



# Full wwPDB X-ray Structure Validation Report ⓘ

Jan 4, 2024 – 09:39 pm GMT

PDB ID : 5IS9  
Title : Crystal structure of mouse CARM1 in complex with inhibitor SA0375  
Authors : Cura, V.; Marechal, N.; Mailliot, J.; Troffer-Charlier, N.; Hassenboehler, P.;  
Wurtz, J.M.; Bonnefond, L.; Cavarelli, J.  
Deposited on : 2016-03-15  
Resolution : 2.40 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](mailto: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>.

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The following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

MolProbity : 4.02b-467  
Mogul : 1.8.4, CSD as541be (2020)  
Xtriage (Phenix) : 1.13  
EDS : 2.36  
buster-report : 1.1.7 (2018)  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
Refmac : 5.8.0158  
CCP4 : 7.0.044 (Gargrove)  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.36

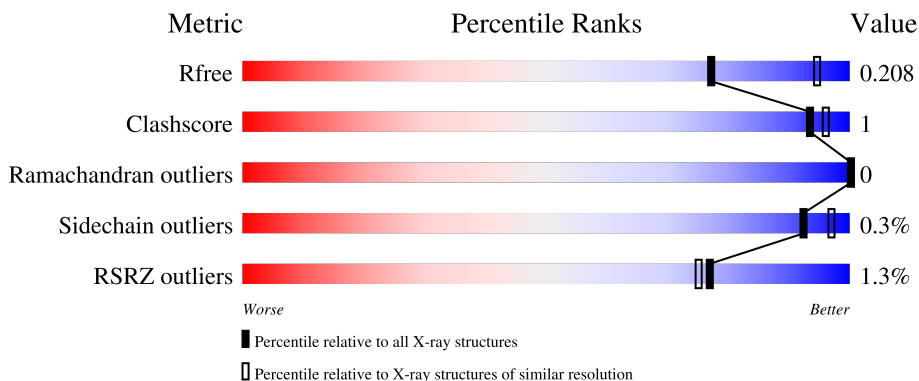
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.40 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	3907 (2.40-2.40)
Clashscore	141614	4398 (2.40-2.40)
Ramachandran outliers	138981	4318 (2.40-2.40)
Sidechain outliers	138945	4319 (2.40-2.40)
RSRZ outliers	127900	3811 (2.40-2.40)

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  $\geq 3$ , 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	361	 93% • 5%
1	B	361	 92% • 5%
1	C	361	 94% • 5%
1	D	361	 91% • 5%

## 2 Entry composition i

There are 8 unique types of molecules in this entry. The entry contains 23145 atoms, of which 11194 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.

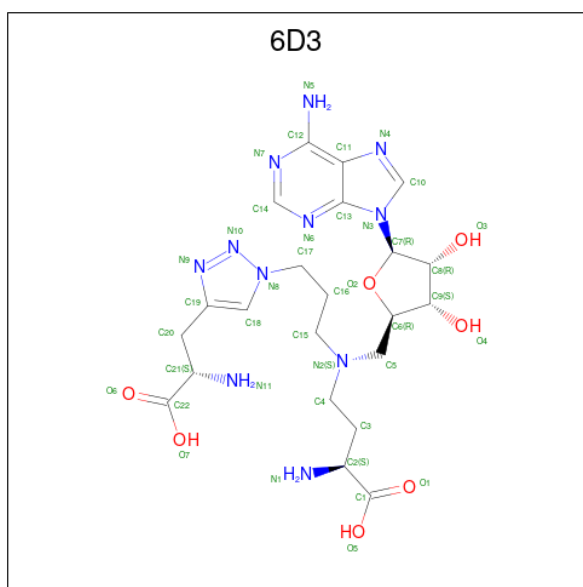
- Molecule 1 is a protein called Histone-arginine methyltransferase CARM1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace	
			Total	C	H	N	O				S
1	A	343	5530	1801	2737	461	514	17	0	5	0
1	B	343	5525	1805	2733	460	512	15	0	4	0
1	C	343	5484	1787	2715	458	509	15	0	2	0
1	D	343	5539	1805	2739	465	516	14	0	6	0

There are 12 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	127	GLY	-	expression tag	UNP Q9WVG6
A	128	HIS	-	expression tag	UNP Q9WVG6
A	129	MET	-	expression tag	UNP Q9WVG6
B	127	GLY	-	expression tag	UNP Q9WVG6
B	128	HIS	-	expression tag	UNP Q9WVG6
B	129	MET	-	expression tag	UNP Q9WVG6
C	127	GLY	-	expression tag	UNP Q9WVG6
C	128	HIS	-	expression tag	UNP Q9WVG6
C	129	MET	-	expression tag	UNP Q9WVG6
D	127	GLY	-	expression tag	UNP Q9WVG6
D	128	HIS	-	expression tag	UNP Q9WVG6
D	129	MET	-	expression tag	UNP Q9WVG6

- Molecule 2 is (2S)-2-amino-4-[(3-{4-[(2S)-2-amino-2-carboxyethyl]-1H-1,2,3-triazol-1-yl}propyl){[(2R,3S,4R,5R)-5-(6-amino-9H-purin-9-yl)-3,4-dihydroxytetrahydrofuran-2-yl]methyl}amino]butanoic acid (non-preferred name) (three-letter code: 6D3) (formula: C<sub>22</sub>H<sub>33</sub>N<sub>11</sub>O<sub>7</sub>).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	
			Total	C	H	N			O
2	A	1	Total	C	H	N	O	0	0
			71	22	31	11	7		
2	B	1	Total	C	H	N	O	0	0
			71	22	31	11	7		
2	C	1	Total	C	H	N	O	0	0
			71	22	31	11	7		
2	D	1	Total	C	H	N	O	0	0
			71	22	31	11	7		

- Molecule 3 is 1,2-ETHANEDIOL (three-letter code: EDO) (formula:  $C_2H_6O_2$ ).



