Full wwPDB X-ray Structure Validation Report (i)

Jun 14, 2022 – 01:24 pm BST

PDB ID	:	6ZV5
Title	:	CML1 crystal structure in complex with Lewis a tetrasaccharide
Authors	:	Varrot, A.; Bleuler-Martinez, S.
Deposited on	:	2020-07-24
Resolution	:	1.95 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 following versions of software and data (see references (1)) were used in the production of this report:

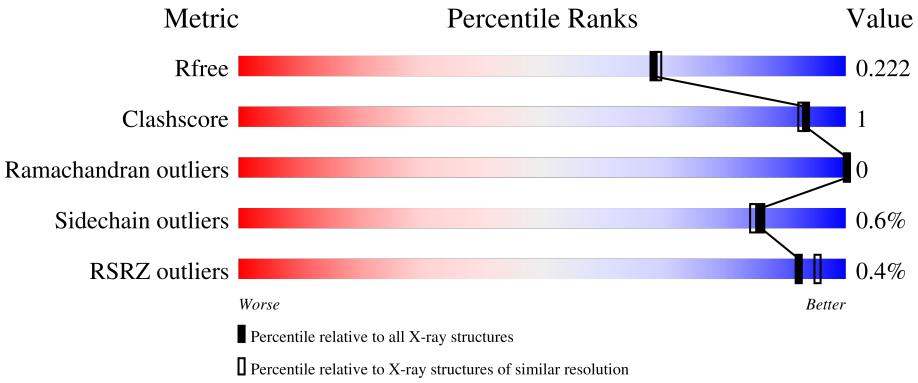
MolProbity	:	4.02b-467
Mogul	:	1.8.4, CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.28.1
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0267
CCP4	:	7.1.010 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.28.1

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 1.95 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	2580 (1.96-1.96)
Clashscore	141614	2705 (1.96-1.96)
Ramachandran outliers	138981	2678 (1.96-1.96)
Sidechain outliers	138945	2678 (1.96-1.96)
RSRZ outliers	127900	2539 (1.96-1.96)

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	AAA	126	95% 5%
1	BBB	126	98% .
1	CCC	126	95% 5%
1	DDD	126	95% 5%
1	EEE	126	2% 96% .

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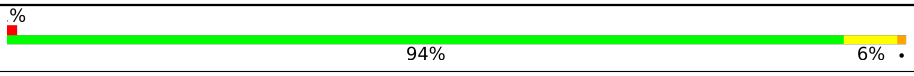
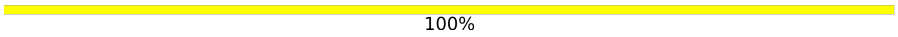
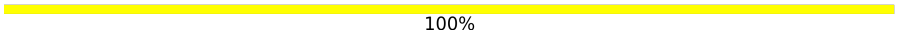
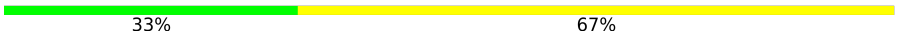
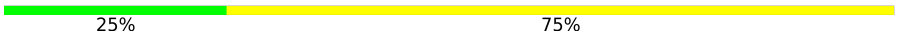
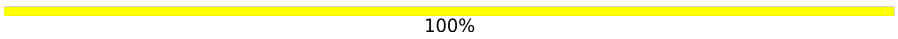
Mol	Chain	Length	Quality of chain
1	FFF	126	
2	AaA	3	
2	BaB	3	
2	EaE	3	
2	FaF	3	
3	CaC	4	
3	DaD	4	

2 Entry composition (i)

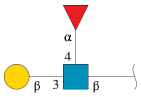
There are 5 unique types of molecules in this entry. The entry contains 6773 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 Mucin-binding lectin 1.

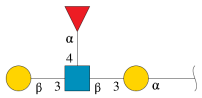
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	AAA	126	Total	C	N	O	S	0	0	0
			960	610	167	182	1			
1	BBB	126	Total	C	N	O	S	0	0	0
			961	611	165	184	1			
1	CCC	126	Total	C	N	O	S	0	0	0
			963	611	167	184	1			
1	DDD	126	Total	C	N	O	S	0	0	0
			963	611	167	184	1			
1	EEE	126	Total	C	N	O	S	0	0	0
			962	611	166	184	1			
1	FFF	126	Total	C	N	O	S	0	0	0
			963	611	167	184	1			

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



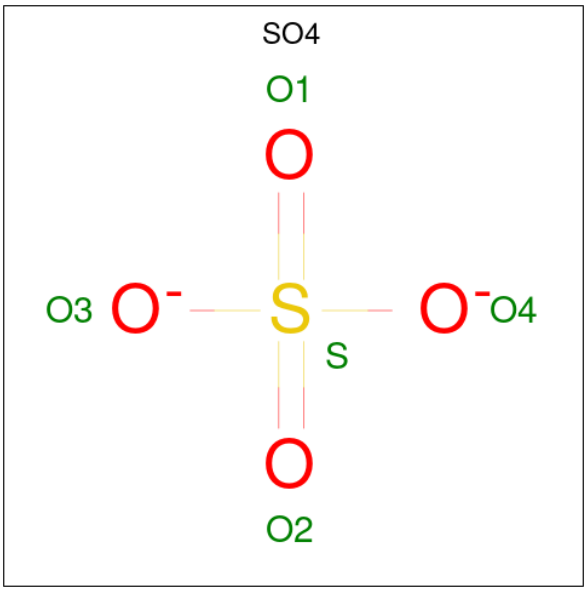
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
2	AaA	3	Total	C	N	O	0	0	0
			36	20	1	15			
2	BaB	3	Total	C	N	O	0	0	0
			36	20	1	15			
2	EaE	3	Total	C	N	O	0	0	0
			36	20	1	15			
2	FaF	3	Total	C	N	O	0	0	0
			36	20	1	15			

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



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf	Trace
3	CaC	4	Total C N O 47 26 1 20	0	0	0
3	DaD	4	Total C N O 47 26 1 20	0	0	0

- Molecule 4 is SULFATE ION (three-letter code: SO4) (formula: O_4S).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	BBB	1	Total O S 5 4 1	0	0
4	CCC	1	Total O S 5 4 1	0	0
4	DDD	1	Total O S 5 4 1	0	0
4	DDD	1	Total O S 5 4 1	0	0
4	DDD	1	Total O S 5 4 1	0	0
4	EEE	1	Total O S 5 4 1	0	0
4	FFF	1	Total O S 5 4 1	0	0

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Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	FFF	1	Total O S 5 4 1	0	0
4	FFF	1	Total O S 5 4 1	0	0
4	FFF	1	Total O S 5 4 1	0	0
4	FFF	1	Total O S 5 4 1	0	0

- Molecule 5 is water.

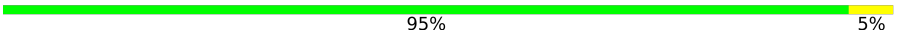
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	AAA	117	Total O 126 126	0	9
5	BBB	133	Total O 143 143	0	10
5	CCC	96	Total O 99 99	0	3
5	DDD	135	Total O 139 139	0	4
5	EEE	85	Total O 91 91	0	6
5	FFF	107	Total O 110 110	0	3

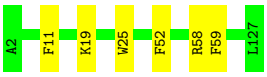
3 Residue-property plots (i)

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: Mucin-binding lectin 1

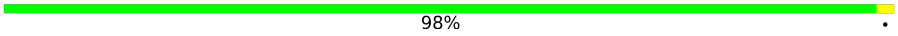
Chain AAA:

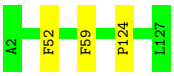




• Molecule 1: Mucin-binding lectin 1

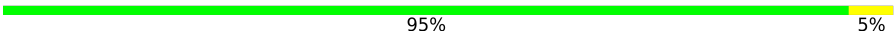
Chain BBB:

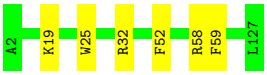




• Molecule 1: Mucin-binding lectin 1

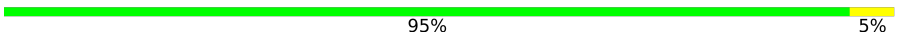
Chain CCC:





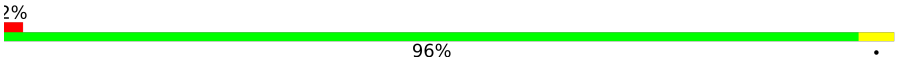
• Molecule 1: Mucin-binding lectin 1

Chain DDD:



