



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 6, 2026 – 08:35 PM UTC

PDB ID : 6DF6 / pdb_00006df6
Title : Crystal structure of estrogen receptor alpha in complex with receptor degrader 16ab
Authors : Kiefer, J.R.; Vinogradova, M.; Liang, J.; Zhang, B.; Ortwine, D.F.; Nettles, K.W.; Nwachukwu, J.C.
Deposited on : 2018-05-14
Resolution : 2.50 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	:	4-5-2 with Phenix2.0
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	2.0
EDS	:	3.0
Buster-report	:	wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4	:	9.0.010 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.49

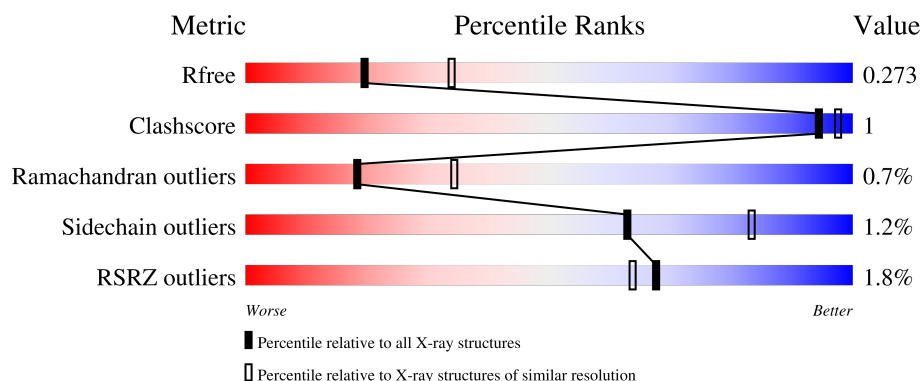
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.50 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}	180053	5829 (2.50-2.50)
Clashscore	190562	6492 (2.50-2.50)
Ramachandran outliers	187476	6378 (2.50-2.50)
Sidechain outliers	187428	6380 (2.50-2.50)
RSRZ outliers	180081	5833 (2.50-2.50)

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	280	80% 16%
1	B	280	2% 76% 21%
1	C	280	79% 17%
1	D	280	2% 78% 18%

2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 7353 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 Estrogen receptor.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	235	Total	C	N	O	S	0	1	0
			1848	1184	311	335	18			
1	B	220	Total	C	N	O	S	0	1	0
			1710	1094	296	304	16			
1	C	233	Total	C	N	O	S	0	0	0
			1820	1168	306	328	18			
1	D	231	Total	C	N	O	S	0	1	0
			1799	1150	308	324	17			

There are 104 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	274	MET	-	initiating methionine	UNP P03372
A	275	HIS	-	expression tag	UNP P03372
A	276	HIS	-	expression tag	UNP P03372
A	277	HIS	-	expression tag	UNP P03372
A	278	HIS	-	expression tag	UNP P03372
A	279	HIS	-	expression tag	UNP P03372
A	280	HIS	-	expression tag	UNP P03372
A	281	SER	-	expression tag	UNP P03372
A	282	SER	-	expression tag	UNP P03372
A	283	GLY	-	expression tag	UNP P03372
A	284	VAL	-	expression tag	UNP P03372
A	285	ASP	-	expression tag	UNP P03372
A	286	LEU	-	expression tag	UNP P03372
A	287	GLY	-	expression tag	UNP P03372
A	288	THR	-	expression tag	UNP P03372
A	289	GLU	-	expression tag	UNP P03372
A	290	ASN	-	expression tag	UNP P03372
A	291	LEU	-	expression tag	UNP P03372
A	292	TYR	-	expression tag	UNP P03372
A	293	PHE	-	expression tag	UNP P03372
A	294	GLN	-	expression tag	UNP P03372

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Chain	Residue	Modelled	Actual	Comment	Reference
A	295	SER	-	expression tag	UNP P03372
A	296	ASN	-	expression tag	UNP P03372
A	297	ALA	-	expression tag	UNP P03372
A	372	SER	LEU	conflict	UNP P03372
A	536	SER	LEU	conflict	UNP P03372
B	274	MET	-	initiating methionine	UNP P03372
B	275	HIS	-	expression tag	UNP P03372
B	276	HIS	-	expression tag	UNP P03372
B	277	HIS	-	expression tag	UNP P03372
B	278	HIS	-	expression tag	UNP P03372
B	279	HIS	-	expression tag	UNP P03372
B	280	HIS	-	expression tag	UNP P03372
B	281	SER	-	expression tag	UNP P03372
B	282	SER	-	expression tag	UNP P03372
B	283	GLY	-	expression tag	UNP P03372
B	284	VAL	-	expression tag	UNP P03372
B	285	ASP	-	expression tag	UNP P03372
B	286	LEU	-	expression tag	UNP P03372
B	287	GLY	-	expression tag	UNP P03372
B	288	THR	-	expression tag	UNP P03372
B	289	GLU	-	expression tag	UNP P03372
B	290	ASN	-	expression tag	UNP P03372
B	291	LEU	-	expression tag	UNP P03372
B	292	TYR	-	expression tag	UNP P03372
B	293	PHE	-	expression tag	UNP P03372
B	294	GLN	-	expression tag	UNP P03372
B	295	SER	-	expression tag	UNP P03372
B	296	ASN	-	expression tag	UNP P03372
B	297	ALA	-	expression tag	UNP P03372
B	372	SER	LEU	conflict	UNP P03372
B	536	SER	LEU	conflict	UNP P03372
C	274	MET	-	initiating methionine	UNP P03372
C	275	HIS	-	expression tag	UNP P03372
C	276	HIS	-	expression tag	UNP P03372
C	277	HIS	-	expression tag	UNP P03372
C	278	HIS	-	expression tag	UNP P03372
C	279	HIS	-	expression tag	UNP P03372
C	280	HIS	-	expression tag	UNP P03372
C	281	SER	-	expression tag	UNP P03372
C	282	SER	-	expression tag	UNP P03372
C	283	GLY	-	expression tag	UNP P03372
C	284	VAL	-	expression tag	UNP P03372

