Full wwPDB X-ray Structure Validation Report (i)

Sep 12, 2023 – 04:34 AM EDT

PDB ID	:	4L6T
Title	:	GM1 bound form of the ECX AB5 holotoxin
Authors	:	Littler, D.R.; Ng, N.M.; Rossjohn, J.; Beddoe, T.
Deposited on	:	2013-06-12
Resolution	:	1.86 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 (i) 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 (i)) were used in the production of this report:

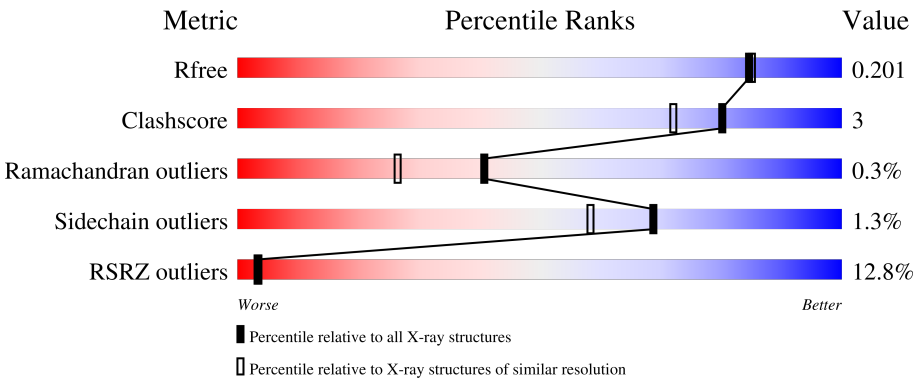
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.35.1
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.35.1

1 Overall quality at a glance (i)

The following experimental techniques were used to determine the structure:
X-RAY DIFFRACTION

The reported resolution of this entry is 1.86 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}	130704	2469 (1.86-1.86)
Clashscore	141614	2625 (1.86-1.86)
Ramachandran outliers	138981	2592 (1.86-1.86)
Sidechain outliers	138945	2592 (1.86-1.86)
RSRZ outliers	127900	2436 (1.86-1.86)

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 <=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	266	32%, 79%, 13%, • 6%
2	B	112	%, 89%, • 6%
2	C	112	3%, 93%, • 6%
2	D	112	2%, 86%, 8%, 6%
2	E	112	4%, 88%, 6%, 6%

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Mol	Chain	Length	Quality of chain
2	F	112	3%, 88%, 5%, 6%
3	G	5	60%, 40%
3	H	5	100%
3	I	5	40%, 40%, 20%
3	J	5	60%, 20%, 20%
3	K	5	20%, 60%, 20%

2 Entry composition (i)

There are 5 unique types of molecules in this entry. The entry contains 7017 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 ECXA.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	249	1938	1212	347	373	6	0	0	0

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	20	MET	-	initiating methionine	UNP Q8GAV4

- Molecule 2 is a protein called ECXB.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	B	105	825	518	140	161	6	0	0	0
2	C	105	847	531	142	168	6	0	4	0
2	D	105	838	525	142	165	6	0	2	0
2	E	105	829	520	141	163	5	0	1	0
2	F	105	836	523	143	165	5	0	2	0

There are 45 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	22	MET	-	initiating methionine	UNP Q8GAV3
B	126	LEU	-	expression tag	UNP Q8GAV3
B	127	GLU	-	expression tag	UNP Q8GAV3
B	128	HIS	-	expression tag	UNP Q8GAV3
B	129	HIS	-	expression tag	UNP Q8GAV3
B	130	HIS	-	expression tag	UNP Q8GAV3
B	131	HIS	-	expression tag	UNP Q8GAV3

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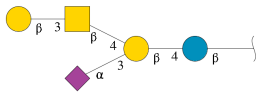
Chain	Residue	Modelled	Actual	Comment	Reference
B	132	HIS	-	expression tag	UNP Q8GAV3
B	133	HIS	-	expression tag	UNP Q8GAV3
C	22	MET	-	initiating methionine	UNP Q8GAV3
C	126	LEU	-	expression tag	UNP Q8GAV3
C	127	GLU	-	expression tag	UNP Q8GAV3
C	128	HIS	-	expression tag	UNP Q8GAV3
C	129	HIS	-	expression tag	UNP Q8GAV3
C	130	HIS	-	expression tag	UNP Q8GAV3
C	131	HIS	-	expression tag	UNP Q8GAV3
C	132	HIS	-	expression tag	UNP Q8GAV3
C	133	HIS	-	expression tag	UNP Q8GAV3
D	22	MET	-	initiating methionine	UNP Q8GAV3
D	126	LEU	-	expression tag	UNP Q8GAV3
D	127	GLU	-	expression tag	UNP Q8GAV3
D	128	HIS	-	expression tag	UNP Q8GAV3
D	129	HIS	-	expression tag	UNP Q8GAV3
D	130	HIS	-	expression tag	UNP Q8GAV3
D	131	HIS	-	expression tag	UNP Q8GAV3
D	132	HIS	-	expression tag	UNP Q8GAV3
D	133	HIS	-	expression tag	UNP Q8GAV3
E	22	MET	-	initiating methionine	UNP Q8GAV3
E	126	LEU	-	expression tag	UNP Q8GAV3
E	127	GLU	-	expression tag	UNP Q8GAV3
E	128	HIS	-	expression tag	UNP Q8GAV3
E	129	HIS	-	expression tag	UNP Q8GAV3
E	130	HIS	-	expression tag	UNP Q8GAV3
E	131	HIS	-	expression tag	UNP Q8GAV3
E	132	HIS	-	expression tag	UNP Q8GAV3
E	133	HIS	-	expression tag	UNP Q8GAV3
F	22	MET	-	initiating methionine	UNP Q8GAV3
F	126	LEU	-	expression tag	UNP Q8GAV3
F	127	GLU	-	expression tag	UNP Q8GAV3
F	128	HIS	-	expression tag	UNP Q8GAV3
F	129	HIS	-	expression tag	UNP Q8GAV3
F	130	HIS	-	expression tag	UNP Q8GAV3
F	131	HIS	-	expression tag	UNP Q8GAV3
F	132	HIS	-	expression tag	UNP Q8GAV3
F	133	HIS	-	expression tag	UNP Q8GAV3

- Molecule 3 is an oligosaccharide called beta-D-galactopyranose-(1-3)-2-acetamido-2-deoxy-beta-D-galactopyranose-(1-4)-[N-acetyl-alpha-neuraminic acid-(2-3)]beta-D-galactopyranose-(1-4)-beta-D-glucopyranose.



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
3	G	5	68	37	2	29	0	0	0
3	H	5	68	37	2	29	0	0	0
3	I	5	68	37	2	29	0	0	0
3	J	5	68	37	2	29	0	0	0
3	K	5	68	37	2	29	0	0	0

- Molecule 4 is ZINC ION (three-letter code: ZN) (formula: Zn).

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

- Molecule 5 is water.

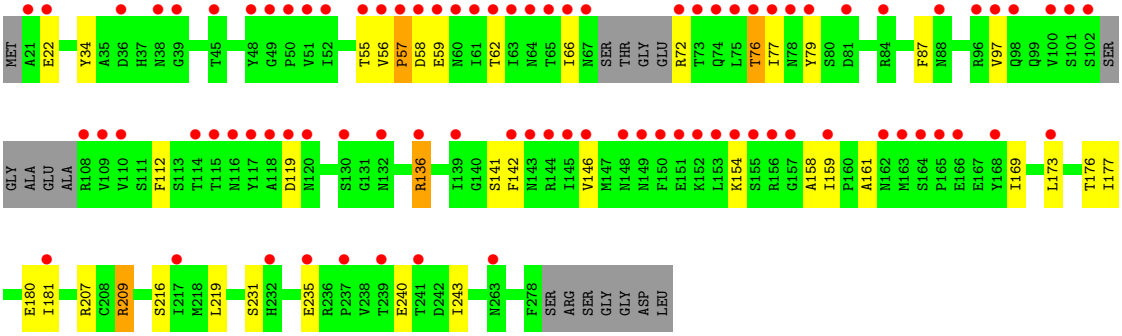
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	O		
5	A	48	48	48	0	0
5	B	93	94	94	0	1
5	C	115	115	115	0	0
5	D	119	119	119	0	0
5	E	101	102	102	0	1
5	F	85	85	85	0	0

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.

