



Full wwPDB X-ray Structure Validation Report ⓘ

Nov 11, 2023 – 10:08 am GMT

PDB ID : 6FCR
Title : The X-ray Structure of Lytic Transglycosylase Slt inactive mutant E503Q from *Pseudomonas aeruginosa* in complex with NAG-NAMtetrapeptide-NAG-anh NAMtetrapeptide
Authors : Batuecas, M.T.; Dominguez-Gil, T.; Hermoso, J.A.
Deposited on : 2017-12-21
Resolution : 2.75 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 : 1.8.4, 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

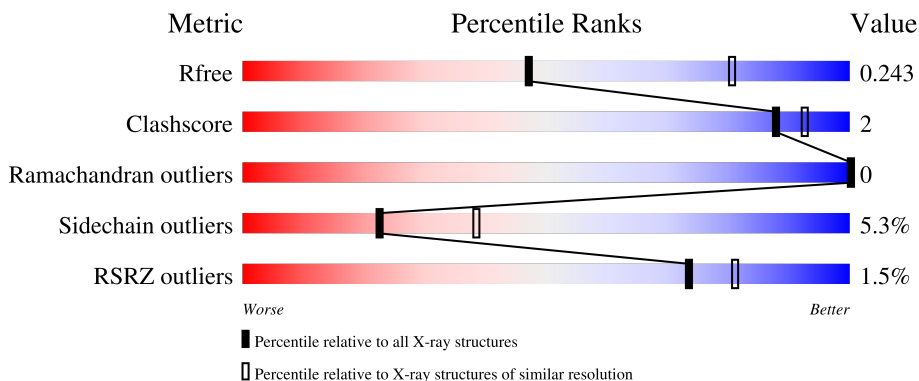
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

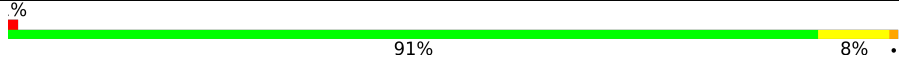



The reported resolution of this entry is 2.75 Å.

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	1235 (2.78-2.74)
Clashscore	141614	1277 (2.78-2.74)
Ramachandran outliers	138981	1257 (2.78-2.74)
Sidechain outliers	138945	1257 (2.78-2.74)
RSRZ outliers	127900	1207 (2.78-2.74)

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	613	 91% 8%
2	F	4	 75% 25%
2	G	4	 75% 25%
3	B	3	 33% 67%

2 Entry composition [i](#)

There are 7 unique types of molecules in this entry. The entry contains 5239 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 Soluble lytic murein transglycosylase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	613	4977	3157	914	895	11	0	1	0

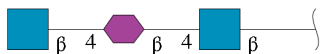
There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	503	GLN	GLU	engineered mutation	UNP A0A069QJX4

- Molecule 2 is a protein (with D amino acids) called ALA-DGL-API-DAL.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
2	F	4	31	18	5	8	0	0	0
2	G	4	31	18	5	8	0	0	0

- Molecule 3 is an oligosaccharide called 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-N-acetyl-beta-muramic acid-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
3	B	3	46	27	3	16	0	0	0

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



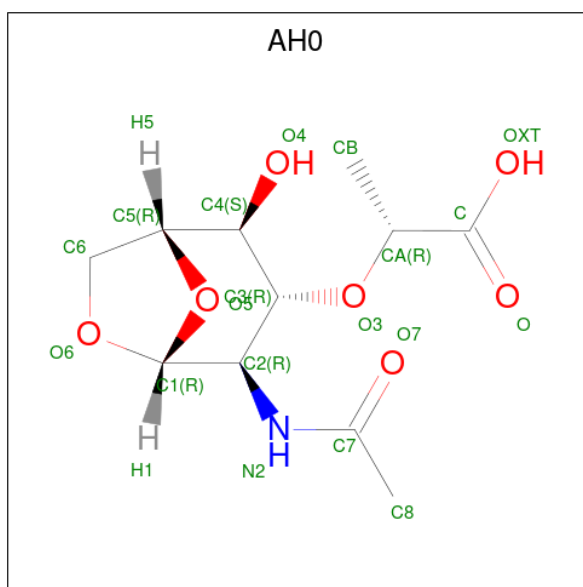
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	A	1	Total	C	O	0	0
			6	3	3		

