



Full wwPDB X-ray Structure Validation Report ⓘ

Jun 24, 2025 – 05:09 pm BST

PDB ID : 7AY6 / pdb_00007ay6
Title : Crystal structure of the PDE4D catalytic domain in complex with GEBR-41b
Authors : Torretta, A.; Abbate, S.; Parisini, E.
Deposited on : 2020-11-11
Resolution : 1.66 Å(reported)

This is a Full wwPDB X-ray Structure Validation Report for a publicly released PDB entry.

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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 Phenix2.0rc1
Mogul	:	1.8.4, CSD as541be (2020)
Xtriage (Phenix)	:	2.0rc1
EDS	:	3.0
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4	:	9.0.003 (Gargrove)
Density-Fitness	:	1.0.11
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.44

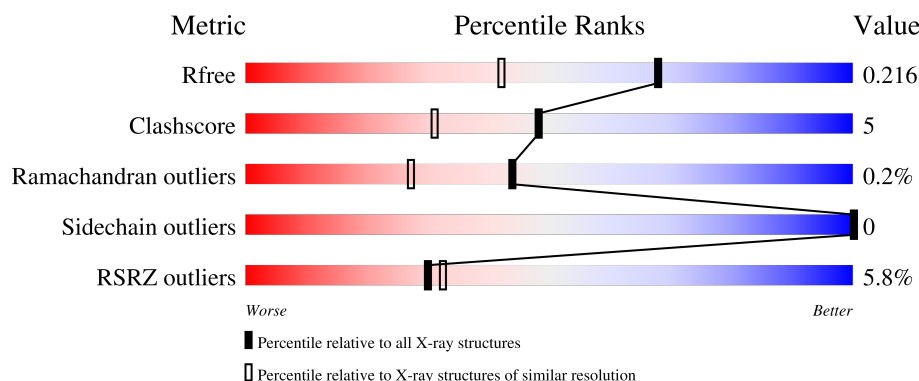
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.66 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}	164625	2328 (1.66-1.66)
Clashscore	180529	2515 (1.66-1.66)
Ramachandran outliers	177936	2475 (1.66-1.66)
Sidechain outliers	177891	2475 (1.66-1.66)
RSRZ outliers	164620	2328 (1.66-1.66)

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	343	6% 85% 11% ..
1	B	343	5% 86% 9% 5%

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

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
5	EDO	A	512	-	-	X	-

2 Entry composition

There are 6 unique types of molecules in this entry. The entry contains 6263 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.

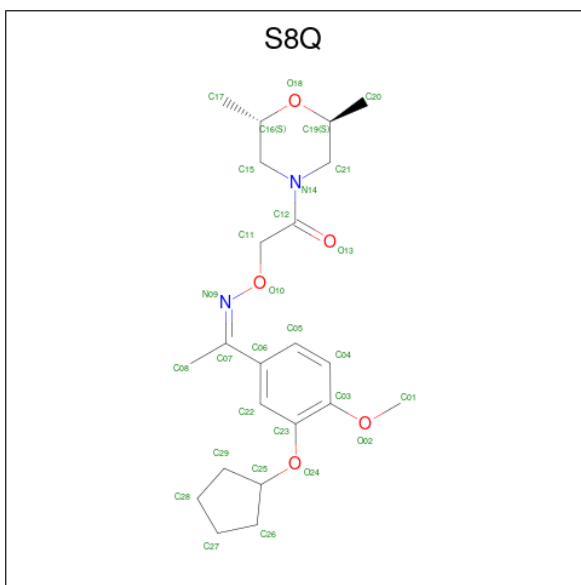
- Molecule 1 is a protein called cAMP-specific 3',5'-cyclic phosphodiesterase 4D.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	332	Total	C	N	O	S	0	10	0
			2731	1733	464	519	15			
1	B	327	Total	C	N	O	S	0	7	0
			2680	1700	454	510	16			

There are 16 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	77	MET	-	initiating methionine	UNP Q08499
A	413	ALA	-	expression tag	UNP Q08499
A	414	HIS	-	expression tag	UNP Q08499
A	415	HIS	-	expression tag	UNP Q08499
A	416	HIS	-	expression tag	UNP Q08499
A	417	HIS	-	expression tag	UNP Q08499
A	418	HIS	-	expression tag	UNP Q08499
A	419	HIS	-	expression tag	UNP Q08499
B	77	MET	-	initiating methionine	UNP Q08499
B	413	ALA	-	expression tag	UNP Q08499
B	414	HIS	-	expression tag	UNP Q08499
B	415	HIS	-	expression tag	UNP Q08499
B	416	HIS	-	expression tag	UNP Q08499
B	417	HIS	-	expression tag	UNP Q08499
B	418	HIS	-	expression tag	UNP Q08499
B	419	HIS	-	expression tag	UNP Q08499

- Molecule 2 is 2-[({Z})-1-(3-cyclopentyloxy-4-methoxy-phenyl)ethylideneamino]oxy-1-[(2 {S},6 {S})-2,6-dimethylmorpholin-4-yl]ethanone (CCD ID: S8Q) (formula: C₂₂H₃₂N₂O₅) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
2	A	1	Total	C	N	O	0	0
			29	22	2	5		
2	B	1	Total	C	N	O	0	0
			29	22	2	5		

- Molecule 3 is ZINC ION (CCD ID: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	1	Total	Zn	0	0
			1	1		
3	B	1	Total	Zn	0	0
			1	1		

- Molecule 4 is MAGNESIUM ION (CCD ID: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	5	Total	Mg	0	0
			5	5		
4	B	3	Total	Mg	0	0
			3	3		

- Molecule 5 is 1,2-ETHANEDIOL (CCD ID: EDO) (formula: C₂H₆O₂).



