



Full wwPDB X-ray Structure Validation Report ⓘ

Aug 10, 2020 – 12:04 PM BST

PDB ID : 4MWF
Title : Structure of Hepatitis C Virus Envelope Glycoprotein E2 core bound to broadly neutralizing antibody AR3C
Authors : Kong, L.; Wilson, I.A.; Law, M.
Deposited on : 2013-09-24
Resolution : 2.65 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 ⓘ symbol.

The following versions of software and data (see [references ⓘ](#)) 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 : 2.13.1
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) : 2.13.1

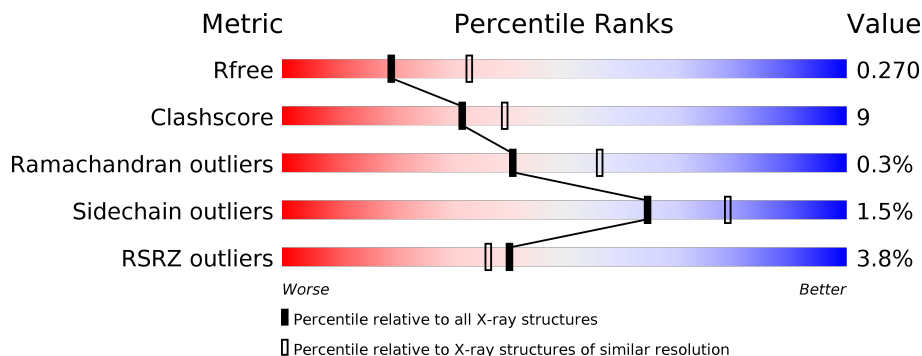
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.65 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.




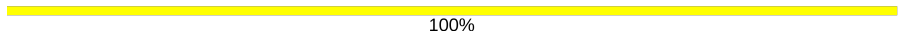
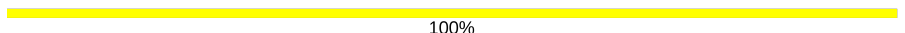
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	1426 (2.66-2.62)
Clashscore	141614	1472 (2.66-2.62)
Ramachandran outliers	138981	1446 (2.66-2.62)
Sidechain outliers	138945	1446 (2.66-2.62)
RSRZ outliers	127900	1408 (2.66-2.62)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments on the lower bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$. 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	233	
1	H	233	
2	B	214	
2	L	214	
3	C	212	
3	D	212	

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Mol	Chain	Length	Quality of chain
4	E	8	 88% 13%
5	F	2	 100%
5	G	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
6	NAG	C	712	-	-	-	X

2 Entry composition [i](#)

There are 6 unique types of molecules in this entry. The entry contains 9433 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 Fab AR3C heavy chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	223	Total 1663	C 1047	N 282	O 327	S 7	0	0	0
1	H	228	Total 1697	C 1065	N 288	O 337	S 7	0	0	0

- Molecule 2 is a protein called Fab AR3C light chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	B	211	Total 1612	C 1005	N 277	O 326	S 4	0	0	0
2	L	212	Total 1620	C 1011	N 278	O 327	S 4	0	0	0

- Molecule 3 is a protein called Envelope glycoprotein E2.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
3	C	169	Total 1288	C 818	N 218	O 235	S 17	0	0	0
3	D	171	Total 1305	C 831	N 222	O 235	S 17	0	0	0

There are 16 discrepancies between the modelled and reference sequences:

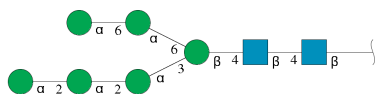
Chain	Residue	Modelled	Actual	Comment	Reference
C	448	ASP	ASN	engineered mutation	UNP P27958
C	482	GLY	-	linker	UNP P27958
C	483	SER	-	linker	UNP P27958
C	484	SER	-	linker	UNP P27958
C	485	GLY	-	linker	UNP P27958
C	576	ASP	ASN	engineered mutation	UNP P27958
C	589	HIS	TYR	variant	UNP P27958
C	602	TRP	ARG	variant	UNP P27958

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Chain	Residue	Modelled	Actual	Comment	Reference
D	448	ASP	ASN	engineered mutation	UNP P27958
D	482	GLY	-	linker	UNP P27958
D	483	SER	-	linker	UNP P27958
D	484	SER	-	linker	UNP P27958
D	485	GLY	-	linker	UNP P27958
D	576	ASP	ASN	engineered mutation	UNP P27958
D	589	HIS	TYR	variant	UNP P27958
D	602	TRP	ARG	variant	UNP P27958

- 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)-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.



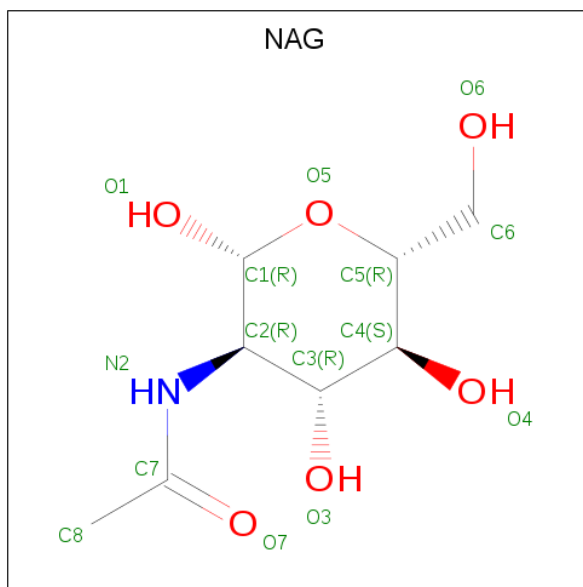
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
4	E	8	94	52	2	40	0	0	0

- Molecule 5 is an oligosaccharide called 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.

