



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 10, 2026 – 12:30 AM UTC

PDB ID : 4Z7N / pdb_00004z7n
Title : Integrin alphaIIb beta3 in complex with AGDV peptide
Authors : Lin, F.-Y.; Zhu, J.; Springer, T.A.
Deposited on : 2015-04-07
Resolution : 2.60 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:

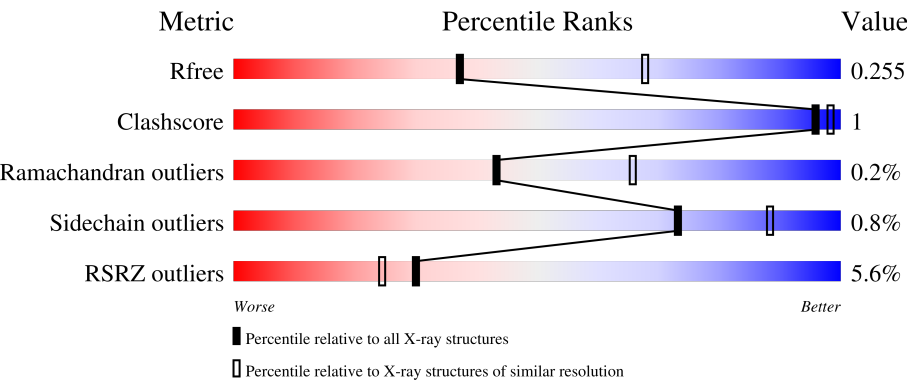
MolProbity	:	4-5-2 with Phenix2.0
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	2.0
EDS	:	3.0
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4	:	9.0.010 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.49

1 Overall quality at a glance i

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

The reported resolution of this entry is 2.60 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.



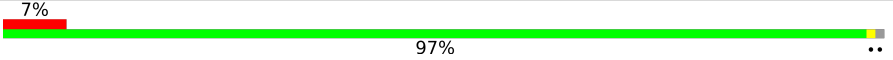
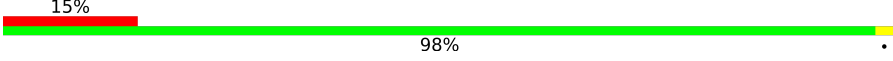
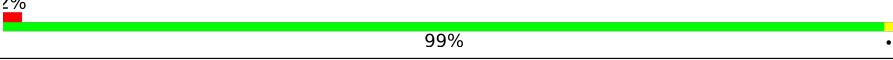
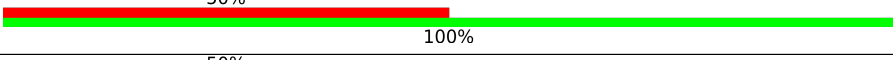
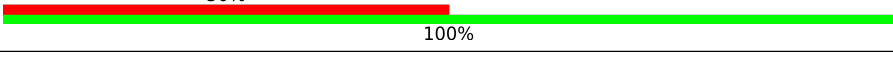
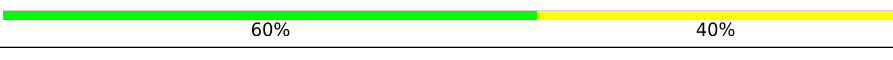
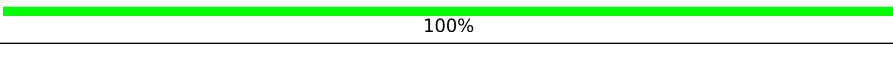
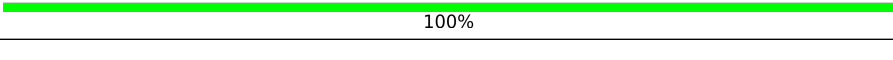
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R _{free}	180053	4008 (2.60-2.60)
Clashscore	190562	4347 (2.60-2.60)
Ramachandran outliers	187476	4277 (2.60-2.60)
Sidechain outliers	187428	4277 (2.60-2.60)
RSRZ outliers	180081	4008 (2.60-2.60)

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	455	% 95%5%
1	C	455	2% 97%. .
2	B	469	6% 96%. .
2	D	469	5% 96%. .
3	E	219	13% 97%. .

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Mol	Chain	Length	Quality of chain
3	H	219	
4	F	214	
4	L	214	
5	G	4	
5	J	4	
6	I	5	
7	K	2	
7	N	2	
8	M	4	

2 Entry composition

There are 15 unique types of molecules in this entry. The entry contains 41957 atoms, of which 20198 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 Integrin alpha-IIb.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
1	A	455	Total	C	H	N	O	S	1	2	0
			6839	2223	3341	602	665	8			
1	C	453	Total	C	H	N	O	S	0	0	0
			6782	2207	3308	598	661	8			

- Molecule 2 is a protein called Integrin beta-3.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
2	B	464	Total	C	H	N	O	S	4	0	0
			7075	2229	3496	611	706	33			
2	D	469	Total	C	H	N	O	S	10	0	0
			7140	2248	3528	617	713	34			

- Molecule 3 is a protein called Monoclonal antibody 10E5 heavy chain.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
3	E	216	Total	C	H	N	O	S	0	0	0
			3242	1041	1600	266	329	6			
3	H	216	Total	C	H	N	O	S	0	0	0
			3242	1041	1600	266	329	6			

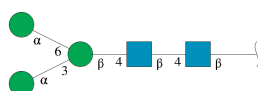
- Molecule 4 is a protein called Monoclonal antibody 10E5 light chain.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
4	F	214	Total	C	H	N	O	S	1	0	0
			3190	1019	1553	268	341	9			
4	L	214	Total	C	H	N	O	S	0	0	0
			3190	1019	1553	268	341	9			

- Molecule 5 is a protein called Tetrapeptide ALA-GLY-ASP-VAL.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
5	G	4	Total	C	H	N	O	0	0	0
			45	14	20	4	7			
5	J	4	Total	C	H	N	O	0	0	0
			45	14	20	4	7			

- Molecule 6 is an oligosaccharide called alpha-D-mannopyranose-(1-3)-[alpha-D-mannopyranose-(1-6)]beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
6	I	5	Total	C	H	N	O	0	0	0
			113	34	52	2	25			

- Molecule 7 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
7	K	2	Total	C	H	N	O	0	0	0
			53	16	25	2	10			
7	N	2	Total	C	H	N	O	0	0	0
			53	16	25	2	10			

- Molecule 8 is an oligosaccharide called alpha-D-mannopyranose-(1-3)-beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.

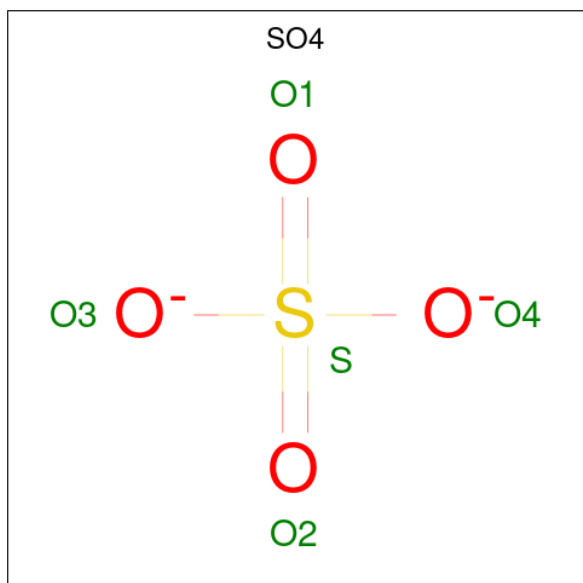


Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
8	M	4	Total	C	H	N	O	0	0	0
			93	28	43	2	20			

- Molecule 9 is CALCIUM ION (CCD ID: CA) (formula: Ca).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
9	A	4	Total	Ca	0	0
			4	4		
9	C	4	Total	Ca	0	0
			4	4		

- Molecule 10 is SULFATE ION (CCD ID: SO4) (formula: O₄S).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
10	A	1	Total	O	S	0	0
			5	4	1		
10	A	1	Total	O	S	0	0
			5	4	1		
10	A	1	Total	O	S	0	0
			5	4	1		
10	A	1	Total	O	S	0	0
			5	4	1		
10	C	1	Total	O	S	0	0
			5	4	1		
10	C	1	Total	O	S	0	0
			5	4	1		
10	C	1	Total	O	S	0	0
			5	4	1		
10	L	1	Total	O	S	0	0
			5	4	1		

