



wwPDB X-ray Structure Validation Summary Report ⓘ

Nov 22, 2023 – 06:16 PM JST

PDB ID : 7XCM
Title : Crystal structure of sulfite MttB structure at 3.2 Å resolution
Authors : Li, J.; Chan, M.K.
Deposited on : 2022-03-24
Resolution : 3.20 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 ⓘ 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 : 1.8.5 (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

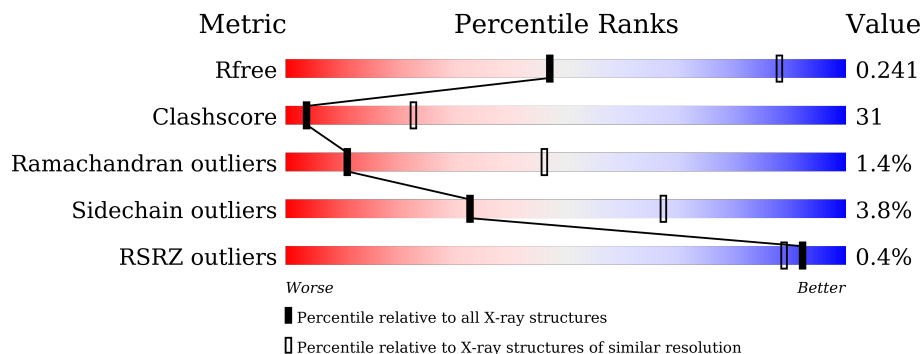
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 3.20 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	1133 (3.20-3.20)
Clashscore	141614	1253 (3.20-3.20)
Ramachandran outliers	138981	1234 (3.20-3.20)
Sidechain outliers	138945	1233 (3.20-3.20)
RSRZ outliers	127900	1095 (3.20-3.20)

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 $\leq 5\%$. 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	503	 51% 44%
1	B	503	 49% 48%
1	C	503	 43% 50%
1	D	503	 49% 47%
1	E	503	 44% 51%
1	F	503	 45% 50%

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
4	GOL	C	603	-	-	X	-
4	GOL	D	604	-	-	X	-
4	GOL	F	603	-	-	X	-

2 Entry composition [i](#)

There are 5 unique types of molecules in this entry. The entry contains 22891 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 Trimethylamine methyltransferase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	494	3765	2394	629	720	22	0	0	0
1	B	494	3765	2394	629	720	22	0	0	0
1	C	493	3757	2389	628	719	21	0	0	0
1	D	494	3765	2394	629	720	22	0	0	0
1	E	494	3765	2394	629	720	22	0	0	0
1	F	494	3765	2394	629	720	22	0	0	0

There are 54 discrepancies between the modelled and reference sequences:

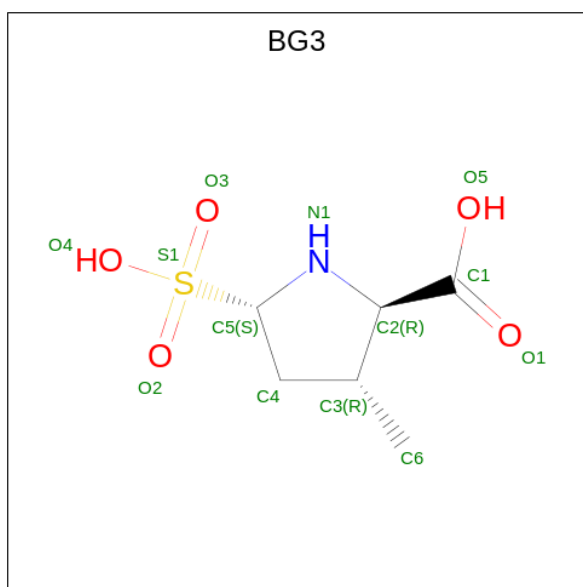
Chain	Residue	Modelled	Actual	Comment	Reference
A	334	LYS	PYL	conflict	UNP A0A0E3QRM4
A	496	GLY	-	expression tag	UNP A0A0E3QRM4
A	497	GLY	-	expression tag	UNP A0A0E3QRM4
A	498	HIS	-	expression tag	UNP A0A0E3QRM4
A	499	HIS	-	expression tag	UNP A0A0E3QRM4
A	500	HIS	-	expression tag	UNP A0A0E3QRM4
A	501	HIS	-	expression tag	UNP A0A0E3QRM4
A	502	HIS	-	expression tag	UNP A0A0E3QRM4
A	503	HIS	-	expression tag	UNP A0A0E3QRM4
B	334	LYS	PYL	conflict	UNP A0A0E3QRM4
B	496	GLY	-	expression tag	UNP A0A0E3QRM4
B	497	GLY	-	expression tag	UNP A0A0E3QRM4
B	498	HIS	-	expression tag	UNP A0A0E3QRM4
B	499	HIS	-	expression tag	UNP A0A0E3QRM4
B	500	HIS	-	expression tag	UNP A0A0E3QRM4
B	501	HIS	-	expression tag	UNP A0A0E3QRM4
B	502	HIS	-	expression tag	UNP A0A0E3QRM4

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Chain	Residue	Modelled	Actual	Comment	Reference
B	503	HIS	-	expression tag	UNP A0A0E3QRM4
C	334	LYS	PYL	conflict	UNP A0A0E3QRM4
C	496	GLY	-	expression tag	UNP A0A0E3QRM4
C	497	GLY	-	expression tag	UNP A0A0E3QRM4
C	498	HIS	-	expression tag	UNP A0A0E3QRM4
C	499	HIS	-	expression tag	UNP A0A0E3QRM4
C	500	HIS	-	expression tag	UNP A0A0E3QRM4
C	501	HIS	-	expression tag	UNP A0A0E3QRM4
C	502	HIS	-	expression tag	UNP A0A0E3QRM4
C	503	HIS	-	expression tag	UNP A0A0E3QRM4
D	334	LYS	PYL	conflict	UNP A0A0E3QRM4
D	496	GLY	-	expression tag	UNP A0A0E3QRM4
D	497	GLY	-	expression tag	UNP A0A0E3QRM4
D	498	HIS	-	expression tag	UNP A0A0E3QRM4
D	499	HIS	-	expression tag	UNP A0A0E3QRM4
D	500	HIS	-	expression tag	UNP A0A0E3QRM4
D	501	HIS	-	expression tag	UNP A0A0E3QRM4
D	502	HIS	-	expression tag	UNP A0A0E3QRM4
D	503	HIS	-	expression tag	UNP A0A0E3QRM4
E	334	LYS	PYL	conflict	UNP A0A0E3QRM4
E	496	GLY	-	expression tag	UNP A0A0E3QRM4
E	497	GLY	-	expression tag	UNP A0A0E3QRM4
E	498	HIS	-	expression tag	UNP A0A0E3QRM4
E	499	HIS	-	expression tag	UNP A0A0E3QRM4
E	500	HIS	-	expression tag	UNP A0A0E3QRM4
E	501	HIS	-	expression tag	UNP A0A0E3QRM4
E	502	HIS	-	expression tag	UNP A0A0E3QRM4
E	503	HIS	-	expression tag	UNP A0A0E3QRM4
F	334	LYS	PYL	conflict	UNP A0A0E3QRM4
F	496	GLY	-	expression tag	UNP A0A0E3QRM4
F	497	GLY	-	expression tag	UNP A0A0E3QRM4
F	498	HIS	-	expression tag	UNP A0A0E3QRM4
F	499	HIS	-	expression tag	UNP A0A0E3QRM4
F	500	HIS	-	expression tag	UNP A0A0E3QRM4
F	501	HIS	-	expression tag	UNP A0A0E3QRM4
F	502	HIS	-	expression tag	UNP A0A0E3QRM4
F	503	HIS	-	expression tag	UNP A0A0E3QRM4

- Molecule 2 is 3-METHYL-5-SULFO-PYRROLIDINE-2-CARBOXYLIC ACID (three-letter code: BG3) (formula: C₆H₁₁NO₅S) (labeled as "Ligand of Interest" by depositor).

