



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 5, 2026 – 10:03 AM UTC

PDB ID : 2ERO / pdb_00002ero
Title : Crystal structure of vascular apoptosis-inducing protein-1(orthorhombic crystal form)
Authors : Takeda, S.; Igarashi, T.; Araki, S.
Deposited on : 2005-10-25
Resolution : 2.50 Å(reported)

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

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

A user guide is available at

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

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

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

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

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

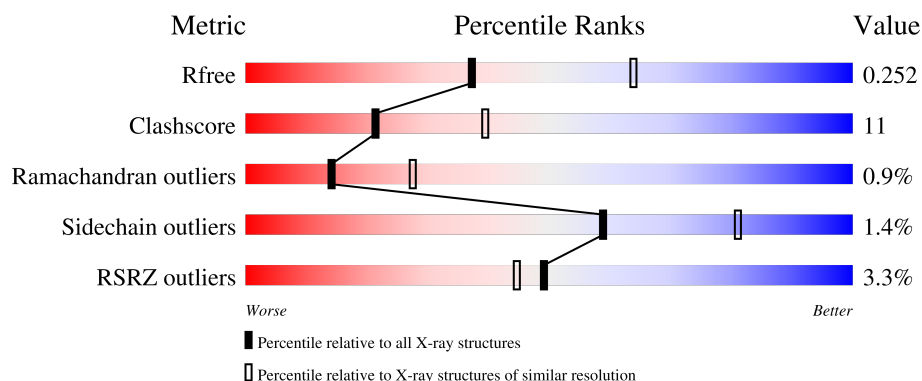
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.50 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	5829 (2.50-2.50)
Clashscore	190562	6492 (2.50-2.50)
Ramachandran outliers	187476	6378 (2.50-2.50)
Sidechain outliers	187428	6380 (2.50-2.50)
RSRZ outliers	180081	5833 (2.50-2.50)

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	427	3% 75% 23%
1	B	427	4% 75% 23%
2	C	2	100%
2	D	2	100%

2 Entry composition [i](#)

There are 6 unique types of molecules in this entry. The entry contains 6824 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 vascular apoptosis-inducing protein 1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	426	Total	C	N	O	S	0	0	0
			3279	2022	584	626	47			
1	B	426	Total	C	N	O	S	0	0	0
			3279	2022	584	626	47			

- Molecule 2 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
2	C	2	Total	C	N	O	0	0	0
			28	16	2	10			
2	D	2	Total	C	N	O	0	0	0
			28	16	2	10			

- Molecule 3 is ZINC ION (CCD ID: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	1	Total	Zn	0	0
			1	1		
3	B	1	Total	Zn	0	0
			1	1		

- Molecule 4 is CALCIUM ION (CCD ID: CA) (formula: Ca).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	2	Total	Ca	0	0
			2	2		

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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	B	2	Total	Ca	0	0
			2	2		

- Molecule 5 is COBALT (III) ION (CCD ID: 3CO) (formula: Co).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	1	Total	Co	0	0
			1	1		

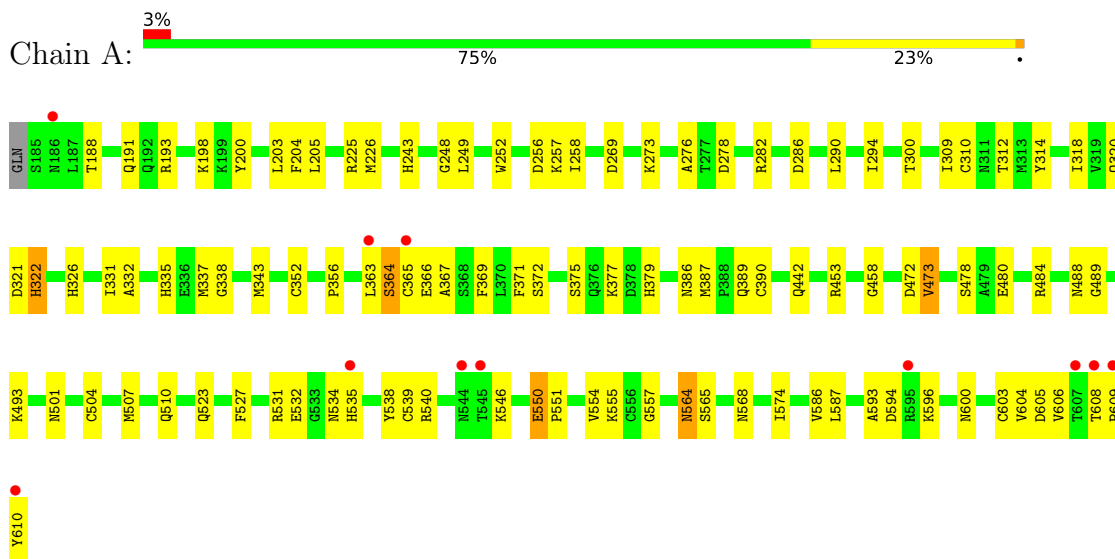
- Molecule 6 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	A	114	Total	O	0	0
			114	114		
6	B	89	Total	O	0	0
			89	89		

