



Full wwPDB X-ray Structure Validation Report ⓘ

Nov 30, 2023 – 04:08 PM EST

PDB ID : 8V4O
Title : Crystal structure of Acetyl-CoA synthetase 2 in complex with AMP from *Candida albicans*
Authors : Seattle Structural Genomics Center for Infectious Disease; Seattle Structural Genomics Center for Infectious Disease (SSGCID)
Deposited on : 2023-11-29
Resolution : 2.70 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 : 2.36
buster-report : 1.1.7 (2018)
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac : 5.8.0158
CCP4 : 7.0.044 (Gargrove)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.36

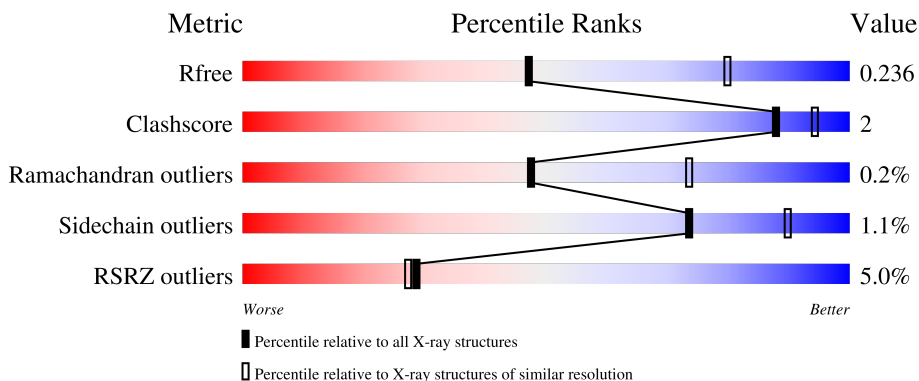
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.70 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	2808 (2.70-2.70)
Clashscore	141614	3122 (2.70-2.70)
Ramachandran outliers	138981	3069 (2.70-2.70)
Sidechain outliers	138945	3069 (2.70-2.70)
RSRZ outliers	127900	2737 (2.70-2.70)

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	686	 91% 5%
1	B	686	 9% 86% 6% 8%
1	C	686	 4% 72% 24%

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
4	AMP	B	707	-	-	-	X

2 Entry composition

There are 5 unique types of molecules in this entry. The entry contains 14259 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 Acetyl-coenzyme A synthetase 2.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	660	5085	3244	865	962	14	0	0	0
1	B	628	4837	3098	815	911	13	0	0	0
1	C	523	4038	2595	668	762	13	0	0	0

There are 51 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	1	MET	-	initiating methionine	UNP Q8NJN3
A	2	HIS	-	expression tag	UNP Q8NJN3
A	3	HIS	-	expression tag	UNP Q8NJN3
A	4	HIS	-	expression tag	UNP Q8NJN3
A	5	HIS	-	expression tag	UNP Q8NJN3
A	6	HIS	-	expression tag	UNP Q8NJN3
A	7	HIS	-	expression tag	UNP Q8NJN3
A	8	HIS	-	expression tag	UNP Q8NJN3
A	9	HIS	-	expression tag	UNP Q8NJN3
A	10	GLU	-	expression tag	UNP Q8NJN3
A	11	ASN	-	expression tag	UNP Q8NJN3
A	12	LEU	-	expression tag	UNP Q8NJN3
A	13	TYR	-	expression tag	UNP Q8NJN3
A	14	PHE	-	expression tag	UNP Q8NJN3
A	15	GLN	-	expression tag	UNP Q8NJN3
A	16	GLY	-	expression tag	UNP Q8NJN3
A	403	ALA	VAL	variant	UNP Q8NJN3
B	1	MET	-	initiating methionine	UNP Q8NJN3
B	2	HIS	-	expression tag	UNP Q8NJN3
B	3	HIS	-	expression tag	UNP Q8NJN3
B	4	HIS	-	expression tag	UNP Q8NJN3
B	5	HIS	-	expression tag	UNP Q8NJN3
B	6	HIS	-	expression tag	UNP Q8NJN3

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Chain	Residue	Modelled	Actual	Comment	Reference
B	7	HIS	-	expression tag	UNP Q8N3N3
B	8	HIS	-	expression tag	UNP Q8N3N3
B	9	HIS	-	expression tag	UNP Q8N3N3
B	10	GLU	-	expression tag	UNP Q8N3N3
B	11	ASN	-	expression tag	UNP Q8N3N3
B	12	LEU	-	expression tag	UNP Q8N3N3
B	13	TYR	-	expression tag	UNP Q8N3N3
B	14	PHE	-	expression tag	UNP Q8N3N3
B	15	GLN	-	expression tag	UNP Q8N3N3
B	16	GLY	-	expression tag	UNP Q8N3N3
B	403	ALA	VAL	variant	UNP Q8N3N3
C	1	MET	-	initiating methionine	UNP Q8N3N3
C	2	HIS	-	expression tag	UNP Q8N3N3
C	3	HIS	-	expression tag	UNP Q8N3N3
C	4	HIS	-	expression tag	UNP Q8N3N3
C	5	HIS	-	expression tag	UNP Q8N3N3
C	6	HIS	-	expression tag	UNP Q8N3N3
C	7	HIS	-	expression tag	UNP Q8N3N3
C	8	HIS	-	expression tag	UNP Q8N3N3
C	9	HIS	-	expression tag	UNP Q8N3N3
C	10	GLU	-	expression tag	UNP Q8N3N3
C	11	ASN	-	expression tag	UNP Q8N3N3
C	12	LEU	-	expression tag	UNP Q8N3N3
C	13	TYR	-	expression tag	UNP Q8N3N3
C	14	PHE	-	expression tag	UNP Q8N3N3
C	15	GLN	-	expression tag	UNP Q8N3N3
C	16	GLY	-	expression tag	UNP Q8N3N3
C	403	ALA	VAL	variant	UNP Q8N3N3

- Molecule 2 is SULFATE ION (three-letter code: SO4) (formula: O₄S).

