



Full wwPDB X-ray Structure Validation Report ⓘ

Apr 18, 2026 – 11:02 PM UTC

PDB ID : 4ZA3 / pdb_00004za3
Title : Structural studies on a non-toxic homologue of type II RIPs from Momordica charantia (bitter melon)-Native-3
Authors : Chandran, T.; Sharma, A.; Vijayan, M.
Deposited on : 2015-04-13
Resolution : 1.67 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

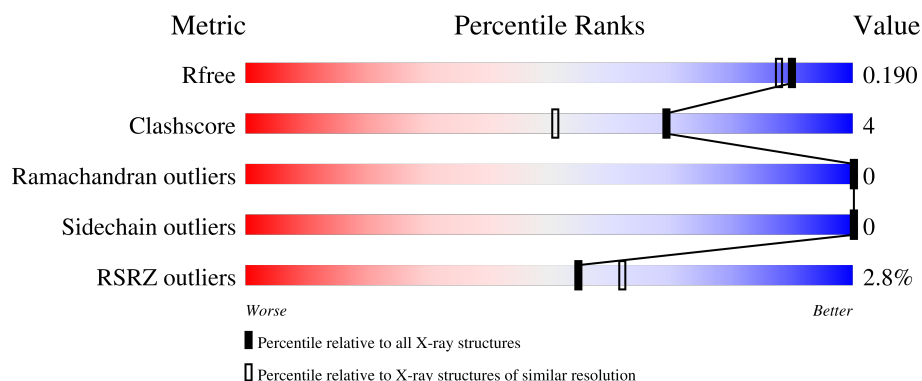
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.67 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	1054 (1.68-1.68)
Clashscore	190562	1078 (1.68-1.68)
Ramachandran outliers	187476	1068 (1.68-1.68)
Sidechain outliers	187428	1067 (1.68-1.68)
RSRZ outliers	180081	1055 (1.68-1.68)

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	247	2% 53% 44% .
2	B	260	4% 56% 42% .
3	C	2	50% 50%
4	D	2	100%
5	E	2	100%

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
4	BMA	D	2	-	-	-	X

2 Entry composition [i](#)

There are 9 unique types of molecules in this entry. The entry contains 4626 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 rRNA N-glycosidase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	247	Total	C	N	O	S	0	0	0
			1944	1248	308	377	11			

- Molecule 2 is a protein called rRNA N-glycosidase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	260	Total	C	N	O	S	0	0	0
			1991	1231	351	395	14			

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



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
3	C	2	Total	C	N	O	0	0	0
			24	14	1	9			

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



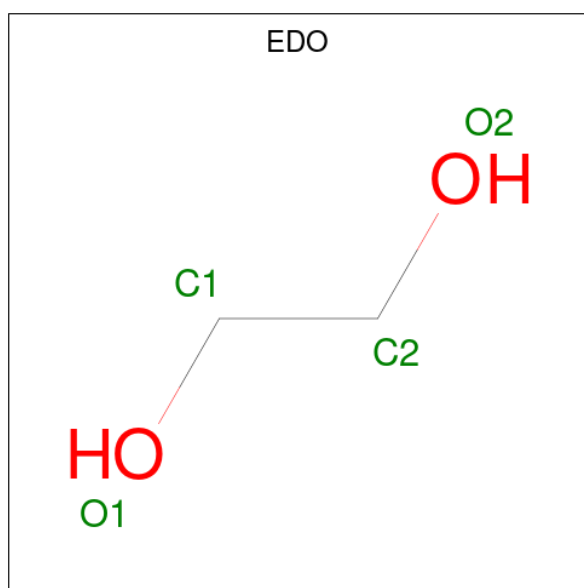
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
4	D	2	Total	C	N	O	0	0	0
			25	14	1	10			

- Molecule 5 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
5	E	2	Total	C	N	O	0	0	0
			28	16	2	10			

- Molecule 6 is 1,2-ETHANEDIOL (CCD ID: EDO) (formula: C₂H₆O₂).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
6	A	1	Total	C	O	0	0
			4	2	2		
6	A	1	Total	C	O	0	0
			4	2	2		
6	B	1	Total	C	O	0	0
			4	2	2		
6	B	1	Total	C	O	0	0
			4	2	2		
6	B	1	Total	C	O	0	0
			4	2	2		

- Molecule 7 is 2-acetamido-2-deoxy-beta-D-glucopyranose (CCD ID: NAG) (formula: C₈H₁₅NO₆).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
7	A	1	Total	C	N	O	0	0
			14	8	1	5		

- Molecule 8 is GLYCEROL (CCD ID: GOL) (formula: $C_3H_8O_3$).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
8	B	1	Total	C	O	0	0
			6	3	3		

- Molecule 9 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
9	A	243	Total 243	O 243	0	0
9	B	327	Total 327	O 327	0	0

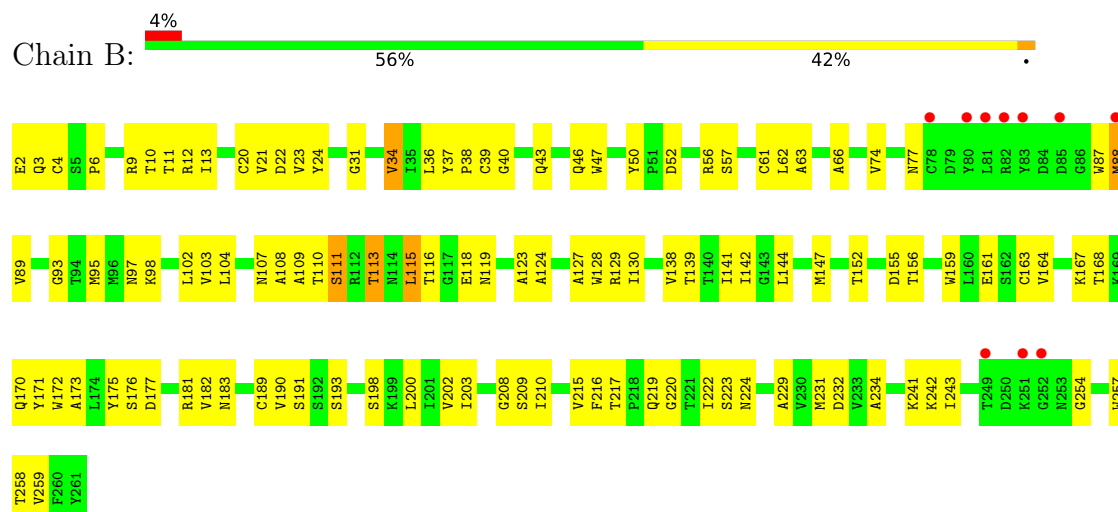
3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red dot above a residue indicates a poor fit to the electron density ($RSRZ > 2$). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

• Molecule 1: rRNA N-glycosidase



• Molecule 2: rRNA N-glycosidase



• Molecule 3: alpha-L-fucopyranose-(1-3)-2-acetamido-2-deoxy-beta-D-glucopyranose



