



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 5, 2026 – 02:49 PM UTC

PDB ID : 6TVB / pdb_00006tvb
Title : Crystal structure of the haemagglutinin from a transmissible H10N7 seal influenza virus isolated in Netherland in complex with human receptor analogue 6'-SLN
Authors : Zhang, J.; Xiong, X.; Purkiss, A.; Walker, P.; Gamblin, S.; Skehel, J.J.
Deposited on : 2020-01-09
Resolution : 1.65 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 ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

The following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

MolProbity	:	4-5-2 with Phenix2.0
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	2.0
EDS	:	3.0
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4	:	9.0.010 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.49

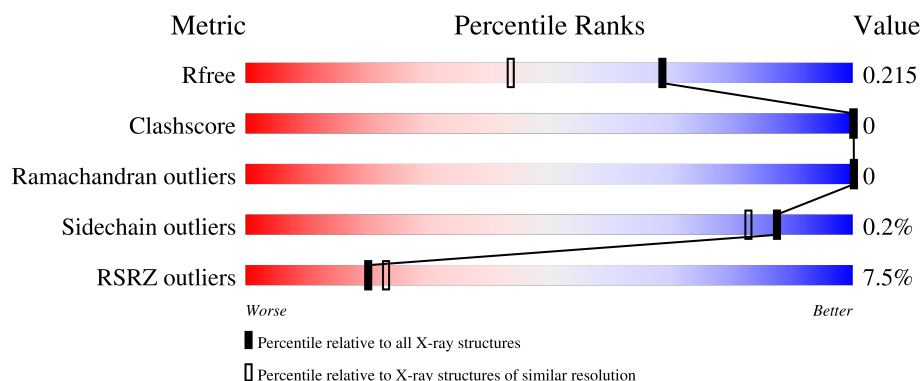
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.65 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	180053	2563 (1.66-1.66)
Clashscore	190562	2662 (1.66-1.66)
Ramachandran outliers	187476	2621 (1.66-1.66)
Sidechain outliers	187428	2621 (1.66-1.66)
RSRZ outliers	180081	2564 (1.66-1.66)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$. The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	325	6% 98%
1	C	325	6% 98%
1	E	325	5% 99%
2	B	177	11% 99%
2	D	177	10% 99%

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Mol	Chain	Length	Quality of chain
2	F	177	11% 97%
3	G	3	33% 67%
3	H	3	33% 67%
3	I	3	33% 67%

2 Entry composition

There are 6 unique types of molecules in this entry. The entry contains 12834 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	320	Total	C	N	O	S	0	1	0
			2427	1509	440	462	16			
1	C	320	Total	C	N	O	S	0	0	0
			2429	1512	440	461	16			
1	E	322	Total	C	N	O	S	0	0	0
			2425	1514	436	459	16			

There are 15 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-1	ASP	-	expression tag	UNP A0A0A7HR51
A	0	PRO	-	expression tag	UNP A0A0A7HR51
A	96	LYS	GLU	conflict	UNP A0A0A7HR51
A	205	SER	ASN	conflict	UNP A0A0A7HR51
A	237	ILE	THR	conflict	UNP A0A0A7HR51
C	-1	ASP	-	expression tag	UNP A0A0A7HR51
C	0	PRO	-	expression tag	UNP A0A0A7HR51
C	96	LYS	GLU	conflict	UNP A0A0A7HR51
C	205	SER	ASN	conflict	UNP A0A0A7HR51
C	237	ILE	THR	conflict	UNP A0A0A7HR51
E	-1	ASP	-	expression tag	UNP A0A0A7HR51
E	0	PRO	-	expression tag	UNP A0A0A7HR51
E	96	LYS	GLU	conflict	UNP A0A0A7HR51
E	205	SER	ASN	conflict	UNP A0A0A7HR51
E	237	ILE	THR	conflict	UNP A0A0A7HR51

- Molecule 2 is a protein called Hemagglutinin HA2.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	175	Total	C	N	O	S	0	0	0
			1379	856	242	273	8			

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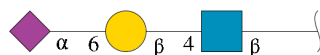
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Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	D	175	Total	C	N	O	S	0	0	0
			1368	846	242	272	8			
2	F	172	Total	C	N	O	S	0	0	0
			1347	836	238	265	8			

There are 6 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	158	ASN	ASP	conflict	UNP A0A0A7HR51
B	177	LYS	-	expression tag	UNP A0A0A7HR51
D	158	ASN	ASP	conflict	UNP A0A0A7HR51
D	177	LYS	-	expression tag	UNP A0A0A7HR51
F	158	ASN	ASP	conflict	UNP A0A0A7HR51
F	177	LYS	-	expression tag	UNP A0A0A7HR51

- Molecule 3 is an oligosaccharide called N-acetyl-alpha-neuraminic acid-(2-6)-beta-D-galactopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
3	G	3	Total	C	N	O	0	0	0
			46	25	2	19			
3	H	3	Total	C	N	O	0	0	0
			46	25	2	19			
3	I	3	Total	C	N	O	0	0	0
			46	25	2	19			

- Molecule 4 is 1,2-ETHANEDIOL (CCD ID: EDO) (formula: C₂H₆O₂).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	A	1	Total	C	O	0	0
			4	2	2		
4	A	1	Total	C	O	0	0
			4	2	2		
4	B	1	Total	C	O	0	0
			4	2	2		
4	C	1	Total	C	O	0	0
			4	2	2		
4	C	1	Total	C	O	0	0
			4	2	2		
4	C	1	Total	C	O	0	0
			4	2	2		
4	C	1	Total	C	O	0	0
			4	2	2		
4	C	1	Total	C	O	0	0
			4	2	2		
4	C	1	Total	C	O	0	0
			4	2	2		
4	D	1	Total	C	O	0	0
			4	2	2		
4	E	1	Total	C	O	0	0
			4	2	2		

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Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	F	1	Total	C	O	0	0
			4	2	2		
4	F	1	Total	C	O	0	0
			4	2	2		
4	F	1	Total	C	O	0	0
			4	2	2		

