



Full wwPDB X-ray Structure Validation Report ⓘ

Jul 13, 2026 – 01:50 pm BST

PDB ID : 9RX0 / pdb_00009rx0
Title : Crystal structure of the YbgO lectin domain, in complex with Man-alpha1-3-Man
Authors : D'Hondt, A.K.; Remaut, H.K.
Deposited on : 2025-07-10
Resolution : 2.00 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	:	1.8.4, CSD as541be (2020)
Xtriage (Phenix)	:	2.0
EDS	:	3.0
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4	:	9.0.015 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.50

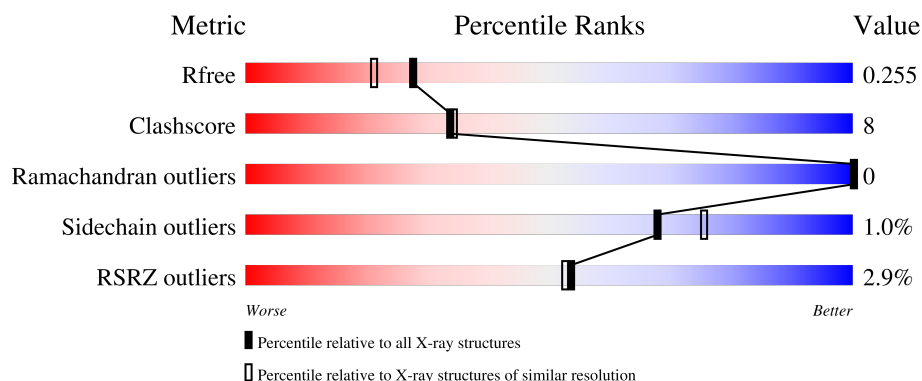
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.00 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	10052 (2.00-2.00)
Clashscore	190562	11152 (2.00-2.00)
Ramachandran outliers	187476	11031 (2.00-2.00)
Sidechain outliers	187428	11029 (2.00-2.00)
RSRZ outliers	180081	10067 (2.00-2.00)

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	214	0.2% 73% 16% 10%
1	B	214	4% 70% 21% 9%
1	C	214	0.2% 76% 14% 10%
1	D	214	4% 76% 13% 10%
2	E	2	100%

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Mol	Chain	Length	Quality of chain
2	F	2	 50%50%
2	G	2	 100%
2	H	2	 50%50%

2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 6568 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 Fimbrial protein.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	192	Total	C	N	O	S	0	0	0
			1523	956	259	300	8			
1	B	194	Total	C	N	O	S	0	3	0
			1554	979	261	306	8			
1	C	193	Total	C	N	O	S	0	0	0
			1531	962	260	301	8			
1	D	192	Total	C	N	O	S	0	0	0
			1523	956	259	300	8			

There are 80 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	195	GLY	-	expression tag	UNP A0A0C2EAI1
A	196	ALA	-	expression tag	UNP A0A0C2EAI1
A	197	ALA	-	expression tag	UNP A0A0C2EAI1
A	198	ALA	-	expression tag	UNP A0A0C2EAI1
A	199	TYR	-	expression tag	UNP A0A0C2EAI1
A	200	PRO	-	expression tag	UNP A0A0C2EAI1
A	201	TYR	-	expression tag	UNP A0A0C2EAI1
A	202	ASP	-	expression tag	UNP A0A0C2EAI1
A	203	VAL	-	expression tag	UNP A0A0C2EAI1
A	204	PRO	-	expression tag	UNP A0A0C2EAI1
A	205	ASP	-	expression tag	UNP A0A0C2EAI1
A	206	TYR	-	expression tag	UNP A0A0C2EAI1
A	207	GLY	-	expression tag	UNP A0A0C2EAI1
A	208	SER	-	expression tag	UNP A0A0C2EAI1
A	209	HIS	-	expression tag	UNP A0A0C2EAI1
A	210	HIS	-	expression tag	UNP A0A0C2EAI1
A	211	HIS	-	expression tag	UNP A0A0C2EAI1
A	212	HIS	-	expression tag	UNP A0A0C2EAI1
A	213	HIS	-	expression tag	UNP A0A0C2EAI1
A	214	HIS	-	expression tag	UNP A0A0C2EAI1
B	195	GLY	-	expression tag	UNP A0A0C2EAI1

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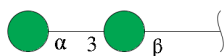
Chain	Residue	Modelled	Actual	Comment	Reference
B	196	ALA	-	expression tag	UNP A0A0C2EAI1
B	197	ALA	-	expression tag	UNP A0A0C2EAI1
B	198	ALA	-	expression tag	UNP A0A0C2EAI1
B	199	TYR	-	expression tag	UNP A0A0C2EAI1
B	200	PRO	-	expression tag	UNP A0A0C2EAI1
B	201	TYR	-	expression tag	UNP A0A0C2EAI1
B	202	ASP	-	expression tag	UNP A0A0C2EAI1
B	203	VAL	-	expression tag	UNP A0A0C2EAI1
B	204	PRO	-	expression tag	UNP A0A0C2EAI1
B	205	ASP	-	expression tag	UNP A0A0C2EAI1
B	206	TYR	-	expression tag	UNP A0A0C2EAI1
B	207	GLY	-	expression tag	UNP A0A0C2EAI1
B	208	SER	-	expression tag	UNP A0A0C2EAI1
B	209	HIS	-	expression tag	UNP A0A0C2EAI1
B	210	HIS	-	expression tag	UNP A0A0C2EAI1
B	211	HIS	-	expression tag	UNP A0A0C2EAI1
B	212	HIS	-	expression tag	UNP A0A0C2EAI1
B	213	HIS	-	expression tag	UNP A0A0C2EAI1
B	214	HIS	-	expression tag	UNP A0A0C2EAI1
C	195	GLY	-	expression tag	UNP A0A0C2EAI1
C	196	ALA	-	expression tag	UNP A0A0C2EAI1
C	197	ALA	-	expression tag	UNP A0A0C2EAI1
C	198	ALA	-	expression tag	UNP A0A0C2EAI1
C	199	TYR	-	expression tag	UNP A0A0C2EAI1
C	200	PRO	-	expression tag	UNP A0A0C2EAI1
C	201	TYR	-	expression tag	UNP A0A0C2EAI1
C	202	ASP	-	expression tag	UNP A0A0C2EAI1
C	203	VAL	-	expression tag	UNP A0A0C2EAI1
C	204	PRO	-	expression tag	UNP A0A0C2EAI1
C	205	ASP	-	expression tag	UNP A0A0C2EAI1
C	206	TYR	-	expression tag	UNP A0A0C2EAI1
C	207	GLY	-	expression tag	UNP A0A0C2EAI1
C	208	SER	-	expression tag	UNP A0A0C2EAI1
C	209	HIS	-	expression tag	UNP A0A0C2EAI1
C	210	HIS	-	expression tag	UNP A0A0C2EAI1
C	211	HIS	-	expression tag	UNP A0A0C2EAI1
C	212	HIS	-	expression tag	UNP A0A0C2EAI1
C	213	HIS	-	expression tag	UNP A0A0C2EAI1
C	214	HIS	-	expression tag	UNP A0A0C2EAI1
D	195	GLY	-	expression tag	UNP A0A0C2EAI1
D	196	ALA	-	expression tag	UNP A0A0C2EAI1
D	197	ALA	-	expression tag	UNP A0A0C2EAI1