- Molecule 5 is ACETATE ION (three-letter code: ACT) (formula: $C_2H_3O_2$).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
5	A	1	Total	C	O	0	0
			4	2	2		

- Molecule 6 is 2-(2-ACETYLAMINO-4-HYDROXY-6,8-DIOXA-BICYCLO[3.2.1]OCT-3-YL OXY)-PROPIONIC ACID (three-letter code: AH0) (formula: $C_{11}H_{17}NO_7$).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	N	O		
6	G	1	18	11	1	6	0	0

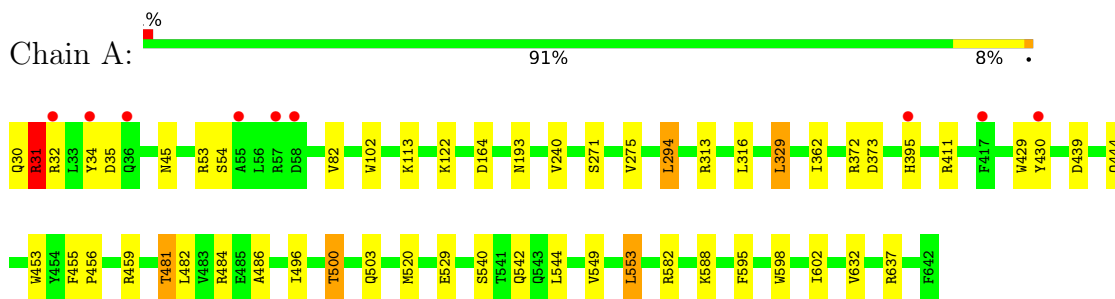
- Molecule 7 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
7	A	120	Total	O	0	0
			120	120		
7	F	4	Total	O	0	0
			4	4		
7	G	2	Total	O	0	0
			2	2		

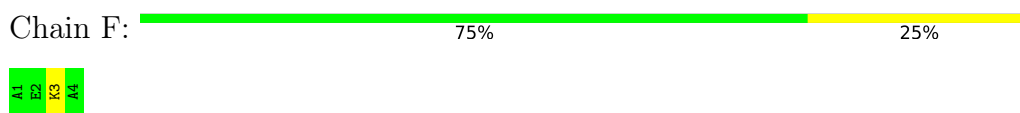
3 Residue-property plots [i](#)

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.

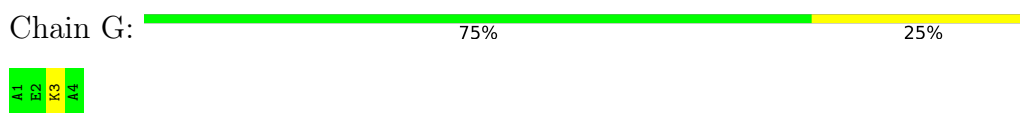
- Molecule 1: Soluble lytic murein transglycosylase



- Molecule 2: ALA-DGL-API-DAL



- Molecule 2: ALA-DGL-API-DAL



- Molecule 3: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-N-acetyl-beta-muramic acid-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose



4 Data and refinement statistics i

Property	Value	Source
Space group	P 63	Depositor
Cell constants a, b, c, α , β , γ	166.70Å 166.70Å 55.38Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	144.37 – 2.75 48.12 – 2.75	Depositor EDS
% Data completeness (in resolution range)	99.9 (144.37-2.75) 99.9 (48.12-2.75)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.48 (at 2.77Å)	Xtrriage
Refinement program	REFMAC 5.8.0158	Depositor
R, R_{free}	0.191 , 0.245 0.198 , 0.243	Depositor DCC
R_{free} test set	1146 reflections (4.94%)	wwPDB-VP
Wilson B-factor (Å ²)	63.0	Xtrriage
Anisotropy	0.241	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.33 , 41.3	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.33$	Xtrriage
Estimated twinning fraction	0.030 for h,-h-k,-l	Xtrriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	5239	wwPDB-VP
Average B, all atoms (Å ²)	66.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.27% 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: AMU, ACT, DGL, DAL, NAG, GOL, AH0, API

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	0.45	0/5104	0.72	3/6920 (0.0%)
2	F	0.77	0/4	0.44	0/4
2	G	0.57	0/4	1.33	0/4
All	All	0.46	0/5112	0.72	3/6928 (0.0%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	2

There are no bond length outliers.

