



wwPDB X-ray Structure Validation Summary Report ⓘ

Apr 20, 2021 – 12:22 AM JST

PDB ID : 7BTK
Title : E.coli beta-galactosidase (E537Q) in complex with fluorescent probe KSA01
Authors : Chen, X.; Hu, Y.L.; Liu, Q.M.; Gao, Y.; Yuan, R.; Guo, Y.
Deposited on : 2020-04-01
Resolution : 2.70 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 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 : 2.18
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) : 2.18

ria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
2	F6L	A	1101	-	-	-	X
2	F6L	B	1101	-	-	-	X
2	F6L	C	1101	-	-	-	X
2	F6L	D	1101	-	-	-	X

2 Entry composition

There are 7 unique types of molecules in this entry. The entry contains 33869 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 Beta-galactosidase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	1021	Total	C	N	O	S	0	0	0
			8126	5147	1438	1503	38			
1	B	1021	Total	C	N	O	S	0	1	0
			8084	5120	1434	1493	37			
1	C	1023	Total	C	N	O	S	0	0	0
			8092	5122	1436	1496	38			
1	D	1021	Total	C	N	O	S	0	0	0
			8107	5136	1439	1495	37			

There are 8 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-1	SER	-	expression tag	UNP P00722
A	537	GLN	GLU	engineered mutation	UNP P00722
B	-1	SER	-	expression tag	UNP P00722
B	537	GLN	GLU	engineered mutation	UNP P00722
C	-1	SER	-	expression tag	UNP P00722
C	537	GLN	GLU	engineered mutation	UNP P00722
D	-1	SER	-	expression tag	UNP P00722
D	537	GLN	GLU	engineered mutation	UNP P00722

- Molecule 2 is 4-[[2-[(E)-2-[4-[(2S,3R,4S,5R,6R)-6-(hydroxymethyl)-3,4,5-tris(oxidanyl)oxan-2-yl]oxyphenyl]ethenyl]-3,3-dimethyl-2H-indol-1-yl]methyl]benzoic acid (three-letter code: F6L) (formula: C₃₂H₃₄NO₈) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
2	A	1	Total 41	C 32	N 1	O 8	0	0
2	B	1	Total 41	C 32	N 1	O 8	0	0
2	C	1	Total 41	C 32	N 1	O 8	0	0
2	D	1	Total 41	C 32	N 1	O 8	0	0

- Molecule 3 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	2	Total Mg 2 2	0	0
3	B	1	Total Mg 1 1	0	0
3	C	2	Total Mg 2 2	0	0
3	D	2	Total Mg 2 2	0	0

- Molecule 4 is SODIUM ION (three-letter code: NA) (formula: Na).

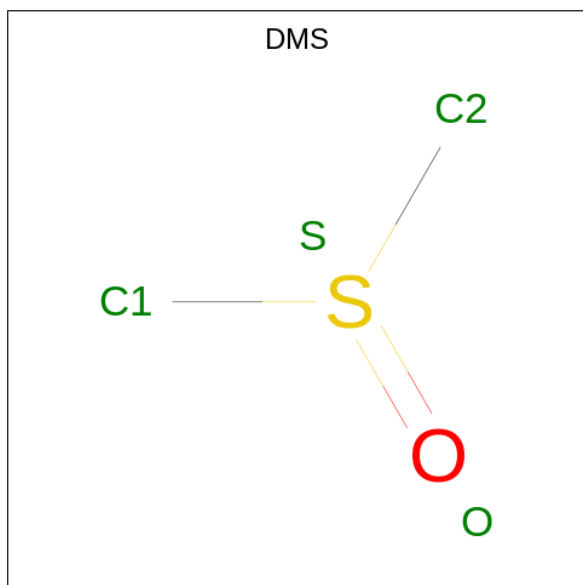
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	2	Total Na 2 2	0	0

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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	B	1	Total	Na	0	0
			1	1		
4	C	2	Total	Na	0	0
			2	2		
4	D	2	Total	Na	0	0
			2	2		

- Molecule 5 is DIMETHYL SULFOXIDE (three-letter code: DMS) (formula: C₂H₆OS).



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

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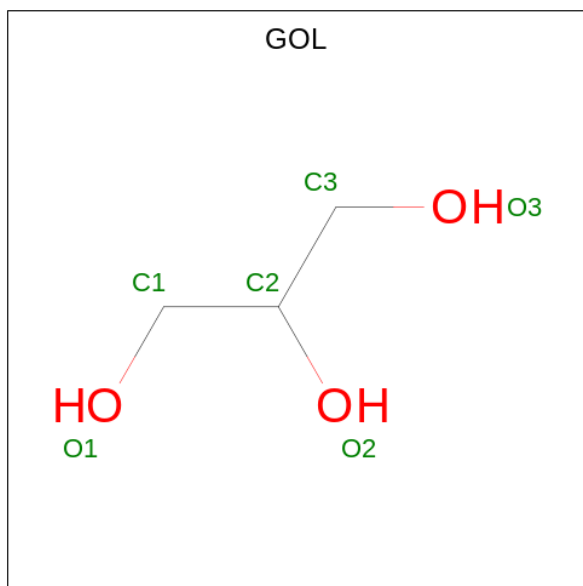
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
5	A	1	Total 4	C 2	O 1	S 1	0	0
5	A	1	Total 4	C 2	O 1	S 1	0	0
5	A	1	Total 4	C 2	O 1	S 1	0	0
5	A	1	Total 4	C 2	O 1	S 1	0	0
5	B	1	Total 4	C 2	O 1	S 1	0	0
5	B	1	Total 4	C 2	O 1	S 1	0	0
5	B	1	Total 4	C 2	O 1	S 1	0	0
5	B	1	Total 4	C 2	O 1	S 1	0	0
5	B	1	Total 4	C 2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

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

- Molecule 6 is GLYCEROL (three-letter code: GOL) (formula: $C_3H_8O_3$).



