



Full wwPDB X-ray Structure Validation Report ⓘ

Sep 4, 2023 – 10:11 PM JST

PDB ID : 8JYC
Title : Crystal Structure of Intracellular B30.2 Domain of BTN3A1 and BTN2A1 in Complex with DMAPP
Authors : Yuan, L.J.; Yang, Y.Y.; Li, X.; Cai, N.N.; Chen, C.-C.; Guo, R.-T.; Zhang, Y.H.
Deposited on : 2023-07-03
Resolution : 2.29 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 : 4.02b-467
Mogul : 1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix) : 1.13
EDS : 2.35
buster-report : 1.1.7 (2018)
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac : 5.8.0158
CCP4 : 7.0.044 (Gargrove)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.35

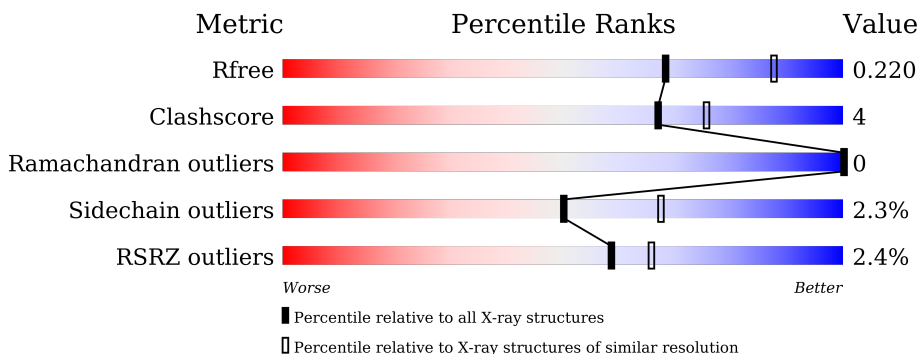
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.29 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	5042 (2.30-2.30)
Clashscore	141614	5643 (2.30-2.30)
Ramachandran outliers	138981	5575 (2.30-2.30)
Sidechain outliers	138945	5575 (2.30-2.30)
RSRZ outliers	127900	4938 (2.30-2.30)

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	218	
1	B	218	
2	C	196	
2	D	196	

2 Entry composition [i](#)

There are 9 unique types of molecules in this entry. The entry contains 6669 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 Butyrophilin subfamily 2 member A1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	200	Total 1614	C 1020	N 290	O 295	S 9	0	1	0
1	B	199	Total 1596	C 1009	N 285	O 293	S 9	0	0	0

There are 12 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	310	GLY	-	expression tag	UNP Q7KYR7
A	311	ALA	-	expression tag	UNP Q7KYR7
A	312	GLY	-	expression tag	UNP Q7KYR7
A	313	ALA	-	expression tag	UNP Q7KYR7
A	314	GLY	-	expression tag	UNP Q7KYR7
A	315	ALA	-	expression tag	UNP Q7KYR7
B	310	GLY	-	expression tag	UNP Q7KYR7
B	311	ALA	-	expression tag	UNP Q7KYR7
B	312	GLY	-	expression tag	UNP Q7KYR7
B	313	ALA	-	expression tag	UNP Q7KYR7
B	314	GLY	-	expression tag	UNP Q7KYR7
B	315	ALA	-	expression tag	UNP Q7KYR7

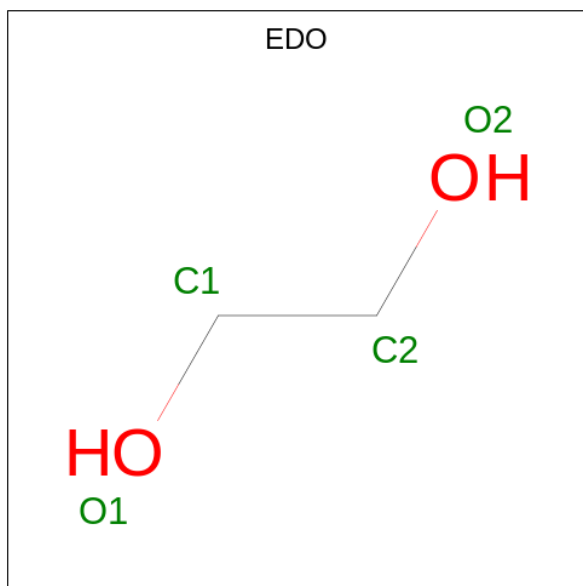
- Molecule 2 is a protein called Butyrophilin subfamily 3 member A1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	C	184	Total 1498	C 967	N 252	O 273	S 6	0	1	0
2	D	178	Total 1437	C 926	N 242	O 263	S 6	0	0	0

There are 20 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
C	296	MET	-	expression tag	UNP O00481
C	297	GLY	-	expression tag	UNP O00481
C	484	LEU	-	expression tag	UNP O00481
C	485	GLU	-	expression tag	UNP O00481
C	486	HIS	-	expression tag	UNP O00481
C	487	HIS	-	expression tag	UNP O00481
C	488	HIS	-	expression tag	UNP O00481
C	489	HIS	-	expression tag	UNP O00481
C	490	HIS	-	expression tag	UNP O00481
C	491	HIS	-	expression tag	UNP O00481
D	296	MET	-	expression tag	UNP O00481
D	297	GLY	-	expression tag	UNP O00481
D	484	LEU	-	expression tag	UNP O00481
D	485	GLU	-	expression tag	UNP O00481
D	486	HIS	-	expression tag	UNP O00481
D	487	HIS	-	expression tag	UNP O00481
D	488	HIS	-	expression tag	UNP O00481
D	489	HIS	-	expression tag	UNP O00481
D	490	HIS	-	expression tag	UNP O00481
D	491	HIS	-	expression tag	UNP O00481

- Molecule 3 is 1,2-ETHANEDIOL (three-letter code: EDO) (formula: C₂H₆O₂).



