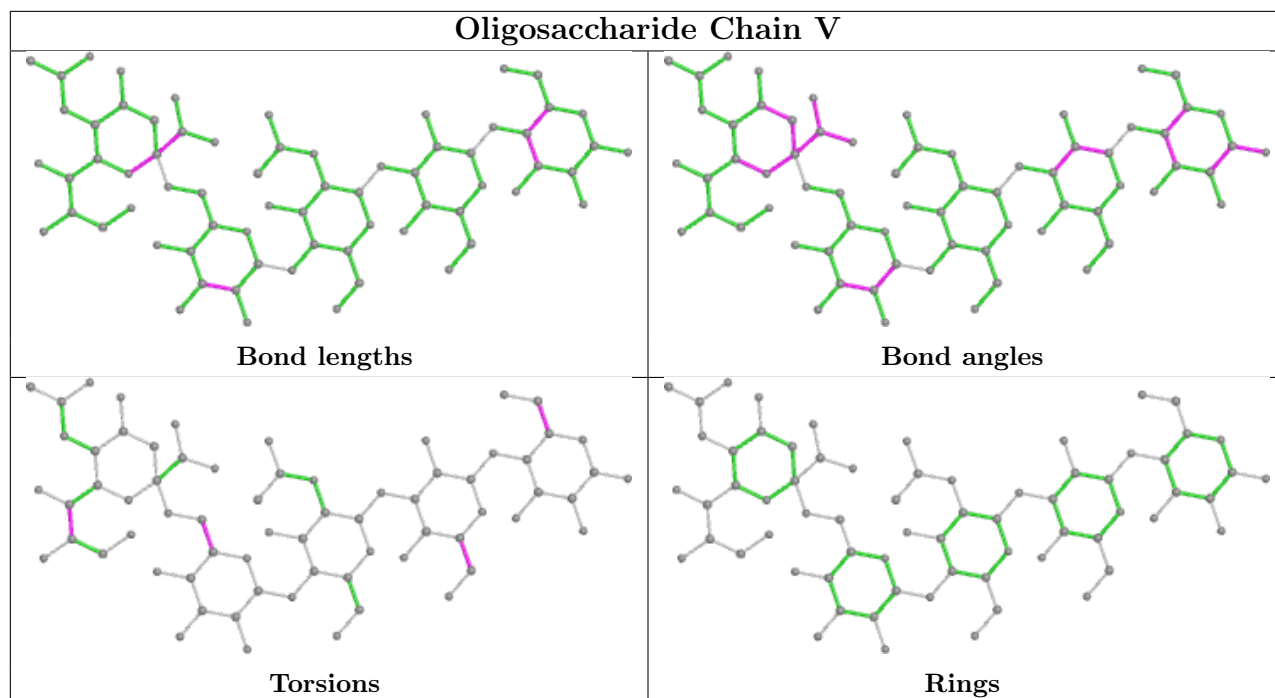


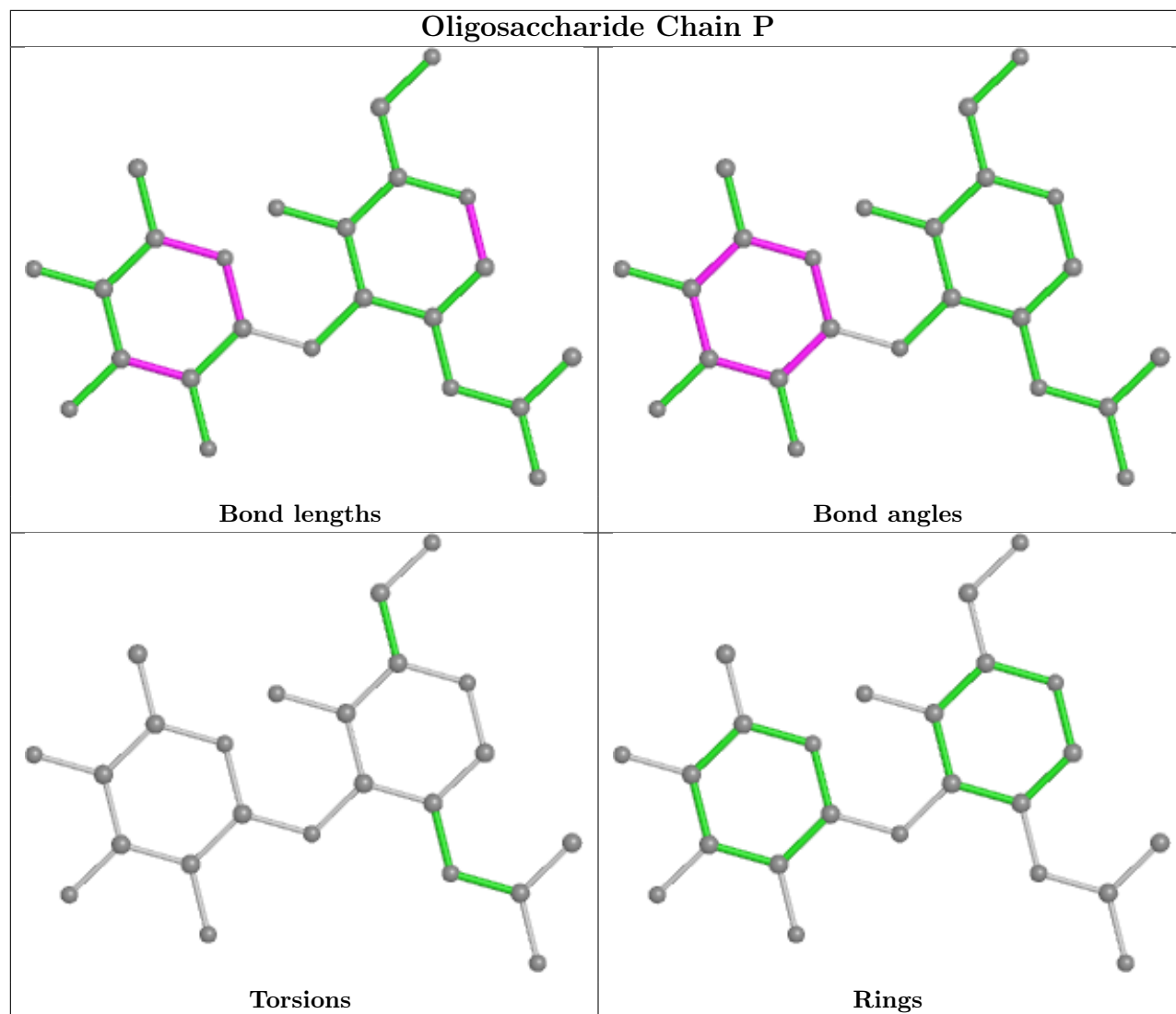


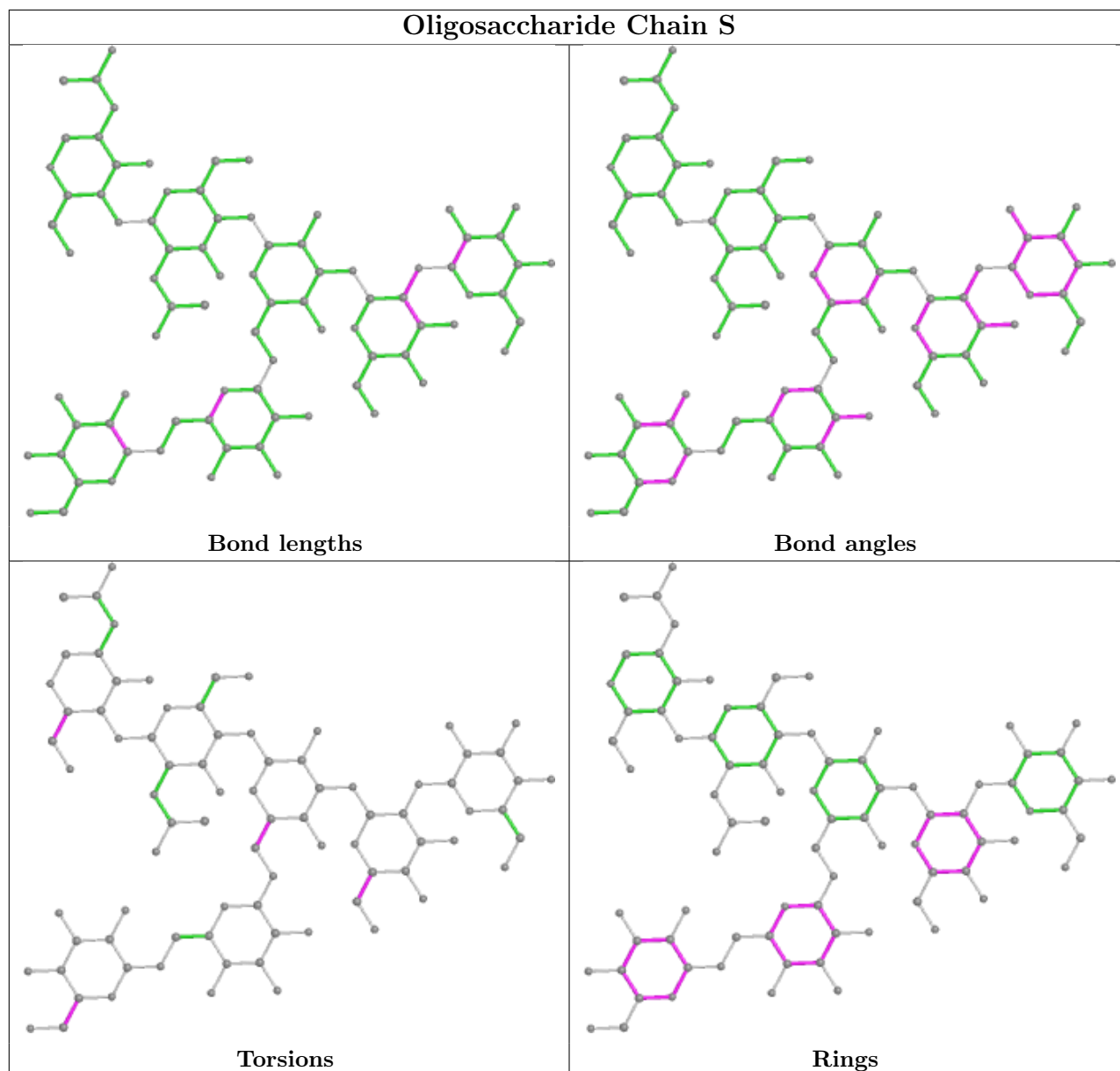


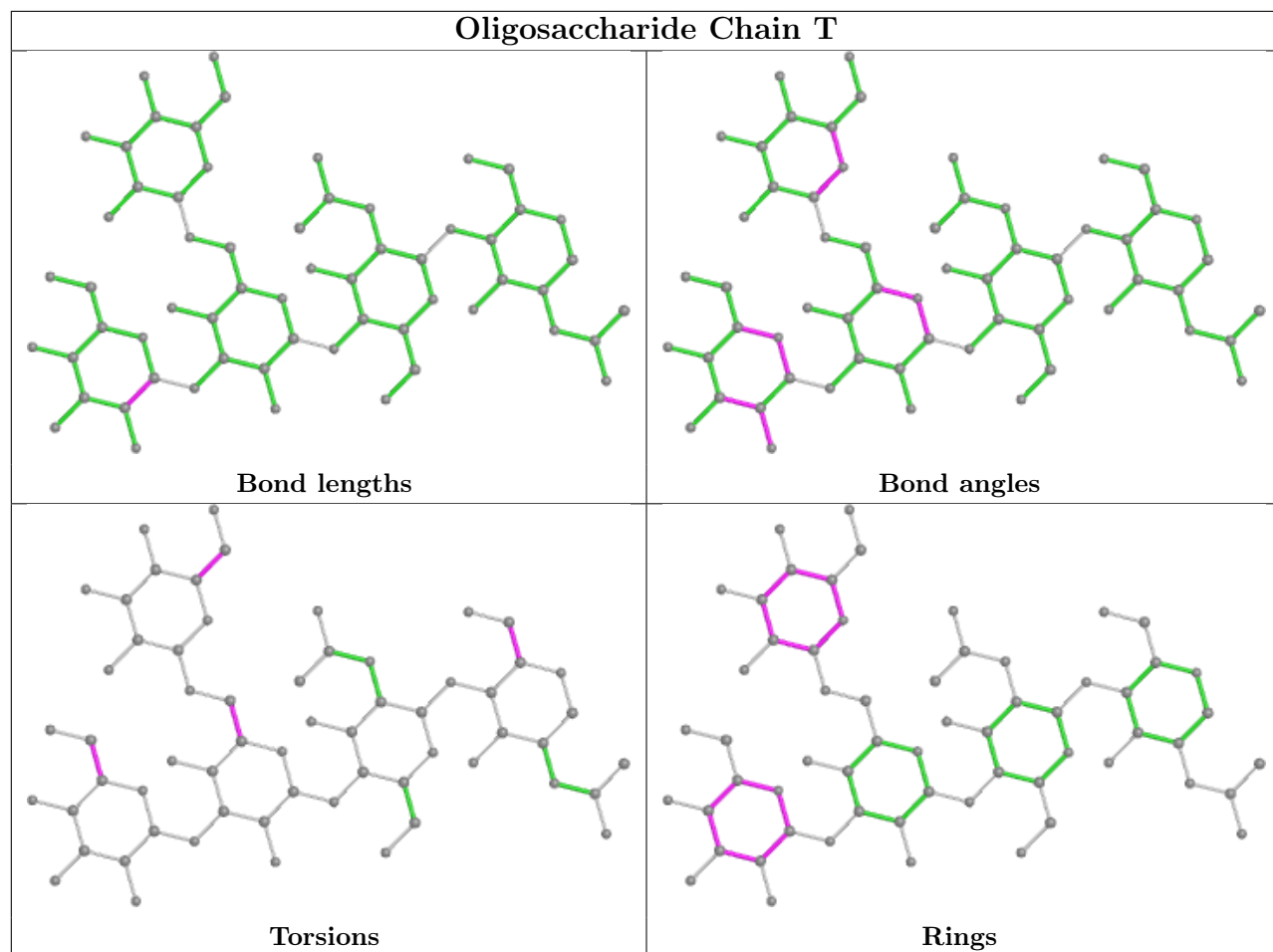


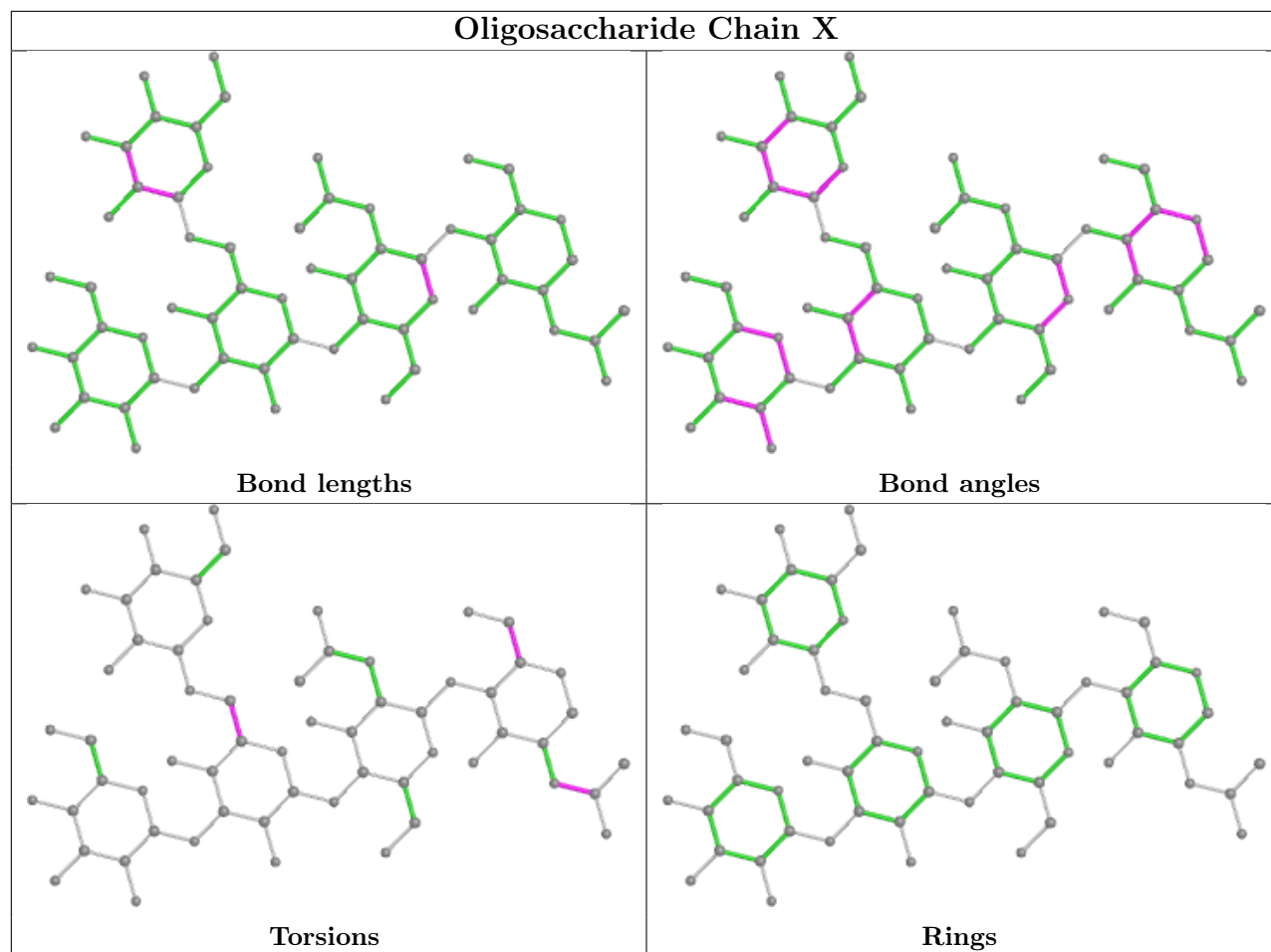




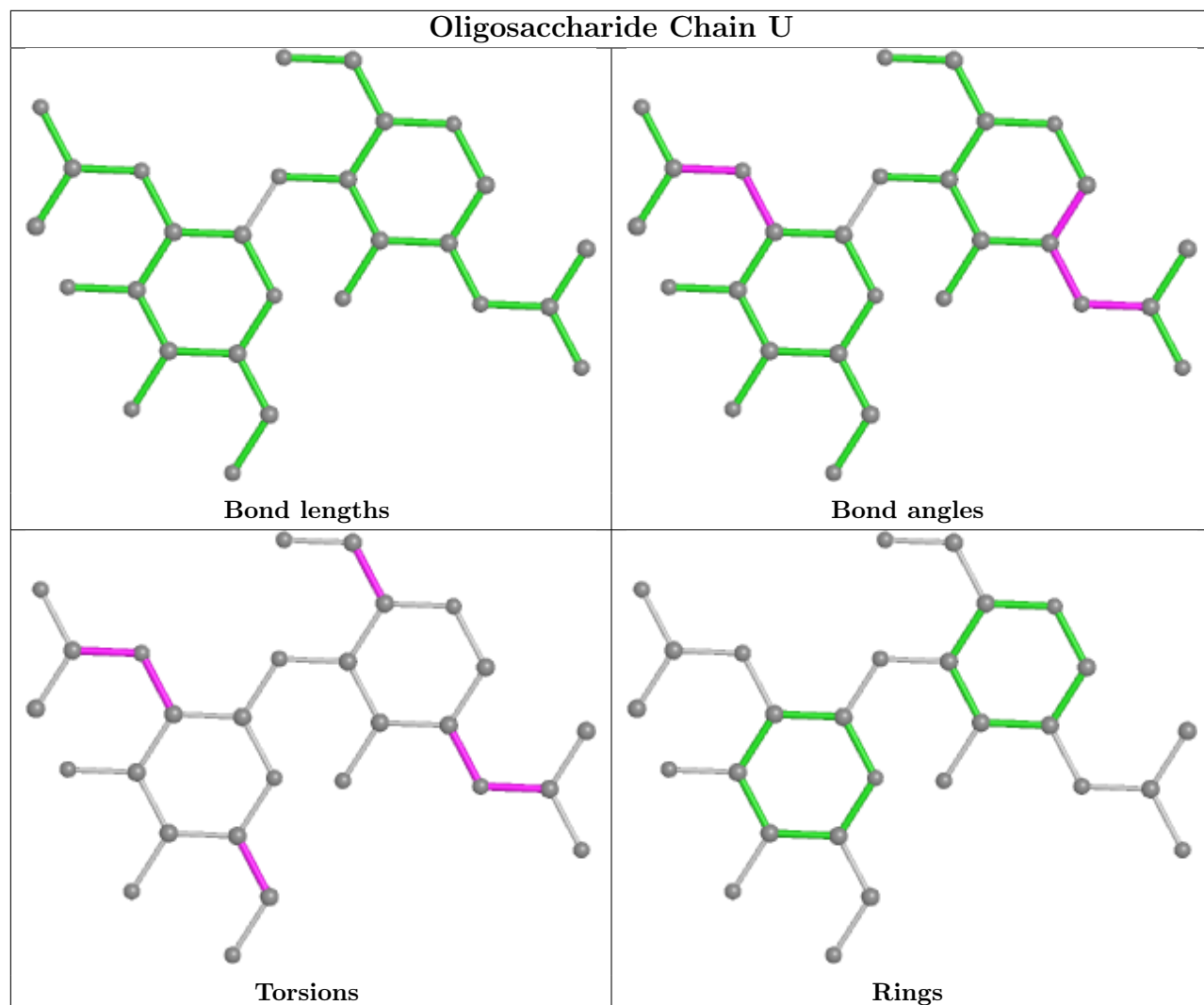


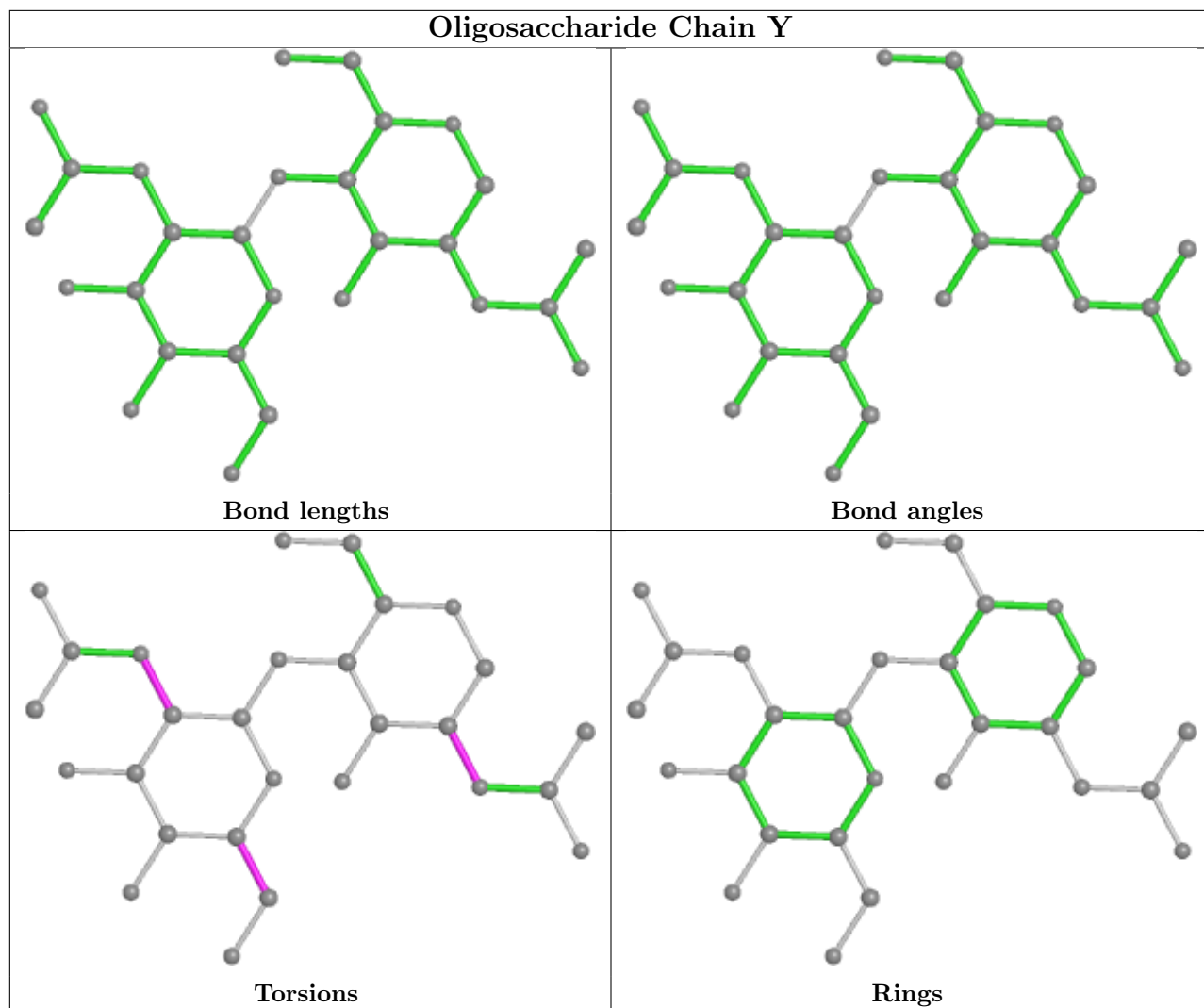


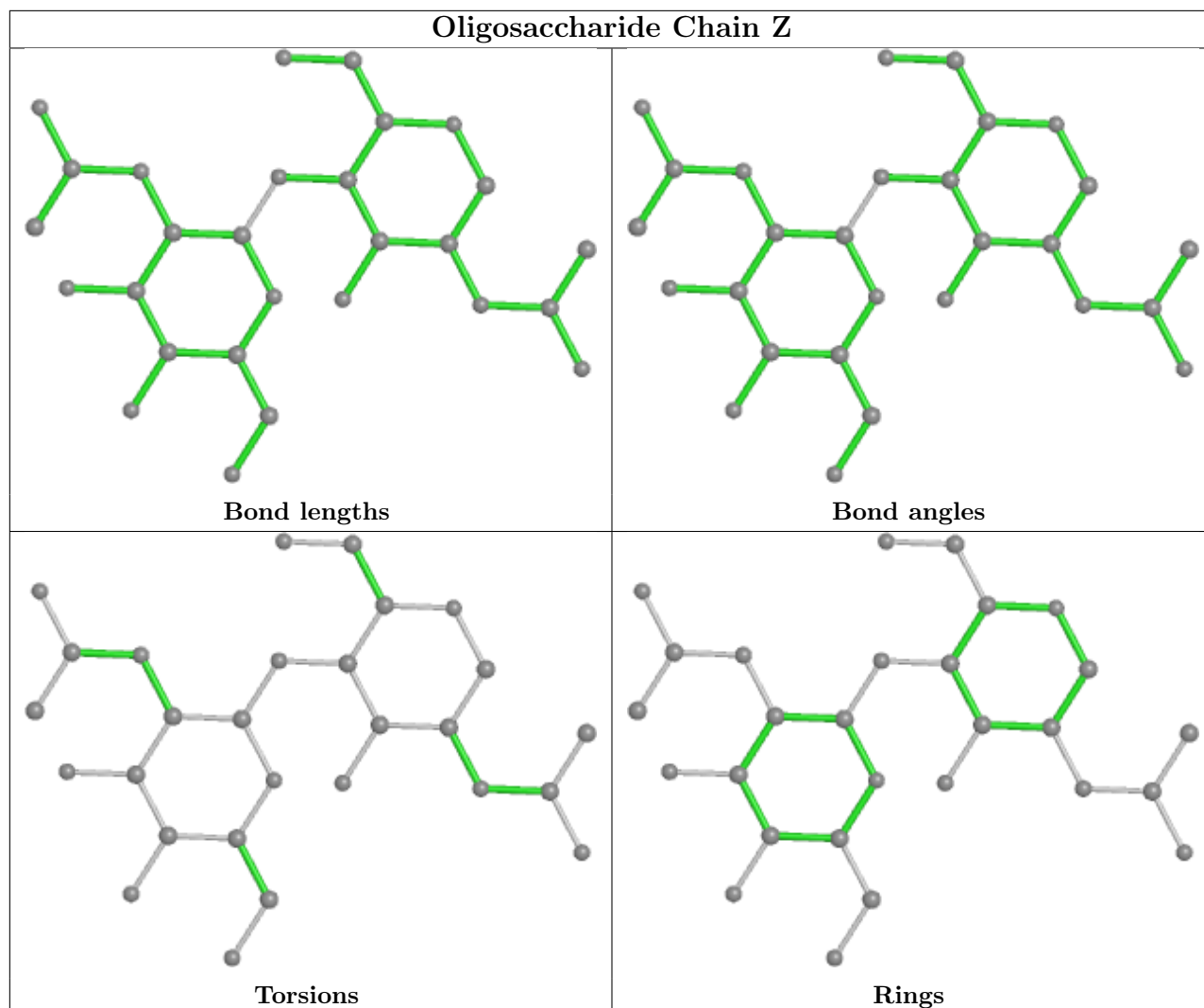


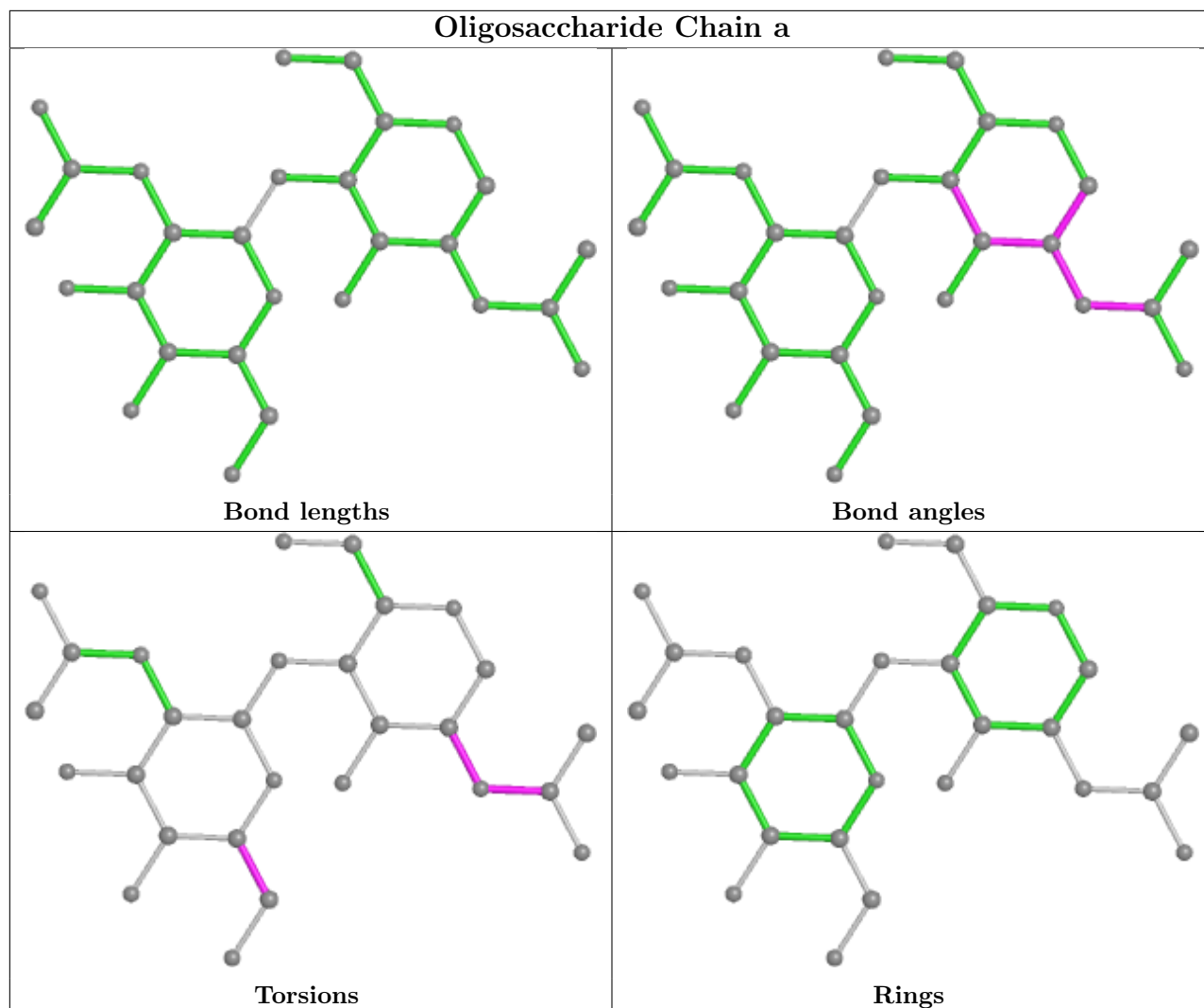


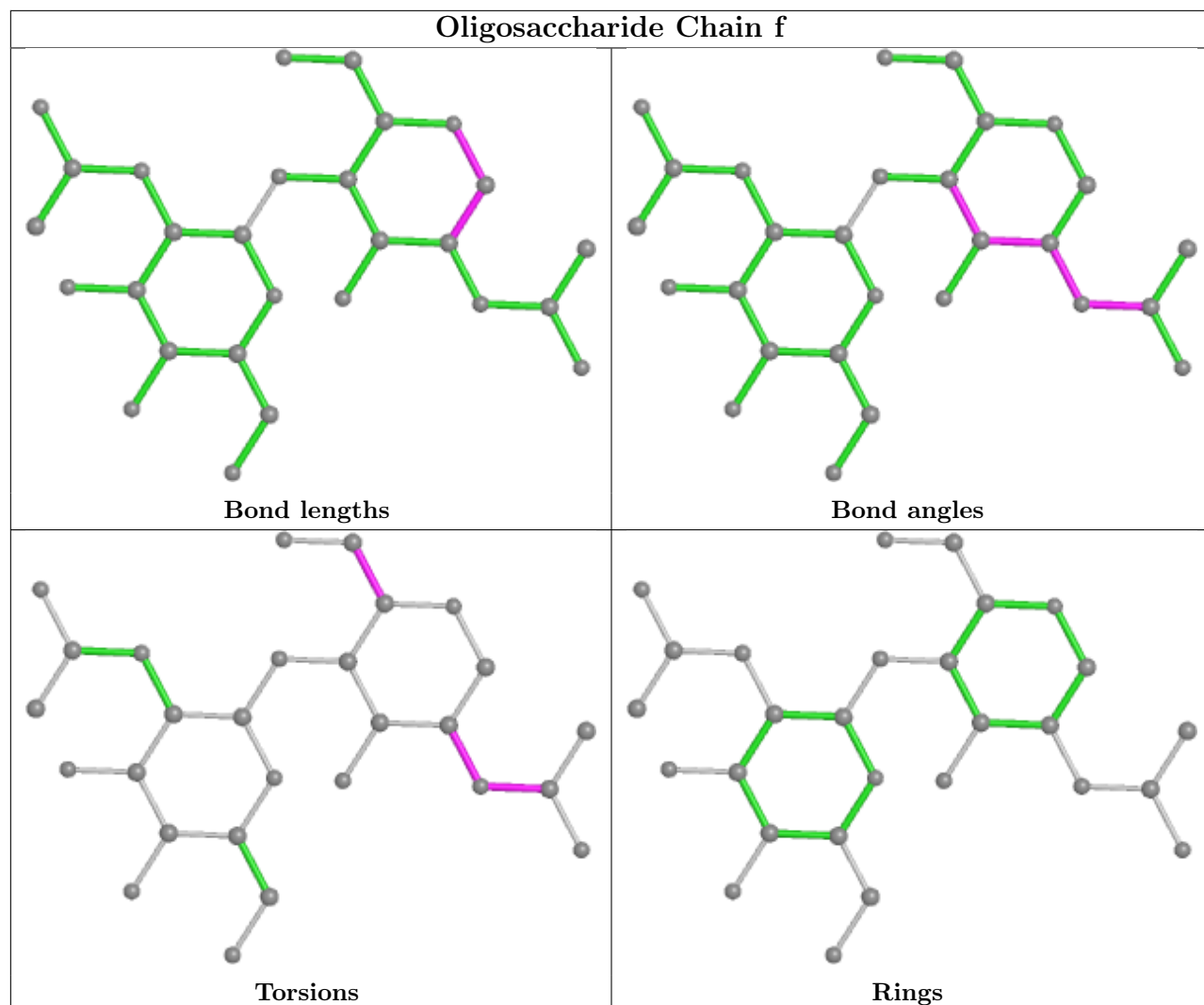


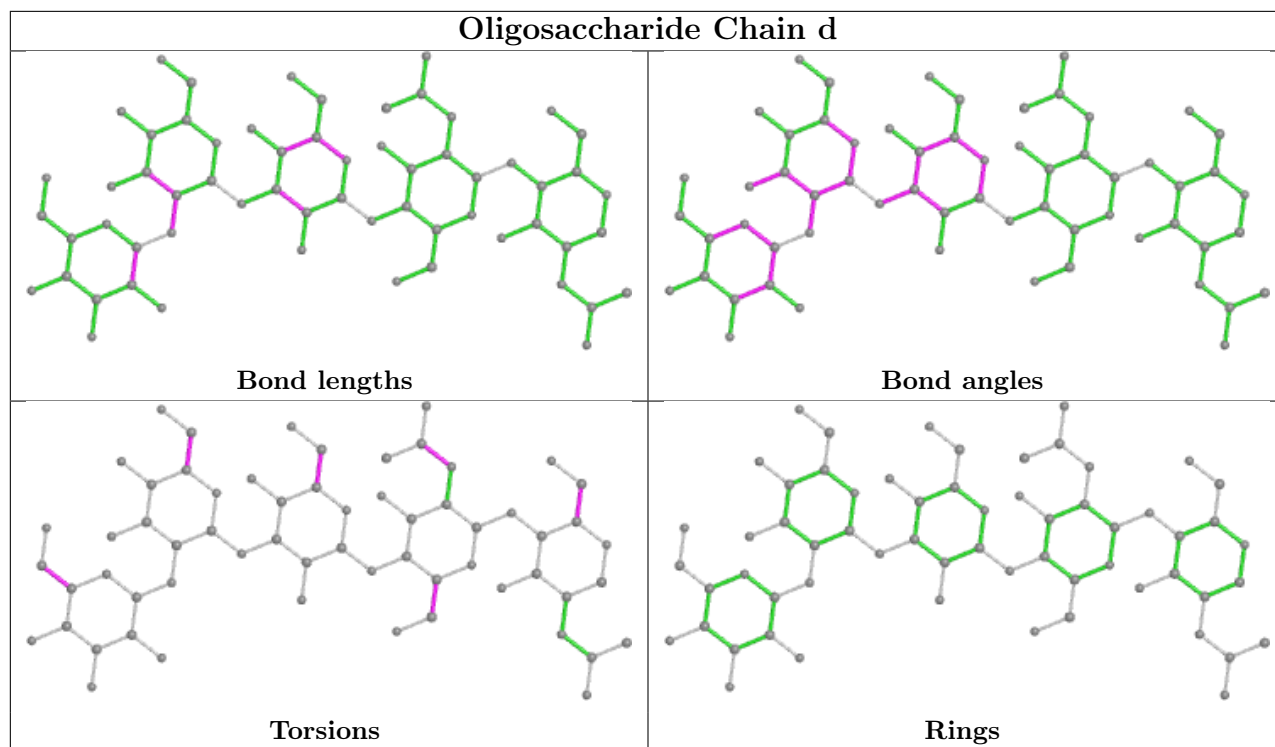












## 5.6 Ligand geometry [i](#)

8 ligands are modelled in this entry.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
