



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 9, 2026 – 07:43 AM UTC

PDB ID : 5NFG / pdb_00005nfg
Title : Structure of recombinant cardosin B from *Cynara cardunculus*
Authors : Pereira, P.J.B.; Figueiredo, A.C.; Manso, J.A.; Almeida, C.M.; Simoes, I.
Deposited on : 2017-03-14
Resolution : 2.38 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

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

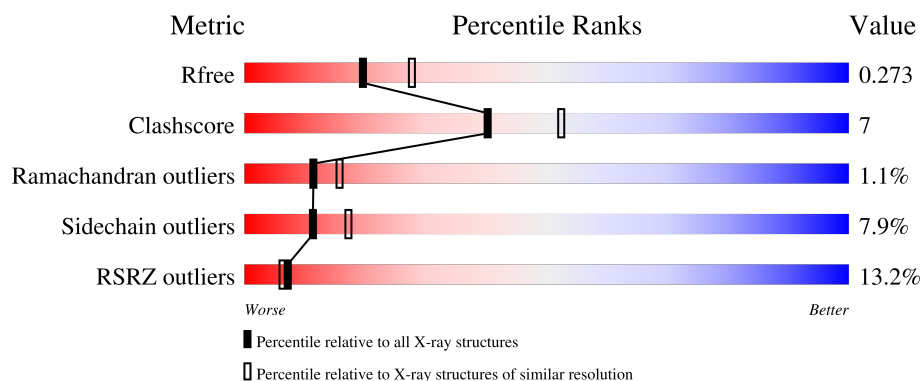
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.38 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	7164 (2.40-2.36)
Clashscore	190562	7722 (2.40-2.36)
Ramachandran outliers	187476	7626 (2.40-2.36)
Sidechain outliers	187428	7627 (2.40-2.36)
RSRZ outliers	180081	7170 (2.40-2.36)

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	383	11% 70% 16% • 13%
1	B	383	11% 66% 17% • 14%
2	C	6	33% 67%
2	E	6	33% 67%
3	D	4	100%

Continued on next page...

Continued from previous page...

Mol	Chain	Length	Quality of chain
3	F	4	 100%

2 Entry composition [i](#)

There are 4 unique types of molecules in this entry. The entry contains 5400 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.

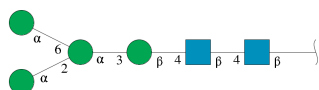
- Molecule 1 is a protein called Procardosin-B,Procardosin-B.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	333	Total	C	N	O	S	0	1	0
			2530	1606	403	509	12			
1	B	328	Total	C	N	O	S	0	0	0
			2485	1581	397	495	12			

There are 10 discrepancies between the modelled and reference sequences:

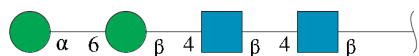
Chain	Residue	Modelled	Actual	Comment	Reference
A	1	MET	-	initiating methionine	UNP Q9XFX4
A	45	ARG	SER	conflict	UNP Q9XFX4
A	292	GLY	-	linker	UNP Q9XFX4
A	293	GLY	-	linker	UNP Q9XFX4
A	294	GLY	-	linker	UNP Q9XFX4
B	1	MET	-	initiating methionine	UNP Q9XFX4
B	45	ARG	SER	conflict	UNP Q9XFX4
B	292	GLY	-	linker	UNP Q9XFX4
B	293	GLY	-	linker	UNP Q9XFX4
B	294	GLY	-	linker	UNP Q9XFX4

- Molecule 2 is an oligosaccharide called alpha-D-mannopyranose-(1-2)-[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
2	C	6	Total	C	N	O	0	0	0
			72	40	2	30			
2	E	6	Total	C	N	O	0	0	0
			72	40	2	30			

- Molecule 3 is an oligosaccharide called 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
3	D	4	Total	C	N	O	0	0	0
			50	28	2	20			
3	F	4	Total	C	N	O	0	0	0
			50	28	2	20			

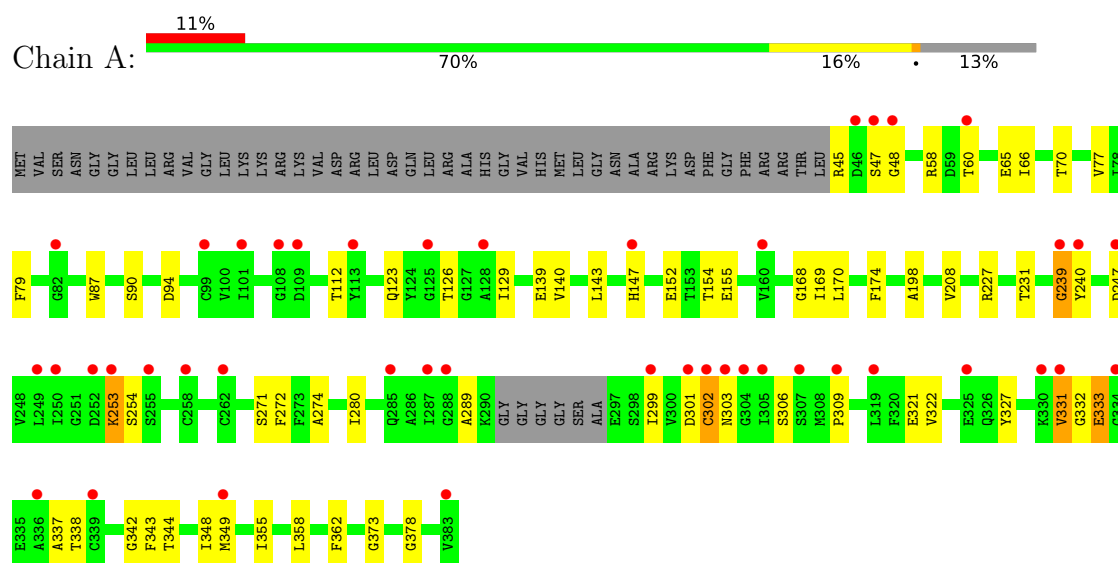
- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	67	Total	O	0	0
			67	67		
4	B	74	Total	O	0	0
			74	74		

