



wwPDB X-ray Structure Validation Summary Report ⓘ

Mar 10, 2026 – 08:22 AM UTC

PDB ID : 3C6S / pdb_00003c6s
Title : Crystal structure of Fab F22-4 in complex with a Shigella flexneri 2a O-Ag pentadecasaccharide
Authors : Saul, F.A.; Vulliez-le-Normand, B.; Bentley, G.A.
Deposited on : 2008-02-05
Resolution : 1.80 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

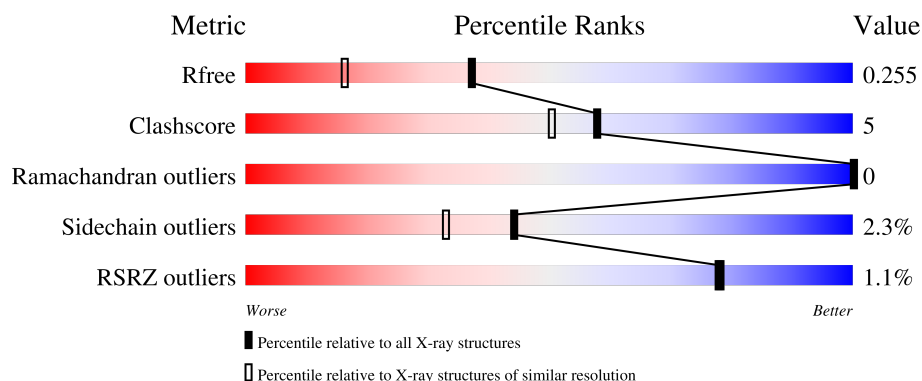
1 Overall quality at a glance ⓘ

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.80 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	7662 (1.80-1.80)
Clashscore	190562	8479 (1.80-1.80)
Ramachandran outliers	187476	8391 (1.80-1.80)
Sidechain outliers	187428	8390 (1.80-1.80)
RSRZ outliers	180081	7663 (1.80-1.80)

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	219	89% 10% .
1	C	219	% 91% 8%
1	E	219	91% 8% .
1	G	219	% 88% 9% ..
2	B	217	2% 86% 9% ..

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Mol	Chain	Length	Quality of chain
2	D	217	% 82% 12%
2	F	217	% 84% 12%
2	H	217	% 85% 9%
3	I	11	18% 82%
3	J	11	18% 64% 18%
3	K	11	18% 73% 9%
3	L	11	36% 55% 9%

2 Entry composition [i](#)

There are 5 unique types of molecules in this entry. The entry contains 15755 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.

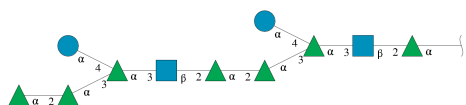
- Molecule 1 is a protein called Fab F22-4 light chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	216	Total	C	N	O	S	0	1	0
			1680	1051	288	335	6			
1	C	218	Total	C	N	O	S	0	0	0
			1690	1056	288	340	6			
1	E	216	Total	C	N	O	S	0	0	0
			1673	1047	285	335	6			
1	G	216	Total	C	N	O	S	0	0	0
			1673	1047	285	335	6			

- Molecule 2 is a protein called Fab F22-4 heavy chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	209	Total	C	N	O	S	0	0	0
			1604	1021	260	314	9			
2	D	209	Total	C	N	O	S	0	2	0
			1616	1029	261	317	9			
2	F	209	Total	C	N	O	S	0	1	0
			1610	1025	260	316	9			
2	H	209	Total	C	N	O	S	0	0	0
			1604	1021	260	314	9			

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



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
3	I	11	Total	C	N	O	0	0	0
			120	70	2	48			
3	J	11	Total	C	N	O	0	0	0
			120	70	2	48			
3	K	11	Total	C	N	O	0	0	0
			120	70	2	48			
3	L	11	Total	C	N	O	0	0	0
			120	70	2	48			

- Molecule 4 is PALLADIUM ION (CCD ID: PD) (formula: Pd).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	1	Total	Pd	0	0
			1	1		

- Molecule 5 is water.

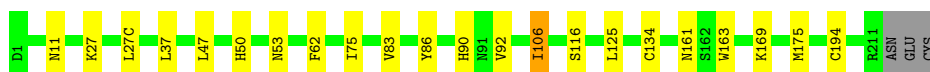
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	273	Total	O	0	0
			273	273		
5	B	211	Total	O	0	0
			211	211		
5	C	260	Total	O	0	0
			260	260		
5	D	280	Total	O	0	0
			280	280		
5	E	271	Total	O	0	0
			271	271		
5	F	312	Total	O	0	0
			312	312		
5	G	256	Total	O	0	0
			256	256		
5	H	261	Total	O	0	0
			261	261		

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: Fab F22-4 light chain

Chain A: 



- Molecule 1: Fab F22-4 light chain

Chain C: 



- Molecule 1: Fab F22-4 light chain

Chain E: 



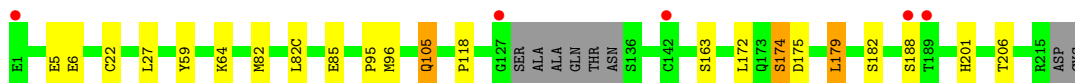
- Molecule 1: Fab F22-4 light chain

Chain G: 

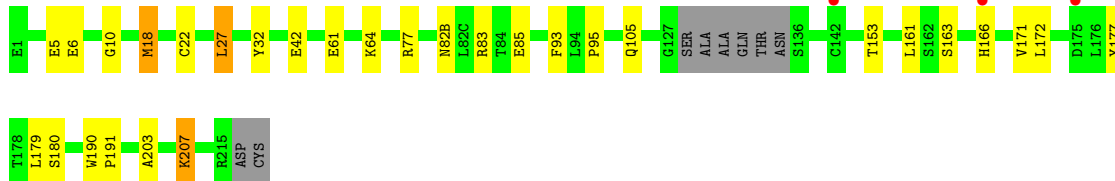
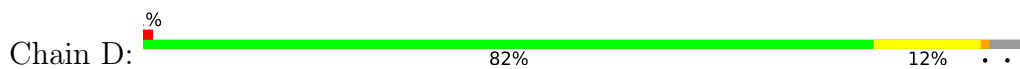