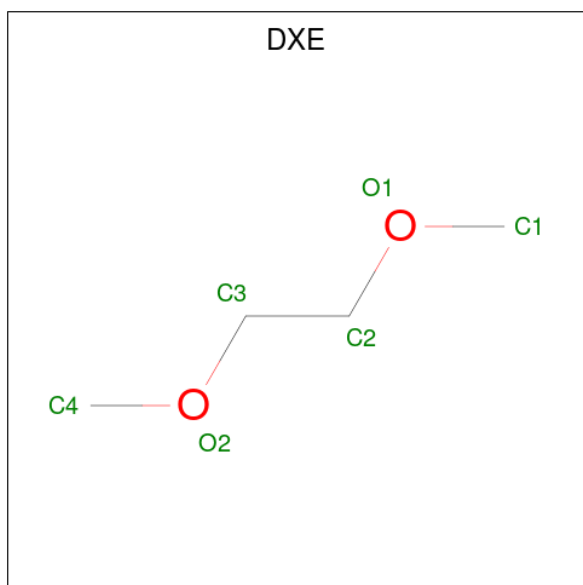
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	1	Total C H O 10 2 6 2	0	0
3	A	1	Total C H O 10 2 6 2	0	0
3	A	1	Total C H O 10 2 6 2	0	0
3	A	1	Total C O 4 2 2	0	0
3	A	1	Total C O 4 2 2	0	0
3	B	1	Total C H O 10 2 6 2	0	0
3	B	1	Total C O 4 2 2	0	0
3	B	1	Total C O 4 2 2	0	0
3	C	1	Total C H O 10 2 6 2	0	0
3	C	1	Total C H O 10 2 6 2	0	0
3	C	1	Total C H O 10 2 6 2	0	0
3	C	1	Total C O 4 2 2	0	0
3	C	1	Total C O 4 2 2	0	0
3	D	1	Total C H O 10 2 6 2	0	0
3	D	1	Total C H O 10 2 6 2	0	0
3	D	1	Total C O 4 2 2	0	0

- Molecule 4 is DI(HYDROXYETHYL)ETHER (three-letter code: PEG) (formula: C<sub>4</sub>H<sub>10</sub>O<sub>3</sub>).



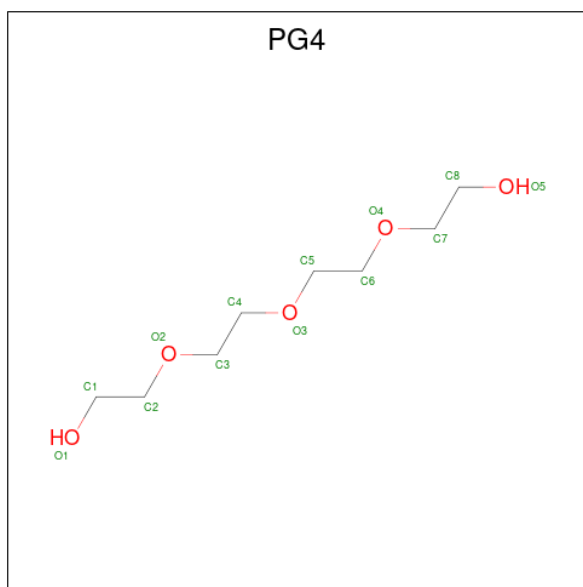
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	H	O		
4	A	1	17	4	10	3	0	0
4	A	1	17	4	10	3	0	0
4	B	1	17	4	10	3	0	0
4	D	1	17	4	10	3	0	0

- Molecule 5 is 1,2-DIMETHOXYETHANE (three-letter code: DXE) (formula:  $C_4H_{10}O_2$ ).



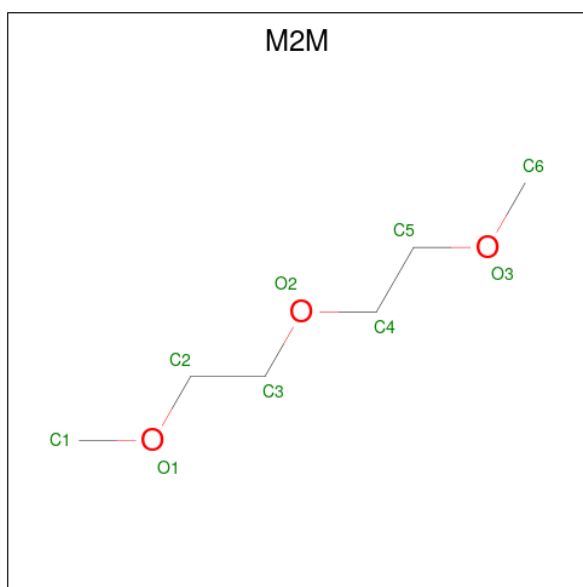
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
5	A	1	Total	C	H	O	0	0
			16	4	10	2		
5	A	1	Total	C	H	O	0	0
			16	4	10	2		

- Molecule 6 is TETRAETHYLENE GLYCOL (three-letter code: PG4) (formula: C<sub>8</sub>H<sub>18</sub>O<sub>5</sub>).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
6	A	1	Total	C	H	O	0	0
			31	8	18	5		

- Molecule 7 is 1-METHOXY-2-(2-METHOXYETHOXY)ETHANE (three-letter code: M2M) (formula: C<sub>6</sub>H<sub>14</sub>O<sub>3</sub>).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	H	O		
7	B	1	23	6	14	3	0	0

- Molecule 8 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
8	A	171	Total	O	0	0
			171	171		
8	B	141	Total	O	0	0
			141	141		
8	C	108	Total	O	0	0
			108	108		
8	D	91	Total	O	0	0
			91	91		





## 4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 2	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	74.89Å 98.37Å 206.94Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	19.60 – 2.40 19.60 – 2.32	Depositor EDS
% Data completeness (in resolution range)	95.8 (19.60-2.40) 95.8 (19.60-2.32)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	0.09	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	4.53 (at 2.33Å)	Xtrriage
Refinement program	PHENIX (dev_2016: ???)	Depositor
R, $R_{free}$	0.168 , 0.206 0.168 , 0.208	Depositor DCC
$R_{free}$ test set	3194 reflections (4.97%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	32.4	Xtrriage
Anisotropy	0.101	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.41 , 49.8	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.49$ , $\langle L^2 \rangle = 0.32$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
$F_o, F_c$ correlation	0.96	EDS
Total number of atoms	23145	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	41.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 38.42 % of the origin peak, indicating pseudo-translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo-translational symmetry is equal to 3.6944e-04. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

<sup>1</sup>Intensities estimated from amplitudes.

<sup>2</sup>Theoretical 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: PG4, PEG, 6D3, EDO, DXE, M2M

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	0.29	0/2864	0.46	0/3879
1	B	0.28	0/2865	0.44	0/3882
1	C	0.27	0/2840	0.43	0/3848
1	D	0.27	0/2878	0.45	1/3900 (0.0%)
All	All	0.28	0/11447	0.44	1/15509 (0.0%)

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	D	295	LEU	CA-CB-CG	6.34	129.89	115.30

