Full wwPDB X-ray Structure Validation Report ⓘ

Oct 2, 2023 – 03:48 AM EDT

PDB ID	:	6MN1
Title	:	Crystal structure of meta-AAC0038, an environmental aminoglycoside resistance enzyme, mutant H168A in abortive complex with gentamicin-CoA
Authors	:	Stogios, P.J.; Skarina, T.; Michalska, K.; Xu, Z.; Yim, V.; Savchenko, A.; Joachimiak, A.; Satchell, K.J.; Center for Structural Genomics of Infectious Diseases (CSGID)
Deposited on	:	2018-10-01
Resolution	:	2.25 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	:	FAILED
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	FAILED
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.35.1

1 Overall quality at a glance (i)

The following experimental techniques were used to determine the structure:
X-RAY DIFFRACTION

The reported resolution of this entry is 2.25 Å.

There are no overall percentile quality scores available for this entry.

MolProbity and EDS failed to run properly - the sequence quality summary graphics cannot be shown.

2 Entry composition

There are 8 unique types of molecules in this entry. The entry contains 4828 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.

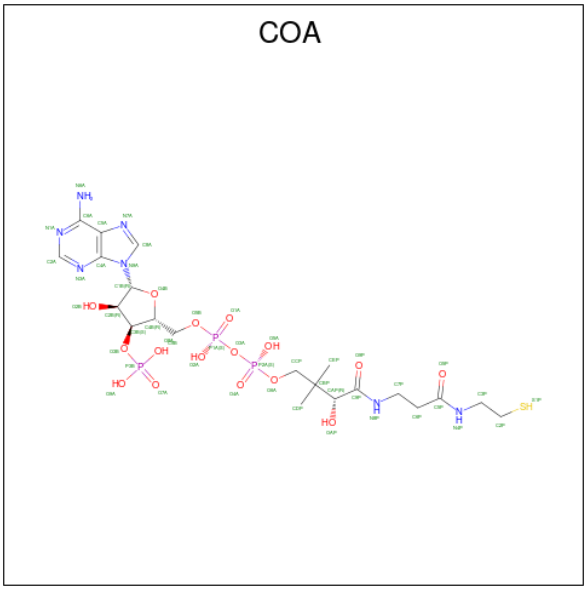
- Molecule 1 is a protein called Aminoglycoside N(3)-acetyltransferase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	260	Total	C	N	O	S	0	0	0
			1996	1265	349	377	5			
1	B	259	Total	C	N	O	S	0	0	0
			1991	1262	348	376	5			

There are 4 discrepancies between the modelled and reference sequences:

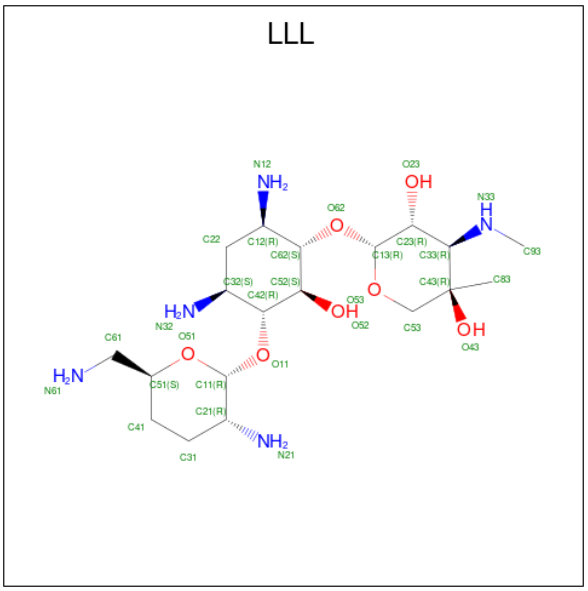
Chain	Residue	Modelled	Actual	Comment	Reference
A	1	VAL	-	expression tag	UNP A0A059X981
A	168	ALA	HIS	engineered mutation	UNP A0A059X981
B	1	VAL	-	expression tag	UNP A0A059X981
B	168	ALA	HIS	engineered mutation	UNP A0A059X981

- Molecule 2 is COENZYME A (three-letter code: COA) (formula: $C_{21}H_{36}N_7O_{16}P_3S$).



