



Full wwPDB X-ray Structure Validation Report ⓘ

Nov 28, 2023 – 07:42 pm GMT

PDB ID : 1DZH
Title : P14-FLUORESCHEIN-N135Q-S380C-ANTITHROMBIN-III
Authors : Mccoy, A.J.; Huntington, J.A.; Carrell, R.W.
Deposited on : 2000-02-28
Resolution : 2.85 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 : 4.02b-467
Mogul : 1.8.4, CSD as541be (2020)
Xtrriage (Phenix) : 1.13
EDS : 2.36
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac : 5.8.0158
CCP4 : 7.0.044 (Gargrove)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.36

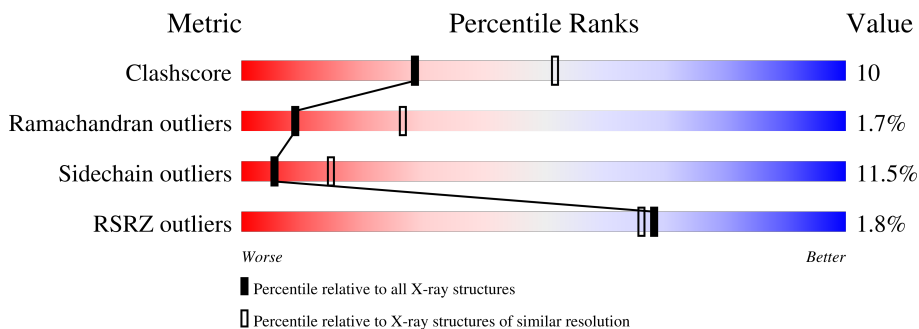
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.85 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	141614	3438 (2.90-2.82)
Ramachandran outliers	138981	3348 (2.90-2.82)
Sidechain outliers	138945	3351 (2.90-2.82)
RSRZ outliers	127900	3103 (2.90-2.82)

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	I	432	
2	L	432	
3	A	2	
3	B	2	
4	C	4	

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 crite-

ria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
1	CYF	I	380	X	-	-	-
3	NAG	A	2	-	-	-	X
4	BMA	C	3	-	-	-	X
5	NAG	I	801	-	-	-	X

2 Entry composition i

There are 7 unique types of molecules in this entry. The entry contains 6609 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 ANTITHROMBIN-III.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	I	418	3302	2108	551	625	18	0	0	0

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
I	135	GLN	ASN	engineered mutation	UNP P01008
I	380	CYF	SER	engineered mutation	UNP P01008

- Molecule 2 is a protein called ANTITHROMBIN-III.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	L	407	3110	1988	522	583	17	0	0	1

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



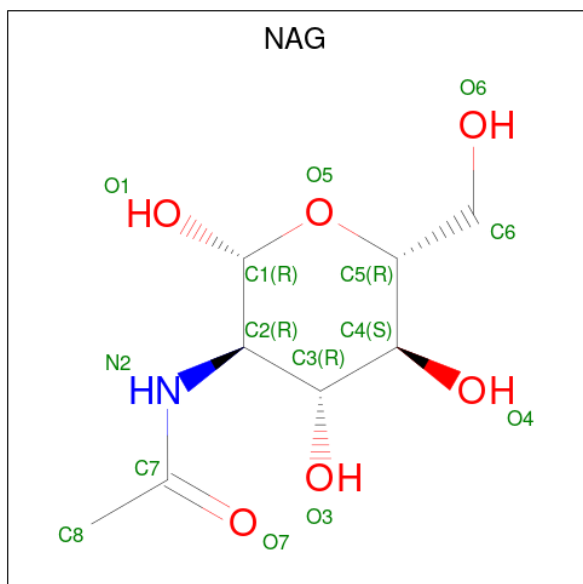
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
3	A	2	28	16	2	10	0	0	0
3	B	2	28	16	2	10	0	0	0

- Molecule 4 is an oligosaccharide called beta-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	
			Total	C	N				O
4	C	4	50	28	2	20	0	0	0

- Molecule 5 is 2-acetamido-2-deoxy-beta-D-glucopyranose (three-letter code: NAG) (formula: $C_8H_{15}NO_6$).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf	
			Total	C	N			O
5	I	1	14	8	1	5	0	0
5	I	1	14	8	1	5	0	0
5	L	1	14	8	1	5	0	0

- Molecule 6 is GLYCEROL (three-letter code: GOL) (formula: $C_3H_8O_3$).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
6	I	1	Total C O 6 3 3	0	0
6	L	1	Total C O 6 3 3	0	0

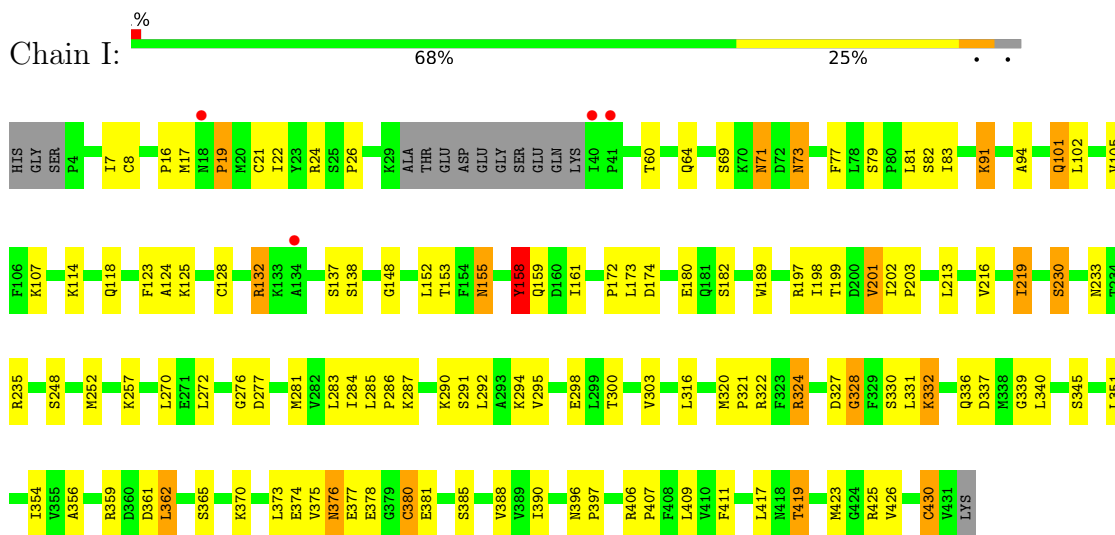
- Molecule 7 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
7	I	28	Total O 28 28	0	0
7	L	9	Total O 9 9	0	0

