



Full wwPDB X-ray Structure Validation Report ⓘ

Sep 14, 2023 – 02:53 AM EDT

PDB ID : 4RVN
Title : Crystal structure of a Putative Acyl-CoA ligase (BT_0428) from Bacteroides thetaiotaomicron VPI-5482 at 2.20 Å resolution
Authors : Joint Center for Structural Genomics (JCSG)
Deposited on : 2014-11-26
Resolution : 2.20 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)
Xtrriage (Phenix) : 1.13
EDS : 2.35.1
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

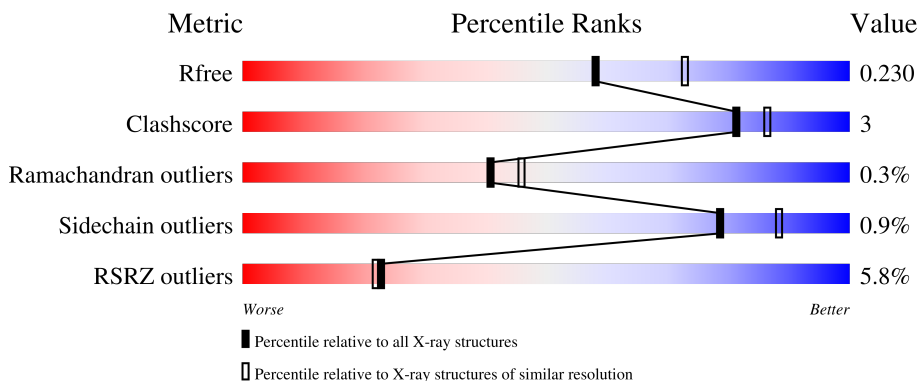
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.20 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	4898 (2.20-2.20)
Clashscore	141614	5594 (2.20-2.20)
Ramachandran outliers	138981	5503 (2.20-2.20)
Sidechain outliers	138945	5504 (2.20-2.20)
RSRZ outliers	127900	4800 (2.20-2.20)

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	436	 3% 94% 6%
1	B	436	 11% 92% 5%
1	C	436	 3% 93% 7%
1	D	436	 5% 92% 6%

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
6	UNL	A	507	-	-	X	-
6	UNL	B	503	-	-	X	-
6	UNL	C	507	-	-	X	-
6	UNL	D	503	-	-	X	-

2 Entry composition [i](#)

There are 9 unique types of molecules in this entry. The entry contains 14520 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 Phenylacetate-coenzyme A ligase.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
			Total	C	N	O	S	Se			
1	A	433	3445	2173	593	658	6	15	0	6	0
1	B	424	3356	2115	581	639	6	15	0	8	0
1	C	434	3427	2162	597	647	6	15	0	3	0
1	D	426	3362	2124	577	640	6	15	0	6	0

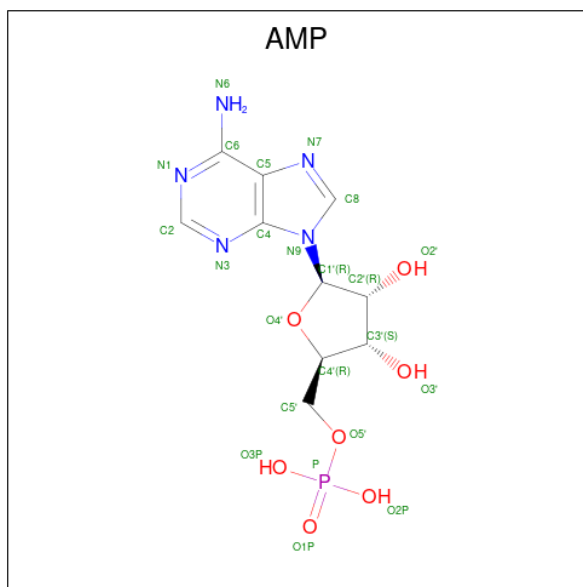
There are 4 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	0	GLY	-	expression tag	UNP Q8AAN6
B	0	GLY	-	expression tag	UNP Q8AAN6
C	0	GLY	-	expression tag	UNP Q8AAN6
D	0	GLY	-	expression tag	UNP Q8AAN6

- Molecule 2 is ZINC ION (three-letter code: ZN) (formula: Zn).

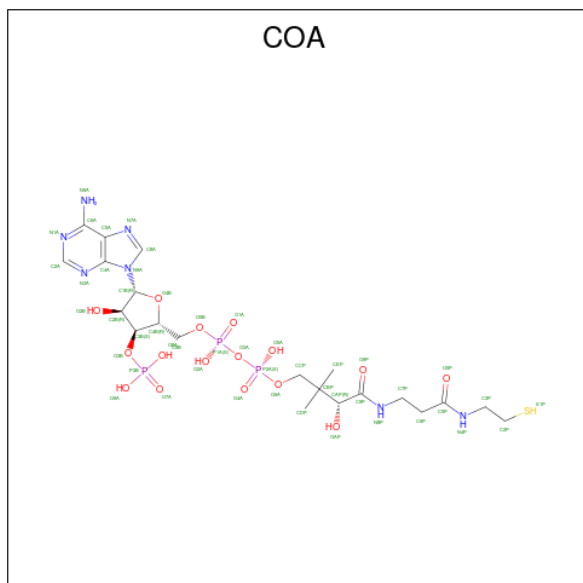
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	1	Total 1	Zn 1	0	0
2	B	1	Total 1	Zn 1	0	0
2	C	1	Total 1	Zn 1	0	0
2	D	1	Total 1	Zn 1	0	0

- Molecule 3 is ADENOSINE MONOPHOSPHATE (three-letter code: AMP) (formula: C₁₀H₁₄N₅O₇P).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	N	O	P		
3	A	1	Total	C	N	O	P	0	1
			23	10	5	7	1		
3	B	1	Total	C	N	O	P	0	0
			23	10	5	7	1		
3	C	1	Total	C	N	O	P	0	0
			23	10	5	7	1		
3	D	1	Total	C	N	O	P	0	0
			23	10	5	7	1		

- Molecule 4 is COENZYME A (three-letter code: COA) (formula: $C_{21}H_{36}N_7O_{16}P_3S$).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
4	A	1	Total	C	N	O	P	0	0
			31	10	5	13	3		
4	C	1	Total	C	N	O	P	0	0
			31	10	5	13	3		

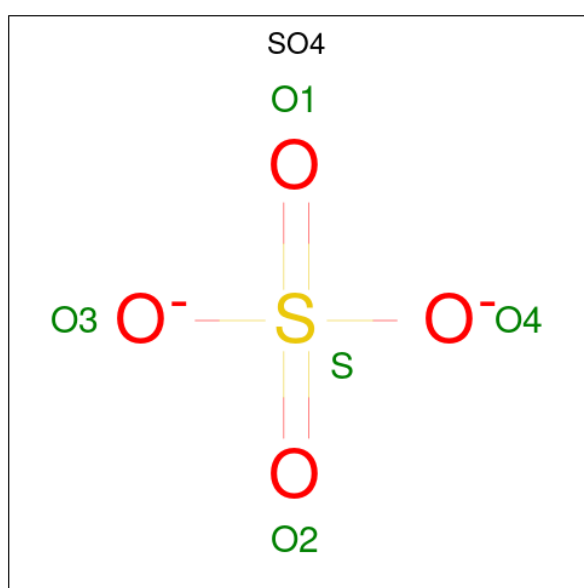
- Molecule 5 is POTASSIUM ION (three-letter code: K) (formula: K).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	3	Total	K	0	0
			3	3		
5	C	3	Total	K	0	0
			3	3		

- Molecule 6 is UNKNOWN LIGAND (three-letter code: UNL) (formula:).

