Full wwPDB X-ray Structure Validation Report (i)

Apr 21, 2026 – 03:03 AM JST

PDB ID	:	9UOC / pdb_00009uoc
Title	:	Crystal structure of nanobody Tnb150 with MERS-CoV RBD
Authors	:	Wang, X.; Lin, Z.
Deposited on	:	2025-04-25
Resolution	:	3.24 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:

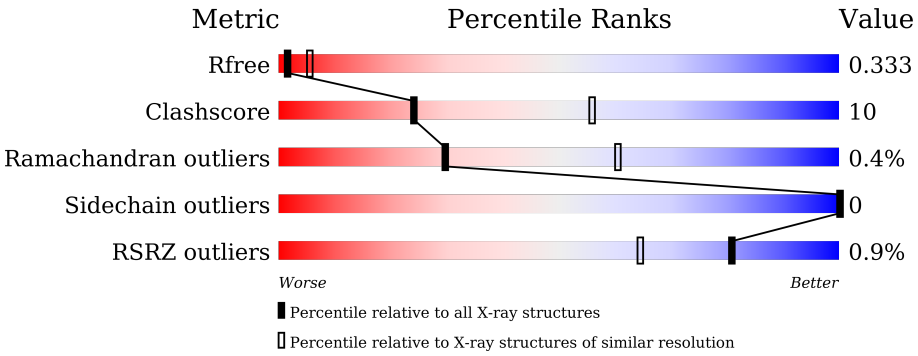
MolProbity	:	4-5-2 with Phenix2.0
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	2.0
EDS	:	3.0
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4	:	9.0.010 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.49

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 3.24 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}	180053	2153 (3.28-3.20)
Clashscore	190562	2275 (3.28-3.20)
Ramachandran outliers	187476	2233 (3.28-3.20)
Sidechain outliers	187428	2232 (3.28-3.20)
RSRZ outliers	180081	2153 (3.28-3.20)

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	B	208	74% 25%
1	C	208	80% 20%
1	E	208	79% 21%
1	G	208	2% 76% 20%
2	A	123	76% 24%
2	D	123	2% 72% 27%

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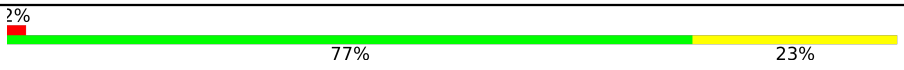
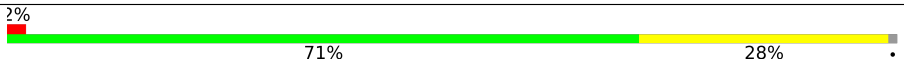
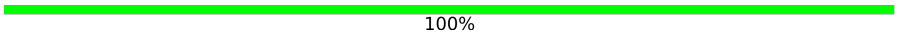
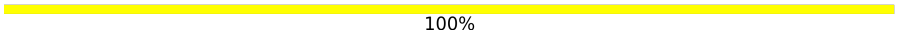
Mol	Chain	Length	Quality of chain
2	F	123	
2	H	123	
3	I	2	
3	J	2	

2 Entry composition (i)

There are 4 unique types of molecules in this entry. The entry contains 10110 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 Spike glycoprotein.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	B	206	Total	C	N	O	S	0	0	0
			1588	1015	254	308	11			
1	C	208	Total	C	N	O	S	0	0	0
			1608	1026	256	315	11			
1	E	208	Total	C	N	O	S	0	0	0
			1608	1026	256	315	11			
1	G	200	Total	C	N	O	S	0	0	0
			1545	990	243	301	11			

- Molecule 2 is a protein called Tnb150.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	A	123	Total	C	N	O	S	0	0	0
			925	574	159	184	8			
2	D	123	Total	C	N	O	S	0	0	0
			925	574	159	184	8			
2	F	123	Total	C	N	O	S	0	0	0
			925	574	159	184	8			
2	H	122	Total	C	N	O	S	0	0	0
			916	569	157	182	8			

- Molecule 3 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
3	I	2	Total	C	N	O	0	0	0
			28	16	2	10			

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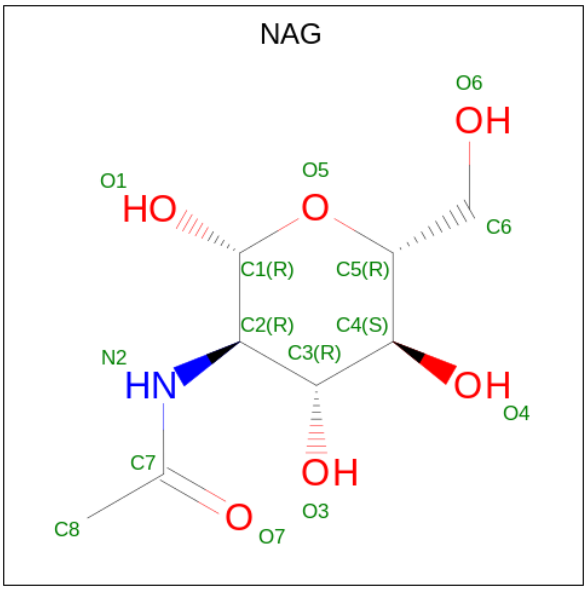
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf	Trace
3	J	2	Total C N O 28 16 2 10	0	0	0

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



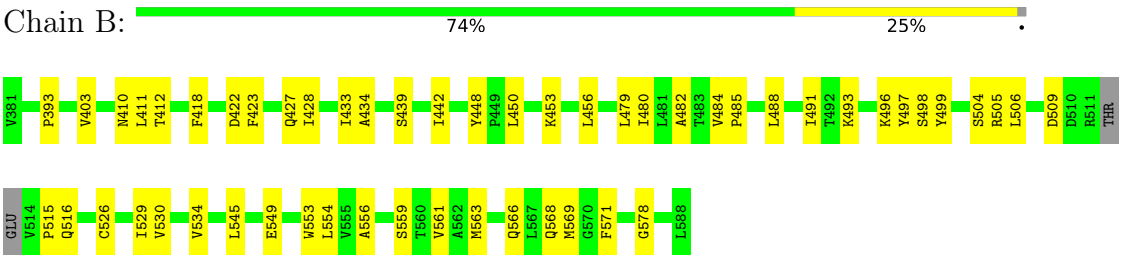
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	B	1	Total C N O 14 8 1 5	0	0

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.

