WORLDWIDE PDB PROTEIN DATA BANK

Full wwPDB X-ray Structure Validation Report ⓘ

Feb 9, 2026 – 03:57 pm GMT

PDB ID	:	9S96 / pdb_00009s96
Title	:	Crystal structure of the BRL3 ectodomain from Arabidopsis thaliana in complex with typhasterol.
Authors	:	Caregnato, A.; Hothorn, M.
Deposited on	:	2025-08-06
Resolution	:	2.31 Å(reported)

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

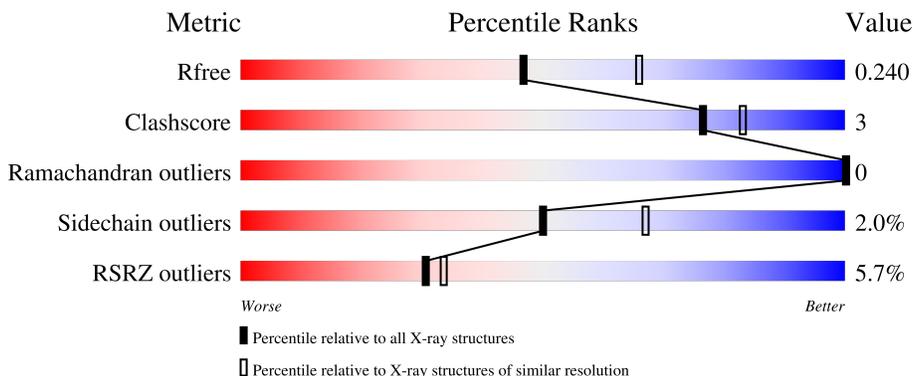|		
MolProbity	:	4-5-2 with Phenix2.0
Mogul	:	1.8.4, CSD as541be (2020)
Xtriage (Phenix)	:	2.0
EDS	:	3.0
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4	:	9.0.010 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.48

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 2.31 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
Rfree		0.240
Clashscore		3
Ramachandran outliers		0
Sidechain outliers		2.0%
RSRZ outliers		5.7%

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))
R$_{free}$	164625	7250 (2.34-2.30)
Clashscore	180529	8063 (2.34-2.30)
Ramachandran outliers	177936	7993 (2.34-2.30)
Sidechain outliers	177891	7993 (2.34-2.30)
RSRZ outliers	164620	7250 (2.34-2.30)

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	779	6% / 87% 5% 8%
1	B	779	5% / 85% 7% 8%
2	C	2	50% 50%
2	D	2	50% 50%
2	F	2	100%

Continued on next page...

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Mol	Chain	Length	Quality of chain
2	G	2	100%
2	H	2	50% 50%
2	J	2	100%
2	K	2	100%
2	L	2	100%
2	M	2	50% 50%
2	P	2	100%
2	Q	2	100%
2	S	2	100%
3	E	11	9% 91%
4	I	3	33% 33% 33%
4	R	3	33% 67%
5	N	9	78% 22%
6	O	2	50% 50%
7	T	3	67% 33%

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
10	SO4	B	806	-	-	X	-

2 Entry composition ⓘ

There are 13 unique types of molecules in this entry. The entry contains 23348 atoms, of which 11463 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 Receptor-like protein kinase BRI1-like 3.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
1	A	715	Total 10697	C 3370	H 5335	N 904	O 1061	S 27	0	1	0
1	B	720	Total 10751	C 3392	H 5352	N 908	O 1072	S 27	0	1	0

There are 18 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	771	ALA	-	expression tag	UNP Q9LJF3
A	772	ALA	-	expression tag	UNP Q9LJF3
A	773	ALA	-	expression tag	UNP Q9LJF3
A	774	GLU	-	expression tag	UNP Q9LJF3
A	775	ASN	-	expression tag	UNP Q9LJF3
A	776	LEU	-	expression tag	UNP Q9LJF3
A	777	TYR	-	expression tag	UNP Q9LJF3
A	778	PHE	-	expression tag	UNP Q9LJF3
A	779	GLN	-	expression tag	UNP Q9LJF3
B	771	ALA	-	expression tag	UNP Q9LJF3
B	772	ALA	-	expression tag	UNP Q9LJF3
B	773	ALA	-	expression tag	UNP Q9LJF3
B	774	GLU	-	expression tag	UNP Q9LJF3
B	775	ASN	-	expression tag	UNP Q9LJF3
B	776	LEU	-	expression tag	UNP Q9LJF3
B	777	TYR	-	expression tag	UNP Q9LJF3
B	778	PHE	-	expression tag	UNP Q9LJF3
B	779	GLN	-	expression tag	UNP Q9LJF3

- Molecule 2 is an oligosaccharide called 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.
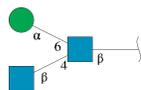
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	C	2	Total	C	H	N	O	0	0	0
			53	16	25	2	10			
2	D	2	Total	C	H	N	O	0	0	0
			53	16	25	2	10			
2	F	2	Total	C	H	N	O	0	0	0
			52	16	24	2	10			
2	G	2	Total	C	H	N	O	0	0	0
			51	16	23	2	10			
2	H	2	Total	C	H	N	O	0	0	0
			53	16	25	2	10			
2	J	2	Total	C	H	N	O	0	0	0
			53	16	25	2	10			
2	K	2	Total	C	H	N	O	0	0	0
			53	16	25	2	10			
2	L	2	Total	C	H	N	O	0	0	0
			53	16	25	2	10			
2	M	2	Total	C	H	N	O	0	0	0
			53	16	25	2	10			
2	P	2	Total	C	H	N	O	0	0	0
			52	16	24	2	10			
2	Q	2	Total	C	H	N	O	0	0	0
			53	16	25	2	10			
2	S	2	Total	C	H	N	O	0	0	0
			53	16	25	2	10			

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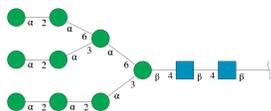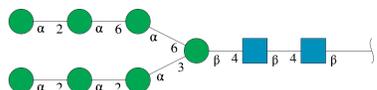

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	E	11	Total	C	H	N	O	0	0	0
			233	70	106	2	55			

- Molecule 4 is an oligosaccharide called 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-[alpha-D-mannopyranose-(1-6)]2-acetamido-2-deoxy-beta-D-glucopyranose.
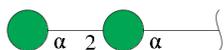
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
4	I	3	Total	C	H	N	O	0	0	0
			73	22	34	2	15			
4	R	3	Total	C	H	N	O	0	0	0
			73	22	34	2	15			

- Molecule 5 is an oligosaccharide called alpha-D-mannopyranose-(1-2)-alpha-D-mannopyranose-(1-2)-alpha-D-mannopyranose-(1-3)-[alpha-D-mannopyranose-(1-2)-alpha-D-mannopyranose-(1-6)-alpha-D-mannopyranose-(1-6)]beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.
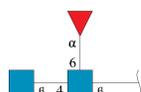
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
5	N	9	Total	C	H	N	O	0	0	0
			180	58	75	2	45			

- Molecule 6 is an oligosaccharide called alpha-D-mannopyranose-(1-2)-alpha-D-mannopyranose.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
6	O	2	Total	C	H	O	0	0	0
			41	12	19	10			

- Molecule 7 is an oligosaccharide called 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-[alpha-L-fucopyranose-(1-6)]2-acetamido-2-deoxy-beta-D-glucopyranose.
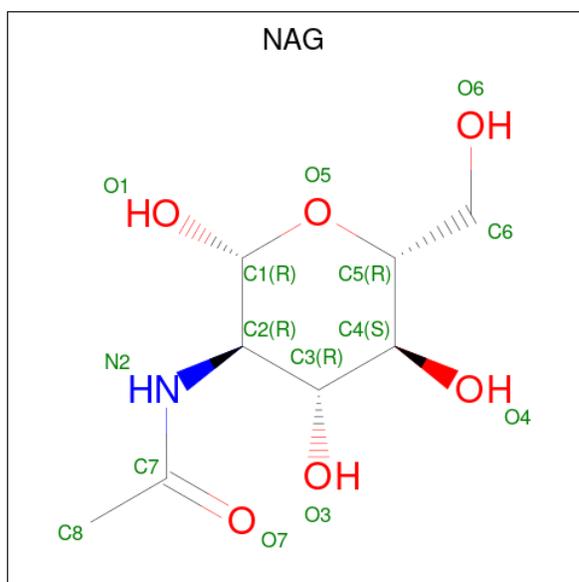
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	H	N	O			
7	T	3	72	22	34	2	14	0	0	0

- Molecule 8 is Typhasterol (CCD ID: A1JMF) (formula: $C_{28}H_{48}O_4$).

A1JMF
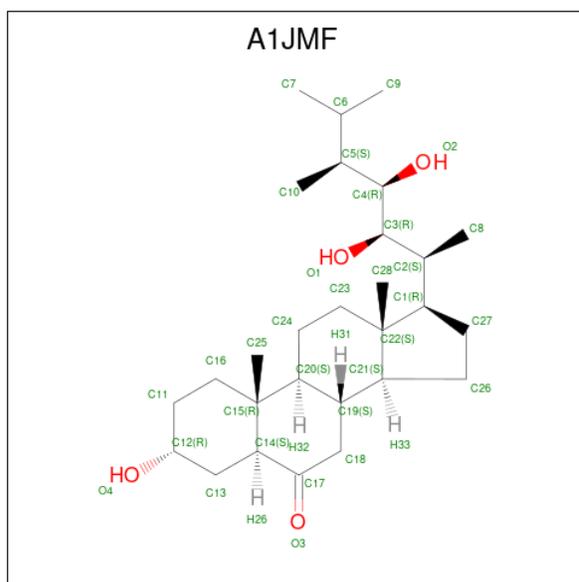
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	H	O		
8	A	1	80	28	48	4	0	0
8	B	1	80	28	48	4	0	0

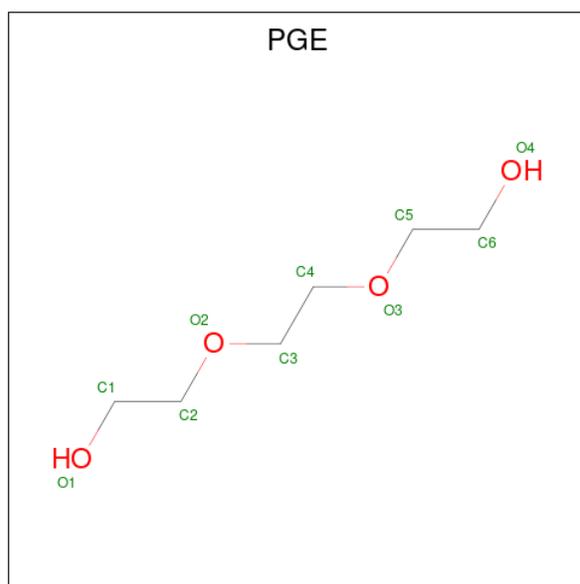- Molecule 9 is 2-acetamido-2-deoxy-beta-D-glucopyranose (CCD ID: NAG) (formula: $C_8H_{15}NO_6$).

NAG

O6
OH

O1   O5
HO   O
  C6
C1(R)   C5(R)
C2(R)   C4(S)
C3(R)
N2
HN   OH
  O4
C7   OH
C8   O   O3
  O7

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
9	A	1	Total	C	H	N	O	0	0
			27	8	13	1	5		
9	A	1	Total	C	H	N	O	0	0
			27	8	13	1	5		
9	B	1	Total	C	H	N	O	0	0
			27	8	13	1	5		
9	B	1	Total	C	H	N	O	0	0
			26	8	12	1	5		

• Molecule 10 is SULFATE ION (CCD ID: SO4) (formula: O_4S).

SO4

O1
O

O3 O⁻ — S — O⁻ O4
  S

O
O2
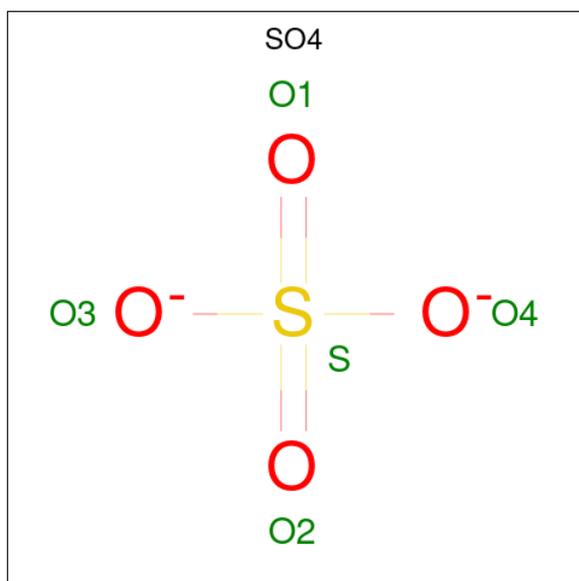
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
10	A	1	Total 5	O 4	S 1	0	0
10	A	1	Total 5	O 4	S 1	0	0
10	A	1	Total 5	O 4	S 1	0	0
10	B	1	Total 5	O 4	S 1	0	0
10	B	1	Total 5	O 4	S 1	0	0
10	B	1	Total 5	O 4	S 1	0	0
10	B	1	Total 5	O 4	S 1	0	0
10	B	1	Total 5	O 4	S 1	0	0

- Molecule 11 is TRIETHYLENE GLYCOL (CCD ID: PGE) (formula: $C_6H_{14}O_4$).

PGE

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
11	A	1	Total 24	C 6	H 14	O 4	0	0
11	B	1	Total 24	C 6	H 14	O 4	0	0

- Molecule 12 is ACETATE ION (CCD ID: ACT) (formula: $C_2H_3O_2$).

ACT

OXT

O⁻

C

CH3

O

O

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
12	B	1	Total 7	C 2	H 3	O 2	0	0

• Molecule 13 is water.

