



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 20, 2026 – 06:40 PM UTC

PDB ID : 7EIS / pdb_00007eis
Title : Crystal structure of chondroitin ABC lyase I in complex with chondroitin disaccharide 0S
Authors : Takashima, M.; Miyanaga, A.; Eguchi, T.
Deposited on : 2021-03-31
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

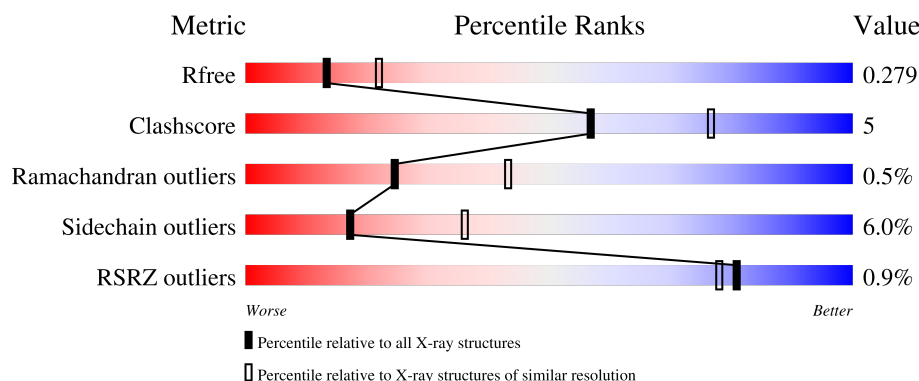
1 Overall quality at a glance

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	1021	
2	B	2	
2	C	2	

2 Entry composition [i](#)

There are 4 unique types of molecules in this entry. The entry contains 7872 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 Chondroitin sulfate ABC endolyase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	966	Total	C	N	O	S	0	0	0
			7720	4913	1317	1469	21			

- Molecule 2 is an oligosaccharide called 4-deoxy-alpha-L-threo-hex-4-enopyranuronic acid-(1-3)-2-acetamido-2-deoxy-beta-D-galactopyranose.



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
2	B	2	Total	C	N	O	0	0	0
			26	14	1	11			
2	C	2	Total	C	N	O	0	0	0
			26	14	1	11			

- Molecule 3 is MAGNESIUM ION (CCD ID: MG) (formula: Mg).

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

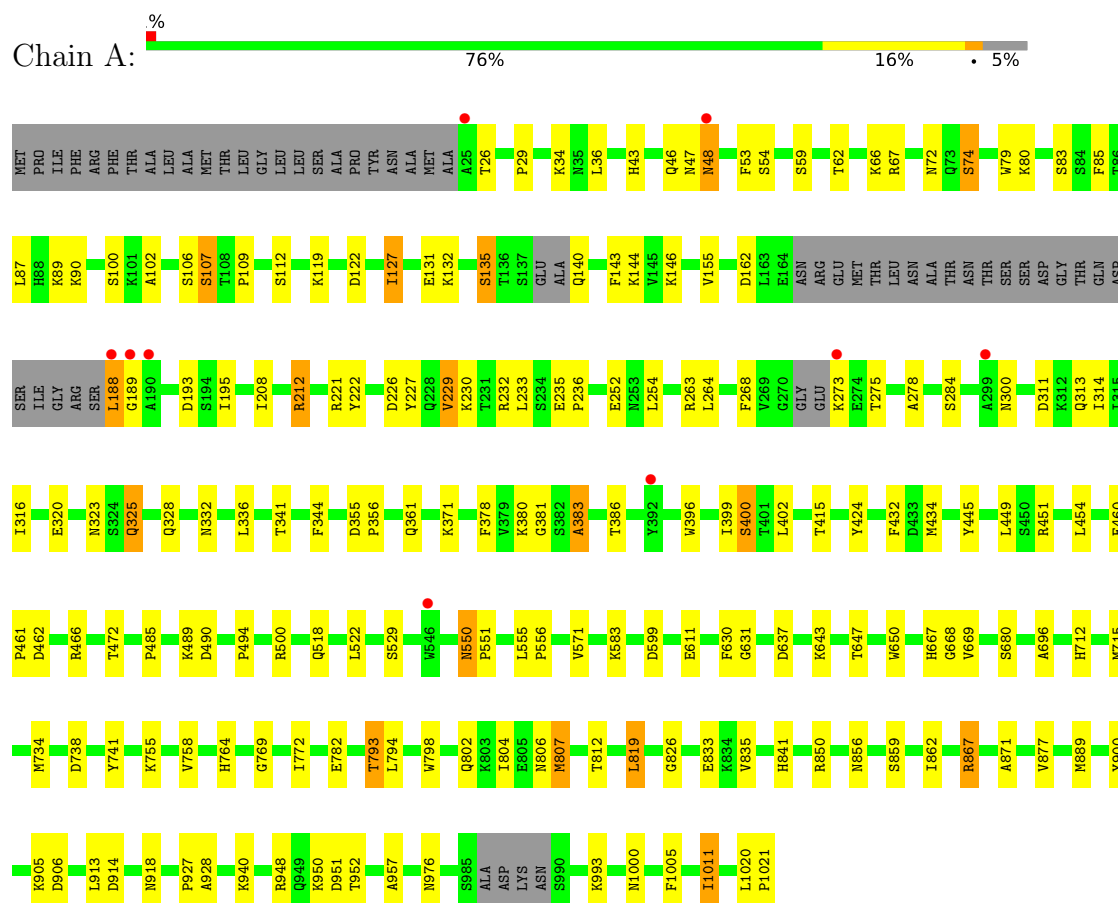
- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	99	Total	O	0	0
			99	99		