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Chain	Residue	Modelled	Actual	Comment	Reference
D	198	ALA	-	expression tag	UNP A0A0C2EAI1
D	199	TYR	-	expression tag	UNP A0A0C2EAI1
D	200	PRO	-	expression tag	UNP A0A0C2EAI1
D	201	TYR	-	expression tag	UNP A0A0C2EAI1
D	202	ASP	-	expression tag	UNP A0A0C2EAI1
D	203	VAL	-	expression tag	UNP A0A0C2EAI1
D	204	PRO	-	expression tag	UNP A0A0C2EAI1
D	205	ASP	-	expression tag	UNP A0A0C2EAI1
D	206	TYR	-	expression tag	UNP A0A0C2EAI1
D	207	GLY	-	expression tag	UNP A0A0C2EAI1
D	208	SER	-	expression tag	UNP A0A0C2EAI1
D	209	HIS	-	expression tag	UNP A0A0C2EAI1
D	210	HIS	-	expression tag	UNP A0A0C2EAI1
D	211	HIS	-	expression tag	UNP A0A0C2EAI1
D	212	HIS	-	expression tag	UNP A0A0C2EAI1
D	213	HIS	-	expression tag	UNP A0A0C2EAI1
D	214	HIS	-	expression tag	UNP A0A0C2EAI1

- Molecule 2 is an oligosaccharide called alpha-D-mannopyranose-(1-3)-beta-D-mannopyranose.



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf	Trace
2	E	2	Total	C	O	0	0	0
			22	12	10			
2	F	2	Total	C	O	0	0	0
			22	12	10			
2	G	2	Total	C	O	0	0	0
			22	12	10			
2	H	2	Total	C	O	0	0	0
			22	12	10			

- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	96	Total	O	0	0
			96	96		
3	B	92	Total	O	0	0
			92	92		

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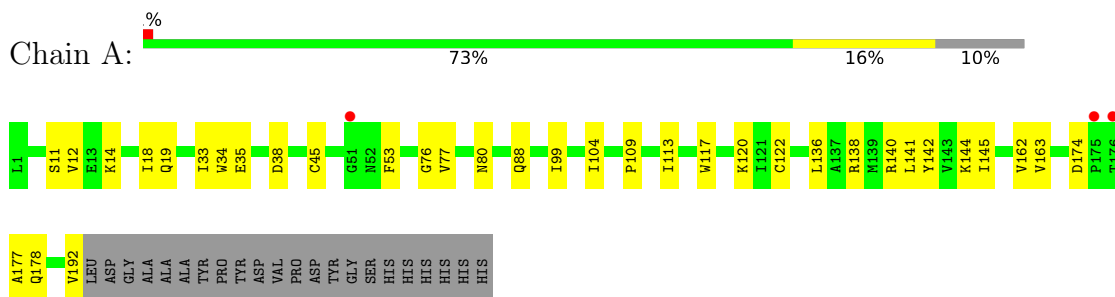
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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	C	81	Total	O	0	0
			81	81		
3	D	80	Total	O	0	0
			80	80		

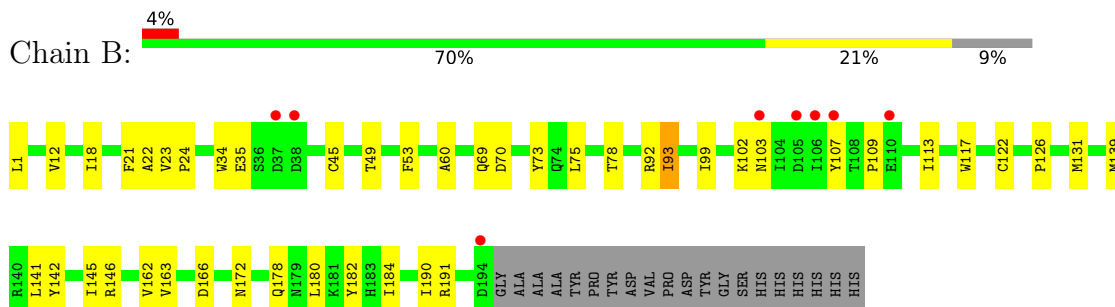
3 Residue-property plots [i](#)

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.

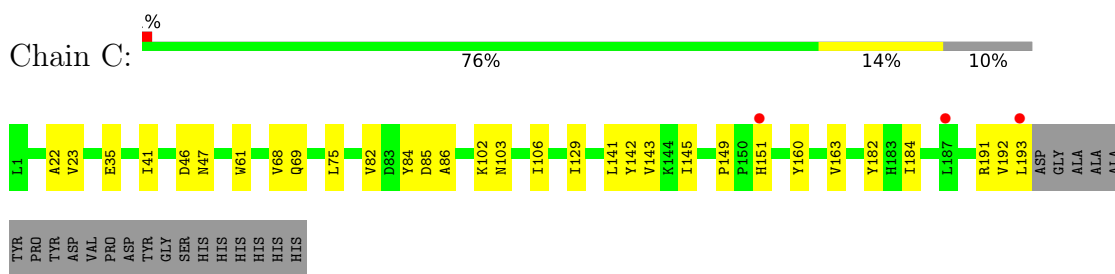
• Molecule 1: Fimbrial protein



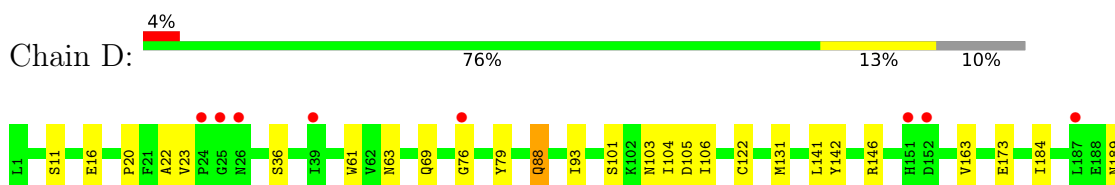
• Molecule 1: Fimbrial protein



• Molecule 1: Fimbrial protein



• Molecule 1: Fimbrial protein



LEU	ASP	GLY	ALA	ALA	ALA	TYR	PRO	TYR	ASP	VAL	PRO	ASP	TYR	GLY	SER	HIS	HIS	HIS	HIS	HIS
BM11	MAN2																			

- Molecule 2: alpha-D-mannopyranose-(1-3)-beta-D-mannopyranose

Chain E:

100%

BM11	MAN2
------	------

- Molecule 2: alpha-D-mannopyranose-(1-3)-beta-D-mannopyranose

Chain F:

50%50%

BM11	MAN2
------	------

- Molecule 2: alpha-D-mannopyranose-(1-3)-beta-D-mannopyranose

Chain G:

100%

BM11	MAN2
------	------

- Molecule 2: alpha-D-mannopyranose-(1-3)-beta-D-mannopyranose

Chain H:

50%50%

BM11	MAN2
------	------

4 Data and refinement statistics

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, α , β , γ	27.25Å 83.70Å 85.69Å 93.16° 89.96° 94.27°	Depositor
Resolution (Å)	61.42 – 2.00 61.42 – 2.00	Depositor EDS
% Data completeness (in resolution range)	66.7 (61.42-2.00) 66.7 (61.42-2.00)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	0.96 (at 1.98Å)	Xtriage
Refinement program	PHENIX 1.21.2_5419	Depositor
R, R_{free}	0.212 , 0.255 0.212 , 0.255	Depositor DCC
R_{free} test set	1734 reflections (3.35%)	wwPDB-VP
Wilson B-factor (Å ²)	10.6	Xtriage
Anisotropy	0.359	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.39 , 47.0	EDS
L-test for twinning ²	$\langle L \rangle = 0.46$, $\langle L^2 \rangle = 0.29$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.89	EDS
Total number of atoms	6568	wwPDB-VP
Average B, all atoms (Å ²)	14.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 7.00% 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 [i](#)

5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: MAN, 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	0.38	0/1560	0.57	0/2121
1	B	0.45	0/1600	0.69	0/2176
1	C	0.45	0/1568	0.70	0/2132
1	D	0.53	1/1560 (0.1%)	0.66	0/2121
All	All	0.46	1/6288 (0.0%)	0.66	0/8550

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	D	63	ASN	C-O	11.27	1.29	1.23

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts [i](#)

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	1523	0	1439	20	0
1	B	1554	0	1480	30	0
1	C	1531	0	1450	21	0
1	D	1523	0	1439	22	0
2	E	22	0	19	0	0
2	F	22	0	19	1	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	G	22	0	19	0	0
2	H	22	0	19	1	0
3	A	96	0	0	2	0
3	B	92	0	0	7	0
3	C	81	0	0	5	0
3	D	80	0	0	2	0
All	All	6568	0	5884	93	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 8.

All (93) 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:D:16:GLU:HG2	1:D:36:SER:HB2	1.48	0.92
1:C:145:ILE:HD11	1:C:149:PRO:HD3	1.53	0.90
1:B:1:LEU:HB2	3:B:301:HOH:O	1.76	0.85
3:B:301:HOH:O	2:F:2:MAN:H4	1.83	0.78
1:A:35:GLU:HG2	1:A:140:ARG:HD3	1.70	0.73
1:C:85:ASP:O	3:C:301:HOH:O	2.08	0.71
1:C:184:ILE:HB	3:C:312:HOH:O	1.91	0.70
1:D:69:GLN:HE21	1:D:146:ARG:NH2	1.93	0.67
1:B:162:VAL:HG13	1:B:163:VAL:HG12	1.79	0.64
1:C:102:LYS:HD3	3:C:319:HOH:O	1.97	0.64
1:A:136:LEU:HG	1:A:138:ARG:HD2	1.80	0.64
1:D:141:LEU:CB	1:D:184:ILE:HD11	2.29	0.62
1:C:41:ILE:HD13	1:C:182:TYR:OH	1.99	0.62
1:C:23:VAL:HG12	1:C:192:VAL:HA	1.82	0.62
1:B:49:THR:HG22	1:B:102:LYS:HE2	1.82	0.60
1:B:109:PRO:HB3	1:B:126:PRO:HB2	1.82	0.60
1:B:73:TYR:N	3:B:302:HOH:O	2.36	0.58
1:C:82:VAL:HG13	1:C:84:TYR:HE1	1.67	0.58
1:D:104:ILE:HG22	1:D:131:MET:HE3	1.85	0.57
1:B:53:PHE:HE2	1:B:103:ASN:HD22	1.52	0.57
1:D:23:VAL:HG12	1:D:192:VAL:HA	1.84	0.57
1:D:69:GLN:HE21	1:D:146:ARG:HH22	1.52	0.56
1:A:33:ILE:HD13	1:A:145:ILE:HG23	1.87	0.56
1:B:35:GLU:OE1	1:B:142:TYR:HB3	2.06	0.55
1:A:53:PHE:HB3	1:A:104:ILE:HD12	1.87	0.55
1:C:75:LEU:HD22	1:C:143:VAL:HG22	1.89	0.55
1:C:160:TYR:HB3	3:C:312:HOH:O	2.07	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:180[B]:LEU:HD11	1:B:182:TYR:HE1	1.73	0.54
1:D:141:LEU:HB3	1:D:184:ILE:HD11	1.90	0.54
1:B:166[A]:ASP:OD1	1:B:172:ASN:HB2	2.07	0.53
1:B:60:ALA:O	1:B:93[A]:ILE:HG12	2.08	0.52
1:A:122:CYS:HB2	3:A:315:HOH:O	2.09	0.52
1:D:16:GLU:HG2	1:D:36:SER:CB	2.30	0.52
1:B:102:LYS:HA	1:B:131:MET:HG2	1.92	0.52
1:B:78:THR:O	1:B:139:MET:HA	2.10	0.52
1:C:47:ASN:H	1:C:102:LYS:HE2	1.75	0.52
1:D:61:TRP:O	1:D:163:VAL:HA	2.09	0.51
1:D:105:ASP:OD1	1:D:131:MET:HE1	2.10	0.51
1:B:180[B]:LEU:HD11	1:B:182:TYR:CE1	2.45	0.51
1:A:18:ILE:HG12	1:A:34:TRP:CE2	2.46	0.51
1:A:38:ASP:HB2	1:A:140:ARG:NH2	2.26	0.50
1:B:109:PRO:O	1:B:113:ILE:HG12	2.11	0.50
1:D:16:GLU:HG3	3:D:343:HOH:O	2.12	0.49
1:D:122:CYS:HB3	3:D:357:HOH:O	2.12	0.49
1:B:70:ASP:C	3:B:302:HOH:O	2.56	0.49
1:D:22:ALA:HA	1:D:191:ARG:O	2.12	0.49
1:A:76:GLY:HA3	1:A:142:TYR:CE1	2.48	0.48
1:B:23:VAL:HG11	1:B:145:ILE:HD12	1.95	0.48
1:C:141:LEU:HB3	1:C:184:ILE:HD11	1.94	0.48
1:D:141:LEU:HB2	1:D:184:ILE:HD11	1.95	0.48
1:D:20:PRO:HA	1:D:189:ASN:HB3	1.96	0.47
1:B:75:LEU:HD13	1:B:184:ILE:HD12	1.96	0.47
1:C:61:TRP:O	1:C:163:VAL:HA	2.15	0.47
1:B:107:TYR:CE1	1:B:117:TRP:HZ3	2.33	0.46
1:C:35:GLU:HG3	1:C:142:TYR:HB3	1.98	0.46
1:B:69:GLN:HG2	1:B:146:ARG:HH22	1.81	0.45
1:B:122:CYS:HB2	3:B:327:HOH:O	2.16	0.45
1:B:24:PRO:HB3	1:D:106:ILE:HG13	1.99	0.45
1:C:46:ASP:HB2	1:C:102:LYS:NZ	2.32	0.44
1:B:92:ARG:HG2	3:B:382:HOH:O	2.17	0.44
1:C:103:ASN:O	1:C:106:ILE:HG12	2.18	0.44
1:B:21:PHE:O	1:B:191:ARG:HG2	2.18	0.44
1:C:151:HIS:CG	1:C:193:LEU:HD11	2.53	0.44
1:C:82:VAL:HG13	1:C:84:TYR:CE1	2.50	0.43
1:A:19:GLN:HG3	3:A:353:HOH:O	2.16	0.43
1:B:18:ILE:HG13	1:B:34:TRP:CE2	2.53	0.43
1:A:109:PRO:O	1:A:113:ILE:HG12	2.18	0.43
1:D:173:GLU:HB2	2:H:1:BMA:H61	2.01	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:88:GLN:CD	1:D:88:GLN:N	2.77	0.43
1:A:117:TRP:CD1	1:A:120:LYS:HE3	2.54	0.43
1:A:11:SER:HB3	1:A:14:LYS:HE2	2.01	0.42
1:D:103:ASN:O	1:D:106:ILE:HG12	2.18	0.42
1:A:45:CYS:HB2	1:A:99:ILE:CD1	2.50	0.42
1:A:141:LEU:HD22	1:A:162:VAL:HG11	2.02	0.42
1:B:141:LEU:HD22	1:B:162:VAL:HG11	2.00	0.42
3:B:319:HOH:O	1:C:68:VAL:HG23	2.19	0.42
1:B:45:CYS:HB2	1:B:99:ILE:HD11	2.01	0.42
1:D:76:GLY:HA3	1:D:142:TYR:CZ	2.55	0.41
1:B:12:VAL:HG11	1:B:178:GLN:HB3	2.02	0.41
1:A:174:ASP:HB3	1:A:177:ALA:HB2	2.02	0.41
1:C:75:LEU:CD2	1:C:143:VAL:HG22	2.50	0.41
1:D:101:SER:O	1:D:131:MET:HE2	2.20	0.41
1:A:12:VAL:HG11	1:A:178:GLN:HB3	2.03	0.41
1:A:80:ASN:HD21	1:A:138:ARG:NH1	2.19	0.41
1:A:142:TYR:CE1	1:A:144:LYS:HE3	2.56	0.41
1:B:21:PHE:CE1	1:B:190:ILE:HG12	2.55	0.41
1:A:38:ASP:HB2	1:A:140:ARG:HH21	1.86	0.41
1:B:22:ALA:HA	1:B:191:ARG:O	2.21	0.40
1:D:79:TYR:HB2	1:D:93:ILE:HD13	2.03	0.40
1:C:86:ALA:HB3	3:C:305:HOH:O	2.21	0.40
1:C:22:ALA:HA	1:C:191:ARG:O	2.22	0.40
1:A:77:VAL:HG11	1:A:163:VAL:HB	2.03	0.40
1:B:45:CYS:HB2	1:B:99:ILE:CD1	2.51	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	190/214 (89%)	184 (97%)	6 (3%)	0	100 100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	B	195/214 (91%)	189 (97%)	6 (3%)	0	100	100
1	C	191/214 (89%)	187 (98%)	4 (2%)	0	100	100
1	D	190/214 (89%)	182 (96%)	8 (4%)	0	100	100
All	All	766/856 (90%)	742 (97%)	24 (3%)	0	100	100

