



Full wwPDB X-ray Structure Validation Report ⓘ

Oct 30, 2023 – 04:25 PM JST

PDB ID : 4W4N
Title : Crystal structure of human Fc at 1.80 Å
Authors : Caaveiro, J.M.M.; Kiyoshi, M.; Tsumoto, K.
Deposited on : 2014-08-15
Resolution : 1.80 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 : 4.02b-467
Mogul : 1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix) : 1.13
EDS : 2.36
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac : 5.8.0158
CCP4 : 7.0.044 (Gargrove)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.36

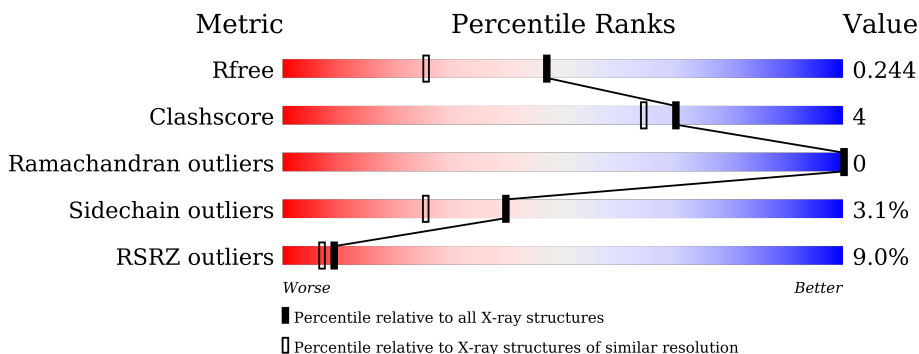
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.80 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}	130704	5950 (1.80-1.80)
Clashscore	141614	6793 (1.80-1.80)
Ramachandran outliers	138981	6697 (1.80-1.80)
Sidechain outliers	138945	6696 (1.80-1.80)
RSRZ outliers	127900	5850 (1.80-1.80)

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	 13% 81% 11% • 8%
1	B	223	 4% 81% 11% • 7%
2	C	7	 100%
3	D	8	 100%

2 Entry composition i

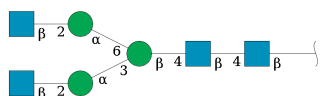
There are 5 unique types of molecules in this entry. The entry contains 3931 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 Ig gamma-1 chain C region.

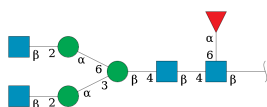
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	206	Total	C	N	O	S	0	3	0
			1666	1062	279	319	6			
1	B	207	Total	C	N	O	S	0	5	0
			1688	1077	283	322	6			

- Molecule 2 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)-2-acetamido-2-deoxy-beta-D-glucopyranose.



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
2	C	7	Total	C	N	O	0	0	0
			89	50	4	35			

- Molecule 3 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
			Total	C	N	O			
3	D	8	Total	C	N	O	0	0	0
			99	56	4	39			

- Molecule 4 is GLYCEROL (three-letter code: GOL) (formula: C₃H₈O₃).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	B	1	Total	C	O	0	1
			12	6	6		

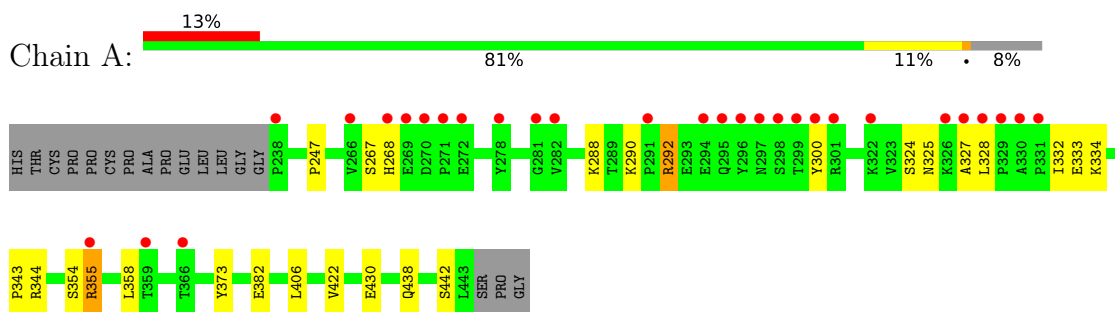
- Molecule 5 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	137	Total	O	0	0
			137	137		
5	B	237	Total	O	0	3
			240	240		

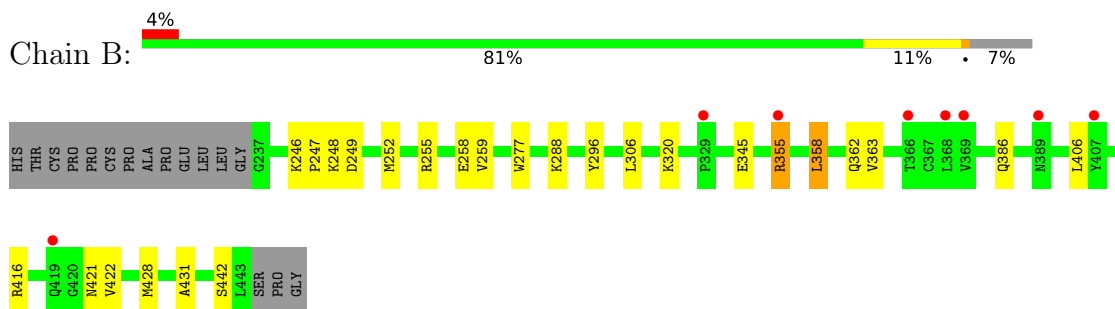
3 Residue-property plots [i](#)

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.