- Molecule 11 is GLYCEROL (CCD ID: GOL) (formula: C₃H₈O₃).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
11	A	1	Total	C	H	O	0	0
			14	3	8	3		

- Molecule 12 is MANGANESE (II) ION (CCD ID: MN) (formula: Mn).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
12	B	3	Total	Mn	0	0
			3	3		
12	D	3	Total	Mn	0	0
			3	3		

- Molecule 13 is 2-acetamido-2-deoxy-beta-D-glucopyranose (CCD ID: NAG) (formula: C₈H₁₅NO₆).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
13	B	1	Total	C	H	N	O	0	0
			27	8	13	1	5		
13	D	1	Total	C	H	N	O	0	0
			27	8	13	1	5		

- Molecule 14 is CHLORIDE ION (CCD ID: CL) (formula: Cl).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
14	C	1	Total	Cl	0	0
			1	1		

- Molecule 15 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
15	A	319	Total	O	0	0
			319	319		
15	B	144	Total	O	0	0
			144	144		
15	C	123	Total	O	0	0
			123	123		
15	D	75	Total	O	0	0
			75	75		
15	E	9	Total	O	0	0
			9	9		
15	F	9	Total	O	0	0
			9	9		

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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
15	H	16	Total 16	O 16	0	0
15	L	28	Total 28	O 28	0	0
15	G	5	Total 5	O 5	0	0
15	J	4	Total 4	O 4	0	0

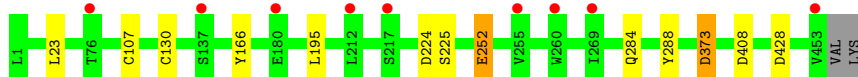
3 Residue-property plots [i](#)

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.

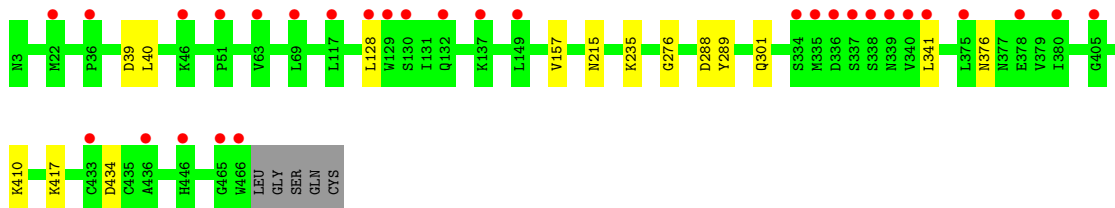
- Molecule 1: Integrin alpha-IIb



- Molecule 1: Integrin alpha-IIb



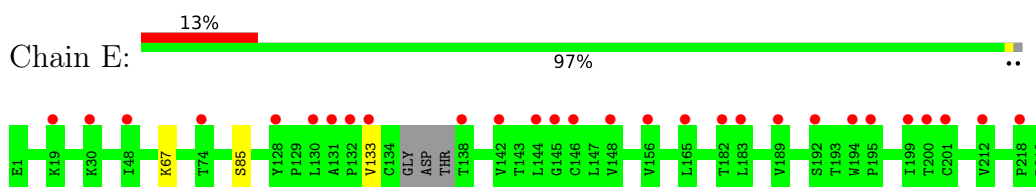
- Molecule 2: Integrin beta-3



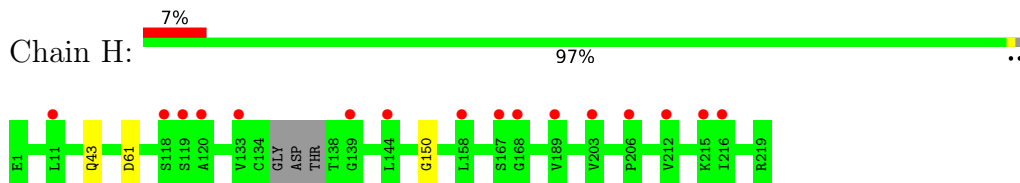
- Molecule 2: Integrin beta-3



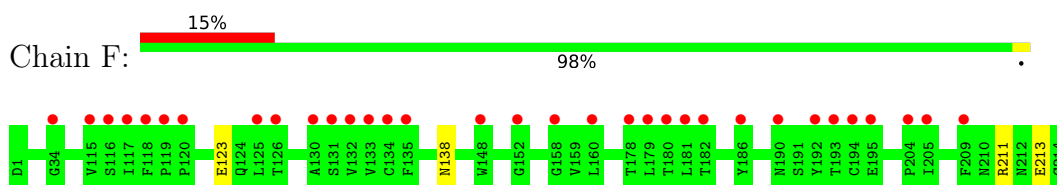
- Molecule 3: Monoclonal antibody 10E5 heavy chain



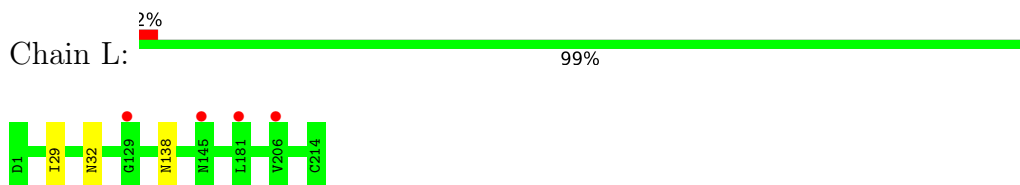
- Molecule 3: Monoclonal antibody 10E5 heavy chain



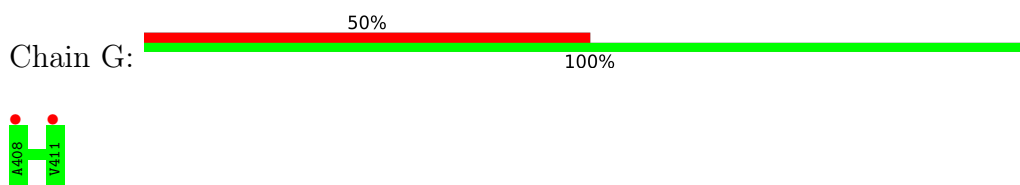
- Molecule 4: Monoclonal antibody 10E5 light chain



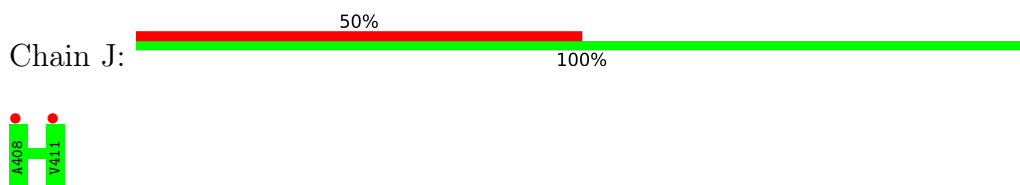
- Molecule 4: Monoclonal antibody 10E5 light chain



- Molecule 5: Tetrapeptide ALA-GLY-ASP-VAL



- Molecule 5: Tetrapeptide ALA-GLY-ASP-VAL



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





- Molecule 7: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain K:  100%



- Molecule 7: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain N:  100%



- Molecule 8: alpha-D-mannopyranose-(1-3)-beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain M:  75% 25%



4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 2	Depositor
Cell constants a, b, c, α , β , γ	256.88Å 144.37Å 104.64Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	49.19 – 2.60 49.19 – 2.60	Depositor EDS
% Data completeness (in resolution range)	95.9 (49.19-2.60) 84.1 (49.19-2.60)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	0.55 (at 2.61Å)	Xtriage
Refinement program	PHENIX (1.10pre_2104: ???)	Depositor
R, R_{free}	0.230 , 0.253 0.232 , 0.255	Depositor DCC
R_{free} test set	2000 reflections (1.71%)	wwPDB-VP
Wilson B-factor (Å ²)	50.6	Xtriage
Anisotropy	0.449	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.37 , 68.4	EDS
L-test for twinning ²	$\langle L \rangle = 0.48$, $\langle L^2 \rangle = 0.32$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.93	EDS
Total number of atoms	41957	wwPDB-VP
Average B, all atoms (Å ²)	105.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.25% 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: GOL, MN, SO4, CL, NAG, MAN, BMA, CA

