



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 17, 2026 – 06:13 PM UTC

PDB ID : 2DW2 / pdb_00002dw2
Title : Crystal structure of VAP2 from Crotalus atrox venom (Form 2-5 crystal)
Authors : Takeda, S.; Igarashi, T.; Araki, S.
Deposited on : 2006-08-02
Resolution : 2.70 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

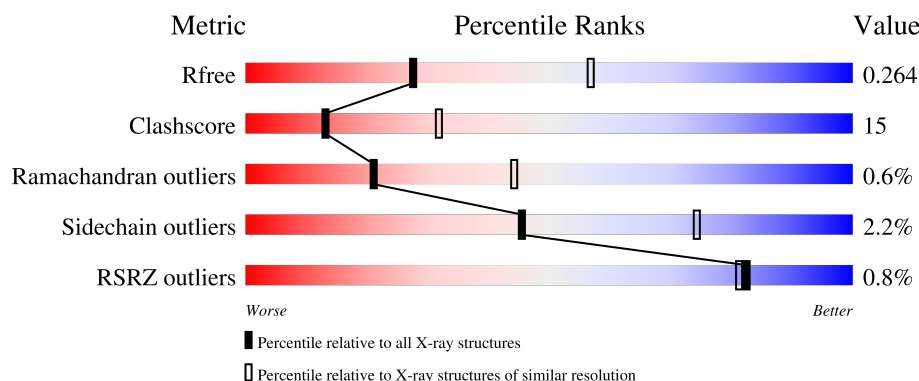
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.70 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	3538 (2.70-2.70)
Clashscore	190562	3843 (2.70-2.70)
Ramachandran outliers	187476	3778 (2.70-2.70)
Sidechain outliers	187428	3778 (2.70-2.70)
RSRZ outliers	180081	3538 (2.70-2.70)

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	419	71% 26% ..
1	B	419	68% 28% ..
2	C	9	33% 33% 33%
2	D	9	67% 22% 11%

2 Entry composition [i](#)

There are 5 unique types of molecules in this entry. The entry contains 6823 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.

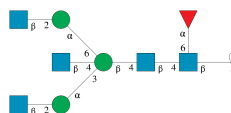
- Molecule 1 is a protein called Catrocollastatin.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	415	Total	C	N	O	S	0	0	0
			3219	1990	545	637	47			
1	B	415	Total	C	N	O	S	0	0	0
			3219	1990	545	637	47			

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	203	VAL	PHE	SEE REMARK 999	UNP Q90282
B	203	VAL	PHE	SEE REMARK 999	UNP Q90282

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



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
2	C	9	Total	C	N	O	0	0	0
			113	64	5	44			
2	D	9	Total	C	N	O	0	0	0
			113	64	5	44			

- 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		

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

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

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	3	Total 3	Ca 3	0	0
4	B	3	Total 3	Ca 3	0	0

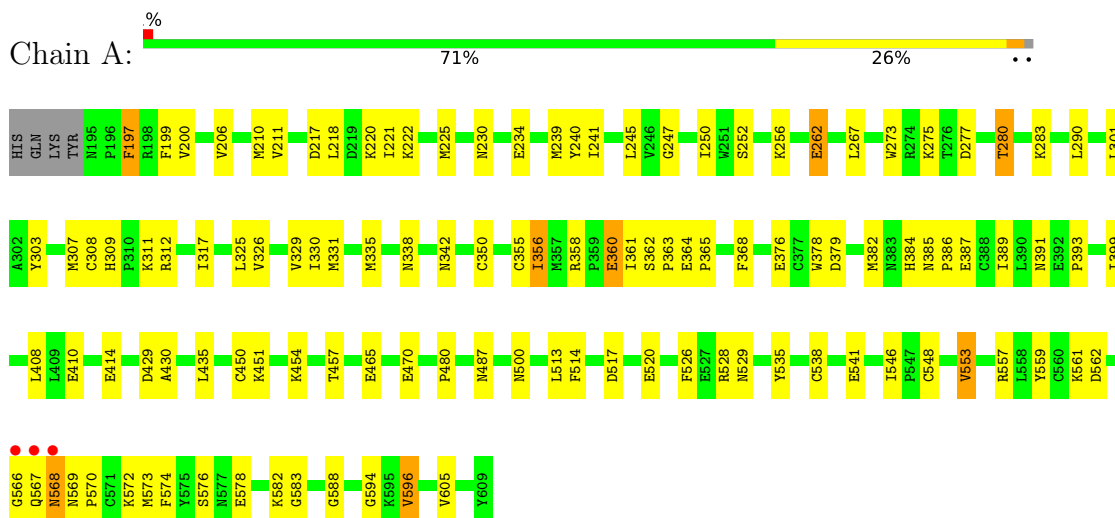
- Molecule 5 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	85	Total 85	O 85	0	0
5	B	66	Total 66	O 66	0	0

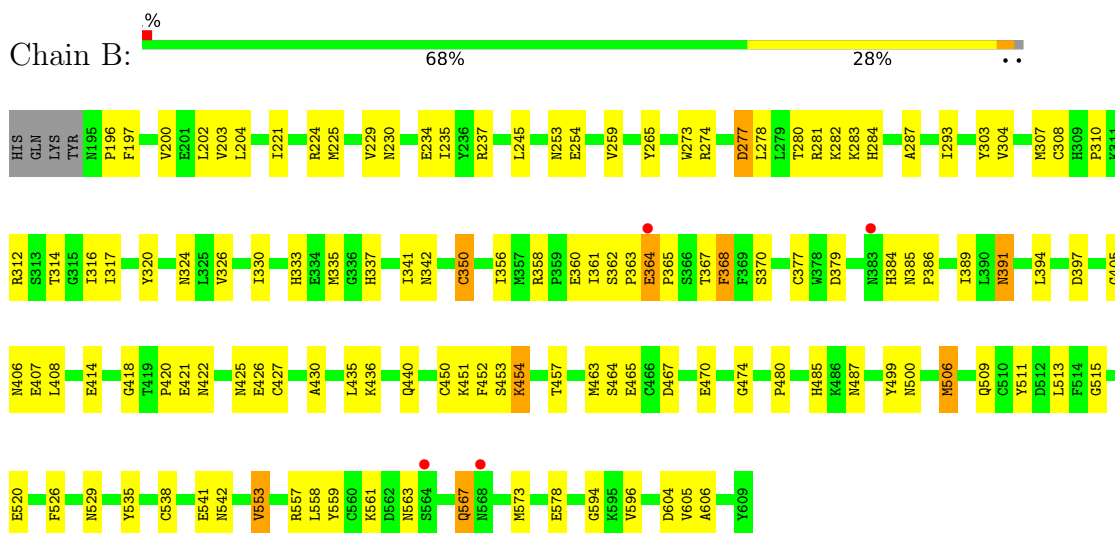
3 Residue-property plots

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: Catrocollastatin



• Molecule 1: Catrocollastatin



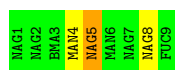
• Molecule 2: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-2)-alpha-D-mannopyranose-(1-3)-[2-acetamido-2-deoxy-beta-D-glucopyranose-(1-2)-alpha-D-mannopyranose-(1-6)][2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)]beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-[alpha-L-fucopyranose-(1-6)]2-acetamido-2-deoxy-beta-D-glucopyranose

