W O R L D W I D E
wwPDB
P R O T E I N   D A T A   B A N K

wwPDB X-ray Structure Validation Summary Report ⓘ

Oct 31, 2023 – 08:05 AM EDT

PDB ID : 3RUG
Title : Crystal structure of Valpha10-Vbeta8.1 NKT TCR in complex with CD1d-al
phaglucosylceramide (C20:2)
Authors : Patel, O.; Rossjohn, J.
Deposited on : 2011-05-05
Resolution : 2.20 Å(reported)

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
buster-report	:	1.1.7 (2018)
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 2.20 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.
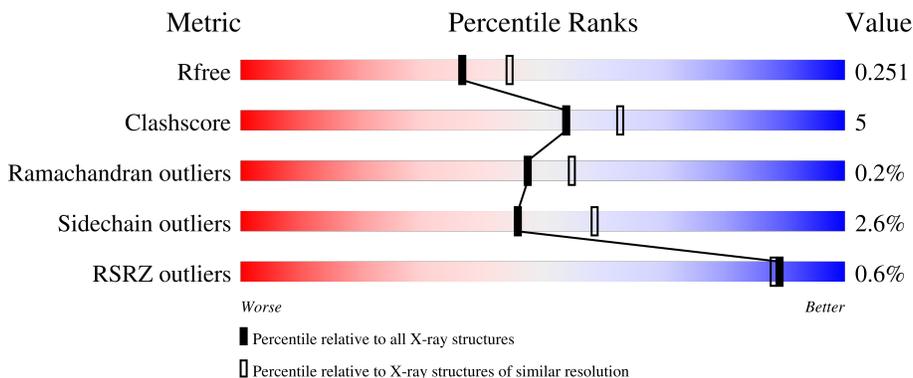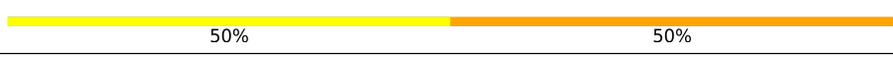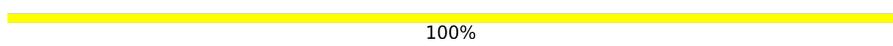

Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	4898 (2.20-2.20)
Clashscore	141614	5594 (2.20-2.20)
Ramachandran outliers	138981	5503 (2.20-2.20)
Sidechain outliers	138945	5504 (2.20-2.20)
RSRZ outliers	127900	4800 (2.20-2.20)

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	302	82% 12% · 5%
1	C	302	82% 11% · 6%
2	B	99	86% 12% ··
2	D	99	85% 12% ··
3	E	204	88% 9% ·

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Mol	Chain	Length	Quality of chain
3	G	204	89% 8%
4	F	241	87% 10%
4	H	241	84% 13%
5	I	2	50% 50%
5	J	2	100%

2 Entry composition ⓘ

There are 8 unique types of molecules in this entry. The entry contains 13311 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 Antigen-presenting glycoprotein CD1d1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	286	Total	C	N	O	S	0	0	0
			2267	1450	390	413	14			
1	C	285	Total	C	N	O	S	0	0	0
			2250	1441	387	408	14			

There are 48 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	201	HIS	ASP	conflict	UNP P11609
A	280	GLY	-	expression tag	UNP P11609
A	281	SER	-	expression tag	UNP P11609
A	282	LEU	-	expression tag	UNP P11609
A	283	HIS	-	expression tag	UNP P11609
A	284	HIS	-	expression tag	UNP P11609
A	285	ILE	-	expression tag	UNP P11609
A	286	LEU	-	expression tag	UNP P11609
A	287	ASP	-	expression tag	UNP P11609
A	288	ALA	-	expression tag	UNP P11609
A	289	GLN	-	expression tag	UNP P11609
A	290	LYS	-	expression tag	UNP P11609
A	291	MET	-	expression tag	UNP P11609
A	292	VAL	-	expression tag	UNP P11609
A	293	TRP	-	expression tag	UNP P11609
A	294	ASN	-	expression tag	UNP P11609
A	295	HIS	-	expression tag	UNP P11609
A	296	ARG	-	expression tag	UNP P11609
A	297	HIS	-	expression tag	UNP P11609
A	298	HIS	-	expression tag	UNP P11609
A	299	HIS	-	expression tag	UNP P11609
A	300	HIS	-	expression tag	UNP P11609
A	301	HIS	-	expression tag	UNP P11609
A	302	HIS	-	expression tag	UNP P11609
C	201	HIS	ASP	conflict	UNP P11609

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Chain	Residue	Modelled	Actual	Comment	Reference
C	280	GLY	-	expression tag	UNP P11609
C	281	SER	-	expression tag	UNP P11609
C	282	LEU	-	expression tag	UNP P11609
C	283	HIS	-	expression tag	UNP P11609
C	284	HIS	-	expression tag	UNP P11609
C	285	ILE	-	expression tag	UNP P11609
C	286	LEU	-	expression tag	UNP P11609
C	287	ASP	-	expression tag	UNP P11609
C	288	ALA	-	expression tag	UNP P11609
C	289	GLN	-	expression tag	UNP P11609
C	290	LYS	-	expression tag	UNP P11609
C	291	MET	-	expression tag	UNP P11609
C	292	VAL	-	expression tag	UNP P11609
C	293	TRP	-	expression tag	UNP P11609
C	294	ASN	-	expression tag	UNP P11609
C	295	HIS	-	expression tag	UNP P11609
C	296	ARG	-	expression tag	UNP P11609
C	297	HIS	-	expression tag	UNP P11609
C	298	HIS	-	expression tag	UNP P11609
C	299	HIS	-	expression tag	UNP P11609
C	300	HIS	-	expression tag	UNP P11609
C	301	HIS	-	expression tag	UNP P11609
C	302	HIS	-	expression tag	UNP P11609

- Molecule 2 is a protein called Beta-2-microglobulin.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	98	Total 785	C 501	N 133	O 144	S 7	0	0	0
2	D	98	Total 794	C 508	N 133	O 146	S 7	0	0	0

- Molecule 3 is a protein called Valpha10(mouse variable domain, human constant domain).

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	E	198	Total 1474	C 917	N 240	O 309	S 8	0	0	0
3	G	198	Total 1466	C 910	N 236	O 312	S 8	0	0	0

- Molecule 4 is a protein called Vbeta8.1(mouse variable domain, human constant domain).

