



Full wwPDB X-ray Structure Validation Report ⓘ

Aug 6, 2020 – 10:14 AM BST

PDB ID : 1JMJ
Title : Crystal Structure of Native Heparin Cofactor II
Authors : Baglin, T.P.; Carrell, R.W.; Church, F.C.; Huntington, J.A.
Deposited on : 2001-07-18
Resolution : 2.35 Å(reported)

This is a Full wwPDB X-ray Structure Validation Report for a publicly released PDB entry.

We welcome your comments at validation@mail.wwpdb.org

A user guide is available at

<https://www.wwpdb.org/validation/2017/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

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

MolProbity : 4.02b-467
Mogul : 1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix) : 1.13
EDS : 2.13.1
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac : 5.8.0158
CCP4 : 7.0.044 (Gargrove)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.13.1

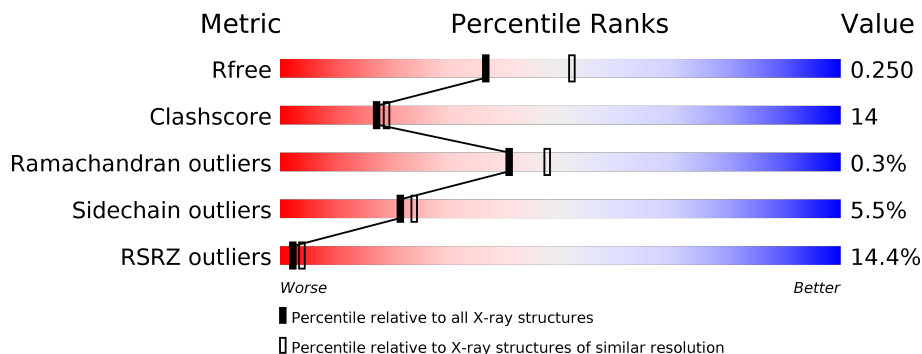
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.35 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	1164 (2.36-2.36)
Clashscore	141614	1232 (2.36-2.36)
Ramachandran outliers	138981	1211 (2.36-2.36)
Sidechain outliers	138945	1212 (2.36-2.36)
RSRZ outliers	127900	1150 (2.36-2.36)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments on the lower bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$. The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	480	 12% 59% 21% 17%
1	B	480	 11% 59% 19% 19%
2	C	3	 33% 33% 33%

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	NAG	C	2	-	-	-	X
2	BMA	C	3	-	-	-	X
4	NAG	B	481	-	-	-	X

2 Entry composition [i](#)

There are 5 unique types of molecules in this entry. The entry contains 6723 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 HEPARIN COFACTOR II.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	397	3228	2069	560	579	20	0	0	
1	B	387	3144	2017	549	558	14	0	0	

- Molecule 2 is an oligosaccharide called 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			
2	C	3	39	22	2	15	0	0	0

- Molecule 3 is CALCIUM ION (three-letter code: CA) (formula: Ca).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	1	Total	Ca	0	0
			1	1		

- Molecule 4 is 2-acetamido-2-deoxy-beta-D-glucopyranose (three-letter code: NAG) (formula: C₈H₁₅NO₆).



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

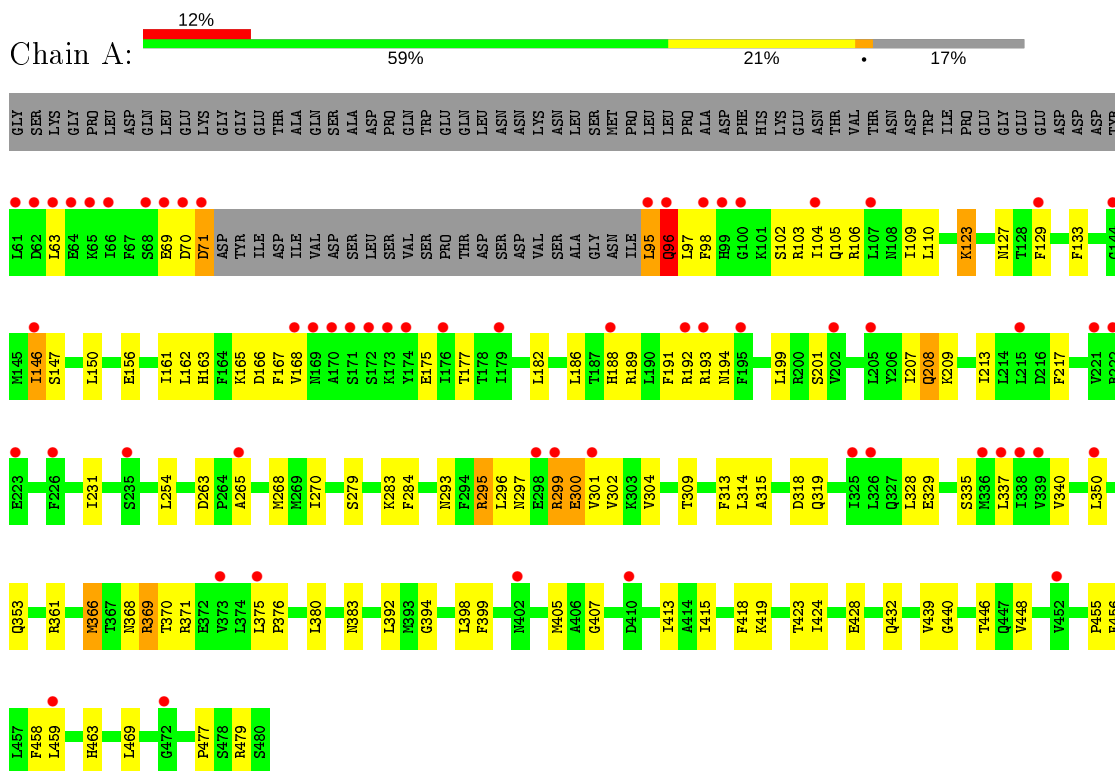
- Molecule 5 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	O		
5	A	157	157	157	0	0
5	B	140	140	140	0	0

