



# Full wwPDB X-ray Structure Validation Report ⓘ

Aug 7, 2020 – 04:54 PM BST

PDB ID : 5L56  
Title : Plexin A1 full extracellular region, domains 1 to 10, to 4 angstrom  
Authors : Janssen, B.J.C.; Kong, Y.; Malinauskas, T.; Vangoor, V.R.; Coles, C.H.; Kaufmann, R.; Ni, T.; Gilbert, R.J.C.; Padilla-Parra, S.; Pasterkamp, R.J.; Jones, E.Y.  
Deposited on : 2016-05-28  
Resolution : 4.00 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

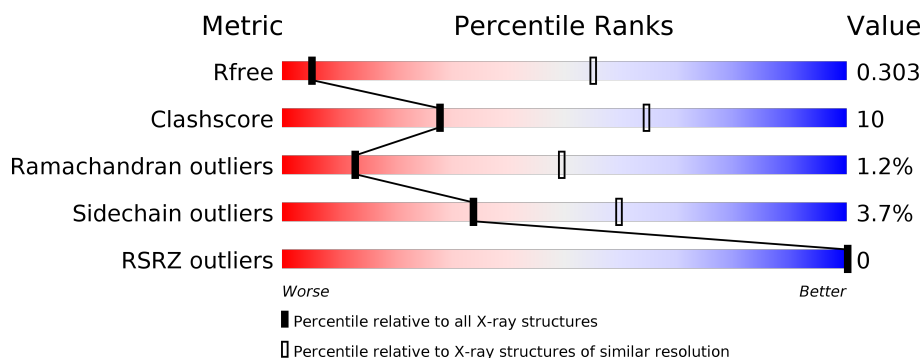
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 4.00 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.




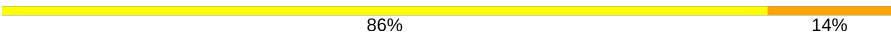
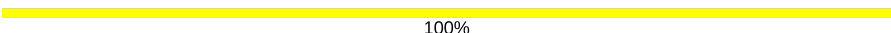
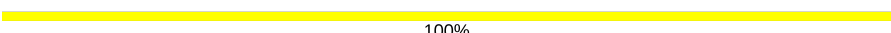
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
$R_{free}$	130704	1087 (4.30-3.70)
Clashscore	141614	1148 (4.30-3.70)
Ramachandran outliers	138981	1108 (4.30-3.70)
Sidechain outliers	138945	1099 (4.30-3.70)
RSRZ outliers	127900	1028 (4.34-3.66)

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	1212	
2	B	4	
2	D	4	
3	C	6	
3	I	6	
4	E	7	

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Mol	Chain	Length	Quality of chain
4	F	7	 14%86%
4	J	7	 86%14%
5	G	5	 100%
6	H	3	 100%

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

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
4	NAG	J	1	X	-	-	-

## 2 Entry composition [i](#)

There are 7 unique types of molecules in this entry. The entry contains 9692 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.

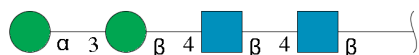
- Molecule 1 is a protein called Plexin-A1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	1171	9085	5719	1593	1715	58	0	0	0

There are 12 discrepancies between the modelled and reference sequences:

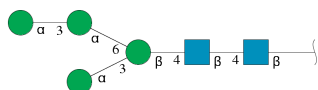
Chain	Residue	Modelled	Actual	Comment	Reference
A	34	GLU	-	expression tag	UNP P70206
A	35	THR	-	expression tag	UNP P70206
A	36	GLY	-	expression tag	UNP P70206
A	1237	ARG	-	expression tag	UNP P70206
A	1238	THR	-	expression tag	UNP P70206
A	1239	LYS	-	expression tag	UNP P70206
A	1240	HIS	-	expression tag	UNP P70206
A	1241	HIS	-	expression tag	UNP P70206
A	1242	HIS	-	expression tag	UNP P70206
A	1243	HIS	-	expression tag	UNP P70206
A	1244	HIS	-	expression tag	UNP P70206
A	1245	HIS	-	expression tag	UNP P70206

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



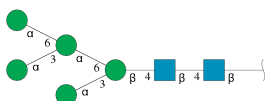
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
2	B	4	50	28	2	20	0	0	0
2	D	4	50	28	2	20	0	0	0

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



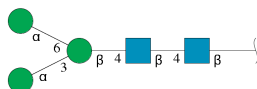
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
3	C	6	Total	C	N	O	0	0	0
			72	40	2	30			
3	I	6	Total	C	N	O	0	0	0
			72	40	2	30			

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



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
4	E	7	Total	C	N	O	0	0	0
			83	46	2	35			
4	F	7	Total	C	N	O	0	0	0
			83	46	2	35			
4	J	7	Total	C	N	O	0	0	0
			83	46	2	35			

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



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

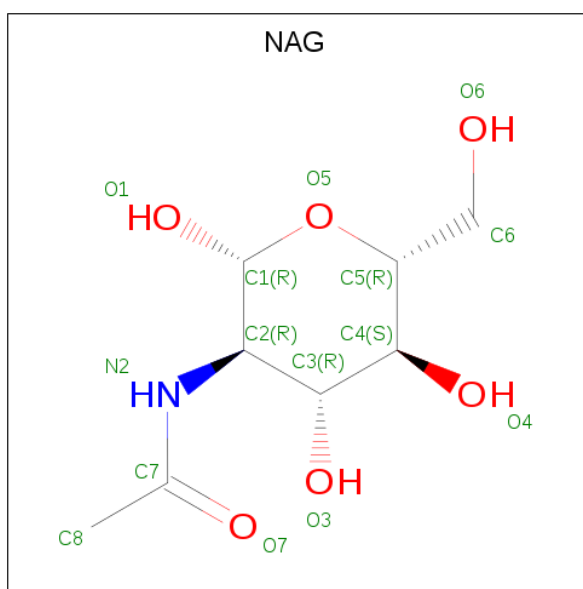
- Molecule 6 is an oligosaccharide called beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-b

eta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.



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

- Molecule 7 is 2-acetamido-2-deoxy-beta-D-glucopyranose (three-letter code: NAG) (formula:  $C_8H_{15}NO_6$ ).

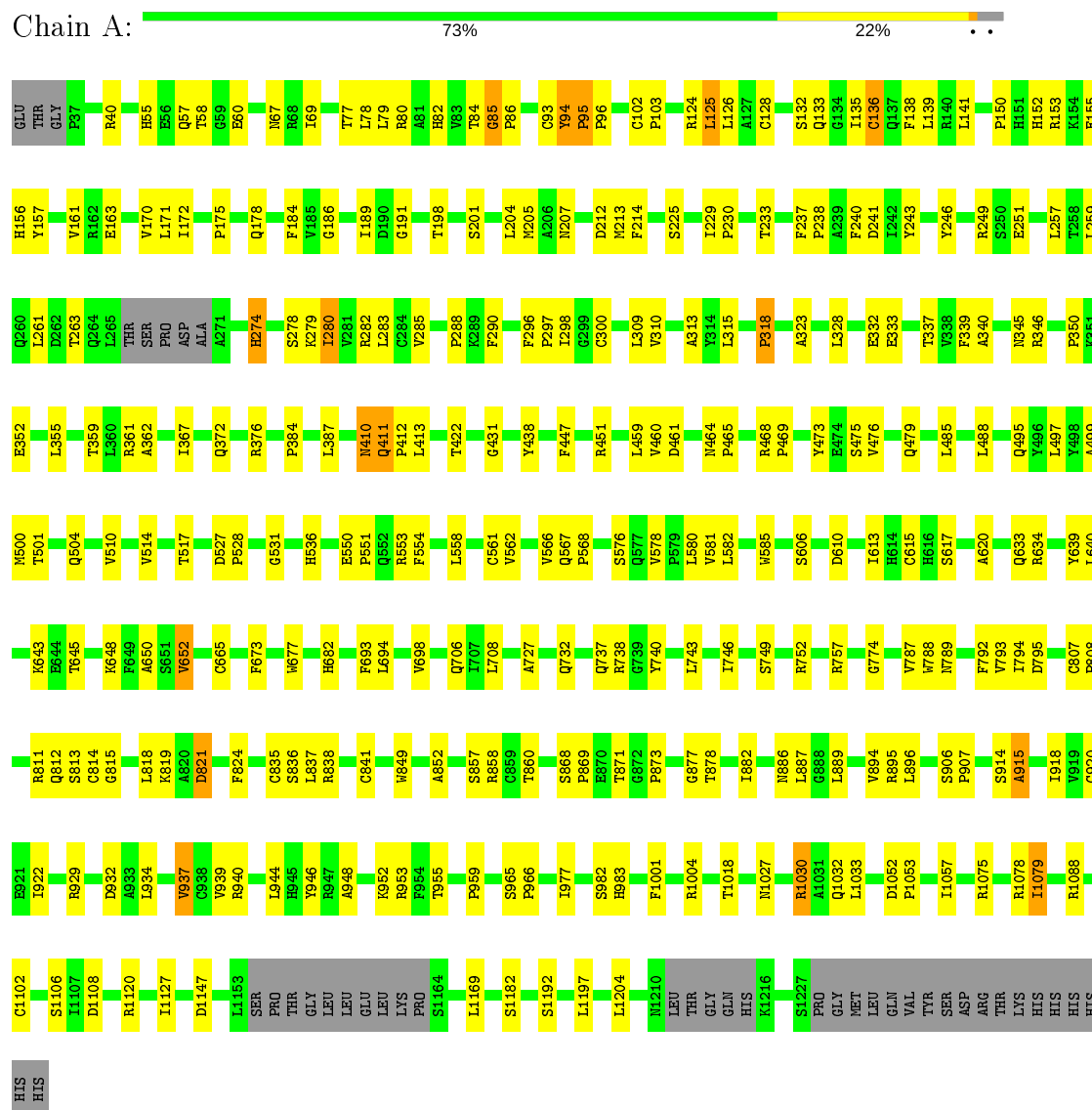


Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
7	A	1	Total	C	N	O	0	0
			14	8	1	5		

### 3 Residue-property plots

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: Plexin-A1



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

Chain B:  25% 50% 25%



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

Chain D:  100%



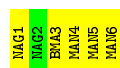
- Molecule 3: alpha-D-mannopyranose-(1-3)-alpha-D-mannopyranose-(1-6)-[alpha-D-mannopyranose-(1-3)]beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain C:  17% 83%

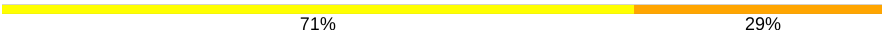


- Molecule 3: alpha-D-mannopyranose-(1-3)-alpha-D-mannopyranose-(1-6)-[alpha-D-mannopyranose-(1-3)]beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain I:  17% 83%



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

Chain E:  71% 29%




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

Chain F:  14% 86%




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

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

Chain J:  86% 14%



- Molecule 5: 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 G:  100%



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

Chain H:  100%



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 43 21 2	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	195.34Å 195.34Å 176.18Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	87.51 – 4.00 87.36 – 4.00	Depositor EDS
% Data completeness (in resolution range)	98.6 (87.51-4.00) 98.6 (87.36-4.00)	Depositor EDS
$R_{merge}$	0.24	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.74 (at 4.01Å)	Xtriage
Refinement program	REFMAC 5.7.0032	Depositor
R, $R_{free}$	0.257 , 0.308 0.253 , 0.303	Depositor DCC
$R_{free}$ test set	1471 reflections (5.08%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	117.4	Xtriage
Anisotropy	0.274	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.22 , 70.1	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.41$ , $\langle L^2 \rangle = 0.23$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
$F_o, F_c$ correlation	0.89	EDS
Total number of atoms	9692	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	133.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.11% 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: BMA, NAG, MAN

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	0.33	0/9297	0.59	0/12642

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	8

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (8) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	1052	ASP	Peptide
1	A	410	ASN	Peptide
1	A	527	ASP	Peptide
1	A	807	CYS	Peptide
1	A	85	GLY	Peptide
1	A	868	SER	Peptide
1	A	94	TYR	Peptide
1	A	965	SER	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	9085	0	8879	187	0
2	B	50	0	43	1	0
2	D	50	0	43	0	0
3	C	72	0	60	0	0
3	I	72	0	61	0	0
4	E	83	0	70	1	0
4	F	83	0	70	0	0
4	J	83	0	70	1	0
5	G	61	0	52	0	0
6	H	39	0	34	0	0
7	A	14	0	13	0	0
All	All	9692	0	9395	189	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 10.

All (189) 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:411:GLN:HG2	1:A:412:PRO:HD2	1.35	1.06
1:A:860:THR:HA	1:A:946:TYR:CE1	1.93	1.01
1:A:860:THR:HA	1:A:946:TYR:HE1	1.29	0.91
1:A:468:ARG:HG2	1:A:469:PRO:HD2	1.51	0.89
1:A:94:TYR:CD2	1:A:95:PRO:HD3	2.08	0.89
1:A:189:ILE:HD12	1:A:198:THR:HG23	1.52	0.88
1:A:808:PRO:HD2	1:A:835:CYS:O	1.76	0.85
1:A:567:GLN:HB3	1:A:568:PRO:HD3	1.61	0.81
1:A:280:ILE:HB	1:A:298:ILE:HD12	1.64	0.80
1:A:818:LEU:HB3	1:A:852:ALA:HB2	1.62	0.80
1:A:153:ARG:H	1:A:156:HIS:HD2	1.30	0.79
1:A:789:ASN:HD22	1:A:792:PHE:HE2	1.31	0.78
1:A:259:LEU:HD23	1:A:346:ARG:HG3	1.66	0.78
1:A:895:ARG:O	1:A:896:LEU:HB2	1.85	0.76
1:A:411:GLN:CG	1:A:412:PRO:HD2	2.14	0.75
1:A:230:PRO:O	1:A:233:THR:HG22	1.86	0.74