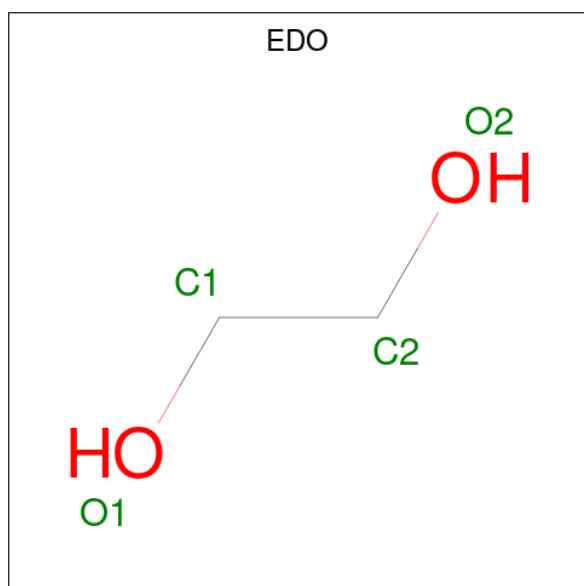
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	A	1	Total	O	0	0
			10	10		
6	B	1	Total	O	0	0
			9	9		
6	C	1	Total	O	0	0
			6	6		
6	D	1	Total	O	0	0
			7	7		

- Molecule 7 is SULFATE ION (three-letter code: SO4) (formula: O₄S).



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

- Molecule 8 is 1,2-ETHANEDIOL (three-letter code: EDO) (formula: C₂H₆O₂).



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

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Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
8	C	1	Total C O 4 2 2	0	0
8	C	1	Total C O 4 2 2	0	0
8	D	1	Total C O 4 2 2	0	0
8	D	1	Total C O 4 2 2	0	0

- Molecule 9 is water.

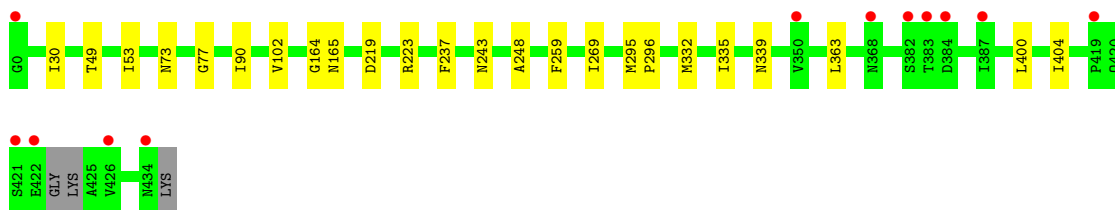
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
9	A	213	Total O 214 214	0	1
9	B	142	Total O 143 143	0	1
9	C	134	Total O 135 135	0	1
9	D	173	Total O 173 173	0	1

3 Residue-property plots [i](#)

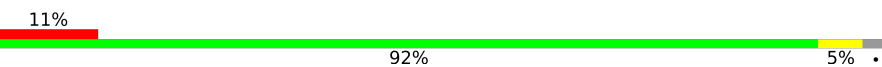
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. 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.

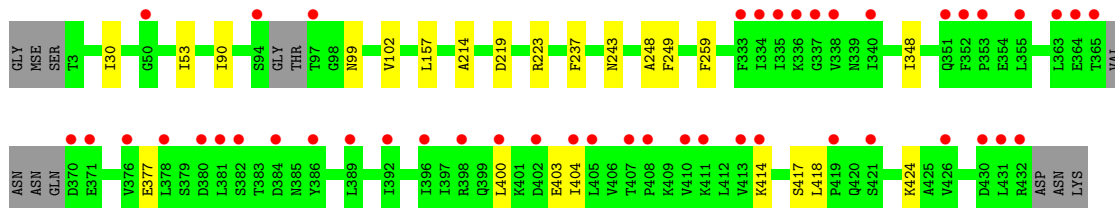
- Molecule 1: Phenylacetate-coenzyme A ligase

Chain A: 

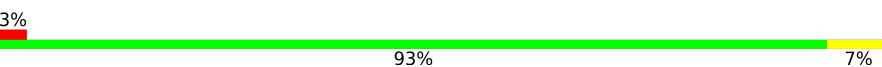


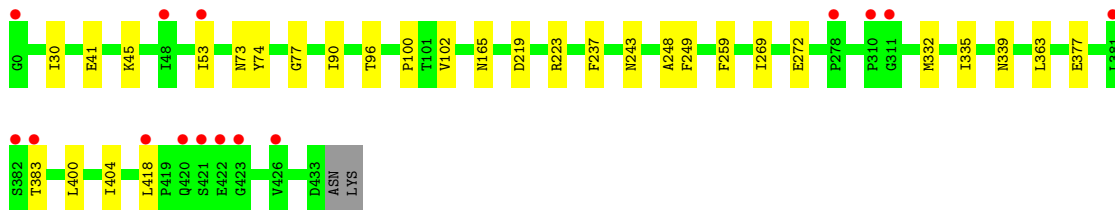
- Molecule 1: Phenylacetate-coenzyme A ligase

Chain B: 



- Molecule 1: Phenylacetate-coenzyme A ligase

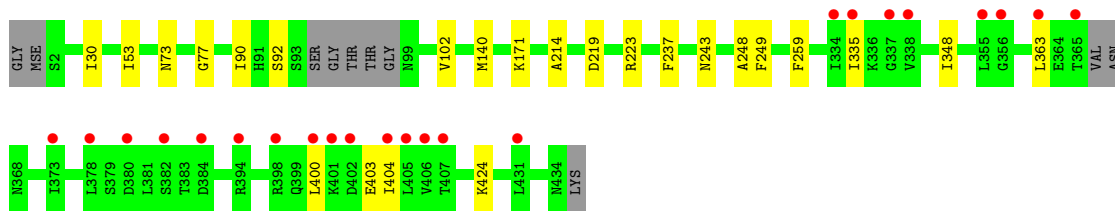
Chain C: 



- Molecule 1: Phenylacetate-coenzyme A ligase

Chain D: 





4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 2	Depositor
Cell constants a, b, c, α , β , γ	127.78Å 211.30Å 71.98Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	47.78 – 2.20 47.78 – 2.20	Depositor EDS
% Data completeness (in resolution range)	99.9 (47.78-2.20) 99.9 (47.78-2.20)	Depositor EDS
R_{merge}	0.11	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.11 (at 2.20Å)	Xtrriage
Refinement program	BUSTER-TNT 2.10.0, BUSTER 2.10.0	Depositor
R, R_{free}	0.192 , 0.219 0.204 , 0.230	Depositor DCC
R_{free} test set	4990 reflections (5.01%)	wwPDB-VP
Wilson B-factor (Å ²)	38.1	Xtrriage
Anisotropy	0.564	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.31 , 43.1	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	14520	wwPDB-VP
Average B, all atoms (Å ²)	57.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.70% 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: ZN, SO4, EDO, COA, AMP, UNL, K

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	0.42	0/3506	0.60	0/4709
1	B	0.42	0/3423	0.59	0/4601
1	C	0.42	0/3480	0.60	0/4675
1	D	0.42	0/3423	0.60	0/4602
All	All	0.42	0/13832	0.60	0/18587

There are no bond length outliers.

There are no bond angle outliers.

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	3445	0	3434	14	0
1	B	3356	0	3309	13	0
1	C	3427	0	3417	13	0
1	D	3362	0	3307	14	0
2	A	1	0	0	0	0
2	B	1	0	0	0	0
2	C	1	0	0	0	0
2	D	1	0	0	0	0
3	A	23	0	0	1	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	B	23	0	12	2	0
3	C	23	0	12	3	0
3	D	23	0	12	2	0
4	A	31	0	11	1	0
4	C	31	0	11	0	0
5	A	3	0	0	0	0
5	C	3	0	0	0	0
6	A	10	0	0	7	0
6	B	9	0	0	3	0
6	C	6	0	0	5	0
6	D	7	0	0	5	0
7	A	10	0	0	0	0
7	B	5	0	0	0	0
7	C	5	0	0	0	0
7	D	5	0	0	0	0
8	A	20	0	30	2	0
8	B	4	0	6	0	0
8	C	12	0	18	0	0
8	D	8	0	12	0	0
9	A	214	0	0	1	0
9	B	143	0	0	0	0
9	C	135	0	0	0	0
9	D	173	0	0	0	0
All	All	14520	0	13591	72	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 3.