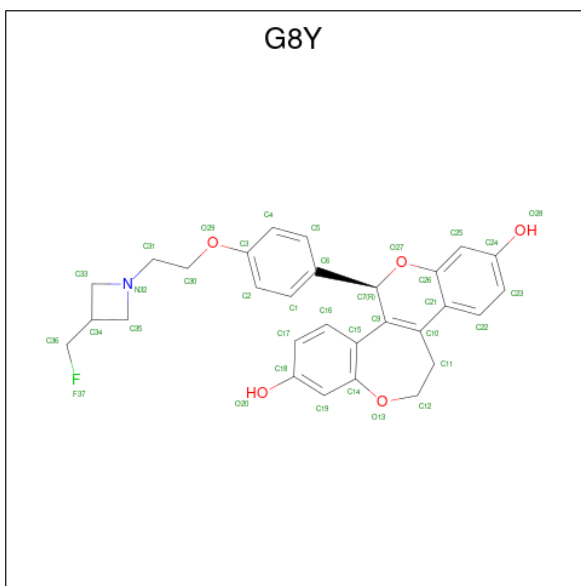
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Chain	Residue	Modelled	Actual	Comment	Reference
C	285	ASP	-	expression tag	UNP P03372
C	286	LEU	-	expression tag	UNP P03372
C	287	GLY	-	expression tag	UNP P03372
C	288	THR	-	expression tag	UNP P03372
C	289	GLU	-	expression tag	UNP P03372
C	290	ASN	-	expression tag	UNP P03372
C	291	LEU	-	expression tag	UNP P03372
C	292	TYR	-	expression tag	UNP P03372
C	293	PHE	-	expression tag	UNP P03372
C	294	GLN	-	expression tag	UNP P03372
C	295	SER	-	expression tag	UNP P03372
C	296	ASN	-	expression tag	UNP P03372
C	297	ALA	-	expression tag	UNP P03372
C	372	SER	LEU	conflict	UNP P03372
C	536	SER	LEU	conflict	UNP P03372
D	274	MET	-	initiating methionine	UNP P03372
D	275	HIS	-	expression tag	UNP P03372
D	276	HIS	-	expression tag	UNP P03372
D	277	HIS	-	expression tag	UNP P03372
D	278	HIS	-	expression tag	UNP P03372
D	279	HIS	-	expression tag	UNP P03372
D	280	HIS	-	expression tag	UNP P03372
D	281	SER	-	expression tag	UNP P03372
D	282	SER	-	expression tag	UNP P03372
D	283	GLY	-	expression tag	UNP P03372
D	284	VAL	-	expression tag	UNP P03372
D	285	ASP	-	expression tag	UNP P03372
D	286	LEU	-	expression tag	UNP P03372
D	287	GLY	-	expression tag	UNP P03372
D	288	THR	-	expression tag	UNP P03372
D	289	GLU	-	expression tag	UNP P03372
D	290	ASN	-	expression tag	UNP P03372
D	291	LEU	-	expression tag	UNP P03372
D	292	TYR	-	expression tag	UNP P03372
D	293	PHE	-	expression tag	UNP P03372
D	294	GLN	-	expression tag	UNP P03372
D	295	SER	-	expression tag	UNP P03372
D	296	ASN	-	expression tag	UNP P03372
D	297	ALA	-	expression tag	UNP P03372
D	372	SER	LEU	conflict	UNP P03372
D	536	SER	LEU	conflict	UNP P03372

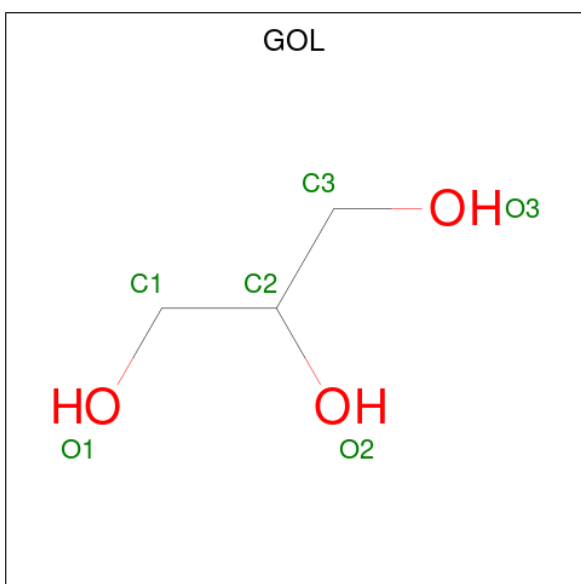
- Molecule 2 is (8R)-8-(4-{2-[3-(fluoromethyl)azetidin-1-yl]ethoxy}phenyl)-1,8-dihydro-2H-[1]

benzopyrano[4,3-d][1]benzoxepine-5,11-diol (CCD ID: G8Y) (formula: $C_{29}H_{28}FNO_5$).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	A	1	Total	C	F	N	O	0	0
			36	29	1	1	5		
2	B	1	Total	C	F	N	O	0	0
			36	29	1	1	5		
2	C	1	Total	C	F	N	O	0	0
			36	29	1	1	5		
2	D	1	Total	C	F	N	O	0	0
			36	29	1	1	5		

- Molecule 3 is GLYCEROL (CCD ID: GOL) (formula: $C_3H_8O_3$).



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

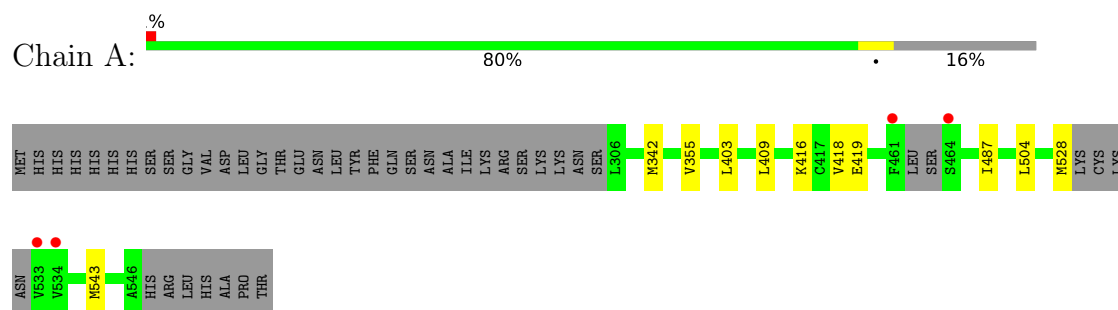
- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	6	Total	O	0	0
			6	6		
4	B	6	Total	O	0	0
			6	6		
4	C	3	Total	O	0	0
			3	3		
4	D	5	Total	O	0	0
			5	5		