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:743:LEU:HD22	1:A:752:ARG:HG2	1.70	0.74
1:A:860:THR:CA	1:A:946:TYR:HE1	2.03	0.71
1:A:82:HIS:HD2	1:A:84:THR:HG22	1.55	0.70
1:A:171:LEU:HD22	1:A:204:LEU:HD11	1.72	0.70
1:A:852:ALA:HA	1:A:857:SER:OG	1.91	0.70
1:A:1079:ILE:HD11	1:A:1102:CYS:HB3	1.73	0.70
1:A:606:SER:HB3	1:A:615:CYS:HB3	1.74	0.69
1:A:310:VAL:HG22	1:A:339:PHE:CE1	2.28	0.69
1:A:345:ASN:HD22	1:A:1120:ARG:NH2	1.90	0.69
1:A:813:SER:HB2	1:A:886:ASN:OD1	1.93	0.69
1:A:55:HIS:HE2	1:A:141:LEU:HD21	1.57	0.68
1:A:895:ARG:HA	1:A:907:PRO:HG2	1.76	0.68
1:A:468:ARG:CG	1:A:469:PRO:HD2	2.24	0.68
1:A:818:LEU:HB2	1:A:889:LEU:HD11	1.75	0.67
1:A:746:ILE:HB	1:A:749:SER:O	1.95	0.67
1:A:566:VAL:HG22	1:A:582:LEU:HD23	1.76	0.66
1:A:175:PRO:HG2	1:A:178:GLN:HG3	1.77	0.66
1:A:315:LEU:HD11	1:A:333:GLU:HB3	1.78	0.66
1:A:1057:ILE:HD12	1:A:1147:ASP:OD1	1.97	0.65
1:A:887:LEU:HB2	1:A:915:ALA:HA	1.80	0.63
1:A:69:ILE:HD12	1:A:84:THR:HG21	1.79	0.63
1:A:550:GLU:HB3	1:A:551:PRO:HD2	1.80	0.63
1:A:345:ASN:HD22	1:A:1120:ARG:HH21	1.48	0.62
1:A:58:THR:OG1	1:A:60:GLU:HG2	1.99	0.61
1:A:939:VAL:HG22	1:A:946:TYR:HB3	1.82	0.61
1:A:639:TYR:CD2	1:A:648:LYS:HD2	2.36	0.61
1:A:740:TYR:CD1	1:A:788:TRP:HB3	2.36	0.60
1:A:732:GLN:HG2	1:A:757:ARG:HH22	1.66	0.60
1:A:819:LYS:NZ	1:A:914:SER:O	2.26	0.60
1:A:578:VAL:H	1:A:617:SER:HB3	1.66	0.60
1:A:55:HIS:NE2	1:A:141:LEU:HD21	2.17	0.59
1:A:858:ARG:HB3	1:A:940:ARG:NH2	2.17	0.59
1:A:259:LEU:HD23	1:A:346:ARG:CG	2.31	0.59
1:A:153:ARG:N	1:A:156:HIS:HD2	1.99	0.58
1:A:246:TYR:CD2	1:A:313:ALA:HB3	2.39	0.58
1:A:447:PHE:HZ	1:A:510:VAL:HG23	1.69	0.58
1:A:878:THR:HB	1:A:922:ILE:HD12	1.84	0.57
1:A:485:LEU:HD12	1:A:500:MET:HG2	1.86	0.57
1:A:132:SER:HB2	1:A:135:ILE:HG12	1.87	0.57
1:A:531:GLY:HA3	1:A:554:PHE:CZ	2.40	0.57
1:A:172:ILE:HG22	1:A:249:ARG:HD2	1.87	0.56

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:808:PRO:HG3	1:A:835:CYS:HB3	1.87	0.56
1:A:732:GLN:HG2	1:A:757:ARG:NH2	2.20	0.56
1:A:337:THR:O	1:A:355:LEU:HD12	2.05	0.56
1:A:153:ARG:H	1:A:156:HIS:CD2	2.18	0.56
1:A:789:ASN:HB3	1:A:792:PHE:CD2	2.41	0.56
1:A:738:ARG:HB2	1:A:789:ASN:HA	1.89	0.55
1:A:682:HIS:HB3	1:A:792:PHE:CD1	2.41	0.55
1:A:279:LYS:HG2	1:A:297:PRO:HA	1.87	0.55
1:A:737:GLN:HG2	1:A:789:ASN:ND2	2.22	0.55
1:A:318:PRO:HG2	1:A:323:ALA:HB2	1.89	0.55
1:A:282:ARG:HG3	1:A:283:LEU:N	2.22	0.55
1:A:296:PHE:CE1	1:A:367:ILE:HG12	2.41	0.55
1:A:567:GLN:HB2	1:A:581:VAL:HG22	1.87	0.55
1:A:488:LEU:HD12	1:A:499:ALA:HA	1.89	0.54
1:A:93:CYS:O	1:A:133:GLN:NE2	2.40	0.54
1:A:877:GLY:HA3	1:A:1030:ARG:HG3	1.89	0.54
1:A:789:ASN:HB3	1:A:792:PHE:HD2	1.73	0.53
1:A:205:MET:HG3	1:A:212:ASP:HB3	1.90	0.53
1:A:566:VAL:HG22	1:A:582:LEU:CD2	2.37	0.53
1:A:332:GLU:OE2	1:A:361:ARG:NH2	2.41	0.53
1:A:310:VAL:HG22	1:A:339:PHE:HE1	1.72	0.53
1:A:278:SER:HB3	1:A:310:VAL:HG23	1.91	0.53
1:A:459:LEU:HD21	1:A:528:PRO:HG3	1.91	0.53
1:A:536:HIS:HA	1:A:645:THR:HG21	1.90	0.53
1:A:821:ASP:HB2	1:A:824:PHE:CD2	2.44	0.53
1:A:170:VAL:HG11	1:A:249:ARG:HB2	1.91	0.52
1:A:58:THR:CB	1:A:60:GLU:HG2	2.39	0.52
1:A:126:LEU:HD11	1:A:136:CYS:SG	2.49	0.52
1:A:124:ARG:HD2	1:A:138:PHE:HD2	1.74	0.52
1:A:640:LEU:HD12	1:A:650:ALA:HB3	1.91	0.52
1:A:461:ASP:HA	1:A:464:ASN:HB3	1.92	0.52
1:A:447:PHE:CZ	1:A:510:VAL:HG23	2.45	0.52
1:A:677:TRP:HB3	1:A:698:VAL:HB	1.92	0.51
1:A:153:ARG:NH2	1:A:212:ASP:HA	2.26	0.51
1:A:229:ILE:HD12	1:A:240:PHE:HE2	1.76	0.51
1:A:345:ASN:ND2	1:A:1120:ARG:HH21	2.08	0.51
1:A:438:TYR:CE1	1:A:510:VAL:HG21	2.46	0.50
1:A:55:HIS:CE1	1:A:57:GLN:HB2	2.46	0.50
1:A:323:ALA:HA	1:A:328:LEU:HD12	1.94	0.50
4:E:1:NAG:H61	4:E:2:NAG:HN2	1.77	0.50
1:A:186:GLY:HA2	1:A:198:THR:O	2.12	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:431:GLY:HA3	1:A:451:ARG:HD2	1.93	0.50
1:A:939:VAL:CG2	1:A:946:TYR:HB3	2.42	0.49
1:A:708:LEU:H	1:A:727:ALA:HA	1.77	0.49
1:A:172:ILE:HD11	1:A:184:PHE:HE2	1.77	0.49
1:A:464:ASN:CG	1:A:465:PRO:HD2	2.32	0.49
1:A:153:ARG:HB2	1:A:156:HIS:CD2	2.48	0.48
1:A:495:GLN:O	1:A:510:VAL:HG12	2.13	0.48
1:A:1027:ASN:HB3	1:A:1032:GLN:HG3	1.95	0.48
1:A:337:THR:HG1	1:A:339:PHE:HE2	1.60	0.48
1:A:40:ARG:NH2	2:B:1:NAG:O3	2.47	0.48
1:A:907:PRO:HA	1:A:920:CYS:HA	1.96	0.48
1:A:96:PRO:HD2	1:A:157:TYR:CZ	2.48	0.47
1:A:447:PHE:CD2	1:A:497:LEU:HD22	2.50	0.47
1:A:821:ASP:HB2	1:A:824:PHE:CE2	2.50	0.47
1:A:372:GLN:O	1:A:376:ARG:HD3	2.15	0.47
1:A:461:ASP:CA	1:A:464:ASN:HB3	2.45	0.47
1:A:460:VAL:HA	1:A:469:PRO:HB3	1.96	0.47
1:A:567:GLN:CB	1:A:581:VAL:HG22	2.44	0.47
1:A:934:LEU:HD23	1:A:953:ARG:HB3	1.97	0.46
1:A:566:VAL:CG2	1:A:652:VAL:HG21	2.45	0.46
1:A:665:CYS:HB3	1:A:795:ASP:OD2	2.15	0.46
1:A:818:LEU:HD22	1:A:852:ALA:H	1.80	0.46
1:A:172:ILE:HD13	1:A:285:VAL:HG13	1.97	0.46
1:A:558:LEU:HD12	1:A:561:CYS:SG	2.56	0.46
1:A:79:LEU:O	1:A:80:ARG:HG3	2.17	0.45
1:A:932:ASP:N	1:A:932:ASP:OD1	2.50	0.45
1:A:937:VAL:HG23	1:A:948:ALA:HB3	1.98	0.45
1:A:860:THR:HG22	1:A:946:TYR:OH	2.16	0.45
1:A:566:VAL:HG23	1:A:652:VAL:HG21	1.98	0.45
1:A:102:CYS:HA	1:A:103:PRO:HD3	1.87	0.45
1:A:125:LEU:HD23	1:A:139:LEU:HB2	1.99	0.44
1:A:201:SER:HB2	1:A:290:PHE:HE1	1.81	0.44
1:A:501:THR:OG1	1:A:504:GLN:N	2.44	0.44
1:A:550:GLU:HB2	1:A:553:ARG:HG3	2.00	0.44
1:A:576:SER:OG	1:A:620:ALA:N	2.51	0.44
1:A:887:LEU:HD23	1:A:918:ILE:HD11	1.98	0.44
1:A:67:ASN:CB	1:A:85:GLY:HA3	2.48	0.44
1:A:261:LEU:HD11	1:A:274:HIS:CB	2.48	0.44
1:A:682:HIS:CB	1:A:792:PHE:CD1	3.01	0.44
1:A:815:GLY:O	1:A:819:LYS:HB2	2.17	0.44
1:A:740:TYR:HE1	1:A:794:ILE:HD11	1.83	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:359:THR:HG23	1:A:362:ALA:CB	2.48	0.44
1:A:161:VAL:HG12	1:A:163:GLU:H	1.83	0.43
1:A:906:SER:HA	1:A:907:PRO:HD3	1.77	0.43
1:A:952:LYS:HD2	1:A:952:LYS:HA	1.70	0.43
1:A:1088:ARG:HD2	1:A:1106:SER:O	2.18	0.43
1:A:150:PRO:HB2	1:A:156:HIS:ND1	2.34	0.43
1:A:706:GLN:O	1:A:727:ALA:HB1	2.19	0.43
1:A:155:GLU:N	1:A:155:GLU:OE1	2.51	0.43
1:A:138:PHE:CZ	1:A:213:MET:HE2	2.53	0.43
1:A:808:PRO:HB2	1:A:811:ARG:H	1.82	0.43
1:A:959:PRO:HA	1:A:983:HIS:HB2	2.01	0.43
1:A:132:SER:CB	1:A:135:ILE:HG12	2.47	0.43
1:A:789:ASN:ND2	1:A:792:PHE:HE2	2.09	0.43
1:A:838:ARG:NH1	1:A:841:CYS:O	2.51	0.43
1:A:894:VAL:HG11	1:A:918:ILE:HD13	1.99	0.43
1:A:1078:ARG:HG3	1:A:1127:ILE:HB	1.99	0.43
1:A:309:LEU:O	1:A:339:PHE:HA	2.19	0.43
1:A:639:TYR:HD2	1:A:648:LYS:HD2	1.84	0.43
1:A:410:ASN:O	1:A:411:GLN:O	2.37	0.42
1:A:58:THR:HB	1:A:60:GLU:HG2	2.01	0.42
1:A:633:GLN:OE1	1:A:673:PHE:CE1	2.72	0.42
4:J:1:NAG:H83	4:J:1:NAG:H2	1.87	0.42
1:A:818:LEU:HD22	1:A:852:ALA:N	2.34	0.42
1:A:237:PHE:HA	1:A:238:PRO:HD3	1.89	0.42
1:A:787:VAL:HG22	1:A:793:VAL:HG22	2.01	0.42
1:A:1001:PHE:HZ	1:A:1004:ARG:HB2	1.85	0.42
1:A:476:VAL:HB	1:A:479:GLN:HG2	2.01	0.42
1:A:818:LEU:HB3	1:A:852:ALA:CB	2.41	0.42
1:A:944:LEU:HD12	1:A:944:LEU:H	1.85	0.42
1:A:468:ARG:HG2	1:A:469:PRO:CD	2.36	0.41
1:A:682:HIS:HB3	1:A:792:PHE:CE1	2.55	0.41
1:A:871:THR:HG22	1:A:955:THR:HB	2.02	0.41
1:A:340:ALA:HB1	1:A:350:PRO:HG2	2.02	0.41
1:A:643:LYS:HE3	1:A:643:LYS:HB3	1.98	0.41
1:A:568:PRO:HG2	1:A:580:LEU:HD23	2.01	0.41
1:A:582:LEU:HB2	1:A:613:ILE:HB	2.02	0.41
1:A:138:PHE:CZ	1:A:213:MET:CE	3.04	0.41
1:A:1169:LEU:HB2	1:A:1204:LEU:HB2	2.02	0.41
1:A:136:CYS:HB3	1:A:214:PHE:CZ	2.56	0.41
1:A:225:SER:HB3	1:A:288:PRO:O	2.20	0.41
1:A:189:ILE:HG22	1:A:191:GLY:H	1.86	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:69:ILE:CD1	1:A:84:THR:HG21	2.48	0.41
1:A:873:PRO:HD2	1:A:878:THR:OG1	2.21	0.41
1:A:836:SER:O	1:A:849:TRP:NE1	2.54	0.41
1:A:241:ASP:HB3	1:A:243:TYR:CZ	2.56	0.40
1:A:263:THR:HB	1:A:384:PRO:HB2	2.01	0.40
1:A:461:ASP:CB	1:A:464:ASN:HB3	2.50	0.40
1:A:473:TYR:CE2	1:A:475:SER:HB2	2.56	0.40
1:A:488:LEU:HG	1:A:497:LEU:HD11	2.02	0.40
1:A:606:SER:CB	1:A:615:CYS:HB3	2.48	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	1163/1212 (96%)	1056 (91%)	93 (8%)	14 (1%)	<b>13</b> 49

All (14) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	86	PRO
1	A	95	PRO
1	A	411	GLN
1	A	869	PRO
1	A	915	ALA
1	A	1192	SER
1	A	251	GLU
1	A	1053	PRO
1	A	1182	SER
1	A	694	LEU
1	A	966	PRO
1	A	318	PRO

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Mol	Chain	Res	Type
1	A	1108	ASP
1	A	774	GLY

### 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	1015/1051 (97%)	977 (96%)	38 (4%)	34 60

All (38) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	77	THR
1	A	78	LEU
1	A	125	LEU
1	A	128	CYS
1	A	136	CYS
1	A	152	HIS
1	A	207	ASN
1	A	257	LEU
1	A	274	HIS
1	A	280	ILE
1	A	300	CYS
1	A	352	GLU
1	A	387	LEU
1	A	413	LEU
1	A	422	THR
1	A	514	VAL
1	A	517	THR
1	A	562	VAL
1	A	585	TRP
1	A	610	ASP
1	A	634	ARG
1	A	652	VAL
1	A	693	PHE
1	A	812	GLN