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

Chain D:  100%

MAG1
BNA2

- Molecule 5: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose

Chain E:  100%

MAG1
MAG2

4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 2	Depositor
Cell constants a, b, c, α , β , γ	141.40Å 119.59Å 44.86Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	32.50 – 1.67 32.50 – 1.67	Depositor EDS
% Data completeness (in resolution range)	98.2 (32.50-1.67) 98.2 (32.50-1.67)	Depositor EDS
R_{merge}	0.07	Depositor
R_{sym}	0.07	Depositor
$\langle I/\sigma(I) \rangle$ ¹	3.73 (at 1.68Å)	Xtriage
Refinement program	REFMAC 5.8.0107	Depositor
R, R_{free}	0.160 , 0.183 0.169 , 0.190	Depositor DCC
R_{free} test set	4443 reflections (5.01%)	wwPDB-VP
Wilson B-factor (Å ²)	16.7	Xtriage
Anisotropy	0.570	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.35 , 41.7	EDS
L-test for twinning ²	$\langle L \rangle = 0.47$, $\langle L^2 \rangle = 0.30$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	4626	wwPDB-VP
Average B, all atoms (Å ²)	21.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.53% 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, FUC, BMA, GOL, EDO

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	2.08	109/1988 (5.5%)	1.05	5/2701 (0.2%)
2	B	2.03	104/2025 (5.1%)	1.14	10/2755 (0.4%)
All	All	2.06	213/4013 (5.3%)	1.10	15/5456 (0.3%)

All (213) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	47	GLU	CA-C	-10.79	1.39	1.52
1	A	115	GLU	C-O	-7.76	1.14	1.24
1	A	225	ILE	C-O	-7.75	1.15	1.24
2	B	182	VAL	C-O	-7.58	1.16	1.24
2	B	57	SER	C-O	-7.55	1.15	1.23
1	A	190	LEU	C-O	-7.53	1.15	1.24
2	B	202	VAL	C-O	-7.51	1.15	1.24
2	B	34	VAL	C-O	-7.44	1.15	1.24
1	A	165	LYS	C-O	-7.37	1.14	1.24
1	A	63	THR	C-O	-7.37	1.15	1.24
1	A	78	ALA	C-O	-7.36	1.15	1.24
2	B	176	SER	C-O	-7.34	1.14	1.24
2	B	115	LEU	C-O	-7.29	1.15	1.23
1	A	105	MET	C-O	-7.28	1.15	1.23
2	B	43	GLN	C-O	-7.19	1.15	1.24
2	B	224	ASN	C-O	-7.15	1.16	1.24
2	B	66	ALA	C-N	-7.13	1.23	1.33
1	A	116	ILE	C-O	-7.09	1.16	1.24
2	B	104	LEU	C-O	-7.02	1.15	1.24
2	B	129	ARG	C-O	-7.01	1.15	1.24
1	A	241	PHE	C-O	-6.99	1.15	1.23
1	A	182	THR	C-O	-6.98	1.15	1.24
2	B	138	VAL	C-O	-6.94	1.15	1.24
2	B	254	GLY	C-O	-6.87	1.16	1.24

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	198	SER	C-O	-6.86	1.16	1.24
1	A	189	SER	C-O	-6.86	1.15	1.24
2	B	164	VAL	C-O	-6.86	1.16	1.24
1	A	65	ALA	C-O	-6.81	1.16	1.24
1	A	152	LEU	C-O	-6.81	1.16	1.24
2	B	173	ALA	C-O	-6.74	1.16	1.24
2	B	123	ALA	C-O	-6.71	1.14	1.23
1	A	133	GLU	C-O	-6.66	1.16	1.24
2	B	22	ASP	C-O	-6.65	1.16	1.23
2	B	222	ILE	C-O	-6.65	1.16	1.24
2	B	177	ASP	C-O	-6.61	1.15	1.24
1	A	164	PHE	C-O	-6.59	1.16	1.24
2	B	159	TRP	C-O	-6.58	1.16	1.23
2	B	193	SER	C-O	-6.58	1.16	1.23
1	A	22	ARG	C-O	-6.57	1.16	1.24
1	A	36	ILE	C-O	-6.57	1.16	1.24
2	B	191	SER	C-O	-6.56	1.16	1.23
1	A	158	VAL	C-O	-6.56	1.16	1.23
1	A	175	ILE	C-O	-6.53	1.16	1.24
1	A	132	PHE	C-O	-6.50	1.16	1.24
1	A	66	ILE	C-O	-6.50	1.16	1.24
1	A	27	ILE	C-O	-6.48	1.17	1.24
1	A	135	SER	C-O	-6.48	1.16	1.24
2	B	39	CYS	C-O	-6.46	1.16	1.23
1	A	96	ILE	C-O	-6.45	1.17	1.24
2	B	61	CYS	C-O	-6.44	1.16	1.24
2	B	87	TRP	C-O	-6.43	1.16	1.23
1	A	17	PHE	C-O	-6.43	1.16	1.24
2	B	156	THR	C-O	-6.42	1.15	1.24
1	A	160	GLU	C-O	-6.41	1.16	1.24
1	A	95	VAL	C-O	-6.41	1.17	1.23
2	B	172	TRP	C-O	-6.35	1.15	1.23
1	A	199	LEU	C-O	-6.33	1.16	1.24
1	A	186	ALA	C-O	-6.33	1.16	1.24
1	A	193	ASN	C-O	-6.33	1.15	1.24
1	A	73	PHE	C-O	-6.31	1.16	1.23
1	A	24	GLN	C-O	-6.30	1.16	1.24
1	A	181	PHE	C-O	-6.30	1.16	1.23
1	A	33	SER	C-O	-6.26	1.16	1.24
2	B	223	SER	C-O	-6.26	1.16	1.23
1	A	52	VAL	C-O	-6.26	1.17	1.24
1	A	213	ASP	C-O	-6.26	1.16	1.23

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	159	LEU	C-O	-6.23	1.16	1.24
1	A	75	ALA	C-O	-6.20	1.17	1.24
1	A	167	ILE	C-O	-6.17	1.16	1.24
2	B	258	THR	C-O	-6.14	1.16	1.23
1	A	203	ALA	C-O	-6.11	1.16	1.24
2	B	171	TYR	C-O	-6.07	1.16	1.23
2	B	259	VAL	C-O	-6.07	1.17	1.24
2	B	200	LEU	C-O	-6.07	1.16	1.23
1	A	196	GLN	C-O	-6.07	1.16	1.24
1	A	197	LEU	C-O	-6.07	1.16	1.24
2	B	203	ILE	C-O	-6.06	1.17	1.24
1	A	156	GLN	C-O	-6.05	1.17	1.24
2	B	142	ILE	C-O	-6.03	1.17	1.24
1	A	7	SER	C-N	-6.03	1.21	1.34
2	B	74	VAL	C-O	-6.02	1.17	1.24
2	B	130	ILE	C-O	-6.02	1.17	1.24
1	A	184	GLY	C-O	-6.01	1.18	1.23
1	A	242	GLN	C-O	-5.99	1.16	1.23
2	B	147	MET	C-O	-5.97	1.16	1.23
1	A	54	LEU	C-O	-5.97	1.17	1.24
1	A	140	PHE	C-O	-5.97	1.17	1.24
1	A	51	LEU	C-O	-5.96	1.16	1.23
2	B	215	VAL	C-O	-5.96	1.17	1.24
1	A	12	ASP	C-O	-5.93	1.17	1.24
2	B	234	ALA	C-O	-5.93	1.16	1.23
1	A	150	SER	C-O	-5.92	1.17	1.24
2	B	241	LYS	C-O	-5.90	1.16	1.23
1	A	16	SER	C-O	-5.90	1.17	1.24
1	A	125	THR	C-O	-5.89	1.17	1.24
1	A	200	GLN	C-O	-5.89	1.17	1.24
1	A	114	ILE	C-O	-5.87	1.17	1.24
1	A	215	VAL	C-O	-5.87	1.17	1.24
1	A	155	ILE	C-O	-5.86	1.17	1.24
2	B	128	TRP	C-O	-5.83	1.16	1.23
2	B	6	PRO	C-O	-5.83	1.17	1.23
2	B	50	TYR	C-O	-5.82	1.18	1.24
2	B	95	MET	C-O	-5.79	1.17	1.24
2	B	127	ALA	C-O	-5.79	1.17	1.24
2	B	141	ILE	C-O	-5.79	1.17	1.24
2	B	210	ILE	C-O	-5.79	1.17	1.24
2	B	103	VAL	C-O	-5.79	1.18	1.24
1	A	226	GLY	C-O	-5.78	1.16	1.23

