



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 17, 2026 – 10:29 PM UTC

PDB ID : 3D26 / pdb_00003d26
Title : Norwalk P domain A-trisaccharide complex
Authors : Hegde, R.; Bu, W.
Deposited on : 2008-05-07
Resolution : 2.30 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 types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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

MolProbity	:	4-5-2 with Phenix2.0
Mogul	:	2022.3.0, CSD as543be (2022)
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

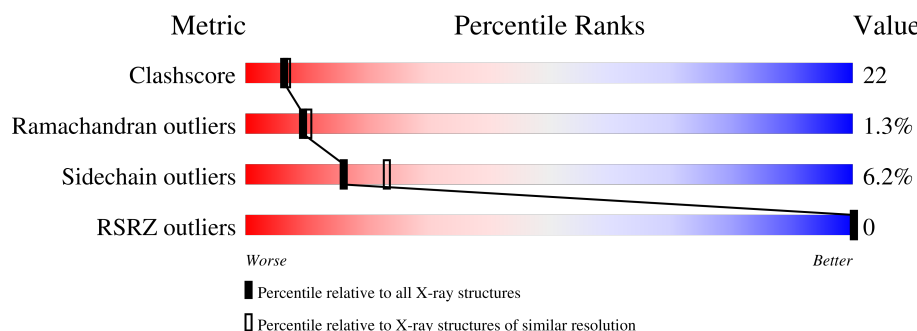
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.30 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))
Clashscore	190562	6919 (2.30-2.30)
Ramachandran outliers	187476	6854 (2.30-2.30)
Sidechain outliers	187428	6854 (2.30-2.30)
RSRZ outliers	180081	6325 (2.30-2.30)

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 $\leq 5\%$. 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	301	
1	B	301	
2	C	3	
2	D	3	

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
2	GAL	C	1	X	-	-	-
2	NGA	C	3	X	-	-	-
2	NGA	D	3	X	-	-	-

2 Entry composition [i](#)

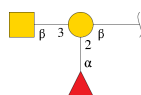
There are 3 unique types of molecules in this entry. The entry contains 4540 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 58 kd capsid protein.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	284	Total	C	N	O	S	0	0	0
			2138	1372	355	403	8			
1	B	284	Total	C	N	O	S	0	0	0
			2142	1375	355	404	8			

- Molecule 2 is an oligosaccharide called alpha-L-fucopyranose-(1-2)-[2-acetamido-2-deoxy-beta-D-galactopyranose-(1-3)]beta-D-galactopyranose.



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
2	C	3	Total	C	N	O	0	0	0
			36	20	1	15			
2	D	3	Total	C	N	O	0	0	0
			36	20	1	15			

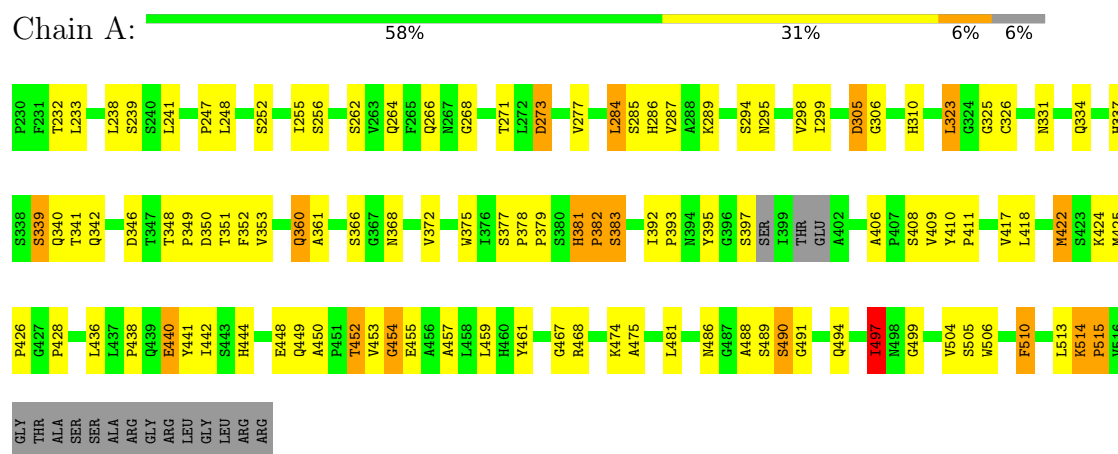
- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	48	Total	O	0	0
			48	48		
3	B	140	Total	O	0	0
			140	140		

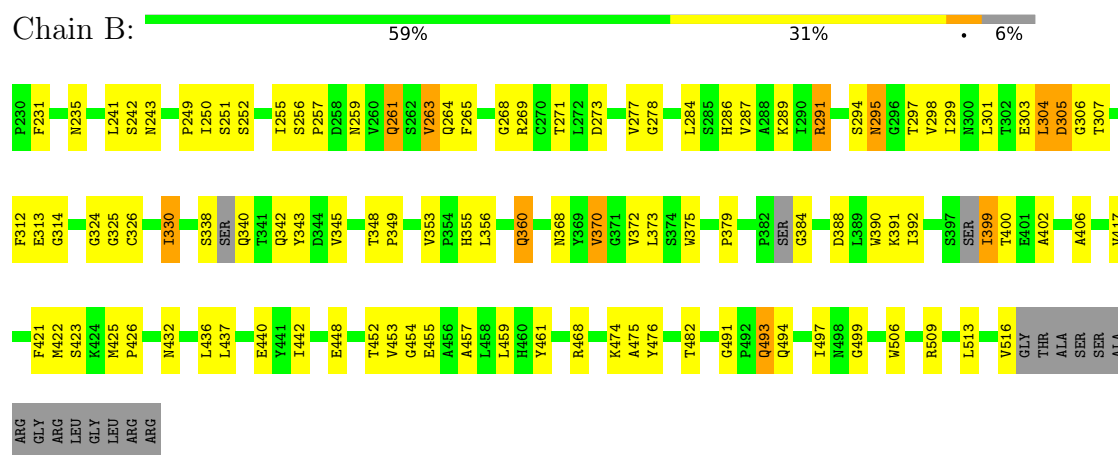
3 Residue-property plots

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

- Molecule 1: 58 kd capsid protein



- Molecule 1: 58 kd capsid protein



- Molecule 2: alpha-L-fucopyranose-(1-2)-[2-acetamido-2-deoxy-beta-D-galactopyranose-(1-3)]beta-D-galactopyranose



