



# Full wwPDB X-ray Structure Validation Report ⓘ

Mar 17, 2025 – 12:22 PM EDT

PDB ID : 4MMX  
Title : Integrin AlphaVBeta3 ectodomain bound to the tenth domain of Fibronectin  
Authors : van Agthoven, J.; Xiong, J.; Arnaout, M.A.  
Deposited on : 2013-09-09  
Resolution : 3.32 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) : 1.21  
EDS : 3.0  
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)  
CCP4 : 9.0.004 (Gargrove)  
Density-Fitness : 1.0.11  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.41.4

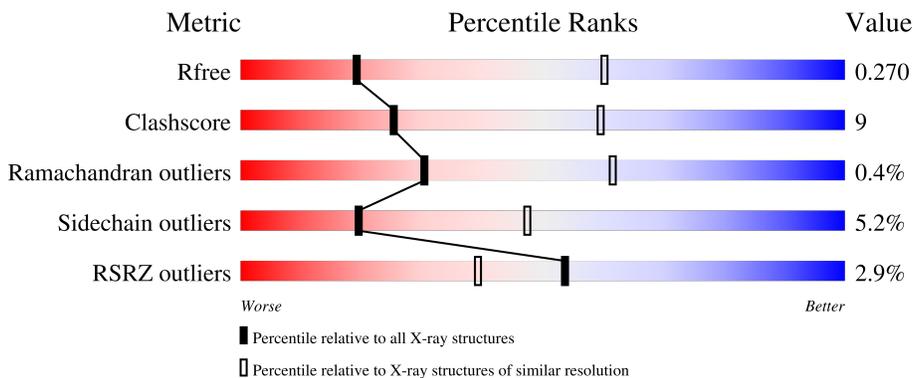
# 1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 3.32 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



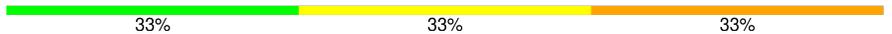
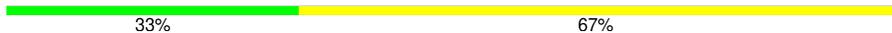
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
$R_{free}$	164625	1066 (3.34-3.30)
Clashscore	180529	1111 (3.34-3.30)
Ramachandran outliers	177936	1109 (3.34-3.30)
Sidechain outliers	177891	1108 (3.34-3.30)
RSRZ outliers	164620	1066 (3.34-3.30)

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	959	
2	B	692	
3	C	98	
4	D	4	
4	G	4	

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Mol	Chain	Length	Quality of chain
5	E	2	 50% 50%
5	H	2	 100%
5	I	2	 50% 50%
5	K	2	 50% 50%
6	F	6	 33% 33% 33%
7	J	3	 67% 33%
7	L	3	 33% 67%

## 2 Entry composition [i](#)

There are 10 unique types of molecules in this entry. The entry contains 13626 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 Integrin alpha-V.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	924	7196	4556	1221	1384	35	0	0	0

- Molecule 2 is a protein called Integrin beta-3.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	B	690	5294	3250	904	1070	70	0	0	0

- Molecule 3 is a protein called Fibronectin.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
3	C	93	694	438	115	141	0	0	0

There are 5 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
C	1510	GLY	-	expression tag	UNP P02751
C	1511	LYS	-	expression tag	UNP P02751
C	1512	LYS	-	expression tag	UNP P02751
C	1513	GLY	-	expression tag	UNP P02751
C	1514	LYS	-	expression tag	UNP P02751

- Molecule 4 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.



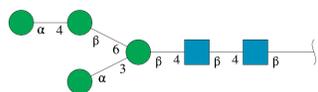
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
4	D	4	Total	C	N	O	0	0	0
			50	28	2	20			
4	G	4	Total	C	N	O	0	0	0
			50	28	2	20			

- Molecule 5 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
5	E	2	Total	C	N	O	0	0	0
			28	16	2	10			
5	H	2	Total	C	N	O	0	0	0
			28	16	2	10			
5	I	2	Total	C	N	O	0	0	0
			28	16	2	10			
5	K	2	Total	C	N	O	0	0	0
			28	16	2	10			

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



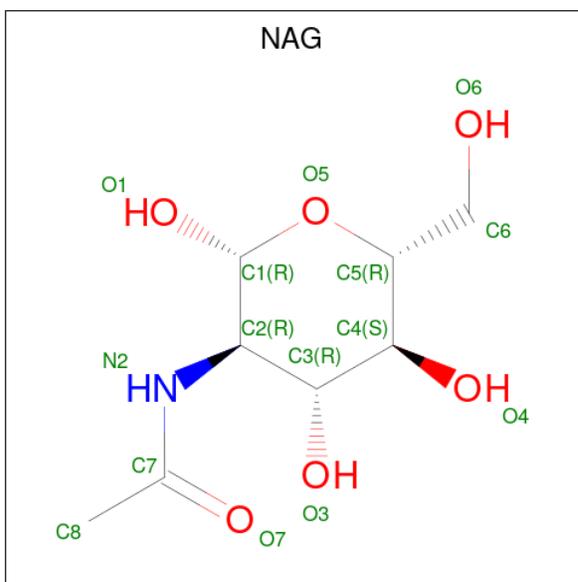
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
6	F	6	Total	C	N	O	0	0	0
			72	40	2	30			

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



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

- Molecule 8 is 2-acetamido-2-deoxy-beta-D-glucopyranose (three-letter code: NAG) (formula:  $C_8H_{15}NO_6$ ).



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

- Molecule 9 is MANGANESE (II) ION (three-letter code: MN) (formula: Mn).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
9	A	5	Total	Mn	0	0
			5	5		
9	B	3	Total	Mn	0	0
			3	3		

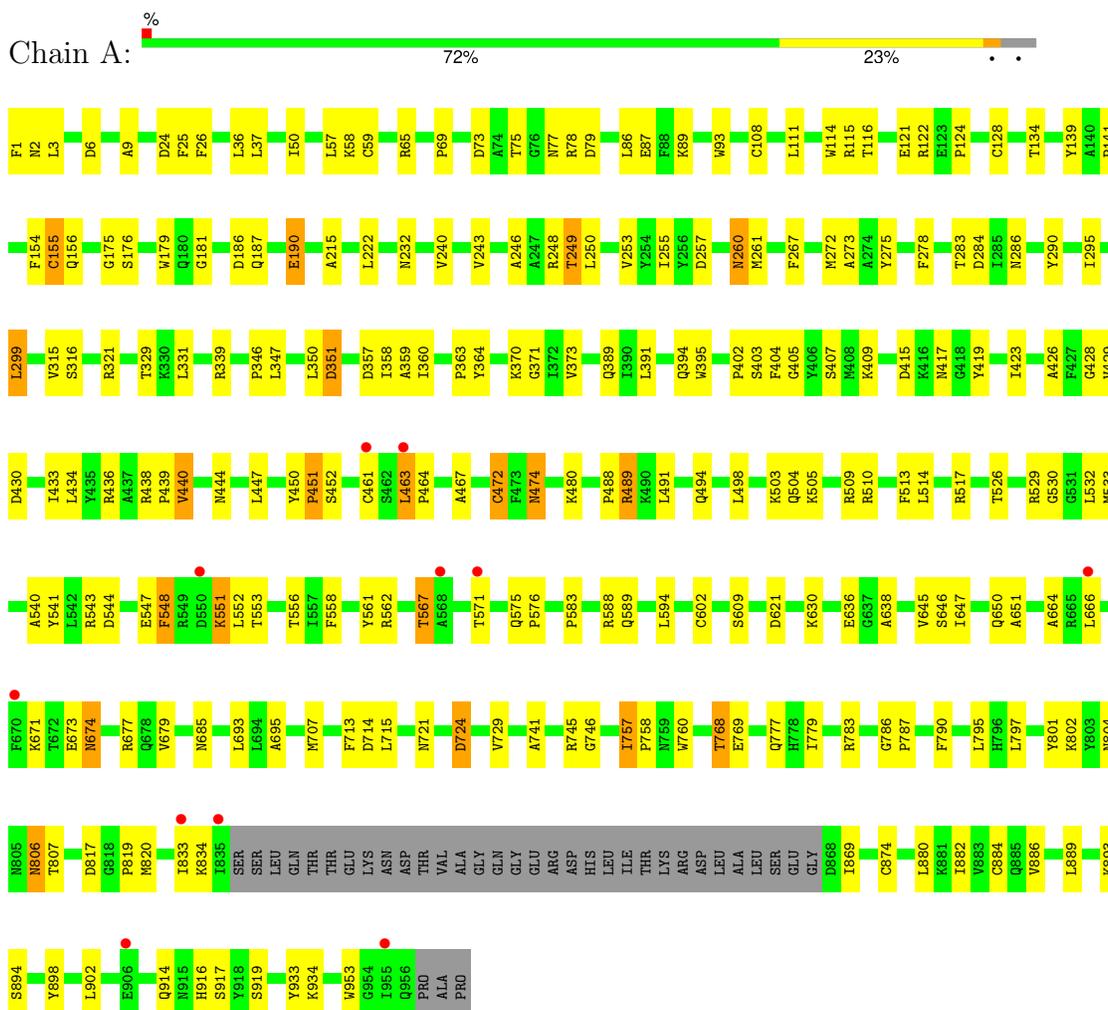
- Molecule 10 is water.

<b>Mol</b>	<b>Chain</b>	<b>Residues</b>	<b>Atoms</b>	<b>ZeroOcc</b>	<b>AltConf</b>
10	B	2	Total O 2 2	0	0

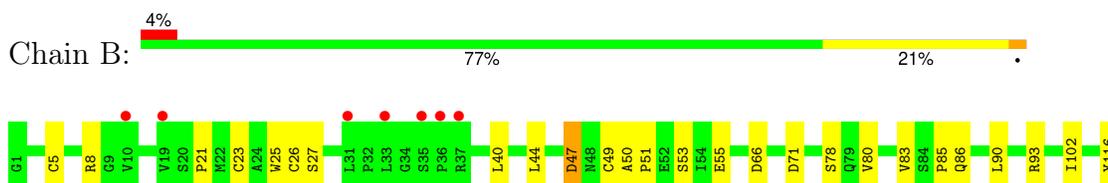
### 3 Residue-property plots [i](#)

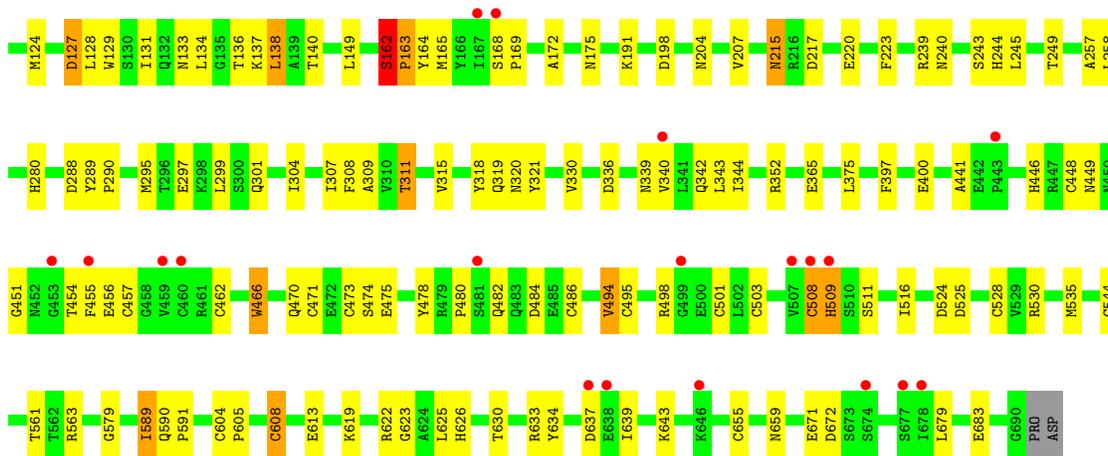
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. 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: Integrin alpha-V

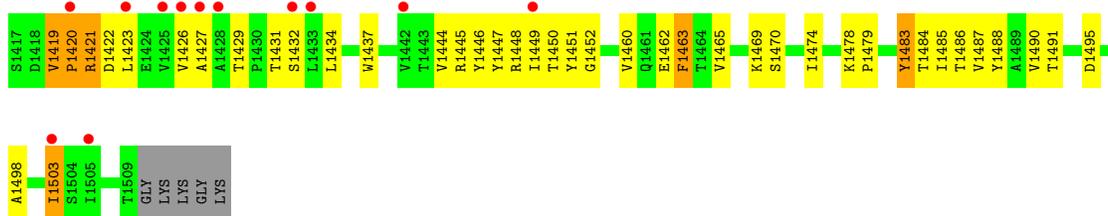


#### • Molecule 2: Integrin beta-3





- Molecule 3: Fibronectin



- Molecule 4: 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



- Molecule 4: 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



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



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

Chain H:  100%

MAG1  
MAG2

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

Chain I:  50% 50%

MAG1  
MAG2

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

Chain K:  50% 50%

MAG1  
MAG2

- Molecule 6: alpha-D-mannopyranose-(1-4)-beta-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:  33% 33% 33%

MAG1  
MAG2  
BMA3  
BMA4  
MAN5  
MAN6

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

Chain J:  67% 33%

MAG1  
MAG2  
BMA3

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

Chain L:  33% 67%

MAG1  
MAG2  
BMA3

## 4 Data and refinement statistics i

Property	Value	Source
Space group	P 32 2 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	129.86Å 129.86Å 305.83Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	42.51 – 3.32 42.51 – 3.32	Depositor EDS
% Data completeness (in resolution range)	88.0 (42.51-3.32) 87.9 (42.51-3.32)	Depositor EDS
$R_{merge}$	0.11	Depositor
$R_{sym}$	0.11	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	2.73 (at 3.32Å)	Xtrriage
Refinement program	PHENIX (1.20.1_4487: ???)	Depositor
R, $R_{free}$	0.220 , 0.269 0.220 , 0.270	Depositor DCC
$R_{free}$ test set	1943 reflections (4.91%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	86.7	Xtrriage
Anisotropy	0.148	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.29 , 61.6	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.48$ , $\langle L^2 \rangle = 0.31$	Xtrriage
Estimated twinning fraction	0.036 for -h,-k,l	Xtrriage
$F_o, F_c$ correlation	0.92	EDS
Total number of atoms	13626	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	102.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.96% of the height of the origin peak. No significant pseudotranslation is detected.*

<sup>1</sup>Intensities estimated from amplitudes.