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	0.17	0/3600	0.30	0/4905
1	C	0.14	0/3570	0.27	0/4865
2	B	0.14	0/3645	0.28	0/4942
2	D	0.12	0/3678	0.26	0/4986
3	E	0.09	0/1684	0.24	0/2305
3	H	0.11	0/1684	0.24	0/2305
4	F	0.10	0/1673	0.22	0/2269
4	L	0.11	0/1673	0.25	0/2269
5	G	0.09	0/24	0.23	0/30
5	J	0.08	0/24	0.20	0/30
All	All	0.13	0/21255	0.27	0/28906

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

Mol	Chain	#Chirality outliers	#Planarity outliers
2	B	0	1

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
2	B	341	LEU	Peptide

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	3498	3341	3341	13	0
1	C	3474	3308	3308	7	0
2	B	3579	3496	3496	5	0
2	D	3612	3528	3527	12	0
3	E	1642	1600	1600	1	0
3	H	1642	1600	1600	2	0
4	F	1637	1553	1553	2	0
4	L	1637	1553	1553	1	0
5	G	25	20	20	0	0
5	J	25	20	20	0	0
6	I	61	52	52	0	0
7	K	28	25	25	0	0
7	N	28	25	25	0	0
8	M	50	43	43	0	0
9	A	4	0	0	0	0
9	C	4	0	0	0	0
10	A	20	0	0	0	0
10	C	15	0	0	0	0
10	L	5	0	0	0	0
11	A	6	8	8	0	0
12	B	3	0	0	0	0
12	D	3	0	0	0	0
13	B	14	13	13	4	0
13	D	14	13	13	0	0
14	C	1	0	0	0	0
15	A	319	0	0	9	1
15	B	144	0	0	1	0
15	C	123	0	0	4	1
15	D	75	0	0	6	0
15	E	9	0	0	0	0
15	F	9	0	0	0	0
15	G	5	0	0	0	0
15	H	16	0	0	1	0
15	J	4	0	0	0	0
15	L	28	0	0	0	0
All	All	21759	20198	20197	47	1

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 1.

All (47) 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:276:ARG:NH1	15:A:604:HOH:O	2.17	0.78
1:A:369:ASP:OD2	15:A:601:HOH:O	2.02	0.77
2:B:235:LYS:NZ	2:B:276:GLY:O	2.24	0.71
1:C:408:ASP:OD2	15:C:601:HOH:O	2.10	0.69
1:A:276:ARG:NH1	15:A:612:HOH:O	2.26	0.69
13:B:2004:NAG:H83	13:B:2004:NAG:H3	1.73	0.69
1:A:369:ASP:CG	15:A:601:HOH:O	2.37	0.65
1:C:428:ASP:OD2	15:C:602:HOH:O	2.14	0.64
2:D:462:CYS:SG	2:D:471:CYS:N	2.71	0.64
1:C:373:ASP:O	15:C:603:HOH:O	2.14	0.63
1:A:402:ARG:O	15:A:602:HOH:O	2.15	0.63
1:C:284:GLN:OE1	15:C:604:HOH:O	2.17	0.57
1:A:190:TYR:O	15:A:606:HOH:O	2.18	0.56
1:A:408:ASP:OD2	15:A:605:HOH:O	2.17	0.56
13:B:2004:NAG:H3	13:B:2004:NAG:C8	2.37	0.55
1:C:252:GLU:N	1:C:252:GLU:OE2	2.39	0.55
1:A:440:TYR:OH	15:A:603:HOH:O	2.16	0.55
2:D:288:ASP:OD1	2:D:289:TYR:N	2.40	0.55
2:D:210:GLN:OE1	15:D:2101:HOH:O	2.18	0.54
4:F:211:ARG:O	4:F:213:GLU:N	2.41	0.53
13:B:2004:NAG:H83	13:B:2004:NAG:C3	2.41	0.51
1:C:224:ASP:OD1	1:C:225:SER:N	2.41	0.51
2:B:288:ASP:OD1	2:B:289:TYR:N	2.40	0.50
2:B:410:LYS:NZ	2:B:434:ASP:OD2	2.44	0.49
2:D:221:GLY:O	15:D:2102:HOH:O	2.19	0.49
3:H:61:ASP:OD1	15:H:301:HOH:O	2.19	0.49
2:D:217:ASP:OD2	2:D:255:HIS:NE2	2.43	0.49
4:F:123:GLU:OE1	4:F:123:GLU:N	2.43	0.48
2:D:290:PRO:O	15:D:2103:HOH:O	2.20	0.48
2:D:372:ALA:O	2:D:380:ILE:N	2.47	0.47
3:H:43:GLN:OE1	3:H:43:GLN:N	2.46	0.46
2:D:310:VAL:O	2:D:333:LEU:N	2.44	0.46
1:C:107:CYS:HA	1:C:130:CYS:HA	1.98	0.46
3:E:67:LYS:NZ	3:E:85:SER:O	2.50	0.44
1:A:122:ALA:O	1:A:123:GLU:HB2	2.18	0.44
2:D:251:ASP:OD2	15:D:2104:HOH:O	2.21	0.43
1:A:41:ARG:NH2	15:A:634:HOH:O	2.44	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:224:ASP:OD1	1:A:225:SER:N	2.43	0.42
2:D:126:ASP:OD1	2:D:127:ASP:N	2.52	0.42
1:A:28:ASP:OD1	1:A:32:ARG:N	2.49	0.42
13:B:2004:NAG:C8	13:B:2004:NAG:C3	2.95	0.42
1:A:276:ARG:HD2	1:A:279:ARG:HB2	2.02	0.41
4:L:29:ILE:O	4:L:32:ASN:ND2	2.48	0.41
2:D:150:ARG:NH1	15:D:2111:HOH:O	2.45	0.41
2:B:301:GLN:NE2	15:B:2109:HOH:O	2.35	0.41
2:B:39:ASP:OD1	2:B:40:LEU:N	2.46	0.41
2:D:329:THR:N	15:D:2108:HOH:O	2.49	0.40

All (1) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
15:A:605:HOH:O	15:C:632:HOH:O[1_554]	2.13	0.07

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	455/455 (100%)	434 (95%)	21 (5%)	0	100	100
1	C	451/455 (99%)	432 (96%)	19 (4%)	0	100	100
2	B	462/469 (98%)	438 (95%)	23 (5%)	1 (0%)	43	66
2	D	467/469 (100%)	445 (95%)	21 (4%)	1 (0%)	43	66
3	E	212/219 (97%)	197 (93%)	14 (7%)	1 (0%)	24	46
3	H	212/219 (97%)	202 (95%)	9 (4%)	1 (0%)	24	46
4	F	212/214 (99%)	202 (95%)	9 (4%)	1 (0%)	24	46
4	L	212/214 (99%)	205 (97%)	6 (3%)	1 (0%)	24	46

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
5	G	2/4 (50%)	2 (100%)	0	0	100	100
5	J	2/4 (50%)	2 (100%)	0	0	100	100
All	All	2687/2722 (99%)	2559 (95%)	122 (4%)	6 (0%)	43	66

All (6) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
3	E	133	VAL
2	B	157	VAL
4	L	138	ASN
2	D	157	VAL
4	F	138	ASN
3	H	150	GLY

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	365/363 (101%)	358 (98%)	7 (2%)	50	75
1	C	361/363 (99%)	355 (98%)	6 (2%)	53	78
2	B	411/415 (99%)	407 (99%)	4 (1%)	68	86
2	D	415/415 (100%)	413 (100%)	2 (0%)	81	92
3	E	187/189 (99%)	187 (100%)	0	100	100
3	H	187/189 (99%)	187 (100%)	0	100	100
4	F	188/188 (100%)	188 (100%)	0	100	100
4	L	188/188 (100%)	188 (100%)	0	100	100
5	G	2/2 (100%)	2 (100%)	0	100	100
5	J	2/2 (100%)	2 (100%)	0	100	100
All	All	2306/2314 (100%)	2287 (99%)	19 (1%)	73	88

