



wwPDB X-ray Structure Validation Summary Report ⓘ

Mar 8, 2026 – 04:46 PM UTC

PDB ID : 1VBO / pdb_00001vbo
Title : Crystal structure of artocarpin-mannotriose complex
Authors : Jeyaprakash, A.A.; Srivastav, A.; Surolia, A.; Vijayan, M.
Deposited on : 2004-02-28
Resolution : 2.35 Å(reported)

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

We welcome your comments at validation@mail.wwpdb.org

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>.

The following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

MolProbity	:	4-5-2 with Phenix2.0
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	2.0
EDS	:	3.0
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4	:	9.0.010 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.49

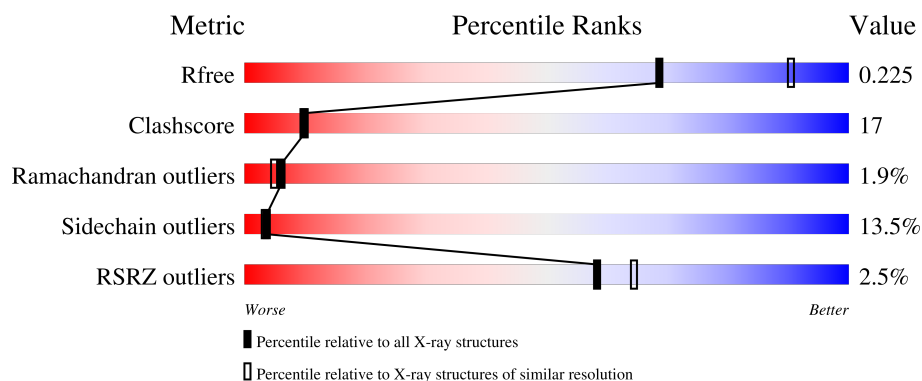
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.35 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}	180053	1596 (2.36-2.36)
Clashscore	190562	1663 (2.36-2.36)
Ramachandran outliers	187476	1646 (2.36-2.36)
Sidechain outliers	187428	1646 (2.36-2.36)
RSRZ outliers	180081	1598 (2.36-2.36)

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 ≥ 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	149	9% 64% 27% 7% .
1	B	149	9% 65% 27% 6% .
1	C	149	74% 17% 6% .
1	D	149	66% 23% 7% 5%
1	E	149	3% 61% 28% 9% .

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Mol	Chain	Length	Quality of chain
1	F	149	
1	G	149	
1	H	149	
2	I	3	
2	J	3	
2	K	3	
2	L	3	
2	M	3	
2	N	3	

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
1	AYA	A	1	X	-	-	-
1	AYA	C	1	X	-	-	-
1	AYA	D	1	X	-	-	-
1	AYA	E	1	X	-	-	-
1	AYA	F	1	X	-	-	-
1	AYA	G	1	X	-	-	-
1	AYA	H	1	X	-	-	-
2	MAN	I	1	X	-	-	-
2	MAN	J	1	X	-	-	-
2	MAN	K	1	X	-	-	-
3	MAN	F	2405	X	-	-	-

2 Entry composition [i](#)

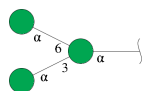
There are 4 unique types of molecules in this entry. The entry contains 9846 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 artocarpin.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	149	Total	C	N	O	S	0	0	0
			1141	734	184	222	1			
1	B	149	Total	C	N	O	S	0	0	0
			1141	734	184	222	1			
1	C	149	Total	C	N	O	S	0	0	0
			1141	734	184	222	1			
1	D	149	Total	C	N	O	S	0	0	0
			1141	734	184	222	1			
1	E	149	Total	C	N	O	S	0	0	0
			1141	734	184	222	1			
1	F	149	Total	C	N	O	S	0	0	0
			1141	734	184	222	1			
1	G	149	Total	C	N	O	S	0	0	0
			1141	734	184	222	1			
1	H	149	Total	C	N	O	S	0	0	0
			1141	734	184	222	1			

- Molecule 2 is an oligosaccharide called alpha-D-mannopyranose-(1-3)-[alpha-D-mannopyranose-(1-6)]alpha-D-mannopyranose.



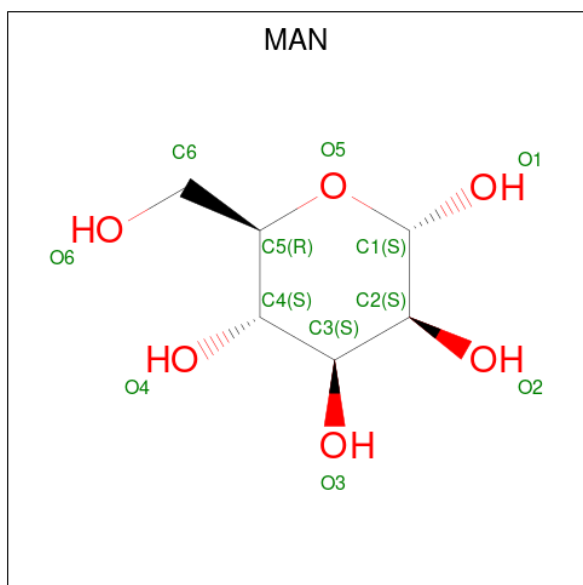
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf	Trace
2	I	3	Total	C	O	0	0	0
			34	18	16			
2	J	3	Total	C	O	0	0	0
			34	18	16			
2	K	3	Total	C	O	0	0	0
			34	18	16			
2	L	3	Total	C	O	0	0	0
			34	18	16			

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Mol	Chain	Residues	Atoms			ZeroOcc	AltConf	Trace
2	M	3	Total	C	O	0	0	0
			34	18	16			
2	N	3	Total	C	O	0	0	0
			34	18	16			

- Molecule 3 is alpha-D-mannopyranose (CCD ID: MAN) (formula: C₆H₁₂O₆).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	D	1	Total	C	O	0	0
			12	6	6		
3	F	1	Total	C	O	0	0
			12	6	6		

- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	59	Total	O	0	0
			59	59		
4	B	60	Total	O	0	0
			60	60		
4	C	75	Total	O	0	0
			75	75		
4	D	74	Total	O	0	0
			74	74		
4	E	36	Total	O	0	0
			36	36		

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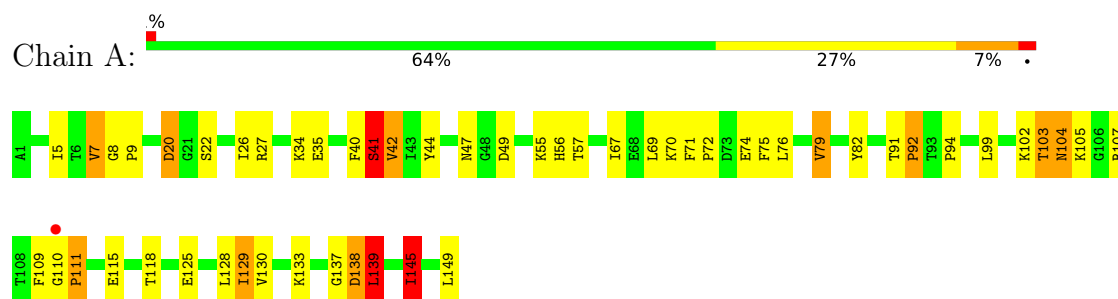
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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	F	51	Total 51	O 51	0	0
4	G	73	Total 73	O 73	0	0
4	H	62	Total 62	O 62	0	0

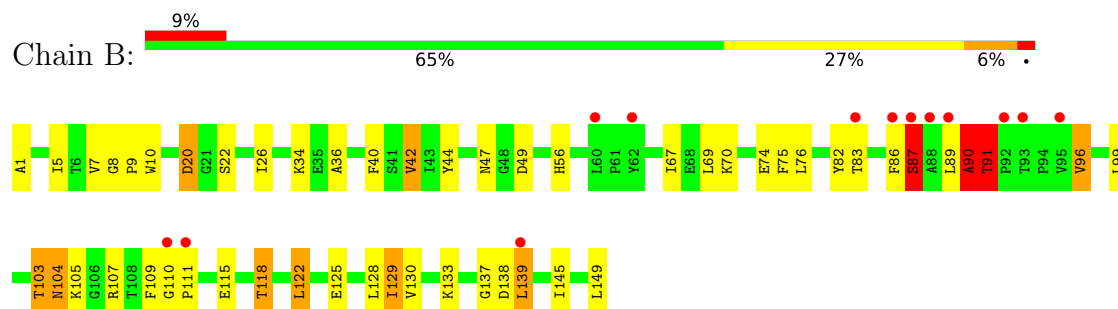
3 Residue-property plots [i](#)

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.

