



# wwPDB X-ray Structure Validation Summary Report ⓘ

Oct 6, 2024 – 05:45 PM JST

PDB ID : 4Z0C  
Title : Crystal structure of TLR13-ssRNA13 complex  
Authors : Song, W.; Han, Z.; Chai, J.  
Deposited on : 2015-03-26  
Resolution : 2.30 Å(reported)

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

We welcome your comments at [validation@mail.wwpdb.org](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	:	3.0
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4	:	9.0.003 (Gargrove)
Density-Fitness	:	1.0.11
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.39

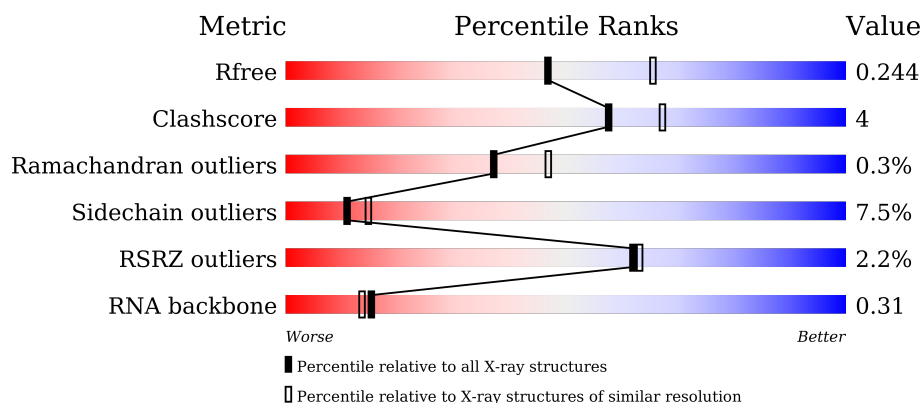
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.30 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))
$R_{free}$	164625	5963 (2.30-2.30)
Clashscore	180529	6698 (2.30-2.30)
Ramachandran outliers	177936	6640 (2.30-2.30)
Sidechain outliers	177891	6640 (2.30-2.30)
RSRZ outliers	164620	5963 (2.30-2.30)
RNA backbone	3690	1032 (2.60-2.00)

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	709	<div> <div>2%</div> <div> <div></div> <div>82%</div> <div>16%</div> <div>.</div> </div> </div>
1	D	709	<div> <div>2%</div> <div> <div></div> <div>84%</div> <div>14%</div> <div>.</div> </div> </div>
2	B	13	<div> <div>38%</div> <div>46%</div> <div>15%</div> </div>
2	C	13	<div> <div>54%</div> <div>38%</div> <div>8%</div> </div>

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Mol	Chain	Length	Quality of chain
3	E	2	 100%
3	F	2	 50%  50%
3	G	2	 50%  50%
3	H	2	 100%
3	I	2	 50%  50%
3	J	2	 100%

## 2 Entry composition [i](#)

There are 5 unique types of molecules in this entry. The entry contains 12821 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 Toll-like receptor 13.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	709	Total	C	N	O	S	0	0	0
			5724	3672	984	1048	20			
1	D	709	Total	C	N	O	S	0	0	0
			5730	3675	987	1048	20			

- Molecule 2 is a RNA chain called DNA (5'-R(P\*AP\*CP\*GP\*GP\*AP\*AP\*AP\*GP\*AP\*CP\*CP\*CP\*C)-3').

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	13	Total	C	N	O	P	0	0	0
			279	125	55	86	13			
2	C	13	Total	C	N	O	P	0	0	0
			279	125	55	86	13			

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



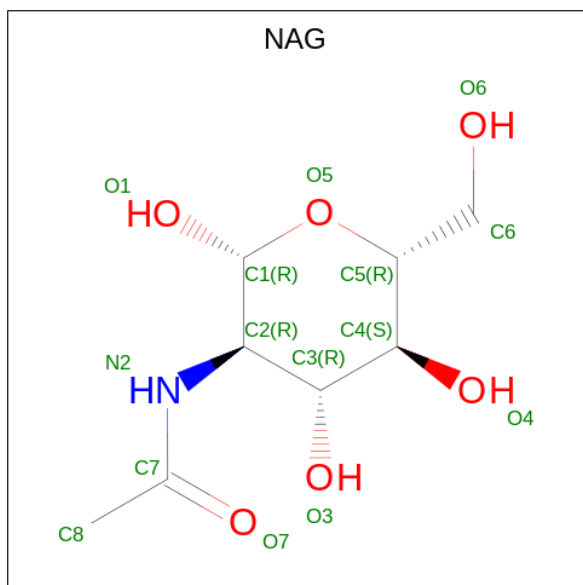
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
3	E	2	Total	C	N	O	0	0	0
			28	16	2	10			
3	F	2	Total	C	N	O	0	0	0
			28	16	2	10			
3	G	2	Total	C	N	O	0	0	0
			28	16	2	10			
3	H	2	Total	C	N	O	0	0	0
			28	16	2	10			
3	I	2	Total	C	N	O	0	0	0
			28	16	2	10			

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Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
3	J	2	Total	C	N	O	0	0	0
			28	16	2	10			

- Molecule 4 is 2-acetamido-2-deoxy-beta-D-glucopyranose (three-letter code: NAG) (formula:  $C_8H_{15}NO_6$ ).



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

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

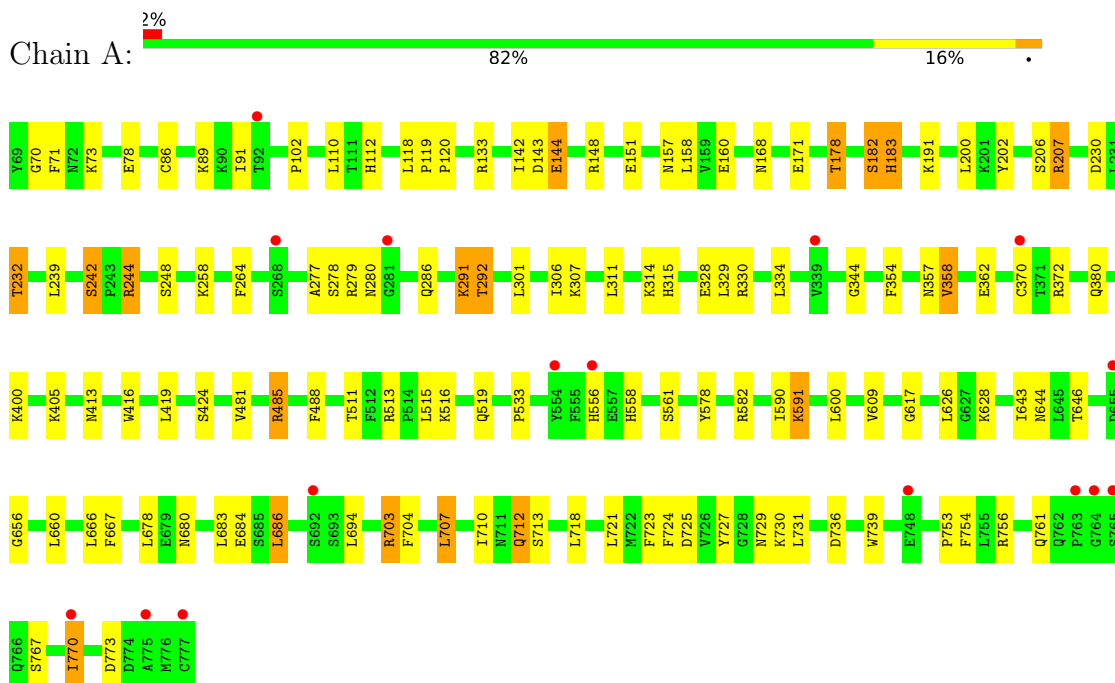
- Molecule 5 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	117	Total	O	0	0
			117	117		
5	D	207	Total	O	0	0
			207	207		
5	B	18	Total	O	0	0
			18	18		
5	C	19	Total	O	0	0
			19	19		

