



# Full wwPDB X-ray Structure Validation Report ⓘ

Jun 19, 2024 – 05:46 AM EDT

PDB ID : 3W3G  
Title : Crystal structure of human TLR8 (unliganded form)  
Authors : Tanji, H.; Ohto, U.; Shimizu, T.  
Deposited on : 2012-12-21  
Resolution : 2.30 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	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	1.20.1
EDS	:	2.37.1
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)	:	2.37.1

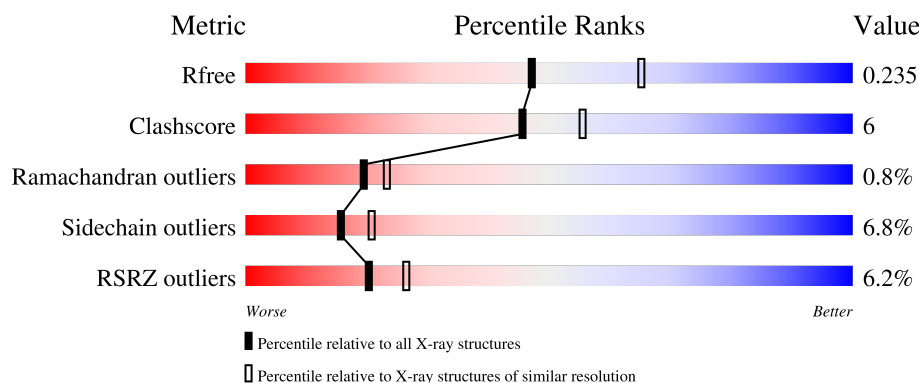
# 1 Overall quality at a glance i

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.



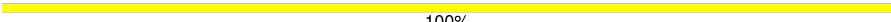


Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
$R_{free}$	130704	5042 (2.30-2.30)
Clashscore	141614	5643 (2.30-2.30)
Ramachandran outliers	138981	5575 (2.30-2.30)
Sidechain outliers	138945	5575 (2.30-2.30)
RSRZ outliers	127900	4938 (2.30-2.30)

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	811	<div> <div>3%</div> <div>77%</div> <div>13%</div> <div>7%</div> </div>
1	B	811	<div> <div>8%</div> <div>73%</div> <div>15%</div> <div>8%</div> </div>
2	C	3	<div> <div>33%</div> <div>67%</div> </div>
2	D	3	<div> <div>100%</div> </div>
2	E	3	<div> <div>100%</div> </div>

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Mol	Chain	Length	Quality of chain
2	G	3	 100%
2	H	3	 33%67%
3	F	2	 100%

## 2 Entry composition

There are 6 unique types of molecules in this entry. The entry contains 12865 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.

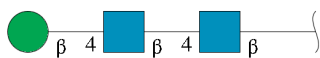
- Molecule 1 is a protein called Toll-like receptor 8.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	752	Total	C	N	O	S	0	0	0
			6055	3873	1029	1134	19			
1	B	743	Total	C	N	O	S	0	0	0
			5985	3828	1019	1119	19			

There are 20 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	23	ARG	-	expression tag	UNP Q9NR97
A	24	SER	-	expression tag	UNP Q9NR97
A	25	PRO	-	expression tag	UNP Q9NR97
A	26	TRP	-	expression tag	UNP Q9NR97
A	828	GLU	-	expression tag	UNP Q9NR97
A	829	PHE	-	expression tag	UNP Q9NR97
A	830	LEU	-	expression tag	UNP Q9NR97
A	831	VAL	-	expression tag	UNP Q9NR97
A	832	PRO	-	expression tag	UNP Q9NR97
A	833	ARG	-	expression tag	UNP Q9NR97
B	23	ARG	-	expression tag	UNP Q9NR97
B	24	SER	-	expression tag	UNP Q9NR97
B	25	PRO	-	expression tag	UNP Q9NR97
B	26	TRP	-	expression tag	UNP Q9NR97
B	828	GLU	-	expression tag	UNP Q9NR97
B	829	PHE	-	expression tag	UNP Q9NR97
B	830	LEU	-	expression tag	UNP Q9NR97
B	831	VAL	-	expression tag	UNP Q9NR97
B	832	PRO	-	expression tag	UNP Q9NR97
B	833	ARG	-	expression tag	UNP Q9NR97

- Molecule 2 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.



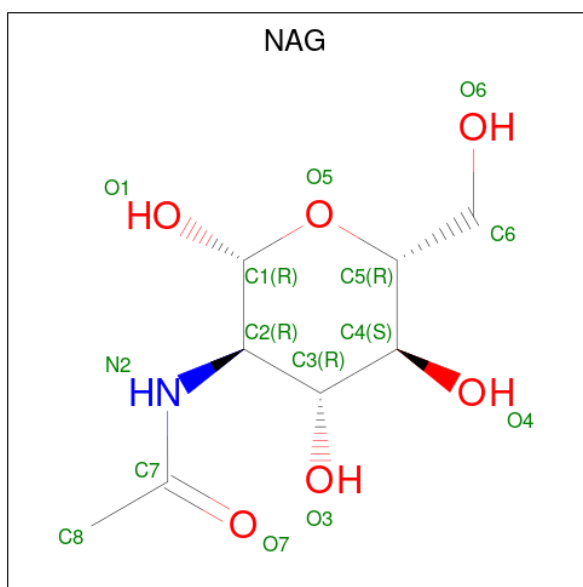
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
2	C	3	Total	C	N	O	0	0	0
			39	22	2	15			
2	D	3	Total	C	N	O	0	0	0
			39	22	2	15			
2	E	3	Total	C	N	O	0	0	0
			39	22	2	15			
2	G	3	Total	C	N	O	0	0	0
			39	22	2	15			
2	H	3	Total	C	N	O	0	0	0
			39	22	2	15			

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



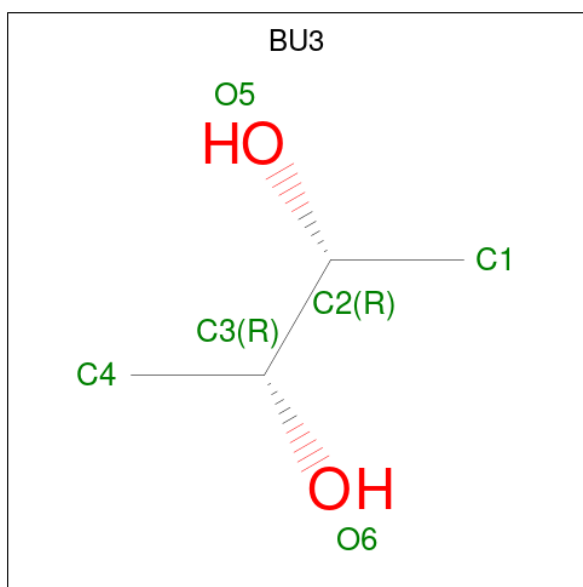
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
3	F	2	Total	C	N	O	0	0	0
			28	16	2	10			

- 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	B	1	Total	C	N	O	0	0
			14	8	1	5		
4	B	1	Total	C	N	O	0	0
			14	8	1	5		
4	B	1	Total	C	N	O	0	0
			14	8	1	5		

- Molecule 5 is (R,R)-2,3-BUTANEDIOL (three-letter code: BU3) (formula: C<sub>4</sub>H<sub>10</sub>O<sub>2</sub>).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
5	A	1	Total	C	O	0	0
			6	4	2		

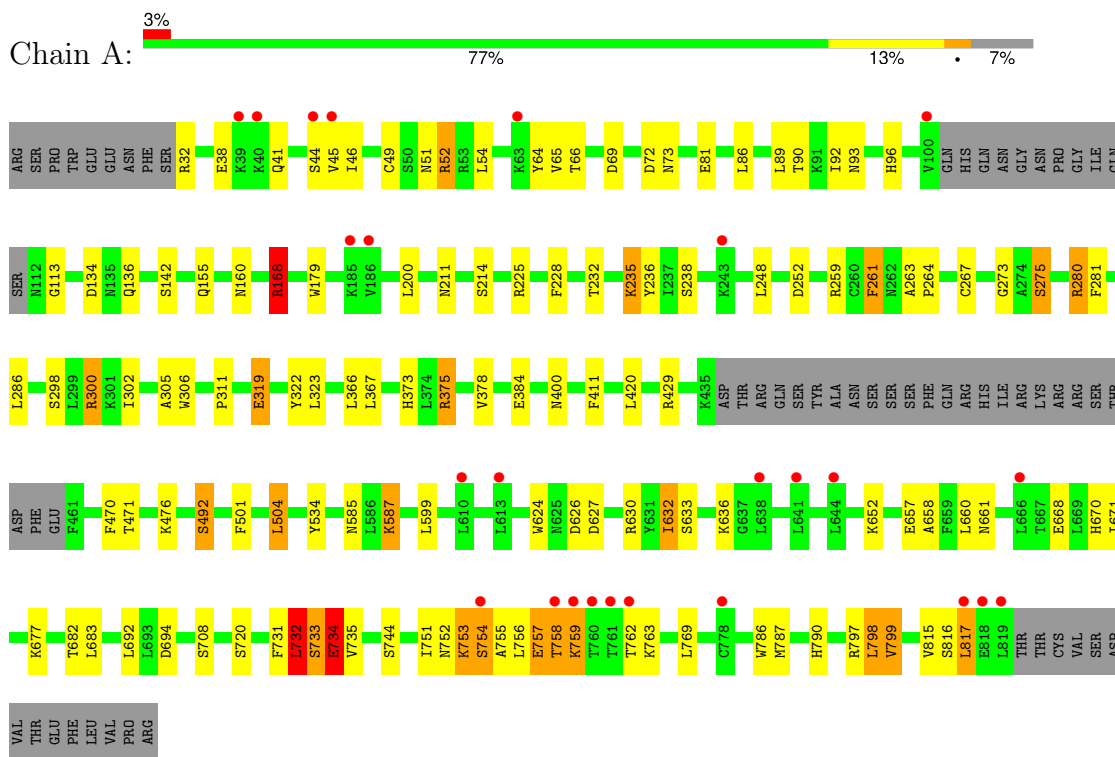
- Molecule 6 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	A	299	Total	O	0	0
			299	299		
6	B	157	Total	O	0	0
			157	157		

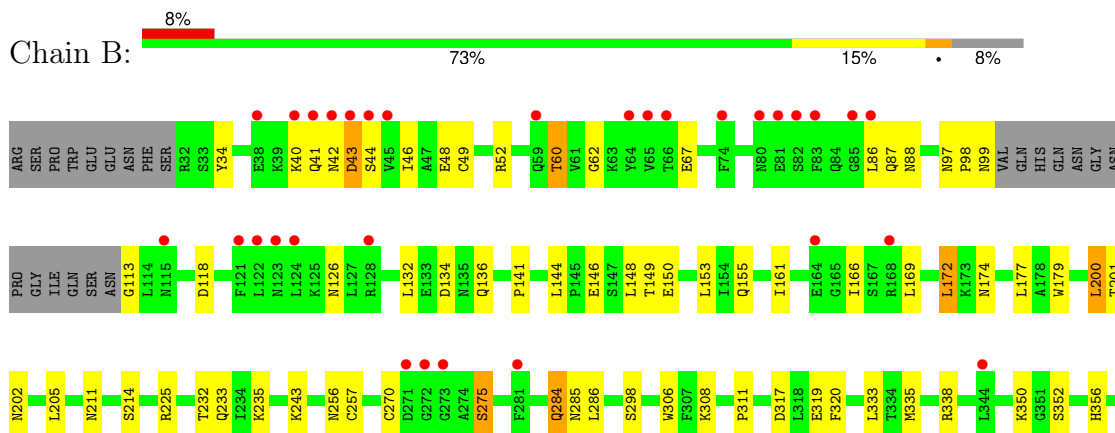
### 3 Residue-property plots [i](#)

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.