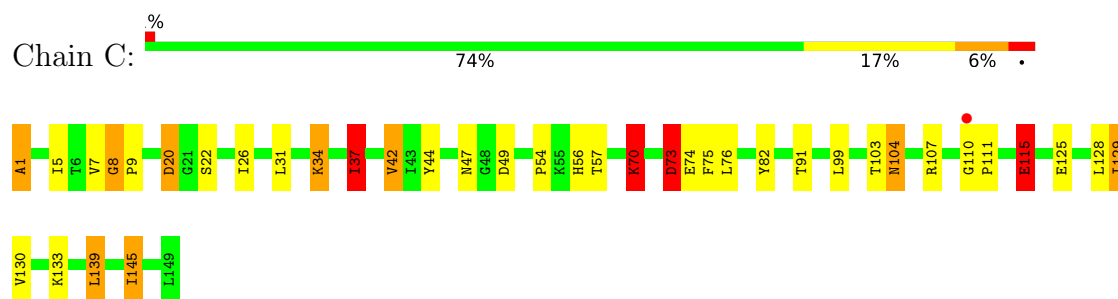
• Molecule 1: artocarpin



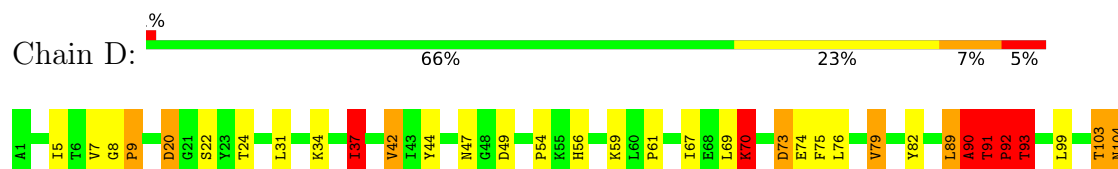
• Molecule 1: artocarpin



• Molecule 1: artocarpin



• Molecule 1: artocarpin





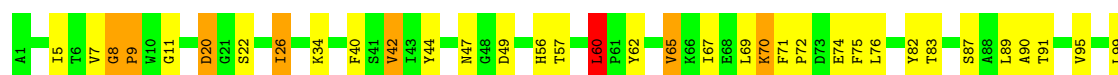
- Molecule 1: artocarpin



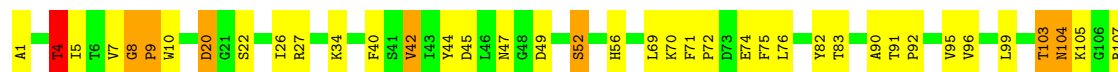
- Molecule 1: artocarpin



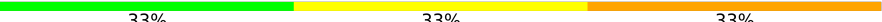
- Molecule 1: artocarpin



- Molecule 1: artocarpin



- Molecule 2: alpha-D-mannopyranose-(1-3)-[alpha-D-mannopyranose-(1-6)]alpha-D-mannopyranose

Chain I:  33% 33% 33%



- Molecule 2: α -D-mannopyranose-(1-3)-[α -D-mannopyranose-(1-6)] α -D-mannopyranose

Chain J:  67% 33%



- Molecule 2: α -D-mannopyranose-(1-3)-[α -D-mannopyranose-(1-6)] α -D-mannopyranose

Chain K:  33% 67%



- Molecule 2: α -D-mannopyranose-(1-3)-[α -D-mannopyranose-(1-6)] α -D-mannopyranose

Chain L:  33% 67%



- Molecule 2: α -D-mannopyranose-(1-3)-[α -D-mannopyranose-(1-6)] α -D-mannopyranose

Chain M:  33% 67%



- Molecule 2: α -D-mannopyranose-(1-3)-[α -D-mannopyranose-(1-6)] α -D-mannopyranose

Chain N:  33% 67%



4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	138.22Å 72.30Å 59.37Å 90.00° 94.48° 90.00°	Depositor
Resolution (Å)	19.85 – 2.35 19.85 – 2.35	Depositor EDS
% Data completeness (in resolution range)	99.2 (19.85-2.35) 99.2 (19.85-2.35)	Depositor EDS
R_{merge}	0.10	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.20 (at 2.35Å)	Xtriage
Refinement program	CNS 1.1	Depositor
R, R_{free}	0.209 , 0.226 0.221 , 0.225	Depositor DCC
R_{free} test set	2456 reflections (5.06%)	wwPDB-VP
Wilson B-factor (Å ²)	38.1	Xtriage
Anisotropy	0.232	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.30 , 36.8	EDS
L-test for twinning ²	$\langle L \rangle = 0.51$, $\langle L^2 \rangle = 0.35$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	9846	wwPDB-VP
Average B, all atoms (Å ²)	39.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 59.94 % of the origin peak, indicating pseudo-translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo-translational symmetry is equal to 1.6374e-05. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

¹Intensities estimated from amplitudes.

²Theoretical 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: AYA, 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	0.75	2/1165 (0.2%)	1.58	17/1580 (1.1%)
1	B	1.53	7/1165 (0.6%)	2.48	32/1580 (2.0%)
1	C	0.82	6/1165 (0.5%)	2.30	22/1580 (1.4%)
1	D	1.51	9/1165 (0.8%)	2.27	41/1580 (2.6%)
1	E	1.36	7/1165 (0.6%)	2.68	37/1580 (2.3%)
1	F	1.48	6/1165 (0.5%)	1.93	28/1580 (1.8%)
1	G	0.94	4/1165 (0.3%)	2.00	20/1580 (1.3%)
1	H	0.82	3/1165 (0.3%)	1.56	17/1580 (1.1%)
All	All	1.20	44/9320 (0.5%)	2.13	214/12640 (1.7%)

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	2	1
1	B	1	3
1	C	1	3
1	D	3	4
1	E	1	5
1	F	1	0
1	G	1	2
1	H	1	0
All	All	11	18

The worst 5 of 44 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	F	8	GLY	C-N	31.92	1.74	1.33
1	B	91	THR	N-CA	-30.59	1.03	1.46

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	D	91	THR	N-CA	-28.79	1.05	1.46
1	E	9	PRO	CA-C	-26.21	1.28	1.52
1	E	8	GLY	C-N	24.44	1.55	1.33

The worst 5 of 214 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	G	8	GLY	O-C-N	-51.75	70.02	121.77
1	E	110	GLY	CA-C-N	47.86	179.67	119.84
1	E	110	GLY	C-N-CA	47.86	179.67	119.84
1	B	110	GLY	CA-C-N	47.84	179.64	119.84
1	B	110	GLY	C-N-CA	47.84	179.64	119.84

