W O R L D W I D E
wwPDB
P R O T E I N   D A T A   B A N K

wwPDB X-ray Structure Validation Summary Report ⓘ

Aug 10, 2020 – 08:54 AM BST

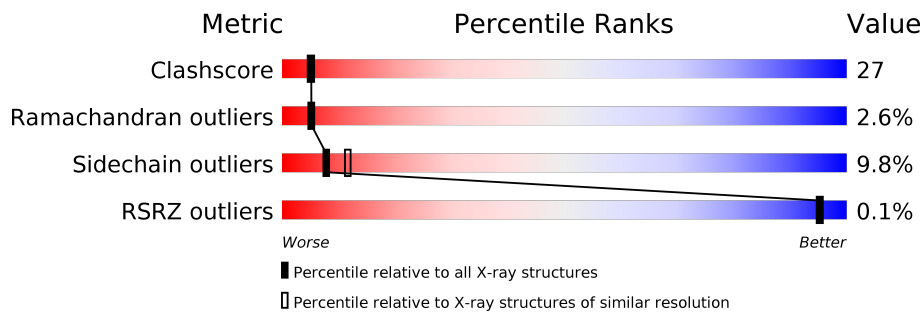|		
PDB ID	:	1IVC
Title	:	STRUCTURES OF AROMATIC INHIBITORS OF INFLUENZA VIRUS NEURAMINIDASE
Authors	:	Jedrzejas, M.J.; Luo, M.
Deposited on	:	1994-12-12
Resolution	:	2.40 Å(reported)

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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 2.40 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	Percentile Ranks	Value
Clashscore		27
Ramachandran outliers		2.6%
Sidechain outliers		9.8%
RSRZ outliers		0.1%

Worse   *Better*

▮ Percentile relative to all X-ray structures

▯ Percentile relative to X-ray structures of similar resolution

Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
Clashscore	141614	4398 (2.40-2.40)
Ramachandran outliers	138981	4318 (2.40-2.40)
Sidechain outliers	138945	4319 (2.40-2.40)
RSRZ outliers	127900	3811 (2.40-2.40)

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 on 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	388	56% 38% 6% •
1	B	388	55% 38% 6% •
2	C	2	50% 50%
2	F	2	100%
2	G	2	50% 50%
2	J	2	100%
3	D	4	25% 75%

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Mol	Chain	Length	Quality of chain
4	E	6	17% 83%
4	I	6	17% 83%
5	H	4	50% 50%

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
2	NAG	C	2	-	-	-	X
3	BMA	D	3	-	-	-	X
3	FUL	D	4	-	-	X	X
4	NAG	E	1	-	-	X	-
4	NAG	E	2	-	-	-	X
4	BMA	E	3	-	X	-	X
4	MAN	E	4	-	-	X	X
4	MAN	E	5	-	-	-	X
4	MAN	E	6	-	-	X	X
4	NAG	I	2	-	-	-	X
4	BMA	I	3	-	X	-	X
4	MAN	I	4	-	-	-	X
4	MAN	I	5	-	-	-	X
4	MAN	I	6	-	-	X	X
5	BMA	H	3	-	-	-	X
5	FUC	H	4	X	-	-	X

2 Entry composition (i)

There are 7 unique types of molecules in this entry. The entry contains 8220 atoms, of which 1790 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 INFLUENZA A SUBTYPE N2 NEURAMINIDASE.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
1	A	388	Total 3745	C 1866	H 723	N 545	O 588	S 23	0	0	0
1	B	388	Total 3745	C 1866	H 723	N 545	O 588	S 23	0	0	0

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	339	ASP	ASN	conflict	UNP P06820
B	339	ASP	ASN	conflict	UNP P06820

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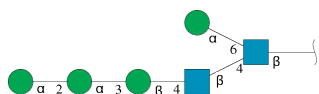

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	C	2	Total 55	C 16	H 27	N 2	O 10	0	0	0
2	F	2	Total 55	C 16	H 27	N 2	O 10	0	0	0
2	G	2	Total 55	C 16	H 27	N 2	O 10	0	0	0
2	J	2	Total 55	C 16	H 27	N 2	O 10	0	0	0

- Molecule 3 is an oligosaccharide called beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-[beta-L-fucopyranose-(1-6)]2-acetamido-2-deoxy-beta-D-glucopyranose.
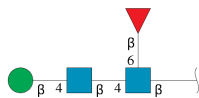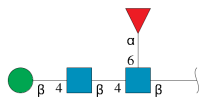
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	D	4	Total 96	C 28	H 47	N 2	O 19	0	0	0

- Molecule 4 is an oligosaccharide called alpha-D-mannopyranose-(1-2)-alpha-D-mannopyran ose-(1-3)-beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-[al pha-D-mannopyranose-(1-6)]2-acetamido-2-deoxy-beta-D-glucopyranose.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
4	E	6	Total 139	C 40	H 67	N 2	O 30	0	0	0
4	I	6	Total 139	C 40	H 67	N 2	O 30	0	0	0

- Molecule 5 is an oligosaccharide called beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-b eta-D-glucopyranose-(1-4)-[alpha-L-fucopyranose-(1-6)]2-acetamido-2-deoxy-beta-D-glucopy ranose.
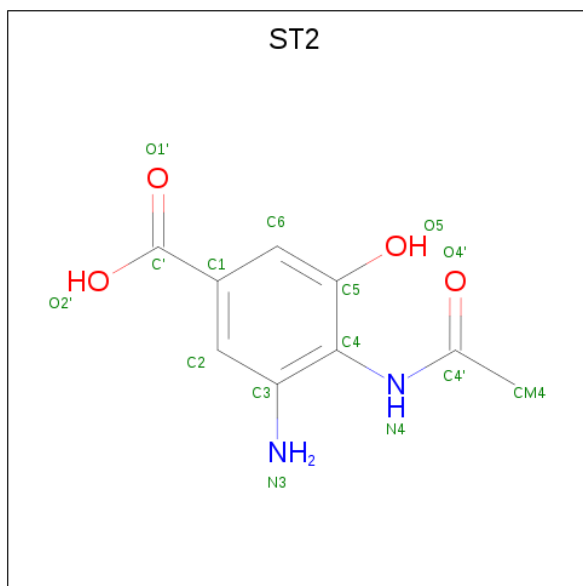
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
5	H	4	Total 96	C 28	H 47	N 2	O 19	0	0	0