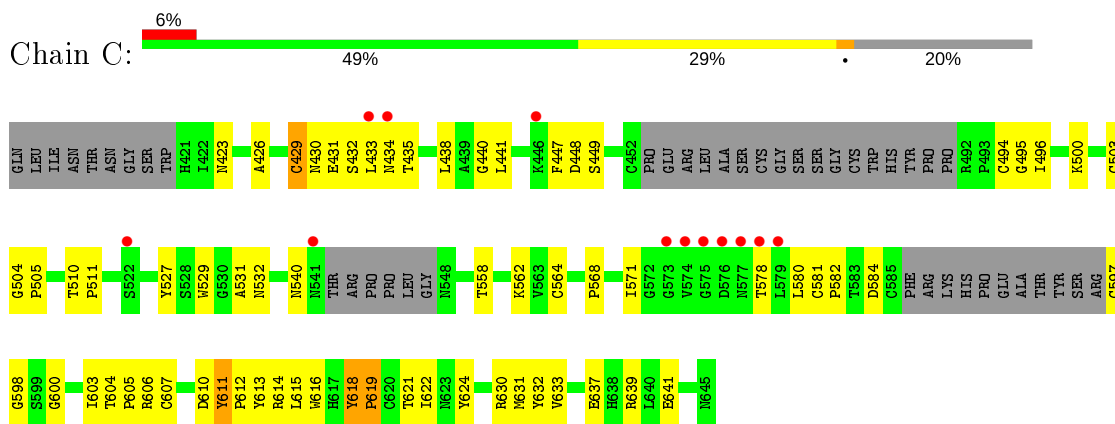


Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
5	F	2	28	16	2	10	0	0	0
5	G	2	28	16	2	10	0	0	0

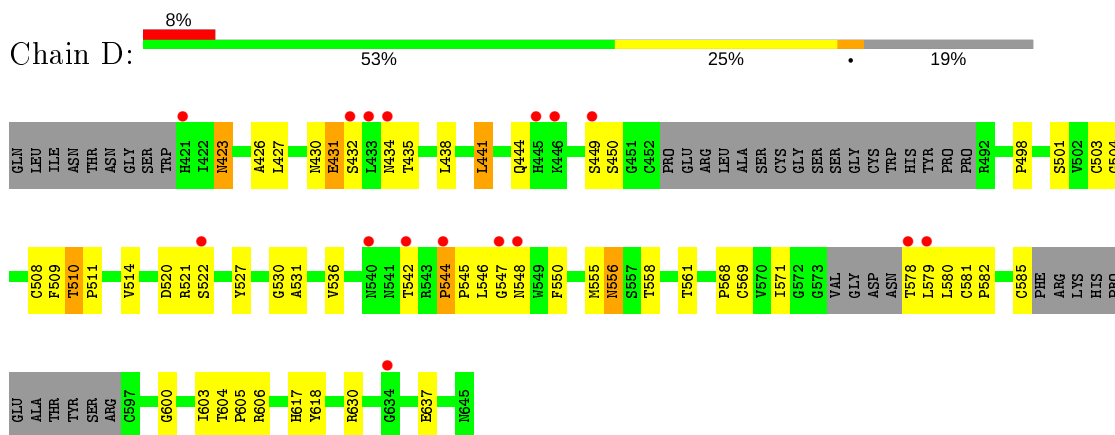
- Molecule 6 is 2-acetamido-2-deoxy-beta-D-glucopyranose (three-letter code: NAG) (formula: C₈H₁₅NO₆).



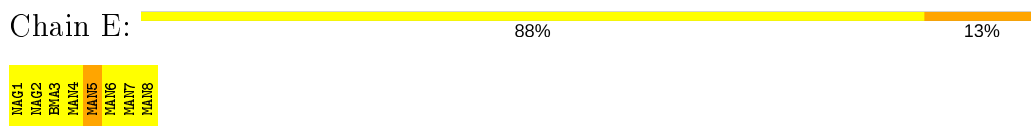
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	N	O		
6	C	1	Total 14	8	1	5	0	0
6	C	1	Total 14	8	1	5	0	0
6	C	1	Total 14	8	1	5	0	0
6	D	1	Total 14	8	1	5	0	0
6	D	1	Total 14	8	1	5	0	0
6	D	1	Total 14	8	1	5	0	0
6	D	1	Total 14	8	1	5	0	0



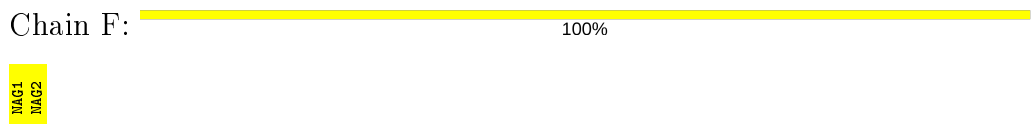
- Molecule 3: Envelope glycoprotein E2



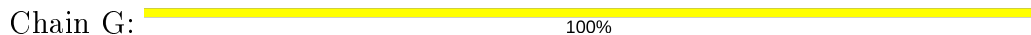
- Molecule 4: alpha-D-mannopyranose-(1-2)-alpha-D-mannopyranose-(1-2)-alpha-D-mannopyranose-(1-3)-[alpha-D-mannopyranose-(1-6)-alpha-D-mannopyranose-(1-6)]beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose



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



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



MAC1
MAC2

4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	47.13Å 166.55Å 209.96Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	49.08 – 2.65 49.08 – 2.64	Depositor EDS
% Data completeness (in resolution range)	92.7 (49.08-2.65) 92.8 (49.08-2.64)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.77 (at 2.65Å)	Xtrriage
Refinement program	PHENIX (phenix.refine: 1.8.2_1309)	Depositor
R, R_{free}	0.231 , 0.270 0.232 , 0.270	Depositor DCC
R_{free} test set	2316 reflections (5.04%)	wwPDB-VP
Wilson B-factor (Å ²)	55.5	Xtrriage
Anisotropy	0.761	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.29 , 48.8	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.92	EDS
Total number of atoms	9433	wwPDB-VP
Average B, all atoms (Å ²)	71.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 10.00% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical values of $\langle |L| \rangle$, $\langle L^2 \rangle$ 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: BMA, NAG, MAN