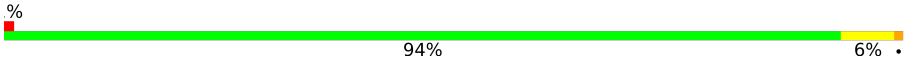
• Molecule 1: Mucin-binding lectin 1

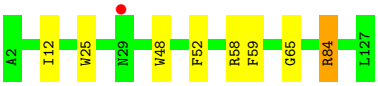
Chain EEE:



• Molecule 1: Mucin-binding lectin 1

Chain FFF:



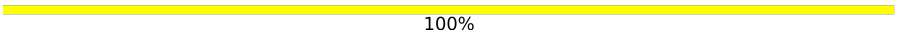


• Molecule 2: beta-D-galactopyranose-(1-3)-[alpha-L-fucopyranose-(1-4)]2-acetamido-2-deoxy-beta-D-glucopyranose

Chain AaA:

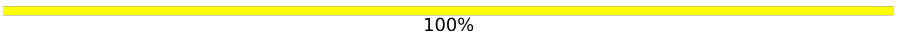
• Molecule 2: beta-D-galactopyranose-(1-3)-[alpha-L-fucopyranose-(1-4)]2-acetamido-2-deoxy-beta-D-glucopyranose

Chain BaB:



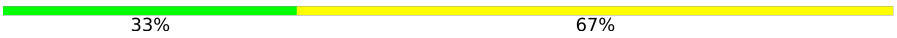
• Molecule 2: beta-D-galactopyranose-(1-3)-[alpha-L-fucopyranose-(1-4)]2-acetamido-2-deoxy-beta-D-glucopyranose

Chain EaE:



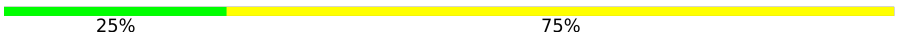
• Molecule 2: beta-D-galactopyranose-(1-3)-[alpha-L-fucopyranose-(1-4)]2-acetamido-2-deoxy-beta-D-glucopyranose

Chain FaF:



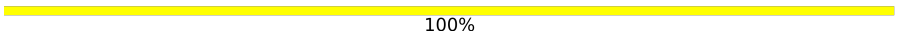
• Molecule 3: beta-D-galactopyranose-(1-3)-[alpha-L-fucopyranose-(1-4)]2-acetamido-2-deoxy-beta-D-glucopyranose-(1-3)-alpha-D-galactopyranose

Chain CaC:



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

Chain DaD:



4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 31	Depositor
Cell constants a, b, c, α, β, γ	73.92Å 73.92Å 119.59Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	43.70 – 1.95 43.70 – 1.95	Depositor EDS
% Data completeness (in resolution range)	98.3 (43.70-1.95) 98.3 (43.70-1.95)	Depositor EDS
R_{merge}	0.06	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	2.47 (at 1.95Å)	Xtriage
Refinement program	REFMAC 5.8.0258	Depositor
R, R_{free}	0.187 , 0.239 0.171 , 0.222	Depositor DCC
R_{free} test set	2590 reflections (4.94%)	wwPDB-VP
Wilson B-factor (Å^2)	29.5	Xtriage
Anisotropy	0.777	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	(Not available) , (Not available)	EDS
L-test for twinning[2]	$< \|L\| > = 0.49$, $< L^2 > = 0.31$	Xtriage
Estimated twinning fraction	0.018 for -h,-k,l 0.037 for h,-h-k,-l 0.035 for -k,-h,-l	Xtriage
F_o,F_c correlation	0.97	EDS
Total number of atoms	6773	wwPDB-VP
Average B, all atoms (Å^2)	34.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.57% 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

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: SO4, FUC, GAL, NAG, GLA

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	AAA	0.87	0/985	0.90	0/1345
1	BBB	0.91	0/986	0.93	0/1346
1	CCC	0.83	0/988	0.86	0/1349
1	DDD	0.84	0/988	0.92	0/1349
1	EEE	0.86	0/987	0.88	0/1348
1	FFF	0.87	0/988	0.89	1/1349 (0.1%)
All	All	0.86	0/5922	0.90	1/8086 (0.0%)

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	FFF	84	ARG	NE-CZ-NH1	7.93	124.27	120.30

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	AAA	960	0	937	4	0
1	BBB	961	0	932	3	0
1	CCC	963	0	939	3	0
1	DDD	963	0	939	2	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	EEE	962	0	934	3	0
1	FFF	963	0	939	4	0
2	AaA	36	0	33	0	0
2	BaB	36	0	33	0	0
2	EaE	36	0	33	0	0
2	FaF	36	0	33	0	0
3	CaC	47	0	42	0	0
3	DaD	47	0	42	0	0
4	BBB	5	0	0	0	0
4	CCC	5	0	0	1	0
4	DDD	15	0	0	0	0
4	EEE	5	0	0	0	0
4	FFF	25	0	0	0	0
5	AAA	126	0	0	0	0
5	BBB	143	0	0	0	0
5	CCC	99	0	0	0	0
5	DDD	139	0	0	0	0
5	EEE	91	0	0	1	0
5	FFF	110	0	0	0	0
All	All	6773	0	5836	17	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 1.

All (17) 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:CCC:32:ARG:NH2	4:CCC:201:SO4:O3	2.28	0.66
1:EEE:5:HIS:ND1	5:EEE:301:HOH:O	2.30	0.64
1:DDD:52:PHE:HB2	1:DDD:59:PHE:CZ	2.45	0.52
1:AAA:52:PHE:HB2	1:AAA:59:PHE:CZ	2.45	0.52
1:EEE:52:PHE:HB2	1:EEE:59:PHE:CZ	2.47	0.50
1:AAA:25:TRP:CE2	1:AAA:58:ARG:HB3	2.47	0.49
1:FFF:52:PHE:HB2	1:FFF:59:PHE:CZ	2.47	0.49
1:CCC:52:PHE:HB2	1:CCC:59:PHE:CZ	2.49	0.48
1:BBB:52:PHE:HB2	1:BBB:59:PHE:CZ	2.49	0.47
1:AAA:11:PHE:CE2	1:BBB:124:PRO:HD3	2.50	0.46
1:CCC:25:TRP:CE2	1:CCC:58:ARG:HB3	2.51	0.46
1:FFF:65:GLY:O	1:FFF:84:ARG:NH2	2.51	0.44
1:FFF:25:TRP:CE2	1:FFF:58:ARG:HB3	2.55	0.42
1:AAA:11:PHE:CZ	1:BBB:124:PRO:HD3	2.56	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:EEE:25:TRP:CE2	1:EEE:58:ARG:HB3	2.55	0.41
1:FFF:12:ILE:HB	1:FFF:48:TRP:HB2	2.03	0.41
1:DDD:25:TRP:CE2	1:DDD:58:ARG:HB3	2.55	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	AAA	124/126 (98%)	121 (98%)	3 (2%)	0	100	100
1	BBB	124/126 (98%)	120 (97%)	4 (3%)	0	100	100
1	CCC	124/126 (98%)	120 (97%)	4 (3%)	0	100	100
1	DDD	124/126 (98%)	120 (97%)	4 (3%)	0	100	100
1	EEE	124/126 (98%)	121 (98%)	3 (2%)	0	100	100
1	FFF	124/126 (98%)	121 (98%)	3 (2%)	0	100	100
All	All	744/756 (98%)	723 (97%)	21 (3%)	0	100	100

There are no Ramachandran outliers to report.