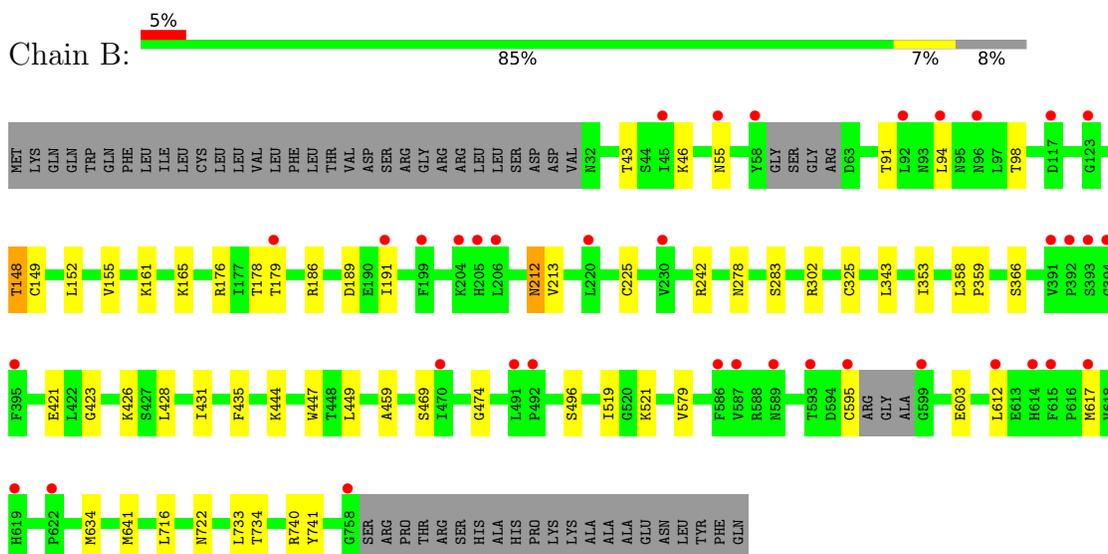| Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
13	A	109	Total 109	O 109	0	0
13	B	125	Total 125	O 125	0	0

3 Residue-property plots ⓘ

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: Receptor-like protein kinase BRI1-like 3
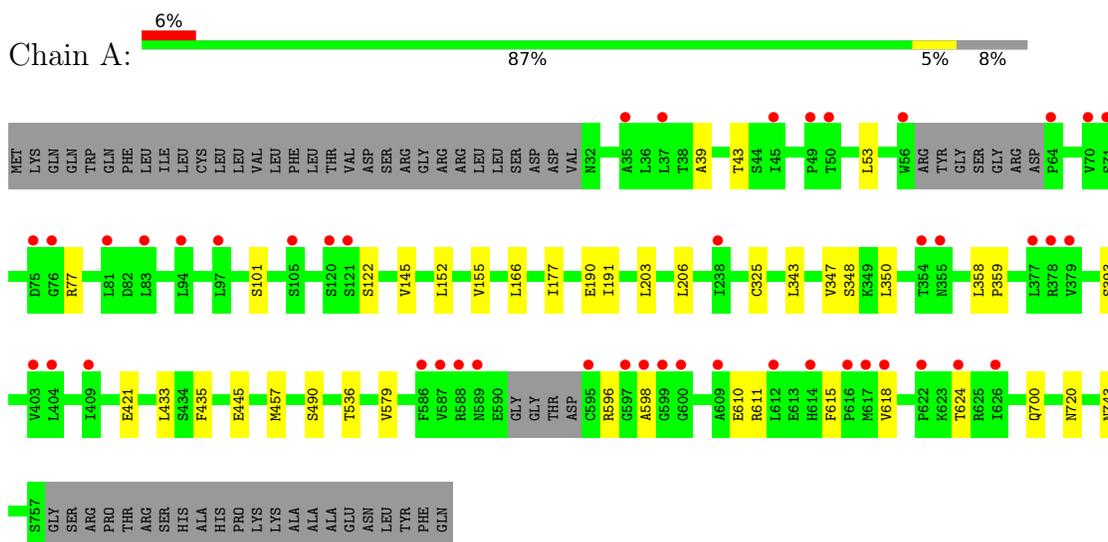
• Molecule 1: Receptor-like protein kinase BRI1-like 3

• Molecule 2: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-gluc opyranose
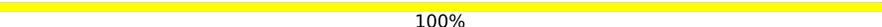
Chain C:

NAG1 NAG2

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

Chain D:

NAG1 NAG2

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

Chain F:

NAG1 NAG2

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

Chain G:

NAG1 NAG2

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

Chain H:

NAG1 NAG2

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

Chain J:

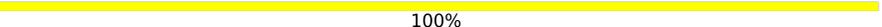NAG1 NAG2

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

Chain K:

NAG1 NAG2

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

Chain L:

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

Chain M:

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

Chain P:

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

Chain Q:

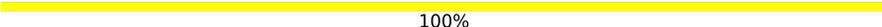• Molecule 2: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-gluc opyranose

Chain S:

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

Chain E:

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

Chain I:

33% 33% 33%

NAG1 NAG2 MAN3

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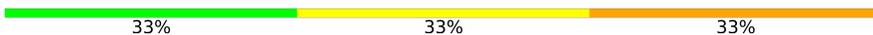
Chain R:

33% 67%

NAG1 NAG2 MAN3

• Molecule 5: alpha-D-mannopyranose-(1-2)-alpha-D-mannopyranose-(1-2)-alpha-D-mannopyranose-(1-3)-[alpha-D-mannopyranose-(1-2)-alpha-D-mannopyranose-(1-6)-alpha-D-mannopyranose-(1-6)]beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain N:

78% 22%

NAG1 NAG2 BMA3 MAN4 MAN5 MAN6 MAN7 MAN8 MAN9

• Molecule 6: alpha-D-mannopyranose-(1-2)-alpha-D-mannopyranose

Chain O:

50% 50%

MAN1 MAN2

• Molecule 7: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-[alpha-L-fucopyranose-(1-6)]2-acetamido-2-deoxy-beta-D-glucopyranose

Chain T:

67% 33%

NAG1 NAG2 FUC3

4　Data and refinement statistics ⓘ

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, α, β, γ	61.27Å　　81.85Å　　122.38Å 106.96°　　91.77°　　112.83°	Depositor
Resolution (Å)	47.24　–　2.31 47.24　–　2.31	Depositor EDS
% Data completeness (in resolution range)	91.9 (47.24-2.31) 82.7 (47.24-2.31)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	0.74 (at 2.32Å)	Xtriage
Refinement program	PHENIX 1.21.1_5286	Depositor
R, R_{free}	0.215　,　0.239 0.217　,　0.240	Depositor DCC
R_{free} test set	4157 reflections (4.58%)	wwPDB-VP
Wilson B-factor (Å^2)	54.7	Xtriage
Anisotropy	0.400	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.39 , 51.3	EDS
L-test for twinning [2]	$< |L| > = 0.51, < L^2 > = 0.34$	Xtriage
Estimated twinning fraction	0.010 for h,-h-k,-l	Xtriage
F_o,F_c correlation	0.96	EDS
Total number of atoms	23348	wwPDB-VP
Average B, all atoms (Å^2)	95.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.73% 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 (i)

5.1   Standard geometry (i)

Bond lengths and bond angles in the following residue types are not validated in this section: SO4, FUC, PGE, ACT, BMA, A1JMF, MAN, 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	0.09	0/5458	0.26	0/7412
1	B	0.09	0/5497	0.27	0/7467
All	All	0.09	0/10955	0.27	0/14879

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	5362	5335	5332	25	0
1	B	5399	5352	5351	31	0
2	C	28	25	25	1	0
2	D	28	25	25	0	0
2	F	28	24	25	1	0
2	G	28	23	25	2	0
2	H	28	25	25	1	0
2	J	28	25	25	0	0
2	K	28	25	25	0	0
2	L	28	25	25	0	0
2	M	28	25	25	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	P	28	24	25	0	0
2	Q	28	25	25	3	0
2	S	28	25	25	1	0
3	E	127	106	106	0	0
4	I	39	34	34	1	0
4	R	39	34	34	0	0
5	N	105	75	88	2	0
6	O	22	19	19	1	0
7	T	38	34	34	0	0
8	A	32	48	0	0	0
8	B	32	48	0	0	0
9	A	28	26	26	0	0
9	B	28	25	26	0	0
10	A	15	0	0	0	0
10	B	25	0	0	2	0
11	A	10	14	14	0	0
11	B	10	14	14	0	0
12	B	4	3	3	0	0
13	A	109	0	0	4	0
13	B	125	0	0	6	0
All	All	11885	11463	11381	64	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 3.

All (64) 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:B:733:LEU:O	1:B:741:TYR:OH	1.87	0.91
2:G:1:NAG:H61	2:G:2:NAG:H82	1.63	0.81
2:Q:1:NAG:H61	2:Q:2:NAG:H82	1.66	0.77
1:B:366:SER:O	13:B:901:HOH:O	2.03	0.76
1:B:186:ARG:NH2	10:B:806:SO4:O3	2.20	0.74
1:A:39:ALA:O	1:A:43:THR:OG1	2.03	0.72
1:B:343:LEU:HD21	1:B:358:LEU:HD13	1.71	0.72
1:B:278:ASN:OD1	13:B:902:HOH:O	2.10	0.70
1:B:212:ASN:ND2	13:B:905:HOH:O	2.25	0.68
1:A:610:GLU:OE1	13:A:901:HOH:O	2.13	0.66
1:A:610:GLU:OE2	2:F:2:NAG:N2	2.30	0.64
1:B:283:SER:HB2	5:N:1:NAG:H82	1.79	0.64
1:B:423:GLY:O	1:B:426:LYS:NZ	2.31	0.62

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:77:ARG:NH2	1:A:101:SER:OG	2.33	0.62
1:A:343:LEU:HD21	1:A:358:LEU:CD1	2.31	0.61
1:B:474:GLY:O	13:B:903:HOH:O	2.17	0.58
1:A:720:ASN:ND2	1:A:743:ASN:OD1	2.37	0.57
1:A:152:LEU:HD21	1:A:155:VAL:HB	1.87	0.56
1:B:444:LYS:NZ	1:B:469:SER:OG	2.40	0.55
1:B:617:MET:SD	1:B:617:MET:N	2.80	0.54
1:B:191:ILE:HD11	1:B:213:VAL:HG21	1.90	0.53
1:A:343:LEU:HD21	1:A:358:LEU:HD13	1.90	0.52
1:B:343:LEU:HD21	1:B:358:LEU:CD1	2.38	0.52
2:S:1:NAG:O3	2:S:2:NAG:H83	2.10	0.51
4:I:2:NAG:O7	4:I:3:MAN:O6	2.21	0.50
1:A:358:LEU:N	1:A:359:PRO:CD	2.74	0.50
1:B:421:GLU:OE1	1:B:421:GLU:N	2.39	0.50
1:A:393:SER:OG	1:A:421:GLU:OE1	2.22	0.49
1:A:598:ALA:H	2:H:1:NAG:H81	1.77	0.49
1:A:445:GLU:OE1	1:A:445:GLU:N	2.44	0.49
1:A:190:GLU:O	13:A:902:HOH:O	2.20	0.49
1:A:347:VAL:HA	1:A:350:LEU:HD12	1.94	0.49
1:B:734:THR:HG22	13:B:919:HOH:O	2.12	0.48
1:B:358:LEU:N	1:B:359:PRO:CD	2.77	0.48
5:N:7:MAN:O3	6:O:1:MAN:C1	2.62	0.47
1:B:459:ALA:C	2:Q:1:NAG:H81	2.40	0.47
1:A:145:VAL:CG1	1:A:152:LEU:HD22	2.44	0.47
1:B:152:LEU:HD21	1:B:155:VAL:HB	1.95	0.47
1:B:302:ARG:NH2	13:B:902:HOH:O	2.42	0.47
1:B:148:THR:HG22	1:B:149:CYS:H	1.79	0.46
2:G:2:NAG:H83	2:G:2:NAG:H3	1.98	0.46
2:Q:2:NAG:H83	2:Q:2:NAG:H3	1.97	0.45
1:B:428:LEU:HD13	1:B:431:ILE:HD11	1.98	0.45
1:A:618:VAL:HG13	1:A:624:THR:HG21	1.99	0.43
1:B:91:THR:HG23	1:B:91:THR:O	2.17	0.43
1:A:166:LEU:HD12	1:A:191:ILE:HG12	2.00	0.43
1:A:490:SER:O	13:A:903:HOH:O	2.21	0.43
1:A:145:VAL:HG13	1:A:152:LEU:HD22	2.01	0.43
1:B:423:GLY:HA2	1:B:449:LEU:HD21	1.99	0.43
1:A:177:ILE:O	1:A:177:ILE:HG23	2.19	0.42
1:A:720:ASN:HA	1:A:743:ASN:HB3	2.00	0.42
1:B:447:TRP:O	1:B:474:GLY:HA3	2.20	0.42
1:B:161:LYS:NZ	10:B:806:SO4:S	2.92	0.42
2:C:2:NAG:C1	2:C:2:NAG:H82	2.50	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:536:THR:O	13:A:904:HOH:O	2.22	0.42
1:A:433:LEU:HD12	1:A:457:MET:HE2	2.02	0.42
1:B:165:LYS:HG2	1:B:189:ASP:HB3	2.01	0.42
1:A:435:PHE:CE1	1:A:611:ARG:HG3	2.56	0.41
1:B:43:THR:O	1:B:46:LYS:NZ	2.52	0.41
1:B:716:LEU:O	1:B:740:ARG:HG2	2.20	0.41
1:B:94:LEU:HG	1:B:98:THR:HG23	2.03	0.41
1:A:203:LEU:HD21	1:A:206:LEU:HB2	2.03	0.40
1:B:176:ARG:O	1:B:178:THR:HG23	2.21	0.40
1:B:496:SER:HB2	1:B:521:LYS:HD2	2.02	0.40

There are no symmetry-related clashes.

