Full wwPDB X-ray Structure Validation Report (i)

May 13, 2020 – 06:58 am BST

PDB ID	:	1W4R
Title	:	Structure of a type II thymidine kinase with bound dTTP
Authors	:	Birringer, M.S.; Claus, M.T.; Folkers, G.; Kloer, D.P.; Schulz, G.E.; Scapozza, L.
Deposited on	:	2004-07-27
Resolution	:	1.83 Å(reported)

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	:	2.11
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.11

1 Overall quality at a glance ⓘ

The following experimental techniques were used to determine the structure:
X-RAY DIFFRACTION

The reported resolution of this entry is 1.83 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.
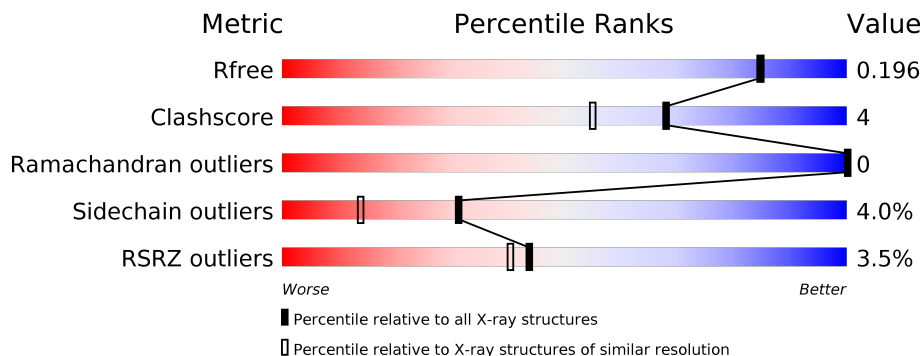
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	4003 (1.86-1.82)
Clashscore	141614	4233 (1.86-1.82)
Ramachandran outliers	138981	4185 (1.86-1.82)
Sidechain outliers	138945	4186 (1.86-1.82)
RSRZ outliers	127900	3957 (1.86-1.82)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments on the lower bar indicate the fraction of residues that contain outliers for >=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	195	6% 83% 6% • 11%
1	B	195	4% 75% 8% • 14%
1	C	195	3% 69% 12% • 18%
1	D	195	% 75% 6% • 18%
1	E	195	4% 76% 6% • 18%
1	F	195	3% 77% 5% • 17%

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Mol	Chain	Length	Quality of chain
1	G	195	% 76% 5% · 18%
1	H	195	3% 75% 7% 17%

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
4	DTU	E	1193	-	-	X	-

2 Entry composition (i)

There are 5 unique types of molecules in this entry. The entry contains 11477 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 THYMIDINE KINASE.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	174	Total	C	N	O	S	0	2	0
			1365	869	237	246	13			
1	B	167	Total	C	N	O	S	0	2	0
			1310	838	226	234	12			
1	C	160	Total	C	N	O	S	0	3	0
			1257	804	219	223	11			
1	D	160	Total	C	N	O	S	0	2	0
			1250	801	217	221	11			
1	E	160	Total	C	N	O	S	0	2	0
			1252	801	219	221	11			
1	F	161	Total	C	N	O	S	0	3	0
			1270	813	221	224	12			
1	G	160	Total	C	N	O	S	0	1	0
			1245	797	216	221	11			
1	H	161	Total	C	N	O	S	0	1	0
			1254	802	217	224	11			

There are 120 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	0	MET	-	expression tag	UNP P04183
A	1	ARG	-	expression tag	UNP P04183
A	2	GLY	-	expression tag	UNP P04183
A	3	SER	-	expression tag	UNP P04183
A	4	HIS	-	expression tag	UNP P04183
A	5	HIS	-	expression tag	UNP P04183
A	6	HIS	-	expression tag	UNP P04183
A	7	HIS	-	expression tag	UNP P04183
A	8	HIS	-	expression tag	UNP P04183
A	9	HIS	-	expression tag	UNP P04183
A	10	LEU	-	expression tag	UNP P04183
A	11	VAL	-	expression tag	UNP P04183
A	12	PRO	-	expression tag	UNP P04183

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Chain	Residue	Modelled	Actual	Comment	Reference
A	13	ARG	-	expression tag	UNP P04183
A	14	GLY	-	expression tag	UNP P04183
B	0	MET	-	expression tag	UNP P04183
B	1	ARG	-	expression tag	UNP P04183
B	2	GLY	-	expression tag	UNP P04183
B	3	SER	-	expression tag	UNP P04183
B	4	HIS	-	expression tag	UNP P04183
B	5	HIS	-	expression tag	UNP P04183
B	6	HIS	-	expression tag	UNP P04183
B	7	HIS	-	expression tag	UNP P04183
B	8	HIS	-	expression tag	UNP P04183
B	9	HIS	-	expression tag	UNP P04183
B	10	LEU	-	expression tag	UNP P04183
B	11	VAL	-	expression tag	UNP P04183
B	12	PRO	-	expression tag	UNP P04183
B	13	ARG	-	expression tag	UNP P04183
B	14	GLY	-	expression tag	UNP P04183
C	0	MET	-	expression tag	UNP P04183
C	1	ARG	-	expression tag	UNP P04183
C	2	GLY	-	expression tag	UNP P04183
C	3	SER	-	expression tag	UNP P04183
C	4	HIS	-	expression tag	UNP P04183
C	5	HIS	-	expression tag	UNP P04183
C	6	HIS	-	expression tag	UNP P04183
C	7	HIS	-	expression tag	UNP P04183
C	8	HIS	-	expression tag	UNP P04183
C	9	HIS	-	expression tag	UNP P04183
C	10	LEU	-	expression tag	UNP P04183
C	11	VAL	-	expression tag	UNP P04183
C	12	PRO	-	expression tag	UNP P04183
C	13	ARG	-	expression tag	UNP P04183
C	14	GLY	-	expression tag	UNP P04183
D	0	MET	-	expression tag	UNP P04183
D	1	ARG	-	expression tag	UNP P04183
D	2	GLY	-	expression tag	UNP P04183
D	3	SER	-	expression tag	UNP P04183
D	4	HIS	-	expression tag	UNP P04183
D	5	HIS	-	expression tag	UNP P04183
D	6	HIS	-	expression tag	UNP P04183
D	7	HIS	-	expression tag	UNP P04183
D	8	HIS	-	expression tag	UNP P04183
D	9	HIS	-	expression tag	UNP P04183

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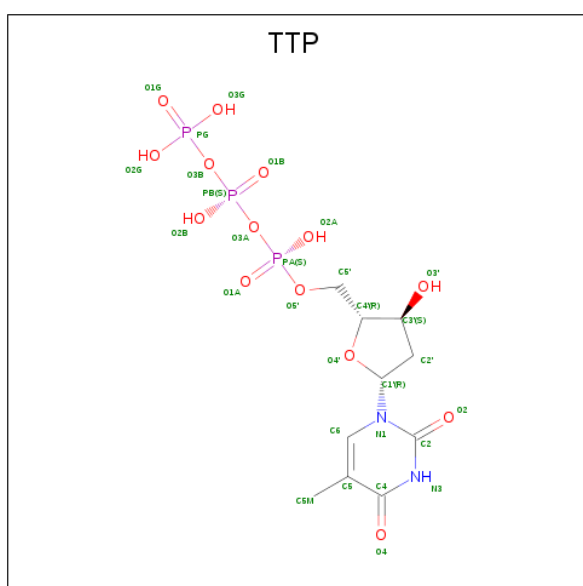*Continued from previous page...*

Chain	Residue	Modelled	Actual	Comment	Reference
D	10	LEU	-	expression tag	UNP P04183
D	11	VAL	-	expression tag	UNP P04183
D	12	PRO	-	expression tag	UNP P04183
D	13	ARG	-	expression tag	UNP P04183
D	14	GLY	-	expression tag	UNP P04183
E	0	MET	-	expression tag	UNP P04183
E	1	ARG	-	expression tag	UNP P04183
E	2	GLY	-	expression tag	UNP P04183
E	3	SER	-	expression tag	UNP P04183
E	4	HIS	-	expression tag	UNP P04183
E	5	HIS	-	expression tag	UNP P04183
E	6	HIS	-	expression tag	UNP P04183
E	7	HIS	-	expression tag	UNP P04183
E	8	HIS	-	expression tag	UNP P04183
E	9	HIS	-	expression tag	UNP P04183
E	10	LEU	-	expression tag	UNP P04183
E	11	VAL	-	expression tag	UNP P04183
E	12	PRO	-	expression tag	UNP P04183
E	13	ARG	-	expression tag	UNP P04183
E	14	GLY	-	expression tag	UNP P04183
F	0	MET	-	expression tag	UNP P04183
F	1	ARG	-	expression tag	UNP P04183
F	2	GLY	-	expression tag	UNP P04183
F	3	SER	-	expression tag	UNP P04183
F	4	HIS	-	expression tag	UNP P04183
F	5	HIS	-	expression tag	UNP P04183
F	6	HIS	-	expression tag	UNP P04183
F	7	HIS	-	expression tag	UNP P04183
F	8	HIS	-	expression tag	UNP P04183
F	9	HIS	-	expression tag	UNP P04183
F	10	LEU	-	expression tag	UNP P04183
F	11	VAL	-	expression tag	UNP P04183
F	12	PRO	-	expression tag	UNP P04183
F	13	ARG	-	expression tag	UNP P04183
F	14	GLY	-	expression tag	UNP P04183
G	0	MET	-	expression tag	UNP P04183
G	1	ARG	-	expression tag	UNP P04183
G	2	GLY	-	expression tag	UNP P04183
G	3	SER	-	expression tag	UNP P04183
G	4	HIS	-	expression tag	UNP P04183
G	5	HIS	-	expression tag	UNP P04183
G	6	HIS	-	expression tag	UNP P04183

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Chain	Residue	Modelled	Actual	Comment	Reference
G	7	HIS	-	expression tag	UNP P04183
G	8	HIS	-	expression tag	UNP P04183
G	9	HIS	-	expression tag	UNP P04183
G	10	LEU	-	expression tag	UNP P04183
G	11	VAL	-	expression tag	UNP P04183
G	12	PRO	-	expression tag	UNP P04183
G	13	ARG	-	expression tag	UNP P04183
G	14	GLY	-	expression tag	UNP P04183
H	0	MET	-	expression tag	UNP P04183
H	1	ARG	-	expression tag	UNP P04183
H	2	GLY	-	expression tag	UNP P04183
H	3	SER	-	expression tag	UNP P04183
H	4	HIS	-	expression tag	UNP P04183
H	5	HIS	-	expression tag	UNP P04183
H	6	HIS	-	expression tag	UNP P04183
H	7	HIS	-	expression tag	UNP P04183
H	8	HIS	-	expression tag	UNP P04183
H	9	HIS	-	expression tag	UNP P04183
H	10	LEU	-	expression tag	UNP P04183
H	11	VAL	-	expression tag	UNP P04183
H	12	PRO	-	expression tag	UNP P04183
H	13	ARG	-	expression tag	UNP P04183
H	14	GLY	-	expression tag	UNP P04183

- Molecule 2 is THYMIDINE-5'-TRIPHOSPHATE (three-letter code: TTP) (formula: $C_{10}H_{17}N_2O_{14}P_3$).

