



# wwPDB X-ray Structure Validation Summary Report ⓘ

Jun 17, 2024 – 03:35 AM EDT

PDB ID : 5M2X  
Title : Crystal structure of the full-length Zika virus NS5 protein (Human isolate Z1106033)  
Authors : Ferrero, D.S.; Ruiz-Arroyo, V.M.; Soler, N.; Uson, I.; Verdaguer, N.  
Deposited on : 2016-10-13  
Resolution : 4.99 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.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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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 : 2.37.1  
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) : 2.37.1

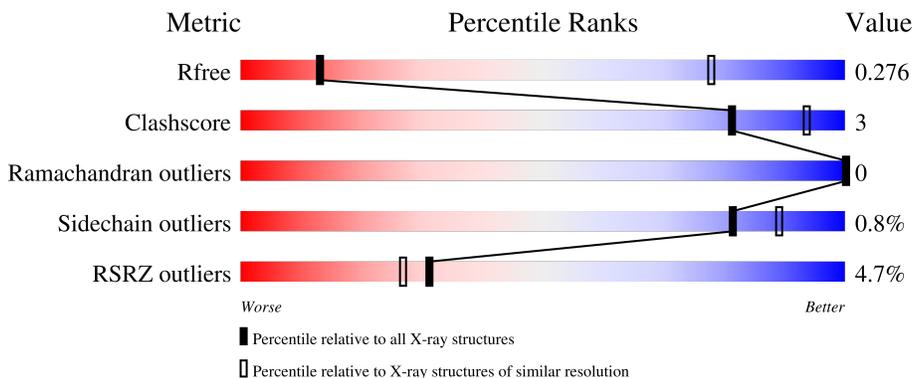
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 4.99 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	1140 (6.20-3.80)
Clashscore	141614	1000 (6.16-3.82)
Ramachandran outliers	138981	1146 (6.20-3.80)
Sidechain outliers	138945	1122 (6.20-3.80)
RSRZ outliers	127900	1010 (6.22-3.72)

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 of 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	914	 5% 89% 8% .
1	B	914	 6% 90% 7% .
1	C	914	 6% 90% 6% .
1	D	914	 3% 89% 7% .
1	E	914	 3% 89% 8% .

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Mol	Chain	Length	Quality of chain
1	F	914	

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
3	PO4	D	1002	-	-	-	X

## 2 Entry composition [i](#)

There are 4 unique types of molecules in this entry. The entry contains 42817 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 NS5.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	883	7097	4463	1286	1302	46	0	0	0
1	B	882	7090	4459	1285	1300	46	0	0	0
1	C	883	7097	4463	1286	1302	46	0	0	0
1	D	883	7097	4463	1286	1302	46	0	0	0
1	E	883	7097	4463	1286	1302	46	0	0	0
1	F	883	7097	4463	1286	1302	46	0	0	0

There are 66 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	0	MET	-	initiating methionine	UNP A0A1B2ZC85
A	904	GLY	-	expression tag	UNP A0A1B2ZC85
A	905	SER	-	expression tag	UNP A0A1B2ZC85
A	906	SER	-	expression tag	UNP A0A1B2ZC85
A	907	SER	-	expression tag	UNP A0A1B2ZC85
A	908	HIS	-	expression tag	UNP A0A1B2ZC85
A	909	HIS	-	expression tag	UNP A0A1B2ZC85
A	910	HIS	-	expression tag	UNP A0A1B2ZC85
A	911	HIS	-	expression tag	UNP A0A1B2ZC85
A	912	HIS	-	expression tag	UNP A0A1B2ZC85
A	913	HIS	-	expression tag	UNP A0A1B2ZC85
B	0	MET	-	initiating methionine	UNP A0A1B2ZC85
B	904	GLY	-	expression tag	UNP A0A1B2ZC85
B	905	SER	-	expression tag	UNP A0A1B2ZC85
B	906	SER	-	expression tag	UNP A0A1B2ZC85
B	907	SER	-	expression tag	UNP A0A1B2ZC85
B	908	HIS	-	expression tag	UNP A0A1B2ZC85

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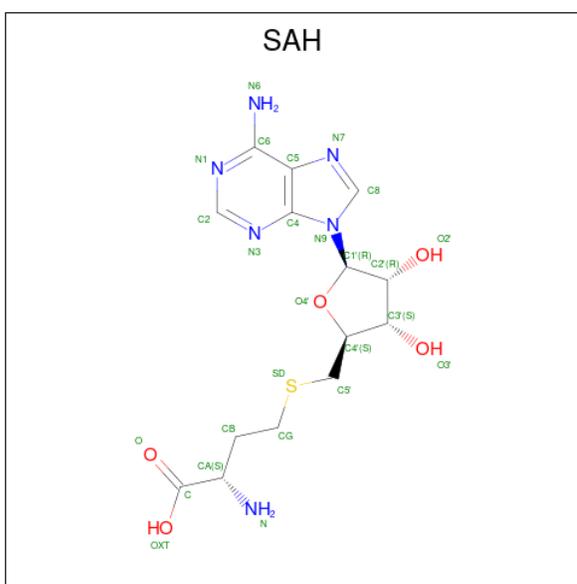
Chain	Residue	Modelled	Actual	Comment	Reference
B	909	HIS	-	expression tag	UNP A0A1B2ZC85
B	910	HIS	-	expression tag	UNP A0A1B2ZC85
B	911	HIS	-	expression tag	UNP A0A1B2ZC85
B	912	HIS	-	expression tag	UNP A0A1B2ZC85
B	913	HIS	-	expression tag	UNP A0A1B2ZC85
C	0	MET	-	initiating methionine	UNP A0A1B2ZC85
C	904	GLY	-	expression tag	UNP A0A1B2ZC85
C	905	SER	-	expression tag	UNP A0A1B2ZC85
C	906	SER	-	expression tag	UNP A0A1B2ZC85
C	907	SER	-	expression tag	UNP A0A1B2ZC85
C	908	HIS	-	expression tag	UNP A0A1B2ZC85
C	909	HIS	-	expression tag	UNP A0A1B2ZC85
C	910	HIS	-	expression tag	UNP A0A1B2ZC85
C	911	HIS	-	expression tag	UNP A0A1B2ZC85
C	912	HIS	-	expression tag	UNP A0A1B2ZC85
C	913	HIS	-	expression tag	UNP A0A1B2ZC85
D	0	MET	-	initiating methionine	UNP A0A1B2ZC85
D	904	GLY	-	expression tag	UNP A0A1B2ZC85
D	905	SER	-	expression tag	UNP A0A1B2ZC85
D	906	SER	-	expression tag	UNP A0A1B2ZC85
D	907	SER	-	expression tag	UNP A0A1B2ZC85
D	908	HIS	-	expression tag	UNP A0A1B2ZC85
D	909	HIS	-	expression tag	UNP A0A1B2ZC85
D	910	HIS	-	expression tag	UNP A0A1B2ZC85
D	911	HIS	-	expression tag	UNP A0A1B2ZC85
D	912	HIS	-	expression tag	UNP A0A1B2ZC85
D	913	HIS	-	expression tag	UNP A0A1B2ZC85
E	0	MET	-	initiating methionine	UNP A0A1B2ZC85
E	904	GLY	-	expression tag	UNP A0A1B2ZC85
E	905	SER	-	expression tag	UNP A0A1B2ZC85
E	906	SER	-	expression tag	UNP A0A1B2ZC85
E	907	SER	-	expression tag	UNP A0A1B2ZC85
E	908	HIS	-	expression tag	UNP A0A1B2ZC85
E	909	HIS	-	expression tag	UNP A0A1B2ZC85
E	910	HIS	-	expression tag	UNP A0A1B2ZC85
E	911	HIS	-	expression tag	UNP A0A1B2ZC85
E	912	HIS	-	expression tag	UNP A0A1B2ZC85
E	913	HIS	-	expression tag	UNP A0A1B2ZC85
F	0	MET	-	initiating methionine	UNP A0A1B2ZC85
F	904	GLY	-	expression tag	UNP A0A1B2ZC85
F	905	SER	-	expression tag	UNP A0A1B2ZC85
F	906	SER	-	expression tag	UNP A0A1B2ZC85