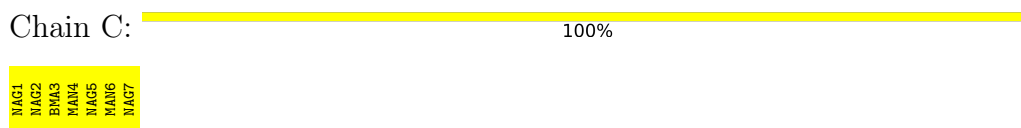
- Molecule 1: Ig gamma-1 chain C region



- Molecule 1: Ig gamma-1 chain C region



- Molecule 2: 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)-2-acetamido-2-deoxy-beta-D-glucopyranose



- Molecule 3: 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



MAG1
MAG2
BMA3
MAN4
NAG5
MANG
MAG7
FUC8

4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	49.71Å 79.29Å 138.67Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	22.19 – 1.80 22.19 – 1.80	Depositor EDS
% Data completeness (in resolution range)	98.9 (22.19-1.80) 99.0 (22.19-1.80)	Depositor EDS
R_{merge}	0.06	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.04 (at 1.80Å)	Xtrriage
Refinement program	REFMAC 5.8.0073	Depositor
R, R_{free}	0.200 , 0.244 0.200 , 0.244	Depositor DCC
R_{free} test set	2087 reflections (4.08%)	wwPDB-VP
Wilson B-factor (Å ²)	26.9	Xtrriage
Anisotropy	0.179	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.35 , 45.2	EDS
L-test for twinning ²	$\langle L \rangle = 0.48$, $\langle L^2 \rangle = 0.32$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	3931	wwPDB-VP
Average B, all atoms (Å ²)	43.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 6.21% 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: NAG, BMA, FUC, GOL, MAN

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 5$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# $ Z > 5$	RMSZ	# $ Z > 5$
1	A	1.01	3/1721 (0.2%)	1.00	3/2344 (0.1%)
1	B	1.03	2/1749 (0.1%)	1.00	4/2383 (0.2%)
All	All	1.02	5/3470 (0.1%)	1.00	7/4727 (0.1%)

All (5) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	267	SER	CB-OG	8.97	1.53	1.42
1	B	258	GLU	CD-OE2	-6.42	1.18	1.25
1	B	277	TRP	CE3-CZ3	6.41	1.49	1.38
1	A	324	SER	CB-OG	5.55	1.49	1.42
1	A	430	GLU	CD-OE1	-5.45	1.19	1.25

All (7) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	344	ARG	NE-CZ-NH2	-8.96	115.82	120.30
1	A	344	ARG	NE-CZ-NH1	8.39	124.49	120.30
1	B	416	ARG	NE-CZ-NH1	7.36	123.98	120.30
1	B	428	MET	CG-SD-CE	-7.29	88.53	100.20
1	B	248	LYS	CD-CE-NZ	-5.29	99.53	111.70
1	A	382	GLU	CB-CA-C	-5.26	99.88	110.40
1	B	320	LYS	CD-CE-NZ	-5.01	100.17	111.70