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
4	F	236	Total 1850	C 1174	N 319	O 351	S 6	0	0	0
4	H	236	Total 1850	C 1174	N 322	O 348	S 6	0	0	0

- Molecule 5 is an oligosaccharide called 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.
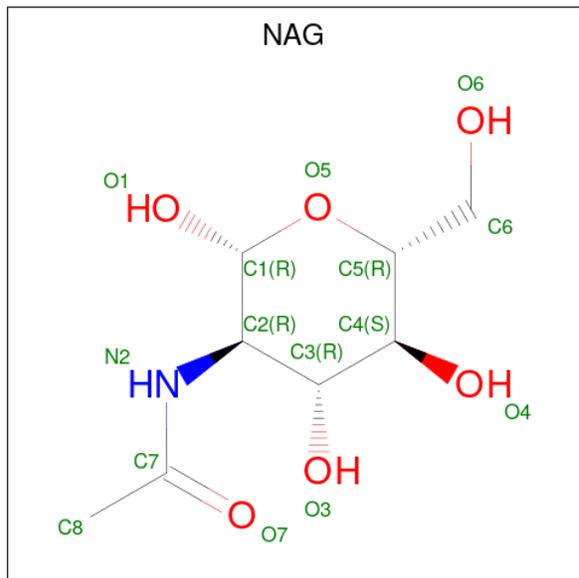

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
5	I	2	Total 28	C 16	N 2	O 10	0	0	0
5	J	2	Total 28	C 16	N 2	O 10	0	0	0

- Molecule 6 is (11E,14E)-N-[(2S,3S,4R)-1-(alpha-D-glucopyranosyloxy)-3,4-dihydroxyoctadecan-2-yl]icosa-11,14-dienamide (three-letter code: DB6) (formula: $C_{44}H_{83}NO_9$).

DB6
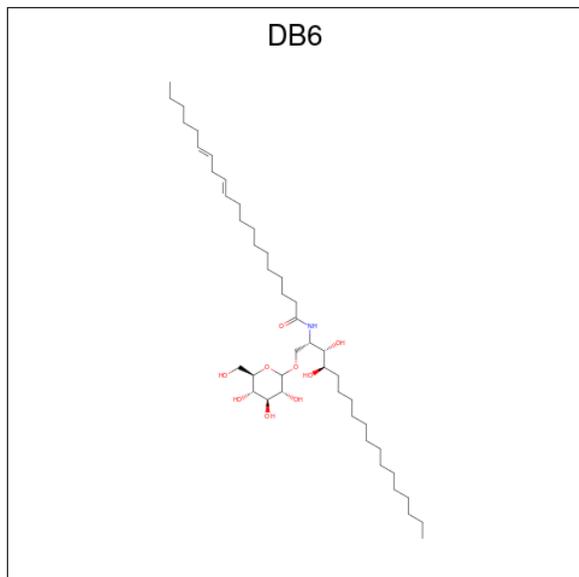
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
6	A	1	Total 54	C 44	N 1	O 9	0	0
6	C	1	Total 54	C 44	N 1	O 9	0	0

- Molecule 7 is 2-acetamido-2-deoxy-beta-D-glucopyranose (three-letter code: NAG) (formula: $C_8H_{15}NO_6$).

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

- Molecule 8 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
8	A	60	Total	O	0	0
			60	60		
8	B	19	Total	O	0	0
			19	19		
8	C	49	Total	O	0	0
			49	49		
8	D	25	Total	O	0	0
			25	25		
8	E	33	Total	O	0	0
			33	33		
8	F	60	Total	O	0	0
			60	60		

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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
8	G	47	Total O 47 47	0	0
8	H	62	Total O 62 62	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.
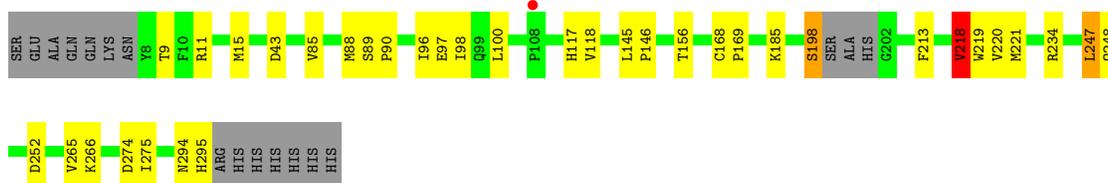
• Molecule 1: Antigen-presenting glycoprotein CD1d1

Chain A:

• Molecule 1: Antigen-presenting glycoprotein CD1d1

Chain C:

• Molecule 2: Beta-2-microglobulin

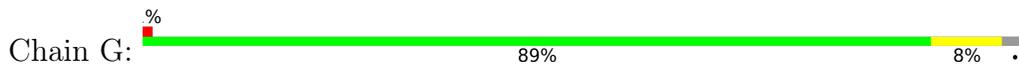Chain B:

• Molecule 2: Beta-2-microglobulin

Chain D:

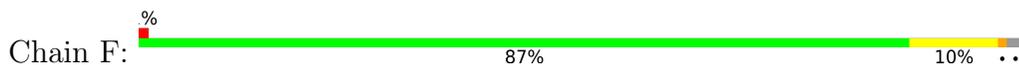• Molecule 3: Valpha10(mouse variable domain, human constant domain)

Chain E:

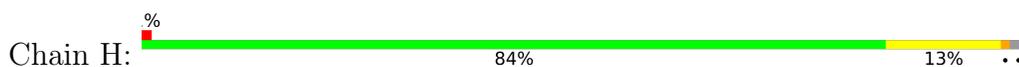GLY GLN Q3 M32 S56 L72 S87 I91 S92 V127 P128 P133 L140 K448 S149 V150 D157 S158 Q159 V177 R181 S189 N207 S218 PRO GLU SER SER

• Molecule 3: Valpha10(mouse variable domain, human constant domain)

%

Chain G:
89%   8%

GLY GLN Q3 M32 R63 L72 S87 I91 A105 L116 V127 D134 Q139 V150 S158 T173 D174 K175 L178 R181 D198 S218 PRO GLU SER SER

• Molecule 4: Vbeta8.1(mouse variable domain, human constant domain)

%

Chain F:
87%   10%

GLU ALA A3 H29 D30 Y31 R43 Q44 D45 T46 G47 H48 G49 L50 I53 S56 C104 A105 S106 G109 N132 P135 T161 G162 E169 L170 Q188 P189 L196 ASN ASP S199 R200 R206 P243 A256 ASP

• Molecule 4: Vbeta8.1(mouse variable domain, human constant domain)

%

Chain H:
84%   13%

GLU ALA A3 S10 N27 N28 H29 D30 Y31 R43 Q44 D45 T46 G47 H48 G49 L50 I53 S56 Y57 T62 S106 R107 R123 D129 L130 K131 S144 H150 L159 D166 K177 D186 P187 Q188 A195 L196 ASN ASP S199 S204 S205 R206

R218 N219 H220 Y228 E251 A252 W253 A256 ASP

• Molecule 5: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-gluc opyranose

Chain I:
50%   50%

NAG1 NAG2

• Molecule 5: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-gluc opyranose