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Mol	Chain	Res	Type
1	A	814	CYS
1	A	821	ASP
1	A	837	LEU
1	A	882	ILE
1	A	929	ARG
1	A	937	VAL
1	A	977	ILE
1	A	982	SER
1	A	1018	THR
1	A	1030	ARG
1	A	1033	LEU
1	A	1075	ARG
1	A	1079	ILE
1	A	1197	LEU

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (6) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	156	HIS
1	A	345	ASN
1	A	706	GLN
1	A	729	ASN
1	A	764	GLN
1	A	899	HIS

### 5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

41 non-standard protein/DNA/RNA residues 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	MAN	C	5	3	11,11,12	0.59	0	15,15,17	1.30	2 (13%)
5	NAG	G	2	5	14,14,15	0.66	0	17,19,21	1.12	1 (5%)
4	MAN	F	6	4	11,11,12	0.60	0	15,15,17	1.02	1 (6%)
3	NAG	I	2	3	14,14,15	0.57	0	17,19,21	1.15	0
7	NAG	A	1334	1	14,14,15	0.53	0	17,19,21	1.00	1 (5%)
3	MAN	C	6	3	11,11,12	0.59	0	15,15,17	1.10	2 (13%)
4	MAN	F	5	4	11,11,12	0.64	0	15,15,17	1.18	2 (13%)
3	MAN	I	5	3	11,11,12	0.61	0	15,15,17	1.15	3 (20%)
6	NAG	H	2	6	14,14,15	0.57	0	17,19,21	1.19	2 (11%)
4	NAG	F	1	1,4	14,14,15	0.62	0	17,19,21	1.29	1 (5%)
3	MAN	C	4	3	11,11,12	0.67	0	15,15,17	1.04	2 (13%)
5	NAG	G	1	1,5	14,14,15	0.65	0	17,19,21	1.10	1 (5%)
3	NAG	C	2	3	14,14,15	0.50	0	17,19,21	1.24	1 (5%)
3	MAN	I	6	3	11,11,12	0.65	0	15,15,17	0.95	2 (13%)
4	NAG	F	2	4	14,14,15	0.53	0	17,19,21	1.07	1 (5%)
5	MAN	G	4	5	11,11,12	0.56	0	15,15,17	0.95	1 (6%)
4	MAN	J	7	4	11,11,12	0.62	0	15,15,17	1.17	2 (13%)
2	MAN	B	4	2	11,11,12	0.64	0	15,15,17	1.10	2 (13%)
2	NAG	D	1	1,2	14,14,15	0.64	0	17,19,21	1.30	1 (5%)
4	MAN	E	5	4	11,11,12	0.54	0	15,15,17	1.29	1 (6%)
6	NAG	H	1	1,6	14,14,15	0.58	0	17,19,21	1.15	1 (5%)
3	NAG	I	1	1,3	14,14,15	0.59	0	17,19,21	1.05	1 (5%)
4	MAN	J	5	4	11,11,12	0.64	0	15,15,17	1.33	2 (13%)
4	MAN	E	7	4	11,11,12	0.59	0	15,15,17	0.92	1 (6%)
2	NAG	D	2	2	14,14,15	0.55	0	17,19,21	1.20	2 (11%)
4	MAN	E	4	4	11,11,12	0.63	0	15,15,17	1.04	1 (6%)
4	NAG	E	1	1,4	14,14,15	0.67	0	17,19,21	1.23	1 (5%)
4	NAG	J	1	1,4	14,14,15	0.42	0	17,19,21	1.50	3 (17%)
5	MAN	G	5	5	11,11,12	0.54	0	15,15,17	1.55	3 (20%)
4	MAN	J	6	4	11,11,12	0.64	0	15,15,17	1.10	1 (6%)
4	NAG	E	2	4	14,14,15	0.54	0	17,19,21	1.14	2 (11%)
4	NAG	J	2	4	14,14,15	0.54	0	17,19,21	1.46	3 (17%)
4	MAN	E	6	4	11,11,12	0.57	0	15,15,17	1.40	2 (13%)
3	MAN	I	4	3	11,11,12	0.75	0	15,15,17	1.42	2 (13%)
4	MAN	J	4	4	11,11,12	0.63	0	15,15,17	1.00	1 (6%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
2	MAN	D	4	2	11,11,12	0.59	0	15,15,17	1.09	2 (13%)
2	NAG	B	1	1,2	14,14,15	0.79	0	17,19,21	1.73	3 (17%)
4	MAN	F	4	4	11,11,12	0.65	0	15,15,17	0.87	0
3	NAG	C	1	1,3	14,14,15	0.65	0	17,19,21	1.19	1 (5%)
2	NAG	B	2	2	14,14,15	0.59	0	17,19,21	1.56	1 (5%)
4	MAN	F	7	4	11,11,12	0.56	0	15,15,17	1.16	1 (6%)

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	MAN	C	5	3	-	0/2/19/22	0/1/1/1
5	NAG	G	2	5	-	2/6/23/26	0/1/1/1
4	MAN	F	6	4	-	2/2/19/22	0/1/1/1
3	NAG	I	2	3	-	2/6/23/26	0/1/1/1
7	NAG	A	1334	1	-	1/6/23/26	0/1/1/1
3	MAN	C	6	3	-	0/2/19/22	0/1/1/1
4	MAN	F	5	4	-	0/2/19/22	0/1/1/1
3	MAN	I	5	3	-	1/2/19/22	0/1/1/1
6	NAG	H	2	6	-	2/6/23/26	0/1/1/1
4	NAG	F	1	1,4	-	1/6/23/26	0/1/1/1
3	MAN	C	4	3	-	2/2/19/22	0/1/1/1
5	NAG	G	1	1,5	-	2/6/23/26	0/1/1/1
3	NAG	C	2	3	-	1/6/23/26	0/1/1/1
3	MAN	I	6	3	-	1/2/19/22	0/1/1/1
4	NAG	F	2	4	-	2/6/23/26	0/1/1/1
5	MAN	G	4	5	-	0/2/19/22	0/1/1/1
4	MAN	J	7	4	-	2/2/19/22	0/1/1/1
2	MAN	B	4	2	-	1/2/19/22	0/1/1/1
2	NAG	D	1	1,2	-	2/6/23/26	0/1/1/1
4	MAN	E	5	4	-	0/2/19/22	0/1/1/1
6	NAG	H	1	1,6	-	2/6/23/26	0/1/1/1
3	NAG	I	1	1,3	-	0/6/23/26	0/1/1/1
4	MAN	J	5	4	-	2/2/19/22	0/1/1/1
4	MAN	E	7	4	-	2/2/19/22	0/1/1/1
2	NAG	D	2	2	-	0/6/23/26	0/1/1/1
4	MAN	E	4	4	-	1/2/19/22	0/1/1/1

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

There are no bond length outliers.

All (63) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	1	NAG	C4-C3-C2	5.14	118.56	111.02
2	B	2	NAG	C4-C3-C2	4.88	118.17	111.02
5	G	5	MAN	C1-O5-C5	4.44	118.21	112.19
4	E	5	MAN	C1-O5-C5	4.23	117.92	112.19
3	I	4	MAN	C1-C2-C3	4.17	114.79	109.67
2	D	1	NAG	C4-C3-C2	4.09	117.01	111.02
4	E	1	NAG	C4-C3-C2	4.00	116.88	111.02
3	C	2	NAG	C1-O5-C5	3.98	117.58	112.19
4	J	1	NAG	C1-O5-C5	3.73	117.25	112.19
4	F	2	NAG	C1-O5-C5	3.68	117.18	112.19
4	E	6	MAN	C1-O5-C5	3.66	117.15	112.19
4	J	5	MAN	C1-C2-C3	3.42	113.87	109.67
3	C	5	MAN	C1-O5-C5	3.41	116.81	112.19
6	H	1	NAG	C4-C3-C2	3.32	115.88	111.02
4	F	1	NAG	C4-C3-C2	3.30	115.86	111.02
3	I	1	NAG	C1-O5-C5	3.28	116.64	112.19
4	F	7	MAN	C1-O5-C5	3.25	116.59	112.19
2	B	1	NAG	C3-C4-C5	3.06	115.70	110.24
4	J	2	NAG	C4-C3-C2	3.04	115.48	111.02
5	G	2	NAG	C4-C3-C2	3.04	115.47	111.02

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	G	1	NAG	C4-C3-C2	3.03	115.45	111.02
6	H	2	NAG	C4-C3-C2	2.98	115.39	111.02
2	D	2	NAG	C1-O5-C5	2.97	116.21	112.19
4	J	2	NAG	C3-C4-C5	2.92	115.44	110.24
4	J	7	MAN	C1-C2-C3	2.89	113.22	109.67
4	E	6	MAN	C1-C2-C3	2.88	113.20	109.67
3	C	5	MAN	C1-C2-C3	2.87	113.20	109.67
3	C	1	NAG	C4-C3-C2	2.84	115.17	111.02
3	C	6	MAN	C1-O5-C5	2.81	116.00	112.19
4	E	4	MAN	O5-C5-C6	2.80	111.59	107.20
3	I	4	MAN	O5-C5-C6	2.78	111.57	107.20
4	J	6	MAN	C1-C2-C3	2.76	113.06	109.67
5	G	5	MAN	O5-C5-C6	2.69	111.42	107.20
2	D	2	NAG	C4-C3-C2	2.68	114.94	111.02
5	G	4	MAN	C1-O5-C5	2.61	115.72	112.19
3	I	5	MAN	C1-C2-C3	2.61	112.87	109.67
3	C	4	MAN	C1-C2-C3	2.58	112.84	109.67
2	B	4	MAN	C1-C2-C3	2.55	112.80	109.67
3	I	5	MAN	C1-O5-C5	2.49	115.56	112.19
2	B	4	MAN	O5-C5-C6	2.48	111.09	107.20
4	J	2	NAG	O5-C1-C2	-2.47	107.38	111.29
5	G	5	MAN	C1-C2-C3	2.46	112.69	109.67
4	F	5	MAN	C1-O5-C5	2.44	115.50	112.19
3	C	6	MAN	C1-C2-C3	2.36	112.56	109.67
3	C	4	MAN	O5-C5-C6	2.32	110.85	107.20
4	J	5	MAN	O5-C5-C6	2.32	110.84	107.20
4	F	6	MAN	C1-O5-C5	2.28	115.28	112.19
3	I	6	MAN	C1-C2-C3	2.27	112.45	109.67
2	D	4	MAN	C1-O5-C5	2.27	115.26	112.19
4	F	5	MAN	C3-C4-C5	2.26	114.28	110.24
6	H	2	NAG	O5-C1-C2	-2.26	107.72	111.29
4	J	7	MAN	C1-O5-C5	2.25	115.25	112.19
4	J	1	NAG	O5-C1-C2	-2.25	107.74	111.29
2	B	1	NAG	C2-N2-C7	2.24	126.10	122.90
7	A	1334	NAG	C4-C3-C2	2.23	114.28	111.02
4	E	2	NAG	C3-C4-C5	2.20	114.16	110.24
2	D	4	MAN	C1-C2-C3	2.17	112.34	109.67
4	E	7	MAN	C1-O5-C5	2.17	115.13	112.19
3	I	6	MAN	O5-C5-C6	2.11	110.51	107.20
3	I	5	MAN	O5-C5-C6	2.09	110.48	107.20
4	J	4	MAN	O5-C5-C6	2.06	110.43	107.20
4	E	2	NAG	O5-C1-C2	-2.05	108.06	111.29

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	J	1	NAG	O4-C4-C5	2.01	114.28	109.30

All (1) chirality outliers are listed below:

Mol	Chain	Res	Type	Atom
4	J	1	NAG	C1

All (48) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	J	1	NAG	C8-C7-N2-C2
4	J	1	NAG	O7-C7-N2-C2
4	E	2	NAG	O5-C5-C6-O6
4	E	2	NAG	C4-C5-C6-O6
6	H	2	NAG	C4-C5-C6-O6
3	C	1	NAG	O5-C5-C6-O6
3	I	2	NAG	O5-C5-C6-O6
3	C	4	MAN	O5-C5-C6-O6
5	G	2	NAG	C4-C5-C6-O6
6	H	2	NAG	O5-C5-C6-O6
3	C	4	MAN	C4-C5-C6-O6
3	C	1	NAG	C4-C5-C6-O6
3	I	2	NAG	C4-C5-C6-O6
2	D	1	NAG	O5-C5-C6-O6
2	B	1	NAG	O5-C5-C6-O6
4	F	7	MAN	O5-C5-C6-O6
5	G	2	NAG	O5-C5-C6-O6
4	F	2	NAG	C4-C5-C6-O6
5	G	1	NAG	O5-C5-C6-O6
2	D	1	NAG	C4-C5-C6-O6
5	G	1	NAG	C4-C5-C6-O6
4	F	7	MAN	C4-C5-C6-O6
4	F	6	MAN	C4-C5-C6-O6
3	C	2	NAG	O5-C5-C6-O6
4	F	6	MAN	O5-C5-C6-O6
4	F	2	NAG	O5-C5-C6-O6
6	H	1	NAG	C4-C5-C6-O6
4	J	7	MAN	C4-C5-C6-O6
2	B	1	NAG	C4-C5-C6-O6
4	E	7	MAN	C4-C5-C6-O6
3	I	4	MAN	C4-C5-C6-O6
4	J	5	MAN	C4-C5-C6-O6

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Mol	Chain	Res	Type	Atoms
4	J	7	MAN	O5-C5-C6-O6
4	J	1	NAG	O5-C5-C6-O6
2	B	4	MAN	C4-C5-C6-O6
6	H	1	NAG	O5-C5-C6-O6
4	J	5	MAN	O5-C5-C6-O6
4	E	1	NAG	C4-C5-C6-O6
3	I	5	MAN	C4-C5-C6-O6
4	E	7	MAN	O5-C5-C6-O6
7	A	1334	NAG	C4-C5-C6-O6
3	I	4	MAN	O5-C5-C6-O6
4	E	1	NAG	O5-C5-C6-O6
4	F	1	NAG	C4-C5-C6-O6
3	I	6	MAN	C4-C5-C6-O6
4	E	4	MAN	O5-C5-C6-O6
5	G	5	MAN	C4-C5-C6-O6
4	J	6	MAN	C4-C5-C6-O6

All (1) ring outliers are listed below:

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

4 monomers are involved in 3 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	E	1	NAG	1	0
4	J	1	NAG	1	0
4	E	2	NAG	1	0
2	B	1	NAG	1	0