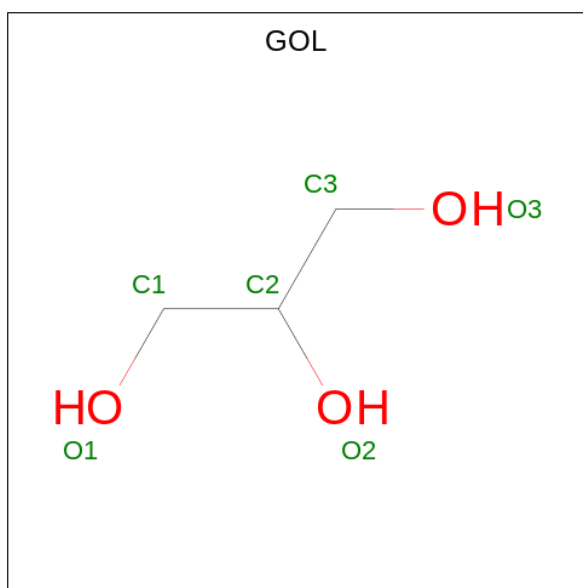


Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	N	O	S		
2	A	1	Total	C	N	O	S	0	0
			12	6	1	4	1		
2	B	1	Total	C	N	O	S	0	0
			12	6	1	4	1		
2	C	1	Total	C	N	O	S	0	0
			12	6	1	4	1		
2	D	1	Total	C	N	O	S	0	0
			12	6	1	4	1		
2	E	1	Total	C	N	O	S	0	0
			12	6	1	4	1		
2	F	1	Total	C	N	O	S	0	0
			12	6	1	4	1		

- Molecule 3 is SODIUM ION (three-letter code: NA) (formula: Na).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	Na		
3	A	1	Total	Na	0	0
			1	1		
3	B	1	Total	Na	0	0
			1	1		
3	C	1	Total	Na	0	0
			1	1		
3	D	1	Total	Na	0	0
			1	1		
3	E	1	Total	Na	0	0
			1	1		
3	F	1	Total	Na	0	0
			1	1		

- Molecule 4 is GLYCEROL (three-letter code: GOL) (formula: $C_3H_8O_3$).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	1	Total C O 6 3 3	0	0
4	A	1	Total C O 6 3 3	0	0
4	B	1	Total C O 6 3 3	0	0
4	B	1	Total C O 6 3 3	0	0
4	C	1	Total C O 6 3 3	0	0
4	D	1	Total C O 6 3 3	0	0
4	D	1	Total C O 6 3 3	0	0
4	D	1	Total C O 6 3 3	0	0
4	E	1	Total C O 6 3 3	0	0
4	E	1	Total C O 6 3 3	0	0
4	F	1	Total C O 6 3 3	0	0

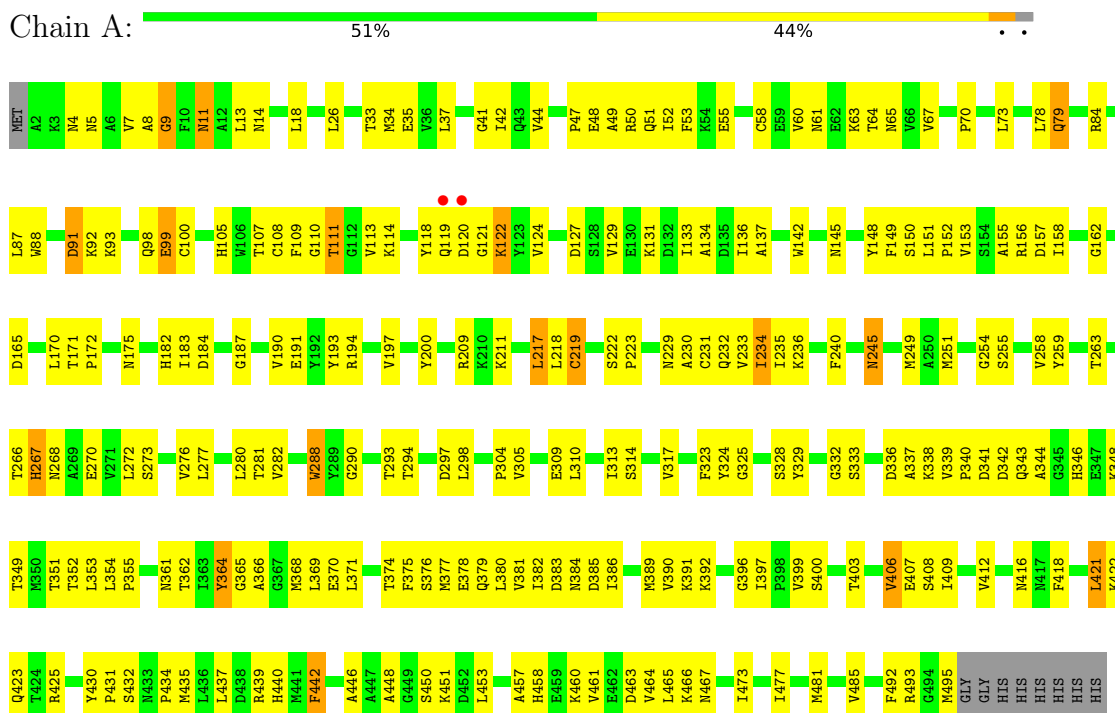
- Molecule 5 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	30	Total 30	O 30	0	0
5	B	28	Total 28	O 28	0	0
5	C	23	Total 23	O 23	0	0
5	D	29	Total 29	O 29	0	0
5	E	25	Total 25	O 25	0	0
5	F	30	Total 30	O 30	0	0

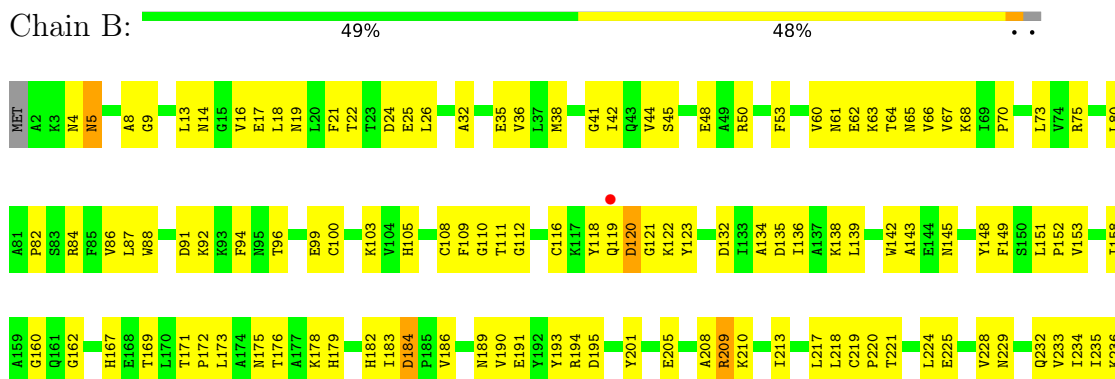
3 Residue-property plots

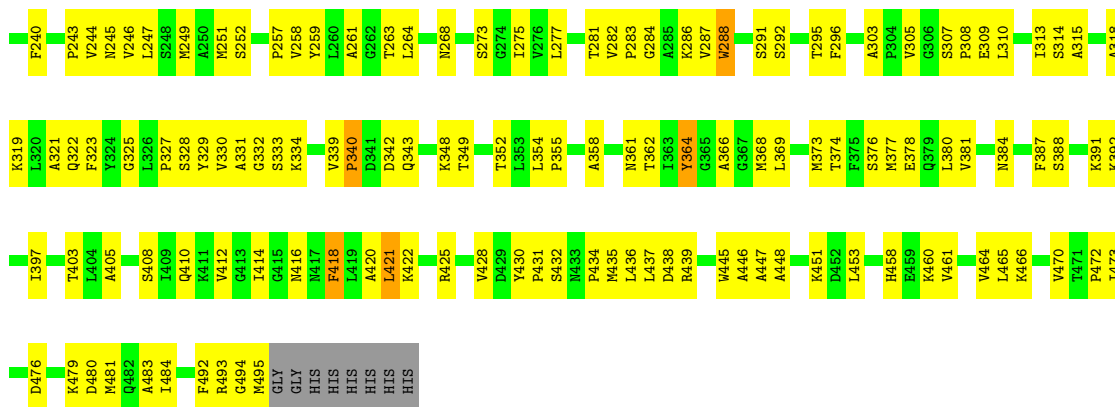
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. 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: Trimethylamine methyltransferase

