



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 9, 2026 – 11:37 AM UTC

PDB ID : 3OLI / pdb_00003oli
Title : Structures of human pancreatic alpha-amylase in complex with acarviosatin IV03
Authors : Qin, X.; Ren, L.
Deposited on : 2010-08-26
Resolution : 1.50 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

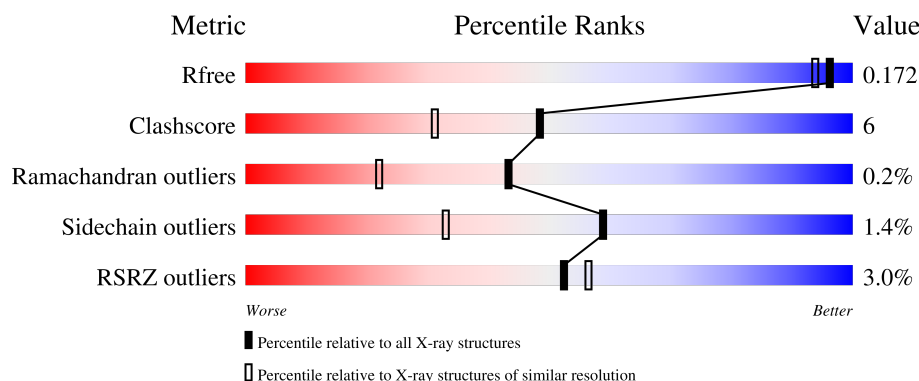
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.50 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	4037 (1.50-1.50)
Clashscore	190562	4235 (1.50-1.50)
Ramachandran outliers	187476	4153 (1.50-1.50)
Sidechain outliers	187428	4150 (1.50-1.50)
RSRZ outliers	180081	4039 (1.50-1.50)

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	496	3% 91% 8%
2	B	2	100%
3	C	3	33% 67%
4	D	3	100%
5	E	2	50% 50%

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
12	MPD	A	515	-	-	X	-

2 Entry composition [i](#)

There are 13 unique types of molecules in this entry. The entry contains 4616 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 Pancreatic alpha-amylase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	495	Total	C	N	O	S	0	0	0
			3939	2492	695	731	21			

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	287	MET	VAL	engineered mutation	UNP P04746

- Molecule 2 is an oligosaccharide called alpha-D-quinovopyranose-(1-4)-alpha-D-glucopyranose.



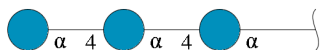
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf	Trace
2	B	2	Total	C	O	0	0	0
			20	12	8			

- Molecule 3 is an oligosaccharide called alpha-D-quinovopyranose-(1-4)-alpha-D-glucopyranose-(1-4)-alpha-D-glucopyranose.



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf	Trace
3	C	3	Total	C	O	0	0	0
			32	18	14			

- Molecule 4 is an oligosaccharide called alpha-D-glucopyranose-(1-4)-alpha-D-glucopyranose-(1-4)-alpha-D-glucopyranose.



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf	Trace
4	D	3	Total	C	O	0	0	0
			34	18	16			

- Molecule 5 is an oligosaccharide called alpha-D-glucopyranose-(1-4)-alpha-D-glucopyranose.



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf	Trace
5	E	2	Total	C	O	0	0	0
			23	12	11			

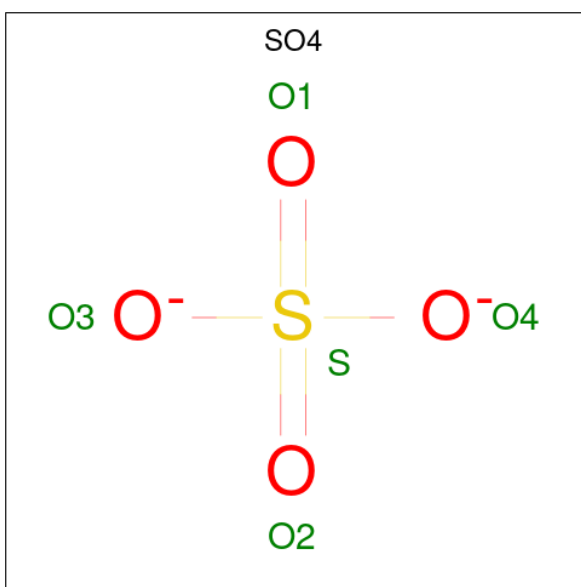
- Molecule 6 is CALCIUM ION (CCD ID: CA) (formula: Ca).

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

- Molecule 7 is CHLORIDE ION (CCD ID: CL) (formula: Cl).

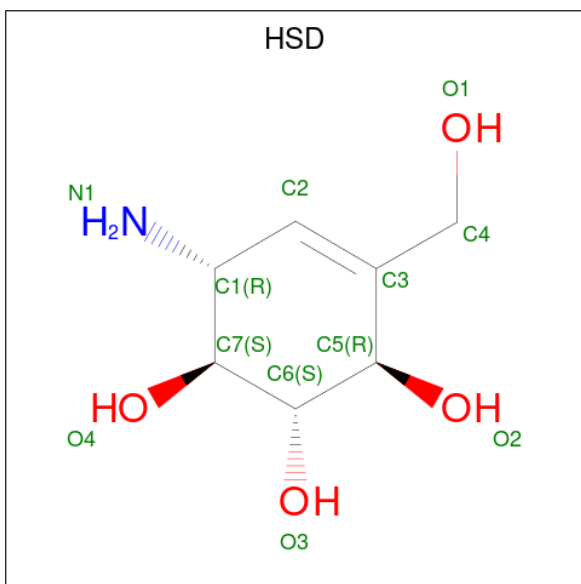
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
7	A	1	Total	Cl	0	0
			1	1		

- Molecule 8 is SULFATE ION (CCD ID: SO4) (formula: O₄S).



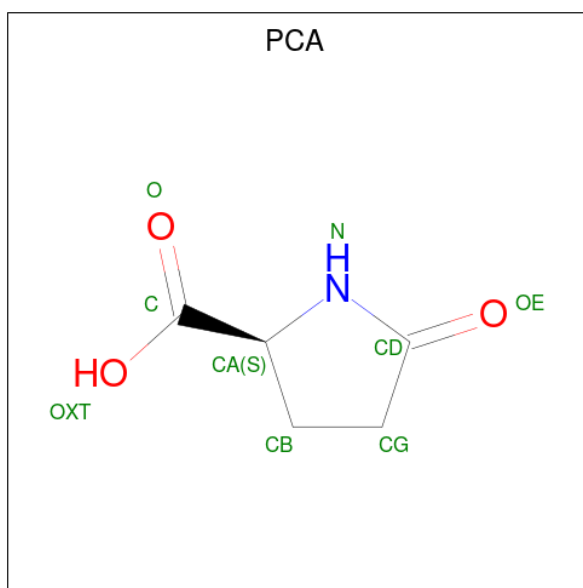
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
8	A	1	Total	O	S	0	0
			5	4	1		

- Molecule 9 is (1S,2S,3R,6R)-6-amino-4-(hydroxymethyl)cyclohex-4-ene-1,2,3-triol (CCD ID: HSD) (formula: C₇H₁₃NO₄).



