Full wwPDB X-ray Structure Validation Report (i)

Oct 22, 2023 – 07:40 AM EDT

PDB ID	:	3ARD
Title	:	Ternary crystal structure of the mouse NKT TCR-CD1d-3'deoxy-alpha-galactosylceramide
Authors	:	Wun, K.S.; Rossjohn, J.
Deposited on	:	2010-11-27
Resolution	:	3.01 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:

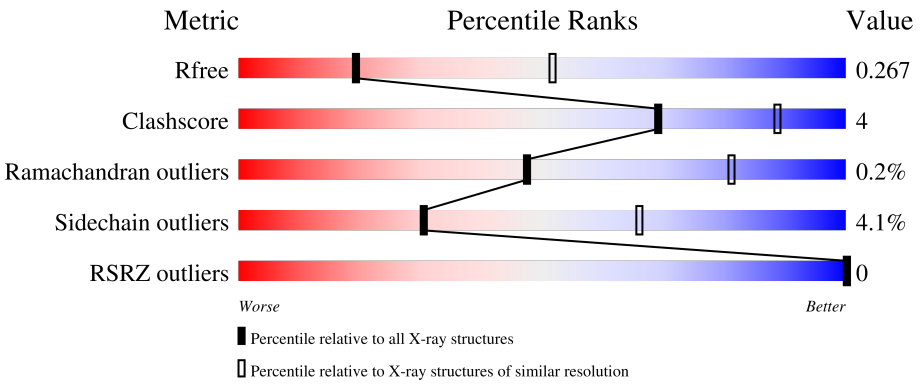
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.36
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.36

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 3.01 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	2399 (3.04-3.00)
Clashscore	141614	2734 (3.04-3.00)
Ramachandran outliers	138981	2640 (3.04-3.00)
Sidechain outliers	138945	2643 (3.04-3.00)
RSRZ outliers	127900	2287 (3.04-3.00)

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	302	84% 12% • •
2	B	99	85% 15%
3	C	207	88% 9% •
4	D	244	88% 9% • •
5	E	2	100%

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Mol	Chain	Length	Quality of chain
5	F	2	100%
5	G	2	100%

2 Entry composition (i)

There are 7 unique types of molecules in this entry. The entry contains 6466 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 Antigen-presenting glycoprotein CD1d1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	294	2282	1456	393	419	14	0	0	0

There are 24 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	201	HIS	ASP	conflict	UNP P11609
A	280	GLY	-	expression tag	UNP P11609
A	281	SER	-	expression tag	UNP P11609
A	282	LEU	-	expression tag	UNP P11609
A	283	HIS	-	expression tag	UNP P11609
A	284	HIS	-	expression tag	UNP P11609
A	285	ILE	-	expression tag	UNP P11609
A	286	LEU	-	expression tag	UNP P11609
A	287	ASP	-	expression tag	UNP P11609
A	288	ALA	-	expression tag	UNP P11609
A	289	GLN	-	expression tag	UNP P11609
A	290	LYS	-	expression tag	UNP P11609
A	291	MET	-	expression tag	UNP P11609
A	292	VAL	-	expression tag	UNP P11609
A	293	TRP	-	expression tag	UNP P11609
A	294	ASN	-	expression tag	UNP P11609
A	295	HIS	-	expression tag	UNP P11609
A	296	ARG	-	expression tag	UNP P11609
A	297	HIS	-	expression tag	UNP P11609
A	298	HIS	-	expression tag	UNP P11609
A	299	HIS	-	expression tag	UNP P11609
A	300	HIS	-	expression tag	UNP P11609
A	301	HIS	-	expression tag	UNP P11609
A	302	HIS	-	expression tag	UNP P11609

- Molecule 2 is a protein called Beta-2-microglobulin.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	B	99	743	478	124	135	6	0	0	0

- Molecule 3 is a protein called NKT Valpha14-Jalpha18,NKT Valpha14-Jalpha18.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
3	C	202	1493	926	252	308	7	0	0	0

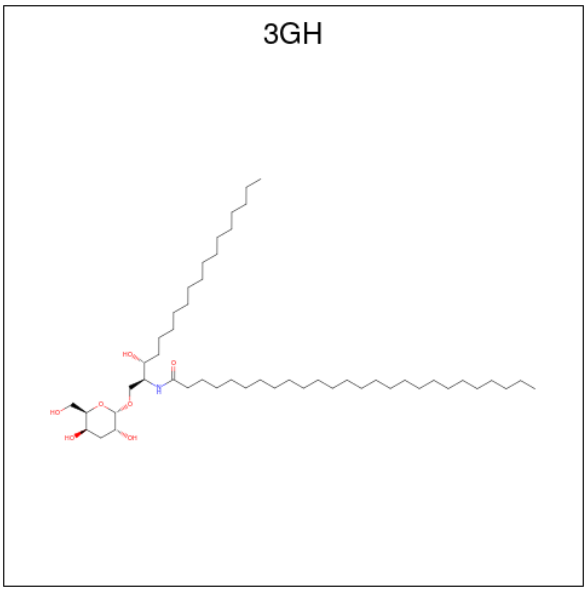
- Molecule 4 is a protein called Vbeta8.2,Vbeta8.2.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
4	D	238	1800	1138	319	337	6	0	0	0

- Molecule 5 is an oligosaccharide called 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
5	E	2	23	13	2	8	0	0	0
5	F	2	24	14	2	8	0	0	0
5	G	2	25	14	2	9	0	0	0

- Molecule 6 is N-{(2S,3R)-1-[(3-deoxy-alpha-D-xylo-hexopyranosyl)oxy]-3-hydroxyoctadecan-2-yl}hexacosanamide (three-letter code: 3GH) (formula: $C_{50}H_{99}NO_7$).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	N	O		
6	A	1	58	50	1	7	0	0

- Molecule 7 is water.