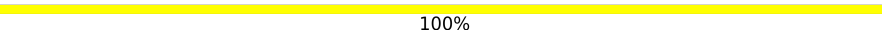
3 Residue-property plots

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: Chondroitin sulfate ABC endolysase



- Molecule 2: 4-deoxy-alpha-L-threo-hex-4-enopyranuronic acid-(1-3)-2-acetamido-2-deoxy-beta-D-galactopyranose

Chain B: 



- Molecule 2: 4-deoxy-alpha-L-threo-hex-4-enopyranuronic acid-(1-3)-2-acetamido-2-deoxy-beta-D-galactopyranose

Chain C:

100%

RGA1
GCD2

4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	48.79Å 94.29Å 228.99Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	48.98 – 2.50 48.98 – 2.50	Depositor EDS
% Data completeness (in resolution range)	99.9 (48.98-2.50) 99.9 (48.98-2.50)	Depositor EDS
R_{merge}	0.18	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.57 (at 2.51Å)	Xtriage
Refinement program	REFMAC 5.8.0238	Depositor
R, R_{free}	0.204 , 0.278 0.211 , 0.279	Depositor DCC
R_{free} test set	1830 reflections (4.86%)	wwPDB-VP
Wilson B-factor (Å ²)	38.7	Xtriage
Anisotropy	0.659	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.34 , 32.0	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	7872	wwPDB-VP
Average B, all atoms (Å ²)	45.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.68% 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: GCD, NGA, MG

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	1.15	4/7909 (0.1%)	1.52	37/10726 (0.3%)

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	500	ARG	C-O	5.82	1.31	1.23
1	A	109	PRO	C-O	5.50	1.29	1.23
1	A	668	GLY	C-O	5.33	1.31	1.24
1	A	529	SER	C-O	5.08	1.29	1.23

All (37) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	812	THR	CA-CB-OG1	-7.11	98.94	109.60
1	A	383	ALA	CA-C-N	6.30	131.08	122.19
1	A	383	ALA	C-N-CA	6.30	131.08	122.19
1	A	252	GLU	CB-CG-CD	6.18	123.10	112.60
1	A	341	THR	CB-CA-C	5.71	119.85	110.88
1	A	1011	ILE	CA-C-O	5.60	122.26	119.12
1	A	611	GLU	CA-C-O	-5.58	115.25	121.23
1	A	867	ARG	CB-CA-C	5.54	119.50	111.02
1	A	361	GLN	CA-C-N	5.52	127.95	120.44
1	A	361	GLN	C-N-CA	5.52	127.95	120.44
1	A	889	MET	CA-C-N	5.41	127.53	120.28
1	A	889	MET	C-N-CA	5.41	127.53	120.28
1	A	235	GLU	CB-CA-C	5.38	116.14	110.17
1	A	278	ALA	CA-C-N	5.37	128.39	120.82
1	A	278	ALA	C-N-CA	5.37	128.39	120.82
1	A	263	ARG	CA-C-N	5.35	127.71	120.65
1	A	263	ARG	C-N-CA	5.35	127.71	120.65

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	918	ASN	CB-CA-C	5.29	119.24	111.73
1	A	833	GLU	N-CA-C	-5.22	105.19	112.45
1	A	325	GLN	CA-C-N	5.21	127.78	120.28
1	A	325	GLN	C-N-CA	5.21	127.78	120.28
1	A	472	THR	CA-C-N	5.17	127.73	120.28
1	A	472	THR	C-N-CA	5.17	127.73	120.28
1	A	162	ASP	CA-CB-CG	5.15	117.75	112.60
1	A	462	ASP	CB-CA-C	5.15	118.12	109.89
1	A	1000	ASN	CA-CB-CG	-5.13	107.47	112.60
1	A	841	HIS	CA-C-O	-5.12	114.64	120.58
1	A	236	PRO	CA-C-N	5.10	128.45	120.75
1	A	236	PRO	C-N-CA	5.10	128.45	120.75
1	A	712	HIS	CB-CA-C	5.09	120.54	110.42
1	A	793	THR	CB-CA-C	5.08	119.88	109.67
1	A	489	LYS	CB-CA-C	5.03	118.62	109.62
1	A	928	ALA	CA-C-O	-5.03	115.85	121.23
1	A	927	PRO	CA-C-O	-5.02	115.69	121.36
1	A	454	LEU	CA-C-N	5.01	126.99	120.28
1	A	454	LEU	C-N-CA	5.01	126.99	120.28
1	A	631	GLY	CA-C-O	-5.01	116.63	121.19

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	7720	0	7558	71	1
2	B	26	0	19	0	0
2	C	26	0	19	0	0
3	A	1	0	0	0	0
4	A	99	0	0	0	0
All	All	7872	0	7596	71	1

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 5.

