



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 5, 2026 – 09:11 PM UTC

PDB ID : 6GEY / pdb_00006gey
Title : Trypanosoma brucei PTR1 in complex with inhibitor 4g (F125)
Authors : Landi, G.; Pozzi, C.; Mangani, S.
Deposited on : 2018-04-27
Resolution : 1.56 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	:	4-5-2 with Phenix2.0
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	2.0
EDS	:	3.0
Buster-report	:	wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4	:	9.0.010 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.49

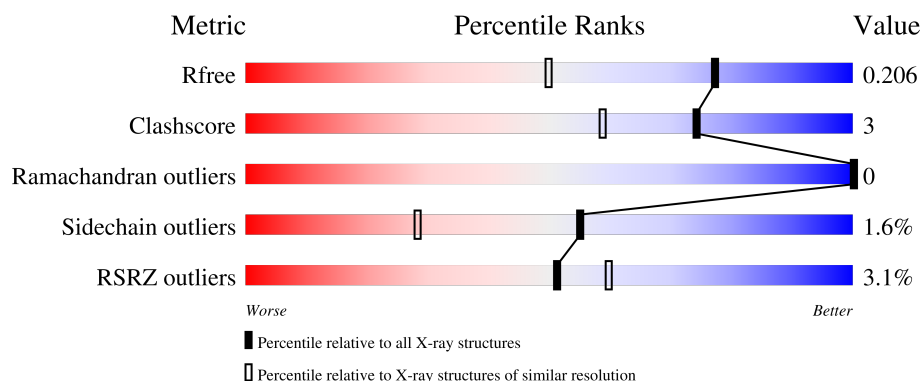
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.56 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}	180053	2145 (1.56-1.56)
Clashscore	190562	2189 (1.56-1.56)
Ramachandran outliers	187476	2153 (1.56-1.56)
Sidechain outliers	187428	2150 (1.56-1.56)
RSRZ outliers	180081	2146 (1.56-1.56)

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	288	 2% 80% 7% 12%
1	B	288	 2% 81% 7% 12%
1	C	288	 5% 78% 9% 13%
1	D	288	 2% 77% 9% 13%

2 Entry composition

There are 6 unique types of molecules in this entry. The entry contains 8539 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
1	A	252	Total	C	N	O	S	0	8	0
			1895	1195	333	356	11			
1	B	252	Total	C	N	O	S	0	7	0
			1891	1191	328	360	12			
1	C	251	Total	C	N	O	S	0	6	0
			1868	1174	327	356	11			
1	D	250	Total	C	N	O	S	0	9	0
			1864	1178	324	350	12			

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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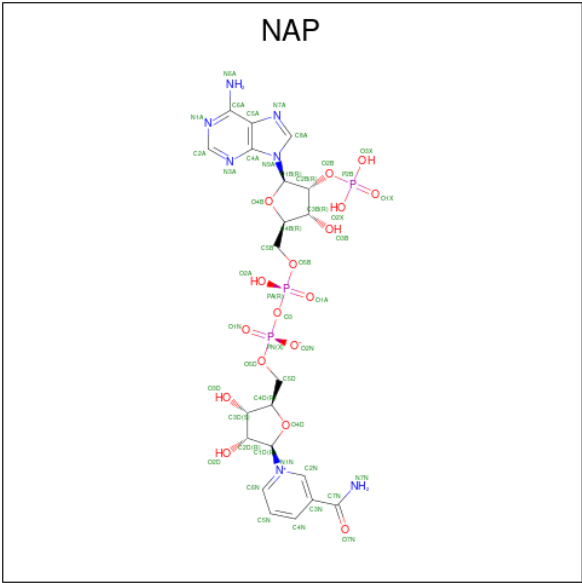
Chain	Residue	Modelled	Actual	Comment	Reference
B	-18	GLY	-	expression tag	UNP O76290
B	-17	SER	-	expression tag	UNP O76290
B	-16	SER	-	expression tag	UNP O76290
B	-15	HIS	-	expression tag	UNP O76290
B	-14	HIS	-	expression tag	UNP O76290
B	-13	HIS	-	expression tag	UNP O76290
B	-12	HIS	-	expression tag	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 (CCD ID: NAP) (formula: C₂₁H₂₈N₇O₁₇P₃).



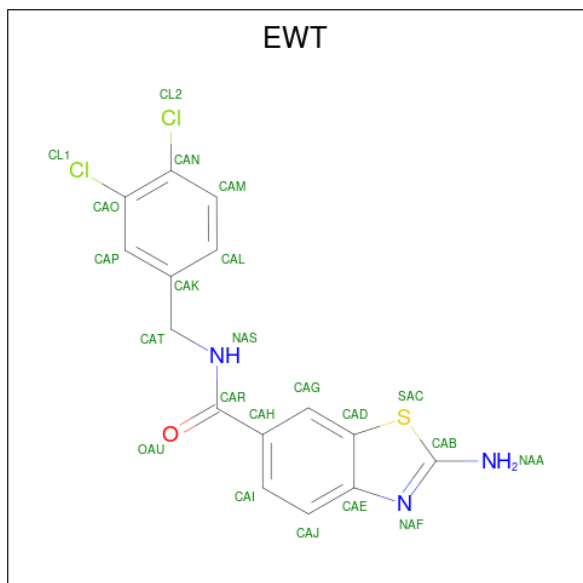
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	A	1	Total 48	C 21	N 7	O 17	P 3	0	0
2	B	1	Total 48	C 21	N 7	O 17	P 3	0	0

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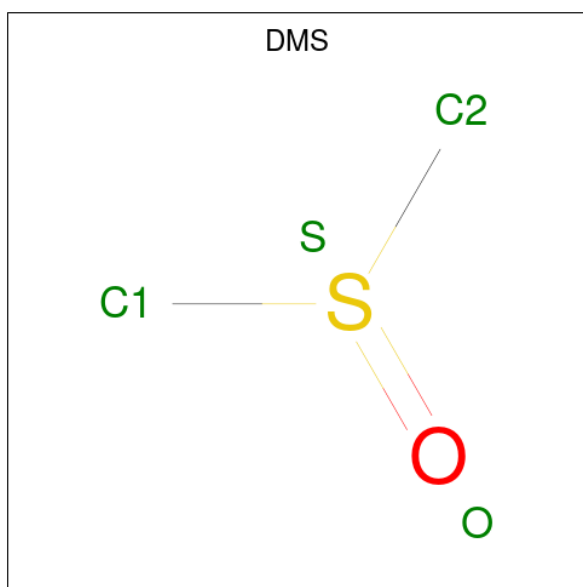
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	C	1	Total	C	N	O	P	0	0
			48	21	7	17	3		
2	D	1	Total	C	N	O	P	0	0
			48	21	7	17	3		

- Molecule 3 is 2-azanyl- {N}-[(3,4-dichlorophenyl)methyl]-1,3-benzothiazole-6-carboxamide (CCD ID: EWT) (formula: C₁₅H₁₁Cl₂N₃OS).



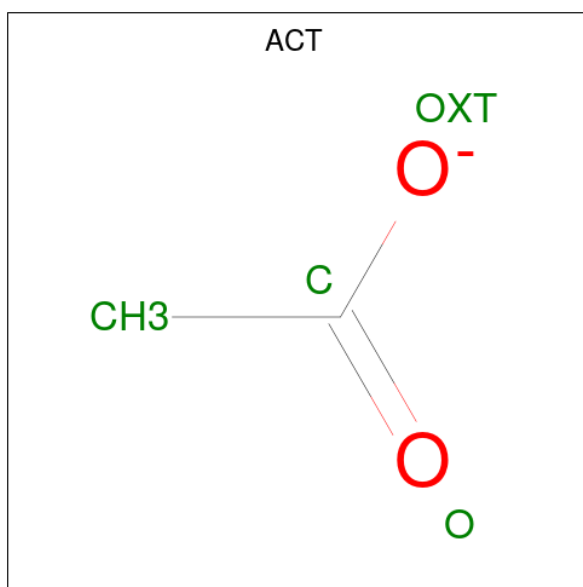
Mol	Chain	Residues	Atoms						ZeroOcc	AltConf
3	A	1	Total 22	C 15	Cl 2	N 3	O 1	S 1	0	0
3	B	1	Total 22	C 15	Cl 2	N 3	O 1	S 1	0	0
3	C	1	Total 22	C 15	Cl 2	N 3	O 1	S 1	0	0
3	D	1	Total 22	C 15	Cl 2	N 3	O 1	S 1	0	0

- Molecule 4 is DIMETHYL SULFOXIDE (CCD ID: DMS) (formula: C₂H₆OS).



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

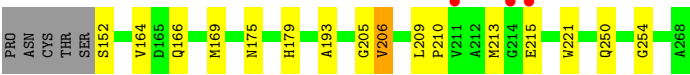
- Molecule 5 is ACETATE ION (CCD ID: ACT) (formula: $C_2H_3O_2^-$).