Chain C:  33% 33% 33%



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

Chain D:  67% 22% 11%



4 Data and refinement statistics

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α , β , γ	220.74Å 79.47Å 58.69Å 90.00° 91.73° 90.00°	Depositor
Resolution (Å)	50.00 – 2.70 50.00 – 2.70	Depositor EDS
% Data completeness (in resolution range)	95.8 (50.00-2.70) 95.7 (50.00-2.70)	Depositor EDS
R_{merge}	0.09	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	5.31 (at 2.69Å)	Xtriage
Refinement program	CNS 1.0	Depositor
R, R_{free}	0.199 , 0.260 0.214 , 0.264	Depositor DCC
R_{free} test set	1334 reflections (4.96%)	wwPDB-VP
Wilson B-factor (Å ²)	26.0	Xtriage
Anisotropy	0.373	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.36 , 45.2	EDS
L-test for twinning ²	$\langle L \rangle = 0.48$, $\langle L^2 \rangle = 0.31$	Xtriage
Estimated twinning fraction	0.094 for -h,-k,l	Xtriage
F_o, F_c correlation	0.92	EDS
Total number of atoms	6823	wwPDB-VP
Average B, all atoms (Å ²)	25.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.49% 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: NAG, CA, FUC, MAN, ZN, 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	A	0.33	0/3291	0.86	7/4453 (0.2%)
1	B	0.32	0/3291	0.88	11/4453 (0.2%)
All	All	0.32	0/6582	0.87	18/8906 (0.2%)

There are no bond length outliers.

All (18) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	350	CYS	N-CA-C	-6.71	103.24	112.03
1	A	350	CYS	N-CA-C	-6.22	103.88	112.03
1	B	578	GLU	N-CA-C	-6.11	104.90	112.90
1	A	364	GLU	CA-C-N	5.81	125.76	119.78
1	A	364	GLU	C-N-CA	5.81	125.76	119.78
1	B	364	GLU	CA-C-N	5.76	125.78	119.90
1	B	364	GLU	C-N-CA	5.76	125.78	119.90
1	B	384	HIS	N-CA-C	-5.57	103.29	110.19
1	B	320	TYR	N-CA-C	5.40	117.25	111.36
1	B	513	LEU	N-CA-C	5.34	116.96	111.03
1	B	197	PHE	N-CA-C	5.32	117.74	110.24
1	A	356	ILE	N-CA-C	5.30	116.66	110.62
1	A	384	HIS	N-CA-C	-5.17	102.84	110.48
1	B	379	ASP	N-CA-C	-5.11	105.89	111.82
1	A	197	PHE	N-CA-C	5.11	117.63	110.23
1	B	485	HIS	N-CA-C	-5.05	104.01	110.53
1	B	368	PHE	N-CA-C	5.05	118.44	109.96
1	A	379	ASP	N-CA-C	-5.03	105.80	111.28

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts ⓘ

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	3219	0	2985	90	0
1	B	3219	0	2985	101	0
2	C	113	0	97	5	0
2	D	113	0	97	1	0
3	A	1	0	0	0	0
3	B	1	0	0	0	0
4	A	3	0	0	0	0
4	B	3	0	0	0	0
5	A	85	0	0	4	0
5	B	66	0	0	5	0
All	All	6823	0	6164	191	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 15.

All (191) 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:204:LEU:HD13	1:B:225:MET:HE3	1.43	0.99
1:A:529:ASN:HD21	1:A:557:ARG:HB3	1.36	0.91
1:B:326:VAL:HG13	1:B:361:ILE:HD11	1.63	0.81
1:B:529:ASN:HD21	1:B:557:ARG:HB3	1.47	0.80
1:B:454:LYS:HE3	1:B:457:THR:HG21	1.69	0.72
1:B:454:LYS:H	1:B:454:LYS:CD	2.02	0.72
1:B:224:ARG:HE	1:B:324:ASN:ND2	1.87	0.71
1:B:454:LYS:H	1:B:454:LYS:HD3	1.53	0.71
1:A:378:TRP:O	1:A:382:MET:HG2	1.93	0.69
1:A:470:GLU:HB3	1:A:480:PRO:HG2	1.75	0.69
1:B:363:PRO:C	1:B:365:PRO:HD3	2.19	0.68
1:B:224:ARG:HE	1:B:324:ASN:HD21	1.42	0.68
1:A:574:PHE:CZ	1:A:582:LYS:HE3	2.29	0.68
1:B:526:PHE:O	1:B:553:VAL:HG22	1.94	0.67
1:B:386:PRO:O	1:B:389:ILE:HG12	1.94	0.67
1:A:275:LYS:HE2	1:A:311:LYS:HB2	1.77	0.67
1:A:526:PHE:HB3	1:A:553:VAL:HG13	1.78	0.66