- Molecule 2: Fab F22-4 heavy chain

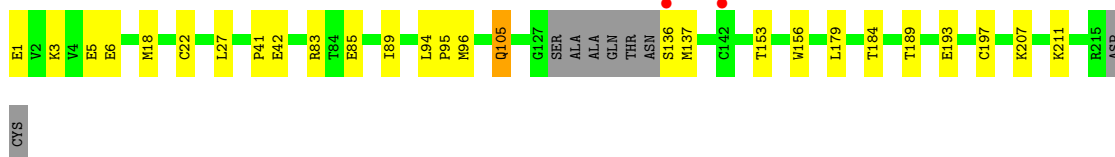
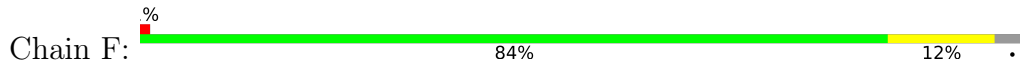
Chain B: 



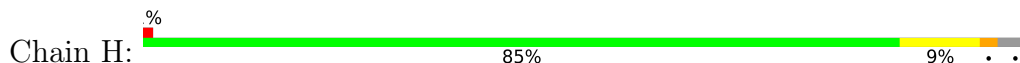
- Molecule 2: Fab F22-4 heavy chain



- Molecule 2: Fab F22-4 heavy chain



- Molecule 2: Fab F22-4 heavy chain



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

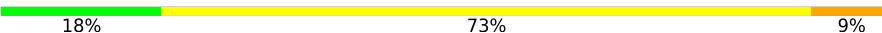


- Molecule 3: alpha-L-rhamnopyranose-(1-2)-alpha-L-rhamnopyranose-(1-3)-[alpha-D-glucopyranose-(1-4)]alpha-L-rhamnopyranose-(1-3)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-2)-alpha-L-rhamnopyranose-(1-2)-alpha-L-rhamnopyranose-(1-3)-[alpha-D-glucopyranose-(1-4)]alpha-L-rhamnopyranose-(1-3)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-2)-alpha-L-rhamnopyranose



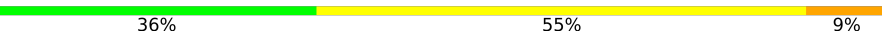
- Molecule 3: alpha-L-rhamnopyranose-(1-2)-alpha-L-rhamnopyranose-(1-3)-[alpha-D-glucopyranose-(1-4)]alpha-L-rhamnopyranose-(1-3)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-2)-alpha-

L-rhamnopyranose-(1-2)-alpha-L-rhamnopyranose-(1-3)-[alpha-D-glucopyranose-(1-4)]alpha-L-rhamnopyranose-(1-3)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-2)-alpha-L-rhamnopyranose

Chain K:  18% 73% 9%



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

Chain L:  36% 55% 9%



4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	66.86Å 137.15Å 109.38Å 90.00° 94.97° 90.00°	Depositor
Resolution (Å)	44.79 – 1.80 44.79 – 1.80	Depositor EDS
% Data completeness (in resolution range)	99.1 (44.79-1.80) 99.1 (44.79-1.80)	Depositor EDS
R_{merge}	0.11	Depositor
R_{sym}	0.11	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.72 (at 1.74Å)	Xtriage
Refinement program	REFMAC 5.2.0003	Depositor
R, R_{free}	0.191 , 0.251 0.199 , 0.255	Depositor DCC
R_{free} test set	2670 reflections (1.34%)	wwPDB-VP
Wilson B-factor (Å ²)	16.5	Xtriage
Anisotropy	0.592	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.37 , 65.2	EDS
L-test for twinning ²	$\langle L \rangle = 0.44$, $\langle L^2 \rangle = 0.27$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	15755	wwPDB-VP
Average B, all atoms (Å ²)	23.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 14.04% of the height of the origin peak. No significant pseudotranslation is detected.*

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: GLC, PD, RAM, 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	0.83	1/1723 (0.1%)	0.87	0/2340
1	C	0.82	1/1729 (0.1%)	0.88	0/2349
1	E	0.85	0/1712	0.90	0/2326
1	G	0.86	1/1712 (0.1%)	0.86	0/2326
2	B	0.81	0/1646	0.88	0/2245
2	D	0.88	0/1664	0.93	1/2269 (0.0%)
2	F	0.91	1/1655 (0.1%)	0.90	1/2257 (0.0%)
2	H	0.87	1/1646 (0.1%)	0.89	0/2245
All	All	0.85	5/13487 (0.0%)	0.89	2/18357 (0.0%)

All (5) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	C	201	SER	C-N	6.47	1.42	1.34
2	F	89	ILE	CA-CB	-5.57	1.47	1.54
1	G	67	SER	N-CA	-5.39	1.40	1.46
2	H	88	GLY	N-CA	-5.29	1.39	1.45
1	A	125	LEU	C-O	-5.03	1.18	1.24

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	F	18	MET	CG-SD-CE	-5.13	89.62	100.90
2	D	203	ALA	N-CA-C	5.06	117.53	111.71

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts ⓘ

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	1680	0	1625	14	0
1	C	1690	0	1628	12	0
1	E	1673	0	1616	12	0
1	G	1673	0	1616	14	0
2	B	1604	0	1574	12	1
2	D	1616	0	1588	20	0
2	F	1610	0	1580	15	0
2	H	1604	0	1574	19	1
3	I	120	0	106	0	0
3	J	120	0	106	2	0
3	K	120	0	106	3	0
3	L	120	0	106	1	0
4	A	1	0	0	0	0
5	A	273	0	0	7	0
5	B	211	0	0	1	1
5	C	260	0	0	2	0
5	D	280	0	0	7	2
5	E	271	0	0	3	1
5	F	312	0	0	7	1
5	G	256	0	0	2	0
5	H	261	0	0	8	1
All	All	15755	0	13225	121	4

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 5.

The worst 5 of 121 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)
2:H:18:MET:CG	5:H:514:HOH:O	1.76	1.28
2:H:18:MET:CE	5:H:514:HOH:O	2.00	1.07
2:D:171:VAL:HB	5:D:532:HOH:O	1.55	1.07
1:A:134:CYS:SG	5:A:424:HOH:O	2.17	1.03
2:H:18:MET:SD	5:H:514:HOH:O	2.04	1.02

All (4) 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)
2:H:136:SER:N	5:E:372:HOH:O[2_545]	1.80	0.40
2:B:188:SER:N	5:D:513:HOH:O[2_645]	1.99	0.21
5:B:335:HOH:O	5:D:509:HOH:O[2_645]	2.02	0.18
5:F:420:HOH:O	5:H:354:HOH:O[2_655]	2.11	0.09

