



# wwPDB X-ray Structure Validation Summary Report ⓘ

May 15, 2020 – 08:14 am BST

PDB ID : 3SZG  
Title : Crystal structure of C176A glutamine-dependent NAD<sup>+</sup> synthetase from M. tuberculosis bound to AMP/PPi and NaAD<sup>+</sup>  
Authors : Chuenchor, W.; Doukov, T.; Gerratana, B.  
Deposited on : 2011-07-19  
Resolution : 2.25 Å(reported)

This is a wwPDB X-ray Structure Validation Summary Report for a publicly released PDB entry.

We welcome your comments at [validation@mail.wwpdb.org](mailto: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.

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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

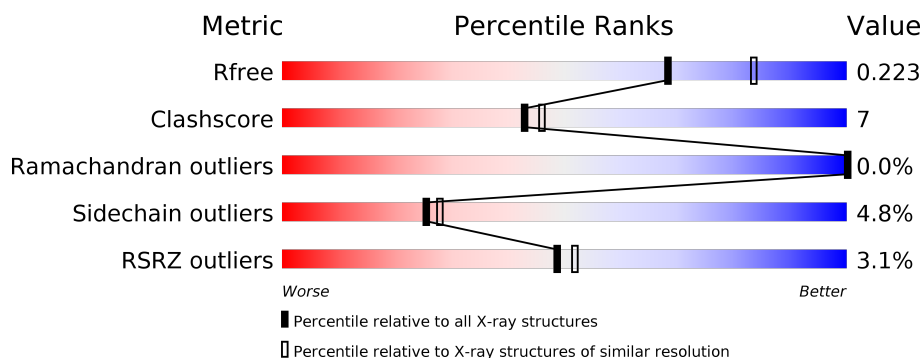
# 1 Overall quality at a glance ⓘ

The following experimental techniques were used to determine the structure:

## *X-RAY DIFFRACTION*

The reported resolution of this entry is 2.25 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	1377 (2.26-2.26)
Clashscore	141614	1487 (2.26-2.26)
Ramachandran outliers	138981	1449 (2.26-2.26)
Sidechain outliers	138945	1450 (2.26-2.26)
RSRZ outliers	127900	1356 (2.26-2.26)

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  $\geq 3$ , 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	680	<div> <div>4%</div> <div> <div></div> <div>81%</div> <div>13%</div> <div>• •</div> </div> </div>
1	B	680	<div> <div>2%</div> <div> <div></div> <div>80%</div> <div>13%</div> <div>• 5%</div> </div> </div>
1	C	680	<div> <div>3%</div> <div> <div></div> <div>82%</div> <div>13%</div> <div>• •</div> </div> </div>
1	D	680	<div> <div>3%</div> <div> <div></div> <div>82%</div> <div>12%</div> <div>• •</div> </div> </div>

## 2 Entry composition

There are 6 unique types of molecules in this entry. The entry contains 21381 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.

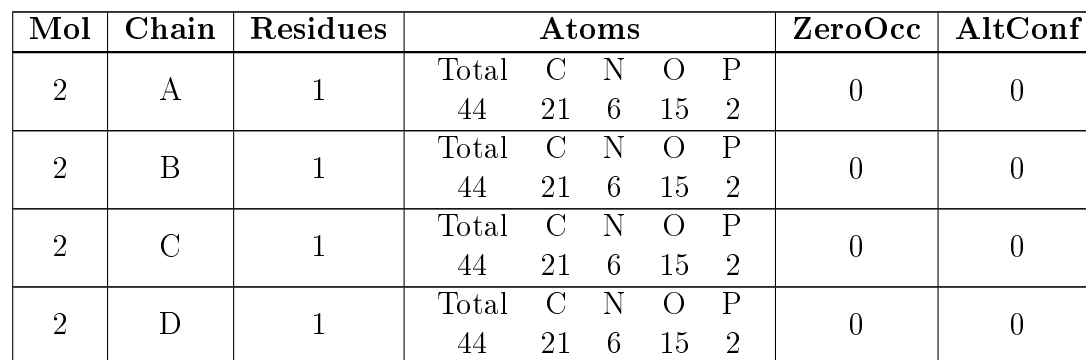
- Molecule 1 is a protein called Glutamine-dependent NAD(+) synthetase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	650	Total	C	N	O	S	0	0	0
			5040	3191	902	932	15			
1	B	649	Total	C	N	O	S	0	0	0
			5039	3188	902	934	15			
1	C	660	Total	C	N	O	S	0	0	0
			5119	3243	913	948	15			
1	D	658	Total	C	N	O	S	0	0	0
			5116	3242	912	947	15			

There are 8 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	0	SER	-	expression tag	UNP P0A5L6
A	176	ALA	CYS	engineered mutation	UNP P0A5L6
B	0	SER	-	expression tag	UNP P0A5L6
B	176	ALA	CYS	engineered mutation	UNP P0A5L6
C	0	SER	-	expression tag	UNP P0A5L6
C	176	ALA	CYS	engineered mutation	UNP P0A5L6
D	0	SER	-	expression tag	UNP P0A5L6
D	176	ALA	CYS	engineered mutation	UNP P0A5L6

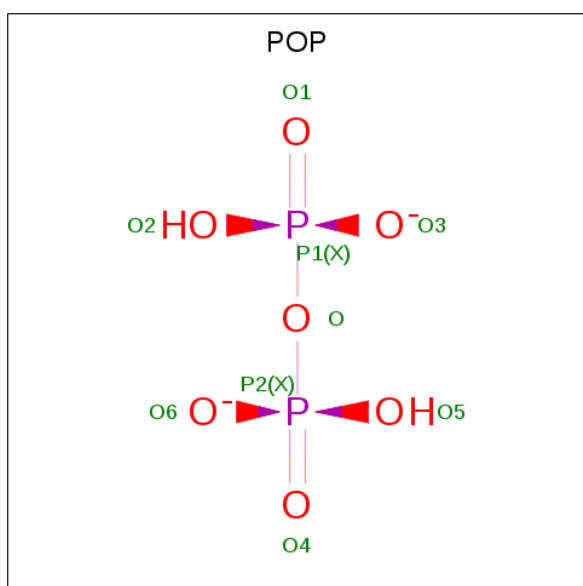
- Molecule 2 is NICOTINIC ACID ADENINE DINUCLEOTIDE (three-letter code: DND) (formula:  $C_{21}H_{27}N_6O_{15}P_2$ ).



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- The chemical structure of AMP (Adenosine Monophosphate) is shown, highlighting the adenine base, ribose sugar, and phosphate group. The atoms are labeled as follows:
- Adenine Base:** N1, N3, N7, N9, C2, C4, C5, C6, C8.
  - Ribose Sugar:** C1'(R), C2'(R), C3'(S), C4'(R), C5'.
  - Phosphate Group:** P, O1P, O2P, O3P, O4', O5'.
- The structure is a 3D representation with stereochemistry indicated by wedge and dash bonds. The adenine base is connected to the ribose sugar at the C1' position, which is in the (R) configuration. The ribose sugar is in the (S) configuration at C3' and (R) at C4'. The phosphate group is attached to the C5' position of the ribose sugar.

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

- Molecule 4 is PYROPHOSPHATE 2- (three-letter code: POP) (formula:  $\text{H}_2\text{O}_7\text{P}_2$ ).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	A	1	Total	O	P	0	0
			9	7	2		
4	B	1	Total	O	P	0	0
			9	7	2		
4	C	1	Total	O	P	0	0
			9	7	2		
4	D	1	Total	O	P	0	0
			9	7	2		

- Molecule 5 is GLYCEROL (three-letter code: GOL) (formula:  $\text{C}_3\text{H}_8\text{O}_3$ ).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
5	B	1	Total	C	O	0	0
			6	3	3		
5	C	1	Total	C	O	0	0
			6	3	3		
5	D	1	Total	C	O	0	0
			6	3	3		