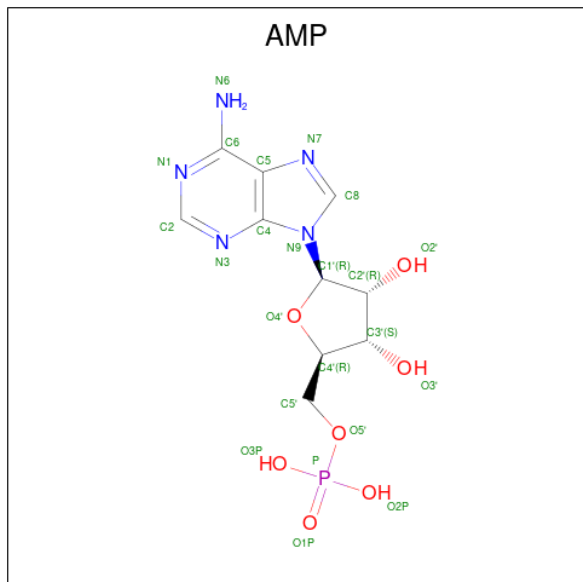


Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	A	1	Total O S 5 4 1	0	0
2	A	1	Total O S 5 4 1	0	0
2	A	1	Total O S 5 4 1	0	0
2	A	1	Total O S 5 4 1	0	0
2	A	1	Total O S 5 4 1	0	0
2	B	1	Total O S 5 4 1	0	0
2	B	1	Total O S 5 4 1	0	0
2	B	1	Total O S 5 4 1	0	0
2	B	1	Total O S 5 4 1	0	0
2	B	1	Total O S 5 4 1	0	0

- Molecule 3 is CHLORIDE ION (three-letter code: CL) (formula: Cl).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	2	Total Cl 2 2	0	0
3	B	1	Total Cl 1 1	0	0

- Molecule 4 is ADENOSINE MONOPHOSPHATE (three-letter code: AMP) (formula: $C_{10}H_{14}N_5O_7P$) (labeled as "Ligand of Interest" by depositor).



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


- Molecule 5 is water.

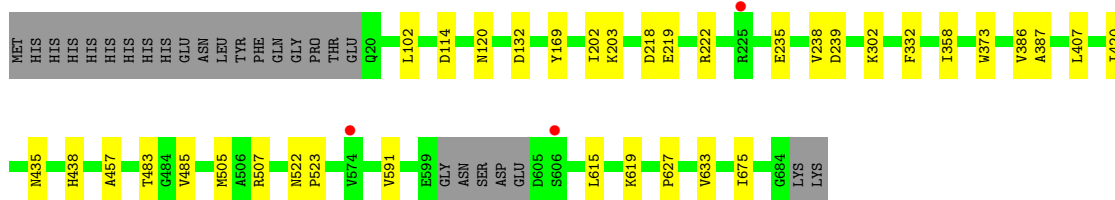
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	90	Total 90	O 90	0	0
5	B	70	Total 70	O 70	0	0
5	C	17	Total 17	O 17	0	0

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.

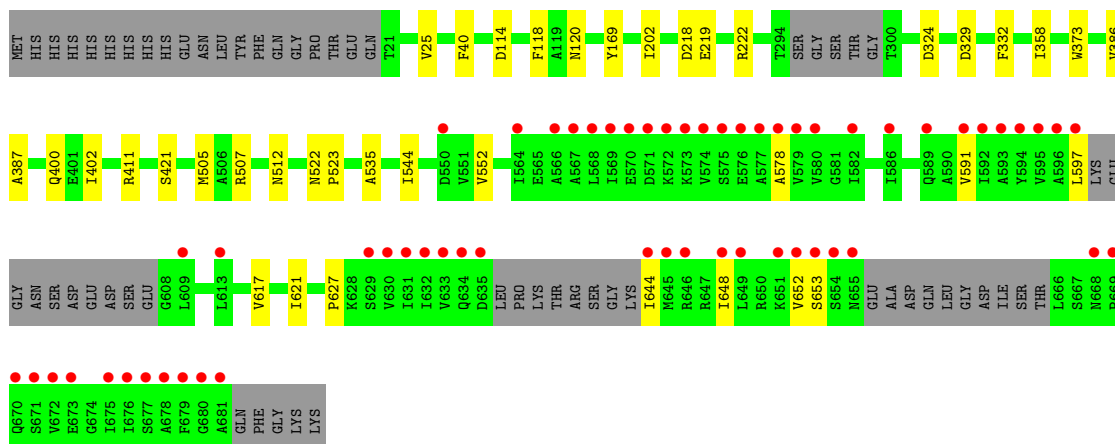
- Molecule 1: Acetyl-coenzyme A synthetase 2

Chain A: 