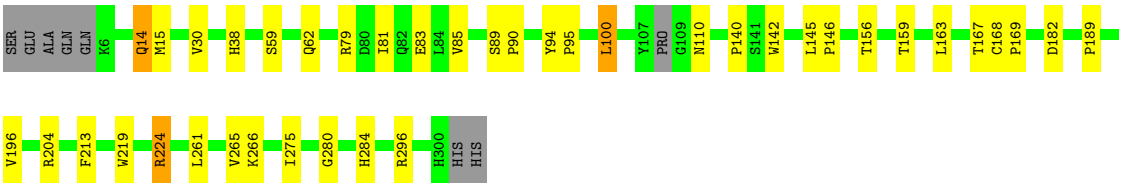
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	O		
7	A	6	6	6	0	0
			Total	O		
7	B	2	2	2	0	0
			Total	O		
7	C	7	7	7	0	0
			Total	O		
7	D	3	3	3	0	0

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.

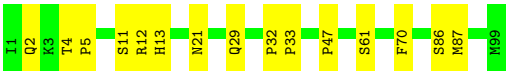
• Molecule 1: Antigen-presenting glycoprotein CD1d1

Chain A:



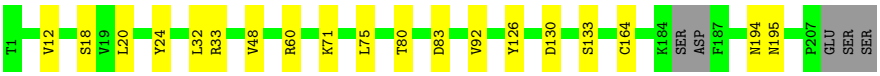
• Molecule 2: Beta-2-microglobulin

Chain B:



• Molecule 3: NKT Valpha14-Jalpha18,NKT Valpha14-Jalpha18

Chain C:

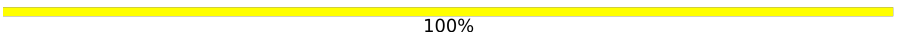


• Molecule 4: Vbeta8.2,Vbeta8.2

Chain D:

• Molecule 5: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain E:



• Molecule 5: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain F: 100%

NAG1
NAG2

• Molecule 5: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain G: 100%

NAG1
NAG2

4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α, β, γ	58.99Å 86.73Å 235.20Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	47.76 – 3.01 47.14 – 3.01	Depositor EDS
% Data completeness (in resolution range)	99.5 (47.76-3.01) 99.5 (47.14-3.01)	Depositor EDS
R_{merge}	0.20	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	2.38 (at 3.01Å)	Xtriage
Refinement program	REFMAC 5.5.0109	Depositor
R, R_{free}	0.213 , 0.277 0.207 , 0.267	Depositor DCC
R_{free} test set	1261 reflections (5.08%)	wwPDB-VP
Wilson B-factor (Å^2)	68.6	Xtriage
Anisotropy	0.669	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.29 , 32.0	EDS
L-test for twinning[2]	$< \|L\| > = 0.46$, $< L^2 > = 0.28$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.93	EDS
Total number of atoms	6466	wwPDB-VP
Average B, all atoms (Å^2)	73.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.14% 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: NAG, 3GH

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	0.31	0/2353	0.46	0/3212
2	B	0.31	0/769	0.47	0/1059
3	C	0.32	0/1521	0.49	0/2077
4	D	0.32	0/1850	0.48	0/2532
All	All	0.32	0/6493	0.47	0/8880

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	2282	0	2055	19	0
2	B	743	0	638	7	0
3	C	1493	0	1348	11	0
4	D	1800	0	1634	12	0
5	E	23	0	17	0	0
5	F	24	0	18	0	0
5	G	25	0	21	0	0
6	A	58	0	99	1	0
7	A	6	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
7	B	2	0	0	0	0
7	C	7	0	0	1	0
7	D	3	0	0	0	0
All	All	6466	0	5830	45	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 4.