<sup>2</sup>Theoretical values of  $\langle |L| \rangle$ ,  $\langle L^2 \rangle$  for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

## 5 Model quality [i](#)

### 5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: NAG, BMA, MN, 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	0.27	0/7352	0.52	0/9967
2	B	0.27	0/5390	0.52	0/7289
3	C	0.25	0/710	0.58	0/975
All	All	0.27	0/13452	0.53	0/18231

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
2	B	0	3

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (3) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
2	B	162	SER	Peptide
2	B	475	GLU	Peptide
2	B	78	SER	Peptide

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

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	7196	0	7013	145	0
2	B	5294	0	5024	89	0
3	C	694	0	688	28	0
4	D	50	0	43	0	0
4	G	50	0	43	0	0
5	E	28	0	25	0	0
5	H	28	0	25	0	0
5	I	28	0	25	0	0
5	K	28	0	25	1	0
6	F	72	0	61	2	0
7	J	39	0	34	0	0
7	L	39	0	34	0	0
8	A	42	0	39	1	0
8	B	28	0	26	2	0
9	A	5	0	0	0	0
9	B	3	0	0	0	0
10	B	2	0	0	0	0
All	All	13626	0	13105	253	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 9.

All (253) 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)
3:C:1421:ARG:HG2	3:C:1422:ASP:H	1.38	0.87
1:A:488:PRO:HG2	1:A:567:THR:HG22	1.60	0.82
2:B:134:LEU:O	2:B:138:LEU:N	2.13	0.76
1:A:551:LYS:HB3	1:A:553:THR:H	1.49	0.76
1:A:504:GLN:HG2	1:A:509:ARG:HG3	1.67	0.75
1:A:351:ASP:N	1:A:351:ASP:OD1	2.16	0.75
2:B:590:GLN:HG2	2:B:591:PRO:HD2	1.69	0.74
2:B:473:CYS:SG	2:B:474:SER:N	2.58	0.74
2:B:27:SER:HB2	2:B:53:SER:HB3	1.68	0.73
1:A:480:LYS:HB2	1:A:533:MET:HG2	1.73	0.71
2:B:623:GLY:HA2	2:B:626:HIS:HB3	1.74	0.69
1:A:741:ALA:H	1:A:786:GLY:HA3	1.56	0.69
1:A:187:GLN:HB2	1:A:190:GLU:HB2	1.74	0.69
3:C:1421:ARG:HB2	3:C:1503:ILE:HD12	1.74	0.69
2:B:448:CYS:SG	2:B:449:ASN:ND2	2.62	0.68
1:A:556:THR:HG22	1:A:589:GLN:HG2	1.74	0.68
1:A:769:GLU:HG2	1:A:902:LEU:HD11	1.75	0.68

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:779:ILE:HD12	1:A:898:TYR:HD1	1.58	0.68
2:B:162:SER:O	2:B:164:TYR:N	2.28	0.67
2:B:133:ASN:O	2:B:204:ASN:ND2	2.27	0.67
2:B:168:SER:HB2	2:B:169:PRO:HD2	1.75	0.67
1:A:707:MET:HE2	1:A:934:LYS:H	1.59	0.67
2:B:446:HIS:HA	2:B:451:GLY:HA2	1.77	0.66
2:B:498:ARG:O	2:B:508:CYS:HB3	1.95	0.66
1:A:503:LYS:HG3	1:A:510:ARG:HD3	1.77	0.66
1:A:609:SER:HB3	1:A:630:LYS:HB3	1.76	0.66
1:A:395:TRP:HE1	1:A:433:ILE:HD11	1.61	0.66
3:C:1451:TYR:HB3	3:C:1485:ILE:HG23	1.77	0.66
1:A:402:PRO:HA	1:A:428:GLY:HA3	1.78	0.65
2:B:124:MET:HA	2:B:127:ASP:OD2	1.98	0.64
1:A:347:LEU:HD11	1:A:357:ASP:HB2	1.79	0.64
1:A:450:TYR:HB3	1:A:451:PRO:HD2	1.79	0.63
1:A:474:ASN:OD1	1:A:474:ASN:N	2.31	0.63
1:A:463:LEU:HA	1:A:467:ALA:HB2	1.80	0.63
2:B:579:GLY:HA2	2:B:589:ILE:HG13	1.79	0.63
1:A:371:GLY:HA3	1:A:404:PHE:HB3	1.80	0.63
1:A:505:LYS:HB3	2:B:509:HIS:CD2	2.32	0.63
1:A:544:ASP:HB3	1:A:547:GLU:HG3	1.82	0.62
1:A:802:LYS:HG2	1:A:807:THR:HA	1.82	0.62
1:A:240:VAL:HG22	1:A:255:ILE:HG12	1.80	0.62
2:B:622:ARG:HH22	2:B:659:ASN:HD22	1.48	0.62
3:C:1448:ARG:HB2	3:C:1488:TYR:HB2	1.82	0.61
1:A:1:PHE:HA	1:A:389:GLN:HB2	1.83	0.61
2:B:71:ASP:OD1	2:B:71:ASP:N	2.32	0.61
1:A:621:ASP:HB2	1:A:787:PRO:HB3	1.81	0.61
3:C:1448:ARG:NH2	3:C:1462:GLU:OE1	2.28	0.61
2:B:8:ARG:NH2	2:B:544:CYS:SG	2.74	0.61
1:A:181:GLY:HA3	1:A:222:LEU:HB3	1.83	0.60
2:B:498:ARG:HD3	2:B:516:ILE:HD13	1.83	0.60
1:A:438:ARG:NE	1:A:575:GLN:O	2.27	0.59
1:A:914:GLN:O	1:A:953:TRP:NE1	2.35	0.59
2:B:129:TRP:HZ3	2:B:339:ASN:HD21	1.50	0.59
2:B:83:VAL:O	2:B:86:GLN:NE2	2.35	0.59
1:A:250:LEU:HD12	1:A:272:MET:HG2	1.85	0.59
1:A:347:LEU:HD23	1:A:359:ALA:HB2	1.84	0.59
1:A:768:THR:HG23	1:A:834:LYS:HB2	1.85	0.59
1:A:249:THR:HG23	1:A:273:ALA:H	1.68	0.58
2:B:215:ASN:O	3:C:1495:ASP:HB3	2.04	0.58

