wwPDB X-ray Structure Validation Summary Report (i)

Nov 13, 2023 – 02:52 PM JST

PDB ID	:	5XEZ
Title	:	Structure of the Full-length glucagon class B G protein-coupled receptor
Authors	:	Zhang, H.; Qiao, A.; Yang, D.; Yang, L.; Dai, A.; de Graaf, C.; Reedtz-Runge, S.; Dharmarajan, V.; Zhang, H.; Han, G.W.; Grant, T.; Sierra, R.; Weierstall, U.; Nelson, G.; Liu, W.; Wu, Y.; Ma, L.; Cai, X.; Lin, G.; Wu, X.; Geng, Z.; Dong, Y.; Song, G.; Griffin, P.; Lau, J.; Cherezov, V.; Yang, H.; Hanson, M.; Stevens, R.; Jiang, H.; Wang, M.; Zhao, Q.; Wu, B.
Deposited on	:	2017-04-06
Resolution	:	3.00 Å(reported)

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

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

The types of validation reports are described at
http://www.wwpdb.org/validation/2017/FAQs#types.

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

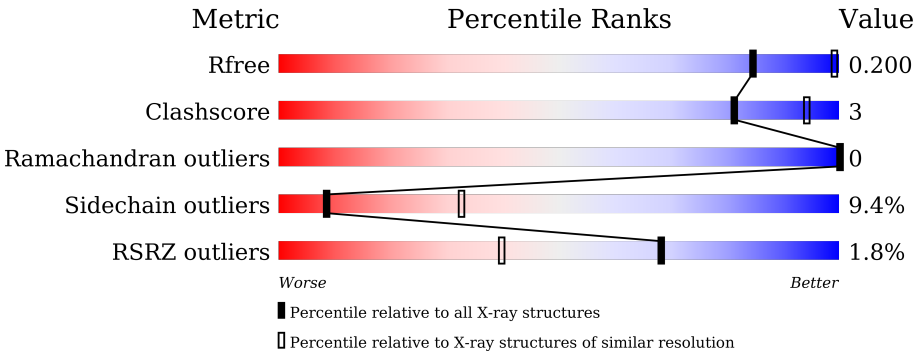
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.36
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)

1 Overall quality at a glance (i)

The following experimental techniques were used to determine the structure:
X-RAY DIFFRACTION

The reported resolution of this entry is 3.00 Å.

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



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	2092 (3.00-3.00)
Clashscore	141614	2416 (3.00-3.00)
Ramachandran outliers	138981	2333 (3.00-3.00)
Sidechain outliers	138945	2336 (3.00-3.00)
RSRZ outliers	127900	1990 (3.00-3.00)

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	574	3%, 84%, 10%, 5%
1	B	574	3%, 76%, 9%, ·, 13%
2	C	231	87%, 13%
2	H	231	87%, 12%, ·

Continued on next page...

Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.36

Continued from previous page...

Mol	Chain	Length	Quality of chain
3	D	214	84% 14%
3	L	214	85% 12%
4	E	2	50% 50%
4	F	2	100%
4	G	2	100%
4	I	2	100%
4	J	2	100%

2 Entry composition (i)

There are 6 unique types of molecules in this entry. The entry contains 15068 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 Glucagon receptor,Endolysin,Glucagon receptor.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	545	Total	C	N	O	S	0	0	0
			4234	2732	733	746	23			
1	B	499	Total	C	N	O	S	0	0	0
			3792	2447	654	669	22			

There are 26 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	24	GLY	-	expression tag	UNP P47871
A	25	ALA	-	expression tag	UNP P47871
A	26	PRO	-	expression tag	UNP P47871
A	1054	THR	CYS	engineered mutation	UNP D9IEF7
A	1097	ALA	CYS	engineered mutation	UNP D9IEF7
A	433	GLU	-	expression tag	UNP P47871
A	434	PHE	-	expression tag	UNP P47871
A	435	LEU	-	expression tag	UNP P47871
A	436	GLU	-	expression tag	UNP P47871
A	437	VAL	-	expression tag	UNP P47871
A	438	LEU	-	expression tag	UNP P47871
A	439	PHE	-	expression tag	UNP P47871
A	440	GLN	-	expression tag	UNP P47871
B	24	GLY	-	expression tag	UNP P47871
B	25	ALA	-	expression tag	UNP P47871
B	26	PRO	-	expression tag	UNP P47871
B	1054	THR	CYS	engineered mutation	UNP D9IEF7
B	1097	ALA	CYS	engineered mutation	UNP D9IEF7
B	433	GLU	-	expression tag	UNP P47871
B	434	PHE	-	expression tag	UNP P47871
B	435	LEU	-	expression tag	UNP P47871
B	436	GLU	-	expression tag	UNP P47871
B	437	VAL	-	expression tag	UNP P47871
B	438	LEU	-	expression tag	UNP P47871
B	439	PHE	-	expression tag	UNP P47871

Continued on next page...

Continued from previous page...

Chain	Residue	Modelled	Actual	Comment	Reference
B	440	GLN	-	expression tag	UNP P47871

- Molecule 2 is a protein called Antibody, mAb1, heavy chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	C	231	Total	C	N	O	S	0	0	0
			1756	1107	297	344	8			
2	H	231	Total	C	N	O	S	0	0	0
			1756	1107	297	344	8			

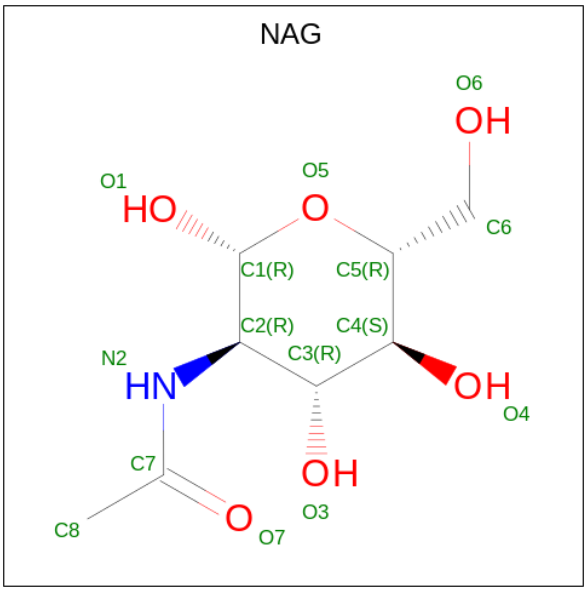
- Molecule 3 is a protein called Antibody, mAb1, light chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	D	214	Total	C	N	O	S	0	0	0
			1633	1015	280	332	6			
3	L	214	Total	C	N	O	S	0	0	0
			1633	1015	280	332	6			

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

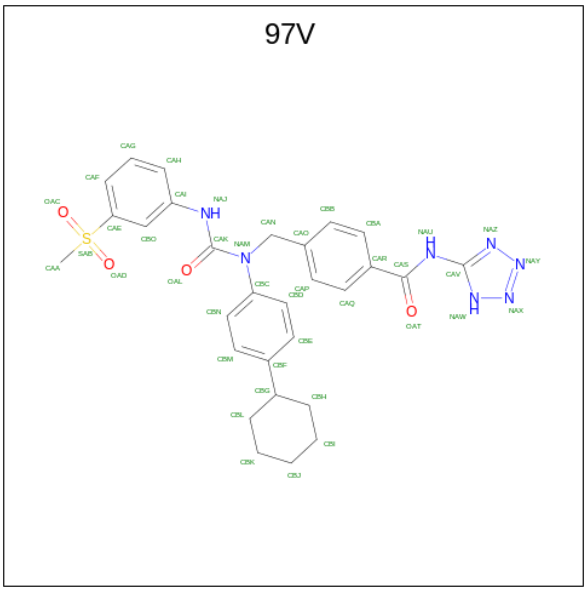
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
4	E	2	Total	C	N	O	0	0	0
			28	16	2	10			
4	F	2	Total	C	N	O	0	0	0
			28	16	2	10			
4	G	2	Total	C	N	O	0	0	0
			28	16	2	10			
4	I	2	Total	C	N	O	0	0	0
			28	16	2	10			
4	J	2	Total	C	N	O	0	0	0
			28	16	2	10			

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



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

- Molecule 6 is 4-{[(4-cyclohexylphenyl){[3-(methylsulfonyl)phenyl]carbamoyl}amino]methyl }-N-(1H-tetrazol-5-yl)benzamide (three-letter code: 97V) (formula: $C_{29}H_{31}N_7O_4S$).