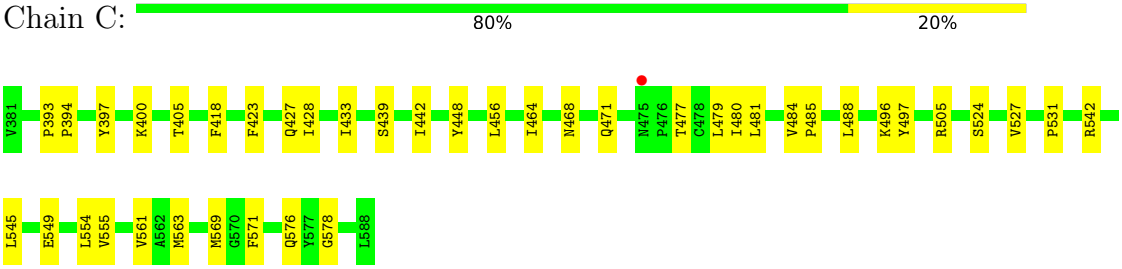
• Molecule 1: Spike glycoprotein

Chain B:



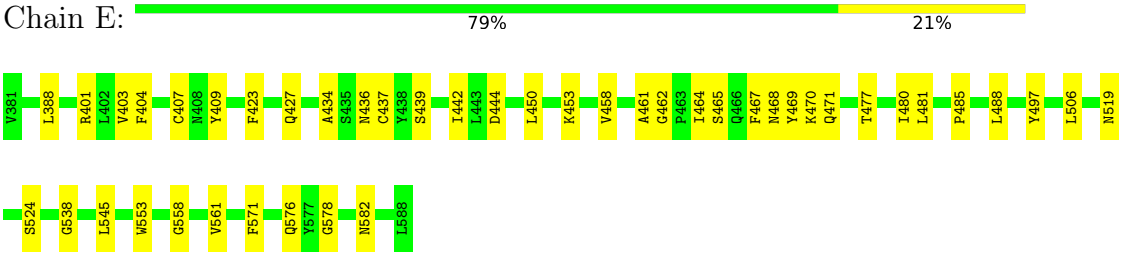
• Molecule 1: Spike glycoprotein

Chain C:



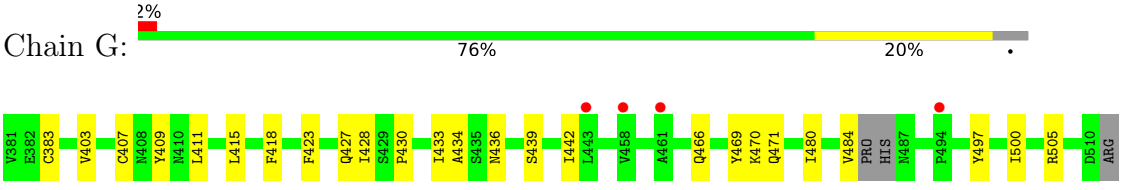
• Molecule 1: Spike glycoprotein

Chain E:



• Molecule 1: Spike glycoprotein

Chain G:

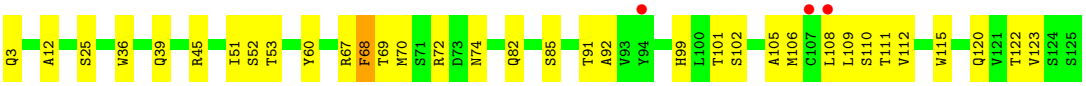


• Molecule 2: Tnb150

Chain A:

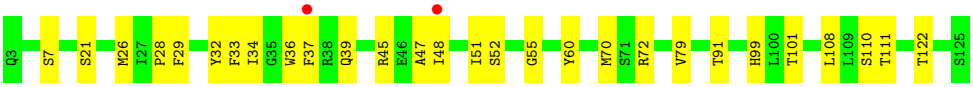
• Molecule 2: Tnb150

Chain D:



• Molecule 2: Tnb150

Chain F:



• Molecule 2: Tnb150

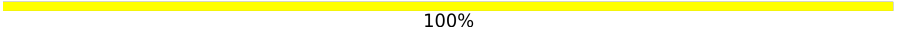
Chain H:

• Molecule 3: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain I:

• Molecule 3: 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	80.93Å 116.60Å 87.06Å 90.00° 93.34° 90.00°	Depositor
Resolution (Å)	86.91 – 3.24 86.91 – 3.24	Depositor EDS
% Data completeness (in resolution range)	96.9 (86.91-3.24) 96.9 (86.91-3.24)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.21 (at 3.26Å)	Xtriage
Refinement program	PHENIX (1.18.2_3874: ???)	Depositor
R, R_{free}	0.287 , 0.332 0.286 , 0.333	Depositor DCC
R_{free} test set	1987 reflections (7.73%)	wwPDB-VP
Wilson B-factor (Å^2)	68.3	Xtriage
Anisotropy	0.646	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.30 , 41.5	EDS
L-test for twinning[2]	$< \|L\| > = 0.43$, $< L^2 > = 0.26$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.86	EDS
Total number of atoms	10110	wwPDB-VP
Average B, all atoms (Å^2)	86.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.08% 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: 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	B	0.11	0/1626	0.36	0/2219
1	C	0.19	0/1647	0.39	0/2249
1	E	0.12	0/1647	0.33	0/2249
1	G	0.11	0/1579	0.31	0/2151
2	A	0.13	0/944	0.41	0/1277
2	D	0.14	0/944	0.42	0/1277
2	F	0.14	0/944	0.38	0/1277
2	H	0.12	0/935	0.40	0/1265
All	All	0.14	0/10266	0.37	0/13964

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

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	B	1588	0	1554	35	0
1	C	1608	0	1574	30	0
1	E	1608	0	1573	26	0
1	G	1545	0	1517	29	0
2	A	925	0	881	22	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	D	925	0	881	26	0
2	F	925	0	881	22	0
2	H	916	0	875	25	0
3	I	28	0	25	0	0
3	J	28	0	25	2	0
4	B	14	0	13	0	0
All	All	10110	0	9799	198	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 10.