Mol	Chain	Residues	Atoms						ZeroOcc	AltConf
2	A	1	Total	C	N	O	P	S	0	0
			48	21	7	16	3	1		
2	B	1	Total	C	N	O	P	S	0	0
			48	21	7	16	3	1		

- Molecule 3 is (2R,3R,4R,5R)-2-((1S,2S,3R,4S,6R)-4,6-DIAMINO-3-((2R,3R,6S)-3-AMIN O-6-(AMINOMETHYL)-TETRAHYDRO-2H-PYRAN-2-YLOXY)-2-HYDR OXYCYCLO HEXYLOXY)-5-METHYL-4-(METHYLAMINO)-TETRAHYDRO-2H-PYRAN-3,5-DIOL (three-letter code: LLL) (formula: $C_{19}H_{39}N_5O_7$).

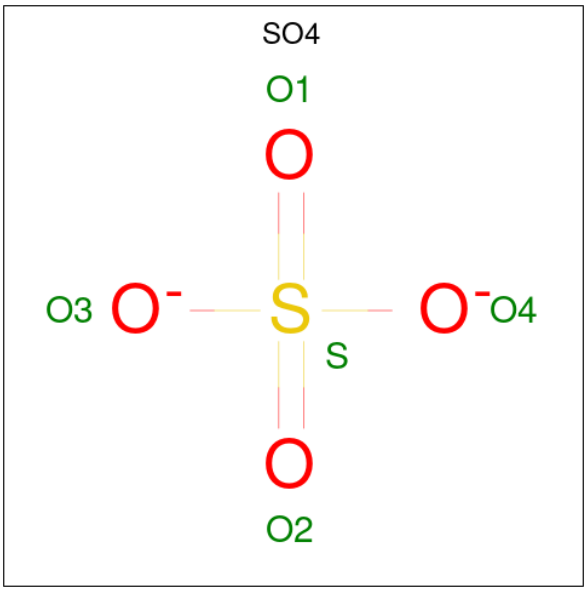


Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
3	A	1	Total	C	N	O	0	0
			31	19	5	7		
3	B	1	Total	C	N	O	0	0
			31	19	5	7		

- Molecule 4 is CHLORIDE ION (three-letter code: CL) (formula: Cl).

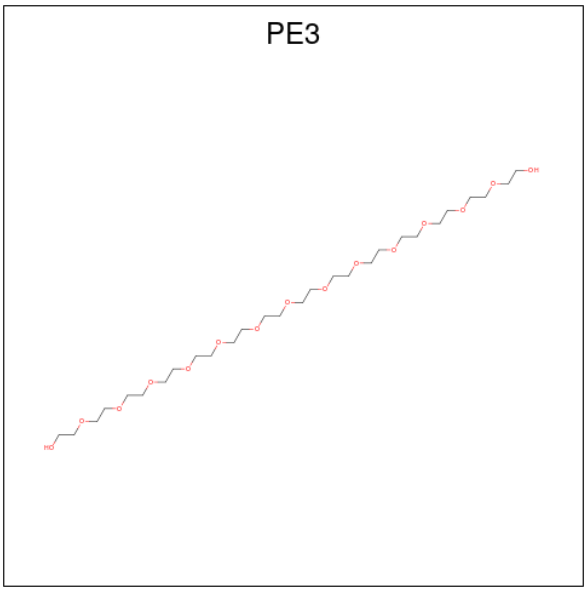
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	1	Total	Cl	0	0
			1	1		
4	B	1	Total	Cl	0	0
			1	1		

- Molecule 5 is SULFATE ION (three-letter code: SO4) (formula: O_4S).



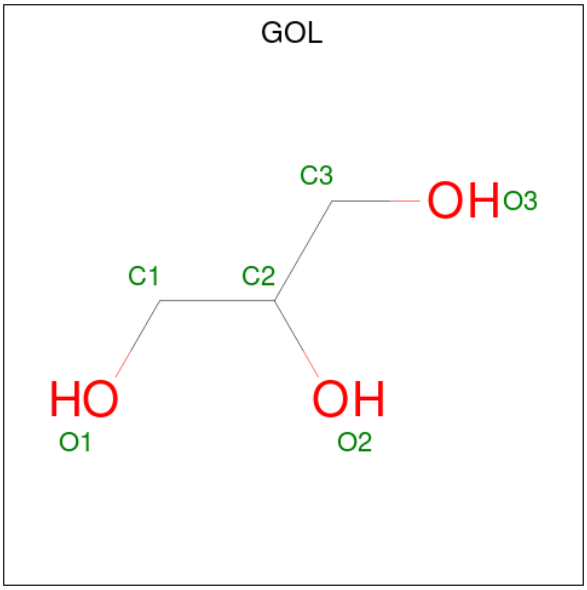
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	A	1	Total O S 5 4 1	0	0
5	A	1	Total O S 5 4 1	0	0
5	B	1	Total O S 5 4 1	0	0
5	B	1	Total O S 5 4 1	0	0

- Molecule 6 is 3,6,9,12,15,18,21,24,27,30,33,36,39-TRIDECAOXAHENTETRACONTANE-1 ,41-DIOL (three-letter code: PE3) (formula: $C_{28}H_{58}O_{15}$).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
6	A	1	Total C O 10 6 4	0	0
6	A	1	Total C O 7 4 3	0	0

- Molecule 7 is GLYCEROL (three-letter code: GOL) (formula: $C_3H_8O_3$).