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	215/219 (98%)	209 (97%)	6 (3%)	0	100	100
1	C	216/219 (99%)	211 (98%)	5 (2%)	0	100	100
1	E	214/219 (98%)	211 (99%)	3 (1%)	0	100	100
1	G	214/219 (98%)	209 (98%)	5 (2%)	0	100	100
2	B	205/217 (94%)	203 (99%)	2 (1%)	0	100	100
2	D	207/217 (95%)	204 (99%)	3 (1%)	0	100	100
2	F	206/217 (95%)	204 (99%)	2 (1%)	0	100	100
2	H	205/217 (94%)	201 (98%)	4 (2%)	0	100	100
All	All	1682/1744 (96%)	1652 (98%)	30 (2%)	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	192/194 (99%)	189 (98%)	3 (2%)	55	47
1	C	193/194 (100%)	191 (99%)	2 (1%)	68	64
1	E	191/194 (98%)	189 (99%)	2 (1%)	68	64
1	G	191/194 (98%)	185 (97%)	6 (3%)	35	23
2	B	185/191 (97%)	179 (97%)	6 (3%)	34	22
2	D	187/191 (98%)	178 (95%)	9 (5%)	23	11
2	F	186/191 (97%)	182 (98%)	4 (2%)	45	34
2	H	185/191 (97%)	181 (98%)	4 (2%)	45	34
All	All	1510/1540 (98%)	1474 (98%)	36 (2%)	44	31

5 of 36 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	G	81	GLU
2	H	136	SER
1	G	157	ASN
2	H	1	GLU
2	D	27	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 41 such sidechains are listed below:

Mol	Chain	Res	Type
1	G	38	GLN
2	H	31	ASN
1	G	42	GLN
1	G	91	ASN
2	H	81	GLN

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 ⓘ

44 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$
3	RAM	I	1	3	10,10,11	0.57	0	14,14,16	1.59	4 (28%)
3	GLC	I	10	3	11,11,12	0.70	0	15,15,17	1.24	2 (13%)
3	GLC	I	11	3	11,11,12	0.50	0	15,15,17	0.79	1 (6%)
3	NAG	I	2	3	14,14,15	0.61	0	17,19,21	1.44	3 (17%)
3	RAM	I	3	3	10,10,11	0.62	0	14,14,16	0.76	0
3	RAM	I	4	3	10,10,11	0.59	0	14,14,16	0.95	1 (7%)
3	RAM	I	5	3	10,10,11	0.67	0	14,14,16	1.37	2 (14%)
3	NAG	I	6	3	14,14,15	0.60	0	17,19,21	1.29	2 (11%)
3	RAM	I	7	3	10,10,11	0.66	0	14,14,16	1.01	1 (7%)
3	RAM	I	8	3	10,10,11	0.46	0	14,14,16	1.22	1 (7%)
3	RAM	I	9	3	10,10,11	0.52	0	14,14,16	0.99	0
3	RAM	J	1	3	10,10,11	0.53	0	14,14,16	1.35	2 (14%)
3	GLC	J	10	3	11,11,12	0.88	0	15,15,17	1.64	4 (26%)
3	GLC	J	11	3	11,11,12	0.65	0	15,15,17	1.08	1 (6%)
3	NAG	J	2	3	14,14,15	0.48	0	17,19,21	0.98	1 (5%)
3	RAM	J	3	3	10,10,11	0.75	0	14,14,16	0.84	1 (7%)
3	RAM	J	4	3	10,10,11	0.62	0	14,14,16	0.72	0
3	RAM	J	5	3	10,10,11	0.91	0	14,14,16	1.62	4 (28%)
3	NAG	J	6	3	14,14,15	0.55	0	17,19,21	1.08	1 (5%)
3	RAM	J	7	3	10,10,11	0.82	0	14,14,16	1.22	1 (7%)
3	RAM	J	8	3	10,10,11	0.75	0	14,14,16	1.49	4 (28%)
3	RAM	J	9	3	10,10,11	0.77	0	14,14,16	1.18	0
3	RAM	K	1	3	10,10,11	0.50	0	14,14,16	0.76	0
3	GLC	K	10	3	11,11,12	1.09	1 (9%)	15,15,17	1.08	1 (6%)
3	GLC	K	11	3	11,11,12	0.60	0	15,15,17	0.90	1 (6%)
3	NAG	K	2	3	14,14,15	0.60	0	17,19,21	1.16	2 (11%)
3	RAM	K	3	3	10,10,11	0.89	1 (10%)	14,14,16	0.84	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
3	RAM	K	4	3	10,10,11	0.79	1 (10%)	14,14,16	1.00	0
3	RAM	K	5	3	10,10,11	0.80	0	14,14,16	0.98	0
3	NAG	K	6	3	14,14,15	0.81	1 (7%)	17,19,21	1.00	0
3	RAM	K	7	3	10,10,11	0.61	0	14,14,16	0.96	0
3	RAM	K	8	3	10,10,11	0.65	0	14,14,16	1.05	1 (7%)
3	RAM	K	9	3	10,10,11	0.50	0	14,14,16	1.24	2 (14%)
3	RAM	L	1	3	10,10,11	0.56	0	14,14,16	0.93	0
3	GLC	L	10	3	11,11,12	0.76	0	15,15,17	1.27	2 (13%)
3	GLC	L	11	3	11,11,12	0.70	0	15,15,17	1.25	1 (6%)
3	NAG	L	2	3	14,14,15	0.48	0	17,19,21	1.02	0
3	RAM	L	3	3	10,10,11	0.84	0	14,14,16	0.81	0
3	RAM	L	4	3	10,10,11	0.86	1 (10%)	14,14,16	1.08	1 (7%)
3	RAM	L	5	3	10,10,11	0.82	0	14,14,16	1.23	3 (21%)
3	NAG	L	6	3	14,14,15	0.83	1 (7%)	17,19,21	1.07	1 (5%)
3	RAM	L	7	3	10,10,11	0.63	0	14,14,16	1.22	1 (7%)
3	RAM	L	8	3	10,10,11	0.66	0	14,14,16	0.91	0
3	RAM	L	9	3	10,10,11	0.63	0	14,14,16	1.02	1 (7%)