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	112	GLU	C-O	-5.77	1.17	1.24
2	B	257	TRP	C-O	-5.77	1.16	1.23
2	B	118	GLU	C-O	-5.76	1.16	1.23
2	B	102	LEU	C-O	-5.75	1.16	1.23
1	A	129	ILE	C-O	-5.71	1.17	1.24
1	A	137	PHE	C-O	-5.70	1.17	1.24
2	B	152	THR	C-O	-5.69	1.16	1.23
1	A	168	GLU	C-O	-5.69	1.17	1.24
1	A	55	THR	C-O	-5.68	1.16	1.24
1	A	162	ALA	C-O	-5.68	1.17	1.24
2	B	119	ASN	C-O	-5.67	1.17	1.23
2	B	40	GLY	C-O	-5.66	1.17	1.23
2	B	139	THR	C-O	-5.66	1.16	1.23
1	A	2	LEU	C-O	-5.64	1.17	1.23
2	B	93	GLY	C-O	-5.64	1.17	1.24
1	A	216	SER	C-O	-5.64	1.17	1.24
2	B	198	SER	C-O	-5.63	1.16	1.24
2	B	63	ALA	C-O	-5.62	1.17	1.23
1	A	237	ALA	C-O	-5.62	1.16	1.24
1	A	23	LYS	C-O	-5.60	1.17	1.24
2	B	21	VAL	C-O	-5.59	1.18	1.24
2	B	168	THR	C-O	-5.58	1.17	1.24
1	A	92	ALA	C-O	-5.57	1.17	1.24
2	B	89	VAL	C-O	-5.57	1.17	1.24
2	B	23	VAL	C-O	-5.57	1.16	1.23
1	A	166	PHE	C-O	-5.57	1.17	1.24
1	A	214	SER	C-O	-5.55	1.16	1.23
2	B	181	ARG	C-O	-5.55	1.17	1.23
2	B	232	ASP	C-O	-5.55	1.17	1.23
2	B	231	MET	C-O	-5.54	1.17	1.23
1	A	163	LYS	C-O	-5.53	1.17	1.24
2	B	47	TRP	C-O	-5.50	1.17	1.24
1	A	15	LYS	C-O	-5.48	1.17	1.24
2	B	124	ALA	C-O	-5.48	1.17	1.24
2	B	220	GLY	C-O	-5.48	1.17	1.24
1	A	11	ALA	C-O	-5.47	1.17	1.24
1	A	185	LEU	C-O	-5.46	1.17	1.24
1	A	79	ALA	C-O	-5.46	1.17	1.24
1	A	223	GLU	C-O	-5.45	1.16	1.24
2	B	20	CYS	C-O	-5.44	1.17	1.23
1	A	21	LEU	C-O	-5.43	1.17	1.24
1	A	113	SER	C-O	-5.43	1.17	1.24

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	122	ARG	C-O	-5.41	1.17	1.24
1	A	33	SER	C-N	-5.41	1.26	1.33
2	B	56	ARG	C-O	-5.40	1.17	1.23
1	A	240	ALA	C-O	-5.39	1.17	1.24
1	A	28	GLY	C-O	-5.37	1.16	1.23
2	B	170	GLN	C-O	-5.34	1.16	1.24
2	B	209	SER	C-O	-5.34	1.16	1.23
1	A	18	ILE	C-O	-5.33	1.18	1.24
2	B	12	ARG	C-O	-5.33	1.16	1.23
2	B	13	ILE	C-O	-5.33	1.18	1.24
2	B	163	CYS	C-O	-5.32	1.17	1.23
1	A	38	ILE	C-O	-5.32	1.18	1.24
2	B	52	ASP	C-O	-5.30	1.17	1.24
2	B	208	GLY	C-O	-5.29	1.16	1.23
2	B	229	ALA	C-O	-5.28	1.17	1.23
2	B	116	THR	C-O	-5.27	1.17	1.23
2	B	46	GLN	C-O	-5.26	1.17	1.24
2	B	189	CYS	C-O	-5.25	1.17	1.23
1	A	211	PHE	C-O	-5.25	1.16	1.23
2	B	190	VAL	C-O	-5.25	1.18	1.24
2	B	10	THR	C-O	-5.24	1.17	1.24
2	B	175	TYR	C-O	-5.24	1.17	1.23
1	A	131	HIS	C-O	-5.23	1.17	1.24
1	A	127	LEU	C-O	-5.23	1.17	1.23
2	B	243	ILE	C-O	-5.22	1.18	1.24
2	B	24	TYR	C-O	-5.21	1.17	1.23
1	A	89	PRO	C-O	-5.21	1.18	1.24
1	A	83	TYR	C-O	-5.20	1.18	1.23
2	B	9	ARG	C-O	-5.20	1.17	1.23
1	A	68	VAL	C-O	-5.20	1.16	1.24
2	B	155	ASP	C-O	-5.19	1.17	1.23
2	B	109	ALA	C-O	-5.17	1.17	1.24
2	B	110	THR	C-O	-5.17	1.17	1.23
1	A	171	VAL	C-O	-5.17	1.18	1.24
1	A	81	ARG	C-O	-5.16	1.17	1.23
2	B	88	MET	C-O	-5.15	1.18	1.24
2	B	161	GLU	C-O	-5.15	1.17	1.23
1	A	40	LYS	C-O	-5.14	1.16	1.23
1	A	169	GLN	C-O	-5.14	1.18	1.24
1	A	91	ILE	C-O	-5.14	1.18	1.24
2	B	11	THR	C-O	-5.13	1.17	1.23
2	B	77	ASN	C-O	-5.12	1.17	1.23

