



Full wwPDB X-ray Structure Validation Report ⓘ

Nov 24, 2025 – 02:10 PM EST

PDB ID : 9MCX / pdb_00009mcx
Title : CRYSTAL STRUCTURE OF HUMAN IGG1 FC FRAGMENT-FC-GAMMA RECEPTOR IIA COMPLEX H131 VARIANT
Authors : Tolbert, W.D.; Pazgier, M.
Deposited on : 2024-12-05
Resolution : 2.38 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 : 20231227.v01 (using entries in the PDB archive December 27th 2023)
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) : 2.46

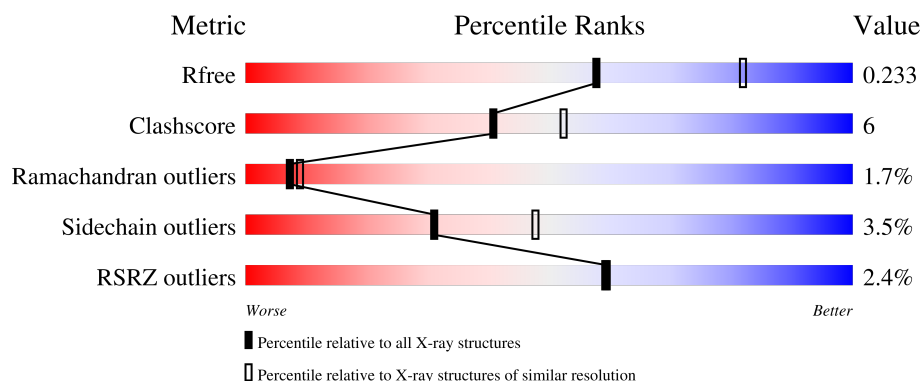
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.38 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}	164625	6699 (2.40-2.36)
Clashscore	180529	7414 (2.40-2.36)
Ramachandran outliers	177936	7337 (2.40-2.36)
Sidechain outliers	177891	7338 (2.40-2.36)
RSRZ outliers	164620	6699 (2.40-2.36)

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	223	<div> <div>2%</div> <div> <div></div> <div>78%</div> <div>15%</div> <div>• 5%</div> </div> </div>
1	B	223	<div> <div></div> <div> <div>82%</div> <div>13%</div> <div>• 5%</div> </div> </div>
2	C	173	<div> <div>5%</div> <div> <div></div> <div>76%</div> <div>18%</div> <div>• •</div> </div> </div>
3	D	4	<div> <div></div> <div> <div>50%</div> <div>50%</div> </div> </div>
4	E	8	<div> <div></div> <div> <div>50%</div> <div>50%</div> </div> </div>

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Mol	Chain	Length	Quality of chain
4	F	8	

2 Entry composition [i](#)

There are 6 unique types of molecules in this entry. The entry contains 5219 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.

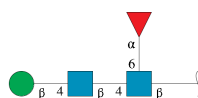
- Molecule 1 is a protein called Immunoglobulin gamma-1 heavy chain Fc fragment.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	211	Total	C	N	O	S	0	0	0
			1684	1073	283	322	6			
1	B	212	Total	C	N	O	S	0	0	0
			1693	1078	284	325	6			

- Molecule 2 is a protein called Low affinity immunoglobulin gamma Fc region receptor II-a H131 variant.

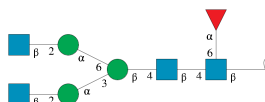
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	C	171	Total	C	N	O	S	0	1	0
			1365	865	235	260	5			

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



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
3	D	4	Total	C	N	O	0	0	0
			49	28	2	19			

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



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
4	E	8	Total	C	N	O	0	0	0
			99	56	4	39			
4	F	8	Total	C	N	O	0	0	0
			99	56	4	39			

- Molecule 5 is 2-acetamido-2-deoxy-beta-D-glucopyranose (CCD ID: NAG) (formula: $C_8H_{15}NO_6$).



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

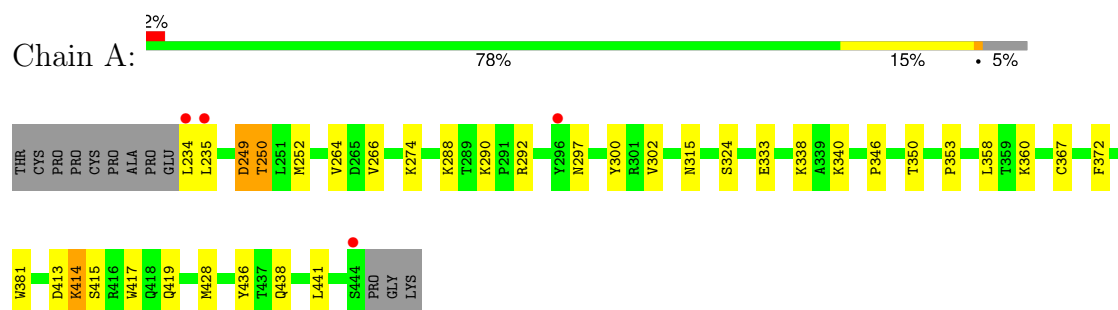
- Molecule 6 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	A	74	Total	O	0	0
			74	74		
6	B	80	Total	O	0	0
			80	80		
6	C	62	Total	O	0	0
			62	62		

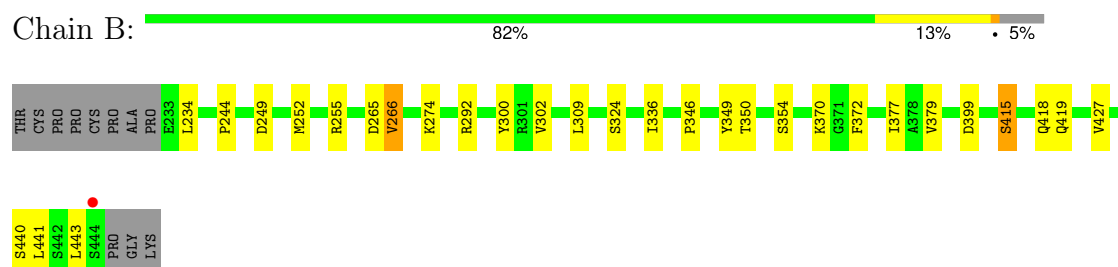
3 Residue-property plots [i](#)

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.