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 5$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	$\# Z > 5$	RMSZ	$\# Z > 5$
1	A	0.34	0/1702	0.51	0/2314
1	H	0.38	0/1737	0.56	0/2363
2	B	0.31	0/1646	0.49	0/2235
2	L	0.36	0/1654	0.55	0/2246
3	C	0.45	2/1328 (0.2%)	0.67	2/1816 (0.1%)
3	D	0.37	0/1347	0.69	0/1843
All	All	0.37	2/9414 (0.0%)	0.58	2/12817 (0.0%)

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	C	619	PRO	N-CD	5.18	1.55	1.47
3	C	612	PRO	N-CD	5.14	1.55	1.47

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	C	611	TYR	C-N-CD	5.68	140.33	128.40
3	C	618	TYR	C-N-CD	5.64	140.24	128.40

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	1663	0	1626	32	0
1	H	1697	0	1653	24	0
2	B	1612	0	1570	11	0
2	L	1620	0	1581	10	0
3	C	1288	0	1193	53	0
3	D	1305	0	1219	44	0
4	E	94	0	79	1	0
5	F	28	0	25	0	0
5	G	28	0	25	5	0
6	C	42	0	39	1	0
6	D	56	0	52	0	0
All	All	9433	0	9062	165	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 9.

All (165) 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)
3:C:433:LEU:HD12	1:H:99:ARG:HD2	1.43	1.01
1:H:97:THR:HG22	1:H:99:ARG:HH12	1.35	0.90
3:C:433:LEU:CD1	1:H:99:ARG:HD2	2.02	0.90
3:C:610:ASP:HB3	3:C:641:GLU:HB3	1.65	0.78
1:A:66:ARG:HE	1:A:82(A):ARG:HB2	1.52	0.74
1:H:68:THR:OG1	1:H:82(A):ARG:NH2	2.20	0.73
1:A:99:ARG:HA	3:D:432:SER:HB2	1.71	0.73
3:C:578:THR:OG1	3:C:581:CYS:O	2.07	0.73
1:H:97:THR:HG22	1:H:99:ARG:NH1	2.03	0.73
1:H:39:GLN:HB2	1:H:45:LEU:HD23	1.74	0.70
3:D:578:THR:HG23	3:D:579:LEU:HG	1.75	0.68
5:G:1:NAG:H62	5:G:2:NAG:H82	1.76	0.68
3:C:597:CYS:SG	3:C:598:GLY:N	2.67	0.67
3:D:530:GLY:N	3:D:531:ALA:HB3	2.10	0.67
3:C:430:ASN:OD1	3:C:431:GLU:N	2.29	0.66
1:A:191:THR:HG21	3:C:630:ARG:HG3	1.77	0.66
1:A:99:ARG:NH1	3:D:432:SER:O	2.28	0.66
3:C:495:GLY:N	3:C:540:ASN:OD1	2.29	0.65
3:C:429:CYS:HB2	1:H:100(A):CYS:HB2	1.77	0.65
3:D:604:THR:HG22	3:D:606:ARG:H	1.61	0.65
1:H:99:ARG:HG3	2:L:91:TYR:CE2	2.31	0.65
3:C:604:THR:HB	3:C:607:CYS:HB2	1.78	0.64
3:D:503:CYS:O	3:D:555:MET:HB3	1.97	0.64