All (72) 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)
3:D:502:AMP:O1P	6:D:503:UNL:O2	1.65	1.13
6:D:503:UNL:O2	6:D:503:UNL:O1	1.96	0.84
6:D:503:UNL:O2	6:D:503:UNL:O3	1.98	0.81
3:D:502:AMP:P	6:D:503:UNL:O2	2.39	0.80
3:B:502:AMP:O2P	6:B:503:UNL:O3	1.99	0.80
3:A:502[A]:AMP:O3P	6:A:507:UNL:O4	2.06	0.73
6:C:507:UNL:O5	6:C:507:UNL:O6	2.10	0.70
1:B:214:ALA:HB1	1:B:424:LYS:HE2	1.74	0.69
3:C:502:AMP:P	6:C:507:UNL:O1	2.51	0.68
3:C:502:AMP:O2P	6:C:507:UNL:O1	2.12	0.67

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:C:502:AMP:O3P	6:C:507:UNL:O1	2.14	0.65
1:A:30:ILE:HD13	1:A:53:ILE:HG13	1.80	0.64
1:D:30:ILE:HD13	1:D:53:ILE:HG13	1.80	0.63
6:A:507:UNL:O4	6:A:507:UNL:O2	2.17	0.63
1:B:30:ILE:HD13	1:B:53:ILE:HG13	1.81	0.62
1:C:30:ILE:HD13	1:C:53:ILE:HG13	1.81	0.62
6:C:507:UNL:O1	6:C:507:UNL:O2	2.18	0.62
1:D:90:ILE:HG23	1:D:102:VAL:HG13	1.83	0.60
6:A:507:UNL:O4	6:A:507:UNL:O5	2.21	0.59
6:A:507:UNL:O5	6:A:507:UNL:O6	2.21	0.58
1:D:348:ILE:HD12	1:D:400:LEU:HD23	1.87	0.57
1:B:348:ILE:HD12	1:B:400:LEU:HD23	1.87	0.57
1:D:214:ALA:HB1	1:D:424:LYS:HE2	1.89	0.54
6:B:503:UNL:O3	6:B:503:UNL:O2	2.27	0.52
1:D:335:ILE:HD13	1:D:363:LEU:HD22	1.92	0.52
1:C:335:ILE:HD13	1:C:363:LEU:HD22	1.92	0.51
1:A:335:ILE:HD13	1:A:363:LEU:HD22	1.94	0.50
1:C:237:PHE:HB3	1:C:248:ALA:HB3	1.95	0.49
1:C:41:GLU:HG3	1:C:45:LYS:HE2	1.96	0.48
1:A:296:PRO:HD2	9:A:606:HOH:O	2.13	0.48
1:B:237:PHE:HB3	1:B:248:ALA:HB3	1.96	0.48
1:D:237:PHE:HB3	1:D:248:ALA:HB3	1.95	0.47
1:D:30:ILE:CD1	1:D:53:ILE:HG13	2.44	0.47
1:A:295:MSE:HE1	8:A:512:EDO:H22	1.97	0.46
1:C:96:THR:HA	1:D:171:LYS:HD2	1.98	0.46
1:A:30:ILE:CD1	1:A:53:ILE:HG13	2.46	0.45
1:A:332:MSE:SE	1:A:339:ASN:HB3	2.67	0.45
1:A:49:THR:HA	8:A:510:EDO:H21	1.98	0.45
1:A:90:ILE:HG23	1:A:102:VAL:HG13	1.98	0.45
1:B:90:ILE:HG23	1:B:102:VAL:HG13	1.99	0.44
6:A:507:UNL:O6	6:A:507:UNL:O7	2.35	0.44
1:A:237:PHE:HB3	1:A:248:ALA:HB3	1.99	0.44
6:D:503:UNL:O1	6:D:503:UNL:O5	2.36	0.44
1:B:30:ILE:CD1	1:B:53:ILE:HG13	2.46	0.44
1:B:414:LYS:HB3	1:B:417:SER:OG	2.17	0.44
1:D:92:SER:HB3	1:D:140:MSE:HE3	2.00	0.43
1:C:400:LEU:O	1:C:404:ILE:HG12	2.18	0.43
1:C:219:ASP:O	1:C:223:ARG:HG2	2.19	0.43
1:B:400:LEU:O	1:B:404:ILE:HG12	2.19	0.43
1:D:348:ILE:HD11	1:D:403:GLU:HG2	2.01	0.43
1:A:400:LEU:O	1:A:404:ILE:HG12	2.18	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:74:TYR:CE1	1:C:100:PRO:HD2	2.53	0.43
1:D:348:ILE:HD11	1:D:403:GLU:CB	2.49	0.43
1:C:30:ILE:CD1	1:C:53:ILE:HG13	2.47	0.43
1:A:90:ILE:HD11	1:B:157:LEU:HD21	2.01	0.43
1:C:73:ASN:HB3	1:C:77:GLY:HA3	2.00	0.42
1:D:219:ASP:O	1:D:223:ARG:HG2	2.19	0.42
1:D:400:LEU:O	1:D:404:ILE:HG12	2.19	0.42
1:A:219:ASP:O	1:A:223:ARG:HG2	2.19	0.42
1:B:377:GLU:HG3	1:B:418:LEU:HD12	2.01	0.42
1:B:348:ILE:HD11	1:B:403:GLU:HG2	2.00	0.42
1:A:73:ASN:HB3	1:A:77:GLY:HA3	2.01	0.42
1:B:219:ASP:O	1:B:223:ARG:HG2	2.19	0.42
1:B:348:ILE:HD11	1:B:403:GLU:CB	2.49	0.42
1:A:164:GLY:HA2	4:A:503:COA:H1B	2.01	0.42
1:C:332:MSE:SE	1:C:339:ASN:HB3	2.70	0.41
1:C:90:ILE:HG23	1:C:102:VAL:HG13	2.02	0.41
1:D:73:ASN:HB3	1:D:77:GLY:HA3	2.01	0.41
3:B:502:AMP:O2P	6:B:503:UNL:O2	2.38	0.41
1:C:377:GLU:HG3	1:C:418:LEU:HD12	2.02	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	435/436 (100%)	418 (96%)	16 (4%)	1 (0%)	47 55
1	B	426/436 (98%)	411 (96%)	14 (3%)	1 (0%)	47 55
1	C	435/436 (100%)	414 (95%)	19 (4%)	2 (0%)	29 31
1	D	426/436 (98%)	408 (96%)	17 (4%)	1 (0%)	47 55
All	All	1722/1744 (99%)	1651 (96%)	66 (4%)	5 (0%)	41 46

All (5) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	243	ASN
1	B	243	ASN
1	C	243	ASN
1	D	243	ASN
1	C	383	THR

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	377/370 (102%)	374 (99%)	3 (1%)	81	90
1	B	363/370 (98%)	360 (99%)	3 (1%)	81	90
1	C	371/370 (100%)	366 (99%)	5 (1%)	69	81
1	D	361/370 (98%)	359 (99%)	2 (1%)	86	93
All	All	1472/1480 (100%)	1459 (99%)	13 (1%)	78	88

All (13) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	165	ASN
1	A	259	PHE
1	A	269	ILE
1	B	99	ASN
1	B	249	PHE
1	B	259	PHE
1	C	165	ASN
1	C	249	PHE
1	C	259	PHE
1	C	269	ILE
1	C	272	GLU
1	D	249	PHE
1	D	259	PHE

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (2) such

sidechains are listed below:

Mol	Chain	Res	Type
1	A	369	GLN
1	C	369	GLN

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](#)