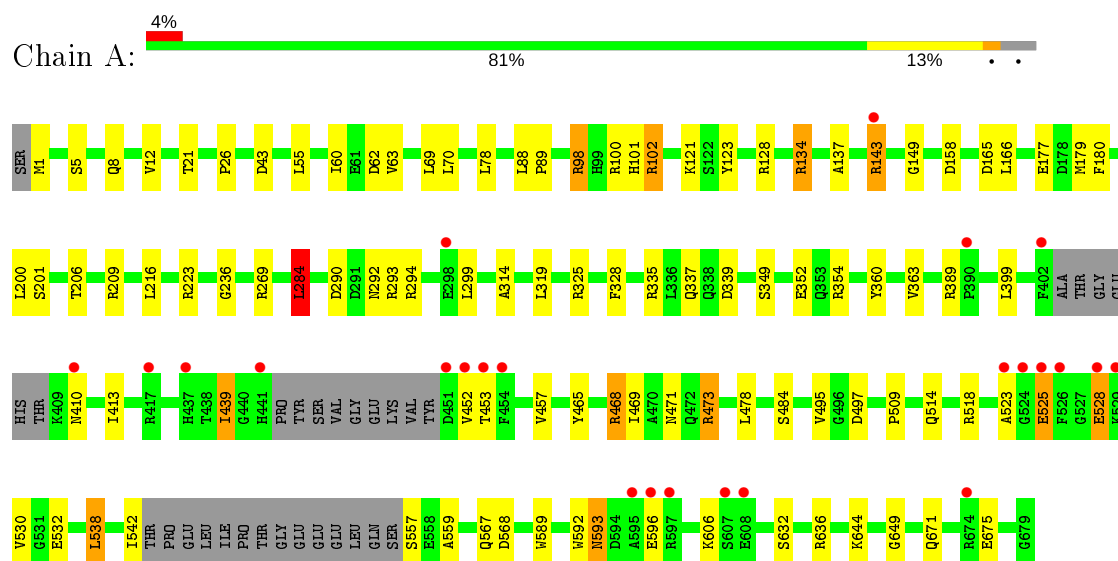
- Molecule 6 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	A	162	Total	O	0	0
			162	162		
6	B	190	Total	O	0	0
			190	190		
6	C	216	Total	O	0	0
			216	216		
6	D	177	Total	O	0	0
			177	177		

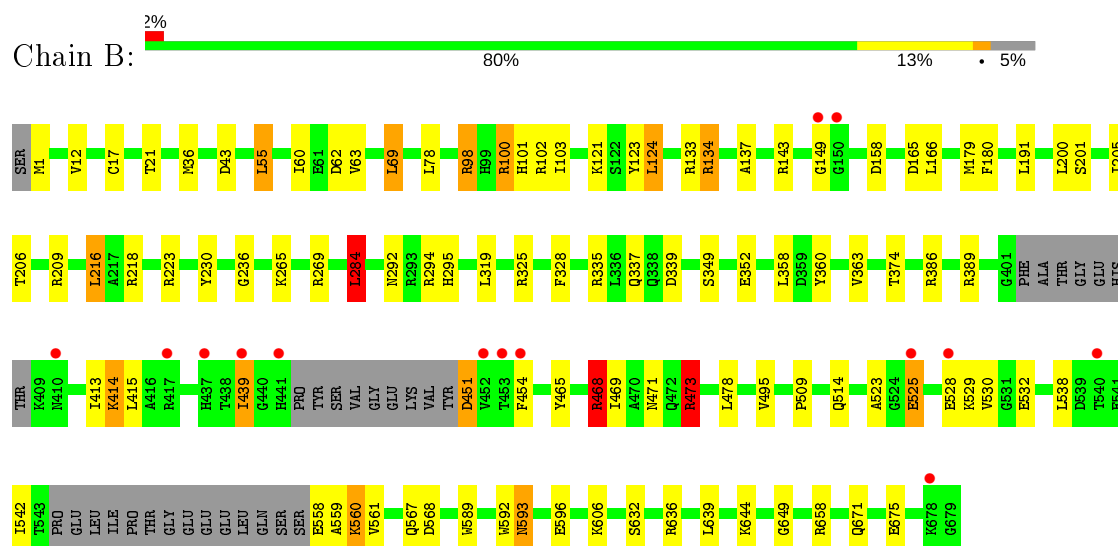
### 3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA and DNA 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.

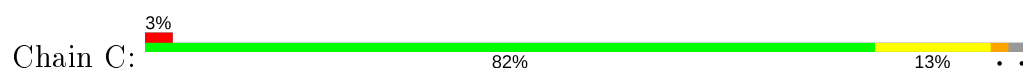
- Molecule 1: Glutamine-dependent NAD(+) synthetase

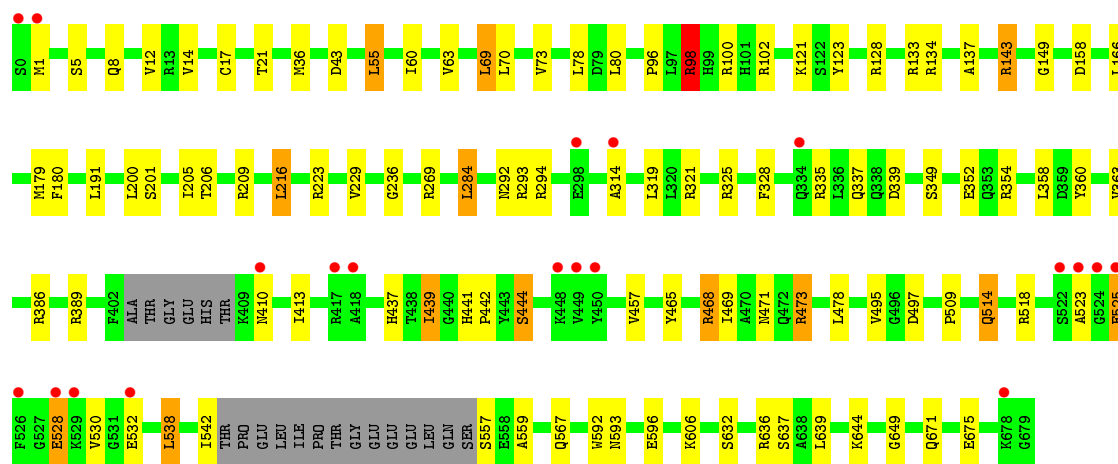


- Molecule 1: Glutamine-dependent NAD(+) synthetase

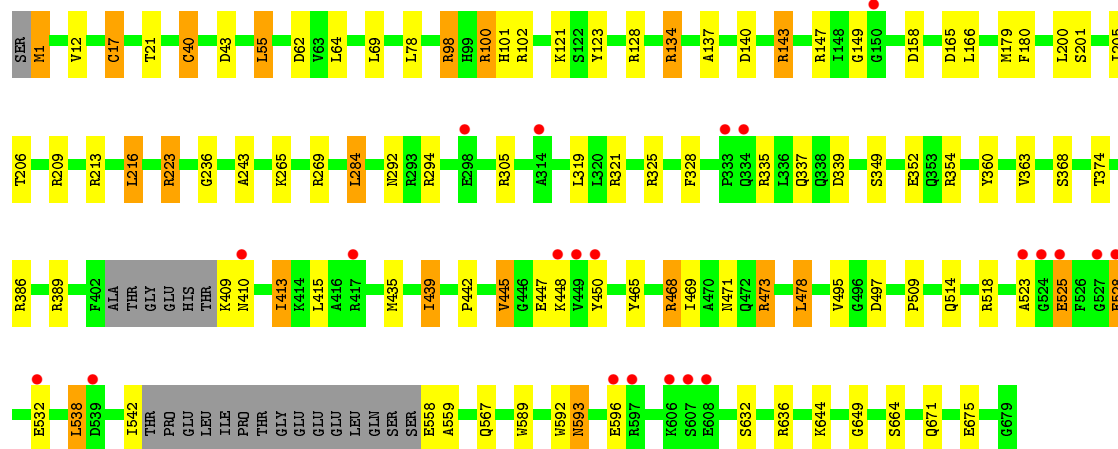
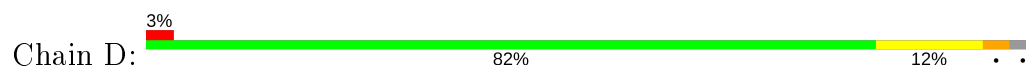


- Molecule 1: Glutamine-dependent NAD(+) synthetase





• Molecule 1: Glutamine-dependent NAD(+) synthetase



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 41 21 2	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	177.94Å 177.94Å 214.94Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	39.12 – 2.25 39.12 – 2.25	Depositor EDS
% Data completeness (in resolution range)	99.3 (39.12-2.25) 99.4 (39.12-2.25)	Depositor EDS
$R_{merge}$	0.19	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	2.94 (at 2.24Å)	Xtriage
Refinement program	PHENIX (phenix.refine: 1.7.1_743)	Depositor
R, $R_{free}$	0.192 , 0.229 0.184 , 0.223	Depositor DCC
$R_{free}$ test set	8068 reflections (4.99%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	26.3	Xtriage
Anisotropy	1.180	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.39 , 63.0	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.45$ , $\langle L^2 \rangle = 0.27$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
$F_o, F_c$ correlation	0.96	EDS
Total number of atoms	21381	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	43.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 12.58% of the height of the origin peak. No significant pseudotranslation is detected.*

<sup>1</sup>Intensities estimated from amplitudes.

