wwPDB X-ray Structure Validation Summary Report (i)

Sep 23, 2023 – 09:54 PM EDT

PDB ID	:	5TO3
Title	:	Crystal structure of thrombin mutant W215A/E217A fused to EGF456 of thrombomodulin via a 31-residue linker and bound to PPACK
Authors	:	Barranco-Medina, S.; Murphy, M.; Pelc, L.; Chen, Z.; Di Cera, E.; Pozzi, N.
Deposited on	:	2016-10-16
Resolution	:	2.34 Å(reported)

This is a wwPDB X-ray Structure Validation Summary 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 (i) 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 (i)) were used in the production of this report:

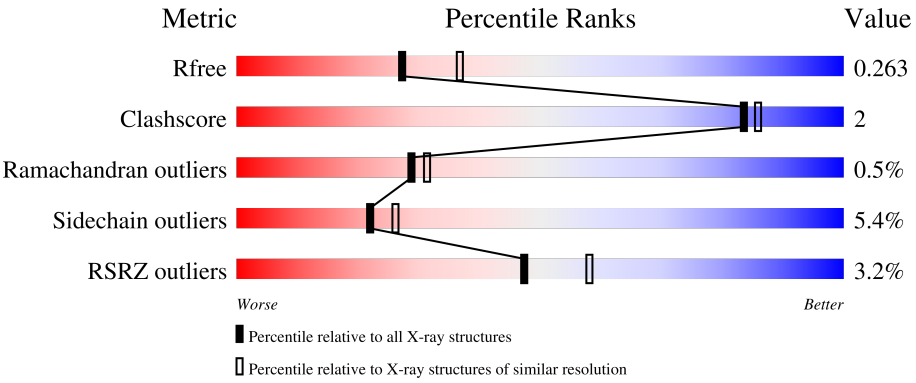
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.35.1
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.35.1

1 Overall quality at a glance (i)

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

The reported resolution of this entry is 2.34 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	2096 (2.36-2.32)
Clashscore	141614	2193 (2.36-2.32)
Ramachandran outliers	138981	2159 (2.36-2.32)
Sidechain outliers	138945	2160 (2.36-2.32)
RSRZ outliers	127900	2067 (2.36-2.32)

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	46	2% 85% 11% .
2	B	409	3% 79% 10% 10%
3	C	7	100%

2 Entry composition (i)

There are 8 unique types of molecules in this entry. The entry contains 3477 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 Prothrombin.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	44	Total	C	N	O	S	0	0	0
			362	228	58	75	1			

- Molecule 2 is a protein called Prothrombin,Thrombomodulin.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	367	Total	C	N	O	S	0	0	0
			2879	1807	504	535	33			

There are 32 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	242	ALA	TRP	engineered mutation	UNP P00734
B	244	ALA	GLU	engineered mutation	UNP P00734
B	274	GLY	-	linker	UNP P00734
B	275	GLY	-	linker	UNP P00734
B	276	SER	-	linker	UNP P00734
B	318	SER	-	linker	UNP P00734
B	319	SER	-	linker	UNP P00734
B	320	ALA	-	linker	UNP P00734
B	321	GLY	-	linker	UNP P00734
B	322	GLY	-	linker	UNP P00734
B	323	GLY	-	linker	UNP P00734
B	324	SER	-	linker	UNP P00734
B	325	SER	-	linker	UNP P00734
B	326	SER	-	linker	UNP P00734
B	327	GLY	-	linker	UNP P00734
B	328	GLY	-	linker	UNP P00734
B	329	GLY	-	linker	UNP P00734
B	330	GLY	-	linker	UNP P00734
B	331	SER	-	linker	UNP P00734
B	332	SER	-	linker	UNP P00734

