



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 8, 2026 – 05:12 PM UTC

PDB ID : 9GXF / pdb_00009gxf
Title : Crystal structure of Lotus japonicus CHIP13 extracellular domain
Authors : Gysel, K.; Andersen, K.R.
Deposited on : 2024-09-30
Resolution : 1.64 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

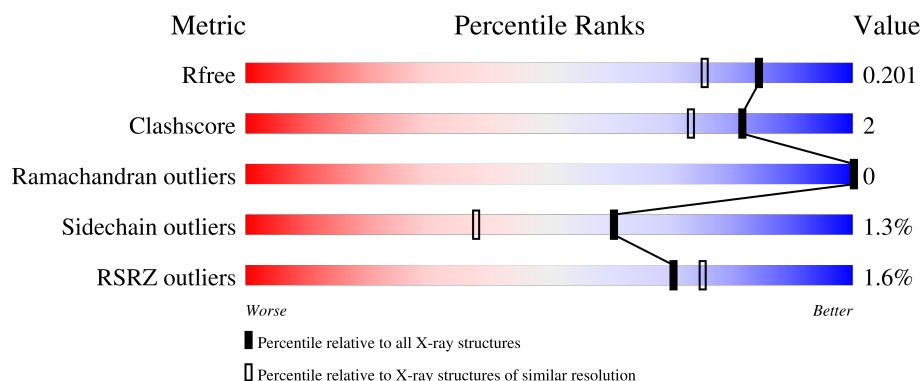
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.64 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.



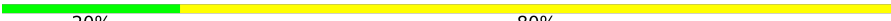
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	180053	1141 (1.64-1.64)
Clashscore	190562	1171 (1.64-1.64)
Ramachandran outliers	187476	1151 (1.64-1.64)
Sidechain outliers	187428	1150 (1.64-1.64)
RSRZ outliers	180081	1141 (1.64-1.64)

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	227	<div> <div style="width: 100%; height: 10px; background: linear-gradient(to right, red, orange, yellow, green, grey);"></div> <div style="display: flex; justify-content: space-between; padding: 0 5px;"> % 93% ... </div> </div>
1	B	227	<div> <div style="width: 100%; height: 10px; background: linear-gradient(to right, red, orange, yellow, green, grey);"></div> <div style="display: flex; justify-content: space-between; padding: 0 5px;"> 2% 88% 8% . </div> </div>
2	C	3	<div> <div style="width: 100%; height: 10px; background: linear-gradient(to right, yellow, green, grey);"></div> <div style="display: flex; justify-content: space-between; padding: 0 5px;"> 100% </div> </div>
3	D	2	<div> <div style="width: 100%; height: 10px; background: linear-gradient(to right, yellow, green, grey);"></div> <div style="display: flex; justify-content: space-between; padding: 0 5px;"> 100% </div> </div>
4	E	5	<div> <div style="width: 100%; height: 10px; background: linear-gradient(to right, green, yellow, orange, red, grey);"></div> <div style="display: flex; justify-content: space-between; padding: 0 5px;"> 20% 60% 20% </div> </div>

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Mol	Chain	Length	Quality of chain
4	F	5	 A horizontal bar chart showing the quality of chain 4. The bar is divided into two segments: a green segment on the left labeled '20%' and a yellow segment on the right labeled '80%'. The green segment represents the percentage of residues that are outliers for geometric or electron-density-fit criteria.

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
6	ACT	B	303	-	-	X	-

2 Entry composition

There are 8 unique types of molecules in this entry. The entry contains 4274 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.

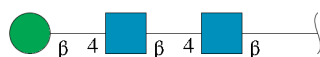
- Molecule 1 is a protein called LysM type receptor kinase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	218	Total	C	N	O	S	0	12	0
			1724	1080	274	360	10			
1	B	218	Total	C	N	O	S	0	15	0
			1763	1102	283	368	10			

There are 12 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	254	HIS	-	expression tag	UNP D3KU00
A	255	HIS	-	expression tag	UNP D3KU00
A	256	HIS	-	expression tag	UNP D3KU00
A	257	HIS	-	expression tag	UNP D3KU00
A	258	HIS	-	expression tag	UNP D3KU00
A	259	HIS	-	expression tag	UNP D3KU00
B	254	HIS	-	expression tag	UNP D3KU00
B	255	HIS	-	expression tag	UNP D3KU00
B	256	HIS	-	expression tag	UNP D3KU00
B	257	HIS	-	expression tag	UNP D3KU00
B	258	HIS	-	expression tag	UNP D3KU00
B	259	HIS	-	expression tag	UNP D3KU00

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



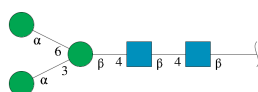
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
2	C	3	Total	C	N	O	0	0	0
			39	22	2	15			

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



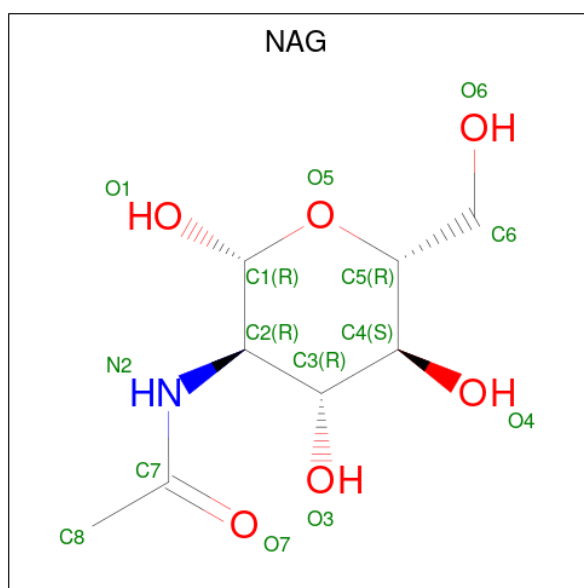
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
3	D	2	Total	C	N	O	0	0	0
			28	16	2	10			