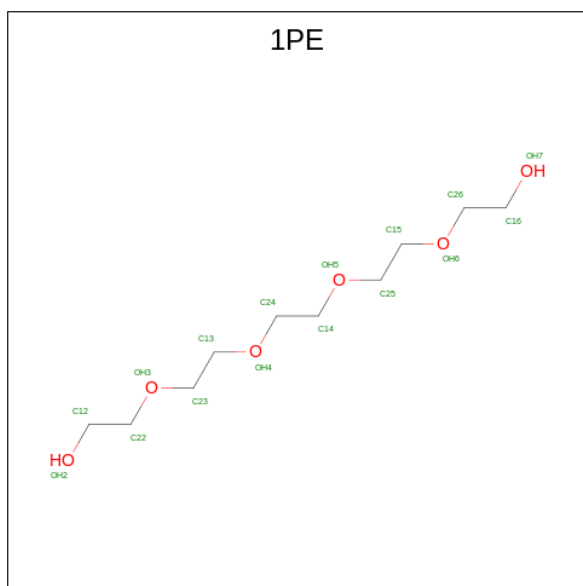
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	A	1	Total	C	O	0	0
			4	2	2		
3	A	1	Total	C	O	0	0
			4	2	2		

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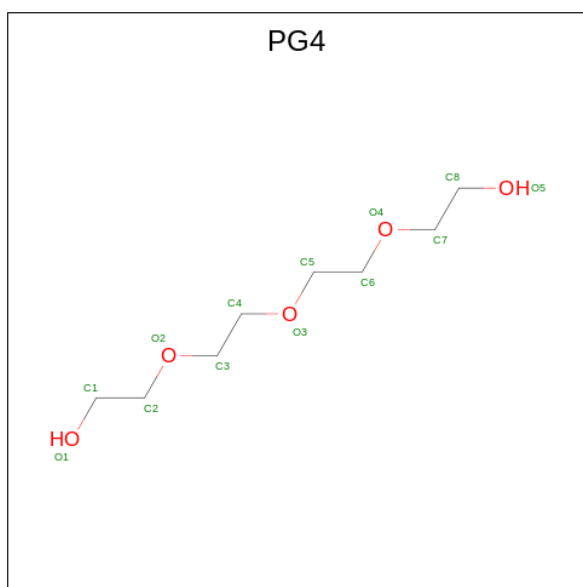
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	B	1	Total C O 4 2 2	0	0
3	B	1	Total C O 4 2 2	0	0
3	B	1	Total C O 4 2 2	0	0
3	B	1	Total C O 4 2 2	0	0
3	C	1	Total C O 4 2 2	0	0
3	C	1	Total C O 4 2 2	0	0

- Molecule 4 is PENTAETHYLENE GLYCOL (three-letter code: 1PE) (formula: $C_{10}H_{22}O_6$).



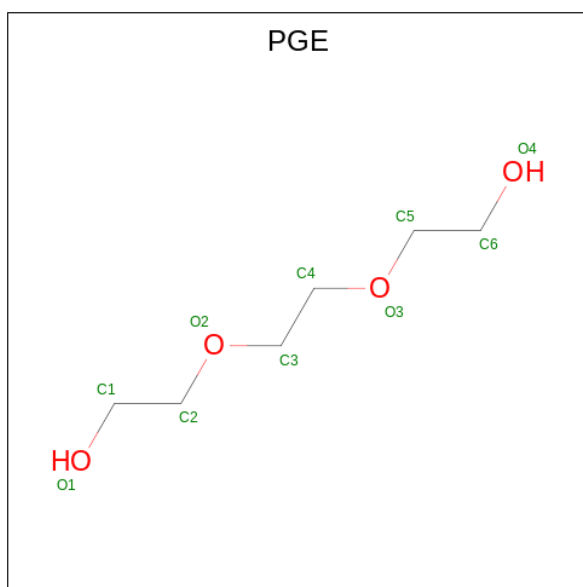
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	1	Total C O 16 10 6	0	0
4	A	1	Total C O 16 10 6	0	0
4	A	1	Total C O 16 10 6	0	0
4	C	1	Total C O 16 10 6	0	0

- Molecule 5 is TETRAETHYLENE GLYCOL (three-letter code: PG4) (formula: $C_8H_{18}O_5$).



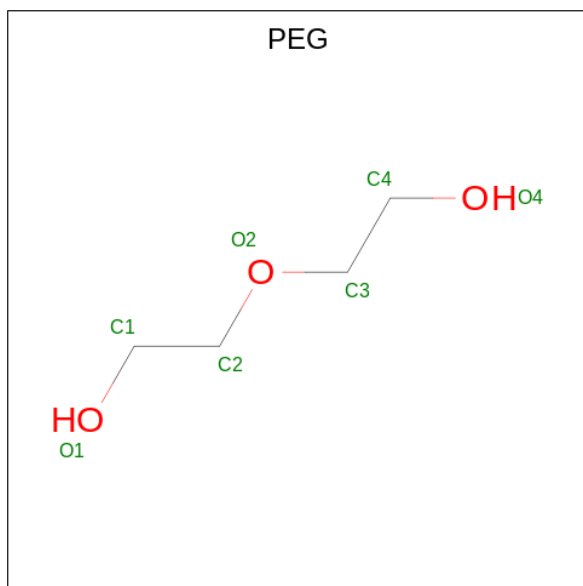
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
5	A	1	Total	C	O	0	0
			13	8	5		
5	A	1	Total	C	O	0	0
			13	8	5		
5	C	1	Total	C	O	0	0
			13	8	5		

- Molecule 6 is TRIETHYLENE GLYCOL (three-letter code: PGE) (formula: C₆H₁₄O₄).