14	NAG	G	416	1	14,14,15	1.29	1 (7%)	17,19,21	1.47	1 (5%)
14	NAG	D	202	2	14,14,15	1.12	1 (7%)	17,19,21	0.72	0
14	NAG	B	201	2	14,14,15	0.53	0	17,19,21	1.25	1 (5%)
14	NAG	F	201	2	14,14,15	0.36	0	17,19,21	0.63	1 (5%)
14	NAG	E	414	1	14,14,15	0.36	0	17,19,21	0.52	0
14	NAG	C	523	1	14,14,15	0.25	0	17,19,21	1.04	1 (5%)
14	NAG	A	522	1	14,14,15	0.36	0	17,19,21	0.48	0
15	CAC	D	201	-	0,4,4	-	-	0,6,6	-	-

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
14	NAG	G	416	1	-	2/6/23/26	0/1/1/1
14	NAG	D	202	2	-	0/6/23/26	0/1/1/1
14	NAG	B	201	2	-	2/6/23/26	0/1/1/1
14	NAG	F	201	2	-	2/6/23/26	0/1/1/1
14	NAG	E	414	1	-	0/6/23/26	0/1/1/1
14	NAG	C	523	1	-	2/6/23/26	0/1/1/1
14	NAG	A	522	1	-	0/6/23/26	0/1/1/1

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
14	G	416	NAG	O5-C1	4.66	1.51	1.43
14	D	202	NAG	O5-C1	-3.57	1.38	1.43

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
14	G	416	NAG	C1-O5-C5	5.84	120.10	112.19
14	B	201	NAG	C1-O5-C5	4.38	118.13	112.19
14	C	523	NAG	C1-O5-C5	3.51	116.95	112.19
14	F	201	NAG	C1-O5-C5	2.05	114.97	112.19

There are no chirality outliers.

