WORLDWIDE PDB
PROTEIN DATA BANK

wwPDB X-ray Structure Validation Summary Report ⓘ

Jun 24, 2025 – 05:38 pm BST

PDB ID	:	7QQG / pdb_00007qqg
Title	:	Crystal structure of MYORG bound to 1-deoxygalactonojirimycin
Authors	:	Meek, R.W.; Davies, G.J.
Deposited on	:	2022-01-07
Resolution	:	2.43 Å(reported)

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

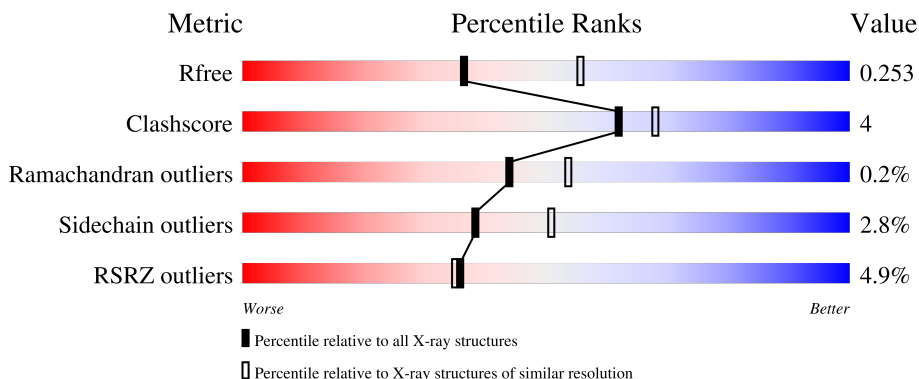|		
MolProbity	:	4-5-2 with Phenix2.0rc1
Mogul	:	1.8.4, CSD as541be (2020)
Xtriage (Phenix)	:	2.0rc1
EDS	:	3.0
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4	:	9.0.003 (Gargrove)
Density-Fitness	:	1.0.11
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.44

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 2.43 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.
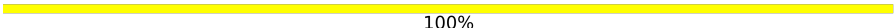
Metric	Percentile Ranks	Value
Rfree		0.253
Clashscore		4
Ramachandran outliers		0.2%
Sidechain outliers		2.8%
RSRZ outliers		4.9%

Worse   *Better*

▌ Percentile relative to all X-ray structures

▯ Percentile relative to X-ray structures of similar resolution
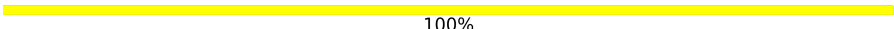
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R$_{free}$	164625	2124 (2.46-2.42)
Clashscore	180529	2259 (2.46-2.42)
Ramachandran outliers	177936	2244 (2.46-2.42)
Sidechain outliers	177891	2244 (2.46-2.42)
RSRZ outliers	164620	2124 (2.46-2.42)

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	636	2% ▪ / 87% green, 9% yellow ·
1	B	636	% ▪ / 86% green, 11% yellow ··
1	C	636	4% ▪ / 85% green, 11% yellow ··
1	D	636	11% ▪ / 69% green, 9% yellow, 22% grey
2	E	2	100% yellow

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Mol	Chain	Length	Quality of chain
2	G	2	50% 50%
2	H	2	100%
2	I	2	50% 50%
2	J	2	50% 50%
2	K	2	100%
3	F	3	67% 33%

2 Entry composition ⓘ

There are 7 unique types of molecules in this entry. The entry contains 19500 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, the ZeroOcc column contains the number of atoms modelled with zero occupancy, the AltConf column contains the number of residues with at least one atom in alternate conformation and the Trace column contains the number of residues modelled with at most 2 atoms.

- Molecule 1 is a protein called Myogenesis-regulating glycosidase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	618	Total	C	N	O	S	0	0	0
			4973	3207	866	884	16			
1	B	623	Total	C	N	O	S	0	0	0
			5013	3234	874	889	16			
1	C	614	Total	C	N	O	S	0	0	0
			4913	3175	848	874	16			
1	D	496	Total	C	N	O	S	0	0	0
			3964	2575	672	707	10			

There are 4 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	79	GLY	-	expression tag	UNP Q6NSJ0
B	79	GLY	-	expression tag	UNP Q6NSJ0
C	79	GLY	-	expression tag	UNP Q6NSJ0
D	79	GLY	-	expression tag	UNP Q6NSJ0

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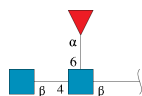

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
2	E	2	Total	C	N	O	0	0	0
			28	16	2	10			
2	G	2	Total	C	N	O	0	0	0
			28	16	2	10			
2	H	2	Total	C	N	O	0	0	0
			28	16	2	10			

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Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
2	I	2	Total 28	C 16	N 2	O 10	0	0	0
2	J	2	Total 28	C 16	N 2	O 10	0	0	0
2	K	2	Total 28	C 16	N 2	O 10	0	0	0

- Molecule 3 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
3	F	3	Total 38	C 22	N 2	O 14	0	0	0

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

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

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

- Molecule 5 is (2R,3S,4R,5S)-2-(hydroxymethyl)piperidine-3,4,5-triol (CCD ID: DGJ) (formula: $C_6H_{13}NO_4$) (labeled as "Ligand of Interest" by depositor).
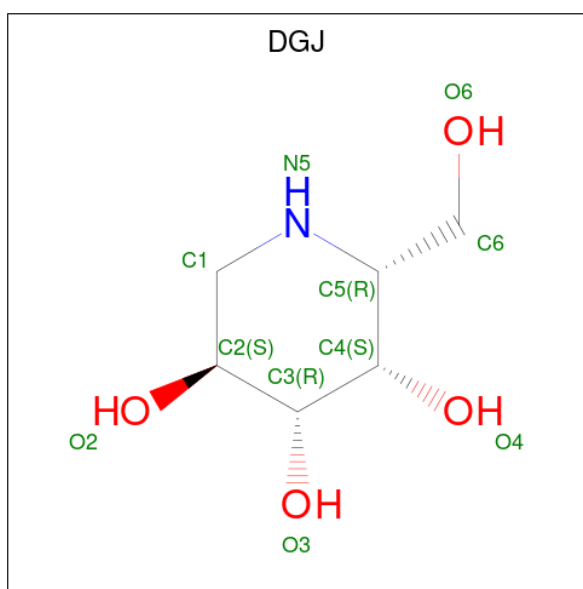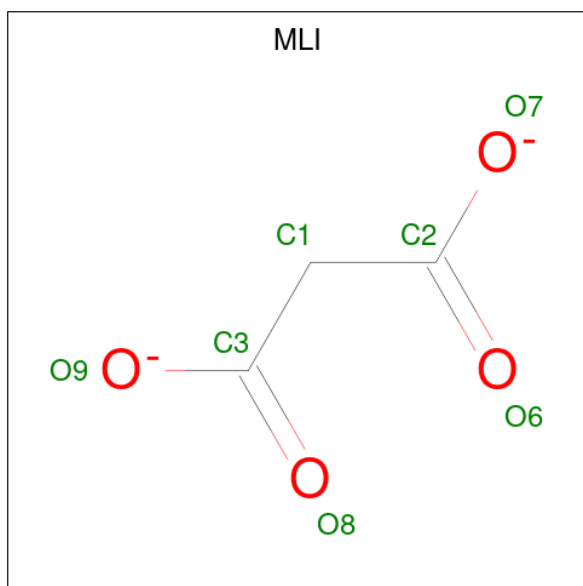

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
5	A	1	Total 11	C 6	N 1	O 4	0	0
5	B	1	Total 11	C 6	N 1	O 4	0	0
5	C	1	Total 11	C 6	N 1	O 4	0	0

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Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
5	D	1	Total 11	C 6	N 1	O 4	0	0

- Molecule 6 is MALONATE ION (CCD ID: MLI) (formula: $C_3H_2O_4$).

Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
6	A	1	Total 7	C 3	O 4	0	0
6	B	1	Total 7	C 3	O 4	0	0

- Molecule 7 is water.

| Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
7	A	86	Total 86	O 86	0	0
7	B	91	Total 91	O 91	0	0
7	C	33	Total 33	O 33	0	0
7	D	23	Total 23	O 23	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.
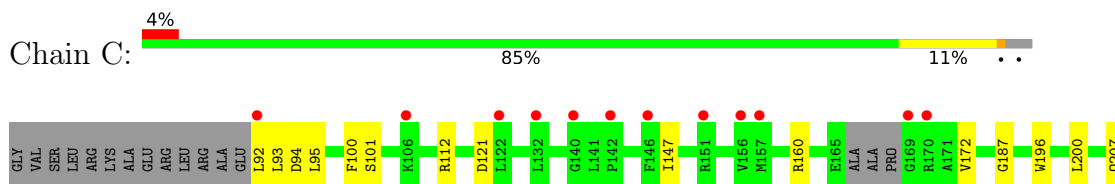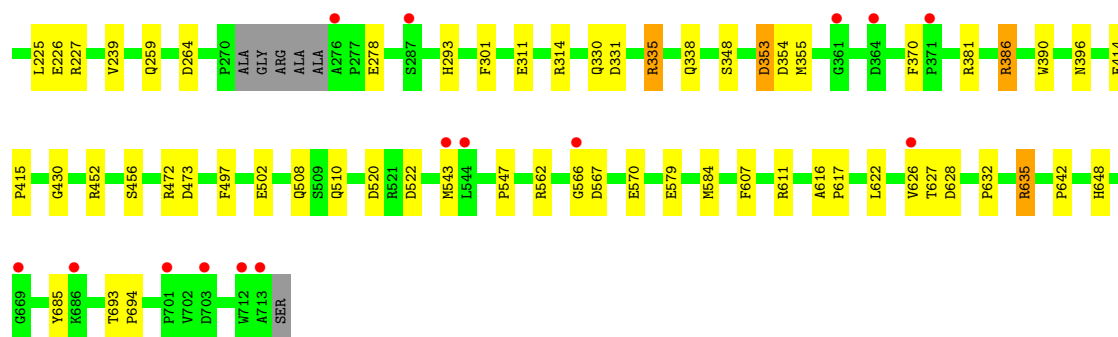
• Molecule 1: Myogenesis-regulating glycosidase
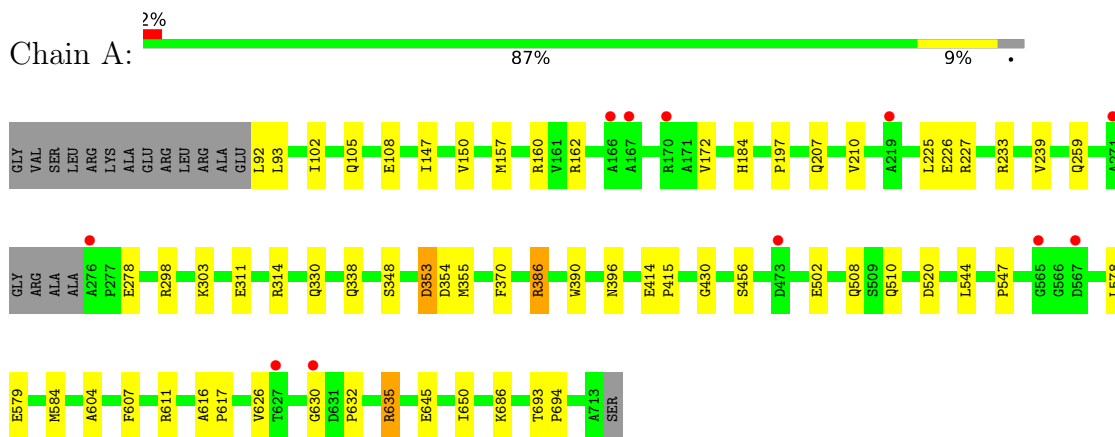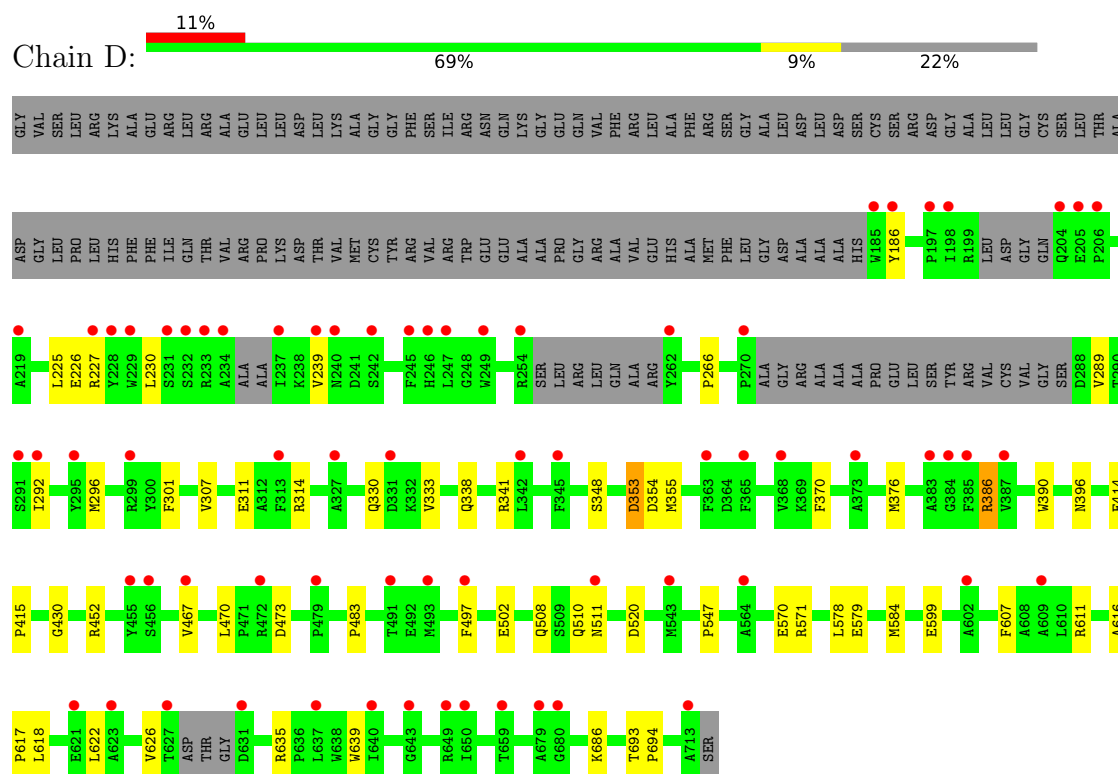

• Molecule 1: Myogenesis-regulating glycosidase
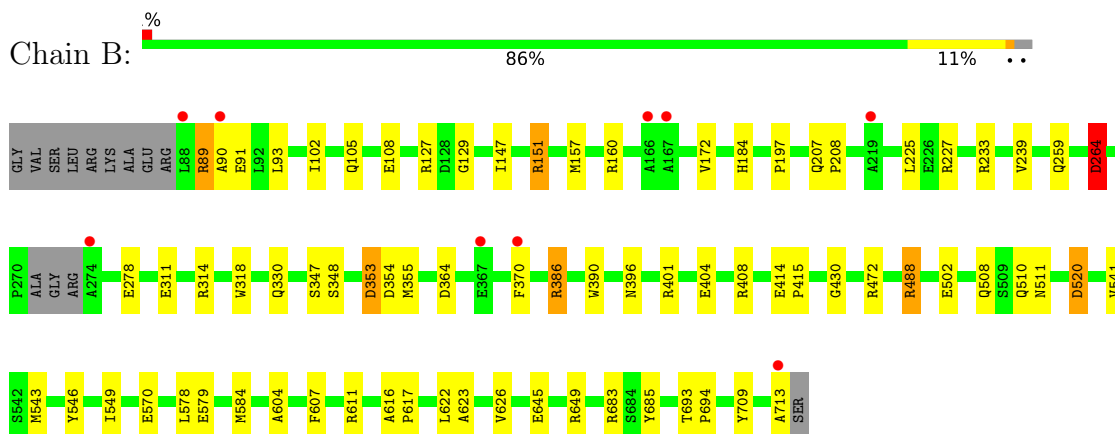
• Molecule 1: Myogenesis-regulating glycosidase

• Molecule 1: Myogenesis-regulating glycosidase

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

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

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

Chain H:

100%

MAG1
NAG2

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

Chain I:

50%   50%

NAG1
NAG2

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

Chain J:

50%   50%

NAG1
NAG2

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

Chain K:

100%

NAG1
NAG2

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

Chain F:

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	73.11Å 78.88Å 176.22Å 80.78° 80.21° 62.64°	Depositor
Resolution (Å)	69.75 – 2.43 69.75 – 2.43	Depositor EDS
% Data completeness (in resolution range)	98.1 (69.75-2.43) 96.9 (69.75-2.43)	Depositor EDS
R_{merge}	0.07	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.48 (at 2.42Å)	Xtriage
Refinement program	REFMAC 5.8.0267	Depositor
R, R_{free}	0.224 , 0.250 0.227 , 0.253	Depositor DCC
R_{free} test set	6102 reflections (4.80%)	wwPDB-VP
Wilson B-factor (Å^2)	47.2	Xtriage
Anisotropy	0.145	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.35 , 38.9	EDS
L-test for twinning[2]	$< |L| > = 0.50, < L^2 > = 0.33$	Xtriage
Estimated twinning fraction	0.015 for h,h-k,h-l	Xtriage
F_o,F_c correlation	0.93	EDS
Total number of atoms	19500	wwPDB-VP
Average B, all atoms (Å^2)	61.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.79% 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: NAG, DGJ, MLI, FUC

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	0.99	0/5129	1.29	0/6988
1	B	0.99	0/5169	1.30	4/7040 (0.1%)
1	C	0.98	0/5067	1.30	5/6907 (0.1%)
1	D	0.97	0/4097	1.32	2/5602 (0.0%)
All	All	0.98	0/19462	1.30	11/26537 (0.0%)

There are no bond length outliers.