- Molecule 6 is CALCIUM ION (three-letter code: CA) (formula: Ca).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	B	1	Total 1	Ca 1	0	0
6	A	1	Total 1	Ca 1	0	0

- Molecule 7 is 4-(ACETYLAMINO)-5-AMINO-3-HYDROXYBENZOIC ACID (three-letter

code: ST2) (formula: $C_9H_{10}N_2O_4$).

| Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
7	A	1	Total	C	H	N	O	0	0
			19	9	4	2	4		
7	B	1	Total	C	H	N	O	0	0
			19	9	4	2	4		

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: INFLUENZA A SUBTYPE N2 NEURAMINIDASE
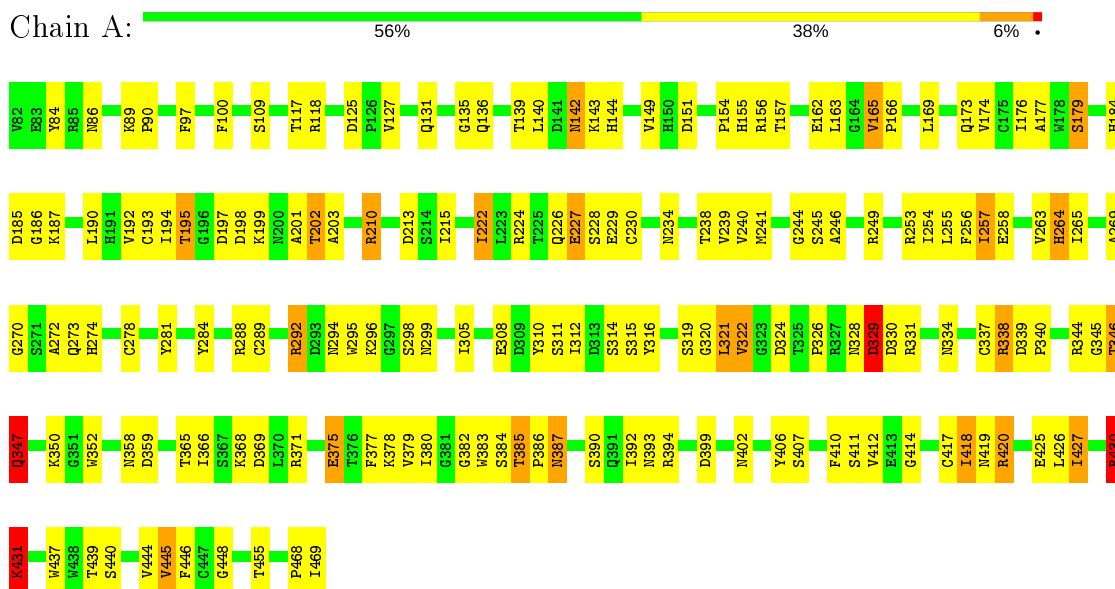
Chain A:

- Molecule 1: INFLUENZA A SUBTYPE N2 NEURAMINIDASE
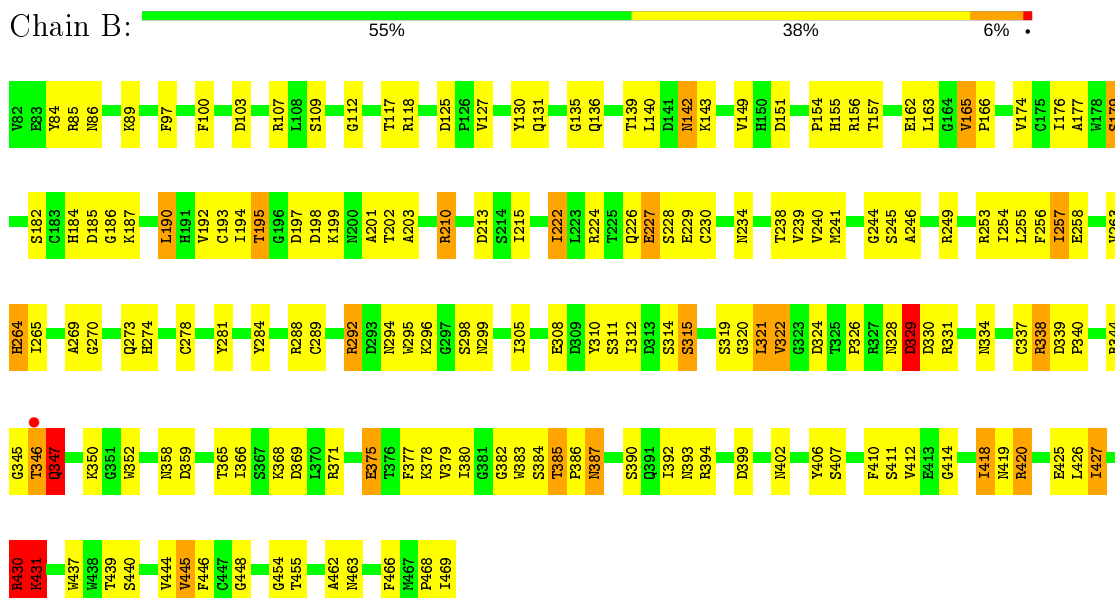
Chain B:

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

Chain C:

50%　　　　　　　　　　　50%

NAG1 NAG2

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

Chain F:

100%

NAG1 NAG2

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

Chain G:

50%　　　　　　　　　　　50%

NAG1 NAG2

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

Chain J:

100%

NAG1 NAG2

• Molecule 3: beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-[beta-L-fucopyranose-(1-6)]2-acetamido-2-deoxy-beta-D-glucopyranose

Chain D:

25%　　　　　　　　　75%

NAG1 NAG2 BMA3 FUL4

• Molecule 4: alpha-D-mannopyranose-(1-2)-alpha-D-mannopyranose-(1-3)-beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-[alpha-D-mannopyranose-(1-6)]2-acetamido-2-deoxy-beta-D-glucopyranose

Chain E:

17%　　　　　　　　　83%

NAG1 NAG2 BMA3 MAN4 MAN5 MAN6

• Molecule 4: alpha-D-mannopyranose-(1-2)-alpha-D-mannopyranose-(1-3)-beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-[alpha-D-mannopyranose-(1-6)]2-acetamido-2-deoxy-beta-D-glucopyranose

Chain I: 17%   83%

NAG1 NAG2 BMA3 MAN4 MAN5 MAN6

• Molecule 5: beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-[alpha-L-fucopyranose-(1-6)]2-acetamido-2-deoxy-beta-D-glucopyranose

