



Full wwPDB X-ray Structure Validation Report ⓘ

Sep 26, 2024 – 04:12 PM EDT

PDB ID : 9C6L
Title : Yasminevirus c12orf29, a 5' to 3' RNA ligase
Authors : Hu, Y.; Lopez, V.A.; Tagliabracci, V.S.; Tomchick, D.R.
Deposited on : 2024-06-07
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 : 2022.3.0, CSD as543be (2022)
Xtrriage (Phenix) : 1.20.1
EDS : 3.0
buster-report : 1.1.7 (2018)
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4 : 9.0.002 (Gargrove)
Density-Fitness : 1.0.11
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.38.3

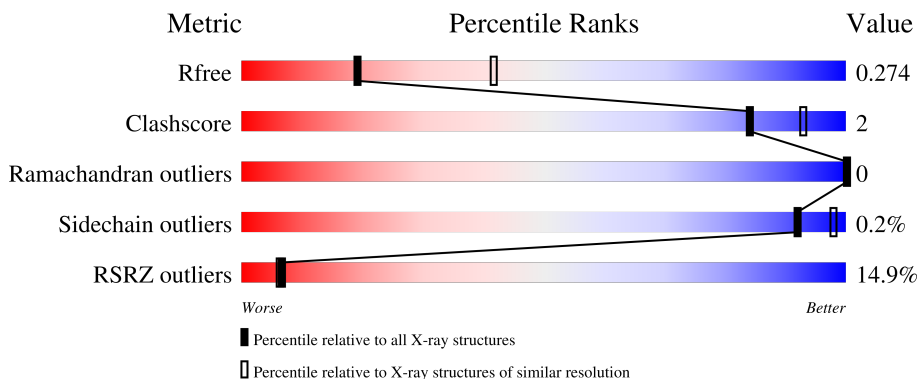
1 Overall quality at a glance

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.



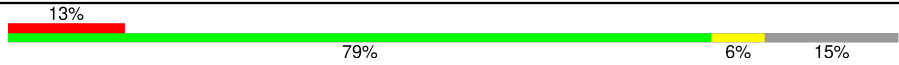
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	164625	3333 (2.70-2.70)
Clashscore	180529	3684 (2.70-2.70)
Ramachandran outliers	177936	3633 (2.70-2.70)
Sidechain outliers	177891	3633 (2.70-2.70)
RSRZ outliers	164620	3333 (2.70-2.70)

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	277	
1	B	277	
1	C	277	
1	D	277	
1	E	277	

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Mol	Chain	Length	Quality of chain
1	F	277	 <p>A horizontal bar chart representing the quality of chain. The bar is divided into four segments: a red segment on the left labeled '13%', a large green segment labeled '79%', a small yellow segment labeled '6%', and a grey segment on the right labeled '15%'.</p>

2 Entry composition

There are 5 unique types of molecules in this entry. The entry contains 22648 atoms, of which 11235 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.

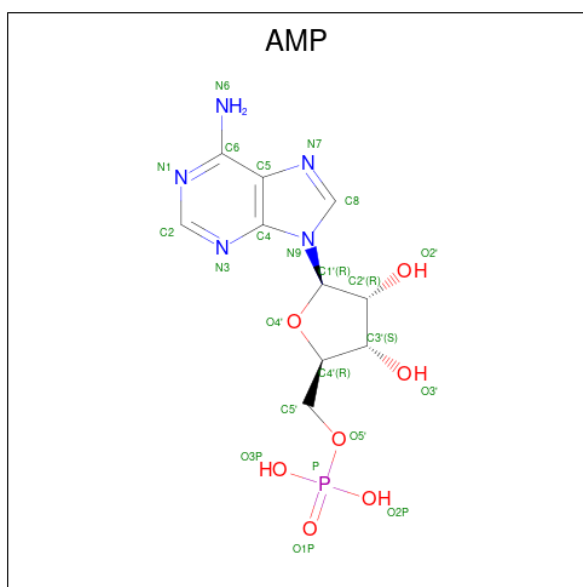
- Molecule 1 is a protein called RNA ligase1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace	
			Total	C	H	N	O				S
1	A	242	3780	1192	1886	342	347	13	0	0	0
1	B	246	3808	1201	1894	345	355	13	0	0	0
1	C	238	3734	1178	1867	338	338	13	0	0	0
1	D	238	3692	1168	1833	333	345	13	0	0	0
1	E	237	3689	1166	1840	333	337	13	0	0	0
1	F	235	3690	1165	1843	334	335	13	0	0	0

There are 6 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	0	SER	-	expression tag	UNP A0A5K0UB63
B	0	SER	-	expression tag	UNP A0A5K0UB63
C	0	SER	-	expression tag	UNP A0A5K0UB63
D	0	SER	-	expression tag	UNP A0A5K0UB63
E	0	SER	-	expression tag	UNP A0A5K0UB63
F	0	SER	-	expression tag	UNP A0A5K0UB63

- Molecule 2 is ADENOSINE MONOPHOSPHATE (three-letter code: AMP) (formula: C₁₀H₁₄N₅O₇P) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	
			Total	C	H	N	O			P
2	A	1	Total	C	H	N	O	P	0	0
			35	10	12	5	7	1		
2	B	1	Total	C	H	N	O	P	0	0
			35	10	12	5	7	1		
2	C	1	Total	C	H	N	O	P	0	0
			35	10	12	5	7	1		
2	D	1	Total	C	H	N	O	P	0	0
			35	10	12	5	7	1		
2	E	1	Total	C	H	N	O	P	0	0
			35	10	12	5	7	1		
2	F	1	Total	C	H	N	O	P	0	0
			35	10	12	5	7	1		

- Molecule 3 is SODIUM ION (three-letter code: NA) (formula: Na).

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

- Molecule 4 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	Mg		
4	A	1	Total	Mg	0	0
			1	1		

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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	B	1	Total 1	Mg 1	0	0
4	C	1	Total 1	Mg 1	0	0
4	D	1	Total 1	Mg 1	0	0
4	E	2	Total 2	Mg 2	0	0

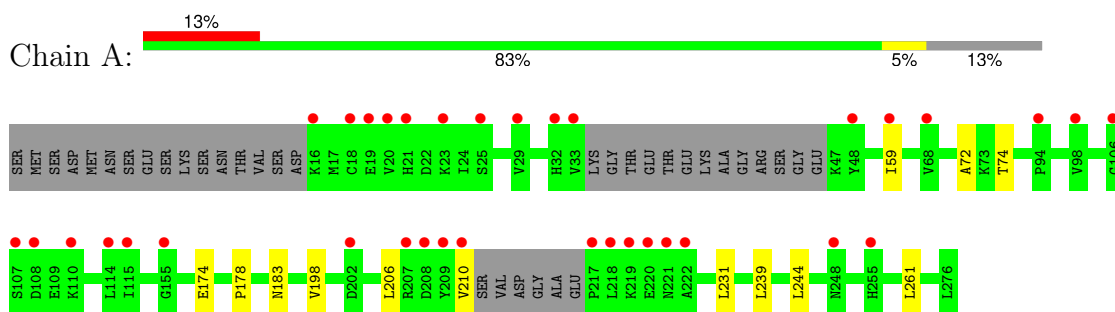
- Molecule 5 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	5	Total 5	O 5	0	0
5	B	5	Total 5	O 5	0	0
5	C	7	Total 7	O 7	0	0
5	D	5	Total 5	O 5	0	0
5	E	7	Total 7	O 7	0	0
5	F	5	Total 5	O 5	0	0

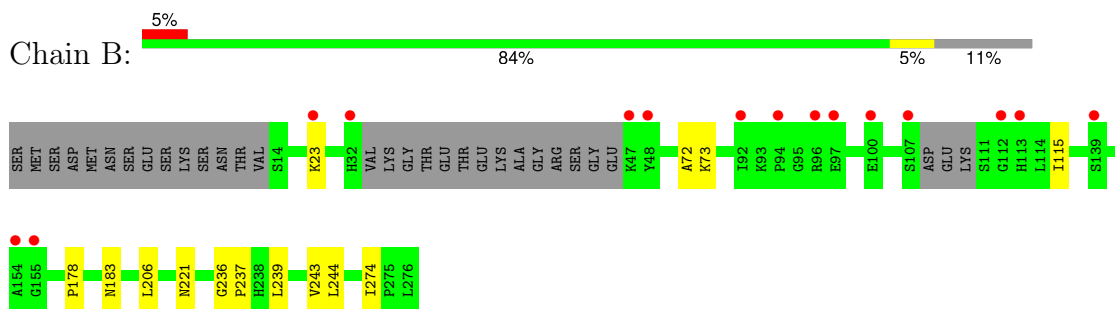
3 Residue-property plots [i](#)

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.

