



Full wwPDB X-ray Structure Validation Report ⓘ

Jun 27, 2024 – 01:06 PM JST

PDB ID : 8W4L
Title : Crystal structure of closed conformation of human immunoglobulin Fc in presence of EndoSz
Authors : Guan, H.H.; Lin, C.C.; Hsieh, Y.C.; Chen, C.J.
Deposited on : 2023-08-24
Resolution : 3.10 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 : 2.37.1
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) : 2.37.1

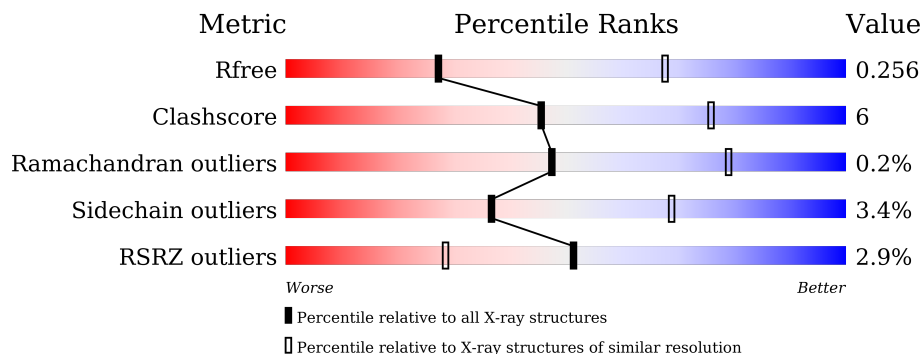
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 3.10 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	1094 (3.10-3.10)
Clashscore	141614	1184 (3.10-3.10)
Ramachandran outliers	138981	1141 (3.10-3.10)
Sidechain outliers	138945	1141 (3.10-3.10)
RSRZ outliers	127900	1067 (3.10-3.10)

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	 5% 74% 17% 7%
1	B	223	 78% 15% 6%
2	C	10	 10% 90%
3	D	10	 20% 80%

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 crite-

ria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
2	GAL	C	6	-	-	-	X
2	SIA	C	7	-	-	-	X
2	NAG	C	9	-	-	-	X
3	GAL	D	6	-	-	-	X

2 Entry composition i

There are 4 unique types of molecules in this entry. The entry contains 3583 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.

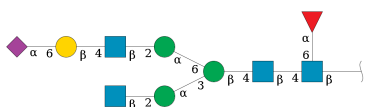
- Molecule 1 is a protein called Immunoglobulin gamma-1 heavy chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	207	Total 1661	C 1057	N 279	O 318	S 7	0	0	0
1	B	209	Total 1669	C 1061	N 281	O 320	S 7	0	0	0

There are 4 discrepancies between the modelled and reference sequences:

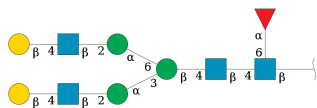
Chain	Residue	Modelled	Actual	Comment	Reference
A	356	GLU	ASP	variant	UNP P0DOX5
A	358	MET	LEU	variant	UNP P0DOX5
B	356	GLU	ASP	variant	UNP P0DOX5
B	358	MET	LEU	variant	UNP P0DOX5

- Molecule 2 is an oligosaccharide called N-acetyl-alpha-neuraminic acid-(2-6)-beta-D-galactopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-2)-alpha-D-mannopyranose-(1-6)-[2-acetamido-2-deoxy-beta-D-glucopyranose-(1-2)-alpha-D-mannopyranose-(1-3)]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.



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
2	C	10	Total 130	C 73	N 5	O 52	0	0	0

- Molecule 3 is an oligosaccharide called beta-D-galactopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-2)-alpha-D-mannopyranose-(1-3)-[beta-D-galactopyranose-(1-4)-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	10	121	68	4	49	0	0	0

- Molecule 4 is CHLORIDE ION (three-letter code: CL) (formula: Cl) (labeled as "Ligand of Interest" by depositor).

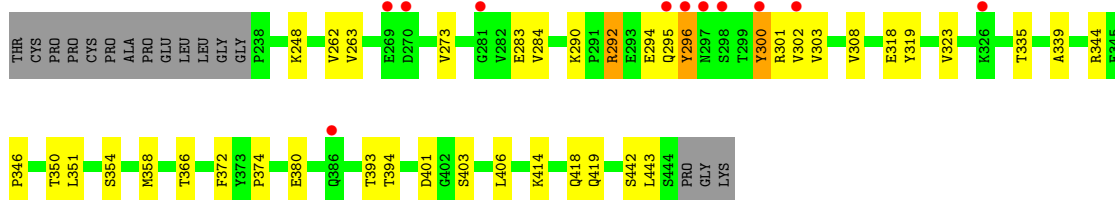
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	1	Total	Cl	0	0
			1	1		
4	B	1	Total	Cl	0	0
			1	1		

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.

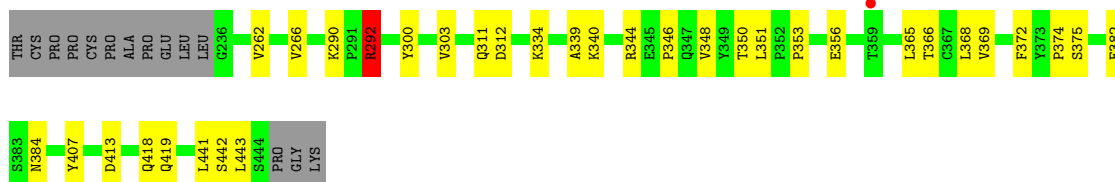
- Molecule 1: Immunoglobulin gamma-1 heavy chain

Chain A: 5% 74% 17% 7%



- Molecule 1: Immunoglobulin gamma-1 heavy chain

Chain B: 78% 15% 6%




- Molecule 2: N-acetyl-alpha-neuraminic acid-(2-6)-beta-D-galactopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-2)-alpha-D-mannopyranose-(1-6)-[2-acetamido-2-deoxy-beta-D-glucopyranose-(1-2)-alpha-D-mannopyranose-(1-3)]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