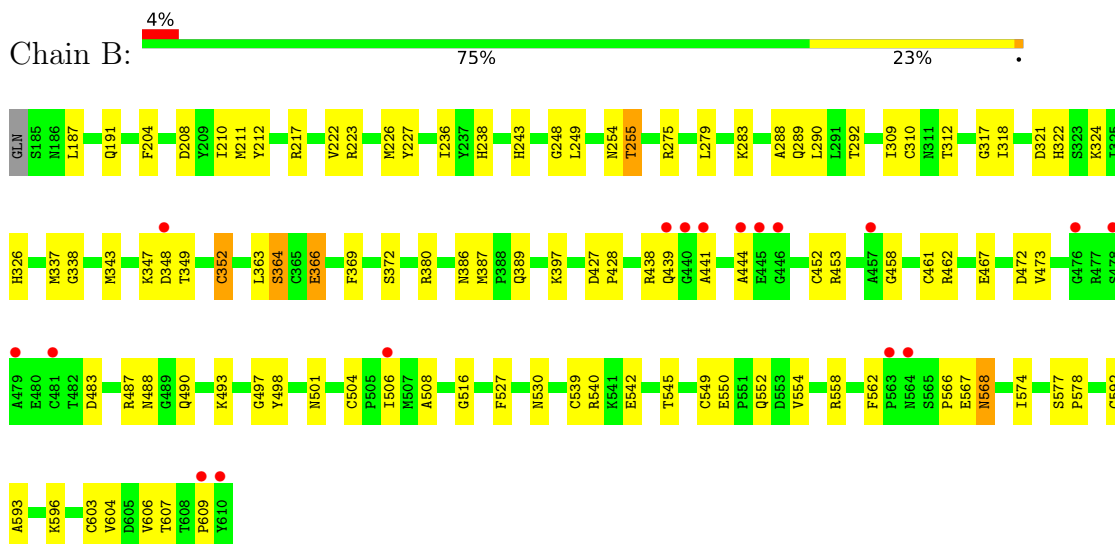
3 Residue-property plots [i](#)

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: vascular apoptosis-inducing protein 1



- Molecule 1: vascular apoptosis-inducing protein 1



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

Chain C:  100%

MAG1
MAG2

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

Chain D:  100%

MAG1
MAG2

4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	86.71Å 93.27Å 137.74Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	50.00 – 2.50 50.00 – 2.50	Depositor EDS
% Data completeness (in resolution range)	98.8 (50.00-2.50) 99.2 (50.00-2.50)	Depositor EDS
R_{merge}	0.07	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	4.00 (at 2.51Å)	Xtriage
Refinement program	CNS 1.0	Depositor
R, R_{free}	0.212 , 0.258 0.205 , 0.252	Depositor DCC
R_{free} test set	1946 reflections (5.01%)	wwPDB-VP
Wilson B-factor (Å ²)	43.1	Xtriage
Anisotropy	0.152	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.31 , 36.0	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	6824	wwPDB-VP
Average B, all atoms (Å ²)	44.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.66% 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: 3CO, ZN, CA, 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	0.37	0/3343	0.87	7/4517 (0.2%)
1	B	0.36	0/3343	0.87	9/4517 (0.2%)
All	All	0.37	0/6686	0.87	16/9034 (0.2%)

There are no bond length outliers.

All (16) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	322	HIS	N-CA-C	7.37	121.53	112.54
1	A	314	TYR	N-CA-C	6.50	120.52	112.59
1	B	389	GLN	N-CA-C	6.40	118.34	111.36
1	A	322	HIS	N-CA-C	6.23	120.34	112.87
1	A	321	ASP	N-CA-C	-5.80	101.70	110.70
1	B	366	GLU	N-CA-C	-5.72	106.25	113.18
1	A	550	GLU	N-CA-C	-5.68	102.46	110.29
1	B	337	MET	N-CA-C	-5.64	105.23	111.71
1	B	352	CYS	N-CA-C	-5.57	105.91	114.16
1	A	389	GLN	N-CA-C	5.54	119.20	112.23
1	A	203	LEU	N-CA-C	5.33	118.50	109.76
1	B	326	HIS	N-CA-C	5.24	117.74	111.71
1	B	321	ASP	N-CA-C	-5.11	102.77	110.70
1	A	337	MET	N-CA-C	-5.05	105.91	111.71
1	B	516	GLY	CA-C-N	5.02	125.02	119.90
1	B	516	GLY	C-N-CA	5.02	125.02	119.90

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts ⓘ

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	3279	0	3140	73	0
1	B	3279	0	3140	69	0
2	C	28	0	25	0	0
2	D	28	0	25	0	0
3	A	1	0	0	0	0
3	B	1	0	0	0	0
4	A	2	0	0	0	0
4	B	2	0	0	0	0
5	A	1	0	0	0	0
6	A	114	0	0	4	0
6	B	89	0	0	4	0
All	All	6824	0	6330	141	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 11.