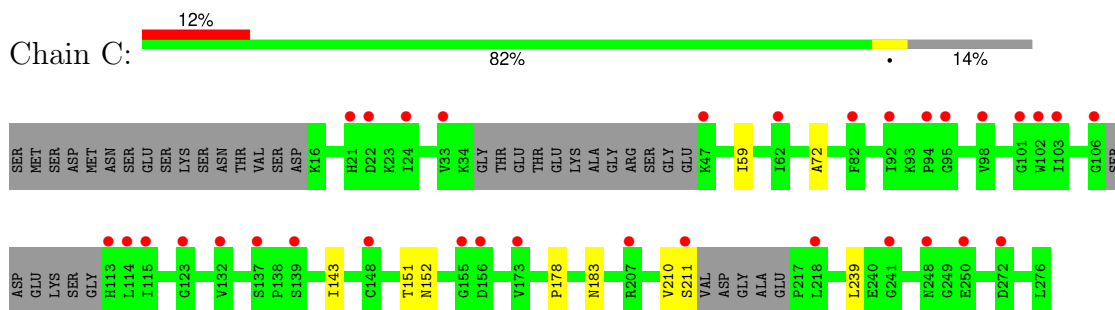
- Molecule 1: RNA ligase1



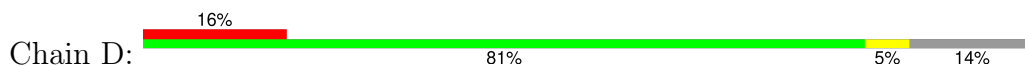
- Molecule 1: RNA ligase1

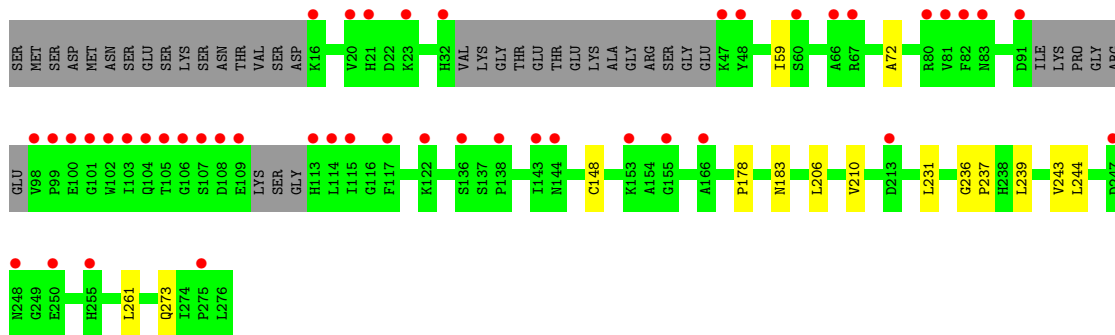


- Molecule 1: RNA ligase1

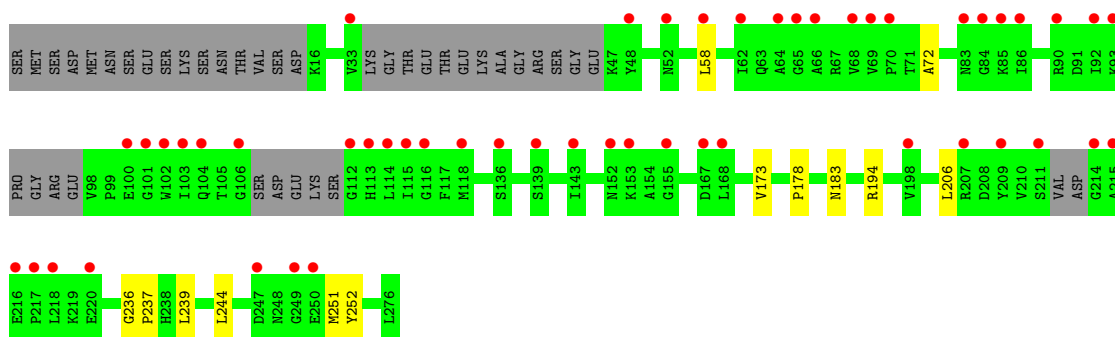
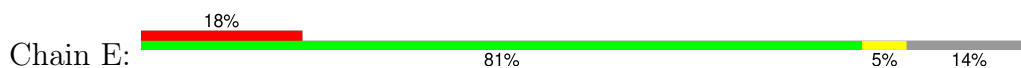


- Molecule 1: RNA ligase1

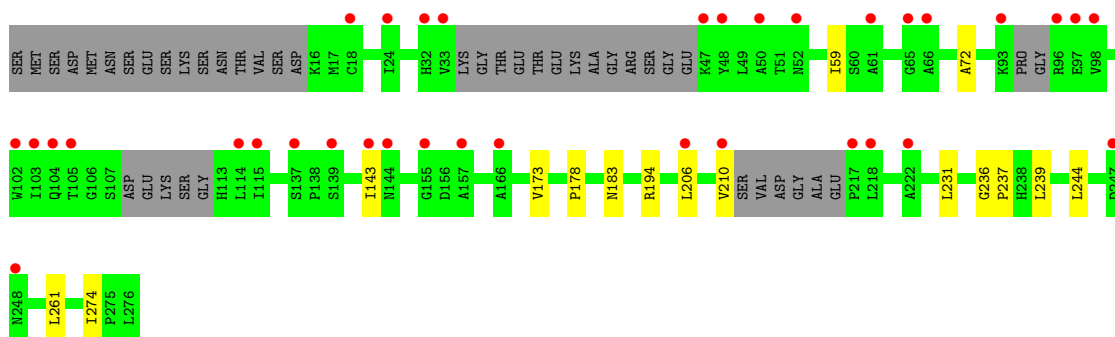
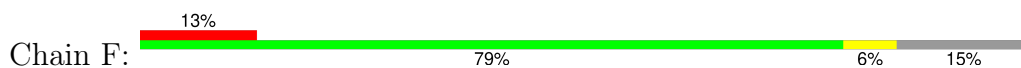