Of 36 ligands modelled in this entry, 10 are monoatomic and 4 are unknown - leaving 22 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$
7	SO4	A	508	-	4,4,4	0.17	0	6,6,6	0.20	0
8	EDO	D	505	-	3,3,3	0.60	0	2,2,2	0.26	0
8	EDO	B	505	-	3,3,3	0.55	0	2,2,2	0.34	0
8	EDO	A	514	-	3,3,3	0.56	0	2,2,2	0.35	0
8	EDO	A	511	-	3,3,3	0.56	0	2,2,2	0.35	0
7	SO4	A	509	-	4,4,4	0.15	0	6,6,6	0.05	0
3	AMP	D	502	-	22,25,25	0.57	0	25,38,38	0.76	1 (4%)
8	EDO	C	510	-	3,3,3	0.59	0	2,2,2	0.27	0
8	EDO	A	513	-	3,3,3	0.67	0	2,2,2	0.20	0
3	AMP	B	502	-	22,25,25	0.60	0	25,38,38	0.81	2 (8%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
8	EDO	A	512	-	3,3,3	0.45	0	2,2,2	0.33	0
3	AMP	C	502	5	22,25,25	0.57	0	25,38,38	0.76	1 (4%)
7	SO4	C	508	-	4,4,4	0.14	0	6,6,6	0.07	0
8	EDO	D	506	-	3,3,3	0.57	0	2,2,2	0.33	0
4	COA	A	503	-	28,33,50	0.73	0	35,52,75	1.45	7 (20%)
7	SO4	D	504	-	4,4,4	0.13	0	6,6,6	0.11	0
8	EDO	A	510	-	3,3,3	0.59	0	2,2,2	0.18	0
4	COA	C	503	-	28,33,50	0.82	2 (7%)	35,52,75	1.36	8 (22%)
8	EDO	C	509	-	3,3,3	0.55	0	2,2,2	0.35	0
8	EDO	C	511	-	3,3,3	0.61	0	2,2,2	0.26	0
7	SO4	B	504	-	4,4,4	0.16	0	6,6,6	0.11	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
8	EDO	A	510	-	-	0/1/1/1	-
8	EDO	A	512	-	-	0/1/1/1	-
8	EDO	D	505	-	-	0/1/1/1	-
3	AMP	C	502	5	-	0/6/26/26	0/3/3/3
4	COA	C	503	-	-	4/17/37/64	0/3/3/3
8	EDO	A	513	-	-	0/1/1/1	-
8	EDO	B	505	-	-	0/1/1/1	-
8	EDO	C	509	-	-	0/1/1/1	-
8	EDO	C	511	-	-	0/1/1/1	-
8	EDO	D	506	-	-	0/1/1/1	-
4	COA	A	503	-	-	4/17/37/64	0/3/3/3
3	AMP	D	502	-	-	0/6/26/26	0/3/3/3
8	EDO	A	514	-	-	0/1/1/1	-
8	EDO	A	511	-	-	0/1/1/1	-
8	EDO	C	510	-	-	0/1/1/1	-
3	AMP	B	502	-	-	1/6/26/26	0/3/3/3

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	C	503	COA	P3B-O3B	2.29	1.63	1.59
4	C	503	COA	P2A-O6A	2.11	1.63	1.54

All (19) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	A	503	COA	O6A-P2A-O3A	4.29	119.02	104.64
4	C	503	COA	O6A-P2A-O3A	3.77	117.27	104.64
4	A	503	COA	O5A-P2A-O4A	3.05	122.64	110.68
4	C	503	COA	O5A-P2A-O4A	2.79	121.60	110.68
4	A	503	COA	O6A-P2A-O5A	-2.51	98.03	107.64
4	C	503	COA	O6A-P2A-O5A	-2.46	98.22	107.64
3	D	502	AMP	C5-C6-N6	2.43	124.05	120.35
4	A	503	COA	C5A-C6A-N6A	2.37	123.96	120.35
3	C	502	AMP	C5-C6-N6	2.35	123.92	120.35
4	A	503	COA	O3A-P2A-O4A	-2.33	98.28	111.19
4	C	503	COA	O2A-P1A-O1A	2.31	123.65	112.24
3	B	502	AMP	C5-C6-N6	2.29	123.83	120.35
4	A	503	COA	O2A-P1A-O1A	2.26	123.41	112.24
4	C	503	COA	C5A-C6A-N6A	2.17	123.66	120.35
4	C	503	COA	O3A-P2A-O4A	-2.14	99.30	111.19
4	A	503	COA	P1A-O3A-P2A	-2.11	125.57	132.83
4	C	503	COA	P1A-O3A-P2A	-2.09	125.64	132.83
3	B	502	AMP	P-O5'-C5'	2.05	123.93	118.30
4	C	503	COA	O3B-P3B-O7A	2.04	117.25	109.39

There are no chirality outliers.

All (9) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	A	503	COA	C5B-O5B-P1A-O1A
4	A	503	COA	C5B-O5B-P1A-O2A
4	A	503	COA	C5B-O5B-P1A-O3A
4	C	503	COA	C5B-O5B-P1A-O1A
4	C	503	COA	C5B-O5B-P1A-O2A
4	C	503	COA	C5B-O5B-P1A-O3A
3	B	502	AMP	C5'-O5'-P-O3P
4	A	503	COA	P2A-O3A-P1A-O2A
4	C	503	COA	P2A-O3A-P1A-O2A

There are no ring outliers.

6 monomers are involved in 10 short contacts:

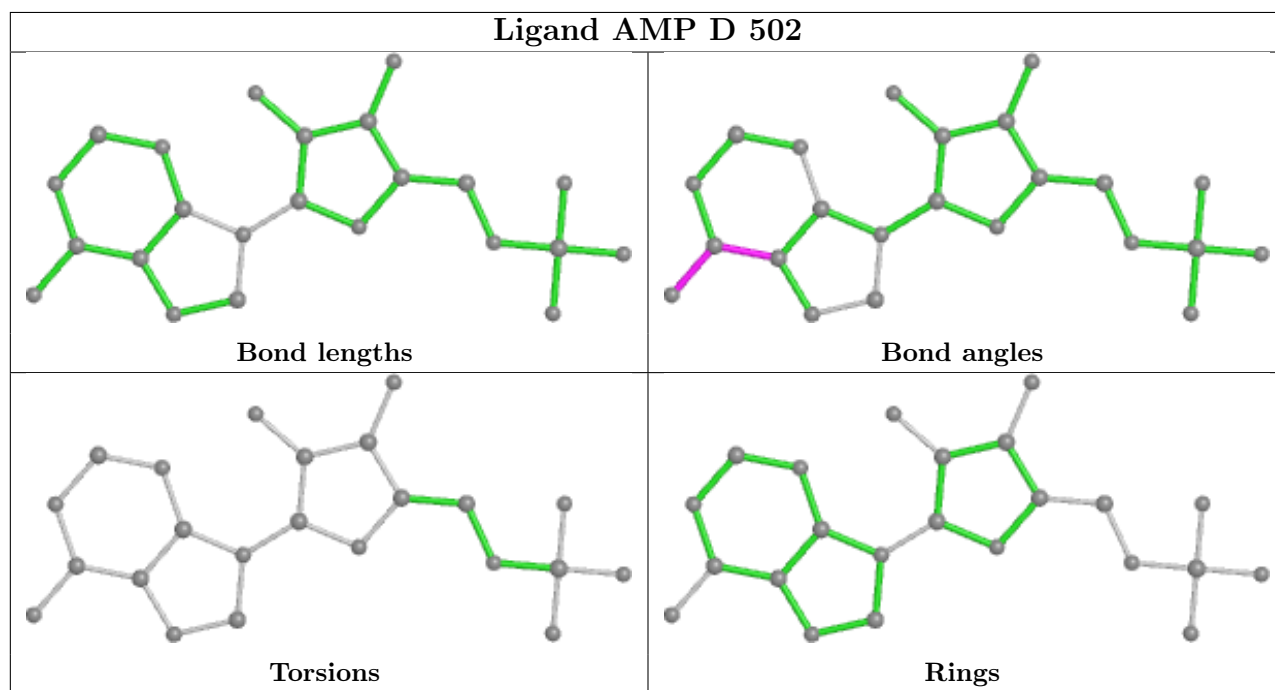
Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	D	502	AMP	2	0
3	B	502	AMP	2	0