- Molecule 2: alpha-L-fucopyranose-(1-2)-[2-acetamido-2-deoxy-beta-D-galactopyranose-(1-3)]beta a-D-galactopyranose

Chain D:  33% 67%

 G111
FUC2
NGA3

4 Data and refinement statistics

Property	Value	Source
Space group	P 31 2 1	Depositor
Cell constants a, b, c, α , β , γ	83.01Å 83.01Å 162.98Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	50.00 – 2.30 50.00 – 2.30	Depositor EDS
% Data completeness (in resolution range)	(Not available) (50.00-2.30) 88.7 (50.00-2.30)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	0.04	Depositor
$\langle I/\sigma(I) \rangle$ ¹	13.10 (at 2.29Å)	Xtriage
Refinement program	CNS	Depositor
R, R_{free}	0.220 , 0.260 0.254 , (Not available)	Depositor DCC
R_{free} test set	No test flags present.	wwPDB-VP
Wilson B-factor (Å ²)	27.4	Xtriage
Anisotropy	0.313	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.33 , 17.5	EDS
L-test for twinning ²	$\langle L \rangle = 0.41$, $\langle L^2 \rangle = 0.24$	Xtriage
Estimated twinning fraction	0.084 for -h,-k,l	Xtriage
F_o, F_c correlation	0.91	EDS
Total number of atoms	4540	wwPDB-VP
Average B, all atoms (Å ²)	20.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.58% 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 ⓘ

5.1 Standard geometry ⓘ

Bond lengths and bond angles in the following residue types are not validated in this section: NGA, FUC, GAL

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

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
1	A	0.45	0/2208	1.04	16/3027 (0.5%)
1	B	0.43	0/2211	1.00	10/3030 (0.3%)
All	All	0.44	0/4419	1.02	26/6057 (0.4%)

There are no bond length outliers.

All (26) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	382	PRO	N-CA-C	-8.22	96.96	112.33
1	B	476	TYR	CA-C-N	8.12	127.68	119.24
1	B	476	TYR	C-N-CA	8.12	127.68	119.24
1	B	306	GLY	N-CA-C	-7.96	104.34	114.37
1	A	287	VAL	N-CA-C	6.96	118.01	109.30
1	B	287	VAL	N-CA-C	6.89	117.92	109.30
1	A	361	ALA	N-CA-C	-6.26	99.68	109.25
1	A	351	THR	N-CA-C	-6.09	105.85	113.28
1	B	345	VAL	N-CA-C	6.02	116.53	107.75
1	A	395	TYR	N-CA-C	5.90	117.38	111.07
1	B	301	LEU	N-CA-C	5.75	119.00	110.48
1	A	497	ILE	N-CA-C	5.58	117.54	112.29
1	A	306	GLY	N-CA-C	-5.58	107.66	114.92
1	B	356	LEU	N-CA-C	-5.56	105.81	112.59
1	A	295	ASN	N-CA-C	-5.53	106.20	113.17
1	A	514	LYS	N-CA-C	-5.51	102.13	110.39
1	A	310	HIS	CA-C-N	5.47	125.56	119.32
1	A	310	HIS	C-N-CA	5.47	125.56	119.32
1	A	381	HIS	N-CA-C	5.16	121.21	109.81
1	A	284	LEU	N-CA-C	-5.08	106.18	112.38
1	B	370	VAL	N-CA-C	-5.04	101.05	108.11
1	A	467	GLY	N-CA-C	-5.03	108.06	115.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	491	GLY	CA-C-N	5.02	126.11	119.84
1	A	491	GLY	C-N-CA	5.02	126.11	119.84
1	B	304	LEU	CA-C-N	5.01	126.99	120.28
1	B	304	LEU	C-N-CA	5.01	126.99	120.28

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	A	2138	0	2058	101	0
1	B	2142	0	2060	96	0
2	C	36	0	33	0	0
2	D	36	0	33	2	0
3	A	48	0	0	9	0
3	B	140	0	0	15	0
All	All	4540	0	4184	189	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 22.

All (189) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:425:MET:HE3	1:A:426:PRO:HD2	1.33	1.10
1:A:241:LEU:HD22	1:A:440:GLU:HG3	1.26	1.09
1:B:425:MET:HE3	1:B:426:PRO:HD2	1.33	1.08
1:A:266:GLN:HG2	1:A:392:ILE:HD11	1.35	1.06
1:B:261:GLN:HE21	1:B:261:GLN:HA	1.30	0.95
1:B:375:TRP:HA	1:B:425:MET:HE2	1.51	0.92
1:B:452:THR:HG22	3:B:714:HOH:O	1.72	0.90
1:B:241:LEU:HD22	1:B:440:GLU:HG3	1.54	0.88
1:B:295:ASN:ND2	1:B:297:THR:H	1.76	0.84
1:A:422:MET:HB2	3:A:540:HOH:O	1.79	0.80