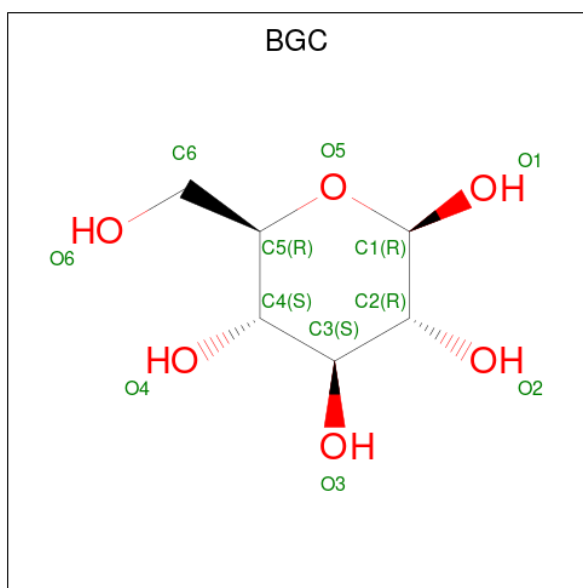
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
9	A	1	Total	C	N	O	0	0
			12	7	1	4		
9	A	1	Total	C	N	O	0	0
			12	7	1	4		

- Molecule 10 is PYROGLUTAMIC ACID (CCD ID: PCA) (formula: $C_5H_7NO_3$).



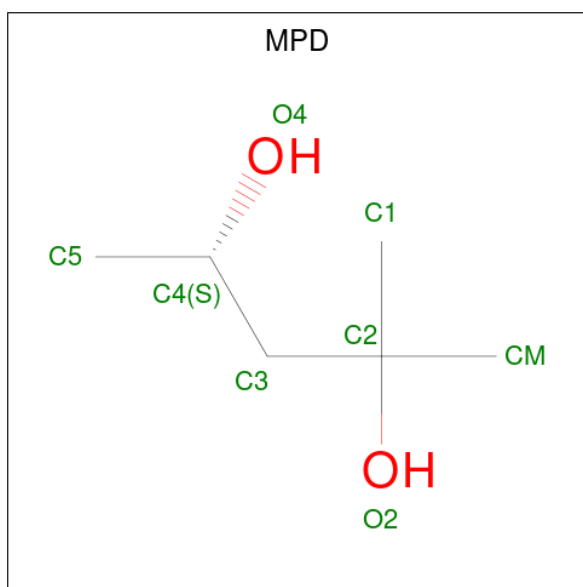
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
10	A	1	Total	C	N	O	0	0
			8	5	1	2		

- Molecule 11 is beta-D-glucopyranose (CCD ID: BGC) (formula: $C_6H_{12}O_6$).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
11	A	1	Total	C	O	0	0
			12	6	6		

- Molecule 12 is (4S)-2-METHYL-2,4-PENTANEDIOL (CCD ID: MPD) (formula: $C_6H_{14}O_2$).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
12	A	1	Total	C	O	0	0
			8	6	2		
12	A	1	Total	C	O	0	0
			8	6	2		

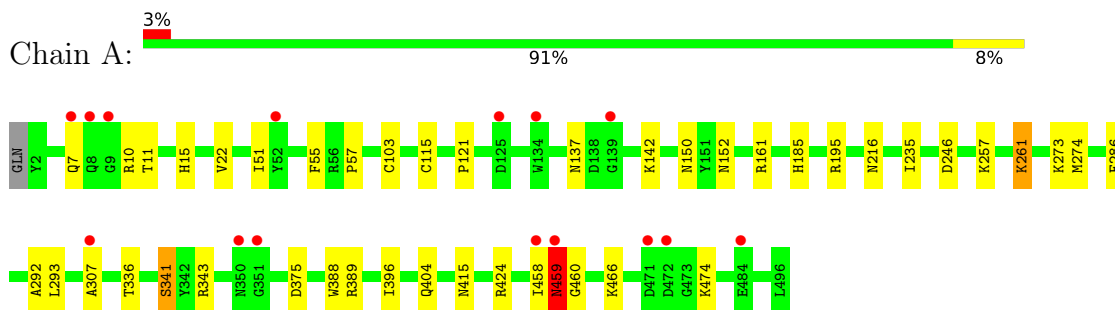
- Molecule 13 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
13	A	501	Total	O	0	0
			501	501		

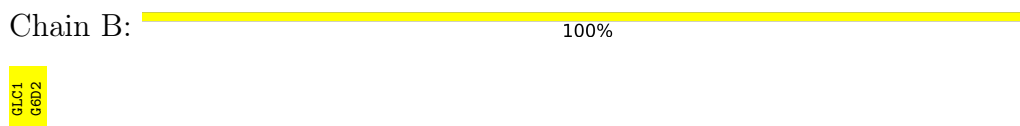
3 Residue-property plots

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: Pancreatic alpha-amylase



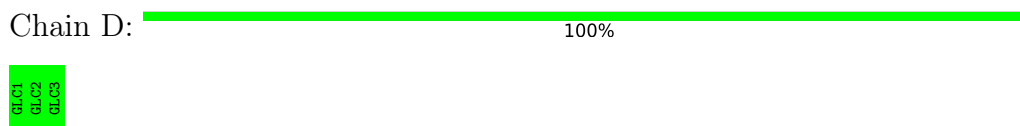
- Molecule 2: alpha-D-quinovopyranose-(1-4)-alpha-D-glucopyranose



- Molecule 3: alpha-D-quinovopyranose-(1-4)-alpha-D-glucopyranose-(1-4)-alpha-D-glucopyranose



- Molecule 4: alpha-D-glucopyranose-(1-4)-alpha-D-glucopyranose-(1-4)-alpha-D-glucopyranose



- Molecule 5: alpha-D-glucopyranose-(1-4)-alpha-D-glucopyranose



4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	52.57Å 74.45Å 134.90Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	35.88 – 1.50 35.88 – 1.50	Depositor EDS
% Data completeness (in resolution range)	84.4 (35.88-1.50) 84.5 (35.88-1.50)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.66 (at 1.38Å)	Xtriage
Refinement program	CNS 1.2	Depositor
R, R_{free}	0.171 , 0.177 0.166 , 0.172	Depositor DCC
R_{free} test set	3714 reflections (4.75%)	wwPDB-VP
Wilson B-factor (Å ²)	12.5	Xtriage
Anisotropy	0.296	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.38 , 39.4	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	4616	wwPDB-VP
Average B, all atoms (Å ²)	15.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.76% 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: SO4, CA, GLC, BGC, MPD, HSD, CL, PCA, G6D

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	0.47	0/4053	0.91	12/5503 (0.2%)

There are no bond length outliers.