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	372	ARG	NE-CZ-NH1	5.26	122.93	120.30
1	A	32	ARG	NE-CZ-NH1	5.05	122.83	120.30
1	A	637	ARG	NE-CZ-NH1	5.01	122.81	120.30

There are no chirality outliers.

All (2) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	31	ARG	Peptide
1	A	588	LYS	Peptide

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	4977	0	4909	19	0
2	F	31	0	22	0	0
2	G	31	0	21	0	0
3	B	46	0	40	2	0
4	A	6	0	8	0	0
5	A	4	0	3	0	0
6	G	18	0	15	0	0
7	A	120	0	0	1	0
7	F	4	0	0	0	0
7	G	2	0	0	0	0
All	All	5239	0	5018	20	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 2.

All (20) 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:193[B]:ASN:ND2	7:A:801:HOH:O	1.75	1.19
1:A:294:LEU:HD13	1:A:316:LEU:HD23	1.60	0.82
1:A:500:THR:HG22	1:A:520:MET:HG2	1.80	0.63
1:A:496:ILE:O	1:A:500:THR:HG23	2.03	0.59
1:A:595:PHE:CD2	1:A:632:VAL:HG11	2.46	0.51
1:A:482:LEU:HD22	1:A:496:ILE:HG22	1.93	0.51
1:A:313:ARG:HD2	1:A:329:LEU:HD11	1.92	0.51
1:A:429:TRP:CZ2	1:A:444:GLN:HG2	2.46	0.50
1:A:503:GLN:NE2	3:B:2:AMU:O6	2.44	0.49
1:A:481:THR:HG23	1:A:484:ARG:NH2	2.29	0.48
1:A:598:TRP:CZ3	1:A:602:ILE:HD11	2.50	0.46
1:A:453:TRP:CE2	1:A:456:PRO:HG2	2.53	0.44
3:B:2:AMU:H62	3:B:3:NAG:C7	2.48	0.43
1:A:455:PHE:HB3	1:A:456:PRO:HD3	2.00	0.43
1:A:31:ARG:CZ	1:A:31:ARG:HB2	2.47	0.43
1:A:486:ALA:HB2	1:A:496:ILE:HD12	2.00	0.43
1:A:430:TYR:HH	1:A:455:PHE:HE1	1.66	0.42

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:82:VAL:HG11	1:A:102:TRP:CD2	2.56	0.41
1:A:271:SER:O	1:A:275:VAL:HG13	2.20	0.41
1:A:549:VAL:O	1:A:553:LEU:HD23	2.21	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	612/613 (100%)	597 (98%)	15 (2%)	0	100 100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains [i](#)

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
1	A	508/507 (100%)	481 (95%)	27 (5%)	22 38

All (27) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	30	GLN
1	A	31	ARG
1	A	34	TYR

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	A	35	ASP
1	A	45	ASN
1	A	53	ARG
1	A	54	SER
1	A	113	LYS
1	A	122	LYS
1	A	164	ASP
1	A	240	VAL
1	A	294	LEU
1	A	329	LEU
1	A	362	ILE
1	A	373	ASP
1	A	395	HIS
1	A	411	ARG
1	A	439	ASP
1	A	459	ARG
1	A	481	THR
1	A	500	THR
1	A	529	GLU
1	A	540	SER
1	A	542	GLN
1	A	544	LEU
1	A	553	LEU
1	A	582	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (2) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	223	GLN
1	A	402	GLN

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

6 non-standard protein/DNA/RNA residues 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	API	F	3	2	9,11,12	2.58	2 (22%)	7,13,15	1.08	1 (14%)
2	API	G	3	2	9,11,12	2.60	2 (22%)	7,13,15	1.45	2 (28%)

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	API	F	3	2	-	4/11/12/14	-
2	API	G	3	2	-	5/11/12/14	-

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	F	3	API	O3-C7	7.09	1.43	1.22
2	G	3	API	O3-C7	6.99	1.43	1.22
2	G	3	API	O4-C7	-2.71	1.21	1.30
2	F	3	API	O4-C7	-2.61	1.22	1.30

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	G	3	API	O4-C7-C6	2.56	122.10	113.38
2	G	3	API	O4-C7-O3	-2.21	119.07	124.09
2	F	3	API	O4-C7-C6	2.13	120.63	113.38

There are no chirality outliers.