All (8) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
14	G	416	NAG	O5-C5-C6-O6
14	B	201	NAG	O5-C5-C6-O6
14	C	523	NAG	O5-C5-C6-O6
14	B	201	NAG	C4-C5-C6-O6
14	G	416	NAG	C4-C5-C6-O6
14	C	523	NAG	C4-C5-C6-O6
14	F	201	NAG	O5-C5-C6-O6
14	F	201	NAG	C4-C5-C6-O6

There are no ring outliers.

No monomer is involved in short contacts.

## 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, 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	319/329 (96%)	-0.26	2 (0%) 89 89	36, 63, 116, 177	0
1	C	319/329 (96%)	-0.13	4 (1%) 77 77	46, 76, 116, 186	0
1	E	319/329 (96%)	-0.24	3 (0%) 84 84	52, 74, 111, 178	0
1	G	321/329 (97%)	0.00	11 (3%) 45 40	53, 92, 173, 245	0
2	B	172/174 (98%)	-0.24	1 (0%) 89 89	38, 60, 100, 139	0
2	D	172/174 (98%)	-0.19	1 (0%) 89 89	25, 76, 116, 163	0
2	F	172/174 (98%)	-0.17	1 (0%) 89 89	40, 71, 109, 160	0
2	H	172/174 (98%)	1.23	45 (26%) 0 0	50, 162, 227, 274	0
All	All	1966/2012 (97%)	-0.05	68 (3%) 44 38	25, 76, 174, 274	0

All (68) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	G	328	THR	13.0
2	H	133	MET	10.4
2	H	42	GLN	8.9
1	G	13	LEU	7.8
2	H	135	ASN	7.0
1	G	12	THR	6.7
2	H	2	ILE	6.3
2	H	134	GLY	5.2
2	H	33	GLY	5.2
2	H	31	GLY	4.9
2	H	158	ASP	4.7
2	H	119	PHE	4.6
2	H	160	ASP	4.5
2	D	58	LYS	4.5
2	H	20	GLY	4.3
2	H	141	TYR	4.3

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>	<b>RSRZ</b>
2	F	32	THR	4.3
2	H	1	GLY	4.2
1	G	11	ALA	4.2
2	H	144	CYS	4.0
2	H	172	GLN	3.9
2	H	169	ASN	3.8
1	G	327	GLN	3.8
2	H	23	GLY	3.8
1	A	8	ASN	3.8
2	H	32	THR	3.8
1	G	8	ASN	3.8
2	H	26	HIS	3.7
2	H	146	ASN	3.7
2	H	132	ASP	3.6
1	G	10	MET	3.6
2	H	30	GLU	3.3
2	H	24	PHE	3.3
2	H	35	ALA	3.2
2	H	143	LYS	3.1
1	G	9	SER	3.1
1	G	14	CYS	2.9
2	H	123	ARG	2.9
2	H	164	ASN	2.9
2	H	145	ASP	2.8
2	H	3	PHE	2.8
1	C	276	GLU	2.8
2	H	17	MET	2.8
2	H	22	TYR	2.7
1	C	8	ASN	2.7
2	H	37	ASP	2.7
2	H	21	TRP	2.7
2	H	38	LEU	2.6
2	H	18	VAL	2.6
2	H	140	ILE	2.6
1	A	10	MET	2.5
2	H	153	ARG	2.5
1	C	158	ASN	2.4
2	H	154	ASN	2.4
1	G	15	LEU	2.3
2	H	16	GLY	2.3
2	H	171	PHE	2.3
2	H	124	ARG	2.3

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Mol	Chain	Res	Type	RSRZ
2	H	28	ASN	2.3
2	H	27	GLN	2.3
2	H	52	LEU	2.2
1	C	127	TRP	2.1
1	E	9	SER	2.1
2	H	137	CYS	2.1
1	E	8	ASN	2.1
1	E	11	ALA	2.1
1	G	16	GLY	2.0
2	B	171	PHE	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
7	BMA	N	3	11/12	0.58	0.38	175,201,208,210	0
5	BMA	Q	3	11/12	0.60	0.26	197,204,208,208	0
11	MAN	T	4	11/12	0.61	0.43	137,173,185,188	0
11	MAN	T	5	11/12	0.61	0.43	150,179,184,186	0
5	BMA	W	3	11/12	0.63	0.30	196,199,202,203	0
4	MAN	M	4	11/12	0.66	0.32	142,159,173,180	0
4	BMA	M	3	11/12	0.66	0.43	185,198,205,205	0
11	MAN	X	4	11/12	0.69	0.25	104,160,175,176	0
4	MAN	J	4	11/12	0.70	0.26	147,161,172,176	0
7	NAG	N	2	14/15	0.71	0.35	138,187,202,212	0
12	NAG	U	2	14/15	0.71	0.31	147,171,181,182	0
12	NAG	f	2	14/15	0.71	0.35	136,171,182,184	0
13	MAN	d	4	11/12	0.71	0.31	160,181,191,196	0
13	MAN	d	5	11/12	0.71	0.37	163,174,189,190	0
5	MAN	c	4	11/12	0.72	0.32	153,179,183,185	0
10	MAN	S	7	11/12	0.73	0.38	181,183,188,189	0
11	MAN	X	5	11/12	0.73	0.14	114,133,140,141	0
7	BMA	e	3	11/12	0.74	0.34	153,178,185,186	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å <sup>2</sup> )	Q<0.9
11	BMA	T	3	11/12	0.74	0.30	172,186,187,189	0
12	NAG	Y	2	14/15	0.77	0.48	178,182,187,189	0
12	NAG	f	1	14/15	0.78	0.25	110,142,172,184	0
5	MAN	R	4	11/12	0.78	0.33	164,184,193,194	0
5	MAN	Q	4	11/12	0.79	0.33	180,193,203,203	0
6	MAN	L	5	11/12	0.80	0.32	132,170,178,178	0
5	NAG	W	2	14/15	0.80	0.25	132,167,182,192	0
8	BGC	V	1	12/12	0.80	0.33	129,146,153,155	0
6	MAN	L	6	11/12	0.81	0.39	147,160,167,167	0
12	NAG	a	2	14/15	0.81	0.38	124,169,182,185	0
5	NAG	R	2	14/15	0.81	0.21	102,126,149,158	0
10	MAN	S	6	11/12	0.81	0.27	155,172,181,182	0
13	MAN	d	3	11/12	0.81	0.20	164,177,193,200	0
5	BMA	c	3	11/12	0.81	0.36	161,186,195,195	0
7	NAG	e	1	14/15	0.81	0.24	98,114,130,147	0
8	BGC	g	1	12/12	0.82	0.43	167,182,186,189	0
5	MAN	W	4	11/12	0.82	0.43	167,187,193,194	0
9	NAG	P	1	14/15	0.83	0.28	136,162,179,196	0
5	BMA	K	3	11/12	0.84	0.20	144,171,177,178	0
5	NAG	R	1	14/15	0.84	0.26	102,126,141,150	0
11	NAG	T	2	14/15	0.84	0.37	97,158,173,184	0
4	NAG	M	2	14/15	0.84	0.34	112,171,187,198	0
7	NAG	N	1	14/15	0.85	0.19	100,128,154,176	0
10	MAN	S	3	11/12	0.85	0.14	101,135,153,160	0
7	NAG	b	1	14/15	0.85	0.22	144,171,190,199	0
7	NAG	e	2	14/15	0.86	0.37	86,155,172,177	0
5	NAG	Q	2	14/15	0.86	0.33	129,175,188,197	0
7	BMA	b	3	11/12	0.86	0.26	167,179,193,193	0
3	NAG	I	1	14/15	0.86	0.24	131,141,150,153	0
11	BMA	X	3	11/12	0.86	0.22	138,156,162,164	0
9	FUL	P	2	10/11	0.87	0.24	179,182,184,185	0
12	NAG	a	1	14/15	0.87	0.20	102,121,148,167	0
7	NAG	b	2	14/15	0.87	0.35	166,205,210,210	0
12	NAG	Y	1	14/15	0.87	0.29	113,148,163,167	0
10	MAN	S	5	11/12	0.88	0.29	137,162,168,170	0
12	NAG	Z	2	14/15	0.88	0.48	156,192,207,214	0
13	NAG	d	2	14/15	0.88	0.23	108,130,159,166	0
6	MAN	L	4	11/12	0.89	0.33	170,179,185,190	0
5	NAG	W	1	14/15	0.89	0.14	100,121,145,165	0
4	BMA	J	3	11/12	0.89	0.18	143,161,171,185	0
3	FUL	I	2	10/11	0.89	0.27	151,161,168,176	0
11	NAG	X	2	14/15	0.89	0.17	77,107,124,128	0

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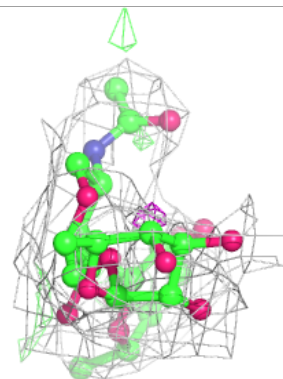
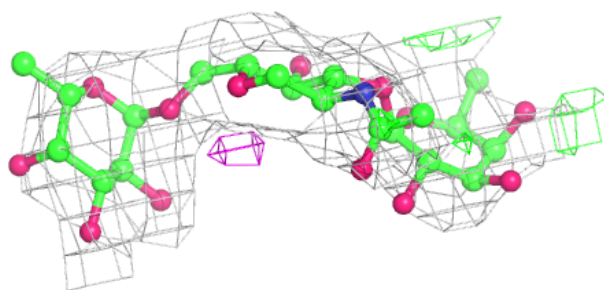
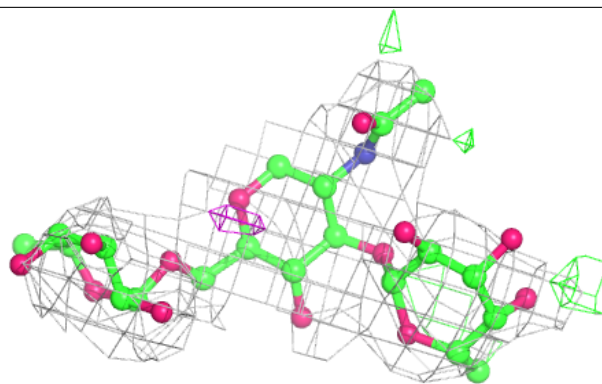
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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors( $\text{\AA}^2$ )	Q<0.9
3	FUC	I	3	10/11	0.90	0.42	139,152,159,161	0
5	NAG	K	1	14/15	0.90	0.16	93,107,114,123	0
4	NAG	M	1	14/15	0.90	0.16	78,98,119,147	0
5	MAN	K	4	11/12	0.90	0.28	140,160,169,170	0
6	MAN	L	3	11/12	0.91	0.20	153,158,164,175	0
5	BMA	R	3	11/12	0.91	0.13	122,160,173,187	0
8	GAL	V	2	11/12	0.91	0.25	105,138,153,154	0
8	NAG	V	3	14/15	0.91	0.21	76,124,140,140	0
5	NAG	Q	1	14/15	0.91	0.15	82,95,125,148	0
8	GAL	g	2	11/12	0.91	0.35	162,174,179,180	0
8	NAG	g	3	14/15	0.91	0.29	150,166,172,173	0
8	GAL	g	4	11/12	0.91	0.36	142,149,154,154	0
5	NAG	c	2	14/15	0.91	0.27	123,161,177,191	0
4	NAG	J	2	14/15	0.91	0.23	94,121,136,150	0
5	NAG	K	2	14/15	0.91	0.15	112,135,147,164	0
12	NAG	U	1	14/15	0.91	0.18	125,135,156,170	0
8	BGC	O	1	12/12	0.92	0.23	101,129,142,144	0
6	NAG	L	2	14/15	0.92	0.24	98,113,136,138	0
11	NAG	X	1	14/15	0.92	0.12	84,103,114,115	0
10	MAN	S	4	11/12	0.92	0.29	141,169,172,177	0
5	NAG	c	1	14/15	0.92	0.16	108,131,147,155	0
12	NAG	Z	1	14/15	0.94	0.31	104,115,130,152	0
6	NAG	L	1	14/15	0.94	0.14	71,83,106,109	0
8	SIA	V	5	20/21	0.94	0.30	86,110,139,139	0
11	NAG	T	1	14/15	0.94	0.34	85,98,117,132	0
10	NAG	S	2	14/15	0.94	0.28	87,103,115,137	0
8	SIA	g	5	20/21	0.95	0.38	107,142,149,149	0
8	GAL	V	4	11/12	0.95	0.19	113,124,135,139	0
4	NAG	J	1	14/15	0.95	0.13	66,77,101,114	0
8	SIA	O	5	20/21	0.96	0.22	67,89,119,129	0
8	GAL	O	2	11/12	0.96	0.17	97,111,116,118	0
8	NAG	O	3	14/15	0.96	0.21	73,98,108,115	0
13	NAG	d	1	14/15	0.96	0.10	86,101,119,123	0
10	NAG	S	1	14/15	0.97	0.23	50,82,109,110	0
8	GAL	O	4	11/12	0.98	0.12	71,77,91,99	0