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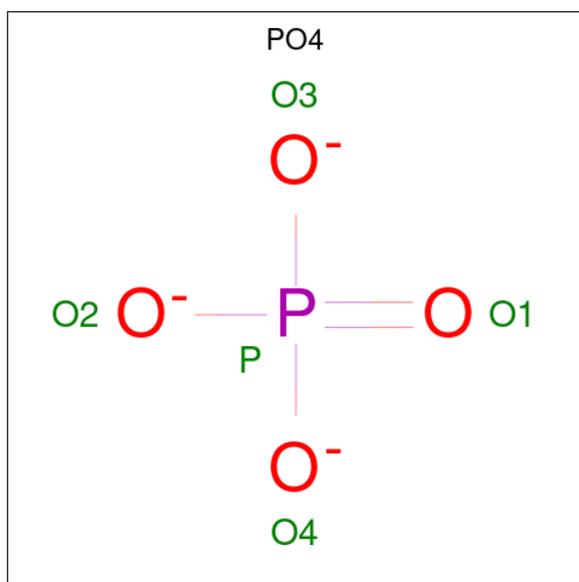
Chain	Residue	Modelled	Actual	Comment	Reference
F	907	SER	-	expression tag	UNP A0A1B2ZC85
F	908	HIS	-	expression tag	UNP A0A1B2ZC85
F	909	HIS	-	expression tag	UNP A0A1B2ZC85
F	910	HIS	-	expression tag	UNP A0A1B2ZC85
F	911	HIS	-	expression tag	UNP A0A1B2ZC85
F	912	HIS	-	expression tag	UNP A0A1B2ZC85
F	913	HIS	-	expression tag	UNP A0A1B2ZC85

- Molecule 2 is S-ADENOSYL-L-HOMOCYSTEINE (three-letter code: SAH) (formula:  $C_{14}H_{20}N_6O_5S$ ).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	A	1	Total	C	N	O	S	0	0
			26	14	6	5	1		
2	B	1	Total	C	N	O	S	0	0
			26	14	6	5	1		
2	C	1	Total	C	N	O	S	0	0
			26	14	6	5	1		
2	D	1	Total	C	N	O	S	0	0
			26	14	6	5	1		
2	E	1	Total	C	N	O	S	0	0
			26	14	6	5	1		
2	F	1	Total	C	N	O	S	0	0
			26	14	6	5	1		

- Molecule 3 is PHOSPHATE ION (three-letter code: PO4) (formula:  $O_4P$ ).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	1	Total O P 5 4 1	0	0
3	A	1	Total O P 5 4 1	0	0
3	B	1	Total O P 5 4 1	0	0
3	B	1	Total O P 5 4 1	0	0
3	C	1	Total O P 5 4 1	0	0
3	D	1	Total O P 5 4 1	0	0
3	D	1	Total O P 5 4 1	0	0
3	D	1	Total O P 5 4 1	0	0
3	D	1	Total O P 5 4 1	0	0
3	E	1	Total O P 5 4 1	0	0
3	E	1	Total O P 5 4 1	0	0
3	F	1	Total O P 5 4 1	0	0
3	F	1	Total O P 5 4 1	0	0
3	F	1	Total O P 5 4 1	0	0

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Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	F	1	Total	O	P	0	0
			5	4	1		

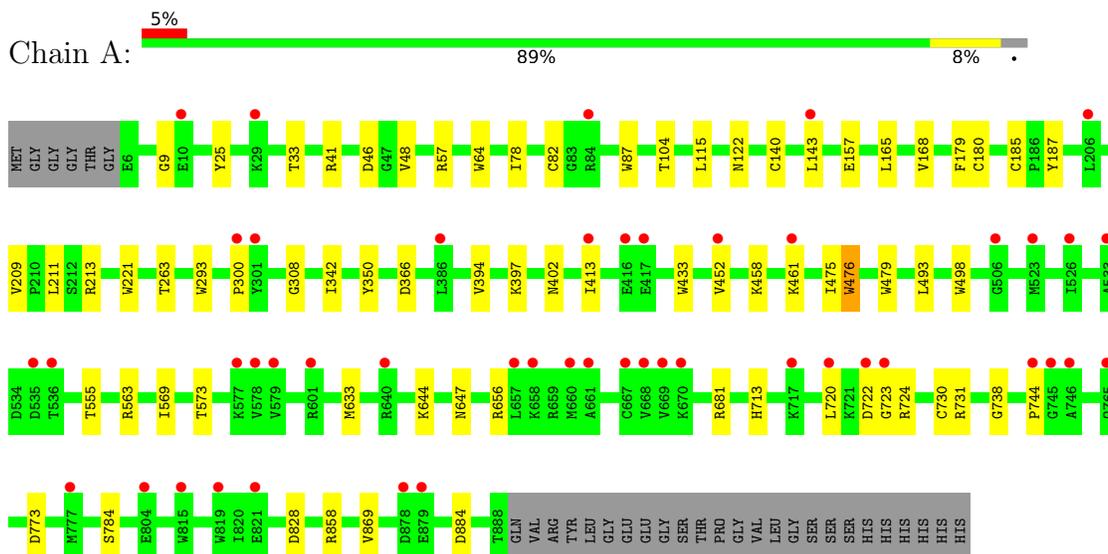
- Molecule 4 is ZINC ION (three-letter code: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	2	Total	Zn	0	0
			2	2		
4	B	1	Total	Zn	0	0
			1	1		
4	C	2	Total	Zn	0	0
			2	2		
4	D	2	Total	Zn	0	0
			2	2		
4	E	2	Total	Zn	0	0
			2	2		
4	F	2	Total	Zn	0	0
			2	2		

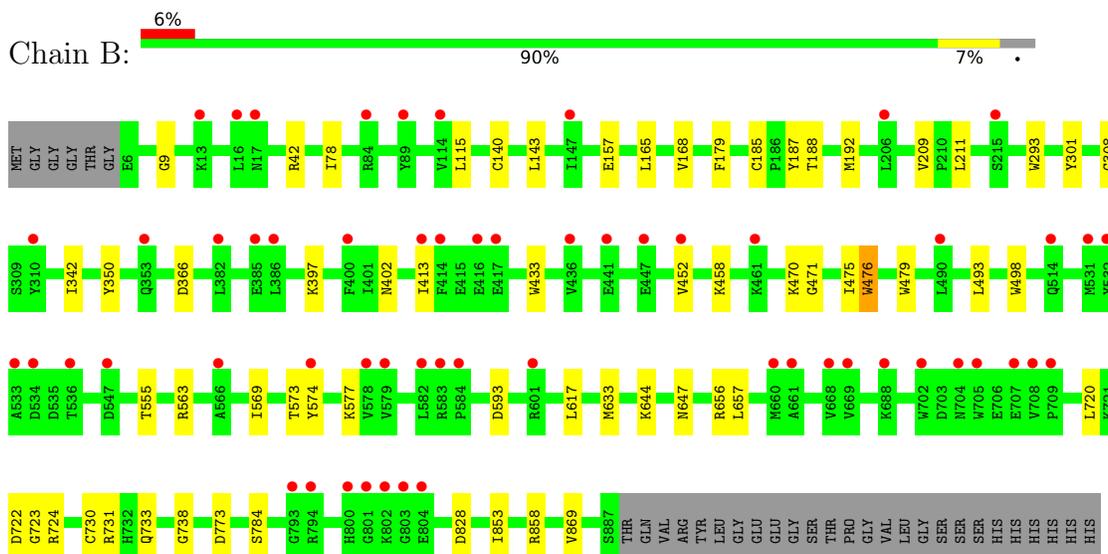
### 3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red dot above a residue indicates a poor fit to the electron density ( $RSRZ > 2$ ). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

