wwPDB X-ray Structure Validation Summary Report (i)

Sep 17, 2023 – 10:27 AM EDT

PDB ID	:	4Z7V
Title	:	L3-12 complex
Authors	:	Petersen, J.; Rossjohn, J.; Reid, H.H.; Koning, F.
Deposited on	:	2015-04-08
Resolution	:	2.65 Å(reported)

The following versions of software and data (see references (i)) were used in the production of this report:

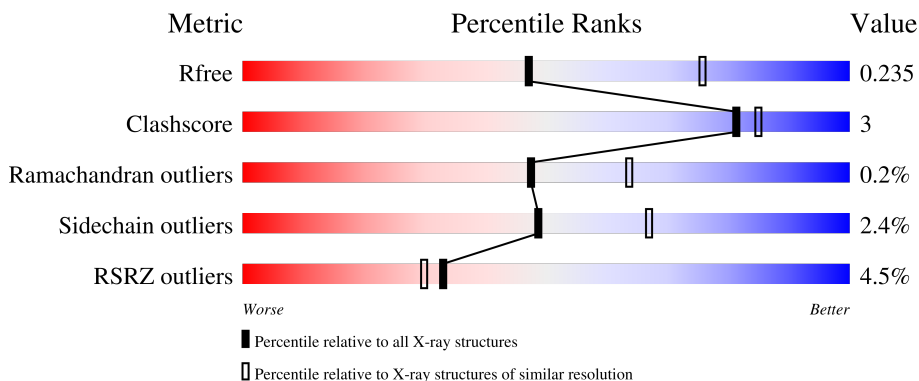|		
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.35.1
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.35.1

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 2.65 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	Percentile Ranks	Value
Rfree		0.235
Clashscore		3
Ramachandran outliers		0.2%
Sidechain outliers		2.4%
RSRZ outliers		4.5%

Worse *Better*

▮ Percentile relative to all X-ray structures

▯ Percentile relative to X-ray structures of similar resolution

Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	1332 (2.68-2.64)
Clashscore	141614	1374 (2.68-2.64)
Ramachandran outliers	138981	1349 (2.68-2.64)
Sidechain outliers	138945	1349 (2.68-2.64)
RSRZ outliers	127900	1318 (2.68-2.64)

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 <=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	192	5% / 88% / 6% / 6%
1	C	192	7% / 88% / 6% / 6%
2	B	213	14% / 72% / 8% / 19%
2	D	213	8% / 69% / 12% · 18%
3	E	204	% / 88% / 9% ·

Continued on next page...

Continued from previous page...

Mol	Chain	Length	Quality of chain
3	G	204	93%
4	F	244	95% 5%
4	H	244	94% 5%
5	I	18	72% 28%
5	J	18	67% 6% 28%
6	K	6	100%
7	L	4	25% 75%

2 Entry composition ⓘ

There are 9 unique types of molecules in this entry. The entry contains 13077 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 MHC class II HLA-DQ-alpha chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	180	Total	C	N	O	S	0	0	0
			1418	912	236	268	2			
1	C	180	Total	C	N	O	S	0	0	0
			1408	906	232	268	2			

There are 16 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	182	THR	-	expression tag	UNP Q30069
A	183	SER	-	expression tag	UNP Q30069
A	184	GLY	-	expression tag	UNP Q30069
A	185	ASP	-	expression tag	UNP Q30069
A	186	ASP	-	expression tag	UNP Q30069
A	187	ASP	-	expression tag	UNP Q30069
A	188	ASP	-	expression tag	UNP Q30069
A	189	LYS	-	expression tag	UNP Q30069
C	182	THR	-	expression tag	UNP Q30069
C	183	SER	-	expression tag	UNP Q30069
C	184	GLY	-	expression tag	UNP Q30069
C	185	ASP	-	expression tag	UNP Q30069
C	186	ASP	-	expression tag	UNP Q30069
C	187	ASP	-	expression tag	UNP Q30069
C	188	ASP	-	expression tag	UNP Q30069
C	189	LYS	-	expression tag	UNP Q30069

- Molecule 2 is a protein called MHC class II HLA-DQ-beta-1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	172	Total	C	N	O	S	0	0	0
			1338	857	225	249	7			
2	D	175	Total	C	N	O	S	0	0	0
			1361	870	231	253	7			