Chain H: 50%   50%

NAG1 NAG2 BMA3 FUC4

4 Data and refinement statistics (i)

Property	Value	Source
Space group	C 2 2 21	Depositor
Cell constants a, b, c, α, β, γ	120.35Å 139.72Å 140.23Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	6.50 – 2.40 25.94 – 2.40	Depositor EDS
% Data completeness (in resolution range)	(Not available) (6.50-2.40) 61.4 (25.94-2.40)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$<I/\sigma(I)>$ [1]	2.26 (at 2.39Å)	Xtriage
Refinement program	X-PLOR	Depositor
R, R_{free}	0.204 , (Not available) 0.213 , (Not available)	Depositor DCC
R_{free} test set	No test flags present.	wwPDB-VP
Wilson B-factor (Å^2)	22.4	Xtriage
Anisotropy	1.090	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.38 , 57.2	EDS
L-test for twinning [2]	$<|L|>=0.45, <L^2>=0.27$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.88	EDS
Total number of atoms	8220	wwPDB-VP
Average B, all atoms (Å^2)	14.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.82% of the height of the origin peak. No significant pseudotranslation is detected.*

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[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: BMA, NAG, CA, FUC, ST2, FUL, MAN

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	0.65	0/3092	0.91	3/4194 (0.1%)
1	B	0.65	0/3092	0.91	3/4194 (0.1%)
All	All	0.65	0/6184	0.91	6/8388 (0.1%)

There are no bond length outliers.

The worst 5 of 6 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	430	ARG	N-CA-C	5.66	126.28	111.00
1	B	430	ARG	N-CA-C	5.66	126.28	111.00
1	A	321	LEU	CA-CB-CG	-5.48	102.69	115.30
1	B	321	LEU	CA-CB-CG	-5.48	102.69	115.30
1	A	345	GLY	N-CA-C	5.15	125.97	113.10

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	A	3022	723	2852	143	3
1	B	3022	723	2852	159	1
2	C	28	27	25	3	0
2	F	28	27	25	3	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	G	28	27	25	3	0
2	J	28	27	25	3	0
3	D	49	47	43	1	9
4	E	72	67	61	28	9
4	I	72	67	61	15	2
5	H	49	47	43	1	0
6	A	1	0	0	0	0
6	B	1	0	0	0	0
7	A	15	4	9	3	0
7	B	15	4	9	3	0
All	All	6430	1790	6030	334	12

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 27.

The worst 5 of 334 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)
4:I:6:MAN:C5	4:I:6:MAN:C4	1.76	1.61
4:E:6:MAN:C4	4:E:6:MAN:C5	1.76	1.56
1:B:455:THR:CG2	4:E:1:NAG:H61	1.60	1.32
1:B:455:THR:HG21	4:E:1:NAG:C6	1.59	1.31
1:B:455:THR:CG2	4:E:6:MAN:H2	1.82	1.10

The worst 5 of 12 symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:D:4:FUL:H4	4:E:4:MAN:H1[3_654]	0.90	0.70
3:D:4:FUL:H1	4:E:4:MAN:O3[3_654]	0.96	0.64
3:D:4:FUL:H5	4:E:4:MAN:O5[3_654]	1.26	0.34
1:A:455:THR:HG1	4:I:1:NAG:H1[4_555]	1.31	0.29
3:D:4:FUL:C1	4:E:4:MAN:O3[3_654]	1.93	0.27

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	386/388 (100%)	338 (88%)	38 (10%)	10 (3%)	5	5
1	B	386/388 (100%)	338 (88%)	38 (10%)	10 (3%)	5	5
All	All	772/776 (100%)	676 (88%)	76 (10%)	20 (3%)	5	5

5 of 20 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	329	ASP
1	A	330	ASP
1	A	346	THR
1	A	347	GLN
1	B	329	ASP

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	338/338 (100%)	305 (90%)	33 (10%)	8	11
1	B	338/338 (100%)	305 (90%)	33 (10%)	8	11
All	All	676/676 (100%)	610 (90%)	66 (10%)	8	11

5 of 66 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	427	ILE

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Mol	Chain	Res	Type
1	B	179	SER
1	B	418	ILE
1	A	430	ARG
1	B	142	ASN

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 23 such sidechains are listed below:

Mol	Chain	Res	Type
1	A	402	ASN
1	B	104	ASN
1	B	402	ASN
1	A	419	ASN
1	B	131	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)

28 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	C	1	1,2	14,14,15	2.11	6 (42%)	17,19,21	2.91	5 (29%)
2	NAG	C	2	2	14,14,15	3.49	6 (42%)	17,19,21	3.17	8 (47%)
3	NAG	D	1	1,3	14,14,15	1.73	3 (21%)	17,19,21	2.88	7 (41%)
3	NAG	D	2	3	14,14,15	2.53	7 (50%)	17,19,21	3.90	9 (52%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	#|Z| > 2	Counts	RMSZ	#|Z| > 2
3	BMA	D	3	3	11,11,12	3.48	6 (54%)	15,15,17	2.86	5 (33%)
3	FUL	D	4	3	10,10,11	3.17	6 (60%)	14,14,16	2.68	6 (42%)
4	NAG	E	1	1,4	14,14,15	3.56	7 (50%)	17,19,21	3.37	12 (70%)
4	NAG	E	2	4	14,14,15	3.25	4 (28%)	17,19,21	2.50	6 (35%)
4	BMA	E	3	4	11,11,12	4.87	8 (72%)	15,15,17	3.15	8 (53%)
4	MAN	E	4	4	11,11,12	2.75	6 (54%)	15,15,17	2.72	8 (53%)
4	MAN	E	5	4	11,11,12	3.93	8 (72%)	15,15,17	1.74	4 (26%)
4	MAN	E	6	4	11,11,12	4.98	9 (81%)	15,15,17	2.73	8 (53%)
2	NAG	F	1	1,2	14,14,15	3.25	6 (42%)	17,19,21	3.42	10 (58%)
2	NAG	F	2	2	14,14,15	1.79	4 (28%)	17,19,21	3.84	11 (64%)
2	NAG	G	1	1,2	14,14,15	2.11	6 (42%)	17,19,21	2.91	5 (29%)
2	NAG	G	2	2	14,14,15	3.49	6 (42%)	17,19,21	3.17	8 (47%)
5	NAG	H	1	1,5	14,14,15	1.73	3 (21%)	17,19,21	2.88	7 (41%)
5	NAG	H	2	5	14,14,15	2.53	7 (50%)	17,19,21	3.90	9 (52%)
5	BMA	H	3	5	11,11,12	3.48	6 (54%)	15,15,17	2.86	5 (33%)
5	FUC	H	4	5	10,10,11	3.17	6 (60%)	14,14,16	2.68	6 (42%)
4	NAG	I	1	1,4	14,14,15	3.56	7 (50%)	17,19,21	3.37	12 (70%)
4	NAG	I	2	4	14,14,15	3.25	4 (28%)	17,19,21	2.50	6 (35%)
4	BMA	I	3	4	11,11,12	4.87	8 (72%)	15,15,17	3.15	8 (53%)
4	MAN	I	4	4	11,11,12	2.75	6 (54%)	15,15,17	2.72	8 (53%)
4	MAN	I	5	4	11,11,12	3.93	8 (72%)	15,15,17	1.74	4 (26%)
4	MAN	I	6	4	11,11,12	4.98	9 (81%)	15,15,17	2.73	8 (53%)
2	NAG	J	1	1,2	14,14,15	3.25	6 (42%)	17,19,21	3.42	10 (58%)
2	NAG	J	2	2	14,14,15	1.79	4 (28%)	17,19,21	3.84	11 (64%)