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:562:ASP:CG	1:A:567:GLN:HG3	2.20	0.66
1:B:594:GLY:C	1:B:605:VAL:HG23	2.21	0.65
1:A:326:VAL:HG13	1:A:361:ILE:HD11	1.78	0.65
1:B:425:ASN:HD22	1:B:426:GLU:N	1.95	0.64
1:A:408:LEU:O	1:A:410:GLU:HG3	1.96	0.64
1:A:277:ASP:O	1:A:280:THR:HG22	1.98	0.63
1:A:526:PHE:HB3	1:A:553:VAL:CG1	2.29	0.63
1:B:277:ASP:O	1:B:280:THR:HB	1.98	0.63
1:B:326:VAL:HG13	1:B:361:ILE:CD1	2.29	0.62
1:A:355:CYS:H	1:A:358:ARG:NH1	1.98	0.61
1:B:465:GLU:OE2	2:C:5:NAG:H3	2.01	0.61
1:A:317:ILE:HD13	1:A:331:MET:HA	1.82	0.61
1:A:317:ILE:CD1	1:A:331:MET:HA	2.30	0.60
1:A:210:MET:HE2	1:A:290:LEU:HD23	1.82	0.60
1:B:283:LYS:HD2	1:B:283:LYS:H	1.66	0.60
1:A:487:ASN:ND2	1:A:500:ASN:H	2.00	0.60
1:B:558:LEU:HD12	1:B:559:TYR:H	1.67	0.59
1:A:206:VAL:HB	1:A:250:ILE:HD13	1.83	0.59
1:B:203:VAL:HG11	1:B:278:LEU:HD21	1.83	0.59
1:B:350:CYS:HB3	1:B:370:SER:HA	1.83	0.59
1:A:517:ASP:OD2	1:B:342:ASN:HB3	2.03	0.59
1:B:391:ASN:HD22	1:B:391:ASN:N	2.00	0.59
1:A:568:ASN:O	1:A:570:PRO:HD3	2.04	0.58
1:A:487:ASN:HD21	1:A:500:ASN:H	1.51	0.58
1:B:229:VAL:HG21	1:B:245:LEU:HD13	1.86	0.58
1:B:596:VAL:HG13	1:B:605:VAL:HG22	1.86	0.57
1:B:283:LYS:HD2	1:B:283:LYS:N	2.19	0.57
1:B:454:LYS:HD3	1:B:454:LYS:N	2.20	0.57
1:B:535:TYR:CD1	1:B:573:MET:HE2	2.39	0.57
1:B:361:ILE:HB	5:B:27:HOH:O	2.04	0.57
1:B:440:GLN:HE21	1:B:452:PHE:H	1.53	0.57
1:A:283:LYS:N	1:A:283:LYS:HD2	2.20	0.56
1:B:450:CYS:C	1:B:451:LYS:HD2	2.29	0.56
1:A:454:LYS:O	1:A:457:THR:HG23	2.04	0.56
1:B:487:ASN:HD21	1:B:500:ASN:H	1.53	0.56
1:A:567:GLN:O	1:A:568:ASN:HB3	2.05	0.56
1:A:326:VAL:HG13	1:A:361:ILE:CD1	2.35	0.56
1:B:316:ILE:C	1:B:317:ILE:HD12	2.31	0.56
1:A:312:ARG:HD3	1:B:567:GLN:OE1	2.05	0.56
1:B:425:ASN:ND2	1:B:427:CYS:H	2.03	0.56
1:A:535:TYR:CD1	1:A:573:MET:HE2	2.41	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:245:LEU:HG	1:A:399:ILE:HD11	1.88	0.55
1:B:229:VAL:HG11	1:B:245:LEU:HB2	1.89	0.54
1:B:561:LYS:HD3	1:B:563:ASN:HD21	1.72	0.54
1:A:221:ILE:O	1:A:225:MET:HG2	2.08	0.54
1:B:454:LYS:H	1:B:454:LYS:CE	2.21	0.54
1:A:307:MET:O	1:A:308:CYS:HB2	2.06	0.54
2:C:5:NAG:C8	2:C:8:NAG:H61	2.37	0.54
1:B:304:VAL:HA	1:B:337:HIS:O	2.08	0.54
1:B:440:GLN:NE2	1:B:452:PHE:H	2.05	0.53
1:B:511:TYR:HA	1:B:515:GLY:O	2.08	0.53
1:B:200:VAL:HG11	1:B:335:MET:HE3	1.90	0.53
1:A:360:GLU:HG2	5:A:67:HOH:O	2.08	0.53
1:B:221:ILE:O	1:B:225:MET:HG2	2.08	0.53
1:B:259:VAL:HG12	1:B:293:ILE:HD12	1.91	0.53
1:A:200:VAL:HG11	1:A:335:MET:HE3	1.91	0.53
1:A:576:SER:C	1:A:578:GLU:H	2.17	0.53
1:B:364:GLU:N	1:B:365:PRO:HD3	2.23	0.53
1:B:307:MET:O	1:B:308:CYS:HB2	2.09	0.52
1:A:588:GLY:C	1:A:596:VAL:HG22	2.35	0.51
1:B:225:MET:O	1:B:229:VAL:HG23	2.10	0.51
1:B:356:ILE:HG12	1:B:368:PHE:O	2.10	0.51
1:B:282:LYS:HD3	1:B:283:LYS:N	2.26	0.51
1:B:526:PHE:HB3	1:B:553:VAL:HG13	1.93	0.50
2:C:6:MAN:O5	2:C:7:NAG:H82	2.11	0.50
1:B:274:ARG:HH21	1:B:284:HIS:CD2	2.29	0.50
1:A:594:GLY:O	1:A:605:VAL:HG23	2.12	0.49
1:A:356:ILE:HD13	1:A:368:PHE:C	2.37	0.49
1:B:421:GLU:N	1:B:421:GLU:OE2	2.44	0.49
1:A:256:LYS:HD2	1:A:273:TRP:CZ2	2.47	0.49
1:A:362:SER:O	1:A:365:PRO:HD3	2.12	0.49
1:B:237:ARG:NH2	1:B:422:ASN:HB3	2.28	0.49
1:A:529:ASN:HB3	1:A:548:CYS:SG	2.53	0.49
1:B:464:SER:HA	2:C:4:MAN:O4	2.12	0.49
1:A:210:MET:HE2	1:A:290:LEU:CD2	2.43	0.49
1:B:287:ALA:HB3	1:B:314:THR:HG22	1.93	0.49
1:A:325:LEU:O	1:A:329:VAL:HG23	2.12	0.48
1:B:506:MET:HG2	1:B:520:GLU:CD	2.37	0.48
1:A:335:MET:O	1:A:338:ASN:HB2	2.13	0.48
1:B:465:GLU:HG2	5:B:66:HOH:O	2.12	0.48
1:A:317:ILE:HG23	1:A:330:ILE:CG2	2.43	0.48
1:B:470:GLU:HB3	1:B:480:PRO:HG2	1.95	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:199:PHE:CD2	1:A:393:PRO:HD2	2.49	0.48
1:A:541:GLU:HG2	1:A:546:ILE:CG1	2.44	0.48
1:A:230:ASN:O	1:A:234:GLU:HG3	2.14	0.47
1:B:281:ARG:HH11	1:B:281:ARG:HG3	1.79	0.47