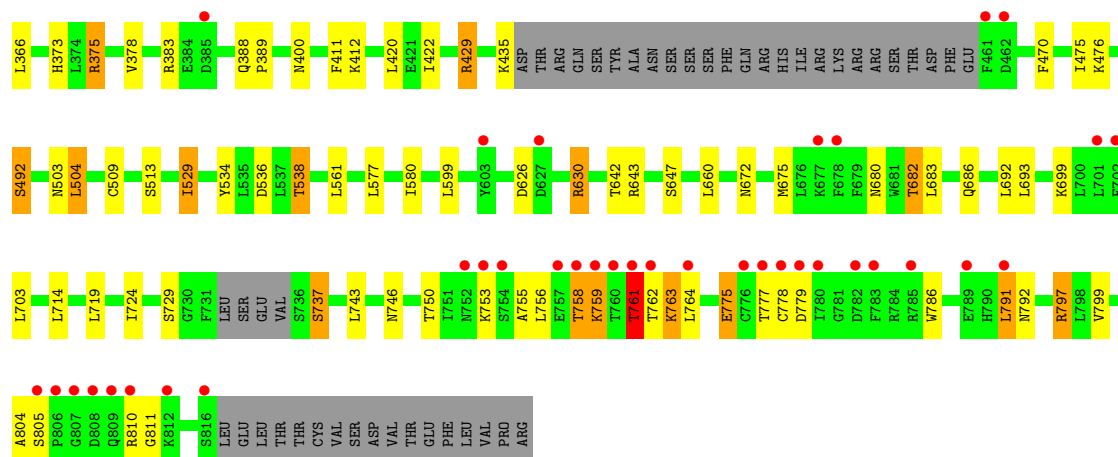
#### • Molecule 1: Toll-like receptor 8



#### • Molecule 1: Toll-like receptor 8







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

Chain C: 33% 67%



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

Chain D: 100%



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

Chain E: 100%



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

Chain G: 100%



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

Chain H: 33% 67%



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

Chain F:

100%



## 4 Data and refinement statistics

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	137.53Å 101.97Å 141.34Å 90.00° 104.75° 90.00°	Depositor
Resolution (Å)	34.38 – 2.30 34.38 – 2.30	Depositor EDS
% Data completeness (in resolution range)	99.6 (34.38-2.30) 99.6 (34.38-2.30)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	0.14	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	3.03 (at 2.29Å)	Xtriage
Refinement program	REFMAC 5.6.0117	Depositor
R, $R_{free}$	0.182 , 0.236 0.181 , 0.235	Depositor DCC
$R_{free}$ test set	4191 reflections (5.00%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	29.1	Xtriage
Anisotropy	0.071	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.34 , 44.1	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.50$ , $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
$F_o, F_c$ correlation	0.95	EDS
Total number of atoms	12865	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	40.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.93% 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: BU3, NAG, BMA

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	0.71	3/6179 (0.0%)	0.80	6/8380 (0.1%)
1	B	0.61	3/6108 (0.0%)	0.72	4/8281 (0.0%)
All	All	0.66	6/12287 (0.0%)	0.76	10/16661 (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
1	A	0	1

All (6) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	179	TRP	CD2-CE2	5.42	1.47	1.41
1	A	624	TRP	CD2-CE2	5.42	1.47	1.41
1	A	786	TRP	CD2-CE2	5.25	1.47	1.41
1	B	306	TRP	CD2-CE2	5.24	1.47	1.41
1	A	306	TRP	CD2-CE2	5.20	1.47	1.41
1	B	786	TRP	CD2-CE2	5.07	1.47	1.41

All (10) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	791	LEU	CA-CB-CG	7.00	131.41	115.30
1	B	375	ARG	NE-CZ-NH2	-6.68	116.96	120.30
1	A	375	ARG	NE-CZ-NH2	-6.57	117.01	120.30
1	A	259	ARG	NE-CZ-NH2	-5.71	117.44	120.30
1	A	300	ARG	NE-CZ-NH2	-5.33	117.63	120.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	168	ARG	NE-CZ-NH1	5.18	122.89	120.30
1	A	319	GLU	CB-CA-C	-5.13	100.14	110.40
1	A	168	ARG	NE-CZ-NH2	-5.09	117.75	120.30
1	B	43	ASP	N-CA-C	5.06	124.67	111.00
1	B	643	ARG	NE-CZ-NH1	5.00	122.80	120.30

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	734	GLU	Peptide

## 5.2 Too-close contacts ⓘ

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	6055	0	6054	72	0
1	B	5985	0	5981	86	0
2	C	39	0	34	0	0
2	D	39	0	34	0	0
2	E	39	0	34	0	0
2	G	39	0	34	0	0
2	H	39	0	34	0	0
3	F	28	0	25	0	0
4	A	84	0	78	0	0
4	B	56	0	52	1	0
5	A	6	0	10	2	0
6	A	299	0	0	13	0
6	B	157	0	0	7	0
All	All	12865	0	12370	158	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 6.

All (158) 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:708:SER:HB3	1:A:734:GLU:O	1.45	1.11
1:B:172:LEU:HD21	1:B:200:LEU:HG	1.25	1.11
1:B:630:ARG:HH11	1:B:630:ARG:HG3	1.26	0.99
1:A:375:ARG:HD2	6:A:1191:HOH:O	1.74	0.87
1:B:536:ASP:OD1	1:B:538:THR:HB	1.75	0.85
1:B:429:ARG:HD2	1:B:492:SER:OG	1.79	0.82
1:B:172:LEU:CD2	1:B:200:LEU:HG	2.09	0.80
1:A:731:PHE:C	1:A:733:SER:H	1.86	0.77
1:B:150:GLU:HG2	1:B:174:ASN:HB2	1.68	0.76
1:A:96:HIS:HD2	1:A:134:ASP:OD2	1.71	0.73
1:A:375:ARG:CD	6:A:1191:HOH:O	2.32	0.73
1:B:422:ILE:HG23	1:B:475:ILE:HD12	1.71	0.73
1:A:168:ARG:HH11	1:A:168:ARG:HG3	1.54	0.72
1:B:746:ASN:HA	6:B:1249:HOH:O	1.88	0.72
1:A:733:SER:HB3	1:A:734:GLU:HA	1.75	0.69
1:B:660:LEU:HD22	1:B:686:GLN:HG3	1.75	0.69
1:B:630:ARG:HH11	1:B:630:ARG:CG	2.03	0.69
1:A:708:SER:CB	1:A:734:GLU:O	2.32	0.68
1:B:319:GLU:HG2	6:B:1118:HOH:O	1.94	0.67
1:B:46:ILE:HG13	1:B:67:GLU:HB2	1.77	0.66
1:A:732:LEU:HB2	1:A:755:ALA:O	1.95	0.66
1:B:804:ALA:HA	1:B:810:ARG:HG3	1.78	0.66
1:B:577:LEU:HB3	1:B:580:ILE:HD12	1.77	0.65
1:A:168:ARG:HH11	1:A:168:ARG:CG	2.09	0.65
1:A:752:ASN:O	1:A:756:LEU:HG	1.98	0.63
1:B:52:ARG:HG3	1:B:799:VAL:HG21	1.80	0.63
1:A:319:GLU:HG2	6:A:1128:HOH:O	1.99	0.62
1:A:280:ARG:NH1	1:A:305:ALA:HB1	2.15	0.62
1:B:529:ILE:H	1:B:529:ILE:HD13	1.65	0.61
1:A:626:ASP:OD2	1:A:630:ARG:HD3	2.01	0.60
1:A:45:VAL:HG23	1:A:65:VAL:HA	1.83	0.60
1:A:501:PHE:HA	1:A:504:LEU:HD22	1.84	0.60
1:B:797:ARG:CG	1:B:797:ARG:HH11	2.14	0.59
1:A:384:GLU:HG3	6:A:1293:HOH:O	2.01	0.59
1:A:280:ARG:HD3	1:A:281:PHE:CE1	2.38	0.59
1:B:169:LEU:O	1:B:172:LEU:HD22	2.02	0.59
1:B:350:LYS:HE3	6:B:1221:HOH:O	2.02	0.58
1:B:113:GLY:HA3	1:B:136:GLN:HB3	1.85	0.58
1:B:411:PHE:HB3	1:B:504:LEU:HD13	1.85	0.57
1:B:714:LEU:O	1:B:737:SER:HB3	2.05	0.56
1:B:777:THR:HG22	1:B:778:CYS:H	1.70	0.56
1:B:797:ARG:HH11	1:B:797:ARG:HB3	1.70	0.56