All (141) 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:B:226:MET:SD	1:B:249:LEU:HD11	2.11	0.90
1:A:226:MET:SD	1:A:249:LEU:HD11	2.12	0.90
1:A:198:LYS:HD3	1:A:200:TYR:OH	1.81	0.80
1:A:198:LYS:HE2	1:A:243:HIS:CE1	2.16	0.79
1:A:532:GLU:CD	1:A:534:ASN:HB2	2.08	0.79
1:B:222:VAL:HG12	1:B:226:MET:HE2	1.65	0.78
1:B:488:ASN:HD21	1:B:501:ASN:H	1.33	0.76
1:B:527:PHE:HB3	1:B:554:VAL:HG12	1.70	0.73
1:B:223:ARG:HA	1:B:226:MET:HE3	1.69	0.73
1:A:564:ASN:C	1:A:564:ASN:HD22	1.96	0.71
1:A:564:ASN:HD22	1:A:565:SER:N	1.87	0.71
1:A:531:ARG:CZ	1:A:551:PRO:HG3	2.21	0.71
1:A:510:GLN:NE2	1:A:587:LEU:H	1.90	0.70
1:A:478:SER:OG	1:A:480:GLU:HG2	1.91	0.69
1:A:290:LEU:HB3	1:A:318:ILE:HG22	1.74	0.68
1:B:236:ILE:HG12	1:B:369:PHE:HB3	1.77	0.67