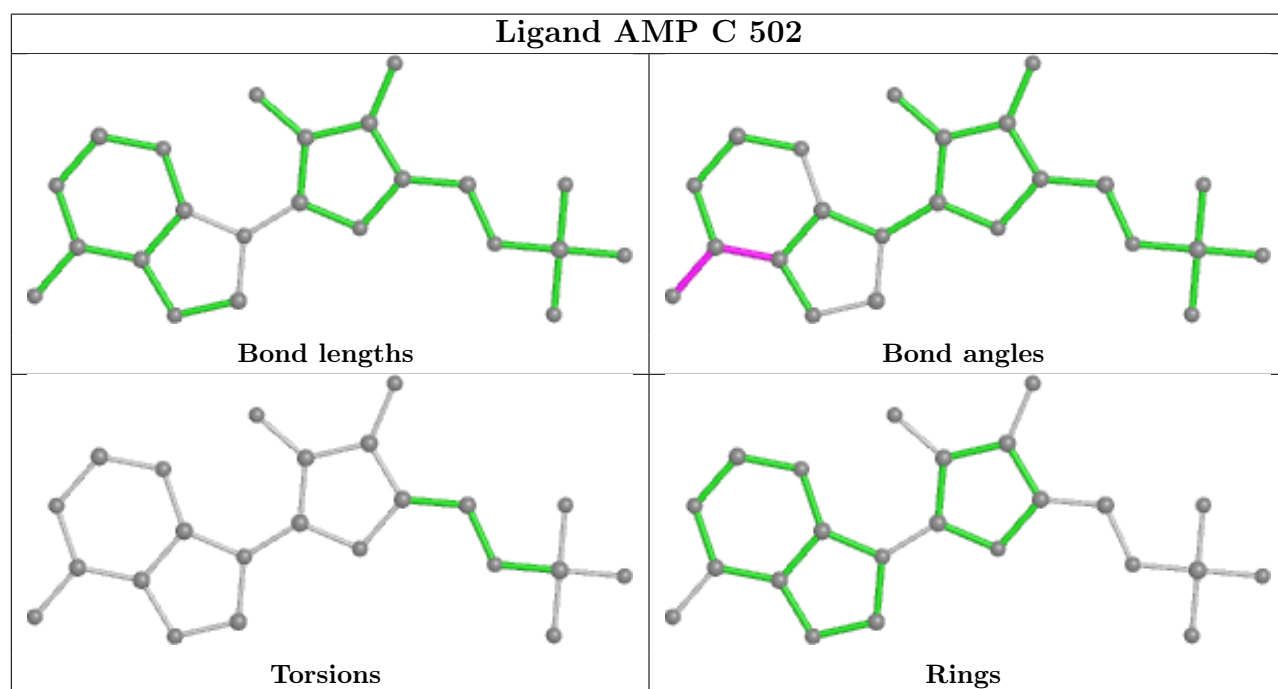
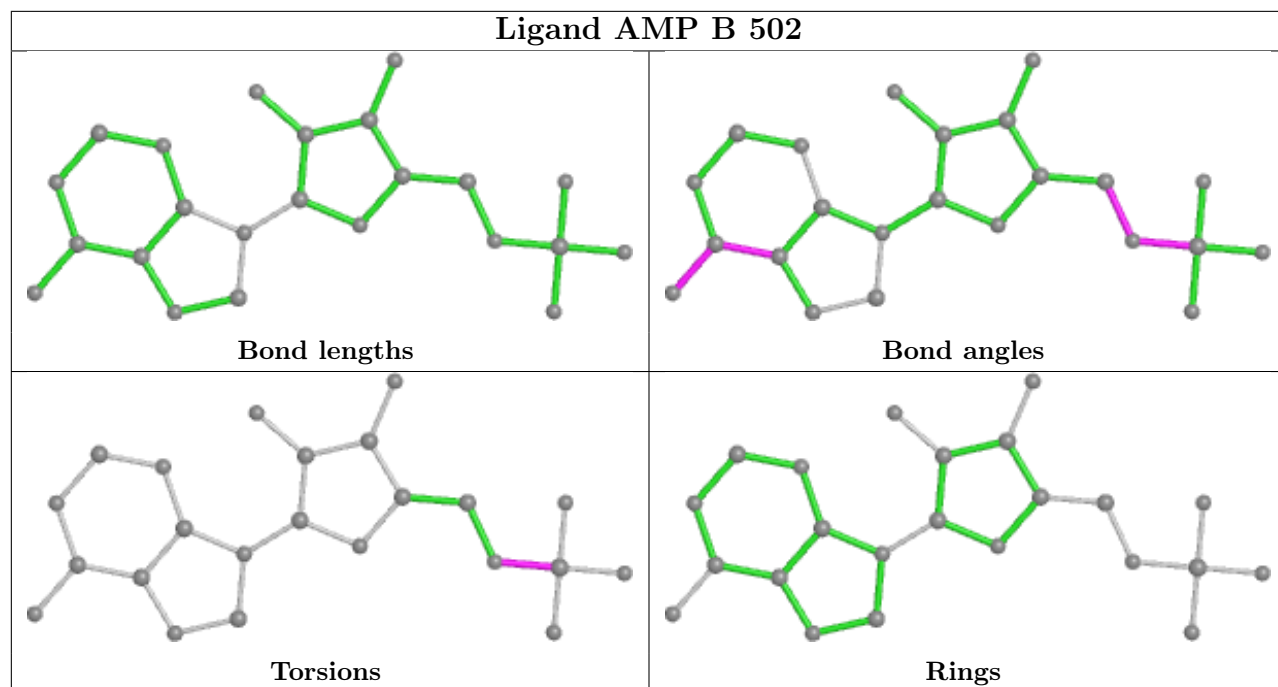
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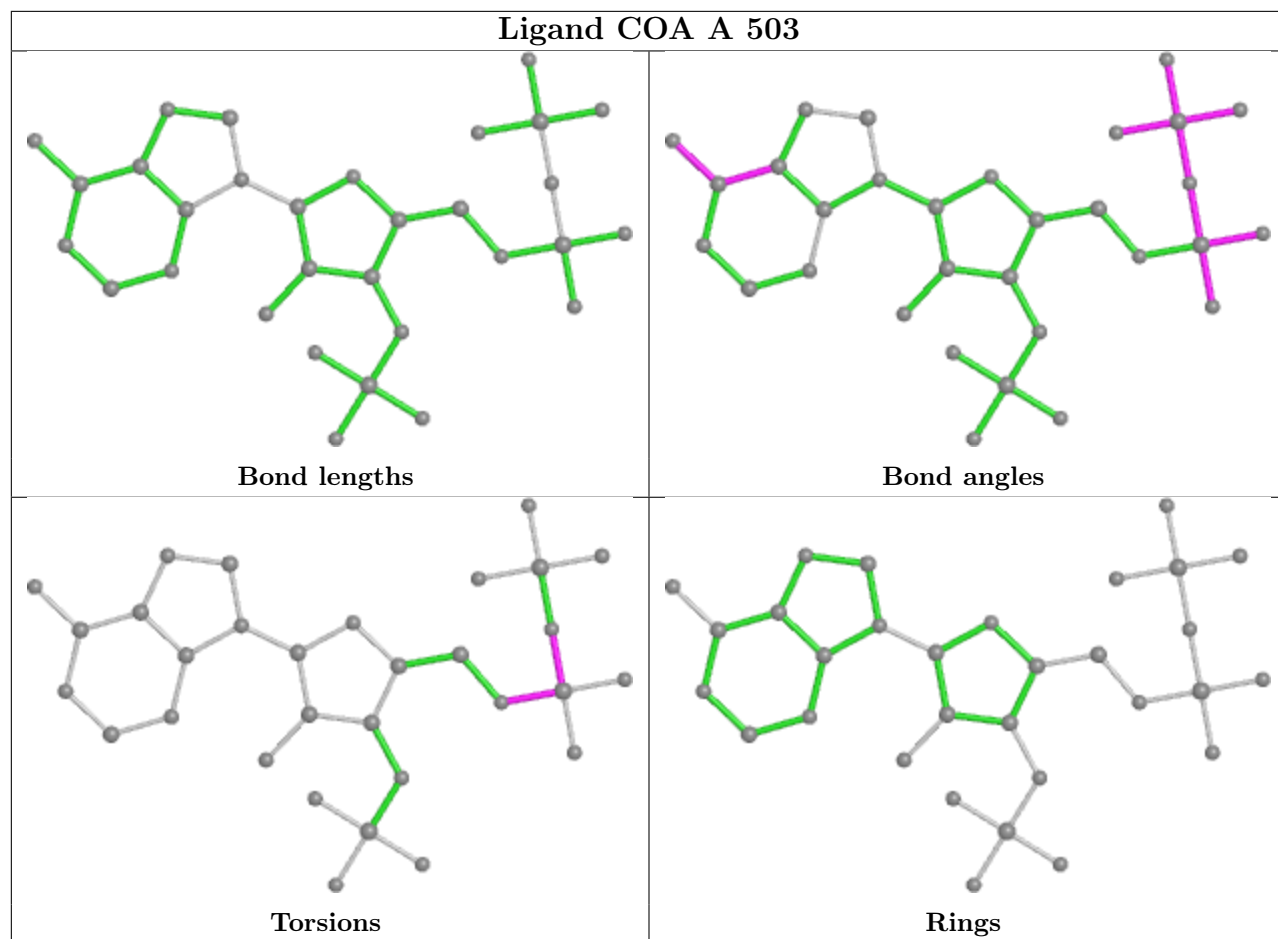
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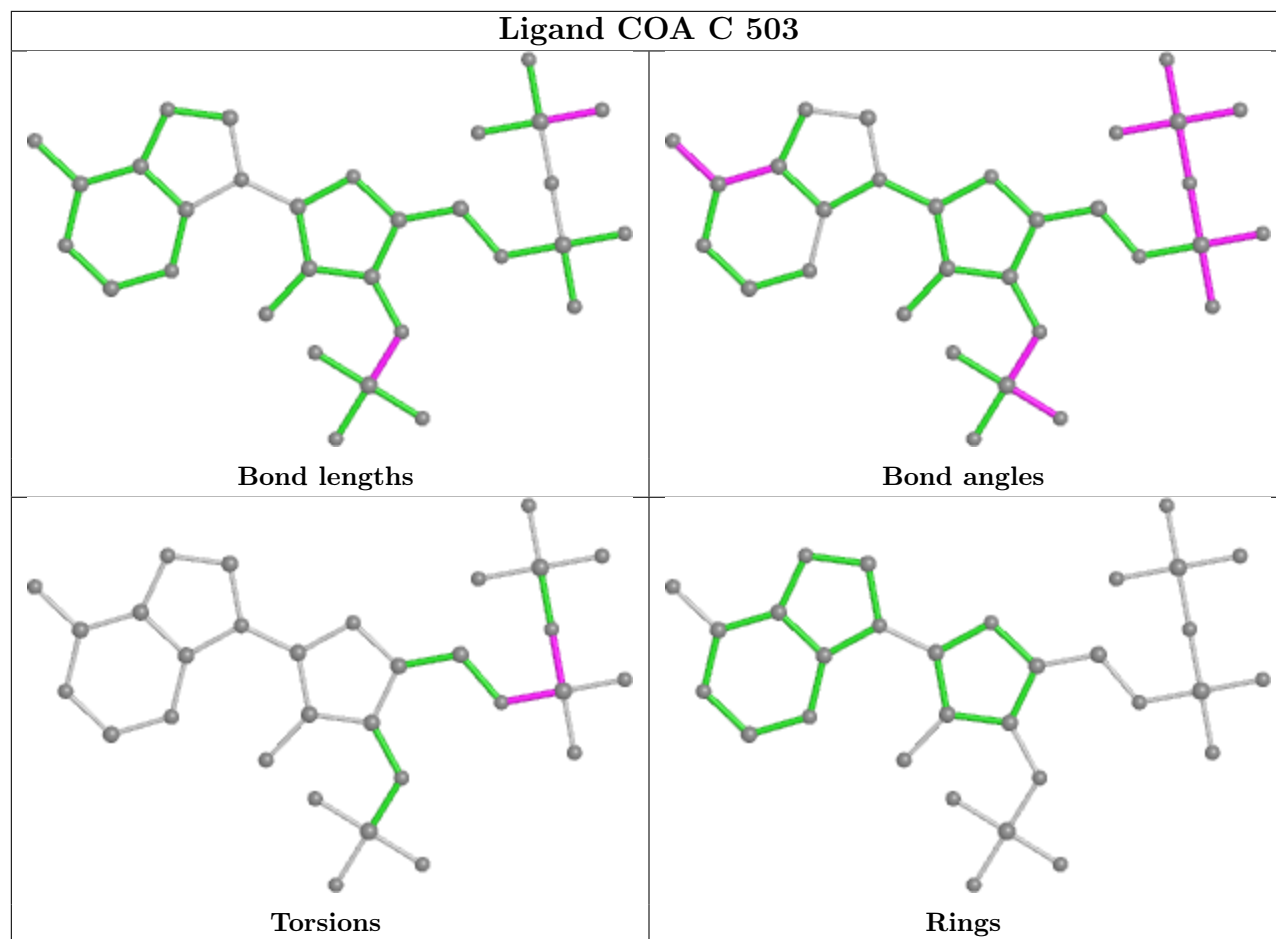
Mol	Chain	Res	Type	Clashes	Symm-Clashes
8	A	512	EDO	1	0
3	C	502	AMP	3	0
4	A	503	COA	1	0
8	A	510	EDO	1	0

