



Full wwPDB X-ray Structure Validation Report ⓘ

May 22, 2020 – 04:36 pm BST

PDB ID : 6GD0
Title : Trypanosoma brucei PTR1 in complex with inhibitor 4g (F133)
Authors : Landi, G.; Pozzi, C.; Mangani, S.
Deposited on : 2018-04-20
Resolution : 1.74 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 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 : 2.11
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) : 2.11

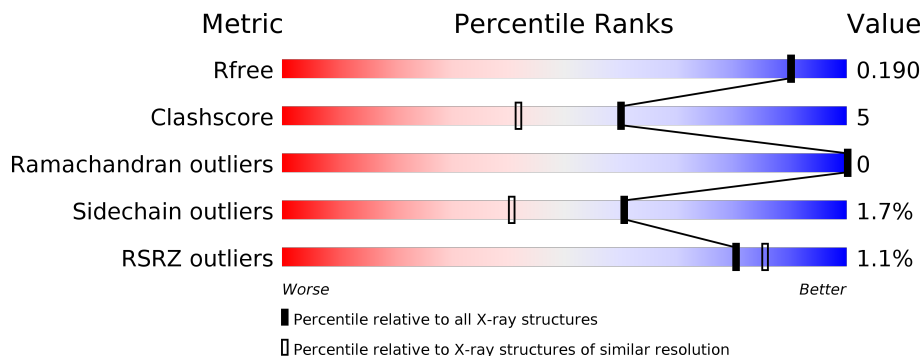
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.74 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	3764 (1.76-1.72)
Clashscore	141614	3923 (1.76-1.72)
Ramachandran outliers	138981	3878 (1.76-1.72)
Sidechain outliers	138945	3878 (1.76-1.72)
RSRZ outliers	127900	3705 (1.76-1.72)

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 on 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	288	 77% 11% 12%
1	B	288	 80% 6% 13%
1	C	288	 74% 9% 17%
1	D	288	 78% 8% 14%

2 Entry composition [i](#)

There are 5 unique types of molecules in this entry. The entry contains 8735 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 Pteridine reductase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	254	1943	1227	340	363	13	0	13	0
1	B	250	1909	1208	332	357	12	0	12	0
1	C	239	1843	1159	327	346	11	0	14	0
1	D	249	1874	1191	325	346	12	0	13	0

There are 80 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-19	MET	-	initiating methionine	UNP O76290
A	-18	GLY	-	expression tag	UNP O76290
A	-17	SER	-	expression tag	UNP O76290
A	-16	SER	-	expression tag	UNP O76290
A	-15	HIS	-	expression tag	UNP O76290
A	-14	HIS	-	expression tag	UNP O76290
A	-13	HIS	-	expression tag	UNP O76290
A	-12	HIS	-	expression tag	UNP O76290
A	-11	HIS	-	expression tag	UNP O76290
A	-10	HIS	-	expression tag	UNP O76290
A	-9	SER	-	expression tag	UNP O76290
A	-8	SER	-	expression tag	UNP O76290
A	-7	GLY	-	expression tag	UNP O76290
A	-6	LEU	-	expression tag	UNP O76290
A	-5	VAL	-	expression tag	UNP O76290
A	-4	PRO	-	expression tag	UNP O76290
A	-3	ARG	-	expression tag	UNP O76290
A	-2	GLY	-	expression tag	UNP O76290
A	-1	SER	-	expression tag	UNP O76290
A	0	HIS	-	expression tag	UNP O76290
B	-19	MET	-	initiating methionine	UNP O76290

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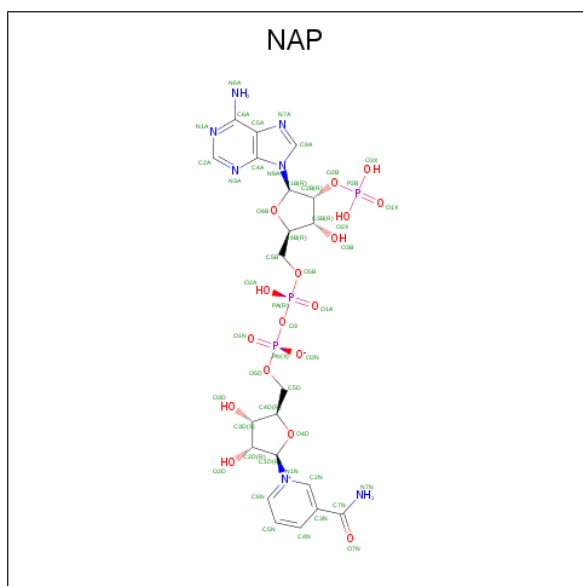
Chain	Residue	Modelled	Actual	Comment	Reference
B	-18	GLY	-	expression tag	UNP O76290
B	-17	SER	-	expression tag	UNP O76290
B	-16	SER	-	expression tag	UNP O76290
B	-15	HIS	-	expression tag	UNP O76290
B	-14	HIS	-	expression tag	UNP O76290
B	-13	HIS	-	expression tag	UNP O76290
B	-12	HIS	-	expression tag	UNP O76290
B	-11	HIS	-	expression tag	UNP O76290
B	-10	HIS	-	expression tag	UNP O76290
B	-9	SER	-	expression tag	UNP O76290
B	-8	SER	-	expression tag	UNP O76290
B	-7	GLY	-	expression tag	UNP O76290
B	-6	LEU	-	expression tag	UNP O76290
B	-5	VAL	-	expression tag	UNP O76290
B	-4	PRO	-	expression tag	UNP O76290
B	-3	ARG	-	expression tag	UNP O76290
B	-2	GLY	-	expression tag	UNP O76290
B	-1	SER	-	expression tag	UNP O76290
B	0	HIS	-	expression tag	UNP O76290
C	-19	MET	-	initiating methionine	UNP O76290
C	-18	GLY	-	expression tag	UNP O76290
C	-17	SER	-	expression tag	UNP O76290
C	-16	SER	-	expression tag	UNP O76290
C	-15	HIS	-	expression tag	UNP O76290
C	-14	HIS	-	expression tag	UNP O76290
C	-13	HIS	-	expression tag	UNP O76290
C	-12	HIS	-	expression tag	UNP O76290
C	-11	HIS	-	expression tag	UNP O76290
C	-10	HIS	-	expression tag	UNP O76290
C	-9	SER	-	expression tag	UNP O76290
C	-8	SER	-	expression tag	UNP O76290
C	-7	GLY	-	expression tag	UNP O76290
C	-6	LEU	-	expression tag	UNP O76290
C	-5	VAL	-	expression tag	UNP O76290
C	-4	PRO	-	expression tag	UNP O76290
C	-3	ARG	-	expression tag	UNP O76290
C	-2	GLY	-	expression tag	UNP O76290
C	-1	SER	-	expression tag	UNP O76290
C	0	HIS	-	expression tag	UNP O76290
D	-19	MET	-	initiating methionine	UNP O76290
D	-18	GLY	-	expression tag	UNP O76290
D	-17	SER	-	expression tag	UNP O76290

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Chain	Residue	Modelled	Actual	Comment	Reference
D	-16	SER	-	expression tag	UNP O76290
D	-15	HIS	-	expression tag	UNP O76290
D	-14	HIS	-	expression tag	UNP O76290
D	-13	HIS	-	expression tag	UNP O76290
D	-12	HIS	-	expression tag	UNP O76290
D	-11	HIS	-	expression tag	UNP O76290
D	-10	HIS	-	expression tag	UNP O76290
D	-9	SER	-	expression tag	UNP O76290
D	-8	SER	-	expression tag	UNP O76290
D	-7	GLY	-	expression tag	UNP O76290
D	-6	LEU	-	expression tag	UNP O76290
D	-5	VAL	-	expression tag	UNP O76290
D	-4	PRO	-	expression tag	UNP O76290
D	-3	ARG	-	expression tag	UNP O76290
D	-2	GLY	-	expression tag	UNP O76290
D	-1	SER	-	expression tag	UNP O76290
D	0	HIS	-	expression tag	UNP O76290

- Molecule 2 is NADP NICOTINAMIDE-ADENINE-DINUCLEOTIDE PHOSPHATE (three-letter code: NAP) (formula: $C_{21}H_{28}N_7O_{17}P_3$).