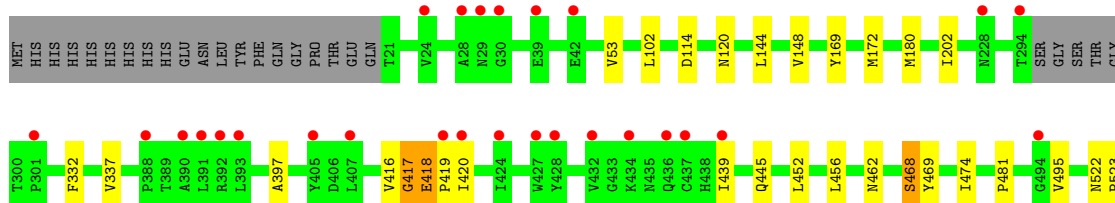
- Molecule 1: Acetyl-coenzyme A synthetase 2

Chain B: 



- Molecule 1: Acetyl-coenzyme A synthetase 2

Chain C: 



4 Data and refinement statistics

Property	Value	Source
Space group	P 61 2 2	Depositor
Cell constants a, b, c, α , β , γ	139.46Å 139.46Å 544.99Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	49.68 – 2.70 49.68 – 2.70	Depositor EDS
% Data completeness (in resolution range)	100.0 (49.68-2.70) 100.0 (49.68-2.70)	Depositor EDS
R_{merge}	0.18	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.92 (at 2.69Å)	Xtrriage
Refinement program	PHENIX 1.21rc1_5162	Depositor
R, R_{free}	0.215 , 0.240 0.213 , 0.236	Depositor DCC
R_{free} test set	4340 reflections (4.98%)	wwPDB-VP
Wilson B-factor (Å ²)	61.9	Xtrriage
Anisotropy	0.458	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.31 , 39.9	EDS
L-test for twinning ²	$\langle L \rangle = 0.51$, $\langle L^2 \rangle = 0.34$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	14259	wwPDB-VP
Average B, all atoms (Å ²)	73.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 1.88% 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: AMP, CL, SO4

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	0.26	0/5214	0.48	0/7100
1	B	0.25	0/4961	0.48	0/6761
1	C	0.24	0/4157	0.45	0/5679
All	All	0.25	0/14332	0.47	0/19540

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	5085	0	4935	17	0
1	B	4837	0	4677	20	0
1	C	4038	0	3820	19	0
2	A	25	0	0	0	0
2	B	25	0	0	0	0
3	A	2	0	0	0	0
3	B	1	0	0	0	0
4	A	23	0	12	0	0
4	B	23	0	12	1	0
4	C	23	0	12	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
5	A	90	0	0	1	0
5	B	70	0	0	2	0
5	C	17	0	0	0	0
All	All	14259	0	13468	55	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 2.

All (55) 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:B:222:ARG:NH1	5:B:802:HOH:O	2.20	0.73
1:C:172:MET:SD	1:C:337:VAL:HG23	2.32	0.70
1:A:633:VAL:HG11	1:A:675:ILE:HD13	1.77	0.66
1:C:169:TYR:CZ	1:C:202:ILE:HD11	2.34	0.62
1:C:180:MET:CE	1:C:337:VAL:HG11	2.29	0.62
1:A:591:VAL:HG23	1:A:627:PRO:HA	1.84	0.60
1:B:591:VAL:HG23	1:B:627:PRO:HA	1.87	0.57
1:B:218:ASP:OD1	1:B:219:GLU:N	2.37	0.55
1:A:218:ASP:OD1	1:A:219:GLU:N	2.36	0.55
1:C:416:VAL:HG13	1:C:417:GLY:N	2.23	0.54
1:C:337:VAL:O	1:C:337:VAL:HG12	2.09	0.52
1:C:481:PRO:HG3	1:C:495:VAL:HG23	1.92	0.52
1:B:324:ASP:OD2	1:B:411:ARG:NH1	2.43	0.51
1:C:180:MET:SD	1:C:337:VAL:HG11	2.51	0.51
1:C:468:SER:OG	1:C:469:TYR:N	2.44	0.51
1:A:483:THR:OG1	1:A:485:VAL:HG22	2.10	0.50
1:A:102:LEU:HD22	1:B:118:PHE:CZ	2.47	0.50
1:B:40:PHE:CD2	1:B:411:ARG:HG2	2.47	0.49
1:B:597:LEU:O	5:B:801:HOH:O	2.20	0.48
1:B:169:TYR:CZ	1:B:202:ILE:HD11	2.50	0.47
1:C:416:VAL:HG13	1:C:417:GLY:H	1.80	0.46
1:A:222:ARG:NE	5:A:802:HOH:O	2.39	0.46
1:B:617:VAL:HG13	1:B:621:ILE:HD12	1.98	0.46
1:A:235:GLU:O	1:A:238:VAL:HG12	2.16	0.45
1:B:25:VAL:HG22	1:B:535:ALA:HB1	1.99	0.45
1:B:648:ILE:O	1:B:652:VAL:HG23	2.17	0.45
1:B:329:ASP:OD1	1:B:411:ARG:NH2	2.50	0.45
1:B:522:ASN:N	1:B:523:PRO:CD	2.81	0.44
1:B:552:VAL:HG11	1:B:591:VAL:CG1	2.47	0.44
1:C:53:VAL:O	1:C:53:VAL:HG22	2.17	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:420:ILE:O	1:C:420:ILE:HG23	2.18	0.44
1:A:169:TYR:CZ	1:A:202:ILE:HD11	2.53	0.43
1:C:144:LEU:O	1:C:148:VAL:HG23	2.19	0.43
1:A:420:ILE:O	1:A:420:ILE:HG23	2.18	0.43
1:A:505:MET:O	1:A:507:ARG:NH1	2.52	0.43
1:B:332:PHE:HB2	1:B:358:ILE:HD12	2.00	0.43
1:B:505:MET:O	1:B:507:ARG:NH1	2.52	0.42
1:A:203:LYS:NZ	1:A:239:ASP:OD2	2.52	0.42
1:A:332:PHE:HB2	1:A:358:ILE:HD12	2.01	0.42
1:B:544:ILE:HG21	4:B:707:AMP:C2	2.54	0.42
1:C:418:GLU:CB	1:C:419:PRO:CD	2.97	0.42
1:C:439:ILE:O	1:C:462:ASN:ND2	2.47	0.42
1:A:438:HIS:CD2	1:A:457:ALA:HA	2.54	0.42
1:B:386:VAL:HG22	1:B:387:ALA:N	2.34	0.42
1:C:456:LEU:HD12	1:C:456:LEU:N	2.35	0.42
1:A:522:ASN:N	1:A:523:PRO:CD	2.82	0.42
1:C:102:LEU:N	1:C:102:LEU:HD12	2.35	0.42
1:B:578:ALA:HB2	1:B:644:ILE:HD13	2.01	0.41
1:C:452:LEU:HD23	1:C:474:ILE:HG12	2.01	0.41
1:A:386:VAL:HG22	1:A:387:ALA:N	2.36	0.41
1:A:373:TRP:HB3	1:A:407:LEU:HD21	2.02	0.41
1:C:522:ASN:N	1:C:523:PRO:CD	2.83	0.41
1:A:615:LEU:HG	1:A:619:LYS:HE3	2.02	0.41
1:C:474:ILE:HD12	1:C:474:ILE:N	2.36	0.41
1:B:373:TRP:NE1	1:B:402:ILE:HG12	2.36	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	656/686 (96%)	637 (97%)	19 (3%)	0	100 100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	B	618/686 (90%)	597 (97%)	21 (3%)	0	100	100
1	C	519/686 (76%)	486 (94%)	30 (6%)	3 (1%)	25	50
All	All	1793/2058 (87%)	1720 (96%)	70 (4%)	3 (0%)	47	73