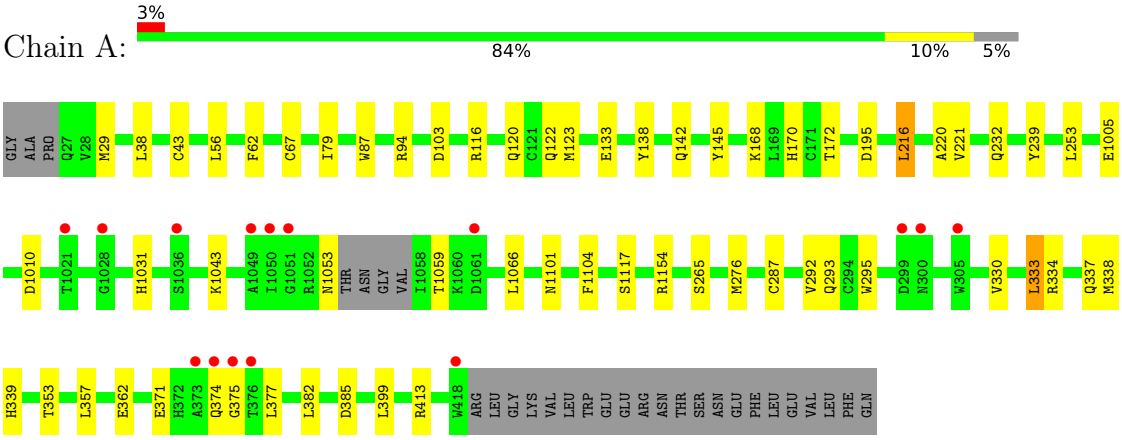
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
6	A	1	Total	C	N	O	S	0	0
			41	29	7	4	1		
6	B	1	Total	C	N	O	S	0	0
			41	29	7	4	1		

3 Residue-property plots (i)

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red dot above a residue indicates a poor fit to the electron density (RSRZ > 2). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

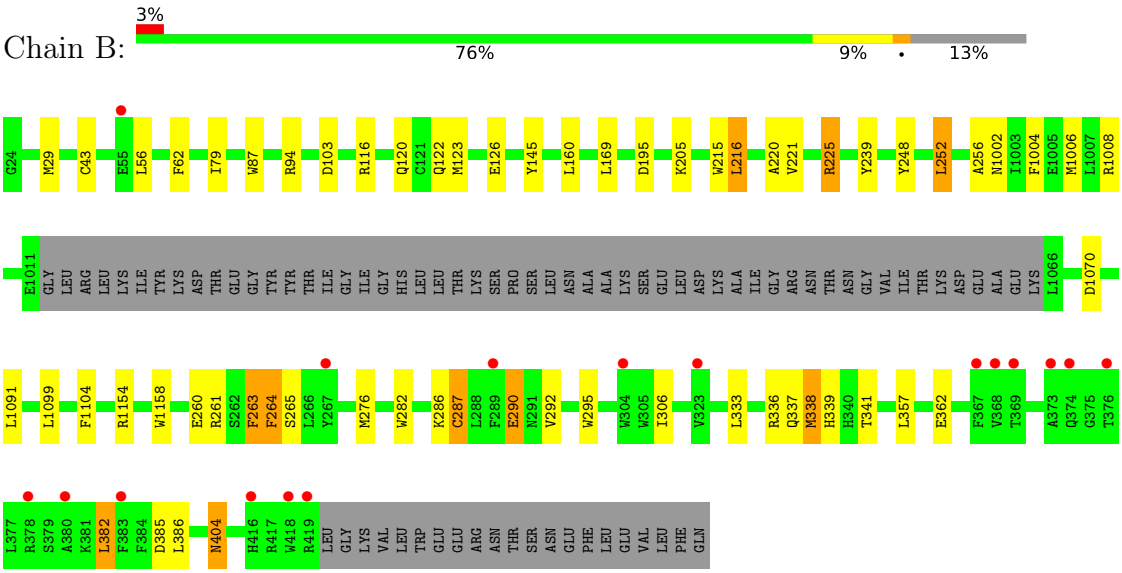
• Molecule 1: Glucagon receptor,Endolysin,Glucagon receptor

Chain A:



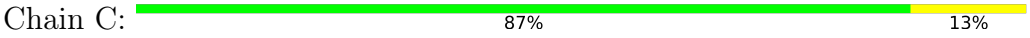
• Molecule 1: Glucagon receptor,Endolysin,Glucagon receptor

Chain B:



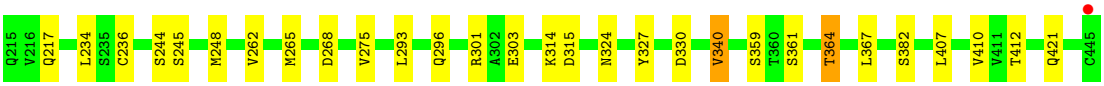
• Molecule 2: Antibody, mAb1, heavy chain

Chain C:



• Molecule 2: Antibody, mAb1, heavy chain

Chain H:

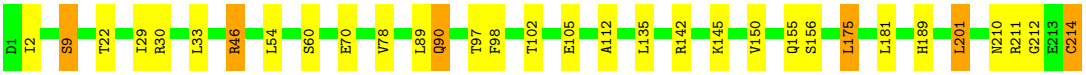


• Molecule 3: Antibody, mAb1, light chain

Chain D:

• Molecule 3: Antibody, mAb1, light chain

Chain L:

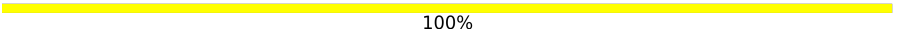


• Molecule 4: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain E:

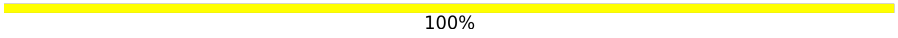
• Molecule 4: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain F:



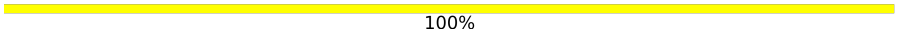
• Molecule 4: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain G:



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

Chain I:



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

Chain J:

4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α, β, γ	72.61Å 245.33Å 96.15Å 90.00° 90.01° 90.00°	Depositor
Resolution (Å)	31.78 – 3.00 31.78 – 3.00	Depositor EDS
% Data completeness (in resolution range)	99.8 (31.78-3.00) 99.9 (31.78-3.00)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	2.18 (at 3.00Å)	Xtriage
Refinement program	REFMAC 5.8.0103	Depositor
R, R_{free}	0.210 , 0.243 0.173 , 0.200	Depositor DCC
R_{free} test set	3312 reflections (4.95%)	wwPDB-VP
Wilson B-factor (Å^2)	54.9	Xtriage
Anisotropy	0.102	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.23 , 11.2	EDS
L-test for twinning[2]	$< \|L\| > = 0.47$, $< L^2 > = 0.29$	Xtriage
Estimated twinning fraction	0.086 for h,-k,-l	Xtriage
Reported twinning fraction	0.501 for H, K, L 0.499 for h,-k,-l	Depositor
Outliers	0 of 66961 reflections	Xtriage
F_o,F_c correlation	0.94	EDS
Total number of atoms	15068	wwPDB-VP
Average B, all atoms (Å^2)	80.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.47% of the height of the origin peak. No significant pseudotranslation is detected.*

[1] Intensities estimated from amplitudes.

[2] Theoretical values of $< |L| >$, $< L^2 >$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: 97V, 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	0.45	0/4338	0.65	0/5901
1	B	0.45	0/3888	0.67	4/5306 (0.1%)
2	C	0.42	0/1799	0.70	0/2448
2	H	0.41	0/1799	0.71	0/2448
3	D	0.40	0/1666	0.70	0/2259
3	L	0.40	0/1666	0.71	1/2259 (0.0%)
All	All	0.43	0/15156	0.68	5/20621 (0.0%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand.A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	1

There are no bond length outliers.

All (5) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	B	225	ARG	NE-CZ-NH1	5.96	123.28	120.30
1	B	145	TYR	CA-CB-CG	5.39	123.64	113.40
1	B	1154	ARG	NE-CZ-NH1	5.21	122.90	120.30
1	B	1006	MET	CG-SD-CE	5.15	108.44	100.20
3	L	175	LEU	CA-CB-CG	5.02	126.85	115.30

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	337	GLN	Peptide

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	4234	0	4091	15	0
1	B	3792	0	3570	28	0
2	C	1756	0	1704	7	0
2	H	1756	0	1704	7	0
3	D	1633	0	1590	15	0
3	L	1633	0	1590	12	0
4	E	28	0	25	1	0
4	F	28	0	25	0	0
4	G	28	0	25	0	0
4	I	28	0	25	0	0
4	J	28	0	25	1	0
5	A	14	0	13	1	0
5	B	28	0	26	1	0
6	A	41	0	0	1	0
6	B	41	0	0	1	0
All	All	15068	0	14413	77	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.