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	2793	2737	2732	8	0
1	B	2792	2733	2729	9	0
1	C	2769	2715	2713	4	0
1	D	2800	2739	2728	11	0
2	A	40	31	0	1	0
2	B	40	31	0	1	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	C	40	31	0	1	0
2	D	40	31	0	1	0
3	A	20	18	30	0	0
3	B	12	6	18	1	0
3	C	20	18	30	0	0
3	D	12	12	18	1	0
4	A	14	20	20	2	0
4	B	7	10	10	0	0
4	D	7	10	10	1	0
5	A	12	20	20	0	0
6	A	13	18	18	0	0
7	B	9	14	14	2	0
8	A	171	0	0	0	0
8	B	141	0	0	4	0
8	C	108	0	0	2	0
8	D	91	0	0	2	0
All	All	11951	11194	11090	32	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 (32) 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:D:169:ARG:NH2	1:D:258:GLU:OE2	2.13	0.81
1:A:169:ARG:NH2	1:A:258:GLU:OE2	2.15	0.80
1:B:362:GLU:OE2	8:B:601:HOH:O	2.03	0.75
1:D:333[B]:ASP:OD1	1:D:337:ARG:NH2	2.28	0.67
1:D:469:ASP:OD1	8:D:601:HOH:O	2.15	0.65
1:C:469:ASP:OD1	8:C:601:HOH:O	2.16	0.58
7:B:506:M2M:H13	8:B:697:HOH:O	2.05	0.57
1:B:465:SER:O	8:B:602:HOH:O	2.18	0.54
1:A:188:ILE:HD12	1:A:210:LYS:HB3	1.90	0.52
1:C:267:GLU:OE2	2:C:501:6D3:N11	2.43	0.52
1:D:150:TYR:HA	3:D:504:EDO:H11	1.92	0.52
1:C:224:GLU:OE1	8:C:602:HOH:O	2.18	0.52
1:B:266:ASN:O	1:B:267:GLU:HB2	2.11	0.50
1:A:266:ASN:O	1:A:267:GLU:HB2	2.11	0.50
1:C:266:ASN:O	1:C:267:GLU:HB2	2.12	0.50
1:B:267:GLU:OE2	2:B:501:6D3:N11	2.45	0.49
1:D:266:ASN:O	1:D:267:GLU:HB2	2.12	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:413:LEU:HD23	3:B:503:EDO:H11	1.95	0.47
1:A:167:TYR:CE2	1:D:430:LYS:HD3	2.51	0.46
1:A:188:ILE:CD1	1:A:210:LYS:HB3	2.46	0.46
1:B:333:ASP:OD1	1:B:337:ARG:NH2	2.49	0.46
4:A:507:PEG:H42	1:D:461:GLY:HA3	2.00	0.44
1:D:315:TYR:HD2	1:D:328:ARG:CD	2.31	0.43
1:B:467:LEU:HG	7:B:506:M2M:C2	2.49	0.43
1:A:178:LEU:HD13	4:A:507:PEG:H32	2.01	0.42
1:D:463:LYS:NZ	8:D:610:HOH:O	2.48	0.42
1:D:267:GLU:OE2	2:D:501:6D3:N11	2.52	0.42
1:B:242:LYS:NZ	8:B:613:HOH:O	2.52	0.41
1:A:169:ARG:HD2	1:A:258:GLU:OE2	2.21	0.41
1:A:267:GLU:OE2	2:A:501:6D3:N11	2.54	0.41
1:B:317:PRO:HG3	4:D:505:PEG:H41	2.02	0.41
1:D:295:LEU:CD1	1:D:295:LEU:N	2.85	0.40

There are no symmetry-related clashes.

## 5.3 Torsion angles [i](#)

### 5.3.1 Protein backbone [i](#)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	346/361 (96%)	336 (97%)	10 (3%)	0	100	100
1	B	345/361 (96%)	337 (98%)	8 (2%)	0	100	100
1	C	343/361 (95%)	333 (97%)	10 (3%)	0	100	100
1	D	346/361 (96%)	336 (97%)	10 (3%)	0	100	100
All	All	1380/1444 (96%)	1342 (97%)	38 (3%)	0	100	100

There are no Ramachandran outliers to report.

### 5.3.2 Protein sidechains [i](#)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	304/313 (97%)	303 (100%)	1 (0%)	92	97
1	B	303/313 (97%)	302 (100%)	1 (0%)	92	97
1	C	301/313 (96%)	300 (100%)	1 (0%)	92	97
1	D	305/313 (97%)	304 (100%)	1 (0%)	92	97
All	All	1213/1252 (97%)	1209 (100%)	4 (0%)	92	97

All (4) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	295	LEU
1	B	364	LYS
1	C	258	GLU
1	D	295	LEU

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](#)

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

28 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
3	EDO	D	504	-	3,3,3	0.48	0	2,2,2	0.43	0
3	EDO	B	502	-	3,3,3	0.46	0	2,2,2	0.46	0
3	EDO	C	502	-	3,3,3	0.48	0	2,2,2	0.43	0
3	EDO	C	504	-	3,3,3	0.47	0	2,2,2	0.45	0
3	EDO	C	506	-	3,3,3	0.47	0	2,2,2	0.54	0
2	6D3	D	501	-	38,43,43	1.60	6 (15%)	38,61,61	1.71	4 (10%)
3	EDO	D	503	-	3,3,3	0.48	0	2,2,2	0.43	0
3	EDO	B	503	-	3,3,3	0.45	0	2,2,2	0.63	0
4	PEG	A	508	-	6,6,6	0.48	0	5,5,5	0.55	0
2	6D3	A	501	-	38,43,43	1.57	4 (10%)	38,61,61	1.82	4 (10%)
3	EDO	A	505	-	3,3,3	0.47	0	2,2,2	0.49	0
3	EDO	D	502	-	3,3,3	0.48	0	2,2,2	0.42	0
3	EDO	A	506	-	3,3,3	0.48	0	2,2,2	0.39	0
5	DXE	A	509	-	5,5,5	0.42	0	4,4,4	0.28	0
4	PEG	B	505	-	6,6,6	0.48	0	5,5,5	0.62	0
5	DXE	A	510	-	5,5,5	0.44	0	4,4,4	0.26	0
7	M2M	B	506	-	8,8,8	0.57	0	7,7,7	0.32	0
6	PG4	A	511	-	12,12,12	0.52	0	11,11,11	0.29	0
2	6D3	C	501	-	38,43,43	1.63	4 (10%)	38,61,61	1.79	4 (10%)
3	EDO	C	505	-	3,3,3	0.47	0	2,2,2	0.51	0
3	EDO	A	503	-	3,3,3	0.46	0	2,2,2	0.48	0
2	6D3	B	501	-	38,43,43	1.59	4 (10%)	38,61,61	1.75	3 (7%)
4	PEG	A	507	-	6,6,6	0.48	0	5,5,5	0.48	0
3	EDO	A	502	-	3,3,3	0.48	0	2,2,2	0.42	0
3	EDO	A	504	-	3,3,3	0.45	0	2,2,2	0.53	0
3	EDO	C	503	-	3,3,3	0.46	0	2,2,2	0.53	0
4	PEG	D	505	-	6,6,6	0.47	0	5,5,5	0.43	0
3	EDO	B	504	-	3,3,3	0.47	0	2,2,2	0.34	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
3	EDO	D	504	-	-	0/1/1/1	-
3	EDO	B	502	-	-	1/1/1/1	-
3	EDO	C	502	-	-	1/1/1/1	-
3	EDO	C	504	-	-	1/1/1/1	-
3	EDO	C	506	-	-	1/1/1/1	-
2	6D3	D	501	-	-	7/26/47/47	0/4/4/4
3	EDO	D	503	-	-	1/1/1/1	-
3	EDO	B	503	-	-	1/1/1/1	-
4	PEG	A	508	-	-	3/4/4/4	-
2	6D3	A	501	-	-	8/26/47/47	0/4/4/4
3	EDO	A	505	-	-	1/1/1/1	-
3	EDO	D	502	-	-	1/1/1/1	-
3	EDO	A	506	-	-	0/1/1/1	-
5	DXE	A	509	-	-	2/3/3/3	-
4	PEG	B	505	-	-	2/4/4/4	-
5	DXE	A	510	-	-	2/3/3/3	-
7	M2M	B	506	-	-	3/6/6/6	-
6	PG4	A	511	-	-	2/10/10/10	-
2	6D3	C	501	-	-	8/26/47/47	0/4/4/4
3	EDO	C	505	-	-	1/1/1/1	-
3	EDO	A	503	-	-	1/1/1/1	-
2	6D3	B	501	-	-	5/26/47/47	0/4/4/4
4	PEG	A	507	-	-	1/4/4/4	-
3	EDO	A	502	-	-	1/1/1/1	-
3	EDO	A	504	-	-	1/1/1/1	-
3	EDO	C	503	-	-	1/1/1/1	-
4	PEG	D	505	-	-	3/4/4/4	-
3	EDO	B	504	-	-	0/1/1/1	-