There are no Ramachandran outliers to report.

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	167/184 (91%)	165 (99%)	2 (1%)	63	70
1	B	172/184 (94%)	170 (99%)	2 (1%)	63	70
1	C	168/184 (91%)	166 (99%)	2 (1%)	63	70
1	D	167/184 (91%)	165 (99%)	2 (1%)	63	70
All	All	674/736 (92%)	666 (99%)	8 (1%)	68	70

All (8) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	88	GLN
1	A	192	VAL
1	B	93[A]	ILE
1	B	93[B]	ILE
1	C	69	GLN
1	C	129	ILE
1	D	11	SER
1	D	88	GLN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (12) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	80	ASN
1	A	87	ASN
1	A	151	HIS
1	B	80	ASN
1	B	88	GLN
1	B	154	GLN
1	B	179	ASN
1	C	151	HIS
1	C	178	GLN
1	D	63	ASN
1	D	69	GLN
1	D	96	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 ⓘ

8 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	BMA	E	1	2	11,11,12	0.90	0	15,15,17	1.64	4 (26%)
2	MAN	E	2	2	11,11,12	0.77	0	15,15,17	1.59	4 (26%)
2	BMA	F	1	2	11,11,12	1.02	1 (9%)	15,15,17	1.74	6 (40%)
2	MAN	F	2	2	11,11,12	0.99	1 (9%)	15,15,17	1.74	3 (20%)
2	BMA	G	1	2	11,11,12	1.06	0	15,15,17	1.55	2 (13%)
2	MAN	G	2	2	11,11,12	0.98	1 (9%)	15,15,17	1.38	2 (13%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
2	BMA	H	1	2	11,11,12	1.24	1 (9%)	15,15,17	1.59	1 (6%)
2	MAN	H	2	2	11,11,12	0.61	0	15,15,17	1.44	2 (13%)

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	BMA	E	1	2	-	0/2/19/22	0/1/1/1
2	MAN	E	2	2	-	0/2/19/22	0/1/1/1
2	BMA	F	1	2	-	0/2/19/22	0/1/1/1
2	MAN	F	2	2	-	0/2/19/22	0/1/1/1
2	BMA	G	1	2	-	0/2/19/22	0/1/1/1
2	MAN	G	2	2	-	0/2/19/22	0/1/1/1
2	BMA	H	1	2	-	0/2/19/22	0/1/1/1
2	MAN	H	2	2	-	0/2/19/22	0/1/1/1

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	H	1	BMA	C2-C3	2.97	1.56	1.52
2	F	2	MAN	O5-C1	-2.65	1.39	1.43
2	G	2	MAN	O5-C1	-2.62	1.39	1.43
2	F	1	BMA	C2-C3	2.11	1.55	1.52

All (24) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	H	1	BMA	C1-O5-C5	4.67	118.52	112.19
2	E	1	BMA	C1-O5-C5	4.14	117.80	112.19
2	F	2	MAN	C1-C2-C3	-4.02	104.72	109.67
2	G	1	BMA	C1-O5-C5	3.81	117.35	112.19
2	G	2	MAN	O5-C5-C6	3.63	112.90	107.20
2	F	2	MAN	O5-C5-C6	3.43	112.58	107.20
2	E	2	MAN	O2-C2-C3	3.38	116.91	110.14
2	F	1	BMA	C1-O5-C5	3.19	116.52	112.19
2	H	2	MAN	O2-C2-C1	-2.90	103.21	109.15
2	E	2	MAN	O2-C2-C1	-2.72	103.58	109.15
2	G	2	MAN	O2-C2-C1	-2.59	103.86	109.15
2	E	2	MAN	C1-C2-C3	-2.54	106.54	109.67
2	F	1	BMA	O6-C6-C5	-2.45	102.87	111.29

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	E	1	BMA	O5-C5-C6	2.38	110.93	107.20
2	F	1	BMA	O3-C3-C2	-2.30	105.59	109.99
2	F	1	BMA	O3-C3-C4	2.20	115.42	110.35
2	E	1	BMA	O2-C2-C1	-2.19	104.67	109.15
2	E	1	BMA	O4-C4-C3	-2.15	105.38	110.35
2	H	2	MAN	C1-O5-C5	2.13	115.07	112.19
2	F	2	MAN	O2-C2-C1	-2.11	104.83	109.15
2	E	2	MAN	O4-C4-C3	-2.10	105.48	110.35
2	F	1	BMA	C2-C3-C4	2.10	114.53	110.89
2	G	1	BMA	O4-C4-C3	-2.08	105.54	110.35
2	F	1	BMA	O4-C4-C3	-2.05	105.61	110.35

There are no chirality outliers.