<sup>2</sup>Theoretical 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: DND, GOL, POP, 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	0.82	2/5156 (0.0%)	0.95	15/7003 (0.2%)
1	B	0.85	2/5154 (0.0%)	0.91	14/6999 (0.2%)
1	C	0.85	2/5239 (0.0%)	0.91	14/7118 (0.2%)
1	D	0.90	6/5236 (0.1%)	0.92	14/7112 (0.2%)
All	All	0.85	12/20785 (0.1%)	0.92	57/28232 (0.2%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	B	0	1
1	D	0	1
All	All	0	2

The worst 5 of 12 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	D	40	CYS	CB-SG	20.02	2.16	1.82
1	D	17	CYS	CB-SG	12.07	2.02	1.82
1	C	284	LEU	CG-CD2	-7.48	1.24	1.51
1	A	284	LEU	CG-CD2	-6.98	1.26	1.51
1	B	284	LEU	CG-CD2	-6.83	1.26	1.51

The worst 5 of 57 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	100	ARG	NE-CZ-NH1	-18.65	110.98	120.30
1	A	134	ARG	NE-CZ-NH2	-18.09	111.26	120.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	100	ARG	NE-CZ-NH2	17.31	128.96	120.30
1	D	134	ARG	NE-CZ-NH2	-16.60	112.00	120.30
1	C	134	ARG	NE-CZ-NH1	-16.36	112.12	120.30

There are no chirality outliers.

All (2) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	B	559	ALA	Peptide
1	D	559	ALA	Peptide

## 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	5040	0	4938	69	0
1	B	5039	0	4949	79	0
1	C	5119	0	5014	75	0
1	D	5116	0	5021	70	0
2	A	44	0	25	0	0
2	B	44	0	25	1	0
2	C	44	0	25	1	0
2	D	44	0	25	0	0
3	A	23	0	12	2	0
3	B	23	0	12	0	0
3	C	23	0	12	0	0
3	D	23	0	12	0	0
4	A	9	0	0	0	0
4	B	9	0	0	1	0
4	C	9	0	0	0	0
4	D	9	0	0	1	0
5	B	6	0	8	0	0
5	C	6	0	8	0	0
5	D	6	0	8	0	0
6	A	162	0	0	5	0
6	B	190	0	0	6	0
6	C	216	0	0	10	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
6	D	177	0	0	4	0
All	All	21381	0	20094	276	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 7.

The worst 5 of 276 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:17:CYS:SG	1:D:17:CYS:CB	2.02	1.47
1:D:40:CYS:SG	1:D:40:CYS:CB	2.16	1.33
1:B:69:LEU:HD12	1:B:69:LEU:C	1.76	1.06
1:D:143:ARG:HH11	1:D:143:ARG:HG2	1.27	0.98
1:C:143:ARG:HG2	1:C:143:ARG:HH11	1.32	0.93

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	642/680 (94%)	615 (96%)	26 (4%)	1 (0%)	47	55
1	B	641/680 (94%)	616 (96%)	25 (4%)	0	100	100
1	C	654/680 (96%)	624 (95%)	30 (5%)	0	100	100
1	D	652/680 (96%)	626 (96%)	26 (4%)	0	100	100
All	All	2589/2720 (95%)	2481 (96%)	107 (4%)	1 (0%)	100	100

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	177	GLU

### 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	519/548 (95%)	497 (96%)	22 (4%)	30	34
1	B	521/548 (95%)	498 (96%)	23 (4%)	28	32
1	C	528/548 (96%)	502 (95%)	26 (5%)	25	27
1	D	529/548 (96%)	500 (94%)	29 (6%)	21	21
All	All	2097/2192 (96%)	1997 (95%)	100 (5%)	25	28

5 of 100 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	C	1	MET
1	C	319	LEU
1	D	514	GLN
1	C	55	LEU
1	C	179	MET

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (4) such sidechains are listed below:

Mol	Chain	Res	Type
1	B	295	HIS
1	C	515	HIS
1	C	626	GLN
1	D	295	HIS

### 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](#)

15 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	$\# Z  > 2$
5	GOL	C	683	-	5,5,5	0.55	0	5,5,5	1.04	0
3	AMP	C	681	-	22,25,25	0.78	0	25,38,38	1.50	4 (16%)
3	AMP	D	681	-	22,25,25	0.83	0	25,38,38	1.55	3 (12%)
3	AMP	A	681	-	22,25,25	0.68	0	25,38,38	1.39	2 (8%)
3	AMP	B	681	-	22,25,25	0.92	0	25,38,38	1.53	3 (12%)
4	POP	D	682	-	6,8,8	0.71	0	13,13,13	1.21	1 (7%)
5	GOL	D	683	-	5,5,5	0.63	0	5,5,5	0.57	0
4	POP	C	682	-	6,8,8	0.62	0	13,13,13	1.29	1 (7%)
4	POP	A	682	-	6,8,8	0.81	0	13,13,13	0.95	0
4	POP	B	682	-	6,8,8	0.93	0	13,13,13	1.18	1 (7%)
2	DND	D	680	-	40,48,48	1.11	3 (7%)	47,73,73	1.22	4 (8%)
2	DND	B	680	-	40,48,48	1.17	2 (5%)	47,73,73	1.35	7 (14%)
5	GOL	B	683	-	5,5,5	0.53	0	5,5,5	0.71	0
2	DND	C	680	-	40,48,48	1.25	2 (5%)	47,73,73	1.16	2 (4%)
2	DND	A	680	-	40,48,48	1.15	1 (2%)	47,73,73	1.30	4 (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
5	GOL	C	683	-	-	2/4/4/4	-
3	AMP	C	681	-	-	1/6/26/26	0/3/3/3

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	AMP	D	681	-	-	2/6/26/26	0/3/3/3
3	AMP	A	681	-	-	2/6/26/26	0/3/3/3
3	AMP	B	681	-	-	5/6/26/26	0/3/3/3
4	POP	D	682	-	-	0/6/6/6	-
5	GOL	D	683	-	-	2/4/4/4	-
4	POP	C	682	-	-	0/6/6/6	-
4	POP	A	682	-	-	0/6/6/6	-
4	POP	B	682	-	-	3/6/6/6	-
2	DND	D	680	-	-	4/22/62/62	0/5/5/5
2	DND	B	680	-	-	6/22/62/62	0/5/5/5
5	GOL	B	683	-	-	4/4/4/4	-
2	DND	C	680	-	-	3/22/62/62	0/5/5/5
2	DND	A	680	-	-	4/22/62/62	0/5/5/5

The worst 5 of 8 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	C	680	DND	C3N-C7N	5.62	1.52	1.47
2	B	680	DND	C3N-C7N	5.46	1.52	1.47
2	A	680	DND	C3N-C7N	4.89	1.52	1.47
2	D	680	DND	C3N-C7N	3.64	1.51	1.47
2	C	680	DND	O4B-C1B	3.29	1.45	1.41

The worst 5 of 32 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	D	681	AMP	N3-C2-N1	-5.65	119.85	128.68
2	B	680	DND	N3A-C2A-N1A	-5.59	119.94	128.68
2	D	680	DND	N3A-C2A-N1A	-5.06	120.77	128.68
3	B	681	AMP	N3-C2-N1	-4.87	121.07	128.68
3	C	681	AMP	N3-C2-N1	-4.45	121.73	128.68

There are no chirality outliers.

