wwPDB X-ray Structure Validation Summary Report (i)

Apr 28, 2025 – 03:12 PM EDT

PDB ID	:	4JUN / pdb_00004jun
Title	:	Crystal structure of H5N1 influenza virus hemagglutinin, clade 5
Authors	:	DuBois, R.M.; Zaraket, H.; Reddivari, M.; Coop, T.; Heath, R.J.; White, S.W.; Russell, C.J.
Deposited on	:	2013-03-25
Resolution	:	2.34 Å(reported)

This is a wwPDB X-ray Structure Validation Summary Report for a publicly released PDB entry.

We welcome your comments at *validation@mail.wwpdb.org*
A user guide is available at
https://www.wwpdb.org/validation/2017/XrayValidationReportHelp
with specific help available everywhere you see the (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:

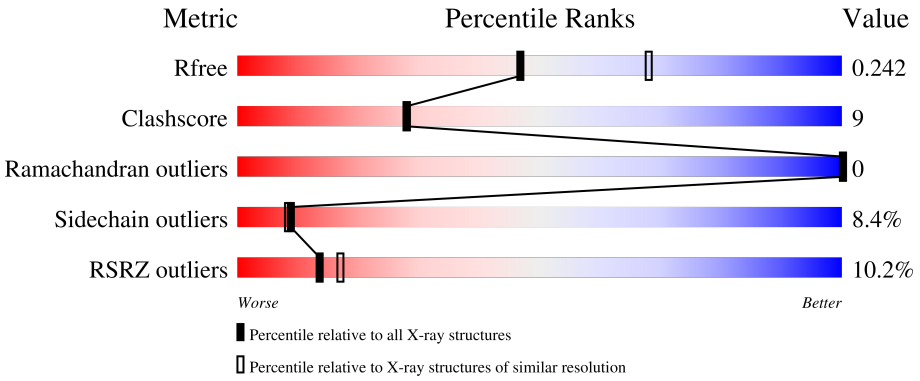
MolProbity	:	4-5-2 with Phenix2.0rc1
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	2.0rc1
EDS	:	3.0
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4	:	9.0.006 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.43.1

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 2.34 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}	164625	2747 (2.36-2.32)
Clashscore	180529	2936 (2.36-2.32)
Ramachandran outliers	177936	2912 (2.36-2.32)
Sidechain outliers	177891	2912 (2.36-2.32)
RSRZ outliers	164620	2747 (2.36-2.32)

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	329	2% 83% 12%
1	C	329	4% 78% 17%
1	E	329	4% 78% 17%
2	B	182	5% 74% 16% 7%
2	D	182	30% 65% 20% 10%

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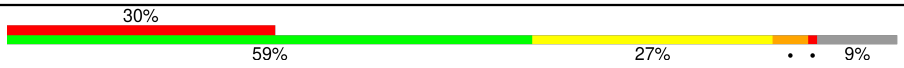
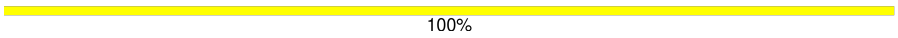
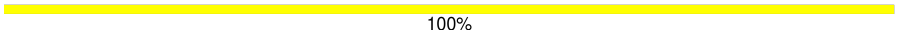
Mol	Chain	Length	Quality of chain
2	F	182	
3	G	2	
3	H	2	
3	I	2	

2 Entry composition (i)

There are 6 unique types of molecules in this entry. The entry contains 12083 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 Hemagglutinin HA1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	321	Total	C	N	O	S	0	1	0
			2543	1605	442	482	14			
1	C	321	Total	C	N	O	S	0	1	0
			2543	1605	442	482	14			
1	E	321	Total	C	N	O	S	0	1	0
			2543	1605	442	482	14			

There are 18 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	5	GLY	-	expression tag	UNP Q2F4V6
A	6	SER	-	expression tag	UNP Q2F4V6
A	7	ALA	-	expression tag	UNP Q2F4V6
A	8	ASP	-	expression tag	UNP Q2F4V6
A	9	PRO	-	expression tag	UNP Q2F4V6
A	10	GLY	-	expression tag	UNP Q2F4V6
C	5	GLY	-	expression tag	UNP Q2F4V6
C	6	SER	-	expression tag	UNP Q2F4V6
C	7	ALA	-	expression tag	UNP Q2F4V6
C	8	ASP	-	expression tag	UNP Q2F4V6
C	9	PRO	-	expression tag	UNP Q2F4V6
C	10	GLY	-	expression tag	UNP Q2F4V6
E	5	GLY	-	expression tag	UNP Q2F4V6
E	6	SER	-	expression tag	UNP Q2F4V6
E	7	ALA	-	expression tag	UNP Q2F4V6
E	8	ASP	-	expression tag	UNP Q2F4V6
E	9	PRO	-	expression tag	UNP Q2F4V6
E	10	GLY	-	expression tag	UNP Q2F4V6

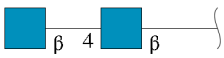
- Molecule 2 is a protein called Hemagglutinin HA2.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	170	Total	C	N	O	S	0	0	0
			1382	859	243	272	8			
2	D	164	Total	C	N	O	S	0	0	0
			1329	827	230	264	8			
2	F	166	Total	C	N	O	S	0	0	0
			1343	835	232	268	8			

There are 18 discrepancies between the modelled and reference sequences:

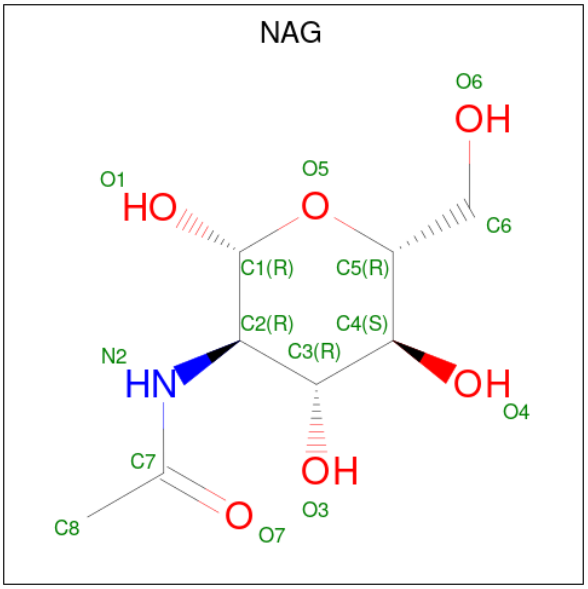
Chain	Residue	Modelled	Actual	Comment	Reference
B	177	ARG	-	expression tag	UNP Q2F4V6
B	178	SER	-	expression tag	UNP Q2F4V6
B	179	LEU	-	expression tag	UNP Q2F4V6
B	180	VAL	-	expression tag	UNP Q2F4V6
B	181	PRO	-	expression tag	UNP Q2F4V6
B	182	ARG	-	expression tag	UNP Q2F4V6
D	177	ARG	-	expression tag	UNP Q2F4V6
D	178	SER	-	expression tag	UNP Q2F4V6
D	179	LEU	-	expression tag	UNP Q2F4V6
D	180	VAL	-	expression tag	UNP Q2F4V6
D	181	PRO	-	expression tag	UNP Q2F4V6
D	182	ARG	-	expression tag	UNP Q2F4V6
F	177	ARG	-	expression tag	UNP Q2F4V6
F	178	SER	-	expression tag	UNP Q2F4V6
F	179	LEU	-	expression tag	UNP Q2F4V6
F	180	VAL	-	expression tag	UNP Q2F4V6
F	181	PRO	-	expression tag	UNP Q2F4V6
F	182	ARG	-	expression tag	UNP Q2F4V6

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



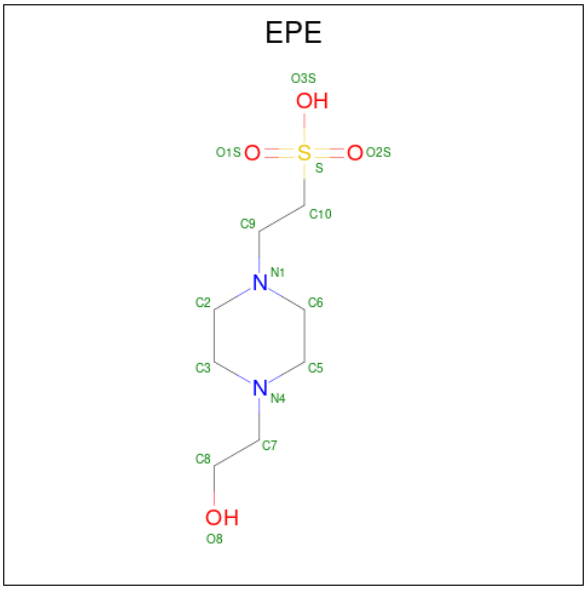
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
3	G	2	Total	C	N	O	0	0	0
			28	16	2	10			
3	H	2	Total	C	N	O	0	0	0
			28	16	2	10			
3	I	2	Total	C	N	O	0	0	0
			28	16	2	10			

- Molecule 4 is 2-acetamido-2-deoxy-beta-D-glucopyranose (CCD ID: NAG) (formula: $C_8H_{15}NO_6$).



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

- Molecule 5 is 4-(2-HYDROXYETHYL)-1-PIPERAZINE ETHANESULFONIC ACID (CCD ID: EPE) (formula: $C_8H_{18}N_2O_4S$).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
5	E	1	Total	C	N	O	S	0	0
			15	8	2	4	1		

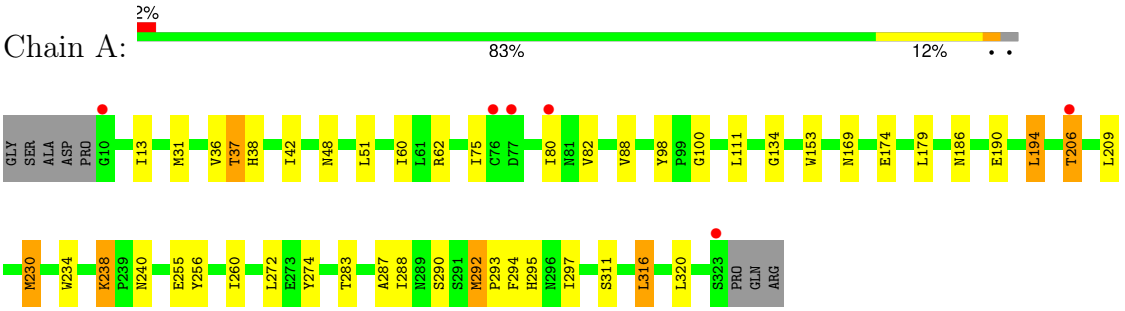
- Molecule 6 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	A	77	Total	O	0	0
			77	77		
6	B	14	Total	O	0	0
			14	14		
6	C	68	Total	O	0	0
			68	68		
6	D	14	Total	O	0	0
			14	14		
6	E	66	Total	O	0	0
			66	66		
6	F	20	Total	O	0	0
			20	20		

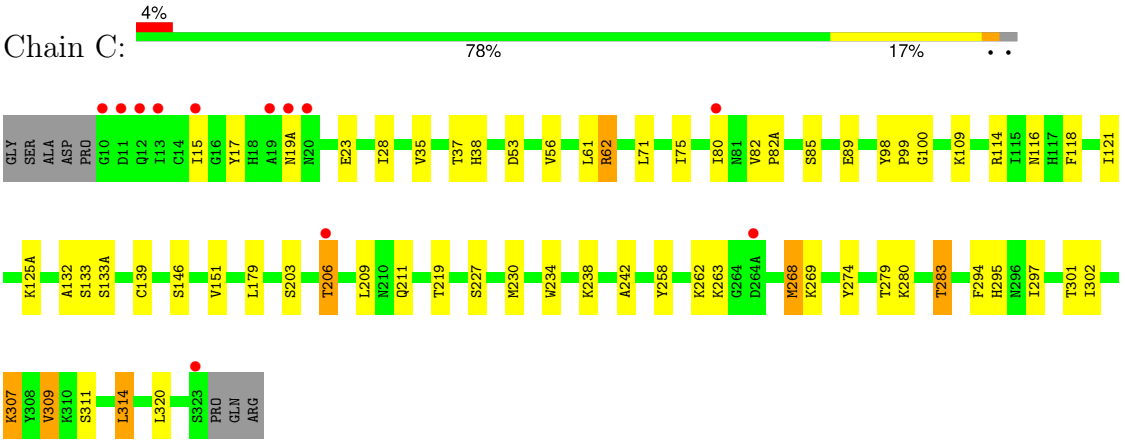
3 Residue-property plots (i)

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.