Chain C: 10% 90%



- Molecule 3: beta-D-galactopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-2)-alpha-D-mannopyranose-(1-3)-[beta-D-galactopyranose-(1-4)-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 D:  20% 80%

MAN1
MAN2
BMA3
MAN4
NAG5
GAL6
MAN7
NAG8
GAL9
FUC10

4 Data and refinement statistics

Property	Value	Source
Space group	P 61 2 2	Depositor
Cell constants a, b, c, α , β , γ	151.96Å 151.96Å 113.30Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	28.72 – 3.10 29.17 – 3.10	Depositor EDS
% Data completeness (in resolution range)	98.8 (28.72-3.10) 98.8 (29.17-3.10)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	4.14 (at 3.11Å)	Xtrriage
Refinement program	PHENIX 1.17.1_3660	Depositor
R, R_{free}	0.207 , 0.257 0.207 , 0.256	Depositor DCC
R_{free} test set	728 reflections (5.09%)	wwPDB-VP
Wilson B-factor (Å ²)	52.6	Xtrriage
Anisotropy	0.156	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.33 , 38.3	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.33$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.91	EDS
Total number of atoms	3583	wwPDB-VP
Average B, all atoms (Å ²)	52.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.14% 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, SIA, FUC, CL, BMA, GAL, 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	0.46	0/1707	0.64	0/2324
1	B	0.55	0/1715	0.69	1/2335 (0.0%)
All	All	0.51	0/3422	0.67	1/4659 (0.0%)

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	292	ARG	CG-CD-NE	5.10	122.51	111.80

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	1661	0	1628	27	0
1	B	1669	0	1633	18	0
2	C	130	0	110	0	0
3	D	121	0	103	0	0
4	A	1	0	0	0	0
4	B	1	0	0	0	0
All	All	3583	0	3474	45	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 (45) 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:418:GLN:O	1:A:419:GLN:HG2	1.81	0.81
1:B:292:ARG:HD2	1:B:300:TYR:CE1	2.24	0.73
1:A:418:GLN:HA	1:A:443:LEU:HD22	1.76	0.67
1:A:292:ARG:HH11	1:A:292:ARG:HG3	1.60	0.66
1:B:418:GLN:HA	1:B:443:LEU:HD22	1.80	0.62
1:A:273:VAL:HG21	1:A:302:VAL:HG21	1.82	0.61
1:A:339:ALA:HB3	1:A:374:PRO:HB3	1.86	0.58
1:A:292:ARG:HG3	1:A:292:ARG:NH1	2.19	0.57
1:B:346:PRO:HB3	1:B:372:PHE:HB3	1.88	0.56
1:A:418:GLN:HA	1:A:443:LEU:CD2	2.36	0.55
1:A:295:GLN:HA	1:A:295:GLN:NE2	2.20	0.55
1:B:368:LEU:HD13	1:B:407:TYR:CZ	2.42	0.55
1:B:290:LYS:HE2	1:B:303:VAL:CG2	2.36	0.55
1:A:351:LEU:HB2	1:A:366:THR:HB	1.91	0.52
1:A:346:PRO:HB3	1:A:372:PHE:HB3	1.94	0.50
1:A:296:TYR:CD2	1:A:296:TYR:N	2.79	0.49
1:A:344:ARG:HH21	1:A:403:SER:HB3	1.76	0.49
1:B:266:VAL:HB	1:B:300:TYR:HB2	1.93	0.49
1:A:294:GLU:HA	1:A:300:TYR:HA	1.92	0.49
1:B:356:GLU:OE1	1:B:356:GLU:N	2.43	0.48
1:B:339:ALA:HB3	1:B:374:PRO:HB3	1.94	0.48
1:B:348:VAL:HG22	1:B:369:VAL:HG13	1.94	0.48
1:A:290:LYS:HD3	1:A:303:VAL:HB	1.95	0.47
1:A:393:THR:HG22	1:A:394:THR:O	2.15	0.47
1:A:263:VAL:HG22	1:A:323:VAL:HG21	1.97	0.47
1:B:290:LYS:HE2	1:B:303:VAL:HG21	1.97	0.47
1:B:311:GLN:HG2	1:B:312:ASP:N	2.29	0.46
1:A:358:MET:CE	1:A:414:LYS:HG3	2.46	0.46
1:B:418:GLN:O	1:B:419:GLN:HG2	2.15	0.45
1:A:262:VAL:HG13	1:A:301:ARG:HH21	1.82	0.45
1:B:353:PRO:HD3	1:B:365:LEU:HD23	1.97	0.44
1:A:283:GLU:HG3	1:A:284:VAL:N	2.32	0.44
1:A:393:THR:HG23	1:A:406:LEU:HD13	1.99	0.44
1:A:262:VAL:CG1	1:A:301:ARG:HH21	2.31	0.44
1:A:401:ASP:OD1	1:A:401:ASP:N	2.51	0.43
1:A:308:VAL:HG12	1:A:319:TYR:CE1	2.54	0.43
1:B:351:LEU:HB2	1:B:366:THR:HB	2.00	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:248:LYS:NZ	1:A:380:GLU:OE2	2.43	0.43
1:B:262:VAL:HG13	1:B:303:VAL:HG12	2.00	0.43
1:B:350:THR:O	1:B:351:LEU:HD23	2.19	0.42
1:A:296:TYR:H	1:A:296:TYR:HD2	1.63	0.42
1:A:350:THR:O	1:A:351:LEU:HD23	2.21	0.41
1:B:350:THR:HB	1:B:441:LEU:HD13	2.02	0.41
1:B:418:GLN:HA	1:B:443:LEU:CD2	2.48	0.41
1:A:318:GLU:HG2	1:A:335:THR:CG2	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	205/223 (92%)	198 (97%)	7 (3%)	0	100	100
1	B	207/223 (93%)	201 (97%)	5 (2%)	1 (0%)	29	64
All	All	412/446 (92%)	399 (97%)	12 (3%)	1 (0%)	47	79

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	384	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	194/206 (94%)	189 (97%)	5 (3%)	46	74
1	B	194/206 (94%)	186 (96%)	8 (4%)	30	64
All	All	388/412 (94%)	375 (97%)	13 (3%)	37	69

All (13) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	292	ARG
1	A	296	TYR
1	A	300	TYR
1	A	354	SER
1	A	442	SER
1	B	292	ARG
1	B	334	LYS
1	B	340	LYS
1	B	344	ARG
1	B	375	SER
1	B	382	GLU
1	B	413	ASP
1	B	442	SER

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. There are no such sidechains identified.