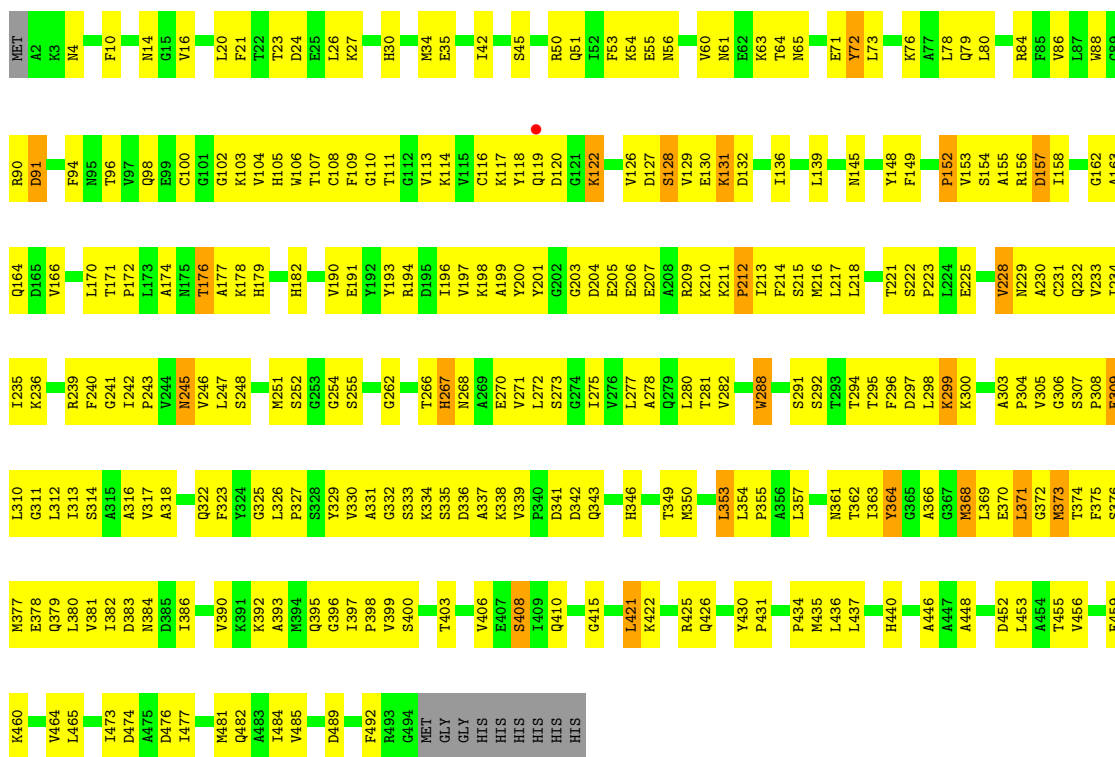


- Molecule 1: Trimethylamine methyltransferase

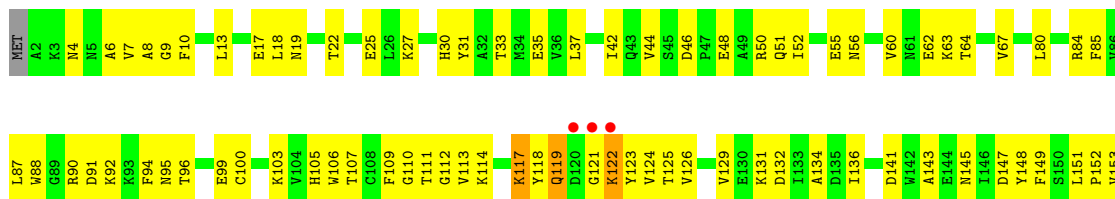




● Molecule 1: Trimethylamine methyltransferase



● Molecule 1: Trimethylamine methyltransferase



I473	V317	G241	K92
D474	A318	I242	A93
A475	K319	N245	F94
D476	L320	V246	E99
I477	A321	L247	V104
F478	Q322	S248	H106
K479	F323	M249	W106
D480	G332	A250	T107
M481	S333	M251	C108
A482	K334	S252	F109
A483	A337	Y259	G110
I484	K338	L260	T111
V485	V339	A261	G112
D486	P340	H267	V113
F487	L419	M268	K114
A488	A420	V186	V115
D489	L421	G187	C116
F492	K422	V271	K117
M495	R425	L272	Y118
GLY	Q426	S273	Q119
GLY	L427	G274	D120
HIS	V428	I275	G121
HIS	D429	A278	K122
HIS	M435	Q279	Y123
HIS	L436	L280	V124
HIS	L437	D196	T125
HIS	D438	T281	V126
	R439	V282	D127
	H440	P283	S128
	M441	G284	V129
	G443	A285	E130
	D444	K286	K131
	W445	V287	D132
	A446	W288	I133
	A447	Y289	A134
	A448	G290	D135
	A449	S291	I136
	S450	S292	D141
	K451	T293	W142
	D452	T294	K211
	L453	T295	M216
	A454	F296	L217
	T455	D297	L218
	V456	L298	C219
	A457	K299	L224
	H458	K300	G227
	E459	G301	S229
	K460	T302	A230
	V461	A303	V305
	E462	P304	C231
	D463	V306	G306
	V464	S307	S307
	L465	P308	V232
	H468	E309	V233
		L310	I234
		G311	I235
			K236
			F387

4 Data and refinement statistics i

Property	Value	Source
Space group	P 32 2 1	Depositor
Cell constants a, b, c, α , β , γ	174.84Å 174.84Å 300.12Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	20.00 – 3.20 19.95 – 3.20	Depositor EDS
% Data completeness (in resolution range)	84.5 (20.00-3.20) 84.5 (19.95-3.20)	Depositor EDS
R_{merge}	0.20	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.24 (at 3.22Å)	Xtrriage
Refinement program	CNS	Depositor
R, R_{free}	0.167 , 0.243 0.166 , 0.241	Depositor DCC
R_{free} test set	7479 reflections (10.10%)	wwPDB-VP
Wilson B-factor (Å ²)	55.4	Xtrriage
Anisotropy	0.517	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.33 , 77.0	EDS
L-test for twinning ²	$\langle L \rangle = 0.47$, $\langle L^2 \rangle = 0.30$	Xtrriage
Estimated twinning fraction	0.029 for -h,-k,l	Xtrriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	22891	wwPDB-VP
Average B, all atoms (Å ²)	53.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.10% 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: BG3, NA, GOL

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	0.34	0/3840	0.61	0/5209
1	B	0.35	0/3840	0.63	0/5209
1	C	0.33	0/3832	0.60	0/5199
1	D	0.34	0/3840	0.62	0/5209
1	E	0.34	0/3840	0.62	0/5209
1	F	0.35	0/3840	0.60	0/5209
All	All	0.34	0/23032	0.61	0/31244

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 [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	3765	0	3762	256	0
1	B	3765	0	3762	227	0
1	C	3757	0	3753	274	0
1	D	3765	0	3762	242	0
1	E	3765	0	3762	243	0
1	F	3765	0	3762	288	0
2	A	12	0	10	1	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	B	12	0	9	2	0
2	C	12	0	10	1	0
2	D	12	0	10	0	0
2	E	12	0	10	0	0
2	F	12	0	10	0	0
3	A	1	0	0	0	0
3	B	1	0	0	0	0
3	C	1	0	0	0	0
3	D	1	0	0	0	0
3	E	1	0	0	0	0
3	F	1	0	0	0	0
4	A	12	0	16	3	0
4	B	12	0	16	3	0
4	C	6	0	8	5	0
4	D	18	0	24	9	0
4	E	12	0	16	0	0
4	F	6	0	8	7	0
5	A	30	0	0	3	0
5	B	28	0	0	1	0
5	C	23	0	0	3	0
5	D	29	0	0	4	0
5	E	25	0	0	3	0
5	F	30	0	0	3	0
All	All	22891	0	22710	1416	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 31.