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:300:THR:O	1:B:324:LYS:HE2	1.94	0.67
1:B:338:GLY:HA2	1:B:343:MET:HE3	1.76	0.67
1:B:488:ASN:ND2	1:B:501:ASN:H	1.95	0.65
1:B:223:ARG:HD2	6:B:764:HOH:O	1.97	0.65
1:B:441:ALA:CB	1:B:452:CYS:HB3	2.28	0.64
1:A:596:LYS:HE3	1:A:603:CYS:SG	2.38	0.64
1:B:254:ASN:O	1:B:255:THR:HB	1.98	0.63
1:B:527:PHE:HB3	1:B:554:VAL:CG1	2.29	0.63
1:A:343:MET:HE1	1:A:371:PHE:CE1	2.34	0.63
1:B:461:CYS:SG	1:B:462:ARG:N	2.73	0.62
1:A:488:ASN:HD21	1:A:501:ASN:H	1.48	0.62
1:B:530:ASN:HD21	1:B:558:ARG:HB3	1.66	0.61
1:B:607:THR:HB	6:B:769:HOH:O	2.00	0.60
1:B:210:ILE:HG13	6:B:729:HOH:O	2.02	0.60
1:B:458:GLY:HA2	1:B:473:VAL:HG11	1.83	0.59
1:A:488:ASN:ND2	1:A:501:ASN:H	2.02	0.58
1:A:472:ASP:OD1	1:A:484:ARG:HG2	2.03	0.58
1:A:188:THR:H	1:A:191:GLN:NE2	2.02	0.57
1:A:204:PHE:CD1	1:A:248:GLY:HA3	2.39	0.57
1:B:530:ASN:HB3	1:B:549:CYS:SG	2.44	0.57
1:B:574:ILE:C	1:B:574:ILE:HD12	2.30	0.57
1:B:550:GLU:HB3	1:B:552:GLN:OE1	2.05	0.57
1:B:497:GLY:HA3	1:B:506:ILE:HD11	1.86	0.57
1:A:225:ARG:NH1	1:A:326:HIS:HB3	2.21	0.56
1:B:493:LYS:HE3	1:B:504:CYS:HB3	1.87	0.56
1:B:527:PHE:O	1:B:554:VAL:HG13	2.06	0.55
1:B:441:ALA:HB2	1:B:452:CYS:HB3	1.89	0.55
1:A:363:LEU:O	1:A:364:SER:HB2	2.07	0.54
1:A:489:GLY:HA2	1:A:606:VAL:CG2	2.38	0.54
1:B:223:ARG:HG2	1:B:227:TYR:CZ	2.43	0.54
1:B:506:ILE:HG22	1:B:508:ALA:H	1.72	0.54
1:A:564:ASN:C	1:A:564:ASN:ND2	2.65	0.53
1:A:527:PHE:O	1:A:554:VAL:HG22	2.08	0.53
1:B:204:PHE:CD1	1:B:248:GLY:HA3	2.43	0.53
1:B:275:ARG:HD2	1:B:288:ALA:HB3	1.91	0.53
1:B:347:LYS:O	1:B:349:THR:N	2.41	0.53
1:A:442:GLN:HG3	1:A:453:ARG:NH1	2.23	0.52
1:B:472:ASP:OD1	1:B:483:ASP:HA	2.10	0.52
1:B:596:LYS:HB3	1:B:603:CYS:SG	2.50	0.52
1:B:238:HIS:HE1	1:B:243:HIS:ND1	2.08	0.52
1:B:566:PRO:HB2	6:B:709:HOH:O	2.09	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:290:LEU:HB3	1:B:318:ILE:HG22	1.93	0.51
1:B:542:GLU:HB2	1:B:545:THR:CG2	2.40	0.51
1:A:510:GLN:HE22	1:A:587:LEU:H	1.58	0.51
1:B:352:CYS:HB3	1:B:372:SER:HA	1.92	0.50
1:B:458:GLY:HA2	1:B:473:VAL:CG1	2.41	0.50
1:A:205:LEU:HB3	1:A:226:MET:HE2	1.93	0.50
1:B:542:GLU:HB2	1:B:545:THR:HG23	1.93	0.50
1:A:278:ASP:O	1:A:282:ARG:NH1	2.45	0.49
1:B:427:ASP:OD1	1:B:444:ALA:HB1	2.12	0.49
1:A:309:ILE:O	1:A:310:CYS:HB2	2.13	0.49
1:A:193:ARG:HD2	6:A:716:HOH:O	2.12	0.49
1:B:504:CYS:O	1:B:506:ILE:HG12	2.13	0.49
1:A:269:ASP:O	1:A:273:LYS:HG3	2.13	0.49
1:A:493:LYS:NZ	1:A:504:CYS:HB3	2.28	0.49
1:A:604:VAL:HG12	1:A:605:ASP:N	2.29	0.48
1:A:532:GLU:OE1	1:A:534:ASN:HB2	2.12	0.48
1:A:557:GLY:O	1:A:586:VAL:HG23	2.13	0.48
1:B:487:ARG:HH22	1:B:609:PRO:HG3	1.78	0.48
1:B:562:PHE:CE1	1:B:568:ASN:ND2	2.82	0.48
1:A:366:GLU:N	1:A:366:GLU:OE2	2.46	0.47
1:A:596:LYS:HG2	1:A:605:ASP:HA	1.96	0.47
1:B:364:SER:HB2	1:B:366:GLU:OE2	2.15	0.47
1:B:309:ILE:O	1:B:310:CYS:HB2	2.15	0.47
1:B:498:TYR:CD1	1:B:606:VAL:HG11	2.49	0.47
1:A:532:GLU:CG	1:A:534:ASN:HD22	2.27	0.46
1:B:289:GLN:HE22	1:B:317:GLY:HA3	1.80	0.46
1:A:331:ILE:HD11	1:A:369:PHE:CE2	2.50	0.46
1:A:458:GLY:HA2	1:A:473:VAL:HG11	1.97	0.46
1:B:238:HIS:CE1	1:B:243:HIS:ND1	2.83	0.46
1:B:363:LEU:O	1:B:364:SER:HB3	2.16	0.46
1:B:592:CYS:O	1:B:593:ALA:HB2	2.16	0.45
1:A:538:TYR:CD2	1:A:546:LYS:HD3	2.52	0.45
1:A:540:ARG:HD3	1:A:600:ASN:O	2.16	0.45
1:A:198:LYS:HE2	1:A:243:HIS:NE2	2.32	0.45
1:B:438:ARG:O	1:B:439:GLN:C	2.60	0.45
1:B:497:GLY:HA3	1:B:506:ILE:CD1	2.46	0.45
1:B:212:TYR:CE1	1:B:217:ARG:HA	2.52	0.44
1:A:294:ILE:O	1:A:320:GLN:HG3	2.17	0.44
1:A:320:GLN:C	1:A:322:HIS:H	2.26	0.44
1:A:379:HIS:HE1	6:A:723:HOH:O	2.00	0.44
1:A:606:VAL:HG23	1:A:610:TYR:CE2	2.52	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:187:LEU:HB3	1:B:191:GLN:HE21	1.83	0.44
1:B:226:MET:HE3	1:B:249:LEU:HD21	1.99	0.44
1:A:568:ASN:HB3	6:A:729:HOH:O	2.17	0.44
1:A:493:LYS:HG3	1:A:504:CYS:SG	2.59	0.43
1:A:286:ASP:OD1	1:A:390:CYS:SG	2.77	0.43
1:A:593:ALA:O	1:A:594:ASP:C	2.60	0.43
1:B:540:ARG:NH2	1:B:542:GLU:OE1	2.52	0.43
1:A:198:LYS:HD3	1:A:200:TYR:CZ	2.52	0.42
1:A:256:ASP:HB3	1:A:258:ILE:O	2.19	0.42
1:A:377:LYS:HA	1:A:377:LYS:HD2	1.79	0.42
1:A:507:MET:HE1	1:A:555:LYS:HB3	2.01	0.42
1:A:204:PHE:CE1	1:A:248:GLY:HA3	2.55	0.42
1:A:343:MET:SD	1:A:375:SER:HB3	2.59	0.42
1:B:204:PHE:CD2	1:B:279:LEU:HD21	2.55	0.42
1:A:320:GLN:C	1:A:322:HIS:N	2.77	0.42
1:B:380:ARG:HG3	1:B:380:ARG:HH11	1.84	0.42
1:A:458:GLY:HA2	1:A:473:VAL:CG1	2.50	0.42
1:A:531:ARG:NH1	1:A:551:PRO:HG3	2.34	0.42
1:A:332:ALA:O	1:A:335:HIS:HB3	2.20	0.42
1:B:208:ASP:OD1	1:B:211:MET:HG2	2.19	0.42
1:B:289:GLN:HA	1:B:317:GLY:O	2.19	0.42
1:B:223:ARG:HA	1:B:226:MET:CE	2.44	0.42
1:A:188:THR:H	1:A:191:GLN:HE21	1.67	0.41
1:A:523:GLN:NE2	6:A:742:HOH:O	2.54	0.41
1:A:550:GLU:O	1:A:551:PRO:C	2.64	0.41
1:B:453:ARG:HG2	1:B:453:ARG:HH11	1.84	0.41
1:B:596:LYS:HA	1:B:604:VAL:O	2.18	0.41
1:A:352:CYS:HB3	1:A:372:SER:HA	2.01	0.41
1:A:386:ASN:O	1:A:387:MET:C	2.63	0.41
1:A:493:LYS:HZ2	1:A:504:CYS:HB3	1.85	0.41
1:A:338:GLY:HA2	1:A:343:MET:HE2	2.02	0.41
1:A:608:THR:HG23	1:A:609:PRO:HD2	2.02	0.41
1:B:607:THR:HG22	1:B:607:THR:O	2.20	0.41
1:A:532:GLU:CG	1:A:534:ASN:HB2	2.50	0.41
1:A:276:ALA:HB2	1:A:312:THR:O	2.21	0.41
1:B:386:ASN:O	1:B:387:MET:C	2.65	0.40
1:B:577:SER:HA	1:B:578:PRO:HD3	1.97	0.40
1:A:574:ILE:HD12	1:A:574:ILE:C	2.47	0.40
1:B:527:PHE:CB	1:B:554:VAL:CG1	2.98	0.40
1:B:527:PHE:CB	1:B:554:VAL:HG12	2.45	0.40
1:A:252:TRP:CE2	1:A:257:LYS:HG2	2.57	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:356:PRO:HG2	1:A:367:ALA:HA	2.04	0.40
1:B:427:ASP:HA	1:B:428:PRO:HD2	1.88	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	424/427 (99%)	405 (96%)	17 (4%)	2 (0%)	24	43
1	B	424/427 (99%)	387 (91%)	31 (7%)	6 (1%)	9	17
All	All	848/854 (99%)	792 (93%)	48 (6%)	8 (1%)	14	27