All (19) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	23	LEU
1	A	61	GLU
1	A	166	TYR
1	A	252	GLU
1	A	270	LEU
1	A	288	TYR
1	A	373	ASP
2	B	128	LEU
2	B	215	ASN
2	B	376	ASN
2	B	417	LYS
1	C	23	LEU
1	C	166	TYR
1	C	195	LEU
1	C	252	GLU
1	C	288	TYR
1	C	373	ASP
2	D	215	ASN
2	D	365	GLU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (17) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	215	HIS
1	A	304	HIS
2	B	79	GLN
2	B	269	ASN
2	B	279	ASN
2	B	280	HIS
1	C	158	ASN
1	C	388	GLN
2	D	133	ASN
2	D	210	GLN
2	D	280	HIS
2	D	305	ASN
3	E	170	HIS
4	F	138	ASN
4	F	210	ASN
4	L	27	GLN
4	L	53	ASN

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 ⓘ

13 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	$\# Z > 2$
6	NAG	I	1	2,6	14,14,15	0.31	0	17,19,21	0.44	0
6	NAG	I	2	6	14,14,15	0.21	0	17,19,21	0.44	0
6	BMA	I	3	6	11,11,12	0.77	0	15,15,17	0.71	0
6	MAN	I	4	6	11,11,12	0.67	0	15,15,17	1.01	2 (13%)
6	MAN	I	5	6	11,11,12	0.67	0	15,15,17	0.99	2 (13%)
7	NAG	K	1	7,2	14,14,15	0.32	0	17,19,21	0.36	0
7	NAG	K	2	7	14,14,15	0.24	0	17,19,21	0.42	0
8	NAG	M	1	8,2	14,14,15	0.26	0	17,19,21	0.43	0
8	NAG	M	2	8	14,14,15	0.23	0	17,19,21	0.42	0
8	BMA	M	3	8	11,11,12	0.58	0	15,15,17	0.69	0
8	MAN	M	4	8	11,11,12	0.71	0	15,15,17	0.96	2 (13%)
7	NAG	N	1	7,2	14,14,15	0.40	0	17,19,21	0.36	0
7	NAG	N	2	7	14,14,15	0.23	0	17,19,21	0.44	0

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
6	NAG	I	1	2,6	-	0/6/23/26	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
6	NAG	I	2	6	-	2/6/23/26	0/1/1/1
6	BMA	I	3	6	-	0/2/19/22	0/1/1/1
6	MAN	I	4	6	-	2/2/19/22	0/1/1/1
6	MAN	I	5	6	-	1/2/19/22	0/1/1/1
7	NAG	K	1	7,2	-	3/6/23/26	0/1/1/1
7	NAG	K	2	7	-	1/6/23/26	0/1/1/1
8	NAG	M	1	8,2	-	0/6/23/26	0/1/1/1
8	NAG	M	2	8	-	0/6/23/26	0/1/1/1
8	BMA	M	3	8	-	2/2/19/22	0/1/1/1
8	MAN	M	4	8	-	0/2/19/22	0/1/1/1
7	NAG	N	1	7,2	-	2/6/23/26	0/1/1/1
7	NAG	N	2	7	-	2/6/23/26	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(°)
6	I	4	MAN	O2-C2-C3	-2.33	105.33	110.15
6	I	5	MAN	C1-O5-C5	2.32	115.30	112.19
8	M	4	MAN	O2-C2-C3	-2.24	105.52	110.15
6	I	5	MAN	O2-C2-C3	-2.18	105.65	110.15
8	M	4	MAN	C1-O5-C5	2.13	115.05	112.19
6	I	4	MAN	C1-O5-C5	2.10	115.00	112.19

There are no chirality outliers.

All (15) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
7	N	2	NAG	O5-C5-C6-O6
7	N	1	NAG	O5-C5-C6-O6
6	I	4	MAN	C4-C5-C6-O6
6	I	4	MAN	O5-C5-C6-O6
8	M	3	BMA	O5-C5-C6-O6
7	N	1	NAG	C4-C5-C6-O6
8	M	3	BMA	C4-C5-C6-O6
7	N	2	NAG	C4-C5-C6-O6
7	K	1	NAG	O5-C5-C6-O6
6	I	5	MAN	O5-C5-C6-O6
7	K	1	NAG	C4-C5-C6-O6
7	K	2	NAG	O5-C5-C6-O6

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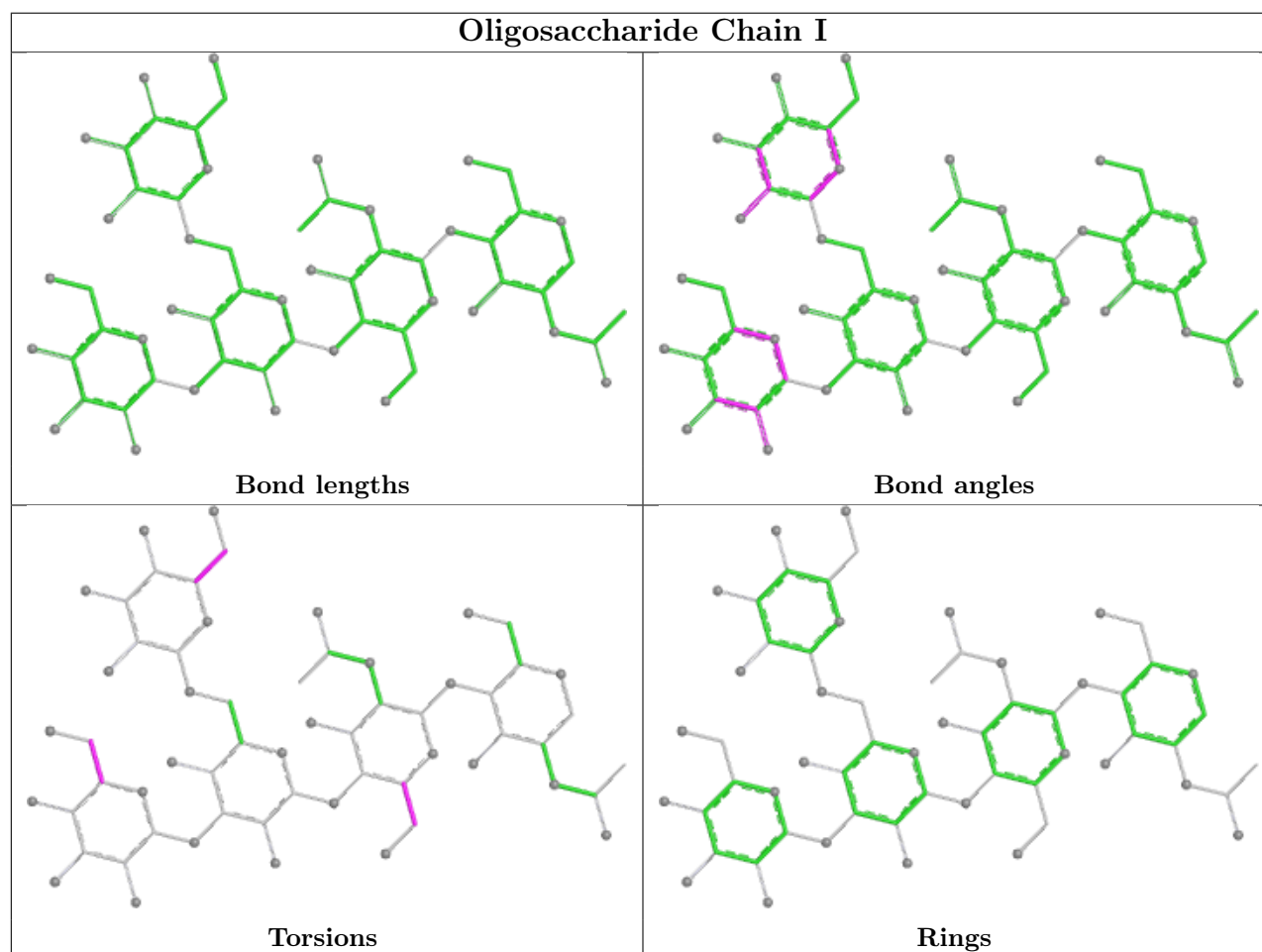
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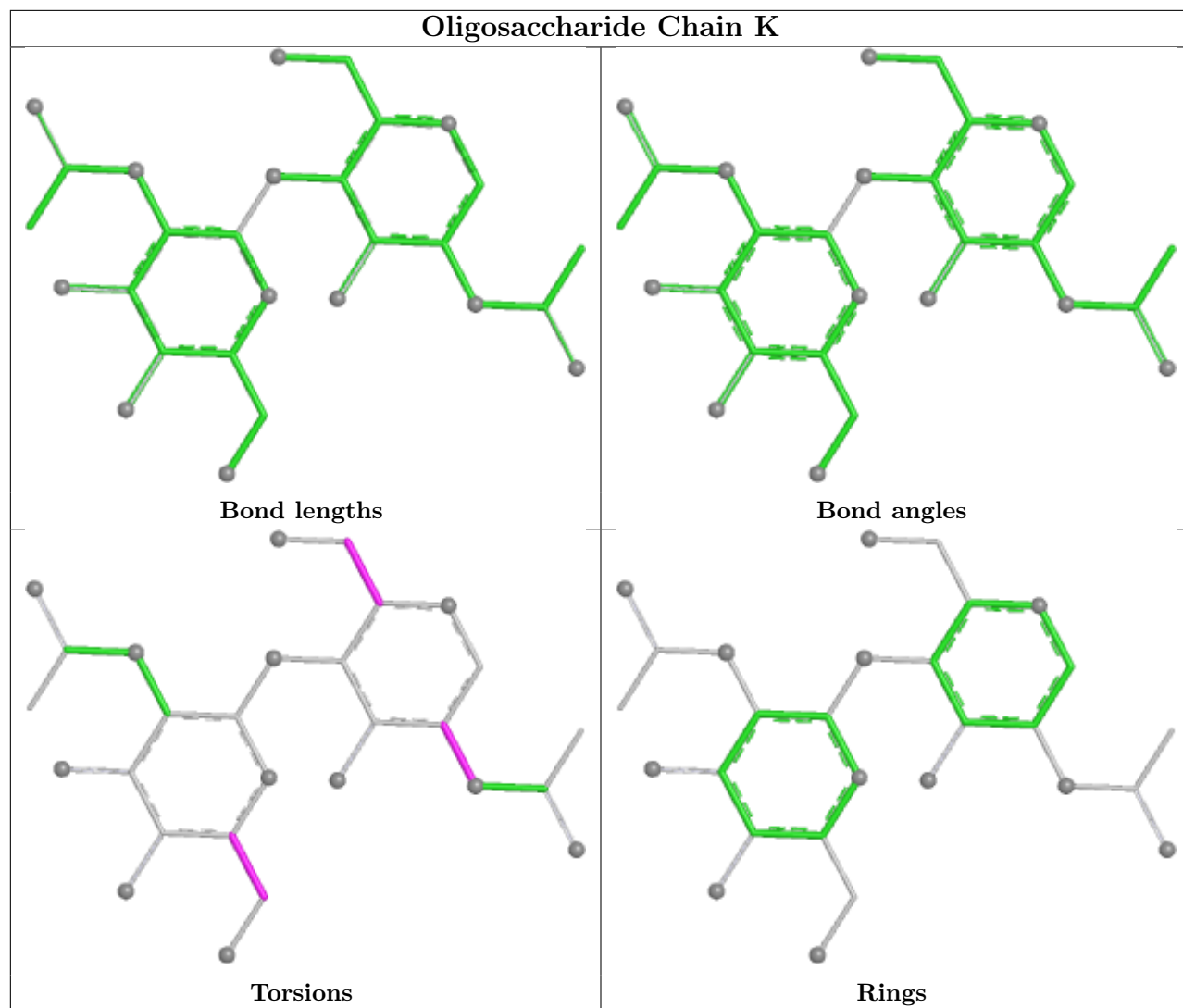
Mol	Chain	Res	Type	Atoms
7	K	1	NAG	C1-C2-N2-C7
6	I	2	NAG	C4-C5-C6-O6
6	I	2	NAG	O5-C5-C6-O6

