



# wwPDB X-ray Structure Validation Summary Report ⓘ

May 23, 2020 – 04:28 pm BST

PDB ID : 5EOM  
Title : Structure of full-length human MAB21L1 with bound CTP  
Authors : de Oliveira Mann, C.C.; Witte, G.; Hopfner, K.-P.  
Deposited on : 2015-11-10  
Resolution : 2.55 Å(reported)

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

We welcome your comments at [validation@mail.wwpdb.org](mailto:validation@mail.wwpdb.org)

A user guide is available at

<https://www.wwpdb.org/validation/2017/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

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

MolProbity : 4.02b-467  
Mogul : 1.8.5 (274361), CSD as541be (2020)  
Xtriage (Phenix) : 1.13  
EDS : 2.11  
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

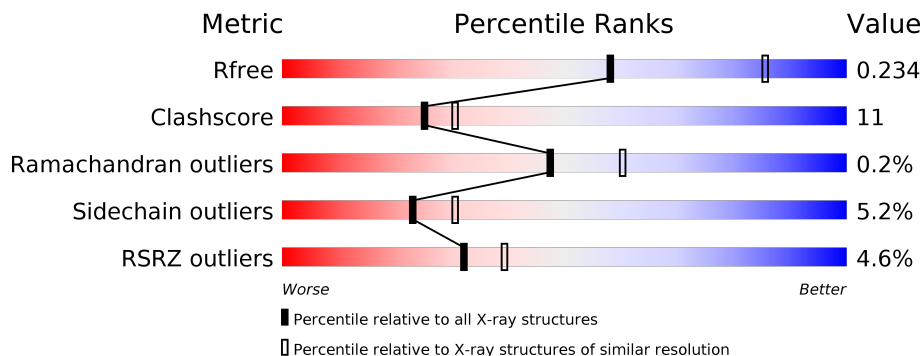
# 1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.55 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.






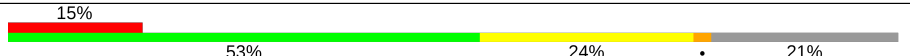
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
$R_{free}$	130704	1284 (2.56-2.52)
Clashscore	141614	1332 (2.56-2.52)
Ramachandran outliers	138981	1315 (2.56-2.52)
Sidechain outliers	138945	1315 (2.56-2.52)
RSRZ outliers	127900	1272 (2.56-2.52)

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  $\geq 3$ , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions  $\leq 5\%$ . The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	362	
1	B	362	
1	C	362	
1	D	362	
1	E	362	
1	F	362	

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Mol	Chain	Length	Quality of chain
1	G	362	
1	H	362	
1	I	362	
1	J	362	

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
2	CIT	C	401	-	-	X	-

## 2 Entry composition [i](#)

There are 5 unique types of molecules in this entry. The entry contains 28115 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 Protein mab-21-like 1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	349	2821	1790	506	505	20	0	2	0
1	B	349	2792	1771	494	507	20	0	0	0
1	D	342	2749	1748	492	490	19	0	0	0
1	E	348	2806	1779	503	507	17	0	1	0
1	F	339	2721	1732	482	490	17	0	0	0
1	G	352	2824	1790	506	508	20	0	0	0
1	H	345	2767	1759	491	497	20	0	0	0
1	I	346	2783	1767	499	499	18	0	0	0
1	J	286	2304	1467	415	407	15	0	0	0
1	C	353	2846	1804	510	511	21	0	2	0

There are 40 discrepancies between the modelled and reference sequences:

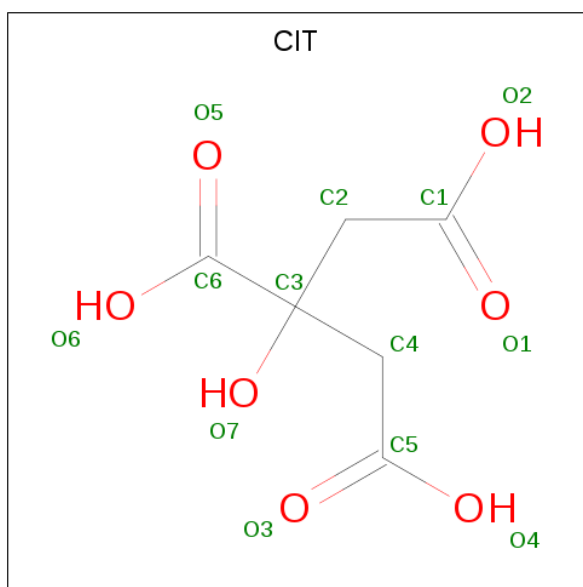
Chain	Residue	Modelled	Actual	Comment	Reference
A	-2	GLY	-	expression tag	UNP Q13394
A	-1	ALA	-	expression tag	UNP Q13394
A	0	MET	-	expression tag	UNP Q13394
A	1	ASP	-	expression tag	UNP Q13394
B	-2	GLY	-	expression tag	UNP Q13394
B	-1	ALA	-	expression tag	UNP Q13394
B	0	MET	-	expression tag	UNP Q13394
B	1	ASP	-	expression tag	UNP Q13394
D	-2	GLY	-	expression tag	UNP Q13394

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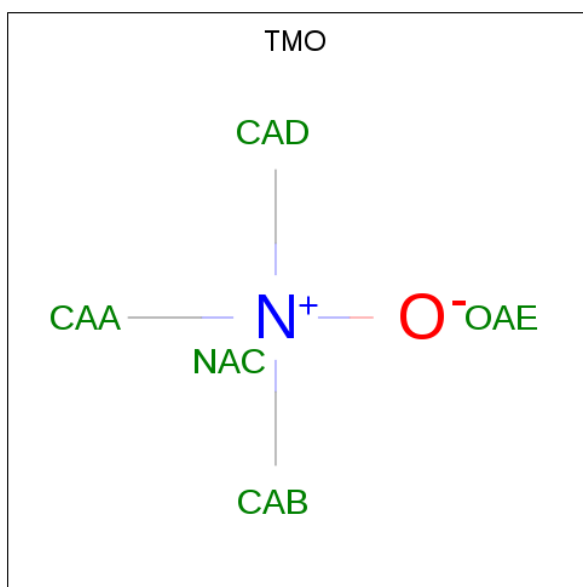
Chain	Residue	Modelled	Actual	Comment	Reference
D	-1	ALA	-	expression tag	UNP Q13394
D	0	MET	-	expression tag	UNP Q13394
D	1	ASP	-	expression tag	UNP Q13394
E	-2	GLY	-	expression tag	UNP Q13394
E	-1	ALA	-	expression tag	UNP Q13394
E	0	MET	-	expression tag	UNP Q13394
E	1	ASP	-	expression tag	UNP Q13394
F	-2	GLY	-	expression tag	UNP Q13394
F	-1	ALA	-	expression tag	UNP Q13394
F	0	MET	-	expression tag	UNP Q13394
F	1	ASP	-	expression tag	UNP Q13394
G	-2	GLY	-	expression tag	UNP Q13394
G	-1	ALA	-	expression tag	UNP Q13394
G	0	MET	-	expression tag	UNP Q13394
G	1	ASP	-	expression tag	UNP Q13394
H	-2	GLY	-	expression tag	UNP Q13394
H	-1	ALA	-	expression tag	UNP Q13394
H	0	MET	-	expression tag	UNP Q13394
H	1	ASP	-	expression tag	UNP Q13394
I	-2	GLY	-	expression tag	UNP Q13394
I	-1	ALA	-	expression tag	UNP Q13394
I	0	MET	-	expression tag	UNP Q13394
I	1	ASP	-	expression tag	UNP Q13394
J	-2	GLY	-	expression tag	UNP Q13394
J	-1	ALA	-	expression tag	UNP Q13394
J	0	MET	-	expression tag	UNP Q13394
J	1	ASP	-	expression tag	UNP Q13394
C	-2	GLY	-	expression tag	UNP Q13394
C	-1	ALA	-	expression tag	UNP Q13394
C	0	MET	-	expression tag	UNP Q13394
C	1	ASP	-	expression tag	UNP Q13394

- Molecule 2 is CITRIC ACID (three-letter code: CIT) (formula: C<sub>6</sub>H<sub>8</sub>O<sub>7</sub>).



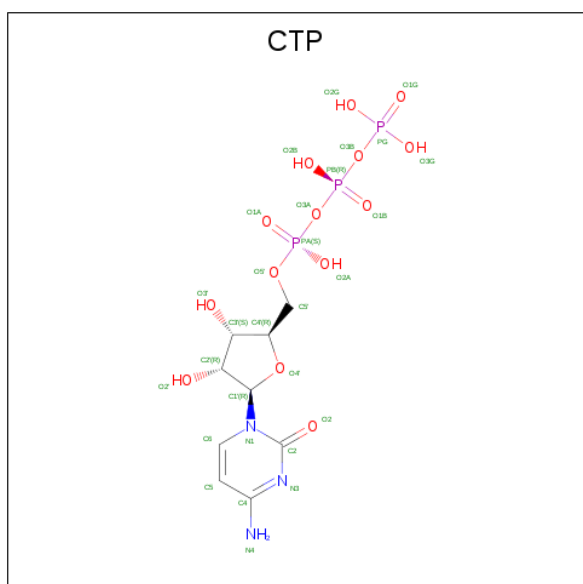
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	A	1	Total	C	O	0	0
			13	6	7		
2	B	1	Total	C	O	0	0
			13	6	7		
2	D	1	Total	C	O	0	0
			13	6	7		
2	E	1	Total	C	O	0	0
			13	6	7		
2	F	1	Total	C	O	0	0
			13	6	7		
2	G	1	Total	C	O	0	0
			13	6	7		
2	H	1	Total	C	O	0	0
			13	6	7		
2	H	1	Total	C	O	0	0
			13	6	7		
2	I	1	Total	C	O	0	0
			13	6	7		
2	C	1	Total	C	O	0	0
			13	6	7		

- Molecule 3 is trimethylamine oxide (three-letter code: TMO) (formula: C<sub>3</sub>H<sub>9</sub>NO).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	N	O		
3	A	1	5	3	1	1	0	0
3	F	1	5	3	1	1	0	0
3	C	1	5	3	1	1	0	0
3	C	1	5	3	1	1	0	0

- Molecule 4 is CYTIDINE-5'-TRIPHOSPHATE (three-letter code: CTP) (formula:  $C_9H_{16}N_3O_{14}P_3$ ).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
4	A	1	Total	C	N	O	P	0	0
			29	9	3	14	3		
4	B	1	Total	C	N	O	P	0	0
			29	9	3	14	3		
4	D	1	Total	C	N	O	P	0	0
			29	9	3	14	3		
4	E	1	Total	C	N	O	P	0	0
			29	9	3	14	3		
4	F	1	Total	C	N	O	P	0	0
			29	9	3	14	3		
4	G	1	Total	C	N	O	P	0	0
			29	9	3	14	3		
4	H	1	Total	C	N	O	P	0	0
			29	9	3	14	3		
4	I	1	Total	C	N	O	P	0	0
			29	9	3	14	3		
4	J	1	Total	C	N	O	P	0	0
			29	9	3	14	3		
4	C	1	Total	C	N	O	P	0	0
			29	9	3	14	3		

- Molecule 5 is water.