The worst 5 of 77 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:256:ALA:HB3	1:B:1002:ASN:HA	1.68	0.75
1:B:248:TYR:HA	1:B:264:PHE:HE2	1.57	0.67
1:B:248:TYR:HA	1:B:264:PHE:CE2	2.34	0.62
3:L:189:HIS:O	3:L:211:ARG:NH1	2.35	0.59
3:D:189:HIS:O	3:D:211:ARG:NH1	2.35	0.57

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	541/574 (94%)	513 (95%)	28 (5%)	0	100	100
1	B	495/574 (86%)	467 (94%)	28 (6%)	0	100	100
2	C	229/231 (99%)	216 (94%)	13 (6%)	0	100	100
2	H	229/231 (99%)	216 (94%)	13 (6%)	0	100	100
3	D	212/214 (99%)	200 (94%)	12 (6%)	0	100	100
3	L	212/214 (99%)	201 (95%)	11 (5%)	0	100	100
All	All	1918/2038 (94%)	1813 (94%)	105 (6%)	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	428/493 (87%)	393 (92%)	35 (8%)	11	39
1	B	371/493 (75%)	341 (92%)	30 (8%)	11	40
2	C	196/196 (100%)	172 (88%)	24 (12%)	5	21
2	H	196/196 (100%)	174 (89%)	22 (11%)	6	24
3	D	187/187 (100%)	169 (90%)	18 (10%)	8	32
3	L	187/187 (100%)	169 (90%)	18 (10%)	8	32
All	All	1565/1752 (89%)	1418 (91%)	147 (9%)	8	32

5 of 147 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	H	275	VAL
3	L	175	LEU
2	H	315	ASP
3	L	22	THR
1	B	1104	PHE

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 7 such sidechains are listed below:

Mol	Chain	Res	Type
3	D	155	GLN
3	D	158	ASN
3	L	158	ASN
3	L	155	GLN
3	D	152	ASN

5.3.3 RNA (i)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates (i)

10 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	$\#\|Z\| > 2$
4	NAG	E	1	4,1	14,14,15	0.55	0	17,19,21	1.62	2 (11%)
4	NAG	E	2	4	14,14,15	0.60	0	17,19,21	1.94	3 (17%)
4	NAG	F	1	4,1	14,14,15	0.26	0	17,19,21	1.12	2 (11%)
4	NAG	F	2	4	14,14,15	0.35	0	17,19,21	1.18	2 (11%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\|>2$	Counts	RMSZ	$\#\|Z\|>2$
4	NAG	G	1	4,1	14,14,15	0.68	0	17,19,21	1.90	3 (17%)
4	NAG	G	2	4	14,14,15	0.44	0	17,19,21	1.57	3 (17%)
4	NAG	I	1	4,1	14,14,15	0.67	0	17,19,21	1.68	4 (23%)
4	NAG	I	2	4	14,14,15	0.23	0	17,19,21	1.13	2 (11%)
4	NAG	J	1	4,1	14,14,15	0.72	0	17,19,21	2.22	7 (41%)
4	NAG	J	2	4	14,14,15	0.60	0	17,19,21	1.60	6 (35%)

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	NAG	E	1	4,1	-	0/6/23/26	0/1/1/1
4	NAG	E	2	4	-	5/6/23/26	0/1/1/1
4	NAG	F	1	4,1	-	0/6/23/26	0/1/1/1
4	NAG	F	2	4	-	2/6/23/26	0/1/1/1
4	NAG	G	1	4,1	-	2/6/23/26	0/1/1/1
4	NAG	G	2	4	-	4/6/23/26	0/1/1/1
4	NAG	I	1	4,1	-	4/6/23/26	0/1/1/1
4	NAG	I	2	4	-	2/6/23/26	0/1/1/1
4	NAG	J	1	4,1	-	2/6/23/26	0/1/1/1
4	NAG	J	2	4	-	2/6/23/26	0/1/1/1

There are no bond length outliers.

The worst 5 of 34 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
4	E	2	NAG	C2-N2-C7	5.17	130.27	122.90
4	G	1	NAG	O5-C1-C2	-5.11	103.22	111.29
4	E	1	NAG	C1-O5-C5	5.01	118.99	112.19
4	J	1	NAG	O5-C1-C2	-4.58	104.05	111.29
4	E	2	NAG	C8-C7-N2	3.66	122.29	116.10

There are no chirality outliers.

5 of 23 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	E	2	NAG	C4-C5-C6-O6
4	E	2	NAG	O5-C5-C6-O6
4	I	1	NAG	C4-C5-C6-O6
4	E	2	NAG	C8-C7-N2-C2
4	E	2	NAG	O7-C7-N2-C2

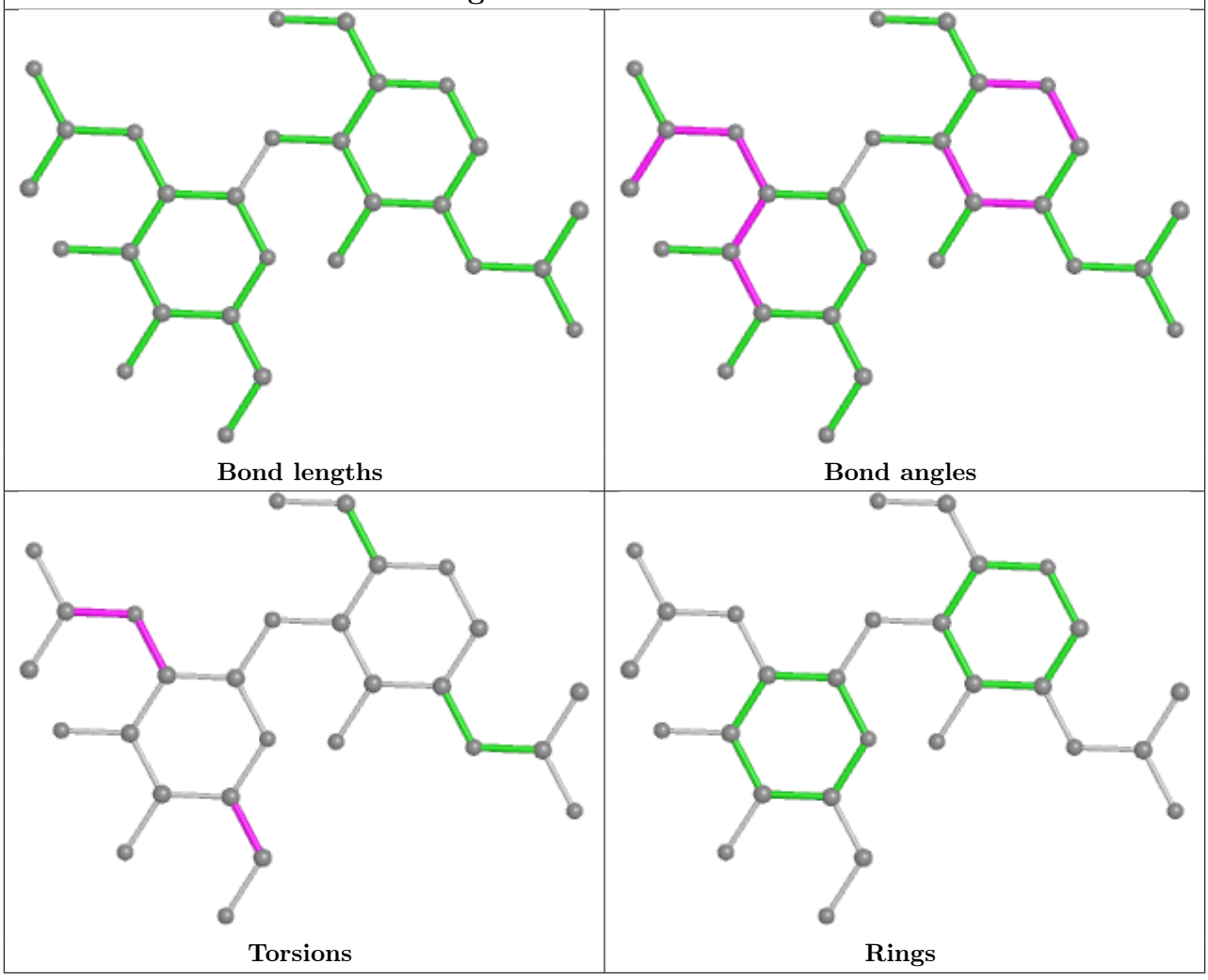
There are no ring outliers.