● Molecule 1: RNA ligase1



● Molecule 1: RNA ligase1



4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	104.90Å 84.22Å 115.24Å 90.00° 106.88° 90.00°	Depositor
Resolution (Å)	46.41 – 2.70 46.41 – 2.70	Depositor EDS
% Data completeness (in resolution range)	85.6 (46.41-2.70) 85.6 (46.41-2.70)	Depositor EDS
R_{merge}	0.19	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	3.00 (at 2.69Å)	Xtrriage
Refinement program	PHENIX 1.21.1_5286	Depositor
R, R_{free}	0.232 , 0.275 0.232 , 0.274	Depositor DCC
R_{free} test set	51121 reflections (4.29%)	wwPDB-VP
Wilson B-factor (Å ²)	45.3	Xtrriage
Anisotropy	0.093	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.40 , 54.1	EDS
L-test for twinning ²	$\langle L \rangle = 0.46$, $\langle L^2 \rangle = 0.28$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.86	EDS
Total number of atoms	22648	wwPDB-VP
Average B, all atoms (Å ²)	59.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 16.40% 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: NA, MG, AMP

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	0.24	0/1936	0.46	0/2615
1	B	0.24	0/1956	0.47	0/2644
1	C	0.24	0/1908	0.46	0/2576
1	D	0.24	0/1899	0.46	0/2567
1	E	0.23	0/1888	0.46	0/2549
1	F	0.23	0/1886	0.46	0/2545
All	All	0.24	0/11473	0.46	0/15496

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	1894	1886	1886	7	0
1	B	1914	1894	1894	9	0
1	C	1867	1867	1867	6	0
1	D	1859	1833	1833	9	0
1	E	1849	1840	1840	7	0
1	F	1847	1843	1843	11	0
2	A	23	12	12	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	B	23	12	12	1	0
2	C	23	12	12	0	0
2	D	23	12	12	1	0
2	E	23	12	12	0	0
2	F	23	12	12	0	0
3	A	4	0	0	0	0
3	C	1	0	0	0	0
4	A	1	0	0	0	0
4	B	1	0	0	0	0
4	C	1	0	0	0	0
4	D	1	0	0	0	0
4	E	2	0	0	0	0
5	A	5	0	0	0	0
5	B	5	0	0	0	0
5	C	7	0	0	0	0
5	D	5	0	0	0	0
5	E	7	0	0	0	0
5	F	5	0	0	0	0
All	All	11413	11235	11235	49	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 2.

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

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:59:ILE:HD13	1:D:210:VAL:HG22	1.72	0.72
1:A:59:ILE:HD13	1:A:210:VAL:HG22	1.77	0.66
1:F:72:ALA:HB1	1:F:239:LEU:HD22	1.81	0.62
1:C:72:ALA:HB1	1:C:239:LEU:HD22	1.82	0.61
1:A:74:THR:HG23	1:A:174:GLU:HG2	1.84	0.60
1:B:72:ALA:HB1	1:B:239:LEU:HD22	1.85	0.59
1:D:72:ALA:HB1	1:D:239:LEU:HD22	1.85	0.58
1:D:206:LEU:HD12	1:D:244:LEU:HD11	1.87	0.55
1:B:23:LYS:HG2	1:B:115:ILE:HD11	1.91	0.52
1:B:239:LEU:HD21	1:B:274:ILE:HD12	1.91	0.52
1:B:243:VAL:HG11	2:B:301:AMP:C2	2.45	0.52
1:D:231:LEU:HD21	1:D:261:LEU:HD22	1.90	0.52
1:B:178:PRO:HA	1:B:183:ASN:HB2	1.93	0.50
1:D:178:PRO:HA	1:D:183:ASN:HB2	1.93	0.50
1:A:178:PRO:HA	1:A:183:ASN:HB2	1.93	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:206:LEU:HD12	1:B:244:LEU:HD11	1.95	0.49
1:E:58:LEU:HD13	1:E:252:TYR:CD2	2.48	0.49
1:F:173:VAL:HG12	1:F:194:ARG:HA	1.96	0.47
1:A:72:ALA:HB1	1:A:239:LEU:HD22	1.97	0.47
1:E:72:ALA:HB1	1:E:239:LEU:HD22	1.97	0.46
1:B:239:LEU:HD21	1:B:274:ILE:CD1	2.45	0.46
1:F:239:LEU:HD21	1:F:274:ILE:CD1	2.45	0.46
1:C:178:PRO:HA	1:C:183:ASN:HB2	1.97	0.46
1:C:210:VAL:HG12	1:C:211:SER:N	2.32	0.45
1:F:231:LEU:HD21	1:F:261:LEU:HD22	1.99	0.45
1:F:206:LEU:HD13	1:F:244:LEU:HD11	1.99	0.45
1:F:143:ILE:HG22	1:F:143:ILE:O	2.17	0.44
1:C:151:THR:HG22	1:C:152:ASN:O	2.17	0.44
1:C:59:ILE:HG23	1:C:210:VAL:HG13	1.98	0.44
1:D:243:VAL:HG11	2:D:301:AMP:C2	2.53	0.44
1:E:178:PRO:HA	1:E:183:ASN:HB2	2.00	0.44
1:E:206:LEU:CD1	1:E:244:LEU:HD11	2.48	0.44
1:A:72:ALA:HB3	1:A:198:VAL:HB	2.00	0.44
1:A:231:LEU:HD21	1:A:261:LEU:HD22	2.00	0.43
1:F:178:PRO:HA	1:F:183:ASN:HB2	2.00	0.43
1:D:206:LEU:CD1	1:D:244:LEU:HD11	2.48	0.43
1:A:206:LEU:HD12	1:A:244:LEU:HD11	2.01	0.42
1:F:206:LEU:CD1	1:F:244:LEU:HD11	2.49	0.42
1:F:239:LEU:HD21	1:F:274:ILE:HD12	2.02	0.41
1:B:236:GLY:N	1:B:237:PRO:HD2	2.36	0.41
1:F:59:ILE:HG23	1:F:210:VAL:HG13	2.03	0.41
1:D:231:LEU:HD21	1:D:261:LEU:CD2	2.50	0.41
1:D:236:GLY:N	1:D:237:PRO:HD2	2.36	0.41
1:F:236:GLY:N	1:F:237:PRO:HD2	2.35	0.40
1:B:73:LYS:HB2	1:B:243:VAL:HG23	2.03	0.40
1:C:143:ILE:O	1:C:143:ILE:HG22	2.21	0.40
1:E:173:VAL:HG12	1:E:194:ARG:HA	2.03	0.40
1:E:236:GLY:N	1:E:237:PRO:HD2	2.36	0.40
1:E:244:LEU:O	1:E:251:MET:HA	2.21	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	236/277 (85%)	226 (96%)	10 (4%)	0	100	100
1	B	240/277 (87%)	227 (95%)	13 (5%)	0	100	100
1	C	230/277 (83%)	219 (95%)	11 (5%)	0	100	100
1	D	230/277 (83%)	222 (96%)	8 (4%)	0	100	100
1	E	227/277 (82%)	207 (91%)	20 (9%)	0	100	100
1	F	225/277 (81%)	222 (99%)	3 (1%)	0	100	100
All	All	1388/1662 (84%)	1323 (95%)	65 (5%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains [i](#)

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	208/237 (88%)	208 (100%)	0	100	100
1	B	210/237 (89%)	209 (100%)	1 (0%)	86	95
1	C	205/237 (86%)	205 (100%)	0	100	100
1	D	204/237 (86%)	202 (99%)	2 (1%)	73	89
1	E	202/237 (85%)	202 (100%)	0	100	100
1	F	203/237 (86%)	203 (100%)	0	100	100
All	All	1232/1422 (87%)	1229 (100%)	3 (0%)	92	98

All (3) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	B	221	ASN
1	D	148	CYS
1	D	273	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 oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 17 ligands modelled in this entry, 11 are monoatomic - leaving 6 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	AMP	C	301	4	21,25,25	0.76	0	23,38,38	1.08	1 (4%)
2	AMP	E	301	4	21,25,25	0.75	0	23,38,38	1.09	1 (4%)
2	AMP	B	301	4	21,25,25	0.76	0	23,38,38	1.29	2 (8%)
2	AMP	F	301	-	21,25,25	0.76	0	23,38,38	1.31	2 (8%)
2	AMP	A	301	4	21,25,25	0.75	0	23,38,38	1.25	2 (8%)
2	AMP	D	301	4	21,25,25	0.76	0	23,38,38	1.29	2 (8%)

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
2	AMP	C	301	4	-	5/6/26/26	0/3/3/3
2	AMP	E	301	4	-	3/6/26/26	0/3/3/3
2	AMP	B	301	4	-	4/6/26/26	0/3/3/3
2	AMP	F	301	-	-	3/6/26/26	0/3/3/3
2	AMP	A	301	4	-	1/6/26/26	0/3/3/3
2	AMP	D	301	4	-	6/6/26/26	0/3/3/3

There are no bond length outliers.