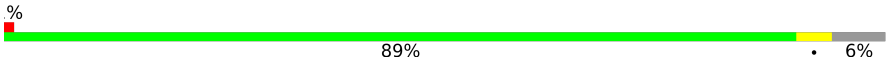
- Molecule 1: ECXA

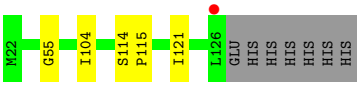
Chain A:



- Molecule 2: ECXB

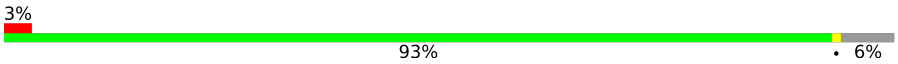
Chain B:

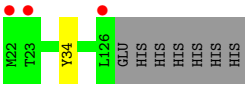




- Molecule 2: ECXB

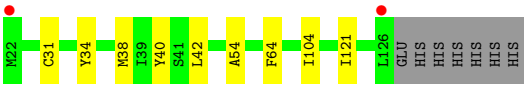
Chain C:





- Molecule 2: ECXB

Chain D:

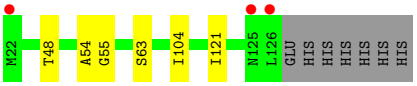


- Molecule 2: ECXB

Chain E:

• Molecule 2: ECXB

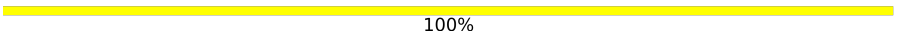
Chain F:



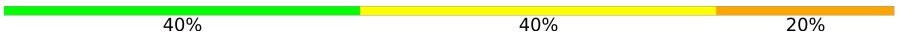
• Molecule 3: beta-D-galactopyranose-(1-3)-2-acetamido-2-deoxy-beta-D-galactopyranose-(1-4)-[N-acetyl-alpha-neuraminic acid-(2-3)]beta-D-galactopyranose-(1-4)-beta-D-glucopyranose

Chain G:

• Molecule 3: beta-D-galactopyranose-(1-3)-2-acetamido-2-deoxy-beta-D-galactopyranose-(1-4)-[N-acetyl-alpha-neuraminic acid-(2-3)]beta-D-galactopyranose-(1-4)-beta-D-glucopyranose

Chain H: 

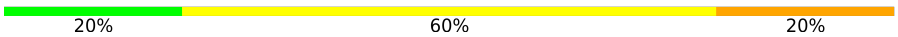
• Molecule 3: beta-D-galactopyranose-(1-3)-2-acetamido-2-deoxy-beta-D-galactopyranose-(1-4)-[N-acetyl-alpha-neuraminic acid-(2-3)]beta-D-galactopyranose-(1-4)-beta-D-glucopyranose

Chain I: 

• Molecule 3: beta-D-galactopyranose-(1-3)-2-acetamido-2-deoxy-beta-D-galactopyranose-(1-4)-[N-acetyl-alpha-neuraminic acid-(2-3)]beta-D-galactopyranose-(1-4)-beta-D-glucopyranose

Chain J:

• Molecule 3: beta-D-galactopyranose-(1-3)-2-acetamido-2-deoxy-beta-D-galactopyranose-(1-4)-[N-acetyl-alpha-neuraminic acid-(2-3)]beta-D-galactopyranose-(1-4)-beta-D-glucopyranose

Chain K: 

BGC1
GAL2
NGA3
GAL4
SIA5

4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 65 2 2	Depositor
Cell constants a, b, c, α, β, γ	120.44Å 120.44Å 273.48Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	29.82 – 1.86 29.82 – 1.86	Depositor EDS
% Data completeness (in resolution range)	99.7 (29.82-1.86) 99.3 (29.82-1.86)	Depositor EDS
R_{merge}	0.04	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	3.75 (at 1.85Å)	Xtriage
Refinement program	PHENIX (phenix.refine: 1.8.2_1309)	Depositor
R, R_{free}	0.178 , 0.198 0.180 , 0.201	Depositor DCC
R_{free} test set	4923 reflections (4.99%)	wwPDB-VP
Wilson B-factor (Å^2)	21.9	Xtriage
Anisotropy	0.114	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.37 , 57.1	EDS
L-test for twinning[2]	$< \|L\| > = 0.50$, $< L^2 > = 0.33$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.96	EDS
Total number of atoms	7017	wwPDB-VP
Average B, all atoms (Å^2)	37.0	wwPDB-VP

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

[1]Intensities estimated from amplitudes.

[2]Theoretical values of $< |L| >$, $< L^2 >$ 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: SIA, NGA, ZN, BGC, GAL

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 5$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	$\#\|Z\|>5$	RMSZ	$\#\|Z\|>5$
1	A	0.27	0/1975	0.45	0/2675
2	B	0.46	0/838	0.56	0/1132
2	C	0.42	0/866	0.58	0/1170
2	D	0.43	0/851	0.57	0/1150
2	E	0.39	0/842	0.53	0/1139
2	F	0.38	0/849	0.51	0/1148
All	All	0.38	0/6221	0.52	0/8414

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	1938	0	1876	20	0
2	B	825	0	828	3	0
2	C	847	0	849	1	0
2	D	838	0	838	5	0
2	E	829	0	827	4	0
2	F	836	0	830	4	0
3	G	68	0	58	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	H	68	0	58	0	0
3	I	68	0	58	1	0
3	J	68	0	58	1	0
3	K	68	0	58	1	0
4	A	1	0	0	0	0
5	A	48	0	0	0	0
5	B	94	0	0	0	0
5	C	115	0	0	0	0
5	D	119	0	0	0	0
5	E	102	0	0	0	0
5	F	85	0	0	0	0
All	All	7017	0	6338	34	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 3.

