Full wwPDB X-ray Structure Validation Report (i)

Sep 11, 2023 – 01:24 PM EDT

PDB ID	:	8GLI
Title	:	Crystal Structure of Human CD1b in Complex with Mycobacterial C85-GMM
Authors	:	Balaji, G.; Rossjohn, J.; Shahine, A.
Deposited on	:	2023-03-22
Resolution	:	2.10 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
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)	:	2.35.1

1 Overall quality at a glance ⓘ

The following experimental techniques were used to determine the structure:
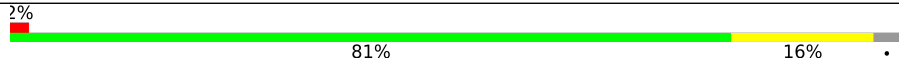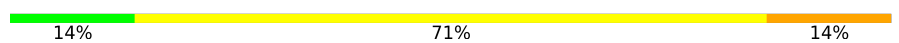*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.10 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.
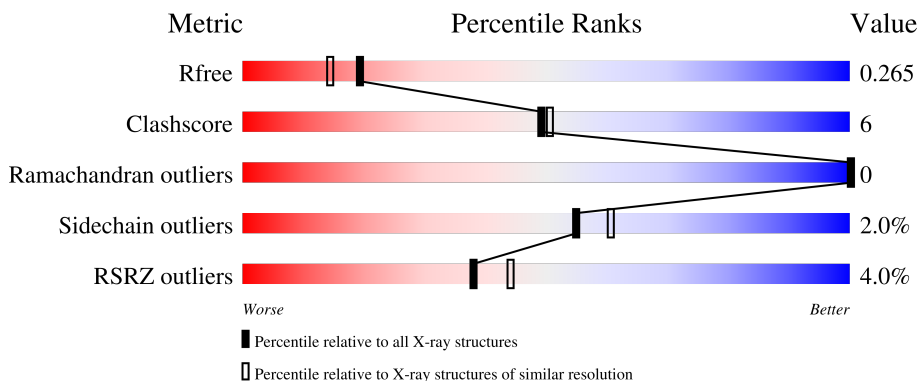
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	5197 (2.10-2.10)
Clashscore	141614	5710 (2.10-2.10)
Ramachandran outliers	138981	5647 (2.10-2.10)
Sidechain outliers	138945	5648 (2.10-2.10)
RSRZ outliers	127900	5083 (2.10-2.10)

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 <=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	300	4% / 82% / 11% · 6%
2	B	101	2% / 81% / 16% ·
3	C	7	14% / 71% / 14%

2 Entry composition ⓘ

There are 8 unique types of molecules in this entry. The entry contains 3342 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 T-cell surface glycoprotein CD1b.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	281	2175	1394	369	402	10	0	1	0

There are 23 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	279	GLY	-	expression tag	UNP P29016
A	280	SER	-	expression tag	UNP P29016
A	281	GLY	-	expression tag	UNP P29016
A	282	LEU	-	expression tag	UNP P29016
A	283	ASN	-	expression tag	UNP P29016
A	284	ASP	-	expression tag	UNP P29016
A	285	ILE	-	expression tag	UNP P29016
A	286	PHE	-	expression tag	UNP P29016
A	287	GLU	-	expression tag	UNP P29016
A	288	ALA	-	expression tag	UNP P29016
A	289	GLN	-	expression tag	UNP P29016
A	290	LYS	-	expression tag	UNP P29016
A	291	ILE	-	expression tag	UNP P29016
A	292	GLU	-	expression tag	UNP P29016
A	293	TRP	-	expression tag	UNP P29016
A	294	HIS	-	expression tag	UNP P29016
A	295	GLU	-	expression tag	UNP P29016
A	296	HIS	-	expression tag	UNP P29016
A	297	HIS	-	expression tag	UNP P29016
A	298	HIS	-	expression tag	UNP P29016
A	299	HIS	-	expression tag	UNP P29016
A	300	HIS	-	expression tag	UNP P29016
A	301	HIS	-	expression tag	UNP P29016

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

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	B	98	768	494	131	141	2	0	0	0

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	1	PRO	-	expression tag	UNP P61769
B	2	LYS	-	expression tag	UNP P61769

- Molecule 3 is an oligosaccharide called alpha-D-mannopyranose-(1-3)-[alpha-D-mannopyran ose-(1-6)]beta-D-mannopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-[al pha-L-fucopyranose-(1-3)][alpha-L-fucopyranose-(1-6)]2-acetamido-2-deoxy-beta-D-glucopyr anose.
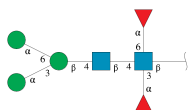
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
3	C	7	81	46	2	33	0	0	0

- Molecule 4 is 6-O-[(2R,3R)-3-hydroxy-20-{(1R,2S)-2-[(17R,18R)-17-methoxy-18-methyldo triacontyl]cyclopropyl}-2-pentadecylicosanoyl]-alpha-L-galactopyranose (three-letter code: ZR2) (formula: $C_{78}H_{152}O_9$) (labeled as "Ligand of Interest" by depositor).