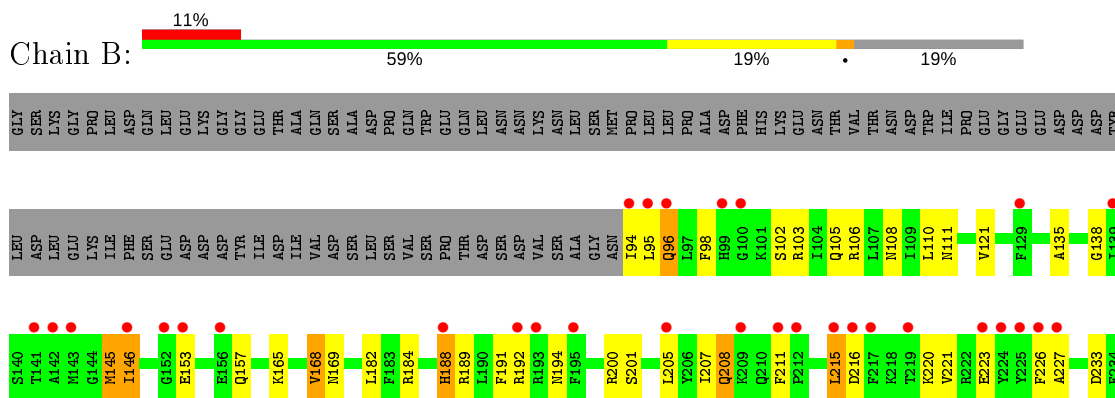
3 Residue-property plots

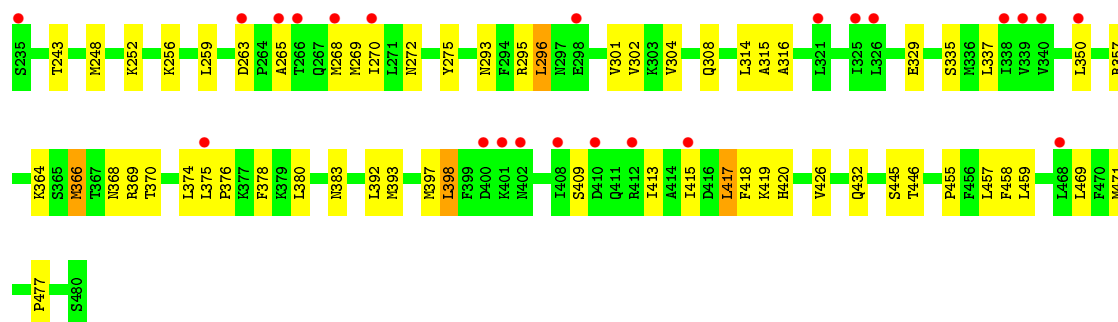
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. 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: HEPARIN COFACTOR II



- Molecule 1: HEPARIN COFACTOR II





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

Chain C: 33% 33% 33%

MAG1
MAG2
BMA3

4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	74.73Å 80.00Å 92.24Å 90.00° 102.04° 90.00°	Depositor
Resolution (Å)	25.00 – 2.35 25.05 – 2.35	Depositor EDS
% Data completeness (in resolution range)	88.0 (25.00-2.35) 88.1 (25.05-2.35)	Depositor EDS
R_{merge}	0.14	Depositor
R_{sym}	0.14	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.57 (at 2.36Å)	Xtrriage
Refinement program	CNS 1.0	Depositor
R, R_{free}	0.208 , 0.255 0.209 , 0.250	Depositor DCC
R_{free} test set	995 reflections (2.54%)	wwPDB-VP
Wilson B-factor (Å ²)	31.6	Xtrriage
Anisotropy	0.624	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.36 , 54.9	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	0.95	EDS
Total number of atoms	6723	wwPDB-VP
Average B, all atoms (Å ²)	37.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 7.08% 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: CA, BMA, NAG

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

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
1	A	0.36	0/3291	0.62	0/4431
1	B	0.35	0/3207	0.63	0/4320
All	All	0.36	0/6498	0.62	0/8751

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts [i](#)

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	3228	0	3279	95	0
1	B	3144	0	3207	84	0
2	C	39	0	34	4	0
3	A	1	0	0	0	0
4	B	14	0	13	0	0
5	A	157	0	0	2	0
5	B	140	0	0	1	0
All	All	6723	0	6533	179	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 14.