All (34) 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:E:104:ILE:HD12	2:E:121:ILE:HD11	1.83	0.61
1:A:66:ILE:HA	1:A:72:ARG:HA	1.88	0.56
1:A:56:VAL:HG22	1:A:112:PHE:HB2	1.89	0.53
2:B:104:ILE:HD12	2:B:121:ILE:HD11	1.91	0.52
2:F:104:ILE:HD12	2:F:121:ILE:HD11	1.90	0.52
1:A:146:VAL:HG11	1:A:169:ILE:HG12	1.91	0.52
2:D:38:MET:HE3	2:D:40:TYR:CE2	2.47	0.49
1:A:87:PHE:CD1	1:A:97:VAL:HG11	2.49	0.48
1:A:154:LYS:HG3	1:A:159:ILE:HG13	1.96	0.47
2:F:55:GLY:HA3	3:J:5:SIA:H91	1.96	0.47
2:D:104:ILE:HD12	2:D:121:ILE:HD11	1.95	0.47
1:A:142:PHE:HA	1:A:146:VAL:HG23	1.97	0.46
1:A:207:ARG:HD3	1:A:209:ARG:HD2	1.97	0.46
2:B:55:GLY:HA3	3:K:5:SIA:H91	1.97	0.45
1:A:22:GLU:HG2	1:A:235:GLU:HG2	1.98	0.45
1:A:240:GLU:O	1:A:243:ILE:HG12	2.17	0.44
2:F:48:THR:HG1	2:F:63[A]:SER:HB2	1.80	0.44
1:A:216:SER:O	1:A:219:LEU:HG	2.17	0.44
1:A:176:THR:O	1:A:180:GLU:HG2	2.17	0.44
2:B:114:SER:HA	2:B:115:PRO:C	2.37	0.43
2:C:34:TYR:CZ	2:D:54:ALA:HB1	2.54	0.43
2:D:34:TYR:CZ	2:E:54:ALA:HB1	2.54	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:E:34:TYR:CZ	2:F:54:ALA:HB1	2.54	0.42
1:A:62:THR:HG22	1:A:76:THR:HB	2.02	0.42
1:A:119:ASP:OD2	1:A:141:SER:OG	2.36	0.42
1:A:154:LYS:HG2	1:A:161:ALA:HA	2.02	0.42
1:A:77:ILE:HD13	1:A:173:LEU:HD23	2.02	0.42
2:D:42:LEU:HD13	2:D:64:PHE:CZ	2.55	0.42
1:A:57:PRO:C	1:A:59:GLU:H	2.24	0.41
1:A:158:ALA:HA	1:A:231:SER:OG	2.21	0.41
1:A:136:ARG:HE	1:A:136:ARG:HB3	1.56	0.41
2:E:55:GLY:HA3	3:I:5:SIA:H91	2.04	0.40
1:A:119:ASP:OD2	1:A:119:ASP:N	2.50	0.40
1:A:177:ILE:O	1:A:181:ILE:HG12	2.22	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	243/266 (91%)	232 (96%)	9 (4%)	2 (1%)	19 7
2	B	103/112 (92%)	102 (99%)	1 (1%)	0	100 100
2	C	107/112 (96%)	107 (100%)	0	0	100 100
2	D	105/112 (94%)	105 (100%)	0	0	100 100
2	E	104/112 (93%)	104 (100%)	0	0	100 100
2	F	105/112 (94%)	105 (100%)	0	0	100 100
All	All	767/826 (93%)	755 (98%)	10 (1%)	2 (0%)	41 26

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	58	ASP

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Mol	Chain	Res	Type
1	A	57	PRO

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	211/228 (92%)	205 (97%)	6 (3%)	43	27
2	B	93/100 (93%)	93 (100%)	0	100	100
2	C	97/100 (97%)	97 (100%)	0	100	100
2	D	95/100 (95%)	94 (99%)	1 (1%)	73	65
2	E	93/100 (93%)	91 (98%)	2 (2%)	52	36
2	F	94/100 (94%)	94 (100%)	0	100	100
All	All	683/728 (94%)	674 (99%)	9 (1%)	69	58

All (9) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	34	TYR
1	A	55	THR
1	A	76	THR
1	A	79	TYR
1	A	136	ARG
1	A	209	ARG
2	D	31	CYS
2	E	31	CYS
2	E	102	ILE

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

5.3.3 RNA (i)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates (i)

25 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	BGC	G	1	3	12,12,12	0.45	0	17,17,17	0.81	0
3	GAL	G	2	3	11,11,12	0.36	0	15,15,17	1.39	3 (20%)
3	NGA	G	3	3	14,14,15	0.25	0	17,19,21	0.62	0
3	GAL	G	4	3	11,11,12	0.51	0	15,15,17	0.60	0
3	SIA	G	5	3	20,20,21	1.13	2 (10%)	24,28,31	1.06	2 (8%)
3	BGC	H	1	3	12,12,12	0.39	0	17,17,17	0.84	1 (5%)
3	GAL	H	2	3	11,11,12	0.20	0	15,15,17	1.50	2 (13%)
3	NGA	H	3	3	14,14,15	0.39	0	17,19,21	1.00	1 (5%)
3	GAL	H	4	3	11,11,12	0.41	0	15,15,17	0.87	1 (6%)
3	SIA	H	5	3	20,20,21	1.03	2 (10%)	24,28,31	1.13	2 (8%)
3	BGC	I	1	3	12,12,12	0.44	0	17,17,17	0.92	1 (5%)
3	GAL	I	2	3	11,11,12	0.32	0	15,15,17	1.31	2 (13%)
3	NGA	I	3	3	14,14,15	0.41	0	17,19,21	0.89	0
3	GAL	I	4	3	11,11,12	0.46	0	15,15,17	0.69	0
3	SIA	I	5	3	20,20,21	1.11	2 (10%)	24,28,31	1.09	2 (8%)
3	BGC	J	1	3	12,12,12	0.49	0	17,17,17	0.98	0
3	GAL	J	2	3	11,11,12	0.24	0	15,15,17	1.33	2 (13%)
3	NGA	J	3	3	14,14,15	0.34	0	17,19,21	0.94	0
3	GAL	J	4	3	11,11,12	0.47	0	15,15,17	0.85	0
3	SIA	J	5	3	20,20,21	1.11	2 (10%)	24,28,31	1.12	2 (8%)
3	BGC	K	1	3	12,12,12	0.47	0	17,17,17	1.13	1 (5%)
3	GAL	K	2	3	11,11,12	0.24	0	15,15,17	1.21	2 (13%)
3	NGA	K	3	3	14,14,15	0.31	0	17,19,21	1.13	1 (5%)
3	GAL	K	4	3	11,11,12	0.27	0	15,15,17	0.70	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
3	SIA	K	5	3	20,20,21	1.07	2 (10%)	24,28,31	1.03	2 (8%)

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	BGC	G	1	3	-	0/2/22/22	0/1/1/1
3	GAL	G	2	3	-	0/2/19/22	0/1/1/1
3	NGA	G	3	3	-	0/6/23/26	0/1/1/1
3	GAL	G	4	3	-	0/2/19/22	0/1/1/1
3	SIA	G	5	3	-	3/18/34/38	0/1/1/1
3	BGC	H	1	3	-	0/2/22/22	0/1/1/1
3	GAL	H	2	3	-	0/2/19/22	0/1/1/1
3	NGA	H	3	3	-	0/6/23/26	0/1/1/1
3	GAL	H	4	3	-	0/2/19/22	0/1/1/1
3	SIA	H	5	3	-	3/18/34/38	0/1/1/1
3	BGC	I	1	3	-	0/2/22/22	0/1/1/1
3	GAL	I	2	3	-	0/2/19/22	0/1/1/1
3	NGA	I	3	3	-	0/6/23/26	0/1/1/1
3	GAL	I	4	3	-	0/2/19/22	0/1/1/1
3	SIA	I	5	3	-	1/18/34/38	0/1/1/1
3	BGC	J	1	3	-	0/2/22/22	0/1/1/1
3	GAL	J	2	3	-	0/2/19/22	0/1/1/1
3	NGA	J	3	3	-	0/6/23/26	0/1/1/1
3	GAL	J	4	3	-	0/2/19/22	0/1/1/1
3	SIA	J	5	3	-	3/18/34/38	0/1/1/1
3	BGC	K	1	3	-	0/2/22/22	0/1/1/1
3	GAL	K	2	3	-	0/2/19/22	0/1/1/1
3	NGA	K	3	3	-	1/6/23/26	0/1/1/1
3	GAL	K	4	3	-	0/2/19/22	0/1/1/1
3	SIA	K	5	3	-	3/18/34/38	0/1/1/1

All (10) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	J	5	SIA	O1A-C1	3.87	1.33	1.22
3	I	5	SIA	O1A-C1	3.70	1.33	1.22
3	K	5	SIA	O1A-C1	3.65	1.33	1.22
3	G	5	SIA	O1A-C1	3.64	1.33	1.22

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	H	5	SIA	O1A-C1	3.49	1.32	1.22
3	H	5	SIA	O1B-C1	-2.40	1.22	1.30
3	K	5	SIA	O1B-C1	-2.28	1.23	1.30
3	J	5	SIA	O1B-C1	-2.25	1.23	1.30
3	I	5	SIA	O1B-C1	-2.18	1.23	1.30
3	G	5	SIA	O1B-C1	-2.08	1.23	1.30