ZR2
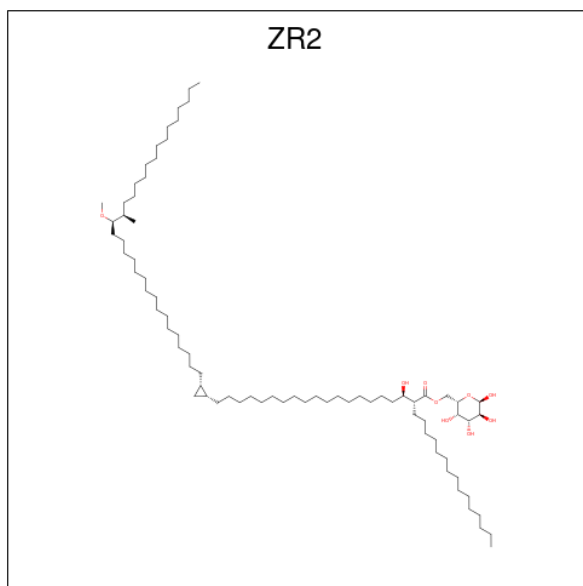
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	A	1	Total 87	C 78	O 9	0	0

- Molecule 5 is 2-acetamido-2-deoxy-beta-D-glucopyranose (three-letter code: NAG) (formula: $C_8H_{15}NO_6$).
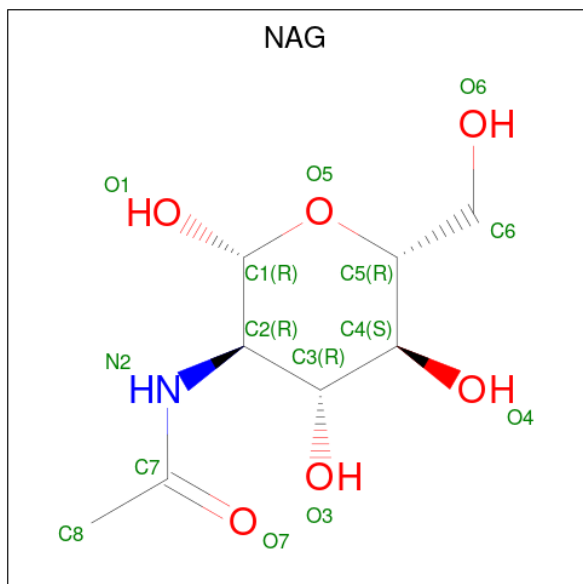
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
5	A	1	Total 14	C 8	N 1	O 5	0	0

- Molecule 6 is CHLORIDE ION (three-letter code: CL) (formula: Cl).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	A	1	Total 1	Cl 1	0	0

- Molecule 7 is IODIDE ION (three-letter code: IOD) (formula: I).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
7	A	1	Total 1	I 1	0	0
7	B	2	Total 2	I 2	0	0

- Molecule 8 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
8	A	162	Total 162	O 162	0	0
8	B	51	Total 51	O 51	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: T-cell surface glycoprotein CD1b

• Molecule 2: Beta-2-microglobulin

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

4 Data and refinement statistics ⓘ

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α, β, γ	57.23Å 76.60Å 92.44Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	46.22 – 2.10 48.66 – 2.10	Depositor EDS
% Data completeness (in resolution range)	99.7 (46.22-2.10) 99.8 (48.66-2.10)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	2.30 (at 2.10Å)	Xtriage
Refinement program	PHENIX (1.20.1_4487: ???)	Depositor
R, R_{free}	0.206 , 0.267 0.205 , 0.265	Depositor DCC
R_{free} test set	1226 reflections (5.04%)	wwPDB-VP
Wilson B-factor (Å^2)	29.2	Xtriage
Anisotropy	0.127	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.37 , 64.2	EDS
L-test for twinning[2]	$< |L| > = 0.50, < L^2 > = 0.33$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.93	EDS
Total number of atoms	3342	wwPDB-VP
Average B, all atoms (Å^2)	32.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.66% of the height of the origin peak. No significant pseudotranslation is detected.*

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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 ⓘ

5.1 Standard geometry ⓘ

Bond lengths and bond angles in the following residue types are not validated in this section: MAN, ZR2, FUC, NAG, CL, IOD, BMA

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	0.41	0/2238	0.61	0/3040
2	B	0.37	0/791	0.59	0/1080
All	All	0.40	0/3029	0.60	0/4120

There are no bond length outliers.

There are no bond angle outliers.