All (10) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	F	301	AMP	N3-C2-N1	-4.24	122.92	128.67
2	B	301	AMP	N3-C2-N1	-4.20	122.97	128.67
2	D	301	AMP	N3-C2-N1	-4.07	123.14	128.67
2	A	301	AMP	N3-C2-N1	-3.73	123.61	128.67
2	E	301	AMP	N3-C2-N1	-3.22	124.30	128.67
2	C	301	AMP	N3-C2-N1	-3.11	124.46	128.67
2	F	301	AMP	C4-C5-N7	-2.51	106.69	109.34
2	D	301	AMP	C4-C5-N7	-2.46	106.74	109.34
2	B	301	AMP	C4-C5-N7	-2.44	106.76	109.34
2	A	301	AMP	C4-C5-N7	-2.22	106.99	109.34

There are no chirality outliers.

All (22) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	B	301	AMP	C5'-O5'-P-O3P
2	C	301	AMP	C5'-O5'-P-O1P
2	C	301	AMP	C5'-O5'-P-O3P
2	D	301	AMP	C5'-O5'-P-O1P
2	D	301	AMP	C5'-O5'-P-O2P
2	D	301	AMP	C5'-O5'-P-O3P
2	D	301	AMP	C4'-C5'-O5'-P
2	B	301	AMP	O4'-C4'-C5'-O5'
2	B	301	AMP	C3'-C4'-C5'-O5'
2	E	301	AMP	O4'-C4'-C5'-O5'

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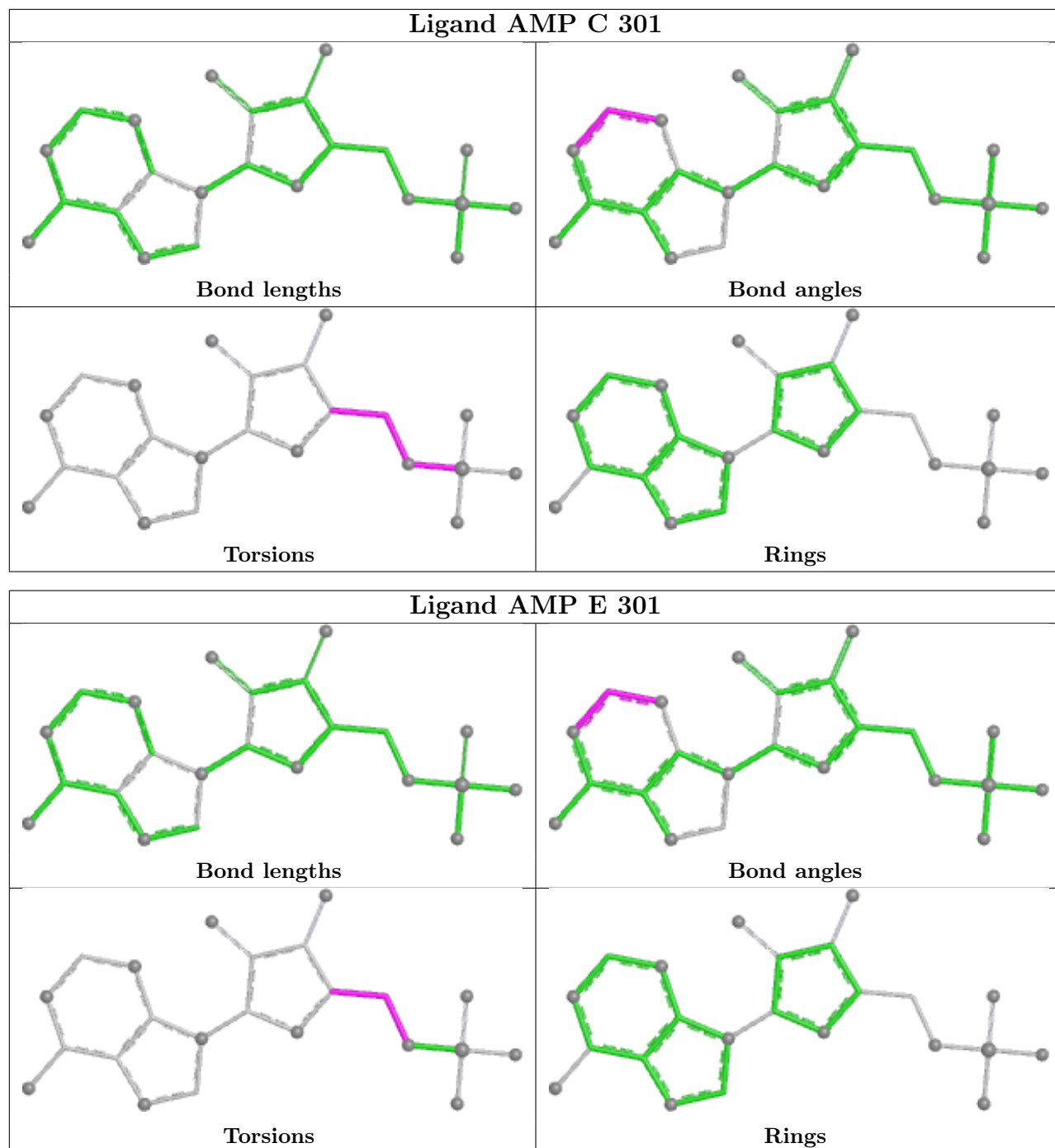
Mol	Chain	Res	Type	Atoms
2	E	301	AMP	C3'-C4'-C5'-O5'
2	F	301	AMP	O4'-C4'-C5'-O5'
2	D	301	AMP	O4'-C4'-C5'-O5'
2	D	301	AMP	C3'-C4'-C5'-O5'
2	F	301	AMP	C3'-C4'-C5'-O5'
2	C	301	AMP	C4'-C5'-O5'-P
2	A	301	AMP	C4'-C5'-O5'-P
2	F	301	AMP	C4'-C5'-O5'-P
2	B	301	AMP	C4'-C5'-O5'-P
2	E	301	AMP	C4'-C5'-O5'-P
2	C	301	AMP	C5'-O5'-P-O2P
2	C	301	AMP	C3'-C4'-C5'-O5'