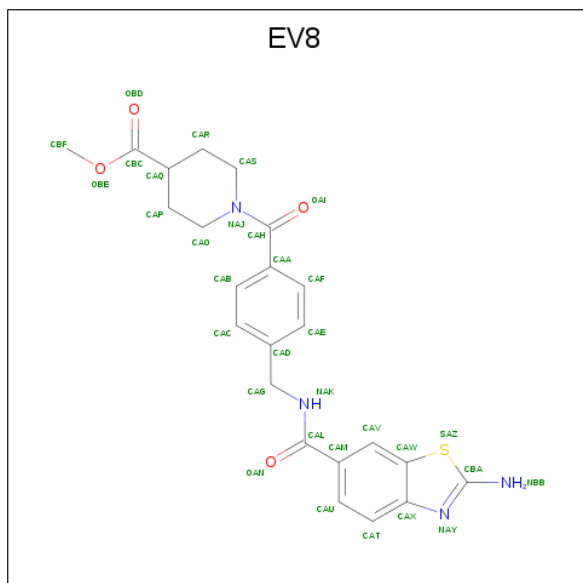
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	
			Total	C	N	O			P
2	A	1	Total	C	N	O	P	0	0
			48	21	7	17	3		
2	B	1	Total	C	N	O	P	0	0
			48	21	7	17	3		

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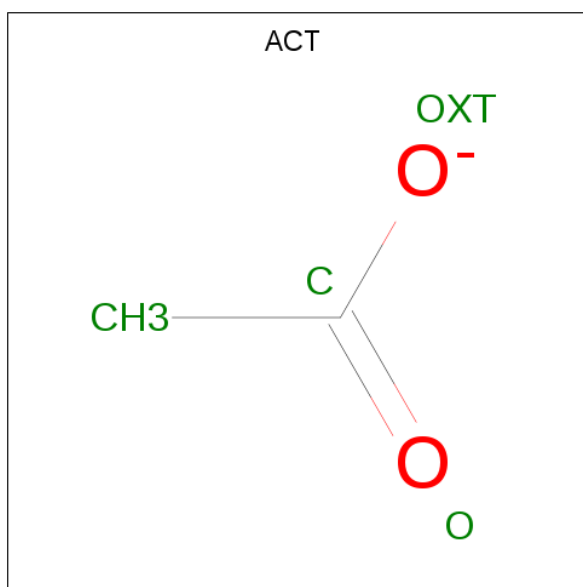
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	
2	C	1	Total	C	N	O	P	0	0
			48	21	7	17	3		
2	D	1	Total	C	N	O	P	0	0
			48	21	7	17	3		

- Molecule 3 is methyl 1-[4-[(2-azanyl-1,3-benzothiazol-6-yl)carbonylamino]methyl]phenyl]carbonylpiperidine-4-carboxylate (three-letter code: EV8) (formula: C₂₃H₂₄N₄O₄S).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	
3	A	1	Total	C	N	O	S	0	0
			32	23	4	4	1		
3	B	1	Total	C	N	O	S	0	0
			23	16	4	2	1		
3	D	1	Total	C	N	O	S	0	0
			23	16	4	2	1		

- Molecule 4 is ACETATE ION (three-letter code: ACT) (formula: C₂H₃O₂).



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

- Molecule 5 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	A	230	Total O 230 230	0	0
5	B	253	Total O 253 253	0	6
5	C	204	Total O 204 204	0	3
5	D	201	Total O 201 201	0	3



4 Data and refinement statistics i

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	74.96Å 91.12Å 82.97Å 90.00° 115.90° 90.00°	Depositor
Resolution (Å)	67.43 – 1.74 67.43 – 1.74	Depositor EDS
% Data completeness (in resolution range)	99.6 (67.43-1.74) 99.6 (67.43-1.74)	Depositor EDS
R_{merge}	0.06	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	5.83 (at 1.74Å)	Xtrriage
Refinement program	REFMAC 5.8.0222	Depositor
R, R_{free}	0.154 , 0.190 0.154 , 0.190	Depositor DCC
R_{free} test set	5070 reflections (4.95%)	wwPDB-VP
Wilson B-factor (Å ²)	13.0	Xtrriage
Anisotropy	0.114	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.34 , 48.3	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtrriage
Estimated twinning fraction	0.012 for h,-k,-h-l	Xtrriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	8735	wwPDB-VP
Average B, all atoms (Å ²)	16.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 37.16 % of the origin peak, indicating pseudo-translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo-translational symmetry is equal to 4.4760e-04. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

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: EV8, NAP, ACT

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	0.71	0/2000	0.76	0/2713
1	B	0.72	0/1969	0.81	0/2673
1	C	0.71	0/1889	0.76	0/2563
1	D	0.70	0/1937	0.78	0/2633
All	All	0.71	0/7795	0.78	0/10582

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	1943	0	1993	26	0
1	B	1909	0	1952	16	0
1	C	1843	0	1857	22	0
1	D	1874	0	1912	21	0
2	A	48	0	25	2	0
2	B	48	0	25	3	0
2	C	48	0	25	1	0
2	D	48	0	25	3	0
3	A	32	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	B	23	0	0	1	0
3	D	23	0	0	0	0
4	A	4	0	3	0	0
4	D	4	0	3	1	0
5	A	230	0	0	3	0
5	B	253	0	0	0	0
5	C	204	0	0	4	0
5	D	201	0	0	2	0
All	All	8735	0	7820	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 5.