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

- Molecule 6 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	A	190	Total 192	O 192	0	2
6	B	201	Total 203	O 203	0	6
6	C	153	Total 153	O 153	0	1
6	D	177	Total 177	O 177	0	0



4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	74.71Å 89.97Å 82.76Å 90.00° 115.55° 90.00°	Depositor
Resolution (Å)	67.41 – 1.56 67.41 – 1.56	Depositor EDS
% Data completeness (in resolution range)	89.6 (67.41-1.56) 89.6 (67.41-1.56)	Depositor EDS
R_{merge}	0.04	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.37 (at 1.56Å)	Xtriage
Refinement program	REFMAC 5.8.0158	Depositor
R, R_{free}	0.174 , 0.211 (Not available) , 0.206	Depositor DCC
R_{free} test set	6300 reflections (4.49%)	wwPDB-VP
Wilson B-factor (Å ²)	13.6	Xtriage
Anisotropy	0.767	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.36 , 44.9	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	0.013 for h,-k,-h-l	Xtriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	8539	wwPDB-VP
Average B, all atoms (Å ²)	22.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 35.03 % 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 6.2192e-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

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: EWT, DMS, ACT, NAP

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	1.29	1/1943 (0.1%)	1.08	0/2636
1	B	1.36	3/1933 (0.2%)	1.09	0/2626
1	C	1.36	4/1907 (0.2%)	1.14	2/2593 (0.1%)
1	D	1.36	1/1915 (0.1%)	1.11	6/2602 (0.2%)
All	All	1.34	9/7698 (0.1%)	1.10	8/10457 (0.1%)

All (9) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	C	130	ALA	N-CA	6.92	1.53	1.46
1	B	46	ASP	C-O	-5.80	1.17	1.24
1	C	137	SER	N-CA	5.73	1.53	1.46
1	B	205	GLY	CA-C	5.51	1.55	1.51
1	C	35	HIS	CA-C	5.44	1.56	1.52
1	C	182	VAL	N-CA	5.43	1.52	1.46
1	B	182	VAL	CA-CB	5.16	1.60	1.54
1	A	130	ALA	N-CA	5.12	1.51	1.46
1	D	86	ARG	N-CA	5.03	1.51	1.46

All (8) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	69	LEU	CA-C-N	-7.24	111.01	119.05
1	C	69	LEU	C-N-CA	-7.24	111.01	119.05
1	D	130	ALA	CA-C-N	-5.76	112.75	119.32
1	D	130	ALA	C-N-CA	-5.76	112.75	119.32
1	D	193	ALA	CA-C-N	-5.63	114.30	119.82
1	D	193	ALA	C-N-CA	-5.63	114.30	119.82
1	D	250	GLN	N-CA-C	5.35	118.91	112.38
1	D	205	GLY	N-CA-C	-5.19	105.49	110.21

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts

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	1895	0	1928	12	0
1	B	1891	0	1896	12	0
1	C	1868	0	1860	16	0
1	D	1864	0	1883	16	0
2	A	48	0	25	0	0
2	B	48	0	25	2	0
2	C	48	0	25	3	0
2	D	48	0	25	1	0
3	A	22	0	0	0	0
3	B	22	0	0	0	0
3	C	22	0	0	0	0
3	D	22	0	0	1	0
4	A	4	0	6	0	0
4	B	4	0	6	0	0
4	D	4	0	6	1	0
5	C	4	0	3	0	0
6	A	192	0	0	4	0
6	B	203	0	0	1	0
6	C	153	0	0	1	0
6	D	177	0	0	1	0
All	All	8539	0	7688	48	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 3.

All (48) 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:152:SER:HB2	6:D:551:HOH:O	1.78	0.83
1:D:164:VAL:HG22	1:D:179:HIS:CD2	2.22	0.75
1:D:175[B]:ASN:OD1	4:D:303:DMS:H22	1.88	0.73

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:164:VAL:HG22	1:C:179:HIS:CD2	2.26	0.70
1:D:206[B]:VAL:HG21	1:D:209:LEU:HD21	1.80	0.64
1:B:104:GLN:H	1:D:140[B]:GLN:HE22	1.51	0.58
1:C:214:GLY:O	1:C:218:LYS:HG3	2.03	0.58
1:D:206[B]:VAL:CG2	1:D:209:LEU:HD21	2.38	0.54
1:A:22[A]:LYS:HG2	1:A:242:ILE:HG13	1.90	0.53
1:A:65:ASN:HA	1:A:69:LEU:HD22	1.91	0.52
1:B:136[B]:MET:HE1	1:D:116:VAL:HG21	1.94	0.50
1:C:206:VAL:HG23	1:C:209:LEU:HD13	1.93	0.49
1:A:9:THR:HA	1:A:33:HIS:HB3	1.94	0.48
1:D:78:ASN:OD1	1:D:141:ARG:NH1	2.42	0.48
1:B:15:ILE:HB	2:B:301:NAP:H51N	1.96	0.48
1:B:190:LEU:HG	1:D:169:MET:HE1	1.95	0.48
1:D:65:ASN:HA	1:D:69:LEU:HD22	1.95	0.47
1:C:9:THR:HA	1:C:33:HIS:HB3	1.97	0.47
1:B:9:THR:HA	1:B:33:HIS:HB3	1.97	0.46
1:A:127:ASN:HA	6:A:405:HOH:O	2.16	0.46
1:A:141:ARG:HG3	6:A:438:HOH:O	2.15	0.45
1:C:35:HIS:HB2	2:C:301:NAP:C2A	2.46	0.45
1:C:208:LEU:HD21	6:C:467:HOH:O	2.15	0.45
1:A:22[B]:LYS:HG3	6:A:505:HOH:O	2.16	0.45
1:B:102:LEU:O	1:D:136[B]:MET:HG3	2.16	0.45
1:D:221:TRP:NE1	3:D:302:EWT:CL1	2.87	0.44
1:B:35:HIS:HB2	2:B:301:NAP:C2A	2.46	0.44
1:A:178:LYS:NZ	6:A:405:HOH:O	2.50	0.44
1:C:95:SER:HB3	2:C:301:NAP:H3D	1.99	0.44
1:B:117:GLU:HG3	1:D:67:ASN:HA	1.99	0.43
1:C:265:LEU:HD11	1:D:254:GLY:HA3	2.01	0.43
1:D:35:HIS:HB2	2:D:301:NAP:C2A	2.49	0.42
1:A:161:ASP:HB3	1:A:164:VAL:HG13	2.00	0.42
1:C:65:ASN:HA	1:C:69:LEU:HD22	2.01	0.42
1:A:13[B]:LYS:HB3	1:A:13[B]:LYS:HE3	1.88	0.42
1:C:209:LEU:HG	1:C:218:LYS:HG2	2.02	0.42
1:C:247:GLY:HA2	1:C:250:GLN:HG3	2.02	0.42
1:A:192:LEU:HB3	1:A:197:ILE:HB	2.01	0.41
1:B:142:GLN:C	6:B:555:HOH:O	2.62	0.41
1:B:192:LEU:HB3	1:B:197:ILE:HB	2.03	0.41
1:A:251:TYR:CD2	1:B:232:ALA:HB2	2.55	0.41
1:C:123:LEU:O	1:C:127[B]:ASN:HB2	2.20	0.41
1:A:251:TYR:CE2	1:B:232:ALA:HB2	2.56	0.41
1:C:205:GLY:O	2:C:301:NAP:H4N	2.21	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:223:ARG:O	1:C:229:ARG:NH1	2.41	0.41
1:C:138:PHE:O	1:C:142:GLN:HG2	2.21	0.40
1:C:164:VAL:HG22	1:C:179:HIS:NE2	2.37	0.40
1:D:210:PRO:HD2	1:D:213:MET:HE3	2.03	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	253/288 (88%)	244 (96%)	9 (4%)	0	100	100
1	B	253/288 (88%)	246 (97%)	7 (3%)	0	100	100
1	C	251/288 (87%)	242 (96%)	9 (4%)	0	100	100
1	D	252/288 (88%)	244 (97%)	8 (3%)	0	100	100
All	All	1009/1152 (88%)	976 (97%)	33 (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	202/231 (87%)	197 (98%)	5 (2%)	42	14
1	B	199/231 (86%)	195 (98%)	4 (2%)	48	20

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	C	195/231 (84%)	194 (100%)	1 (0%)	81	68
1	D	197/231 (85%)	192 (98%)	5 (2%)	42	14
All	All	793/924 (86%)	778 (98%)	15 (2%)	55	22

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

Mol	Chain	Res	Type
1	A	53	SER
1	A	131	PRO
1	A	152	SER
1	A	209	LEU
1	A	250[A]	GLN
1	B	164	VAL
1	B	166	GLN
1	B	217[A]	GLU
1	B	217[B]	GLU
1	C	166	GLN
1	D	166	GLN
1	D	206[A]	VAL
1	D	206[B]	VAL
1	D	215[A]	GLU
1	D	215[B]	GLU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (13) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	25	GLN
1	A	92	ASN
1	B	65	ASN
1	B	92	ASN
1	B	250	GLN
1	C	54	ASN
1	C	65	ASN
1	C	92	ASN
1	D	65	ASN
1	D	67	ASN
1	D	92	ASN
1	D	119	GLN
1	D	140[B]	GLN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains ⓘ

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

5.5 Carbohydrates ⓘ

There are no oligosaccharides in this entry.

