Full wwPDB X-ray Structure Validation Report (i)

Oct 4, 2023 – 10:27 AM EDT

PDB ID	:	6Q20
Title	:	Crystal structure of human 1E01 Fab in complex with influenza virus neuraminidase from A/Japan/305/1957 (H2N2)
Authors	:	Zhu, X.; Wilson, I.A.
Deposited on	:	2019-08-06
Resolution	:	2.45 Å(reported)

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

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

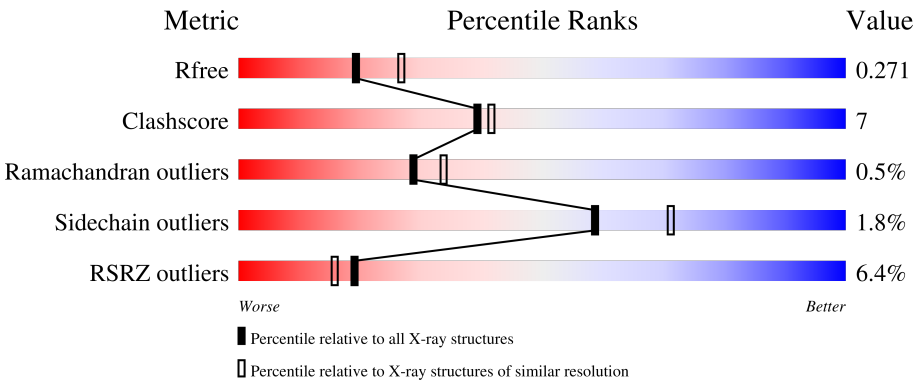
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.35.1
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.35.1

1 Overall quality at a glance (i)

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

The reported resolution of this entry is 2.45 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	1544 (2.48-2.44)
Clashscore	141614	1613 (2.48-2.44)
Ramachandran outliers	138981	1598 (2.48-2.44)
Sidechain outliers	138945	1598 (2.48-2.44)
RSRZ outliers	127900	1523 (2.48-2.44)

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	393	% 85% 13% •
2	L	216	6% 81% 18% •
3	H	240	15% 74% 19% • 5%
4	B	7	29% 71%
5	C	2	100%

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
7	CA	A	512	-	-	-	X

2 Entry composition (i)

There are 8 unique types of molecules in this entry. The entry contains 6596 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 Neuraminidase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	388	3014	1862	541	588	23	0	0	0

There are 5 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	77	GLY	-	expression tag	UNP C7RWN0
A	78	SER	-	expression tag	UNP C7RWN0
A	79	PRO	-	expression tag	UNP C7RWN0
A	80	SER	-	expression tag	UNP C7RWN0
A	81	ARG	-	expression tag	UNP C7RWN0

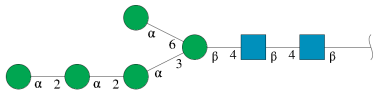
- Molecule 2 is a protein called 1E01 Fab kappa light chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	L	215	1661	1051	274	331	5	0	0	0

- Molecule 3 is a protein called 1E01 Fab IgG1 heavy chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
3	H	227	1731	1096	294	335	6	0	0	0

- Molecule 4 is an oligosaccharide called alpha-D-mannopyranose-(1-2)-alpha-D-mannopyranose-(1-2)-alpha-D-mannopyranose-(1-3)-[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.

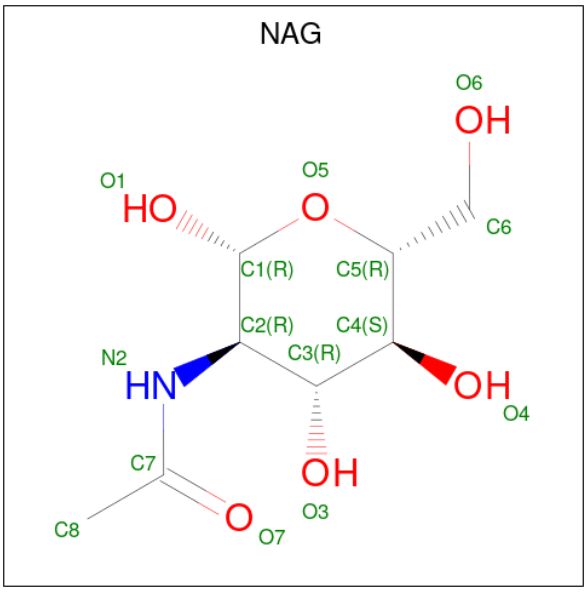


Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
4	B	7	83	46	2	35	0	0	0

- Molecule 5 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
			Total	C	N	O			
5	C	2	28	16	2	10	0	0	0

- Molecule 6 is 2-acetamido-2-deoxy-beta-D-glucopyranose (three-letter code: NAG) (formula: $C_8H_{15}NO_6$).