The worst 5 of 1416 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:C:368:MET:HG2	1:C:369:LEU:H	1.22	1.05
1:F:209:ARG:HH12	1:F:241:GLY:HA3	1.21	1.05
1:D:118:TYR:H	4:D:604:GOL:H12	1.23	1.03
1:B:377:MET:HE1	1:B:465:LEU:HD11	1.40	1.00
1:F:136:ILE:HG21	1:F:152:PRO:HG3	1.42	0.98

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	492/503 (98%)	434 (88%)	55 (11%)	3 (1%)	25	64
1	B	492/503 (98%)	435 (88%)	52 (11%)	5 (1%)	15	54
1	C	491/503 (98%)	424 (86%)	57 (12%)	10 (2%)	7	38
1	D	492/503 (98%)	424 (86%)	63 (13%)	5 (1%)	15	54
1	E	492/503 (98%)	417 (85%)	64 (13%)	11 (2%)	6	35
1	F	492/503 (98%)	433 (88%)	51 (10%)	8 (2%)	9	43
All	All	2951/3018 (98%)	2567 (87%)	342 (12%)	42 (1%)	11	46

5 of 42 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	C	371	LEU
1	E	421	LEU
1	F	62	GLU
1	C	421	LEU
1	D	202	GLY

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	405/412 (98%)	388 (96%)	17 (4%)	30	65
1	B	405/412 (98%)	390 (96%)	15 (4%)	34	68
1	C	404/412 (98%)	387 (96%)	17 (4%)	30	65

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	D	405/412 (98%)	391 (96%)	14 (4%)	36	69
1	E	405/412 (98%)	389 (96%)	16 (4%)	31	66
1	F	405/412 (98%)	391 (96%)	14 (4%)	36	69
All	All	2429/2472 (98%)	2336 (96%)	93 (4%)	33	67

5 of 93 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	D	364	TYR
1	E	218	LEU
1	D	375	PHE
1	E	86	VAL
1	E	364	TYR

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 83 such sidechains are listed below:

Mol	Chain	Res	Type
1	E	65	ASN
1	F	175	ASN
1	E	105	HIS
1	E	322	GLN
1	F	268	ASN

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 23 ligands modelled in this entry, 6 are monoatomic - leaving 17 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	GOL	C	603	-	5,5,5	0.31	0	5,5,5	0.81	0
4	GOL	D	605	-	5,5,5	0.33	0	5,5,5	0.50	0
4	GOL	E	604	-	5,5,5	0.33	0	5,5,5	0.95	0
4	GOL	D	603	-	5,5,5	0.29	0	5,5,5	0.49	0
4	GOL	B	603	-	5,5,5	0.27	0	5,5,5	0.80	0
2	BG3	D	601	1	8,12,13	1.06	0	11,18,20	1.54	4 (36%)
4	GOL	A	603	-	5,5,5	0.34	0	5,5,5	0.34	0
4	GOL	B	604	-	5,5,5	0.36	0	5,5,5	0.72	0
2	BG3	E	601	1	8,12,13	1.19	0	11,18,20	1.47	4 (36%)
4	GOL	D	604	-	5,5,5	0.30	0	5,5,5	0.78	0
2	BG3	C	601	1	8,12,13	1.39	1 (12%)	11,18,20	1.42	3 (27%)
4	GOL	F	603	-	5,5,5	0.30	0	5,5,5	1.28	1 (20%)
2	BG3	F	601	1	8,12,13	1.09	0	11,18,20	1.35	3 (27%)
4	GOL	E	603	-	5,5,5	0.32	0	5,5,5	0.48	0
2	BG3	B	601	1	8,12,13	1.59	1 (12%)	11,18,20	1.46	3 (27%)
2	BG3	A	601	1	8,12,13	1.37	1 (12%)	11,18,20	1.51	2 (18%)
4	GOL	A	604	-	5,5,5	0.28	0	5,5,5	0.48	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
4	GOL	C	603	-	-	4/4/4/4	-
4	GOL	D	605	-	-	4/4/4/4	-
4	GOL	E	604	-	-	0/4/4/4	-
4	GOL	D	603	-	-	2/4/4/4	-
4	GOL	B	603	-	-	3/4/4/4	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	BG3	D	601	1	-	1/1/20/22	0/1/1/1
4	GOL	A	603	-	-	4/4/4/4	-
4	GOL	B	604	-	-	4/4/4/4	-
2	BG3	E	601	1	-	1/1/20/22	0/1/1/1
4	GOL	D	604	-	-	2/4/4/4	-
2	BG3	C	601	1	-	0/1/20/22	0/1/1/1
4	GOL	F	603	-	-	1/4/4/4	-
2	BG3	F	601	1	-	1/1/20/22	0/1/1/1
4	GOL	E	603	-	-	2/4/4/4	-
2	BG3	B	601	1	-	1/1/20/22	0/1/1/1
2	BG3	A	601	1	-	1/1/20/22	0/1/1/1
4	GOL	A	604	-	-	4/4/4/4	-

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	601	BG3	C3-C2	-3.28	1.51	1.55
2	C	601	BG3	C3-C2	-2.51	1.52	1.55
2	A	601	BG3	C3-C2	-2.37	1.52	1.55

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

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	F	601	BG3	C2-N1-C5	-2.66	97.98	106.43
2	D	601	BG3	C6-C3-C4	-2.61	108.21	113.05
2	A	601	BG3	C2-N1-C5	-2.52	98.42	106.43
2	C	601	BG3	C2-N1-C5	-2.50	98.47	106.43
2	E	601	BG3	C2-N1-C5	-2.47	98.57	106.43

There are no chirality outliers.

5 of 35 torsion outliers are listed below:

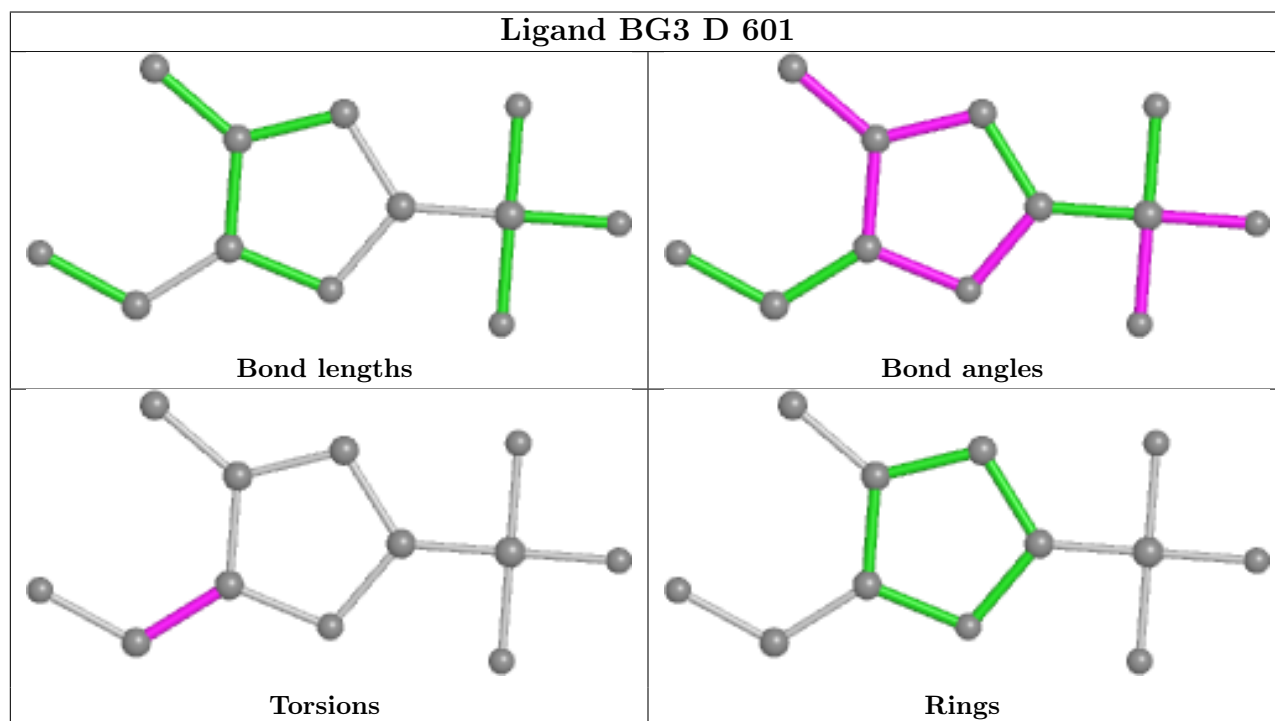
Mol	Chain	Res	Type	Atoms
2	A	601	BG3	O1-C1-C2-C3
2	D	601	BG3	O1-C1-C2-C3
2	E	601	BG3	O1-C1-C2-C3
4	A	603	GOL	O1-C1-C2-C3
4	A	603	GOL	C1-C2-C3-O3

