wwPDB X-ray Structure Validation Summary Report (i)

Jun 24, 2024 – 12:34 PM EDT

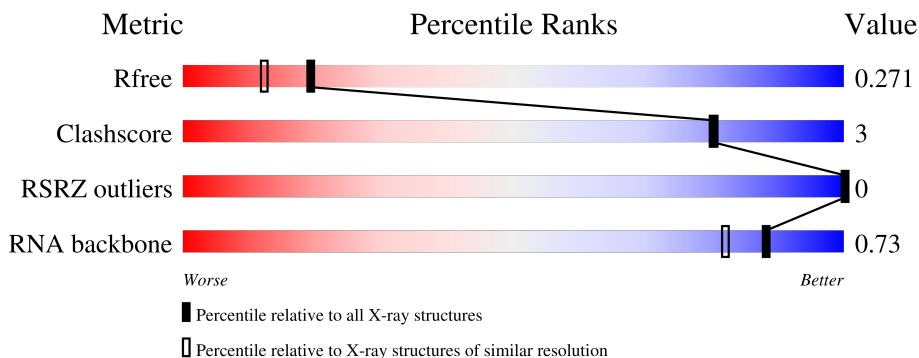|		
PDB ID	:	6YMK
Title	:	Crystal structure of the SAM-SAH riboswitch with AMP
Authors	:	Huang, L.; Lilley, D.M.J.
Deposited on	:	2020-04-08
Resolution	:	2.03 Å(reported)

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 2.03 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	Percentile Ranks	Value
Rfree		0.271
Clashscore		3
RSRZ outliers		0
RNA backbone		0.73

Worse   *Better*

■ Percentile relative to all X-ray structures

▯ Percentile relative to X-ray structures of similar resolution

Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	10434 (2.04-2.00)
Clashscore	141614	11643 (2.04-2.00)
RSRZ outliers	127900	10220 (2.04-2.00)
RNA backbone	3102	1039 (2.50-1.54)

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 <=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	26	69% 31%
1	C	26	96% •
1	F	26	77% 23%
1	I	26	88% 12%
1	M	26	77% 12% 12%
1	O	26	81% 15% •

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Mol	Chain	Length	Quality of chain
2	B	9	78% 22%
2	D	9	44% 56%
2	G	9	78% 22%
2	J	9	89% 11%
2	N	9	89% 11%
2	P	9	67% 33%

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	MTA	G	101	-	-	-	X
4	SO4	D	101	-	-	-	X
4	SO4	J	101	-	-	-	X

2 Entry composition ⓘ

There are 6 unique types of molecules in this entry. The entry contains 7167 atoms, of which 2427 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 RNA chain called Chains: A,C,F,I,M,O.

Mol	Chain	Residues	Atoms							ZeroOcc	AltConf	Trace
1	A	26	Total 833	Br 1	C 246	H 283	N 97	O 181	P 25	0	0	0
1	C	26	Total 833	Br 1	C 246	H 283	N 97	O 181	P 25	0	0	0
1	F	26	Total 833	Br 1	C 246	H 283	N 97	O 181	P 25	0	0	0
1	I	26	Total 833	Br 1	C 246	H 283	N 97	O 181	P 25	0	0	0
1	M	26	Total 833	Br 1	C 246	H 283	N 97	O 181	P 25	0	0	0
1	O	26	Total 833	Br 1	C 246	H 283	N 97	O 181	P 25	0	0	0

- Molecule 2 is a RNA chain called Chains: B,D,G,J,N,P.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
2	B	9	Total 291	C 87	H 99	N 37	O 60	P 8	0	0	0
2	D	9	Total 291	C 87	H 99	N 37	O 60	P 8	0	0	0
2	G	9	Total 291	C 87	H 99	N 37	O 60	P 8	0	0	0
2	J	9	Total 291	C 87	H 99	N 37	O 60	P 8	0	0	0
2	N	9	Total 291	C 87	H 99	N 37	O 60	P 8	0	0	0
2	P	9	Total 291	C 87	H 99	N 37	O 60	P 8	0	0	0

- Molecule 3 is 5'-DEOXY-5'-METHYLTHIOADENOSINE (three-letter code: MTA) (formula: $C_{11}H_{15}N_5O_3S$) (labeled as "Ligand of Interest" by depositor).
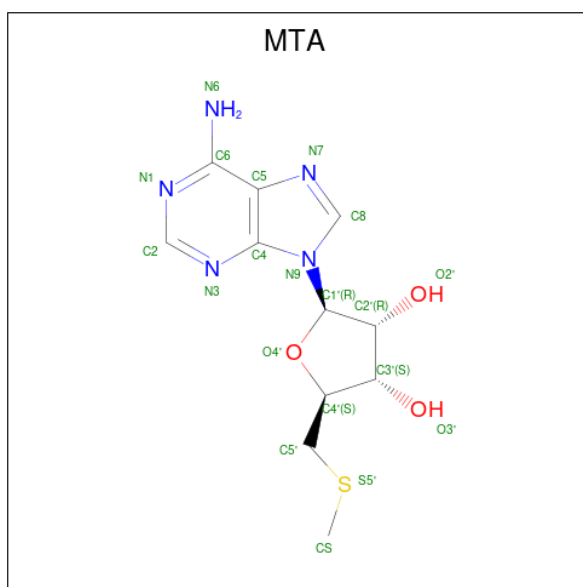
Mol	Chain	Residues	Atoms						ZeroOcc	AltConf
3	A	1	Total	C	H	N	O	S	0	0
			35	11	15	5	3	1		
3	B	1	Total	C	H	N	O	S	0	0
			35	11	15	5	3	1		
3	C	1	Total	C	H	N	O	S	0	0
			35	11	15	5	3	1		
3	F	1	Total	C	H	N	O	S	0	0
			35	11	15	5	3	1		
3	G	1	Total	C	H	N	O	S	0	0
			35	11	15	5	3	1		
3	I	1	Total	C	H	N	O	S	0	0
			35	11	15	5	3	1		
3	M	1	Total	C	H	N	O	S	0	0
			35	11	15	5	3	1		
3	M	1	Total	C	H	N	O	S	0	0
			35	11	15	5	3	1		
3	O	1	Total	C	H	N	O	S	0	0
			35	11	15	5	3	1		