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

- Molecule 7 is CALCIUM ION (three-letter code: CA) (formula: Ca).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	Ca		
7	A	2	2	2	0	0

- Molecule 8 is water.

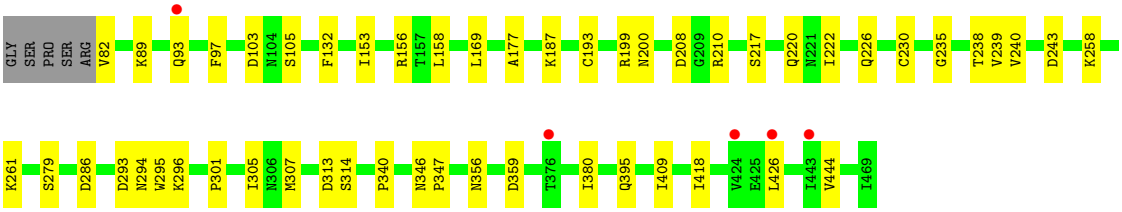
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	O		
8	A	41	41	41	0	0
			Total	O		
8	L	10	10	10	0	0
			Total	O		
8	H	12	12	12	0	0

3 Residue-property plots (i)

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

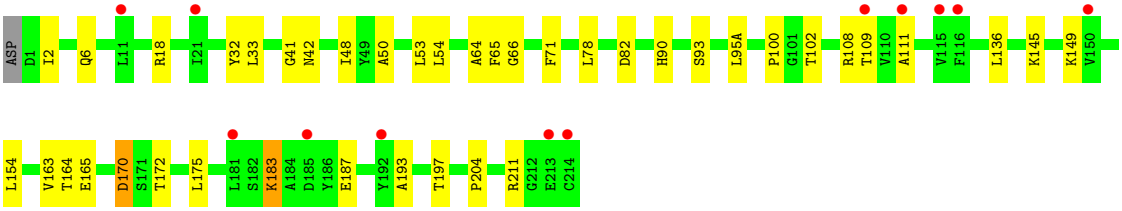
• Molecule 1: Neuraminidase

Chain A:



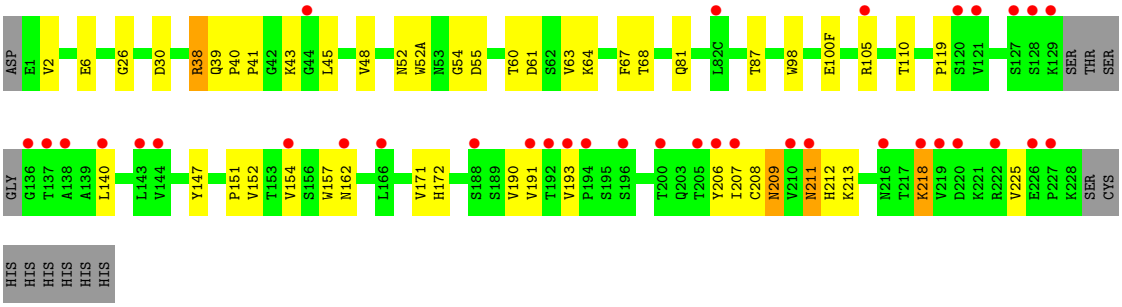
• Molecule 2: 1E01 Fab kappa light chain

Chain L:

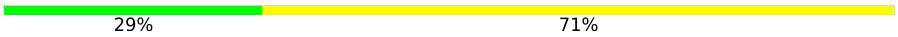


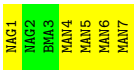
• Molecule 3: 1E01 Fab IgG1 heavy chain

Chain H:

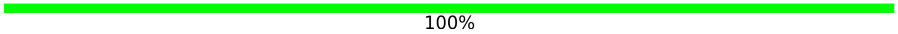


• Molecule 4: alpha-D-mannopyranose-(1-2)-alpha-D-mannopyranose-(1-2)-alpha-D-mannopyranose-(1-3)-[alpha-D-mannopyranose-(1-6)]beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain B: 



• Molecule 5: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain C: 

4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 4 21 2	Depositor
Cell constants a, b, c, α, β, γ	160.45Å 160.45Å 84.17Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	47.04 – 2.45 47.04 – 2.45	Depositor EDS
% Data completeness (in resolution range)	99.3 (47.04-2.45) 99.5 (47.04-2.45)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	0.12	Depositor
$< I/\sigma(I) >$ [1]	2.11 (at 2.45Å)	Xtriage
Refinement program	PHENIX (1.12_2829)	Depositor
R, R_{free}	0.217 , 0.272 0.217 , 0.271	Depositor DCC
R_{free} test set	2157 reflections (5.30%)	wwPDB-VP
Wilson B-factor (Å^2)	50.8	Xtriage
Anisotropy	0.882	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.31 , 51.5	EDS
L-test for twinning[2]	$< \|L\| > = 0.50$, $< L^2 > = 0.34$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.95	EDS
Total number of atoms	6596	wwPDB-VP
Average B, all atoms (Å^2)	70.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.70% 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 (i)