All (9) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	F	3	API	C4-C5-C6-C7
2	F	3	API	N6-C6-C7-O3
2	G	3	API	O-C-CA-C3
2	F	3	API	N6-C6-C7-O4

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms
2	G	3	API	C3-C4-C5-C6
2	G	3	API	C5-C6-C7-O3
2	G	3	API	C5-C6-C7-O4
2	F	3	API	C4-C5-C6-N6
2	G	3	API	C4-C5-C6-N6

There are no ring outliers.

No monomer is involved in short contacts.

5.5 Carbohydrates [i](#)

3 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	B	1	3,6	14,14,15	1.22	2 (14%)	17,19,21	1.48	3 (17%)
3	AMU	B	2	3,2	17,18,20	1.61	2 (11%)	21,24,28	1.64	5 (23%)
3	NAG	B	3	3	14,14,15	0.61	0	17,19,21	1.87	3 (17%)

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	B	1	3,6	-	0/6/23/26	0/1/1/1
3	AMU	B	2	3,2	-	0/10/29/34	0/1/1/1
3	NAG	B	3	3	-	2/6/23/26	0/1/1/1

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	B	2	AMU	O10-C10	5.77	1.43	1.19

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	B	1	NAG	O5-C1	-2.87	1.39	1.43
3	B	1	NAG	C1-C2	2.33	1.55	1.52
3	B	2	AMU	C1-C2	2.15	1.55	1.52

All (11) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	B	3	NAG	C2-N2-C7	5.64	130.93	122.90
3	B	2	AMU	C1-C2-C3	4.06	114.96	109.17
3	B	3	NAG	O7-C7-C8	-3.18	116.15	122.06
3	B	1	NAG	O3-C3-C2	-3.14	102.96	109.47
3	B	2	AMU	C4-C3-C2	2.68	115.87	111.18
3	B	1	NAG	O5-C1-C2	-2.35	107.57	111.29
3	B	1	NAG	O5-C5-C6	-2.21	103.75	107.20
3	B	3	NAG	C8-C7-N2	2.20	119.83	116.10
3	B	2	AMU	O7-C7-C8	-2.20	117.98	122.06
3	B	2	AMU	C3-C4-C5	-2.17	105.04	109.66
3	B	2	AMU	O5-C5-C4	-2.02	105.90	110.83

There are no chirality outliers.

All (2) torsion outliers are listed below:

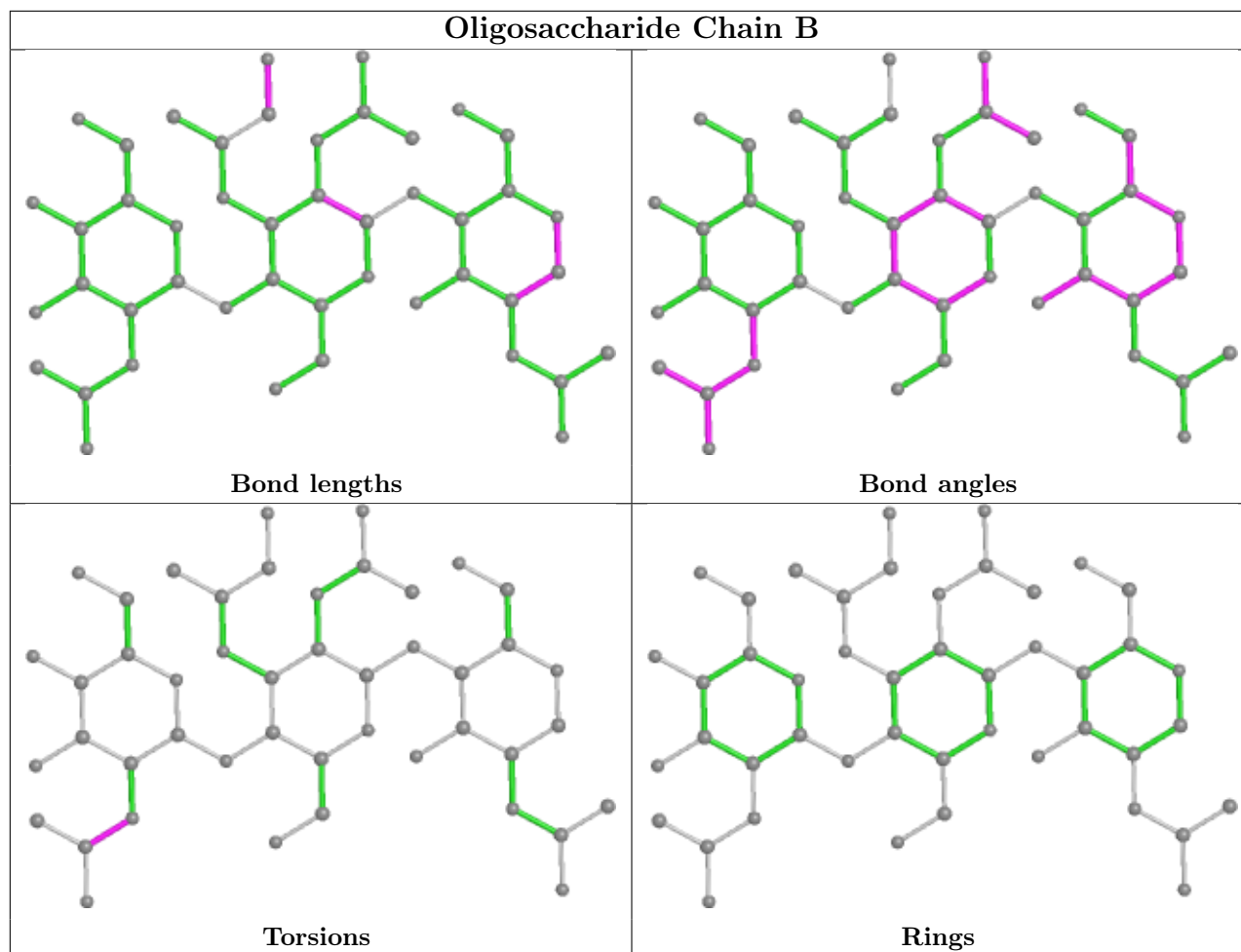
Mol	Chain	Res	Type	Atoms
3	B	3	NAG	C8-C7-N2-C2
3	B	3	NAG	O7-C7-N2-C2

There are no ring outliers.

2 monomers are involved in 2 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	B	3	NAG	1	0
3	B	2	AMU	2	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.



5.6 Ligand geometry [i](#)

3 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
6	AH0	G	101	3,2	18,19,20	0.83	0	22,27,29	3.30	5 (22%)
4	GOL	A	701	-	5,5,5	0.44	0	5,5,5	0.34	0
5	ACT	A	702	-	3,3,3	0.81	0	3,3,3	0.58	0

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

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
6	AH0	G	101	3,2	-	2/8/35/37	0/3/2/2
4	GOL	A	701	-	-	3/4/4/4	-

There are no bond length outliers.

All (5) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
6	G	101	AH0	O5-C5-C6	-9.49	92.53	101.55
6	G	101	AH0	C6-C5-C4	8.55	123.56	113.69
6	G	101	AH0	O5-C1-C2	4.96	112.62	109.56
6	G	101	AH0	O5-C1-O6	-4.62	102.53	105.98
6	G	101	AH0	O5-C5-C4	2.73	111.46	108.54

There are no chirality outliers.