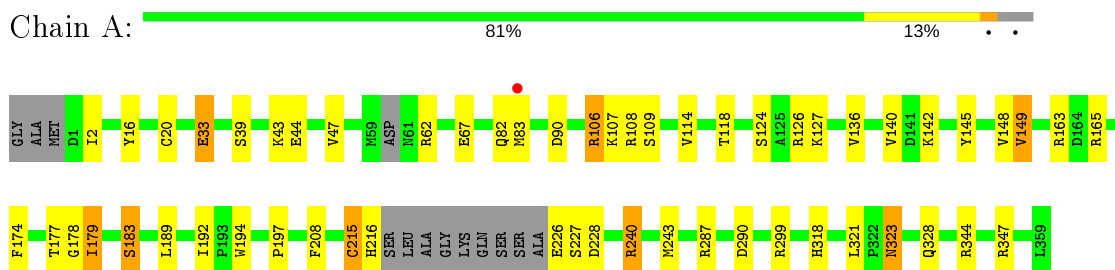
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	51	Total	O	0	0
			51	51		
5	B	27	Total	O	0	0
			27	27		
5	D	21	Total	O	0	0
			21	21		
5	E	26	Total	O	0	0
			26	26		
5	F	38	Total	O	0	0
			38	38		
5	G	17	Total	O	0	0
			17	17		
5	H	18	Total	O	0	0
			18	18		
5	I	18	Total	O	0	0
			18	18		
5	J	16	Total	O	0	0
			16	16		
5	C	30	Total	O	0	0
			30	30		



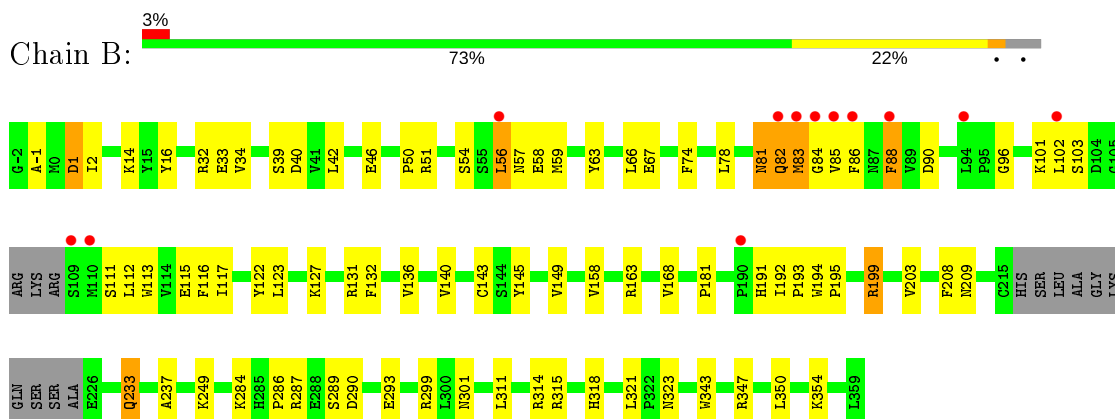
### 3 Residue-property plots [i](#)

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.

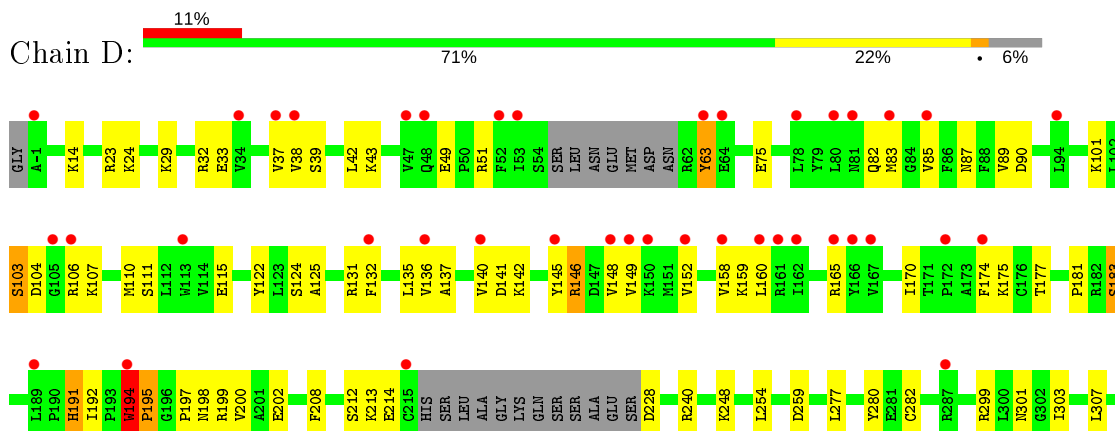
- Molecule 1: Protein mab-21-like 1



- Molecule 1: Protein mab-21-like 1

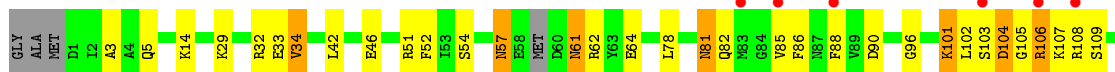
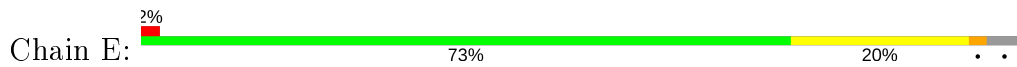


- Molecule 1: Protein mab-21-like 1

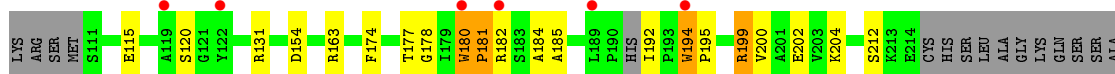




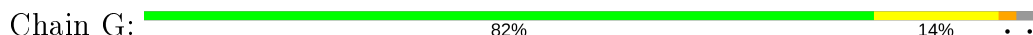
• Molecule 1: Protein mab-21-like 1



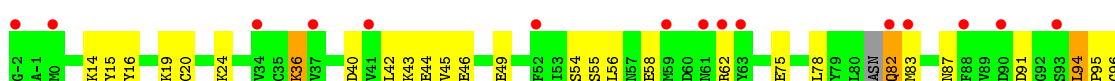
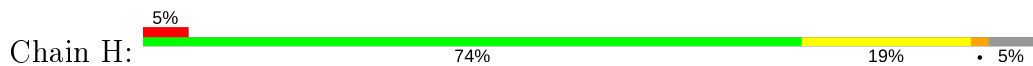
• Molecule 1: Protein mab-21-like 1

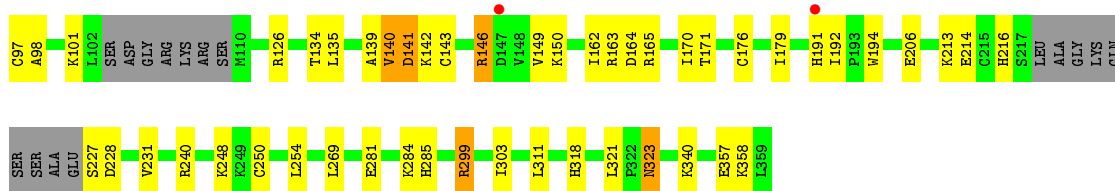


• Molecule 1: Protein mab-21-like 1

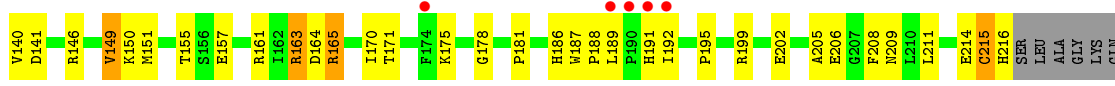
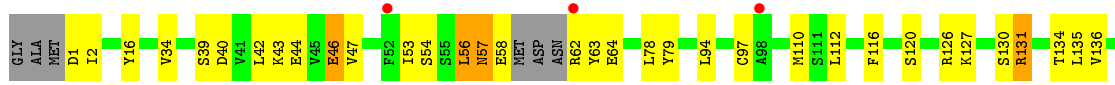


• Molecule 1: Protein mab-21-like 1

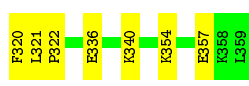
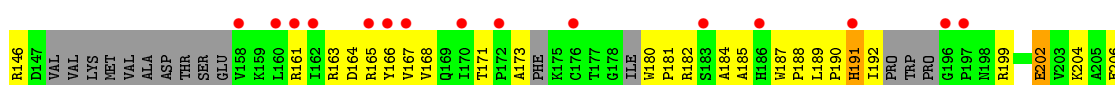
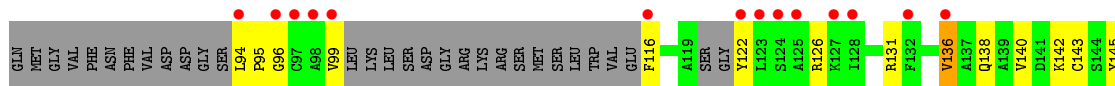
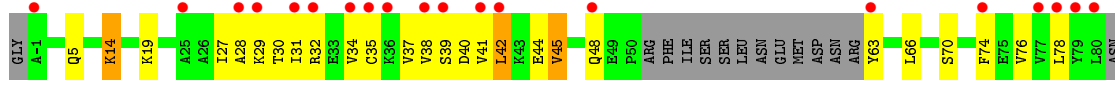