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

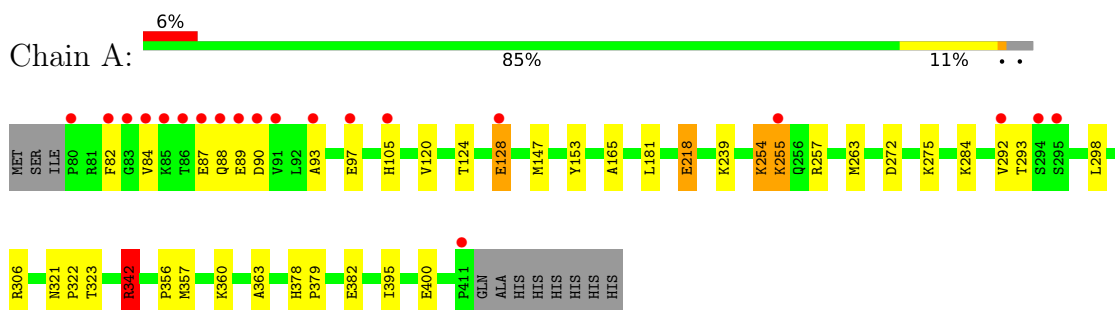
- Molecule 6 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	A	378	Total 379	O 379	0	1
6	B	349	Total 349	O 349	0	0

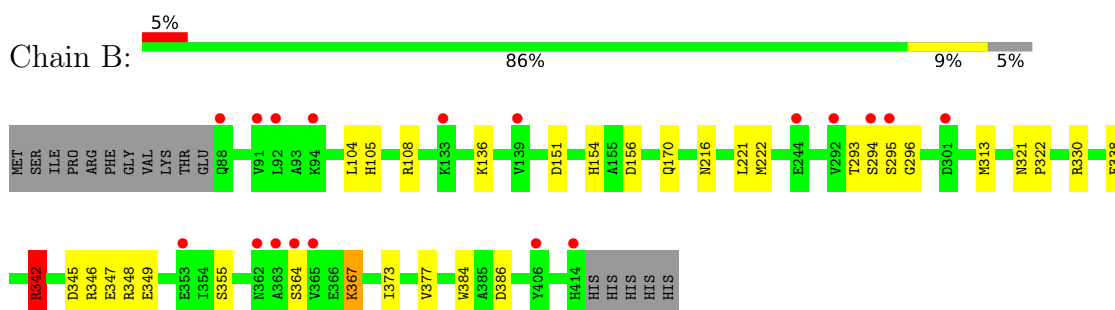
3 Residue-property plots

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: cAMP-specific 3',5'-cyclic phosphodiesterase 4D



- Molecule 1: cAMP-specific 3',5'-cyclic phosphodiesterase 4D



4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	64.84Å 98.66Å 120.24Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	49.33 – 1.66 49.33 – 1.66	Depositor EDS
% Data completeness (in resolution range)	98.2 (49.33-1.66) 91.4 (49.33-1.66)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.20 (at 1.66Å)	Xtriage
Refinement program	PHENIX 1.18.2_3874	Depositor
R, R_{free}	0.181 , 0.214 0.183 , 0.216	Depositor DCC
R_{free} test set	4576 reflections (5.05%)	wwPDB-VP
Wilson B-factor (Å ²)	14.9	Xtriage
Anisotropy	0.490	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.33 , 37.1	EDS
L-test for twinning ²	$\langle L \rangle = 0.48$, $\langle L^2 \rangle = 0.31$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	6263	wwPDB-VP
Average B, all atoms (Å ²)	25.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.17% 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

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: S8Q, ZN, EDO, MG

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	0.62	0/2817	0.80	6/3824 (0.2%)
1	B	0.60	0/2756	0.79	6/3743 (0.2%)
All	All	0.61	0/5573	0.80	12/7567 (0.2%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	2
1	B	0	1
All	All	0	3

There are no bond length outliers.