All (27) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	H	2	GAL	O3-C3-C2	-4.02	102.30	109.99
3	J	5	SIA	O1B-C1-C2	3.30	122.46	113.03
3	I	2	GAL	O3-C3-C2	-3.25	103.78	109.99
3	G	2	GAL	O3-C3-C2	-3.05	104.16	109.99
3	K	2	GAL	C1-C2-C3	3.03	113.39	109.67
3	H	2	GAL	C1-C2-C3	3.03	113.39	109.67
3	J	2	GAL	O3-C3-C2	-2.94	104.36	109.99
3	I	2	GAL	C1-C2-C3	2.89	113.22	109.67
3	J	2	GAL	C1-C2-C3	2.89	113.21	109.67
3	I	5	SIA	O1B-C1-C2	2.82	121.08	113.03
3	G	2	GAL	C1-C2-C3	2.78	113.09	109.67
3	G	5	SIA	O1B-C1-C2	2.75	120.87	113.03
3	H	5	SIA	O1B-C1-C2	2.64	120.58	113.03
3	K	2	GAL	O3-C3-C2	-2.60	105.01	109.99
3	K	5	SIA	O1B-C1-C2	2.52	120.23	113.03
3	K	3	NGA	O5-C5-C6	2.48	111.09	107.20
3	H	5	SIA	O1B-C1-O1A	-2.45	118.53	124.09
3	I	5	SIA	O1B-C1-O1A	-2.45	118.53	124.09
3	K	5	SIA	O1B-C1-O1A	-2.43	118.57	124.09
3	G	5	SIA	O1B-C1-O1A	-2.43	118.58	124.09
3	H	3	NGA	O5-C5-C6	2.40	110.96	107.20
3	J	5	SIA	O1B-C1-O1A	-2.25	118.97	124.09
3	H	4	GAL	O5-C1-C2	-2.25	107.30	110.77
3	G	2	GAL	O5-C5-C6	2.17	110.61	107.20
3	I	1	BGC	O4-C4-C3	-2.04	105.64	110.35
3	K	1	BGC	C1-O5-C5	-2.02	109.86	113.66
3	H	1	BGC	O5-C1-C2	-2.01	106.69	110.28

There are no chirality outliers.

All (14) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	K	5	SIA	O8-C8-C9-O9
3	K	5	SIA	C7-C8-C9-O9
3	J	5	SIA	O1A-C1-C2-O6
3	K	3	NGA	O5-C5-C6-O6
3	H	5	SIA	O8-C8-C9-O9
3	G	5	SIA	O8-C8-C9-O9
3	G	5	SIA	C7-C8-C9-O9
3	G	5	SIA	O1A-C1-C2-O6
3	H	5	SIA	O1A-C1-C2-O6
3	I	5	SIA	O1A-C1-C2-O6
3	K	5	SIA	O1A-C1-C2-O6
3	H	5	SIA	C7-C8-C9-O9
3	J	5	SIA	O1A-C1-C2-C3
3	J	5	SIA	O1B-C1-C2-C3

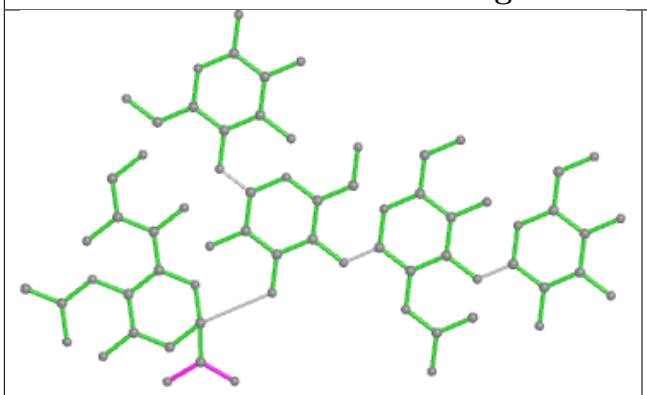
There are no ring outliers.

3 monomers are involved in 3 short contacts:

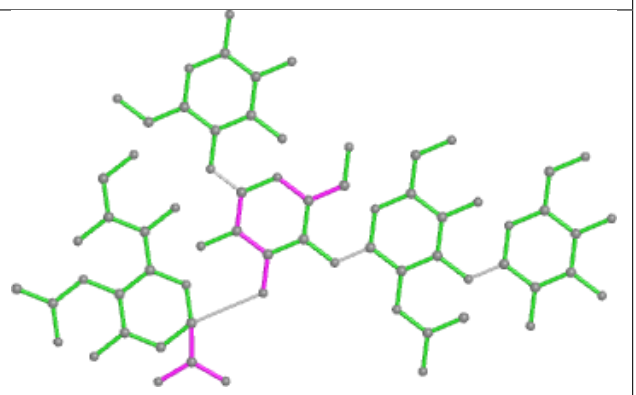
Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	K	5	SIA	1	0
3	I	5	SIA	1	0
3	J	5	SIA	1	0