All (71) 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:59:SER:HG	1:A:83:SER:HG	1.15	0.85
1:A:226:ASP:HB3	1:A:383:ALA:HB2	1.70	0.72
1:A:146:LYS:HE3	1:A:227:TYR:O	1.91	0.70
1:A:432:PHE:O	1:A:434:MET:HG3	1.93	0.68
1:A:29:PRO:HB3	1:A:90:LYS:HB3	1.78	0.66
1:A:264:LEU:HG	1:A:522:LEU:HD13	1.78	0.66
1:A:344:PHE:C	1:A:344:PHE:CD1	2.77	0.62
1:A:550:ASN:N	1:A:551:PRO:HA	2.15	0.62
1:A:738:ASP:OD1	1:A:755:LYS:NZ	2.35	0.59
1:A:85:PHE:C	1:A:85:PHE:CD1	2.82	0.56
1:A:53:PHE:CZ	1:A:87:LEU:HD13	2.41	0.55
1:A:212:ARG:O	1:A:212:ARG:HD2	2.06	0.55
1:A:571:VAL:HG12	1:A:571:VAL:O	2.08	0.54
1:A:26:THR:O	1:A:89:LYS:NZ	2.40	0.54
1:A:221:ARG:O	1:A:233:LEU:HD13	2.08	0.53
1:A:835:VAL:HG22	1:A:862:ILE:HG12	1.90	0.53
1:A:47:ASN:O	1:A:48:ASN:C	2.51	0.53
1:A:550:ASN:N	1:A:551:PRO:CA	2.71	0.52
1:A:460:GLU:OE1	1:A:461:PRO:HD2	2.10	0.52
1:A:782:GLU:HA	1:A:862:ILE:O	2.10	0.51
1:A:313:GLN:O	1:A:316:ILE:HG22	2.11	0.51
1:A:772:ILE:HB	1:A:871:ALA:HB3	1.93	0.50
1:A:264:LEU:HD13	1:A:402:LEU:CD1	2.42	0.50
1:A:948:ARG:HH12	1:A:951:ASP:HA	1.77	0.49
1:A:1020:LEU:HD23	1:A:1021:PRO:HD2	1.95	0.49
1:A:494:PRO:HB2	1:A:1011:ILE:HD11	1.93	0.49
1:A:957:ALA:HB3	1:A:1005:PHE:CG	2.48	0.49
1:A:311:ASP:O	1:A:314:ILE:HG12	2.13	0.49
1:A:140:GLN:OE1	1:A:189:GLY:N	2.43	0.48
1:A:769:GLY:O	1:A:905:LYS:HE2	2.13	0.48
1:A:36:LEU:HD23	1:A:102:ALA:HB2	1.95	0.47
1:A:555:LEU:N	1:A:556:PRO:CD	2.77	0.47
1:A:518:GLN:O	1:A:522:LEU:HG	2.15	0.47
1:A:734:MET:HA	1:A:758:VAL:O	2.15	0.47
1:A:914:ASP:C	1:A:914:ASP:OD1	2.58	0.47
1:A:680:SER:O	1:A:794:LEU:HD11	2.15	0.46
1:A:131:GLU:HA	1:A:193:ASP:OD1	2.16	0.46
1:A:396:TRP:O	1:A:400:SER:HB3	2.15	0.46
1:A:485:PRO:HG2	1:A:490:ASP:O	2.16	0.46
1:A:232:ARG:HG2	1:A:233:LEU:HG	1.98	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:669:VAL:HG12	1:A:696:ALA:HB2	1.98	0.46
1:A:59:SER:OG	1:A:83:SER:OG	2.00	0.45
1:A:100:SER:HA	1:A:107:SER:HB2	1.97	0.45
1:A:900:TYR:CD2	1:A:900:TYR:C	2.95	0.45
1:A:764:HIS:HA	1:A:877:VAL:O	2.17	0.45
1:A:650:TRP:CD1	1:A:715:MET:HE2	2.52	0.44
1:A:67:ARG:O	1:A:74:SER:OG	2.34	0.44
1:A:336:LEU:HD12	1:A:336:LEU:HA	1.82	0.44
1:A:445:TYR:HA	1:A:449:LEU:HB2	2.00	0.43
1:A:188:LEU:HD23	1:A:188:LEU:HA	1.86	0.43
1:A:264:LEU:HD13	1:A:402:LEU:HD11	2.00	0.43
1:A:300:ASN:OD1	1:A:300:ASN:N	2.49	0.43
1:A:819:LEU:O	1:A:826:GLY:HA2	2.18	0.43
1:A:451:ARG:NH1	1:A:518:GLN:OE1	2.45	0.43
1:A:906:ASP:OD1	1:A:906:ASP:C	2.62	0.43
1:A:127:ILE:HG13	1:A:143:PHE:CZ	2.54	0.42
1:A:227:TYR:CD2	1:A:381:GLY:HA3	2.54	0.42
1:A:798:TRP:O	1:A:819:LEU:HA	2.19	0.42
1:A:222:TYR:HB3	1:A:386:THR:HG21	2.02	0.42
1:A:268:PHE:CE2	1:A:399:ILE:HD12	2.55	0.42
1:A:320:GLU:OE2	1:A:320:GLU:N	2.47	0.41
1:A:79:TRP:HE1	1:A:208:ILE:HG13	1.85	0.41
1:A:355:ASP:HA	1:A:356:PRO:HD3	1.93	0.41
1:A:378:PHE:HA	1:A:424:TYR:OH	2.21	0.41
1:A:336:LEU:HD22	1:A:378:PHE:CE2	2.56	0.41
1:A:155:VAL:HG13	1:A:229:VAL:HG21	2.02	0.41
1:A:807:MET:HE2	1:A:856:ASN:CG	2.45	0.40
1:A:900:TYR:HB2	1:A:913:LEU:O	2.21	0.40
1:A:571:VAL:O	1:A:571:VAL:CG1	2.68	0.40
1:A:867:ARG:HH11	1:A:867:ARG:HG3	1.85	0.40
1:A:630:PHE:HB3	1:A:643:LYS:HG3	2.03	0.40