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

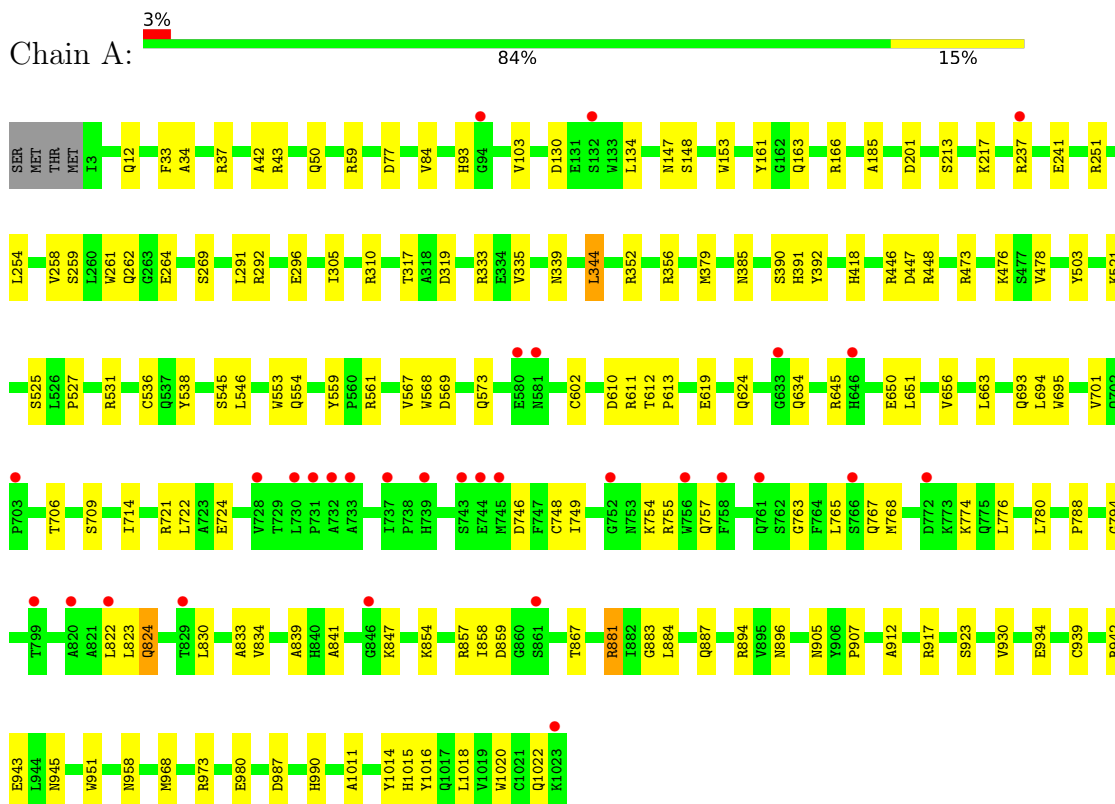
- Molecule 7 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
7	A	293	Total 293	O 293	0	0
7	B	297	Total 297	O 297	0	0
7	C	281	Total 281	O 281	0	0
7	D	253	Total 253	O 253	0	0

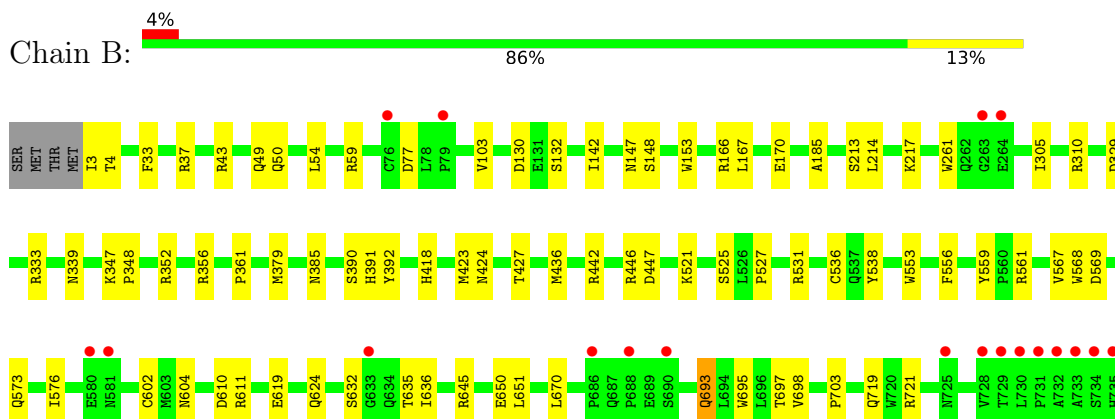
3 Residue-property plots

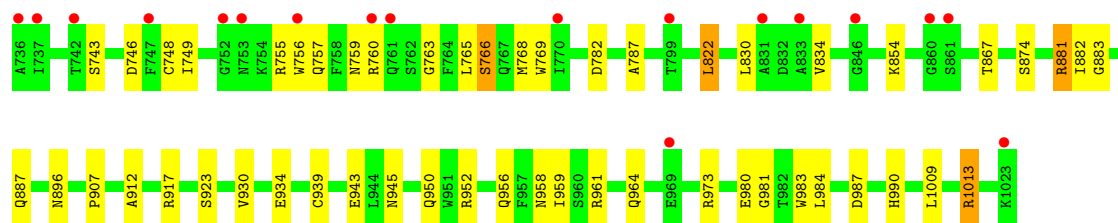
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density.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

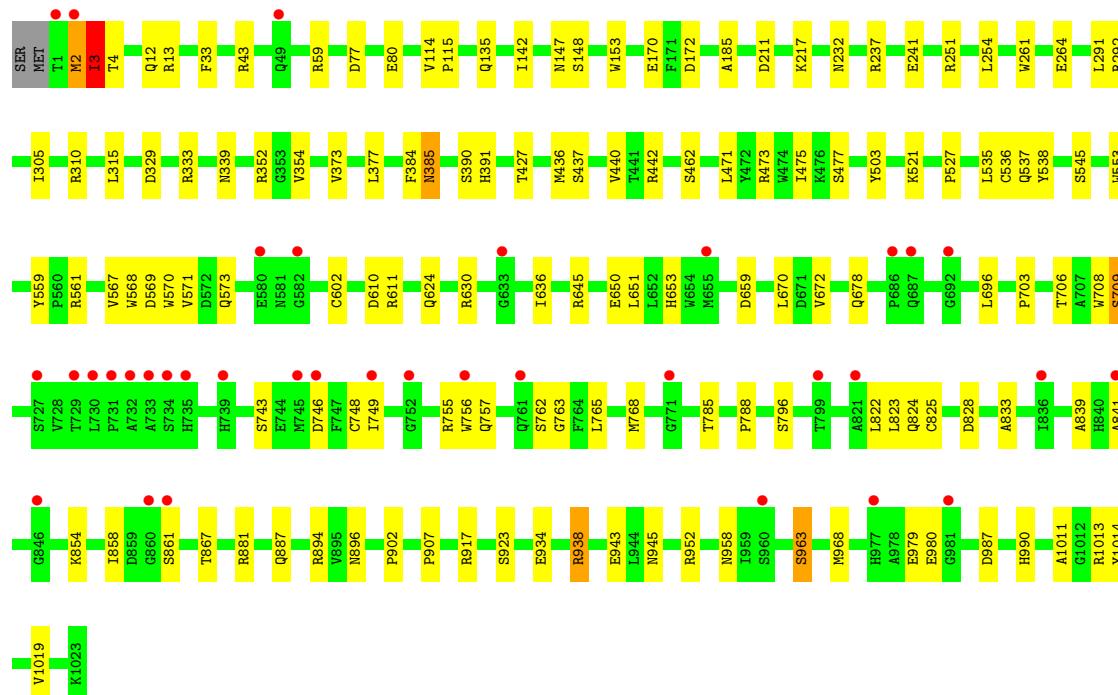
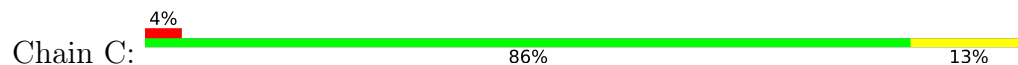