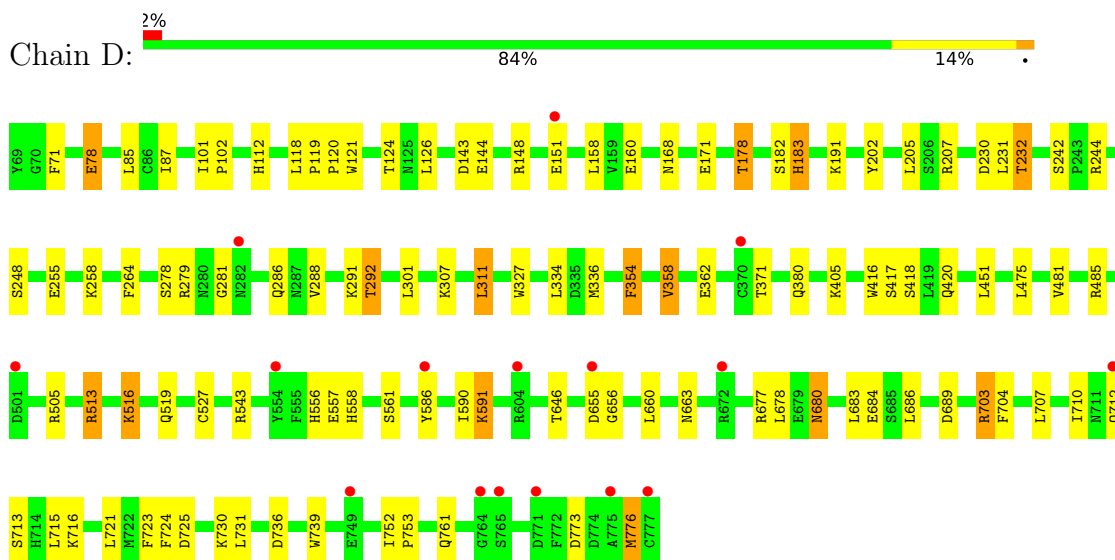
### 3 Residue-property plots [i](#)

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: Toll-like receptor 13



#### • Molecule 1: Toll-like receptor 13



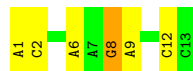
- Molecule 2: DNA (5'-R(P\*AP\*CP\*GP\*GP\*AP\*AP\*AP\*GP\*AP\*CP\*CP\*CP\*C)-3')

Chain B:  38% 46% 15%



- Molecule 2: DNA (5'-R(P\*AP\*CP\*GP\*GP\*AP\*AP\*AP\*GP\*AP\*CP\*CP\*CP\*C)-3')

Chain C:  54% 38% 8%



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

Chain E:  100%



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

Chain F:  50% 50%



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

Chain G:  50% 50%



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

Chain H:  100%



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

Chain I:  50% 50%



MAG1  
MAG2

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

Chain J:

100%

MAG1  
MAG2

## 4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	112.55Å 115.21Å 167.61Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	45.90 – 2.30 45.90 – 2.30	Depositor EDS
% Data completeness (in resolution range)	92.5 (45.90-2.30) 92.4 (45.90-2.30)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	2.07 (at 2.29Å)	Xtriage
Refinement program	PHENIX (phenix.refine: 1.8_1069)	Depositor
R, $R_{free}$	0.191 , 0.244 0.193 , 0.244	Depositor DCC
$R_{free}$ test set	4489 reflections (5.00%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	38.9	Xtriage
Anisotropy	0.989	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.33 , 38.8	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.49$ , $\langle L^2 \rangle = 0.32$	Xtriage
Estimated twinning fraction	0.000 for k,h,-l	Xtriage
$F_o, F_c$ correlation	0.95	EDS
Total number of atoms	12821	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	37.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.96% 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

### 5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: NAG

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with  $|Z| > 5$  is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	$\# Z  > 5$	RMSZ	$\# Z  > 5$
1	A	0.41	0/5845	0.61	1/7918 (0.0%)
1	D	0.45	0/5851	0.62	0/7925
2	B	0.68	0/312	1.21	1/484 (0.2%)
2	C	0.61	0/312	1.35	1/484 (0.2%)
All	All	0.45	0/12320	0.67	3/16811 (0.0%)

There are no bond length outliers.

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	C	8	G	O4'-C1'-N9	6.81	113.65	108.20
2	B	2	C	P-O3'-C3'	5.72	126.56	119.70
1	A	70	GLY	N-CA-C	-5.37	99.68	113.10

There are no chirality outliers.

There are no planarity outliers.

### 5.2 Too-close contacts

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	5724	0	5782	61	0
1	D	5730	0	5789	46	0
2	B	279	0	144	3	0
2	C	279	0	144	1	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	E	28	0	25	0	0
3	F	28	0	25	0	0
3	G	28	0	25	1	0
3	H	28	0	25	1	0
3	I	28	0	25	1	0
3	J	28	0	25	0	0
4	A	126	0	117	4	0
4	D	154	0	143	1	0
5	A	117	0	0	3	0
5	B	18	0	0	0	0
5	C	19	0	0	0	0
5	D	207	0	0	6	0
All	All	12821	0	12269	108	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 4.

The worst 5 of 108 close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:279:ARG:NH1	5:A:1001:HOH:O	2.11	0.82
1:D:689:ASP:OD1	1:D:716:LYS:NZ	2.13	0.81
1:D:148:ARG:NH1	1:D:171:GLU:HG2	1.97	0.80
1:A:556:HIS:CD2	1:A:558:HIS:H	2.01	0.78
4:D:917:NAG:O4	5:D:1001:HOH:O	2.04	0.75

There are no symmetry-related clashes.

## 5.3 Torsion angles [i](#)

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

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	707/709 (100%)	657 (93%)	48 (7%)	2 (0%)	37	47
1	D	707/709 (100%)	650 (92%)	55 (8%)	2 (0%)	37	47
All	All	1414/1418 (100%)	1307 (92%)	103 (7%)	4 (0%)	37	47

All (4) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	D	773	ASP
1	A	656	GLY
1	D	656	GLY
1	A	773	ASP

### 5.3.2 Protein sidechains ⓘ

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	662/663 (100%)	610 (92%)	52 (8%)	10	13
1	D	663/663 (100%)	615 (93%)	48 (7%)	12	16
All	All	1325/1326 (100%)	1225 (92%)	100 (8%)	11	15

5 of 100 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	D	178	THR
1	D	354	PHE
1	D	776	MET
1	D	183	HIS
1	D	258	LYS

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	556	HIS
1	A	597	GLN

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Mol	Chain	Res	Type
1	D	556	HIS

### 5.3.3 RNA ⓘ

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
2	B	13/13 (100%)	5 (38%)	2 (15%)
2	C	13/13 (100%)	3 (23%)	2 (15%)
All	All	26/26 (100%)	8 (30%)	4 (15%)

5 of 8 RNA backbone outliers are listed below:

Mol	Chain	Res	Type
2	B	2	C
2	B	3	G
2	B	9	A
2	B	12	C
2	B	13	C

All (4) RNA pucker outliers are listed below:

Mol	Chain	Res	Type
2	B	1	A
2	B	2	C
2	C	1	A
2	C	8	G

## 5.4 Non-standard residues in protein, DNA, RNA chains ⓘ

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

## 5.5 Carbohydrates ⓘ

12 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	E	1	1,3	14,14,15	0.84	1 (7%)	17,19,21	1.30	2 (11%)
3	NAG	E	2	3	14,14,15	0.55	0	17,19,21	1.31	1 (5%)
3	NAG	F	1	1,3	14,14,15	0.58	0	17,19,21	1.46	3 (17%)
3	NAG	F	2	3	14,14,15	0.52	0	17,19,21	0.94	0
3	NAG	G	1	1,3	14,14,15	0.66	0	17,19,21	1.24	3 (17%)
3	NAG	G	2	3	14,14,15	0.54	0	17,19,21	1.19	3 (17%)
3	NAG	H	1	1,3	14,14,15	0.65	0	17,19,21	0.79	0
3	NAG	H	2	3	14,14,15	0.71	0	17,19,21	1.53	4 (23%)
3	NAG	I	1	1,3	14,14,15	0.52	0	17,19,21	0.94	1 (5%)
3	NAG	I	2	3	14,14,15	0.62	0	17,19,21	1.12	1 (5%)
3	NAG	J	1	1,3	14,14,15	0.72	0	17,19,21	1.77	2 (11%)
3	NAG	J	2	3	14,14,15	0.61	0	17,19,21	1.01	1 (5%)

