



# Full wwPDB X-ray Structure Validation Report ⓘ

Aug 20, 2020 – 08:00 PM BST

PDB ID : 5MZV  
Title : IL-23:IL-23R:Nb22E11 complex  
Authors : Bloch, Y.; Savvides, S.N.  
Deposited on : 2017-02-01  
Resolution : 2.80 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.

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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 : 2.13.1  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
Refmac : 5.8.0158  
CCP4 : 7.0.044 (Gargrove)  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.13.1

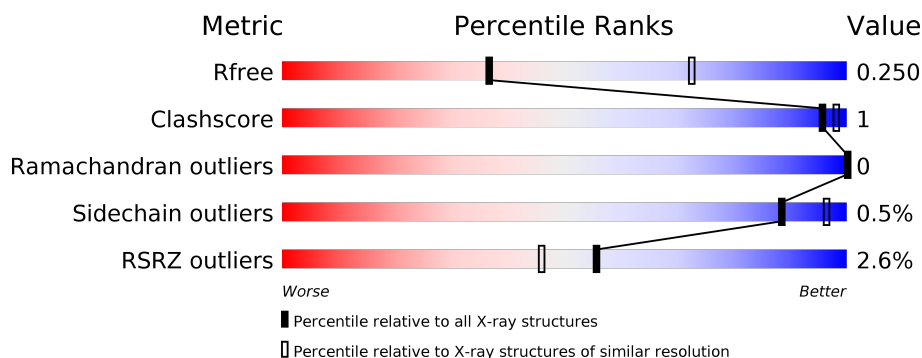
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

## *X-RAY DIFFRACTION*

The reported resolution of this entry is 2.80 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.




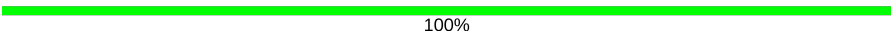
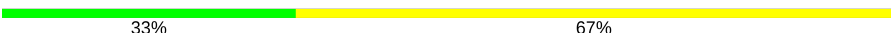
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
$R_{free}$	130704	3140 (2.80-2.80)
Clashscore	141614	3569 (2.80-2.80)
Ramachandran outliers	138981	3498 (2.80-2.80)
Sidechain outliers	138945	3500 (2.80-2.80)
RSRZ outliers	127900	3078 (2.80-2.80)

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 on 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	328	<div> <div style="width: 91%;"></div> <div style="width: 8%;"></div> <div style="width: 1%;"></div> </div>
2	B	198	<div> <div style="width: 67%;"></div> <div style="width: 31%;"></div> <div style="width: 2%;"></div> </div>
3	C	330	<div> <div style="width: 84%;"></div> <div style="width: 11%;"></div> <div style="width: 5%;"></div> </div>
4	D	156	<div> <div style="width: 76%;"></div> <div style="width: 21%;"></div> <div style="width: 3%;"></div> </div>
5	E	7	<div> <div style="width: 43%;"></div> <div style="width: 57%;"></div> </div>
6	F	2	<div> <div style="width: 100%;"></div> </div>

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Mol	Chain	Length	Quality of chain
6	H	2	 50%50%
6	I	2	 100%
7	G	3	 33%67%

## 2 Entry composition [i](#)

There are 11 unique types of molecules in this entry. The entry contains 13889 atoms, of which 6773 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 Interleukin-12 subunit beta.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
1	A	303	Total	C	H	N	O	S	0	0	0
			4689	1515	2290	395	477	12			

- Molecule 2 is a protein called Interleukin-23 subunit alpha.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
2	B	137	Total	C	H	N	O	S	0	0	0
			2108	674	1047	190	192	5			

There are 9 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	190	GLY	-	expression tag	UNP Q9NPF7
B	191	THR	-	expression tag	UNP Q9NPF7
B	192	LYS	-	expression tag	UNP Q9NPF7
B	193	HIS	-	expression tag	UNP Q9NPF7
B	194	HIS	-	expression tag	UNP Q9NPF7
B	195	HIS	-	expression tag	UNP Q9NPF7
B	196	HIS	-	expression tag	UNP Q9NPF7
B	197	HIS	-	expression tag	UNP Q9NPF7
B	198	HIS	-	expression tag	UNP Q9NPF7

- Molecule 3 is a protein called Interleukin-23 receptor.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
3	C	293	Total	C	H	N	O	S	0	4	0
			4729	1538	2331	392	448	20			

There are 13 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
C	318	ILE	-	expression tag	UNP Q5VWK5

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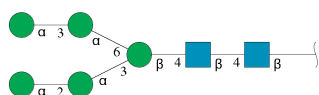
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Chain	Residue	Modelled	Actual	Comment	Reference
C	319	GLU	-	expression tag	UNP Q5VWK5
C	320	GLY	-	expression tag	UNP Q5VWK5
C	321	ARG	-	expression tag	UNP Q5VWK5
C	322	GLY	-	expression tag	UNP Q5VWK5
C	323	THR	-	expression tag	UNP Q5VWK5
C	324	LYS	-	expression tag	UNP Q5VWK5
C	325	HIS	-	expression tag	UNP Q5VWK5
C	326	HIS	-	expression tag	UNP Q5VWK5
C	327	HIS	-	expression tag	UNP Q5VWK5
C	328	HIS	-	expression tag	UNP Q5VWK5
C	329	HIS	-	expression tag	UNP Q5VWK5
C	330	HIS	-	expression tag	UNP Q5VWK5

- Molecule 4 is a protein called Nanobody 22E11.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
4	D	123	Total	C	H	N	O	S	0	1	0
			1845	589	900	168	184	4			

- Molecule 5 is an oligosaccharide called alpha-D-mannopyranose-(1-2)-alpha-D-mannopyranose-(1-3)-[alpha-D-mannopyranose-(1-3)-alpha-D-mannopyranose-(1-6)]beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
5	E	7	Total	C	H	N	O	0	0	0
			153	46	70	2	35			

- Molecule 6 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
6	F	2	Total	C	H	N	O	0	0	0
			53	16	25	2	10			
6	H	2	Total	C	H	N	O	0	0	0
			53	16	25	2	10			
6	I	2	Total	C	H	N	O	0	0	0
			53	16	25	2	10			

- 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
7	G	3	Total	C	H	N	O	0	0	0
			73	22	34	2	15			

- Molecule 8 is CHLORIDE ION (three-letter code: CL) (formula: Cl).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
8	A	1	Total	Cl	0	0
			1	1		
8	C	2	Total	Cl	0	0
			2	2		

- Molecule 9 is SODIUM ION (three-letter code: NA) (formula: Na).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
9	A	1	Total	Na	0	0
			1	1		