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

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:122:ASP:OD1	1:A:284:SER:OG[1_655]	2.19	0.01

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	956/1021 (94%)	887 (93%)	64 (7%)	5 (0%)	24	43

All (5) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	135	SER
1	A	48	ASN
1	A	380	LYS
1	A	850	ARG
1	A	550	ASN

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	847/890 (95%)	796 (94%)	51 (6%)	17	36

All (51) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	34	LYS
1	A	43	HIS
1	A	46	GLN
1	A	54	SER
1	A	62	THR
1	A	66	LYS

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Mol	Chain	Res	Type
1	A	72	ASN
1	A	74	SER
1	A	80	LYS
1	A	106	SER
1	A	107	SER
1	A	112	SER
1	A	119	LYS
1	A	127	ILE
1	A	132	LYS
1	A	135	SER
1	A	144	LYS
1	A	188	LEU
1	A	195	ILE
1	A	212	ARG
1	A	229	VAL
1	A	230	LYS
1	A	254	LEU
1	A	273	LYS
1	A	275	THR
1	A	323	ASN
1	A	325	GLN
1	A	328	GLN
1	A	332	ASN
1	A	371	LYS
1	A	400	SER
1	A	415	THR
1	A	466	ARG
1	A	583	LYS
1	A	599	ASP
1	A	637	ASP
1	A	647	THR
1	A	667	HIS
1	A	741	TYR
1	A	793	THR
1	A	802	GLN
1	A	804	ILE
1	A	806	ASN
1	A	807	MET
1	A	819	LEU
1	A	859	SER
1	A	940	LYS
1	A	950	LYS

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Mol	Chain	Res	Type
1	A	952	THR
1	A	976	ASN
1	A	993	LYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (6) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	58	ASN
1	A	325	GLN
1	A	648	ASN
1	A	656	ASN
1	A	675	ASN
1	A	967	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	NGA	B	1	2	15,15,15	1.18	1 (6%)	21,21,21	3.49	10 (47%)
2	GCD	B	2	2	10,11,12	2.64	3 (30%)	12,15,17	3.18	8 (66%)
2	NGA	C	1	2	15,15,15	1.11	2 (13%)	21,21,21	2.16	7 (33%)
2	GCD	C	2	2	10,11,12	2.25	1 (10%)	12,15,17	2.83	6 (50%)

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	NGA	B	1	2	-	3/6/26/26	0/1/1/1
2	GCD	B	2	2	-	0/4/17/20	0/1/1/1
2	NGA	C	1	2	-	1/6/26/26	0/1/1/1
2	GCD	C	2	2	-	4/4/17/20	0/1/1/1

All (7) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	2	GCD	O5-C5	6.85	1.46	1.37
2	C	2	GCD	O5-C5	6.23	1.45	1.37
2	B	2	GCD	O6B-C6	-2.83	1.22	1.30
2	B	2	GCD	C4-C5	2.22	1.37	1.33
2	C	1	NGA	C3-C2	2.13	1.57	1.53
2	C	1	NGA	C4-C5	2.05	1.57	1.53
2	B	1	NGA	O3-C3	2.04	1.48	1.43