All (179) 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:314:LEU:HB3	1:A:366:MET:HG2	1.48	0.96
1:B:96:GLN:H	1:B:96:GLN:NE2	1.64	0.95
1:A:405:MET:HE1	1:A:413:ILE:HG13	1.52	0.92
1:A:110:LEU:HD12	1:A:167:PHE:HB2	1.59	0.84
2:C:2:NAG:H82	2:C:2:NAG:H3	1.61	0.83
1:A:329:GLU:OE1	1:A:335:SER:HB3	1.80	0.82
1:B:221:VAL:HG13	1:B:227:ALA:HB3	1.60	0.82
1:B:192:ARG:HH11	1:B:192:ARG:HG3	1.43	0.82
1:A:70:ASP:HB3	5:A:631:HOH:O	1.82	0.80
1:B:314:LEU:HB3	1:B:366:MET:HG2	1.65	0.78
1:B:135:ALA:H	1:B:420:HIS:CE1	2.03	0.77
1:A:95:LEU:O	1:A:96:GLN:HB3	1.87	0.73
1:B:398:LEU:HD11	1:B:415:ILE:HD12	1.70	0.73
1:A:370:THR:HG22	1:A:446:THR:HG22	1.69	0.72
1:B:329:GLU:OE2	1:B:335:SER:HB3	1.90	0.71
1:B:295:ARG:O	1:B:455:PRO:HD3	1.90	0.71
1:B:350:LEU:HD11	1:B:457:LEU:HD12	1.72	0.70
1:B:96:GLN:H	1:B:96:GLN:HE21	1.38	0.70
1:B:215:LEU:HD13	1:B:216:ASP:N	2.08	0.69
1:A:293:ASN:HB3	1:A:301:VAL:HG11	1.74	0.68
1:B:145:MET:HG2	1:B:221:VAL:HG22	1.75	0.67
1:B:304:VAL:HG11	1:B:477:PRO:HG2	1.77	0.67
1:A:63:LEU:HD22	1:A:63:LEU:H	1.63	0.64
1:A:375:LEU:HD12	1:A:376:PRO:HD2	1.79	0.64
1:A:95:LEU:HD22	1:A:98:PHE:CD1	2.32	0.64
1:B:216:ASP:OD1	1:B:220:LYS:HE2	1.98	0.63
1:B:207:ILE:HD13	1:B:268:MET:HG3	1.80	0.63
1:A:69:GLU:OE2	1:B:445:SER:HB2	1.98	0.63
1:A:95:LEU:O	1:A:96:GLN:CB	2.47	0.63
1:B:375:LEU:HD12	1:B:376:PRO:HD2	1.81	0.63
1:A:405:MET:HE1	1:A:413:ILE:CG1	2.26	0.62
1:B:146:ILE:HG13	1:B:270:ILE:HD11	1.80	0.62
1:B:138:GLY:C	1:B:272:ASN:HD21	2.03	0.62
1:B:98:PHE:CD2	1:B:106:ARG:HD3	2.34	0.62
1:B:252:LYS:HD2	1:B:275:TYR:OH	2.00	0.61
1:B:98:PHE:HZ	1:B:110:LEU:HD21	1.63	0.61
1:B:94:ILE:O	1:B:357:ARG:NH2	2.31	0.61
1:A:405:MET:CE	1:A:413:ILE:HG13	2.26	0.61
1:B:350:LEU:CD1	1:B:457:LEU:HD12	2.31	0.60
1:B:94:ILE:HG22	1:B:95:LEU:HG	1.83	0.60