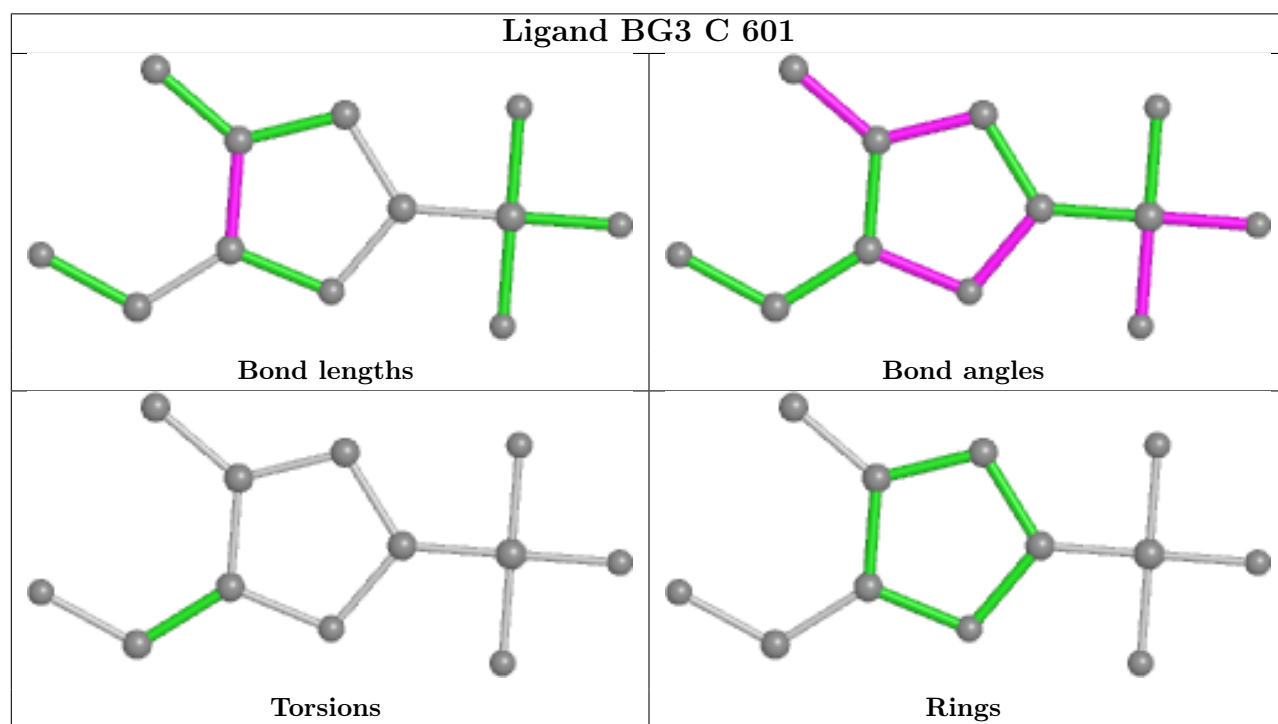
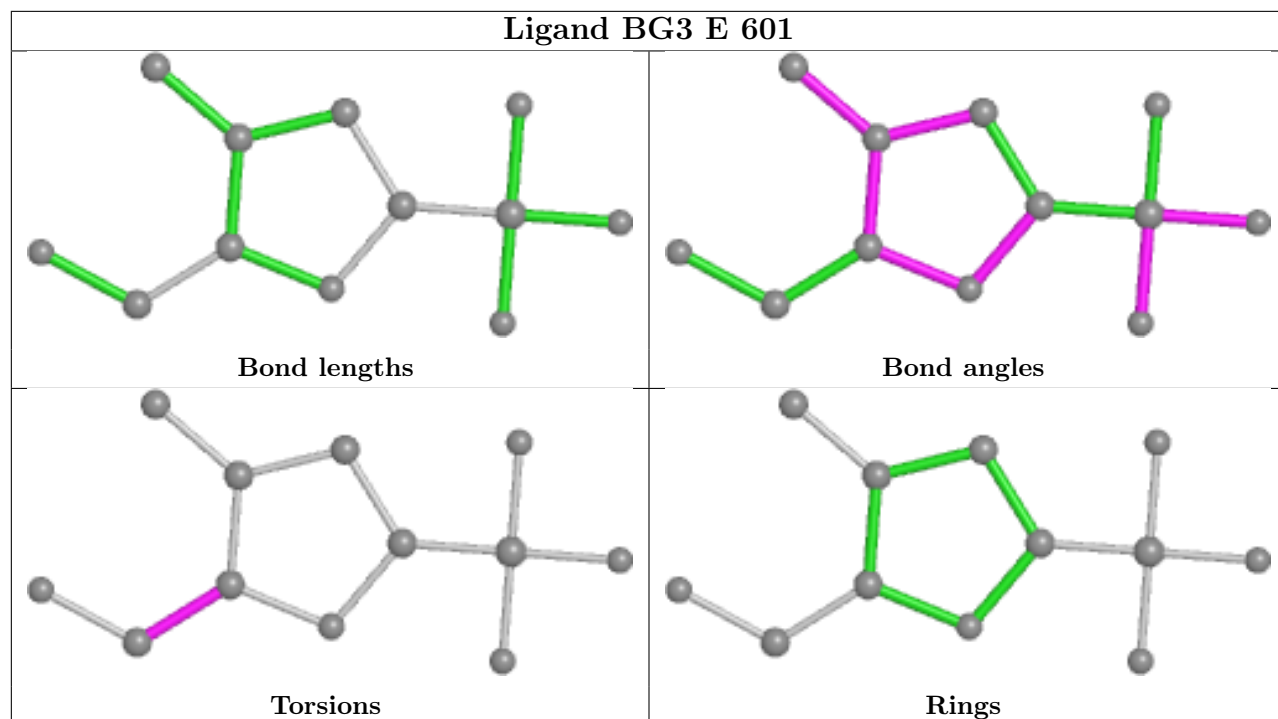
There are no ring outliers.