There are 42 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	-12	GLY	-	expression tag	UNP O19707
B	-11	GLY	-	expression tag	UNP O19707
B	-10	SER	-	expression tag	UNP O19707
B	-9	ILE	-	expression tag	UNP O19707
B	-8	GLU	-	expression tag	UNP O19707
B	-7	GLY	-	expression tag	UNP O19707
B	-6	ARG	-	expression tag	UNP O19707
B	-5	GLY	-	expression tag	UNP O19707
B	-4	GLY	-	expression tag	UNP O19707
B	-3	SER	-	expression tag	UNP O19707
B	-2	GLY	-	expression tag	UNP O19707
B	-1	ALA	-	expression tag	UNP O19707
B	0	SER	-	expression tag	UNP O19707
B	193	THR	-	expression tag	UNP O19707
B	194	GLY	-	expression tag	UNP O19707
B	195	GLY	-	expression tag	UNP O19707
B	196	ASP	-	expression tag	UNP O19707
B	197	ASP	-	expression tag	UNP O19707
B	198	ASP	-	expression tag	UNP O19707
B	199	ASP	-	expression tag	UNP O19707
B	200	LYS	-	expression tag	UNP O19707
D	-12	GLY	-	expression tag	UNP O19707
D	-11	GLY	-	expression tag	UNP O19707
D	-10	SER	-	expression tag	UNP O19707
D	-9	ILE	-	expression tag	UNP O19707
D	-8	GLU	-	expression tag	UNP O19707
D	-7	GLY	-	expression tag	UNP O19707
D	-6	ARG	-	expression tag	UNP O19707
D	-5	GLY	-	expression tag	UNP O19707
D	-4	GLY	-	expression tag	UNP O19707
D	-3	SER	-	expression tag	UNP O19707
D	-2	GLY	-	expression tag	UNP O19707
D	-1	ALA	-	expression tag	UNP O19707
D	0	SER	-	expression tag	UNP O19707
D	193	THR	-	expression tag	UNP O19707
D	194	GLY	-	expression tag	UNP O19707
D	195	GLY	-	expression tag	UNP O19707
D	196	ASP	-	expression tag	UNP O19707
D	197	ASP	-	expression tag	UNP O19707
D	198	ASP	-	expression tag	UNP O19707
D	199	ASP	-	expression tag	UNP O19707
D	200	LYS	-	expression tag	UNP O19707

- Molecule 3 is a protein called T-CELL RECEPTOR, L3-12 ALPHA CHAIN.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	E	199	Total 1534	C 954	N 268	O 303	S 9	0	0	0
3	G	198	Total 1524	C 949	N 266	O 300	S 9	0	0	0

- Molecule 4 is a protein called T-CELL RECEPTOR, L3-12 BETA CHAIN.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
4	F	243	Total 1916	C 1206	N 332	O 373	S 5	0	0	0
4	H	242	Total 1907	C 1202	N 332	O 368	S 5	0	0	0

- Molecule 5 is a protein called deamidated DQ8-glia-alpha1 peptide.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
5	I	13	Total 95	C 56	N 16	O 23	0	0	0
5	J	13	Total 95	C 56	N 16	O 23	0	0	0

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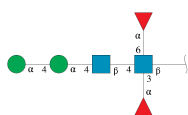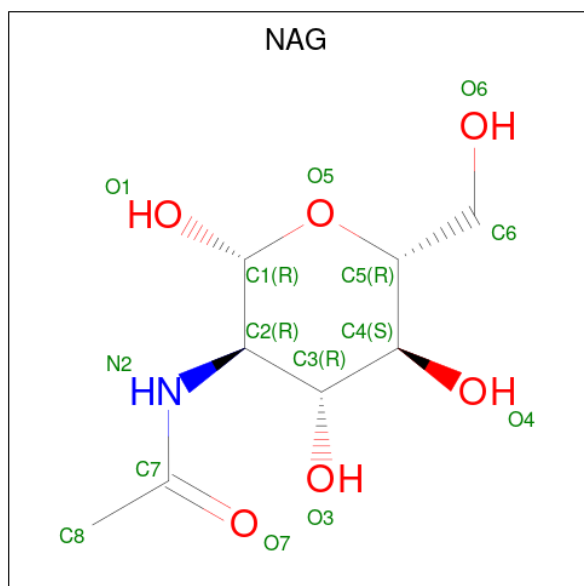

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
6	K	6	Total 70	C 40	N 2	O 28	0	0	0

- Molecule 7 is an oligosaccharide called alpha-L-fucopyranose-(1-3)-[2-acetamido-2-deoxy-be ta-D-glucopyranose-(1-4)][alpha-L-fucopyranose-(1-6)]2-acetamido-2-deoxy-beta-D-glucopyr anose.
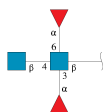
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
7	L	4	Total	C	N	O	0	0	0
			48	28	2	18			

- Molecule 8 is 2-acetamido-2-deoxy-beta-D-glucopyranose (three-letter code: NAG) (formula: $C_8H_{15}NO_6$).

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

- Molecule 9 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
9	A	12	Total	O	0	0
			12	12		
9	B	7	Total	O	0	0
			7	7		
9	C	17	Total	O	0	0
			17	17		
9	D	10	Total	O	0	0
			10	10		
9	E	63	Total	O	0	0
			63	63		
9	F	79	Total	O	0	0
			79	79		

Continued on next page...