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:77:ASN:HB3	1:A:87:GLU:HG3	1.85	0.58
1:A:552:LEU:HD21	1:A:594:LEU:HD22	1.86	0.57
2:B:639:ILE:HG12	2:B:679:LEU:HD23	1.86	0.56
1:A:215:ALA:HB3	3:C:1445:ARG:HD3	1.88	0.56
1:A:447:LEU:O	1:A:588:ARG:NE	2.36	0.56
1:A:646:SER:HB2	1:A:714:ASP:HB2	1.87	0.56
1:A:395:TRP:HB3	1:A:429:VAL:HG11	1.86	0.56
1:A:50:ILE:HD12	1:A:89:LYS:HB2	1.88	0.56
3:C:1437:TRP:O	3:C:1470:SER:OG	2.24	0.56
1:A:645:VAL:HB	1:A:679:VAL:HB	1.88	0.55
1:A:284:ASP:OD2	1:A:290:TYR:N	2.39	0.55
1:A:436:ARG:HH12	1:A:571:THR:HB	1.70	0.55
1:A:664:ALA:HB3	1:A:695:ALA:HB2	1.87	0.55
3:C:1429:THR:OG1	3:C:1431:THR:O	2.23	0.55
1:A:801:TYR:HB2	1:A:880:LEU:HB2	1.86	0.55
1:A:73:ASP:OD1	1:A:75:THR:OG1	2.19	0.54
3:C:1426:VAL:HB	3:C:1434:LEU:HD23	1.87	0.54
3:C:1478:LYS:HE3	3:C:1479:PRO:HD2	1.88	0.54
1:A:232:ASN:N	1:A:232:ASN:OD1	2.37	0.54
1:A:78:ARG:HB3	1:A:86:LEU:HB3	1.89	0.54
1:A:373:VAL:HB	1:A:391:LEU:HB2	1.88	0.54
2:B:643:LYS:HA	2:B:683:GLU:HG2	1.90	0.54
1:A:347:LEU:HD13	1:A:350:LEU:HB2	1.90	0.54
1:A:513:PHE:HA	1:A:540:ALA:HA	1.90	0.54
2:B:164:TYR:O	2:B:215:ASN:HB2	2.09	0.53
2:B:243:SER:OG	2:B:352:ARG:NH1	2.41	0.53
1:A:139:TYR:OH	1:A:186:ASP:OD2	2.25	0.53
2:B:134:LEU:O	2:B:137:LYS:N	2.42	0.53
2:B:25:TRP:HB3	2:B:55:GLU:HB2	1.91	0.53
1:A:494:GLN:HB2	1:A:562:ARG:HB3	1.90	0.52
1:A:464:PRO:HD2	1:A:467:ALA:HA	1.92	0.52
3:C:1419:VAL:HG22	3:C:1420:PRO:HD2	1.92	0.52
3:C:1420:PRO:O	3:C:1421:ARG:HB3	2.09	0.52
2:B:561:THR:HG22	2:B:563:ARG:H	1.74	0.52
1:A:155:CYS:HB2	1:A:176:SER:OG	2.09	0.51
3:C:1450:THR:O	3:C:1486:THR:N	2.38	0.51
2:B:239:ARG:O	2:B:244:HIS:NE2	2.43	0.51
1:A:402:PRO:HB3	1:A:429:VAL:HG13	1.92	0.51
1:A:589:GLN:OE1	1:A:685:ASN:ND2	2.43	0.51
2:B:530:ARG:HG2	2:B:535:MET:HA	1.91	0.51
1:A:820:MET:HG3	1:A:886:VAL:HG22	1.93	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:3:LEU:HG	1:A:350:LEU:HD21	1.93	0.50
2:B:509:HIS:ND1	2:B:509:HIS:N	2.59	0.50
1:A:489:ARG:H	1:A:489:ARG:HD3	1.77	0.50
1:A:804:ASN:O	1:A:806:ASN:ND2	2.45	0.50
1:A:819:PRO:HD3	1:A:893:LYS:HE3	1.93	0.50
2:B:441:ALA:HB1	2:B:455:PHE:HE2	1.77	0.50
1:A:2:ASN:OD1	1:A:2:ASN:N	2.44	0.50
1:A:423:ILE:HG12	1:A:434:LEU:HD23	1.93	0.49
2:B:319:GLN:HA	2:B:330:VAL:HG21	1.94	0.49
1:A:498:LEU:HB2	1:A:558:PHE:HB3	1.93	0.49
1:A:498:LEU:HD23	1:A:558:PHE:HD2	1.76	0.49
1:A:783:ARG:HG3	1:A:894:SER:HB3	1.94	0.49
1:A:439:PRO:HD2	1:A:576:PRO:HA	1.94	0.49
1:A:671:LYS:NZ	1:A:673:GLU:OE1	2.39	0.49
2:B:613:GLU:HG2	2:B:625:LEU:HB2	1.93	0.49
3:C:1419:VAL:HG13	3:C:1420:PRO:O	2.13	0.49
2:B:23:CYS:HA	2:B:40:LEU:HB3	1.94	0.49
2:B:288:ASP:OD1	2:B:289:TYR:N	2.38	0.49
1:A:9:ALA:HB3	1:A:434:LEU:HB3	1.95	0.48
1:A:415:ASP:OD2	1:A:417:ASN:ND2	2.46	0.48
1:A:114:TRP:CE2	1:A:116:THR:HA	2.48	0.48
1:A:602:CYS:HA	1:A:636:GLU:OE1	2.13	0.48
2:B:494:VAL:HG12	2:B:501:CYS:HB2	1.94	0.48
1:A:154:PHE:HD2	2:B:163:PRO:HB3	1.78	0.48
1:A:510:ARG:HH12	1:A:553:THR:HB	1.79	0.48
1:A:24:ASP:OD1	1:A:25:PHE:N	2.42	0.48
1:A:404:PHE:HE1	1:A:433:ILE:HD12	1.79	0.48
2:B:340:VAL:HA	2:B:343:LEU:HD23	1.95	0.48
1:A:179:TRP:HZ2	2:B:163:PRO:HB2	1.78	0.48
2:B:245:LEU:HD22	2:B:307:ILE:HD11	1.96	0.48
1:A:543:ARG:NH1	1:A:547:GLU:OE1	2.46	0.47
1:A:674:ASN:HD22	8:A:1002:NAG:H61	1.78	0.47
2:B:136:THR:H	2:B:204:ASN:HD21	1.60	0.47
2:B:671:GLU:HG3	2:B:672:ASP:H	1.79	0.47
1:A:248:ARG:NH1	1:A:272:MET:SD	2.87	0.47
1:A:529:ARG:HG2	1:A:530:GLY:H	1.79	0.47
2:B:5:CYS:SG	2:B:40:LEU:HD23	2.54	0.47
2:B:244:HIS:HB2	2:B:304:ILE:HA	1.95	0.47
1:A:243:VAL:HG22	1:A:246:ALA:HB2	1.96	0.47
2:B:311:THR:O	2:B:315:VAL:HG23	2.14	0.47
1:A:869:ILE:HA	1:A:917:SER:HB2	1.96	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:400:GLU:HB2	5:K:1:NAG:H83	1.96	0.47
1:A:472:CYS:HA	1:A:541:TYR:HA	1.97	0.47
1:A:666:LEU:HD11	1:A:693:LEU:HD13	1.97	0.47
2:B:295:MET:O	2:B:299:LEU:HB2	2.15	0.47
2:B:318:TYR:HA	2:B:321:TYR:HB2	1.97	0.47
1:A:57:LEU:HA	1:A:69:PRO:HA	1.96	0.46
2:B:50:ALA:N	2:B:51:PRO:HD3	2.30	0.46
2:B:339:ASN:CG	2:B:340:VAL:H	2.19	0.46
2:B:21:PRO:O	2:B:93:ARG:NH1	2.49	0.46
2:B:249:THR:HG22	2:B:309:ALA:HB3	1.97	0.46
2:B:375:LEU:HD21	2:B:630:THR:HG22	1.97	0.46
3:C:1452:GLY:HA3	3:C:1460:VAL:HG12	1.97	0.46
1:A:505:LYS:HD2	2:B:509:HIS:HD2	1.80	0.46
1:A:510:ARG:HG2	1:A:548:PHE:CD2	2.51	0.46
1:A:124:PRO:HB2	1:A:156:GLN:HG2	1.96	0.46
6:F:4:BMA:H3	6:F:5:MAN:H5	1.98	0.46
1:A:638:ALA:HA	1:A:721:ASN:HD21	1.79	0.46
1:A:36:LEU:HB2	1:A:59:CYS:HB2	1.96	0.46
1:A:248:ARG:HG3	1:A:250:LEU:HD13	1.97	0.46
1:A:154:PHE:CD2	2:B:163:PRO:HB3	2.51	0.46
3:C:1421:ARG:HG2	3:C:1422:ASP:N	2.18	0.46
1:A:415:ASP:OD1	1:A:415:ASP:N	2.46	0.46
2:B:604:CYS:HB2	2:B:605:PRO:HD2	1.98	0.45
1:A:419:TYR:CE1	1:A:439:PRO:HA	2.52	0.45
3:C:1420:PRO:O	3:C:1421:ARG:CB	2.64	0.45
3:C:1444:VAL:HA	3:C:1491:THR:HG22	1.99	0.45
1:A:139:TYR:CZ	1:A:141:PRO:HG3	2.51	0.45
2:B:66:ASP:HB3	2:B:85:PRO:HB3	1.98	0.45
1:A:346:PRO:HA	1:A:358:ILE:HG13	1.98	0.45
6:F:3:BMA:H62	6:F:4:BMA:H2	1.47	0.45
1:A:295:ILE:HB	1:A:316:SER:HB3	1.99	0.45
1:A:464:PRO:O	1:A:517:ARG:NH2	2.50	0.45
2:B:480:PRO:C	2:B:482:GLN:H	2.19	0.45
1:A:24:ASP:HA	1:A:409:LYS:HG2	1.98	0.44
1:A:253:VAL:HB	1:A:267:PHE:HB2	1.98	0.44
1:A:757:ILE:HG23	1:A:760:TRP:HB2	1.98	0.44
3:C:1446:TYR:CZ	3:C:1490:VAL:HG11	2.52	0.44
3:C:1449:ILE:O	3:C:1462:GLU:HA	2.17	0.44
1:A:757:ILE:HD12	1:A:758:PRO:HD2	1.98	0.44
2:B:47:ASP:N	2:B:47:ASP:OD1	2.49	0.44
2:B:456:GLU:HG2	2:B:457:CYS:H	1.81	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:482:GLN:HB3	2:B:484:ASP:H	1.82	0.44
1:A:363:PRO:HA	1:A:404:PHE:O	2.17	0.44
1:A:797:LEU:HB3	1:A:882:ILE:HB	1.99	0.44
1:A:745:ARG:NH2	2:B:591:PRO:HB2	2.33	0.44
1:A:790:PHE:CZ	1:A:889:LEU:HB2	2.53	0.44
1:A:561:TYR:OH	1:A:583:PRO:O	2.20	0.44
1:A:115:ARG:O	1:A:115:ARG:HG2	2.18	0.43
1:A:299:LEU:HD21	2:B:257:ALA:HB3	1.99	0.43
3:C:1490:VAL:HG23	3:C:1498:ALA:HB1	1.98	0.43
1:A:248:ARG:O	1:A:249:THR:HG22	2.19	0.43
1:A:257:ASP:HB3	1:A:260:ASN:O	2.18	0.43
1:A:444:ASN:HB3	1:A:480:LYS:HB3	2.01	0.43
1:A:248:ARG:CZ	8:B:702:NAG:H2	2.48	0.43
2:B:136:THR:O	2:B:140:THR:HG23	2.18	0.43
2:B:524:ASP:OD1	2:B:525:ASP:N	2.52	0.43
1:A:339:ARG:HD2	1:A:364:TYR:CD2	2.53	0.43
1:A:795:LEU:HB3	1:A:884:CYS:HB2	2.00	0.43
2:B:375:LEU:HD22	2:B:633:ARG:HG2	1.99	0.43
2:B:608:CYS:HB3	2:B:655:CYS:HB3	1.86	0.43
1:A:286:ASN:OD1	1:A:286:ASN:N	2.51	0.43
1:A:645:VAL:HG22	1:A:715:LEU:HD22	2.00	0.43
2:B:619:LYS:HD3	2:B:619:LYS:HA	1.82	0.43
2:B:240:ASN:OD1	2:B:240:ASN:N	2.50	0.43
1:A:724:ASP:N	1:A:724:ASP:OD1	2.51	0.43
2:B:320:ASN:ND2	8:B:702:NAG:O7	2.45	0.43
1:A:405:GLY:C	1:A:407:SER:H	2.22	0.43
1:A:797:LEU:HD23	1:A:882:ILE:HD12	2.01	0.43
2:B:308:PHE:HB2	2:B:330:VAL:HG22	2.00	0.43
1:A:154:PHE:O	1:A:175:GLY:HA3	2.18	0.42
2:B:509:HIS:C	2:B:511:SER:H	2.21	0.42
1:A:315:VAL:HG21	1:A:360:ILE:HD13	2.00	0.42
1:A:514:LEU:HA	1:A:541:TYR:CD1	2.54	0.42
1:A:746:GLY:HA2	1:A:779:ILE:O	2.19	0.42
1:A:651:ALA:O	1:A:677:ARG:NH1	2.38	0.42
1:A:403:SER:O	1:A:426:ALA:HA	2.20	0.42
2:B:128:LEU:O	2:B:131:ILE:HG22	2.19	0.42
1:A:65:ARG:HA	1:A:65:ARG:HD3	1.91	0.42
2:B:172:ALA:HA	2:B:175:ASN:O	2.18	0.42
2:B:462:CYS:SG	2:B:466:TRP:HB3	2.60	0.42
1:A:370:LYS:HD3	1:A:394:GLN:HA	2.01	0.42
1:A:514:LEU:HA	1:A:541:TYR:HD1	1.84	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:297:GLU:O	2:B:301:GLN:HG2	2.20	0.42
1:A:108:CYS:HA	1:A:128:CYS:HA	2.00	0.42
1:A:647:ILE:HG22	1:A:713:PHE:CE2	2.55	0.42
2:B:191:LYS:HE2	2:B:280:HIS:NE2	2.35	0.42
2:B:441:ALA:HB1	2:B:455:PHE:CE2	2.53	0.42
2:B:365:GLU:OE1	2:B:365:GLU:N	2.53	0.42
2:B:486:CYS:HB3	2:B:495:CYS:HB3	2.02	0.42
1:A:551:LYS:HA	1:A:551:LYS:HD3	1.58	0.41
1:A:777:GLN:HG2	1:A:779:ILE:HD11	2.02	0.41
1:A:278:PHE:CD1	2:B:258:LEU:HD13	2.55	0.41
2:B:470:GLN:O	2:B:471:CYS:SG	2.78	0.41
3:C:1447:TYR:HB2	3:C:1465:VAL:HG23	2.02	0.41
1:A:438:ARG:O	1:A:440:VAL:HG23	2.21	0.41
1:A:26:PHE:HB2	1:A:37:LEU:HG	2.03	0.41
1:A:741:ALA:H	1:A:786:GLY:CA	2.28	0.41
1:A:121:GLU:HG3	1:A:122:ARG:H	1.86	0.41
1:A:93:TRP:CD1	1:A:111:LEU:HD22	2.55	0.41
2:B:102:ILE:HG23	2:B:397:PHE:HB2	2.02	0.41
2:B:249:THR:HA	2:B:309:ALA:O	2.21	0.41
2:B:473:CYS:HA	2:B:503:CYS:HB2	2.03	0.41
3:C:1463:PHE:HD1	3:C:1463:PHE:HA	1.68	0.41
1:A:869:ILE:HD11	1:A:919:SER:HB3	2.01	0.40
2:B:223:PHE:HB3	2:B:290:PRO:HG2	2.02	0.40
2:B:634:TYR:HD1	2:B:634:TYR:HA	1.76	0.40
3:C:1432:SER:OG	3:C:1474:ILE:O	2.28	0.40
3:C:1448:ARG:O	3:C:1488:TYR:N	2.33	0.40
1:A:463:LEU:N	1:A:464:PRO:HD3	2.37	0.40
1:A:491:LEU:O	1:A:526:THR:HA	2.21	0.40
3:C:1483:TYR:HD1	3:C:1483:TYR:HA	1.74	0.40
1:A:272:MET:SD	2:B:320:ASN:HB3	2.61	0.40
3:C:1427:ALA:H	3:C:1434:LEU:HB3	1.87	0.40

There are no symmetry-related clashes.