All (12) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	342	ARG	CD-NE-CZ	12.98	142.58	124.40
1	A	255	LYS	CG-CD-CE	-10.47	87.22	111.30
1	A	342	ARG	CD-NE-CZ	10.44	139.01	124.40
1	A	255	LYS	CD-CE-NZ	7.63	136.31	111.90
1	A	255	LYS	CA-CB-CG	-7.29	99.52	114.10
1	B	367	LYS	CA-CB-CG	6.41	126.92	114.10
1	B	367	LYS	CB-CA-C	-6.27	100.39	110.79
1	B	293	THR	CA-C-N	-6.06	112.36	120.54
1	B	293	THR	C-N-CA	-6.06	112.36	120.54
1	B	367	LYS	CG-CD-CE	-5.67	98.27	111.30
1	A	254	LYS	CB-CG-CD	-5.13	99.50	111.30
1	A	218	GLU	CA-CB-CG	-5.08	103.94	114.10

There are no chirality outliers.

All (3) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	128	GLU	Sidechain
1	A	342	ARG	Sidechain
1	B	342	ARG	Sidechain

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	2731	0	2718	35	2
1	B	2680	0	2653	25	2
2	A	29	0	0	0	0
2	B	29	0	0	0	0
3	A	1	0	0	0	0
3	B	1	0	0	0	0
4	A	5	0	0	0	0
4	B	3	0	0	0	0
5	A	28	0	42	6	0
5	B	28	0	42	3	0
6	A	379	0	0	6	0
6	B	349	0	0	5	0
All	All	6263	0	5455	59	2

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.

All (59) 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:255:LYS:NZ	6:A:601:HOH:O	2.01	0.93
1:A:84:VAL:HG12	1:A:147:MET:HE1	1.59	0.82
1:A:363:ALA:H	5:A:512:EDO:H12	1.45	0.82
1:B:364:SER:HB3	1:B:367:LYS:HD3	1.72	0.71
1:A:400:GLU:HG3	6:A:681:HOH:O	1.96	0.63
1:A:357:MET:HE1	5:A:514:EDO:O1	2.00	0.61

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:88:GLN:HG3	1:A:90:ASP:H	1.64	0.61
1:A:292:VAL:HG12	1:A:293:THR:O	2.01	0.60
1:B:105:HIS:HB3	1:B:108:ARG:HD2	1.85	0.58
1:B:294:SER:O	1:B:296:GLY:N	2.37	0.57
1:B:330:ARG:NH2	6:B:609:HOH:O	2.31	0.57
1:A:82:PHE:HB3	1:A:120[B]:VAL:HG23	1.87	0.56
1:A:272:ASP:HB3	1:A:275:LYS:HD2	1.88	0.55
1:A:239:LYS:HD3	1:B:221:LEU:HD21	1.90	0.54
1:A:124:THR:O	1:A:128:GLU:HG2	2.08	0.54
1:A:257[B]:ARG:HG2	1:A:257[B]:ARG:HH21	1.72	0.53
1:A:323:THR:HB	1:A:395:ILE:HG23	1.91	0.53
1:A:382:GLU:OE1	6:A:602:HOH:O	2.19	0.53
1:B:386[B]:ASP:OD1	6:B:601:HOH:O	2.18	0.53
1:A:342:ARG:HH11	1:A:342:ARG:HB3	1.73	0.52
1:A:363:ALA:N	5:A:512:EDO:H12	2.20	0.52
1:B:345:ASP:O	1:B:349:GLU:HG3	2.10	0.52
1:B:338:GLU:OE2	1:B:342:ARG:NH2	2.37	0.51
1:B:364:SER:CB	1:B:367:LYS:HD3	2.40	0.51
1:B:346:ARG:HH22	5:B:510:EDO:H11	1.77	0.50
1:A:254:LYS:HE2	1:A:254:LYS:HB3	1.58	0.48
1:B:321:ASN:HB2	1:B:322:PRO:HD3	1.96	0.47
1:A:360:LYS:O	5:A:512:EDO:H21	2.16	0.46
1:A:306:ARG:NH1	6:A:616:HOH:O	2.42	0.46
1:B:347:GLU:OE2	1:B:355:SER:OG	2.29	0.45
1:B:313:MET:HB2	1:B:384:TRP:CH2	2.52	0.45
1:B:104:LEU:HD22	1:B:170:GLN:HG3	1.98	0.44
1:B:216:ASN:ND2	6:B:613:HOH:O	2.37	0.44
1:A:89:GLU:OE2	6:A:603:HOH:O	2.21	0.44
1:B:222[B]:MET:HE3	1:B:222[B]:MET:HB2	1.88	0.44
1:A:181:LEU:CD2	1:A:298:LEU:HD12	2.48	0.44
1:A:257[B]:ARG:HH21	1:A:257[B]:ARG:CG	2.31	0.43
1:A:378:HIS:HB3	1:A:379:PRO:HD3	1.99	0.43
1:B:156:ASP:OD2	5:B:509:EDO:H11	2.19	0.43
1:A:284:LYS:NZ	6:A:612:HOH:O	2.34	0.43
1:A:93:ALA:O	1:A:97:GLU:HG3	2.19	0.42
1:B:151:ASP:OD2	6:B:602:HOH:O	2.21	0.42
1:B:294:SER:C	1:B:296:GLY:H	2.28	0.42
1:A:363:ALA:H	5:A:512:EDO:C1	2.23	0.42
1:A:255:LYS:HE2	1:A:255:LYS:HB2	1.05	0.42
1:B:105:HIS:CB	1:B:108:ARG:HD2	2.49	0.42
1:B:154:HIS:ND1	5:B:509:EDO:H12	2.34	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:222[A]:MET:HE2	1:B:222[A]:MET:HB2	1.95	0.41
1:A:356:PRO:O	1:A:357:MET:HB2	2.20	0.41
1:A:87:GLU:H	1:A:87:GLU:CD	2.28	0.41
1:A:82:PHE:HZ	1:A:93:ALA:HB2	1.85	0.41
1:A:105:HIS:HB3	5:A:513:EDO:O2	2.20	0.41
1:A:181:LEU:HD21	1:A:298:LEU:HD12	2.01	0.41
1:B:136:LYS:HE2	1:B:136:LYS:HB2	1.93	0.41
1:B:348:ARG:HA	6:B:636:HOH:O	2.20	0.41
1:A:153:TYR:CZ	1:A:165:ALA:HB2	2.56	0.41
1:B:373:ILE:HA	1:B:377:VAL:HB	2.03	0.40
1:A:321:ASN:HB2	1:A:322:PRO:HD3	2.03	0.40