5.6 Ligand geometry ⓘ

12 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	A	301	-	50,52,52	2.09	14 (28%)	71,80,80	1.71	17 (23%)
2	NAP	B	301	-	50,52,52	1.90	11 (22%)	71,80,80	1.72	14 (19%)
4	DMS	B	303	-	3,3,3	0.33	0	3,3,3	1.85	1 (33%)
2	NAP	D	301	-	50,52,52	1.77	13 (26%)	71,80,80	1.92	18 (25%)
3	EWT	B	302	-	24,24,24	1.79	8 (33%)	34,34,34	3.43	6 (17%)
3	EWT	A	302	-	24,24,24	2.33	8 (33%)	34,34,34	3.30	9 (26%)
2	NAP	C	301	-	50,52,52	1.68	8 (16%)	71,80,80	1.84	18 (25%)
4	DMS	A	303[A]	-	3,3,3	0.62	0	3,3,3	0.77	0
4	DMS	D	303	-	3,3,3	0.43	0	3,3,3	1.60	1 (33%)
5	ACT	C	303	-	3,3,3	0.86	0	3,3,3	0.65	0
3	EWT	C	302	-	24,24,24	3.13	8 (33%)	34,34,34	3.27	11 (32%)
3	EWT	D	302	-	24,24,24	1.89	4 (16%)	34,34,34	2.97	6 (17%)

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	A	301	-	-	0/35/67/67	0/5/5/5
2	NAP	B	301	-	-	0/35/67/67	0/5/5/5
2	NAP	D	301	-	-	0/35/67/67	0/5/5/5
3	EWT	B	302	-	-	0/9/9/9	0/3/3/3
3	EWT	A	302	-	-	0/9/9/9	0/3/3/3
2	NAP	C	301	-	-	0/35/67/67	0/5/5/5
3	EWT	C	302	-	-	0/9/9/9	0/3/3/3
3	EWT	D	302	-	-	0/9/9/9	0/3/3/3

All (74) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	C	302	EWT	CAB-SAC	-12.55	1.62	1.76
2	B	301	NAP	PA-O3	6.99	1.67	1.59
2	C	301	NAP	C5A-C4A	5.91	1.49	1.39
3	A	302	EWT	CAO-CL1	5.89	1.87	1.73
2	A	301	NAP	C5A-C4A	5.62	1.49	1.39
2	A	301	NAP	PN-O3	5.20	1.65	1.59
2	D	301	NAP	C5A-C4A	5.07	1.48	1.39
2	B	301	NAP	C5A-C4A	5.04	1.48	1.39
2	A	301	NAP	PA-O3	4.77	1.64	1.59
3	A	302	EWT	CAT-CAK	-4.60	1.41	1.51
3	D	302	EWT	CAB-NAF	4.55	1.36	1.31
3	A	302	EWT	CAH-CAR	-4.36	1.40	1.50
3	C	302	EWT	CAT-CAK	-4.26	1.42	1.51
2	D	301	NAP	PA-O3	4.11	1.63	1.59
2	A	301	NAP	O4D-C1D	4.07	1.46	1.40
2	C	301	NAP	PA-O3	4.00	1.63	1.59
3	C	302	EWT	CAB-NAF	3.98	1.36	1.31
2	B	301	NAP	PN-O3	3.87	1.63	1.59
3	D	302	EWT	CAH-CAR	-3.87	1.41	1.50
3	D	302	EWT	CAT-CAK	-3.82	1.43	1.51
2	C	301	NAP	PN-O3	3.69	1.63	1.59
3	B	302	EWT	CAT-CAK	-3.64	1.43	1.51
2	A	301	NAP	C5A-C6A	3.62	1.51	1.41
2	D	301	NAP	O4D-C1D	3.54	1.45	1.40
2	A	301	NAP	C8A-N7A	3.48	1.38	1.31
2	C	301	NAP	C5A-C6A	3.45	1.50	1.41
3	A	302	EWT	CAG-CAD	-3.40	1.34	1.39
2	B	301	NAP	O4D-C1D	3.37	1.45	1.40
2	D	301	NAP	P2B-O2B	3.30	1.65	1.59

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	D	301	NAP	C5A-C6A	3.10	1.49	1.41
2	A	301	NAP	C7N-N7N	3.08	1.38	1.33
2	A	301	NAP	C2N-N1N	3.03	1.38	1.35
2	A	301	NAP	C5N-C4N	3.00	1.44	1.38
3	D	302	EWT	CAI-CAH	3.00	1.44	1.39
3	B	302	EWT	CAN-CL2	2.99	1.80	1.73
2	D	301	NAP	C7N-N7N	2.98	1.38	1.33
2	D	301	NAP	PN-O3	2.96	1.62	1.59
3	A	302	EWT	CAJ-CAE	-2.93	1.35	1.40
3	A	302	EWT	CAB-NAF	2.81	1.34	1.31
3	A	302	EWT	CAP-CAO	2.80	1.43	1.38
2	B	301	NAP	C2A-N3A	2.78	1.38	1.33
2	A	301	NAP	C2A-N1A	2.78	1.38	1.33
2	C	301	NAP	C2N-N1N	2.73	1.38	1.35
3	B	302	EWT	CAB-NAF	2.72	1.34	1.31
2	D	301	NAP	C4A-N3A	2.70	1.39	1.34
2	B	301	NAP	C2N-N1N	2.69	1.37	1.35
2	C	301	NAP	C8A-N7A	2.66	1.36	1.31
3	C	302	EWT	CAD-SAC	2.64	1.79	1.74
2	B	301	NAP	C7N-N7N	2.63	1.37	1.33
2	A	301	NAP	P2B-O2B	2.63	1.64	1.59
3	B	302	EWT	CAJ-CAE	-2.58	1.35	1.40
2	A	301	NAP	C2A-N3A	2.55	1.38	1.33
3	C	302	EWT	CAG-CAD	-2.52	1.35	1.39
2	D	301	NAP	C8A-N7A	2.51	1.36	1.31
2	B	301	NAP	C5A-C6A	2.47	1.47	1.41
2	C	301	NAP	C2A-N1A	2.46	1.38	1.33
2	D	301	NAP	C2A-N1A	2.46	1.38	1.33
2	B	301	NAP	O4B-C4B	-2.46	1.39	1.45
2	B	301	NAP	C4A-N9A	-2.39	1.32	1.37
3	A	302	EWT	CAP-CAK	2.39	1.43	1.39
3	B	302	EWT	CAH-CAR	-2.35	1.45	1.50
3	B	302	EWT	CAI-CAH	2.35	1.43	1.39
3	B	302	EWT	CAG-CAD	-2.33	1.35	1.39
2	A	301	NAP	C4A-N9A	-2.31	1.32	1.37
3	B	302	EWT	CAI-CAJ	2.23	1.42	1.38
2	B	301	NAP	C2B-C1B	2.22	1.58	1.53
3	C	302	EWT	CAH-CAR	-2.22	1.45	1.50
2	A	301	NAP	C4A-N3A	2.19	1.38	1.34
2	D	301	NAP	C2N-N1N	2.19	1.37	1.35
3	C	302	EWT	CAG-CAH	2.16	1.42	1.39
2	C	301	NAP	C4A-N9A	-2.14	1.33	1.37

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	D	301	NAP	C4N-C3N	2.10	1.42	1.39
2	D	301	NAP	C2A-N3A	2.07	1.37	1.33
3	C	302	EWT	CAJ-CAE	-2.05	1.36	1.40

All (101) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	B	302	EWT	SAC-CAB-NAF	-12.68	107.85	115.72
3	C	302	EWT	CAD-SAC-CAB	11.92	94.53	88.89
3	A	302	EWT	SAC-CAB-NAF	-11.29	108.71	115.72
3	D	302	EWT	SAC-CAB-NAF	-10.26	109.35	115.72
3	B	302	EWT	CAE-NAF-CAB	9.56	116.24	110.57
3	B	302	EWT	CAD-SAC-CAB	9.34	93.30	88.89
3	A	302	EWT	CAE-NAF-CAB	9.09	115.96	110.57
3	D	302	EWT	CAE-NAF-CAB	8.20	115.44	110.57
3	C	302	EWT	CAE-NAF-CAB	8.01	115.32	110.57
3	C	302	EWT	SAC-CAB-NAF	-7.80	110.88	115.72
3	D	302	EWT	CAD-SAC-CAB	7.38	92.38	88.89
3	A	302	EWT	SAC-CAB-NAA	6.55	127.25	120.13
3	A	302	EWT	CAD-SAC-CAB	5.76	91.61	88.89
2	C	301	NAP	C2B-C1B-N9A	-5.65	104.45	113.75
2	D	301	NAP	O7N-C7N-C3N	-5.41	112.99	119.60
2	D	301	NAP	C4A-N9A-C8A	5.40	111.41	105.74
3	D	302	EWT	SAC-CAB-NAA	5.37	125.97	120.13
2	B	301	NAP	C2B-C1B-N9A	-5.08	105.40	113.75
2	A	301	NAP	C2B-C1B-N9A	-5.01	105.51	113.75
3	B	302	EWT	SAC-CAB-NAA	4.98	125.54	120.13
2	B	301	NAP	C4A-N9A-C8A	4.87	110.85	105.74
2	A	301	NAP	C4A-N9A-C8A	4.85	110.83	105.74
2	D	301	NAP	O4B-C1B-N9A	4.81	117.32	108.09
2	D	301	NAP	C2B-C1B-N9A	-4.71	106.00	113.75
3	C	302	EWT	CAP-CAO-CL1	4.65	126.07	118.45
2	C	301	NAP	O4B-C1B-N9A	4.21	116.17	108.09
2	C	301	NAP	C4A-N9A-C8A	4.20	110.15	105.74
2	C	301	NAP	C3N-C7N-N7N	4.18	122.89	117.74
3	A	302	EWT	CAK-CAT-NAS	-4.17	104.28	113.07
3	A	302	EWT	CAJ-CAI-CAH	-3.93	116.60	120.80
2	A	301	NAP	C4A-N9A-C1B	-3.74	117.89	126.63
3	A	302	EWT	CAP-CAO-CL1	3.74	124.57	118.45
2	B	301	NAP	O4B-C1B-N9A	3.69	115.18	108.09
2	C	301	NAP	C4A-C5A-N7A	-3.66	106.39	110.58
2	D	301	NAP	C4A-N9A-C1B	-3.62	118.16	126.63