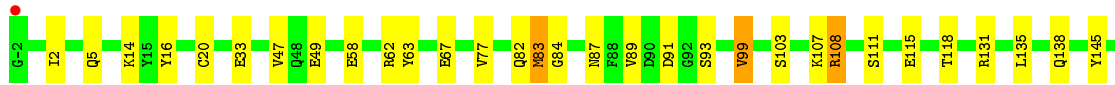
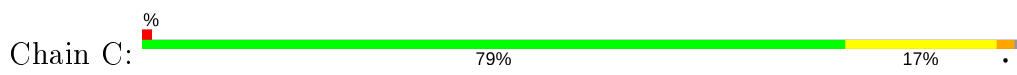
• Molecule 1: Protein mab-21-like 1

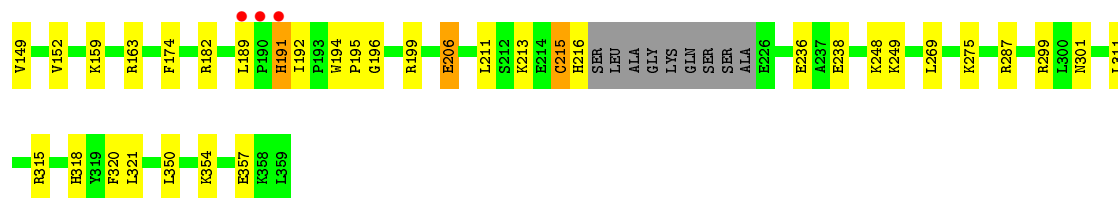


• Molecule 1: Protein mab-21-like 1



• Molecule 1: Protein mab-21-like 1





## 4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	115.00Å 177.76Å 134.94Å 90.00° 97.58° 90.00°	Depositor
Resolution (Å)	49.98 – 2.55 49.98 – 2.55	Depositor EDS
% Data completeness (in resolution range)	99.8 (49.98-2.55) 99.8 (49.98-2.55)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	0.07	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	2.32 (at 2.54Å)	Xtrriage
Refinement program	PHENIX (1.10.1_2155: ???)	Depositor
R, $R_{free}$	0.199 , 0.227 0.205 , 0.234	Depositor DCC
$R_{free}$ test set	1670 reflections (0.96%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	64.2	Xtrriage
Anisotropy	0.542	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.28 , 53.4	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.49$ , $\langle L^2 \rangle = 0.32$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
$F_o, F_c$ correlation	0.95	EDS
Total number of atoms	28115	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	93.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 8.80% of the height of the origin peak. No significant pseudotranslation is detected.*

<sup>1</sup> Intensities estimated from amplitudes.

<sup>2</sup> Theoretical values of  $\langle |L| \rangle$ ,  $\langle L^2 \rangle$  for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

## 5 Model quality i

### 5.1 Standard geometry i

Bond lengths and bond angles in the following residue types are not validated in this section: CIT, CTP, TMO

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	0.26	0/2886	0.48	0/3897
1	B	0.25	0/2850	0.45	0/3852
1	C	0.25	0/2912	0.45	0/3933
1	D	0.28	0/2807	0.51	1/3792 (0.0%)
1	E	0.26	0/2867	0.47	1/3873 (0.0%)
1	F	0.32	1/2775 (0.0%)	0.50	0/3748
1	G	0.25	0/2884	0.44	0/3897
1	H	0.26	0/2825	0.46	0/3817
1	I	0.38	2/2842 (0.1%)	0.54	4/3840 (0.1%)
1	J	0.27	0/2345	0.46	1/3159 (0.0%)
All	All	0.28	3/27993 (0.0%)	0.48	7/37808 (0.0%)

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	E	0	2
1	J	0	1
All	All	0	3

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	I	319	TYR	CD2-CE2	-9.56	1.25	1.39
1	F	319	TYR	CD2-CE2	-6.11	1.30	1.39
1	I	46	GLU	CB-CG	-5.61	1.41	1.52

The worst 5 of 7 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	J	42	LEU	CA-CB-CG	6.65	130.59	115.30
1	D	194	TRP	CA-CB-CG	6.46	125.97	113.70
1	I	215	CYS	CB-CA-C	-5.80	98.79	110.40
1	I	319	TYR	OH-CZ-CE2	-5.66	104.82	120.10
1	E	199	ARG	CG-CD-NE	-5.23	100.81	111.80

There are no chirality outliers.

All (3) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	E	61	ASN	Peptide
1	J	136	VAL	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	2821	0	2860	47	0
1	B	2792	0	2813	68	1
1	C	2846	0	2882	38	0
1	D	2749	0	2791	71	0
1	E	2806	0	2839	58	0
1	F	2721	0	2755	65	1
1	G	2824	0	2854	43	0
1	H	2767	0	2795	64	0
1	I	2783	0	2817	77	0
1	J	2304	0	2347	85	0
2	A	13	0	5	1	0
2	B	13	0	5	2	0
2	C	13	0	5	7	0
2	D	13	0	5	2	0
2	E	13	0	5	0	0
2	F	13	0	5	1	0
2	G	13	0	5	2	0
2	H	26	0	10	1	0
2	I	13	0	5	2	0
3	A	5	0	9	1	0
3	C	10	0	18	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	F	5	0	9	0	0
4	A	29	0	12	1	0
4	B	29	0	12	0	0
4	C	29	0	12	0	0
4	D	29	0	12	1	0
4	E	29	0	12	2	0
4	F	29	0	12	1	0
4	G	29	0	12	0	0
4	H	29	0	12	3	0
4	I	29	0	12	2	0
4	J	29	0	12	0	0
5	A	51	0	0	0	0
5	B	27	0	0	0	0
5	C	30	0	0	0	0
5	D	21	0	0	0	0
5	E	26	0	0	1	0
5	F	38	0	0	1	0
5	G	17	0	0	0	0
5	H	18	0	0	4	0
5	I	18	0	0	2	0
5	J	16	0	0	3	0
All	All	28115	0	27959	599	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 11.

The worst 5 of 599 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:J:187:TRP:CE3	1:J:204:LYS:HE3	1.70	1.26
1:E:103:SER:O	1:E:106:ARG:HB2	1.34	1.23
1:J:187:TRP:CZ3	1:J:204:LYS:HE3	1.74	1.21
1:J:187:TRP:CE3	1:J:204:LYS:CE	2.34	1.09
1:E:104:ASP:OD1	1:E:105:GLY:N	1.93	1.02

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)
1:B:32:ARG:NH1	1:F:154:ASP:OD2[2_846]	2.13	0.07



## 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	345/362 (95%)	337 (98%)	8 (2%)	0	100	100
1	B	343/362 (95%)	333 (97%)	10 (3%)	0	100	100
1	C	351/362 (97%)	344 (98%)	7 (2%)	0	100	100
1	D	336/362 (93%)	320 (95%)	15 (4%)	1 (0%)	41	51
1	E	343/362 (95%)	333 (97%)	8 (2%)	2 (1%)	25	34
1	F	327/362 (90%)	310 (95%)	15 (5%)	2 (1%)	25	34
1	G	348/362 (96%)	339 (97%)	9 (3%)	0	100	100
1	H	337/362 (93%)	326 (97%)	11 (3%)	0	100	100
1	I	340/362 (94%)	335 (98%)	5 (2%)	0	100	100
1	J	266/362 (74%)	255 (96%)	11 (4%)	0	100	100
All	All	3336/3620 (92%)	3232 (97%)	99 (3%)	5 (0%)	47	65

All (5) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	D	195	PRO
1	E	108	ARG
1	E	104	ASP
1	F	61	ASN
1	F	181	PRO

### 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	311/317 (98%)	299 (96%)	12 (4%)	32	44
1	B	307/317 (97%)	296 (96%)	11 (4%)	35	47
1	C	313/317 (99%)	290 (93%)	23 (7%)	14	18
1	D	301/317 (95%)	286 (95%)	15 (5%)	24	33
1	E	309/317 (98%)	294 (95%)	15 (5%)	25	34
1	F	299/317 (94%)	282 (94%)	17 (6%)	20	27
1	G	310/317 (98%)	297 (96%)	13 (4%)	30	40
1	H	304/317 (96%)	289 (95%)	15 (5%)	25	34
1	I	306/317 (96%)	288 (94%)	18 (6%)	19	25
1	J	251/317 (79%)	231 (92%)	20 (8%)	12	15
All	All	3011/3170 (95%)	2852 (95%)	159 (5%)	23	30

5 of 159 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	G	36	LYS
1	H	134	THR
1	C	103	SER
1	G	81	ASN
1	G	294	SER

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 25 such sidechains are listed below:

Mol	Chain	Res	Type
1	E	261	HIS
1	F	21	GLN
1	C	81	ASN
1	E	271	ASN
1	F	82	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](#)

24 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
3	TMO	C	402	-	4,4,4	1.91	2 (50%)	6,6,6	0.22	0
2	CIT	D	401	-	3,12,12	1.26	0	3,17,17	1.46	1 (33%)
2	CIT	C	401	-	3,12,12	1.22	0	3,17,17	2.29	2 (66%)
4	CTP	G	402	-	23,30,30	0.83	0	30,47,47	1.45	5 (16%)
2	CIT	H	401	-	3,12,12	1.22	0	3,17,17	2.24	1 (33%)
4	CTP	F	403	-	23,30,30	0.81	0	30,47,47	1.44	5 (16%)
3	TMO	A	402	-	4,4,4	1.89	3 (75%)	6,6,6	0.24	0
2	CIT	G	401	-	3,12,12	1.37	0	3,17,17	2.45	1 (33%)
2	CIT	F	401	-	3,12,12	1.20	0	3,17,17	2.08	2 (66%)
4	CTP	B	402	-	23,30,30	0.80	0	30,47,47	1.45	5 (16%)
4	CTP	H	403	-	23,30,30	0.80	0	30,47,47	1.48	5 (16%)
4	CTP	A	403	-	23,30,30	0.81	0	30,47,47	1.43	5 (16%)
2	CIT	B	401	-	3,12,12	1.37	0	3,17,17	2.30	2 (66%)
2	CIT	H	402	-	3,12,12	1.33	0	3,17,17	2.18	1 (33%)
4	CTP	C	404	-	23,30,30	0.83	0	30,47,47	1.44	5 (16%)
4	CTP	D	402	-	23,30,30	0.81	0	30,47,47	1.47	5 (16%)
3	TMO	F	402	-	4,4,4	1.86	1 (25%)	6,6,6	0.23	0
2	CIT	I	401	-	3,12,12	1.21	0	3,17,17	1.93	2 (66%)
4	CTP	J	401	-	23,30,30	0.81	0	30,47,47	1.47	6 (20%)
2	CIT	E	401	-	3,12,12	1.30	0	3,17,17	1.69	1 (33%)
3	TMO	C	403	-	4,4,4	1.87	2 (50%)	6,6,6	0.22	0
4	CTP	I	402	-	23,30,30	0.82	0	30,47,47	1.52	5 (16%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
4	CTP	E	402	-	23,30,30	0.81	0	30,47,47	1.43	5 (16%)
2	CIT	A	401	-	3,12,12	1.36	0	3,17,17	1.35	0