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



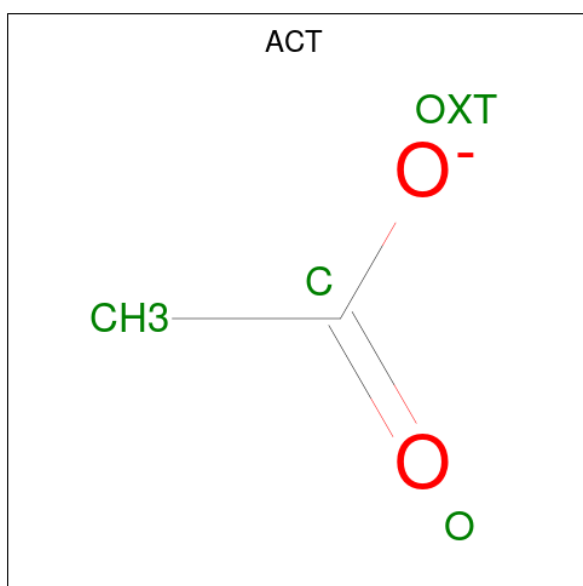
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
4	E	5	Total	C	N	O	0	0	0
			61	34	2	25			
4	F	5	Total	C	N	O	0	0	0
			61	34	2	25			

- Molecule 5 is 2-acetamido-2-deoxy-beta-D-glucopyranose (CCD ID: NAG) (formula: $C_8H_{15}NO_6$).



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

- Molecule 6 is ACETATE ION (CCD ID: ACT) (formula: $C_2H_3O_2$).



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

- Molecule 7 is GLYCEROL (CCD ID: GOL) (formula: $C_3H_8O_3$).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
7	A	1	Total	C	O	0	0
			6	3	3		

- Molecule 8 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
8	A	260	Total	O	0	0
			260	260		
8	B	268	Total	O	0	0
			268	268		

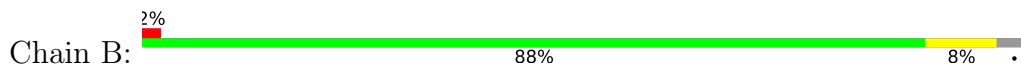
3 Residue-property plots [i](#)

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: LysM type receptor kinase



- Molecule 1: LysM type receptor kinase



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



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



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



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

Chain F:  20% 80%

MAG1
MAG2
EMA3
MAN4
MAN5

4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	58.74Å 91.90Å 92.07Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	49.49 – 1.64 49.49 – 1.64	Depositor EDS
% Data completeness (in resolution range)	99.8 (49.49-1.64) 99.8 (49.49-1.64)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.21 (at 1.64Å)	Xtriage
Refinement program	PHENIX 1.21.1_5286	Depositor
R, R_{free}	0.176 , 0.201 0.176 , 0.201	Depositor DCC
R_{free} test set	2122 reflections (3.44%)	wwPDB-VP
Wilson B-factor (Å ²)	27.7	Xtriage
Anisotropy	0.152	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.35 , 45.3	EDS
L-test for twinning ²	$\langle L \rangle = 0.51$, $\langle L^2 \rangle = 0.34$	Xtriage
Estimated twinning fraction	0.000 for -h,l,k	Xtriage
F_o, F_c correlation	0.97	EDS
Total number of atoms	4274	wwPDB-VP
Average B, all atoms (Å ²)	35.0	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 40.47 % 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 2.7231e-04. 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: PCA, BMA, GOL, NAG, MAN, ACT

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	0.23	0/1785	0.45	0/2441
1	B	0.24	0/1816	0.45	0/2485
All	All	0.24	0/3601	0.45	0/4926

There are no bond length outliers.

There are no bond angle outliers.

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	1724	0	1673	3	1
1	B	1763	0	1694	15	0
2	C	39	0	34	0	0
3	D	28	0	25	0	0
4	E	61	0	52	0	1
4	F	61	0	52	0	0
5	A	28	0	26	0	0
5	B	28	0	26	0	0
6	A	4	0	3	0	0
6	B	4	0	3	2	0
7	A	6	0	8	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
8	A	260	0	0	1	0
8	B	268	0	0	5	0
All	All	4274	0	3596	18	1

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 2.

All (18) 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:126:ASN:H	6:B:303:ACT:H2	1.30	0.96
1:A:69:LYS:HG3	1:A:109:MET:HE3	1.61	0.82
1:B:74[A]:GLU:OE1	8:B:401:HOH:O	2.14	0.65
1:A:109:MET:HG2	1:A:248:LEU:HD12	1.78	0.64
1:B:69:LYS:HG3	1:B:109:MET:HE3	1.83	0.60
1:B:126:ASN:N	6:B:303:ACT:H2	2.08	0.59
1:A:200:GLN:NE2	8:A:402:HOH:O	2.32	0.59
1:B:137:THR:O	1:B:141[A]:ILE:HG12	2.02	0.59
1:B:165[A]:ASN:ND2	8:B:409:HOH:O	2.38	0.57
1:B:173[B]:HIS:ND1	8:B:403:HOH:O	2.35	0.49
1:B:111[B]:THR:HG21	1:B:244:PRO:HG3	1.98	0.44
1:B:190:PHE:CD1	1:B:239:PRO:HB2	2.54	0.43
1:B:129:TYR:CE2	1:B:141[A]:ILE:HD12	2.54	0.43
1:B:109:MET:HG2	1:B:248:LEU:HD12	2.02	0.42
1:B:60[B]:THR:HG22	8:B:434:HOH:O	2.19	0.41
1:B:109:MET:HE1	1:B:197:LEU:HB2	2.02	0.41
1:B:141[A]:ILE:HD13	8:B:461:HOH:O	2.20	0.41
1:B:79[B]:SER:HA	1:B:89:PRO:HG3	2.02	0.41

All (1) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:225:ASP:OD2	4:E:3:BMA:O4[2_454]	2.18	0.02

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	228/227 (100%)	219 (96%)	9 (4%)	0	100	100
1	B	231/227 (102%)	224 (97%)	7 (3%)	0	100	100
All	All	459/454 (101%)	443 (96%)	16 (4%)	0	100	100

There are no Ramachandran outliers to report.