- Molecule 4 is SULFATE ION (three-letter code: SO4) (formula: O_4S).
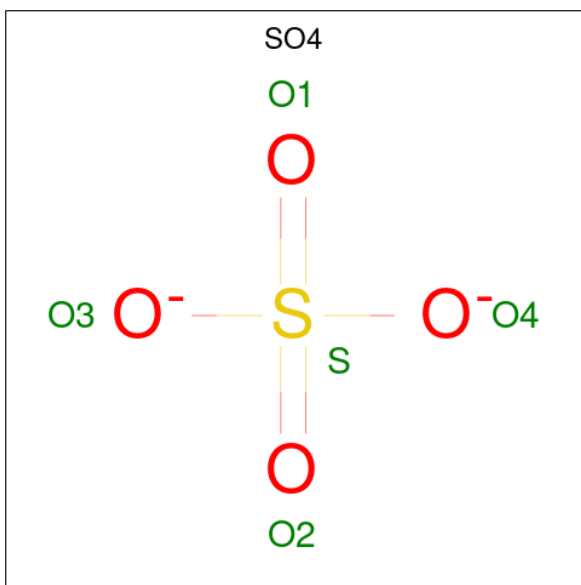
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	D	1	Total 5	O 4	S 1	0	0
4	J	1	Total 5	O 4	S 1	0	0

- Molecule 5 is SODIUM ION (three-letter code: NA) (formula: Na).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	D	1	Total 1	Na 1	0	0
5	F	1	Total 1	Na 1	0	0

- Molecule 6 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	A	18	Total 18	O 18	0	0
6	B	3	Total 3	O 3	0	0
6	D	2	Total 2	O 2	0	0
6	F	18	Total 18	O 18	0	0
6	G	4	Total 4	O 4	0	0

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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	I	7	Total 7	O 7	0	0
6	M	23	Total 23	O 23	0	0
6	N	10	Total 10	O 10	0	0
6	O	7	Total 7	O 7	0	0
6	P	4	Total 4	O 4	0	0

3 Residue-property plots ⓘ

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: Chains: A,C,F,I,M,O

Chain A:

- Molecule 1: Chains: A,C,F,I,M,O

Chain C:

- Molecule 1: Chains: A,C,F,I,M,O

Chain F:

- Molecule 1: Chains: A,C,F,I,M,O

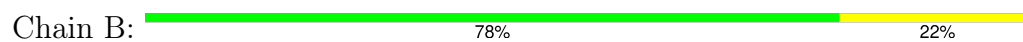Chain I:

- Molecule 1: Chains: A,C,F,I,M,O

Chain M:

- Molecule 1: Chains: A,C,F,I,M,O

Chain O:

G7 C10 A13 A14 C15 G27 U28 C32
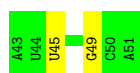
• Molecule 2: Chains: B,D,G,J,N,P

Chain B:

78%　　22%

A43 U44 U45 A48 A51

• Molecule 2: Chains: B,D,G,J,N,P

Chain D:

44%　　56%

A43 G46 G47 A48 G49 C50 A51

• Molecule 2: Chains: B,D,G,J,N,P

Chain G:

78%　　22%

A43 U44 U45 G49 C50 A51

• Molecule 2: Chains: B,D,G,J,N,P

Chain J:

89%　　11%

A43 G46 A51

• Molecule 2: Chains: B,D,G,J,N,P

Chain N:

89%　　11%

A43 G46 A51

• Molecule 2: Chains: B,D,G,J,N,P

Chain P:

67%　　33%

A43 G46 C50 A51
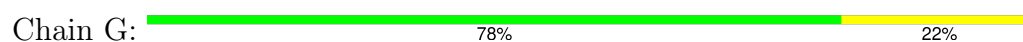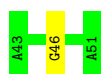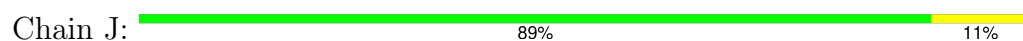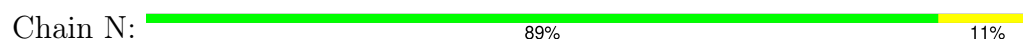
4 Data and refinement statistics (i)

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α, β, γ	87.10Å 147.85Å 75.01Å 90.00° 91.84° 90.00°	Depositor
Resolution (Å)	37.48 – 2.03 75.02 – 2.03	Depositor EDS
% Data completeness (in resolution range)	93.5 (37.48-2.03) 99.6 (75.02-2.03)	Depositor EDS
R_{merge}	0.09	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.09 (at 2.03Å)	Xtriage
Refinement program	PHENIX 1.17.1_3660, PHENIX 1.17.1_3660	Depositor
R, R_{free}	0.225 , 0.264 0.234 , 0.271	Depositor DCC
R_{free} test set	2983 reflections (4.90%)	wwPDB-VP
Wilson B-factor (Å^2)	54.2	Xtriage
Anisotropy	0.058	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.20 , 25.0	EDS
L-test for twinning[2]	$< \vert L \vert > = 0.49, < L^2 > = 0.32$	Xtriage
Estimated twinning fraction	0.013 for -1/2*h+1/2*k,3/2*h+1/2*k,-l 0.016 for -1/2*h-1/2*k,-3/2*h+1/2*k,-l 0.086 for 1/2*h+1/2*k,3/2*h-1/2*k,-l 0.167 for 1/2*h-1/2*k,-3/2*h-1/2*k,-l 0.024 for -h,-k,l	Xtriage
F_o,F_c correlation	0.95	EDS
Total number of atoms	7167	wwPDB-VP
Average B, all atoms (Å^2)	88.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.66% of the height of the origin peak. No significant pseudotranslation is detected.*

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[1]Intensities estimated from amplitudes.