## 5.3 Torsion angles

### 5.3.1 Protein backbone

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	920/959 (96%)	862 (94%)	56 (6%)	2 (0%)	44	72
2	B	688/692 (99%)	607 (88%)	78 (11%)	3 (0%)	30	61
3	C	91/98 (93%)	80 (88%)	9 (10%)	2 (2%)	5	28
All	All	1699/1749 (97%)	1549 (91%)	143 (8%)	7 (0%)	30	61

All (7) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	451	PRO
3	C	1421	ARG
2	B	162	SER
2	B	163	PRO
2	B	49	CYS
3	C	1420	PRO
1	A	440	VAL

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

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	784/813 (96%)	745 (95%)	39 (5%)	20	49
2	B	612/614 (100%)	583 (95%)	29 (5%)	22	51
3	C	78/81 (96%)	70 (90%)	8 (10%)	6	22
All	All	1474/1508 (98%)	1398 (95%)	76 (5%)	19	47

All (76) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	6	ASP
1	A	58	LYS
1	A	79	ASP

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
1	A	134	THR
1	A	155	CYS
1	A	190	GLU
1	A	249	THR
1	A	260	ASN
1	A	261	MET
1	A	275	TYR
1	A	283	THR
1	A	299	LEU
1	A	321	ARG
1	A	329	THR
1	A	331	LEU
1	A	351	ASP
1	A	430	ASP
1	A	452	SER
1	A	461	CYS
1	A	463	LEU
1	A	472	CYS
1	A	474	ASN
1	A	489	ARG
1	A	532	LEU
1	A	548	PHE
1	A	551	LYS
1	A	567	THR
1	A	650	GLN
1	A	674	ASN
1	A	724	ASP
1	A	729	VAL
1	A	757	ILE
1	A	768	THR
1	A	806	ASN
1	A	817	ASP
1	A	833	ILE
1	A	874	CYS
1	A	916	HIS
1	A	933	TYR
2	B	26	CYS
2	B	44	LEU
2	B	47	ASP
2	B	80	VAL
2	B	90	LEU
2	B	116	TYR

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Mol	Chain	Res	Type
2	B	127	ASP
2	B	138	LEU
2	B	149	LEU
2	B	165	MET
2	B	198	ASP
2	B	207	VAL
2	B	215	ASN
2	B	217	ASP
2	B	220	GLU
2	B	311	THR
2	B	336	ASP
2	B	342	GLN
2	B	344	ILE
2	B	454	THR
2	B	466	TRP
2	B	478	TYR
2	B	494	VAL
2	B	508	CYS
2	B	509	HIS
2	B	528	CYS
2	B	589	ILE
2	B	608	CYS
2	B	637	ASP
3	C	1419	VAL
3	C	1423	LEU
3	C	1463	PHE
3	C	1469	LYS
3	C	1483	TYR
3	C	1484	THR
3	C	1487	VAL
3	C	1503	ILE

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (2) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	55	GLN
2	B	509	HIS

### 5.3.3 RNA

There are no RNA molecules in this entry.

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

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

## 5.5 Carbohydrates [i](#)

28 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
4	NAG	D	1	4,1	14,14,15	0.39	0	17,19,21	0.45	0
4	NAG	D	2	4	14,14,15	0.23	0	17,19,21	0.49	0
4	BMA	D	3	4	11,11,12	0.90	0	15,15,17	1.04	1 (6%)
4	MAN	D	4	4	11,11,12	0.68	0	15,15,17	1.03	2 (13%)
5	NAG	E	1	5,1	14,14,15	1.22	1 (7%)	17,19,21	1.75	4 (23%)
5	NAG	E	2	5	14,14,15	0.21	0	17,19,21	0.39	0
6	NAG	F	1	6,1	14,14,15	0.35	0	17,19,21	0.42	0
6	NAG	F	2	6	14,14,15	0.23	0	17,19,21	0.49	0
6	BMA	F	3	6	11,11,12	0.66	0	15,15,17	0.74	0
6	BMA	F	4	6	11,11,12	1.19	2 (18%)	15,15,17	1.07	1 (6%)
6	MAN	F	5	6	11,11,12	1.01	1 (9%)	15,15,17	1.49	4 (26%)
6	MAN	F	6	6	11,11,12	0.78	0	15,15,17	0.94	2 (13%)
4	NAG	G	1	4,1	14,14,15	0.24	0	17,19,21	0.47	0
4	NAG	G	2	4	14,14,15	0.27	0	17,19,21	0.39	0
4	BMA	G	3	4	11,11,12	0.72	0	15,15,17	0.86	1 (6%)
4	MAN	G	4	4	11,11,12	0.58	0	15,15,17	1.01	2 (13%)
5	NAG	H	1	5,1	14,14,15	0.30	0	17,19,21	0.36	0
5	NAG	H	2	5	14,14,15	0.26	0	17,19,21	0.40	0
5	NAG	I	1	5,1	14,14,15	0.39	0	17,19,21	0.37	0
5	NAG	I	2	5	14,14,15	0.65	0	17,19,21	0.90	1 (5%)
7	NAG	J	1	7,1	14,14,15	0.27	0	17,19,21	0.47	0
7	NAG	J	2	7	14,14,15	0.42	0	17,19,21	0.49	0
7	BMA	J	3	7	11,11,12	0.95	1 (9%)	15,15,17	1.30	2 (13%)
5	NAG	K	1	2,5	14,14,15	0.48	0	17,19,21	0.96	1 (5%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
5	NAG	K	2	5	14,14,15	0.38	0	17,19,21	1.08	2 (11%)
7	NAG	L	1	7,2	14,14,15	0.23	0	17,19,21	0.42	0
7	NAG	L	2	7	14,14,15	0.78	1 (7%)	17,19,21	1.22	1 (5%)
7	BMA	L	3	7	11,11,12	0.83	0	15,15,17	1.12	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
4	NAG	D	1	4,1	-	2/6/23/26	0/1/1/1
4	NAG	D	2	4	-	4/6/23/26	0/1/1/1
4	BMA	D	3	4	-	0/2/19/22	0/1/1/1
4	MAN	D	4	4	-	0/2/19/22	0/1/1/1
5	NAG	E	1	5,1	-	6/6/23/26	0/1/1/1
5	NAG	E	2	5	-	4/6/23/26	0/1/1/1
6	NAG	F	1	6,1	-	0/6/23/26	0/1/1/1
6	NAG	F	2	6	-	0/6/23/26	0/1/1/1
6	BMA	F	3	6	-	1/2/19/22	0/1/1/1
6	BMA	F	4	6	-	1/2/19/22	0/1/1/1
6	MAN	F	5	6	-	0/2/19/22	0/1/1/1
6	MAN	F	6	6	-	0/2/19/22	0/1/1/1
4	NAG	G	1	4,1	-	1/6/23/26	0/1/1/1
4	NAG	G	2	4	-	2/6/23/26	0/1/1/1
4	BMA	G	3	4	-	1/2/19/22	0/1/1/1
4	MAN	G	4	4	-	0/2/19/22	0/1/1/1
5	NAG	H	1	5,1	-	2/6/23/26	0/1/1/1
5	NAG	H	2	5	-	0/6/23/26	0/1/1/1
5	NAG	I	1	5,1	-	0/6/23/26	0/1/1/1
5	NAG	I	2	5	-	2/6/23/26	0/1/1/1
7	NAG	J	1	7,1	-	0/6/23/26	0/1/1/1
7	NAG	J	2	7	-	0/6/23/26	0/1/1/1
7	BMA	J	3	7	-	0/2/19/22	0/1/1/1
5	NAG	K	1	2,5	-	2/6/23/26	0/1/1/1
5	NAG	K	2	5	-	2/6/23/26	0/1/1/1
7	NAG	L	1	7,2	-	2/6/23/26	0/1/1/1
7	NAG	L	2	7	-	1/6/23/26	0/1/1/1
7	BMA	L	3	7	-	1/2/19/22	0/1/1/1

All (6) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	E	1	NAG	O5-C1	-4.36	1.36	1.43
6	F	5	MAN	C1-C2	2.77	1.58	1.52
7	L	2	NAG	O5-C1	2.73	1.48	1.43
7	J	3	BMA	C1-C2	2.39	1.57	1.52
6	F	4	BMA	C4-C5	2.34	1.58	1.53
6	F	4	BMA	O5-C5	2.15	1.47	1.43

All (25) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	E	1	NAG	C2-N2-C7	4.77	129.29	122.90
7	L	2	NAG	C1-O5-C5	4.71	118.50	112.19
5	E	1	NAG	C3-C4-C5	3.54	116.66	110.23
5	K	2	NAG	C1-O5-C5	3.46	116.82	112.19
5	I	2	NAG	C1-O5-C5	3.45	116.81	112.19
6	F	5	MAN	C1-O5-C5	3.12	116.36	112.19
5	K	1	NAG	C1-O5-C5	3.03	116.25	112.19
7	L	3	BMA	C1-O5-C5	2.97	116.16	112.19
6	F	5	MAN	C1-C2-C3	2.85	113.79	109.64
4	D	4	MAN	C1-O5-C5	2.83	115.98	112.19
6	F	4	BMA	C1-O5-C5	2.77	115.90	112.19
4	G	4	MAN	C1-O5-C5	2.61	115.68	112.19
7	J	3	BMA	C1-O5-C5	2.59	115.66	112.19
4	D	3	BMA	O3-C3-C2	2.55	115.25	110.05
5	E	1	NAG	C4-C3-C2	2.48	114.65	111.02
5	E	1	NAG	C1-C2-N2	2.47	114.33	110.43
6	F	5	MAN	O2-C2-C3	-2.46	105.05	110.15
4	G	3	BMA	O2-C2-C3	-2.43	105.11	110.15
4	G	4	MAN	O2-C2-C3	-2.23	105.54	110.15
7	J	3	BMA	C1-C2-C3	2.22	112.88	109.64
6	F	6	MAN	O2-C2-C3	-2.13	105.74	110.15
5	K	2	NAG	C3-C4-C5	2.09	114.02	110.23
4	D	4	MAN	O2-C2-C3	-2.07	105.86	110.15
6	F	6	MAN	C1-O5-C5	2.06	114.95	112.19
6	F	5	MAN	O5-C1-C2	2.03	115.62	110.79

There are no chirality outliers.

All (34) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	D	1	NAG	O5-C5-C6-O6

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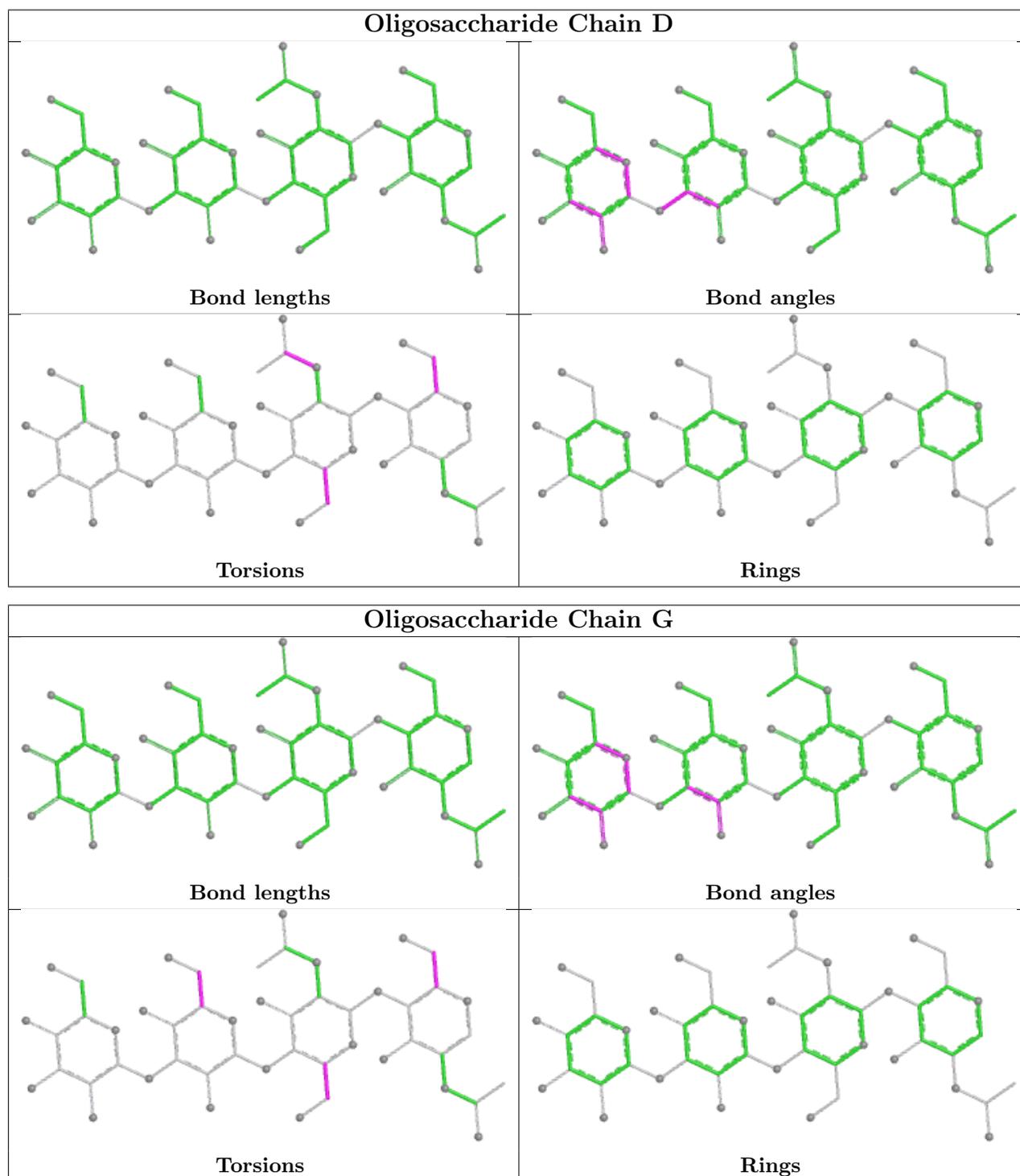
Mol	Chain	Res	Type	Atoms
4	G	2	NAG	O5-C5-C6-O6
5	H	1	NAG	O5-C5-C6-O6
5	E	1	NAG	O5-C5-C6-O6
4	D	2	NAG	O5-C5-C6-O6
7	L	1	NAG	O5-C5-C6-O6
5	E	2	NAG	O5-C5-C6-O6
5	K	1	NAG	O5-C5-C6-O6
4	G	2	NAG	C4-C5-C6-O6
5	H	1	NAG	C4-C5-C6-O6
5	E	1	NAG	C4-C5-C6-O6
4	D	1	NAG	C4-C5-C6-O6
7	L	1	NAG	C4-C5-C6-O6
4	D	2	NAG	C4-C5-C6-O6
5	K	1	NAG	C4-C5-C6-O6
4	D	2	NAG	C8-C7-N2-C2
4	D	2	NAG	O7-C7-N2-C2
5	E	1	NAG	C8-C7-N2-C2
5	E	1	NAG	O7-C7-N2-C2
5	E	2	NAG	C8-C7-N2-C2
5	E	2	NAG	O7-C7-N2-C2
5	I	2	NAG	C8-C7-N2-C2
5	I	2	NAG	O7-C7-N2-C2
5	K	2	NAG	C8-C7-N2-C2
5	K	2	NAG	O7-C7-N2-C2
4	G	3	BMA	O5-C5-C6-O6
5	E	2	NAG	C4-C5-C6-O6
7	L	3	BMA	O5-C5-C6-O6
6	F	3	BMA	O5-C5-C6-O6
6	F	4	BMA	O5-C5-C6-O6
4	G	1	NAG	O5-C5-C6-O6
5	E	1	NAG	C1-C2-N2-C7
5	E	1	NAG	C3-C2-N2-C7
7	L	2	NAG	C4-C5-C6-O6