Continued from previous page...

| Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
9	G	59	Total 59	O 59	0	0
9	H	84	Total 84	O 84	0	0
9	I	2	Total 2	O 2	0	0
9	J	2	Total 2	O 2	0	0

3 Residue-property plots ⓘ

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red dot above a residue indicates a poor fit to the electron density (RSRZ > 2). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.
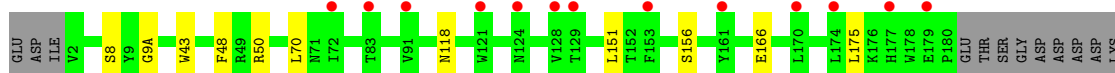
• Molecule 1: MHC class II HLA-DQ-alpha chain
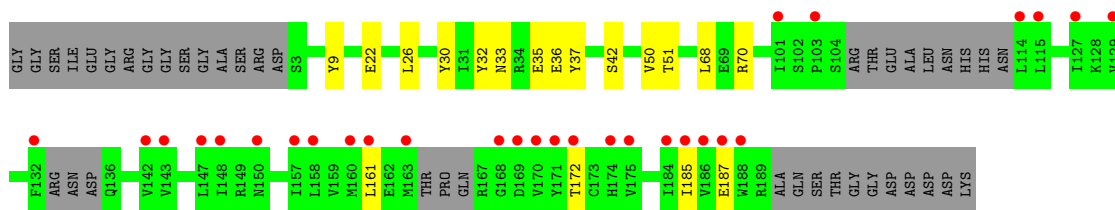
Chain A:
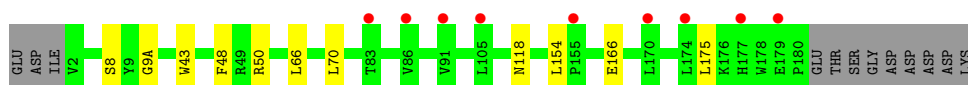
• Molecule 1: MHC class II HLA-DQ-alpha chain

Chain C:

• Molecule 2: MHC class II HLA-DQ-beta-1

Chain B:

• Molecule 2: MHC class II HLA-DQ-beta-1

Chain D:
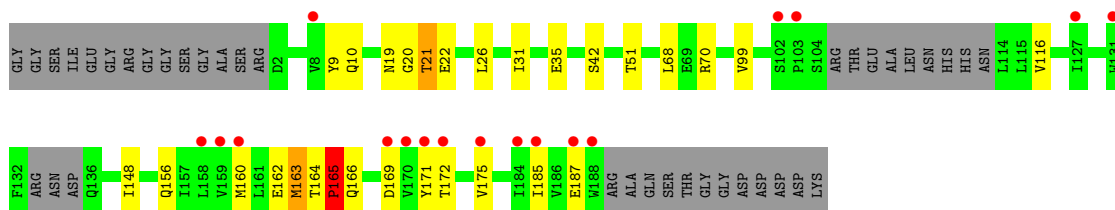
• Molecule 3: T-CELL RECEPTOR, L3-12 ALPHA CHAIN
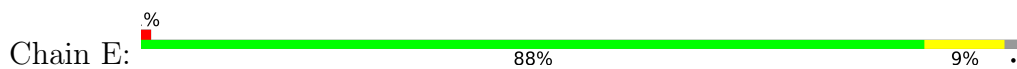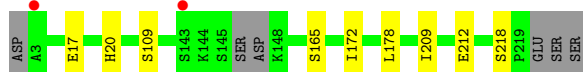
Chain E:

• Molecule 3: T-CELL RECEPTOR, L3-12 ALPHA CHAIN

Chain G:

• Molecule 4: T-CELL RECEPTOR, L3-12 BETA CHAIN

Chain F:

• Molecule 4: T-CELL RECEPTOR, L3-12 BETA CHAIN

Chain H:

• Molecule 5: deamidated DQ8-glia-alpha1 peptide

Chain I:

• Molecule 5: deamidated DQ8-glia-alpha1 peptide

Chain J:

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

Chain K:

• Molecule 7: alpha-L-fucopyranose-(1-3)-[2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)][alpha a-L-fucopyranose-(1-6)]2-acetamido-2-deoxy-beta-D-glucopyranose

Chain L:

4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, α, β, γ	56.51Å 76.96Å 132.28Å 93.87° 89.47° 105.09°	Depositor
Resolution (Å)	74.14 – 2.65 74.14 – 2.65	Depositor EDS
% Data completeness (in resolution range)	98.3 (74.14-2.65) 98.3 (74.14-2.65)	Depositor EDS
R_{merge}	0.06	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	2.69 (at 2.65Å)	Xtriage
Refinement program	BUSTER 2.10.1	Depositor
R, R_{free}	0.187 , 0.226 0.198 , 0.235	Depositor DCC
R_{free} test set	3114 reflections (5.08%)	wwPDB-VP
Wilson B-factor (Å^2)	46.2	Xtriage
Anisotropy	0.181	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.31 , 54.0	EDS
L-test for twinning[2]	$< |L| > = 0.48, < L^2 > = 0.31$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.93	EDS
Total number of atoms	13077	wwPDB-VP
Average B, all atoms (Å^2)	61.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.32% of the height of the origin peak. No significant pseudotranslation is detected.*

---

[1]Intensities estimated from amplitudes.
[2]Theoretical values of $< |L| >$, $< L^2 >$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality ⓘ