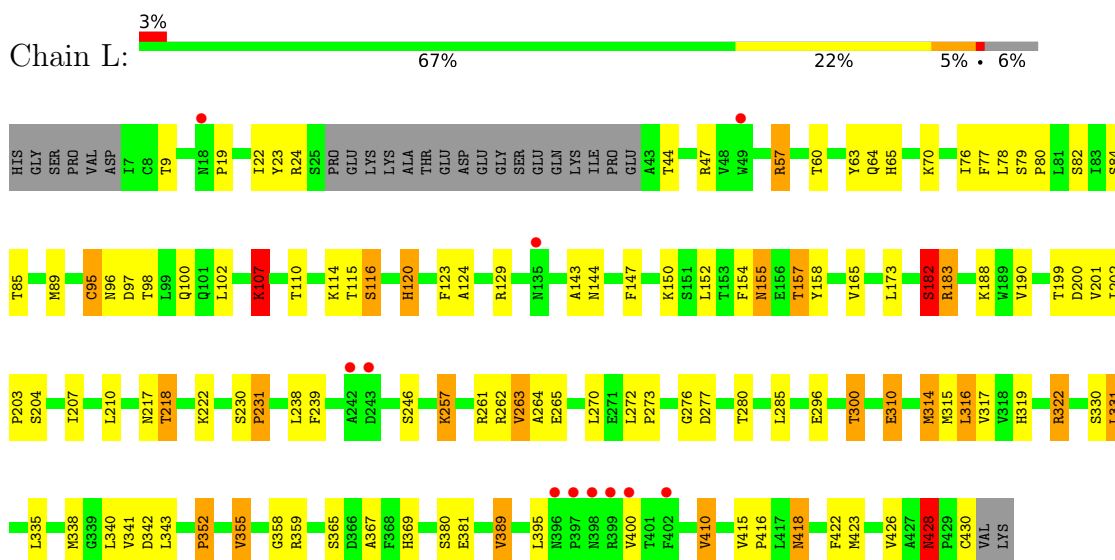
3 Residue-property plots [i](#)

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: ANTITHROMBIN-III



- Molecule 2: ANTITHROMBIN-III




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

Chain A:  100%

MAG1
MAG2

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

Chain B:  50% 50%

MAG1
MAG2

- Molecule 4: beta-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 C:  50% 50%

MAG1
MAG2
BMA3
BMA4

4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	69.17Å 99.86Å 89.42Å 90.00° 105.63° 90.00°	Depositor
Resolution (Å)	20.00 – 2.85 20.01 – 2.85	Depositor EDS
% Data completeness (in resolution range)	99.7 (20.00-2.85) 100.0 (20.01-2.85)	Depositor EDS
R_{merge}	0.07	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	3.47 (at 2.83Å)	Xtrriage
Refinement program	REFMAC	Depositor
R, R_{free}	0.207 , 0.258 0.206 , (Not available)	Depositor DCC
R_{free} test set	No test flags present.	wwPDB-VP
Wilson B-factor (Å ²)	63.4	Xtrriage
Anisotropy	0.568	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.29 , 67.3	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	6609	wwPDB-VP
Average B, all atoms (Å ²)	63.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.99% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical values of $\langle |L| \rangle$, $\langle L^2 \rangle$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality [i](#)

5.1 Standard geometry [i](#)

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

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

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
1	I	0.51	0/3332	1.00	2/4507 (0.0%)
2	L	0.50	0/3173	1.00	4/4305 (0.1%)
All	All	0.51	0/6505	1.00	6/8812 (0.1%)

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
1	I	1	8
2	L	0	10
All	All	1	18

There are no bond length outliers.

All (6) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	L	322	ARG	NE-CZ-NH1	9.84	125.22	120.30
2	L	322	ARG	CD-NE-CZ	5.66	131.52	123.60
1	I	132	ARG	NE-CZ-NH1	5.57	123.09	120.30
2	L	316	LEU	CA-CB-CG	5.35	127.60	115.30
2	L	322	ARG	NE-CZ-NH2	-5.25	117.67	120.30
1	I	158	TYR	CB-CG-CD1	5.17	124.10	121.00

All (1) chirality outliers are listed below:

Mol	Chain	Res	Type	Atom
1	I	380	CYF	C10

All (18) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	I	107	LYS	Mainchain
1	I	155	ASN	Mainchain
1	I	180	GLU	Mainchain
1	I	189	TRP	Mainchain
1	I	257	LYS	Mainchain
1	I	328	GLY	Mainchain
1	I	406	ARG	Mainchain
1	I	71	ASN	Mainchain
2	L	107	LYS	Mainchain
2	L	157	THR	Mainchain
2	L	182	SER	Mainchain
2	L	231	PRO	Mainchain
2	L	300	THR	Mainchain
2	L	322	ARG	Mainchain
2	L	367	ALA	Mainchain
2	L	428	ASN	Mainchain
2	L	80	PRO	Mainchain
2	L	98	THR	Mainchain