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

- Molecule 8 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
8	A	358	Total O 365 365	0	7

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Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
8	B	227	Total O 237 237	0	10

MolProbity and EDS failed to run properly - this section is therefore empty.

3 Data and refinement statistics (i)

EDS failed to run properly - this section is therefore incomplete.

Property	Value	Source
Space group	P 31 2 1	Depositor
Cell constants a, b, c, α, β, γ	127.34Å 127.34Å 95.27Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	29.12 – 2.25	Depositor
% Data completeness (in resolution range)	99.9 (29.12-2.25)	Depositor
R_{merge}	0.14	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.92 (at 2.24Å)	Xtriage
Refinement program	PHENIX (DEV_3092: ???)	Depositor
R, R_{free}	0.177 , 0.210	Depositor
Wilson B-factor (Å^2)	32.9	Xtriage
Anisotropy	0.283	Xtriage
L-test for twinning[2]	$< \|L\| > = 0.50$, $< L^2 > = 0.33$	Xtriage
Estimated twinning fraction	0.025 for -h,-k,l	Xtriage
Total number of atoms	4828	wwPDB-VP
Average B, all atoms (Å^2)	50.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.29% of the height of the origin peak. No significant pseudotranslation is detected.*

[1] Intensities estimated from amplitudes.

[2] Theoretical values of $< |L| >$, $< L^2 >$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

4 Model quality

4.1 Standard geometry

MolProbity failed to run properly - this section is therefore empty.

4.2 Too-close contacts

MolProbity failed to run properly - this section is therefore empty.

4.3 Torsion angles

4.3.1 Protein backbone

MolProbity failed to run properly - this section is therefore empty.

4.3.2 Protein sidechains

MolProbity failed to run properly - this section is therefore empty.

4.3.3 RNA

MolProbity failed to run properly - this section is therefore empty.

4.4 Non-standard residues in protein, DNA, RNA chains

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

4.5 Carbohydrates

There are no monosaccharides in this entry.

4.6 Ligand geometry

Of 19 ligands modelled in this entry, 2 are monoatomic - leaving 17 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	SO4	B	305	-	4,4,4	0.15	0	6,6,6	0.06	0
3	LLL	A	302	2	29,33,33	0.96	1 (3%)	34,49,49	1.11	3 (8%)
5	SO4	A	305	-	4,4,4	0.14	0	6,6,6	0.07	0
7	GOL	A	309	-	5,5,5	0.97	0	5,5,5	0.98	0
5	SO4	A	304	-	4,4,4	0.14	0	6,6,6	0.05	0
7	GOL	A	311	-	5,5,5	0.89	0	5,5,5	0.99	0
7	GOL	A	308	-	5,5,5	0.91	0	5,5,5	0.98	0
5	SO4	B	304	-	4,4,4	0.14	0	6,6,6	0.06	0
6	PE3	A	307	-	6,6,42	0.63	0	5,5,41	1.00	1 (20%)
7	GOL	B	307	-	5,5,5	0.92	0	5,5,5	0.94	0
7	GOL	B	308	-	5,5,5	0.89	0	5,5,5	0.96	0
3	LLL	B	302	2	29,33,33	0.91	1 (3%)	34,49,49	1.21	4 (11%)
2	COA	B	301	3	41,50,50	4.26	11 (26%)	52,75,75	1.92	8 (15%)
6	PE3	A	306	-	9,9,42	0.56	0	8,8,41	1.02	0
7	GOL	B	306	-	5,5,5	0.93	0	5,5,5	0.99	0
7	GOL	A	310	-	5,5,5	0.90	0	5,5,5	0.99	0
2	COA	A	301	3	41,50,50	4.18	12 (29%)	52,75,75	2.02	11 (21%)

