



# wwPDB X-ray Structure Validation Summary Report ⓘ

Jan 6, 2025 – 04:38 PM EST

PDB ID : 9AUW  
Title : Crystal structure of A. baumannii GuaB dCBS with inhibitor GNE9979  
Authors : Harris, S.F.; Wu, P.  
Deposited on : 2024-03-01  
Resolution : 2.30 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.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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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	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	1.21
EDS	:	3.0
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4	:	9.0.004 (Gargrove)
Density-Fitness	:	1.0.11
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.40

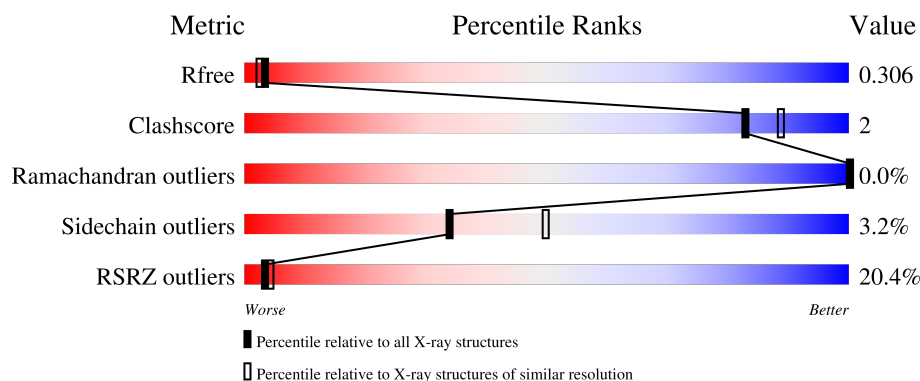
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.30 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))
$R_{free}$	164625	5963 (2.30-2.30)
Clashscore	180529	6698 (2.30-2.30)
Ramachandran outliers	177936	6640 (2.30-2.30)
Sidechain outliers	177891	6640 (2.30-2.30)
RSRZ outliers	164620	5963 (2.30-2.30)

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  $\geq 3$ , 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	395	<div> <div>20%</div> <div>77%</div> <div>8%</div> <div>15%</div> </div>
1	B	395	<div> <div>18%</div> <div>77%</div> <div>7%</div> <div>15%</div> </div>
1	C	395	<div> <div>14%</div> <div>77%</div> <div>8%</div> <div>15%</div> </div>
1	D	395	<div> <div>17%</div> <div>78%</div> <div>6%</div> <div>15%</div> </div>
1	E	395	<div> <div>17%</div> <div>79%</div> <div>6%</div> <div>15%</div> </div>

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Mol	Chain	Length	Quality of chain
1	F	395	<div><div></div><div>18%</div><div>79%</div><div>6%</div><div>14%</div></div>
1	G	395	<div><div></div><div>18%</div><div>79%</div><div>5%</div><div>15%</div></div>
1	H	395	<div><div></div><div>18%</div><div>80%</div><div>5%</div><div>15%</div></div>

## 2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 20734 atoms, of which 104 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 Inosine-5'-monophosphate dehydrogenase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	336	Total	C	N	O	S	0	4	0
			2476	1553	438	469	16			
1	B	336	Total	C	N	O	S	0	4	0
			2473	1551	436	470	16			
1	C	336	Total	C	N	O	S	0	1	0
			2452	1539	432	465	16			
1	D	337	Total	C	N	O	S	0	4	0
			2482	1556	438	472	16			
1	E	337	Total	C	N	O	S	0	2	0
			2464	1545	434	469	16			
1	F	338	Total	C	N	O	S	0	3	0
			2480	1556	437	471	16			
1	G	336	Total	C	N	O	S	0	4	0
			2475	1551	438	470	16			
1	H	336	Total	C	N	O	S	0	4	0
			2475	1551	438	470	16			

There are 128 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-15	MET	-	initiating methionine	UNP P31002
A	-14	HIS	-	expression tag	UNP P31002
A	-13	HIS	-	expression tag	UNP P31002
A	-12	HIS	-	expression tag	UNP P31002
A	-11	HIS	-	expression tag	UNP P31002
A	-10	HIS	-	expression tag	UNP P31002
A	-9	HIS	-	expression tag	UNP P31002
A	-8	GLY	-	expression tag	UNP P31002
A	-7	GLU	-	expression tag	UNP P31002
A	-6	ASN	-	expression tag	UNP P31002
A	-5	LEU	-	expression tag	UNP P31002
A	-4	TYR	-	expression tag	UNP P31002
A	-3	PHE	-	expression tag	UNP P31002

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Chain	Residue	Modelled	Actual	Comment	Reference
A	-2	GLN	-	expression tag	UNP P31002
A	-1	GLY	-	expression tag	UNP P31002
A	0	SER	-	expression tag	UNP P31002
B	-15	MET	-	initiating methionine	UNP P31002
B	-14	HIS	-	expression tag	UNP P31002
B	-13	HIS	-	expression tag	UNP P31002
B	-12	HIS	-	expression tag	UNP P31002
B	-11	HIS	-	expression tag	UNP P31002
B	-10	HIS	-	expression tag	UNP P31002
B	-9	HIS	-	expression tag	UNP P31002
B	-8	GLY	-	expression tag	UNP P31002
B	-7	GLU	-	expression tag	UNP P31002
B	-6	ASN	-	expression tag	UNP P31002
B	-5	LEU	-	expression tag	UNP P31002
B	-4	TYR	-	expression tag	UNP P31002
B	-3	PHE	-	expression tag	UNP P31002
B	-2	GLN	-	expression tag	UNP P31002
B	-1	GLY	-	expression tag	UNP P31002
B	0	SER	-	expression tag	UNP P31002
C	-15	MET	-	initiating methionine	UNP P31002
C	-14	HIS	-	expression tag	UNP P31002
C	-13	HIS	-	expression tag	UNP P31002
C	-12	HIS	-	expression tag	UNP P31002
C	-11	HIS	-	expression tag	UNP P31002
C	-10	HIS	-	expression tag	UNP P31002
C	-9	HIS	-	expression tag	UNP P31002
C	-8	GLY	-	expression tag	UNP P31002
C	-7	GLU	-	expression tag	UNP P31002
C	-6	ASN	-	expression tag	UNP P31002
C	-5	LEU	-	expression tag	UNP P31002
C	-4	TYR	-	expression tag	UNP P31002
C	-3	PHE	-	expression tag	UNP P31002
C	-2	GLN	-	expression tag	UNP P31002
C	-1	GLY	-	expression tag	UNP P31002
C	0	SER	-	expression tag	UNP P31002
D	-15	MET	-	initiating methionine	UNP P31002
D	-14	HIS	-	expression tag	UNP P31002
D	-13	HIS	-	expression tag	UNP P31002
D	-12	HIS	-	expression tag	UNP P31002
D	-11	HIS	-	expression tag	UNP P31002
D	-10	HIS	-	expression tag	UNP P31002
D	-9	HIS	-	expression tag	UNP P31002

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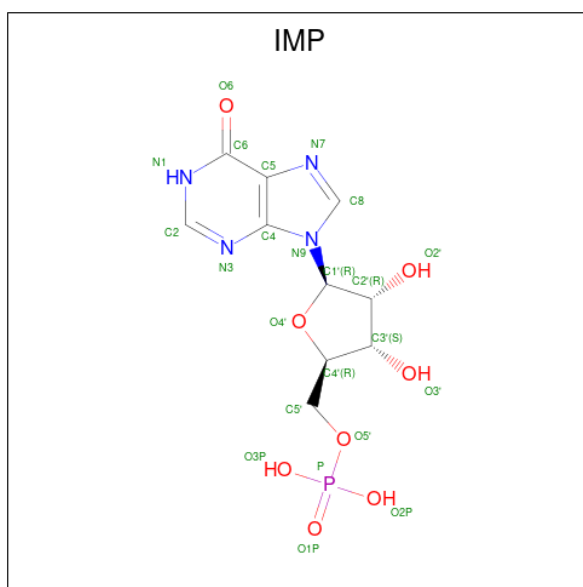
Chain	Residue	Modelled	Actual	Comment	Reference
D	-8	GLY	-	expression tag	UNP P31002
D	-7	GLU	-	expression tag	UNP P31002
D	-6	ASN	-	expression tag	UNP P31002
D	-5	LEU	-	expression tag	UNP P31002
D	-4	TYR	-	expression tag	UNP P31002
D	-3	PHE	-	expression tag	UNP P31002
D	-2	GLN	-	expression tag	UNP P31002
D	-1	GLY	-	expression tag	UNP P31002
D	0	SER	-	expression tag	UNP P31002
E	-15	MET	-	initiating methionine	UNP P31002
E	-14	HIS	-	expression tag	UNP P31002
E	-13	HIS	-	expression tag	UNP P31002
E	-12	HIS	-	expression tag	UNP P31002
E	-11	HIS	-	expression tag	UNP P31002
E	-10	HIS	-	expression tag	UNP P31002
E	-9	HIS	-	expression tag	UNP P31002
E	-8	GLY	-	expression tag	UNP P31002
E	-7	GLU	-	expression tag	UNP P31002
E	-6	ASN	-	expression tag	UNP P31002
E	-5	LEU	-	expression tag	UNP P31002
E	-4	TYR	-	expression tag	UNP P31002
E	-3	PHE	-	expression tag	UNP P31002
E	-2	GLN	-	expression tag	UNP P31002
E	-1	GLY	-	expression tag	UNP P31002
E	0	SER	-	expression tag	UNP P31002
F	-15	MET	-	initiating methionine	UNP P31002
F	-14	HIS	-	expression tag	UNP P31002
F	-13	HIS	-	expression tag	UNP P31002
F	-12	HIS	-	expression tag	UNP P31002
F	-11	HIS	-	expression tag	UNP P31002
F	-10	HIS	-	expression tag	UNP P31002
F	-9	HIS	-	expression tag	UNP P31002
F	-8	GLY	-	expression tag	UNP P31002
F	-7	GLU	-	expression tag	UNP P31002
F	-6	ASN	-	expression tag	UNP P31002
F	-5	LEU	-	expression tag	UNP P31002
F	-4	TYR	-	expression tag	UNP P31002
F	-3	PHE	-	expression tag	UNP P31002
F	-2	GLN	-	expression tag	UNP P31002
F	-1	GLY	-	expression tag	UNP P31002
F	0	SER	-	expression tag	UNP P31002
G	-15	MET	-	initiating methionine	UNP P31002

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Chain	Residue	Modelled	Actual	Comment	Reference
G	-14	HIS	-	expression tag	UNP P31002
G	-13	HIS	-	expression tag	UNP P31002
G	-12	HIS	-	expression tag	UNP P31002
G	-11	HIS	-	expression tag	UNP P31002
G	-10	HIS	-	expression tag	UNP P31002
G	-9	HIS	-	expression tag	UNP P31002
G	-8	GLY	-	expression tag	UNP P31002
G	-7	GLU	-	expression tag	UNP P31002
G	-6	ASN	-	expression tag	UNP P31002
G	-5	LEU	-	expression tag	UNP P31002
G	-4	TYR	-	expression tag	UNP P31002
G	-3	PHE	-	expression tag	UNP P31002
G	-2	GLN	-	expression tag	UNP P31002
G	-1	GLY	-	expression tag	UNP P31002
G	0	SER	-	expression tag	UNP P31002
H	-15	MET	-	initiating methionine	UNP P31002
H	-14	HIS	-	expression tag	UNP P31002
H	-13	HIS	-	expression tag	UNP P31002
H	-12	HIS	-	expression tag	UNP P31002
H	-11	HIS	-	expression tag	UNP P31002
H	-10	HIS	-	expression tag	UNP P31002
H	-9	HIS	-	expression tag	UNP P31002
H	-8	GLY	-	expression tag	UNP P31002
H	-7	GLU	-	expression tag	UNP P31002
H	-6	ASN	-	expression tag	UNP P31002
H	-5	LEU	-	expression tag	UNP P31002
H	-4	TYR	-	expression tag	UNP P31002
H	-3	PHE	-	expression tag	UNP P31002
H	-2	GLN	-	expression tag	UNP P31002
H	-1	GLY	-	expression tag	UNP P31002
H	0	SER	-	expression tag	UNP P31002

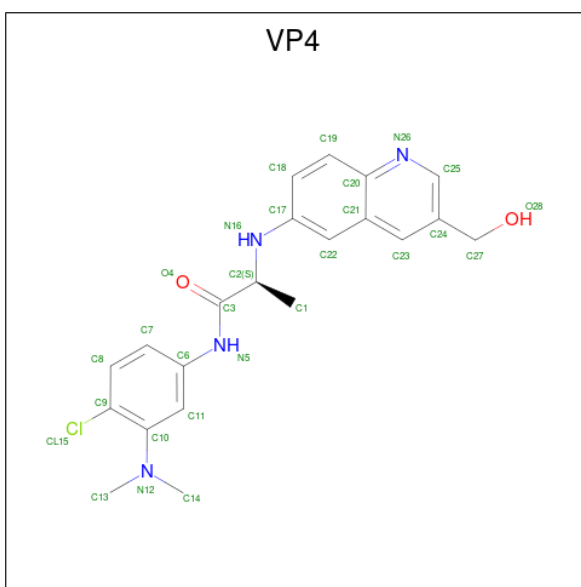
- Molecule 2 is INOSINIC ACID (three-letter code: IMP) (formula: C<sub>10</sub>H<sub>13</sub>N<sub>4</sub>O<sub>8</sub>P).