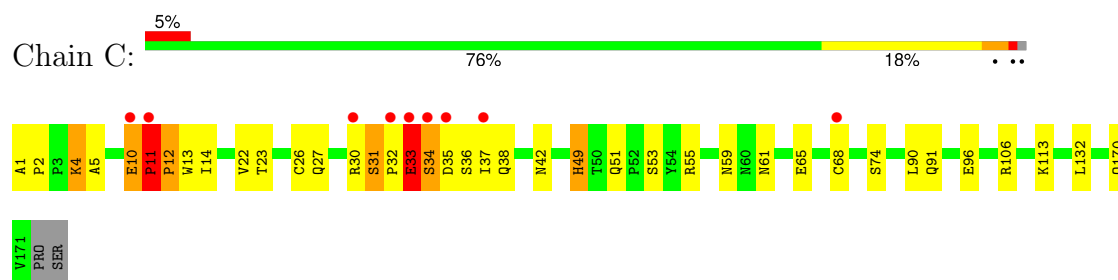
- Molecule 1: Immunoglobulin gamma-1 heavy chain Fc fragment



- Molecule 1: Immunoglobulin gamma-1 heavy chain Fc fragment



- Molecule 2: Low affinity immunoglobulin gamma Fc region receptor II-a H131 variant



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



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

Chain E:  50% 50%

NA61	NA62	BR43	MAN4	NA65	NA66	NA67	FUC8
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- Molecule 4: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-2)-alpha-D-mannopyranose-(1-3)-[2-acetamido-2-deoxy-beta-D-glucopyranose-(1-2)-alpha-D-mannopyranose-(1-6)]beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-[alpha-L-fucopyranose-(1-6)]2-acetamido-2-deoxy-beta-D-glucopyranose

Chain F:  50% 50%

NA61	NA62	BR43	MAN4	NA65	NA66	NA67	FUC8
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4 Data and refinement statistics

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α , β , γ	161.12Å 66.10Å 72.09Å 90.00° 94.32° 90.00°	Depositor
Resolution (Å)	28.02 – 2.38 28.02 – 2.38	Depositor EDS
% Data completeness (in resolution range)	88.1 (28.02-2.38) 88.0 (28.02-2.38)	Depositor EDS
R_{merge}	0.07	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	6.02 (at 2.39Å)	Xtriage
Refinement program	PHENIX (1.20.1_4487: ???)	Depositor
R, R_{free}	0.184 , 0.234 0.185 , 0.233	Depositor DCC
R_{free} test set	1306 reflections (4.27%)	wwPDB-VP
Wilson B-factor (Å ²)	33.8	Xtriage
Anisotropy	0.114	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.31 , 37.8	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	5219	wwPDB-VP
Average B, all atoms (Å ²)	38.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.59% 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: FUC, BMA, MAN, NAG

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	0.19	0/1730	0.41	0/2357
1	B	0.17	0/1739	0.38	0/2369
2	C	0.32	1/1407 (0.1%)	0.65	3/1922 (0.2%)
All	All	0.23	1/4876 (0.0%)	0.48	3/6648 (0.0%)

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	C	12	PRO	C-O	-5.02	1.17	1.24

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	C	11	PRO	CB-CA-C	10.05	123.18	110.92
2	C	11	PRO	N-CA-CB	-6.82	96.47	103.08
2	C	11	PRO	CA-N-CD	-6.07	103.50	112.00