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	LLL	A	302	2	-	1/11/65/65	0/3/3/3
7	GOL	A	309	-	-	2/4/4/4	-
7	GOL	B	308	-	-	4/4/4/4	-
7	GOL	A	311	-	-	0/4/4/4	-
7	GOL	A	308	-	-	0/4/4/4	-
7	GOL	B	307	-	-	0/4/4/4	-
6	PE3	A	307	-	-	1/4/4/40	-
3	LLL	B	302	2	-	1/11/65/65	0/3/3/3
6	PE3	A	306	-	-	3/7/7/40	-
2	COA	B	301	3	-	11/44/64/64	0/3/3/3
7	GOL	B	306	-	-	0/4/4/4	-
7	GOL	A	310	-	-	2/4/4/4	-
2	COA	A	301	3	-	0/44/64/64	0/3/3/3

All (25) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	301	COA	O4B-C1B	18.23	1.66	1.41
2	A	301	COA	O4B-C1B	17.41	1.65	1.41
2	B	301	COA	C2B-C1B	-13.16	1.33	1.53
2	A	301	COA	C2B-C1B	-12.99	1.34	1.53
2	A	301	COA	C5P-N4P	7.06	1.49	1.33
2	B	301	COA	C5P-N4P	6.89	1.49	1.33
2	B	301	COA	C9P-N8P	6.75	1.48	1.33
2	A	301	COA	C9P-N8P	6.73	1.48	1.33
2	A	301	COA	O4B-C4B	-6.50	1.30	1.45
2	B	301	COA	O4B-C4B	-6.25	1.31	1.45
2	B	301	COA	C6A-N6A	4.82	1.51	1.34
2	A	301	COA	C6A-N6A	4.75	1.51	1.34
2	A	301	COA	P3B-O3B	4.49	1.67	1.59
2	B	301	COA	P3B-O3B	4.42	1.67	1.59
3	A	302	LLL	C42-C32	3.40	1.60	1.53
3	B	302	LLL	C42-C32	3.29	1.60	1.53
2	A	301	COA	C2A-N3A	2.83	1.36	1.32
2	B	301	COA	O3B-C3B	-2.71	1.34	1.44
2	B	301	COA	C2A-N3A	2.65	1.36	1.32
2	A	301	COA	O3B-C3B	-2.63	1.34	1.44
2	B	301	COA	O9P-C9P	-2.59	1.18	1.23
2	A	301	COA	O9P-C9P	-2.46	1.18	1.23
2	B	301	COA	P2A-O6A	2.27	1.68	1.59
2	A	301	COA	P2A-O6A	2.19	1.68	1.59
2	A	301	COA	C3B-C4B	2.06	1.58	1.52

All (27) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	B	301	COA	C5A-C6A-N6A	8.52	133.29	120.35
2	A	301	COA	C5A-C6A-N6A	8.42	133.14	120.35
2	A	301	COA	N3A-C2A-N1A	-5.62	119.89	128.68
2	B	301	COA	N3A-C2A-N1A	-5.61	119.92	128.68
2	B	301	COA	N6A-C6A-N1A	-5.58	106.99	118.57
2	A	301	COA	N6A-C6A-N1A	-5.53	107.09	118.57
3	A	302	LLL	C41-C51-C61	-2.96	107.17	112.83
2	A	301	COA	P2A-O3A-P1A	-2.94	122.73	132.83
2	A	301	COA	C3P-N4P-C5P	2.90	128.21	122.84
3	B	302	LLL	C41-C51-C61	-2.84	107.41	112.83
3	B	302	LLL	C93-N33-C33	2.57	118.13	114.38
2	B	301	COA	C2P-C3P-N4P	-2.51	106.56	112.31
2	A	301	COA	O5P-C5P-C6P	-2.42	117.58	122.02

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	A	301	COA	C3B-C2B-C1B	2.40	105.21	99.89
2	B	301	COA	P2A-O3A-P1A	-2.38	124.65	132.83
2	B	301	COA	C6P-C7P-N8P	-2.38	107.09	111.90
2	A	301	COA	O6A-CCP-CBP	-2.32	106.82	110.55
2	A	301	COA	C2P-C3P-N4P	-2.31	107.03	112.31
2	A	301	COA	C2B-C3B-C4B	-2.30	99.15	103.22
2	B	301	COA	C2B-C3B-C4B	-2.24	99.25	103.22
2	A	301	COA	C6P-C7P-N8P	-2.22	107.41	111.90
2	B	301	COA	CAP-C9P-N8P	2.09	120.74	116.58
3	B	302	LLL	C13-C23-C33	2.07	112.77	109.34
3	B	302	LLL	C41-C31-C21	-2.05	106.15	111.29
3	A	302	LLL	C93-N33-C33	2.05	117.37	114.38
3	A	302	LLL	C41-C31-C21	-2.02	106.22	111.29
6	A	307	PE3	O37-C38-C39	2.00	118.87	110.07

There are no chirality outliers.