All (3) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	C	417	GLY
1	C	468	SER
1	C	397	ALA

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	532/568 (94%)	527 (99%)	5 (1%)	78	92
1	B	504/568 (89%)	498 (99%)	6 (1%)	71	88
1	C	415/568 (73%)	410 (99%)	5 (1%)	71	88
All	All	1451/1704 (85%)	1435 (99%)	16 (1%)	73	90

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

Mol	Chain	Res	Type
1	A	114	ASP
1	A	120	ASN
1	A	132	ASP
1	A	302	LYS
1	A	435	ASN
1	B	114	ASP
1	B	120	ASN
1	B	400	GLN
1	B	421	SER
1	B	512	ASN
1	B	653	SER

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Mol	Chain	Res	Type
1	C	114	ASP
1	C	120	ASN
1	C	332	PHE
1	C	418	GLU
1	C	445	GLN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. There are no such sidechains identified.

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains [i](#)

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

5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 16 ligands modelled in this entry, 3 are monoatomic - leaving 13 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	$\# Z > 2$
2	SO4	B	704	-	4,4,4	0.65	0	6,6,6	0.09	0
2	SO4	B	703	-	4,4,4	0.60	0	6,6,6	0.04	0
4	AMP	B	707	-	22,25,25	0.89	1 (4%)	25,38,38	1.22	2 (8%)
2	SO4	A	701	-	4,4,4	0.62	0	6,6,6	0.06	0
4	AMP	C	701	-	22,25,25	0.87	1 (4%)	25,38,38	1.26	2 (8%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
2	SO4	A	702	-	4,4,4	0.64	0	6,6,6	0.05	0
2	SO4	A	703	-	4,4,4	0.64	0	6,6,6	0.06	0
2	SO4	B	701	-	4,4,4	0.60	0	6,6,6	0.06	0
2	SO4	B	702	-	4,4,4	0.63	0	6,6,6	0.09	0
2	SO4	A	704	-	4,4,4	0.61	0	6,6,6	0.12	0
2	SO4	A	705	-	4,4,4	0.61	0	6,6,6	0.10	0
4	AMP	A	708	-	22,25,25	0.88	1 (4%)	25,38,38	1.26	2 (8%)
2	SO4	B	705	-	4,4,4	0.63	0	6,6,6	0.09	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	AMP	B	707	-	-	1/6/26/26	0/3/3/3
4	AMP	C	701	-	-	5/6/26/26	0/3/3/3
4	AMP	A	708	-	-	5/6/26/26	0/3/3/3

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	C	701	AMP	C5-C4	2.48	1.47	1.40
4	B	707	AMP	C5-C4	2.47	1.47	1.40
4	A	708	AMP	C5-C4	2.37	1.47	1.40

All (6) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	A	708	AMP	N3-C2-N1	-3.70	122.90	128.68
4	C	701	AMP	N3-C2-N1	-3.43	123.31	128.68
4	B	707	AMP	N3-C2-N1	-3.41	123.35	128.68
4	A	708	AMP	C4-C5-N7	-2.91	106.37	109.40
4	C	701	AMP	C4-C5-N7	-2.86	106.42	109.40
4	B	707	AMP	C4-C5-N7	-2.71	106.57	109.40

There are no chirality outliers.