- Molecule 1: NS5

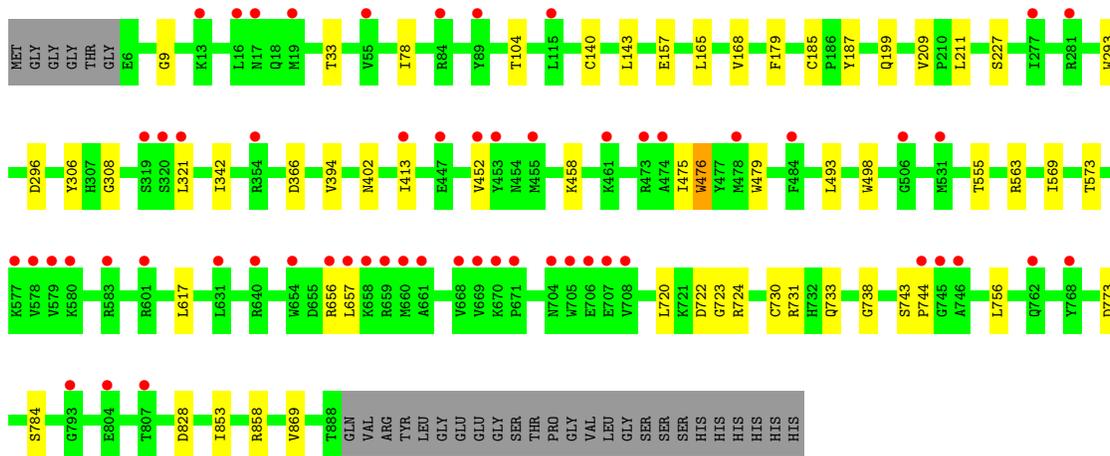


- Molecule 1: NS5

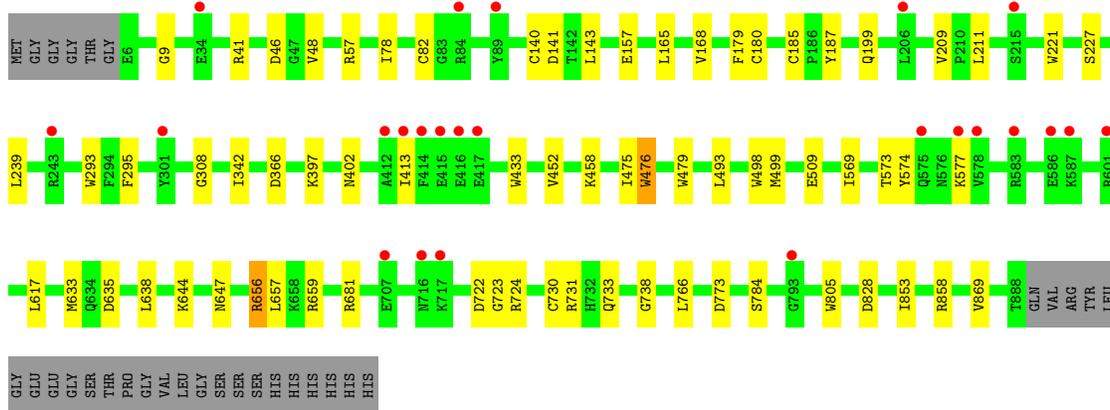
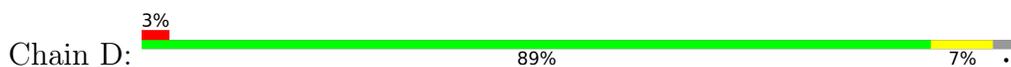


- Molecule 1: NS5

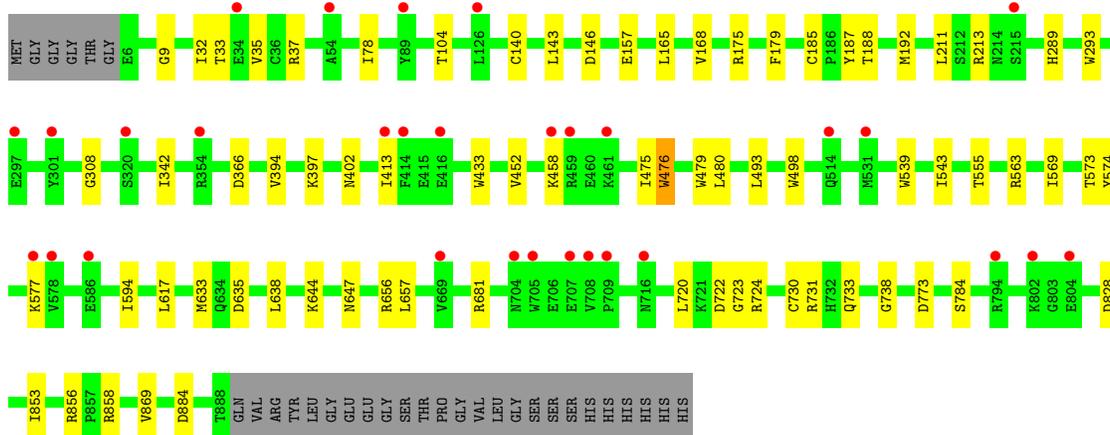
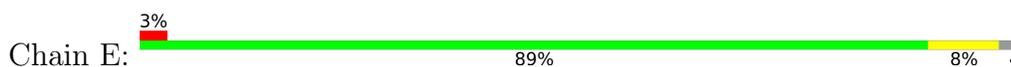




• Molecule 1: NS5

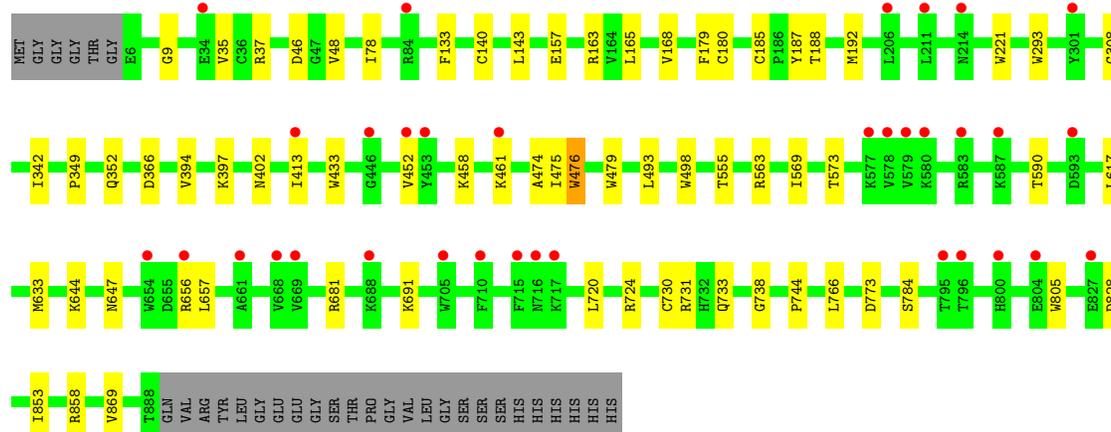


• Molecule 1: NS5



• Molecule 1: NS5

Chain F:  4% 89% 7%



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	191.06Å 192.06Å 407.23Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	49.52 – 4.99 49.52 – 4.99	Depositor EDS
% Data completeness (in resolution range)	99.7 (49.52-4.99) 97.1 (49.52-4.99)	Depositor EDS
$R_{merge}$	0.75	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	2.67 (at 5.10Å)	Xtrriage
Refinement program	PHENIX (1.11_2567: ???)	Depositor
R, $R_{free}$	0.227 , 0.276 0.227 , 0.276	Depositor DCC
$R_{free}$ test set	3279 reflections (4.99%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	110.6	Xtrriage
Anisotropy	0.394	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.31 , 216.6	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.32$ , $\langle L^2 \rangle = 0.15$	Xtrriage
Estimated twinning fraction	0.166 for k,h,-l	Xtrriage
Reported twinning fraction	0.842 for H, K, L 0.158 for K, H, -L	Depositor
Outliers	0 of 65689 reflections	Xtrriage
$F_o, F_c$ correlation	0.86	EDS
Total number of atoms	42817	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	160.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 1.64% 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 [i](#)