All (2) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:218:GLU:OE2	1:B:367:LYS:NZ[3_555]	1.83	0.37
1:A:255:LYS:NZ	1:B:294:SER:O[2_554]	2.13	0.07

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	340/343 (99%)	334 (98%)	6 (2%)	0	100	100
1	B	332/343 (97%)	324 (98%)	7 (2%)	1 (0%)	37	21
All	All	672/686 (98%)	658 (98%)	13 (2%)	1 (0%)	44	30

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	295	SER

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	313/313 (100%)	313 (100%)	0	100	100
1	B	305/313 (97%)	305 (100%)	0	100	100
All	All	618/626 (99%)	618 (100%)	0	100	100

There are no protein residues with a non-rotameric sidechain to report.

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (7) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	278	ASN
1	B	127	GLN
1	B	210	GLN
1	B	214	ASN
1	B	250	GLN
1	B	278	ASN
1	B	321	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 oligosaccharides in this entry.

5.6 Ligand geometry

Of 26 ligands modelled in this entry, 10 are monoatomic - leaving 16 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	EDO	B	506	-	3,3,3	0.52	0	2,2,2	0.69	0
5	EDO	A	513	-	3,3,3	0.34	0	2,2,2	0.91	0
5	EDO	B	507	-	3,3,3	0.51	0	2,2,2	0.35	0
5	EDO	B	508	-	3,3,3	0.51	0	2,2,2	0.15	0
5	EDO	B	510	-	3,3,3	0.48	0	2,2,2	0.44	0
5	EDO	A	514	-	3,3,3	0.58	0	2,2,2	0.47	0
5	EDO	A	508	-	3,3,3	0.56	0	2,2,2	0.51	0
5	EDO	A	510	-	3,3,3	0.45	0	2,2,2	0.79	0
5	EDO	A	511	-	3,3,3	0.52	0	2,2,2	0.64	0
5	EDO	B	511	-	3,3,3	0.48	0	2,2,2	0.43	0
5	EDO	A	512	-	3,3,3	0.48	0	2,2,2	0.34	0
2	S8Q	B	501	-	31,31,31	1.96	8 (25%)	41,42,42	2.47	7 (17%)
5	EDO	B	509	-	3,3,3	0.59	0	2,2,2	0.09	0
5	EDO	B	512	-	3,3,3	0.53	0	2,2,2	0.30	0
2	S8Q	A	501	-	31,31,31	1.82	8 (25%)	41,42,42	2.95	11 (26%)
5	EDO	A	509	-	3,3,3	0.55	0	2,2,2	0.56	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
5	EDO	B	506	-	-	0/1/1/1	-
5	EDO	A	513	-	-	1/1/1/1	-
5	EDO	B	507	-	-	0/1/1/1	-
5	EDO	B	508	-	-	0/1/1/1	-
5	EDO	B	510	-	-	0/1/1/1	-
5	EDO	A	514	-	-	0/1/1/1	-
5	EDO	A	508	-	-	0/1/1/1	-
5	EDO	A	510	-	-	1/1/1/1	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
5	EDO	A	511	-	-	0/1/1/1	-
5	EDO	B	511	-	-	0/1/1/1	-
5	EDO	A	512	-	-	1/1/1/1	-
2	S8Q	B	501	-	-	1/20/39/39	0/3/3/3
5	EDO	B	509	-	-	1/1/1/1	-
5	EDO	B	512	-	-	1/1/1/1	-
2	S8Q	A	501	-	-	7/20/39/39	0/3/3/3
5	EDO	A	509	-	-	0/1/1/1	-