All (8) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	348	ASP
1	B	567	GLU
1	A	364	SER
1	B	255	THR
1	B	364	SER
1	A	535	HIS
1	B	568	ASN
1	B	467	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	362/363 (100%)	358 (99%)	4 (1%)	65	84
1	B	362/363 (100%)	356 (98%)	6 (2%)	53	78
All	All	724/726 (100%)	714 (99%)	10 (1%)	59	81

All (10) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	365	CYS
1	A	473	VAL
1	A	539	CYS
1	A	564	ASN
1	B	283	LYS
1	B	292	THR
1	B	312	THR
1	B	397	LYS
1	B	490	GLN
1	B	539	CYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (32) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	191	GLN
1	A	231	ASN
1	A	287	ASN
1	A	289	GLN
1	A	297	ASN
1	A	340	ASN
1	A	379	HIS
1	A	486	GLN
1	A	488	ASN
1	A	490	GLN
1	A	510	GLN
1	A	523	GLN
1	A	528	GLN
1	A	534	ASN
1	A	535	HIS
1	A	564	ASN
1	A	568	ASN
1	A	579	ASN

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Mol	Chain	Res	Type
1	A	602	GLN
1	B	191	GLN
1	B	192	GLN
1	B	238	HIS
1	B	289	GLN
1	B	376	GLN
1	B	486	GLN
1	B	488	ASN
1	B	490	GLN
1	B	501	ASN
1	B	523	GLN
1	B	530	ASN
1	B	579	ASN
1	B	602	GLN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates ⓘ

4 monosaccharides are modelled in this entry.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\# Z > 2$	Counts	RMSZ	$\# Z > 2$
2	NAG	C	1	2,1	14,14,15	0.66	0	17,19,21	0.94	1 (5%)
2	NAG	C	2	2	14,14,15	0.54	0	17,19,21	0.74	1 (5%)
2	NAG	D	1	2,1	14,14,15	0.58	0	17,19,21	0.76	1 (5%)
2	NAG	D	2	2	14,14,15	0.59	0	17,19,21	0.76	1 (5%)

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	NAG	C	1	2,1	-	4/6/23/26	0/1/1/1
2	NAG	C	2	2	-	2/6/23/26	0/1/1/1
2	NAG	D	1	2,1	-	2/6/23/26	0/1/1/1
2	NAG	D	2	2	-	3/6/23/26	0/1/1/1

There are no bond length outliers.

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	C	2	NAG	C2-N2-C7	-2.45	119.61	122.90
2	D	1	NAG	C2-N2-C7	-2.28	119.85	122.90
2	D	2	NAG	C2-N2-C7	-2.22	119.93	122.90
2	C	1	NAG	C2-N2-C7	-2.15	120.02	122.90

There are no chirality outliers.