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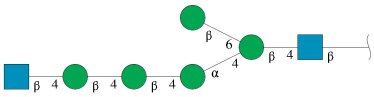
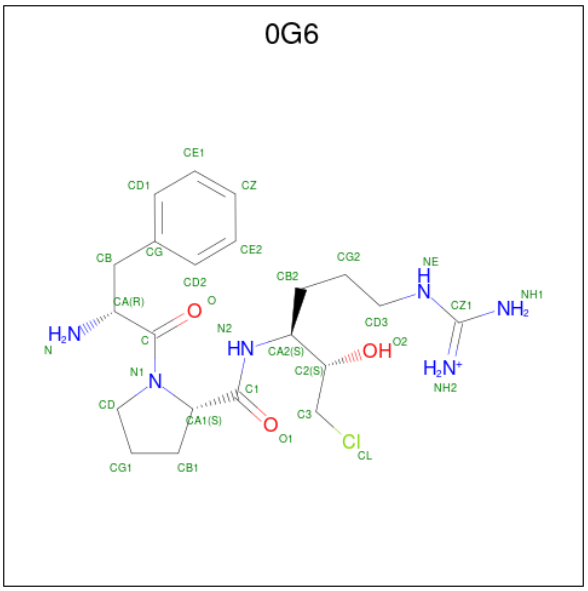
Chain	Residue	Modelled	Actual	Comment	Reference
B	333	SER	-	linker	UNP P00734
B	334	ALA	-	linker	UNP P00734
B	335	GLY	-	linker	UNP P00734
B	336	GLY	-	linker	UNP P00734
B	337	GLY	-	linker	UNP P00734
B	338	SER	-	linker	UNP P00734
B	339	SER	-	linker	UNP P00734
B	340	SER	-	linker	UNP P00734
B	341	GLY	-	linker	UNP P00734
B	342	GLY	-	linker	UNP P00734
B	343	GLY	-	linker	UNP P00734
B	344	GLY	-	linker	UNP P00734

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



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
3	C	7	83	46	2	35	0	0	0

- Molecule 4 is D-phenylalanyl-N-[(2S,3S)-6-{[amino(iminio)methyl]amino}-1-chloro-2-hydroxyhexan-3-yl]-L-prolinamide (three-letter code: 0G6) (formula: $C_{21}H_{34}ClN_6O_3$).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	B	1	Total C N O 30 21 6 3	0	0

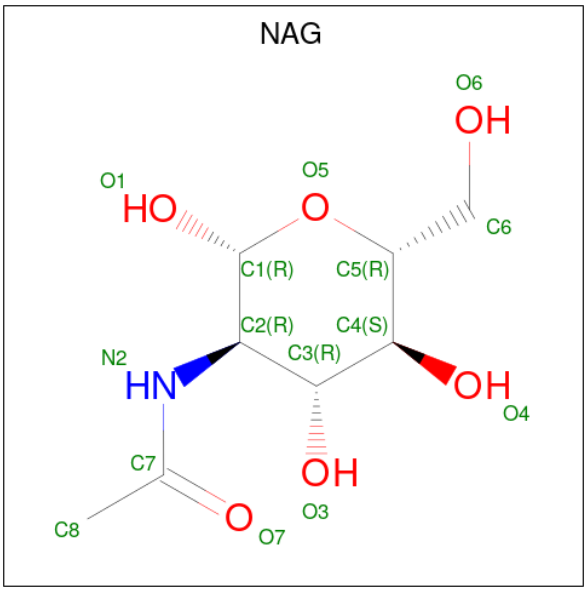
- Molecule 5 is POTASSIUM ION (three-letter code: K) (formula: K).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	B	1	Total K 1 1	0	0

- Molecule 6 is SODIUM ION (three-letter code: NA) (formula: Na).

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

- Molecule 8 is water.

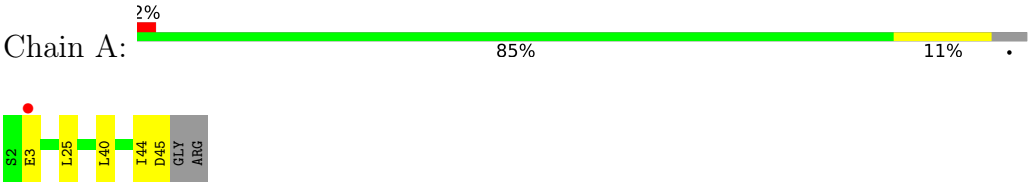
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
8	A	9	Total O 9 9	0	0
8	B	84	Total O 84 84	0	0

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.