### 5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: PO4, SAH, ZN

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with  $|Z| > 5$  is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z  >5	RMSZ	# Z  >5
1	A	0.24	0/7262	0.44	0/9813
1	B	0.24	0/7255	0.44	0/9803
1	C	0.24	0/7262	0.43	0/9813
1	D	0.24	0/7262	0.44	0/9813
1	E	0.24	0/7262	0.44	0/9813
1	F	0.24	0/7262	0.44	0/9813
All	All	0.24	0/43565	0.44	0/58868

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	7097	0	6997	42	0
1	B	7090	0	6992	33	0
1	C	7097	0	6997	30	0
1	D	7097	0	6997	40	0
1	E	7097	0	6997	39	0
1	F	7097	0	6998	37	0
2	A	26	0	19	4	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	B	26	0	19	1	0
2	C	26	0	19	2	0
2	D	26	0	19	2	0
2	E	26	0	19	3	0
2	F	26	0	19	0	0
3	A	10	0	0	1	0
3	B	10	0	0	0	0
3	C	5	0	0	0	0
3	D	20	0	0	0	0
3	E	10	0	0	0	0
3	F	20	0	0	1	0
4	A	2	0	0	0	0
4	B	1	0	0	0	0
4	C	2	0	0	0	0
4	D	2	0	0	0	0
4	E	2	0	0	0	0
4	F	2	0	0	0	0
All	All	42817	0	42092	223	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.

The worst 5 of 223 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:104:THR:HA	2:C:1001:SAH:H2	1.64	0.78
1:A:104:THR:HA	2:A:1001:SAH:H2	1.67	0.77
1:D:141:ASP:OD1	1:E:175:ARG:NH2	2.23	0.69
1:D:569:ILE:O	1:D:573:THR:HB	1.94	0.68
1:A:165:LEU:HA	1:A:168:VAL:HG22	1.78	0.65

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	881/914 (96%)	819 (93%)	62 (7%)	0	100	100
1	B	880/914 (96%)	822 (93%)	58 (7%)	0	100	100
1	C	881/914 (96%)	821 (93%)	60 (7%)	0	100	100
1	D	881/914 (96%)	817 (93%)	64 (7%)	0	100	100
1	E	881/914 (96%)	820 (93%)	61 (7%)	0	100	100
1	F	881/914 (96%)	819 (93%)	62 (7%)	0	100	100
All	All	5285/5484 (96%)	4918 (93%)	367 (7%)	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	756/779 (97%)	749 (99%)	7 (1%)	78	88
1	B	755/779 (97%)	750 (99%)	5 (1%)	84	90
1	C	756/779 (97%)	750 (99%)	6 (1%)	81	89
1	D	756/779 (97%)	751 (99%)	5 (1%)	84	90
1	E	756/779 (97%)	748 (99%)	8 (1%)	73	85
1	F	756/779 (97%)	750 (99%)	6 (1%)	81	89
All	All	4535/4674 (97%)	4498 (99%)	37 (1%)	81	89

5 of 37 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	E	656	ARG
1	F	479	TRP
1	E	856	ARG
1	F	394	VAL
1	C	366	ASP

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (2) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	238	GLN
1	F	765	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 monosaccharides in this entry.

### 5.6 Ligand geometry [i](#)

Of 32 ligands modelled in this entry, 11 are monoatomic - leaving 21 for Mogul analysis.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with  $|Z| > 2$  is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
2	SAH	B	1001	-	24,28,28	1.04	1 (4%)	25,40,40	1.53	4 (16%)
3	PO4	D	1002	-	4,4,4	0.92	0	6,6,6	0.43	0
3	PO4	F	1004	-	4,4,4	0.91	0	6,6,6	0.46	0
3	PO4	F	1003	-	4,4,4	0.92	0	6,6,6	0.39	0
3	PO4	F	1002	-	4,4,4	0.92	0	6,6,6	0.46	0
2	SAH	E	1001	-	24,28,28	1.04	1 (4%)	25,40,40	1.53	4 (16%)
2	SAH	A	1001	-	24,28,28	1.04	1 (4%)	25,40,40	1.53	4 (16%)
3	PO4	C	1002	-	4,4,4	0.92	0	6,6,6	0.43	0
3	PO4	F	1005	-	4,4,4	0.91	0	6,6,6	0.46	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
3	PO4	E	1002	-	4,4,4	0.92	0	6,6,6	0.42	0
3	PO4	A	1003	-	4,4,4	0.90	0	6,6,6	0.55	0
2	SAH	F	1001	-	24,28,28	1.04	1 (4%)	25,40,40	1.53	4 (16%)
3	PO4	D	1003	-	4,4,4	0.92	0	6,6,6	0.42	0
3	PO4	E	1003	-	4,4,4	0.90	0	6,6,6	0.43	0
3	PO4	A	1002	-	4,4,4	0.91	0	6,6,6	0.40	0
2	SAH	C	1001	-	24,28,28	1.04	1 (4%)	25,40,40	1.53	4 (16%)
3	PO4	B	1003	-	4,4,4	0.91	0	6,6,6	0.45	0
3	PO4	B	1002	-	4,4,4	0.91	0	6,6,6	0.46	0
3	PO4	D	1004	-	4,4,4	0.90	0	6,6,6	0.48	0
3	PO4	D	1005	-	4,4,4	0.91	0	6,6,6	0.44	0
2	SAH	D	1001	-	24,28,28	1.03	1 (4%)	25,40,40	1.53	4 (16%)

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	SAH	C	1001	-	-	3/11/31/31	0/3/3/3
2	SAH	B	1001	-	-	5/11/31/31	0/3/3/3
2	SAH	A	1001	-	-	6/11/31/31	0/3/3/3
2	SAH	F	1001	-	-	5/11/31/31	0/3/3/3
2	SAH	E	1001	-	-	8/11/31/31	0/3/3/3
2	SAH	D	1001	-	-	7/11/31/31	0/3/3/3

The worst 5 of 6 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	F	1001	SAH	C5-C4	2.51	1.47	1.40
2	C	1001	SAH	C5-C4	2.50	1.47	1.40
2	E	1001	SAH	C5-C4	2.50	1.47	1.40
2	A	1001	SAH	C5-C4	2.50	1.47	1.40
2	B	1001	SAH	C5-C4	2.50	1.47	1.40

The worst 5 of 24 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	D	1001	SAH	C3'-C2'-C1'	3.41	106.12	100.98
2	B	1001	SAH	C3'-C2'-C1'	3.40	106.09	100.98

*Continued on next page...*

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	F	1001	SAH	C3'-C2'-C1'	3.39	106.09	100.98
2	A	1001	SAH	C3'-C2'-C1'	3.39	106.08	100.98
2	C	1001	SAH	C3'-C2'-C1'	3.38	106.07	100.98

There are no chirality outliers.