## 5.5 Carbohydrates

49 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	B	1	1,2	14,14,15	0.79	0	17,19,21	1.73	3 (17%)
2	NAG	B	2	2	14,14,15	0.59	0	17,19,21	1.56	1 (5%)
2	BMA	B	3	2	11,11,12	0.65	0	15,15,17	0.86	0
2	MAN	B	4	2	11,11,12	0.64	0	15,15,17	1.10	2 (13%)
3	NAG	C	1	1,3	14,14,15	0.65	0	17,19,21	1.19	1 (5%)
3	NAG	C	2	3	14,14,15	0.50	0	17,19,21	1.24	1 (5%)
3	BMA	C	3	3	11,11,12	0.54	0	15,15,17	0.70	0
3	MAN	C	4	3	11,11,12	0.67	0	15,15,17	1.04	2 (13%)
3	MAN	C	5	3	11,11,12	0.59	0	15,15,17	1.30	2 (13%)
3	MAN	C	6	3	11,11,12	0.59	0	15,15,17	1.10	2 (13%)
2	NAG	D	1	1,2	14,14,15	0.64	0	17,19,21	1.30	1 (5%)
2	NAG	D	2	2	14,14,15	0.55	0	17,19,21	1.20	2 (11%)
2	BMA	D	3	2	11,11,12	0.83	1 (9%)	15,15,17	2.23	4 (26%)
2	MAN	D	4	2	11,11,12	0.59	0	15,15,17	1.09	2 (13%)
4	NAG	E	1	1,4	14,14,15	0.67	0	17,19,21	1.23	1 (5%)
4	NAG	E	2	4	14,14,15	0.54	0	17,19,21	1.14	2 (11%)
4	BMA	E	3	4	11,11,12	0.60	0	15,15,17	1.66	3 (20%)
4	MAN	E	4	4	11,11,12	0.63	0	15,15,17	1.04	1 (6%)
4	MAN	E	5	4	11,11,12	0.54	0	15,15,17	1.29	1 (6%)
4	MAN	E	6	4	11,11,12	0.57	0	15,15,17	1.40	2 (13%)
4	MAN	E	7	4	11,11,12	0.59	0	15,15,17	0.92	1 (6%)
4	NAG	F	1	1,4	14,14,15	0.62	0	17,19,21	1.29	1 (5%)
4	NAG	F	2	4	14,14,15	0.53	0	17,19,21	1.07	1 (5%)
4	BMA	F	3	4	11,11,12	0.54	0	15,15,17	0.91	1 (6%)
4	MAN	F	4	4	11,11,12	0.65	0	15,15,17	0.87	0
4	MAN	F	5	4	11,11,12	0.64	0	15,15,17	1.18	2 (13%)
4	MAN	F	6	4	11,11,12	0.60	0	15,15,17	1.02	1 (6%)
4	MAN	F	7	4	11,11,12	0.56	0	15,15,17	1.16	1 (6%)
5	NAG	G	1	1,5	14,14,15	0.65	0	17,19,21	1.10	1 (5%)
5	NAG	G	2	5	14,14,15	0.66	0	17,19,21	1.12	1 (5%)
5	BMA	G	3	5	11,11,12	0.43	0	15,15,17	1.72	2 (13%)
5	MAN	G	4	5	11,11,12	0.56	0	15,15,17	0.95	1 (6%)
5	MAN	G	5	5	11,11,12	0.54	0	15,15,17	1.55	3 (20%)
6	NAG	H	1	1,6	14,14,15	0.58	0	17,19,21	1.15	1 (5%)
6	NAG	H	2	6	14,14,15	0.57	0	17,19,21	1.19	2 (11%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
6	BMA	H	3	6	11,11,12	0.49	0	15,15,17	1.20	2 (13%)
3	NAG	I	1	1,3	14,14,15	0.59	0	17,19,21	1.05	1 (5%)
3	NAG	I	2	3	14,14,15	0.57	0	17,19,21	1.15	0
3	BMA	I	3	3	11,11,12	0.53	0	15,15,17	1.27	2 (13%)
3	MAN	I	4	3	11,11,12	0.75	0	15,15,17	1.42	2 (13%)
3	MAN	I	5	3	11,11,12	0.61	0	15,15,17	1.15	3 (20%)
3	MAN	I	6	3	11,11,12	0.65	0	15,15,17	0.95	2 (13%)
4	NAG	J	1	1,4	14,14,15	0.42	0	17,19,21	1.50	3 (17%)
4	NAG	J	2	4	14,14,15	0.54	0	17,19,21	1.46	3 (17%)
4	BMA	J	3	4	11,11,12	0.39	0	15,15,17	0.82	1 (6%)
4	MAN	J	4	4	11,11,12	0.63	0	15,15,17	1.00	1 (6%)
4	MAN	J	5	4	11,11,12	0.64	0	15,15,17	1.33	2 (13%)
4	MAN	J	6	4	11,11,12	0.64	0	15,15,17	1.10	1 (6%)
4	MAN	J	7	4	11,11,12	0.62	0	15,15,17	1.17	2 (13%)

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	B	1	1,2	-	2/6/23/26	0/1/1/1
2	NAG	B	2	2	-	0/6/23/26	0/1/1/1
2	BMA	B	3	2	-	2/2/19/22	0/1/1/1
2	MAN	B	4	2	-	1/2/19/22	0/1/1/1
3	NAG	C	1	1,3	-	2/6/23/26	0/1/1/1
3	NAG	C	2	3	-	1/6/23/26	0/1/1/1
3	BMA	C	3	3	-	0/2/19/22	0/1/1/1
3	MAN	C	4	3	-	2/2/19/22	0/1/1/1
3	MAN	C	5	3	-	0/2/19/22	0/1/1/1
3	MAN	C	6	3	-	0/2/19/22	0/1/1/1
2	NAG	D	1	1,2	-	2/6/23/26	0/1/1/1
2	NAG	D	2	2	-	0/6/23/26	0/1/1/1
2	BMA	D	3	2	-	0/2/19/22	0/1/1/1
2	MAN	D	4	2	-	0/2/19/22	0/1/1/1
4	NAG	E	1	1,4	-	2/6/23/26	0/1/1/1
4	NAG	E	2	4	-	2/6/23/26	0/1/1/1
4	BMA	E	3	4	-	2/2/19/22	0/1/1/1

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

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	D	3	BMA	C2-C3	2.13	1.55	1.52

All (77) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	D	3	BMA	C1-C2-C3	7.27	118.61	109.67
2	B	1	NAG	C4-C3-C2	5.14	118.56	111.02
2	B	2	NAG	C4-C3-C2	4.88	118.17	111.02
5	G	3	BMA	C1-O5-C5	4.59	118.42	112.19
5	G	5	MAN	C1-O5-C5	4.44	118.21	112.19
4	E	5	MAN	C1-O5-C5	4.23	117.92	112.19
3	I	4	MAN	C1-C2-C3	4.17	114.79	109.67
2	D	1	NAG	C4-C3-C2	4.09	117.01	111.02
4	E	1	NAG	C4-C3-C2	4.00	116.88	111.02
3	C	2	NAG	C1-O5-C5	3.98	117.58	112.19
5	G	3	BMA	C1-C2-C3	3.74	114.27	109.67
4	E	3	BMA	C3-C4-C5	3.74	116.92	110.24
4	J	1	NAG	C1-O5-C5	3.73	117.25	112.19
4	F	2	NAG	C1-O5-C5	3.68	117.18	112.19
4	E	6	MAN	C1-O5-C5	3.66	117.15	112.19
4	J	5	MAN	C1-C2-C3	3.42	113.87	109.67
3	C	5	MAN	C1-O5-C5	3.41	116.81	112.19
6	H	1	NAG	C4-C3-C2	3.32	115.88	111.02
4	F	1	NAG	C4-C3-C2	3.30	115.86	111.02
3	I	1	NAG	C1-O5-C5	3.28	116.64	112.19
4	F	7	MAN	C1-O5-C5	3.25	116.59	112.19
6	H	3	BMA	C1-O5-C5	3.22	116.56	112.19
4	E	3	BMA	C1-C2-C3	3.15	113.54	109.67
2	B	1	NAG	C3-C4-C5	3.06	115.70	110.24
4	J	2	NAG	C4-C3-C2	3.04	115.48	111.02
5	G	2	NAG	C4-C3-C2	3.04	115.47	111.02
5	G	1	NAG	C4-C3-C2	3.03	115.45	111.02
3	I	3	BMA	C3-C4-C5	2.98	115.56	110.24
6	H	2	NAG	C4-C3-C2	2.98	115.39	111.02
4	E	3	BMA	C2-C3-C4	2.97	116.04	110.89
2	D	2	NAG	C1-O5-C5	2.97	116.21	112.19
4	J	2	NAG	C3-C4-C5	2.92	115.44	110.24
4	J	7	MAN	C1-C2-C3	2.89	113.22	109.67
4	E	6	MAN	C1-C2-C3	2.88	113.20	109.67
3	C	5	MAN	C1-C2-C3	2.87	113.20	109.67
3	C	1	NAG	C4-C3-C2	2.84	115.17	111.02
3	C	6	MAN	C1-O5-C5	2.81	116.00	112.19
4	E	4	MAN	O5-C5-C6	2.80	111.59	107.20
3	I	4	MAN	O5-C5-C6	2.78	111.57	107.20
4	J	6	MAN	C1-C2-C3	2.76	113.06	109.67
5	G	5	MAN	O5-C5-C6	2.69	111.42	107.20
2	D	2	NAG	C4-C3-C2	2.68	114.94	111.02
5	G	4	MAN	C1-O5-C5	2.61	115.72	112.19

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	I	5	MAN	C1-C2-C3	2.61	112.87	109.67
6	H	3	BMA	C1-C2-C3	2.59	112.85	109.67
3	C	4	MAN	C1-C2-C3	2.58	112.84	109.67
2	B	4	MAN	C1-C2-C3	2.55	112.80	109.67
3	I	5	MAN	C1-O5-C5	2.49	115.56	112.19
2	B	4	MAN	O5-C5-C6	2.48	111.09	107.20
4	J	2	NAG	O5-C1-C2	-2.47	107.38	111.29
5	G	5	MAN	C1-C2-C3	2.46	112.69	109.67
4	F	5	MAN	C1-O5-C5	2.44	115.50	112.19
2	D	3	BMA	C2-C3-C4	2.36	114.98	110.89
3	C	6	MAN	C1-C2-C3	2.36	112.56	109.67
3	C	4	MAN	O5-C5-C6	2.32	110.85	107.20
4	J	5	MAN	O5-C5-C6	2.32	110.84	107.20
4	F	6	MAN	C1-O5-C5	2.28	115.28	112.19
3	I	6	MAN	C1-C2-C3	2.27	112.45	109.67
2	D	3	BMA	O5-C1-C2	2.27	114.27	110.77
2	D	4	MAN	C1-O5-C5	2.27	115.26	112.19
4	F	5	MAN	C3-C4-C5	2.26	114.28	110.24
6	H	2	NAG	O5-C1-C2	-2.26	107.72	111.29
4	J	7	MAN	C1-O5-C5	2.25	115.25	112.19
4	J	1	NAG	O5-C1-C2	-2.25	107.74	111.29
2	B	1	NAG	C2-N2-C7	2.24	126.10	122.90
4	E	2	NAG	C3-C4-C5	2.20	114.16	110.24
4	F	3	BMA	O5-C5-C6	2.19	110.63	107.20
2	D	4	MAN	C1-C2-C3	2.17	112.34	109.67
4	E	7	MAN	C1-O5-C5	2.17	115.13	112.19
3	I	3	BMA	C2-C3-C4	2.16	114.64	110.89
2	D	3	BMA	C1-O5-C5	2.15	115.11	112.19
3	I	6	MAN	O5-C5-C6	2.11	110.51	107.20
3	I	5	MAN	O5-C5-C6	2.09	110.48	107.20
4	J	4	MAN	O5-C5-C6	2.06	110.43	107.20
4	J	3	BMA	C1-O5-C5	2.05	114.97	112.19
4	E	2	NAG	O5-C1-C2	-2.05	108.06	111.29
4	J	1	NAG	O4-C4-C5	2.01	114.28	109.30

All (1) chirality outliers are listed below:

Mol	Chain	Res	Type	Atom
4	J	1	NAG	C1

All (57) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	J	1	NAG	C8-C7-N2-C2
4	J	1	NAG	O7-C7-N2-C2
5	G	3	BMA	O5-C5-C6-O6
4	E	2	NAG	O5-C5-C6-O6
4	E	2	NAG	C4-C5-C6-O6
6	H	2	NAG	C4-C5-C6-O6
3	C	1	NAG	O5-C5-C6-O6
3	I	2	NAG	O5-C5-C6-O6
3	C	4	MAN	O5-C5-C6-O6
5	G	2	NAG	C4-C5-C6-O6
6	H	2	NAG	O5-C5-C6-O6
3	C	4	MAN	C4-C5-C6-O6
3	C	1	NAG	C4-C5-C6-O6
5	G	3	BMA	C4-C5-C6-O6
3	I	2	NAG	C4-C5-C6-O6
6	H	3	BMA	O5-C5-C6-O6
4	E	3	BMA	O5-C5-C6-O6
2	D	1	NAG	O5-C5-C6-O6
2	B	1	NAG	O5-C5-C6-O6
4	F	7	MAN	O5-C5-C6-O6
5	G	2	NAG	O5-C5-C6-O6
4	F	2	NAG	C4-C5-C6-O6
5	G	1	NAG	O5-C5-C6-O6
2	D	1	NAG	C4-C5-C6-O6
5	G	1	NAG	C4-C5-C6-O6
4	F	7	MAN	C4-C5-C6-O6
4	F	6	MAN	C4-C5-C6-O6
3	C	2	NAG	O5-C5-C6-O6
4	F	6	MAN	O5-C5-C6-O6
4	F	2	NAG	O5-C5-C6-O6
4	J	3	BMA	O5-C5-C6-O6
4	E	3	BMA	C4-C5-C6-O6
2	B	3	BMA	C4-C5-C6-O6
6	H	1	NAG	C4-C5-C6-O6
4	J	7	MAN	C4-C5-C6-O6
2	B	1	NAG	C4-C5-C6-O6
6	H	3	BMA	C4-C5-C6-O6
4	E	7	MAN	C4-C5-C6-O6
3	I	4	MAN	C4-C5-C6-O6
4	J	5	MAN	C4-C5-C6-O6
4	J	7	MAN	O5-C5-C6-O6
4	J	1	NAG	O5-C5-C6-O6
2	B	4	MAN	C4-C5-C6-O6

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Mol	Chain	Res	Type	Atoms
6	H	1	NAG	O5-C5-C6-O6
3	I	3	BMA	O5-C5-C6-O6
4	J	5	MAN	O5-C5-C6-O6
4	E	1	NAG	C4-C5-C6-O6
3	I	5	MAN	C4-C5-C6-O6
4	E	7	MAN	O5-C5-C6-O6
3	I	4	MAN	O5-C5-C6-O6
4	E	1	NAG	O5-C5-C6-O6
4	F	1	NAG	C4-C5-C6-O6
2	B	3	BMA	O5-C5-C6-O6
3	I	6	MAN	C4-C5-C6-O6
4	E	4	MAN	O5-C5-C6-O6
4	J	6	MAN	C4-C5-C6-O6
5	G	5	MAN	C4-C5-C6-O6