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:585:ASN:O	1:A:587:LYS:HD2	2.06	0.56
1:B:626:ASP:OD2	1:B:630:ARG:NH1	2.39	0.56
1:A:302:ILE:HD11	1:A:323:LEU:HD13	1.89	0.55
1:B:284:GLN:HG2	1:B:285:ASN:N	2.20	0.55
1:B:52:ARG:CG	1:B:799:VAL:HG21	2.36	0.55
1:A:731:PHE:C	1:A:733:SER:N	2.59	0.55
1:B:172:LEU:HD21	1:B:200:LEU:CG	2.18	0.55
1:A:692:LEU:C	1:A:692:LEU:HD23	2.26	0.55
1:A:731:PHE:O	1:A:733:SER:N	2.38	0.54
1:A:657:GLU:H	1:A:657:GLU:CD	2.11	0.54
1:B:356:HIS:CD2	1:B:383:ARG:HD2	2.43	0.54
1:A:632:ILE:HD13	1:A:658:ALA:HB2	1.89	0.54
1:B:41:GLN:O	1:B:44:SER:HB2	2.07	0.54
1:A:757:GLU:HB2	1:A:759:LYS:NZ	2.24	0.53
1:A:275:SER:HB2	1:A:298:SER:O	2.08	0.53
1:A:96:HIS:CD2	1:A:134:ASP:OD2	2.57	0.53
1:A:168:ARG:HG3	1:A:168:ARG:NH1	2.20	0.53
5:A:1016:BU3:H42	6:A:1192:HOH:O	2.08	0.52
1:B:630:ARG:HG3	1:B:630:ARG:NH1	2.06	0.52
1:B:172:LEU:CB	6:B:1233:HOH:O	2.58	0.52
1:B:729:SER:HA	1:B:755:ALA:HA	1.92	0.52
1:B:34:TYR:O	1:B:60:THR:HB	2.11	0.51
1:B:88:ASN:HA	1:B:126:ASN:HD22	1.75	0.51
1:A:429:ARG:HB3	1:B:429:ARG:NH1	2.26	0.51
1:A:41:GLN:NE2	1:A:46:ILE:HD11	2.26	0.51
1:A:51:ASN:HA	1:A:72:ASP:O	2.10	0.51
1:A:411:PHE:HB3	1:A:504:LEU:HD13	1.93	0.51
1:B:388:GLN:HB2	1:B:389:PRO:HD3	1.91	0.51
1:B:319:GLU:HB3	1:B:320:PHE:CD2	2.46	0.51
1:B:797:ARG:HH11	1:B:797:ARG:CB	2.24	0.50
1:B:513:SER:OG	1:B:538:THR:HG22	2.10	0.50
1:B:797:ARG:HH11	1:B:797:ARG:HG2	1.75	0.50
1:B:172:LEU:HB3	6:B:1233:HOH:O	2.12	0.49
1:A:211:ASN:O	1:A:232:THR:HA	2.12	0.49
1:A:476:LYS:HD3	6:A:1266:HOH:O	2.13	0.49
1:B:758:THR:OG1	1:B:759:LYS:HA	2.12	0.48
1:B:132:LEU:HB2	1:B:153:LEU:HD23	1.96	0.48
1:B:87:GLN:HG2	1:B:88:ASN:OD1	2.14	0.48
1:B:214:SER:HA	1:B:233:GLN:O	2.14	0.47
1:B:529:ILE:HD13	1:B:529:ILE:N	2.29	0.47
1:A:113:GLY:HA2	1:A:136:GLN:HB2	1.97	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:134:ASP:HA	1:A:155:GLN:O	2.14	0.47
1:A:660:LEU:HD21	1:A:683:LEU:HD22	1.97	0.47
1:B:412:LYS:HB3	1:B:503:ASN:HB3	1.96	0.47
1:B:692:LEU:C	1:B:692:LEU:HD23	2.35	0.47
1:B:797:ARG:HG2	1:B:797:ARG:NH1	2.29	0.47
1:B:235:LYS:HD2	1:B:270:CYS:SG	2.54	0.47
1:A:720:SER:HA	1:A:744:SER:O	2.15	0.47
1:A:280:ARG:CZ	1:A:305:ALA:HB1	2.46	0.46
1:B:200:LEU:O	1:B:202:ASN:N	2.43	0.46
1:B:743:LEU:C	1:B:746:ASN:HD22	2.19	0.46
1:B:626:ASP:CG	1:B:630:ARG:HH12	2.18	0.46
1:B:161:ILE:HD12	1:B:177:LEU:HD13	1.96	0.46
1:B:375:ARG:HD2	6:B:1130:HOH:O	2.16	0.46
1:B:141:PRO:O	1:B:144:LEU:HG	2.15	0.46
1:B:692:LEU:HD23	1:B:693:LEU:N	2.31	0.46
1:B:205:LEU:C	1:B:205:LEU:HD23	2.37	0.45
1:B:308:LYS:HA	1:B:335:MET:CE	2.46	0.45
1:B:375:ARG:CD	6:B:1130:HOH:O	2.63	0.45
1:A:787:MET:HE3	1:A:798:LEU:HD11	1.98	0.45
1:B:211:ASN:O	1:B:232:THR:HA	2.17	0.45
1:B:626:ASP:CG	1:B:630:ARG:NH1	2.70	0.45
1:A:44:SER:HB2	1:A:66:THR:OG1	2.17	0.45
1:B:626:ASP:OD1	1:B:630:ARG:NH1	2.43	0.45
1:B:680:ASN:OD1	1:B:682:THR:HG23	2.17	0.44
1:B:683:LEU:HD21	4:B:1011:NAG:O5	2.17	0.44
1:B:761:THR:OG1	1:B:762:THR:N	2.50	0.44
1:A:261:PHE:C	1:A:261:PHE:HD1	2.20	0.44
1:A:261:PHE:C	1:A:261:PHE:CD1	2.91	0.44
1:B:675:MET:HB3	1:B:699:LYS:HE2	1.99	0.44
1:A:228:PHE:HA	1:A:252:ASP:HB3	2.00	0.44
1:B:275:SER:HB2	1:B:298:SER:O	2.17	0.44
1:B:373:HIS:HA	1:B:400:ASN:HB3	2.00	0.44
1:A:492:SER:HA	6:A:1274:HOH:O	2.17	0.44
1:B:333:LEU:HD22	1:B:366:LEU:HD11	1.99	0.44
1:A:753:LYS:O	1:A:754:SER:CB	2.66	0.43
1:B:41:GLN:N	1:B:44:SER:O	2.44	0.43
1:B:775:GLU:HA	1:B:805:SER:HB2	2.00	0.43
1:A:263:ALA:HA	1:A:264:PRO:HD3	1.85	0.43
1:B:166:ILE:HD12	1:B:200:LEU:HD21	2.00	0.43
1:B:529:ILE:N	1:B:529:ILE:CD1	2.82	0.43
1:B:763:LYS:HB3	1:B:764:LEU:H	1.54	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:32:ARG:HD3	1:A:798:LEU:HD21	2.00	0.43
1:A:69:ASP:HA	1:A:93:ASN:HB3	2.01	0.43
1:A:373:HIS:HA	1:A:400:ASN:HB3	2.00	0.43
1:A:236:TYR:CE2	1:A:238:SER:HB3	2.53	0.42
1:A:267:CYS:CB	6:A:1248:HOH:O	2.66	0.42
1:A:636:LYS:HE2	1:A:661:ASN:OD1	2.19	0.42
1:A:267:CYS:HB2	6:A:1248:HOH:O	2.18	0.42
1:A:751:ILE:HD11	1:A:769:LEU:HD22	2.00	0.42
1:A:52:ARG:HG2	1:A:799:VAL:HG21	2.01	0.42
1:A:89:LEU:HD13	1:A:92:ILE:HD11	2.01	0.42
1:B:308:LYS:HA	1:B:335:MET:HE2	2.01	0.42
1:B:703:LEU:HD21	1:B:719:LEU:HD13	2.02	0.42
1:A:38:GLU:OE1	1:A:64:TYR:OH	2.30	0.42
1:A:235:LYS:HG2	6:A:1282:HOH:O	2.19	0.42
1:B:810:ARG:HA	1:B:811:GLY:HA2	1.64	0.41
1:A:300:ARG:HG2	1:A:322:TYR:HB2	2.01	0.41
1:A:758:THR:O	1:A:758:THR:OG1	2.37	0.41
1:A:758:THR:HB	1:A:790:HIS:NE2	2.35	0.41
1:B:97:ASN:HA	1:B:98:PRO:HA	1.85	0.41
1:B:660:LEU:HD23	1:B:660:LEU:HA	1.92	0.41
1:B:134:ASP:HA	1:B:155:GLN:O	2.20	0.41
5:A:1016:BU3:C4	6:A:1204:HOH:O	2.67	0.41
1:A:54:LEU:HD12	1:A:73:ASN:ND2	2.36	0.41
1:A:763:LYS:HA	1:A:763:LYS:HD2	1.82	0.41
1:A:86:LEU:HA	6:A:1211:HOH:O	2.21	0.41
1:A:155:GLN:HA	1:A:179:TRP:O	2.21	0.41
1:B:311:PRO:O	1:B:338:ARG:HD2	2.21	0.41
1:A:429:ARG:HE	1:B:492:SER:HB3	1.86	0.41
1:A:816:SER:C	1:A:817:LEU:HD13	2.42	0.41
1:B:647:SER:HA	1:B:672:ASN:O	2.20	0.40
1:A:311:PRO:HD2	6:A:1183:HOH:O	2.20	0.40
1:A:733:SER:HA	1:A:735:VAL:H	1.85	0.40
1:A:670:HIS:HA	1:A:694:ASP:HB3	2.02	0.40
1:B:256:ASN:O	1:B:257:CYS:HB2	2.22	0.40

There are no symmetry-related clashes.

## 5.3 Torsion angles [i](#)

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

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	746/811 (92%)	691 (93%)	49 (7%)	6 (1%)	19	23
1	B	735/811 (91%)	677 (92%)	52 (7%)	6 (1%)	19	23
All	All	1481/1622 (91%)	1368 (92%)	101 (7%)	12 (1%)	19	23

All (12) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	733	SER
1	A	273	GLY
1	A	732	LEU
1	A	754	SER
1	B	42	ASN
1	B	43	ASP
1	B	201	THR
1	B	761	THR
1	A	378	VAL
1	A	762	THR
1	B	378	VAL
1	B	62	GLY

### 5.3.2 Protein sidechains [i](#)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	699/755 (93%)	654 (94%)	45 (6%)	17	23

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	B	690/755 (91%)	641 (93%)	49 (7%)	14	19
All	All	1389/1510 (92%)	1295 (93%)	94 (7%)	16	21

All (94) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	49	CYS
1	A	52	ARG
1	A	81	GLU
1	A	90	THR
1	A	142	SER
1	A	160	ASN
1	A	168	ARG
1	A	200	LEU
1	A	214	SER
1	A	225	ARG
1	A	235	LYS
1	A	248	LEU
1	A	261	PHE
1	A	275	SER
1	A	280	ARG
1	A	286	LEU
1	A	366	LEU
1	A	367	LEU
1	A	420	LEU
1	A	470	PHE
1	A	471	THR
1	A	492	SER
1	A	504	LEU
1	A	534	TYR
1	A	587	LYS
1	A	599	LEU
1	A	627	ASP
1	A	632	ILE
1	A	633	SER
1	A	652	LYS
1	A	668	GLU
1	A	671	ILE
1	A	677	LYS
1	A	682	THR
1	A	732	LEU
1	A	734	GLU