5.2 Too-close contacts [i](#)

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	I	3302	0	3213	66	0
2	L	3110	0	2984	59	0
3	A	28	0	25	2	0
3	B	28	0	25	1	0
4	C	50	0	43	1	0
5	I	28	0	26	0	0
5	L	14	0	13	0	0
6	I	6	0	8	0	0
6	L	6	0	8	0	0
7	I	28	0	0	1	0
7	L	9	0	0	0	0
All	All	6609	0	6345	125	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 (125) 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:I:105:VAL:HG21	1:I:340:LEU:HB2	1.61	0.83
2:L:222:LYS:HE2	2:L:381:GLU:HG3	1.62	0.81
1:I:213:LEU:HD11	1:I:354:ILE:HD13	1.65	0.78
1:I:91:LYS:HB2	1:I:102:LEU:HD13	1.67	0.76
2:L:331:LEU:HD21	2:L:369:HIS:HB2	1.71	0.73
1:I:284:ILE:HB	1:I:409:LEU:HB2	1.72	0.71
1:I:300:THR:HB	1:I:303:VAL:HB	1.72	0.70
2:L:102:LEU:HD23	2:L:340:LEU:HD21	1.75	0.69
2:L:428:ASN:HD22	2:L:430:CYS:H	1.44	0.66
2:L:183:ARG:HH11	2:L:204:SER:HA	1.60	0.66
2:L:102:LEU:HD21	2:L:343:LEU:HD22	1.79	0.65
1:I:19:PRO:HG2	1:I:21:CYS:HB2	1.78	0.65
1:I:300:THR:HG22	1:I:303:VAL:H	1.63	0.63
1:I:376:ASN:ND2	1:I:378:GLU:H	1.96	0.62
2:L:85:THR:HG22	2:L:89:MET:HE2	1.83	0.60
1:I:291:SER:HB3	1:I:294:LYS:HG3	1.83	0.60
1:I:252:MET:SD	1:I:377:GLU:HG3	2.41	0.60
1:I:276:GLY:O	1:I:277:ASP:HB2	2.01	0.60
2:L:276:GLY:O	2:L:277:ASP:HB2	2.02	0.59
1:I:376:ASN:HD22	1:I:378:GLU:H	1.51	0.59
1:I:71:ASN:HD21	1:I:73:ASN:HD22	1.50	0.57
1:I:94:ALA:HA	1:I:351:LEU:HD23	1.88	0.56
1:I:380:CYF:H16	1:I:380:CYF:OL	2.06	0.56
2:L:82:SER:HA	2:L:217:ASN:ND2	2.22	0.55
2:L:63:TYR:HE2	2:L:296:GLU:HG2	1.72	0.55
2:L:157:THR:HG21	3:B:2:NAG:H82	1.89	0.55
1:I:380:CYF:C11	1:I:380:CYF:O4	2.55	0.54
1:I:152:LEU:HD13	1:I:354:ILE:HG21	1.89	0.54
1:I:373:LEU:HG	1:I:375:VAL:HG23	1.90	0.54
2:L:79:SER:H	2:L:369:HIS:CE1	2.27	0.53
1:I:292:LEU:HD21	1:I:425:ARG:HG3	1.91	0.52
2:L:183:ARG:NH1	2:L:204:SER:HA	2.25	0.52
2:L:79:SER:H	2:L:369:HIS:HE1	1.58	0.51
2:L:358:GLY:O	2:L:359:ARG:C	2.49	0.51
1:I:292:LEU:HD11	1:I:409:LEU:HG	1.92	0.50
2:L:263:VAL:HG12	2:L:264:ALA:H	1.76	0.50
1:I:380:CYF:C15	1:I:380:CYF:H8	2.41	0.49
2:L:183:ARG:HA	2:L:207:ILE:HD12	1.94	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:I:201:VAL:HG12	1:I:370:LYS:HB2	1.94	0.49
2:L:70:LYS:HE3	2:L:76:ILE:HG12	1.95	0.49
2:L:355:VAL:HG21	2:L:359:ARG:HB2	1.94	0.49
1:I:198:ILE:HG12	1:I:370:LYS:HD3	1.94	0.49
2:L:428:ASN:ND2	2:L:430:CYS:H	2.10	0.48
2:L:410:VAL:HG22	2:L:426:VAL:HG23	1.94	0.48
1:I:77:PHE:CE1	1:I:373:LEU:HD22	2.49	0.48
1:I:374:GLU:HB3	1:I:380:CYF:H16	1.96	0.47
1:I:376:ASN:HD22	1:I:376:ASN:C	2.17	0.47
1:I:270:LEU:HD21	1:I:272:LEU:HD21	1.96	0.47
1:I:388:VAL:HG22	2:L:317:VAL:HB	1.95	0.47
2:L:120:HIS:HB3	2:L:165:VAL:HG11	1.96	0.47
4:C:2:NAG:H62	4:C:3:BMA:H2	1.97	0.47
1:I:328:GLY:HA2	1:I:370:LYS:HG3	1.97	0.47
1:I:7:ILE:HG13	1:I:8:CYS:N	2.28	0.47
1:I:152:LEU:HA	1:I:356:ALA:HB2	1.96	0.47
1:I:290:LYS:HE2	1:I:295:VAL:HG23	1.95	0.47
2:L:85:THR:HB	2:L:217:ASN:ND2	2.30	0.47
2:L:23:TYR:HB3	2:L:116:SER:HB3	1.97	0.46
2:L:154:PHE:HA	2:L:355:VAL:HA	1.98	0.46
2:L:124:ALA:HB2	2:L:165:VAL:HG13	1.97	0.46
3:A:1:NAG:H61	3:A:2:NAG:H82	1.97	0.46
1:I:198:ILE:HG23	1:I:370:LYS:HD3	1.97	0.46
2:L:147:PHE:HB3	2:L:173:LEU:HD12	1.98	0.46
2:L:273:PRO:HA	2:L:280:THR:HG22	1.96	0.46
1:I:320:MET:HA	1:I:321:PRO:HD3	1.86	0.45
1:I:332:LYS:O	1:I:336:GLN:HB2	2.15	0.45
1:I:173:LEU:HD13	1:I:182:SER:HB3	1.97	0.45
2:L:173:LEU:HB3	2:L:182:SER:OG	2.16	0.45
1:I:407:PRO:HA	1:I:426:VAL:O	2.17	0.45
1:I:411:PHE:CE2	1:I:423:MET:HE3	2.51	0.45
1:I:248:SER:O	1:I:430:CYS:HB3	2.17	0.45
1:I:201:VAL:HG22	7:I:904:HOH:O	2.16	0.45
1:I:285:LEU:HD12	1:I:286:PRO:HD2	1.98	0.44
2:L:239:PHE:O	2:L:246:SER:HA	2.17	0.44
1:I:390:ILE:HG12	2:L:319:HIS:CD2	2.53	0.44
1:I:101:GLN:HG2	1:I:339:GLY:O	2.17	0.44
1:I:114:LYS:HZ3	1:I:118:GLN:HE22	1.65	0.44
1:I:294:LYS:O	1:I:298:GLU:HG3	2.16	0.44
2:L:200:ASP:O	2:L:201:VAL:C	2.56	0.44
2:L:202:ILE:HA	2:L:203:PRO:HD2	1.86	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:I:148:GLY:O	1:I:172:PRO:HA	2.18	0.44
1:I:380:CYF:O4	1:I:380:CYF:C12	2.66	0.44
1:I:79:SER:OG	1:I:219:ILE:HG13	2.18	0.44
1:I:390:ILE:HG12	2:L:319:HIS:HD2	1.83	0.43
1:I:396:ASN:OD1	1:I:397:PRO:HD2	2.19	0.43
1:I:155:ASN:HB3	1:I:158:TYR:HB2	2.00	0.43
1:I:374:GLU:HB3	1:I:380:CYF:OL	2.18	0.43
2:L:60:THR:O	2:L:64:GLN:HG3	2.19	0.43
2:L:190:VAL:HG21	2:L:201:VAL:HG21	2.00	0.43
2:L:95:CYS:HB3	2:L:96:ASN:OD1	2.18	0.43
1:I:281:MET:HE3	1:I:283:LEU:HD21	2.01	0.43
2:L:410:VAL:CG2	2:L:426:VAL:HG23	2.48	0.43
2:L:24:ARG:HA	2:L:114:LYS:O	2.18	0.43
2:L:57:ARG:HE	2:L:57:ARG:HB2	1.57	0.43
2:L:157:THR:O	2:L:158:TYR:C	2.55	0.43
2:L:261:ARG:HG2	2:L:310:GLU:HG2	2.01	0.42
2:L:65:HIS:CE1	2:L:338:MET:HG2	2.54	0.42
1:I:60:THR:O	1:I:64:GLN:HG3	2.19	0.42
1:I:202:ILE:HA	1:I:203:PRO:HD2	1.92	0.42
1:I:287:LYS:HG3	1:I:290:LYS:H	1.84	0.42
2:L:154:PHE:O	2:L:155:ASN:C	2.57	0.42
1:I:123:PHE:O	1:I:124:ALA:C	2.58	0.42
1:I:324:ARG:HE	1:I:374:GLU:CD	2.23	0.42
2:L:331:LEU:HB2	2:L:335:LEU:HD12	2.02	0.42
2:L:77:PHE:CZ	2:L:422:PHE:HB3	2.55	0.41
2:L:89:MET:SD	2:L:144:ASN:HB3	2.59	0.41
2:L:365:SER:OG	2:L:389:VAL:HG22	2.19	0.41
1:I:198:ILE:HG21	1:I:201:VAL:HG13	2.02	0.41
2:L:23:TYR:CZ	2:L:100:GLN:HG3	2.56	0.41
2:L:257:LYS:HA	2:L:314:MET:O	2.20	0.41
1:I:16:PRO:HD2	1:I:161:ILE:HD11	2.01	0.41
1:I:361:ASP:O	1:I:362:LEU:C	2.59	0.41
2:L:415:VAL:HB	2:L:416:PRO:HD3	2.02	0.41
1:I:81:LEU:O	1:I:82:SER:C	2.59	0.41
1:I:380:CYF:OL	1:I:380:CYF:C16	2.67	0.41
2:L:60:THR:HG21	2:L:300:THR:HA	2.03	0.41
2:L:270:LEU:HD21	2:L:272:LEU:HD21	2.03	0.41
2:L:415:VAL:N	2:L:416:PRO:HD2	2.36	0.41
2:L:107:LYS:O	2:L:110:THR:HB	2.21	0.41
2:L:230:SER:HA	2:L:231:PRO:HD3	1.84	0.41
1:I:230:SER:HB3	1:I:233:ASN:ND2	2.36	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:A:1:NAG:H61	3:A:2:NAG:N2	2.35	0.40
1:I:331:LEU:O	1:I:332:LYS:C	2.60	0.40
2:L:143:ALA:O	2:L:218:THR:HB	2.21	0.40
1:I:417:LEU:HB2	1:I:419:THR:HG23	2.04	0.40
2:L:257:LYS:HD2	2:L:315:MET:HG2	2.02	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	I	413/432 (96%)	364 (88%)	40 (10%)	9 (2%)	6	21
2	L	403/432 (93%)	349 (87%)	49 (12%)	5 (1%)	13	35
All	All	816/864 (94%)	713 (87%)	89 (11%)	14 (2%)	9	27