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:153:GLU:O	1:B:157:GLN:HG3	2.03	0.59
1:A:370:THR:CG2	1:A:446:THR:HG22	2.32	0.58
1:A:96:GLN:HE21	1:A:96:GLN:HA	1.66	0.58
1:B:135:ALA:H	1:B:420:HIS:HE1	1.46	0.58
1:B:208:GLN:HA	1:B:208:GLN:OE1	2.03	0.58
1:B:192:ARG:CG	1:B:192:ARG:HH11	2.15	0.58
1:B:296:LEU:HD22	1:B:302:VAL:HG13	1.84	0.58
1:B:272:ASN:HD22	1:B:420:HIS:HD2	1.50	0.58
1:B:184:ARG:HG3	1:B:188:HIS:CE1	2.38	0.57
1:A:304:VAL:HG11	1:A:477:PRO:HG2	1.85	0.57
1:A:102:SER:OG	1:A:104:ILE:HG22	2.05	0.56
1:A:63:LEU:HD22	1:A:63:LEU:N	2.19	0.56
1:B:96:GLN:N	1:B:96:GLN:NE2	2.46	0.56
1:A:299:ARG:HB2	1:A:299:ARG:NH1	2.20	0.56
1:B:192:ARG:NH1	1:B:192:ARG:HG3	2.19	0.56
1:A:209:LYS:HB2	1:A:231:ILE:HD11	1.87	0.56
1:A:146:ILE:HG13	1:A:270:ILE:HD11	1.87	0.56
1:A:299:ARG:O	1:A:300:GLU:HB3	2.05	0.56
1:A:70:ASP:O	1:A:71:ASP:HB2	2.06	0.55
1:B:308:GLN:HG3	1:B:374:LEU:HG	1.88	0.55
1:A:405:MET:HE1	1:A:413:ILE:O	2.06	0.55
1:B:417:LEU:HD11	1:B:419:LYS:HB2	1.87	0.55
1:A:95:LEU:O	1:A:95:LEU:HG	2.05	0.55
1:B:95:LEU:HD22	1:B:98:PHE:CE1	2.41	0.55
1:A:192:ARG:HH11	1:A:192:ARG:HG3	1.73	0.54
1:A:188:HIS:O	1:A:192:ARG:HG2	2.08	0.54
1:A:168:VAL:HG13	1:A:175:GLU:HA	1.90	0.54
1:B:398:LEU:CD1	1:B:415:ILE:HD12	2.38	0.53
1:B:205:LEU:HD12	1:B:269:MET:O	2.09	0.53
1:B:370:THR:HG22	1:B:446:THR:HG22	1.91	0.53
1:A:147:SER:HA	1:A:150:LEU:HG	1.91	0.53
1:A:398:LEU:HD13	1:A:398:LEU:O	2.09	0.53
1:A:337:LEU:O	1:A:458:PHE:HA	2.09	0.53
1:A:263:ASP:OD1	1:A:265:ALA:HB3	2.09	0.52
1:A:368:ASN:HD22	2:C:1:NAG:H83	1.74	0.52
1:B:102:SER:O	1:B:106:ARG:HG3	2.10	0.52
1:A:110:LEU:CD1	1:A:167:PHE:HB2	2.37	0.51
1:A:335:SER:OG	1:A:463:HIS:HE1	1.92	0.51
1:A:405:MET:HE1	1:A:413:ILE:C	2.31	0.51
1:B:96:GLN:N	1:B:96:GLN:HE21	2.05	0.51
1:B:184:ARG:O	1:B:188:HIS:ND1	2.44	0.51

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:175:GLU:HG3	1:A:177:THR:CG2	2.41	0.50
1:A:295:ARG:O	1:A:455:PRO:HD3	2.11	0.50
1:B:94:ILE:HG22	1:B:95:LEU:N	2.26	0.50
1:A:208:GLN:HE21	1:A:208:GLN:CA	2.24	0.50
1:B:208:GLN:OE1	1:B:233:ASP:HA	2.11	0.50
1:A:69:GLU:CD	1:B:445:SER:HB2	2.32	0.50
1:A:209:LYS:CB	1:A:231:ILE:HD11	2.42	0.50
1:B:316:ALA:N	1:B:366:MET:HE2	2.27	0.49
1:B:184:ARG:HD3	1:B:223:GLU:O	2.11	0.49
1:A:299:ARG:HH11	1:A:299:ARG:CB	2.26	0.49
1:A:104:ILE:HG23	1:A:105:GLN:N	2.26	0.49
1:A:254:LEU:HD21	1:A:423:THR:HB	1.95	0.49
1:B:188:HIS:CE1	1:B:226:PHE:CZ	3.00	0.49
1:B:368:ASN:O	1:B:369:ARG:HD2	2.12	0.49
1:A:313:PHE:HB2	1:A:371:ARG:HD2	1.94	0.49
1:A:315:ALA:HB3	1:A:371:ARG:CZ	2.43	0.48
1:B:215:LEU:O	1:B:215:LEU:HD22	2.12	0.48
1:B:296:LEU:HD22	1:B:302:VAL:CG1	2.43	0.48
1:A:439:VAL:HG22	1:A:440:GLY:N	2.28	0.48
1:A:371:ARG:HG2	1:A:448:VAL:CG2	2.43	0.48
2:C:2:NAG:H82	2:C:2:NAG:C3	2.39	0.48
1:A:314:LEU:HD23	1:A:368:ASN:HA	1.96	0.48
1:A:279:SER:HB2	1:A:283:LYS:NZ	2.29	0.48
2:C:2:NAG:C8	2:C:2:NAG:H3	2.39	0.48
1:A:123:LYS:HD2	5:A:605:HOH:O	2.13	0.48
1:B:188:HIS:O	1:B:192:ARG:HG2	2.14	0.48
1:A:63:LEU:CD2	1:A:63:LEU:H	2.27	0.47
1:B:153:GLU:HB3	1:B:397:MET:CE	2.45	0.47
1:A:103:ARG:HG2	1:A:182:LEU:HD11	1.97	0.47
1:A:104:ILE:HD11	1:A:186:LEU:HB2	1.96	0.47
1:A:217:PHE:HB2	1:A:407:GLY:O	2.15	0.47
1:A:318:ASP:OD2	1:A:361:ARG:NH2	2.40	0.46
1:B:145:MET:HE1	1:B:146:ILE:HG12	1.96	0.46
1:B:383:ASN:HD21	1:B:419:LYS:HE3	1.80	0.46
1:A:127:ASN:HB3	1:A:129:PHE:CE1	2.50	0.46
1:A:192:ARG:NH1	1:A:194:ASN:OD1	2.48	0.46
1:A:405:MET:CE	1:A:413:ILE:O	2.64	0.46
1:A:268:MET:HG2	1:A:415:ILE:HD13	1.98	0.46
1:B:293:ASN:HB3	1:B:301:VAL:HG11	1.97	0.46
1:A:424:ILE:HA	1:A:432:GLN:HE22	1.80	0.46
1:A:162:LEU:O	1:A:163:HIS:HB2	2.16	0.45