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	1684	0	1655	22	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	B	1693	0	1661	17	0
2	C	1365	0	1305	26	0
3	D	49	0	43	0	0
4	E	99	0	85	1	0
4	F	99	0	85	0	0
5	C	14	0	13	0	0
6	A	74	0	0	3	0
6	B	80	0	0	1	0
6	C	62	0	0	2	0
All	All	5219	0	4847	63	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 (63) 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)
2:C:10:GLU:HG2	2:C:23:THR:H	1.27	0.98
2:C:10:GLU:HB3	2:C:23:THR:HB	1.51	0.92
1:A:346:PRO:HB3	1:A:372:PHE:HB3	1.66	0.78
1:B:249:ASP:OD2	1:B:255:ARG:NH1	2.21	0.74
2:C:11:PRO:O	2:C:13:TRP:N	2.23	0.71
1:A:436:TYR:OH	1:A:438:GLN:NE2	2.25	0.70
2:C:10:GLU:HG2	2:C:23:THR:N	2.03	0.70
1:A:252:MET:HG3	1:A:428:MET:HE1	1.74	0.69
1:B:266:VAL:HG22	1:B:300:TYR:HB2	1.76	0.68
1:B:346:PRO:HB3	1:B:372:PHE:HB3	1.77	0.67
1:A:358:LEU:O	1:A:414:LYS:NZ	2.26	0.66
1:A:333:GLU:OE2	1:A:333:GLU:N	2.25	0.66
1:A:338:LYS:NZ	6:A:502:HOH:O	2.27	0.66
1:A:315:ASN:ND2	6:A:501:HOH:O	2.27	0.66
1:A:292:ARG:HG2	1:A:302:VAL:HG22	1.78	0.63
1:A:290:LYS:NZ	6:A:503:HOH:O	2.31	0.63
1:B:415:SER:O	1:B:419:GLN:HG3	2.00	0.62
2:C:42:ASN:HA	2:C:65:GLU:HG2	1.83	0.61
1:B:252:MET:HB2	1:B:255:ARG:HG3	1.83	0.59
1:A:297:ASN:HD22	4:E:1:NAG:H83	1.67	0.58
2:C:55:ARG:NH1	6:C:307:HOH:O	2.37	0.58
1:A:350:THR:HB	1:A:441:LEU:HD13	1.86	0.57
1:A:249:ASP:O	1:A:250:THR:HG22	2.06	0.55
2:C:10:GLU:CB	2:C:23:THR:HB	2.33	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:415:SER:O	1:A:419:GLN:HG2	2.08	0.54
2:C:49[A]:HIS:NE2	2:C:53:SER:O	2.39	0.53
1:A:274:LYS:HB3	1:A:324:SER:HB2	1.92	0.52
2:C:23:THR:OG1	2:C:55:ARG:HG3	2.10	0.52
2:C:13:TRP:CG	2:C:91:GLN:HB3	2.45	0.52
2:C:113:LYS:NZ	6:C:305:HOH:O	2.35	0.51
1:B:244:PRO:HB3	1:B:336:ILE:HD11	1.93	0.50
1:B:377:ILE:O	6:B:501:HOH:O	2.20	0.50
1:A:235:LEU:HA	2:C:132:LEU:HD21	1.94	0.49
2:C:11:PRO:C	2:C:13:TRP:H	2.19	0.49
1:B:379:VAL:HG22	1:B:427:VAL:HG22	1.95	0.49
2:C:31:SER:H	2:C:32:PRO:HD2	1.77	0.48
1:A:288:LYS:O	1:A:290:LYS:HE2	2.14	0.47
1:A:353:PRO:HD2	1:A:417:TRP:CZ2	2.50	0.47
2:C:51:GLN:NE2	2:C:51:GLN:HA	2.30	0.47
2:C:31:SER:N	2:C:32:PRO:HD2	2.30	0.47
2:C:26:CYS:SG	2:C:37:ILE:HG23	2.56	0.46
2:C:91:GLN:OE1	2:C:106:ARG:HD3	2.15	0.46
1:B:350:THR:HB	1:B:441:LEU:HD13	1.98	0.45
1:B:252:MET:CB	1:B:255:ARG:HG3	2.45	0.45
1:B:274:LYS:HB3	1:B:324:SER:HB2	1.99	0.45
2:C:4:LYS:HA	2:C:74:SER:OG	2.17	0.45
1:A:266:VAL:HB	1:A:300:TYR:HB2	1.98	0.44
1:B:292:ARG:HG2	1:B:302:VAL:HG22	2.00	0.44
1:A:360:LYS:HE2	1:B:349:TYR:OH	2.18	0.43
1:B:370:LYS:HB2	1:B:370:LYS:HE3	1.63	0.43
2:C:30:ARG:HH21	2:C:37:ILE:HD11	1.82	0.43
1:B:418:GLN:HA	1:B:443:LEU:HD11	2.00	0.43
2:C:1:ALA:HB1	2:C:2:PRO:HD2	2.01	0.43
2:C:96:GLU:CD	2:C:170:GLN:NE2	2.77	0.42
1:A:413:ASP:OD2	1:A:413:ASP:N	2.52	0.42
1:B:309:LEU:HD23	1:B:309:LEU:HA	1.88	0.42
2:C:33:GLU:HB2	2:C:34:SER:H	1.59	0.41
1:A:367:CYS:HB2	1:A:381:TRP:CZ2	2.56	0.41
2:C:59:ASN:ND2	2:C:61:ASN:H	2.18	0.41
1:B:234:LEU:HD22	1:B:265:ASP:HB3	2.02	0.41
2:C:10:GLU:HG3	2:C:11:PRO:CD	2.51	0.41
1:A:360:LYS:O	1:A:414:LYS:HE2	2.21	0.40
2:C:4:LYS:O	2:C:5:ALA:HB3	2.22	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	209/223 (94%)	200 (96%)	9 (4%)	0	100	100
1	B	210/223 (94%)	209 (100%)	1 (0%)	0	100	100
2	C	170/173 (98%)	148 (87%)	11 (6%)	11 (6%)	1	0
All	All	589/619 (95%)	557 (95%)	21 (4%)	11 (2%)	7	7

All (11) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	C	11	PRO
2	C	31	SER
2	C	12	PRO
2	C	35	ASP
2	C	36	SER
2	C	38	GLN
2	C	33	GLU
2	C	49[A]	HIS
2	C	49[B]	HIS
2	C	27	GLN
2	C	34	SER

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	196/206 (95%)	190 (97%)	6 (3%)	35	53

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	B	197/206 (96%)	192 (98%)	5 (2%)	42	61
2	C	158/159 (99%)	150 (95%)	8 (5%)	20	32
All	All	551/571 (96%)	532 (97%)	19 (3%)	31	49

All (19) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	234	LEU
1	A	249	ASP
1	A	250	THR
1	A	264	VAL
1	A	340	LYS
1	A	414	LYS
1	B	266	VAL
1	B	354	SER
1	B	399	ASP
1	B	415	SER
1	B	440	SER
2	C	4	LYS
2	C	10	GLU
2	C	11	PRO
2	C	14	ILE
2	C	22	VAL
2	C	33	GLU
2	C	68	CYS
2	C	90	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (11) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	285	HIS
1	A	315	ASN
1	A	419	GLN
1	A	433	HIS
1	A	438	GLN
1	B	276	ASN
2	C	27	GLN
2	C	51	GLN
2	C	59	ASN
2	C	131	HIS

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Mol	Chain	Res	Type
2	C	170	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 ⓘ