5.1 Standard geometry ⓘ

Bond lengths and bond angles in the following residue types are not validated in this section: FUC, 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	0.39	0/1462	0.57	0/2002
1	C	0.40	0/1451	0.57	0/1987
2	B	0.45	0/1371	0.58	0/1878
2	D	0.53	1/1396 (0.1%)	0.62	1/1913 (0.1%)
3	E	0.39	0/1567	0.62	0/2134
3	G	0.39	0/1557	0.61	0/2122
4	F	0.39	0/1967	0.61	0/2681
4	H	0.38	0/1958	0.60	0/2669
5	I	0.30	0/97	0.52	0/130
5	J	0.31	0/97	0.55	0/130
All	All	0.41	1/12923 (0.0%)	0.60	1/17646 (0.0%)

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	D	165	PRO	N-CD	5.26	1.55	1.47

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	D	164	THR	C-N-CD	5.71	140.39	128.40

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	1418	0	1311	5	0
1	C	1408	0	1297	5	0
2	B	1338	0	1228	13	0
2	D	1361	0	1243	22	0
3	E	1534	0	1434	9	0
3	G	1524	0	1426	4	0
4	F	1916	0	1795	4	0
4	H	1907	0	1787	6	0
5	I	95	0	80	0	0
5	J	95	0	80	1	0
6	K	70	0	61	0	0
7	L	48	0	43	9	0
8	A	14	0	13	0	0
8	C	14	0	13	0	0
9	A	12	0	0	0	0
9	B	7	0	0	0	0
9	C	17	0	0	0	0
9	D	10	0	0	0	0
9	E	63	0	0	1	0
9	F	79	0	0	0	0
9	G	59	0	0	0	0
9	H	84	0	0	0	0
9	I	2	0	0	0	0
9	J	2	0	0	0	0
All	All	13077	0	11811	64	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 3.

The worst 5 of 64 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:B:35:GLU:OE1	2:B:51:THR:HG21	1.43	1.14
2:D:166:GLN:O	2:D:169:ASP:OD1	1.85	0.95
2:D:35:GLU:OE2	2:D:51:THR:OG1	1.89	0.88
7:L:1:NAG:O4	7:L:3:NAG:O7	1.96	0.84
2:D:19:ASN:O	7:L:4:FUC:O4	1.96	0.82

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	178/192 (93%)	173 (97%)	5 (3%)	0	100	100
1	C	178/192 (93%)	173 (97%)	5 (3%)	0	100	100
2	B	164/213 (77%)	156 (95%)	8 (5%)	0	100	100
2	D	169/213 (79%)	160 (95%)	9 (5%)	0	100	100
3	E	197/204 (97%)	189 (96%)	5 (2%)	3 (2%)	10	15
3	G	194/204 (95%)	185 (95%)	9 (5%)	0	100	100
4	F	241/244 (99%)	234 (97%)	7 (3%)	0	100	100
4	H	240/244 (98%)	234 (98%)	6 (2%)	0	100	100
5	I	11/18 (61%)	11 (100%)	0	0	100	100
5	J	11/18 (61%)	11 (100%)	0	0	100	100
All	All	1583/1742 (91%)	1526 (96%)	54 (3%)	3 (0%)	47	64

All (3) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
3	E	64	SER
3	E	145	SER
3	E	209	ILE

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	154/176 (88%)	151 (98%)	3 (2%)	57	74
1	C	152/176 (86%)	149 (98%)	3 (2%)	55	73
2	B	138/189 (73%)	134 (97%)	4 (3%)	42	60
2	D	139/189 (74%)	134 (96%)	5 (4%)	35	51
3	E	168/185 (91%)	164 (98%)	4 (2%)	49	67
3	G	168/185 (91%)	164 (98%)	4 (2%)	49	67
4	F	205/211 (97%)	200 (98%)	5 (2%)	49	67
4	H	203/211 (96%)	198 (98%)	5 (2%)	47	66
5	I	11/14 (79%)	11 (100%)	0	100	100
5	J	11/14 (79%)	11 (100%)	0	100	100
All	All	1349/1550 (87%)	1316 (98%)	33 (2%)	49	67

5 of 33 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
4	H	13	THR
4	H	66	ARG
4	H	232	GLU
2	D	163	MET
2	D	68	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (3) such sidechains are listed below:

Mol	Chain	Res	Type
3	E	203	ASN
4	F	55	GLN
3	G	67	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 (i)

10 monosaccharides are modelled in this entry.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	#$|Z| > 2$	Counts	RMSZ	#$|Z| > 2$
6	NAG	K	1	2,6	14,14,15	0.30	0	17,19,21	0.80	1 (5%)
6	NAG	K	2	6	14,14,15	0.32	0	17,19,21	0.92	1 (5%)
6	MAN	K	3	6	11,11,12	0.38	0	15,15,17	1.35	1 (6%)
6	MAN	K	4	6	11,11,12	0.34	0	15,15,17	0.98	1 (6%)
6	FUC	K	5	6	10,10,11	0.42	0	14,14,16	0.87	1 (7%)
6	FUC	K	6	6	10,10,11	0.51	0	14,14,16	1.29	1 (7%)
7	NAG	L	1	7,2	14,14,15	1.12	1 (7%)	17,19,21	1.88	4 (23%)
7	FUC	L	2	7	10,10,11	0.41	0	14,14,16	0.76	0
7	NAG	L	3	7	14,14,15	0.75	0	17,19,21	1.56	2 (11%)
7	FUC	L	4	7	10,10,11	0.39	0	14,14,16	2.35	6 (42%)