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	A	1	Total 58	C 20	N 4	O 28	P 6	0	1
2	B	1	Total 58	C 20	N 4	O 28	P 6	0	1
2	C	1	Total 58	C 20	N 4	O 28	P 6	0	1
2	D	1	Total 58	C 20	N 4	O 28	P 6	0	1
2	E	1	Total 58	C 20	N 4	O 28	P 6	0	1
2	F	1	Total 58	C 20	N 4	O 28	P 6	0	1
2	G	1	Total 58	C 20	N 4	O 28	P 6	0	1
2	H	1	Total 58	C 20	N 4	O 28	P 6	0	1

- Molecule 3 is ZINC ION (three-letter code: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	G	1	Total 1	Zn 1	0	0
3	D	1	Total 1	Zn 1	0	0
3	E	1	Total 1	Zn 1	0	0
3	H	1	Total 1	Zn 1	0	0
3	B	1	Total 1	Zn 1	0	0
3	C	1	Total 1	Zn 1	0	0
3	A	1	Total 1	Zn 1	0	0
3	F	1	Total 1	Zn 1	0	0

- Molecule 4 is (2R,3S)-1,4-DIMERCAPTOBUTANE-2,3-DIOL (three-letter code: DTU) (formula: $C_4H_{10}O_2S_2$).

DTU
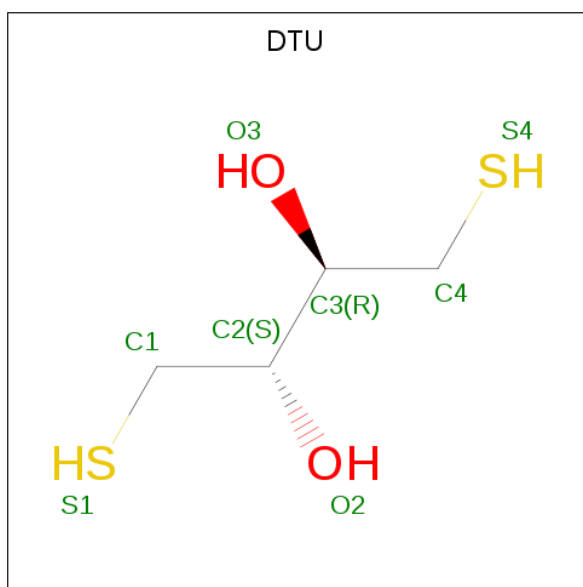
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
4	E	1	Total 8	C 4	O 2	S 2	0	0

- Molecule 5 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	110	Total 110	O 110	0	0
5	B	108	Total 108	O 108	0	0
5	C	85	Total 85	O 85	0	0
5	D	95	Total 95	O 95	0	0
5	E	83	Total 83	O 83	0	0
5	F	117	Total 117	O 117	0	0
5	G	108	Total 108	O 108	0	0
5	H	88	Total 88	O 88	0	0

3 Residue-property plots ⓘ

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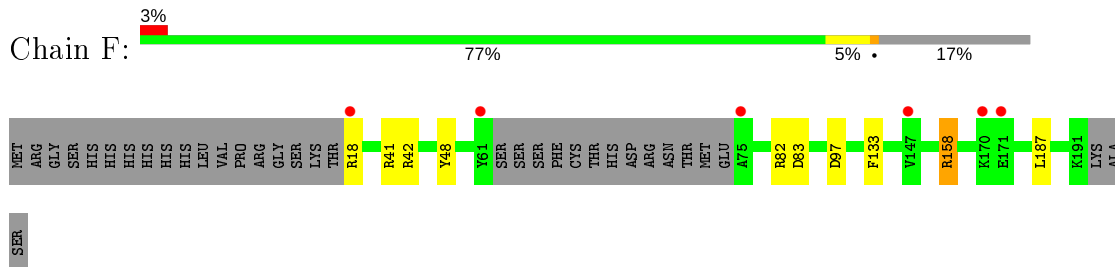
- Molecule 1: THYMIDINE KINASE
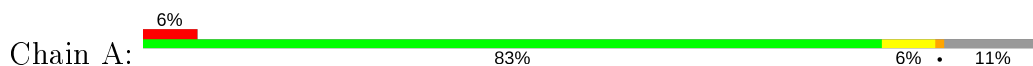
Chain A:

- Molecule 1: THYMIDINE KINASE

Chain B:

- Molecule 1: THYMIDINE KINASE

Chain C:

- Molecule 1: THYMIDINE KINASE

Chain D:
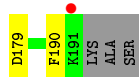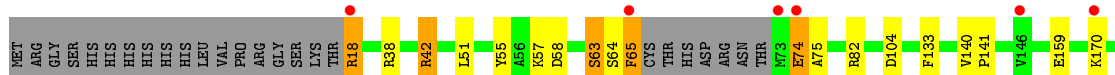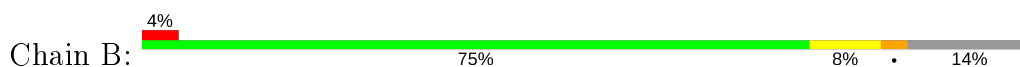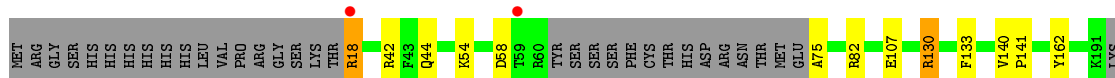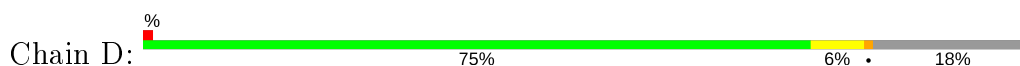
- Molecule 1: THYMIDINE KINASE

Chain E:

- Molecule 1: THYMIDINE KINASE

Chain F:

- Molecule 1: THYMIDINE KINASE

Chain G:

- Molecule 1: THYMIDINE KINASE

Chain H:
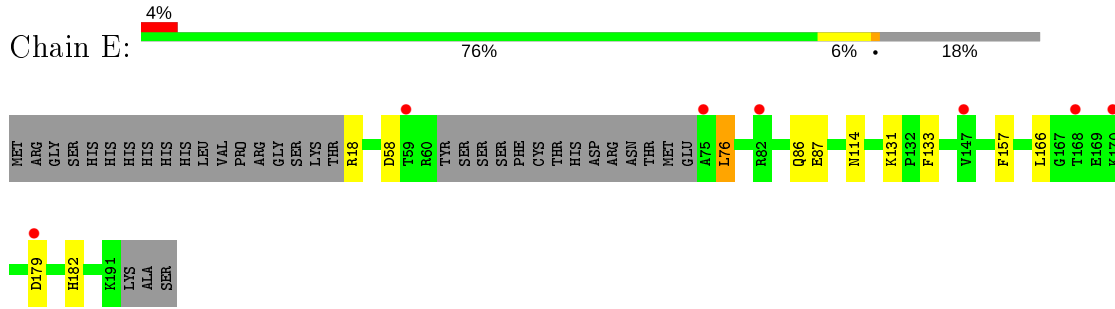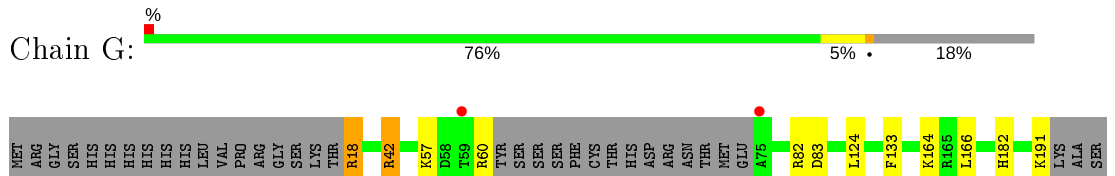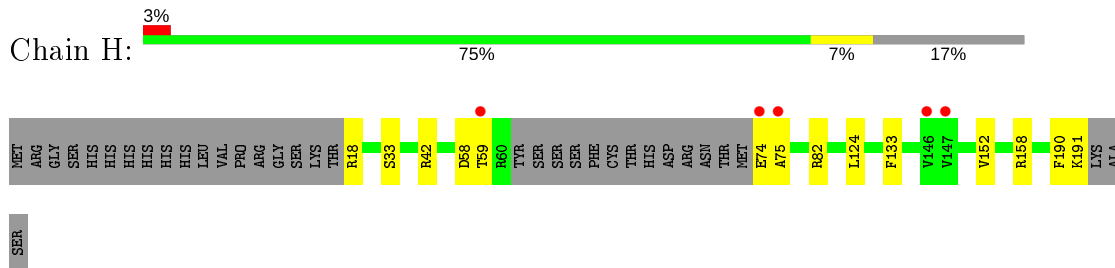
4 Data and refinement statistics (i)

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α, β, γ	157.50Å　122.92Å　115.27Å 90.00°　130.00°　90.00°	Depositor
Resolution (Å)	20.00　–　1.83 39.39　–　1.83	Depositor EDS
% Data completeness (in resolution range)	99.0 (20.00-1.83) 99.9 (39.39-1.83)	Depositor EDS
R_{merge}	0.05	Depositor
R_{sym}	(Not available)	Depositor
$<I/\sigma(I)>$ [1]	6.04 (at 1.83Å)	Xtriage
Refinement program	REFMAC 5.0	Depositor
R, R_{free}	0.159　,　0.189 0.169　,　0.196	Depositor DCC
R_{free} test set	7425 reflections (5.03%)	wwPDB-VP
Wilson B-factor (Å^2)	24.3	Xtriage
Anisotropy	0.165	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.39 , 52.2	EDS
L-test for twinning[2]	$<|L|> = 0.49, <L^2> = 0.32$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.96	EDS
Total number of atoms	11477	wwPDB-VP
Average B, all atoms (Å^2)	28.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.55% 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: ZN, TTP, DTU

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	0.77	0/1391	0.84	2/1871 (0.1%)
1	B	0.77	0/1334	0.93	5/1792 (0.3%)
1	C	0.65	0/1283	0.90	4/1724 (0.2%)
1	D	0.73	1/1272 (0.1%)	0.95	4/1709 (0.2%)
1	E	0.70	0/1274	0.81	2/1712 (0.1%)
1	F	0.77	0/1293	0.86	4/1738 (0.2%)
1	G	0.74	0/1263	0.80	1/1698 (0.1%)
1	H	0.74	0/1272	0.84	3/1710 (0.2%)
All	All	0.73	1/10382 (0.0%)	0.87	25/13954 (0.2%)

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

Mol	Chain	#Chirality outliers	#Planarity outliers
1	B	0	3
1	H	0	1
All	All	0	4

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	D	107	GLU	CD-OE2	5.68	1.31	1.25

All (25) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	D	130	ARG	NE-CZ-NH2	-15.86	112.37	120.30
1	D	130	ARG	NE-CZ-NH1	13.10	126.85	120.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	C	130	ARG	NE-CZ-NH2	-12.13	114.24	120.30
1	C	130	ARG	NE-CZ-NH1	11.16	125.88	120.30
1	B	58	ASP	CB-CG-OD2	8.57	126.01	118.30
1	B	42	ARG	NE-CZ-NH1	8.46	124.53	120.30
1	F	97	ASP	CB-CG-OD2	7.78	125.31	118.30
1	H	58	ASP	CB-CG-OD2	6.97	124.58	118.30
1	A	58	ASP	CB-CG-OD2	6.07	123.76	118.30
1	H	42	ARG	NE-CZ-NH2	-6.04	117.28	120.30
1	C	97	ASP	CB-CG-OD2	5.94	123.65	118.30
1	E	58	ASP	CB-CG-OD2	5.80	123.52	118.30
1	B	179	ASP	CB-CG-OD2	5.68	123.41	118.30
1	C	58	ASP	CB-CG-OD2	5.67	123.40	118.30
1	B	38	ARG	NE-CZ-NH1	5.65	123.12	120.30
1	B	42	ARG	NE-CZ-NH2	-5.49	117.56	120.30
1	G	83	ASP	CB-CG-OD2	5.45	123.21	118.30
1	D	42	ARG	NE-CZ-NH2	-5.42	117.59	120.30
1	D	58	ASP	CB-CG-OD2	5.41	123.17	118.30
1	H	75	ALA	N-CA-C	5.35	125.45	111.00
1	F	42	ARG	NE-CZ-NH1	5.14	122.87	120.30
1	E	179	ASP	CB-CG-OD2	5.13	122.92	118.30
1	F	41	ARG	NE-CZ-NH1	5.12	122.86	120.30
1	A	42	ARG	NE-CZ-NH2	-5.11	117.74	120.30
1	F	83	ASP	CB-CG-OD2	5.09	122.88	118.30

There are no chirality outliers.