All (12) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	336	THR	N-CA-C	7.28	121.54	109.46
1	A	341	SER	N-CA-C	6.69	119.58	109.95
1	A	216	ASN	N-CA-C	-6.62	101.62	110.55
1	A	195	ARG	N-CA-C	-6.28	98.50	108.73
1	A	11	THR	N-CA-C	5.97	121.36	112.94
1	A	293	LEU	N-CA-C	-5.86	97.63	107.99
1	A	55	PHE	N-CA-C	5.79	117.90	108.63
1	A	185	HIS	N-CA-C	-5.60	105.08	111.07
1	A	161	ARG	N-CA-C	5.47	117.61	109.25
1	A	292	ALA	N-CA-C	5.29	118.43	109.76
1	A	460	GLY	N-CA-C	5.09	122.31	115.59
1	A	137	ASN	N-CA-C	5.02	118.55	112.93

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	3939	0	3711	32	0
2	B	20	0	10	0	0
3	C	32	0	21	0	0
4	D	34	0	30	0	0
5	E	23	0	21	0	0
6	A	1	0	0	0	0
7	A	1	0	0	0	0
8	A	5	0	0	0	0
9	A	24	0	21	0	0
10	A	8	0	5	0	0
11	A	12	0	12	5	0
12	A	16	0	28	15	0
13	A	501	0	0	16	0
All	All	4616	0	3859	44	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 6.

All (44) 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)
12:A:515:MPD:H12	13:A:847:HOH:O	1.53	1.08
12:A:514:MPD:H52	12:A:514:MPD:O2	1.59	1.00
1:A:396:ILE:HD11	13:A:955:HOH:O	1.63	0.98
1:A:396:ILE:HG21	13:A:954:HOH:O	1.75	0.84
12:A:514:MPD:O2	12:A:514:MPD:C5	2.28	0.81
1:A:261:LYS:HE2	1:A:286:PHE:HE1	1.50	0.77
11:A:511:BGC:O4	12:A:515:MPD:HM2	1.85	0.76
1:A:343:ARG:NH2	13:A:929:HOH:O	2.20	0.72
1:A:389:ARG:HB2	12:A:515:MPD:H13	1.71	0.71
1:A:22:VAL:HG11	13:A:1013:HOH:O	1.92	0.68
1:A:261:LYS:HE2	1:A:286:PHE:CE1	2.30	0.67
11:A:511:BGC:O4	12:A:515:MPD:CM	2.44	0.66
11:A:511:BGC:H3	13:A:1002:HOH:O	1.96	0.64
1:A:103:CYS:SG	1:A:121:PRO:HG3	2.38	0.64
1:A:388:TRP:CD1	11:A:511:BGC:H6C1	2.34	0.63
1:A:150:ASN:ND2	1:A:152:ASN:H	2.00	0.60
1:A:246:ASP:OD2	13:A:897:HOH:O	2.17	0.56
12:A:514:MPD:H52	12:A:514:MPD:HO2	1.66	0.56
1:A:474:LYS:HE2	13:A:960:HOH:O	2.08	0.53
1:A:142:LYS:HE2	13:A:973:HOH:O	2.09	0.52
12:A:514:MPD:H51	13:A:774:HOH:O	2.10	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:389:ARG:HB2	12:A:515:MPD:C1	2.40	0.51
1:A:459:ASN:ND2	1:A:459:ASN:N	2.59	0.50
1:A:22:VAL:HG13	13:A:645:HOH:O	2.12	0.49
1:A:150:ASN:HD22	1:A:150:ASN:C	2.20	0.48
1:A:150:ASN:HD21	1:A:152:ASN:HB2	1.78	0.48
1:A:375:ASP:OD2	12:A:515:MPD:H52	2.14	0.47
1:A:274:MET:H	1:A:415:ASN:HD22	1.63	0.47
1:A:15:HIS:HD2	13:A:580:HOH:O	1.98	0.46
1:A:7:GLN:HB2	1:A:10:ARG:HD2	1.98	0.46
1:A:404:GLN:HG3	1:A:424:ARG:HG3	1.99	0.45
1:A:396:ILE:HG23	13:A:565:HOH:O	2.17	0.44
1:A:257:LYS:O	1:A:261:LYS:HD3	2.17	0.44
1:A:274:MET:H	1:A:415:ASN:ND2	2.16	0.44
1:A:389:ARG:CB	12:A:515:MPD:H13	2.42	0.43
1:A:396:ILE:CG2	13:A:565:HOH:O	2.66	0.43
11:A:511:BGC:H6C2	12:A:515:MPD:HM1	2.00	0.43
12:A:515:MPD:H11	12:A:515:MPD:O4	2.20	0.42
12:A:515:MPD:CM	13:A:846:HOH:O	2.67	0.42
1:A:235:ILE:HG21	1:A:307:ALA:HB2	2.03	0.41
1:A:51:ILE:HB	1:A:57:PRO:HD2	2.03	0.41
1:A:150:ASN:ND2	1:A:152:ASN:HB2	2.36	0.41
12:A:515:MPD:C1	13:A:847:HOH:O	2.36	0.41
1:A:458:ILE:HG22	1:A:459:ASN:ND2	2.37	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	493/496 (99%)	480 (97%)	12 (2%)	1 (0%)	43 22

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	459	ASN

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	418/419 (100%)	412 (99%)	6 (1%)	59 33

All (6) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	115	CYS
1	A	261	LYS
1	A	273	LYS
1	A	341	SER
1	A	459	ASN
1	A	466	LYS

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

Mol	Chain	Res	Type
1	A	8	GLN
1	A	15	HIS
1	A	150	ASN
1	A	152	ASN
1	A	216	ASN
1	A	220	ASN
1	A	363	ASN
1	A	415	ASN
1	A	459	ASN
1	A	476	HIS

5.3.3 RNA [i](#)

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 ⓘ

10 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	GLC	B	1	9,2	11,11,12	0.44	0	15,15,17	0.85	1 (6%)
2	G6D	B	2	9,2	9,9,11	0.50	0	11,12,16	1.59	2 (18%)
3	GLC	C	1	3	12,12,12	0.91	1 (8%)	17,17,17	2.13	8 (47%)
3	GLC	C	2	3	11,11,12	1.04	1 (9%)	15,15,17	0.64	0
3	G6D	C	3	3,9	9,9,11	0.66	0	11,12,16	0.69	0
4	GLC	D	1	4	12,12,12	0.37	0	17,17,17	0.34	0
4	GLC	D	2	4	11,11,12	0.47	0	15,15,17	0.51	0
4	GLC	D	3	4	11,11,12	0.46	0	15,15,17	0.29	0
5	GLC	E	1	5	12,12,12	0.52	0	17,17,17	0.44	0
5	GLC	E	2	5	11,11,12	0.62	0	15,15,17	0.98	1 (6%)