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	CIT	G	401	-	-	4/6/16/16	-
2	CIT	F	401	-	-	5/6/16/16	-
2	CIT	E	401	-	-	2/6/16/16	-
2	CIT	D	401	-	-	6/6/16/16	-
4	CTP	C	404	-	-	3/20/38/38	0/2/2/2
4	CTP	J	401	-	-	3/20/38/38	0/2/2/2
4	CTP	I	402	-	-	10/20/38/38	0/2/2/2
2	CIT	C	401	-	-	3/6/16/16	-
4	CTP	D	402	-	-	6/20/38/38	0/2/2/2
4	CTP	B	402	-	-	5/20/38/38	0/2/2/2
4	CTP	H	403	-	-	6/20/38/38	0/2/2/2
4	CTP	A	403	-	-	1/20/38/38	0/2/2/2
4	CTP	G	402	-	-	7/20/38/38	0/2/2/2
4	CTP	E	402	-	-	5/20/38/38	0/2/2/2
2	CIT	I	401	-	-	6/6/16/16	-
2	CIT	H	401	-	-	1/6/16/16	-
4	CTP	F	403	-	-	8/20/38/38	0/2/2/2
2	CIT	H	402	-	-	4/6/16/16	-
2	CIT	B	401	-	-	0/6/16/16	-
2	CIT	A	401	-	-	4/6/16/16	-

The worst 5 of 8 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	C	402	TMO	CAA-NAC	-2.11	1.45	1.48
3	A	402	TMO	CAA-NAC	-2.07	1.45	1.48
3	C	402	TMO	CAB-NAC	-2.06	1.45	1.48
3	C	403	TMO	CAB-NAC	-2.02	1.45	1.48
3	C	403	TMO	CAA-NAC	-2.02	1.45	1.48

The worst 5 of 64 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed( $^{\circ}$ )	Ideal( $^{\circ}$ )
4	G	402	CTP	C2-N3-C4	3.97	120.37	116.34
2	G	401	CIT	C3-C4-C5	-3.87	108.79	114.98
4	F	403	CTP	C2-N3-C4	3.82	120.21	116.34
4	B	402	CTP	C2-N3-C4	3.81	120.20	116.34
4	I	402	CTP	C2-N3-C4	3.80	120.19	116.34

There are no chirality outliers.

5 of 89 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	D	401	CIT	C2-C3-C4-C5
2	D	401	CIT	O7-C3-C4-C5
2	D	401	CIT	C6-C3-C4-C5
4	G	402	CTP	O4'-C4'-C5'-O5'
4	G	402	CTP	C5'-O5'-PA-O3A

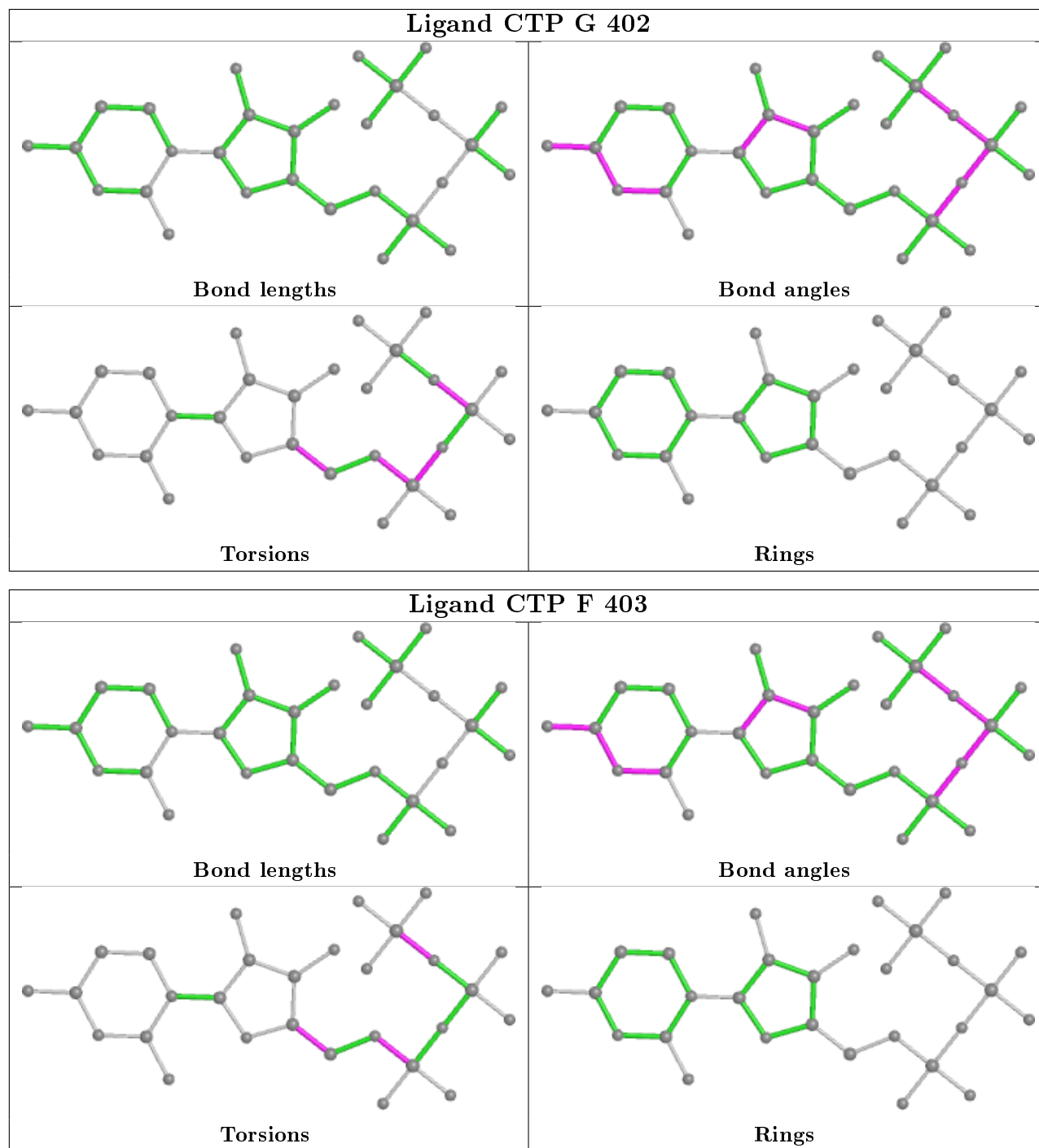
There are no ring outliers.

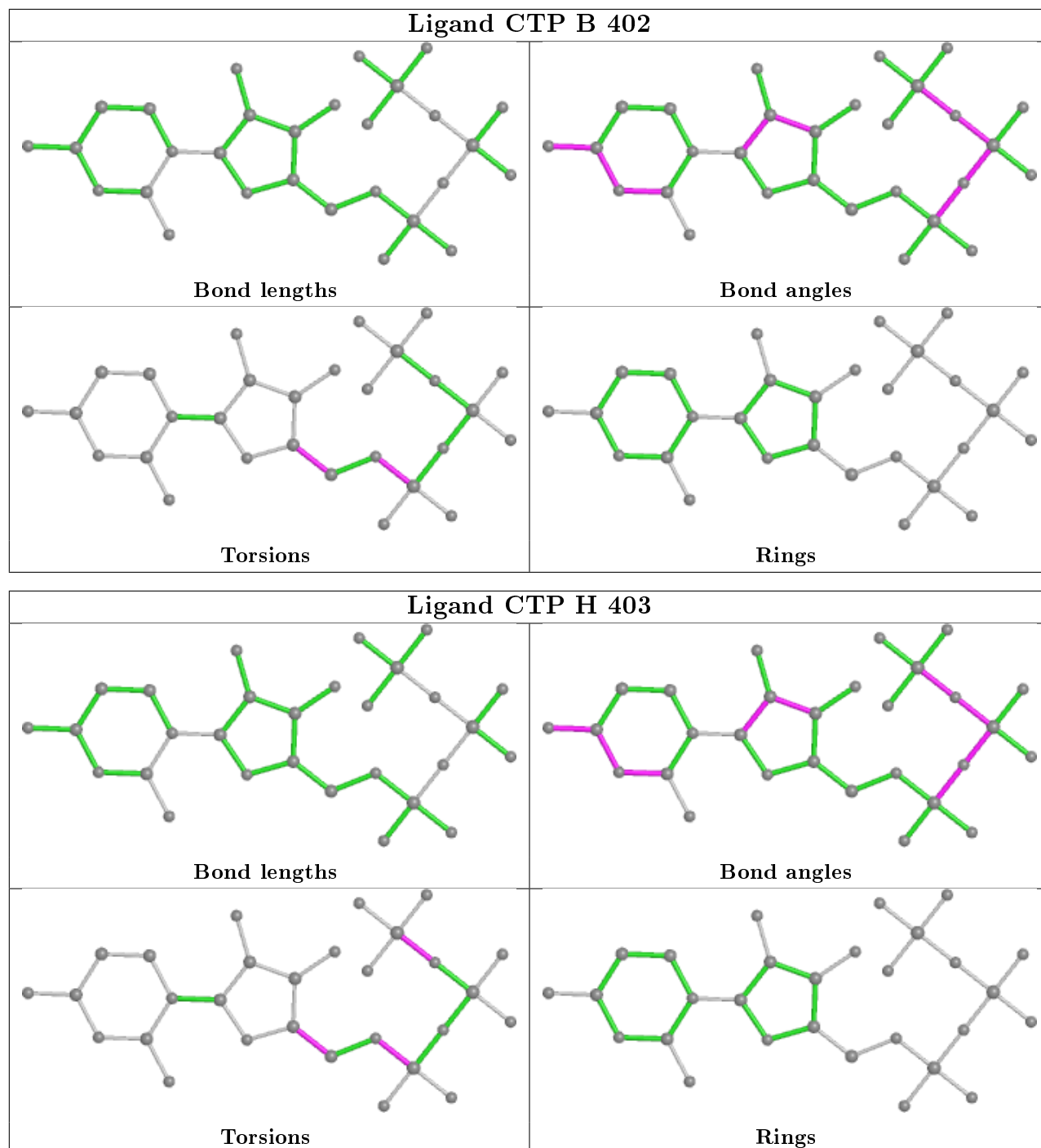
15 monomers are involved in 29 short contacts:

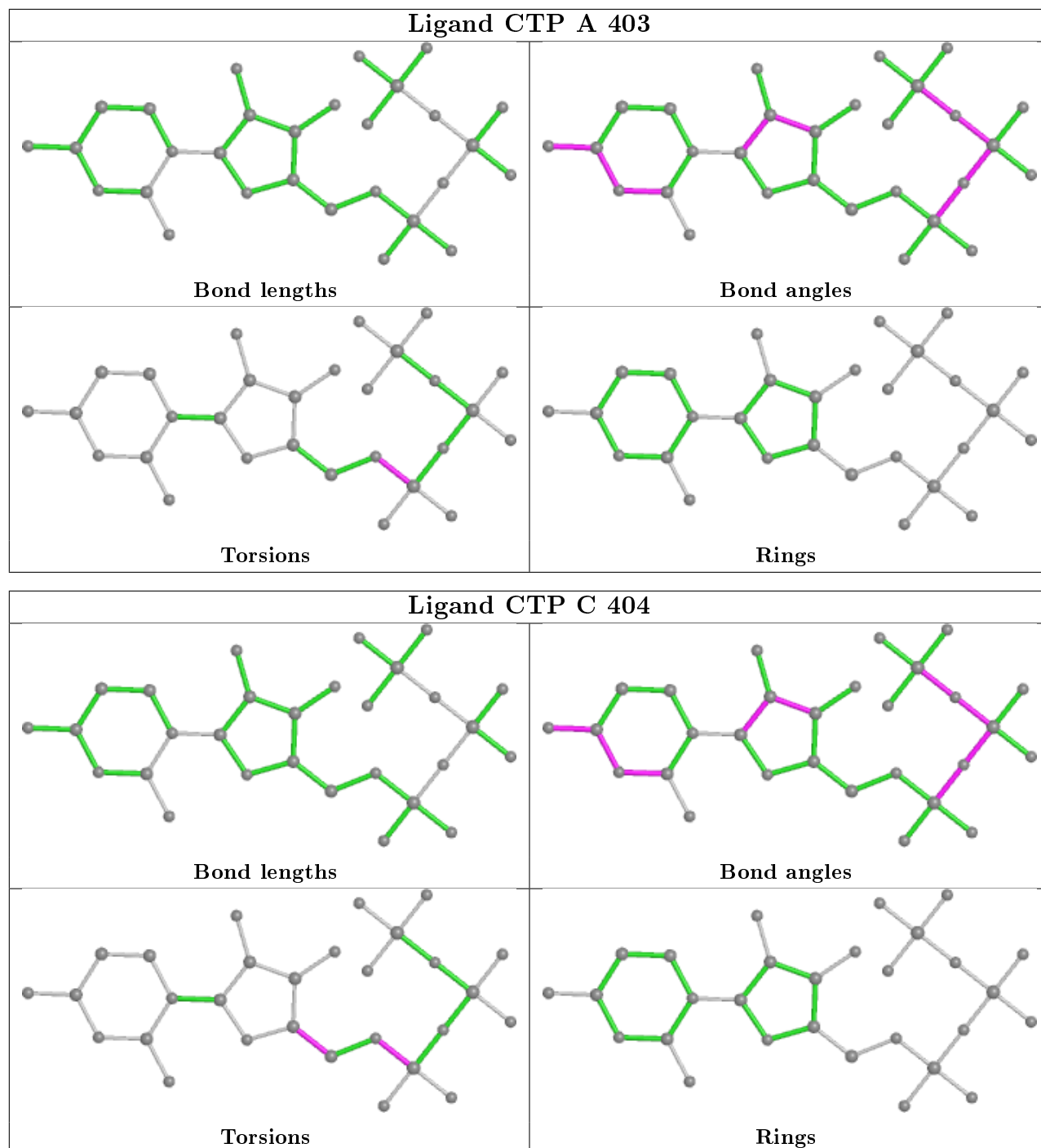
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	D	401	CIT	2	0
2	C	401	CIT	7	0
2	H	401	CIT	1	0
4	F	403	CTP	1	0
3	A	402	TMO	1	0
2	G	401	CIT	2	0
2	F	401	CIT	1	0
4	H	403	CTP	3	0
4	A	403	CTP	1	0
2	B	401	CIT	2	0
4	D	402	CTP	1	0
2	I	401	CIT	2	0
4	I	402	CTP	2	0
4	E	402	CTP	2	0
2	A	401	CIT	1	0

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 than 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier.

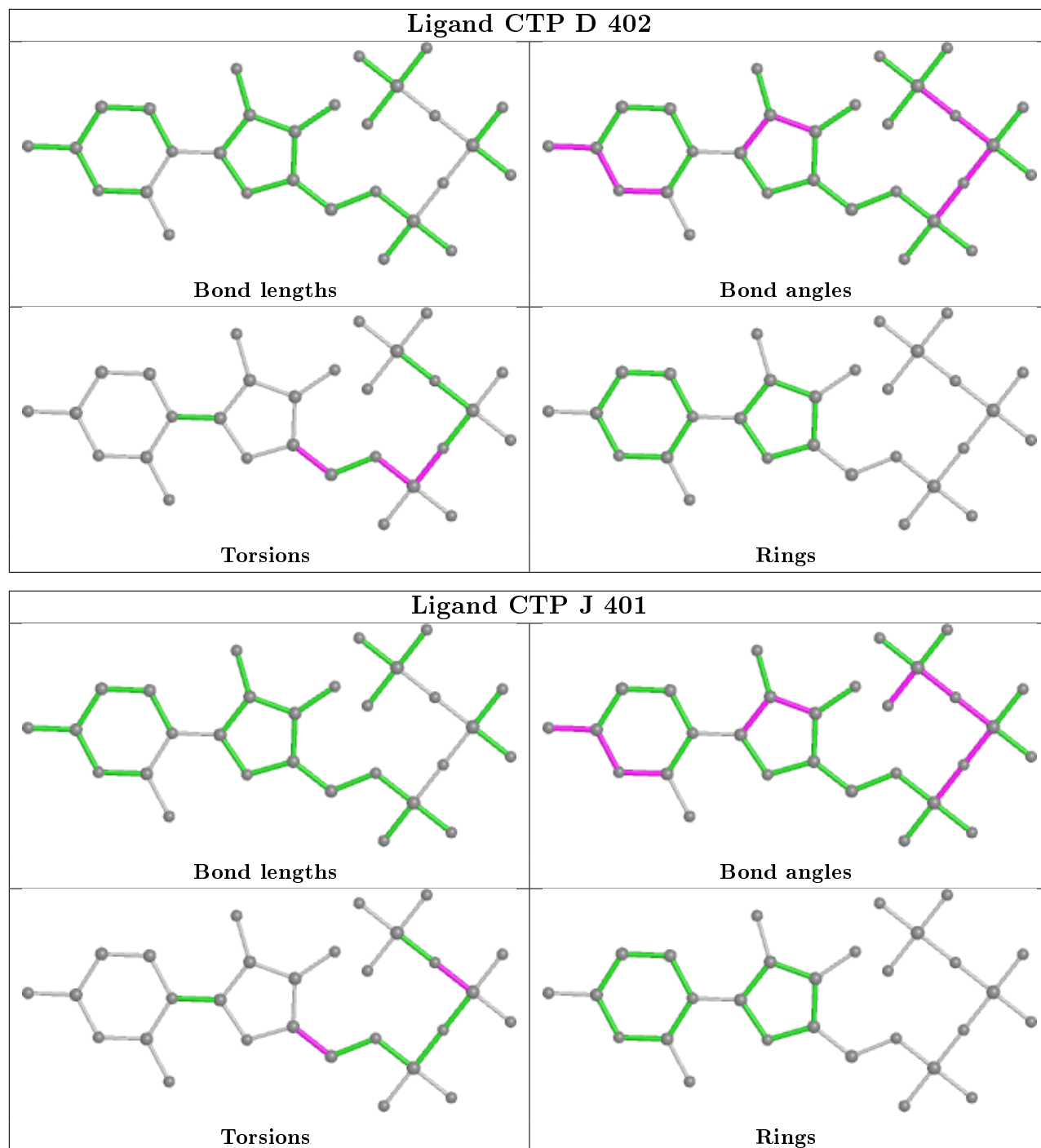
Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