All (18) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	C	501	6D3	C18-C19	6.37	1.45	1.36
2	D	501	6D3	C18-C19	6.30	1.45	1.36
2	B	501	6D3	C18-C19	6.29	1.45	1.36
2	A	501	6D3	C18-C19	6.19	1.45	1.36
2	C	501	6D3	C8-C7	-3.67	1.48	1.53
2	D	501	6D3	C8-C7	-3.55	1.48	1.53

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	501	6D3	C8-C7	-3.54	1.48	1.53
2	A	501	6D3	C8-C7	-3.47	1.48	1.53
2	C	501	6D3	C5-N2	-2.62	1.42	1.47
2	A	501	6D3	C5-N2	-2.35	1.42	1.47
2	B	501	6D3	C5-N2	-2.30	1.43	1.47
2	C	501	6D3	C4-N2	-2.21	1.42	1.47
2	A	501	6D3	C4-N2	-2.15	1.42	1.47
2	B	501	6D3	C4-N2	-2.14	1.42	1.47
2	D	501	6D3	C5-N2	-2.06	1.43	1.47
2	D	501	6D3	C4-N2	-2.03	1.42	1.47
2	D	501	6D3	C3-C4	2.02	1.56	1.52
2	D	501	6D3	O6-C22	2.00	1.28	1.22

All (15) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	501	6D3	N9-N10-N8	6.98	112.58	107.31
2	C	501	6D3	N9-N10-N8	6.73	112.39	107.31
2	D	501	6D3	N9-N10-N8	6.40	112.14	107.31
2	B	501	6D3	N9-N10-N8	6.35	112.11	107.31
2	B	501	6D3	N6-C14-N7	-4.49	121.67	128.68
2	D	501	6D3	N6-C14-N7	-4.42	121.77	128.68
2	A	501	6D3	N6-C14-N7	-4.40	121.80	128.68
2	C	501	6D3	N6-C14-N7	-4.28	121.98	128.68
2	B	501	6D3	C18-C19-N9	-4.19	105.11	111.34
2	A	501	6D3	C18-C19-N9	-4.16	105.17	111.34
2	C	501	6D3	C18-C19-N9	-4.04	105.33	111.34
2	D	501	6D3	C18-C19-N9	-4.04	105.34	111.34
2	C	501	6D3	C13-C11-N4	-2.28	107.02	109.40
2	D	501	6D3	C13-C11-N4	-2.13	107.18	109.40
2	A	501	6D3	C8-C9-C6	2.10	106.73	102.64

There are no chirality outliers.

All (59) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	501	6D3	N1-C2-C3-C4
2	A	501	6D3	C15-C16-C17-N8
2	A	501	6D3	C16-C17-N8-C18
2	A	501	6D3	C16-C17-N8-N10
2	A	501	6D3	C19-C20-C21-C22
2	B	501	6D3	C15-C16-C17-N8

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Mol	Chain	Res	Type	Atoms
2	C	501	6D3	C1-C2-C3-C4
2	C	501	6D3	N1-C2-C3-C4
2	C	501	6D3	C15-C16-C17-N8
2	C	501	6D3	C16-C17-N8-C18
2	C	501	6D3	C16-C17-N8-N10
2	D	501	6D3	C15-C16-C17-N8
2	D	501	6D3	C20-C21-C22-O7
6	A	511	PG4	O2-C3-C4-O3
7	B	506	M2M	O2-C4-C5-O3
5	A	510	DXE	O1-C2-C3-O2
4	B	505	PEG	O1-C1-C2-O2
6	A	511	PG4	O1-C1-C2-O2
4	A	507	PEG	O2-C3-C4-O4
4	D	505	PEG	O1-C1-C2-O2
2	D	501	6D3	C20-C21-C22-O6
5	A	509	DXE	O1-C2-C3-O2
4	A	508	PEG	O2-C3-C4-O4
2	D	501	6D3	N11-C21-C22-O7
3	C	503	EDO	O1-C1-C2-O2
3	C	504	EDO	O1-C1-C2-O2
4	A	508	PEG	C1-C2-O2-C3
4	A	508	PEG	O1-C1-C2-O2
2	A	501	6D3	C19-C20-C21-N11
2	C	501	6D3	O5-C1-C2-N1
3	A	504	EDO	O1-C1-C2-O2
4	B	505	PEG	O2-C3-C4-O4
2	C	501	6D3	O1-C1-C2-N1
2	D	501	6D3	N11-C21-C22-O6
7	B	506	M2M	O1-C2-C3-O2
3	A	505	EDO	O1-C1-C2-O2
3	C	502	EDO	O1-C1-C2-O2
4	D	505	PEG	C4-C3-O2-C2
7	B	506	M2M	C5-C4-O2-C3
2	A	501	6D3	C1-C2-C3-C4
2	B	501	6D3	C20-C21-C22-O7
3	B	502	EDO	O1-C1-C2-O2
3	C	506	EDO	O1-C1-C2-O2
2	C	501	6D3	N2-C15-C16-C17
5	A	510	DXE	C3-C2-O1-C1
2	D	501	6D3	C6-C5-N2-C4
2	B	501	6D3	C20-C21-C22-O6
3	A	502	EDO	O1-C1-C2-O2