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	1666	0	1641	14	0
1	B	1688	0	1667	11	0
2	C	89	0	76	0	0
3	D	99	0	85	0	0
4	B	12	0	16	0	0
5	A	137	0	0	2	0
5	B	240	0	0	2	0
All	All	3931	0	3485	25	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 (25) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:333:GLU:O	1:A:334:LYS:HD2	1.89	0.72
1:A:438:GLN:NE2	5:A:601:HOH:O	2.27	0.65
1:A:328:LEU:HD22	1:A:332:ILE:HD11	1.80	0.64
1:A:292:ARG:H	1:A:292:ARG:HH11	1.47	0.60
1:B:422:VAL:HA	1:B:442:SER:HB3	1.89	0.54
1:A:406:LEU:C	1:A:406:LEU:HD12	2.32	0.50
1:A:438:GLN:HG3	5:A:639:HOH:O	2.12	0.50
1:A:325:ASN:ND2	1:A:327:ALA:H	2.10	0.49
1:A:343:PRO:HA	1:A:373:TYR:O	2.13	0.49
1:B:406:LEU:HD12	1:B:406:LEU:C	2.33	0.49
1:A:268:HIS:CD2	1:A:300:TYR:CE1	3.01	0.48
1:B:421:ASN:ND2	5:B:601:HOH:O	2.42	0.48
1:B:246:LYS:HB2	1:B:249:ASP:OD2	2.14	0.47
1:B:259[B]:VAL:HG23	1:B:306:LEU:HB3	1.97	0.47
1:A:328:LEU:HD13	1:A:332:ILE:HD12	1.98	0.46
1:A:355:ARG:HA	1:A:358:LEU:HD12	1.99	0.44
1:B:358:LEU:HD13	1:B:363:VAL:HG11	1.99	0.44
1:B:249:ASP:OD1	1:B:255[A]:ARG:NE	2.45	0.43
1:B:345[A]:GLU:HG3	1:B:431:ALA:O	2.18	0.43
1:B:358:LEU:HD13	1:B:358:LEU:HA	1.77	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:355:ARG:HE	1:A:355:ARG:HB2	1.40	0.43
1:A:290:LYS:HA	1:A:290:LYS:HD2	1.92	0.42
1:B:355:ARG:HA	1:B:358:LEU:HD23	2.02	0.42
1:A:422:VAL:HA	1:A:442:SER:HB3	2.02	0.42
1:B:252:MET:HE2	5:B:735:HOH:O	2.21	0.41

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	207/223 (93%)	202 (98%)	5 (2%)	0	100	100
1	B	210/223 (94%)	208 (99%)	2 (1%)	0	100	100
All	All	417/446 (94%)	410 (98%)	7 (2%)	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	196/206 (95%)	191 (97%)	5 (3%)	46	32
1	B	198/206 (96%)	191 (96%)	7 (4%)	36	21
All	All	394/412 (96%)	382 (97%)	12 (3%)	40	27

All (12) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	247	PRO
1	A	288	LYS
1	A	292	ARG
1	A	354	SER
1	A	355	ARG
1	B	247	PRO
1	B	288	LYS
1	B	296	TYR
1	B	355	ARG
1	B	358	LEU
1	B	362	GLN
1	B	386	GLN

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	268	HIS
1	A	325	ASN
1	A	390	ASN
1	A	419	GLN
1	A	434	ASN
1	B	315	ASN
1	B	361	ASN
1	B	386	GLN
1	B	390	ASN
1	B	434	ASN

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates [i](#)

15 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	NAG	C	1	2,1	14,14,15	0.81	0	17,19,21	3.05	7 (41%)
2	NAG	C	2	2	14,14,15	0.79	0	17,19,21	1.28	2 (11%)
2	BMA	C	3	2	11,11,12	1.12	1 (9%)	15,15,17	1.67	3 (20%)
2	MAN	C	4	2	11,11,12	1.02	1 (9%)	15,15,17	1.94	4 (26%)
2	NAG	C	5	2	14,14,15	0.50	0	17,19,21	2.24	3 (17%)
2	MAN	C	6	2	11,11,12	0.71	0	15,15,17	1.25	1 (6%)
2	NAG	C	7	2	14,14,15	0.51	0	17,19,21	2.81	6 (35%)
3	NAG	D	1	3,1	14,14,15	1.10	2 (14%)	17,19,21	0.93	0
3	NAG	D	2	3	14,14,15	1.15	2 (14%)	17,19,21	1.76	5 (29%)
3	BMA	D	3	3	11,11,12	1.07	1 (9%)	15,15,17	1.44	2 (13%)
3	MAN	D	4	3	11,11,12	1.26	2 (18%)	15,15,17	2.05	5 (33%)
3	NAG	D	5	3	14,14,15	0.60	0	17,19,21	2.02	6 (35%)
3	MAN	D	6	3	11,11,12	0.88	1 (9%)	15,15,17	2.00	4 (26%)
3	NAG	D	7	3	14,14,15	1.41	2 (14%)	17,19,21	1.61	3 (17%)
3	FUC	D	8	3	10,10,11	1.26	2 (20%)	14,14,16	1.34	2 (14%)

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	NAG	C	1	2,1	-	0/6/23/26	0/1/1/1
2	NAG	C	2	2	-	0/6/23/26	0/1/1/1
2	BMA	C	3	2	-	0/2/19/22	0/1/1/1
2	MAN	C	4	2	-	1/2/19/22	0/1/1/1
2	NAG	C	5	2	-	3/6/23/26	0/1/1/1
2	MAN	C	6	2	-	0/2/19/22	0/1/1/1
2	NAG	C	7	2	-	2/6/23/26	0/1/1/1
3	NAG	D	1	3,1	-	0/6/23/26	0/1/1/1
3	NAG	D	2	3	-	0/6/23/26	0/1/1/1