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	AAA	104/105 (99%)	103 (99%)	1 (1%)	76 74
1	BBB	104/105 (99%)	104 (100%)	0	100 100
1	CCC	105/105 (100%)	104 (99%)	1 (1%)	76 74
1	DDD	105/105 (100%)	103 (98%)	2 (2%)	57 50
1	EEE	104/105 (99%)	104 (100%)	0	100 100
1	FFF	105/105 (100%)	105 (100%)	0	100 100
All	All	627/630 (100%)	623 (99%)	4 (1%)	86 85

All (4) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	AAA	19	LYS
1	CCC	19	LYS
1	DDD	29	ASN
1	DDD	47	LYS

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)

20 monosaccharides are modelled in this entry.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\|>2$	Counts	RMSZ	$\#\|Z\|>2$
2	NAG	AaA	1	2	15,15,15	0.49	0	21,21,21	0.95	1 (4%)
2	GAL	AaA	2	2	11,11,12	1.12	1 (9%)	15,15,17	1.10	0
2	FUC	AaA	3	2	10,10,11	0.83	0	14,14,16	0.86	0
2	NAG	BaB	1	2	15,15,15	0.55	0	21,21,21	1.74	6 (28%)
2	GAL	BaB	2	2	11,11,12	1.29	2 (18%)	15,15,17	1.68	4 (26%)
2	FUC	BaB	3	2	10,10,11	1.02	1 (10%)	14,14,16	0.84	0
3	GLA	CaC	1	3	12,12,12	1.20	1 (8%)	17,17,17	1.33	3 (17%)
3	NAG	CaC	2	3	14,14,15	0.62	0	17,19,21	1.34	2 (11%)
3	GAL	CaC	3	3	11,11,12	0.88	0	15,15,17	1.16	1 (6%)
3	FUC	CaC	4	3	10,10,11	0.87	0	14,14,16	0.73	0
3	GLA	DaD	1	3	12,12,12	1.17	1 (8%)	17,17,17	1.39	1 (5%)
3	NAG	DaD	2	3	14,14,15	0.74	0	17,19,21	1.88	4 (23%)
3	GAL	DaD	3	3	11,11,12	1.16	1 (9%)	15,15,17	1.54	2 (13%)
3	FUC	DaD	4	3	10,10,11	0.92	0	14,14,16	1.20	2 (14%)
2	NAG	EaE	1	2	15,15,15	0.70	1 (6%)	21,21,21	2.04	4 (19%)
2	GAL	EaE	2	2	11,11,12	1.16	1 (9%)	15,15,17	1.04	1 (6%)
2	FUC	EaE	3	2	10,10,11	0.54	0	14,14,16	1.41	3 (21%)
2	NAG	FaF	1	2	15,15,15	0.35	0	21,21,21	1.34	3 (14%)
2	GAL	FaF	2	2	11,11,12	0.66	0	15,15,17	1.07	0
2	FUC	FaF	3	2	10,10,11	0.97	1 (10%)	14,14,16	1.08	2 (14%)

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	AaA	1	2	-	0/6/26/26	0/1/1/1
2	GAL	AaA	2	2	-	1/2/19/22	0/1/1/1
2	FUC	AaA	3	2	-	-	0/1/1/1
2	NAG	BaB	1	2	-	2/6/26/26	0/1/1/1
2	GAL	BaB	2	2	-	1/2/19/22	0/1/1/1
2	FUC	BaB	3	2	-	-	0/1/1/1
3	GLA	CaC	1	3	-	1/2/22/22	0/1/1/1
3	NAG	CaC	2	3	-	0/6/23/26	0/1/1/1
3	GAL	CaC	3	3	-	1/2/19/22	0/1/1/1
3	FUC	CaC	4	3	-	-	0/1/1/1
3	GLA	DaD	1	3	-	2/2/22/22	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	NAG	DaD	2	3	-	0/6/23/26	0/1/1/1
3	GAL	DaD	3	3	-	1/2/19/22	0/1/1/1
3	FUC	DaD	4	3	-	-	0/1/1/1
2	NAG	EaE	1	2	-	2/6/26/26	0/1/1/1
2	GAL	EaE	2	2	-	1/2/19/22	0/1/1/1
2	FUC	EaE	3	2	-	-	0/1/1/1
2	NAG	FaF	1	2	-	4/6/26/26	0/1/1/1
2	GAL	FaF	2	2	-	1/2/19/22	0/1/1/1
2	FUC	FaF	3	2	-	-	0/1/1/1

All (10) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	EaE	2	GAL	C2-C3	-2.87	1.48	1.52
3	CaC	1	GLA	O3-C3	2.39	1.48	1.43
2	BaB	2	GAL	O5-C1	-2.34	1.40	1.43
2	FaF	3	FUC	C1-C2	2.33	1.57	1.52
3	DaD	1	GLA	O1-C1	2.28	1.46	1.39
2	BaB	2	GAL	O4-C4	2.18	1.48	1.43
2	AaA	2	GAL	C4-C5	2.17	1.57	1.53
3	DaD	3	GAL	O5-C1	-2.15	1.40	1.43
2	EaE	1	NAG	C1-C2	2.08	1.55	1.52
2	BaB	3	FUC	O5-C5	2.00	1.47	1.43

All (39) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	EaE	1	NAG	O5-C1-C2	-6.14	103.35	109.52
3	DaD	2	NAG	C2-N2-C7	-4.57	116.39	122.90
3	DaD	2	NAG	C1-O5-C5	4.45	118.22	112.19
3	DaD	1	GLA	C1-O5-C5	-4.19	105.75	113.66
2	EaE	1	NAG	C1-C2-C3	4.16	116.21	110.54
2	BaB	1	NAG	C1-O5-C5	-3.79	106.51	113.66
2	BaB	1	NAG	C2-N2-C7	-3.51	114.64	123.18
3	CaC	3	GAL	O5-C1-C2	-3.36	105.58	110.77
2	BaB	2	GAL	C1-O5-C5	3.36	116.74	112.19
2	EaE	1	NAG	O1-C1-C2	3.34	116.15	109.22
2	FaF	1	NAG	C1-C2-N2	-3.25	106.96	110.73
3	DaD	3	GAL	C1-C2-C3	3.21	113.61	109.67
3	DaD	2	NAG	O5-C5-C6	-2.98	102.53	107.20
2	EaE	2	GAL	C1-C2-C3	2.79	113.10	109.67
2	BaB	2	GAL	C1-C2-C3	2.79	113.10	109.67

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	EaE	3	FUC	O2-C2-C3	-2.76	104.61	110.14
3	CaC	2	NAG	C2-N2-C7	-2.63	119.16	122.90
3	DaD	3	GAL	O5-C5-C6	-2.63	103.08	107.20
2	BaB	1	NAG	C1-C2-N2	2.63	113.77	110.73
3	CaC	1	GLA	O1-C1-C2	-2.60	101.71	109.03
2	BaB	1	NAG	C3-C4-C5	-2.52	105.74	110.24
2	EaE	1	NAG	C2-N2-C7	-2.52	117.06	123.18
3	DaD	4	FUC	C2-C3-C4	-2.51	106.55	110.89
3	CaC	1	GLA	O5-C5-C4	-2.48	105.18	109.69
2	BaB	2	GAL	C3-C4-C5	-2.46	105.86	110.24
2	FaF	1	NAG	C2-N2-C7	2.39	128.98	123.18
2	BaB	2	GAL	O5-C5-C6	-2.37	103.48	107.20
2	FaF	1	NAG	C3-C2-N2	2.35	115.06	110.62
3	CaC	1	GLA	O3-C3-C2	-2.35	104.91	110.35
2	FaF	3	FUC	O3-C3-C2	2.29	114.39	109.99
2	BaB	1	NAG	C1-C2-C3	2.20	113.55	110.54
2	BaB	1	NAG	C6-C5-C4	2.19	118.13	113.00
3	CaC	2	NAG	C1-C2-N2	-2.16	106.79	110.49
3	DaD	2	NAG	O5-C1-C2	2.14	114.67	111.29
2	AaA	1	NAG	O4-C4-C3	-2.12	105.45	110.35
3	DaD	4	FUC	O2-C2-C3	-2.12	105.90	110.14
2	EaE	3	FUC	O5-C1-C2	-2.07	107.58	110.77
2	FaF	3	FUC	C2-C3-C4	-2.04	107.36	110.89
2	EaE	3	FUC	C6-C5-C4	-2.01	109.36	113.07

There are no chirality outliers.