All (14) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	I	174	ASP
1	I	362	LEU
1	I	19	PRO
1	I	159	GLN
2	L	418	ASN
1	I	26	PRO
1	I	365	SER
1	I	137	SER
1	I	332	LYS
2	L	19	PRO
2	L	400	VAL
2	L	352	PRO
1	I	83	ILE

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Mol	Chain	Res	Type
2	L	355	VAL

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	I	353/382 (92%)	320 (91%)	33 (9%)	9 24
2	L	323/383 (84%)	278 (86%)	45 (14%)	3 9
All	All	676/765 (88%)	598 (88%)	78 (12%)	5 15

All (78) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	I	17	MET
1	I	22	ILE
1	I	24	ARG
1	I	69	SER
1	I	73	ASN
1	I	91	LYS
1	I	101	GLN
1	I	125	LYS
1	I	128	CYS
1	I	132	ARG
1	I	138	SER
1	I	153	THR
1	I	158	TYR
1	I	197	ARG
1	I	199	THR
1	I	201	VAL
1	I	216	VAL
1	I	219	ILE
1	I	230	SER
1	I	235	ARG
1	I	316	LEU
1	I	322	ARG

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Mol	Chain	Res	Type
1	I	324	ARG
1	I	327	ASP
1	I	330	SER
1	I	337	ASP
1	I	345	SER
1	I	359	ARG
1	I	376	ASN
1	I	381	GLU
1	I	385	SER
1	I	419	THR
1	I	430	CYS
2	L	9	THR
2	L	22	ILE
2	L	44	THR
2	L	47	ARG
2	L	57	ARG
2	L	78	LEU
2	L	84	SER
2	L	95	CYS
2	L	97	ASP
2	L	107	LYS
2	L	115	THR
2	L	116	SER
2	L	120	HIS
2	L	123	PHE
2	L	129	ARG
2	L	150	LYS
2	L	152	LEU
2	L	155	ASN
2	L	182	SER
2	L	183	ARG
2	L	188	LYS
2	L	199	THR
2	L	210	LEU
2	L	218	THR
2	L	238	LEU
2	L	257	LYS
2	L	262	ARG
2	L	263	VAL
2	L	265	GLU
2	L	285	LEU
2	L	310	GLU

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Mol	Chain	Res	Type
2	L	314	MET
2	L	316	LEU
2	L	330	SER
2	L	331	LEU
2	L	341	VAL
2	L	342	ASP
2	L	352	PRO
2	L	380	SER
2	L	389	VAL
2	L	395	LEU
2	L	410	VAL
2	L	418	ASN
2	L	423	MET
2	L	428	ASN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (16) such sidechains are listed below:

Mol	Chain	Res	Type
1	I	71	ASN
1	I	118	GLN
1	I	233	ASN
1	I	254	GLN
1	I	268	GLN
1	I	305	GLN
1	I	376	ASN
1	I	418	ASN
2	L	71	ASN
2	L	100	GLN
2	L	254	GLN
2	L	319	HIS
2	L	336	GLN
2	L	369	HIS
2	L	418	ASN
2	L	428	ASN

5.3.3 RNA

There are no RNA molecules in this entry.