3 monomers are involved in 2 short contacts:

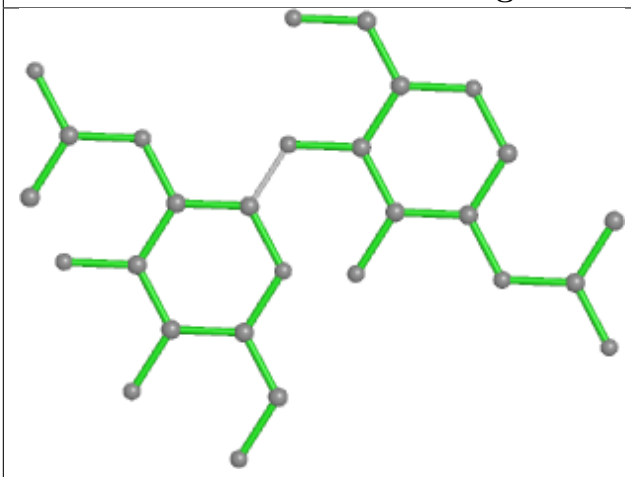
Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	J	2	NAG	1	0
4	J	1	NAG	1	0
4	E	2	NAG	1	0

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

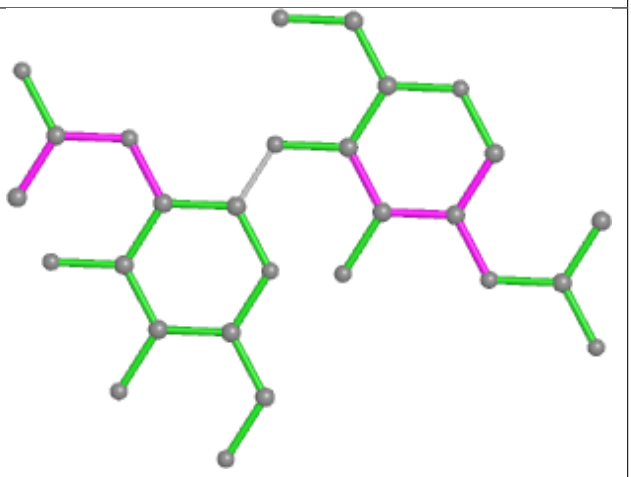
Oligosaccharide Chain E



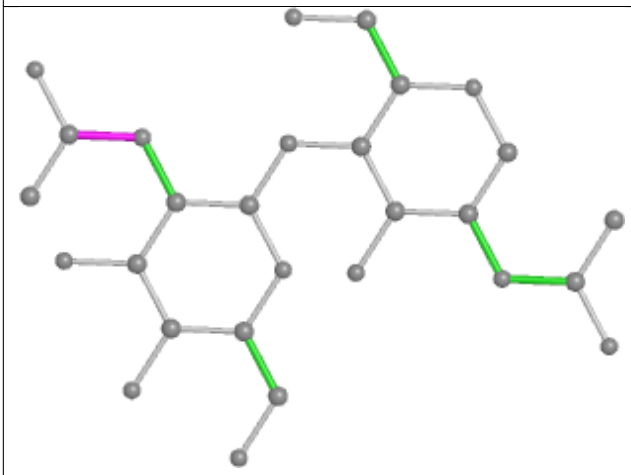
Oligosaccharide Chain F



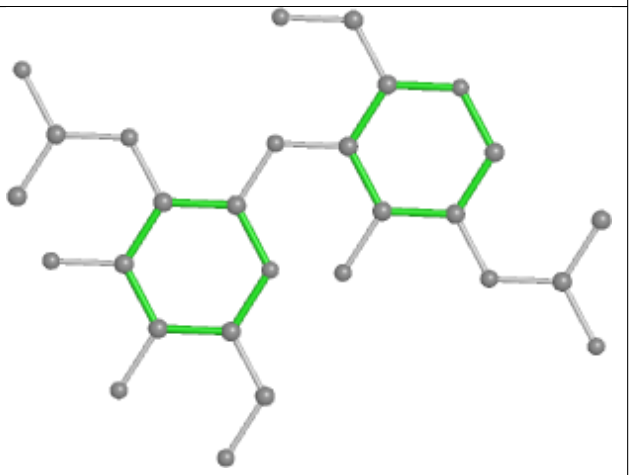
Bond lengths



Bond angles

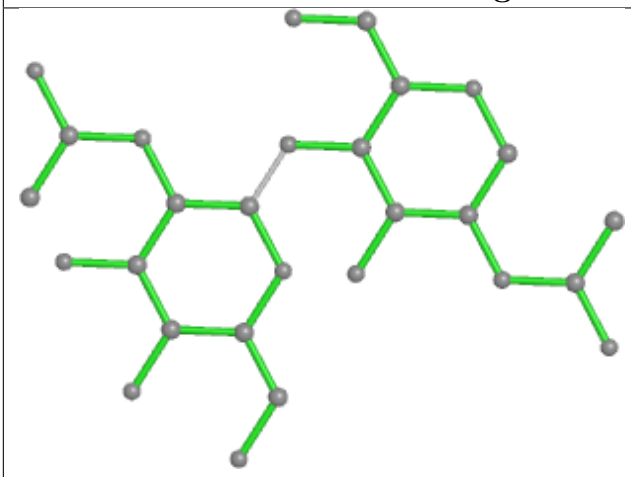


Torsions

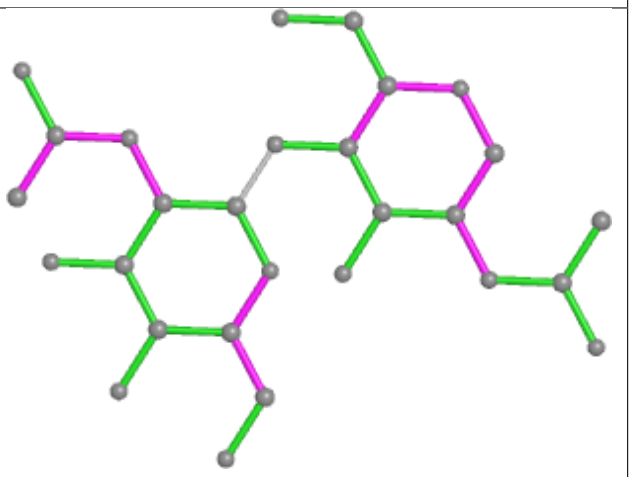


Rings

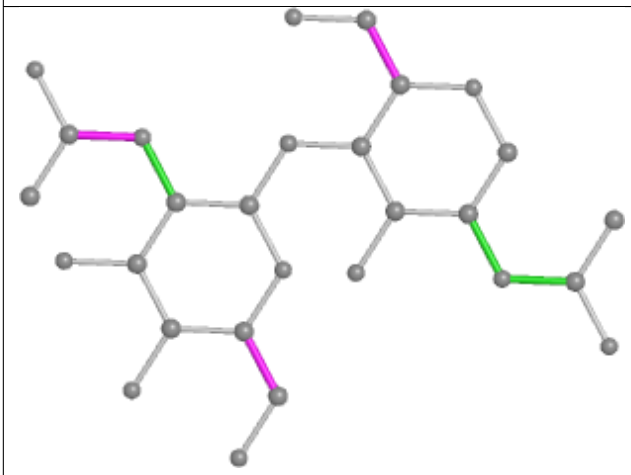
Oligosaccharide Chain G



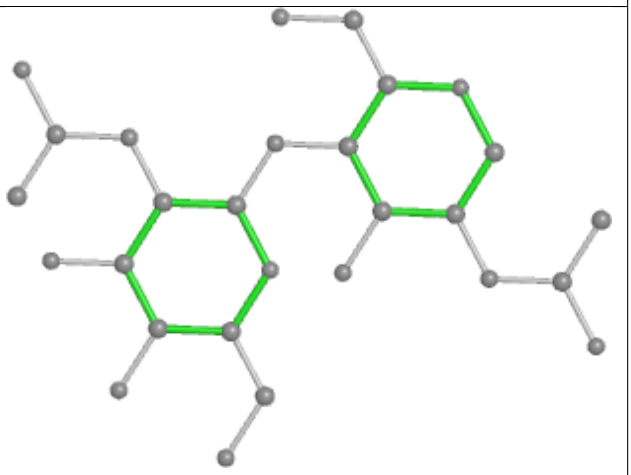
Bond lengths



Bond angles

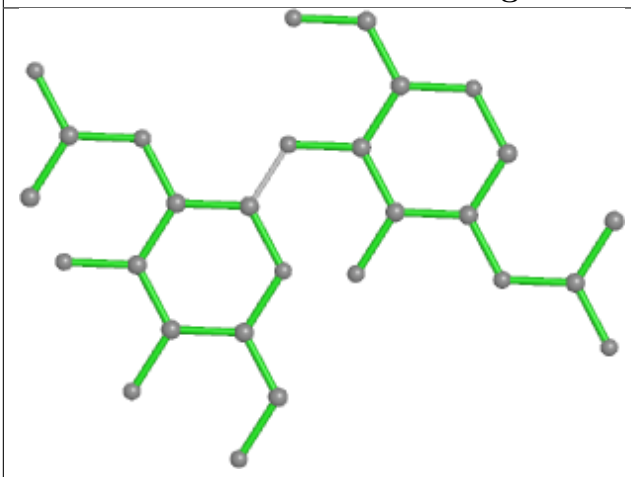


Torsions

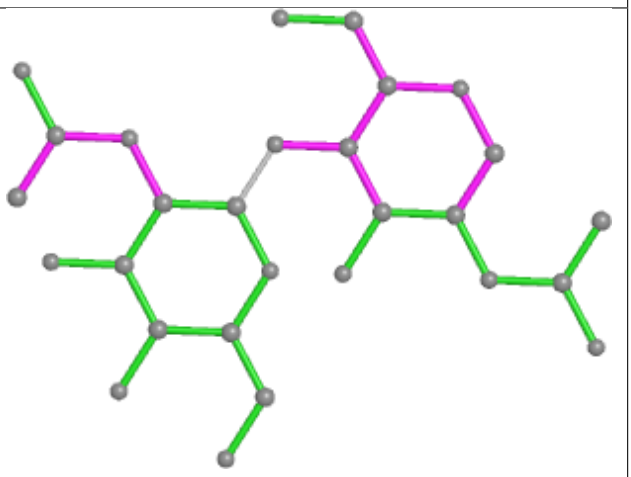


Rings

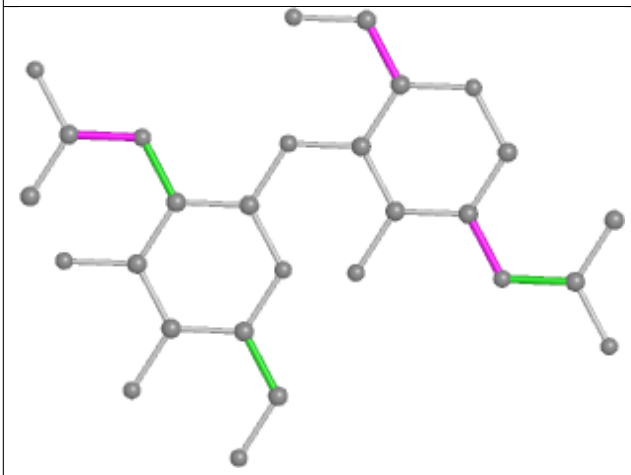
Oligosaccharide Chain I



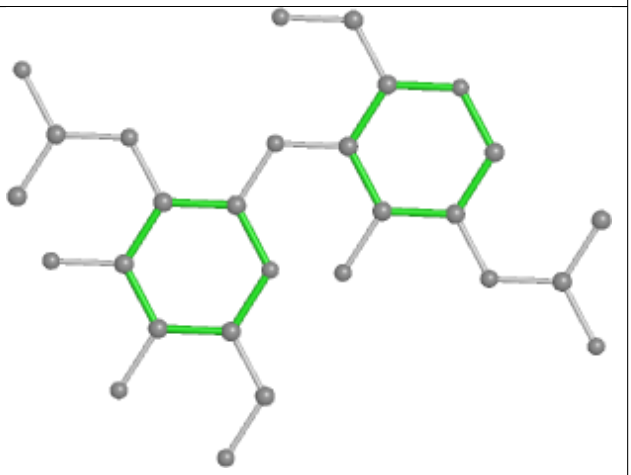
Bond lengths



Bond angles

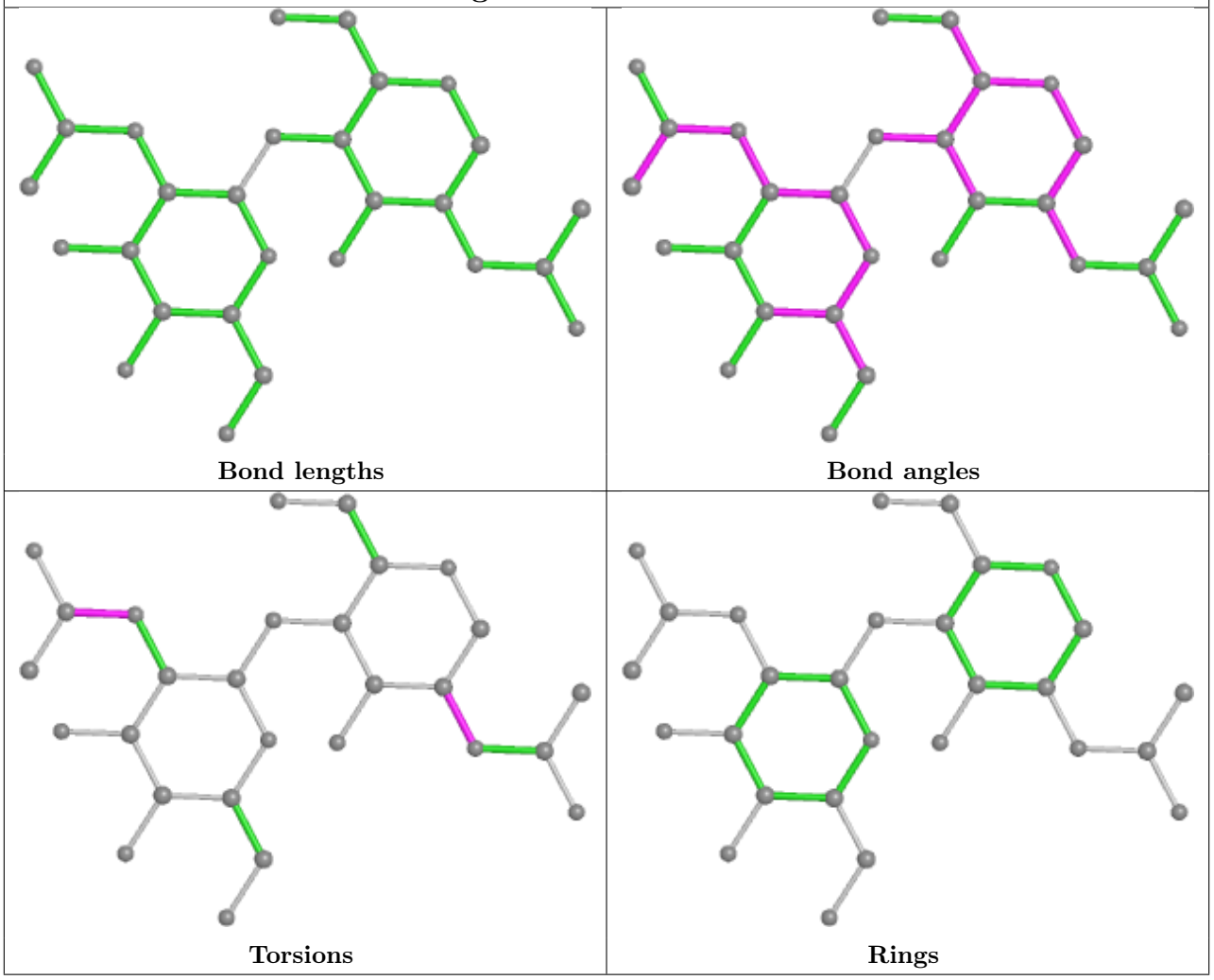


Torsions



Rings

Oligosaccharide Chain J



5.6 Ligand geometry (i)

5 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	97V	A	1208	-	43,45,45	1.91	8 (18%)	55,63,63	1.65	12 (21%)
5	NAG	B	1203	1	14,14,15	0.47	0	17,19,21	1.55	3 (17%)
6	97V	B	1207	-	43,45,45	1.91	8 (18%)	55,63,63	1.51	9 (16%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\|>2$	Counts	RMSZ	$\#\|Z\|>2$