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](#)

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$
2	NAG	C	1	1,2	14,14,15	0.75	1 (7%)	17,19,21	0.82	1 (5%)
2	FUC	C	10	2	10,10,11	1.10	0	14,14,16	1.42	2 (14%)
2	NAG	C	2	2	14,14,15	0.79	1 (7%)	17,19,21	0.62	0
2	BMA	C	3	2	11,11,12	1.16	1 (9%)	15,15,17	1.10	3 (20%)
2	MAN	C	4	2	11,11,12	1.19	1 (9%)	15,15,17	1.46	1 (6%)
2	NAG	C	5	2	14,14,15	0.63	0	17,19,21	0.66	0
2	GAL	C	6	2	11,11,12	1.55	1 (9%)	15,15,17	1.27	2 (13%)
2	SIA	C	7	2	20,20,21	2.44	5 (25%)	24,28,31	1.98	6 (25%)
2	MAN	C	8	2	11,11,12	1.39	2 (18%)	15,15,17	1.58	3 (20%)
2	NAG	C	9	2	14,14,15	0.67	1 (7%)	17,19,21	0.97	1 (5%)
3	NAG	D	1	3,1	14,14,15	0.43	0	17,19,21	0.83	0
3	FUC	D	10	3	10,10,11	1.00	1 (10%)	14,14,16	0.99	1 (7%)
3	NAG	D	2	3	14,14,15	0.63	0	17,19,21	0.63	0
3	BMA	D	3	3	11,11,12	1.21	0	15,15,17	1.29	3 (20%)
3	MAN	D	4	3	11,11,12	1.23	1 (9%)	15,15,17	1.25	1 (6%)
3	NAG	D	5	3	14,14,15	0.52	0	17,19,21	1.47	2 (11%)
3	GAL	D	6	3	11,11,12	2.04	4 (36%)	15,15,17	0.98	0
3	MAN	D	7	3	11,11,12	1.02	1 (9%)	15,15,17	1.54	2 (13%)
3	NAG	D	8	3	14,14,15	0.77	1 (7%)	17,19,21	0.79	1 (5%)
3	GAL	D	9	3	11,11,12	2.77	5 (45%)	15,15,17	1.66	3 (20%)

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	1,2	-	2/6/23/26	0/1/1/1
2	FUC	C	10	2	-	-	0/1/1/1
2	NAG	C	2	2	-	0/6/23/26	0/1/1/1
2	BMA	C	3	2	-	2/2/19/22	0/1/1/1
2	MAN	C	4	2	-	2/2/19/22	0/1/1/1
2	NAG	C	5	2	-	2/6/23/26	0/1/1/1
2	GAL	C	6	2	-	1/2/19/22	0/1/1/1
2	SIA	C	7	2	-	5/18/34/38	0/1/1/1

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	MAN	C	8	2	-	2/2/19/22	0/1/1/1
2	NAG	C	9	2	-	4/6/23/26	0/1/1/1
3	NAG	D	1	3,1	-	0/6/23/26	0/1/1/1
3	FUC	D	10	3	-	-	0/1/1/1
3	NAG	D	2	3	-	0/6/23/26	0/1/1/1
3	BMA	D	3	3	-	1/2/19/22	0/1/1/1
3	MAN	D	4	3	-	2/2/19/22	0/1/1/1
3	NAG	D	5	3	-	4/6/23/26	0/1/1/1
3	GAL	D	6	3	-	2/2/19/22	0/1/1/1
3	MAN	D	7	3	-	2/2/19/22	0/1/1/1
3	NAG	D	8	3	-	2/6/23/26	0/1/1/1
3	GAL	D	9	3	-	1/2/19/22	0/1/1/1

All (26) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	C	7	SIA	C2-C1	8.13	1.59	1.52
3	D	9	GAL	C2-C3	5.65	1.60	1.52
3	D	9	GAL	C1-C2	4.81	1.63	1.52
3	D	6	GAL	O5-C1	3.95	1.50	1.43
2	C	6	GAL	C1-C2	3.82	1.60	1.52
2	C	7	SIA	C7-C6	3.61	1.57	1.53
2	C	7	SIA	O6-C2	3.59	1.48	1.43
3	D	6	GAL	C1-C2	3.30	1.59	1.52
3	D	6	GAL	O5-C5	3.00	1.49	1.43
3	D	9	GAL	O3-C3	2.98	1.50	1.43
3	D	4	MAN	O2-C2	-2.95	1.37	1.43
3	D	9	GAL	C4-C3	2.77	1.59	1.52
2	C	7	SIA	C4-C5	2.73	1.55	1.53
3	D	8	NAG	O5-C1	-2.70	1.39	1.43
2	C	7	SIA	C6-C5	2.65	1.57	1.53
2	C	3	BMA	O5-C5	2.59	1.48	1.43
2	C	2	NAG	C1-C2	2.59	1.56	1.52
2	C	8	MAN	C1-C2	2.46	1.57	1.52
3	D	9	GAL	O2-C2	2.44	1.48	1.43
2	C	8	MAN	O5-C5	2.34	1.48	1.43
2	C	1	NAG	O5-C1	2.27	1.47	1.43
2	C	9	NAG	O5-C1	2.15	1.47	1.43
2	C	4	MAN	O5-C5	2.13	1.47	1.43
3	D	6	GAL	C4-C3	2.12	1.57	1.52
3	D	10	FUC	C1-C2	2.06	1.56	1.52

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	D	7	MAN	O4-C4	2.04	1.47	1.43