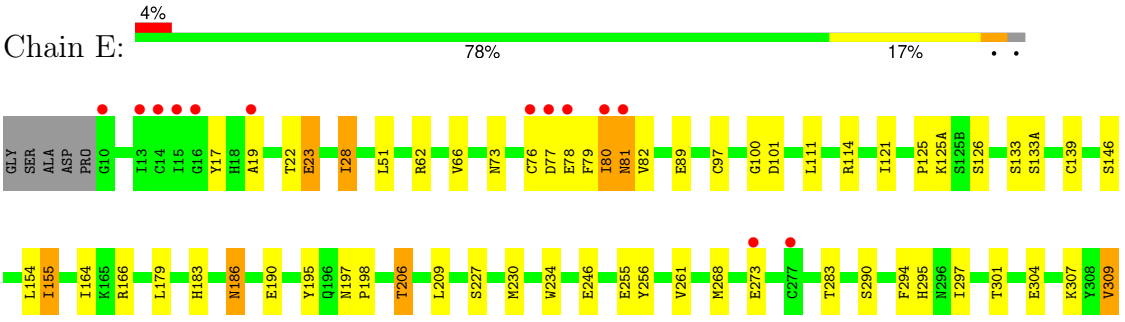
• Molecule 1: Hemagglutinin HA1



• Molecule 1: Hemagglutinin HA1

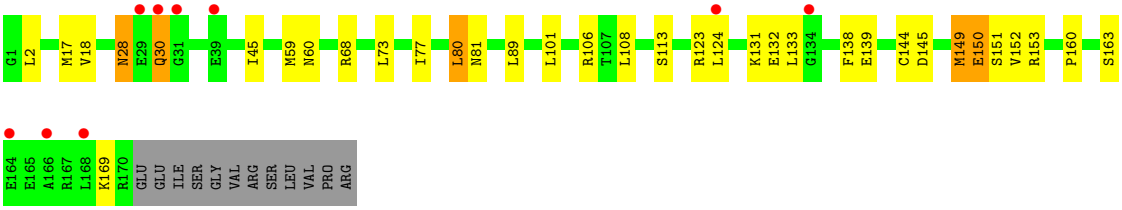


• Molecule 1: Hemagglutinin HA1



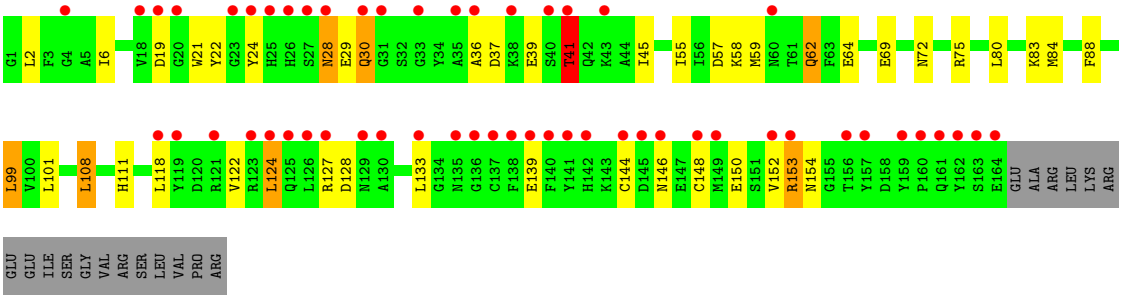
• Molecule 2: Hemagglutinin HA2

Chain B:



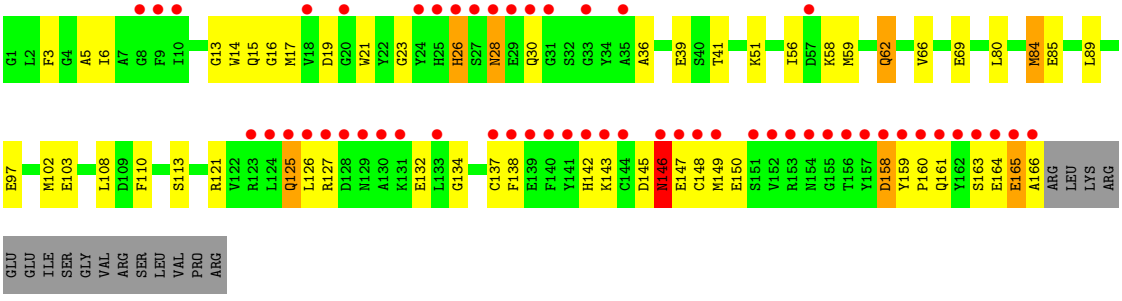
• Molecule 2: Hemagglutinin HA2

Chain D:



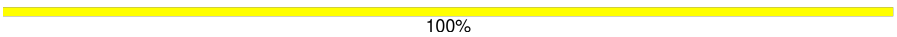
• Molecule 2: Hemagglutinin HA2

Chain F:



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

Chain G:

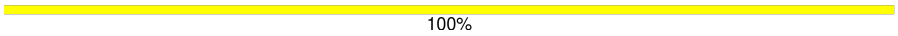


• Molecule 3: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain H:

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

Chain I:



4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α, β, γ	73.04Å 237.06Å 72.86Å 90.00° 119.18° 90.00°	Depositor
Resolution (Å)	49.62 – 2.34 49.62 – 2.34	Depositor EDS
% Data completeness (in resolution range)	81.7 (49.62-2.34) 86.3 (49.62-2.34)	Depositor EDS
R_{merge}	0.09	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	3.10 (at 2.34Å)	Xtriage
Refinement program	PHENIX 1.6.4_486	Depositor
R, R_{free}	0.201 , 0.245 0.197 , 0.242	Depositor DCC
R_{free} test set	3946 reflections (5.03%)	wwPDB-VP
Wilson B-factor (Å^2)	34.7	Xtriage
Anisotropy	0.246	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.34 , 39.7	EDS
L-test for twinning[2]	$< \|L\| > = 0.49$, $< L^2 > = 0.32$	Xtriage
Estimated twinning fraction	0.008 for l,k,-h-l 0.008 for -h-l,k,h 0.027 for -h-l,-k,l 0.023 for h,-k,-h-l 0.028 for l,-k,h	Xtriage
F_o,F_c correlation	0.94	EDS
Total number of atoms	12083	wwPDB-VP
Average B, all atoms (Å^2)	44.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.66% 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: EPE, NAG

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

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	#$\|Z\|$ >5	RMSZ	#$\|Z\|$ >5
1	A	0.60	2/2608 (0.1%)	0.86	2/3542 (0.1%)
1	C	0.57	0/2608	0.91	2/3542 (0.1%)
1	E	0.56	0/2608	0.89	3/3542 (0.1%)
2	B	0.49	0/1409	0.79	0/1894
2	D	0.47	0/1356	0.89	2/1825 (0.1%)
2	F	0.49	0/1370	0.86	3/1844 (0.2%)
All	All	0.55	2/11959 (0.0%)	0.87	12/16189 (0.1%)

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	62	ARG	C-O	-6.95	1.18	1.24
1	A	230	MET	C-O	-5.05	1.17	1.24

The worst 5 of 12 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	E	82	VAL	N-CA-C	10.24	119.80	107.61
2	F	146	ASN	N-CA-C	8.79	121.66	111.11
1	E	82	VAL	N-CA-CB	-7.66	104.25	112.37
2	F	5	ALA	N-CA-C	7.56	121.00	111.24
1	A	206	THR	N-CA-C	-6.58	99.33	109.14

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	2543	0	2486	29	0
1	C	2543	0	2486	37	0
1	E	2543	0	2484	42	0
2	B	1382	0	1291	24	0
2	D	1329	0	1230	42	0
2	F	1343	0	1241	48	0
3	G	28	0	25	2	0
3	H	28	0	25	2	0
3	I	28	0	25	0	0
4	A	14	0	13	0	0
4	C	14	0	13	0	0
4	E	14	0	13	0	0
5	E	15	0	17	1	0
6	A	77	0	0	0	0
6	B	14	0	0	0	0
6	C	68	0	0	1	0
6	D	14	0	0	0	0
6	E	66	0	0	1	0
6	F	20	0	0	0	0
All	All	12083	0	11349	201	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 9.

The worst 5 of 201 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:F:30:GLN:NE2	2:F:145:ASP:HB2	1.56	1.16
2:F:30:GLN:HE21	2:F:145:ASP:HB2	0.96	1.08
2:D:29:GLU:HB3	2:D:30:GLN:NE2	1.73	1.02
2:D:30:GLN:NE2	2:D:30:GLN:H	1.60	0.99
2:B:80:LEU:HD12	2:B:80:LEU:O	1.63	0.98

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	320/329 (97%)	314 (98%)	6 (2%)	0	100	100
1	C	320/329 (97%)	314 (98%)	6 (2%)	0	100	100
1	E	320/329 (97%)	314 (98%)	6 (2%)	0	100	100
2	B	168/182 (92%)	166 (99%)	2 (1%)	0	100	100
2	D	162/182 (89%)	157 (97%)	5 (3%)	0	100	100
2	F	164/182 (90%)	156 (95%)	8 (5%)	0	100	100
All	All	1454/1533 (95%)	1421 (98%)	33 (2%)	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	A	286/291 (98%)	273 (96%)	13 (4%)	23	29
1	C	286/291 (98%)	269 (94%)	17 (6%)	16	19
1	E	286/291 (98%)	264 (92%)	22 (8%)	10	10
2	B	145/156 (93%)	127 (88%)	18 (12%)	4	3
2	D	140/156 (90%)	123 (88%)	17 (12%)	4	3
2	F	141/156 (90%)	121 (86%)	20 (14%)	2	2
All	All	1284/1341 (96%)	1177 (92%)	107 (8%)	9	9

5 of 107 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	D	83	LYS
1	E	111	LEU
2	F	121	ARG
2	D	101	LEU
1	E	22	THR

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 38 such sidechains are listed below:

Mol	Chain	Res	Type
1	E	20	ASN
2	F	129	ASN
1	E	158	ASN
2	F	30	GLN
2	F	161	GLN

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	$\#\|Z\| > 2$
3	NAG	G	1	1,3	14,14,15	0.71	0	17,19,21	0.79	0
3	NAG	G	2	3	14,14,15	0.60	0	17,19,21	1.30	2 (11%)
3	NAG	H	1	1,3	14,14,15	0.68	0	17,19,21	0.92	1 (5%)
3	NAG	H	2	3	14,14,15	0.67	0	17,19,21	1.10	1 (5%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\|>2$	Counts	RMSZ	$\#\|Z\|>2$
3	NAG	I	1	1,3	14,14,15	0.68	0	17,19,21	1.58	4 (23%)
3	NAG	I	2	3	14,14,15	0.68	0	17,19,21	1.10	1 (5%)

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	NAG	G	1	1,3	-	0/6/23/26	0/1/1/1
3	NAG	G	2	3	-	1/6/23/26	0/1/1/1
3	NAG	H	1	1,3	-	0/6/23/26	0/1/1/1
3	NAG	H	2	3	-	2/6/23/26	0/1/1/1
3	NAG	I	1	1,3	-	0/6/23/26	0/1/1/1
3	NAG	I	2	3	-	2/6/23/26	0/1/1/1

There are no bond length outliers.

The worst 5 of 9 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	G	2	NAG	O5-C1-C2	-4.00	105.09	111.29
3	I	1	NAG	C2-N2-C7	2.82	126.67	122.90
3	I	2	NAG	C1-O5-C5	2.61	115.68	112.19
3	H	2	NAG	C1-O5-C5	2.60	115.67	112.19
3	I	1	NAG	C1-O5-C5	-2.41	108.95	112.19

There are no chirality outliers.