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:474:LYS:HG3	1:A:513:LEU:HD21	1.66	0.77
1:A:449:GLN:HE22	1:B:235:ASN:ND2	1.83	0.76
1:A:241:LEU:HD22	1:A:440:GLU:CG	2.09	0.76
1:A:453:VAL:HG12	1:A:454:GLY:H	1.53	0.74
1:A:340:GLN:HG2	1:B:342:GLN:HE21	1.54	0.73
1:B:295:ASN:HD21	1:B:298:VAL:H	1.35	0.73
1:B:259:ASN:ND2	3:B:613:HOH:O	2.21	0.73
1:A:341:THR:HG23	3:A:556:HOH:O	1.89	0.72
1:B:273:ASP:HB2	3:B:583:HOH:O	1.89	0.72
1:A:266:GLN:CG	1:A:392:ILE:HD11	2.17	0.72
1:A:381:HIS:O	1:A:383:SER:N	2.22	0.71
1:B:360:GLN:NE2	1:B:360:GLN:H	1.88	0.71
2:D:2:FUC:O2	2:D:3:NGA:H5	1.91	0.70
1:B:268:GLY:HA2	1:B:442:ILE:HD11	1.73	0.68
1:A:360:GLN:HE21	1:A:360:GLN:H	1.41	0.67
1:B:295:ASN:HD22	1:B:297:THR:H	1.41	0.67
1:A:252:SER:HA	1:A:497:ILE:HG21	1.75	0.67
1:A:381:HIS:C	1:A:383:SER:N	2.53	0.66
1:B:330:ILE:HG22	1:B:373:LEU:HA	1.78	0.66
1:A:375:TRP:HA	1:A:425:MET:HE2	1.78	0.65
1:A:490:SER:HB2	1:A:494:GLN:OE1	1.95	0.65
1:B:295:ASN:HD22	1:B:295:ASN:C	2.03	0.65
1:B:425:MET:HE3	1:B:426:PRO:CD	2.20	0.65
1:B:305:ASP:HB3	1:B:307:THR:HG23	1.77	0.65
1:B:491:GLY:N	1:B:493:GLN:HE21	1.94	0.64
1:A:247:PRO:HB3	1:A:284:LEU:HD11	1.78	0.64
1:A:264:GLN:O	1:A:392:ILE:HD12	1.97	0.63
1:B:459:LEU:HD11	1:B:475:ALA:HB2	1.81	0.62
1:A:360:GLN:H	1:A:360:GLN:NE2	1.97	0.62
1:B:360:GLN:H	1:B:360:GLN:HE21	1.47	0.62
1:B:291:ARG:HE	1:B:368:ASN:HD21	1.47	0.62
1:B:295:ASN:ND2	1:B:298:VAL:H	1.97	0.61
1:B:436:LEU:O	1:B:437:LEU:HD23	2.00	0.61
3:A:535:HOH:O	1:B:286:HIS:HE1	1.82	0.61
1:B:474:LYS:HG3	1:B:513:LEU:HD21	1.82	0.61
1:A:331:ASN:HD21	1:A:340:GLN:HB2	1.65	0.60
1:B:264:GLN:NE2	3:B:603:HOH:O	2.34	0.60
1:A:241:LEU:CD2	1:A:440:GLU:HG3	2.18	0.59
1:A:342:GLN:HE21	1:B:340:GLN:HG2	1.68	0.59
1:A:232:THR:HG22	1:A:444:HIS:CE1	2.38	0.58
1:B:392:ILE:O	1:B:392:ILE:HD12	2.04	0.58