• Molecule 1: Beta-galactosidase

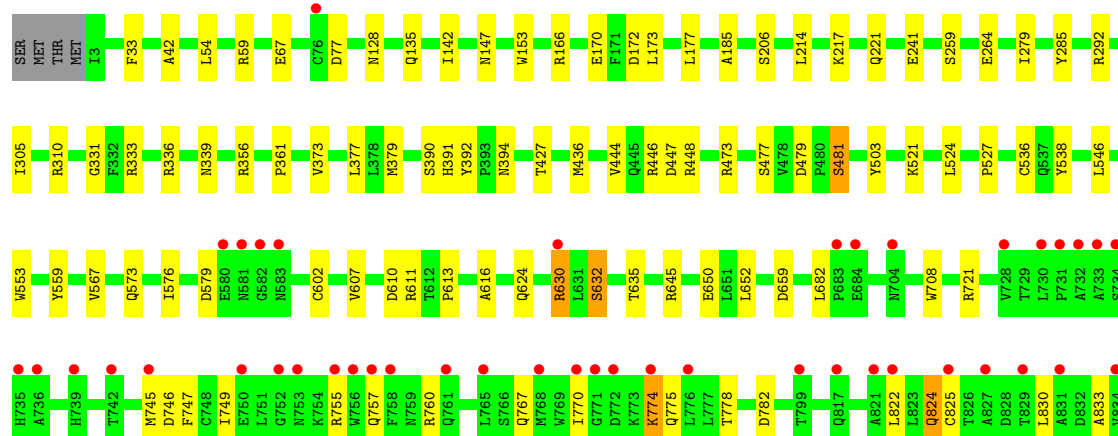
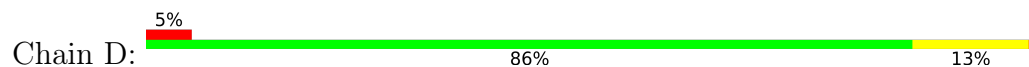


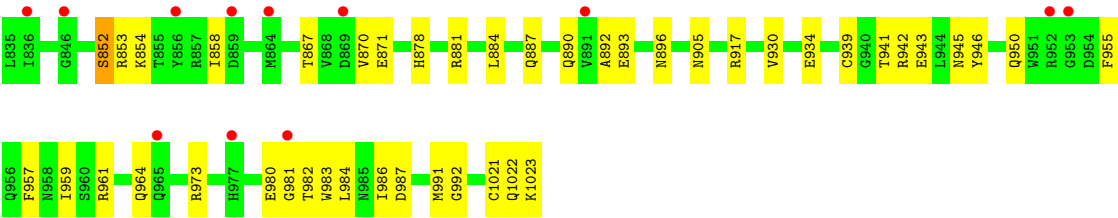


• Molecule 1: Beta-galactosidase



• Molecule 1: Beta-galactosidase





4 Data and refinement statistics

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α , β , γ	249.83Å 85.45Å 243.31Å 90.00° 94.15° 90.00°	Depositor
Resolution (Å)	19.87 – 2.70 19.86 – 2.70	Depositor EDS
% Data completeness (in resolution range)	99.5 (19.87-2.70) 99.8 (19.86-2.70)	Depositor EDS
R_{merge}	0.16	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	3.44 (at 2.71Å)	Xtriage
Refinement program	REFMAC 5.8.0222	Depositor
R, R_{free}	0.218 , 0.233 0.222 , 0.236	Depositor DCC
R_{free} test set	7202 reflections (5.13%)	wwPDB-VP
Wilson B-factor (Å ²)	33.3	Xtriage
Anisotropy	0.041	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.33 , 48.4	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.91	EDS
Total number of atoms	33869	wwPDB-VP
Average B, all atoms (Å ²)	37.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 16.51% 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: MG, F6L, DMS, GOL, NA

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	0.43	0/8367	0.56	0/11423
1	B	0.42	0/8329	0.57	0/11380
1	C	0.42	0/8333	0.57	0/11382
1	D	0.41	0/8348	0.58	0/11400
All	All	0.42	0/33377	0.57	0/45585

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	8126	0	7703	90	0
1	B	8084	0	7608	87	0
1	C	8092	0	7614	80	0
1	D	8107	0	7675	98	0
2	A	41	0	0	1	0
2	B	41	0	0	0	0
2	C	41	0	0	3	0
2	D	41	0	0	1	0
3	A	2	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	B	1	0	0	0	0
3	C	2	0	0	0	0
3	D	2	0	0	0	0
4	A	2	0	0	0	0
4	B	1	0	0	0	0
4	C	2	0	0	0	0
4	D	2	0	0	0	0
5	A	48	0	72	2	0
5	B	40	0	60	1	0
5	C	32	0	48	0	0
5	D	32	0	48	1	0
6	B	6	0	8	0	0
7	A	293	0	0	6	0
7	B	297	0	0	6	0
7	C	281	0	0	5	0
7	D	253	0	0	6	0
All	All	33869	0	30836	347	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 5.

The worst 5 of 347 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:352:ARG:H	1:C:385:ASN:HD21	0.91	0.89
1:C:352:ARG:H	1:C:385:ASN:ND2	1.70	0.88
1:C:352:ARG:N	1:C:385:ASN:HD21	1.73	0.85
1:A:857:ARG:HH11	1:A:859:ASP:HB3	1.48	0.79
1:D:747:PHE:CE2	1:D:760:ARG:HD3	2.19	0.77

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	1019/1025 (99%)	977 (96%)	40 (4%)	2 (0%)	47	73
1	B	1020/1025 (100%)	978 (96%)	42 (4%)	0	100	100
1	C	1021/1025 (100%)	977 (96%)	42 (4%)	2 (0%)	47	73
1	D	1019/1025 (99%)	975 (96%)	44 (4%)	0	100	100
All	All	4079/4100 (100%)	3907 (96%)	168 (4%)	4 (0%)	51	78

All (4) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	C	3	ILE
1	A	722	LEU
1	C	2	MET
1	A	201	ASP

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	857/877 (98%)	837 (98%)	20 (2%)	50	78
1	B	844/877 (96%)	830 (98%)	14 (2%)	60	84
1	C	843/877 (96%)	820 (97%)	23 (3%)	44	74
1	D	851/877 (97%)	833 (98%)	18 (2%)	53	80
All	All	3395/3508 (97%)	3320 (98%)	75 (2%)	52	79

5 of 75 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	D	128	ASN
1	D	824	GLN
1	D	259	SER
1	D	579	ASP

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Mol	Chain	Res	Type
1	B	536	CYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 20 such sidechains are listed below:

Mol	Chain	Res	Type
1	D	163	GLN
1	D	890	GLN
1	D	965	GLN
1	D	945	ASN
1	B	93	HIS

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 57 ligands modelled in this entry, 14 are monoatomic - leaving 43 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	DMS	B	1112	-	3,3,3	0.32	0	3,3,3	0.80	0
5	DMS	C	1107	-	3,3,3	0.27	0	3,3,3	0.93	0
5	DMS	C	1113	-	3,3,3	0.29	0	3,3,3	0.67	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
5	DMS	B	1108	-	3,3,3	0.36	0	3,3,3	0.73	0
5	DMS	A	1109	-	3,3,3	0.28	0	3,3,3	0.72	0
5	DMS	B	1109	-	3,3,3	0.31	0	3,3,3	0.53	0
5	DMS	C	1106	-	3,3,3	0.22	0	3,3,3	1.04	0
5	DMS	C	1111	-	3,3,3	0.36	0	3,3,3	0.79	0
5	DMS	A	1113	-	3,3,3	0.37	0	3,3,3	0.81	0
5	DMS	D	1111	-	3,3,3	0.32	0	3,3,3	0.81	0
5	DMS	D	1113	-	3,3,3	0.29	0	3,3,3	0.84	0
5	DMS	D	1107	-	3,3,3	0.29	0	3,3,3	0.88	0
5	DMS	A	1108	-	3,3,3	0.36	0	3,3,3	1.08	0
5	DMS	C	1108	-	3,3,3	0.38	0	3,3,3	0.71	0
5	DMS	A	1115	-	3,3,3	0.26	0	3,3,3	0.82	0
5	DMS	D	1112	-	3,3,3	0.35	0	3,3,3	0.67	0
5	DMS	B	1107	-	3,3,3	0.16	0	3,3,3	1.10	0
2	F6L	A	1101	3,4	43,45,45	2.57	9 (20%)	62,66,66	2.63	31 (50%)
2	F6L	D	1101	3,4	43,45,45	2.57	9 (20%)	62,66,66	2.90	28 (45%)
5	DMS	A	1117	-	3,3,3	0.43	0	3,3,3	0.95	0
5	DMS	C	1110	-	3,3,3	0.18	0	3,3,3	0.77	0
5	DMS	D	1106	-	3,3,3	0.33	0	3,3,3	0.85	0
6	GOL	B	1114	-	5,5,5	0.30	0	5,5,5	0.45	0
5	DMS	B	1105	-	3,3,3	0.34	0	3,3,3	0.72	0
5	DMS	B	1111	-	3,3,3	0.25	0	3,3,3	0.76	0
5	DMS	B	1113	-	3,3,3	0.48	0	3,3,3	0.50	0
2	F6L	B	1101	3,4	43,45,45	2.60	10 (23%)	62,66,66	2.56	27 (43%)
5	DMS	D	1110	-	3,3,3	0.32	0	3,3,3	0.52	0
5	DMS	C	1109	-	3,3,3	0.31	0	3,3,3	0.86	0
5	DMS	D	1109	-	3,3,3	0.28	0	3,3,3	0.63	0
5	DMS	C	1112	-	3,3,3	0.28	0	3,3,3	0.80	0
5	DMS	A	1116	-	3,3,3	0.23	0	3,3,3	0.78	0
5	DMS	A	1111	-	3,3,3	0.33	0	3,3,3	0.79	0
2	F6L	C	1101	3,4	43,45,45	2.41	8 (18%)	62,66,66	2.41	26 (41%)
5	DMS	B	1110	-	3,3,3	0.37	0	3,3,3	0.75	0
5	DMS	D	1108	-	3,3,3	0.19	0	3,3,3	0.80	0
5	DMS	A	1107	-	3,3,3	0.30	0	3,3,3	0.88	0
5	DMS	A	1106	-	3,3,3	0.33	0	3,3,3	1.03	0
5	DMS	B	1106	-	3,3,3	0.31	0	3,3,3	0.75	0
5	DMS	A	1114	-	3,3,3	0.37	0	3,3,3	0.87	0
5	DMS	A	1110	-	3,3,3	0.32	0	3,3,3	0.74	0
5	DMS	B	1104	-	3,3,3	0.25	0	3,3,3	0.80	0
5	DMS	A	1112	-	3,3,3	0.21	0	3,3,3	1.02	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
2	F6L	B	1101	3,4	-	9/15/59/59	0/5/5/5
2	F6L	A	1101	3,4	-	10/15/59/59	0/5/5/5
2	F6L	D	1101	3,4	-	7/15/59/59	0/5/5/5
6	GOL	B	1114	-	-	0/4/4/4	-
2	F6L	C	1101	3,4	-	5/15/59/59	0/5/5/5

The worst 5 of 36 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	D	1101	F6L	C22-C17	10.80	1.54	1.39
2	B	1101	F6L	C22-C17	10.60	1.53	1.39
2	A	1101	F6L	C22-C17	10.50	1.53	1.39
2	C	1101	F6L	C22-C17	9.92	1.52	1.39
2	D	1101	F6L	C21-C22	7.04	1.53	1.38

The worst 5 of 112 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	D	1101	F6L	C26-C25-N01	12.19	131.30	113.02
2	A	1101	F6L	C04-O01-C10	7.43	128.68	117.79
2	D	1101	F6L	C04-O01-C10	7.02	128.09	117.79
2	D	1101	F6L	C25-N01-C16	6.45	134.57	124.35
2	C	1101	F6L	C09-C08-C07	6.42	122.03	110.82

There are no chirality outliers.

5 of 31 torsion outliers are listed below:

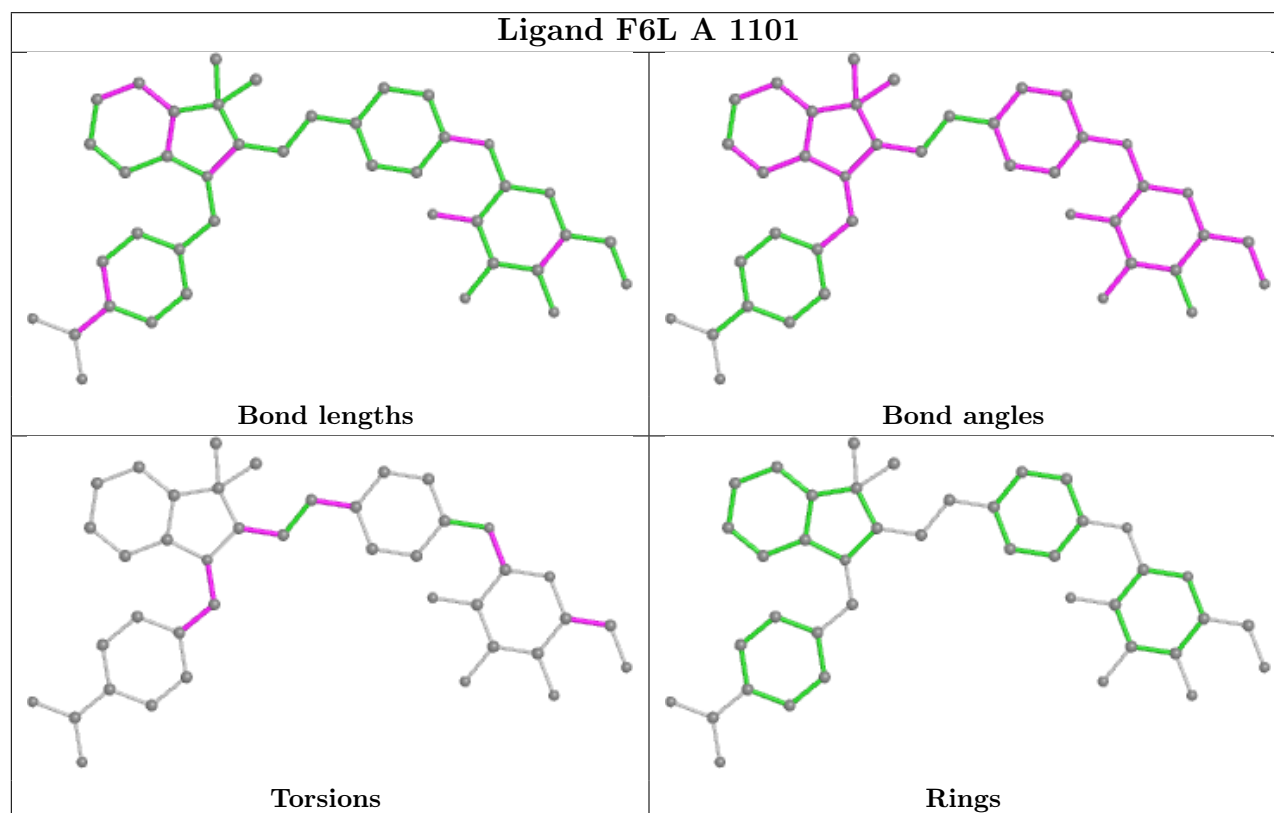
Mol	Chain	Res	Type	Atoms
2	A	1101	F6L	C13-C14-C15-N01
2	A	1101	F6L	C09-C10-O01-C04
2	B	1101	F6L	C13-C14-C15-N01
2	B	1101	F6L	C09-C10-O01-C04
2	C	1101	F6L	C13-C14-C15-N01

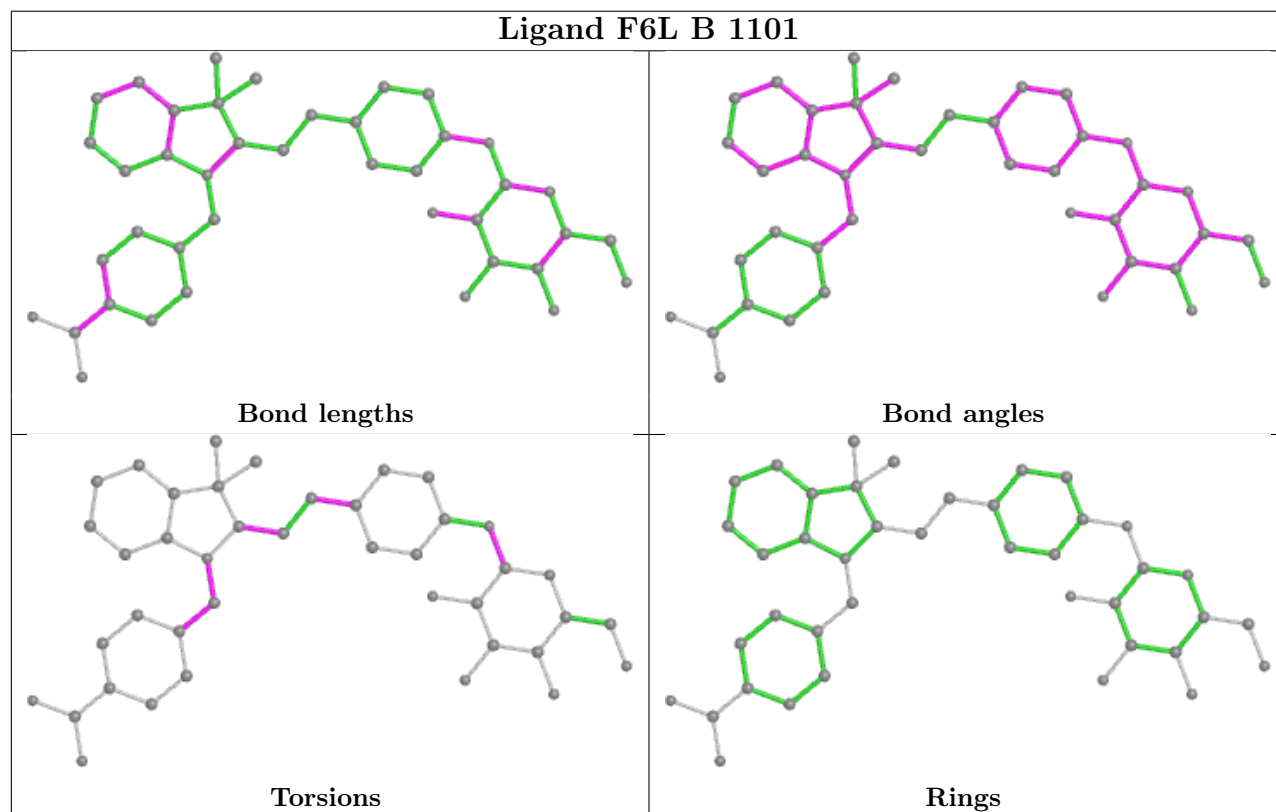
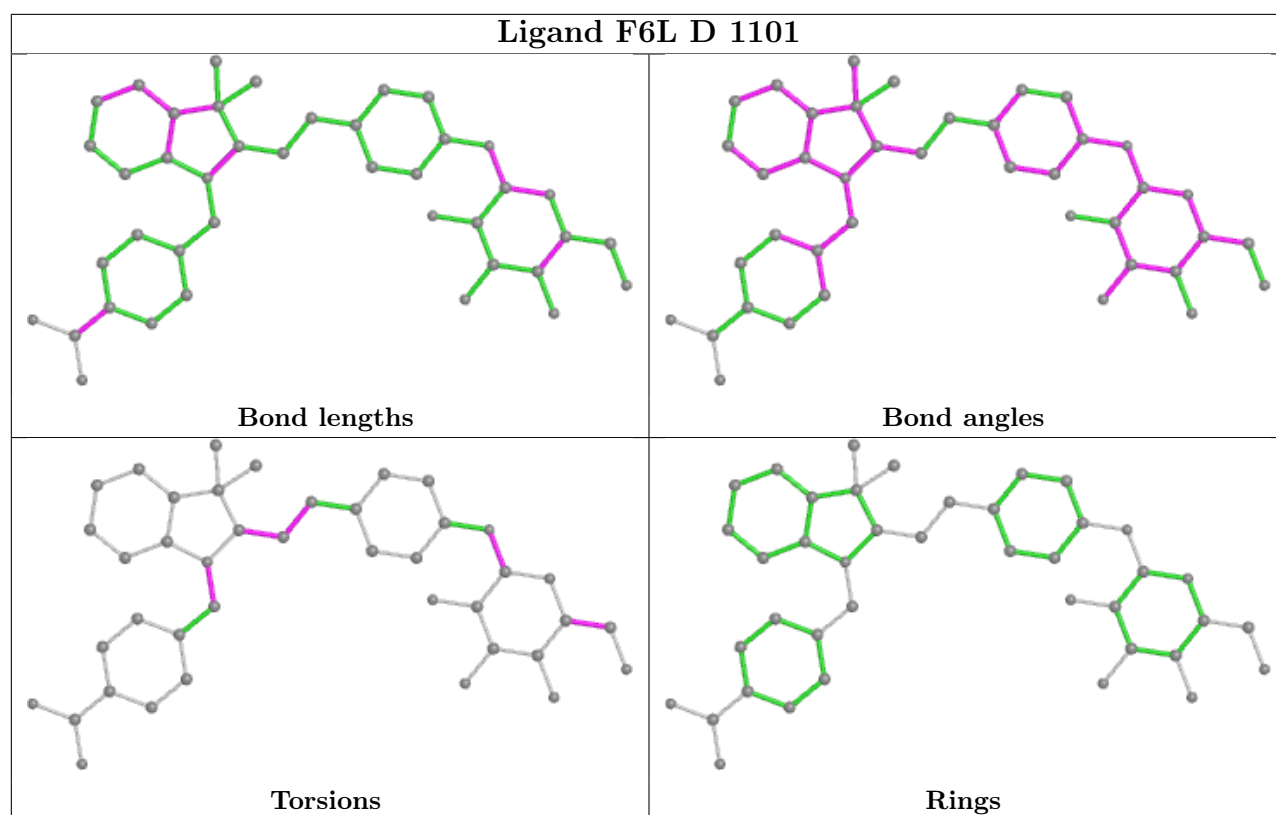
There are no ring outliers.