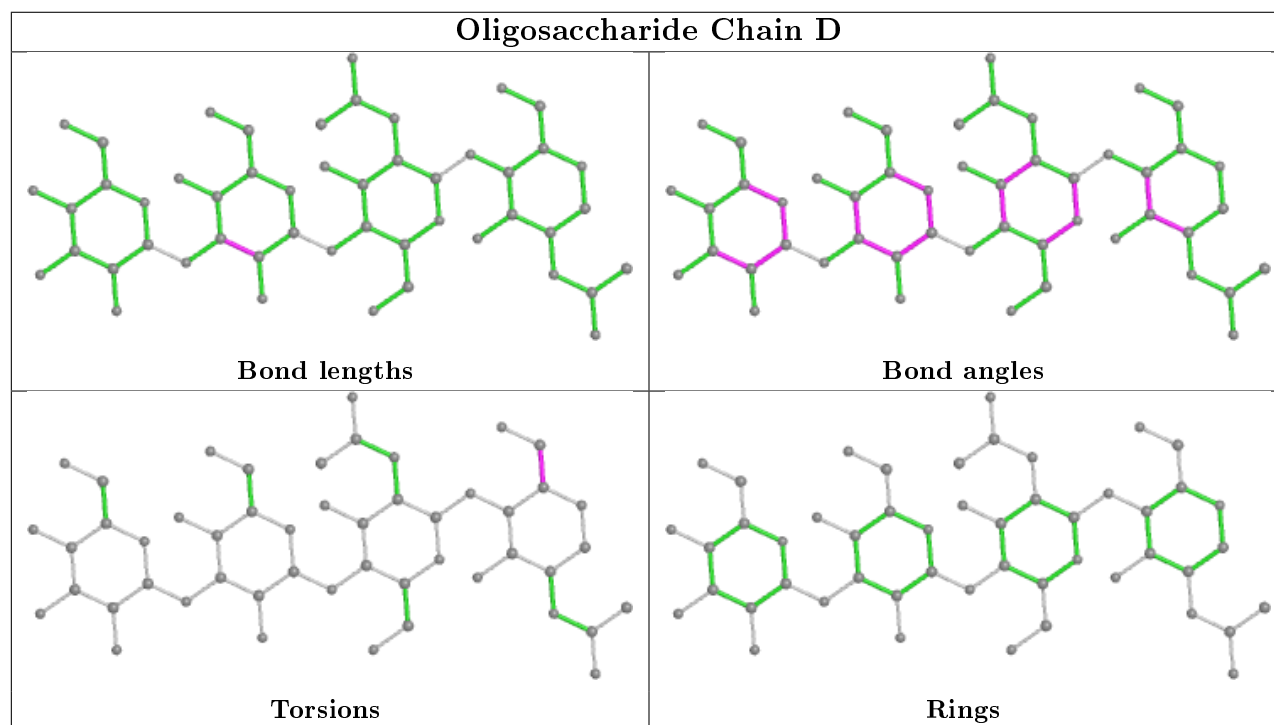
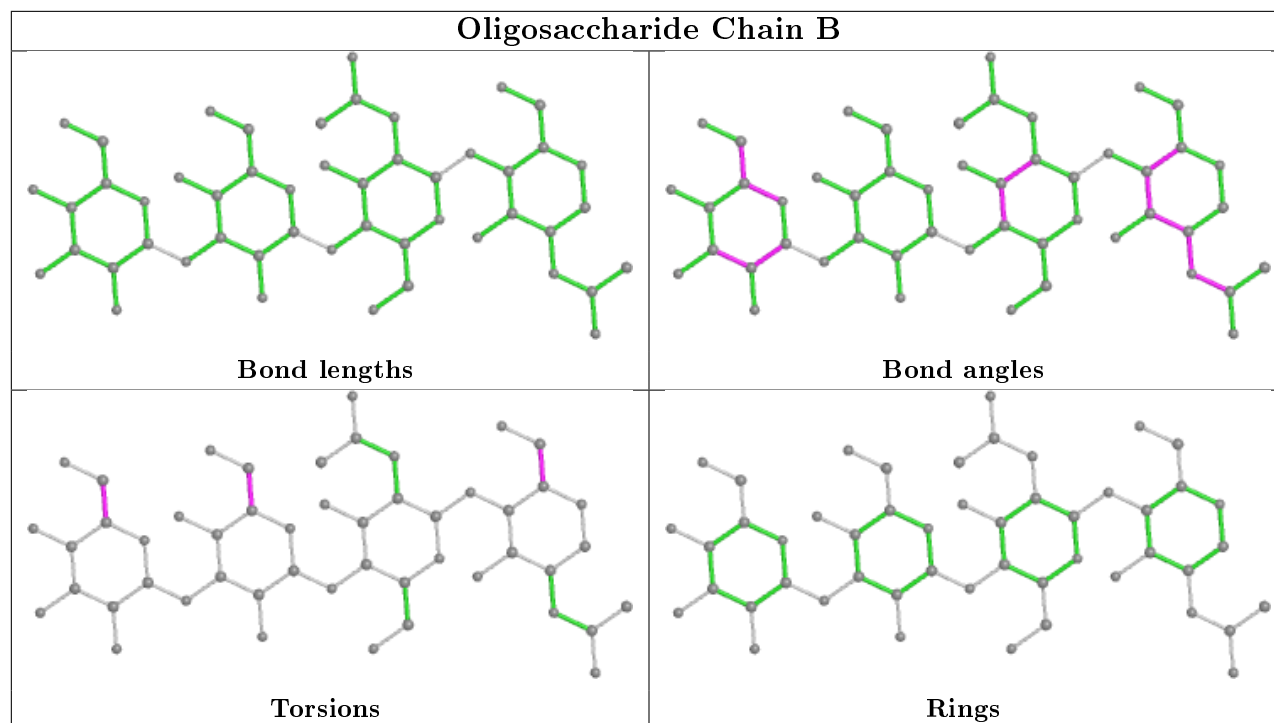
All (1) ring outliers are listed below:

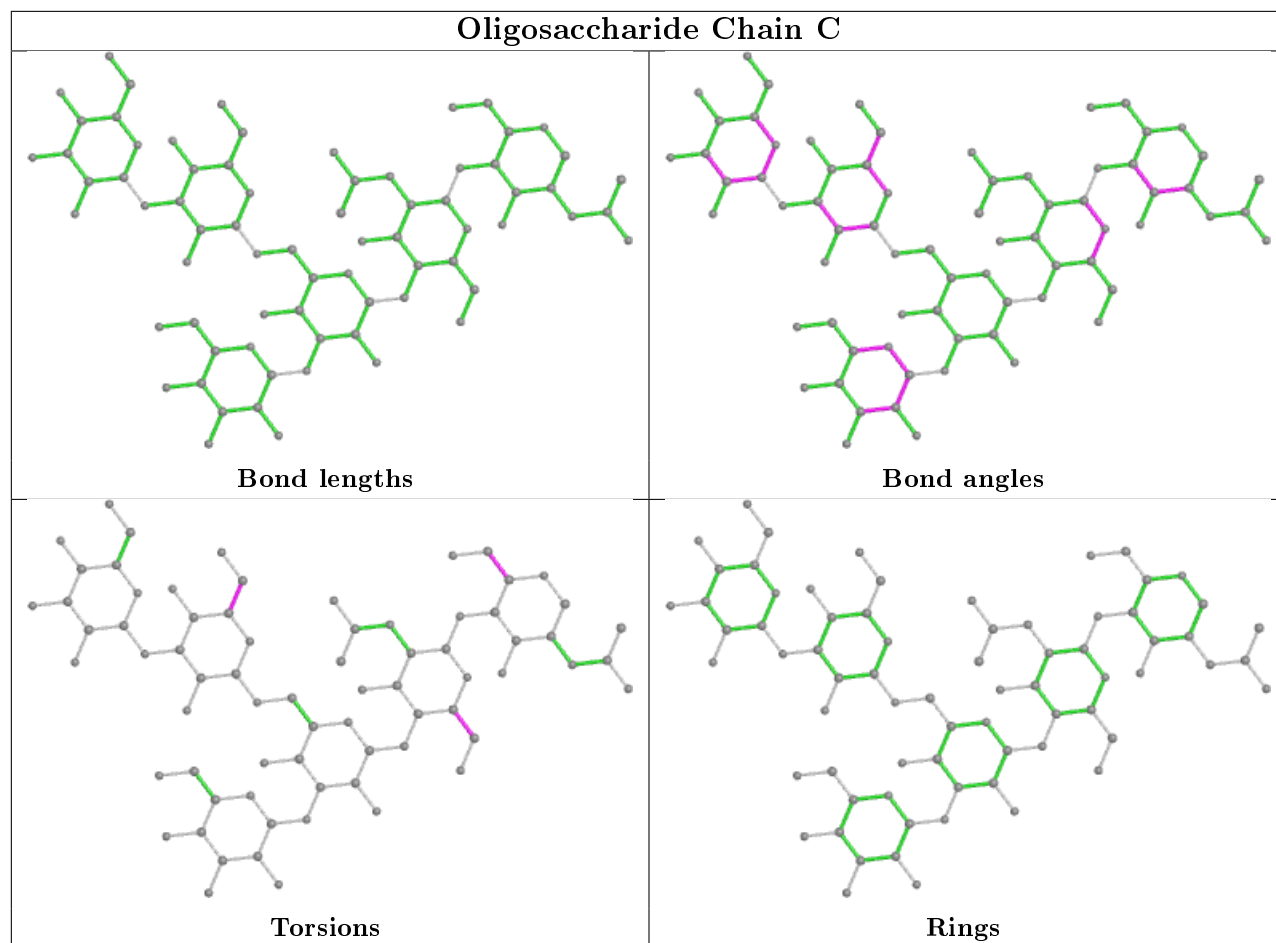
Mol	Chain	Res	Type	Atoms
5	G	5	MAN	C1-C2-C3-C4-C5-O5

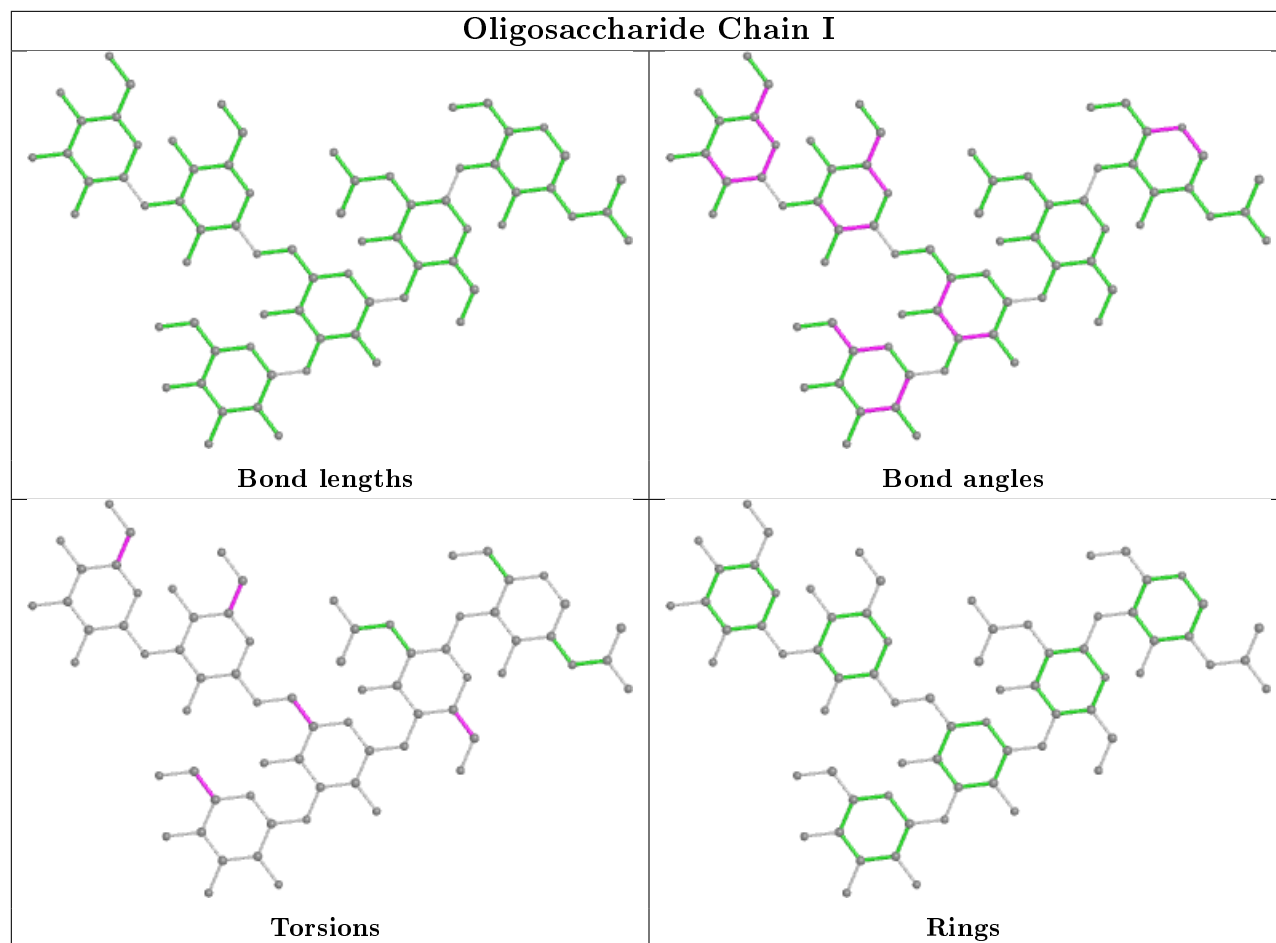
4 monomers are involved in 3 short contacts:

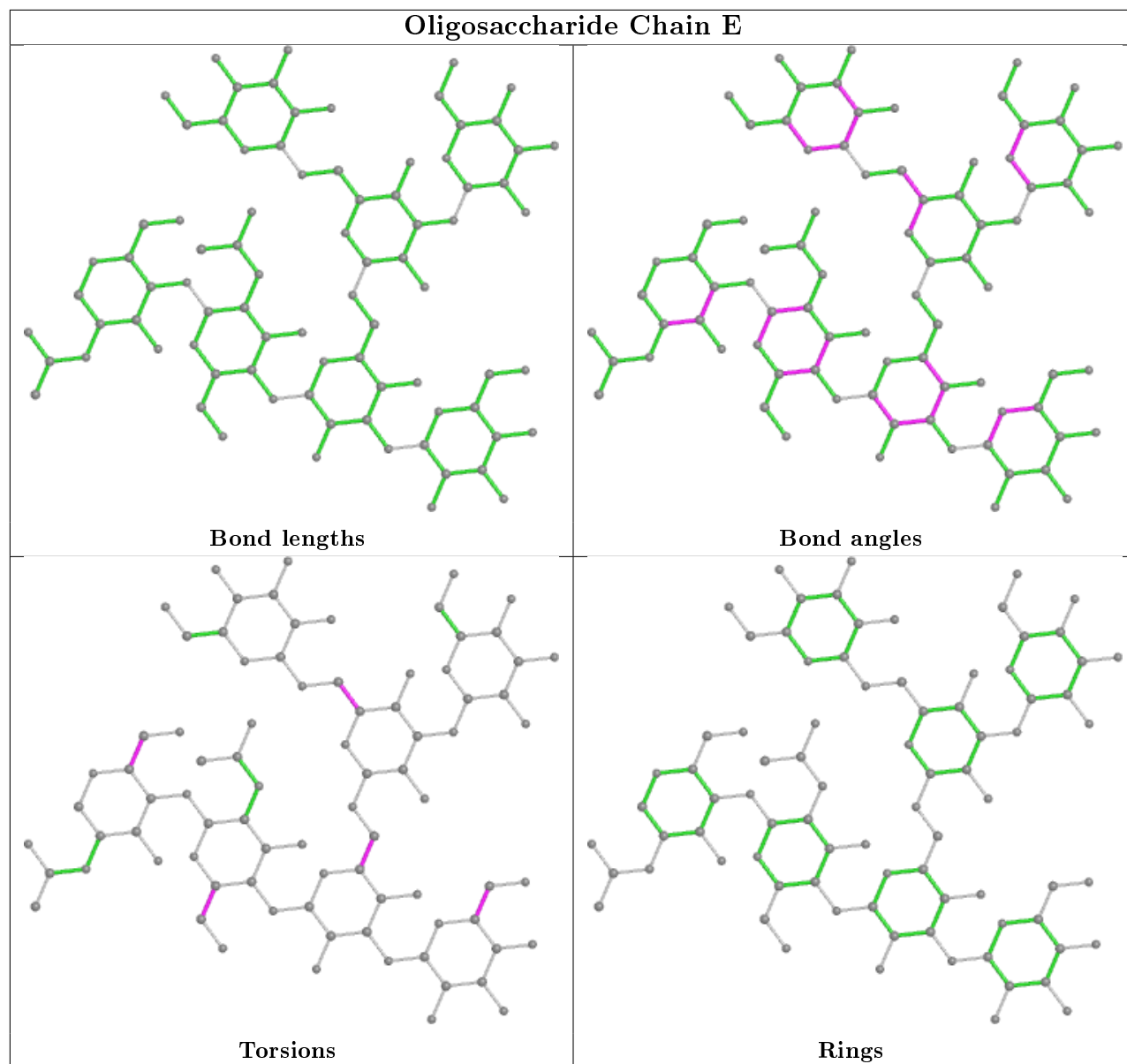
Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	E	1	NAG	1	0
4	J	1	NAG	1	0
4	E	2	NAG	1	0
2	B	1	NAG	1	0

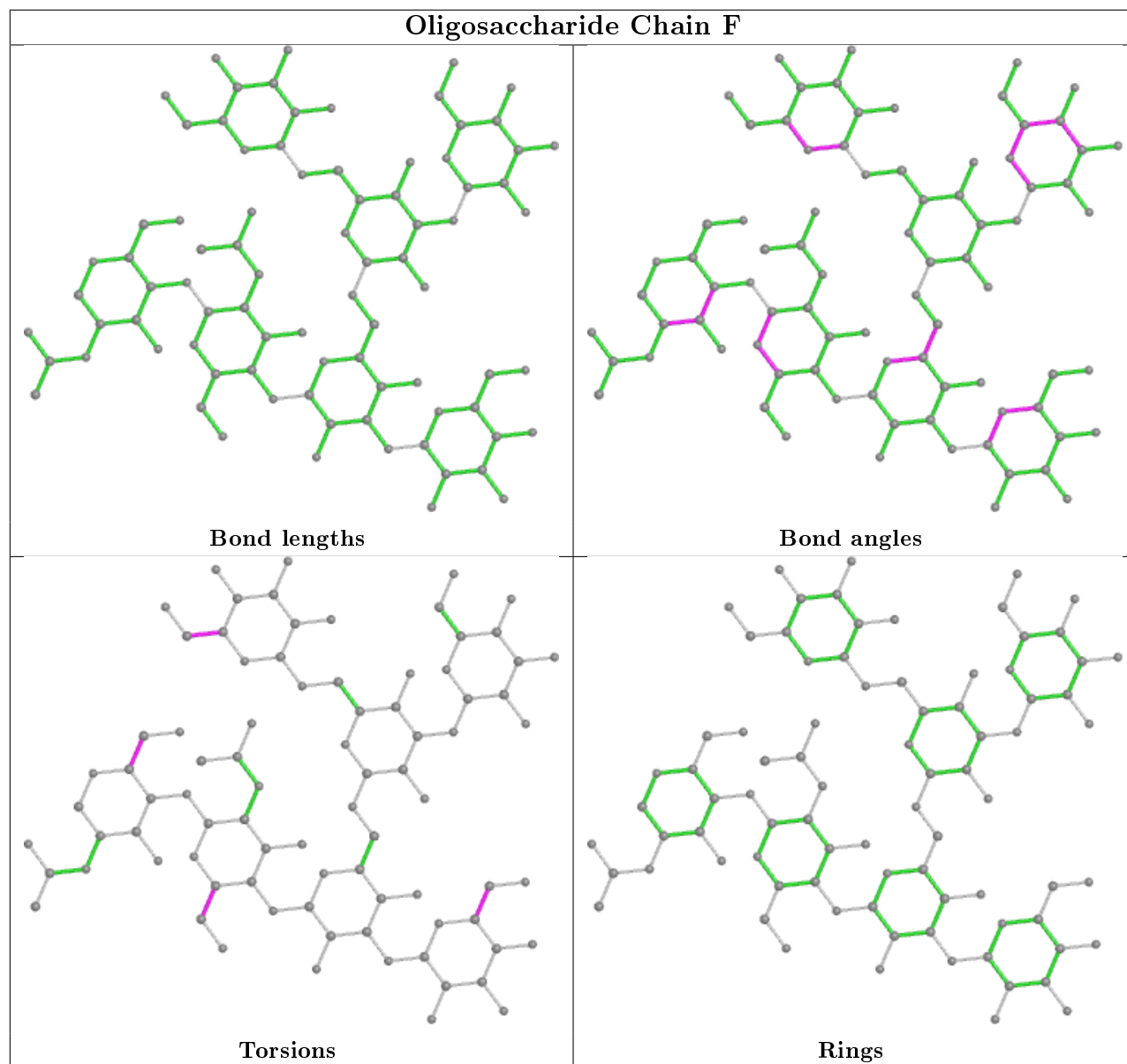
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for oligosaccharide.

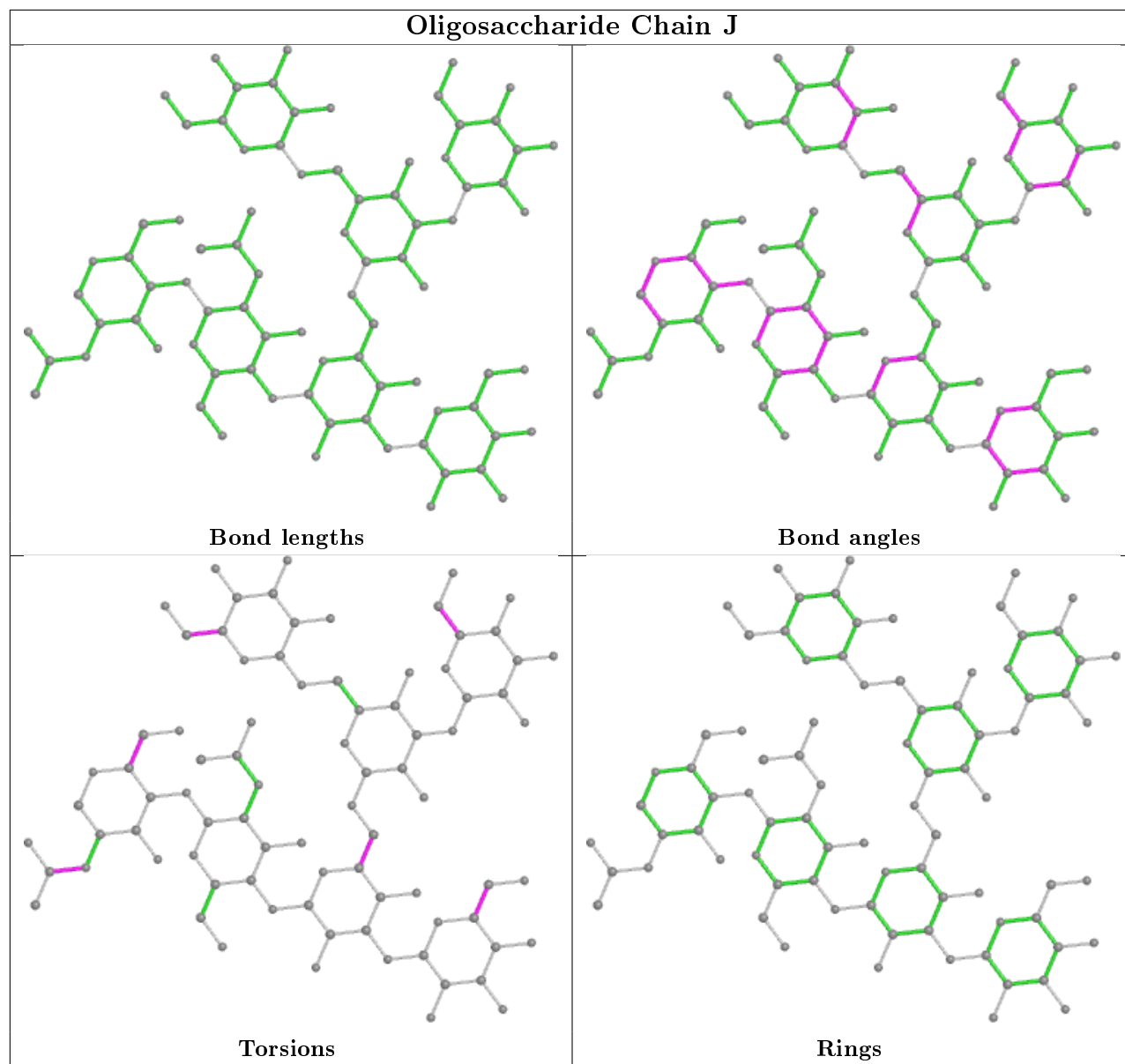




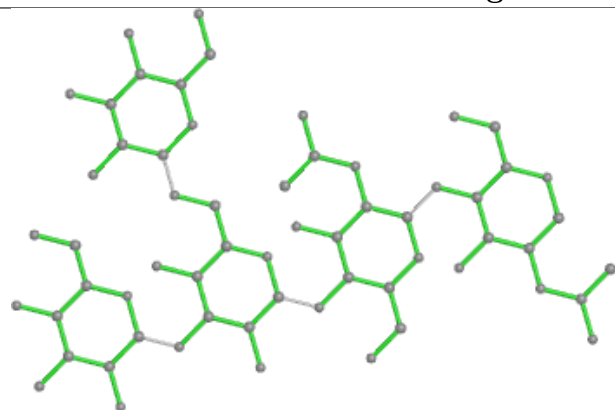




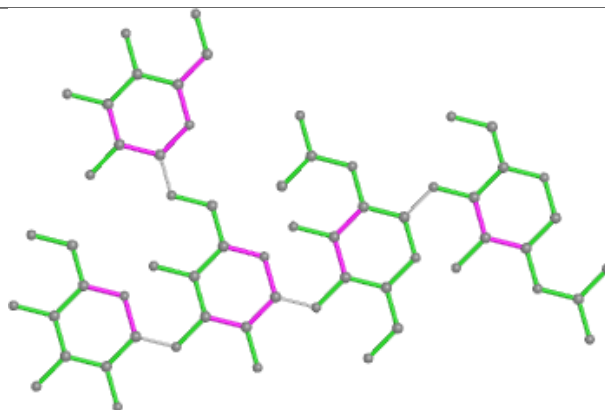




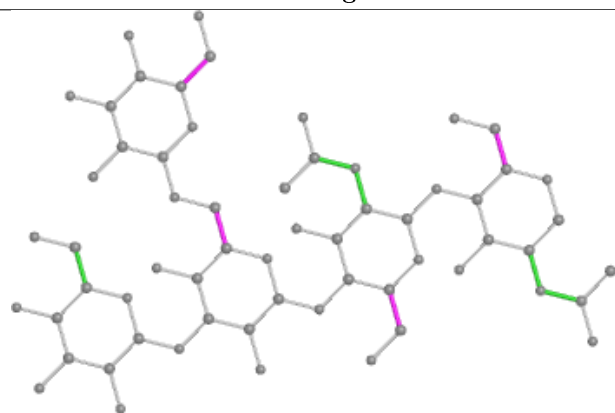
## Oligosaccharide Chain G



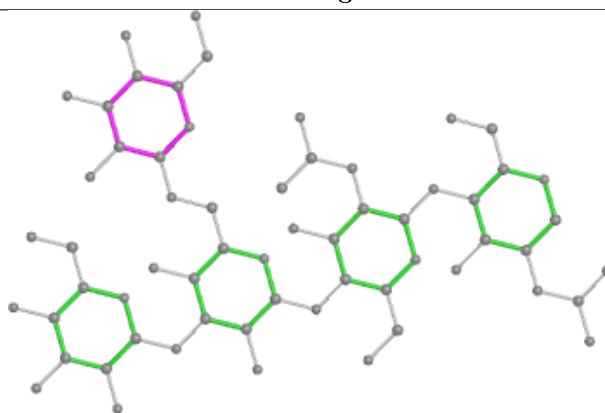
Bond lengths



Bond angles

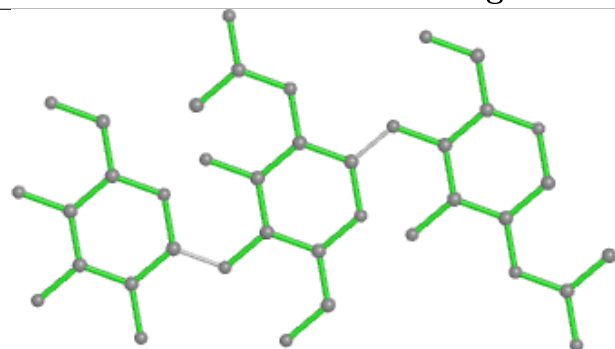


Torsions

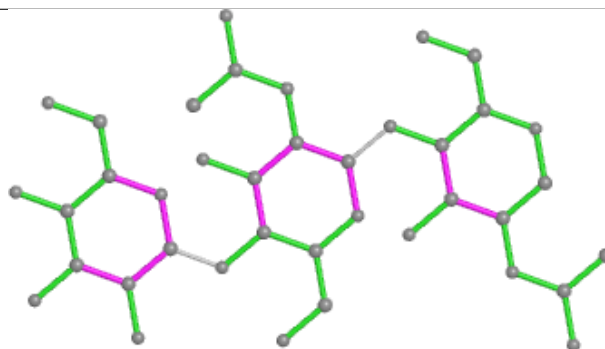


Rings

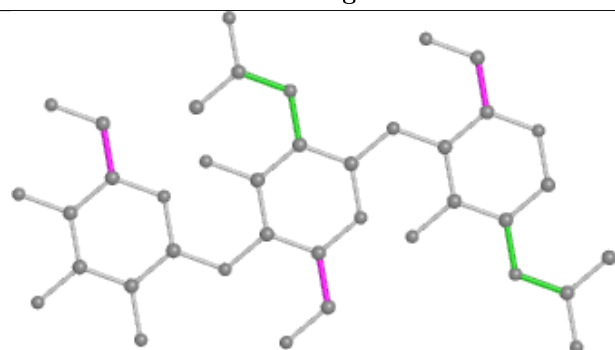
## Oligosaccharide Chain H



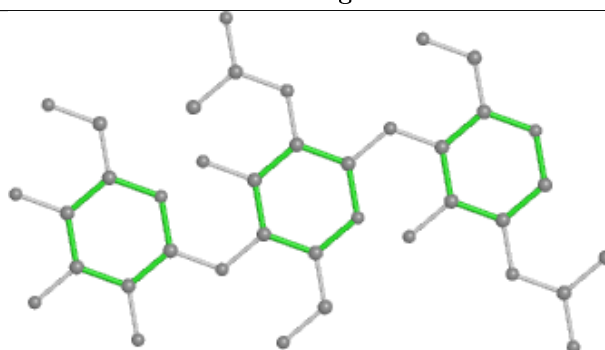
Bond lengths



Bond angles



Torsions



Rings

## 5.6 Ligand geometry

1 ligand is 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	$\# Z  > 2$
7	NAG	A	1334	1	14,14,15	0.53	0	17,19,21	1.00	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
7	NAG	A	1334	1	-	1/6/23/26	0/1/1/1

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed( $^{\circ}$ )	Ideal( $^{\circ}$ )
7	A	1334	NAG	C4-C3-C2	2.23	114.28	111.02

There are no chirality outliers.