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

1 non-standard protein/DNA/RNA residue 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
1	CYF	I	380	1	37,38,39	2.90	9 (24%)	47,54,56	2.19	15 (31%)

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
1	CYF	I	380	1	1/1/4/6	1/16/32/34	0/4/4/4

All (9) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	I	380	CYF	C14-C10	-8.46	1.41	1.53
1	I	380	CYF	C9-C10	-8.14	1.38	1.52
1	I	380	CYF	C11-C10	-6.47	1.41	1.52
1	I	380	CYF	O1-C1	-5.39	1.24	1.37
1	I	380	CYF	O3-C6	-5.24	1.24	1.37
1	I	380	CYF	C19-C20	-4.73	1.39	1.49
1	I	380	CYF	O2-C3	4.04	1.44	1.38
1	I	380	CYF	C19-C14	3.32	1.44	1.40
1	I	380	CYF	C18-C19	2.17	1.43	1.39

All (15) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	I	380	CYF	C11-C10-C9	8.97	119.20	105.83
1	I	380	CYF	CAL-CL-NL	4.19	120.15	114.41
1	I	380	CYF	OL-CL-CAL	-4.13	114.45	121.58
1	I	380	CYF	C4-O2-C3	-3.65	110.58	118.58
1	I	380	CYF	O2-C4-C9	3.58	127.31	122.38

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	I	380	CYF	C14-C10-C9	2.70	122.29	113.32
1	I	380	CYF	C8-C9-C10	-2.56	122.08	126.14
1	I	380	CYF	C12-C11-C10	-2.54	122.11	126.14
1	I	380	CYF	C4-C9-C10	-2.50	118.89	121.53
1	I	380	CYF	O2-C4-C5	-2.46	111.54	115.20
1	I	380	CYF	O5-C20-O4	-2.41	118.01	123.35
1	I	380	CYF	C3-C11-C10	-2.31	119.10	121.53
1	I	380	CYF	CB-SG-CAL	2.22	125.04	104.44
1	I	380	CYF	C18-C17-NL	2.11	127.06	120.18
1	I	380	CYF	O5-C20-C19	2.04	121.18	115.31

All (1) chirality outliers are listed below:

Mol	Chain	Res	Type	Atom
1	I	380	CYF	C10

All (1) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
1	I	380	CYF	SG-CAL-CL-NL

There are no ring outliers.

1 monomer is involved in 7 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
1	I	380	CYF	7	0

5.5 Carbohydrates [i](#)

8 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	A	1	3,1	14,14,15	1.23	1 (7%)	17,19,21	0.87	1 (5%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
3	NAG	A	2	3	14,14,15	1.21	1 (7%)	17,19,21	0.80	0
3	NAG	B	1	2,3	14,14,15	1.50	4 (28%)	17,19,21	1.42	3 (17%)
3	NAG	B	2	3	14,14,15	1.46	2 (14%)	17,19,21	1.85	3 (17%)
4	NAG	C	1	2,4	14,14,15	1.33	2 (14%)	17,19,21	0.98	1 (5%)
4	NAG	C	2	4	14,14,15	1.33	1 (7%)	17,19,21	1.92	4 (23%)
4	BMA	C	3	4	11,11,12	0.99	1 (9%)	15,15,17	1.79	2 (13%)
4	BMA	C	4	4	11,11,12	1.43	2 (18%)	15,15,17	3.48	2 (13%)

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	A	1	3,1	-	0/6/23/26	0/1/1/1
3	NAG	A	2	3	-	2/6/23/26	0/1/1/1
3	NAG	B	1	2,3	-	2/6/23/26	0/1/1/1
3	NAG	B	2	3	-	2/6/23/26	0/1/1/1
4	NAG	C	1	2,4	-	0/6/23/26	0/1/1/1
4	NAG	C	2	4	-	3/6/23/26	0/1/1/1
4	BMA	C	3	4	-	2/2/19/22	0/1/1/1
4	BMA	C	4	4	-	2/2/19/22	0/1/1/1

All (14) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	C	1	NAG	O7-C7	-3.75	1.14	1.23
4	C	2	NAG	O7-C7	-3.74	1.14	1.23
3	B	1	NAG	O7-C7	-3.74	1.14	1.23
4	C	4	BMA	O5-C1	-3.66	1.37	1.43
3	B	2	NAG	O7-C7	-3.66	1.15	1.23
3	A	2	NAG	O7-C7	-3.65	1.15	1.23
3	A	1	NAG	O7-C7	-3.51	1.15	1.23
3	B	2	NAG	C1-C2	2.64	1.56	1.52
4	C	4	BMA	O5-C5	-2.39	1.38	1.43
3	B	1	NAG	C4-C3	2.24	1.58	1.52
3	B	1	NAG	C2-N2	2.15	1.50	1.46
4	C	3	BMA	O5-C1	-2.11	1.40	1.43
4	C	1	NAG	C2-N2	2.08	1.49	1.46

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	B	1	NAG	C3-C2	-2.07	1.48	1.52

All (16) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	C	4	BMA	C1-O5-C5	12.30	128.85	112.19
4	C	2	NAG	C1-O5-C5	5.46	119.59	112.19
4	C	3	BMA	C1-O5-C5	5.01	118.98	112.19
3	B	2	NAG	O5-C1-C2	-4.59	104.04	111.29
3	B	2	NAG	C4-C3-C2	-4.44	104.51	111.02
3	B	1	NAG	O4-C4-C3	-3.71	101.77	110.35
4	C	4	BMA	O5-C1-C2	3.43	116.07	110.77
3	B	2	NAG	C1-O5-C5	3.13	116.44	112.19
4	C	3	BMA	O3-C3-C2	-3.08	104.09	109.99
4	C	1	NAG	C4-C3-C2	2.79	115.11	111.02
4	C	2	NAG	O5-C1-C2	-2.69	107.04	111.29
4	C	2	NAG	C2-N2-C7	2.61	126.63	122.90
3	A	1	NAG	O5-C1-C2	-2.55	107.27	111.29
4	C	2	NAG	O5-C5-C6	-2.23	103.70	107.20
3	B	1	NAG	O5-C1-C2	-2.15	107.90	111.29
3	B	1	NAG	O5-C5-C6	-2.06	103.97	107.20

There are no chirality outliers.