All (5) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	H	2	NAG	O5-C5-C6-O6
3	I	2	NAG	O5-C5-C6-O6
3	I	2	NAG	C4-C5-C6-O6
3	H	2	NAG	C4-C5-C6-O6
3	G	2	NAG	C1-C2-N2-C7

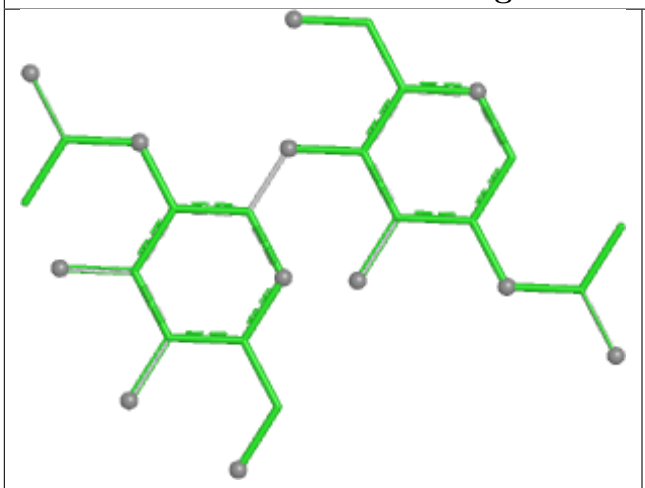
There are no ring outliers.

2 monomers are involved in 4 short contacts:

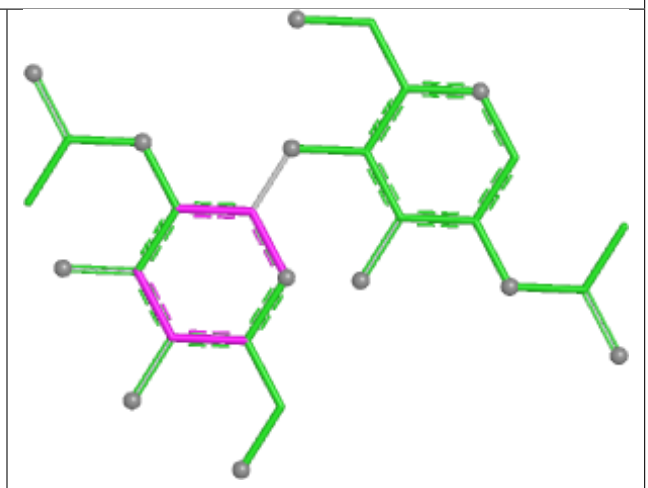
Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	G	1	NAG	2	0
3	H	1	NAG	2	0