All (45) 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:A:168:CYS:HB3	1:A:169:PRO:HD3	1.70	0.73
1:A:189:PRO:HB3	1:A:213:PHE:HB3	1.73	0.71
1:A:280:GLY:H	1:A:284:HIS:HD2	1.42	0.66
4:D:36:ARG:HB3	4:D:46:ILE:HD11	1.81	0.62
1:A:59:SER:H	1:A:62:GLN:HE21	1.46	0.62
1:A:219:TRP:HB3	1:A:266:LYS:HB2	1.81	0.61
1:A:265:VAL:HB	1:A:275:ILE:HB	1.85	0.58
1:A:30:VAL:HB	1:A:38:HIS:HB2	1.86	0.56
2:B:29:GLN:HA	2:B:61:SER:HB2	1.89	0.54
4:D:21:LEU:HD22	4:D:112:THR:HG21	1.90	0.54
4:D:13:ALA:HB3	4:D:116:VAL:HG22	1.90	0.52
1:A:14:GLN:HG2	1:A:100:LEU:HB3	1.92	0.52
3:C:12:VAL:HG11	3:C:18:SER:HB3	1.92	0.50
4:D:46:ILE:HG22	4:D:47:HIS:CD2	2.47	0.50
3:C:164:CYS:CB	4:D:196:ARG:HH11	2.24	0.50
3:C:24:TYR:CE1	3:C:71:LYS:HD2	2.47	0.49
1:A:163:LEU:HA	1:A:167:THR:HB	1.93	0.49
2:B:11:SER:HB2	2:B:21:ASN:OD1	2.12	0.49
1:A:280:GLY:H	1:A:284:HIS:CD2	2.26	0.48
1:A:156:THR:HG23	6:A:307:3GH:HABA	1.94	0.48
1:A:14:GLN:HG2	1:A:100:LEU:CB	2.44	0.47
3:C:133:SER:HA	7:C:211:HOH:O	2.14	0.47
1:A:89:SER:CB	1:A:90:PRO:HD3	2.44	0.47
4:D:207:PRO:HA	4:D:244:GLY:O	2.14	0.47
2:B:13:HIS:HB2	2:B:21:ASN:ND2	2.30	0.47
1:A:81:ILE:O	1:A:85:VAL:HG23	2.15	0.47
1:A:145:LEU:HB3	1:A:146:PRO:HD3	1.98	0.46
4:D:14:VAL:HG13	4:D:120:LEU:HG	1.98	0.46
2:B:13:HIS:HB2	2:B:21:ASN:HD21	1.81	0.46
2:B:2:GLN:HG2	2:B:86:SER:HB3	1.97	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:C:130:ASP:HB3	3:C:133:SER:O	2.16	0.45
3:C:164:CYS:HB3	4:D:196:ARG:HH11	1.82	0.45
3:C:33:ARG:HE	3:C:48:VAL:HG22	1.82	0.45
1:A:140:PRO:HB2	1:A:142:TRP:CD1	2.54	0.43
3:C:164:CYS:HB3	4:D:196:ARG:NH1	2.33	0.43
3:C:126:TYR:CE2	4:D:137:GLU:HG3	2.54	0.43
1:A:224:ARG:HG2	1:A:261:LEU:HD23	2.01	0.42
2:B:32:PRO:HB3	2:B:33:PRO:HD2	2.01	0.42
3:C:20:LEU:HD12	3:C:75:LEU:HD23	2.01	0.42
1:A:94:TYR:HB3	1:A:95:PRO:HA	2.01	0.42
2:B:4:THR:HA	2:B:5:PRO:HD3	1.88	0.42
1:A:79:ARG:O	1:A:83:GLU:HG2	2.20	0.41
4:D:130:VAL:HG23	4:D:240:ALA:HB3	2.02	0.41
3:C:32:LEU:HD12	3:C:92:VAL:HG22	2.03	0.41
4:D:234:VAL:O	4:D:236:GLN:HG2	2.20	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	290/302 (96%)	285 (98%)	5 (2%)	0	100	100
2	B	97/99 (98%)	94 (97%)	2 (2%)	1 (1%)	15	50
3	C	198/207 (96%)	189 (96%)	9 (4%)	0	100	100
4	D	234/244 (96%)	223 (95%)	10 (4%)	1 (0%)	34	71
All	All	819/852 (96%)	791 (97%)	26 (3%)	2 (0%)	47	81

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	B	47	PRO
4	D	177	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	227/264 (86%)	217 (96%)	10 (4%)	28	64
2	B	70/93 (75%)	67 (96%)	3 (4%)	29	64
3	C	159/186 (86%)	154 (97%)	5 (3%)	40	74
4	D	178/206 (86%)	170 (96%)	8 (4%)	27	63
All	All	634/749 (85%)	608 (96%)	26 (4%)	30	66

All (26) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	14	GLN
1	A	15	MET
1	A	100	LEU
1	A	110	ASN
1	A	159	THR
1	A	182	ASP
1	A	196	VAL
1	A	204	ARG
1	A	224	ARG
1	A	296	ARG
2	B	12	ARG
2	B	70	PHE
2	B	87	MET
3	C	60	ARG
3	C	80	THR
3	C	83	ASP
3	C	194	ASN
3	C	195	ASN
4	D	5	THR
4	D	14	VAL

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Mol	Chain	Res	Type
4	D	36	ARG
4	D	55	THR
4	D	62	ASP
4	D	83	THR
4	D	174	CYS
4	D	188	ASP

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (9) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	55	GLN
1	A	60	ASN
1	A	62	GLN
1	A	67	GLN
1	A	110	ASN
1	A	284	HIS
3	C	127	GLN
4	D	24	ASN
4	D	27	ASN

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)

6 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	$\#\|Z\| > 2$
5	NAG	E	1	5,1	14,14,15	0.46	0	17,19,21	1.21	1 (5%)
5	NAG	E	2	5	9,9,15	0.65	0	8,12,21	1.18	1 (12%)
5	NAG	F	1	5,1	14,14,15	0.55	0	17,19,21	0.83	0
5	NAG	F	2	5	10,10,15	0.60	0	11,14,21	0.49	0
5	NAG	G	1	5,1	14,14,15	0.61	0	17,19,21	1.15	2 (11%)
5	NAG	G	2	5	11,11,15	0.79	0	12,15,21	1.28	2 (16%)

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
5	NAG	E	1	5,1	-	2/6/23/26	0/1/1/1
5	NAG	E	2	5	-	-	0/1/1/1
5	NAG	F	1	5,1	-	1/6/23/26	0/1/1/1
5	NAG	F	2	5	-	-	0/1/1/1
5	NAG	G	1	5,1	-	2/6/23/26	0/1/1/1
5	NAG	G	2	5	-	0/2/19/26	0/1/1/1

There are no bond length outliers.

All (6) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
5	E	1	NAG	C1-O5-C5	3.82	117.37	112.19
5	G	2	NAG	C4-C3-C2	2.80	116.09	111.37
5	G	1	NAG	C4-C3-C2	2.71	114.99	111.02
5	G	2	NAG	C1-O5-C5	2.32	115.34	112.19
5	E	2	NAG	C4-C3-C2	2.29	113.15	110.94
5	G	1	NAG	C1-O5-C5	2.21	115.19	112.19

There are no chirality outliers.