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

All (14) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	D	7	NAG	C1-C2	3.73	1.57	1.52
3	D	2	NAG	C3-C2	3.06	1.59	1.52
3	D	8	FUC	C6-C5	2.71	1.58	1.51
2	C	3	BMA	O5-C1	-2.44	1.39	1.43
3	D	8	FUC	C1-C2	2.37	1.57	1.52
3	D	1	NAG	C1-C2	2.20	1.55	1.52
3	D	4	MAN	C4-C5	2.19	1.57	1.53
3	D	4	MAN	O5-C1	-2.14	1.40	1.43
3	D	1	NAG	O5-C5	-2.13	1.39	1.43
3	D	3	BMA	C2-C3	2.13	1.55	1.52
3	D	2	NAG	O7-C7	2.11	1.28	1.23
3	D	7	NAG	C4-C5	2.09	1.57	1.53
3	D	6	MAN	C2-C3	2.03	1.55	1.52
2	C	4	MAN	C4-C5	2.01	1.57	1.53

All (53) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	C	7	NAG	C1-O5-C5	8.38	123.54	112.19
2	C	1	NAG	C2-N2-C7	6.96	132.81	122.90
2	C	5	NAG	C1-O5-C5	6.68	121.24	112.19
2	C	1	NAG	C1-C2-N2	5.72	120.25	110.49
2	C	7	NAG	C6-C5-C4	-5.09	101.09	113.00
2	C	4	MAN	C1-O5-C5	5.06	119.05	112.19
2	C	1	NAG	C1-O5-C5	4.75	118.63	112.19
3	D	6	MAN	C1-O5-C5	4.65	118.49	112.19
3	D	5	NAG	C2-N2-C7	4.51	129.33	122.90
3	D	4	MAN	O2-C2-C3	-4.46	101.20	110.14
3	D	6	MAN	O5-C5-C6	3.90	113.32	107.20
3	D	8	FUC	O5-C1-C2	-3.82	104.88	110.77
3	D	7	NAG	C1-O5-C5	-3.81	107.03	112.19
2	C	5	NAG	C4-C3-C2	-3.76	105.50	111.02

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	C	1	NAG	O7-C7-C8	-3.76	115.07	122.06
2	C	1	NAG	O5-C5-C6	3.74	113.06	107.20
3	D	2	NAG	O7-C7-N2	3.67	128.69	121.95
3	D	2	NAG	C8-C7-N2	-3.60	110.01	116.10
3	D	3	BMA	O3-C3-C2	-3.54	103.22	109.99
3	D	4	MAN	C1-C2-C3	3.48	113.95	109.67
3	D	5	NAG	C1-O5-C5	3.46	116.88	112.19
2	C	4	MAN	O2-C2-C3	-3.31	103.52	110.14
2	C	3	BMA	O6-C6-C5	-3.26	100.12	111.29
2	C	3	BMA	O4-C4-C3	-3.17	103.02	110.35
2	C	6	MAN	C1-O5-C5	3.16	116.47	112.19
2	C	5	NAG	C8-C7-N2	3.13	121.40	116.10
2	C	7	NAG	O5-C5-C4	3.11	118.40	110.83
2	C	7	NAG	O3-C3-C4	-3.07	103.25	110.35
3	D	4	MAN	C1-O5-C5	2.86	116.07	112.19
2	C	1	NAG	O7-C7-N2	2.77	127.04	121.95
2	C	3	BMA	C1-C2-C3	2.76	113.05	109.67
3	D	4	MAN	O5-C1-C2	-2.73	106.56	110.77
3	D	6	MAN	C6-C5-C4	-2.58	106.97	113.00
3	D	2	NAG	O5-C1-C2	-2.51	107.32	111.29
3	D	3	BMA	O2-C2-C3	2.48	115.11	110.14
3	D	5	NAG	C6-C5-C4	-2.46	107.24	113.00
3	D	4	MAN	O4-C4-C3	-2.46	104.67	110.35
3	D	7	NAG	C1-C2-N2	-2.43	106.33	110.49
3	D	5	NAG	O7-C7-N2	2.41	126.39	121.95
3	D	6	MAN	O6-C6-C5	-2.37	103.15	111.29
3	D	7	NAG	O5-C1-C2	-2.31	107.64	111.29
2	C	7	NAG	O6-C6-C5	-2.29	103.44	111.29
3	D	2	NAG	O4-C4-C5	-2.26	103.70	109.30
2	C	4	MAN	O3-C3-C4	-2.25	105.14	110.35
3	D	5	NAG	O3-C3-C2	-2.20	104.91	109.47
2	C	2	NAG	C1-O5-C5	2.17	115.13	112.19
2	C	7	NAG	C3-C4-C5	2.13	114.04	110.24
2	C	2	NAG	O7-C7-N2	2.11	125.83	121.95
3	D	2	NAG	C2-N2-C7	-2.08	119.94	122.90
2	C	1	NAG	C4-C3-C2	2.06	114.04	111.02
3	D	8	FUC	C3-C4-C5	-2.03	106.61	109.77
2	C	4	MAN	O4-C4-C5	2.03	114.34	109.30
3	D	5	NAG	O6-C6-C5	-2.01	104.38	111.29

There are no chirality outliers.