All (16) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	501	S8Q	C12-N14	6.02	1.47	1.35
2	A	501	S8Q	C12-N14	5.43	1.46	1.35
2	A	501	S8Q	C06-C07	3.72	1.54	1.49
2	B	501	S8Q	C06-C07	3.50	1.54	1.49
2	A	501	S8Q	C28-C29	3.34	1.65	1.51
2	B	501	S8Q	C28-C29	3.25	1.65	1.51
2	B	501	S8Q	C29-C25	-3.17	1.35	1.52
2	B	501	S8Q	C08-C07	2.66	1.55	1.50
2	A	501	S8Q	C29-C25	-2.57	1.38	1.52
2	B	501	S8Q	O02-C03	2.42	1.41	1.37
2	A	501	S8Q	C08-C07	2.26	1.54	1.50
2	B	501	S8Q	O24-C23	2.18	1.41	1.37
2	B	501	S8Q	O18-C19	-2.10	1.40	1.44
2	A	501	S8Q	O24-C23	2.09	1.41	1.37
2	A	501	S8Q	C07-N09	-2.06	1.26	1.28
2	A	501	S8Q	O02-C03	2.01	1.40	1.37

All (18) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	501	S8Q	O10-N09-C07	11.90	130.09	111.91
2	B	501	S8Q	O10-N09-C07	10.19	127.48	111.91
2	B	501	S8Q	C16-C15-N14	7.09	121.00	110.35
2	A	501	S8Q	C06-C07-N09	6.28	126.57	115.28
2	A	501	S8Q	C08-C07-N09	-6.21	114.38	123.88
2	A	501	S8Q	C16-C15-N14	5.84	119.13	110.35
2	B	501	S8Q	C19-C21-N14	5.16	118.11	110.35
2	A	501	S8Q	C11-O10-N09	5.04	113.00	107.84
2	A	501	S8Q	C19-C21-N14	4.41	116.98	110.35
2	B	501	S8Q	C11-C12-N14	3.32	124.65	116.93

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	501	S8Q	C11-O10-N09	3.17	111.09	107.84
2	A	501	S8Q	O02-C03-C23	2.81	119.32	115.41
2	A	501	S8Q	C23-O24-C25	-2.77	110.86	120.21
2	A	501	S8Q	C19-O18-C16	2.73	118.15	112.03
2	B	501	S8Q	C23-O24-C25	-2.66	111.22	120.21
2	B	501	S8Q	C22-C06-C07	-2.61	116.92	120.54
2	A	501	S8Q	C22-C23-C03	2.30	122.89	119.84
2	A	501	S8Q	C04-C05-C06	2.09	123.21	120.78

There are no chirality outliers.

All (13) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	501	S8Q	C12-C11-O10-N09
2	A	501	S8Q	C26-C25-O24-C23
2	A	501	S8Q	C29-C25-O24-C23
5	A	513	EDO	O1-C1-C2-O2
5	B	512	EDO	O1-C1-C2-O2
2	A	501	S8Q	O10-C11-C12-O13
2	A	501	S8Q	C08-C07-N09-O10
2	A	501	S8Q	C06-C07-N09-O10
2	A	501	S8Q	O10-C11-C12-N14
2	B	501	S8Q	C12-C11-O10-N09
5	A	510	EDO	O1-C1-C2-O2
5	A	512	EDO	O1-C1-C2-O2
5	B	509	EDO	O1-C1-C2-O2