Chain J:
100%

NAG1 NAG2

4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants $a, b, c, \alpha, \beta, \gamma$	81.14Å 118.83Å 108.12Å 90.00° 110.24° 90.00°	Depositor
Resolution (Å)	50.00 – 2.20 48.22 – 2.20	Depositor EDS
% Data completeness (in resolution range)	99.7 (50.00-2.20) 99.6 (48.22-2.20)	Depositor EDS
R_{merge}	0.15	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	2.41 (at 2.20Å)	Xtriage
Refinement program	REFMAC 5.5.0102	Depositor
R, R_{free}	0.210 , 0.254 0.208 , 0.251	Depositor DCC
R_{free} test set	4866 reflections (5.01%)	wwPDB-VP
Wilson B-factor (Å^2)	25.7	Xtriage
Anisotropy	0.255	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.36 , 41.9	EDS
L-test for twinning [2]	$< |L| > = 0.49, < L^2 > = 0.32$	Xtriage
Estimated twinning fraction	0.019 for h,-k,-h-l	Xtriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	13311	wwPDB-VP
Average B, all atoms (Å^2)	23.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 35.02 % of the origin peak, indicating pseudo-translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo-translational symmetry is equal to 6.2311e-04. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

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[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 (i)

5.1   Standard geometry (i)

Bond lengths and bond angles in the following residue types are not validated in this section: DB6, 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	0.58	0/2335	0.70	1/3179 (0.0%)
1	C	0.63	0/2318	0.72	1/3157 (0.0%)
2	B	0.59	0/811	0.69	0/1107
2	D	0.70	0/820	0.70	0/1117
3	E	0.61	0/1504	0.66	0/2048
3	G	0.60	0/1496	0.69	0/2041
4	F	0.67	1/1902 (0.1%)	0.73	0/2594
4	H	0.66	0/1902	0.71	1/2593 (0.0%)
All	All	0.63	1/13088 (0.0%)	0.70	3/17836 (0.0%)

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	F	169	GLU	CG-CD	5.04	1.59	1.51

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	C	218	VAL	CB-CA-C	-6.67	98.72	111.40
4	H	159	LEU	CA-CB-CG	5.30	127.50	115.30
1	A	175	LEU	CA-CB-CG	5.29	127.47	115.30

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	2267	0	2140	28	0
1	C	2250	0	2126	27	0
2	B	785	0	731	6	0
2	D	794	0	745	10	0
3	E	1474	0	1360	11	0
3	G	1466	0	1333	10	0
4	F	1850	0	1735	17	0
4	H	1850	0	1743	34	0
5	I	28	0	25	1	0
5	J	28	0	25	0	0
6	A	54	0	83	3	0
6	C	54	0	83	3	0
7	A	28	0	26	0	0
7	C	28	0	26	0	0
8	A	60	0	0	2	0
8	B	19	0	0	0	0
8	C	49	0	0	1	0
8	D	25	0	0	2	0
8	E	33	0	0	1	0
8	F	60	0	0	2	0
8	G	47	0	0	0	0
8	H	62	0	0	8	0
All	All	13311	0	12181	134	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 5.

The worst 5 of 134 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)
4:H:47:GLY:HA3	4:H:48:HIS:CD2	1.96	1.01
4:H:45:ASP:O	4:H:47:GLY:HA2	1.66	0.95
4:H:46:THR:HA	4:H:48:HIS:NE2	1.82	0.93
4:H:150:HIS:NE2	8:H:340:HOH:O	1.94	0.91
1:A:62:GLN:OE1	8:A:352:HOH:O	1.97	0.83

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	282/302 (93%)	275 (98%)	6 (2%)	1 (0%)	34	37
1	C	281/302 (93%)	277 (99%)	4 (1%)	0	100	100
2	B	96/99 (97%)	92 (96%)	2 (2%)	2 (2%)	7	4
2	D	96/99 (97%)	92 (96%)	4 (4%)	0	100	100
3	E	196/204 (96%)	192 (98%)	4 (2%)	0	100	100
3	G	196/204 (96%)	192 (98%)	4 (2%)	0	100	100
4	F	232/241 (96%)	222 (96%)	10 (4%)	0	100	100
4	H	232/241 (96%)	224 (97%)	8 (3%)	0	100	100
All	All	1611/1692 (95%)	1566 (97%)	42 (3%)	3 (0%)	47	55

All (3) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	B	97	ARG
2	B	47	PRO
1	A	90	PRO

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	240/264 (91%)	232 (97%)	8 (3%)	38	49
1	C	238/264 (90%)	232 (98%)	6 (2%)	47	60

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
2	B	86/93 (92%)	81 (94%)	5 (6%)	20	23
2	D	87/93 (94%)	85 (98%)	2 (2%)	50	63
3	E	166/182 (91%)	162 (98%)	4 (2%)	49	62
3	G	165/182 (91%)	160 (97%)	5 (3%)	41	53
4	F	195/207 (94%)	193 (99%)	2 (1%)	76	86
4	H	195/207 (94%)	191 (98%)	4 (2%)	53	67
All	All	1372/1492 (92%)	1336 (97%)	36 (3%)	46	58

5 of 36 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
3	G	175	LYS
4	H	206	ARG
3	G	181	ARG
4	H	43	ARG
2	B	99	MET

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 19 such sidechains are listed below:

Mol	Chain	Res	Type
4	H	27	ASN
4	H	220	HIS
4	H	246	GLN
4	H	167	HIS
2	D	31	HIS

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 ⓘ

4 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	$\#|Z| > 2$
5	NAG	I	1	5,1	14,14,15	0.53	0	17,19,21	1.40	3 (17%)
5	NAG	I	2	5	14,14,15	0.59	0	17,19,21	1.76	2 (11%)
5	NAG	J	1	5,1	14,14,15	0.57	0	17,19,21	1.57	2 (11%)
5	NAG	J	2	5	14,14,15	0.54	0	17,19,21	1.98	6 (35%)

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	I	1	5,1	-	0/6/23/26	0/1/1/1
5	NAG	I	2	5	-	0/6/23/26	0/1/1/1
5	NAG	J	1	5,1	-	0/6/23/26	0/1/1/1
5	NAG	J	2	5	-	2/6/23/26	0/1/1/1

There are no bond length outliers.

The worst 5 of 13 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
5	I	2	NAG	C1-O5-C5	6.07	120.41	112.19
5	J	1	NAG	C1-O5-C5	4.62	118.45	112.19
5	J	2	NAG	C4-C3-C2	-3.82	105.42	111.02
5	J	2	NAG	C3-C4-C5	-3.63	103.77	110.24
5	J	2	NAG	C1-O5-C5	3.39	116.79	112.19

There are no chirality outliers.

All (2) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
5	J	2	NAG	O5-C5-C6-O6
5	J	2	NAG	C4-C5-C6-O6

There are no ring outliers.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	I	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.