5.1 Standard geometry (i)

Bond lengths and bond angles in the following residue types are not validated in this section: CA, MAN, NAG, BMA

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	0.30	0/3088	0.50	0/4193
2	L	0.25	0/1700	0.47	0/2311
3	H	0.27	0/1774	0.51	0/2415
All	All	0.28	0/6562	0.50	0/8919

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	3014	0	2828	30	0
2	L	1661	0	1620	29	0
3	H	1731	0	1686	42	0
4	B	83	0	70	0	0
5	C	28	0	25	0	0
6	A	14	0	13	0	0
7	A	2	0	0	0	0
8	A	41	0	0	0	0
8	H	12	0	0	1	0
8	L	10	0	0	0	0
All	All	6596	0	6242	94	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 7.

All (94) 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)
2:L:2:ILE:HD11	2:L:90:HIS:CE1	2.07	0.89
1:A:97:PHE:H	1:A:395:GLN:HE22	1.26	0.83
2:L:42:ASN:HA	3:H:105:ARG:HE	1.52	0.74
3:H:140:LEU:HD21	3:H:225:VAL:HG11	1.71	0.73
3:H:61:ASP:HA	3:H:64:LYS:HD2	1.72	0.72
3:H:52:ASN:ND2	3:H:55:ASP:OD1	2.24	0.71
2:L:108:ARG:NH1	2:L:109:THR:O	2.24	0.70
3:H:211:ASN:OD1	3:H:218:LYS:NZ	2.21	0.70
2:L:50:ALA:HB3	2:L:53:LEU:HD23	1.73	0.69
3:H:100(F):GLU:OE2	3:H:100(F):GLU:N	2.21	0.69
3:H:105:ARG:O	3:H:105:ARG:NH1	2.23	0.69
2:L:136:LEU:HB2	2:L:175:LEU:HB3	1.75	0.68
1:A:97:PHE:N	1:A:395:GLN:HE22	1.90	0.68
1:A:294:ASN:O	1:A:346:ASN:ND2	2.28	0.66
1:A:177:ALA:HB2	1:A:193:CYS:HB3	1.78	0.64
2:L:41:GLY:C	3:H:105:ARG:HH21	2.02	0.63
1:A:426:LEU:HD21	1:A:444:VAL:HG12	1.79	0.63
1:A:199:ARG:HG3	3:H:98:TRP:CZ2	2.33	0.62
2:L:78:LEU:HD22	2:L:82:ASP:HB2	1.81	0.61
1:A:296:LYS:O	1:A:340:PRO:HB2	2.02	0.60
1:A:208:ASP:O	1:A:210:ARG:NH1	2.34	0.60
3:H:68:THR:HB	3:H:81:GLN:HB3	1.84	0.60
1:A:238:THR:HG21	1:A:305:ILE:HG21	1.84	0.59
3:H:211:ASN:HD22	3:H:212:HIS:N	2.01	0.57
1:A:226:GLN:HE21	1:A:240:VAL:H	1.51	0.57
2:L:42:ASN:HA	3:H:105:ARG:NE	2.18	0.57
3:H:119:PRO:HB3	3:H:147:TYR:HB3	1.87	0.56
3:H:162:ASN:HA	3:H:207:ILE:HG22	1.89	0.55
3:H:87:THR:HG23	3:H:110:THR:HA	1.89	0.54
1:A:153:ILE:HG12	1:A:156:ARG:HG3	1.89	0.54
1:A:132:PHE:HB3	1:A:158:LEU:HD11	1.89	0.54
3:H:193:VAL:HG11	3:H:206:TYR:CZ	2.43	0.52
1:A:279:SER:HB3	1:A:409:ILE:HG22	1.91	0.52
2:L:2:ILE:HD11	2:L:90:HIS:ND1	2.25	0.52
3:H:105:ARG:NH2	8:H:301:HOH:O	2.37	0.52
2:L:6:GLN:HB3	2:L:102:THR:HG23	1.92	0.51
3:H:157:TRP:CZ3	3:H:208:CYS:HB3	2.45	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:359:ASP:OD1	1:A:380:ILE:HA	2.10	0.50
2:L:163:VAL:HG22	2:L:175:LEU:HD23	1.93	0.50
3:H:100(F):GLU:H	3:H:100(F):GLU:CD	2.14	0.50
2:L:164:THR:HG22	2:L:165:GLU:O	2.12	0.50
2:L:90:HIS:ND1	2:L:93:SER:HB2	2.27	0.49
3:H:171:VAL:HG22	3:H:191:VAL:HG23	1.94	0.49
1:A:82:VAL:HG22	1:A:187:LYS:HG2	1.95	0.49