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	RAM	I	1	3	-	-	0/1/1/1
3	GLC	I	10	3	-	0/2/19/22	0/1/1/1
3	GLC	I	11	3	-	0/2/19/22	0/1/1/1
3	NAG	I	2	3	-	1/6/23/26	0/1/1/1
3	RAM	I	3	3	-	-	0/1/1/1
3	RAM	I	4	3	-	-	0/1/1/1
3	RAM	I	5	3	-	-	0/1/1/1
3	NAG	I	6	3	-	0/6/23/26	0/1/1/1
3	RAM	I	7	3	-	-	0/1/1/1
3	RAM	I	8	3	-	-	0/1/1/1
3	RAM	I	9	3	-	-	0/1/1/1
3	RAM	J	1	3	-	-	0/1/1/1
3	GLC	J	10	3	-	0/2/19/22	0/1/1/1
3	GLC	J	11	3	-	0/2/19/22	0/1/1/1
3	NAG	J	2	3	-	2/6/23/26	0/1/1/1
3	RAM	J	3	3	-	-	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	RAM	J	4	3	-	-	0/1/1/1
3	RAM	J	5	3	-	-	0/1/1/1
3	NAG	J	6	3	-	0/6/23/26	0/1/1/1
3	RAM	J	7	3	-	-	0/1/1/1
3	RAM	J	8	3	-	-	0/1/1/1
3	RAM	J	9	3	-	-	0/1/1/1
3	RAM	K	1	3	-	-	0/1/1/1
3	GLC	K	10	3	-	0/2/19/22	0/1/1/1
3	GLC	K	11	3	-	0/2/19/22	0/1/1/1
3	NAG	K	2	3	-	1/6/23/26	0/1/1/1
3	RAM	K	3	3	-	-	0/1/1/1
3	RAM	K	4	3	-	-	0/1/1/1
3	RAM	K	5	3	-	-	0/1/1/1
3	NAG	K	6	3	-	0/6/23/26	0/1/1/1
3	RAM	K	7	3	-	-	0/1/1/1
3	RAM	K	8	3	-	-	0/1/1/1
3	RAM	K	9	3	-	-	0/1/1/1
3	RAM	L	1	3	-	-	0/1/1/1
3	GLC	L	10	3	-	0/2/19/22	0/1/1/1
3	GLC	L	11	3	-	0/2/19/22	0/1/1/1
3	NAG	L	2	3	-	0/6/23/26	0/1/1/1
3	RAM	L	3	3	-	-	0/1/1/1
3	RAM	L	4	3	-	-	0/1/1/1
3	RAM	L	5	3	-	-	0/1/1/1
3	NAG	L	6	3	-	0/6/23/26	0/1/1/1
3	RAM	L	7	3	-	-	0/1/1/1
3	RAM	L	8	3	-	-	0/1/1/1
3	RAM	L	9	3	-	-	0/1/1/1

The worst 5 of 6 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	K	10	GLC	O5-C1	-3.22	1.38	1.43
3	L	6	NAG	C1-C2	2.78	1.56	1.52
3	L	4	RAM	O2-C2	-2.25	1.38	1.43
3	K	4	RAM	O2-C2	-2.24	1.38	1.43
3	K	6	NAG	O5-C1	-2.23	1.40	1.43

The worst 5 of 53 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	J	10	GLC	C1-O5-C5	3.98	117.52	112.19

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	I	1	RAM	O5-C5-C4	3.72	116.25	109.55
3	L	11	GLC	C1-O5-C5	3.50	116.88	112.19
3	I	2	NAG	O5-C1-C2	-3.24	106.27	111.29
3	I	10	GLC	C1-O5-C5	3.08	116.32	112.19

There are no chirality outliers.

All (4) torsion outliers are listed below:

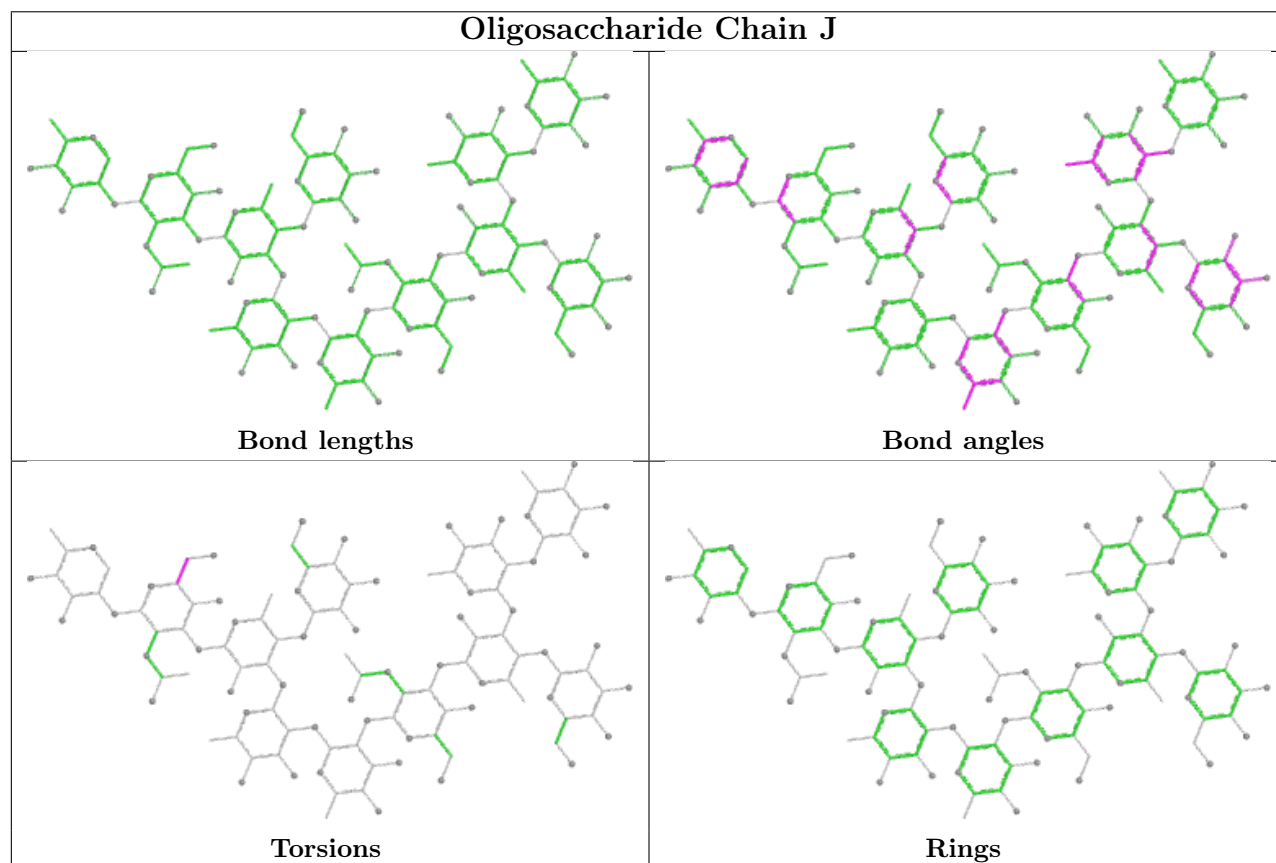
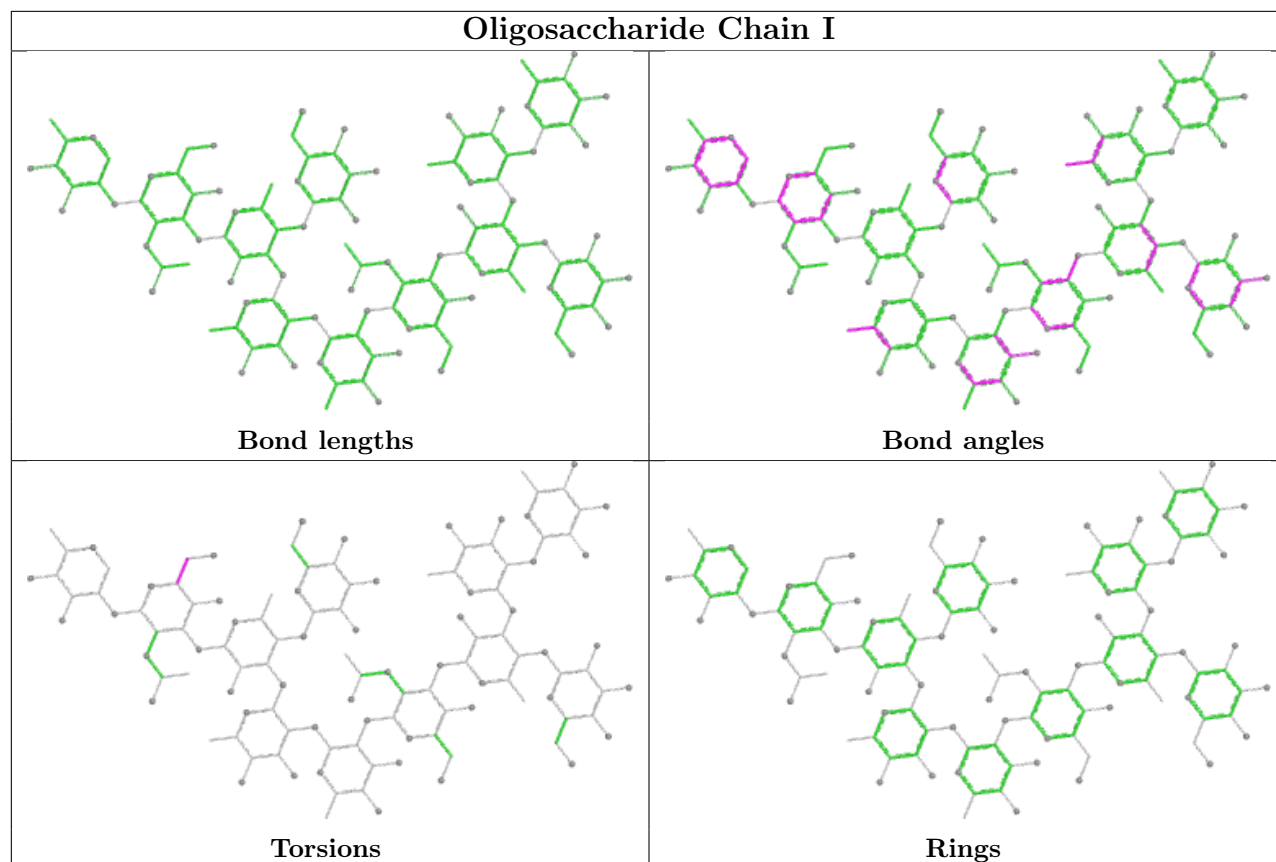
Mol	Chain	Res	Type	Atoms
3	J	2	NAG	O5-C5-C6-O6
3	J	2	NAG	C4-C5-C6-O6
3	K	2	NAG	O5-C5-C6-O6
3	I	2	NAG	O5-C5-C6-O6