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	NAG	E	1	1,3	-	1/6/23/26	0/1/1/1
3	NAG	E	2	3	-	0/6/23/26	0/1/1/1
3	NAG	F	1	1,3	-	0/6/23/26	0/1/1/1
3	NAG	F	2	3	-	2/6/23/26	0/1/1/1
3	NAG	G	1	1,3	-	0/6/23/26	0/1/1/1
3	NAG	G	2	3	-	0/6/23/26	0/1/1/1
3	NAG	H	1	1,3	-	0/6/23/26	0/1/1/1
3	NAG	H	2	3	-	0/6/23/26	0/1/1/1
3	NAG	I	1	1,3	-	0/6/23/26	0/1/1/1
3	NAG	I	2	3	-	0/6/23/26	0/1/1/1
3	NAG	J	1	1,3	-	0/6/23/26	0/1/1/1
3	NAG	J	2	3	-	0/6/23/26	0/1/1/1

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	E	1	NAG	C1-C2	2.12	1.55	1.52

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

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	J	1	NAG	C3-C4-C5	-4.34	102.50	110.24
3	J	1	NAG	O5-C5-C6	4.17	113.74	107.20
3	E	2	NAG	C1-O5-C5	3.65	117.13	112.19
3	H	2	NAG	C1-O5-C5	3.54	116.99	112.19
3	F	1	NAG	C2-N2-C7	-3.39	118.07	122.90

There are no chirality outliers.

All (3) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	E	1	NAG	O5-C5-C6-O6
3	F	2	NAG	C4-C5-C6-O6
3	F	2	NAG	O5-C5-C6-O6

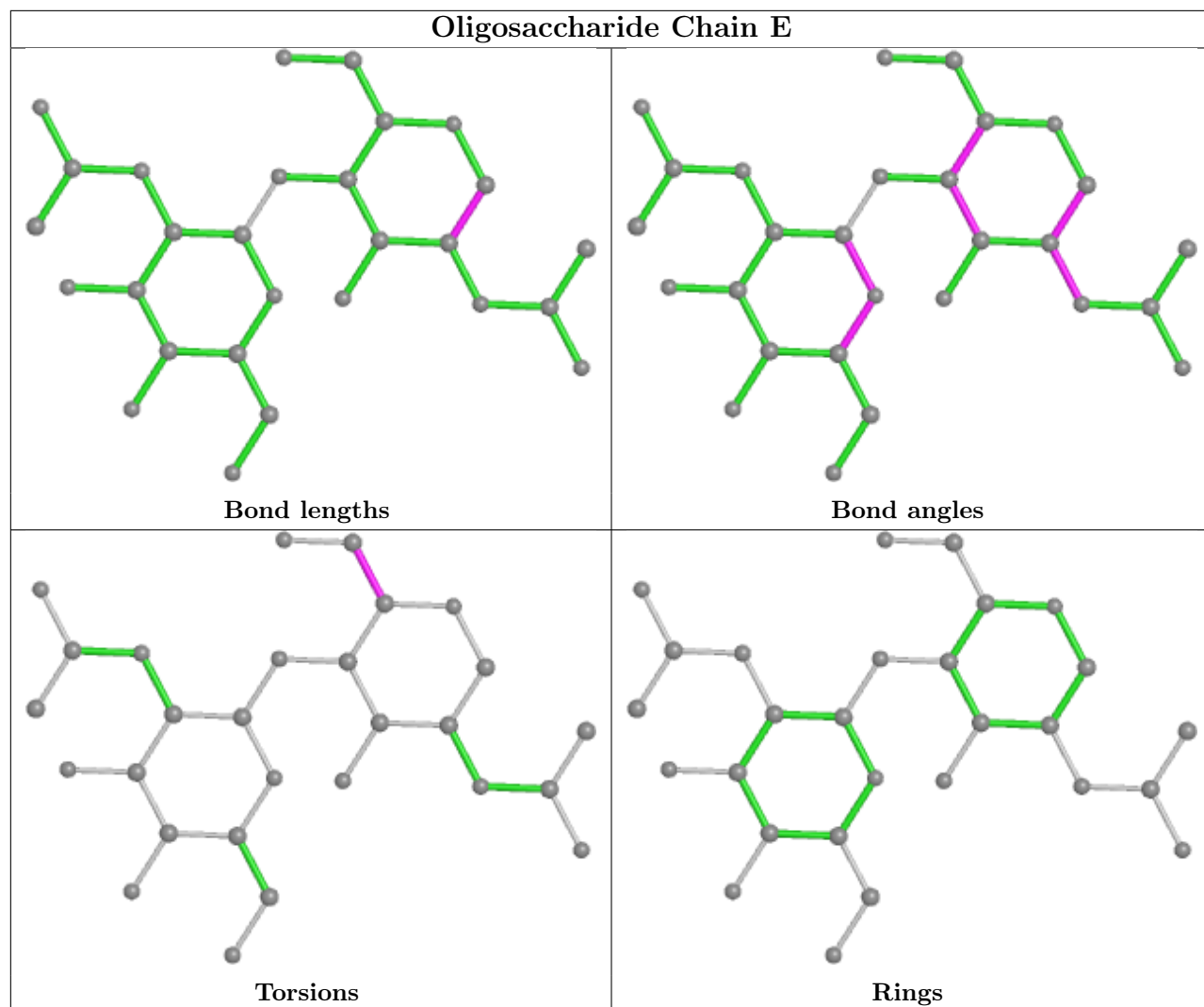
There are no ring outliers.

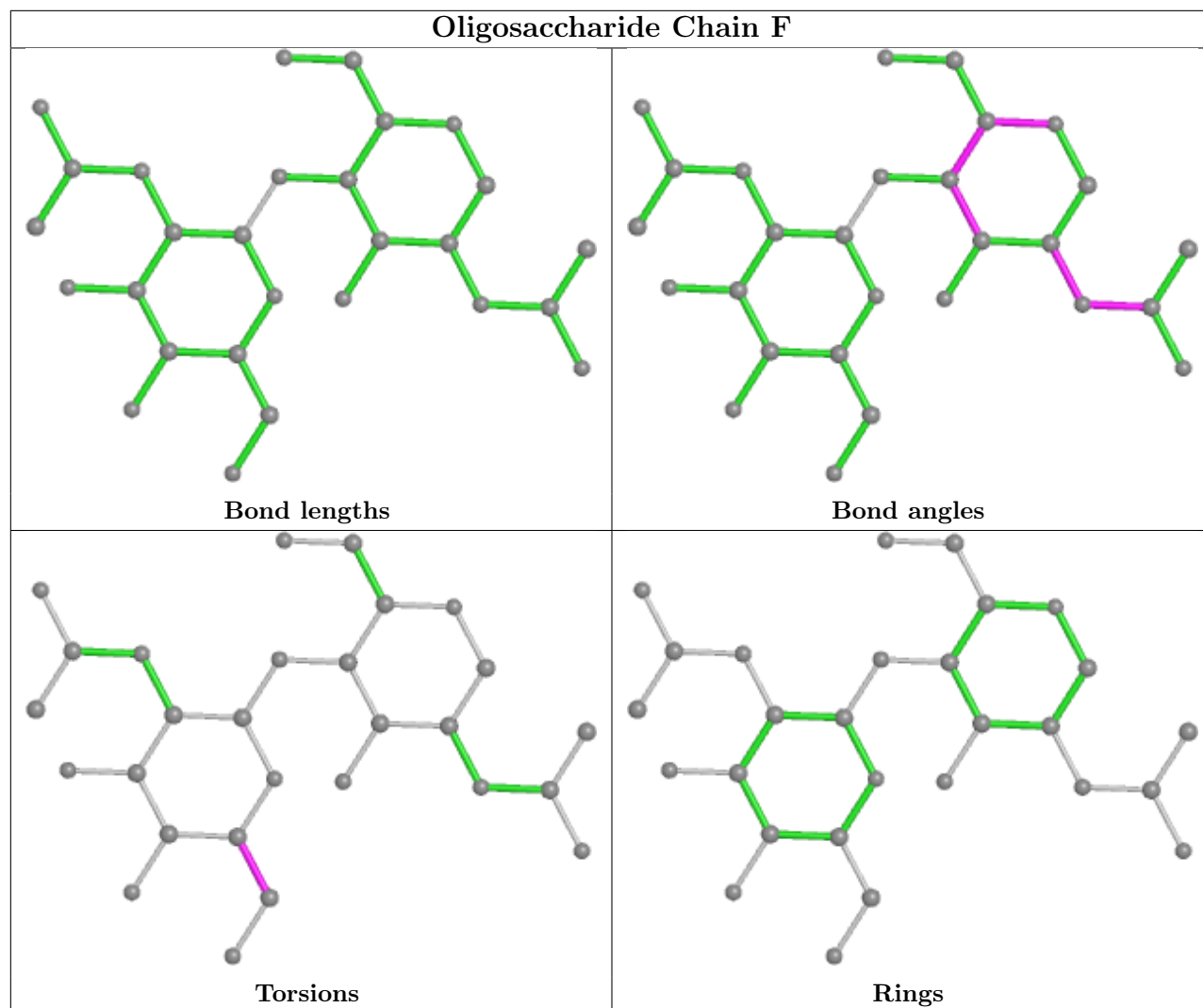
3 monomers are involved in 3 short contacts:

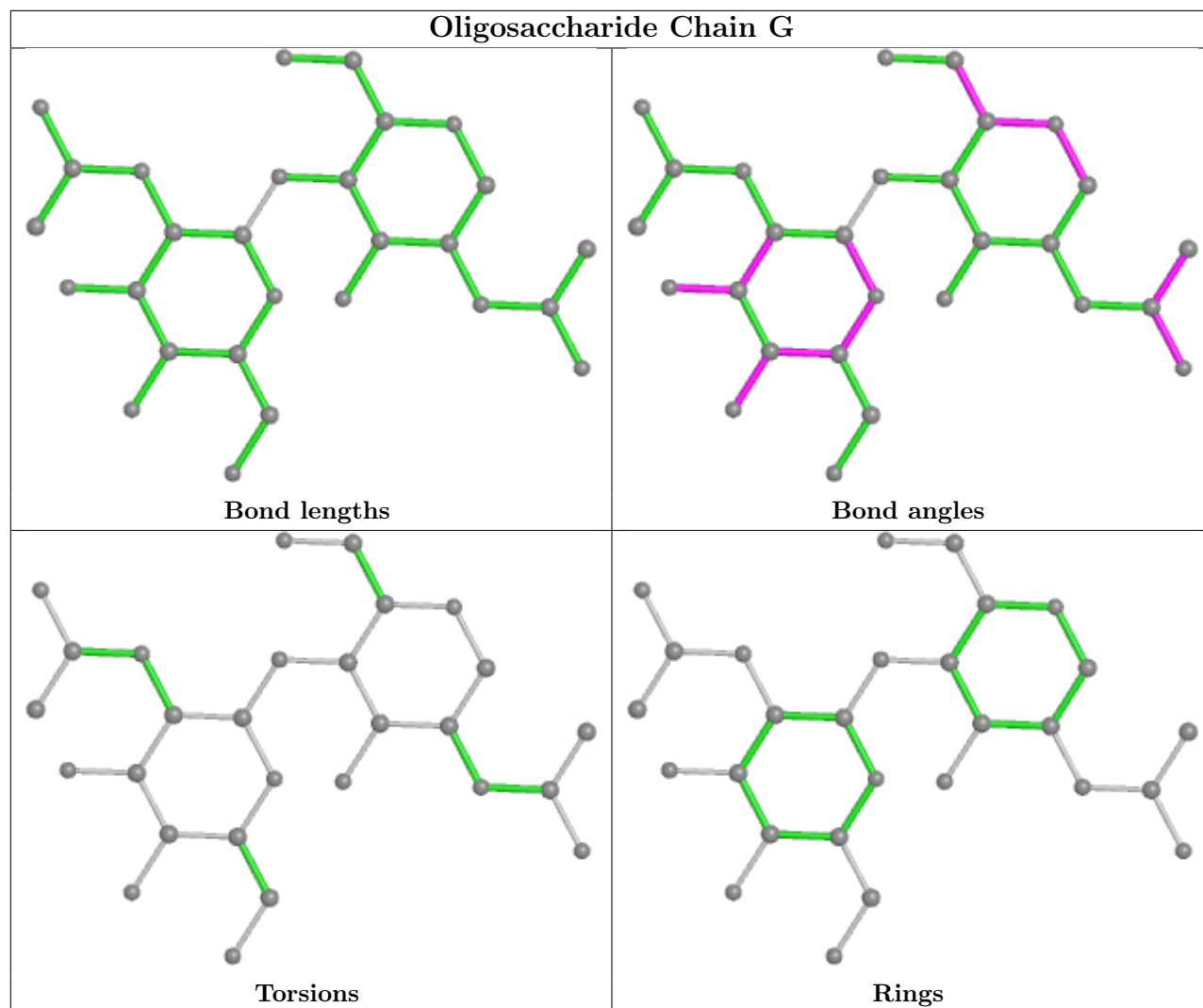
Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	I	1	NAG	1	0
3	G	1	NAG	1	0
3	H	1	NAG	1	0

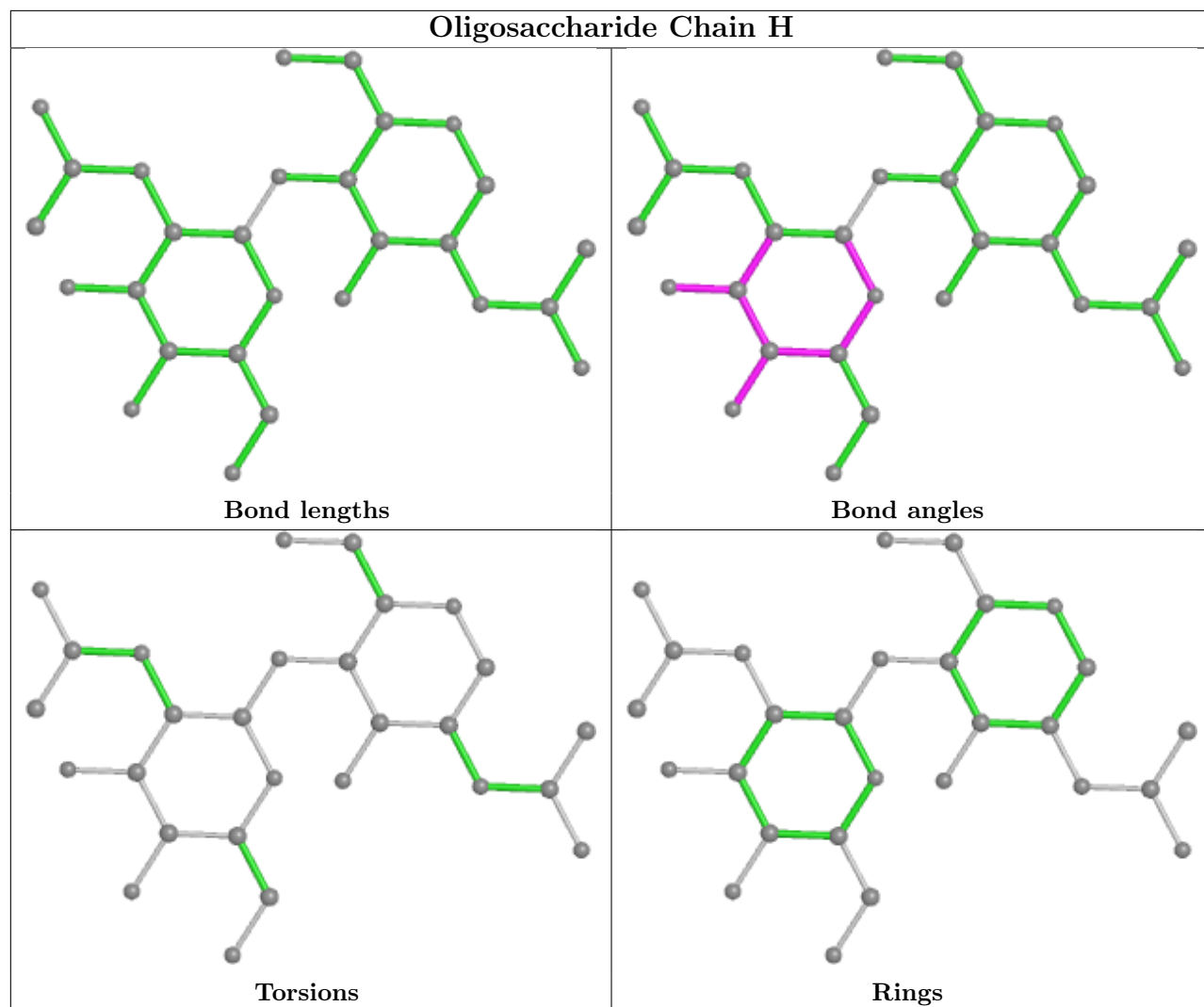
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for oligosaccharide.