1:B:406:ASN:ND2	1:B:408:LEU:HD12	2.29	0.47
1:B:237:ARG:HE	1:B:407:GLU:CD	2.23	0.47
1:A:387:GLU:OE2	1:A:387:GLU:N	2.44	0.47
1:A:520:GLU:O	1:A:561:LYS:HE3	2.15	0.47
1:A:541:GLU:HG2	1:A:546:ILE:HG13	1.96	0.47
1:B:303:TYR:CD2	1:B:312:ARG:HA	2.50	0.47
1:B:341:ILE:HD11	1:B:377:CYS:HB2	1.97	0.46
1:B:451:LYS:HD2	1:B:451:LYS:N	2.30	0.46
1:A:303:TYR:CD2	1:A:312:ARG:HA	2.51	0.46
1:B:594:GLY:O	1:B:605:VAL:HG23	2.14	0.46
1:B:604:ASP:OD2	1:B:606:ALA:HB3	2.15	0.46
1:A:567:GLN:OE1	1:A:569:ASN:N	2.49	0.46
1:B:454:LYS:O	1:B:457:THR:HG23	2.16	0.46
1:A:358:ARG:HG3	1:A:358:ARG:HH11	1.79	0.46
1:B:558:LEU:HD12	1:B:559:TYR:N	2.30	0.46
1:A:239:MET:O	1:A:241:ILE:HG13	2.15	0.46
1:A:457:THR:HG21	5:A:146:HOH:O	2.16	0.45
1:A:312:ARG:HD2	1:B:567:GLN:HE22	1.81	0.45
1:A:528:ARG:HH11	1:A:528:ARG:HG3	1.80	0.45
1:A:588:GLY:O	1:A:596:VAL:HG22	2.16	0.45
1:B:420:PRO:HG2	1:B:421:GLU:OE2	2.17	0.45
1:A:247:GLY:CA	1:A:399:ILE:HD13	2.47	0.45
1:B:274:ARG:HD3	1:B:310:PRO:O	2.17	0.45
1:B:358:ARG:HH21	1:B:358:ARG:HG2	1.83	0.44
2:C:4:MAN:O2	2:C:5:NAG:H82	2.18	0.44
1:A:256:LYS:HD2	1:A:273:TRP:HZ2	1.82	0.44
1:B:414:GLU:OE2	1:B:435:LEU:N	2.48	0.44
1:A:247:GLY:C	1:A:399:ILE:HD13	2.43	0.44
1:B:425:ASN:HD22	1:B:425:ASN:C	2.25	0.44
1:B:541:GLU:O	1:B:542:ASN:HB2	2.18	0.44
1:A:363:PRO:HA	5:A:91:HOH:O	2.17	0.44
1:A:465:GLU:OE2	2:D:5:NAG:H3	2.17	0.44
1:A:267:LEU:HD22	1:A:301:LEU:HG	1.99	0.44
1:A:526:PHE:O	1:A:553:VAL:HG13	2.18	0.44
1:A:218:LEU:O	1:A:222:LYS:HG3	2.17	0.44
1:B:405:GLY:O	1:B:418:GLY:HA2	2.17	0.44
1:B:202:LEU:HD12	1:B:203:VAL:H	1.83	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:463:MET:HG3	1:B:467:ASP:OD1	2.17	0.44
1:B:464:SER:HB2	5:B:66:HOH:O	2.17	0.44
1:A:211:VAL:HG21	1:A:252:SER:HA	2.01	0.43
1:A:356:ILE:HD13	1:A:368:PHE:O	2.18	0.43
1:A:576:SER:C	1:A:578:GLU:N	2.74	0.43
1:B:454:LYS:HE3	1:B:454:LYS:H	1.82	0.43
1:A:450:CYS:O	1:A:451:LYS:HD3	2.18	0.43
1:B:265:TYR:C	1:B:265:TYR:CD2	2.97	0.43
1:A:535:TYR:CD1	1:A:535:TYR:C	2.97	0.43
1:B:453:SER:O	1:B:474:GLY:HA2	2.19	0.43
1:A:391:ASN:HD22	1:A:391:ASN:H	1.66	0.42
1:A:567:GLN:O	1:A:568:ASN:CB	2.66	0.42
1:B:386:PRO:HB2	1:B:389:ILE:HG12	2.01	0.42
1:A:197:PHE:HA	1:A:240:TYR:O	2.19	0.42
1:B:204:LEU:CD1	1:B:225:MET:HE3	2.31	0.42
1:B:330:ILE:O	1:B:333:HIS:HB3	2.19	0.42
1:B:259:VAL:CG1	1:B:293:ILE:HD12	2.49	0.42
1:B:557:ARG:HG2	1:B:573:MET:HG3	2.01	0.42
1:A:529:ASN:ND2	1:A:557:ARG:HB3	2.17	0.42
1:A:574:PHE:CD1	1:A:574:PHE:C	2.97	0.42
1:B:235:ILE:HG23	1:B:367:THR:O	2.20	0.42
1:B:281:ARG:HG3	1:B:281:ARG:NH1	2.34	0.42
1:A:317:ILE:HD11	1:A:331:MET:HA	2.02	0.42
1:A:574:PHE:CE1	1:A:582:LYS:HG2	2.54	0.42
1:A:356:ILE:HD12	1:A:356:ILE:N	2.35	0.41
1:A:569:ASN:HD22	1:A:570:PRO:HD2	1.85	0.41
1:A:307:MET:O	1:A:308:CYS:CB	2.67	0.41
1:B:509:GLN:HB3	5:B:117:HOH:O	2.19	0.41
1:B:204:LEU:HD13	1:B:225:MET:CE	2.30	0.41
1:A:385:ASN:O	1:A:387:GLU:N	2.53	0.41
1:B:273:TRP:O	1:B:277:ASP:HB3	2.20	0.41
1:B:394:LEU:HB2	1:B:397:ASP:OD2	2.21	0.41
1:A:217:ASP:CG	1:A:220:LYS:HB2	2.46	0.41
1:B:230:ASN:O	1:B:234:GLU:HG3	2.20	0.41
1:B:487:ASN:ND2	1:B:500:ASN:H	2.18	0.41
1:A:513:LEU:HD11	1:A:583:GLY:HA2	2.02	0.41
1:A:514:PHE:CZ	1:A:572:LYS:HG3	2.56	0.41
1:A:529:ASN:ND2	1:A:559:TYR:OH	2.53	0.41
1:A:262:GLU:HB2	5:A:69:HOH:O	2.21	0.41
1:B:362:SER:HB2	1:B:363:PRO:HD2	2.03	0.41
1:B:386:PRO:HB2	1:B:389:ILE:CD1	2.51	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:342:ASN:HB2	1:A:376:GLU:OE1	2.21	0.40
1:A:414:GLU:HB3	1:A:435:LEU:HG	2.02	0.40
1:B:253:ASN:HB2	5:B:115:HOH:O	2.20	0.40
1:A:386:PRO:O	1:A:389:ILE:HG12	2.21	0.40
1:A:309:HIS:CE1	1:A:311:LYS:H	2.38	0.40
1:A:429:ASP:O	1:A:430:ALA:C	2.65	0.40
1:B:326:VAL:O	1:B:330:ILE:HG13	2.21	0.40
1:B:287:ALA:O	1:B:314:THR:HA	2.21	0.40
1:B:317:ILE:HD12	1:B:317:ILE:N	2.37	0.40
1:B:499:TYR:CZ	1:B:500:ASN:ND2	2.89	0.40