All (32) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	C	7	SIA	C6-O6-C2	5.30	122.67	111.34
2	C	4	MAN	C1-O5-C5	4.92	118.86	112.19
3	D	5	NAG	C1-O5-C5	4.74	118.61	112.19
3	D	9	GAL	C1-C2-C3	4.31	114.96	109.67
2	C	7	SIA	O6-C2-C3	-4.26	104.59	110.46
3	D	4	MAN	O2-C2-C3	-4.08	101.96	110.14
2	C	8	MAN	C1-O5-C5	3.89	117.47	112.19
3	D	7	MAN	C1-O5-C5	3.59	117.06	112.19
2	C	10	FUC	C1-C2-C3	-3.50	105.36	109.67
2	C	8	MAN	O2-C2-C3	-3.20	103.73	110.14
3	D	7	MAN	O2-C2-C3	-3.20	103.73	110.14
2	C	6	GAL	O2-C2-C1	2.66	114.60	109.15
2	C	7	SIA	C4-C3-C2	2.65	114.55	109.81
3	D	10	FUC	C1-C2-C3	2.54	112.79	109.67
2	C	9	NAG	C1-O5-C5	2.53	115.62	112.19
3	D	3	BMA	O2-C2-C3	-2.48	105.17	110.14
3	D	9	GAL	O3-C3-C2	2.45	114.69	109.99
2	C	7	SIA	C4-C5-C6	2.45	115.29	109.10
3	D	3	BMA	C1-O5-C5	2.44	115.50	112.19
2	C	3	BMA	C1-O5-C5	2.41	115.46	112.19
2	C	7	SIA	C3-C4-C5	2.37	114.33	111.46
2	C	8	MAN	O2-C2-C1	2.32	113.89	109.15
2	C	3	BMA	O2-C2-C3	-2.28	105.56	110.14
3	D	8	NAG	C1-O5-C5	2.27	115.27	112.19
2	C	10	FUC	O2-C2-C1	2.22	113.69	109.15
3	D	9	GAL	O2-C2-C1	2.21	113.67	109.15
2	C	3	BMA	O5-C5-C6	2.08	110.47	107.20
2	C	7	SIA	C5-N5-C10	2.07	128.21	123.18
2	C	1	NAG	C1-O5-C5	2.07	114.99	112.19
3	D	3	BMA	O6-C6-C5	-2.04	104.28	111.29
2	C	6	GAL	C1-O5-C5	2.03	114.94	112.19
3	D	5	NAG	C4-C3-C2	-2.03	108.05	111.02

There are no chirality outliers.

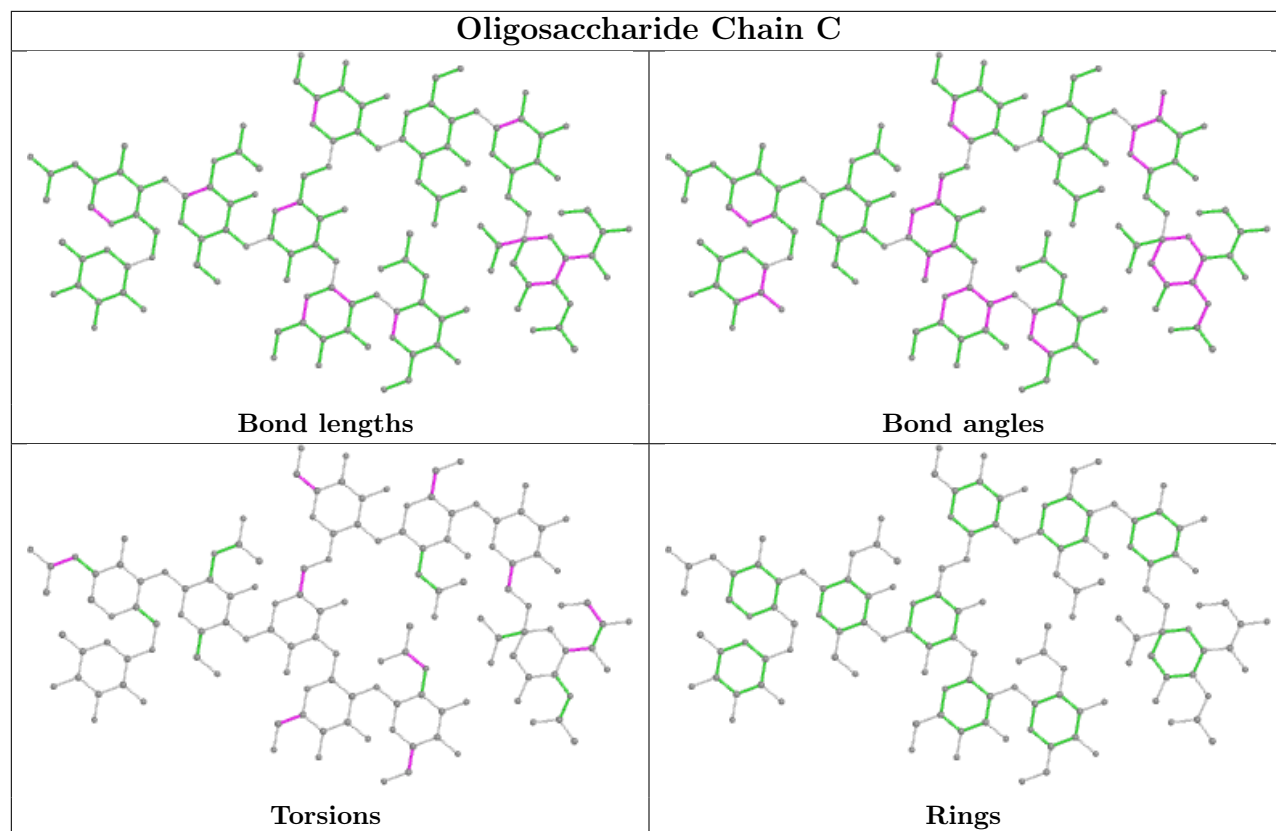
All (34) torsion outliers are listed below:

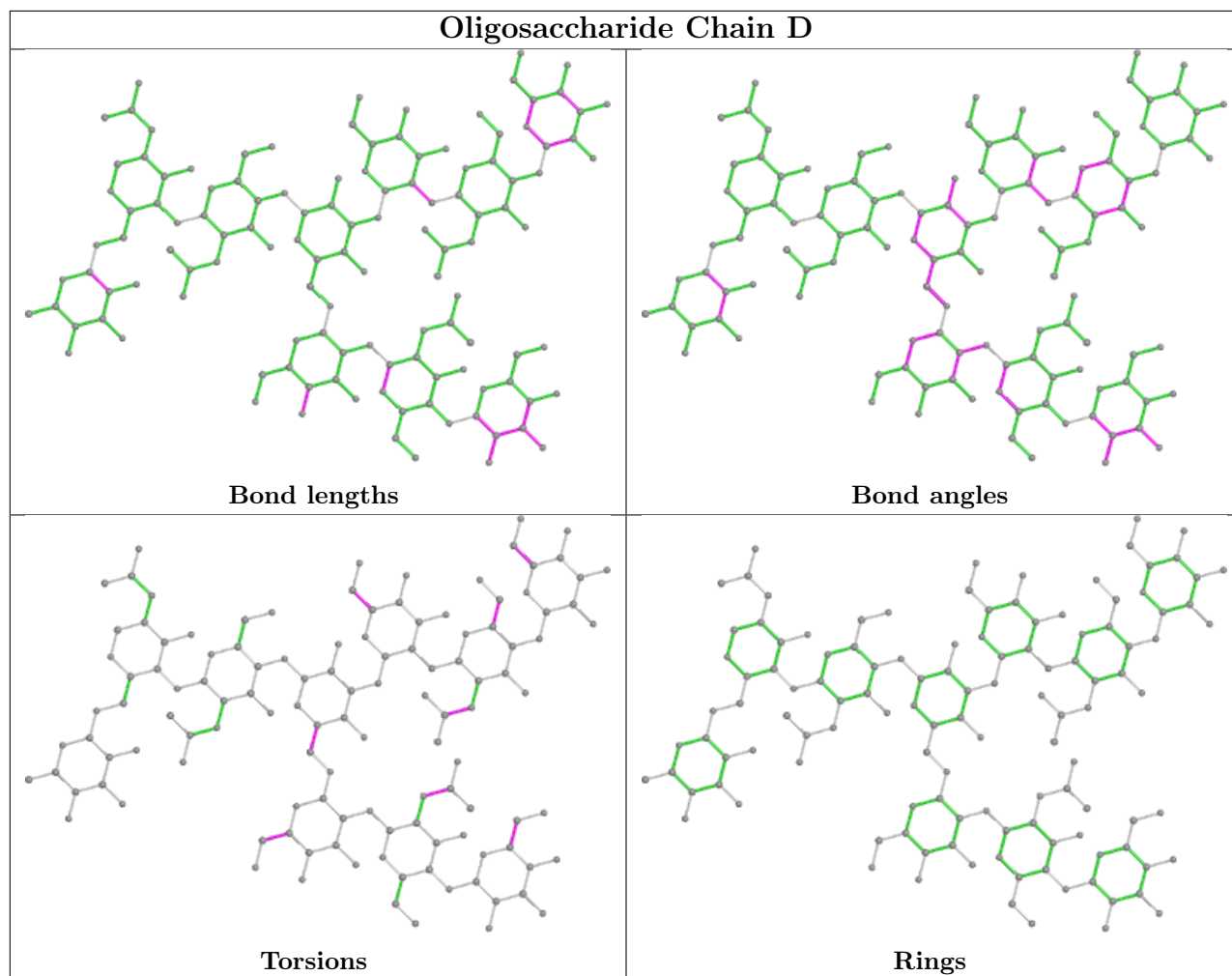
Mol	Chain	Res	Type	Atoms
2	C	7	SIA	C5-C6-C7-C8
2	C	7	SIA	C5-C6-C7-O7
2	C	7	SIA	O6-C6-C7-O7
2	C	3	BMA	O5-C5-C6-O6
3	D	5	NAG	O5-C5-C6-O6
2	C	9	NAG	O5-C5-C6-O6
2	C	4	MAN	O5-C5-C6-O6
2	C	3	BMA	C4-C5-C6-O6
2	C	9	NAG	C4-C5-C6-O6
3	D	5	NAG	C4-C5-C6-O6
3	D	6	GAL	O5-C5-C6-O6
3	D	4	MAN	C4-C5-C6-O6
2	C	1	NAG	C8-C7-N2-C2
2	C	1	NAG	O7-C7-N2-C2
2	C	9	NAG	C8-C7-N2-C2
2	C	9	NAG	O7-C7-N2-C2
3	D	5	NAG	C8-C7-N2-C2
3	D	5	NAG	O7-C7-N2-C2
3	D	8	NAG	C8-C7-N2-C2
3	D	8	NAG	O7-C7-N2-C2
3	D	4	MAN	O5-C5-C6-O6
2	C	8	MAN	O5-C5-C6-O6
2	C	6	GAL	O5-C5-C6-O6
2	C	4	MAN	C4-C5-C6-O6
3	D	7	MAN	C4-C5-C6-O6
2	C	5	NAG	C4-C5-C6-O6
3	D	3	BMA	O5-C5-C6-O6
2	C	5	NAG	O5-C5-C6-O6
3	D	7	MAN	O5-C5-C6-O6
2	C	8	MAN	C4-C5-C6-O6
3	D	9	GAL	C4-C5-C6-O6
2	C	7	SIA	C7-C8-C9-O9
2	C	7	SIA	O6-C6-C7-C8
3	D	6	GAL	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 2 ligands modelled in this entry, 2 are monoatomic - leaving 0 for Mogul analysis.