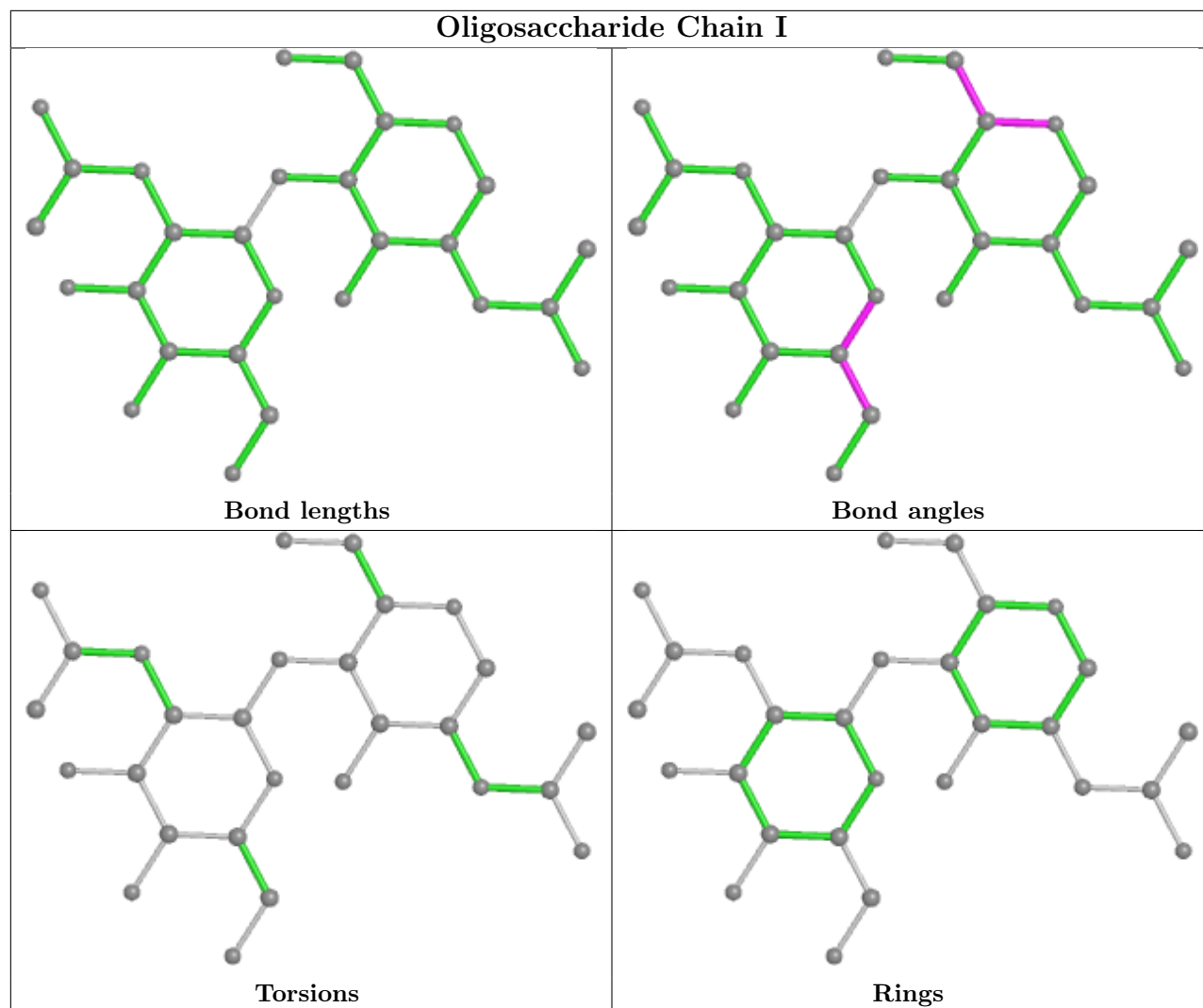


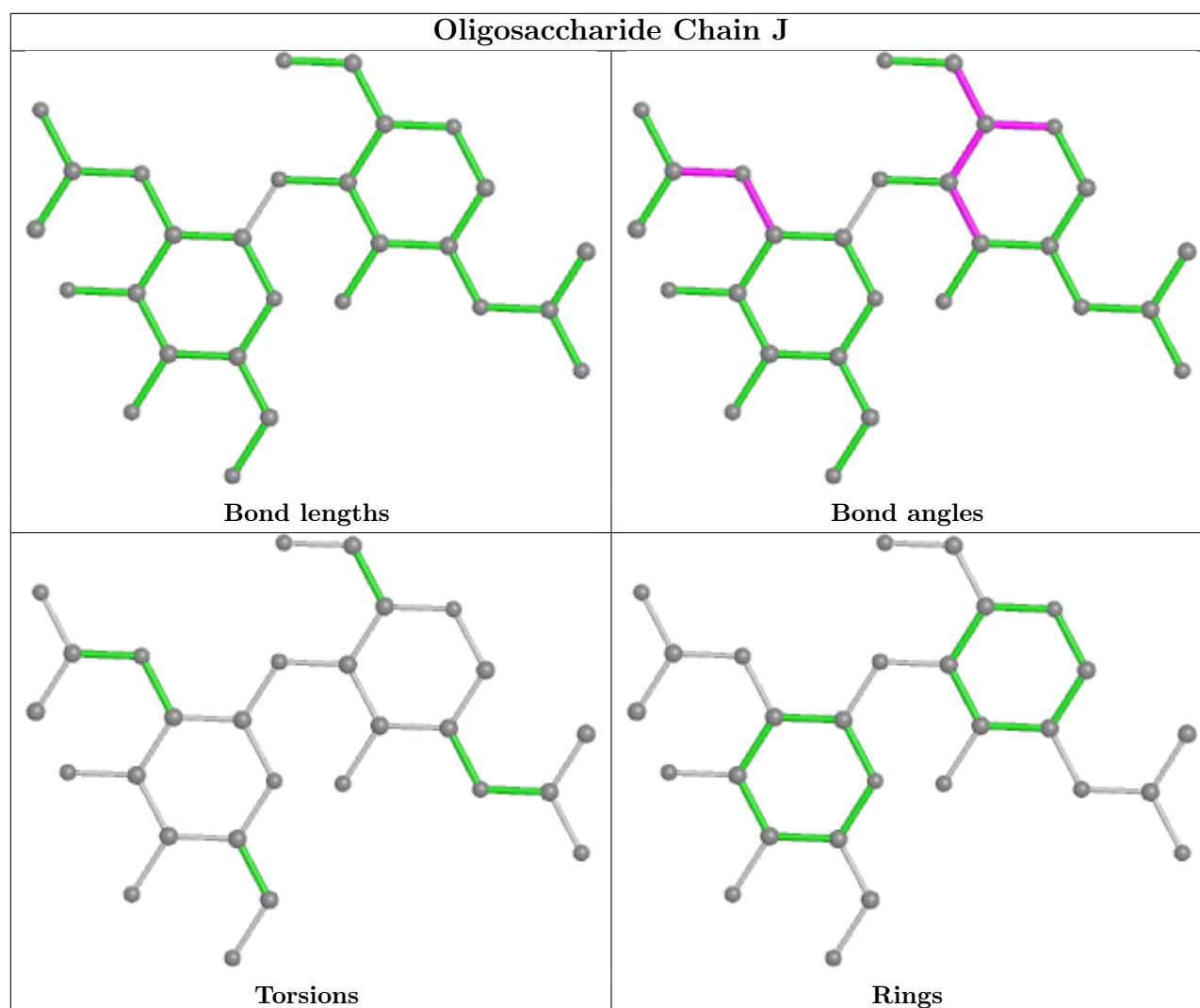












## 5.6 Ligand geometry [i](#)

20 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	$\# Z  > 2$
4	NAG	A	914	-	14,14,15	0.48	0	17,19,21	1.02	0
4	NAG	D	903	1	14,14,15	0.58	0	17,19,21	0.90	0
4	NAG	A	911	1	14,14,15	0.58	0	17,19,21	1.01	1 (5%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
4	NAG	D	914	1	14,14,15	0.49	0	17,19,21	0.84	0
4	NAG	D	908	1	14,14,15	0.62	0	17,19,21	1.25	2 (11%)
4	NAG	A	904	1	14,14,15	0.62	0	17,19,21	0.76	0
4	NAG	D	905	1	14,14,15	0.64	0	17,19,21	1.07	1 (5%)
4	NAG	A	915	1	14,14,15	0.48	0	17,19,21	0.89	2 (11%)
4	NAG	A	903	1	14,14,15	0.46	0	17,19,21	1.52	3 (17%)
4	NAG	D	917	1	14,14,15	0.49	0	17,19,21	1.43	3 (17%)
4	NAG	A	910	1	14,14,15	0.45	0	17,19,21	1.51	1 (5%)
4	NAG	D	912	1	14,14,15	0.58	0	17,19,21	1.19	2 (11%)
4	NAG	A	906	1	14,14,15	0.50	0	17,19,21	1.31	3 (17%)
4	NAG	D	904	1	14,14,15	0.50	0	17,19,21	1.24	2 (11%)
4	NAG	D	913	1	14,14,15	0.51	0	17,19,21	1.13	2 (11%)
4	NAG	D	916	1	14,14,15	0.60	0	17,19,21	1.47	3 (17%)
4	NAG	D	915	1	14,14,15	0.64	0	17,19,21	1.44	3 (17%)
4	NAG	A	905	1	14,14,15	0.46	0	17,19,21	1.24	1 (5%)
4	NAG	D	909	1	14,14,15	0.60	0	17,19,21	1.72	3 (17%)
4	NAG	A	909	-	14,14,15	0.76	1 (7%)	17,19,21	1.53	3 (17%)

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. '2' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	NAG	A	914	-	-	1/6/23/26	0/1/1/1
4	NAG	D	903	1	-	0/6/23/26	0/1/1/1
4	NAG	A	911	1	-	1/6/23/26	0/1/1/1
4	NAG	D	914	1	-	0/6/23/26	0/1/1/1
4	NAG	D	908	1	-	0/6/23/26	0/1/1/1
4	NAG	A	904	1	-	3/6/23/26	0/1/1/1
4	NAG	D	905	1	-	0/6/23/26	0/1/1/1
4	NAG	A	915	1	-	2/6/23/26	0/1/1/1
4	NAG	A	903	1	-	2/6/23/26	0/1/1/1
4	NAG	D	917	1	-	2/6/23/26	0/1/1/1
4	NAG	A	910	1	-	2/6/23/26	0/1/1/1
4	NAG	D	912	1	-	1/6/23/26	0/1/1/1
4	NAG	A	906	1	-	0/6/23/26	0/1/1/1
4	NAG	D	904	1	-	4/6/23/26	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	NAG	D	913	1	-	0/6/23/26	0/1/1/1
4	NAG	D	916	1	-	2/6/23/26	0/1/1/1
4	NAG	D	915	1	-	0/6/23/26	0/1/1/1
4	NAG	A	905	1	-	0/6/23/26	0/1/1/1
4	NAG	D	909	1	-	0/6/23/26	0/1/1/1
4	NAG	A	909	-	-	0/6/23/26	0/1/1/1