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



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
10	C	1	Total	C	H	N	O	0	0
			27	8	13	1	5		
10	C	1	Total	C	H	N	O	0	0
			27	8	13	1	5		

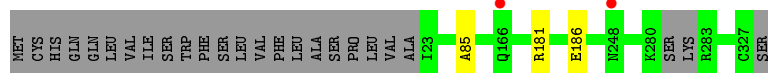
- Molecule 11 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
11	A	29	Total	O	0	0
			29	29		
11	B	2	Total	O	0	0
			2	2		
11	C	38	Total	O	0	0
			38	38		
11	D	6	Total	O	0	0
			6	6		

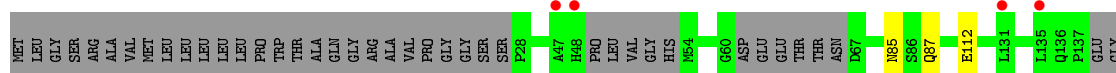
### 3 Residue-property plots [i](#)

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.

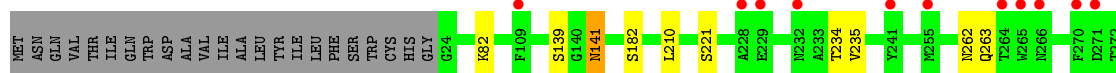
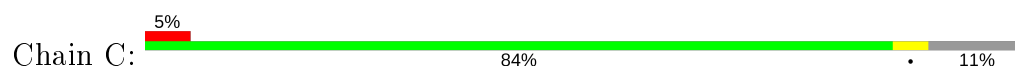
- Molecule 1: Interleukin-12 subunit beta



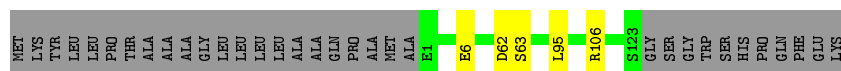
- Molecule 2: Interleukin-23 subunit alpha



- Molecule 3: Interleukin-23 receptor



- Molecule 4: Nanobody 22E11



- Molecule 5: alpha-D-mannopyranose-(1-2)-alpha-D-mannopyranose-(1-3)-[alpha-D-mannopyranose-(1-3)-alpha-D-mannopyranose-(1-6)]beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-



## D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain E:  43% 57%

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

Chain F:  100%

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

Chain H:  50% 50%

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

Chain I:  100%

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

Chain G:  33% 67%

## 4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	67.22Å 112.19Å 109.87Å 90.00° 106.24° 90.00°	Depositor
Resolution (Å)	76.85 – 2.80 76.85 – 2.80	Depositor EDS
% Data completeness (in resolution range)	98.5 (76.85-2.80) 97.9 (76.85-2.80)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	2.51 (at 2.82Å)	Xtriage
Refinement program	PHENIX (dev_2614: ???), BUSTER	Depositor
R, $R_{free}$	0.212 , 0.250 0.212 , 0.250	Depositor DCC
$R_{free}$ test set	1594 reflections (4.19%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	68.7	Xtriage
Anisotropy	0.212	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.34 , 37.4	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.47$ , $\langle L^2 \rangle = 0.29$	Xtriage
Estimated twinning fraction	0.037 for h,-k,-h-l	Xtriage
$F_o, F_c$ correlation	0.94	EDS
Total number of atoms	13889	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	86.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.86% 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: MAN, NA, BMA, NAG, CL

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	0.25	0/2457	0.46	0/3339
2	B	0.23	0/1084	0.37	0/1468
3	C	0.26	0/2473	0.46	0/3361
4	D	0.29	0/970	0.46	0/1315
All	All	0.26	0/6984	0.45	0/9483

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

### 5.2 Too-close contacts [i](#)

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	2399	2290	2288	2	0
2	B	1061	1047	1046	2	0
3	C	2398	2331	2328	7	0
4	D	945	900	901	3	0
5	E	83	70	70	0	0
6	F	28	25	25	0	0
6	H	28	25	25	3	0
6	I	28	25	25	0	0
7	G	39	34	34	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
8	A	1	0	0	0	0
8	C	2	0	0	0	0
9	A	1	0	0	0	0
10	C	28	26	26	0	0
11	A	29	0	0	0	0
11	B	2	0	0	0	0
11	C	38	0	0	0	0
11	D	6	0	0	0	0
All	All	7116	6773	6768	15	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 1.

All (15) 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:181:ARG:NH1	1:A:186:GLU:OE1	2.34	0.60
3:C:287:ASN:N	3:C:315:THR:OG1	2.37	0.58
4:D:6:GLU:OE1	4:D:6:GLU:N	2.40	0.55
1:A:85:ALA:O	4:D:106:ARG:NH2	2.42	0.53
2:B:85:ASN:OD1	2:B:87:GLN:N	2.40	0.53
6:H:1:NAG:O3	6:H:1:NAG:O7	2.25	0.52
4:D:62:ASP:OD1	4:D:63:SER:N	2.46	0.49
3:C:234:THR:OG1	3:C:235:VAL:N	2.47	0.47
3:C:221:SER:O	3:C:305:GLN:NE2	2.48	0.47
3:C:139:SER:O	6:H:1:NAG:H82	2.18	0.44
6:H:1:NAG:H62	6:H:2:NAG:N2	2.34	0.43
2:B:112:GLU:O	2:B:158:ARG:NH1	2.51	0.42
3:C:262:ASN:OD1	3:C:263:GLN:N	2.48	0.42
3:C:273:ASN:O	3:C:278:GLN:NE2	2.53	0.41
3:C:141:ASN:HB3	3:C:182:SER:HA	2.03	0.40

There are no symmetry-related clashes.

## 5.3 Torsion angles ⓘ

### 5.3.1 Protein backbone ⓘ

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	299/328 (91%)	282 (94%)	17 (6%)	0	100	100
2	B	129/198 (65%)	123 (95%)	6 (5%)	0	100	100
3	C	295/330 (89%)	270 (92%)	25 (8%)	0	100	100
4	D	122/156 (78%)	118 (97%)	4 (3%)	0	100	100
All	All	845/1012 (84%)	793 (94%)	52 (6%)	0	100	100

There are no Ramachandran outliers to report.