5	NAG	A	1201	1	14,14,15	0.40	0	17,19,21	1.39	2 (11%)
5	NAG	B	1204	1	14,14,15	0.91	1 (7%)	17,19,21	2.09	7 (41%)

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	97V	A	1208	-	-	12/32/42/42	0/5/5/5
5	NAG	B	1203	1	-	1/6/23/26	0/1/1/1
6	97V	B	1207	-	-	12/32/42/42	0/5/5/5
5	NAG	A	1201	1	-	2/6/23/26	0/1/1/1
5	NAG	B	1204	1	-	1/6/23/26	0/1/1/1

The worst 5 of 17 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
6	B	1207	97V	CAN-CAO	-5.53	1.41	1.51
6	A	1208	97V	CAN-CAO	-5.42	1.41	1.51
6	A	1208	97V	CAR-CAS	-4.94	1.39	1.50
6	B	1207	97V	CBF-CBG	-4.93	1.42	1.52
6	B	1207	97V	CAR-CAS	-4.92	1.39	1.50

The worst 5 of 33 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
5	B	1204	NAG	C2-N2-C7	5.17	130.26	122.90
6	B	1207	97V	OAD-SAB-OAC	-4.93	109.43	117.92
6	A	1208	97V	OAD-SAB-OAC	-4.81	109.64	117.92
6	B	1207	97V	CAI-CBO-CAE	4.28	122.12	118.89
6	B	1207	97V	CAA-SAB-CAE	3.98	109.29	104.58

There are no chirality outliers.

5 of 28 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
5	B	1204	NAG	C3-C2-N2-C7
6	A	1208	97V	NAJ-CAK-NAM-CAN
6	A	1208	97V	OAL-CAK-NAM-CAN

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms
6	B	1207	97V	NAJ-CAK-NAM-CAN
6	B	1207	97V	OAL-CAK-NAM-CAN

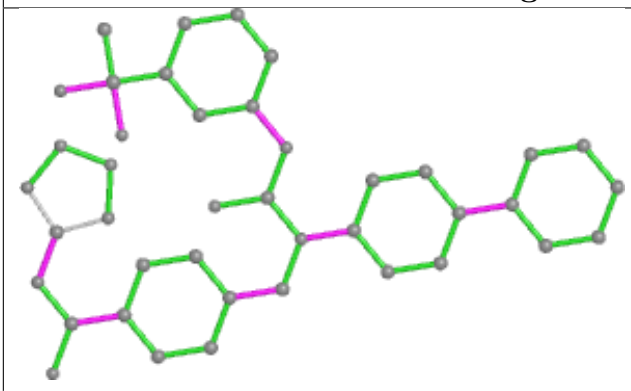
There are no ring outliers.