All (198) 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:H:12:ALA:HB1	2:H:124:SER:H	1.42	0.84
2:D:45:ARG:HH21	2:D:109:LEU:HD21	1.41	0.83
2:F:101:THR:HG23	2:F:111:THR:HG21	1.63	0.81
1:E:461:ALA:O	1:E:465:SER:OG	2.04	0.74
1:B:423:PHE:HD1	1:B:480:ILE:HG12	1.57	0.70
1:B:485:PRO:HA	1:B:566:GLN:HE21	1.55	0.70
2:F:34:ILE:HG13	2:F:79:VAL:HG21	1.72	0.70
2:A:83:MET:HE1	2:A:121:VAL:HG21	1.73	0.69
1:G:442:ILE:HD11	2:H:111:THR:HG22	1.76	0.66
2:A:34:ILE:HG13	2:A:79:VAL:HG21	1.76	0.66
2:D:99:HIS:HB3	2:D:112:VAL:HA	1.77	0.65
1:E:423:PHE:CD1	1:E:480:ILE:HG12	2.32	0.64
1:G:576:GLN:HG2	2:H:110:SER:HB2	1.78	0.64
1:C:439:SER:HB3	1:C:578:GLY:HA2	1.80	0.64
1:E:480:ILE:HB	1:E:571:PHE:HB2	1.80	0.64
1:B:428:ILE:HG21	1:B:433:ILE:HD13	1.78	0.64
1:E:497:TYR:HB2	1:E:561:VAL:HB	1.78	0.64
2:D:3:GLN:HB2	2:D:25:SER:HB3	1.80	0.64
2:F:52:SER:O	2:F:72:ARG:NH1	2.31	0.63
1:B:493:LYS:HB3	1:B:563:MET:HE2	1.80	0.63
2:H:53:THR:HA	2:H:72:ARG:NH1	2.13	0.63
1:C:496:LYS:HA	1:C:563:MET:HB2	1.80	0.63
1:E:576:GLN:HG2	2:F:110:SER:HB3	1.80	0.63
1:B:427:GLN:O	2:F:45:ARG:NH2	2.32	0.62
1:C:442:ILE:HD11	2:D:111:THR:HG22	1.81	0.62
2:D:36:TRP:HD1	2:D:70:MET:HE3	1.64	0.62
1:B:423:PHE:CD1	1:B:480:ILE:HG12	2.35	0.61