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	209/204 (102%)	205 (98%)	4 (2%)	50	23
1	B	212/204 (104%)	210 (99%)	2 (1%)	70	54
All	All	421/408 (103%)	415 (99%)	6 (1%)	61	35

All (6) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	109	MET
1	A	111[A]	THR
1	A	111[B]	THR
1	A	200	GLN
1	B	49	ASN
1	B	109	MET

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (8) such

sidechains are listed below:

Mol	Chain	Res	Type
1	A	48	HIS
1	A	54	ASN
1	A	124	GLN
1	A	158	GLN
1	A	200	GLN
1	B	48	HIS
1	B	124	GLN
1	B	158	GLN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

2 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	PCA	B	33	1	7,8,9	0.72	0	9,10,12	1.14	0
1	PCA	A	33	1	7,8,9	0.63	0	9,10,12	1.30	1 (11%)

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	PCA	B	33	1	-	0/0/11/13	0/1/1/1
1	PCA	A	33	1	-	0/0/11/13	0/1/1/1

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	33	PCA	CB-CA-N	2.11	109.05	103.24

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

5.5 Carbohydrates

15 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	2,1	14,14,15	0.73	0	17,19,21	0.98	1 (5%)
2	NAG	C	2	2	14,14,15	0.82	0	17,19,21	1.28	3 (17%)
2	BMA	C	3	2	11,11,12	0.81	0	15,15,17	3.05	7 (46%)
3	NAG	D	1	1,3	14,14,15	0.70	0	17,19,21	1.43	1 (5%)
3	NAG	D	2	3	14,14,15	0.72	0	17,19,21	0.99	1 (5%)
4	NAG	E	1	4,1	14,14,15	0.83	0	17,19,21	1.07	1 (5%)
4	NAG	E	2	4	14,14,15	0.76	0	17,19,21	0.77	0
4	BMA	E	3	4	11,11,12	0.93	0	15,15,17	2.97	7 (46%)
4	MAN	E	4	4	11,11,12	0.75	0	15,15,17	1.01	1 (6%)
4	MAN	E	5	4	11,11,12	0.69	0	15,15,17	1.39	1 (6%)
4	NAG	F	1	4,1	14,14,15	0.64	0	17,19,21	1.36	2 (11%)
4	NAG	F	2	4	14,14,15	0.72	0	17,19,21	0.83	0
4	BMA	F	3	4	11,11,12	0.89	0	15,15,17	2.26	5 (33%)
4	MAN	F	4	4	11,11,12	0.84	1 (9%)	15,15,17	1.03	1 (6%)
4	MAN	F	5	4	11,11,12	0.67	0	15,15,17	2.41	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	NAG	C	1	2,1	-	0/6/23/26	0/1/1/1
2	NAG	C	2	2	-	2/6/23/26	0/1/1/1
2	BMA	C	3	2	-	0/2/19/22	0/1/1/1
3	NAG	D	1	1,3	-	0/6/23/26	0/1/1/1
3	NAG	D	2	3	-	0/6/23/26	0/1/1/1
4	NAG	E	1	4,1	-	0/6/23/26	0/1/1/1
4	NAG	E	2	4	-	2/6/23/26	0/1/1/1
4	BMA	E	3	4	-	0/2/19/22	0/1/1/1
4	MAN	E	4	4	-	2/2/19/22	1/1/1/1
4	MAN	E	5	4	-	0/2/19/22	0/1/1/1
4	NAG	F	1	4,1	-	2/6/23/26	0/1/1/1
4	NAG	F	2	4	-	0/6/23/26	0/1/1/1
4	BMA	F	3	4	-	0/2/19/22	0/1/1/1
4	MAN	F	4	4	-	0/2/19/22	0/1/1/1
4	MAN	F	5	4	-	0/2/19/22	0/1/1/1

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	F	4	MAN	O5-C1	-2.16	1.40	1.43

All (34) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	C	3	BMA	C1-O5-C5	9.53	124.96	112.19
4	E	3	BMA	C1-O5-C5	8.39	123.44	112.19
4	F	5	MAN	C1-O5-C5	7.16	121.79	112.19
4	F	3	BMA	C1-O5-C5	6.57	121.00	112.19
3	D	1	NAG	C1-O5-C5	4.47	118.18	112.19
4	E	5	MAN	C1-O5-C5	4.26	117.90	112.19
4	F	5	MAN	C1-C2-C3	-3.83	104.06	109.64
4	E	3	BMA	C3-C4-C5	3.72	116.98	110.23
4	E	3	BMA	C1-C2-C3	3.57	114.84	109.64
4	E	3	BMA	O3-C3-C2	-3.11	103.70	110.05
4	F	1	NAG	C1-C2-N2	2.93	115.05	110.43
2	C	3	BMA	C3-C4-C5	2.87	115.43	110.23
2	C	2	NAG	C4-C3-C2	2.85	115.19	111.02
4	E	4	MAN	C1-O5-C5	2.79	115.92	112.19
2	C	3	BMA	C2-C3-C4	2.76	115.71	110.86

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	E	3	BMA	C2-C3-C4	2.69	115.59	110.86
2	C	3	BMA	O4-C4-C3	-2.64	104.14	110.38
4	E	1	NAG	C1-O5-C5	2.64	115.72	112.19
4	F	3	BMA	O3-C3-C4	2.60	116.51	110.38
2	C	3	BMA	O5-C1-C2	2.60	116.99	110.79
4	F	1	NAG	C2-N2-C7	2.59	126.37	122.90
4	F	4	MAN	O3-C3-C2	-2.56	104.83	110.05
3	D	2	NAG	C2-N2-C7	2.48	126.23	122.90
4	E	3	BMA	O5-C5-C4	2.43	116.73	110.83
2	C	2	NAG	O5-C1-C2	-2.42	107.55	111.29
2	C	3	BMA	C1-C2-C3	2.21	112.87	109.64
2	C	3	BMA	O5-C5-C4	2.12	115.97	110.83
4	F	3	BMA	O3-C3-C2	-2.09	105.78	110.05
2	C	2	NAG	C2-N2-C7	2.06	125.67	122.90
2	C	1	NAG	C1-O5-C5	2.06	114.94	112.19
4	F	5	MAN	C2-C3-C4	-2.04	107.27	110.86
4	F	3	BMA	O4-C4-C3	-2.04	105.57	110.38
4	E	3	BMA	O4-C4-C3	-2.03	105.59	110.38
4	F	3	BMA	C2-C3-C4	2.02	114.42	110.86

There are no chirality outliers.