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	C	1	1,2	-	0/6/23/26	0/1/1/1
2	NAG	C	2	2	-	2/6/23/26	0/1/1/1
3	NAG	D	1	1,3	-	1/6/23/26	0/1/1/1
3	NAG	D	2	3	-	1/6/23/26	0/1/1/1
3	BMA	D	3	3	-	2/2/19/22	0/1/1/1
3	FUL	D	4	3	-	-	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	NAG	E	1	1,4	-	3/6/23/26	0/1/1/1
4	NAG	E	2	4	-	0/6/23/26	0/1/1/1
4	BMA	E	3	4	-	2/2/19/22	1/1/1/1
4	MAN	E	4	4	-	0/2/19/22	0/1/1/1
4	MAN	E	5	4	-	2/2/19/22	1/1/1/1
4	MAN	E	6	4	-	0/2/19/22	0/1/1/1
2	NAG	F	1	1,2	-	3/6/23/26	0/1/1/1
2	NAG	F	2	2	-	2/6/23/26	0/1/1/1
2	NAG	G	1	1,2	-	0/6/23/26	0/1/1/1
2	NAG	G	2	2	-	2/6/23/26	0/1/1/1
5	NAG	H	1	1,5	-	1/6/23/26	0/1/1/1
5	NAG	H	2	5	-	1/6/23/26	0/1/1/1
5	BMA	H	3	5	-	2/2/19/22	0/1/1/1
5	FUC	H	4	5	1/1/5/5	-	0/1/1/1
4	NAG	I	1	1,4	-	3/6/23/26	0/1/1/1
4	NAG	I	2	4	-	0/6/23/26	0/1/1/1
4	BMA	I	3	4	-	2/2/19/22	1/1/1/1
4	MAN	I	4	4	-	0/2/19/22	0/1/1/1
4	MAN	I	5	4	-	2/2/19/22	1/1/1/1
4	MAN	I	6	4	-	0/2/19/22	0/1/1/1
2	NAG	J	1	1,2	-	3/6/23/26	0/1/1/1
2	NAG	J	2	2	-	2/6/23/26	0/1/1/1

The worst 5 of 172 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	I	6	MAN	C4-C5	11.12	1.76	1.53
4	E	6	MAN	C4-C5	11.12	1.76	1.53
4	E	3	BMA	C2-C3	9.89	1.67	1.52
4	I	3	BMA	C2-C3	9.89	1.67	1.52
4	E	2	NAG	C1-C2	9.43	1.66	1.52

The worst 5 of 214 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	H	1	NAG	C1-O5-C5	8.99	124.37	112.19
3	D	1	NAG	C1-O5-C5	8.99	124.37	112.19
5	H	2	NAG	C8-C7-N2	8.94	131.23	116.10
3	D	2	NAG	C8-C7-N2	8.94	131.23	116.10

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	H	3	BMA	C1-O5-C5	8.70	123.98	112.19

All (1) chirality outliers are listed below:

Mol	Chain	Res	Type	Atom
5	H	4	FUC	C1

5 of 36 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
5	H	1	NAG	C3-C2-N2-C7
2	J	2	NAG	C1-C2-N2-C7
2	F	2	NAG	C1-C2-N2-C7
3	D	1	NAG	C3-C2-N2-C7
5	H	3	BMA	O5-C5-C6-O6

All (4) ring outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	E	5	MAN	C1-C2-C3-C4-C5-O5
4	I	5	MAN	C1-C2-C3-C4-C5-O5
4	E	3	BMA	C1-C2-C3-C4-C5-O5
4	I	3	BMA	C1-C2-C3-C4-C5-O5

21 monomers are involved in 68 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	H	2	NAG	1	0
2	J	2	NAG	1	0
4	I	4	MAN	3	0
2	F	1	NAG	3	0
2	G	2	NAG	3	0
3	D	4	FUL	0	9
4	E	2	NAG	5	0
4	E	4	MAN	3	9
4	I	6	MAN	9	0
3	D	2	NAG	1	0
5	H	3	BMA	1	0
2	F	2	NAG	1	0
4	I	1	NAG	3	2
4	E	6	MAN	14	0
2	C	2	NAG	3	0