### 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	269/297 (91%)	269 (100%)	0	100	100
2	B	115/167 (69%)	115 (100%)	0	100	100
3	C	268/298 (90%)	265 (99%)	3 (1%)	73	92
4	D	100/122 (82%)	99 (99%)	1 (1%)	76	93
All	All	752/884 (85%)	748 (100%)	4 (0%)	88	96

All (4) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
3	C	82	LYS
3	C	141	ASN
3	C	210	LEU
4	D	95	LEU

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (4) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	125	ASN

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Mol	Chain	Res	Type
1	A	266	HIS
2	B	154	GLN
4	D	39	GLN

### 5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

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

## 5.5 Carbohydrates ⓘ

16 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
5	NAG	E	1	1,5	14,14,15	0.34	0	17,19,21	0.39	0
5	NAG	E	2	5	14,14,15	0.27	0	17,19,21	0.38	0
5	BMA	E	3	5	11,11,12	0.76	0	15,15,17	0.90	0
5	MAN	E	4	5	11,11,12	0.70	0	15,15,17	1.09	2 (13%)
5	MAN	E	5	5	11,11,12	0.61	0	15,15,17	1.00	2 (13%)
5	MAN	E	6	5	11,11,12	0.65	0	15,15,17	1.02	2 (13%)
5	MAN	E	7	5	11,11,12	0.73	0	15,15,17	0.89	1 (6%)
6	NAG	F	1	3,6	14,14,15	0.38	0	17,19,21	0.47	0
6	NAG	F	2	6	14,14,15	0.25	0	17,19,21	0.55	0
7	NAG	G	1	3,7	14,14,15	0.60	1 (7%)	17,19,21	0.77	0
7	NAG	G	2	7	14,14,15	0.25	0	17,19,21	0.75	1 (5%)
7	BMA	G	3	7	11,11,12	0.59	0	15,15,17	0.76	0
6	NAG	H	1	3,6	14,14,15	0.75	1 (7%)	17,19,21	0.80	0
6	NAG	H	2	6	14,14,15	0.29	0	17,19,21	0.58	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
6	NAG	I	1	3,6	14,14,15	0.37	0	17,19,21	0.45	0
6	NAG	I	2	6	14,14,15	0.27	0	17,19,21	0.51	0

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
5	NAG	E	1	1,5	-	0/6/23/26	0/1/1/1
5	NAG	E	2	5	-	0/6/23/26	0/1/1/1
5	BMA	E	3	5	-	0/2/19/22	0/1/1/1
5	MAN	E	4	5	-	0/2/19/22	0/1/1/1
5	MAN	E	5	5	-	1/2/19/22	0/1/1/1
5	MAN	E	6	5	-	2/2/19/22	0/1/1/1
5	MAN	E	7	5	-	2/2/19/22	0/1/1/1
6	NAG	F	1	3,6	-	2/6/23/26	0/1/1/1
6	NAG	F	2	6	-	1/6/23/26	0/1/1/1
7	NAG	G	1	3,7	-	1/6/23/26	0/1/1/1
7	NAG	G	2	7	-	1/6/23/26	0/1/1/1
7	BMA	G	3	7	-	0/2/19/22	0/1/1/1
6	NAG	H	1	3,6	-	3/6/23/26	0/1/1/1
6	NAG	H	2	6	-	2/6/23/26	0/1/1/1
6	NAG	I	1	3,6	-	0/6/23/26	0/1/1/1
6	NAG	I	2	6	-	2/6/23/26	0/1/1/1

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
6	H	1	NAG	O5-C1	-2.58	1.39	1.43
7	G	1	NAG	O5-C1	-2.04	1.40	1.43

All (8) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
7	G	2	NAG	C1-O5-C5	2.78	115.95	112.19
5	E	4	MAN	O2-C2-C3	-2.69	104.76	110.14
5	E	4	MAN	C1-O5-C5	2.59	115.71	112.19
5	E	6	MAN	C1-O5-C5	2.57	115.67	112.19
5	E	5	MAN	C1-O5-C5	2.48	115.56	112.19
5	E	6	MAN	O2-C2-C3	-2.17	105.79	110.14

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	E	5	MAN	O2-C2-C3	-2.14	105.85	110.14
5	E	7	MAN	C1-O5-C5	2.09	115.02	112.19

There are no chirality outliers.

All (17) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
5	E	7	MAN	O5-C5-C6-O6
6	H	1	NAG	C1-C2-N2-C7
5	E	6	MAN	O5-C5-C6-O6
5	E	7	MAN	C4-C5-C6-O6
5	E	6	MAN	C4-C5-C6-O6
6	I	2	NAG	O5-C5-C6-O6
5	E	5	MAN	O5-C5-C6-O6
7	G	2	NAG	O5-C5-C6-O6
6	H	1	NAG	O5-C5-C6-O6
6	H	2	NAG	C4-C5-C6-O6
6	F	1	NAG	C4-C5-C6-O6
6	F	1	NAG	O5-C5-C6-O6
6	H	2	NAG	O5-C5-C6-O6
6	H	1	NAG	C3-C2-N2-C7
6	I	2	NAG	C3-C2-N2-C7
7	G	1	NAG	C3-C2-N2-C7
6	F	2	NAG	O5-C5-C6-O6