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

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

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	207/223 (92%)	0.12	11 (5%) 26 12	24, 61, 106, 124	0
1	B	209/223 (93%)	-0.37	1 (0%) 91 81	14, 30, 79, 94	0
All	All	416/446 (93%)	-0.13	12 (2%) 51 28	14, 45, 93, 124	0

All (12) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	296	TYR	3.9
1	A	269	GLU	3.6
1	A	298	SER	3.4
1	A	300	TYR	2.6
1	A	295	GLN	2.6
1	A	297	ASN	2.4
1	A	326	LYS	2.4
1	A	386	GLN	2.3
1	B	359	THR	2.2
1	A	270	ASP	2.1
1	A	281	GLY	2.1
1	A	302	VAL	2.0

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

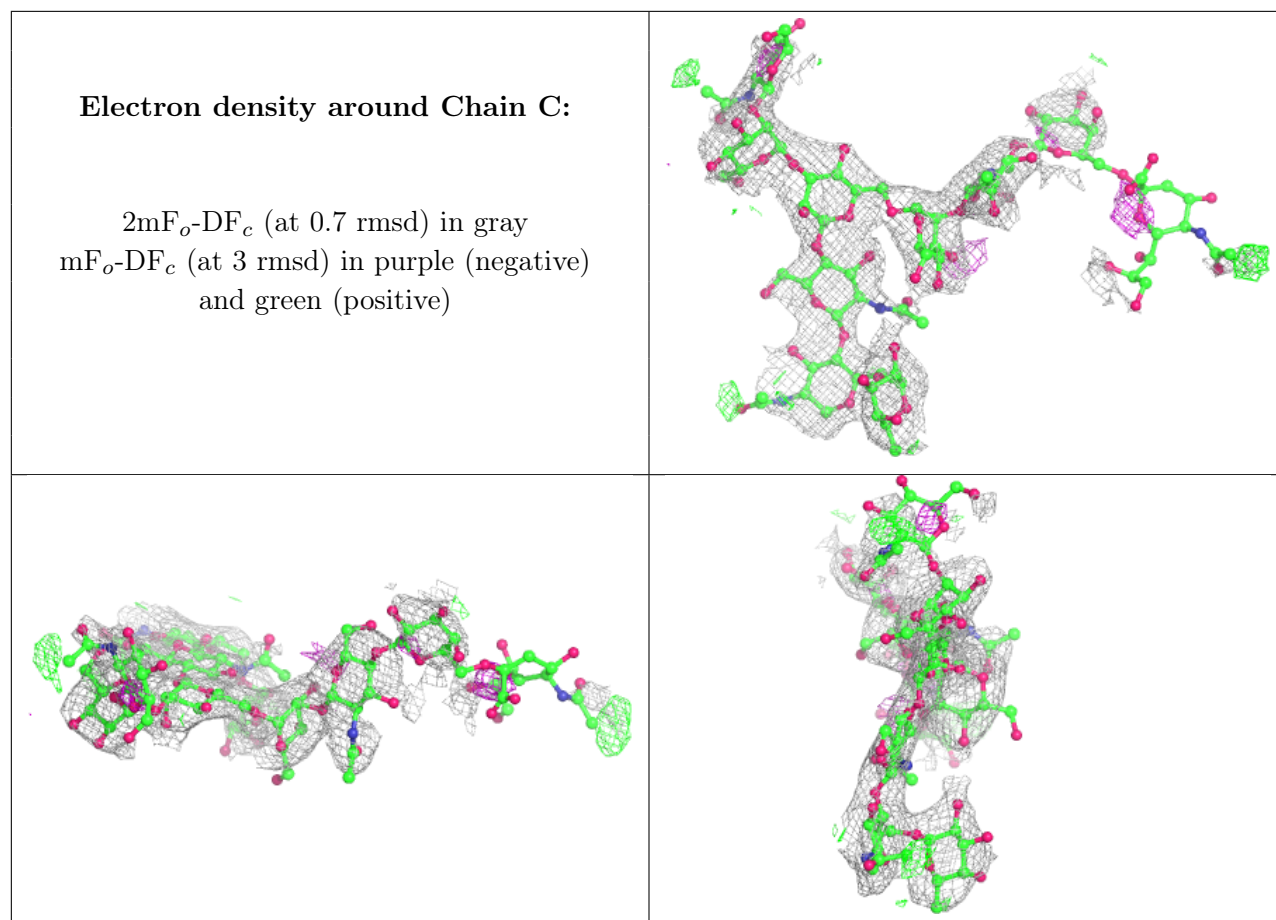
There are no non-standard protein/DNA/RNA residues in this entry.

