W O R L D W I D E
wwPDB
P R O T E I N   D A T A   B A N K

wwPDB X-ray Structure Validation Summary Report (i)

Oct 4, 2023 – 06:59 AM EDT

PDB ID	:	6OJS
Title	:	Crystal structure of TS-DHFR from Cryptosporidium hominis in complex with NADPH, FdUMP, MTX and 2-amino-4-oxo-4,7-dihydro-pyrrolo[2,3-d]pyrimi dine-methyl-phenyl-D-glutamic acid
Authors	:	Czyzyk, D.J.; Anderson, K.S.; Jorgensen, W.L.; Valhondo, M.
Deposited on	:	2019-04-12
Resolution	:	3.21 Å(reported)

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

We welcome your comments at *validation@mail.wwpdb.org*
A user guide is available at
https://www.wwpdb.org/validation/2017/XrayValidationReportHelp
with specific help available everywhere you see the (i) symbol.

The types of validation reports are described at
http://www.wwpdb.org/validation/2017/FAQs#types.

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

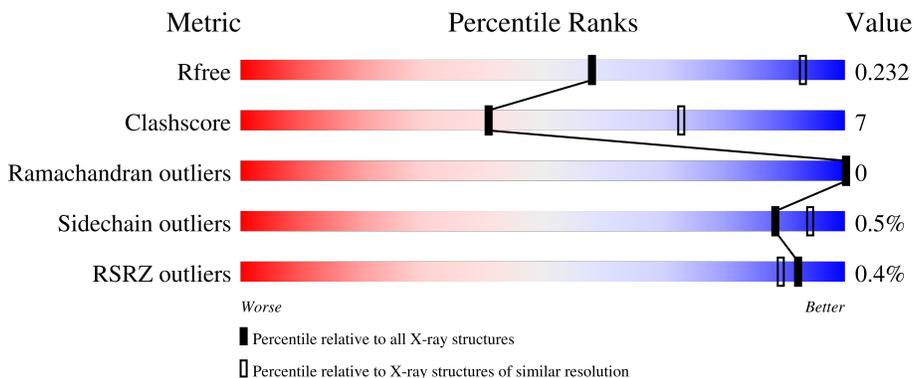|		
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.35.1
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.35.1

1 Overall quality at a glance ⓘ

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

The reported resolution of this entry is 3.21 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		0.232
Clashscore		7
Ramachandran outliers		0
Sidechain outliers		0.5%
RSRZ outliers		0.4%

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	1335 (3.24-3.20)
Clashscore	141614	1460 (3.24-3.20)
Ramachandran outliers	138981	1437 (3.24-3.20)
Sidechain outliers	138945	1436 (3.24-3.20)
RSRZ outliers	127900	1291 (3.24-3.20)

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	521	81% 17% •
1	B	521	81% 16% •
1	C	521	78% 19% •
1	D	521	82% 15% •

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| Mol	Chain	Length	Quality of chain
1	E	521	78% 19%

2 Entry composition ⓘ

There are 5 unique types of molecules in this entry. The entry contains 20926 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 Bifunctional dihydrofolate reductase-thymidylate synthase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	508	Total	C	N	O	S	0	0	0
			4072	2602	684	765	21			
1	B	508	Total	C	N	O	S	0	0	0
			4056	2591	680	764	21			
1	C	508	Total	C	N	O	S	0	0	0
			4068	2598	682	767	21			
1	D	508	Total	C	N	O	S	0	0	0
			4016	2566	675	754	21			
1	E	508	Total	C	N	O	S	0	0	0
			4054	2591	683	759	21			

- Molecule 2 is NADPH DIHYDRO-NICOTINAMIDE-ADENINE-DINUCLEOTIDE PHOSPHATE (three-letter code: NDP) (formula: $C_{21}H_{30}N_7O_{17}P_3$).
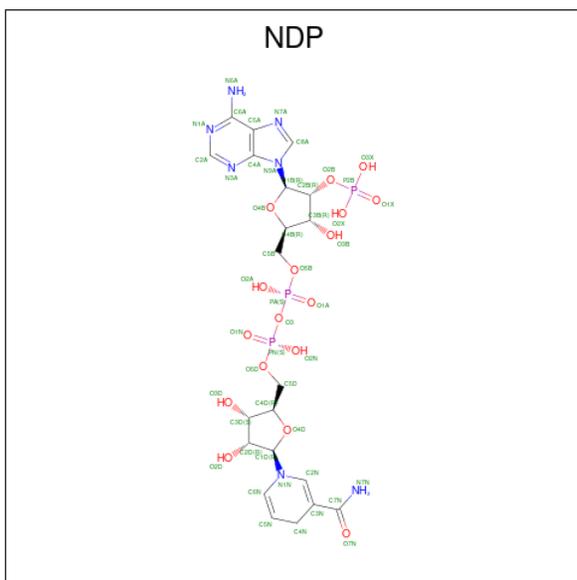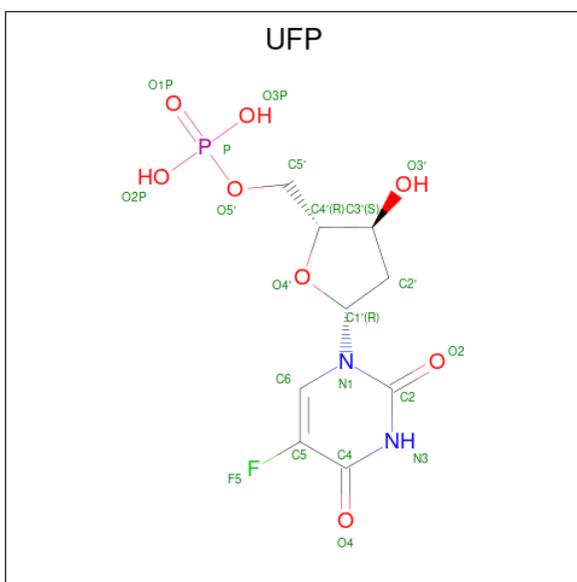

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	A	1	Total	C	N	O	P	0	0
			48	21	7	17	3		

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Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	B	1	Total	C	N	O	P	0	0
			48	21	7	17	3		
2	C	1	Total	C	N	O	P	0	0
			48	21	7	17	3		
2	D	1	Total	C	N	O	P	0	0
			48	21	7	17	3		
2	E	1	Total	C	N	O	P	0	0
			48	21	7	17	3		

- Molecule 3 is 5-FLUORO-2'-DEOXYURIDINE-5'-MONOPHOSPHATE (three-letter code: UFP) (formula: $C_9H_{12}FN_2O_8P$).

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf
3	A	1	Total	C	F	N	O	P	0	0
			21	9	1	2	8	1		
3	B	1	Total	C	F	N	O	P	0	0
			21	9	1	2	8	1		
3	C	1	Total	C	F	N	O	P	0	0
			21	9	1	2	8	1		
3	D	1	Total	C	F	N	O	P	0	0
			21	9	1	2	8	1		
3	E	1	Total	C	F	N	O	P	0	0
			21	9	1	2	8	1		

- Molecule 4 is N-{4-[(2-amino-4-oxo-4,7-dihydro-3H-pyrrolo[2,3-d]pyrimidin-5-yl)methyl]benzene-1-carbonyl}-D-glutamic acid (three-letter code: D96) (formula: $C_{19}H_{19}N_5O_6$).
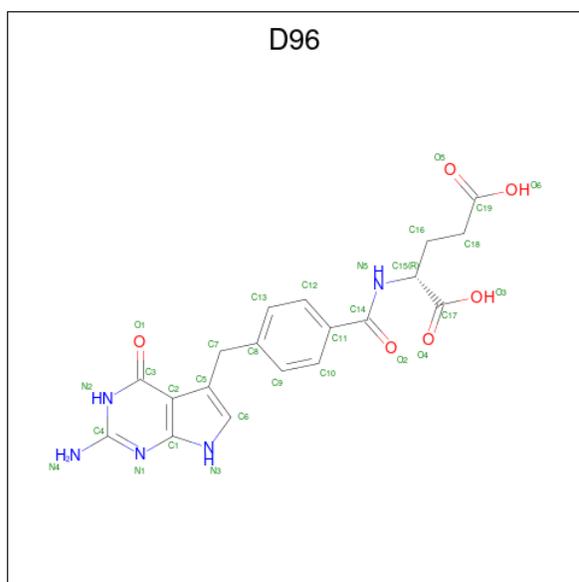
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
4	A	1	Total 30	C 19	N 5	O 6	0	0
4	B	1	Total 30	C 19	N 5	O 6	0	0
4	C	1	Total 30	C 19	N 5	O 6	0	0
4	D	1	Total 30	C 19	N 5	O 6	0	0
4	E	1	Total 30	C 19	N 5	O 6	0	0