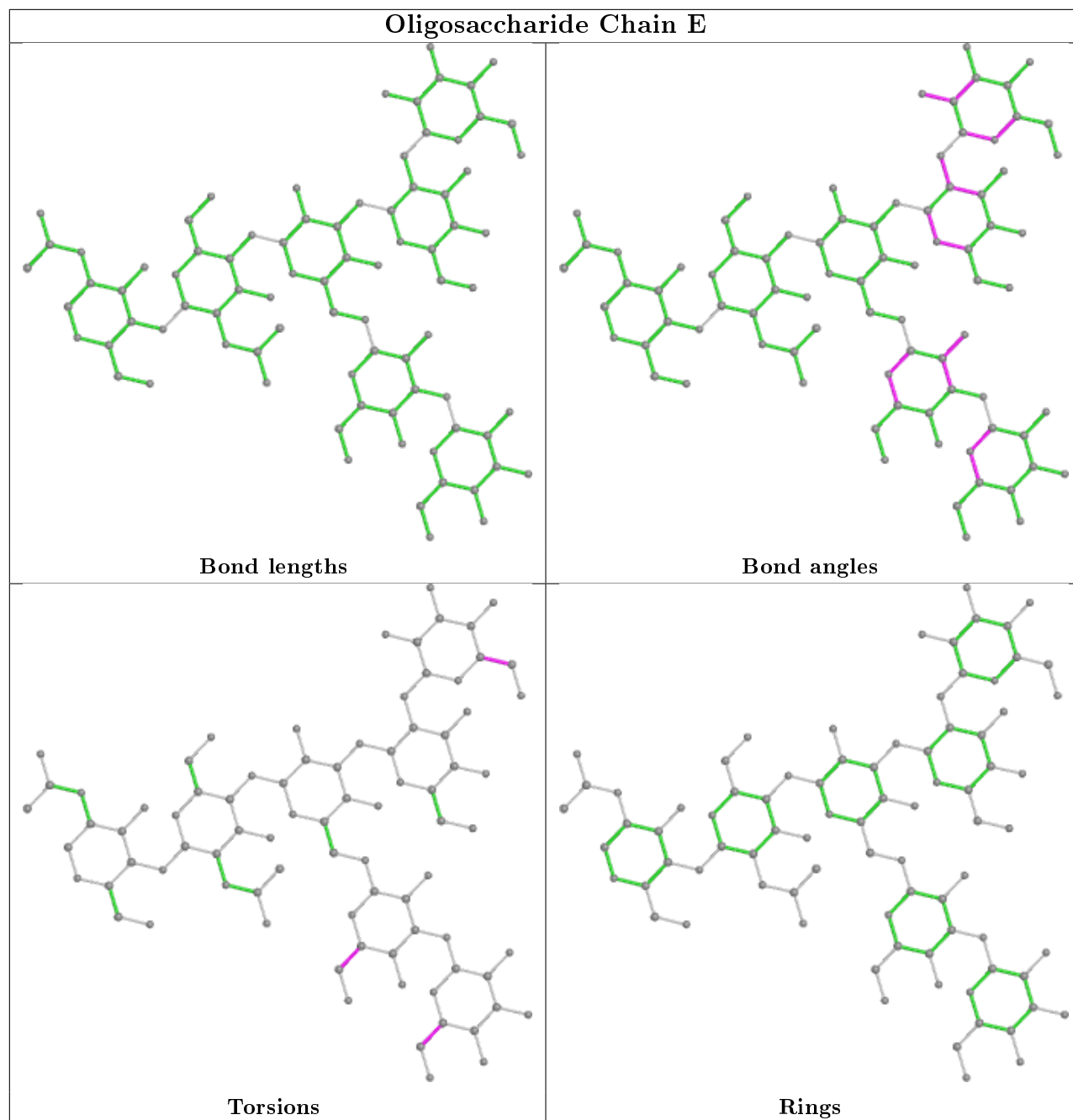
There are no ring outliers.

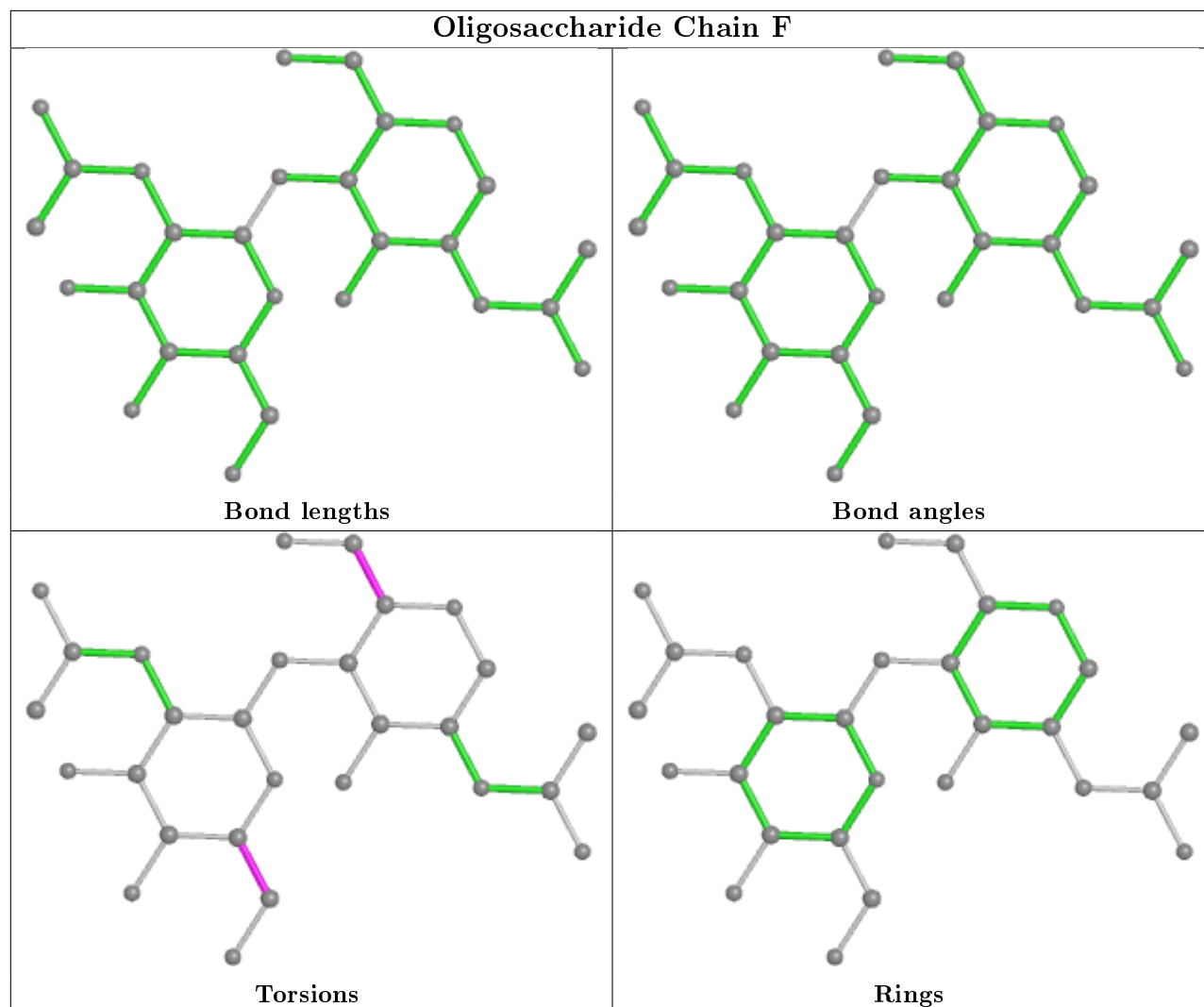
2 monomers are involved in 3 short contacts:

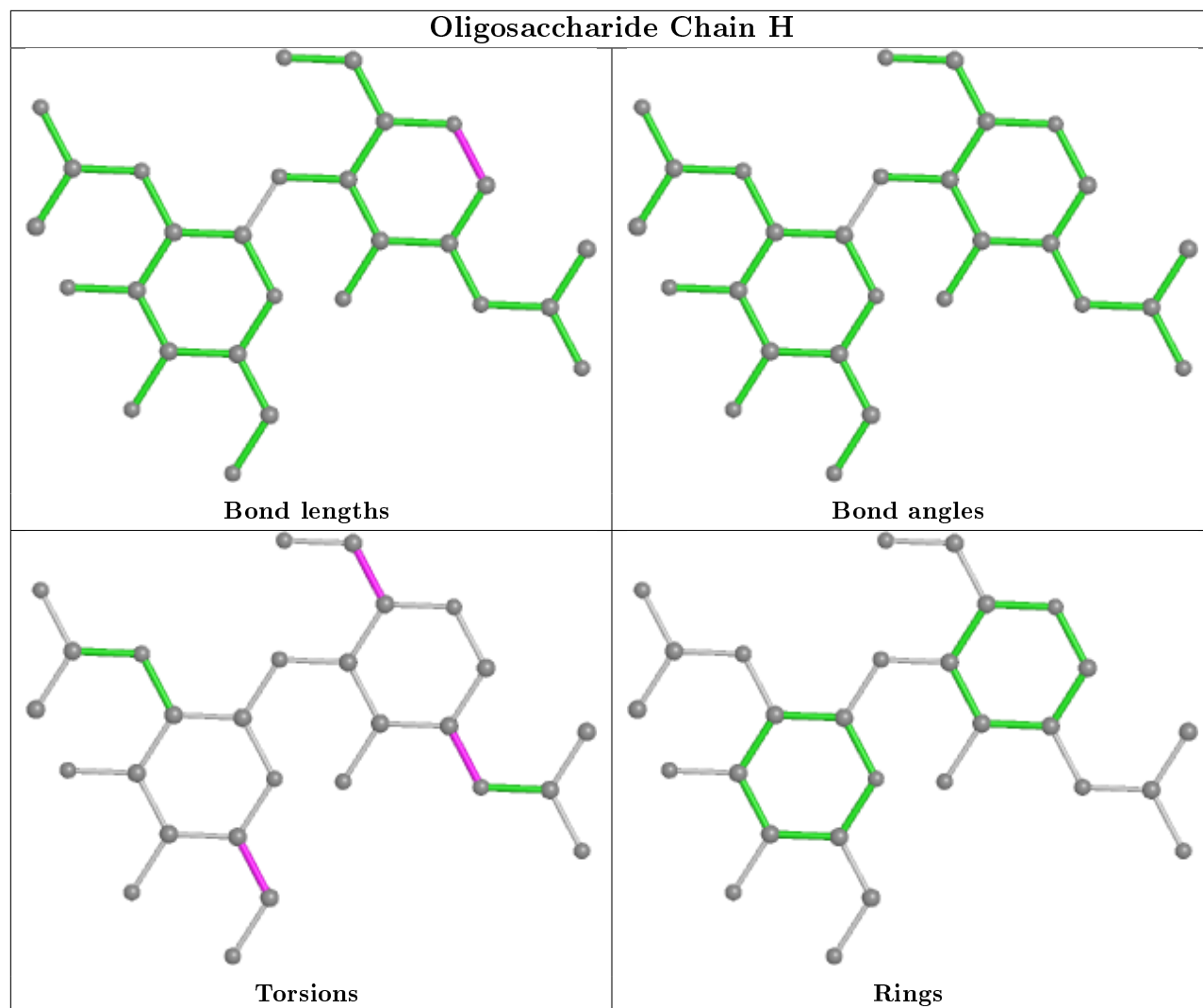
Mol	Chain	Res	Type	Clashes	Symm-Clashes
6	H	1	NAG	3	0
6	H	2	NAG	1	0

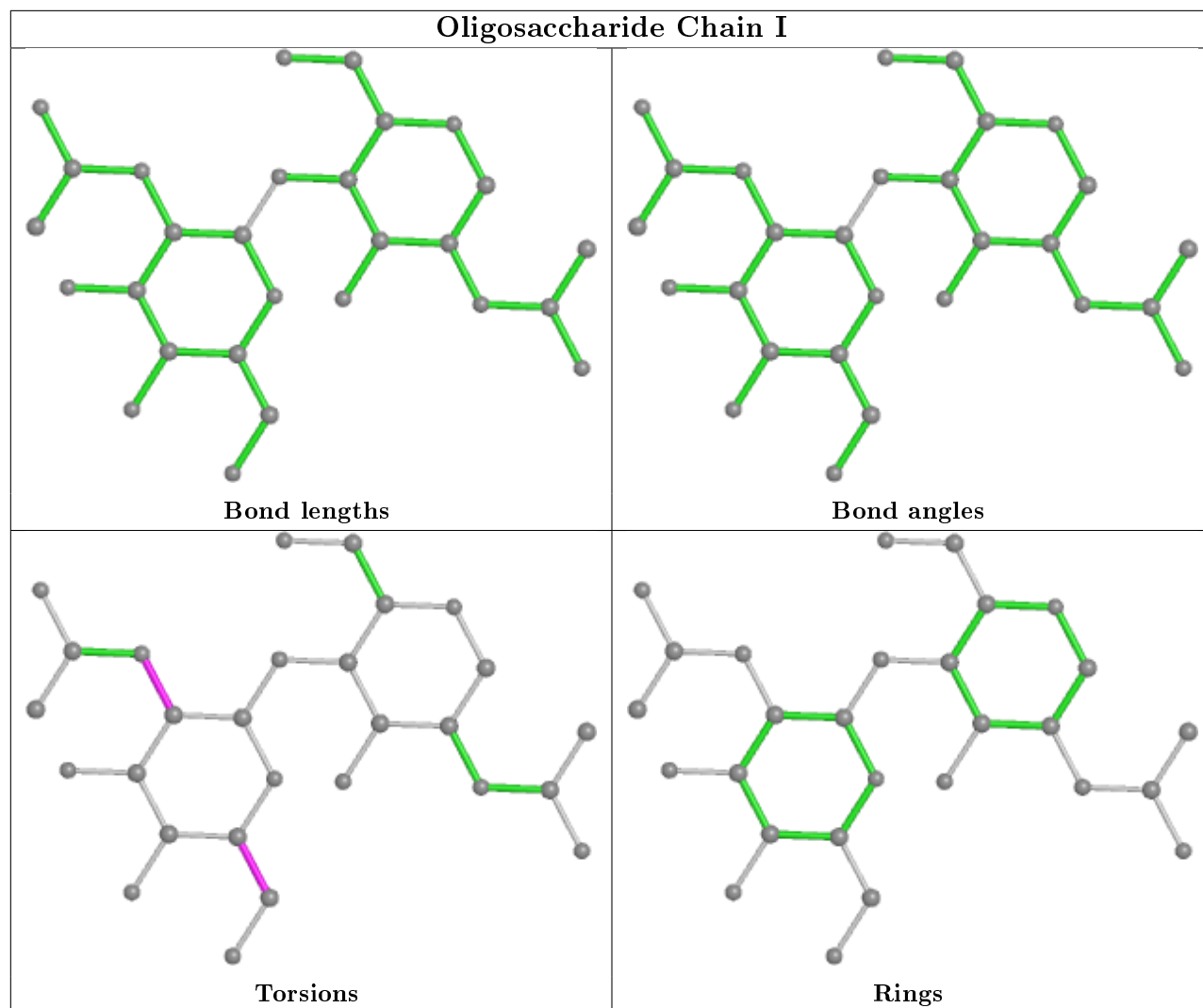
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for oligosaccharide.