5 of 38 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
5	C	683	GOL	O1-C1-C2-C3
3	C	681	AMP	C5'-O5'-P-O3P
3	D	681	AMP	C5'-O5'-P-O3P

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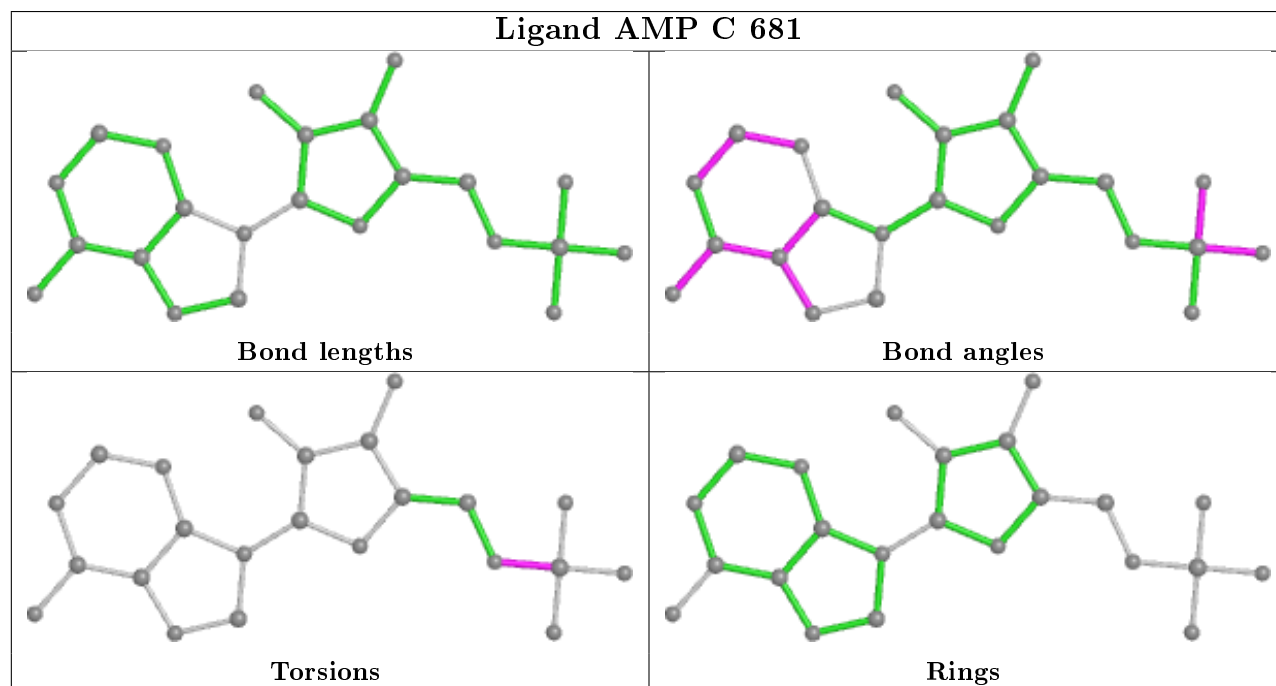
Mol	Chain	Res	Type	Atoms
3	A	681	AMP	C5'-O5'-P-O1P
3	B	681	AMP	C5'-O5'-P-O1P

There are no ring outliers.

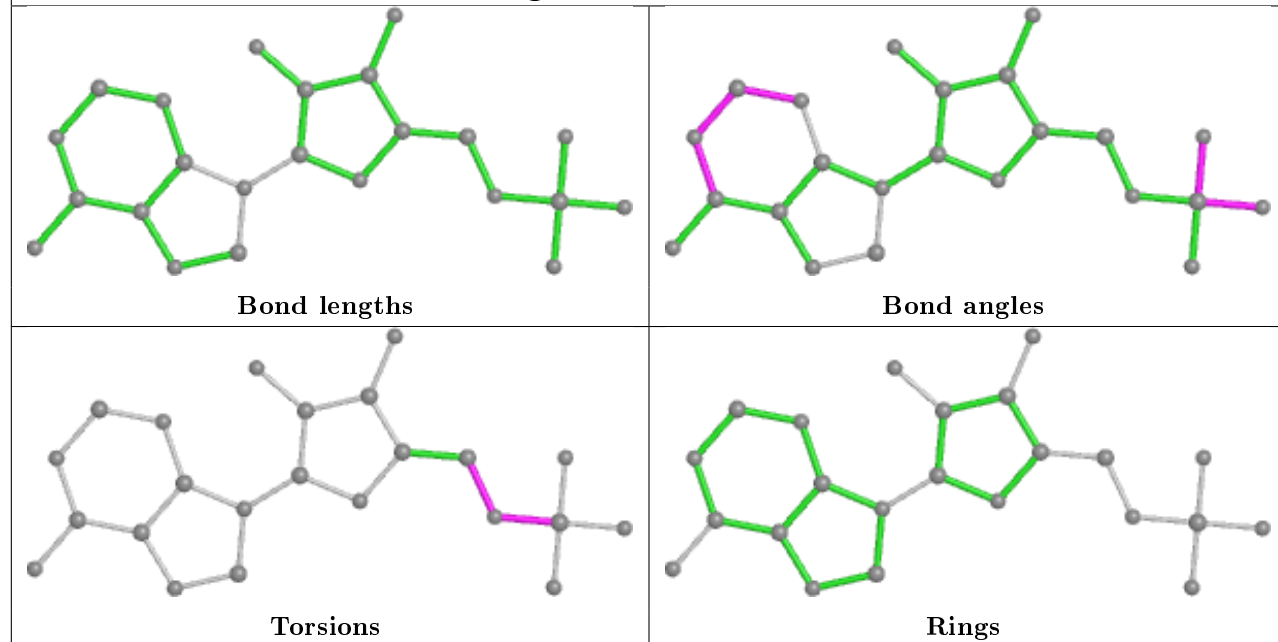
5 monomers are involved in 6 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	681	AMP	2	0
4	D	682	POP	1	0
4	B	682	POP	1	0
2	B	680	DND	1	0
2	C	680	DND	1	0

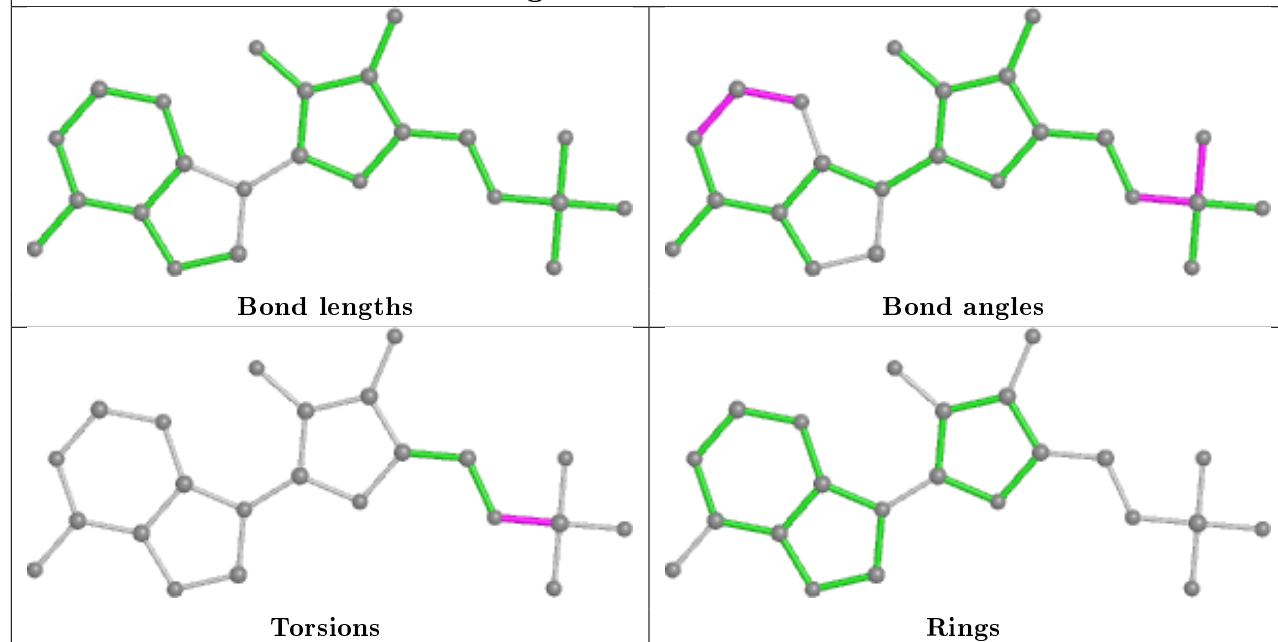
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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