There are no symmetry-related clashes.

5.3 Torsion angles ⓘ

5.3.1 Protein backbone ⓘ

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	413/419 (99%)	380 (92%)	31 (8%)	2 (0%)	24	48
1	B	413/419 (99%)	381 (92%)	29 (7%)	3 (1%)	18	41
All	All	826/838 (99%)	761 (92%)	60 (7%)	5 (1%)	21	44

All (5) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	430	ALA
1	A	568	ASN
1	B	277	ASP
1	B	196	PRO
1	A	566	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	361/365 (99%)	355 (98%)	6 (2%)	53	79
1	B	361/365 (99%)	351 (97%)	10 (3%)	38	68
All	All	722/730 (99%)	706 (98%)	16 (2%)	45	74

All (16) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	262	GLU
1	A	280	THR
1	A	360	GLU
1	A	538	CYS
1	A	553	VAL
1	A	596	VAL
1	B	254	GLU
1	B	360	GLU
1	B	385	ASN
1	B	391	ASN
1	B	436	LYS
1	B	454	LYS
1	B	506	MET
1	B	538	CYS
1	B	553	VAL
1	B	567	GLN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (27) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	288	GLN
1	A	383	ASN
1	A	385	ASN
1	A	422	ASN
1	A	487	ASN
1	A	502	ASN

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Mol	Chain	Res	Type
1	A	508	HIS
1	A	529	ASN
1	A	569	ASN
1	A	599	ASN
1	B	268	ASN
1	B	288	GLN
1	B	324	ASN
1	B	385	ASN
1	B	425	ASN
1	B	440	GLN
1	B	475	GLN
1	B	485	HIS
1	B	487	ASN
1	B	500	ASN
1	B	529	ASN
1	B	542	ASN
1	B	544	ASN
1	B	563	ASN
1	B	581	HIS
1	B	599	ASN
1	B	601	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](#)

18 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	0.55	0	17,19,21	0.81	1 (5%)
2	NAG	C	2	2	14,14,15	0.54	0	17,19,21	0.81	0
2	BMA	C	3	2	11,11,12	0.54	0	15,15,17	0.53	0
2	MAN	C	4	2	11,11,12	0.87	1 (9%)	15,15,17	1.40	2 (13%)
2	NAG	C	5	2	14,14,15	0.66	0	17,19,21	0.70	1 (5%)
2	MAN	C	6	2	11,11,12	0.65	0	15,15,17	0.60	0
2	NAG	C	7	2	14,14,15	0.58	0	17,19,21	0.62	0
2	NAG	C	8	2	14,14,15	0.48	0	17,19,21	0.74	1 (5%)
2	FUC	C	9	2	10,10,11	0.55	0	14,14,16	0.44	0
2	NAG	D	1	2,1	14,14,15	0.54	0	17,19,21	0.82	0
2	NAG	D	2	2	14,14,15	0.56	0	17,19,21	0.71	0
2	BMA	D	3	2	11,11,12	0.53	0	15,15,17	0.60	0
2	MAN	D	4	2	11,11,12	0.91	1 (9%)	15,15,17	1.27	2 (13%)
2	NAG	D	5	2	14,14,15	0.70	1 (7%)	17,19,21	0.72	0
2	MAN	D	6	2	11,11,12	0.40	0	15,15,17	0.69	0
2	NAG	D	7	2	14,14,15	0.50	0	17,19,21	0.59	0
2	NAG	D	8	2	14,14,15	0.46	0	17,19,21	0.79	1 (5%)
2	FUC	D	9	2	10,10,11	0.70	0	14,14,16	0.33	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	2,1	-	4/6/23/26	0/1/1/1
2	NAG	C	2	2	-	0/6/23/26	0/1/1/1
2	BMA	C	3	2	-	0/2/19/22	0/1/1/1
2	MAN	C	4	2	-	2/2/19/22	0/1/1/1
2	NAG	C	5	2	-	2/6/23/26	0/1/1/1
2	MAN	C	6	2	-	2/2/19/22	0/1/1/1
2	NAG	C	7	2	-	3/6/23/26	0/1/1/1
2	NAG	C	8	2	-	2/6/23/26	0/1/1/1
2	FUC	C	9	2	-	-	0/1/1/1
2	NAG	D	1	2,1	-	3/6/23/26	0/1/1/1
2	NAG	D	2	2	-	0/6/23/26	0/1/1/1
2	BMA	D	3	2	-	0/2/19/22	0/1/1/1
2	MAN	D	4	2	-	0/2/19/22	0/1/1/1
2	NAG	D	5	2	-	3/6/23/26	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	MAN	D	6	2	-	0/2/19/22	0/1/1/1
2	NAG	D	7	2	-	3/6/23/26	0/1/1/1
2	NAG	D	8	2	-	4/6/23/26	0/1/1/1
2	FUC	D	9	2	-	-	0/1/1/1

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	C	4	MAN	C2-C3	2.27	1.56	1.52
2	D	4	MAN	C2-C3	2.22	1.55	1.52
2	D	5	NAG	C1-C2	2.01	1.55	1.52

All (8) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	C	4	MAN	C1-C2-C3	4.42	116.08	109.64
2	D	4	MAN	C1-C2-C3	3.80	115.18	109.64
2	D	8	NAG	C2-N2-C7	-2.36	119.73	122.90
2	C	1	NAG	C2-N2-C7	-2.32	119.79	122.90
2	C	8	NAG	C2-N2-C7	-2.25	119.89	122.90
2	C	4	MAN	C2-C3-C4	2.17	114.68	110.86
2	C	5	NAG	C2-N2-C7	-2.01	120.21	122.90
2	D	4	MAN	C2-C3-C4	2.00	114.38	110.86

There are no chirality outliers.