[2]Theoretical values of $< \vert L \vert >$, $< L^2 >$ 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: CBV, NA, MTA, SO4

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	0.70	1/589 (0.2%)	1.06	1/914 (0.1%)
1	C	0.40	0/589	0.82	0/914
1	F	0.82	0/589	1.19	3/914 (0.3%)
1	I	0.48	0/589	0.84	0/914
1	M	0.86	0/589	1.23	6/914 (0.7%)
1	O	0.52	0/589	0.95	0/914
2	B	0.70	0/215	1.10	1/334 (0.3%)
2	D	0.58	0/215	1.05	1/334 (0.3%)
2	G	0.75	0/215	1.19	1/334 (0.3%)
2	J	0.62	0/215	0.98	0/334
2	N	0.70	0/215	1.19	0/334
2	P	0.51	0/215	0.93	0/334
All	All	0.65	1/4824 (0.0%)	1.04	13/7488 (0.2%)

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	25	G	C6-N1	-5.01	1.36	1.39

The worst 5 of 13 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	M	24	G	C8-N9-C4	-7.63	103.35	106.40
1	M	22	C	N3-C4-C5	7.03	124.71	121.90
1	M	26	C	N1-C2-O2	-6.84	114.80	118.90
1	M	24	G	N7-C8-N9	6.83	116.52	113.10
1	F	13	A	C5-N7-C8	6.21	107.00	103.90

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	550	283	282	5	0
1	C	550	283	282	0	0
1	F	550	283	282	2	0
1	I	550	283	282	1	0
1	M	550	283	282	4	0
1	O	550	283	282	4	0
2	B	192	99	99	1	0
2	D	192	99	99	1	2
2	G	192	99	99	1	0
2	J	192	99	99	0	0
2	N	192	99	99	0	0
2	P	192	99	99	0	2
3	A	20	15	15	1	0
3	B	20	15	14	1	0
3	C	20	15	14	0	0
3	F	20	15	15	1	0
3	G	20	15	14	1	0
3	I	20	15	15	0	0
3	M	40	30	29	1	0
3	O	20	15	15	0	0
4	D	5	0	0	0	0
4	J	5	0	0	0	0
5	D	1	0	0	0	0
5	F	1	0	0	0	0
6	A	18	0	0	3	0
6	B	3	0	0	0	0
6	D	2	0	0	1	0
6	F	18	0	0	0	0
6	G	4	0	0	0	0
6	I	7	0	0	1	0
6	M	23	0	0	3	1
6	N	10	0	0	0	0
6	O	7	0	0	4	0
6	P	4	0	0	0	0
All	All	4740	2427	2417	19	3

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 19 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:M:26:C:N3	6:M:201:HOH:O	1.91	1.01
1:O:15:C:O2	6:O:201:HOH:O	1.93	0.86
1:M:20:U:N3	6:M:203:HOH:O	2.20	0.74
1:O:13:A:N1	6:O:203:HOH:O	2.21	0.73
1:A:20:U:N3	6:A:201:HOH:O	2.22	0.72

All (3) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
6:M:203:HOH:O	6:M:203:HOH:O[2_456]	1.85	0.35
2:D:50:C:O2	2:P:51:A:O2'[4_445]	2.10	0.10
2:D:51:A:O2'	2:P:50:C:O2[4_445]	2.17	0.03

5.3 Torsion angles ⓘ

5.3.1 Protein backbone ⓘ

There are no protein molecules in this entry.

5.3.2 Protein sidechains ⓘ

There are no protein molecules in this entry.

5.3.3 RNA ⓘ

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
1	A	24/26 (92%)	0	0
1	C	24/26 (92%)	0	0
1	F	24/26 (92%)	0	0
1	I	24/26 (92%)	1 (4%)	0
1	M	24/26 (92%)	0	0
1	O	24/26 (92%)	1 (4%)	0
2	B	8/9 (88%)	0	0

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Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
2	D	8/9 (88%)	1 (12%)	0
2	G	8/9 (88%)	0	0
2	J	8/9 (88%)	1 (12%)	0
2	N	8/9 (88%)	1 (12%)	0
2	P	8/9 (88%)	1 (12%)	0
All	All	192/210 (91%)	6 (3%)	0

5 of 6 RNA backbone outliers are listed below:

Mol	Chain	Res	Type
2	D	46	G
1	I	28	U
2	J	46	G
2	N	46	G
1	O	28	U

There are no RNA pucker outliers to report.

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

6 non-standard protein/DNA/RNA residues 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	$\#\|Z\| > 2$
1	CBV	A	10	1	19,22,23	1.05	2 (10%)	26,32,35	0.65	1 (3%)
1	CBV	C	10	1	19,22,23	1.03	3 (15%)	26,32,35	0.69	0
1	CBV	F	10	1	19,22,23	1.09	3 (15%)	26,32,35	1.06	2 (7%)
1	CBV	O	10	1	19,22,23	1.08	3 (15%)	26,32,35	0.64	0
1	CBV	M	10	1	19,22,23	1.07	3 (15%)	26,32,35	0.73	1 (3%)
1	CBV	I	10	1	19,22,23	1.05	3 (15%)	26,32,35	0.65	0

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
1	CBV	A	10	1	-	0/7/25/26	0/2/2/2
1	CBV	C	10	1	-	0/7/25/26	0/2/2/2
1	CBV	F	10	1	-	2/7/25/26	0/2/2/2
1	CBV	O	10	1	-	0/7/25/26	0/2/2/2
1	CBV	M	10	1	-	2/7/25/26	0/2/2/2
1	CBV	I	10	1	-	0/7/25/26	0/2/2/2

The worst 5 of 17 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	F	10	CBV	C6-N1	-2.93	1.33	1.38
1	O	10	CBV	C6-C5	2.69	1.39	1.34
1	M	10	CBV	C6-N1	-2.68	1.33	1.38
1	O	10	CBV	C4-C5	2.59	1.49	1.42
1	I	10	CBV	C6-C5	2.57	1.39	1.34

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	F	10	CBV	N1-C2-N3	3.35	124.61	118.80
1	M	10	CBV	N1-C2-N3	2.12	122.48	118.80
1	F	10	CBV	O2-C2-N3	-2.05	119.10	122.33
1	A	10	CBV	O2-C2-N3	-2.05	119.10	122.33

There are no chirality outliers.

All (4) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
1	M	10	CBV	O4'-C4'-C5'-O5'
1	F	10	CBV	O4'-C4'-C5'-O5'
1	M	10	CBV	C3'-C4'-C5'-O5'
1	F	10	CBV	C3'-C4'-C5'-O5'

There are no ring outliers.

No monomer is involved in short contacts.

5.5　Carbohydrates ⓘ

There are no monosaccharides in this entry.