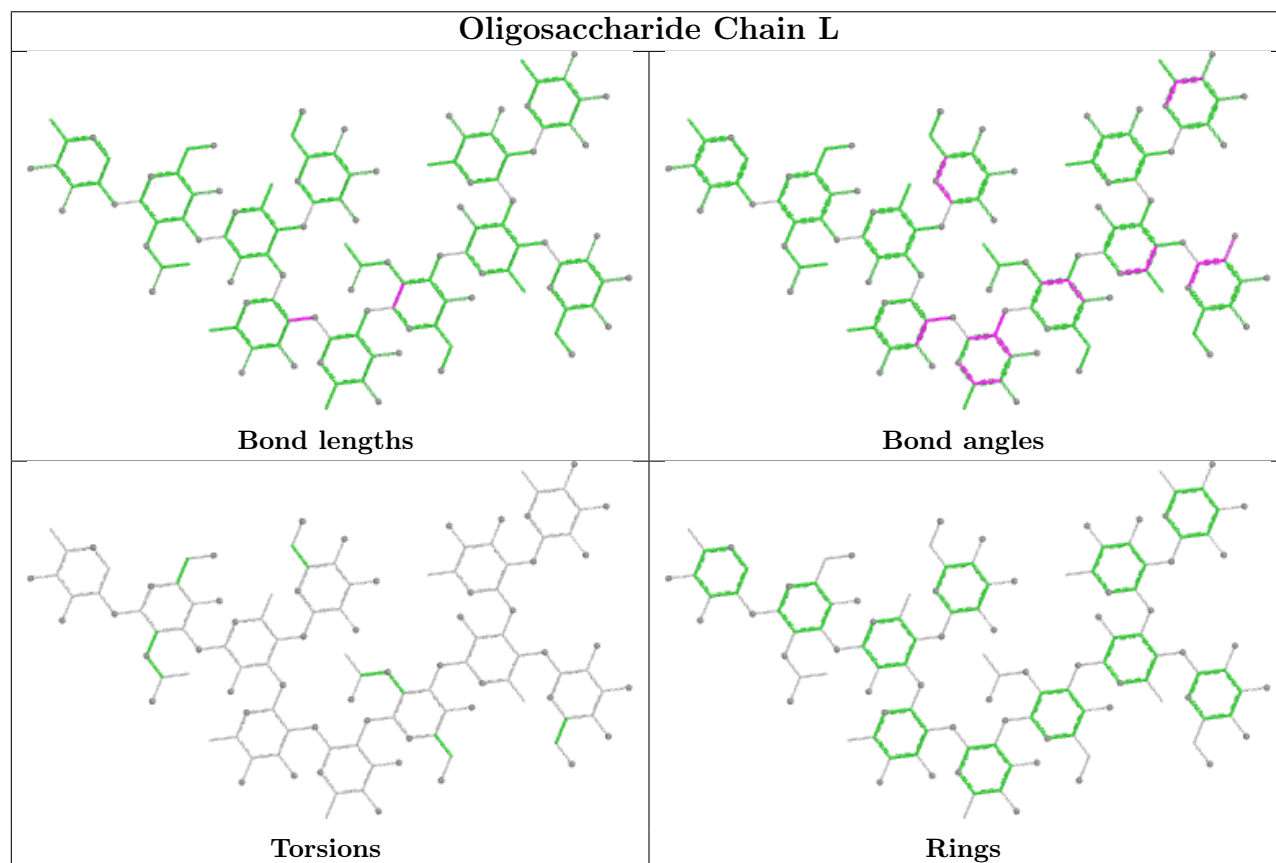
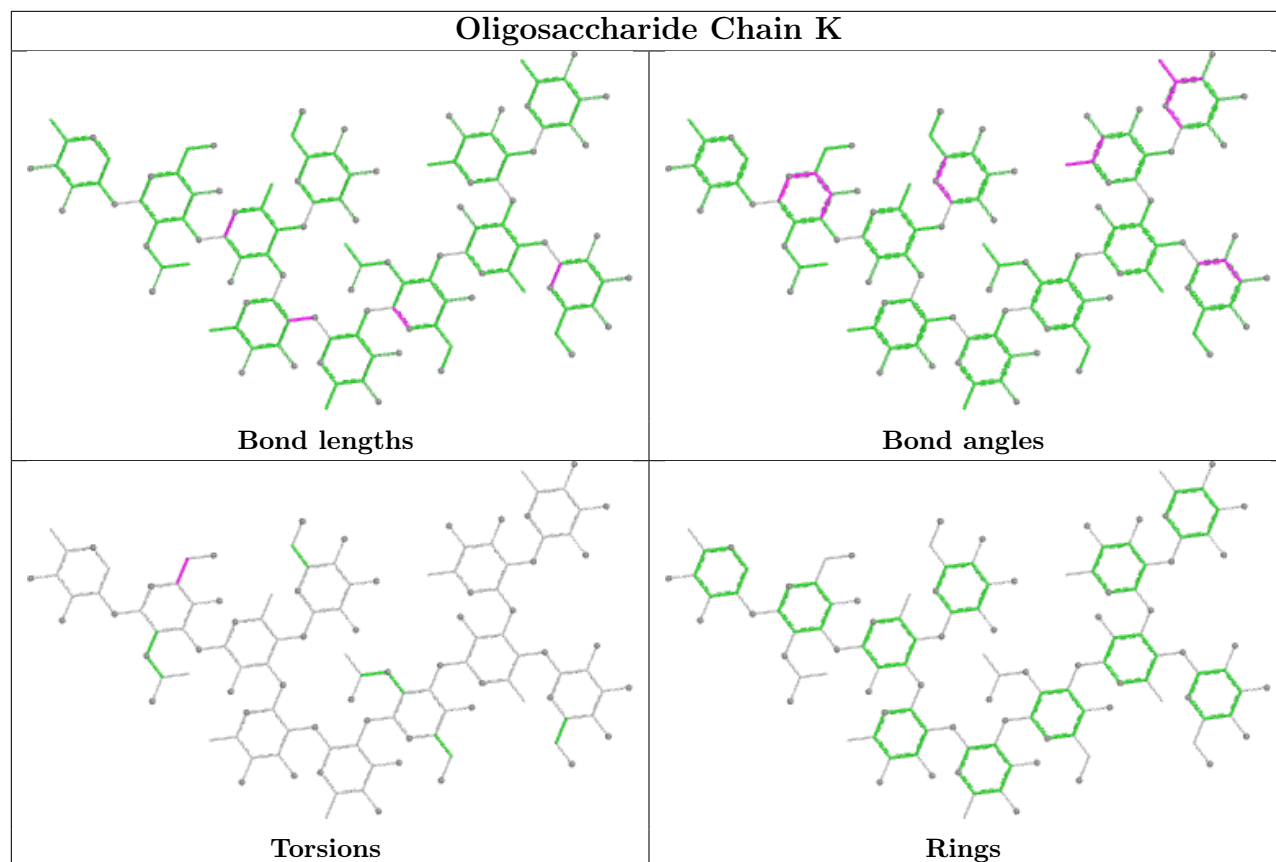
There are no ring outliers.