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:368:ASN:O	1:A:369:ARG:HD3	2.16	0.45
1:A:207:ILE:HD12	1:A:213:ILE:HG12	1.97	0.45
1:A:297:ASN:ND2	1:A:300:GLU:HG2	2.31	0.45
1:B:248:MET:SD	1:B:256:LYS:HG2	2.56	0.45
1:A:192:ARG:CG	1:A:192:ARG:HH11	2.29	0.45
1:B:192:ARG:HH12	1:B:194:ASN:CG	2.19	0.45
1:B:357:ARG:HH11	1:B:357:ARG:HG2	1.82	0.45
1:A:268:MET:HE2	1:A:415:ILE:HD13	1.98	0.45
1:A:95:LEU:HD23	1:A:97:LEU:HB2	1.99	0.45
1:A:105:GLN:O	1:A:109:ILE:HG13	2.17	0.44
1:A:284:PHE:O	1:A:428:GLU:HB3	2.16	0.44
1:A:156:GLU:OE1	1:A:165:LYS:NZ	2.40	0.44
1:A:133:PHE:CZ	1:A:424:ILE:HB	2.52	0.44
1:A:370:THR:HG22	1:A:446:THR:HA	1.99	0.44
1:B:98:PHE:HZ	1:B:110:LEU:CD2	2.30	0.44
1:A:398:LEU:HD12	1:A:399:PHE:CE2	2.53	0.44
1:B:215:LEU:C	1:B:215:LEU:HD22	2.38	0.44
1:A:315:ALA:HB3	1:A:371:ARG:NH1	2.34	0.43
1:B:103:ARG:HG2	1:B:182:LEU:HD11	2.00	0.43
1:B:458:PHE:O	1:B:471:MET:HA	2.18	0.43
1:A:161:ILE:HD11	1:A:394:GLY:HA3	2.00	0.43
1:A:95:LEU:CD2	1:A:97:LEU:HB2	2.49	0.43
1:B:108:ASN:HA	1:B:111:ASN:HB2	2.00	0.43
1:B:102:SER:OG	1:B:105:GLN:HG3	2.19	0.43
1:A:301:VAL:HG12	1:A:302:VAL:N	2.32	0.43
1:B:378:PHE:CZ	1:B:426:VAL:HG21	2.53	0.43
1:B:200:ARG:NH2	1:B:252:LYS:HE3	2.34	0.42
1:A:340:VAL:HG22	1:A:456:PHE:HB3	2.01	0.42
1:A:299:ARG:HB2	1:A:299:ARG:HH11	1.82	0.42
1:B:191:PHE:CZ	1:B:201:SER:HB2	2.54	0.42
1:A:104:ILE:CG2	1:A:105:GLN:N	2.82	0.42
1:B:409:SER:HB3	1:B:413:ILE:HD11	2.02	0.42
1:A:98:PHE:CD2	1:A:106:ARG:HD3	2.55	0.41
1:A:129:PHE:HD2	1:A:479:ARG:NH1	2.18	0.41
1:A:191:PHE:CZ	1:A:201:SER:HB2	2.55	0.41
1:A:208:GLN:HA	1:A:208:GLN:NE2	2.35	0.41
1:B:315:ALA:C	1:B:366:MET:HG3	2.41	0.41
1:B:145:MET:HE1	1:B:146:ILE:HA	2.01	0.41
1:A:284:PHE:HA	1:A:309:THR:HB	2.02	0.41
1:B:145:MET:CE	1:B:146:ILE:HA	2.51	0.41
1:B:263:ASP:OD1	1:B:265:ALA:HB3	2.20	0.41

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:121:VAL:HG21	1:B:393:MET:HG2	2.03	0.41
1:A:383:ASN:OD1	1:A:419:LYS:HE3	2.21	0.41
1:B:165:LYS:O	1:B:169:ASN:HB2	2.19	0.41
1:B:337:LEU:O	1:B:458:PHE:HA	2.20	0.41
1:A:175:GLU:HG3	1:A:177:THR:HG23	2.02	0.41
1:B:243:THR:HG21	1:B:259:LEU:CD1	2.51	0.41
1:A:319:GLN:HG3	1:B:364:LYS:O	2.21	0.41
1:A:268:MET:CE	1:A:415:ILE:HD13	2.50	0.41
1:A:424:ILE:O	1:A:424:ILE:HG23	2.20	0.41
1:A:192:ARG:O	1:A:193:ARG:C	2.59	0.40
1:B:168:VAL:CG2	1:B:169:ASN:N	2.84	0.40
1:B:192:ARG:CG	1:B:192:ARG:NH1	2.74	0.40
1:A:370:THR:CG2	1:A:446:THR:HA	2.51	0.40
1:B:191:PHE:CE1	1:B:201:SER:HB2	2.56	0.40
1:B:211:PHE:CD1	1:B:211:PHE:N	2.89	0.40
1:B:189:ARG:HB2	5:B:576:HOH:O	2.22	0.40

There are no symmetry-related clashes.