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)
1:C:230[A]:ARG:HB3	5:C:448:HOH:O	1.63	0.98
1:C:190[B]:LEU:HD21	1:D:265:LEU:HB2	1.72	0.72
4:D:303:ACT:H2	5:D:579:HOH:O	1.92	0.68
1:A:22:LYS:HG2	1:A:242:ILE:HG13	1.77	0.67
1:B:247:GLY:HA2	1:B:250[A]:GLN:HG3	1.77	0.66
1:B:206[B]:VAL:HG23	1:B:263:LEU:HD22	1.78	0.66
1:A:190[A]:LEU:HD12	1:C:167:PRO:HG2	1.79	0.64
1:B:167:PRO:HG2	1:D:190[B]:LEU:HD12	1.79	0.64
1:A:189:ALA:CA	1:A:199[B]:VAL:HG22	2.27	0.64
1:C:225:VAL:O	1:C:229[A]:ARG:HD3	1.98	0.64
1:A:64[B]:THR:HG23	2:A:301:NAP:H62A	1.62	0.62
1:D:213:MET:HE3	1:D:217:GLU:HB3	1.81	0.62
1:B:104:GLN:H	1:D:140:GLN:HE22	1.47	0.61
1:A:250:GLN:CD	1:B:236:GLN:HE21	2.03	0.61
1:C:232[A]:ALA:HB2	1:D:251:TYR:CE2	2.36	0.61
1:B:15:ILE:HB	2:B:301:NAP:H51N	1.85	0.58
1:A:189:ALA:HA	1:A:199[B]:VAL:HG22	1.85	0.58
1:C:230[A]:ARG:CB	5:C:448:HOH:O	2.34	0.56
1:A:250:GLN:NE2	5:A:401:HOH:O	2.36	0.55
1:A:64[B]:THR:CG2	1:A:122:GLU:HG2	2.36	0.55
1:A:64[B]:THR:HG22	1:A:122:GLU:HG2	1.89	0.55
1:C:122:GLU:O	1:C:126:THR:HG23	2.07	0.54
1:A:141:ARG:HG2	5:A:563:HOH:O	2.07	0.54
1:D:140:GLN:NE2	5:D:403:HOH:O	2.39	0.53
1:D:164:VAL:HG22	1:D:179:HIS:CD2	2.43	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:222:ARG:HB3	1:C:229[A]:ARG:O	2.08	0.53
1:C:65:ASN:HA	1:C:69:LEU:HD22	1.90	0.53
1:B:167:PRO:HG2	1:D:190[B]:LEU:CD1	2.38	0.53
1:A:65:ASN:HA	1:A:69:LEU:HD22	1.92	0.52
1:C:205:GLY:O	2:C:301:NAP:H4N	2.10	0.51
1:D:9:THR:HA	1:D:33:HIS:HB3	1.93	0.51
1:A:210:PRO:HD2	1:A:213:MET:CE	2.42	0.49
1:C:9:THR:HA	1:C:33:HIS:HB3	1.95	0.49
1:D:65:ASN:HA	1:D:69:LEU:HD22	1.94	0.49
1:A:193:ALA:HB3	1:A:194:PRO:HD3	1.95	0.49
1:C:230[A]:ARG:HB3	5:C:473:HOH:O	2.12	0.48
1:C:123:LEU:O	1:C:127[A]:ASN:HB2	2.13	0.48
1:B:164:VAL:HG22	1:B:179:HIS:CD2	2.49	0.47
1:D:133:LEU:HD23	1:D:136[B]:MET:CE	2.44	0.47
1:A:22:LYS:CE	1:A:235:GLU:HG3	2.45	0.46
1:D:133:LEU:HD23	1:D:136[B]:MET:HE3	1.98	0.45
1:A:213:MET:HG3	1:A:217:GLU:HB3	1.97	0.45
1:C:232[A]:ALA:HA	1:C:236:GLN:OE1	2.17	0.45
1:A:236:GLN:HE21	1:B:250[B]:GLN:HG3	1.81	0.45
2:B:301:NAP:H2D	3:B:302:EV8:CBA	2.46	0.45
1:B:35:HIS:HB2	2:B:301:NAP:C2A	2.47	0.44
1:A:156:ILE:HB	1:A:199[B]:VAL:HG12	2.00	0.44
1:D:15:ILE:HB	2:D:301:NAP:H51N	2.00	0.44
1:A:15:ILE:HB	2:A:301:NAP:H51N	2.00	0.44
1:C:232[A]:ALA:HB2	1:D:251:TYR:CD2	2.53	0.43
1:C:230[B]:ARG:CD	1:D:250[B]:GLN:HG3	2.48	0.43
1:C:222:ARG:O	1:C:229[A]:ARG:HA	2.17	0.43
5:A:522:HOH:O	1:B:250[B]:GLN:HG2	2.18	0.43
1:A:9:THR:HA	1:A:33:HIS:HB3	2.00	0.43
1:A:236:GLN:NE2	1:B:250[B]:GLN:HG3	2.33	0.42
1:D:35:HIS:HB2	2:D:301:NAP:C2A	2.50	0.42
1:A:102:LEU:O	1:C:136[B]:MET:HG3	2.19	0.42
1:A:210:PRO:HD2	1:A:213:MET:HE1	2.01	0.42
1:C:128:ALA:C	1:C:131:PRO:HD2	2.40	0.42
1:A:189:ALA:N	1:A:199[B]:VAL:CG2	2.83	0.42
1:A:225:VAL:O	1:A:229:ARG:HD3	2.19	0.42
1:C:177:GLY:HA3	5:C:402:HOH:O	2.20	0.41
1:D:205:GLY:O	2:D:301:NAP:H4N	2.20	0.41
1:B:9:THR:HA	1:B:33:HIS:HB3	2.02	0.41
1:D:230[A]:ARG:HH21	1:D:236:GLN:HE22	1.68	0.41
1:D:78:ASN:OD1	1:D:141:ARG:NH1	2.50	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:125:GLY:HA2	1:B:129[A]:ILE:HB	2.03	0.41
1:B:67[B]:ASN:HA	1:D:117:GLU:HG3	2.03	0.41
1:A:169:MET:SD	1:C:191:GLU:HA	2.61	0.41
1:C:224:LYS:C	1:C:229[A]:ARG:NH1	2.74	0.41
1:A:78:ASN:OD1	1:A:141:ARG:NH1	2.47	0.40
1:B:103:VAL:HG21	1:D:195:TYR:CZ	2.56	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	260/288 (90%)	251 (96%)	9 (4%)	0	100	100
1	B	256/288 (89%)	248 (97%)	8 (3%)	0	100	100
1	C	245/288 (85%)	236 (96%)	9 (4%)	0	100	100
1	D	255/288 (88%)	246 (96%)	9 (4%)	0	100	100
All	All	1016/1152 (88%)	981 (97%)	35 (3%)	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	210/231 (91%)	206 (98%)	4 (2%)	57	36
1	B	205/231 (89%)	200 (98%)	5 (2%)	49	26
1	C	194/231 (84%)	191 (98%)	3 (2%)	65	47
1	D	199/231 (86%)	196 (98%)	3 (2%)	65	47
All	All	808/924 (87%)	793 (98%)	15 (2%)	60	36

All (15) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	149[A]	CYS
1	A	152	SER
1	A	209	LEU
1	A	216	GLU
1	B	2	GLU
1	B	67[A]	ASN
1	B	67[B]	ASN
1	B	179	HIS
1	B	230	ARG
1	C	141	ARG
1	C	179	HIS
1	C	250	GLN
1	D	179	HIS
1	D	250[A]	GLN
1	D	250[B]	GLN

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (6) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	236	GLN
1	B	54	ASN
1	B	65	ASN
1	B	179	HIS
1	B	236	GLN
1	D	140	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 carbohydrates in this entry.

5.6 Ligand geometry [i](#)

9 ligands are modelled in this entry.

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	NAP	D	301	-	45,52,52	1.16	2 (4%)	56,80,80	1.38	7 (12%)
4	ACT	D	303	-	1,3,3	4.22	1 (100%)	0,3,3	0.00	-
4	ACT	A	303	-	1,3,3	3.09	1 (100%)	0,3,3	0.00	-
2	NAP	A	301	-	45,52,52	1.32	6 (13%)	56,80,80	1.26	5 (8%)
2	NAP	C	301	-	45,52,52	1.18	3 (6%)	56,80,80	1.46	7 (12%)
3	EV8	B	302	-	22,25,35	2.11	6 (27%)	30,35,49	1.61	8 (26%)
3	EV8	A	302	-	32,35,35	1.90	8 (25%)	44,49,49	1.55	8 (18%)
3	EV8	D	302	-	22,25,35	2.15	5 (22%)	30,35,49	1.34	4 (13%)
2	NAP	B	301	-	45,52,52	1.17	3 (6%)	56,80,80	1.56	11 (19%)

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	NAP	D	301	-	-	1/31/67/67	0/5/5/5
2	NAP	A	301	-	-	0/31/67/67	0/5/5/5
2	NAP	C	301	-	-	1/31/67/67	0/5/5/5
3	EV8	B	302	-	-	4/13/13/33	0/3/3/4

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	EV8	A	302	-	-	2/23/33/33	1/4/4/4
3	EV8	D	302	-	-	4/13/13/33	0/3/3/4
2	NAP	B	301	-	-	0/31/67/67	0/5/5/5

All (35) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	D	302	EV8	CAA-CAH	-5.76	1.41	1.50
3	B	302	EV8	CAA-CAH	-5.15	1.42	1.50
3	A	302	EV8	CAA-CAH	-4.62	1.42	1.50
3	A	302	EV8	CAM-CAL	-4.47	1.40	1.50
3	D	302	EV8	CAM-CAL	-4.42	1.41	1.50
4	D	303	ACT	CH3-C	4.22	1.54	1.48
3	B	302	EV8	CAT-CAX	-3.71	1.35	1.41
2	C	301	NAP	C2A-N3A	3.56	1.37	1.32
3	A	302	EV8	CAG-CAD	-3.54	1.43	1.51
2	A	301	NAP	C2N-N1N	3.41	1.39	1.35
3	D	302	EV8	CAT-CAX	-3.41	1.35	1.41
2	C	301	NAP	C5A-C4A	3.37	1.49	1.40
3	B	302	EV8	CAM-CAL	-3.34	1.43	1.50
2	B	301	NAP	C4A-N3A	3.33	1.40	1.35
2	A	301	NAP	O4D-C1D	3.14	1.45	1.41
3	D	302	EV8	CAG-CAD	-3.10	1.44	1.51
4	A	303	ACT	CH3-C	3.09	1.52	1.48
2	D	301	NAP	P2B-O2B	3.06	1.65	1.59
2	A	301	NAP	C2A-N1A	2.76	1.39	1.33
3	B	302	EV8	CAG-CAD	-2.76	1.45	1.51
3	B	302	EV8	CAV-CAM	2.64	1.42	1.37
3	B	302	EV8	CAT-CAU	2.63	1.42	1.36
2	B	301	NAP	O4D-C1D	2.52	1.44	1.41
3	A	302	EV8	CAT-CAX	-2.47	1.37	1.41
3	A	302	EV8	CAG-NAK	2.47	1.50	1.46
2	C	301	NAP	O2D-C2D	2.45	1.48	1.43
3	A	302	EV8	OBE-CBC	2.44	1.39	1.33
2	A	301	NAP	C2A-N3A	2.44	1.36	1.32
3	A	302	EV8	CAT-CAU	2.40	1.41	1.36
2	A	301	NAP	C4A-N3A	2.29	1.38	1.35
3	A	302	EV8	CAS-NAJ	2.29	1.51	1.47
2	A	301	NAP	C5A-C4A	2.17	1.46	1.40
2	D	301	NAP	C2N-N1N	2.07	1.37	1.35
3	D	302	EV8	CAT-CAU	2.05	1.40	1.36
2	B	301	NAP	C5A-C4A	2.04	1.46	1.40