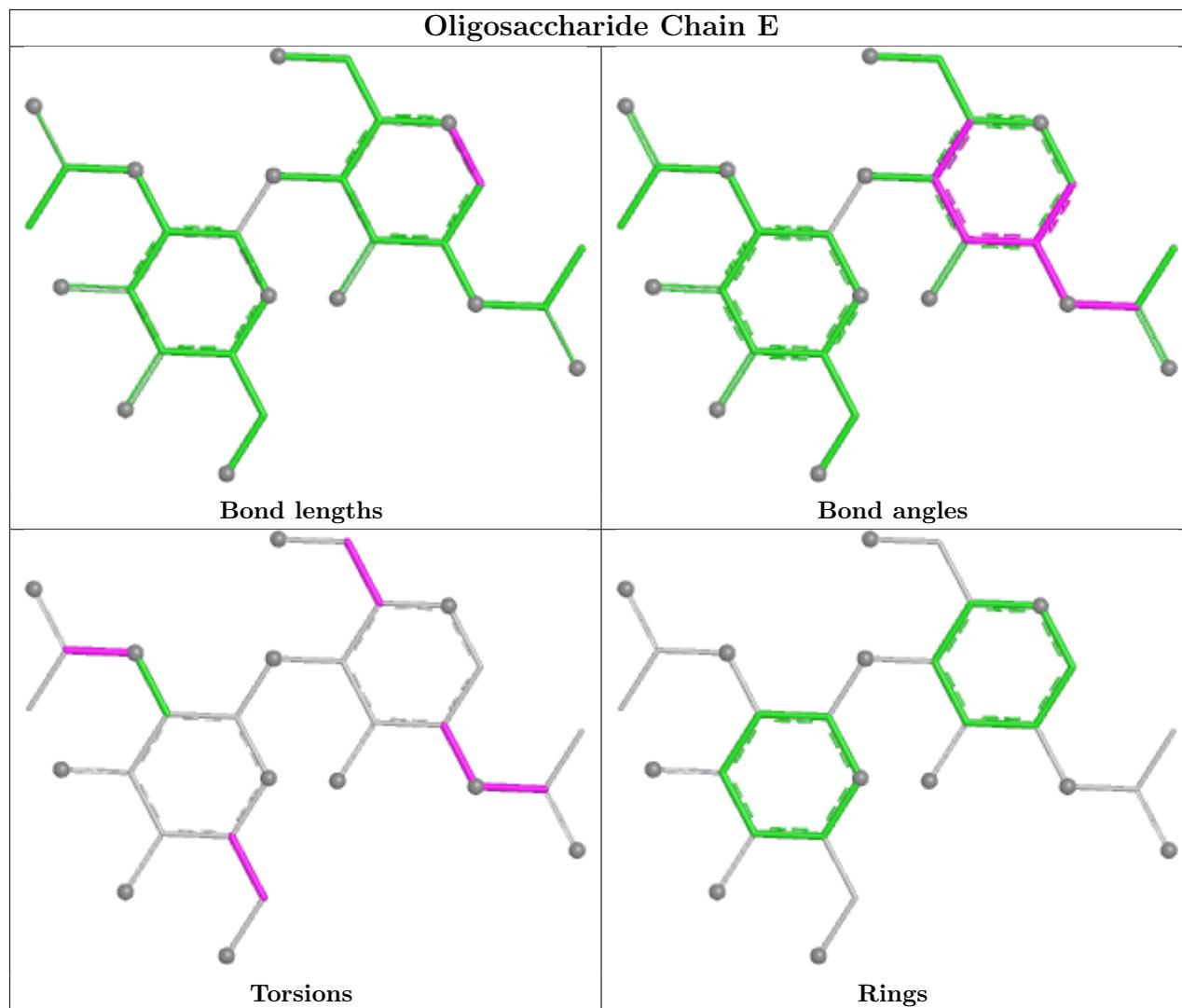
There are no ring outliers.

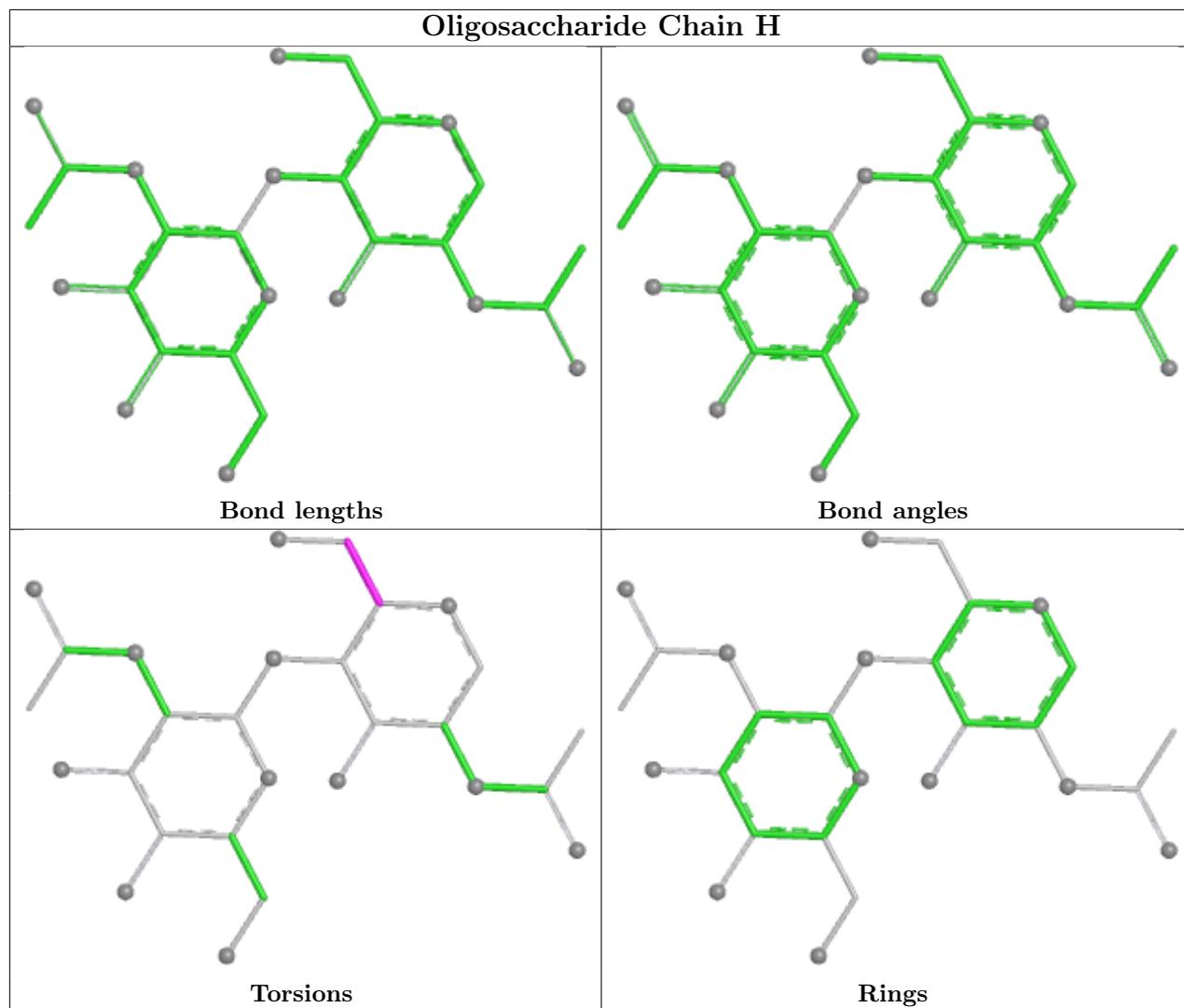
4 monomers are involved in 3 short contacts:

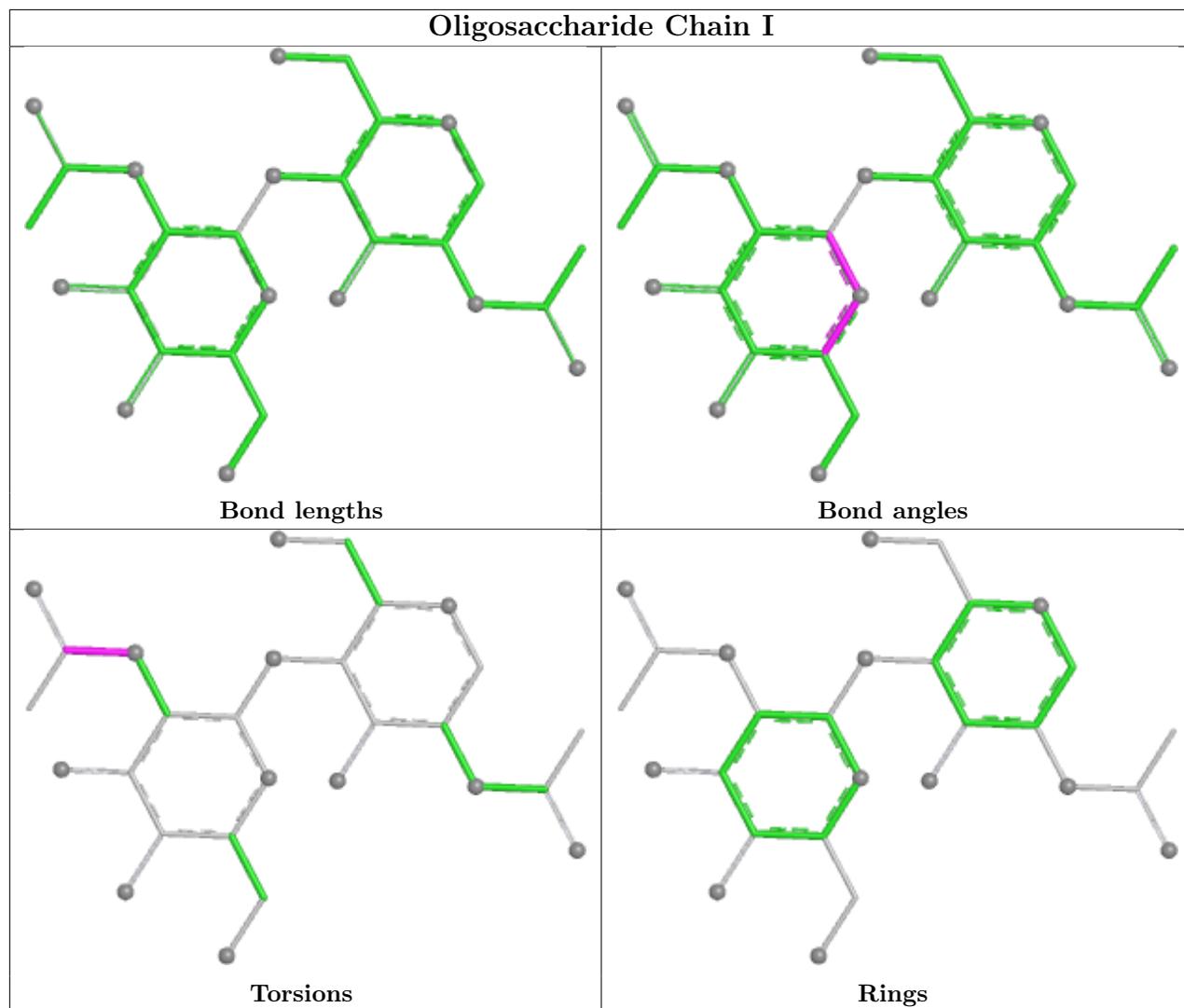
Mol	Chain	Res	Type	Clashes	Symm-Clashes
6	F	3	BMA	1	0
6	F	5	MAN	1	0
6	F	4	BMA	2	0
5	K	1	NAG	1	0