All (5) torsion outliers are listed below:

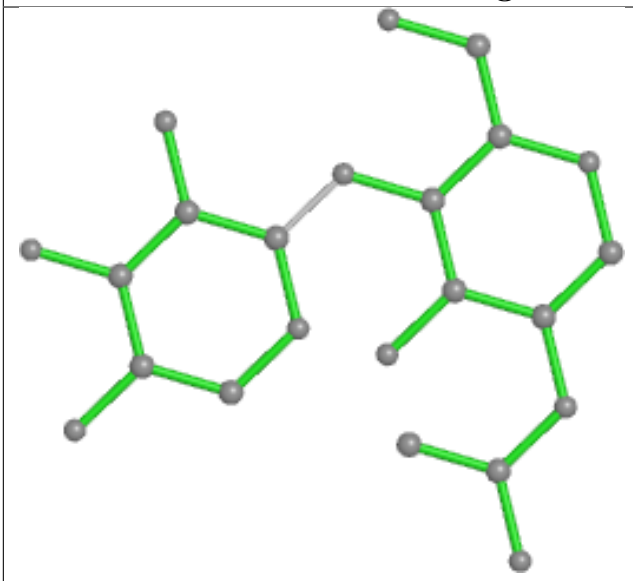
Mol	Chain	Res	Type	Atoms
5	G	1	NAG	O5-C5-C6-O6
5	E	1	NAG	C8-C7-N2-C2
5	E	1	NAG	O7-C7-N2-C2
5	G	1	NAG	C4-C5-C6-O6
5	F	1	NAG	C4-C5-C6-O6

There are no ring outliers.

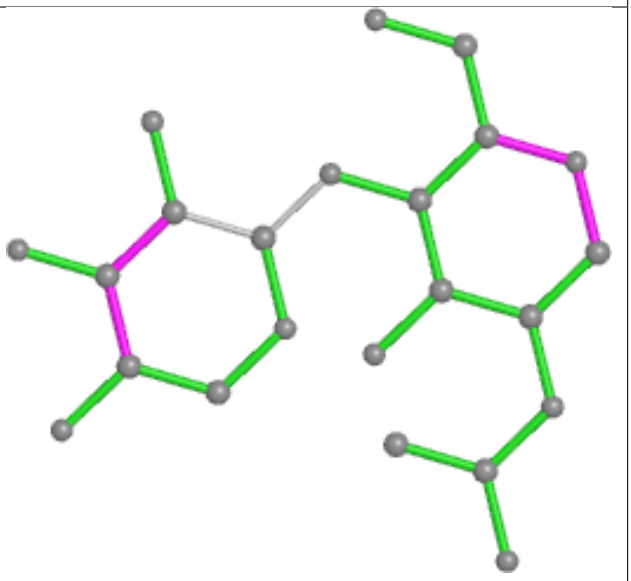
No monomer is involved in short contacts.