Mol	Chain	Residues	Atoms						ZeroOcc	AltConf
2	A	1	Total	C	H	N	O	P	0	0
			36	10	13	4	8	1		
2	B	1	Total	C	H	N	O	P	0	0
			36	10	13	4	8	1		
2	C	1	Total	C	H	N	O	P	0	0
			36	10	13	4	8	1		
2	D	1	Total	C	H	N	O	P	0	0
			36	10	13	4	8	1		
2	E	1	Total	C	H	N	O	P	0	0
			36	10	13	4	8	1		
2	F	1	Total	C	H	N	O	P	0	0
			36	10	13	4	8	1		
2	G	1	Total	C	H	N	O	P	0	0
			36	10	13	4	8	1		
2	H	1	Total	C	H	N	O	P	0	0
			36	10	13	4	8	1		

- Molecule 3 is N-[4-chloro-3-(dimethylamino)phenyl]-N 2 -[3-(hydroxymethyl)quinolin-6-yl]-L-alaninamide (three-letter code: VP4) (formula: C<sub>21</sub>H<sub>23</sub>ClN<sub>4</sub>O<sub>2</sub>) (labeled as "Ligand of Interest" by depositor).





Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
3	A	1	Total	C	Cl	N	O	0	0
			28	21	1	4	2		
3	B	1	Total	C	Cl	N	O	0	0
			28	21	1	4	2		
3	C	1	Total	C	Cl	N	O	0	0
			28	21	1	4	2		
3	D	1	Total	C	Cl	N	O	0	0
			28	21	1	4	2		
3	E	1	Total	C	Cl	N	O	0	0
			28	21	1	4	2		
3	F	1	Total	C	Cl	N	O	0	0
			28	21	1	4	2		
3	G	1	Total	C	Cl	N	O	0	0
			28	21	1	4	2		
3	H	1	Total	C	Cl	N	O	0	0
			28	21	1	4	2		

- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	60	Total	O	0	0
			60	60		
4	B	62	Total	O	0	0
			62	62		
4	C	69	Total	O	0	0
			69	69		
4	D	41	Total	O	0	0
			41	41		

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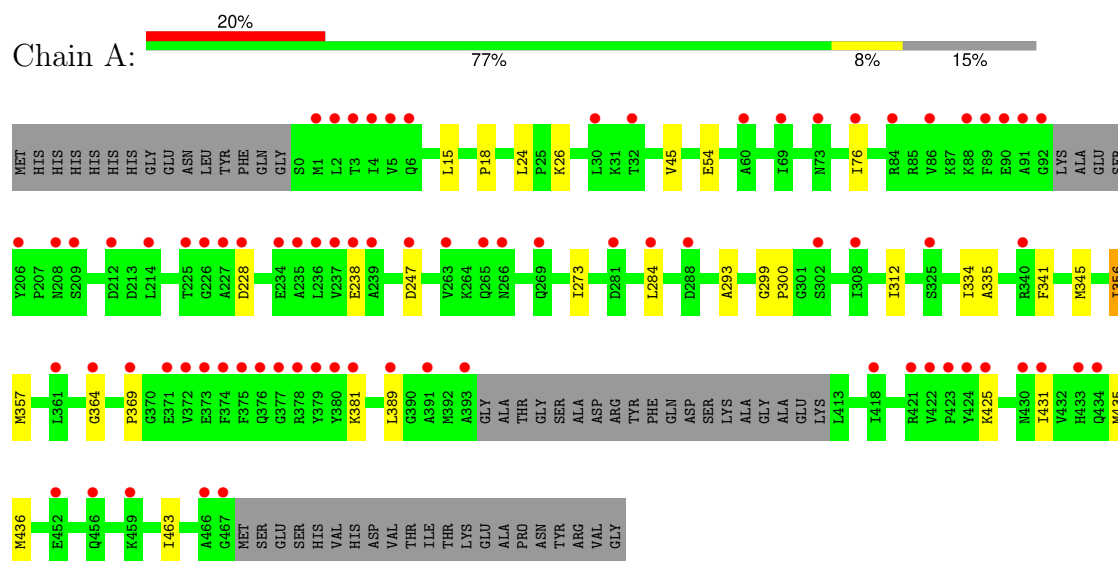
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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	E	48	Total 48	O 48	0	0
4	F	52	Total 52	O 52	0	0
4	G	53	Total 53	O 53	0	0
4	H	60	Total 60	O 60	0	0

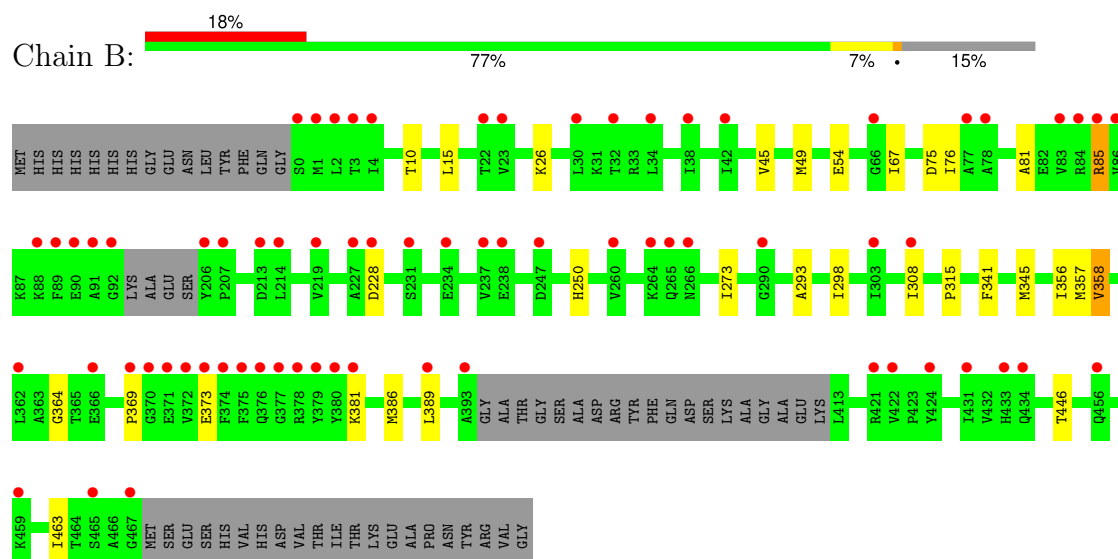
### 3 Residue-property plots [i](#)

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.

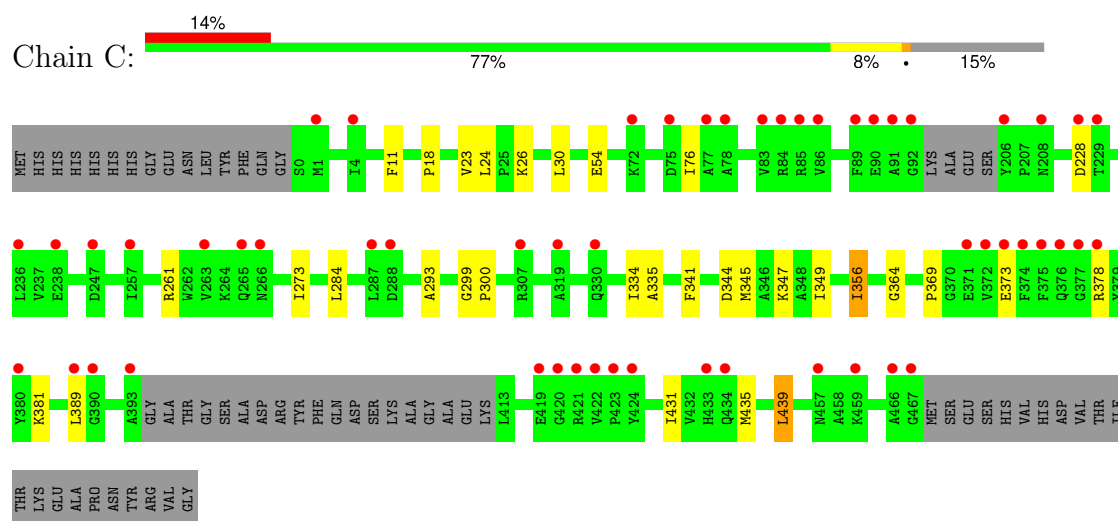
- Molecule 1: Inosine-5'-monophosphate dehydrogenase



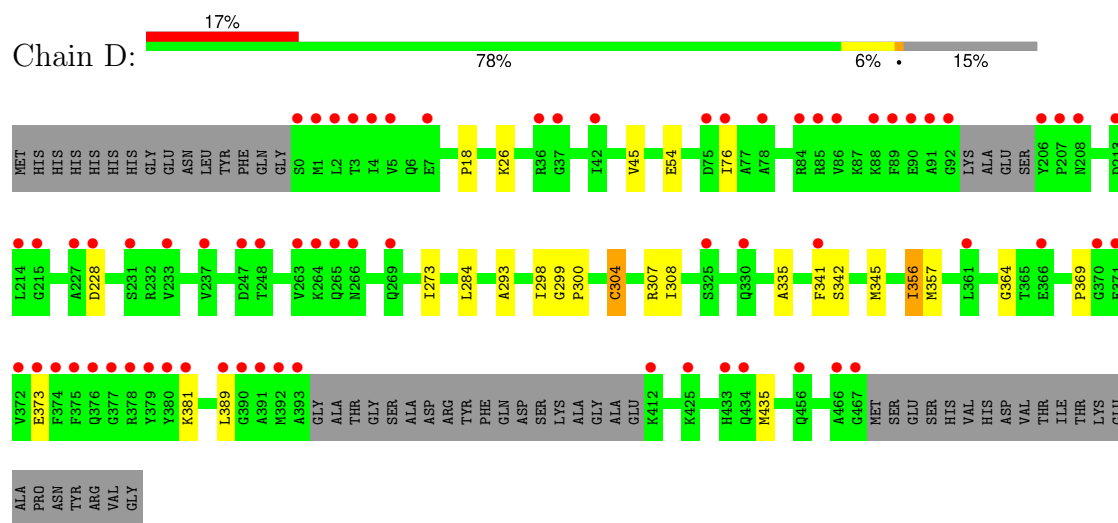
- Molecule 1: Inosine-5'-monophosphate dehydrogenase