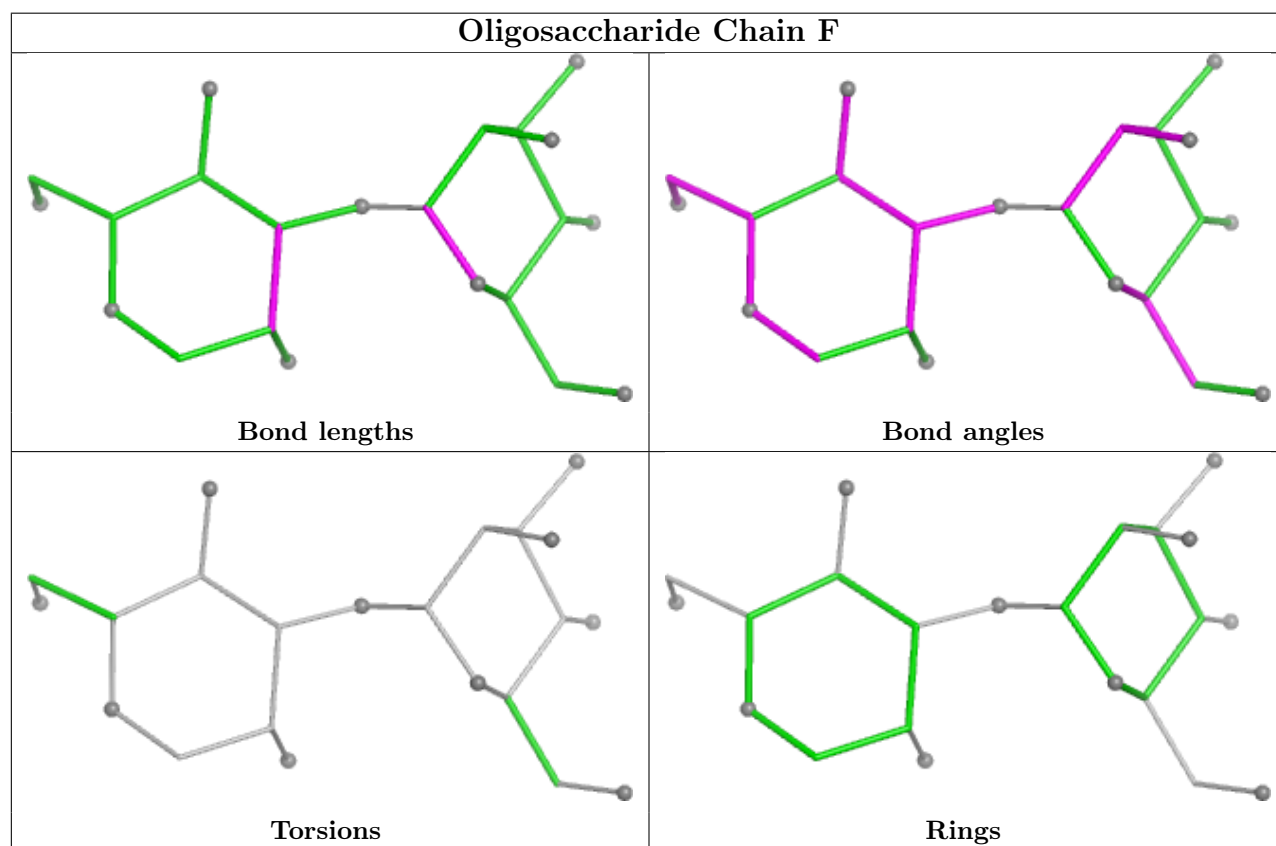
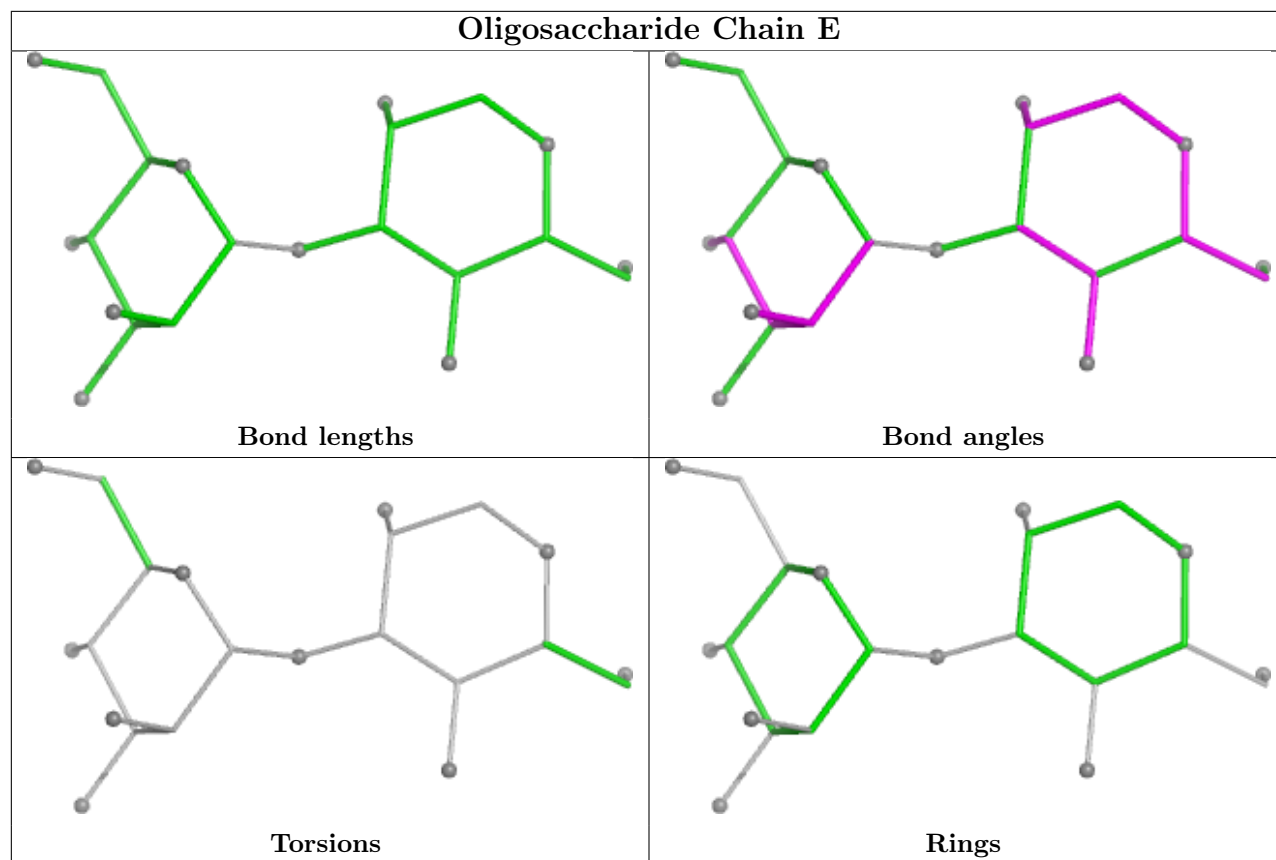
There are no torsion outliers.