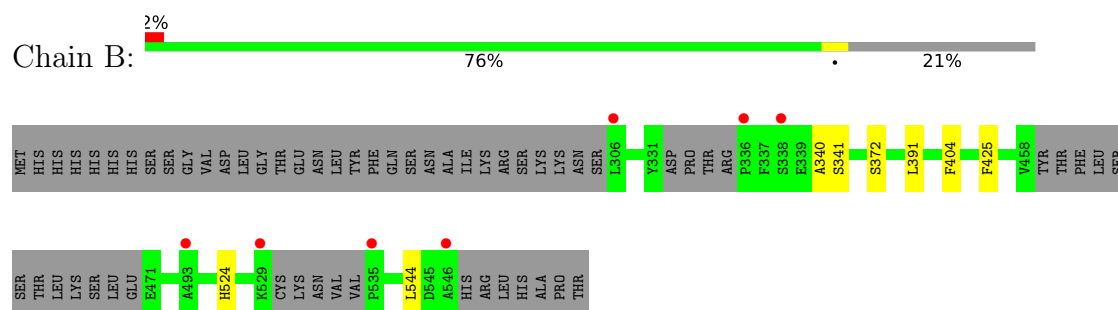
3 Residue-property plots [i](#)

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.

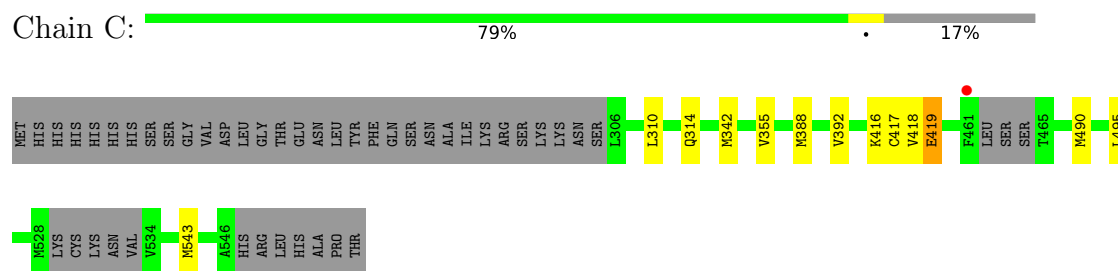
- Molecule 1: Estrogen receptor



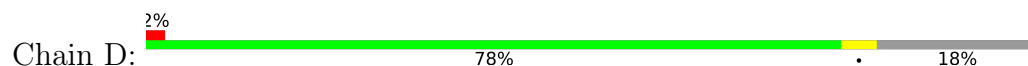
- Molecule 1: Estrogen receptor

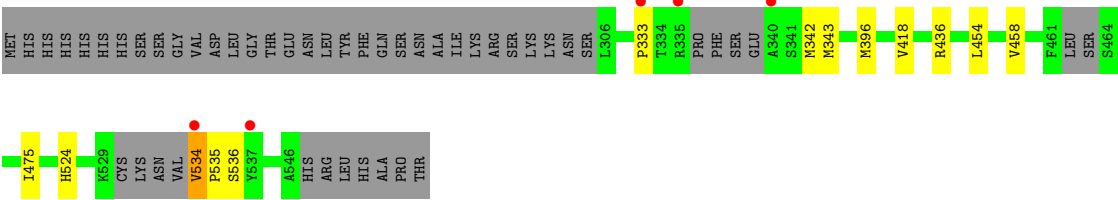


- Molecule 1: Estrogen receptor



- Molecule 1: Estrogen receptor





4 Data and refinement statistics

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, α , β , γ	53.39Å 58.86Å 94.05Å 79.75° 75.42° 63.10°	Depositor
Resolution (Å)	35.00 – 2.50 35.00 – 2.50	Depositor EDS
% Data completeness (in resolution range)	79.7 (35.00-2.50) 79.7 (35.00-2.50)	Depositor EDS
R_{merge}	0.08	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.23 (at 2.51Å)	Xtriage
Refinement program	REFMAC 5.8.0155	Depositor
R, R_{free}	0.218 , 0.273 0.221 , 0.273	Depositor DCC
R_{free} test set	1385 reflections (4.06%)	wwPDB-VP
Wilson B-factor (Å ²)	48.5	Xtriage
Anisotropy	0.034	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.33 , 31.0	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	0.095 for h,h-k,h-l	Xtriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	7353	wwPDB-VP
Average B, all atoms (Å ²)	56.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 7.47% 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: G8Y, 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	0.53	0/1883	0.84	0/2549
1	B	0.54	0/1738	0.85	0/2349
1	C	0.55	0/1854	0.85	0/2510
1	D	0.55	0/1829	0.87	2/2474 (0.1%)
All	All	0.54	0/7304	0.85	2/9882 (0.0%)

There are no bond length outliers.

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	D	534	VAL	CA-C-N	6.55	128.03	119.84
1	D	534	VAL	C-N-CA	6.55	128.03	119.84

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	1848	0	1846	5	0
1	B	1710	0	1713	2	0
1	C	1820	0	1828	5	0
1	D	1799	0	1805	7	0
2	A	36	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	B	36	0	0	1	0
2	C	36	0	0	0	0
2	D	36	0	0	1	0
3	B	6	0	8	0	0
3	D	6	0	8	0	0
4	A	6	0	0	0	0
4	B	6	0	0	0	0
4	C	3	0	0	0	0
4	D	5	0	0	0	0
All	All	7353	0	7208	19	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 1.