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	D	301	NAP	N9A-C8A-N7A	-3.42	109.08	113.94
3	C	302	EWT	CAI-CAH-CAG	-3.39	115.32	119.25
2	B	301	NAP	C3N-C7N-N7N	3.39	121.91	117.74
2	C	301	NAP	C4A-N9A-C1B	-3.38	118.73	126.63
2	B	301	NAP	C2A-N1A-C6A	3.35	124.24	118.73
2	B	301	NAP	C4A-N9A-C1B	-3.35	118.80	126.63
2	A	301	NAP	N3A-C2A-N1A	-3.34	123.52	128.58
2	A	301	NAP	O7N-C7N-C3N	-3.24	115.64	119.60
2	C	301	NAP	C5A-C4A-N3A	-3.24	122.26	126.72
2	B	301	NAP	N3A-C2A-N1A	-3.22	123.71	128.58
2	D	301	NAP	N3A-C2A-N1A	-3.21	123.72	128.58
4	B	303	DMS	O-S-C1	3.21	122.56	106.49
3	C	302	EWT	SAC-CAB-NAA	3.15	123.55	120.13
2	C	301	NAP	O2B-P2B-O1X	-3.11	98.25	109.33
2	D	301	NAP	N3A-C4A-N9A	3.11	132.45	127.17
2	B	301	NAP	O2A-PA-O1A	3.09	126.83	112.44
3	C	302	EWT	CAN-CAO-CL1	-3.06	113.66	120.84
2	C	301	NAP	N3A-C4A-N9A	2.98	132.24	127.17
3	D	302	EWT	OAU-CAR-NAS	-2.96	116.83	122.59
3	B	302	EWT	NAA-CAB-NAF	2.92	126.43	124.13
2	D	301	NAP	C4A-C5A-N7A	-2.91	107.25	110.58
3	A	302	EWT	CAT-CAK-CAL	-2.89	115.04	120.94
2	C	301	NAP	C5A-N7A-C8A	2.84	107.91	103.45
2	A	301	NAP	N3A-C4A-N9A	2.79	131.92	127.17
2	D	301	NAP	C5A-N7A-C8A	2.78	107.82	103.45
2	D	301	NAP	C3N-C7N-N7N	2.77	121.15	117.74
2	C	301	NAP	N9A-C8A-N7A	-2.73	110.06	113.94
2	D	301	NAP	C2A-N1A-C6A	2.71	123.18	118.73
4	D	303	DMS	O-S-C1	2.70	120.03	106.49
3	C	302	EWT	CAE-CAD-SAC	-2.70	105.76	109.75
3	A	302	EWT	CAT-CAK-CAP	2.66	126.31	120.63
3	C	302	EWT	CAM-CAN-CL2	2.65	123.65	118.42
2	D	301	NAP	C5A-C4A-N3A	-2.65	123.07	126.72
2	A	301	NAP	O2A-PA-O1A	2.64	124.75	112.44
2	B	301	NAP	O4B-C4B-C3B	-2.59	100.00	105.15
2	D	301	NAP	C4D-O4D-C1D	2.57	112.28	109.92
2	C	301	NAP	C6A-C5A-N7A	2.54	136.99	132.09
2	C	301	NAP	C2A-N1A-C6A	2.54	122.91	118.73
2	A	301	NAP	O2B-P2B-O1X	-2.50	100.42	109.33
2	C	301	NAP	C6N-N1N-C1D	-2.49	114.84	119.73
2	A	301	NAP	C5N-C4N-C3N	-2.49	117.92	120.36
2	A	301	NAP	C6A-C5A-N7A	2.46	136.84	132.09

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	D	301	NAP	C6A-C5A-N7A	2.42	136.76	132.09
2	A	301	NAP	C5A-C4A-N3A	-2.39	123.42	126.72
2	C	301	NAP	N3A-C2A-N1A	-2.39	124.97	128.58
2	A	301	NAP	O4B-C1B-N9A	2.38	112.66	108.09
2	A	301	NAP	C2A-N3A-C4A	2.37	117.61	111.83
3	B	302	EWT	CAJ-CAI-CAH	-2.34	118.30	120.80
2	A	301	NAP	O4B-C4B-C3B	-2.33	100.53	105.15
2	B	301	NAP	O7N-C7N-C3N	-2.32	116.76	119.60
3	C	302	EWT	CAG-CAD-SAC	2.31	131.84	126.07
2	C	301	NAP	O7N-C7N-N7N	-2.28	119.32	122.62
2	B	301	NAP	N6A-C6A-N1A	2.25	123.40	118.38
2	B	301	NAP	N3A-C4A-N9A	2.23	130.96	127.17
2	C	301	NAP	O2D-C2D-C3D	2.23	118.95	111.82
2	A	301	NAP	C2A-N1A-C6A	2.20	122.35	118.73
2	D	301	NAP	O7N-C7N-N7N	2.20	125.80	122.62
3	D	302	EWT	CAP-CAO-CL1	2.17	122.00	118.45
2	B	301	NAP	C6A-C5A-N7A	2.16	136.26	132.09
2	B	301	NAP	O2D-C2D-C3D	2.11	118.59	111.82
3	C	302	EWT	CAK-CAT-NAS	-2.10	108.64	113.07
2	A	301	NAP	N6A-C6A-N1A	2.09	123.02	118.38
2	D	301	NAP	C2A-N3A-C4A	2.05	116.85	111.83
2	D	301	NAP	O2X-P2B-O1X	2.05	118.83	110.83
2	C	301	NAP	C2A-N3A-C4A	2.03	116.80	111.83
2	A	301	NAP	N9A-C8A-N7A	-2.01	111.08	113.94

There are no chirality outliers.

There are no torsion outliers.

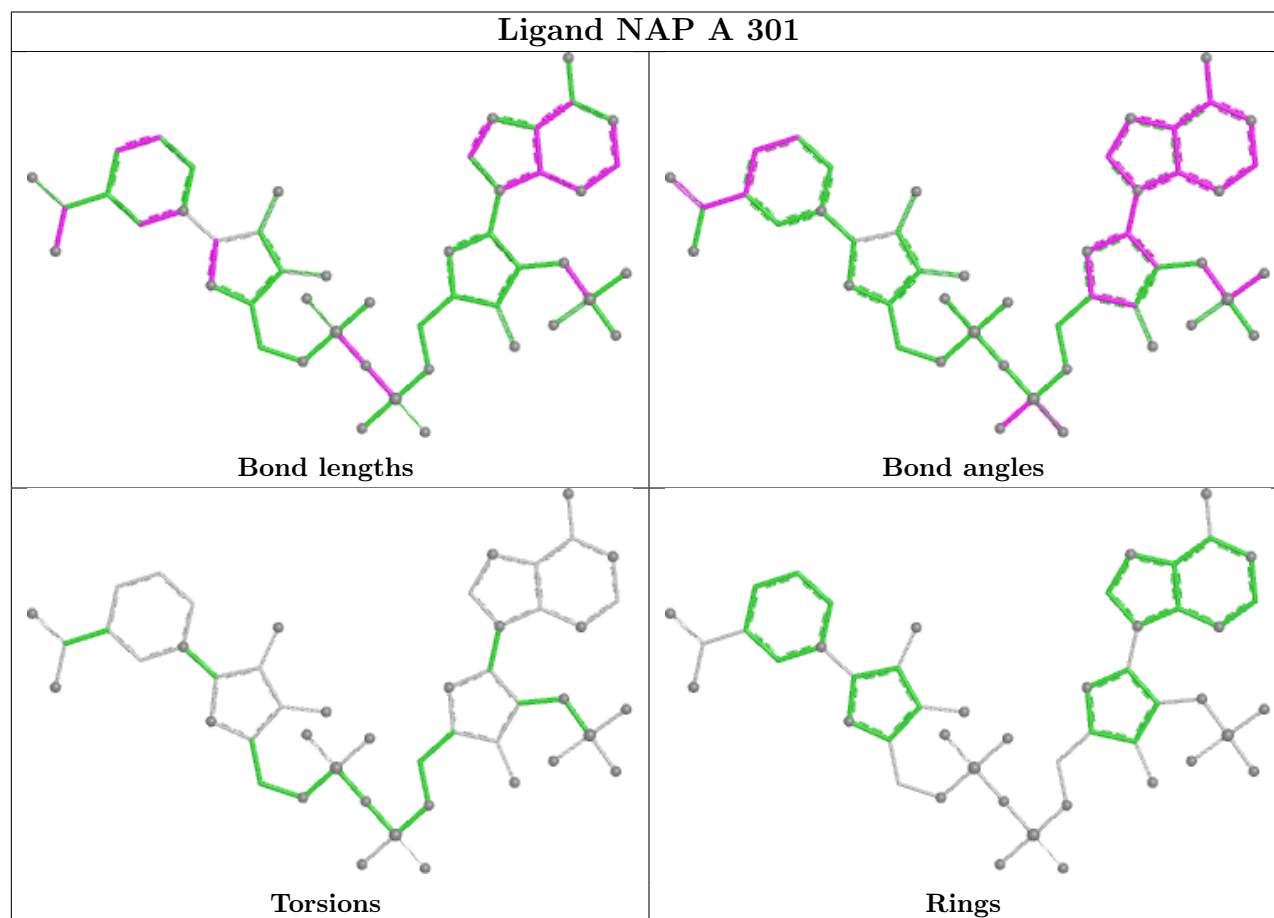
There are no ring outliers.