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Mol	Chain	Res	Type
1	A	753	LYS
1	A	757	GLU
1	A	758	THR
1	A	759	LYS
1	A	797	ARG
1	A	798	LEU
1	A	799	VAL
1	A	815	VAL
1	A	817	LEU
1	B	40	LYS
1	B	48	GLU
1	B	49	CYS
1	B	60	THR
1	B	86	LEU
1	B	99	ASN
1	B	118	ASP
1	B	146	GLU
1	B	148	LEU
1	B	149	THR
1	B	172	LEU
1	B	200	LEU
1	B	225	ARG
1	B	243	LYS
1	B	275	SER
1	B	284	GLN
1	B	286	LEU
1	B	317	ASP
1	B	352	SER
1	B	420	LEU
1	B	429	ARG
1	B	435	LYS
1	B	470	PHE
1	B	476	LYS
1	B	492	SER
1	B	504	LEU
1	B	509	CYS
1	B	529	ILE
1	B	534	TYR
1	B	538	THR
1	B	561	LEU
1	B	599	LEU
1	B	630	ARG

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Mol	Chain	Res	Type
1	B	642	THR
1	B	682	THR
1	B	724	ILE
1	B	737	SER
1	B	750	THR
1	B	753	LYS
1	B	756	LEU
1	B	758	THR
1	B	759	LYS
1	B	761	THR
1	B	763	LYS
1	B	775	GLU
1	B	779	ASP
1	B	791	LEU
1	B	792	ASN
1	B	797	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (10) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	41	GLN
1	A	77	HIS
1	A	96	HIS
1	A	604	ASN
1	A	752	ASN
1	B	126	ASN
1	B	157	ASN
1	B	233	GLN
1	B	285	ASN
1	B	792	ASN

### 5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

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

## 5.5 Carbohydrates ⓘ

17 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
2	NAG	C	1	1,2	14,14,15	0.92	1 (7%)	17,19,21	1.57	2 (11%)
2	NAG	C	2	2	14,14,15	0.84	0	17,19,21	1.82	5 (29%)
2	BMA	C	3	2	11,11,12	0.26	0	15,15,17	0.52	0
2	NAG	D	1	1,2	14,14,15	1.03	1 (7%)	17,19,21	1.37	2 (11%)
2	NAG	D	2	2	14,14,15	0.77	0	17,19,21	2.44	6 (35%)
2	BMA	D	3	2	11,11,12	0.45	0	15,15,17	1.23	2 (13%)
2	NAG	E	1	1,2	14,14,15	0.60	0	17,19,21	1.65	6 (35%)
2	NAG	E	2	2	14,14,15	1.03	1 (7%)	17,19,21	2.12	6 (35%)
2	BMA	E	3	2	11,11,12	0.77	0	15,15,17	1.58	3 (20%)
3	NAG	F	1	3,1	14,14,15	0.74	0	17,19,21	1.85	6 (35%)
3	NAG	F	2	3	14,14,15	0.50	0	17,19,21	1.11	1 (5%)
2	NAG	G	1	1,2	14,14,15	0.59	0	17,19,21	1.43	3 (17%)
2	NAG	G	2	2	14,14,15	0.65	0	17,19,21	1.95	3 (17%)
2	BMA	G	3	2	11,11,12	0.56	0	15,15,17	0.98	1 (6%)
2	NAG	H	1	1,2	14,14,15	0.82	0	17,19,21	1.72	5 (29%)
2	NAG	H	2	2	14,14,15	0.80	0	17,19,21	1.92	2 (11%)
2	BMA	H	3	2	11,11,12	0.25	0	15,15,17	0.52	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
2	NAG	C	1	1,2	-	0/6/23/26	0/1/1/1
2	NAG	C	2	2	-	2/6/23/26	0/1/1/1
2	BMA	C	3	2	-	2/2/19/22	0/1/1/1
2	NAG	D	1	1,2	-	0/6/23/26	0/1/1/1

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

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	E	2	NAG	O5-C1	-2.35	1.39	1.43
2	D	1	NAG	O5-C1	-2.27	1.39	1.43
2	C	1	NAG	C2-N2	-2.02	1.42	1.46

All (53) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	D	2	NAG	C1-O5-C5	6.91	121.44	112.19
2	G	2	NAG	C1-O5-C5	5.67	119.79	112.19
2	H	2	NAG	C1-O5-C5	5.67	119.79	112.19
2	E	2	NAG	O6-C6-C5	-4.55	95.84	111.33
2	G	1	NAG	C1-C2-N2	-4.34	103.60	110.43
2	E	2	NAG	C1-O5-C5	4.13	117.72	112.19
2	C	1	NAG	O5-C1-C2	-3.91	105.23	111.29
2	D	1	NAG	C1-C2-N2	-3.67	104.65	110.43
2	E	3	BMA	C1-O5-C5	3.43	116.78	112.19
2	D	2	NAG	C6-C5-C4	-3.42	104.61	113.02
2	H	1	NAG	C1-C2-N2	3.33	115.67	110.43
2	C	2	NAG	C1-C2-N2	3.26	115.58	110.43
2	C	2	NAG	O5-C5-C6	3.23	113.95	107.66
3	F	1	NAG	C1-O5-C5	3.17	116.44	112.19
2	E	1	NAG	C1-O5-C5	3.10	116.34	112.19
2	H	1	NAG	O5-C1-C2	-3.07	106.54	111.29
2	C	2	NAG	O5-C1-C2	-3.05	106.58	111.29

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	C	2	NAG	C2-N2-C7	-3.03	118.84	122.90
2	E	2	NAG	C6-C5-C4	-2.99	105.68	113.02
2	G	2	NAG	C6-C5-C4	-2.86	105.99	113.02
3	F	1	NAG	O6-C6-C5	-2.86	101.58	111.33
2	E	3	BMA	O5-C5-C6	2.80	113.11	107.66
2	E	1	NAG	C8-C7-N2	2.79	120.75	116.12
2	H	2	NAG	C6-C5-C4	-2.76	106.23	113.02
2	D	2	NAG	O5-C5-C4	2.72	117.45	110.83
2	G	2	NAG	O5-C5-C4	2.62	117.19	110.83
2	D	2	NAG	O5-C5-C6	-2.61	102.58	107.66
3	F	1	NAG	O3-C3-C2	-2.59	104.03	109.40
2	D	2	NAG	O3-C3-C4	-2.59	104.28	110.38
3	F	1	NAG	C1-C2-N2	2.58	114.50	110.43
2	H	1	NAG	C1-O5-C5	2.52	115.57	112.19
2	E	2	NAG	O5-C5-C6	-2.51	102.77	107.66
3	F	1	NAG	O5-C1-C2	-2.50	107.43	111.29
2	D	3	BMA	C1-O5-C5	2.50	115.53	112.19
2	E	2	NAG	C2-N2-C7	-2.46	119.60	122.90
2	E	1	NAG	O7-C7-N2	-2.44	117.66	121.98
2	E	3	BMA	O3-C3-C2	2.39	114.92	110.05
2	D	3	BMA	C3-C4-C5	2.38	114.54	110.23
3	F	1	NAG	C2-N2-C7	-2.36	119.74	122.90
2	E	1	NAG	C3-C4-C5	-2.35	105.97	110.23
2	E	2	NAG	O3-C3-C4	-2.34	104.87	110.38
2	H	1	NAG	C8-C7-N2	2.33	119.97	116.12
2	C	2	NAG	C4-C3-C2	2.32	114.42	111.02
2	E	1	NAG	O4-C4-C3	-2.31	104.92	110.38
3	F	2	NAG	C2-N2-C7	-2.31	119.81	122.90
2	H	1	NAG	O5-C5-C4	-2.28	105.27	110.83
2	G	1	NAG	O5-C1-C2	2.28	114.82	111.29
2	C	1	NAG	C2-N2-C7	-2.23	119.92	122.90
2	G	1	NAG	C1-O5-C5	2.18	115.11	112.19
2	G	3	BMA	C1-C2-C3	2.12	112.73	109.64
2	D	2	NAG	O6-C6-C5	-2.09	104.23	111.33
2	D	1	NAG	C4-C3-C2	-2.07	107.99	111.02
2	E	1	NAG	C1-C2-N2	2.06	113.68	110.43

There are no chirality outliers.

All (16) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	H	3	BMA	O5-C5-C6-O6