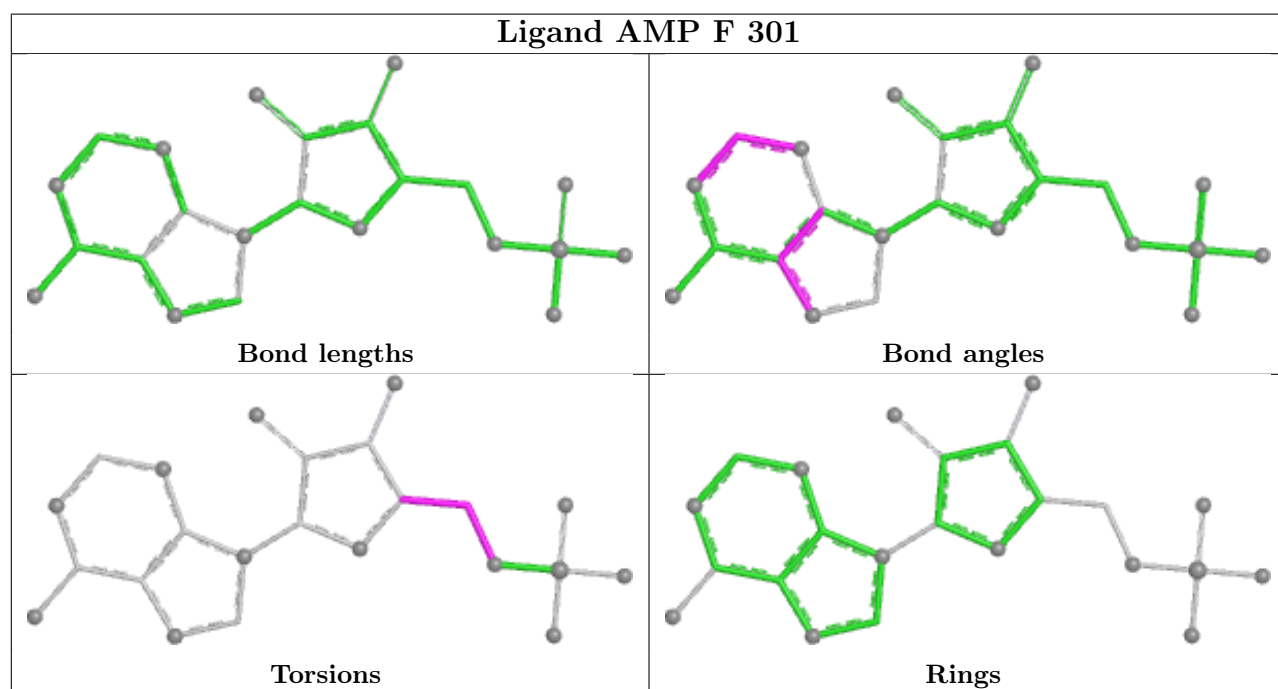
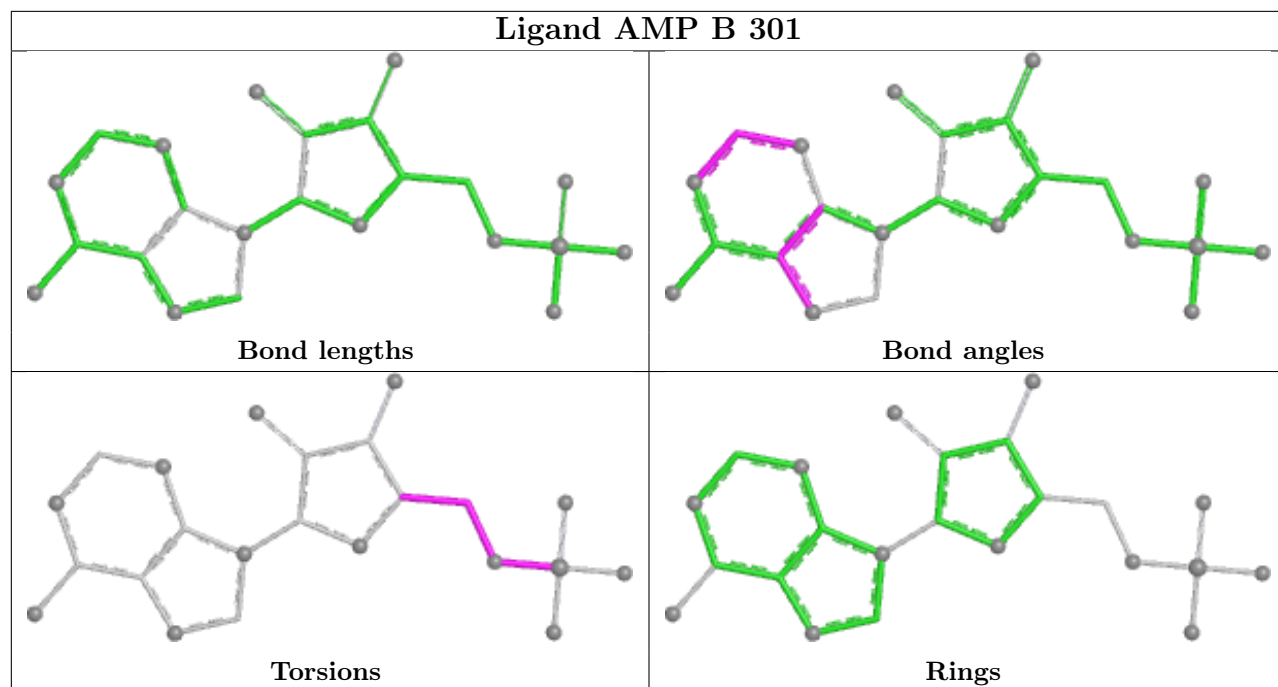
There are no ring outliers.

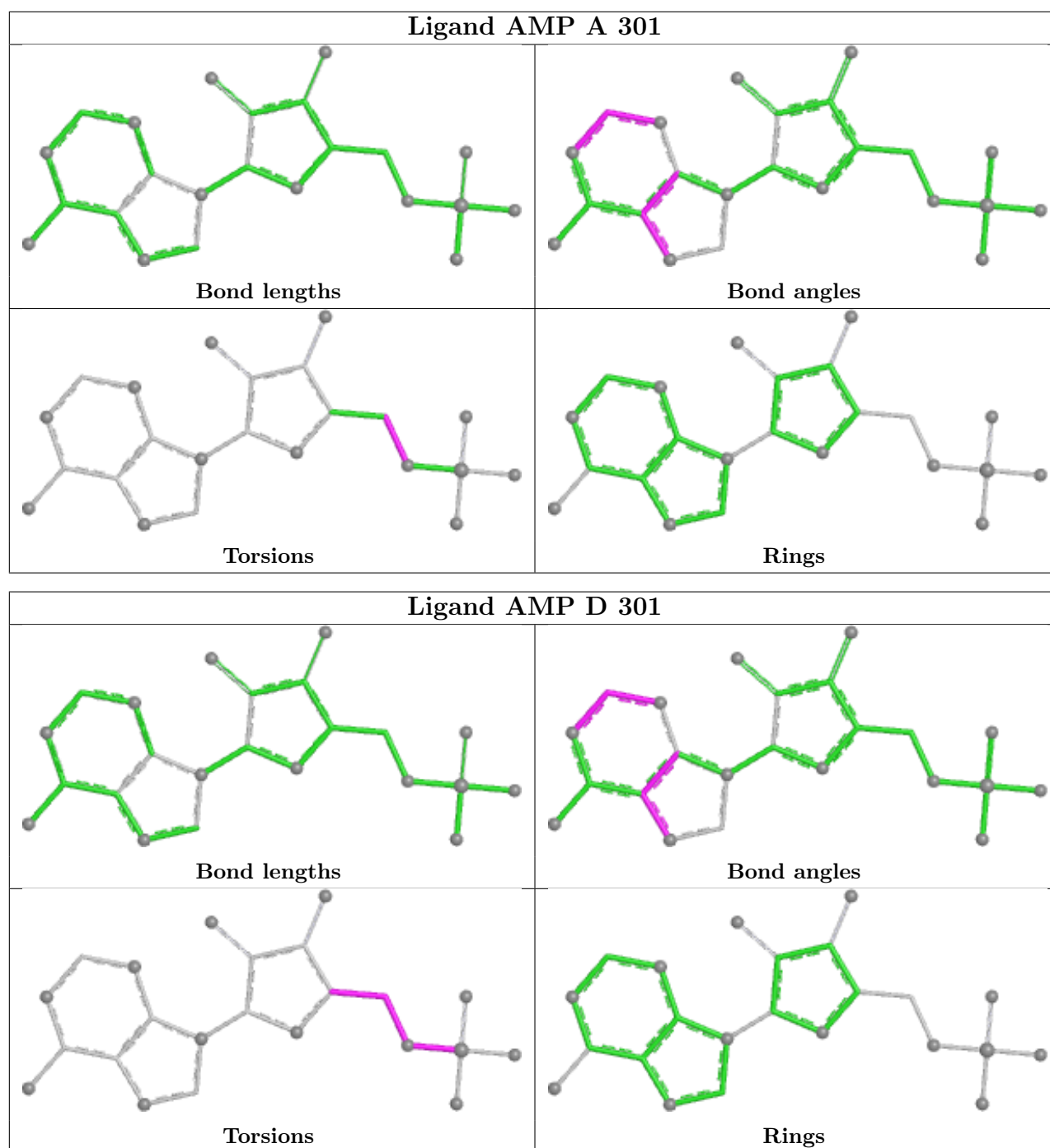
2 monomers are involved in 2 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	B	301	AMP	1	0
2	D	301	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	242/277 (87%)	0.96	35 (14%) 7 6	30, 59, 106, 138	0
1	B	246/277 (88%)	0.50	15 (6%) 28 26	25, 46, 86, 120	0
1	C	238/277 (85%)	0.90	33 (13%) 7 7	23, 57, 93, 114	0
1	D	238/277 (85%)	1.00	45 (18%) 4 4	25, 57, 98, 138	0
1	E	237/277 (85%)	1.06	51 (21%) 3 3	23, 57, 96, 120	0
1	F	235/277 (84%)	1.07	35 (14%) 7 6	31, 64, 97, 123	0
All	All	1436/1662 (86%)	0.91	214 (14%) 7 6	23, 56, 98, 138	0