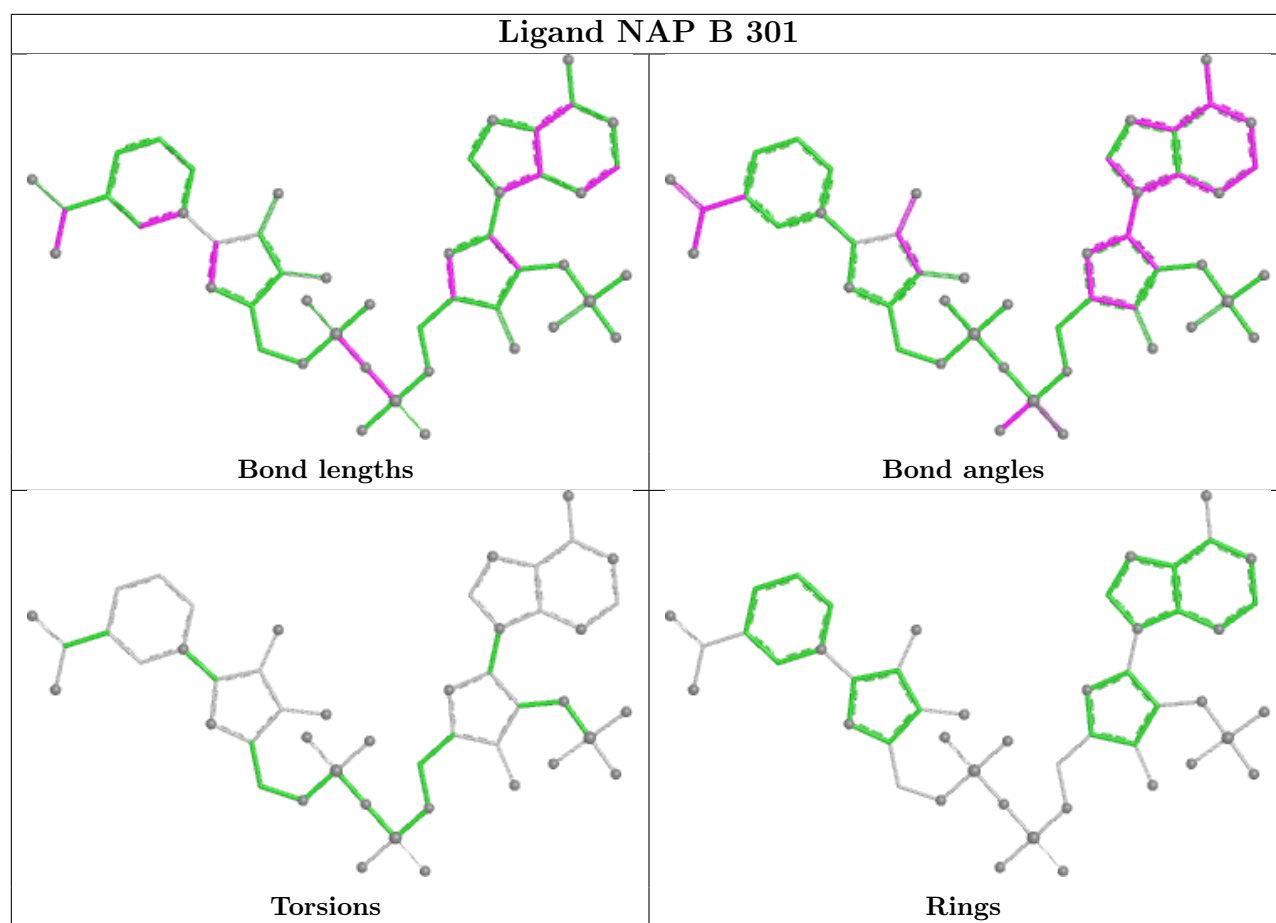
5 monomers are involved in 8 short contacts:

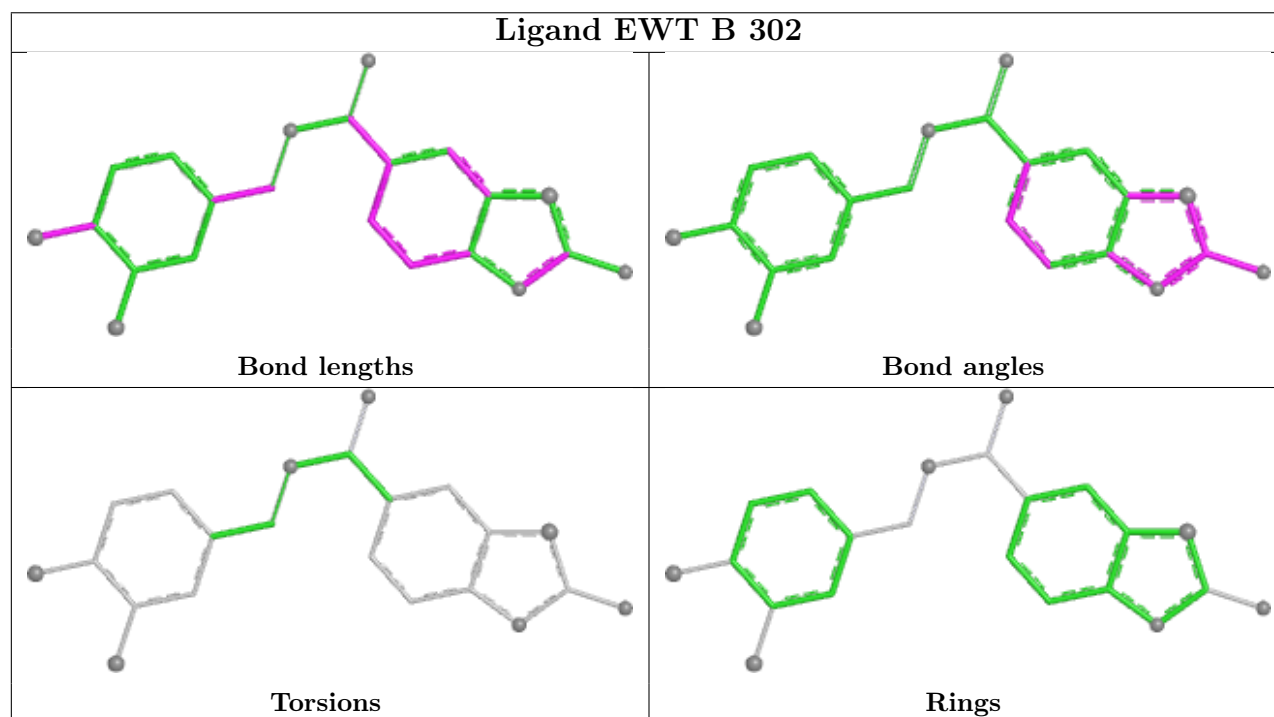
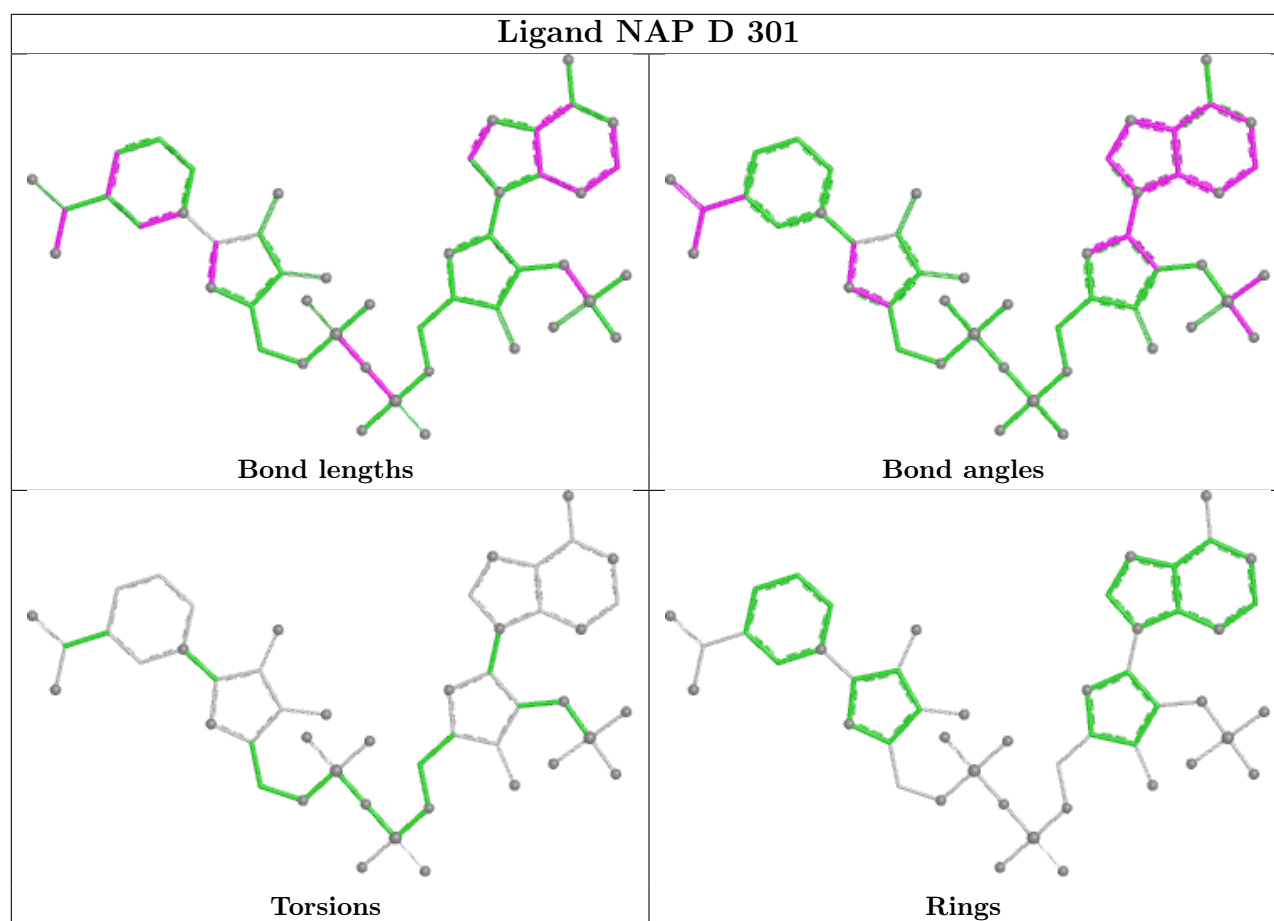
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	B	301	NAP	2	0
2	D	301	NAP	1	0
2	C	301	NAP	3	0
4	D	303	DMS	1	0
3	D	302	EWT	1	0