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:D:509:PHE:C	3:D:511:PRO:HA	2.19	0.63
1:H:2:GLN:N	1:H:3:LEU:HA	2.14	0.63
3:C:630:ARG:HH12	3:C:639:ARG:HH21	1.48	0.61
3:D:520:ASP:O	3:D:522:SER:HA	2.00	0.61
3:D:510:THR:N	3:D:511:PRO:HA	2.16	0.60
3:D:430:ASN:OD1	3:D:431:GLU:HB3	2.02	0.59
3:C:426:ALA:O	3:C:504:GLY:HA2	2.02	0.59
1:H:32:TYR:CD1	1:H:98:PRO:HG3	2.37	0.59
2:L:37:GLN:HB2	2:L:47:LEU:HD11	1.85	0.58
1:A:11:VAL:HB	1:A:147:PRO:HG3	1.85	0.58
1:A:56:THR:HG21	1:A:100(D):GLY:HA3	1.86	0.58
1:A:38:ARG:HB3	1:A:48:ILE:HD11	1.85	0.58
3:D:498:PRO:HA	3:D:536:VAL:HG12	1.85	0.58
3:D:521:ARG:HB3	3:D:536:VAL:HG21	1.86	0.57
3:D:578:THR:OG1	3:D:579:LEU:N	2.33	0.57
3:D:444:GLN:N	3:D:444:GLN:OE1	2.29	0.57
1:H:197:ASN:ND2	1:H:208:ASP:OD1	2.38	0.57
3:C:496:ILE:HD11	6:C:712:NAG:H82	1.86	0.57
2:B:14:SER:OG	2:B:107:LYS:NZ	2.38	0.57
3:C:611:TYR:CE1	3:C:614:ARG:HB2	2.40	0.57
3:C:429:CYS:SG	3:C:438:LEU:HD11	2.45	0.57
3:D:544:PRO:O	3:D:546:LEU:HA	2.05	0.56
1:H:26:GLY:N	1:H:27:GLY:HA2	2.20	0.56
1:A:142:VAL:HG11	1:A:150:VAL:HG21	1.87	0.56
1:A:119:PRO:HB3	1:A:145:TYR:HB3	1.87	0.56
3:C:511:PRO:HB3	3:C:568:PRO:HB3	1.89	0.55
1:A:66:ARG:NE	1:A:82(A):ARG:HB2	2.21	0.55
3:D:511:PRO:HB3	3:D:568:PRO:HB3	1.89	0.55
1:H:97:THR:CG2	1:H:99:ARG:HH12	2.15	0.54
3:C:440:GLY:HA3	3:C:616:TRP:CD1	2.42	0.54
3:C:615:LEU:CD2	3:C:622:ILE:HA	2.37	0.54
1:A:198:VAL:HB	1:A:207:VAL:HG13	1.90	0.54
1:A:93:VAL:HG21	1:A:100(J):PHE:HB3	1.89	0.54
1:A:121:VAL:O	1:A:209:LYS:NZ	2.41	0.54
3:C:432:SER:HB2	3:C:438:LEU:HB2	1.90	0.53
3:D:510:THR:N	3:D:511:PRO:CA	2.71	0.53
3:D:582:PRO:HA	3:D:605:PRO:HA	1.90	0.53
3:D:509:PHE:HB3	3:D:511:PRO:O	2.09	0.52
2:B:21:LEU:HD22	2:B:102:THR:HG21	1.91	0.52
3:C:441:LEU:HD21	1:H:54:PHE:HZ	1.75	0.52
3:D:568:PRO:HB2	3:D:603:ILE:HG22	1.92	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:33:LEU:HD22	2:B:71:PHE:CG	2.45	0.51
3:C:611:TYR:CD1	3:C:614:ARG:HB2	2.45	0.51
1:A:191:THR:CG2	3:C:630:ARG:HG3	2.40	0.50
3:C:568:PRO:HB2	3:C:603:ILE:HG22	1.94	0.50
3:D:544:PRO:HG2	3:D:550:PHE:CE1	2.47	0.50
3:D:434:ASN:OD1	3:D:435:THR:N	2.45	0.50
3:C:578:THR:HG23	3:C:578:THR:O	2.11	0.50
3:C:571:ILE:HB	3:C:580:LEU:HD12	1.93	0.49
1:A:66:ARG:HH21	1:A:82(A):ARG:HH11	1.61	0.49
3:D:544:PRO:HA	3:D:547:GLY:H	1.77	0.49
3:C:447:PHE:CZ	3:C:619:PRO:HB2	2.48	0.49
3:C:434:ASN:OD1	3:C:435:THR:N	2.46	0.49
3:C:423:ASN:OD1	3:C:527:TYR:HD1	1.95	0.49
2:B:123:GLU:O	2:B:126:LYS:HG2	2.12	0.49
2:L:18:ARG:HH11	2:L:74:THR:HG21	1.77	0.49
3:D:558:THR:HG23	5:G:1:NAG:HN2	1.76	0.49
2:L:120:PRO:HD3	2:L:132:VAL:HG22	1.94	0.49
3:C:434:ASN:OD1	3:C:435:THR:HG22	2.14	0.48
3:D:423:ASN:HB3	3:D:527:TYR:O	2.13	0.48
3:C:448:ASP:OD1	3:C:449:SER:N	2.41	0.48
3:D:441:LEU:HD12	3:D:441:LEU:O	2.13	0.48
3:C:632:TYR:CE2	3:C:637:GLU:HB2	2.48	0.48
3:C:630:ARG:HD3	3:C:637:GLU:OE2	2.13	0.48
1:A:25:SER:HA	1:A:26:GLY:HA2	1.61	0.47
5:G:1:NAG:H61	5:G:2:NAG:N2	2.30	0.47
1:A:126:PRO:HG2	1:A:213:PRO:HB3	1.96	0.47
3:D:569:CYS:O	3:D:571:ILE:N	2.47	0.47
5:G:1:NAG:H61	5:G:2:NAG:HN2	1.80	0.47
1:A:98:PRO:HB2	3:D:438:LEU:HG	1.97	0.47
3:D:544:PRO:HA	3:D:547:GLY:O	2.15	0.46
2:L:33:LEU:HD22	2:L:71:PHE:CG	2.50	0.46
3:D:510:THR:HG22	3:D:548:ASN:O	2.15	0.46
1:H:32:TYR:CG	1:H:98:PRO:HG3	2.50	0.46