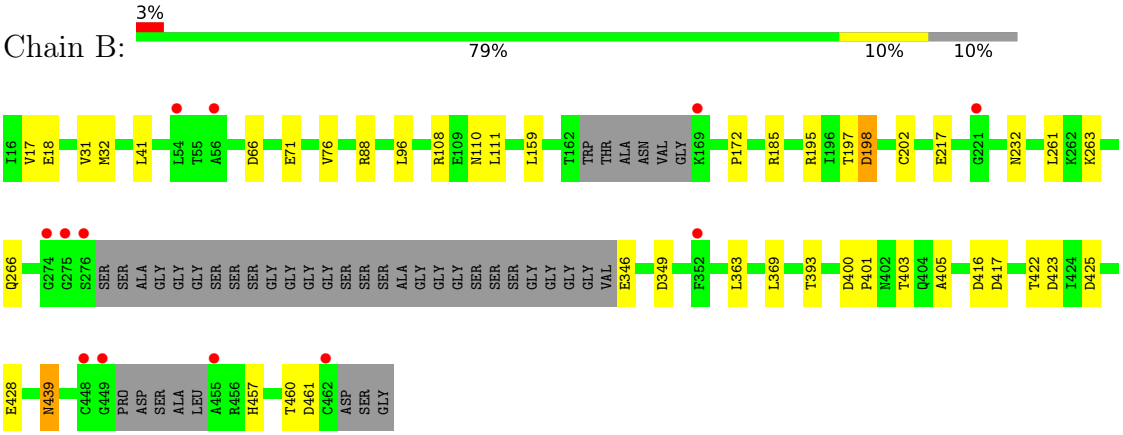
• Molecule 1: Prothrombin

Chain A:



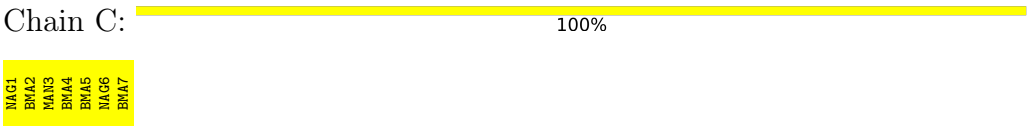
• Molecule 2: Prothrombin,Thrombomodulin

Chain B:



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

Chain C:



4 Data and refinement statistics (i)

Property	Value	Source
Space group	C 2 2 21	Depositor
Cell constants a, b, c, α, β, γ	62.94Å 162.17Å 128.86Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	40.00 – 2.34 34.66 – 2.34	Depositor EDS
% Data completeness (in resolution range)	96.4 (40.00-2.34) 96.5 (34.66-2.34)	Depositor EDS
R_{merge}	0.11	Depositor
R_{sym}	0.11	Depositor
$< I/\sigma(I) >$ [1]	2.26 (at 2.34Å)	Xtriage
Refinement program	REFMAC 5.8.0085	Depositor
R, R_{free}	0.214 , 0.255 0.220 , 0.263	Depositor DCC
R_{free} test set	1388 reflections (5.11%)	wwPDB-VP
Wilson B-factor (Å^2)	36.4	Xtriage
Anisotropy	0.353	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.31 , 31.6	EDS
L-test for twinning[2]	$< \|L\| > = 0.45$, $< L^2 > = 0.28$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.94	EDS
Total number of atoms	3477	wwPDB-VP
Average B, all atoms (Å^2)	47.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.57% 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: K, BMA, NA, MAN, NAG, 0G6

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	0.57	0/369	0.83	0/494
2	B	0.64	0/2950	0.83	3/3991 (0.1%)
All	All	0.63	0/3319	0.83	3/4485 (0.1%)

There are no bond length outliers.

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	B	423	ASP	CB-CG-OD2	-5.51	113.34	118.30
2	B	349	ASP	CB-CG-OD1	5.14	122.93	118.30
2	B	439	ASN	CB-CA-C	-5.02	100.36	110.40

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	362	0	338	1	0
2	B	2879	0	2741	14	0
3	C	83	0	70	0	0
4	B	30	0	31	0	0
5	B	1	0	0	0	0
6	B	1	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
7	B	28	0	26	0	0
8	A	9	0	0	0	0
8	B	84	0	0	0	0
All	All	3477	0	3206	15	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.

The worst 5 of 15 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:425:ASP:HA	2:B:439:ASN:OD1	1.86	0.74
2:B:159:LEU:HD21	2:B:172:PRO:HB3	1.80	0.63
2:B:17:VAL:HG12	2:B:18:GLU:HG2	1.81	0.61
2:B:400:ASP:OD2	2:B:403:THR:OG1	2.22	0.58
2:B:363:LEU:HD11	2:B:369:LEU:HB2	1.88	0.54

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	42/46 (91%)	39 (93%)	3 (7%)	0	100 100
2	B	359/409 (88%)	334 (93%)	23 (6%)	2 (1%)	25 26
All	All	401/455 (88%)	373 (93%)	26 (6%)	2 (0%)	29 31

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	B	405	ALA

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Mol	Chain	Res	Type
2	B	401	PRO

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	40/41 (98%)	37 (92%)	3 (8%)	13	14
2	B	315/337 (94%)	299 (95%)	16 (5%)	24	29
All	All	355/378 (94%)	336 (95%)	19 (5%)	22	26

5 of 19 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	B	263	LYS
2	B	393	THR
2	B	422	THR
2	B	346	GLU
2	B	195	ARG

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

5.3.3 RNA (i)

There are no RNA molecules in this entry.