All (214) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	E	112	GLY	6.9
1	A	33	VAL	6.1
1	D	107	SER	5.3
1	E	247	ASP	5.1
1	A	48	TYR	5.0
1	E	62	ILE	4.6
1	B	155	GLY	4.4
1	A	210	VAL	4.4
1	A	107	SER	4.4
1	E	215	ALA	4.4
1	B	48	TYR	4.4
1	A	248	ASN	4.3
1	D	106	GLY	4.3
1	D	101	GLY	4.1
1	F	143	ILE	4.1
1	A	20	VAL	4.1
1	F	248	ASN	4.1
1	E	139	SER	4.1
1	F	114	LEU	4.0

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Mol	Chain	Res	Type	RSRZ
1	B	32	HIS	3.9
1	E	214	GLY	3.9
1	F	218	LEU	3.9
1	A	23	LYS	3.9
1	E	102	TRP	3.8
1	F	210	VAL	3.8
1	E	217	PRO	3.8
1	D	32	HIS	3.8
1	F	96	ARG	3.8
1	A	108	ASP	3.7
1	D	114	LEU	3.7
1	D	105	THR	3.7
1	B	92	ILE	3.6
1	E	93	LYS	3.6
1	D	98	VAL	3.6
1	F	155	GLY	3.6
1	D	117	PHE	3.6
1	E	85	LYS	3.5
1	E	113	HIS	3.5
1	A	16	LYS	3.5
1	D	248	ASN	3.5
1	C	113	HIS	3.4
1	C	106	GLY	3.4
1	E	116	GLY	3.4
1	F	66	ALA	3.4
1	E	66	ALA	3.3
1	C	114	LEU	3.3
1	E	216	GLU	3.3
1	E	250	GLU	3.3
1	A	29	VAL	3.3
1	D	144	ASN	3.3
1	D	103	ILE	3.3
1	E	168	LEU	3.3
1	B	113	HIS	3.2
1	D	166	ALA	3.2
1	D	122	LYS	3.2
1	D	155	GLY	3.2
1	C	211	SER	3.2
1	F	166	ALA	3.2
1	E	207	ARG	3.2
1	D	23	LYS	3.1
1	B	47	LYS	3.1

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Mol	Chain	Res	Type	RSRZ
1	D	47	LYS	3.1
1	D	113	HIS	3.1
1	A	19	GLU	3.1
1	F	32	HIS	3.1
1	E	101	GLY	3.1
1	F	247	ASP	3.0
1	F	33	VAL	3.0
1	D	104	GLN	3.0
1	A	21	HIS	3.0
1	D	83	ASN	3.0
1	C	139	SER	3.0
1	F	48	TYR	3.0
1	B	112	GLY	3.0
1	D	143	ILE	2.9
1	C	94	PRO	2.9
1	E	65	GLY	2.9
1	A	32	HIS	2.9
1	C	173	VAL	2.9
1	F	139	SER	2.9
1	E	58	LEU	2.9
1	D	109	GLU	2.9
1	D	255	HIS	2.9
1	E	103	ILE	2.9
1	D	82	PHE	2.9
1	A	219	LYS	2.8
1	A	217	PRO	2.8
1	E	100	GLU	2.8
1	A	114	LEU	2.8
1	E	153	LYS	2.8
1	F	222	ALA	2.8
1	E	114	LEU	2.8
1	F	98	VAL	2.7
1	E	211	SER	2.7
1	C	101	GLY	2.7
1	E	155	GLY	2.7
1	A	18	CYS	2.7
1	C	21	HIS	2.7
1	A	98	VAL	2.6
1	E	68	VAL	2.6
1	F	104	GLN	2.6
1	E	90	ARG	2.6
1	F	93	LYS	2.6

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Mol	Chain	Res	Type	RSRZ
1	E	84	GLY	2.6
1	A	115	ILE	2.6
1	D	136	SER	2.6
1	D	91	ASP	2.6
1	D	108	ASP	2.6
1	A	207	ARG	2.6
1	F	102	TRP	2.6
1	C	98	VAL	2.6
1	E	52	ASN	2.6
1	E	106	GLY	2.6
1	A	220	GLU	2.5
1	B	94	PRO	2.5
1	D	80	ARG	2.5
1	E	48	TYR	2.5
1	F	206	LEU	2.5
1	E	167	ASP	2.5
1	D	21	HIS	2.5
1	D	16	LYS	2.5
1	C	102	TRP	2.5
1	E	136	SER	2.5
1	A	94	PRO	2.5
1	F	24	ILE	2.5
1	C	103	ILE	2.5
1	F	47	LYS	2.4
1	D	81	VAL	2.4
1	C	92	ILE	2.4
1	E	218	LEU	2.4
1	B	107	SER	2.4
1	D	60	SER	2.4
1	F	61	ALA	2.4
1	F	217	PRO	2.4
1	E	33	VAL	2.4
1	F	137	SER	2.4
1	E	115	ILE	2.4
1	A	209	TYR	2.4
1	C	95	GLY	2.4
1	A	218	LEU	2.3
1	D	100	GLU	2.3
1	B	139	SER	2.3
1	A	155	GLY	2.3
1	C	248	ASN	2.3
1	F	52	ASN	2.3