- Molecule 5 is 2-acetamido-2-deoxy-beta-D-glucopyranose (CCD ID: NAG) (formula: $C_8H_{15}NO_6$).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
5	B	1	Total	C	N	O	0	0
			14	8	1	5		
5	B	1	Total	C	N	O	0	0
			14	8	1	5		
5	D	1	Total	C	N	O	0	0
			14	8	1	5		

- Molecule 6 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	A	264	Total	O	0	0
			264	264		
6	B	157	Total	O	0	0
			157	157		
6	C	269	Total	O	0	0
			269	269		

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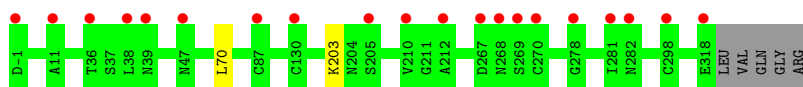
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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	D	134	Total 134	O 134	0	0
6	E	242	Total 242	O 242	0	0
6	F	145	Total 145	O 145	0	0

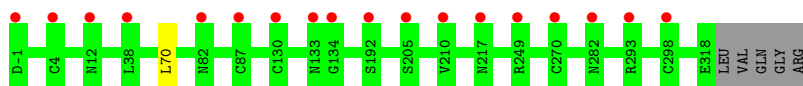
3 Residue-property plots [i](#)

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: Hemagglutinin HA1



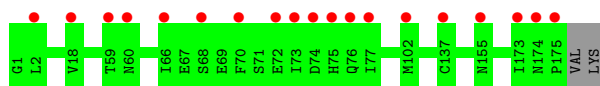
- Molecule 1: Hemagglutinin HA1



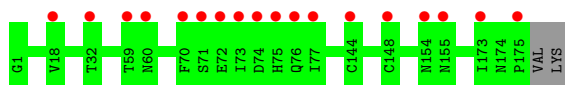
- Molecule 1: Hemagglutinin HA1



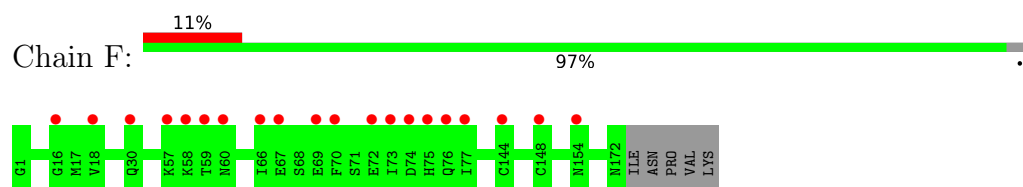
- Molecule 2: Hemagglutinin HA2



- Molecule 2: Hemagglutinin HA2



- Molecule 2: Hemagglutinin HA2



- Molecule 3: N-acetyl-alpha-neuraminic acid-(2-6)-beta-D-galactopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose



- Molecule 3: N-acetyl-alpha-neuraminic acid-(2-6)-beta-D-galactopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose



- Molecule 3: N-acetyl-alpha-neuraminic acid-(2-6)-beta-D-galactopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose



4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	64.46Å 213.11Å 76.58Å 90.00° 98.28° 90.00°	Depositor
Resolution (Å)	54.73 – 1.65 54.73 – 1.65	Depositor EDS
% Data completeness (in resolution range)	99.9 (54.73-1.65) 99.9 (54.73-1.65)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.50 (at 1.65Å)	Xtriage
Refinement program	REFMAC 5.8.0158	Depositor
R, R_{free}	0.201 , 0.215 0.203 , 0.215	Depositor DCC
R_{free} test set	12238 reflections (5.02%)	wwPDB-VP
Wilson B-factor (Å ²)	26.0	Xtriage
Anisotropy	0.505	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.34 , 33.9	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	12834	wwPDB-VP
Average B, all atoms (Å ²)	32.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.42% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical values of $\langle |L| \rangle$, $\langle L^2 \rangle$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality [i](#)

5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: NAG, EDO, SIA, GAL

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

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
1	A	0.47	0/2477	0.64	0/3358
1	C	0.47	0/2479	0.63	0/3358
1	E	0.47	0/2475	0.63	0/3355
2	B	0.49	0/1404	0.76	0/1897
2	D	0.49	0/1394	0.76	0/1887
2	F	0.49	0/1372	0.76	0/1855
All	All	0.48	0/11601	0.68	0/15710

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	2427	0	2384	1	0
1	C	2429	0	2400	0	0
1	E	2425	0	2383	1	0
2	B	1379	0	1278	0	0
2	D	1368	0	1239	0	0
2	F	1347	0	1235	0	0
3	G	46	0	40	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	H	46	0	40	0	0
3	I	46	0	40	0	0
4	A	8	0	12	0	0
4	B	4	0	6	0	0
4	C	36	0	54	0	0
4	D	4	0	6	0	0
4	E	4	0	6	0	0
4	F	12	0	18	0	0
5	B	28	0	26	0	0
5	D	14	0	13	0	0
6	A	264	0	0	0	0
6	B	157	0	0	0	0
6	C	269	0	0	0	0
6	D	134	0	0	0	0
6	E	242	0	0	0	0
6	F	145	0	0	0	0
All	All	12834	0	11180	1	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 0.