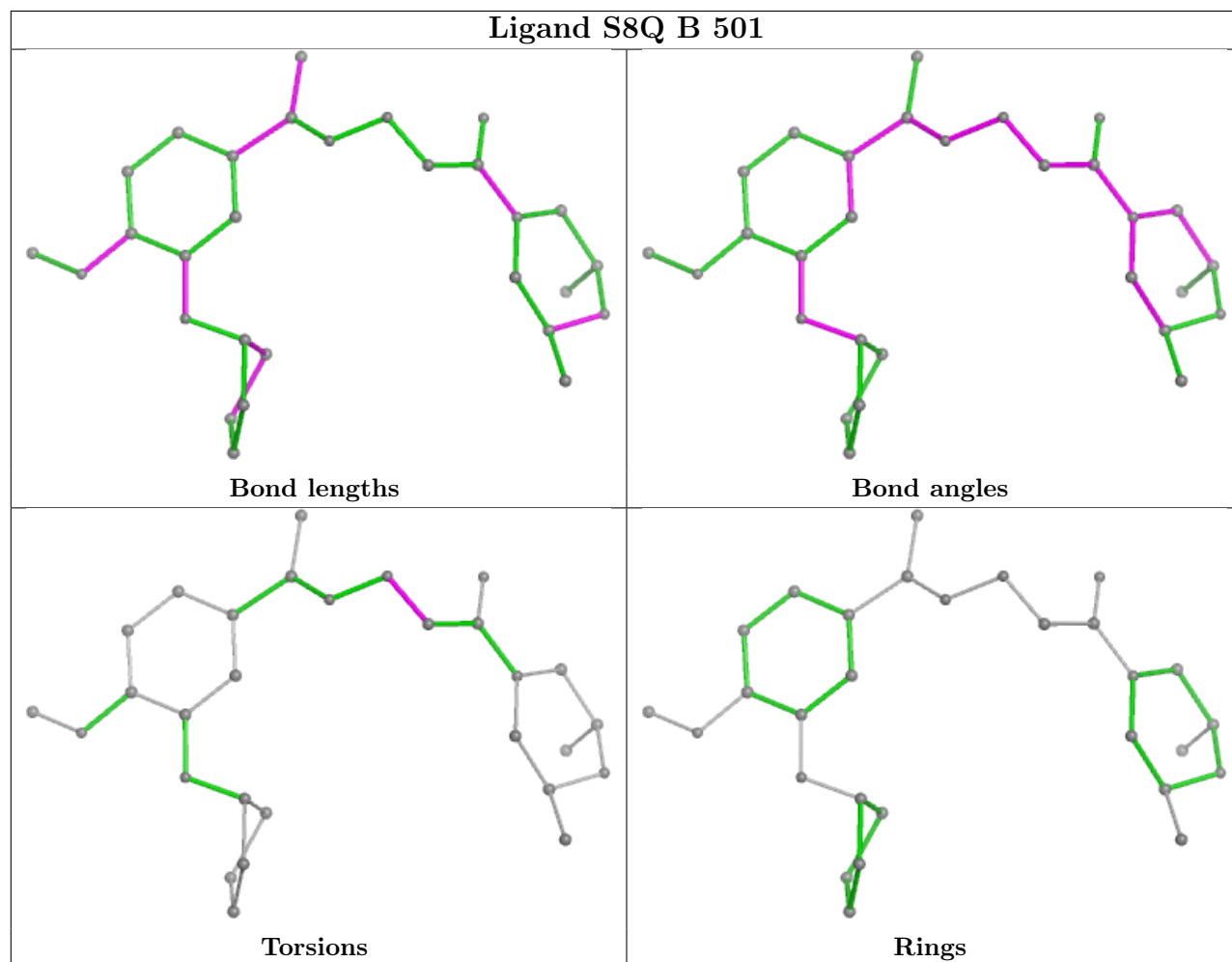
There are no ring outliers.

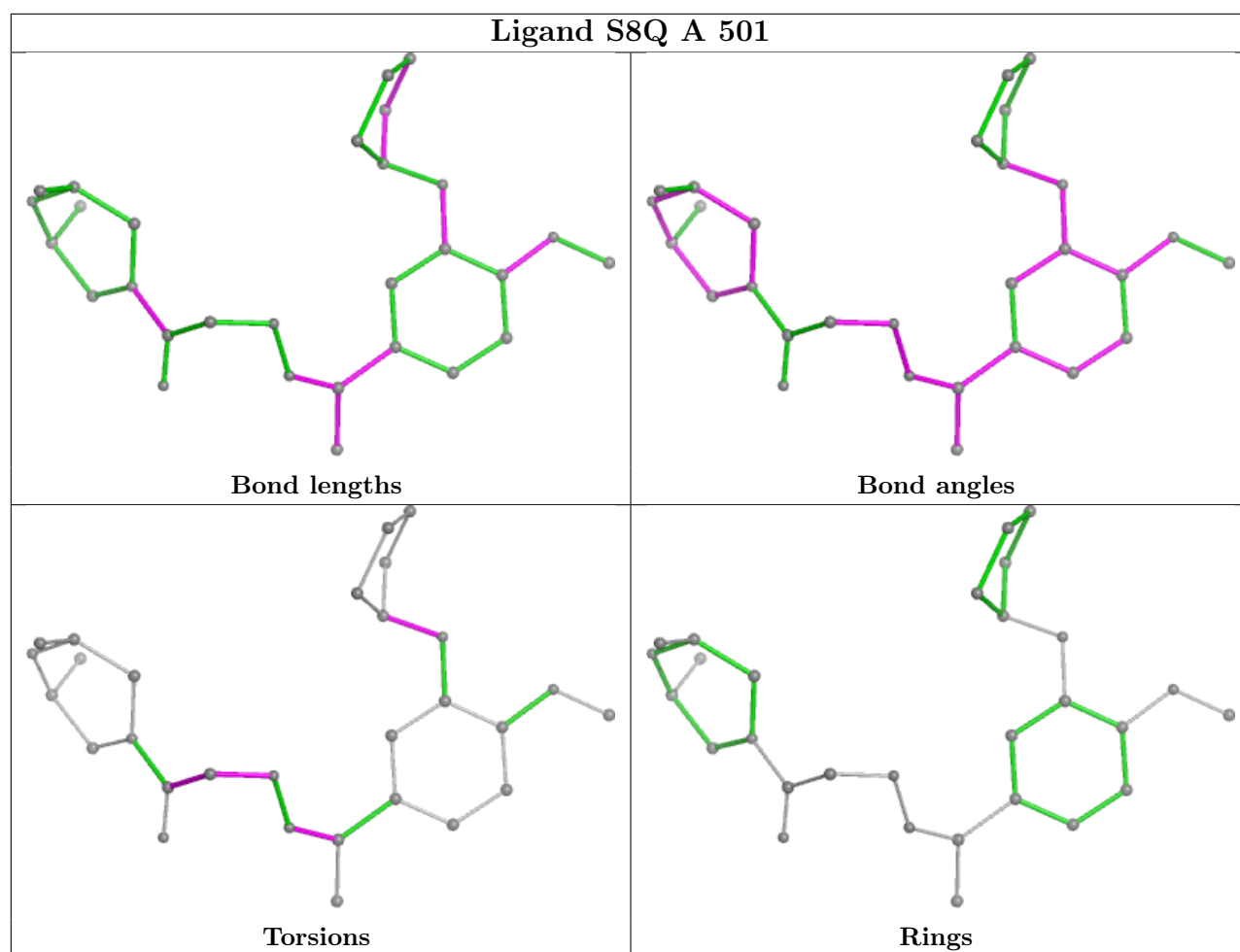
5 monomers are involved in 9 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	A	513	EDO	1	0
5	B	510	EDO	1	0
5	A	514	EDO	1	0
5	A	512	EDO	4	0
5	B	509	EDO	2	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	332/343 (96%)	0.01	20 (6%)	29 31	8, 20, 42, 83	10 (3%)
1	B	327/343 (95%)	0.26	18 (5%)	32 34	8, 22, 46, 73	7 (2%)
All	All	659/686 (96%)	0.14	38 (5%)	30 32	8, 21, 46, 83	17 (2%)