All (19) 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:487:ILE:HD11	1:A:504:LEU:HD22	1.68	0.74
1:C:342:MET:HE2	1:C:418:VAL:HG23	1.71	0.73
1:D:342:MET:HE2	1:D:418:VAL:HG23	1.84	0.58
1:D:458:VAL:CG2	1:D:475:ILE:HG21	2.38	0.54
1:D:396:MET:HE3	1:D:436:ARG:HA	1.92	0.52
1:D:454:LEU:O	1:D:458:VAL:HG23	2.13	0.48
1:A:342:MET:HE2	1:A:418:VAL:HG23	1.99	0.45
1:A:418:VAL:O	1:A:528:MET:HE1	2.17	0.45
1:C:490:MET:HB3	1:C:495:LEU:HD12	1.98	0.44
1:A:355:VAL:HG22	1:A:543:MET:HE3	2.01	0.43
1:A:403:LEU:HD13	1:A:409:LEU:HD13	2.03	0.41
1:C:355:VAL:HA	1:C:543:MET:HE3	2.03	0.41
1:B:524:HIS:ND1	2:B:601:G8Y:O28	2.50	0.41
1:D:343:MET:CE	1:D:418:VAL:HG21	2.51	0.41
1:D:458:VAL:HG21	1:D:475:ILE:HG21	2.01	0.41
1:C:310:LEU:HD22	1:C:314:GLN:HB3	2.02	0.41
1:C:388:MET:O	1:C:392:VAL:HG23	2.21	0.41
1:D:524:HIS:ND1	2:D:601:G8Y:O28	2.46	0.40
1:B:391:LEU:HD13	1:B:404:PHE:HA	2.02	0.40

There are no symmetry-related clashes.

5.3 Torsion angles

5.3.1 Protein backbone

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	230/280 (82%)	224 (97%)	6 (3%)	0	100	100
1	B	213/280 (76%)	209 (98%)	2 (1%)	2 (1%)	14	27
1	C	227/280 (81%)	223 (98%)	3 (1%)	1 (0%)	30	49
1	D	224/280 (80%)	218 (97%)	3 (1%)	3 (1%)	9	18
All	All	894/1120 (80%)	874 (98%)	14 (2%)	6 (1%)	18	34

All (6) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	341	SER
1	D	535	PRO
1	D	536	SER
1	B	340	ALA
1	C	419	GLU
1	D	333	PRO

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	203/252 (81%)	201 (99%)	2 (1%)	68	86
1	B	183/252 (73%)	180 (98%)	3 (2%)	55	79
1	C	200/252 (79%)	197 (98%)	3 (2%)	57	80
1	D	196/252 (78%)	195 (100%)	1 (0%)	81	92

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
All	All	782/1008 (78%)	773 (99%)	9 (1%)	63	83

All (9) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	416	LYS
1	A	419	GLU
1	B	372	SER
1	B	425	PHE
1	B	544	LEU
1	C	416	LYS
1	C	417	CYS
1	C	419	GLU
1	D	534	VAL

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (17) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	356	HIS
1	A	441	GLN
1	A	474	HIS
1	A	488	HIS
1	A	501	HIS
1	A	502	GLN
1	A	519	ASN
1	B	356	HIS
1	B	377	HIS
1	B	516	HIS
1	B	519	ASN
1	C	348	ASN
1	C	455	ASN
1	C	474	HIS
1	C	513	HIS
1	D	375	GLN
1	D	474	HIS

5.3.3 RNA ⓘ

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 oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

6 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$
2	G8Y	B	601	-	38,41,41	1.11	3 (7%)	44,59,59	1.33	4 (9%)
2	G8Y	C	601	-	38,41,41	1.18	2 (5%)	44,59,59	1.34	4 (9%)
3	GOL	B	602	-	5,5,5	0.34	0	5,5,5	0.29	0
2	G8Y	A	601	-	38,41,41	1.19	3 (7%)	44,59,59	1.32	4 (9%)
2	G8Y	D	601	-	38,41,41	1.12	3 (7%)	44,59,59	1.31	4 (9%)
3	GOL	D	602	-	5,5,5	0.36	0	5,5,5	0.24	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	G8Y	B	601	-	-	2/8/46/46	0/6/6/6
2	G8Y	C	601	-	-	3/8/46/46	0/6/6/6
3	GOL	B	602	-	-	2/4/4/4	-
2	G8Y	A	601	-	-	2/8/46/46	0/6/6/6
2	G8Y	D	601	-	-	3/8/46/46	0/6/6/6
3	GOL	D	602	-	-	2/4/4/4	-

All (11) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	C	601	G8Y	C9-C10	4.68	1.40	1.34
2	D	601	G8Y	C9-C10	4.35	1.39	1.34
2	A	601	G8Y	C9-C10	4.32	1.39	1.34
2	B	601	G8Y	C9-C10	4.27	1.39	1.34
2	A	601	G8Y	C15-C9	2.54	1.51	1.47
2	D	601	G8Y	C15-C9	2.49	1.51	1.47
2	B	601	G8Y	C15-C9	2.37	1.50	1.47
2	B	601	G8Y	C15-C14	2.27	1.44	1.40
2	C	601	G8Y	C15-C9	2.17	1.50	1.47
2	A	601	G8Y	C15-C14	2.11	1.44	1.40
2	D	601	G8Y	C15-C14	2.05	1.44	1.40

All (16) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	601	G8Y	C12-O13-C14	4.61	123.78	116.13
2	A	601	G8Y	C12-O13-C14	4.13	122.99	116.13
2	C	601	G8Y	O27-C26-C21	-4.13	117.36	122.16
2	D	601	G8Y	C14-C15-C9	3.95	126.07	121.56
2	C	601	G8Y	C14-C15-C9	3.88	125.99	121.56
2	A	601	G8Y	C14-C15-C9	3.85	125.96	121.56
2	B	601	G8Y	O27-C26-C21	-3.74	117.81	122.16
2	D	601	G8Y	O27-C26-C21	-3.71	117.85	122.16
2	C	601	G8Y	C12-O13-C14	3.65	122.18	116.13
2	D	601	G8Y	C12-O13-C14	3.48	121.91	116.13
2	B	601	G8Y	C14-C15-C9	3.38	125.42	121.56
2	A	601	G8Y	O27-C26-C21	-3.19	118.46	122.16
2	D	601	G8Y	O27-C26-C25	3.11	121.60	116.29
2	B	601	G8Y	O27-C26-C25	3.02	121.44	116.29
2	C	601	G8Y	O27-C26-C25	2.87	121.19	116.29
2	A	601	G8Y	O27-C26-C25	2.23	120.11	116.29

There are no chirality outliers.