20 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	D	1	2,3	14,14,15	0.67	0	17,19,21	1.07	1 (5%)
3	NAG	D	2	3	14,14,15	0.46	0	17,19,21	0.47	0
3	BMA	D	3	3	11,11,12	0.79	0	15,15,17	0.96	1 (6%)
3	FUC	D	4	3	10,10,11	0.90	0	14,14,16	0.80	0
4	NAG	E	1	1,4	14,14,15	0.42	0	17,19,21	0.51	0
4	NAG	E	2	4	14,14,15	0.53	0	17,19,21	0.51	0
4	BMA	E	3	4	11,11,12	0.89	1 (9%)	15,15,17	0.95	0
4	MAN	E	4	4	11,11,12	0.78	1 (9%)	15,15,17	1.12	1 (6%)
4	NAG	E	5	4	14,14,15	0.33	0	17,19,21	0.46	0
4	MAN	E	6	4	11,11,12	0.53	0	15,15,17	1.14	2 (13%)
4	NAG	E	7	4	14,14,15	0.25	0	17,19,21	0.56	0
4	FUC	E	8	4	10,10,11	0.75	0	14,14,16	0.84	0
4	NAG	F	1	1,4	14,14,15	0.43	0	17,19,21	0.49	0
4	NAG	F	2	4	14,14,15	0.35	0	17,19,21	0.57	0
4	BMA	F	3	4	11,11,12	0.58	0	15,15,17	1.07	2 (13%)
4	MAN	F	4	4	11,11,12	0.88	0	15,15,17	1.37	2 (13%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
4	NAG	F	5	4	14,14,15	0.46	0	17,19,21	0.43	0
4	MAN	F	6	4	11,11,12	0.94	0	15,15,17	1.02	1 (6%)
4	NAG	F	7	4	14,14,15	0.29	0	17,19,21	0.52	0
4	FUC	F	8	4	10,10,11	0.81	1 (10%)	14,14,16	0.97	0

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	NAG	D	1	2,3	-	4/6/23/26	0/1/1/1
3	NAG	D	2	3	-	3/6/23/26	0/1/1/1
3	BMA	D	3	3	-	1/2/19/22	0/1/1/1
3	FUC	D	4	3	-	-	0/1/1/1
4	NAG	E	1	1,4	-	2/6/23/26	0/1/1/1
4	NAG	E	2	4	-	0/6/23/26	0/1/1/1
4	BMA	E	3	4	-	0/2/19/22	0/1/1/1
4	MAN	E	4	4	-	2/2/19/22	0/1/1/1
4	NAG	E	5	4	-	4/6/23/26	0/1/1/1
4	MAN	E	6	4	-	1/2/19/22	0/1/1/1
4	NAG	E	7	4	-	4/6/23/26	0/1/1/1
4	FUC	E	8	4	-	-	0/1/1/1
4	NAG	F	1	1,4	-	4/6/23/26	0/1/1/1
4	NAG	F	2	4	-	0/6/23/26	0/1/1/1
4	BMA	F	3	4	-	2/2/19/22	0/1/1/1
4	MAN	F	4	4	-	2/2/19/22	0/1/1/1
4	NAG	F	5	4	-	2/6/23/26	0/1/1/1
4	MAN	F	6	4	-	0/2/19/22	0/1/1/1
4	NAG	F	7	4	-	2/6/23/26	0/1/1/1
4	FUC	F	8	4	-	-	0/1/1/1

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	E	4	MAN	O5-C1	-2.03	1.40	1.43
4	E	3	BMA	O5-C1	-2.03	1.40	1.43
4	F	8	FUC	O5-C5	2.01	1.47	1.43

All (10) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	F	4	MAN	C1-O5-C5	4.28	117.93	112.19
4	E	4	MAN	O2-C2-C3	-3.54	102.81	110.15
4	E	6	MAN	C1-O5-C5	3.19	116.47	112.19
4	F	3	BMA	C1-O5-C5	2.84	115.99	112.19
4	F	4	MAN	O2-C2-C3	-2.67	104.62	110.15
4	E	6	MAN	O2-C2-C3	-2.58	104.80	110.15
3	D	1	NAG	C1-O5-C5	2.44	115.46	112.19
4	F	3	BMA	O2-C2-C3	-2.36	105.26	110.15
4	F	6	MAN	O2-C2-C3	-2.35	105.28	110.15
3	D	3	BMA	C1-O5-C5	2.20	115.13	112.19

There are no chirality outliers.

All (33) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	D	2	NAG	O5-C5-C6-O6
4	E	5	NAG	O5-C5-C6-O6
4	E	4	MAN	C4-C5-C6-O6
3	D	1	NAG	C4-C5-C6-O6
4	E	5	NAG	C4-C5-C6-O6
4	E	1	NAG	C8-C7-N2-C2
4	E	1	NAG	O7-C7-N2-C2
4	E	5	NAG	C8-C7-N2-C2
4	E	5	NAG	O7-C7-N2-C2
4	E	7	NAG	C8-C7-N2-C2
4	E	7	NAG	O7-C7-N2-C2
4	F	1	NAG	C8-C7-N2-C2
4	F	1	NAG	O7-C7-N2-C2
4	F	5	NAG	C8-C7-N2-C2
4	F	5	NAG	O7-C7-N2-C2
4	F	7	NAG	C8-C7-N2-C2
4	F	7	NAG	O7-C7-N2-C2
4	E	4	MAN	O5-C5-C6-O6
3	D	2	NAG	C4-C5-C6-O6
4	F	4	MAN	C4-C5-C6-O6
3	D	1	NAG	O5-C5-C6-O6
4	F	4	MAN	O5-C5-C6-O6
4	F	3	BMA	O5-C5-C6-O6
4	E	7	NAG	C4-C5-C6-O6
3	D	3	BMA	O5-C5-C6-O6
4	F	1	NAG	C4-C5-C6-O6