All (17) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	FaF	1	NAG	O5-C5-C6-O6
3	DaD	1	GLA	O5-C5-C6-O6
2	FaF	1	NAG	C4-C5-C6-O6
2	EaE	1	NAG	C8-C7-N2-C2
2	EaE	1	NAG	O7-C7-N2-C2
2	FaF	1	NAG	C8-C7-N2-C2
2	FaF	1	NAG	O7-C7-N2-C2
3	DaD	1	GLA	C4-C5-C6-O6
3	CaC	3	GAL	O5-C5-C6-O6
2	AaA	2	GAL	O5-C5-C6-O6
2	BaB	2	GAL	O5-C5-C6-O6
2	EaE	2	GAL	O5-C5-C6-O6
2	FaF	2	GAL	O5-C5-C6-O6

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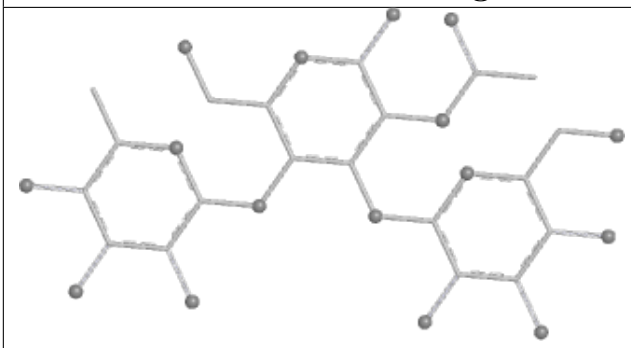
Mol	Chain	Res	Type	Atoms
3	DaD	3	GAL	O5-C5-C6-O6
2	BaB	1	NAG	C4-C5-C6-O6
3	CaC	1	GLA	O5-C5-C6-O6
2	BaB	1	NAG	O5-C5-C6-O6

There are no ring outliers.

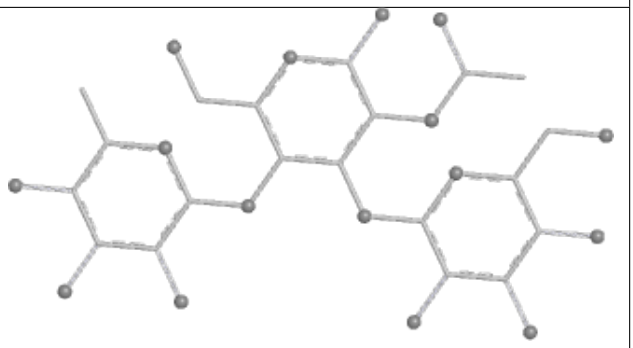
No monomer is involved in short contacts.

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

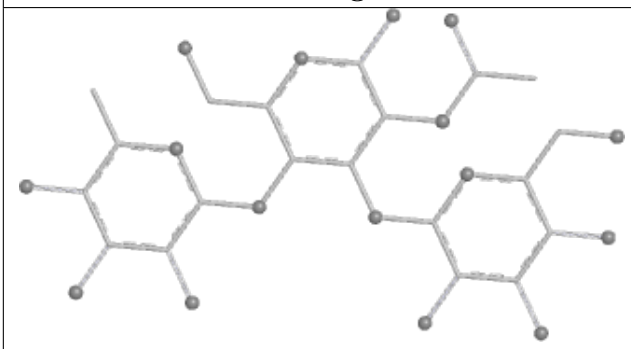
Oligosaccharide Chain AaA



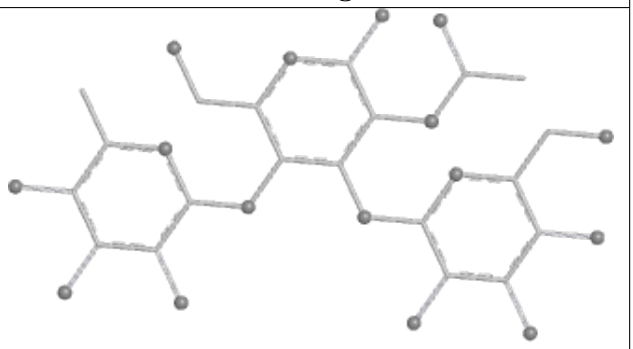
Bond lengths



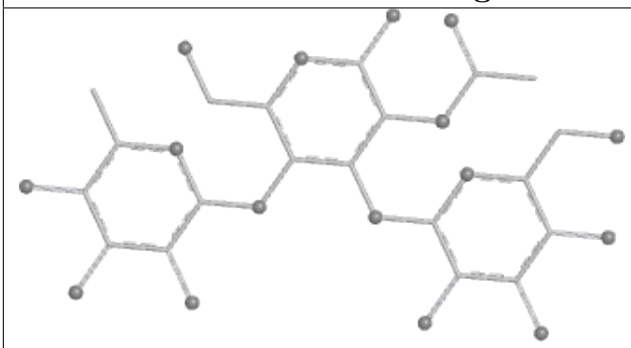
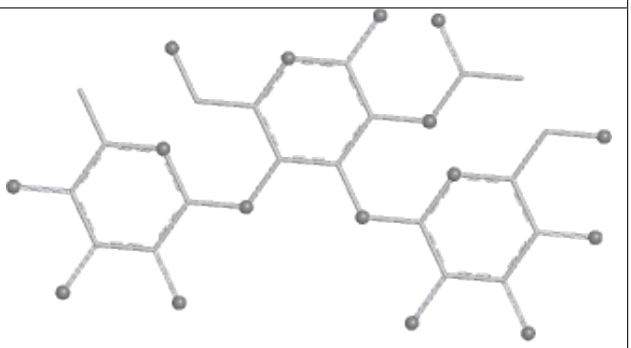
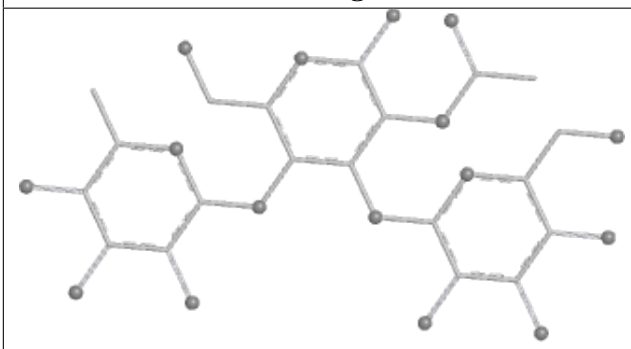
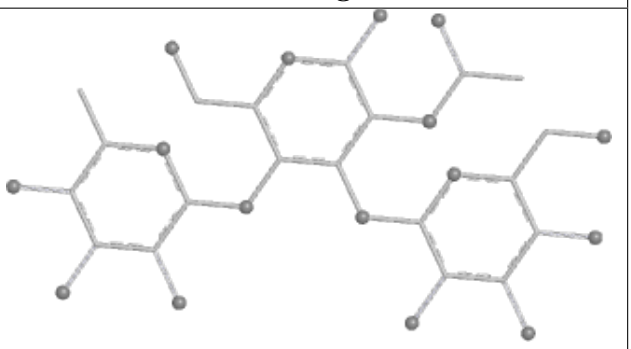
Bond angles

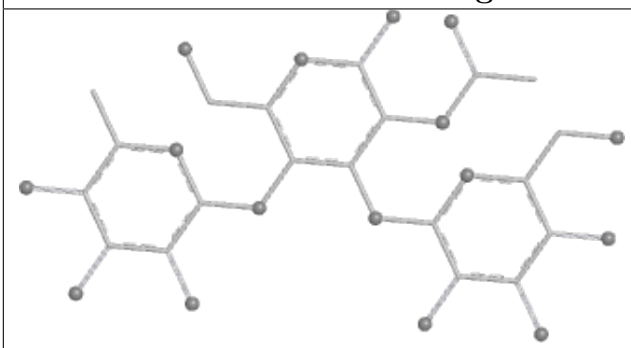
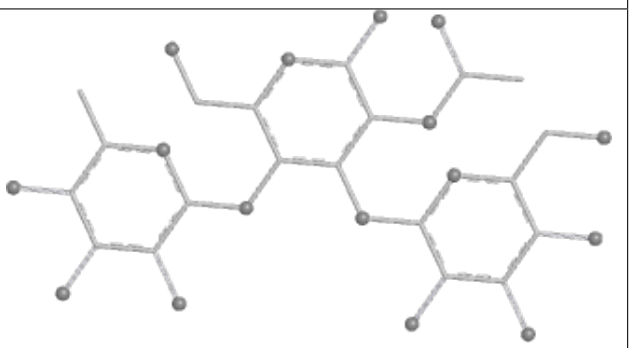
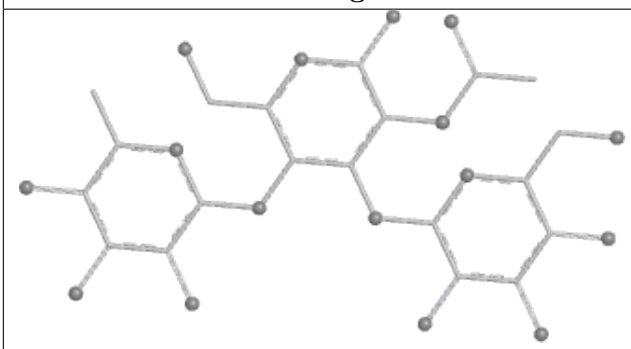
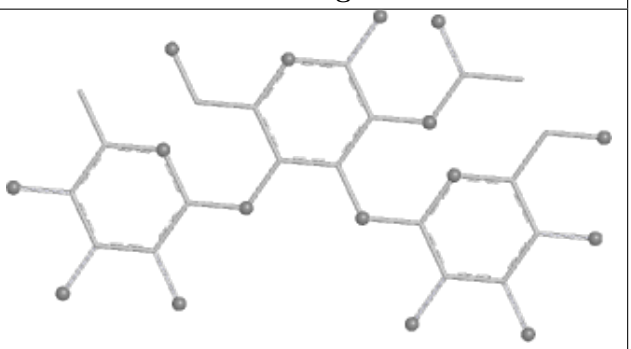