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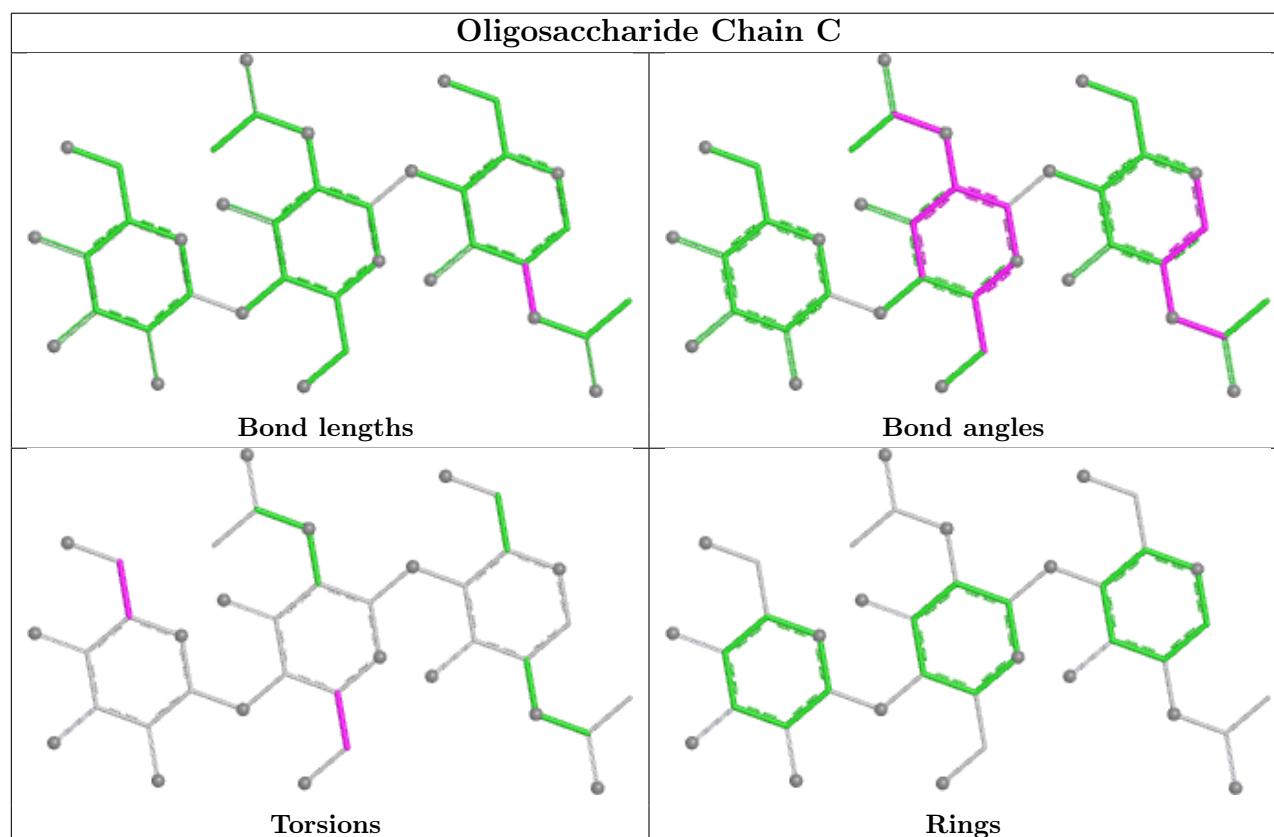
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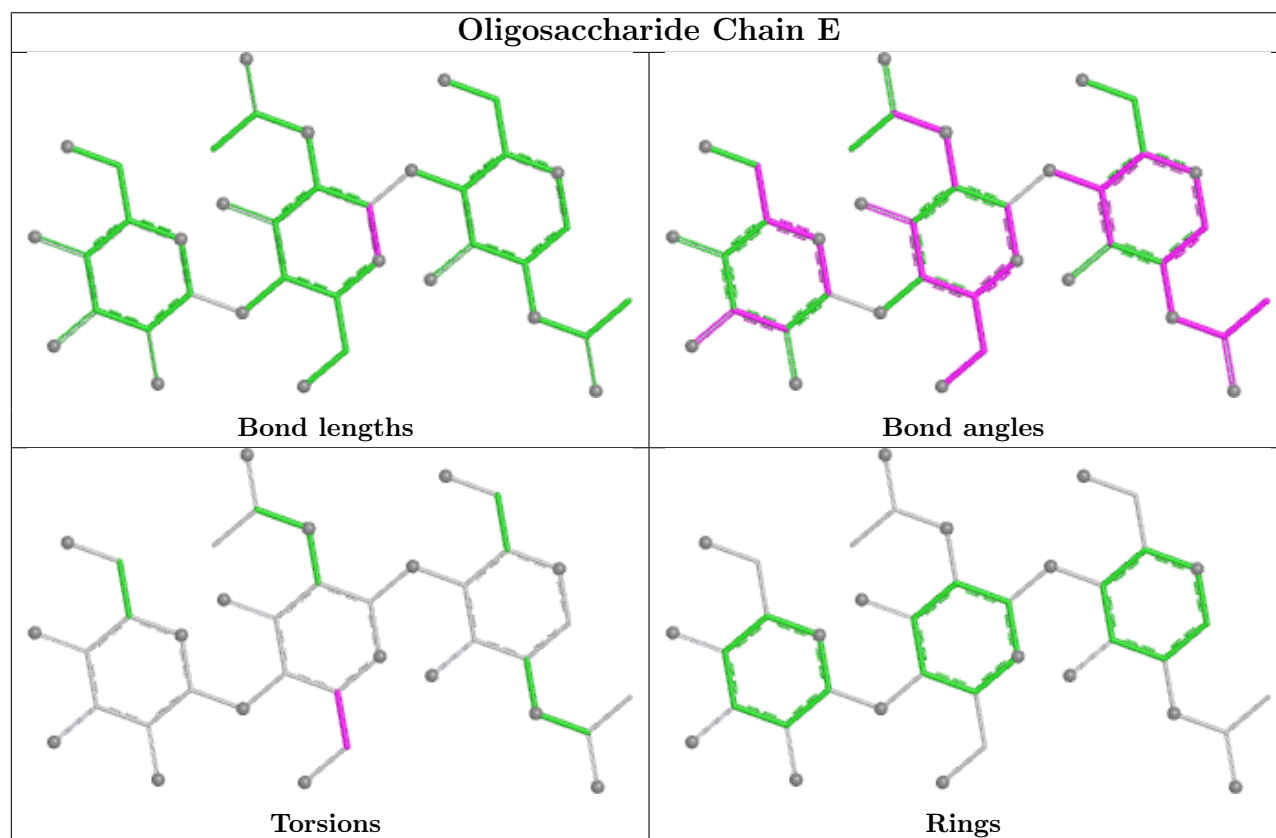
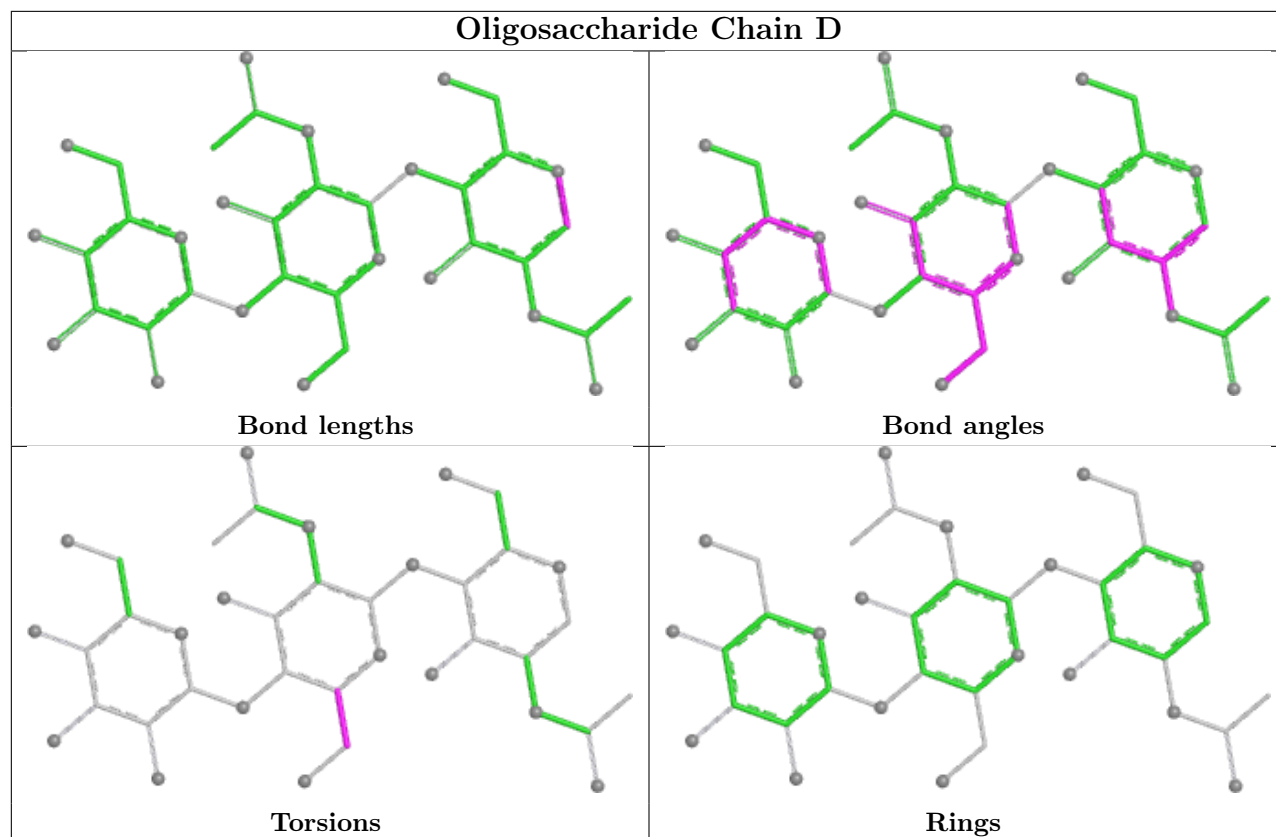
Mol	Chain	Res	Type	Atoms
2	D	2	NAG	C4-C5-C6-O6
2	D	2	NAG	O5-C5-C6-O6
2	H	3	BMA	C4-C5-C6-O6
2	G	2	NAG	C4-C5-C6-O6
2	C	2	NAG	C4-C5-C6-O6
2	C	2	NAG	O5-C5-C6-O6
2	C	3	BMA	C4-C5-C6-O6
2	E	2	NAG	C4-C5-C6-O6
2	E	2	NAG	O5-C5-C6-O6
2	G	2	NAG	O5-C5-C6-O6
2	C	3	BMA	O5-C5-C6-O6
3	F	2	NAG	C4-C5-C6-O6
2	G	3	BMA	C4-C5-C6-O6
2	H	2	NAG	C4-C5-C6-O6
3	F	2	NAG	O5-C5-C6-O6