All (28) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	C	1	NAG	C8-C7-N2-C2
2	C	1	NAG	O7-C7-N2-C2
2	C	5	NAG	C8-C7-N2-C2
2	C	5	NAG	O7-C7-N2-C2
2	D	1	NAG	C8-C7-N2-C2
2	D	1	NAG	O7-C7-N2-C2
2	D	5	NAG	C8-C7-N2-C2
2	D	5	NAG	O7-C7-N2-C2
2	D	7	NAG	C8-C7-N2-C2
2	D	7	NAG	O7-C7-N2-C2
2	D	8	NAG	O5-C5-C6-O6
2	C	7	NAG	O7-C7-N2-C2
2	C	4	MAN	C4-C5-C6-O6

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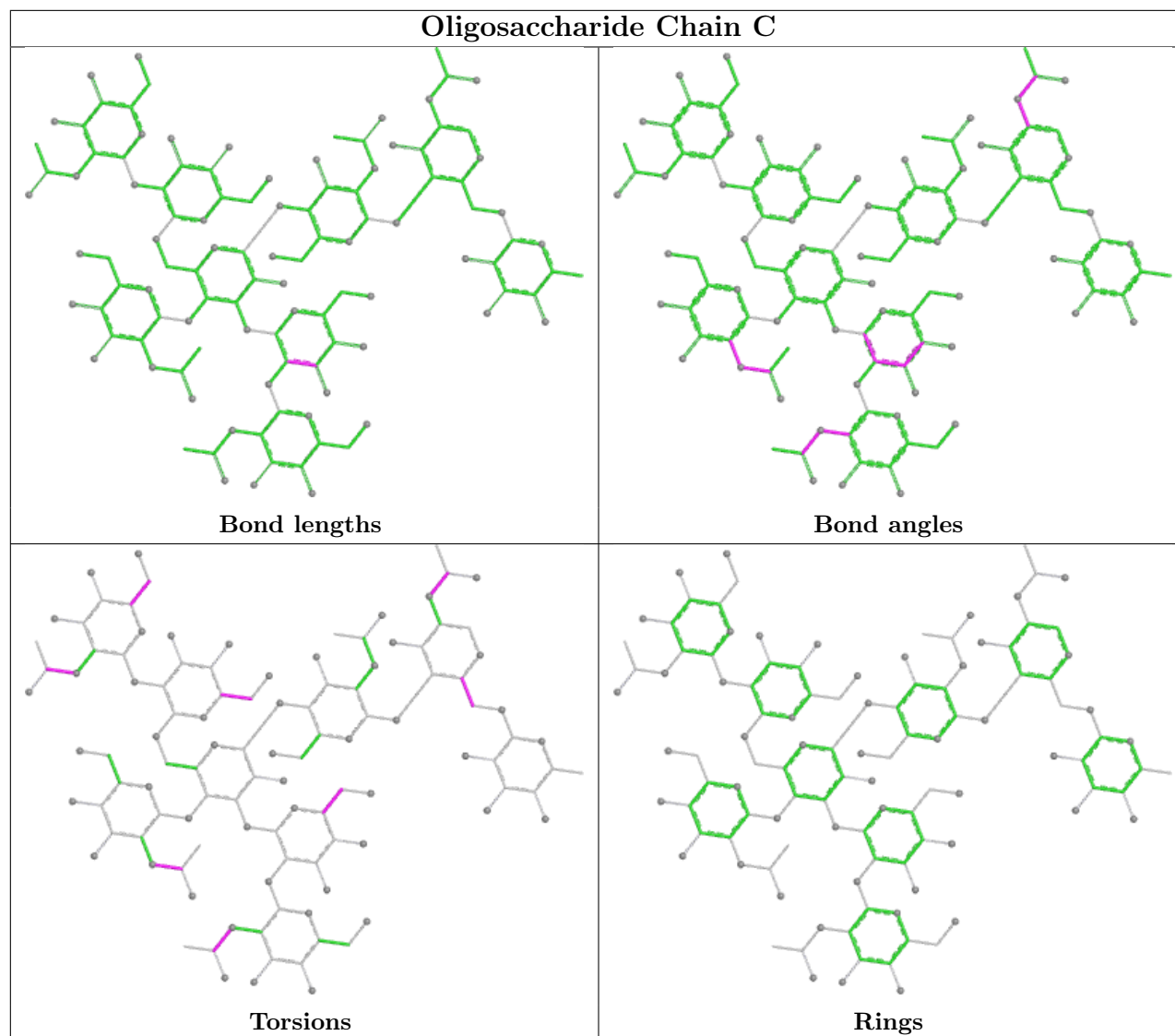
Mol	Chain	Res	Type	Atoms
2	C	7	NAG	C8-C7-N2-C2
2	D	8	NAG	C4-C5-C6-O6
2	C	4	MAN	O5-C5-C6-O6
2	C	1	NAG	C4-C5-C6-O6
2	C	1	NAG	O5-C5-C6-O6
2	C	6	MAN	C4-C5-C6-O6
2	C	6	MAN	O5-C5-C6-O6
2	D	8	NAG	C8-C7-N2-C2
2	D	8	NAG	O7-C7-N2-C2
2	D	7	NAG	O5-C5-C6-O6
2	C	7	NAG	O5-C5-C6-O6
2	C	8	NAG	C8-C7-N2-C2
2	D	1	NAG	C4-C5-C6-O6
2	C	8	NAG	O7-C7-N2-C2
2	D	5	NAG	C4-C5-C6-O6