Oligosaccharide Chain I

Bond lengths

Bond angles

Torsions

Rings

Oligosaccharide Chain J

Bond lengths | Bond angles | Torsions | Rings
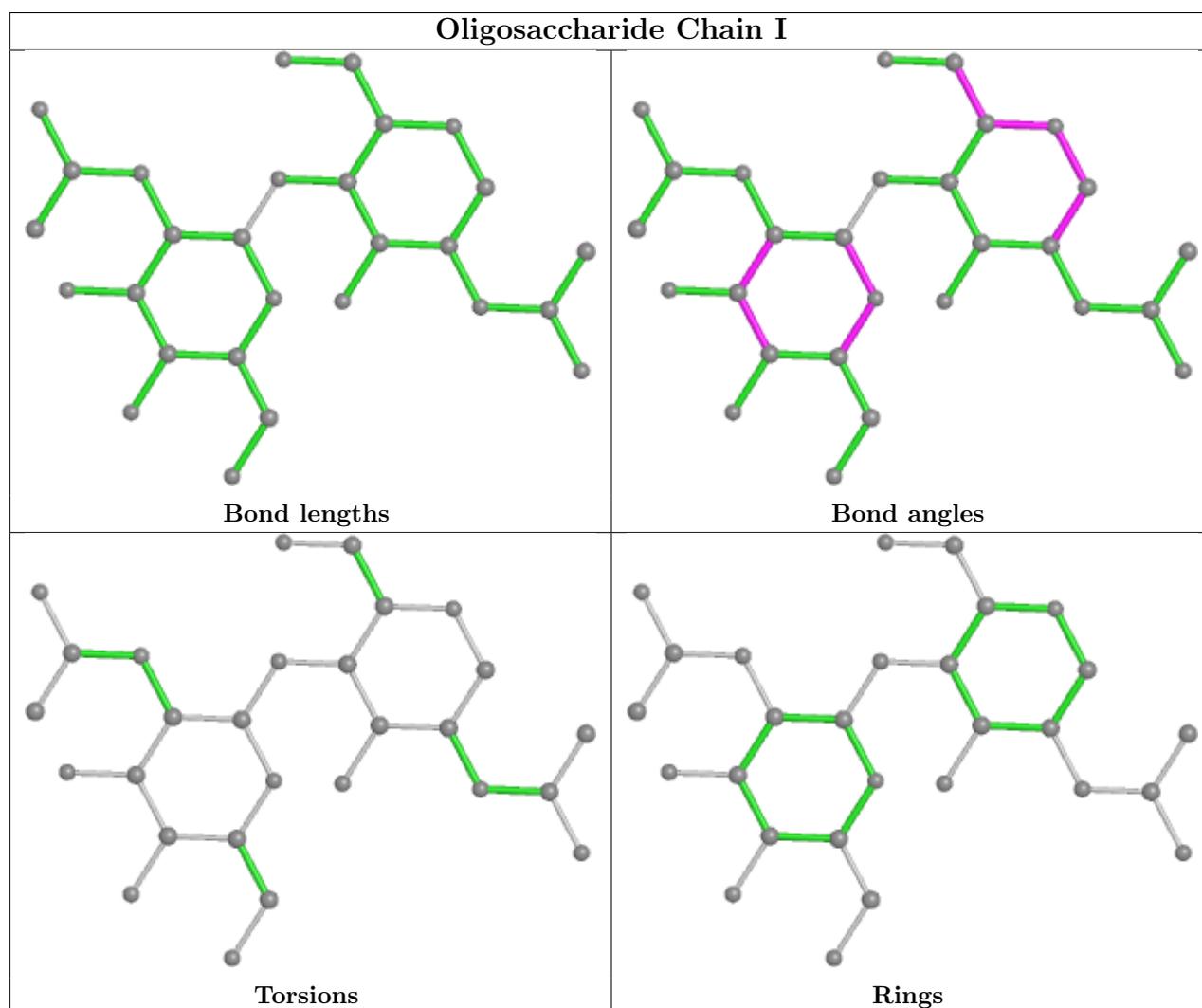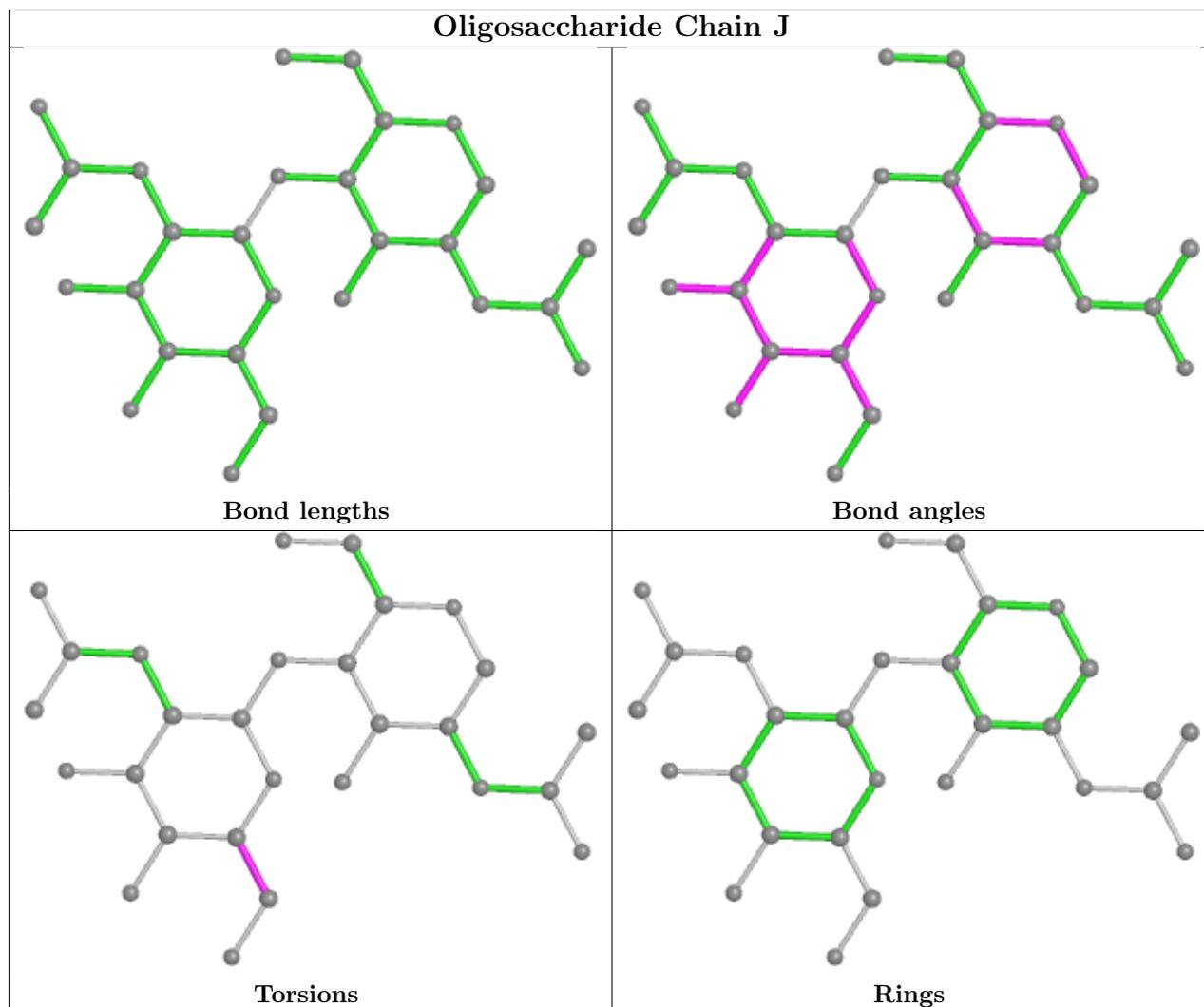
5.6　Ligand geometry　ⓘ