5 of 34 torsion outliers are listed below:

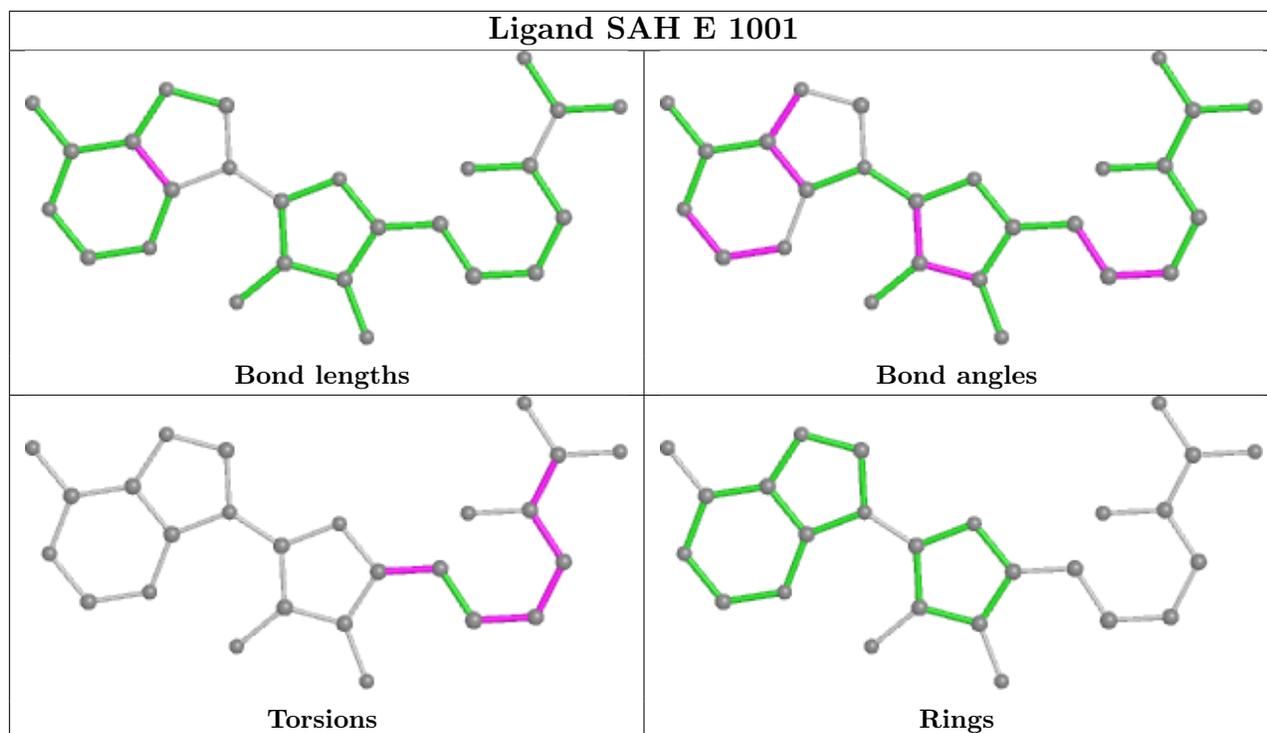
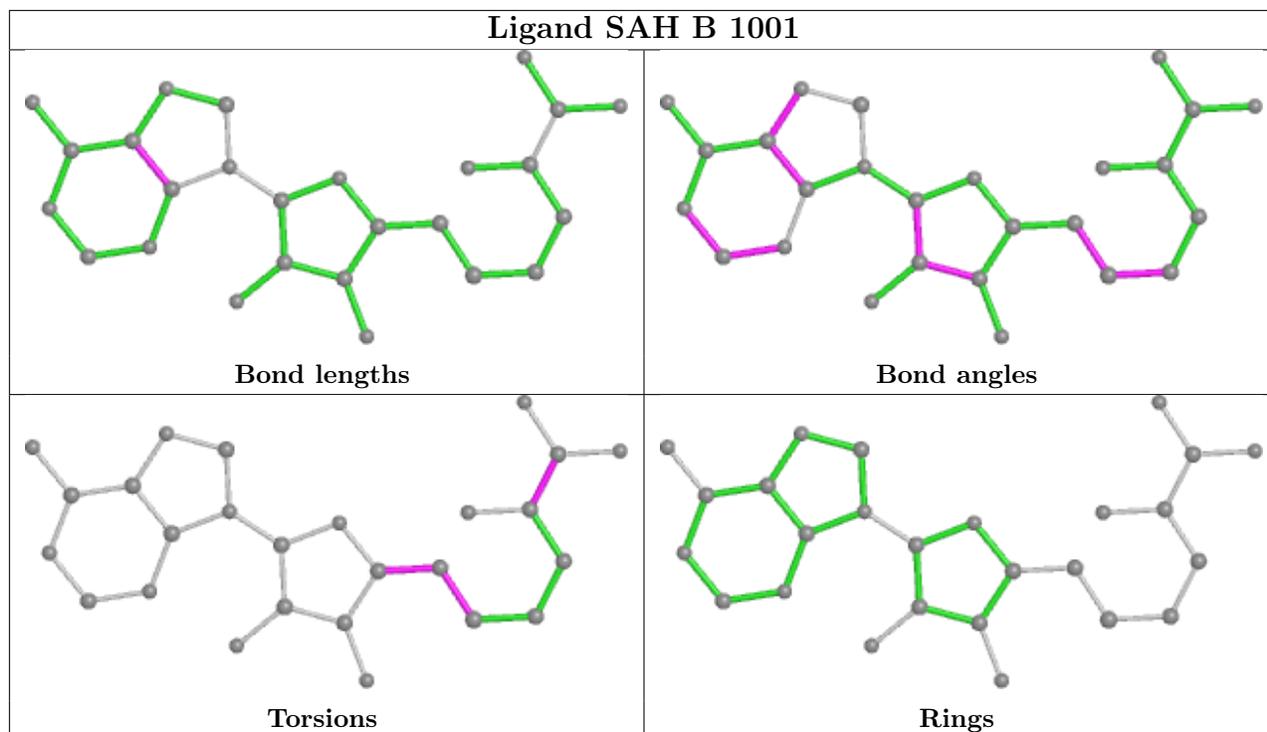
Mol	Chain	Res	Type	Atoms
2	B	1001	SAH	O4'-C4'-C5'-SD
2	B	1001	SAH	C3'-C4'-C5'-SD
2	D	1001	SAH	O4'-C4'-C5'-SD
2	D	1001	SAH	C3'-C4'-C5'-SD
2	E	1001	SAH	O-C-CA-N