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	GLC	B	1	9,2	-	0/2/19/22	0/1/1/1
2	G6D	B	2	9,2	-	-	0/1/1/1
3	GLC	C	1	3	-	2/2/22/22	0/1/1/1
3	GLC	C	2	3	-	0/2/19/22	0/1/1/1
3	G6D	C	3	3,9	-	-	0/1/1/1
4	GLC	D	1	4	-	0/2/22/22	0/1/1/1
4	GLC	D	2	4	-	0/2/19/22	0/1/1/1
4	GLC	D	3	4	-	0/2/19/22	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
5	GLC	E	1	5	-	0/2/22/22	0/1/1/1
5	GLC	E	2	5	-	0/2/19/22	0/1/1/1

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	C	2	GLC	O5-C1	2.25	1.47	1.43
3	C	1	GLC	C4-C5	-2.19	1.48	1.53

All (12) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	C	1	GLC	O5-C1-C2	3.73	116.85	110.30
3	C	1	GLC	C4-C3-C2	-3.70	104.34	110.83
3	C	1	GLC	O1-C1-C2	3.39	118.81	108.98
2	B	2	G6D	O5-C5-C4	3.34	112.62	109.39
3	C	1	GLC	O5-C5-C4	2.95	115.01	109.70
5	E	2	GLC	C1-O5-C5	2.62	115.69	112.19
3	C	1	GLC	C6-C5-C4	2.56	119.31	113.02
3	C	1	GLC	O2-C2-C3	2.51	116.30	110.38
3	C	1	GLC	O1-C1-O5	2.45	117.69	110.41
3	C	1	GLC	O4-C4-C3	-2.29	104.98	110.38
2	B	1	GLC	C3-C4-C5	-2.04	106.53	110.23
2	B	2	G6D	C3-C4-C5	-2.02	108.00	111.21

There are no chirality outliers.

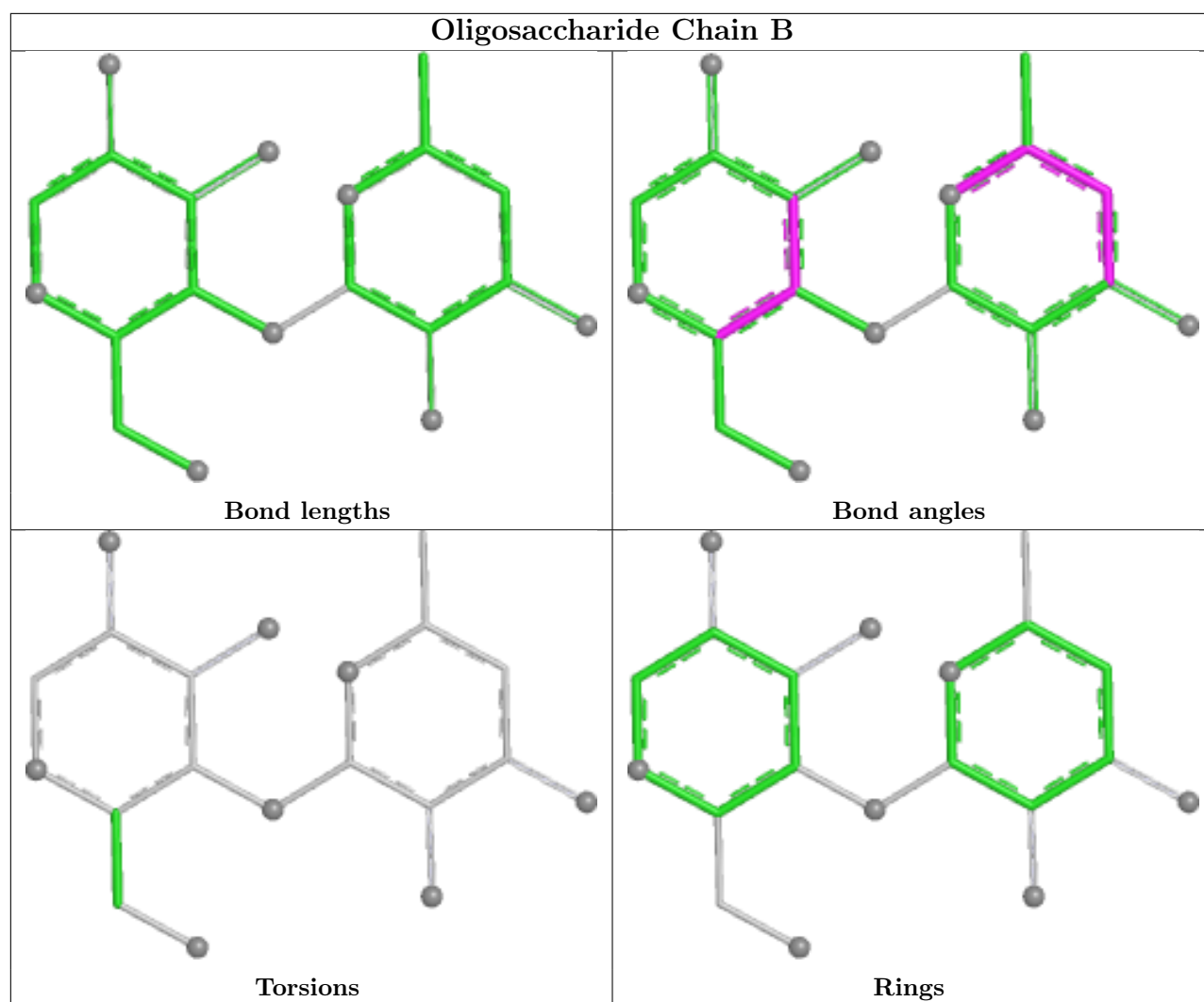
All (2) torsion outliers are listed below:

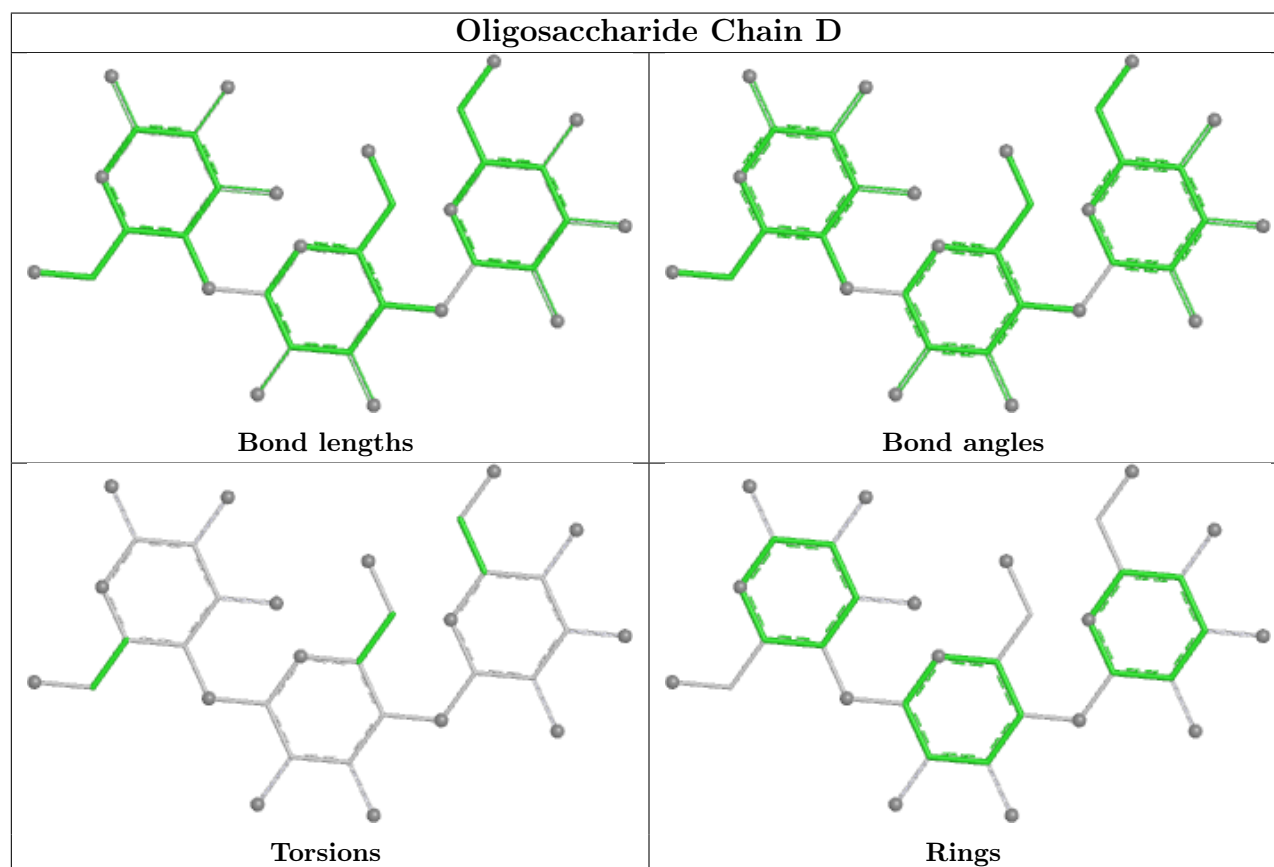
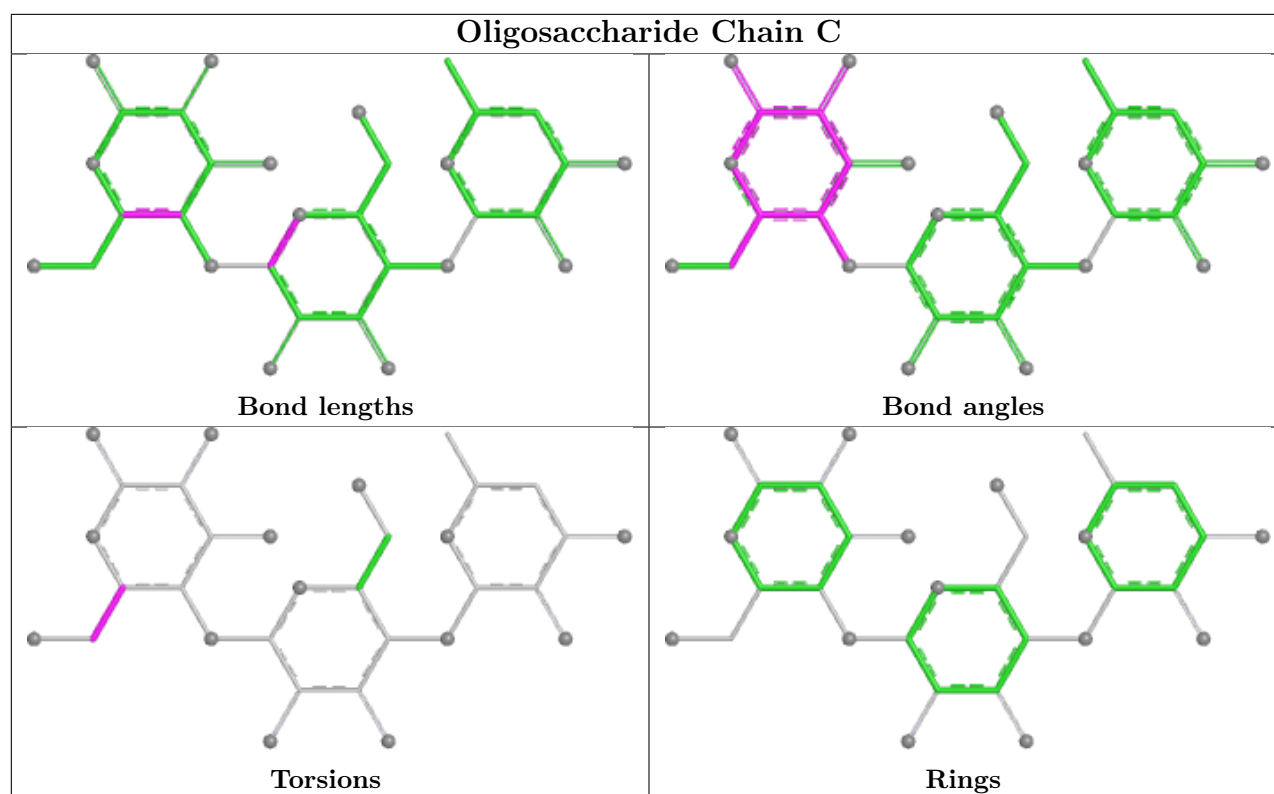
Mol	Chain	Res	Type	Atoms
3	C	1	GLC	O5-C5-C6-O6
3	C	1	GLC	C4-C5-C6-O6