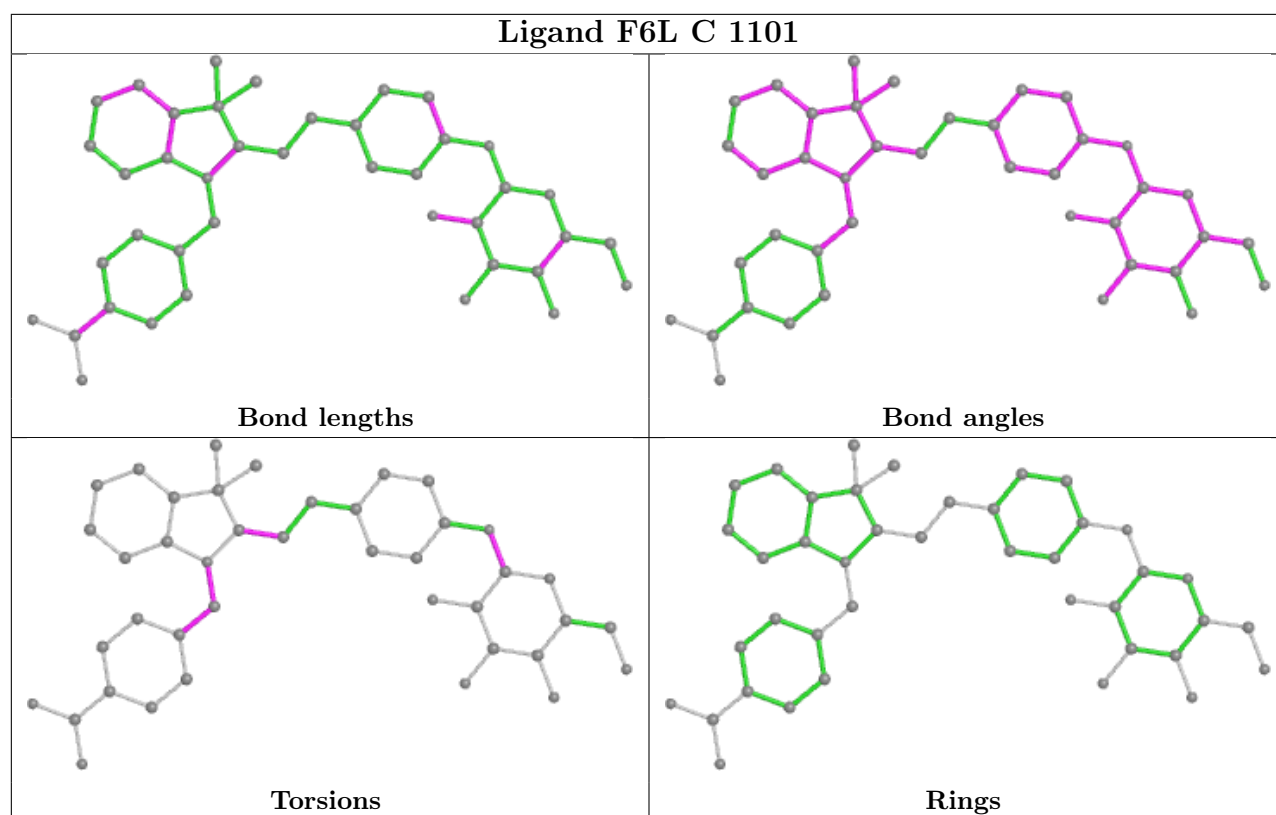
7 monomers are involved in 9 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	1101	F6L	1	0
2	D	1101	F6L	1	0
5	A	1117	DMS	1	0
5	D	1106	DMS	1	0
5	B	1113	DMS	1	0
2	C	1101	F6L	3	0
5	A	1114	DMS	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 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	1021/1025 (99%)	0.03	31 (3%)	50	51	11, 31, 67, 96	0
1	B	1021/1025 (99%)	0.07	37 (3%)	42	42	12, 32, 70, 134	0
1	C	1023/1025 (99%)	0.09	36 (3%)	44	44	10, 33, 73, 117	0
1	D	1021/1025 (99%)	0.22	56 (5%)	25	24	12, 36, 82, 117	0
All	All	4086/4100 (99%)	0.10	160 (3%)	39	38	10, 33, 74, 134	0

The worst 5 of 160 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	731	PRO	9.0
1	C	1	THR	6.7
1	B	733	ALA	6.2
1	C	732	ALA	5.6
1	D	846	GLY	5.2

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 [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.