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	418/436 (95%)	-0.14	12 (2%) 51 49	28, 47, 83, 133	0
1	B	410/436 (94%)	0.43	46 (11%) 5 4	32, 57, 107, 133	0
1	C	419/436 (96%)	0.08	15 (3%) 42 41	33, 58, 95, 114	0
1	D	412/436 (94%)	0.16	23 (5%) 24 23	30, 51, 92, 119	0
All	All	1659/1744 (95%)	0.13	96 (5%) 23 22	28, 54, 98, 133	0

All (96) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	421	SER	8.4
1	D	405	LEU	5.6
1	B	400	LEU	5.6
1	A	426	VAL	5.5
1	D	338	VAL	5.4
1	B	334	ILE	5.3
1	B	431	LEU	5.3
1	C	53	ILE	4.7
1	B	363	LEU	4.7
1	B	340	ILE	4.7
1	B	338	VAL	4.6
1	B	396	ILE	4.5
1	B	398[A]	ARG	4.4
1	B	335	ILE	4.3
1	B	402	ASP	4.3
1	B	364	GLU	4.2
1	B	365	THR	4.2
1	B	392	ILE	4.0
1	B	389	LEU	4.0
1	B	333	PHE	4.0
1	B	370	ASP	4.0

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Mol	Chain	Res	Type	RSRZ
1	B	371	GLU	4.0
1	C	382	SER	3.9
1	B	94	SER	3.9
1	B	405	LEU	3.8
1	D	378	LEU	3.8
1	B	410	VAL	3.7
1	D	335	ILE	3.7
1	C	0	GLY	3.6
1	B	407	THR	3.6
1	B	411	LYS	3.6
1	C	383	THR	3.5
1	B	430	ASP	3.5
1	B	404	ILE	3.5
1	A	419	PRO	3.4
1	D	373	ILE	3.3
1	D	400	LEU	3.3
1	B	337	GLY	3.3
1	A	422	GLU	3.3
1	B	408	PRO	3.2
1	D	382	SER	3.1
1	D	355	LEU	3.1
1	B	352	PHE	3.1
1	D	363	LEU	3.1
1	B	336	LYS	3.1
1	C	418	LEU	3.0
1	C	423	GLY	3.0
1	C	421	SER	3.0
1	D	402	ASP	2.9
1	B	381	LEU	2.9
1	B	50	GLY	2.9
1	B	380	ASP	2.9
1	A	383	THR	2.8
1	D	431	LEU	2.8
1	A	368	ASN	2.8
1	B	378	LEU	2.7
1	A	434	ASN	2.7
1	B	384	ASP	2.7
1	C	426	VAL	2.7
1	A	350	VAL	2.6
1	C	310	PRO	2.6
1	B	421	SER	2.6
1	D	380	ASP	2.6

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Mol	Chain	Res	Type	RSRZ
1	D	337	GLY	2.5
1	B	419	PRO	2.5
1	D	407	THR	2.5
1	D	334	ILE	2.5
1	A	384	ASP	2.5
1	A	387	ILE	2.5
1	C	420	GLN	2.4
1	D	404	ILE	2.4
1	D	406	VAL	2.4
1	B	351[A]	GLN	2.4
1	D	394	ARG	2.4
1	B	386	TYR	2.3
1	B	426	VAL	2.3
1	D	401	LYS	2.3
1	B	432	ARG	2.3
1	C	48	ILE	2.3
1	B	97	THR	2.2
1	B	353	PRO	2.2
1	A	382	SER	2.2
1	D	356	GLY	2.2
1	B	376	VAL	2.2
1	A	0	GLY	2.2
1	C	311	GLY	2.2
1	D	398	ARG	2.2
1	C	381	LEU	2.2
1	C	278	PRO	2.1
1	B	382	SER	2.1
1	B	414	LYS	2.1
1	B	355	LEU	2.0
1	D	365	THR	2.0
1	C	422	GLU	2.0
1	B	413	VAL	2.0
1	D	384	ASP	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](#)