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	A	909	NAG	O5-C1	-2.08	1.40	1.43

The worst 5 of 35 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	A	910	NAG	C1-O5-C5	4.96	118.91	112.19
4	A	909	NAG	O5-C1-C2	-4.62	104.00	111.29
4	A	903	NAG	C1-O5-C5	4.39	118.14	112.19
4	D	909	NAG	C2-N2-C7	-4.12	117.03	122.90
4	D	916	NAG	C1-O5-C5	3.96	117.56	112.19

There are no chirality outliers.

5 of 20 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	D	904	NAG	C8-C7-N2-C2
4	D	904	NAG	O7-C7-N2-C2
4	D	917	NAG	O5-C5-C6-O6
4	D	917	NAG	C4-C5-C6-O6
4	A	915	NAG	C8-C7-N2-C2

There are no ring outliers.

4 monomers are involved in 5 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	A	914	NAG	1	0
4	A	904	NAG	1	0
4	D	917	NAG	1	0
4	A	909	NAG	2	0



## 5.7 Other polymers [i](#)

There are no such residues in this entry.

## 5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

## 6 Fit of model and data [i](#)

### 6.1 Protein, DNA and RNA chains [i](#)

In the following table, the column labelled ‘#RSRZ > 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95<sup>th</sup> percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled ‘Q < 0.9’ lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å <sup>2</sup> )	Q<0.9
1	A	709/709 (100%)	-0.01	16 (2%) 61 62	15, 38, 64, 121	0
1	D	709/709 (100%)	-0.16	16 (2%) 61 62	15, 31, 57, 105	0
2	B	13/13 (100%)	-0.65	0 100 100	27, 34, 55, 71	0
2	C	13/13 (100%)	-0.73	0 100 100	29, 32, 54, 72	0
All	All	1444/1444 (100%)	-0.09	32 (2%) 62 63	15, 34, 62, 121	0

The worst 5 of 32 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	D	554	TYR	6.8
1	D	370	CYS	4.9
1	A	764	GLY	3.9
1	A	281	GLY	3.4
1	A	554	TYR	3.2

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

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

### 6.3 Carbohydrates [i](#)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 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.

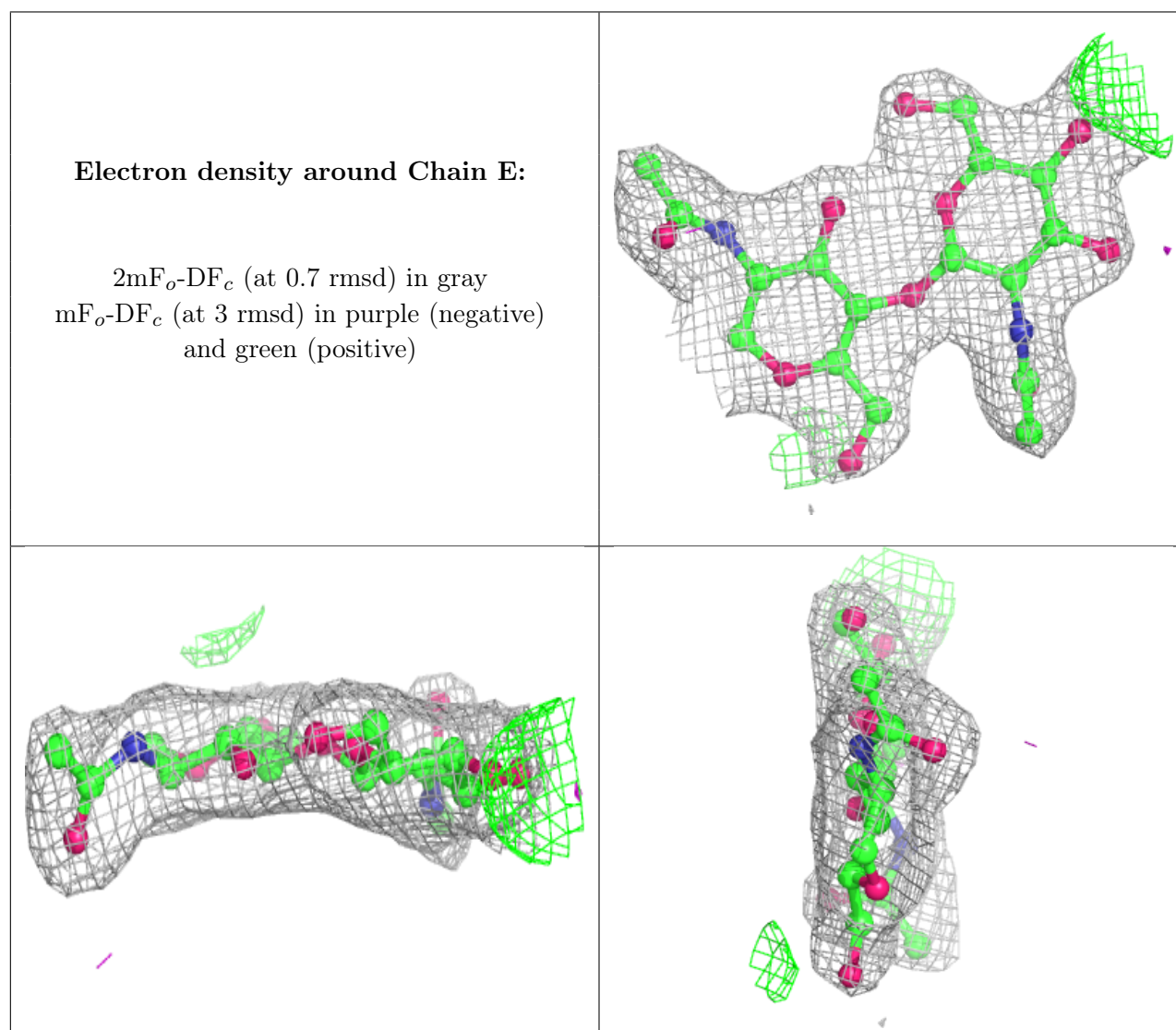
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å <sup>2</sup> )	Q<0.9
3	NAG	I	2	14/15	0.79	0.11	33,47,53,59	0
3	NAG	J	2	14/15	0.84	0.11	42,49,61,65	0