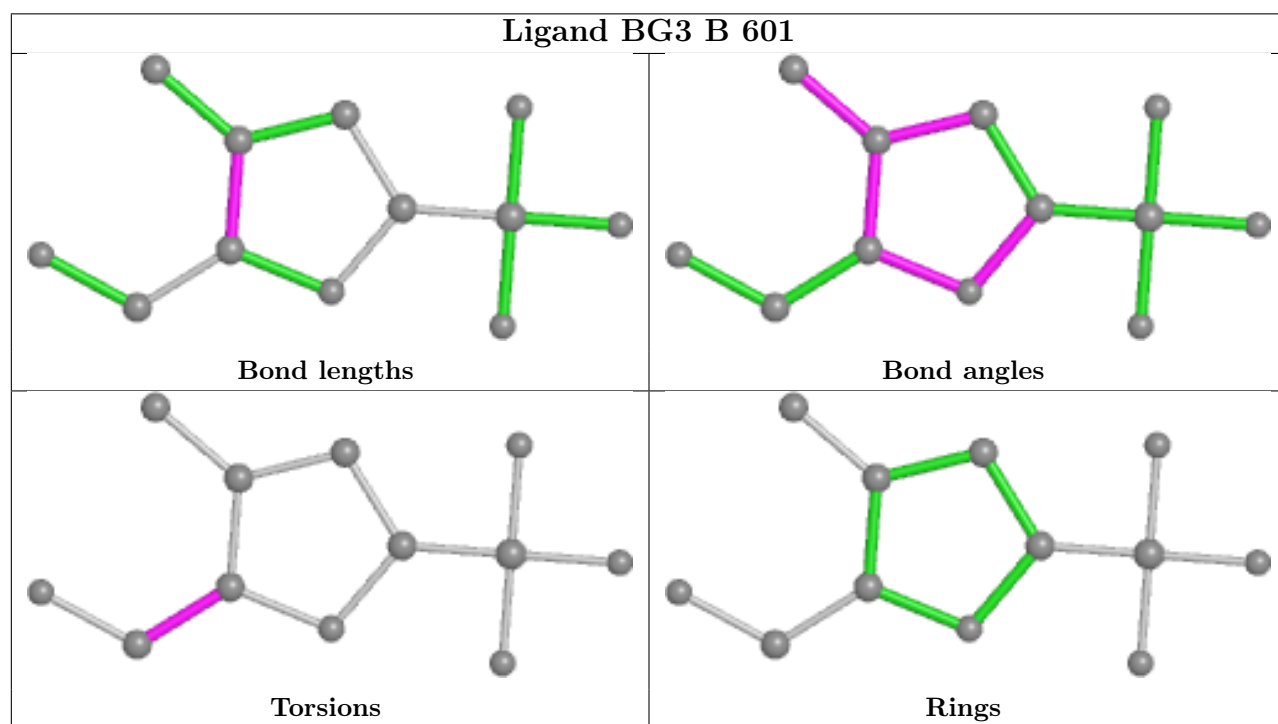
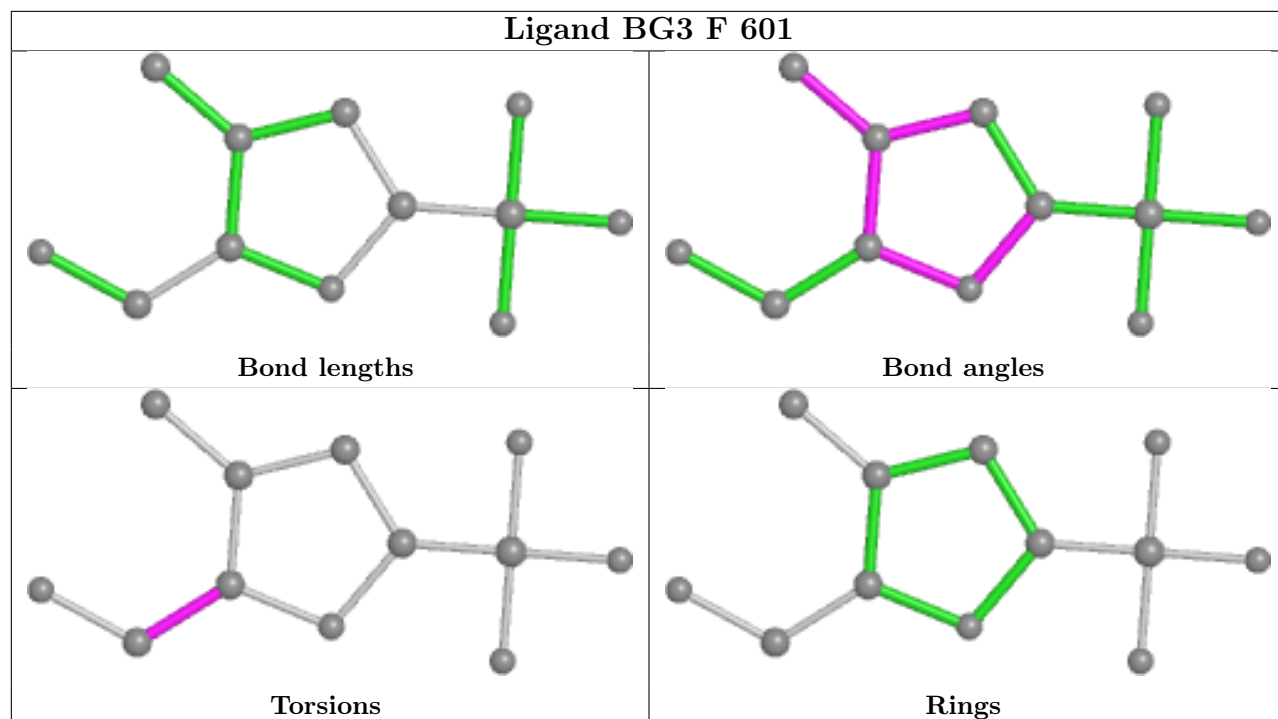
8 monomers are involved in 31 short contacts:

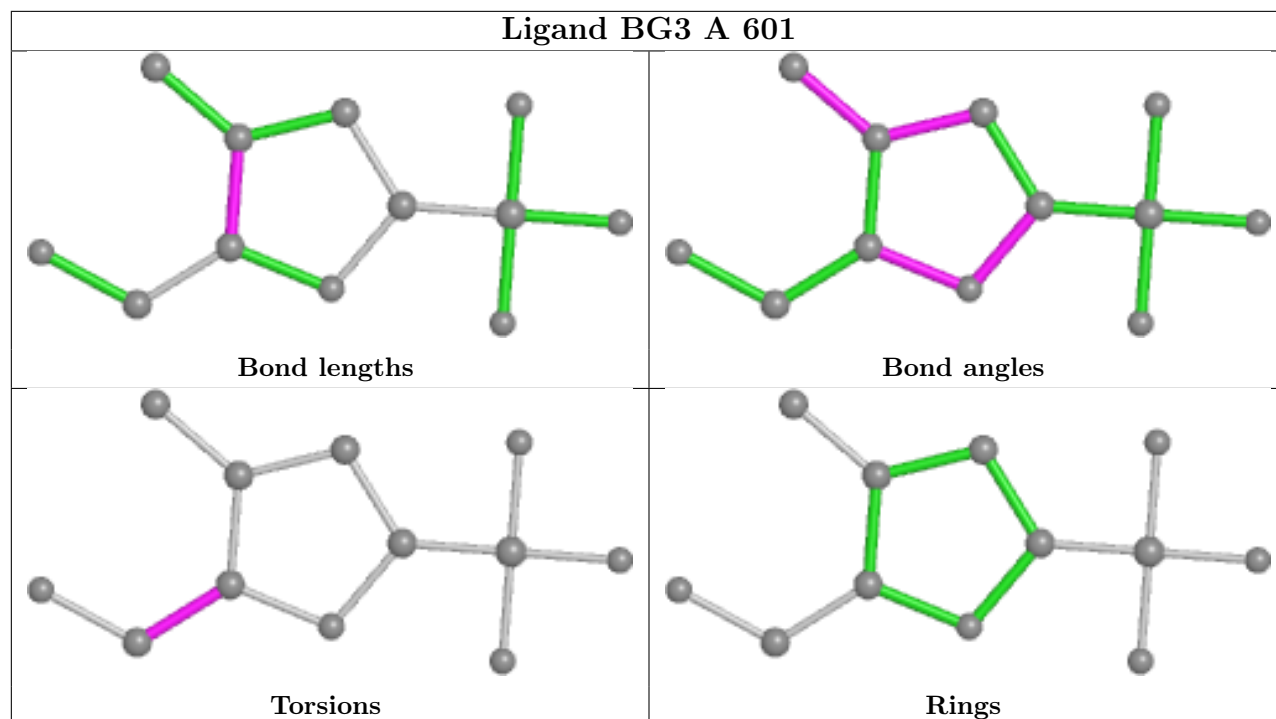
Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	C	603	GOL	5	0
4	B	603	GOL	3	0
4	D	604	GOL	9	0
2	C	601	BG3	1	0
4	F	603	GOL	7	0
2	B	601	BG3	2	0
2	A	601	BG3	1	0
4	A	604	GOL	3	0

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 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	494/503 (98%)	-0.79	2 (0%) 92 89	22, 47, 74, 132	0
1	B	494/503 (98%)	-0.85	1 (0%) 95 94	19, 44, 70, 132	0
1	C	493/503 (98%)	-0.62	1 (0%) 95 94	27, 61, 96, 134	0
1	D	494/503 (98%)	-0.76	3 (0%) 89 83	19, 50, 80, 123	0
1	E	494/503 (98%)	-0.77	3 (0%) 89 83	18, 48, 80, 132	0
1	F	494/503 (98%)	-0.73	1 (0%) 95 94	22, 52, 87, 115	0
All	All	2963/3018 (98%)	-0.75	11 (0%) 92 89	18, 50, 85, 134	0

The worst 5 of 11 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	120	ASP	3.2
1	E	119	GLN	2.7
1	E	120	ASP	2.6
1	F	495	MET	2.5
1	E	495	MET	2.5

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

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

6.3 Carbohydrates [i](#)

There are no monosaccharides in this entry.