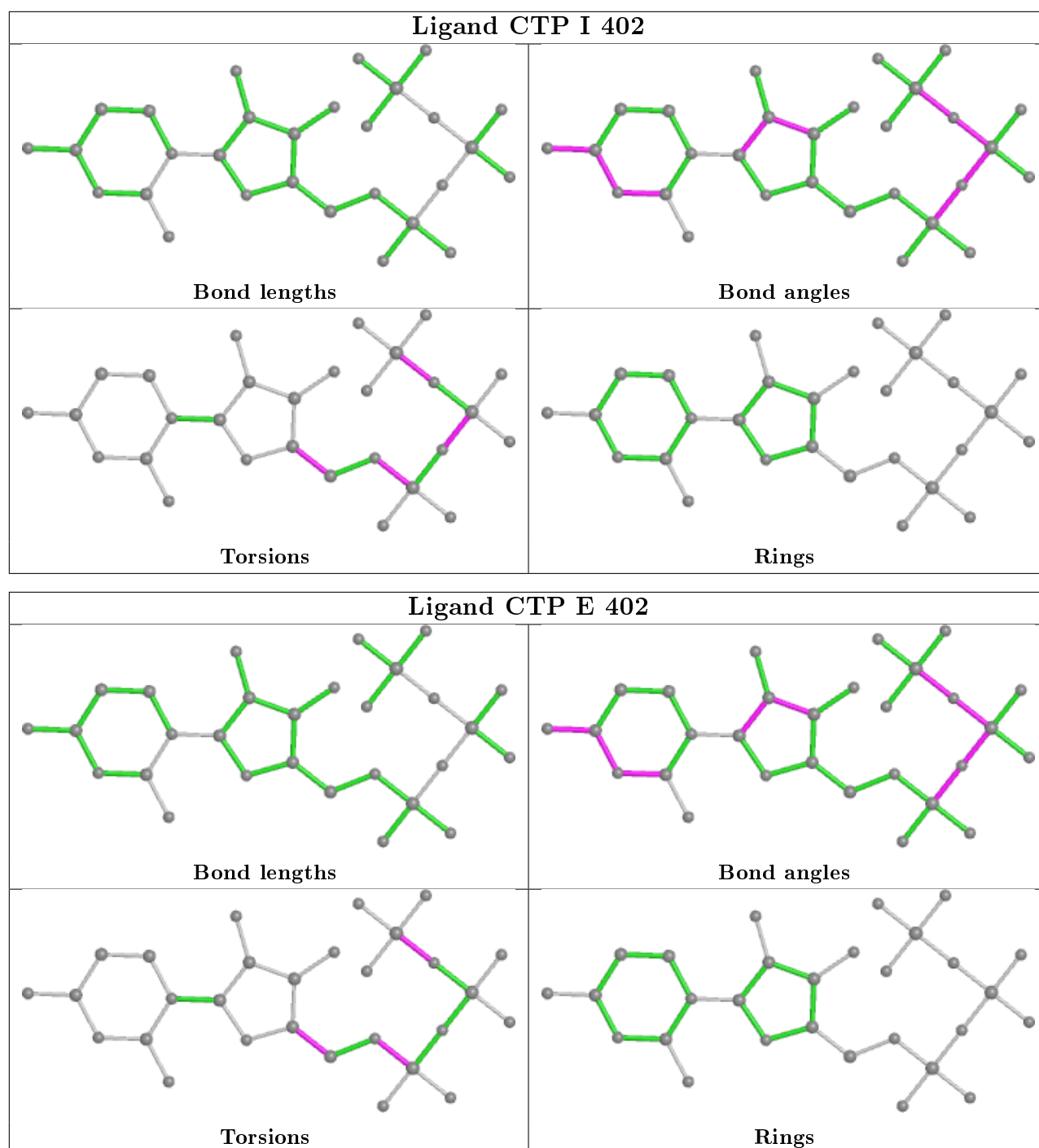












## 5.7 Other polymers [i](#)

There are no such residues in this entry.

## 5.8 Polymer linkage issues [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, 95<sup>th</sup> percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled 'Q < 0.9' lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å <sup>2</sup> )	Q<0.9
1	A	349/362 (96%)	-0.03	1 (0%) 94 96	44, 73, 126, 176	0
1	B	349/362 (96%)	0.01	12 (3%) 45 52	49, 78, 134, 170	0
1	C	353/362 (97%)	-0.11	4 (1%) 80 85	47, 71, 125, 183	0
1	D	342/362 (94%)	0.54	40 (11%) 4 6	41, 102, 170, 202	0
1	E	348/362 (96%)	-0.03	7 (2%) 65 72	48, 80, 134, 195	0
1	F	339/362 (93%)	0.05	14 (4%) 37 44	42, 84, 143, 184	0
1	G	352/362 (97%)	-0.12	1 (0%) 94 96	47, 84, 132, 186	0
1	H	345/362 (95%)	0.17	17 (4%) 29 35	43, 95, 163, 194	0
1	I	346/362 (95%)	0.11	8 (2%) 60 67	55, 101, 148, 203	0
1	J	286/362 (79%)	0.89	54 (18%) 1 1	49, 114, 182, 215	0
All	All	3409/3620 (94%)	0.13	158 (4%) 32 39	41, 85, 157, 215	0

The worst 5 of 158 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	J	166	TYR	12.6
1	J	35	CYS	10.4
1	J	132	PHE	8.1
1	J	38	VAL	7.6
1	J	31	ILE	6.7

### 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](#)

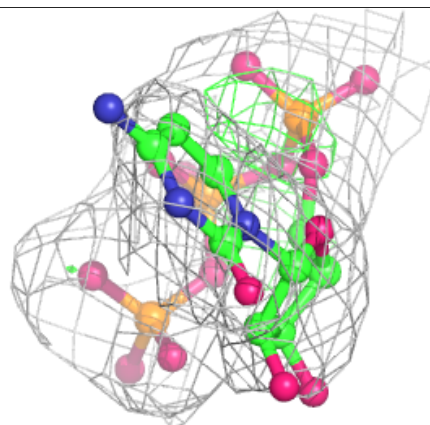
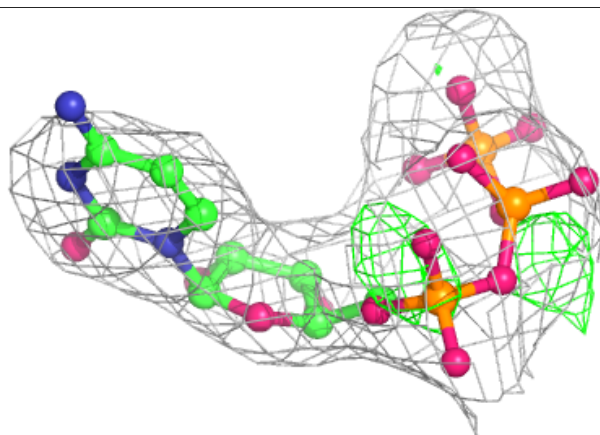
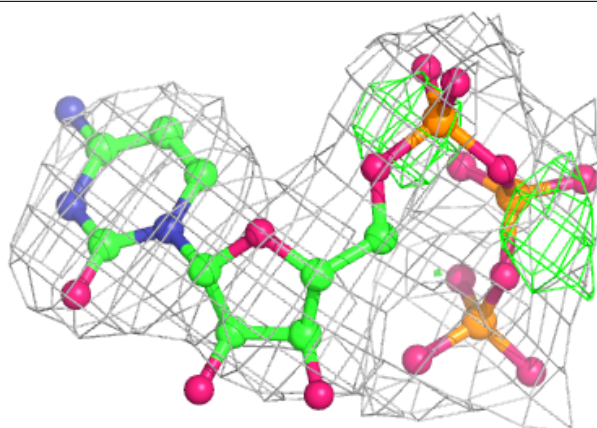
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95<sup>th</sup> percentile and maximum values of B factors of atoms in the group. The column labelled 'Q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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å <sup>2</sup> )	Q<0.9
3	TMO	C	403	5/5	0.83	0.40	130,130,132,137	0
2	CIT	C	401	13/13	0.84	0.14	86,104,126,130	0
4	CTP	I	402	29/29	0.84	0.22	117,146,189,197	0
2	CIT	I	401	13/13	0.85	0.24	104,112,141,144	0
2	CIT	G	401	13/13	0.87	0.19	107,119,134,139	0
2	CIT	H	401	13/13	0.88	0.14	93,123,140,142	0
2	CIT	A	401	13/13	0.88	0.19	88,115,146,147	0
2	CIT	D	401	13/13	0.89	0.15	78,109,137,142	0
2	CIT	F	401	13/13	0.90	0.12	94,115,131,134	0
3	TMO	F	402	5/5	0.90	0.26	109,113,116,116	0
2	CIT	B	401	13/13	0.91	0.13	84,94,123,129	0
3	TMO	A	402	5/5	0.92	0.18	109,112,113,115	0
4	CTP	H	403	29/29	0.93	0.16	82,124,129,130	0
2	CIT	H	402	13/13	0.93	0.11	106,115,124,128	0
4	CTP	J	401	29/29	0.93	0.18	91,126,136,157	0
2	CIT	E	401	13/13	0.94	0.10	87,100,110,117	0
3	TMO	C	402	5/5	0.94	0.55	97,103,104,109	0
4	CTP	D	402	29/29	0.95	0.19	82,117,129,130	0
4	CTP	C	404	29/29	0.97	0.15	52,75,92,99	0
4	CTP	B	402	29/29	0.97	0.14	55,77,94,119	0
4	CTP	E	402	29/29	0.97	0.14	60,78,89,108	0
4	CTP	G	402	29/29	0.97	0.15	74,94,110,114	0
4	CTP	F	403	29/29	0.98	0.14	55,68,82,94	0
4	CTP	A	403	29/29	0.98	0.17	45,64,83,85	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.

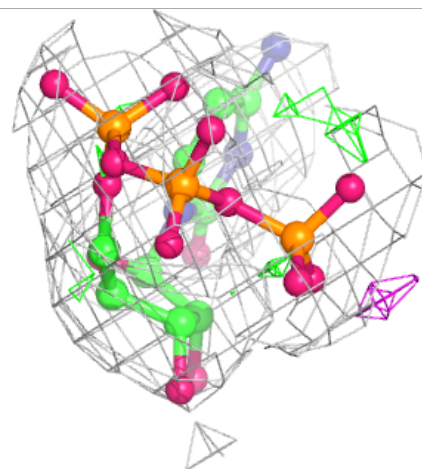
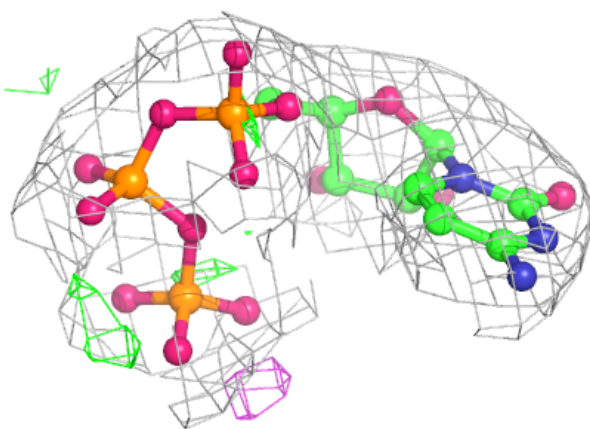
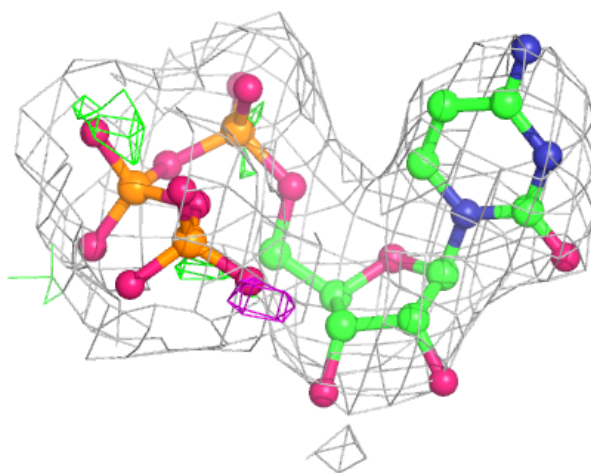
**Electron density around CTP I 402:**