All (50) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	301	NAP	O7N-C7N-C3N	-5.20	113.41	119.63
2	D	301	NAP	C1B-N9A-C4A	-4.90	118.03	126.64
3	A	302	EV8	CAD-CAG-NAK	-4.80	102.77	113.05
2	D	301	NAP	O7N-C7N-C3N	-4.64	114.08	119.63
2	A	301	NAP	C1B-N9A-C4A	-4.26	119.15	126.64
2	C	301	NAP	O2B-P2B-O1X	-4.02	93.86	109.39
2	C	301	NAP	C3N-C7N-N7N	3.99	122.54	117.75
3	D	302	EV8	CAD-CAG-NAK	-3.97	104.55	113.05
2	C	301	NAP	C1B-N9A-C4A	-3.89	119.81	126.64
3	A	302	EV8	OBE-CBC-CAQ	3.87	117.68	111.76
3	B	302	EV8	CAT-CAU-CAM	-3.73	116.57	120.79
2	B	301	NAP	C1B-N9A-C4A	-3.69	120.16	126.64
3	D	302	EV8	NBB-CBA-NAY	3.20	127.32	123.19
2	B	301	NAP	C6N-N1N-C2N	3.19	124.88	121.97
3	A	302	EV8	CAT-CAU-CAM	-3.08	117.32	120.79
3	B	302	EV8	CAV-CAW-SAZ	3.07	131.23	125.10
2	D	301	NAP	N3A-C2A-N1A	-2.94	124.08	128.68
3	B	302	EV8	NBB-CBA-NAY	2.92	126.97	123.19
2	B	301	NAP	C3N-C2N-N1N	-2.90	117.59	120.43
2	C	301	NAP	C4A-C5A-N7A	-2.82	106.46	109.40
2	B	301	NAP	C3N-C7N-N7N	2.81	121.12	117.75
3	B	302	EV8	CAD-CAG-NAK	-2.80	107.04	113.05
3	A	302	EV8	CAA-CAH-NAJ	2.76	122.22	118.72
3	A	302	EV8	NBB-CBA-NAY	2.75	126.75	123.19
3	D	302	EV8	CAW-CAX-NAY	2.70	114.33	108.04
2	A	301	NAP	N6A-C6A-N1A	2.70	124.17	118.57
2	A	301	NAP	O4B-C4B-C3B	-2.64	99.88	105.11
2	D	301	NAP	C3N-C7N-N7N	2.58	120.85	117.75
3	B	302	EV8	CAX-CAW-SAZ	-2.57	108.45	111.85
3	A	302	EV8	CAO-NAJ-CAS	2.55	117.53	112.62
3	B	302	EV8	CAG-NAK-CAL	-2.54	115.80	121.81
2	C	301	NAP	O3X-P2B-O1X	2.42	120.16	110.68
3	B	302	EV8	OAN-CAL-NAK	-2.41	117.80	122.61
2	A	301	NAP	O3X-P2B-O1X	2.40	120.06	110.68
2	B	301	NAP	C2A-N1A-C6A	2.38	122.83	118.75
2	C	301	NAP	C2A-N1A-C6A	2.33	122.75	118.75
3	A	302	EV8	CAW-CAX-NAY	2.29	113.36	108.04
3	B	302	EV8	CAW-CAX-NAY	2.28	113.34	108.04
2	C	301	NAP	N6A-C6A-N1A	2.22	123.18	118.57
2	B	301	NAP	C4A-C5A-N7A	-2.19	107.12	109.40
2	D	301	NAP	O3X-P2B-O2X	2.17	115.92	107.64
2	B	301	NAP	N3A-C2A-N1A	-2.15	125.32	128.68

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	D	301	NAP	C2A-N1A-C6A	2.15	122.43	118.75
2	B	301	NAP	C2D-C3D-C4D	2.12	106.76	102.64
2	B	301	NAP	O2A-PA-O1A	2.10	122.64	112.24
3	A	302	EV8	CAV-CAW-SAZ	2.10	129.29	125.10
2	A	301	NAP	N3A-C2A-N1A	-2.09	125.41	128.68
3	D	302	EV8	CAX-CAW-SAZ	-2.06	109.12	111.85
2	B	301	NAP	O7N-C7N-N7N	2.03	125.46	122.58
2	D	301	NAP	O2B-P2B-O1X	-2.01	101.64	109.39

There are no chirality outliers.

All (12) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	302	EV8	OBD-CBC-OBE-CBF
3	A	302	EV8	CAQ-CBC-OBE-CBF
3	D	302	EV8	CAF-CAA-CAH-NAJ
3	D	302	EV8	CAF-CAA-CAH-OAI
3	D	302	EV8	CAB-CAA-CAH-NAJ
3	D	302	EV8	CAB-CAA-CAH-OAI
3	B	302	EV8	CAF-CAA-CAH-NAJ
3	B	302	EV8	CAB-CAA-CAH-NAJ
3	B	302	EV8	CAF-CAA-CAH-OAI
3	B	302	EV8	CAB-CAA-CAH-OAI
2	D	301	NAP	C5B-O5B-PA-O1A
2	C	301	NAP	C5B-O5B-PA-O1A

All (1) ring outliers are listed below:

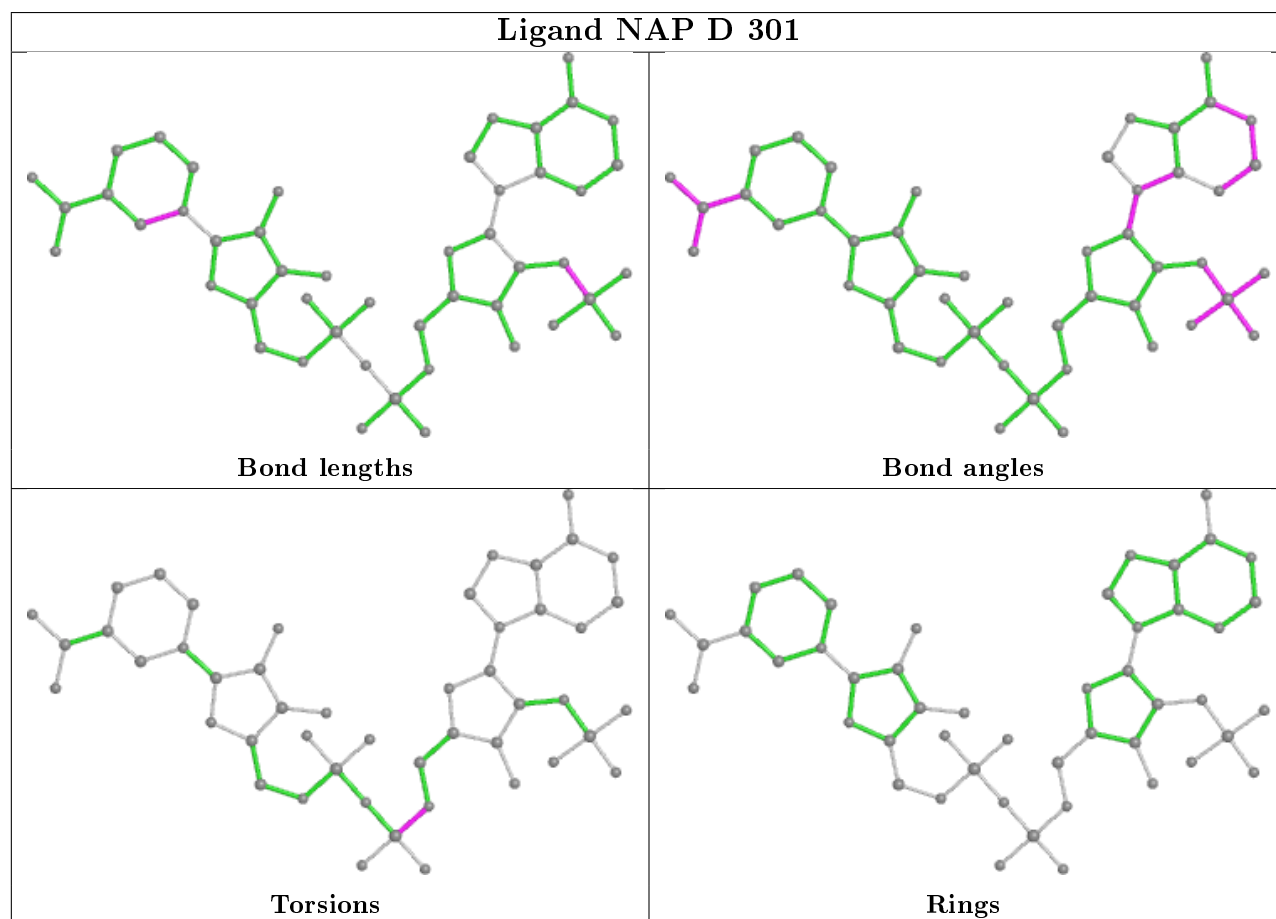
Mol	Chain	Res	Type	Atoms
3	A	302	EV8	CAO-CAP-CAQ-CAR-CAS-NAJ