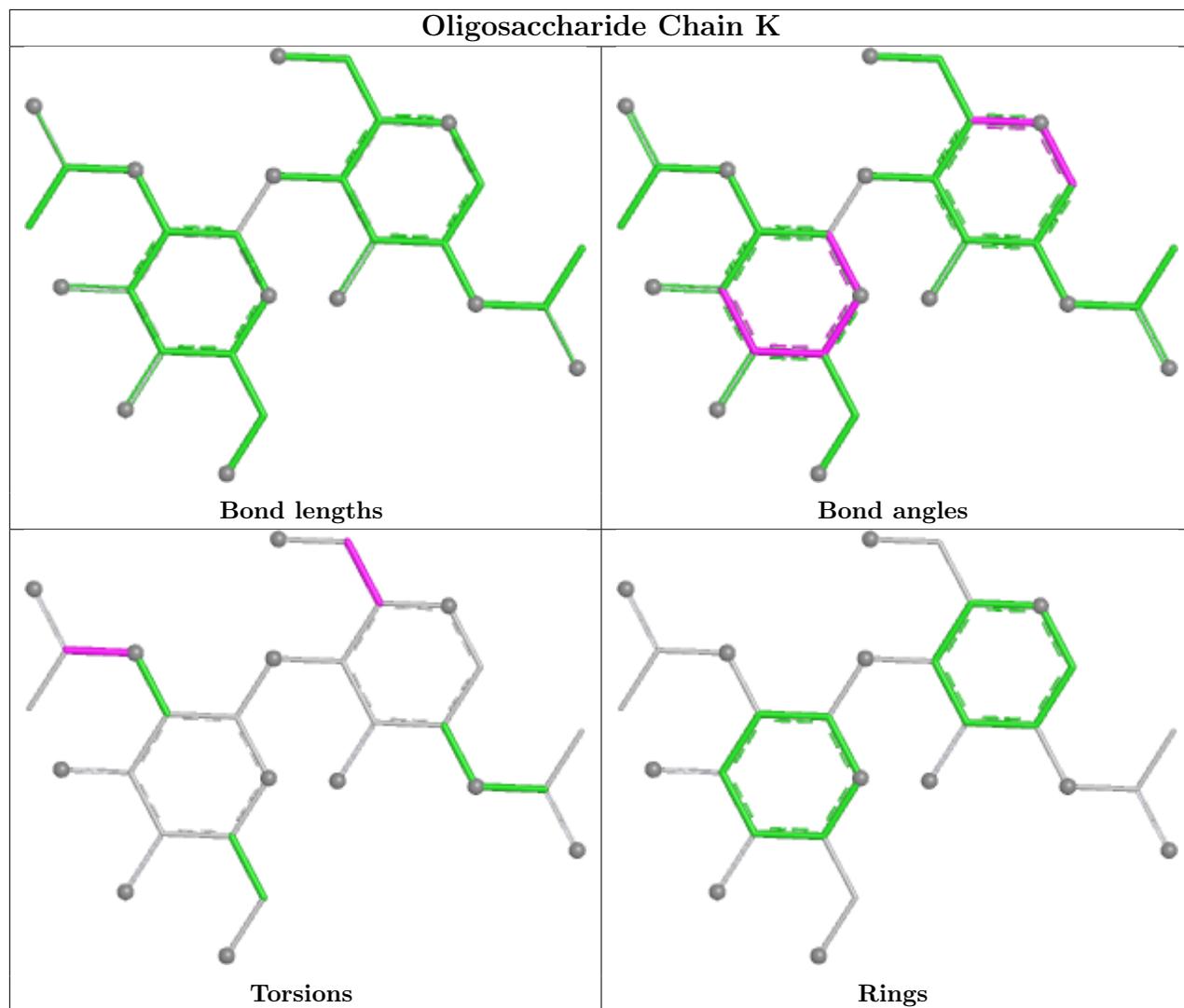
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for oligosaccharide.

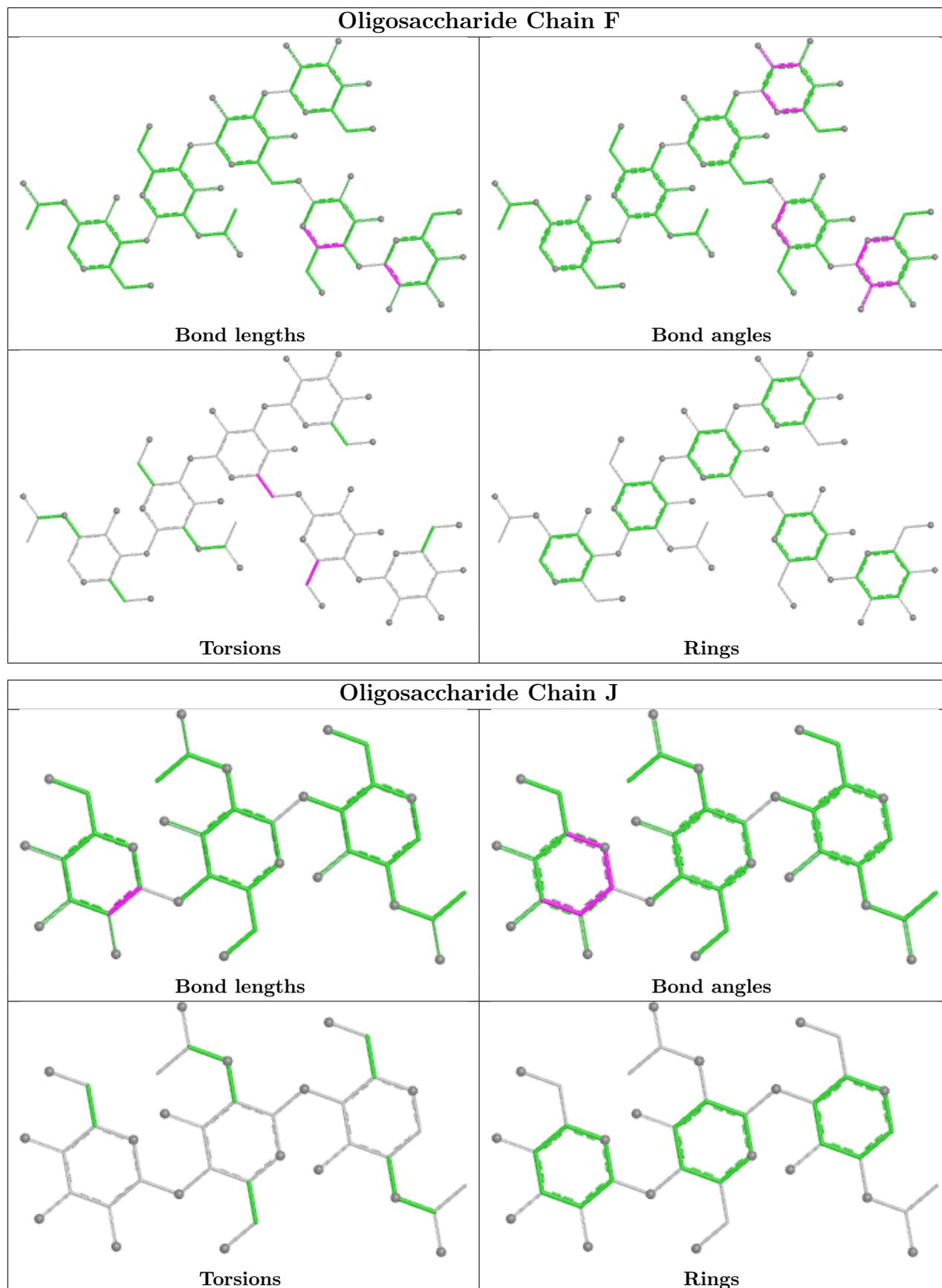


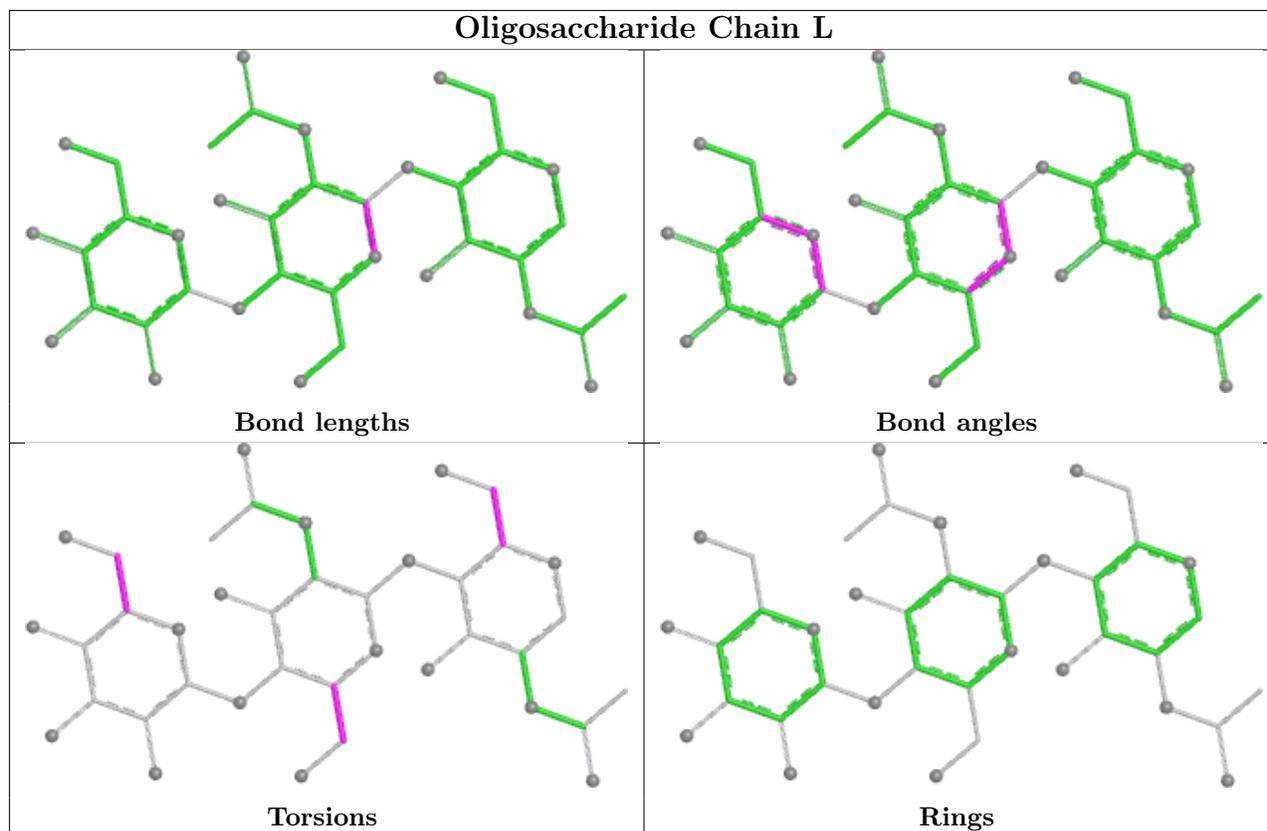












## 5.6 Ligand geometry [i](#)

Of 13 ligands modelled in this entry, 8 are monoatomic - leaving 5 for Mogul analysis.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\# Z  > 2$	Counts	RMSZ	$\# Z  > 2$
8	NAG	B	701	2	14,14,15	0.76	1 (7%)	17,19,21	1.23	1 (5%)
8	NAG	B	702	2	14,14,15	0.35	0	17,19,21	0.62	0
8	NAG	A	1001	1	14,14,15	0.27	0	17,19,21	0.46	0
8	NAG	A	1002	1	14,14,15	0.85	1 (7%)	17,19,21	1.22	1 (5%)
8	NAG	A	1003	1	14,14,15	0.27	0	17,19,21	0.53	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
8	NAG	B	701	2	-	1/6/23/26	0/1/1/1
8	NAG	B	702	2	-	2/6/23/26	0/1/1/1
8	NAG	A	1001	1	-	2/6/23/26	0/1/1/1
8	NAG	A	1002	1	-	1/6/23/26	0/1/1/1
8	NAG	A	1003	1	-	1/6/23/26	0/1/1/1

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
8	A	1002	NAG	O5-C1	2.99	1.48	1.43
8	B	701	NAG	O5-C1	2.70	1.48	1.43

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
8	B	701	NAG	C1-O5-C5	4.84	118.68	112.19
8	A	1002	NAG	C1-O5-C5	4.80	118.62	112.19

There are no chirality outliers.