All (25) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	B	301	COA	C3B-C4B-C5B-O5B
2	B	301	COA	C5B-O5B-P1A-O1A
2	B	301	COA	CCP-O6A-P2A-O4A
2	B	301	COA	CCP-O6A-P2A-O5A
7	A	309	GOL	C1-C2-C3-O3
7	A	310	GOL	C1-C2-C3-O3
7	B	308	GOL	C1-C2-C3-O3
7	B	308	GOL	O2-C2-C3-O3
2	B	301	COA	O4B-C4B-C5B-O5B
7	B	308	GOL	O1-C1-C2-C3
7	A	309	GOL	O2-C2-C3-O3
7	A	310	GOL	O2-C2-C3-O3
7	B	308	GOL	O1-C1-C2-O2
6	A	306	PE3	C38-C39-O40-C41
2	B	301	COA	C3B-O3B-P3B-O9A
6	A	306	PE3	C35-C36-O37-C38
2	B	301	COA	CAP-CBP-CCP-O6A
6	A	307	PE3	C39-C38-O37-C36
3	A	302	LLL	C52-C42-O11-C11
2	B	301	COA	CDP-CBP-CCP-O6A
2	B	301	COA	CEP-CBP-CCP-O6A
6	A	306	PE3	O37-C38-C39-O40
3	B	302	LLL	C52-C42-O11-C11

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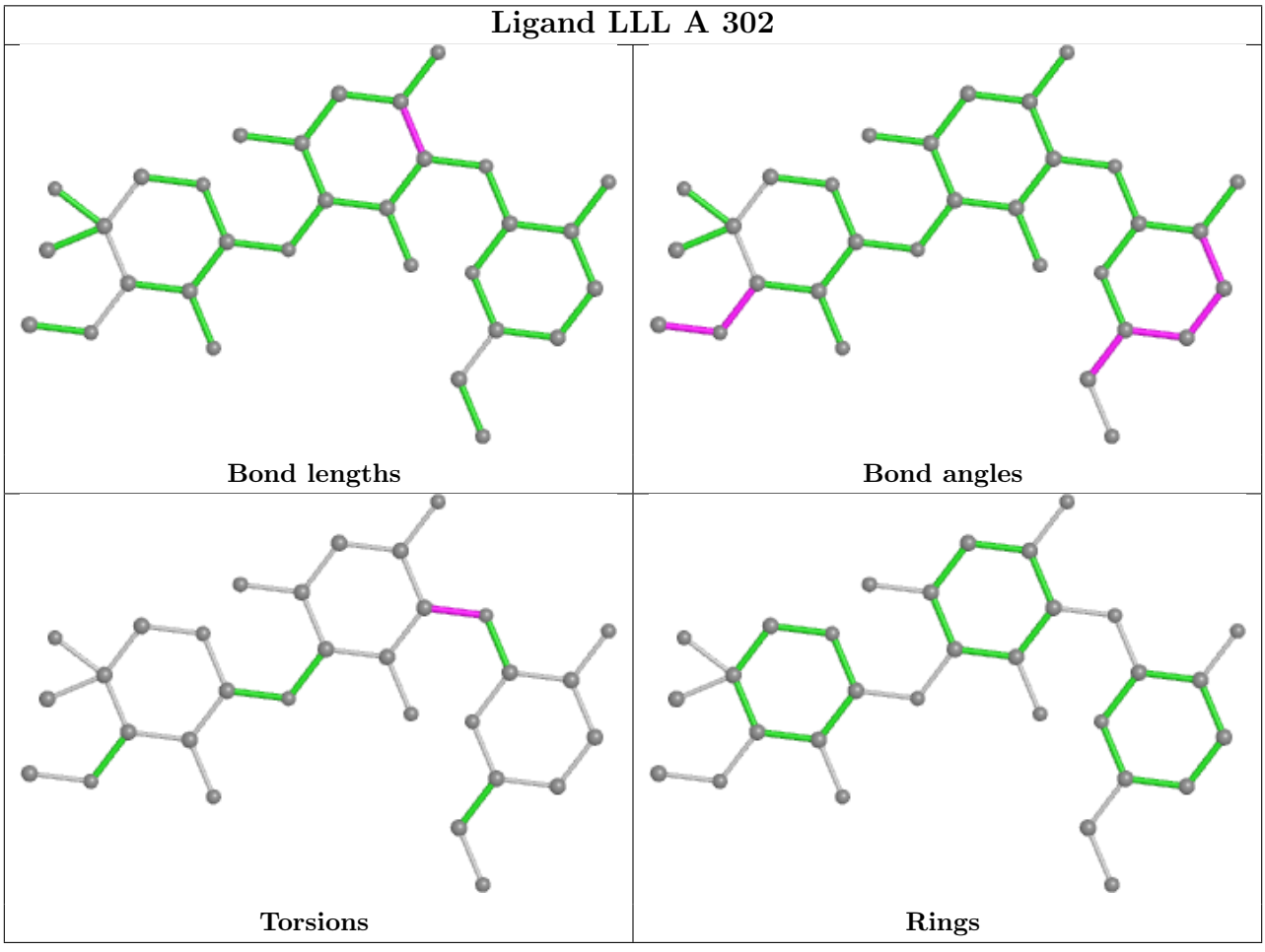
Mol	Chain	Res	Type	Atoms
2	B	301	COA	CCP-O6A-P2A-O3A
2	B	301	COA	P2A-O3A-P1A-O2A