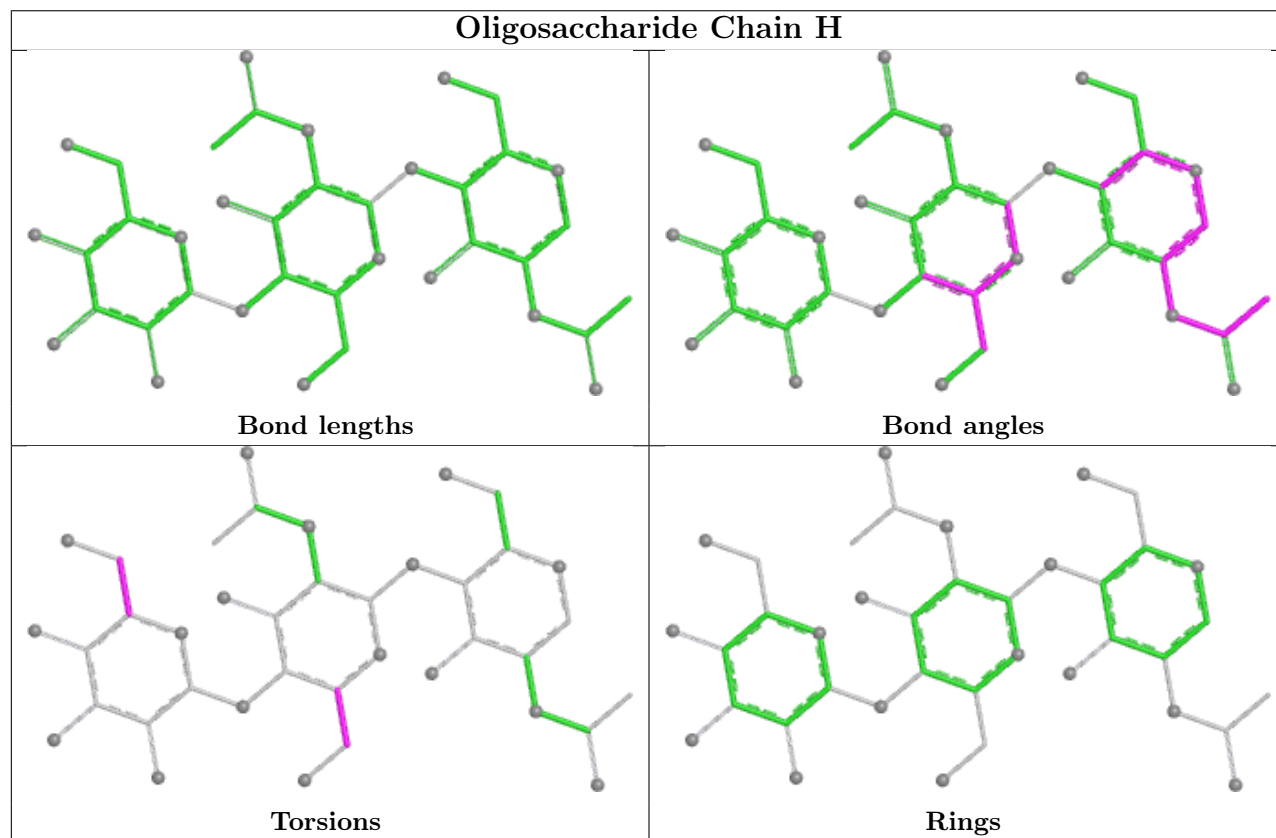
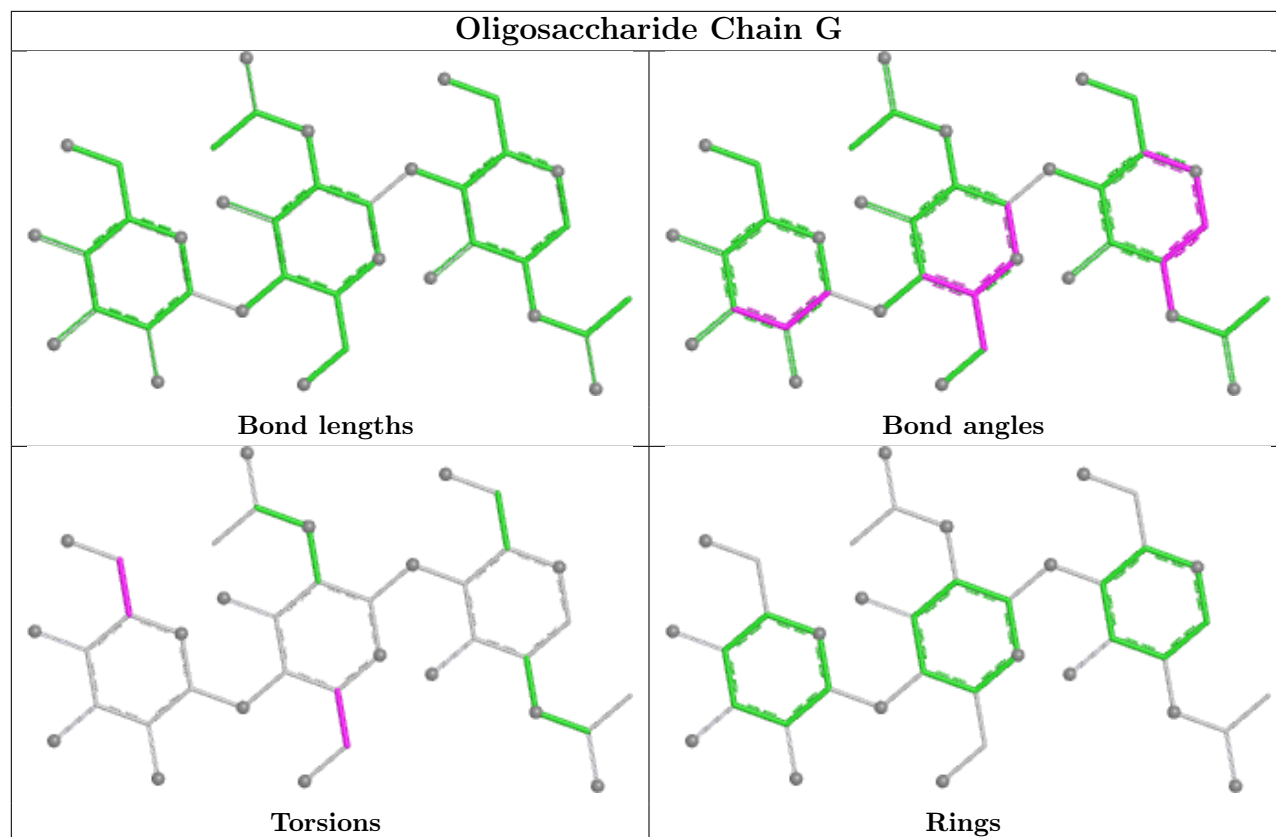
There are no ring outliers.

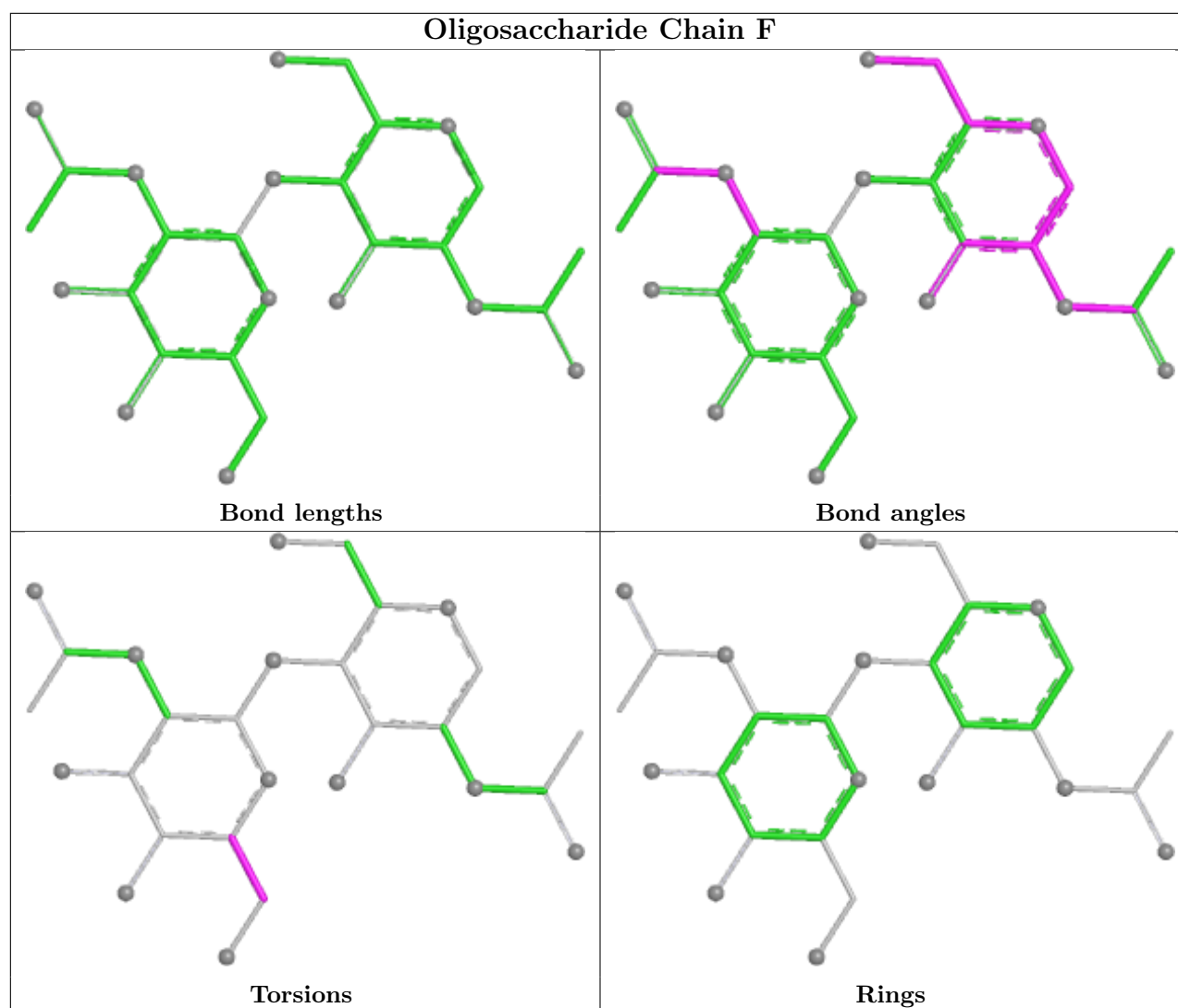
No monomer is involved in short contacts.

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](#)

11 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	1008	1	14,14,15	0.78	0	17,19,21	1.27	2 (11%)
5	BU3	A	1016	-	4,5,5	0.49	0	6,6,6	0.80	0
4	NAG	A	1014	1	14,14,15	0.66	0	17,19,21	1.20	2 (11%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
4	NAG	A	1013	1	14,14,15	0.86	1 (7%)	17,19,21	1.97	5 (29%)
4	NAG	B	1007	1	14,14,15	0.75	0	17,19,21	1.04	0
4	NAG	A	1004	1	14,14,15	0.71	0	17,19,21	1.17	1 (5%)
4	NAG	A	1015	1	14,14,15	0.62	0	17,19,21	1.08	1 (5%)
4	NAG	B	1011	1	14,14,15	0.47	0	17,19,21	1.55	2 (11%)
4	NAG	A	1012	1	14,14,15	0.53	0	17,19,21	1.17	2 (11%)
4	NAG	B	1003	1	14,14,15	0.54	0	17,19,21	1.17	1 (5%)
4	NAG	B	1012	1	14,14,15	0.58	0	17,19,21	0.78	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
4	NAG	A	1008	1	-	0/6/23/26	0/1/1/1
5	BU3	A	1016	-	-	4/4/4/4	-
4	NAG	A	1014	1	-	0/6/23/26	0/1/1/1
4	NAG	A	1013	1	-	0/6/23/26	0/1/1/1
4	NAG	B	1007	1	-	0/6/23/26	0/1/1/1
4	NAG	A	1004	1	-	2/6/23/26	0/1/1/1
4	NAG	A	1015	1	-	1/6/23/26	0/1/1/1
4	NAG	B	1011	1	-	0/6/23/26	0/1/1/1
4	NAG	A	1012	1	-	2/6/23/26	0/1/1/1
4	NAG	B	1003	1	-	4/6/23/26	0/1/1/1
4	NAG	B	1012	1	-	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	1013	NAG	O3-C3	-2.18	1.37	1.43

All (16) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	A	1013	NAG	C1-O5-C5	5.23	119.19	112.19
4	B	1011	NAG	C1-O5-C5	4.96	118.83	112.19
4	A	1015	NAG	C1-O5-C5	3.83	117.31	112.19
4	A	1014	NAG	O5-C5-C6	3.30	114.08	107.66
4	A	1013	NAG	C1-C2-N2	-3.14	105.49	110.43

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	A	1008	NAG	C1-O5-C5	2.94	116.13	112.19
4	B	1011	NAG	O5-C1-C2	-2.74	107.06	111.29
4	A	1013	NAG	C6-C5-C4	-2.67	106.46	113.02
4	A	1013	NAG	O4-C4-C3	-2.58	104.29	110.38
4	A	1012	NAG	O5-C1-C2	-2.53	107.38	111.29
4	A	1008	NAG	O5-C1-C2	-2.51	107.41	111.29
4	B	1003	NAG	C8-C7-N2	2.47	120.22	116.12
4	A	1012	NAG	C1-O5-C5	2.34	115.32	112.19
4	A	1014	NAG	C3-C4-C5	-2.22	106.22	110.23
4	A	1013	NAG	O6-C6-C5	-2.19	103.89	111.33
4	A	1004	NAG	C8-C7-N2	2.11	119.62	116.12

There are no chirality outliers.