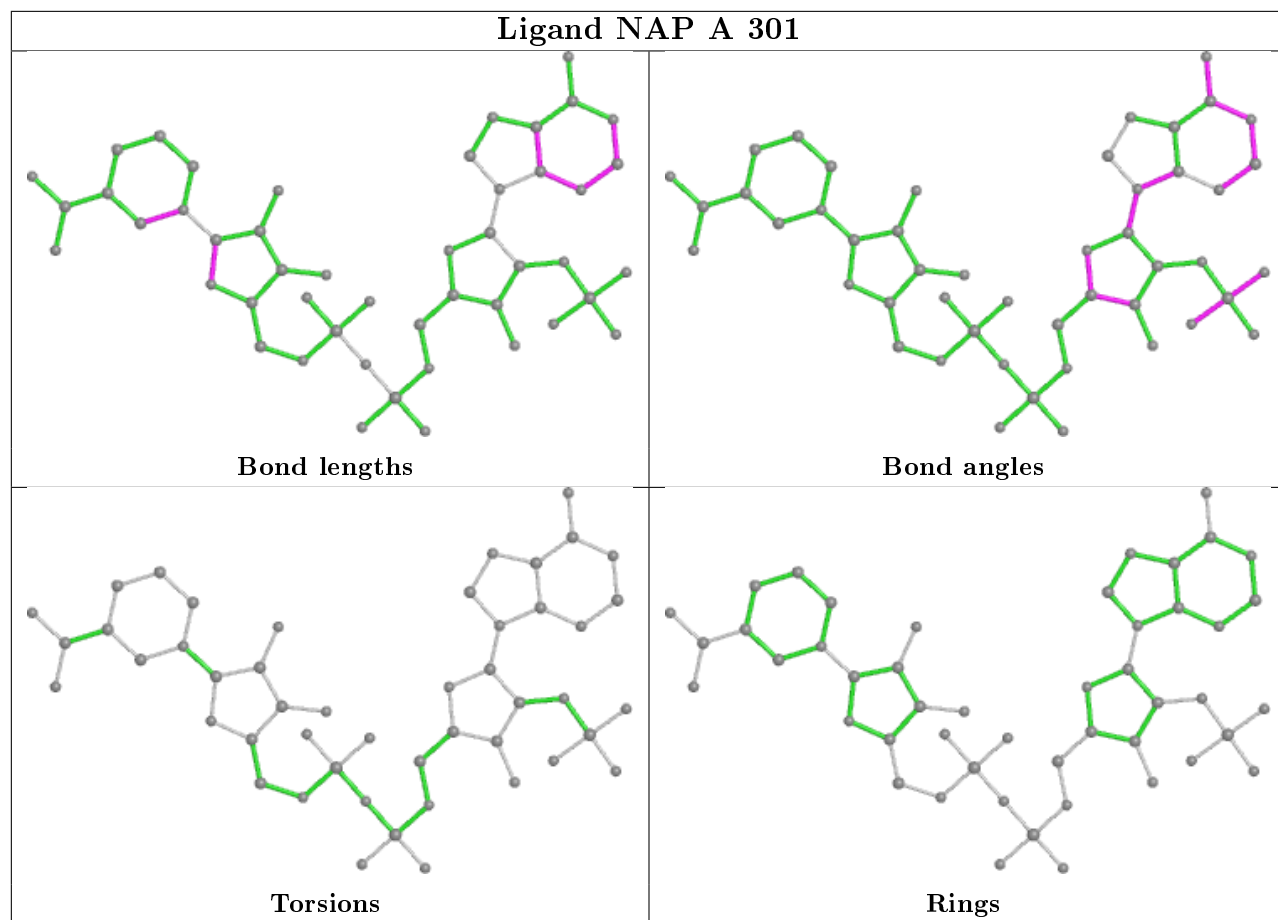
6 monomers are involved in 10 short contacts:

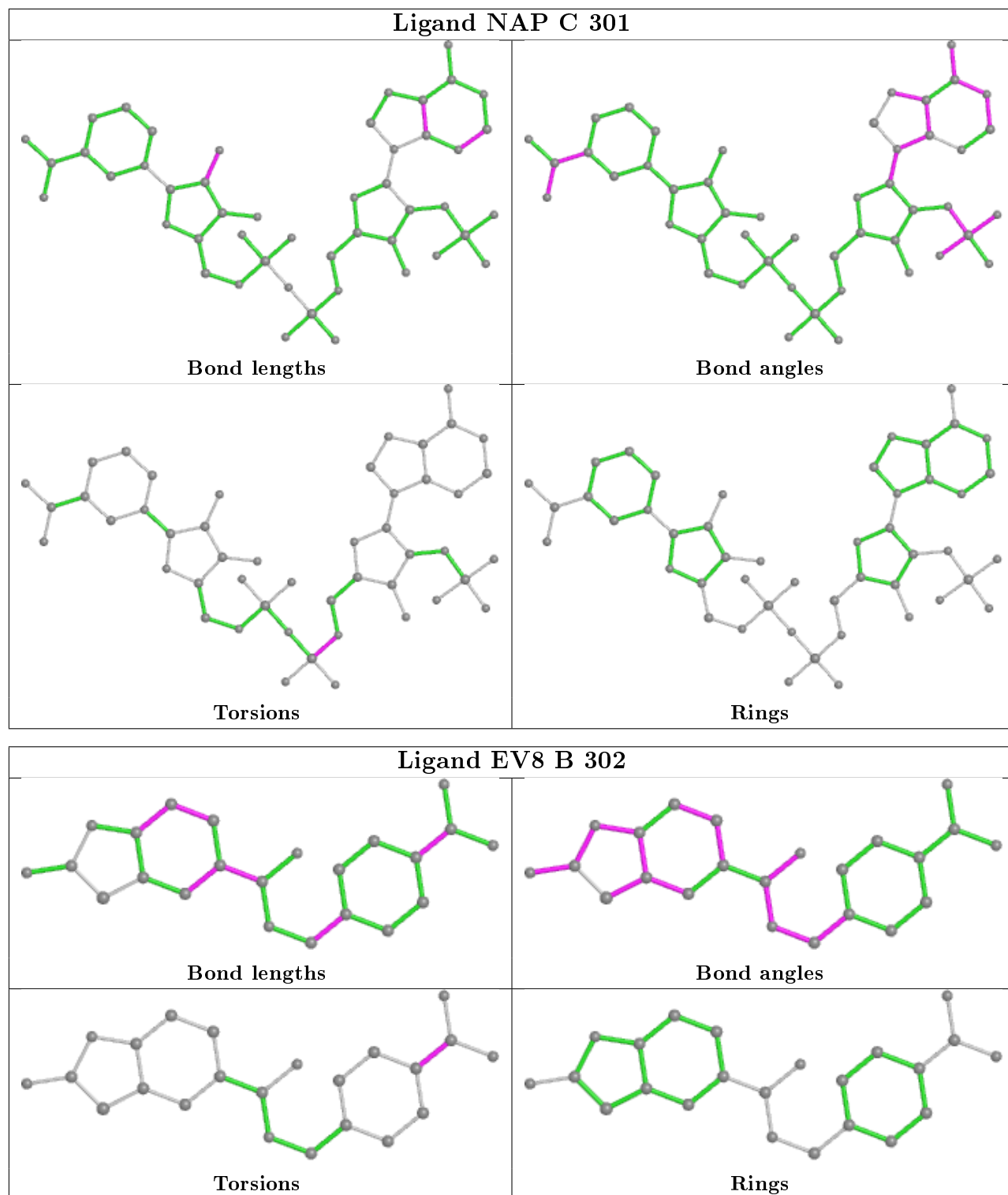
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	D	301	NAP	3	0
4	D	303	ACT	1	0
2	A	301	NAP	2	0
2	C	301	NAP	1	0
3	B	302	EV8	1	0
2	B	301	NAP	3	0