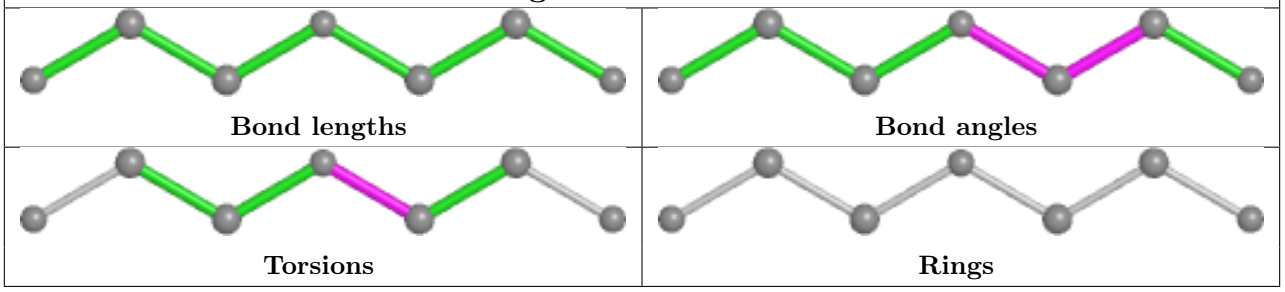
There are no ring outliers.

No monomer is involved in short contacts.