All (11) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	A	708	AMP	C5'-O5'-P-O2P

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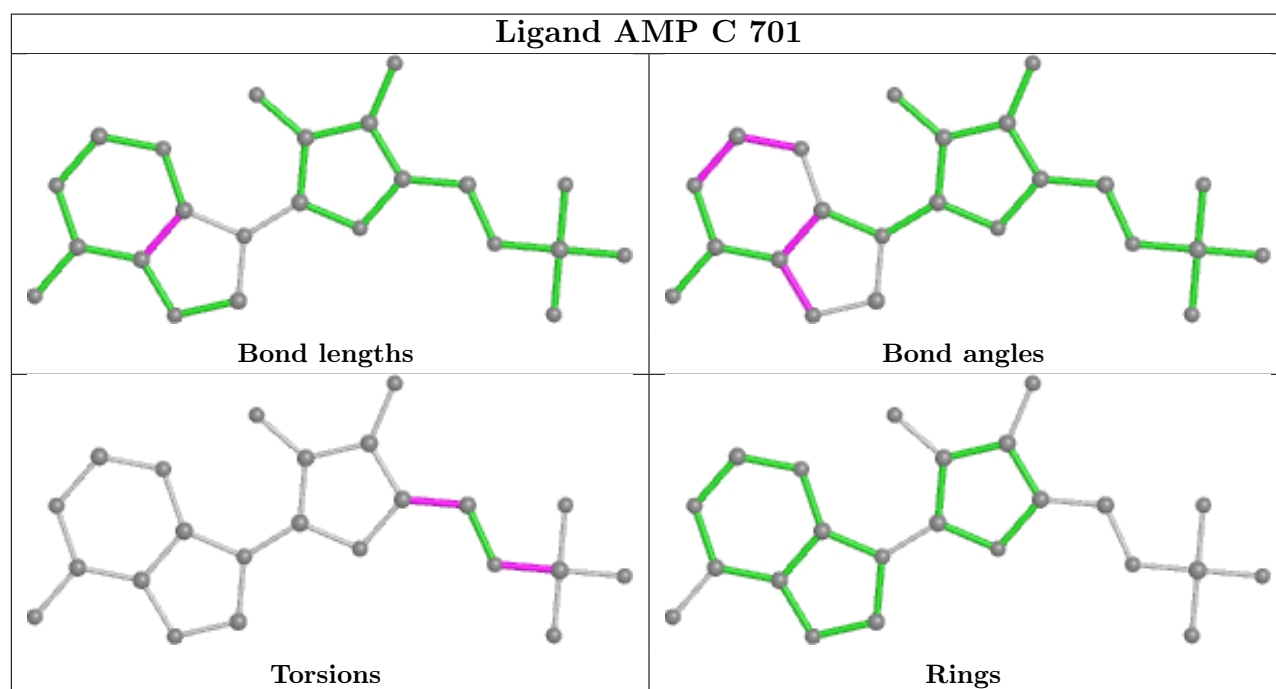
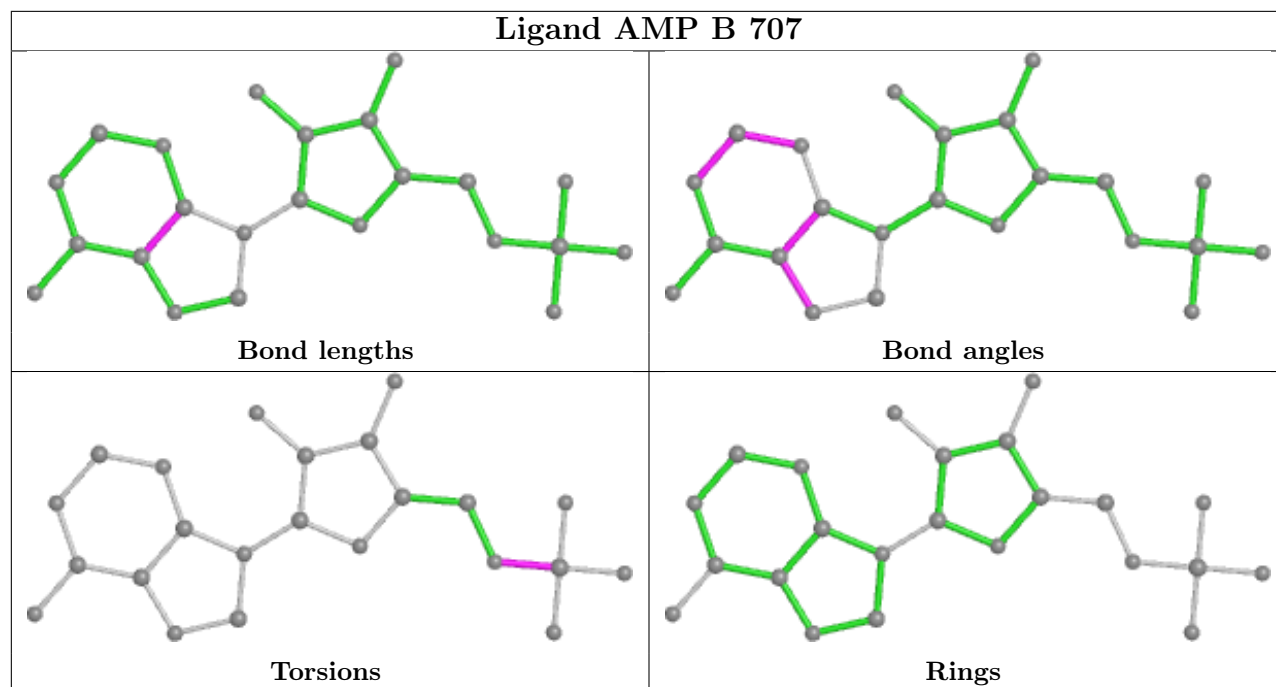
Mol	Chain	Res	Type	Atoms
4	A	708	AMP	C5'-O5'-P-O3P
4	A	708	AMP	C3'-C4'-C5'-O5'
4	C	701	AMP	C5'-O5'-P-O1P
4	C	701	AMP	C5'-O5'-P-O2P
4	C	701	AMP	C5'-O5'-P-O3P
4	C	701	AMP	C3'-C4'-C5'-O5'
4	A	708	AMP	O4'-C4'-C5'-O5'
4	C	701	AMP	O4'-C4'-C5'-O5'
4	A	708	AMP	C5'-O5'-P-O1P
4	B	707	AMP	C5'-O5'-P-O3P