The worst 5 of 11 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	B	264	ASP	CA-CB-CG	7.07	119.67	112.60
1	C	566	GLY	CA-C-N	5.52	127.61	120.44
1	C	566	GLY	C-N-CA	5.52	127.61	120.44
1	B	570	GLU	CA-C-N	5.50	127.58	120.44
1	B	570	GLU	C-N-CA	5.50	127.58	120.44

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	4973	0	4802	32	0
1	B	5013	0	4851	47	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	C	4913	0	4715	35	0
1	D	3964	0	3713	38	0
2	E	28	0	25	0	0
2	G	28	0	25	0	0
2	H	28	0	25	0	0
2	I	28	0	25	0	0
2	J	28	0	25	0	0
2	K	28	0	25	0	0
3	F	38	0	34	1	0
4	A	42	0	39	1	0
4	B	28	0	26	0	0
4	C	42	0	39	0	0
4	D	28	0	26	0	0
5	A	11	0	13	0	0
5	B	11	0	13	1	0
5	C	11	0	13	0	0
5	D	11	0	13	0	0
6	A	7	0	2	0	0
6	B	7	0	2	0	0
7	A	86	0	0	2	0
7	B	91	0	0	0	0
7	C	33	0	0	0	0
7	D	23	0	0	0	0
All	All	19500	0	18451	151	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 4.

The worst 5 of 151 close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:108:GLU:OE2	1:A:233:ARG:HD3	1.71	0.90
1:C:547:PRO:HG3	1:C:626:VAL:HG11	1.72	0.72
1:A:584:MET:O	1:A:611:ARG:NH2	2.22	0.72
1:D:584:MET:O	1:D:611:ARG:NH2	2.24	0.71
1:C:584:MET:O	1:C:611:ARG:NH2	2.23	0.70

There are no symmetry-related clashes.

5.3 Torsion angles ⓘ

5.3.1 Protein backbone ⓘ

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	614/636 (96%)	586 (95%)	27 (4%)	1 (0%)	44	53
1	B	619/636 (97%)	592 (96%)	26 (4%)	1 (0%)	44	53
1	C	608/636 (96%)	579 (95%)	28 (5%)	1 (0%)	44	53
1	D	484/636 (76%)	455 (94%)	28 (6%)	1 (0%)	44	53
All	All	2325/2544 (91%)	2212 (95%)	109 (5%)	4 (0%)	44	53

All (4) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	520	ASP
1	B	520	ASP
1	C	520	ASP
1	D	520	ASP

5.3.2 Protein sidechains ⓘ

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	517/533 (97%)	502 (97%)	15 (3%)	37	49
1	B	519/533 (97%)	509 (98%)	10 (2%)	52	65
1	C	507/533 (95%)	487 (96%)	20 (4%)	27	37
1	D	402/533 (75%)	392 (98%)	10 (2%)	42	55
All	All	1945/2132 (91%)	1890 (97%)	55 (3%)	38	51

5 of 55 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	C	200	LEU
1	C	353	ASP
1	D	686	LYS
1	D	386	ARG
1	C	207	GLN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 10 such sidechains are listed below:

Mol	Chain	Res	Type
1	C	338	GLN
1	C	344	HIS
1	D	344	HIS
1	A	344	HIS
1	B	344	HIS

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 ⓘ

15 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	E	1	1,2	14,14,15	0.50	0	17,19,21	1.39	2 (11%)
2	NAG	E	2	2	14,14,15	0.47	0	17,19,21	1.92	6 (35%)

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Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
3	NAG	F	1	1,3	14,14,15	0.42	0	17,19,21	1.27	2 (11%)
3	NAG	F	2	3	14,14,15	0.53	0	17,19,21	1.50	2 (11%)
3	FUC	F	3	3	10,10,11	0.89	1 (10%)	14,14,16	1.60	4 (28%)
2	NAG	G	1	1,2	14,14,15	0.50	0	17,19,21	1.03	0
2	NAG	G	2	2	14,14,15	0.80	0	17,19,21	1.16	2 (11%)
2	NAG	H	1	1,2	14,14,15	0.44	0	17,19,21	1.33	3 (17%)
2	NAG	H	2	2	14,14,15	0.67	0	17,19,21	1.10	1 (5%)
2	NAG	I	1	1,2	14,14,15	0.37	0	17,19,21	1.27	1 (5%)
2	NAG	I	2	2	14,14,15	0.42	0	17,19,21	1.08	0
2	NAG	J	1	1,2	14,14,15	0.49	0	17,19,21	0.90	0
2	NAG	J	2	2	14,14,15	0.25	0	17,19,21	0.96	1 (5%)
2	NAG	K	1	1,2	14,14,15	0.55	0	17,19,21	1.36	2 (11%)
2	NAG	K	2	2	14,14,15	0.40	0	17,19,21	0.96	1 (5%)

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	NAG	E	1	1,2	-	0/6/23/26	0/1/1/1
2	NAG	E	2	2	-	1/6/23/26	0/1/1/1
3	NAG	F	1	1,3	-	0/6/23/26	0/1/1/1
3	NAG	F	2	3	-	0/6/23/26	0/1/1/1
3	FUC	F	3	3	-	-	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
2	NAG	H	1	1,2	-	0/6/23/26	0/1/1/1
2	NAG	H	2	2	-	0/6/23/26	0/1/1/1
2	NAG	I	1	1,2	-	0/6/23/26	0/1/1/1
2	NAG	I	2	2	-	0/6/23/26	0/1/1/1
2	NAG	J	1	1,2	-	0/6/23/26	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	-	0/6/23/26	0/1/1/1

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	F	3	FUC	C2-C3	2.11	1.55	1.52

The worst 5 of 27 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	F	2	NAG	O5-C5-C6	4.23	113.84	107.20
2	E	2	NAG	C1-C2-N2	3.65	116.73	110.49
2	K	1	NAG	C1-C2-N2	-3.57	104.39	110.49
2	E	2	NAG	C4-C3-C2	-3.33	106.14	111.02
2	I	1	NAG	O5-C5-C6	3.29	112.37	107.20

There are no chirality outliers.

All (5) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	J	2	NAG	O5-C5-C6-O6
2	J	2	NAG	C4-C5-C6-O6
2	E	2	NAG	O5-C5-C6-O6
2	G	2	NAG	C4-C5-C6-O6
2	G	2	NAG	O5-C5-C6-O6

There are no ring outliers.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	F	3	FUC	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 E

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain G

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain H

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain I

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 F

Bond lengths

Bond angles

Torsions

Rings

5.6 Ligand geometry ⓘ

16 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	$\#|Z| > 2$
6	MLI	B	804	-	6,6,6	1.25	0	7,7,7	1.56	1 (14%)
4	NAG	B	802	1	14,14,15	0.47	0	17,19,21	1.11	1 (5%)
5	DGJ	A	803	-	11,11,11	1.42	3 (27%)	13,15,15	1.92	3 (23%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	#|Z| > 2	Counts	RMSZ	#|Z| > 2
4	NAG	C	802	1	14,14,15	0.32	0	17,19,21	1.35	3 (17%)
6	MLI	A	804	-	6,6,6	1.82	2 (33%)	7,7,7	1.37	0
4	NAG	A	801	1	14,14,15	0.55	0	17,19,21	2.11	4 (23%)
4	NAG	B	801	1	14,14,15	0.60	0	17,19,21	1.21	4 (23%)
4	NAG	D	1002	1	14,14,15	0.60	0	17,19,21	1.61	2 (11%)
4	NAG	C	801	1	14,14,15	0.71	0	17,19,21	1.44	2 (11%)
4	NAG	C	803	1	14,14,15	0.90	0	17,19,21	2.13	2 (11%)
5	DGJ	D	1000	-	11,11,11	1.45	1 (9%)	13,15,15	0.93	0
5	DGJ	C	804	-	11,11,11	1.87	3 (27%)	13,15,15	1.72	4 (30%)
4	NAG	A	805	1	14,14,15	0.56	0	17,19,21	1.04	0
4	NAG	A	802	1	14,14,15	0.56	0	17,19,21	1.66	2 (11%)
4	NAG	D	1001	1	14,14,15	0.59	0	17,19,21	1.47	3 (17%)
5	DGJ	B	803	-	11,11,11	1.47	3 (27%)	13,15,15	0.95	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
6	MLI	B	804	-	-	0/4/4/4	-
4	NAG	B	802	1	-	0/6/23/26	0/1/1/1
5	DGJ	A	803	-	-	0/2/19/19	0/1/1/1
4	NAG	C	802	1	-	0/6/23/26	0/1/1/1
6	MLI	A	804	-	-	0/4/4/4	-
4	NAG	A	801	1	-	0/6/23/26	0/1/1/1
4	NAG	B	801	1	-	1/6/23/26	0/1/1/1
4	NAG	D	1002	1	-	1/6/23/26	0/1/1/1
4	NAG	C	801	1	-	2/6/23/26	0/1/1/1
4	NAG	C	803	1	-	0/6/23/26	0/1/1/1
5	DGJ	D	1000	-	-	0/2/19/19	0/1/1/1
5	DGJ	C	804	-	-	0/2/19/19	0/1/1/1
4	NAG	A	805	1	-	0/6/23/26	0/1/1/1
4	NAG	A	802	1	-	1/6/23/26	0/1/1/1
4	NAG	D	1001	1	-	0/6/23/26	0/1/1/1
5	DGJ	B	803	-	-	0/2/19/19	0/1/1/1

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

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	D	1000	DGJ	C1-C2	3.85	1.56	1.52
5	C	804	DGJ	C1-C2	3.82	1.56	1.52
5	C	804	DGJ	C5-N5	3.11	1.52	1.47
5	B	803	DGJ	C1-N5	2.90	1.51	1.47
5	A	803	DGJ	C1-N5	2.75	1.51	1.47

The worst 5 of 31 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
4	C	803	NAG	C1-O5-C5	7.30	122.09	112.19
4	A	801	NAG	C3-C4-C5	-5.19	100.98	110.24
4	D	1002	NAG	C1-O5-C5	4.86	118.78	112.19
4	A	802	NAG	C1-O5-C5	4.46	118.24	112.19
4	C	801	NAG	C1-O5-C5	4.35	118.09	112.19

There are no chirality outliers.