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
6	NAG	K	1	2,6	-	2/6/23/26	0/1/1/1
6	NAG	K	2	6	-	2/6/23/26	0/1/1/1
6	MAN	K	3	6	-	0/2/19/22	1/1/1/1
6	MAN	K	4	6	-	0/2/19/22	1/1/1/1
6	FUC	K	5	6	-	-	0/1/1/1
6	FUC	K	6	6	-	-	0/1/1/1
7	NAG	L	1	7,2	-	2/6/23/26	0/1/1/1
7	FUC	L	2	7	-	-	0/1/1/1
7	NAG	L	3	7	-	4/6/23/26	0/1/1/1
7	FUC	L	4	7	-	-	0/1/1/1

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
7	L	1	NAG	C1-C2	3.25	1.57	1.52

The worst 5 of 18 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
7	L	1	NAG	C1-O5-C5	5.21	119.25	112.19
7	L	3	NAG	C2-N2-C7	-5.08	115.67	122.90
6	K	3	MAN	C1-O5-C5	4.64	118.47	112.19
7	L	4	FUC	C1-C2-C3	4.54	115.24	109.67
7	L	4	FUC	O5-C1-C2	-4.53	103.77	110.77

There are no chirality outliers.

5 of 10 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
7	L	3	NAG	C8-C7-N2-C2
7	L	3	NAG	O7-C7-N2-C2
6	K	1	NAG	C4-C5-C6-O6
6	K	1	NAG	O5-C5-C6-O6
7	L	3	NAG	O5-C5-C6-O6

All (2) ring outliers are listed below:

Mol	Chain	Res	Type	Atoms
6	K	4	MAN	C1-C2-C3-C4-C5-O5
6	K	3	MAN	C1-C2-C3-C4-C5-O5

4 monomers are involved in 9 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
7	L	1	NAG	1	0
7	L	2	FUC	3	0
7	L	4	FUC	5	0
7	L	3	NAG	4	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.