All (1) 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:203:LYS:NZ	1:E:224:ASP:OD2	2.49	0.42

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	319/325 (98%)	315 (99%)	4 (1%)	0	100	100
1	C	318/325 (98%)	313 (98%)	5 (2%)	0	100	100
1	E	320/325 (98%)	316 (99%)	4 (1%)	0	100	100
2	B	173/177 (98%)	167 (96%)	6 (4%)	0	100	100
2	D	173/177 (98%)	167 (96%)	6 (4%)	0	100	100
2	F	170/177 (96%)	166 (98%)	4 (2%)	0	100	100
All	All	1473/1506 (98%)	1444 (98%)	29 (2%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains ⓘ

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	266/275 (97%)	265 (100%)	1 (0%)	84	77
1	C	267/275 (97%)	266 (100%)	1 (0%)	84	77
1	E	263/275 (96%)	263 (100%)	0	100	100
2	B	141/151 (93%)	141 (100%)	0	100	100
2	D	137/151 (91%)	137 (100%)	0	100	100
2	F	135/151 (89%)	135 (100%)	0	100	100
All	All	1209/1278 (95%)	1207 (100%)	2 (0%)	87	83

All (2) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	70	LEU
1	C	70	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (15) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	12	ASN
1	A	48	HIS
1	A	268	ASN
2	B	27	GLN
2	B	76	GLN
1	C	39	ASN
1	C	152	GLN
2	D	26	HIS
2	D	105	GLN
1	E	12	ASN
1	E	48	HIS
1	E	100	GLN
1	E	268	ASN
2	F	26	HIS
2	F	172	ASN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates ⓘ

9 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	3	15,15,15	0.52	0	21,21,21	1.46	4 (19%)
3	GAL	G	2	3	11,11,12	0.35	0	15,15,17	0.54	0
3	SIA	G	3	3	20,20,21	0.59	0	21,28,31	1.08	2 (9%)
3	NAG	H	1	3	15,15,15	0.44	0	21,21,21	1.52	4 (19%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
3	GAL	H	2	3	11,11,12	0.32	0	15,15,17	0.58	0
3	SIA	H	3	3	20,20,21	0.59	0	21,28,31	1.13	3 (14%)
3	NAG	I	1	3	15,15,15	0.49	0	21,21,21	1.80	5 (23%)
3	GAL	I	2	3	11,11,12	0.31	0	15,15,17	0.48	0
3	SIA	I	3	3	20,20,21	0.59	0	21,28,31	1.17	2 (9%)

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	3	-	1/6/26/26	0/1/1/1
3	GAL	G	2	3	-	0/2/19/22	0/1/1/1
3	SIA	G	3	3	-	0/18/34/38	0/1/1/1
3	NAG	H	1	3	-	2/6/26/26	0/1/1/1
3	GAL	H	2	3	-	0/2/19/22	0/1/1/1
3	SIA	H	3	3	-	0/18/34/38	0/1/1/1
3	NAG	I	1	3	-	2/6/26/26	0/1/1/1
3	GAL	I	2	3	-	1/2/19/22	0/1/1/1
3	SIA	I	3	3	-	0/18/34/38	0/1/1/1

There are no bond length outliers.

All (20) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	I	1	NAG	C3-C4-C5	4.35	118.12	110.23
3	I	1	NAG	C4-C3-C2	3.83	115.98	110.40
3	H	1	NAG	C1-C2-N2	-3.61	106.54	110.73
3	H	1	NAG	C8-C7-N2	3.39	121.75	116.12
3	G	1	NAG	O5-C1-C2	3.23	112.76	109.52
3	I	1	NAG	O5-C1-C2	-3.07	106.44	109.52
3	G	1	NAG	C1-O5-C5	2.97	119.40	113.65
3	I	3	SIA	O1B-C1-C2	2.84	120.09	112.71
3	G	1	NAG	C3-C2-N2	-2.78	105.49	110.62
3	H	1	NAG	C2-N2-C7	2.69	129.41	123.11
3	H	1	NAG	C3-C2-N2	-2.49	106.03	110.62
3	I	1	NAG	C1-C2-N2	-2.42	107.92	110.73
3	H	3	SIA	O1B-C1-C2	2.37	118.88	112.71
3	G	1	NAG	C1-C2-N2	-2.37	107.99	110.73
3	I	1	NAG	C3-C2-N2	-2.36	106.28	110.62

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	G	3	SIA	O1B-C1-C2	2.30	118.70	112.71
3	H	3	SIA	O6-C2-C1	2.28	112.02	107.72
3	G	3	SIA	O6-C2-C1	2.17	111.82	107.72
3	H	3	SIA	C4-C5-N5	-2.11	106.28	110.44
3	I	3	SIA	C6-C5-N5	-2.03	107.67	110.91

There are no chirality outliers.

All (6) torsion outliers are listed below:

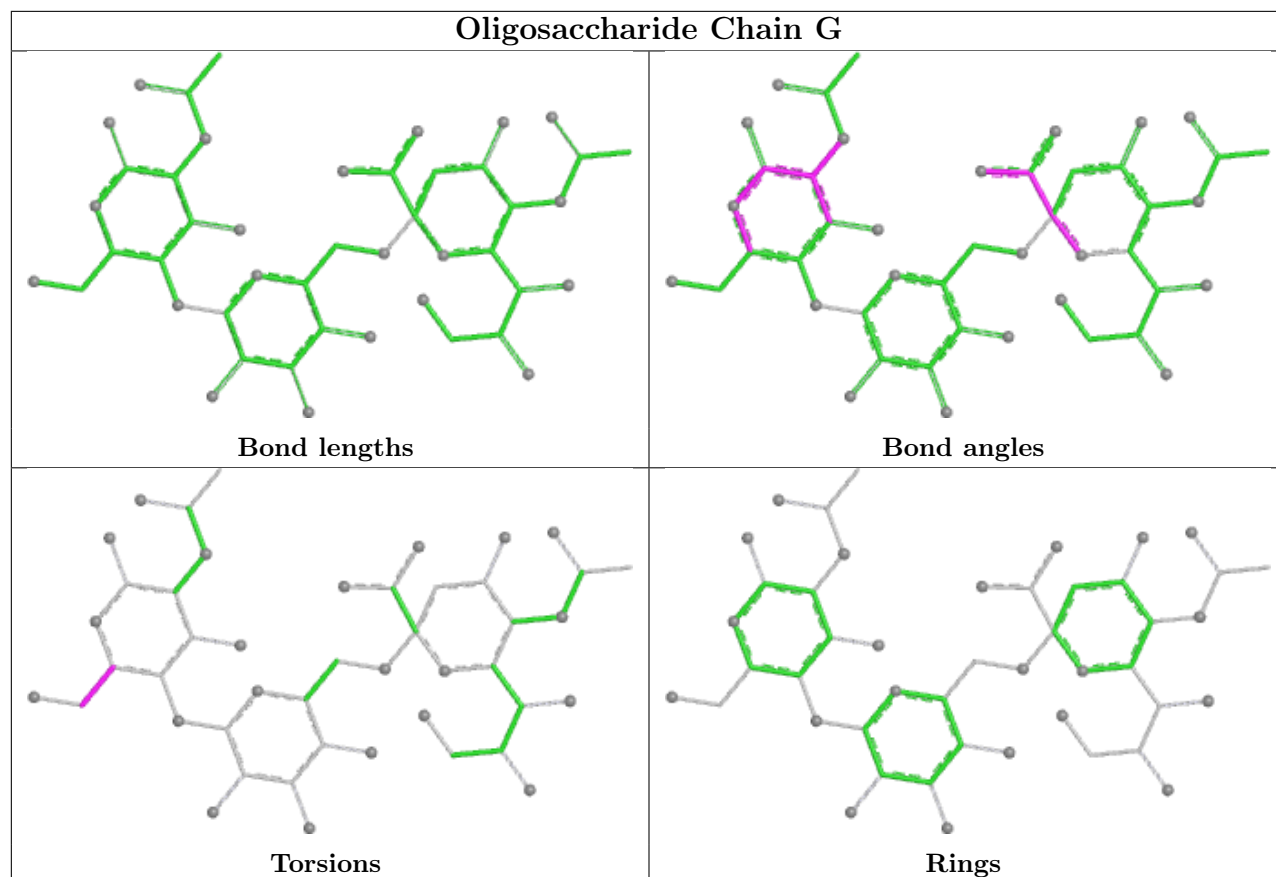
Mol	Chain	Res	Type	Atoms
3	I	1	NAG	O5-C5-C6-O6
3	H	1	NAG	C8-C7-N2-C2
3	H	1	NAG	O7-C7-N2-C2
3	G	1	NAG	O5-C5-C6-O6
3	I	2	GAL	O5-C5-C6-O6
3	I	1	NAG	C4-C5-C6-O6

There are no ring outliers.

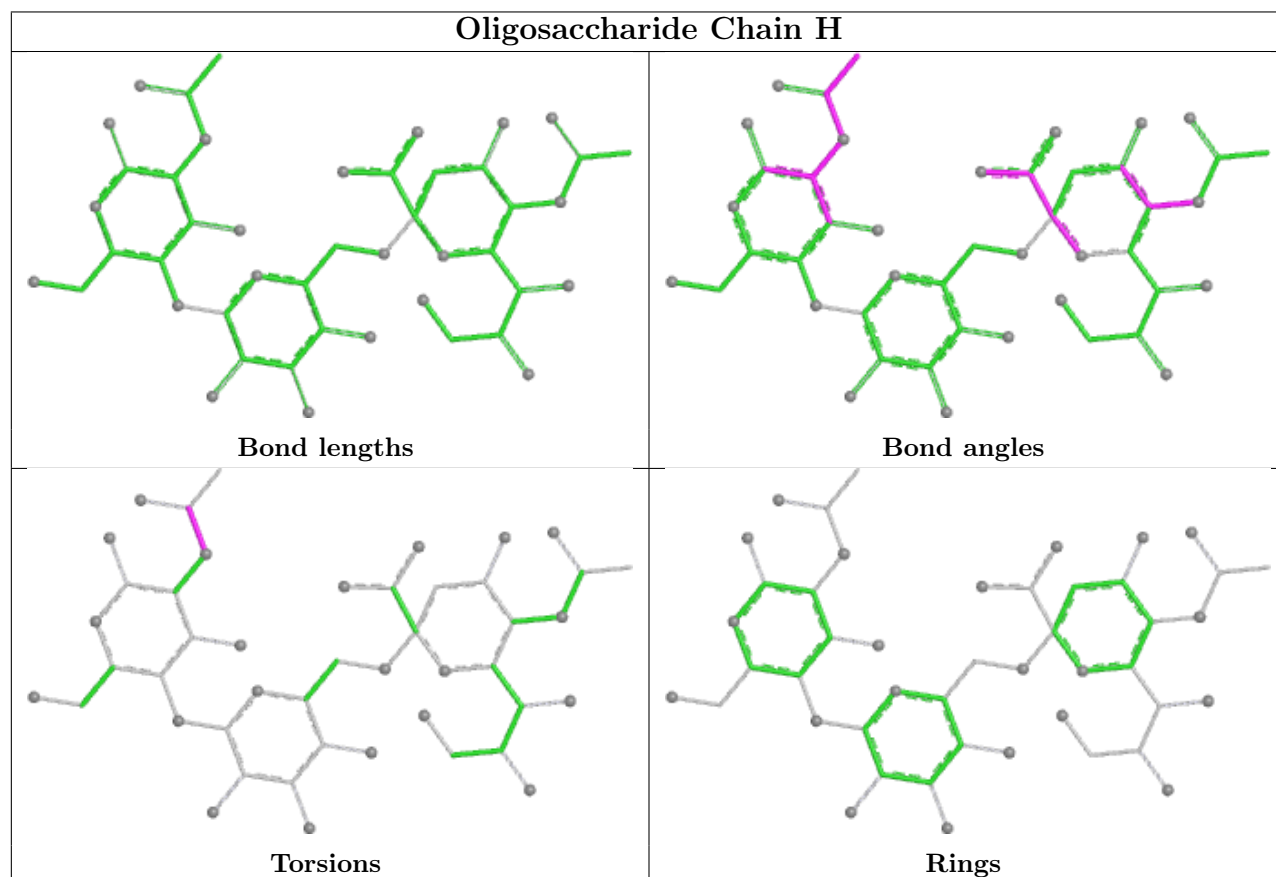
No monomer is involved in short contacts.