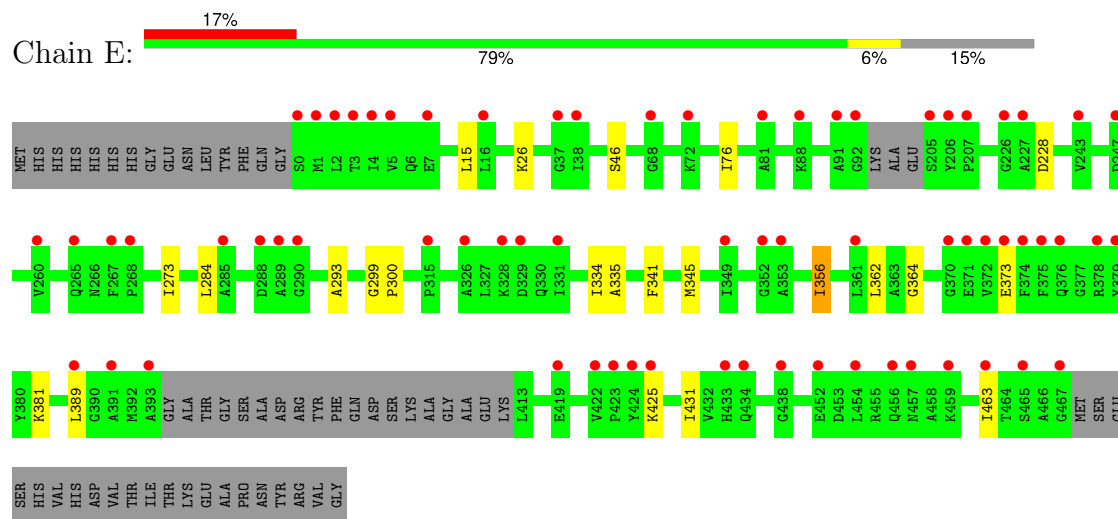
- Molecule 1: Inosine-5'-monophosphate dehydrogenase



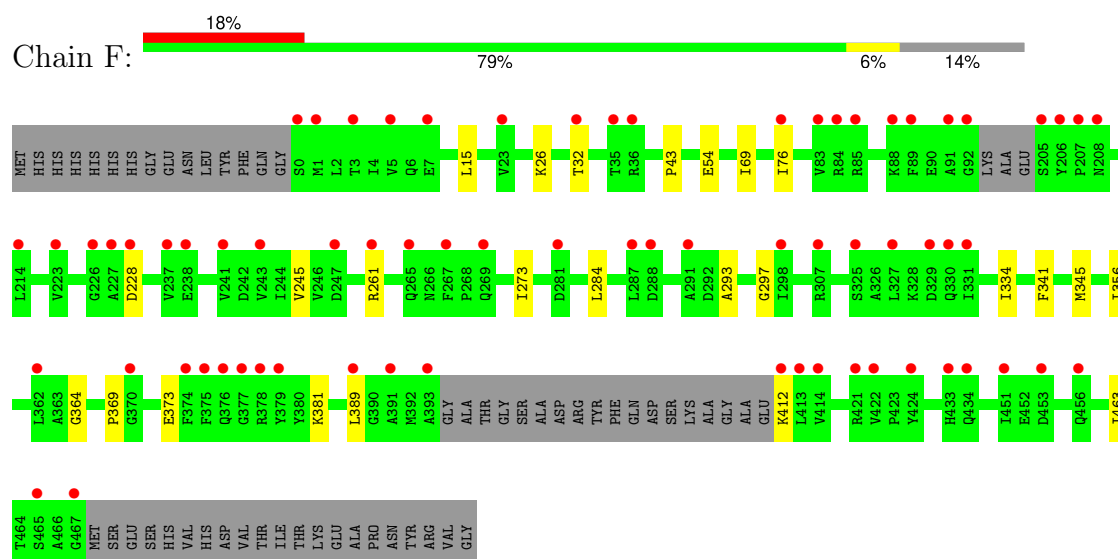
- Molecule 1: Inosine-5'-monophosphate dehydrogenase



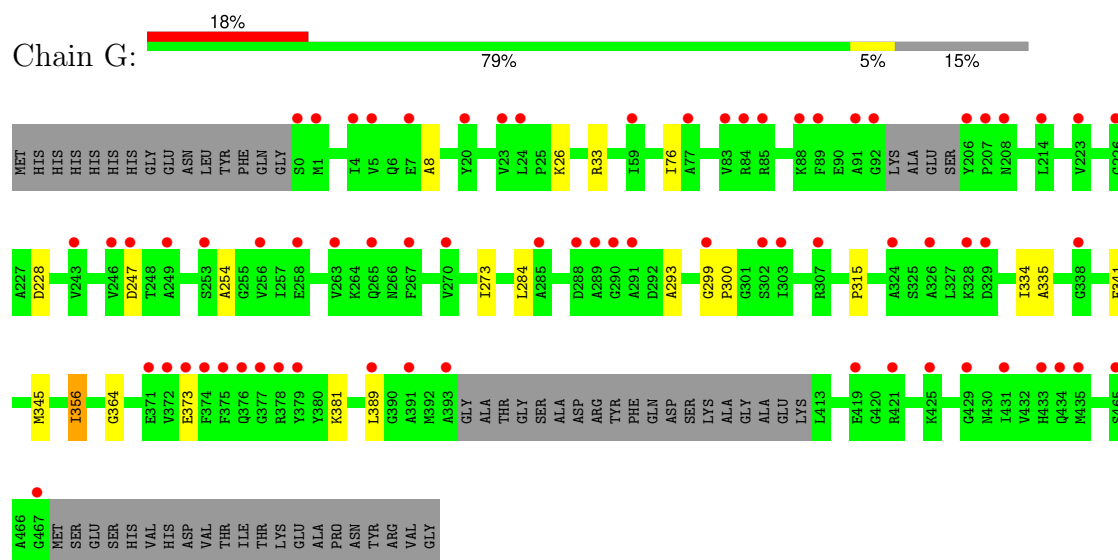
- Molecule 1: Inosine-5'-monophosphate dehydrogenase



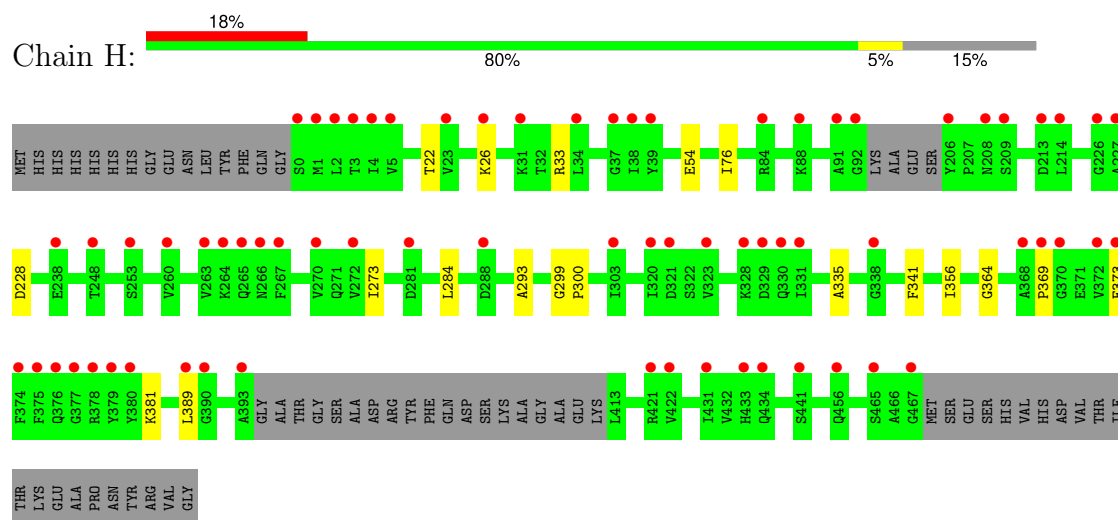
- Molecule 1: Inosine-5'-monophosphate dehydrogenase



• Molecule 1: Inosine-5'-monophosphate dehydrogenase



• Molecule 1: Inosine-5'-monophosphate dehydrogenase



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	113.72Å 127.30Å 127.48Å 90.00° 101.82° 90.00°	Depositor
Resolution (Å)	46.00 – 2.30 46.00 – 2.30	Depositor EDS
% Data completeness (in resolution range)	99.0 (46.00-2.30) 99.0 (46.00-2.30)	Depositor EDS
$R_{merge}$	0.41	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.55 (at 2.29Å)	Xtriage
Refinement program	BUSTER 2.11.6	Depositor
R, $R_{free}$	0.244 , 0.265 0.282 , 0.306	Depositor DCC
$R_{free}$ test set	8032 reflections (5.10%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	24.6	Xtriage
Anisotropy	0.771	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.38 , 43.1	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.49$ , $\langle L^2 \rangle = 0.32$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
$F_o, F_c$ correlation	0.85	EDS
Total number of atoms	20734	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	28.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 12.39% 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: IMP, VP4

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	0.44	0/2508	0.65	0/3389
1	B	0.45	0/2505	0.66	0/3386
1	C	0.44	0/2484	0.65	0/3357
1	D	0.44	0/2514	0.65	0/3396
1	E	0.43	0/2496	0.64	0/3373
1	F	0.44	0/2512	0.64	0/3394
1	G	0.45	0/2507	0.65	0/3387
1	H	0.44	0/2507	0.65	0/3387
All	All	0.44	0/20033	0.65	0/27069

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	2476	0	2534	15	0
1	B	2473	0	2527	15	0
1	C	2452	0	2510	18	0
1	D	2482	0	2538	12	0
1	E	2464	0	2519	10	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	F	2480	0	2540	10	0
1	G	2475	0	2530	10	0
1	H	2475	0	2530	7	0
2	A	23	13	11	0	0
2	B	23	13	11	0	0
2	C	23	13	11	0	0
2	D	23	13	11	1	0
2	E	23	13	11	0	0
2	F	23	13	11	0	0
2	G	23	13	11	0	0
2	H	23	13	11	0	0
3	A	28	0	0	0	0
3	B	28	0	0	0	0
3	C	28	0	0	0	0
3	D	28	0	0	0	0
3	E	28	0	0	0	0
3	F	28	0	0	0	0
3	G	28	0	0	0	0
3	H	28	0	0	0	0
4	A	60	0	0	0	0
4	B	62	0	0	2	0
4	C	69	0	0	6	0
4	D	41	0	0	0	0
4	E	48	0	0	0	0
4	F	52	0	0	1	0
4	G	53	0	0	2	0
4	H	60	0	0	0	0
All	All	20630	104	20316	93	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 2.