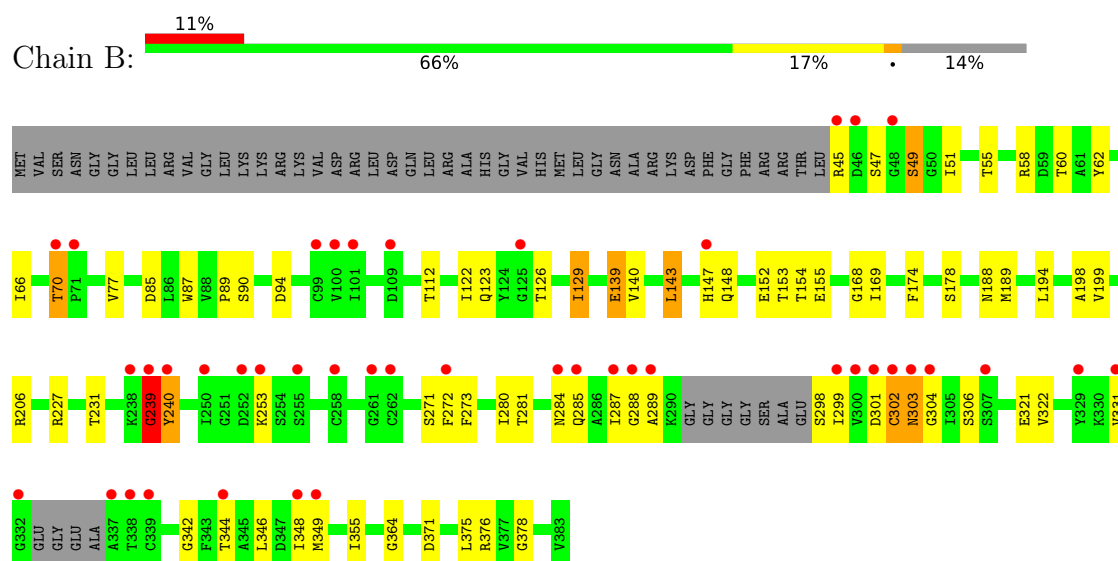
3 Residue-property plots [i](#)

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: Procardosin-B,Procardosin-B

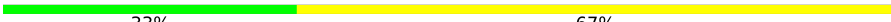


• Molecule 1: Procardosin-B,Procardosin-B



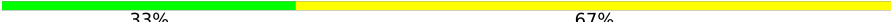
• Molecule 2: alpha-D-mannopyranose-(1-2)-[alpha-D-mannopyranose-(1-6)]alpha-D-mannopyranose-(1-3)-beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetam

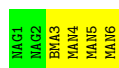
ido-2-deoxy-beta-D-glucopyranose

Chain C:  33% 67%

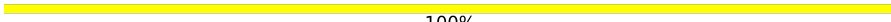


• Molecule 2: alpha-D-mannopyranose-(1-2)-[alpha-D-mannopyranose-(1-6)]alpha-D-mannopyranose-(1-3)-beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain E:  33% 67%

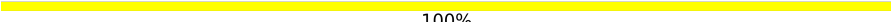


• Molecule 3: alpha-D-mannopyranose-(1-6)-beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain D:  100%



• Molecule 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 F:  100%



4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	52.58Å 143.13Å 64.71Å 90.00° 107.90° 90.00°	Depositor
Resolution (Å)	61.58 – 2.38 61.58 – 2.38	Depositor EDS
% Data completeness (in resolution range)	98.9 (61.58-2.38) 99.0 (61.58-2.38)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	3.13 (at 2.37Å)	Xtriage
Refinement program	PHENIX (1.10.1_2155: ???)	Depositor
R, R_{free}	0.222 , 0.270 0.234 , 0.273	Depositor DCC
R_{free} test set	1807 reflections (4.93%)	wwPDB-VP
Wilson B-factor (Å ²)	35.6	Xtriage
Anisotropy	0.749	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.34 , 53.6	EDS
L-test for twinning ²	$\langle L \rangle = 0.48$, $\langle L^2 \rangle = 0.31$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.92	EDS
Total number of atoms	5400	wwPDB-VP
Average B, all atoms (Å ²)	48.0	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 23.60 % 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 4.5119e-03. 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 [i](#)

5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: MAN, BMA, NAG

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	0.39	0/2590	0.59	0/3518
1	B	0.38	0/2544	0.61	2/3455 (0.1%)
All	All	0.39	0/5134	0.60	2/6973 (0.0%)

There are no bond length outliers.

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	287	ILE	N-CA-C	7.12	119.13	111.58
1	B	239	GLY	N-CA-C	-5.02	101.29	113.18

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts [i](#)

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	2530	0	2370	30	0
1	B	2485	0	2338	40	0
2	C	72	0	61	0	0
2	E	72	0	61	0	0
3	D	50	0	43	1	0
3	F	50	0	43	2	0
4	A	67	0	0	1	0

Continued on next page...

Continued from previous page...

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
4	B	74	0	0	0	0
All	All	5400	0	4916	67	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 7.

All (67) 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:90:SER:HB2	1:B:152:GLU:HB3	1.61	0.81
1:A:332:GLY:HA3	1:A:337:ALA:HA	1.70	0.73
1:A:90:SER:HB2	1:A:152:GLU:HB3	1.70	0.73
1:A:174:PHE:HB2	1:A:239:GLY:HA2	1.71	0.72
1:B:174:PHE:HB2	1:B:239:GLY:HA2	1.75	0.69
1:A:289:ALA:HB1	1:A:299:ILE:HG23	1.76	0.67
1:B:301:ASP:O	1:B:302:CYS:HB2	1.97	0.65
1:A:301:ASP:O	1:A:302:CYS:HB2	1.96	0.64
1:B:289:ALA:HB2	1:B:299:ILE:HG23	1.80	0.64
1:A:112:THR:O	4:A:501:HOH:O	2.13	0.64
1:A:87:TRP:CZ2	1:A:169:ILE:HD13	2.38	0.58
1:A:331:VAL:HG12	1:A:338:THR:HB	1.86	0.57
1:A:253:LYS:HE3	1:A:254:SER:H	1.70	0.57
1:A:154:THR:HG22	1:A:155:GLU:HG3	1.87	0.56
1:B:273:PHE:O	1:B:344:THR:HG22	2.08	0.54
1:B:49:SER:HB3	1:B:51:ILE:HG12	1.90	0.54
1:B:122:ILE:HD12	1:B:129:ILE:HD11	1.90	0.54
1:A:168:GLY:C	1:A:169:ILE:HD12	2.33	0.53
1:B:198:ALA:HB2	3:D:2:NAG:H83	1.92	0.52
1:B:87:TRP:CZ2	1:B:169:ILE:HD13	2.44	0.52
1:A:198:ALA:HB2	3:F:2:NAG:H83	1.91	0.51
1:B:281:THR:O	1:B:285:GLN:HG3	2.10	0.51
1:B:189:MET:HA	1:B:194:LEU:HD12	1.93	0.50
1:B:302:CYS:O	1:B:304:GLY:N	2.44	0.50
1:B:206:ARG:HD3	1:B:364:GLY:HA3	1.93	0.49
1:A:231:THR:O	1:A:378:GLY:HA2	2.12	0.49
1:B:298:SER:O	1:B:299:ILE:HG13	2.12	0.49
1:B:148:GLN:OE1	1:B:188:ASN:ND2	2.39	0.48
1:B:346:LEU:HD21	1:B:348:ILE:HD11	1.96	0.48
1:A:174:PHE:HB2	1:A:239:GLY:CA	2.43	0.47
1:B:168:GLY:C	1:B:169:ILE:HD12	2.40	0.47
1:A:348:ILE:HB	1:A:355:ILE:HG22	1.96	0.46