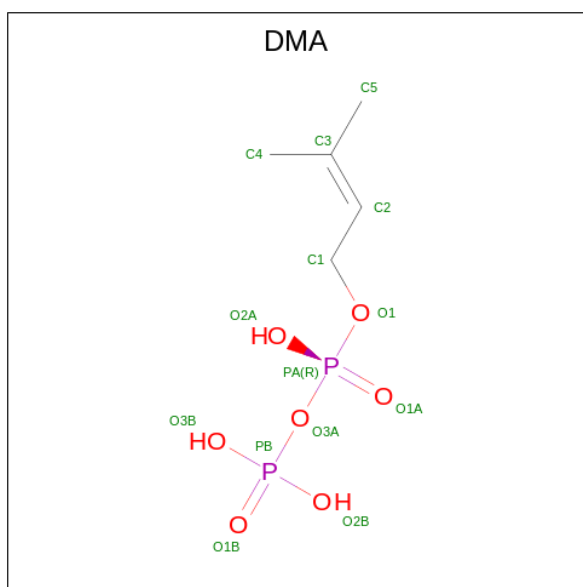
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
6	A	1	Total	C	O	0	0
			10	6	4		

- Molecule 7 is DI(HYDROXYETHYL)ETHER (three-letter code: PEG) (formula: $C_4H_{10}O_3$).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
7	B	1	Total C O 7 4 3	0	0
7	B	1	Total C O 7 4 3	0	0
7	B	1	Total C O 7 4 3	0	0

- Molecule 8 is DIMETHYLALLYL DIPHOSPHATE (three-letter code: DMA) (formula: $C_5H_{12}O_7P_2$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
8	C	1	Total	C	O	P	0	0
			14	5	7	2		
8	D	1	Total	C	O	P	0	0
			14	5	7	2		

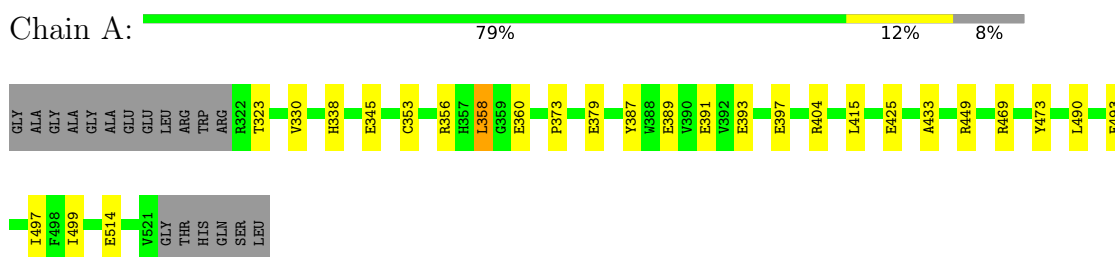
- Molecule 9 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
9	A	104	Total	O	0	0
			104	104		
9	B	94	Total	O	0	0
			94	94		
9	C	77	Total	O	0	0
			77	77		
9	D	55	Total	O	0	0
			55	55		

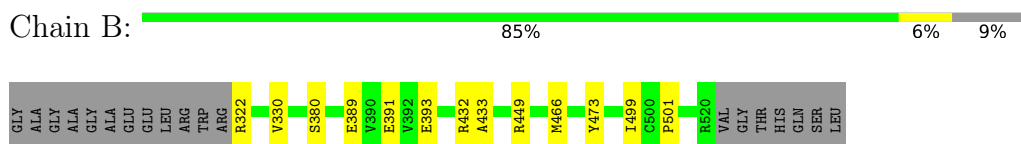
3 Residue-property plots [i](#)

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.

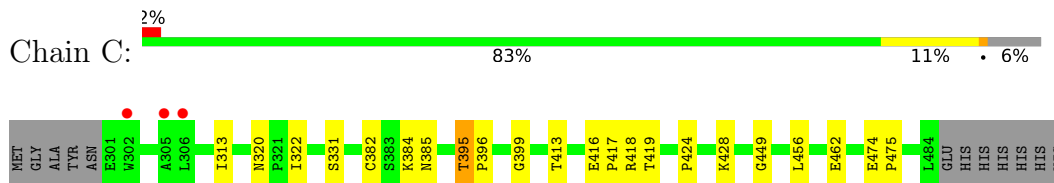
- Molecule 1: Butyrophilin subfamily 2 member A1



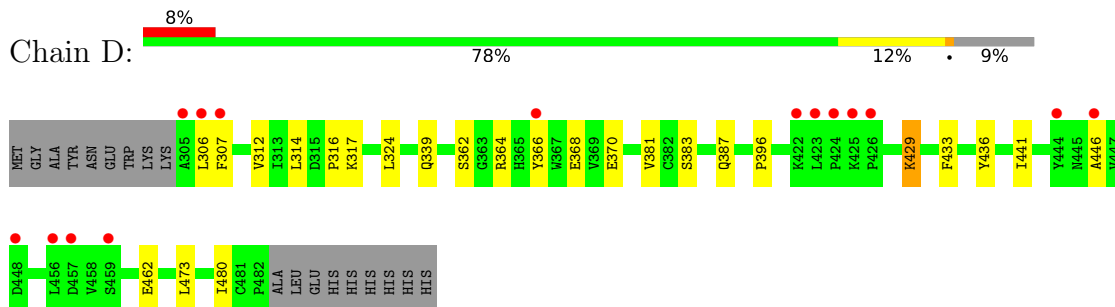
- Molecule 1: Butyrophilin subfamily 2 member A1