All (13) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
5	A	1016	BU3	O5-C2-C3-O6
5	A	1016	BU3	C1-C2-C3-O6
5	A	1016	BU3	O5-C2-C3-C4
4	B	1003	NAG	O5-C5-C6-O6
4	B	1003	NAG	C4-C5-C6-O6
4	A	1004	NAG	C8-C7-N2-C2
4	A	1004	NAG	O7-C7-N2-C2
4	B	1003	NAG	C8-C7-N2-C2
4	B	1003	NAG	O7-C7-N2-C2
4	A	1012	NAG	C4-C5-C6-O6
4	A	1012	NAG	O5-C5-C6-O6
5	A	1016	BU3	C1-C2-C3-C4
4	A	1015	NAG	C4-C5-C6-O6

There are no ring outliers.

2 monomers are involved in 3 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	A	1016	BU3	2	0
4	B	1011	NAG	1	0

## 5.7 Other polymers

There are no such residues in this entry.

## 5.8 Polymer linkage issues ⓘ

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	752/811 (92%)	-0.13	25 (3%)	46 53	14, 27, 61, 139	0
1	B	743/811 (91%)	0.29	68 (9%)	9 12	17, 44, 102, 137	0
All	All	1495/1622 (92%)	0.08	93 (6%)	20 26	14, 33, 92, 139	0

All (93) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	42	ASN	6.9
1	B	273	GLY	6.0
1	B	778	CYS	5.7
1	A	762	THR	5.6
1	B	760	THR	5.5
1	B	41	GLN	5.4
1	A	819	LEU	5.1
1	B	780	ILE	5.1
1	B	806	PRO	5.0
1	A	760	THR	4.8
1	B	83	PHE	4.7
1	A	761	THR	4.4
1	B	785	ARG	4.4
1	B	812	LYS	4.2
1	B	783	PHE	3.9
1	A	641	LEU	3.9
1	B	81	GLU	3.8
1	A	185	LYS	3.6
1	A	817	LEU	3.6
1	B	816	SER	3.5
1	B	808	ASP	3.5
1	B	777	THR	3.5
1	B	753	LYS	3.5
1	B	43	ASP	3.4

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Mol	Chain	Res	Type	RSRZ
1	B	461	PHE	3.4
1	B	123	ASN	3.4
1	B	74	PHE	3.4
1	B	757	GLU	3.4
1	B	701	LEU	3.4
1	B	791	LEU	3.4
1	B	810	ARG	3.3
1	B	281	PHE	3.3
1	B	779	ASP	3.3
1	B	782	ASP	3.3
1	B	40	LYS	3.2
1	B	759	LYS	3.2
1	B	776	CYS	3.2
1	B	124	LEU	3.1
1	B	761	THR	3.1
1	B	809	GLN	3.0
1	A	638	LEU	2.9
1	B	38	GLU	2.8
1	B	807	GLY	2.7
1	B	121	PHE	2.7
1	B	762	THR	2.7
1	B	86	LEU	2.7
1	B	764	LEU	2.6
1	A	644	LEU	2.6
1	B	66	THR	2.5
1	A	40	LYS	2.5
1	A	613	LEU	2.5
1	A	818	GLU	2.5
1	B	59	GLN	2.5
1	B	627	ASP	2.5
1	B	64	TYR	2.4
1	B	85	GLY	2.4
1	A	39	LYS	2.3
1	B	82	SER	2.3
1	B	603	TYR	2.3
1	A	100	VAL	2.3
1	B	752	ASN	2.3
1	B	385	ASP	2.3
1	B	344	LEU	2.2
1	B	754	SER	2.2
1	B	272	GLY	2.2
1	A	754	SER	2.2

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Mol	Chain	Res	Type	RSRZ
1	B	44	SER	2.2
1	B	677	LYS	2.2
1	B	80	ASN	2.2
1	A	44	SER	2.2
1	A	610	LEU	2.2
1	B	168	ARG	2.2
1	B	164	GLU	2.2
1	A	759	LYS	2.2
1	A	778	CYS	2.2
1	B	45	VAL	2.1
1	A	45	VAL	2.1
1	A	186	VAL	2.1
1	A	758	THR	2.1
1	B	65	VAL	2.1
1	B	702	PHE	2.1
1	A	243	LYS	2.1
1	B	789	GLU	2.1
1	B	271	ASP	2.0
1	A	666	LEU	2.0
1	B	462	ASP	2.0
1	B	122	LEU	2.0
1	B	128	ARG	2.0
1	B	678	PHE	2.0
1	B	115	ASN	2.0
1	A	63	LYS	2.0
1	B	758	THR	2.0
1	B	805	SER	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( $\text{\AA}^2$ )	Q<0.9
2	BMA	H	3	11/12	0.79	0.19	42,51,55,57	0

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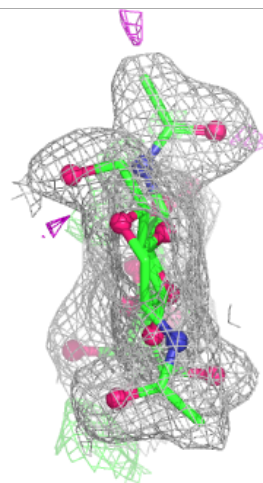
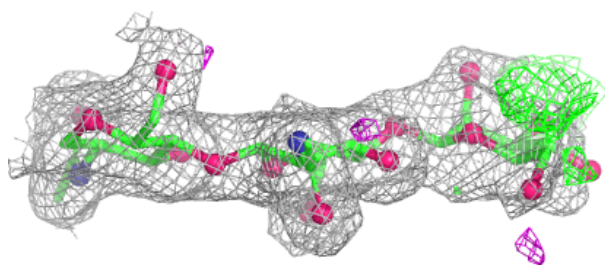
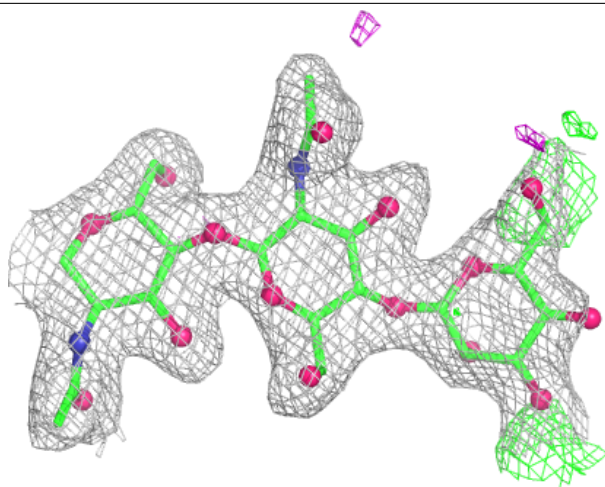
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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors( $\text{\AA}^2$ )	Q<0.9
2	BMA	D	3	11/12	0.80	0.28	51,60,64,69	0
2	BMA	G	3	11/12	0.84	0.29	66,70,75,80	0
2	BMA	C	3	11/12	0.84	0.21	45,57,64,68	0
2	BMA	E	3	11/12	0.94	0.17	31,37,40,47	0
3	NAG	F	2	14/15	0.94	0.11	34,37,48,49	0
2	NAG	G	2	14/15	0.95	0.15	35,44,63,63	0
2	NAG	D	2	14/15	0.95	0.15	31,36,45,52	0
2	NAG	E	2	14/15	0.96	0.10	21,23,27,29	0
2	NAG	C	2	14/15	0.97	0.10	16,20,28,35	0
3	NAG	F	1	14/15	0.97	0.14	26,30,34,39	0
2	NAG	H	2	14/15	0.97	0.09	27,29,35,42	0
2	NAG	H	1	14/15	0.98	0.08	19,22,23,25	0
2	NAG	D	1	14/15	0.98	0.09	17,21,24,26	0
2	NAG	G	1	14/15	0.98	0.08	22,24,26,30	0
2	NAG	E	1	14/15	0.98	0.10	15,18,19,22	0
2	NAG	C	1	14/15	0.98	0.09	14,16,18,19	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.