All (14) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	B	602	GOL	O1-C1-C2-C3
2	B	601	G8Y	C2-C3-O29-C30
2	B	601	G8Y	C4-C3-O29-C30
2	D	601	G8Y	O29-C30-C31-N32
2	C	601	G8Y	C2-C3-O29-C30

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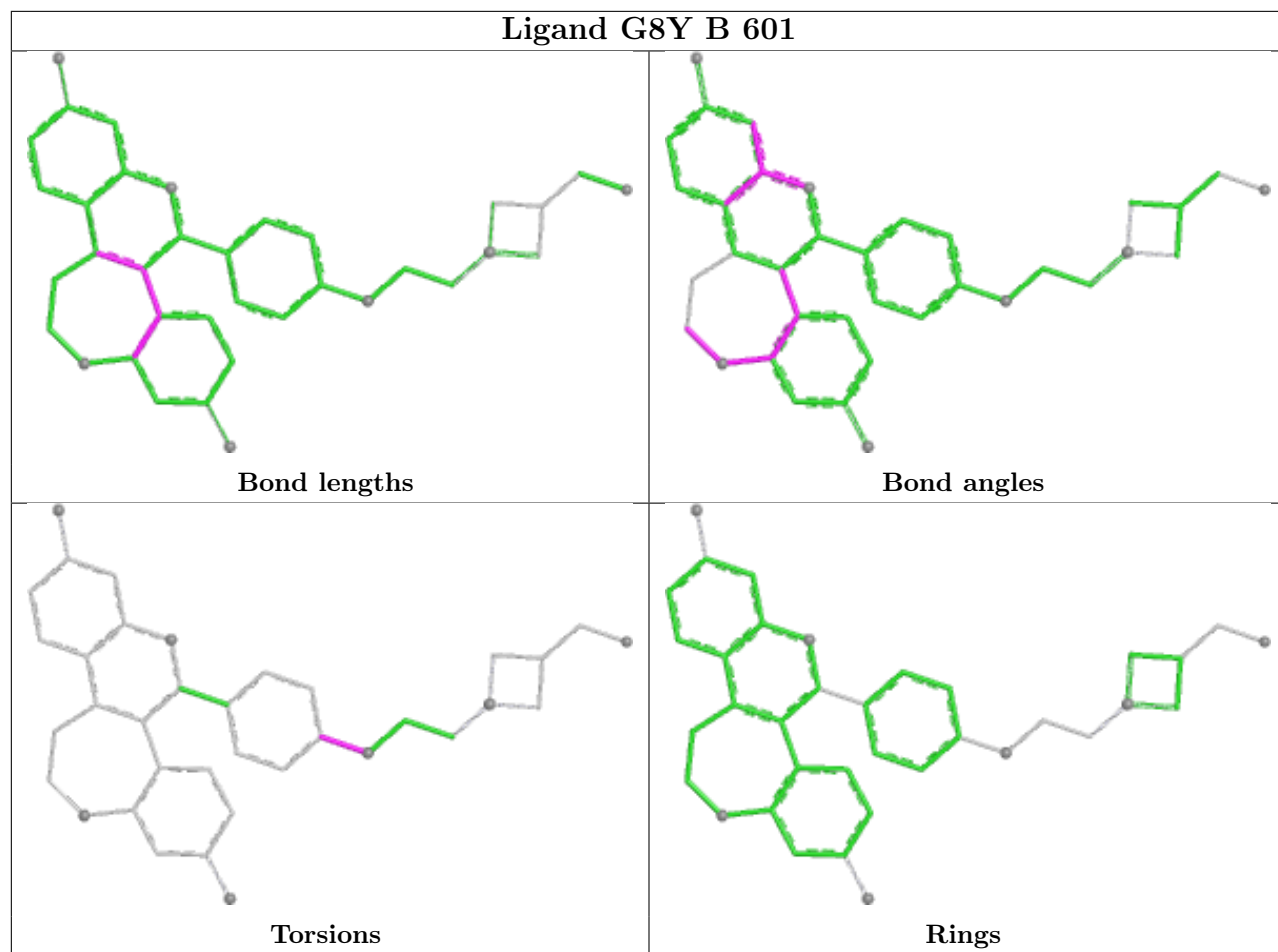
Mol	Chain	Res	Type	Atoms
2	C	601	G8Y	C4-C3-O29-C30
2	D	601	G8Y	C4-C3-O29-C30
2	D	601	G8Y	C2-C3-O29-C30
3	D	602	GOL	O1-C1-C2-C3
3	B	602	GOL	O1-C1-C2-O2
3	D	602	GOL	O1-C1-C2-O2
2	C	601	G8Y	O29-C30-C31-N32
2	A	601	G8Y	C4-C3-O29-C30
2	A	601	G8Y	C2-C3-O29-C30

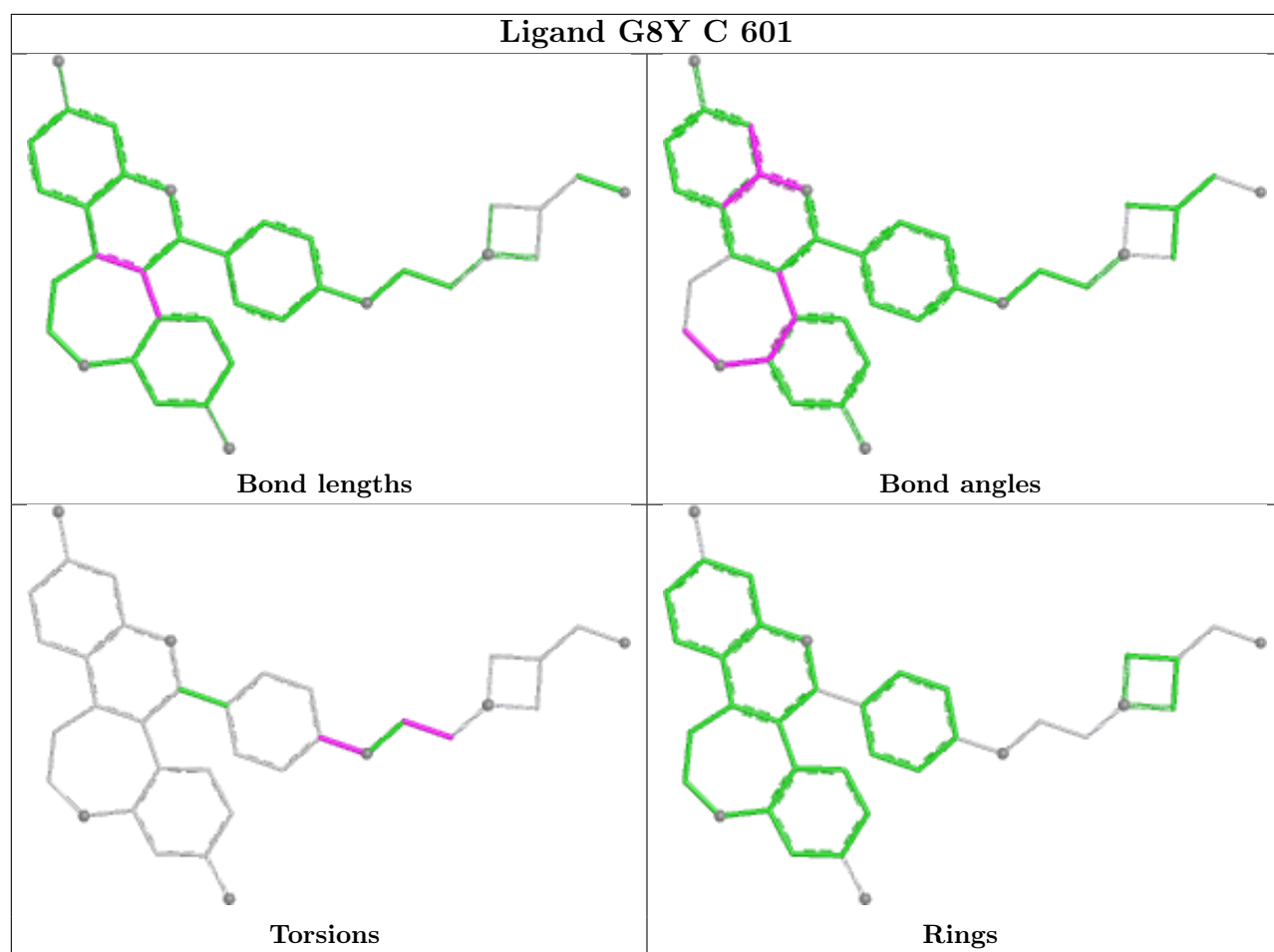
There are no ring outliers.