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

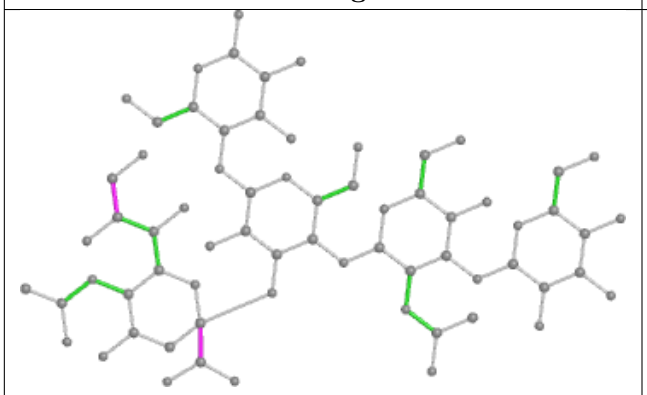
Oligosaccharide Chain G



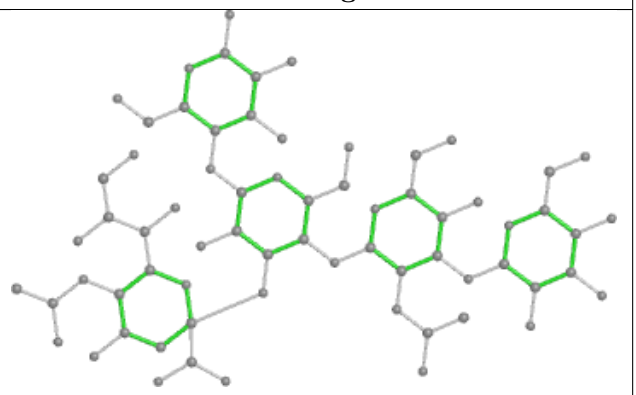
Bond lengths



Bond angles

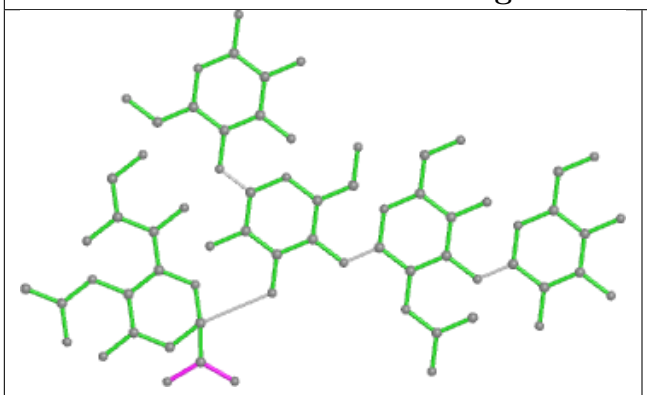


Torsions

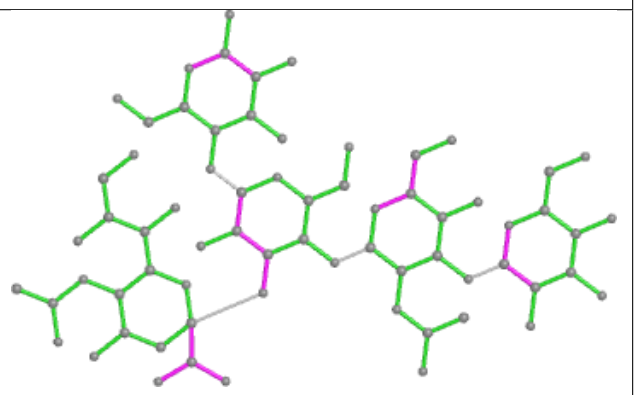


Rings

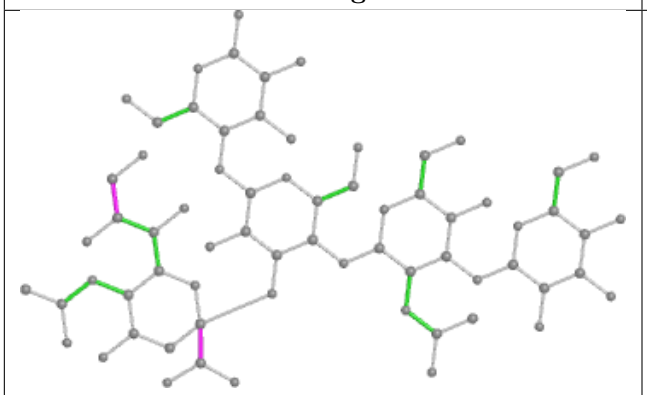
Oligosaccharide Chain H



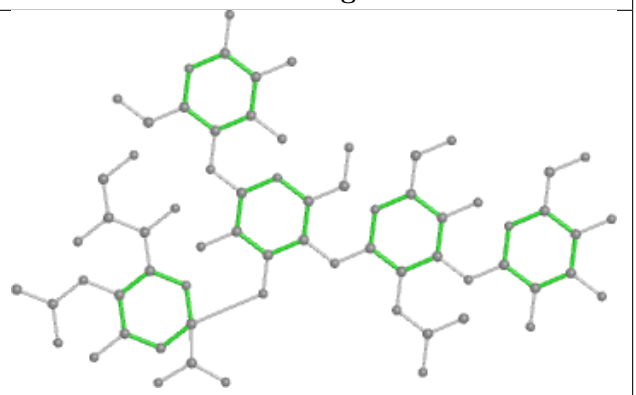
Bond lengths



Bond angles

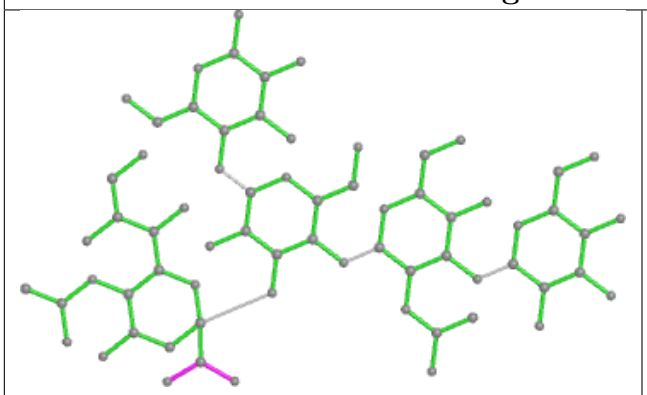


Torsions

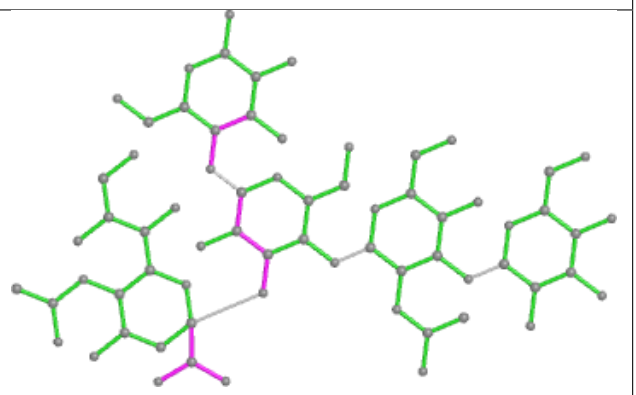


Rings

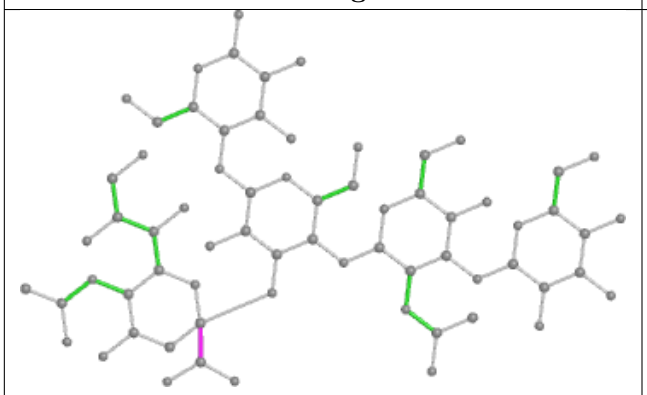
Oligosaccharide Chain I



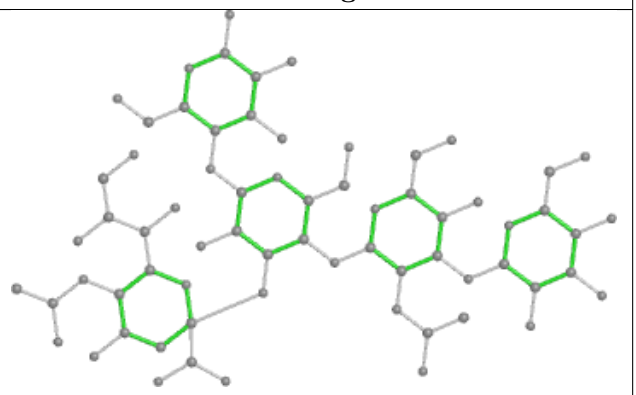
Bond lengths



Bond angles

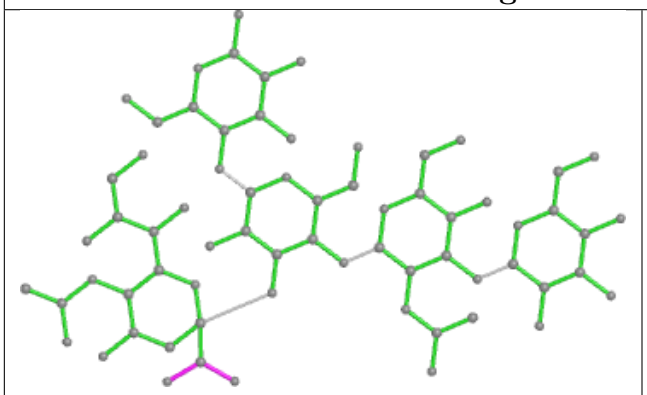


Torsions

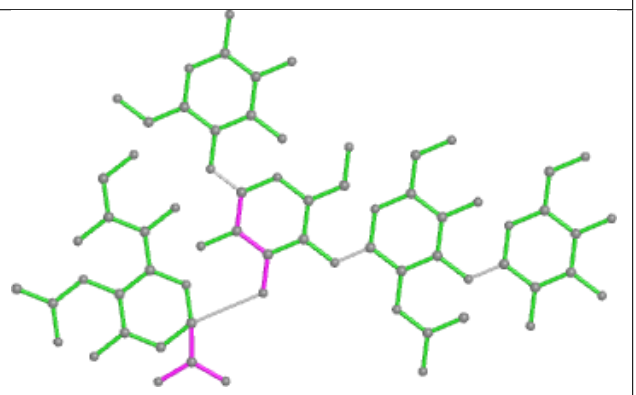


Rings

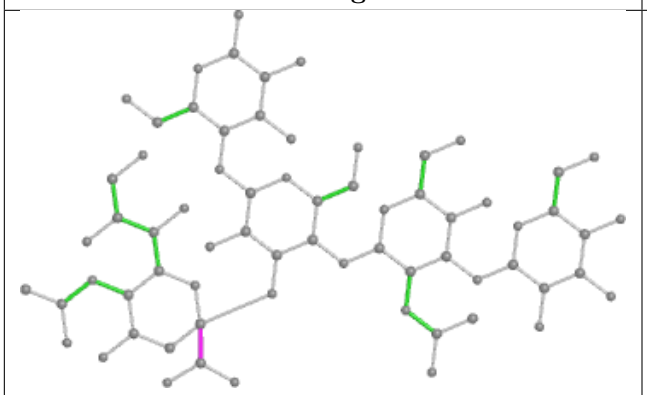
Oligosaccharide Chain J



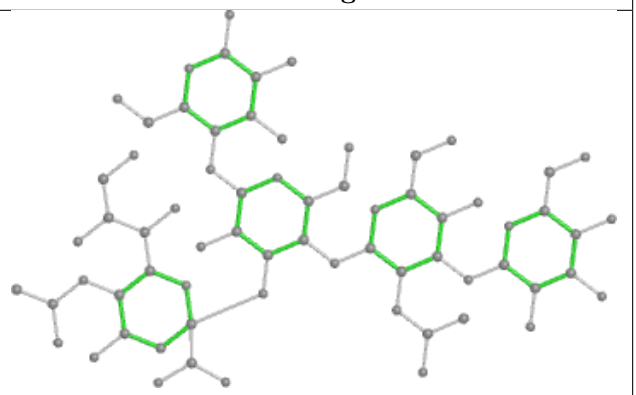
Bond lengths



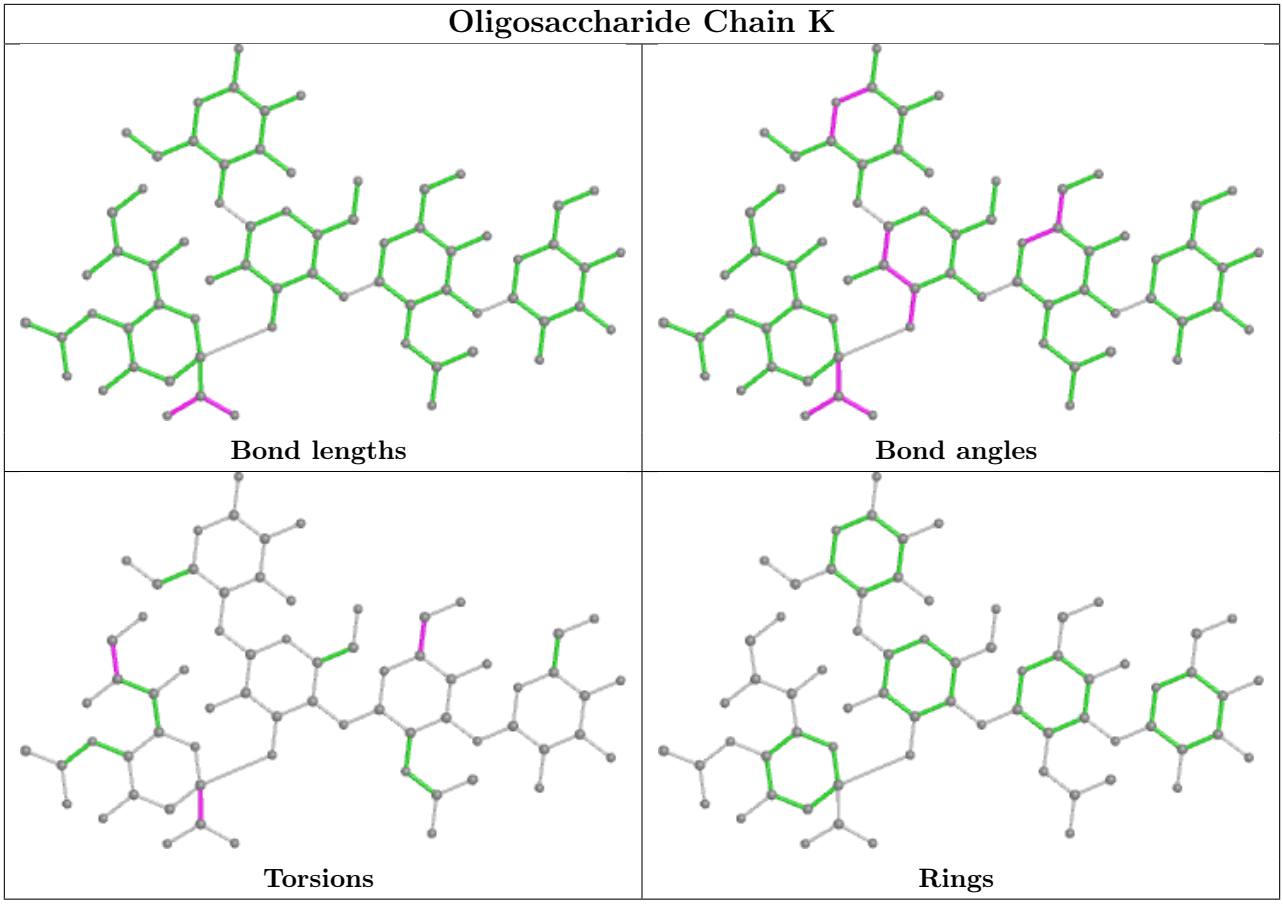