- Molecule 2: Butyrophilin subfamily 3 member A1



- Molecule 2: Butyrophilin subfamily 3 member A1



4 Data and refinement statistics

Property	Value	Source
Space group	P 41	Depositor
Cell constants a, b, c, α , β , γ	90.15Å 90.15Å 167.92Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	47.60 – 2.29 47.55 – 2.29	Depositor EDS
% Data completeness (in resolution range)	99.8 (47.60-2.29) 99.8 (47.55-2.29)	Depositor EDS
R_{merge}	0.12	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.75 (at 2.29Å)	Xtrriage
Refinement program	REFMAC 5.8.0238	Depositor
R, R_{free}	0.171 , 0.216 0.179 , 0.220	Depositor DCC
R_{free} test set	3016 reflections (5.01%)	wwPDB-VP
Wilson B-factor (Å ²)	37.8	Xtrriage
Anisotropy	0.312	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.36 , 49.5	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.34$	Xtrriage
Estimated twinning fraction	0.034 for h,-k,-l	Xtrriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	6669	wwPDB-VP
Average B, all atoms (Å ²)	42.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.36% 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: PEG, DMA, 1PE, PG4, EDO, PGE

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	0.77	1/1658 (0.1%)	0.94	1/2253 (0.0%)
1	B	0.77	1/1640 (0.1%)	0.92	1/2229 (0.0%)
2	C	0.72	0/1543	0.93	1/2099 (0.0%)
2	D	0.68	0/1480	0.94	0/2014
All	All	0.74	2/6321 (0.0%)	0.93	3/8595 (0.0%)

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	389	GLU	CD-OE2	-6.12	1.19	1.25
1	B	389	GLU	CD-OE2	-5.90	1.19	1.25

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	C	418	ARG	NE-CZ-NH1	5.85	123.23	120.30
1	B	449	ARG	NE-CZ-NH2	-5.44	117.58	120.30
1	A	387	TYR	CB-CG-CD1	-5.23	117.86	121.00

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	1614	0	1563	18	0
1	B	1596	0	1542	7	0
2	C	1498	0	1469	10	0
2	D	1437	0	1407	13	0
3	A	8	0	12	1	0
3	B	16	0	24	0	0
3	C	8	0	12	1	0
4	A	48	0	66	3	0
4	C	16	0	22	0	0
5	A	26	0	36	4	0
5	C	13	0	18	0	0
6	A	10	0	14	0	0
7	B	21	0	30	1	0
8	C	14	0	9	0	0
8	D	14	0	9	0	0
9	A	104	0	0	2	0
9	B	94	0	0	3	0
9	C	77	0	0	2	0
9	D	55	0	0	2	0
All	All	6669	0	6233	49	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 4.

All (49) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:387:GLN:HG3	9:D:636:HOH:O	1.83	0.78
1:A:404:ARG:HH11	4:A:603:1PE:H121	1.65	0.61
1:A:425:GLU:OE1	5:A:606:PG4:H71	2.03	0.59
1:B:432:ARG:HD3	9:B:747:HOH:O	2.03	0.59
2:D:312:VAL:HG12	2:D:480:ILE:HD13	1.85	0.58
2:D:307:PHE:CD2	2:D:364:ARG:HB3	2.40	0.57
2:D:383:SER:HB3	2:D:462:GLU:OE1	2.04	0.57
1:A:353:CYS:HB2	1:A:356:ARG:HD3	1.86	0.57
1:A:449:ARG:NH2	1:B:466:MET:O	2.37	0.57
2:D:314:LEU:O	2:D:316:PRO:HD3	2.06	0.56
1:B:330:VAL:HB	1:B:499:ILE:HG21	1.87	0.55
2:D:324:LEU:HD23	2:D:339:GLN:OE1	2.07	0.55
1:A:404:ARG:HH11	4:A:603:1PE:C12	2.20	0.55
3:A:608:EDO:H21	9:A:744:HOH:O	2.07	0.54
1:A:391:GLU:OE2	1:A:449:ARG:HD3	2.09	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:C:385:ASN:OD1	2:C:462:GLU:OE2	2.28	0.52
7:B:602:PEG:H21	7:B:607:PEG:H21	1.91	0.52
1:B:433:ALA:HB1	1:B:473:TYR:CE2	2.47	0.50
1:B:391:GLU:OE2	9:B:701:HOH:O	2.20	0.49
1:A:415:LEU:HD12	5:A:606:PG4:H51	1.94	0.48
2:C:384:LYS:HE3	9:C:629:HOH:O	2.13	0.47
2:C:395:THR:HG21	2:C:416:GLU:HB2	1.97	0.47
1:A:490:LEU:HD21	1:A:497:ILE:HG13	1.96	0.47
1:B:393:GLU:HB2	9:B:731:HOH:O	2.14	0.47
1:A:338:HIS:CB	1:A:373:PRO:HA	2.45	0.46
2:C:413:THR:CG2	2:C:419:THR:HB	2.46	0.46
2:C:474:GLU:HB2	2:C:475:PRO:CD	2.46	0.45
2:D:366:TYR:CD1	2:D:433:PHE:CZ	3.04	0.45
1:A:358:LEU:HD12	1:A:358:LEU:HA	1.88	0.45
1:A:433:ALA:HB1	1:A:473:TYR:CE2	2.54	0.43
2:C:320[A]:ASN:OD1	2:C:322:ILE:HG22	2.18	0.43
2:D:381:VAL:HG22	2:D:441:ILE:HD13	2.01	0.43
1:A:415:LEU:CD1	5:A:606:PG4:H51	2.49	0.43
1:A:469[B]:ARG:NH1	1:B:501:PRO:O	2.49	0.43
2:D:362:SER:HA	2:D:436:TYR:HB3	2.01	0.42
2:D:366:TYR:OH	2:D:368:GLU:CG	2.67	0.42
1:A:360:GLU:O	4:A:604:1PE:H152	2.20	0.42
1:A:514:GLU:N	1:A:514:GLU:CD	2.73	0.42
1:A:330:VAL:HB	1:A:499:ILE:HG21	2.01	0.42
2:D:429:LYS:HB3	2:D:446:ALA:HB3	2.01	0.42
2:C:449:GLY:HA2	3:C:505:EDO:H11	2.01	0.42
1:A:397:GLU:HB2	1:A:493:GLU:HB2	2.02	0.42
5:A:606:PG4:H52	9:A:751:HOH:O	2.20	0.42
2:C:428:LYS:NZ	9:C:605:HOH:O	2.52	0.42
2:D:317:LYS:NZ	9:D:602:HOH:O	2.53	0.42
2:D:306:LEU:H	2:D:306:LEU:HD12	1.86	0.41
1:A:379:GLU:CD	1:A:379:GLU:H	2.25	0.40
2:C:382:CYS:HA	2:C:399:GLY:O	2.21	0.40
2:C:416:GLU:HA	2:C:417:PRO:HA	1.82	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	199/218 (91%)	192 (96%)	7 (4%)	0	100	100
1	B	197/218 (90%)	191 (97%)	6 (3%)	0	100	100
2	C	183/196 (93%)	174 (95%)	9 (5%)	0	100	100
2	D	176/196 (90%)	160 (91%)	16 (9%)	0	100	100
All	All	755/828 (91%)	717 (95%)	38 (5%)	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	180/190 (95%)	176 (98%)	4 (2%)	52	69
1	B	178/190 (94%)	176 (99%)	2 (1%)	73	86
2	C	166/175 (95%)	160 (96%)	6 (4%)	35	49
2	D	160/175 (91%)	156 (98%)	4 (2%)	47	65
All	All	684/730 (94%)	668 (98%)	16 (2%)	50	67