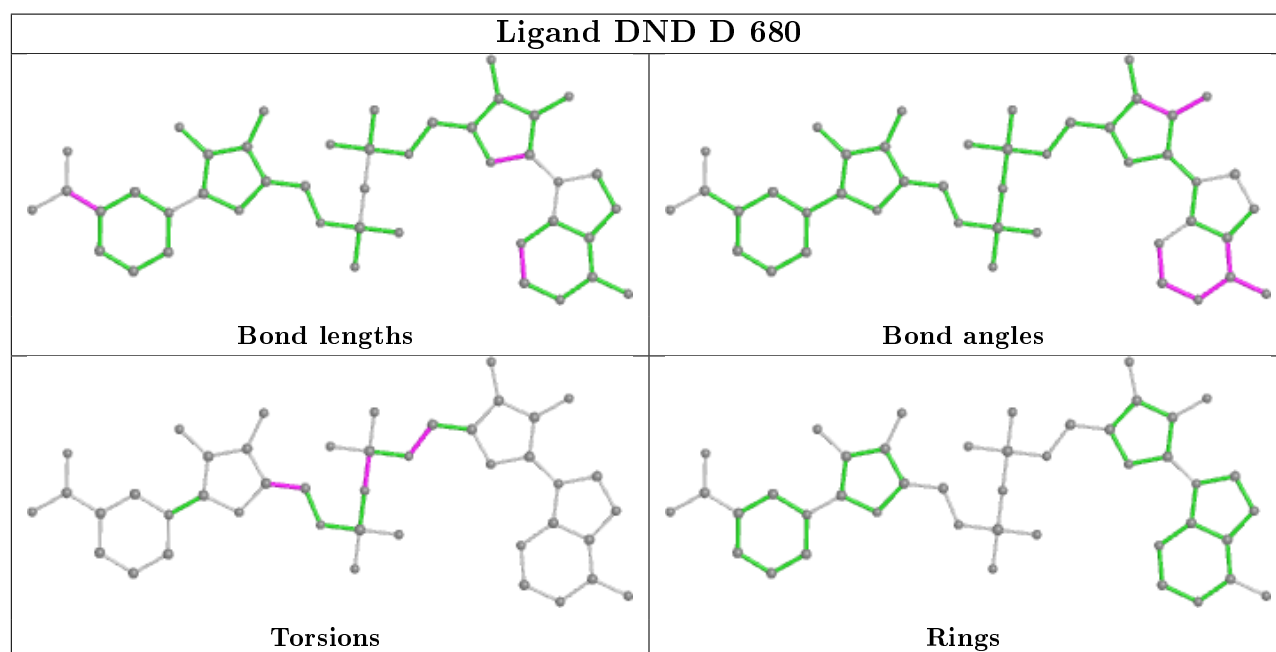
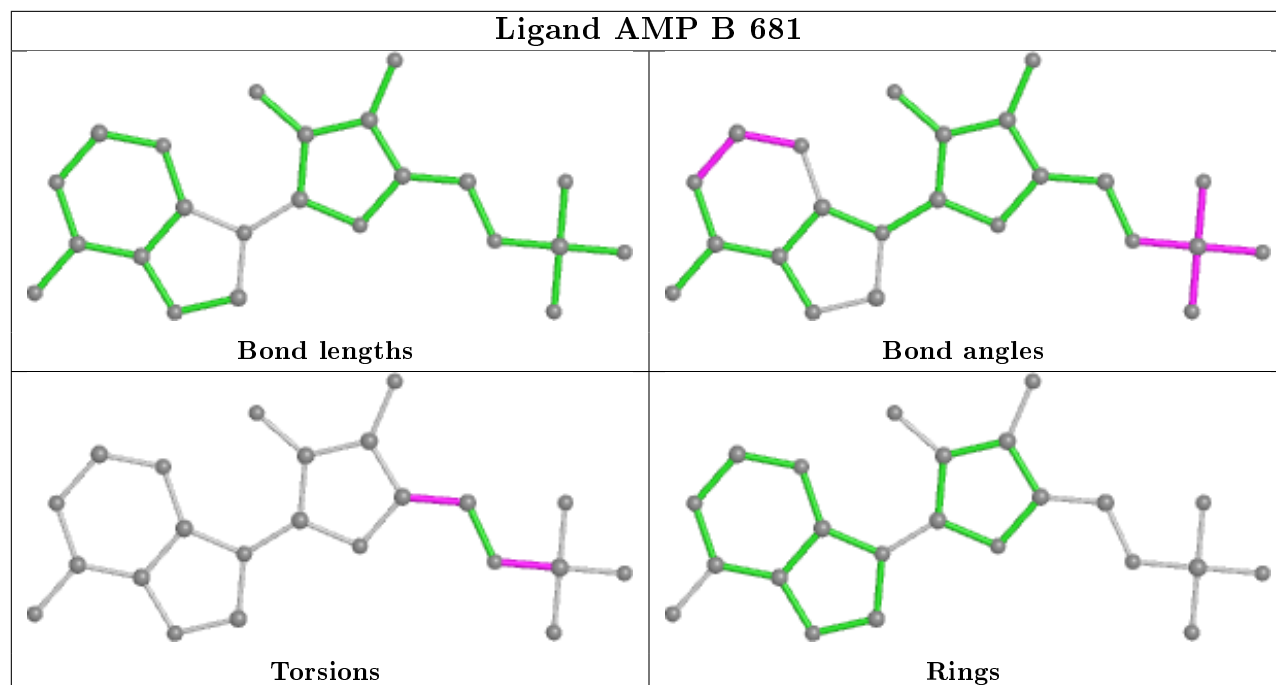


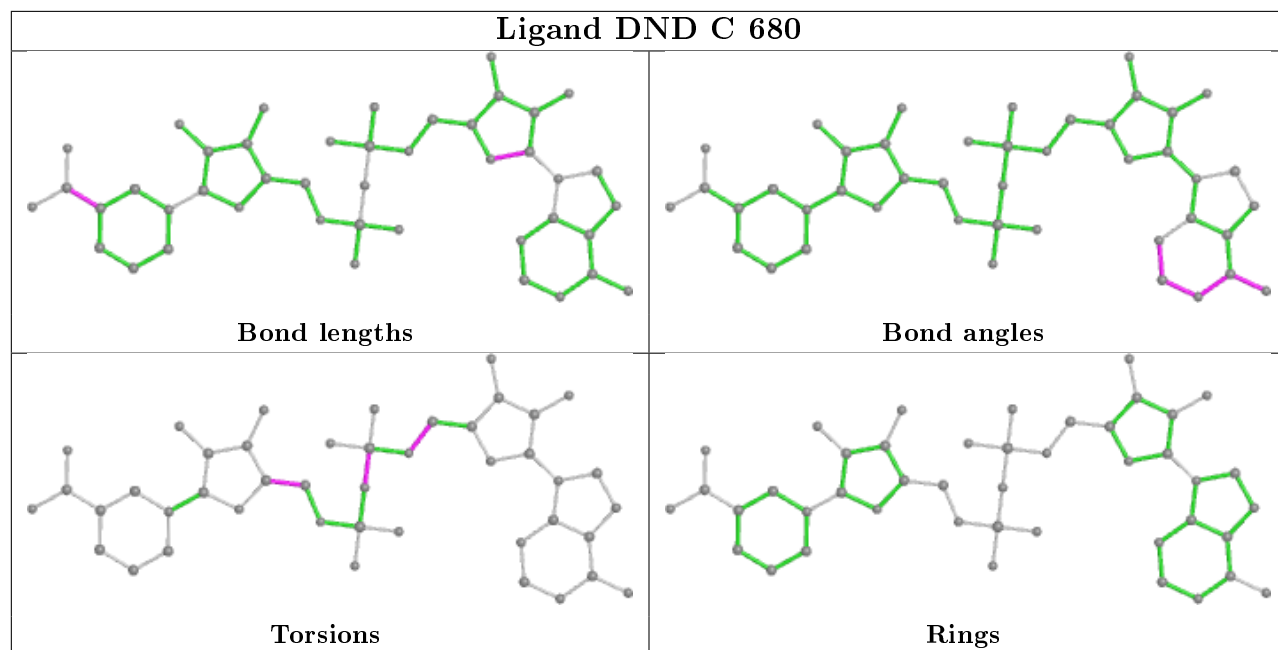
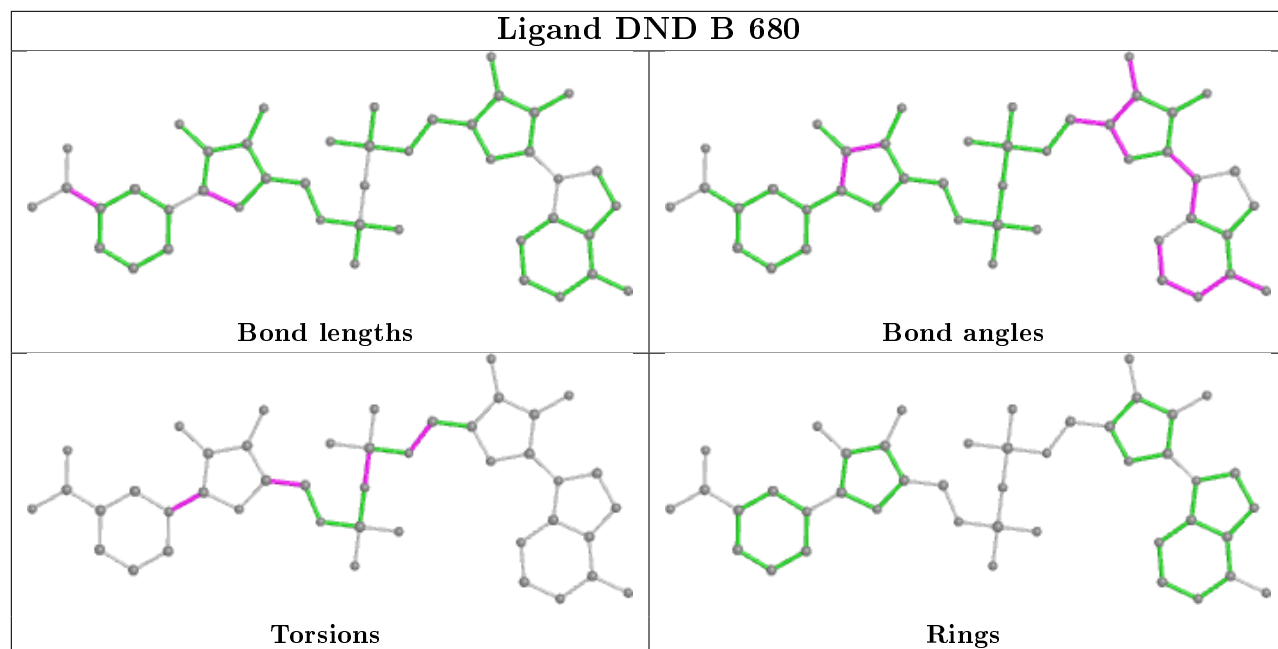
## Ligand AMP D 681