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

5 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	$\#\|Z\| > 2$
7	NAG	B	504	2	14,14,15	0.47	0	17,19,21	1.23	1 (5%)
3	NAG	C	6	3	14,14,15	0.68	0	17,19,21	1.19	3 (17%)
7	NAG	B	512	2	14,14,15	0.90	1 (7%)	17,19,21	2.34	4 (23%)
3	MAN	C	3	3	11,11,12	0.72	0	15,15,17	3.12	5 (33%)
3	NAG	C	1	3,2	14,14,15	0.91	1 (7%)	17,19,21	3.13	7 (41%)

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	B	504	2	-	0/6/23/26	0/1/1/1
3	NAG	C	6	3	-	0/6/23/26	0/1/1/1
7	NAG	B	512	2	-	2/6/23/26	0/1/1/1
3	MAN	C	3	3	-	2/2/19/22	0/1/1/1
3	NAG	C	1	3,2	-	3/6/23/26	0/1/1/1

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
7	B	512	NAG	C1-C2	2.81	1.56	1.52
3	C	1	NAG	C1-C2	2.29	1.55	1.52

The worst 5 of 20 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	C	1	NAG	C1-O5-C5	9.69	125.32	112.19
3	C	3	MAN	C1-O5-C5	9.11	124.53	112.19
7	B	512	NAG	O5-C1-C2	-5.95	101.89	111.29
3	C	3	MAN	O4-C4-C5	5.46	122.85	109.30
3	C	1	NAG	C2-N2-C7	5.10	130.16	122.90

There are no chirality outliers.

5 of 7 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	C	1	NAG	C3-C2-N2-C7
3	C	1	NAG	O5-C5-C6-O6
7	B	512	NAG	O5-C5-C6-O6
3	C	1	NAG	C4-C5-C6-O6
7	B	512	NAG	C4-C5-C6-O6

There are no ring outliers.

No monomer is involved in short contacts.

5.5 Carbohydrates (i)

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	3,2	14,14,15	0.91	1 (7%)	17,19,21	3.13	7 (41%)
3	BMA	C	2	3	11,11,12	0.65	0	15,15,17	2.40	1 (6%)
3	MAN	C	3	3	11,11,12	0.72	0	15,15,17	3.12	5 (33%)
3	BMA	C	4	3	11,11,12	0.66	0	15,15,17	1.85	6 (40%)
3	BMA	C	5	3	11,11,12	0.58	0	15,15,17	1.14	2 (13%)
3	NAG	C	6	3	14,14,15	0.68	0	17,19,21	1.19	3 (17%)
3	BMA	C	7	3	11,11,12	0.80	0	15,15,17	1.39	2 (13%)

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	3,2	-	3/6/23/26	0/1/1/1
3	BMA	C	2	3	-	2/2/19/22	0/1/1/1
3	MAN	C	3	3	-	2/2/19/22	0/1/1/1

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

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	C	1	NAG	C1-C2	2.29	1.55	1.52

The worst 5 of 26 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	C	1	NAG	C1-O5-C5	9.69	125.32	112.19
3	C	3	MAN	C1-O5-C5	9.11	124.53	112.19
3	C	2	BMA	C1-O5-C5	8.45	123.64	112.19
3	C	3	MAN	O4-C4-C5	5.46	122.85	109.30
3	C	1	NAG	C2-N2-C7	5.10	130.16	122.90

There are no chirality outliers.

