WORLDWIDE wwPDB PROTEIN DATA BANK

wwPDB X-ray Structure Validation Summary Report (i)

Dec 3, 2023 – 10:08 PM EST

PDB ID	:	8UH7
Title	:	Structure of T4 Bacteriophage clamp loader bound to the T4 clamp, primer-template DNA, and ATP analog
Authors	:	Gee, C.L.; Marcus, K.; Kelch, B.A.; Makino, D.L.
Deposited on	:	2023-10-07
Resolution	:	2.63 Å(reported)

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The following versions of software and data (see references (i)) were used in the production of this report:

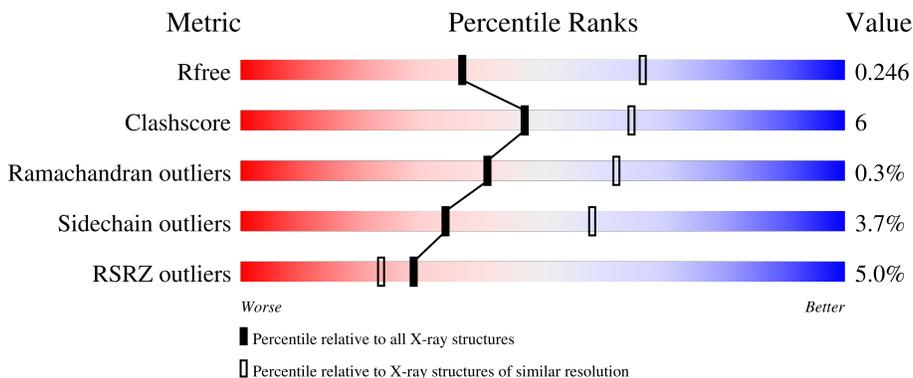|		
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.36
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.36

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 2.63 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		0.246
Clashscore		6
Ramachandran outliers		0.3%
Sidechain outliers		3.7%
RSRZ outliers		5.0%

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	3797 (2.64-2.60)
Clashscore	141614	4168 (2.64-2.60)
Ramachandran outliers	138981	4093 (2.64-2.60)
Sidechain outliers	138945	4093 (2.64-2.60)
RSRZ outliers	127900	3731 (2.64-2.60)

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	187	3% / 77% / 20% ••
2	B	324	86% / 13% •
2	C	324	83% / 15% •
2	D	324	2% / 85% / 12% ••
2	E	324	% / 81% / 13% ••

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Mol	Chain	Length	Quality of chain
3	F	228	34% / 75% / 21%
3	G	228	79% / 20%
3	H	228	7% / 82% / 18%
4	I	30	3% / 43% / 37% / 20%
5	J	20	5% / 80% / 20%

2 Entry composition (i)

There are 9 unique types of molecules in this entry. The entry contains 17800 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 Sliding-clamp-loader small subunit.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	186	Total 1495	C 963	N 247	O 279	S 6	0	0	0

- Molecule 2 is a protein called Sliding-clamp-loader large subunit.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	319	Total 2509	C 1587	N 431	O 474	S 17	0	0	0
2	C	320	Total 2515	C 1590	N 432	O 476	S 17	0	0	0
2	D	319	Total 2509	C 1587	N 431	O 474	S 17	0	0	0
2	E	314	Total 2467	C 1564	N 422	O 465	S 16	0	0	0

There are 20 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	-4	GLY	-	expression tag	UNP P04526
B	-3	PRO	-	expression tag	UNP P04526
B	-2	GLY	-	expression tag	UNP P04526
B	-1	GLY	-	expression tag	UNP P04526
B	0	SER	-	expression tag	UNP P04526
C	-4	GLY	-	expression tag	UNP P04526
C	-3	PRO	-	expression tag	UNP P04526
C	-2	GLY	-	expression tag	UNP P04526
C	-1	GLY	-	expression tag	UNP P04526
C	0	SER	-	expression tag	UNP P04526
D	-4	GLY	-	expression tag	UNP P04526
D	-3	PRO	-	expression tag	UNP P04526
D	-2	GLY	-	expression tag	UNP P04526
D	-1	GLY	-	expression tag	UNP P04526

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Chain	Residue	Modelled	Actual	Comment	Reference
D	0	SER	-	expression tag	UNP P04526
E	-4	GLY	-	expression tag	UNP P04526
E	-3	PRO	-	expression tag	UNP P04526
E	-2	GLY	-	expression tag	UNP P04526
E	-1	GLY	-	expression tag	UNP P04526
E	0	SER	-	expression tag	UNP P04526

- Molecule 3 is a protein called Sliding clamp.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	F	228	Total	C	N	O	Se	0	0	0
			1750	1113	288	343	6			
3	G	228	Total	C	N	O	Se	0	0	0
			1750	1113	288	343	6			
3	H	228	Total	C	N	O	Se	0	0	0
			1750	1113	288	343	6			

- Molecule 4 is a DNA chain called Template DNA strand.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
4	I	24	Total	C	N	O	P	0	0	0
			489	236	76	153	24			

- Molecule 5 is a DNA chain called Primer DNA strand.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
5	J	20	Total	C	N	O	P	0	0	0
			408	195	81	113	19			

- Molecule 6 is [[[(2R,3S,4R,5R)-5-(6-aminopurin-9-yl)-3,4-bis(oxidanyl)oxolan-2-yl]methoxy-oxidanyl-phosphoryl]oxy-oxidanyl-phosphoryl]oxy-tris(fluoranyl)beryllium (three-letter code: 08T) (formula: $C_{10}H_{14}BeF_3N_5O_{10}P_2$) (labeled as "Ligand of Interest" by depositor).

08T

Mol	Chain	Residues	Atoms							ZeroOcc	AltConf
6	B	1	Total	Be	C	F	N	O	P	0	0
			31	1	10	3	5	10	2		
6	C	1	Total	Be	C	F	N	O	P	0	0
			31	1	10	3	5	10	2		
6	D	1	Total	Be	C	F	N	O	P	0	0
			31	1	10	3	5	10	2		

- Molecule 7 is MAGNESIUM ION (three-letter code: MG) (formula: Mg) (labeled as "Ligand of Interest" by depositor).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
7	B	1	Total	Mg	0	0
			1	1		
7	C	1	Total	Mg	0	0
			1	1		
7	D	1	Total	Mg	0	0
			1	1		
7	E	1	Total	Mg	0	0
			1	1		

- Molecule 8 is ADENOSINE-5'-DIPHOSPHATE (three-letter code: ADP) (formula: $C_{10}H_{15}N_5O_{10}P_2$) (labeled as "Ligand of Interest" by depositor).

ADP

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	N	O	P		
8	E	1	27	10	5	10	2	0	0

- Molecule 9 is water.