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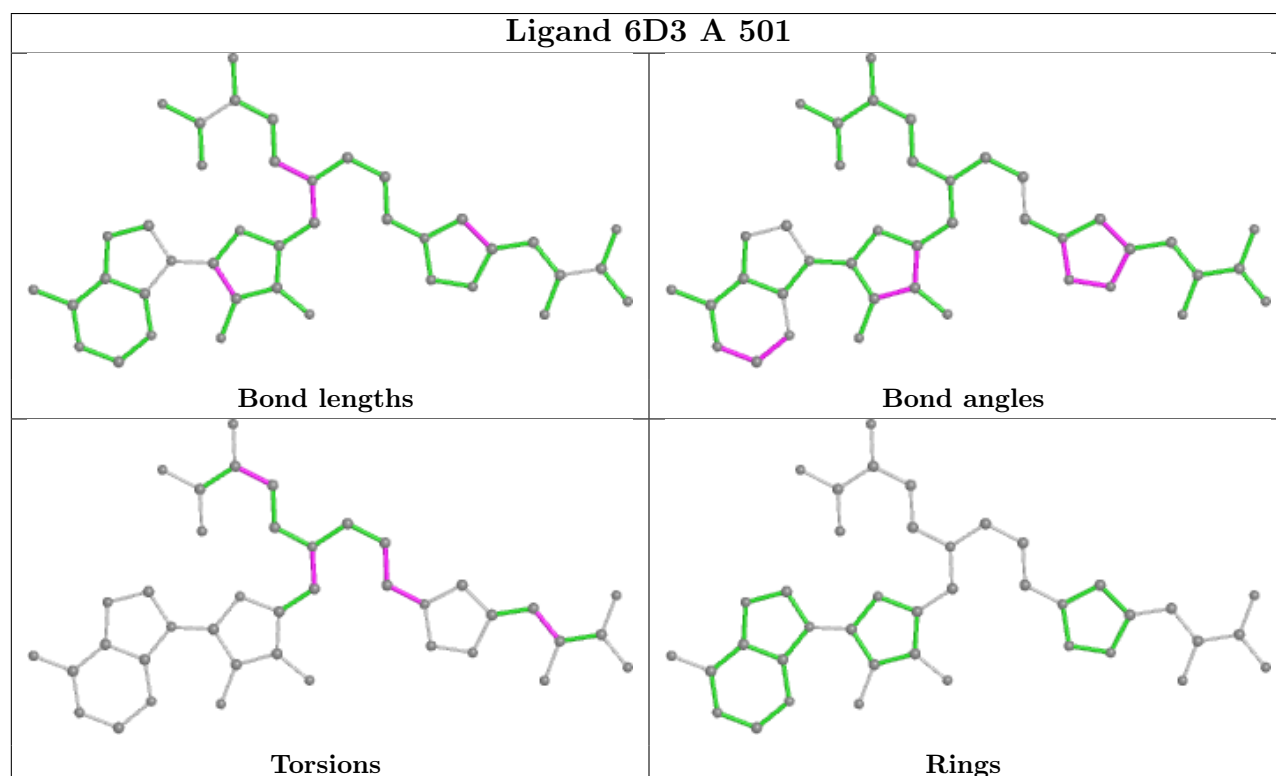
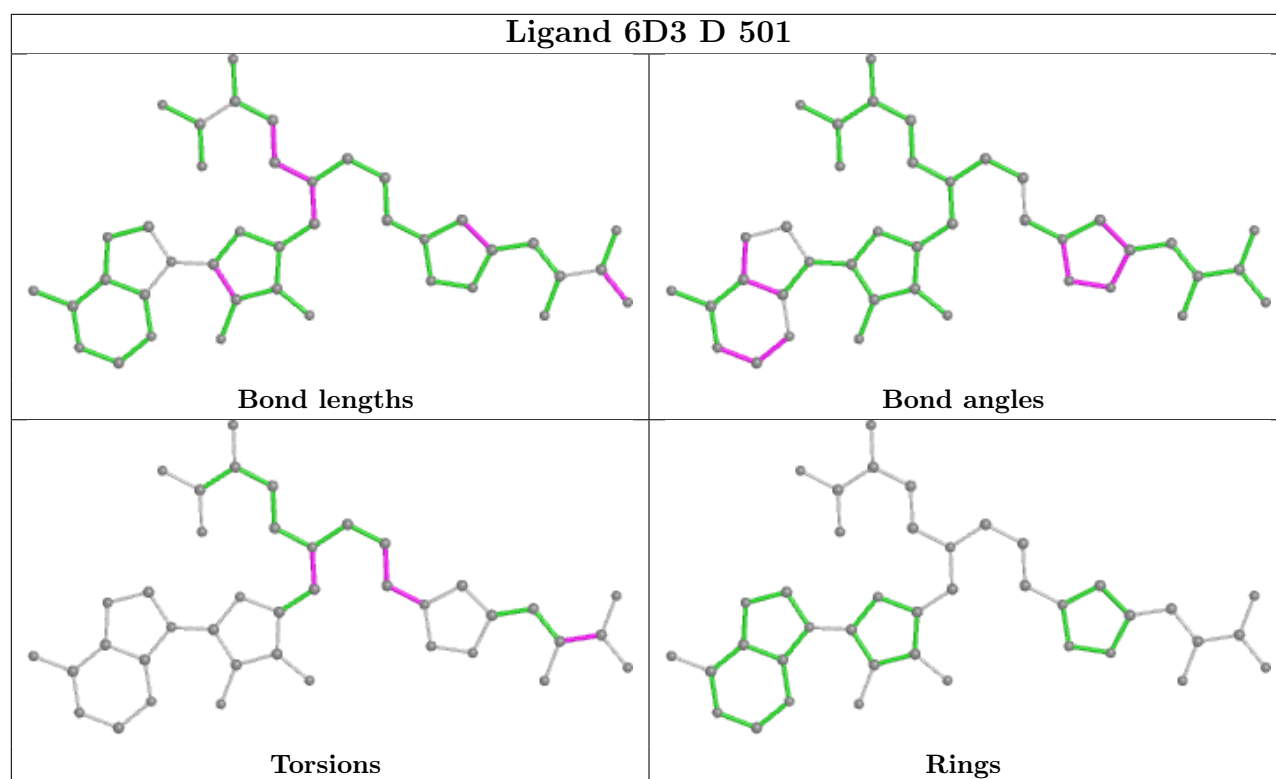
Mol	Chain	Res	Type	Atoms
3	D	503	EDO	O1-C1-C2-O2
2	B	501	6D3	C6-C5-N2-C4
3	D	502	EDO	O1-C1-C2-O2
3	A	503	EDO	O1-C1-C2-O2
3	B	503	EDO	O1-C1-C2-O2
3	C	505	EDO	O1-C1-C2-O2
5	A	509	DXE	C3-C2-O1-C1
4	D	505	PEG	C1-C2-O2-C3
2	B	501	6D3	C18-C19-C20-C21
2	A	501	6D3	C6-C5-N2-C15
2	D	501	6D3	C16-C17-N8-C18