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	2175	0	2076	27	0
2	B	768	0	698	8	1
3	C	81	0	70	1	0
4	A	87	0	0	0	1
5	A	14	0	13	1	0
6	A	1	0	0	0	0
7	A	1	0	0	0	0
7	B	2	0	0	0	0
8	A	162	0	0	11	1
8	B	51	0	0	2	0
All	All	3342	0	2857	35	2

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 (35) 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:209:SER:OG	8:A:501:HOH:O	1.97	0.81
1:A:27:GLN:NE2	8:A:503:HOH:O	2.15	0.79
2:B:89:LEU:O	8:B:301:HOH:O	2.07	0.73
1:A:79:ARG:NH1	8:A:508:HOH:O	2.21	0.70
1:A:128:ASN:O	8:A:502:HOH:O	2.12	0.68
2:B:2:LYS:N	8:B:304:HOH:O	2.31	0.63
1:A:115:ARG:NH2	1:A:122:ASP:OD1	2.34	0.59
1:A:152:GLN:NE2	8:A:512:HOH:O	2.28	0.58
1:A:193:SER:HB3	1:A:277:TRP:CH2	2.38	0.58
1:A:284:ASP:OD2	8:A:504:HOH:O	2.18	0.55
5:A:402:NAG:H83	5:A:402:NAG:H3	1.88	0.55
1:A:217:TRP:HB3	1:A:264:LYS:HB2	1.88	0.55
2:B:52:GLU:HB2	2:B:69:TYR:CZ	2.44	0.52
1:A:182:GLN:HG2	8:A:511:HOH:O	2.10	0.51
1:A:171:LEU:HD12	3:C:2:NAG:H82	1.92	0.50
1:A:87:ASP:OD2	8:A:505:HOH:O	2.20	0.49
2:B:81:ALA:HB2	2:B:96:LYS:HG2	1.96	0.46
1:A:148:ILE:HD11	1:A:154:ILE:HD13	1.98	0.45
2:B:83:ARG:HG3	2:B:94:ILE:HG12	1.99	0.45
1:A:182:GLN:O	8:A:506:HOH:O	2.21	0.45
1:A:263:VAL:HB	1:A:273:ILE:HB	1.99	0.44
2:B:31:GLY:HA2	2:B:63:SER:HB3	2.00	0.44
1:A:278:ARG:O	8:A:507:HOH:O	2.21	0.44
2:B:41:LEU:HD23	2:B:70:THR:HG22	2.00	0.43
1:A:171:LEU:HD23	1:A:171:LEU:HA	1.88	0.42
1:A:123:PHE:CZ	1:A:141:ALA:HA	2.54	0.42
1:A:4:PHE:CD1	1:A:4:PHE:N	2.88	0.42
1:A:145:CYS:HA	1:A:148:ILE:HG22	2.03	0.41
1:A:151:TYR:O	1:A:154:ILE:HG22	2.21	0.41
1:A:282:LEU:HD23	1:A:282:LEU:HA	1.90	0.41
1:A:103:GLU:OE1	8:A:509:HOH:O	2.22	0.41
1:A:117:ALA:HB2	2:B:62:TRP:CE2	2.56	0.41
1:A:76:GLY:O	1:A:80:GLU:HG2	2.21	0.41
1:A:254:GLY:HA2	1:A:280:SER:HB3	2.02	0.41
1:A:45:GLY:O	1:A:71:ARG:HD3	2.21	0.40

All (2) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:5:ARG:NH2	4:A:401:ZR2:O6[4_555]	1.30	0.90
8:A:575:HOH:O	8:A:655:HOH:O[4_455]	2.19	0.01

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	280/300 (93%)	272 (97%)	8 (3%)	0	100	100
2	B	96/101 (95%)	94 (98%)	2 (2%)	0	100	100
All	All	376/401 (94%)	366 (97%)	10 (3%)	0	100	100

There are no Ramachandran outliers to report.

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	225/247 (91%)	221 (98%)	4 (2%)	59	65
2	B	80/96 (83%)	78 (98%)	2 (2%)	47	52
All	All	305/343 (89%)	299 (98%)	6 (2%)	55	60

All (6) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	4	PHE
1	A	21	SER

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W O R L D W I D E
wwPDB
PROTEIN DATA BANK

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Mol	Chain	Res	Type
1	A	152	GLN
1	A	280	SER
2	B	22	SER
2	B	72	PHE

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

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 ⓘ

7 monosaccharides are modelled in this entry.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#|Z| > 2$	Counts	RMSZ	$\#|Z| > 2$
3	NAG	C	1	3,1	14,14,15	0.26	0	17,19,21	0.69	0
3	NAG	C	2	3	14,14,15	0.35	0	17,19,21	0.71	1 (5%)
3	BMA	C	3	3	11,11,12	1.19	1 (9%)	15,15,17	1.05	2 (13%)
3	MAN	C	4	3	11,11,12	0.87	0	15,15,17	1.30	2 (13%)
3	MAN	C	5	3	11,11,12	1.19	1 (9%)	15,15,17	1.01	1 (6%)
3	FUC	C	6	3	10,10,11	1.37	2 (20%)	14,14,16	0.83	0
3	FUC	C	7	3	10,10,11	1.63	3 (30%)	14,14,16	1.37	1 (7%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the

Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

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

All (7) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	C	3	BMA	O5-C1	-2.95	1.39	1.43
3	C	7	FUC	O5-C5	2.77	1.49	1.43
3	C	7	FUC	C1-C2	2.73	1.58	1.52
3	C	7	FUC	O5-C1	-2.66	1.39	1.43
3	C	6	FUC	C2-C3	2.23	1.55	1.52
3	C	5	MAN	O5-C5	2.13	1.47	1.43
3	C	6	FUC	C1-C2	2.05	1.56	1.52

All (7) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	C	4	MAN	C1-O5-C5	2.72	115.87	112.19
3	C	4	MAN	O2-C2-C3	-2.38	105.37	110.14
3	C	7	FUC	C3-C4-C5	-2.34	106.14	109.77
3	C	5	MAN	C1-O5-C5	2.29	115.29	112.19
3	C	3	BMA	C1-O5-C5	2.15	115.11	112.19
3	C	2	NAG	C1-O5-C5	2.11	115.05	112.19
3	C	3	BMA	O2-C2-C3	-2.10	105.93	110.14

There are no chirality outliers.

All (5) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	C	1	NAG	O5-C5-C6-O6
3	C	1	NAG	C4-C5-C6-O6
3	C	4	MAN	C4-C5-C6-O6
3	C	4	MAN	O5-C5-C6-O6
3	C	1	NAG	C3-C2-N2-C7

There are no ring outliers.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	C	2	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 C

Bond lengths   Bond angles   Torsions   Rings
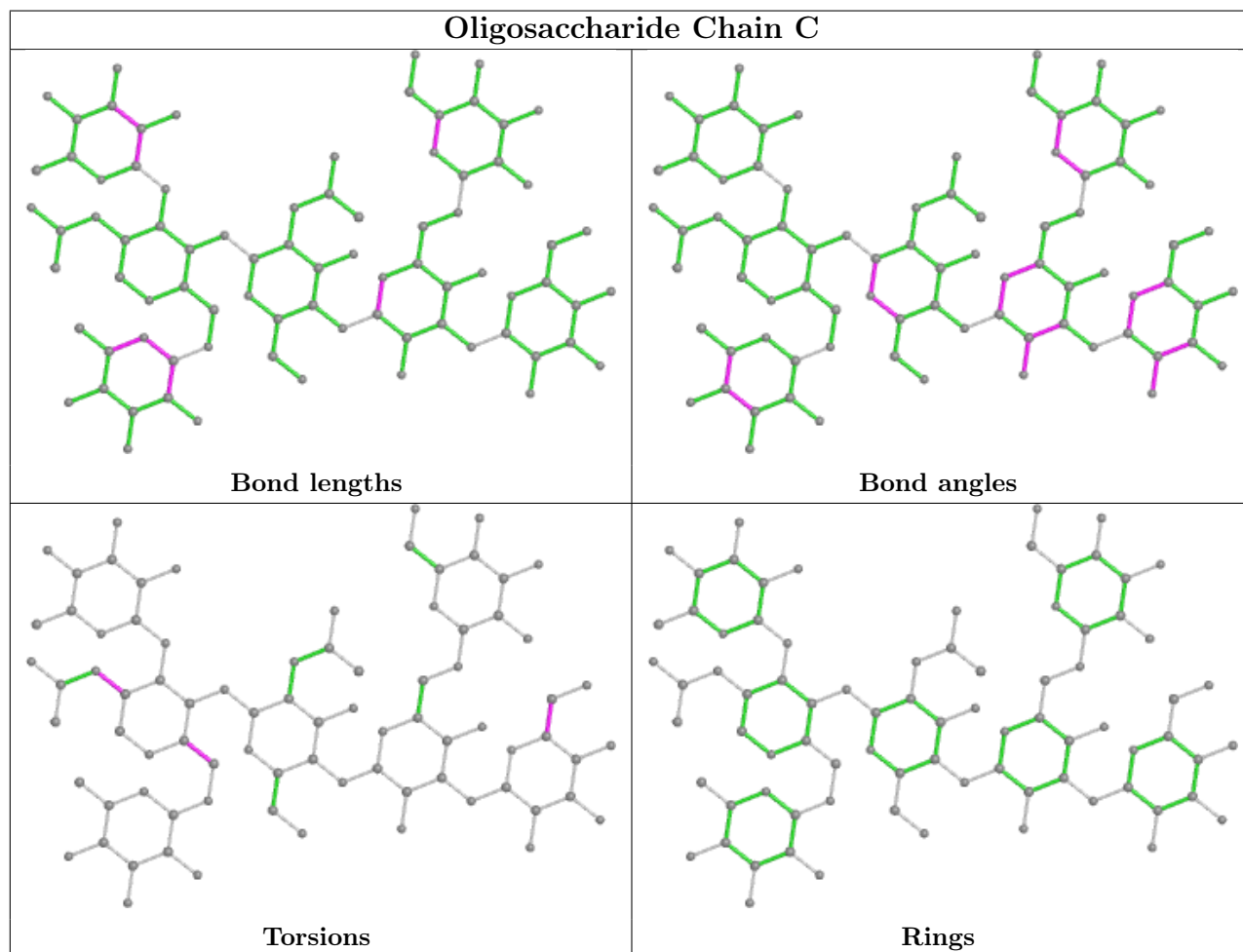
5.6   Ligand geometry ⓘ

Of 6 ligands modelled in this entry, 4 are monoatomic - leaving 2 for Mogul analysis.