5 of 11 chirality outliers are listed below:

Mol	Chain	Res	Type	Atom
1	A	1	AYA	CA
1	A	139	LEU	CA
1	B	91	THR	CA
1	C	1	AYA	CA
1	D	1	AYA	CA

5 of 18 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	27	ARG	Sidechain
1	B	90	ALA	Peptide,Mainchain
1	B	91	THR	Mainchain
1	C	1	AYA	Mainchain
1	C	8	GLY	Mainchain

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	1141	0	1107	44	0
1	B	1141	0	1107	51	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	C	1141	0	1107	28	0
1	D	1141	0	1106	51	0
1	E	1141	0	1107	52	0
1	F	1141	0	1106	47	0
1	G	1141	0	1107	45	0
1	H	1141	0	1107	41	0
2	I	34	0	30	1	0
2	J	34	0	30	3	0
2	K	34	0	30	0	0
2	L	34	0	30	2	0
2	M	34	0	30	4	0
2	N	34	0	30	3	0
3	D	12	0	12	0	0
3	F	12	0	12	1	0
4	A	59	0	0	6	0
4	B	60	0	0	0	0
4	C	75	0	0	7	0
4	D	74	0	0	5	0
4	E	36	0	0	10	0
4	F	51	0	0	6	0
4	G	73	0	0	4	0
4	H	62	0	0	2	0
All	All	9846	0	9058	320	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 17.

The worst 5 of 320 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:B:91:THR:CB	1:B:91:THR:CA	1.80	1.57
1:D:90:ALA:N	1:D:90:ALA:CA	1.71	1.52
1:B:90:ALA:C	1:B:90:ALA:CA	1.80	1.50
1:H:8:GLY:C	1:H:9:PRO:N	1.67	1.48
1:F:8:GLY:C	1:F:9:PRO:N	1.74	1.39

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	147/149 (99%)	140 (95%)	5 (3%)	2 (1%)	9	7
1	B	147/149 (99%)	139 (95%)	4 (3%)	4 (3%)	4	2
1	C	147/149 (99%)	140 (95%)	5 (3%)	2 (1%)	9	7
1	D	147/149 (99%)	136 (92%)	7 (5%)	4 (3%)	4	2
1	E	147/149 (99%)	137 (93%)	6 (4%)	4 (3%)	4	2
1	F	147/149 (99%)	140 (95%)	5 (3%)	2 (1%)	9	7
1	G	147/149 (99%)	140 (95%)	5 (3%)	2 (1%)	9	7
1	H	147/149 (99%)	140 (95%)	5 (3%)	2 (1%)	9	7
All	All	1176/1192 (99%)	1112 (95%)	42 (4%)	22 (2%)	6	5

5 of 22 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	111	PRO
1	B	87	SER
1	B	111	PRO
1	C	111	PRO
1	D	90	ALA

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	122/122 (100%)	104 (85%)	18 (15%)	3	2

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	B	122/122 (100%)	105 (86%)	17 (14%)	3	3
1	C	122/122 (100%)	108 (88%)	14 (12%)	5	5
1	D	122/122 (100%)	105 (86%)	17 (14%)	3	3
1	E	122/122 (100%)	106 (87%)	16 (13%)	4	4
1	F	122/122 (100%)	107 (88%)	15 (12%)	4	4
1	G	122/122 (100%)	105 (86%)	17 (14%)	3	3
1	H	122/122 (100%)	104 (85%)	18 (15%)	3	2
All	All	976/976 (100%)	844 (86%)	132 (14%)	4	3

5 of 132 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	H	7	VAL
1	H	69	LEU
1	H	145	ILE
1	C	145	ILE
1	C	139	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 44 such sidechains are listed below:

Mol	Chain	Res	Type
1	F	47	ASN
1	G	56	HIS
1	F	56	HIS
1	F	121	ASN
1	G	104	ASN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

8 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
1	AYA	H	1	1	6,7,8	0.63	0	6,8,10	1.28	1 (16%)
1	AYA	B	1	1	6,7,8	1.91	1 (16%)	6,8,10	2.63	1 (16%)
1	AYA	A	1	1	6,7,8	0.70	0	6,8,10	1.21	0
1	AYA	C	1	1	6,7,8	0.78	0	6,8,10	1.20	1 (16%)
1	AYA	G	1	1	6,7,8	0.84	0	6,8,10	1.11	0
1	AYA	E	1	1	6,7,8	0.84	0	6,8,10	1.09	0
1	AYA	D	1	1	6,7,8	0.91	0	6,8,10	1.16	0
1	AYA	F	1	1	6,7,8	0.78	0	6,8,10	1.33	1 (16%)

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
1	AYA	H	1	1	1/1/2/4	4/5/6/8	-
1	AYA	B	1	1	-	3/5/6/8	-
1	AYA	A	1	1	1/1/2/4	4/5/6/8	-
1	AYA	C	1	1	1/1/2/4	4/5/6/8	-
1	AYA	G	1	1	1/1/2/4	5/5/6/8	-
1	AYA	E	1	1	1/1/2/4	5/5/6/8	-
1	AYA	D	1	1	1/1/2/4	5/5/6/8	-
1	AYA	F	1	1	1/1/2/4	5/5/6/8	-

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	1	AYA	CB-CA	4.15	1.62	1.51

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	1	AYA	CB-CA-N	-5.93	102.99	109.68
1	F	1	AYA	CB-CA-N	-2.52	106.83	109.68

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	H	1	AYA	CB-CA-N	-2.19	107.20	109.68
1	C	1	AYA	CB-CA-N	-2.04	107.37	109.68

5 of 7 chirality outliers are listed below:

Mol	Chain	Res	Type	Atom
1	A	1	AYA	CA
1	C	1	AYA	CA
1	D	1	AYA	CA
1	E	1	AYA	CA
1	F	1	AYA	CA

5 of 35 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
1	A	1	AYA	C-CA-N-CT
1	A	1	AYA	OT-CT-N-CA
1	A	1	AYA	CM-CT-N-CA
1	A	1	AYA	O-C-CA-CB
1	B	1	AYA	OT-CT-N-CA

There are no ring outliers.

No monomer is involved in short contacts.

5.5 Carbohydrates [i](#)

18 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	MAN	I	1	2	12,12,12	0.70	1 (8%)	17,17,17	1.52	3 (17%)
2	MAN	I	2	2	11,11,12	0.57	0	15,15,17	0.53	0
2	MAN	I	3	2	11,11,12	0.87	0	15,15,17	1.26	1 (6%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
2	MAN	J	1	2	12,12,12	0.43	0	17,17,17	1.99	4 (23%)
2	MAN	J	2	2	11,11,12	0.56	0	15,15,17	0.53	0
2	MAN	J	3	2	11,11,12	0.57	0	15,15,17	3.14	1 (6%)
2	MAN	K	1	2	12,12,12	0.44	0	17,17,17	1.10	2 (11%)
2	MAN	K	2	2	11,11,12	0.62	0	15,15,17	0.47	0
2	MAN	K	3	2	11,11,12	0.58	0	15,15,17	1.76	1 (6%)
2	MAN	L	1	2	12,12,12	0.51	0	17,17,17	1.39	3 (17%)
2	MAN	L	2	2	11,11,12	0.43	0	15,15,17	0.65	0
2	MAN	L	3	2	11,11,12	0.43	0	15,15,17	0.66	0
2	MAN	M	1	2	12,12,12	0.55	0	17,17,17	1.10	2 (11%)
2	MAN	M	2	2	11,11,12	0.56	0	15,15,17	0.62	0
2	MAN	M	3	2	11,11,12	0.99	1 (9%)	15,15,17	1.18	2 (13%)
2	MAN	N	1	2	12,12,12	0.52	0	17,17,17	1.28	2 (11%)
2	MAN	N	2	2	11,11,12	0.61	0	15,15,17	0.60	0
2	MAN	N	3	2	11,11,12	1.15	1 (9%)	15,15,17	3.70	3 (20%)