The worst 5 of 93 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:C:347:LYS:HD2	4:C:904:HOH:O	1.79	0.83
1:F:69:ILE:HD13	4:F:905:HOH:O	1.81	0.81
1:C:344:ASP:HA	4:C:904:HOH:O	1.83	0.77
1:G:293:ALA:HB1	4:G:913:HOH:O	1.84	0.76
1:C:30:LEU:HD22	4:C:969:HOH:O	1.93	0.68



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	334/395 (85%)	328 (98%)	6 (2%)	0	100	100
1	B	334/395 (85%)	322 (96%)	12 (4%)	0	100	100
1	C	331/395 (84%)	324 (98%)	7 (2%)	0	100	100
1	D	335/395 (85%)	327 (98%)	8 (2%)	0	100	100
1	E	333/395 (84%)	328 (98%)	5 (2%)	0	100	100
1	F	335/395 (85%)	327 (98%)	7 (2%)	1 (0%)	37	47
1	G	334/395 (85%)	327 (98%)	7 (2%)	0	100	100
1	H	334/395 (85%)	326 (98%)	8 (2%)	0	100	100
All	All	2670/3160 (84%)	2609 (98%)	60 (2%)	1 (0%)	100	100

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	F	297	GLY

### 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	255/298 (86%)	246 (96%)	9 (4%)	31	46

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	B	255/298 (86%)	247 (97%)	8 (3%)	35	51
1	C	252/298 (85%)	241 (96%)	11 (4%)	24	35
1	D	256/298 (86%)	247 (96%)	9 (4%)	31	46
1	E	254/298 (85%)	248 (98%)	6 (2%)	44	61
1	F	256/298 (86%)	249 (97%)	7 (3%)	40	57
1	G	255/298 (86%)	247 (97%)	8 (3%)	35	51
1	H	255/298 (86%)	249 (98%)	6 (2%)	44	61
All	All	2038/2384 (86%)	1974 (97%)	64 (3%)	34	51

5 of 64 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	G	389	LEU
1	H	33	ARG
1	C	373	GLU
1	C	356	ILE
1	H	284	LEU

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

Mol	Chain	Res	Type
1	A	434	GLN
1	B	250	HIS
1	C	330	GLN
1	D	330	GLN
1	F	250	HIS

### 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 [i](#)

There are no oligosaccharides in this entry.

## 5.6 Ligand geometry [i](#)

16 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$
2	IMP	G	801	-	21,25,25	0.84	1 (4%)	22,38,38	0.69	0
2	IMP	B	801	-	21,25,25	0.85	1 (4%)	22,38,38	0.71	0
3	VP4	C	802	-	30,30,30	0.73	0	42,42,42	1.36	4 (9%)
3	VP4	A	802	-	30,30,30	0.63	0	42,42,42	1.32	3 (7%)
3	VP4	D	802	-	30,30,30	0.73	0	42,42,42	1.30	4 (9%)
3	VP4	E	802	-	30,30,30	0.78	0	42,42,42	1.20	4 (9%)
3	VP4	B	802	-	30,30,30	0.73	0	42,42,42	1.36	4 (9%)
2	IMP	A	801	-	21,25,25	0.85	1 (4%)	22,38,38	0.67	0
3	VP4	H	802	-	30,30,30	0.71	0	42,42,42	1.28	3 (7%)
3	VP4	G	802	-	30,30,30	0.74	0	42,42,42	1.26	4 (9%)
2	IMP	D	801	-	21,25,25	0.81	1 (4%)	22,38,38	0.69	0
2	IMP	F	801	-	21,25,25	0.81	1 (4%)	22,38,38	0.69	0
2	IMP	H	801	-	21,25,25	0.83	1 (4%)	22,38,38	0.70	0
3	VP4	F	802	-	30,30,30	0.70	0	42,42,42	1.34	4 (9%)
2	IMP	C	801	-	21,25,25	0.85	1 (4%)	22,38,38	0.66	0
2	IMP	E	801	-	21,25,25	0.84	0	22,38,38	0.69	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	IMP	G	801	-	-	1/6/26/26	0/3/3/3
2	IMP	B	801	-	-	1/6/26/26	0/3/3/3
3	VP4	C	802	-	-	3/18/18/18	0/3/3/3
3	VP4	A	802	-	-	2/18/18/18	0/3/3/3
3	VP4	D	802	-	-	0/18/18/18	0/3/3/3
3	VP4	E	802	-	-	1/18/18/18	0/3/3/3
3	VP4	B	802	-	-	3/18/18/18	0/3/3/3
2	IMP	A	801	-	-	1/6/26/26	0/3/3/3
3	VP4	H	802	-	-	1/18/18/18	0/3/3/3
3	VP4	G	802	-	-	2/18/18/18	0/3/3/3
2	IMP	D	801	-	-	1/6/26/26	0/3/3/3
2	IMP	F	801	-	-	1/6/26/26	0/3/3/3
2	IMP	H	801	-	-	1/6/26/26	0/3/3/3
3	VP4	F	802	-	-	2/18/18/18	0/3/3/3
2	IMP	C	801	-	-	1/6/26/26	0/3/3/3
2	IMP	E	801	-	-	1/6/26/26	0/3/3/3

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

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	801	IMP	C8-N7	-2.33	1.31	1.34
2	G	801	IMP	C8-N7	-2.31	1.31	1.34
2	H	801	IMP	C8-N7	-2.26	1.31	1.34
2	A	801	IMP	C8-N7	-2.24	1.31	1.34
2	C	801	IMP	C8-N7	-2.17	1.31	1.34

The worst 5 of 30 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	F	802	VP4	C25-N26-C20	4.64	122.33	116.96
3	A	802	VP4	C25-N26-C20	4.56	122.23	116.96
3	B	802	VP4	C25-N26-C20	4.33	121.97	116.96
3	H	802	VP4	C25-N26-C20	4.29	121.92	116.96
3	D	802	VP4	C25-N26-C20	4.27	121.90	116.96

There are no chirality outliers.

5 of 22 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	H	802	VP4	C9-C10-N12-C13
3	A	802	VP4	C9-C10-N12-C13

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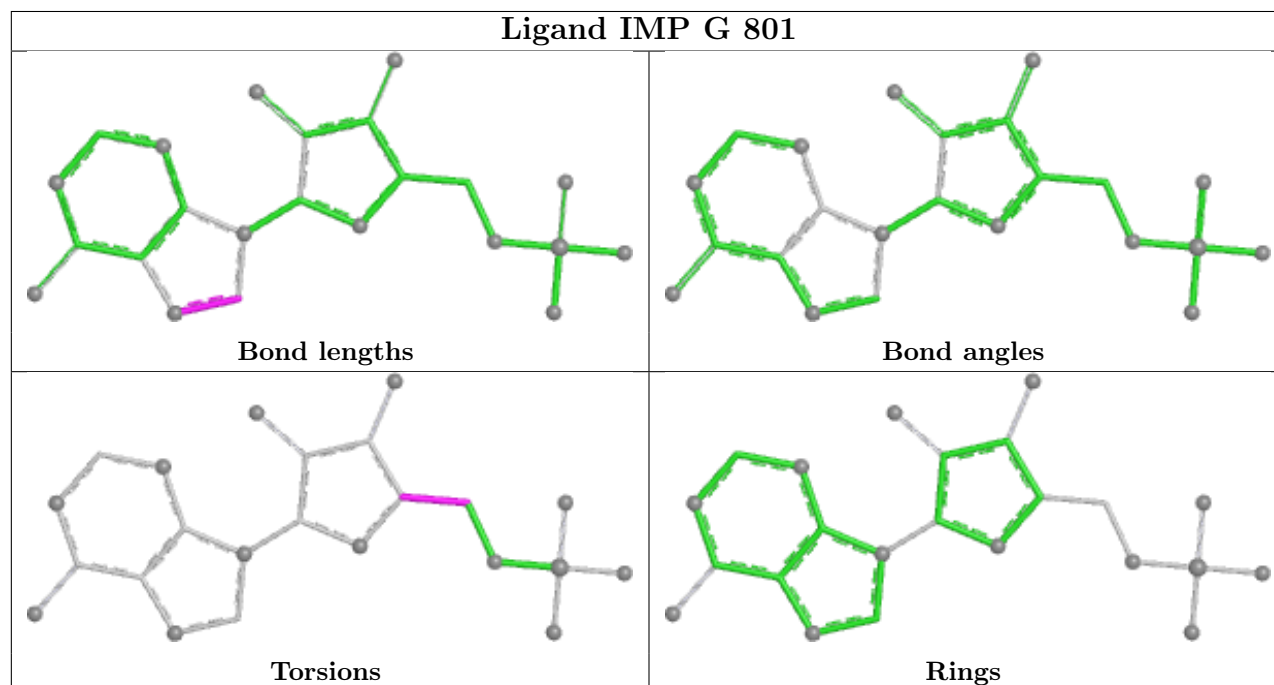
Mol	Chain	Res	Type	Atoms
3	B	802	VP4	C9-C10-N12-C13
3	F	802	VP4	C9-C10-N12-C13
3	G	802	VP4	C9-C10-N12-C13

There are no ring outliers.

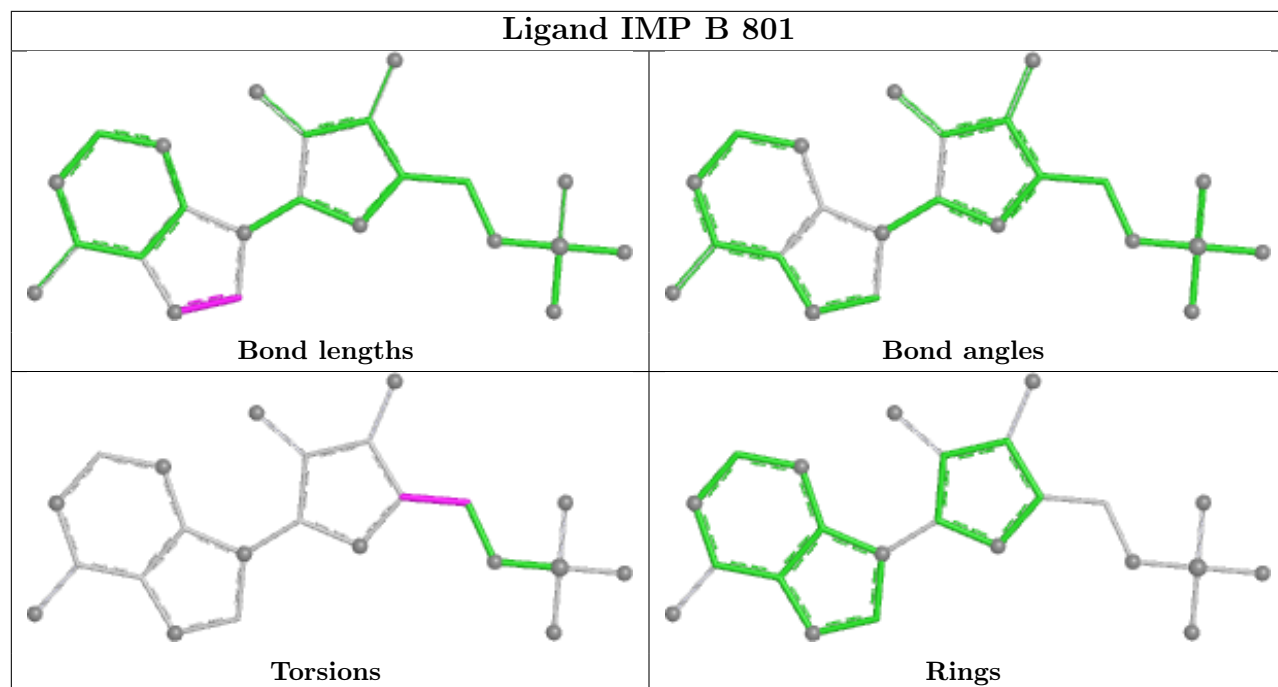
1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	D	801	IMP	1	0