All (8) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	E	4	MAN	O5-C5-C6-O6
4	E	2	NAG	C8-C7-N2-C2
4	E	2	NAG	O7-C7-N2-C2
4	F	1	NAG	C8-C7-N2-C2
4	F	1	NAG	O7-C7-N2-C2
4	E	4	MAN	C4-C5-C6-O6
2	C	2	NAG	O5-C5-C6-O6
2	C	2	NAG	C4-C5-C6-O6

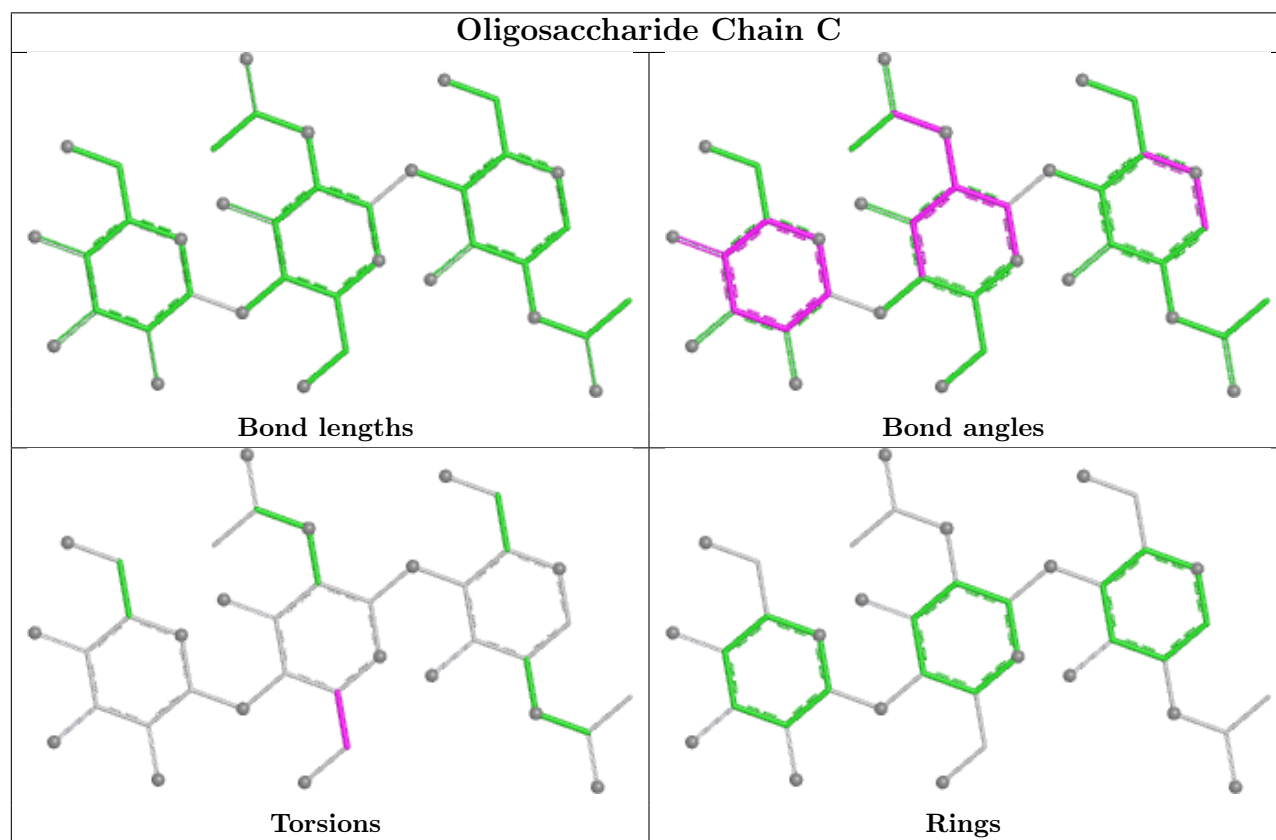
All (1) ring outliers are listed below:

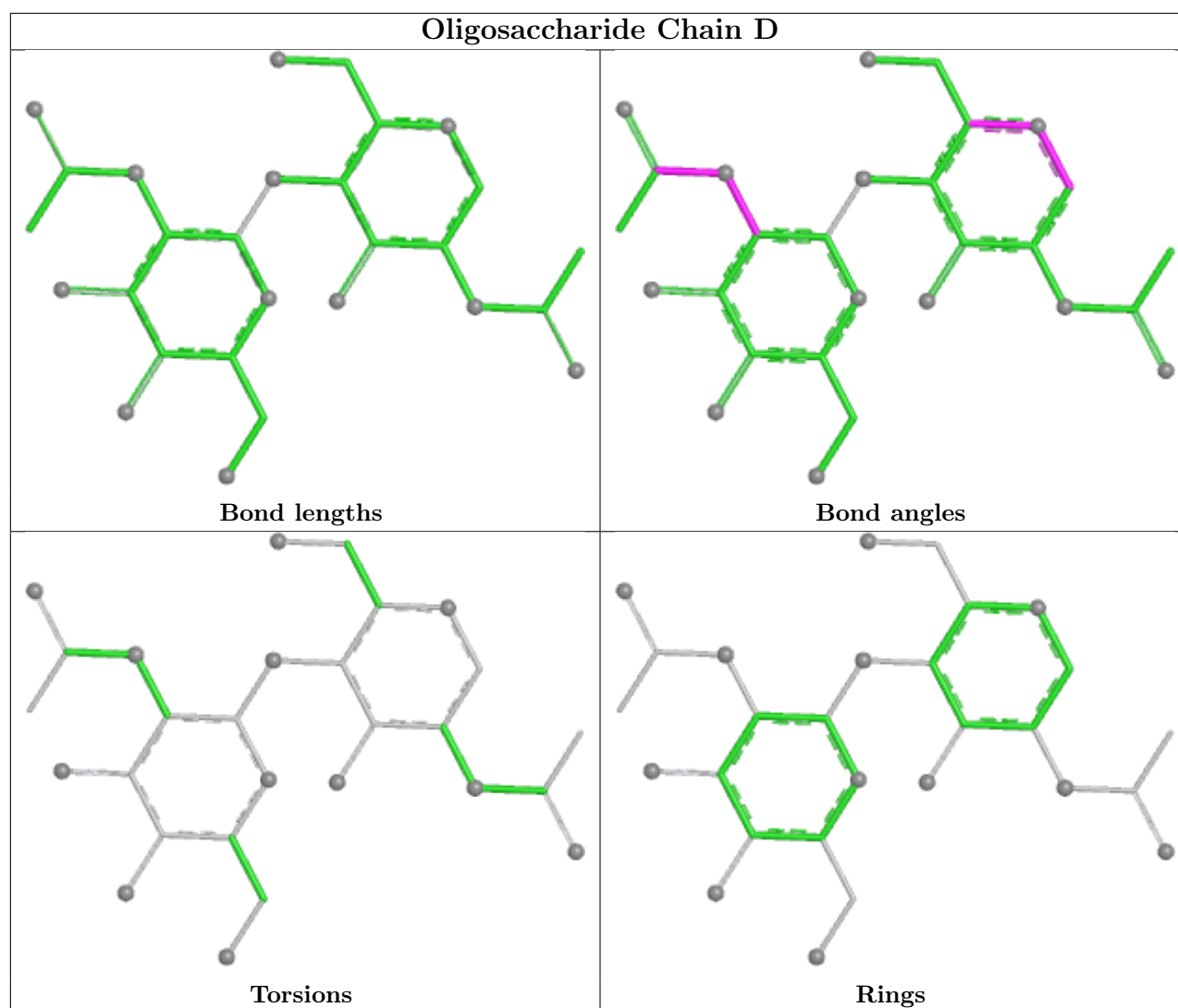
Mol	Chain	Res	Type	Atoms
4	E	4	MAN	C1-C2-C3-C4-C5-O5