All (13) torsion outliers are listed below:

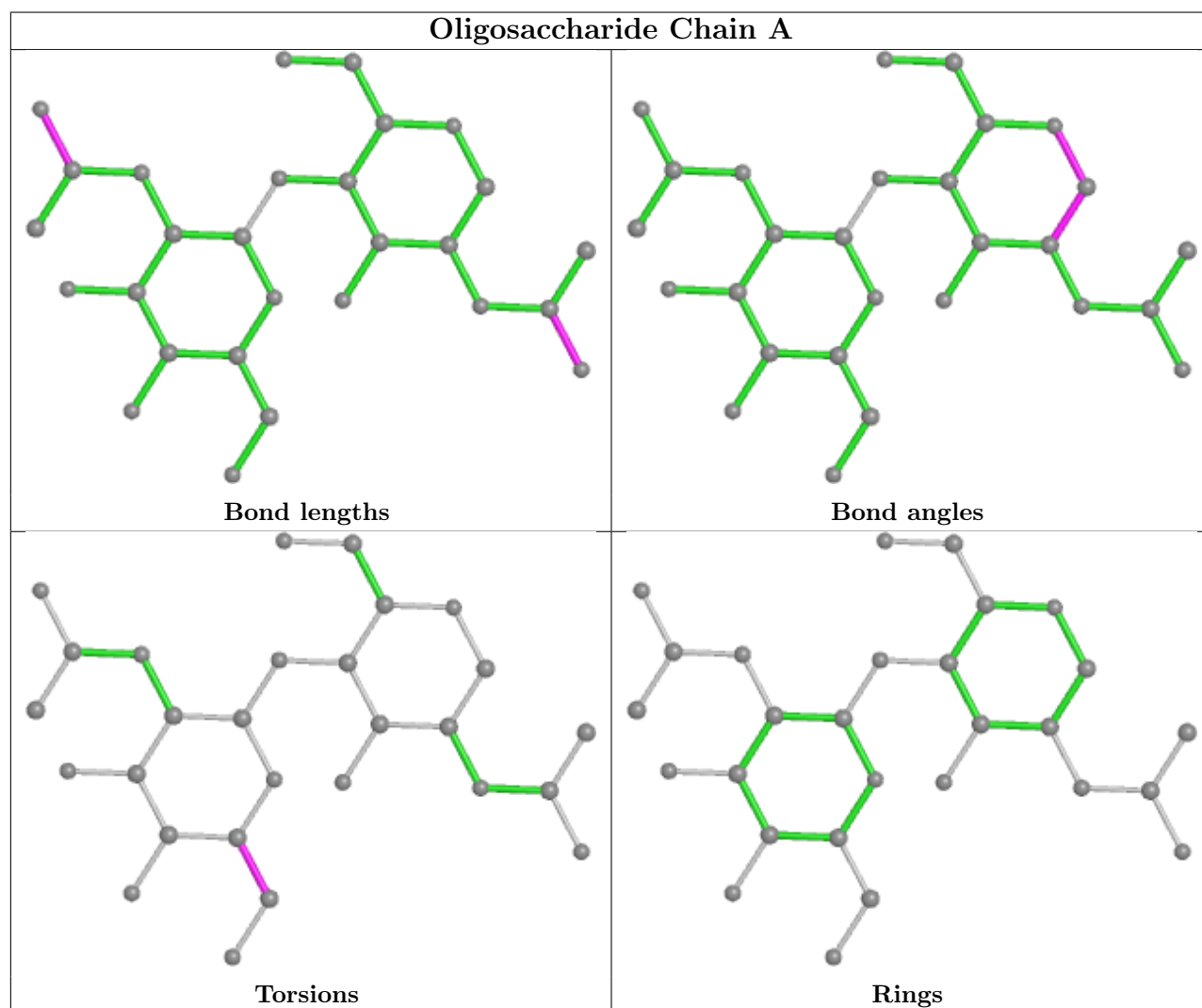
Mol	Chain	Res	Type	Atoms
3	A	2	NAG	O5-C5-C6-O6
4	C	3	BMA	O5-C5-C6-O6
3	B	1	NAG	O5-C5-C6-O6
4	C	4	BMA	C4-C5-C6-O6
4	C	2	NAG	O5-C5-C6-O6
3	A	2	NAG	C4-C5-C6-O6
3	B	2	NAG	O5-C5-C6-O6
4	C	2	NAG	C4-C5-C6-O6
3	B	1	NAG	C4-C5-C6-O6
4	C	3	BMA	C4-C5-C6-O6
3	B	2	NAG	C4-C5-C6-O6
4	C	4	BMA	O5-C5-C6-O6
4	C	2	NAG	C1-C2-N2-C7