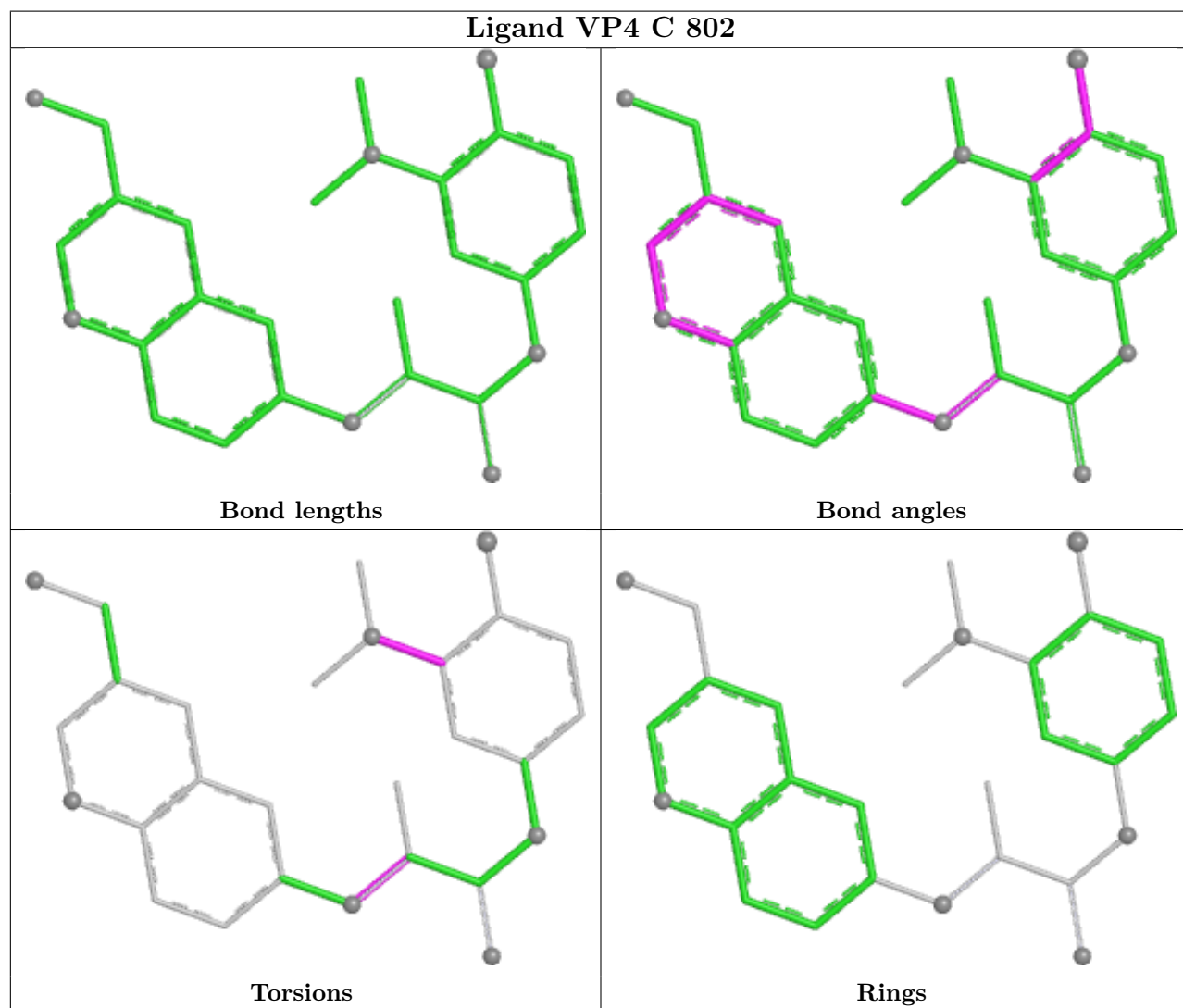
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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