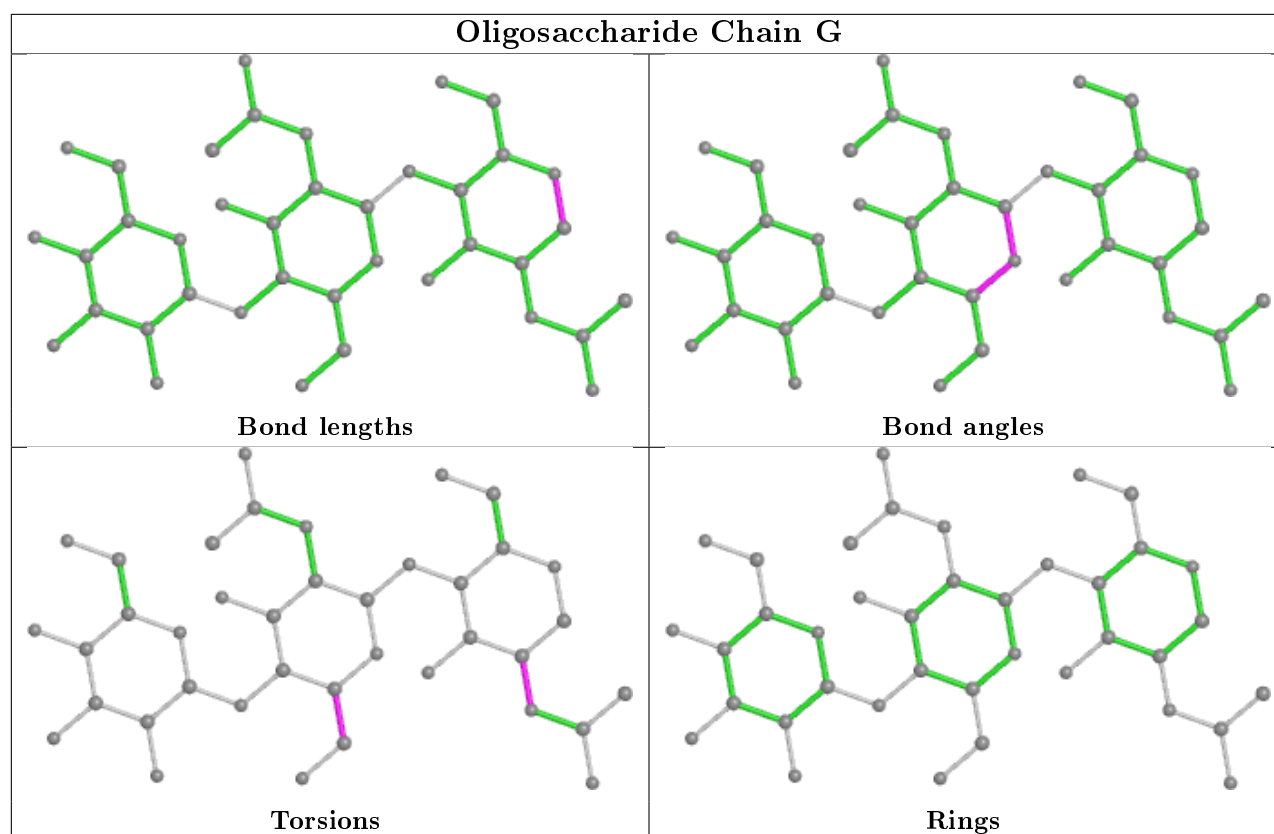












## 5.6 Ligand geometry [i](#)

Of 6 ligands modelled in this entry, 4 are monoatomic - leaving 2 for Mogul analysis.

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	$\# Z  > 2$
10	NAG	C	413	3	14,14,15	0.36	0	17,19,21	0.48	0
10	NAG	C	412	3	14,14,15	0.22	0	17,19,21	0.48	0

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
10	NAG	C	413	3	-	0/6/23/26	0/1/1/1
10	NAG	C	412	3	-	1/6/23/26	0/1/1/1

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (1) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
10	C	412	NAG	C3-C2-N2-C7

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	303/328 (92%)	0.17	2 (0%) 87 84	43, 77, 128, 161	0
2	B	137/198 (69%)	0.33	5 (3%) 42 32	67, 108, 136, 156	0
3	C	293/330 (88%)	0.42	15 (5%) 28 19	48, 76, 152, 194	0
4	D	123/156 (78%)	0.31	0 100 100	42, 58, 93, 108	0
All	All	856/1012 (84%)	0.30	22 (2%) 56 46	42, 79, 136, 194	0

All (22) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
3	C	255	MET	3.1
2	B	48	HIS	3.1
3	C	228	ALA	3.1
3	C	270	PHE	2.9
2	B	187	LEU	2.8
1	A	248	ASN	2.7
2	B	131	LEU	2.7
3	C	281	GLU	2.7
3	C	282	PHE	2.7
3	C	266	ASN	2.7
3	C	264	THR	2.6
3	C	232	ASN	2.6
3	C	241	TYR	2.5
3	C	109	PHE	2.5
3	C	271	ASP	2.5
2	B	47	ALA	2.4
3	C	229	GLU	2.4
1	A	166	GLN	2.4
2	B	135	LEU	2.3
3	C	292	PHE	2.3
3	C	291	VAL	2.0
3	C	265	TRP	2.0