1:H:13:LYS:HD3	1:H:113:SER:HA	1.98	0.46
3:C:447:PHE:CE1	3:C:619:PRO:HB2	2.51	0.46
3:C:494:CYS:HA	3:C:495:GLY:HA3	1.65	0.46
3:C:615:LEU:HD21	3:C:622:ILE:HA	1.97	0.46
3:D:600:GLY:HA2	3:D:618:TYR:CZ	2.51	0.46
3:C:438:LEU:HD12	3:C:438:LEU:HA	1.70	0.46
3:C:529:TRP:HB3	1:H:100(C):GLY:HA3	1.98	0.45
3:D:449:SER:HA	3:D:450:SER:HA	1.49	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:H:36:TRP:CH2	1:H:92:CYS:HB2	2.52	0.45
1:A:18:VAL:HG13	1:A:82(C):LEU:HD11	1.99	0.45
3:C:494:CYS:O	3:C:540:ASN:HA	2.17	0.45
3:C:500:LYS:HE2	3:C:531:ALA:O	2.17	0.45
3:D:501:SER:O	3:D:556:ASN:HA	2.16	0.45
3:C:600:GLY:HA2	3:C:618:TYR:CZ	2.51	0.45
3:D:503:CYS:HA	3:D:504:GLY:HA2	1.66	0.45
1:A:96:VAL:O	1:A:97:THR:HB	2.16	0.44
3:D:582:PRO:HG2	3:D:585:CYS:SG	2.57	0.44
1:H:93:VAL:HG21	1:H:100(J):PHE:HB3	2.00	0.44
1:A:12:LYS:HG3	1:A:18:VAL:CG1	2.47	0.44
1:H:100(C):GLY:HA2	1:H:100(D):GLY:HA2	1.62	0.44
3:C:584:ASP:OD1	3:C:584:ASP:N	2.45	0.44
3:D:426:ALA:O	3:D:504:GLY:HA2	2.17	0.44
5:G:1:NAG:C6	5:G:2:NAG:N2	2.81	0.44
1:A:47:TRP:CD1	2:B:96:LEU:HD12	2.53	0.44
2:L:83:SER:HB2	2:L:106:ILE:HD13	2.00	0.44
1:A:66:ARG:HG2	1:A:82(A):ARG:HB2	2.00	0.44
4:E:5:MAN:C1	4:E:6:MAN:H5	2.48	0.44
3:C:582:PRO:HA	3:C:605:PRO:HA	1.98	0.43
3:C:432:SER:O	3:C:432:SER:OG	2.36	0.43
3:D:630:ARG:NH2	3:D:637:GLU:OE2	2.51	0.43
1:A:146:PHE:HA	1:A:147:PRO:HA	1.85	0.43
3:C:432:SER:CB	3:C:438:LEU:HB2	2.47	0.43
1:A:66:ARG:HE	1:A:82(A):ARG:CB	2.26	0.43
3:C:614:ARG:NH1	3:C:621:THR:OG1	2.52	0.43
1:H:72:ASP:OD1	1:H:74:SER:OG	2.28	0.43
3:C:621:THR:O	3:C:624:TYR:HB2	2.20	0.42
1:H:99:ARG:HA	1:H:99:ARG:HD3	1.71	0.42
3:C:604:THR:HG22	3:C:606:ARG:H	1.85	0.42
3:D:542:THR:O	3:D:547:GLY:HA3	2.20	0.42
2:B:201:LEU:HD13	2:B:205:VAL:HG23	1.99	0.42
1:A:32:TYR:O	1:A:52(A):PRO:HD2	2.19	0.42
2:B:19:ALA:HB2	2:B:78:LEU:HD11	2.01	0.42
3:D:580:LEU:O	3:D:605:PRO:HD3	2.20	0.42
1:A:117:LYS:HD3	1:A:175:LEU:HD21	2.02	0.42
1:A:47:TRP:CG	2:B:96:LEU:HB2	2.55	0.42
3:D:430:ASN:HA	3:D:431:GLU:HA	1.82	0.42
3:D:544:PRO:C	3:D:546:LEU:HA	2.40	0.42
1:H:184:VAL:HG11	1:H:194:TYR:CE1	2.55	0.42
3:C:571:ILE:HD11	3:C:633:VAL:HG22	2.01	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:C:503:CYS:HA	3:C:504:GLY:HA2	1.69	0.41
1:A:36:TRP:CE2	1:A:80:MET:HB2	2.55	0.41
2:B:37:GLN:HB2	2:B:47:LEU:HD11	2.01	0.41
3:D:508:CYS:O	3:D:514:VAL:HG12	2.20	0.41
2:B:94:SER:HB2	2:B:95:PRO:HD3	2.02	0.41
3:C:558:THR:O	3:C:558:THR:HG22	2.21	0.41
2:L:112:ALA:HA	2:L:113:PRO:HD3	1.94	0.41
2:B:89:GLN:HB2	2:B:98:PHE:CD2	2.55	0.41
1:A:100(A):CYS:HB3	3:D:427:LEU:HG	2.03	0.41
2:L:96:LEU:HD12	2:L:96:LEU:H	1.86	0.40
3:D:561:THR:HG21	3:D:617:HIS:O	2.20	0.40
1:A:66:ARG:HH21	1:A:82(A):ARG:HG3	1.85	0.40
3:C:562:LYS:HA	3:C:562:LYS:HD2	1.85	0.40
1:H:60:ALA:HB3	1:H:63:PHE:HD2	1.86	0.40
2:L:140:TYR:CG	2:L:141:PRO:HA	2.57	0.40
2:L:155:GLN:OE1	2:L:158:ASN:ND2	2.47	0.40
1:A:39:GLN:HB2	1:A:45:LEU:HD23	2.04	0.40
3:C:505:PRO:HG2	3:C:613:TYR:CE2	2.57	0.40
3:C:604:THR:HG23	3:C:605:PRO:HD2	2.03	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	219/233 (94%)	216 (99%)	2 (1%)	1 (0%)	29	43
1	H	226/233 (97%)	221 (98%)	5 (2%)	0	100	100
2	B	209/214 (98%)	201 (96%)	8 (4%)	0	100	100
2	L	210/214 (98%)	206 (98%)	4 (2%)	0	100	100
3	C	161/212 (76%)	152 (94%)	8 (5%)	1 (1%)	25	37