All (4) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	B	18	ARG	Peptide
1	B	190	PHE	Peptide
1	B	64	SER	Peptide
1	H	190	PHE	Peptide

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	1365	0	1391	6	0
1	B	1310	0	1341	12	0
1	C	1257	0	1295	10	0
1	D	1250	0	1293	9	0
1	E	1252	0	1293	7	0
1	F	1270	0	1306	5	0
1	G	1245	0	1284	11	0
1	H	1254	0	1290	4	0
2	A	58	0	26	6	0
2	B	58	0	26	4	0
2	C	58	0	26	3	0
2	D	58	0	26	3	0
2	E	58	0	26	4	0
2	F	58	0	26	1	0
2	G	58	0	26	4	0
2	H	58	0	26	4	0
3	A	1	0	0	0	0
3	B	1	0	0	0	0
3	C	1	0	0	0	0
3	D	1	0	0	0	0
3	E	1	0	0	0	0
3	F	1	0	0	0	0
3	G	1	0	0	0	0
3	H	1	0	0	0	0
4	E	8	0	10	5	0
5	A	110	0	0	5	1
5	B	108	0	0	8	0
5	C	85	0	0	4	0
5	D	95	0	0	8	0
5	E	83	0	0	4	0
5	F	117	0	0	2	1
5	G	108	0	0	7	0
5	H	88	0	0	2	0
All	All	11477	0	10711	81	1

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 4.

All (81) 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)
2:B:300[B]:TTP:O1A	5:B:2106:HOH:O	1.52	1.22

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:C:300[A]:TTP:O2G	5:C:2085:HOH:O	1.62	1.17
2:F:300[B]:TTP:O3G	5:F:2109:HOH:O	1.71	1.09
1:A:54[B]:LYS:NZ	5:A:2020:HOH:O	1.79	1.08
1:G:42:ARG:HB3	1:G:42:ARG:NH2	1.70	1.06
2:G:300[B]:TTP:PB	5:G:2104:HOH:O	2.16	1.04
2:B:300[B]:TTP:O1B	5:B:2102:HOH:O	1.83	0.96
2:E:300[B]:TTP:O1A	5:E:2075:HOH:O	1.85	0.92
2:B:300[B]:TTP:O2A	5:B:2100:HOH:O	1.90	0.88
2:G:300[B]:TTP:O1B	5:G:2104:HOH:O	1.91	0.88
1:G:42:ARG:HB3	1:G:42:ARG:HH21	1.39	0.87
2:D:300[B]:TTP:O1G	5:D:2093:HOH:O	1.97	0.83
1:D:18:ARG:N	5:D:2002:HOH:O	2.12	0.82
1:C:52:VAL:O	1:C:75:ALA:HB1	1.81	0.81
2:D:300[B]:TTP:O2B	5:D:2094:HOH:O	2.00	0.80
1:G:42:ARG:CB	1:G:42:ARG:NH2	2.47	0.77
1:D:54[A]:LYS:HG2	5:D:2031:HOH:O	1.86	0.76
1:D:54[A]:LYS:CG	5:D:2031:HOH:O	2.35	0.74
1:G:18:ARG:N	5:G:2001:HOH:O	2.20	0.74
1:C:33[B]:SER:OG	2:C:300[B]:TTP:O1B	2.07	0.73
2:A:300[B]:TTP:O1B	5:A:2106:HOH:O	2.06	0.72
2:C:300[A]:TTP:O2A	5:C:2081:HOH:O	2.05	0.72
1:C:125:ASP:O	5:C:2039:HOH:O	2.13	0.67
2:A:300[B]:TTP:O2A	5:A:2109:HOH:O	0.66	0.66
1:B:82:ARG:HG3	4:E:1193:DTU:S4	2.35	0.66
2:E:300[B]:TTP:O3G	5:E:2076:HOH:O	2.14	0.64
1:G:42:ARG:CB	1:G:42:ARG:CZ	2.76	0.63
2:D:300[B]:TTP:PB	5:D:2095:HOH:O	2.51	0.62
2:B:300[B]:TTP:PB	5:B:2108:HOH:O	2.60	0.60
2:H:300[B]:TTP:O1B	5:H:2084:HOH:O	2.15	0.59
1:C:190:PHE:O	1:C:191:LYS:HB2	2.01	0.59
1:E:157:PHE:HB3	1:F:48:TYR:OH	2.03	0.59
1:C:136:ILE:CG2	5:C:2039:HOH:O	2.50	0.59
1:C:129:GLN:HG2	1:E:86:GLN:NE2	2.20	0.57
2:G:300[A]:TTP:O2A	5:G:2106:HOH:O	0.61	0.57
1:F:158[A]:ARG:HH22	1:F:187:LEU:HD12	1.70	0.56
1:D:54[A]:LYS:HG3	5:D:2031:HOH:O	2.02	0.56
1:F:158[A]:ARG:NH2	5:G:2001:HOH:O	2.38	0.55
1:F:82:ARG:HB2	5:F:2048:HOH:O	2.04	0.55
1:H:124:LEU:HD11	2:H:300[B]:TTP:H5'2	1.89	0.54
2:E:300[B]:TTP:PA	5:E:2075:HOH:O	2.60	0.53
1:B:63[A]:SER:HB2	5:B:2108:HOH:O	2.10	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:130:ARG:HD2	1:D:162:TYR:CD1	2.46	0.51
1:B:104:ASP:OD2	4:E:1193:DTU:S4	2.69	0.50
1:G:42:ARG:CB	1:G:42:ARG:HH21	2.13	0.50
1:B:75:ALA:HB1	5:B:2027:HOH:O	2.11	0.50
1:C:52:VAL:HB	1:C:75:ALA:CB	2.41	0.50
2:E:300[B]:TTP:O2A	5:E:2077:HOH:O	2.19	0.48
1:G:42:ARG:HH22	1:H:152:VAL:HG23	1.79	0.47
1:C:130:ARG:HD2	1:C:162:TYR:CD1	2.50	0.47
1:G:166:LEU:HD11	1:G:182:HIS:CD2	2.49	0.47
1:D:75:ALA:N	5:D:2026:HOH:O	2.47	0.47
1:B:140:VAL:HB	1:B:141:PRO:HD3	1.96	0.46
1:H:33[A]:SER:OG	2:H:300[A]:TTP:O1B	2.34	0.46
1:B:55:TYR:CE2	1:B:57:LYS:HB2	2.51	0.46
1:G:164:LYS:NZ	5:G:2086:HOH:O	2.48	0.46
1:B:18:ARG:N	5:B:2001:HOH:O	2.49	0.45
1:F:158[A]:ARG:CZ	5:G:2001:HOH:O	2.63	0.45
2:A:300[B]:TTP:O2B	5:A:2107:HOH:O	2.16	0.45
1:E:76:LEU:CD2	1:E:87:GLU:HG3	2.46	0.45
1:G:124:LEU:HD11	2:G:300[B]:TTP:H5'2	1.99	0.45
1:A:33[B]:SER:OG	2:A:300[B]:TTP:PB	2.74	0.45
1:E:114:ASN:HD22	4:E:1193:DTU:H2	1.82	0.44
1:C:37:MET:O	1:C:41[B]:ARG:HG3	2.18	0.44
1:E:166:LEU:HD21	1:E:182:HIS:ND1	2.33	0.44
1:A:18:ARG:N	5:A:2001:HOH:O	2.50	0.44
1:B:65:PHE:CD1	1:B:65:PHE:N	2.86	0.44
1:B:51:LEU:HD13	1:B:74:GLU:HG3	1.99	0.43
1:E:18:ARG:CZ	1:H:158:ARG:HD2	2.48	0.43
1:A:28:MET:SD	2:A:300[B]:TTP:H2'2	2.58	0.43
1:A:28:MET:CE	2:A:300[B]:TTP:H3'	2.49	0.43
1:D:18:ARG:HG3	1:D:18:ARG:NH1	2.33	0.42
2:H:300[B]:TTP:O1B	5:H:2082:HOH:O	2.20	0.42
1:G:18:ARG:HA	1:G:18:ARG:HD3	1.64	0.42
1:B:159:GLU:OE1	5:B:2083:HOH:O	2.22	0.42
1:D:140:VAL:HB	1:D:141:PRO:HD3	2.01	0.41
1:A:150:THR:O	1:B:42:ARG:HD2	2.21	0.41
1:B:82:ARG:CG	4:E:1193:DTU:S4	3.07	0.41
1:E:114:ASN:HB2	4:E:1193:DTU:H2	2.03	0.41
1:D:18:ARG:HG3	1:D:18:ARG:HH11	1.87	0.40
1:C:140:VAL:HB	1:C:141:PRO:HD3	2.04	0.40

All (1) 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)
5:A:2049:HOH:O	5:F:2048:HOH:O[1_554]	1.32	0.88

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	174/195 (89%)	173 (99%)	1 (1%)	0	100	100
1	B	165/195 (85%)	161 (98%)	4 (2%)	0	100	100
1	C	159/195 (82%)	159 (100%)	0	0	100	100
1	D	158/195 (81%)	157 (99%)	1 (1%)	0	100	100
1	E	158/195 (81%)	158 (100%)	0	0	100	100
1	F	160/195 (82%)	159 (99%)	1 (1%)	0	100	100
1	G	157/195 (80%)	157 (100%)	0	0	100	100
1	H	158/195 (81%)	157 (99%)	1 (1%)	0	100	100
All	All	1289/1560 (83%)	1281 (99%)	8 (1%)	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	146/162 (90%)	140 (96%)	6 (4%)	30	13
1	B	139/162 (86%)	133 (96%)	6 (4%)	29	12

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles		
1	C	133/162 (82%)	123 (92%)	10 (8%)		13	3
1	D	132/162 (82%)	128 (97%)	4 (3%)		41	23
1	E	132/162 (82%)	129 (98%)	3 (2%)		50	34
1	F	134/162 (83%)	130 (97%)	4 (3%)		41	23
1	G	131/162 (81%)	124 (95%)	7 (5%)		22	7
1	H	132/162 (82%)	126 (96%)	6 (4%)		27	10
All	All	1079/1296 (83%)	1033 (96%)	46 (4%)		31	12

All (46) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	18	ARG
1	A	73	MET
1	A	117	LYS
1	A	133	PHE
1	A	187	LEU
1	A	191	LYS
1	B	63[A]	SER
1	B	63[B]	SER
1	B	65	PHE
1	B	74	GLU
1	B	133	PHE
1	B	170	LYS
1	C	18	ARG
1	C	36	LEU
1	C	54	LYS
1	C	59	THR
1	C	60	ARG
1	C	107[A]	GLU
1	C	107[B]	GLU
1	C	117	LYS
1	C	133	PHE
1	C	170	LYS
1	D	18	ARG
1	D	44	GLN
1	D	82	ARG
1	D	133	PHE
1	E	76	LEU
1	E	131	LYS
1	E	133	PHE

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Mol	Chain	Res	Type
1	F	18	ARG
1	F	133	PHE
1	F	158[A]	ARG
1	F	158[B]	ARG
1	G	18	ARG
1	G	42	ARG
1	G	57	LYS
1	G	60	ARG
1	G	82	ARG
1	G	133	PHE
1	G	191	LYS
1	H	18	ARG
1	H	59	THR
1	H	74	GLU
1	H	82	ARG
1	H	133	PHE
1	H	191	LYS

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (5) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	44	GLN
1	A	138	ASN
1	C	129	GLN
1	E	47	GLN
1	E	86	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 carbohydrates in this entry.