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	A	402	1	14,14,15	0.44	0	17,19,21	1.19	1 (5%)
4	ZR2	A	401	-	88,88,88	1.35	12 (13%)	92,101,101	1.71	10 (10%)

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	A	402	1	-	3/6/23/26	0/1/1/1
4	ZR2	A	401	-	-	51/87/112/112	0/2/2/2

All (12) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	A	401	ZR2	C25-C26	4.07	1.60	1.53
4	A	401	ZR2	C92-C91	3.70	1.61	1.51
4	A	401	ZR2	C81-C82	3.39	1.62	1.51
4	A	401	ZR2	C62-C61	3.29	1.56	1.53
4	A	401	ZR2	C83-C82	3.08	1.59	1.53
4	A	401	ZR2	O3-C80	2.97	1.39	1.33
4	A	401	ZR2	C27-C26	2.80	1.57	1.52
4	A	401	ZR2	C86-C85	2.62	1.58	1.52
4	A	401	ZR2	C85-C84	2.54	1.58	1.52
4	A	401	ZR2	O2-C80	2.37	1.27	1.21
4	A	401	ZR2	C93-C92	2.24	1.56	1.49
4	A	401	ZR2	C84-C83	2.22	1.58	1.52

All (11) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
4	A	401	ZR2	O3-C80-C25	11.02	126.30	111.36
4	A	401	ZR2	C24-C25-C80	5.24	117.57	109.17
4	A	401	ZR2	O3-C80-O2	-4.77	115.10	124.13
4	A	401	ZR2	O3-C81-C82	4.62	118.21	108.43
5	A	402	NAG	C2-N2-C7	4.26	128.97	122.90
4	A	401	ZR2	C81-O3-C80	4.14	125.00	116.84
4	A	401	ZR2	O2-C80-C25	-2.73	118.59	124.67
4	A	401	ZR2	C84-C83-C82	2.53	114.75	110.24
4	A	401	ZR2	O4-C82-C81	2.32	111.35	106.67
4	A	401	ZR2	O5-C86-O4	-2.22	103.71	110.38

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	A	401	ZR2	O1-C26-C27	-2.12	104.53	109.15

There are no chirality outliers.

All (54) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	A	401	ZR2	C25-C80-O3-C81
4	A	401	ZR2	C82-C81-O3-C80
4	A	401	ZR2	O1-C26-C27-C28
4	A	401	ZR2	C46-C45-C92-C93
4	A	401	ZR2	O2-C80-O3-C81
4	A	401	ZR2	C87-C62-C63-C64
4	A	401	ZR2	C54-C55-C56-C57
4	A	401	ZR2	C34-C35-C36-C37
4	A	401	ZR2	C52-C53-C54-C55
5	A	402	NAG	C8-C7-N2-C2
5	A	402	NAG	O7-C7-N2-C2
4	A	401	ZR2	C21-C22-C23-C24
4	A	401	ZR2	C22-C23-C24-C25
4	A	401	ZR2	C41-C42-C43-C91
4	A	401	ZR2	C64-C65-C66-C67
4	A	401	ZR2	C38-C39-C40-C41
4	A	401	ZR2	C27-C28-C29-C30
4	A	401	ZR2	C37-C38-C39-C40
4	A	401	ZR2	C69-C70-C71-C72
4	A	401	ZR2	C51-C52-C53-C54
4	A	401	ZR2	C11-C12-C13-C14
4	A	401	ZR2	C29-C30-C31-C32
4	A	401	ZR2	C47-C48-C49-C50
4	A	401	ZR2	C49-C50-C51-C52
4	A	401	ZR2	C35-C36-C37-C38
4	A	401	ZR2	C55-C56-C57-C58
4	A	401	ZR2	O3-C81-C82-O4
4	A	401	ZR2	C13-C14-C15-C16
4	A	401	ZR2	C20-C21-C22-C23
4	A	401	ZR2	C92-C45-C46-C47
4	A	401	ZR2	C28-C29-C30-C31
4	A	401	ZR2	C19-C20-C21-C22
4	A	401	ZR2	C16-C17-C18-C19
4	A	401	ZR2	C30-C31-C32-C33
4	A	401	ZR2	O3-C81-C82-C83
4	A	401	ZR2	C24-C25-C80-O3