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	MAN	I	1	2	1/1/5/5	0/2/22/22	0/1/1/1
2	MAN	I	2	2	-	0/2/19/22	0/1/1/1
2	MAN	I	3	2	-	0/2/19/22	0/1/1/1
2	MAN	J	1	2	1/1/5/5	0/2/22/22	0/1/1/1
2	MAN	J	2	2	-	0/2/19/22	0/1/1/1
2	MAN	J	3	2	-	0/2/19/22	0/1/1/1
2	MAN	K	1	2	1/1/5/5	0/2/22/22	0/1/1/1
2	MAN	K	2	2	-	0/2/19/22	0/1/1/1
2	MAN	K	3	2	-	0/2/19/22	0/1/1/1
2	MAN	L	1	2	-	0/2/22/22	0/1/1/1
2	MAN	L	2	2	-	0/2/19/22	0/1/1/1
2	MAN	L	3	2	-	0/2/19/22	0/1/1/1
2	MAN	M	1	2	-	0/2/22/22	0/1/1/1
2	MAN	M	2	2	-	0/2/19/22	0/1/1/1
2	MAN	M	3	2	-	1/2/19/22	0/1/1/1
2	MAN	N	1	2	-	0/2/22/22	0/1/1/1
2	MAN	N	2	2	-	0/2/19/22	0/1/1/1
2	MAN	N	3	2	-	1/2/19/22	0/1/1/1

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	N	3	MAN	C4-C5	2.83	1.59	1.53
2	M	3	MAN	C6-C5	-2.74	1.42	1.51
2	I	1	MAN	C6-C5	-2.11	1.44	1.51

The worst 5 of 24 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	J	3	MAN	O6-C6-C5	12.00	152.18	111.33
2	N	3	MAN	O6-C6-C5	10.02	145.45	111.33
2	N	3	MAN	O5-C5-C6	-8.94	90.27	107.66
2	K	3	MAN	O6-C6-C5	6.56	133.66	111.33
2	J	1	MAN	O6-C6-C5	5.42	129.77	111.33

All (3) chirality outliers are listed below:

Mol	Chain	Res	Type	Atom
2	I	1	MAN	C1
2	J	1	MAN	C1
2	K	1	MAN	C1

All (2) torsion outliers are listed below:

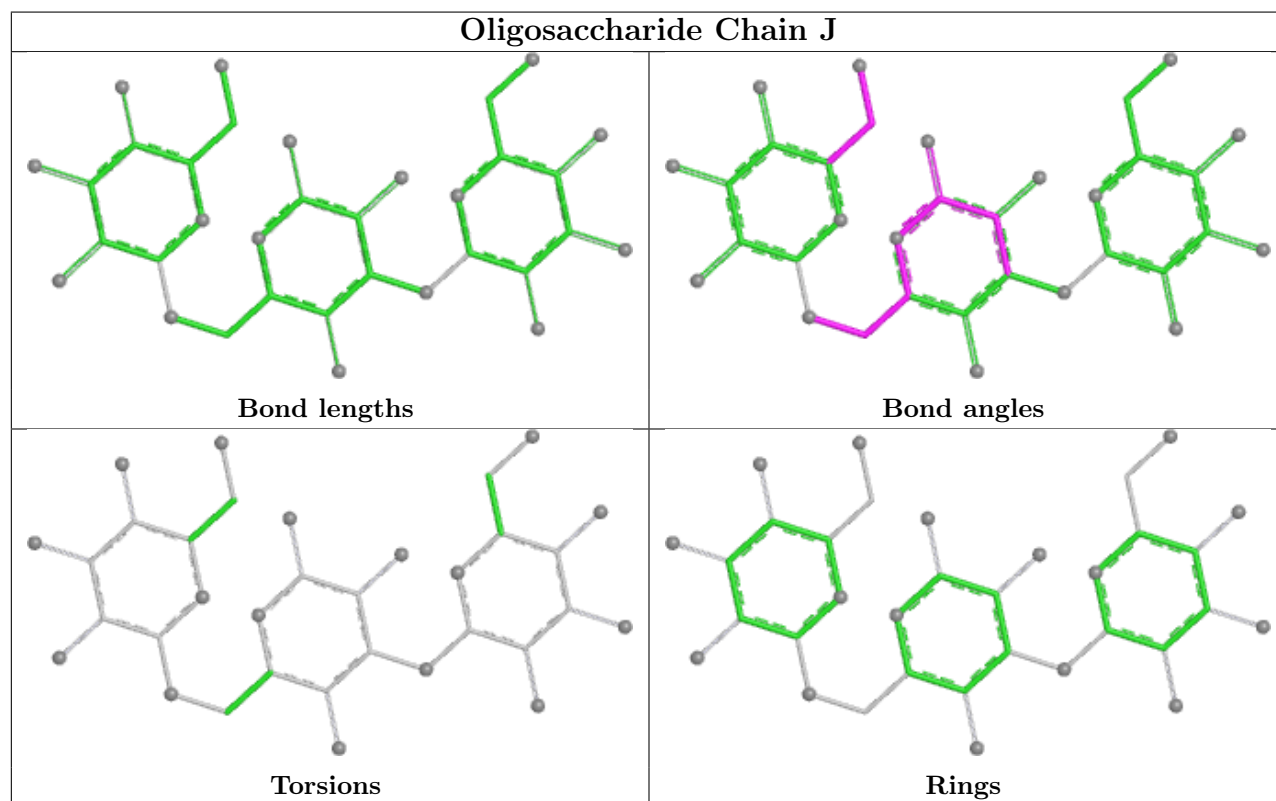
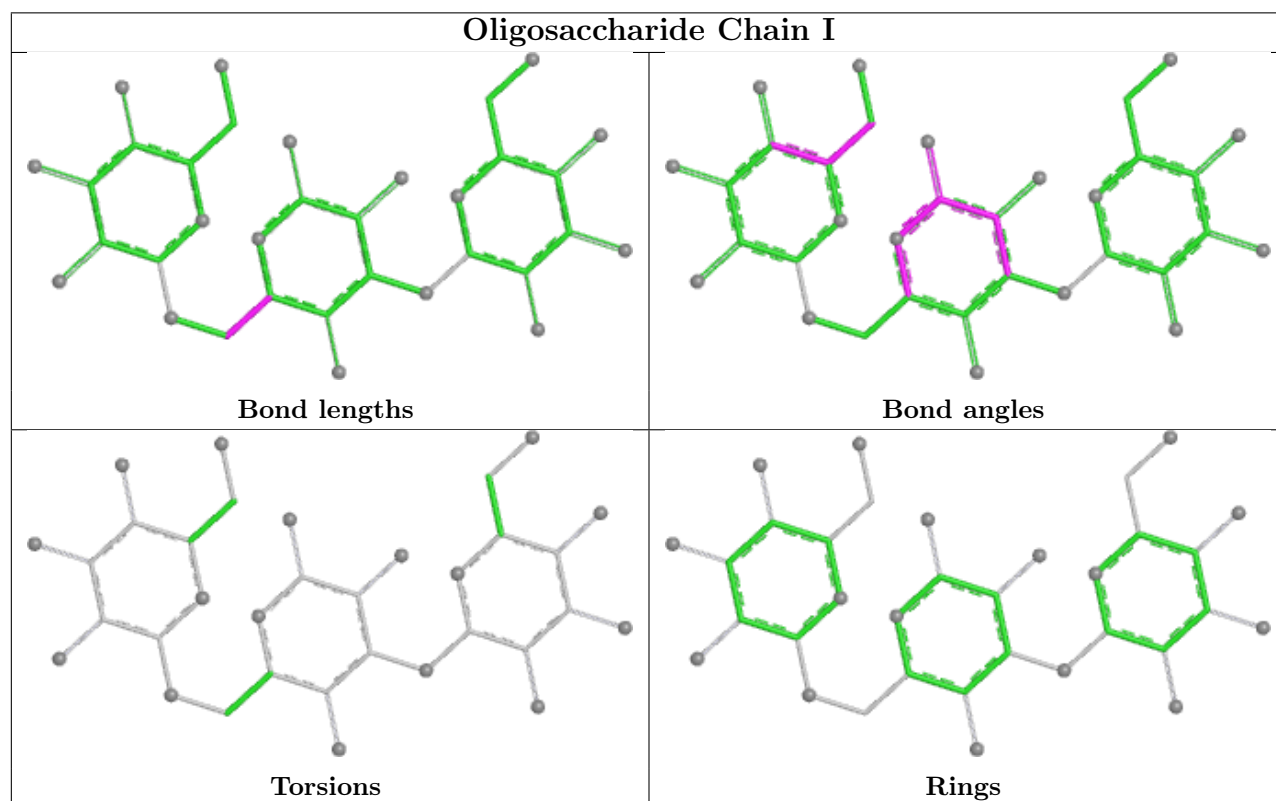
Mol	Chain	Res	Type	Atoms
2	N	3	MAN	C4-C5-C6-O6
2	M	3	MAN	O5-C5-C6-O6