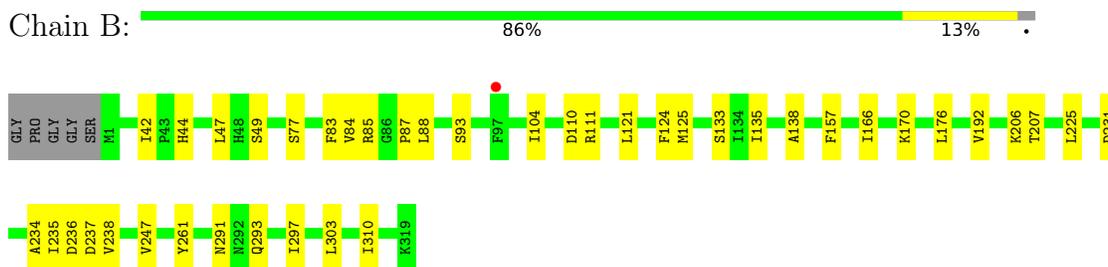| Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
9	A	1	Total 1	O 1	0	0
9	B	7	Total 7	O 7	0	0
9	C	6	Total 6	O 6	0	0
9	D	9	Total 9	O 9	0	0
9	E	7	Total 7	O 7	0	0
9	F	1	Total 1	O 1	0	0
9	G	2	Total 2	O 2	0	0
9	J	1	Total 1	O 1	0	0

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.
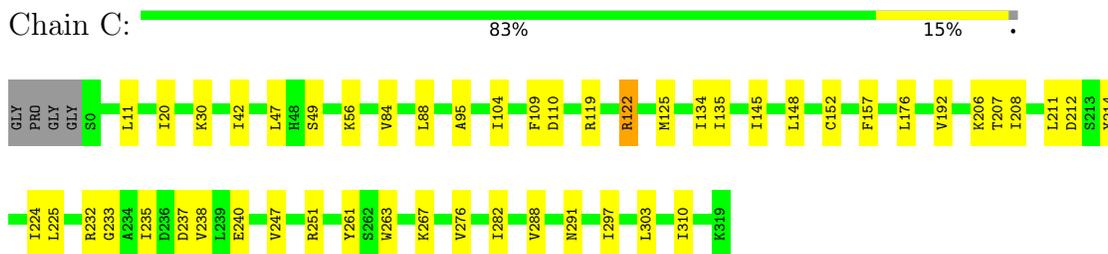
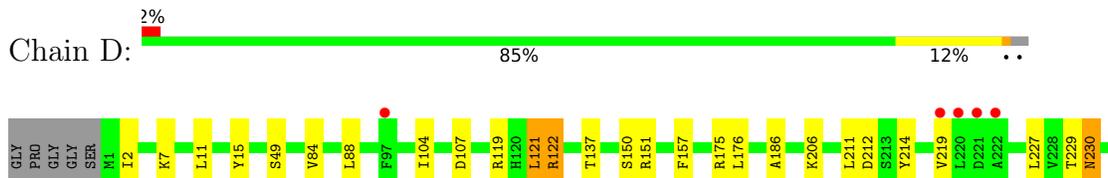• Molecule 1: Sliding-clamp-loader small subunit

• Molecule 2: Sliding-clamp-loader large subunit

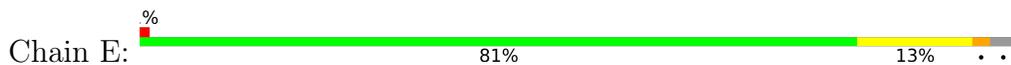• Molecule 2: Sliding-clamp-loader large subunit

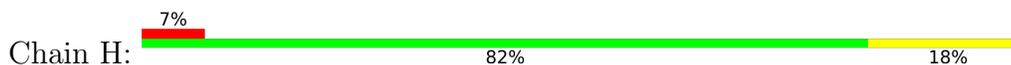• Molecule 2: Sliding-clamp-loader large subunit

D237 V238 L239 V247 R275 P278 I281 I282 R283 M284 Y285 V288 Y294 I297 A298 A299 Y307 I310 E315 K319

• Molecule 2: Sliding-clamp-loader large subunit

Chain E:

%
81% 13% • •

GLY PRO GLY SER MET I2 E12 I20 P26 I36 I42 V67 L88 T89 N90 F91 K102 V103 I104 F109 D110 R111 E116 R119 R122 M125 I134 Q149 R153 G158 K170 C180 I185 A186 I187 Y214 K217

G218 V219 L220 D221 S226 L227 V228 THR ASN ASP ARG G233 A234 I235 D236 D237 V238 K243 L253 D260 W263 I272 V276 M284 Y285 E286 Q293 Y294 H295 G296 I297 L305 I310 C314 W318 K319

• Molecule 3: Sliding clamp

Chain F:

34%
75% 21% •

M7001 D7006 F7028 I7029 M7030 V7034 T7038 I7044 D7049 F7050 I7063 Q7075 S7076 E7077 D7078 I7090 T7099 V7100 V7101 P7106 I7107 P7108 F7109 P7110 V7111 A7112 S7113 A7114 V7115 T7116 E7117 I7118 K7119 A7120 E7121 D7122 L7123 Q7124 Q7125 L7126 L7127 R7128 V7129 S7130 K7131 G7132 L7133 Q7134 I7135

D7136 T7137 I7138 A7139 I7140 T7141 V7142 K7143 E7144 G7145 K7146 I7147 V7148 I7149 N7150 G7151 F7152 V7155 E7156 A7159 L7160 T7161 R7162 V7163 K7164 Y7165 S7166 L7167 T7168 L7169 G7170 D7171 V7172 D7173 G7174 E7175 N7176 T7177 F7178 N7179 F7180 I7181 I7182 N7183 M7184 A7185 N7186 M7187 K7188 M7189 Q7190 P7191 K7195 L7196 L7197 V7198 W7199

A7200 K7201 G7202 K7203 Q7204 G7205 A7206 A7207 K7208 F7209 H7213 V7217 L7220 E7221 A7222 H7226 D7227 F7228

• Molecule 3: Sliding clamp

Chain G:

79% 20% •

M5001 K5002 L5003 A5015 G5026 Q5027 F5028 T5038 E5041 I5048 Y5055 D5056 L5057 F5060 I5063 L5066 D5078 S5088 T5089 I5090 A5095 S5113 E5117 I5118 K5119 D5122 V5129 S5130 R5131 G5132 L5133 Q5134 I5135 I5140 K5146 N5153 K5164 Y5165 S5166 L5167

D5171 F5180 I5181 M5189 K5195 L5196 L5197 L5198 K5203 L5220 E5221 A6222 F5228

• Molecule 3: Sliding clamp

Chain H:

7%
82% 18%

M6001 K6002 L6003 S6004 K6005 T6016 F6028 I6029 M6030 V6034 Y6039 F6060 S6065 L6066 V6067 I6073 S6074 Q6075 E6077 D6078 I6081 K6082 I6083 A6084 D6085 A6086 R6087 S6088 T6089 I6090 F6091 T6099 V6100 V6101 A6102 P6103 N6104 K6105 P6106 E6117 Q6125 L6126 L6127 R6128 V6129 S6130 I6135

I6140 K6146 I6149 Y6165 S6166 L6167 G6170 N6186 M6187 K6188 M6189 L6196 F6209 E6212 H6213 V6217 F6228

• Molecule 4: Template DNA strand

3%

Chain I:

43%   37%   20%

DT DT DT DT DT T7 T8 T9 A12 C17 T18 C19 G20 T21 A22 C27 T28 G29 C30

• Molecule 5: Primer DNA strand

5%

Chain J:

80%   20%

G1 T9 A10 C11 G12 A20

4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α, β, γ	93.35Å 118.33Å 132.88Å 90.00° 102.05° 90.00°	Depositor
Resolution (Å)	49.65 – 2.63 49.65 – 2.63	Depositor EDS
% Data completeness (in resolution range)	65.9 (49.65-2.63) 65.9 (49.65-2.63)	Depositor EDS
R_{merge}	0.33	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.03 (at 2.61Å)	Xtriage
Refinement program	PHENIX 1.14_3260	Depositor
R, R_{free}	0.193 , 0.244 0.196 , 0.246	Depositor DCC
R_{free} test set	2000 reflections (3.60%)	wwPDB-VP
Wilson B-factor (Å^2)	44.7	Xtriage
Anisotropy	0.177	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.30 , 42.1	EDS
L-test for twinning[2]	$< |L| > = 0.48$, $< L^2 > = 0.31$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.92	EDS
Total number of atoms	17800	wwPDB-VP
Average B, all atoms (Å^2)	48.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.05% 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 $< |L| >$, $< L^2 >$ 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: 08T, MG, ADP

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	0.25	0/1523	0.42	0/2051
2	B	0.25	0/2553	0.41	0/3441
2	C	0.26	0/2559	0.42	0/3449
2	D	0.25	0/2553	0.42	0/3441
2	E	0.26	0/2510	0.43	0/3382
3	F	0.25	0/1774	0.44	0/2395
3	G	0.25	0/1774	0.44	0/2395
3	H	0.25	0/1774	0.45	0/2395
4	I	0.55	0/544	1.07	0/838
5	J	0.52	0/459	0.82	0/706
All	All	0.28	0/18023	0.48	0/24493

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	1495	0	1521	26	0
2	B	2509	0	2537	26	0
2	C	2515	0	2542	32	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	D	2509	0	2538	29	0
2	E	2467	0	2495	33	0
3	F	1750	0	1752	33	0
3	G	1750	0	1752	28	0
3	H	1750	0	1752	23	0
4	I	489	0	277	7	0
5	J	408	0	225	2	0
6	B	31	0	13	0	0
6	C	31	0	13	1	0
6	D	31	0	13	1	0
7	B	1	0	0	0	0
7	C	1	0	0	0	0
7	D	1	0	0	0	0
7	E	1	0	0	0	0
8	E	27	0	12	1	0
9	A	1	0	0	0	0
9	B	7	0	0	0	0
9	C	6	0	0	0	0
9	D	9	0	0	0	0
9	E	7	0	0	0	0
9	F	1	0	0	2	0
9	G	2	0	0	0	0
9	J	1	0	0	0	0
All	All	17800	0	17442	216	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 6.

The worst 5 of 216 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:A:162:VAL:HG11	1:A:183:LEU:HD13	1.61	0.82
1:A:162:VAL:HG21	1:A:183:LEU:HD22	1.64	0.78
3:G:5146:LYS:HA	3:G:5171:ASP:HA	1.67	0.77
1:A:122:LEU:HD21	1:A:183:LEU:HD21	1.70	0.72
1:A:175:LYS:HG2	1:A:178:LYS:HG3	1.69	0.72

There are no symmetry-related clashes.

5.3 Torsion angles ⓘ

5.3.1 Protein backbone ⓘ

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	184/187 (98%)	177 (96%)	4 (2%)	3 (2%)	9	18
2	B	317/324 (98%)	303 (96%)	13 (4%)	1 (0%)	41	62
2	C	318/324 (98%)	304 (96%)	14 (4%)	0	100	100
2	D	317/324 (98%)	307 (97%)	10 (3%)	0	100	100
2	E	310/324 (96%)	295 (95%)	14 (4%)	1 (0%)	41	62
3	F	226/228 (99%)	206 (91%)	20 (9%)	0	100	100
3	G	226/228 (99%)	216 (96%)	10 (4%)	0	100	100
3	H	226/228 (99%)	209 (92%)	16 (7%)	1 (0%)	34	55
All	All	2124/2167 (98%)	2017 (95%)	101 (5%)	6 (0%)	41	62

5 of 6 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	E	226	SER
3	H	6086	ALA
1	A	36	ALA
1	A	7	ASP
1	A	9	GLN

5.3.2 Protein sidechains ⓘ

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	162/163 (99%)	154 (95%)	8 (5%)	25	46

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
2	B	277/279 (99%)	276 (100%)	1 (0%)	91	97
2	C	278/279 (100%)	274 (99%)	4 (1%)	67	84
2	D	277/279 (99%)	271 (98%)	6 (2%)	52	74
2	E	272/279 (98%)	260 (96%)	12 (4%)	28	52
3	F	189/183 (103%)	171 (90%)	18 (10%)	8	15
3	G	189/183 (103%)	182 (96%)	7 (4%)	34	58
3	H	189/183 (103%)	178 (94%)	11 (6%)	20	38
All	All	1833/1828 (100%)	1766 (96%)	67 (4%)	34	58

5 of 67 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
3	H	6066	LEU
3	H	6078	ASP
3	H	6126	LEU
2	E	214	TYR
2	E	185	ILE

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. There are no such sidechains identified.

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 8 ligands modelled in this entry, 4 are monoatomic - leaving 4 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	#$|Z| > 2$
6	08T	D	401	7	26,33,33	1.84	6 (23%)	25,52,52	1.60	4 (16%)
8	ADP	E	401	7	24,29,29	0.96	1 (4%)	29,45,45	1.50	4 (13%)
6	08T	C	401	7	26,33,33	1.86	6 (23%)	25,52,52	1.60	4 (16%)
6	08T	B	401	7	26,33,33	1.85	6 (23%)	25,52,52	1.61	5 (20%)

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
6	08T	D	401	7	-	2/12/38/38	0/3/3/3
8	ADP	E	401	7	-	2/12/32/32	0/3/3/3
6	08T	C	401	7	-	0/12/38/38	0/3/3/3
6	08T	B	401	7	-	3/12/38/38	0/3/3/3

The worst 5 of 19 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
6	C	401	08T	C2'-C1'	-4.69	1.46	1.53
6	D	401	08T	C2'-C1'	-4.63	1.46	1.53
6	B	401	08T	C2'-C1'	-4.54	1.46	1.53
6	B	401	08T	C2'-C3'	-4.18	1.41	1.53
6	D	401	08T	C2'-C3'	-4.10	1.42	1.53

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

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
6	C	401	08T	N3-C2-N1	-5.47	120.13	128.68
6	B	401	08T	N3-C2-N1	-5.36	120.30	128.68
6	D	401	08T	N3-C2-N1	-5.28	120.43	128.68
8	E	401	ADP	C3'-C2'-C1'	3.73	106.60	100.98
8	E	401	ADP	PA-O3A-PB	-3.41	121.14	132.83

There are no chirality outliers.

5 of 7 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
8	E	401	ADP	O4'-C4'-C5'-O5'
8	E	401	ADP	C3'-C4'-C5'-O5'
6	B	401	08T	PA-O3A-PB-O2B
6	D	401	08T	C3'-C4'-C5'-O5'
6	D	401	08T	O4'-C4'-C5'-O5'

There are no ring outliers.