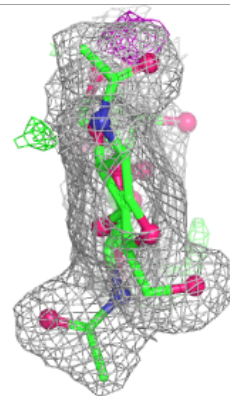
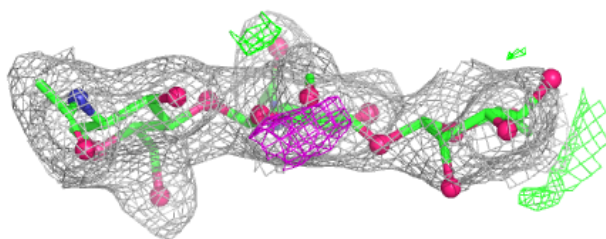
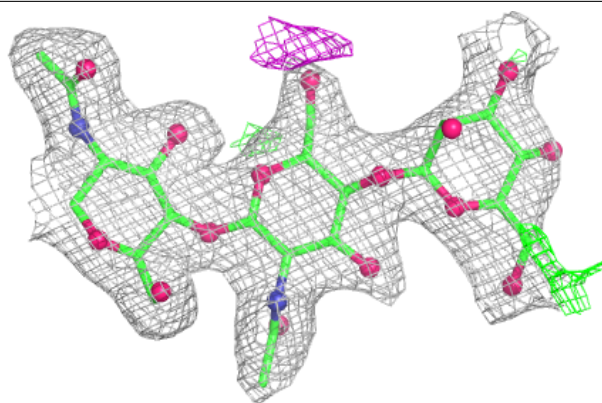
**Electron density around Chain C:**

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

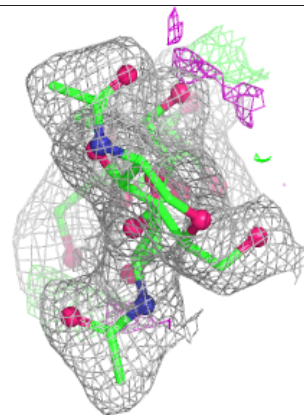
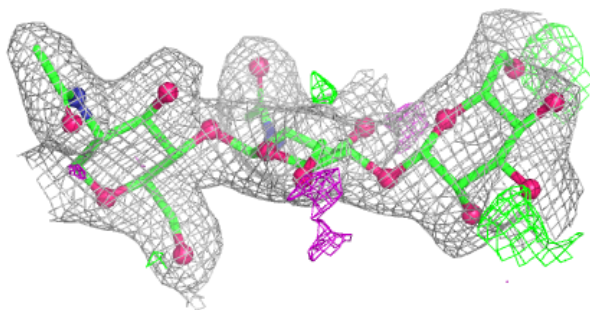
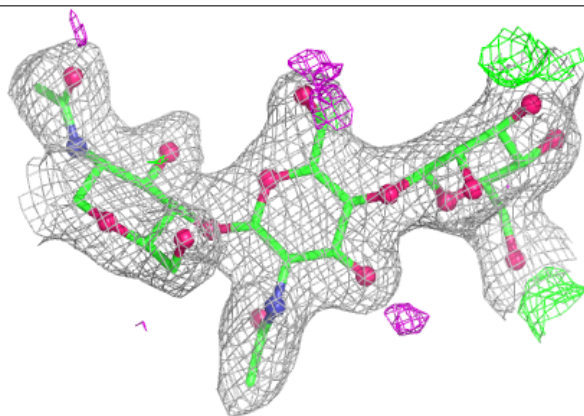


**Electron density around Chain D:**

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

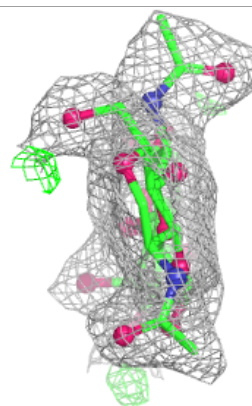
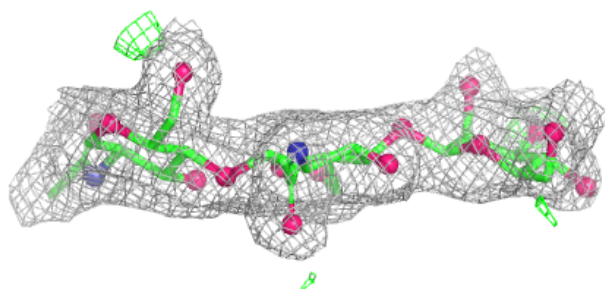
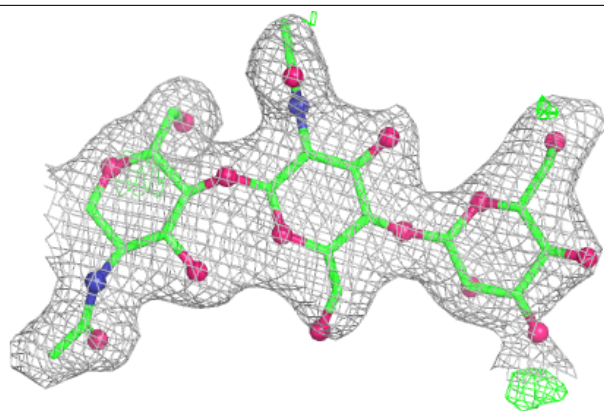
**Electron density around Chain E:**

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

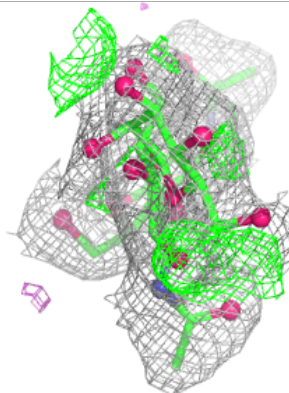
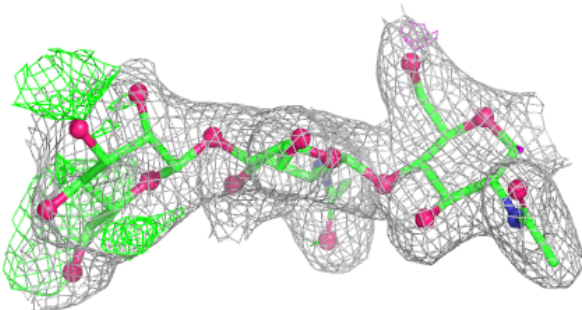
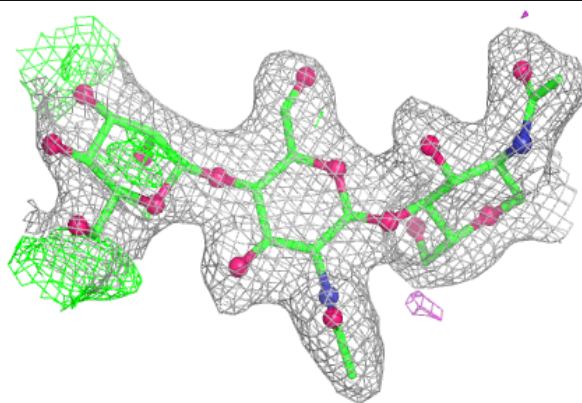


**Electron density around Chain G:**

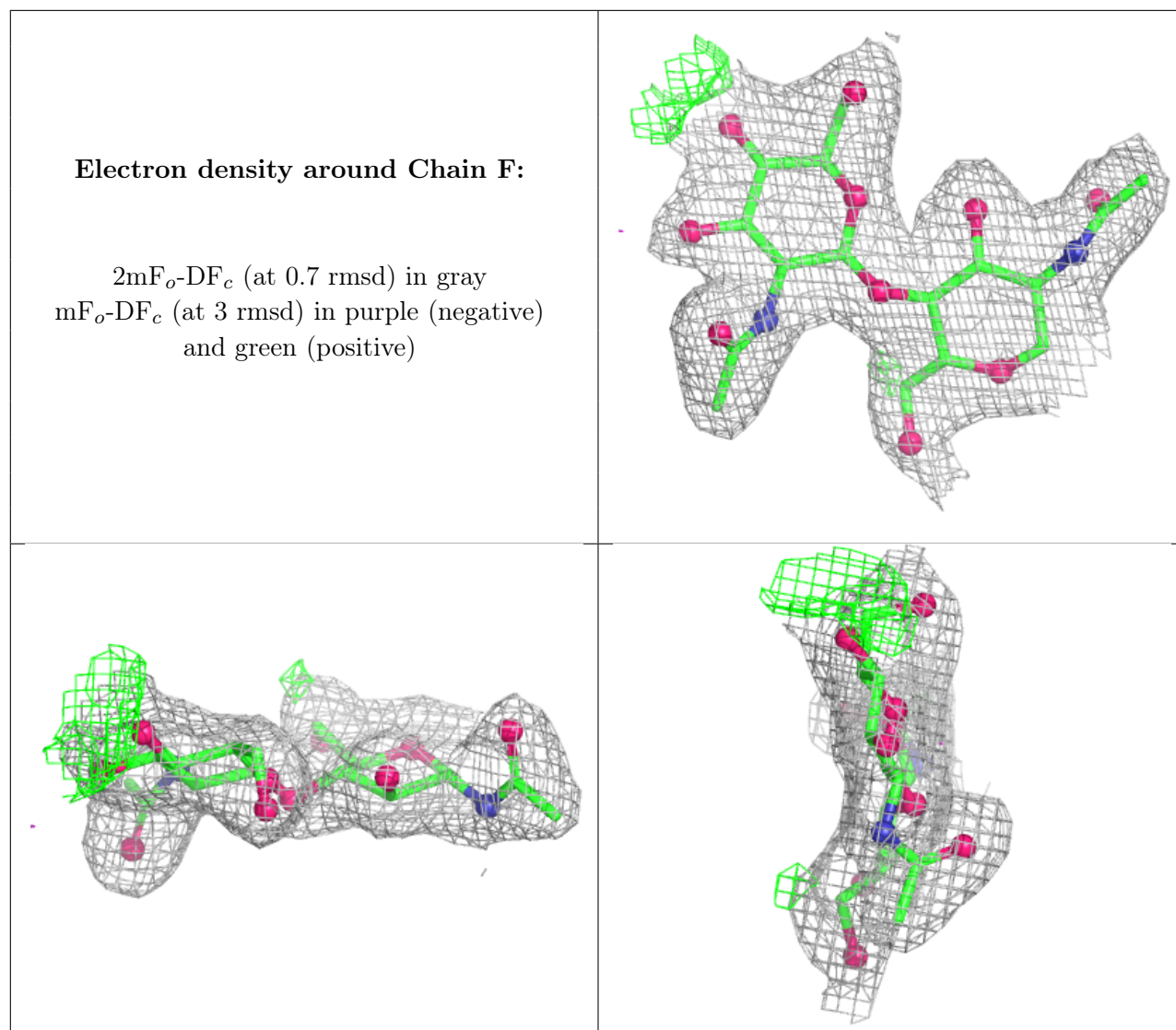
$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)

**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)







## 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
4	NAG	B	1003	14/15	0.78	0.28	59,69,73,76	0
5	BU3	A	1016	6/6	0.85	0.33	49,55,58,69	0
4	NAG	A	1015	14/15	0.87	0.20	55,64,69,70	0
4	NAG	B	1011	14/15	0.90	0.18	59,67,75,76	0
4	NAG	B	1012	14/15	0.91	0.24	57,61,64,66	0
4	NAG	B	1007	14/15	0.91	0.25	51,63,70,71	0
4	NAG	A	1014	14/15	0.93	0.23	42,50,56,57	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors( $\text{\AA}^2$ )	Q<0.9
4	NAG	A	1008	14/15	0.94	0.29	40,47,55,56	0
4	NAG	A	1012	14/15	0.94	0.25	44,47,49,49	0
4	NAG	A	1004	14/15	0.94	0.20	37,44,49,50	0
4	NAG	A	1013	14/15	0.97	0.15	17,20,24,26	0

## 6.5 Other polymers [i](#)

There are no such residues in this entry.