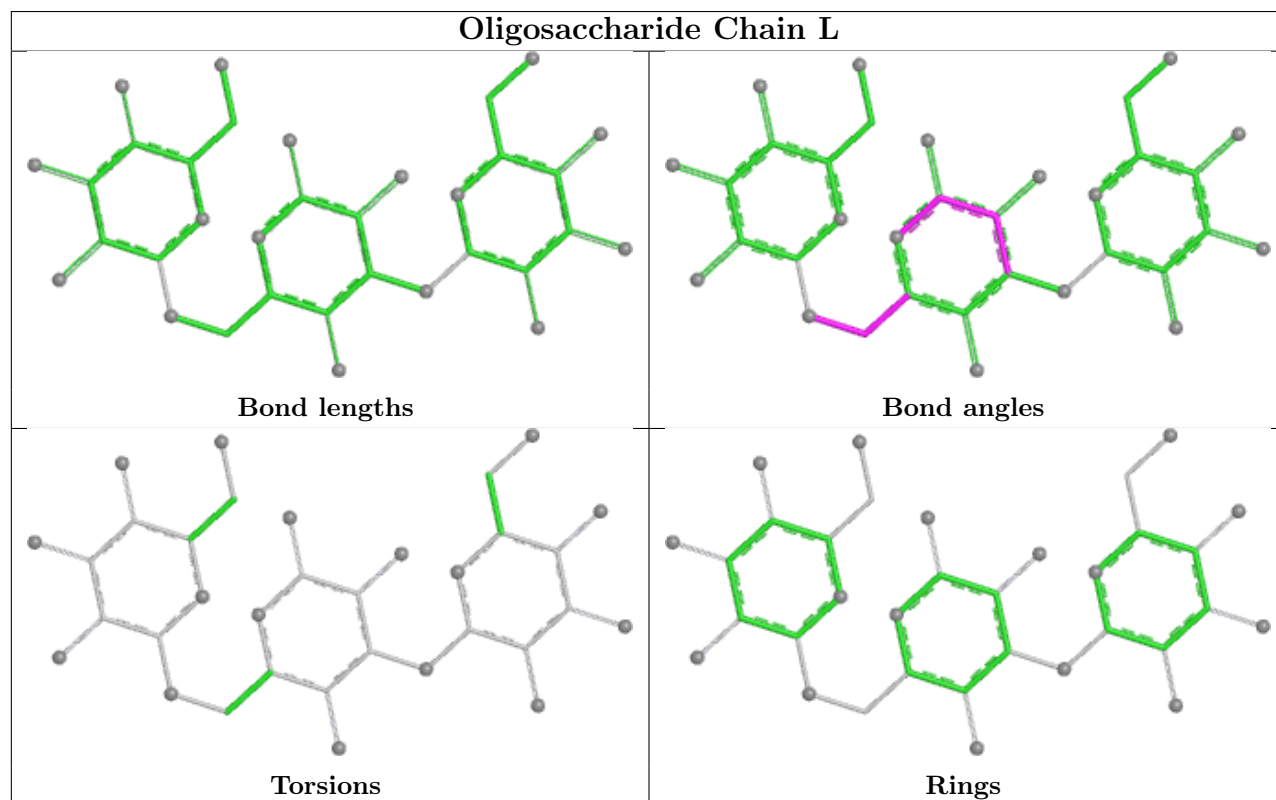
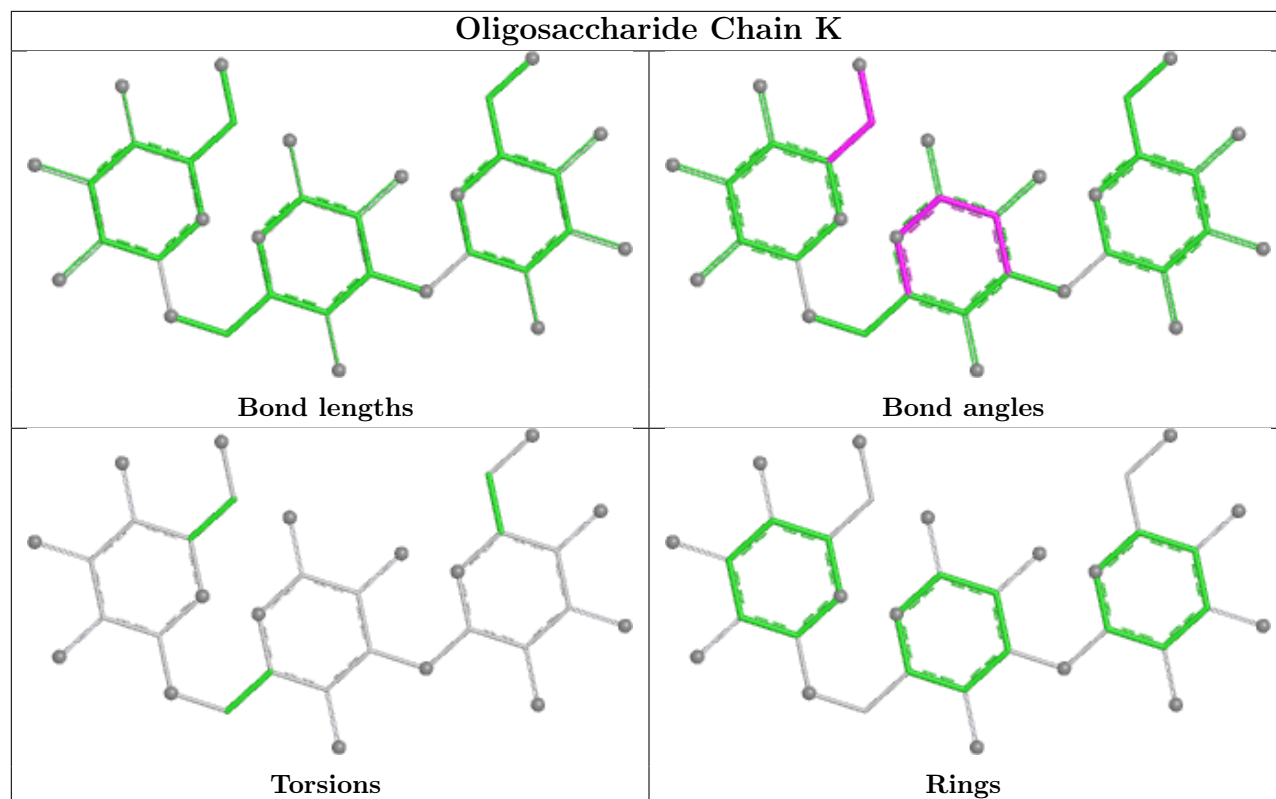
There are no ring outliers.