2:L:48:ILE:HG21	2:L:64:ALA:HB3	1.95	0.48
3:H:211:ASN:CG	3:H:218:LYS:HG3	2.33	0.48
2:L:149:LYS:HB2	2:L:193:ALA:HB3	1.96	0.48
1:A:217:SER:OG	1:A:243:ASP:OD2	2.23	0.48
2:L:66:GLY:HA3	2:L:71:PHE:CD2	2.49	0.47
1:A:199:ARG:HG3	3:H:98:TRP:HZ2	1.79	0.47
2:L:108:ARG:HH12	2:L:111:ALA:HB2	1.79	0.47
3:H:105:ARG:HH11	3:H:105:ARG:HG3	1.79	0.47
3:H:140:LEU:HD21	3:H:225:VAL:CG1	2.43	0.47
3:H:152:VAL:HG12	3:H:212:HIS:HB2	1.97	0.47
3:H:213:LYS:NZ	3:H:218:LYS:HZ1	2.13	0.47
2:L:149:LYS:HG2	2:L:154:LEU:HD23	1.96	0.47
2:L:93:SER:O	2:L:95(A):LEU:N	2.48	0.46
1:A:97:PHE:H	1:A:395:GLN:NE2	2.05	0.46
3:H:2:VAL:HA	3:H:26:GLY:HA3	1.97	0.46
1:A:293:ASP:HB2	1:A:301:PRO:HG3	1.98	0.46
2:L:48:ILE:HD13	2:L:54:LEU:HA	1.97	0.46
2:L:170:ASP:OD1	2:L:172:THR:OG1	2.28	0.45
1:A:226:GLN:HG3	1:A:239:VAL:HG23	1.98	0.45
1:A:93:GLN:OE1	1:A:356:ASN:ND2	2.40	0.45
3:H:172:HIS:HB2	3:H:190:VAL:HG22	1.99	0.45
2:L:78:LEU:HD23	2:L:78:LEU:HA	1.87	0.45
2:L:187:GLU:OE2	2:L:211:ARG:NH1	2.49	0.45
1:A:89:LYS:HB2	1:A:418:ILE:HG12	1.99	0.45
3:H:162:ASN:HA	3:H:207:ILE:CG2	2.47	0.45
3:H:40:PRO:HG2	3:H:43:LYS:HE3	1.99	0.44
2:L:183:LYS:O	2:L:187:GLU:HG2	2.17	0.44
1:A:103:ASP:OD2	1:A:105:SER:OG	2.24	0.44
2:L:95(A):LEU:HD21	3:H:61:ASP:OD1	2.18	0.44
2:L:32:TYR:O	2:L:90:HIS:HD2	2.01	0.43
3:H:162:ASN:OD1	3:H:207:ILE:HG22	2.18	0.43
3:H:39:GLN:HB2	3:H:45:LEU:HD23	2.01	0.43
1:A:169:LEU:HD23	1:A:169:LEU:HA	1.86	0.43
2:L:197:THR:HG22	2:L:204:PRO:HB3	2.01	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:H:105:ARG:NH1	3:H:105:ARG:HG3	2.33	0.43
2:L:6:GLN:HG3	2:L:100:PRO:HD2	2.00	0.42
1:A:235:GLY:O	1:A:258:LYS:HG3	2.20	0.42
1:A:295:TRP:CG	1:A:296:LYS:HG3	2.55	0.42
3:H:154:VAL:HA	3:H:209:ASN:O	2.20	0.42
3:H:52:ASN:OD1	3:H:54:GLY:N	2.45	0.41
1:A:286:ASP:HA	1:A:307:MET:HG2	2.01	0.41
3:H:38:ARG:HD2	3:H:48:VAL:HG12	2.03	0.41
3:H:6:GLU:OE1	3:H:6:GLU:N	2.49	0.41
1:A:238:THR:OG1	1:A:307:MET:HE1	2.20	0.41
3:H:63:VAL:HG13	3:H:67:PHE:CG	2.56	0.41
1:A:296:LYS:HD2	3:H:52(A):TRP:CZ2	2.56	0.40
3:H:40:PRO:HA	3:H:41:PRO:HD3	1.97	0.40
1:A:313:ASP:OD1	1:A:314:SER:N	2.54	0.40
3:H:60:THR:O	3:H:63:VAL:HB	2.20	0.40
2:L:145:LYS:HB3	2:L:197:THR:OG1	2.21	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	386/393 (98%)	364 (94%)	19 (5%)	3 (1%)	19 22
2	L	213/216 (99%)	195 (92%)	18 (8%)	0	100 100
3	H	223/240 (93%)	209 (94%)	13 (6%)	1 (0%)	34 41
All	All	822/849 (97%)	768 (93%)	50 (6%)	4 (0%)	29 34

All (4) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	200	ASN

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Mol	Chain	Res	Type
1	A	347	PRO
1	A	222	ILE
3	H	151	PRO