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:339:SER:HA	1:B:375:TRP:CZ2	2.38	0.58
3:B:692:HOH:O	2:D:3:NGA:H62	2.03	0.58
1:B:452:THR:HG21	3:B:583:HOH:O	2.04	0.57
1:A:239:SER:HB3	1:A:497:ILE:HD13	1.86	0.57
1:B:326:CYS:HA	1:B:379:PRO:HG3	1.86	0.57
1:A:255:ILE:HG22	1:A:256:SER:N	2.19	0.57
1:A:294:SER:O	1:A:366:SER:HA	2.04	0.57
1:A:457:ALA:HB2	1:A:506:TRP:CZ3	2.39	0.57
1:B:261:GLN:HA	1:B:261:GLN:NE2	2.09	0.56
1:A:486:ASN:HD21	1:A:515:PRO:HB2	1.71	0.56
1:B:330:ILE:HD11	1:B:343:TYR:CD2	2.41	0.56
1:A:383:SER:HB2	3:A:538:HOH:O	2.06	0.56
1:B:252:SER:HA	1:B:497:ILE:HG22	1.89	0.55
1:A:425:MET:HE3	1:A:426:PRO:CD	2.23	0.55
1:B:453:VAL:HG12	1:B:454:GLY:N	2.20	0.55
1:A:285:SER:HB3	1:B:242:SER:HB2	1.88	0.55
1:A:490:SER:HB2	1:A:494:GLN:CD	2.31	0.55
1:B:241:LEU:CD2	1:B:440:GLU:HG3	2.32	0.55
1:B:330:ILE:HG22	1:B:373:LEU:CA	2.36	0.54
1:B:295:ASN:ND2	1:B:295:ASN:C	2.65	0.53
1:A:284:LEU:HD13	1:A:284:LEU:O	2.09	0.53
1:B:291:ARG:HH11	1:B:291:ARG:HG3	1.74	0.53
1:B:353:VAL:HG23	1:B:353:VAL:O	2.09	0.53
1:A:233:LEU:HD22	1:A:441:TYR:CE2	2.44	0.53
1:A:252:SER:HA	1:A:497:ILE:CG2	2.39	0.53
1:A:323:LEU:N	1:A:323:LEU:HD23	2.23	0.53
1:A:381:HIS:C	1:A:383:SER:H	2.11	0.53
1:B:256:SER:HA	1:B:390:TRP:CH2	2.44	0.53
1:A:353:VAL:HG11	1:A:397:SER:HB3	1.91	0.52
1:A:489:SER:O	1:A:490:SER:HB2	2.09	0.52
1:B:251:SER:O	1:B:497:ILE:HG21	2.08	0.52
1:A:348:THR:N	1:A:349:PRO:HD2	2.24	0.52
1:B:243:ASN:HB2	1:B:423:SER:OG	2.10	0.52
1:A:289:LYS:HG2	1:A:372:VAL:HG13	1.92	0.52
1:A:268:GLY:HA2	1:A:442:ILE:HD11	1.91	0.52
1:A:449:GLN:N	3:A:537:HOH:O	2.42	0.52
1:A:449:GLN:HE22	1:B:235:ASN:HD22	1.53	0.51
1:A:255:ILE:HG23	1:A:417:VAL:CG1	2.40	0.51
1:A:352:PHE:O	3:A:543:HOH:O	2.19	0.51
1:A:449:GLN:NE2	1:B:235:ASN:HD22	2.08	0.51
1:A:504:VAL:O	1:A:505:SER:HB3	2.10	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:417:VAL:O	1:B:482:THR:HA	2.11	0.51
1:B:468:ARG:NH1	1:B:468:ARG:HB3	2.26	0.51
1:A:449:GLN:NE2	1:B:235:ASN:ND2	2.56	0.51
1:B:491:GLY:CA	1:B:493:GLN:HE21	2.24	0.50
1:A:379:PRO:HB2	1:A:382:PRO:HD2	1.93	0.50
1:A:268:GLY:HA2	1:A:442:ILE:CD1	2.42	0.50
1:B:289:LYS:HG2	1:B:372:VAL:HG22	1.92	0.50
1:A:286:HIS:HE1	3:B:612:HOH:O	1.93	0.50
1:B:330:ILE:HG13	1:B:343:TYR:HB3	1.93	0.50
1:A:409:VAL:HG21	1:A:436:LEU:HD11	1.94	0.49
1:B:277:VAL:HG12	1:B:406:ALA:CB	2.41	0.49
1:A:248:LEU:HD13	1:A:424:LYS:O	2.13	0.49
1:B:348:THR:N	1:B:349:PRO:HD2	2.27	0.49
1:B:455:GLU:HG2	1:B:509:ARG:NH2	2.26	0.49
1:A:348:THR:N	1:A:349:PRO:CD	2.75	0.48
1:B:326:CYS:N	1:B:379:PRO:HG3	2.29	0.48
1:B:330:ILE:HG22	1:B:373:LEU:N	2.28	0.48
1:B:468:ARG:HB3	1:B:468:ARG:HH11	1.79	0.48
1:A:488:ALA:C	1:A:490:SER:N	2.72	0.47
1:A:392:ILE:HG12	1:A:393:PRO:HD2	1.95	0.47
1:B:255:ILE:HG23	3:B:581:HOH:O	2.14	0.47
1:A:379:PRO:CB	1:A:382:PRO:HD2	2.44	0.47
1:A:453:VAL:HG12	1:A:454:GLY:N	2.25	0.47
1:A:247:PRO:CB	1:A:284:LEU:HD11	2.43	0.47
1:A:334:GLN:HB2	1:A:337:HIS:HB2	1.96	0.47
1:B:314:GLY:O	1:B:355:HIS:HD2	1.96	0.47
1:A:510:PHE:CD1	1:A:510:PHE:N	2.82	0.47
1:A:277:VAL:HG12	1:A:406:ALA:HB1	1.96	0.47
1:A:461:TYR:CZ	1:A:499:GLY:HA3	2.49	0.47
1:A:342:GLN:NE2	1:A:375:TRP:HE1	2.13	0.46
1:B:388:ASP:OD2	1:B:391:LYS:HE3	2.15	0.46
1:A:438:PRO:O	1:A:441:TYR:HB2	2.15	0.46
1:B:399:ILE:N	1:B:399:ILE:HD12	2.30	0.46
1:A:411:PRO:HG3	1:A:418:LEU:CD1	2.46	0.46
1:A:468:ARG:HH11	1:A:468:ARG:HG2	1.81	0.46
1:A:450:ALA:O	1:A:452:THR:N	2.48	0.46
1:B:268:GLY:HA2	1:B:442:ILE:CD1	2.43	0.45
1:B:417:VAL:HG12	3:B:581:HOH:O	2.16	0.45
1:A:233:LEU:HD22	1:A:441:TYR:CD2	2.51	0.45
1:A:457:ALA:HB3	1:A:475:ALA:HB3	1.98	0.45
1:B:294:SER:HB2	1:B:299:ILE:HG12	1.97	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:305:ASP:HB2	3:A:564:HOH:O	2.16	0.45
1:A:428:PRO:HB3	1:B:338:SER:OG	2.16	0.45
1:A:448:GLU:C	3:A:537:HOH:O	2.59	0.45
1:A:453:VAL:O	1:A:454:GLY:O	2.35	0.45
1:A:486:ASN:ND2	1:A:515:PRO:HB2	2.32	0.45
1:B:509:ARG:NH1	3:B:620:HOH:O	2.49	0.45
1:B:255:ILE:HG22	1:B:256:SER:N	2.31	0.45
1:B:324:GLY:HA2	3:B:628:HOH:O	2.18	0.45
1:A:289:LYS:HE3	1:A:372:VAL:HG22	1.98	0.44
1:A:360:GLN:HG2	1:A:360:GLN:O	2.16	0.44
1:A:232:THR:CG2	1:A:233:LEU:N	2.80	0.44
1:B:455:GLU:HB3	1:B:509:ARG:HB2	2.00	0.44
1:A:262:SER:HB3	1:A:410:TYR:CD1	2.51	0.44
1:B:263:VAL:HG22	1:B:265:PHE:CE2	2.53	0.44
1:B:325:GLY:O	1:B:326:CYS:HB3	2.17	0.44
1:B:491:GLY:O	1:B:494:GLN:HG2	2.17	0.44
1:B:493:GLN:H	1:B:493:GLN:HG3	1.31	0.44
1:B:277:VAL:HG12	1:B:406:ALA:HB2	1.99	0.44
1:A:264:GLN:HB2	1:A:408:SER:HB3	2.00	0.44
1:A:334:GLN:HG2	1:A:368:ASN:O	2.17	0.44
1:B:326:CYS:CA	1:B:379:PRO:HG3	2.47	0.44
1:B:457:ALA:HB2	1:B:506:TRP:CZ3	2.52	0.44
1:A:488:ALA:O	1:A:489:SER:C	2.61	0.44
1:B:269:ARG:HA	3:B:587:HOH:O	2.17	0.44
1:B:291:ARG:HG3	1:B:291:ARG:NH1	2.32	0.44
1:A:490:SER:CB	1:A:494:GLN:OE1	2.64	0.44
1:B:291:ARG:NE	1:B:368:ASN:HD21	2.13	0.43
1:B:330:ILE:H	1:B:330:ILE:HG12	1.59	0.43
1:A:294:SER:HB2	1:A:299:ILE:HG12	1.99	0.43
1:A:440:GLU:H	1:A:440:GLU:CD	2.24	0.43
1:B:259:ASN:CG	3:B:613:HOH:O	2.57	0.43
1:B:271:THR:OG1	1:B:273:ASP:HB3	2.19	0.43
1:B:330:ILE:CG2	1:B:373:LEU:HA	2.48	0.43
1:A:286:HIS:HD2	3:A:574:HOH:O	2.02	0.43
1:A:331:ASN:ND2	1:A:340:GLN:HB2	2.30	0.43
1:A:409:VAL:HG21	1:A:436:LEU:CD1	2.50	0.42
1:B:250:ILE:HD12	1:B:421:PHE:HB3	2.02	0.42
1:A:346:ASP:O	1:A:349:PRO:HD2	2.20	0.42
1:B:257:PRO:HD3	1:B:390:TRP:CE2	2.55	0.42
1:B:491:GLY:N	1:B:493:GLN:NE2	2.66	0.42
1:A:255:ILE:HG22	1:A:256:SER:H	1.83	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:286:HIS:CE1	3:B:612:HOH:O	2.72	0.41
1:A:377:SER:HB2	1:A:378:PRO:CD	2.50	0.41
1:B:312:PHE:CE1	1:B:313:GLU:HG3	2.56	0.41
1:B:384:GLY:N	3:B:694:HOH:O	2.54	0.41
1:B:461:TYR:CZ	1:B:499:GLY:HA3	2.56	0.41
1:A:474:LYS:O	1:A:481:LEU:HA	2.21	0.41
1:A:271:THR:C	1:A:273:ASP:N	2.79	0.41
1:A:286:HIS:CE1	1:B:249:PRO:HB3	2.55	0.41
1:A:325:GLY:O	1:A:326:CYS:HB3	2.21	0.40
1:B:257:PRO:HD3	1:B:390:TRP:CZ2	2.56	0.40
1:B:291:ARG:HG2	1:B:370:VAL:HG22	2.03	0.40
1:A:348:THR:H	1:A:349:PRO:CD	2.34	0.40
1:A:459:LEU:HD11	1:A:475:ALA:HB2	2.03	0.40
1:B:277:VAL:HG12	1:B:278:GLY:N	2.36	0.40
1:B:303:GLU:C	1:B:305:ASP:N	2.77	0.40