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	224	PRO	C-O	-5.12	1.18	1.23
1	A	232	TYR	C-O	-5.11	1.19	1.24
2	B	97	ASN	C-O	-5.11	1.18	1.24
1	A	60	GLU	C-O	-5.11	1.17	1.24
1	A	108	ASN	C-O	-5.10	1.17	1.23
1	A	70	ASP	C-O	-5.10	1.17	1.24
2	B	62	LEU	C-O	-5.08	1.17	1.23
1	A	179	GLU	C-O	-5.07	1.18	1.24
2	B	111	SER	C-O	-5.07	1.17	1.24
2	B	217	THR	C-O	-5.07	1.17	1.23
1	A	217	LEU	C-O	-5.07	1.18	1.24
2	B	144	LEU	C-O	-5.07	1.17	1.23
2	B	219	GLN	C-O	-5.06	1.17	1.24
2	B	31	GLY	C-O	-5.05	1.17	1.24
2	B	242	LYS	C-O	-5.04	1.18	1.23
1	A	178	MET	C-O	-5.04	1.17	1.23
2	B	216	PHE	C-O	-5.03	1.17	1.24
1	A	102	GLN	C-O	-5.03	1.17	1.23
2	B	183	ASN	C-O	-5.02	1.18	1.24
1	A	43	VAL	C-O	-5.01	1.18	1.24
1	A	170	LYS	C-O	-5.00	1.18	1.24

All (15) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	107	ASN	N-CA-C	8.28	123.15	112.89
2	B	209	SER	N-CA-C	6.86	118.85	110.41
2	B	61	CYS	N-CA-C	6.55	119.91	109.24
2	B	56	ARG	N-CA-C	5.97	119.27	109.72
1	A	47	GLU	N-CA-C	5.82	121.69	113.02
1	A	236	THR	N-CA-C	5.65	119.43	112.54
2	B	108	ALA	N-CA-C	5.56	117.09	110.19
1	A	47	GLU	CA-C-O	5.40	125.22	119.34
2	B	223	SER	N-CA-C	5.28	118.42	109.76
2	B	113	THR	N-CA-C	5.27	116.81	108.96
1	A	129	ILE	N-CA-C	5.20	115.41	110.42
2	B	113	THR	N-CA-CB	-5.17	103.39	111.56
1	A	144	GLU	N-CA-C	5.17	117.58	111.33
2	B	181	ARG	N-CA-C	5.08	118.03	109.95
2	B	167	LYS	N-CA-C	-5.01	100.91	108.67

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	1944	0	1890	14	0
2	B	1991	0	1911	7	0
3	C	24	0	22	4	0
4	D	25	0	22	6	0
5	E	28	0	25	0	0
6	A	8	0	12	1	0
6	B	16	0	24	0	0
7	A	14	0	13	0	0
8	B	6	0	8	0	0
9	A	243	0	0	1	0
9	B	327	0	0	0	0
All	All	4626	0	3927	27	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 4.

All (27) 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)
3:C:1:NAG:O4	4:D:1:NAG:C1	1.68	1.39
1:A:9:PHE:HE2	1:A:129:ILE:HD13	1.30	0.96
3:C:1:NAG:HO4	4:D:1:NAG:C1	1.62	0.94
1:A:9:PHE:HE2	1:A:129:ILE:CD1	1.90	0.85
1:A:9:PHE:CE2	1:A:129:ILE:CD1	2.62	0.83
1:A:9:PHE:CE2	1:A:129:ILE:HD13	2.19	0.74
1:A:129:ILE:HG13	1:A:178:MET:SD	2.30	0.72
2:B:34:VAL:HG12	2:B:115:LEU:HD12	1.73	0.71
3:C:1:NAG:C4	4:D:1:NAG:C1	2.69	0.70
1:A:91:ILE:HG22	1:A:91:ILE:O	2.03	0.59
1:A:107:PHE:HB3	1:A:117:VAL:HG21	1.86	0.58
1:A:109:ASN:O	6:A:301:EDO:H11	2.06	0.56
4:D:1:NAG:O4	4:D:2:BMA:C4	2.55	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:D:1:NAG:O4	4:D:2:BMA:H4	2.07	0.55
1:A:129:ILE:HG21	1:A:178:MET:HE1	1.93	0.51
9:A:452:HOH:O	2:B:3:GLN:CD	2.54	0.51
1:A:9:PHE:CD2	1:A:129:ILE:HD12	2.46	0.51
2:B:36:LEU:HG	2:B:115:LEU:HD21	1.93	0.50
1:A:9:PHE:CD2	1:A:129:ILE:CD1	2.96	0.48
2:B:111:SER:O	2:B:113:THR:HG22	2.13	0.48
1:A:129:ILE:HD11	1:A:175:ILE:HG12	1.97	0.47
1:A:19:LYS:HE2	1:A:23:LYS:NZ	2.30	0.47
2:B:2:GLU:OE1	2:B:4:CYS:HB2	2.19	0.43
2:B:37:TYR:CG	2:B:38:PRO:HD2	2.53	0.43
1:A:200:GLN:HB3	1:A:211:PHE:CG	2.55	0.41
2:B:88:MET:HE2	2:B:98:LYS:HG2	2.02	0.41
3:C:1:NAG:H61	4:D:1:NAG:N2	2.36	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	245/247 (99%)	234 (96%)	11 (4%)	0	100	100
2	B	258/260 (99%)	251 (97%)	7 (3%)	0	100	100
All	All	503/507 (99%)	485 (96%)	18 (4%)	0	100	100

There are no Ramachandran outliers to report.

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	217/217 (100%)	217 (100%)	0	100	100
2	B	221/228 (97%)	221 (100%)	0	100	100
All	All	438/445 (98%)	438 (100%)	0	100	100

There are no protein residues with a non-rotameric sidechain to report.

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (8) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	6	GLN
1	A	101	ASN
1	A	145	ASN
1	A	156	GLN
2	B	43	GLN
2	B	46	GLN
2	B	154	ASN
2	B	157	ASN

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 ⓘ

6 monosaccharides are modelled in this entry.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
3	NAG	C	1	2,3	14,14,15	0.50	0	17,19,21	1.41	1 (5%)
3	FUC	C	2	3	10,10,11	0.97	0	14,14,16	1.29	2 (14%)
4	NAG	D	1	4	14,14,15	0.64	0	17,19,21	2.34	7 (41%)
4	BMA	D	2	4	11,11,12	1.17	1 (9%)	15,15,17	3.08	8 (53%)
5	NAG	E	1	2,5	14,14,15	1.12	1 (7%)	17,19,21	1.03	0
5	NAG	E	2	5	14,14,15	1.11	2 (14%)	17,19,21	2.32	5 (29%)

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	NAG	C	1	2,3	-	1/6/23/26	0/1/1/1
3	FUC	C	2	3	-	-	0/1/1/1
4	NAG	D	1	4	-	1/6/23/26	0/1/1/1
4	BMA	D	2	4	-	2/2/19/22	0/1/1/1
5	NAG	E	1	2,5	-	0/6/23/26	0/1/1/1
5	NAG	E	2	5	-	2/6/23/26	0/1/1/1

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	D	2	BMA	C2-C3	2.67	1.56	1.52
5	E	2	NAG	C2-N2	-2.46	1.42	1.46
5	E	2	NAG	O5-C1	-2.42	1.39	1.43
5	E	1	NAG	O7-C7	-2.42	1.17	1.23