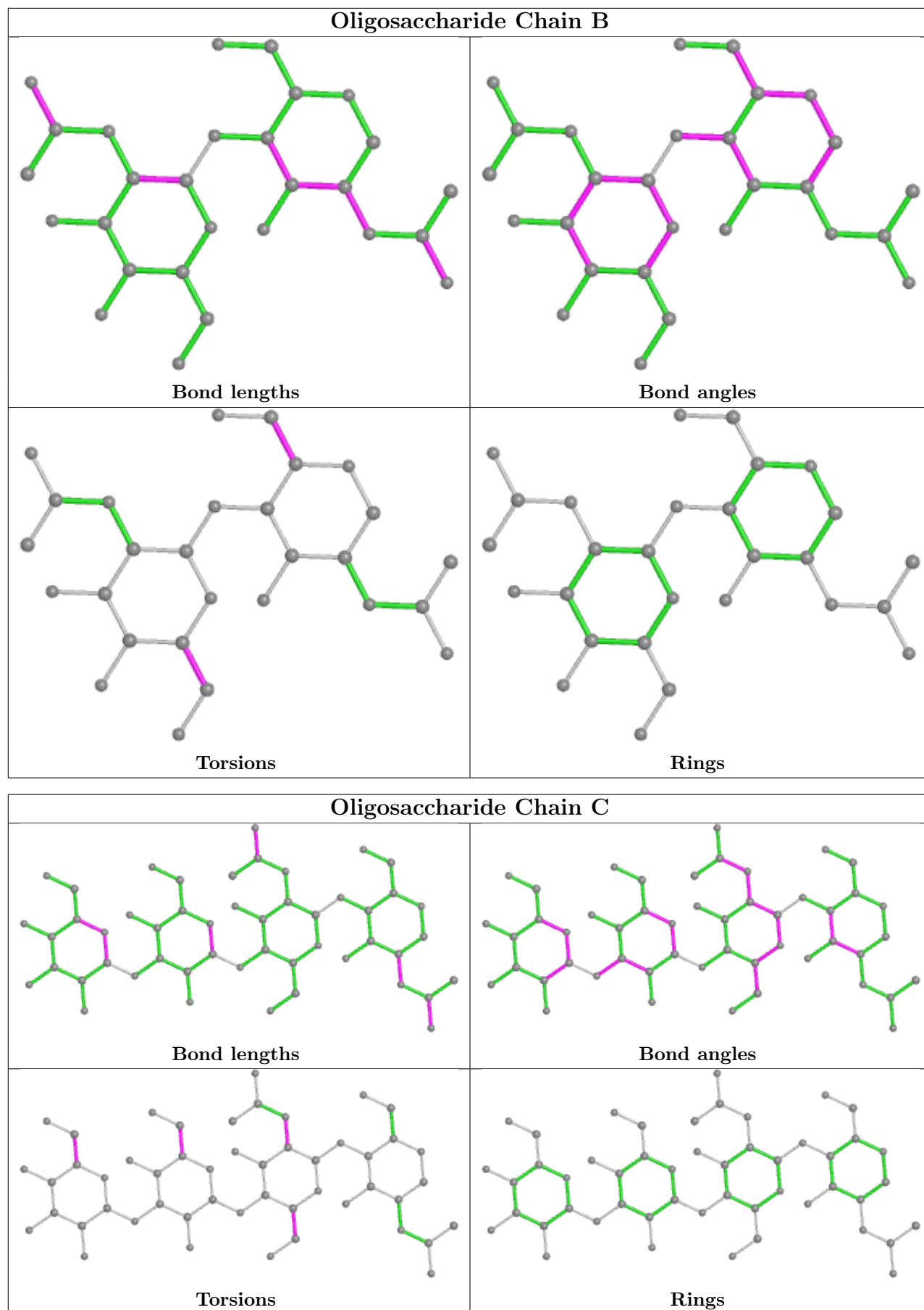
There are no ring outliers.

5 monomers are involved in 4 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	C	2	NAG	1	0
3	A	2	NAG	2	0
3	A	1	NAG	2	0
3	B	2	NAG	1	0
4	C	3	BMA	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

5 ligands are modelled in this entry.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
5	NAG	L	801	2	14,14,15	1.27	1 (7%)	17,19,21	1.27	2 (11%)
6	GOL	L	808	-	5,5,5	0.75	0	5,5,5	0.70	0
5	NAG	I	801	1	14,14,15	1.21	1 (7%)	17,19,21	1.06	1 (5%)
5	NAG	I	804	1	14,14,15	1.25	1 (7%)	17,19,21	1.55	2 (11%)
6	GOL	I	805	-	5,5,5	0.69	0	5,5,5	0.53	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
5	NAG	L	801	2	-	3/6/23/26	0/1/1/1
6	GOL	L	808	-	-	2/4/4/4	-
5	NAG	I	801	1	-	3/6/23/26	0/1/1/1
5	NAG	I	804	1	-	2/6/23/26	0/1/1/1
6	GOL	I	805	-	-	0/4/4/4	-

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	L	801	NAG	O7-C7	-3.75	1.14	1.23
5	I	801	NAG	O7-C7	-3.67	1.14	1.23
5	I	804	NAG	O7-C7	-3.64	1.15	1.23

All (5) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	I	804	NAG	C1-O5-C5	5.11	119.12	112.19

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	L	801	NAG	C1-C2-N2	3.08	115.75	110.49
5	L	801	NAG	C2-N2-C7	2.64	126.66	122.90
5	I	801	NAG	C1-O5-C5	2.26	115.26	112.19
5	I	804	NAG	C6-C5-C4	-2.10	108.09	113.00

There are no chirality outliers.

All (10) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
6	L	808	GOL	O1-C1-C2-C3
5	I	801	NAG	C4-C5-C6-O6
5	L	801	NAG	O5-C5-C6-O6
5	L	801	NAG	C4-C5-C6-O6
5	I	801	NAG	O5-C5-C6-O6
6	L	808	GOL	O1-C1-C2-O2
5	L	801	NAG	C3-C2-N2-C7
5	I	804	NAG	C1-C2-N2-C7
5	I	801	NAG	C3-C2-N2-C7
5	I	804	NAG	C3-C2-N2-C7

There are no ring outliers.

No monomer is involved in short contacts.

5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

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

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

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

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
1	I	417/432 (96%)	-0.44	4 (0%) 82 81	27, 57, 100, 148	0
2	L	407/432 (94%)	-0.29	11 (2%) 54 50	28, 59, 123, 148	0
All	All	824/864 (95%)	-0.37	15 (1%) 68 66	27, 58, 115, 148	0

All (15) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	L	135	ASN	4.0
2	L	398	ASN	3.9
2	L	402	PHE	3.8
2	L	242	ALA	3.4
2	L	400	VAL	3.2
1	I	18	ASN	2.9
2	L	396	ASN	2.5
2	L	18	ASN	2.4
1	I	134	ALA	2.4
2	L	49	TRP	2.4
2	L	397	PRO	2.2
1	I	40	ILE	2.2
2	L	399	ARG	2.1
1	I	41	PRO	2.1
2	L	243	ASP	2.1

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

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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
1	CYF	I	380	35/36	0.89	0.21	36,65,77,82	0