There are no symmetry-related clashes.

5.3 Torsion angles

5.3.1 Protein backbone

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	279/301 (93%)	253 (91%)	21 (8%)	5 (2%)		
1	B	276/301 (92%)	261 (95%)	13 (5%)	2 (1%)		
All	All	555/602 (92%)	514 (93%)	34 (6%)	7 (1%)		

All (7) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	454	GLY
1	A	490	SER
1	B	231	PHE

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Mol	Chain	Res	Type
1	B	402	ALA
1	A	339	SER
1	A	383	SER
1	A	515	PRO

5.3.2 Protein sidechains ⓘ

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	240/253 (95%)	226 (94%)	14 (6%)	18	26
1	B	240/253 (95%)	224 (93%)	16 (7%)	15	21
All	All	480/506 (95%)	450 (94%)	30 (6%)	16	23

All (30) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	238	LEU
1	A	273	ASP
1	A	298	VAL
1	A	305	ASP
1	A	323	LEU
1	A	350	ASP
1	A	360	GLN
1	A	422	MET
1	A	440	GLU
1	A	452	THR
1	A	455	GLU
1	A	497	ILE
1	A	510	PHE
1	A	514	LYS
1	B	261	GLN
1	B	263	VAL
1	B	284	LEU
1	B	291	ARG
1	B	295	ASN

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Mol	Chain	Res	Type
1	B	304	LEU
1	B	305	ASP
1	B	330	ILE
1	B	360	GLN
1	B	399	ILE
1	B	400	THR
1	B	422	MET
1	B	432	ASN
1	B	448	GLU
1	B	493	GLN
1	B	516	VAL

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (28) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	261	GLN
1	A	286	HIS
1	A	300	ASN
1	A	331	ASN
1	A	342	GLN
1	A	360	GLN
1	A	362	ASN
1	A	381	HIS
1	A	404	HIS
1	A	439	GLN
1	A	469	ASN
1	A	486	ASN
1	A	498	ASN
1	B	235	ASN
1	B	261	GLN
1	B	286	HIS
1	B	295	ASN
1	B	342	GLN
1	B	355	HIS
1	B	360	GLN
1	B	362	ASN
1	B	368	ASN
1	B	381	HIS
1	B	444	HIS
1	B	449	GLN
1	B	469	ASN
1	B	493	GLN

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Mol	Chain	Res	Type
1	B	494	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 ⓘ

6 monosaccharides are modelled in this entry.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# $ Z > 2$	Counts	RMSZ	# $ Z > 2$
2	GAL	C	1	2	12,12,12	0.47	0	17,17,17	1.02	2 (11%)
2	FUC	C	2	2	10,10,11	0.42	0	14,14,16	0.67	0
2	NGA	C	3	2	14,14,15	0.56	0	17,19,21	1.30	2 (11%)
2	GAL	D	1	2	12,12,12	0.51	0	17,17,17	0.85	0
2	FUC	D	2	2	10,10,11	0.44	0	14,14,16	0.87	1 (7%)
2	NGA	D	3	2	14,14,15	0.55	0	17,19,21	0.87	1 (5%)

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	GAL	C	1	2	1/1/5/5	0/2/22/22	0/1/1/1
2	FUC	C	2	2	-	-	0/1/1/1
2	NGA	C	3	2	1/1/5/7	0/6/23/26	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	GAL	D	1	2	-	0/2/22/22	0/1/1/1
2	FUC	D	2	2	-	-	0/1/1/1
2	NGA	D	3	2	1/1/5/7	0/6/23/26	0/1/1/1

There are no bond length outliers.