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

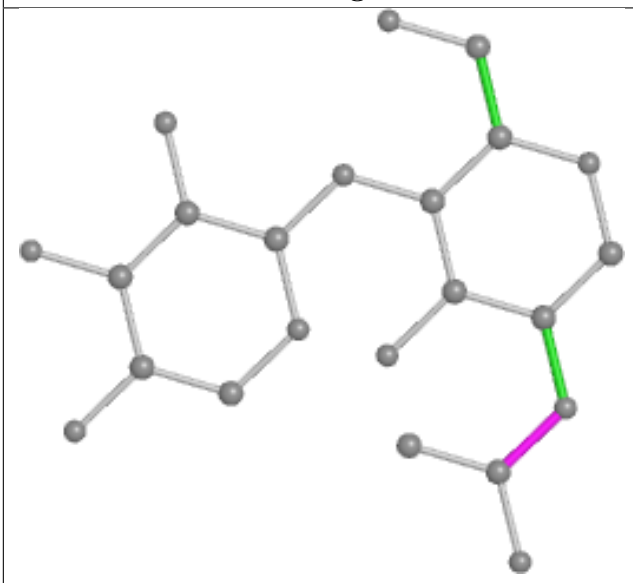
Oligosaccharide Chain E



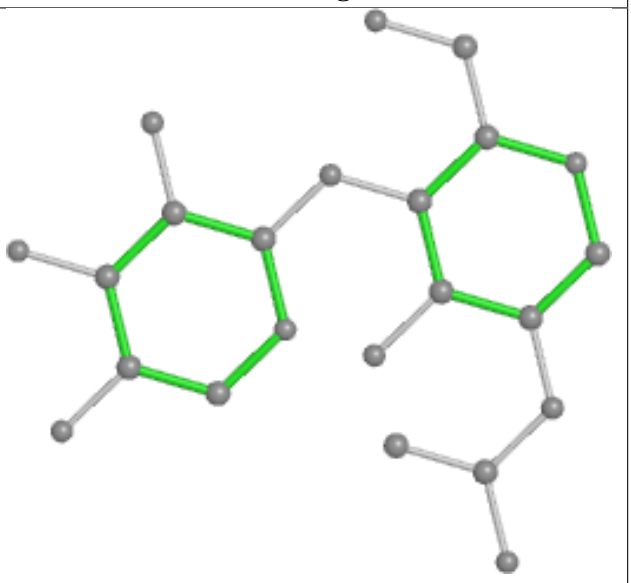
Bond lengths



Bond angles

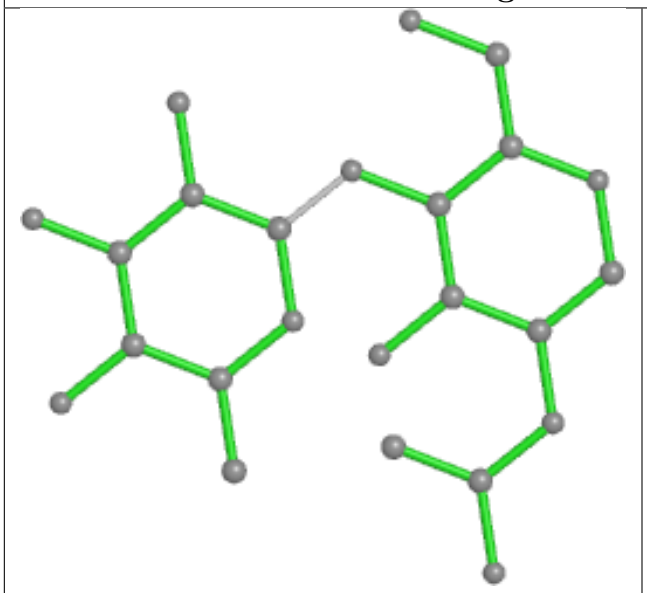


Torsions

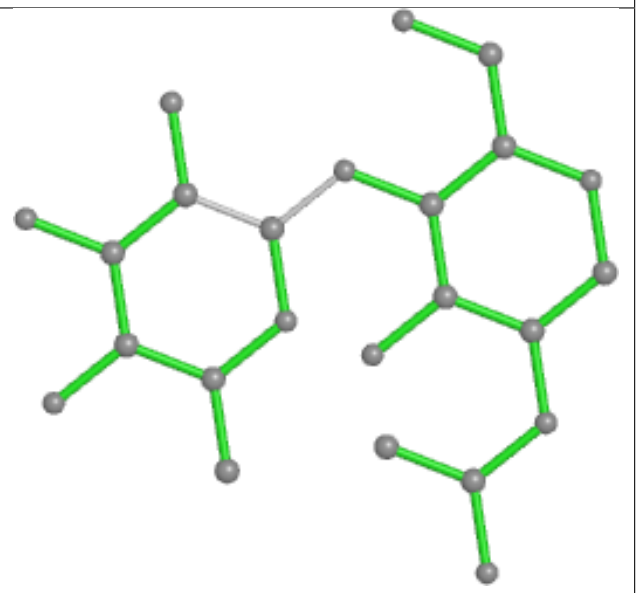


Rings

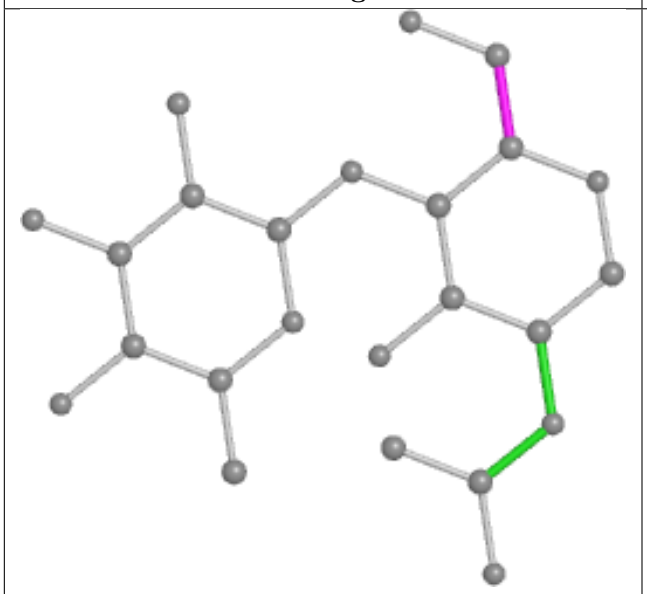
Oligosaccharide Chain F



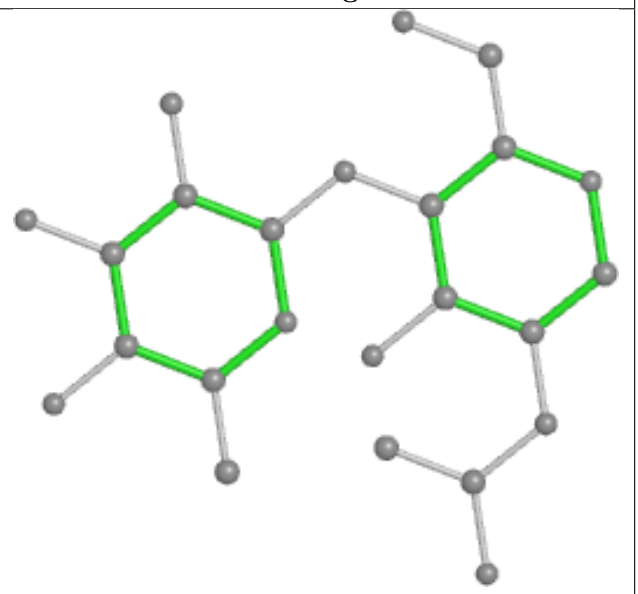
Bond lengths



Bond angles

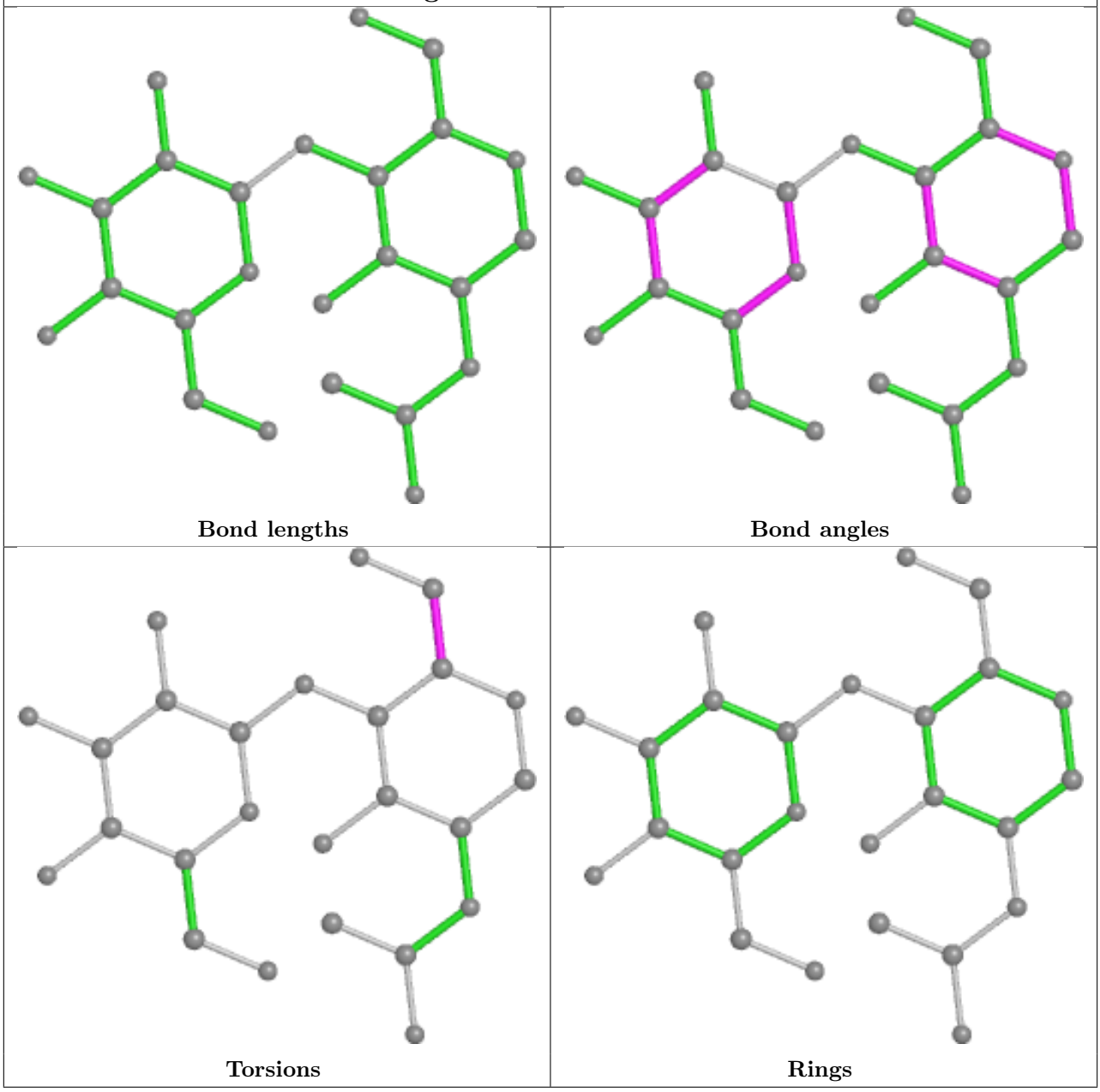


Torsions



Rings

Oligosaccharide Chain G



5.6 Ligand geometry (i)

1 ligand is 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	$\#\|Z\| > 2$
6	3GH	A	307	-	57,58,58	0.40	0	59,65,65	0.77	1 (1%)

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
6	3GH	A	307	-	-	31/55/71/71	0/1/1/1

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
6	A	307	3GH	O6A-C5M-C6A	2.11	111.68	106.44

There are no chirality outliers.

All (31) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