All (7) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
8	A	1001	NAG	O5-C5-C6-O6
8	A	1001	NAG	C4-C5-C6-O6
8	B	702	NAG	O5-C5-C6-O6
8	B	702	NAG	C4-C5-C6-O6
8	B	701	NAG	O5-C5-C6-O6
8	A	1002	NAG	C4-C5-C6-O6
8	A	1003	NAG	O5-C5-C6-O6

There are no ring outliers.

2 monomers are involved in 3 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
8	B	702	NAG	2	0
8	A	1002	NAG	1	0

## 5.7 Other polymers [i](#)

There are no such residues in this entry.

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

There are no chain breaks in this entry.

## 6 Fit of model and data

### 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	924/959 (96%)	-0.15	11 (1%) 76 64	48, 83, 135, 155	0
2	B	690/692 (99%)	0.16	26 (3%) 44 33	50, 96, 190, 224	1 (0%)
3	C	93/98 (94%)	0.88	12 (12%) 9 9	70, 186, 307, 319	0
All	All	1707/1749 (97%)	0.03	49 (2%) 54 39	48, 90, 187, 319	1 (0%)

All (49) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
3	C	1505	ILE	4.0
2	B	677	SER	3.7
1	A	550	ASP	3.7
3	C	1428	ALA	3.6
2	B	37	ARG	3.5
2	B	460	CYS	3.5
1	A	835	ILE	3.5
2	B	36	PRO	3.4
2	B	499	GLY	3.3
2	B	167	ILE	3.2
2	B	19	VAL	3.1
2	B	453	GLY	3.0
2	B	35	SER	2.9
2	B	674	SER	2.9
2	B	459	VAL	2.8
2	B	33	LEU	2.8
3	C	1426	VAL	2.8
2	B	443	PRO	2.7
1	A	571	THR	2.7
3	C	1432	SER	2.7
2	B	168	SER	2.6
3	C	1420	PRO	2.6
3	C	1425	VAL	2.6

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Mol	Chain	Res	Type	RSRZ
1	A	463	LEU	2.5
3	C	1433	LEU	2.4
1	A	833	ILE	2.3
2	B	340	VAL	2.3
2	B	10	VAL	2.3
2	B	507	VAL	2.3
1	A	666	LEU	2.3
1	A	670	PHE	2.2
3	C	1503	ILE	2.2
2	B	455	PHE	2.2
3	C	1442	VAL	2.2
1	A	568	ALA	2.1
1	A	906	GLU	2.1
2	B	509	HIS	2.1
3	C	1423	LEU	2.1
2	B	637	ASP	2.1
1	A	955	ILE	2.1
3	C	1449	ILE	2.1
2	B	31	LEU	2.1
2	B	646	LYS	2.1
2	B	638	GLU	2.1
2	B	481	SER	2.0
1	A	461	CYS	2.0
2	B	678	ILE	2.0
3	C	1427	ALA	2.0
2	B	508	CYS	2.0

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

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

## 6.3 Carbohydrates [\(i\)](#)

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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å <sup>2</sup> )	Q<0.9
4	MAN	D	4	11/12	0.34	0.10	157,165,170,173	0
7	BMA	J	3	11/12	0.37	0.13	160,166,175,175	0

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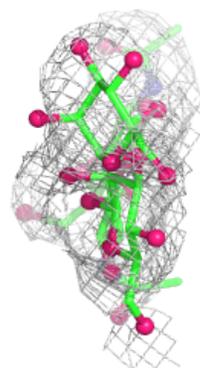
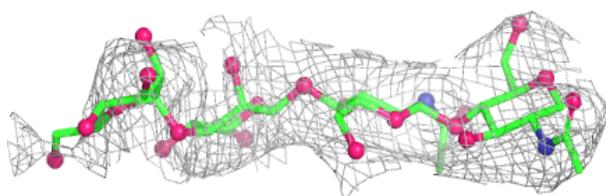
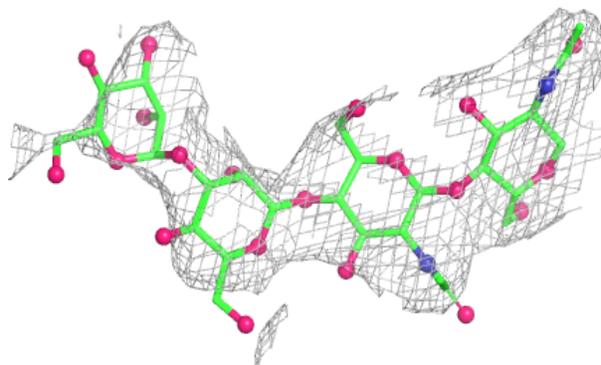
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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors( $\text{\AA}^2$ )	Q<0.9
4	MAN	G	4	11/12	0.45	0.12	144,152,158,162	0
7	NAG	J	2	14/15	0.49	0.13	121,137,156,169	0
4	BMA	G	3	11/12	0.53	0.13	145,147,159,167	0
4	NAG	G	2	14/15	0.60	0.14	122,138,152,159	0
5	NAG	H	2	14/15	0.60	0.11	126,135,138,141	0
4	BMA	D	3	11/12	0.62	0.09	140,150,154,161	0
5	NAG	I	2	14/15	0.64	0.11	137,144,154,156	0
5	NAG	E	2	14/15	0.66	0.12	127,136,146,150	0
6	MAN	F	6	11/12	0.67	0.10	109,121,135,136	0
5	NAG	K	2	14/15	0.73	0.14	134,138,153,158	0
7	BMA	L	3	11/12	0.74	0.11	103,112,118,119	0
5	NAG	I	1	14/15	0.75	0.11	107,127,143,146	0
6	BMA	F	4	11/12	0.75	0.12	90,106,127,128	0
5	NAG	H	1	14/15	0.76	0.11	111,127,138,141	0
5	NAG	E	1	14/15	0.80	0.10	101,119,128,137	0
5	NAG	K	1	14/15	0.83	0.12	91,117,137,141	0
4	NAG	G	1	14/15	0.85	0.11	108,126,140,148	0
6	MAN	F	5	11/12	0.85	0.10	100,107,116,117	0
6	BMA	F	3	11/12	0.85	0.07	88,95,111,122	0
4	NAG	D	2	14/15	0.87	0.09	100,112,117,135	0
7	NAG	L	2	14/15	0.88	0.14	96,111,123,123	0
7	NAG	J	1	14/15	0.92	0.07	76,100,118,120	0
4	NAG	D	1	14/15	0.94	0.09	75,86,101,106	0
6	NAG	F	2	14/15	0.96	0.07	47,62,87,94	0
7	NAG	L	1	14/15	0.96	0.07	75,100,107,107	0
6	NAG	F	1	14/15	0.97	0.06	45,60,89,90	0

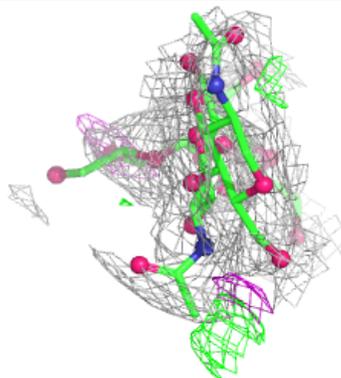
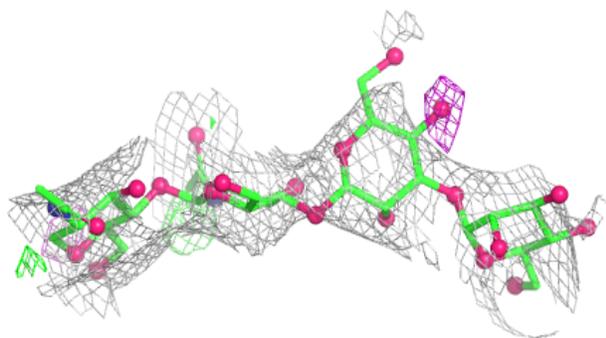
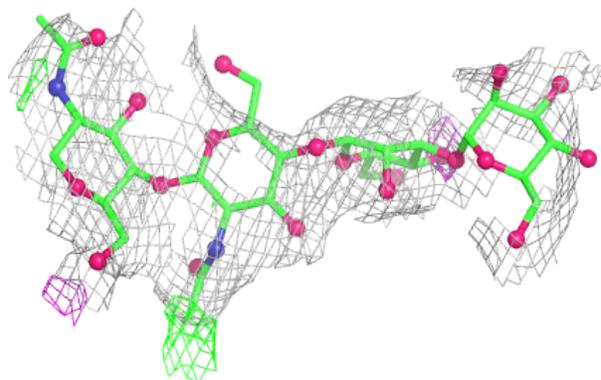
The following is a graphical depiction of the model fit to experimental electron density for oligosaccharide. Each fit is shown from different orientation to approximate a three-dimensional view.

**Electron density around Chain D:**

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

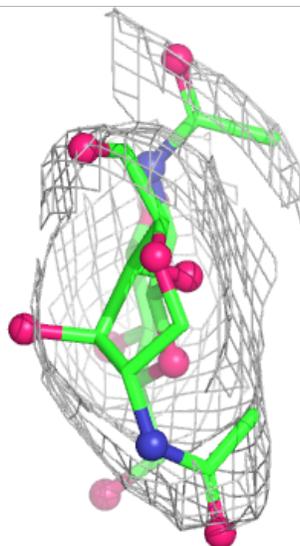
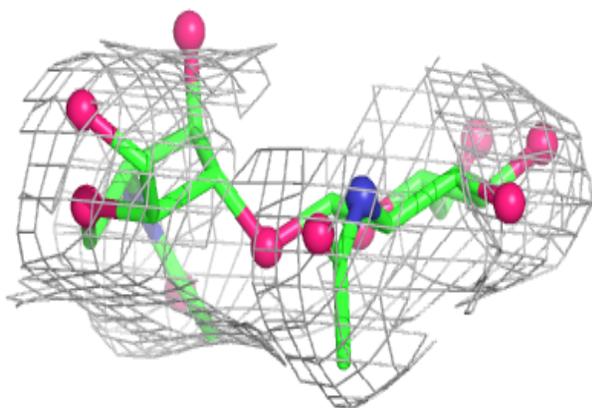
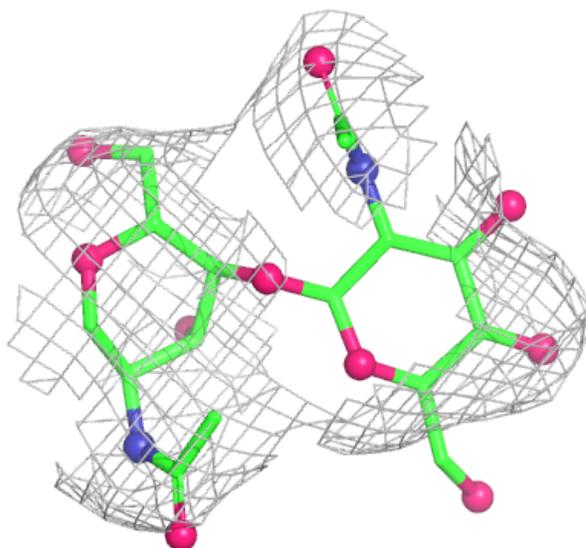
**Electron density around Chain G:**