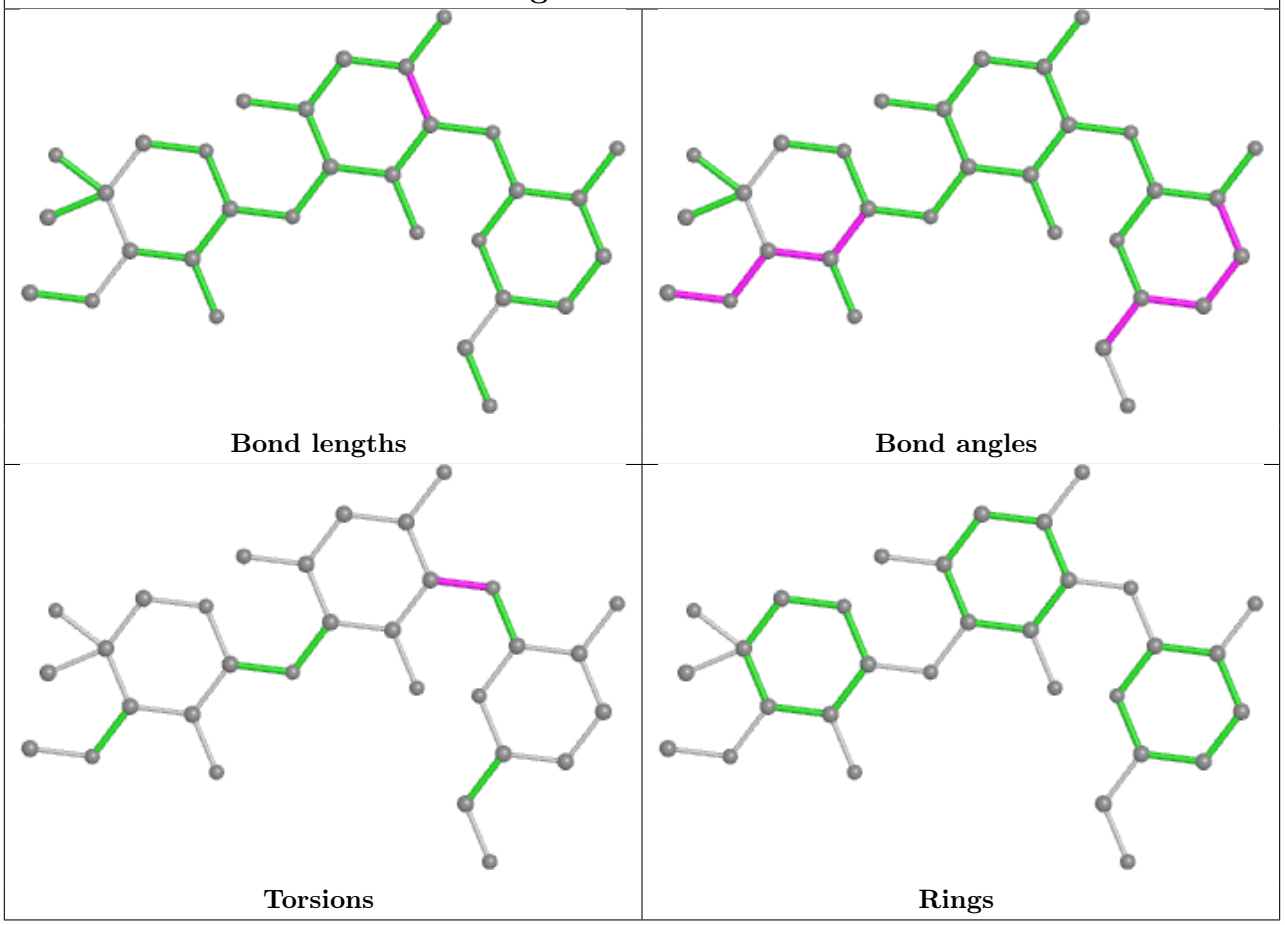
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less then 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.