5.6 Ligand geometry (i)

Of 25 ligands modelled in this entry, 8 are monoatomic - leaving 17 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	TTP	A	300[A]	-	23,30,30	1.85	6 (26%)	29,47,47	1.87	5 (17%)
2	TTP	G	300[B]	-	23,30,30	2.26	6 (26%)	29,47,47	1.70	4 (13%)
2	TTP	H	300[B]	-	23,30,30	2.24	6 (26%)	29,47,47	1.73	5 (17%)
4	DTU	E	1193	-	7,7,7	0.88	0	4,8,8	2.23	3 (75%)
2	TTP	E	300[B]	-	23,30,30	2.17	6 (26%)	29,47,47	1.57	4 (13%)
2	TTP	D	300[B]	-	23,30,30	2.16	6 (26%)	29,47,47	1.76	5 (17%)
2	TTP	H	300[A]	-	23,30,30	2.05	6 (26%)	29,47,47	2.09	2 (6%)
2	TTP	E	300[A]	-	23,30,30	2.20	6 (26%)	29,47,47	1.70	4 (13%)
2	TTP	B	300[A]	-	23,30,30	1.92	6 (26%)	29,47,47	1.82	2 (6%)
2	TTP	C	300[A]	-	23,30,30	2.20	6 (26%)	29,47,47	1.79	5 (17%)
2	TTP	B	300[B]	-	23,30,30	2.22	6 (26%)	29,47,47	1.79	5 (17%)
2	TTP	F	300[A]	-	23,30,30	1.88	7 (30%)	29,47,47	1.86	4 (13%)
2	TTP	G	300[A]	-	23,30,30	2.10	6 (26%)	29,47,47	1.85	5 (17%)
2	TTP	D	300[A]	-	23,30,30	2.06	7 (30%)	29,47,47	1.75	4 (13%)
2	TTP	F	300[B]	-	23,30,30	2.09	6 (26%)	29,47,47	1.78	5 (17%)
2	TTP	A	300[B]	1	23,30,30	2.15	7 (30%)	29,47,47	1.56	1 (3%)
2	TTP	C	300[B]	-	23,30,30	2.23	6 (26%)	29,47,47	1.59	2 (6%)

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	TTP	A	300[A]	-	-	7/19/34/34	0/2/2/2
2	TTP	G	300[B]	-	-	3/19/34/34	0/2/2/2
2	TTP	H	300[B]	-	-	3/19/34/34	0/2/2/2

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	DTU	E	1193	-	-	0/8/8/8	-
2	TTP	E	300[B]	-	-	3/19/34/34	0/2/2/2
2	TTP	D	300[B]	-	-	3/19/34/34	0/2/2/2
2	TTP	H	300[A]	-	-	1/19/34/34	0/2/2/2
2	TTP	E	300[A]	-	-	1/19/34/34	0/2/2/2
2	TTP	B	300[A]	-	-	3/19/34/34	0/2/2/2
2	TTP	C	300[A]	-	-	4/19/34/34	0/2/2/2
2	TTP	B	300[B]	-	-	7/19/34/34	0/2/2/2
2	TTP	F	300[A]	-	-	1/19/34/34	0/2/2/2
2	TTP	G	300[A]	-	-	1/19/34/34	0/2/2/2
2	TTP	D	300[A]	-	-	1/19/34/34	0/2/2/2
2	TTP	F	300[B]	-	-	3/19/34/34	0/2/2/2
2	TTP	A	300[B]	1	-	1/19/34/34	0/2/2/2
2	TTP	C	300[B]	-	-	2/19/34/34	0/2/2/2

All (99) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	E	300[A]	TTP	C2'-C3'	-4.96	1.39	1.52
2	H	300[B]	TTP	C2'-C3'	-4.95	1.39	1.52
2	D	300[B]	TTP	C2'-C3'	-4.95	1.39	1.52
2	D	300[A]	TTP	C2'-C3'	-4.92	1.39	1.52
2	E	300[B]	TTP	C2'-C3'	-4.75	1.40	1.52
2	C	300[A]	TTP	C2'-C3'	-4.73	1.40	1.52
2	G	300[B]	TTP	C2'-C3'	-4.72	1.40	1.52
2	C	300[B]	TTP	C3'-C4'	-4.68	1.40	1.53
2	B	300[B]	TTP	C2'-C3'	-4.68	1.40	1.52
2	F	300[B]	TTP	C2'-C3'	-4.66	1.40	1.52
2	A	300[B]	TTP	C1'-N1	-4.65	1.35	1.49
2	C	300[B]	TTP	C2'-C3'	-4.64	1.40	1.52
2	C	300[A]	TTP	C2'-C1'	-4.58	1.39	1.52
2	E	300[B]	TTP	C3'-C4'	-4.57	1.40	1.53
2	A	300[B]	TTP	C2'-C3'	-4.51	1.40	1.52
2	G	300[B]	TTP	C1'-N1	-4.47	1.36	1.49
2	H	300[A]	TTP	C2'-C3'	-4.46	1.41	1.52
2	G	300[B]	TTP	C3'-C4'	-4.43	1.40	1.53
2	H	300[B]	TTP	C1'-N1	-4.43	1.36	1.49
2	C	300[A]	TTP	C3'-C4'	-4.42	1.40	1.53
2	C	300[B]	TTP	C2'-C1'	-4.39	1.40	1.52
2	E	300[A]	TTP	C3'-C4'	-4.39	1.40	1.53
2	G	300[A]	TTP	C2'-C3'	-4.38	1.41	1.52

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	G	300[B]	TTP	C2'-C1'	-4.35	1.40	1.52
2	B	300[B]	TTP	C3'-C4'	-4.31	1.41	1.53
2	H	300[B]	TTP	C3'-C4'	-4.27	1.41	1.53
2	F	300[A]	TTP	C2'-C3'	-4.27	1.41	1.52
2	H	300[B]	TTP	C2'-C1'	-4.25	1.40	1.52
2	D	300[B]	TTP	C1'-N1	-4.23	1.36	1.49
2	E	300[A]	TTP	C1'-N1	-4.21	1.36	1.49
2	B	300[B]	TTP	C1'-N1	-4.21	1.36	1.49
2	D	300[B]	TTP	C2'-C1'	-4.17	1.40	1.52
2	C	300[A]	TTP	C1'-N1	-4.16	1.37	1.49
2	B	300[B]	TTP	C2'-C1'	-4.15	1.40	1.52
2	E	300[B]	TTP	C2'-C1'	-4.14	1.40	1.52
2	E	300[B]	TTP	C1'-N1	-4.13	1.37	1.49
2	A	300[A]	TTP	C2'-C3'	-4.11	1.42	1.52
2	E	300[A]	TTP	C2'-C1'	-4.07	1.41	1.52
2	C	300[B]	TTP	C1'-N1	-4.07	1.37	1.49
2	B	300[A]	TTP	C2'-C3'	-4.07	1.42	1.52
2	H	300[A]	TTP	C2'-C1'	-4.06	1.41	1.52
2	D	300[B]	TTP	C3'-C4'	-4.06	1.41	1.53
2	G	300[A]	TTP	C3'-C4'	-4.03	1.41	1.53
2	D	300[A]	TTP	C1'-N1	-4.02	1.37	1.49
2	H	300[A]	TTP	C3'-C4'	-3.99	1.42	1.53
2	G	300[A]	TTP	C2'-C1'	-3.98	1.41	1.52
2	F	300[B]	TTP	C3'-C4'	-3.96	1.42	1.53
2	F	300[B]	TTP	C1'-N1	-3.95	1.37	1.49
2	G	300[A]	TTP	C1'-N1	-3.85	1.38	1.49
2	A	300[B]	TTP	C2'-C1'	-3.82	1.41	1.52
2	A	300[B]	TTP	C3'-C4'	-3.82	1.42	1.53
2	B	300[A]	TTP	C1'-N1	-3.76	1.38	1.49
2	F	300[B]	TTP	C2'-C1'	-3.76	1.41	1.52
2	D	300[A]	TTP	C2'-C1'	-3.75	1.41	1.52
2	D	300[A]	TTP	C3'-C4'	-3.71	1.42	1.53
2	F	300[A]	TTP	C3'-C4'	-3.59	1.43	1.53
2	A	300[A]	TTP	C1'-N1	-3.59	1.38	1.49
2	C	300[B]	TTP	C4-N3	3.51	1.39	1.33
2	H	300[A]	TTP	C1'-N1	-3.47	1.39	1.49
2	B	300[A]	TTP	C3'-C4'	-3.43	1.43	1.53
2	F	300[A]	TTP	C2'-C1'	-3.37	1.42	1.52
2	B	300[B]	TTP	C5'-C4'	-3.36	1.41	1.51
2	F	300[A]	TTP	C1'-N1	-3.36	1.39	1.49
2	B	300[A]	TTP	C2'-C1'	-3.35	1.43	1.52
2	A	300[B]	TTP	C5'-C4'	-3.31	1.41	1.51

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	G	300[B]	TTP	C5'-C4'	-3.30	1.41	1.51
2	A	300[A]	TTP	C2'-C1'	-3.27	1.43	1.52
2	F	300[B]	TTP	C5'-C4'	-3.15	1.41	1.51
2	A	300[A]	TTP	C3'-C4'	-3.09	1.44	1.53
2	D	300[B]	TTP	C5'-C4'	-3.08	1.42	1.51
2	C	300[A]	TTP	C4-N3	3.07	1.38	1.33
2	G	300[A]	TTP	C4-N3	3.05	1.38	1.33
2	C	300[B]	TTP	C5'-C4'	-3.03	1.42	1.51
2	D	300[A]	TTP	C5'-C4'	-2.99	1.42	1.51
2	G	300[A]	TTP	C5'-C4'	-2.95	1.42	1.51
2	H	300[B]	TTP	C5'-C4'	-2.95	1.42	1.51
2	F	300[A]	TTP	C5'-C4'	-2.87	1.42	1.51
2	G	300[B]	TTP	C4-N3	2.86	1.38	1.33
2	E	300[B]	TTP	C5'-C4'	-2.83	1.42	1.51
2	H	300[B]	TTP	C4-N3	2.83	1.38	1.33
2	H	300[A]	TTP	C4-N3	2.83	1.38	1.33
2	B	300[B]	TTP	C4-N3	2.81	1.37	1.33
2	E	300[A]	TTP	C5'-C4'	-2.76	1.43	1.51
2	B	300[A]	TTP	C5'-C4'	-2.74	1.43	1.51
2	C	300[A]	TTP	C5'-C4'	-2.72	1.43	1.51
2	B	300[A]	TTP	C4-N3	2.65	1.37	1.33
2	D	300[B]	TTP	C4-N3	2.55	1.37	1.33
2	H	300[A]	TTP	C5'-C4'	-2.55	1.43	1.51
2	E	300[B]	TTP	C4-N3	2.48	1.37	1.33
2	E	300[A]	TTP	C4-N3	2.42	1.37	1.33
2	F	300[B]	TTP	C4-N3	2.38	1.37	1.33
2	A	300[A]	TTP	C5'-C4'	-2.36	1.44	1.51
2	A	300[B]	TTP	C4-N3	2.28	1.37	1.33
2	D	300[A]	TTP	PG-O3G	-2.16	1.46	1.54
2	A	300[A]	TTP	PB-O2B	-2.15	1.45	1.55
2	F	300[A]	TTP	C4-N3	2.14	1.36	1.33
2	D	300[A]	TTP	C4-N3	2.13	1.36	1.33
2	A	300[B]	TTP	PG-O3G	-2.04	1.47	1.54
2	F	300[A]	TTP	PG-O3G	-2.02	1.47	1.54