5.6　Ligand geometry ⓘ

Of 13 ligands modelled in this entry, 2 are monoatomic - leaving 11 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 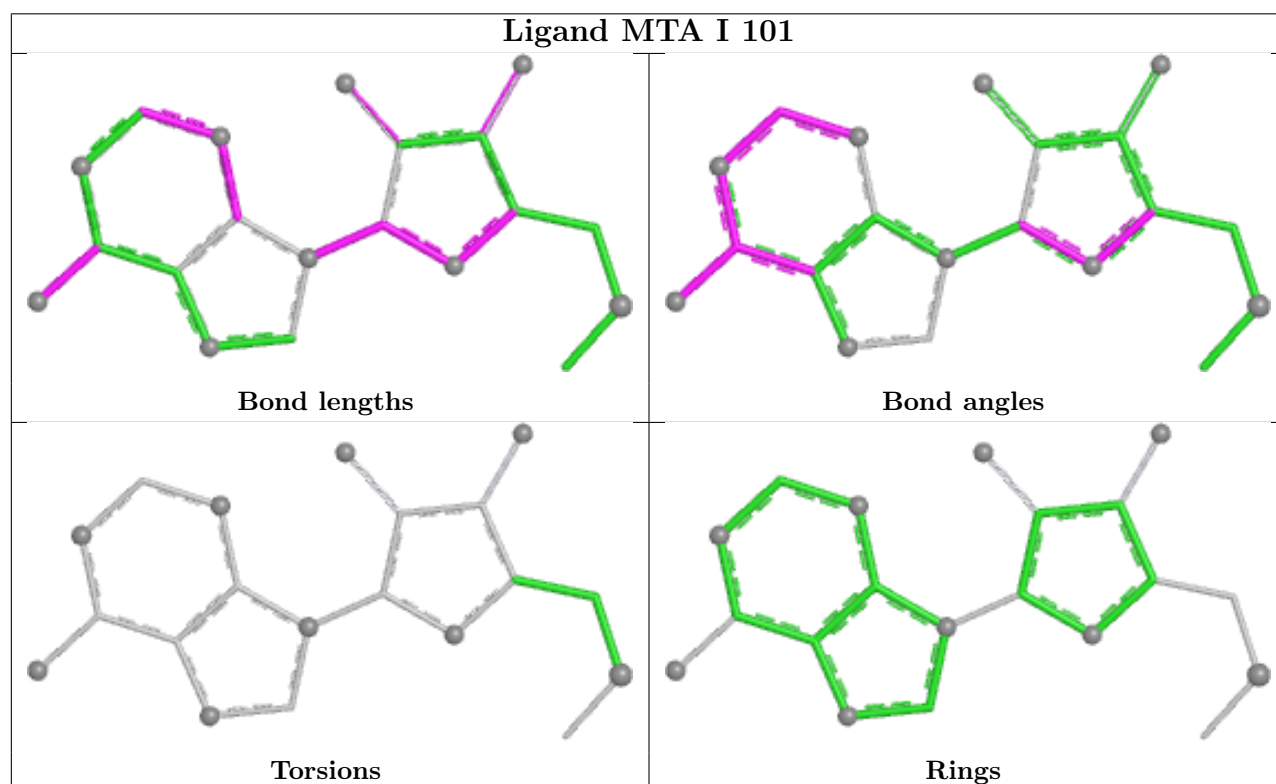Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

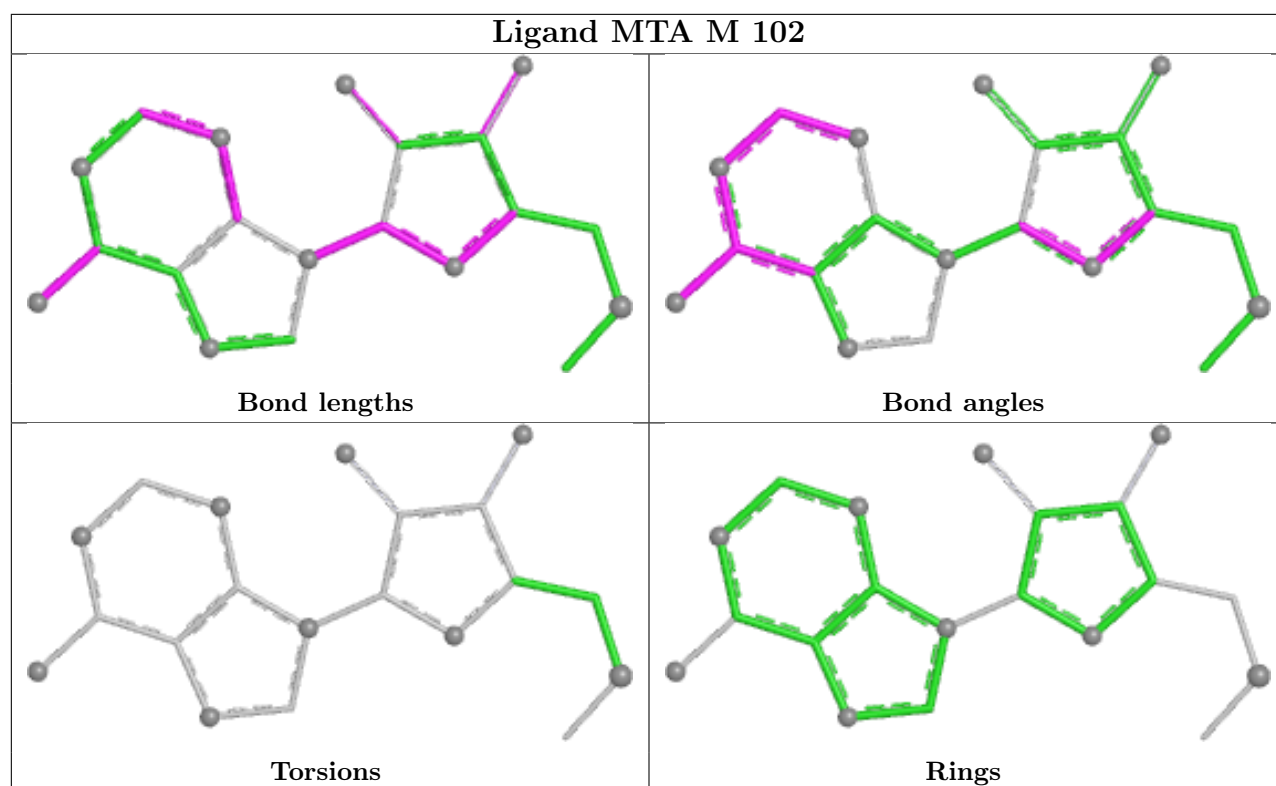| Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#|Z| > 2$	Counts	RMSZ	$\#|Z| > 2$
3	MTA	O	101	-	18,22,22	4.26	7 (38%)	18,32,32	3.04	4 (22%)
3	MTA	A	101	-	18,22,22	4.26	7 (38%)	18,32,32	3.23	5 (27%)
3	MTA	I	101	-	18,22,22	4.32	8 (44%)	18,32,32	2.96	4 (22%)
3	MTA	M	101	-	18,22,22	4.43	7 (38%)	18,32,32	2.81	5 (27%)
3	MTA	B	101	-	18,22,22	4.43	7 (38%)	18,32,32	2.93	4 (22%)
3	MTA	M	102	-	18,22,22	4.11	8 (44%)	18,32,32	3.03	4 (22%)
3	MTA	C	101	-	18,22,22	4.35	8 (44%)	18,32,32	2.96	5 (27%)
3	MTA	G	101	-	18,22,22	4.49	8 (44%)	18,32,32	2.92	4 (22%)
4	SO4	J	101	-	4,4,4	0.23	0	6,6,6	0.07	0
3	MTA	F	101	-	18,22,22	4.22	9 (50%)	18,32,32	2.76	4 (22%)
4	SO4	D	101	-	4,4,4	0.23	0	6,6,6	0.07	0