5.3 Torsion angles (i)

5.3.1 Protein backbone (i)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	710/779 (91%)	663 (93%)	47 (7%)	0	100	100
1	B	715/779 (92%)	665 (93%)	50 (7%)	0	100	100
All	All	1425/1558 (92%)	1328 (93%)	97 (7%)	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	626/679 (92%)	618 (99%)	8 (1%)	65	78
1	B	630/679 (93%)	613 (97%)	17 (3%)	40	56
All	All	1256/1358 (92%)	1231 (98%)	25 (2%)	50	67

All (25) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	53	LEU
1	A	122	SER
1	A	325	CYS
1	A	348	SER
1	A	579	VAL
1	A	596	ARG
1	A	615	PHE
1	A	700	GLN
1	B	55	ASN
1	B	148	THR
1	B	179	THR
1	B	212	ASN
1	B	225	CYS
1	B	242	ARG
1	B	325	CYS
1	B	353	ILE
1	B	435	PHE
1	B	519	ILE
1	B	579	VAL
1	B	595	CYS
1	B	603	GLU
1	B	612	LEU
1	B	634	MET
1	B	641	MET
1	B	722	ASN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (14) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	102	ASN
1	A	159	HIS
1	A	184	ASN
1	A	235	GLN
1	A	317	GLN

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Mol	Chain	Res	Type
1	A	538	ASN
1	A	720	ASN
1	A	732	GLN
1	B	55	ASN
1	B	235	GLN
1	B	317	GLN
1	B	335	ASN
1	B	376	ASN
1	B	570	GLN

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 ⓘ

55 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	0.70	0	17,19,21	1.08	2 (11%)
2	NAG	C	2	2	14,14,15	0.71	0	17,19,21	1.42	1 (5%)
2	NAG	D	1	1,2	14,14,15	0.74	0	17,19,21	1.18	2 (11%)
2	NAG	D	2	2	14,14,15	0.69	0	17,19,21	0.80	0
3	NAG	E	1	3,1	14,14,15	0.72	0	17,19,21	1.11	1 (5%)
3	MAN	E	10	3	11,11,12	0.74	0	15,15,17	1.32	1 (6%)
3	MAN	E	11	3	11,11,12	0.75	0	15,15,17	1.13	1 (6%)
3	NAG	E	2	3	14,14,15	0.76	0	17,19,21	0.99	1 (5%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	#$|Z| > 2$	Counts	RMSZ	#$|Z| > 2$
3	BMA	E	3	3	11,11,12	0.83	0	15,15,17	2.29	5 (33%)
3	MAN	E	4	3	11,11,12	0.82	1 (9%)	15,15,17	0.89	0
3	MAN	E	5	3	11,11,12	0.90	1 (9%)	15,15,17	1.00	0
3	MAN	E	6	3	11,11,12	0.79	0	15,15,17	1.04	0
3	MAN	E	7	3	11,11,12	0.76	0	15,15,17	1.11	1 (6%)
3	MAN	E	8	3	11,11,12	0.79	0	15,15,17	1.06	1 (6%)
3	MAN	E	9	3	11,11,12	0.84	1 (9%)	15,15,17	0.84	0
2	NAG	F	1	1,2	14,14,15	0.72	0	17,19,21	1.17	2 (11%)
2	NAG	F	2	2	14,14,15	0.73	0	17,19,21	0.87	0
2	NAG	G	1	1,2	14,14,15	0.78	0	17,19,21	1.16	1 (5%)
2	NAG	G	2	2	14,14,15	0.72	0	17,19,21	1.55	2 (11%)
2	NAG	H	1	1,2	14,14,15	0.68	0	17,19,21	1.90	3 (17%)
2	NAG	H	2	2	14,14,15	0.84	1 (7%)	17,19,21	1.47	3 (17%)
4	NAG	I	1	4,1	14,14,15	0.72	0	17,19,21	0.94	0
4	NAG	I	2	4	14,14,15	0.70	0	17,19,21	0.87	0
4	MAN	I	3	4	11,11,12	0.83	1 (9%)	15,15,17	0.91	0
2	NAG	J	1	1,2	14,14,15	0.69	0	17,19,21	1.42	2 (11%)
2	NAG	J	2	2	14,14,15	0.66	0	17,19,21	1.20	2 (11%)
2	NAG	K	1	1,2	14,14,15	0.67	0	17,19,21	1.35	2 (11%)
2	NAG	K	2	2	14,14,15	0.66	0	17,19,21	1.07	2 (11%)
2	NAG	L	1	1,2	14,14,15	0.67	0	17,19,21	1.19	1 (5%)
2	NAG	L	2	2	14,14,15	0.67	0	17,19,21	0.97	1 (5%)
2	NAG	M	1	1,2	14,14,15	0.72	0	17,19,21	0.85	0
2	NAG	M	2	2	14,14,15	0.74	0	17,19,21	1.07	1 (5%)
5	NAG	N	1	5,1	14,14,15	0.73	0	17,19,21	1.16	1 (5%)
5	NAG	N	2	5	14,14,15	0.68	0	17,19,21	1.03	2 (11%)
5	BMA	N	3	5	11,11,12	0.90	0	15,15,17	1.97	3 (20%)
5	MAN	N	4	5	11,11,12	0.84	1 (9%)	15,15,17	0.99	0
5	MAN	N	5	5	11,11,12	0.79	1 (9%)	15,15,17	0.95	0
5	MAN	N	6	5	11,11,12	0.80	1 (9%)	15,15,17	0.99	0
5	MAN	N	7	5	11,11,12	0.84	1 (9%)	15,15,17	1.38	3 (20%)
5	MAN	N	8	5	11,11,12	0.75	0	15,15,17	1.08	1 (6%)
5	MAN	N	9	5	11,11,12	0.81	1 (9%)	15,15,17	0.89	0
6	MAN	O	1	6	11,11,12	0.73	0	15,15,17	1.48	2 (13%)
6	MAN	O	2	6	11,11,12	0.85	1 (9%)	15,15,17	1.01	0
2	NAG	P	1	1,2	14,14,15	0.72	0	17,19,21	0.92	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	#|Z| > 2	Counts	RMSZ	#|Z| > 2
2	NAG	P	2	2	14,14,15	0.72	0	17,19,21	0.75	0
2	NAG	Q	1	1,2	14,14,15	0.74	0	17,19,21	1.37	2 (11%)
2	NAG	Q	2	2	14,14,15	0.70	0	17,19,21	1.50	2 (11%)
4	NAG	R	1	4,1	14,14,15	0.76	0	17,19,21	0.96	0
4	NAG	R	2	4	14,14,15	0.71	0	17,19,21	1.17	1 (5%)
4	MAN	R	3	4	11,11,12	0.87	1 (9%)	15,15,17	0.84	0
2	NAG	S	1	1,2	14,14,15	0.74	0	17,19,21	1.28	2 (11%)
2	NAG	S	2	2	14,14,15	0.71	0	17,19,21	1.26	1 (5%)
7	NAG	T	1	7,1	14,14,15	0.75	0	17,19,21	0.91	1 (5%)
7	NAG	T	2	7	14,14,15	0.72	0	17,19,21	0.86	0
7	FUC	T	3	7	10,10,11	0.86	0	14,14,16	0.86	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
2	NAG	C	1	1,2	-	0/6/23/26	0/1/1/1
2	NAG	C	2	2	-	3/6/23/26	0/1/1/1
2	NAG	D	1	1,2	-	2/6/23/26	0/1/1/1
2	NAG	D	2	2	-	0/6/23/26	0/1/1/1
3	NAG	E	1	3,1	-	1/6/23/26	0/1/1/1
3	MAN	E	10	3	-	0/2/19/22	0/1/1/1
3	MAN	E	11	3	-	0/2/19/22	0/1/1/1
3	NAG	E	2	3	-	1/6/23/26	0/1/1/1
3	BMA	E	3	3	-	0/2/19/22	0/1/1/1
3	MAN	E	4	3	-	1/2/19/22	0/1/1/1
3	MAN	E	5	3	-	0/2/19/22	0/1/1/1
3	MAN	E	6	3	-	0/2/19/22	0/1/1/1
3	MAN	E	7	3	-	0/2/19/22	0/1/1/1
3	MAN	E	8	3	-	2/2/19/22	0/1/1/1
3	MAN	E	9	3	-	0/2/19/22	0/1/1/1
2	NAG	F	1	1,2	-	2/6/23/26	0/1/1/1
2	NAG	F	2	2	-	1/6/23/26	0/1/1/1
2	NAG	G	1	1,2	-	1/6/23/26	0/1/1/1
2	NAG	G	2	2	-	3/6/23/26	0/1/1/1
2	NAG	H	1	1,2	-	0/6/23/26	0/1/1/1
2	NAG	H	2	2	-	4/6/23/26	0/1/1/1
4	NAG	I	1	4,1	-	0/6/23/26	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	NAG	I	2	4	-	2/6/23/26	0/1/1/1
4	MAN	I	3	4	-	0/2/19/22	0/1/1/1
2	NAG	J	1	1,2	-	2/6/23/26	0/1/1/1
2	NAG	J	2	2	-	2/6/23/26	0/1/1/1
2	NAG	K	1	1,2	-	0/6/23/26	0/1/1/1
2	NAG	K	2	2	-	1/6/23/26	0/1/1/1
2	NAG	L	1	1,2	-	2/6/23/26	0/1/1/1
2	NAG	L	2	2	-	0/6/23/26	0/1/1/1
2	NAG	M	1	1,2	-	0/6/23/26	0/1/1/1
2	NAG	M	2	2	-	3/6/23/26	0/1/1/1
5	NAG	N	1	5,1	-	0/6/23/26	0/1/1/1
5	NAG	N	2	5	-	0/6/23/26	0/1/1/1
5	BMA	N	3	5	-	0/2/19/22	0/1/1/1
5	MAN	N	4	5	-	2/2/19/22	0/1/1/1
5	MAN	N	5	5	-	0/2/19/22	0/1/1/1
5	MAN	N	6	5	-	0/2/19/22	0/1/1/1
5	MAN	N	7	5	-	0/2/19/22	0/1/1/1
5	MAN	N	8	5	-	2/2/19/22	0/1/1/1
5	MAN	N	9	5	-	0/2/19/22	0/1/1/1
6	MAN	O	1	6	-	0/2/19/22	0/1/1/1
6	MAN	O	2	6	-	2/2/19/22	0/1/1/1
2	NAG	P	1	1,2	-	0/6/23/26	0/1/1/1
2	NAG	P	2	2	-	0/6/23/26	0/1/1/1
2	NAG	Q	1	1,2	-	0/6/23/26	0/1/1/1
2	NAG	Q	2	2	-	3/6/23/26	0/1/1/1
4	NAG	R	1	4,1	-	2/6/23/26	0/1/1/1
4	NAG	R	2	4	-	2/6/23/26	0/1/1/1
4	MAN	R	3	4	-	2/2/19/22	0/1/1/1
2	NAG	S	1	1,2	-	4/6/23/26	0/1/1/1
2	NAG	S	2	2	-	2/6/23/26	0/1/1/1
7	NAG	T	1	7,1	-	0/6/23/26	0/1/1/1
7	NAG	T	2	7	-	0/6/23/26	0/1/1/1
7	FUC	T	3	7	-	-	0/1/1/1

All (12) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	E	5	MAN	O5-C1	-2.44	1.39	1.43
2	H	2	NAG	O5-C1	-2.35	1.40	1.43

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	R	3	MAN	O5-C1	-2.32	1.40	1.43
6	O	2	MAN	O5-C1	-2.26	1.40	1.43
5	N	7	MAN	O5-C1	-2.23	1.40	1.43
4	I	3	MAN	O5-C1	-2.18	1.40	1.43
5	N	4	MAN	O5-C1	-2.18	1.40	1.43
3	E	9	MAN	O5-C1	-2.18	1.40	1.43
5	N	6	MAN	O5-C1	-2.09	1.40	1.43
5	N	5	MAN	O5-C1	-2.09	1.40	1.43
3	E	4	MAN	O5-C1	-2.06	1.40	1.43
5	N	9	MAN	O5-C1	-2.04	1.40	1.43

All (59) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	E	3	BMA	C1-O5-C5	6.45	120.92	112.19
5	N	3	BMA	C1-O5-C5	5.59	119.77	112.19
2	H	1	NAG	O4-C4-C3	-5.05	98.68	110.35
2	G	2	NAG	C2-N2-C7	4.64	129.51	122.90
2	H	1	NAG	O4-C4-C5	4.50	120.46	109.30
2	Q	2	NAG	C2-N2-C7	4.44	129.22	122.90
2	C	2	NAG	C2-N2-C7	4.26	128.96	122.90
3	E	10	MAN	C1-O5-C5	4.08	117.72	112.19
2	S	2	NAG	C2-N2-C7	3.89	128.44	122.90
6	O	1	MAN	C1-O5-C5	3.85	117.40	112.19
2	Q	1	NAG	C1-O5-C5	3.72	117.23	112.19
2	F	1	NAG	C2-N2-C7	3.48	127.86	122.90
2	J	1	NAG	O4-C4-C3	-3.31	102.69	110.35
2	H	2	NAG	O5-C1-C2	-3.29	106.09	111.29
2	L	1	NAG	C2-N2-C7	3.23	127.51	122.90
2	J	1	NAG	C2-N2-C7	3.22	127.48	122.90
2	K	1	NAG	O5-C1-C2	-3.22	106.21	111.29
2	G	1	NAG	C1-O5-C5	3.10	116.39	112.19
2	S	1	NAG	C2-N2-C7	3.07	127.28	122.90
2	H	2	NAG	C2-N2-C7	3.07	127.28	122.90
3	E	7	MAN	C1-O5-C5	3.07	116.35	112.19
2	J	2	NAG	C2-N2-C7	3.05	127.24	122.90
2	D	1	NAG	C2-N2-C7	3.04	127.23	122.90
3	E	11	MAN	C1-O5-C5	3.03	116.29	112.19
4	R	2	NAG	C2-N2-C7	3.02	127.20	122.90
5	N	8	MAN	C1-O5-C5	2.99	116.25	112.19
3	E	3	BMA	O4-C4-C3	-2.91	103.63	110.35
6	O	1	MAN	O5-C1-C2	2.77	115.04	110.77

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
5	N	7	MAN	O4-C4-C3	-2.74	104.01	110.35
2	M	2	NAG	C2-N2-C7	2.74	126.80	122.90
5	N	1	NAG	O4-C4-C3	-2.69	104.13	110.35
5	N	3	BMA	O4-C4-C3	-2.64	104.25	110.35
2	D	1	NAG	O5-C1-C2	-2.55	107.27	111.29
5	N	3	BMA	C2-C3-C4	2.53	115.28	110.89
3	E	8	MAN	C1-O5-C5	2.52	115.60	112.19
2	J	2	NAG	O5-C1-C2	-2.48	107.37	111.29
2	C	1	NAG	O5-C1-C2	-2.47	107.38	111.29
3	E	3	BMA	C2-C3-C4	2.47	115.17	110.89
2	K	2	NAG	C1-O5-C5	2.46	115.53	112.19
5	N	2	NAG	C1-O5-C5	2.45	115.51	112.19
2	K	1	NAG	C1-O5-C5	2.45	115.51	112.19
3	E	3	BMA	O6-C6-C5	-2.40	103.05	111.29
2	L	2	NAG	O5-C1-C2	-2.40	107.50	111.29
2	H	2	NAG	C4-C3-C2	-2.38	107.52	111.02
3	E	2	NAG	O4-C4-C3	-2.35	104.92	110.35
2	S	1	NAG	O5-C1-C2	-2.33	107.61	111.29
2	H	1	NAG	C1-O5-C5	2.30	115.30	112.19
7	T	1	NAG	C1-O5-C5	2.29	115.29	112.19
2	Q	1	NAG	O4-C4-C3	-2.24	105.17	110.35
3	E	1	NAG	O4-C4-C3	-2.20	105.26	110.35
2	K	2	NAG	O5-C1-C2	-2.15	107.90	111.29
2	F	1	NAG	O4-C4-C3	-2.12	105.44	110.35
5	N	2	NAG	O4-C4-C3	-2.12	105.44	110.35
5	N	7	MAN	C1-O5-C5	2.12	115.06	112.19
5	N	7	MAN	C2-C3-C4	2.10	114.53	110.89
2	Q	2	NAG	O5-C1-C2	-2.07	108.02	111.29
3	E	3	BMA	C1-C2-C3	2.05	112.19	109.67
2	C	1	NAG	O4-C4-C3	-2.05	105.61	110.35
2	G	2	NAG	O5-C1-C2	-2.02	108.09	111.29

There are no chirality outliers.