Oligosaccharide Chain K

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain L

Bond lengths / Bond angles / Torsions / Rings
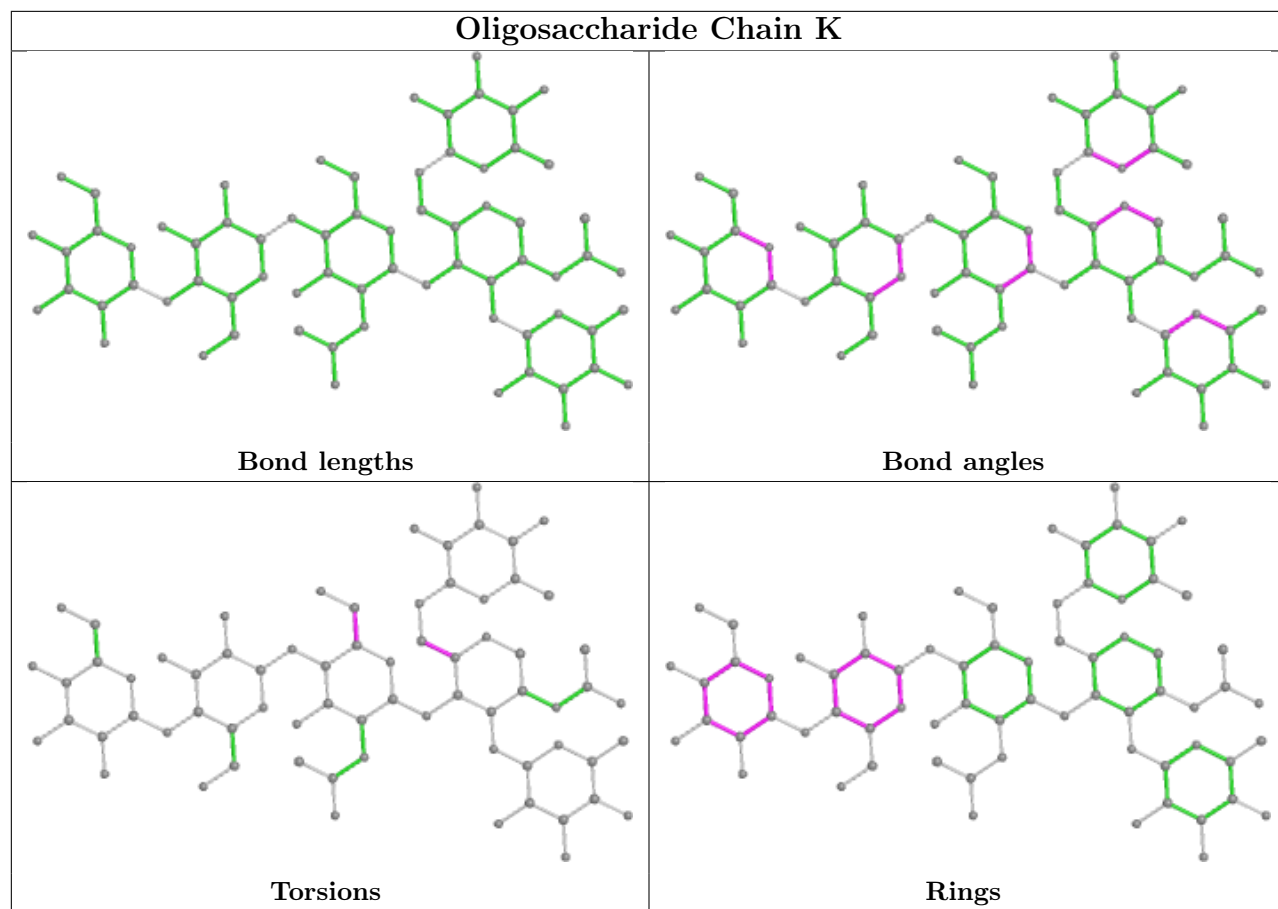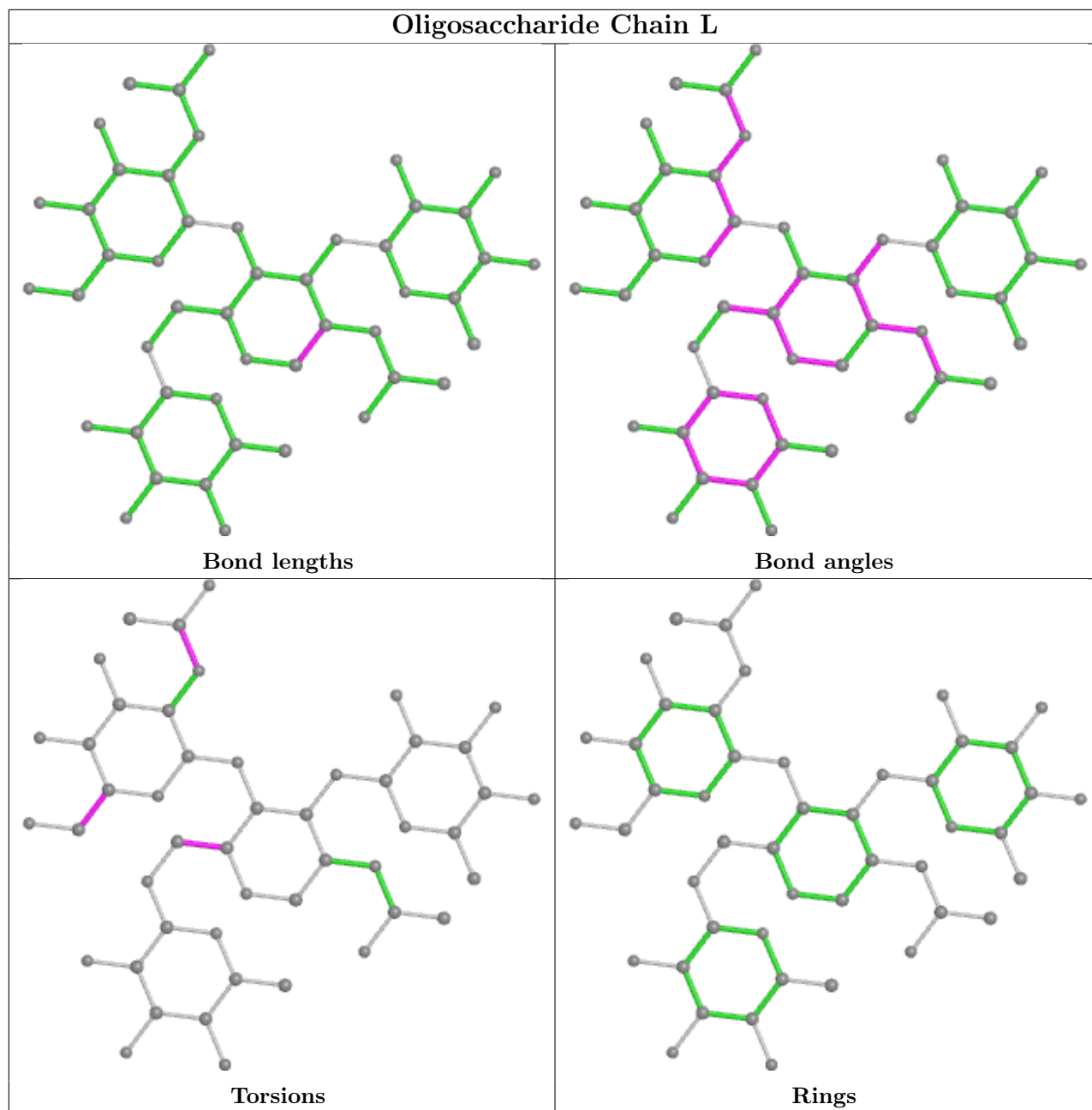
5.6 Ligand geometry (i)

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
8	NAG	A	1000	1	14,14,15	0.28	0	17,19,21	0.81	1 (5%)
8	NAG	C	1000	1	14,14,15	0.29	0	17,19,21	0.72	1 (5%)

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
8	NAG	A	1000	1	-	1/6/23/26	0/1/1/1
8	NAG	C	1000	1	-	0/6/23/26	0/1/1/1

There are no bond length outliers.