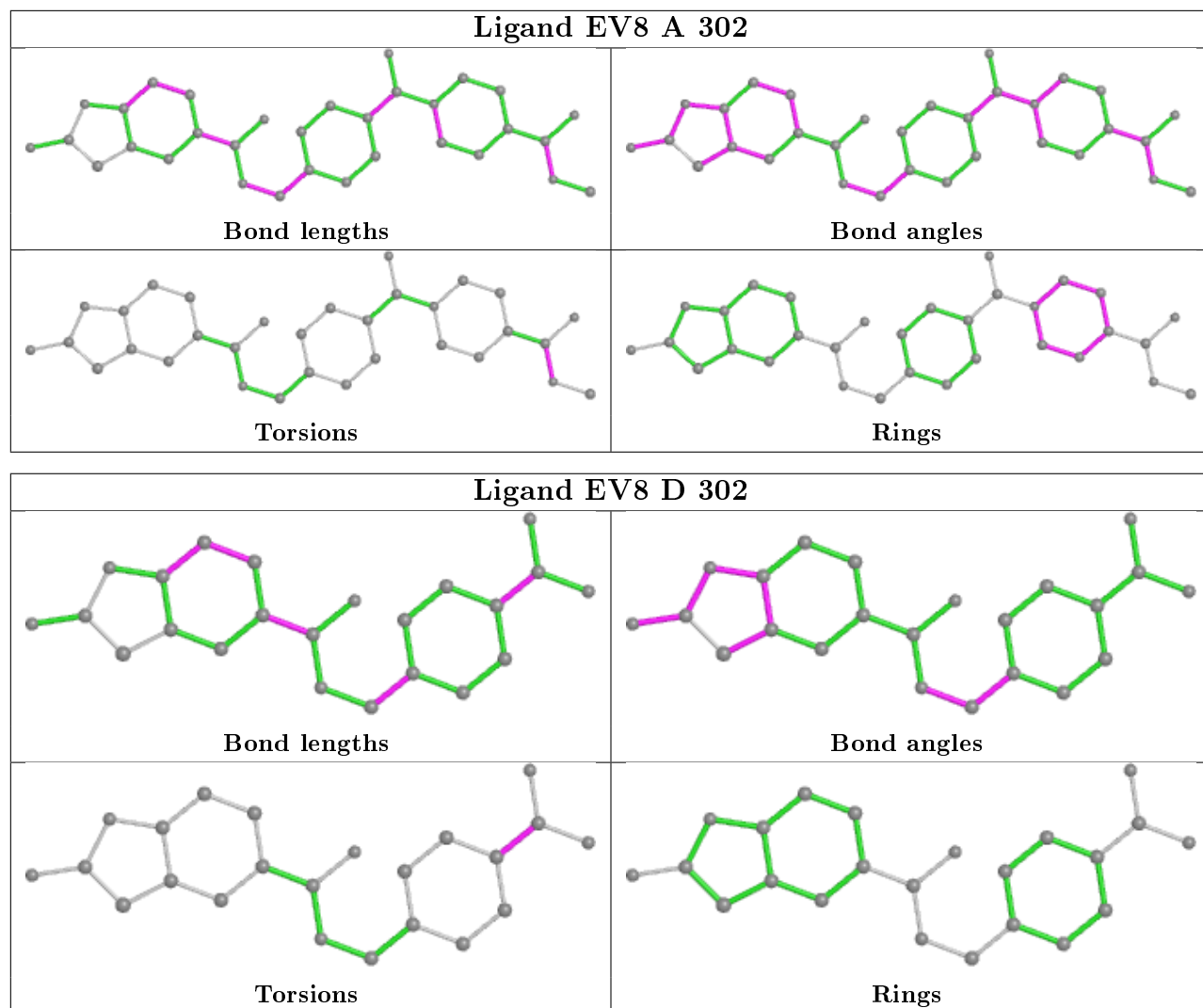
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths,

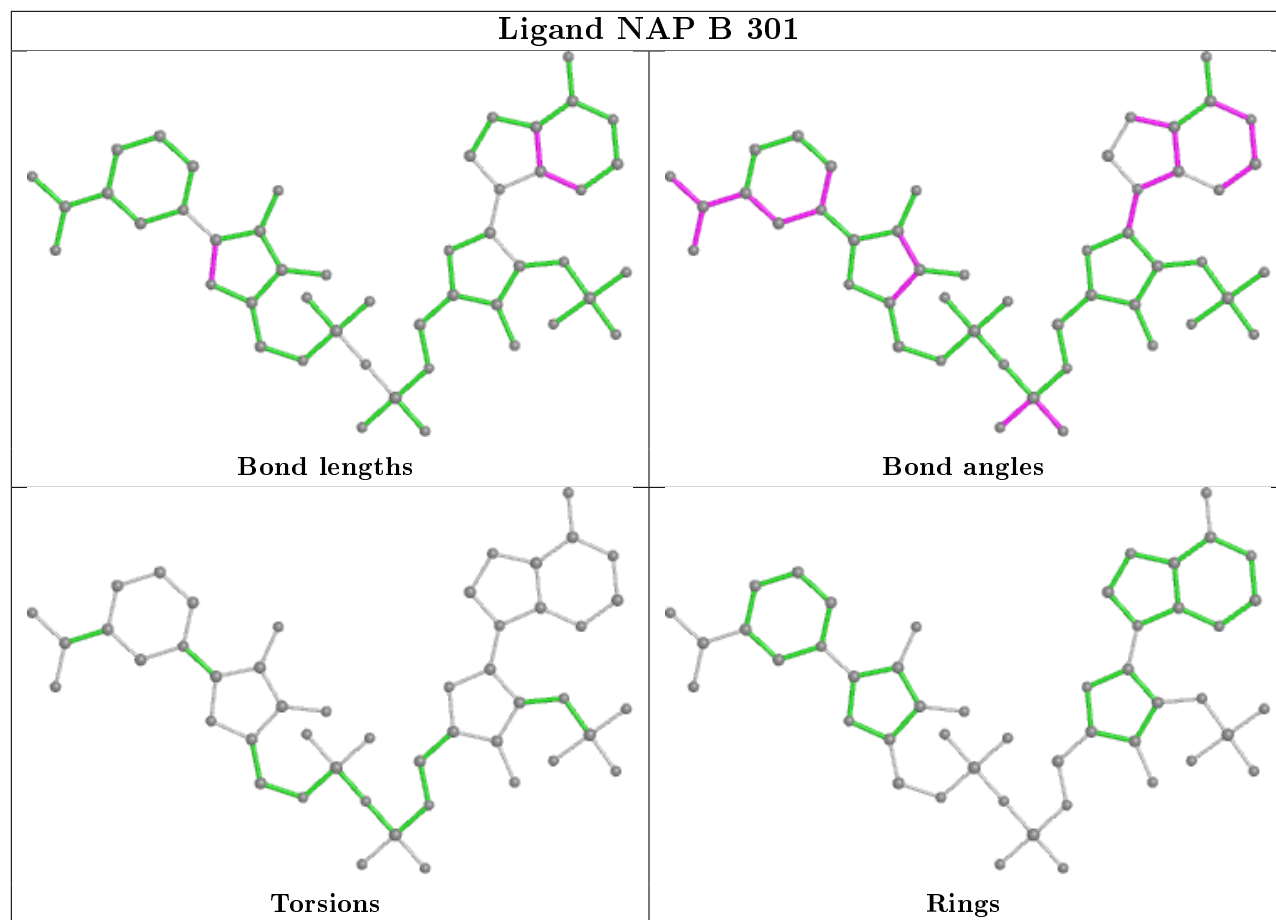
bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within 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	254/288 (88%)	-0.39	3 (1%) 79 84	6, 13, 29, 55	12 (4%)
1	B	250/288 (86%)	-0.48	2 (0%) 86 90	6, 11, 27, 50	1 (0%)
1	C	239/288 (82%)	-0.40	4 (1%) 70 76	7, 14, 28, 47	10 (4%)
1	D	249/288 (86%)	-0.47	2 (0%) 86 90	6, 13, 29, 49	5 (2%)
All	All	992/1152 (86%)	-0.44	11 (1%) 80 85	6, 13, 28, 55	28 (2%)