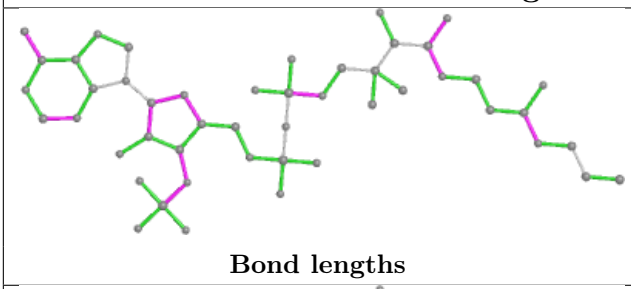
Ligand PE3 A 307

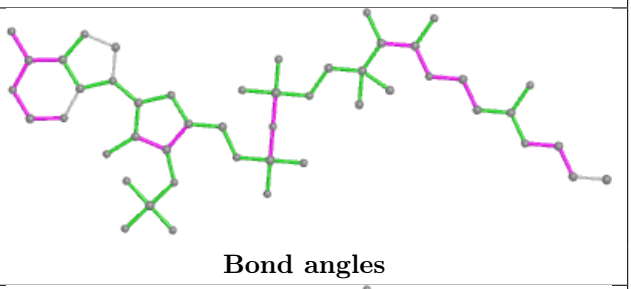


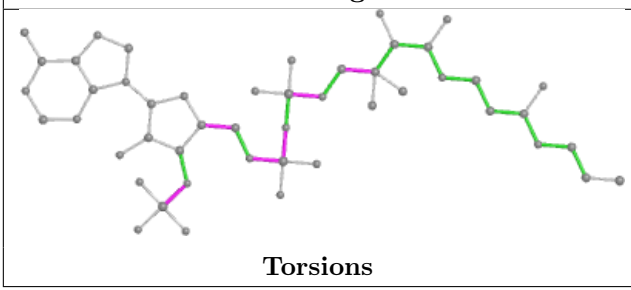
Ligand LLL B 302

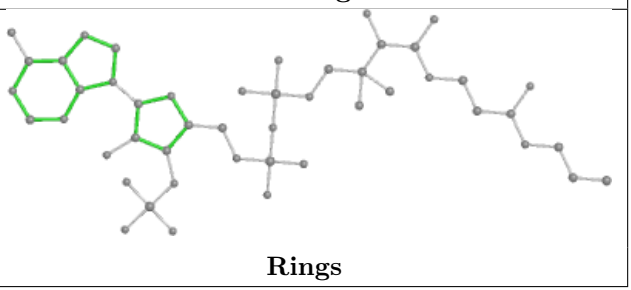


Ligand COA B 301

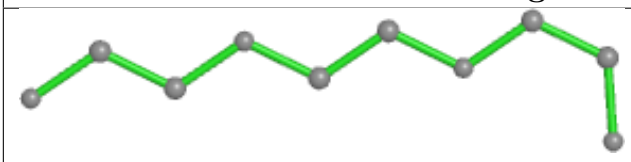

Bond lengths

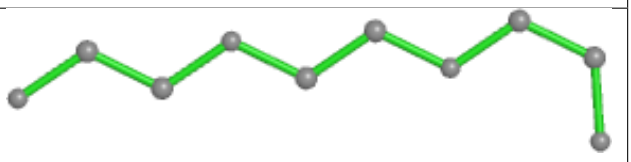

Bond angles

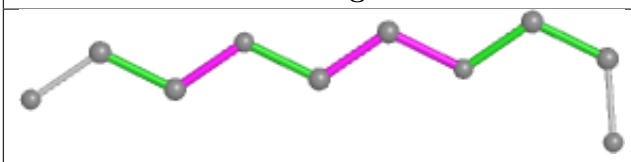

Torsions


Rings

Ligand PE3 A 306


Bond lengths


Bond angles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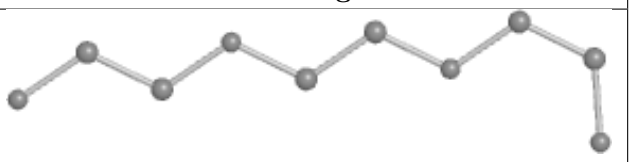
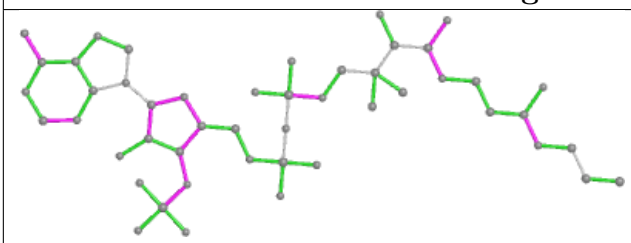

Rings

Ligand COA A 301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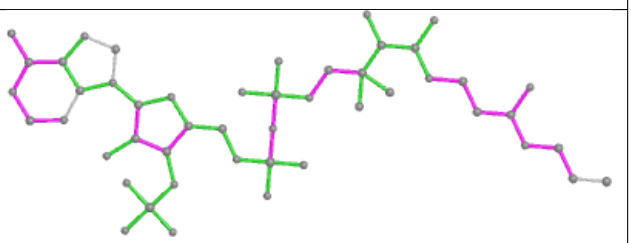
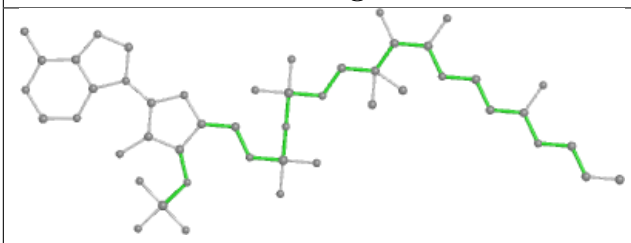

Bond angles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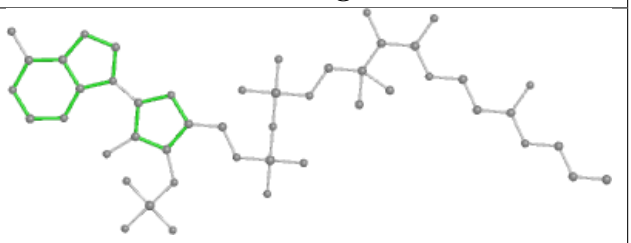
Rings

4.7 Other polymers (i)

There are no such residues in this entry.

4.8 Polymer linkage issues (i)

There are no chain breaks in this entry.

5 Fit of model and data

5.1 Protein, DNA and RNA chains

EDS failed to run properly - this section is therefore empty.

5.2 Non-standard residues in protein, DNA, RNA chains

EDS failed to run properly - this section is therefore empty.

5.3 Carbohydrates

EDS failed to run properly - this section is therefore empty.

5.4 Ligands

EDS failed to run properly - this section is therefore empty.

5.5 Other polymers

EDS failed to run properly - this section is therefore empty.