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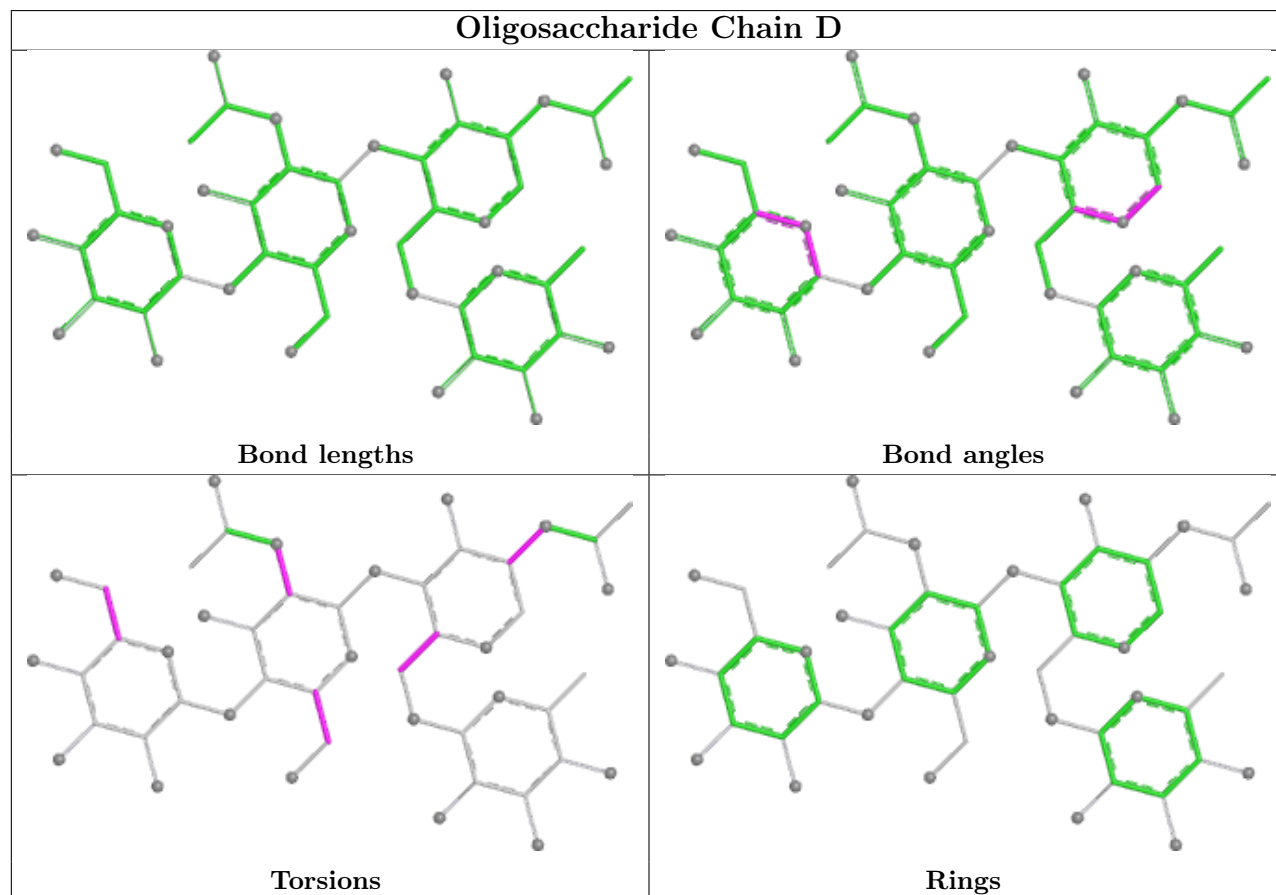
Mol	Chain	Res	Type	Atoms
4	E	7	NAG	O5-C5-C6-O6
3	D	1	NAG	C3-C2-N2-C7
4	F	3	BMA	C4-C5-C6-O6
4	E	6	MAN	O5-C5-C6-O6
3	D	1	NAG	C1-C2-N2-C7
3	D	2	NAG	C1-C2-N2-C7
4	F	1	NAG	O5-C5-C6-O6