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
8	A	1000	NAG	C1-O5-C5	2.70	115.86	112.19
8	C	1000	NAG	C1-O5-C5	2.35	115.37	112.19

There are no chirality outliers.

All (1) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
8	A	1000	NAG	O5-C5-C6-O6

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(Å²)	Q<0.9
1	A	180/192 (93%)	0.41	9 (5%)	28	25	36, 79, 113, 127	0
1	C	180/192 (93%)	0.40	13 (7%)	15	12	40, 79, 118, 138	0
2	B	172/213 (80%)	0.76	29 (16%)	1	1	42, 82, 148, 164	0
2	D	175/213 (82%)	0.48	17 (9%)	7	6	41, 76, 148, 176	0
3	E	199/204 (97%)	-0.09	2 (1%)	82	81	26, 44, 85, 100	0
3	G	198/204 (97%)	-0.15	2 (1%)	82	81	28, 44, 80, 99	0
4	F	243/244 (99%)	-0.23	0	100	100	27, 41, 65, 80	0
4	H	242/244 (99%)	-0.20	0	100	100	29, 42, 61, 83	0
5	I	13/18 (72%)	-0.06	0	100	100	40, 45, 70, 73	0
5	J	13/18 (72%)	-0.08	0	100	100	44, 48, 76, 85	0
All	All	1615/1742 (92%)	0.13	72 (4%)	33	30	26, 54, 115, 176	0

The worst 5 of 72 RSRZ outliers are listed below:

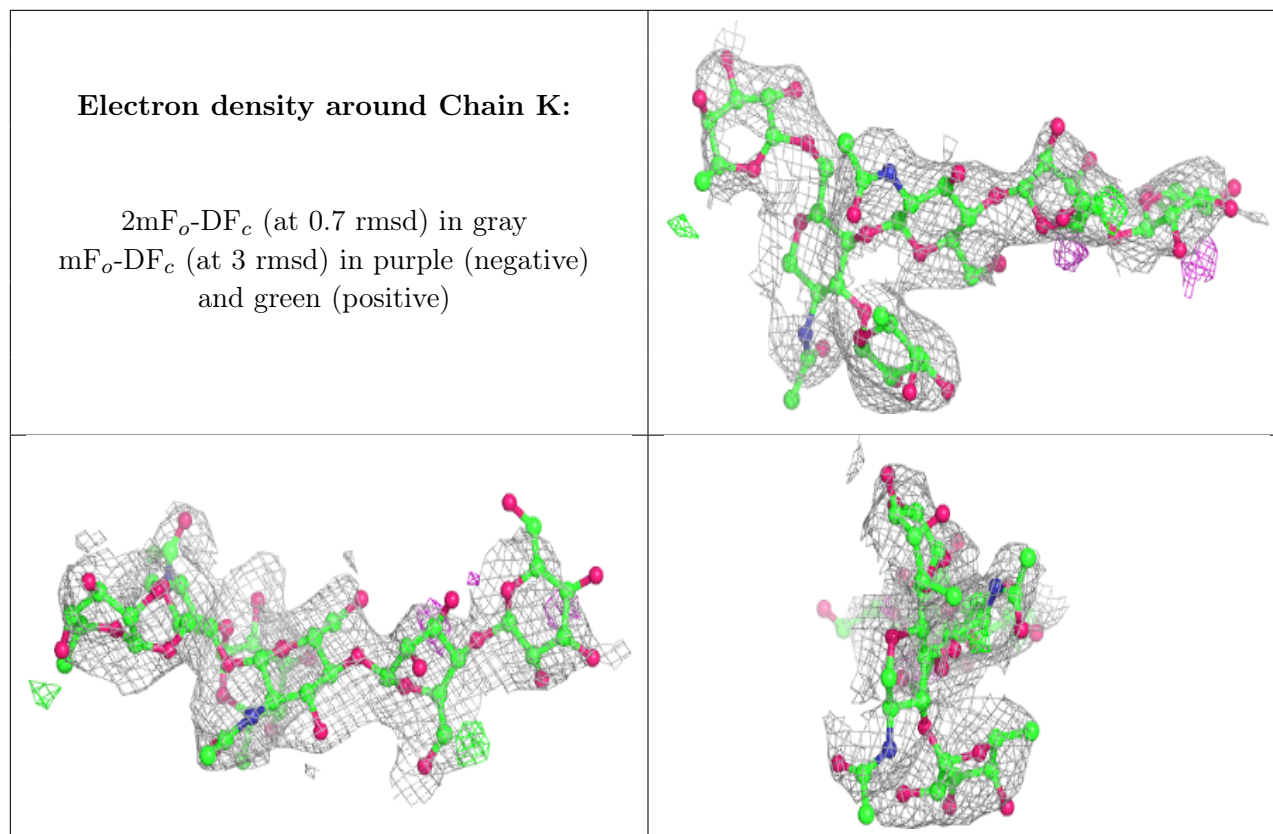| Mol	Chain	Res	Type	RSRZ
2	B	184	ILE	5.2
2	B	188	TRP	5.2
1	C	174	LEU	5.2
2	D	185	ILE	5.2
2	B	170	VAL	5.1