All (65) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	H	300[A]	TTP	C4-N3-C2	9.28	122.98	115.14
2	B	300[A]	TTP	C4-N3-C2	8.08	121.96	115.14
2	F	300[A]	TTP	C4-N3-C2	7.60	121.56	115.14
2	A	300[A]	TTP	C4-N3-C2	7.59	121.55	115.14

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	D	300[A]	TTP	C4-N3-C2	7.41	121.39	115.14
2	G	300[A]	TTP	C4-N3-C2	7.40	121.39	115.14
2	G	300[B]	TTP	C4-N3-C2	6.71	120.81	115.14
2	F	300[B]	TTP	C4-N3-C2	6.61	120.72	115.14
2	A	300[B]	TTP	C4-N3-C2	6.59	120.71	115.14
2	C	300[A]	TTP	C4-N3-C2	6.59	120.71	115.14
2	D	300[B]	TTP	C4-N3-C2	6.43	120.58	115.14
2	C	300[B]	TTP	C4-N3-C2	6.34	120.50	115.14
2	H	300[B]	TTP	C4-N3-C2	6.26	120.43	115.14
2	E	300[A]	TTP	C4-N3-C2	6.15	120.33	115.14
2	B	300[B]	TTP	C4-N3-C2	6.04	120.24	115.14
2	E	300[B]	TTP	C4-N3-C2	5.29	119.61	115.14
2	B	300[B]	TTP	PB-O3B-PG	-3.46	120.97	132.83
2	G	300[B]	TTP	PB-O3A-PA	-3.23	121.75	132.83
2	B	300[B]	TTP	PB-O3A-PA	-3.19	121.89	132.83
2	E	300[A]	TTP	O2A-PA-O1A	3.18	127.94	112.24
2	D	300[B]	TTP	PB-O3A-PA	-3.12	122.11	132.83
2	H	300[B]	TTP	PB-O3A-PA	-2.95	122.69	132.83
2	B	300[A]	TTP	O2A-PA-O1A	2.95	126.81	112.24
2	C	300[A]	TTP	PB-O3A-PA	-2.92	122.79	132.83
2	G	300[A]	TTP	PB-O3B-PG	-2.85	123.05	132.83
4	E	1193	DTU	O2-C2-C3	-2.83	103.91	109.72
2	E	300[B]	TTP	O3G-PG-O3B	2.73	113.79	104.64
2	D	300[B]	TTP	PB-O3B-PG	-2.71	123.53	132.83
2	H	300[B]	TTP	C2'-C3'-C4'	2.69	108.37	102.76
2	H	300[B]	TTP	PB-O3B-PG	-2.66	123.70	132.83
2	F	300[B]	TTP	O3B-PG-O1G	-2.65	96.49	111.19
2	H	300[A]	TTP	C2'-C3'-C4'	2.63	108.24	102.76
2	G	300[A]	TTP	C2'-C3'-C4'	2.61	108.19	102.76
2	E	300[B]	TTP	C2'-C3'-C4'	2.60	108.18	102.76
2	D	300[B]	TTP	C2'-C3'-C4'	2.57	108.12	102.76
2	F	300[B]	TTP	PB-O3A-PA	-2.55	124.06	132.83
2	B	300[B]	TTP	C2'-C3'-C4'	2.54	108.06	102.76
2	B	300[B]	TTP	O5'-C5'-C4'	2.48	117.53	108.99
2	F	300[A]	TTP	O2A-PA-O1A	2.46	124.38	112.24
2	D	300[A]	TTP	O2A-PA-O1A	2.42	124.18	112.24
2	E	300[A]	TTP	C2'-C3'-C4'	2.41	107.79	102.76
2	D	300[A]	TTP	C2'-C3'-C4'	2.39	107.73	102.76
2	E	300[A]	TTP	PB-O3B-PG	-2.37	124.68	132.83
2	C	300[A]	TTP	O5'-C5'-C4'	2.35	117.10	108.99
4	E	1193	DTU	C3-C4-S4	-2.33	107.69	114.47
2	G	300[A]	TTP	O2A-PA-O1A	2.33	123.75	112.24

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	C	300[A]	TTP	C2'-C3'-C4'	2.24	107.42	102.76
2	F	300[B]	TTP	O2G-PG-O3B	2.23	112.13	104.64
2	C	300[B]	TTP	C2'-C3'-C4'	2.23	107.41	102.76
2	H	300[B]	TTP	O2B-PB-O1B	2.23	123.25	112.24
2	A	300[A]	TTP	O2B-PB-O1B	2.22	123.21	112.24
2	D	300[B]	TTP	O5'-C5'-C4'	2.19	116.53	108.99
2	G	300[B]	TTP	PB-O3B-PG	-2.18	125.33	132.83
2	A	300[A]	TTP	O2G-PG-O3B	2.18	111.95	104.64
2	G	300[A]	TTP	O2B-PB-O1B	2.16	122.94	112.24
2	E	300[B]	TTP	PB-O3B-PG	-2.16	125.40	132.83
2	D	300[A]	TTP	O3G-PG-O3B	2.13	111.79	104.64
2	G	300[B]	TTP	C2'-C3'-C4'	2.13	107.21	102.76
2	A	300[A]	TTP	O4'-C1'-C2'	-2.11	102.27	106.25
2	A	300[A]	TTP	O5'-C5'-C4'	2.09	116.20	108.99
2	F	300[A]	TTP	C2'-C3'-C4'	2.09	107.12	102.76
2	F	300[A]	TTP	O2A-PA-O5'	-2.06	98.19	107.75
4	E	1193	DTU	C2-C1-S1	2.05	120.43	114.47
2	C	300[A]	TTP	O2B-PB-O1B	2.03	122.29	112.24
2	F	300[B]	TTP	C2'-C3'-C4'	2.03	107.00	102.76

There are no chirality outliers.

All (44) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	D	300[B]	TTP	O4'-C1'-N1-C6
2	B	300[A]	TTP	O4'-C1'-N1-C6
2	H	300[B]	TTP	C3'-C4'-C5'-O5'
2	H	300[B]	TTP	O4'-C1'-N1-C6
2	F	300[A]	TTP	O4'-C1'-N1-C6
2	F	300[B]	TTP	O4'-C1'-N1-C6
2	H	300[A]	TTP	O4'-C1'-N1-C6
2	E	300[B]	TTP	O4'-C4'-C5'-O5'
2	E	300[B]	TTP	C3'-C4'-C5'-O5'
2	E	300[B]	TTP	O4'-C1'-N1-C6
2	E	300[A]	TTP	O4'-C1'-N1-C6
2	C	300[A]	TTP	C3'-C4'-C5'-O5'
2	C	300[A]	TTP	O4'-C1'-N1-C6
2	G	300[A]	TTP	O4'-C1'-N1-C6
2	A	300[B]	TTP	O4'-C1'-N1-C6
2	C	300[B]	TTP	O4'-C1'-N1-C6
2	A	300[A]	TTP	O4'-C1'-N1-C6
2	G	300[B]	TTP	O4'-C4'-C5'-O5'

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Mol	Chain	Res	Type	Atoms
2	G	300[B]	TTP	C3'-C4'-C5'-O5'
2	G	300[B]	TTP	O4'-C1'-N1-C6
2	B	300[B]	TTP	C5'-O5'-PA-O1A
2	B	300[B]	TTP	C5'-O5'-PA-O2A
2	B	300[B]	TTP	O4'-C1'-N1-C6
2	D	300[A]	TTP	O4'-C1'-N1-C6
2	D	300[B]	TTP	O4'-C4'-C5'-O5'
2	D	300[B]	TTP	C3'-C4'-C5'-O5'
2	B	300[A]	TTP	O4'-C4'-C5'-O5'
2	B	300[A]	TTP	C3'-C4'-C5'-O5'
2	H	300[B]	TTP	O4'-C4'-C5'-O5'
2	F	300[B]	TTP	O4'-C4'-C5'-O5'
2	F	300[B]	TTP	C3'-C4'-C5'-O5'
2	C	300[A]	TTP	O4'-C4'-C5'-O5'
2	B	300[B]	TTP	O4'-C4'-C5'-O5'
2	A	300[A]	TTP	C3'-C4'-C5'-O5'
2	A	300[A]	TTP	O4'-C4'-C5'-O5'
2	A	300[A]	TTP	C5'-O5'-PA-O1A
2	C	300[B]	TTP	C3'-C4'-C5'-O5'
2	A	300[A]	TTP	C5'-O5'-PA-O3A
2	B	300[B]	TTP	C5'-O5'-PA-O3A
2	C	300[A]	TTP	PB-O3A-PA-O1A
2	A	300[A]	TTP	PB-O3A-PA-O1A
2	A	300[A]	TTP	PB-O3A-PA-O2A
2	B	300[B]	TTP	PA-O3A-PB-O2B
2	B	300[B]	TTP	PG-O3B-PB-O2B

There are no ring outliers.

12 monomers are involved in 34 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	G	300[B]	TTP	3	0
2	H	300[B]	TTP	3	0
4	E	1193	DTU	5	0
2	E	300[B]	TTP	4	0
2	D	300[B]	TTP	3	0
2	H	300[A]	TTP	1	0
2	C	300[A]	TTP	2	0
2	B	300[B]	TTP	4	0
2	G	300[A]	TTP	1	0
2	F	300[B]	TTP	1	0
2	A	300[B]	TTP	6	0

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Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	C	300[B]	TTP	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 TTP A 300 (A)

Ligand TTP G 300 (B)

Bond lengths

Bond angles

Torsions

Rings

Ligand TTP H 300 (B)

Bond lengths

Bond angles

Torsions

Rings

Ligand TTP E 300 (B)

Bond lengths

Bond angles

Torsions

Rings

Ligand TTP D 300 (B)

Bond lengths

Bond angles

Torsions

Rings

Ligand TTP H 300 (A)

Bond lengths

Bond angles

Torsions

Rings

Ligand TTP E 300 (A)

Bond lengths

Bond angles

Torsions

Rings

Ligand TTP B 300 (A)

Bond lengths

Bond angles

Torsions

Rings

Ligand TTP C 300 (A)

Bond lengths

Bond angles

Torsions

Rings

Ligand TTP B 300 (B)

Bond lengths

Bond angles

Torsions

Rings

Ligand TTP F 300 (A)

Bond lengths

Bond angles

Torsions

Rings

Ligand TTP G 300 (A)

Bond lengths

Bond angles

Torsions

Rings

Ligand TTP D 300 (A)

Bond lengths

Bond angles

Torsions

Rings

Ligand TTP F 300 (B)

Bond lengths

Bond angles

Torsions

Rings

Ligand TTP A 300 (B)

Bond lengths

Bond angles

Torsions

Rings

Ligand TTP C 300 (B)

Bond lengths

Bond angles

Torsions

Rings

5.7 Other polymers (i)

There are no such residues in this entry.