5.3.2 Protein sidechains (i)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
1	A	338/342 (99%)	335 (99%)	3 (1%)	78 86
2	L	189/190 (100%)	184 (97%)	5 (3%)	46 58
3	H	193/205 (94%)	188 (97%)	5 (3%)	46 58
All	All	720/737 (98%)	707 (98%)	13 (2%)	59 71

All (13) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	220	GLN
1	A	230	CYS
1	A	261	LYS
2	L	18	ARG
2	L	33	LEU
2	L	65	PHE
2	L	170	ASP
2	L	183	LYS
3	H	30	ASP
3	H	38	ARG
3	H	209	ASN
3	H	211	ASN
3	H	218	LYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (8) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	93	GLN

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Mol	Chain	Res	Type
1	A	220	GLN
1	A	226	GLN
1	A	356	ASN
1	A	395	GLN
1	A	432	GLN
2	L	90	HIS
3	H	179	GLN

5.3.3 RNA (i)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates (i)

9 monosaccharides are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
4	NAG	B	1	4,1	14,14,15	0.87	1 (7%)	17,19,21	0.90	1 (5%)
4	NAG	B	2	4	14,14,15	0.30	0	17,19,21	0.46	0
4	BMA	B	3	4	11,11,12	0.64	0	15,15,17	0.76	0
4	MAN	B	4	4	11,11,12	0.75	0	15,15,17	1.16	2 (13%)
4	MAN	B	5	4	11,11,12	0.90	0	15,15,17	1.56	2 (13%)
4	MAN	B	6	4	11,11,12	0.69	0	15,15,17	1.36	2 (13%)
4	MAN	B	7	4	11,11,12	0.63	0	15,15,17	1.01	2 (13%)
5	NAG	C	1	1,5	14,14,15	0.21	0	17,19,21	0.46	0
5	NAG	C	2	5	14,14,15	0.29	0	17,19,21	0.40	0

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	NAG	B	1	4,1	-	0/6/23/26	0/1/1/1
4	NAG	B	2	4	-	0/6/23/26	0/1/1/1
4	BMA	B	3	4	-	0/2/19/22	0/1/1/1
4	MAN	B	4	4	-	1/2/19/22	0/1/1/1
4	MAN	B	5	4	-	1/2/19/22	0/1/1/1
4	MAN	B	6	4	-	2/2/19/22	1/1/1/1
4	MAN	B	7	4	-	2/2/19/22	0/1/1/1
5	NAG	C	1	1,5	-	0/6/23/26	0/1/1/1
5	NAG	C	2	5	-	2/6/23/26	0/1/1/1

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	B	1	NAG	O5-C1	-2.32	1.40	1.43

All (9) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
4	B	5	MAN	C1-O5-C5	4.17	117.85	112.19
4	B	6	MAN	C1-O5-C5	3.93	117.52	112.19
4	B	5	MAN	O2-C2-C3	-3.50	103.13	110.14
4	B	4	MAN	C1-O5-C5	3.29	116.65	112.19
4	B	1	NAG	C1-O5-C5	2.72	115.87	112.19
4	B	7	MAN	C1-O5-C5	2.64	115.77	112.19
4	B	7	MAN	O2-C2-C3	-2.24	105.65	110.14
4	B	6	MAN	O2-C2-C3	-2.23	105.68	110.14
4	B	4	MAN	O2-C2-C3	-2.01	106.11	110.14

There are no chirality outliers.

All (8) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
5	C	2	NAG	O5-C5-C6-O6
4	B	7	MAN	O5-C5-C6-O6
4	B	6	MAN	C4-C5-C6-O6
4	B	7	MAN	C4-C5-C6-O6
5	C	2	NAG	C4-C5-C6-O6

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Mol	Chain	Res	Type	Atoms
4	B	6	MAN	O5-C5-C6-O6
4	B	5	MAN	O5-C5-C6-O6
4	B	4	MAN	C4-C5-C6-O6