3 monomers are involved in 3 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
6	D	401	08T	1	0
8	E	401	ADP	1	0
6	C	401	08T	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 08T D 401

Bond lengths

Bond angles

Torsions

Rings

Ligand ADP E 401

Bond lengths

Bond angles

Torsions

Rings

Ligand 08T C 401

Bond lengths

Bond angles

Torsions

Rings

Ligand 08T B 401

Bond lengths

Bond angles

Torsions

Rings
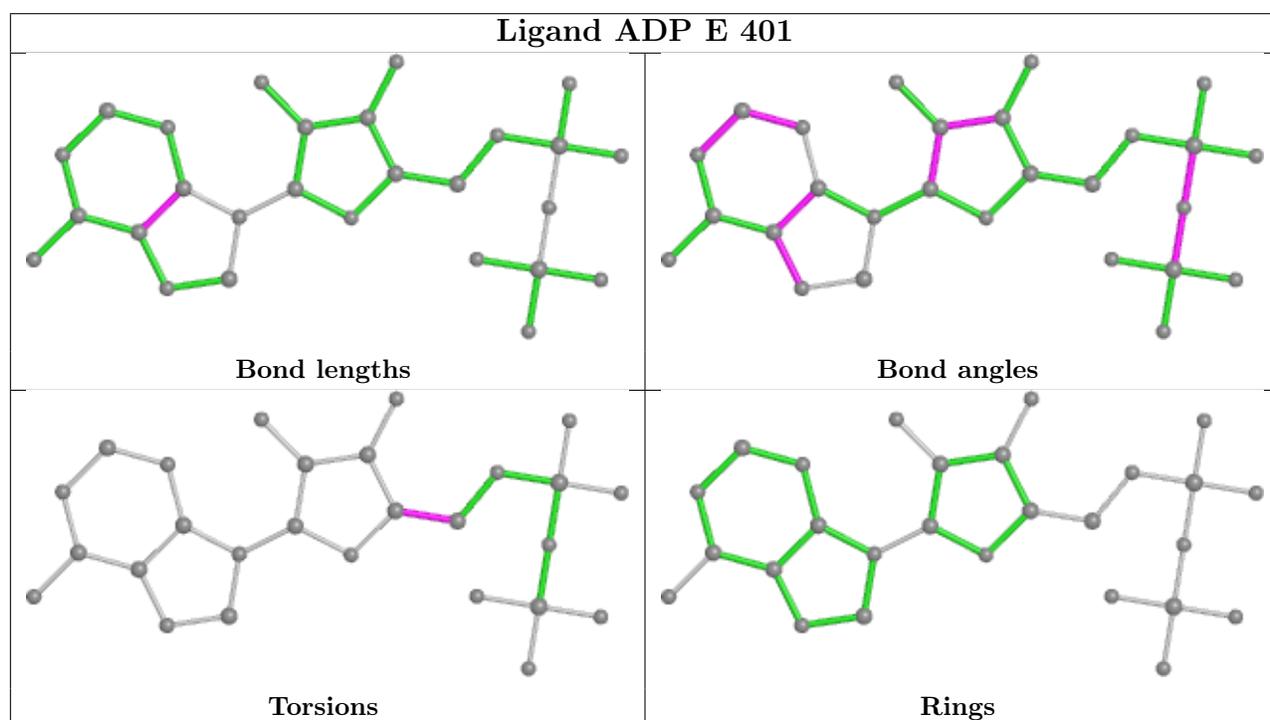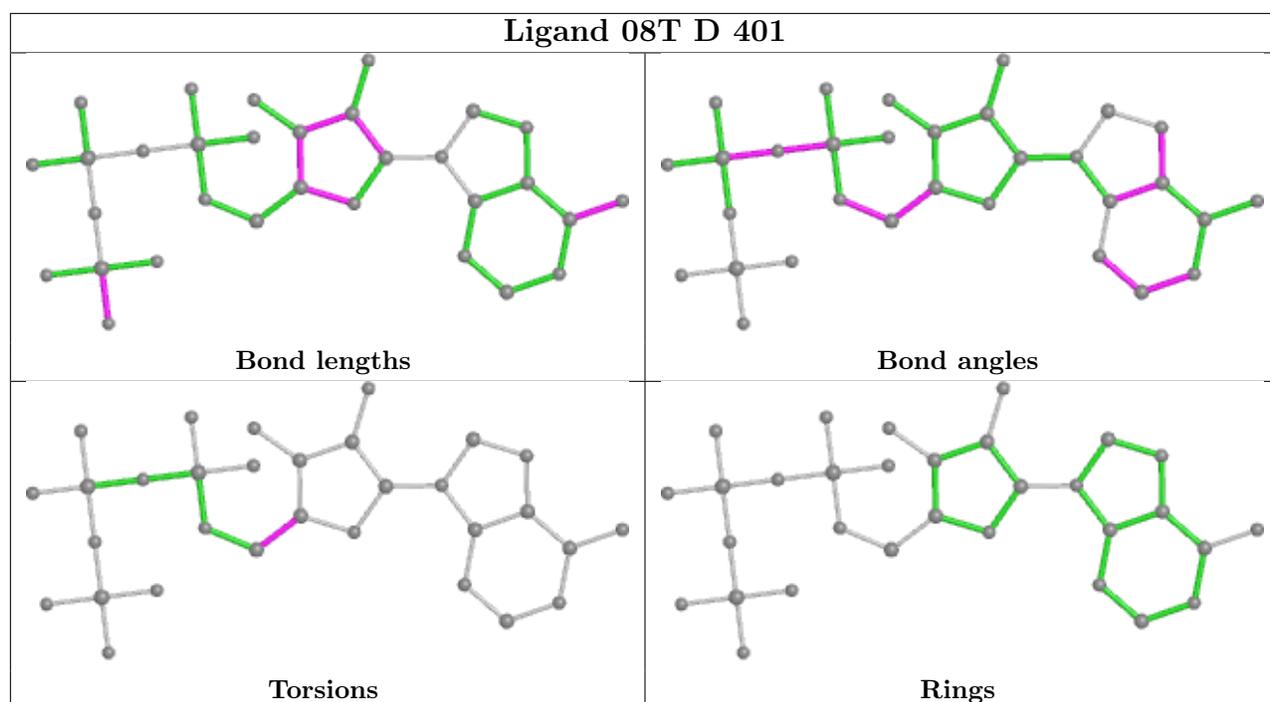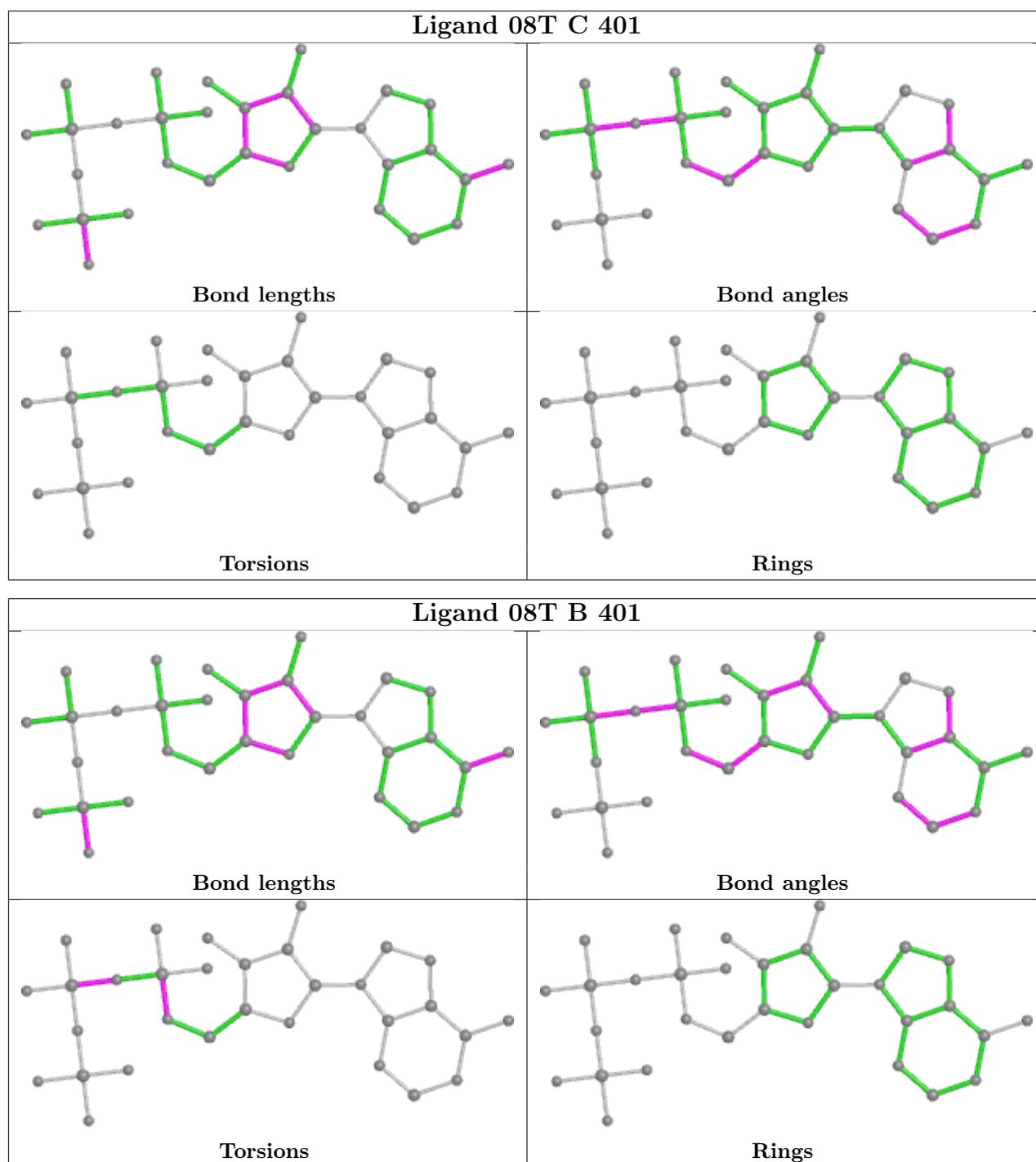
5.7 Other polymers ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues ⓘ