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:F:29:PHE:HB3	2:F:72:ARG:HH21	1.66	0.61
2:D:91:THR:HG23	2:D:122:THR:HA	1.83	0.61
1:G:423:PHE:CD1	1:G:480:ILE:HG12	2.37	0.60
1:C:394:PRO:HG3	1:C:400:LYS:HG2	1.83	0.59
2:D:39:GLN:HB2	2:D:45:ARG:HB3	1.84	0.59
1:E:470:LYS:HD3	1:E:519:ASN:HA	1.83	0.59
1:B:488:LEU:HB3	1:B:491:ILE:HD12	1.85	0.59
1:G:470:LYS:HD3	1:G:519:ASN:HA	1.85	0.58
2:A:33:PHE:CD2	2:A:52:SER:HA	2.38	0.58
2:H:36:TRP:HD1	2:H:70:MET:HE3	1.69	0.58
1:E:423:PHE:HD1	1:E:480:ILE:HG12	1.67	0.58
2:D:12:ALA:HB3	2:D:123:VAL:HG22	1.85	0.58
1:B:403:VAL:HG22	1:B:442:ILE:HG12	1.85	0.58
1:C:545:LEU:HD21	1:C:554:LEU:HB2	1.85	0.58
1:G:403:VAL:HG22	1:G:442:ILE:HG12	1.86	0.57
2:F:91:THR:HG23	2:F:122:THR:HA	1.85	0.57
2:F:36:TRP:HD1	2:F:70:MET:HE3	1.69	0.57
2:H:61:ALA:HB3	2:H:64:VAL:HG22	1.86	0.57
1:C:471:GLN:HB3	1:C:477:THR:HG21	1.85	0.56
1:C:428:ILE:HG21	1:C:433:ILE:HD13	1.87	0.56
1:G:500:ILE:HD11	1:G:530:VAL:HG11	1.87	0.56
3:J:1:NAG:H5	3:J:2:NAG:O5	2.05	0.56
2:D:53:THR:O	2:D:74:ASN:ND2	2.36	0.56
2:D:52:SER:O	2:D:72:ARG:NH1	2.38	0.56
2:A:98:ALA:HB3	2:A:114:TYR:HB2	1.89	0.55
2:H:40:ALA:HB3	2:H:43:LYS:HB2	1.88	0.55
1:C:427:GLN:O	2:H:45:ARG:NH2	2.40	0.55
2:H:20:LEU:HD22	2:H:119:THR:HG21	1.89	0.54
2:D:101:THR:HG21	2:D:105:ALA:O	2.07	0.54
1:B:497:TYR:HB2	1:B:561:VAL:HB	1.89	0.54
1:B:498:SER:HB3	1:B:534:VAL:HG23	1.89	0.54
1:G:480:ILE:HB	1:G:571:PHE:HB2	1.89	0.54
2:H:72:ARG:HD3	2:H:74:ASN:OD1	2.08	0.54
1:C:497:TYR:HB2	1:C:561:VAL:HB	1.89	0.54
1:B:411:LEU:HD23	1:B:434:ALA:HB2	1.88	0.54
2:F:60:TYR:OH	2:F:70:MET:N	2.33	0.54
1:B:418:PHE:HE1	1:B:484:VAL:HG22	1.73	0.54
1:E:545:LEU:HD13	2:F:26:MET:HE1	1.89	0.54
2:D:51:ILE:HD13	2:D:72:ARG:HB2	1.89	0.53
2:A:11:LEU:HD21	1:C:555:VAL:HG11	1.91	0.53
2:D:99:HIS:NE2	2:D:106:MET:O	2.38	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:549:GLU:HB3	2:A:26:MET:HG2	1.91	0.53
2:A:112:VAL:HG11	2:A:115:TRP:NE1	2.23	0.53
2:H:18:LEU:HD21	2:H:86:LEU:HD11	1.91	0.53
2:F:36:TRP:CD1	2:F:70:MET:HE3	2.44	0.53
2:D:36:TRP:CD1	2:D:70:MET:HE3	2.43	0.53
2:H:67:ARG:NH1	2:H:90:ASP:OD2	2.42	0.53
1:G:497:TYR:HB2	1:G:561:VAL:HB	1.91	0.53
1:G:409:TYR:HD2	1:G:584:VAL:HG12	1.73	0.52
1:C:397:TYR:OH	1:C:531:PRO:O	2.26	0.52
1:E:403:VAL:HG22	1:E:442:ILE:HG12	1.91	0.52
1:E:538:GLY:N	1:E:558:GLY:O	2.43	0.52
2:A:51:ILE:HG13	2:A:58:THR:HG22	1.92	0.51
2:F:39:GLN:NE2	2:F:45:ARG:HB2	2.26	0.51
1:B:485:PRO:HA	1:B:566:GLN:NE2	2.26	0.51
1:C:464:ILE:HD13	1:C:468:ASN:HD22	1.75	0.51
2:H:53:THR:HA	2:H:72:ARG:HH12	1.75	0.51
1:B:496:LYS:HA	1:B:563:MET:HB2	1.92	0.51
1:C:418:PHE:HE2	1:C:484:VAL:HG22	1.76	0.50
1:E:437:CYS:HB3	1:E:582:ASN:HB3	1.93	0.50
2:H:99:HIS:HB3	2:H:112:VAL:HA	1.94	0.50
1:B:554:LEU:HD13	2:A:26:MET:HE1	1.93	0.50
2:F:37:PHE:CD1	2:F:47:ALA:HA	2.47	0.50
2:H:48:ILE:HG23	2:H:64:VAL:HG21	1.92	0.50
1:G:505:ARG:HD2	2:H:26:MET:HE2	1.92	0.50
2:F:108:LEU:O	2:F:111:THR:HG22	2.11	0.50
1:E:471:GLN:HB3	1:E:477:THR:HG21	1.93	0.49
1:G:423:PHE:CE2	1:G:430:PRO:HB3	2.48	0.49
2:H:8:GLY:HA3	2:H:20:LEU:HA	1.94	0.49
2:A:6:GLU:HA	2:A:21:SER:O	2.11	0.49
2:F:28:PRO:HD2	2:F:32:TYR:HE2	1.78	0.49
2:H:98:ALA:HB3	2:H:114:TYR:HB2	1.94	0.49
1:B:482:ALA:HB3	1:B:571:PHE:HE2	1.78	0.48
1:B:393:PRO:HB3	1:B:569:MET:HE3	1.94	0.48
1:G:484:VAL:O	1:G:566:GLN:NE2	2.43	0.48
2:H:36:TRP:CD1	2:H:70:MET:HE3	2.47	0.48
2:H:35:GLY:HA2	2:H:50:CYS:HA	1.94	0.48
1:B:450:LEU:N	1:B:568:GLN:HG2	2.28	0.48
1:E:388:LEU:HD21	1:E:571:PHE:HE1	1.79	0.48
1:C:448:TYR:HD2	1:C:481:LEU:HD21	1.79	0.48
2:D:105:ALA:HB1	2:D:108:LEU:HG	1.95	0.48
1:G:514:VAL:N	1:G:515:PRO:HD2	2.29	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:F:51:ILE:HG12	2:F:55:GLY:HA2	1.96	0.47
1:C:464:ILE:HA	1:C:468:ASN:HD22	1.79	0.47
1:B:422:ASP:OD2	1:B:453:LYS:HE3	2.14	0.47
1:G:409:TYR:CD1	1:G:411:LEU:HD13	2.50	0.47
1:C:456:LEU:HG	1:C:479:LEU:HD13	1.96	0.46
1:C:485:PRO:HD2	1:C:488:LEU:HD12	1.97	0.46
2:D:112:VAL:HG11	2:D:115:TRP:NE1	2.31	0.46
1:C:397:TYR:HD2	1:C:527:VAL:HG12	1.80	0.46