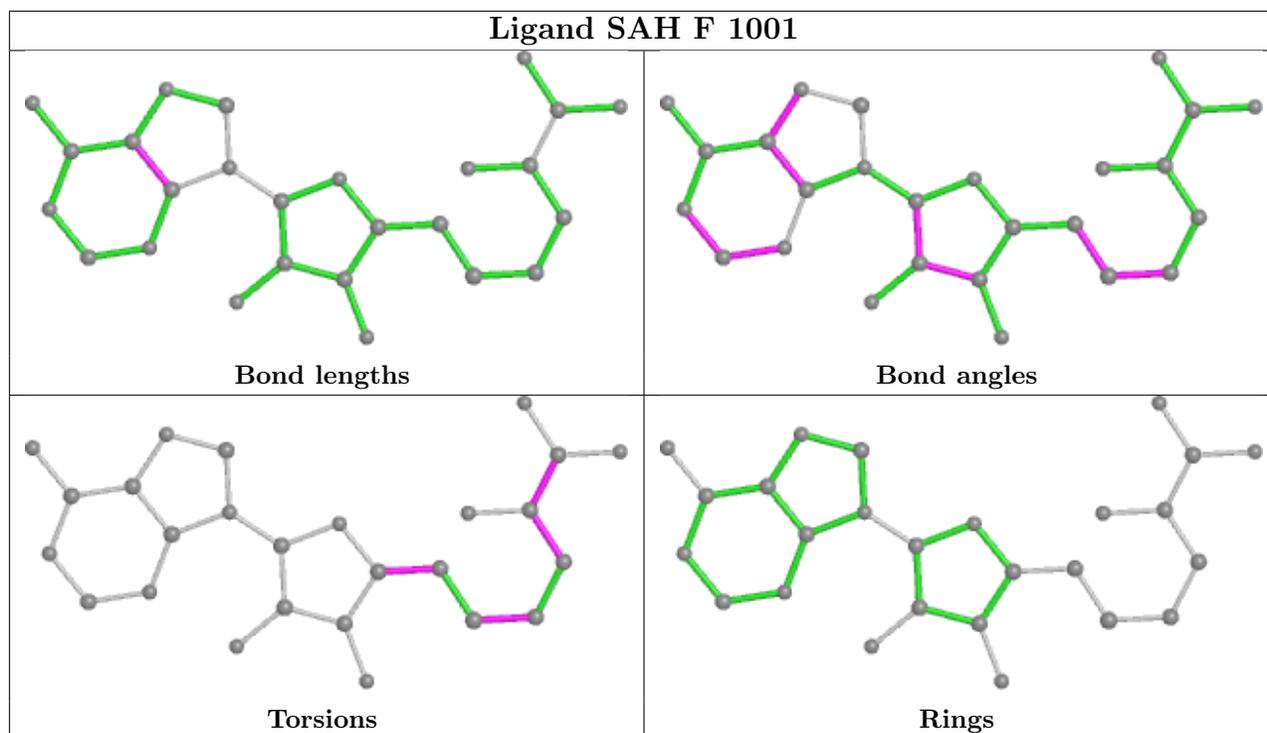
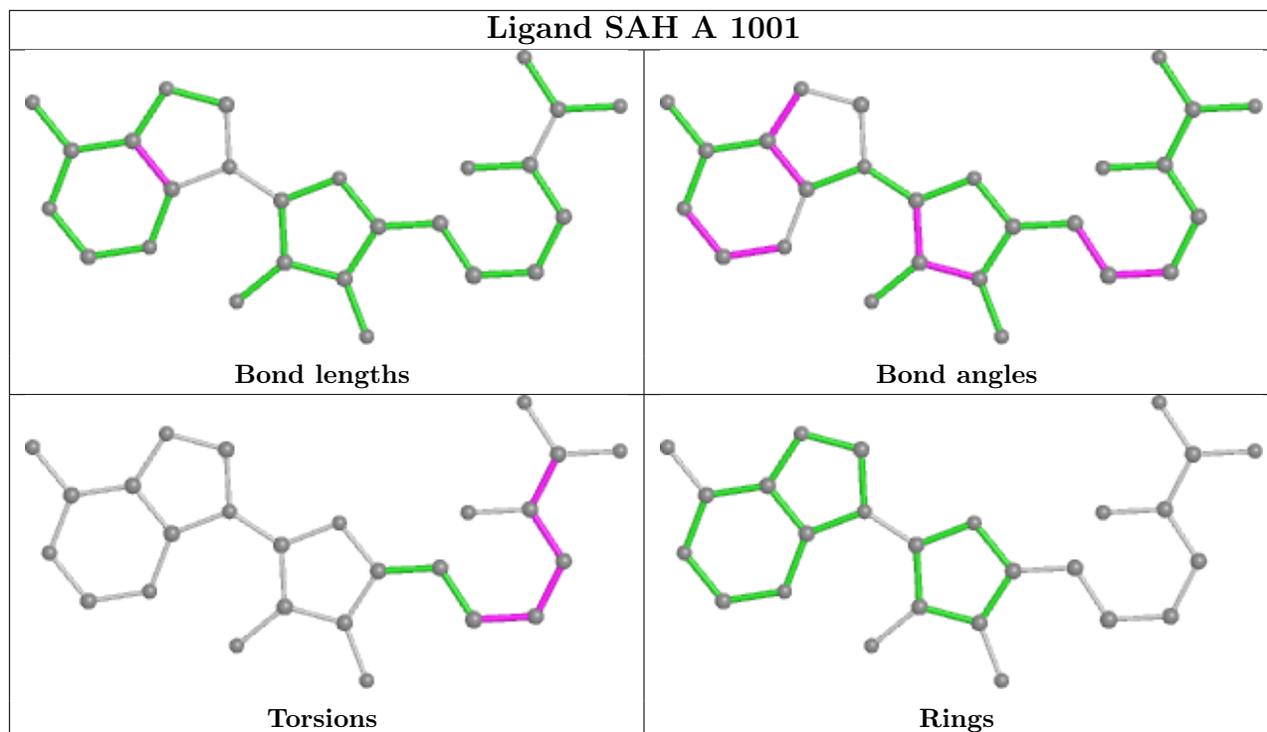
There are no ring outliers.

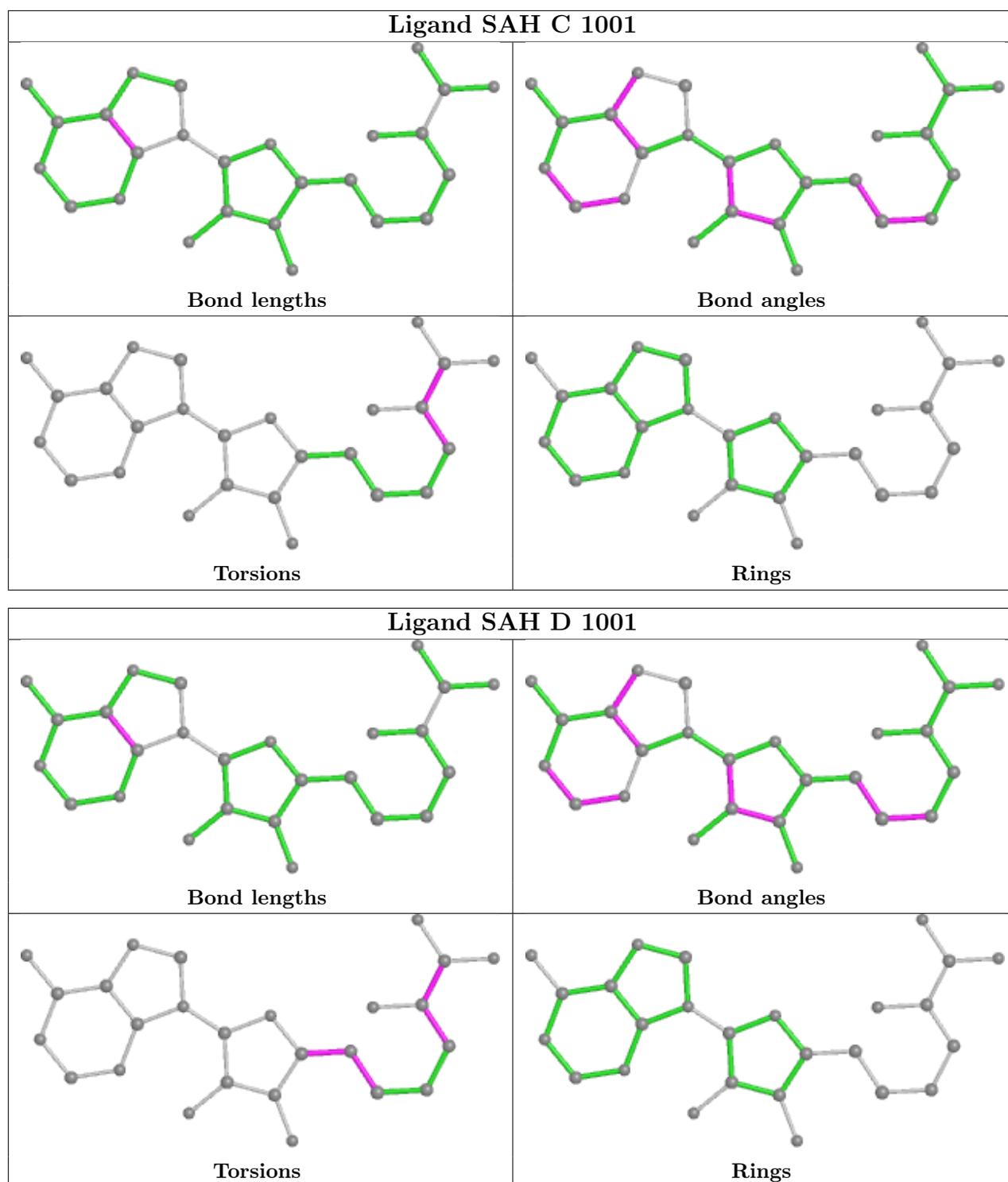
7 monomers are involved in 14 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	B	1001	SAH	1	0
3	F	1003	PO4	1	0
2	E	1001	SAH	3	0
2	A	1001	SAH	4	0
3	A	1003	PO4	1	0
2	C	1001	SAH	2	0
2	D	1001	SAH	2	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