All (6) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	C	3	NGA	C1-O5-C5	-3.61	107.35	112.19
2	C	1	GAL	O3-C3-C2	-2.56	104.35	110.38
2	C	3	NGA	O5-C1-C2	-2.47	107.46	111.29
2	C	1	GAL	C1-O5-C5	-2.34	109.12	113.65
2	D	2	FUC	C6-C5-C4	-2.17	109.10	113.08
2	D	3	NGA	C6-C5-C4	-2.04	108.00	113.02

All (3) chirality outliers are listed below:

Mol	Chain	Res	Type	Atom
2	C	1	GAL	C3
2	C	3	NGA	C1
2	D	3	NGA	C1

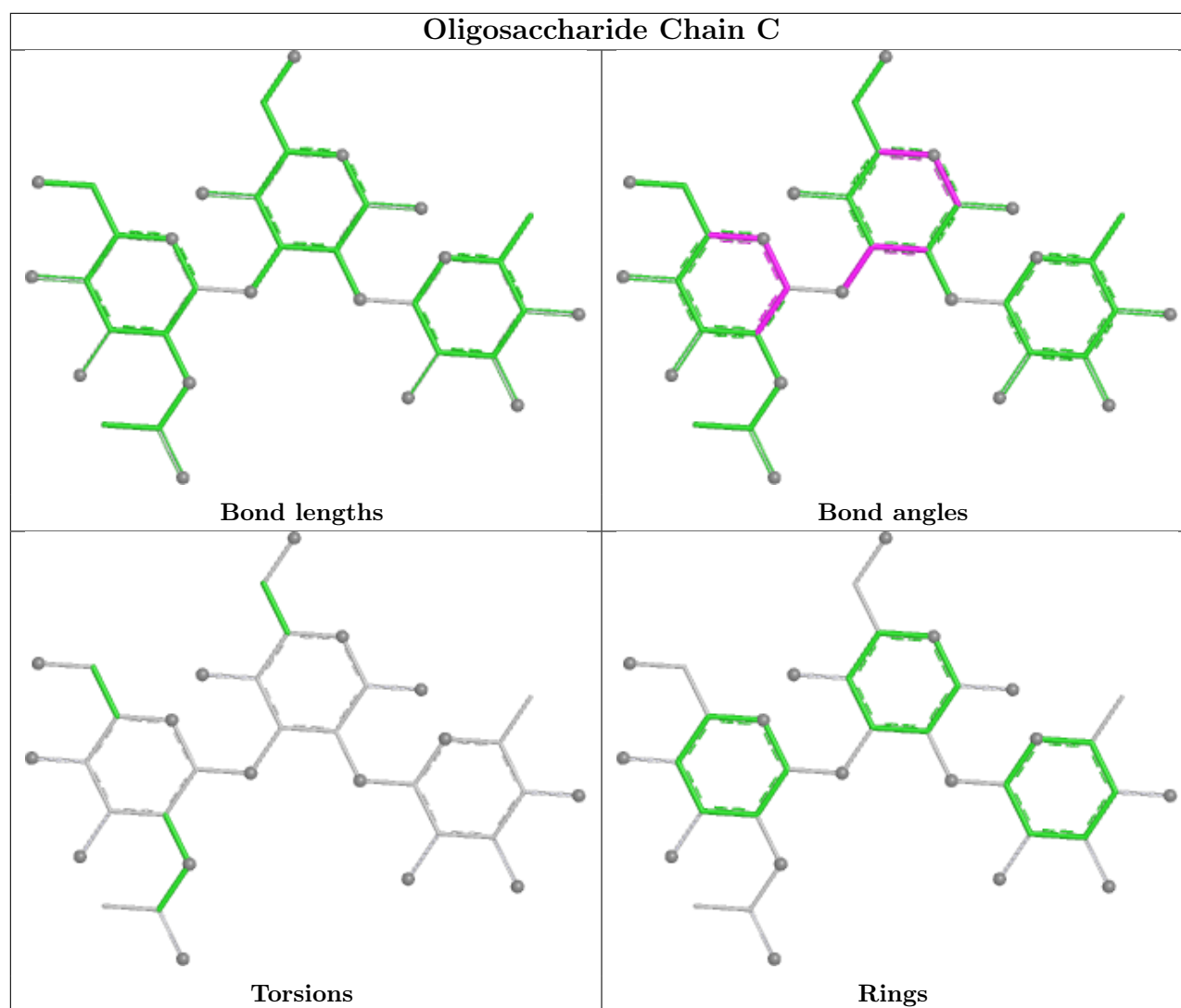
There are no torsion outliers.