4 monomers are involved in 4 short contacts:

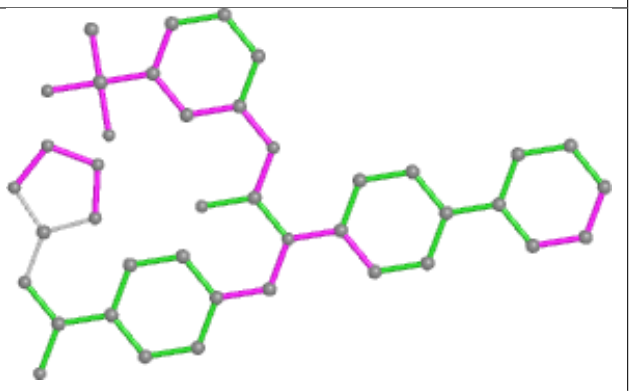
Mol	Chain	Res	Type	Clashes	Symm-Clashes
6	A	1208	97V	1	0
6	B	1207	97V	1	0
5	A	1201	NAG	1	0
5	B	1204	NAG	1	0

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

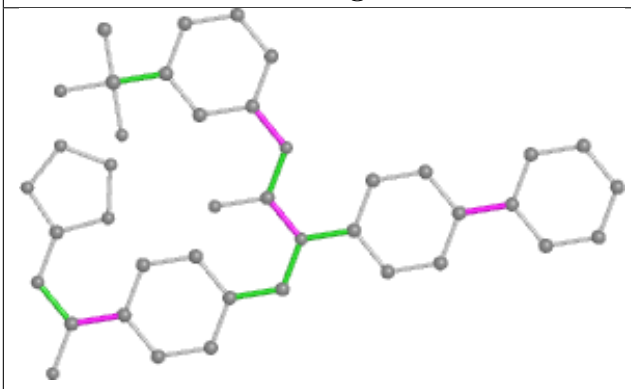
Ligand 97V A 1208



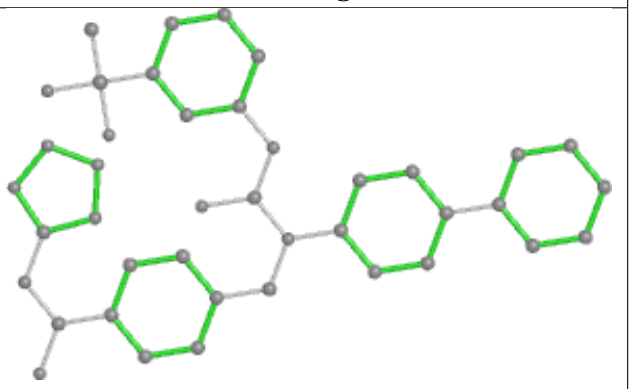
Bond lengths



Bond angles

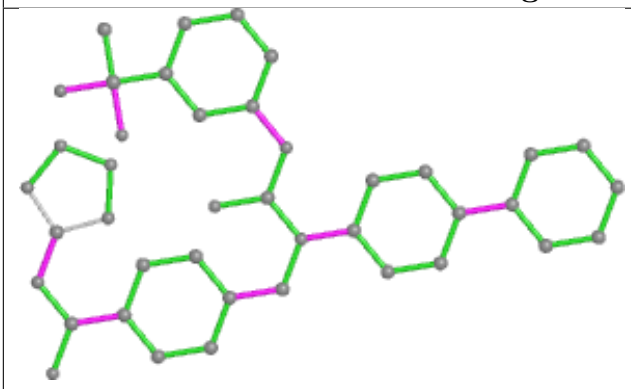


Torsions

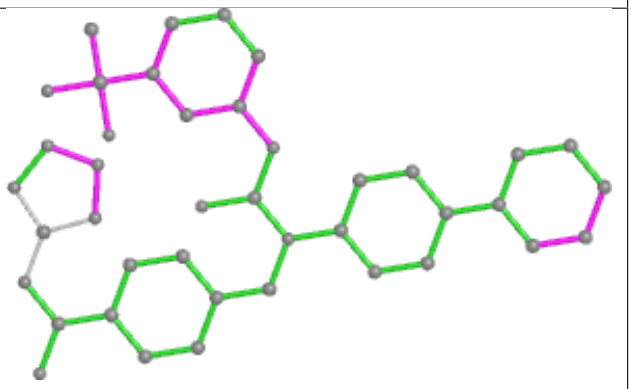


Rings

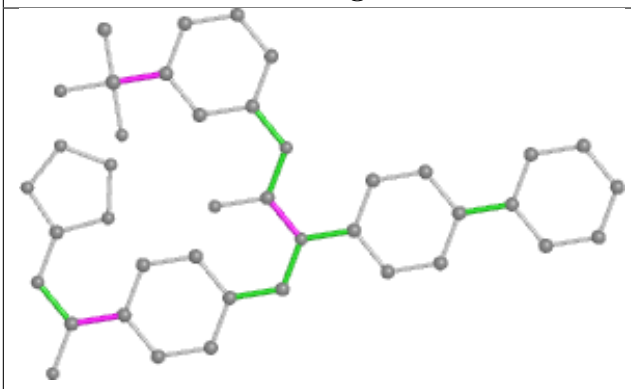
Ligand 97V B 1207



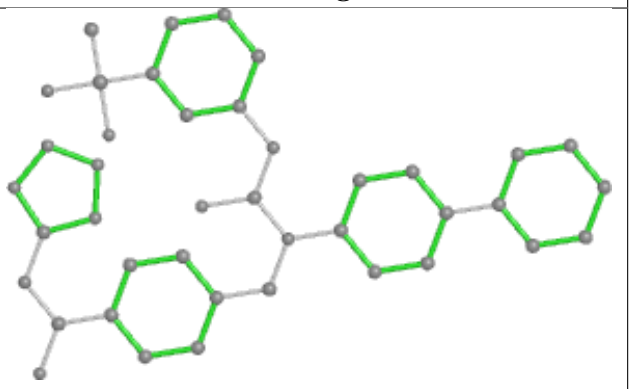
Bond lengths



Bond angles



Torsions



Rings

5.7 Other polymers (i)

There are no such residues in this entry.

5.8 Polymer linkage issues (i)

There are no chain breaks in this entry.

6 Fit of model and data

6.1 Protein, DNA and RNA chains

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

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å^2)	Q<0.9
1	A	545/574 (94%)	-0.23	15 (2%) 53 25	40, 91, 150, 161	0
1	B	499/574 (86%)	-0.26	17 (3%) 45 19	38, 105, 152, 177	0
2	C	231/231 (100%)	-0.66	1 (0%) 92 79	36, 59, 90, 129	0
2	H	231/231 (100%)	-0.66	1 (0%) 92 79	35, 56, 83, 125	0
3	D	214/214 (100%)	-0.70	0 100 100	38, 54, 82, 132	0
3	L	214/214 (100%)	-0.77	0 100 100	29, 48, 76, 118	0
All	All	1934/2038 (94%)	-0.45	34 (1%) 68 40	29, 74, 144, 177	0

The worst 5 of 34 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	1050	ILE	6.0
2	H	445	CYS	6.0
1	A	374	GLN	5.2
1	B	374	GLN	3.6
1	B	289	PHE	3.4