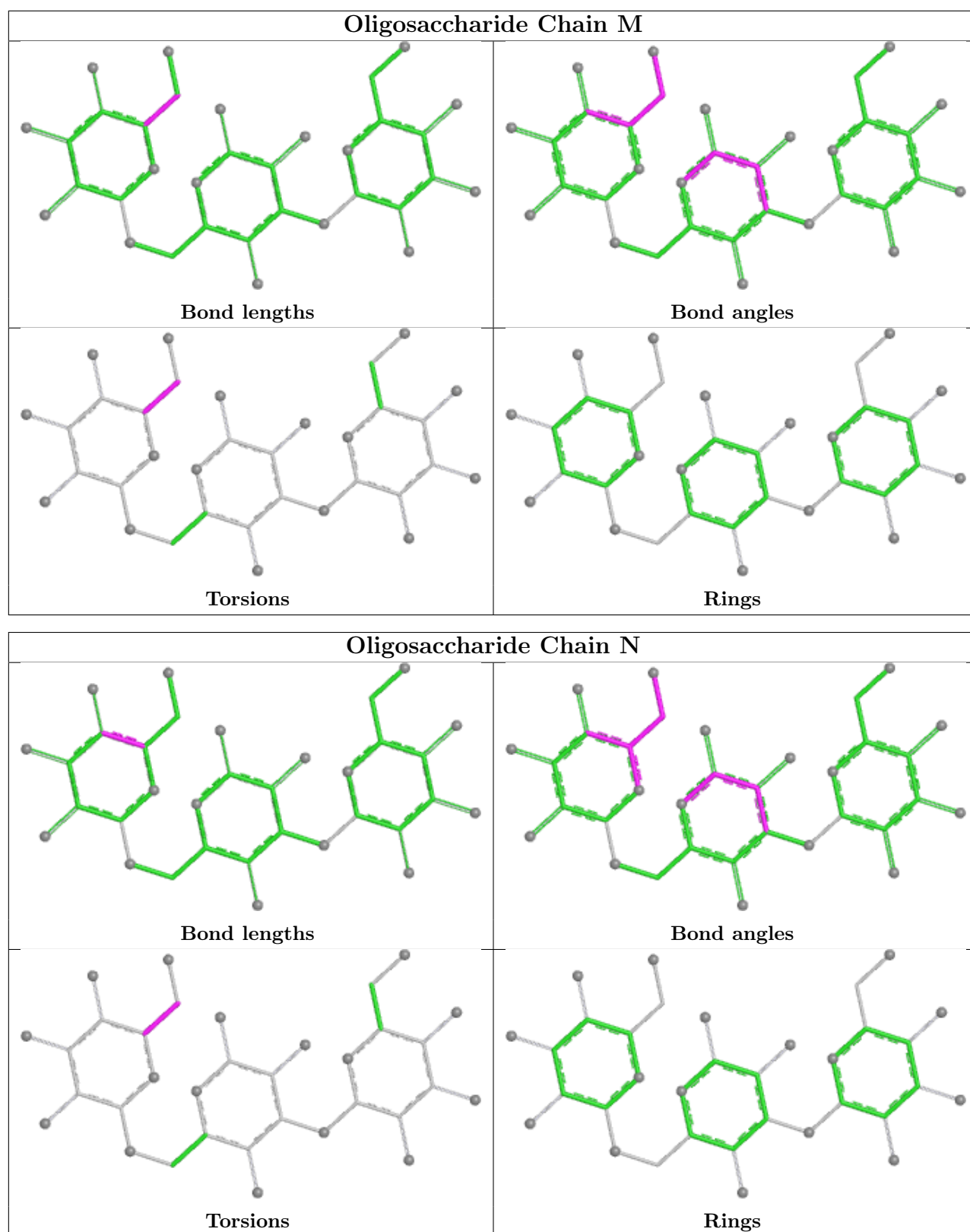
10 monomers are involved in 13 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	M	1	MAN	1	0
2	M	2	MAN	1	0
2	N	2	MAN	1	0
2	N	3	MAN	1	0
2	L	2	MAN	2	0
2	I	1	MAN	1	0
2	N	1	MAN	2	0
2	J	2	MAN	1	0
2	J	1	MAN	2	0
2	M	3	MAN	2	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](#)

2 ligands are modelled in this entry.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\# Z > 2$	Counts	RMSZ	$\# Z > 2$
3	MAN	F	2405	-	12,12,12	0.42	0	17,17,17	0.33	0
3	MAN	D	1405	-	12,12,12	0.36	0	17,17,17	0.32	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
3	MAN	F	2405	-	1/1/5/5	0/2/22/22	0/1/1/1
3	MAN	D	1405	-	-	0/2/22/22	0/1/1/1

There are no bond length outliers.

There are no bond angle outliers.

All (1) chirality outliers are listed below:

Mol	Chain	Res	Type	Atom
3	F	2405	MAN	C1

There are no torsion outliers.

There are no ring outliers.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	F	2405	MAN	1	0

5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues

The following chains have linkage breaks:

Mol	Chain	Number of breaks
1	F	3
1	H	2
1	D	2
1	B	1
1	G	1
1	E	1
1	A	1

The worst 5 of 11 chain breaks are listed below:

Model	Chain	Residue-1	Atom-1	Residue-2	Atom-2	Distance (Å)
1	F	8:GLY	C	9:PRO	N	1.74
1	H	8:GLY	C	9:PRO	N	1.67
1	B	8:GLY	C	9:PRO	N	1.65
1	F	1:AYA	C	2:SER	N	1.65
1	H	1:AYA	C	2:SER	N	1.65

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, 95th 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 ²)	Q<0.9
1	A	148/149 (99%)	0.06	1 (0%) 84 87	23, 37, 57, 63	0
1	B	148/149 (99%)	0.42	13 (8%) 15 18	21, 45, 77, 88	0
1	C	148/149 (99%)	-0.13	1 (0%) 84 87	20, 30, 47, 55	0
1	D	148/149 (99%)	-0.09	1 (0%) 84 87	17, 32, 49, 56	0
1	E	148/149 (99%)	0.35	5 (3%) 48 55	26, 44, 63, 68	0
1	F	148/149 (99%)	0.43	7 (4%) 36 42	25, 46, 71, 79	0
1	G	148/149 (99%)	-0.03	1 (0%) 84 87	22, 33, 52, 57	0
1	H	148/149 (99%)	-0.18	1 (0%) 84 87	20, 32, 46, 58	0
All	All	1184/1192 (99%)	0.10	30 (2%) 58 64	17, 36, 62, 88	0

The worst 5 of 30 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	F	110	GLY	4.6
1	A	110	GLY	4.2
1	C	110	GLY	4.1
1	G	110	GLY	3.9
1	E	110	GLY	3.8