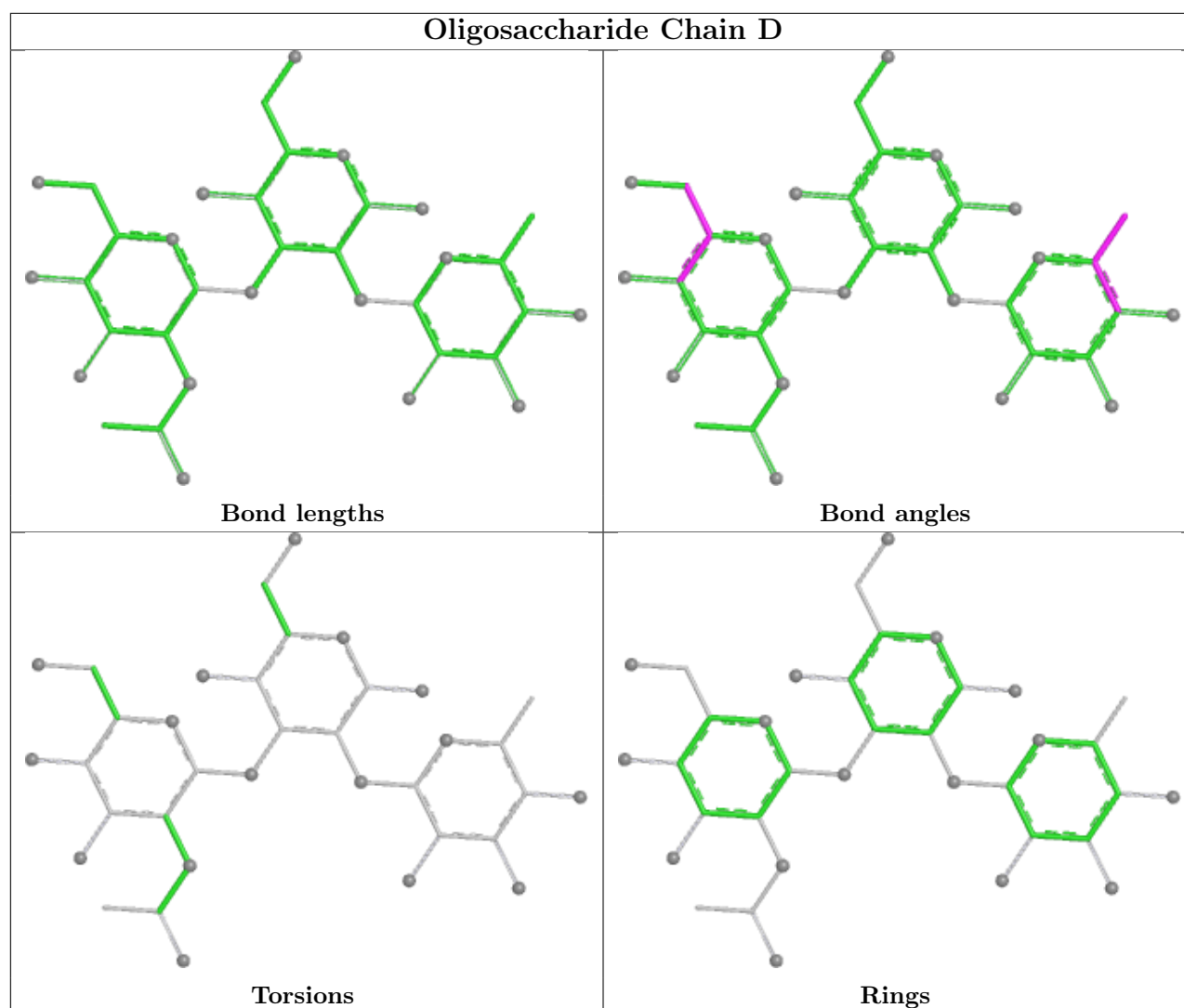
There are no ring outliers.

2 monomers are involved in 2 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	D	3	NGA	2	0
2	D	2	FUC	1	0

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





5.6 Ligand geometry [i](#)

There are no ligands in this entry.

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	284/301 (94%)	-0.93	0 100 100	20, 20, 20, 20	0
1	B	284/301 (94%)	-0.96	0 100 100	20, 20, 20, 20	0
All	All	568/602 (94%)	-0.94	0 100 100	20, 20, 20, 20	0

There are no RSRZ outliers to report.

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](#)

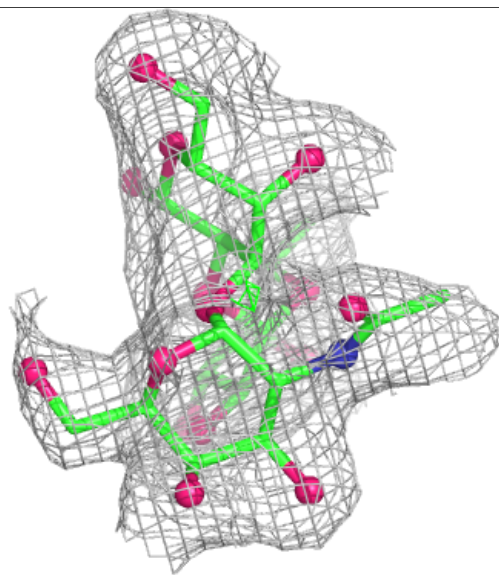
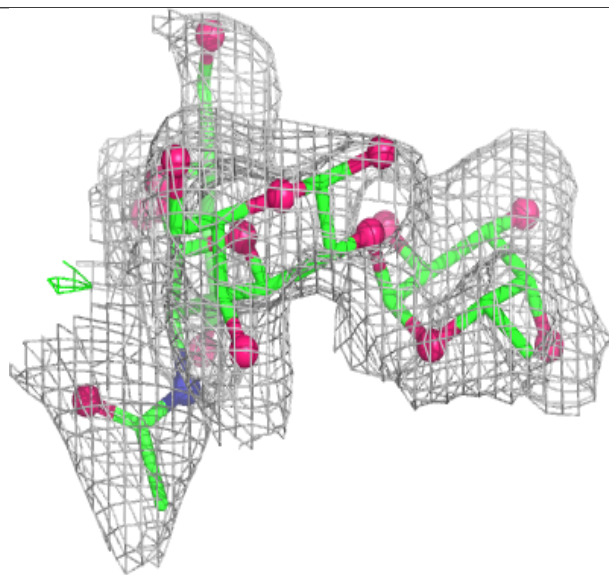
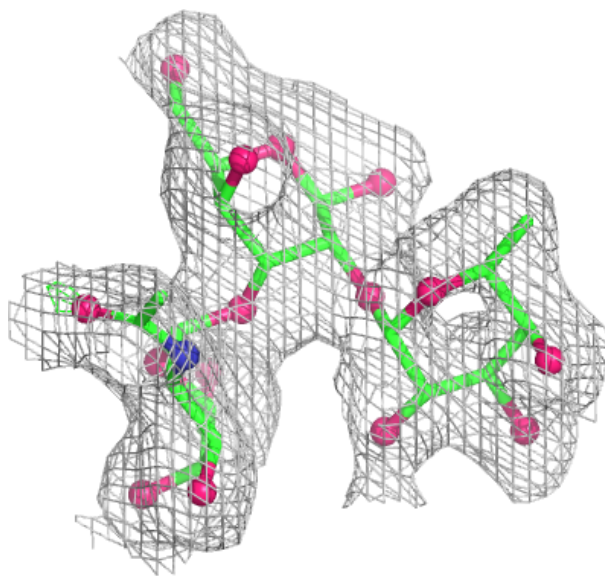
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled ‘Q< 0.9’ lists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