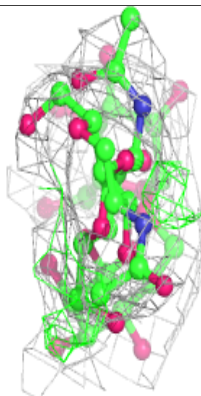
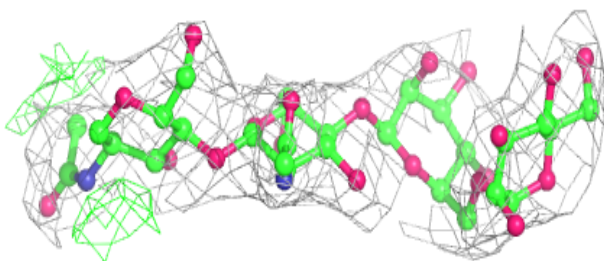
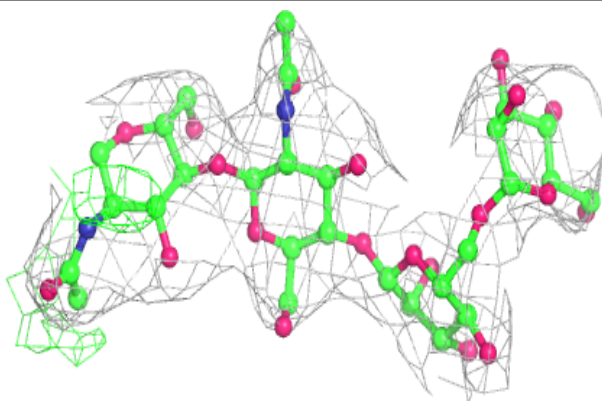
The following is a graphical depiction of the model fit to experimental electron density for oligosaccharide. Each fit is shown from different orientation to approximate a three-dimensional view.

**Electron density around Chain I:**

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

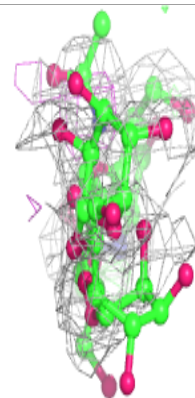
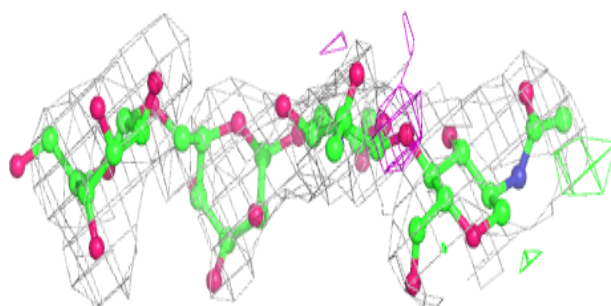
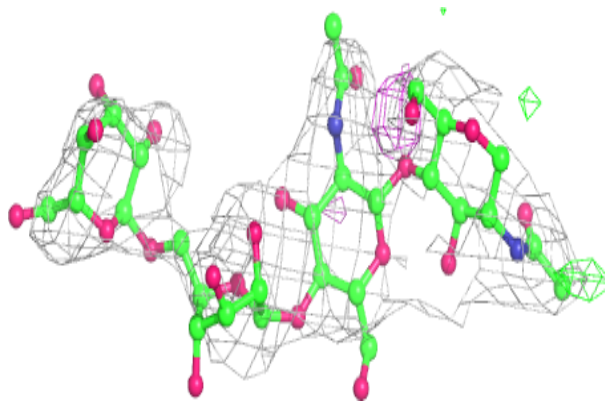
**Electron density around Chain J:**

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

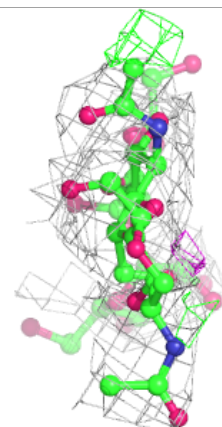
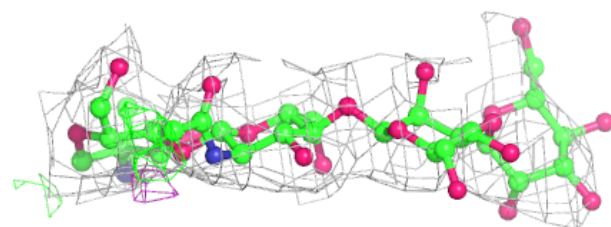
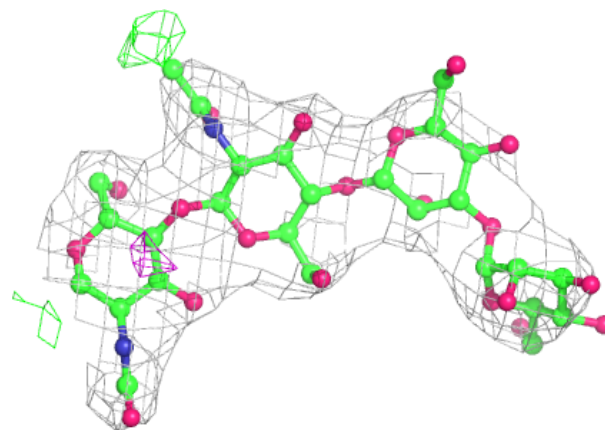


**Electron density around Chain M:**

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

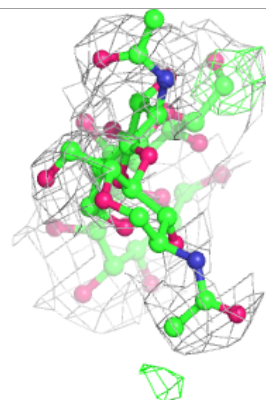
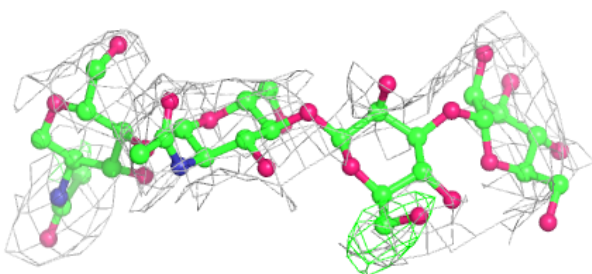
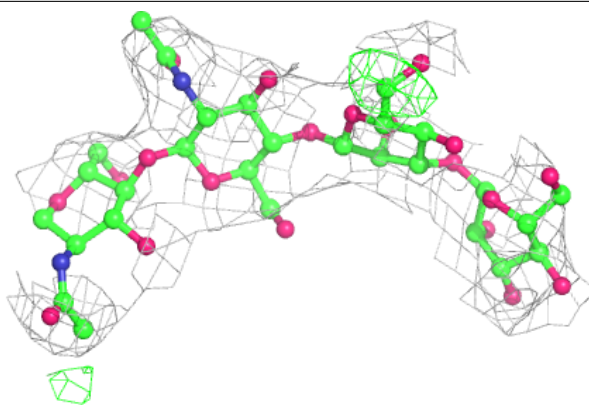
**Electron density around Chain K:**

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

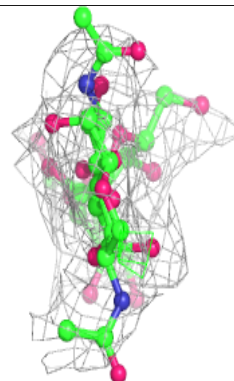
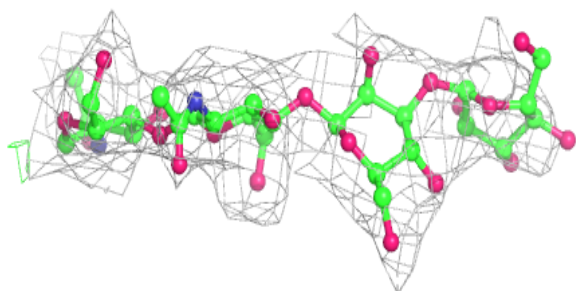
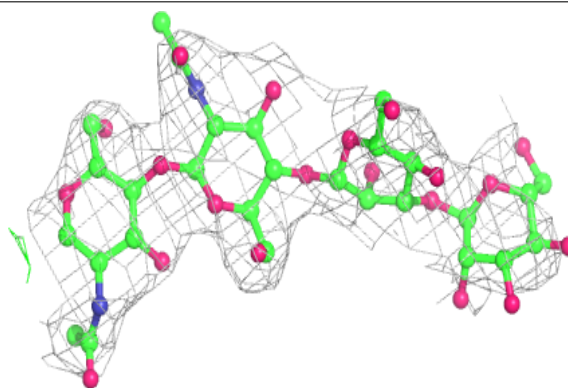


**Electron density around Chain Q:**

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

**Electron density around Chain R:**

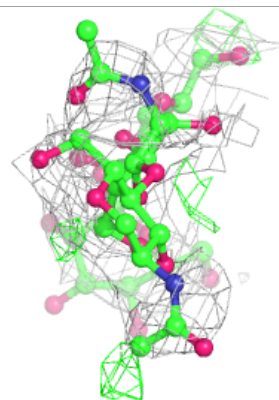
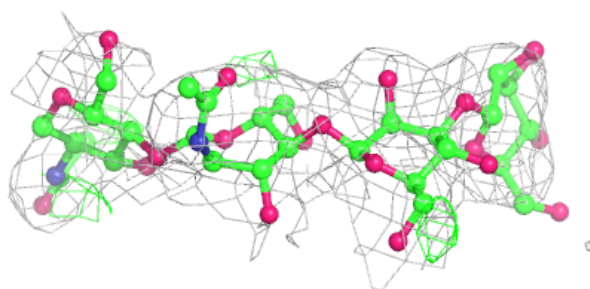
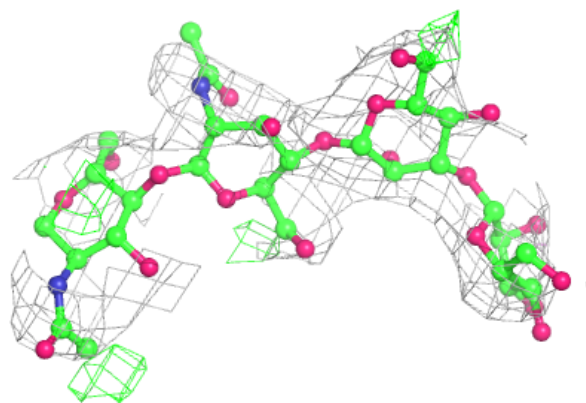
$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)



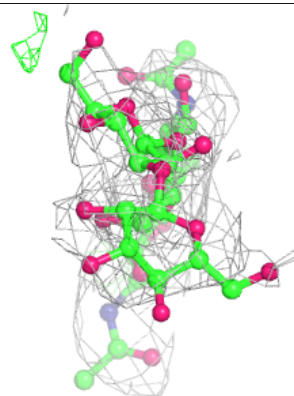
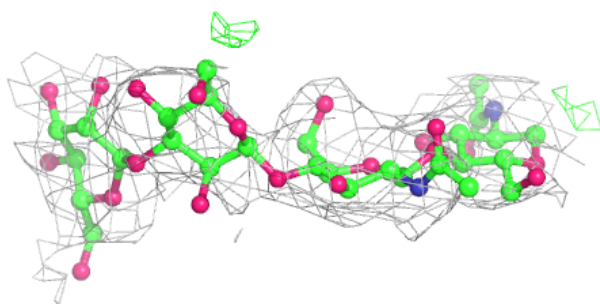
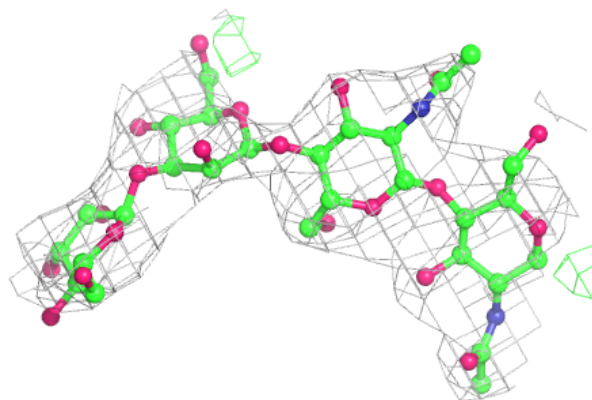