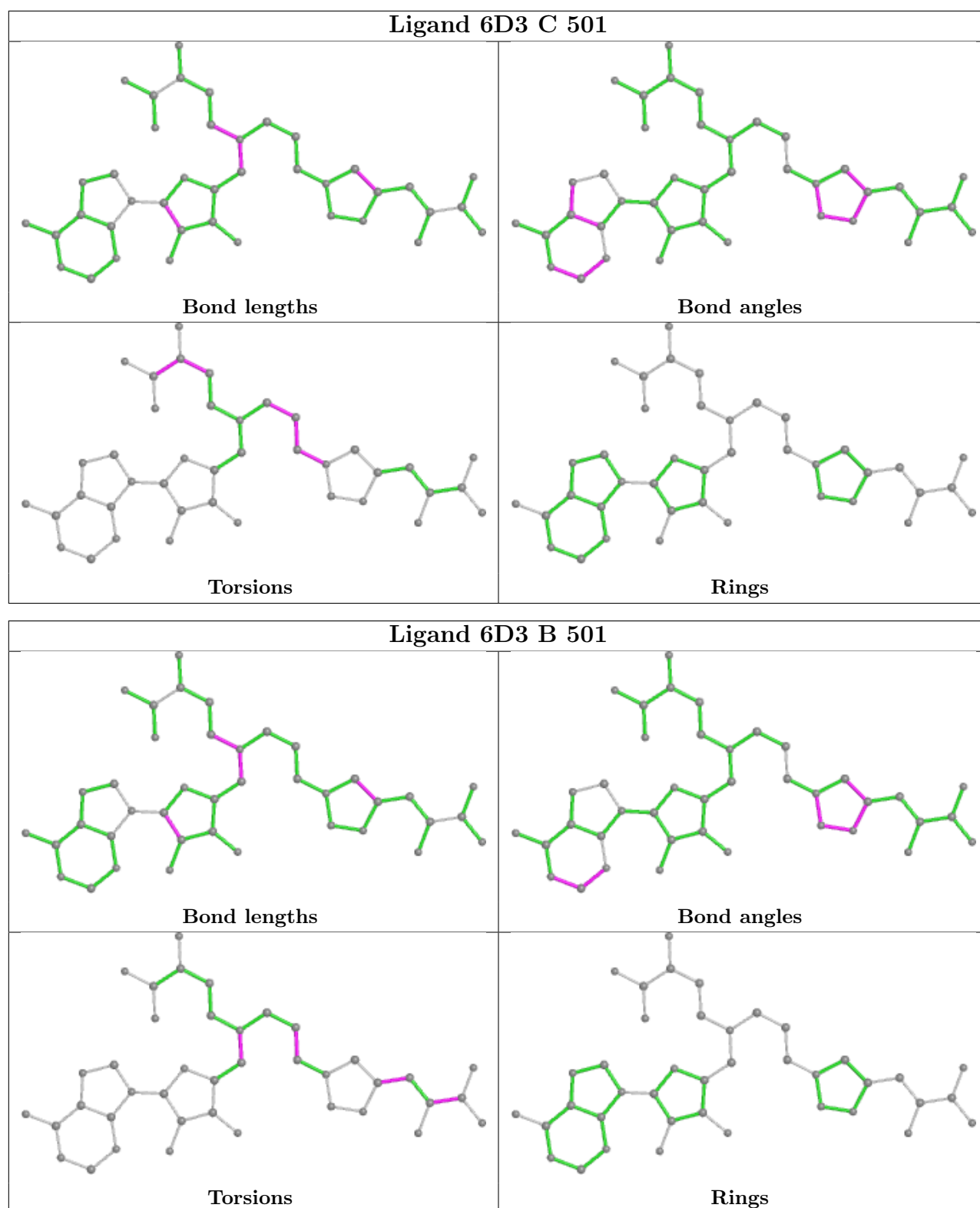
There are no ring outliers.

9 monomers are involved in 11 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	D	504	EDO	1	0
2	D	501	6D3	1	0
3	B	503	EDO	1	0
2	A	501	6D3	1	0
7	B	506	M2M	2	0
2	C	501	6D3	1	0
2	B	501	6D3	1	0
4	A	507	PEG	2	0
4	D	505	PEG	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

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<sup>th</sup> 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 <sup>2</sup> )	Q<0.9
1	A	343/361 (95%)	-0.52	3 (0%) 84 82	18, 29, 46, 61	0
1	B	343/361 (95%)	-0.50	1 (0%) 94 93	20, 33, 49, 66	0
1	C	343/361 (95%)	-0.27	6 (1%) 70 68	25, 40, 60, 75	0
1	D	343/361 (95%)	-0.34	8 (2%) 60 58	27, 38, 55, 70	0
All	All	1372/1444 (95%)	-0.41	18 (1%) 77 75	18, 36, 56, 75	0

All (18) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	478	THR	4.9
1	D	478[A]	THR	4.7
1	A	478	THR	4.2
1	D	477[A]	TYR	4.1
1	C	478	THR	3.7
1	C	477	TYR	3.6
1	A	283	SER	3.3
1	C	140	GLU	3.2
1	C	283	SER	3.1
1	D	475	PHE	2.9
1	D	347	ARG	2.4
1	A	140	GLU	2.3
1	D	144	GLU	2.2
1	C	282	PRO	2.2
1	D	235	ARG	2.1
1	D	140	GLU	2.1
1	D	139	SER	2.0
1	C	228	LYS	2.0

## 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, 95<sup>th</sup> 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 <sup>2</sup> )	Q<0.9
4	PEG	D	505	7/7	0.72	0.27	49,59,70,70	0
7	M2M	B	506	9/9	0.74	0.33	53,64,69,69	0
5	DXE	A	510	6/6	0.76	0.22	52,63,68,68	0
3	EDO	B	504	4/4	0.76	0.17	48,49,49,50	0
5	DXE	A	509	6/6	0.77	0.21	43,51,58,58	0
3	EDO	C	502	4/4	0.81	0.13	48,57,58,59	0
3	EDO	A	502	4/4	0.82	0.13	38,46,50,53	0
3	EDO	C	505	4/4	0.82	0.25	57,57,58,59	0
3	EDO	A	506	4/4	0.83	0.21	34,35,35,40	0
4	PEG	B	505	7/7	0.83	0.23	43,52,58,62	0
4	PEG	A	507	7/7	0.85	0.17	45,54,60,60	0
3	EDO	A	503	4/4	0.85	0.16	39,47,51,57	0
3	EDO	C	504	4/4	0.86	0.16	51,61,62,63	0
2	6D3	C	501	40/40	0.86	0.20	28,52,86,94	0
3	EDO	A	504	4/4	0.87	0.12	44,53,58,61	0
3	EDO	D	503	4/4	0.87	0.11	50,60,60,61	0
6	PG4	A	511	13/13	0.88	0.22	44,53,57,58	0
3	EDO	B	503	4/4	0.88	0.14	47,47,48,51	0
3	EDO	B	502	4/4	0.89	0.09	44,53,56,58	0
3	EDO	D	502	4/4	0.89	0.14	44,53,54,54	0
2	6D3	A	501	40/40	0.90	0.18	15,42,74,86	0
3	EDO	A	505	4/4	0.90	0.14	43,43,45,47	0
2	6D3	D	501	40/40	0.90	0.15	26,42,86,90	0
3	EDO	C	503	4/4	0.92	0.20	50,60,61,62	0
4	PEG	A	508	7/7	0.92	0.31	44,53,54,54	0
2	6D3	B	501	40/40	0.93	0.13	18,38,67,73	0
3	EDO	D	504	4/4	0.94	0.14	49,50,51,52	0