6 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	$\#|Z| > 2$
7	NAG	C	304	1	14,14,15	0.73	0	17,19,21	1.75	2 (11%)
7	NAG	A	304	1	14,14,15	0.61	0	17,19,21	2.42	2 (11%)
7	NAG	A	307	1	14,14,15	0.43	0	17,19,21	1.32	1 (5%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	#|Z| > 2	Counts	RMSZ	#|Z| > 2
6	DB6	C	303	-	54,54,54	0.48	0	59,63,63	1.01	4 (6%)
6	DB6	A	303	-	54,54,54	0.55	1 (1%)	59,63,63	0.97	4 (6%)
7	NAG	C	307	1	14,14,15	0.56	0	17,19,21	1.12	2 (11%)

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
7	NAG	C	304	1	-	2/6/23/26	0/1/1/1
7	NAG	A	304	1	-	2/6/23/26	0/1/1/1
7	NAG	A	307	1	-	0/6/23/26	0/1/1/1
6	DB6	C	303	-	-	8/52/72/72	0/1/1/1
6	DB6	A	303	-	-	11/52/72/72	0/1/1/1
7	NAG	C	307	1	-	0/6/23/26	0/1/1/1

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
6	A	303	DB6	O1A-C1A	2.02	1.43	1.40

The worst 5 of 15 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
7	A	304	NAG	C1-O5-C5	8.44	123.62	112.19
7	C	304	NAG	C1-O5-C5	4.84	118.75	112.19
7	A	307	NAG	C1-O5-C5	4.16	117.83	112.19
7	C	304	NAG	C4-C3-C2	3.67	116.39	111.02
6	C	303	DB6	O6A-C5M-C4A	3.01	115.16	109.69

There are no chirality outliers.

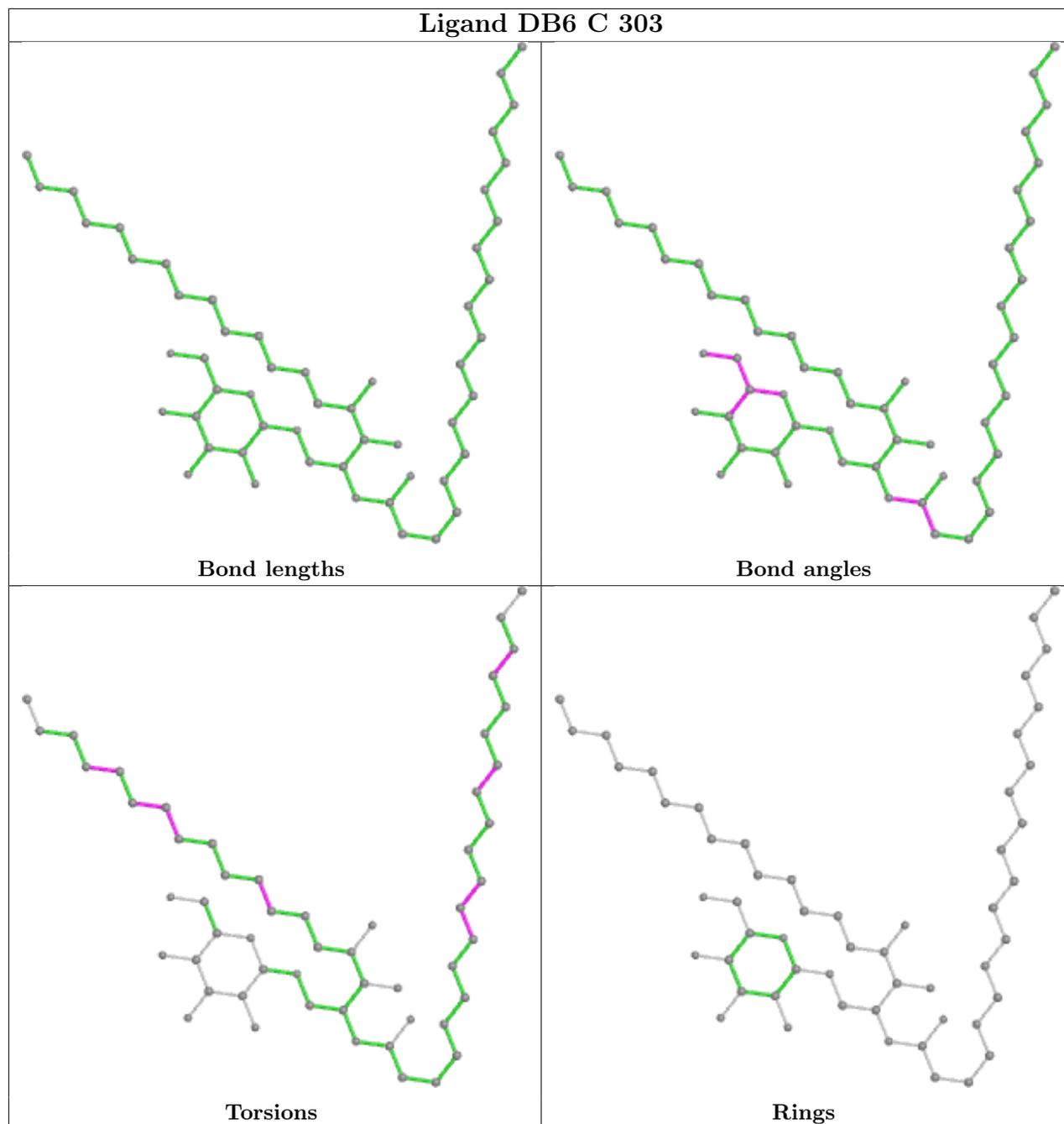5 of 23 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
6	A	303	DB6	CAK-CAL-CAM-CAN
7	C	304	NAG	C4-C5-C6-O6
7	C	304	NAG	O5-C5-C6-O6
7	A	304	NAG	O5-C5-C6-O6
7	A	304	NAG	C4-C5-C6-O6

There are no ring outliers.