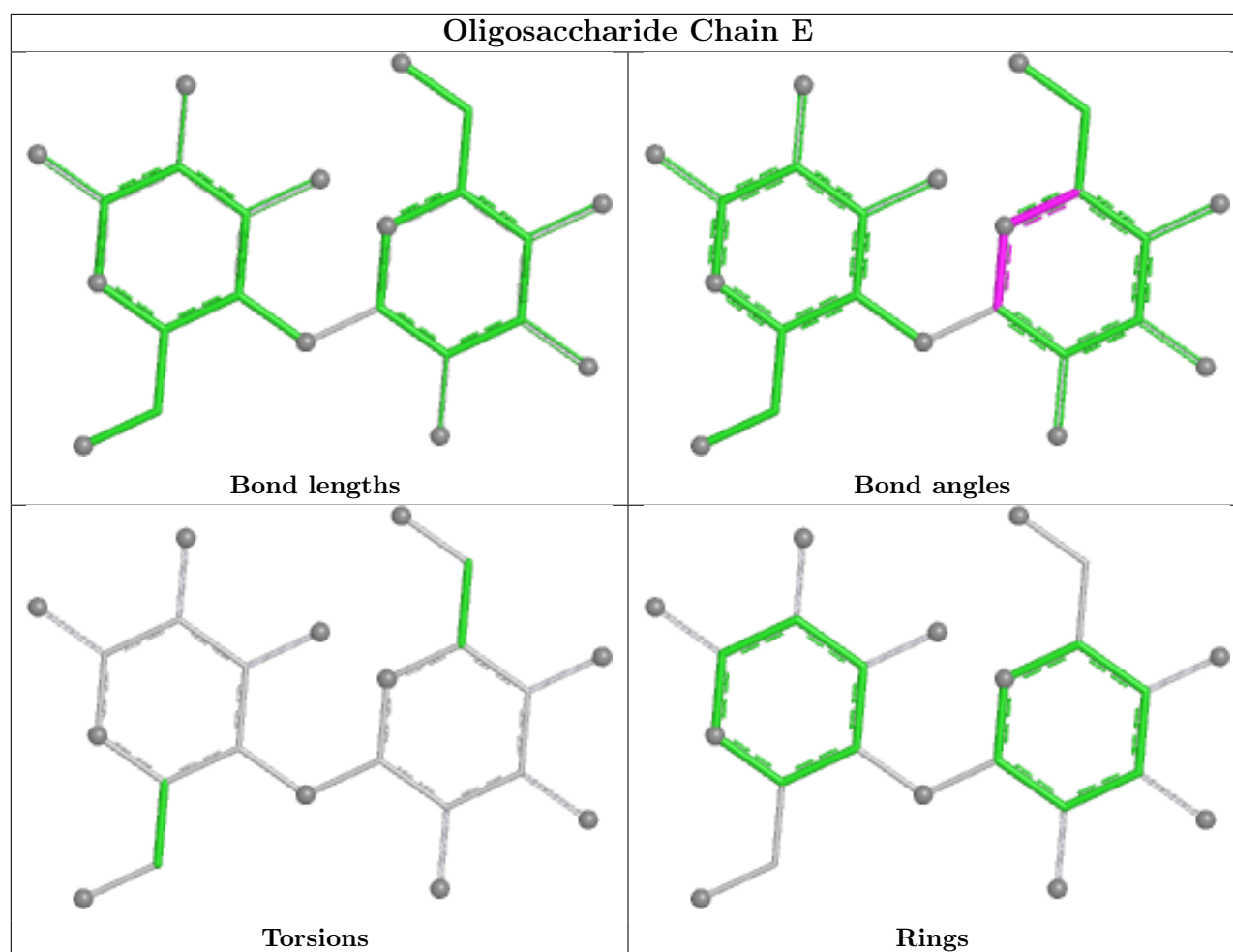
There are no ring outliers.

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 9 ligands modelled in this entry, 2 are monoatomic - leaving 7 for Mogul analysis.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\# Z > 2$	Counts	RMSZ	$\# Z > 2$
12	MPD	A	514	-	7,7,7	0.34	0	9,10,10	0.68	0
9	HSD	A	500	2	12,12,12	1.76	2 (16%)	11,17,17	1.96	3 (27%)
11	BGC	A	511	-	12,12,12	0.73	0	17,17,17	2.05	5 (29%)
12	MPD	A	515	-	7,7,7	0.35	0	9,10,10	0.36	0
8	SO4	A	499	-	4,4,4	0.35	0	6,6,6	0.07	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
10	PCA	A	510	1	7,8,9	1.23	0	9,10,12	2.13	3 (33%)
9	HSD	A	503	3,2	12,12,12	1.85	2 (16%)	11,17,17	2.84	3 (27%)

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
12	MPD	A	514	-	-	5/5/5/5	-
9	HSD	A	500	2	-	0/2/22/22	0/1/1/1
11	BGC	A	511	-	-	0/2/22/22	0/1/1/1
12	MPD	A	515	-	-	2/5/5/5	-
10	PCA	A	510	1	-	0/0/11/13	0/1/1/1
9	HSD	A	503	3,2	-	1/2/22/22	0/1/1/1

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
9	A	503	HSD	C2-C3	4.44	1.39	1.32
9	A	500	HSD	C2-C3	4.15	1.38	1.32
9	A	503	HSD	C5-C3	4.12	1.54	1.51
9	A	500	HSD	C5-C3	3.85	1.54	1.51

All (14) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
9	A	503	HSD	C7-C1-N1	7.47	126.59	111.40
11	A	511	BGC	C1-C2-C3	-6.05	98.01	110.36
9	A	500	HSD	C7-C1-N1	4.49	120.52	111.40
9	A	503	HSD	O4-C7-C6	4.46	120.89	110.38
10	A	510	PCA	CB-CG-CD	-3.74	98.62	104.41
11	A	511	BGC	O1-C1-C2	3.41	118.89	108.98
10	A	510	PCA	O-C-CA	-3.18	116.60	124.77
9	A	500	HSD	O4-C7-C6	3.08	117.63	110.38
9	A	500	HSD	C6-C5-C3	3.01	116.41	111.67
10	A	510	PCA	CB-CA-C	-2.53	109.19	112.66
11	A	511	BGC	C1-O5-C5	-2.33	109.14	113.65
11	A	511	BGC	C6-C5-C4	2.17	118.36	113.02
9	A	503	HSD	C6-C5-C3	2.02	114.85	111.67
11	A	511	BGC	O1-C1-O5	2.01	116.37	110.41

There are no chirality outliers.

All (8) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
9	A	503	HSD	C5-C3-C4-O1
12	A	514	MPD	C2-C3-C4-O4
12	A	514	MPD	C2-C3-C4-C5
12	A	514	MPD	C1-C2-C3-C4
12	A	514	MPD	CM-C2-C3-C4
12	A	514	MPD	O2-C2-C3-C4
12	A	515	MPD	O2-C2-C3-C4
12	A	515	MPD	C1-C2-C3-C4

There are no ring outliers.