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



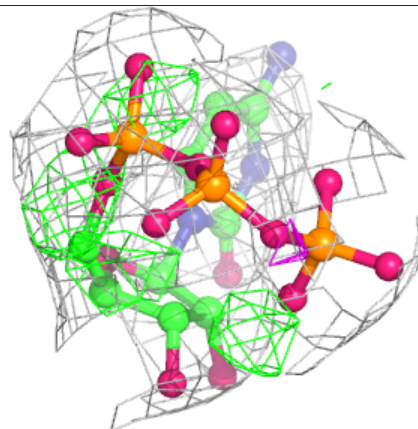
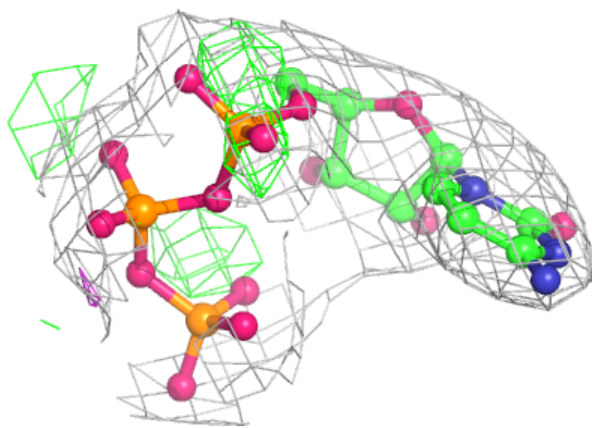
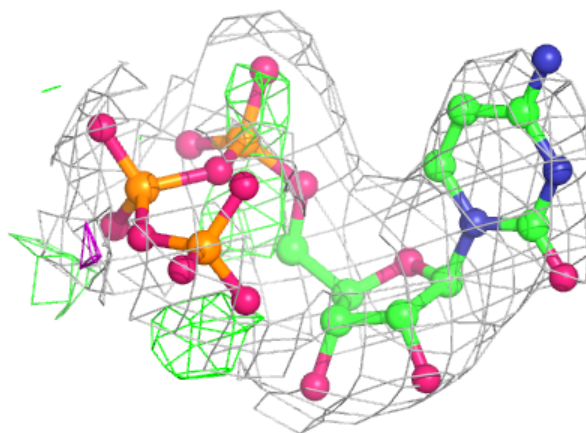
**Electron density around CTP H 403:**

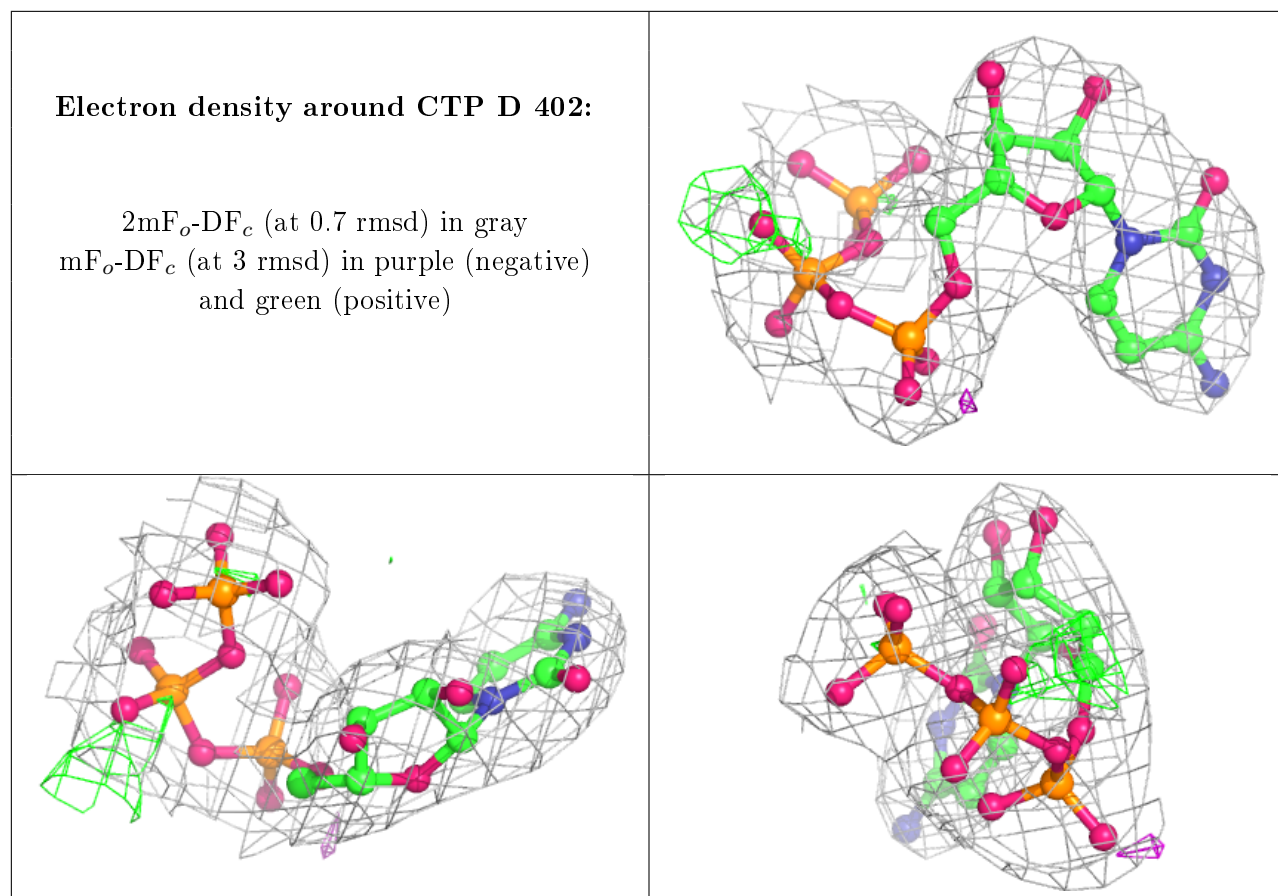
$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)



**Electron density around CTP J 401:**

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

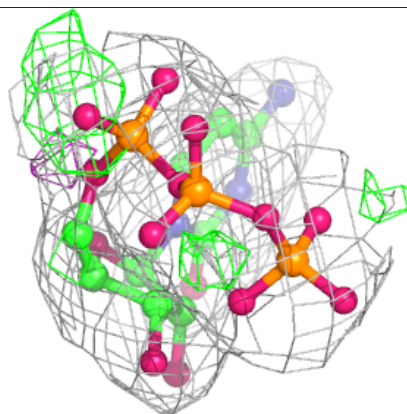
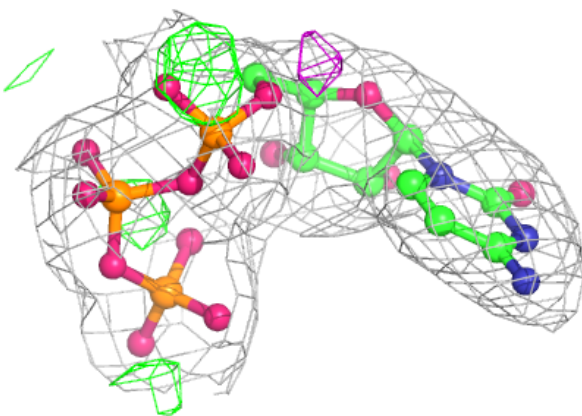
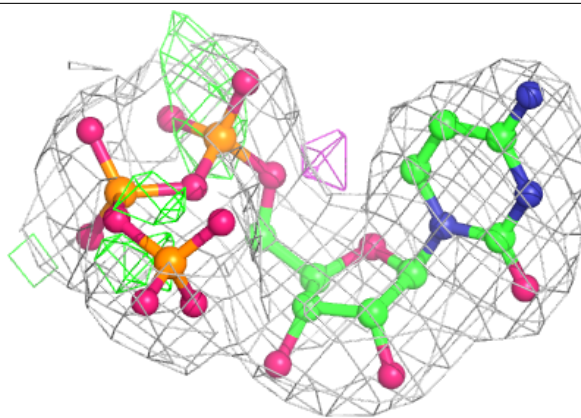




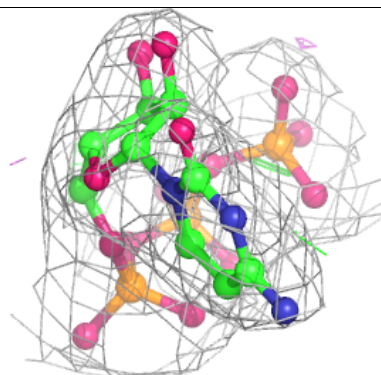
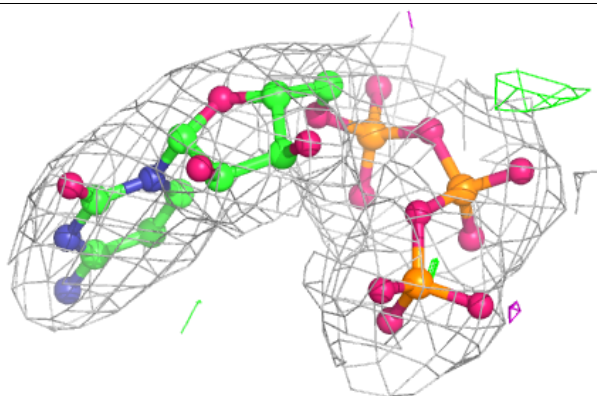
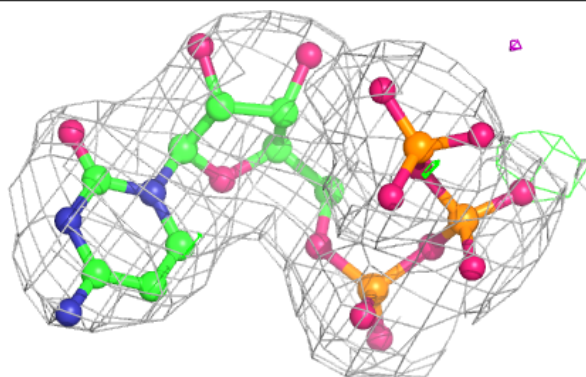