5 monomers are involved in 6 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	J	5	RAM	1	0
3	K	5	RAM	2	0
3	L	6	NAG	1	0
3	J	6	NAG	1	0
3	K	6	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

Of 1 ligands modelled in this entry, 1 is monoatomic - leaving 0 for Mogul analysis.

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

5.7 Other polymers

There are no such residues in this entry.

5.8 Polymer linkage issues

There are no chain breaks in this entry.

6 Fit of model and data [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	216/219 (98%)	0.02	0 100 100	11, 20, 31, 42	1 (0%)
1	C	218/219 (99%)	0.09	2 (0%) 81 81	10, 21, 34, 41	0
1	E	216/219 (98%)	-0.06	1 (0%) 87 88	10, 19, 30, 41	0
1	G	216/219 (98%)	0.13	3 (1%) 73 73	9, 21, 34, 45	0
2	B	209/217 (96%)	0.16	5 (2%) 59 60	14, 22, 35, 40	0
2	D	209/217 (96%)	-0.05	3 (1%) 73 73	10, 19, 34, 40	2 (0%)
2	F	209/217 (96%)	-0.09	2 (0%) 79 80	8, 18, 32, 36	1 (0%)
2	H	209/217 (96%)	-0.04	2 (0%) 79 80	8, 19, 32, 44	0
All	All	1702/1744 (97%)	0.02	18 (1%) 78 78	8, 20, 33, 45	4 (0%)

The worst 5 of 18 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	B	142	CYS	3.5
2	B	189	THR	3.1
2	H	193	GLU	3.1
2	D	175	ASP	2.7
1	C	9	PHE	2.6

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.