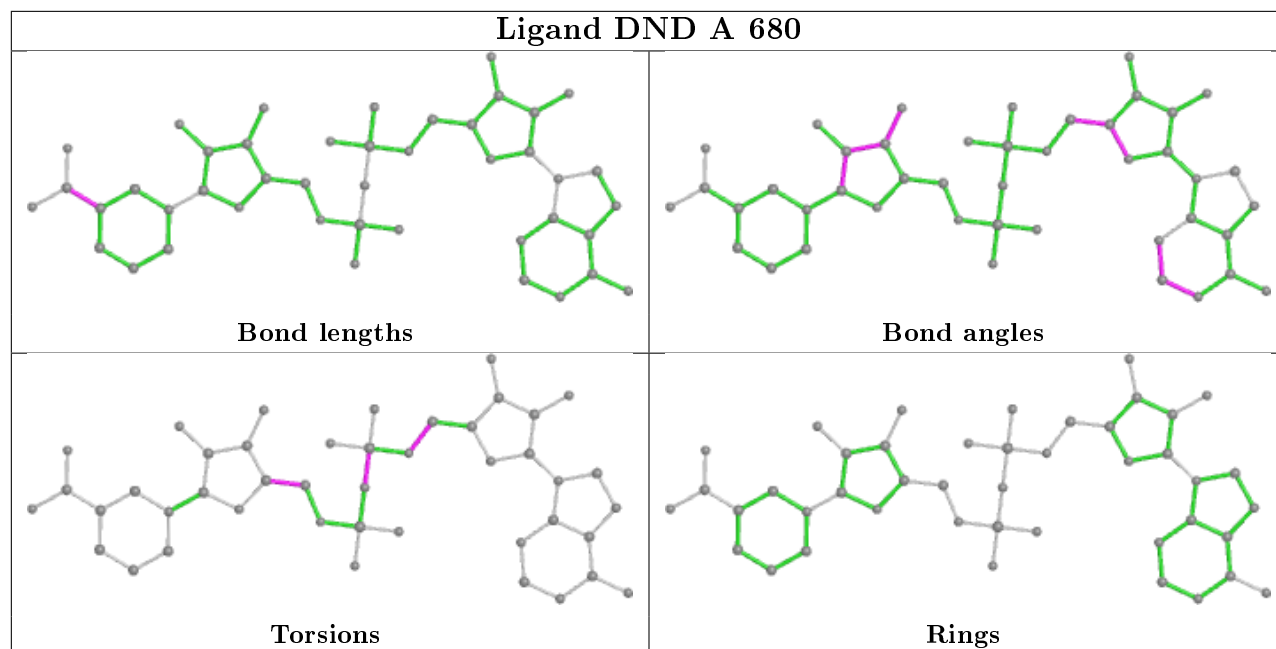


## Ligand AMP A 681









## 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, 95<sup>th</sup> 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 <sup>2</sup> )	Q<0.9
1	A	650/680 (95%)	-0.07	24 (3%) 41 44	26, 42, 71, 108	0
1	B	649/680 (95%)	-0.12	14 (2%) 62 65	23, 38, 68, 108	0
1	C	660/680 (97%)	-0.07	20 (3%) 50 53	22, 38, 68, 108	0
1	D	658/680 (96%)	-0.05	22 (3%) 46 48	23, 40, 71, 109	0
All	All	2617/2720 (96%)	-0.08	80 (3%) 49 52	22, 40, 70, 109	0

The worst 5 of 80 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	448	LYS	5.0
1	D	410	ASN	4.6
1	C	449	VAL	4.6
1	C	524	GLY	4.4
1	A	452	VAL	4.4

### 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](#)

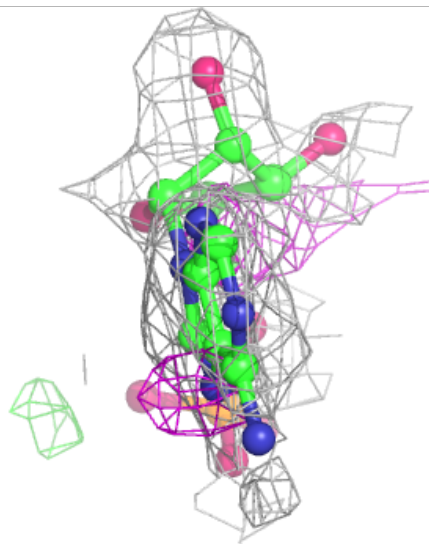
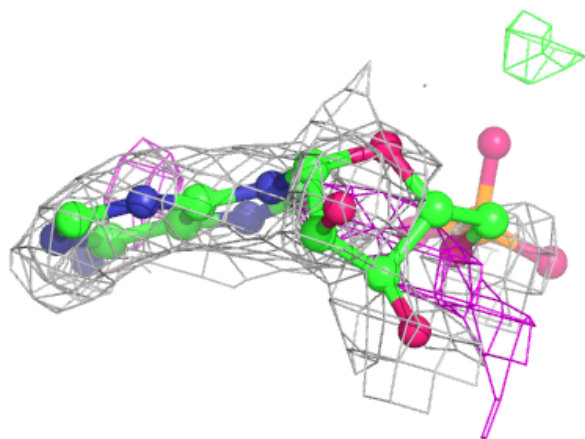
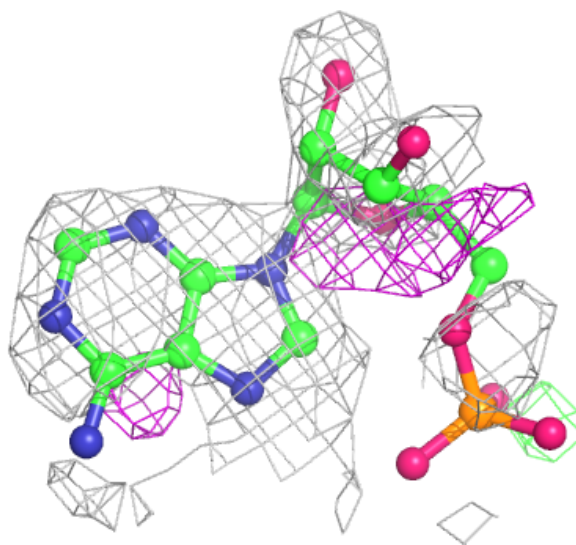
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95<sup>th</sup> percentile and maximum values of B factors of atoms in the group. The column labelled ‘Q< 0.9’ lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors( $\text{\AA}^2$ )	Q<0.9
3	AMP	C	681	23/23	0.69	0.30	58,93,202,206	0
3	AMP	B	681	23/23	0.72	0.25	51,80,139,151	0
3	AMP	A	681	23/23	0.80	0.22	55,89,150,153	0
3	AMP	D	681	23/23	0.80	0.23	44,80,192,196	0
4	POP	B	682	9/9	0.87	0.20	40,77,168,292	0
4	POP	A	682	9/9	0.88	0.19	53,83,179,264	0
5	GOL	D	683	6/6	0.89	0.21	34,49,54,56	0
5	GOL	C	683	6/6	0.90	0.17	33,47,62,62	0
4	POP	C	682	9/9	0.91	0.16	49,103,170,272	0
5	GOL	B	683	6/6	0.92	0.14	30,45,52,57	0
4	POP	D	682	9/9	0.93	0.13	68,95,173,228	0
2	DND	D	680	44/44	0.95	0.13	34,52,87,121	0
2	DND	B	680	44/44	0.96	0.12	32,45,103,132	0
2	DND	C	680	44/44	0.96	0.11	25,46,76,87	0
2	DND	A	680	44/44	0.96	0.13	27,49,112,127	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.