5 of 10 torsion outliers are listed below:

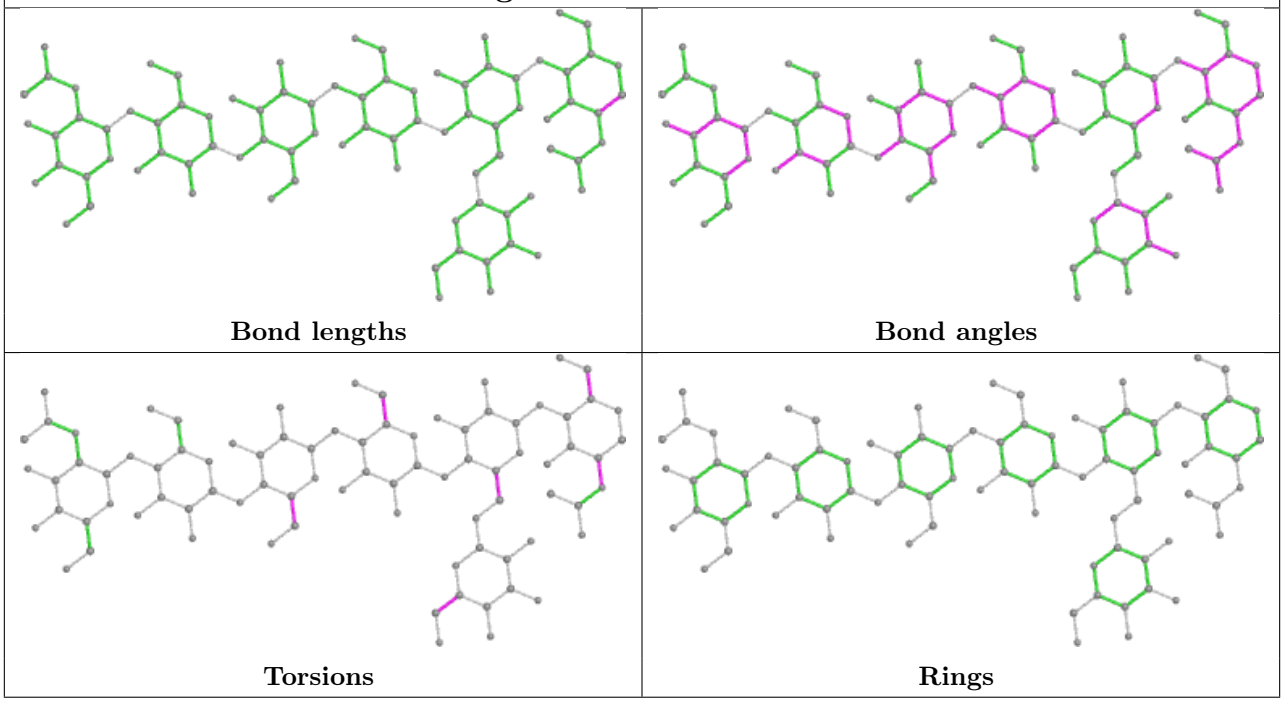
Mol	Chain	Res	Type	Atoms
3	C	1	NAG	C3-C2-N2-C7
3	C	2	BMA	O5-C5-C6-O6
3	C	1	NAG	O5-C5-C6-O6
3	C	1	NAG	C4-C5-C6-O6
3	C	3	MAN	O5-C5-C6-O6

There are no ring outliers.

No monomer is involved in short contacts.

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for oligosaccharide.

Oligosaccharide Chain C



5.6 Ligand geometry (i)

Of 5 ligands modelled in this entry, 2 are monoatomic - leaving 3 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	$\#\|Z\| > 2$
4	0G6	B	501	2	30,31,32	0.51	0	37,41,42	0.93	1 (2%)
7	NAG	B	512	2	14,14,15	0.90	1 (7%)	17,19,21	2.34	4 (23%)
7	NAG	B	504	2	14,14,15	0.47	0	17,19,21	1.23	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
4	0G6	B	501	2	-	4/31/41/43	0/2/2/2

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
7	NAG	B	512	2	-	2/6/23/26	0/1/1/1
7	NAG	B	504	2	-	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)
7	B	512	NAG	C1-C2	2.81	1.56	1.52

The worst 5 of 6 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
7	B	512	NAG	O5-C1-C2	-5.95	101.89	111.29
7	B	512	NAG	C1-O5-C5	4.67	118.52	112.19
7	B	504	NAG	C1-O5-C5	3.57	117.03	112.19
7	B	512	NAG	C1-C2-N2	3.55	116.55	110.49
7	B	512	NAG	O5-C5-C6	2.05	110.42	107.20

There are no chirality outliers.