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

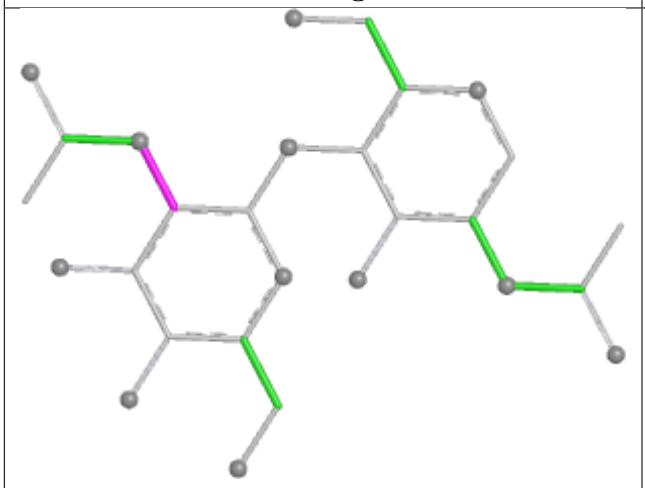
Oligosaccharide Chain G



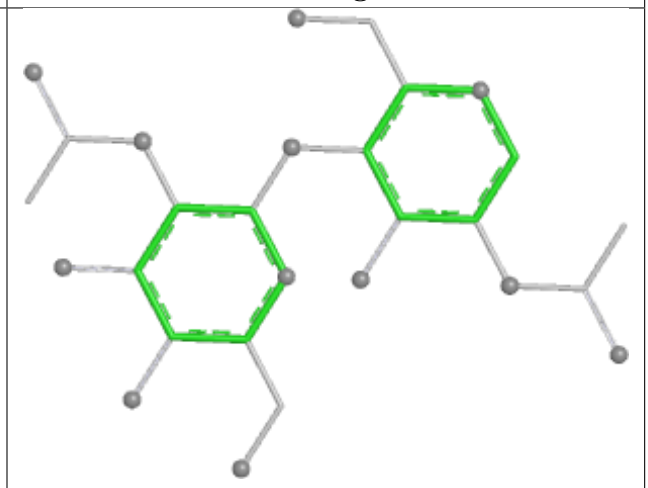
Bond lengths



Bond angles

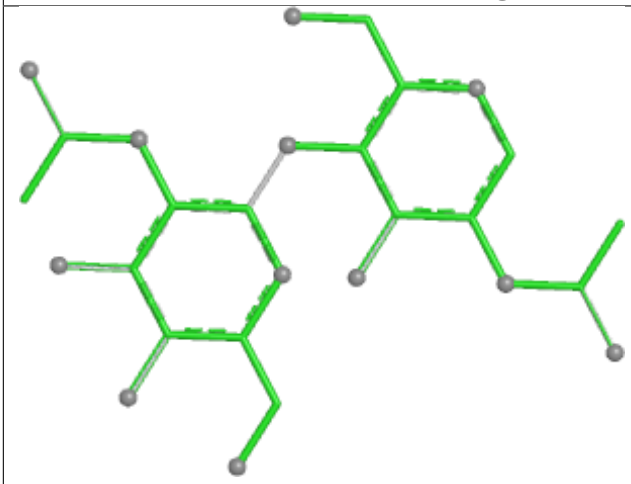


Torsions

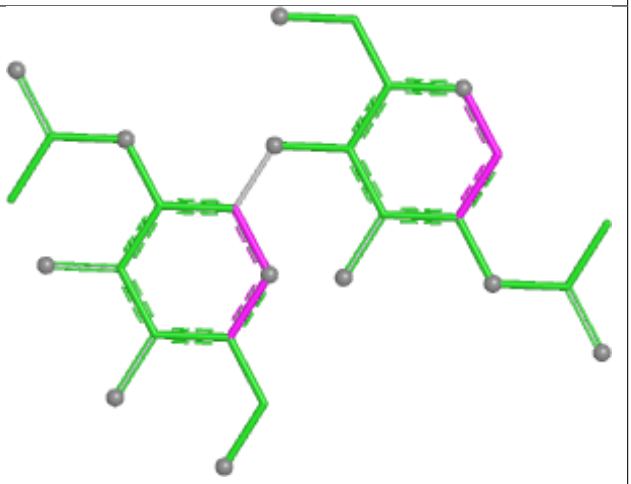


Rings

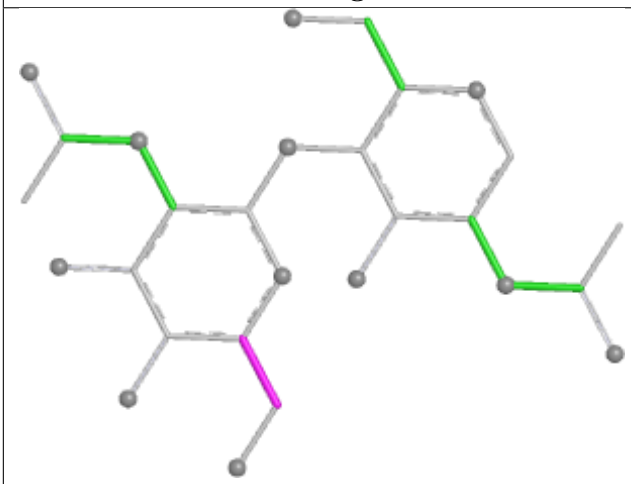
Oligosaccharide Chain H



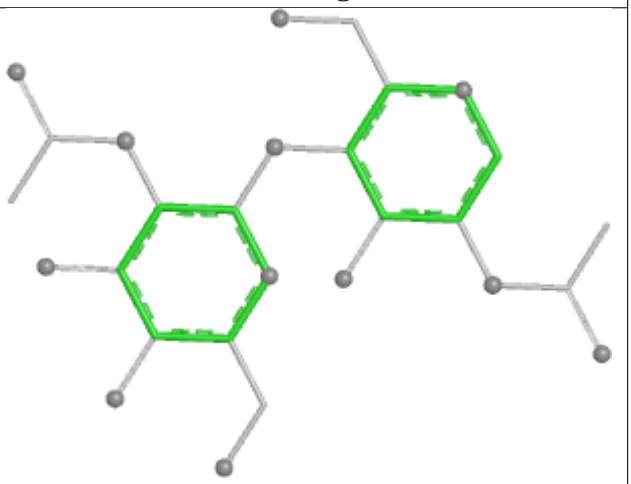
Bond lengths



Bond angles

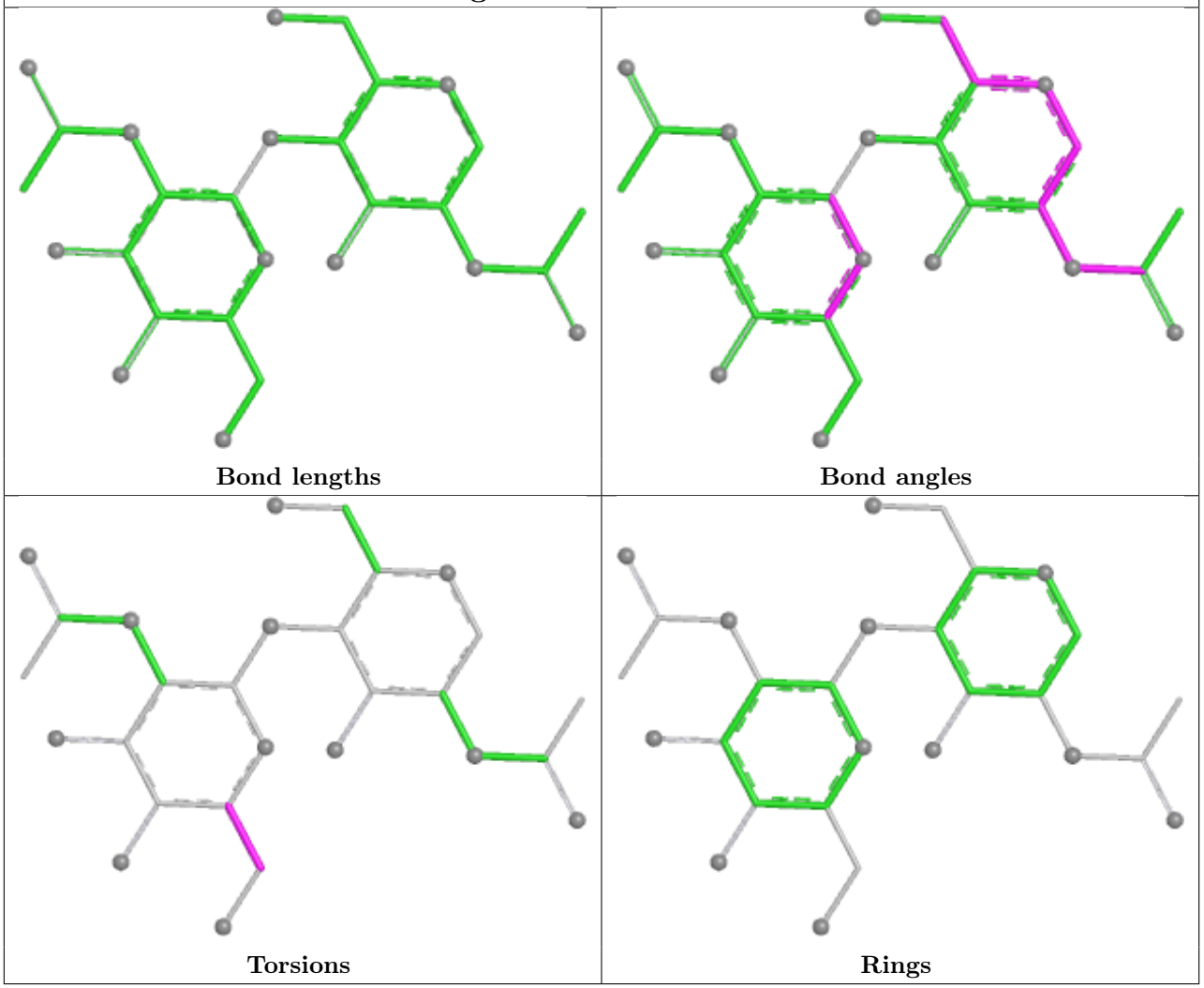


Torsions



Rings

Oligosaccharide Chain I



5.6 Ligand geometry (i)

4 ligands are modelled in this entry.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
5	EPE	E	404	-	15,15,15	1.28	1 (6%)	19,20,20	2.12	5 (26%)
4	NAG	E	403	1	14,14,15	0.58	0	17,19,21	1.37	2 (11%)
4	NAG	C	403	1	14,14,15	0.54	0	17,19,21	1.15	2 (11%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\|>2$	Counts	RMSZ	$\#\|Z\|>2$
4	NAG	A	403	1	14,14,15	0.58	0	17,19,21	1.17	3 (17%)

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	EPE	E	404	-	-	5/9/19/19	0/1/1/1
4	NAG	E	403	1	-	2/6/23/26	0/1/1/1
4	NAG	C	403	1	-	2/6/23/26	0/1/1/1
4	NAG	A	403	1	-	0/6/23/26	0/1/1/1

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	E	404	EPE	C10-S	4.46	1.83	1.77

The worst 5 of 12 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
5	E	404	EPE	C7-N4-C3	4.97	124.49	111.24
5	E	404	EPE	O2S-S-C10	4.61	113.69	106.73
4	E	403	NAG	O5-C1-C2	-3.46	105.93	111.29
4	E	403	NAG	C3-C4-C5	3.17	115.98	110.23
5	E	404	EPE	C5-N4-C3	2.88	115.04	108.84

There are no chirality outliers.

5 of 9 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
5	E	404	EPE	N4-C7-C8-O8
4	E	403	NAG	O5-C5-C6-O6