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

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

## 6.3 Carbohydrates ⓘ

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

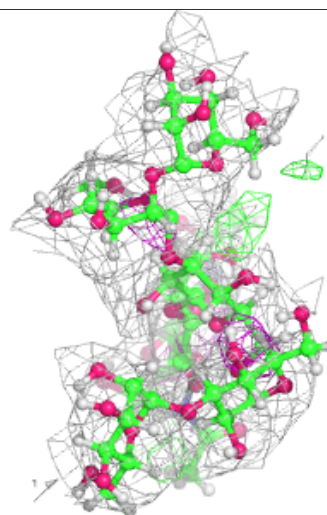
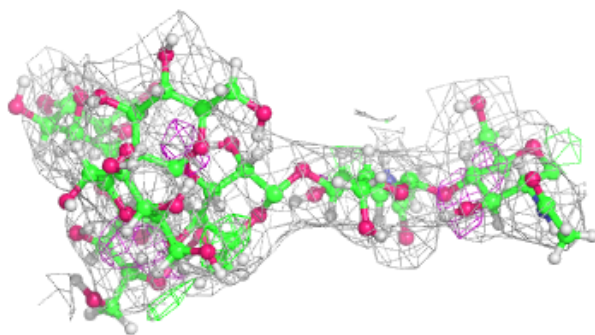
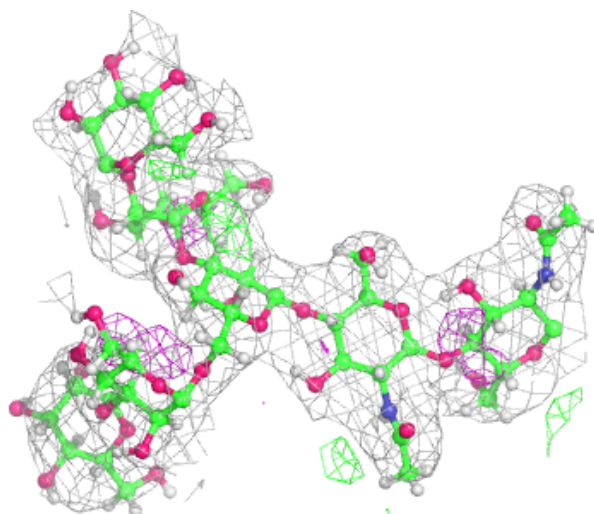
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å <sup>2</sup> )	Q<0.9
5	MAN	E	6	11/12	0.80	0.18	124,134,157,158	0
7	BMA	G	3	11/12	0.80	0.14	127,132,161,161	0
6	NAG	H	2	14/15	0.81	0.15	154,163,165,170	0
6	NAG	I	1	14/15	0.82	0.15	132,139,149,153	0
5	MAN	E	5	11/12	0.82	0.17	160,171,173,177	0
6	NAG	F	2	14/15	0.83	0.21	134,142,148,152	0
6	NAG	I	2	14/15	0.84	0.26	158,165,176,179	0
7	NAG	G	2	14/15	0.84	0.12	111,114,134,136	0
5	MAN	E	7	11/12	0.85	0.19	150,159,184,184	0
5	BMA	E	3	11/12	0.86	0.16	109,117,134,137	0
5	MAN	E	4	11/12	0.86	0.12	113,121,128,129	0
7	NAG	G	1	14/15	0.89	0.18	99,111,126,126	0
6	NAG	F	1	14/15	0.89	0.23	105,108,110,114	0
6	NAG	H	1	14/15	0.92	0.15	118,126,130,131	0
5	NAG	E	1	14/15	0.97	0.18	34,46,56,56	0
5	NAG	E	2	14/15	0.97	0.17	34,52,59,61	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.



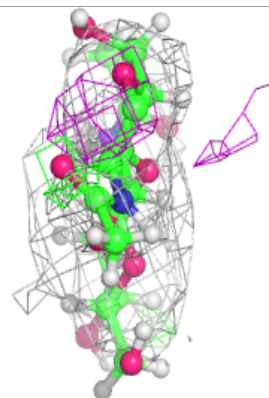
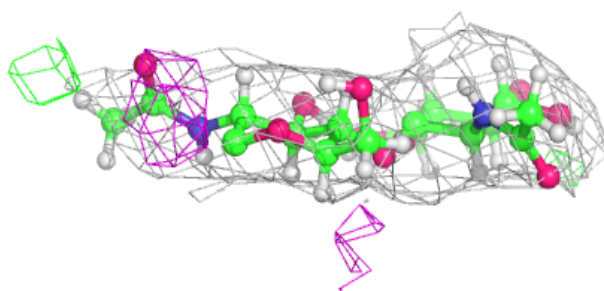
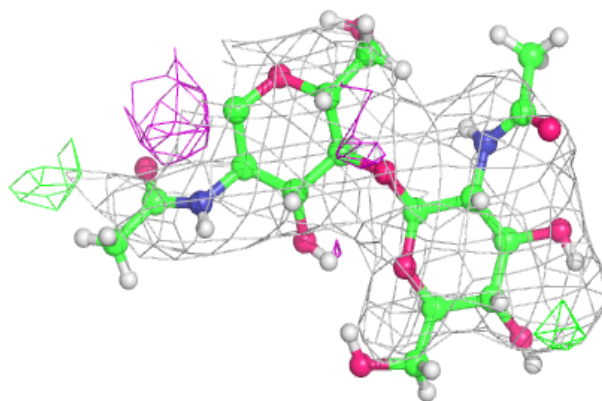
**Electron density around Chain E:**

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

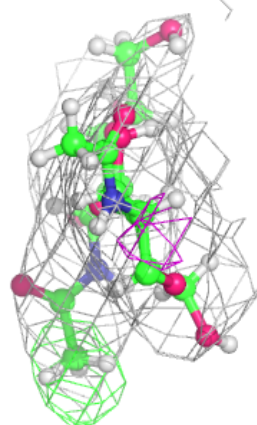
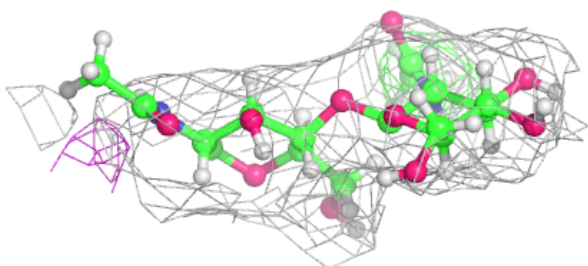
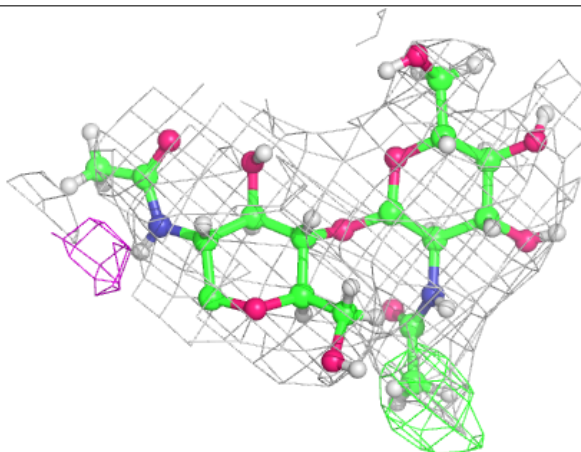