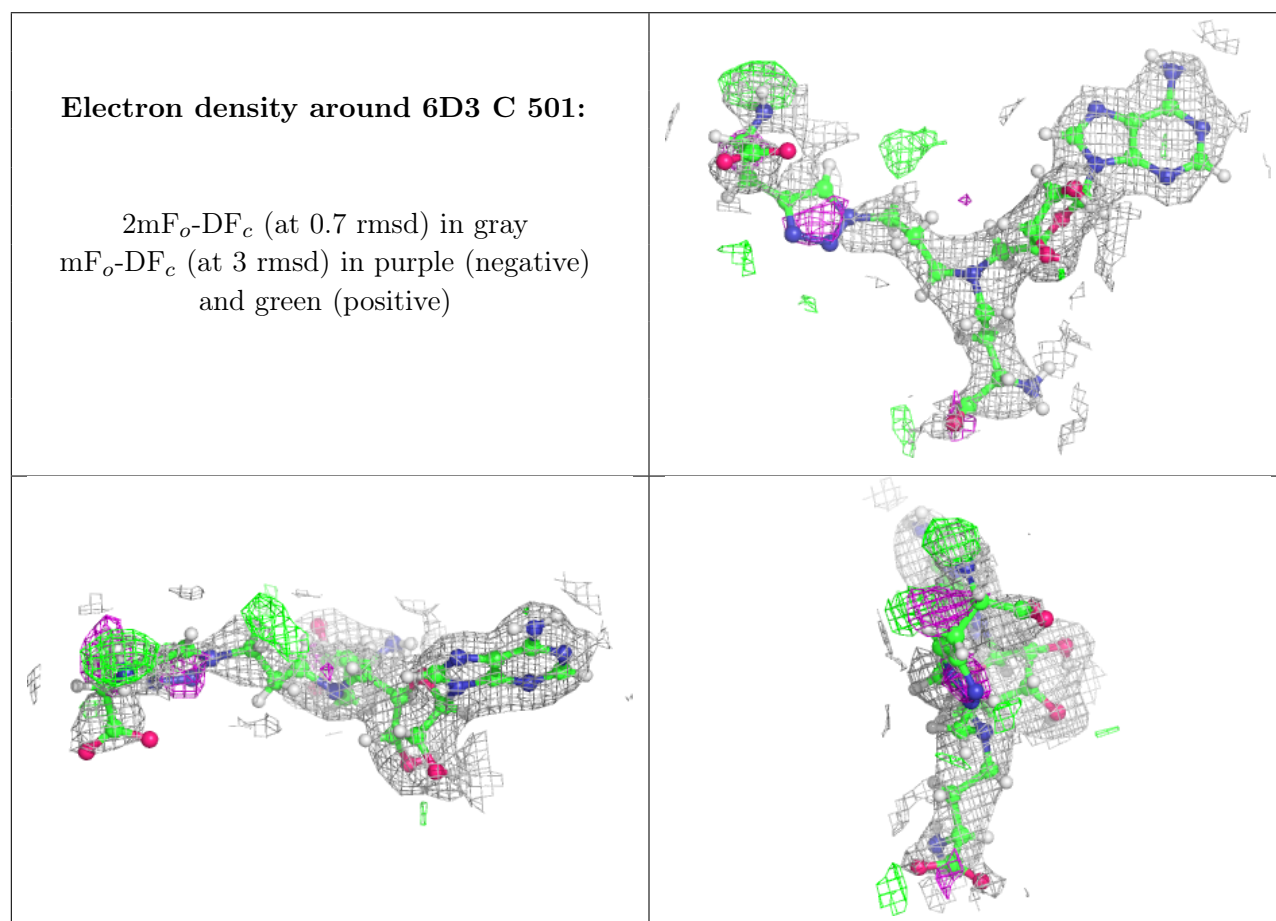
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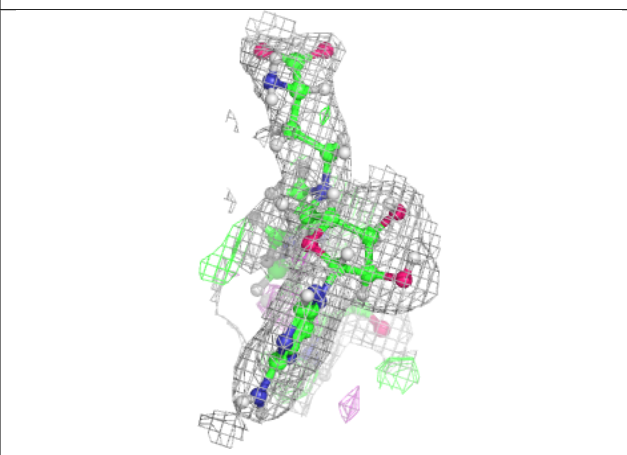
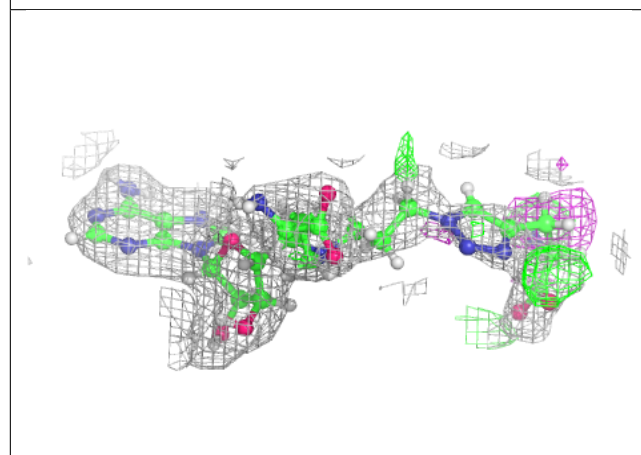
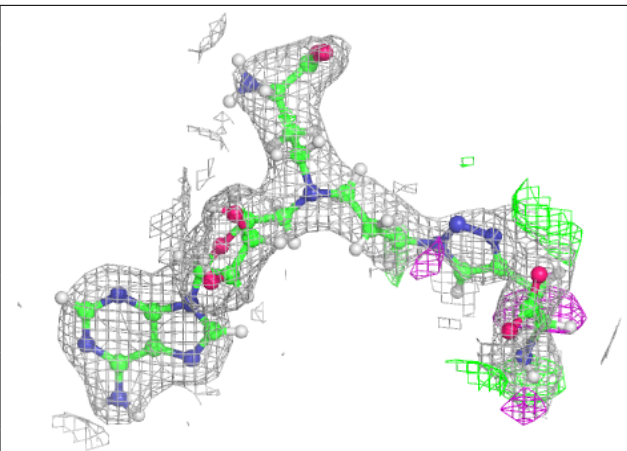
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors( $\text{\AA}^2$ )	Q<0.9
3	EDO	C	506	4/4	0.96	0.07	45,46,47,48	0

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.