1:B:505:ARG:NH2	1:B:549:GLU:O	2.48	0.46
1:C:542:ARG:HG3	1:C:555:VAL:HG22	1.97	0.46
2:A:91:THR:HG23	2:A:122:THR:HA	1.97	0.46
1:C:549:GLU:HG3	2:D:25:SER:OG	2.16	0.46
1:B:499:TYR:CZ	1:B:559:SER:HB2	2.51	0.46
2:A:52:SER:HB3	2:A:57:SER:HB2	1.98	0.46
1:E:409:TYR:HE2	1:E:434:ALA:HA	1.81	0.46
2:A:39:GLN:OE1	1:E:436:ASN:ND2	2.49	0.45
1:C:400:LYS:HD3	1:C:400:LYS:HA	1.72	0.45
2:D:115:TRP:CD1	1:G:427:GLN:HG2	2.51	0.45
1:E:506:LEU:HB3	1:E:553:TRP:HB2	1.98	0.45
1:B:545:LEU:HD21	1:B:554:LEU:HB2	1.98	0.45
2:A:101:THR:HG23	2:A:111:THR:HG21	1.99	0.45
2:A:29:PHE:HB3	2:A:72:ARG:NH2	2.32	0.45
1:E:453:LYS:HD3	1:E:481:LEU:HD12	1.99	0.45
1:B:439:SER:HB3	1:B:578:GLY:HA3	1.98	0.45
2:A:115:TRP:CD1	1:E:427:GLN:HG2	2.52	0.45
1:E:401:ARG:NE	1:E:444:ASP:OD1	2.43	0.44
2:H:51:ILE:HG23	2:H:72:ARG:NH2	2.31	0.44
2:A:101:THR:CG2	2:A:111:THR:HG21	2.47	0.44
1:G:415:LEU:HD21	1:G:480:ILE:HD13	1.98	0.44
1:B:448:TYR:CD2	1:B:456:LEU:HD22	2.52	0.44
2:A:60:TYR:HE1	2:A:70:MET:HG3	1.82	0.44
1:C:405:THR:HG21	2:D:105:ALA:HB2	2.00	0.44
2:F:7:SER:OG	2:F:21:SER:OG	2.35	0.44
1:G:484:VAL:HB	1:G:567:LEU:HB3	2.00	0.44
1:C:405:THR:CG2	2:D:105:ALA:HB2	2.47	0.44
2:D:60:TYR:OH	2:D:69:THR:O	2.23	0.44
2:F:29:PHE:HB3	2:F:72:ARG:NH2	2.32	0.44
2:A:72:ARG:HB2	2:A:79:VAL:HG22	2.00	0.44
1:B:505:ARG:HD2	2:A:26:MET:HE2	2.00	0.43
1:C:524:SER:O	1:C:527:VAL:HG22	2.18	0.43
1:G:409:TYR:OH	1:G:436:ASN:O	2.27	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:H:64:VAL:HB	2:H:68:PHE:CD1	2.54	0.43
2:A:48:ILE:HG23	2:A:64:VAL:HG21	2.00	0.43
2:A:64:VAL:HB	2:A:68:PHE:CG	2.54	0.43
1:C:393:PRO:HB3	1:C:569:MET:HE3	2.00	0.43
2:D:68:PHE:HA	2:D:82:GLN:O	2.19	0.43
1:G:439:SER:N	1:G:576:GLN:O	2.50	0.43
1:E:450:LEU:HD23	1:E:481:LEU:HD13	2.00	0.43
1:B:410:ASN:O	1:B:412:THR:N	2.46	0.42
3:J:1:NAG:H4	3:J:2:NAG:H2	1.87	0.42
1:E:465:SER:HA	1:E:469:TYR:O	2.19	0.42
2:F:72:ARG:HB2	2:F:79:VAL:HG22	2.01	0.42
1:B:504:SER:HA	1:B:515:PRO:HA	2.02	0.42
1:E:467:PHE:O	1:E:524:SER:HB2	2.19	0.42
2:H:51:ILE:HG23	2:H:72:ARG:HH21	1.84	0.42
1:G:423:PHE:HD1	1:G:480:ILE:HG12	1.83	0.42
1:C:423:PHE:CD1	1:C:480:ILE:HG12	2.54	0.42
1:C:505:ARG:NH1	1:C:549:GLU:OE1	2.53	0.42
2:D:67:ARG:HD2	2:D:85:SER:HB2	2.00	0.42
1:B:526:CYS:SG	1:B:556:ALA:HB2	2.60	0.42
1:G:383:CYS:N	1:G:407:CYS:HB2	2.34	0.42
1:B:418:PHE:HB3	1:B:482:ALA:HB1	2.02	0.42
2:F:37:PHE:HD1	2:F:47:ALA:HA	1.85	0.42
1:E:464:ILE:HA	1:E:468:ASN:HD22	1.85	0.42
1:B:509:ASP:N	1:B:509:ASP:OD1	2.53	0.41
1:E:404:PHE:HB3	1:E:407:CYS:SG	2.61	0.41
1:E:439:SER:HB3	1:E:578:GLY:HA3	2.02	0.41
1:G:409:TYR:HE1	1:G:434:ALA:HA	1.85	0.41
1:G:469:TYR:OH	1:G:471:GLN:NE2	2.47	0.41
1:B:504:SER:HA	1:B:516:GLN:H	1.84	0.41
1:B:506:LEU:HD23	1:B:553:TRP:CD1	2.56	0.41
1:E:485:PRO:HD2	1:E:488:LEU:HD12	2.03	0.41
1:G:428:ILE:HG21	1:G:433:ILE:HD13	2.03	0.41
2:D:101:THR:HG22	2:D:102:SER:N	2.35	0.41
2:H:91:THR:HA	2:H:121:VAL:O	2.20	0.41
1:C:576:GLN:HG2	2:D:110:SER:HB3	2.03	0.41
2:H:92:ALA:O	2:H:120:GLN:NE2	2.53	0.41
2:D:92:ALA:O	2:D:120:GLN:NE2	2.53	0.41
2:F:33:PHE:HB2	2:F:99:HIS:HB2	2.02	0.41
1:G:540:TYR:HD2	1:G:542:ARG:NH2	2.19	0.41
1:G:466:GLN:O	1:G:518:VAL:HG12	2.21	0.41
1:C:480:ILE:HB	1:C:571:PHE:HD2	1.86	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:F:36:TRP:O	2:F:48:ILE:HB	2.21	0.40
1:G:418:PHE:HE1	1:G:484:VAL:HG22	1.85	0.40
1:G:587:LYS:HG2	1:G:588:LEU:N	2.37	0.40
1:B:450:LEU:H	1:B:568:GLN:HG2	1.85	0.40
1:B:456:LEU:O	1:B:479:LEU:HD13	2.22	0.40
1:C:448:TYR:CD2	1:C:481:LEU:HD21	2.56	0.40
1:G:540:TYR:HA	1:G:556:ALA:O	2.22	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	B	202/208 (97%)	190 (94%)	10 (5%)	2 (1%)	12 42
1	C	206/208 (99%)	194 (94%)	12 (6%)	0	100 100
1	E	206/208 (99%)	194 (94%)	10 (5%)	2 (1%)	12 42
1	G	192/208 (92%)	181 (94%)	11 (6%)	0	100 100
2	A	121/123 (98%)	115 (95%)	6 (5%)	0	100 100
2	D	121/123 (98%)	111 (92%)	9 (7%)	1 (1%)	16 47
2	F	121/123 (98%)	114 (94%)	7 (6%)	0	100 100
2	H	120/123 (98%)	111 (92%)	9 (8%)	0	100 100
All	All	1289/1324 (97%)	1210 (94%)	74 (6%)	5 (0%)	30 60