5.3 Torsion angles [i](#)

5.3.1 Protein backbone [i](#)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	393/480 (82%)	374 (95%)	17 (4%)	2 (0%)	29	32
1	B	385/480 (80%)	375 (97%)	10 (3%)	0	100	100
All	All	778/960 (81%)	749 (96%)	27 (4%)	2 (0%)	41	47

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	96	GLN
1	A	300	GLU

5.3.2 Protein sidechains [i](#)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	360/433 (83%)	338 (94%)	22 (6%)	18	20
1	B	350/433 (81%)	333 (95%)	17 (5%)	25	29
All	All	710/866 (82%)	671 (94%)	39 (6%)	21	24

All (39) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	71	ASP
1	A	95	LEU
1	A	96	GLN
1	A	123	LYS
1	A	146	ILE
1	A	166	ASP
1	A	189	ARG
1	A	199	LEU
1	A	208	GLN
1	A	295	ARG
1	A	296	LEU
1	A	299	ARG
1	A	328	LEU
1	A	350	LEU
1	A	353	GLN
1	A	366	MET
1	A	369	ARG
1	A	380	LEU
1	A	392	LEU
1	A	418	PHE
1	A	459	LEU
1	A	469	LEU
1	B	96	GLN
1	B	145	MET
1	B	146	ILE
1	B	168	VAL
1	B	188	HIS

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	B	208	GLN
1	B	215	LEU
1	B	296	LEU
1	B	366	MET
1	B	380	LEU
1	B	392	LEU
1	B	398	LEU
1	B	417	LEU
1	B	418	PHE
1	B	432	GLN
1	B	459	LEU
1	B	469	LEU

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (10) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	96	GLN
1	A	208	GLN
1	A	292	HIS
1	A	363	GLN
1	A	463	HIS
1	B	96	GLN
1	B	169	ASN
1	B	272	ASN
1	B	411	GLN
1	B	420	HIS

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates [i](#)

3 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	NAG	C	1	1,2	14,14,15	0.59	0	17,19,21	0.73	0
2	NAG	C	2	2	14,14,15	0.60	0	17,19,21	1.05	1 (5%)
2	BMA	C	3	2	11,11,12	0.45	0	15,15,17	0.38	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
2	NAG	C	1	1,2	-	4/6/23/26	0/1/1/1
2	NAG	C	2	2	-	3/6/23/26	0/1/1/1
2	BMA	C	3	2	-	2/2/19/22	0/1/1/1

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed($^{\circ}$)	Ideal($^{\circ}$)
2	C	2	NAG	C3-C4-C5	2.24	114.23	110.24

There are no chirality outliers.

All (9) torsion outliers are listed below:

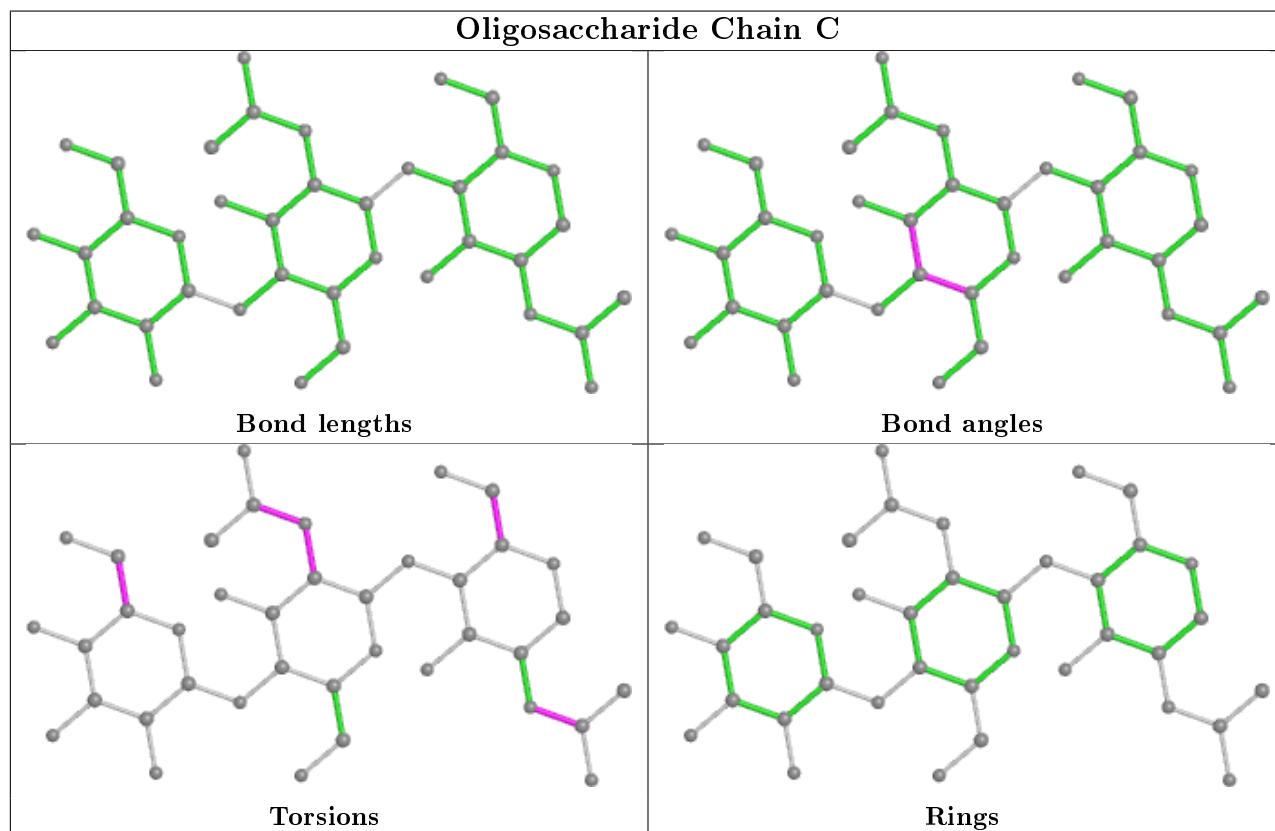
Mol	Chain	Res	Type	Atoms
2	C	2	NAG	C8-C7-N2-C2
2	C	2	NAG	O7-C7-N2-C2
2	C	3	BMA	O5-C5-C6-O6
2	C	3	BMA	C4-C5-C6-O6
2	C	1	NAG	C8-C7-N2-C2
2	C	1	NAG	O7-C7-N2-C2
2	C	1	NAG	C4-C5-C6-O6
2	C	1	NAG	O5-C5-C6-O6
2	C	2	NAG	C3-C2-N2-C7