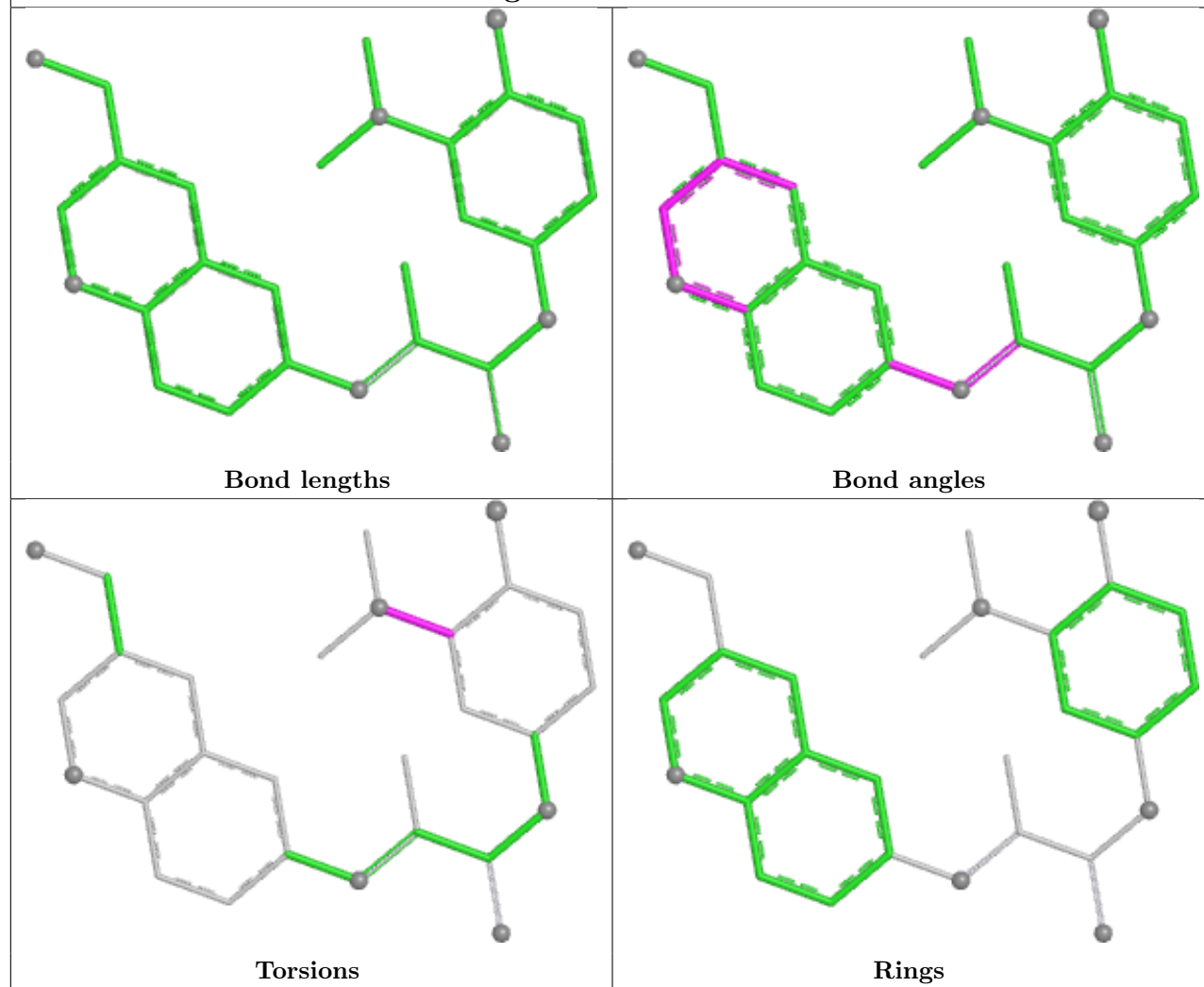
## Ligand IMP B 801



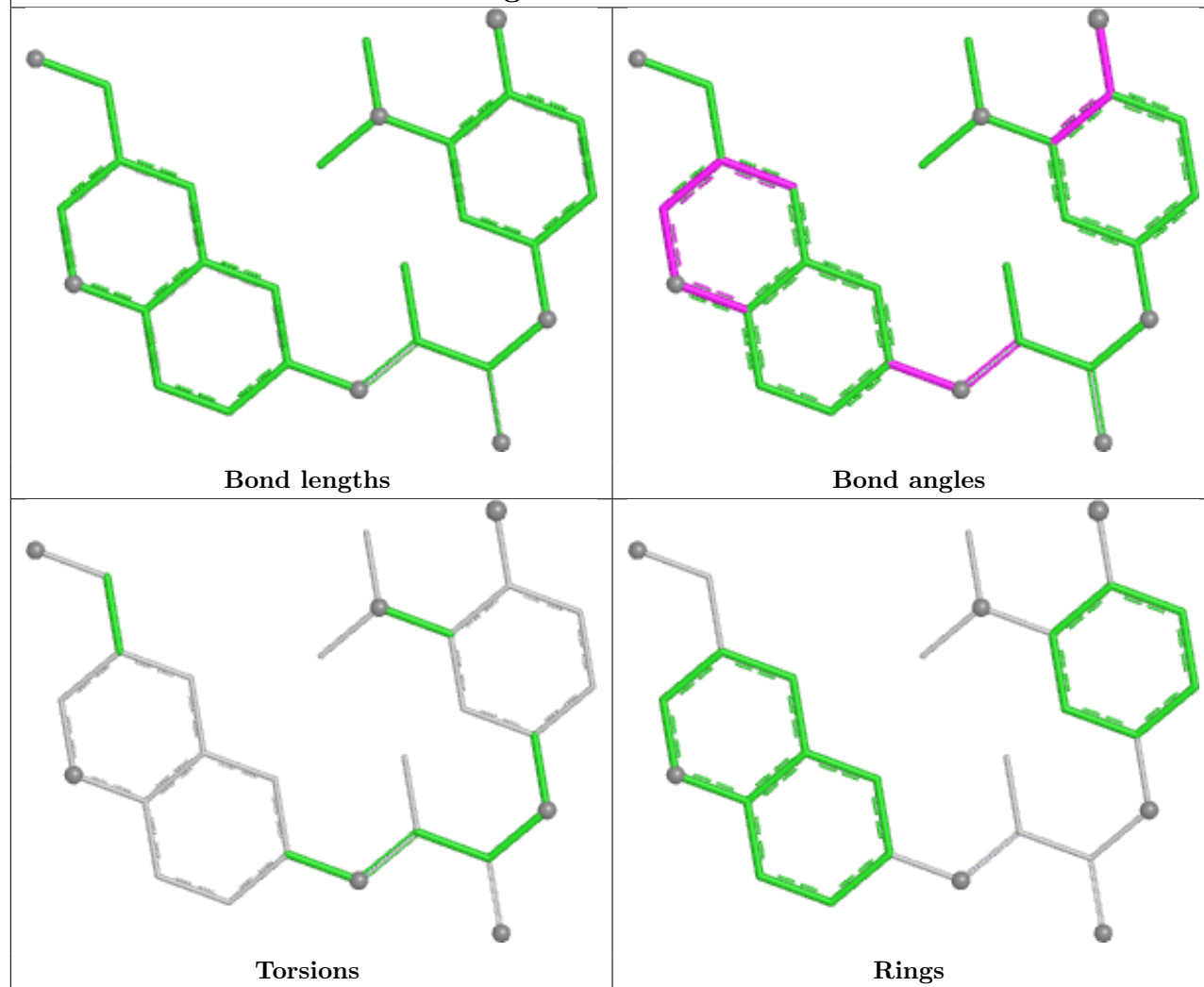
## Ligand VP4 C 802



## Ligand VP4 A 802

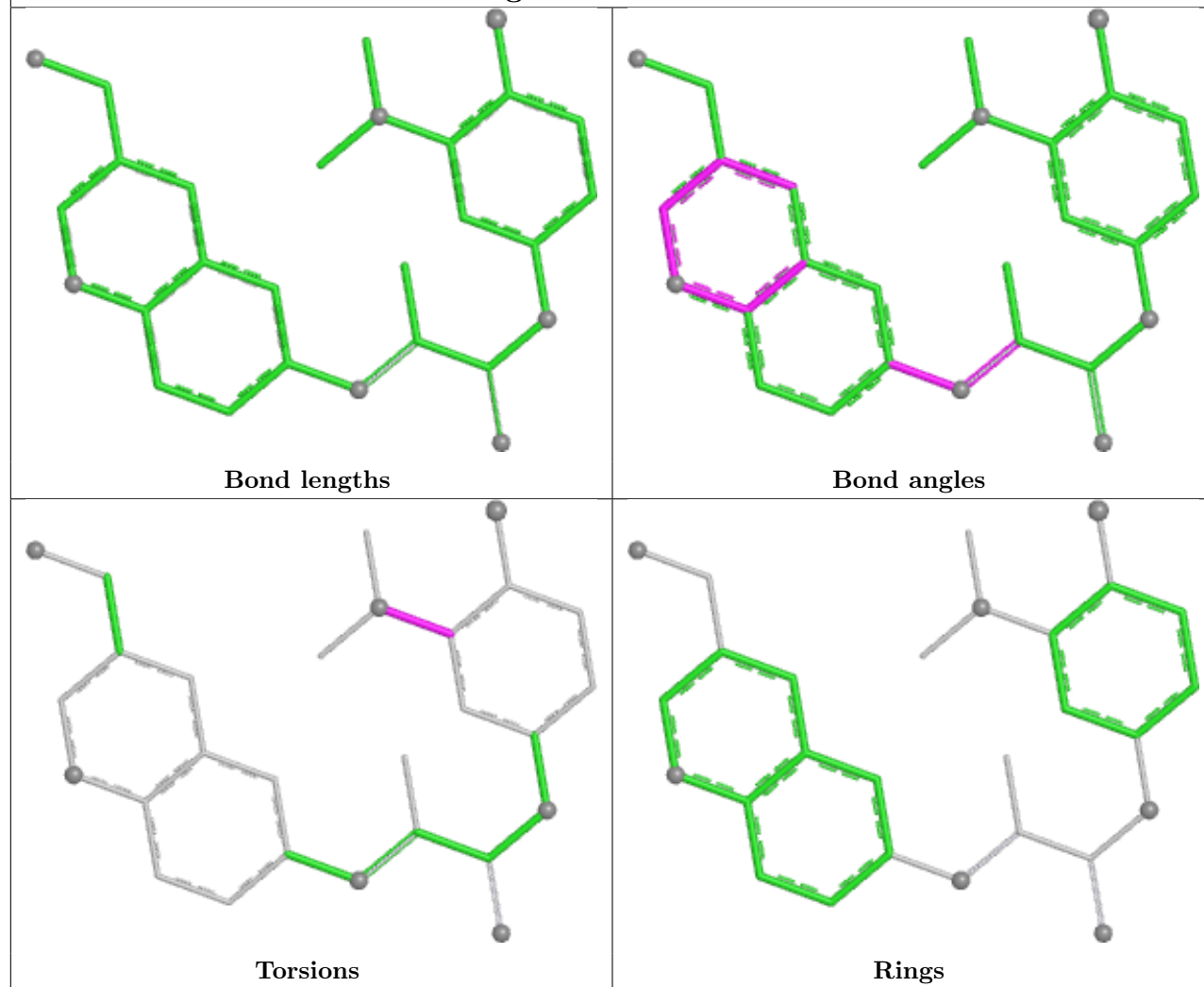


## Ligand VP4 D 802

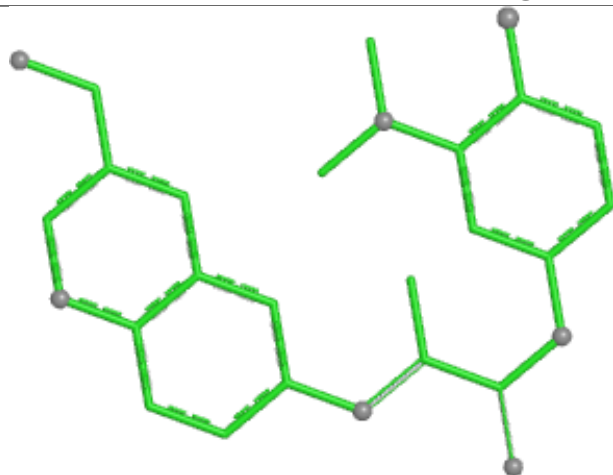




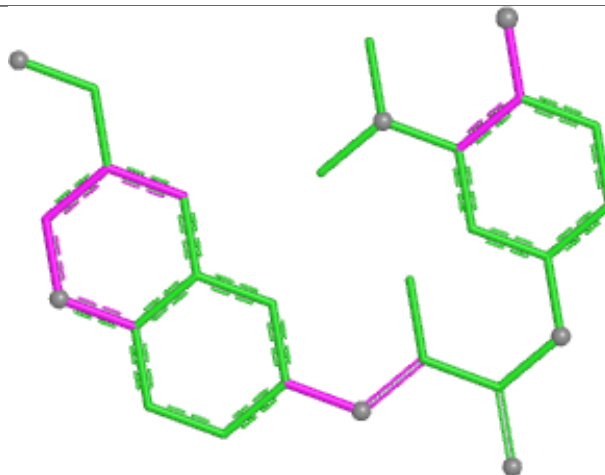
## Ligand VP4 E 802



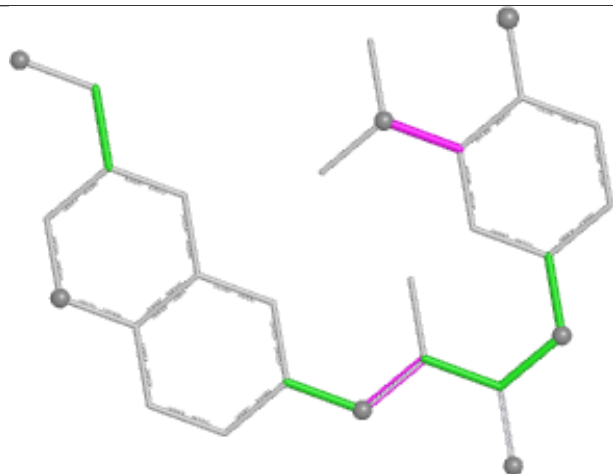
## Ligand VP4 B 802



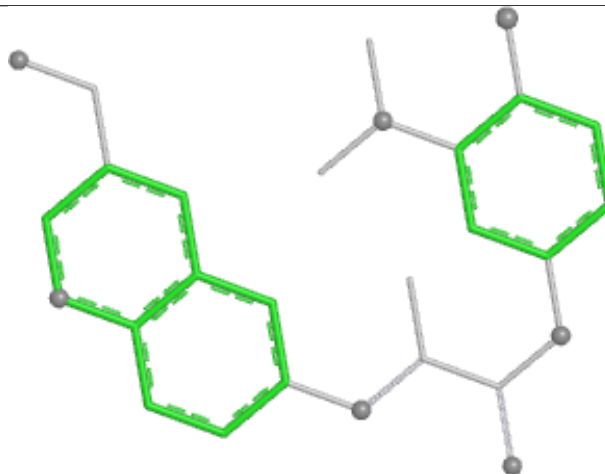
Bond lengths



Bond angles

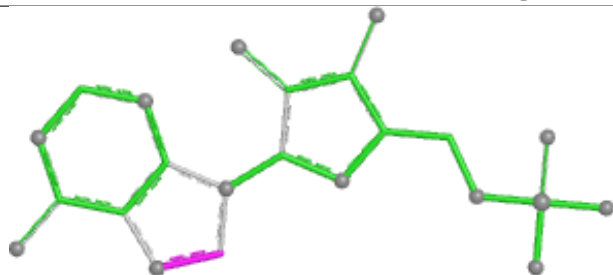


Torsions

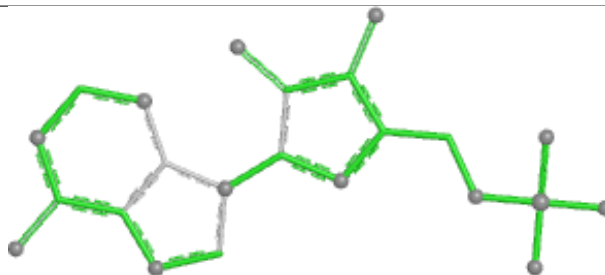


Rings

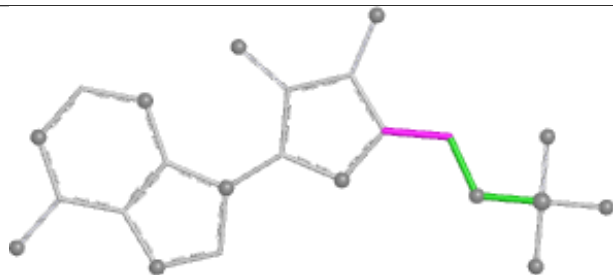
## Ligand IMP A 801



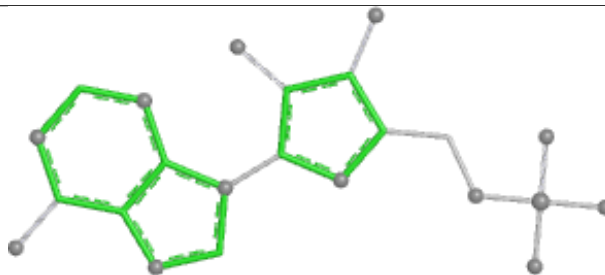
Bond lengths



Bond angles

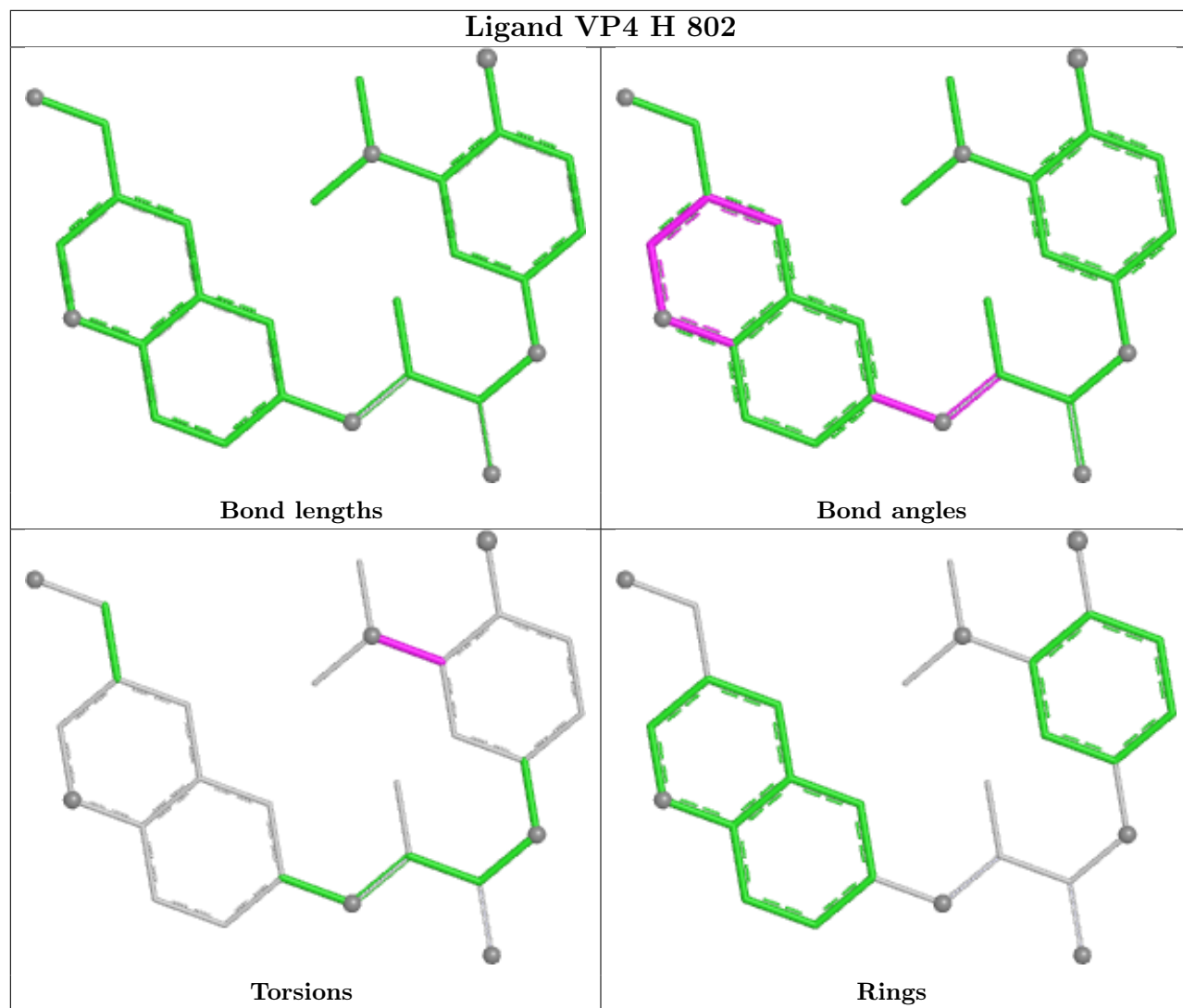


Torsions

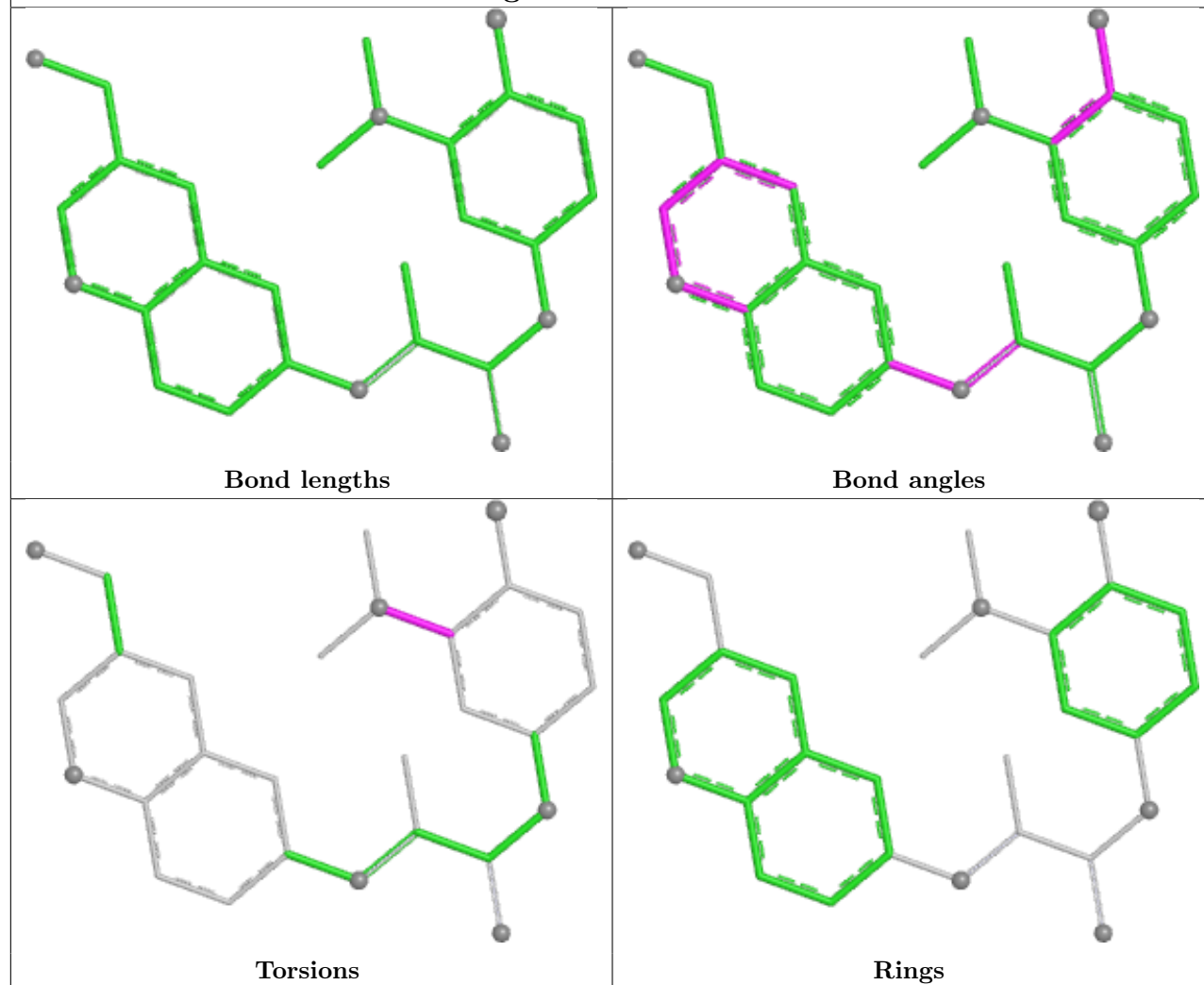


Rings

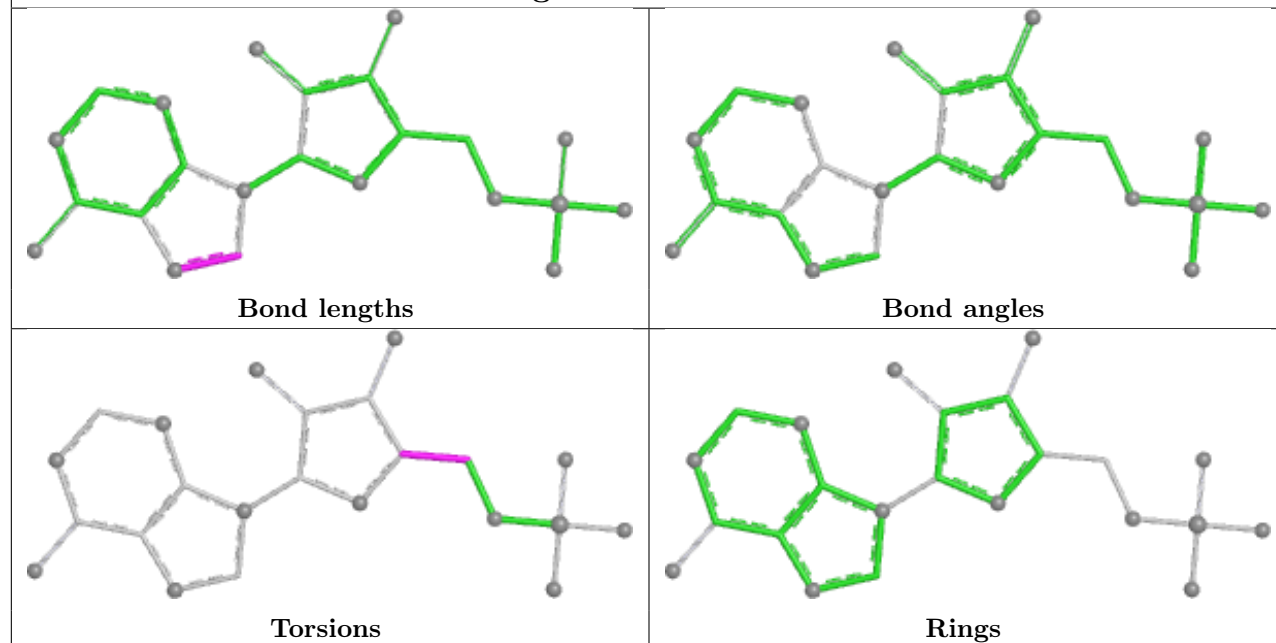