All (31) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	1	NGA	C1-C2-N2	-9.49	99.74	110.73
2	B	1	NGA	O5-C1-C2	6.99	116.54	109.52
2	B	2	GCD	O5-C5-C4	-5.94	119.49	124.94
2	C	1	NGA	C1-C2-C3	-5.84	102.58	110.54
2	B	2	GCD	O5-C5-C6	5.84	122.58	111.85
2	B	1	NGA	C1-C2-C3	5.49	118.03	110.54
2	C	2	GCD	O5-C5-C6	5.35	121.68	111.85
2	B	1	NGA	C1-O5-C5	5.24	123.79	113.65
2	C	1	NGA	C3-C2-N2	4.48	118.87	110.62
2	C	2	GCD	O5-C5-C4	-4.43	120.87	124.94
2	C	2	GCD	O3-C3-C4	-4.04	100.13	109.27
2	B	1	NGA	O7-C7-N2	-3.73	115.39	121.98
2	B	2	GCD	O6B-C6-O6A	-3.30	116.05	123.90
2	B	2	GCD	C1-C2-C3	3.23	114.34	109.64
2	C	1	NGA	O5-C1-C2	-3.16	106.34	109.52
2	C	2	GCD	C1-C2-C3	-3.11	105.11	109.64
2	C	2	GCD	C4-C5-C6	-2.83	117.44	123.56
2	B	1	NGA	O5-C5-C4	2.77	114.70	109.70
2	C	1	NGA	O5-C5-C6	2.71	113.15	106.44

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	2	GCD	C4-C5-C6	-2.60	117.92	123.56
2	B	1	NGA	O4-C4-C5	2.60	115.73	109.32
2	B	1	NGA	O1-C1-C2	-2.55	103.92	109.22
2	B	2	GCD	C3-C4-C5	2.34	125.42	121.45
2	B	2	GCD	O6A-C6-C5	2.27	126.14	120.57
2	C	1	NGA	C3-C4-C5	-2.17	106.30	110.23
2	C	2	GCD	O3-C3-C2	2.16	113.29	109.44
2	C	1	NGA	C1-O5-C5	-2.16	109.47	113.65
2	B	2	GCD	O2-C2-C1	2.11	114.06	109.22
2	C	1	NGA	O4-C4-C5	2.10	114.49	109.32
2	B	1	NGA	C3-C4-C5	-2.09	106.43	110.23
2	B	1	NGA	O7-C7-C8	2.05	125.71	122.05

There are no chirality outliers.

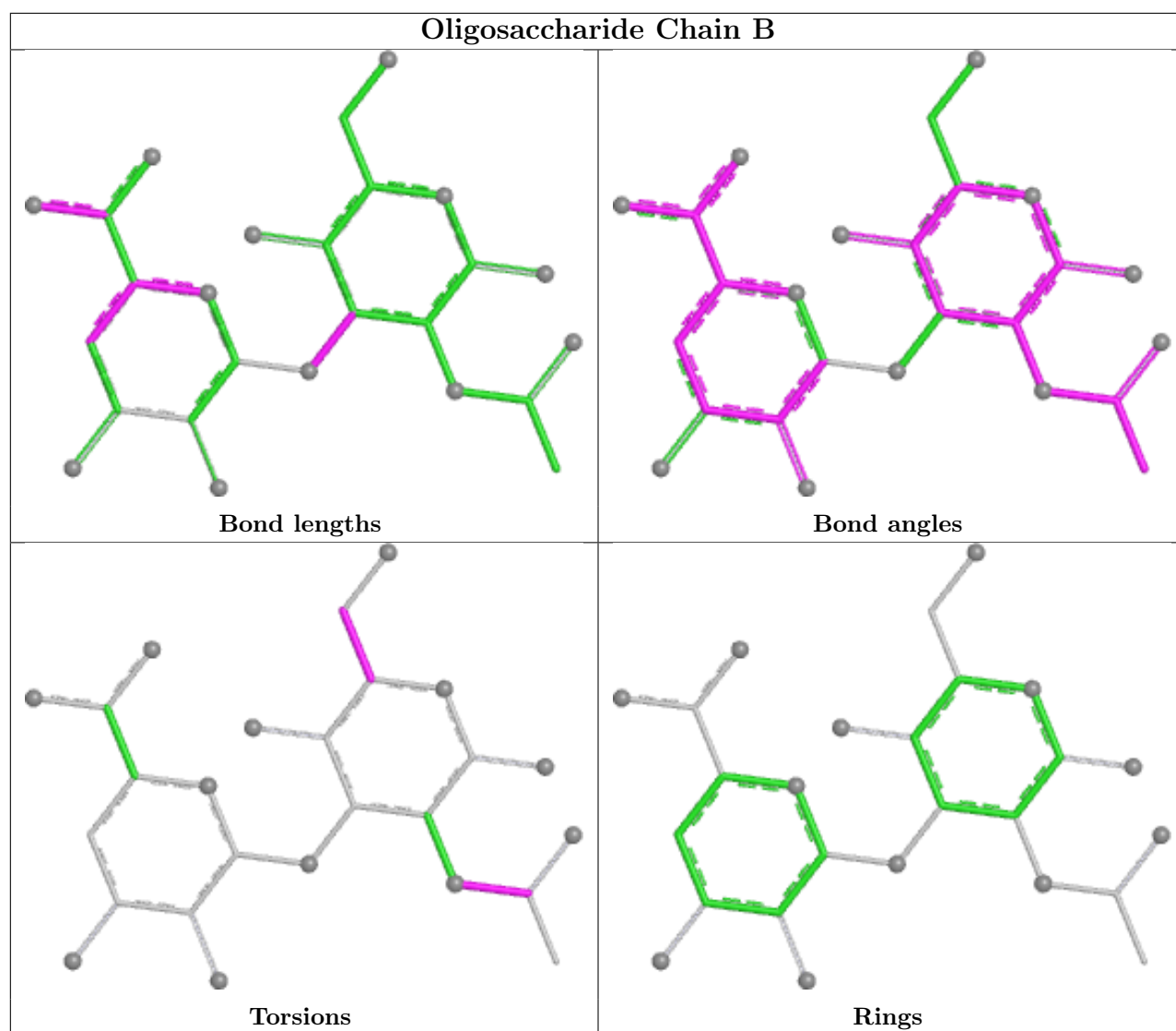
All (8) torsion outliers are listed below:

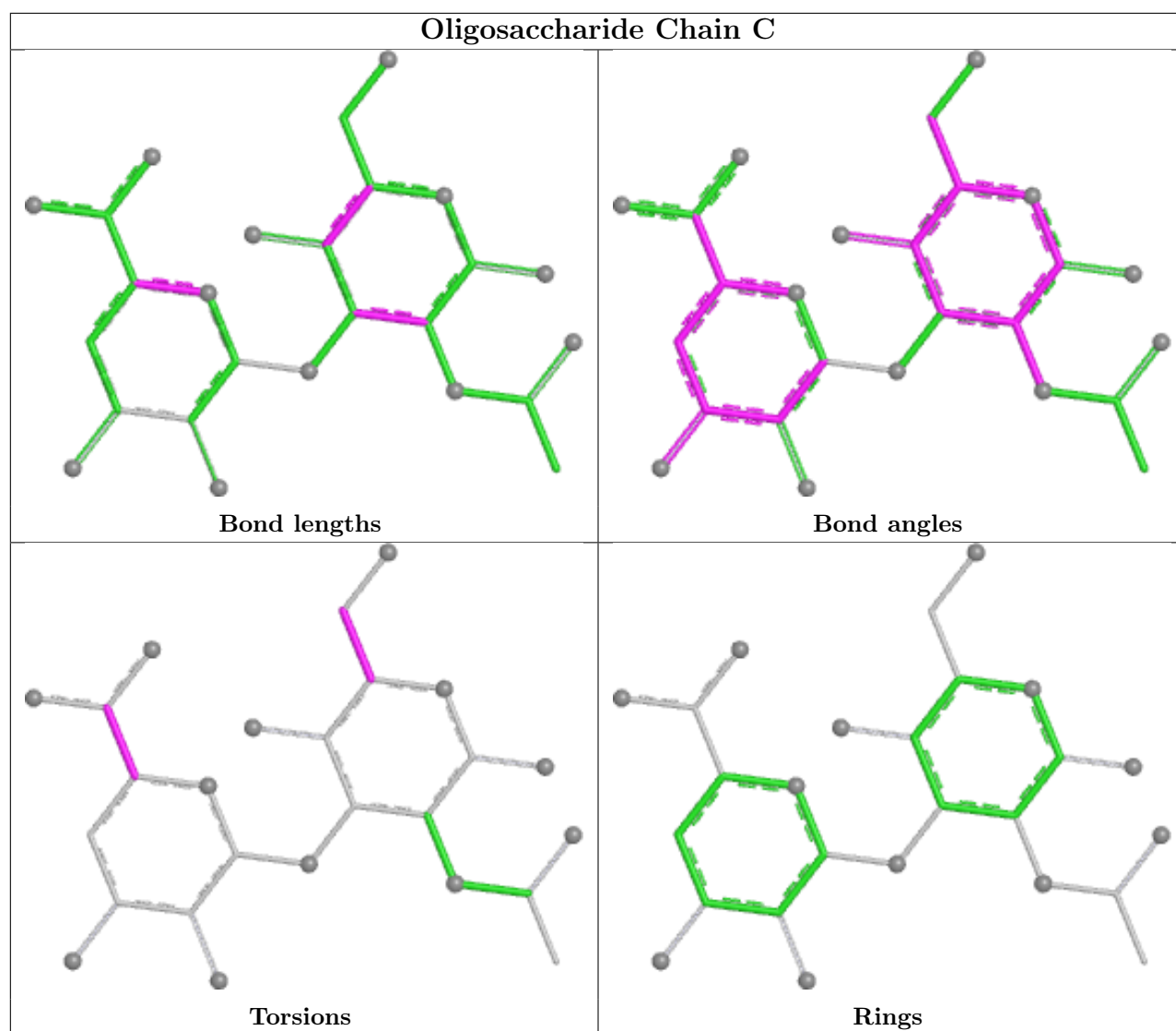
Mol	Chain	Res	Type	Atoms
2	C	2	GCD	C4-C5-C6-O6A
2	C	2	GCD	C4-C5-C6-O6B
2	C	2	GCD	O5-C5-C6-O6A
2	C	2	GCD	O5-C5-C6-O6B
2	B	1	NGA	C8-C7-N2-C2
2	B	1	NGA	O7-C7-N2-C2
2	C	1	NGA	O5-C5-C6-O6
2	B	1	NGA	C4-C5-C6-O6