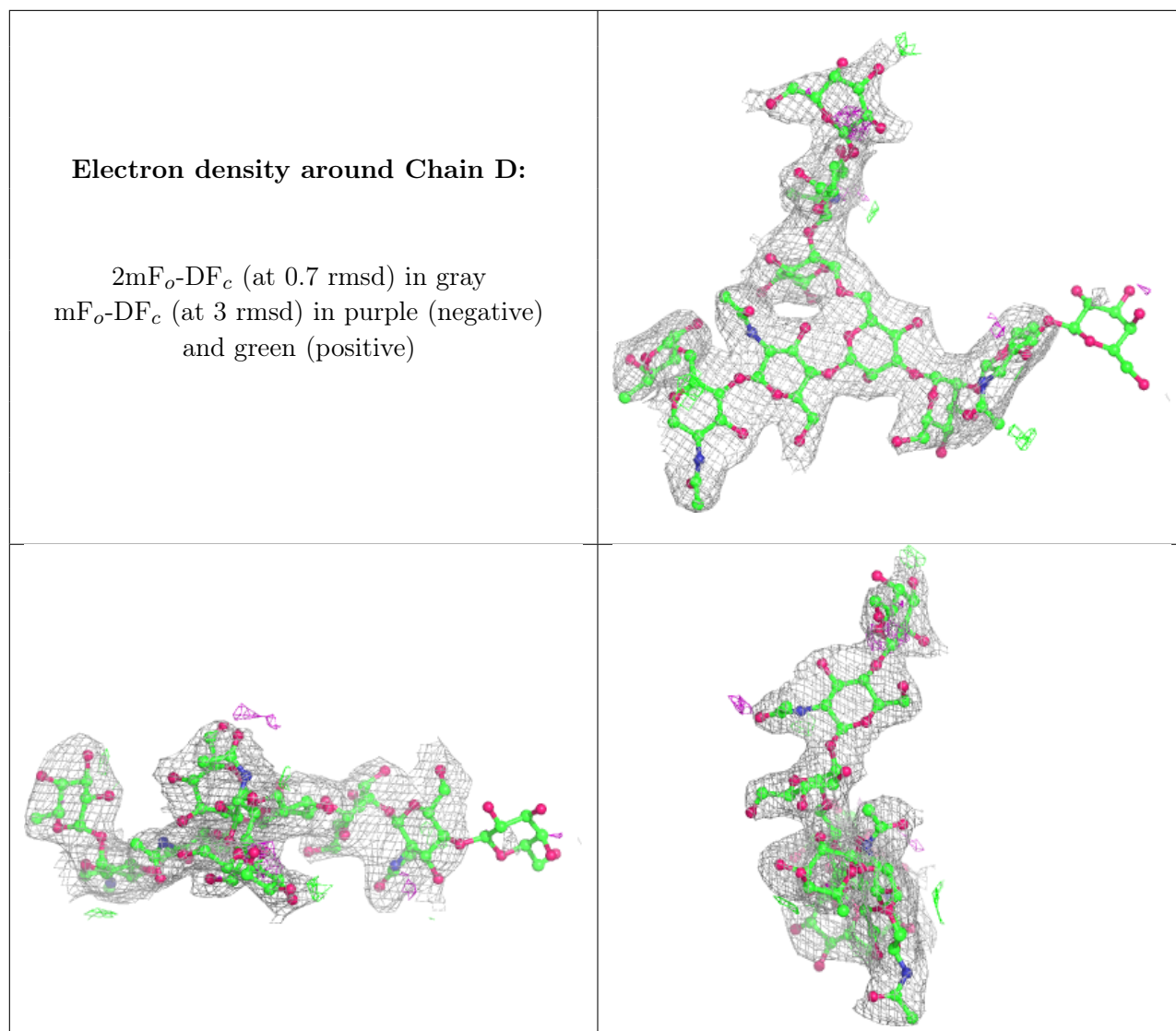
6.3 Carbohydrates [i](#)

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(\AA^2)	Q<0.9
2	SIA	C	7	20/21	0.14	0.83	119,162,175,176	0
3	GAL	D	6	11/12	0.47	0.76	98,123,133,134	0
2	NAG	C	9	14/15	0.48	0.56	97,113,125,128	0
2	GAL	C	6	11/12	0.72	0.48	75,94,128,160	0
3	NAG	D	5	14/15	0.79	0.24	55,73,93,104	0
2	MAN	C	4	11/12	0.82	0.28	78,85,95,99	0
2	NAG	C	1	14/15	0.84	0.25	90,97,107,110	0
3	GAL	D	9	11/12	0.84	0.46	37,50,62,62	0
2	NAG	C	5	14/15	0.85	0.36	74,84,95,95	0
2	MAN	C	8	11/12	0.85	0.39	73,92,104,112	0
2	FUC	C	10	10/11	0.87	0.26	89,96,100,102	0
2	NAG	C	2	14/15	0.88	0.37	77,85,97,99	0
2	BMA	C	3	11/12	0.91	0.16	71,81,82,85	0
3	NAG	D	8	14/15	0.94	0.27	28,34,41,45	0
3	MAN	D	7	11/12	0.94	0.24	27,36,42,52	0
3	MAN	D	4	11/12	0.95	0.16	53,61,71,73	0
3	FUC	D	10	10/11	0.95	0.22	26,31,36,37	0
3	NAG	D	2	14/15	0.97	0.14	22,28,32,36	0
3	BMA	D	3	11/12	0.97	0.09	26,35,45,49	0
3	NAG	D	1	14/15	0.97	0.13	20,24,30,37	0

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





6.4 Ligands [i](#)

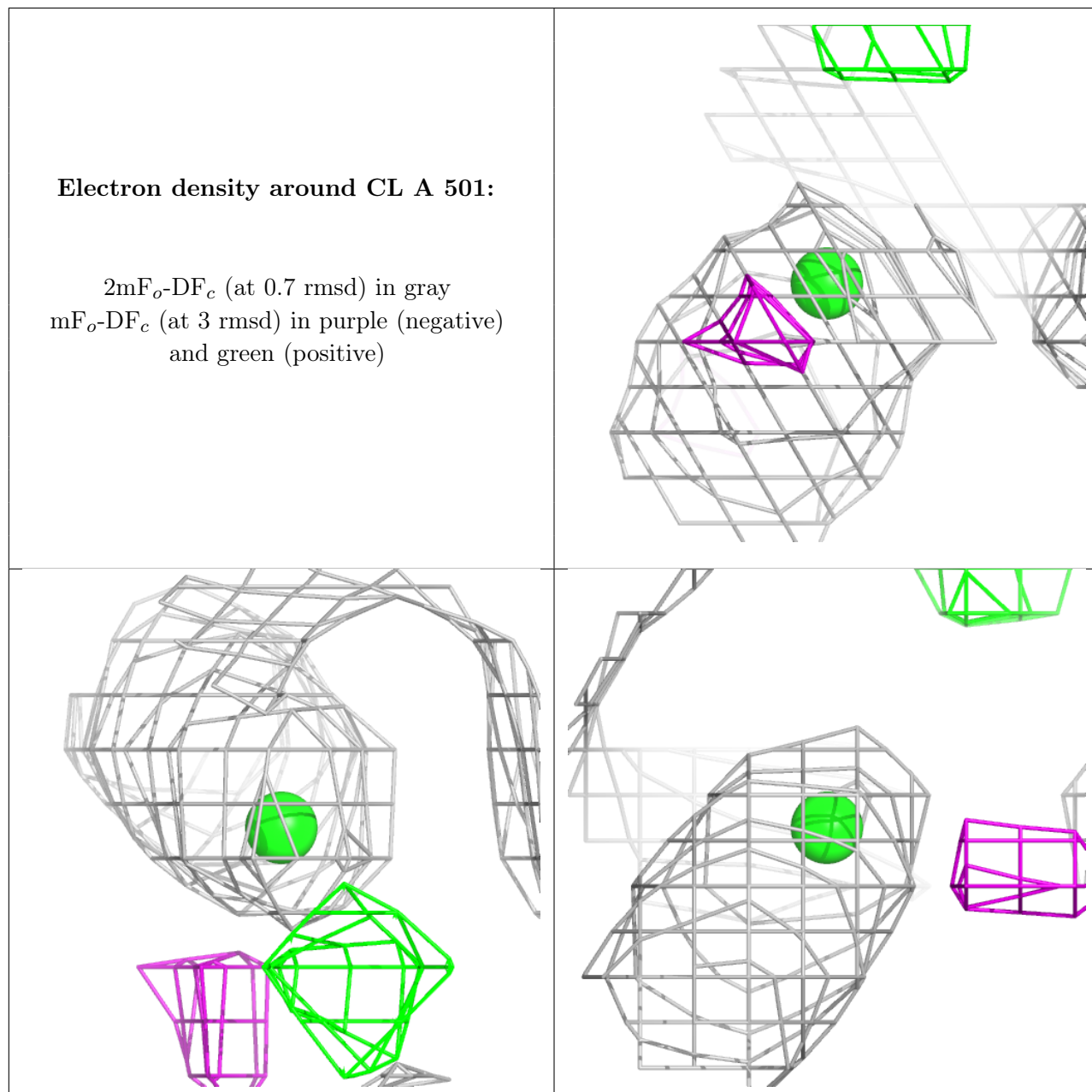
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q < 0.9' lists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