All (16) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	323	THR
1	A	345	GLU

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Mol	Chain	Res	Type
1	A	358	LEU
1	A	393	GLU
1	B	322	ARG
1	B	380	SER
2	C	313	ILE
2	C	331	SER
2	C	395	THR
2	C	396	PRO
2	C	424	PRO
2	C	456	LEU
2	D	370	GLU
2	D	396	PRO
2	D	429	LYS
2	D	473	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (1) such sidechains are listed below:

Mol	Chain	Res	Type
2	D	385	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](#)

21 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
4	1PE	A	604	-	15,15,15	0.65	0	14,14,14	0.59	0
7	PEG	B	601	-	6,6,6	0.51	0	5,5,5	0.36	0
8	DMA	D	501	-	11,13,13	0.88	1 (9%)	15,19,19	1.06	1 (6%)
5	PG4	C	504	-	12,12,12	0.22	0	11,11,11	0.22	0
6	PGE	A	607	-	9,9,9	0.54	0	8,8,8	0.26	0
7	PEG	B	607	-	6,6,6	0.27	0	5,5,5	0.25	0
3	EDO	B	603	-	3,3,3	0.09	0	2,2,2	0.19	0
7	PEG	B	602	-	6,6,6	0.44	0	5,5,5	0.28	0
3	EDO	B	604	-	3,3,3	0.15	0	2,2,2	0.27	0
3	EDO	A	608	-	3,3,3	0.06	0	2,2,2	0.29	0
5	PG4	A	605	-	12,12,12	0.29	0	11,11,11	0.35	0
8	DMA	C	501	-	11,13,13	0.63	0	15,19,19	1.29	2 (13%)
5	PG4	A	606	-	12,12,12	0.44	0	11,11,11	0.38	0
3	EDO	B	606	-	3,3,3	0.13	0	2,2,2	0.30	0
3	EDO	A	601	-	3,3,3	0.17	0	2,2,2	0.32	0
4	1PE	A	602	-	15,15,15	1.01	0	14,14,14	0.96	0
3	EDO	B	605	-	3,3,3	0.16	0	2,2,2	0.31	0
3	EDO	C	502	-	3,3,3	0.12	0	2,2,2	0.26	0
4	1PE	C	503	-	15,15,15	0.70	0	14,14,14	0.46	0
4	1PE	A	603	-	15,15,15	0.74	0	14,14,14	0.82	1 (7%)
3	EDO	C	505	-	3,3,3	0.25	0	2,2,2	0.18	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	1PE	A	604	-	-	6/13/13/13	-
7	PEG	B	601	-	-	1/4/4/4	-
8	DMA	D	501	-	-	3/13/13/13	-
5	PG4	C	504	-	-	4/10/10/10	-
6	PGE	A	607	-	-	2/7/7/7	-
7	PEG	B	607	-	-	1/4/4/4	-
3	EDO	B	603	-	-	1/1/1/1	-
7	PEG	B	602	-	-	1/4/4/4	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	EDO	B	604	-	-	1/1/1/1	-
3	EDO	A	608	-	-	1/1/1/1	-
5	PG4	A	605	-	-	2/10/10/10	-
8	DMA	C	501	-	-	2/13/13/13	-
5	PG4	A	606	-	-	2/10/10/10	-
3	EDO	B	606	-	-	1/1/1/1	-
3	EDO	A	601	-	-	1/1/1/1	-
4	1PE	A	602	-	-	4/13/13/13	-
3	EDO	B	605	-	-	0/1/1/1	-
3	EDO	C	502	-	-	1/1/1/1	-
4	1PE	C	503	-	-	2/13/13/13	-
4	1PE	A	603	-	-	8/13/13/13	-
3	EDO	C	505	-	-	1/1/1/1	-

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
8	D	501	DMA	PB-O2B	-2.04	1.47	1.54

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
8	C	501	DMA	C1-C2-C3	2.81	131.30	126.75
8	C	501	DMA	O3B-PB-O2B	2.22	116.10	107.64
4	A	603	1PE	C23-OH3-C22	2.19	122.79	113.29
8	D	501	DMA	O3B-PB-O2B	2.13	115.79	107.64

There are no chirality outliers.