All (23) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	D	2	BMA	C1-O5-C5	7.03	121.60	112.19
5	E	2	NAG	C1-O5-C5	5.60	119.69	112.19
4	D	2	BMA	O5-C1-C2	-5.58	97.48	110.79
5	E	2	NAG	O5-C1-C2	-5.47	102.83	111.29
4	D	1	NAG	O5-C1-C2	4.66	118.51	111.29
4	D	1	NAG	C2-N2-C7	4.41	128.81	122.90
4	D	1	NAG	C1-C2-N2	3.98	116.70	110.43
4	D	2	BMA	C3-C4-C5	-3.64	103.64	110.23
3	C	1	NAG	C2-N2-C7	3.55	127.66	122.90

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	D	2	BMA	O5-C5-C6	3.52	114.52	107.66
4	D	2	BMA	O2-C2-C1	2.90	115.87	109.22
4	D	1	NAG	O4-C4-C3	-2.86	103.64	110.38
5	E	2	NAG	O4-C4-C3	-2.72	103.96	110.38
3	C	2	FUC	O4-C4-C5	2.51	115.28	109.74
4	D	1	NAG	O5-C5-C4	2.45	116.79	110.83
3	C	2	FUC	O2-C2-C3	-2.42	105.14	110.15
4	D	2	BMA	C2-C3-C4	2.41	115.10	110.86
4	D	2	BMA	O4-C4-C5	2.31	115.02	109.32
4	D	2	BMA	C1-C2-C3	2.24	112.91	109.64
5	E	2	NAG	C8-C7-N2	-2.22	112.43	116.12
4	D	1	NAG	O5-C5-C6	-2.21	103.36	107.66
4	D	1	NAG	O7-C7-C8	-2.10	118.32	122.05
5	E	2	NAG	C6-C5-C4	-2.08	107.90	113.02

There are no chirality outliers.

All (6) torsion outliers are listed below:

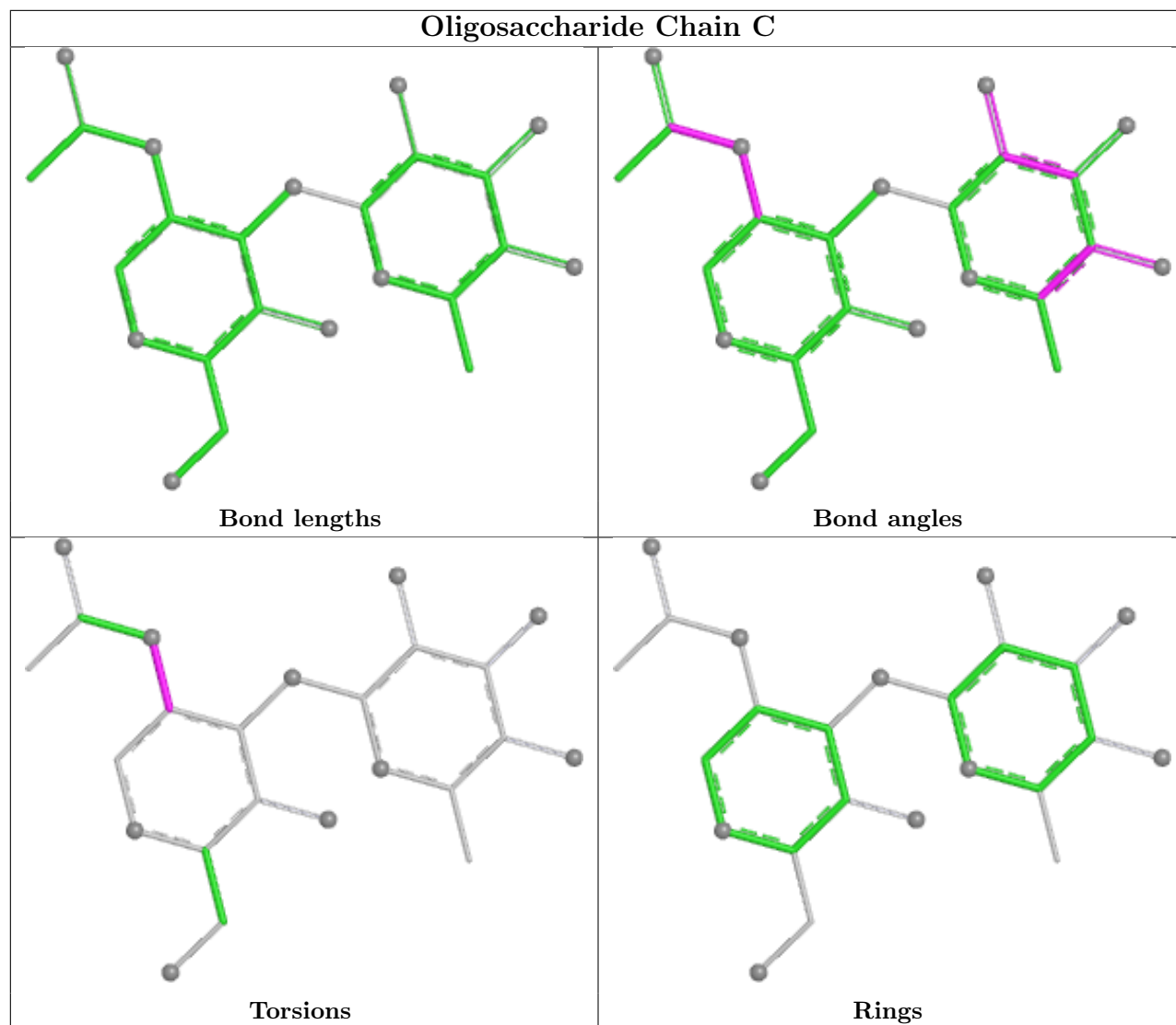
Mol	Chain	Res	Type	Atoms
3	C	1	NAG	C1-C2-N2-C7
4	D	2	BMA	O5-C5-C6-O6
5	E	2	NAG	O5-C5-C6-O6
5	E	2	NAG	C4-C5-C6-O6
4	D	1	NAG	O5-C5-C6-O6
4	D	2	BMA	C4-C5-C6-O6