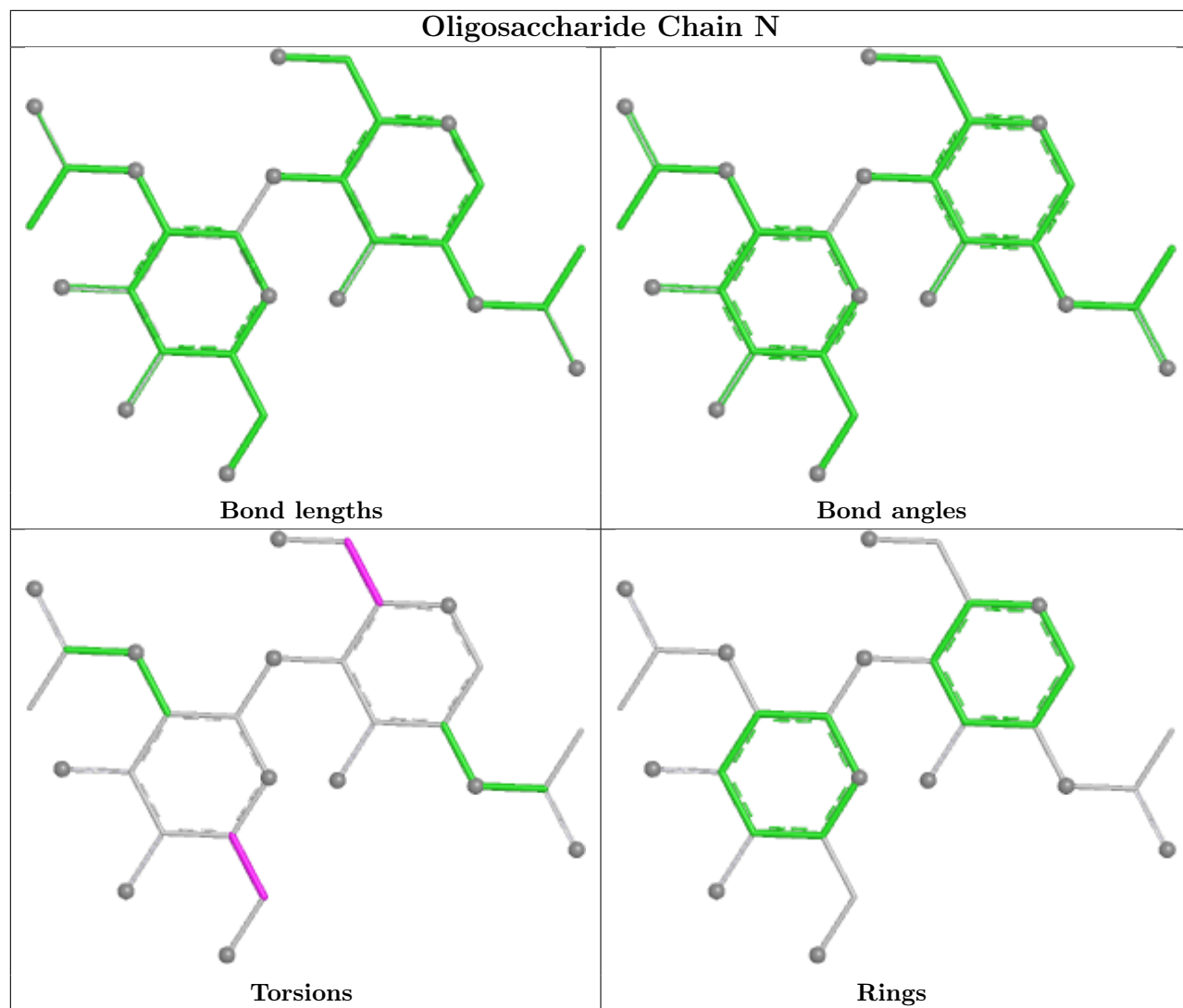
There are no ring outliers.