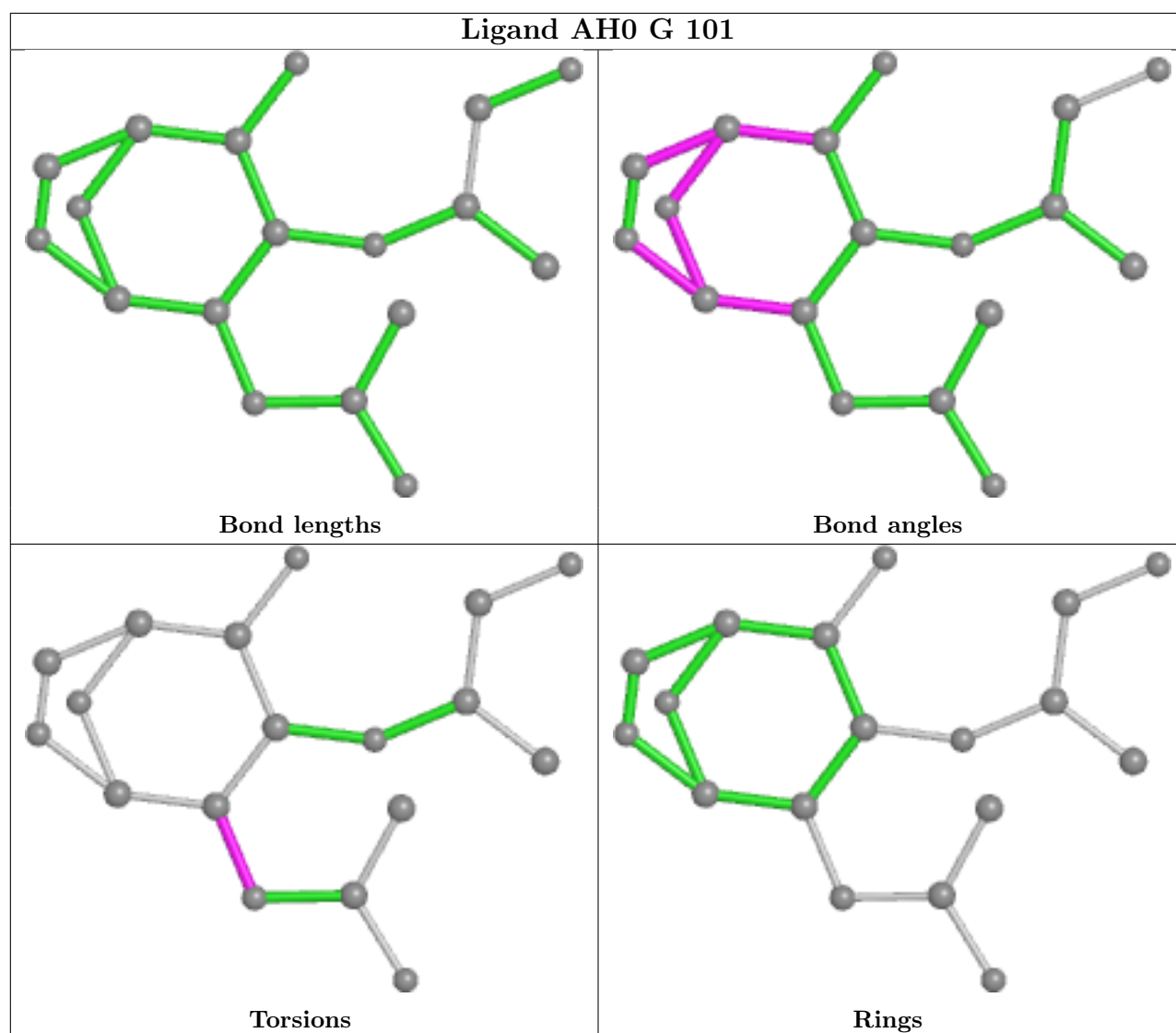
All (5) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	A	701	GOL	C1-C2-C3-O3
4	A	701	GOL	O2-C2-C3-O3
4	A	701	GOL	O1-C1-C2-C3
6	G	101	AH0	C1-C2-N2-C7
6	G	101	AH0	C3-C2-N2-C7

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 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 than 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.



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 [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	613/613 (100%)	0.14	9 (1%) 73 81	42, 64, 98, 114	0
2	F	1/4 (25%)	0.23	0 100 100	69, 69, 69, 69	0
2	G	1/4 (25%)	-0.16	0 100 100	63, 63, 63, 63	0
All	All	615/621 (99%)	0.14	9 (1%) 73 81	42, 64, 98, 114	0

All (9) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	395	HIS	3.9
1	A	36	GLN	3.4
1	A	58	ASP	2.9
1	A	57	ARG	2.8
1	A	55	ALA	2.4
1	A	430	TYR	2.2
1	A	417	PHE	2.2
1	A	34	TYR	2.1
1	A	32	ARG	2.1

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

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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
2	DAL	F	4	6/6	0.72	0.36	94,97,101,104	0
2	API	G	3	12/13	0.81	0.24	74,82,89,91	0
2	API	F	3	12/13	0.85	0.25	79,84,87,87	0
2	DAL	G	4	6/6	0.89	0.25	93,99,101,101	0

Continued on next page...