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:70:THR:HG23	1:B:112:THR:OG1	2.16	0.46
1:B:85:ASP:OD1	1:B:178:SER:OG	2.30	0.46
1:B:174:PHE:HB2	1:B:239:GLY:CA	2.45	0.46
1:B:154:THR:HG22	1:B:155:GLU:HG3	1.98	0.45
1:B:231:THR:O	1:B:378:GLY:HA2	2.17	0.45
1:B:280:ILE:HG22	1:B:284:ASN:ND2	2.32	0.44
1:A:348:ILE:HB	1:A:355:ILE:CG2	2.47	0.44
1:A:272:PHE:HB3	1:A:342:GLY:O	2.18	0.44
1:B:66:ILE:HG22	1:B:140:VAL:HG13	1.99	0.44
1:A:227:ARG:HB2	1:B:47:SER:HB2	1.99	0.44
1:A:280:ILE:HD12	1:A:343:PHE:HB3	1.99	0.44
1:B:371:ASP:HB3	1:B:376:ARG:HG3	2.00	0.44
1:B:371:ASP:HB3	1:B:376:ARG:CG	2.48	0.44
1:B:58:ARG:O	1:B:60:THR:HG23	2.18	0.43
1:B:375:LEU:HD23	1:B:375:LEU:HA	1.85	0.43
1:A:58:ARG:HA	1:A:208:VAL:HG21	2.01	0.43
1:A:79:PHE:CE2	1:A:170:LEU:HD13	2.54	0.42
1:B:139:GLU:HA	1:B:143:LEU:O	2.19	0.42
1:B:289:ALA:CB	1:B:299:ILE:HG23	2.46	0.42
1:A:373:GLY:O	3:F:4:MAN:O3	2.38	0.42
1:B:284:ASN:O	1:B:288:GLY:HA2	2.19	0.42
1:A:247:ASP:OD2	1:A:254:SER:OG	2.35	0.42
1:A:358:LEU:HD23	1:A:362:PHE:CD2	2.54	0.42
1:B:89:PRO:HA	1:B:153:THR:OG1	2.19	0.41
1:B:302:CYS:C	1:B:304:GLY:H	2.28	0.41
1:A:227:ARG:HD3	1:B:47:SER:OG	2.21	0.41
1:B:272:PHE:HB3	1:B:342:GLY:O	2.20	0.41
1:B:348:ILE:HB	1:B:355:ILE:HB	2.03	0.41
1:A:58:ARG:O	1:A:60:THR:HG23	2.20	0.41
1:A:66:ILE:HG22	1:A:140:VAL:HG13	2.02	0.41
1:A:309:PRO:O	1:A:327:TYR:OH	2.34	0.40
1:A:48:GLY:N	1:B:227:ARG:HB2	2.36	0.40
1:B:240:TYR:CD1	1:B:240:TYR:N	2.87	0.40
1:B:55:THR:O	1:B:62:TYR:HA	2.21	0.40
1:A:274:ALA:HA	1:A:344:THR:O	2.21	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	330/383 (86%)	315 (96%)	11 (3%)	4 (1%)	10	14
1	B	322/383 (84%)	309 (96%)	10 (3%)	3 (1%)	14	20
All	All	652/766 (85%)	624 (96%)	21 (3%)	7 (1%)	11	16

All (7) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	303	ASN
1	A	302	CYS
1	B	302	CYS
1	A	333	GLU
1	B	239	GLY
1	A	239	GLY
1	A	303	ASN

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	269/305 (88%)	247 (92%)	22 (8%)	10	16
1	B	265/305 (87%)	244 (92%)	21 (8%)	11	17
All	All	534/610 (88%)	491 (92%)	43 (8%)	11	16

All (43) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	45	ARG
1	A	47	SER
1	A	65[A]	GLU
1	A	65[B]	GLU
1	A	70	THR
1	A	77	VAL
1	A	94	ASP
1	A	123	GLN
1	A	126	THR
1	A	129	ILE
1	A	139	GLU
1	A	143	LEU
1	A	147	HIS
1	A	240	TYR
1	A	253	LYS
1	A	271	SER
1	A	306	SER
1	A	321	GLU
1	A	322	VAL
1	A	331	VAL
1	A	333	GLU
1	A	349	MET
1	B	45	ARG
1	B	49	SER
1	B	70	THR
1	B	77	VAL
1	B	94	ASP
1	B	123	GLN
1	B	126	THR
1	B	129	ILE
1	B	139	GLU
1	B	143	LEU
1	B	147	HIS
1	B	199	VAL
1	B	240	TYR
1	B	253	LYS
1	B	271	SER
1	B	303	ASN
1	B	306	SER
1	B	321	GLU
1	B	322	VAL
1	B	331	VAL
1	B	349	MET

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. There are no such sidechains identified.

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates ⓘ

20 monosaccharides are modelled in this entry.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\# Z > 2$	Counts	RMSZ	$\# Z > 2$
2	NAG	C	1	1,2	14,14,15	0.46	0	17,19,21	0.70	0
2	NAG	C	2	2	14,14,15	0.48	0	17,19,21	0.47	0
2	BMA	C	3	2	11,11,12	1.28	2 (18%)	15,15,17	1.06	2 (13%)
2	MAN	C	4	2	11,11,12	1.31	2 (18%)	15,15,17	1.50	3 (20%)
2	MAN	C	5	2	11,11,12	1.30	2 (18%)	15,15,17	1.04	1 (6%)
2	MAN	C	6	2	11,11,12	0.99	1 (9%)	15,15,17	1.24	2 (13%)
3	NAG	D	1	1,3	14,14,15	0.27	0	17,19,21	1.06	1 (5%)
3	NAG	D	2	3	14,14,15	0.44	0	17,19,21	0.59	0
3	BMA	D	3	3	11,11,12	0.62	0	15,15,17	1.39	3 (20%)
3	MAN	D	4	3	11,11,12	0.73	0	15,15,17	0.86	2 (13%)
2	NAG	E	1	1,2	14,14,15	0.38	0	17,19,21	0.64	0
2	NAG	E	2	2	14,14,15	0.38	0	17,19,21	0.43	0
2	BMA	E	3	2	11,11,12	1.61	3 (27%)	15,15,17	1.47	3 (20%)
2	MAN	E	4	2	11,11,12	1.06	1 (9%)	15,15,17	1.62	3 (20%)
2	MAN	E	5	2	11,11,12	0.95	1 (9%)	15,15,17	1.05	1 (6%)
2	MAN	E	6	2	11,11,12	1.00	1 (9%)	15,15,17	1.18	1 (6%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
3	NAG	F	1	1,3	14,14,15	0.39	0	17,19,21	1.12	1 (5%)
3	NAG	F	2	3	14,14,15	0.52	0	17,19,21	0.66	0
3	BMA	F	3	3	11,11,12	1.04	1 (9%)	15,15,17	1.35	2 (13%)
3	MAN	F	4	3	11,11,12	0.92	0	15,15,17	0.82	0