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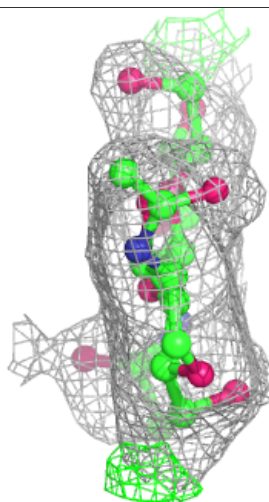
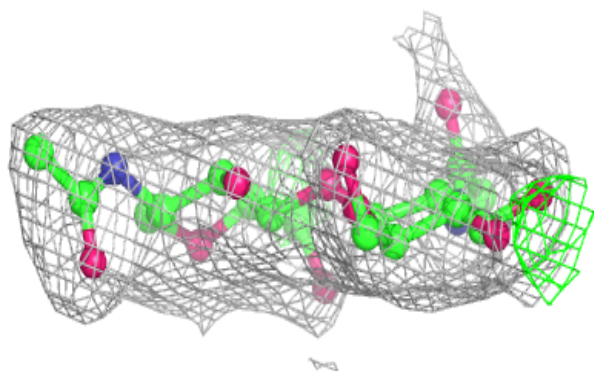
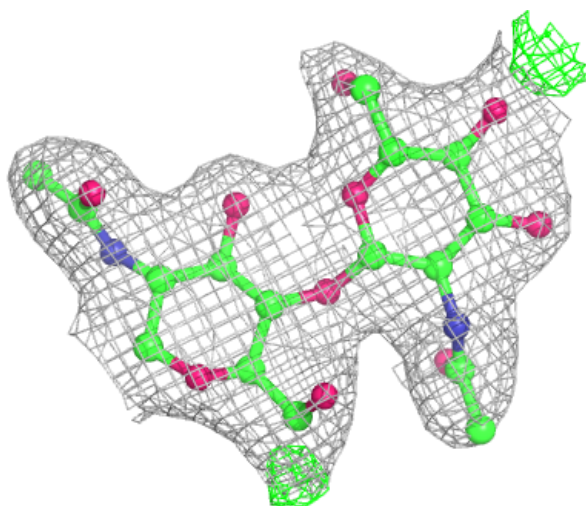
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors( $\text{\AA}^2$ )	Q<0.9
3	NAG	G	2	14/15	0.85	0.10	33,40,45,51	0
3	NAG	F	2	14/15	0.87	0.10	44,51,60,66	0
3	NAG	E	2	14/15	0.88	0.08	29,35,38,39	0
3	NAG	J	1	14/15	0.91	0.07	18,27,39,43	0
3	NAG	H	2	14/15	0.91	0.09	23,30,35,35	0
3	NAG	G	1	14/15	0.92	0.07	28,34,41,42	0
3	NAG	F	1	14/15	0.92	0.07	19,31,45,56	0
3	NAG	I	1	14/15	0.95	0.06	24,33,45,48	0
3	NAG	E	1	14/15	0.95	0.07	27,33,38,39	0
3	NAG	H	1	14/15	0.96	0.05	15,25,32,34	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.



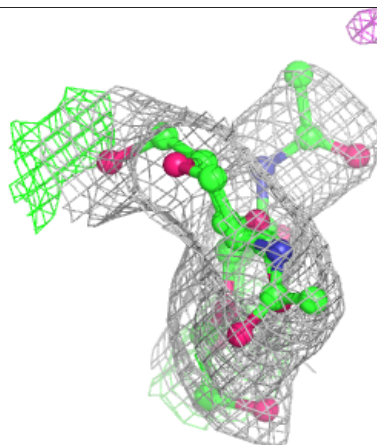
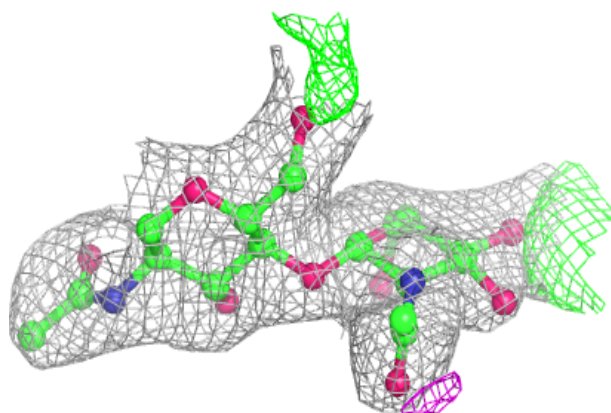
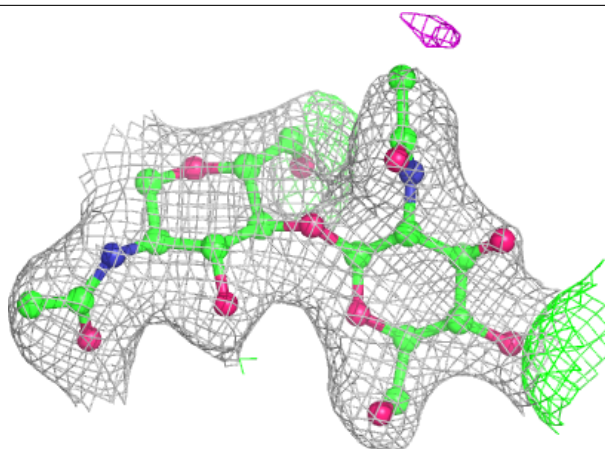
**Electron density around Chain F:**

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



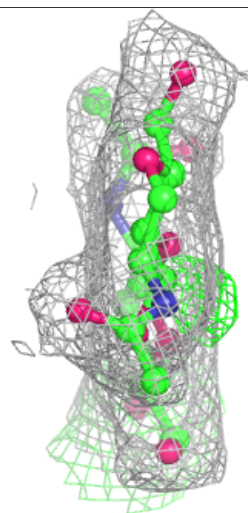
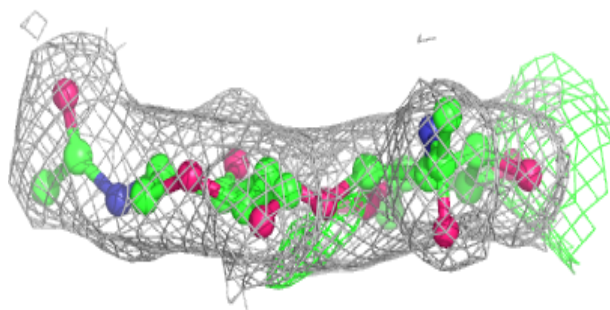
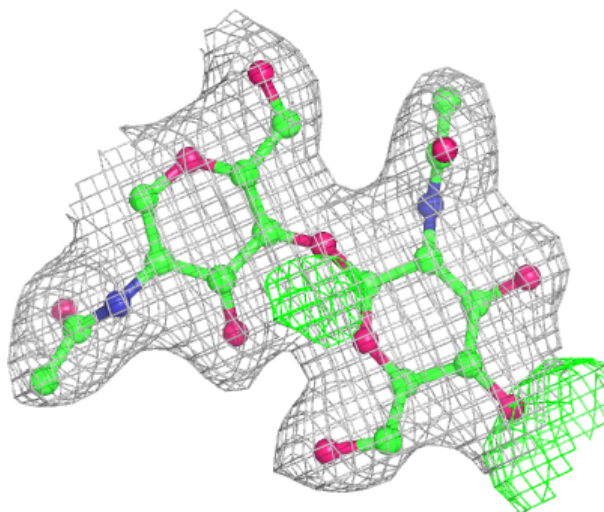
**Electron density around Chain G:**