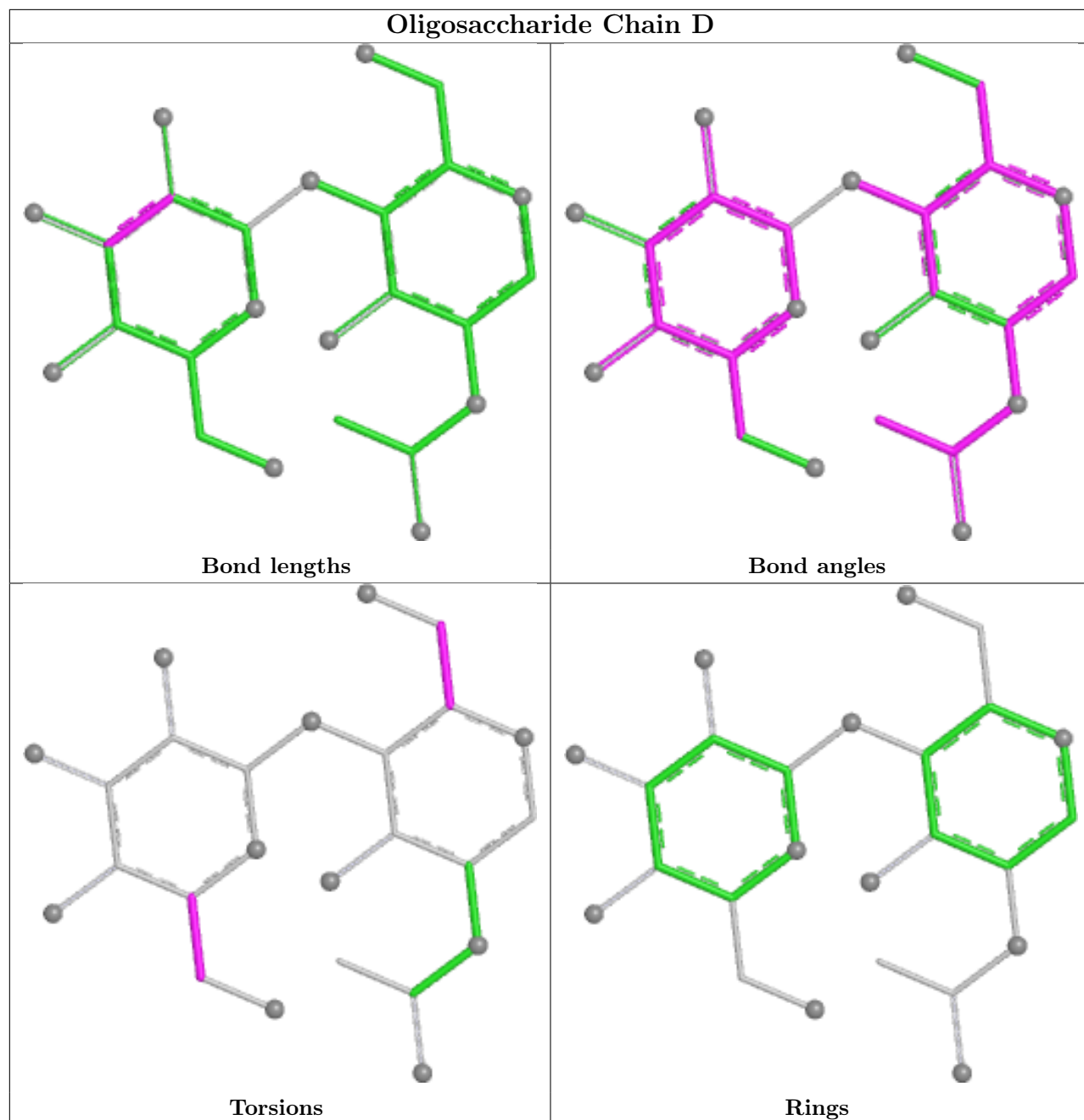
There are no ring outliers.

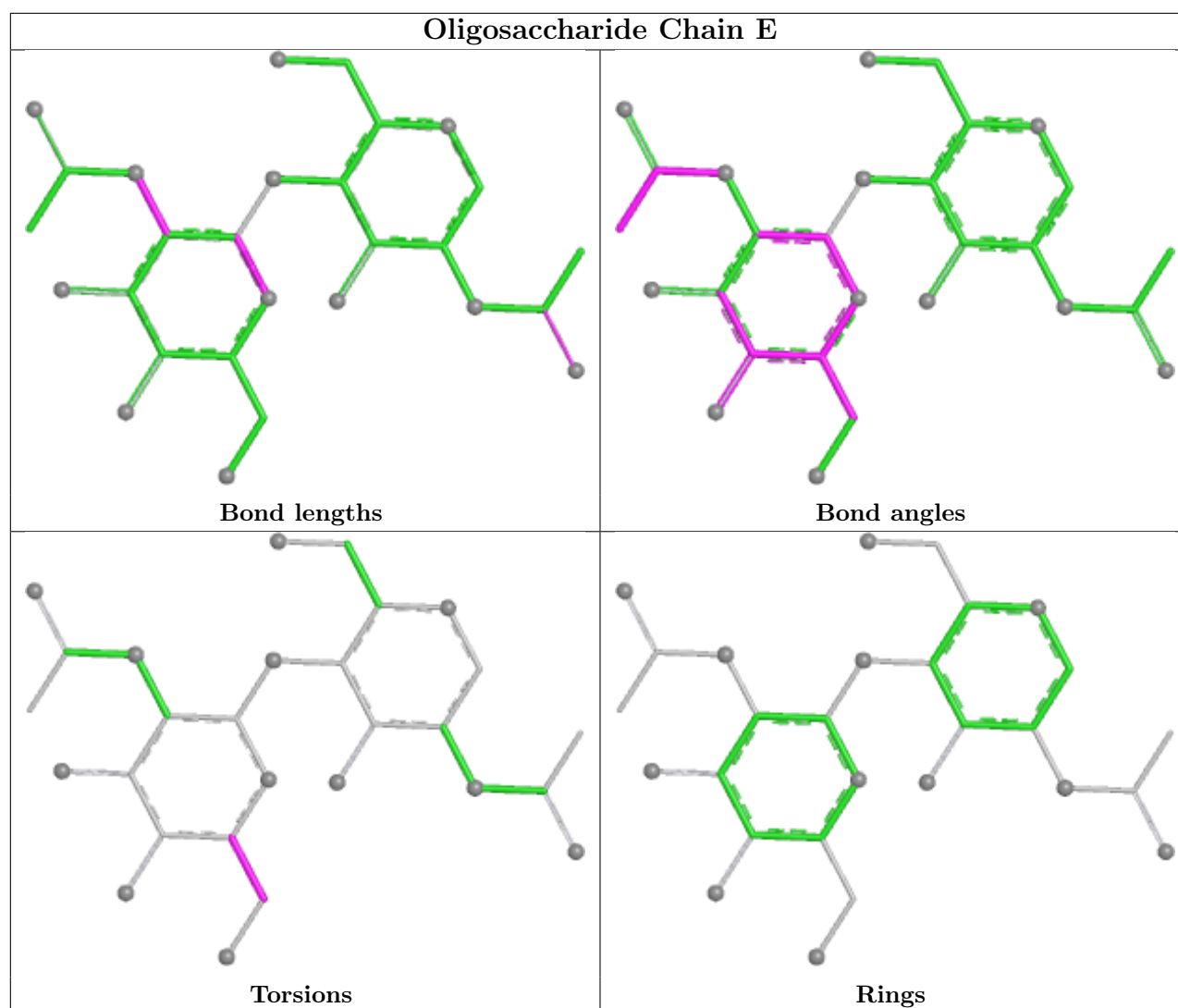
3 monomers are involved in 6 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	C	1	NAG	4	0
4	D	2	BMA	2	0
4	D	1	NAG	6	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](#)