- Molecule 5 is METHOTREXATE (three-letter code: MTX) (formula: $C_{20}H_{22}N_8O_5$).
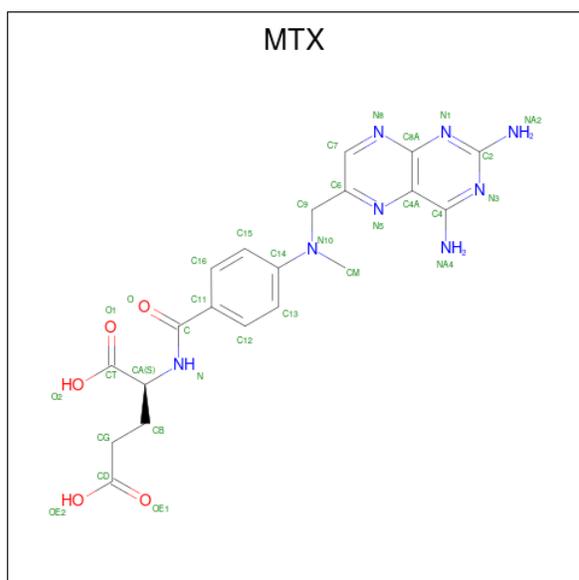
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
5	A	1	Total 33	C 20	N 8	O 5	0	0
5	B	1	Total 33	C 20	N 8	O 5	0	0
5	C	1	Total 33	C 20	N 8	O 5	0	0
5	D	1	Total 33	C 20	N 8	O 5	0	0
5	E	1	Total 33	C 20	N 8	O 5	0	0

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: Bifunctional dihydrofolate reductase-thymidylate synthase

Chain A:
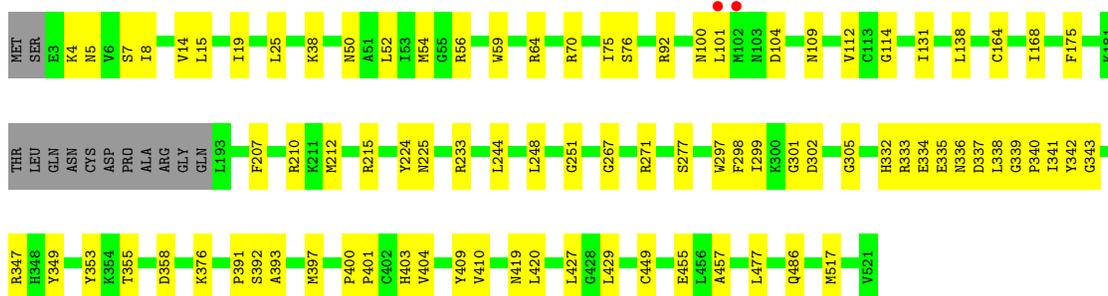
• Molecule 1: Bifunctional dihydrofolate reductase-thymidylate synthase

Chain B:
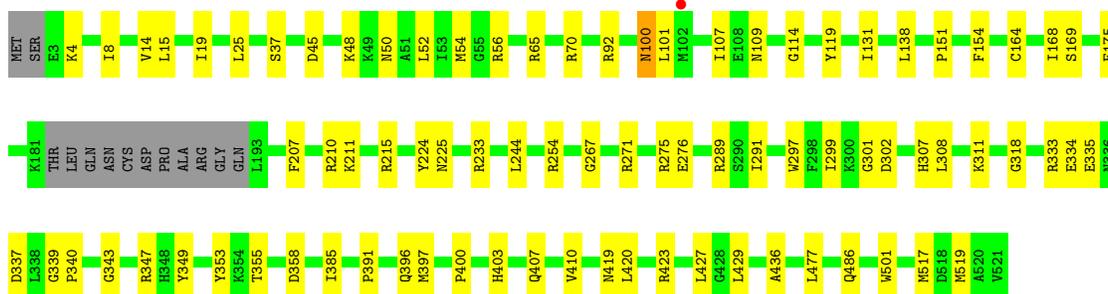
• Molecule 1: Bifunctional dihydrofolate reductase-thymidylate synthase

Chain C:

S290 I291 W297 F298 I299 K300 G301 D302 K311 L325 R333 E334 E335 N336 D337 L338 G339 P340 I341 Y342 G343 R347 H348 Y349 N350 T355 M356 H357 Y360 V365 R382 R383 P391 S392 A393 Q396 M397 H403 N419 L420 R423 L427 G428 L429

P432 A436 G461 T480 F484 P485 Q486 W501 T514 M517 V521
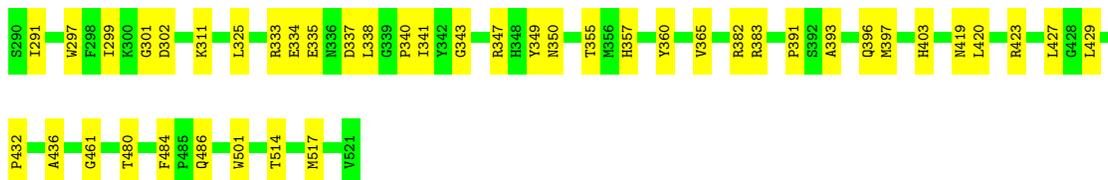
• Molecule 1: Bifunctional dihydrofolate reductase-thymidylate synthase

Chain D:

82%   15%   •

MET SER E3 K4 I8 V14 L15 I19 G20 L25 P26 S37 L52 I53 M54 G55 R56 K57 R70 S76 N100 L101 M102 N103 D104 I107 G114 Y119 I131 P151 F154 S169 F175 K181 THR LEU GLN ASN CYS ASP PRO ALA

ARG GLY GLN L193 F207 R210 Y224 N225 R233 L244 Y263 K285 R289 W297 F298 I299 K300 G301 D302 H307 L308 V313 Y314 I315 W316 S317 G318 N319 G320 S321 K322 R333 E334 E335 N336 D337 L338 G339 P340 I341 Y342 G343 R347 H348 Y349 T355

D358 V365 K376 A393 Q396 M397 H403 L420 R423 L427 G428 L429 F433 Q447 V448 C449 Q486 K492 W501 T514 M517 D518 M519 A520 V521

• Molecule 1: Bifunctional dihydrofolate reductase-thymidylate synthase

Chain E:

%

78%   19%   •

MET SER E3 K4 N5 V6 S7 I8 V14 L15 I19 L25 S37 K43 K48 L52 I53 M54 G55 R56 R70 I75 S76 P86 V89 N100 L101 M102 N109 I110 F111 V112 C113 G114 I131 L138 T145 P151 F154 I168 S169

F175 K181 THR LEU GLN ASN CYS ASP PRO ALA ARG GLY GLN L193 F207 R210 K211 M212 R215 Y224 N225 T226 P227 R233 E234 L241 L244 L248 G251 R254 G267 R271 R275 E276 T283 K284 K285 R289 S290 I291 W297 F298

I299 K300 G301 D302 L325 R333 E334 E335 N336 D337 L338 G339 P340 I341 Y342 G343 R347 H348 Y349 T355 M356 H357 D358 D359 Y360 T361 R383 H384 I385 W389 N390 P391 S392 A393 Q396 M397 P401 C402 H403 V404 V410 N419 L420 R423 L427 G428 L429

A436 L441 M444 Q447 Q486 K492 I496 W501 T514 M517 V521

4 Data and refinement statistics (i)

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α, β, γ	212.62Å 116.19Å 220.88Å 90.00° 95.48° 90.00°	Depositor
Resolution (Å)	50.12 – 3.21 50.12 – 3.21	Depositor EDS
% Data completeness (in resolution range)	98.0 (50.12-3.21) 98.2 (50.12-3.21)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	0.32	Depositor
$< I/\sigma(I) >$ [1]	0.96 (at 3.19Å)	Xtriage
Refinement program	PHENIX (1.10.1_2155)	Depositor
R, R_{free}	0.218 , 0.232 0.218 , 0.232	Depositor DCC
R_{free} test set	4292 reflections (5.00%)	wwPDB-VP
Wilson B-factor (Å^2)	90.3	Xtriage
Anisotropy	0.391	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.31 , 38.9	EDS
L-test for twinning[2]	$< |L| > = 0.46, < L^2 > = 0.29$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.93	EDS
Total number of atoms	20926	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 3.66% 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 $< |L| >$, $< L^2 >$ 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: D96, NDP, UFP, MTX

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	0/4167	0.43	0/5647
1	B	0.25	0/4151	0.42	0/5630
1	C	0.26	0/4163	0.42	0/5644
1	D	0.25	0/4111	0.42	0/5585
1	E	0.25	0/4149	0.42	0/5626
All	All	0.25	0/20741	0.42	0/28132

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	4072	0	3931	63	0
1	B	4056	0	3892	62	0
1	C	4068	0	3913	77	0
1	D	4016	0	3817	52	0
1	E	4054	0	3904	72	0
2	A	48	0	26	3	0
2	B	48	0	26	2	0
2	C	48	0	26	3	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	D	48	0	26	1	0
2	E	48	0	26	2	0
3	A	21	0	10	2	0
3	B	21	0	10	2	0
3	C	21	0	10	1	0
3	D	21	0	10	1	0
3	E	21	0	10	1	0
4	A	30	0	0	0	0
4	B	30	0	0	0	0
4	C	30	0	0	0	0
4	D	30	0	0	1	0
4	E	30	0	0	0	0
5	A	33	0	20	2	0
5	B	33	0	20	2	0
5	C	33	0	20	2	0
5	D	33	0	20	2	0
5	E	33	0	20	2	0
All	All	20926	0	19737	289	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 7.