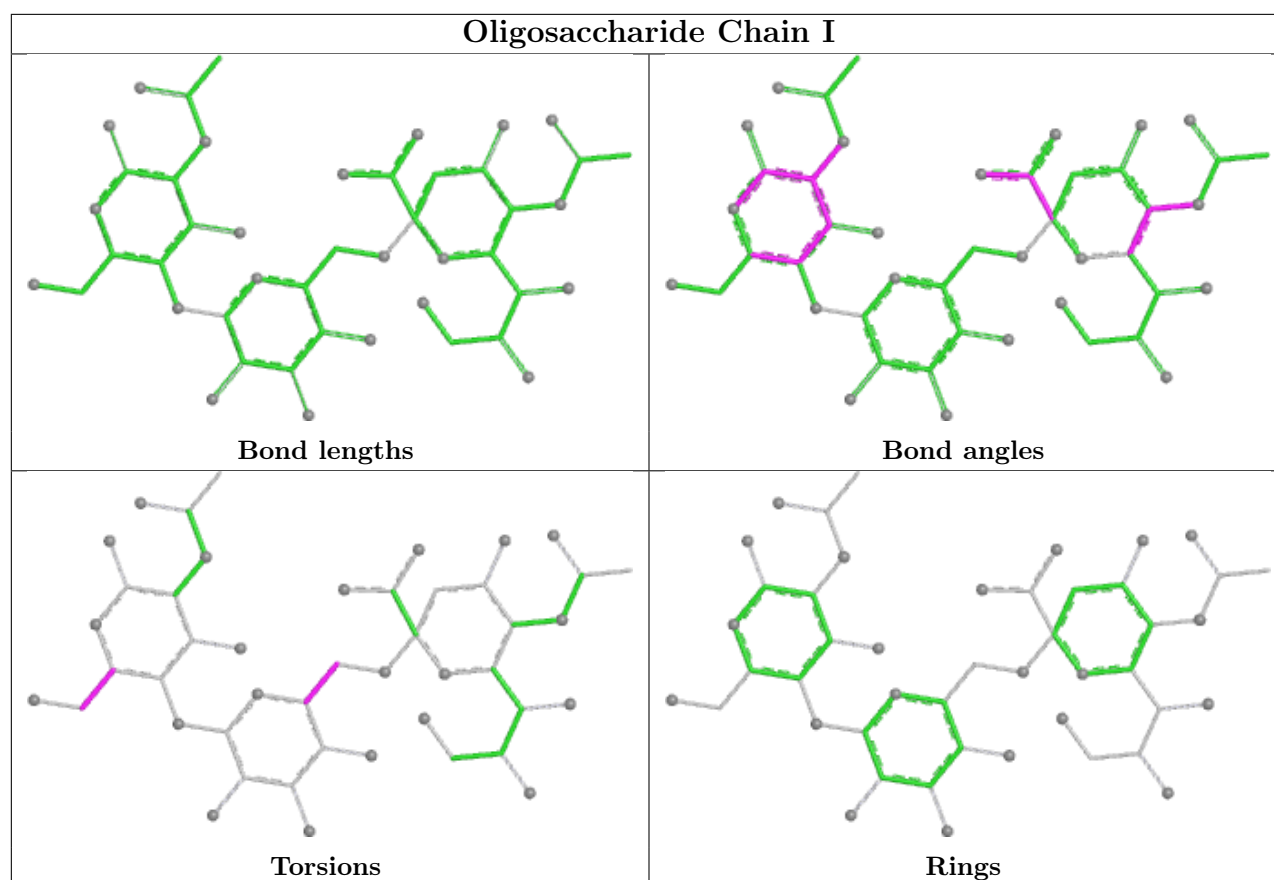
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for oligosaccharide.

Oligosaccharide Chain G



Oligosaccharide Chain H





5.6 Ligand geometry [i](#)

20 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	EDO	F	202	-	3,3,3	0.48	0	2,2,2	0.24	0
4	EDO	C	411	-	3,3,3	0.46	0	2,2,2	0.26	0
4	EDO	C	408	-	3,3,3	0.46	0	2,2,2	0.25	0
4	EDO	D	202	-	3,3,3	0.46	0	2,2,2	0.27	0
4	EDO	C	412	-	3,3,3	0.42	0	2,2,2	0.30	0
4	EDO	C	410	-	3,3,3	0.46	0	2,2,2	0.21	0
4	EDO	A	405	-	3,3,3	0.48	0	2,2,2	0.22	0
4	EDO	C	406	-	3,3,3	0.45	0	2,2,2	0.27	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
4	EDO	B	203	-	3,3,3	0.45	0	2,2,2	0.17	0
4	EDO	C	409	-	3,3,3	0.47	0	2,2,2	0.11	0
5	NAG	B	202	2	14,14,15	0.37	0	17,19,21	0.71	0
4	EDO	C	405	-	3,3,3	0.45	0	2,2,2	0.31	0
5	NAG	D	201	2	14,14,15	0.35	0	17,19,21	0.76	0
4	EDO	C	404	-	3,3,3	0.48	0	2,2,2	0.19	0
5	NAG	B	201	2	14,14,15	0.33	0	17,19,21	0.80	0
4	EDO	E	404	-	3,3,3	0.46	0	2,2,2	0.26	0
4	EDO	C	407	-	3,3,3	0.46	0	2,2,2	0.24	0
4	EDO	F	203	-	3,3,3	0.45	0	2,2,2	0.28	0
4	EDO	F	201	-	3,3,3	0.43	0	2,2,2	0.30	0
4	EDO	A	404	-	3,3,3	0.44	0	2,2,2	0.30	0