All (11) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	113	GLY	4.0
1	A	149[A]	CYS	3.8
1	B	152	SER	3.2
1	B	211	VAL	3.0
1	C	221	TRP	2.8
1	C	152	SER	2.8
1	A	143	LYS	2.7
1	D	152	SER	2.6
1	D	213	MET	2.3
1	A	113	GLY	2.1
1	C	206	VAL	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](#)

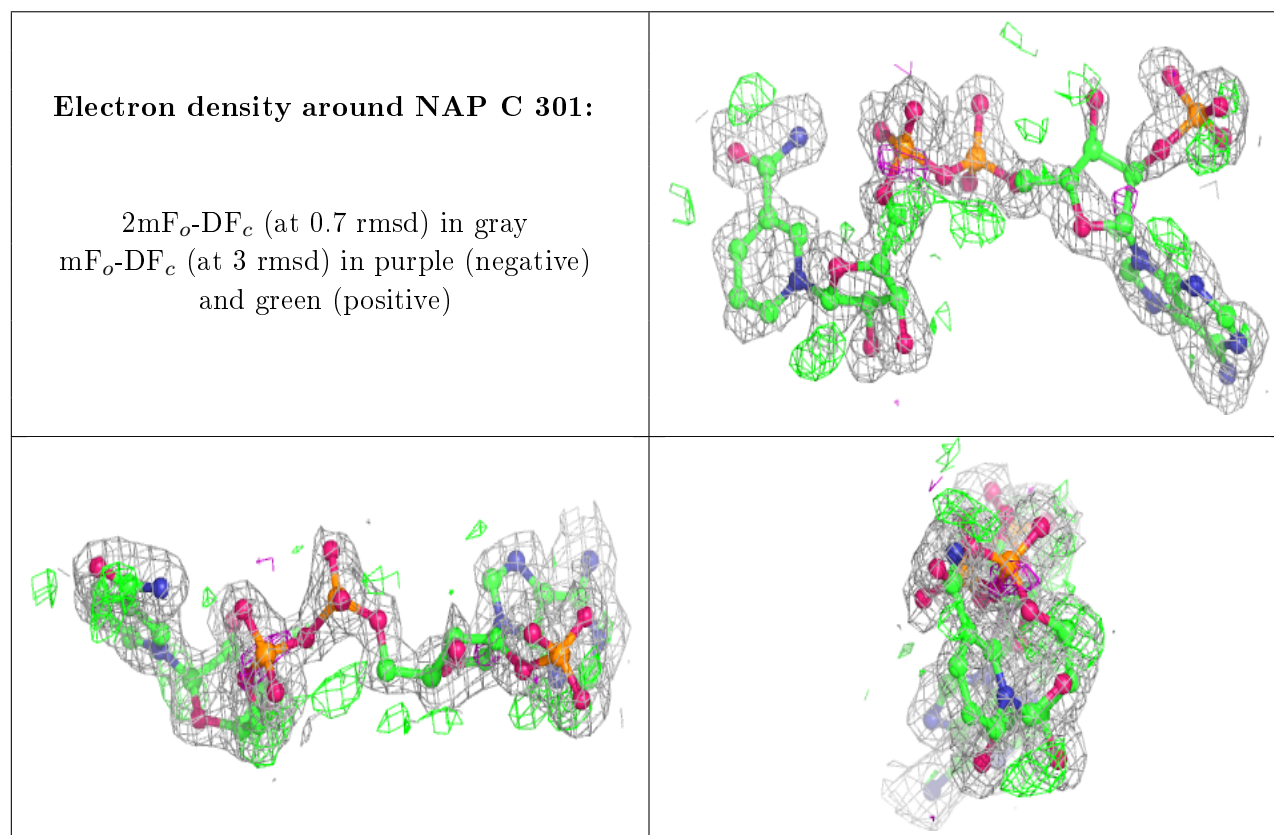
There are no carbohydrates in this entry.

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.

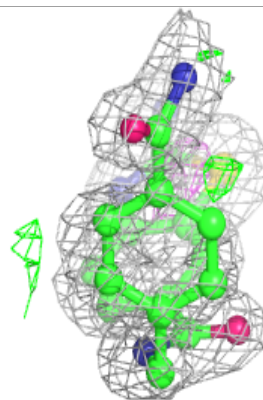
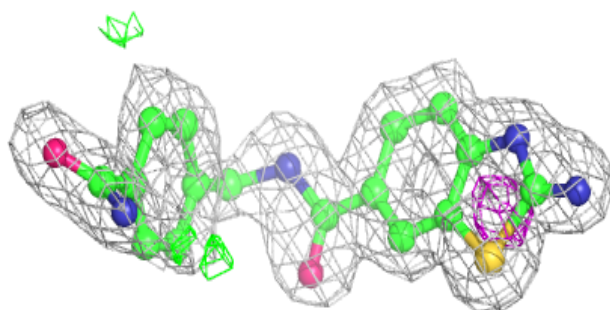
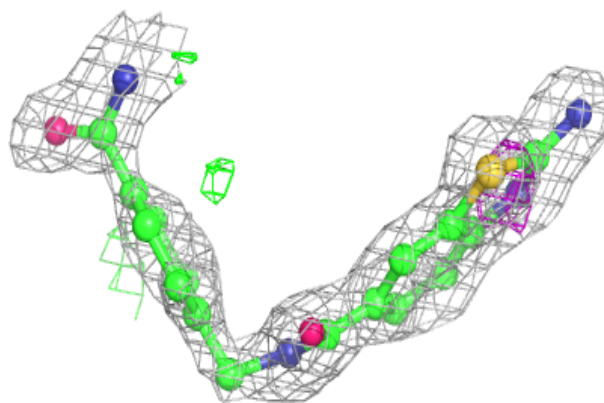
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
4	ACT	D	303	4/4	0.61	0.19	21,35,36,36	0
2	NAP	C	301	48/48	0.84	0.17	15,23,28,30	48
3	EV8	D	302	23/32	0.91	0.16	18,26,42,44	0
3	EV8	B	302	23/32	0.94	0.13	15,24,47,48	0
3	EV8	A	302	32/32	0.95	0.12	16,36,63,71	0
4	ACT	A	303	4/4	0.95	0.11	19,21,22,22	0
2	NAP	A	301	48/48	0.97	0.07	11,14,15,19	0
2	NAP	B	301	48/48	0.97	0.08	10,13,15,15	0
2	NAP	D	301	48/48	0.98	0.07	9,14,16,19	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.