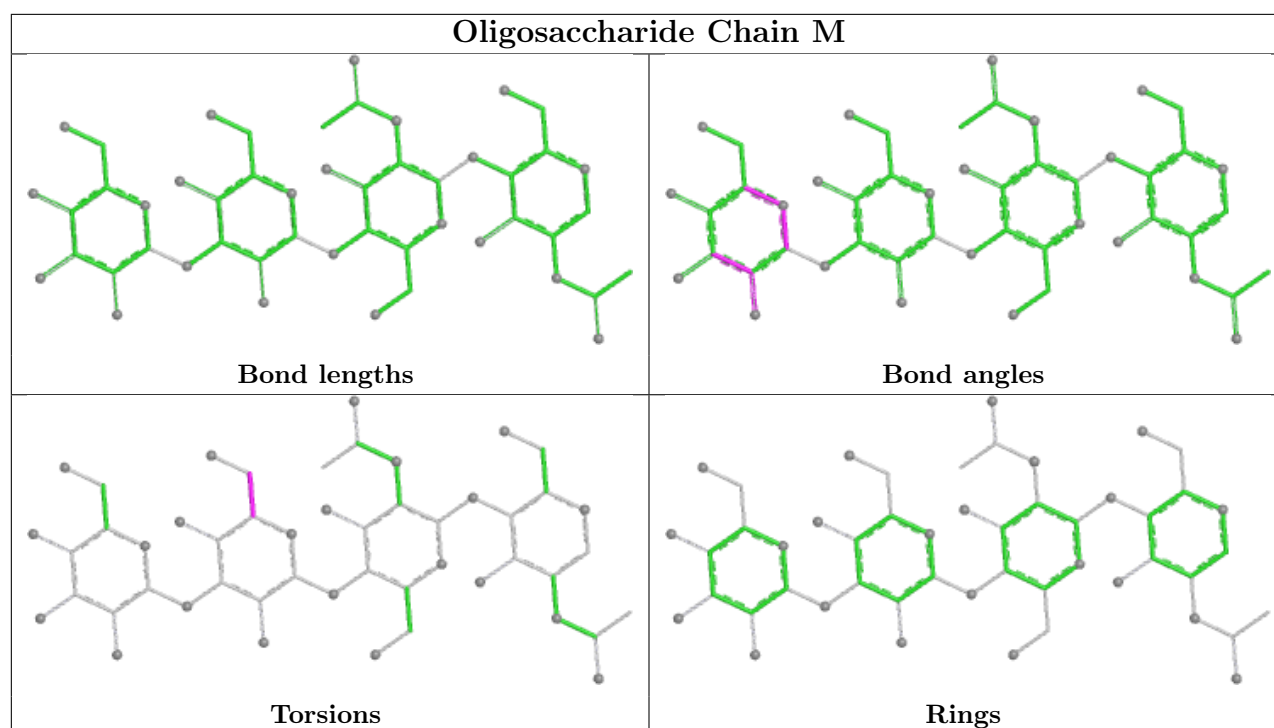
No monomer is involved in short contacts.

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









5.6 Ligand geometry [i](#)

Of 26 ligands modelled in this entry, 15 are monoatomic - leaving 11 for Mogul analysis.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\# Z > 2$	Counts	RMSZ	$\# Z > 2$
10	SO4	A	508	-	4,4,4	0.23	0	6,6,6	0.06	0
10	SO4	A	506	-	4,4,4	0.23	0	6,6,6	0.07	0
13	NAG	B	2004	2	14,14,15	0.45	0	17,19,21	1.48	3 (17%)
10	SO4	C	507	-	4,4,4	0.23	0	6,6,6	0.08	0
11	GOL	A	509	-	5,5,5	0.42	0	5,5,5	0.27	0
13	NAG	D	2004	2	14,14,15	0.25	0	17,19,21	0.39	0
10	SO4	A	507	-	4,4,4	0.22	0	6,6,6	0.06	0
10	SO4	A	505	-	4,4,4	0.24	0	6,6,6	0.08	0
10	SO4	C	501	-	4,4,4	0.23	0	6,6,6	0.06	0
10	SO4	C	508	-	4,4,4	0.24	0	6,6,6	0.09	0
10	SO4	L	301	-	4,4,4	0.23	0	6,6,6	0.07	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
11	GOL	A	509	-	-	0/4/4/4	-
13	NAG	D	2004	2	-	0/6/23/26	0/1/1/1
13	NAG	B	2004	2	-	5/6/23/26	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(°)
13	B	2004	NAG	C2-N2-C7	4.26	128.60	122.90
13	B	2004	NAG	C1-O5-C5	2.69	115.79	112.19
13	B	2004	NAG	C1-C2-N2	2.08	113.71	110.43

There are no chirality outliers.

All (5) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
13	B	2004	NAG	O5-C5-C6-O6
13	B	2004	NAG	C4-C5-C6-O6
13	B	2004	NAG	C8-C7-N2-C2
13	B	2004	NAG	O7-C7-N2-C2
13	B	2004	NAG	C3-C2-N2-C7

There are no ring outliers.

1 monomer is involved in 4 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
13	B	2004	NAG	4	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

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, 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	455/455 (100%)	0.16	5 (1%) 78 74	41, 63, 93, 185	3 (0%)
1	C	453/455 (99%)	0.43	9 (1%) 65 60	56, 84, 115, 152	0
2	B	464/469 (98%)	0.66	30 (6%) 25 19	51, 97, 173, 204	1 (0%)
2	D	469/469 (100%)	0.75	23 (4%) 35 29	55, 107, 160, 199	1 (0%)
3	E	216/219 (98%)	1.10	28 (12%) 7 5	93, 148, 241, 268	0
3	H	216/219 (98%)	0.86	16 (7%) 20 16	75, 124, 172, 199	0
4	F	214/214 (100%)	1.08	33 (15%) 5 4	101, 149, 239, 274	1 (0%)
4	L	214/214 (100%)	0.66	4 (1%) 66 61	75, 110, 136, 173	0
5	G	4/4 (100%)	1.29	2 (50%) 0 0	58, 68, 72, 76	0
5	J	4/4 (100%)	2.36	2 (50%) 0 0	86, 88, 88, 92	0
All	All	2709/2722 (99%)	0.64	152 (5%) 30 24	41, 100, 187, 274	6 (0%)

All (152) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	454	VAL	6.0
5	J	408	ALA	5.0
4	F	194	CYS	3.9
1	A	455	LYS	3.9
2	B	466	TRP	3.8
4	F	135	PHE	3.7
2	B	130	SER	3.7
2	B	375	LEU	3.6
3	E	144	LEU	3.6
1	C	217	SER	3.5
1	C	453	VAL	3.5
2	D	471	CYS	3.4
2	B	340	VAL	3.4

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Mol	Chain	Res	Type	RSRZ
3	H	133	VAL	3.4
2	B	334	SER	3.4
2	B	129	TRP	3.3
3	E	146	CYS	3.3
3	H	11	LEU	3.2
2	B	335	MET	3.2
1	A	217	SER	3.2
2	D	335	MET	3.1
4	F	179	LEU	3.1
3	E	148	VAL	3.1
2	D	446	HIS	3.1
2	D	466	TRP	3.1
2	D	375	LEU	3.1
4	F	209	PHE	3.1
4	F	178	THR	3.0
2	B	149	LEU	3.0
3	E	138	THR	3.0
3	H	216	ILE	2.9
4	F	181	LEU	2.9
2	B	339	ASN	2.9
2	D	376	ASN	2.9
5	J	411	VAL	2.9
4	F	193	THR	2.8
2	B	128	LEU	2.8
2	B	137	LYS	2.8
4	F	205	ILE	2.8
3	E	199	ILE	2.8
3	H	118	SER	2.8
1	C	255	VAL	2.7
2	D	181	LYS	2.7
3	E	145	GLY	2.7
3	E	212	VAL	2.7
3	E	133	VAL	2.7
1	C	212	LEU	2.7
3	E	189	VAL	2.7
3	H	203	VAL	2.7
2	D	354	LYS	2.6
4	F	204	PRO	2.6
5	G	408	ALA	2.6
3	E	195	PRO	2.6
4	F	134	CYS	2.6
3	E	131	ALA	2.6

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Mol	Chain	Res	Type	RSRZ
4	F	126	THR	2.6
4	F	180	THR	2.6
3	E	30	LYS	2.6
3	H	189	VAL	2.5
2	B	338	SER	2.5
3	H	119	SER	2.5
3	H	212	VAL	2.5
4	F	115	VAL	2.5
4	F	133	VAL	2.5
1	C	137	SER	2.5
2	D	391	ILE	2.5
4	F	117	ILE	2.5
2	B	63	VAL	2.5
4	F	132	VAL	2.5
2	B	117	LEU	2.4
3	H	144	LEU	2.4
4	L	145	ASN	2.4
4	F	119	PRO	2.4
3	E	201	CYS	2.4
4	L	206	VAL	2.4
2	B	51	PRO	2.4
2	B	337	SER	2.4
2	B	405	GLY	2.4
3	E	183	LEU	2.4
1	C	260	TRP	2.4
3	E	182	THR	2.4
3	H	139	GLY	2.4
3	H	158	LEU	2.4
4	F	125	LEU	2.4
4	F	186	TYR	2.4
4	F	158	GLY	2.3
2	D	69	LEU	2.3
3	E	130	LEU	2.3
1	A	417	PHE	2.3
2	D	379	VAL	2.3
4	F	190	ASN	2.3
4	F	130	ALA	2.3
2	D	185	LEU	2.3
3	E	128	TYR	2.3
4	F	182	THR	2.3
2	D	129	TRP	2.3
3	H	215	LYS	2.3