All (5) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	530	VAL
1	E	458	VAL
2	D	68	PHE

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Mol	Chain	Res	Type
1	E	462	GLY
1	B	529	ILE

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	B	187/190 (98%)	187 (100%)	0	100	100
1	C	190/190 (100%)	190 (100%)	0	100	100
1	E	190/190 (100%)	190 (100%)	0	100	100
1	G	183/190 (96%)	183 (100%)	0	100	100
2	A	100/100 (100%)	100 (100%)	0	100	100
2	D	100/100 (100%)	100 (100%)	0	100	100
2	F	100/100 (100%)	100 (100%)	0	100	100
2	H	99/100 (99%)	99 (100%)	0	100	100
All	All	1149/1160 (99%)	1149 (100%)	0	100	100

There are no protein residues with a non-rotameric sidechain to report.

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (12) such sidechains are listed below:

Mol	Chain	Res	Type
1	B	501	ASN
1	B	566	GLN
2	A	82	GLN
2	A	84	ASN
1	C	436	ASN
1	E	427	GLN
1	E	475	ASN
1	E	576	GLN
2	F	104	GLN
1	G	475	ASN
1	G	576	GLN

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Mol	Chain	Res	Type
2	H	39	GLN

5.3.3 RNA

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates

4 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	$\#\|Z\| > 2$
3	NAG	I	1	3,1	14,14,15	0.26	0	17,19,21	0.51	0
3	NAG	I	2	3	14,14,15	0.30	0	17,19,21	0.49	0
3	NAG	J	1	3,1	14,14,15	0.26	0	17,19,21	0.53	0
3	NAG	J	2	3	14,14,15	0.48	0	17,19,21	0.83	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
3	NAG	I	1	3,1	-	4/6/23/26	0/1/1/1
3	NAG	I	2	3	-	0/6/23/26	0/1/1/1
3	NAG	J	1	3,1	-	2/6/23/26	0/1/1/1
3	NAG	J	2	3	-	3/6/23/26	0/1/1/1

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (9) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	I	1	NAG	O5-C5-C6-O6
3	I	1	NAG	C4-C5-C6-O6
3	J	1	NAG	C8-C7-N2-C2
3	J	1	NAG	O7-C7-N2-C2
3	J	2	NAG	O5-C5-C6-O6
3	J	2	NAG	C4-C5-C6-O6
3	J	2	NAG	C1-C2-N2-C7
3	I	1	NAG	C3-C2-N2-C7
3	I	1	NAG	C1-C2-N2-C7

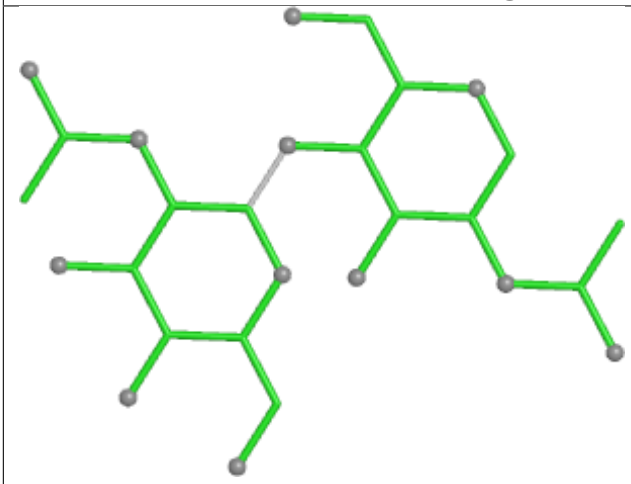
There are no ring outliers.

2 monomers are involved in 2 short contacts:

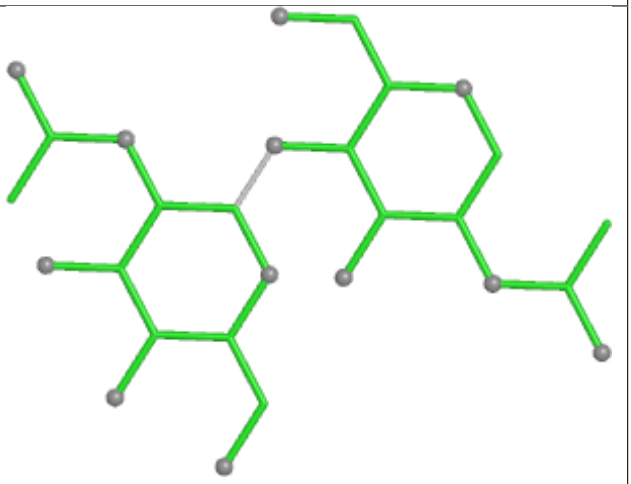
Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	J	2	NAG	2	0
3	J	1	NAG	2	0