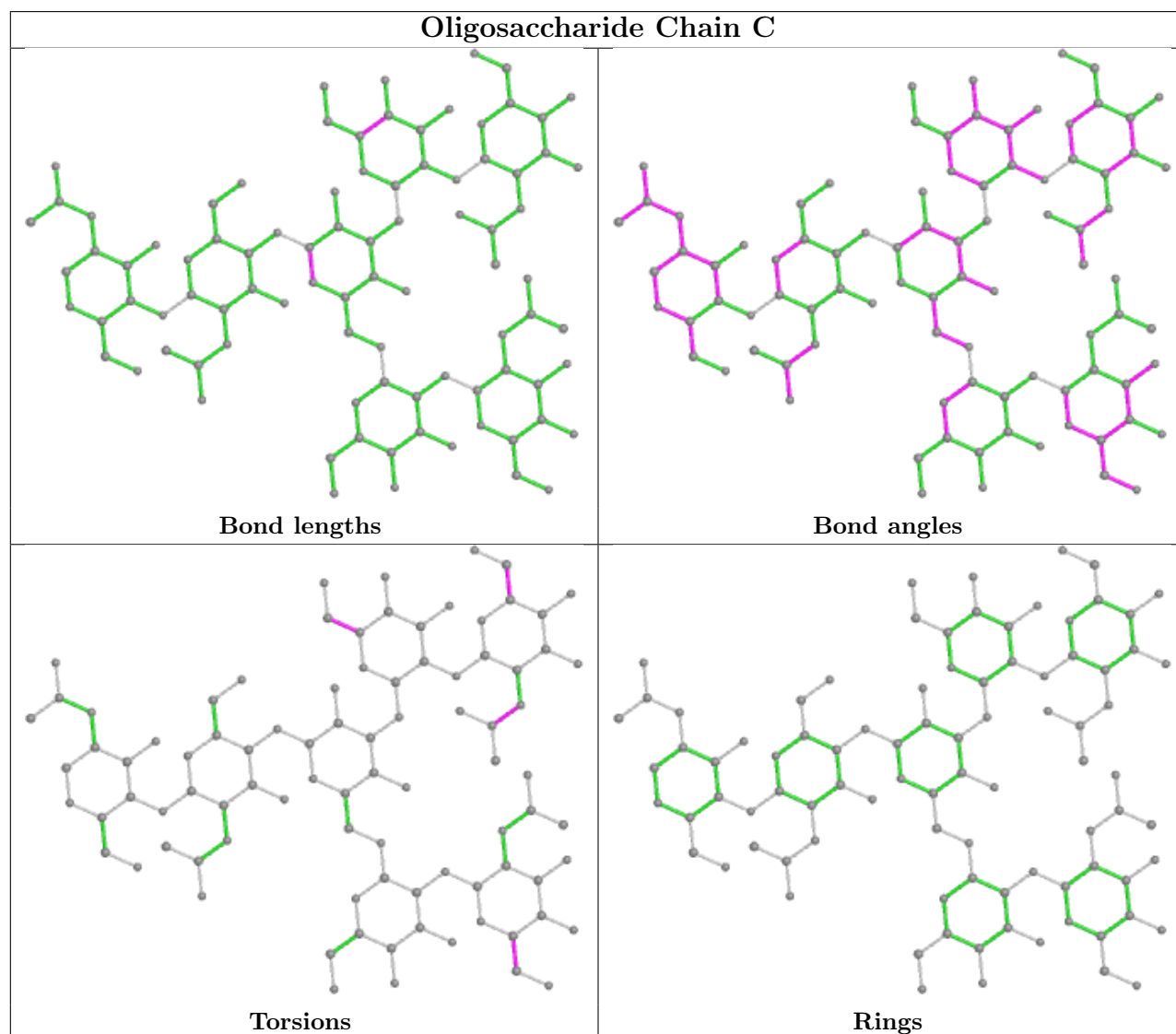
All (8) torsion outliers are listed below:

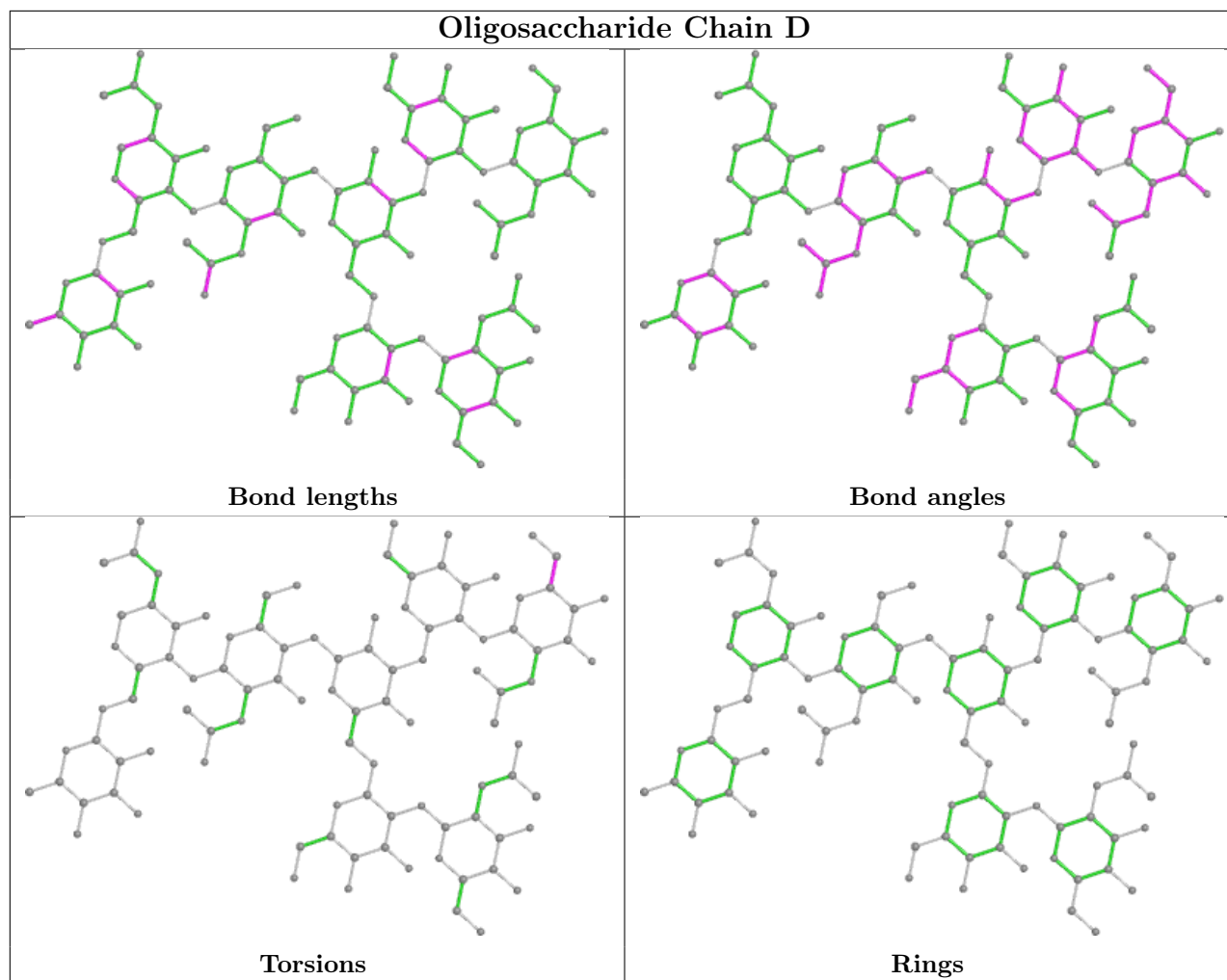
Mol	Chain	Res	Type	Atoms
2	C	7	NAG	O5-C5-C6-O6
2	C	7	NAG	C4-C5-C6-O6
2	C	5	NAG	C8-C7-N2-C2
2	C	5	NAG	O7-C7-N2-C2
3	D	5	NAG	C4-C5-C6-O6
2	C	5	NAG	O5-C5-C6-O6
3	D	5	NAG	O5-C5-C6-O6
2	C	4	MAN	C4-C5-C6-O6

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](#)

2 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	$\# Z > 2$
4	GOL	B	509[B]	-	5,5,5	0.23	0	5,5,5	0.67	0
4	GOL	B	509[A]	-	5,5,5	0.17	0	5,5,5	0.58	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
4	GOL	B	509[B]	-	-	2/4/4/4	-
4	GOL	B	509[A]	-	-	0/4/4/4	-

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (2) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	B	509[B]	GOL	O1-C1-C2-O2
4	B	509[B]	GOL	O1-C1-C2-C3

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	206/223 (92%)	0.62	29 (14%) 2 1	18, 45, 104, 135	0
1	B	207/223 (92%)	0.01	8 (3%) 39 33	17, 30, 63, 85	0
All	All	413/446 (92%)	0.32	37 (8%) 9 7	17, 35, 94, 135	0

All (37) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	296	TYR	10.8
1	A	291	PRO	8.0
1	A	300	TYR	6.4
1	A	281	GLY	5.6
1	A	326	LYS	4.9
1	A	282	VAL	4.6
1	A	331	PRO	4.2
1	A	297	ASN	4.1
1	A	328	LEU	3.9
1	A	295	GLN	3.8
1	A	298	SER	3.7
1	B	368	LEU	3.6
1	A	299	THR	3.5
1	A	330	ALA	3.3
1	A	278	TYR	3.2
1	A	327	ALA	3.1
1	B	355	ARG	3.1
1	A	271	PRO	2.9
1	A	270	ASP	2.9
1	A	294	GLU	2.7
1	A	329	PRO	2.7
1	A	355	ARG	2.7
1	B	366	THR	2.7
1	B	407	TYR	2.6