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	883/914 (96%)	0.45	47 (5%) 26 23	69, 163, 243, 327	0
1	B	882/914 (96%)	0.51	58 (6%) 18 15	73, 172, 263, 355	0
1	C	883/914 (96%)	0.50	58 (6%) 18 15	73, 159, 231, 295	0
1	D	883/914 (96%)	0.37	24 (2%) 54 45	73, 135, 197, 306	0
1	E	883/914 (96%)	0.37	30 (3%) 45 37	71, 142, 212, 266	0
1	F	883/914 (96%)	0.39	34 (3%) 39 32	71, 152, 215, 274	0
All	All	5297/5484 (96%)	0.43	251 (4%) 31 27	69, 154, 236, 355	0

The worst 5 of 251 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	D	416	GLU	5.2
1	A	578	VAL	5.0
1	C	669	VAL	4.7
1	A	660	MET	4.5
1	D	415	GLU	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 monosaccharides in this entry.

## 6.4 Ligands

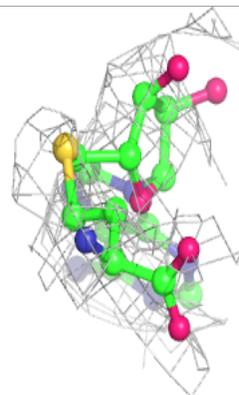
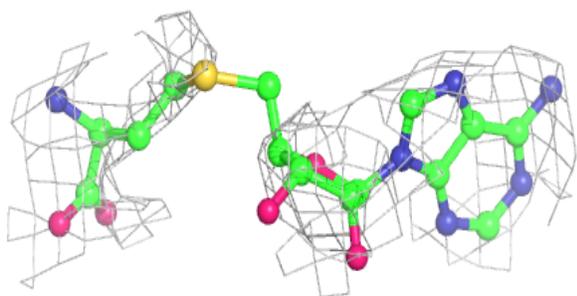
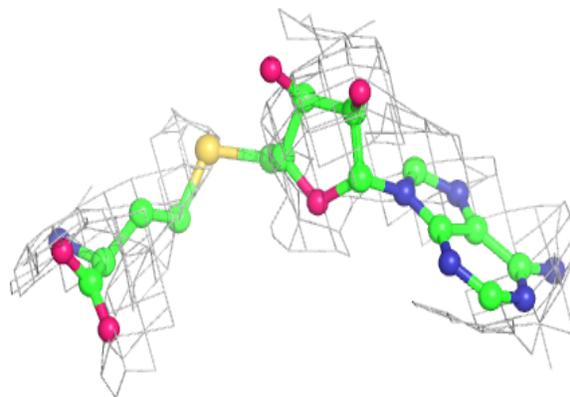
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95<sup>th</sup> percentile and maximum values of B factors of atoms in the group. The column labelled 'Q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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å <sup>2</sup> )	Q<0.9
3	PO4	D	1002	5/5	0.29	0.40	216,236,274,277	0
3	PO4	E	1003	5/5	0.33	0.33	246,259,307,317	0
3	PO4	D	1004	5/5	0.34	0.33	206,229,255,258	0
3	PO4	C	1002	5/5	0.47	0.27	212,232,256,259	0
3	PO4	F	1004	5/5	0.56	0.29	189,200,254,283	0
3	PO4	F	1005	5/5	0.58	0.22	230,263,279,294	0
3	PO4	A	1003	5/5	0.63	0.19	221,228,263,270	0
3	PO4	D	1003	5/5	0.75	0.35	226,244,281,300	0
3	PO4	D	1005	5/5	0.76	0.32	184,191,205,218	0
3	PO4	B	1002	5/5	0.79	0.17	190,205,223,231	0
3	PO4	F	1003	5/5	0.79	0.27	152,187,221,243	0
3	PO4	B	1003	5/5	0.81	0.32	242,270,298,299	0
3	PO4	A	1002	5/5	0.81	0.35	198,219,223,232	0
2	SAH	F	1001	26/26	0.84	0.55	102,140,159,199	0
2	SAH	C	1001	26/26	0.84	0.60	106,137,166,188	0
3	PO4	F	1002	5/5	0.85	0.24	149,157,195,208	0
3	PO4	E	1002	5/5	0.87	0.29	167,192,199,201	0
2	SAH	B	1001	26/26	0.88	0.82	125,163,189,195	0
2	SAH	D	1001	26/26	0.89	0.59	99,154,179,197	0
2	SAH	A	1001	26/26	0.91	0.42	120,140,167,217	0
2	SAH	E	1001	26/26	0.92	0.57	103,133,172,202	0
4	ZN	A	1005	1/1	0.96	0.20	476,476,476,476	0
4	ZN	C	1003	1/1	0.96	0.19	161,161,161,161	0
4	ZN	F	1006	1/1	0.97	0.17	89,89,89,89	0
4	ZN	D	1006	1/1	0.98	0.18	135,135,135,135	0
4	ZN	E	1004	1/1	0.98	0.17	188,188,188,188	0
4	ZN	B	1004	1/1	0.98	0.22	136,136,136,136	0
4	ZN	E	1005	1/1	0.99	0.16	117,117,117,117	0
4	ZN	A	1004	1/1	0.99	0.18	139,139,139,139	0
4	ZN	D	1007	1/1	1.00	0.19	144,144,144,144	0
4	ZN	C	1004	1/1	1.00	0.12	181,181,181,181	0
4	ZN	F	1007	1/1	1.00	0.18	173,173,173,173	0

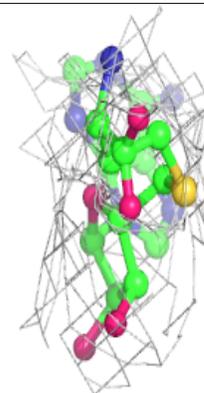
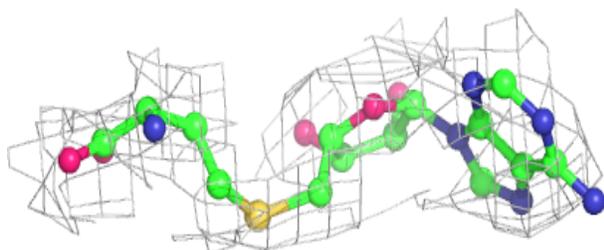
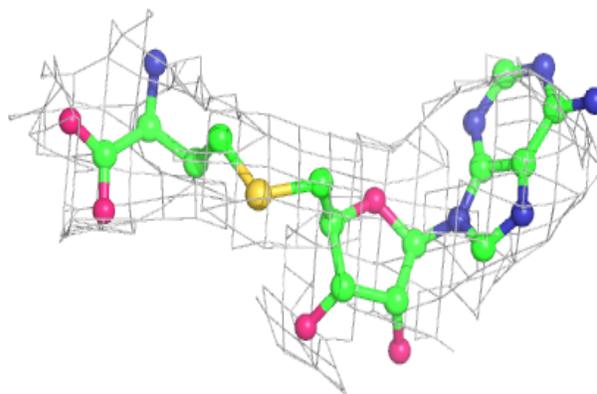
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