6	A	307	3GH	O6A-C5M-C6A-O5A
6	A	307	3GH	C4A-C5M-C6A-O5A
6	A	307	3GH	C13-C14-C15-C16
6	A	307	3GH	CAL-CAM-CAN-CAO
6	A	307	3GH	CAK-CAL-CAM-CAN
6	A	307	3GH	CAE-CAF-CAG-CAH
6	A	307	3GH	CAJ-CAK-CAL-CAM
6	A	307	3GH	CAR-CAS-CAT-CAU
6	A	307	3GH	C11-C12-C13-C14
6	A	307	3GH	CAD-CAE-CAF-CAG
6	A	307	3GH	C6-C7-C8-C9
6	A	307	3GH	C5-C6-C7-C8
6	A	307	3GH	C12-C13-C14-C15
6	A	307	3GH	C10-C11-C12-C13
6	A	307	3GH	CAM-CAN-CAO-CAP
6	A	307	3GH	C11-C10-C9-C8
6	A	307	3GH	CAI-CAJ-CAK-CAL
6	A	307	3GH	CAN-CAO-CAP-CAQ
6	A	307	3GH	C4-C5-C6-C7
6	A	307	3GH	CAT-CAU-CAV-CAW
6	A	307	3GH	C15-C16-C17-C18

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Mol	Chain	Res	Type	Atoms
6	A	307	3GH	CAG-CAH-CAI-CAJ
6	A	307	3GH	C9-C10-C11-C12
6	A	307	3GH	N2-C2-C3-O3
6	A	307	3GH	CAS-CAT-CAU-CAV
6	A	307	3GH	C7-C8-C9-C10
6	A	307	3GH	C3-C4-C5-C6
6	A	307	3GH	C14-C15-C16-C17
6	A	307	3GH	CAU-CAV-CAW-CAX
6	A	307	3GH	CAQ-CAR-CAS-CAT
6	A	307	3GH	CAC-CAD-CAE-CAF