4	C	403	NAG	O5-C5-C6-O6
5	E	404	EPE	C8-C7-N4-C5
5	E	404	EPE	C9-C10-S-O1S

There are no ring outliers.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	E	404	EPE	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	A	321/329 (97%)	-0.20	6 (1%) 66 71	14, 33, 55, 71	1 (0%)
1	C	321/329 (97%)	-0.11	12 (3%) 45 53	12, 33, 61, 112	1 (0%)
1	E	321/329 (97%)	0.01	14 (4%) 39 47	13, 32, 62, 104	1 (0%)
2	B	170/182 (93%)	0.52	9 (5%) 33 40	15, 52, 71, 91	0
2	D	164/182 (90%)	1.29	54 (32%) 1 1	17, 64, 109, 117	0
2	F	166/182 (91%)	1.26	54 (32%) 1 1	18, 65, 117, 125	0
All	All	1463/1533 (95%)	0.28	149 (10%) 13 17	12, 38, 99, 125	3 (0%)

The worst 5 of 149 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	F	166	ALA	7.6
1	E	13	ILE	5.6
2	F	141	TYR	5.6
2	D	141	TYR	5.2
1	E	80	ILE	5.0

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

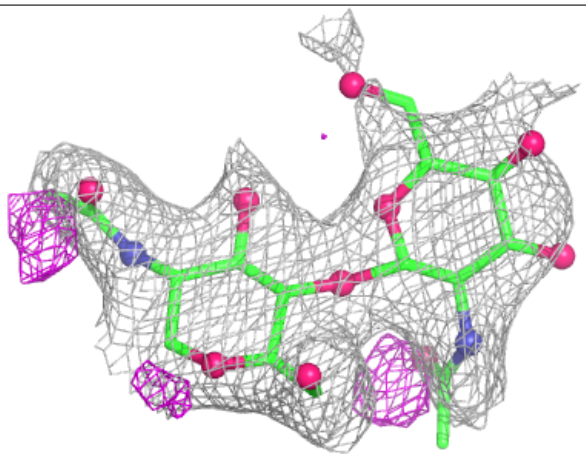
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95^{th} percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9'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

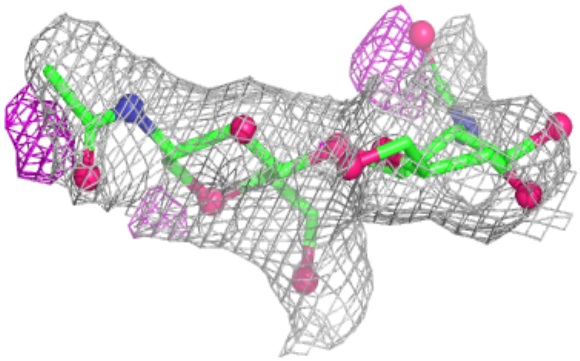
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
3	NAG	H	2	14/15	0.66	0.18	61,74,79,79	0
3	NAG	I	2	14/15	0.67	0.17	61,74,79,79	0
3	NAG	G	2	14/15	0.72	0.18	58,77,84,86	0
3	NAG	H	1	14/15	0.79	0.14	25,44,52,53	0
3	NAG	I	1	14/15	0.81	0.13	31,45,61,69	0
3	NAG	G	1	14/15	0.86	0.12	32,44,52,64	0

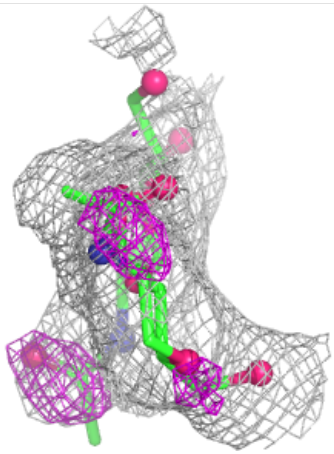
The following is a graphical depiction of the model fit to experimental electron density for oligosaccharide. Each fit is shown from different orientation to approximate a three-dimensional view.