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
3	MTA	O	101	-	-	1/3/23/23	0/3/3/3
3	MTA	A	101	-	-	0/3/23/23	0/3/3/3
3	MTA	I	101	-	-	0/3/23/23	0/3/3/3
3	MTA	M	101	-	-	1/3/23/23	0/3/3/3
3	MTA	B	101	-	-	2/3/23/23	0/3/3/3
3	MTA	M	102	-	-	0/3/23/23	0/3/3/3

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	MTA	C	101	-	-	1/3/23/23	0/3/3/3
3	MTA	G	101	-	-	2/3/23/23	0/3/3/3
3	MTA	F	101	-	-	1/3/23/23	0/3/3/3

The worst 5 of 69 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	G	101	MTA	O4'-C1'	16.42	1.62	1.40
3	B	101	MTA	O4'-C1'	16.17	1.62	1.40
3	M	101	MTA	O4'-C1'	16.15	1.62	1.40
3	C	101	MTA	O4'-C1'	15.47	1.61	1.40
3	I	101	MTA	O4'-C1'	15.39	1.61	1.40

The worst 5 of 39 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	O	101	MTA	C5-C6-N6	8.79	133.70	120.31
3	C	101	MTA	C5-C6-N6	8.48	133.22	120.31
3	A	101	MTA	C5-C6-N6	8.34	133.02	120.31
3	I	101	MTA	C5-C6-N6	8.27	132.91	120.31
3	B	101	MTA	C5-C6-N6	8.00	132.49	120.31

There are no chirality outliers.

5 of 8 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	B	101	MTA	O4'-C4'-C5'-S5'
3	B	101	MTA	C3'-C4'-C5'-S5'
3	C	101	MTA	C4'-C5'-S5'-CS
3	G	101	MTA	O4'-C4'-C5'-S5'
3	G	101	MTA	C3'-C4'-C5'-S5'

There are no ring outliers.

5 monomers are involved in 5 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	101	MTA	1	0
3	M	101	MTA	1	0
3	B	101	MTA	1	0
3	G	101	MTA	1	0
3	F	101	MTA	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 then 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 MTA O 101

Ligand MTA A 101

Bond lengths

Bond angles

Torsions

Rings

Ligand MTA I 101

Bond lengths

Bond angles

Torsions

Rings

Ligand MTA M 101

Bond lengths

Bond angles

Torsions

Rings

Ligand MTA B 101

Bond lengths

Bond angles

Torsions

Rings

Ligand MTA M 102

Bond lengths

Bond angles

Torsions

Rings

Ligand MTA C 101

Bond lengths

Bond angles

Torsions

Rings

Ligand MTA G 101

Bond lengths

Bond angles

Torsions

Rings

Ligand MTA F 101

Bond lengths

Bond angles

Torsions

Rings

5.7 Other polymers ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues (i)

There are no chain breaks in this entry.

6 Fit of model and data ⓘ

6.1 Protein, DNA and RNA chains ⓘ

In the following table, the column labelled '#RSRZ> 2' contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95th percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled 'Q< 0.9' lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2			OWAB(Å^2)	Q<0.9
1	A	25/26 (96%)	-1.10	0	100	100	49, 61, 90, 170	0
1	C	25/26 (96%)	-0.96	0	100	100	56, 90, 114, 154	0
1	F	25/26 (96%)	-0.96	0	100	100	48, 57, 105, 132	0
1	I	25/26 (96%)	-0.90	0	100	100	63, 92, 115, 143	0
1	M	25/26 (96%)	-1.00	0	100	100	50, 62, 98, 141	0
1	O	25/26 (96%)	-0.93	0	100	100	56, 97, 114, 140	0
2	B	9/9 (100%)	-1.15	0	100	100	54, 64, 72, 73	0
2	D	9/9 (100%)	-0.99	0	100	100	54, 67, 96, 141	0
2	G	9/9 (100%)	-1.18	0	100	100	52, 57, 74, 81	0
2	J	9/9 (100%)	-0.89	0	100	100	53, 72, 114, 131	0
2	N	9/9 (100%)	-1.15	0	100	100	50, 61, 71, 71	0
2	P	9/9 (100%)	-0.94	0	100	100	52, 69, 118, 148	0
All	All	204/210 (97%)	-1.00	0	100	100	48, 71, 116, 170	0

There are no RSRZ outliers to report.

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

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
1	CBV	I	10	21/22	0.69	0.18	92,131,230,423	0
1	CBV	M	10	21/22	0.75	0.20	44,75,276,384	0
1	CBV	C	10	21/22	0.78	0.16	86,130,178,230	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($Å^2$)	Q<0.9
1	CBV	O	10	21/22	0.83	0.15	76,129,174,300	0
1	CBV	A	10	21/22	0.85	0.16	44,77,146,308	0
1	CBV	F	10	21/22	0.92	0.11	39,71,105,217	0