**Electron density around Chain W:**

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

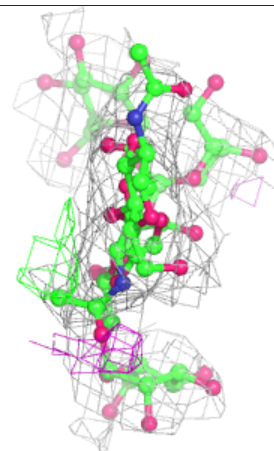
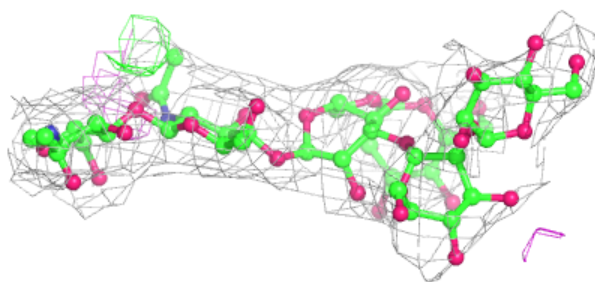
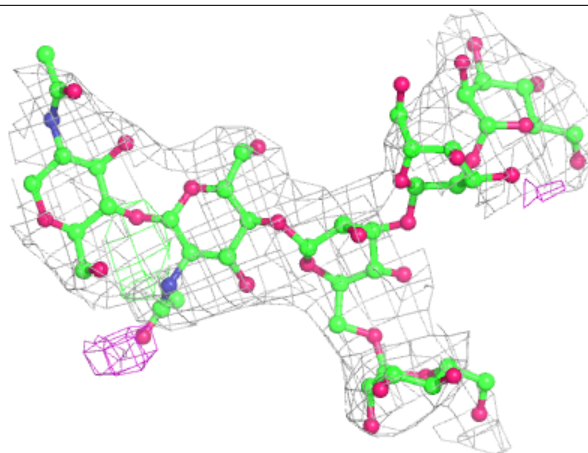
**Electron density around Chain c:**

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

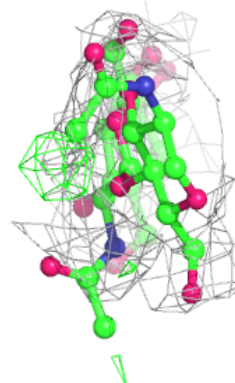
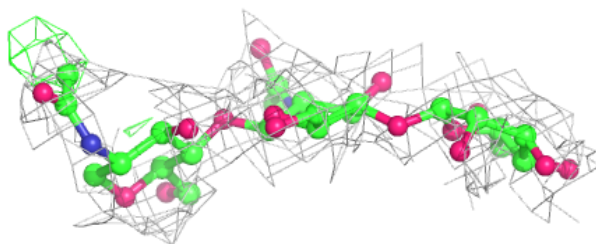
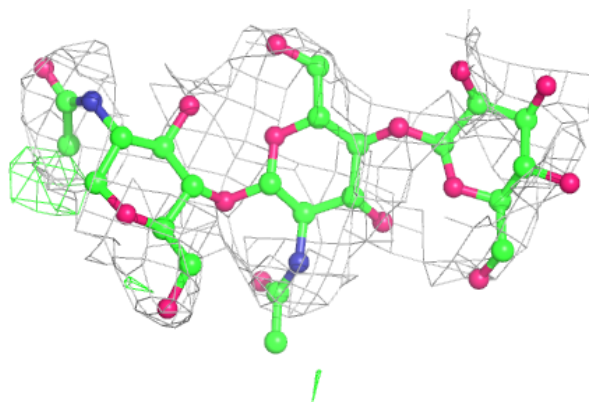


**Electron density around Chain L:**

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

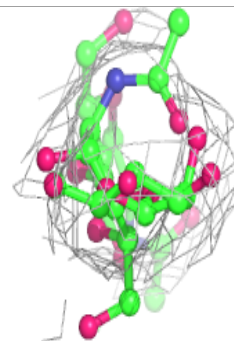
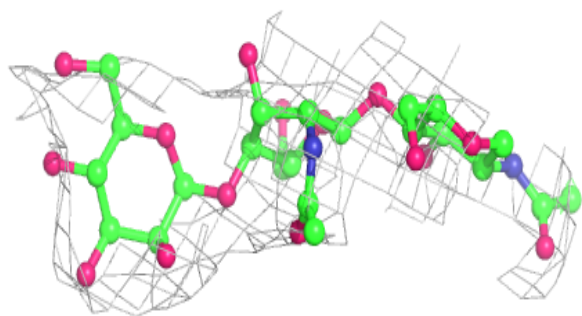
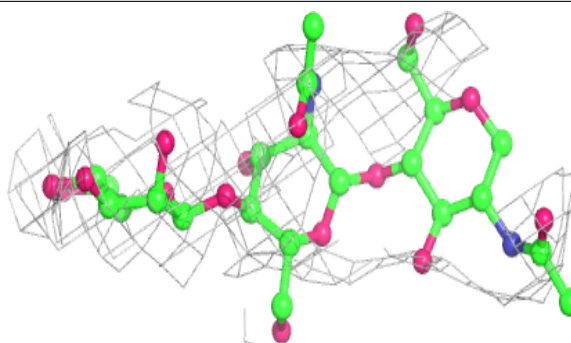
**Electron density around Chain N:**

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

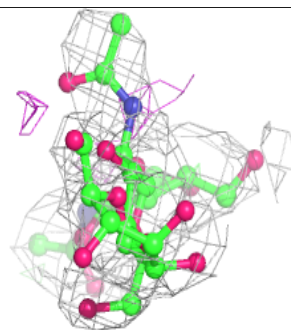
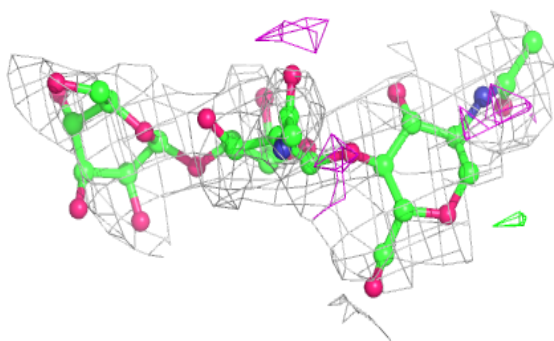
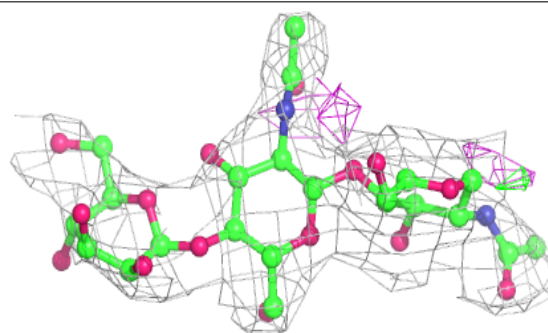


**Electron density around Chain b:**

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

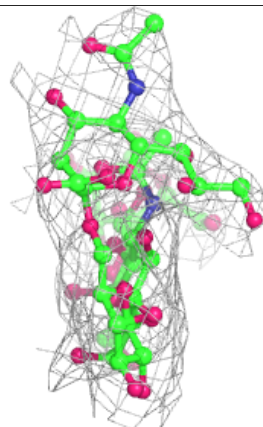
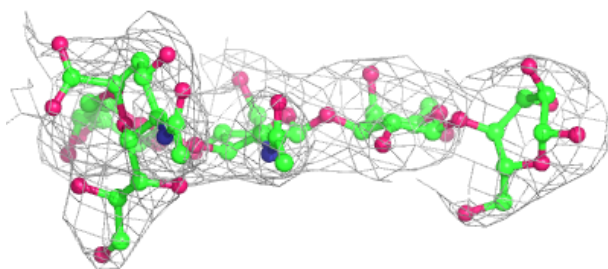
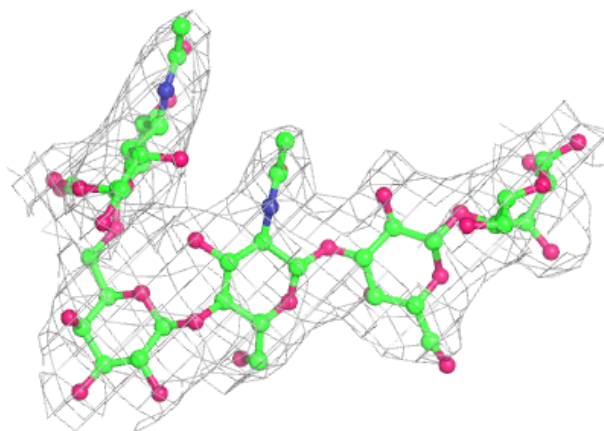
**Electron density around Chain e:**

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

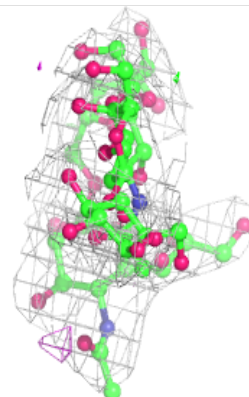
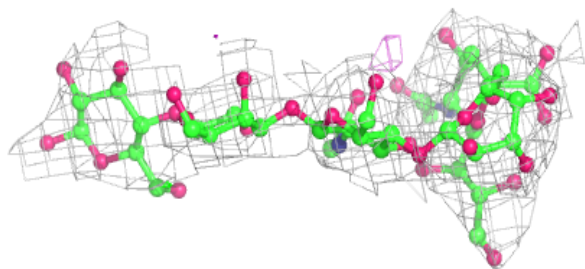
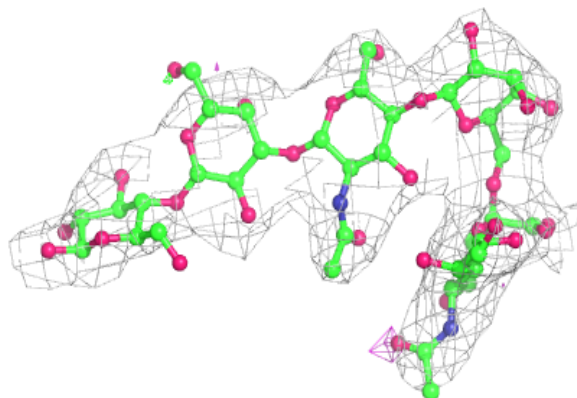