3 monomers are involved in 17 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
12	A	514	MPD	4	0
11	A	511	BGC	5	0
12	A	515	MPD	11	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 [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	495/496 (99%)	-0.02	15 (3%)	52 56	7, 12, 22, 34	0

All (15) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	459	ASN	5.9
1	A	52	TYR	4.4
1	A	9	GLY	3.9
1	A	484	GLU	3.6
1	A	7	GLN	3.4
1	A	458	ILE	3.0
1	A	350	ASN	2.9
1	A	351	GLY	2.9
1	A	8	GLN	2.7
1	A	472	ASP	2.5
1	A	471	ASP	2.4
1	A	125	ASP	2.4
1	A	307	ALA	2.4
1	A	134	TRP	2.2
1	A	139	GLY	2.2

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

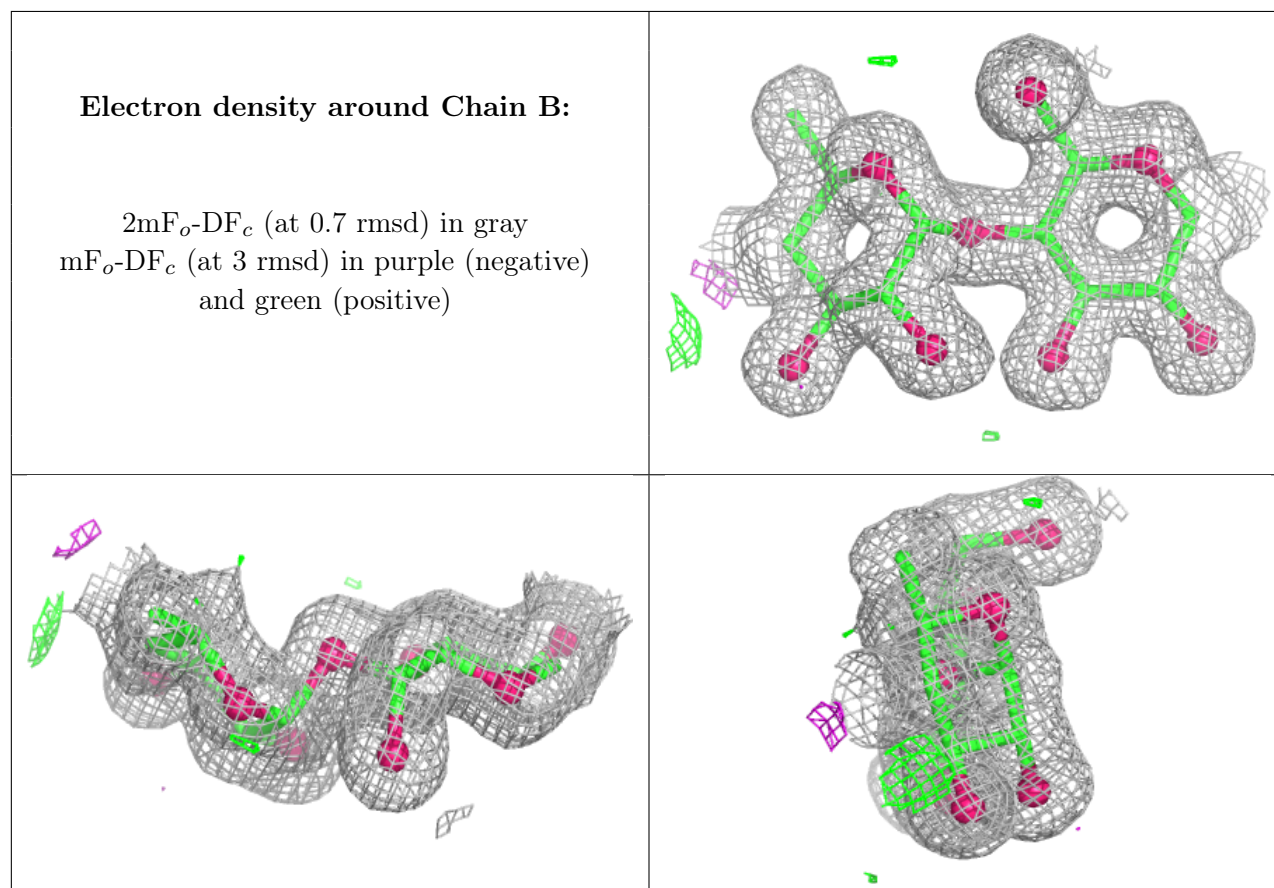
There are no non-standard protein/DNA/RNA residues in this entry.

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.

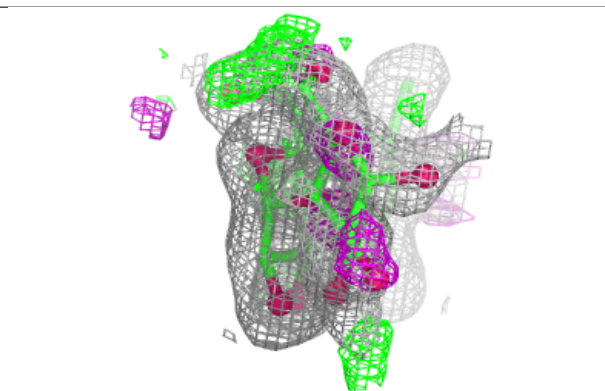
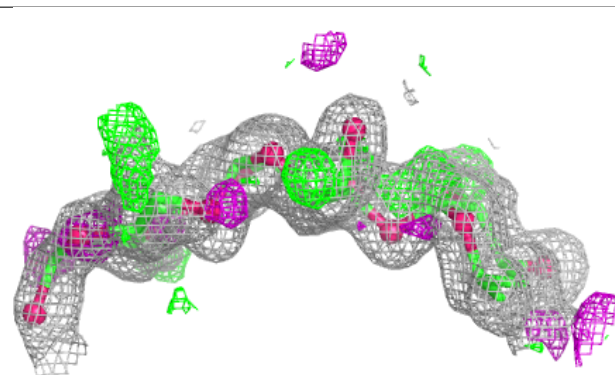
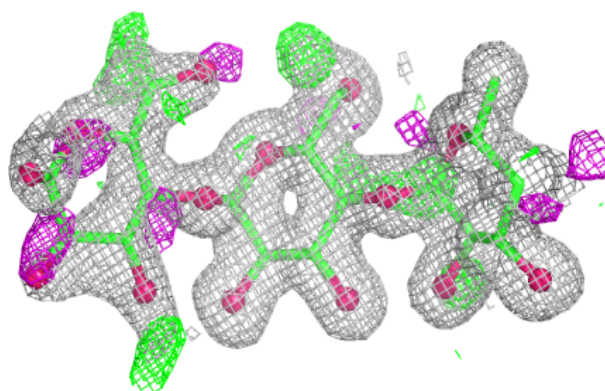
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
4	GLC	D	3	11/12	0.68	0.17	32,34,36,38	0
3	GLC	C	1	12/12	0.73	0.18	22,33,34,34	0
5	GLC	E	1	12/12	0.77	0.13	22,28,28,32	0
4	GLC	D	1	12/12	0.84	0.12	24,27,29,31	0
4	GLC	D	2	11/12	0.89	0.11	23,25,29,29	0
3	G6D	C	3	9/11	0.90	0.10	13,14,16,16	0
5	GLC	E	2	11/12	0.92	0.09	15,18,19,19	0
3	GLC	C	2	11/12	0.93	0.09	14,14,18,21	0
2	G6D	B	2	9/11	0.95	0.07	14,16,18,18	0
2	GLC	B	1	11/12	0.97	0.05	9,11,13,13	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.