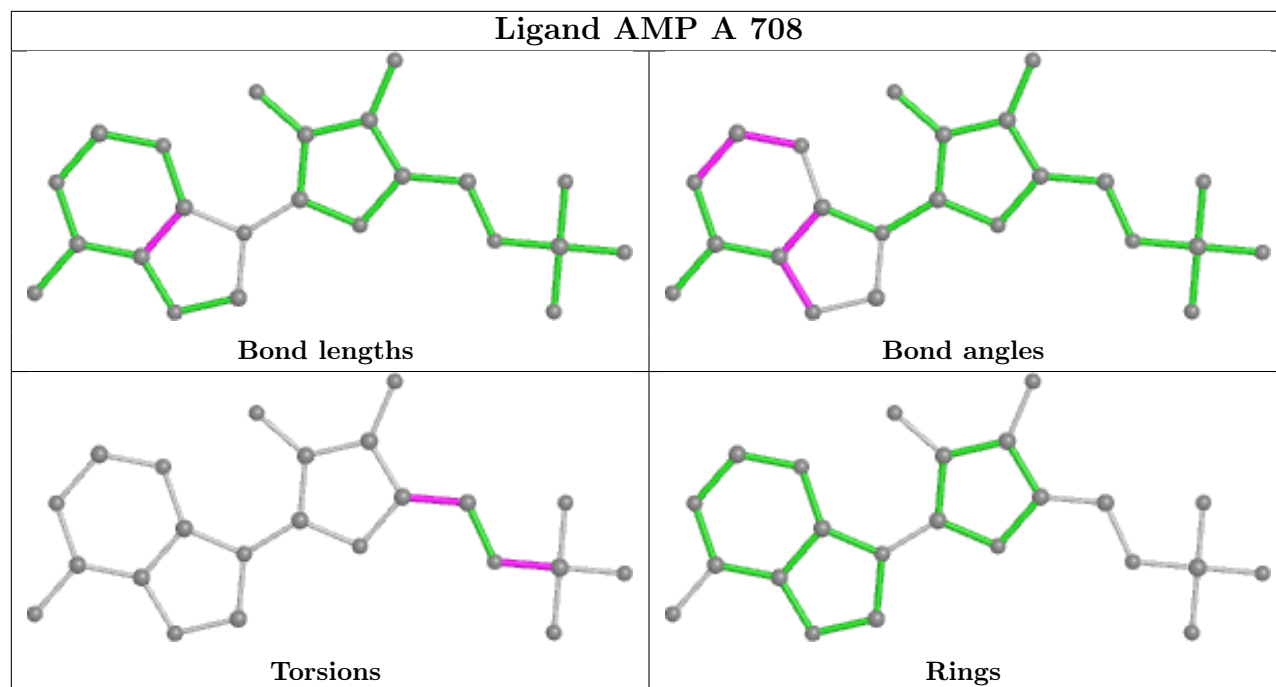
There are no ring outliers.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	B	707	AMP	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

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	660/686 (96%)	-0.17	3 (0%) 91 92	44, 59, 86, 148	0
1	B	628/686 (91%)	0.26	59 (9%) 8 6	46, 62, 130, 175	0
1	C	523/686 (76%)	0.11	28 (5%) 25 24	59, 89, 134, 158	0
All	All	1811/2058 (87%)	0.06	90 (4%) 28 27	44, 66, 126, 175	0

All (90) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	676	ILE	8.9
1	B	679	PHE	7.9
1	B	631	ILE	7.5
1	B	595	VAL	7.1
1	B	672	VAL	6.6
1	B	644	ILE	6.0
1	B	632	ILE	5.9
1	B	633	VAL	5.9
1	B	629	SER	5.3
1	B	680	GLY	5.3
1	B	630	VAL	5.3
1	B	574	VAL	5.3
1	B	550	ASP	4.7
1	B	653	SER	4.7
1	B	673	GLU	4.5
1	B	592	ILE	4.5
1	B	635	ASP	4.5
1	C	28	ALA	4.5
1	C	494	GLY	4.4
1	B	646	ARG	4.3
1	B	675	ILE	4.3
1	B	577	ALA	4.2
1	B	575	SER	4.2