2 monomers are involved in 6 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
6	C	303	DB6	3	0
6	A	303	DB6	3	0

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less then 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

Ligand DB6 C 303

Bond lengths

Bond angles

Torsions

Rings

Ligand DB6 A 303

Bond lengths

Bond angles

Torsions

Rings
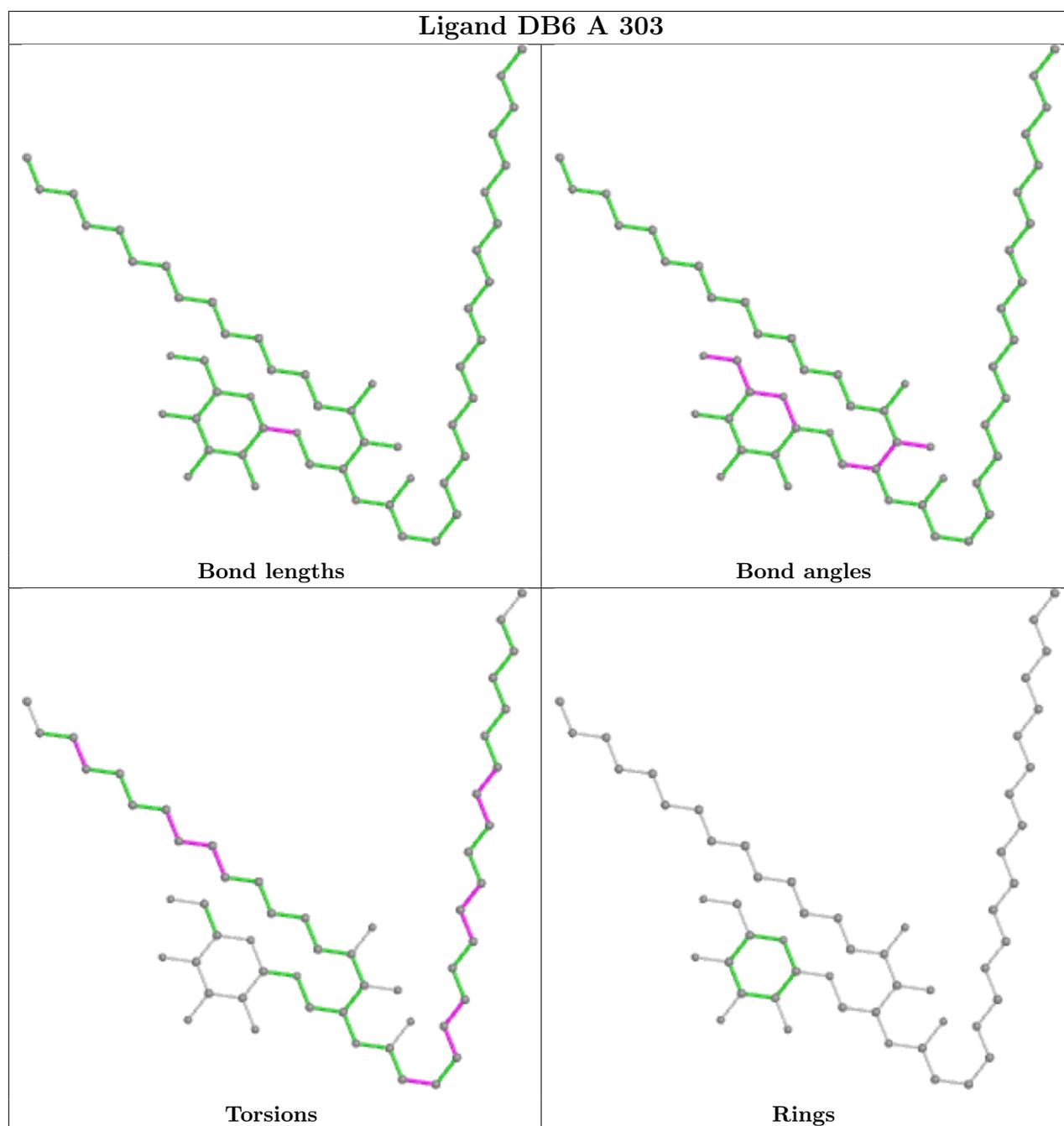
5.7 Other polymers ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues ⓘ

There are no chain breaks in this entry.

6   Fit of model and data   ⓘ

6.1   Protein, DNA and RNA chains   ⓘ

In the following table, the column labelled '#RSRZ> 2' contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95th percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled 'Q< 0.9' lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2			OWAB(Å^2)	Q<0.9
1	A	286/302 (94%)	-0.09	1 (0%)	94	93	9, 24, 43, 49	0
1	C	285/302 (94%)	-0.14	1 (0%)	92	91	7, 21, 37, 45	0
2	B	98/99 (98%)	-0.15	1 (1%)	82	81	8, 27, 40, 45	0
2	D	98/99 (98%)	-0.29	0	100	100	7, 19, 31, 38	0
3	E	198/204 (97%)	-0.14	0	100	100	13, 24, 42, 46	0
3	G	198/204 (97%)	-0.09	2 (1%)	82	81	11, 26, 42, 46	0
4	F	236/241 (97%)	-0.25	2 (0%)	86	85	10, 19, 32, 48	0
4	H	236/241 (97%)	-0.22	3 (1%)	77	75	10, 21, 32, 50	0
All	All	1635/1692 (96%)	-0.16	10 (0%)	89	88	7, 22, 40, 50	0

The worst 5 of 10 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
4	H	47	GLY	5.8
4	H	195	ALA	3.1
4	F	48	HIS	2.6
4	F	47	GLY	2.4
1	C	108	PRO	2.3