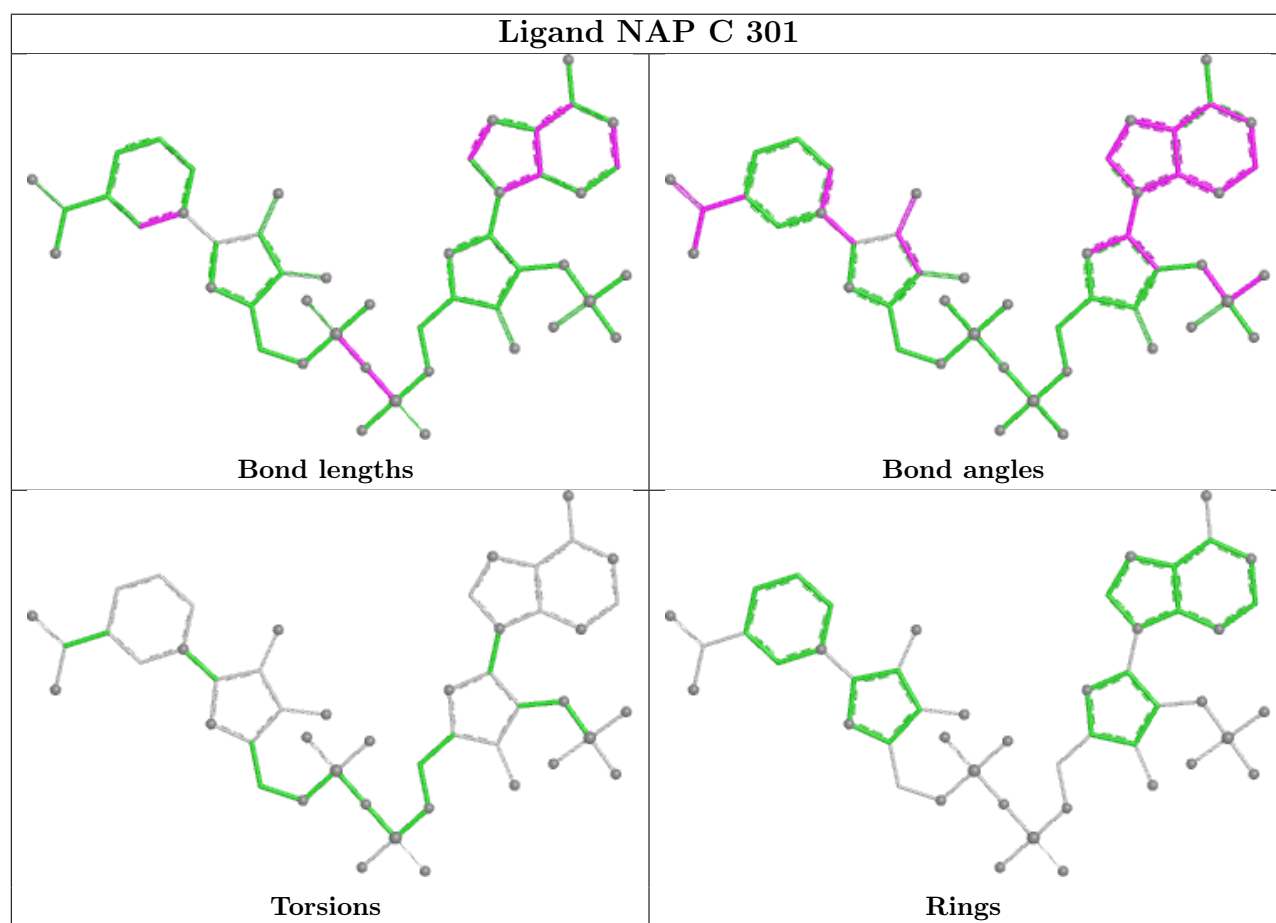
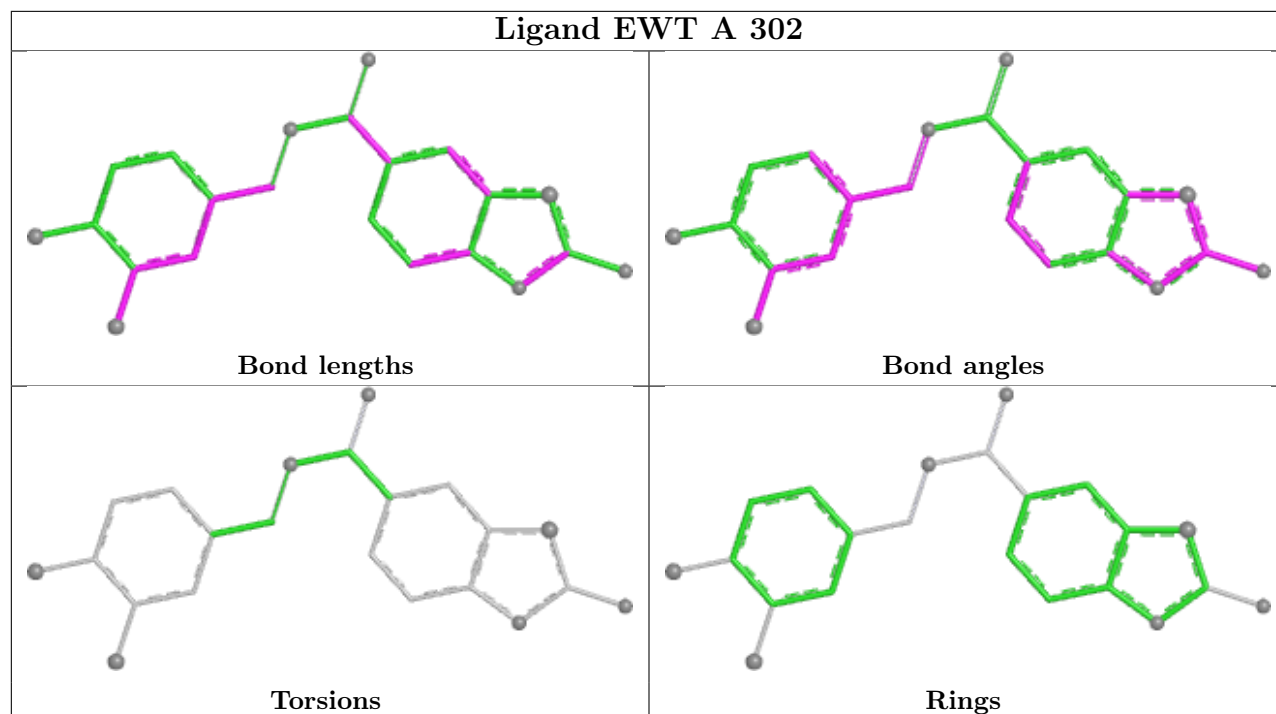
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is

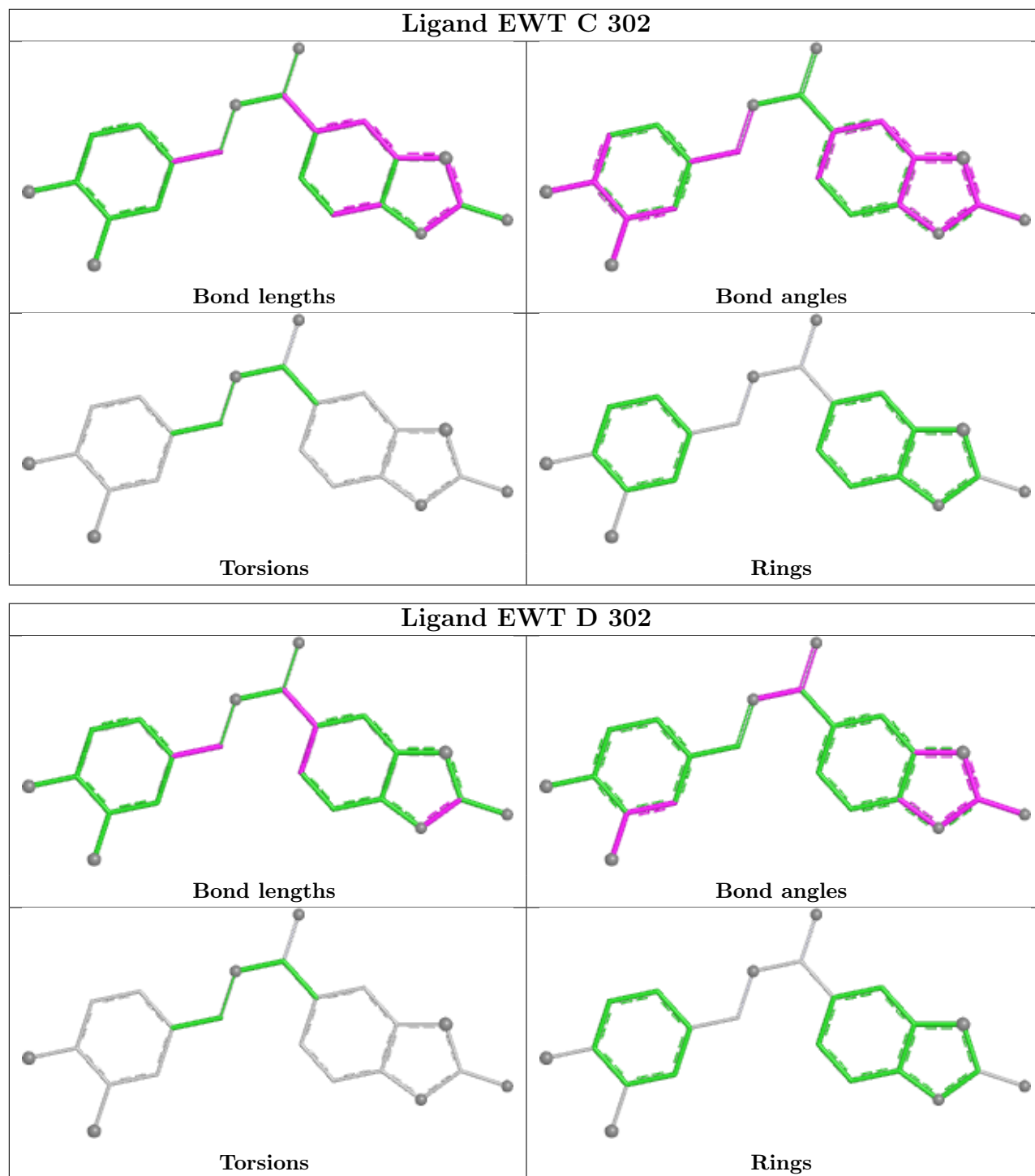
within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question 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 ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues ⓘ