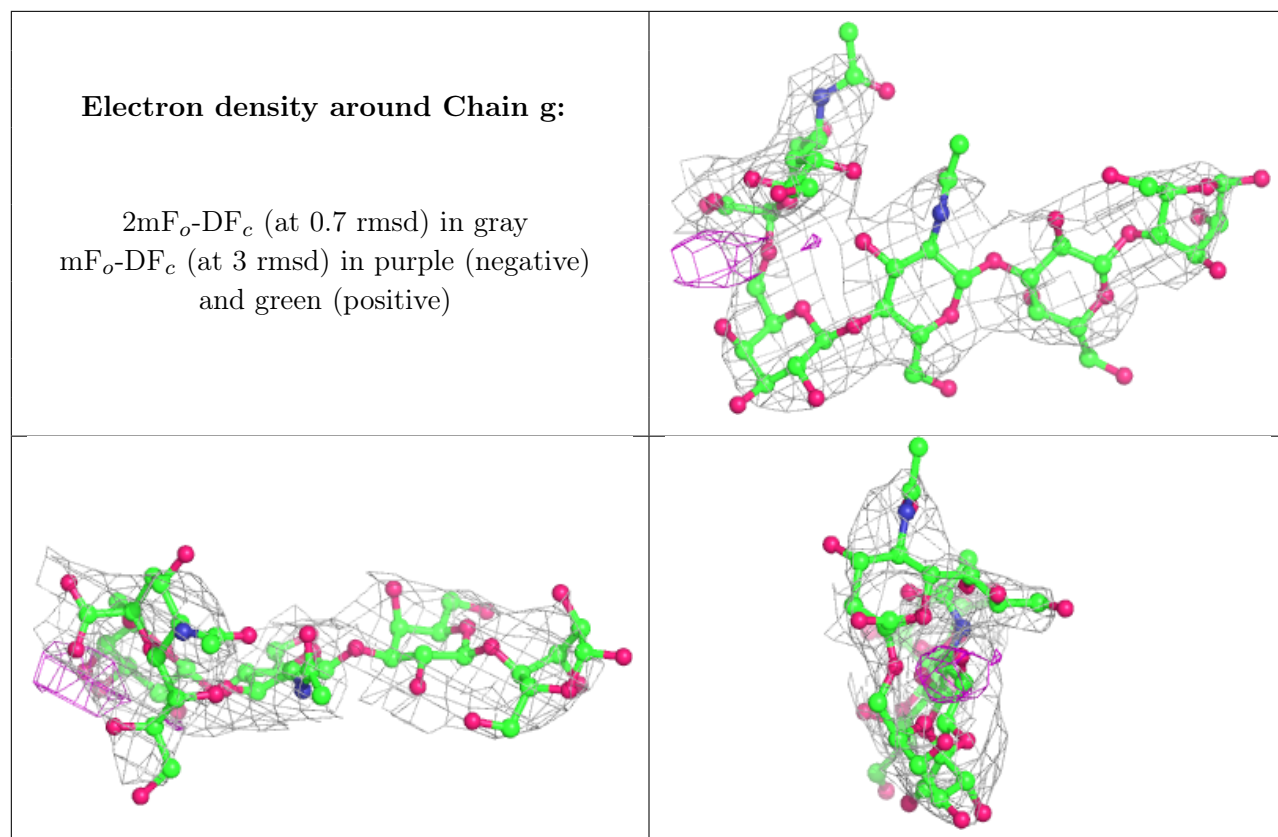
**Electron density around Chain O:**

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

**Electron density around Chain V:**

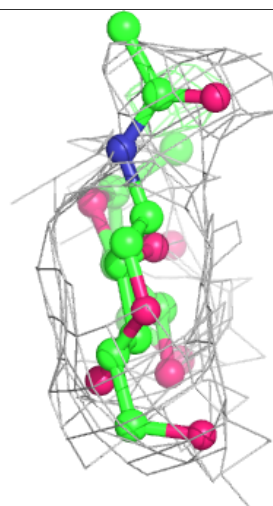
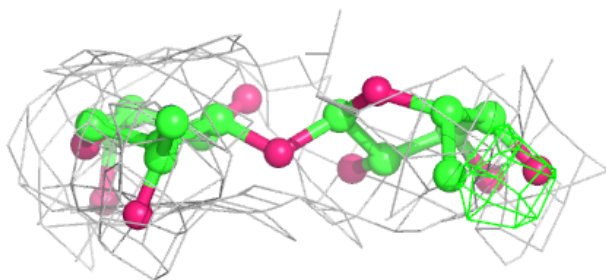
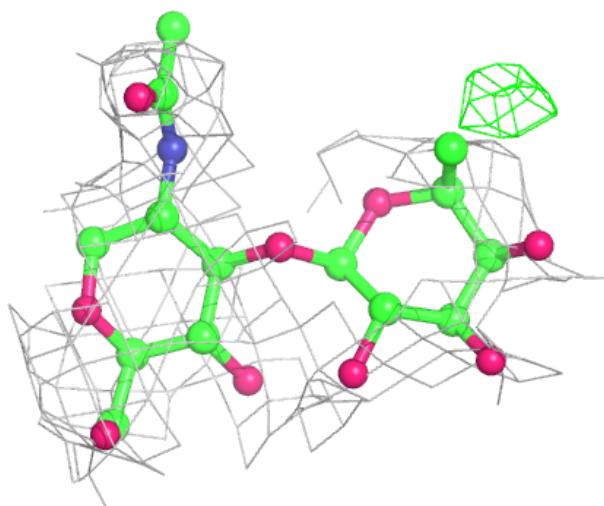
$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)

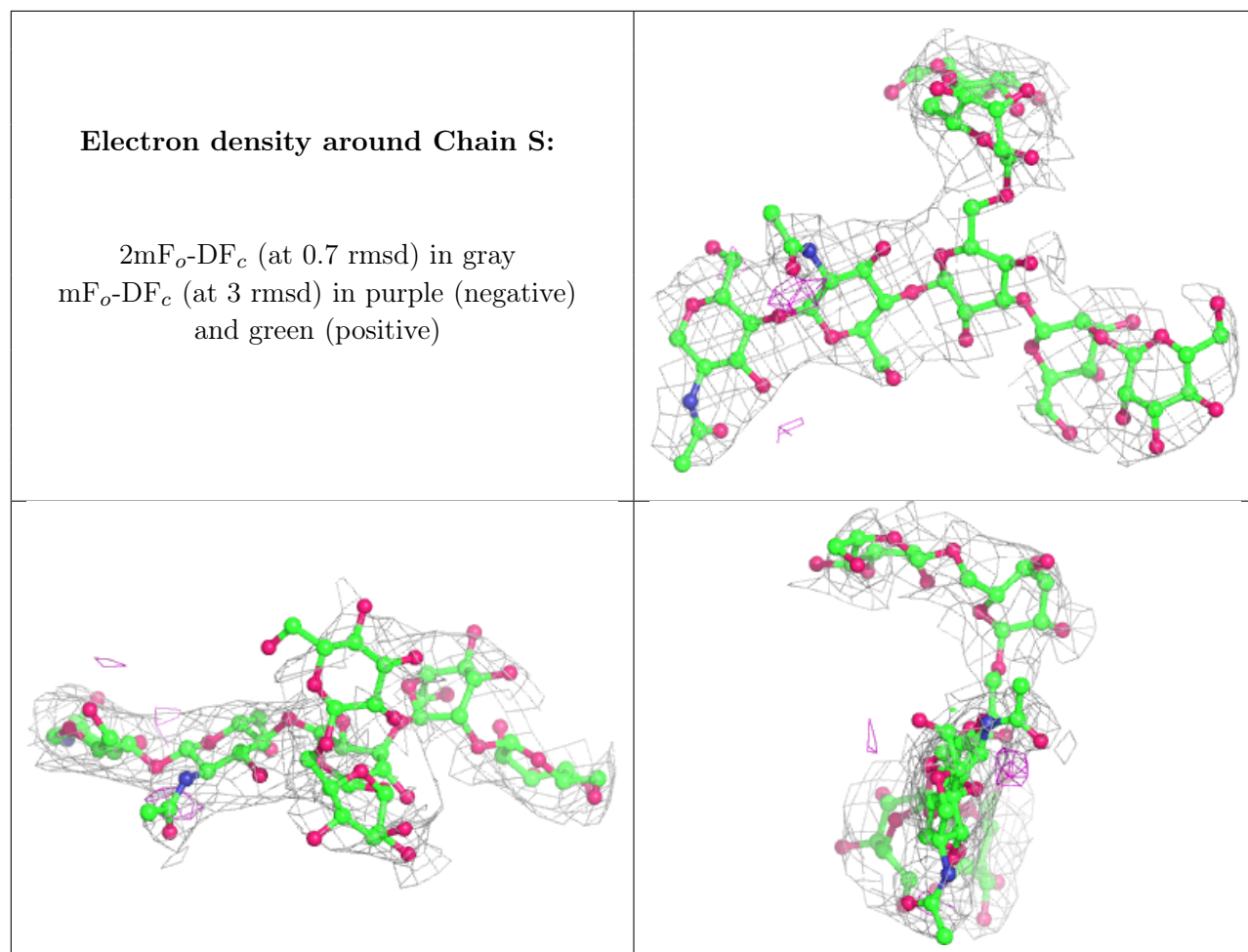


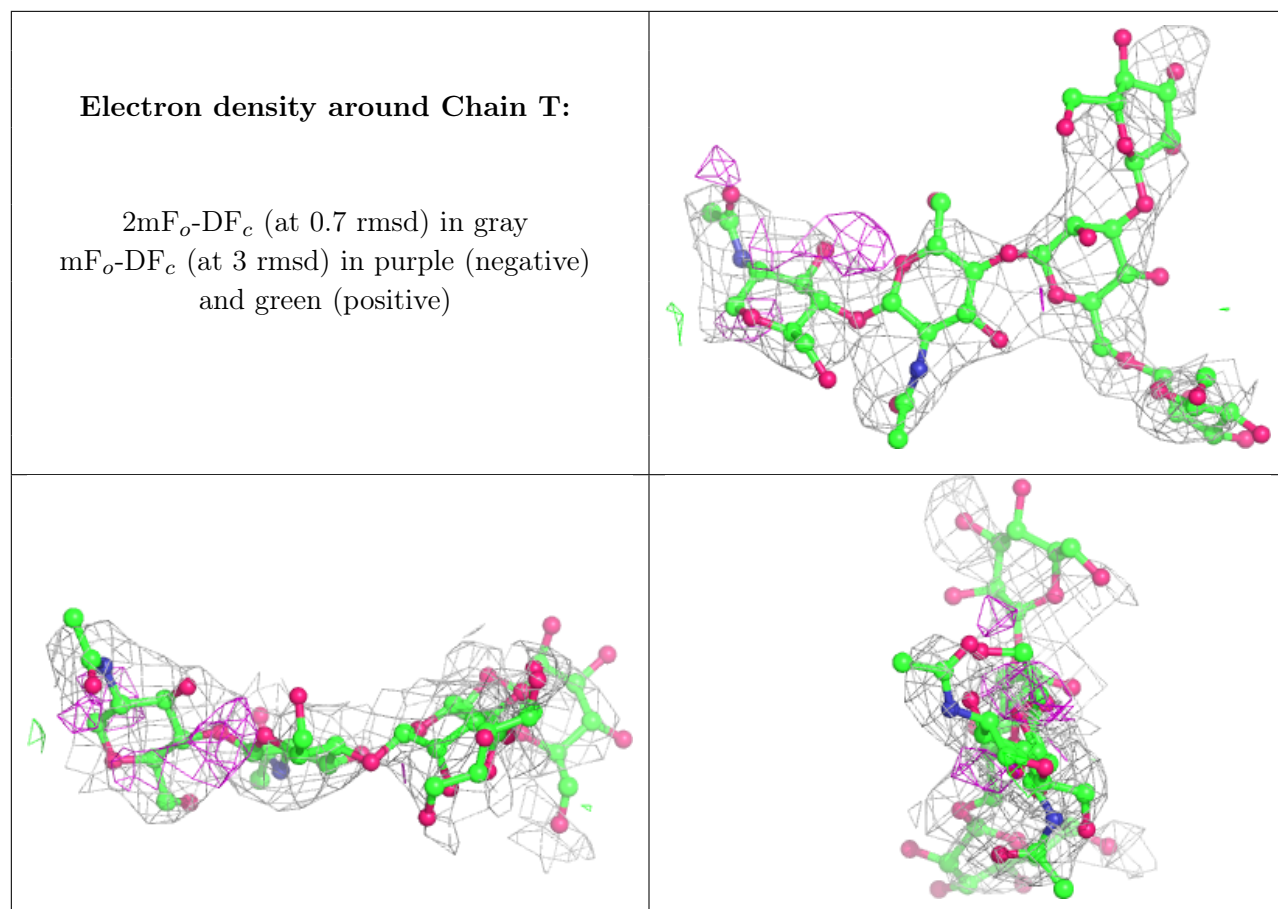


**Electron density around Chain P:**

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



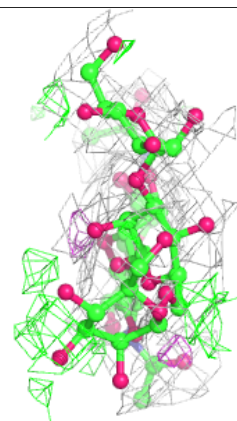
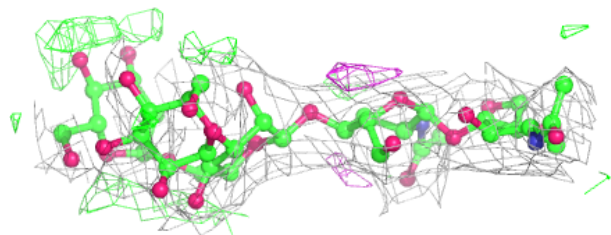
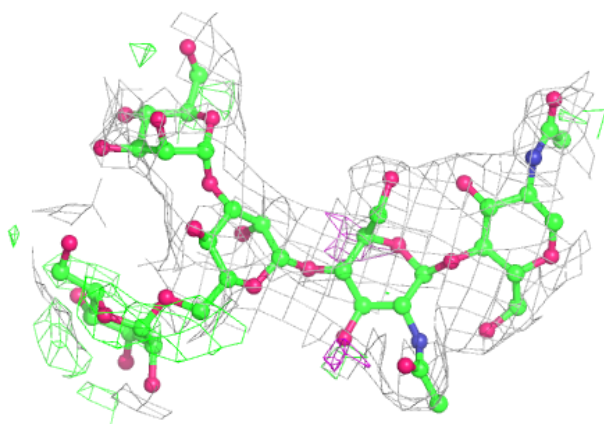






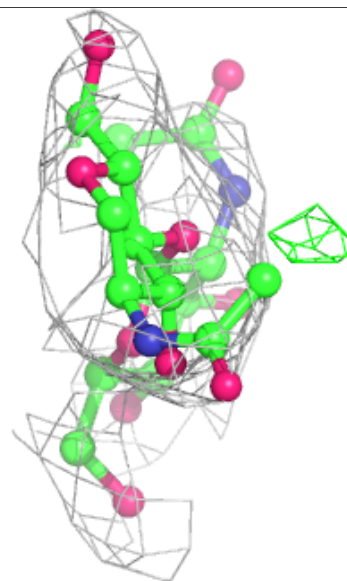
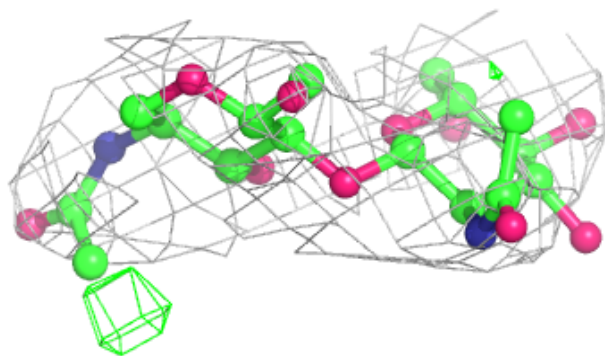
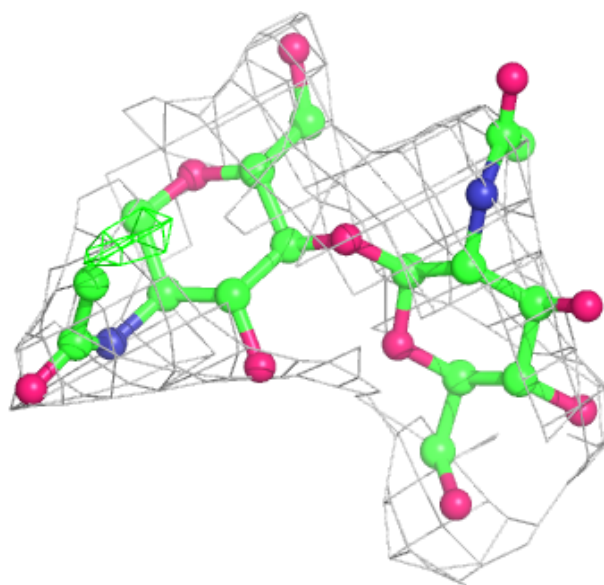
**Electron density around Chain X:**