5 of 6 torsion outliers are listed below:

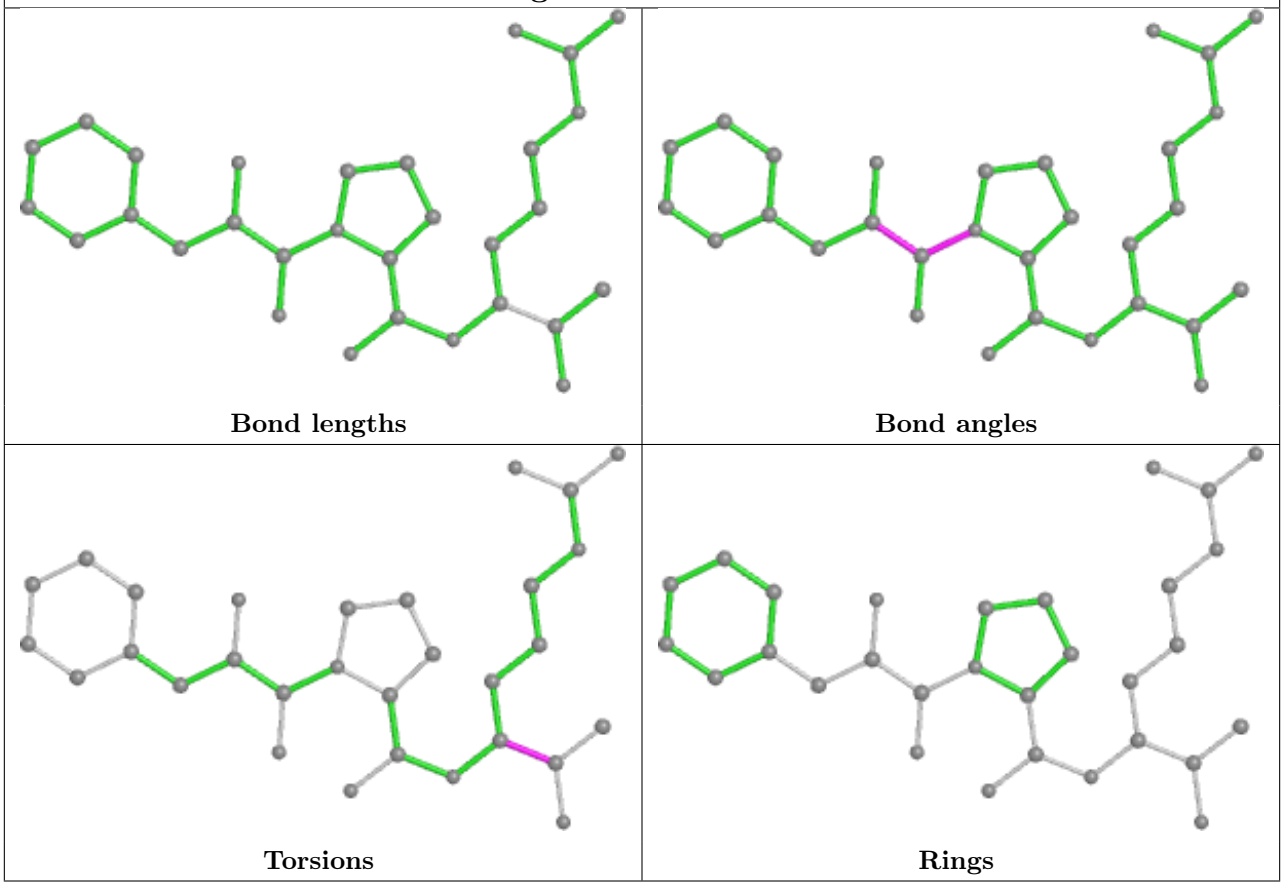
Mol	Chain	Res	Type	Atoms
4	B	501	0G6	C3-C2-CA2-N2
4	B	501	0G6	O2-C2-CA2-CB2
7	B	512	NAG	O5-C5-C6-O6
7	B	512	NAG	C4-C5-C6-O6
4	B	501	0G6	O2-C2-CA2-N2

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 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 0G6 B 501



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, 95^{th} 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	44/46 (95%)	-0.13	1 (2%)	60	69	35, 48, 66, 84	0
2	B	367/409 (89%)	0.06	12 (3%)	46	57	25, 43, 74, 121	0
All	All	411/455 (90%)	0.04	13 (3%)	47	58	25, 44, 72, 121	0

The worst 5 of 13 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	B	275	GLY	9.7
2	B	276	SER	8.4
2	B	449	GLY	6.4
2	B	455	ALA	3.3
2	B	169	LYS	3.2

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

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, 95^{th} 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.