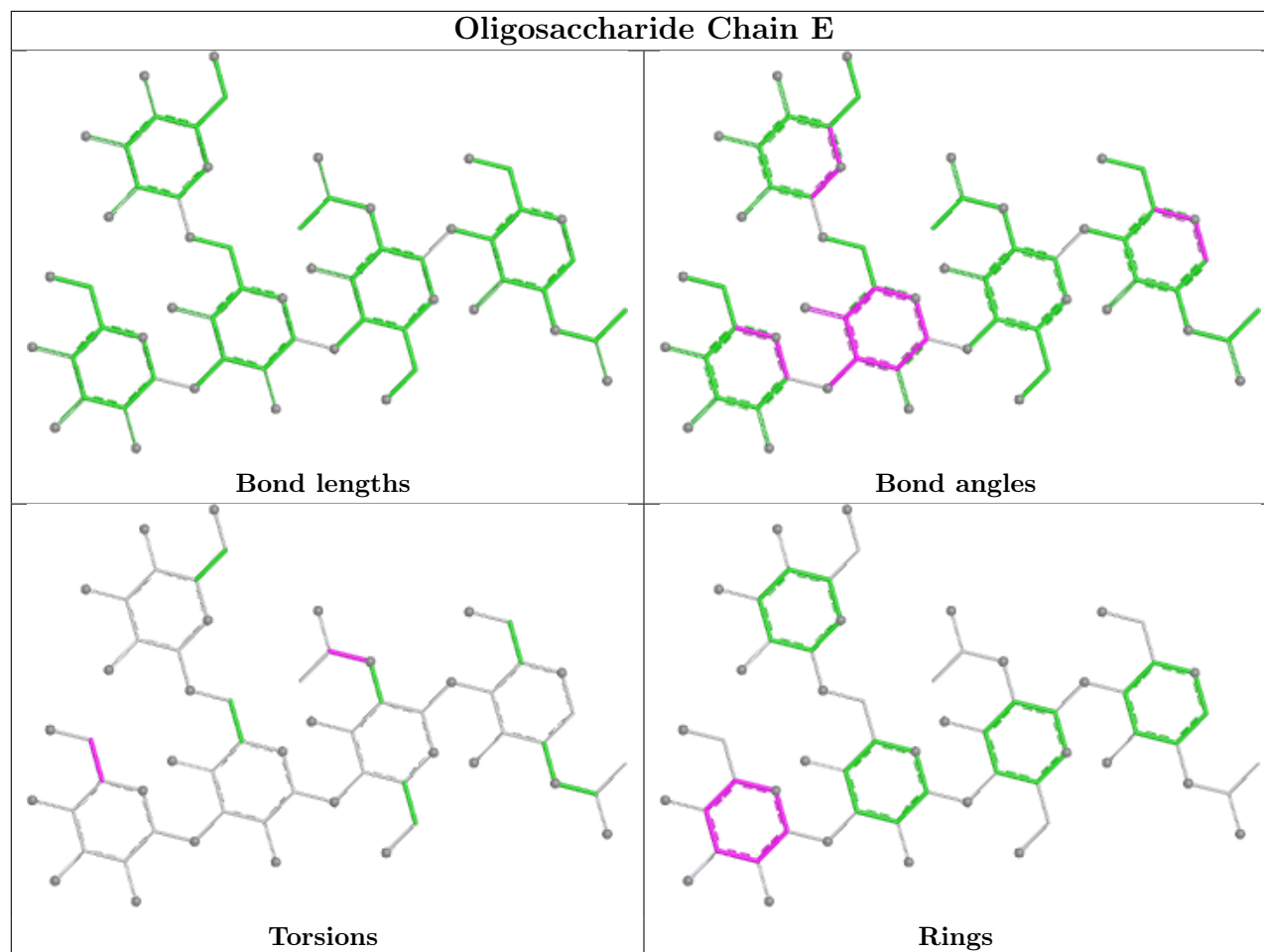
1 monomer is involved in 1 short contact:

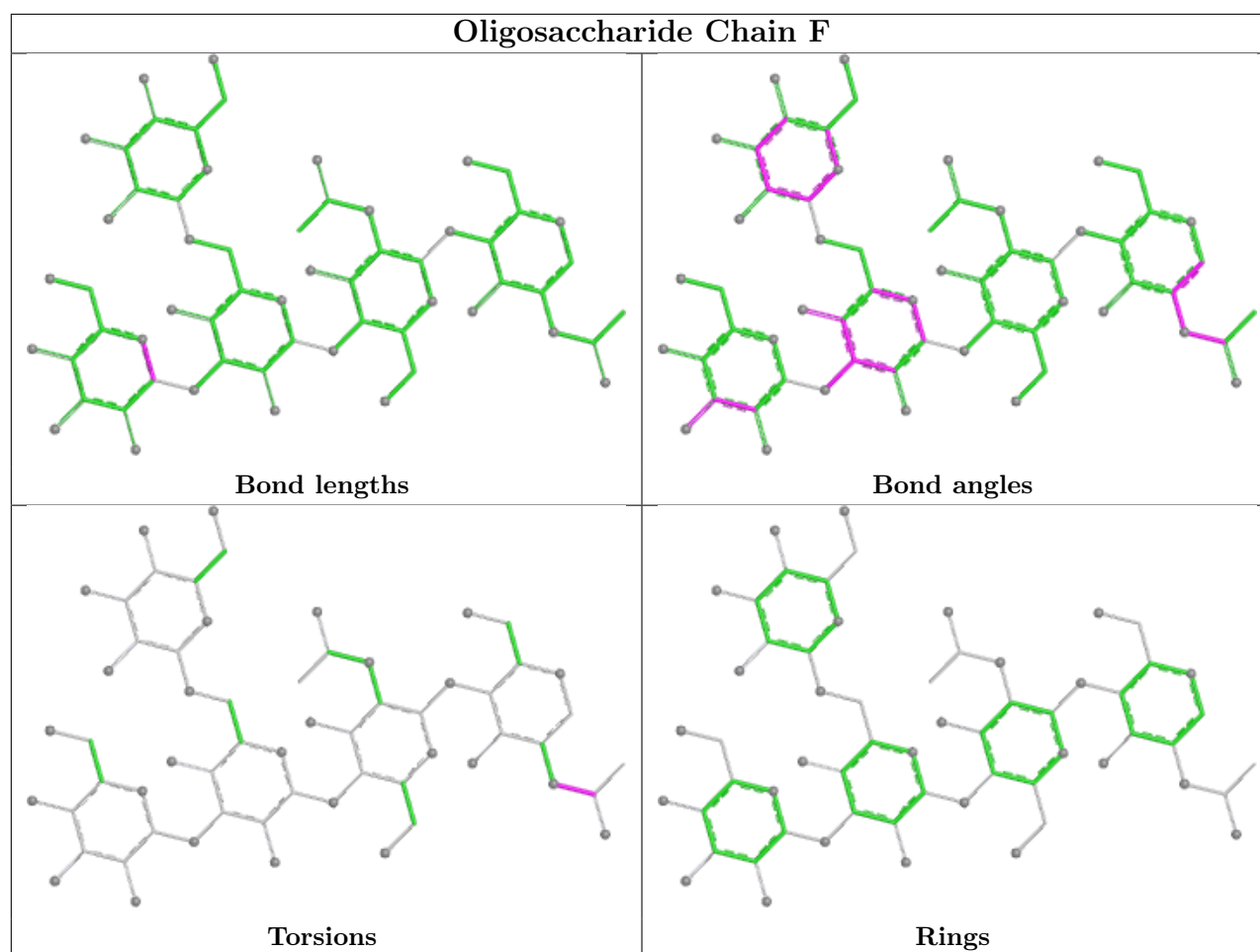
Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	E	3	BMA	0	1

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](#)

7 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	$\# Z > 2$
5	NAG	B	301	1	14,14,15	0.73	0	17,19,21	0.93	1 (5%)
5	NAG	B	302	1	14,14,15	0.70	0	17,19,21	1.00	1 (5%)
5	NAG	A	301	1	14,14,15	0.70	0	17,19,21	0.77	0
7	GOL	A	304	-	5,5,5	0.36	0	5,5,5	0.57	0
6	ACT	B	303	-	3,3,3	1.17	0	3,3,3	1.21	0
6	ACT	A	303	-	3,3,3	1.12	0	3,3,3	1.27	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
5	NAG	A	302	1	14,14,15	0.71	0	17,19,21	1.15	2 (11%)

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
5	NAG	B	301	1	-	1/6/23/26	0/1/1/1
5	NAG	B	302	1	-	0/6/23/26	0/1/1/1
5	NAG	A	301	1	-	2/6/23/26	0/1/1/1
7	GOL	A	304	-	-	0/4/4/4	-
5	NAG	A	302	1	-	2/6/23/26	0/1/1/1

There are no bond length outliers.

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	B	302	NAG	C1-O5-C5	2.34	115.32	112.19
5	A	302	NAG	C2-N2-C7	2.12	125.74	122.90
5	B	301	NAG	C2-N2-C7	2.10	125.71	122.90
5	A	302	NAG	C3-C4-C5	-2.06	106.49	110.23

There are no chirality outliers.

All (5) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
5	A	301	NAG	O5-C5-C6-O6
5	A	301	NAG	C4-C5-C6-O6
5	A	302	NAG	C4-C5-C6-O6
5	A	302	NAG	O5-C5-C6-O6
5	B	301	NAG	C1-C2-N2-C7

There are no ring outliers.

1 monomer is involved in 2 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
6	B	303	ACT	2	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 [i](#)

6.1 Protein, DNA and RNA chains [i](#)

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	217/227 (95%)	0.14	2 (0%) 81 85	15, 29, 47, 102	12 (5%)
1	B	217/227 (95%)	0.06	5 (2%) 61 66	11, 28, 47, 103	15 (6%)
All	All	434/454 (95%)	0.10	7 (1%) 70 75	11, 29, 47, 103	27 (6%)

All (7) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	250	ILE	6.0
1	B	250	ILE	4.6
1	B	233	PHE	4.5
1	B	141[A]	ILE	2.3
1	A	152	CYS	2.2
1	B	102	THR	2.0
1	B	109	MET	2.0

6.2 Non-standard residues in protein, DNA, RNA chains [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
1	PCA	A	33	8/9	0.94	0.07	29,30,33,34	0
1	PCA	B	33	8/9	0.98	0.06	25,27,30,31	0