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Mol	Chain	Res	Type	RSRZ
1	B	596	ALA	3.9
1	B	669	PRO	3.9
1	C	547	ARG	3.9
1	B	655	ASN	3.8
1	B	573	LYS	3.8
1	B	578	ALA	3.8
1	B	613	LEU	3.8
1	B	677	SER	3.8
1	B	593	ALA	3.7
1	B	654	SER	3.6
1	B	634	GLN	3.6
1	B	576	GLU	3.5
1	C	420	ILE	3.5
1	B	569	ILE	3.4
1	B	648	ILE	3.3
1	C	391	LEU	3.3
1	C	432	VAL	3.3
1	B	570	GLU	3.3
1	B	609	LEU	3.2
1	B	572	LYS	3.2
1	B	579	VAL	3.2
1	B	580	VAL	3.2
1	B	597	LEU	3.2
1	B	668	ASN	3.1
1	B	649	LEU	3.1
1	B	594	TYR	3.1
1	B	652	VAL	2.9
1	B	566	ALA	2.9
1	B	671	SER	2.9
1	B	589	GLN	2.9
1	B	586	ILE	2.8
1	C	393	LEU	2.8
1	B	670	GLN	2.8
1	B	681	ALA	2.8
1	B	564	ILE	2.8
1	C	24	VAL	2.8
1	C	301	PRO	2.8
1	B	591	VAL	2.7
1	B	678	ALA	2.7
1	B	582	ILE	2.7
1	B	567	ALA	2.7
1	C	42	GLU	2.7

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Mol	Chain	Res	Type	RSRZ
1	B	568	LEU	2.6
1	C	388	PRO	2.6
1	C	437	CYS	2.6
1	B	571	ASP	2.5
1	C	428	TYR	2.5
1	C	419	PRO	2.4
1	C	407	LEU	2.4
1	C	390	ALA	2.4
1	A	606	SER	2.4
1	B	651	LYS	2.4
1	C	30	GLY	2.3
1	A	225	ARG	2.3
1	C	405	TYR	2.2
1	C	434	LYS	2.2
1	C	427	TRP	2.2
1	B	645	MET	2.2
1	A	574	VAL	2.1
1	C	392	ARG	2.1
1	C	424	ILE	2.1
1	C	436	GLN	2.1
1	C	439	ILE	2.1
1	C	29	ASN	2.1
1	C	39	GLU	2.1
1	C	294	THR	2.1
1	C	228	ASN	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](#)

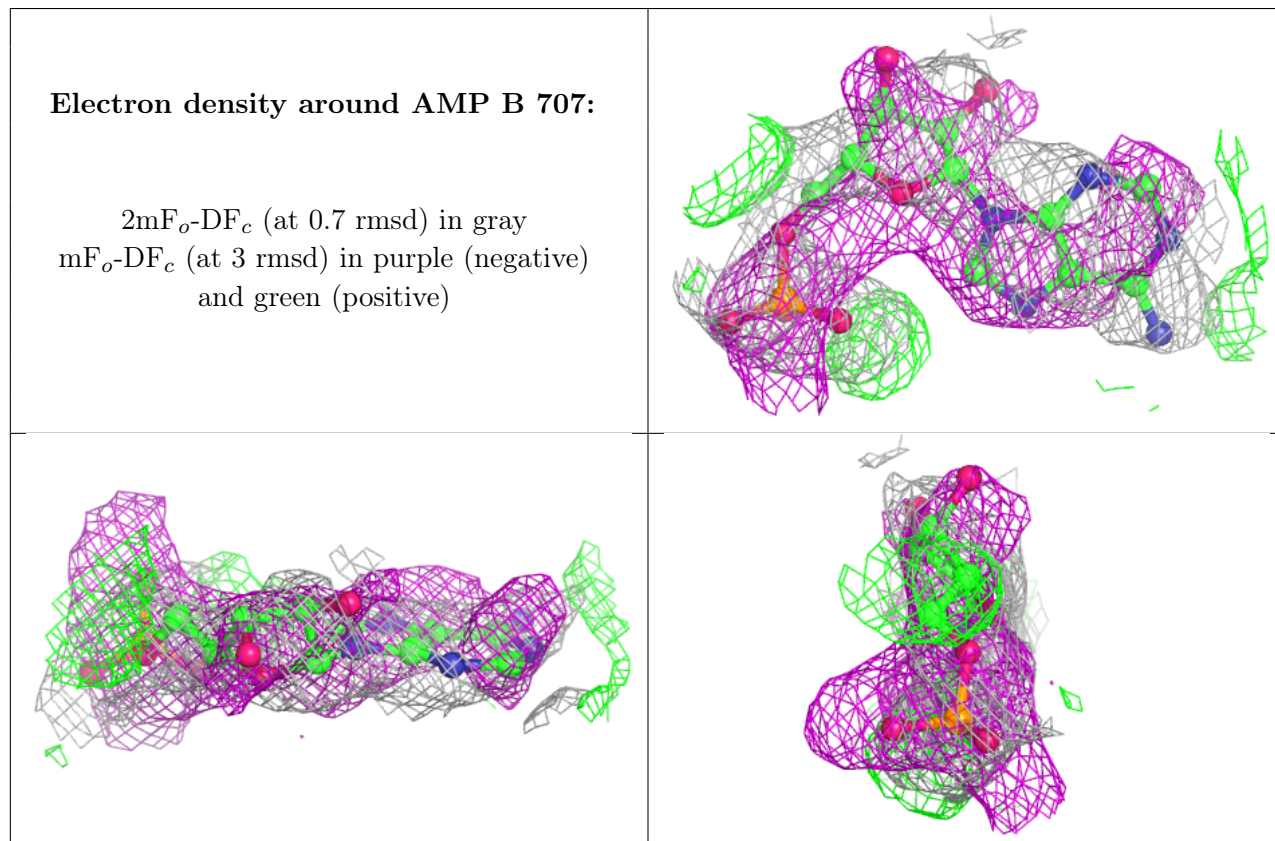
There are no monosaccharides in this entry.