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
4	EDO	F	202	-	-	0/1/1/1	-
4	EDO	C	411	-	-	1/1/1/1	-
4	EDO	C	408	-	-	1/1/1/1	-
4	EDO	D	202	-	-	1/1/1/1	-
4	EDO	C	412	-	-	0/1/1/1	-
4	EDO	C	410	-	-	0/1/1/1	-
4	EDO	A	405	-	-	0/1/1/1	-
4	EDO	C	406	-	-	0/1/1/1	-
4	EDO	B	203	-	-	1/1/1/1	-
4	EDO	C	409	-	-	1/1/1/1	-
5	NAG	B	202	2	-	0/6/23/26	0/1/1/1
4	EDO	C	405	-	-	0/1/1/1	-
5	NAG	D	201	2	-	0/6/23/26	0/1/1/1
4	EDO	C	404	-	-	1/1/1/1	-
5	NAG	B	201	2	-	0/6/23/26	0/1/1/1
4	EDO	E	404	-	-	0/1/1/1	-
4	EDO	C	407	-	-	1/1/1/1	-
4	EDO	F	203	-	-	1/1/1/1	-
4	EDO	F	201	-	-	1/1/1/1	-
4	EDO	A	404	-	-	0/1/1/1	-

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (9) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	C	404	EDO	O1-C1-C2-O2
4	D	202	EDO	O1-C1-C2-O2
4	F	201	EDO	O1-C1-C2-O2
4	B	203	EDO	O1-C1-C2-O2
4	C	407	EDO	O1-C1-C2-O2
4	C	408	EDO	O1-C1-C2-O2
4	F	203	EDO	O1-C1-C2-O2
4	C	409	EDO	O1-C1-C2-O2
4	C	411	EDO	O1-C1-C2-O2

There are no ring outliers.

No monomer is involved in short contacts.

5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

6 Fit of model and data

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, 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	320/325 (98%)	0.61	20 (6%)	26	29	16, 29, 43, 61	1 (0%)
1	C	320/325 (98%)	0.52	18 (5%)	30	34	20, 28, 41, 58	0
1	E	322/325 (99%)	0.66	17 (5%)	32	36	21, 31, 46, 57	0
2	B	175/177 (98%)	0.63	19 (10%)	10	11	19, 26, 51, 80	0
2	D	175/177 (98%)	0.87	18 (10%)	12	12	21, 31, 51, 76	0
2	F	172/177 (97%)	0.74	20 (11%)	9	10	20, 29, 52, 79	0
All	All	1484/1506 (98%)	0.65	112 (7%)	20	23	16, 29, 46, 80	1 (0%)

All (112) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	B	73	ILE	6.4
2	D	73	ILE	6.2
2	F	73	ILE	6.0
2	F	72	GLU	5.3
2	D	173	ILE	4.9
1	C	134	GLY	4.7
2	F	70	PHE	4.4
2	B	74	ASP	4.4
2	B	76	GLN	4.3
2	D	77	ILE	4.2
2	B	175	PRO	4.1
2	D	70	PHE	4.1
2	D	175	PRO	4.0
2	F	66	ILE	3.8
1	E	0	PRO	3.7
2	F	74	ASP	3.7
2	F	60	ASN	3.6
1	C	133	ASN	3.5
2	D	75	HIS	3.5

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Mol	Chain	Res	Type	RSRZ
2	B	70	PHE	3.5
2	D	74	ASP	3.4
1	C	210	VAL	3.4
2	F	57	LYS	3.4
2	D	71	SER	3.4
2	F	77	ILE	3.4
2	D	60	ASN	3.3
1	A	11	ALA	3.2
1	A	282	ASN	3.2
2	F	144	CYS	3.2
2	B	60	ASN	3.2
2	B	68	SER	3.2
1	A	212	ALA	3.2
2	F	75	HIS	3.2
2	D	76	GLN	3.1
2	B	77	ILE	3.1
2	B	75	HIS	3.1
2	F	30	GLN	3.1
1	E	320	VAL	3.0
1	A	298	CYS	3.0
1	E	38	LEU	2.9
2	D	59	THR	2.9
1	C	298	CYS	2.9
1	E	11	ALA	2.8
2	F	148	CYS	2.8
1	A	270	CYS	2.8
2	D	72	GLU	2.8
1	E	130	CYS	2.8
2	F	59	THR	2.8
2	D	154	ASN	2.7
2	D	148	CYS	2.7
2	F	76	GLN	2.7
1	A	38	LEU	2.7
1	E	298	CYS	2.7
2	B	155	ASN	2.7
2	B	72	GLU	2.6
1	C	282	ASN	2.6
1	E	282	ASN	2.6
1	C	-1	ASP	2.6
1	E	4	CYS	2.6
1	A	267	ASP	2.5
1	C	270	CYS	2.5

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Mol	Chain	Res	Type	RSRZ
2	F	58	LYS	2.5
2	D	18	VAL	2.5
2	D	155	ASN	2.5
1	C	130	CYS	2.5
2	B	59	THR	2.5
1	A	268	ASN	2.5
1	E	39	ASN	2.5
1	A	36	THR	2.4
1	A	269	SER	2.4
1	E	203	LYS	2.4
1	A	130	CYS	2.4
2	B	174	ASN	2.4
1	C	192	SER	2.4
2	B	173	ILE	2.4
1	E	53	ASN	2.3
2	D	144	CYS	2.3
1	C	38	LEU	2.3
2	B	66	ILE	2.3
1	E	134	GLY	2.3
1	A	210	VAL	2.3
1	A	-1	ASP	2.3
1	C	82	ASN	2.3
1	E	271	GLU	2.2
2	F	67	GLU	2.2
1	C	87	CYS	2.2
1	E	270	CYS	2.2
1	A	39	ASN	2.2
2	F	154	ASN	2.2
1	C	249	ARG	2.2
1	C	12	ASN	2.2
1	C	217	ASN	2.2
1	C	205	SER	2.2
1	A	87	CYS	2.1
1	A	47	ASN	2.1
1	E	266	ILE	2.1
2	F	16	GLY	2.1
1	E	319	LEU	2.1
2	B	2	LEU	2.1
2	B	102	MET	2.1
2	F	69	GLU	2.1
2	D	32	THR	2.1
1	A	278	GLY	2.1