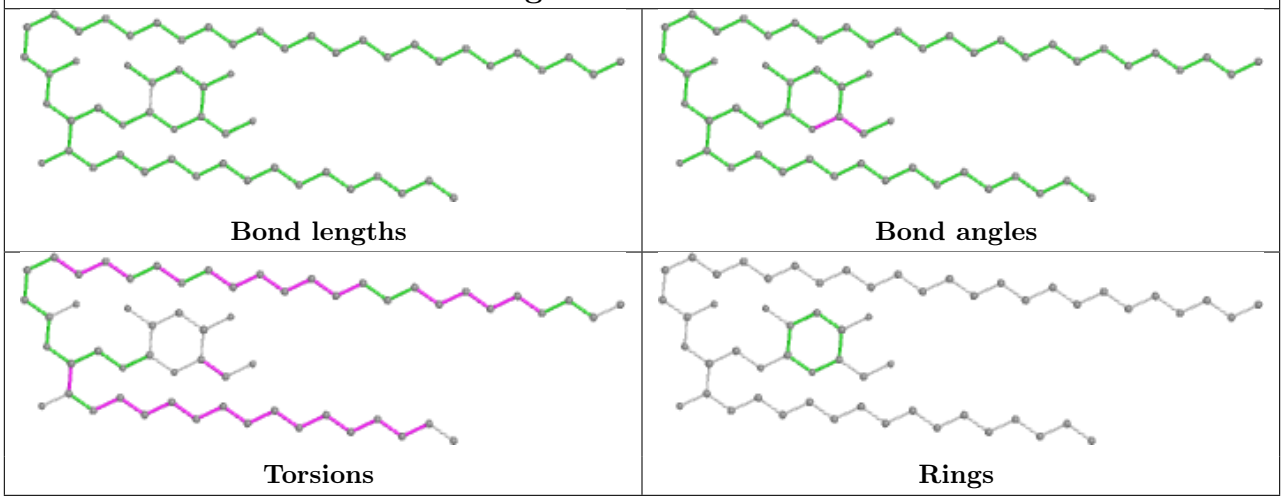
There are no ring outliers.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
6	A	307	3GH	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 all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less then 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

Ligand 3GH A 307



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	294/302 (97%)	-0.39	0	100	100	55, 73, 95, 115	2 (0%)
2	B	99/99 (100%)	-0.39	0	100	100	53, 69, 88, 95	0
3	C	202/207 (97%)	-0.44	0	100	100	52, 71, 92, 105	4 (1%)
4	D	238/244 (97%)	-0.33	0	100	100	52, 74, 107, 120	2 (0%)
All	All	833/852 (97%)	-0.39	0	100	100	52, 73, 98, 120	8 (0%)

There are no RSRZ outliers to report.

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)

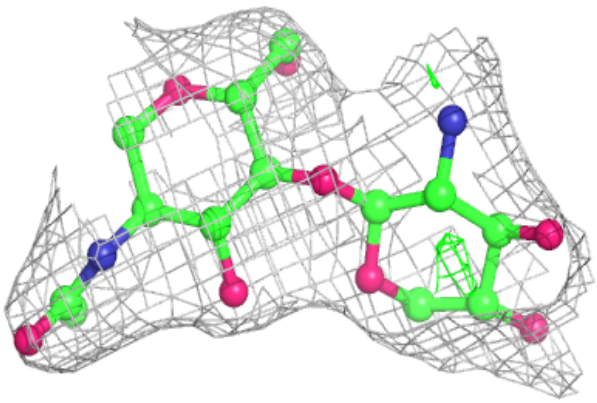
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

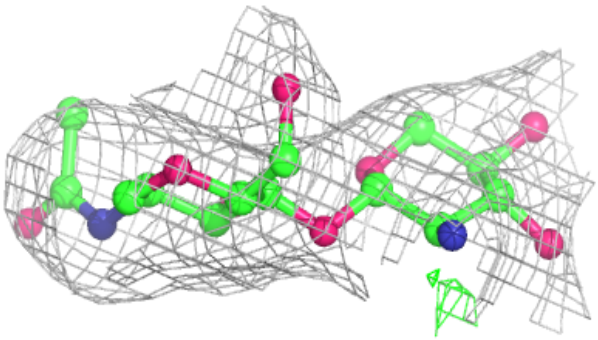
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
5	NAG	E	2	9/15	0.72	0.20	93,99,106,110	0
5	NAG	G	2	11/15	0.86	0.25	104,114,119,124	0
5	NAG	G	1	14/15	0.90	0.24	96,109,115,116	0
5	NAG	E	1	14/15	0.90	0.20	81,87,91,92	0
5	NAG	F	2	10/15	0.92	0.13	100,107,110,115	0
5	NAG	F	1	14/15	0.95	0.17	88,91,95,96	0

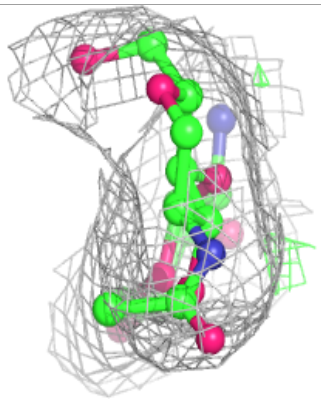
The following is a graphical depiction of the model fit to experimental electron density for oligosaccharide. Each fit is shown from different orientation to approximate a three-dimensional view.