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

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

All (14) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	C	4	MAN	C4-C5	2.83	1.59	1.53
2	C	4	MAN	O5-C5	2.73	1.48	1.43
2	E	3	BMA	O5-C1	-2.71	1.39	1.43
2	C	5	MAN	O5-C5	2.66	1.48	1.43
2	C	3	BMA	O5-C1	-2.64	1.39	1.43

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	E	6	MAN	O5-C5	2.60	1.48	1.43
2	E	3	BMA	C2-C3	-2.57	1.48	1.52
3	F	3	BMA	C1-C2	2.46	1.58	1.52
2	E	3	BMA	C1-C2	2.38	1.57	1.52
2	E	4	MAN	C4-C5	2.37	1.58	1.53
2	C	6	MAN	O5-C5	2.36	1.48	1.43
2	C	3	BMA	C4-C5	2.35	1.58	1.53
2	C	5	MAN	C2-C3	2.25	1.55	1.52
2	E	5	MAN	C2-C3	2.23	1.55	1.52

All (25) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	E	4	MAN	C1-O5-C5	4.15	117.75	112.19
3	F	1	NAG	C1-O5-C5	4.09	117.67	112.19
2	C	4	MAN	C1-O5-C5	3.85	117.34	112.19
3	D	1	NAG	C1-O5-C5	3.84	117.33	112.19
2	E	3	BMA	O2-C2-C3	-3.78	102.33	110.15
2	C	6	MAN	O2-C2-C3	-3.32	103.27	110.15
2	E	6	MAN	O2-C2-C3	-2.92	104.10	110.15
2	E	4	MAN	O2-C2-C3	-2.87	104.21	110.15
2	E	5	MAN	C1-O5-C5	2.69	115.79	112.19
2	E	3	BMA	C3-C4-C5	2.60	114.95	110.23
3	D	3	BMA	C1-O5-C5	2.56	115.62	112.19
3	F	3	BMA	C1-O5-C5	2.51	115.56	112.19
2	C	4	MAN	C1-C2-C3	-2.44	106.09	109.64
2	C	3	BMA	C1-O5-C5	2.40	115.41	112.19
2	C	4	MAN	O2-C2-C3	-2.36	105.25	110.15
2	C	5	MAN	C1-O5-C5	2.31	115.29	112.19
2	E	4	MAN	O3-C3-C2	2.30	114.75	110.05
2	C	3	BMA	O2-C2-C3	-2.29	105.41	110.15
3	D	3	BMA	O2-C2-C3	-2.20	105.58	110.15
3	D	3	BMA	C3-C4-C5	-2.14	106.35	110.23
2	E	3	BMA	C1-O5-C5	2.11	115.01	112.19
3	F	3	BMA	C3-C4-C5	-2.09	106.45	110.23
3	D	4	MAN	O2-C2-C3	-2.06	105.88	110.15
2	C	6	MAN	C1-O5-C5	2.04	114.92	112.19
3	D	4	MAN	C1-O5-C5	2.04	114.92	112.19

There are no chirality outliers.

All (13) torsion outliers are listed below:

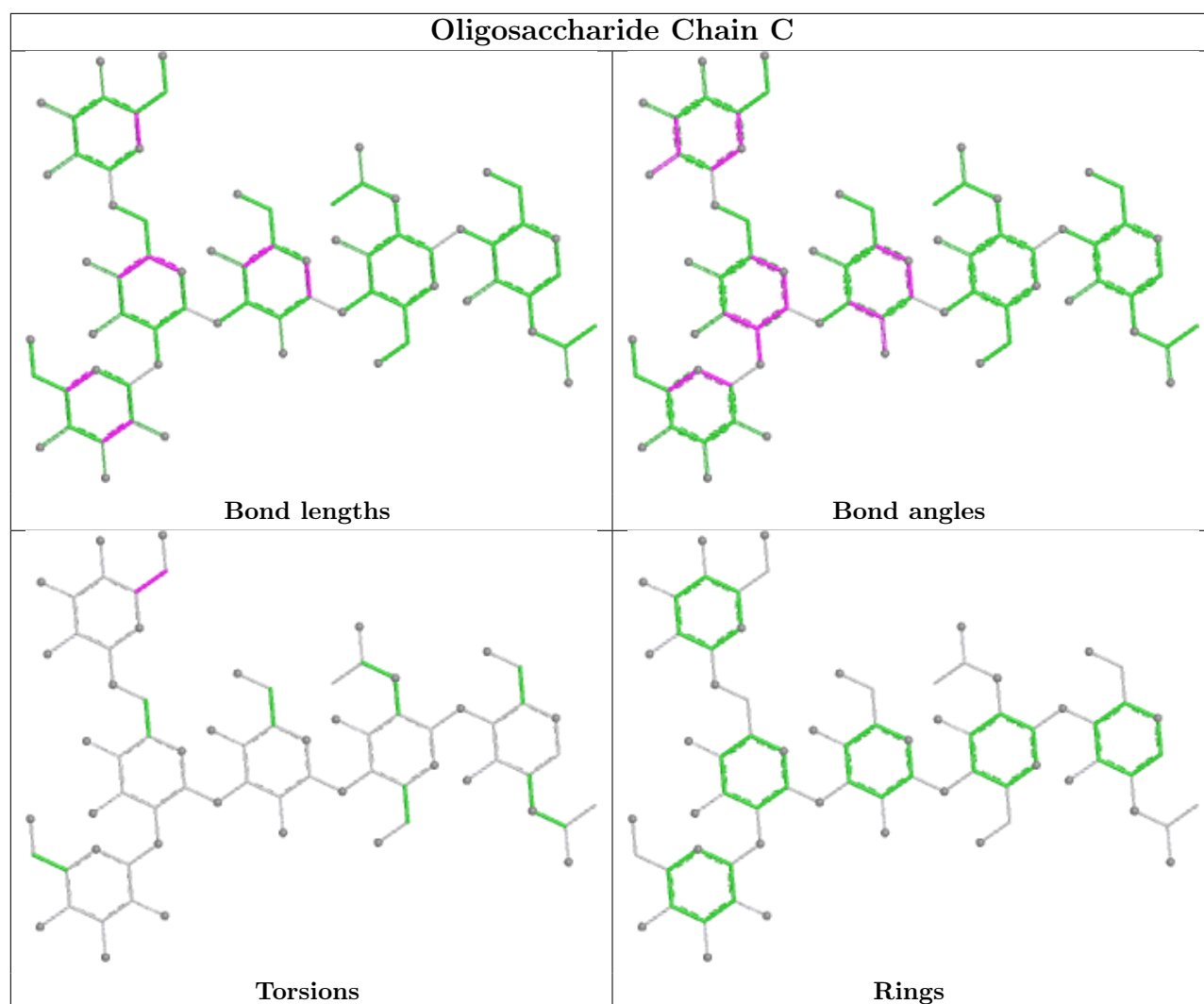
Mol	Chain	Res	Type	Atoms
2	E	6	MAN	O5-C5-C6-O6
2	C	6	MAN	O5-C5-C6-O6
3	F	1	NAG	C4-C5-C6-O6
3	F	1	NAG	O5-C5-C6-O6
3	F	2	NAG	C4-C5-C6-O6
3	F	2	NAG	O5-C5-C6-O6
2	E	6	MAN	C4-C5-C6-O6
2	C	6	MAN	C4-C5-C6-O6
2	E	3	BMA	C4-C5-C6-O6
3	D	2	NAG	C4-C5-C6-O6
3	D	2	NAG	O5-C5-C6-O6
3	D	2	NAG	C1-C2-N2-C7
2	E	3	BMA	O5-C5-C6-O6