All (45) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
8	C	501	DMA	PA-O3A-PB-O2B
8	D	501	DMA	PA-O3A-PB-O3B
5	C	504	PG4	O3-C5-C6-O4
4	A	603	1PE	OH7-C16-C26-OH6
4	A	604	1PE	OH2-C12-C22-OH3
5	C	504	PG4	O2-C3-C4-O3
4	A	603	1PE	OH4-C13-C23-OH3
4	A	603	1PE	OH6-C15-C25-OH5
4	A	602	1PE	OH2-C12-C22-OH3

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Mol	Chain	Res	Type	Atoms
4	A	603	1PE	OH2-C12-C22-OH3
4	A	604	1PE	OH7-C16-C26-OH6
4	C	503	1PE	OH2-C12-C22-OH3
4	A	604	1PE	OH5-C14-C24-OH4
4	A	602	1PE	OH7-C16-C26-OH6
3	B	603	EDO	O1-C1-C2-O2
3	B	604	EDO	O1-C1-C2-O2
3	B	606	EDO	O1-C1-C2-O2
3	C	502	EDO	O1-C1-C2-O2
7	B	607	PEG	O2-C3-C4-O4
3	C	505	EDO	O1-C1-C2-O2
5	A	605	PG4	O1-C1-C2-O2
4	C	503	1PE	OH5-C14-C24-OH4
4	A	602	1PE	C14-C24-OH4-C13
4	A	604	1PE	C16-C26-OH6-C15
4	A	603	1PE	C14-C24-OH4-C13
4	A	604	1PE	C24-C14-OH5-C25
7	B	602	PEG	C4-C3-O2-C2
4	A	603	1PE	OH5-C14-C24-OH4
5	A	606	PG4	O3-C5-C6-O4
6	A	607	PGE	C6-C5-O3-C4
5	C	504	PG4	C8-C7-O4-C6
4	A	602	1PE	C16-C26-OH6-C15
7	B	601	PEG	O2-C3-C4-O4
3	A	601	EDO	O1-C1-C2-O2
4	A	603	1PE	C25-C15-OH6-C26
3	A	608	EDO	O1-C1-C2-O2
5	C	504	PG4	C1-C2-O2-C3
4	A	604	1PE	OH6-C15-C25-OH5
5	A	606	PG4	C6-C5-O3-C4
4	A	603	1PE	C12-C22-OH3-C23
5	A	605	PG4	C1-C2-O2-C3
8	C	501	DMA	PA-O3A-PB-O1B
8	D	501	DMA	PA-O3A-PB-O2B
8	D	501	DMA	PA-O3A-PB-O1B
6	A	607	PGE	O2-C3-C4-O3

There are no ring outliers.

7 monomers are involved in 10 short contacts:

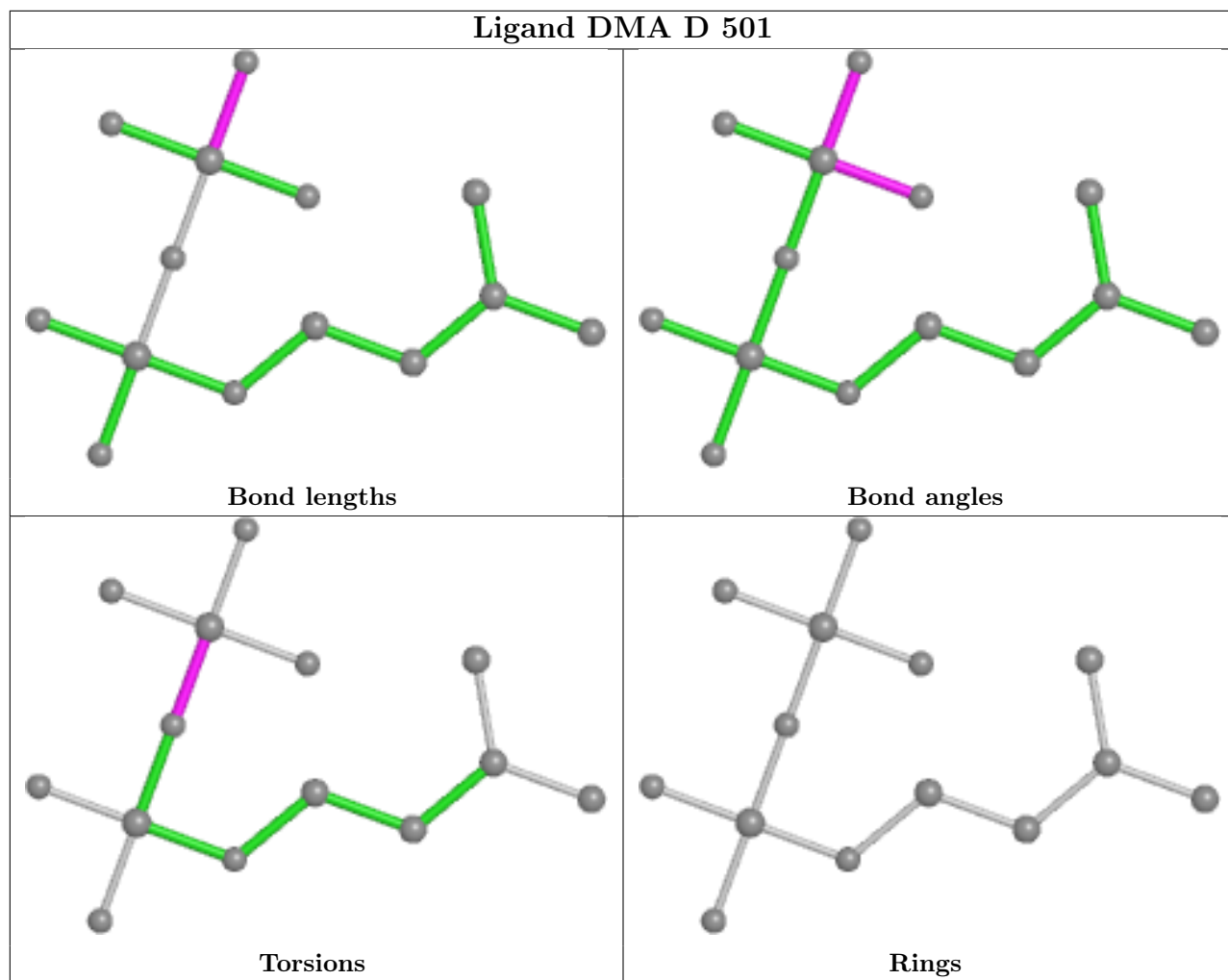
Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	A	604	1PE	1	0