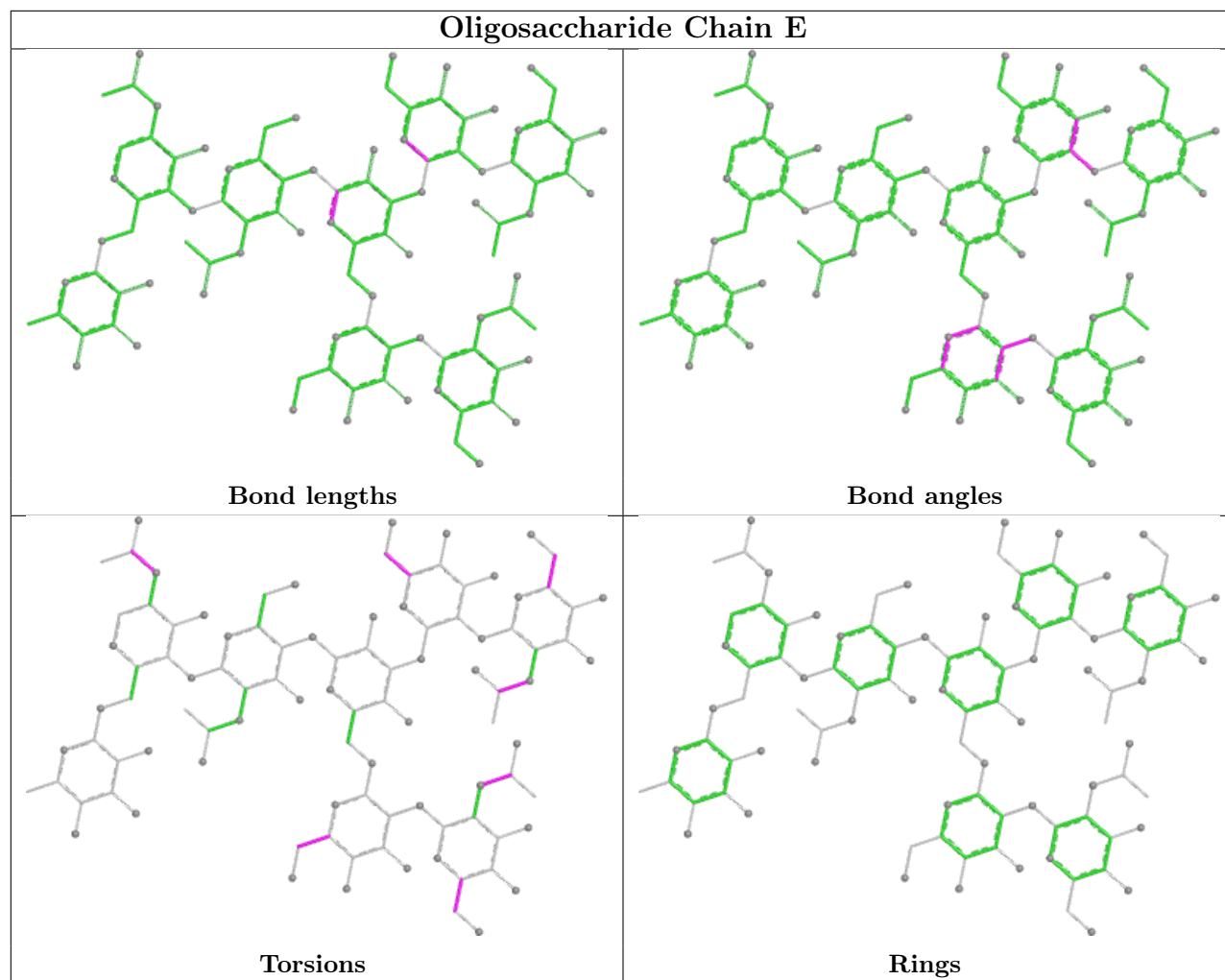
There are no ring outliers.

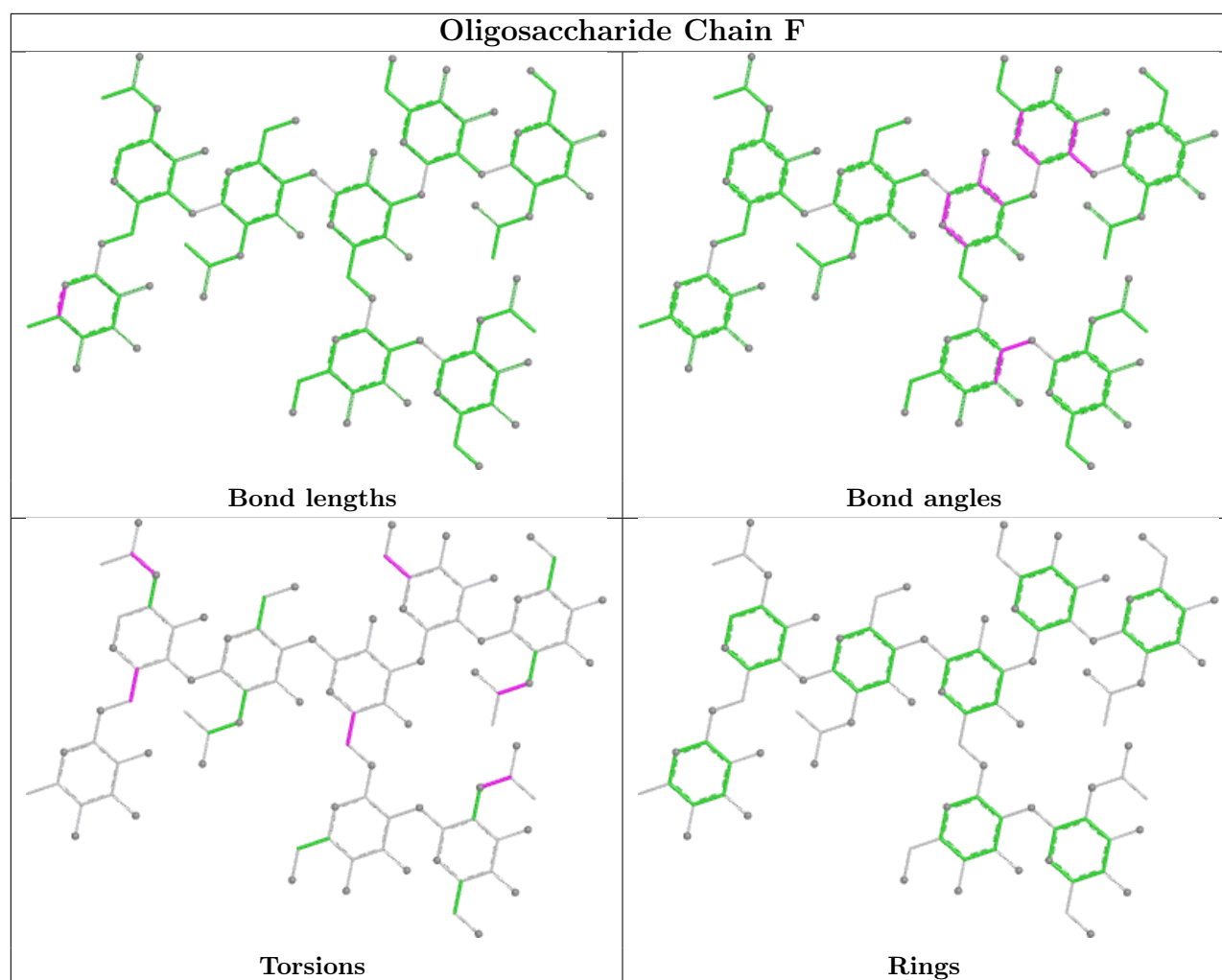
1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	E	1	NAG	1	0

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







5.6 Ligand geometry [i](#)

1 ligand is 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	$\# Z > 2$
5	NAG	C	201	2	14,14,15	0.40	0	17,19,21	0.55	0

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns.