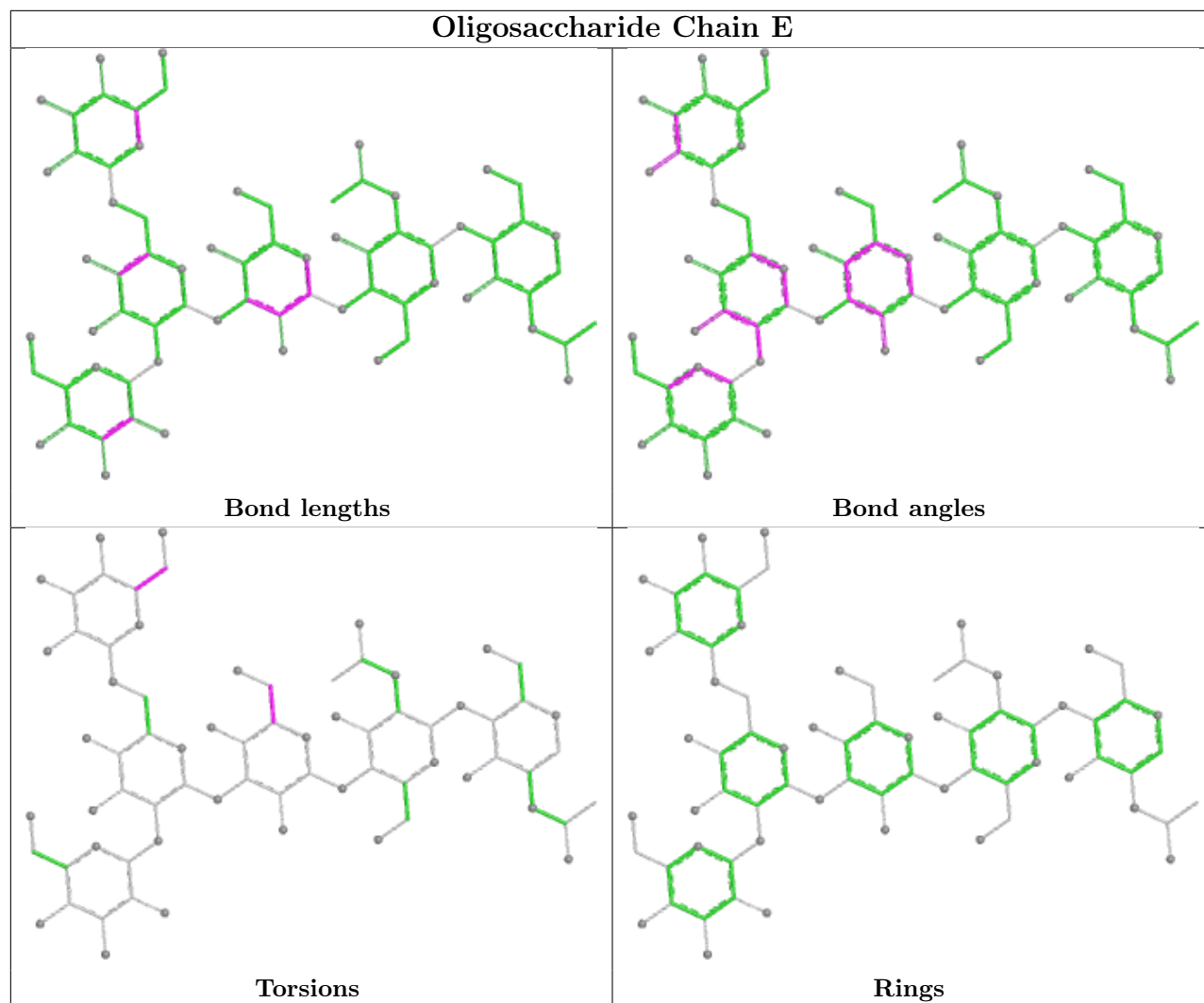
There are no ring outliers.