**Electron density around CTP C 404:**

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

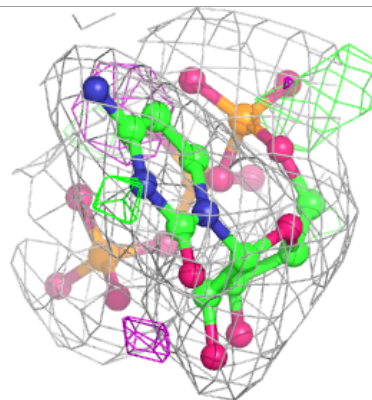
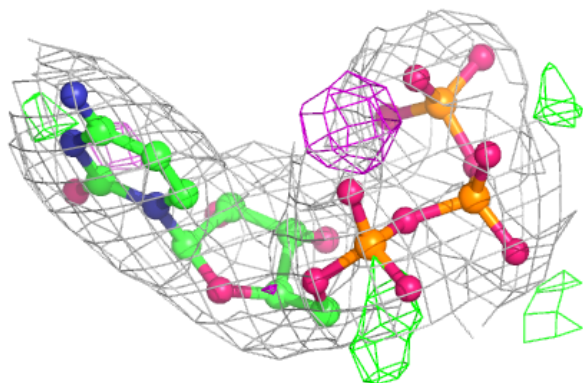
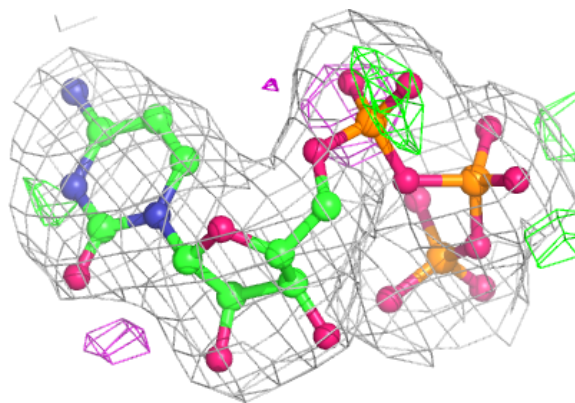
**Electron density around CTP B 402:**

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

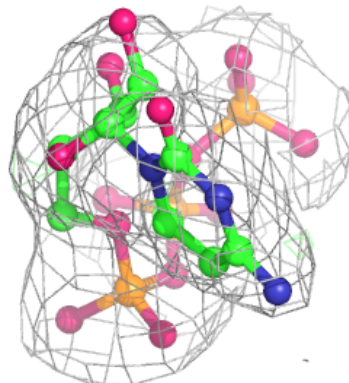
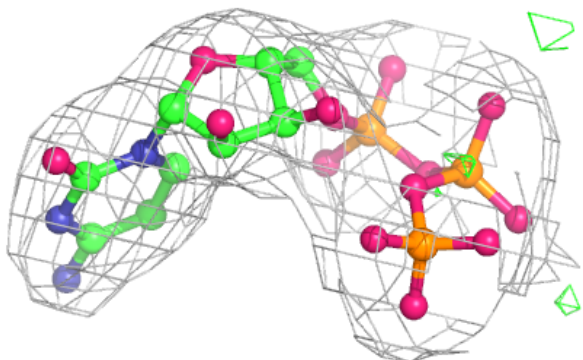
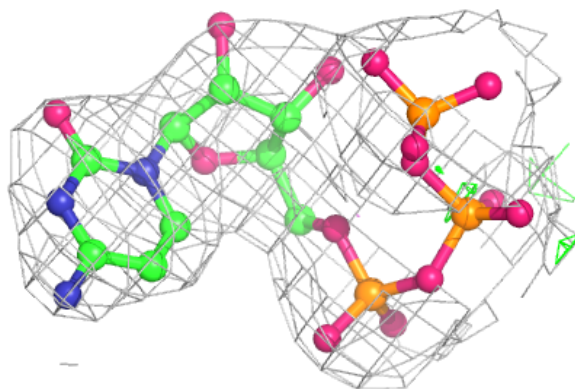


**Electron density around CTP E 402:**

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

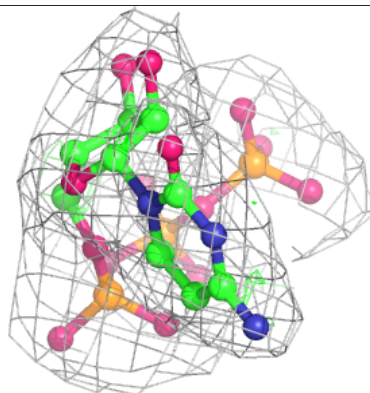
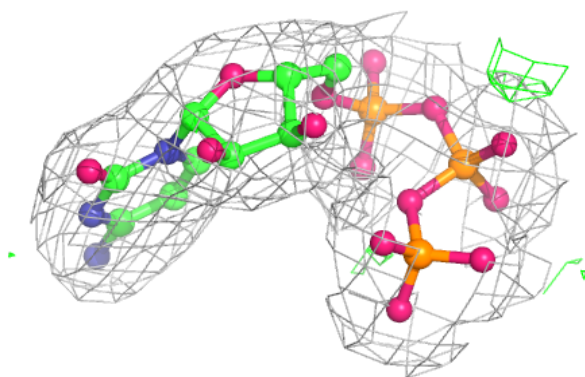
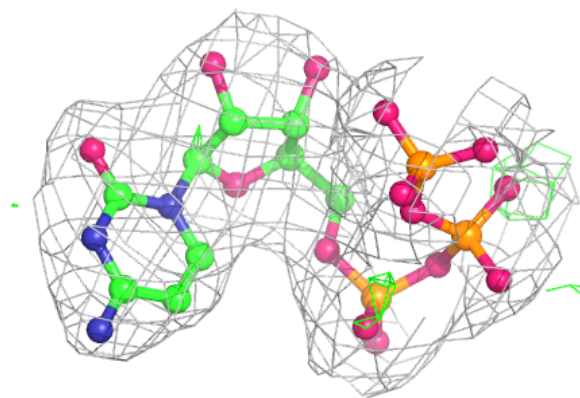
**Electron density around CTP G 402:**

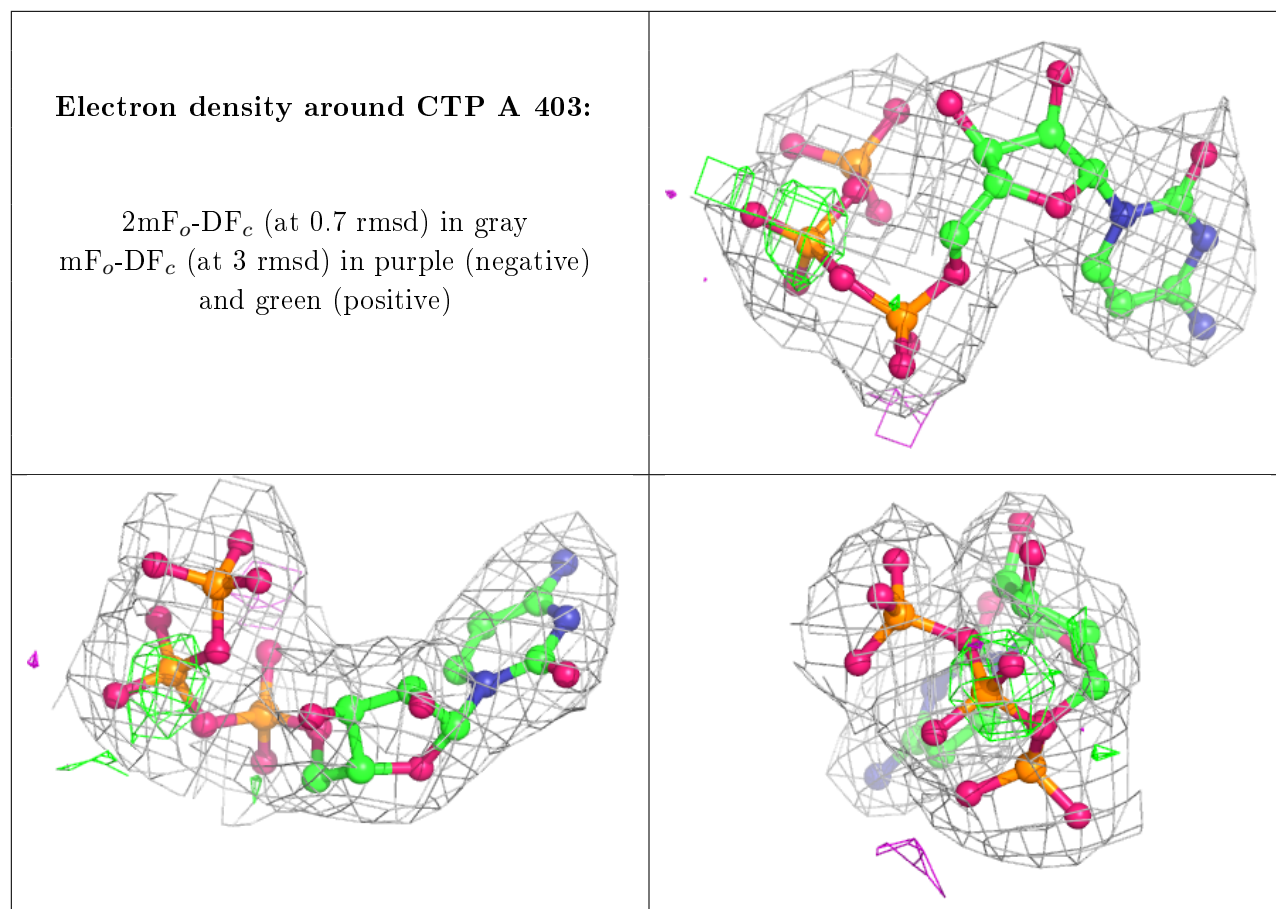
$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)



**Electron density around CTP F 403:**

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





## 6.5 Other polymers [i](#)

There are no such residues in this entry.