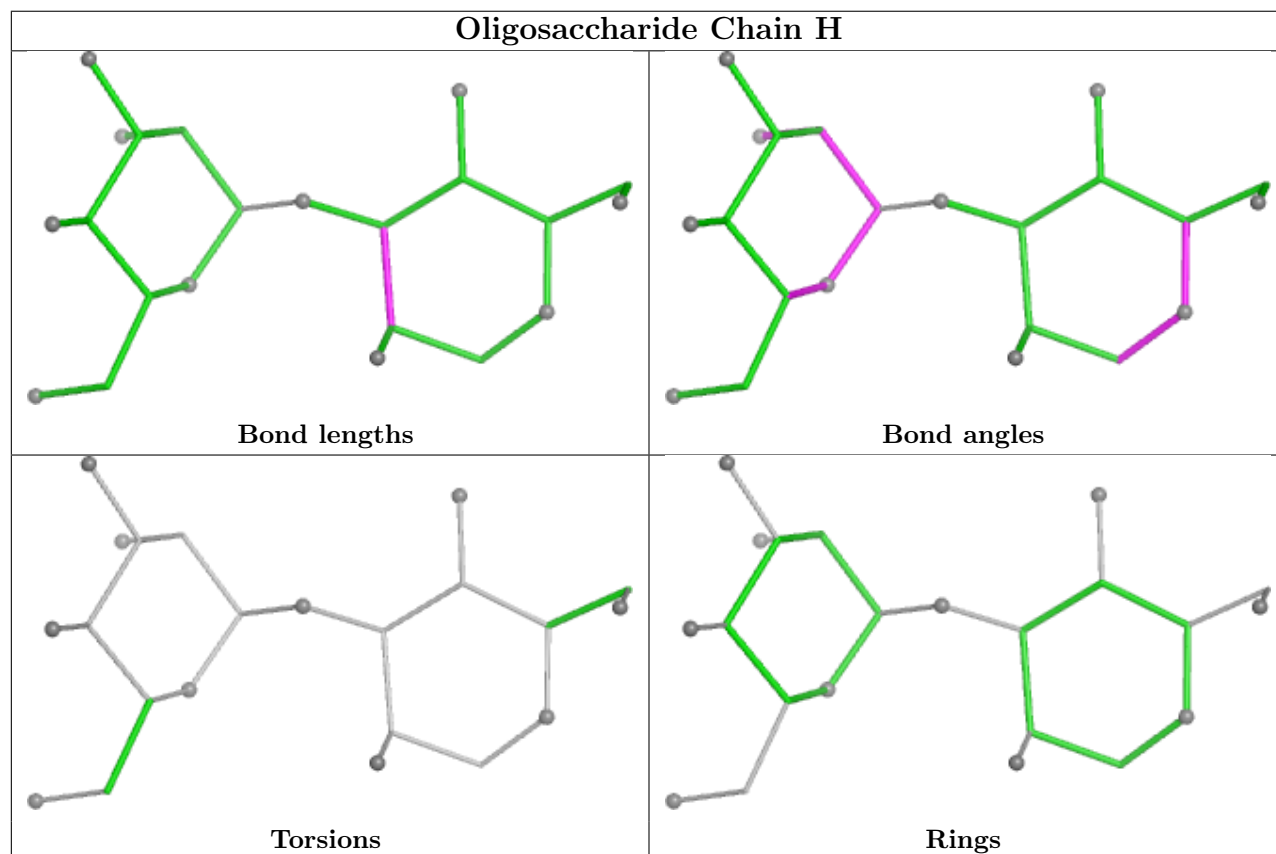
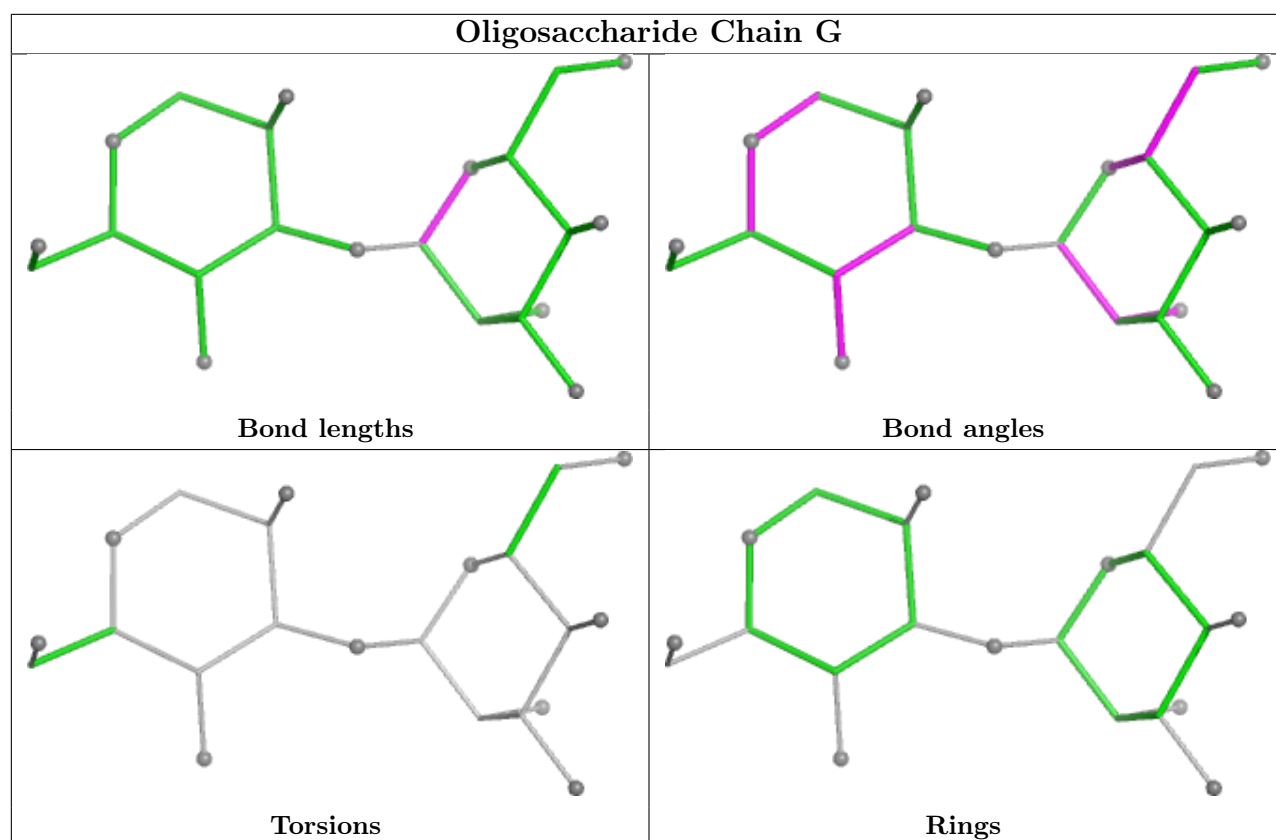
There are no ring outliers.