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)

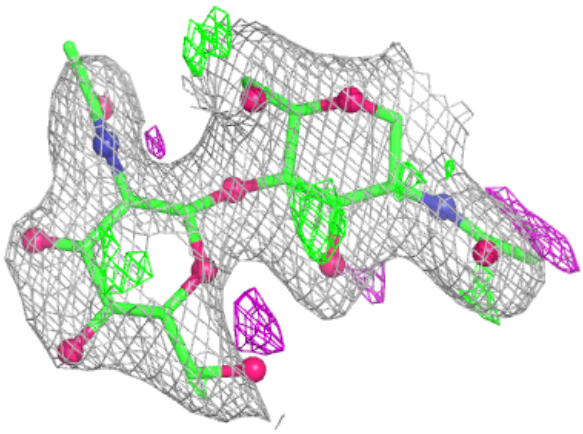


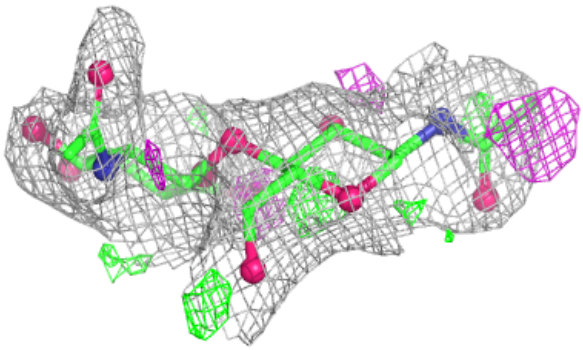


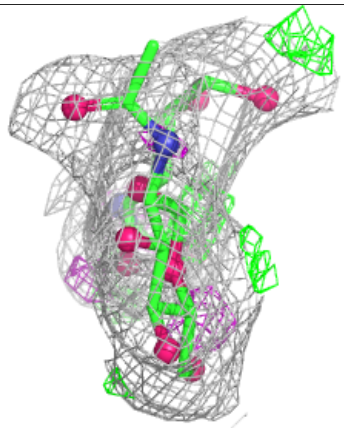


Electron density around Chain H:

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

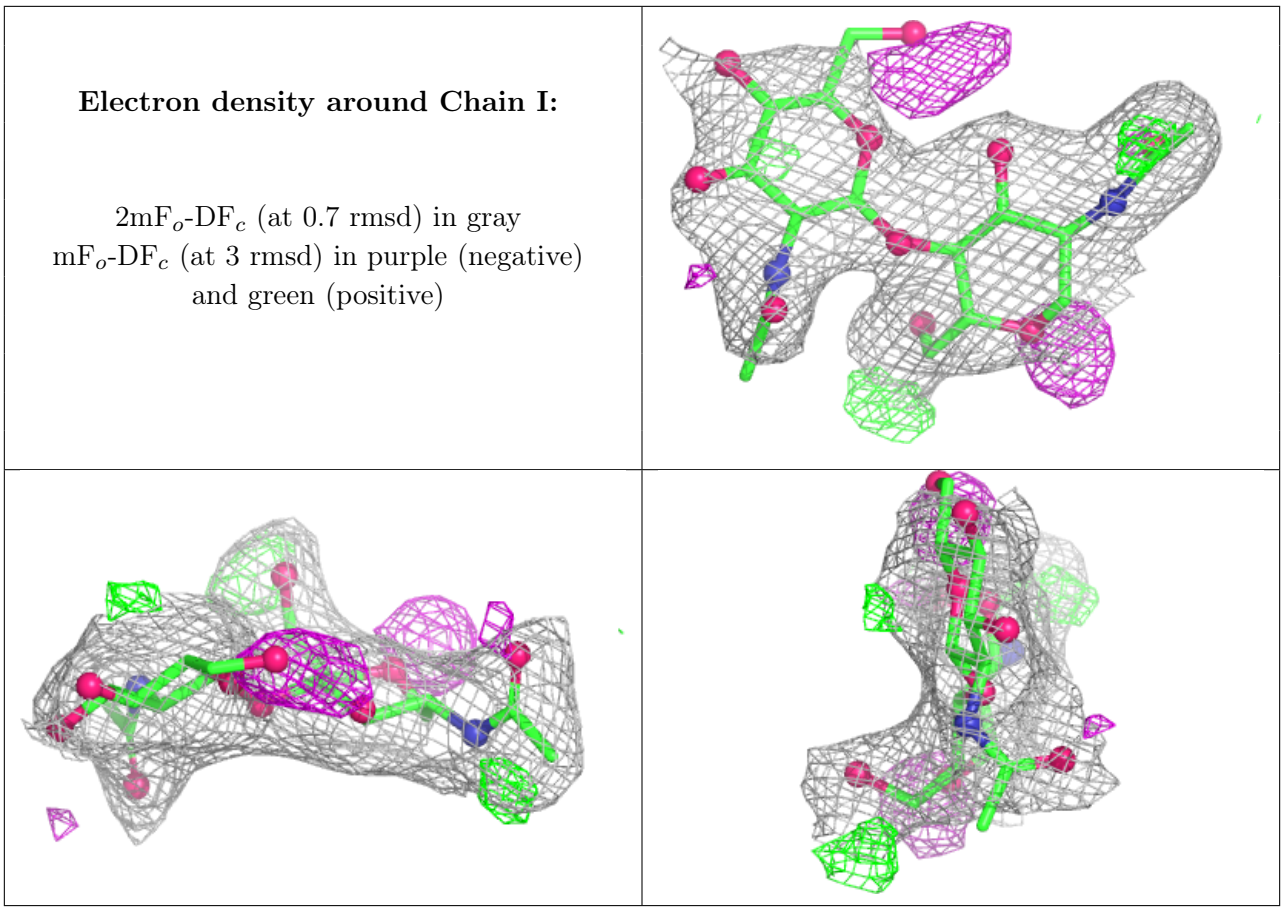






Electron density around Chain I:

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



6.4 Ligands

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	NAG	E	403	14/15	0.61	0.19	76,84,89,90	0
4	NAG	C	403	14/15	0.70	0.18	75,78,85,92	0
4	NAG	A	403	14/15	0.71	0.15	77,81,89,89	0
5	EPE	E	404	15/15	0.85	0.13	26,37,62,72	0

6.5 Other polymers

There are no such residues in this entry.