All (1) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
7	A	1334	NAG	C4-C5-C6-O6

There are no ring outliers.

No monomer is involved in short contacts.

## 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	1171/1212 (96%)	-0.54	0 100 100	43, 122, 212, 302	0

There are no RSRZ outliers to report.

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

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
2	MAN	B	4	11/12	0.58	0.31	262,282,287,288	0
3	MAN	C	5	11/12	0.64	0.24	227,255,259,262	0
4	MAN	E	6	11/12	0.64	0.20	246,255,269,271	0
4	MAN	J	6	11/12	0.68	0.14	264,275,278,279	0
7	NAG	A	1334	14/15	0.69	0.30	203,226,240,242	0
5	MAN	G	5	11/12	0.69	0.30	229,246,253,254	0
4	MAN	J	7	11/12	0.71	0.27	244,272,282,284	0
4	NAG	J	2	14/15	0.72	0.15	253,275,297,308	0
3	NAG	I	2	14/15	0.73	0.21	227,255,266,272	0
4	MAN	J	4	11/12	0.78	0.13	282,295,299,300	0
3	MAN	I	5	11/12	0.79	0.15	225,241,245,246	0
3	MAN	C	6	11/12	0.79	0.27	247,257,267,268	0
3	NAG	I	1	14/15	0.80	0.20	230,258,278,292	0
4	MAN	J	5	11/12	0.82	0.15	263,278,284,287	0
4	MAN	F	4	11/12	0.84	0.11	235,258,264,269	0
4	MAN	F	5	11/12	0.85	0.19	250,253,259,261	0
6	NAG	H	2	14/15	0.86	0.17	224,240,248,256	0
4	MAN	E	7	11/12	0.86	0.19	232,245,257,259	0
3	MAN	C	4	11/12	0.86	0.15	230,242,254,256	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors( $\text{\AA}^2$ )	Q<0.9
5	MAN	G	4	11/12	0.86	0.22	189,227,234,237	0
4	MAN	F	6	11/12	0.88	0.12	246,253,256,257	0
5	NAG	G	2	14/15	0.88	0.27	148,161,174,195	0
4	NAG	J	1	14/15	0.88	0.12	186,212,241,250	0
4	MAN	F	7	11/12	0.88	0.26	230,245,248,256	0
2	NAG	D	2	14/15	0.89	0.30	206,233,247,257	0
3	MAN	I	4	11/12	0.90	0.21	229,248,250,253	0
4	NAG	F	1	14/15	0.90	0.21	166,190,206,218	0
2	NAG	B	1	14/15	0.91	0.14	143,163,173,182	0
4	MAN	E	5	11/12	0.91	0.17	197,204,207,215	0
3	NAG	C	2	14/15	0.91	0.17	184,202,222,233	0
6	NAG	H	1	14/15	0.92	0.14	192,213,227,237	0
3	MAN	I	6	11/12	0.92	0.19	236,244,249,250	0
4	NAG	F	2	14/15	0.92	0.18	206,226,233,240	0
4	MAN	E	4	11/12	0.93	0.08	208,222,237,250	0
4	NAG	E	2	14/15	0.93	0.13	182,208,219,230	0
2	NAG	B	2	14/15	0.93	0.12	192,203,221,240	0
2	MAN	D	4	11/12	0.93	0.18	210,234,236,238	0
5	NAG	G	1	14/15	0.94	0.18	112,127,138,142	0
2	NAG	D	1	14/15	0.94	0.39	170,185,213,214	0
4	NAG	E	1	14/15	0.96	0.17	171,181,191,194	0
3	NAG	C	1	14/15	0.97	0.13	130,149,159,165	0

## 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( $\text{\AA}^2$ )	Q<0.9
2	MAN	B	4	11/12	0.58	0.31	262,282,287,288	0
3	MAN	C	5	11/12	0.64	0.24	227,255,259,262	0
4	MAN	E	6	11/12	0.64	0.20	246,255,269,271	0
4	MAN	J	6	11/12	0.68	0.14	264,275,278,279	0
5	MAN	G	5	11/12	0.69	0.30	229,246,253,254	0
2	BMA	B	3	11/12	0.69	0.23	218,254,267,281	0
4	MAN	J	7	11/12	0.71	0.27	244,272,282,284	0
4	NAG	J	2	14/15	0.72	0.15	253,275,297,308	0
3	NAG	I	2	14/15	0.73	0.21	227,255,266,272	0
4	BMA	F	3	11/12	0.74	0.19	244,248,254,254	0
4	BMA	J	3	11/12	0.75	0.14	276,290,297,300	0

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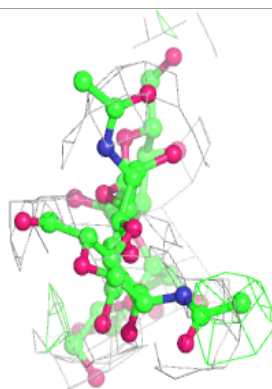
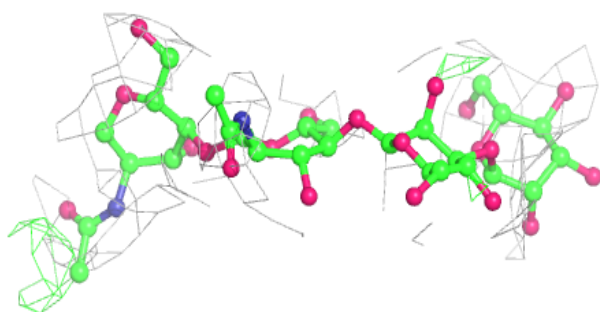
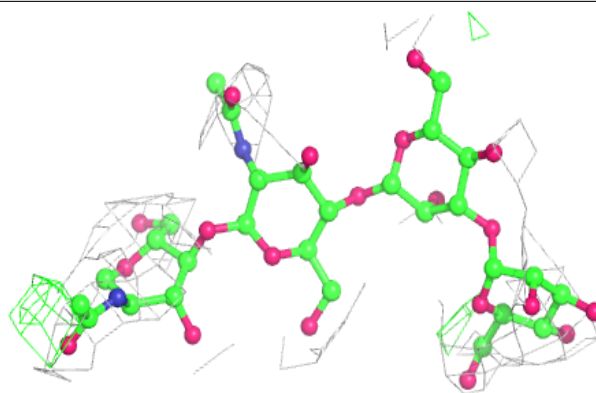
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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors( $\text{\AA}^2$ )	Q<0.9
4	MAN	J	4	11/12	0.78	0.13	282,295,299,300	0
3	MAN	C	6	11/12	0.79	0.27	247,257,267,268	0
3	MAN	I	5	11/12	0.79	0.15	225,241,245,246	0
3	NAG	I	1	14/15	0.80	0.20	230,258,278,292	0
6	BMA	H	3	11/12	0.80	0.19	218,235,247,251	0
4	MAN	J	5	11/12	0.82	0.15	263,278,284,287	0
3	BMA	C	3	11/12	0.82	0.17	235,240,250,265	0
3	BMA	I	3	11/12	0.82	0.18	253,262,269,272	0
2	BMA	D	3	11/12	0.84	0.10	202,234,254,265	0
4	MAN	F	4	11/12	0.84	0.11	235,258,264,269	0
4	MAN	F	5	11/12	0.85	0.19	250,253,259,261	0
4	BMA	E	3	11/12	0.85	0.10	232,248,259,265	0
4	MAN	E	7	11/12	0.86	0.19	232,245,257,259	0
6	NAG	H	2	14/15	0.86	0.17	224,240,248,256	0
5	MAN	G	4	11/12	0.86	0.22	189,227,234,237	0
3	MAN	C	4	11/12	0.86	0.15	230,242,254,256	0
5	BMA	G	3	11/12	0.86	0.19	217,237,244,251	0
4	NAG	J	1	14/15	0.88	0.12	186,212,241,250	0
4	MAN	F	6	11/12	0.88	0.12	246,253,256,257	0
5	NAG	G	2	14/15	0.88	0.27	148,161,174,195	0
4	MAN	F	7	11/12	0.88	0.26	230,245,248,256	0
2	NAG	D	2	14/15	0.89	0.30	206,233,247,257	0
4	NAG	F	1	14/15	0.90	0.21	166,190,206,218	0
3	MAN	I	4	11/12	0.90	0.21	229,248,250,253	0
4	MAN	E	5	11/12	0.91	0.17	197,204,207,215	0
3	NAG	C	2	14/15	0.91	0.17	184,202,222,233	0
2	NAG	B	1	14/15	0.91	0.14	143,163,173,182	0
6	NAG	H	1	14/15	0.92	0.14	192,213,227,237	0
3	MAN	I	6	11/12	0.92	0.19	236,244,249,250	0
4	NAG	F	2	14/15	0.92	0.18	206,226,233,240	0
4	MAN	E	4	11/12	0.93	0.08	208,222,237,250	0
2	NAG	B	2	14/15	0.93	0.12	192,203,221,240	0
2	MAN	D	4	11/12	0.93	0.18	210,234,236,238	0
4	NAG	E	2	14/15	0.93	0.13	182,208,219,230	0
5	NAG	G	1	14/15	0.94	0.18	112,127,138,142	0
2	NAG	D	1	14/15	0.94	0.39	170,185,213,214	0
4	NAG	E	1	14/15	0.96	0.17	171,181,191,194	0
3	NAG	C	1	14/15	0.97	0.13	130,149,159,165	0

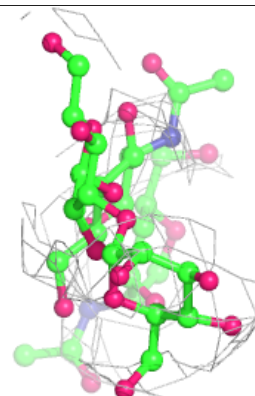
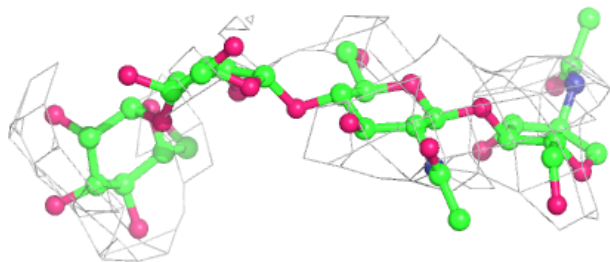
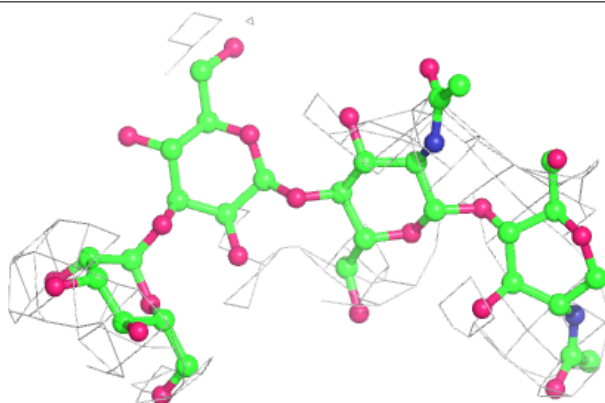
The following is a graphical depiction of the model fit to experimental electron density for oligosaccharide. Each fit is shown from different orientation to approximate a three-dimensional view.