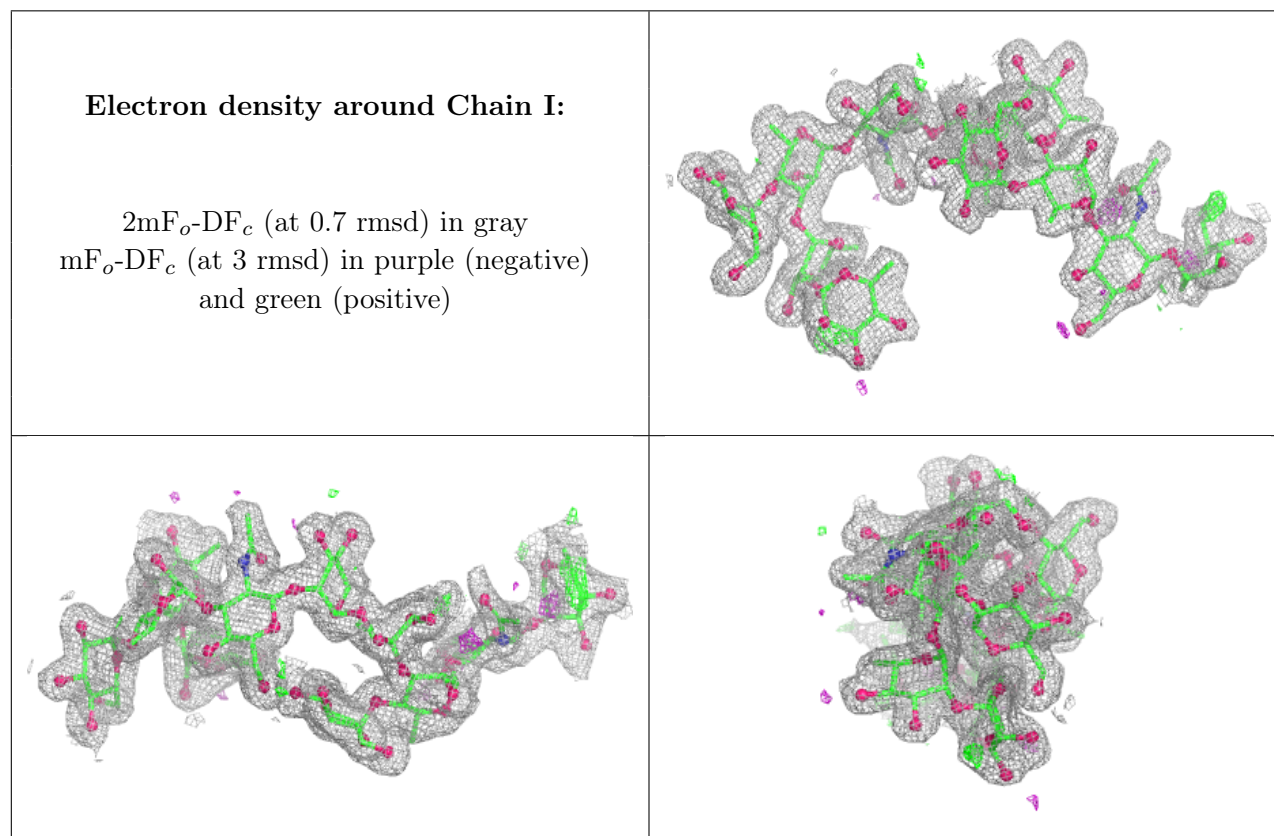
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
3	RAM	I	1	10/11	0.42	0.19	55,59,59,60	0
3	RAM	I	9	10/11	0.72	0.15	37,39,41,42	0
3	RAM	L	1	10/11	0.72	0.14	51,54,54,54	0
3	RAM	L	9	10/11	0.72	0.15	43,45,47,49	0
3	NAG	I	2	14/15	0.73	0.14	42,50,52,52	0
3	NAG	L	2	14/15	0.75	0.15	37,45,47,47	0
3	RAM	J	1	10/11	0.75	0.14	50,53,53,54	0
3	NAG	J	2	14/15	0.77	0.16	43,47,48,48	0
3	RAM	K	9	10/11	0.78	0.13	34,36,40,41	0
3	RAM	K	1	10/11	0.80	0.14	44,46,46,47	0
3	RAM	L	8	10/11	0.81	0.13	32,37,41,41	0
3	RAM	J	9	10/11	0.81	0.13	37,38,39,39	0
3	NAG	K	2	14/15	0.82	0.12	37,41,45,46	0
3	RAM	J	3	10/11	0.83	0.12	36,39,40,41	0
3	RAM	J	8	10/11	0.85	0.12	29,32,34,34	0
3	RAM	J	5	10/11	0.86	0.12	24,31,32,34	0
3	RAM	I	8	10/11	0.89	0.10	29,31,32,34	0
3	RAM	J	4	10/11	0.89	0.10	29,33,35,35	0
3	RAM	K	8	10/11	0.91	0.09	24,27,30,31	0
3	RAM	K	3	10/11	0.91	0.09	26,30,32,34	0
3	GLC	J	11	11/12	0.92	0.09	30,32,34,35	0
3	RAM	I	4	10/11	0.93	0.08	22,25,25,26	0
3	RAM	L	4	10/11	0.93	0.09	22,24,25,26	0
3	RAM	L	7	10/11	0.93	0.08	14,18,22,27	0
3	RAM	I	3	10/11	0.93	0.08	26,32,34,36	0
3	RAM	K	4	10/11	0.93	0.08	17,20,23,24	0
3	RAM	L	3	10/11	0.94	0.09	23,30,32,33	0
3	RAM	I	7	10/11	0.94	0.07	19,20,23,25	0
3	RAM	L	5	10/11	0.94	0.07	19,23,25,26	0
3	RAM	I	5	10/11	0.95	0.07	19,23,26,26	0
3	GLC	K	11	11/12	0.95	0.07	19,22,23,24	0
3	NAG	L	6	14/15	0.95	0.07	15,17,20,21	0
3	GLC	J	10	11/12	0.95	0.06	16,17,19,19	0
3	NAG	J	6	14/15	0.95	0.07	18,20,24,26	0
3	GLC	I	11	11/12	0.95	0.06	21,23,25,25	0
3	GLC	L	10	11/12	0.95	0.06	17,19,21,22	0
3	GLC	K	10	11/12	0.96	0.06	13,15,16,18	0
3	RAM	K	5	10/11	0.96	0.06	16,20,22,23	0
3	NAG	K	6	14/15	0.96	0.06	12,14,17,19	0
3	RAM	K	7	10/11	0.96	0.06	12,14,18,22	0
3	NAG	I	6	14/15	0.96	0.06	17,18,21,22	0