Bond angles



Torsions



Rings



5.6 Ligand geometry (i)

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 (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	249/266 (93%)	1.64	86 (34%)	0	0	23, 67, 112, 134	0
2	B	105/112 (93%)	-0.27	1 (0%)	82	82	16, 25, 41, 56	0
2	C	105/112 (93%)	-0.14	3 (2%)	51	50	13, 18, 34, 90	0
2	D	105/112 (93%)	-0.26	2 (1%)	66	66	12, 17, 30, 78	0
2	E	105/112 (93%)	-0.21	4 (3%)	40	38	14, 20, 36, 87	0
2	F	105/112 (93%)	-0.08	3 (2%)	51	50	16, 29, 45, 93	0
All	All	774/826 (93%)	0.40	99 (12%)	3	3	12, 28, 100, 134	0

All (99) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	F	126	LEU	8.7
1	A	58	ASP	8.6
2	B	126	LEU	8.6
1	A	66	ILE	7.8
2	C	126	LEU	7.4
1	A	79	TYR	7.3
1	A	155	SER	7.2
2	D	22	MET	6.6
1	A	65	THR	6.2
1	A	77	ILE	6.2
1	A	49	GLY	6.2
1	A	57	PRO	6.1
1	A	144	ARG	5.9
1	A	67	ASN	5.8
1	A	61	ILE	5.6
2	E	126	LEU	5.6
2	D	126	LEU	5.5
1	A	148	ASN	5.4
1	A	21	ALA	5.2