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, 95th 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 ²)	Q<0.9
1	AYA	G	1	8/9	0.82	0.14	34,36,37,38	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
1	AYA	F	1	8/9	0.84	0.13	33,34,34,34	0
1	AYA	B	1	8/9	0.88	0.09	27,29,32,32	0
1	AYA	C	1	8/9	0.89	0.10	29,31,32,34	0
1	AYA	D	1	8/9	0.89	0.10	34,34,34,35	0
1	AYA	E	1	8/9	0.90	0.08	32,34,34,35	0
1	AYA	H	1	8/9	0.90	0.11	30,33,35,39	0
1	AYA	A	1	8/9	0.92	0.09	27,29,33,34	0

6.3 Carbohydrates

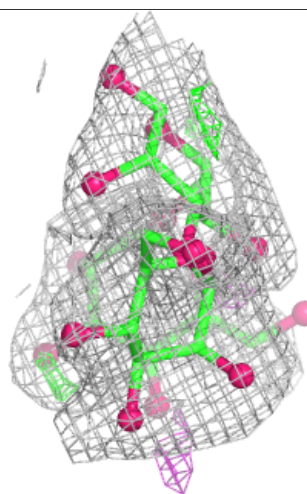
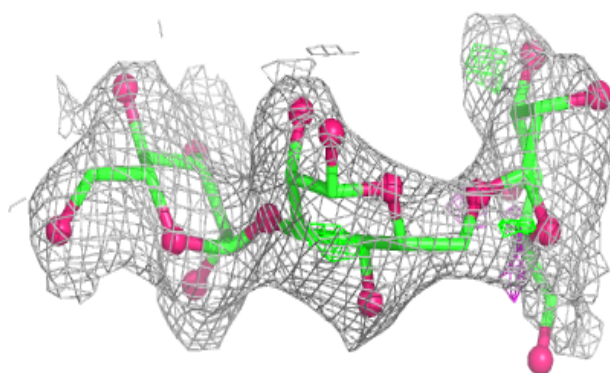
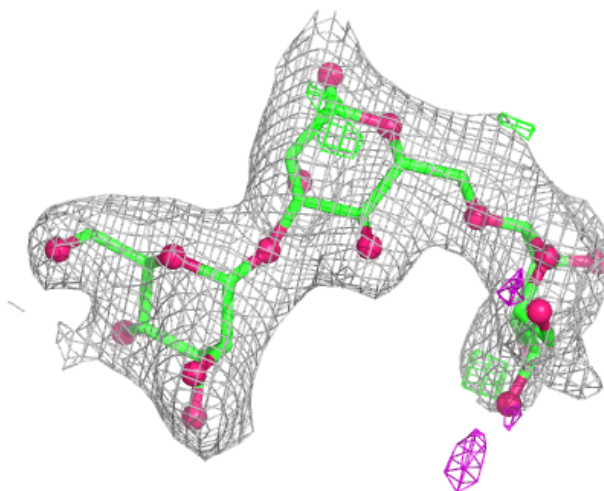
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists 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	J	3	11/12	0.33	0.18	97,99,100,100	0
2	MAN	M	3	11/12	0.44	0.14	80,83,84,84	0
2	MAN	I	3	11/12	0.49	0.18	77,79,83,83	0
2	MAN	L	3	11/12	0.60	0.12	77,78,79,81	0
2	MAN	J	1	12/12	0.63	0.12	81,86,91,95	0
2	MAN	I	1	12/12	0.75	0.12	52,58,66,73	0
2	MAN	L	1	12/12	0.76	0.12	63,68,72,75	0
2	MAN	K	3	11/12	0.77	0.12	51,53,56,56	0
2	MAN	M	1	12/12	0.78	0.10	54,61,69,75	0
2	MAN	J	2	11/12	0.81	0.14	72,75,78,78	0
2	MAN	N	3	11/12	0.82	0.10	49,50,51,51	0
2	MAN	N	1	12/12	0.83	0.09	39,42,44,48	0
2	MAN	L	2	11/12	0.84	0.11	50,55,59,59	0
2	MAN	I	2	11/12	0.90	0.08	41,44,46,48	0
2	MAN	N	2	11/12	0.91	0.08	25,33,35,36	0
2	MAN	M	2	11/12	0.92	0.07	39,44,46,48	0
2	MAN	K	1	12/12	0.94	0.06	36,38,44,47	0
2	MAN	K	2	11/12	0.94	0.06	22,28,32,32	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.

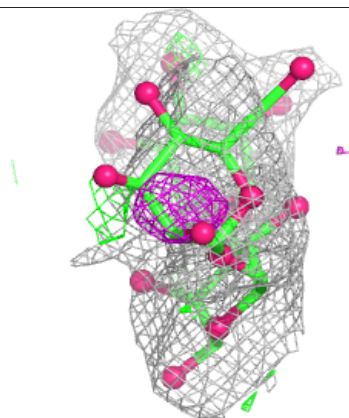
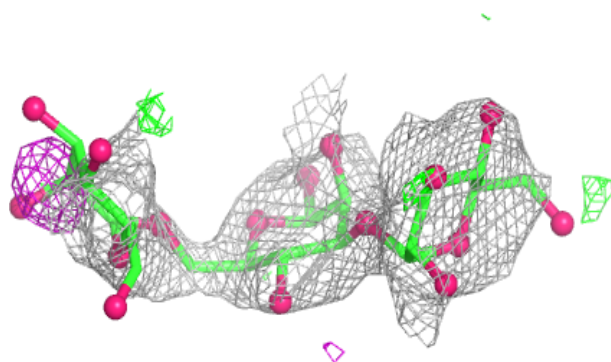
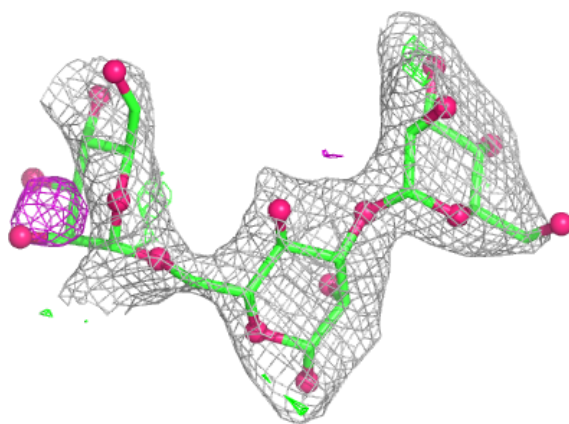
Electron density around Chain I:

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



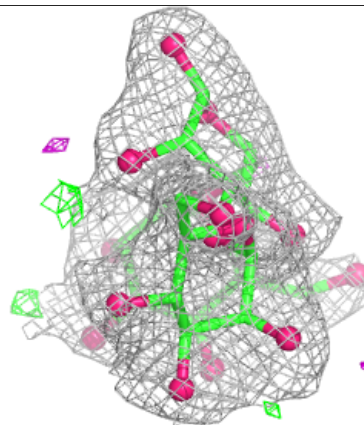
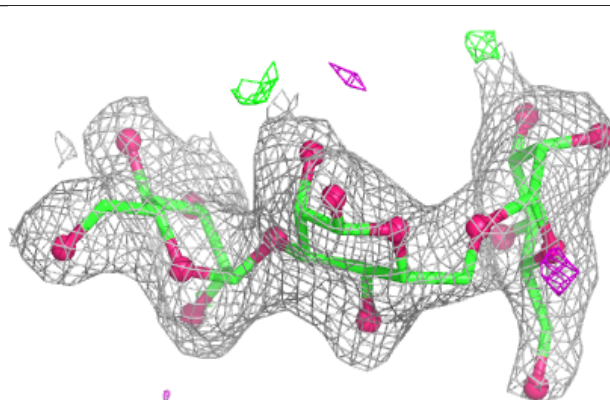
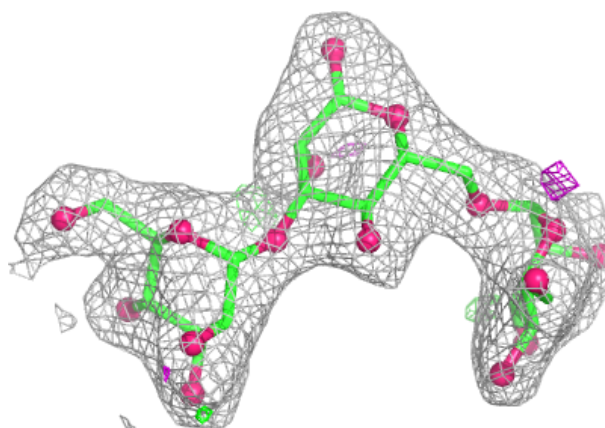
Electron density around Chain J:

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

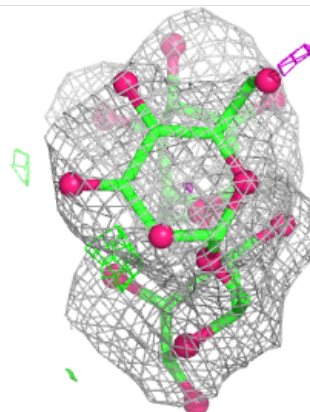
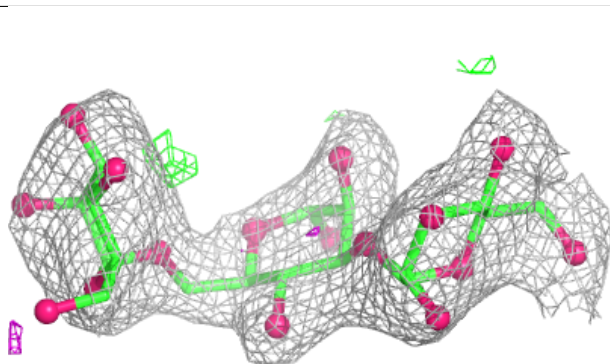
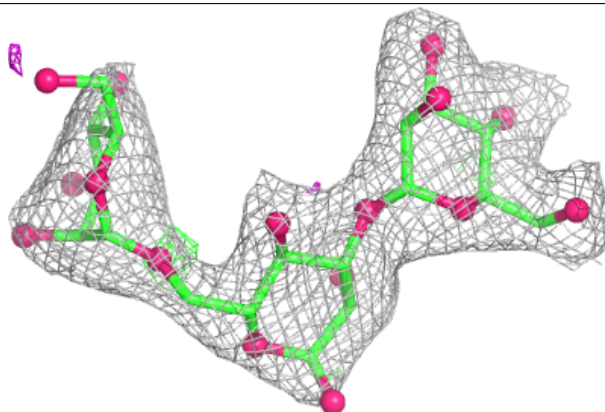


Electron density around Chain K:

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

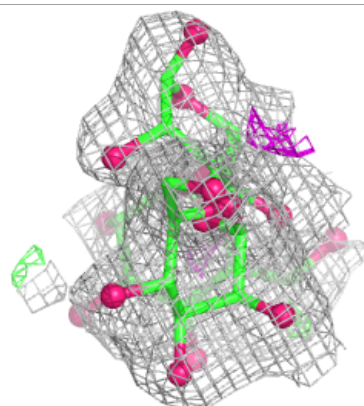
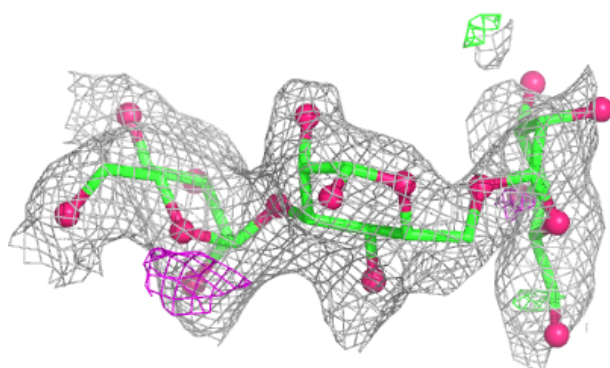
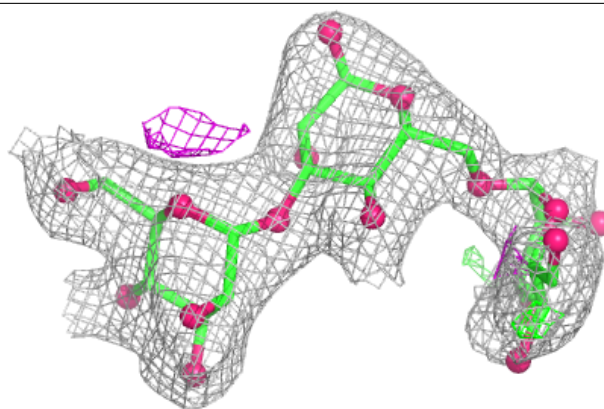
**Electron density around Chain L:**

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

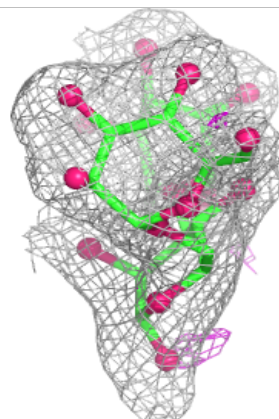
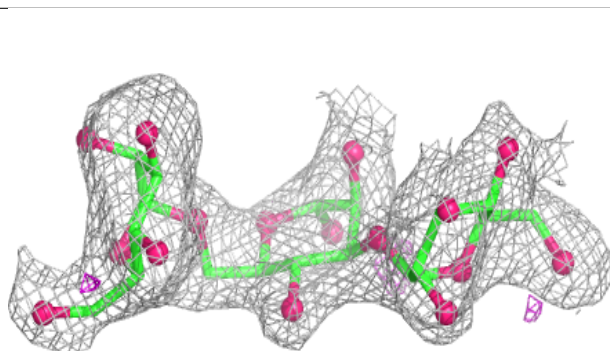
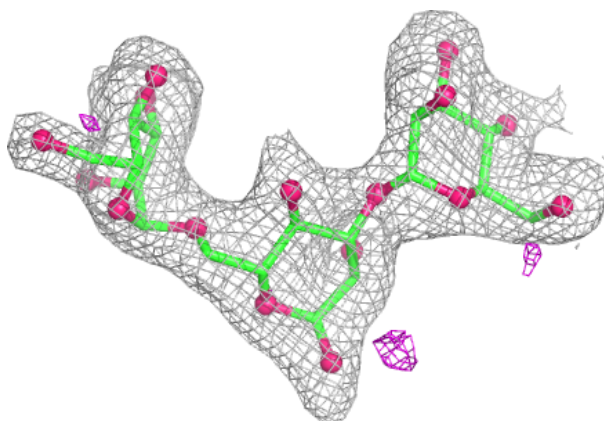


Electron density around Chain M:

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

**Electron density around Chain N:**

$2mF_o-DF_c$ (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, 95th 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
3	MAN	F	2405	12/12	0.78	0.15	100,100,101,101	0
3	MAN	D	1405	12/12	0.88	0.09	46,48,49,52	0

6.5 Other polymers [i](#)

There are no such residues in this entry.