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



**Electron density around Chain H:**

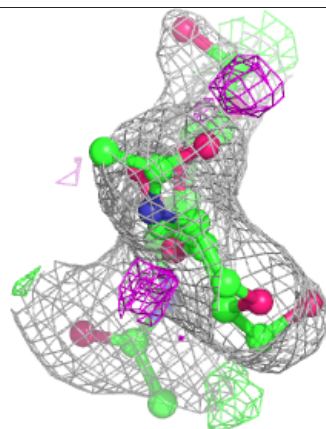
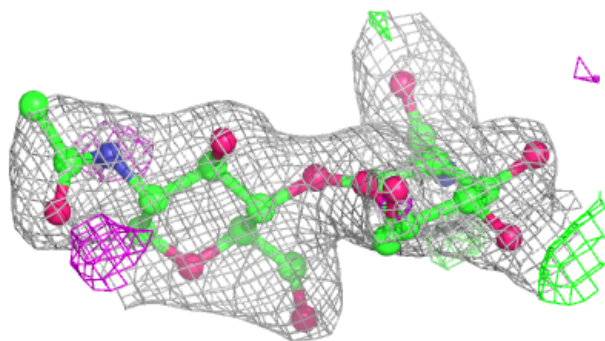
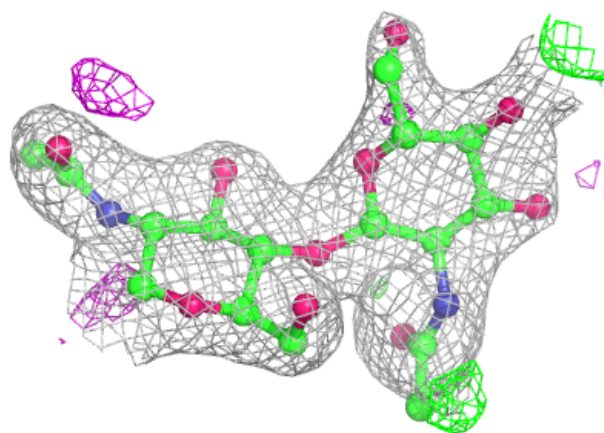
$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)

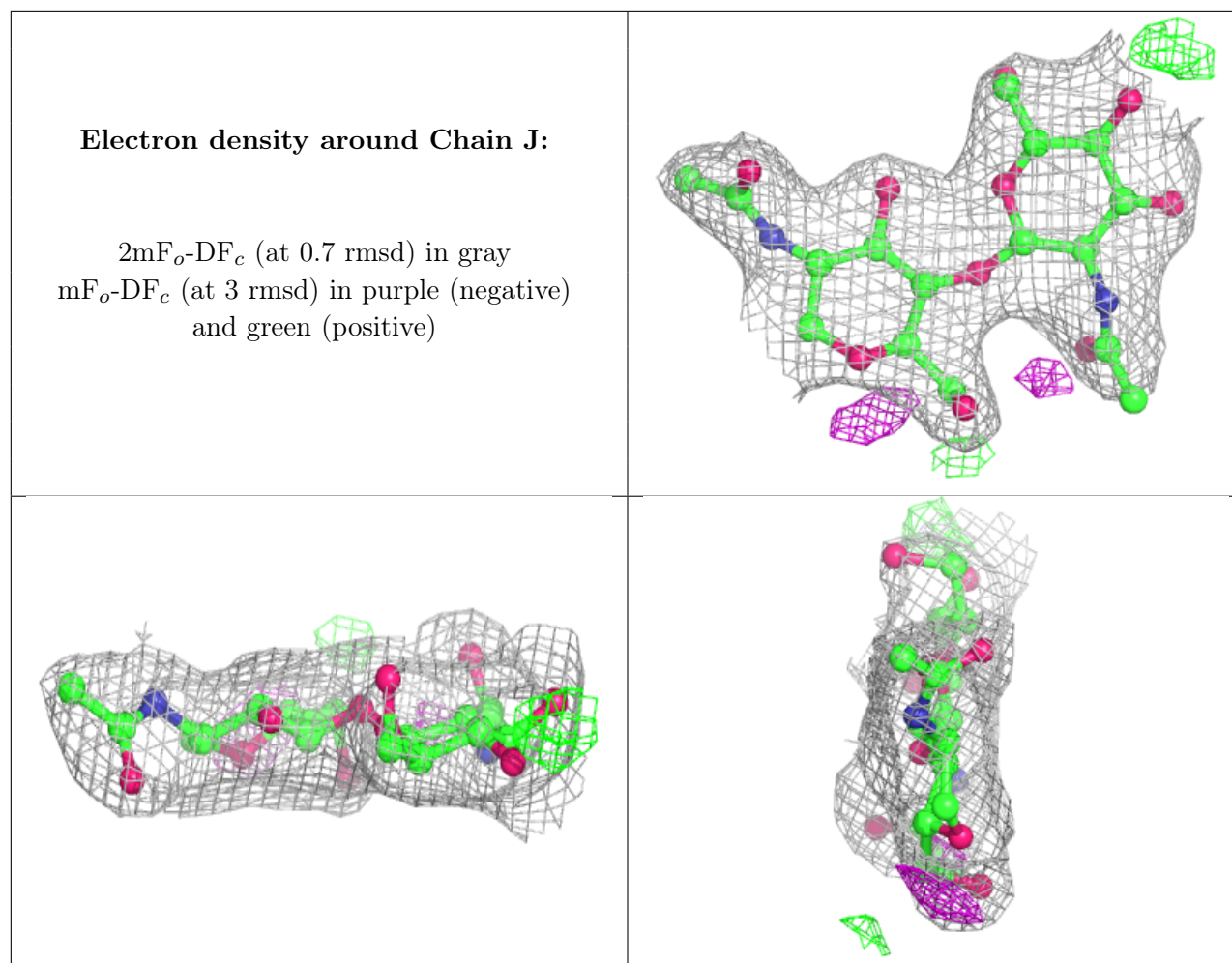




**Electron density around Chain I:**

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





## 6.4 Ligands ⓘ

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 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
4	NAG	A	914	14/15	0.68	0.17	63,73,82,83	0
4	NAG	A	915	14/15	0.68	0.15	68,73,80,82	0
4	NAG	D	904	14/15	0.75	0.14	41,61,67,75	0
4	NAG	A	905	14/15	0.77	0.10	28,44,55,61	0
4	NAG	D	916	14/15	0.78	0.14	63,71,87,89	0
4	NAG	A	903	14/15	0.79	0.15	62,70,82,82	0
4	NAG	A	910	14/15	0.81	0.11	40,57,65,69	0
4	NAG	D	903	14/15	0.81	0.11	51,63,71,74	0
4	NAG	A	909	14/15	0.82	0.13	34,54,61,61	0
4	NAG	D	913	14/15	0.83	0.11	35,55,65,73	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors( $\text{\AA}^2$ )	Q<0.9
4	NAG	D	908	14/15	0.83	0.13	52,62,76,77	0
4	NAG	D	905	14/15	0.85	0.10	24,40,50,57	0
4	NAG	A	904	14/15	0.88	0.10	46,56,64,64	0
4	NAG	A	906	14/15	0.89	0.08	38,46,51,53	0
4	NAG	D	917	14/15	0.89	0.08	39,49,57,62	0
4	NAG	D	915	14/15	0.90	0.08	16,39,45,52	0
4	NAG	D	912	14/15	0.90	0.10	26,36,45,47	0
4	NAG	A	911	14/15	0.90	0.09	46,54,57,63	0
4	NAG	D	909	14/15	0.93	0.07	26,32,38,40	0
4	NAG	D	914	14/15	0.94	0.07	23,31,35,40	0

## 6.5 Other polymers [i](#)

There are no such residues in this entry.