There are no ring outliers.

No monomer is involved in short contacts.

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





5.6 Ligand geometry [i](#)

Of 1 ligands modelled in this entry, 1 is 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	966/1021 (94%)	-0.07	9 (0%) 81 78	28, 41, 70, 98	0

All (9) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	188	LEU	4.1
1	A	190	ALA	3.0
1	A	189	GLY	3.0
1	A	273	LYS	2.8
1	A	25	ALA	2.5
1	A	299	ALA	2.2
1	A	546	TRP	2.1
1	A	392	TYR	2.0
1	A	48	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.

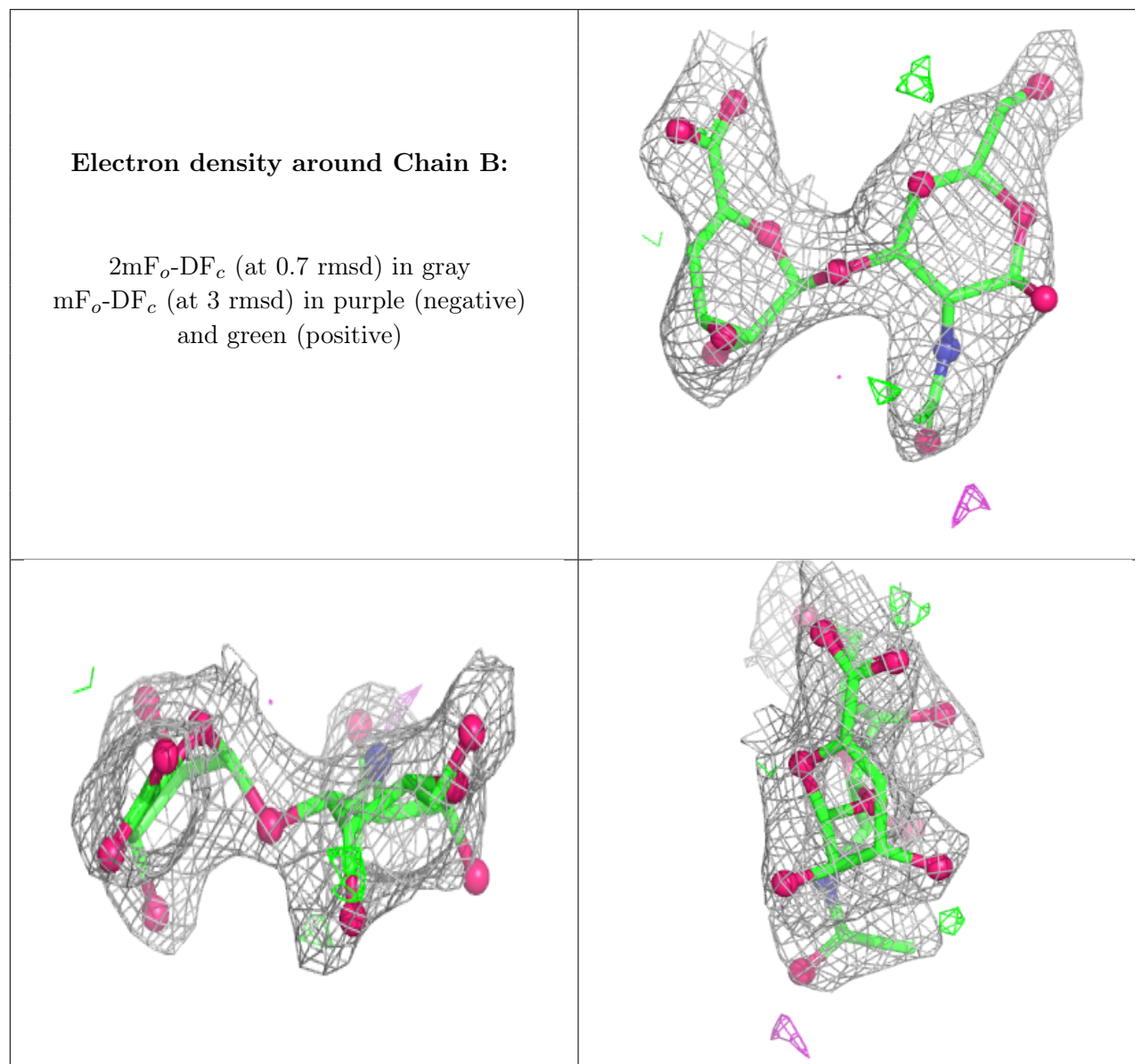
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
2	NGA	B	1	15/15	0.79	0.13	57,63,67,67	0
2	GCD	C	2	11/12	0.81	0.10	65,70,79,80	0
2	NGA	C	1	15/15	0.86	0.11	47,60,66,66	0