The worst 5 of 289 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:E:333:ARG:HG3	1:E:337:ASP:HB3	1.65	0.78
1:C:333:ARG:HG3	1:C:337:ASP:HB3	1.64	0.77
1:B:333:ARG:HG3	1:B:337:ASP:HB3	1.68	0.75
1:B:400:PRO:HG2	1:E:383:ARG:HE	1.52	0.74
1:A:333:ARG:HG3	1:A:337:ASP:HB3	1.69	0.73

There are no symmetry-related clashes.

5.3 Torsion angles (i)

5.3.1 Protein backbone (i)

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the backbone conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	504/521 (97%)	474 (94%)	30 (6%)	0	100	100
1	B	504/521 (97%)	472 (94%)	32 (6%)	0	100	100
1	C	504/521 (97%)	475 (94%)	29 (6%)	0	100	100
1	D	504/521 (97%)	475 (94%)	29 (6%)	0	100	100
1	E	504/521 (97%)	472 (94%)	32 (6%)	0	100	100
All	All	2520/2605 (97%)	2368 (94%)	152 (6%)	0	100	100

There are no Ramachandran outliers to report.

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	441/470 (94%)	438 (99%)	3 (1%)	84	93
1	B	437/470 (93%)	435 (100%)	2 (0%)	88	94
1	C	440/470 (94%)	438 (100%)	2 (0%)	88	94
1	D	427/470 (91%)	424 (99%)	3 (1%)	84	93
1	E	437/470 (93%)	436 (100%)	1 (0%)	93	97
All	All	2182/2350 (93%)	2171 (100%)	11 (0%)	88	94

5 of 11 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	D	100	ASN
1	D	224	TYR
1	E	224	TYR
1	D	263	TYR
1	B	224	TYR

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 23 such sidechains are listed below:

Mol	Chain	Res	Type
1	C	422	GLN
1	D	422	GLN
1	D	336	ASN
1	E	5	ASN
1	A	486	GLN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates ⓘ

There are no monosaccharides in this entry.

5.6 Ligand geometry ⓘ

20 ligands are modelled in this entry.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#|Z| > 2$	Counts	RMSZ	$\#|Z| > 2$
4	D96	C	603	-	31,32,32	1.49	3 (9%)	34,45,45	1.72	7 (20%)
2	NDP	D	601	-	45,52,52	1.96	10 (22%)	53,80,80	1.17	5 (9%)
3	UFP	C	602	-	22,22,22	1.03	2 (9%)	33,33,33	2.61	12 (36%)
5	MTX	A	604	-	35,35,35	1.60	5 (14%)	46,49,49	1.83	9 (19%)
3	UFP	B	602	-	22,22,22	1.05	2 (9%)	33,33,33	2.53	10 (30%)
4	D96	E	603	-	31,32,32	1.49	3 (9%)	34,45,45	1.76	6 (17%)
2	NDP	A	601	-	45,52,52	1.98	10 (22%)	53,80,80	1.16	6 (11%)
4	D96	B	603	-	31,32,32	1.49	3 (9%)	34,45,45	1.76	7 (20%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	#|Z| > 2	Counts	RMSZ	#|Z| > 2
5	MTX	D	604	-	35,35,35	1.60	5 (14%)	46,49,49	1.88	10 (21%)
5	MTX	B	604	-	35,35,35	1.60	5 (14%)	46,49,49	1.84	9 (19%)
4	D96	D	603	-	31,32,32	1.49	3 (9%)	34,45,45	1.78	6 (17%)
2	NDP	E	601	-	45,52,52	1.95	10 (22%)	53,80,80	1.17	6 (11%)
2	NDP	B	601	-	45,52,52	1.96	10 (22%)	53,80,80	1.18	5 (9%)
5	MTX	C	604	-	35,35,35	1.60	5 (14%)	46,49,49	1.83	8 (17%)
4	D96	A	603	-	31,32,32	1.49	3 (9%)	34,45,45	1.78	8 (23%)
2	NDP	C	601	-	45,52,52	1.96	11 (24%)	53,80,80	1.17	7 (13%)
3	UFP	E	602	-	22,22,22	1.24	3 (13%)	33,33,33	2.65	12 (36%)
3	UFP	D	602	-	22,22,22	1.06	2 (9%)	33,33,33	2.61	12 (36%)
5	MTX	E	604	-	35,35,35	1.60	5 (14%)	46,49,49	1.83	9 (19%)
3	UFP	A	602	-	22,22,22	1.27	3 (13%)	33,33,33	2.54	11 (33%)

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
4	D96	C	603	-	-	3/21/21/21	0/3/3/3
2	NDP	D	601	-	-	8/30/77/77	0/5/5/5
3	UFP	C	602	-	-	3/10/22/22	0/2/2/2
5	MTX	A	604	-	-	6/25/25/25	0/3/3/3
3	UFP	B	602	-	-	3/10/22/22	0/2/2/2
4	D96	E	603	-	-	2/21/21/21	0/3/3/3
2	NDP	A	601	-	-	5/30/77/77	0/5/5/5
4	D96	B	603	-	-	6/21/21/21	0/3/3/3
5	MTX	D	604	-	-	7/25/25/25	0/3/3/3
5	MTX	B	604	-	-	7/25/25/25	0/3/3/3
4	D96	D	603	-	-	9/21/21/21	0/3/3/3
2	NDP	E	601	-	-	9/30/77/77	0/5/5/5
2	NDP	B	601	-	-	6/30/77/77	0/5/5/5
5	MTX	C	604	-	-	7/25/25/25	0/3/3/3
4	D96	A	603	-	-	4/21/21/21	0/3/3/3
2	NDP	C	601	-	-	5/30/77/77	0/5/5/5
3	UFP	E	602	-	-	3/10/22/22	0/2/2/2

Continued from previous page...

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	UFP	D	602	-	-	3/10/22/22	0/2/2/2
5	MTX	E	604	-	-	6/25/25/25	0/3/3/3
3	UFP	A	602	-	-	3/10/22/22	0/2/2/2

The worst 5 of 103 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	E	604	MTX	C2-NA2	5.34	1.44	1.33
5	B	604	MTX	C2-NA2	5.31	1.44	1.33
5	D	604	MTX	C2-NA2	5.30	1.44	1.33
5	C	604	MTX	C2-NA2	5.28	1.44	1.33
5	A	604	MTX	C2-NA2	5.25	1.44	1.33

The worst 5 of 165 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	D	602	UFP	C5-C4-N3	6.36	118.82	112.56
3	E	602	UFP	C5-C4-N3	6.27	118.73	112.56
3	C	602	UFP	C5-C4-N3	6.26	118.72	112.56
3	B	602	UFP	C5-C4-N3	6.08	118.55	112.56
3	A	602	UFP	C5-C4-N3	6.06	118.53	112.56

There are no chirality outliers.

5 of 105 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	E	601	NDP	C5D-O5D-PN-O1N
4	D	603	D96	N5-C15-C16-C18
5	A	604	MTX	N-CA-CB-CG
5	B	604	MTX	N-CA-CB-CG
5	C	604	MTX	N-CA-CB-CG

There are no ring outliers.

16 monomers are involved in 28 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	D	601	NDP	1	0
3	C	602	UFP	1	0
5	A	604	MTX	2	0
3	B	602	UFP	2	0

Continued from previous page...