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Mol	Chain	Res	Type	RSRZ
1	B	23	LYS	2.3
1	C	155	GLY	2.3
1	E	83	ASN	2.3
1	A	110	LYS	2.3
1	C	148	CYS	2.3
1	D	99	PRO	2.3
1	F	157	ALA	2.3
1	D	247	ASP	2.3
1	A	68	VAL	2.3
1	D	20	VAL	2.3
1	A	59	ILE	2.3
1	C	24	ILE	2.3
1	C	115	ILE	2.3
1	D	66	ALA	2.3
1	D	138	PRO	2.2
1	E	92	ILE	2.2
1	C	241	GLY	2.2
1	F	105	THR	2.2
1	D	48	TYR	2.2
1	C	82	PHE	2.2
1	A	222	ALA	2.2
1	B	100	GLU	2.2
1	E	220	GLU	2.2
1	E	86	ILE	2.2
1	D	102	TRP	2.2
1	E	249	GLY	2.2
1	F	97	GLU	2.2
1	E	152	ASN	2.2
1	A	208	ASP	2.2
1	C	62	ILE	2.2
1	C	47	LYS	2.2
1	F	18	CYS	2.2
1	A	255	HIS	2.1
1	A	221	ASN	2.1
1	C	22	ASP	2.1
1	D	115	ILE	2.1
1	E	198	VAL	2.1
1	B	96	ARG	2.1
1	A	202	ASP	2.1
1	E	69	VAL	2.1
1	E	104	GLN	2.1
1	D	67	ARG	2.1

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Mol	Chain	Res	Type	RSRZ
1	F	65	GLY	2.1
1	C	250	GLU	2.1
1	D	250	GLU	2.1
1	D	275	PRO	2.1
1	E	70	PRO	2.1
1	D	153	LYS	2.1
1	C	132	VAL	2.1
1	E	143	ILE	2.1
1	F	115	ILE	2.1
1	C	218	LEU	2.1
1	B	154	ALA	2.1
1	F	50	ALA	2.1
1	F	103	ILE	2.1
1	C	272	ASP	2.1
1	E	209	TYR	2.1
1	E	64	ALA	2.1
1	A	106	GLY	2.1
1	C	123	GLY	2.1
1	B	97	GLU	2.0
1	A	25	SER	2.0
1	C	33	VAL	2.0
1	C	207	ARG	2.0
1	C	156	ASP	2.0
1	D	213	ASP	2.0
1	E	118	MET	2.0
1	C	137	SER	2.0
1	F	144	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,

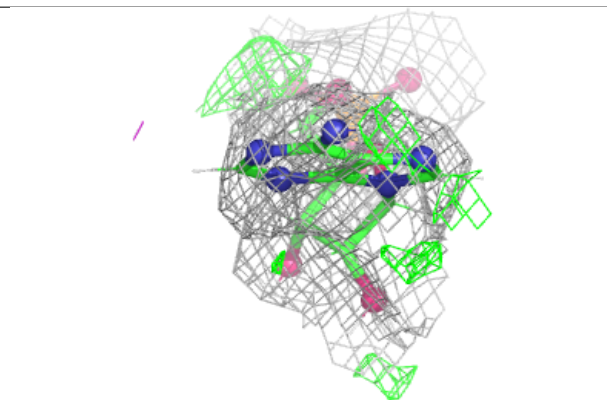
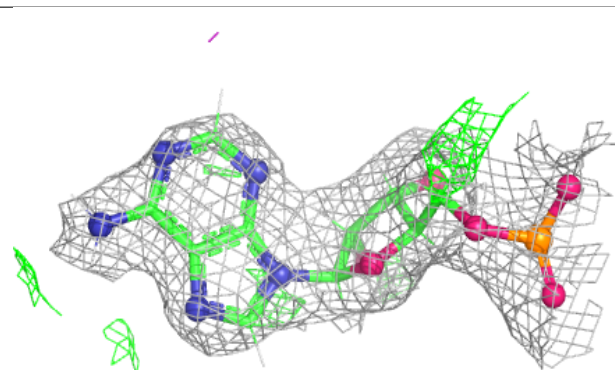
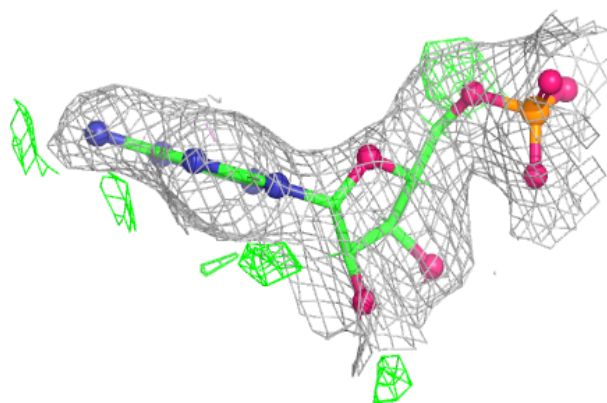
median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
4	MG	E	303	1/1	0.72	0.21	55,55,55,55	0
4	MG	C	303	1/1	0.77	0.24	66,66,66,66	0
3	NA	A	303	1/1	0.78	0.16	41,41,41,41	0
2	AMP	C	301	23/23	0.80	0.15	47,59,89,100	0
4	MG	E	302	1/1	0.81	0.14	44,44,44,44	0
4	MG	D	302	1/1	0.81	0.17	61,61,61,61	0
2	AMP	E	301	23/23	0.89	0.12	35,53,72,77	0
3	NA	A	305	1/1	0.89	0.22	44,44,44,44	0
2	AMP	A	301	23/23	0.90	0.11	34,48,69,74	0
4	MG	B	302	1/1	0.90	0.08	49,49,49,49	0
2	AMP	D	301	23/23	0.91	0.11	37,49,77,87	0
4	MG	A	306	1/1	0.92	0.10	60,60,60,60	0
2	AMP	F	301	23/23	0.92	0.10	38,49,63,75	0
2	AMP	B	301	23/23	0.93	0.10	22,31,46,56	0
3	NA	A	302	1/1	0.94	0.17	39,39,39,39	0
3	NA	A	304	1/1	0.95	0.24	38,38,38,38	0
3	NA	C	302	1/1	0.96	0.08	44,44,44,44	0

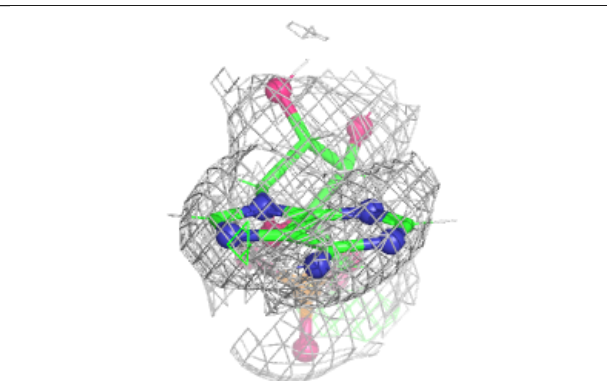
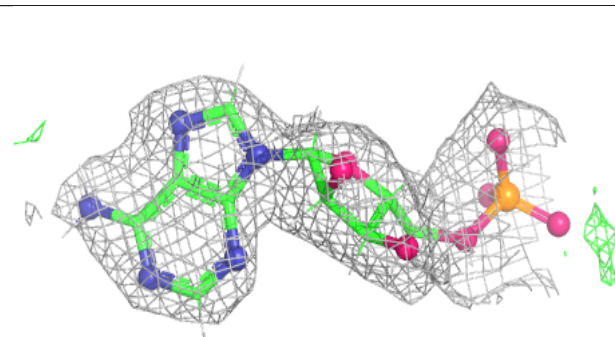
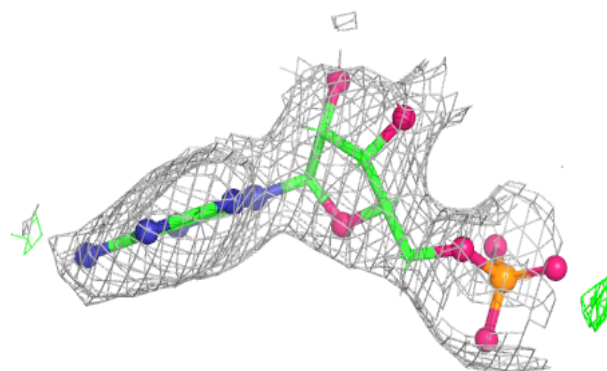
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