**Electron density around SAH F 1001:**

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

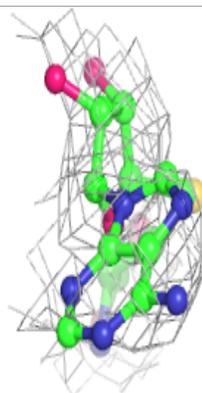
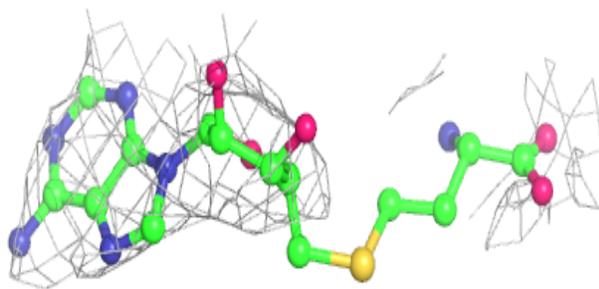
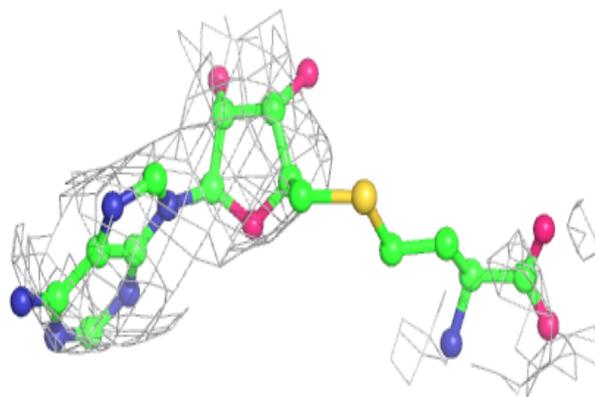
**Electron density around SAH C 1001:**

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

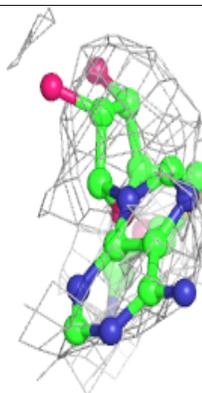
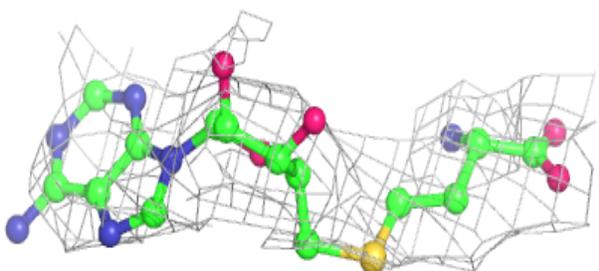
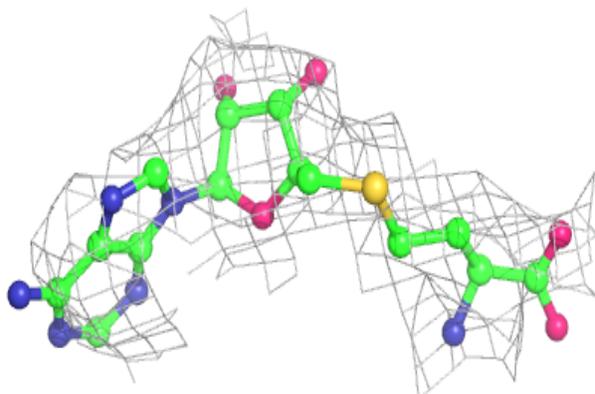


**Electron density around SAH B 1001:**

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

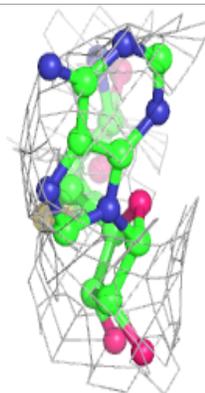
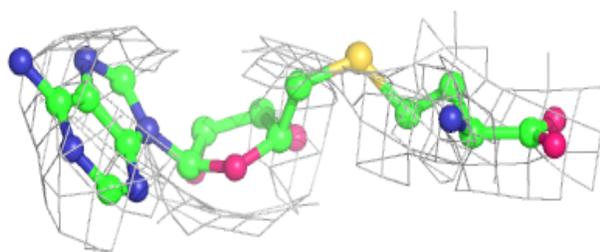
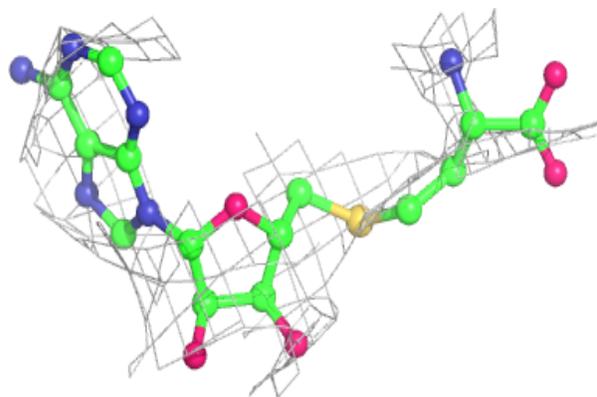
**Electron density around SAH D 1001:**

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

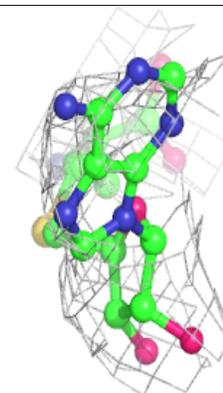
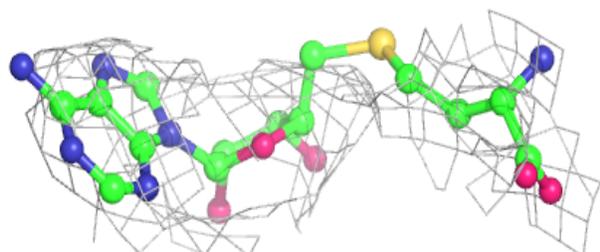
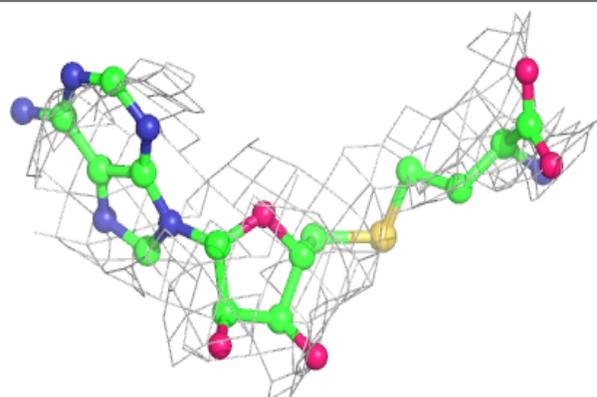


**Electron density around SAH A 1001:**

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

**Electron density around SAH E 1001:**

$2mF_o-DF_c$  (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.