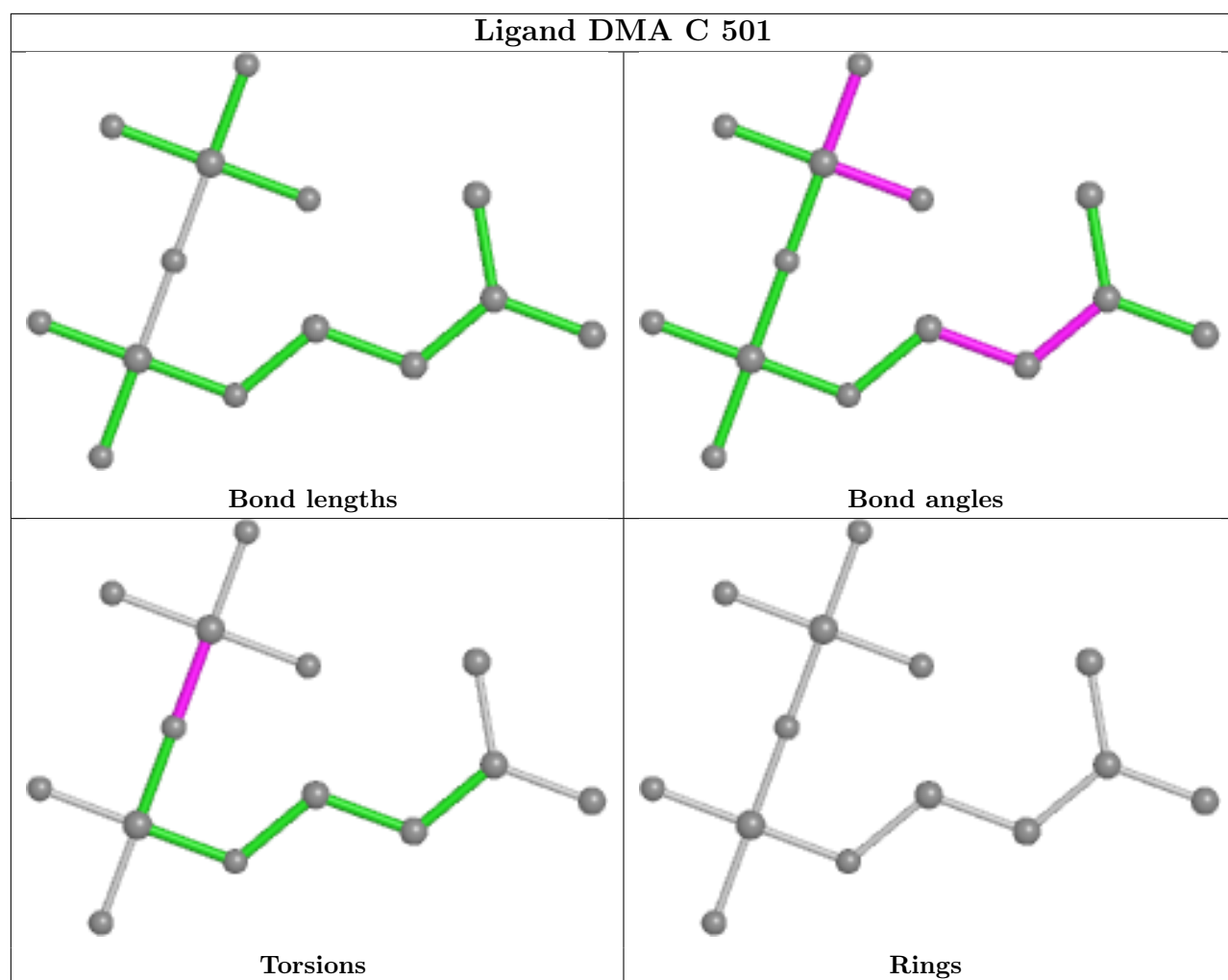
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Mol	Chain	Res	Type	Clashes	Symm-Clashes
7	B	607	PEG	1	0
7	B	602	PEG	1	0
3	A	608	EDO	1	0
5	A	606	PG4	4	0
4	A	603	1PE	2	0
3	C	505	EDO	1	0

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	200/218 (91%)	-0.34	0 100 100	24, 32, 54, 96	0
1	B	199/218 (91%)	-0.35	0 100 100	25, 36, 58, 85	0
2	C	184/196 (93%)	-0.17	3 (1%) 72 77	26, 41, 65, 89	0
2	D	178/196 (90%)	0.21	15 (8%) 11 15	31, 51, 76, 97	0
All	All	761/828 (91%)	-0.18	18 (2%) 59 66	24, 38, 68, 97	0

All (18) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	C	302	TRP	6.1
2	D	424	PRO	4.5
2	D	422	LYS	4.0
2	C	305	ALA	3.8
2	D	423	LEU	3.4
2	D	425	LYS	3.3
2	D	446	ALA	3.1
2	D	307	PHE	3.0
2	D	306	LEU	3.0
2	D	448	ASP	2.9
2	D	305	ALA	2.9
2	D	426	PRO	2.6
2	D	459	SER	2.5
2	D	456	LEU	2.5
2	D	444	TYR	2.5
2	D	457	ASP	2.5
2	C	306	LEU	2.1
2	D	366	TYR	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](#)