5.8 Polymer linkage issues (i)

There are no chain breaks in this entry.

6 Fit of model and data (i)

6.1 Protein, DNA and RNA chains (i)

In the following table, the column labelled '#RSRZ> 2' contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 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	174/195 (89%)	-0.03	11 (6%)	20	17	15, 22, 47, 61	0
1	B	167/195 (85%)	-0.08	7 (4%)	36	33	15, 25, 40, 57	0
1	C	160/195 (82%)	-0.05	5 (3%)	49	46	19, 30, 46, 55	0
1	D	160/195 (82%)	-0.29	2 (1%)	77	77	17, 25, 40, 50	0
1	E	160/195 (82%)	0.04	7 (4%)	34	31	20, 29, 49, 58	0
1	F	161/195 (82%)	-0.22	6 (3%)	41	38	16, 24, 37, 46	0
1	G	160/195 (82%)	-0.23	2 (1%)	77	77	17, 25, 40, 53	0
1	H	161/195 (82%)	-0.11	5 (3%)	49	46	18, 27, 41, 51	0
All	All	1303/1560 (83%)	-0.12	45 (3%)	44	40	15, 26, 44, 61	0

All (45) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	G	59	THR	6.1
1	C	75	ALA	5.0
1	G	75	ALA	4.9
1	A	65	PHE	4.9
1	H	59	THR	4.7
1	C	59	THR	4.5
1	B	65	PHE	4.3
1	D	59	THR	4.3
1	A	67	THR	4.1
1	E	59	THR	4.0
1	E	168	THR	3.9
1	F	61	TYR	3.6
1	B	74	GLU	3.4
1	A	70	ARG	3.3
1	F	75	ALA	3.2
1	B	191	LYS	3.1

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Mol	Chain	Res	Type	RSRZ
1	A	66	CYS	3.1
1	H	74	GLU	3.0
1	D	18	ARG	3.0
1	H	75	ALA	2.9
1	B	73	MET	2.9
1	C	168	THR	2.8
1	B	170	LYS	2.8
1	A	68	HIS	2.8
1	E	170	LYS	2.7
1	E	179	ASP	2.7
1	C	191	LYS	2.5
1	A	69	ASP	2.5
1	H	147	VAL	2.4
1	A	75	ALA	2.4
1	E	147	VAL	2.4
1	F	171	GLU	2.3
1	A	74	GLU	2.3
1	A	171	GLU	2.3
1	E	82[A]	ARG	2.2
1	B	146	VAL	2.2
1	C	147	VAL	2.2
1	F	170	LYS	2.2
1	F	147	VAL	2.2
1	E	75	ALA	2.1
1	F	18	ARG	2.1
1	A	63	SER	2.1
1	B	18	ARG	2.1
1	A	146	VAL	2.1
1	H	146	VAL	2.1

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

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

6.3 Carbohydrates (i)

There are no carbohydrates in this entry.

6.4 Ligands (i)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 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	DTU	E	1193	8/8	0.84	0.19	44,52,56,60	0
2	TTP	B	300[A]	29/29	0.98	0.08	13,17,21,23	29
2	TTP	H	300[B]	29/29	0.98	0.07	19,22,25,28	29
2	TTP	F	300[A]	29/29	0.98	0.07	13,19,25,29	29
2	TTP	F	300[B]	29/29	0.98	0.07	11,17,19,21	29
2	TTP	H	300[A]	29/29	0.98	0.07	17,21,24,25	29
2	TTP	D	300[B]	29/29	0.98	0.08	21,25,28,29	29
2	TTP	E	300[B]	29/29	0.98	0.09	21,25,27,29	29
2	TTP	E	300[A]	29/29	0.98	0.09	17,26,28,31	29
2	TTP	C	300[A]	29/29	0.98	0.09	20,27,33,36	29
2	TTP	A	300[B]	29/29	0.98	0.08	12,16,18,19	29
2	TTP	C	300[B]	29/29	0.98	0.09	17,23,27,28	29
2	TTP	A	300[A]	29/29	0.98	0.08	12,16,20,26	29
2	TTP	B	300[B]	29/29	0.98	0.08	12,20,24,25	29
3	ZN	E	400	1/1	0.98	0.04	33,33,33,33	0
2	TTP	D	300[A]	29/29	0.98	0.08	17,20,23,23	29
3	ZN	H	400	1/1	0.99	0.06	26,26,26,26	0
3	ZN	F	400	1/1	0.99	0.06	27,27,27,27	0
3	ZN	A	400	1/1	0.99	0.06	25,25,25,25	0
2	TTP	G	300[B]	29/29	0.99	0.07	19,25,28,30	29
3	ZN	G	400	1/1	0.99	0.05	25,25,25,25	0
3	ZN	D	400	1/1	0.99	0.06	26,26,26,26	0
3	ZN	B	400	1/1	0.99	0.07	28,28,28,28	0
3	ZN	C	400	1/1	0.99	0.03	27,27,27,27	0
2	TTP	G	300[A]	29/29	0.99	0.07	16,19,21,24	29

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.
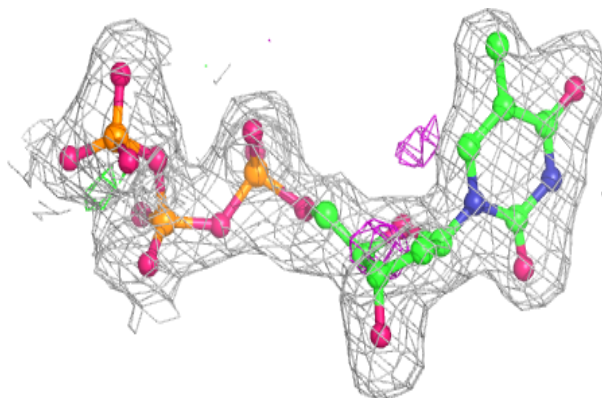
Electron density around TTP B 300 (A):

$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative)
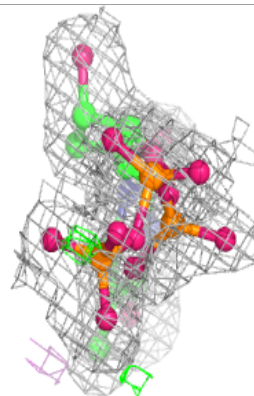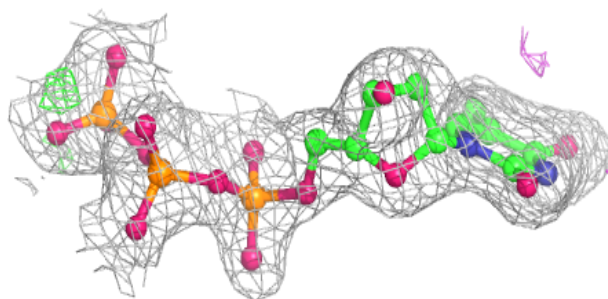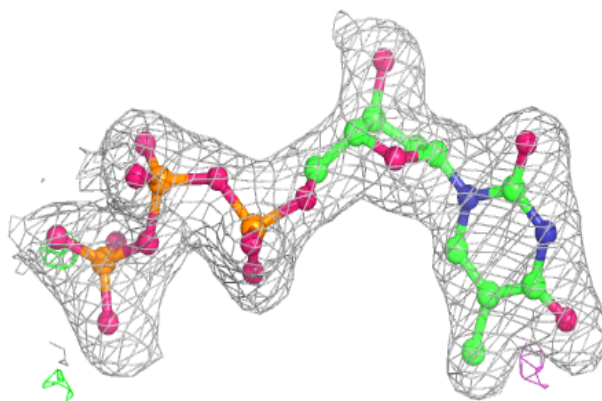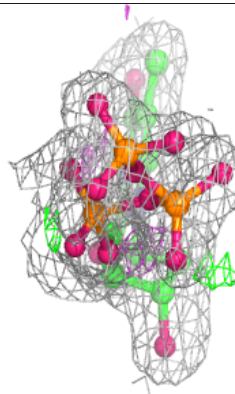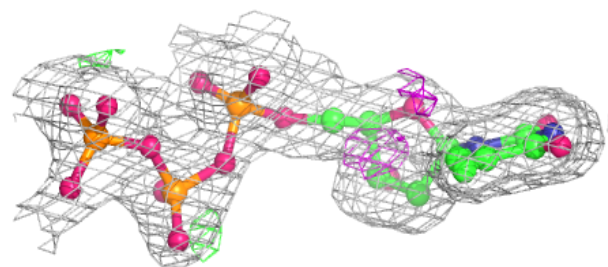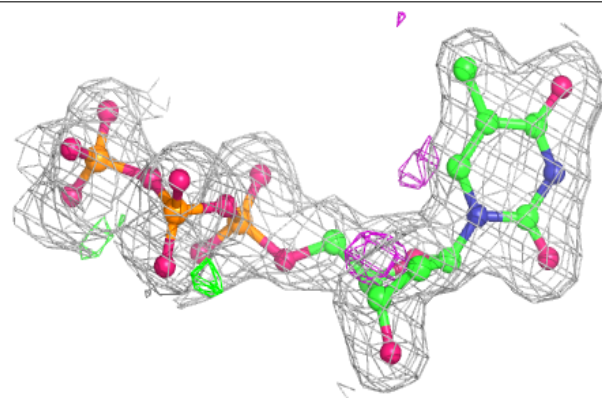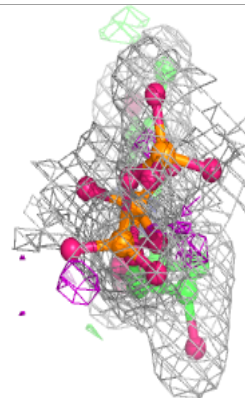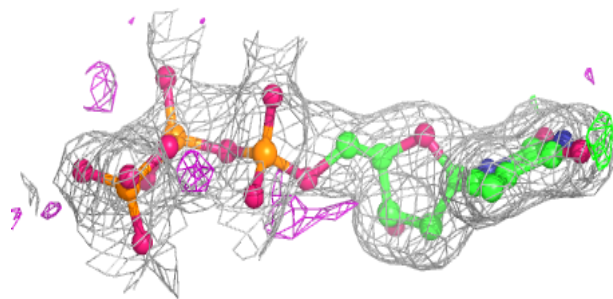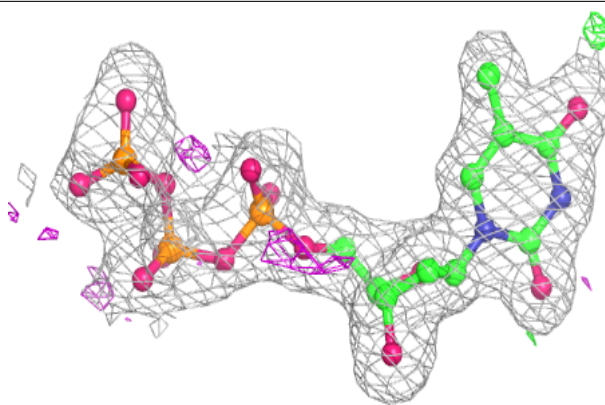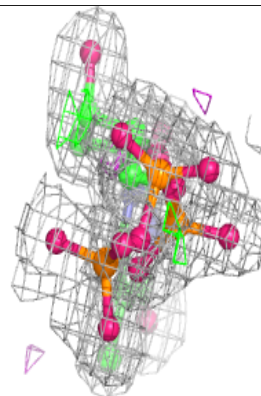and green (positive)
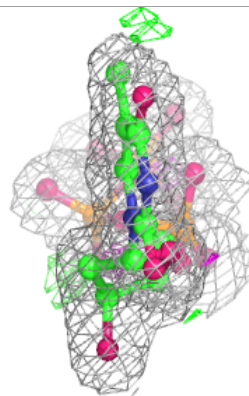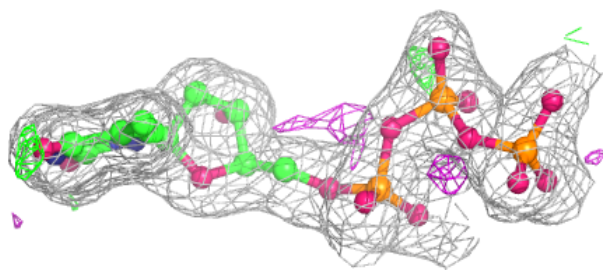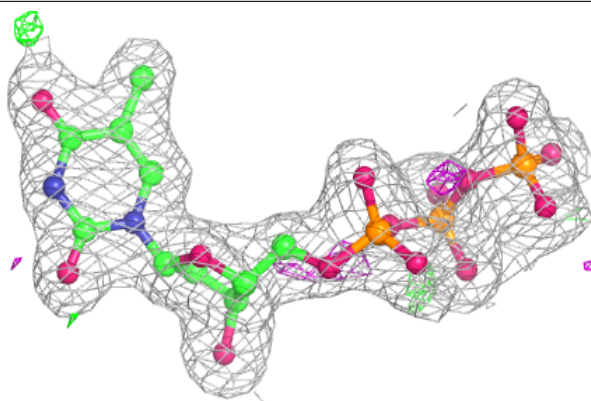
Electron density around TTP H 300 (B):