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Mol	Chain	Res	Type	RSRZ
1	A	109	VAL	5.2
1	A	165	PRO	5.1
1	A	152	LYS	5.0
1	A	150	PHE	5.0
1	A	50	PRO	4.9
1	A	118	ALA	4.7
1	A	156	ARG	4.6
1	A	59	GLU	4.6
1	A	100	VAL	4.5
1	A	60	ASN	4.5
1	A	119	ASP	4.5
1	A	72	ARG	4.4
1	A	64	ASN	4.4
1	A	232	HIS	4.4
1	A	117	TYR	4.4
1	A	52	ILE	4.4
2	C	22	MET	4.3
1	A	84	ARG	4.3
1	A	120	ASN	4.2
1	A	101	SER	4.2
1	A	162	ASN	4.2
2	F	125	ASN	4.1
2	F	22	MET	4.1
1	A	74	GLN	4.1
2	E	22	MET	4.1
1	A	163	MET	3.9
1	A	62	THR	3.9
1	A	73	THR	3.8
1	A	116	ASN	3.8
1	A	145	ILE	3.8
1	A	98	GLN	3.7
1	A	38	ASN	3.7
1	A	22	GLU	3.6
1	A	149	ASN	3.6
1	A	130	SER	3.5
1	A	115	THR	3.5
1	A	75	LEU	3.4
1	A	153	LEU	3.4
1	A	239	THR	3.4
1	A	97	VAL	3.3
1	A	157	GLY	3.2
1	A	102	SER	3.2

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Mol	Chain	Res	Type	RSRZ
1	A	56	VAL	3.2
1	A	132	ASN	3.2
1	A	263	ASN	3.2
2	E	125	ASN	3.1
1	A	63	ILE	3.1
1	A	164	SER	3.0
1	A	51	VAL	3.0
1	A	78	ASN	3.0
1	A	76	THR	2.9
1	A	241	THR	2.9
1	A	159	ILE	2.9
1	A	217	ILE	2.9
1	A	235	GLU	2.8
1	A	154	LYS	2.7
2	C	23	THR	2.7
1	A	237	PRO	2.7
1	A	136	ARG	2.7
1	A	48	TYR	2.6
1	A	110	VAL	2.6
1	A	114	THR	2.6
1	A	45	THR	2.6
1	A	168	TYR	2.6
1	A	146	VAL	2.5
1	A	139	ILE	2.5
1	A	151	GLU	2.5
1	A	55	THR	2.5
1	A	81	ASP	2.5
1	A	39	GLY	2.4
1	A	88	ASN	2.4
1	A	181	ILE	2.4
1	A	108	ARG	2.4
2	E	23	THR	2.4
1	A	142	PHE	2.3
1	A	143	ASN	2.2
1	A	166	GLU	2.1
1	A	173	LEU	2.1
1	A	36	ASP	2.1
1	A	96	ARG	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)

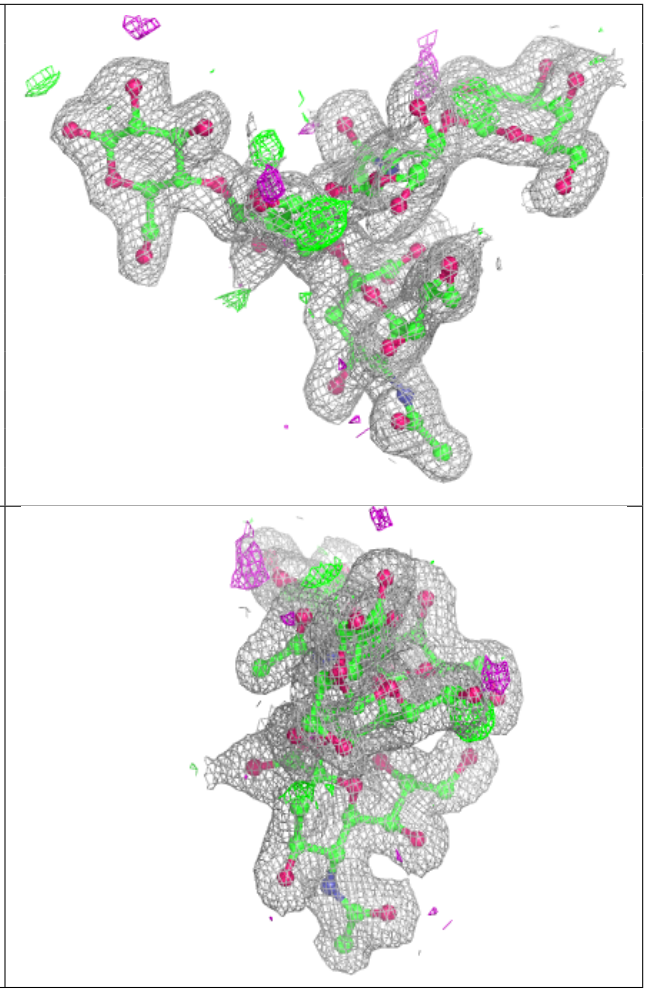
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists 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	BGC	K	1	12/12	0.82	0.34	51,62,70,75	0
3	BGC	I	1	12/12	0.84	0.35	31,44,59,62	0
3	BGC	H	1	12/12	0.88	0.31	35,48,52,61	0
3	SIA	K	5	20/21	0.90	0.12	23,29,37,38	0
3	NGA	K	3	14/15	0.91	0.10	29,31,39,48	0
3	BGC	G	1	12/12	0.91	0.12	25,31,40,45	0
3	BGC	J	1	12/12	0.92	0.20	40,50,53,61	0
3	GAL	G	2	11/12	0.92	0.14	20,23,30,42	0
3	GAL	K	4	11/12	0.93	0.09	23,28,33,33	0
3	GAL	K	2	11/12	0.93	0.12	30,36,43,43	0
3	NGA	H	3	14/15	0.94	0.11	15,21,29,44	0
3	GAL	G	4	11/12	0.94	0.09	16,19,25,25	0
3	NGA	G	3	14/15	0.94	0.07	22,26,31,31	0
3	GAL	H	2	11/12	0.94	0.15	20,23,27,34	0
3	SIA	G	5	20/21	0.95	0.07	20,25,31,31	0
3	SIA	H	5	20/21	0.95	0.09	17,21,23,24	0
3	NGA	J	3	14/15	0.95	0.09	18,24,30,39	0
3	GAL	J	4	11/12	0.95	0.08	15,18,22,22	0
3	SIA	J	5	20/21	0.95	0.08	19,24,27,27	0
3	GAL	H	4	11/12	0.96	0.06	14,16,17,18	0
3	GAL	J	2	11/12	0.96	0.11	20,26,30,37	0
3	GAL	I	4	11/12	0.97	0.08	14,15,17,17	0
3	SIA	I	5	20/21	0.97	0.07	17,21,24,24	0
3	NGA	I	3	14/15	0.97	0.08	17,20,27,35	0
3	GAL	I	2	11/12	0.98	0.12	18,23,29,35	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.