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles
3	D	163/212 (77%)	150 (92%)	11 (7%)	2 (1%)	13 18
All	All	1188/1318 (90%)	1146 (96%)	38 (3%)	4 (0%)	41 56

All (4) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	97	THR
3	D	510	THR
3	C	510	THR
3	D	545	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	186/195 (95%)	184 (99%)	2 (1%)	73 85
1	H	191/195 (98%)	188 (98%)	3 (2%)	62 78
2	B	181/184 (98%)	181 (100%)	0	100 100
2	L	182/184 (99%)	182 (100%)	0	100 100
3	C	143/180 (79%)	139 (97%)	4 (3%)	43 61
3	D	145/180 (81%)	139 (96%)	6 (4%)	30 47
All	All	1028/1118 (92%)	1013 (98%)	15 (2%)	65 79

All (15) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	43	GLN
1	A	95	SER
3	C	429	CYS
3	C	532	ASN
3	C	564	CYS
3	C	631	MET
3	D	423	ASN

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Mol	Chain	Res	Type
3	D	431	GLU
3	D	441	LEU
3	D	544	PRO
3	D	556	ASN
3	D	581	CYS
1	H	3	LEU
1	H	95	SER
1	H	214	LYS

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. There are no such sidechains identified.

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](#)

12 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	3,4	14,14,15	0.43	0	17,19,21	0.98	1 (5%)
4	NAG	E	2	4	14,14,15	0.51	0	17,19,21	1.22	2 (11%)
4	BMA	E	3	4	11,11,12	0.85	1 (9%)	15,15,17	1.63	2 (13%)
4	MAN	E	4	4	11,11,12	0.39	0	15,15,17	1.16	2 (13%)
4	MAN	E	5	4	11,11,12	0.35	0	15,15,17	1.00	1 (6%)
4	MAN	E	6	4	11,11,12	0.21	0	15,15,17	0.84	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
4	MAN	E	7	4	11,11,12	0.88	0	15,15,17	2.29	2 (13%)
4	MAN	E	8	4	11,11,12	0.28	0	15,15,17	0.94	1 (6%)
5	NAG	F	1	3,5	14,14,15	0.52	0	17,19,21	1.11	1 (5%)
5	NAG	F	2	5	14,14,15	0.59	0	17,19,21	0.82	1 (5%)
5	NAG	G	1	3,5	14,14,15	0.28	0	17,19,21	0.63	0
5	NAG	G	2	5	14,14,15	0.30	0	17,19,21	0.60	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	E	1	3,4	-	2/6/23/26	0/1/1/1
4	NAG	E	2	4	-	2/6/23/26	0/1/1/1
4	BMA	E	3	4	-	0/2/19/22	0/1/1/1
4	MAN	E	4	4	-	2/2/19/22	0/1/1/1
4	MAN	E	5	4	-	0/2/19/22	0/1/1/1
4	MAN	E	6	4	-	2/2/19/22	0/1/1/1
4	MAN	E	7	4	-	0/2/19/22	0/1/1/1
4	MAN	E	8	4	-	2/2/19/22	0/1/1/1
5	NAG	F	1	3,5	-	3/6/23/26	0/1/1/1
5	NAG	F	2	5	-	3/6/23/26	0/1/1/1
5	NAG	G	1	3,5	-	2/6/23/26	0/1/1/1
5	NAG	G	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	E	3	BMA	C4-C5	2.15	1.57	1.53

All (13) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	E	7	MAN	C1-O5-C5	7.74	122.68	112.19
4	E	3	BMA	C1-C2-C3	4.10	114.71	109.67
4	E	3	BMA	C1-O5-C5	3.77	117.30	112.19
5	F	1	NAG	O5-C1-C2	-2.88	106.74	111.29
4	E	1	NAG	C2-N2-C7	-2.69	119.07	122.90

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	E	2	NAG	C2-N2-C7	-2.68	119.09	122.90
4	E	7	MAN	O6-C6-C5	2.49	119.82	111.29
4	E	4	MAN	C1-O5-C5	2.48	115.55	112.19
4	E	8	MAN	C1-O5-C5	2.26	115.25	112.19
5	F	2	NAG	C2-N2-C7	-2.12	119.88	122.90
4	E	5	MAN	O2-C2-C3	-2.11	105.91	110.14
4	E	2	NAG	O5-C5-C6	2.10	110.50	107.20
4	E	4	MAN	C2-C3-C4	-2.06	107.34	110.89

There are no chirality outliers.

All (20) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	E	4	MAN	O5-C5-C6-O6
5	G	1	NAG	O5-C5-C6-O6
5	G	2	NAG	O5-C5-C6-O6
5	F	2	NAG	C8-C7-N2-C2
5	F	2	NAG	O7-C7-N2-C2
5	G	1	NAG	C4-C5-C6-O6
4	E	8	MAN	O5-C5-C6-O6
5	G	2	NAG	C4-C5-C6-O6
4	E	4	MAN	C4-C5-C6-O6
5	F	1	NAG	C8-C7-N2-C2
5	F	1	NAG	O7-C7-N2-C2
4	E	6	MAN	O5-C5-C6-O6
4	E	8	MAN	C4-C5-C6-O6
5	F	1	NAG	O5-C5-C6-O6
5	F	2	NAG	O5-C5-C6-O6
4	E	6	MAN	C4-C5-C6-O6
4	E	2	NAG	C8-C7-N2-C2
4	E	1	NAG	C8-C7-N2-C2
4	E	2	NAG	O7-C7-N2-C2
4	E	1	NAG	O7-C7-N2-C2

There are no ring outliers.

4 monomers are involved in 6 short contacts:

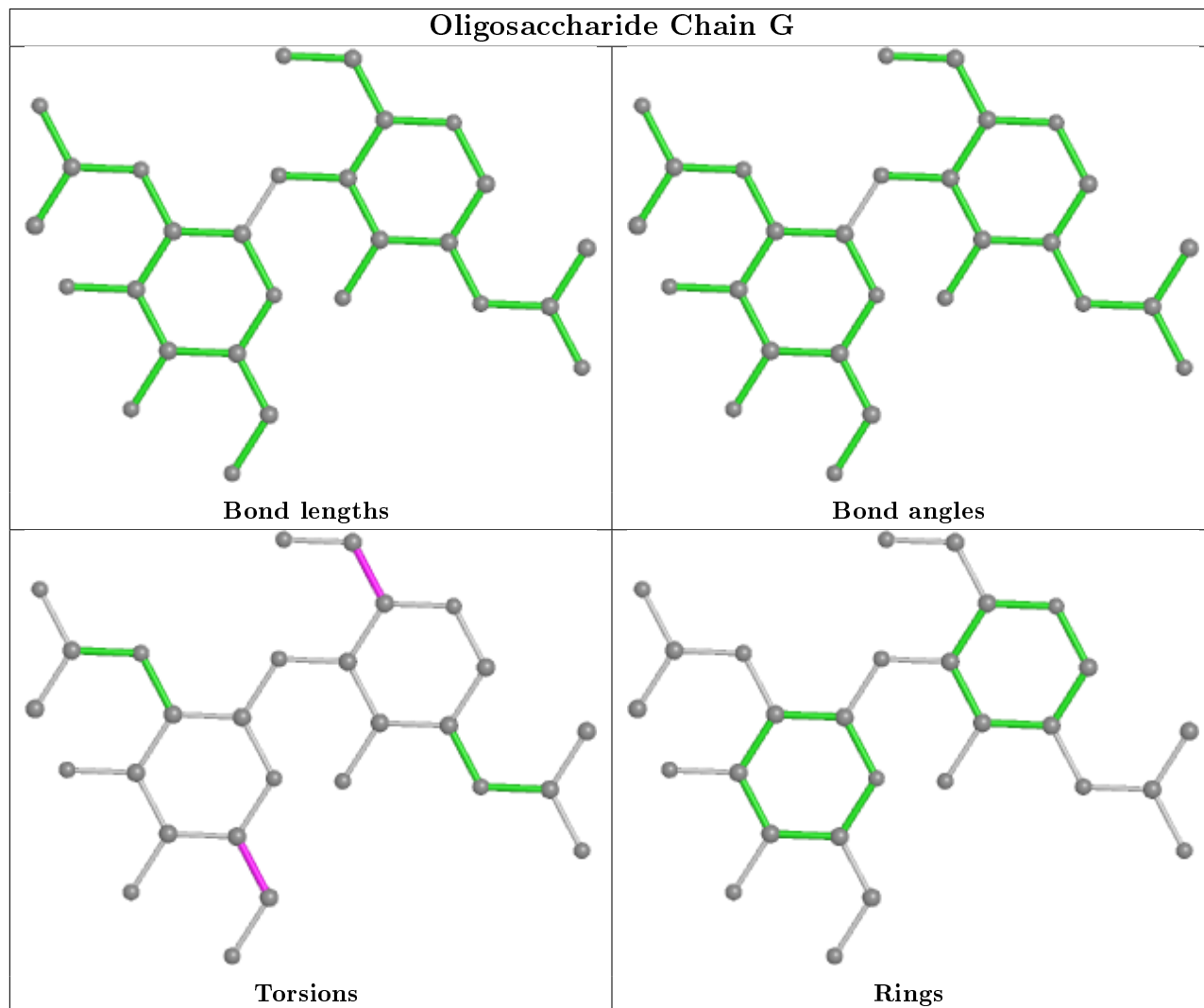
Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	E	6	MAN	1	0
5	G	1	NAG	5	0
5	G	2	NAG	4	0

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Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	E	5	MAN	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.



5.6 Ligand geometry [i](#)

7 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	NAG	C	712	3	14,14,15	0.28	0	17,19,21	0.59	0
6	NAG	D	702	3	14,14,15	0.70	0	17,19,21	0.93	0
6	NAG	D	706	3	14,14,15	0.55	0	17,19,21	0.80	0
6	NAG	D	701	3	14,14,15	0.50	0	17,19,21	0.89	1 (5%)
6	NAG	C	713	3	14,14,15	0.47	0	17,19,21	1.02	1 (5%)
6	NAG	D	703	3	14,14,15	0.30	0	17,19,21	0.61	0
6	NAG	C	711	3	14,14,15	0.50	0	17,19,21	0.98	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
6	NAG	C	712	3	-	2/6/23/26	0/1/1/1
6	NAG	D	702	3	-	0/6/23/26	0/1/1/1
6	NAG	D	706	3	-	2/6/23/26	0/1/1/1
6	NAG	D	701	3	-	2/6/23/26	0/1/1/1
6	NAG	C	713	3	-	0/6/23/26	0/1/1/1
6	NAG	D	703	3	-	2/6/23/26	0/1/1/1
6	NAG	C	711	3	-	0/6/23/26	0/1/1/1

There are no bond length outliers.

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
6	C	713	NAG	C1-O5-C5	3.15	116.46	112.19
6	C	711	NAG	O5-C5-C6	3.07	112.02	107.20
6	D	701	NAG	C1-O5-C5	2.41	115.46	112.19

There are no chirality outliers.

All (8) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
6	C	712	NAG	O7-C7-N2-C2
6	C	712	NAG	C8-C7-N2-C2
6	D	701	NAG	O5-C5-C6-O6
6	D	706	NAG	C8-C7-N2-C2
6	D	703	NAG	C8-C7-N2-C2

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Mol	Chain	Res	Type	Atoms
6	D	703	NAG	O7-C7-N2-C2
6	D	701	NAG	C4-C5-C6-O6
6	D	706	NAG	O7-C7-N2-C2

There are no ring outliers.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
6	C	712	NAG	1	0

5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

6 Fit of model and data [i](#)

6.1 Protein, DNA and RNA chains [i](#)

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

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
1	A	223/233 (95%)	0.19	9 (4%) 38 35	46, 77, 109, 123	0
1	H	228/233 (97%)	0.25	8 (3%) 44 40	39, 55, 96, 134	0
2	B	211/214 (98%)	-0.13	1 (0%) 91 90	48, 72, 95, 114	0
2	L	212/214 (99%)	0.00	0 100 100	39, 57, 76, 101	1 (0%)
3	C	169/212 (79%)	0.34	12 (7%) 16 12	45, 69, 123, 165	0
3	D	171/212 (80%)	0.46	16 (9%) 8 6	50, 81, 120, 141	0
All	All	1214/1318 (92%)	0.17	46 (3%) 40 36	39, 67, 109, 165	1 (0%)

All (46) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
3	C	575	GLY	6.4
3	C	578	THR	6.2
3	C	574	VAL	6.1
1	H	131	THR	6.1
3	C	576	ASP	5.6
1	A	129	LYS	5.0
3	D	544	PRO	4.5
3	C	522	SER	4.3
3	D	433	LEU	4.3
3	D	432	SER	4.0
1	H	132	SER	3.8
1	A	50	GLY	3.5
3	D	547	GLY	3.3
3	D	446	LYS	3.3
1	A	75	THR	3.3
3	C	573	GLY	3.3
1	H	133	GLY	3.2
3	D	445	HIS	3.2
3	D	579	LEU	3.1

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Mol	Chain	Res	Type	RSRZ
3	D	578	THR	3.1
3	D	421	HIS	3.0
3	C	577	ASN	3.0
3	C	579	LEU	3.0
1	A	67	VAL	3.0
1	H	2	GLN	2.9
1	H	129	LYS	2.7
3	C	434	ASN	2.7
3	D	548	ASN	2.7
3	C	446	LYS	2.7
1	H	27	GLY	2.6
3	D	542	THR	2.6
3	D	449	SER	2.5
1	A	26	GLY	2.4
3	D	540	ASN	2.4
3	C	541	ASN	2.3
2	B	127	SER	2.3
3	C	433	LEU	2.2
3	D	522	SER	2.2
1	H	130	SER	2.1
1	A	78	GLY	2.1
3	D	434	ASN	2.1
1	A	28	THR	2.1
1	A	24	THR	2.0
1	A	70	SER	2.0
1	H	3	LEU	2.0
3	D	634	GLY	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.