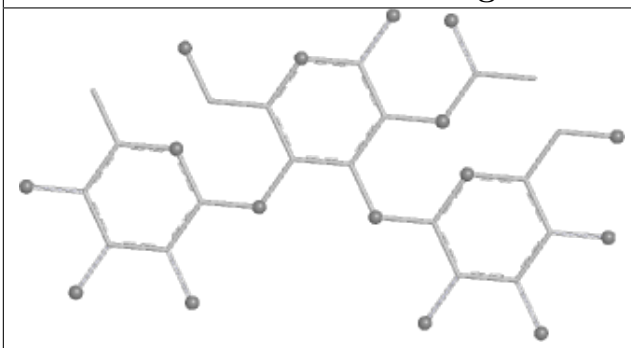
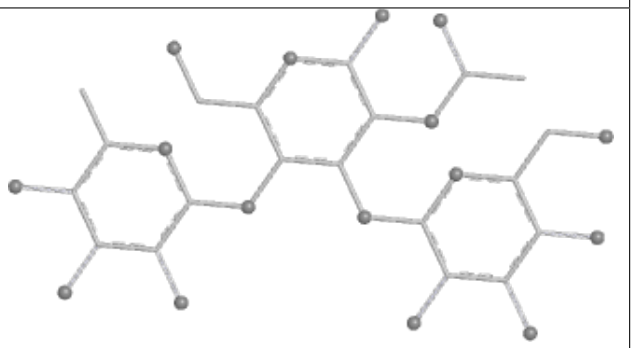
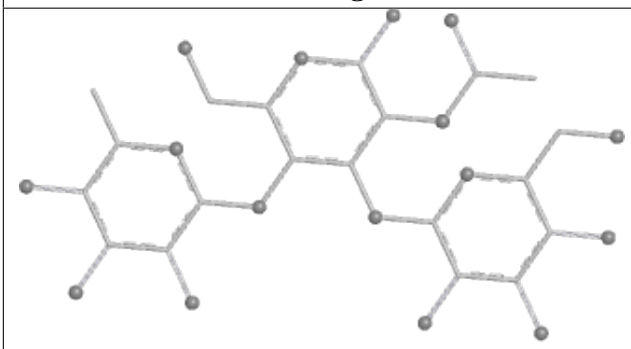
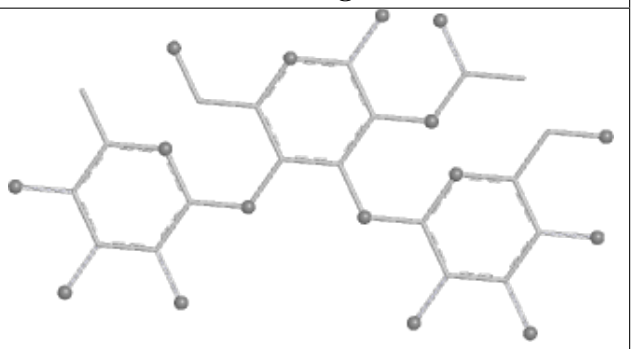
Torsions