All (54) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	R	2	NAG	C3-C2-N2-C7
5	N	8	MAN	O5-C5-C6-O6
5	N	4	MAN	O5-C5-C6-O6
4	R	3	MAN	C4-C5-C6-O6
2	H	2	NAG	O5-C5-C6-O6
4	R	3	MAN	O5-C5-C6-O6

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Mol	Chain	Res	Type	Atoms
5	N	4	MAN	C4-C5-C6-O6
2	C	2	NAG	C8-C7-N2-C2
2	C	2	NAG	O7-C7-N2-C2
2	D	1	NAG	C8-C7-N2-C2
2	D	1	NAG	O7-C7-N2-C2
2	F	1	NAG	C8-C7-N2-C2
2	F	1	NAG	O7-C7-N2-C2
2	G	2	NAG	C8-C7-N2-C2
2	G	2	NAG	O7-C7-N2-C2
2	J	1	NAG	C8-C7-N2-C2
2	J	1	NAG	O7-C7-N2-C2
2	J	2	NAG	C8-C7-N2-C2
2	J	2	NAG	O7-C7-N2-C2
2	L	1	NAG	C8-C7-N2-C2
2	L	1	NAG	O7-C7-N2-C2
2	M	2	NAG	C8-C7-N2-C2
2	M	2	NAG	O7-C7-N2-C2
2	Q	2	NAG	C8-C7-N2-C2
2	Q	2	NAG	O7-C7-N2-C2
2	S	1	NAG	C8-C7-N2-C2
2	S	1	NAG	O7-C7-N2-C2
2	S	2	NAG	C8-C7-N2-C2
2	S	2	NAG	O7-C7-N2-C2
5	N	8	MAN	C4-C5-C6-O6
6	O	2	MAN	C4-C5-C6-O6
2	S	1	NAG	O5-C5-C6-O6
3	E	8	MAN	O5-C5-C6-O6
3	E	2	NAG	O5-C5-C6-O6
3	E	8	MAN	C4-C5-C6-O6
6	O	2	MAN	O5-C5-C6-O6
2	H	2	NAG	C4-C5-C6-O6
2	F	2	NAG	O5-C5-C6-O6
4	R	2	NAG	O5-C5-C6-O6
2	M	2	NAG	O5-C5-C6-O6
4	I	2	NAG	O5-C5-C6-O6
2	C	2	NAG	C1-C2-N2-C7
2	S	1	NAG	C4-C5-C6-O6
2	G	1	NAG	C1-C2-N2-C7
2	G	2	NAG	C3-C2-N2-C7
4	I	2	NAG	C3-C2-N2-C7
3	E	1	NAG	C4-C5-C6-O6
3	E	4	MAN	C4-C5-C6-O6

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Mol	Chain	Res	Type	Atoms
2	K	2	NAG	C4-C5-C6-O6
2	H	2	NAG	C1-C2-N2-C7
2	H	2	NAG	C3-C2-N2-C7
2	Q	2	NAG	C3-C2-N2-C7
4	R	1	NAG	C3-C2-N2-C7
4	R	1	NAG	C1-C2-N2-C7

There are no ring outliers.

14 monomers are involved in 12 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	I	2	NAG	1	0
2	Q	1	NAG	2	0
2	G	2	NAG	2	0
2	C	2	NAG	1	0
5	N	7	MAN	1	0
2	Q	2	NAG	2	0
4	I	3	MAN	1	0
2	S	2	NAG	1	0
2	H	1	NAG	1	0
2	F	2	NAG	1	0
2	S	1	NAG	1	0
6	O	1	MAN	1	0
2	G	1	NAG	1	0
5	N	1	NAG	1	0

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

Oligosaccharide Chain C

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain D

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain F

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain G

Bond lengths

Bond angles

Torsions

Rings

Full wwPDB X-ray Structure Validation Report

Oligosaccharide Chain H

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain J

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain K

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain L

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain M

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain P

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain Q

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain S

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 R

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain N

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain O

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain T

Bond lengths

Bond angles

Torsions

Rings

5.6 Ligand geometry ⓘ

17 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	#$|Z| > 2$
10	SO4	B	808	-	4,4,4	0.61	0	6,6,6	0.05	0
9	NAG	B	803	1	14,14,15	0.71	0	17,19,21	1.05	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	#|Z| > 2	Counts	RMSZ	#|Z| > 2
8	A1JMF	A	801	-	35,35,35	0.32	0	55,56,56	0.61	0
9	NAG	A	803	1	14,14,15	0.70	0	17,19,21	1.22	1 (5%)
10	SO4	A	804	-	4,4,4	0.59	0	6,6,6	0.12	0
9	NAG	A	802	1	14,14,15	0.71	0	17,19,21	0.85	0
10	SO4	B	801	-	4,4,4	0.59	0	6,6,6	0.06	0
11	PGE	B	809	-	9,9,9	0.30	0	8,8,8	0.52	0
12	ACT	B	810	-	3,3,3	1.04	0	3,3,3	1.32	0
10	SO4	A	807	-	4,4,4	0.60	0	6,6,6	0.05	0
10	SO4	A	805	-	4,4,4	0.60	0	6,6,6	0.07	0
8	A1JMF	B	802	-	35,35,35	0.31	0	55,56,56	0.47	0
10	SO4	B	807	-	4,4,4	0.58	0	6,6,6	0.05	0
11	PGE	A	806	-	9,9,9	0.30	0	8,8,8	0.60	0
10	SO4	B	805	-	4,4,4	0.59	0	6,6,6	0.05	0
9	NAG	B	804	1	14,14,15	0.71	0	17,19,21	1.01	0
10	SO4	B	806	-	4,4,4	0.59	0	6,6,6	0.04	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
9	NAG	B	803	1	-	1/6/23/26	0/1/1/1
8	A1JMF	A	801	-	-	4/20/81/81	0/4/4/4
9	NAG	A	803	1	-	0/6/23/26	0/1/1/1
11	PGE	B	809	-	-	4/7/7/7	-
9	NAG	A	802	1	-	0/6/23/26	0/1/1/1
8	A1JMF	B	802	-	-	1/20/81/81	0/4/4/4
11	PGE	A	806	-	-	3/7/7/7	-
9	NAG	B	804	1	-	1/6/23/26	0/1/1/1

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
9	A	803	NAG	C1-O5-C5	3.92	117.51	112.19

There are no chirality outliers.

All (14) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
8	A	801	A1JMF	C10-C5-C6-C7
8	A	801	A1JMF	C10-C5-C6-C9
8	A	801	A1JMF	C4-C5-C6-C7
8	A	801	A1JMF	C4-C5-C6-C9
9	B	804	NAG	O5-C5-C6-O6
8	B	802	A1JMF	C4-C5-C6-C7
11	A	806	PGE	C4-C3-O2-C2
11	B	809	PGE	C6-C5-O3-C4
11	B	809	PGE	C1-C2-O2-C3
9	B	803	NAG	C3-C2-N2-C7
11	A	806	PGE	O2-C3-C4-O3
11	B	809	PGE	O3-C5-C6-O4
11	A	806	PGE	C3-C4-O3-C5
11	B	809	PGE	O2-C3-C4-O3

There are no ring outliers.

1 monomer is involved in 2 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
10	B	806	SO4	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 all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less then 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

Ligand A1JMF A 801

Ligand A1JMF B 802
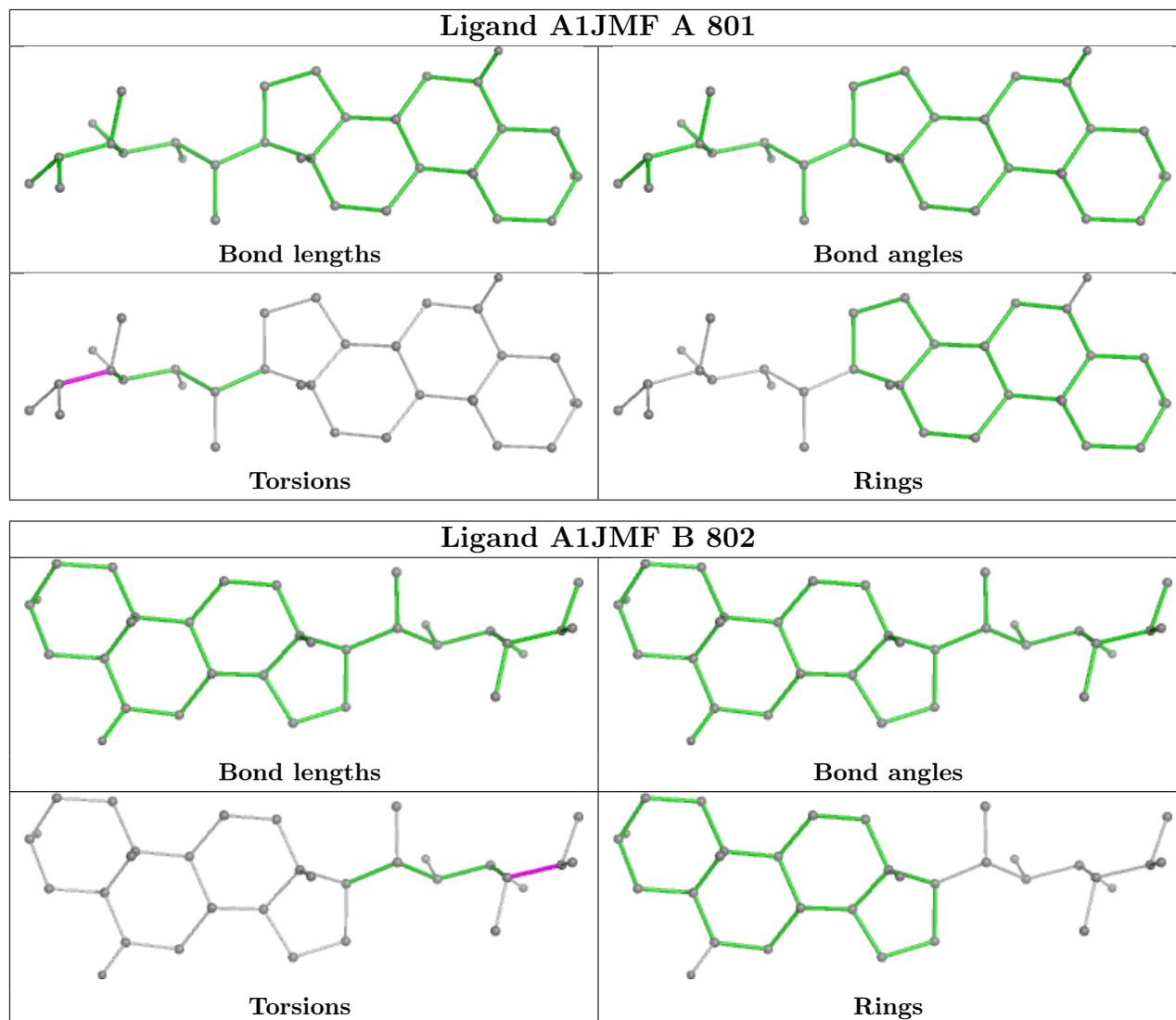
5.7 Other polymers ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues ⓘ

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	715/779 (91%)	0.43	45 (6%)	27	30	61, 87, 186, 248	1 (0%)
1	B	720/779 (92%)	0.37	37 (5%)	34	37	54, 80, 147, 224	1 (0%)
All	All	1435/1558 (92%)	0.40	82 (5%)	30	33	54, 84, 169, 248	2 (0%)

All (82) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	205[A]	HIS	9.1
1	A	587	VAL	7.3
1	A	378[A]	ARG	6.5
1	A	379	VAL	6.0
1	A	377	LEU	5.8
1	B	230	VAL	5.2
1	B	394	GLY	4.4
1	A	617	MET	4.4
1	B	593	THR	4.3
1	A	403	VAL	4.2
1	A	586	PHE	4.1
1	B	58	TYR	3.9
1	B	117	ASP	3.7
1	A	599	GLY	3.7
1	B	220	LEU	3.7
1	A	597	GLY	3.7
1	A	622	PRO	3.5
1	B	595	CYS	3.5
1	B	491	LEU	3.4
1	B	392	PRO	3.4
1	B	758	GLY	3.4
1	A	75	ASP	3.3
1	A	354	THR	3.3
1	A	56	TRP	3.3