**Electron density around Chain F:**

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

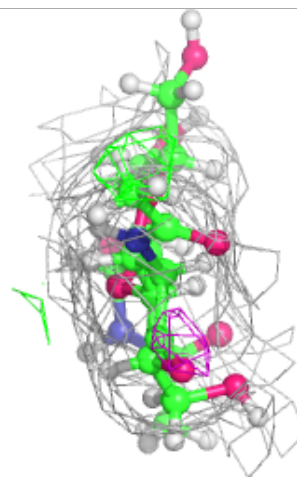
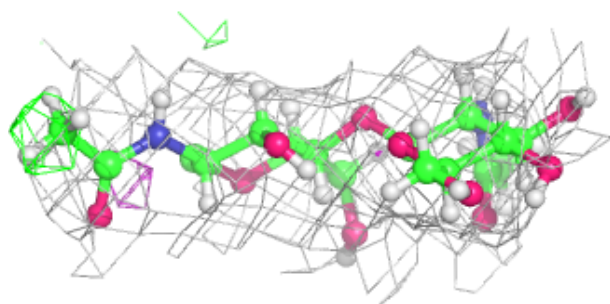
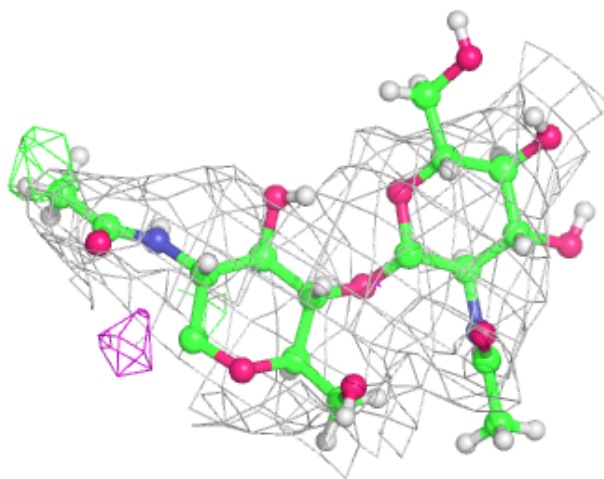
**Electron density around Chain H:**

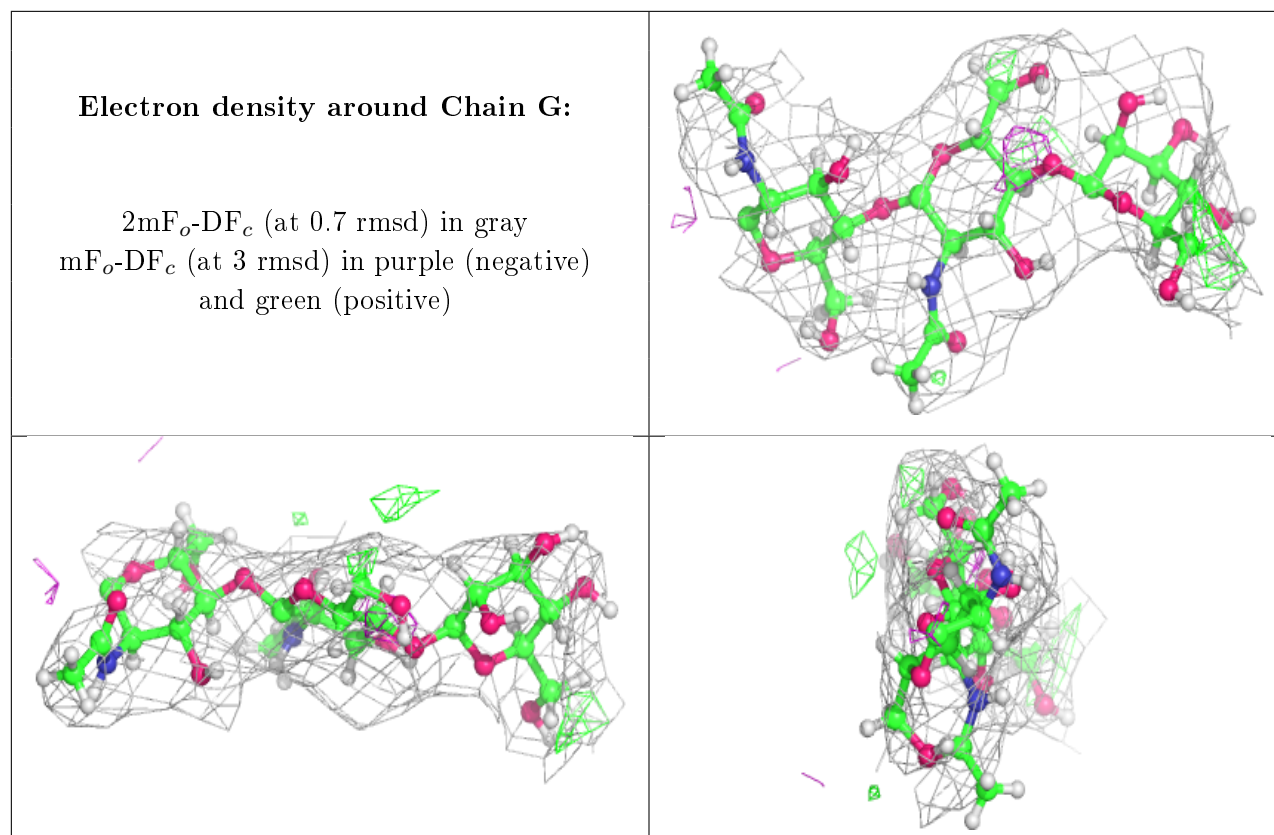
$2mF_o - DF_c$  (at 0.7 rmsd) in gray  
 $mF_o - DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)



**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 [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
10	NAG	C	413	14/15	0.76	0.28	131,141,148,149	0
10	NAG	C	412	14/15	0.76	0.28	160,167,184,184	0
8	CL	C	401	1/1	0.94	0.12	57,57,57,57	0
9	NA	A	402	1/1	0.96	0.09	57,57,57,57	0
8	CL	C	402	1/1	0.97	0.13	57,57,57,57	0
8	CL	A	401	1/1	0.99	0.16	57,57,57,57	0

## 6.5 Other polymers [i](#)

There are no such residues in this entry.