6.2 Non-standard residues in protein, DNA, RNA chains ⓘ

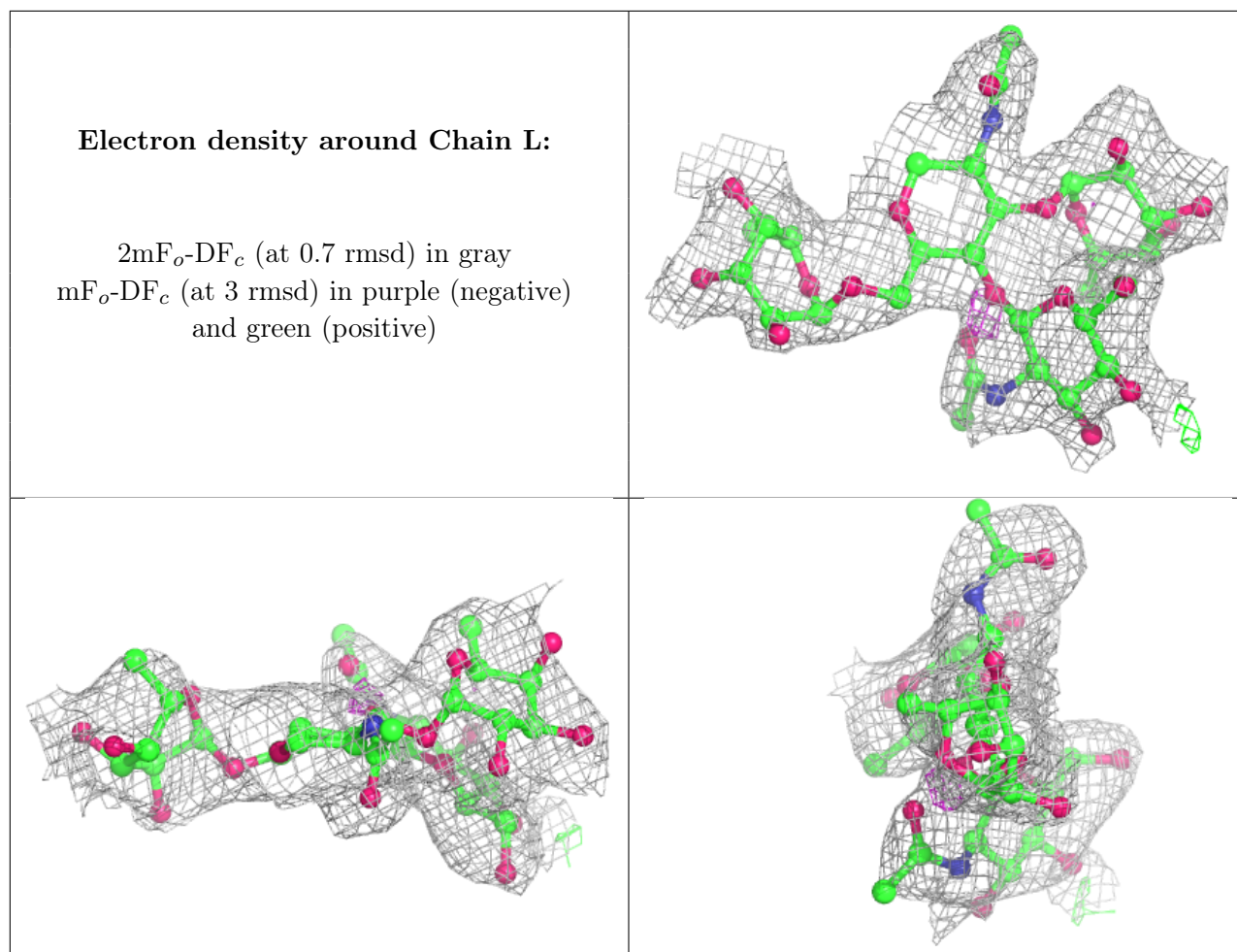There are no non-standard protein/DNA/RNA residues in this entry.

6.3 Carbohydrates (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
6	MAN	K	4	11/12	0.71	0.37	145,150,157,159	0
6	MAN	K	3	11/12	0.78	0.26	141,144,149,149	0
7	FUC	L	2	10/11	0.82	0.22	107,110,115,115	0
6	FUC	K	6	10/11	0.84	0.21	120,124,127,128	0
7	NAG	L	1	14/15	0.87	0.18	95,100,105,110	0
7	NAG	L	3	14/15	0.87	0.20	114,117,123,124	0
6	NAG	K	1	14/15	0.88	0.13	114,117,124,125	0
6	FUC	K	5	10/11	0.89	0.16	127,131,136,137	0
7	FUC	L	4	10/11	0.89	0.18	99,102,104,106	0
6	NAG	K	2	14/15	0.90	0.16	124,131,137,138	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 K:

$2mF_o$-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 L:

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

6.4 Ligands ⓘ

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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
8	NAG	A	1000	14/15	0.82	0.23	113,117,123,123	0
8	NAG	C	1000	14/15	0.88	0.18	114,118,122,122	0

6.5 Other polymers ⓘ

There are no such residues in this entry.