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Mol	Chain	Res	Type	Atoms
4	A	401	ZR2	C12-C13-C14-C15
4	A	401	ZR2	C18-C19-C20-C21
4	A	401	ZR2	C45-C46-C47-C48
4	A	401	ZR2	C10-C11-C12-C13
4	A	401	ZR2	C14-C15-C16-C17
4	A	401	ZR2	C24-C25-C80-O2
4	A	401	ZR2	C58-C59-C60-C61
4	A	401	ZR2	C61-C62-C63-C64
4	A	401	ZR2	C60-C61-C62-C63
4	A	401	ZR2	O9-C61-C62-C63
4	A	401	ZR2	C67-C68-C69-C70
4	A	401	ZR2	C25-C26-C27-C28
4	A	401	ZR2	O9-C61-C62-C87
4	A	401	ZR2	C36-C37-C38-C39
5	A	402	NAG	C3-C2-N2-C7
4	A	401	ZR2	C39-C40-C41-C42
4	A	401	ZR2	C68-C69-C70-C71
4	A	401	ZR2	C42-C43-C91-C93

There are no ring outliers.

2 monomers are involved in 2 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	A	402	NAG	1	0
4	A	401	ZR2	0	1

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 ZR2 A 401
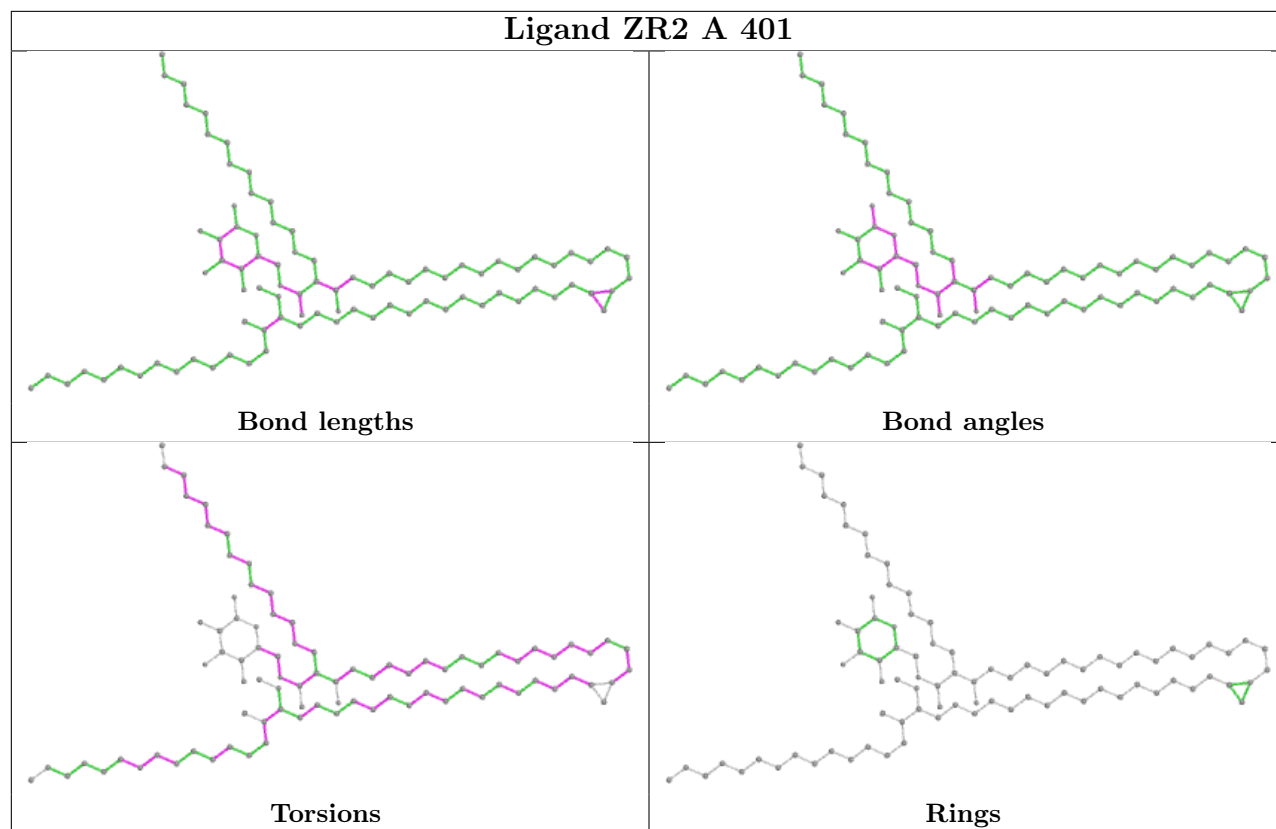
5.7 Other polymers ⓘ

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	281/300 (93%)	0.18	13 (4%)	32	38	18, 27, 49, 71	0
2	B	98/101 (97%)	0.25	2 (2%)	65	69	18, 37, 53, 66	0
All	All	379/401 (94%)	0.20	15 (3%)	38	44	18, 29, 52, 71	0