2 monomers are involved in 2 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	H	1	BMA	1	0
2	F	2	MAN	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

There are no ligands in this entry.

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 ⓘ

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	192/214 (89%)	0.05	3 (1%) 70 70	5, 12, 20, 27	3 (1%)
1	B	194/214 (90%)	0.30	8 (4%) 41 40	3, 12, 25, 33	14 (7%)
1	C	193/214 (90%)	0.14	3 (1%) 70 70	4, 12, 28, 40	0
1	D	192/214 (89%)	0.26	8 (4%) 40 39	6, 13, 33, 46	0
All	All	771/856 (90%)	0.19	22 (2%) 53 52	3, 12, 27, 46	17 (2%)

All (22) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	106	ILE	7.8
1	B	107	TYR	7.1
1	A	175	PRO	6.0
1	A	176	THR	5.5
1	D	25	GLY	5.2
1	C	193	LEU	5.0
1	B	105	ASP	4.4
1	B	38	ASP	4.2
1	D	151	HIS	4.2
1	B	103	ASN	3.4
1	C	151	HIS	3.3
1	B	110	GLU	3.3
1	D	152	ASP	2.7
1	B	37	ASP	2.7
1	D	24	PRO	2.7
1	D	26	ASN	2.5
1	A	51	GLY	2.4
1	D	76	GLY	2.4
1	D	39	ILE	2.3
1	B	194	ASP	2.2
1	C	187	LEU	2.0
1	D	187	LEU	2.0

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

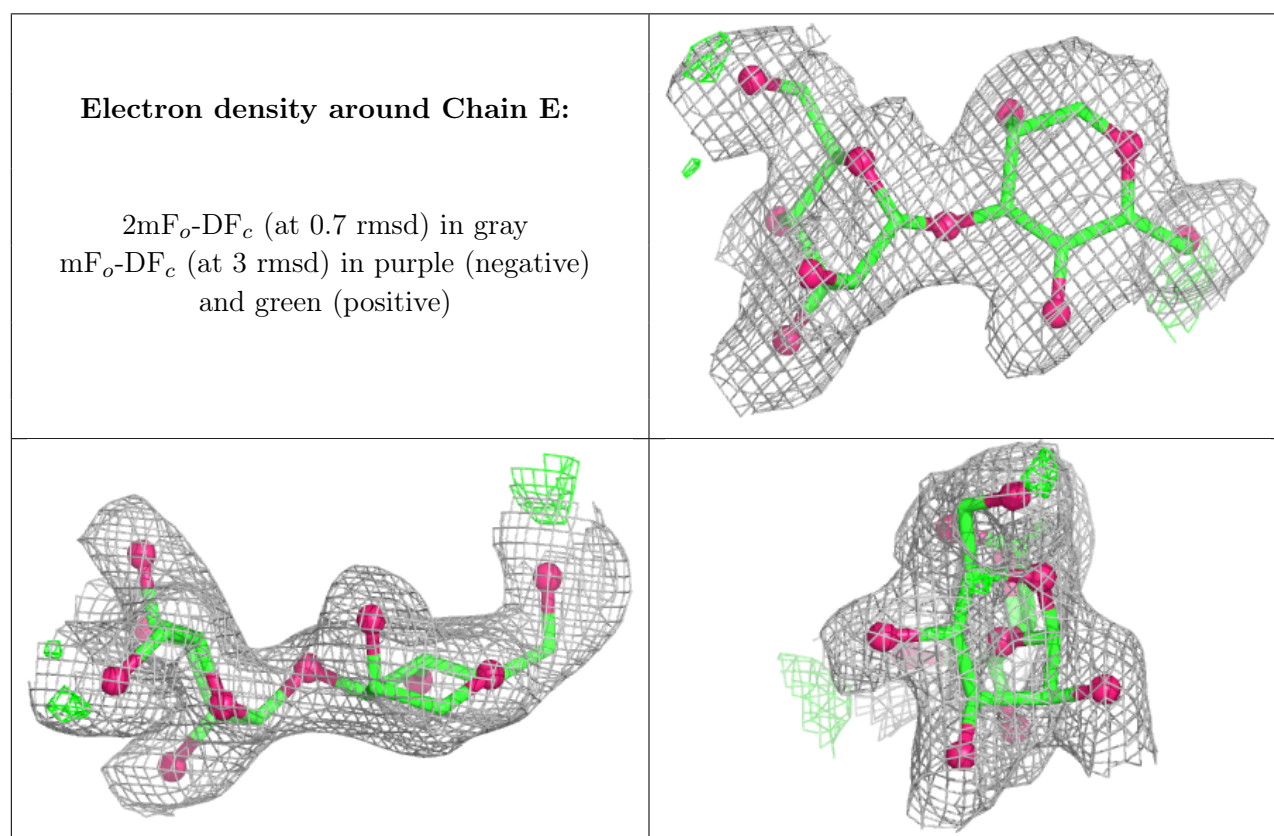
There are no non-standard protein/DNA/RNA residues in this entry.

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.