Continued from previous page...

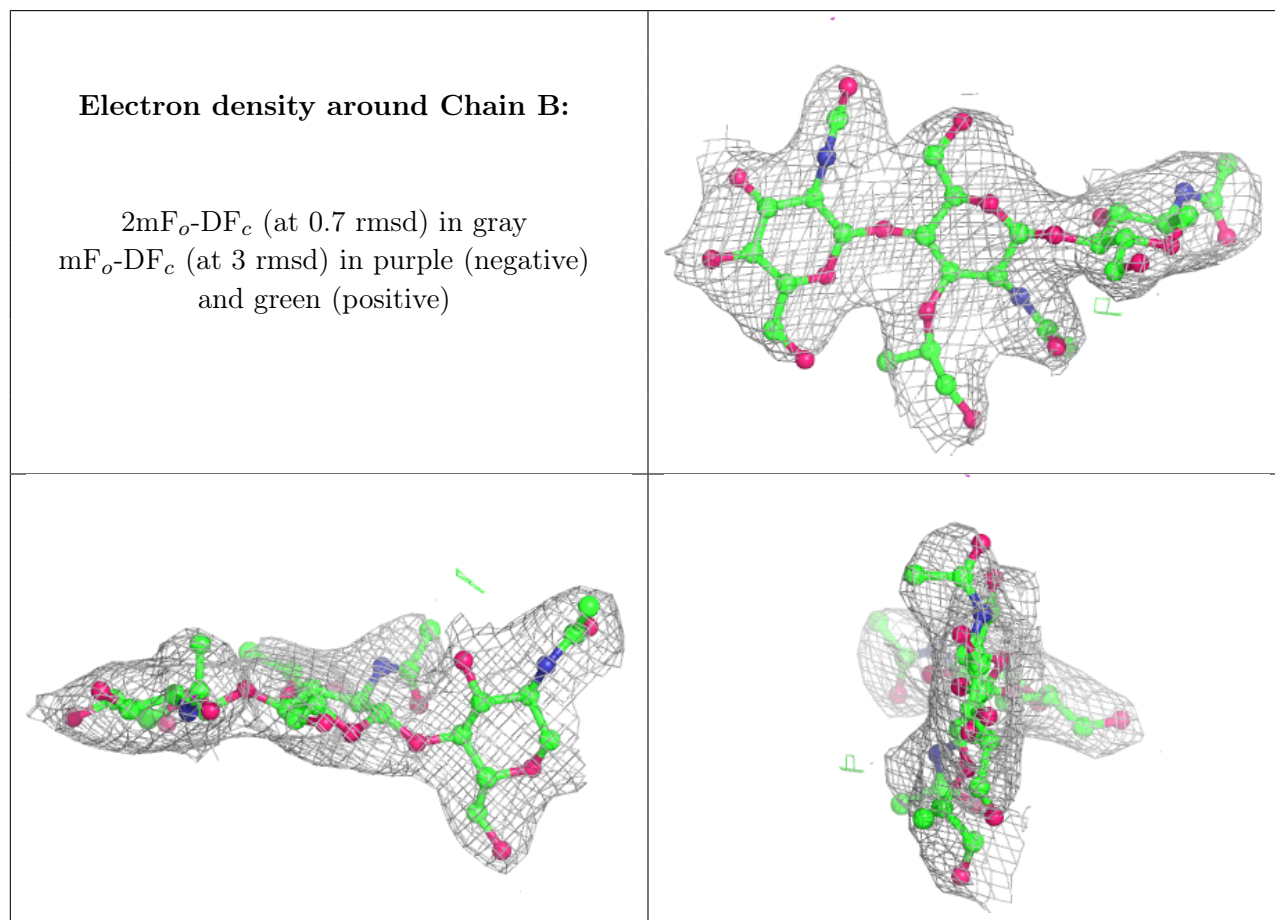
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
2	DGL	G	2	8/10	0.90	0.20	65,70,78,84	0
2	DGL	F	2	8/10	0.92	0.16	73,77,81,84	0

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
3	NAG	B	3	14/15	0.94	0.20	63,65,70,72	0
3	AMU	B	2	18/20	0.96	0.18	62,65,73,79	0
3	NAG	B	1	14/15	0.97	0.13	58,60,62,63	0