8 ligands are modelled in this entry.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\# Z > 2$	Counts	RMSZ	$\# Z > 2$
6	EDO	B	301	-	3,3,3	0.36	0	2,2,2	0.30	0
8	GOL	B	311	-	5,5,5	0.41	0	5,5,5	0.67	0
6	EDO	B	302	-	3,3,3	0.52	0	2,2,2	0.42	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
6	EDO	B	304	-	3,3,3	0.48	0	2,2,2	0.65	0
6	EDO	B	303	-	3,3,3	0.48	0	2,2,2	0.75	0
6	EDO	A	301	-	3,3,3	0.34	0	2,2,2	0.59	0
6	EDO	A	302	-	3,3,3	0.43	0	2,2,2	0.38	0
7	NAG	A	303	1	14,14,15	0.95	1 (7%)	17,19,21	2.52	6 (35%)

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
6	EDO	B	301	-	-	1/1/1/1	-
8	GOL	B	311	-	-	0/4/4/4	-
6	EDO	B	302	-	-	0/1/1/1	-
6	EDO	B	304	-	-	1/1/1/1	-
6	EDO	B	303	-	-	1/1/1/1	-
6	EDO	A	301	-	-	1/1/1/1	-
6	EDO	A	302	-	-	1/1/1/1	-
7	NAG	A	303	1	-	2/6/23/26	0/1/1/1

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
7	A	303	NAG	O5-C1	-2.25	1.39	1.43

All (6) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
7	A	303	NAG	C1-O5-C5	5.92	120.11	112.19
7	A	303	NAG	C1-C2-N2	-4.37	103.54	110.43
7	A	303	NAG	C6-C5-C4	-3.65	104.05	113.02
7	A	303	NAG	O3-C3-C4	-3.43	102.30	110.38
7	A	303	NAG	C2-N2-C7	2.72	126.54	122.90
7	A	303	NAG	O4-C4-C3	-2.42	104.67	110.38

There are no chirality outliers.

All (7) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
6	A	301	EDO	O1-C1-C2-O2

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Mol	Chain	Res	Type	Atoms
6	A	302	EDO	O1-C1-C2-O2
6	B	303	EDO	O1-C1-C2-O2
7	A	303	NAG	C8-C7-N2-C2
7	A	303	NAG	O7-C7-N2-C2
6	B	301	EDO	O1-C1-C2-O2
6	B	304	EDO	O1-C1-C2-O2

There are no ring outliers.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
6	A	301	EDO	1	0

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	247/247 (100%)	0.03	4 (1%) 70 79	10, 18, 30, 40	0
2	B	260/260 (100%)	0.06	10 (3%) 44 52	11, 17, 33, 57	0
All	All	507/507 (100%)	0.04	14 (2%) 55 62	10, 18, 31, 57	0

All (14) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	B	83	TYR	4.2
1	A	9	PHE	3.7
2	B	82	ARG	3.6
2	B	252	GLY	3.6
2	B	249	THR	3.5
2	B	80	TYR	2.9
2	B	85	ASP	2.7
2	B	81	LEU	2.7
2	B	251	LYS	2.5
2	B	88	MET	2.4
2	B	78	CYS	2.4
1	A	2	LEU	2.2
1	A	46	CYS	2.1
1	A	106	ASN	2.0