All (5) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	C	801	NAG	O5-C5-C6-O6
4	C	801	NAG	C4-C5-C6-O6
4	D	1002	NAG	O5-C5-C6-O6
4	A	802	NAG	C8-C7-N2-C2
4	B	801	NAG	C4-C5-C6-O6

There are no ring outliers.

2 monomers are involved in 2 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	A	801	NAG	1	0
5	B	803	DGJ	1	0

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less then 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier.

The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

Ligand DGJ A 803

Bond lengths   Bond angles

Torsions   Rings

Ligand DGJ D 1000

Bond lengths   Bond angles

Torsions   Rings

Ligand DGJ C 804

Bond lengths

Bond angles

Torsions

Rings

Ligand DGJ B 803

Bond lengths

Bond angles

Torsions

Rings
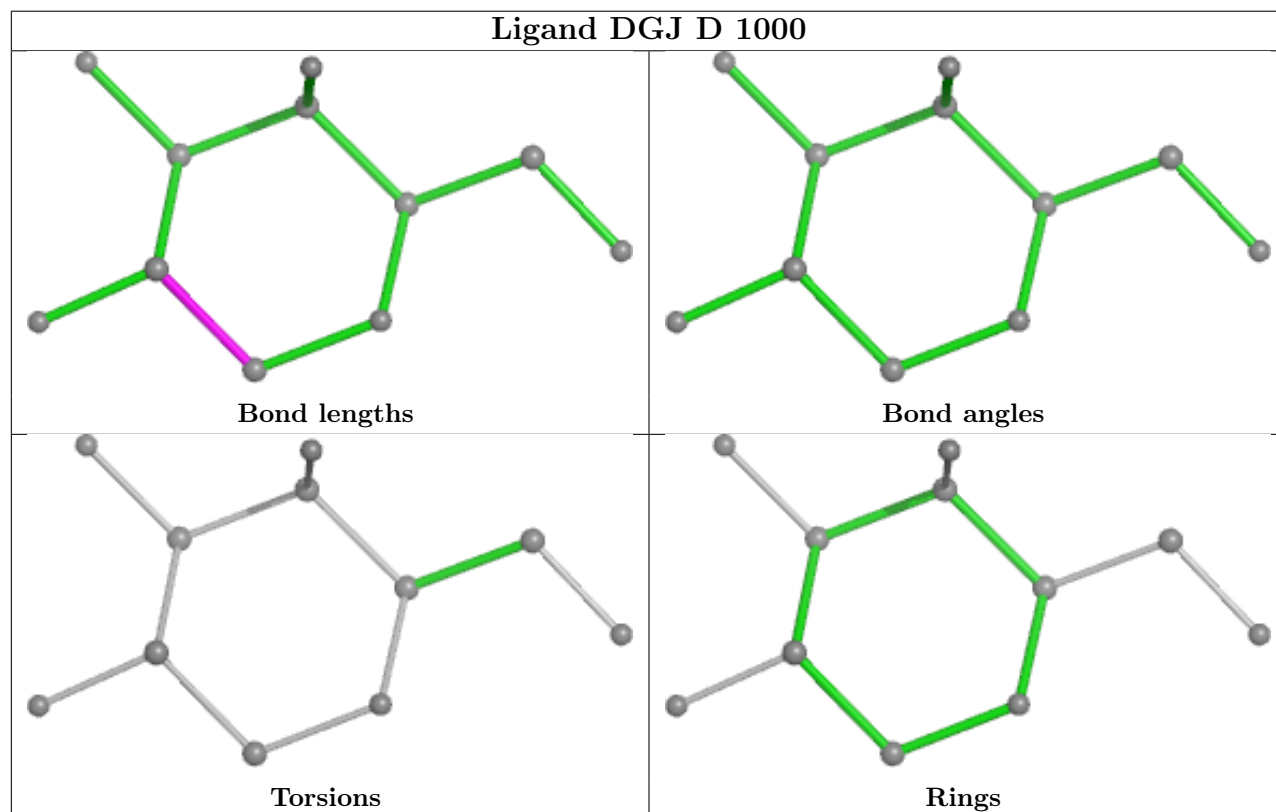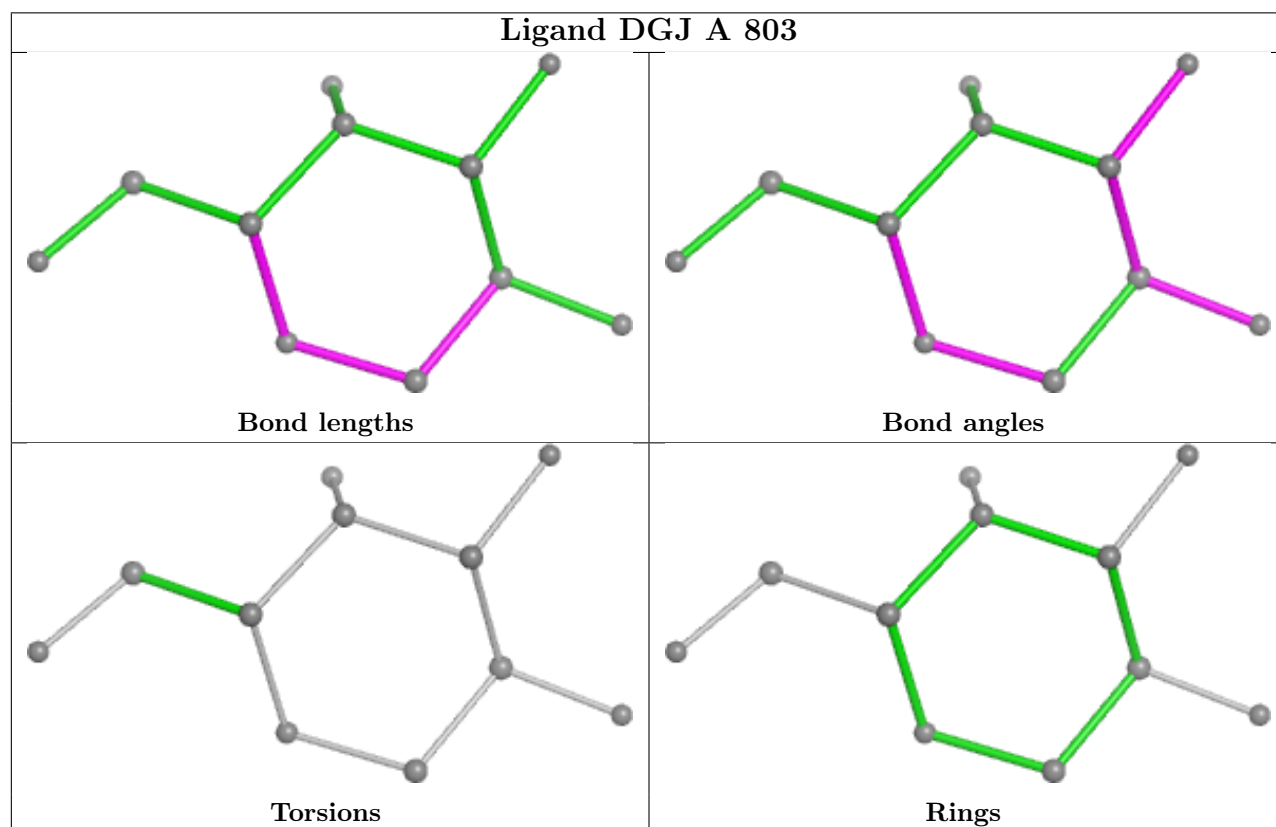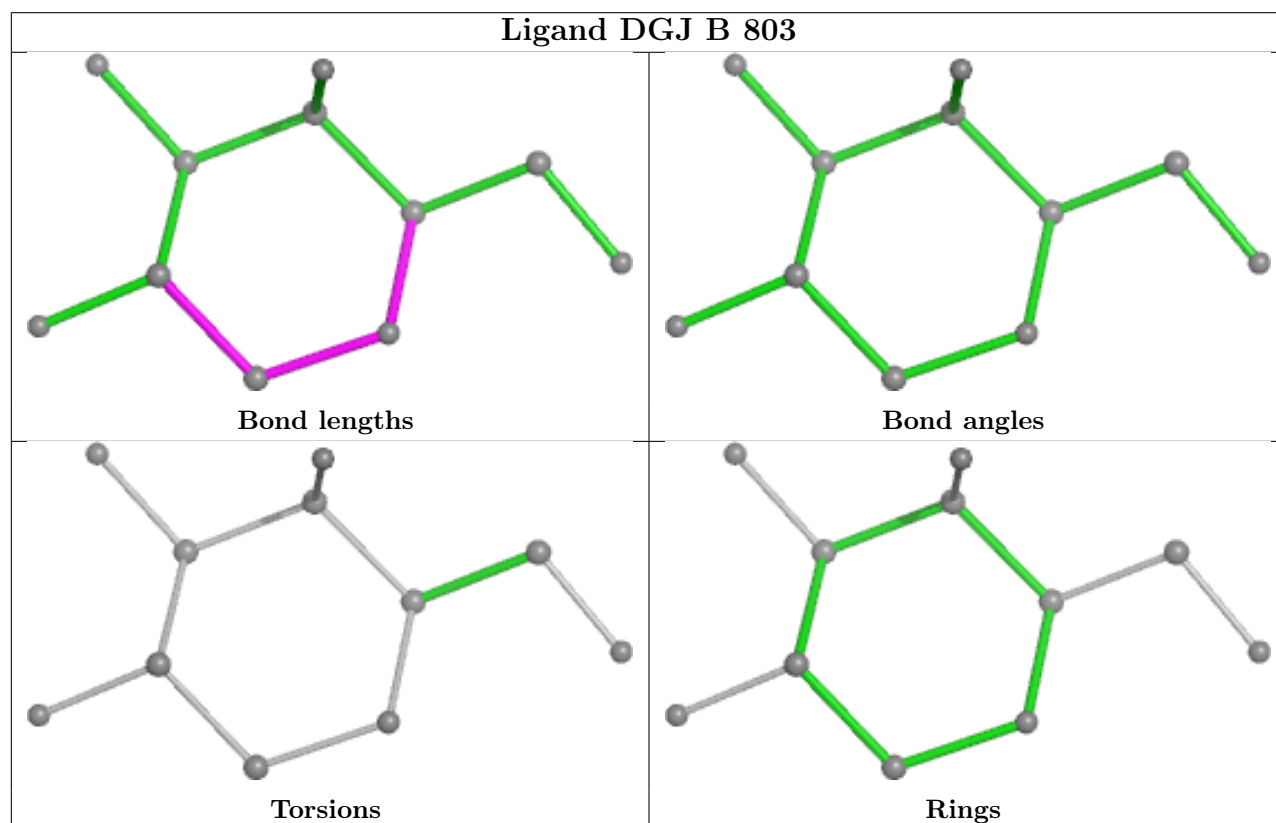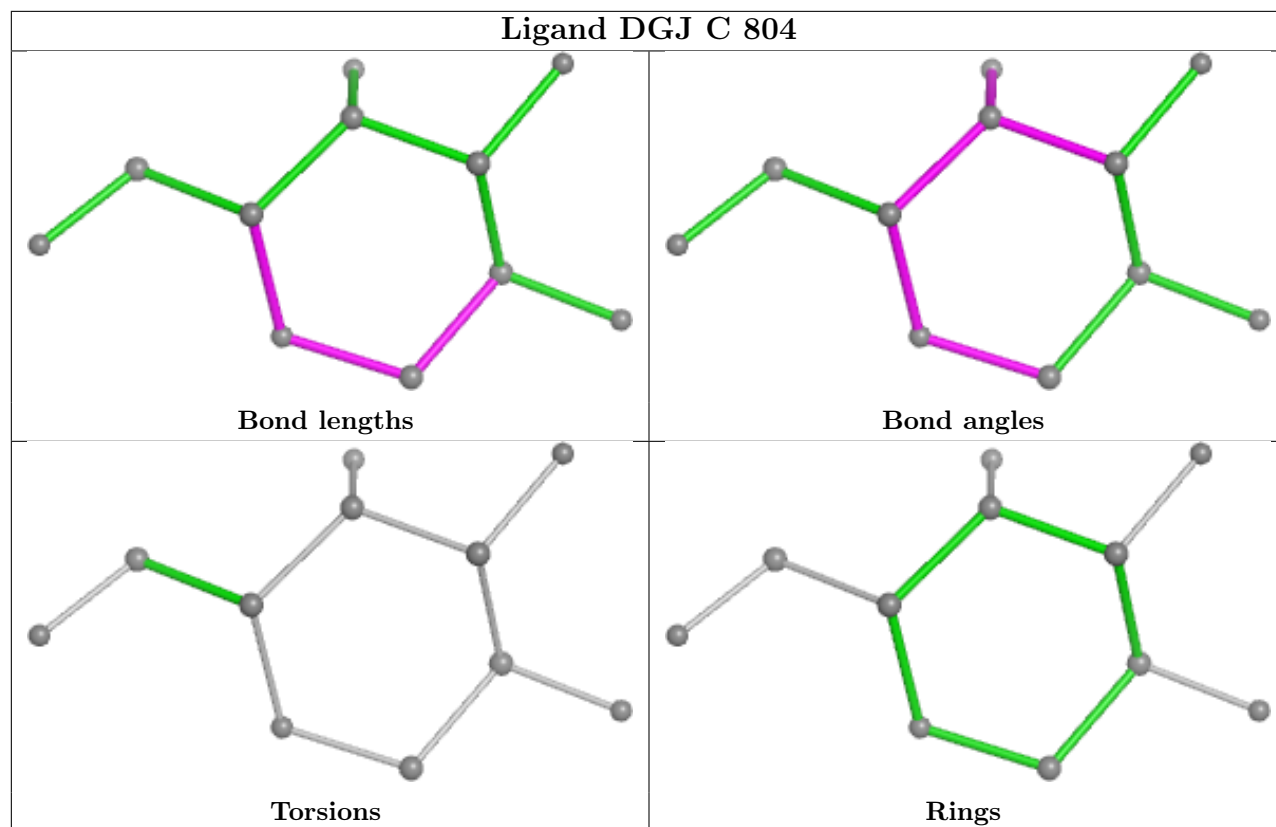
5.7 Other polymers ⓘ