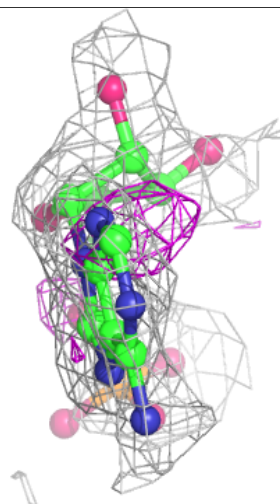
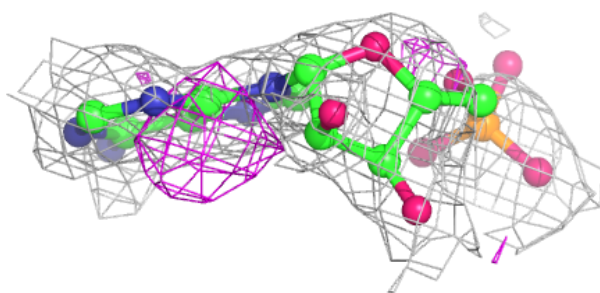
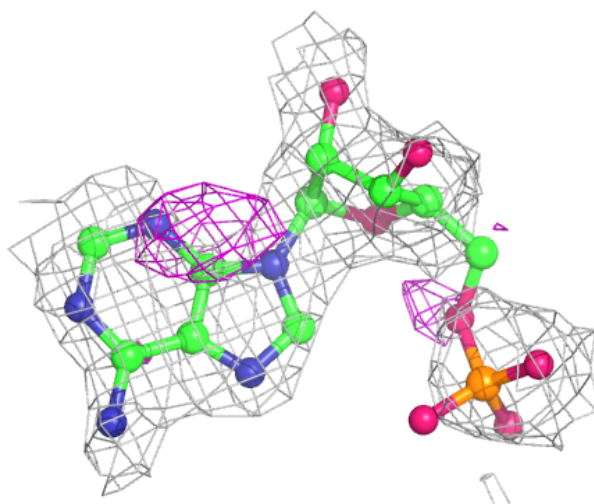
**Electron density around AMP C 681:**

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



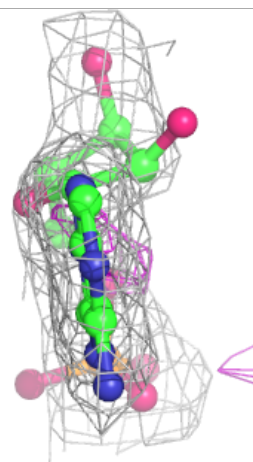
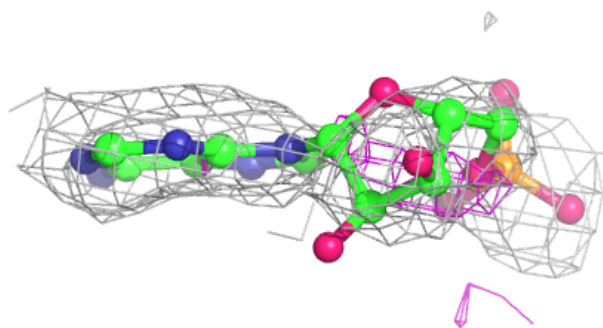
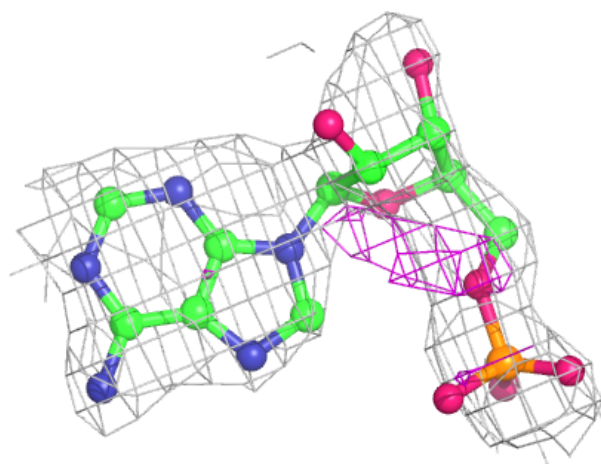
**Electron density around AMP B 681:**

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



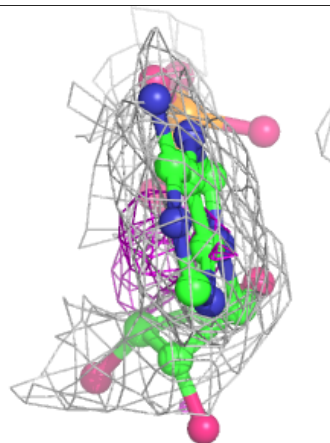
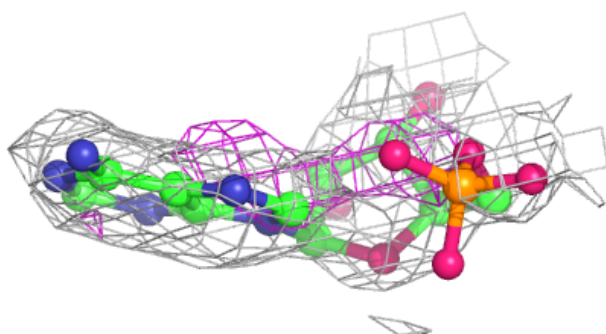
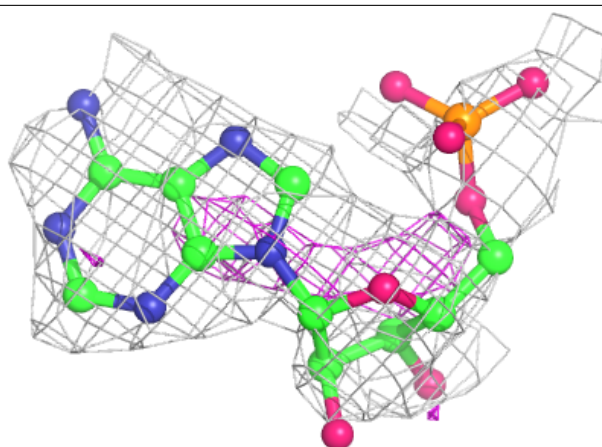
**Electron density around AMP A 681:**