6.2 Non-standard residues in protein, DNA, RNA chains

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

6.3 Carbohydrates

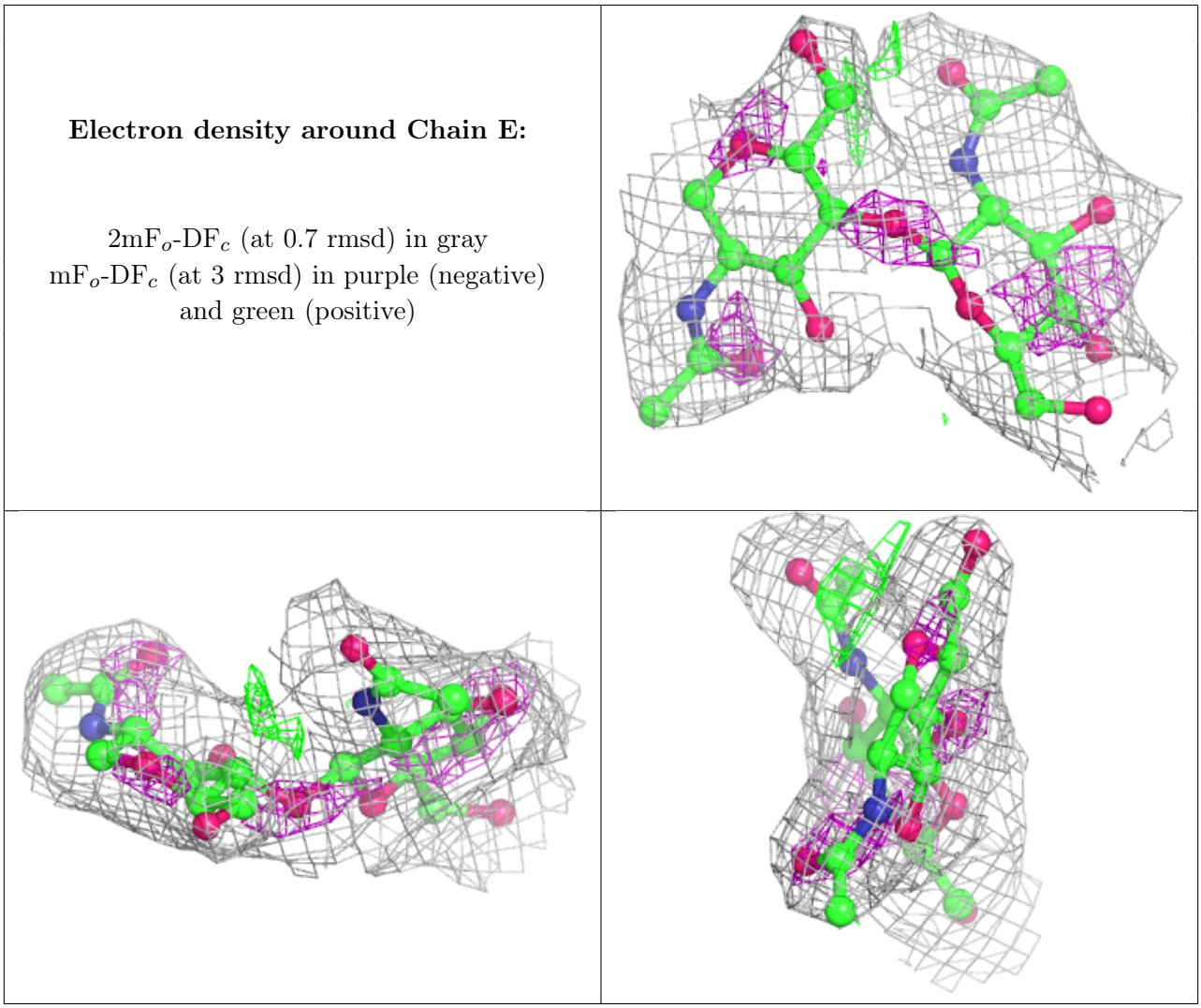
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95^{th} percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9'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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
4	NAG	I	2	14/15	0.89	0.15	67,69,74,76	0
4	NAG	J	2	14/15	0.91	0.30	61,63,73,76	0
4	NAG	E	2	14/15	0.93	0.21	63,65,67,67	0
4	NAG	G	2	14/15	0.93	0.34	58,60,61,62	0
4	NAG	G	1	14/15	0.94	0.24	55,58,60,61	0
4	NAG	J	1	14/15	0.94	0.15	57,59,63,65	0
4	NAG	E	1	14/15	0.94	0.23	62,65,67,67	0
4	NAG	F	1	14/15	0.95	0.11	55,58,59,60	0
4	NAG	I	1	14/15	0.96	0.10	63,65,68,68	0
4	NAG	F	2	14/15	0.97	0.17	57,58,59,61	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.

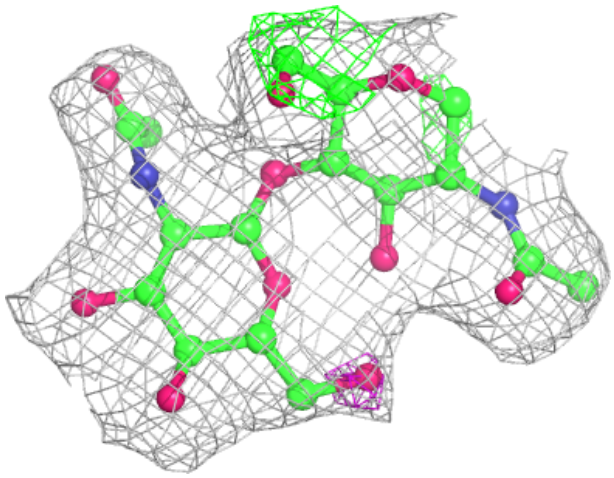
Electron density around Chain E:

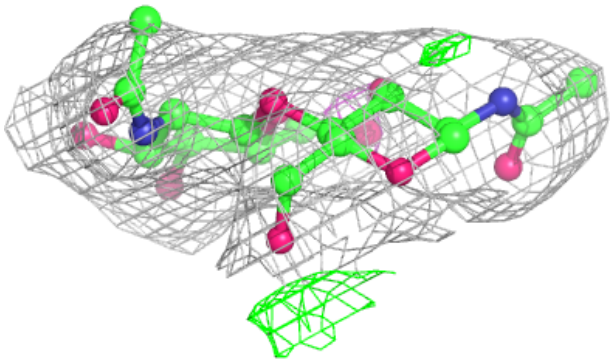
$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)

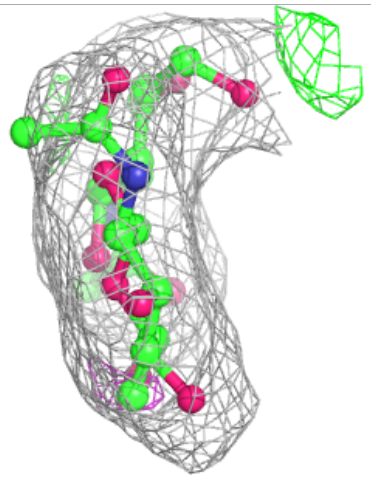


Electron density around Chain F:

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

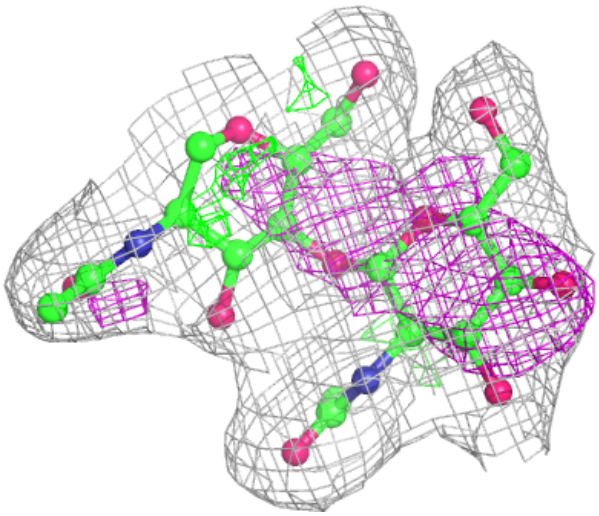


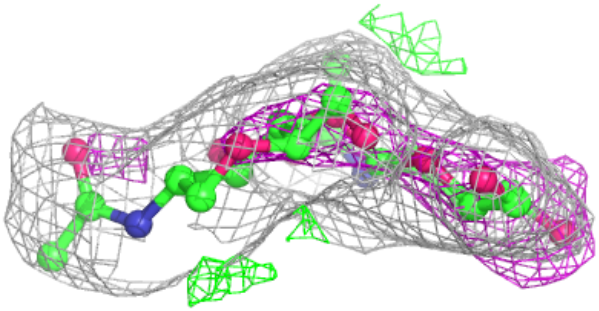


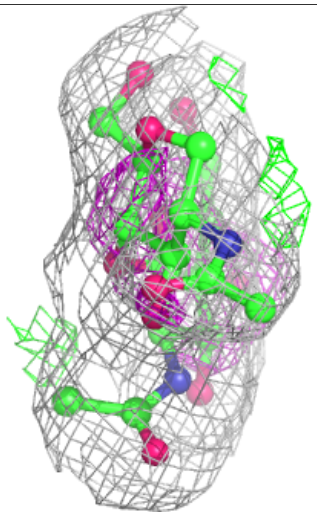


Electron density around Chain G:

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

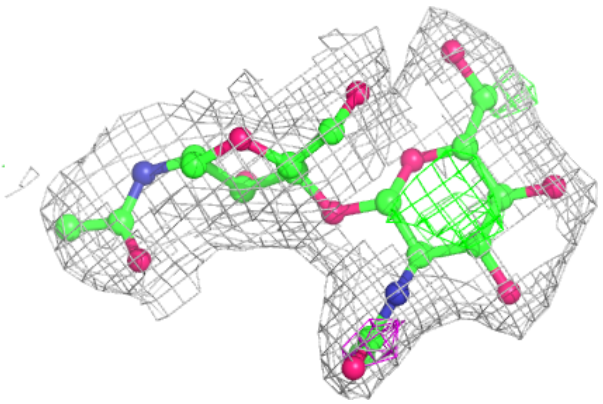


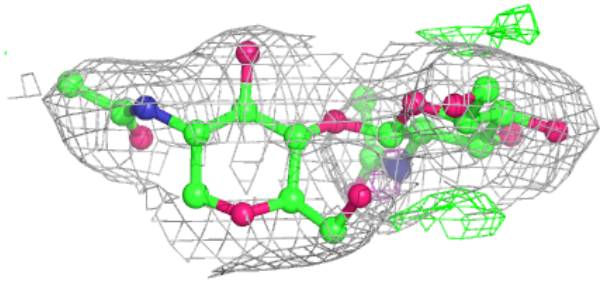


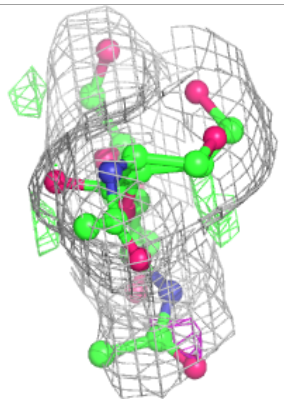


Electron density around Chain I:

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

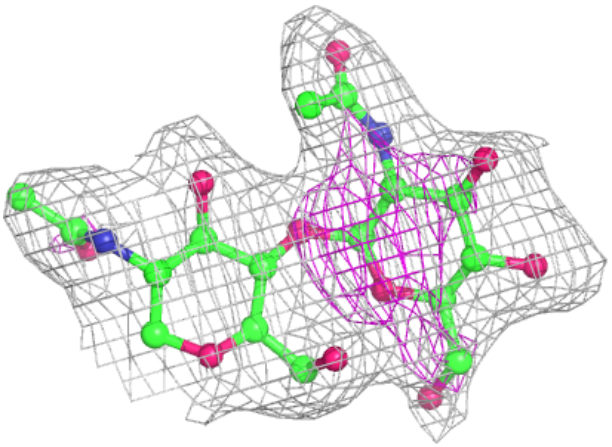


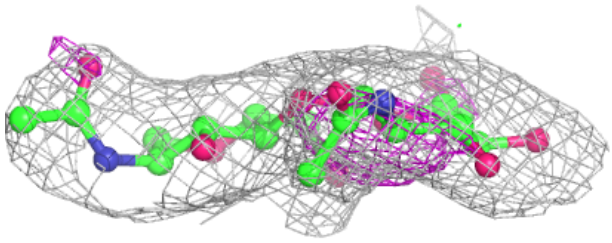


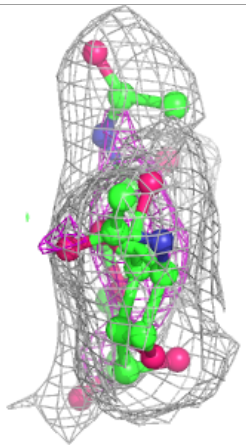


Electron density around Chain J:

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







6.4 Ligands (i)

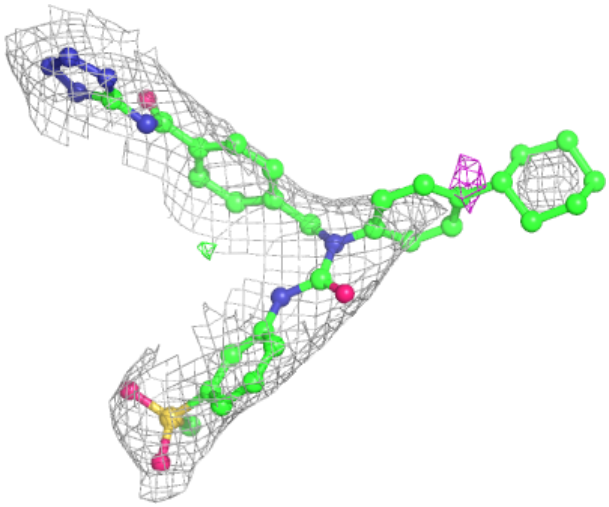
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95^{th} percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9'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

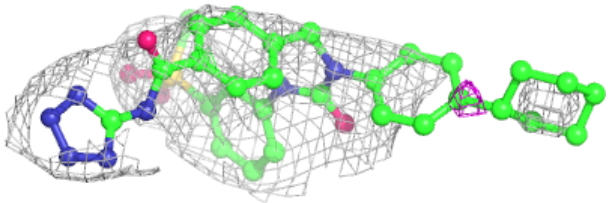
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
6	97V	B	1207	41/41	0.86	0.30	133,146,153,154	0
6	97V	A	1208	41/41	0.87	0.23	83,107,140,141	0
5	NAG	B	1203	14/15	0.92	0.20	62,64,68,70	0
5	NAG	B	1204	14/15	0.94	0.28	67,70,72,72	0
5	NAG	A	1201	14/15	0.95	0.16	61,64,65,65	0

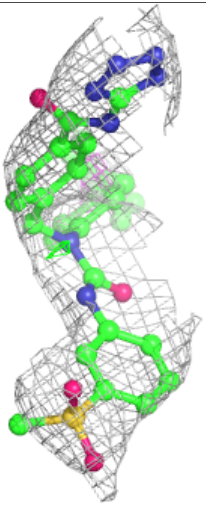
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

Electron density around 97V B 1207:

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

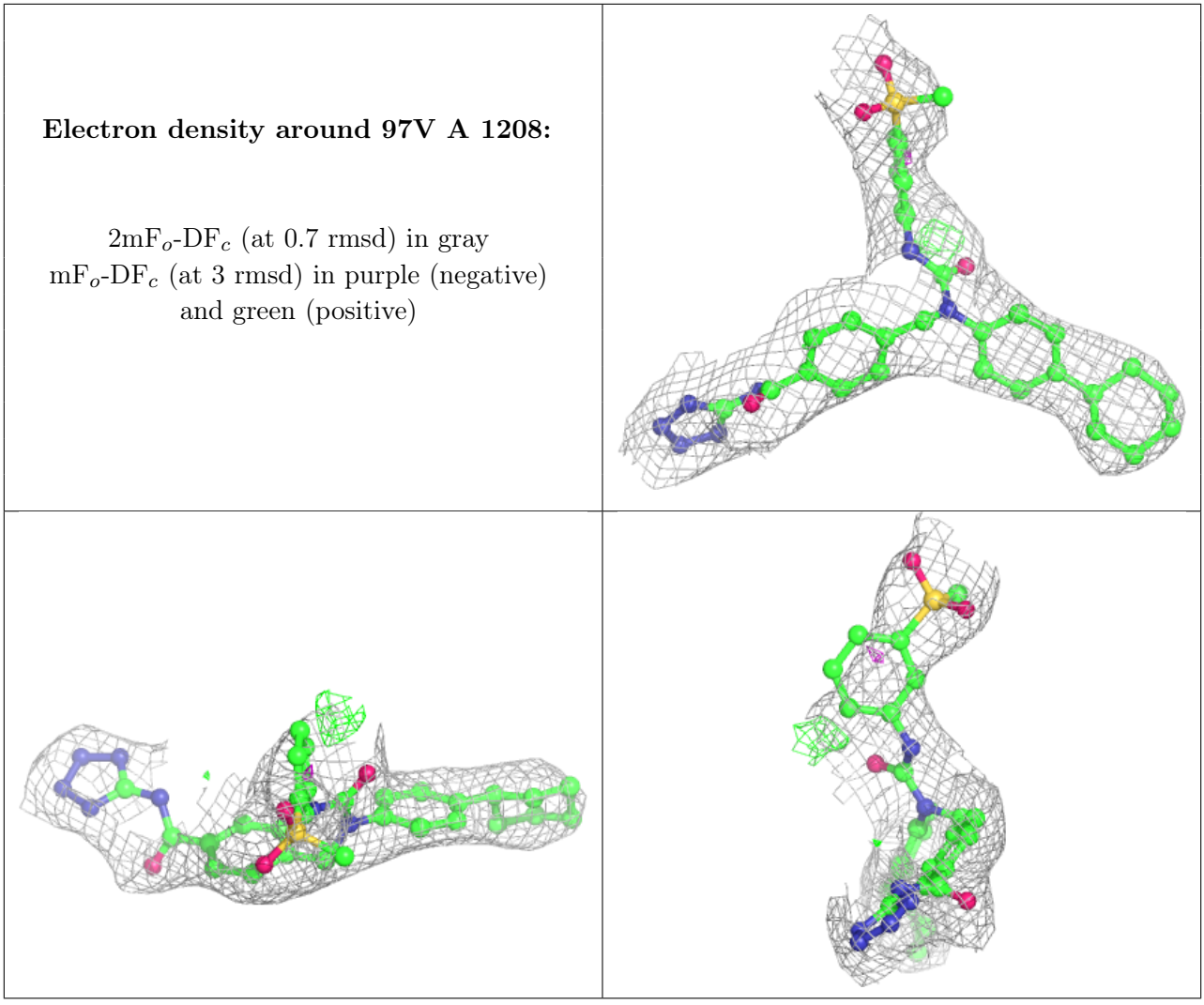






Electron density around 97V A 1208:

$2mF_o$-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.