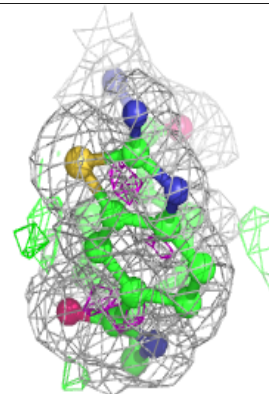
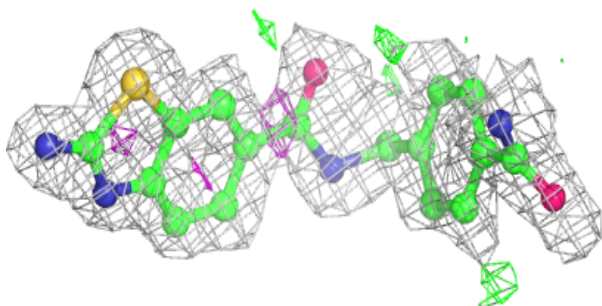
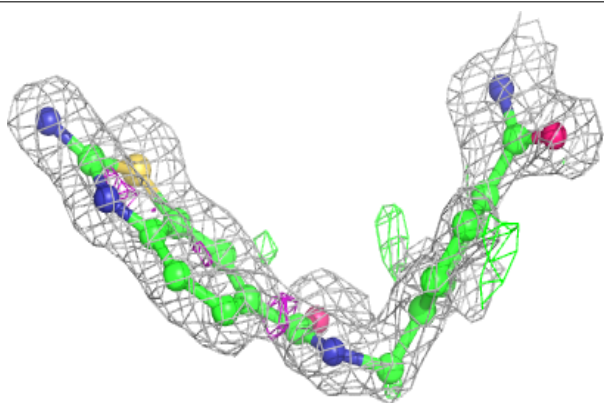


Electron density around EV8 D 302:

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

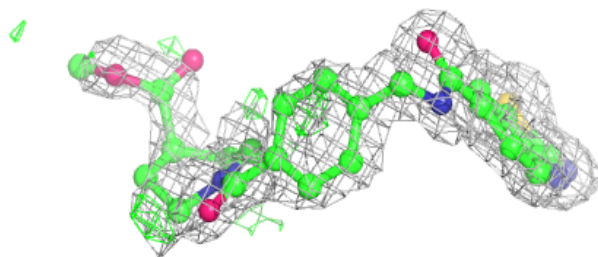
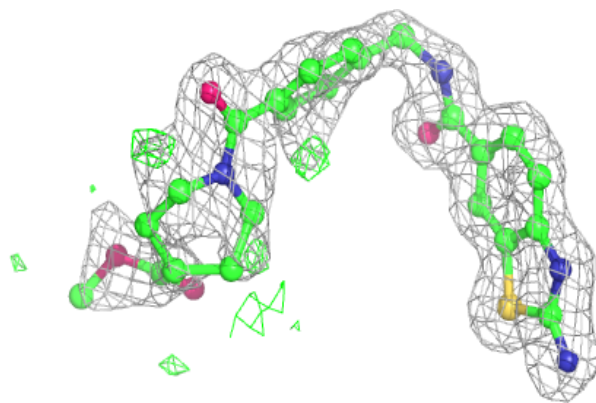
**Electron density around EV8 B 302:**

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

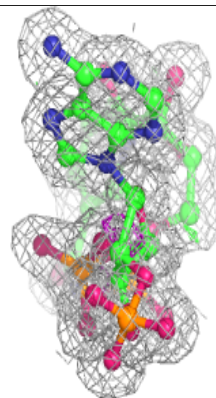
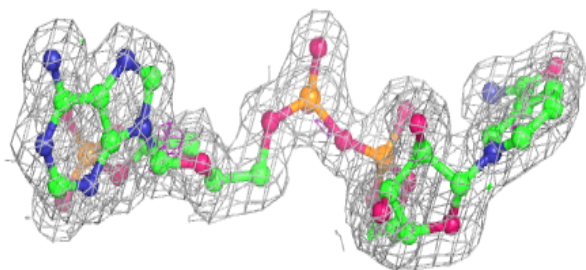
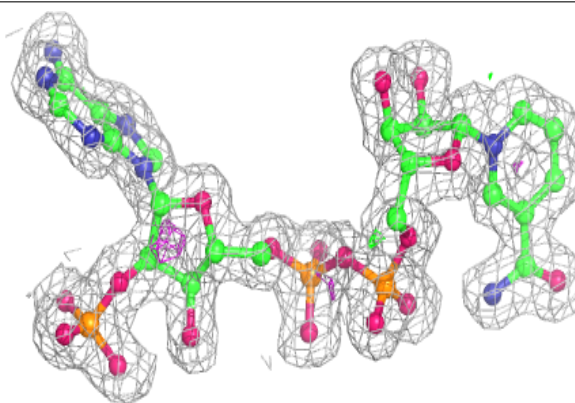


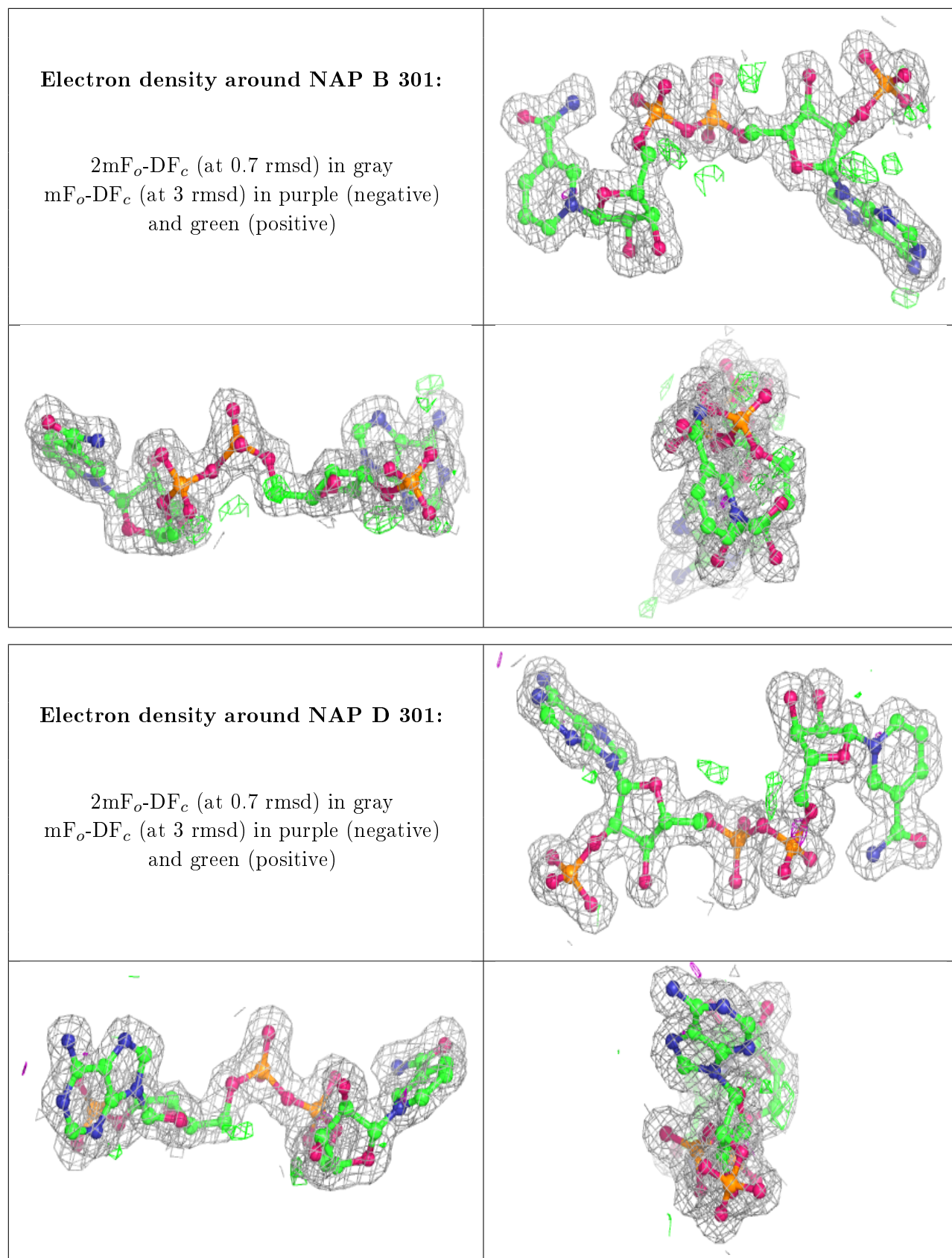
Electron density around EV8 A 302:

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

**Electron density around NAP 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)





6.5 Other polymers

There are no such residues in this entry.