6.3　Carbohydrates ⓘ

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, 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	SO4	J	101	5/5	-0.22	1.53	968,969,969,969	0
4	SO4	D	101	5/5	0.23	1.49	968,969,969,969	0
5	NA	F	102	1/1	0.60	0.33	114,114,114,114	0
3	MTA	G	101	20/20	0.77	0.48	61,408,842,842	0
3	MTA	I	101	20/20	0.85	0.22	55,116,182,208	0
3	MTA	C	101	20/20	0.88	0.17	47,82,164,194	0
3	MTA	B	101	20/20	0.88	0.22	50,155,487,487	0
3	MTA	M	101	20/20	0.89	0.17	43,103,517,517	0
3	MTA	A	101	20/20	0.89	0.12	40,62,193,232	0
3	MTA	O	101	20/20	0.92	0.18	56,97,157,216	0
3	MTA	F	101	20/20	0.95	0.11	37,54,137,137	0
3	MTA	M	102	20/20	0.95	0.10	38,51,81,81	0
5	NA	D	102	1/1	0.96	0.11	92,92,92,92	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.
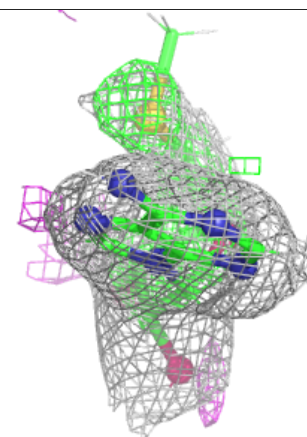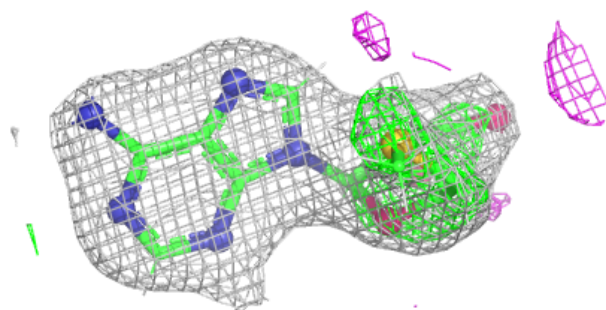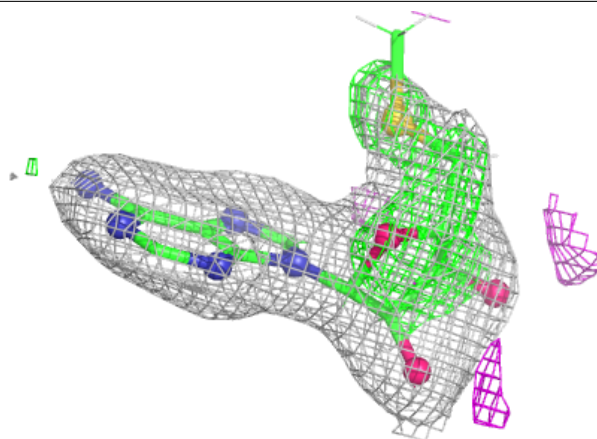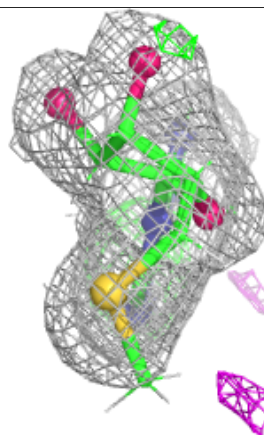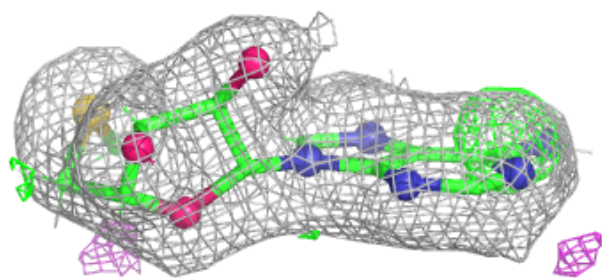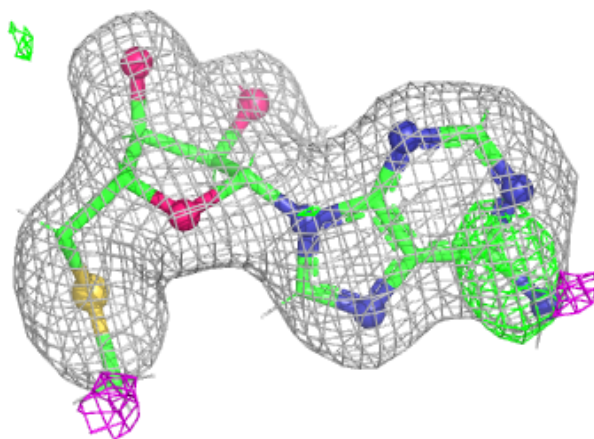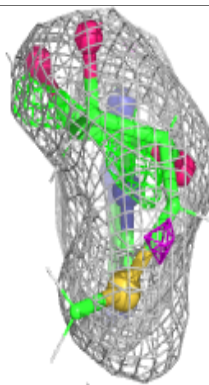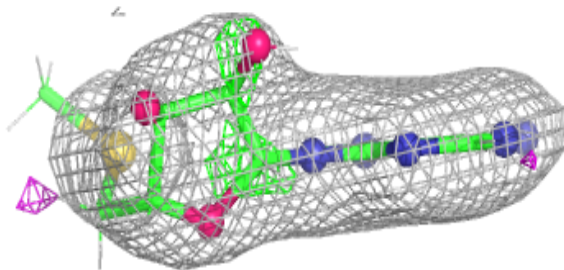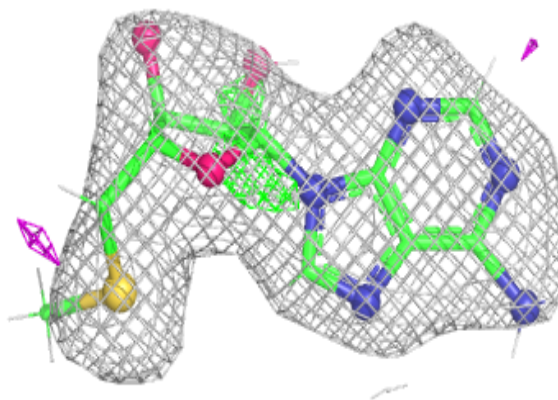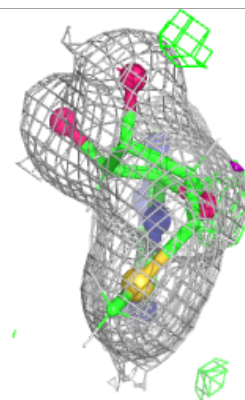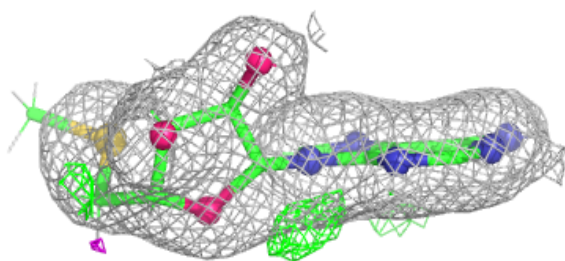
Electron density around MTA G 101:

$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)
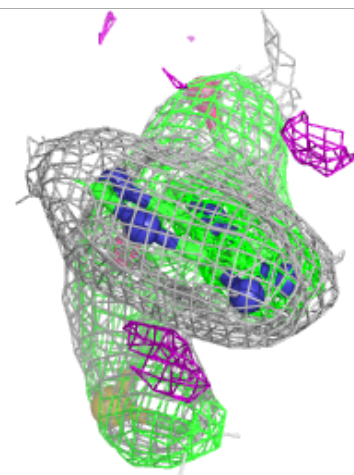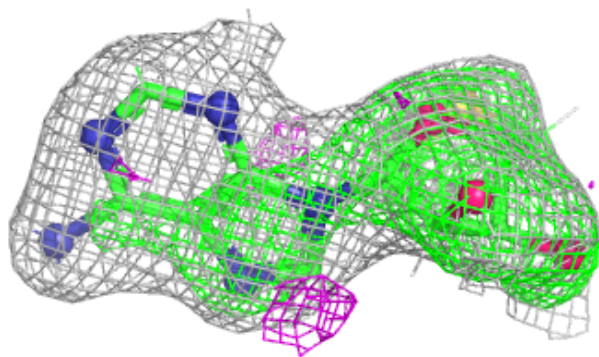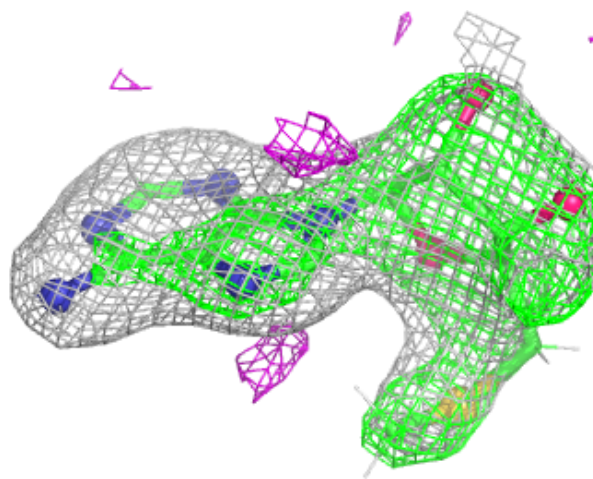
Electron density around MTA I 101:

$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative)
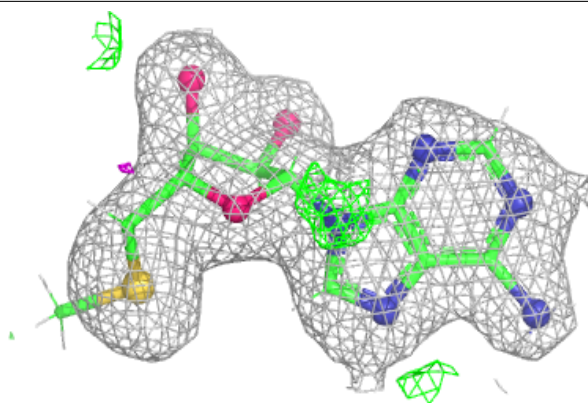and green (positive)
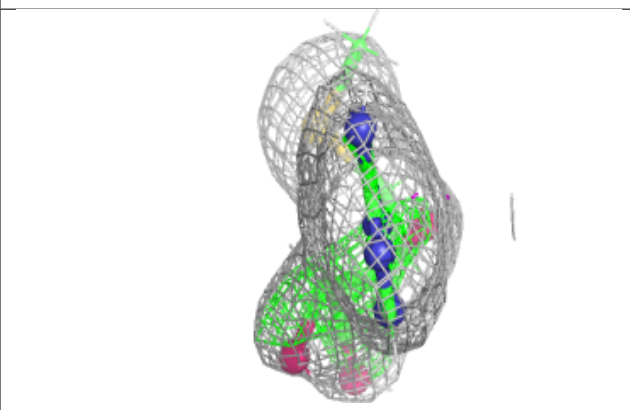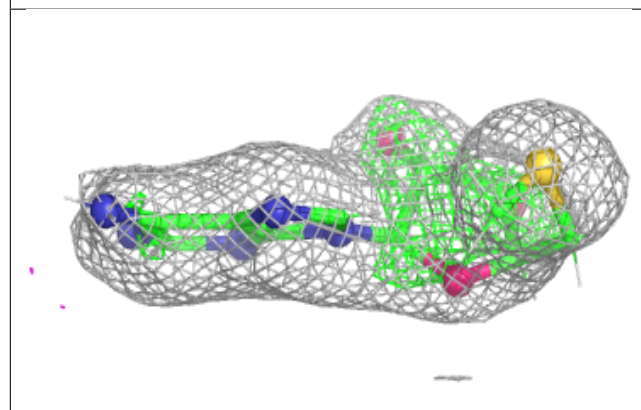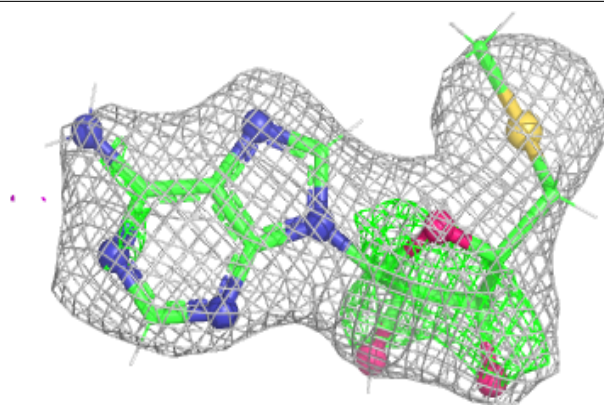
Electron density around MTA C 101:

$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)
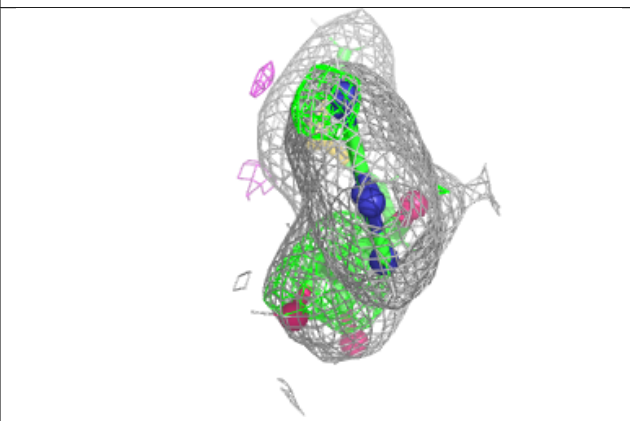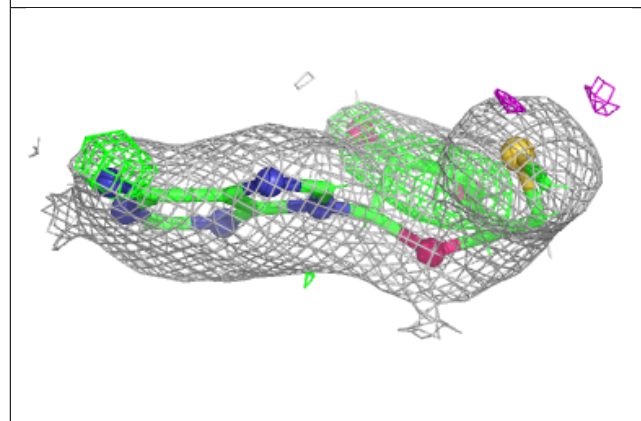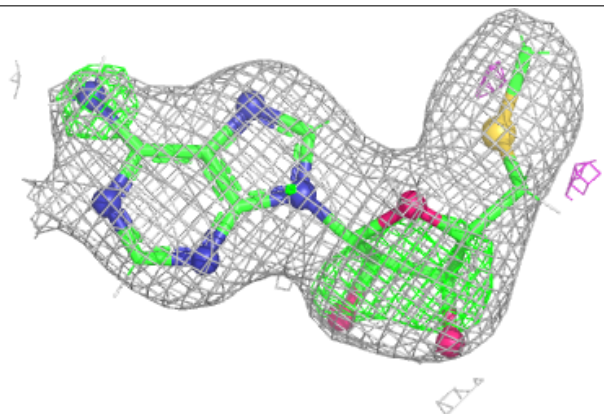
Electron density around MTA B 101:

$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)
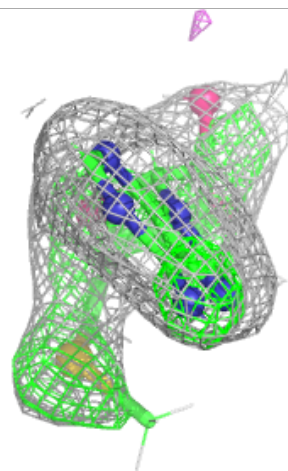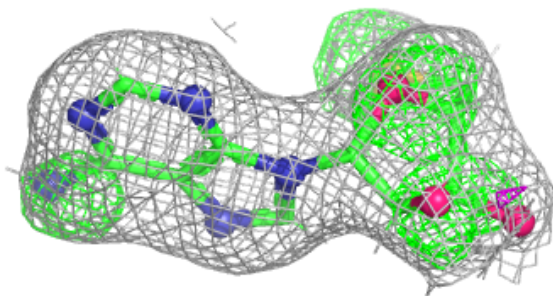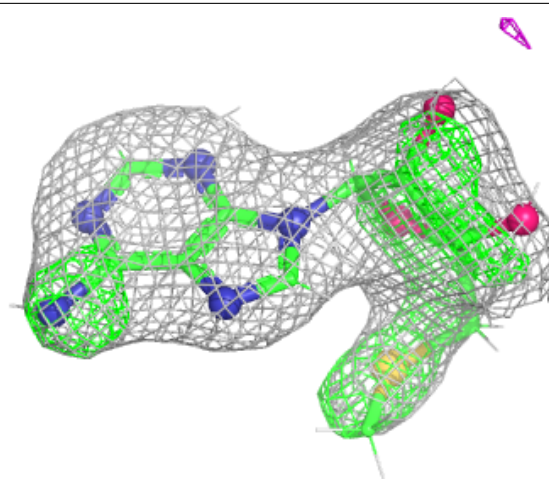
Electron density around MTA M 101:

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

Electron density around MTA A 101:

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 MTA O 101:

2mF$_o$-DF$_c$ (at 0.7 rmsd) in gray
mF$_o$-DF$_c$ (at 3 rmsd) in purple (negative)
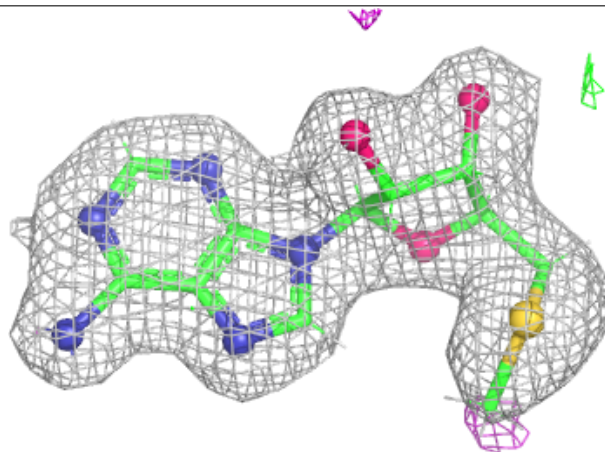and green (positive)

Electron density around MTA F 101:

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 MTA M 102:

2mF$_o$-DF$_c$ (at 0.7 rmsd) in gray
mF$_o$-DF$_c$ (at 3 rmsd) in purple (negative)
and green (positive)
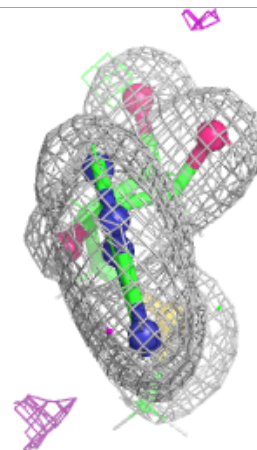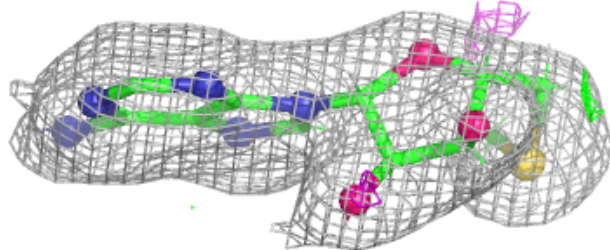
6.5 Other polymers (i)

There are no such residues in this entry.