**Electron density around Chain B:**

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

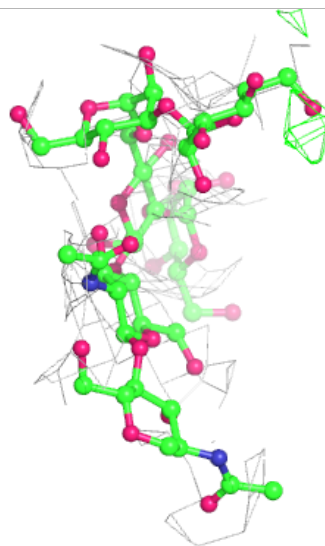
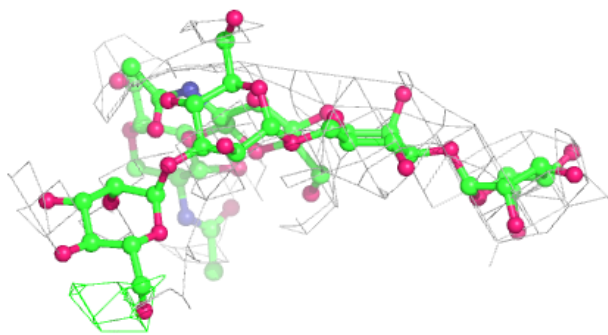
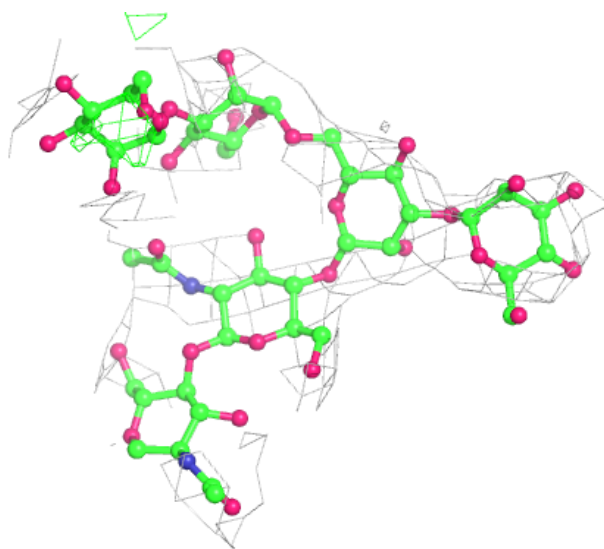
**Electron density around Chain D:**

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



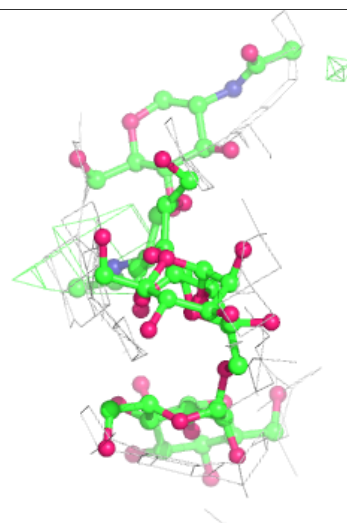
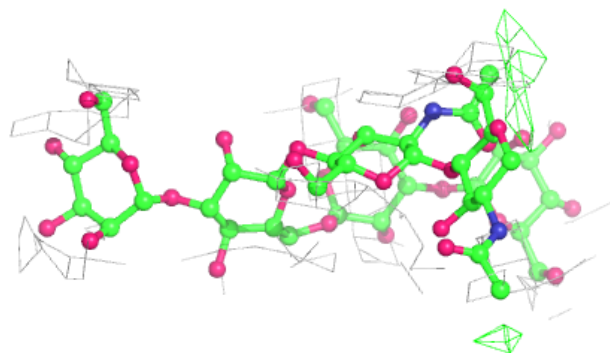
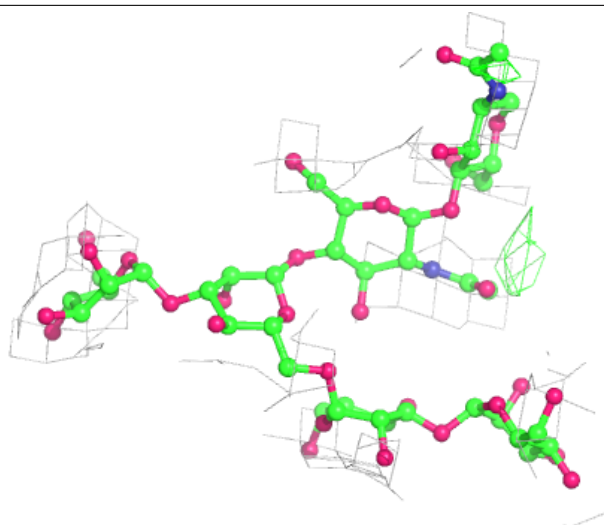
**Electron density around Chain C:**

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



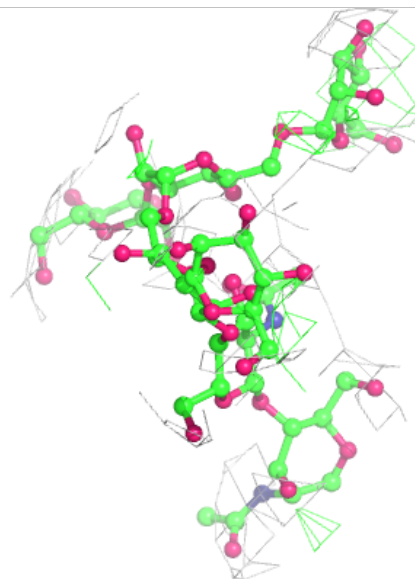
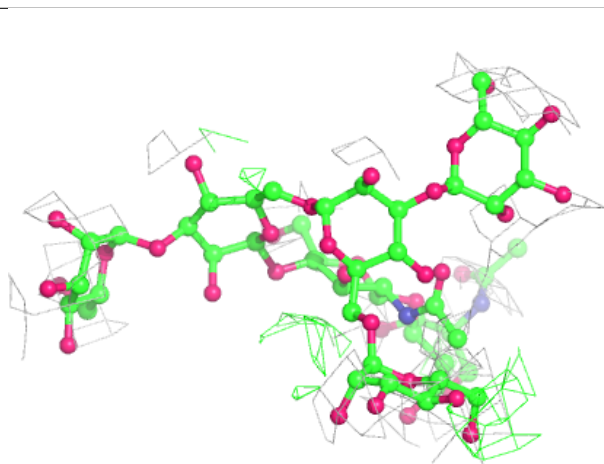
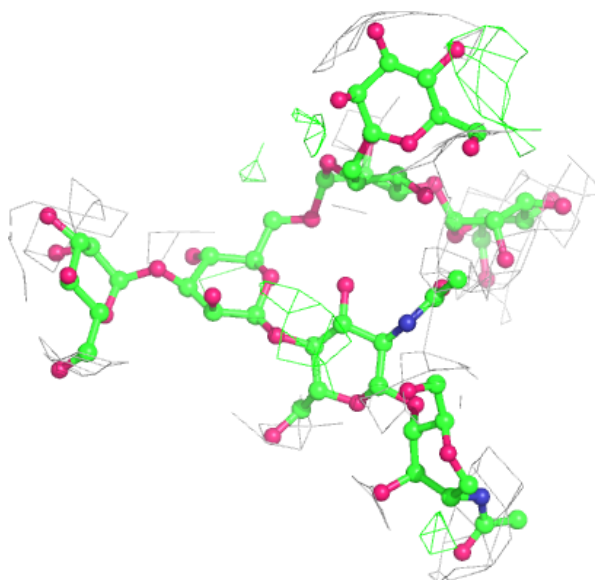
**Electron density around Chain I:**

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



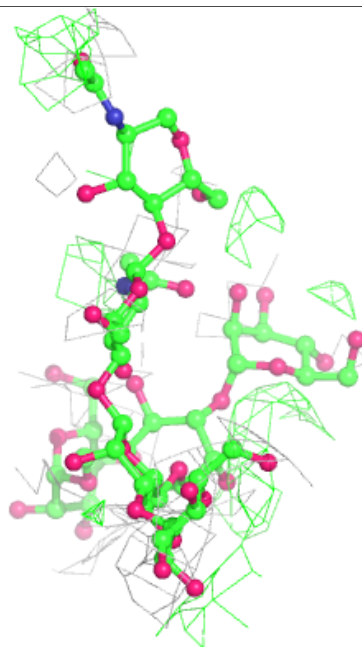
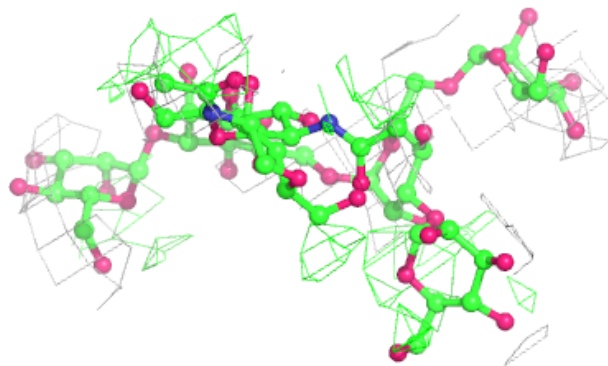
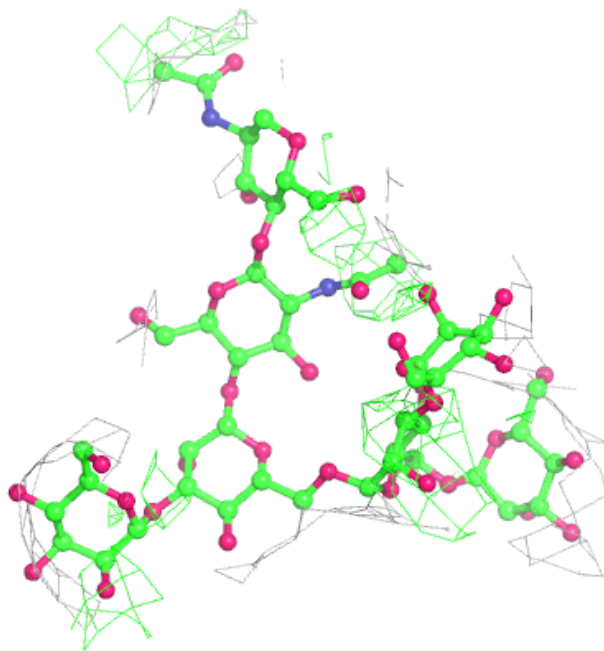
**Electron density around Chain E:**

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



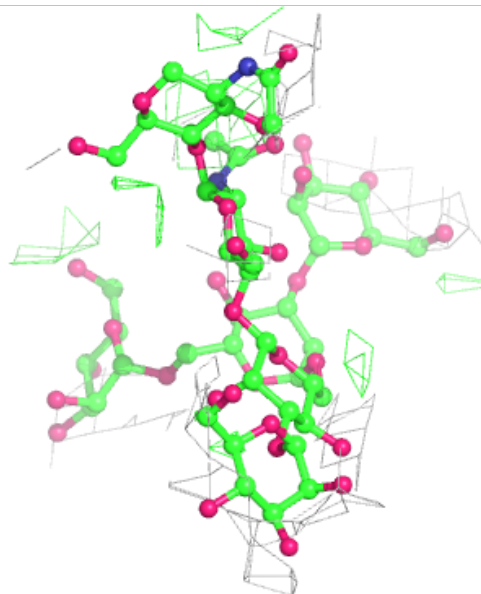
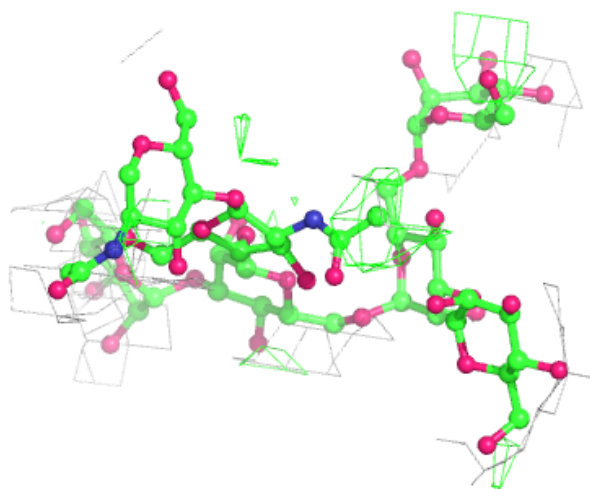
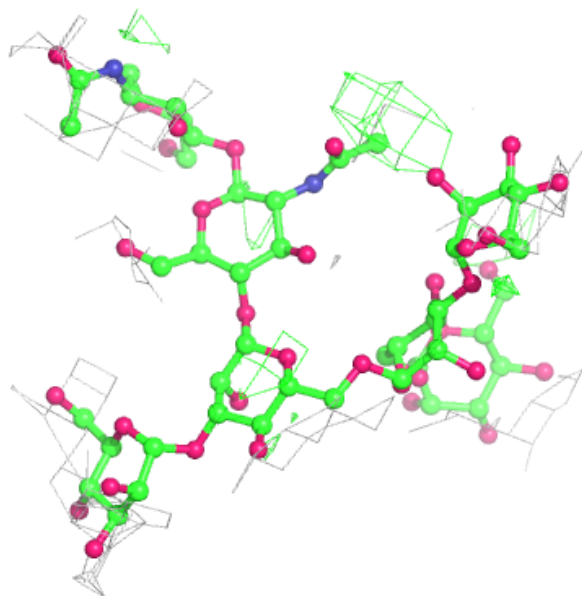
**Electron density around Chain F:**

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



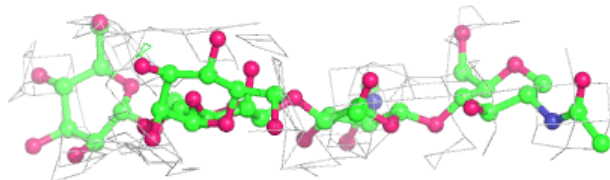
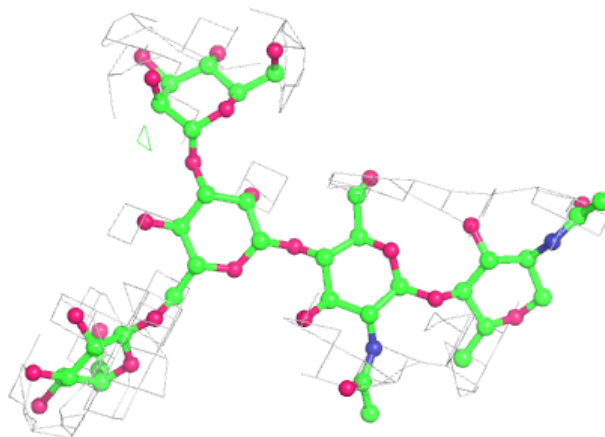
**Electron density around Chain J:**

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

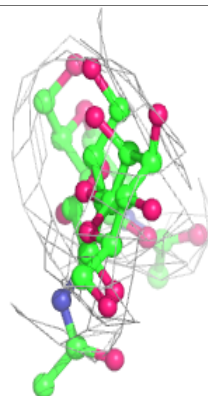
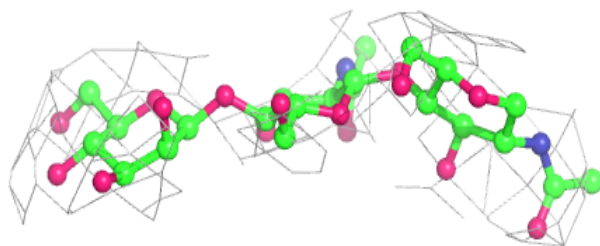
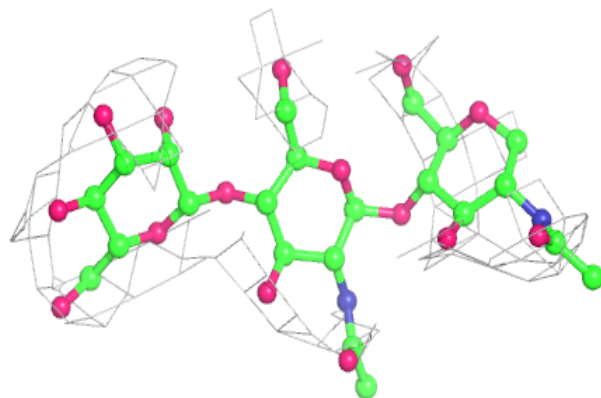


**Electron density around Chain G:**

$2mF_o-DF_c$  (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( $\text{\AA}^2$ )	Q<0.9
7	NAG	A	1334	14/15	0.69	0.30	203,226,240,242	0

## 6.5 Other polymers [i](#)

There are no such residues in this entry.