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.

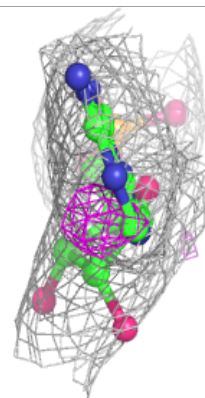
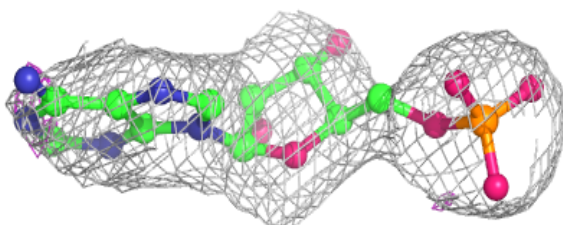
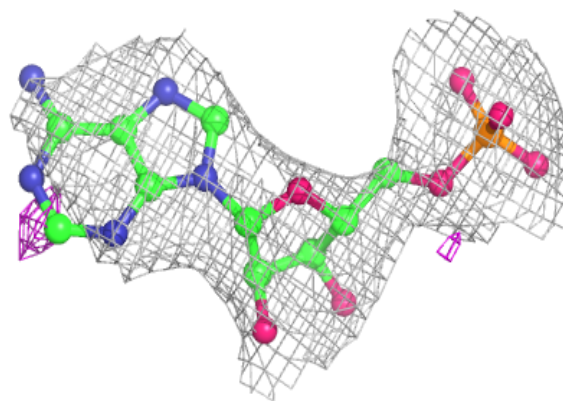
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
4	AMP	B	707	23/23	0.74	0.44	70,78,89,93	0
2	SO4	B	704	5/5	0.81	0.33	74,74,80,98	0
2	SO4	B	705	5/5	0.82	0.18	75,75,86,94	0
2	SO4	B	701	5/5	0.82	0.31	111,117,119,122	0
2	SO4	A	702	5/5	0.84	0.30	77,77,91,92	0
2	SO4	B	702	5/5	0.85	0.61	70,78,87,104	0
2	SO4	A	705	5/5	0.87	0.21	82,82,85,98	0
4	AMP	C	701	23/23	0.89	0.18	99,109,113,115	0
2	SO4	A	704	5/5	0.91	0.23	74,75,84,90	0
2	SO4	A	703	5/5	0.92	0.27	59,62,77,81	0
3	CL	A	706	1/1	0.93	0.08	71,71,71,71	0
3	CL	B	706	1/1	0.93	0.38	98,98,98,98	0
3	CL	A	707	1/1	0.94	0.34	75,75,75,75	0
2	SO4	A	701	5/5	0.94	0.15	73,73,75,76	0
4	AMP	A	708	23/23	0.96	0.20	50,51,53,55	0
2	SO4	B	703	5/5	0.97	0.16	85,87,89,92	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.

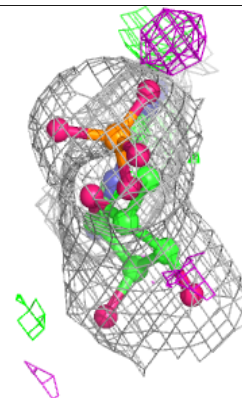
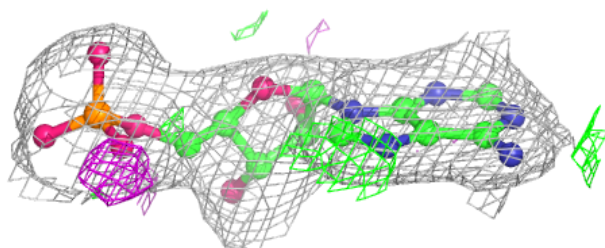
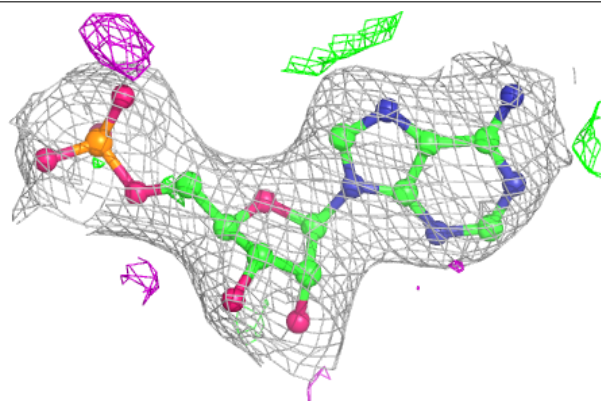


Electron density around AMP C 701:

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

**Electron density around AMP A 708:**

$2mF_o-DF_c$ (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.