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

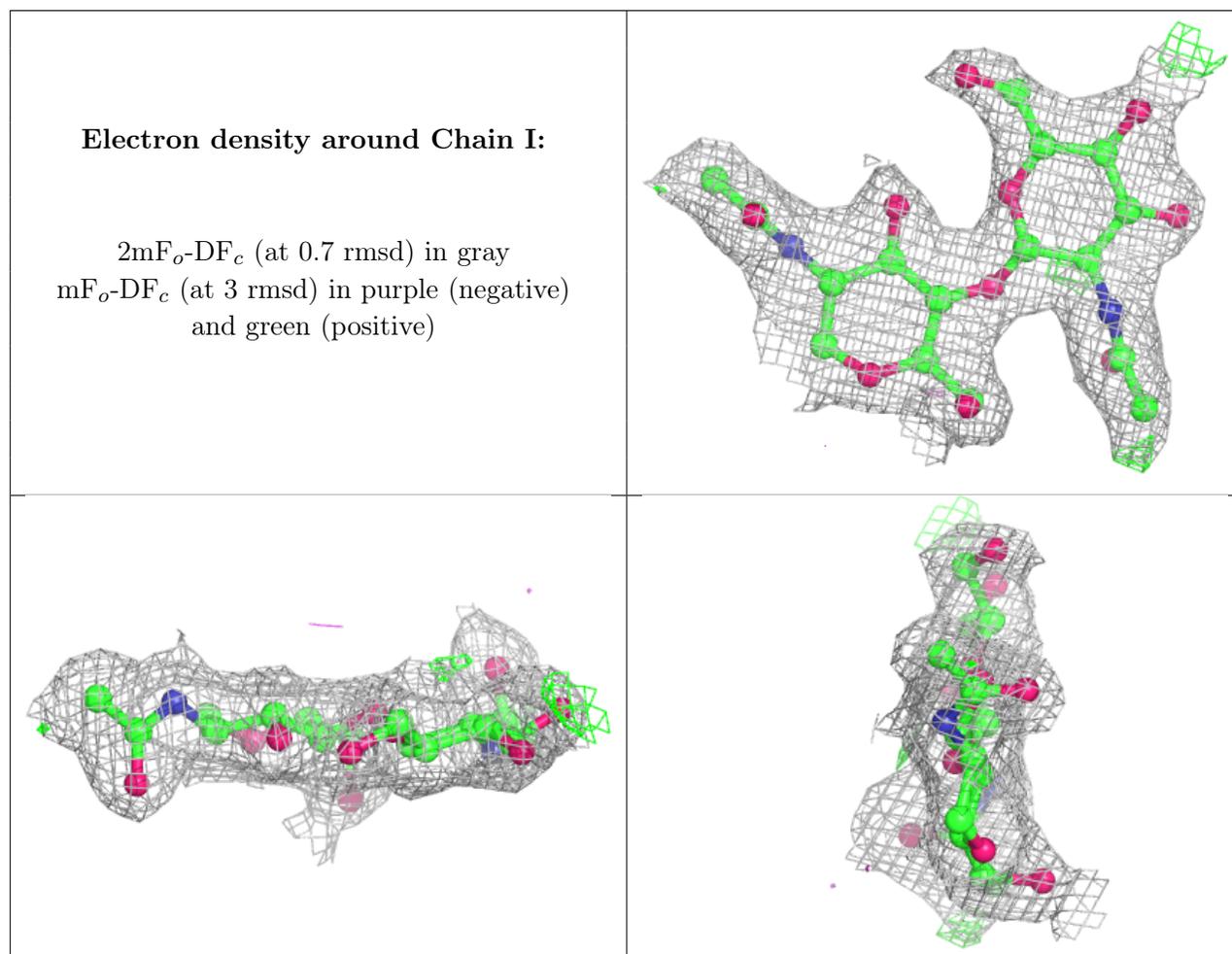There are no non-standard protein/DNA/RNA residues in this entry.
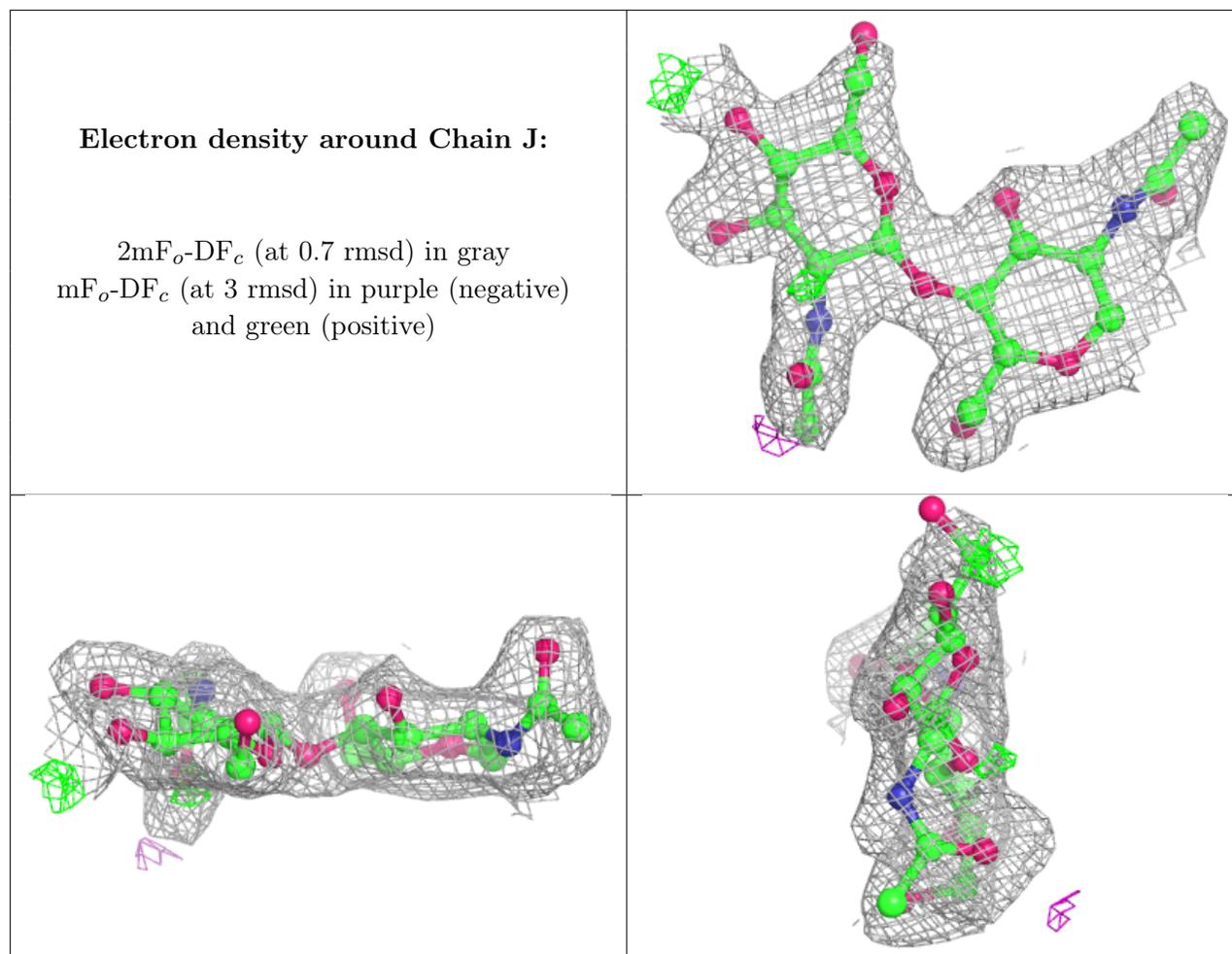
6.3   Carbohydrates   ⓘ