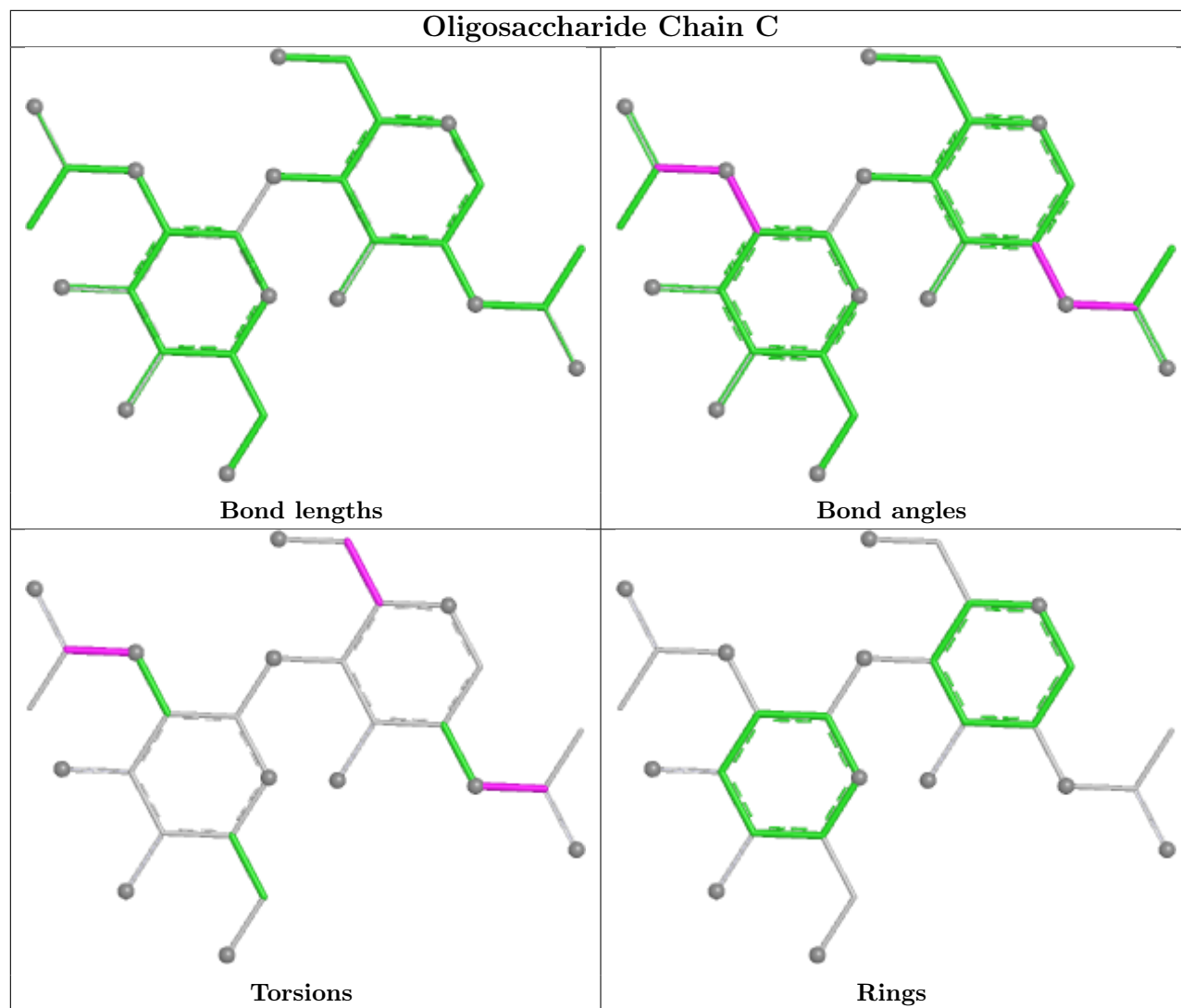
All (11) torsion outliers are listed below:

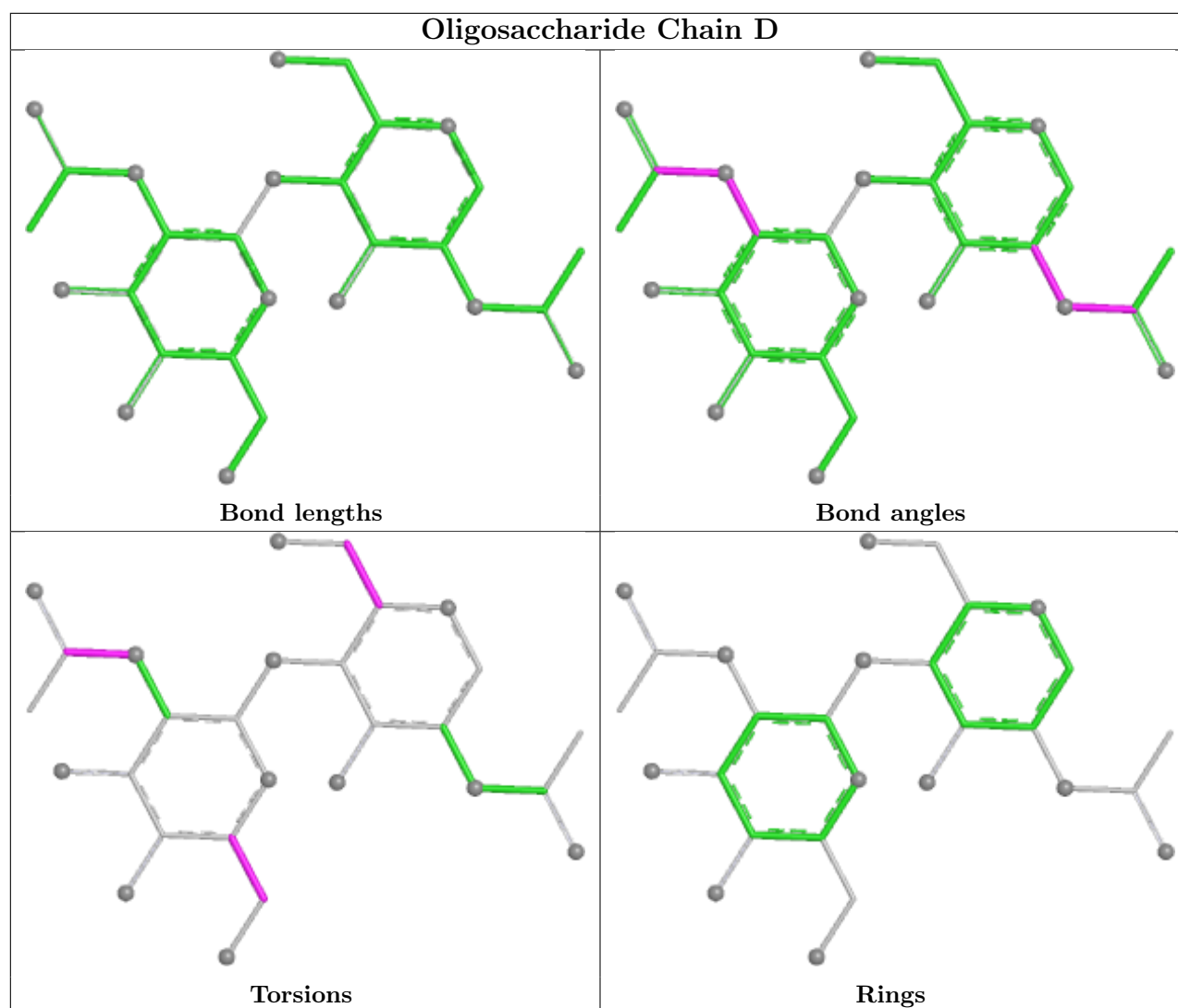
Mol	Chain	Res	Type	Atoms
2	C	2	NAG	C8-C7-N2-C2
2	C	2	NAG	O7-C7-N2-C2
2	D	2	NAG	C8-C7-N2-C2
2	D	2	NAG	O7-C7-N2-C2
2	C	1	NAG	O5-C5-C6-O6
2	D	1	NAG	O5-C5-C6-O6
2	C	1	NAG	C4-C5-C6-O6
2	D	1	NAG	C4-C5-C6-O6
2	C	1	NAG	C8-C7-N2-C2
2	D	2	NAG	C4-C5-C6-O6
2	C	1	NAG	O7-C7-N2-C2