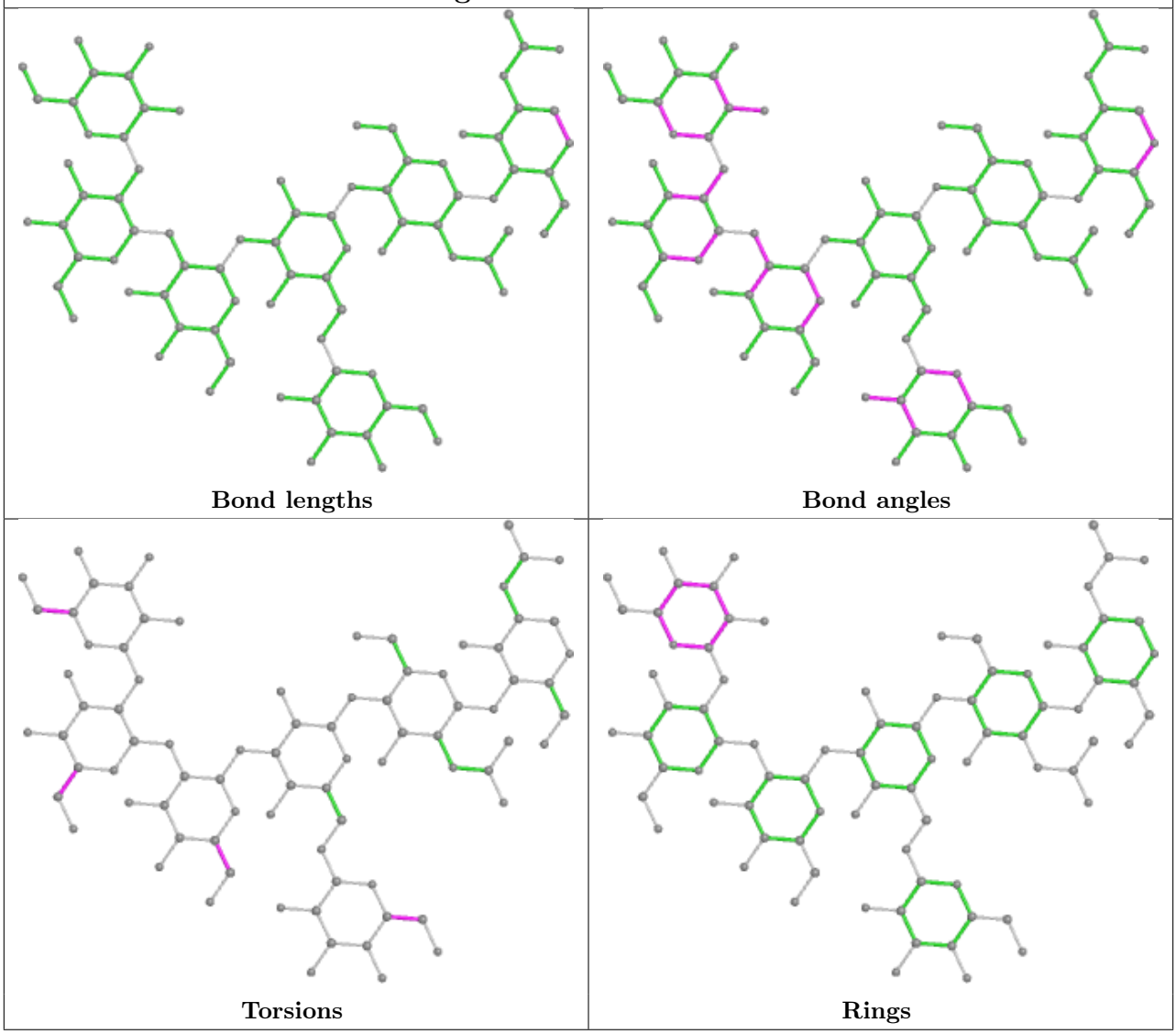
All (1) ring outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	B	6	MAN	C1-C2-C3-C4-C5-O5