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

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

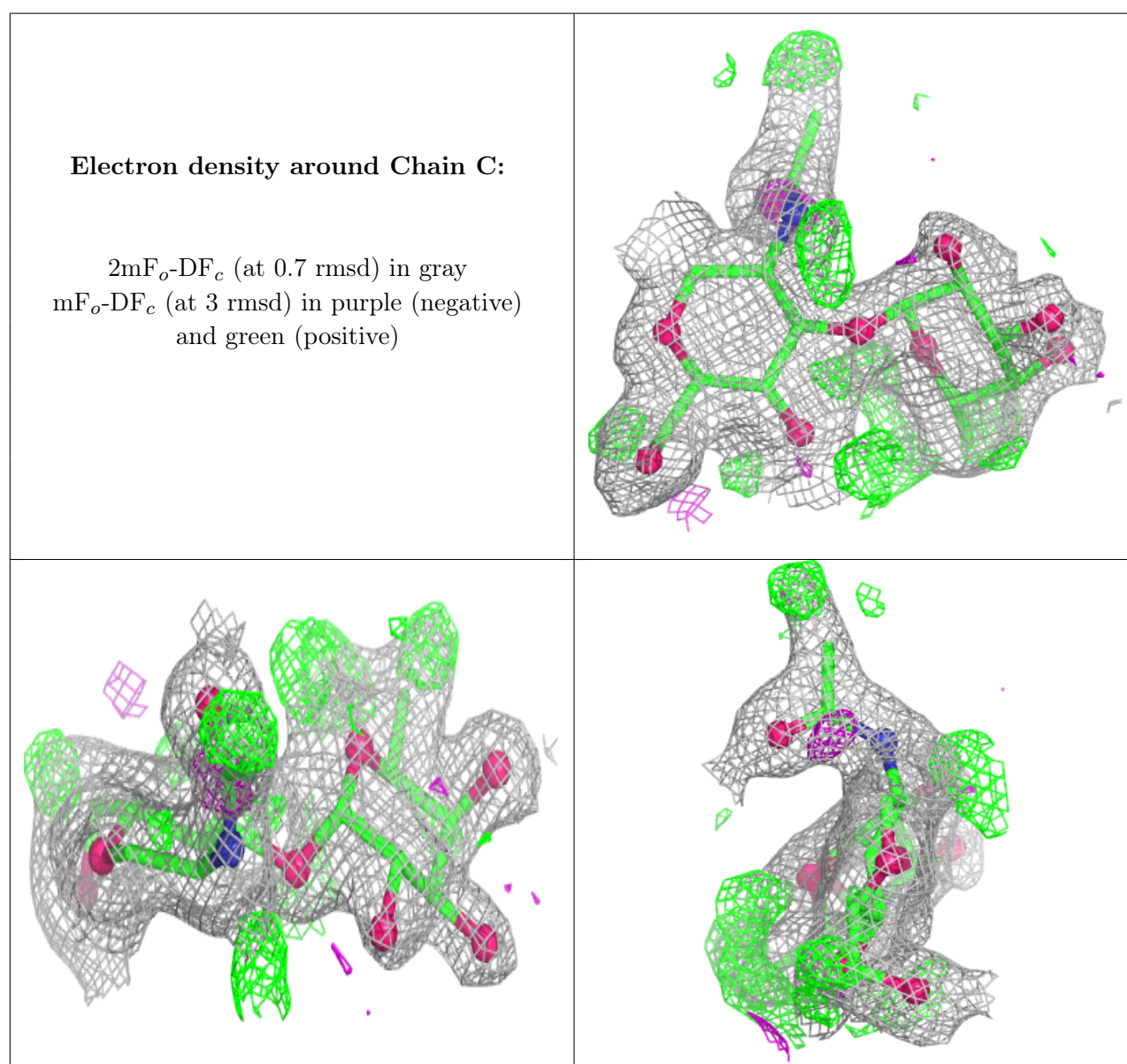
6.3 Carbohydrates ⓘ

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum,

median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

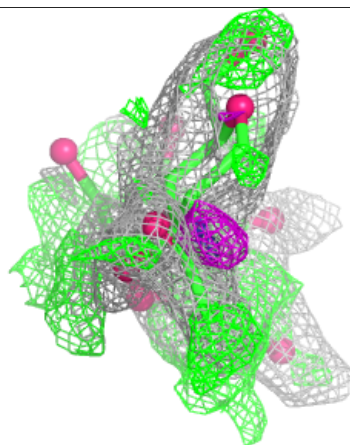
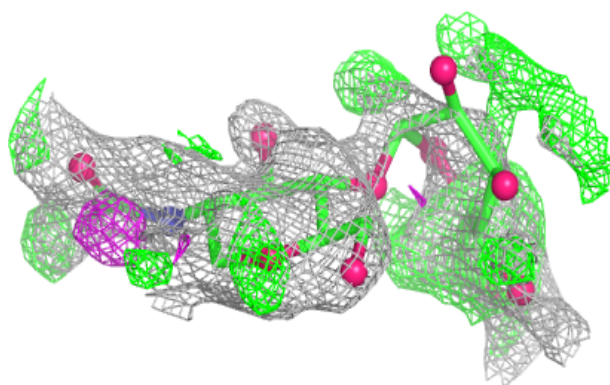
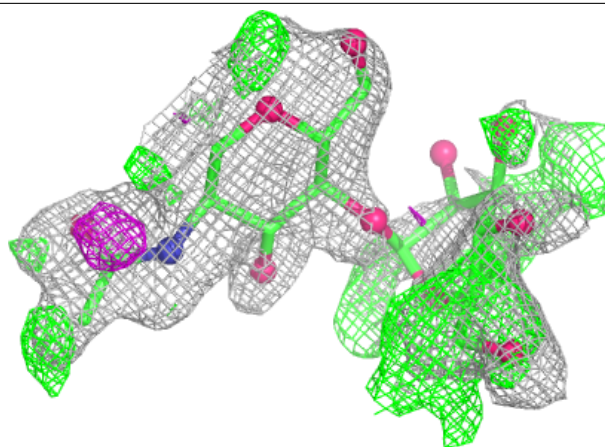
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
4	BMA	D	2	11/12	0.33	0.48	55,61,62,63	11
4	NAG	D	1	14/15	0.67	0.29	47,56,63,63	0
3	FUC	C	2	10/11	0.68	0.19	45,49,53,53	0
5	NAG	E	2	14/15	0.75	0.18	57,60,64,64	0
3	NAG	C	1	14/15	0.89	0.11	23,29,35,36	0
5	NAG	E	1	14/15	0.94	0.08	21,25,31,37	0

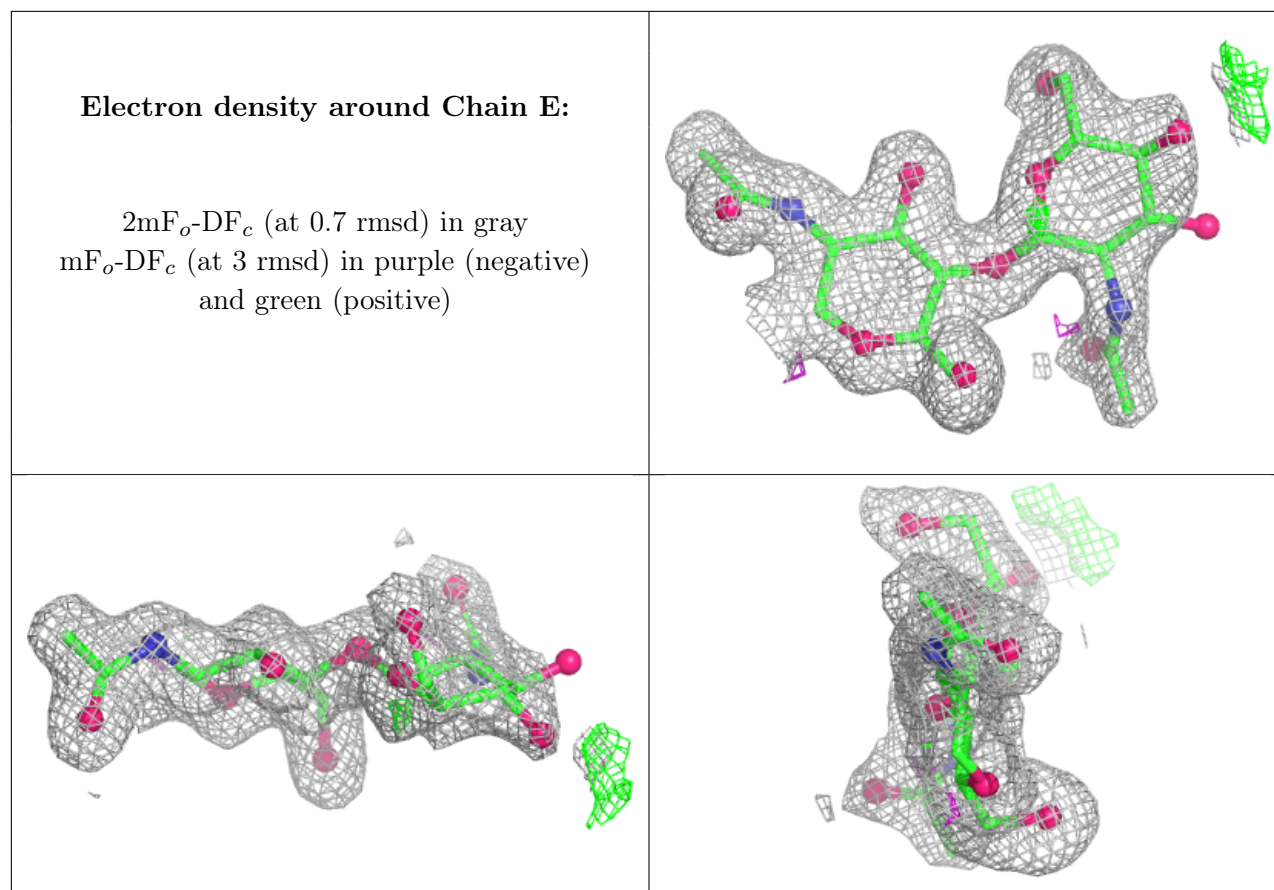
The following is a graphical depiction of the model fit to experimental electron density for oligosaccharide. Each fit is shown from different orientation to approximate a three-dimensional view.



Electron density around Chain D:

$2mF_o-DF_c$ (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
7	NAG	A	303	14/15	0.68	0.18	47,55,59,62	0
6	EDO	B	302	4/4	0.78	0.19	37,39,40,44	0
6	EDO	A	301	4/4	0.79	0.18	37,38,39,40	0
6	EDO	B	303	4/4	0.80	0.19	41,43,44,46	0
6	EDO	A	302	4/4	0.86	0.19	32,33,35,37	0
6	EDO	B	304	4/4	0.90	0.13	29,36,37,40	0
6	EDO	B	301	4/4	0.91	0.11	24,30,30,31	0
8	GOL	B	311	6/6	0.94	0.09	16,18,21,24	0

6.5 Other polymers [i](#)

There are no such residues in this entry.