$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)
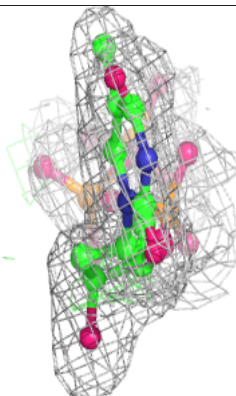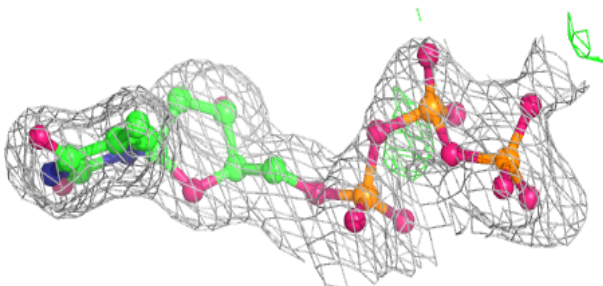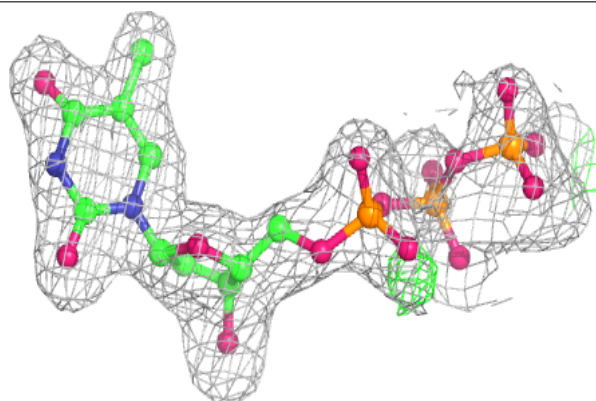
Electron density around TTP F 300 (A):

$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative)
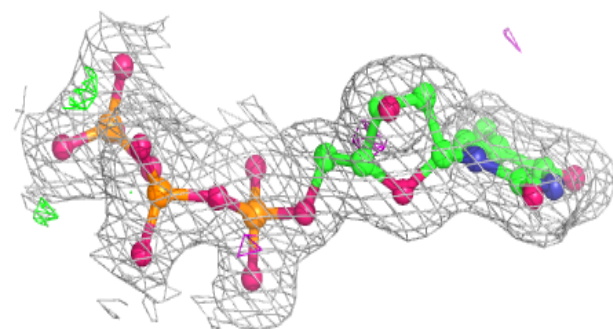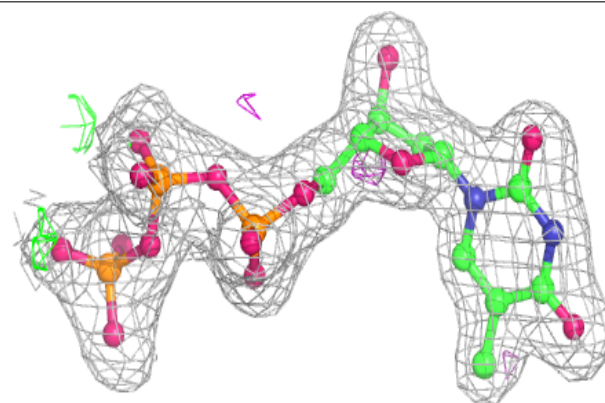and green (positive)
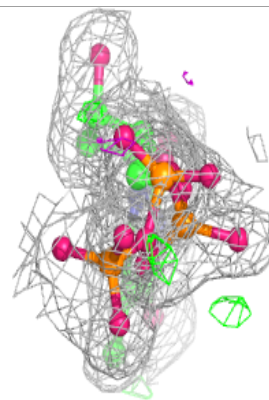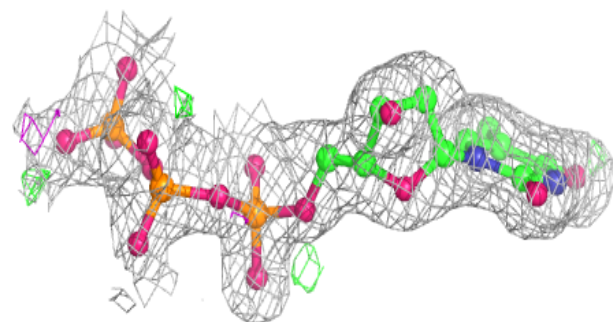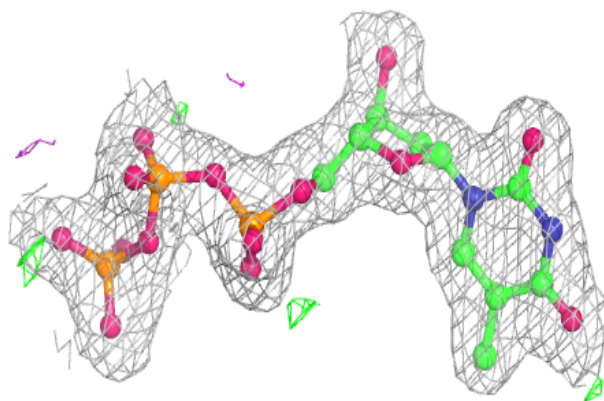
Electron density around TTP F 300 (B):

$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)
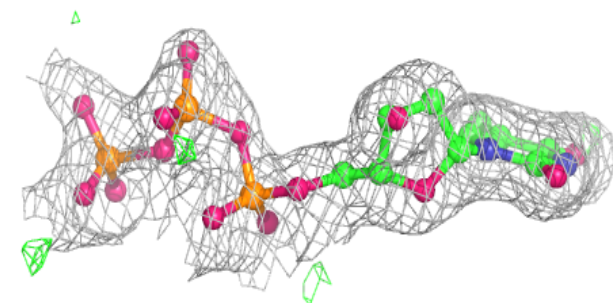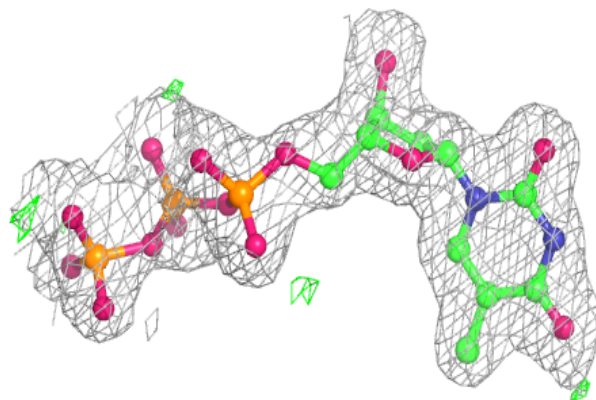
Electron density around TTP H 300 (A):

$2mF_o\text{-}DF_c$ (at 0.7 rmsd) in gray
$mF_o\text{-}DF_c$ (at 3 rmsd) in purple (negative)
and green (positive)
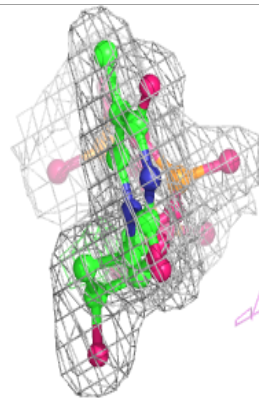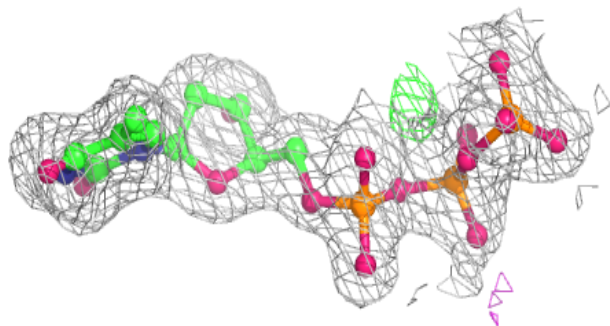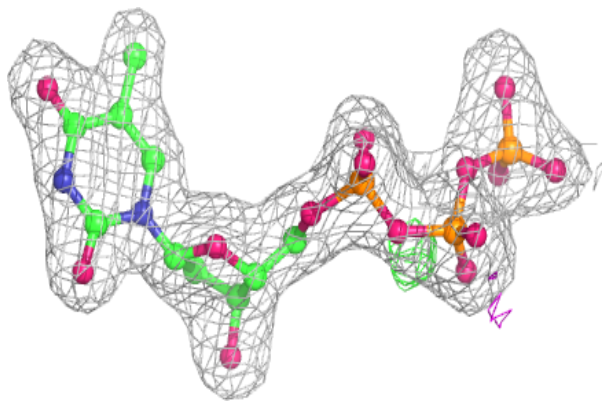
Electron density around TTP D 300 (B):