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Mol	Chain	Res	Type	RSRZ
1	A	366	THR	2.6
1	A	272	GLU	2.5
1	A	268	HIS	2.5
1	A	301	ARG	2.4
1	A	266	VAL	2.4
1	A	269	GLU	2.3
1	B	419	GLN	2.3
1	B	389	ASN	2.2
1	A	359	THR	2.2
1	A	238	PRO	2.2
1	A	322	LYS	2.2
1	B	369	VAL	2.1
1	B	329	PRO	2.1

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

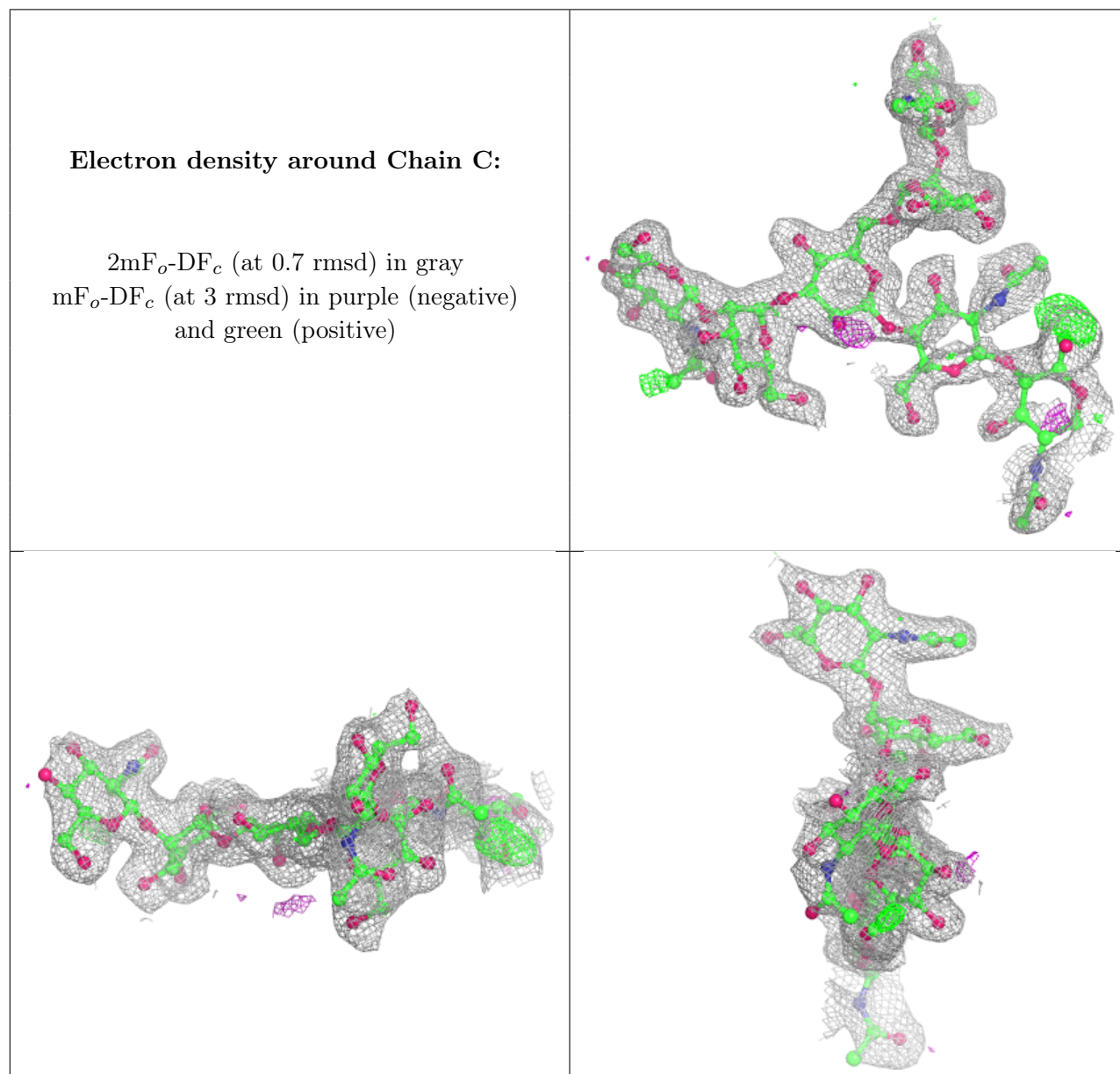
There are no non-standard protein/DNA/RNA residues in this entry.