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 7 ligands modelled in this entry, 7 are monoatomic - leaving 0 for Mogul analysis.

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

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 ⓘ

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	426/427 (99%)	0.03	11 (2%) 57 52	20, 40, 72, 101	0
1	B	426/427 (99%)	0.14	17 (3%) 42 38	21, 43, 73, 99	0
All	All	852/854 (99%)	0.08	28 (3%) 49 45	20, 41, 73, 101	0

All (28) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	610	TYR	3.7
1	B	445	GLU	3.6
1	A	607	THR	3.4
1	B	440	GLY	3.2
1	B	564	ASN	3.2
1	B	444	ALA	3.1
1	B	439	GLN	2.9
1	B	476	GLY	2.8
1	B	563	PRO	2.8
1	A	535	HIS	2.8
1	B	481	CYS	2.7
1	B	479	ALA	2.5
1	A	365	CYS	2.5
1	A	609	PRO	2.5
1	B	506	ILE	2.4
1	B	441	ALA	2.4
1	B	457	ALA	2.4
1	A	544	ASN	2.3
1	A	545	THR	2.2
1	B	478	SER	2.2
1	A	363	LEU	2.2
1	A	595	ARG	2.2
1	B	446	GLY	2.2
1	B	348	ASP	2.2

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Mol	Chain	Res	Type	RSRZ
1	A	186	ASN	2.1
1	B	610	TYR	2.1
1	B	609	PRO	2.0
1	A	608	THR	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](#)

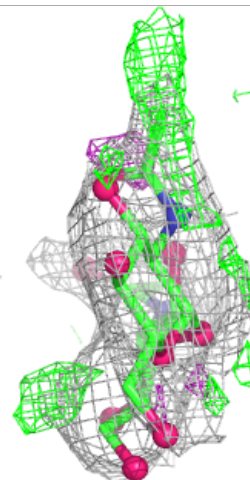
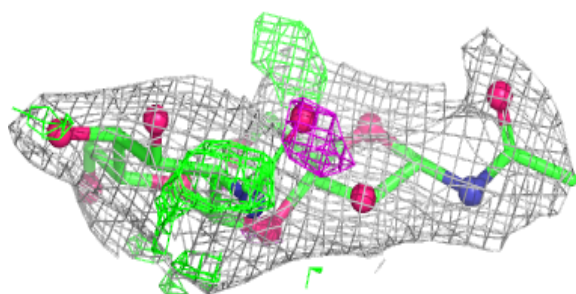
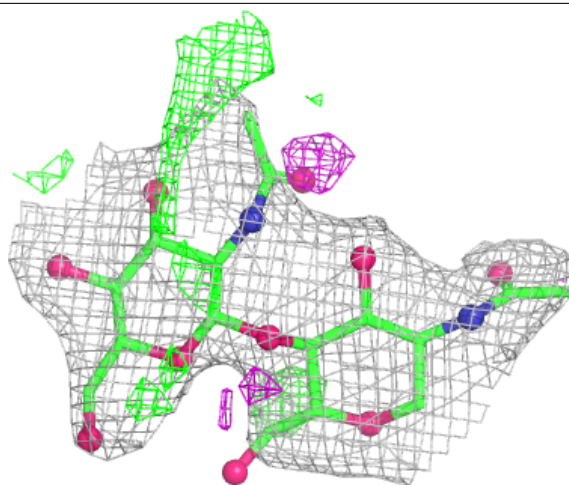
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists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