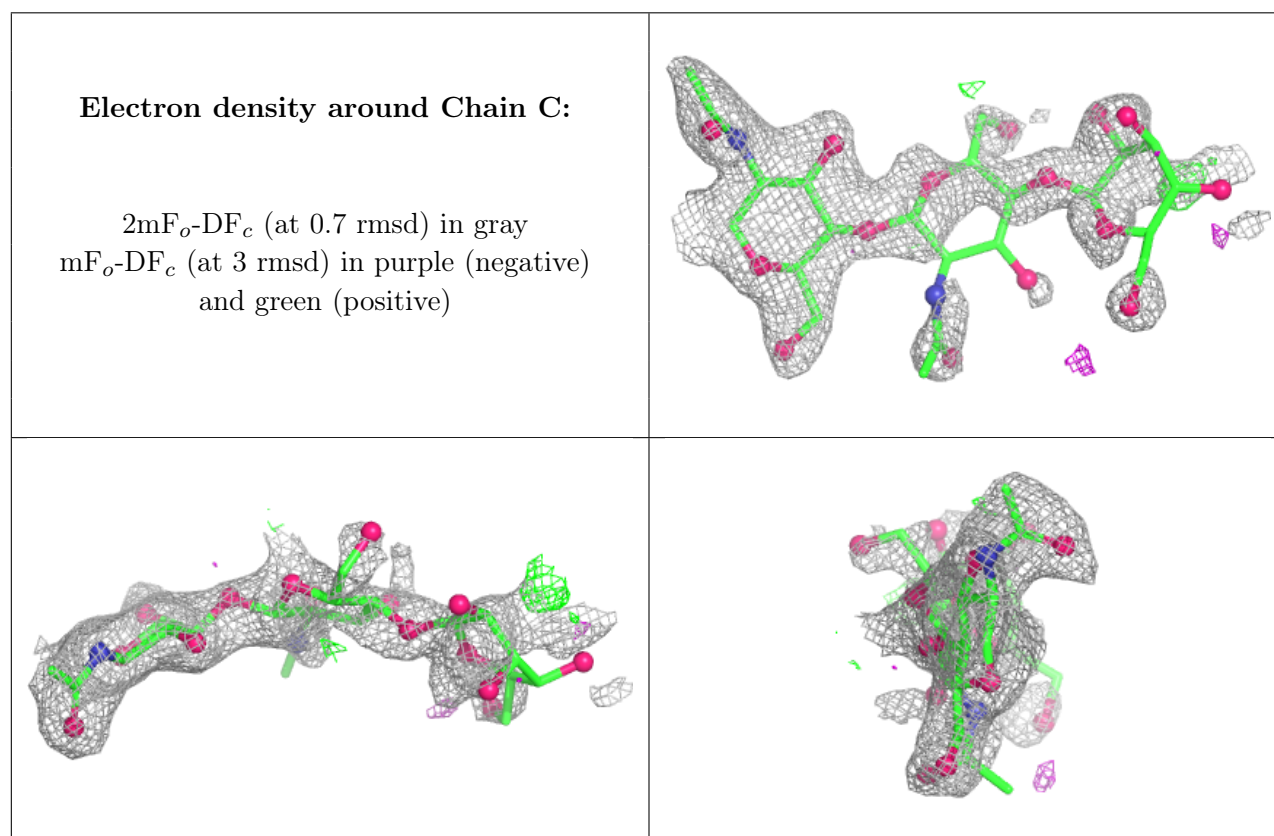
6.3 Carbohydrates [i](#)

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.

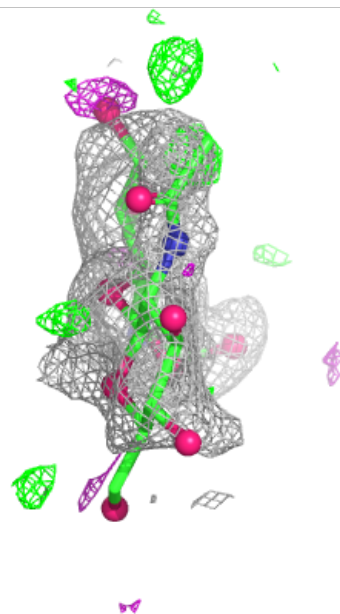
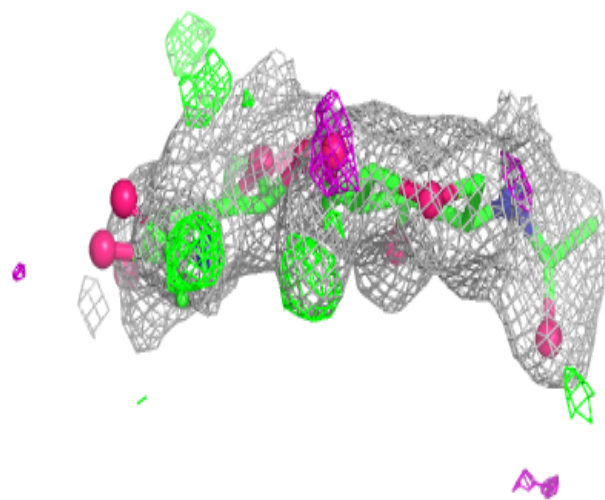
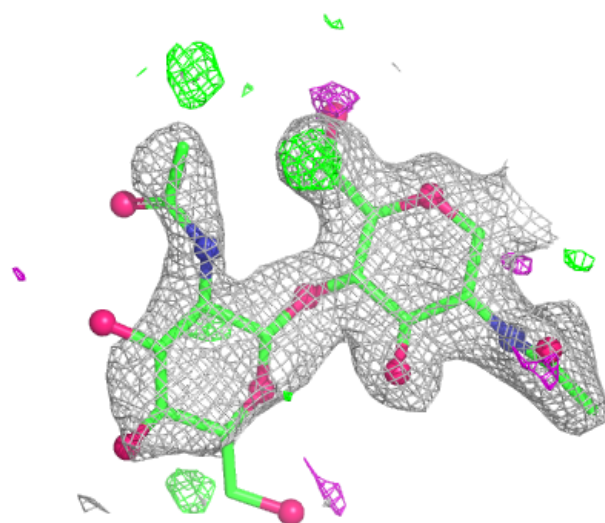
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
4	MAN	E	4	11/12	0.35	0.17	89,90,93,94	0
4	BMA	F	3	11/12	0.59	0.17	75,81,90,97	11
4	MAN	F	5	11/12	0.62	0.27	106,112,115,118	0
3	NAG	D	2	14/15	0.64	0.17	62,73,78,82	0
2	NAG	C	2	14/15	0.64	0.17	70,79,82,83	0
4	MAN	F	4	11/12	0.65	0.17	82,84,87,88	0
2	BMA	C	3	11/12	0.67	0.16	75,81,85,86	0
4	NAG	E	2	14/15	0.81	0.11	49,60,66,71	0
4	BMA	E	3	11/12	0.81	0.12	67,72,79,84	0
4	MAN	E	5	11/12	0.85	0.13	71,74,77,78	0
4	NAG	F	2	14/15	0.90	0.13	42,56,65,66	0
3	NAG	D	1	14/15	0.91	0.10	31,41,51,60	0
2	NAG	C	1	14/15	0.93	0.09	37,51,56,62	0
4	NAG	E	1	14/15	0.94	0.08	27,40,44,46	0
4	NAG	F	1	14/15	0.96	0.07	30,31,41,49	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.