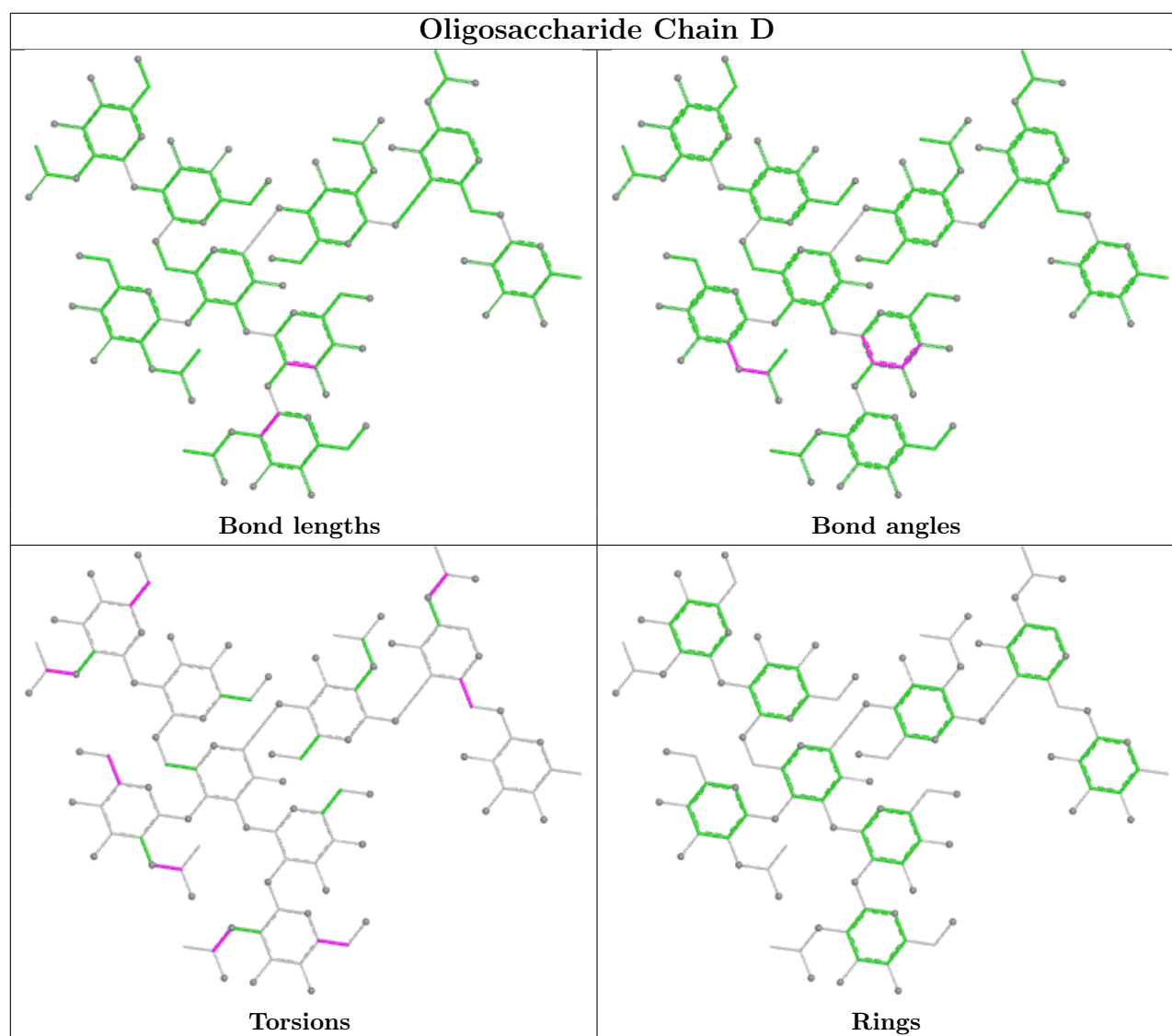
There are no ring outliers.

6 monomers are involved in 6 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	C	6	MAN	1	0
2	C	7	NAG	1	0
2	C	8	NAG	1	0
2	C	5	NAG	3	0
2	C	4	MAN	2	0
2	D	5	NAG	1	0

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





5.6 Ligand geometry [i](#)

Of 8 ligands modelled in this entry, 8 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

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 [i](#)

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

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

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
1	A	415/419 (99%)	-0.22	3 (0%) 84 83	6, 22, 43, 66	0
1	B	415/419 (99%)	-0.13	4 (0%) 79 78	8, 24, 46, 61	0
All	All	830/838 (99%)	-0.17	7 (0%) 82 81	6, 23, 44, 66	0

All (7) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	568	ASN	3.6
1	A	567	GLN	3.1
1	B	364	GLU	2.6
1	B	568	ASN	2.6
1	A	566	GLY	2.4
1	B	564	SER	2.2
1	B	383	ASN	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.

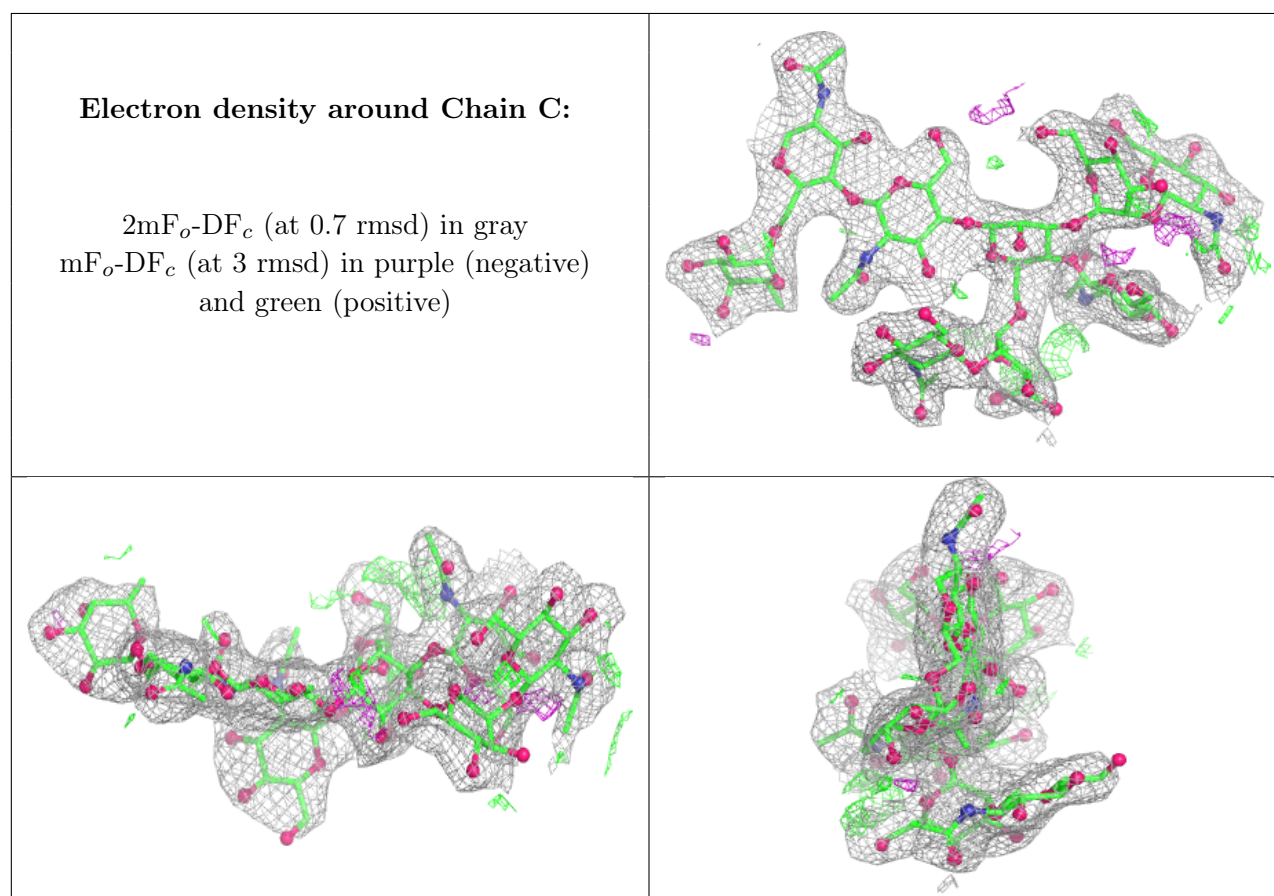
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
2	NAG	D	7	14/15	0.75	0.12	42,47,48,51	0
2	MAN	C	6	11/12	0.83	0.13	32,38,45,46	0