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	601	NDP	3	0
5	D	604	MTX	2	0
5	B	604	MTX	2	0
4	D	603	D96	1	0
2	E	601	NDP	2	0
2	B	601	NDP	2	0
5	C	604	MTX	2	0
2	C	601	NDP	3	0
3	E	602	UFP	1	0
3	D	602	UFP	1	0
5	E	604	MTX	2	0
3	A	602	UFP	2	0

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less 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 D96 C 603

Bond lengths

Bond angles

Torsions

Rings

Ligand NDP D 601

Bond lengths

Bond angles

Torsions

Rings

Ligand UFP C 602

Bond lengths

Bond angles

Torsions

Rings

Ligand MTX A 604

Bond lengths

Bond angles

Torsions

Rings

Ligand UFP B 602

Bond lengths

Bond angles

Torsions

Rings

Ligand D96 E 603

Bond lengths

Bond angles

Torsions

Rings

Ligand NDP A 601

Bond lengths

Bond angles

Torsions

Rings

Ligand D96 B 603

Bond lengths

Bond angles

Torsions

Rings

Ligand MTX D 604

Bond lengths

Bond angles

Torsions

Rings

Ligand MTX B 604

Bond lengths

Bond angles

Torsions

Rings

Ligand D96 D 603

Bond lengths

Bond angles

Torsions

Rings

Ligand NDP E 601

Bond lengths

Bond angles

Torsions

Rings

Ligand NDP B 601

Bond lengths

Bond angles

Torsions

Rings

Ligand MTX C 604

Bond lengths

Bond angles

Torsions

Rings

Ligand D96 A 603

Bond lengths

Bond angles

Torsions

Rings

Ligand NDP C 601

Bond lengths

Bond angles

Torsions

Rings

Ligand UFP E 602

Bond lengths

Bond angles

Torsions

Rings

Ligand UFP D 602

Bond lengths

Bond angles

Torsions

Rings

Ligand MTX E 604

Bond lengths

Bond angles

Torsions

Rings

Ligand UFP A 602

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(Å^2)	Q<0.9
1	A	508/521 (97%)	-0.09	2 (0%)	92	89	65, 80, 107, 163	0
1	B	508/521 (97%)	-0.09	1 (0%)	95	94	71, 88, 114, 164	0
1	C	508/521 (97%)	-0.14	0	100	100	63, 78, 104, 146	0
1	D	508/521 (97%)	0.01	1 (0%)	95	94	82, 99, 129, 165	0
1	E	508/521 (97%)	-0.07	7 (1%)	75	64	68, 85, 116, 158	0
All	All	2540/2605 (97%)	-0.08	11 (0%)	92	89	63, 86, 120, 165	0

The worst 5 of 11 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	102	MET	3.7
1	A	101	LEU	3.3
1	B	102	MET	3.1
1	E	102	MET	2.6
1	E	101	LEU	2.6

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 ⓘ

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	D96	B	603	30/30	0.83	0.29	93,100,114,125	0
4	D96	D	603	30/30	0.83	0.34	105,113,119,120	0
4	D96	A	603	30/30	0.85	0.31	90,96,112,127	0
4	D96	C	603	30/30	0.87	0.31	78,86,97,105	0
5	MTX	E	604	33/33	0.88	0.23	78,87,95,97	0
4	D96	E	603	30/30	0.90	0.29	84,88,107,119	0
3	UFP	A	602	21/21	0.90	0.23	76,88,100,122	0
5	MTX	D	604	33/33	0.91	0.27	89,97,100,103	0
3	UFP	B	602	21/21	0.93	0.22	83,93,102,123	0
5	MTX	A	604	33/33	0.94	0.21	68,74,81,85	0
5	MTX	B	604	33/33	0.94	0.23	72,82,88,93	0
5	MTX	C	604	33/33	0.94	0.24	65,72,82,83	0
3	UFP	D	602	21/21	0.94	0.19	101,110,118,127	0
2	NDP	E	601	48/48	0.94	0.20	82,95,112,114	0
3	UFP	C	602	21/21	0.95	0.18	69,81,90,113	0
2	NDP	D	601	48/48	0.95	0.18	85,96,104,113	0
2	NDP	B	601	48/48	0.95	0.16	81,90,101,103	0
3	UFP	E	602	21/21	0.96	0.19	74,81,91,110	0
2	NDP	C	601	48/48	0.97	0.15	65,78,86,97	0
2	NDP	A	601	48/48	0.97	0.15	67,80,90,96	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.
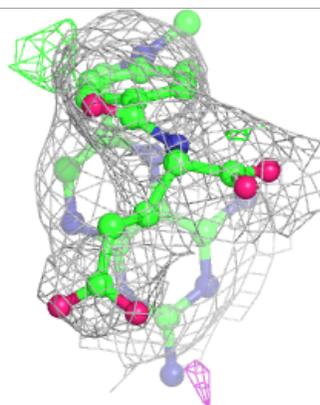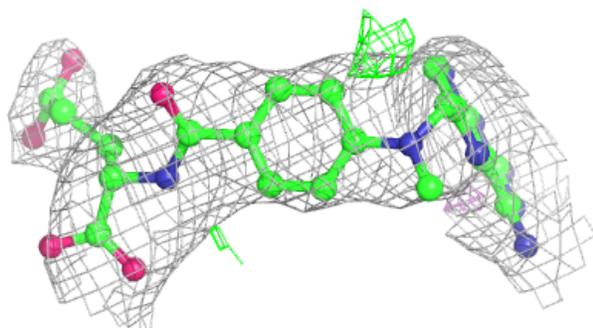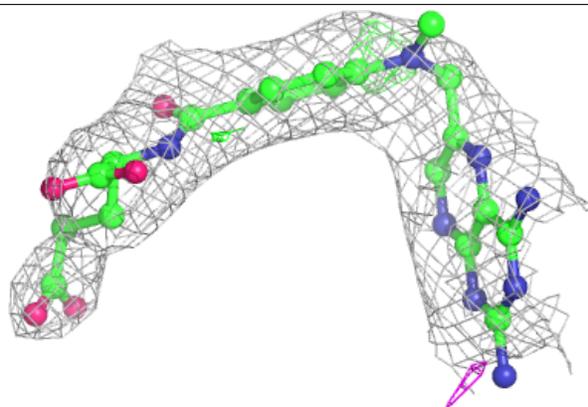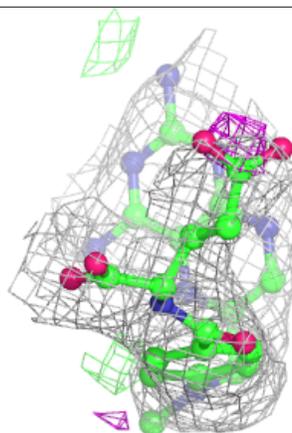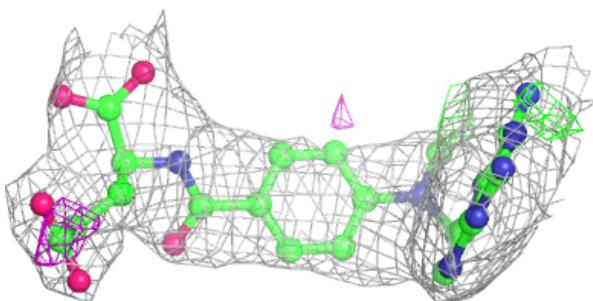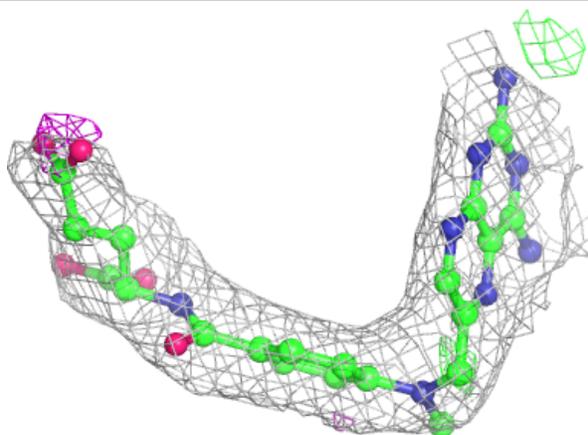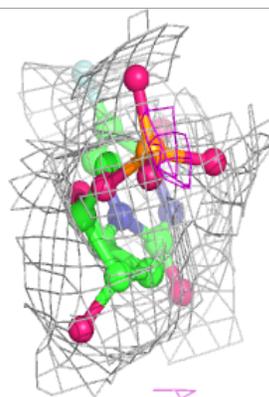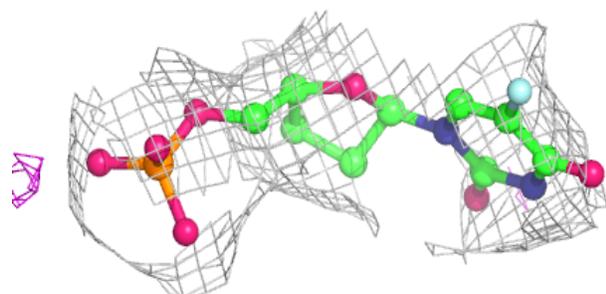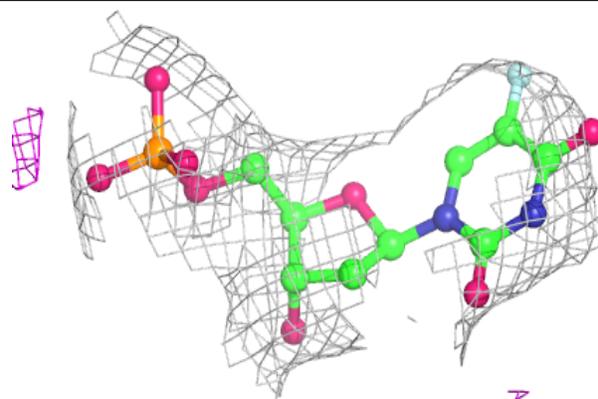
Electron density around D96 B 603:

2mF$_o$-DF$_c$ (at 0.7 rmsd) in gray
mF$_o$-DF$_c$ (at 3 rmsd) in purple (negative)
and green (positive)
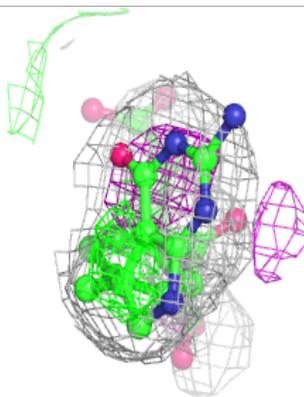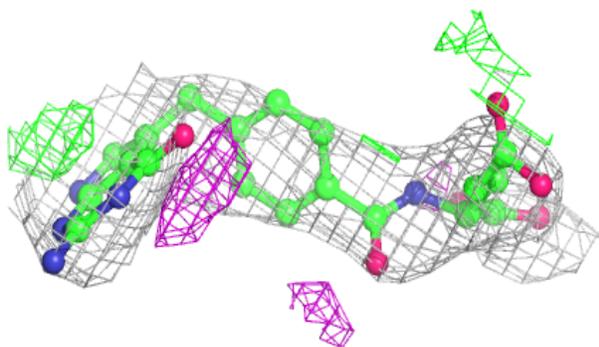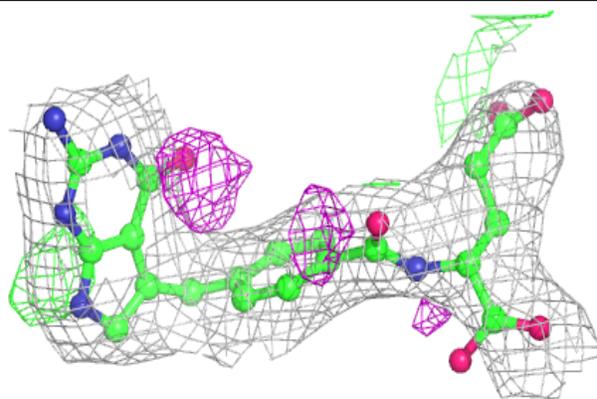
Electron density around D96 D 603:

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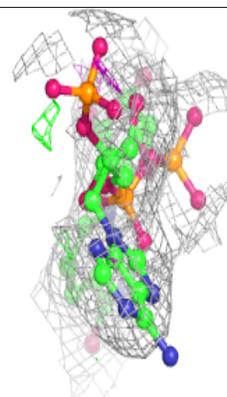mF$_o$-DF$_c$ (at 3 rmsd) in purple (negative)
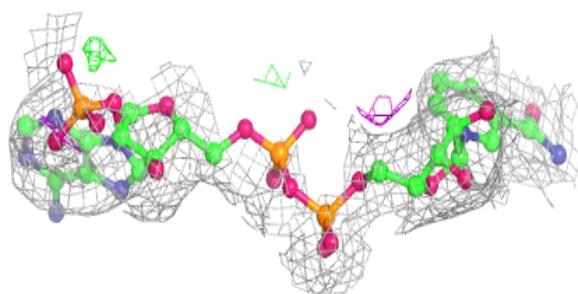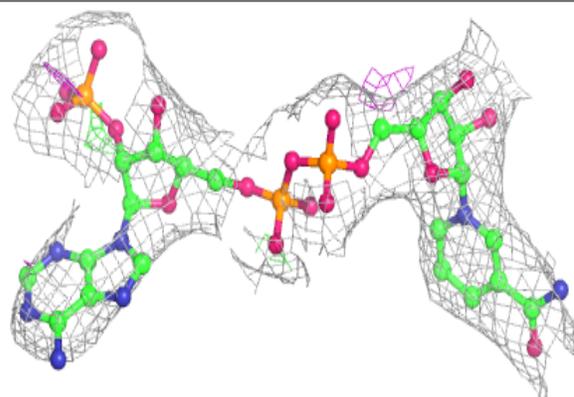and green (positive)
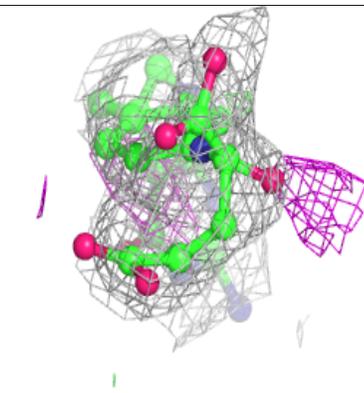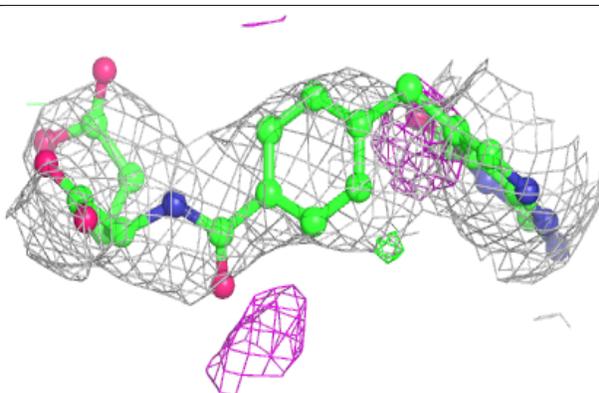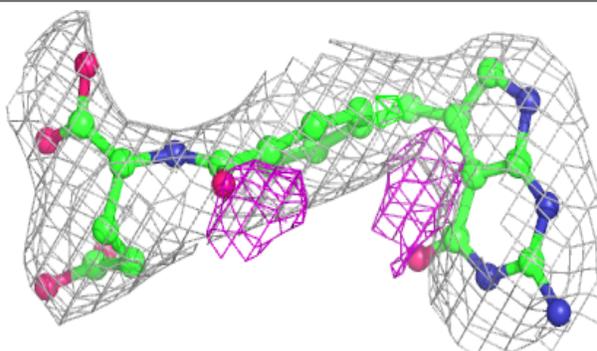
Electron density around D96 A 603:

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mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)
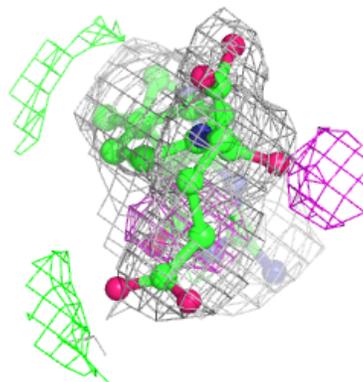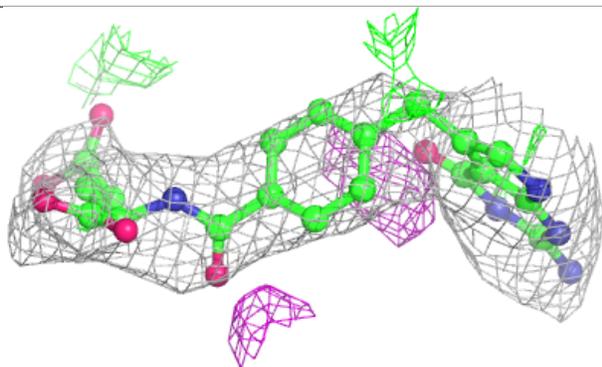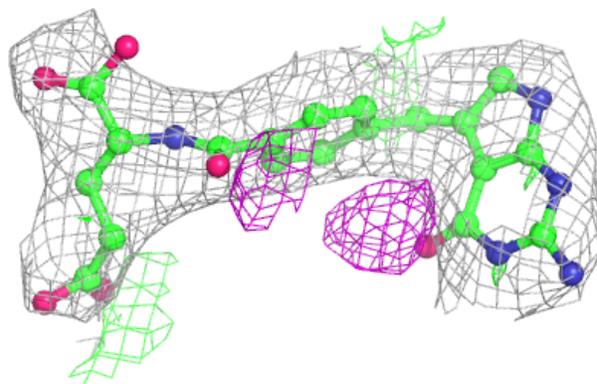
Electron density around D96 C 603:

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mF_o-DF_c (at 3 rmsd) in purple (negative)
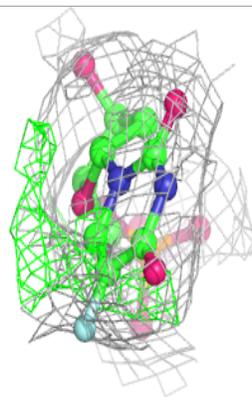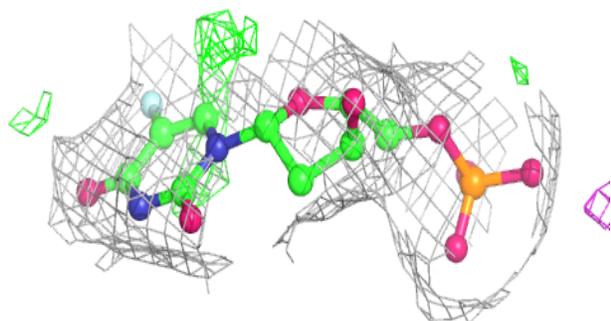and green (positive)
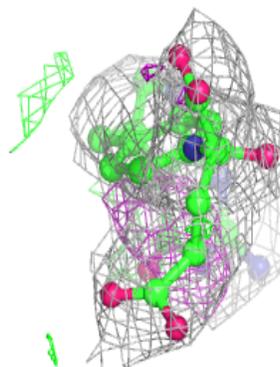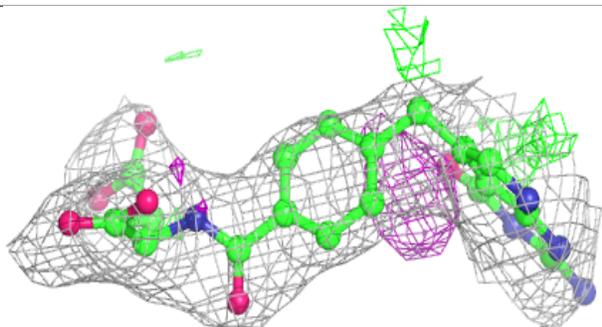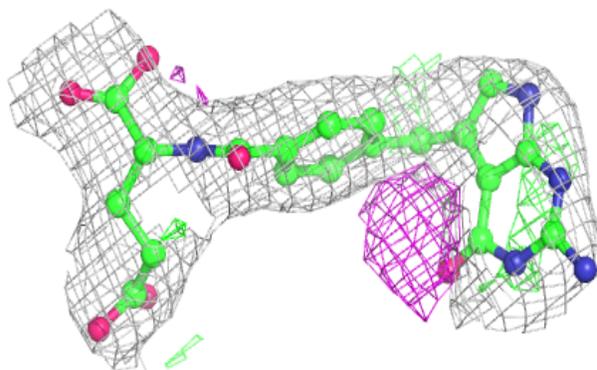
Electron density around MTX E 604:

$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative)
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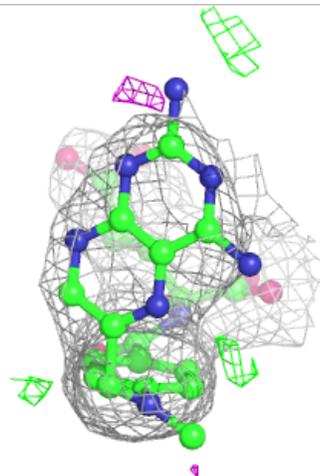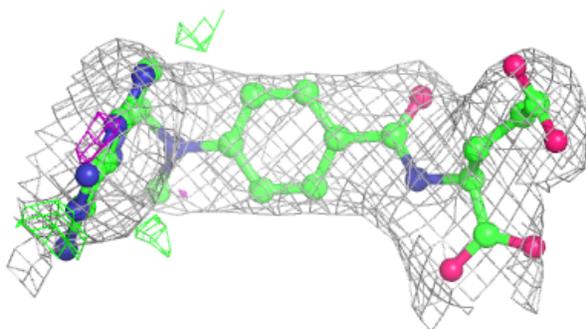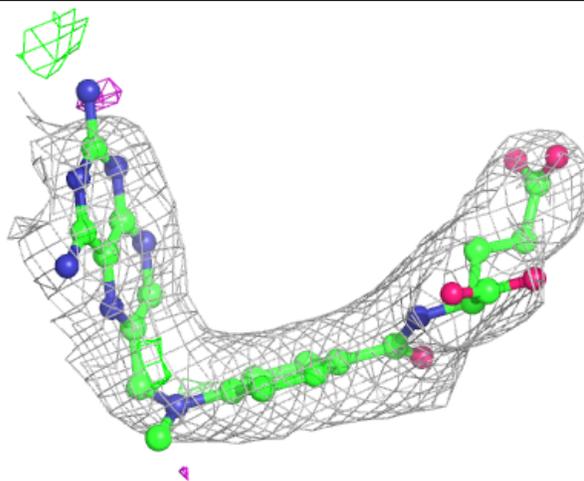
Electron density around D96 E 603:

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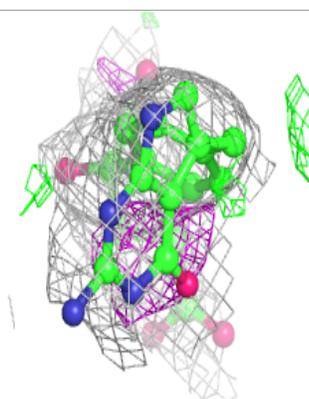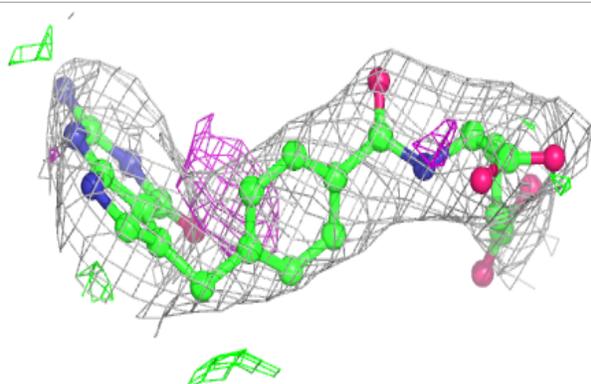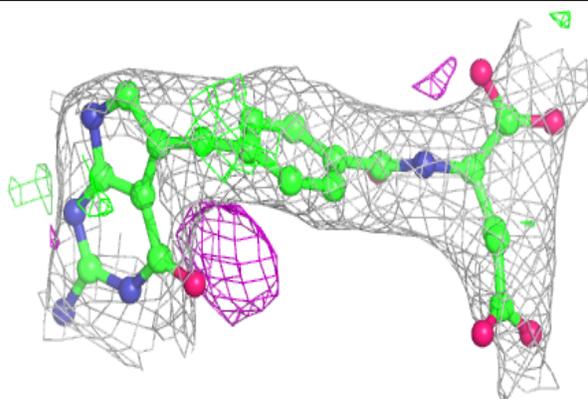
Electron density around UFP A 602:

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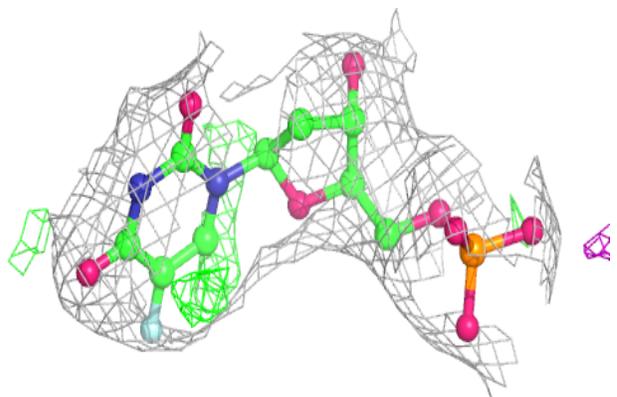mF$_o$-DF$_c$ (at 3 rmsd) in purple (negative)
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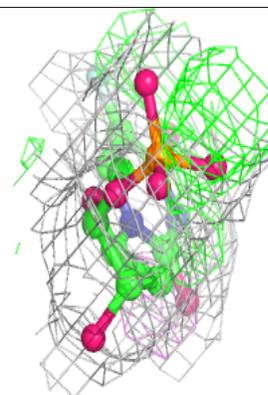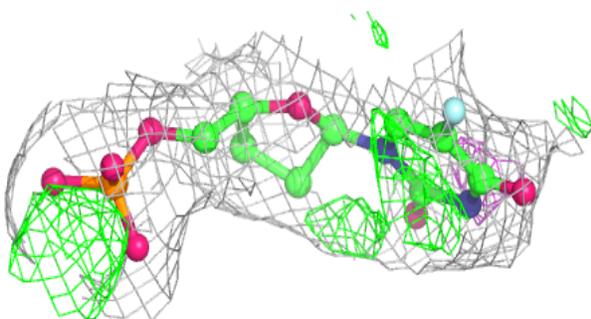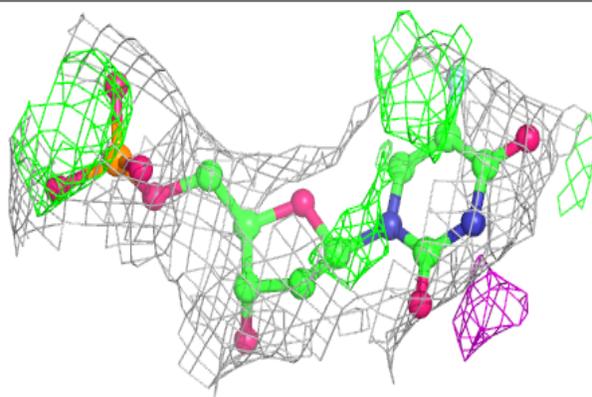
Electron density around MTX D 604:

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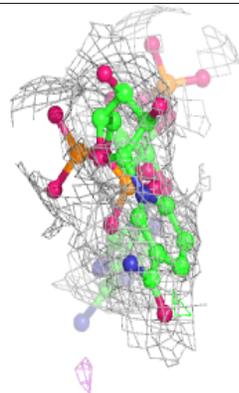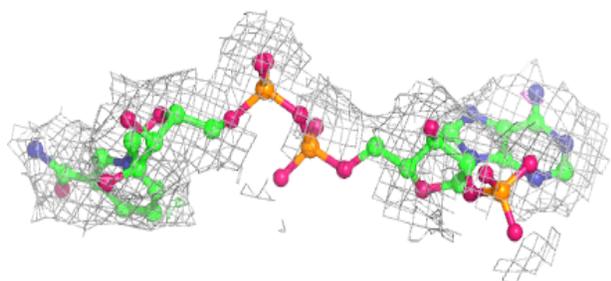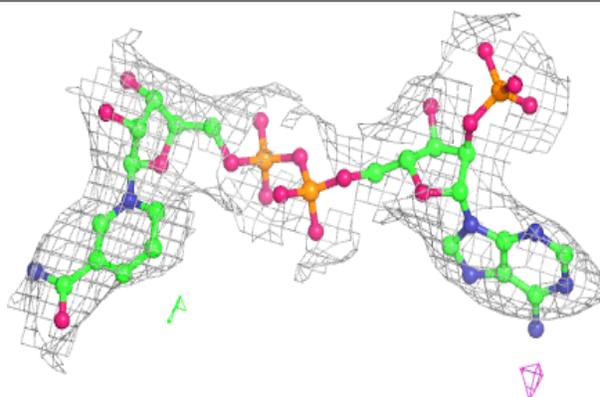and green (positive)
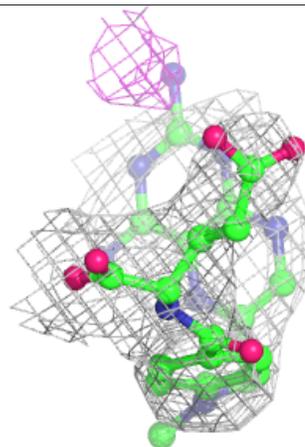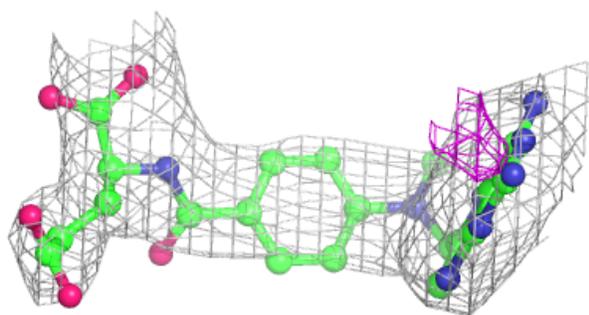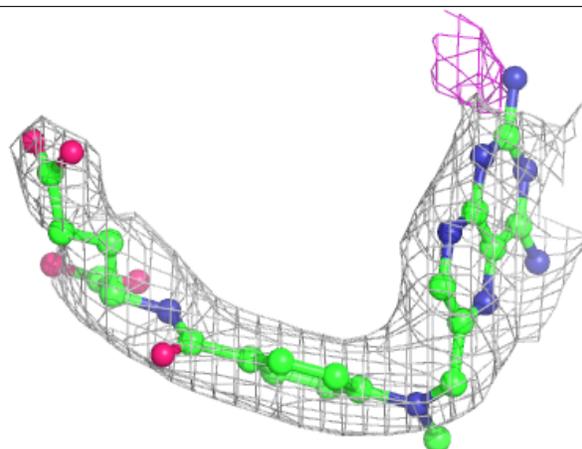
Electron density around UFP B 602:

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and green (positive)
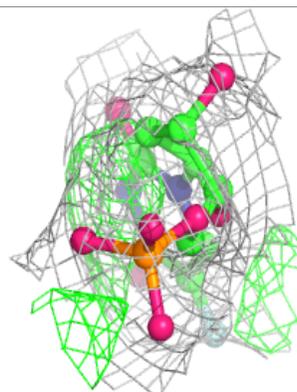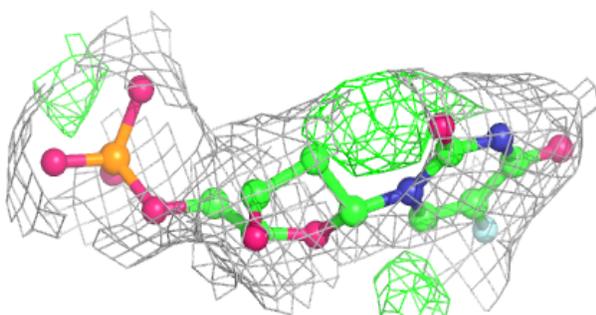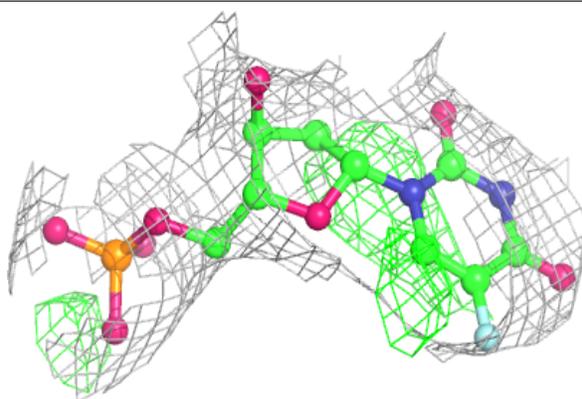
Electron density around MTX A 604:

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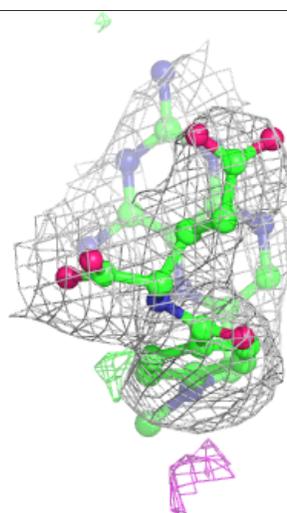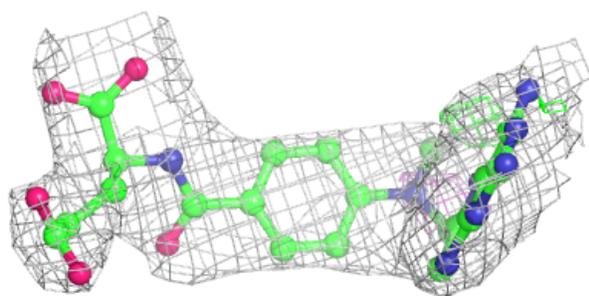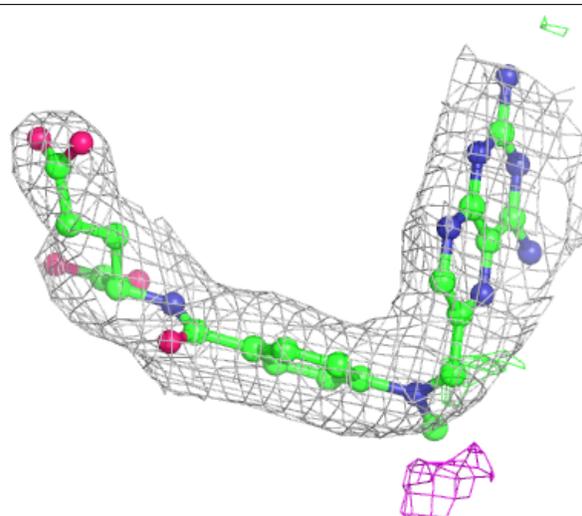
Electron density around MTX B 604:

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

Electron density around MTX C 604:

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

Electron density around UFP D 602:

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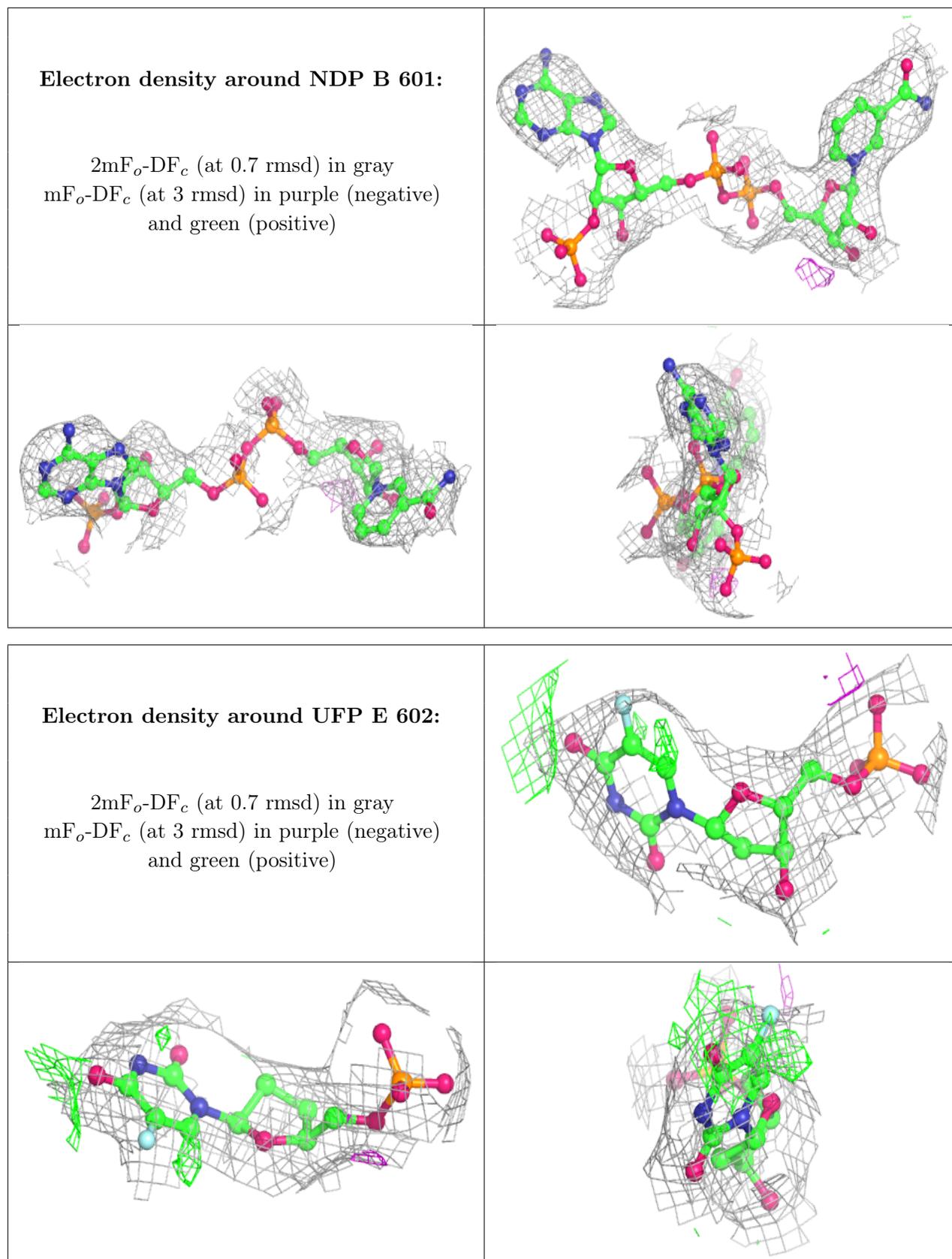mF_o-DF_c (at 3 rmsd) in purple (negative)
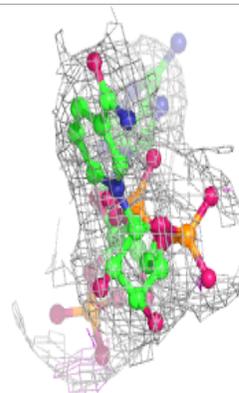and green (positive)
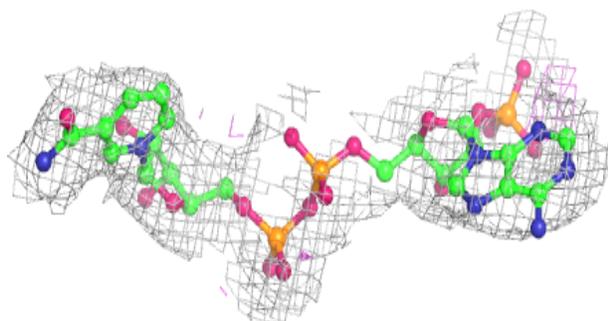

Electron density around NDP E 601:

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

Electron density around UFP C 602:

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

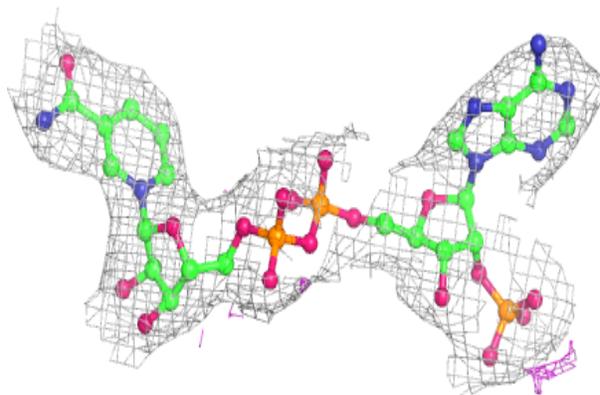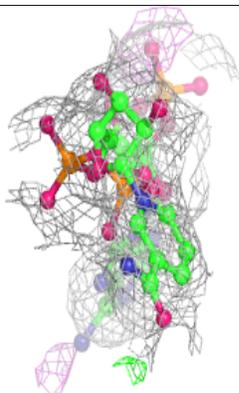
Electron density around NDP D 601:

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

Electron density around NDP B 601:

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

Electron density around UFP E 602:

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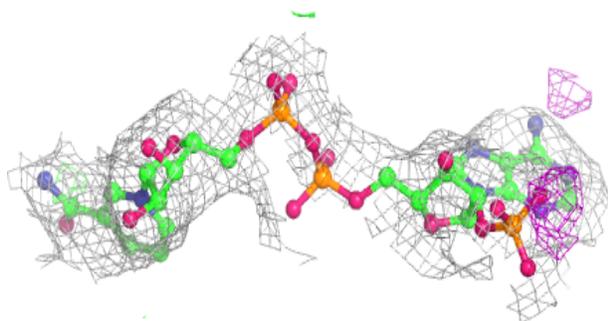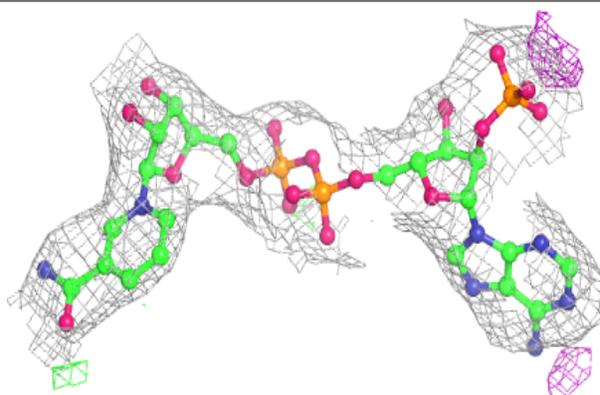$mF_o\text{-}DF_c$ (at 3 rmsd) in purple (negative)
and green (positive)

Electron density around NDP C 601:

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

Electron density around NDP A 601:

$2mF_o$-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 ⓘ

There are no such residues in this entry.