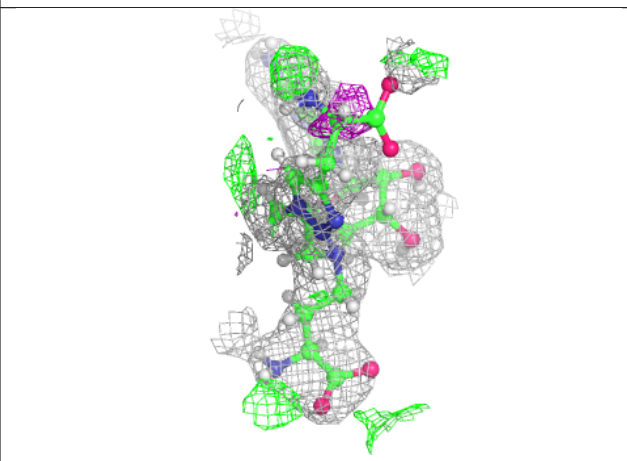
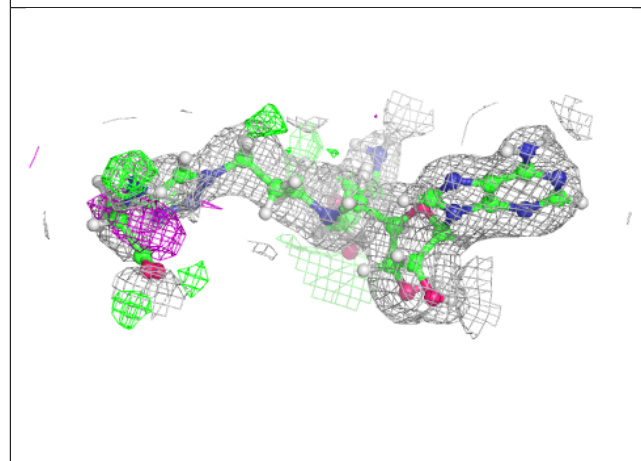
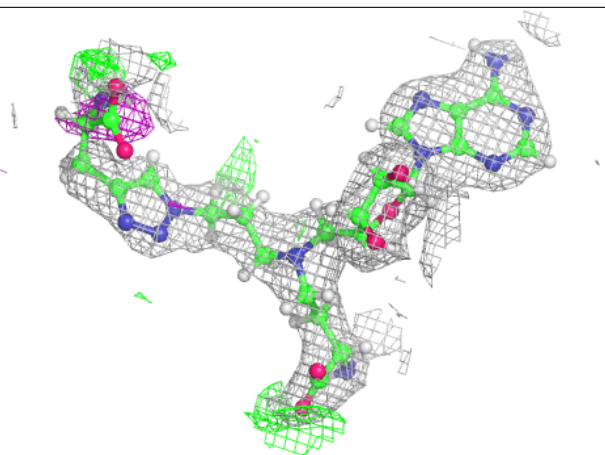
**Electron density around 6D3 A 501:**

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



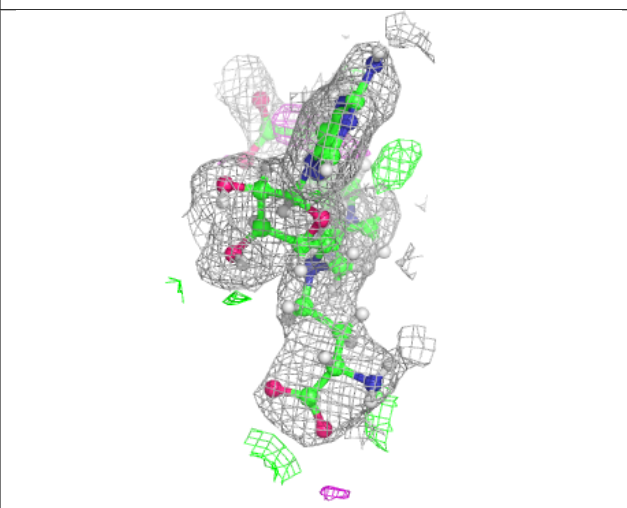
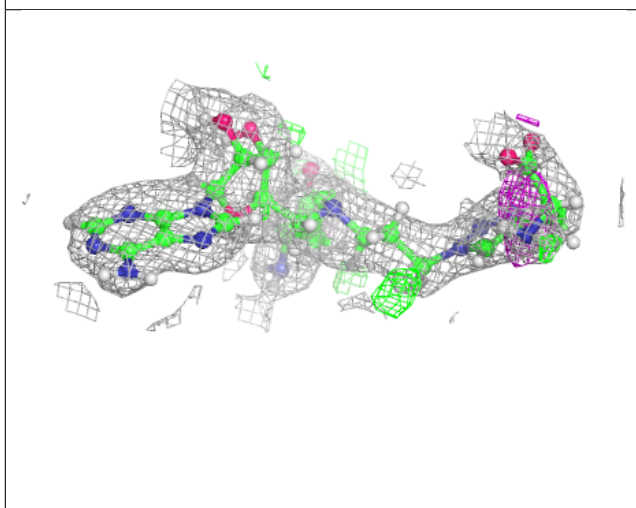
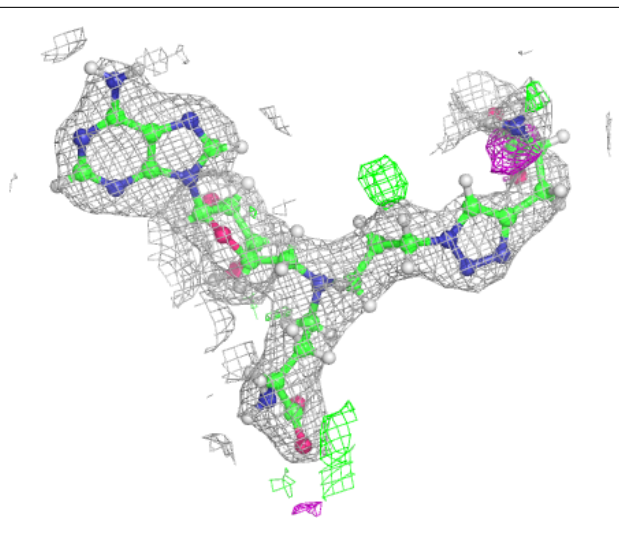
**Electron density around 6D3 D 501:**

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



**Electron density around 6D3 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.