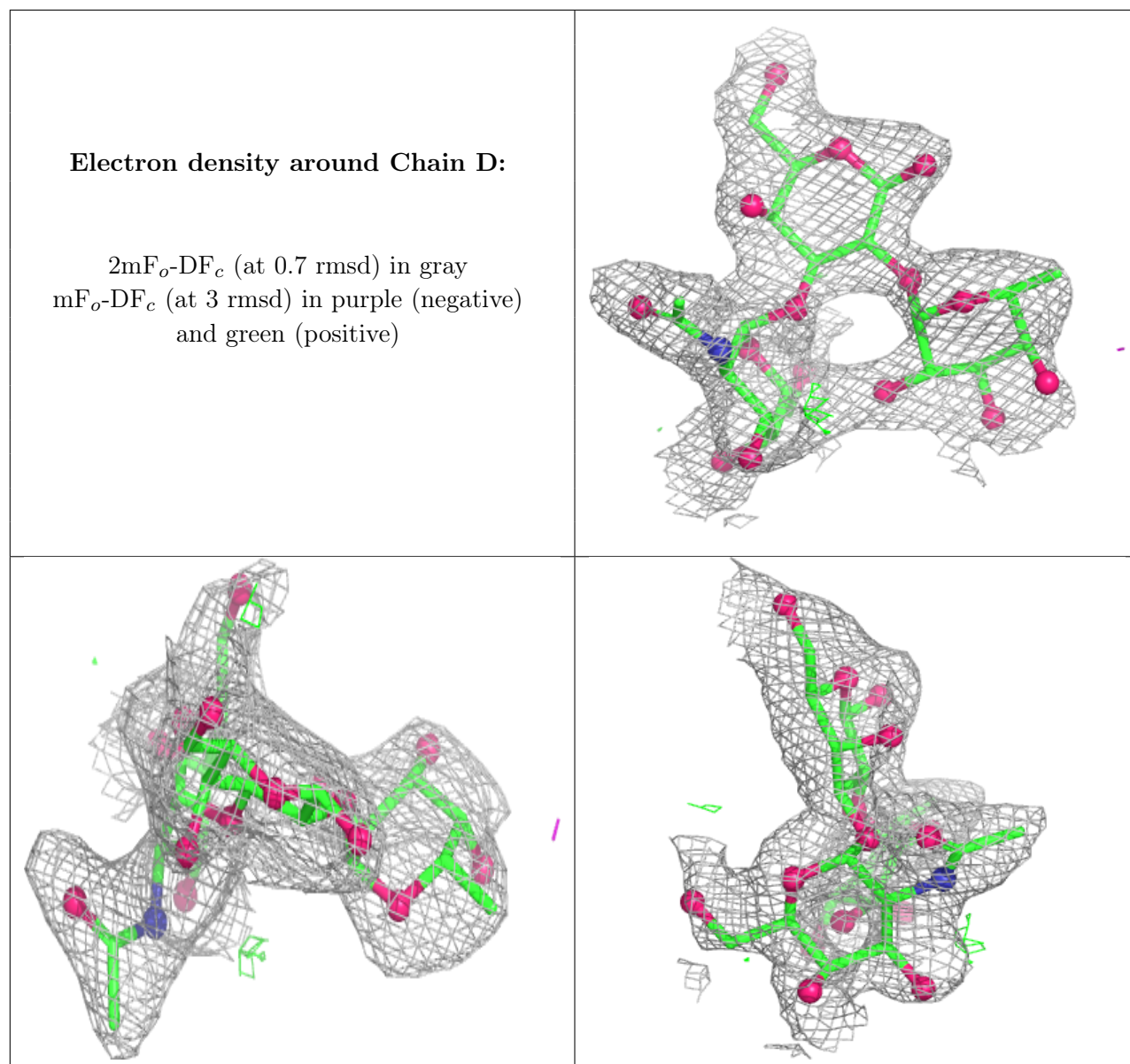
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
2	GAL	D	1	12/12	0.97	0.04	20,20,20,20	0
2	FUC	C	2	10/11	0.98	0.04	20,20,20,20	0
2	NGA	C	3	14/15	0.98	0.04	20,20,20,20	0
2	GAL	C	1	12/12	0.98	0.04	20,20,20,20	0
2	FUC	D	2	10/11	0.98	0.05	20,20,20,20	0
2	NGA	D	3	14/15	0.98	0.05	20,20,20,20	0

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 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](#)

There are no ligands in this entry.

6.5 Other polymers [i](#)

There are no such residues in this entry.