6.4 Ligands

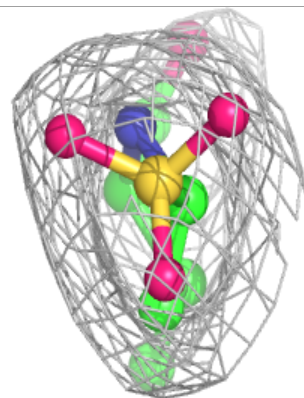
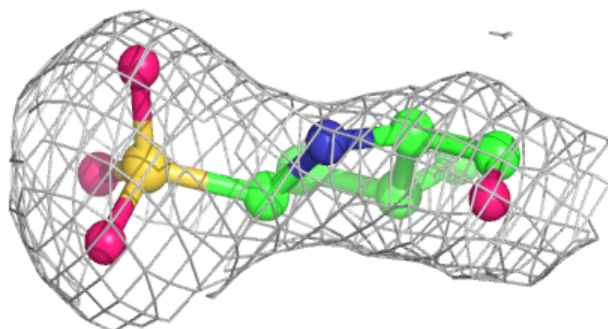
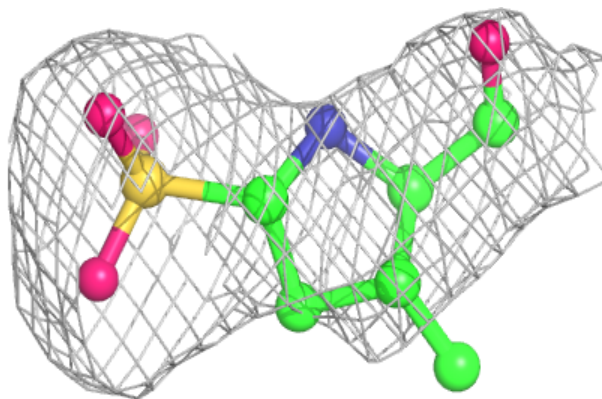
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
4	GOL	D	605	6/6	0.88	0.26	53,76,80,86	0
4	GOL	B	604	6/6	0.89	0.36	28,57,64,65	0
4	GOL	A	603	6/6	0.91	0.30	38,68,70,71	0
4	GOL	F	603	6/6	0.91	0.17	46,53,64,65	0
3	NA	B	602	1/1	0.92	0.07	44,44,44,44	0
4	GOL	D	604	6/6	0.92	0.18	43,63,69,70	0
4	GOL	D	603	6/6	0.93	0.36	29,74,81,92	0
4	GOL	A	604	6/6	0.93	0.12	42,64,72,80	0
3	NA	F	602	1/1	0.93	0.08	50,50,50,50	0
4	GOL	C	603	6/6	0.93	0.19	63,67,74,76	0
4	GOL	E	604	6/6	0.94	0.14	50,62,71,73	0
3	NA	C	602	1/1	0.94	0.07	56,56,56,56	0
2	BG3	C	601	12/13	0.95	0.24	68,99,106,108	0
2	BG3	D	601	12/13	0.95	0.19	37,70,83,91	0
4	GOL	B	603	6/6	0.95	0.14	30,60,65,72	0
3	NA	D	602	1/1	0.95	0.08	73,73,73,73	0
3	NA	A	602	1/1	0.95	0.06	63,63,63,63	0
3	NA	E	602	1/1	0.96	0.09	62,62,62,62	0
2	BG3	E	601	12/13	0.96	0.19	44,69,77,80	0
2	BG3	F	601	12/13	0.96	0.15	48,72,80,82	0
2	BG3	A	601	12/13	0.96	0.19	58,75,85,91	0
4	GOL	E	603	6/6	0.97	0.27	43,51,59,66	0
2	BG3	B	601	12/13	0.98	0.14	32,65,72,85	0

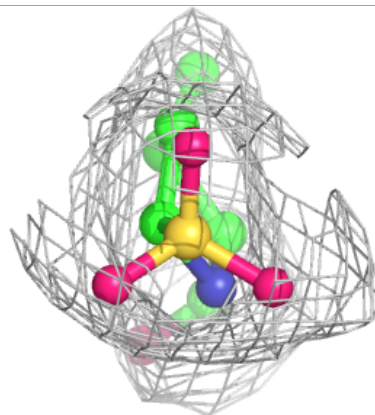
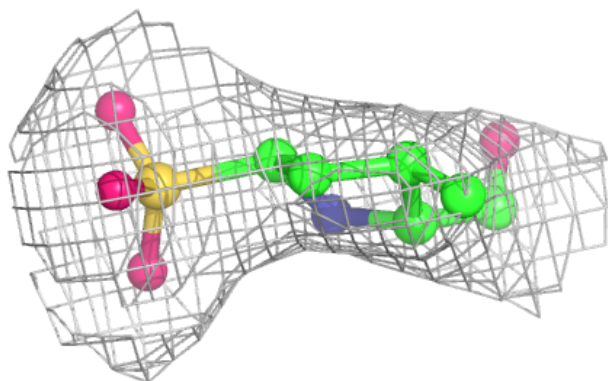
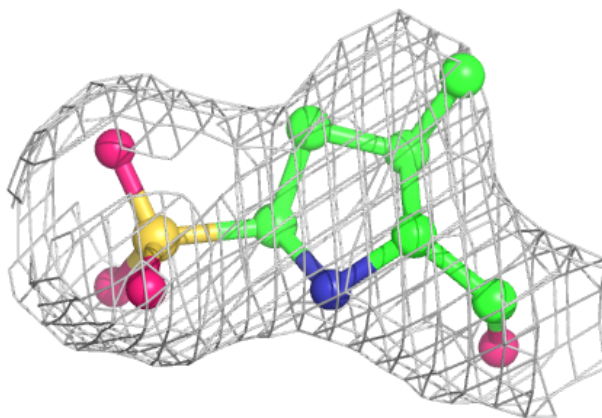
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation to approximate a three-dimensional view.

Electron density around BG3 C 601:

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

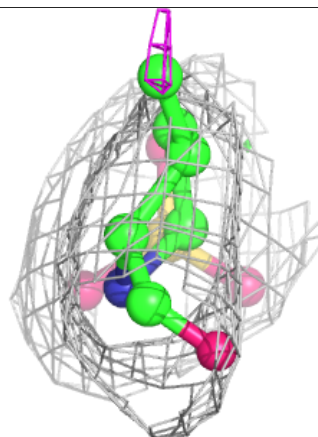
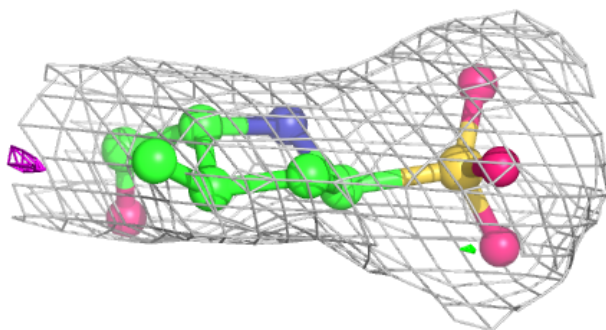
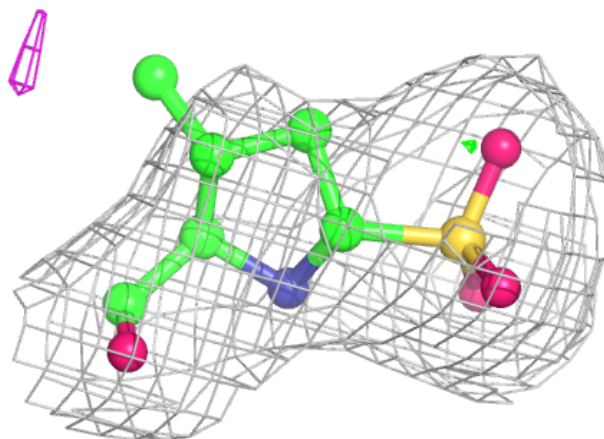
**Electron density around BG3 D 601:**