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Mol	Chain	Res	Type	RSRZ
4	F	195	GLU	2.3
5	G	411	VAL	2.3
2	B	446	HIS	2.2
2	B	22	MET	2.2
4	L	129	GLY	2.2
4	L	181	LEU	2.2
4	F	116	SER	2.2
2	D	63	VAL	2.2
3	E	156	VAL	2.2
3	E	19	LYS	2.2
4	F	34	GLY	2.2
2	B	380	ILE	2.2
2	B	378	GLU	2.2
3	E	218	PRO	2.2
2	B	46	LYS	2.2
3	E	74	THR	2.2
2	B	341	LEU	2.2
2	D	374	CYS	2.2
2	D	405	GLY	2.2
3	H	168	GLY	2.2
2	D	4	ILE	2.2
3	E	194	TRP	2.2
3	H	206	PRO	2.2
2	B	436	ALA	2.1
2	B	465	GLY	2.1
3	E	165	LEU	2.1
3	E	200	THR	2.1
4	F	192	TYR	2.1
2	B	433	CYS	2.1
2	B	36	PRO	2.1
3	E	132	PRO	2.1
2	D	388	GLY	2.1
2	D	88	ILE	2.1
2	D	433	CYS	2.1
2	B	132	GLN	2.1
3	E	142	VAL	2.1
4	F	152	GLY	2.1
1	C	269	ILE	2.1
2	B	336	ASP	2.1
1	A	45	PRO	2.1
2	B	69	LEU	2.0
4	F	160	LEU	2.0

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Mol	Chain	Res	Type	RSRZ
2	D	312	GLU	2.0
3	E	192	SER	2.0
4	F	120	PRO	2.0
4	F	131	SER	2.0
2	D	10	VAL	2.0
4	F	118	PHE	2.0
3	H	120	ALA	2.0
1	C	180	GLU	2.0
1	C	76	THR	2.0
3	E	48	ILE	2.0
4	F	148	TRP	2.0
2	D	469	SER	2.0
3	H	167	SER	2.0

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

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

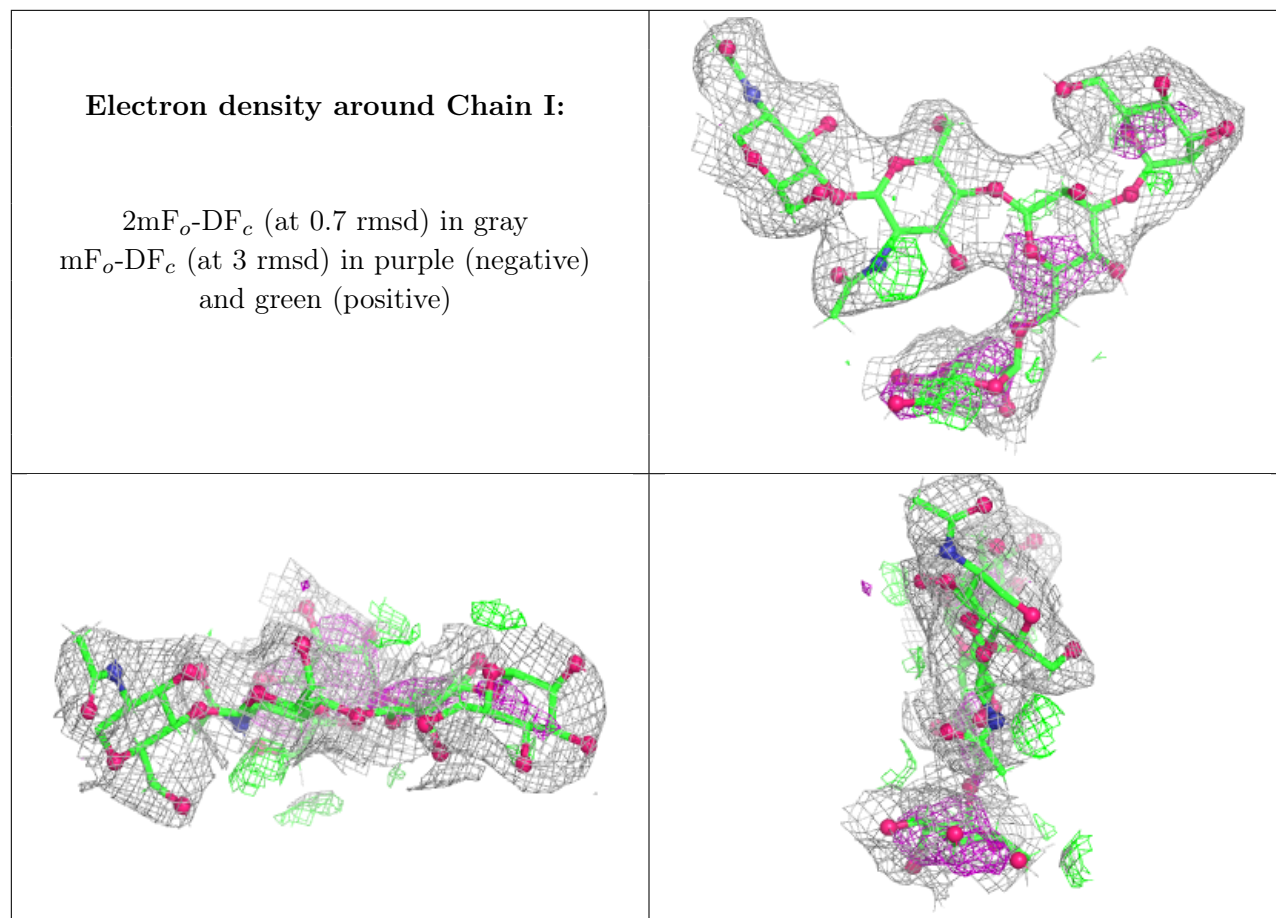
6.3 Carbohydrates ⓘ

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 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
6	NAG	I	1	14/15	-	-	51,69,94,100	0
6	NAG	I	2	14/15	-	-	75,87,101,106	0
6	BMA	I	3	11/12	-	-	76,89,110,110	0
6	MAN	I	4	11/12	-	-	79,87,104,106	0
6	MAN	I	5	11/12	-	-	85,99,119,121	0
8	BMA	M	3	11/12	0.44	0.13	85,91,109,109	0
7	NAG	N	2	14/15	0.53	0.14	83,100,117,125	0
8	MAN	M	4	11/12	0.63	0.12	82,92,110,111	0
7	NAG	N	1	14/15	0.70	0.12	70,88,104,105	0
7	NAG	K	2	14/15	0.74	0.13	88,101,122,122	0
8	NAG	M	2	14/15	0.80	0.11	79,94,113,113	0
8	NAG	M	1	14/15	0.89	0.10	59,78,93,94	0
7	NAG	K	1	14/15	0.89	0.09	72,89,105,105	0

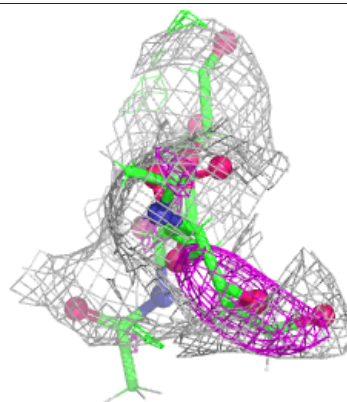
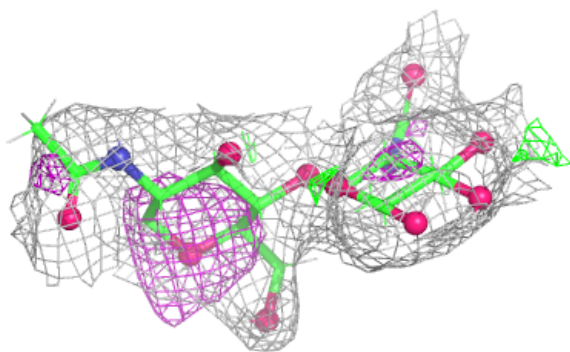
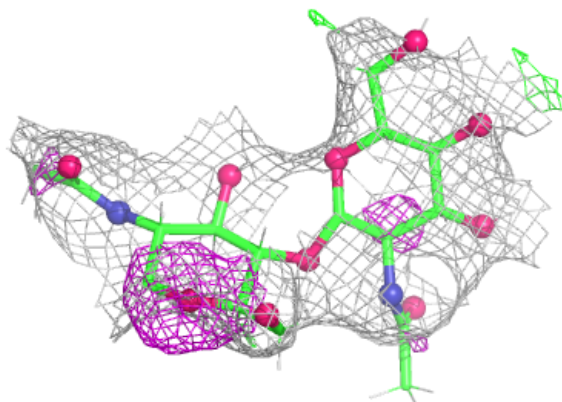
The following is a graphical depiction of the model fit to experimental electron density for oligosac-

charide. Each fit is shown from different orientation to approximate a three-dimensional view.