## Ligand VP4 H 802



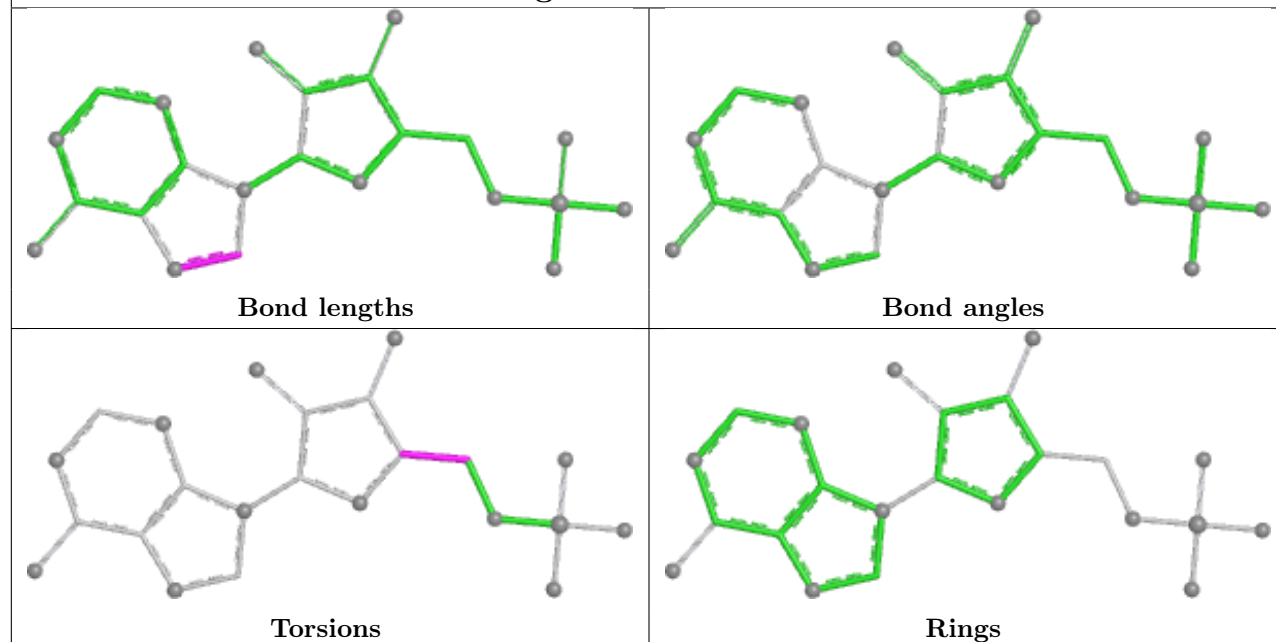
## Ligand VP4 G 802



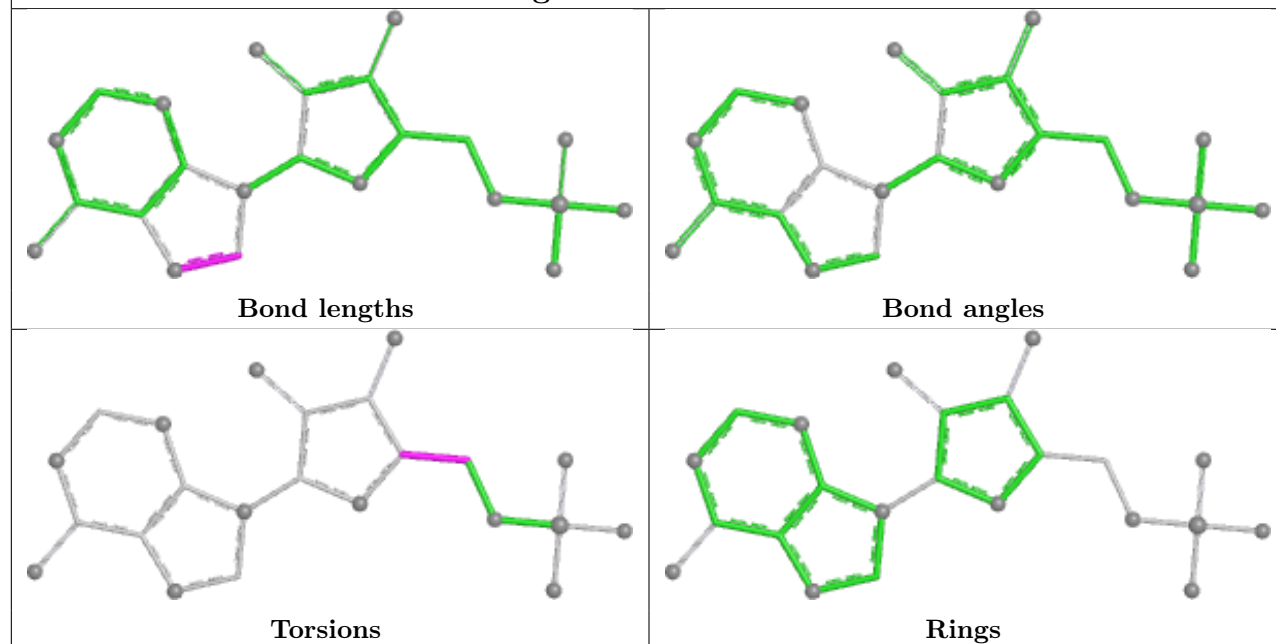
## Ligand IMP D 801



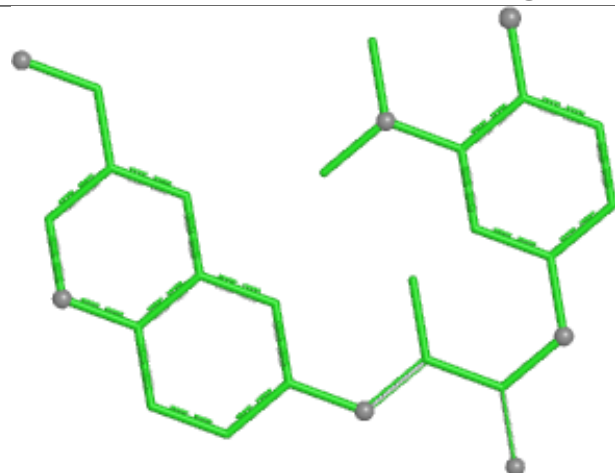
## Ligand IMP F 801



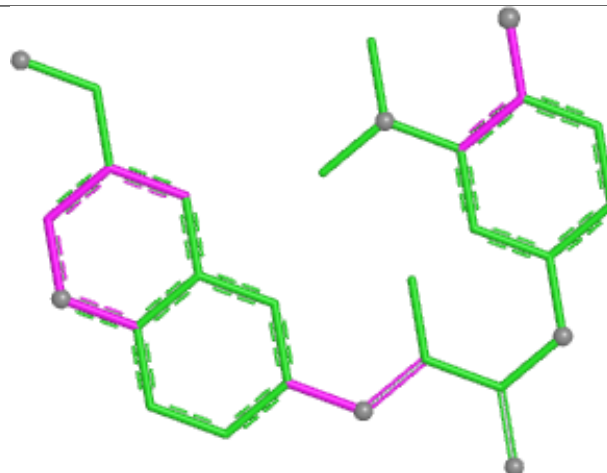
## Ligand IMP H 801



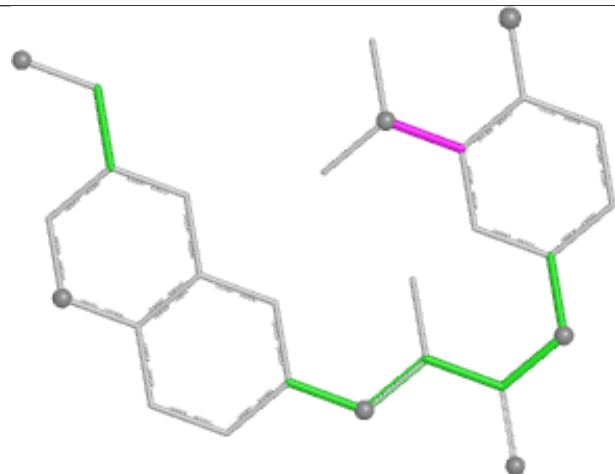
## Ligand VP4 F 802



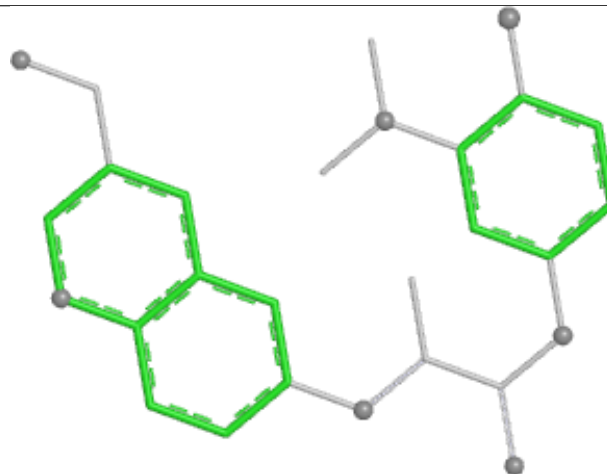
Bond lengths



Bond angles

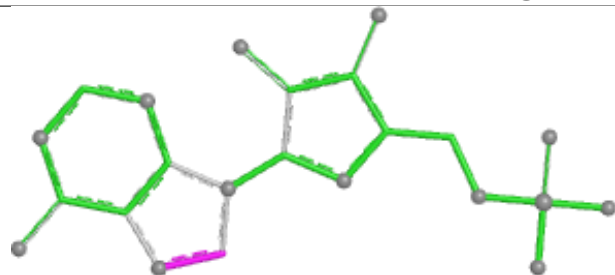


Torsions

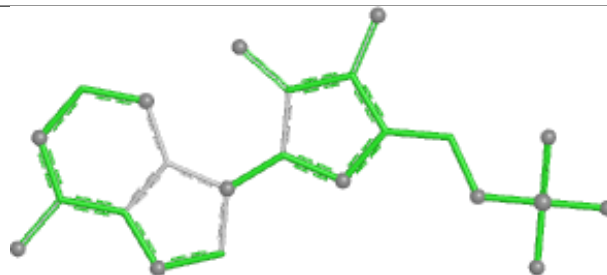


Rings

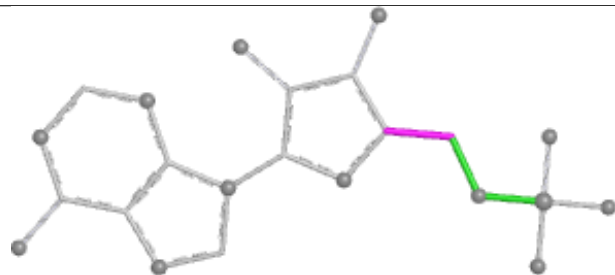
## Ligand IMP C 801



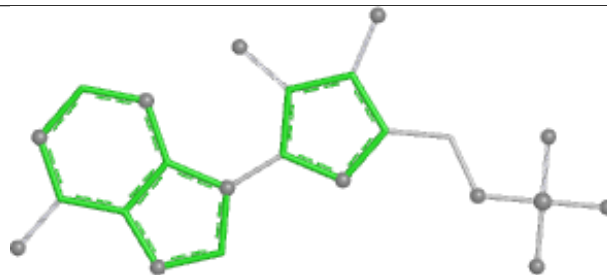
Bond lengths



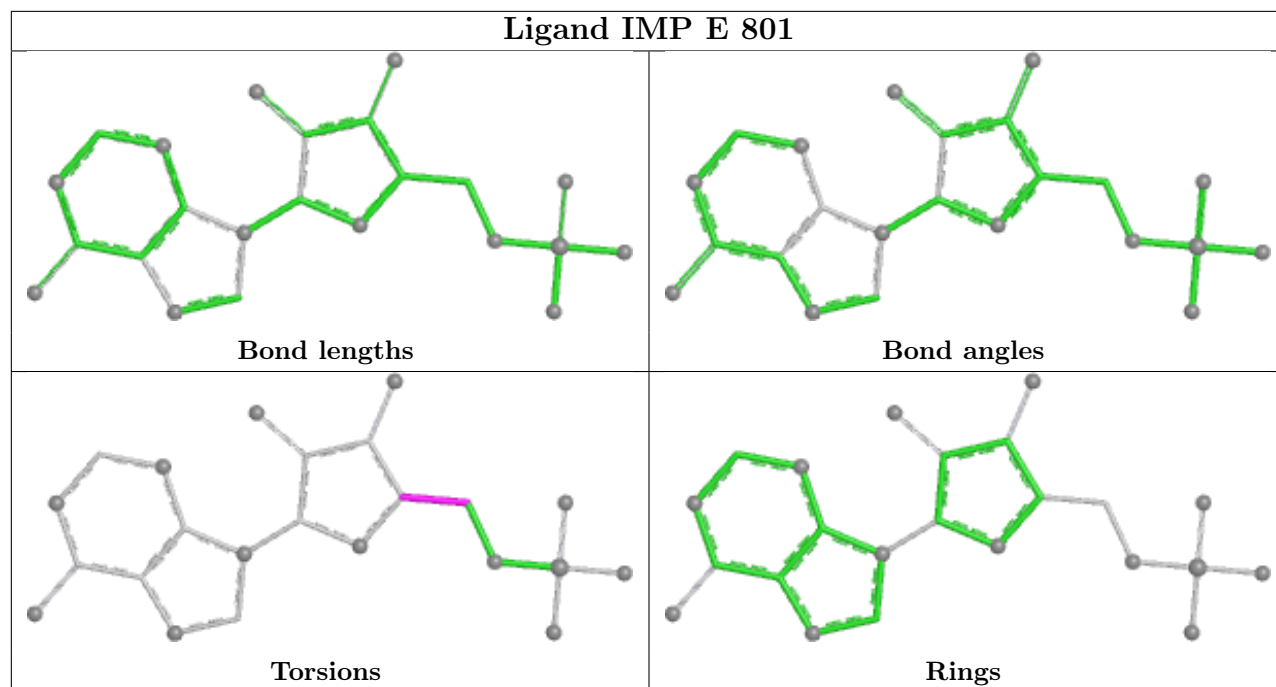
Bond angles



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, 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	336/395 (85%)	1.29	78 (23%) 2 3	10, 24, 48, 94	4 (1%)