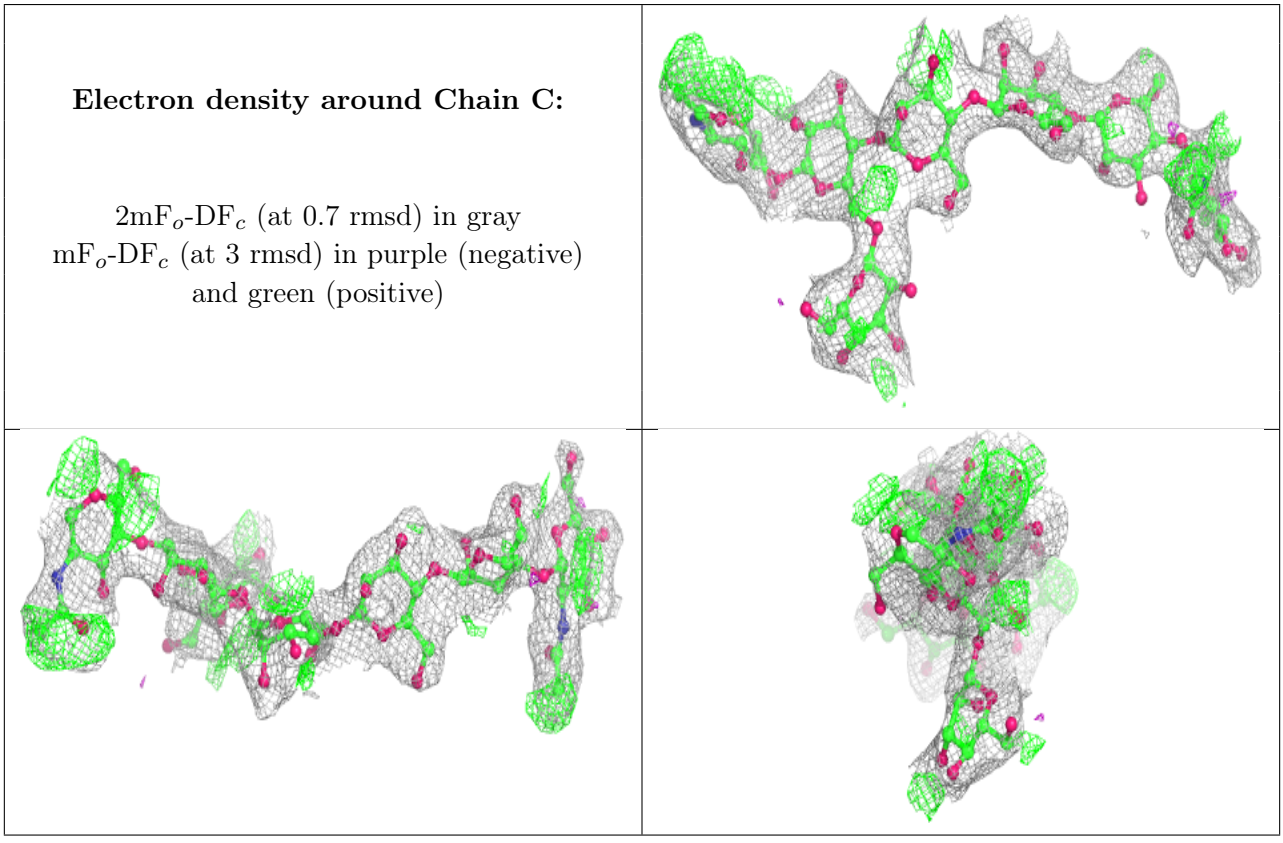
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
3	MAN	C	3	11/12	0.72	0.21	62,74,84,84	0
7	NAG	B	512	14/15	0.76	0.23	56,80,94,97	0
7	NAG	B	504	14/15	0.84	0.23	65,74,78,78	0
3	NAG	C	1	14/15	0.84	0.15	53,67,86,86	0
3	NAG	C	6	14/15	0.87	0.18	40,54,71,71	0

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, 95^{th} 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	BMA	C	7	11/12	0.71	0.28	81,88,98,103	0
3	MAN	C	3	11/12	0.72	0.21	62,74,84,84	0
3	BMA	C	5	11/12	0.83	0.26	67,88,94,110	0
3	NAG	C	1	14/15	0.84	0.15	53,67,86,86	0
3	NAG	C	6	14/15	0.87	0.18	40,54,71,71	0
3	BMA	C	2	11/12	0.87	0.21	68,73,80,81	0
3	BMA	C	4	11/12	0.90	0.23	63,69,72,75	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,