'-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
5	NAG	C	201	2	-	4/6/23/26	0/1/1/1

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (4) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
5	C	201	NAG	O5-C5-C6-O6
5	C	201	NAG	C4-C5-C6-O6
5	C	201	NAG	C8-C7-N2-C2
5	C	201	NAG	O7-C7-N2-C2

There are no ring outliers.

No monomer is involved in short contacts.

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	211/223 (94%)	-0.18	4 (1%) 66 65	24, 36, 63, 72	0
1	B	212/223 (95%)	-0.28	1 (0%) 87 86	23, 36, 54, 84	0
2	C	171/173 (98%)	-0.07	9 (5%) 33 33	20, 31, 66, 97	1 (0%)
All	All	594/619 (95%)	-0.18	14 (2%) 59 59	20, 35, 59, 97	1 (0%)

All (14) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	235	LEU	4.4
2	C	35	ASP	3.9
2	C	32	PRO	3.5
2	C	33	GLU	3.2
2	C	11	PRO	2.7
2	C	10	GLU	2.7
2	C	34	SER	2.7
2	C	37	ILE	2.5
2	C	68	CYS	2.4
1	A	296	TYR	2.4
1	B	444	SER	2.3
1	A	234	LEU	2.3
2	C	30	ARG	2.1
1	A	444	SER	2.1

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

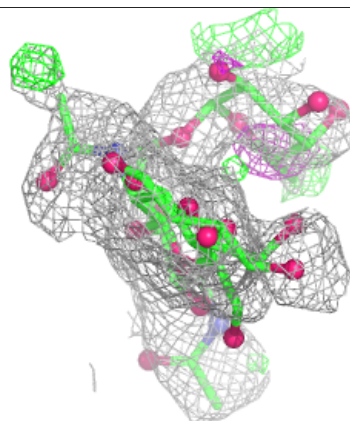
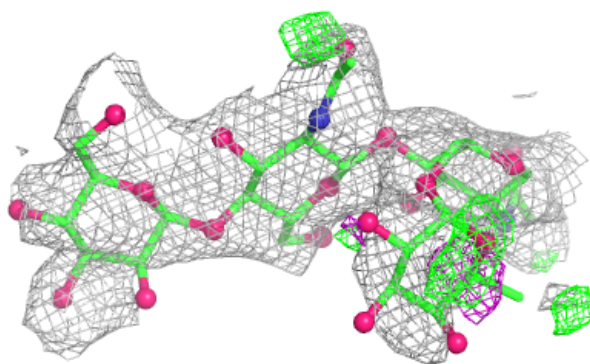
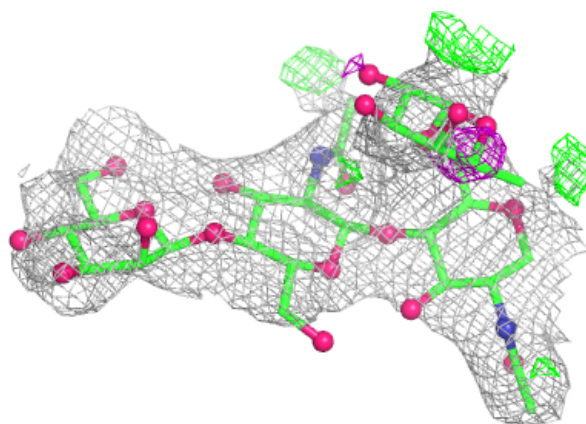
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q<0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
3	FUC	D	4	10/11	0.49	0.24	66,76,79,83	0
4	NAG	E	5	14/15	0.67	0.13	68,82,89,89	0
3	BMA	D	3	11/12	0.69	0.12	67,84,90,92	0
3	NAG	D	2	14/15	0.73	0.12	68,73,81,84	0
4	NAG	F	5	14/15	0.76	0.12	75,79,84,84	0
4	FUC	E	8	10/11	0.80	0.11	36,48,57,59	0
4	FUC	F	8	10/11	0.83	0.12	49,53,60,61	0
4	MAN	E	4	11/12	0.84	0.10	56,64,71,74	0
4	MAN	F	4	11/12	0.84	0.12	52,63,71,75	0
3	NAG	D	1	14/15	0.86	0.12	41,60,71,72	0
4	NAG	F	7	14/15	0.88	0.10	41,48,54,55	0
4	NAG	E	1	14/15	0.89	0.11	27,33,40,41	0
4	MAN	E	6	11/12	0.92	0.07	35,42,47,51	0
4	NAG	F	1	14/15	0.92	0.09	31,37,45,52	0
4	NAG	E	7	14/15	0.92	0.08	33,40,48,48	0
4	BMA	E	3	11/12	0.93	0.09	39,42,47,54	0
4	NAG	F	2	14/15	0.94	0.08	29,37,41,47	0
4	MAN	F	6	11/12	0.94	0.06	42,48,53,56	0
4	BMA	F	3	11/12	0.95	0.07	34,41,45,46	0
4	NAG	E	2	14/15	0.97	0.05	28,33,37,38	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.