All (38) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	86	THR	4.5
1	A	80	PRO	4.0
1	A	82	PHE	4.0
1	B	365	VAL	3.9
1	B	414	HIS	3.5
1	B	363	ALA	3.4
1	A	84	VAL	3.3
1	B	295	SER	3.2
1	A	91	VAL	3.2
1	B	91	VAL	3.1
1	A	83	GLY	3.1
1	A	85	LYS	3.0
1	A	87	GLU	3.0
1	A	93	ALA	3.0
1	B	364	SER	2.9
1	B	88	GLN	2.8
1	A	294	SER	2.7
1	A	90	ASP	2.6
1	B	294	SER	2.6
1	B	362	ASN	2.5
1	B	94	LYS	2.5
1	B	139	VAL	2.4
1	B	353	GLU	2.4
1	A	88	GLN	2.4

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Mol	Chain	Res	Type	RSRZ
1	A	97	GLU	2.4
1	A	411	PRO	2.3
1	A	292	VAL	2.3
1	A	295	SER	2.3
1	A	255	LYS	2.3
1	B	133	LYS	2.3
1	A	105	HIS	2.1
1	B	292	VAL	2.1
1	A	89	GLU	2.1
1	A	128	GLU	2.1
1	B	301	ASP	2.1
1	B	92	LEU	2.1
1	B	406	TYR	2.1
1	B	244	GLU	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 oligosaccharides 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(Å ²)	Q<0.9
5	EDO	A	514	4/4	0.71	0.17	36,41,44,51	0
5	EDO	B	511	4/4	0.72	0.17	43,51,52,68	0
5	EDO	A	512	4/4	0.74	0.15	40,40,50,51	0
5	EDO	B	507	4/4	0.75	0.18	45,49,50,51	0
5	EDO	B	509	4/4	0.76	0.16	42,49,50,54	0
5	EDO	A	511	4/4	0.76	0.17	31,37,43,46	0
5	EDO	B	510	4/4	0.81	0.14	37,40,44,52	0
5	EDO	B	508	4/4	0.81	0.17	32,42,45,46	0
5	EDO	B	512	4/4	0.81	0.15	36,45,50,52	0