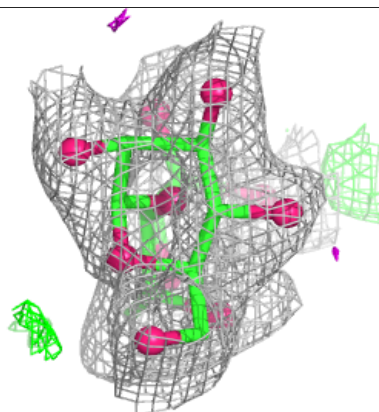
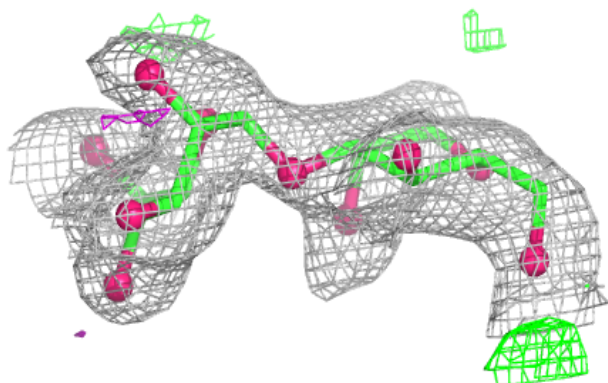
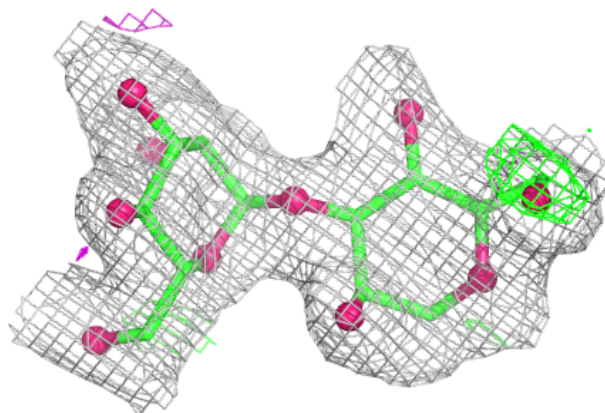
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
2	BMA	F	1	11/12	0.86	0.11	13,19,24,25	0
2	BMA	G	1	11/12	0.90	0.09	8,17,20,24	0
2	BMA	H	1	11/12	0.90	0.10	5,13,22,25	0
2	MAN	E	2	11/12	0.91	0.09	5,10,13,15	0
2	BMA	E	1	11/12	0.91	0.09	12,14,22,24	0
2	MAN	F	2	11/12	0.94	0.08	6,14,21,22	0
2	MAN	G	2	11/12	0.95	0.06	5,7,10,10	0
2	MAN	H	2	11/12	0.97	0.05	4,6,9,10	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.

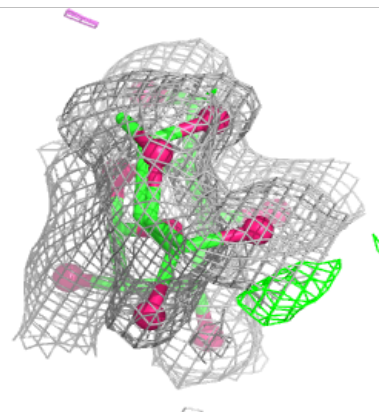
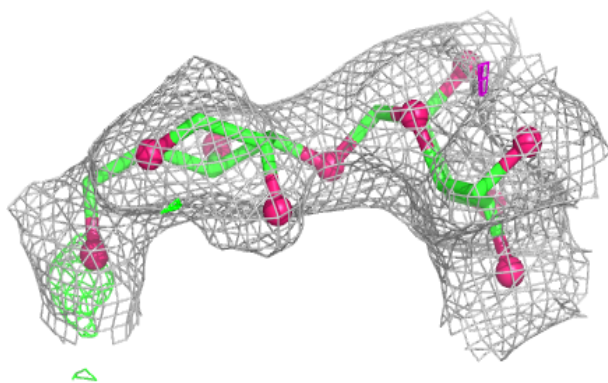
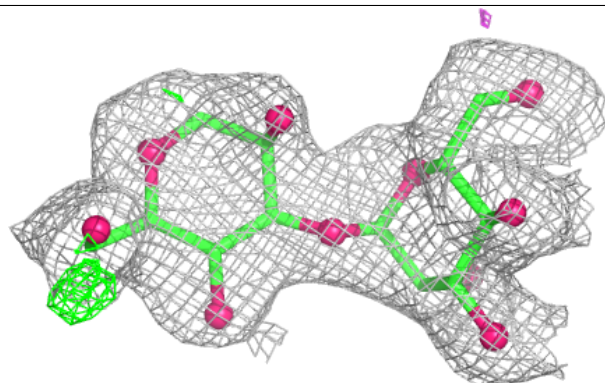


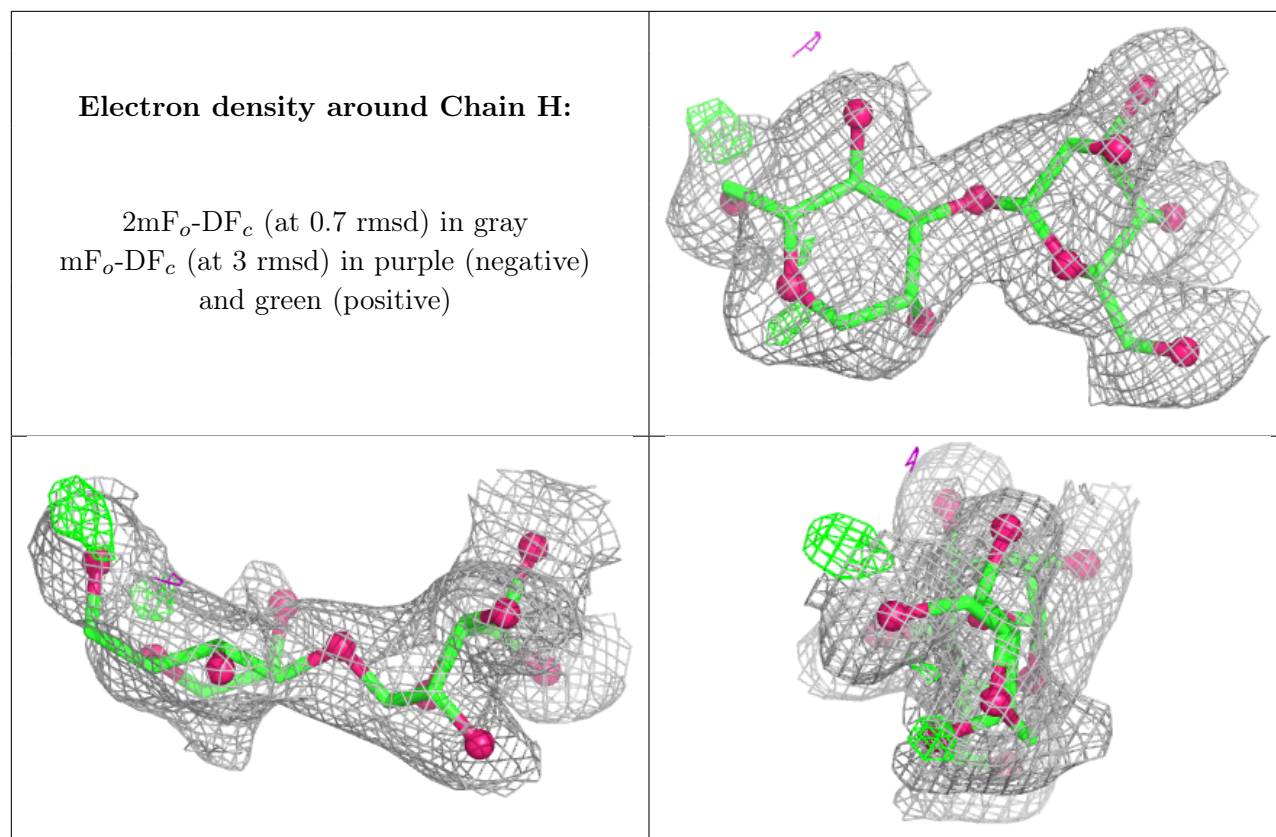
Electron density around Chain F:

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

**Electron density around Chain G:**

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





6.4 Ligands [i](#)

There are no ligands in this entry.

6.5 Other polymers [i](#)

There are no such residues in this entry.