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



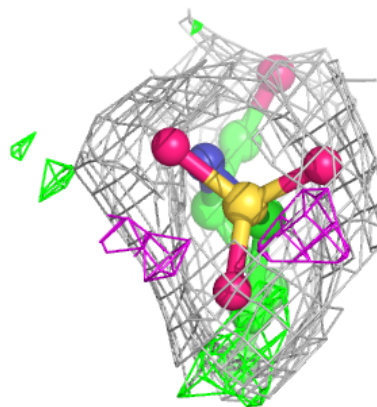
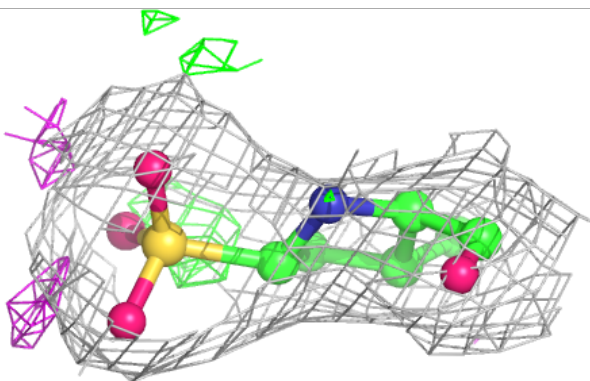
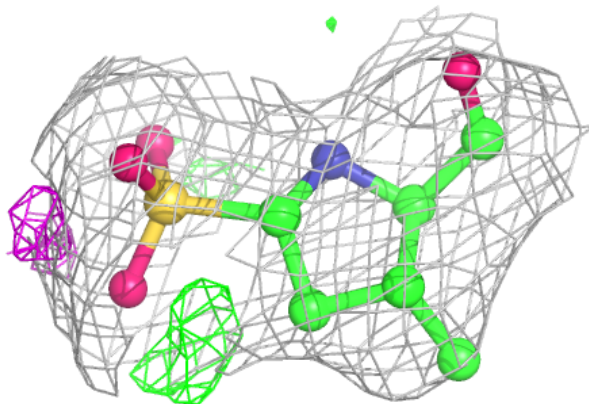
Electron density around BG3 E 601:

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



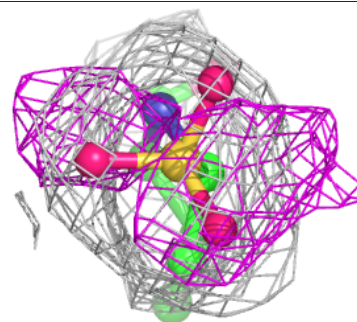
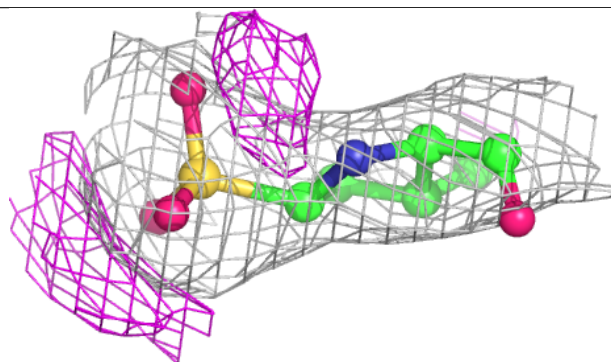
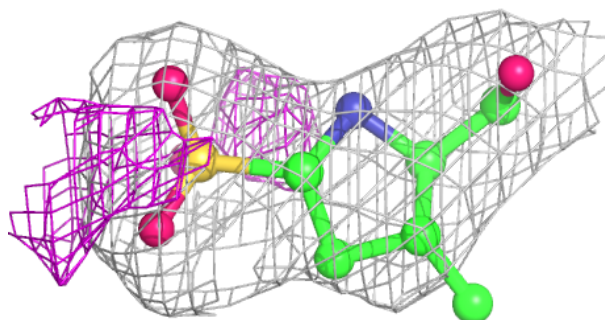
Electron density around BG3 F 601:

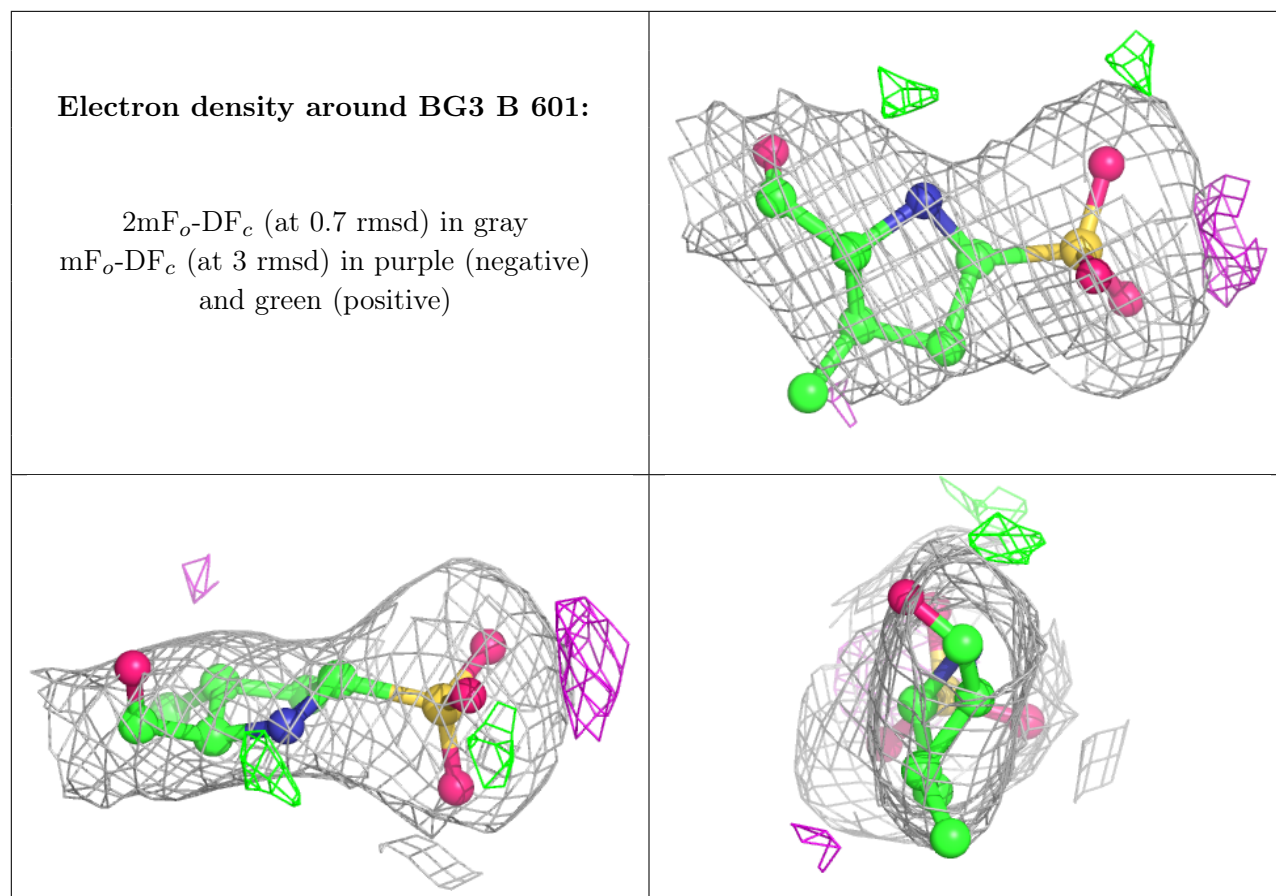
$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



Electron density around BG3 A 601:

$2mF_o-DF_c$ (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.