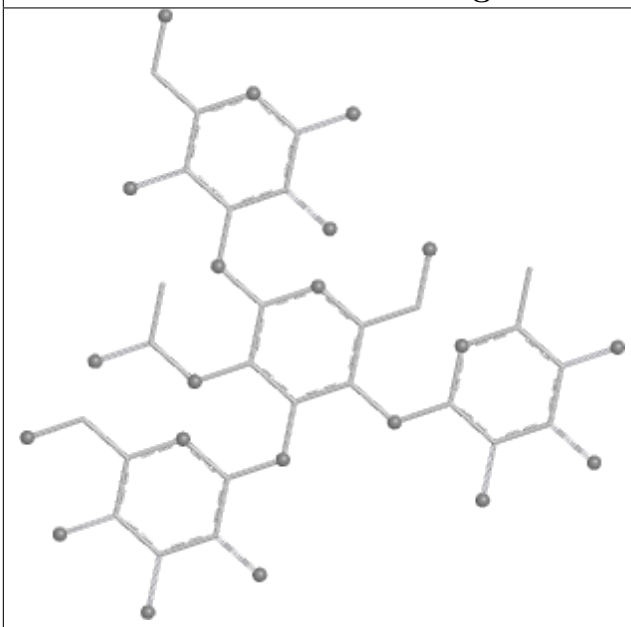
Rings

Oligosaccharide Chain BaB	
	
Bond lengths	**Bond angles**
	
Torsions	**Rings**

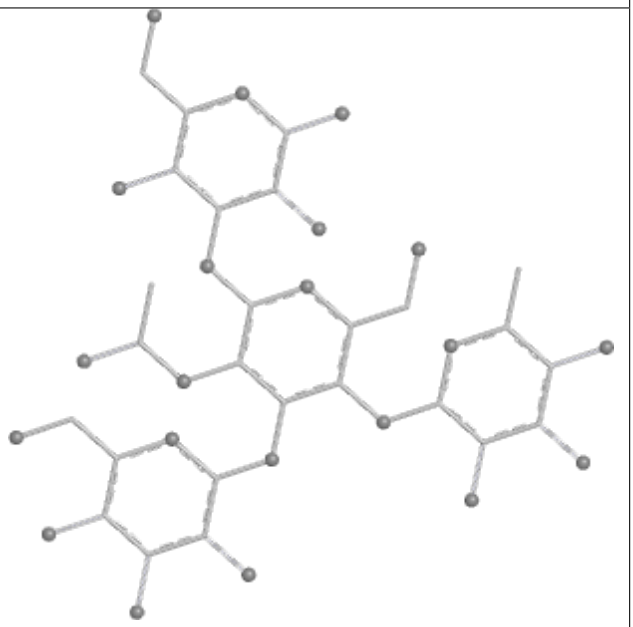
Oligosaccharide Chain EaE	
	
Bond lengths	**Bond angles**
	
Torsions	**Rings**

Oligosaccharide Chain FaF	
	
Bond lengths	**Bond angles**
	
Torsions	**Rings**

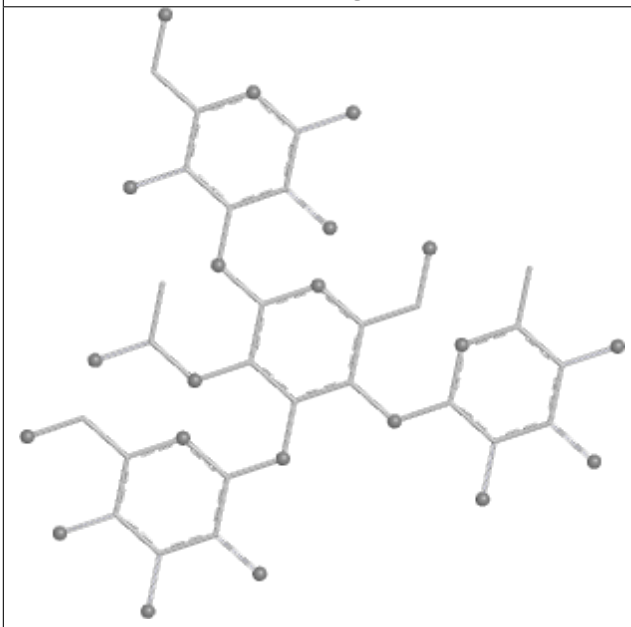
Oligosaccharide Chain CaC



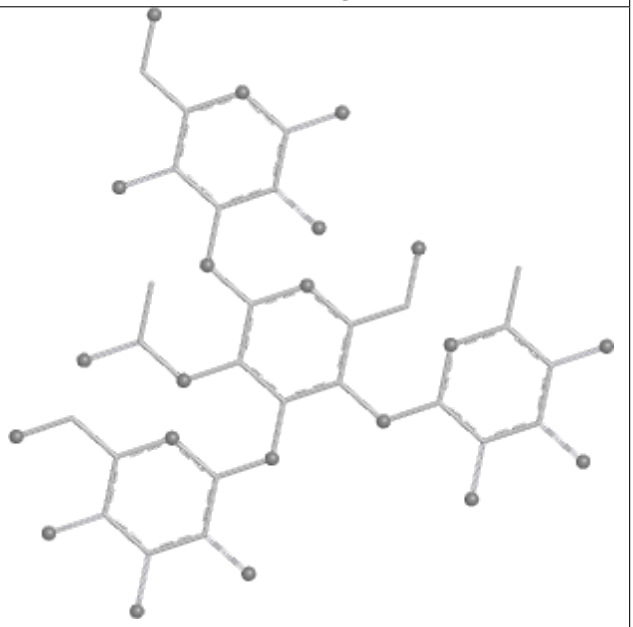
Bond lengths



Bond angles

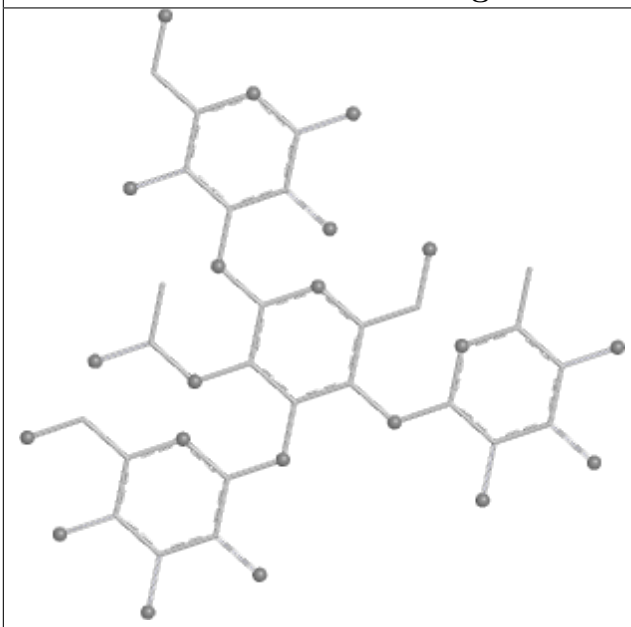


Torsions

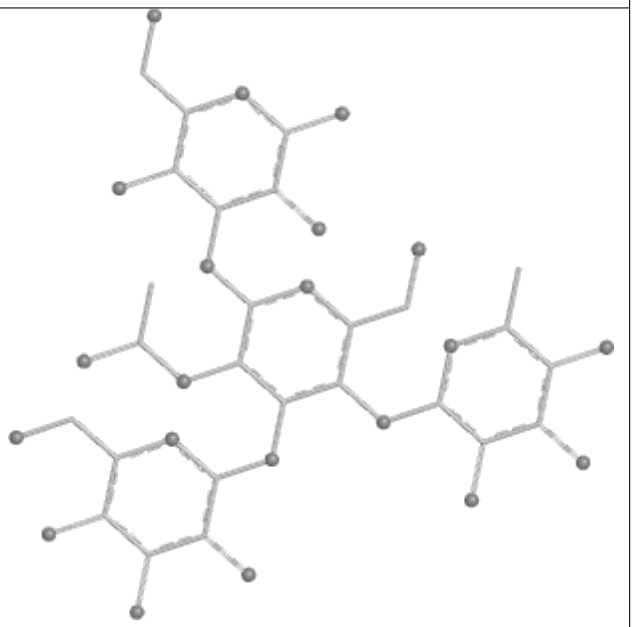


Rings

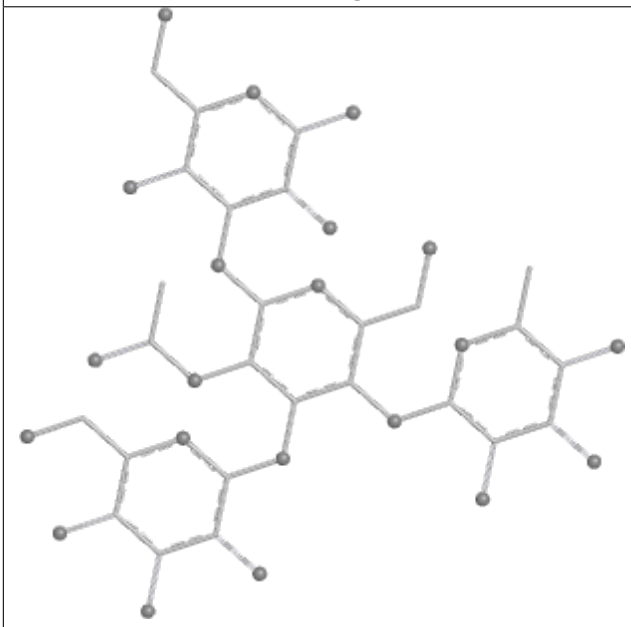
Oligosaccharide Chain DaD



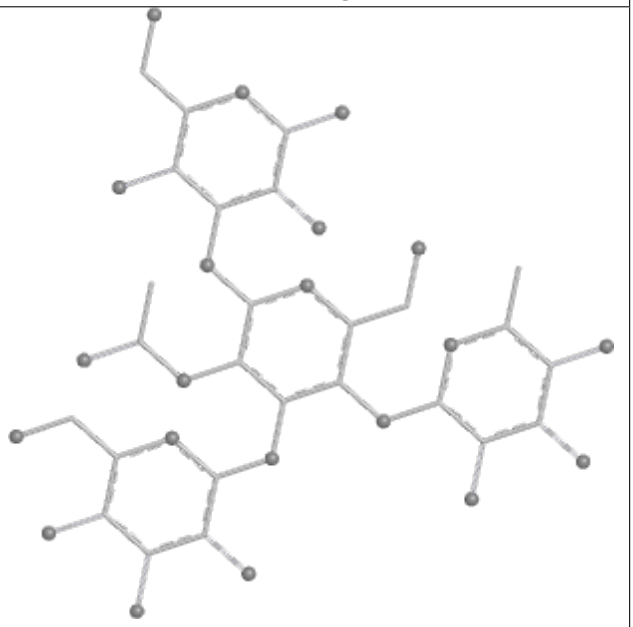
Bond lengths



Bond angles



Torsions



Rings

5.6 Ligand geometry (i)

11 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	$\#\|Z\|>2$
4	SO4	FFF	201	-	4,4,4	0.22	0	6,6,6	0.29	0
4	SO4	FFF	202	-	4,4,4	0.25	0	6,6,6	0.27	0
4	SO4	FFF	204	-	4,4,4	0.34	0	6,6,6	0.41	0
4	SO4	FFF	205	-	4,4,4	0.28	0	6,6,6	0.13	0
4	SO4	DDD	201	-	4,4,4	0.05	0	6,6,6	0.49	0
4	SO4	FFF	203	-	4,4,4	0.40	0	6,6,6	0.44	0
4	SO4	DDD	203	-	4,4,4	0.19	0	6,6,6	0.30	0
4	SO4	DDD	202	-	4,4,4	0.25	0	6,6,6	0.22	0
4	SO4	CCC	201	-	4,4,4	0.51	0	6,6,6	0.28	0
4	SO4	EEE	201	-	4,4,4	0.25	0	6,6,6	0.24	0
4	SO4	BBB	201	-	4,4,4	0.28	0	6,6,6	0.24	0

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.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	CCC	201	SO4	1	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

6.1 Protein, DNA and RNA chains

In the following table, the column labelled '#RSRZ> 2' contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95^{th} 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	AAA	126/126 (100%)	-0.17	0	100	100	25, 31, 42, 55	0
1	BBB	126/126 (100%)	-0.20	0	100	100	24, 28, 34, 55	1 (0%)
1	CCC	126/126 (100%)	-0.15	0	100	100	26, 34, 45, 54	0
1	DDD	126/126 (100%)	-0.18	0	100	100	25, 30, 38, 48	0
1	EEE	126/126 (100%)	0.12	2 (1%)	72	79	26, 35, 50, 68	0
1	FFF	126/126 (100%)	-0.10	1 (0%)	86	90	25, 31, 40, 56	0
All	All	756/756 (100%)	-0.11	3 (0%)	92	95	24, 31, 44, 68	1 (0%)