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Mol	Chain	Res	Type	RSRZ
2	F	18	VAL	2.1
1	A	281	ILE	2.1
1	E	296	GLY	2.0
1	A	205	SER	2.0
2	B	18	VAL	2.0
1	C	4	CYS	2.0
1	A	318	GLU	2.0
1	C	293	ARG	2.0
2	B	137	CYS	2.0

6.2 Non-standard residues in protein, DNA, RNA chains [i](#)

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

6.3 Carbohydrates [i](#)

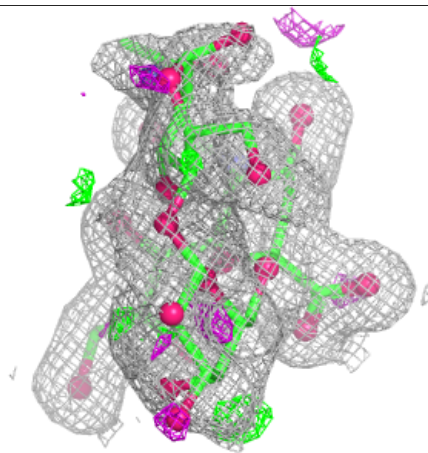
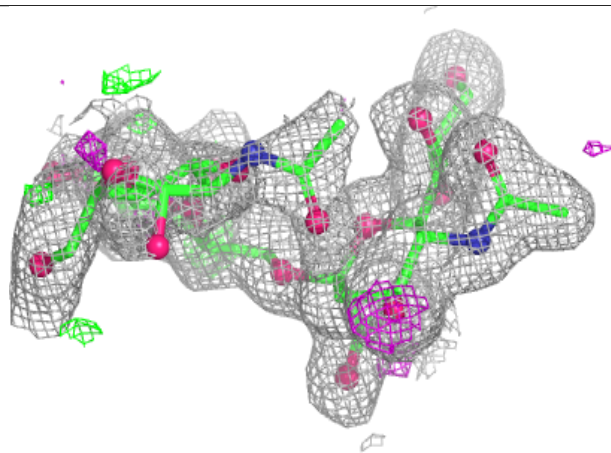
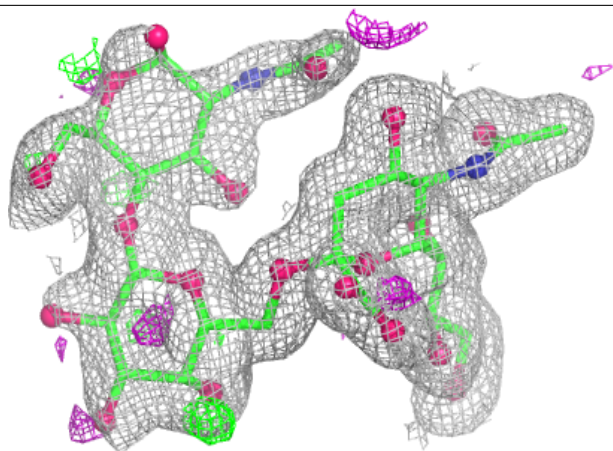
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
3	NAG	H	1	15/15	0.44	0.21	73,88,92,93	0
3	NAG	I	1	15/15	0.63	0.25	56,70,73,73	0
3	NAG	G	1	15/15	0.75	0.18	59,66,70,72	0
3	GAL	H	2	11/12	0.79	0.15	32,54,63,65	0
3	GAL	G	2	11/12	0.81	0.14	31,48,57,58	0
3	GAL	I	2	11/12	0.87	0.12	36,41,44,47	0
3	SIA	I	3	20/21	0.92	0.09	29,31,35,38	0
3	SIA	H	3	20/21	0.94	0.08	26,28,30,30	0
3	SIA	G	3	20/21	0.96	0.07	25,26,28,28	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.

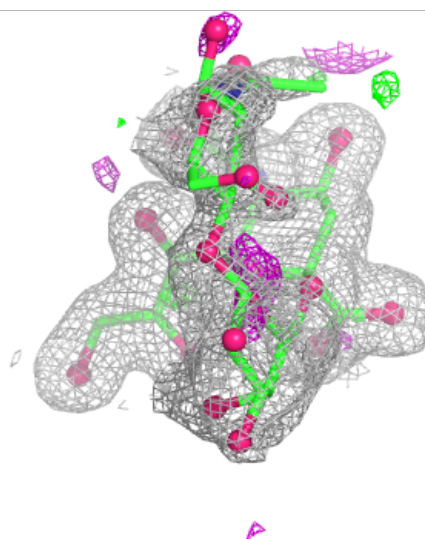
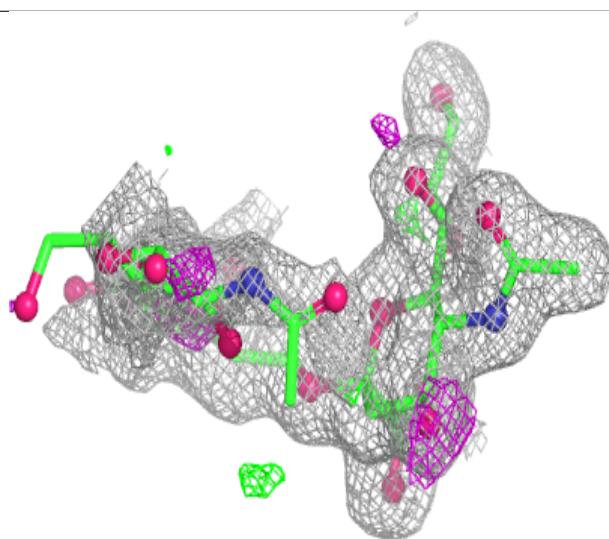
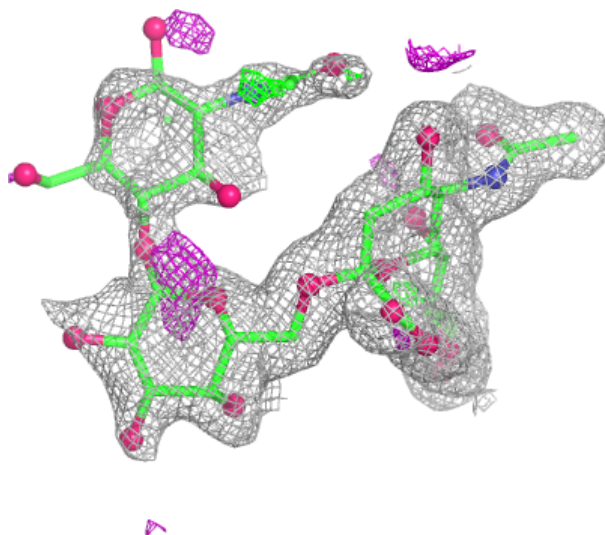
Electron density around Chain G:

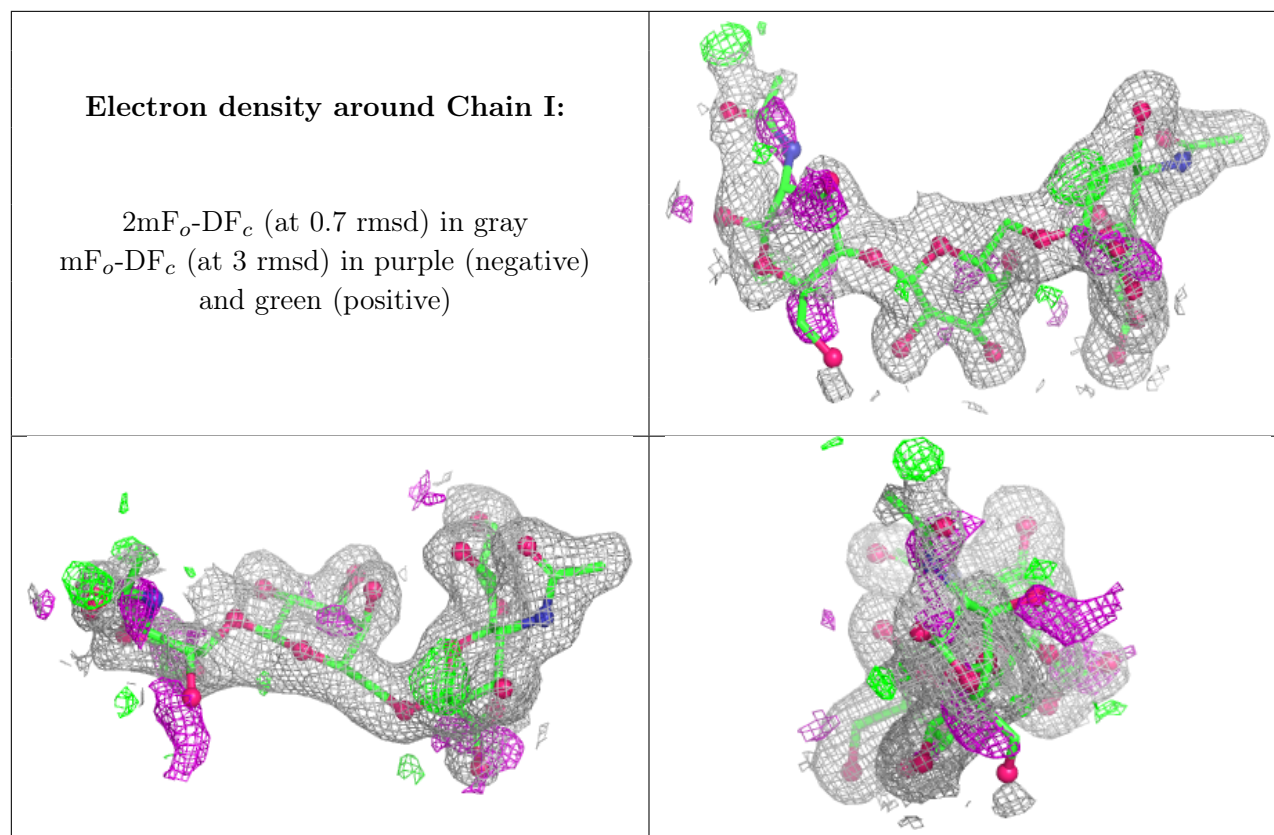
$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



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)





6.4 Ligands [i](#)

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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
4	EDO	A	404	4/4	0.63	0.25	50,51,51,53	0
4	EDO	B	203	4/4	0.63	0.24	38,40,42,44	0
5	NAG	B	201	14/15	0.63	0.18	54,60,66,68	0
5	NAG	D	201	14/15	0.63	0.16	55,60,64,66	0
4	EDO	C	405	4/4	0.64	0.23	52,53,54,57	0
5	NAG	B	202	14/15	0.66	0.18	46,54,59,61	0
4	EDO	A	405	4/4	0.70	0.23	49,52,54,54	0
4	EDO	F	201	4/4	0.74	0.19	50,50,50,51	0
4	EDO	F	202	4/4	0.75	0.20	53,54,54,54	0
4	EDO	F	203	4/4	0.77	0.21	61,61,61,63	0
4	EDO	D	202	4/4	0.78	0.23	57,58,58,59	0
4	EDO	C	410	4/4	0.79	0.17	45,46,46,48	0
4	EDO	C	406	4/4	0.83	0.15	55,56,57,57	0
4	EDO	C	412	4/4	0.83	0.19	44,46,47,49	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
4	EDO	C	408	4/4	0.83	0.17	48,50,51,52	0
4	EDO	C	407	4/4	0.85	0.16	53,53,55,58	0
4	EDO	E	404	4/4	0.86	0.14	41,45,46,47	0
4	EDO	C	411	4/4	0.87	0.14	29,37,37,39	0
4	EDO	C	409	4/4	0.88	0.14	39,40,40,42	0
4	EDO	C	404	4/4	0.89	0.15	53,53,54,55	0

6.5 Other polymers [i](#)

There are no such residues in this entry.