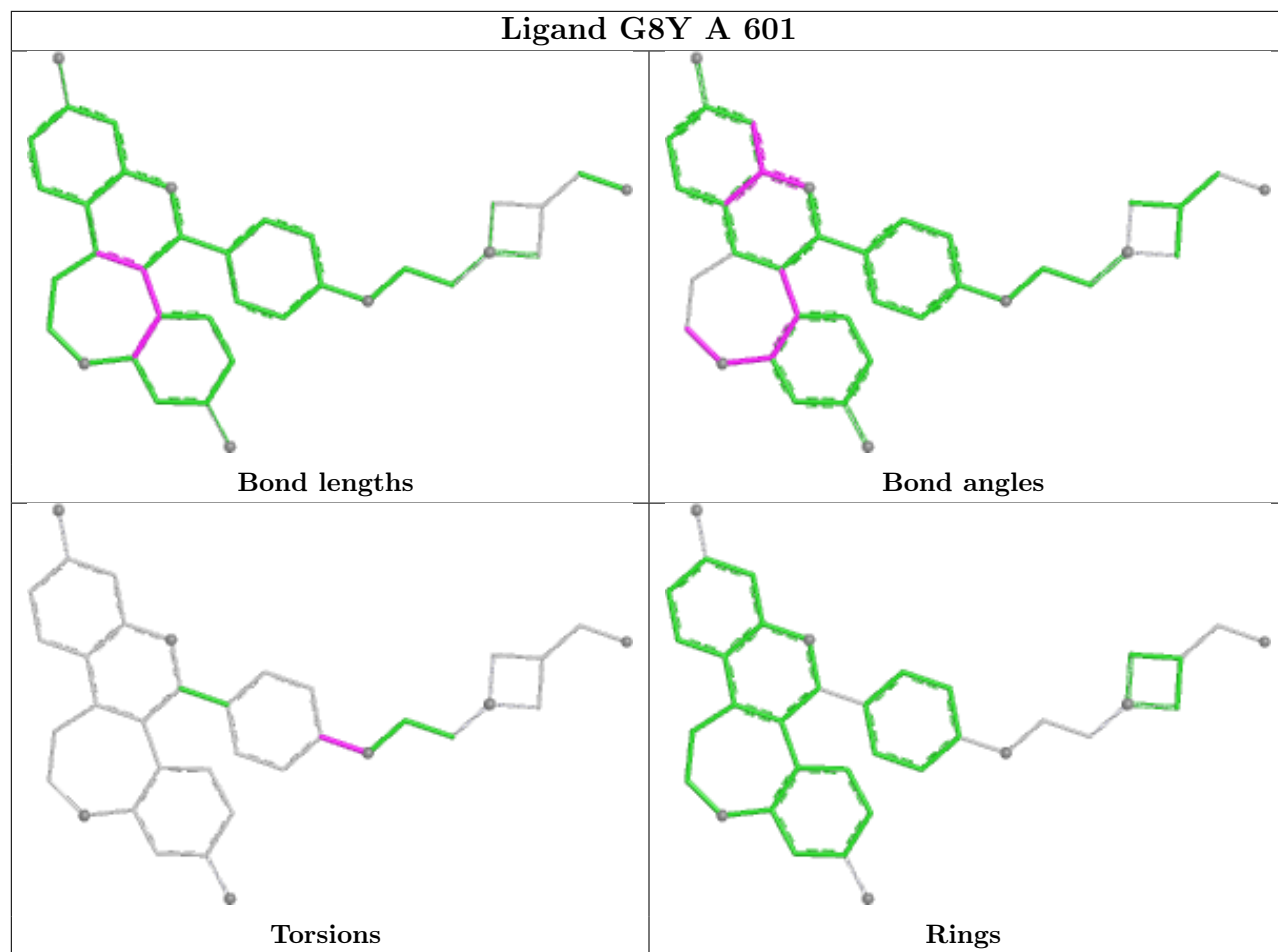
2 monomers are involved in 2 short contacts:

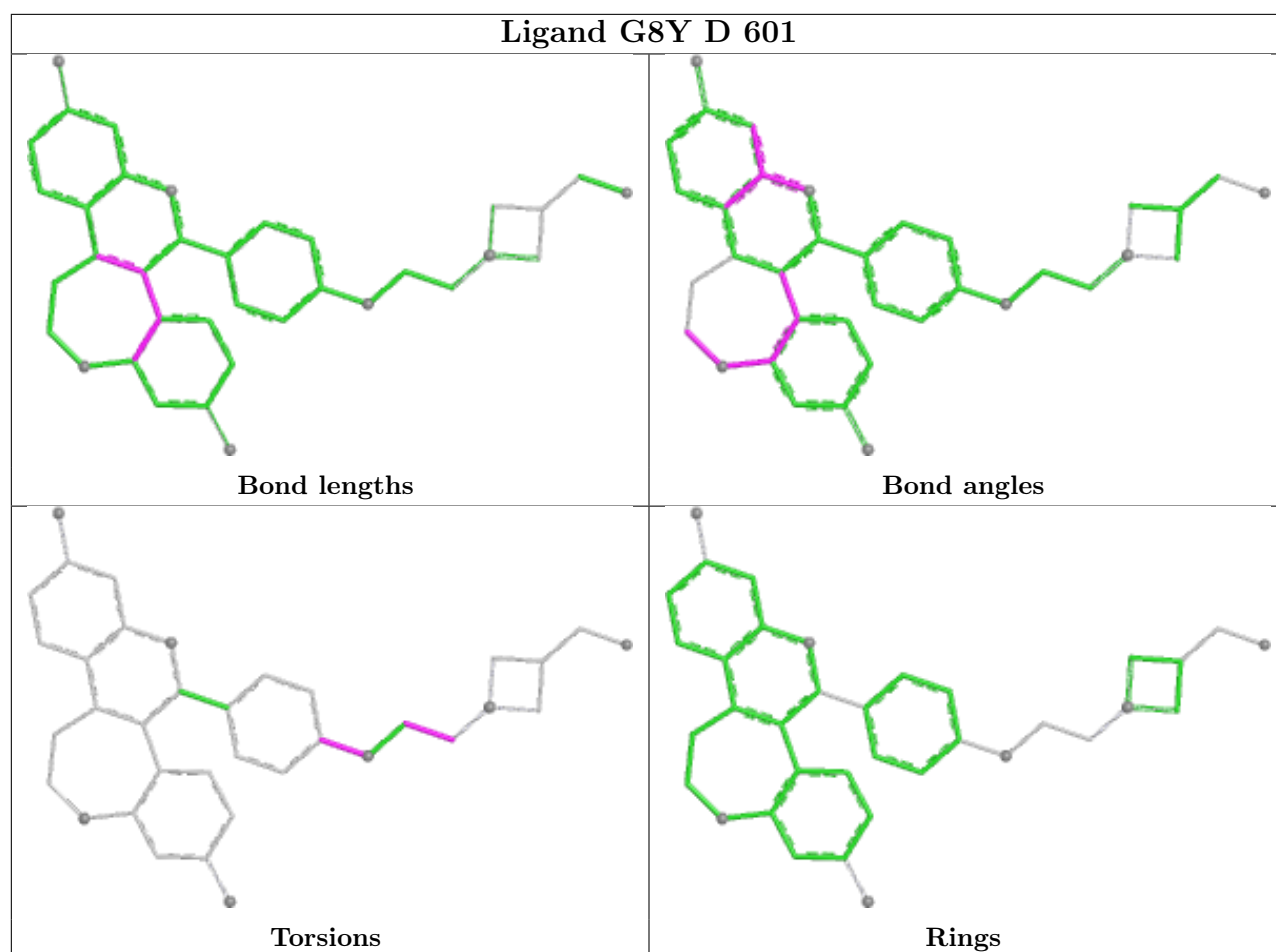
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	B	601	G8Y	1	0
2	D	601	G8Y	1	0

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 ⓘ

6.1 Protein, DNA and RNA chains ⓘ

In the following table, the column labelled ‘#RSRZ> 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95th percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled ‘Q< 0.9’ lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
1	A	235/280 (83%)	-0.09	4 (1%) 69 65	20, 52, 78, 89	1 (0%)
1	B	220/280 (78%)	0.01	7 (3%) 50 46	21, 54, 89, 103	1 (0%)
1	C	233/280 (83%)	-0.05	1 (0%) 88 86	35, 55, 80, 87	0
1	D	231/280 (82%)	0.06	5 (2%) 62 58	21, 55, 92, 113	1 (0%)
All	All	919/1120 (82%)	-0.02	17 (1%) 67 64	20, 54, 86, 113	3 (0%)

All (17) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	534	VAL	4.0
1	B	535	PRO	4.0
1	A	533	VAL	3.7
1	D	534	VAL	3.1
1	A	464	SER	2.7
1	B	546	ALA	2.6
1	B	306	LEU	2.6
1	C	461	PHE	2.5
1	D	335	ARG	2.5
1	A	461	PHE	2.4
1	D	333	PRO	2.4
1	B	493	ALA	2.2
1	D	340	ALA	2.2
1	D	537	TYR	2.1
1	B	338	SER	2.1
1	B	336	PRO	2.1
1	B	529	LYS	2.0

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

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

6.3 Carbohydrates

There are no oligosaccharides in this entry.

6.4 Ligands

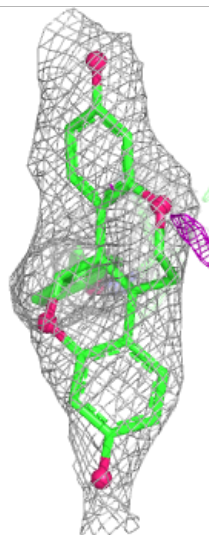
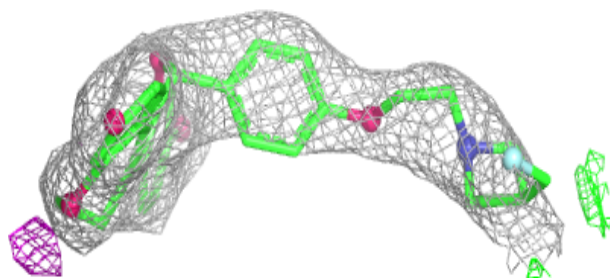
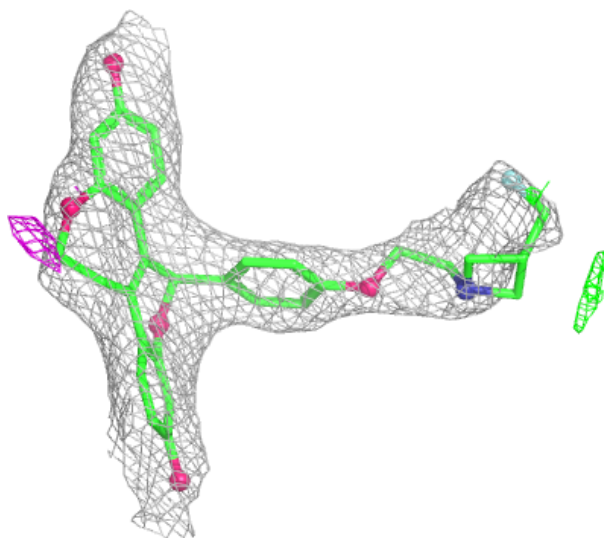
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
3	GOL	D	602	6/6	0.79	0.24	81,87,87,88	0
3	GOL	B	602	6/6	0.86	0.18	65,68,69,70	0
2	G8Y	B	601	36/36	0.88	0.12	53,59,88,90	0
2	G8Y	D	601	36/36	0.89	0.10	50,54,74,82	0
2	G8Y	A	601	36/36	0.90	0.10	44,48,66,72	0
2	G8Y	C	601	36/36	0.92	0.09	48,53,66,72	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.