All (3) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	EEE	29	ASN	2.5
1	EEE	109	PRO	2.2
1	FFF	29	ASN	2.1

6.2 Non-standard residues in protein, DNA, RNA chains

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

6.3 Carbohydrates

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95^{th} 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	GLA	DaD	1	12/12	0.85	0.24	45,50,57,63	0

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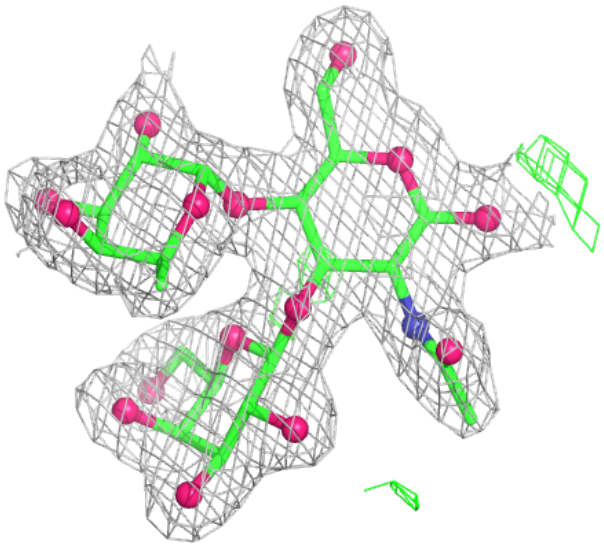
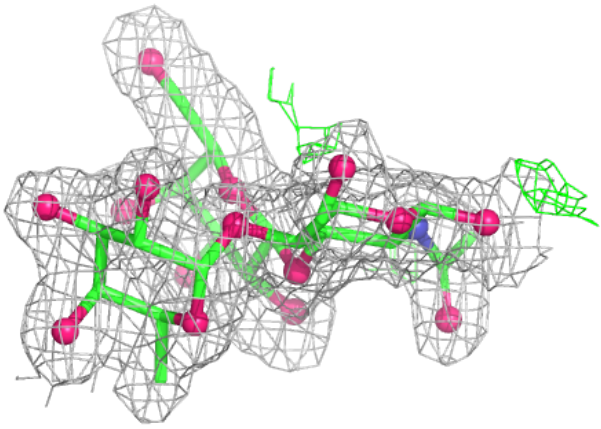
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
2	NAG	FaF	1	15/15	0.87	0.23	41,56,67,67	0
2	NAG	EaE	1	15/15	0.87	0.17	38,53,63,66	0
2	FUC	FaF	3	10/11	0.88	0.14	37,43,49,50	0
3	NAG	DaD	2	14/15	0.90	0.17	29,49,59,60	0
2	NAG	AaA	1	15/15	0.91	0.14	34,44,49,53	0
2	GAL	EaE	2	11/12	0.91	0.19	39,42,51,52	0
3	NAG	CaC	2	14/15	0.92	0.12	30,46,59,59	0
2	NAG	BaB	1	15/15	0.92	0.12	34,41,53,53	0
2	FUC	BaB	3	10/11	0.92	0.12	28,31,35,37	0
3	GLA	CaC	1	12/12	0.93	0.17	38,43,48,54	0
2	FUC	AaA	3	10/11	0.93	0.12	30,31,33,33	0
3	FUC	CaC	4	10/11	0.94	0.10	25,30,32,34	0
2	GAL	AaA	2	11/12	0.94	0.09	33,38,43,43	0
2	FUC	EaE	3	10/11	0.94	0.09	32,38,41,43	0
2	GAL	FaF	2	11/12	0.95	0.17	39,50,62,62	0
2	GAL	BaB	2	11/12	0.95	0.10	33,36,41,49	0
3	GAL	CaC	3	11/12	0.95	0.09	35,45,51,54	0
3	FUC	DaD	4	10/11	0.95	0.09	28,31,34,35	0
3	GAL	DaD	3	11/12	0.96	0.07	36,40,44,45	0

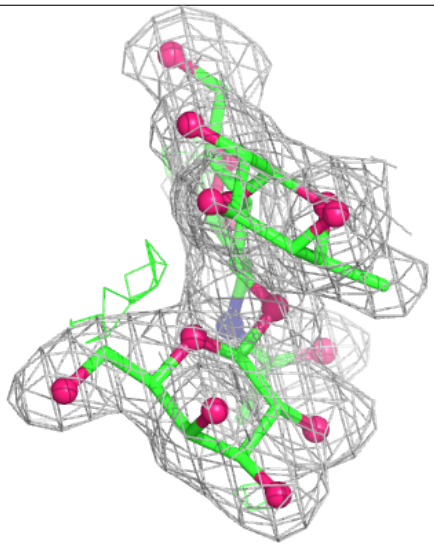
The following is a graphical depiction of the model fit to experimental electron density for oligosaccharide. Each fit is shown from different orientation to approximate a three-dimensional view.

Electron density around Chain AaA:

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

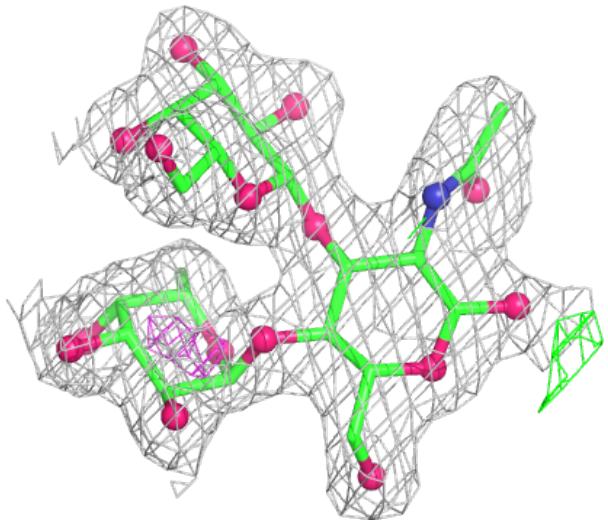


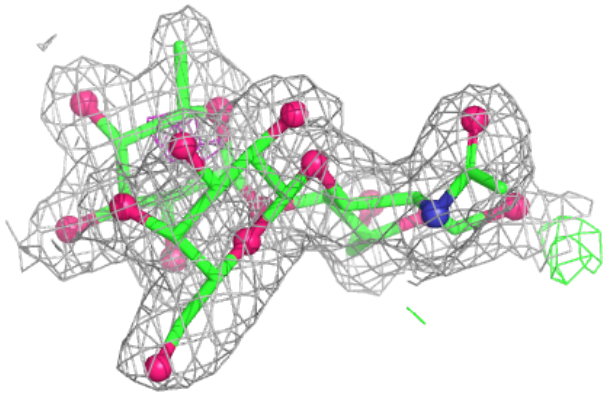


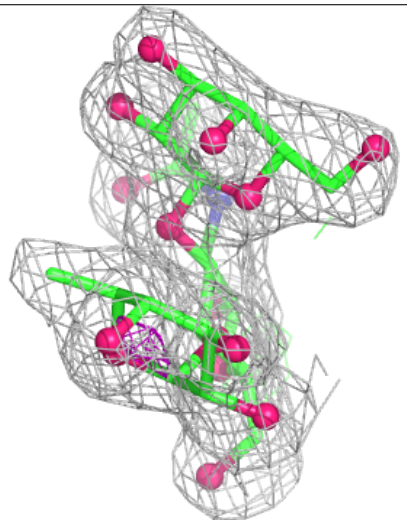


Electron density around Chain BaB:

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

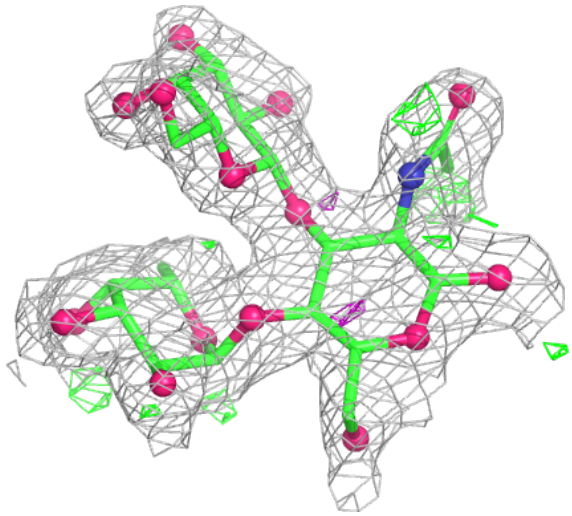


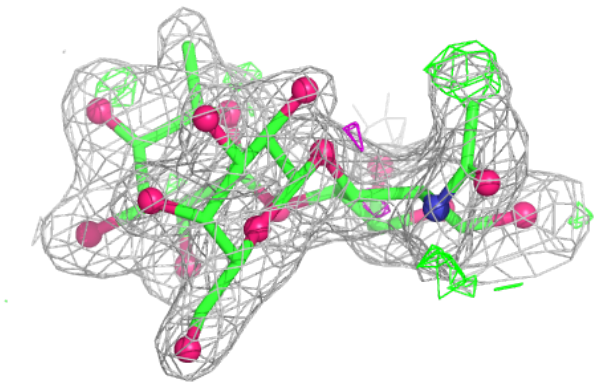




Electron density around Chain EaE:

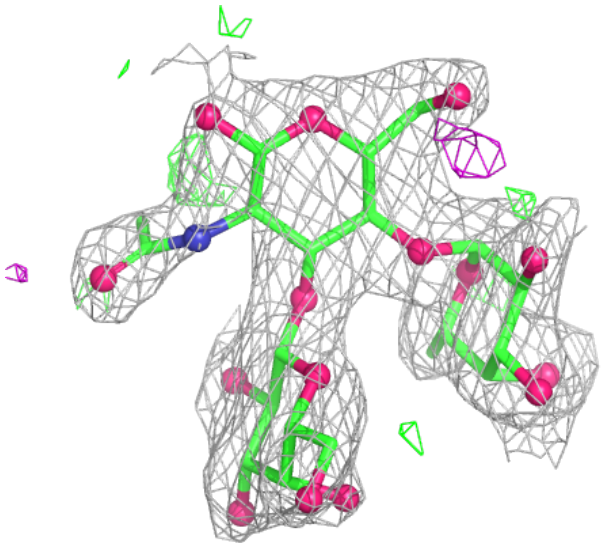
$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)

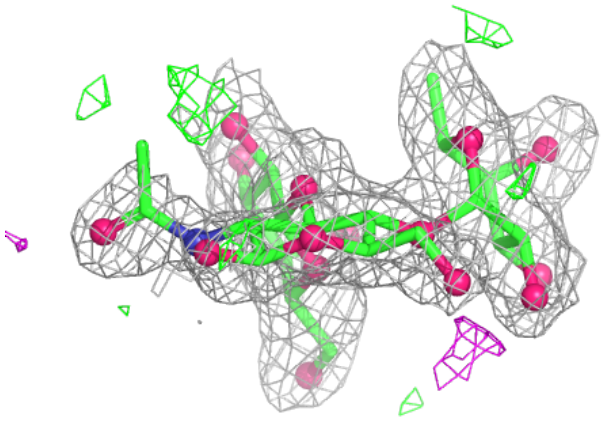




Electron density around Chain FaF:

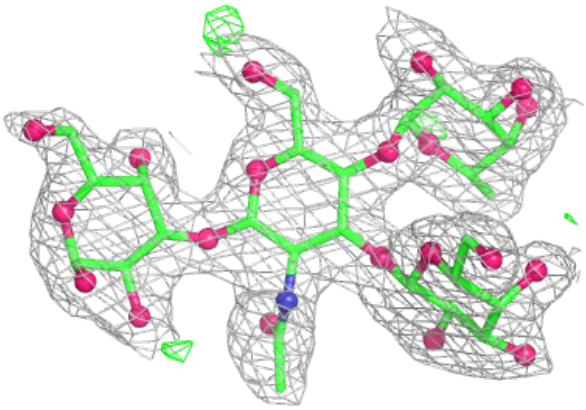
$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)

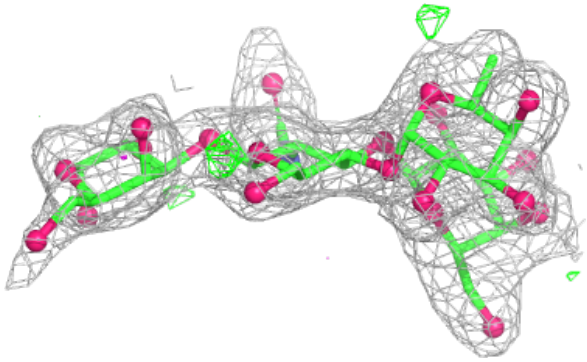


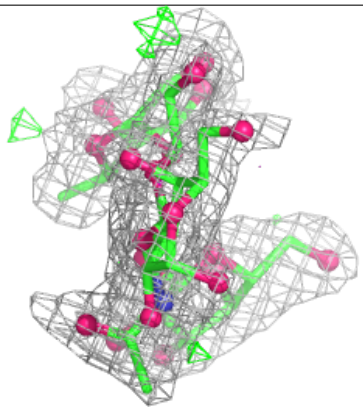


Electron density around Chain CaC:

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

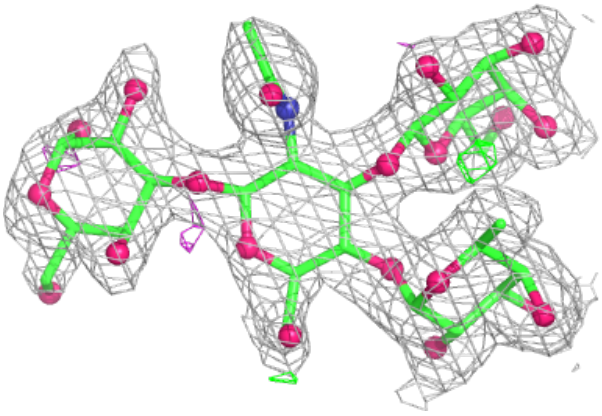


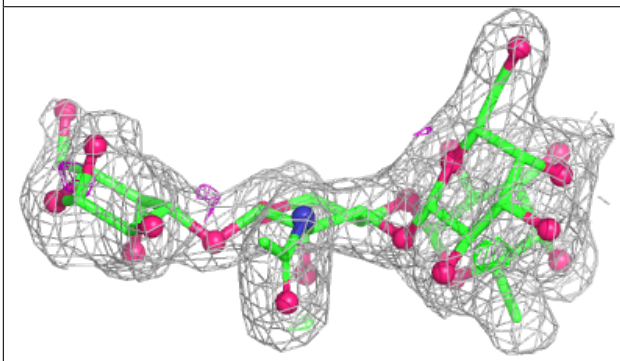


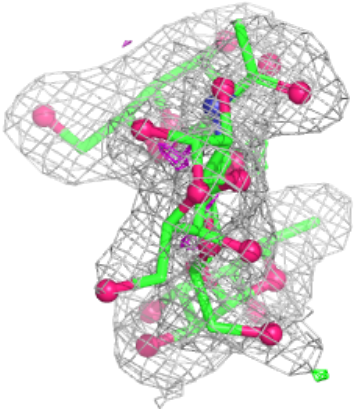


Electron density around Chain DaD:

$2mF_o$-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, 95^{th} 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	SO4	FFF	201	5/5	0.80	0.22	61,61,85,88	0
4	SO4	CCC	201	5/5	0.87	0.34	40,41,44,46	5
4	SO4	FFF	202	5/5	0.88	0.16	67,72,88,109	0
4	SO4	BBB	201	5/5	0.92	0.26	68,70,72,79	0
4	SO4	DDD	203	5/5	0.92	0.27	60,66,66,75	0
4	SO4	FFF	203	5/5	0.93	0.17	41,47,55,57	0
4	SO4	DDD	201	5/5	0.94	0.22	57,61,62,65	0
4	SO4	FFF	205	5/5	0.95	0.30	54,56,60,65	0
4	SO4	FFF	204	5/5	0.96	0.09	35,38,48,49	5
4	SO4	EEE	201	5/5	0.96	0.21	49,63,79,80	0
4	SO4	DDD	202	5/5	0.98	0.14	58,62,64,70	0

6.5 Other polymers (i)

There are no such residues in this entry.