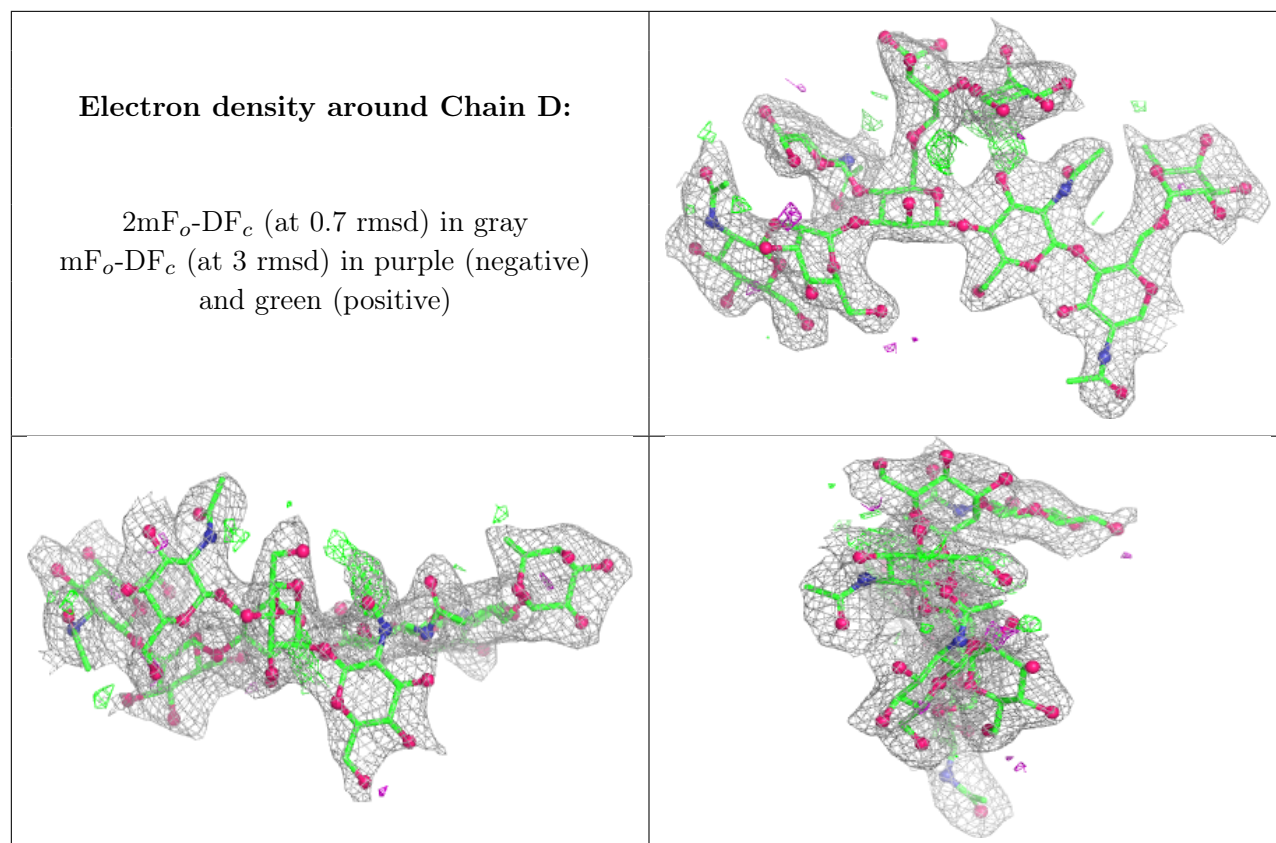
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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
2	NAG	D	5	14/15	0.84	0.12	28,35,38,39	0
2	NAG	C	7	14/15	0.84	0.12	42,45,48,49	0
2	NAG	C	5	14/15	0.86	0.12	14,31,33,34	0
2	MAN	D	4	11/12	0.87	0.15	32,40,43,45	0
2	MAN	C	4	11/12	0.87	0.14	34,37,39,48	0
2	NAG	D	2	14/15	0.87	0.12	24,39,45,46	0
2	NAG	C	2	14/15	0.88	0.10	24,32,35,37	0
2	MAN	D	6	11/12	0.88	0.10	33,36,39,40	0
2	NAG	C	8	14/15	0.88	0.10	30,35,40,40	0
2	FUC	D	9	10/11	0.88	0.10	26,30,34,36	0
2	FUC	C	9	10/11	0.89	0.12	23,30,34,39	0
2	NAG	D	1	14/15	0.90	0.11	29,34,41,46	0
2	NAG	C	1	14/15	0.91	0.10	26,31,35,37	0
2	NAG	D	8	14/15	0.92	0.08	24,31,34,36	0
2	BMA	D	3	11/12	0.92	0.09	34,40,42,45	0
2	BMA	C	3	11/12	0.93	0.08	29,35,38,39	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	CA	B	711	1/1	0.97	0.05	23,23,23,23	0
4	CA	A	703	1/1	0.99	0.03	23,23,23,23	0
4	CA	A	702	1/1	0.99	0.02	20,20,20,20	0
4	CA	B	712	1/1	0.99	0.02	22,22,22,22	0
4	CA	B	713	1/1	0.99	0.02	20,20,20,20	0
4	CA	A	701	1/1	1.00	0.01	21,21,21,21	0
3	ZN	A	700	1/1	1.00	0.01	18,18,18,18	0
3	ZN	B	700	1/1	1.00	0.02	17,17,17,17	0

6.5 Other polymers [i](#)

There are no such residues in this entry.