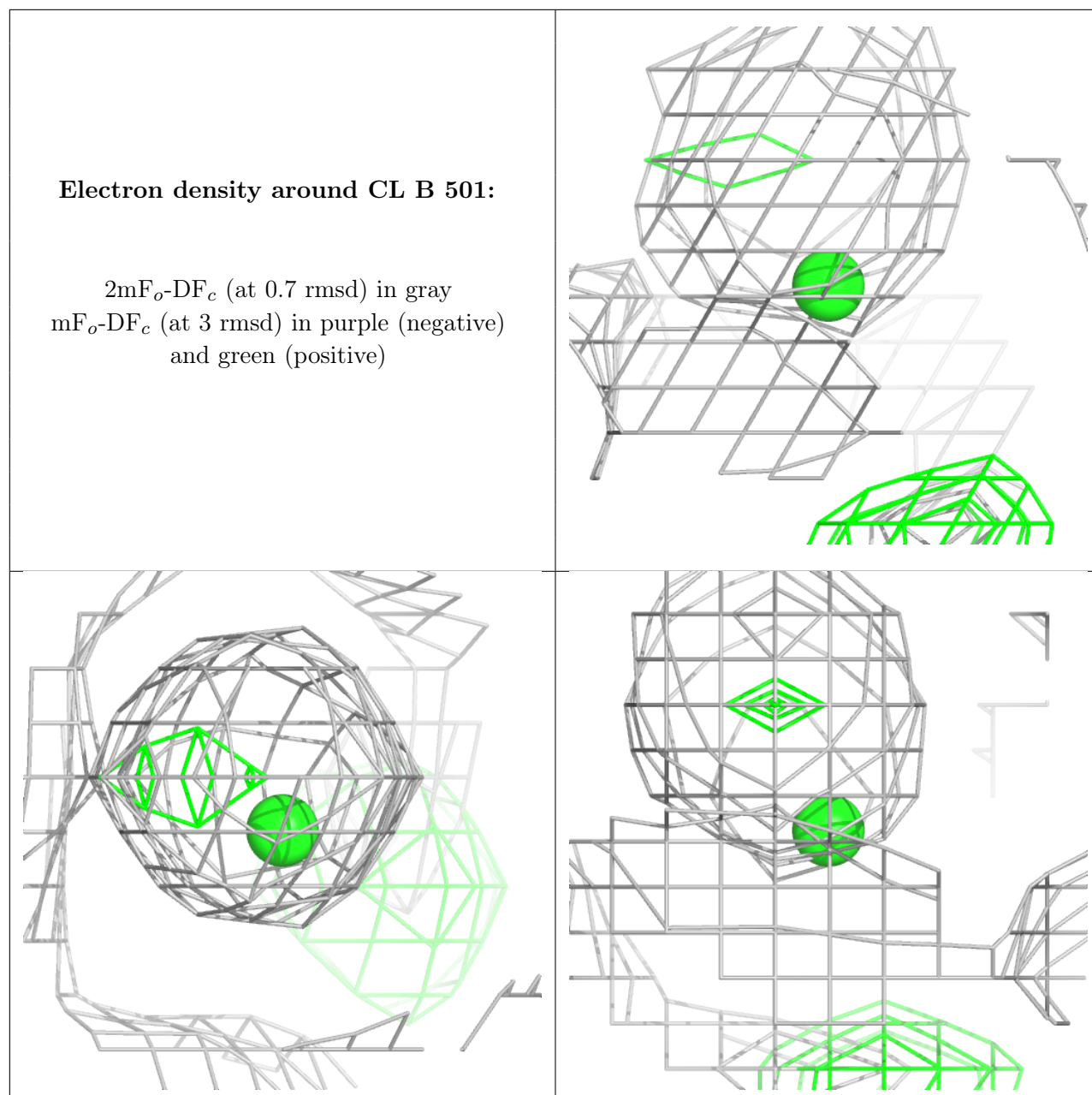
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
4	CL	A	501	1/1	0.91	0.38	56,56,56,56	0
4	CL	B	501	1/1	0.94	0.28	59,59,59,59	0

The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation to approximate a three-dimensional view.

Electron density around CL A 501:

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





6.5 Other polymers ⓘ

There are no such residues in this entry.