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Mol	Chain	Res	Type	RSRZ
1	A	612	LEU	3.2
1	B	206	LEU	3.2
1	A	609	ALA	3.1
1	A	600	GLY	3.0
1	A	35	ALA	3.0
1	A	64	PRO	3.0
1	B	123	GLY	2.9
1	B	395	PHE	2.8
1	A	626	ILE	2.8
1	B	587	VAL	2.8
1	A	50	THR	2.7
1	B	612	LEU	2.7
1	A	97	LEU	2.6
1	B	614	HIS	2.6
1	A	616	PRO	2.6
1	A	595	CYS	2.6
1	B	622	PRO	2.5
1	B	45	ILE	2.5
1	A	70	VAL	2.5
1	A	81	LEU	2.5
1	A	588	ARG	2.5
1	B	617	MET	2.5
1	B	92	LEU	2.5
1	B	470	ILE	2.4
1	A	76	GLY	2.4
1	B	492	PRO	2.4
1	A	614	HIS	2.4
1	B	393	SER	2.4
1	A	37	LEU	2.4
1	B	199	PHE	2.4
1	B	191	ILE	2.4
1	B	619	HIS	2.4
1	B	55	ASN	2.4
1	A	120	SER	2.3
1	A	45	ILE	2.3
1	A	355	ASN	2.3
1	A	598	ALA	2.3
1	A	618	VAL	2.3
1	B	586	PHE	2.3
1	A	238	ILE	2.3
1	A	624	THR	2.2
1	B	391	VAL	2.2

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Mol	Chain	Res	Type	RSRZ
1	A	71	SER	2.2
1	A	404	LEU	2.2
1	A	49	PRO	2.2
1	B	615	PHE	2.2
1	A	409	ILE	2.2
1	B	179	THR	2.2
1	B	599	GLY	2.1
1	A	94	LEU	2.1
1	A	589	ASN	2.1
1	A	121	SER	2.1
1	B	204	LYS	2.1
1	B	94	LEU	2.1
1	A	105	SER	2.0
1	B	96	ASN	2.0
1	A	83	LEU	2.0
1	B	589	ASN	2.0

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, 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
2	NAG	J	2	14/15	0.19	0.15	142,154,184,203	0
2	NAG	M	2	14/15	0.40	0.17	101,128,158,161	0
7	FUC	T	3	10/11	0.40	0.16	116,125,147,151	0
2	NAG	H	2	14/15	0.42	0.16	148,156,187,188	0
2	NAG	H	1	14/15	0.45	0.19	127,163,204,204	0
2	NAG	G	2	14/15	0.48	0.12	125,137,160,168	0
2	NAG	S	2	14/15	0.50	0.13	146,165,199,205	0
4	MAN	I	3	11/12	0.51	0.15	124,132,159,164	0
2	NAG	Q	2	14/15	0.52	0.12	138,148,179,181	0
5	MAN	N	5	11/12	0.54	0.15	117,127,153,154	0
2	NAG	L	2	14/15	0.56	0.15	132,144,170,176	0
2	NAG	D	2	14/15	0.58	0.15	141,151,182,187	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å²)	Q<0.9
4	MAN	R	3	11/12	0.58	0.15	129,143,168,172	0
2	NAG	K	2	14/15	0.59	0.15	124,131,156,158	0
4	NAG	R	2	14/15	0.60	0.14	134,148,174,182	0
2	NAG	C	2	14/15	0.60	0.12	155,165,198,199	0
3	MAN	E	6	11/12	0.65	0.15	114,133,160,161	0
2	NAG	J	1	14/15	0.66	0.13	112,135,163,164	0
2	NAG	C	1	14/15	0.67	0.13	145,174,207,209	0
2	NAG	L	1	14/15	0.67	0.13	106,120,141,144	0
3	MAN	E	5	11/12	0.67	0.12	105,116,140,140	0
5	MAN	N	6	11/12	0.71	0.19	120,138,159,168	0
2	NAG	F	2	14/15	0.73	0.14	102,111,133,138	0
7	NAG	T	2	14/15	0.74	0.12	119,131,152,157	0
2	NAG	Q	1	14/15	0.74	0.10	85,122,159,159	0
2	NAG	G	1	14/15	0.75	0.12	81,109,135,135	0
2	NAG	S	1	14/15	0.76	0.15	111,134,158,161	0
2	NAG	K	1	14/15	0.77	0.13	97,119,144,148	0
4	NAG	I	2	14/15	0.78	0.12	127,140,166,178	0
2	NAG	M	1	14/15	0.78	0.13	86,103,116,124	0
2	NAG	D	1	14/15	0.79	0.11	128,149,179,184	0
4	NAG	I	1	14/15	0.85	0.14	98,119,144,144	0
2	NAG	P	2	14/15	0.85	0.11	91,104,124,132	0
3	MAN	E	4	11/12	0.85	0.09	86,100,119,122	0
3	NAG	E	2	14/15	0.86	0.11	65,73,89,97	0
4	NAG	R	1	14/15	0.88	0.12	98,121,149,154	0
5	MAN	N	7	11/12	0.89	0.10	54,65,77,79	0
5	MAN	N	9	11/12	0.90	0.09	62,72,86,91	0
7	NAG	T	1	14/15	0.90	0.09	76,100,131,132	0
2	NAG	F	1	14/15	0.90	0.11	85,98,110,118	0
2	NAG	P	1	14/15	0.90	0.10	72,86,99,104	0
5	MAN	N	4	11/12	0.91	0.09	91,106,128,128	0
3	BMA	E	3	11/12	0.91	0.10	65,76,92,96	0
3	MAN	E	10	11/12	0.92	0.08	63,71,86,91	0
5	NAG	N	2	14/15	0.92	0.09	52,69,83,94	0
3	MAN	E	7	11/12	0.93	0.07	58,64,77,77	0
5	MAN	N	8	11/12	0.93	0.07	61,67,81,84	0
5	BMA	N	3	11/12	0.93	0.07	64,76,92,95	0
6	MAN	O	1	11/12	0.93	0.09	52,61,72,74	0
3	NAG	E	1	14/15	0.93	0.10	65,71,84,86	0
3	MAN	E	11	11/12	0.93	0.07	66,78,87,99	0
5	NAG	N	1	14/15	0.93	0.12	53,59,66,67	0
3	MAN	E	9	11/12	0.94	0.07	60,64,77,78	0
6	MAN	O	2	11/12	0.96	0.06	57,62,75,76	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
3	MAN	E	8	11/12	0.96	0.06	58,67,82,82	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.
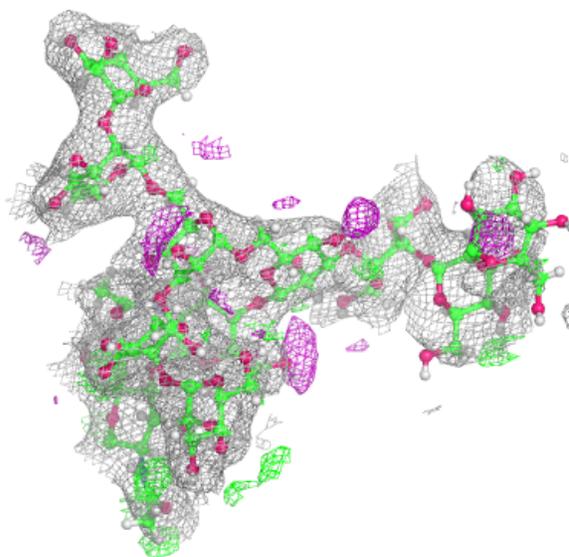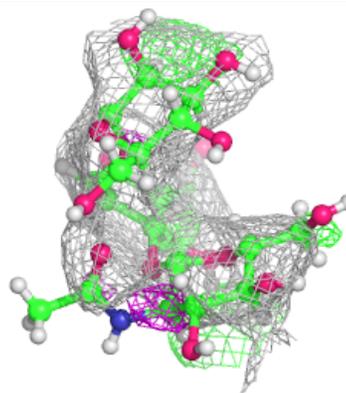
Electron density around Chain C:

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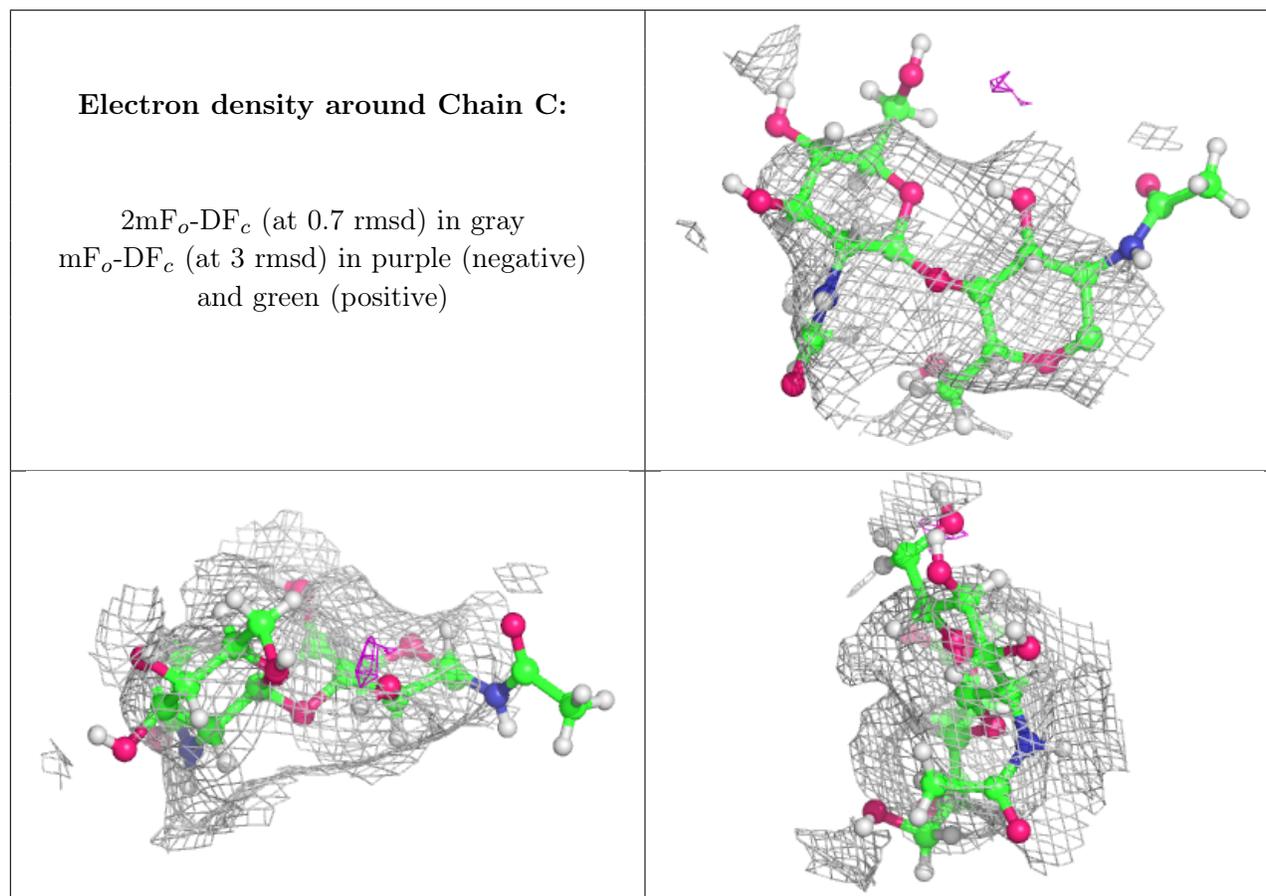
Electron density around Chain D:

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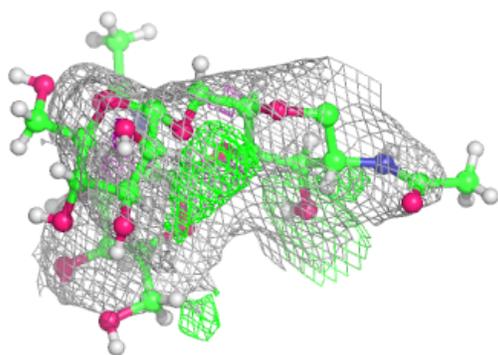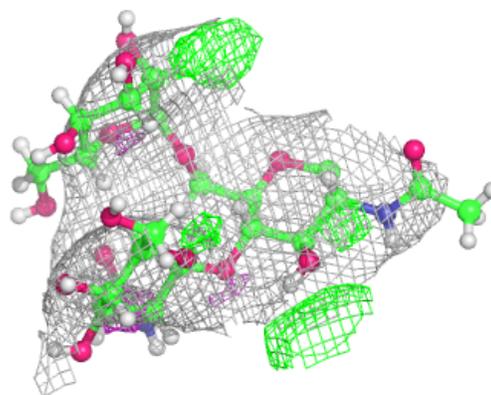and green (positive)
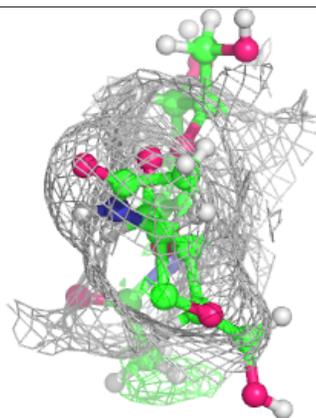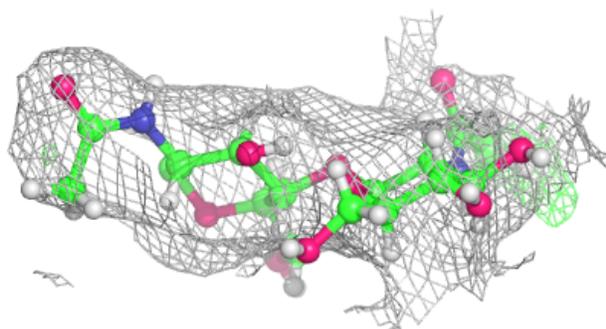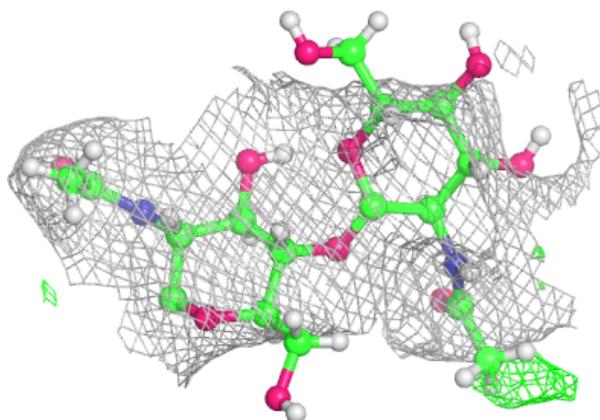
Electron density around Chain F:

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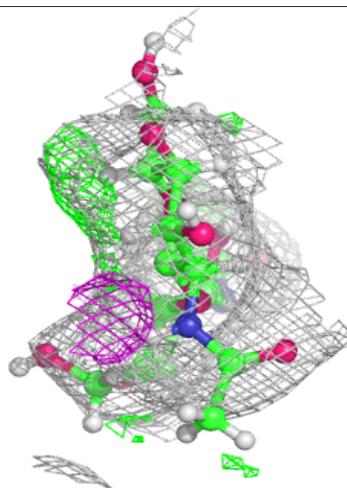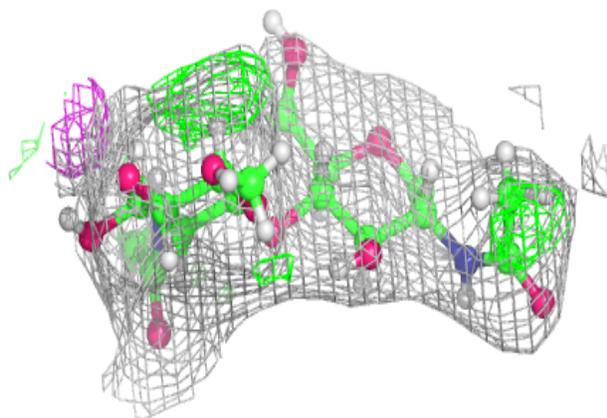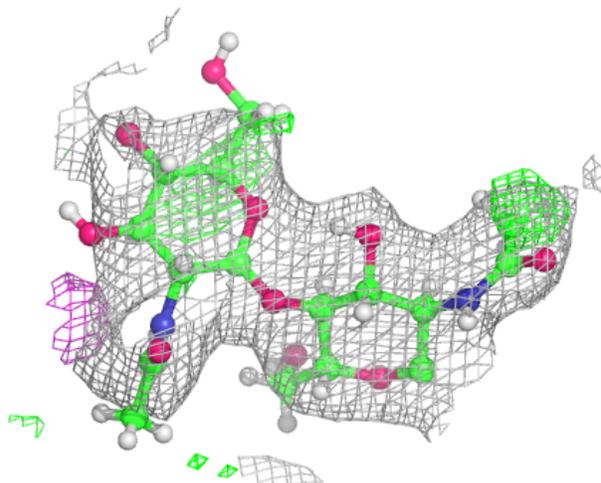
Electron density around Chain G:

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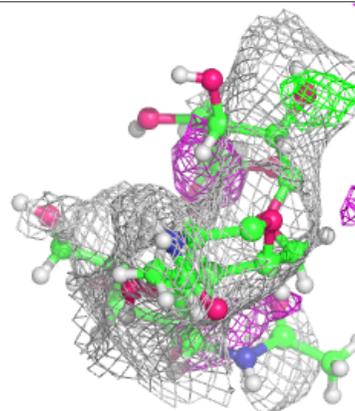and green (positive)
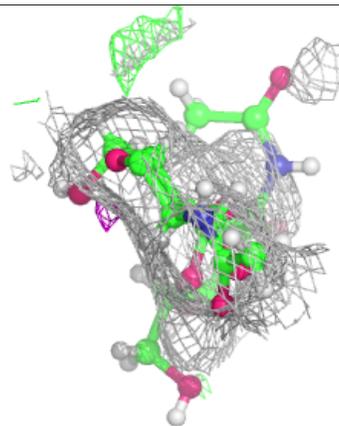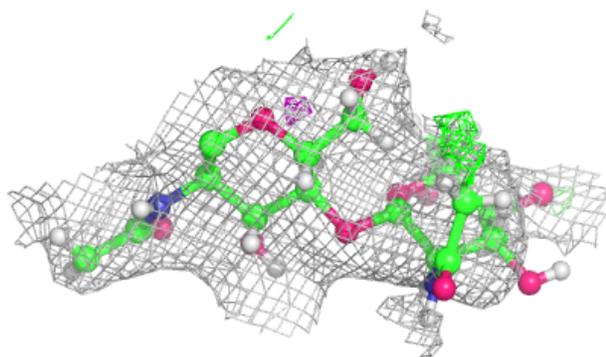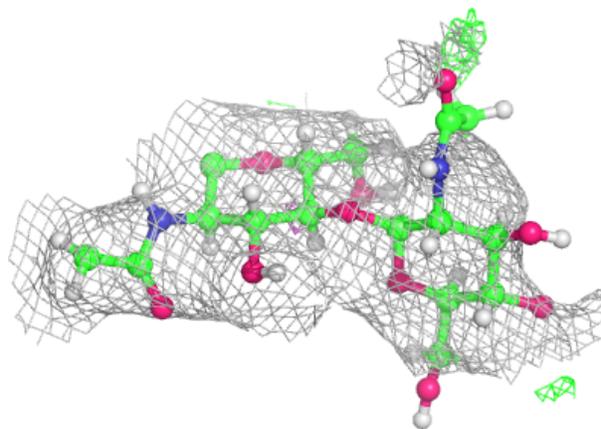
Electron density around Chain H:

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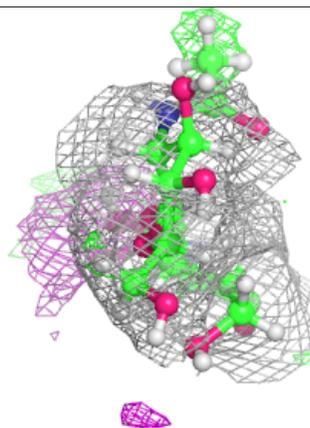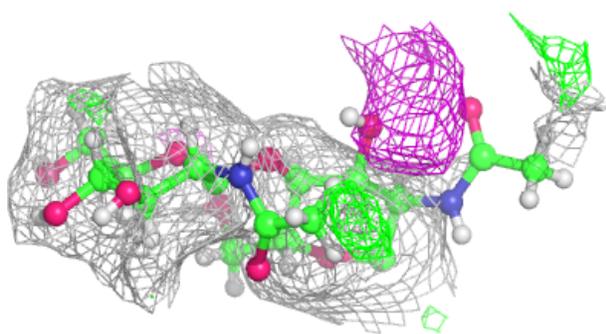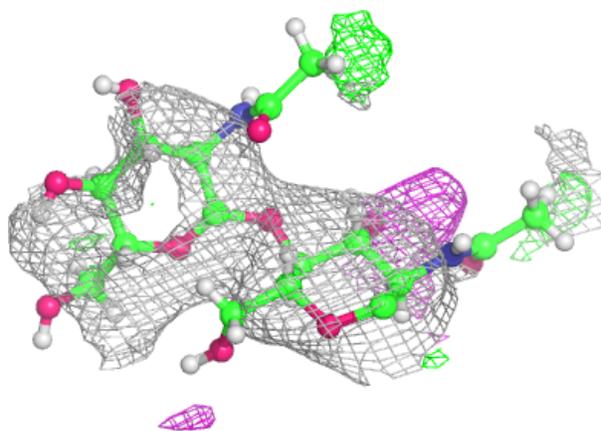
Electron density around Chain J:

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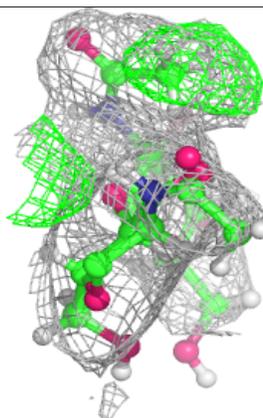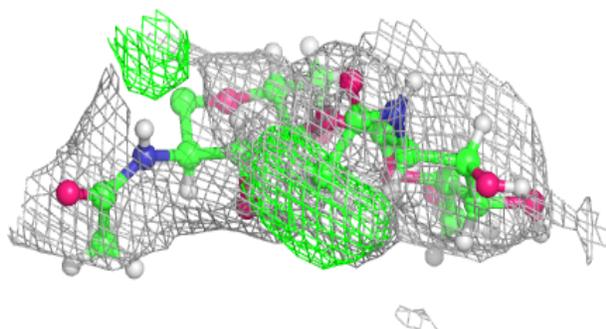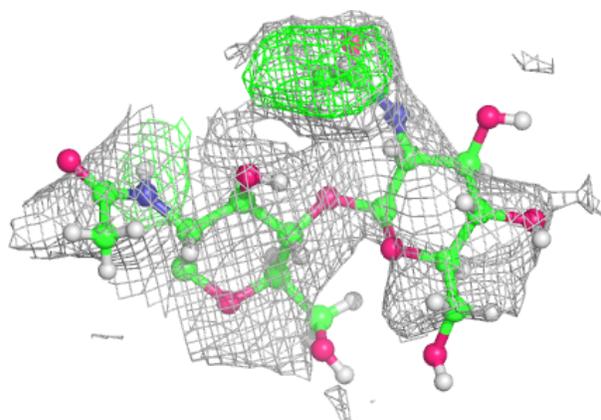
Electron density around Chain K:

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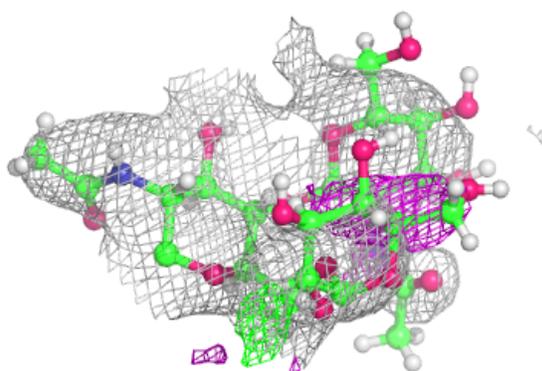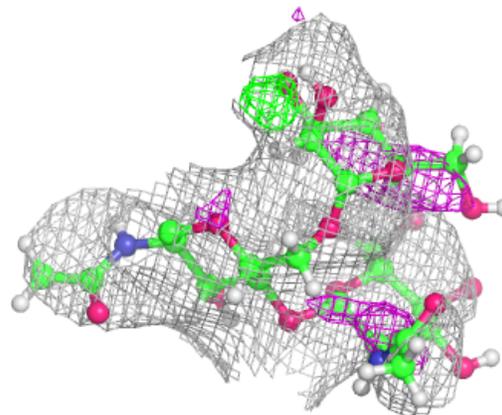and green (positive)
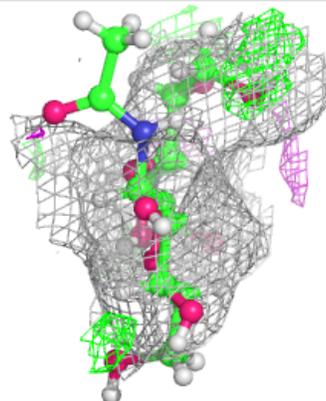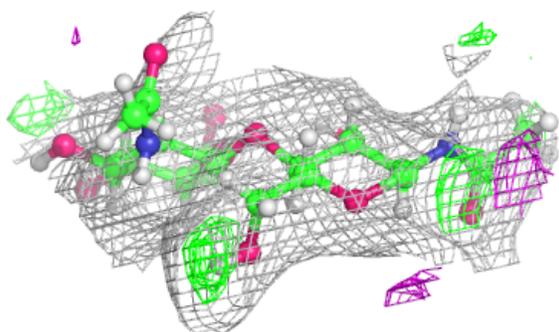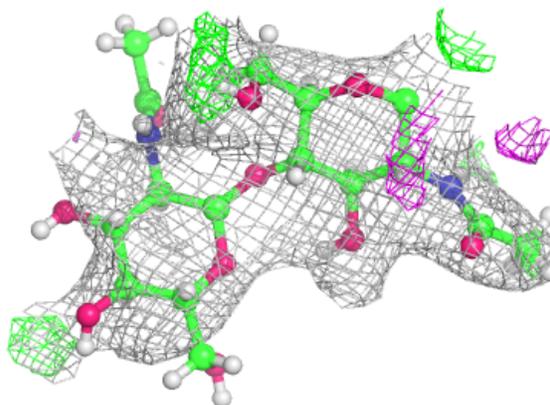
Electron density around Chain L:

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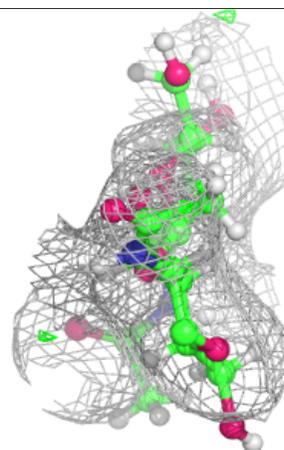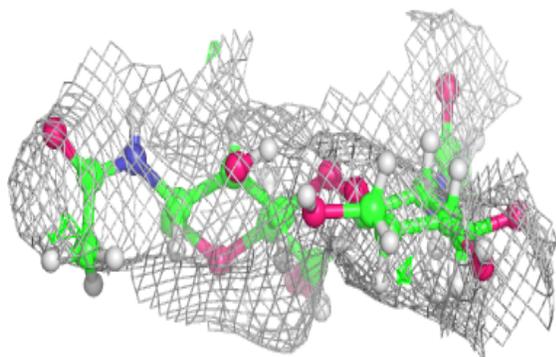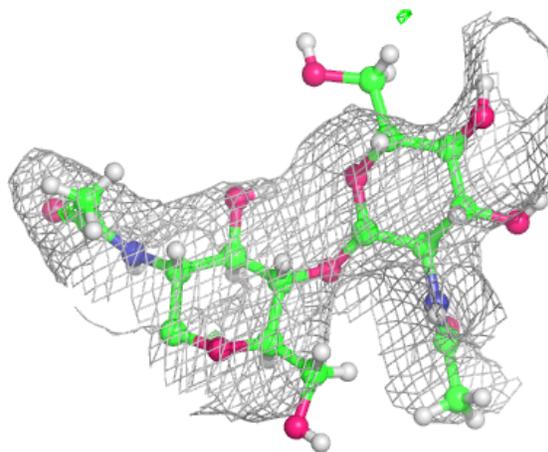
Electron density around Chain M:

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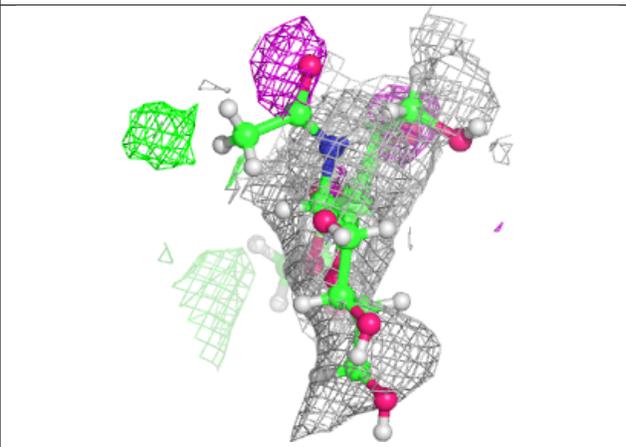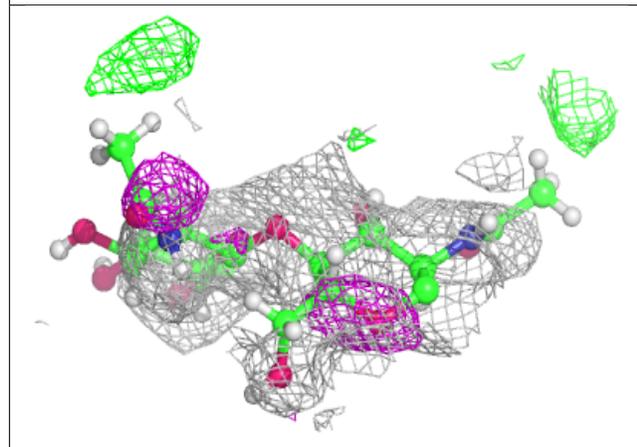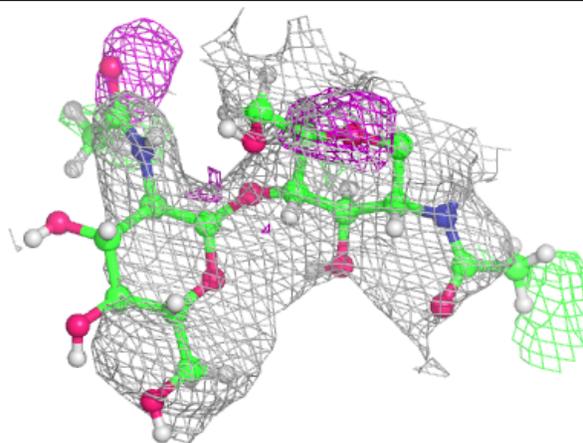
Electron density around Chain P:

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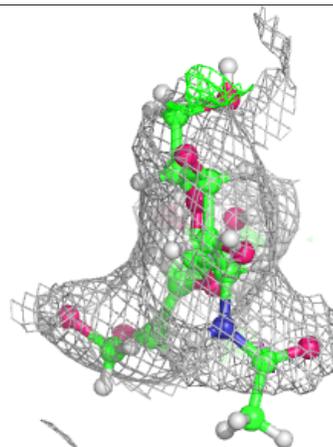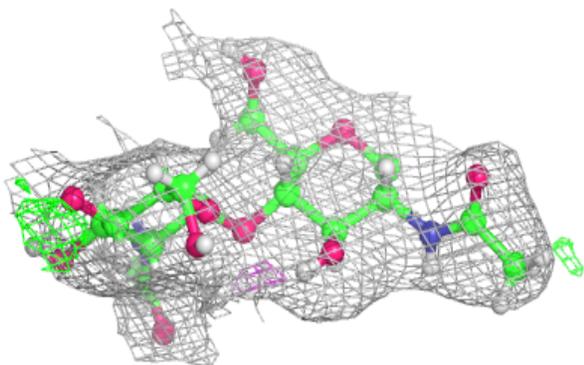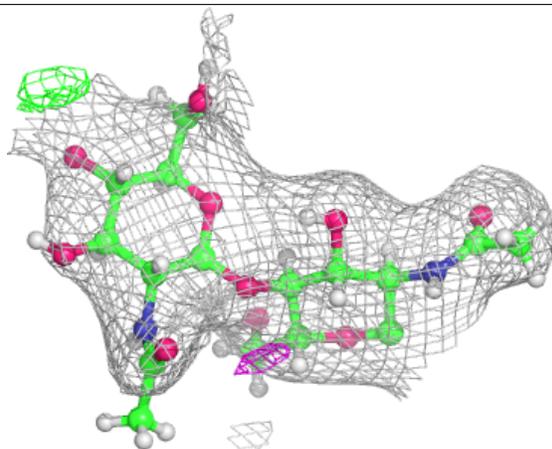
Electron density around Chain Q:

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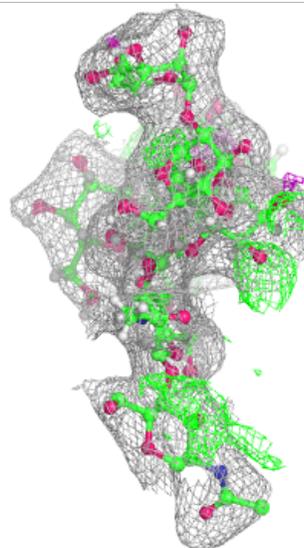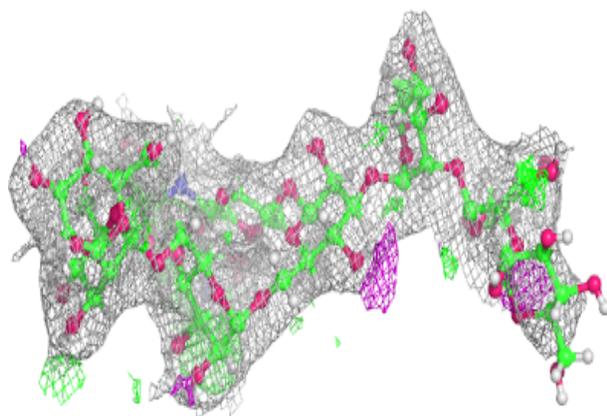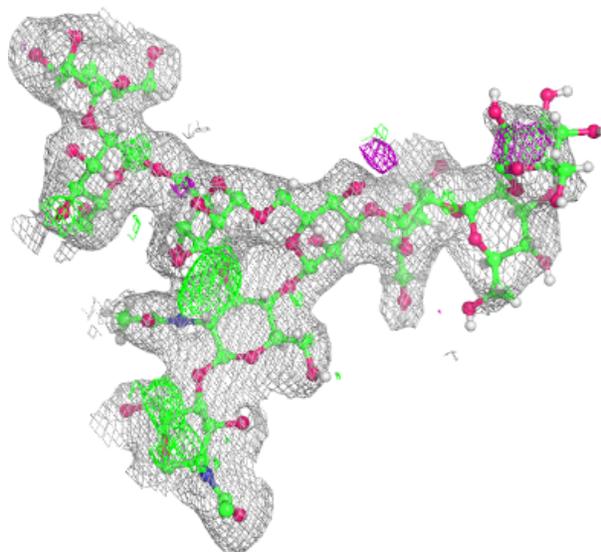and green (positive)
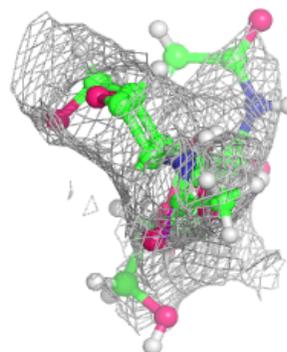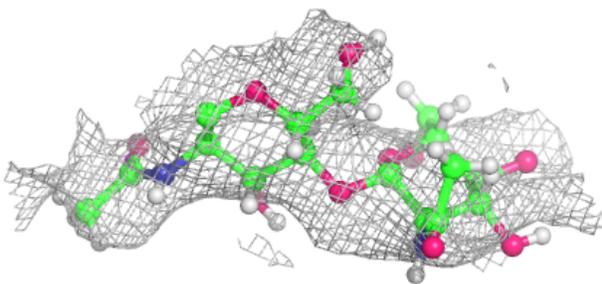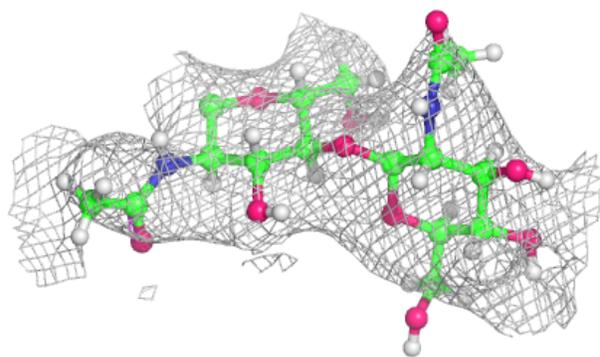
Electron density around Chain S:

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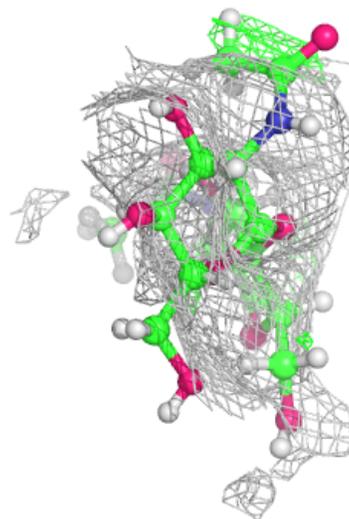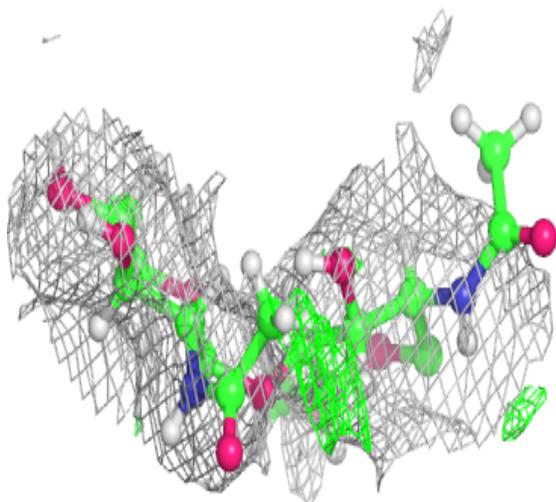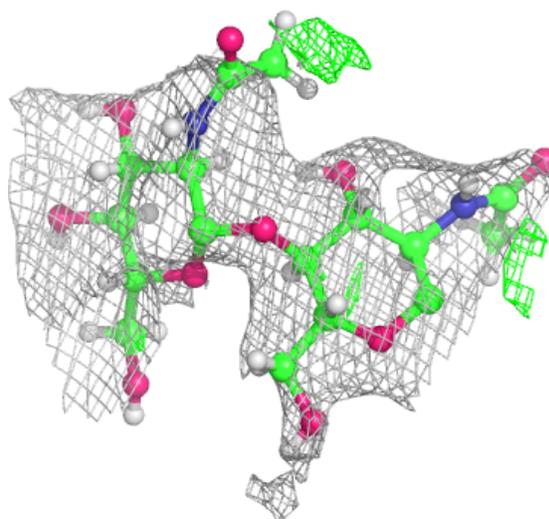
Electron density around Chain E:

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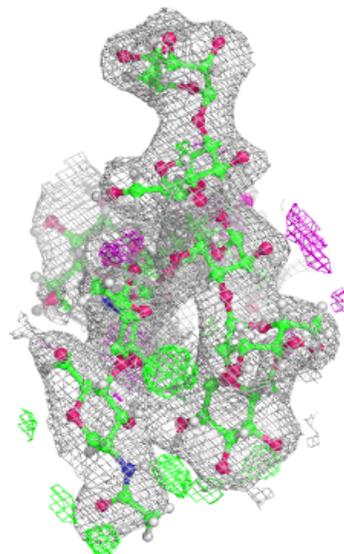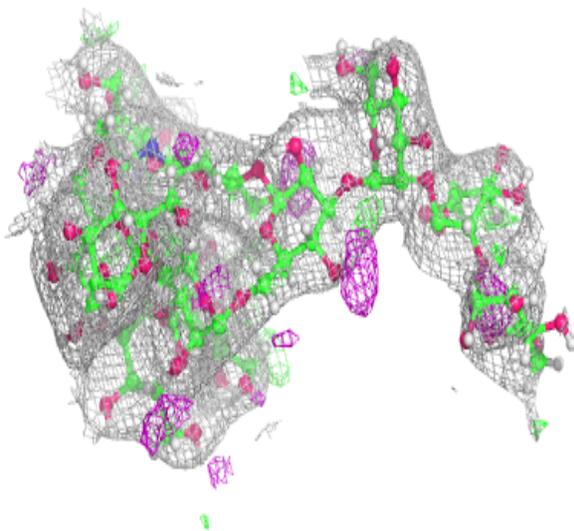
Electron density around Chain I:

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

Electron density around Chain R:

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

Electron density around Chain N:

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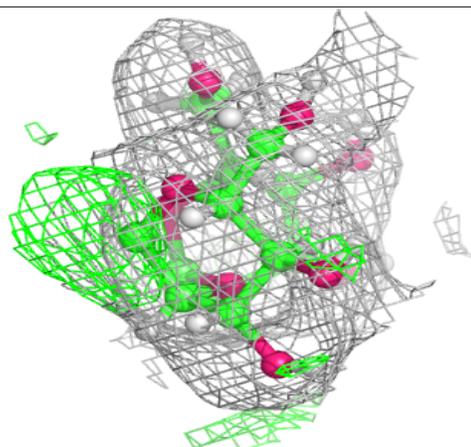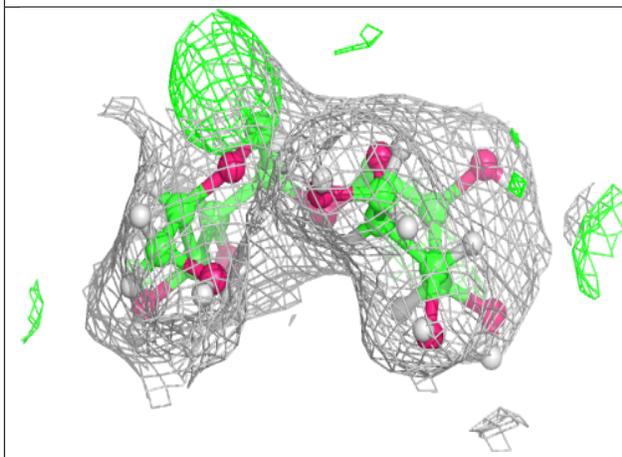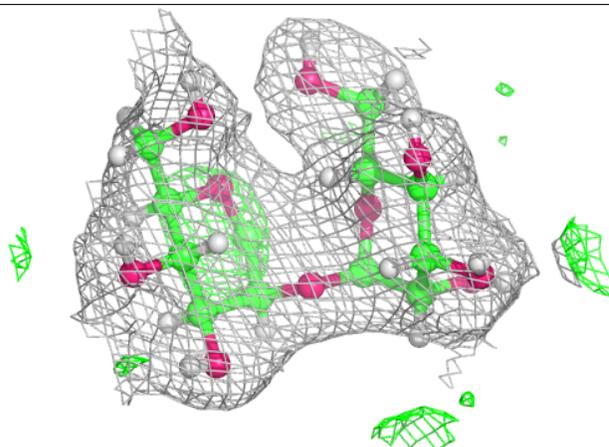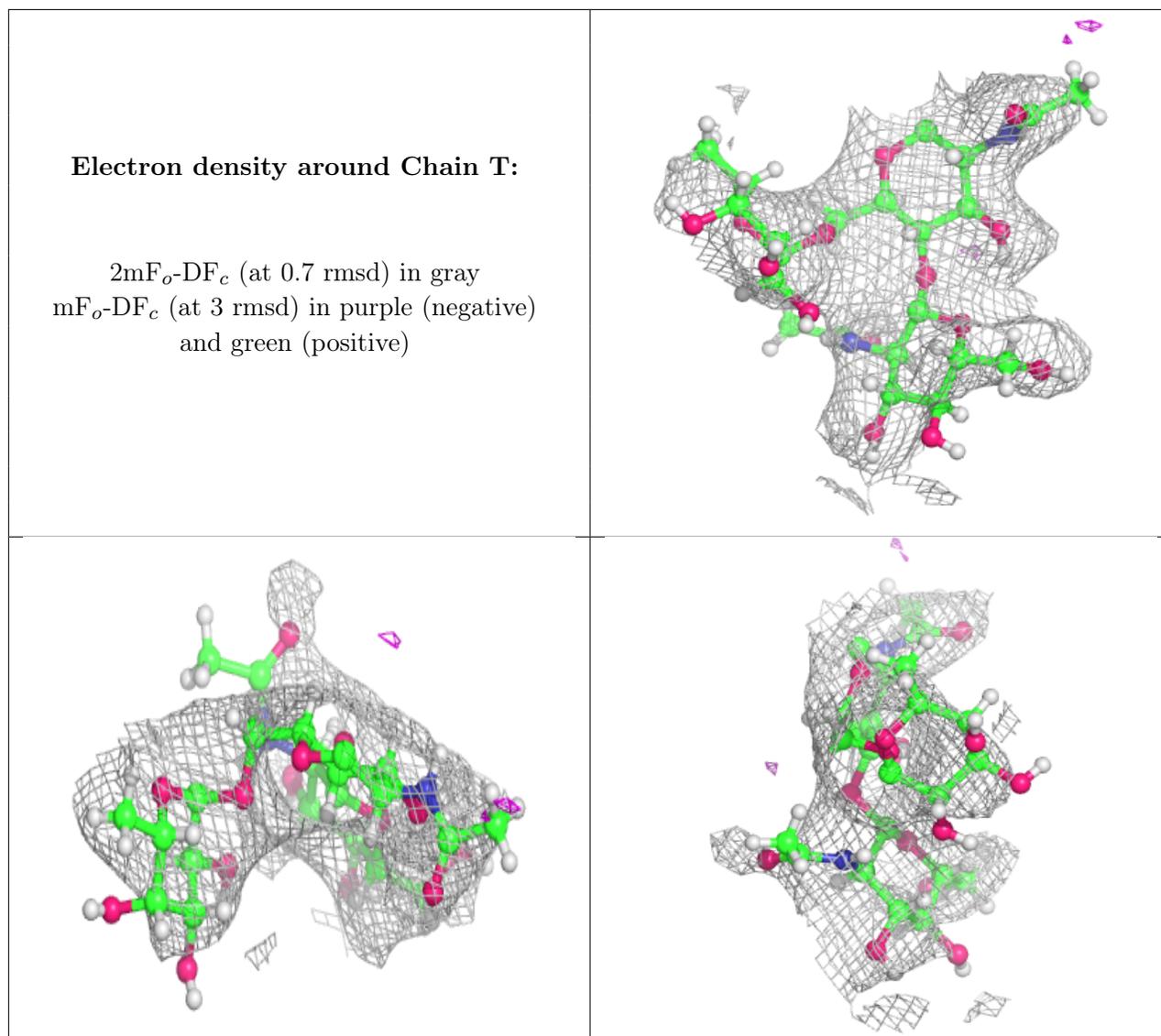mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)

Electron density around Chain O:

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 T:

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

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, 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.
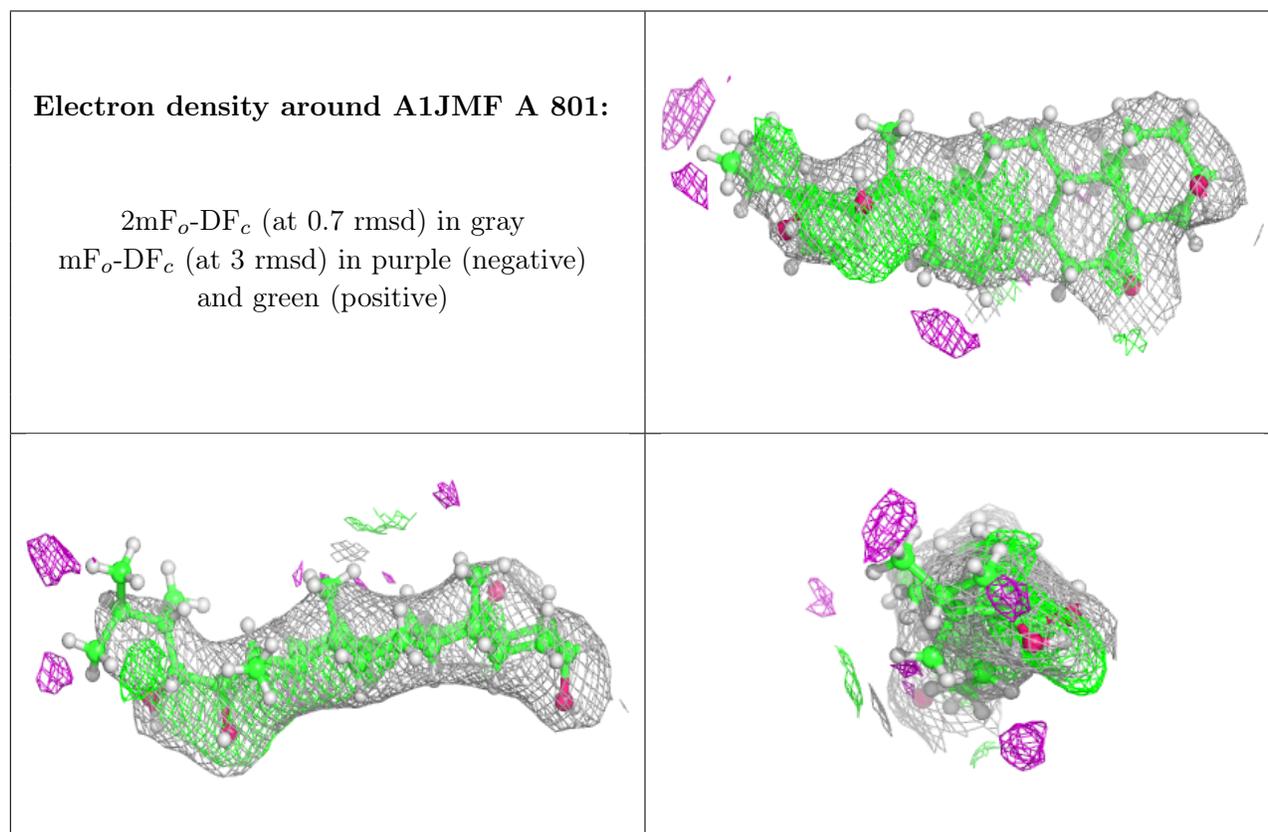
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
10	SO4	B	807	5/5	0.23	0.23	168,190,258,463	0
9	NAG	B	804	14/15	0.54	0.18	103,122,144,147	0
9	NAG	A	803	14/15	0.64	0.14	92,115,140,147	0
9	NAG	B	803	14/15	0.69	0.14	94,113,133,133	0
11	PGE	A	806	10/10	0.70	0.21	72,91,119,124	0
9	NAG	A	802	14/15	0.74	0.13	100,106,126,131	0
10	SO4	B	805	5/5	0.76	0.10	101,101,112,112	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($Å^2$)	Q<0.9
10	SO4	B	806	5/5	0.79	0.07	130,135,143,146	0
10	SO4	B	808	5/5	0.81	0.12	76,82,93,105	0
10	SO4	A	807	5/5	0.82	0.10	94,95,100,101	0
11	PGE	B	809	10/10	0.82	0.14	55,73,86,89	0
10	SO4	A	805	5/5	0.85	0.10	82,85,87,109	0
10	SO4	A	804	5/5	0.93	0.08	67,71,81,83	0
8	A1JMF	A	801	32/32	0.94	0.24	82,106,131,158	0
8	A1JMF	B	802	32/32	0.95	0.18	71,93,112,116	0
12	ACT	B	810	4/4	0.96	0.10	81,82,98,98	0
10	SO4	B	801	5/5	0.97	0.07	59,69,73,74	0

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

Electron density around A1JMF A 801:

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

Electron density around A1JMF B 802:

2mF$_o$-DF$_c$ (at 0.7 rmsd) in gray
mF$_o$-DF$_c$ (at 3 rmsd) in purple (negative)
and green (positive)
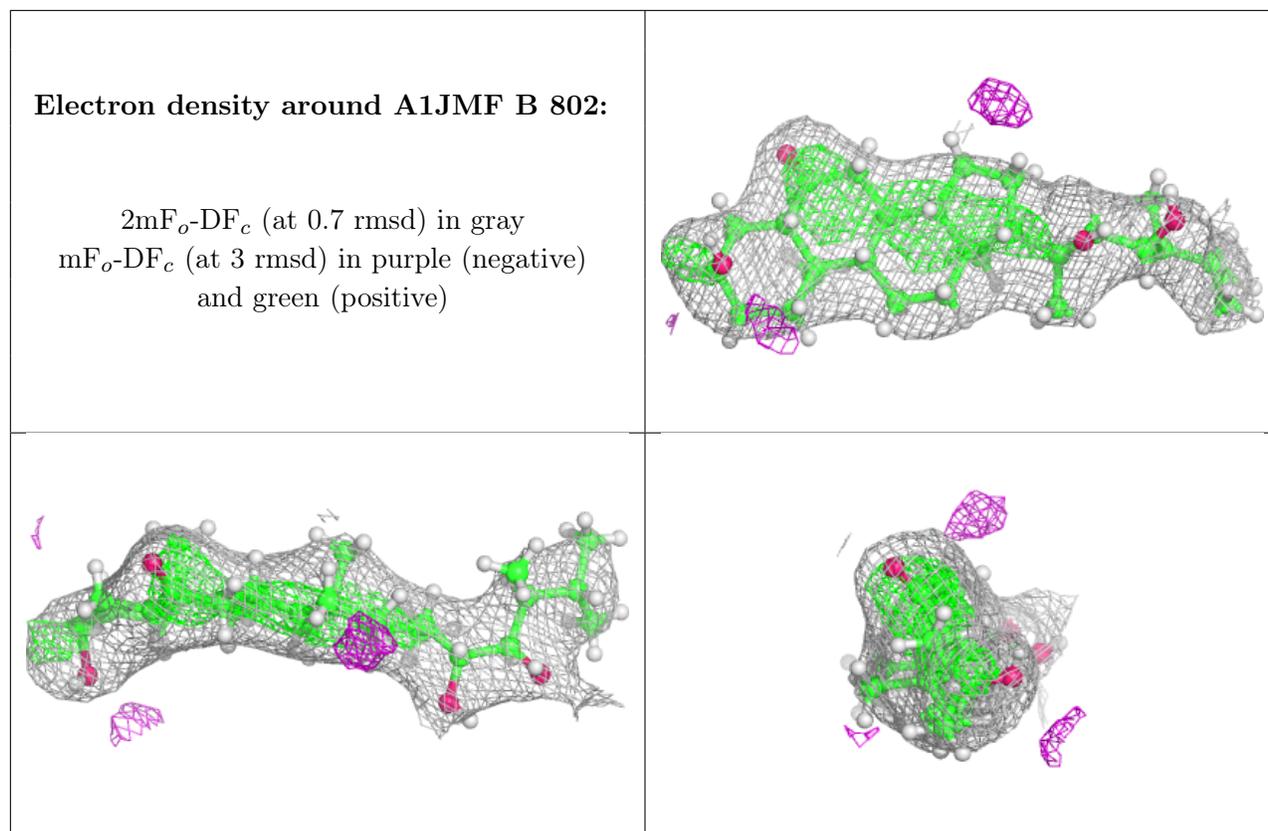
6.5 Other polymers (i)

There are no such residues in this entry.