There are no ring outliers.

2 monomers are involved in 4 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	C	1	NAG	1	0
2	C	2	NAG	3	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](#)

Of 2 ligands modelled in this entry, 1 is monoatomic - leaving 1 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
4	NAG	B	481	1	14,14,15	0.56	0	17,19,21	0.62	0

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	NAG	B	481	1	-	5/6/23/26	0/1/1/1

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (5) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	B	481	NAG	C8-C7-N2-C2
4	B	481	NAG	O7-C7-N2-C2
4	B	481	NAG	C1-C2-N2-C7
4	B	481	NAG	O5-C5-C6-O6
4	B	481	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

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	397/480 (82%)	1.05	59 (14%) 2 3	19, 34, 69, 95	7 (1%)
1	B	387/480 (80%)	0.93	54 (13%) 2 4	17, 34, 60, 85	4 (1%)
All	All	784/960 (81%)	0.99	113 (14%) 2 4	17, 34, 62, 95	11 (1%)

All (113) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	215	LEU	7.3
1	B	94	ILE	7.0
1	A	61	LEU	6.8
1	A	95	LEU	6.7
1	A	215	LEU	6.6
1	A	172	SER	6.4
1	B	402	ASN	6.0
1	A	99	HIS	5.8
1	A	193	ARG	5.7
1	A	62	ASP	5.7
1	A	96	GLN	5.1
1	B	99	HIS	4.9
1	B	219	THR	4.8
1	B	226	PHE	4.7
1	A	402	ASN	4.7
1	B	96	GLN	4.7
1	A	173	LYS	4.7
1	B	195	PHE	4.7
1	A	65	LYS	4.7
1	A	171	SER	4.5
1	A	71	ASP	4.4
1	A	70	ASP	4.4
1	A	170	ALA	4.4
1	B	188	HIS	4.2

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
1	B	193	ARG	4.2
1	A	195	PHE	4.2
1	B	216	ASP	4.1
1	B	265	ALA	4.0
1	B	410	ASP	3.9
1	A	174	TYR	3.9
1	A	169	ASN	3.9
1	A	168	VAL	3.9
1	A	66	ILE	3.8
1	B	146	ILE	3.8
1	A	64	GLU	3.8
1	A	98	PHE	3.8
1	A	100	GLY	3.8
1	B	298	GLU	3.6
1	A	298	GLU	3.4
1	A	223	GLU	3.3
1	B	401	LYS	3.2
1	A	192	ARG	3.2
1	B	235	SER	3.1
1	B	129	PHE	3.1
1	A	339	VAL	3.1
1	A	235	SER	3.1
1	A	265	ALA	3.1
1	B	156	GLU	3.0
1	A	188	HIS	3.0
1	A	326	LEU	2.9
1	A	452	VAL	2.9
1	B	263	ASP	2.9
1	A	375	LEU	2.8
1	A	338	ILE	2.8
1	A	205	LEU	2.7
1	B	339	VAL	2.7
1	A	63	LEU	2.7
1	A	129	PHE	2.7
1	A	221	VAL	2.7
1	B	212	PRO	2.7
1	B	412	ARG	2.7
1	A	410	ASP	2.7
1	B	139	ILE	2.6
1	B	338	ILE	2.6
1	A	222	ARG	2.6
1	A	146	ILE	2.6