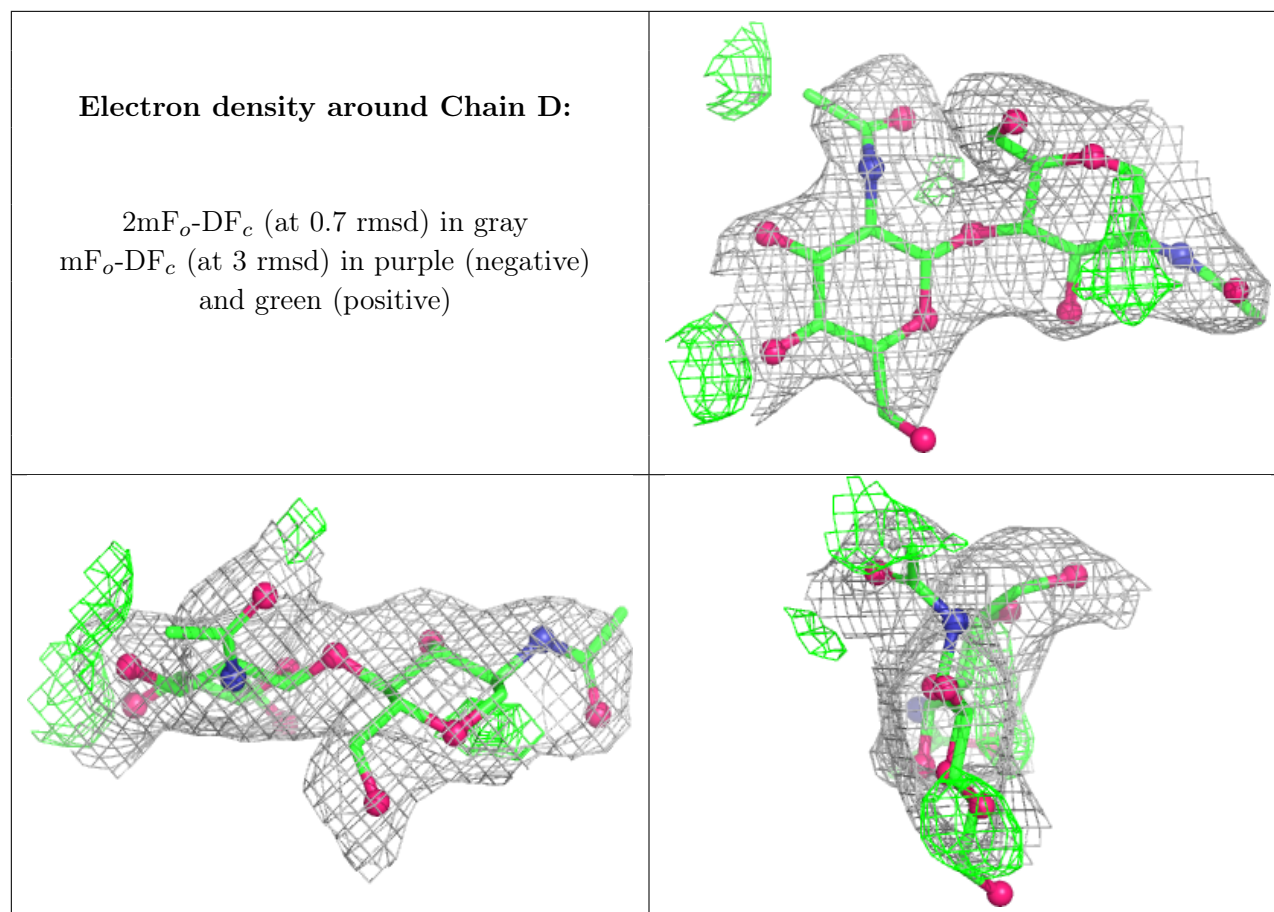
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
2	NAG	C	2	14/15	0.63	0.22	77,81,89,92	0
2	NAG	D	2	14/15	0.76	0.13	61,69,75,76	0
2	NAG	C	1	14/15	0.83	0.18	55,63,70,74	0
2	NAG	D	1	14/15	0.86	0.12	54,62,68,69	0

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

Electron density around Chain C:

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





6.4 Ligands [i](#)

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($\text{\AA}^2$)	Q<0.9
3	ZN	A	700	1/1	0.98	0.05	41,41,41,41	0
3	ZN	B	700	1/1	0.98	0.07	40,40,40,40	0
4	CA	B	701	1/1	0.98	0.03	32,32,32,32	0
4	CA	A	702	1/1	0.99	0.02	38,38,38,38	0
4	CA	B	702	1/1	0.99	0.03	57,57,57,57	0
5	3CO	A	703	1/1	0.99	0.05	35,35,35,35	0
4	CA	A	701	1/1	1.00	0.03	44,44,44,44	0

6.5 Other polymers [i](#)

There are no such residues in this entry.