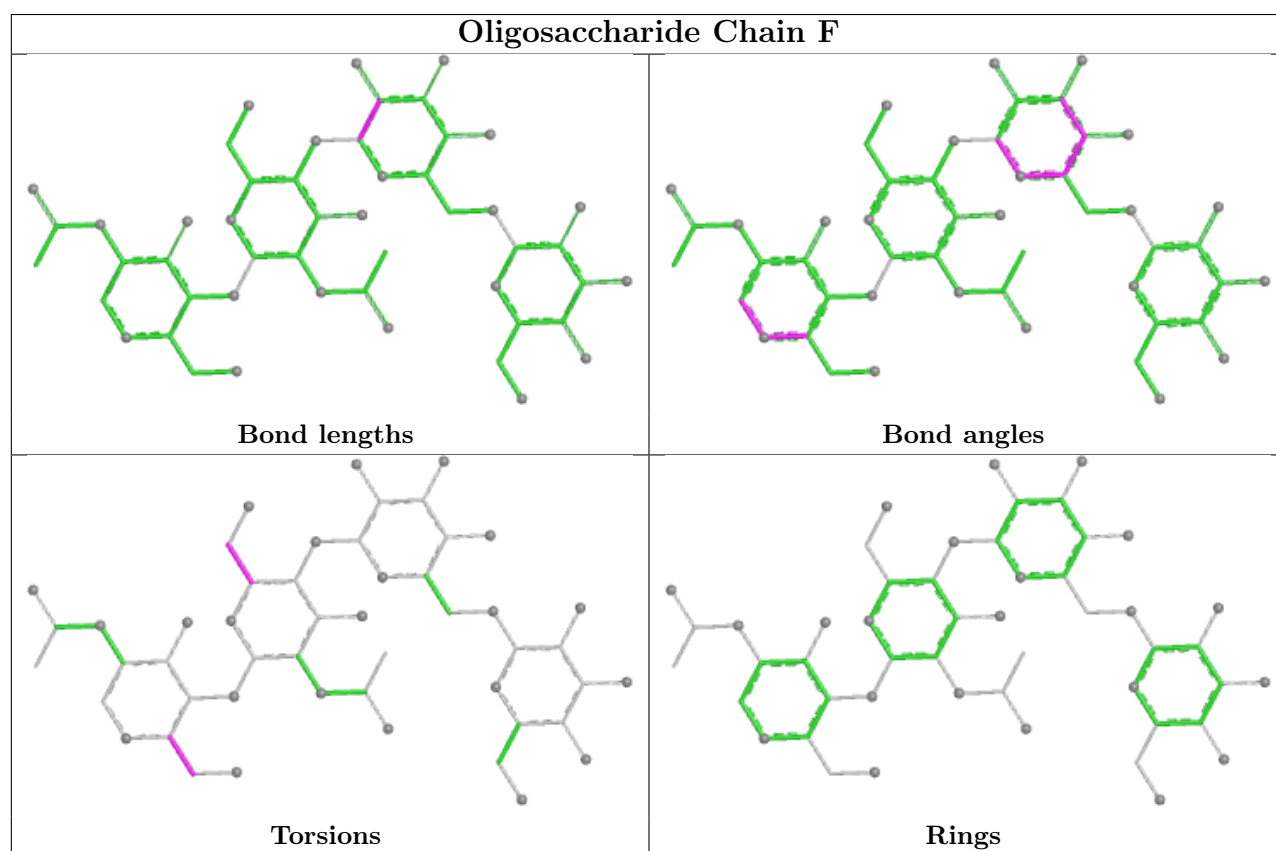
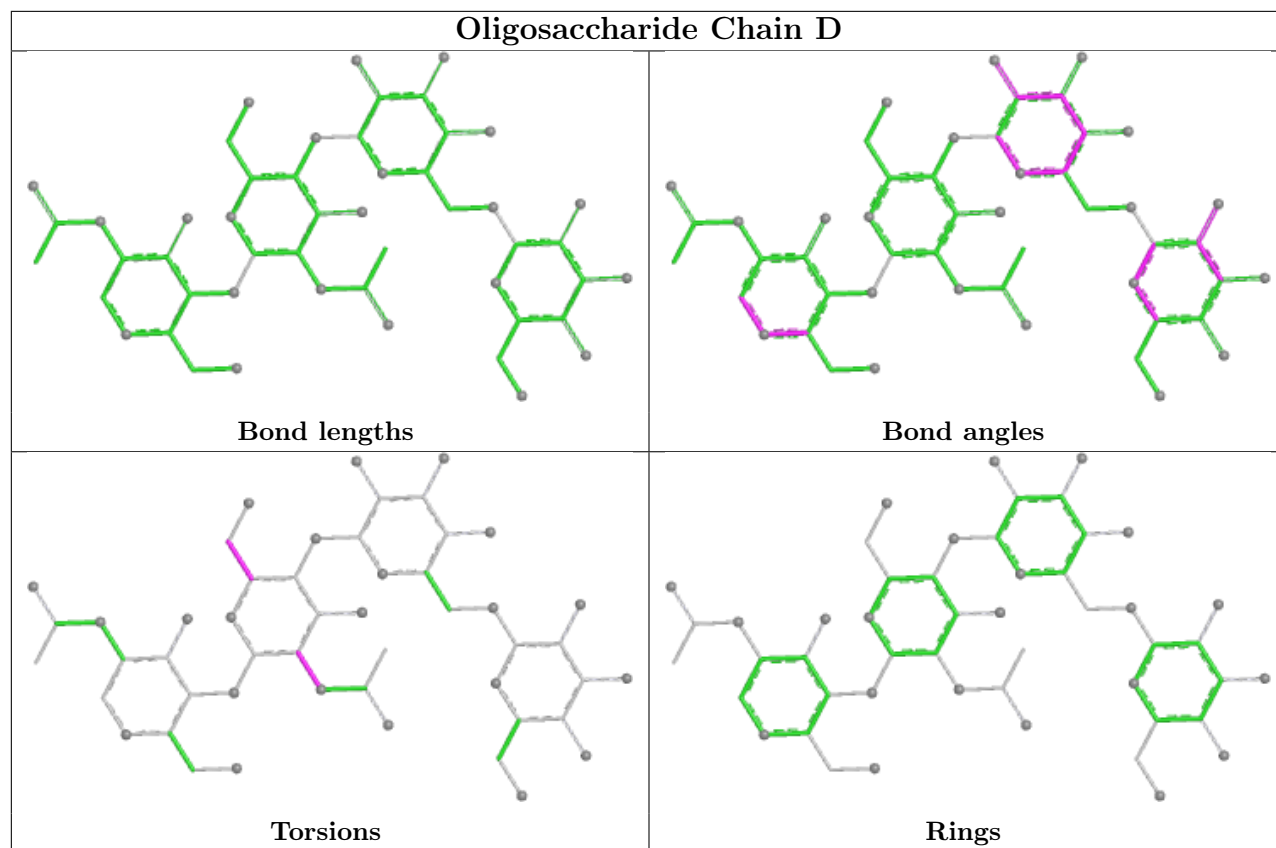
3 monomers are involved in 3 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	D	2	NAG	1	0
3	F	4	MAN	1	0
3	F	2	NAG	1	0

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







5.6 Ligand geometry

There are no ligands in this entry.