$2mF_o\text{-}DF_c$ (at 0.7 rmsd) in gray
$mF_o\text{-}DF_c$ (at 3 rmsd) in purple (negative)
and green (positive)
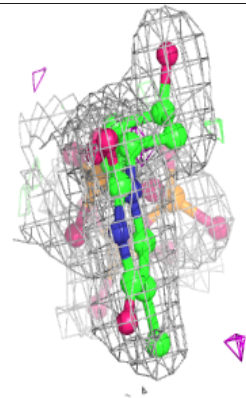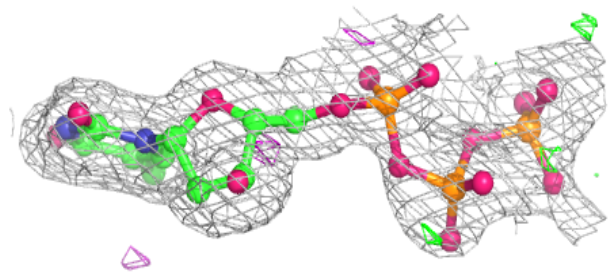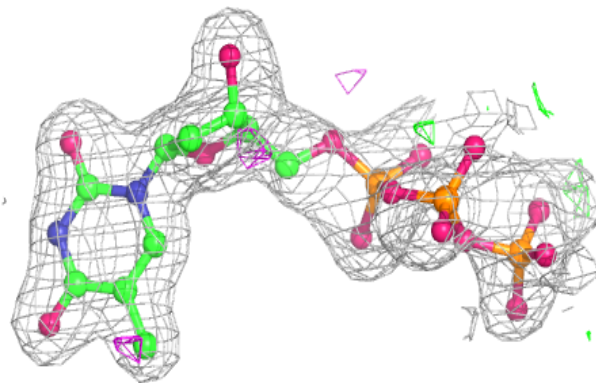
Electron density around TTP E 300 (B):

$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative)
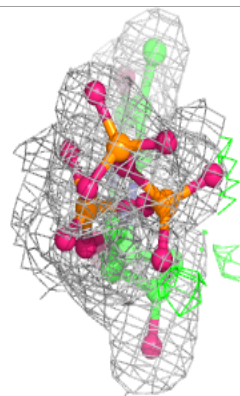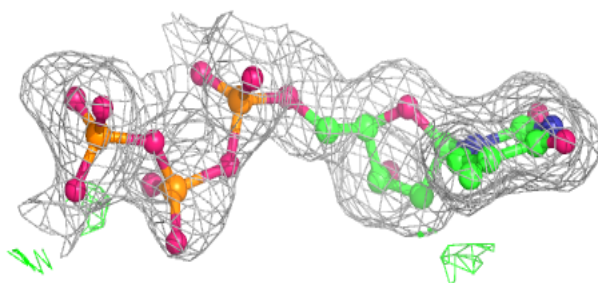and green (positive)
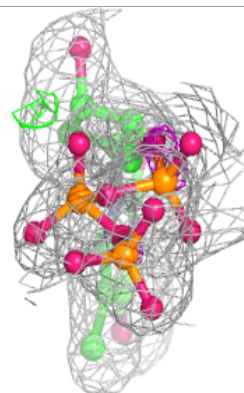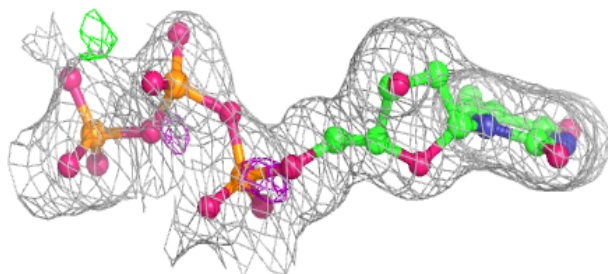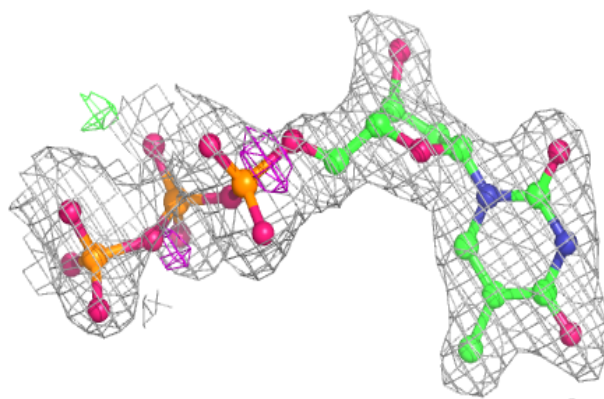
Electron density around TTP E 300 (A):

$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)
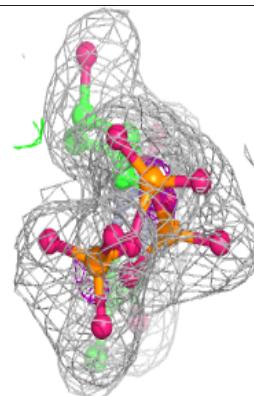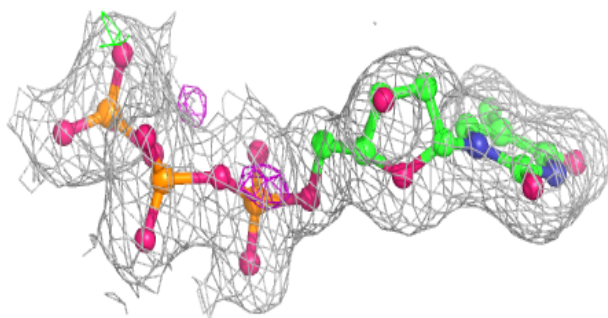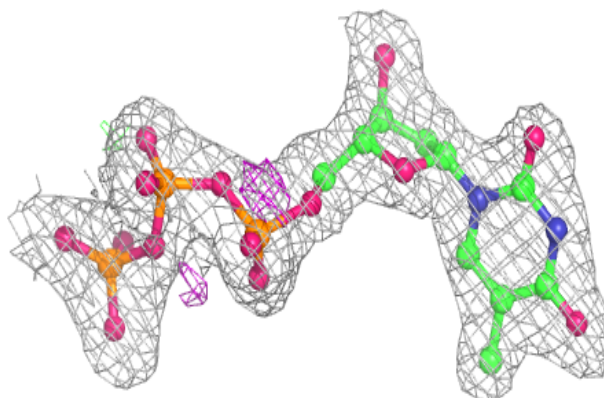
Electron density around TTP C 300 (A):

$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)
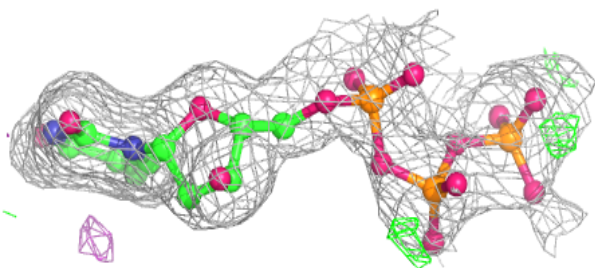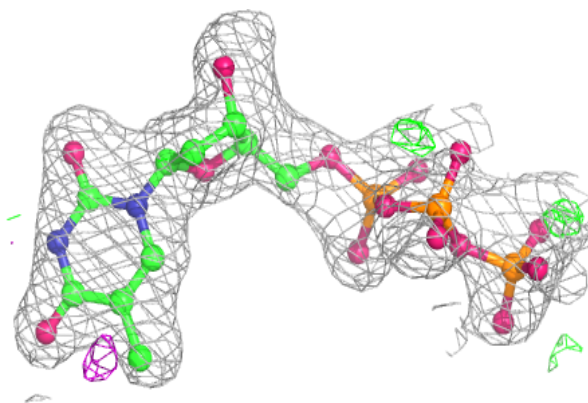
Electron density around TTP A 300 (B):

$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative)
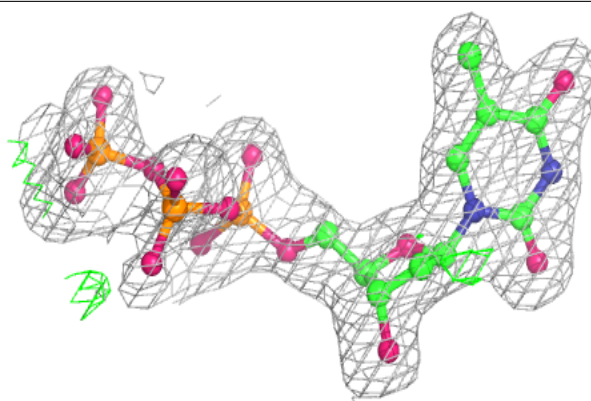and green (positive)
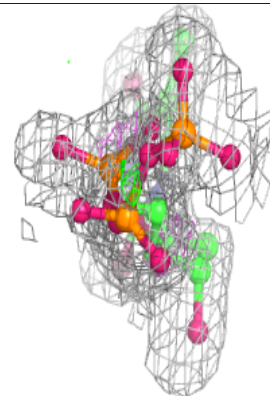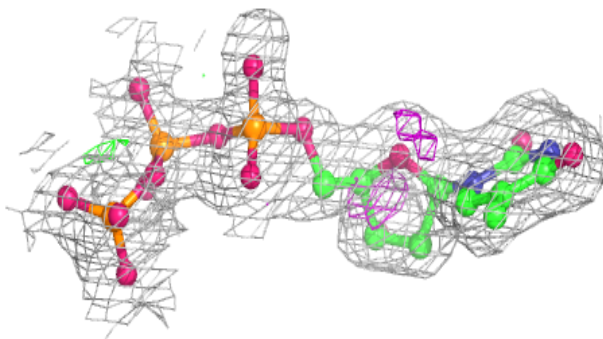
Electron density around TTP C 300 (B):

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

Electron density around TTP A 300 (A):

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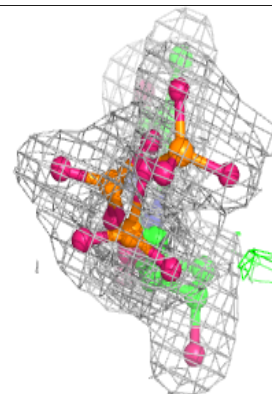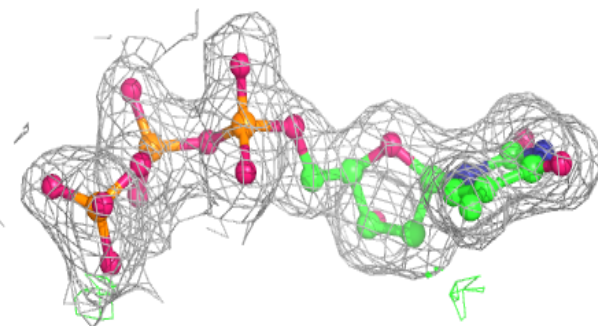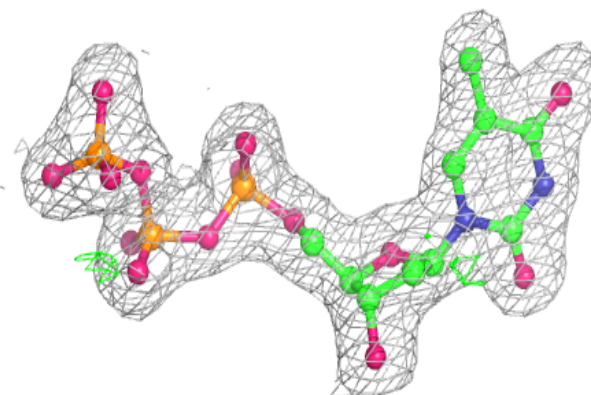and green (positive)

Electron density around TTP B 300 (B):

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

Electron density around TTP D 300 (A):

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

Electron density around TTP G 300 (B):

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

Electron density around TTP G 300 (A):

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

6.5 Other polymers (i)

There are no such residues in this entry.