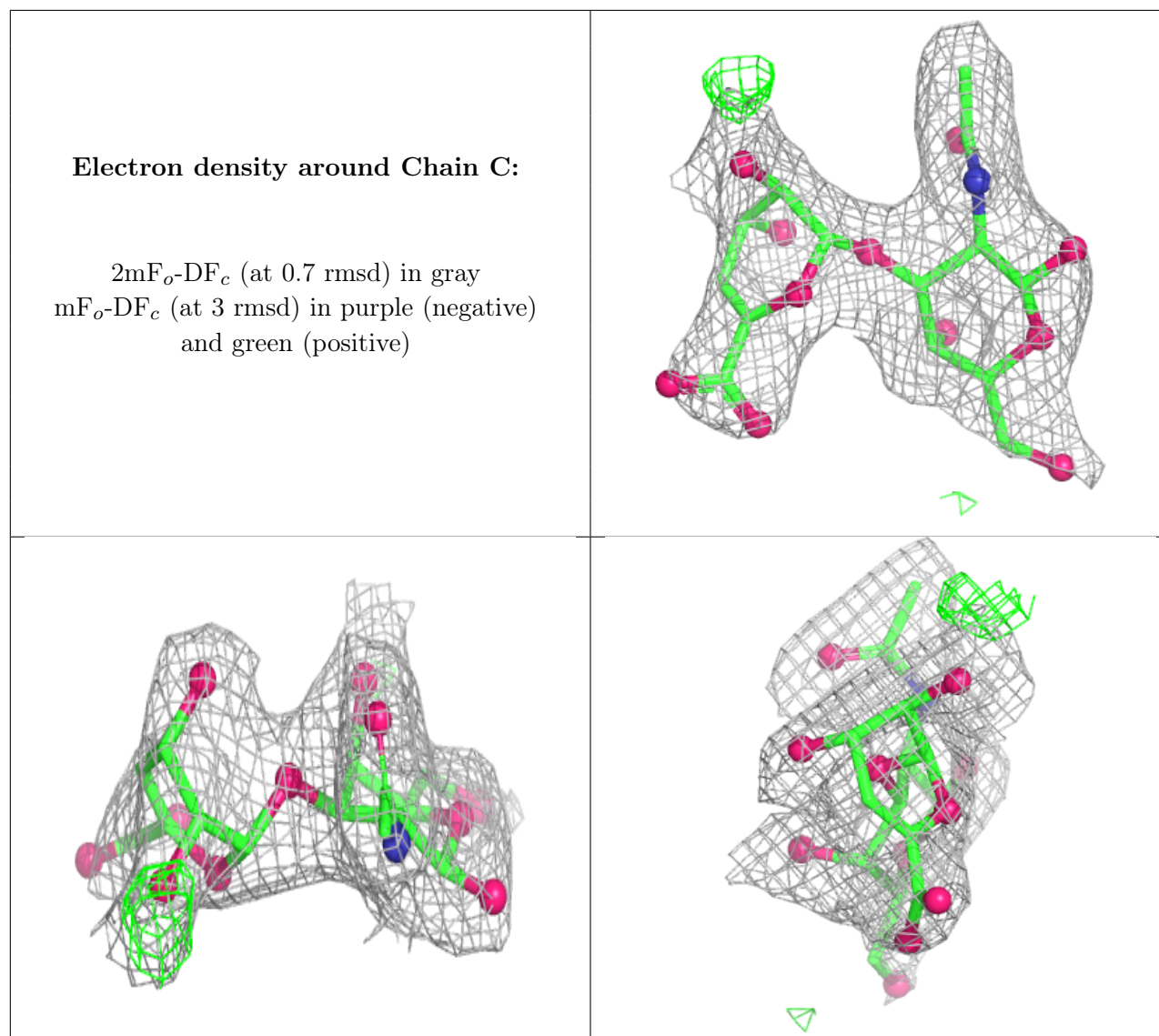
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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
2	GCD	B	2	11/12	0.92	0.09	50,56,57,58	0

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
3	MG	A	1201	1/1	0.97	0.05	55,55,55,55	0

6.5 Other polymers [i](#)

There are no such residues in this entry.