Electron density around AMP C 301:

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

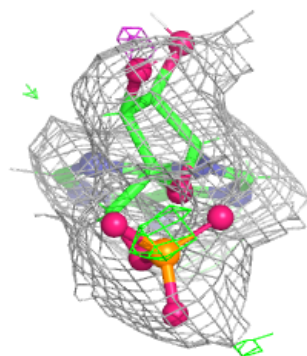
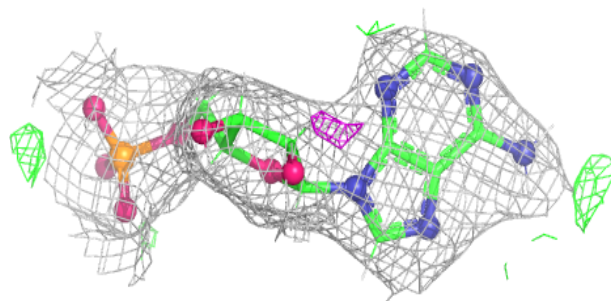
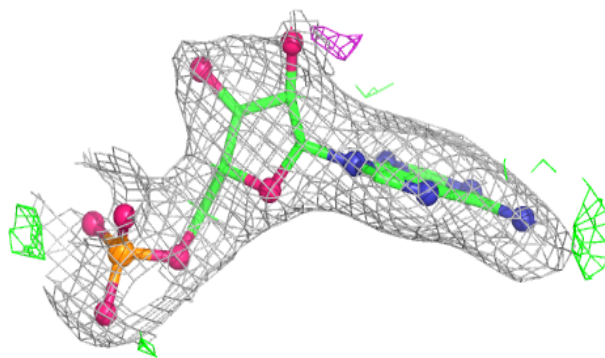
**Electron density around AMP E 301:**

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

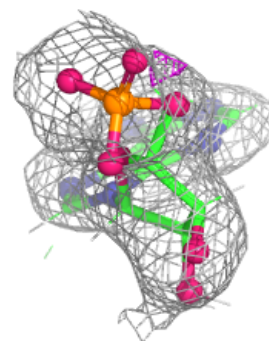
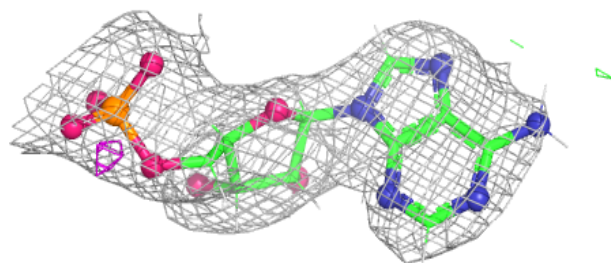
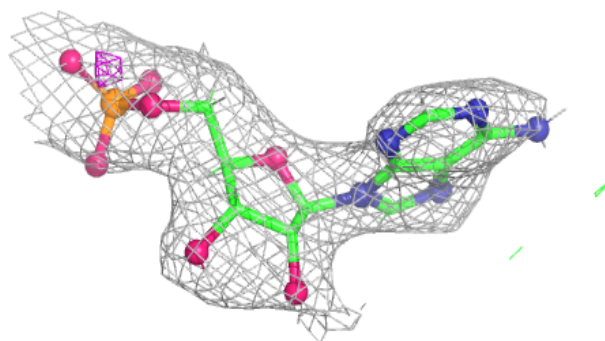


Electron density around AMP A 301:

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

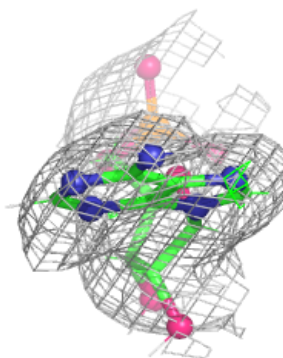
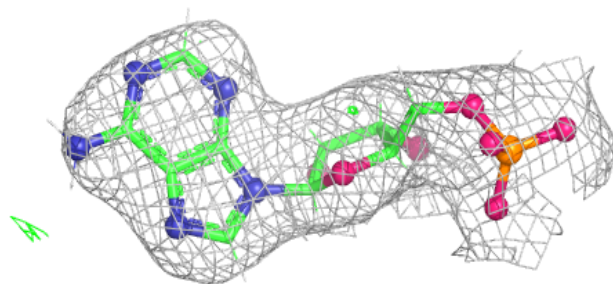
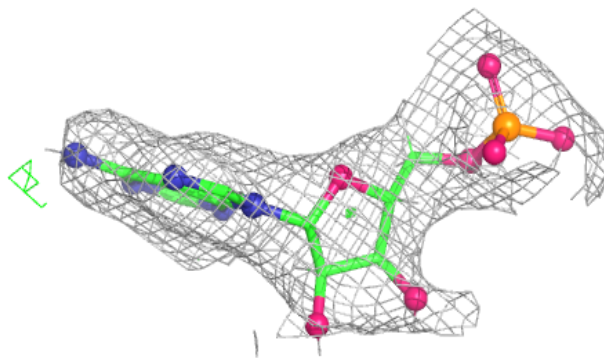
**Electron density around AMP D 301:**

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

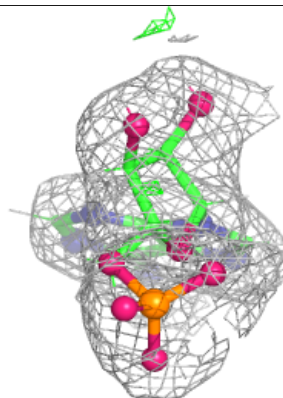
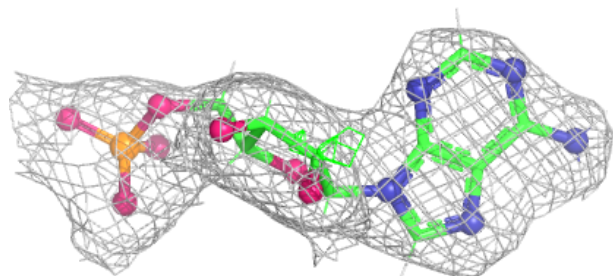
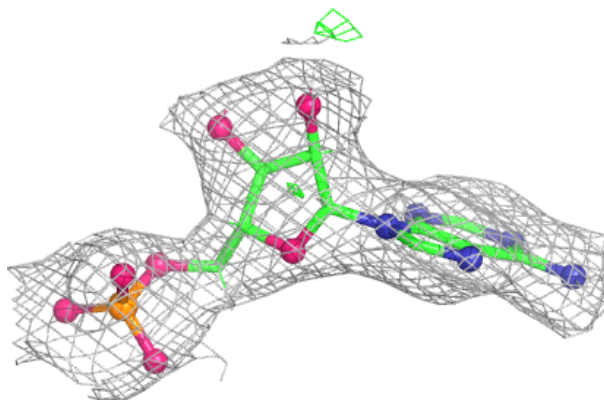


Electron density around AMP F 301:

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

**Electron density around AMP B 301:**

$2mF_o-DF_c$ (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.