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, 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	333/383 (86%)	0.82	44 (13%) 7 6	19, 44, 89, 130	1 (0%)
1	B	328/383 (85%)	0.83	43 (13%) 7 6	20, 46, 86, 126	0
All	All	661/766 (86%)	0.82	87 (13%) 7 6	19, 44, 86, 130	1 (0%)

All (87) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	47	SER	5.7
1	B	303	ASN	4.9
1	A	331	VAL	4.8
1	B	240	TYR	4.6
1	A	304	GLY	4.5
1	B	46	ASP	4.4
1	B	262	CYS	4.3
1	A	302	CYS	4.1
1	A	48	GLY	4.0
1	A	253	LYS	4.0
1	A	301	ASP	4.0
1	B	289	ALA	3.9
1	A	339	CYS	3.8
1	A	262	CYS	3.8
1	A	325	GLU	3.7
1	B	331	VAL	3.7
1	B	304	GLY	3.6
1	A	349	MET	3.6
1	B	302	CYS	3.5
1	A	240	TYR	3.5
1	B	250	ILE	3.5
1	A	252	ASP	3.4
1	B	299	ILE	3.3
1	B	272	PHE	3.3

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
1	A	299	ILE	3.3
1	B	329	TYR	3.2
1	B	109	ASP	3.2
1	A	285	GLN	3.1
1	B	349	MET	3.1
1	B	288	GLY	3.1
1	B	337	ALA	3.1
1	A	46	ASP	3.1
1	A	287	ILE	3.1
1	B	147	HIS	3.1
1	A	239	GLY	3.0
1	A	383	VAL	3.0
1	B	301	ASP	3.0
1	B	332	GLY	2.9
1	A	147	HIS	2.9
1	A	288	GLY	2.9
1	B	239	GLY	2.7
1	B	287	ILE	2.7
1	B	285	GLN	2.6
1	B	261	GLY	2.6
1	A	307	SER	2.6
1	B	255	SER	2.6
1	A	160	VAL	2.6
1	A	334	GLY	2.6
1	B	307	SER	2.6
1	B	252	ASP	2.5
1	B	258	CYS	2.5
1	A	101	ILE	2.5
1	B	101	ILE	2.5
1	A	336	ALA	2.5
1	A	303	ASN	2.5
1	B	70	THR	2.4
1	B	99	CYS	2.4
1	A	250	ILE	2.4
1	B	71	PRO	2.4
1	B	100	VAL	2.4
1	B	238	LYS	2.4
1	A	305	ILE	2.4
1	B	339	CYS	2.4
1	A	249	LEU	2.3
1	B	284	ASN	2.3
1	B	48	GLY	2.3

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
1	A	128	ALA	2.3
1	B	45	ARG	2.3
1	B	348	ILE	2.3
1	A	258	CYS	2.3
1	A	99	CYS	2.2
1	B	253	LYS	2.2
1	A	330	LYS	2.2
1	B	338	THR	2.2
1	A	309	PRO	2.2
1	A	108	GLY	2.2
1	A	255	SER	2.2
1	A	109	ASP	2.1
1	B	300	VAL	2.1
1	B	125	GLY	2.1
1	A	247	ASP	2.1
1	A	113	TYR	2.1
1	A	82	GLY	2.1
1	A	125	GLY	2.1
1	A	60	THR	2.0
1	B	344	THR	2.0
1	A	319	LEU	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, 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.

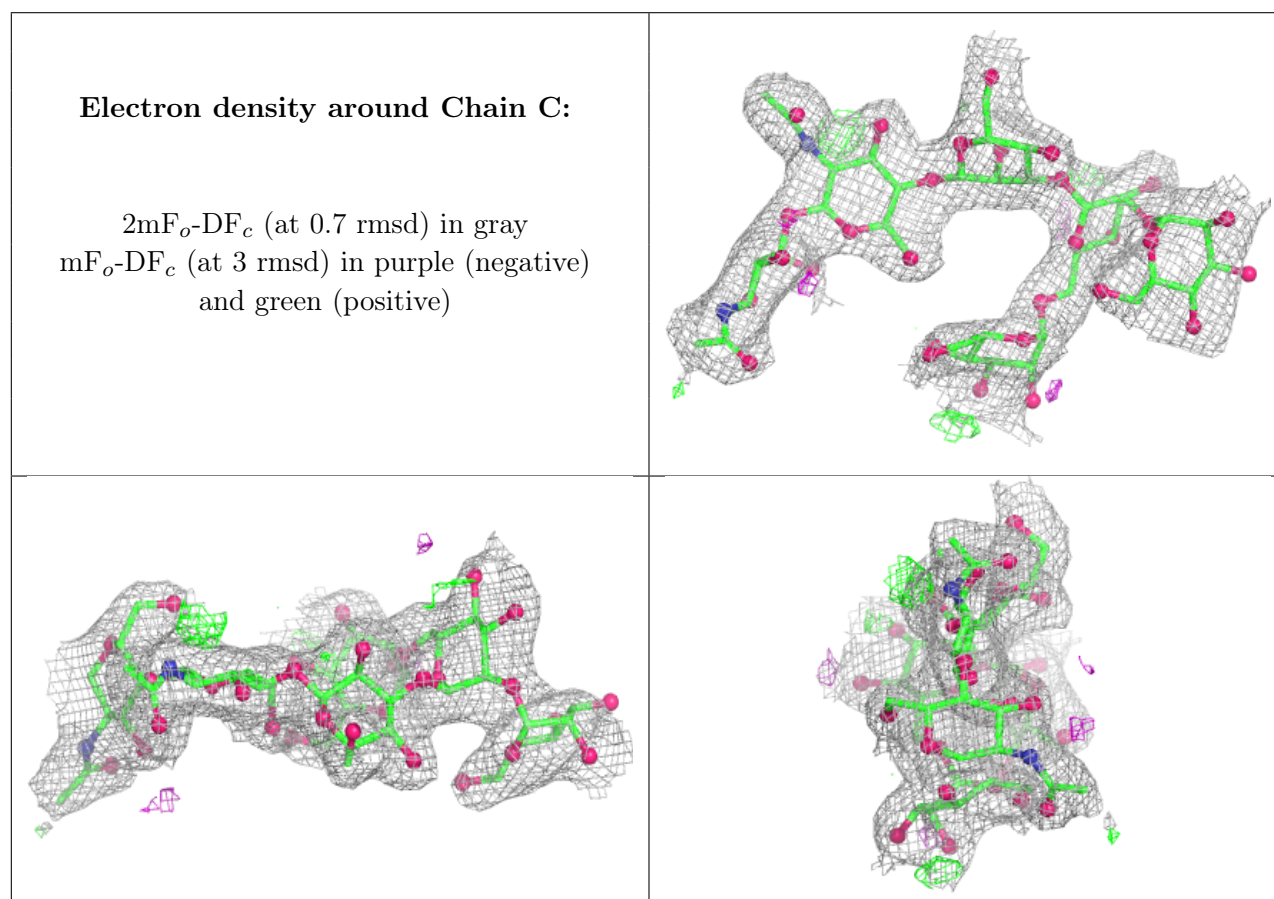
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
3	MAN	F	4	11/12	0.52	0.18	81,95,106,107	0
3	MAN	D	4	11/12	0.58	0.17	81,91,100,101	0
3	BMA	F	3	11/12	0.58	0.18	80,87,93,101	0
3	BMA	D	3	11/12	0.58	0.17	91,99,103,104	0
2	MAN	E	5	11/12	0.76	0.18	75,81,84,85	0
2	MAN	E	6	11/12	0.76	0.18	73,76,83,90	0
2	MAN	C	5	11/12	0.77	0.17	67,74,77,79	0

Continued on next page...