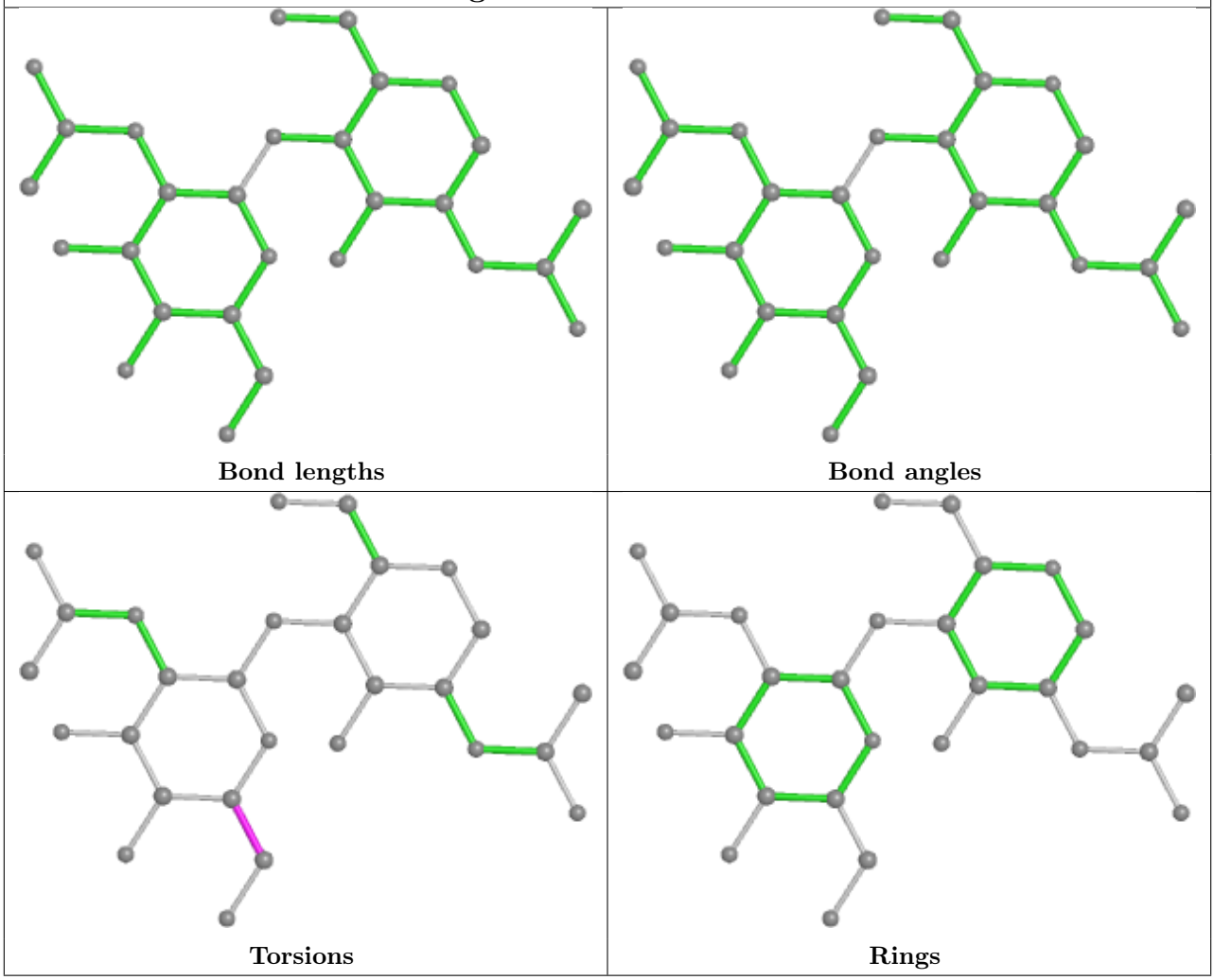
No monomer is involved in short contacts.

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

Oligosaccharide Chain B



Oligosaccharide Chain C



5.6 Ligand geometry (i)

Of 3 ligands modelled in this entry, 2 are monoatomic - leaving 1 for Mogul analysis.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
6	NAG	A	510	1	14,14,15	0.21	0	17,19,21	0.39	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	NAG	A	510	1	-	0/6/23/26	0/1/1/1

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

5.7 Other polymers (i)

There are no such residues in this entry.

5.8 Polymer linkage issues (i)

There are no chain breaks in this entry.

6 Fit of model and data (i)

6.1 Protein, DNA and RNA chains (i)

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

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å^2)	Q<0.9
1	A	388/393 (98%)	0.28	5 (1%) 77 76	37, 56, 75, 99	0
2	L	215/216 (99%)	0.41	12 (5%) 24 21	54, 80, 106, 133	0
3	H	227/240 (94%)	0.80	36 (15%) 1 1	45, 81, 116, 126	0
All	All	830/849 (97%)	0.45	53 (6%) 19 16	37, 66, 108, 133	0

All (53) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
3	H	219	VAL	7.8
3	H	140	LEU	6.6
3	H	136	GLY	6.3
3	H	205	THR	4.9
2	L	214	CYS	4.5
3	H	192	THR	4.4
3	H	128	SER	4.3
3	H	222	ARG	4.1
3	H	166	LEU	4.0
3	H	127	SER	4.0
2	L	116	PHE	3.8
3	H	210	VAL	3.7
3	H	220	ASP	3.7
3	H	154	VAL	3.7
3	H	120	SER	3.6
3	H	162	ASN	3.6
3	H	129	LYS	3.5
3	H	137	THR	3.4
2	L	11	LEU	3.4
3	H	206	TYR	3.4
3	H	191	VAL	3.3
3	H	211	ASN	3.3
2	L	192	TYR	3.1

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Mol	Chain	Res	Type	RSRZ
3	H	143	LEU	3.0
1	A	93	GLN	2.9
3	H	194	PRO	2.9
3	H	196	SER	2.9
3	H	82(C)	LEU	2.9
3	H	193	VAL	2.9
3	H	200	THR	2.8
2	L	185	ASP	2.7
2	L	21	ILE	2.6
2	L	115	VAL	2.6
3	H	207	ILE	2.5
3	H	218	LYS	2.5
3	H	227	PRO	2.5
2	L	150	VAL	2.4
2	L	111	ALA	2.4
1	A	424	VAL	2.3
3	H	105	ARG	2.3
3	H	216	ASN	2.3
1	A	426	LEU	2.3
3	H	226	GLU	2.2
3	H	144	VAL	2.2
2	L	109	THR	2.2
3	H	44	GLY	2.2
1	A	376	THR	2.2
3	H	138	ALA	2.2
3	H	121	VAL	2.1
2	L	213	GLU	2.1
2	L	181	LEU	2.0
3	H	188	SER	2.0
1	A	443	ILE	2.0