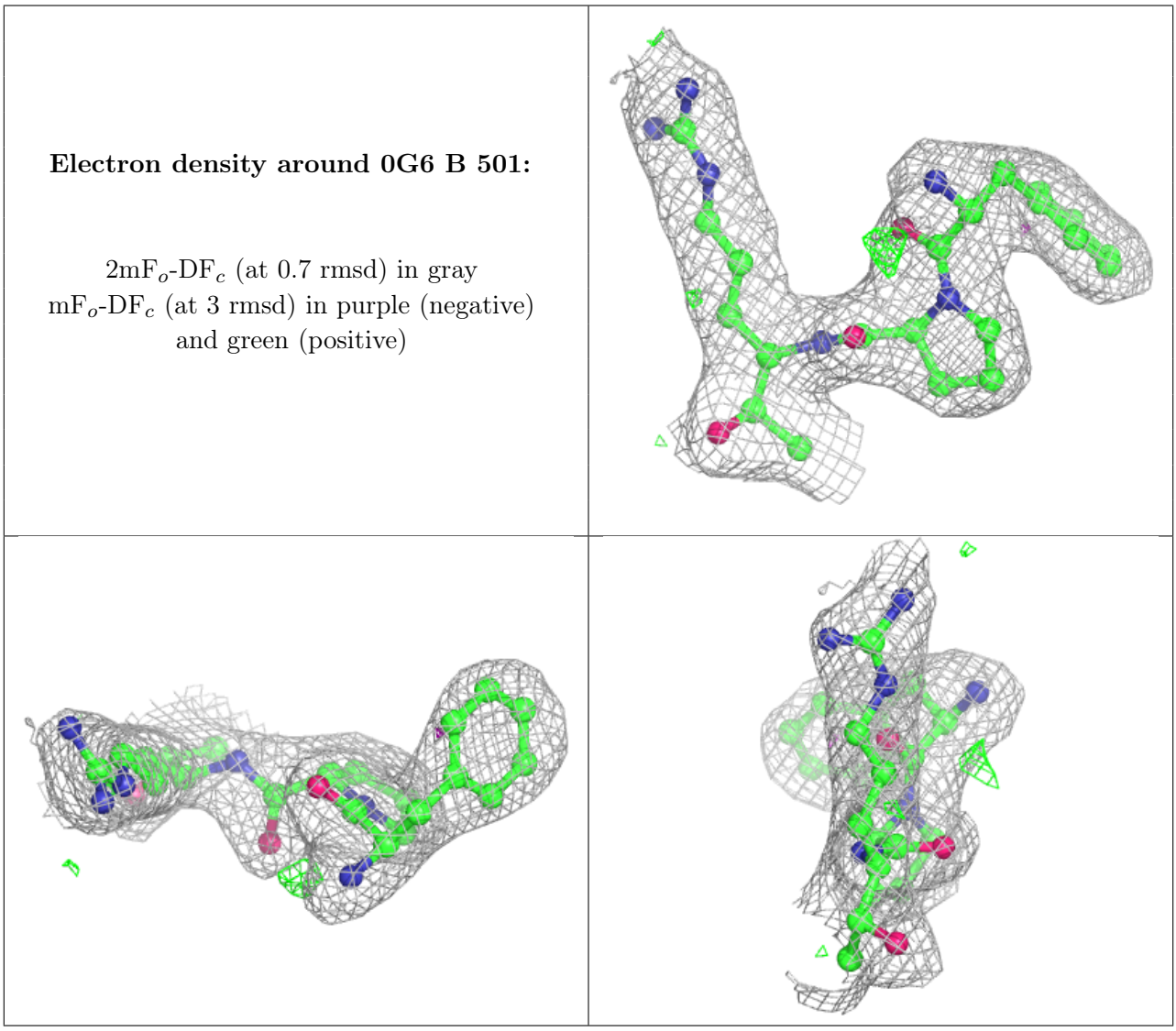
median, 95^{th} percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
7	NAG	B	512	14/15	0.76	0.23	56,80,94,97	0
7	NAG	B	504	14/15	0.84	0.23	65,74,78,78	0
6	NA	B	503	1/1	0.94	0.07	52,52,52,52	0
5	K	B	502	1/1	0.95	0.06	25,25,25,25	0
4	0G6	B	501	30/31	0.96	0.15	30,35,38,41	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 0G6 B 501:

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



6.5 Other polymers (i)

There are no such residues in this entry.