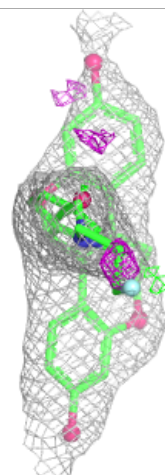
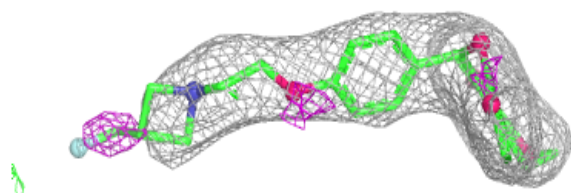
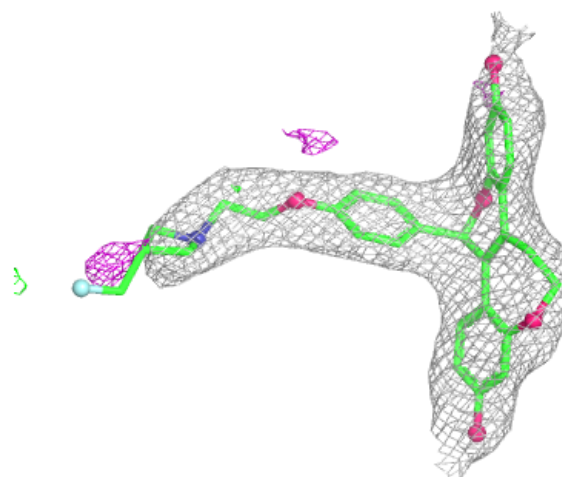
Electron density around G8Y B 601:

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



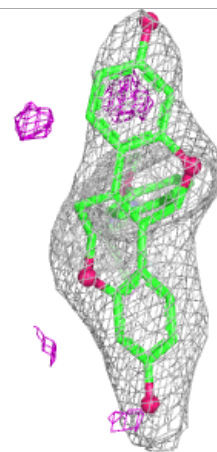
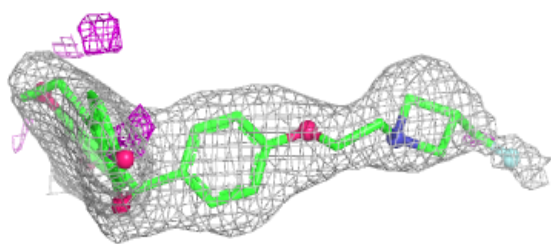
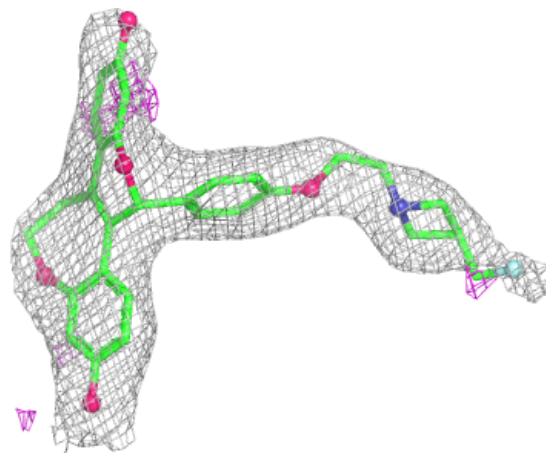
Electron density around G8Y D 601:

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



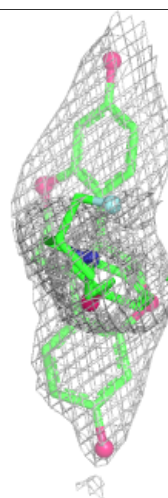
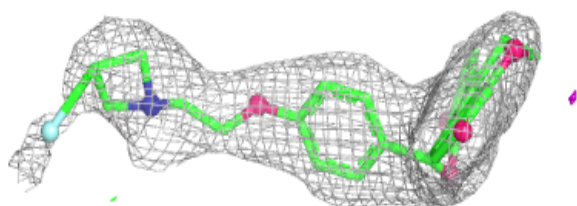
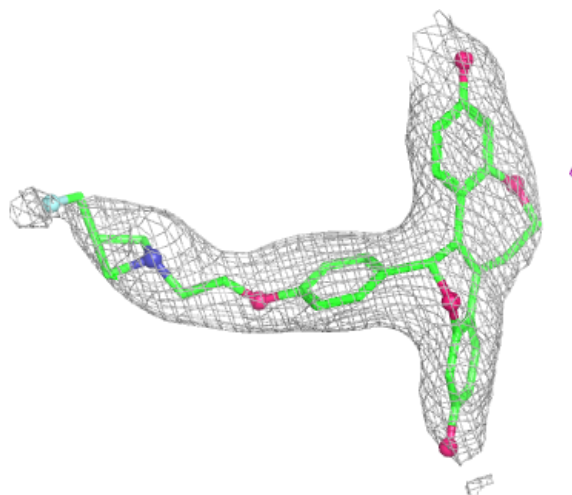
Electron density around G8Y A 601:

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



Electron density around G8Y 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)



6.5 Other polymers [i](#)

There are no such residues in this entry.