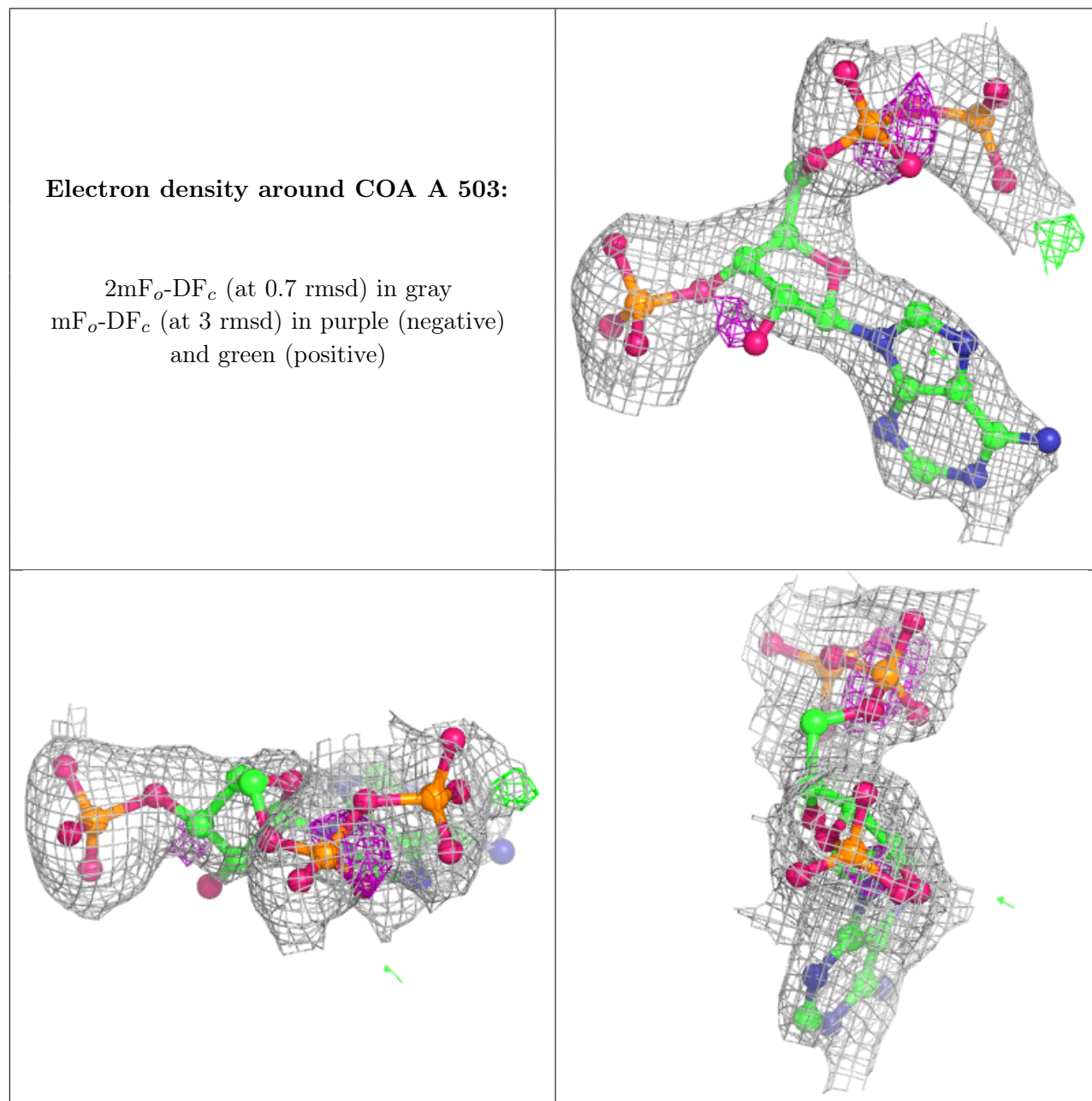
There are no monosaccharides in this entry.

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.

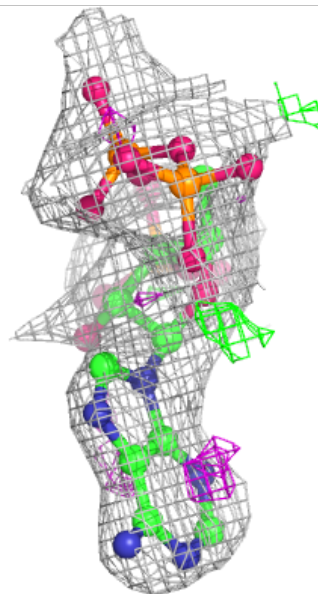
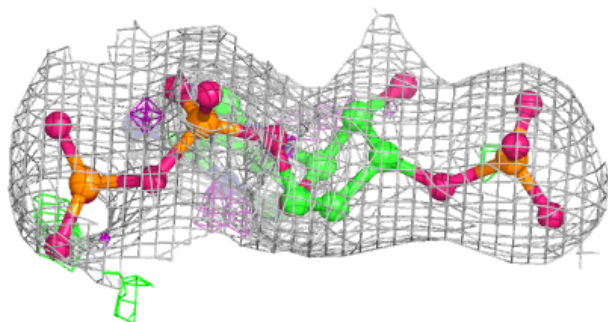
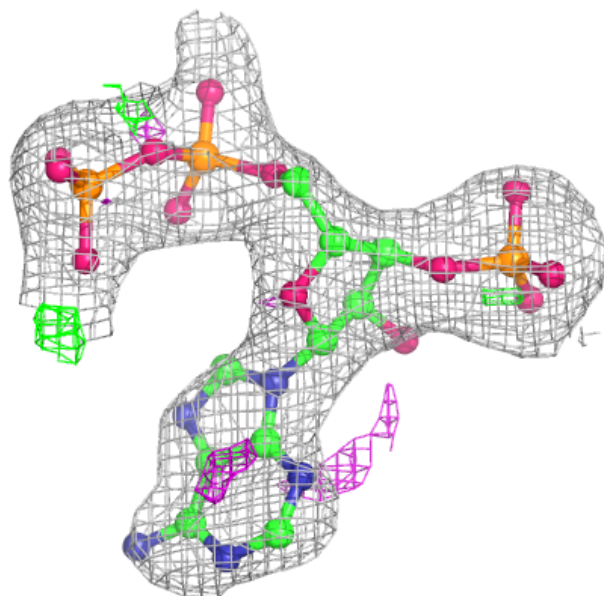
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
8	EDO	A	510	4/4	0.72	0.27	54,55,55,55	0
8	EDO	C	511	4/4	0.74	0.22	51,52,53,54	0
8	EDO	B	505	4/4	0.75	0.26	78,78,78,79	0
8	EDO	C	510	4/4	0.77	0.23	68,68,69,69	0
8	EDO	D	505	4/4	0.77	0.23	76,77,78,78	0
8	EDO	A	514	4/4	0.78	0.20	74,74,74,75	0
6	UNL	A	507	10/-	0.81	0.25	26,36,54,56	0
7	SO4	A	509	5/5	0.83	0.11	127,127,127,127	0
6	UNL	B	503	9/-	0.83	0.47	40,42,59,60	0
8	EDO	C	509	4/4	0.83	0.21	69,69,70,70	0
4	COA	A	503	31/48	0.84	0.18	82,90,109,110	0
8	EDO	D	506	4/4	0.84	0.20	55,56,57,58	0
7	SO4	C	508	5/5	0.85	0.18	114,114,114,114	0
6	UNL	D	503	7/-	0.85	0.34	32,43,56,62	0
6	UNL	C	507	6/-	0.85	0.30	34,42,56,71	0
8	EDO	A	512	4/4	0.89	0.24	60,60,61,61	0
4	COA	C	503	31/48	0.90	0.14	71,76,90,90	0
8	EDO	A	511	4/4	0.90	0.22	73,73,74,75	0
7	SO4	B	504	5/5	0.93	0.13	103,103,103,104	0
7	SO4	D	504	5/5	0.94	0.11	86,86,87,87	0
2	ZN	C	501	1/1	0.95	0.05	57,57,57,57	0
8	EDO	A	513	4/4	0.95	0.14	38,39,39,40	0
5	K	A	505	1/1	0.95	0.08	43,43,43,43	0
5	K	C	506	1/1	0.96	0.07	38,38,38,38	0
2	ZN	B	501	1/1	0.96	0.07	47,47,47,47	0
3	AMP	B	502	23/23	0.96	0.10	45,48,49,50	0
3	AMP	D	502	23/23	0.96	0.09	35,39,52,55	0
3	AMP	C	502	23/23	0.97	0.11	39,42,43,45	0
3	AMP	A	502[A]	23/23	0.98	0.09	29,32,34,36	0
5	K	C	504	1/1	0.98	0.07	44,44,44,44	0
5	K	C	505	1/1	0.98	0.09	37,37,37,37	0
2	ZN	D	501	1/1	0.98	0.07	48,48,48,48	0
7	SO4	A	508	5/5	0.98	0.07	51,51,53,54	0
5	K	A	506	1/1	0.99	0.06	30,30,30,30	0
5	K	A	504	1/1	0.99	0.06	38,38,38,38	0
2	ZN	A	501	1/1	0.99	0.08	43,43,43,43	0