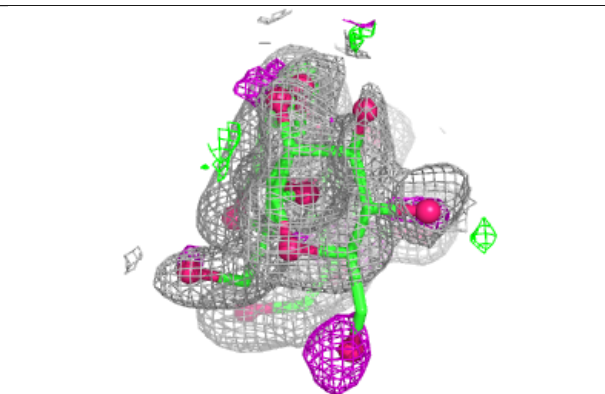
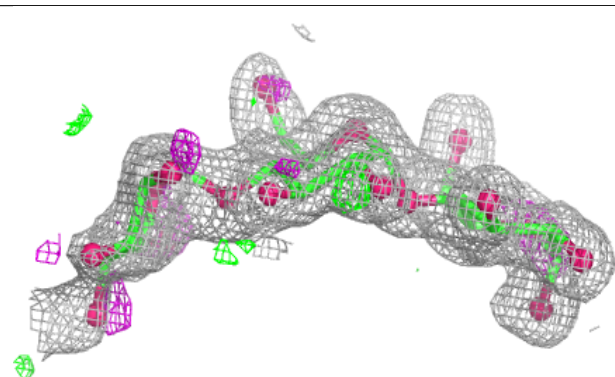
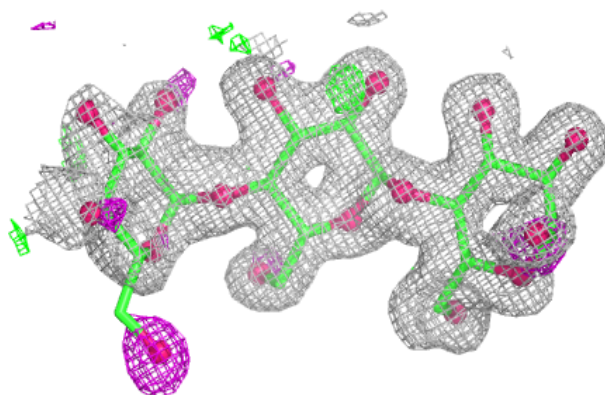


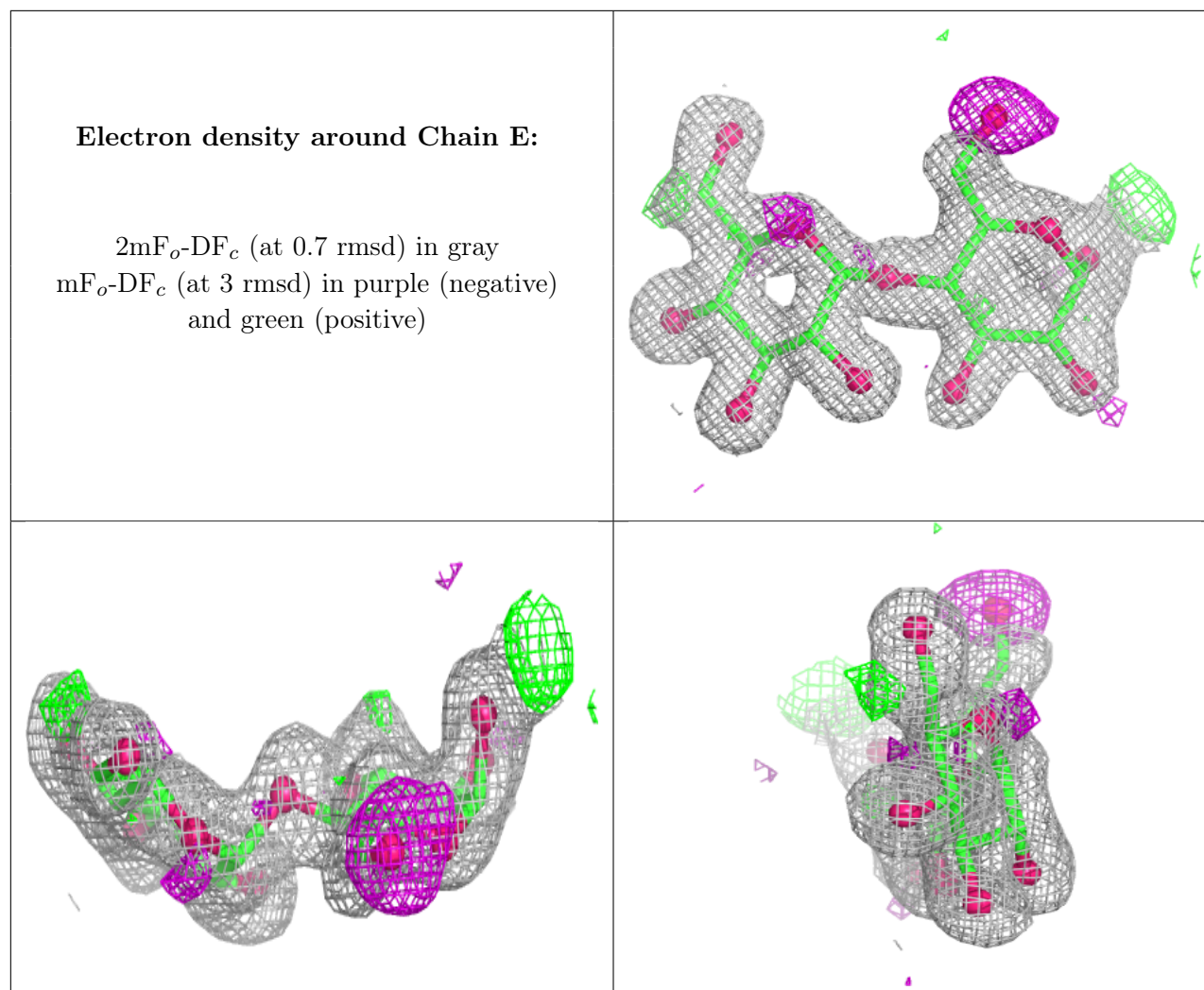
Electron density around Chain C:

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

**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 ⓘ

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
11	BGC	A	511	12/12	0.68	0.14	32,35,37,38	0
9	HSD	A	500	12/12	0.70	0.16	22,30,31,31	0
8	SO4	A	499	5/5	0.71	0.17	45,46,46,48	0
12	MPD	A	515	8/8	0.71	0.16	23,28,29,30	0
12	MPD	A	514	8/8	0.79	0.12	25,27,28,29	0
9	HSD	A	503	12/12	0.83	0.13	10,11,14,14	0
10	PCA	A	510	8/9	0.94	0.07	10,12,12,14	0
6	CA	A	497	1/1	0.99	0.02	9,9,9,9	0
7	CL	A	498	1/1	1.00	0.04	8,8,8,8	0

6.5 Other polymers [i](#)

There are no such residues in this entry.