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Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	D	3	BMA	1	0
4	E	3	BMA	5	0
4	I	2	NAG	6	0
4	I	3	BMA	5	0
2	J	1	NAG	3	0
4	E	1	NAG	11	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.
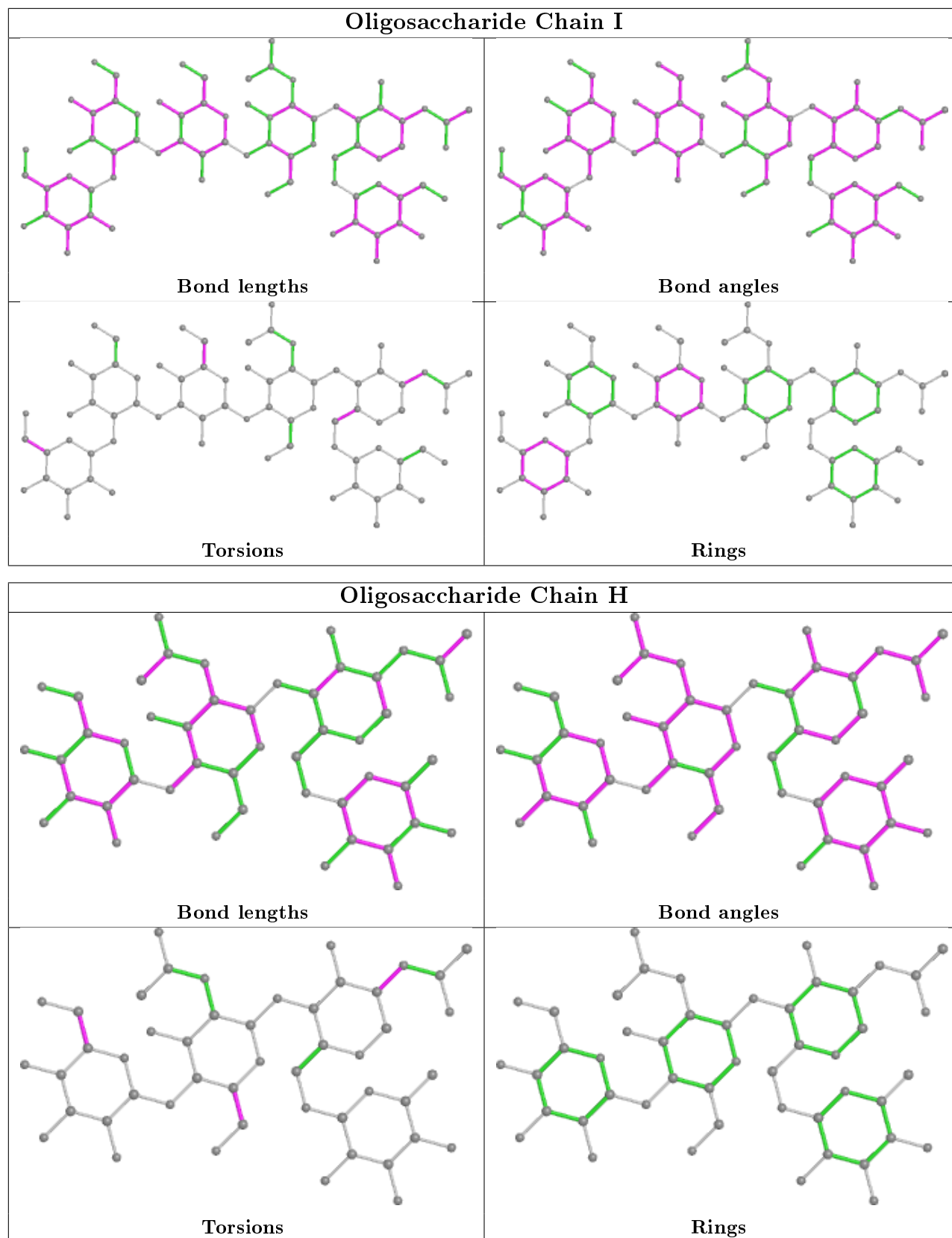

Oligosaccharide Chain C

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain F

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain G

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain J

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain D

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain E

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain I

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain H

Bond lengths

Bond angles

Torsions

Rings

5.6 Ligand geometry (i)

Of 4 ligands modelled in this entry, 2 are monoatomic - leaving 2 for Mogul analysis.

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	#$|Z| > 2$
7	ST2	A	471	-	13,15,15	2.14	3 (23%)	15,21,21	2.03	3 (20%)
7	ST2	B	471	-	13,15,15	2.14	3 (23%)	15,21,21	2.03	3 (20%)

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
7	ST2	A	471	-	-	2/4/8/8	0/1/1/1
7	ST2	B	471	-	-	2/4/8/8	0/1/1/1

The worst 5 of 6 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
7	A	471	ST2	C1-C'	-6.22	1.41	1.47
7	B	471	ST2	C1-C'	-6.22	1.41	1.47
7	A	471	ST2	C3-C4	2.89	1.43	1.40
7	B	471	ST2	C3-C4	2.89	1.43	1.40
7	A	471	ST2	C6-C5	2.08	1.41	1.38

The worst 5 of 6 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
7	A	471	ST2	C4-N4-C4'	-6.22	112.28	122.79
7	B	471	ST2	C4-N4-C4'	-6.22	112.28	122.79
7	A	471	ST2	CM4-C4'-N4	3.56	120.20	114.98
7	B	471	ST2	CM4-C4'-N4	3.56	120.20	114.98
7	A	471	ST2	O4'-C4'-CM4	-2.04	118.26	122.06

There are no chirality outliers.

All (4) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
7	A	471	ST2	O4'-C4'-N4-C4
7	A	471	ST2	CM4-C4'-N4-C4
7	B	471	ST2	O4'-C4'-N4-C4
7	B	471	ST2	CM4-C4'-N4-C4

There are no ring outliers.

2 monomers are involved in 6 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
7	A	471	ST2	3	0
7	B	471	ST2	3	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 (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	388/388 (100%)	-0.50	0	100	100	4, 13, 23, 31	0
1	B	388/388 (100%)	-0.49	1 (0%)	94	93	4, 13, 23, 31	0
All	All	776/776 (100%)	-0.49	1 (0%)	95	95	4, 13, 23, 31	0

All (1) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	346	THR	2.5

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
4	MAN	I	6	11/12	0.46	0.66	15,15,36,41	0
4	MAN	E	6	11/12	0.53	0.62	15,15,36,41	0
3	FUL	D	4	10/11	0.55	0.51	15,15,33,36	0
3	BMA	D	3	11/12	0.56	0.55	15,15,38,39	0
4	MAN	E	4	11/12	0.57	0.49	15,15,34,35	0
4	MAN	I	4	11/12	0.61	0.46	15,15,34,35	0
4	MAN	I	5	11/12	0.62	0.54	15,15,38,40	0
4	NAG	I	1	14/15	0.63	0.29	15,18,31,33	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
4	NAG	E	1	14/15	0.63	0.28	15,18,31,33	0
4	BMA	I	3	11/12	0.64	0.64	15,15,35,36	0
5	BMA	H	3	11/12	0.66	0.45	15,15,38,39	0
4	MAN	E	5	11/12	0.67	0.60	15,15,38,40	0
4	NAG	E	2	14/15	0.68	0.63	15,15,38,38	0
4	NAG	I	2	14/15	0.69	0.64	15,15,38,38	0
2	NAG	C	2	14/15	0.69	0.41	15,15,35,37	0
4	BMA	E	3	11/12	0.73	0.48	15,15,35,36	0
5	NAG	H	2	14/15	0.77	0.37	15,15,34,36	0
3	NAG	D	2	14/15	0.77	0.29	15,15,34,36	0
5	FUC	H	4	10/11	0.78	0.47	15,15,33,36	0
2	NAG	J	1	14/15	0.81	0.22	15,15,35,36	0
2	NAG	G	2	14/15	0.82	0.42	15,15,35,37	0
2	NAG	F	2	14/15	0.84	0.36	15,15,37,37	0
2	NAG	C	1	14/15	0.86	0.32	15,15,31,31	0
5	NAG	H	1	14/15	0.86	0.18	15,20,27,31	0
2	NAG	J	2	14/15	0.87	0.42	15,15,37,37	0
2	NAG	G	1	14/15	0.88	0.25	15,15,31,31	0
2	NAG	F	1	14/15	0.89	0.26	15,15,35,36	0
3	NAG	D	1	14/15	0.94	0.11	15,20,27,31	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 C:

$2mF_o\text{-}DF_c$ (at 0.7 rmsd) in gray
$mF_o\text{-}DF_c$ (at 3 rmsd) in purple (negative)
and green (positive)
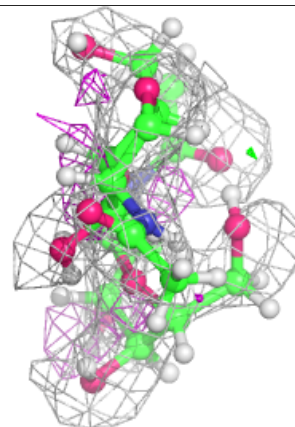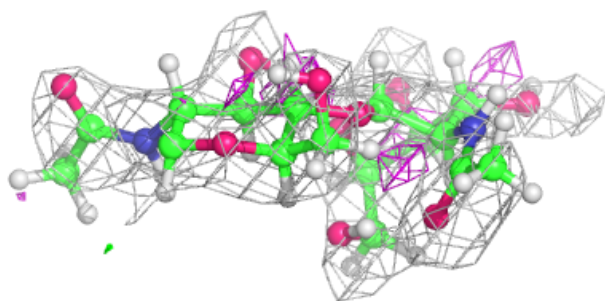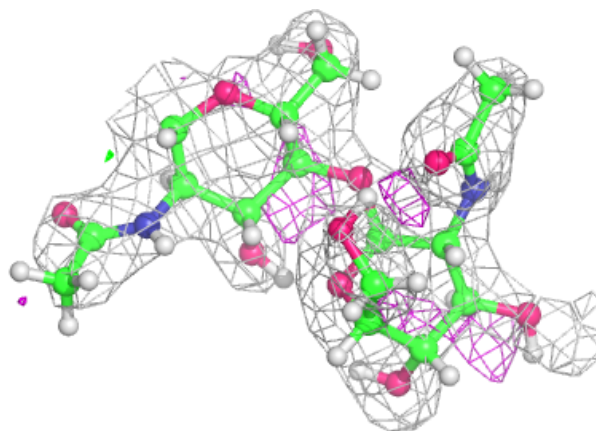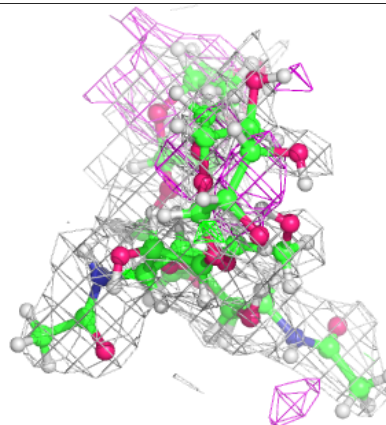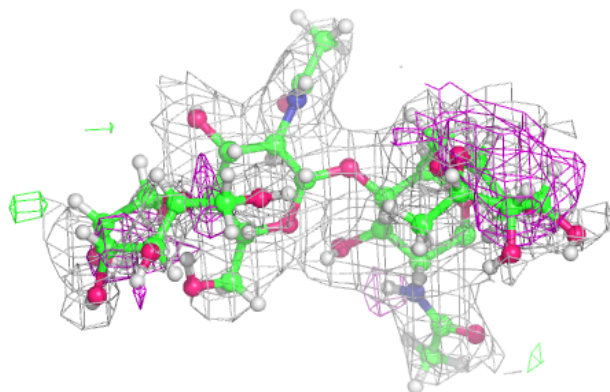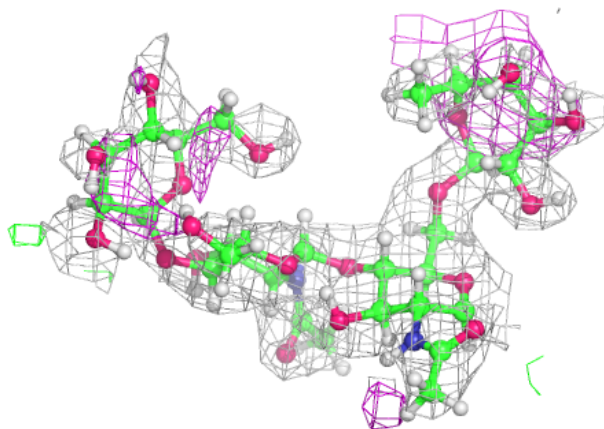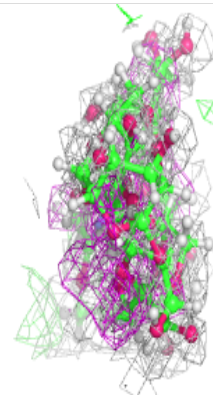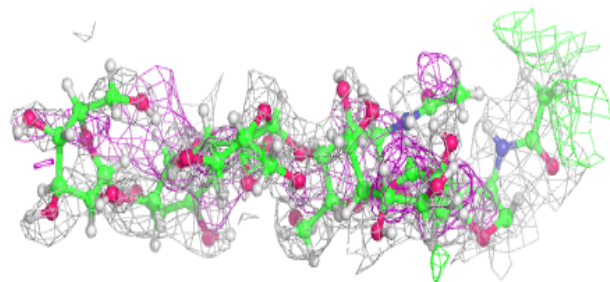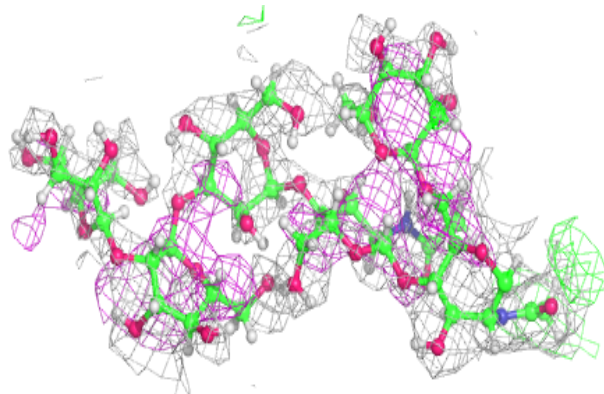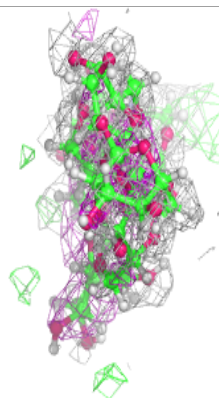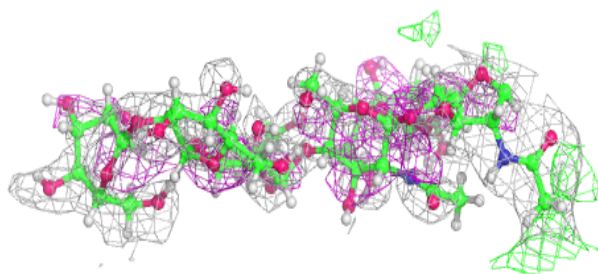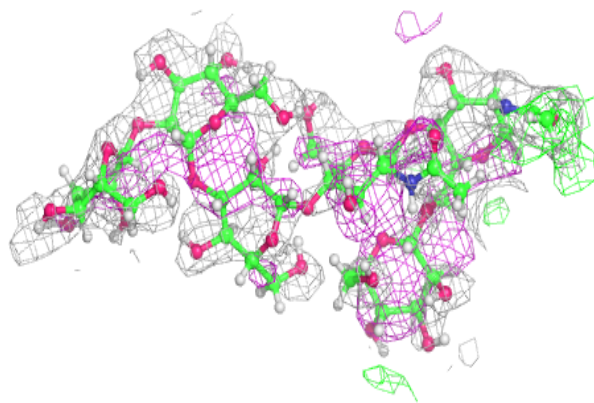
Electron density around Chain F:

$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)
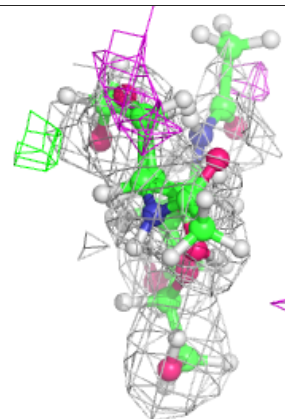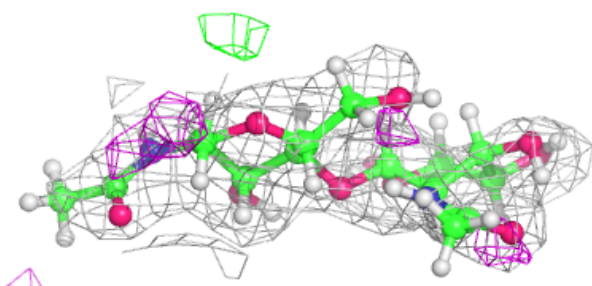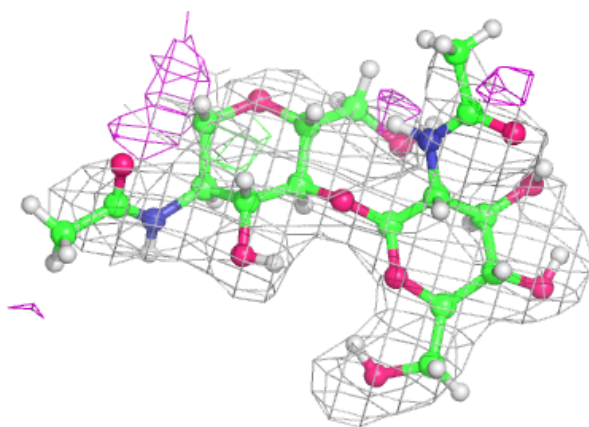
Electron density around Chain G:

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

Electron density around Chain J:

2mF$_o$-DF$_c$ (at 0.7 rmsd) in gray
mF$_o$-DF$_c$ (at 3 rmsd) in purple (negative)
and green (positive)
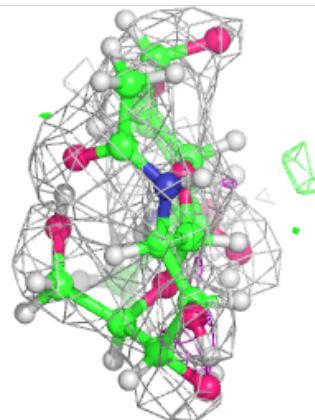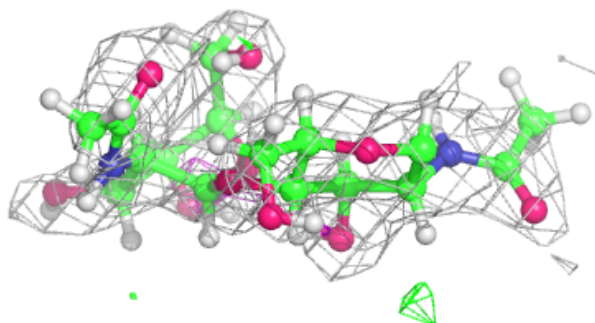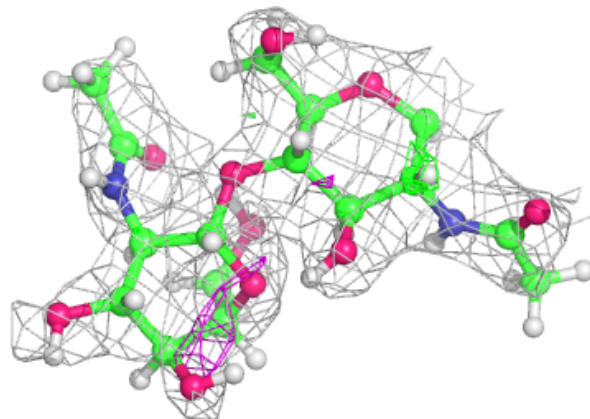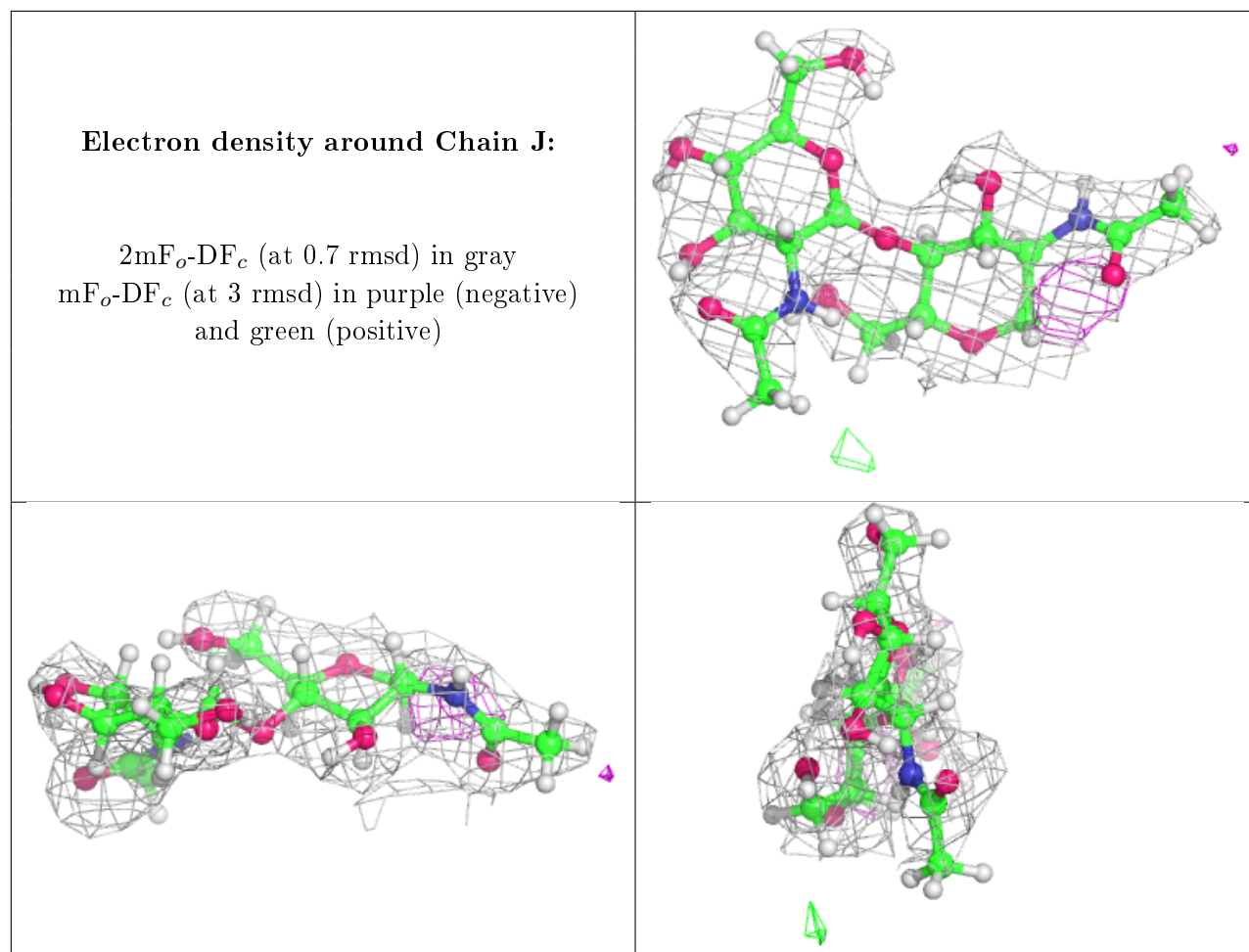
Electron density around Chain D:

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

Electron density around Chain E:

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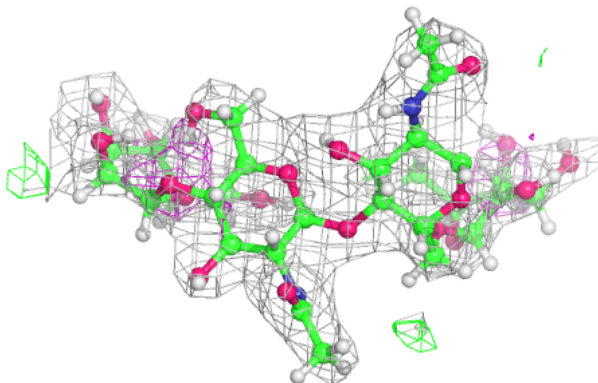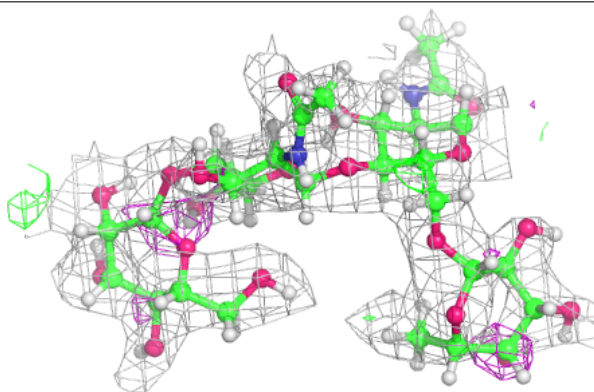$mF_o\text{-}DF_c$ (at 3 rmsd) in purple (negative)
and green (positive)

Electron density around Chain I:

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

Electron density around Chain H:

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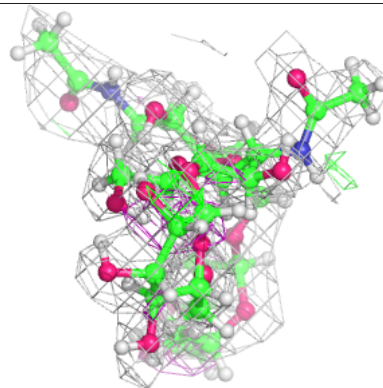
6.4 Ligands (i)

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(Å^2)	Q<0.9
7	ST2	B	471	15/15	0.77	0.30	15,33,38,40	0
7	ST2	A	471	15/15	0.82	0.26	15,33,38,40	0
6	CA	B	470	1/1	0.90	0.07	21,21,21,21	0
6	CA	A	470	1/1	0.94	0.06	21,21,21,21	0

6.5 Other polymers (i)

There are no such residues in this entry.