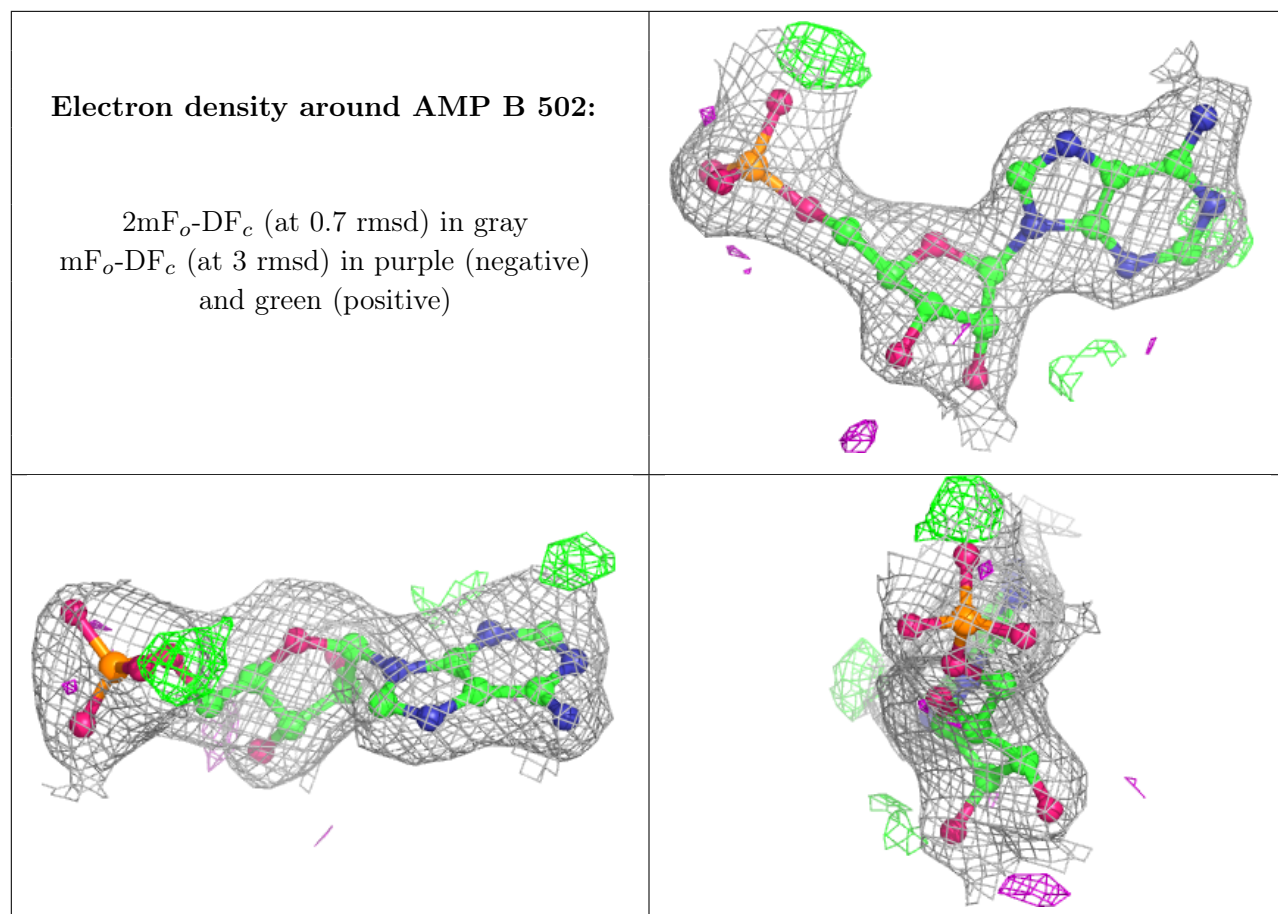
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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



Electron density around COA C 503:

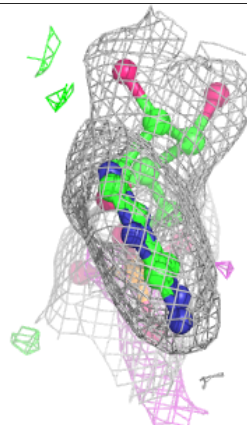
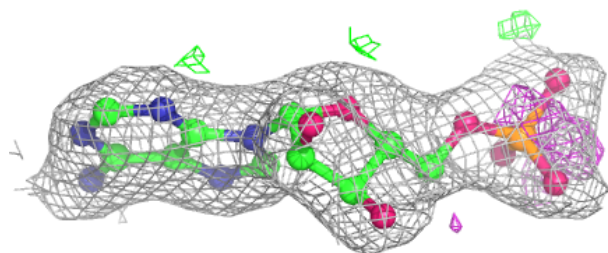
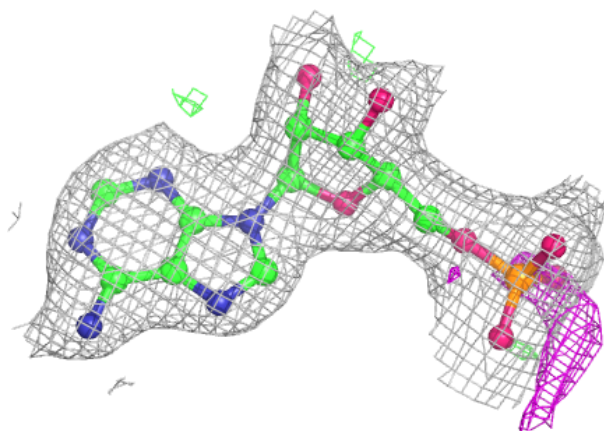
$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



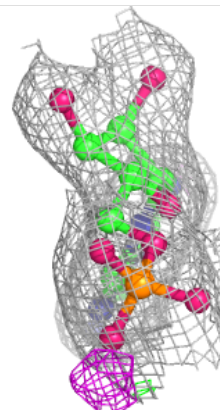
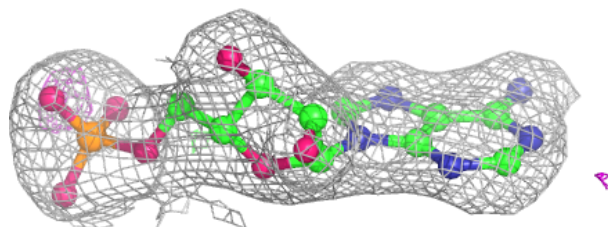
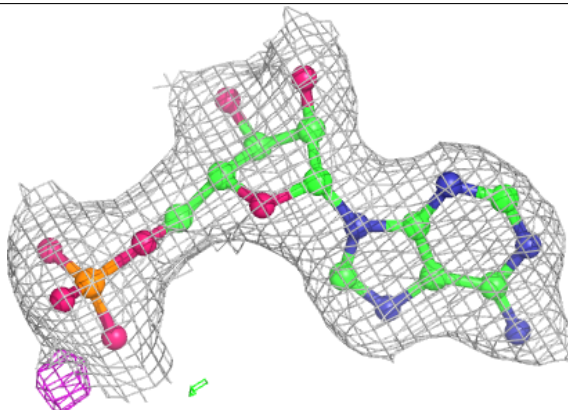


Electron density around AMP D 502:

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

**Electron density around AMP C 502:**

$2mF_o-DF_c$ (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.