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



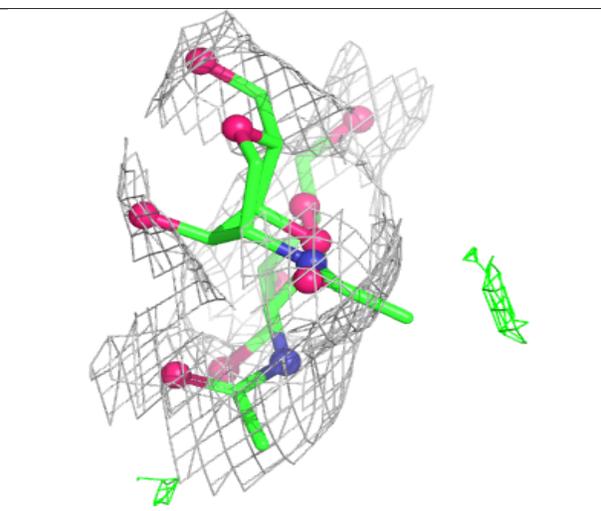
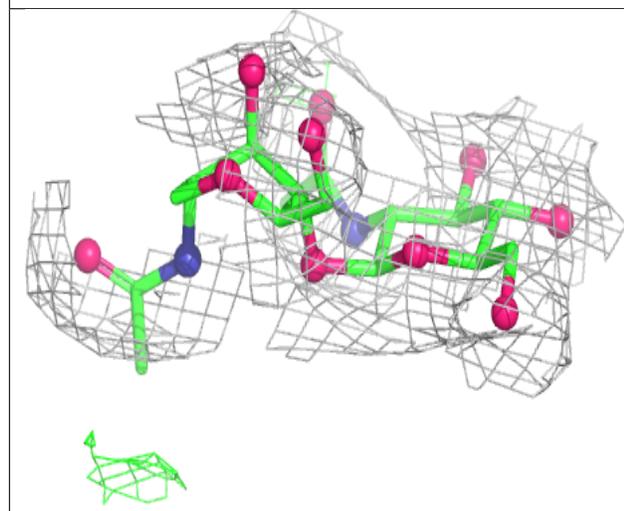
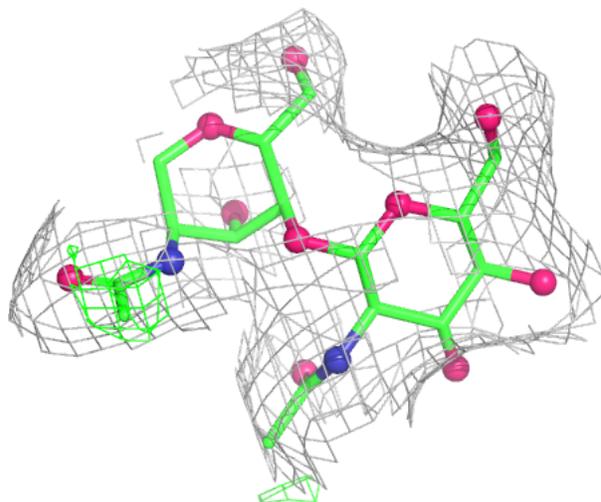
**Electron density around Chain E:**

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



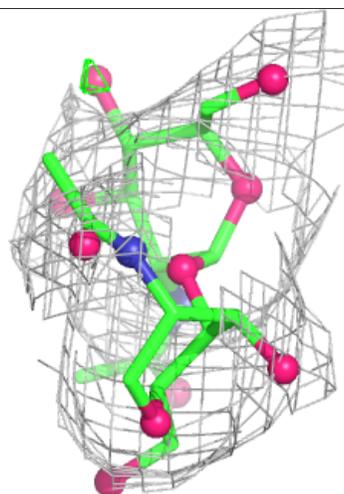
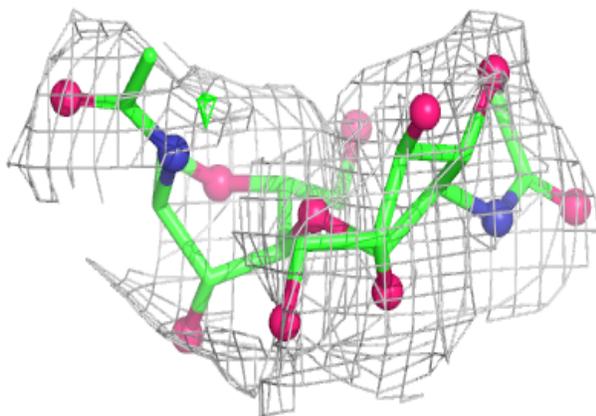
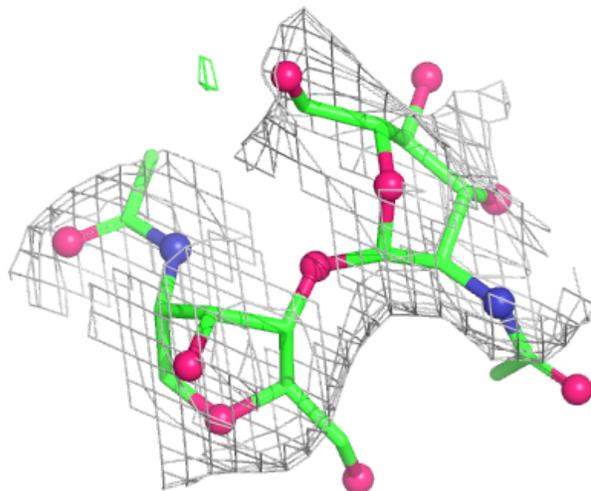
**Electron density around Chain H:**

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



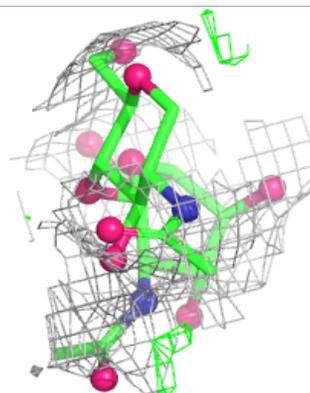
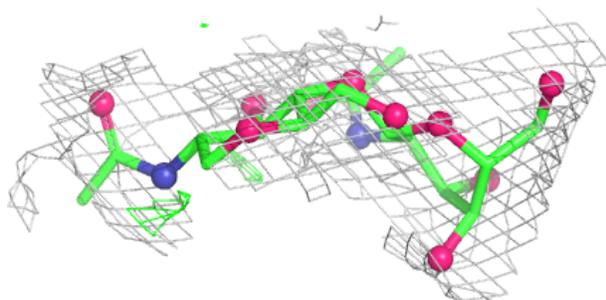
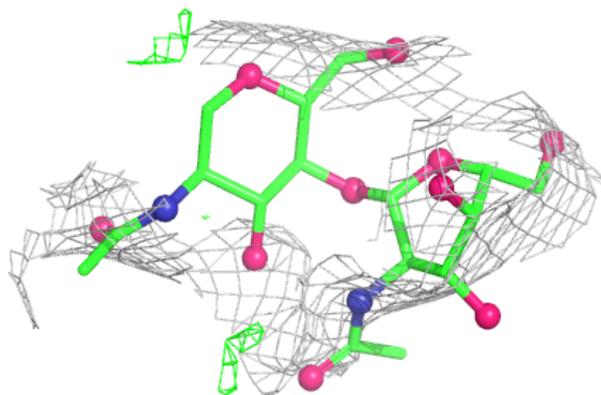
**Electron density around Chain I:**

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

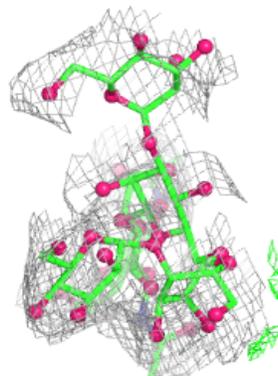
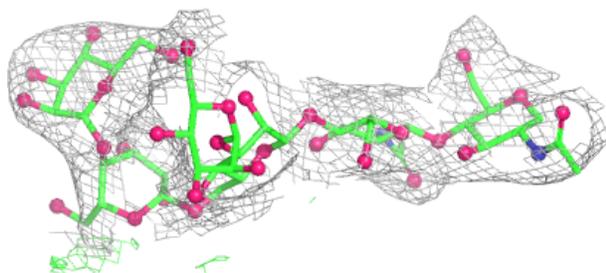
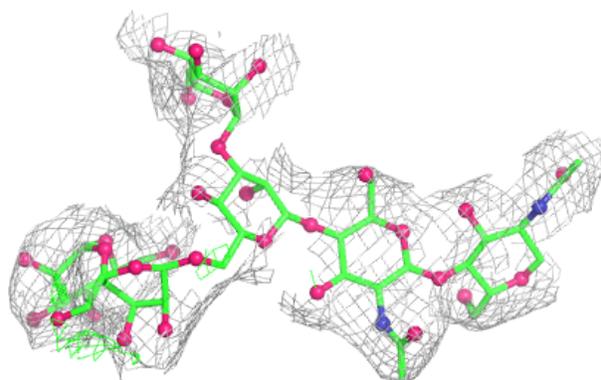


**Electron density around Chain K:**

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

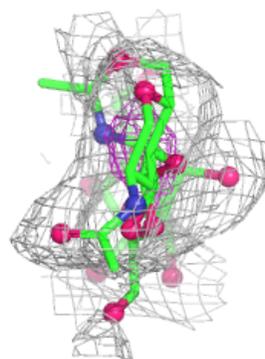
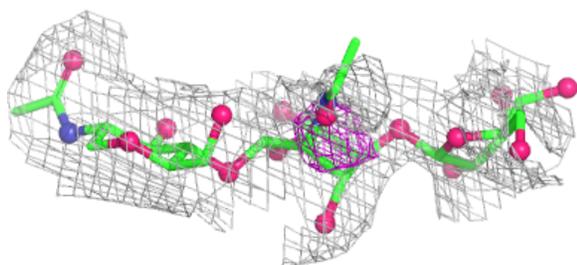
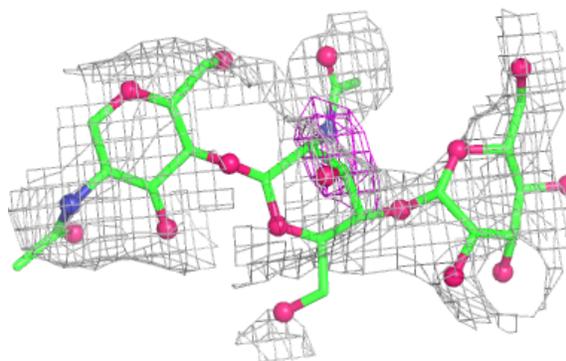
**Electron density around Chain F:**

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

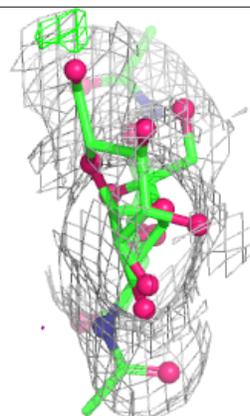
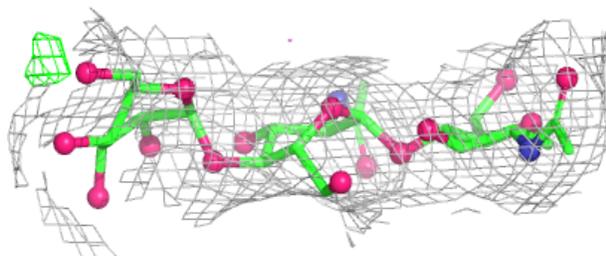
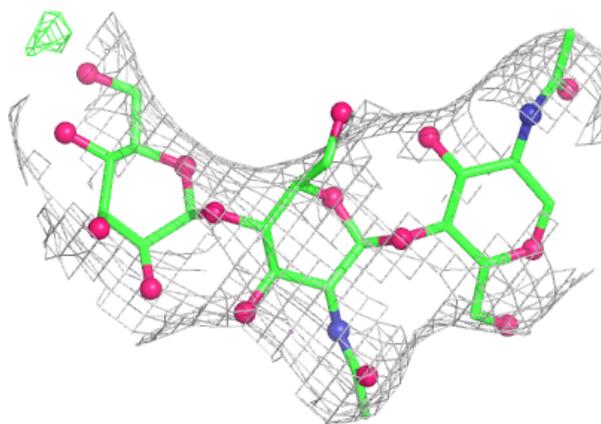


**Electron density around Chain J:**

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

**Electron density around Chain L:**

$2mF_o-DF_c$  (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
8	NAG	A	1002	14/15	0.58	0.11	164,180,187,187	0
8	NAG	A	1001	14/15	0.63	0.12	143,162,169,172	0
8	NAG	B	701	14/15	0.64	0.13	101,128,137,148	0
8	NAG	A	1003	14/15	0.77	0.11	93,108,117,120	0
8	NAG	B	702	14/15	0.87	0.09	80,95,106,114	0
9	MN	A	1004	1/1	0.92	0.08	96,96,96,96	0
9	MN	A	1005	1/1	0.95	0.06	84,84,84,84	0
9	MN	A	1006	1/1	0.97	0.09	119,119,119,119	0
9	MN	B	704	1/1	0.97	0.05	81,81,81,81	0
9	MN	A	1007	1/1	0.98	0.09	114,114,114,114	0
9	MN	A	1008	1/1	0.99	0.03	92,92,92,92	0
9	MN	B	705	1/1	0.99	0.02	55,55,55,55	0
9	MN	B	703	1/1	1.00	0.02	57,57,57,57	0

## 6.5 Other polymers [i](#)

There are no such residues in this entry.