There are no chain breaks in this entry.

6 Fit of model and data ⓘ

6.1 Protein, DNA and RNA chains ⓘ

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

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2			OWAB(Å²)	Q<0.9
1	A	186/187 (99%)	-0.03	5 (2%)	54	49	18, 46, 87, 108	0
2	B	319/324 (98%)	-0.40	1 (0%)	94	93	16, 33, 55, 74	0
2	C	320/324 (98%)	-0.33	0	100	100	12, 26, 50, 88	0
2	D	319/324 (98%)	-0.19	5 (1%)	72	68	9, 27, 74, 107	0
2	E	314/324 (96%)	-0.20	3 (0%)	82	80	14, 36, 68, 92	0
3	F	222/228 (97%)	1.51	77 (34%)	0	0	41, 87, 136, 147	0
3	G	222/228 (97%)	-0.20	0	100	100	26, 48, 73, 95	0
3	H	222/228 (97%)	0.32	15 (6%)	17	13	31, 60, 108, 128	0
4	I	24/30 (80%)	0.07	1 (4%)	36	30	20, 47, 165, 185	0
5	J	20/20 (100%)	-0.26	1 (5%)	28	23	29, 67, 170, 177	0
All	All	2168/2217 (97%)	-0.00	108 (4%)	28	23	9, 40, 104, 185	0

The worst 5 of 108 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
3	F	7178	PHE	7.7
3	F	7140	ILE	7.6
3	F	7147	ILE	7.4
3	F	7145	GLY	7.1
3	F	7165	TYR	6.9

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

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 (i)

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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
8	ADP	E	401	27/27	0.96	0.18	25,36,49,68	0
6	08T	D	401	31/31	0.97	0.16	14,21,29,33	0
6	08T	C	401	31/31	0.97	0.19	10,18,24,25	0
7	MG	B	402	1/1	0.98	0.29	22,22,22,22	0
6	08T	B	401	31/31	0.98	0.17	14,26,37,49	0
7	MG	D	402	1/1	0.99	0.23	11,11,11,11	0
7	MG	E	402	1/1	0.99	0.34	20,20,20,20	0
7	MG	C	402	1/1	0.99	0.25	12,12,12,12	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 ADP E 401:

$2mF_o$-DF_c (at 0.7 rmsd) in gray
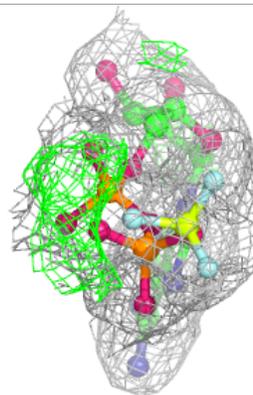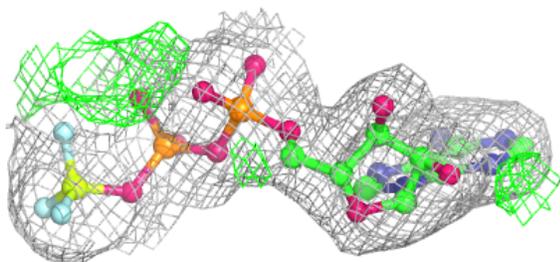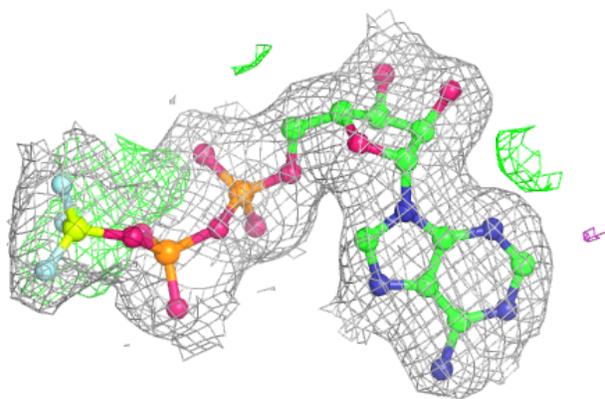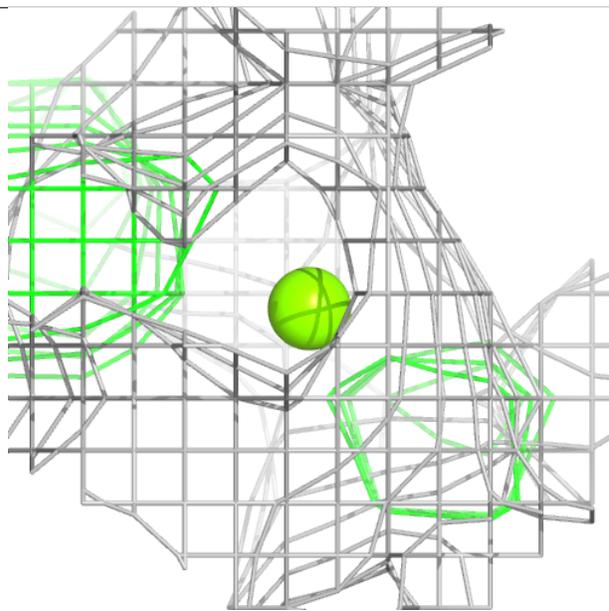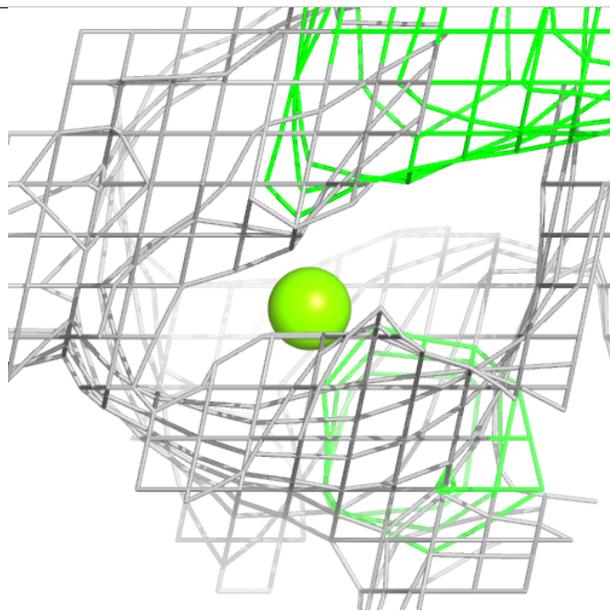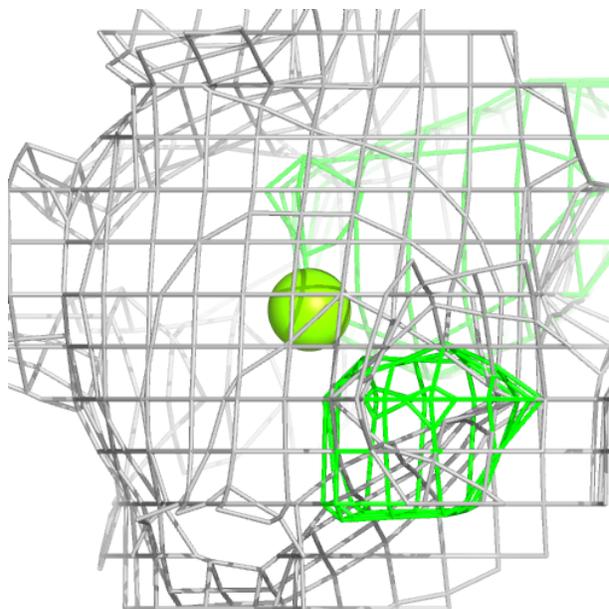mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)
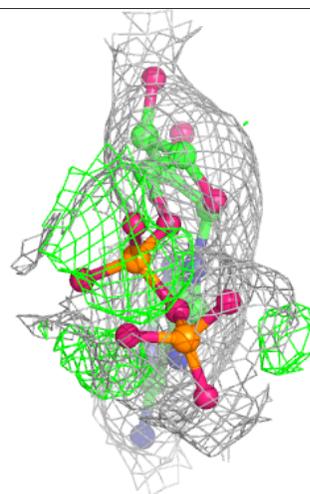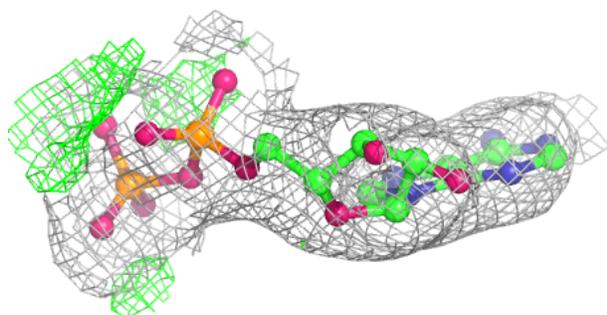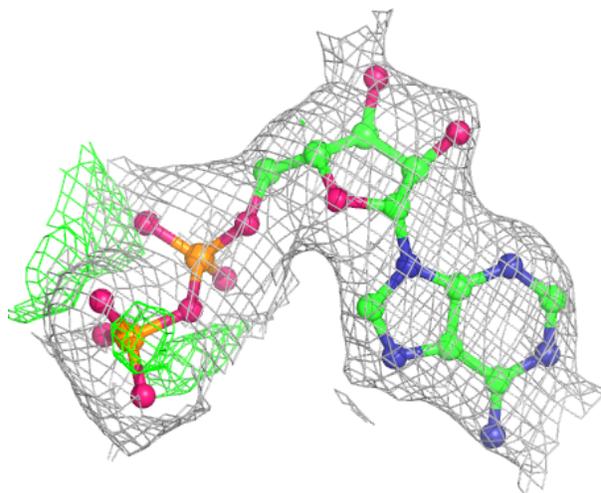
Electron density around 08T D 401:

$2mF_o\text{-}DF_c$ (at 0.7 rmsd) in gray
$mF_o\text{-}DF_c$ (at 3 rmsd) in purple (negative)
and green (positive)
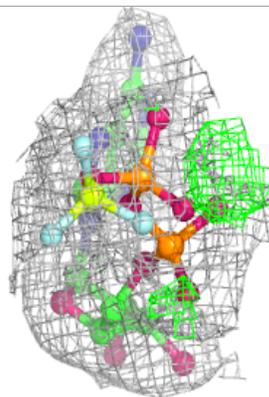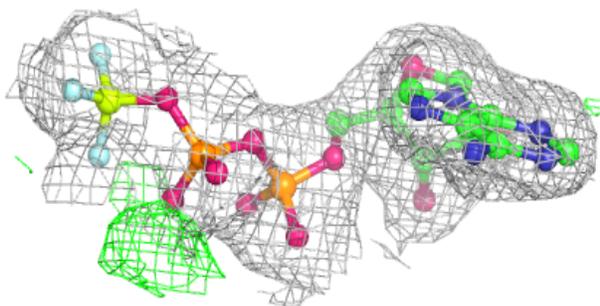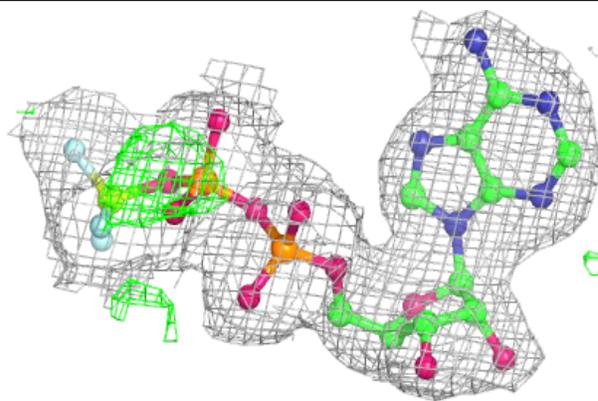
Electron density around 08T C 401:

$2mF_o\text{-}DF_c$ (at 0.7 rmsd) in gray
$mF_o\text{-}DF_c$ (at 3 rmsd) in purple (negative)
and green (positive)
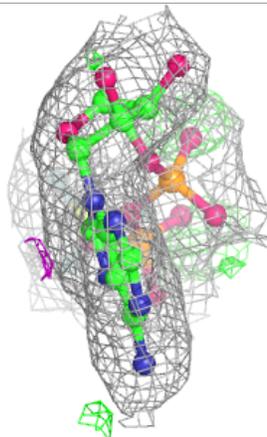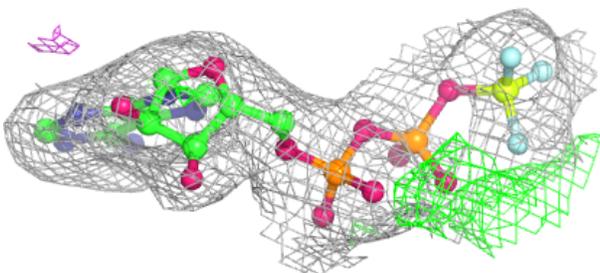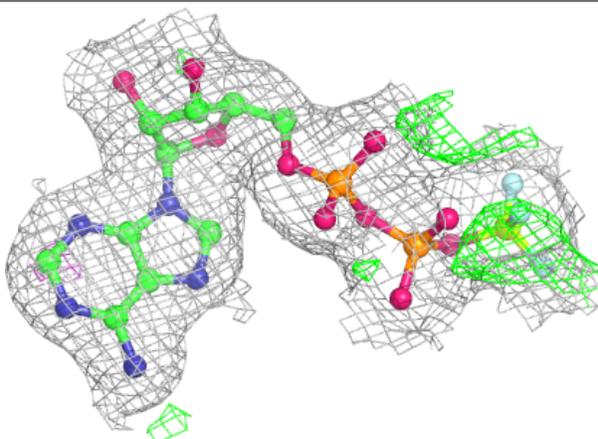
Electron density around MG B 402:

$2mF_o\text{-}DF_c$ (at 0.7 rmsd) in gray
$mF_o\text{-}DF_c$ (at 3 rmsd) in purple (negative)
and green (positive)
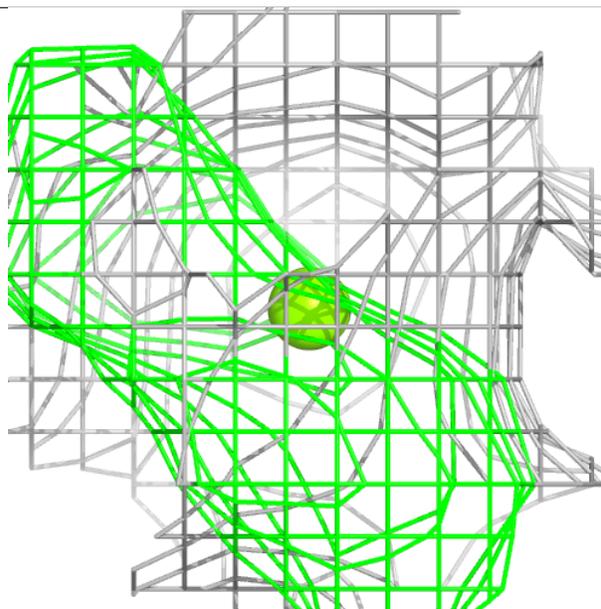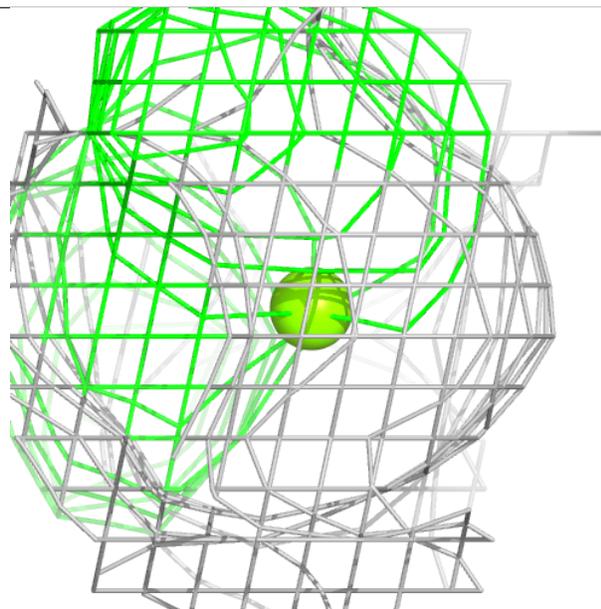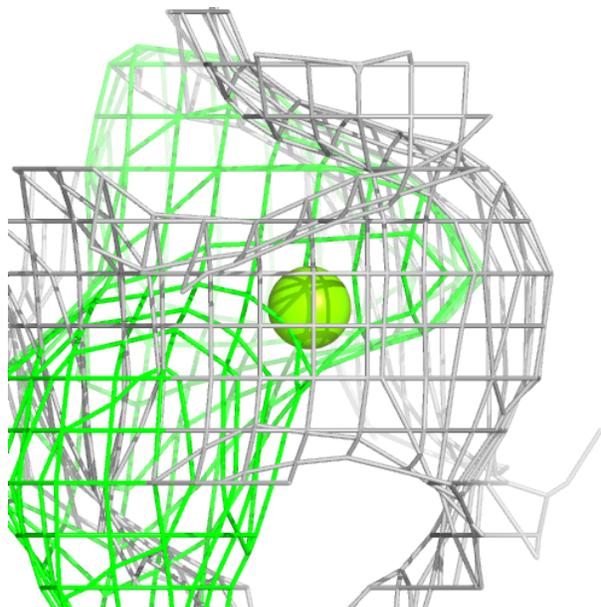
Electron density around 08T B 401:

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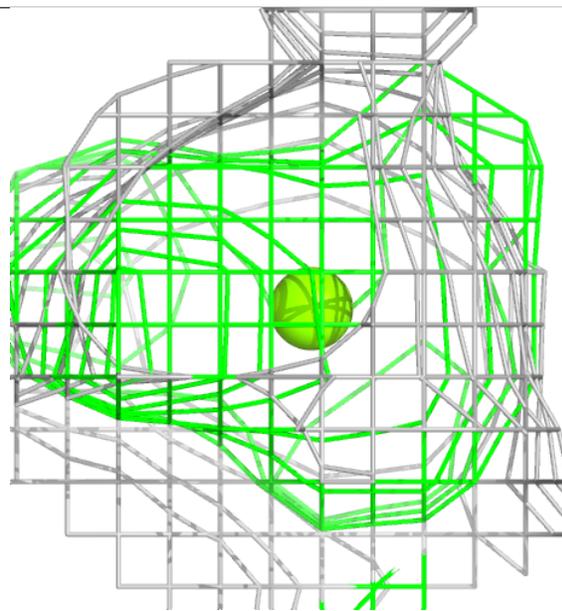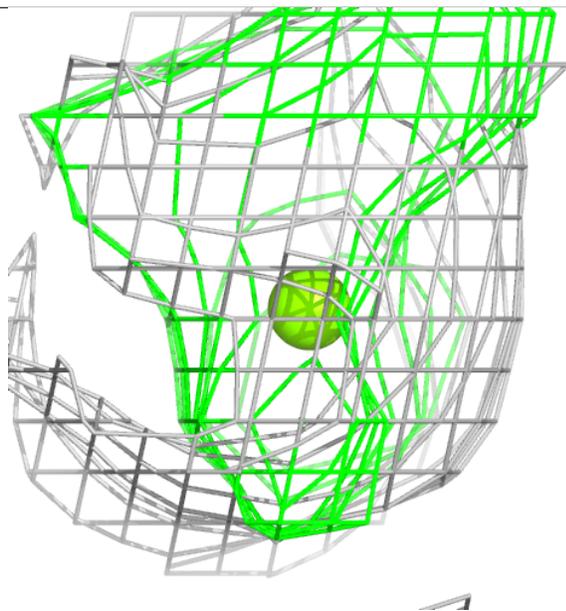mF_o-DF_c (at 3 rmsd) in purple (negative)
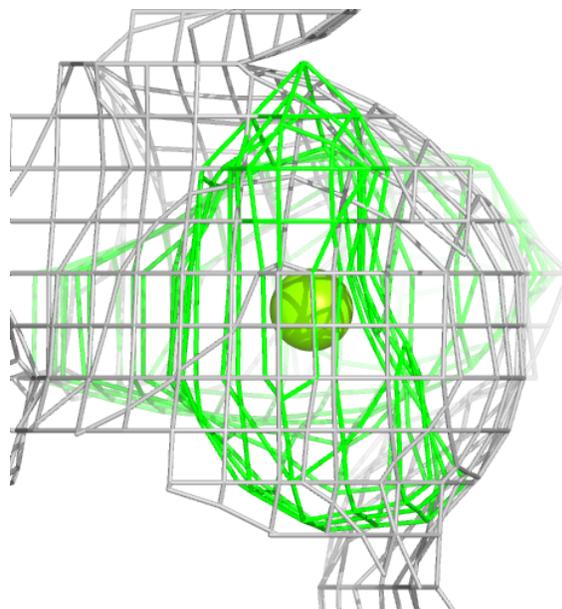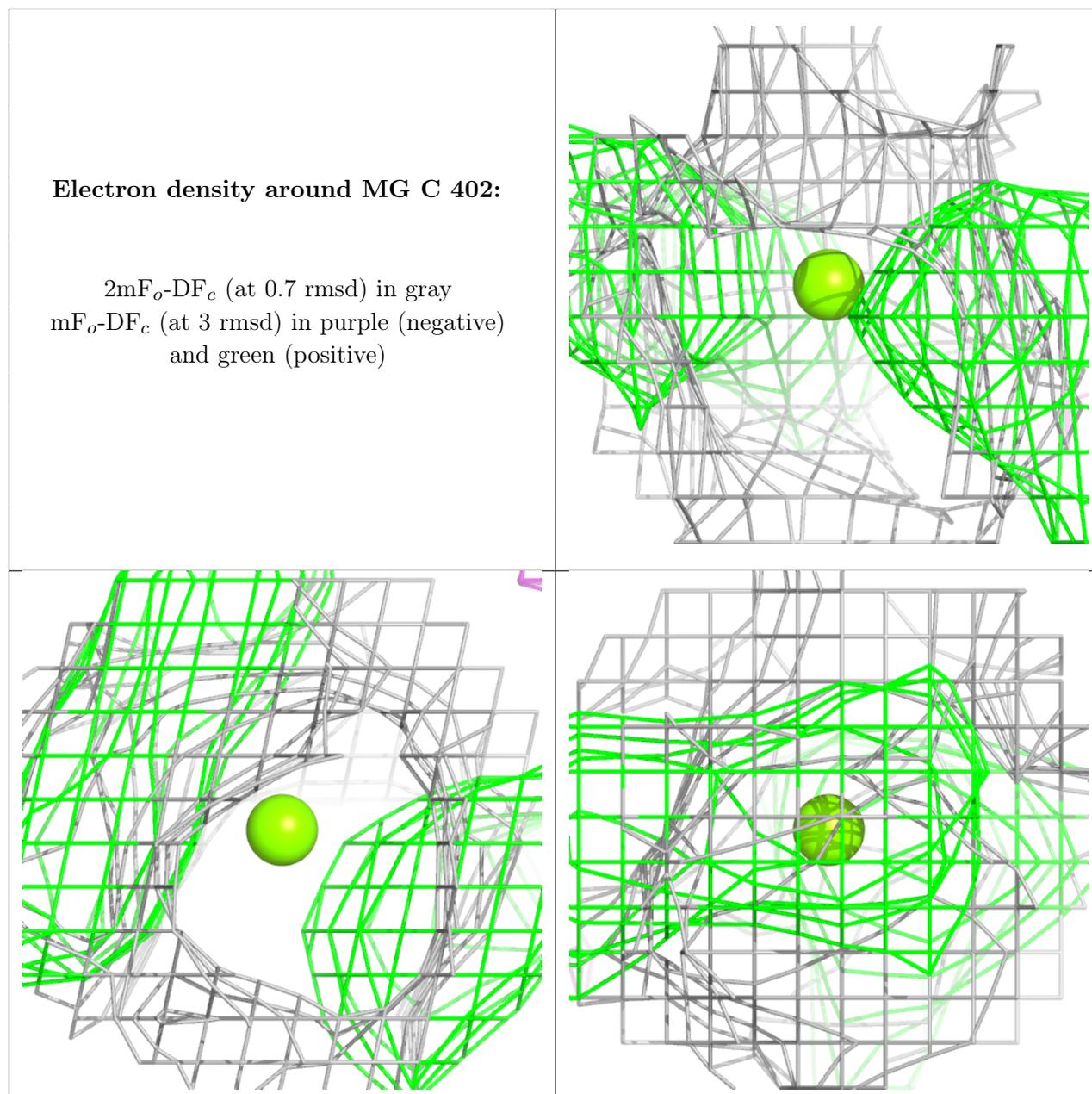and green (positive)

Electron density around MG D 402:

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 MG E 402:

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

Electron density around MG C 402:

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

6.5 Other polymers ⓘ

There are no such residues in this entry.