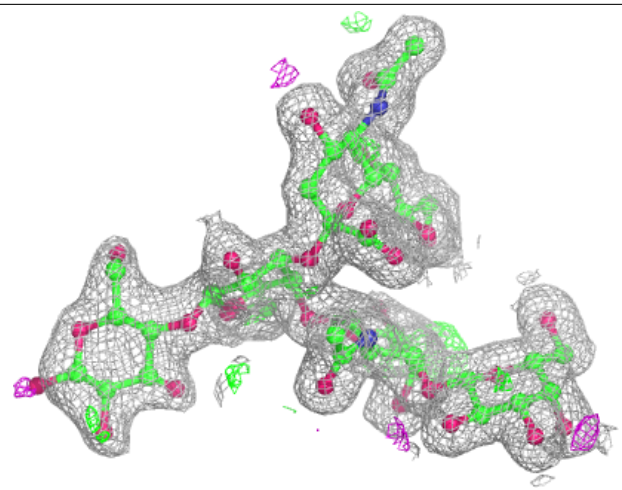
Electron density around Chain G:

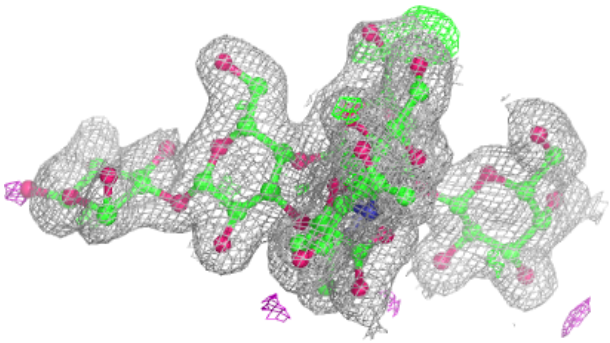
$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)

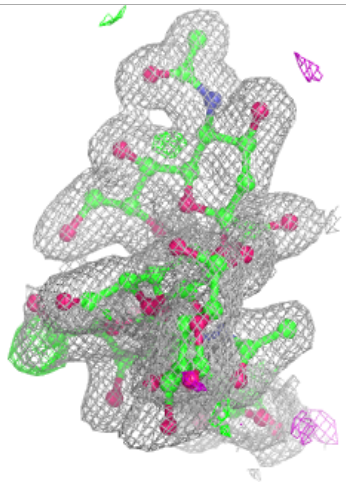


Electron density around Chain H:

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

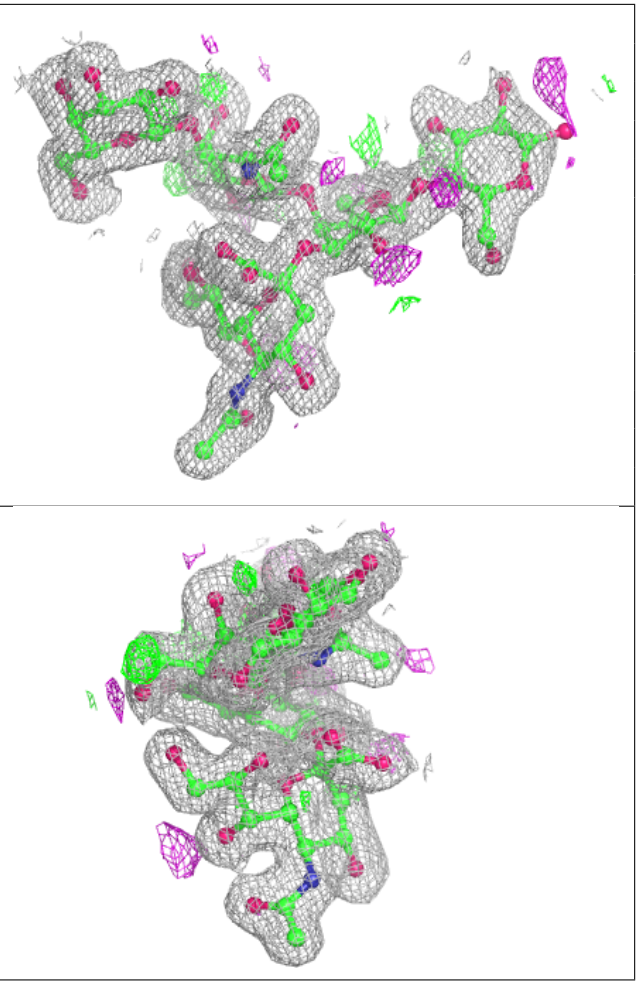






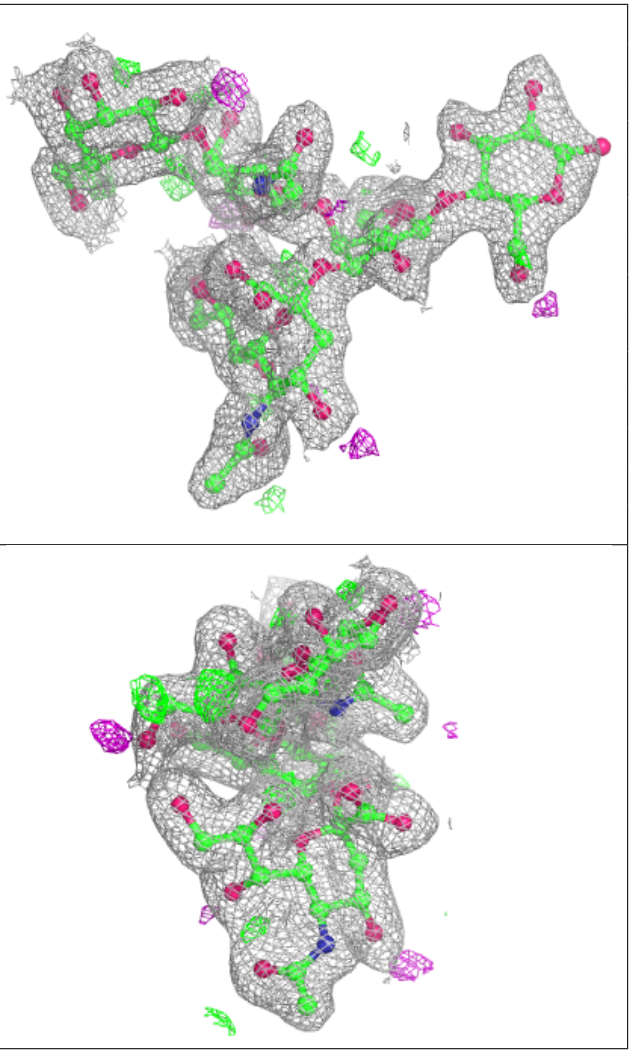
Electron density around Chain I:

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



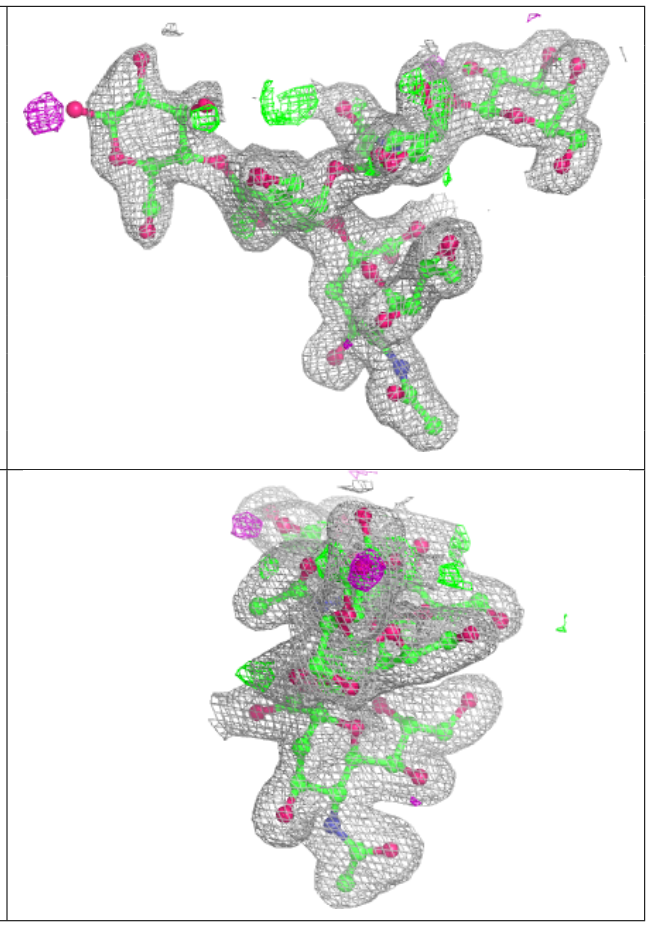
Electron density around Chain J:

$2mF_o$-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(Å^2)	Q<0.9
4	ZN	A	301	1/1	0.98	0.04	41,41,41,41	0

6.5 Other polymers (i)

There are no such residues in this entry.