All (15) RSRZ outliers are listed below:

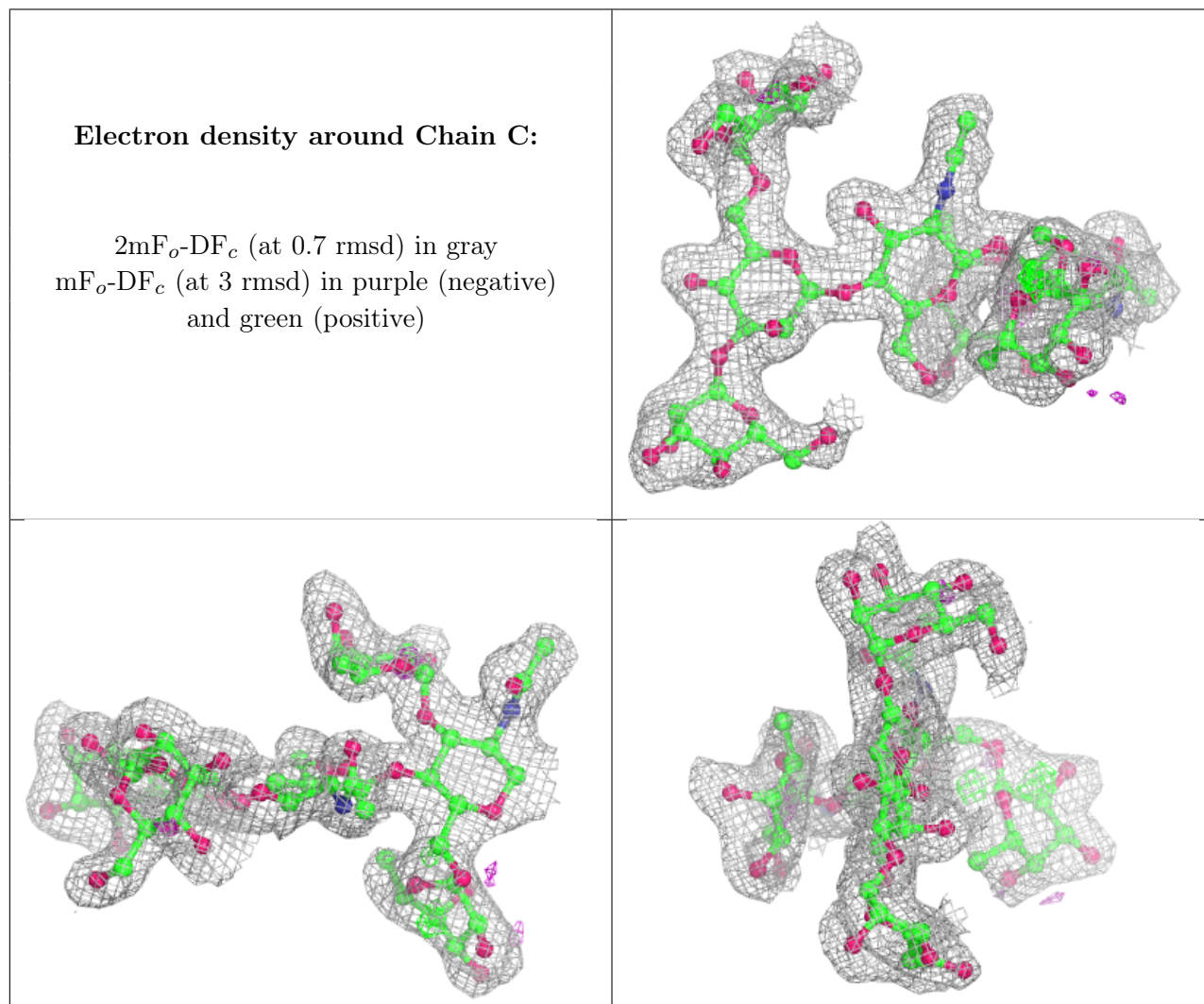| Mol	Chain	Res	Type	RSRZ
1	A	282	LEU	5.1
1	A	4	PHE	4.0
1	A	129	ALA	3.8
1	A	197	PRO	3.3
1	A	5	GLN	3.3
1	A	283	ASN	2.9
1	A	281	GLY	2.7
1	A	202	LEU	2.4
2	B	77	LYS	2.3
1	A	195	PRO	2.3
2	B	19	ASN	2.2
1	A	201	ARG	2.2
1	A	6	GLY	2.1
1	A	284	ASP	2.1
1	A	128	ASN	2.1