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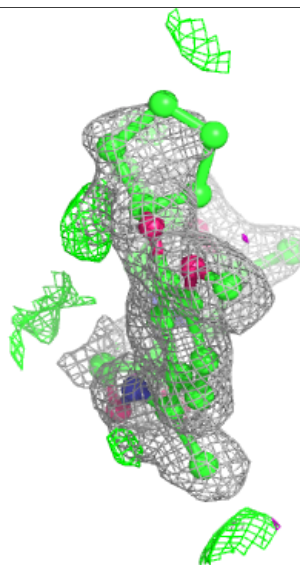
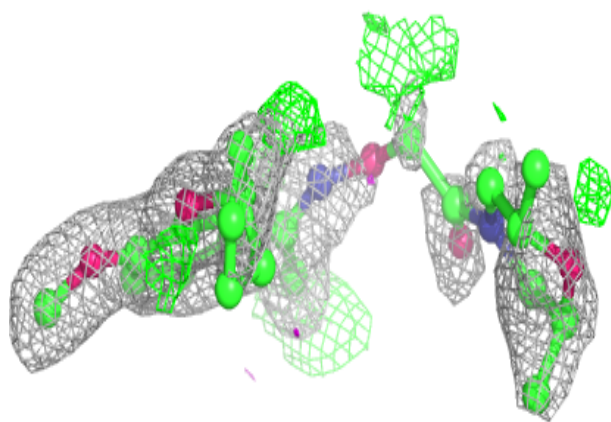
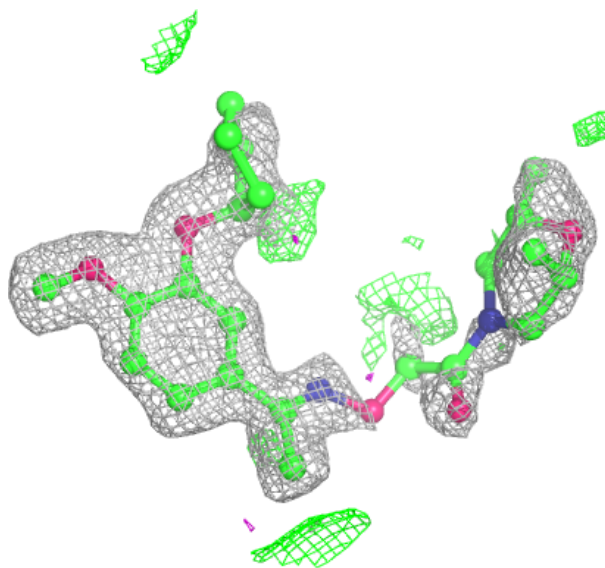
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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
5	EDO	A	510	4/4	0.85	0.12	35,41,41,46	0
2	S8Q	B	501	29/29	0.85	0.18	17,33,53,55	29
5	EDO	A	508	4/4	0.86	0.17	30,34,35,38	0
2	S8Q	A	501	29/29	0.89	0.17	15,27,59,66	29
5	EDO	B	506	4/4	0.89	0.12	27,28,29,32	0
4	MG	A	507	1/1	0.90	0.19	49,49,49,49	0
5	EDO	A	509	4/4	0.91	0.12	25,30,31,32	0
5	EDO	A	513	4/4	0.92	0.16	18,31,34,51	0
4	MG	B	504	1/1	0.96	0.11	36,36,36,36	0
4	MG	A	505	1/1	0.97	0.09	34,34,34,34	0
4	MG	B	505	1/1	0.97	0.12	33,33,33,33	0
4	MG	A	506	1/1	0.97	0.12	23,23,23,23	0
4	MG	A	504	1/1	0.97	0.08	39,39,39,39	0
3	ZN	B	502	1/1	1.00	0.02	14,14,14,14	0
4	MG	A	503	1/1	1.00	0.02	8,8,8,8	0
3	ZN	A	502	1/1	1.00	0.02	13,13,13,13	0
4	MG	B	503	1/1	1.00	0.05	9,9,9,9	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.

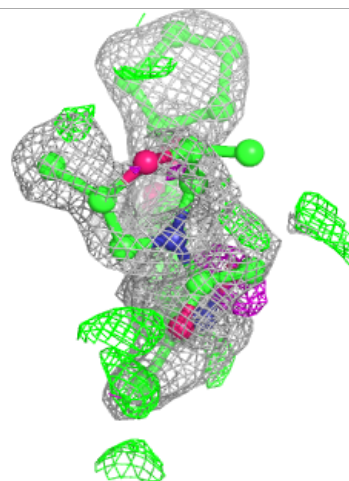
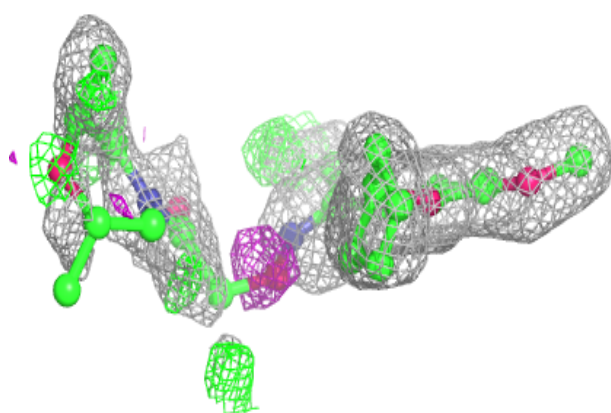
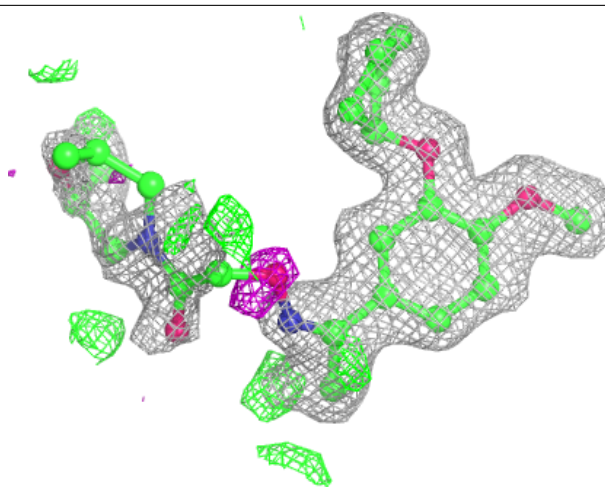
Electron density around S8Q B 501:

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



Electron density around S8Q 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)



6.5 Other polymers [i](#)

There are no such residues in this entry.