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 ⓘ

6.1 Protein, DNA and RNA chains ⓘ

In the following table, the column labelled '#RSRZ> 2' contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95th percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled 'Q< 0.9' lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2			OWAB(Å^2)	Q<0.9
1	A	618/636 (97%)	-0.02	11 (1%)	67	69	29, 45, 66, 95	0
1	B	623/636 (97%)	0.08	9 (1%)	73	75	32, 50, 72, 100	0
1	C	614/636 (96%)	0.63	27 (4%)	39	39	50, 70, 94, 110	0
1	D	496/636 (77%)	1.01	69 (13%)	7	7	52, 75, 101, 116	0
All	All	2351/2544 (92%)	0.39	116 (4%)	36	35	29, 60, 92, 116	0

The worst 5 of 116 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	D	242	SER	6.2
1	D	713	ALA	5.5
1	B	166	ALA	4.9
1	C	92	LEU	4.6
1	C	169	GLY	4.5

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
3	NAG	F	2	14/15	0.64	0.19	66,73,78,79	0
2	NAG	I	2	14/15	0.74	0.15	79,85,88,88	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å²)	Q<0.9
2	NAG	K	2	14/15	0.82	0.10	68,72,77,78	0
2	NAG	E	2	14/15	0.83	0.13	76,80,84,86	0
2	NAG	J	2	14/15	0.83	0.13	67,75,81,81	0
2	NAG	K	1	14/15	0.84	0.10	62,68,72,72	0
2	NAG	G	2	14/15	0.86	0.10	46,52,58,60	0
2	NAG	H	2	14/15	0.89	0.09	46,55,61,64	0
3	FUC	F	3	10/11	0.89	0.12	64,67,69,70	0
2	NAG	J	1	14/15	0.90	0.09	56,59,64,67	0
2	NAG	I	1	14/15	0.90	0.10	60,62,68,75	0
2	NAG	E	1	14/15	0.90	0.11	58,61,68,70	0
3	NAG	F	1	14/15	0.92	0.10	56,59,64,69	0
2	NAG	H	1	14/15	0.94	0.08	51,53,55,56	0
2	NAG	G	1	14/15	0.95	0.07	44,48,52,55	0

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


Electron density around Chain E:

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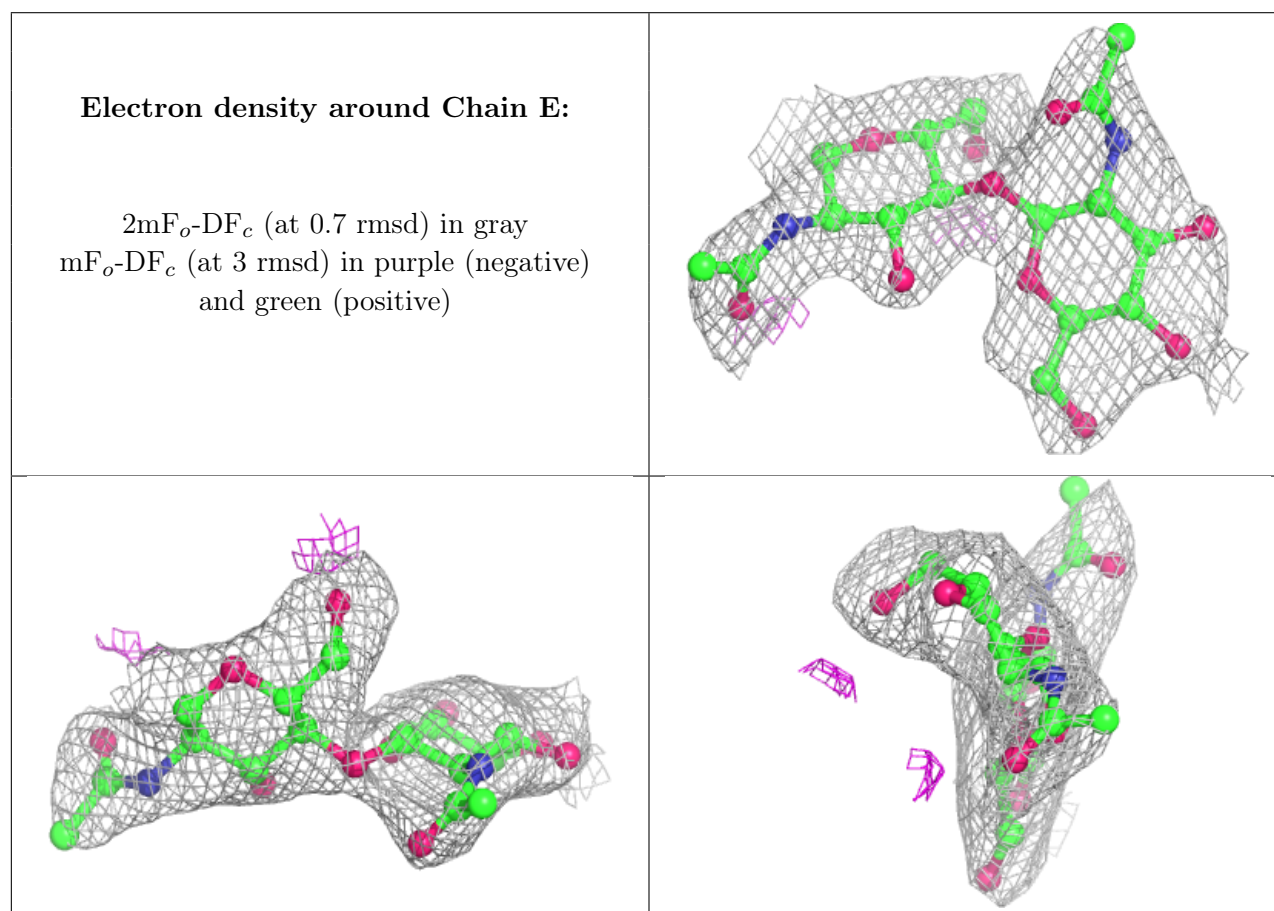
Electron density around Chain G:

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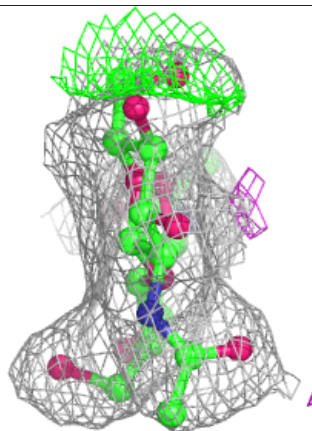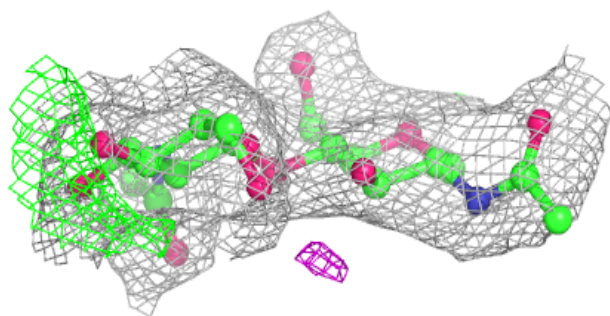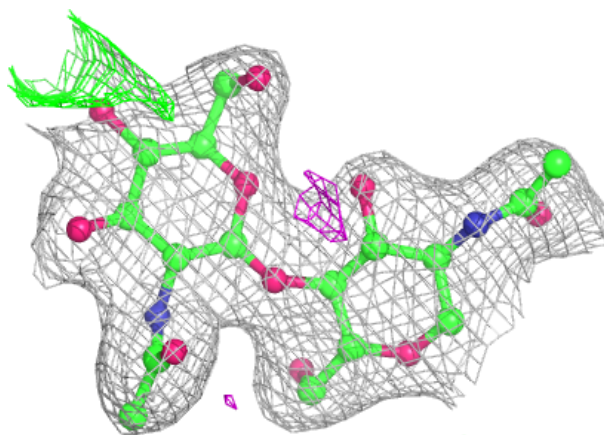
Electron density around Chain H:

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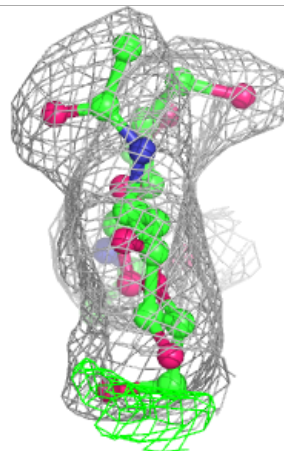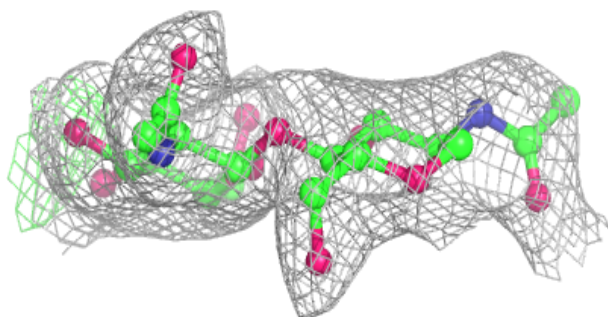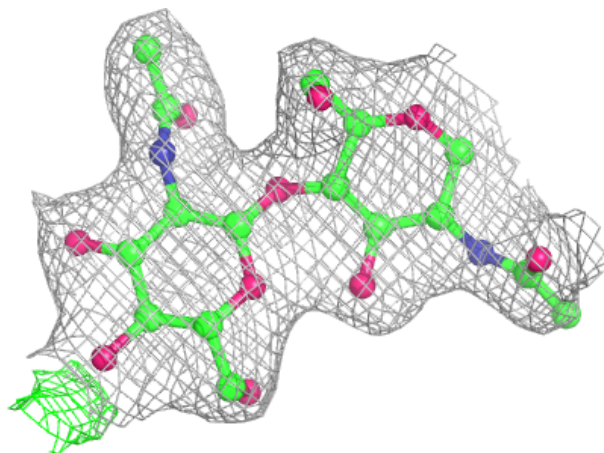
Electron density around Chain I:

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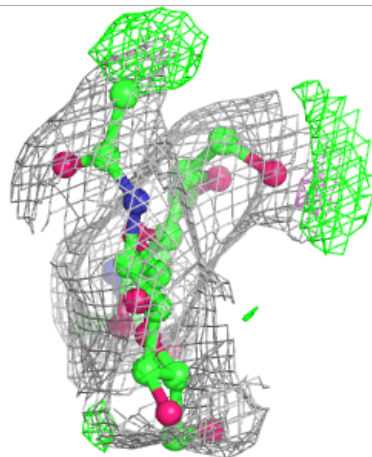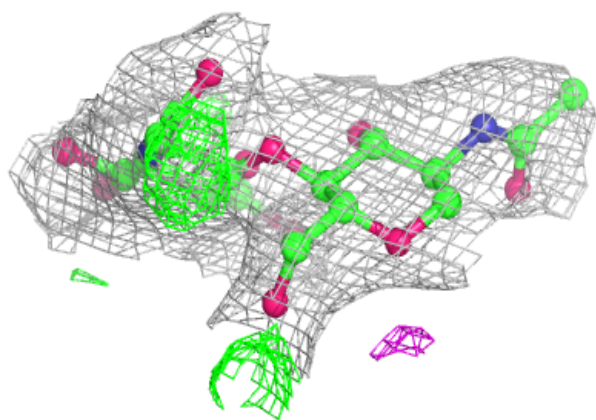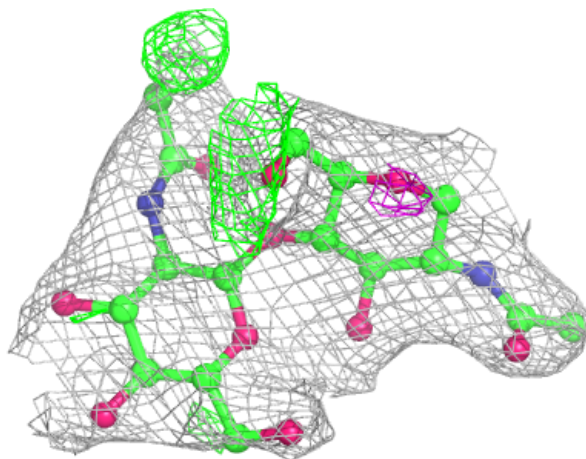
Electron density around Chain J:

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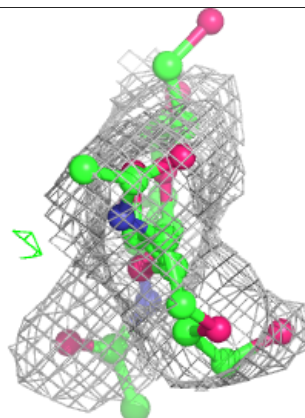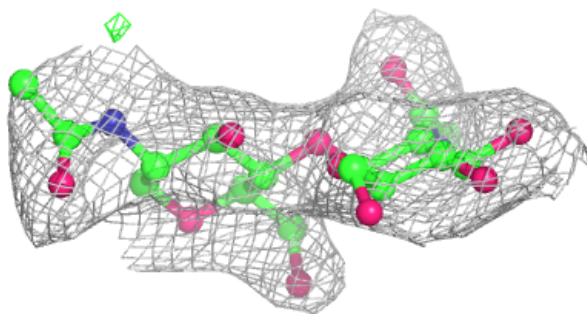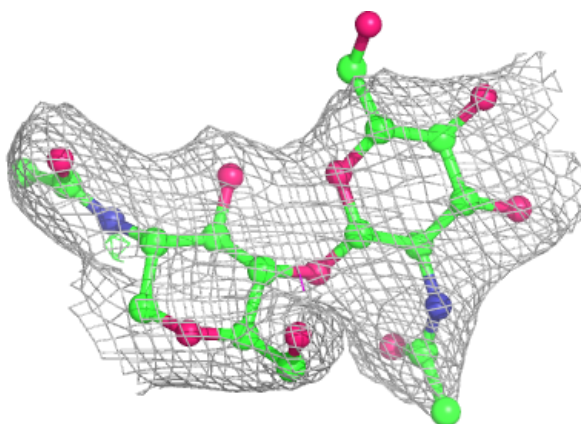
Electron density around Chain K:

$2mF_o\text{-}DF_c$ (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)
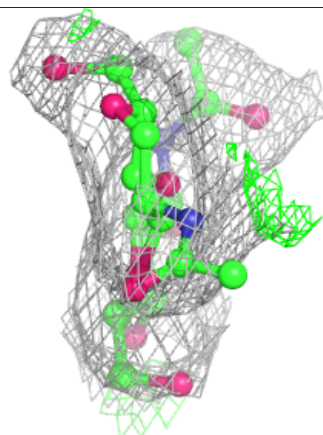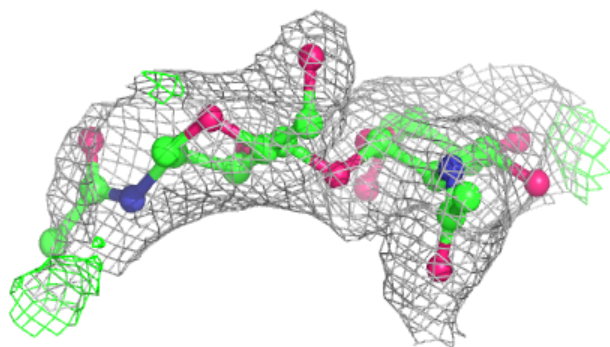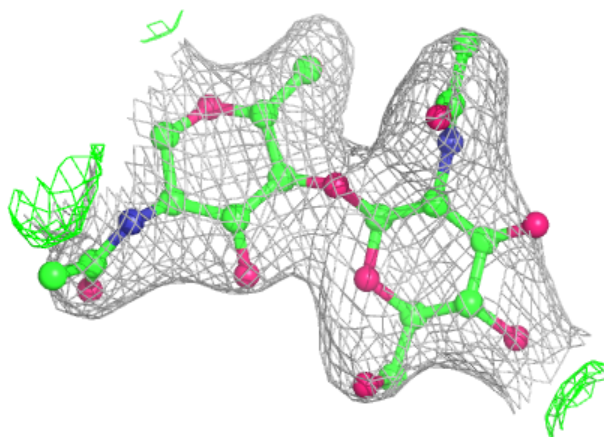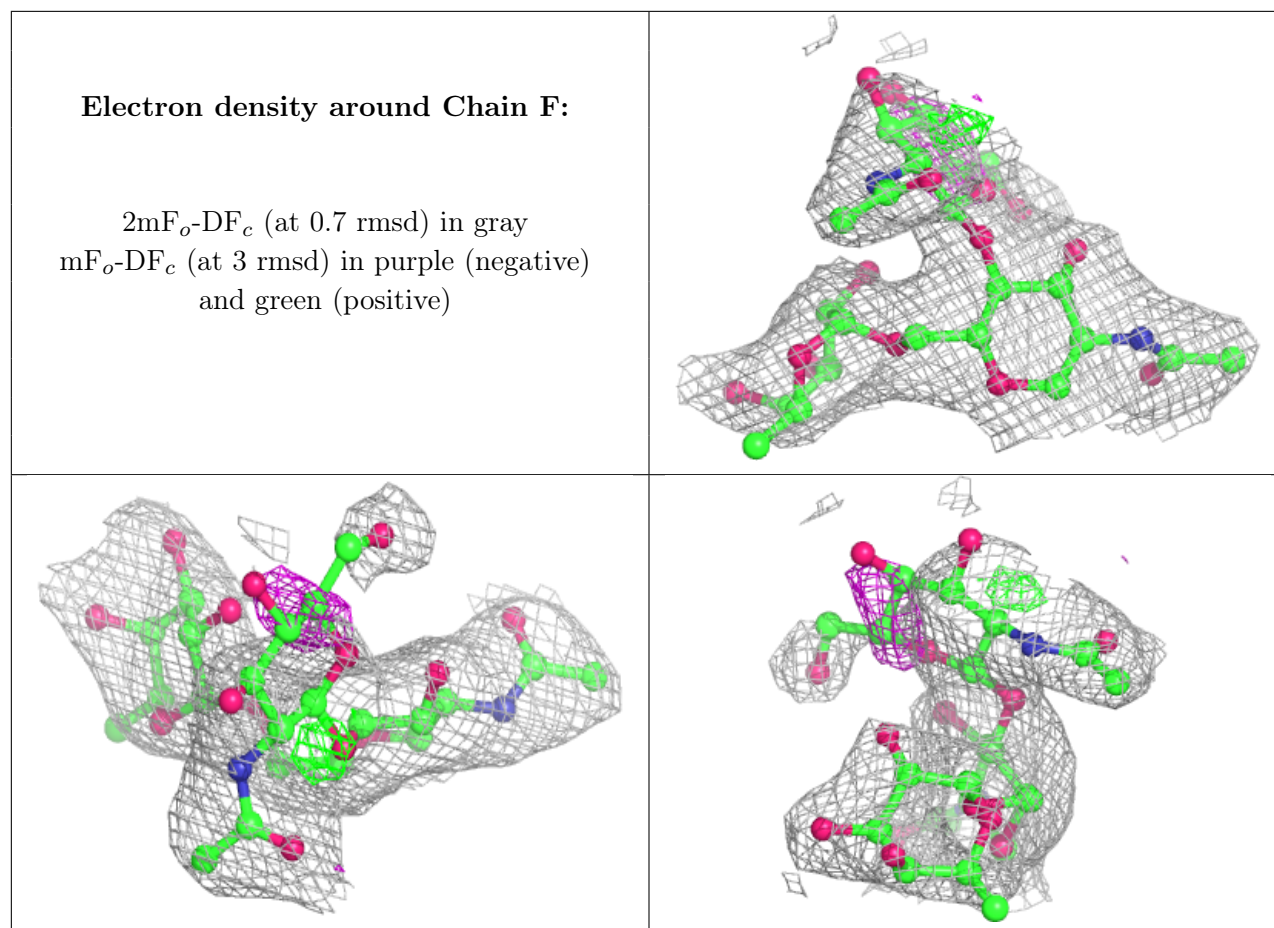
6.4 Ligands ⓘ

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
4	NAG	A	805	14/15	0.55	0.23	87,95,100,101	0
4	NAG	D	1001	14/15	0.69	0.17	86,91,94,95	0
4	NAG	B	802	14/15	0.73	0.17	96,101,103,103	0
4	NAG	A	802	14/15	0.73	0.15	73,76,81,81	0
4	NAG	D	1002	14/15	0.73	0.15	77,87,92,92	0
4	NAG	C	803	14/15	0.80	0.14	73,77,79,79	0
4	NAG	C	801	14/15	0.82	0.14	81,84,88,88	0
4	NAG	C	802	14/15	0.85	0.12	74,76,78,78	0
6	MLI	B	804	7/7	0.88	0.11	52,53,54,55	0
4	NAG	A	801	14/15	0.90	0.09	50,54,56,58	0
5	DGJ	C	804	11/11	0.91	0.09	48,49,51,52	0
4	NAG	B	801	14/15	0.91	0.09	52,54,58,58	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
6	MLI	A	804	7/7	0.92	0.13	51,53,55,56	0
5	DGJ	D	1000	11/11	0.92	0.09	50,52,53,54	0
5	DGJ	B	803	11/11	0.95	0.06	39,40,43,44	0
5	DGJ	A	803	11/11	0.96	0.07	35,36,39,41	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.
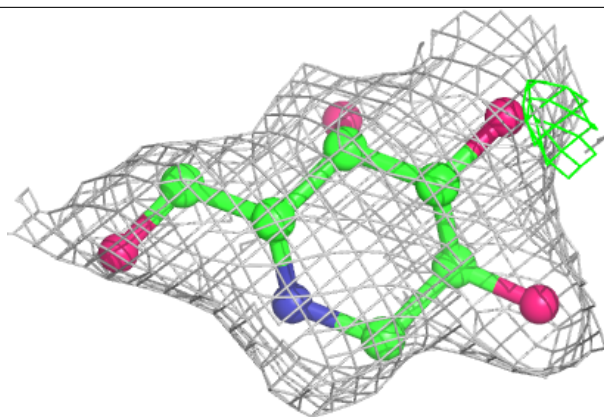
Electron density around DGJ C 804:

$2\text{mF}_o\text{-DF}_c$ (at 0.7 rmsd) in gray
$\text{mF}_o\text{-DF}_c$ (at 3 rmsd) in purple (negative)
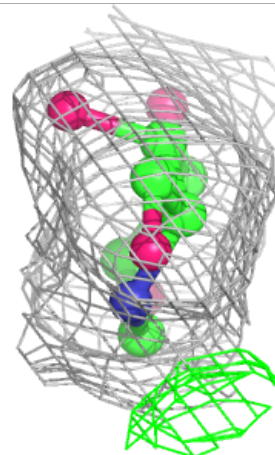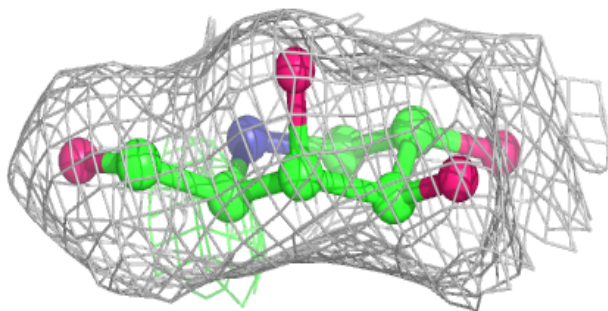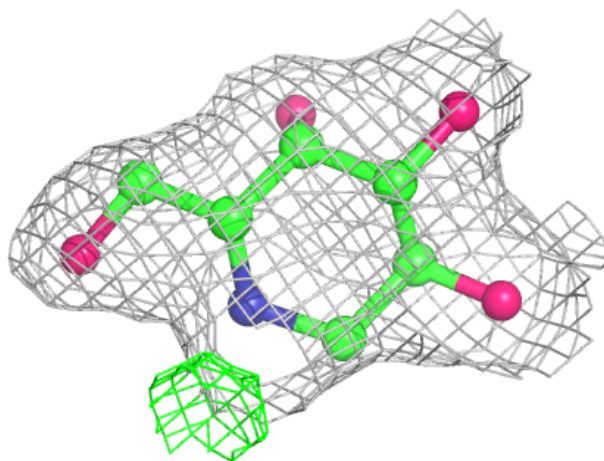and green (positive)
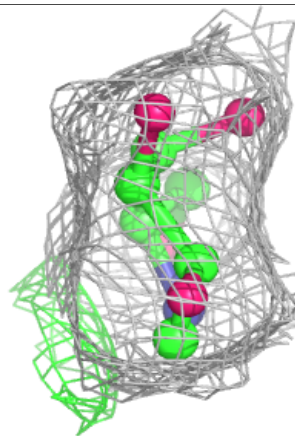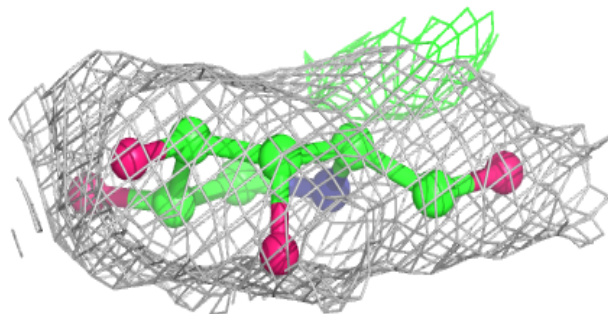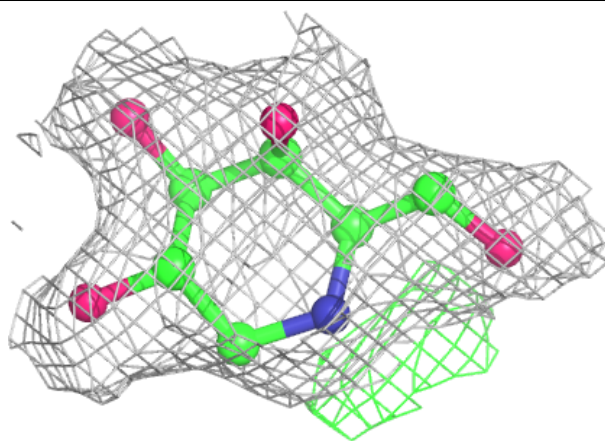
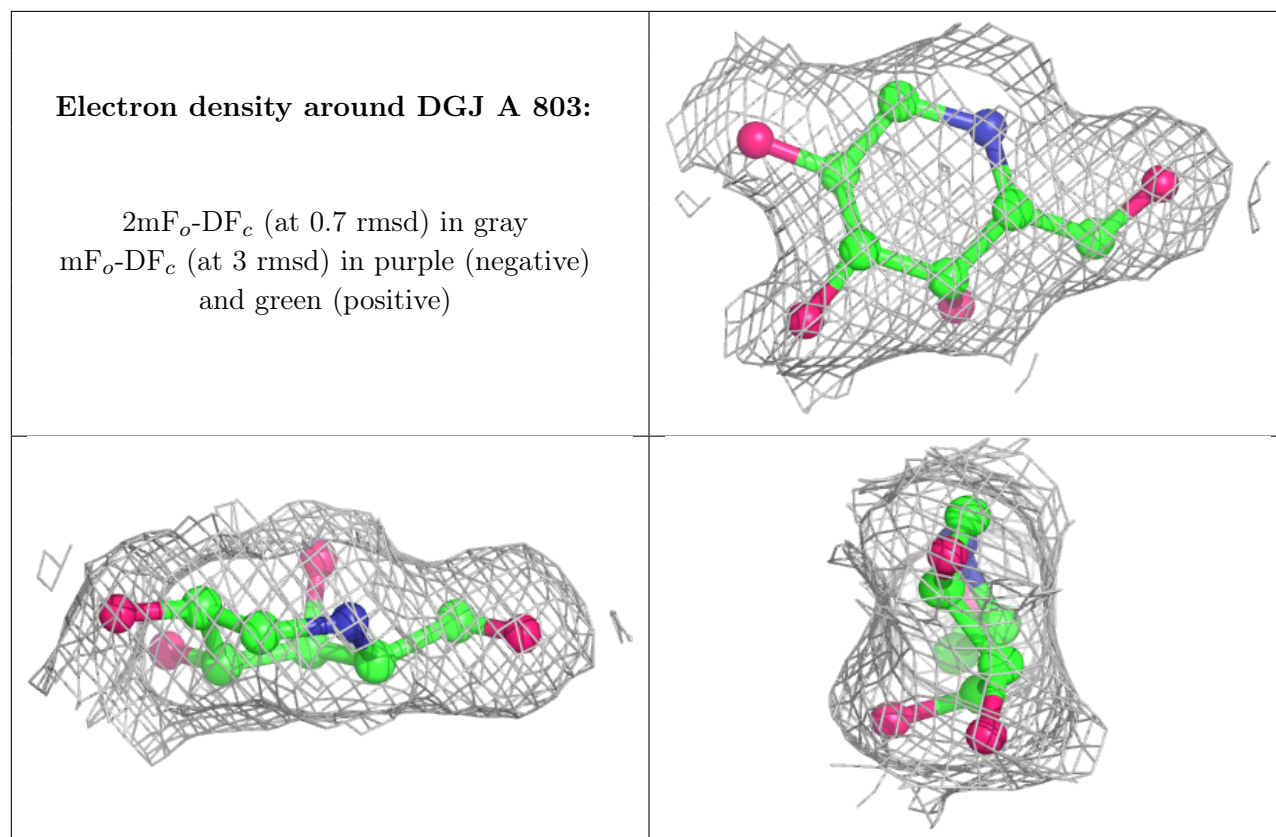**Electron density around DGJ D 1000:**

$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)
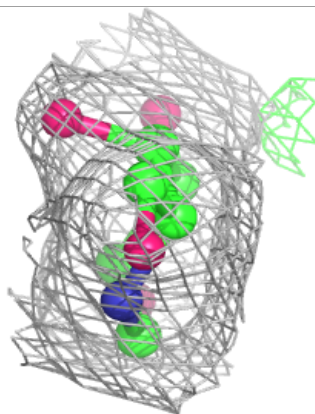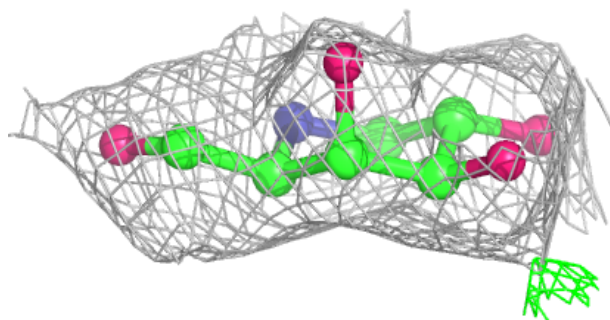
Electron density around DGJ B 803:

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

Electron density around DGJ A 803:

$2mF_o$-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 ⓘ

There are no such residues in this entry.