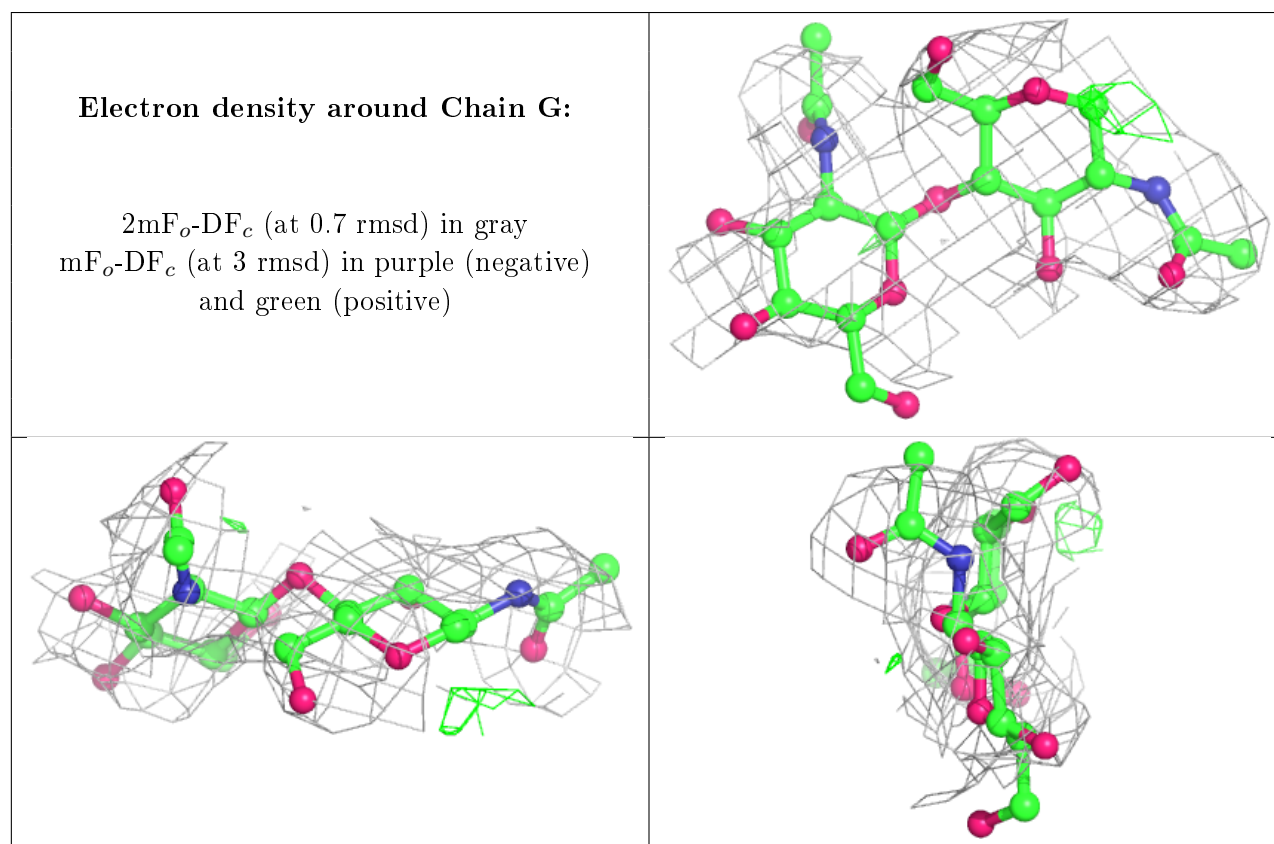
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
4	MAN	E	8	11/12	0.75	0.21	131,135,140,148	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
5	NAG	G	2	14/15	0.78	0.27	113,137,153,153	0
4	MAN	E	6	11/12	0.82	0.15	81,98,105,108	0
5	NAG	F	2	14/15	0.83	0.18	102,121,136,144	0
4	MAN	E	7	11/12	0.83	0.17	96,111,124,130	0
4	BMA	E	3	11/12	0.85	0.18	78,86,99,107	0
5	NAG	G	1	14/15	0.89	0.17	63,93,112,114	0
5	NAG	F	1	14/15	0.90	0.14	63,88,114,115	0
4	MAN	E	5	11/12	0.91	0.17	64,78,85,91	0
4	MAN	E	4	11/12	0.91	0.15	55,69,80,90	0
4	NAG	E	1	14/15	0.94	0.11	60,71,86,92	0
4	NAG	E	2	14/15	0.94	0.17	78,86,102,108	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.



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(\AA^2)	Q<0.9
6	NAG	D	702	14/15	0.65	0.29	132,144,155,158	0
6	NAG	C	712	14/15	0.71	0.44	115,135,162,176	0
6	NAG	C	711	14/15	0.78	0.31	104,126,132,133	0
6	NAG	D	706	14/15	0.80	0.42	101,122,127,130	0
6	NAG	D	701	14/15	0.82	0.24	95,105,126,128	0
6	NAG	D	703	14/15	0.88	0.27	83,109,115,120	0
6	NAG	C	713	14/15	0.90	0.20	93,102,114,116	0

6.5 Other polymers [i](#)

There are no such residues in this entry.