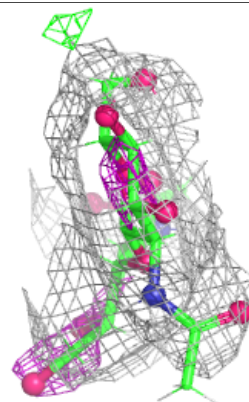
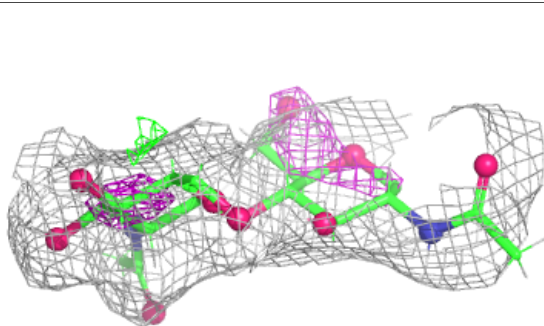
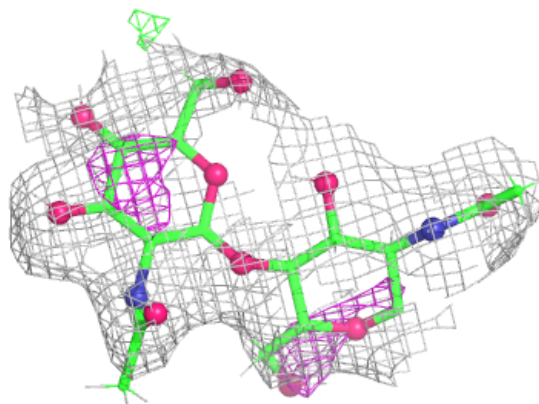


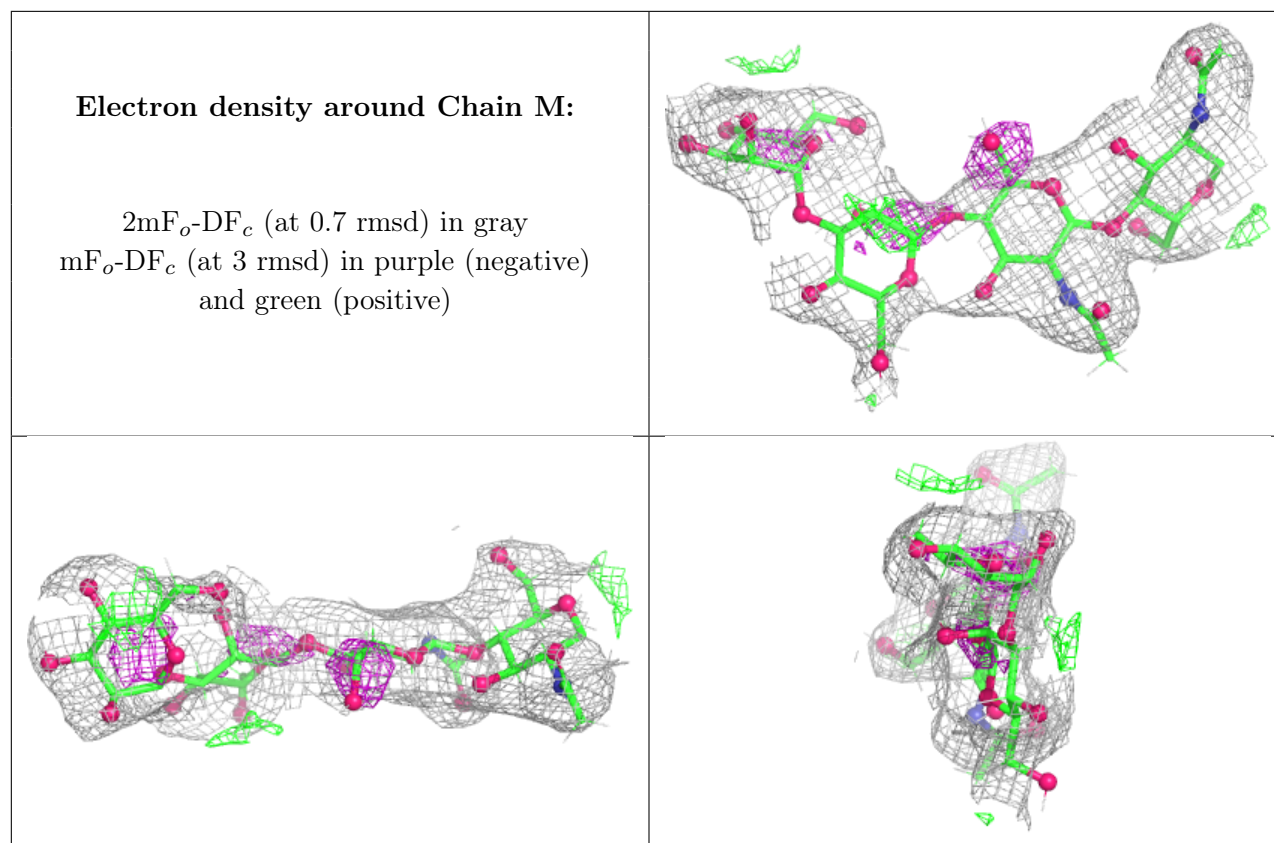
Electron density around Chain K:

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

**Electron density around Chain N:**

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





6.4 Ligands [i](#)

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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
13	NAG	B	2004	14/15	0.38	0.15	72,92,108,110	0
13	NAG	D	2004	14/15	0.51	0.15	70,91,107,107	0
10	SO4	C	501	5/5	0.68	0.20	134,134,135,137	0
10	SO4	L	301	5/5	0.71	0.12	123,123,124,125	0
10	SO4	C	507	5/5	0.76	0.12	124,125,126,131	0
11	GOL	A	509	6/6	0.76	0.17	70,84,91,94	0
10	SO4	C	508	5/5	0.78	0.12	108,116,120,122	0
12	MN	D	2002	1/1	0.83	0.12	247,247,247,247	0
10	SO4	A	508	5/5	0.85	0.17	99,103,110,111	0
10	SO4	A	505	5/5	0.87	0.20	125,126,127,132	0
10	SO4	A	507	5/5	0.90	0.11	102,102,102,108	0
10	SO4	A	506	5/5	0.90	0.14	110,113,114,115	0
14	CL	C	502	1/1	0.92	0.19	95,95,95,95	0
12	MN	D	2003	1/1	0.94	0.10	143,143,143,143	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
12	MN	D	2001	1/1	0.97	0.09	109,109,109,109	0
12	MN	B	2002	1/1	0.97	0.08	145,145,145,145	0
12	MN	B	2003	1/1	0.97	0.07	65,65,65,65	0
9	CA	A	504	1/1	0.98	0.04	53,53,53,53	0
9	CA	C	503	1/1	0.98	0.06	141,141,141,141	0
9	CA	C	504	1/1	0.98	0.05	123,123,123,123	0
9	CA	A	503	1/1	0.98	0.04	53,53,53,53	0
9	CA	A	501	1/1	0.99	0.03	84,84,84,84	0
12	MN	B	2001	1/1	0.99	0.04	46,46,46,46	0
9	CA	A	502	1/1	0.99	0.02	46,46,46,46	0
9	CA	C	505	1/1	0.99	0.03	73,73,73,73	0
9	CA	C	506	1/1	0.99	0.04	75,75,75,75	0

6.5 Other polymers [i](#)

There are no such residues in this entry.