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
1	B	270	ILE	2.6
1	A	459	LEU	2.5
1	A	68	SER	2.5
1	B	408	ILE	2.5
1	A	336	MET	2.5
1	B	266	THR	2.5
1	A	337	LEU	2.5
1	B	325	ILE	2.4
1	B	192	ARG	2.4
1	B	340	VAL	2.4
1	A	104	ILE	2.4
1	B	350	LEU	2.4
1	B	209	LYS	2.4
1	A	176	ILE	2.4
1	A	69	GLU	2.4
1	A	325	ILE	2.4
1	B	217	PHE	2.3
1	B	142	ALA	2.3
1	B	375	LEU	2.3
1	A	301	VAL	2.3
1	A	472	GLY	2.3
1	B	400	ASP	2.3
1	A	179	ILE	2.3
1	B	223	GLU	2.3
1	B	153	GLU	2.2
1	B	268	MET	2.2
1	B	141	THR	2.2
1	B	95	LEU	2.2
1	B	227	ALA	2.2
1	A	299	ARG	2.2
1	B	143	MET	2.2
1	B	205	LEU	2.2
1	B	211	PHE	2.1
1	B	224	TYR	2.1
1	A	350	LEU	2.1
1	B	415	ILE	2.1
1	B	326	LEU	2.1
1	B	468	LEU	2.1
1	B	152	GLY	2.1
1	A	107	LEU	2.1
1	B	321	LEU	2.1
1	B	225	TYR	2.1

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
1	A	202	VAL	2.0
1	A	226	PHE	2.0
1	A	144	GLY	2.0
1	B	100	GLY	2.0
1	A	373	VAL	2.0

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

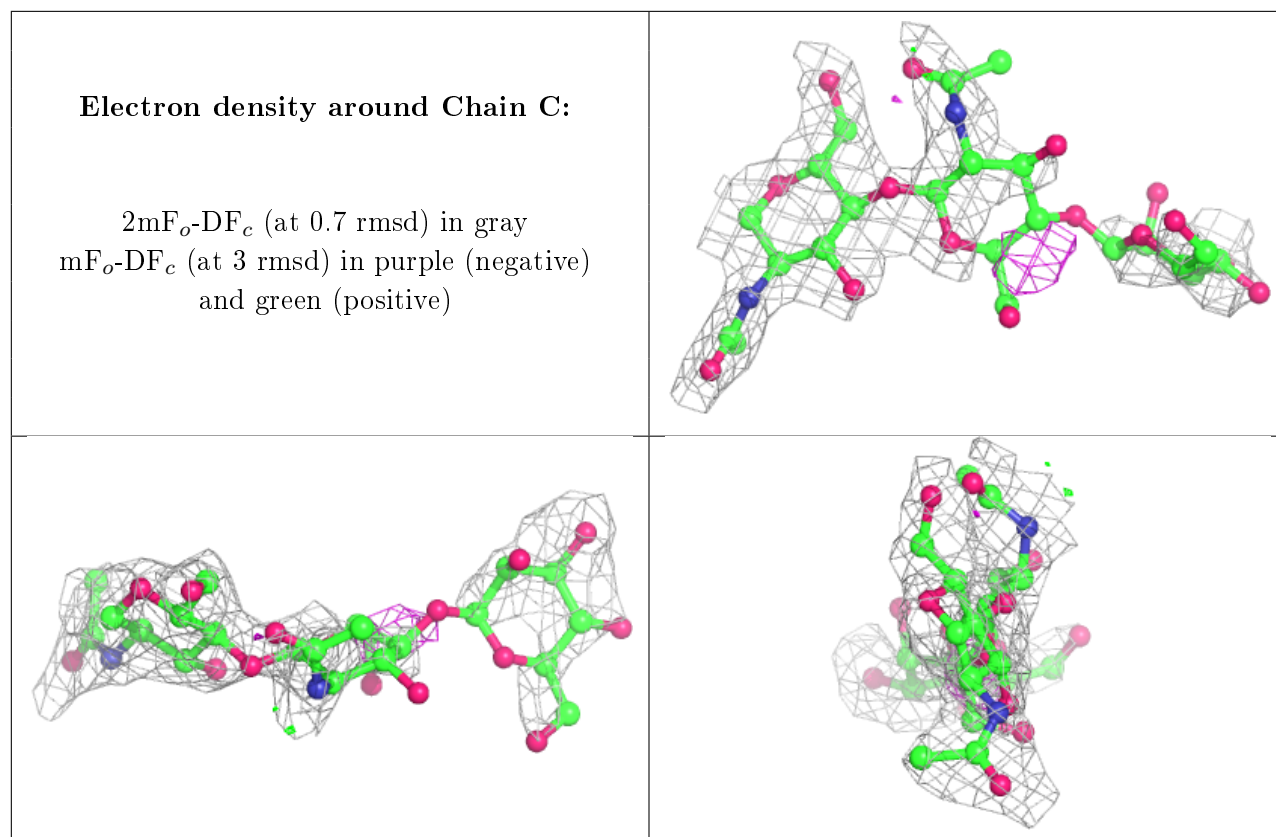
There are no non-standard protein/DNA/RNA residues in this entry.

6.3 Carbohydrates [i](#)

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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
2	BMA	C	3	11/12	0.47	0.70	96,97,97,97	0
2	NAG	C	2	14/15	0.53	0.74	86,90,93,95	0
2	NAG	C	1	14/15	0.86	0.41	61,65,71,80	0

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



6.4 Ligands [i](#)

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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
4	NAG	B	481	14/15	0.79	0.44	51,56,58,59	0
3	CA	A	501	1/1	0.98	0.14	44,44,44,44	0

6.5 Other polymers [i](#)

There are no such residues in this entry.