Electron density around Chain E:

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

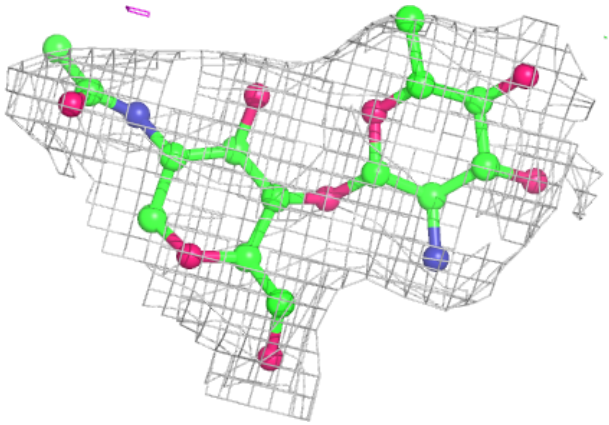


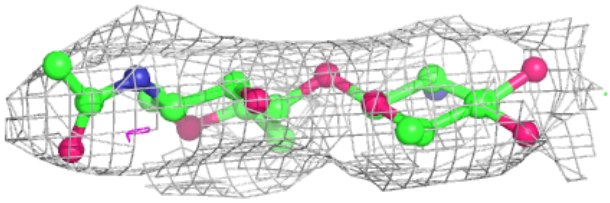


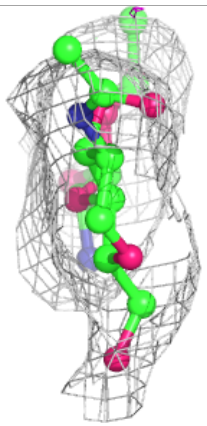


Electron density around Chain F:

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

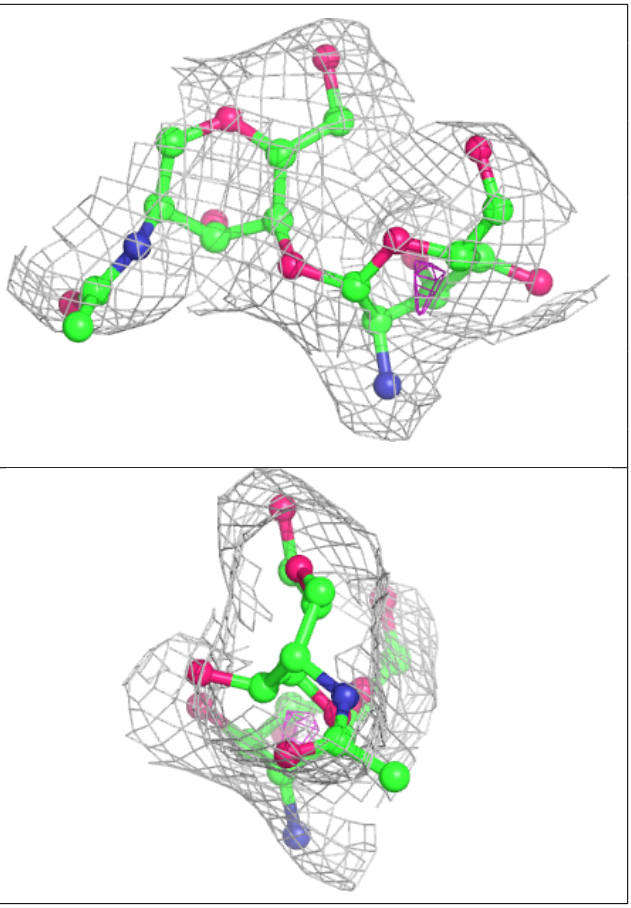






Electron density around Chain G:

$2mF_o$-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)

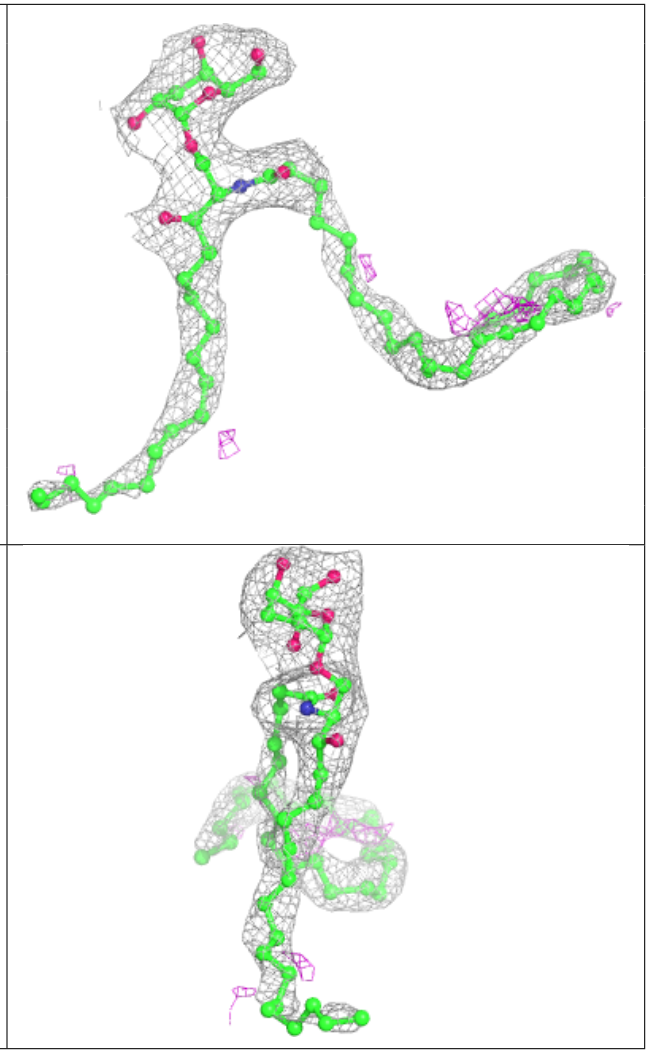
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
6	3GH	A	307	58/58	0.93	0.35	51,59,72,77	8

The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation to approximate a three-dimensional view.

Electron density around 3GH A 307:

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



6.5 Other polymers (i)

There are no such residues in this entry.