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



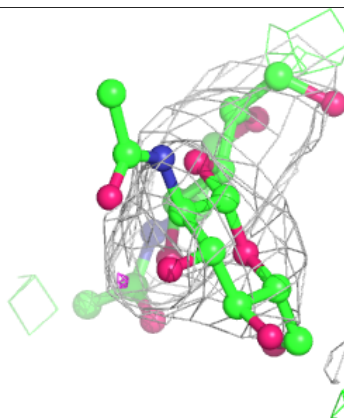
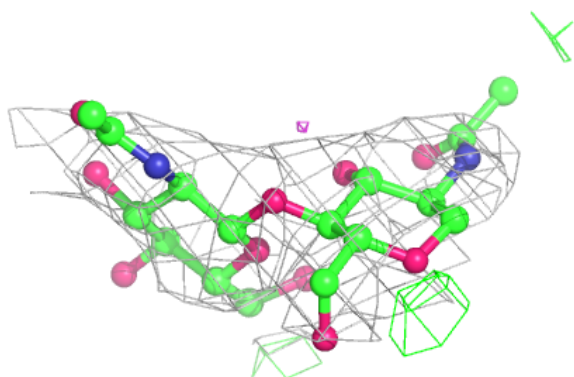
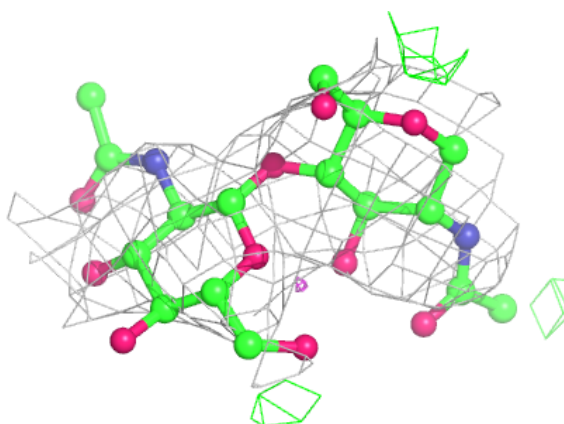
**Electron density around Chain U:**

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

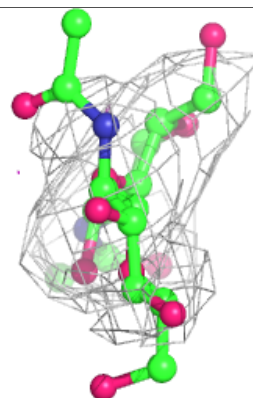
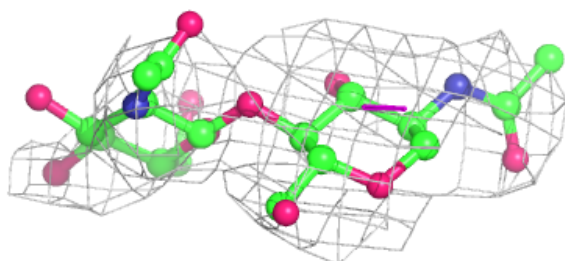
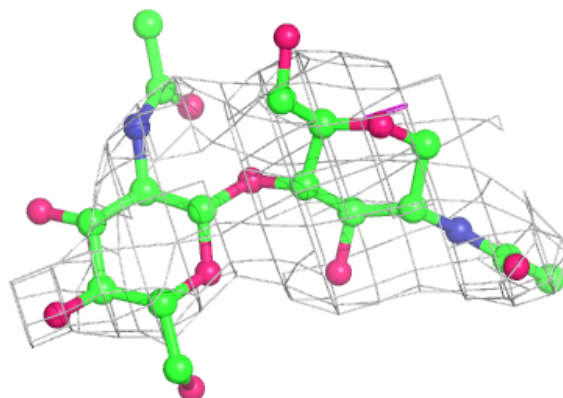


**Electron density around Chain Y:**

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

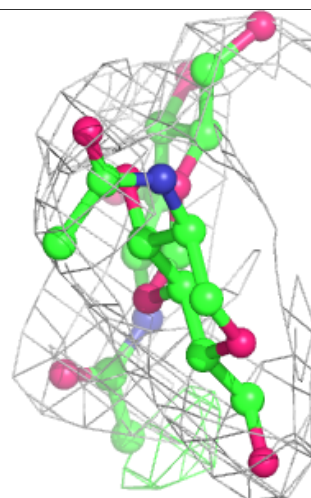
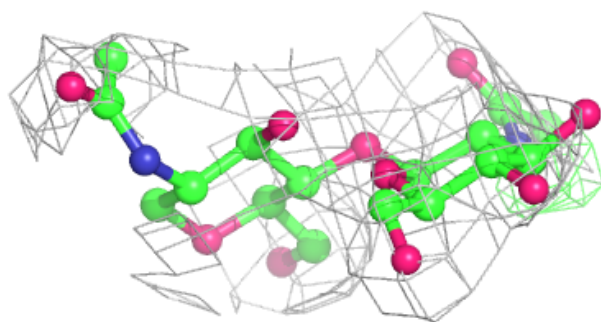
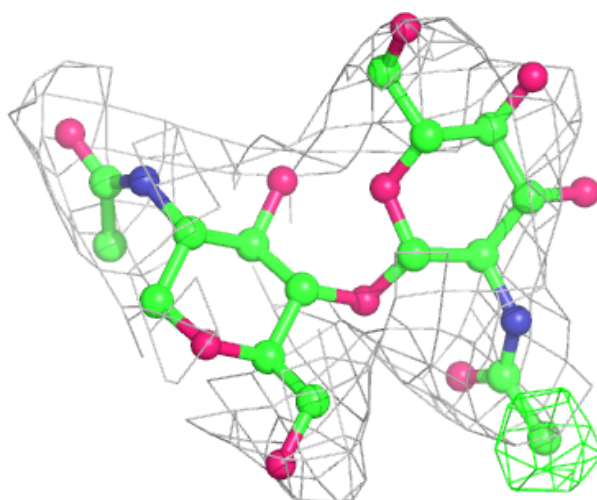
**Electron density around Chain Z:**

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



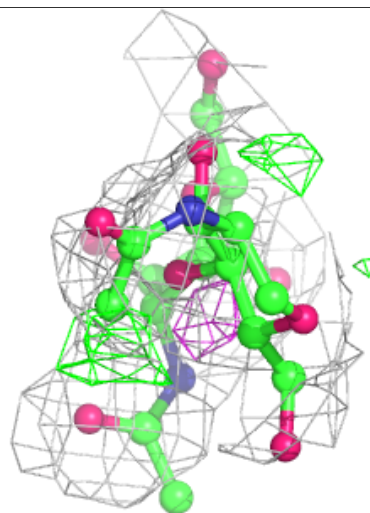
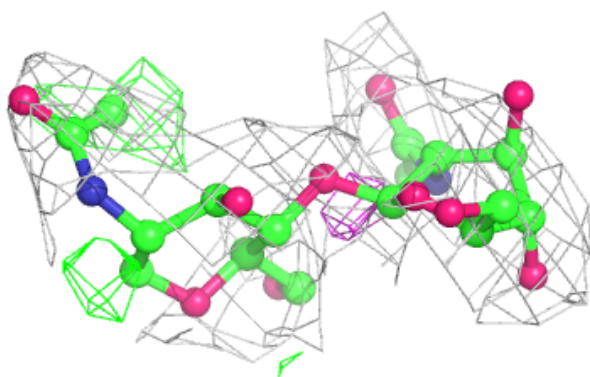
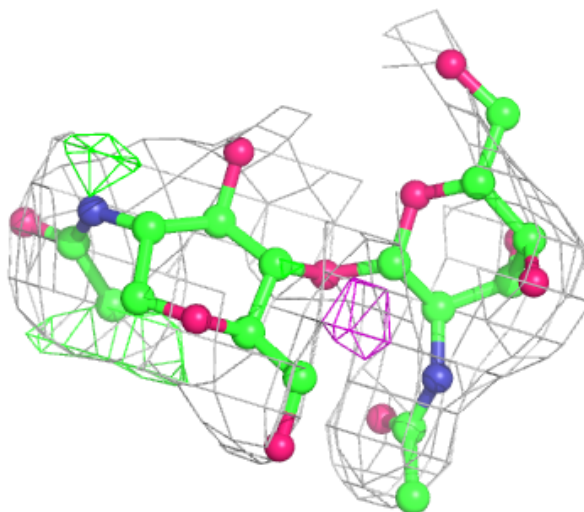
**Electron density around Chain a:**

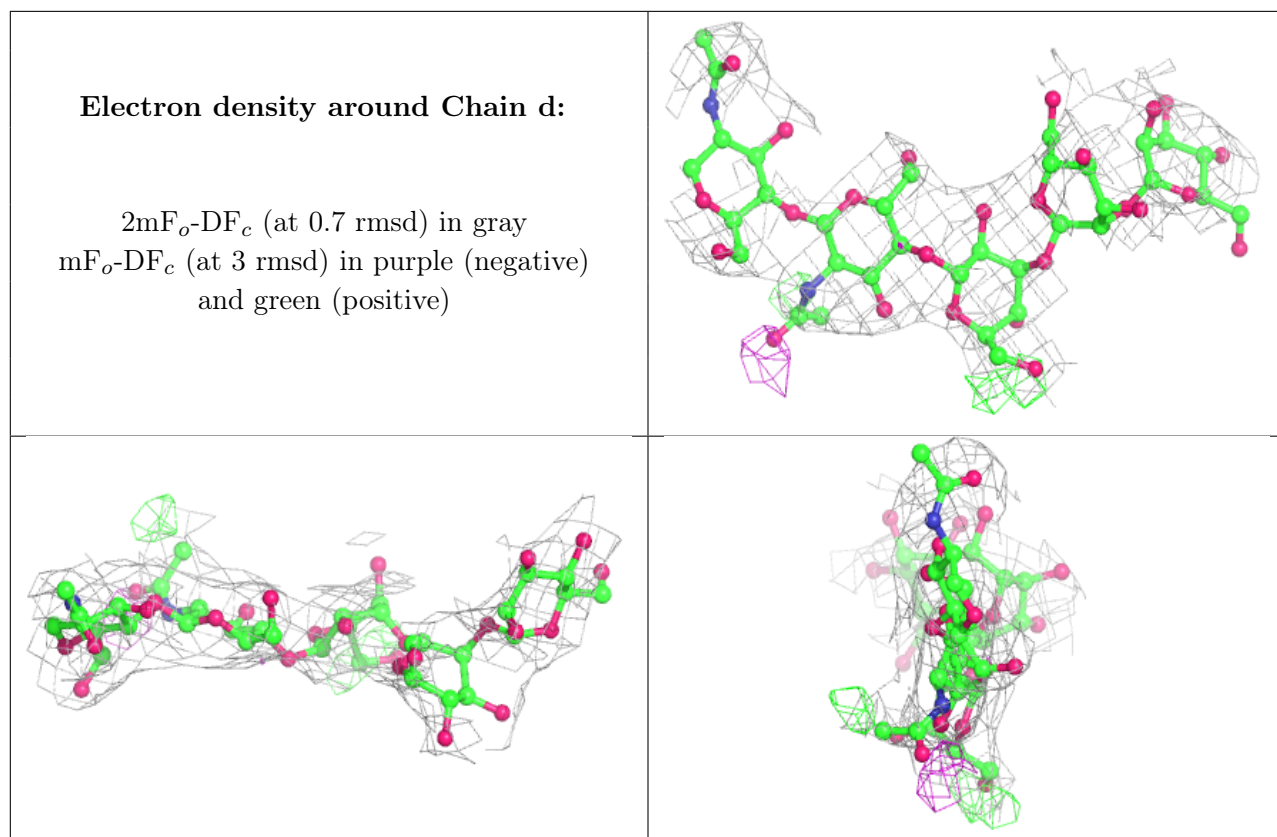
$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)



**Electron density around Chain f:**

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





## 6.4 Ligands [i](#)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 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
14	NAG	E	414	14/15	0.47	0.37	120,156,178,183	0
14	NAG	A	522	14/15	0.67	0.44	132,160,170,173	0
14	NAG	G	416	14/15	0.76	0.28	133,149,163,164	0
14	NAG	C	523	14/15	0.80	0.36	113,146,151,152	0
14	NAG	B	201	14/15	0.81	0.29	106,165,174,175	0
14	NAG	D	202	14/15	0.81	0.32	117,138,149,156	0
14	NAG	F	201	14/15	0.86	0.27	109,130,138,139	0
15	CAC	D	201	5/5	0.89	0.34	145,146,151,160	0

## 6.5 Other polymers [i](#)

There are no such residues in this entry.