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

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

6.3 Carbohydrates ⓘ

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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
3	FUC	C	6	10/11	0.78	0.22	31,39,45,50	0
3	MAN	C	5	11/12	0.84	0.18	23,29,33,35	0
3	MAN	C	4	11/12	0.87	0.15	30,35,44,45	0
3	FUC	C	7	10/11	0.87	0.19	31,44,49,54	0
3	NAG	C	1	14/15	0.91	0.11	23,28,37,50	0
3	NAG	C	2	14/15	0.94	0.09	23,29,35,39	0
3	BMA	C	3	11/12	0.94	0.10	25,28,30,31	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.
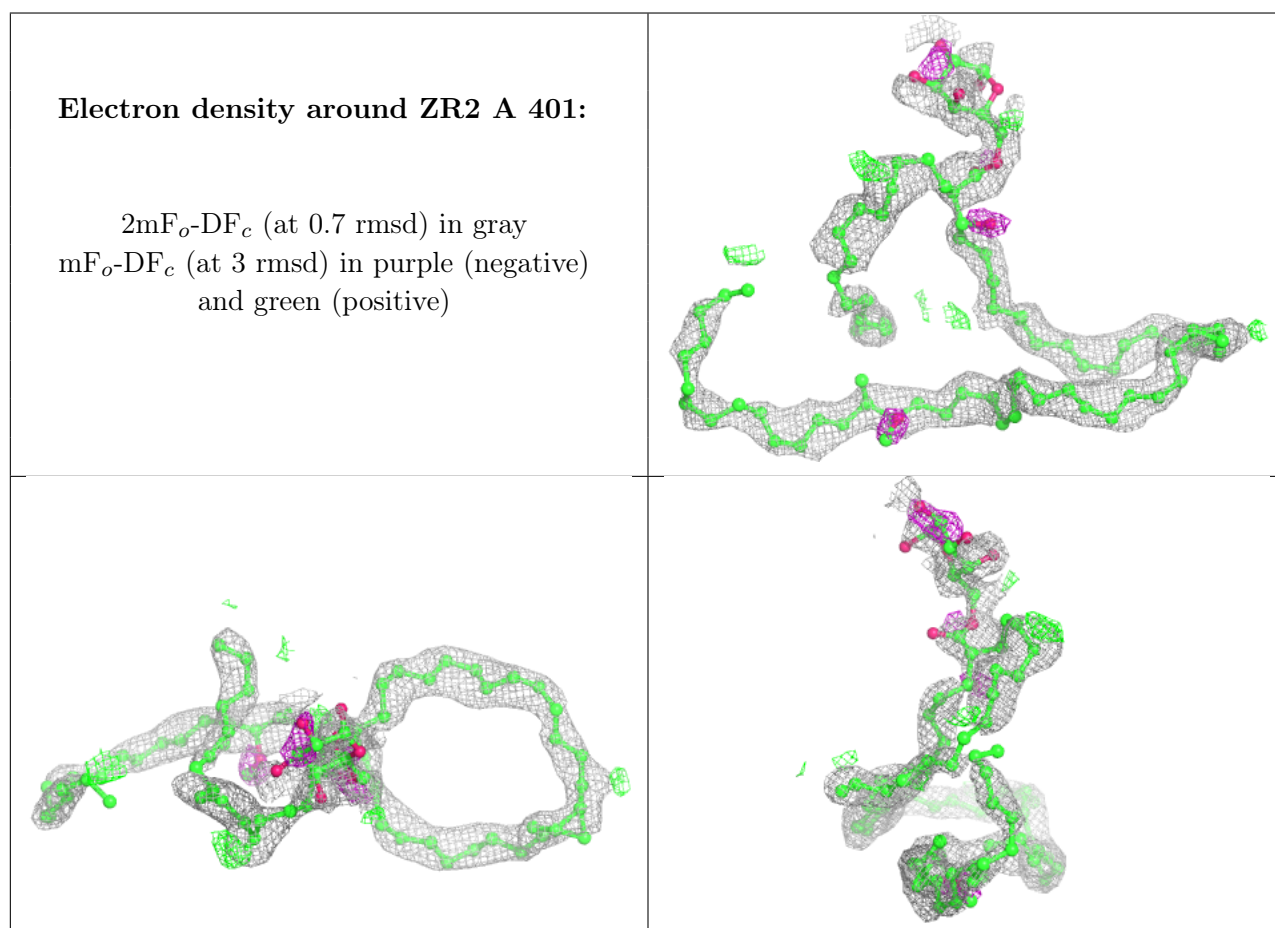

Electron density around Chain C:

$2\text{mF}_o\text{-DF}_c$ (at 0.7 rmsd) in gray
$\text{mF}_o\text{-DF}_c$ (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
5	NAG	A	402	14/15	0.63	0.28	54,62,68,69	0
4	ZR2	A	401	87/87	0.72	0.27	25,37,66,76	0
7	IOD	B	201	1/1	0.87	0.07	84,84,84,84	0
6	CL	A	403	1/1	0.99	0.11	23,23,23,23	0
7	IOD	B	202	1/1	0.99	0.05	74,74,74,74	0
7	IOD	A	404	1/1	1.00	0.09	25,25,25,25	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 ZR2 A 401:

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

6.5 Other polymers (i)

There are no such residues in this entry.