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

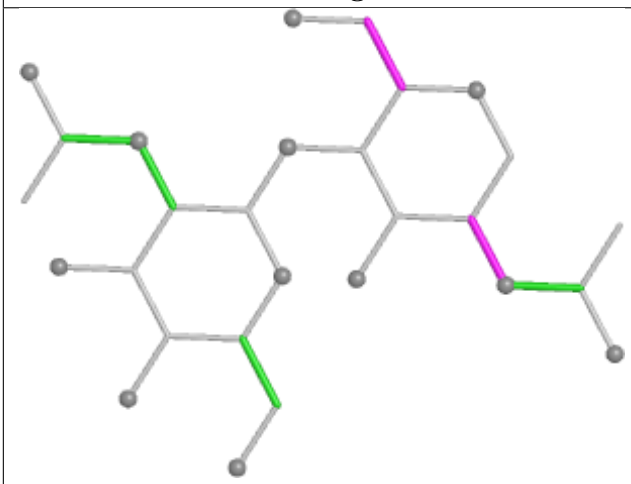
Oligosaccharide Chain I



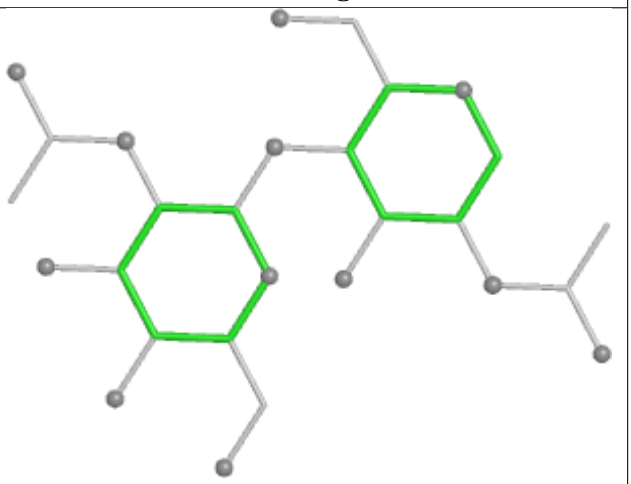
Bond lengths



Bond angles

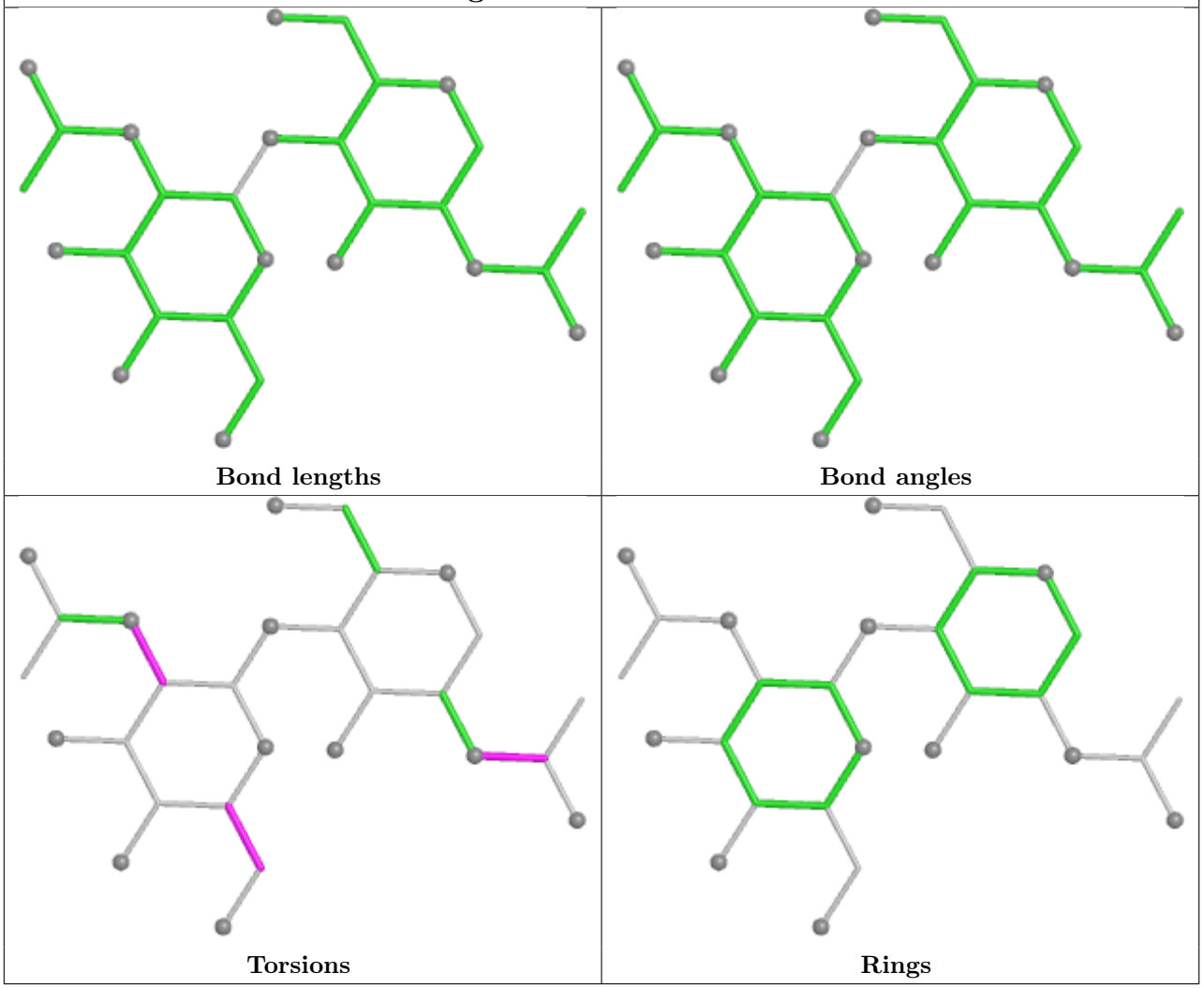


Torsions



Rings

Oligosaccharide Chain J



5.6 Ligand geometry (i)

1 ligand is 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	601	1	14,14,15	0.37	0	17,19,21	0.72	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
4	NAG	B	601	1	-	4/6/23/26	0/1/1/1

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
4	B	601	NAG	C1-O5-C5	2.58	115.68	112.19

There are no chirality outliers.