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	252/288 (87%)	0.12	6 (2%) 59 67	8, 19, 38, 72	8 (3%)
1	B	252/288 (87%)	-0.03	7 (2%) 55 63	7, 17, 32, 72	7 (2%)
1	C	251/288 (87%)	0.27	13 (5%) 33 39	9, 20, 51, 63	8 (3%)
1	D	250/288 (86%)	0.13	5 (2%) 65 73	8, 19, 37, 55	10 (4%)
All	All	1005/1152 (87%)	0.12	31 (3%) 51 60	7, 18, 39, 72	33 (3%)

All (31) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	1	MET	4.7
1	A	143	LYS	3.8
1	C	208	LEU	3.8
1	C	151	SER	3.5
1	B	211	VAL	3.0
1	C	211	VAL	3.0
1	D	104	GLN	3.0
1	D	211	VAL	2.9
1	C	2	GLU	2.8
1	B	104	GLN	2.8
1	C	212	ALA	2.8
1	A	104	GLN	2.7
1	C	3	ALA	2.7
1	C	232	ALA	2.7
1	D	214	GLY	2.7
1	C	53	SER	2.7
1	B	210	PRO	2.6
1	A	221	TRP	2.5
1	A	195	TYR	2.5
1	C	210	PRO	2.4
1	B	151	SER	2.4

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Mol	Chain	Res	Type	RSRZ
1	C	113	GLY	2.2
1	B	2	GLU	2.2
1	A	1	MET	2.1
1	C	214	GLY	2.1
1	C	221	TRP	2.1
1	C	206	VAL	2.0
1	D	215[A]	GLU	2.0
1	A	212	ALA	2.0
1	D	3	ALA	2.0
1	B	195	TYR	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](#)

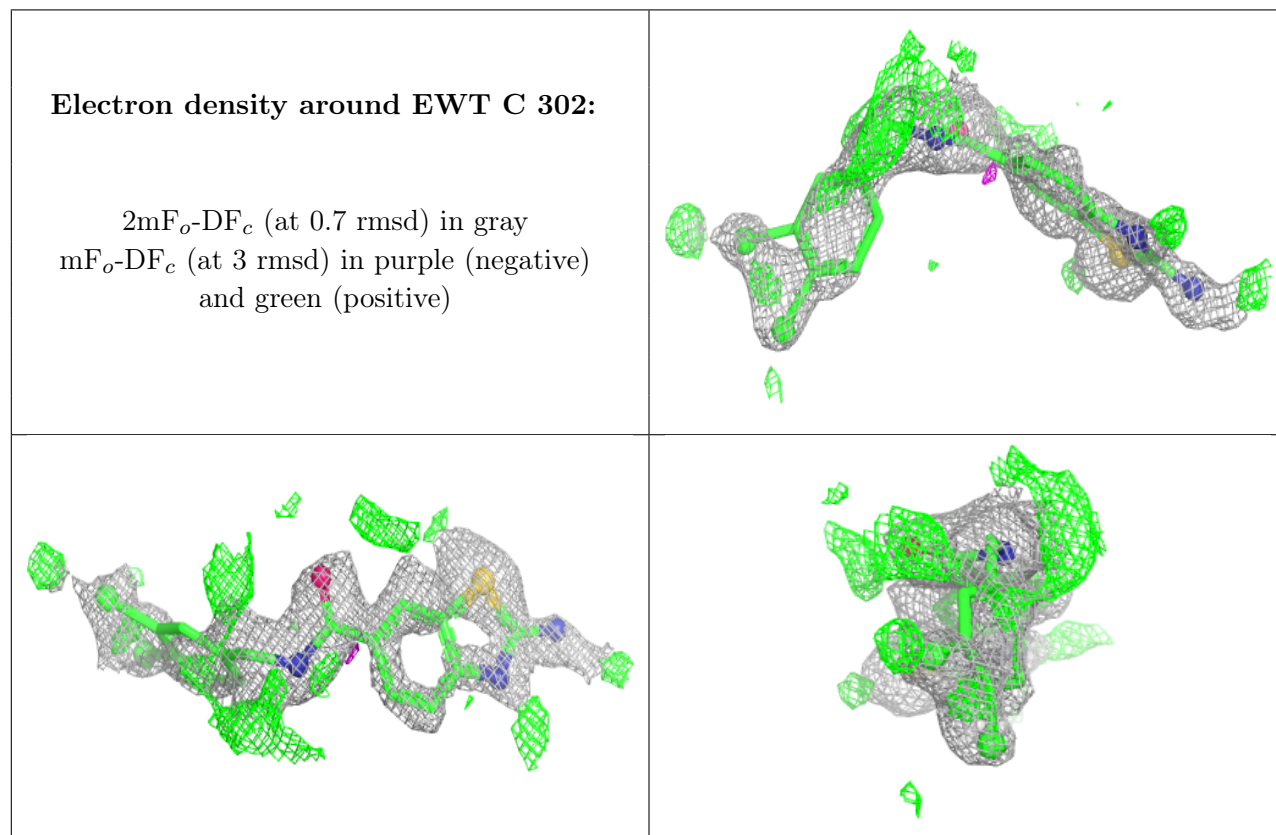
There are no oligosaccharides in this entry.

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.

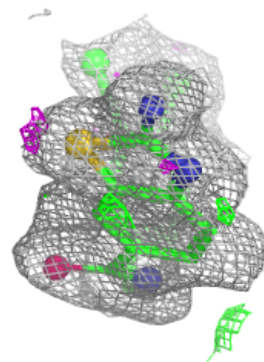
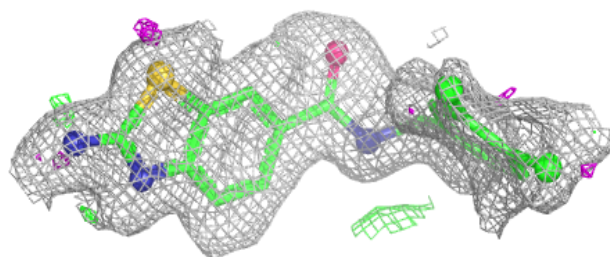
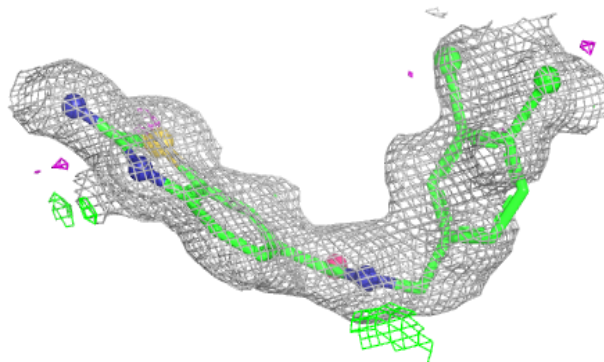
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
4	DMS	B	303	4/4	0.83	0.20	19,22,23,28	4
3	EWT	C	302	22/22	0.85	0.18	24,32,36,42	22
4	DMS	D	303	4/4	0.89	0.16	36,39,41,57	0
3	EWT	A	302	22/22	0.92	0.12	23,35,71,82	0
3	EWT	D	302	22/22	0.93	0.12	22,32,76,96	0
4	DMS	A	303[A]	4/4	0.93	0.17	24,24,24,27	4
3	EWT	B	302	22/22	0.93	0.11	22,33,61,68	0
2	NAP	C	301	48/48	0.93	0.10	16,21,28,30	48
5	ACT	C	303	4/4	0.94	0.08	24,26,27,28	0
2	NAP	A	301	48/48	0.96	0.07	18,22,23,26	0
2	NAP	B	301	48/48	0.97	0.07	16,20,23,25	0
2	NAP	D	301	48/48	0.97	0.07	14,21,26,28	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.

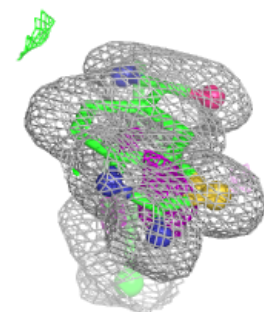
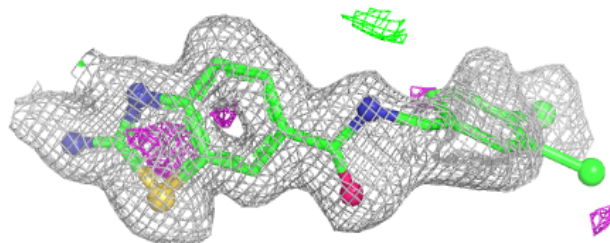
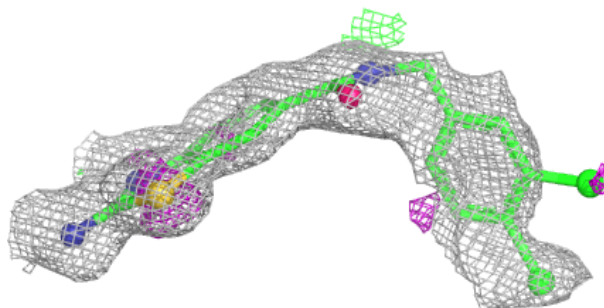


Electron density around EWT A 302:

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

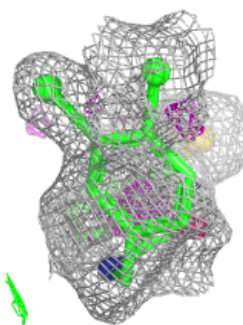
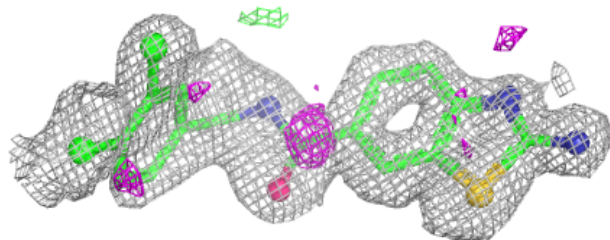
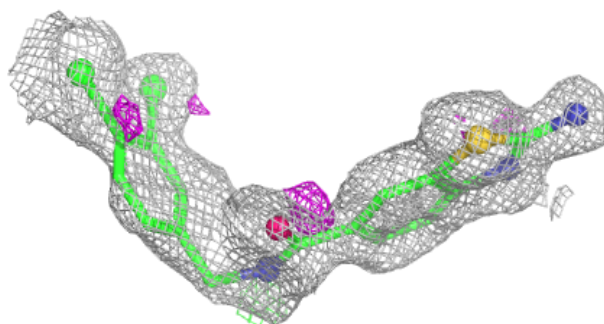
**Electron density around EWT D 302:**

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

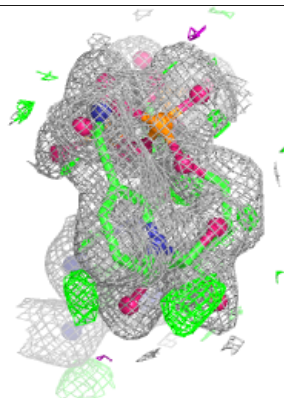
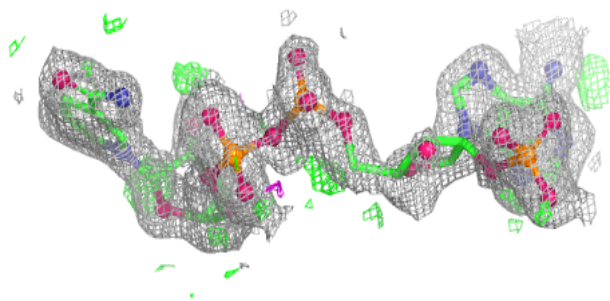
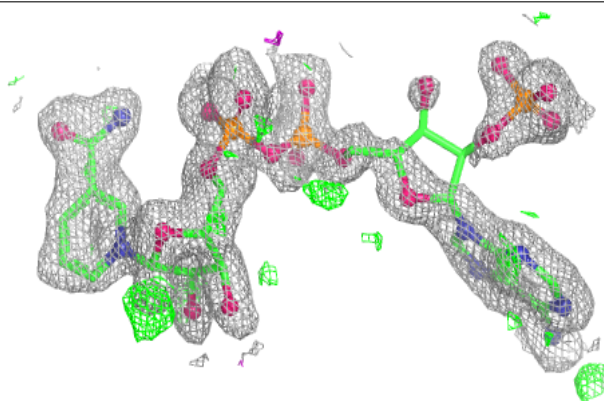


Electron density around EWT B 302:

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

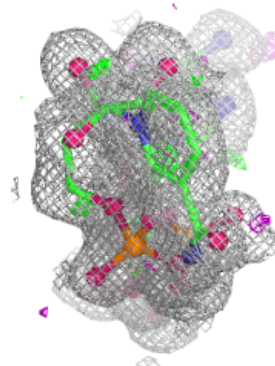
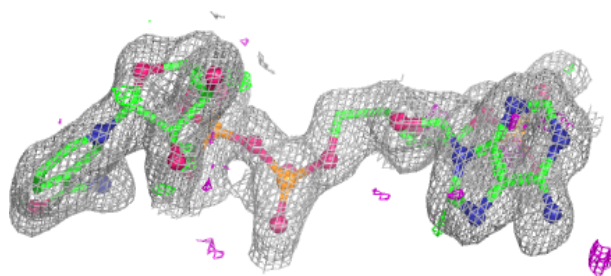
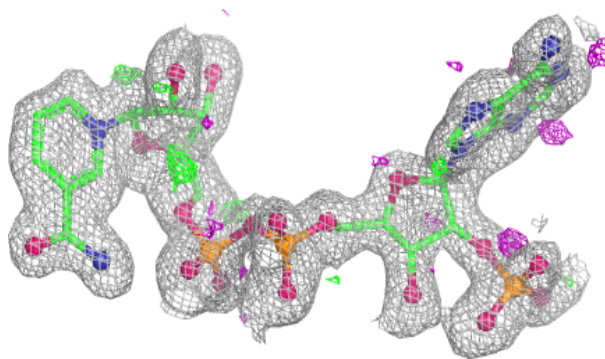
**Electron density around NAP C 301:**

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

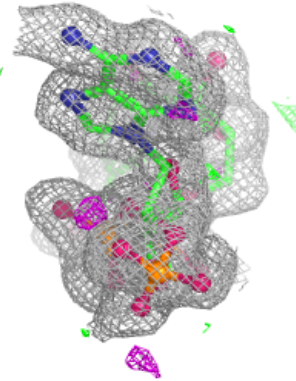
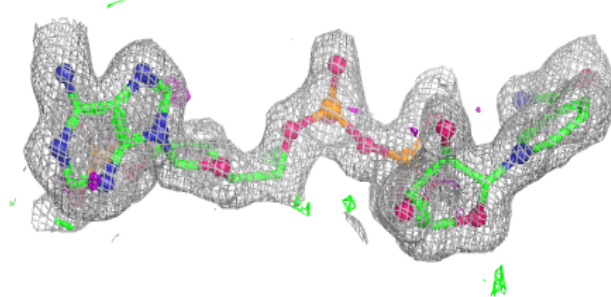
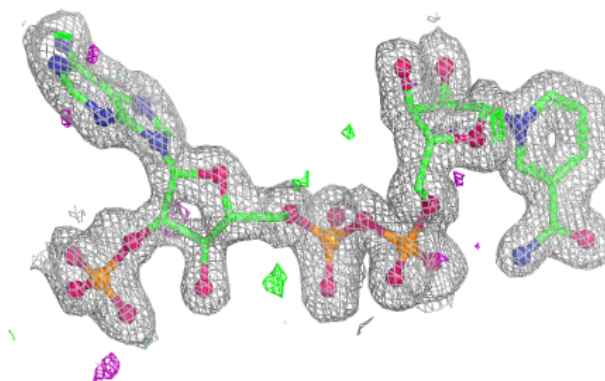


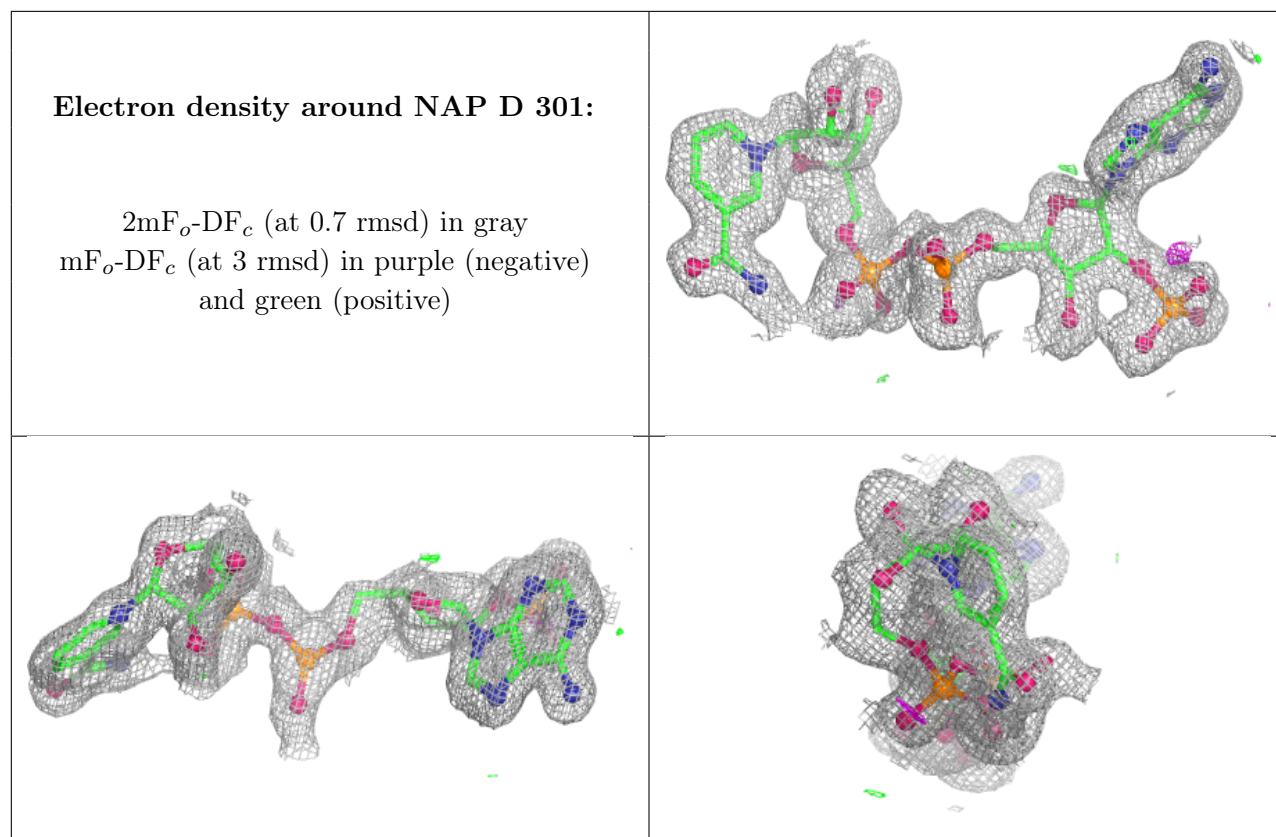
Electron density around NAP A 301:

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

**Electron density around NAP 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.