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

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

6.3 Carbohydrates (i)

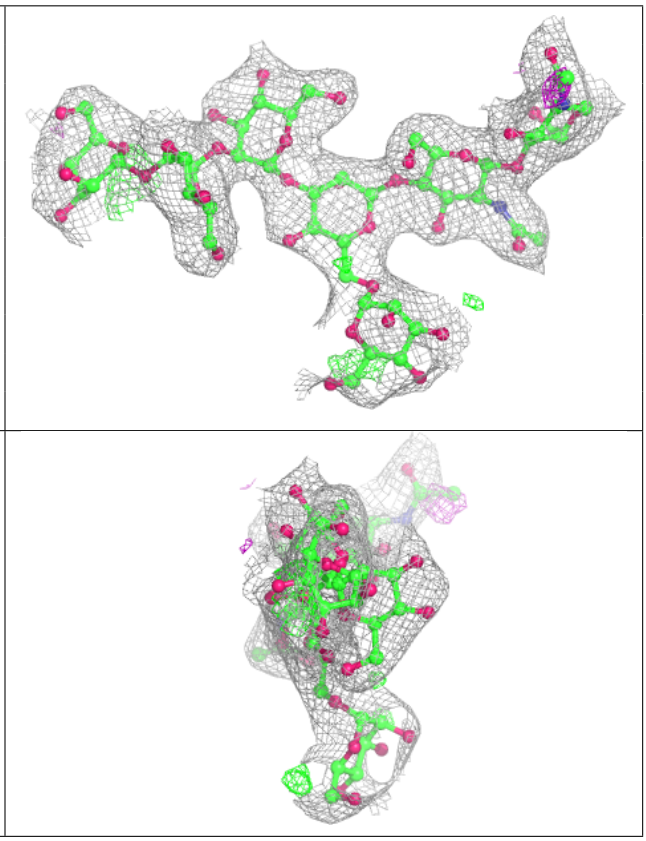
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
4	MAN	B	6	11/12	0.73	0.24	103,110,115,117	0
4	MAN	B	7	11/12	0.85	0.11	111,122,126,129	0
5	NAG	C	2	14/15	0.85	0.21	98,106,112,116	0
4	MAN	B	5	11/12	0.88	0.14	90,96,102,107	0
4	NAG	B	1	14/15	0.91	0.14	47,59,64,65	0
4	MAN	B	4	11/12	0.92	0.12	70,78,81,85	0
5	NAG	C	1	14/15	0.94	0.11	74,86,96,97	0
4	BMA	B	3	11/12	0.95	0.11	66,71,83,102	0
4	NAG	B	2	14/15	0.97	0.12	52,60,71,72	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.

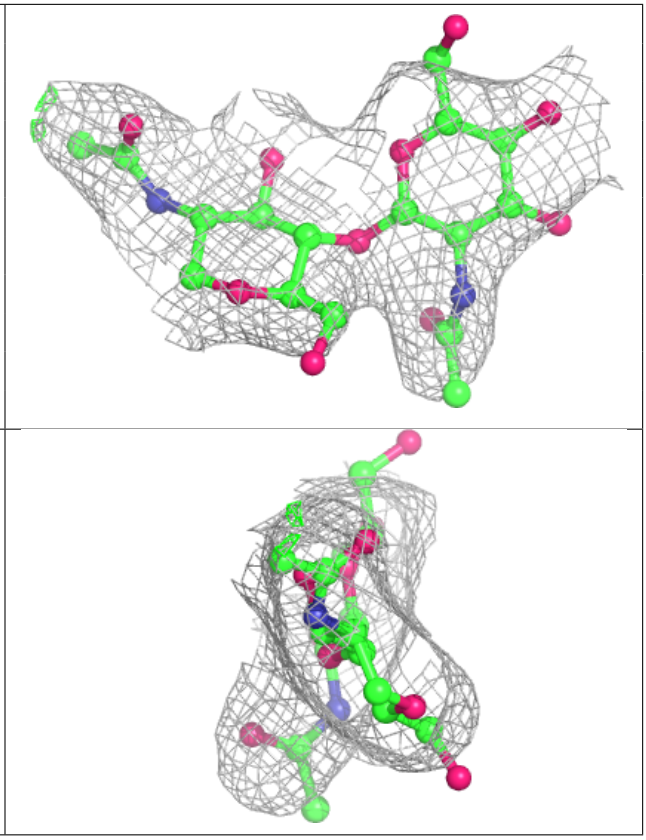
Electron density around Chain B:

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 C:

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



6.4 Ligands (i)

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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
7	CA	A	512	1/1	0.40	0.43	109,109,109,109	1
7	CA	A	511	1/1	0.54	0.19	96,96,96,96	0
6	NAG	A	510	14/15	0.87	0.19	106,109,115,118	0

6.5 Other polymers (i)

There are no such residues in this entry.