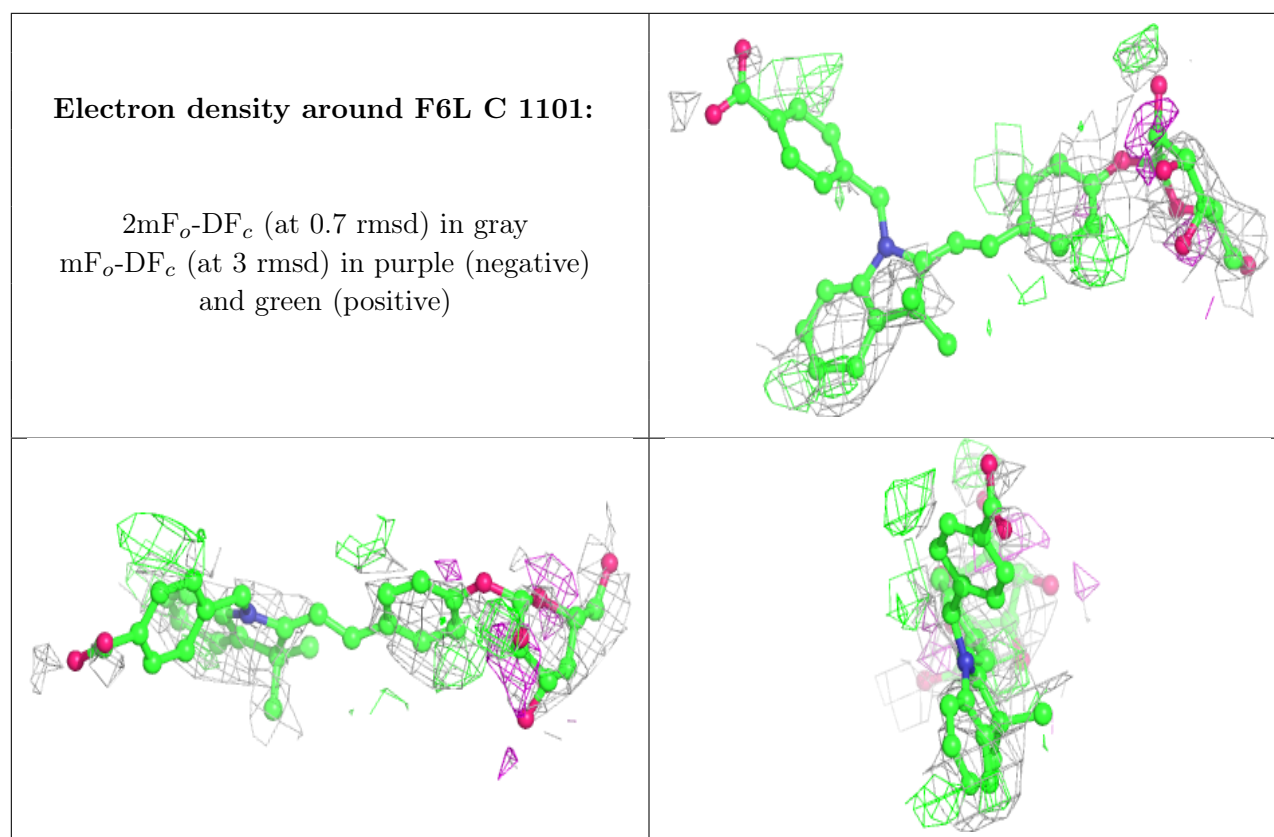
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
2	F6L	C	1101	41/41	0.59	0.59	56,106,146,152	0
2	F6L	A	1101	41/41	0.66	0.49	47,110,151,152	0
2	F6L	D	1101	41/41	0.68	0.49	68,122,158,162	0
2	F6L	B	1101	41/41	0.70	0.46	49,106,146,153	0
3	MG	C	1103	1/1	0.80	0.13	26,26,26,26	0
5	DMS	A	1117	4/4	0.80	0.27	56,63,69,77	0
5	DMS	D	1108	4/4	0.81	0.32	44,51,55,68	0
5	DMS	A	1113	4/4	0.84	0.29	75,86,86,88	0
5	DMS	A	1114	4/4	0.84	0.25	50,64,66,72	0
5	DMS	C	1111	4/4	0.85	0.27	67,75,76,77	0
5	DMS	B	1110	4/4	0.86	0.31	56,62,63,77	0
5	DMS	B	1112	4/4	0.86	0.21	74,76,82,84	0
6	GOL	B	1114	6/6	0.86	0.20	39,44,51,56	0
5	DMS	A	1112	4/4	0.87	0.21	56,64,64,66	0
5	DMS	D	1112	4/4	0.87	0.43	87,89,90,95	0
5	DMS	A	1116	4/4	0.87	0.34	52,61,63,67	0
5	DMS	D	1107	4/4	0.88	0.23	59,65,65,68	0
5	DMS	C	1109	4/4	0.88	0.24	61,63,65,70	0
5	DMS	B	1111	4/4	0.88	0.34	69,74,78,79	0
5	DMS	D	1106	4/4	0.88	0.25	47,53,54,59	0
4	NA	C	1104	1/1	0.89	0.27	29,29,29,29	0
5	DMS	C	1110	4/4	0.89	0.20	53,59,60,64	0
5	DMS	D	1111	4/4	0.89	0.26	59,66,67,75	0
5	DMS	A	1107	4/4	0.89	0.21	51,53,57,61	0
5	DMS	B	1113	4/4	0.89	0.27	72,73,74,77	0
5	DMS	A	1110	4/4	0.90	0.24	63,69,70,73	0
5	DMS	B	1107	4/4	0.91	0.20	65,68,70,72	0
5	DMS	B	1109	4/4	0.91	0.22	73,75,78,78	0
5	DMS	D	1110	4/4	0.91	0.23	68,75,75,76	0
5	DMS	A	1115	4/4	0.91	0.34	67,72,72,75	0
4	NA	D	1104	1/1	0.91	0.29	32,32,32,32	0
5	DMS	D	1113	4/4	0.91	0.24	73,79,79,79	0
5	DMS	A	1109	4/4	0.91	0.22	57,60,63,65	0
5	DMS	B	1105	4/4	0.92	0.19	52,57,60,60	0
3	MG	D	1103	1/1	0.92	0.08	32,32,32,32	0
5	DMS	A	1108	4/4	0.92	0.20	49,50,52,52	0
5	DMS	C	1108	4/4	0.92	0.23	55,59,60,63	0
5	DMS	A	1111	4/4	0.92	0.26	54,62,62,64	0
5	DMS	C	1113	4/4	0.93	0.17	75,76,77,77	0
5	DMS	B	1108	4/4	0.93	0.21	62,67,69,71	0
5	DMS	C	1107	4/4	0.93	0.19	47,52,56,58	0
5	DMS	C	1112	4/4	0.93	0.29	72,75,75,76	0
5	DMS	D	1109	4/4	0.93	0.21	56,57,57,60	0