Continued from previous page...

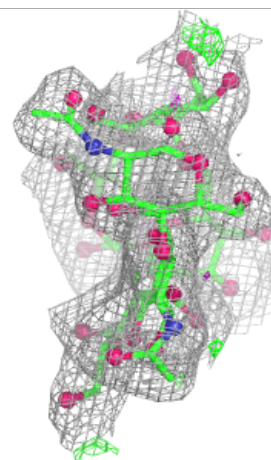
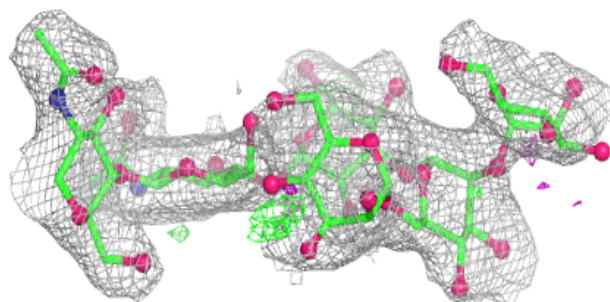
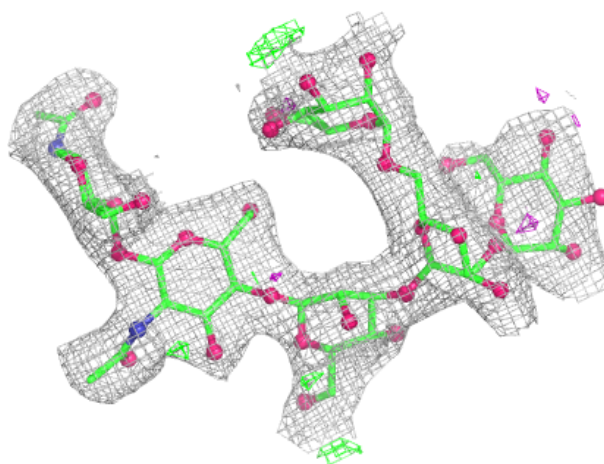
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
2	MAN	C	6	11/12	0.80	0.18	50,63,75,78	0
2	BMA	E	3	11/12	0.86	0.12	34,56,66,68	0
3	NAG	F	2	14/15	0.87	0.13	48,55,73,80	0
2	NAG	E	2	14/15	0.89	0.11	27,42,60,66	0
3	NAG	D	2	14/15	0.90	0.10	26,50,68,82	0
3	NAG	D	1	14/15	0.90	0.11	24,39,50,56	0
2	MAN	E	4	11/12	0.92	0.12	33,58,69,75	0
2	MAN	C	4	11/12	0.92	0.09	39,49,58,59	0
3	NAG	F	1	14/15	0.93	0.10	21,36,50,55	0
2	BMA	C	3	11/12	0.93	0.08	33,47,56,63	0
2	NAG	C	1	14/15	0.93	0.10	31,39,51,56	0
2	NAG	E	1	14/15	0.93	0.10	28,40,51,62	0
2	NAG	C	2	14/15	0.94	0.08	25,43,52,58	0

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



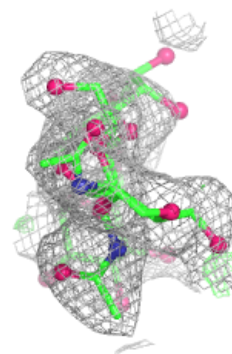
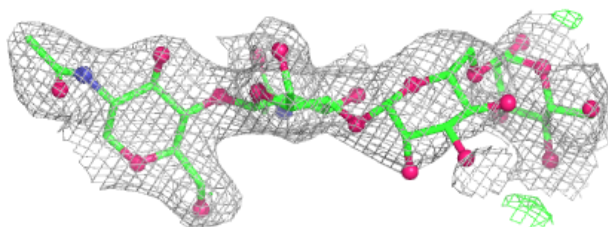
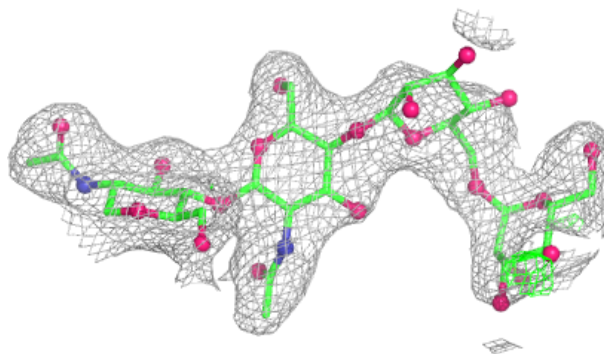
Electron density around Chain E:

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

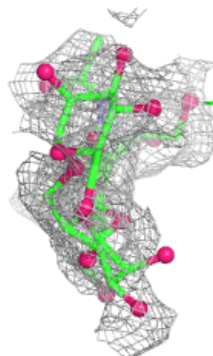
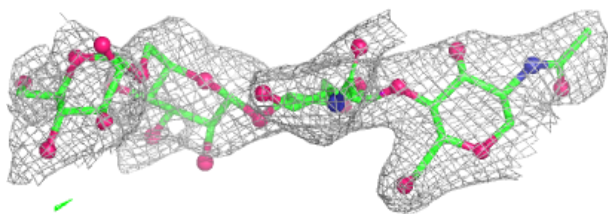
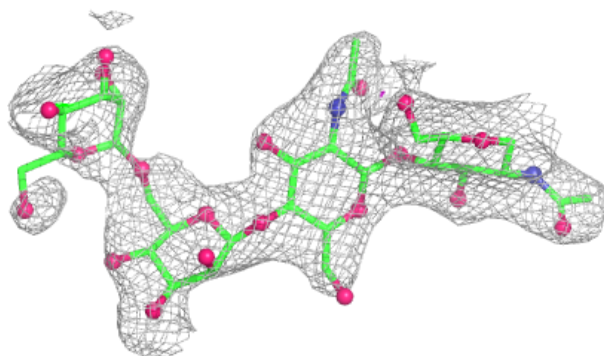


Electron density around Chain D:

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

**Electron density around Chain F:**

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



6.4 Ligands [i](#)

There are no ligands in this entry.

6.5 Other polymers [i](#)

There are no such residues in this entry.