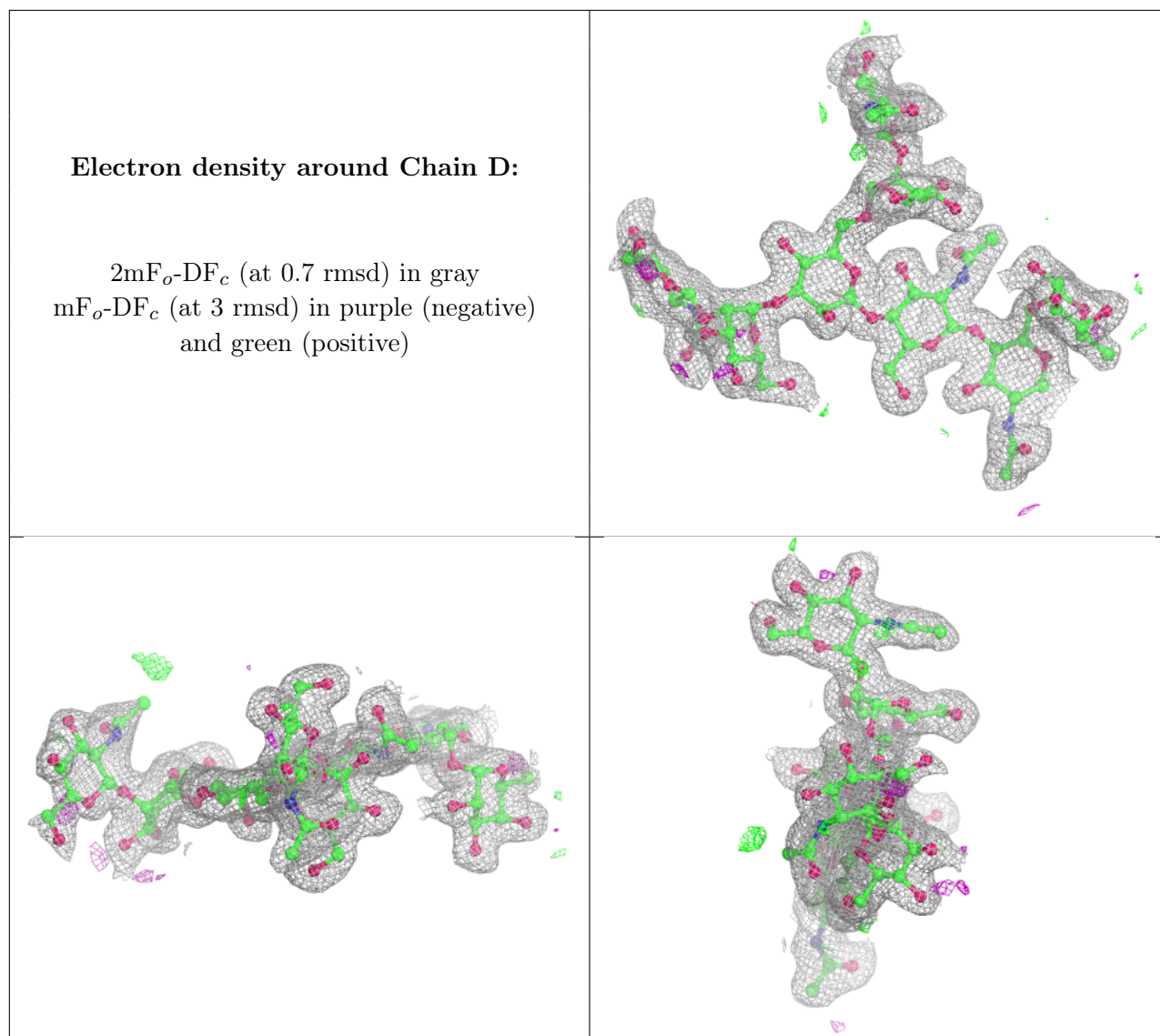
6.3 Carbohydrates [i](#)

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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
2	NAG	C	1	14/15	0.63	0.28	73,81,89,90	0
2	NAG	C	2	14/15	0.70	0.22	54,61,69,70	0
3	NAG	D	5	14/15	0.82	0.30	45,48,53,54	0
2	NAG	C	5	14/15	0.88	0.32	61,71,80,82	0
2	MAN	C	4	11/12	0.89	0.15	45,47,53,58	0
2	BMA	C	3	11/12	0.90	0.11	46,47,51,52	0
2	NAG	C	7	14/15	0.92	0.17	54,57,60,62	0
2	MAN	C	6	11/12	0.93	0.13	51,57,61,65	0
3	NAG	D	7	14/15	0.93	0.11	24,26,30,33	0
3	MAN	D	4	11/12	0.94	0.10	28,32,39,42	0
3	FUC	D	8	10/11	0.94	0.14	30,34,37,42	0
3	BMA	D	3	11/12	0.96	0.07	23,25,26,26	0
3	MAN	D	6	11/12	0.96	0.09	25,27,31,32	0
3	NAG	D	1	14/15	0.98	0.06	27,30,34,34	0
3	NAG	D	2	14/15	0.98	0.06	24,25,27,28	0

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





6.4 Ligands [i](#)

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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
4	GOL	B	509[A]	6/6	0.89	0.15	38,49,52,52	6
4	GOL	B	509[B]	6/6	0.89	0.15	31,47,48,51	6

6.5 Other polymers [i](#)

There are no such residues in this entry.