All (4) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	B	601	NAG	O5-C5-C6-O6
4	B	601	NAG	C4-C5-C6-O6
4	B	601	NAG	C8-C7-N2-C2
4	B	601	NAG	O7-C7-N2-C2

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

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	B	206/208 (99%)	0.22	0 100 100	37, 62, 97, 119	0
1	C	208/208 (100%)	0.26	1 (0%) 87 76	42, 74, 113, 145	0
1	E	208/208 (100%)	0.11	0 100 100	50, 73, 104, 120	0
1	G	200/208 (96%)	0.53	4 (2%) 65 45	85, 112, 144, 157	0
2	A	123/123 (100%)	0.18	0 100 100	36, 59, 82, 101	0
2	D	123/123 (100%)	0.35	3 (2%) 59 40	50, 85, 110, 116	0
2	F	123/123 (100%)	0.23	2 (1%) 70 51	58, 91, 115, 126	0
2	H	122/123 (99%)	0.39	2 (1%) 70 51	104, 143, 167, 176	0
All	All	1313/1324 (99%)	0.28	12 (0%) 81 64	36, 83, 145, 176	0

All (12) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	G	458	VAL	3.3
1	G	443	LEU	2.6
2	H	32	TYR	2.4
2	D	108	LEU	2.3
2	F	48	ILE	2.3
2	D	94	TYR	2.2
1	C	475	ASN	2.2
1	G	494	PRO	2.2
2	F	37	PHE	2.1
2	H	100	LEU	2.1
1	G	461	ALA	2.0
2	D	107	CYS	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)

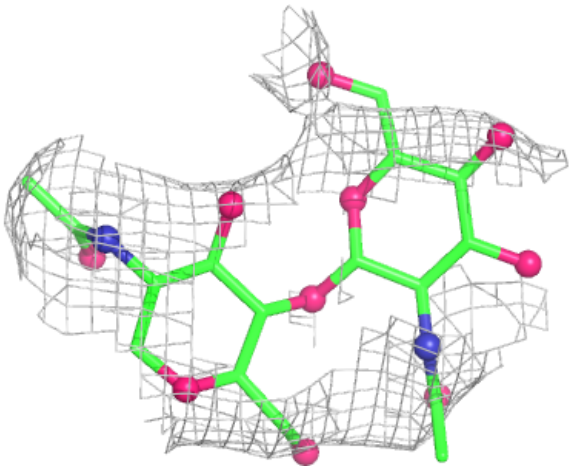
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95^{th} percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9'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

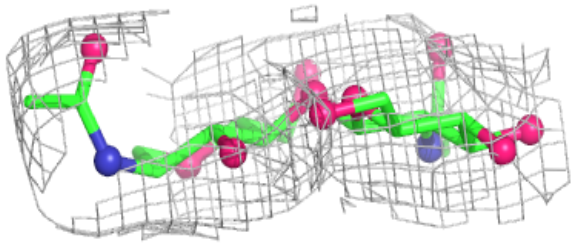
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
3	NAG	J	2	14/15	0.48	0.12	97,123,131,132	0
3	NAG	J	1	14/15	0.74	0.09	107,116,122,122	0
3	NAG	I	2	14/15	0.85	0.11	80,86,91,98	0
3	NAG	I	1	14/15	0.86	0.08	70,77,80,85	0

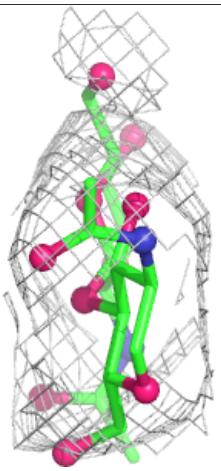
The following is a graphical depiction of the model fit to experimental electron density for oligosaccharide. Each fit is shown from different orientation to approximate a three-dimensional view.

Electron density around Chain I:

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

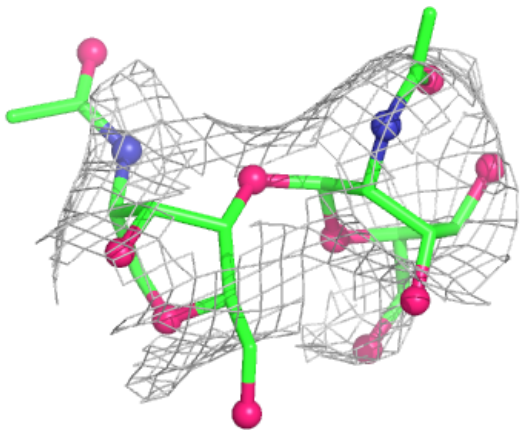


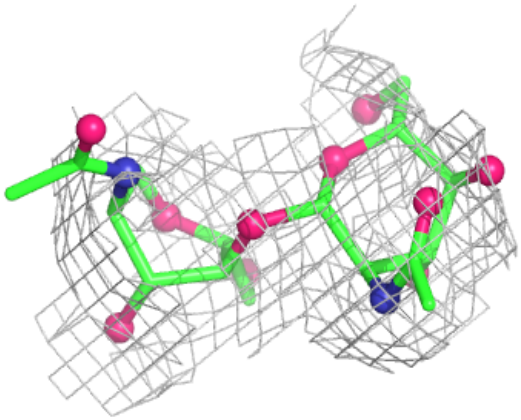


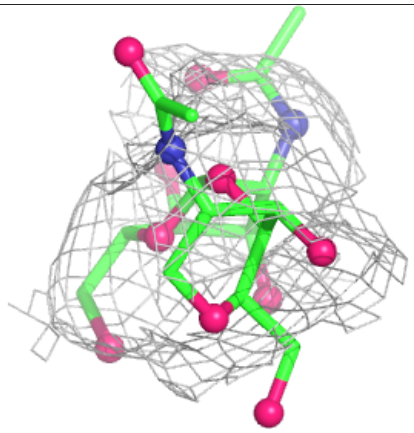


Electron density around Chain J:

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







6.4 Ligands

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	B	601	14/15	0.79	0.10	75,82,93,98	0

6.5 Other polymers

There are no such residues in this entry.