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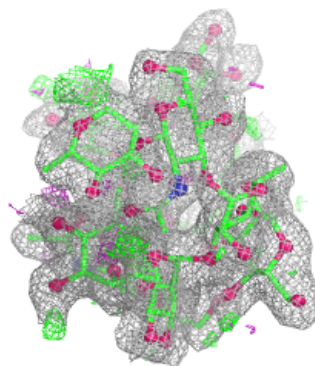
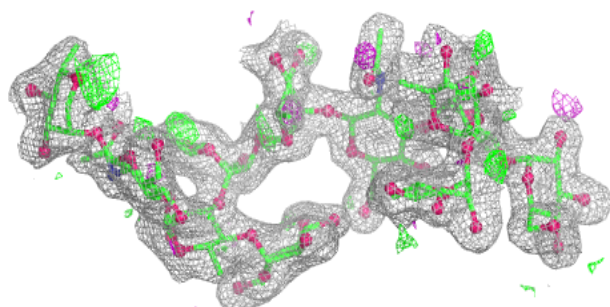
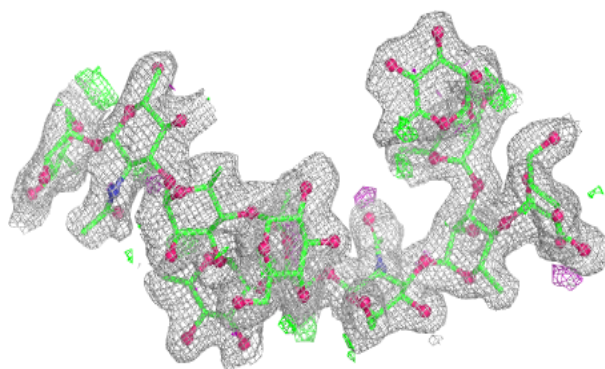
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
3	RAM	J	7	10/11	0.96	0.06	19,21,23,25	0
3	GLC	L	11	11/12	0.96	0.05	17,19,23,23	0
3	GLC	I	10	11/12	0.97	0.05	15,16,18,18	0

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.

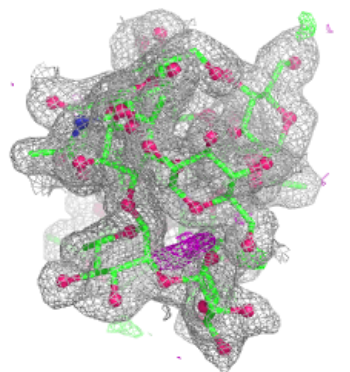
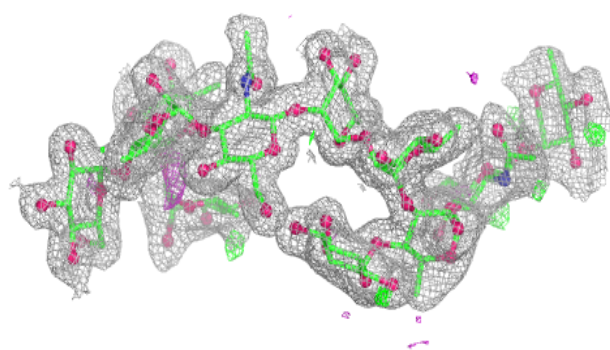
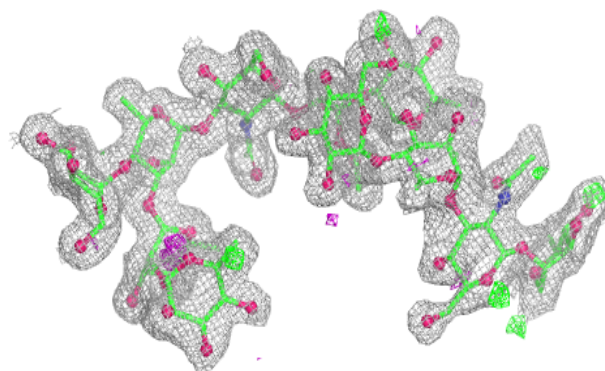


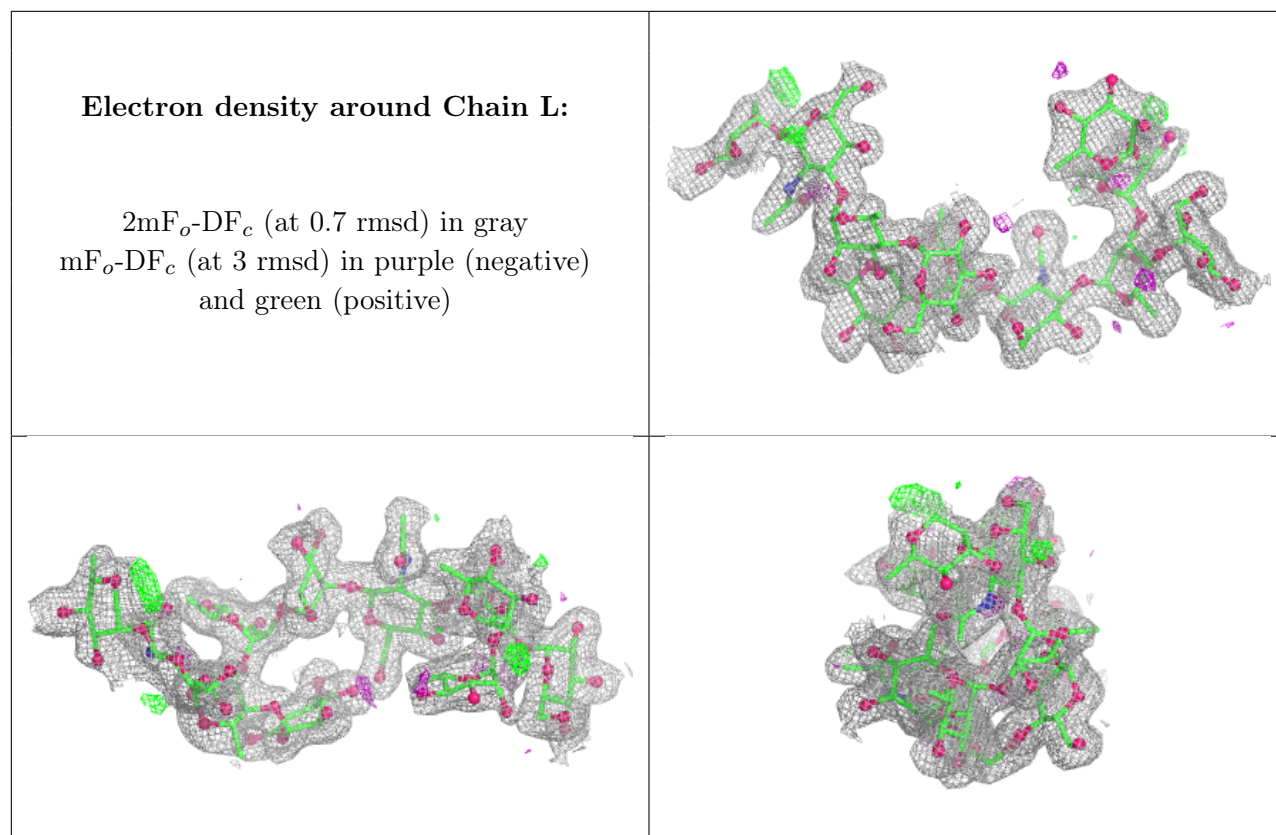
Electron density around Chain J:

$2mF_o-DF_c$ (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)





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
4	PD	A	215	1/1	1.00	0.07	26,26,26,26	0

6.5 Other polymers [i](#)

There are no such residues in this entry.