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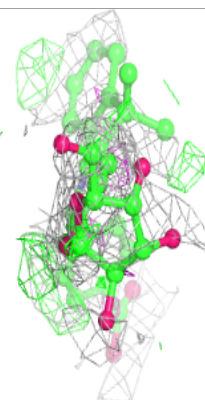
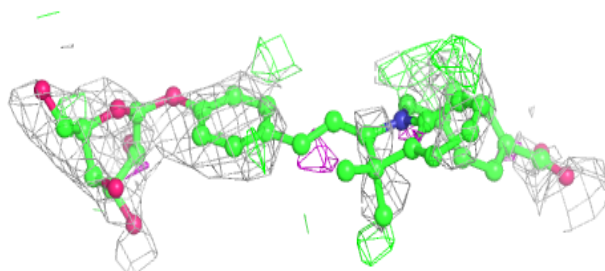
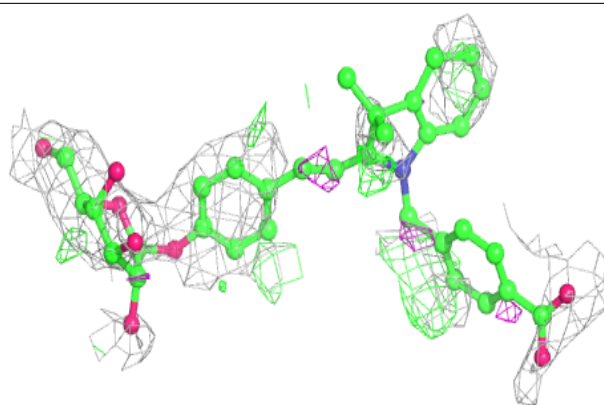
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
5	DMS	B	1106	4/4	0.94	0.21	51,55,57,60	0
4	NA	D	1105	1/1	0.94	0.08	19,19,19,19	0
3	MG	D	1102	1/1	0.95	0.10	35,35,35,35	0
5	DMS	B	1104	4/4	0.95	0.21	43,47,47,47	0
5	DMS	A	1106	4/4	0.95	0.29	44,45,46,48	0
5	DMS	C	1106	4/4	0.95	0.20	43,48,50,51	0
3	MG	C	1102	1/1	0.95	0.08	37,37,37,37	0
4	NA	C	1105	1/1	0.96	0.09	18,18,18,18	0
4	NA	A	1105	1/1	0.96	0.06	19,19,19,19	0
4	NA	A	1104	1/1	0.96	0.09	21,21,21,21	0
3	MG	B	1102	1/1	0.97	0.07	26,26,26,26	0
3	MG	A	1102	1/1	0.97	0.11	30,30,30,30	0
4	NA	B	1103	1/1	0.98	0.10	24,24,24,24	0
3	MG	A	1103	1/1	0.98	0.09	19,19,19,19	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.

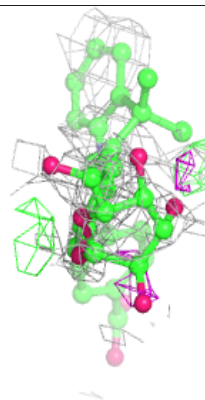
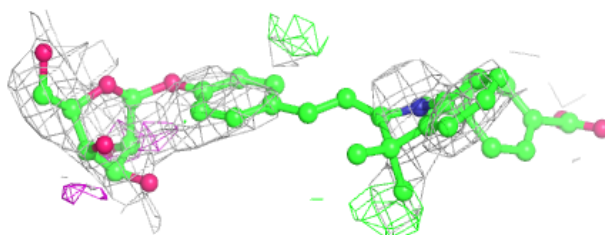
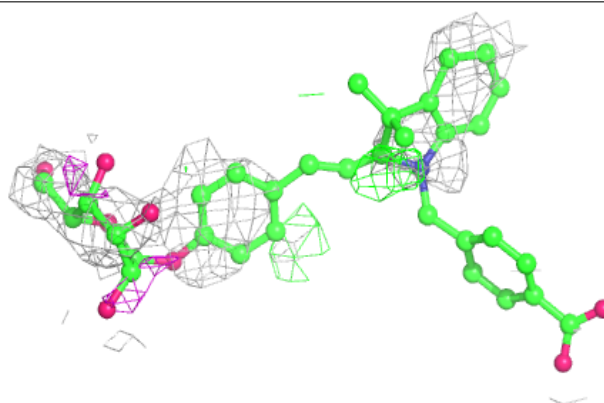


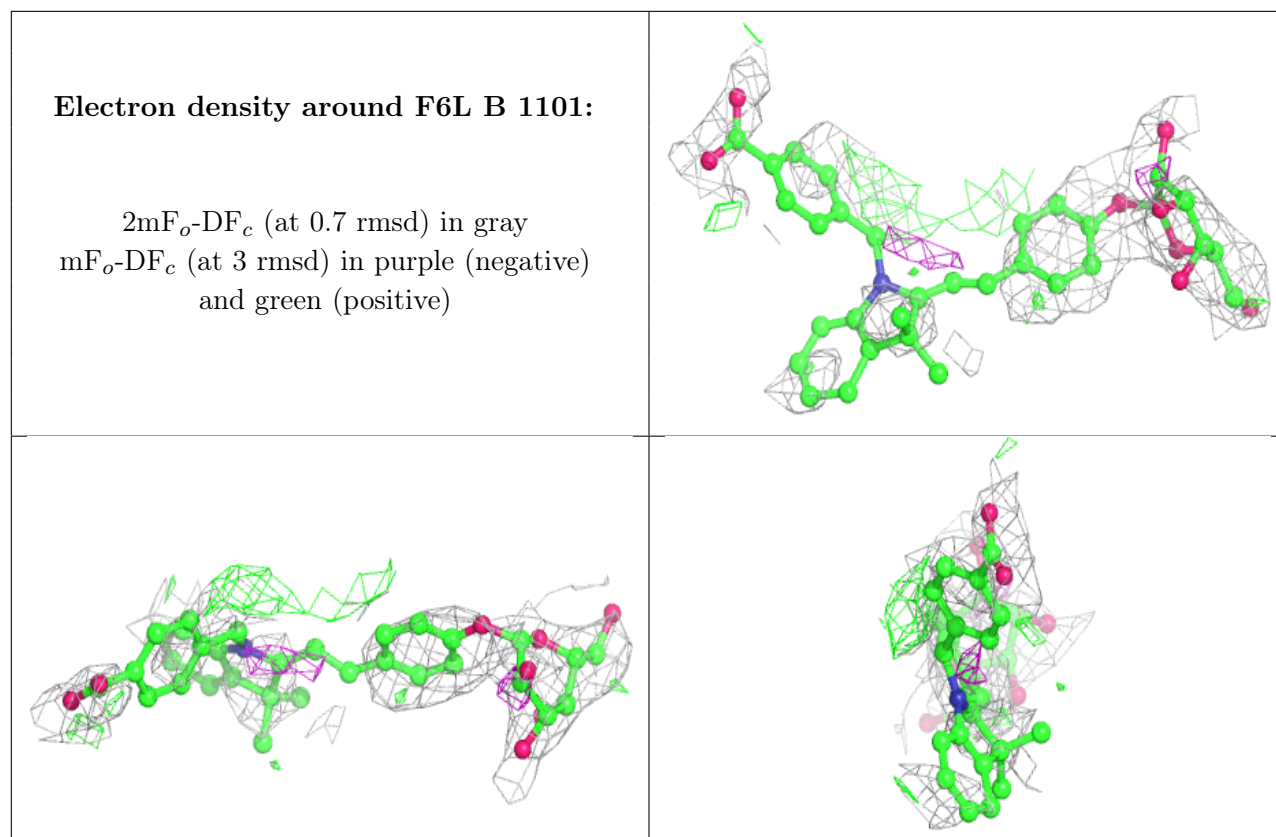
Electron density around F6L A 1101:

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

**Electron density around F6L D 1101:**

$2mF_o - DF_c$ (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.