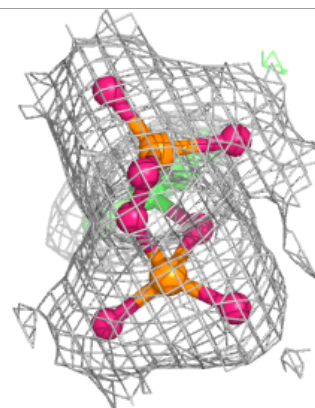
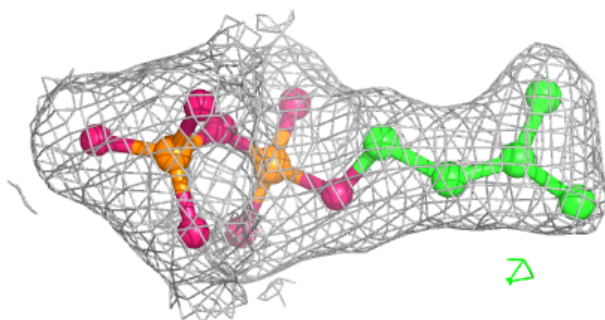
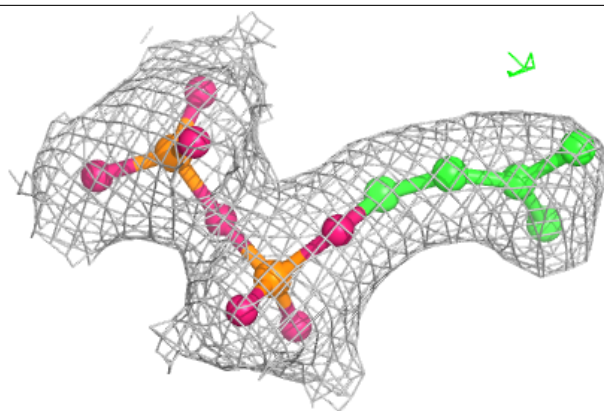
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
3	EDO	B	603	4/4	0.57	0.23	64,64,69,74	0
4	1PE	A	603	16/16	0.79	0.20	42,75,90,91	0
7	PEG	B	601	7/7	0.79	0.20	56,61,70,74	0
6	PGE	A	607	10/10	0.82	0.15	47,60,68,68	0
4	1PE	A	602	16/16	0.82	0.19	43,67,82,83	0
4	1PE	A	604	16/16	0.83	0.16	59,81,92,92	0
3	EDO	B	604	4/4	0.84	0.14	61,61,62,69	0
5	PG4	A	606	13/13	0.84	0.20	47,58,72,78	0
3	EDO	C	502	4/4	0.85	0.14	63,64,67,69	0
7	PEG	B	602	7/7	0.87	0.21	50,51,63,64	0
7	PEG	B	607	7/7	0.89	0.24	48,63,73,75	0
3	EDO	A	601	4/4	0.90	0.16	40,47,49,52	0
5	PG4	C	504	13/13	0.91	0.16	52,68,82,82	0
3	EDO	B	606	4/4	0.92	0.11	56,60,62,64	0
3	EDO	B	605	4/4	0.92	0.14	50,55,56,62	0
3	EDO	C	505	4/4	0.92	0.10	62,64,64,70	0
3	EDO	A	608	4/4	0.93	0.09	63,64,64,69	0
5	PG4	A	605	13/13	0.93	0.15	35,45,66,66	0
4	1PE	C	503	16/16	0.95	0.12	40,50,57,58	0
8	DMA	C	501	14/14	0.99	0.13	24,28,32,36	0
8	DMA	D	501	14/14	0.99	0.09	27,32,38,42	0

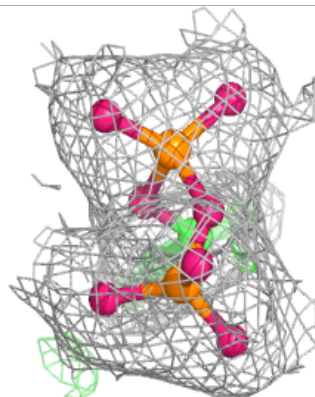
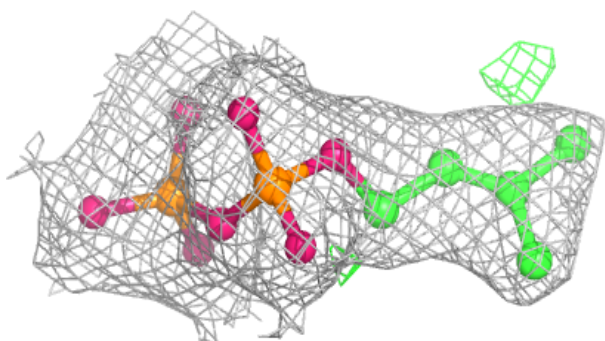
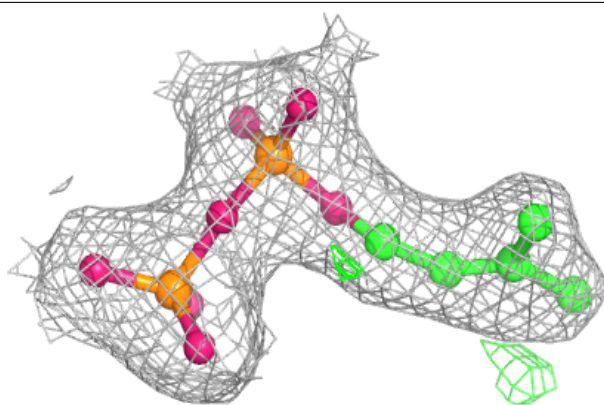
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

Electron density around DMA C 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 DMA 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)



6.5 Other polymers [i](#)

There are no such residues in this entry.