6.3 Carbohydrates

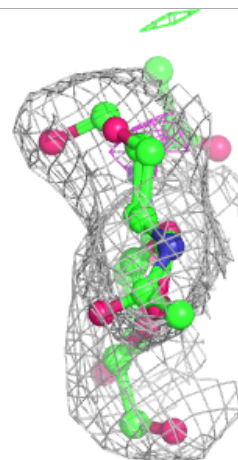
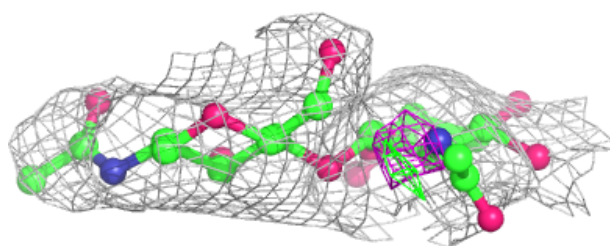
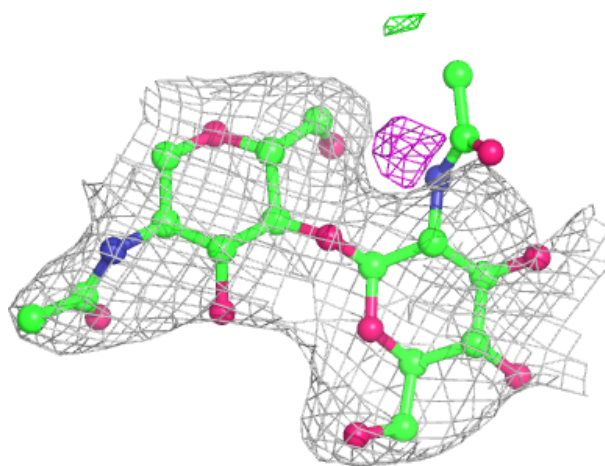
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
3	NAG	A	2	14/15	0.70	0.45	107,118,125,125	0
3	NAG	B	2	14/15	0.76	0.35	120,126,132,133	0
4	BMA	C	4	11/12	0.77	0.33	140,141,143,143	0
4	BMA	C	3	11/12	0.79	0.44	137,139,145,148	0
4	NAG	C	1	14/15	0.84	0.32	93,101,109,116	0
4	NAG	C	2	14/15	0.86	0.45	124,128,133,135	0
3	NAG	B	1	14/15	0.93	0.21	70,88,103,109	0
3	NAG	A	1	14/15	0.93	0.21	78,82,92,100	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.

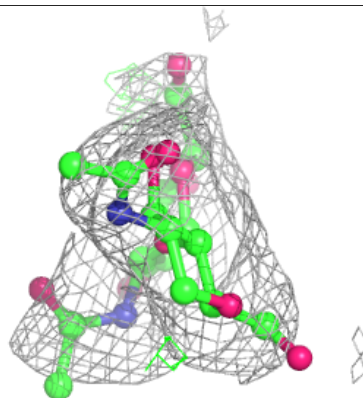
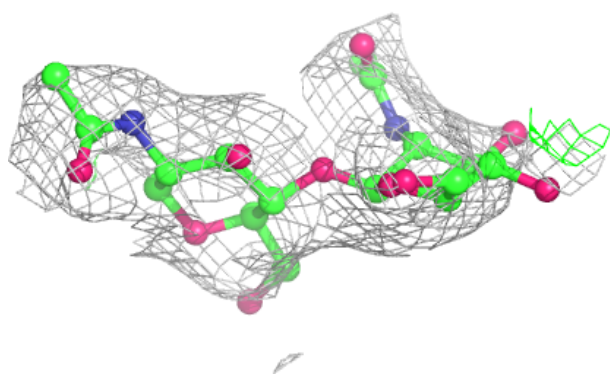
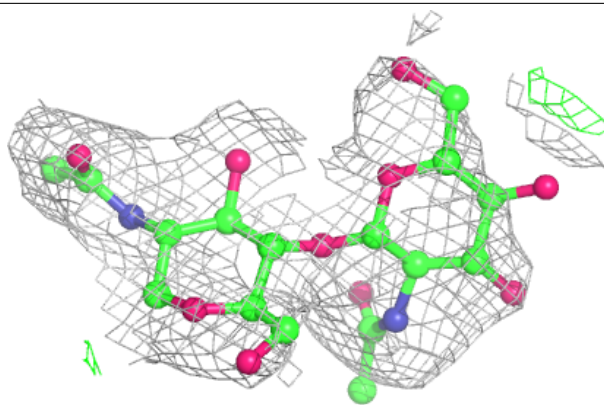
Electron density around Chain A:

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

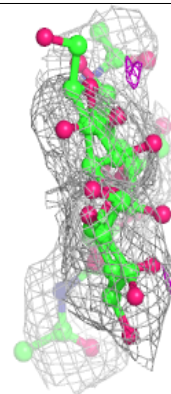
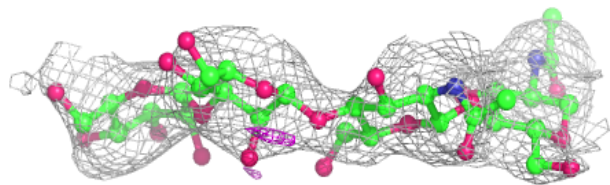
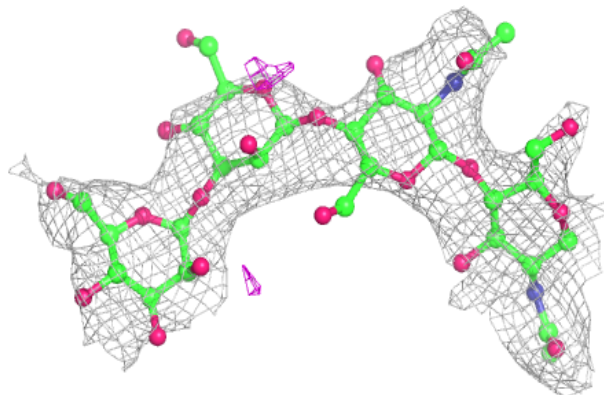


Electron density around Chain B:

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

**Electron density around Chain C:**

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



6.4 Ligands [i](#)

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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
5	NAG	L	801	14/15	0.73	0.29	110,115,122,123	0
5	NAG	I	801	14/15	0.79	0.41	121,128,135,138	0
5	NAG	I	804	14/15	0.81	0.43	112,118,121,124	0
6	GOL	I	805	6/6	0.92	0.21	50,52,56,58	0
6	GOL	L	808	6/6	0.94	0.15	61,65,69,70	0

6.5 Other polymers [i](#)

There are no such residues in this entry.