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

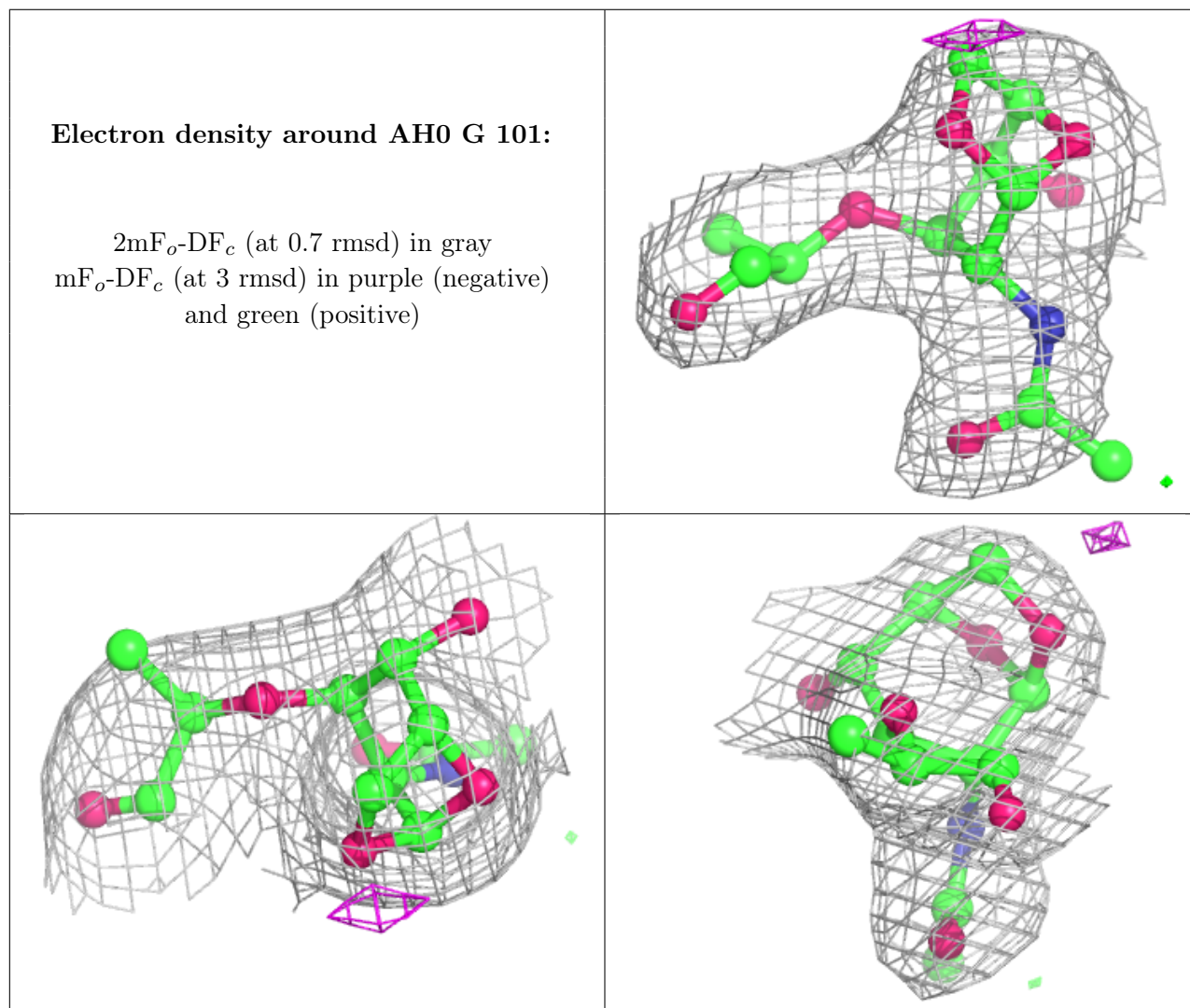


6.4 Ligands [i](#)

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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
4	GOL	A	701	6/6	0.86	0.20	60,65,66,70	0
5	ACT	A	702	4/4	0.92	0.23	62,64,65,65	0
6	AH0	G	101	18/19	0.97	0.13	58,61,68,69	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.



6.5 Other polymers [i](#)

There are no such residues in this entry.