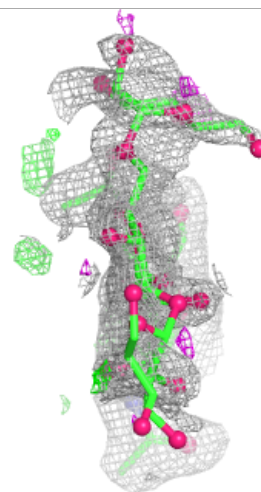
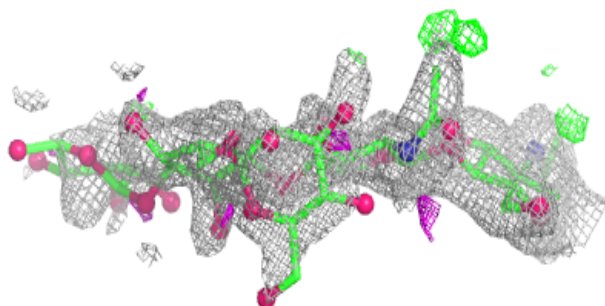
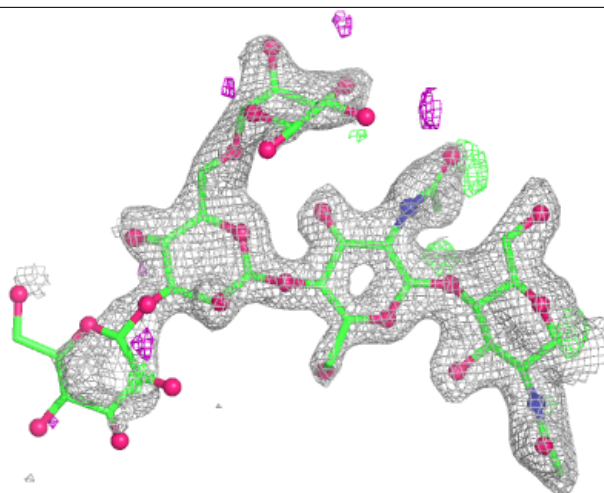
Electron density around Chain D:

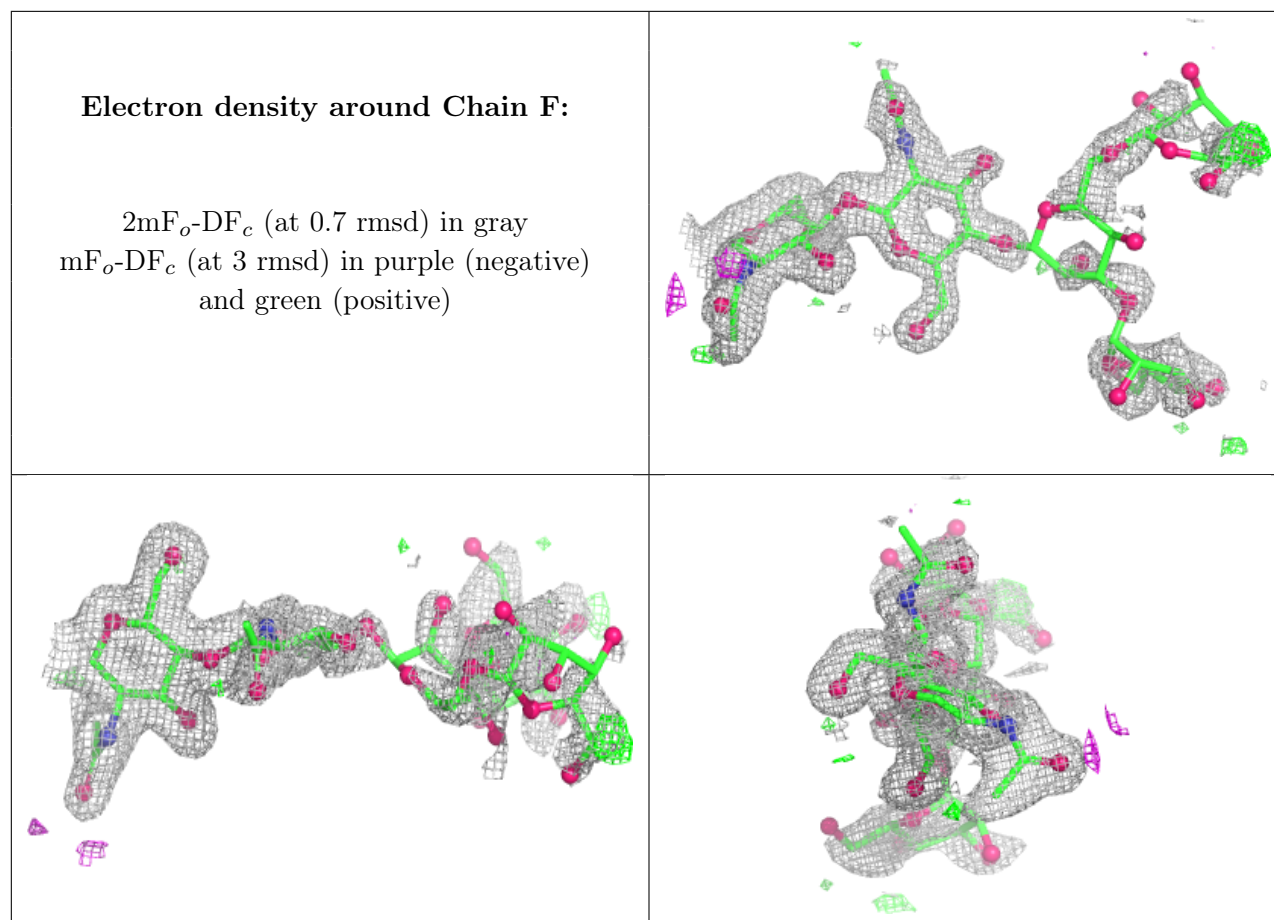
$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



Electron density around Chain E:

$2mF_o-DF_c$ (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(\AA^2)	Q<0.9
5	NAG	B	301	14/15	0.48	0.22	52,66,71,73	14
5	NAG	A	301	14/15	0.50	0.23	58,70,73,74	14
5	NAG	B	302	14/15	0.51	0.17	59,71,76,78	0
6	ACT	A	303	4/4	0.73	0.19	78,78,78,79	0
5	NAG	A	302	14/15	0.76	0.15	44,53,59,60	14
6	ACT	B	303	4/4	0.79	0.16	41,48,53,63	0
7	GOL	A	304	6/6	0.87	0.14	41,50,52,57	0

6.5 Other polymers [i](#)

There are no such residues in this entry.