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

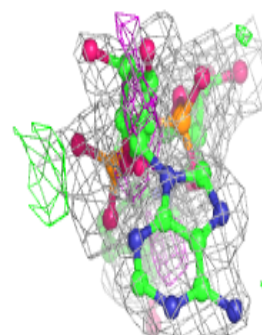
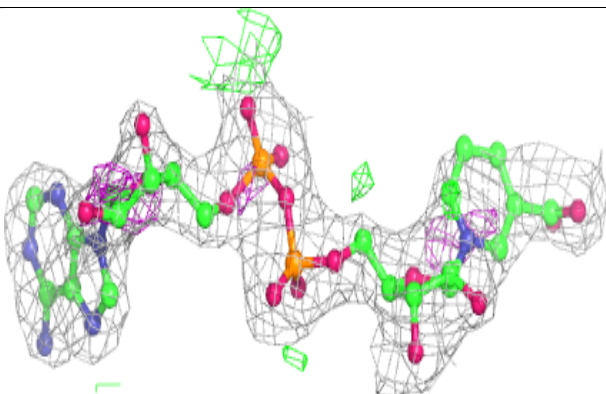
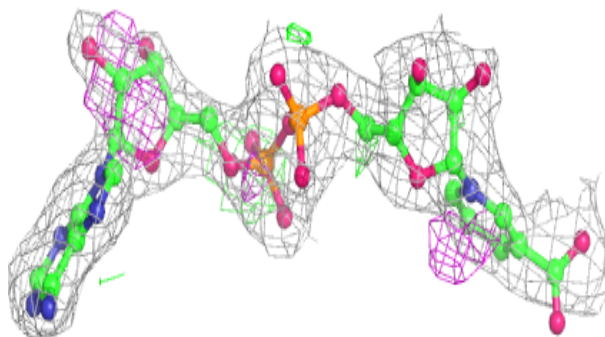


**Electron density around AMP D 681:**

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

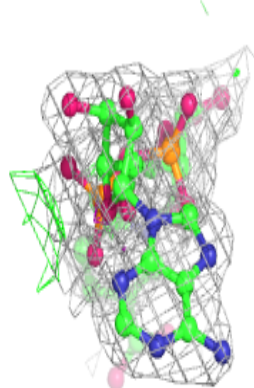
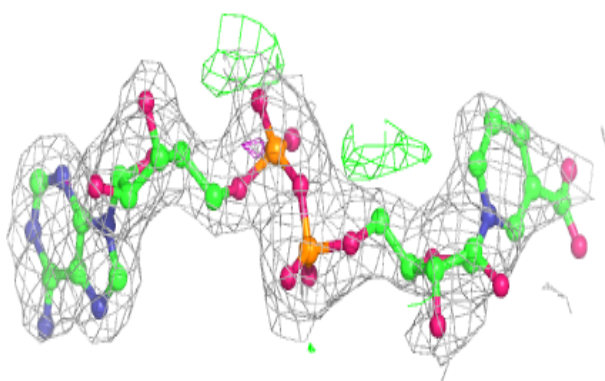
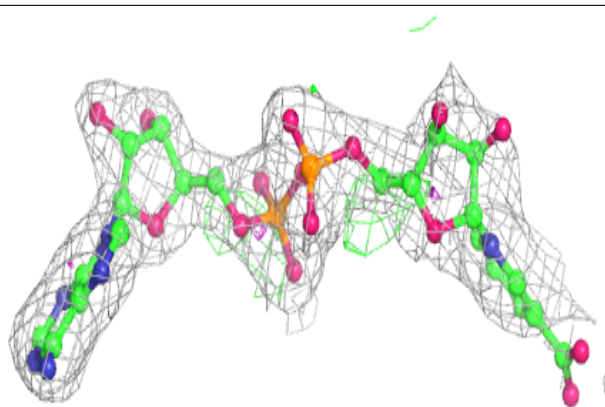
**Electron density around DND D 680:**

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

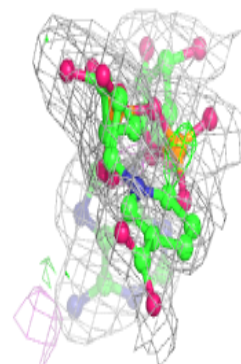
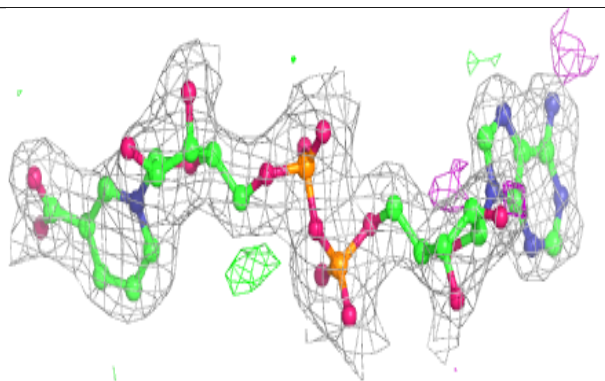
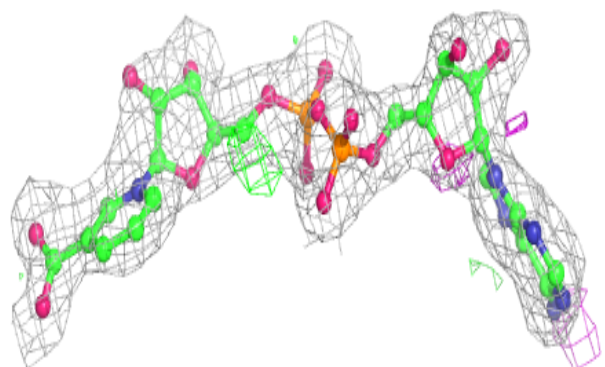


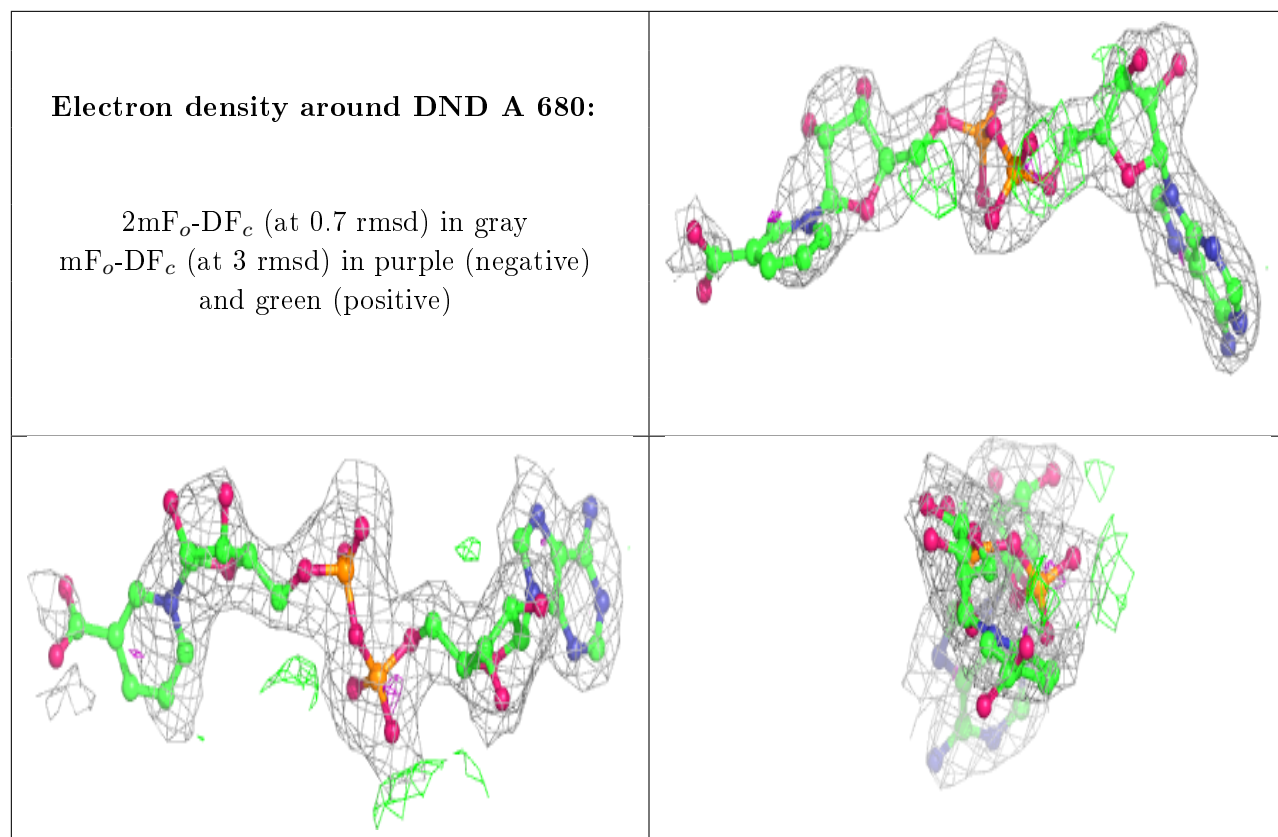
**Electron density around DND B 680:**

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

**Electron density around DND C 680:**

$2mF_o-DF_c$  (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.