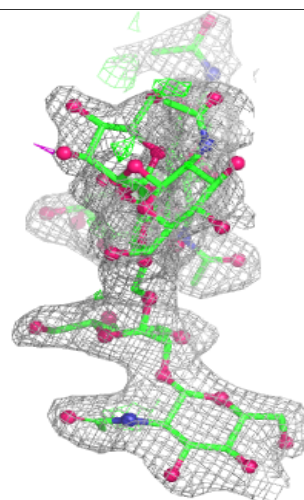
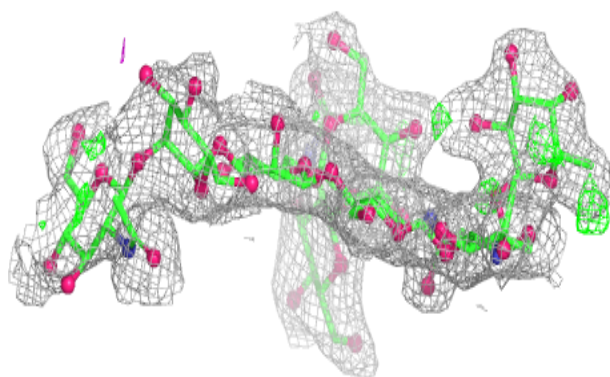
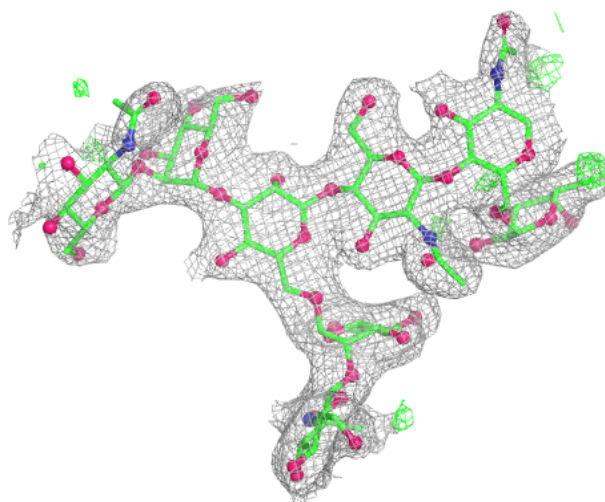
Electron density around Chain D:

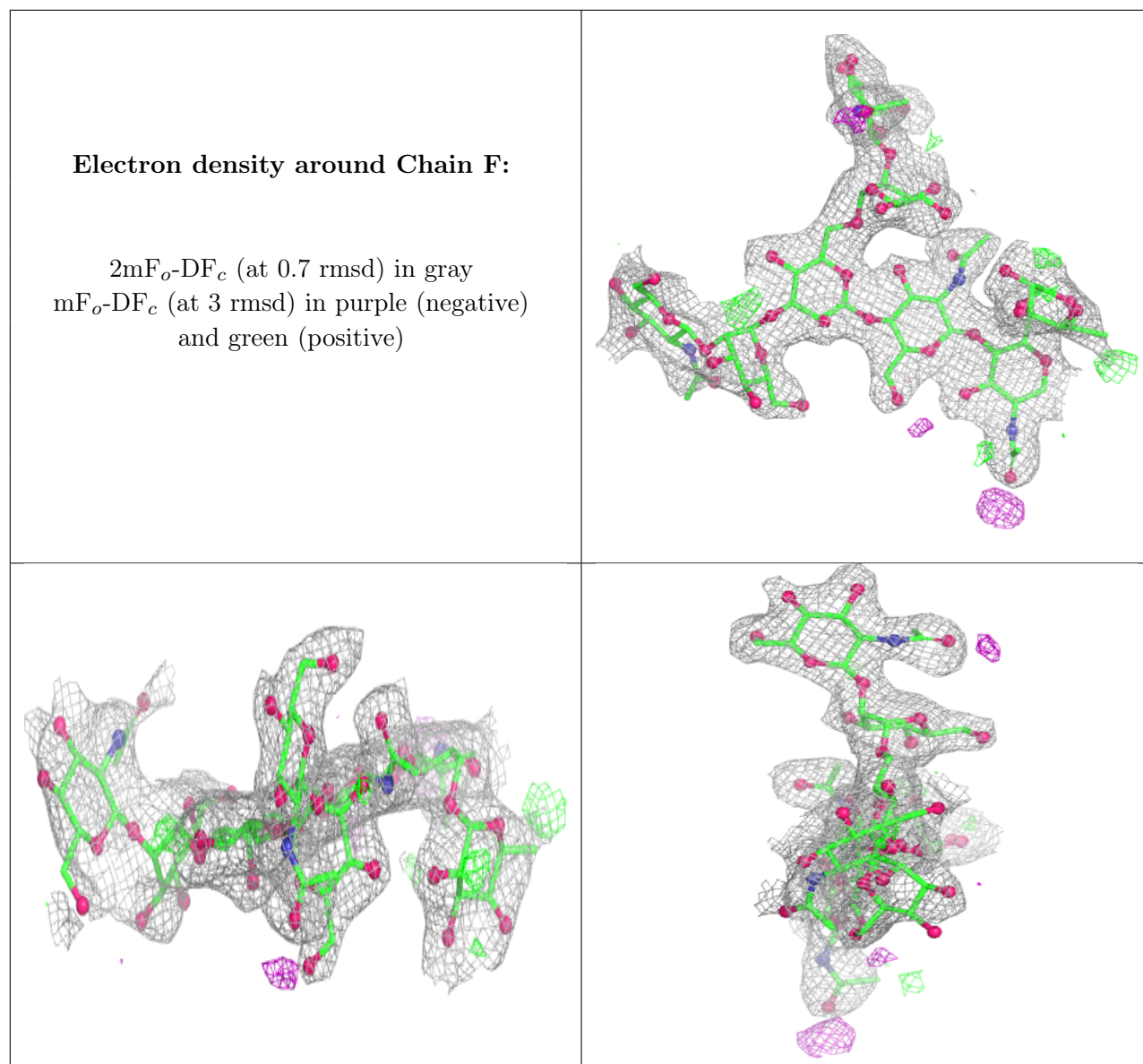
$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



Electron density around Chain E:

$2mF_o-DF_c$ (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(Å ²)	Q<0.9
5	NAG	C	201	14/15	0.67	0.17	55,68,79,82	0

6.5 Other polymers [i](#)

There are no such residues in this entry.