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
5	NAG	J	2	14/15	0.86	0.17	42,47,50,50	0
5	NAG	I	2	14/15	0.89	0.13	36,42,44,45	0
5	NAG	I	1	14/15	0.93	0.14	20,24,30,35	0
5	NAG	J	1	14/15	0.96	0.14	22,25,33,36	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 I:

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

Electron density around Chain J:

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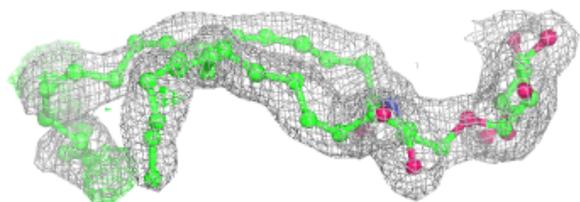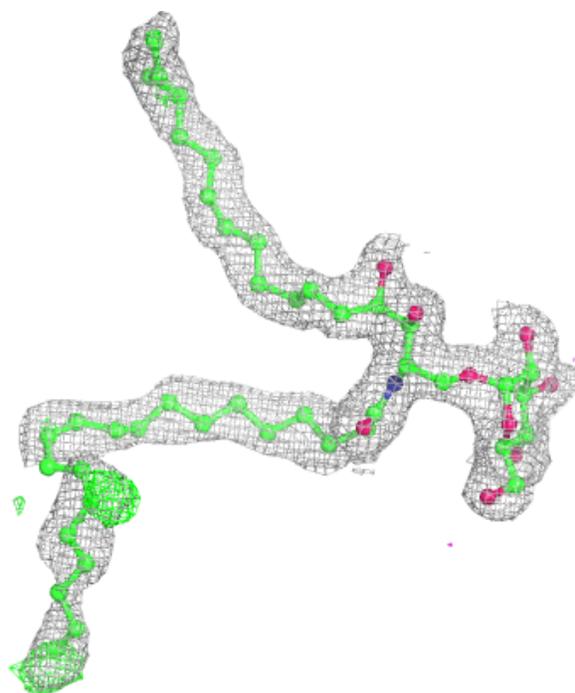and green (positive)

6.4 Ligands ⓘ

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.
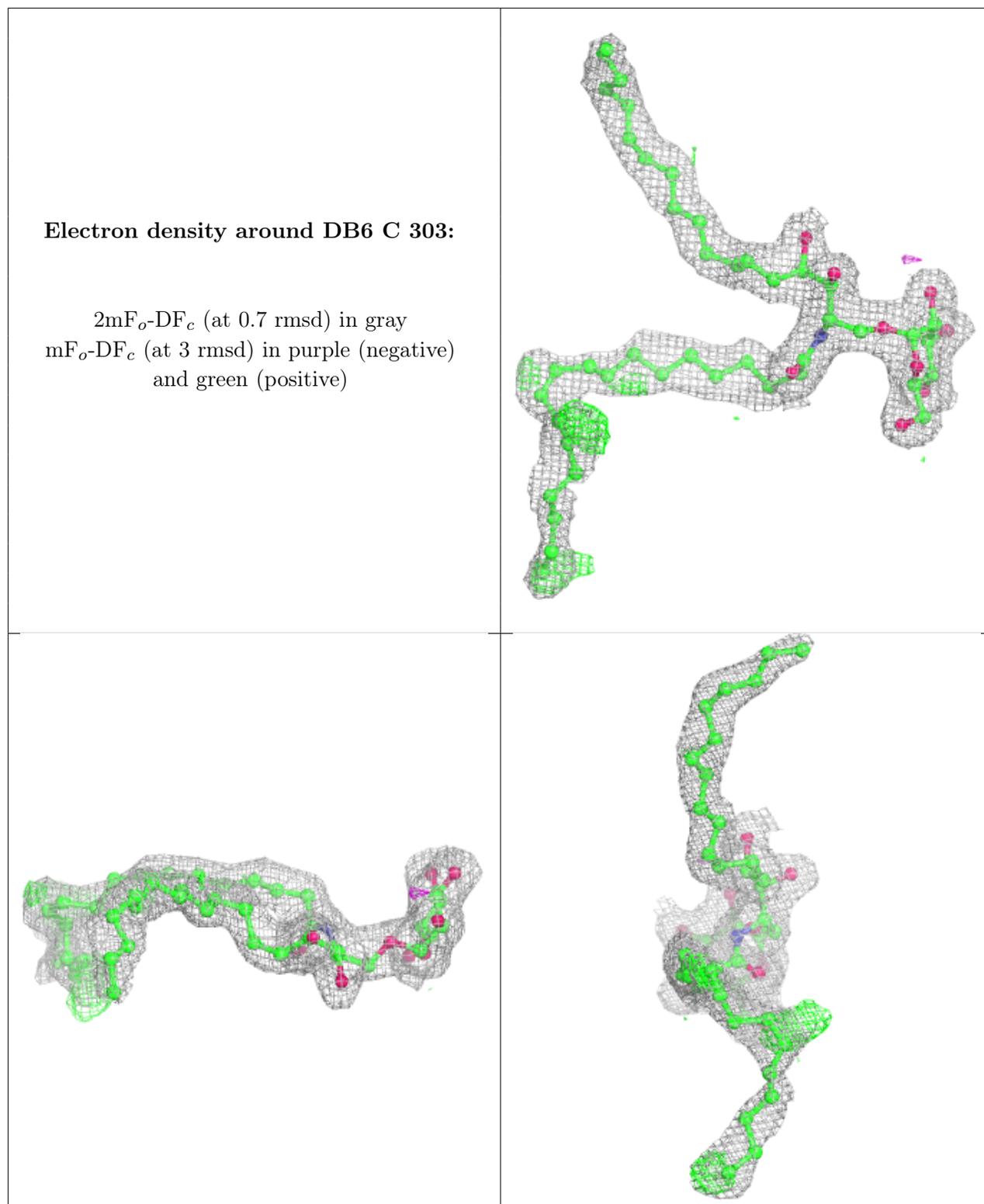
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
7	NAG	C	304	14/15	0.81	0.15	44,49,52,53	0
7	NAG	A	304	14/15	0.84	0.15	32,35,43,43	0
6	DB6	A	303	54/54	0.93	0.17	12,15,26,28	23
6	DB6	C	303	54/54	0.94	0.17	8,14,31,32	23
7	NAG	A	307	14/15	0.95	0.10	31,33,39,41	0
7	NAG	C	307	14/15	0.95	0.11	25,28,33,34	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 DB6 A 303:

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

Electron density around DB6 C 303:

$2mF_o$-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.