1	B	336/395 (85%)	1.24	70 (20%) 3 4	9, 23, 50, 94	4 (1%)
1	C	336/395 (85%)	1.25	54 (16%) 5 7	11, 24, 49, 84	1 (0%)
1	D	337/395 (85%)	1.29	68 (20%) 3 4	7, 24, 48, 96	4 (1%)
1	E	337/395 (85%)	1.34	68 (20%) 3 4	9, 25, 48, 68	2 (0%)
1	F	338/395 (85%)	1.37	70 (20%) 3 4	10, 25, 47, 77	3 (0%)
1	G	336/395 (85%)	1.36	70 (20%) 3 4	11, 25, 49, 72	4 (1%)
1	H	336/395 (85%)	1.29	70 (20%) 3 4	11, 25, 47, 71	4 (1%)
All	All	2692/3160 (85%)	1.30	548 (20%) 3 4	7, 24, 49, 96	26 (0%)

The worst 5 of 548 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	D	92	GLY	9.2
1	A	92	GLY	8.5
1	B	92	GLY	8.0
1	A	373	GLU	7.4
1	C	91	ALA	7.4

### 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 monosaccharides in this entry.



## 6.4 Ligands ⓘ

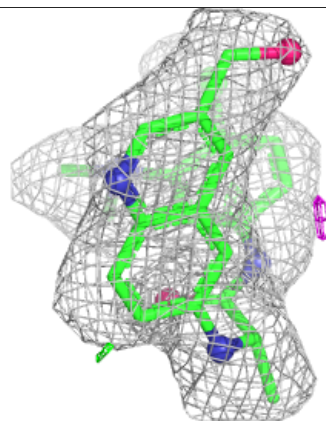
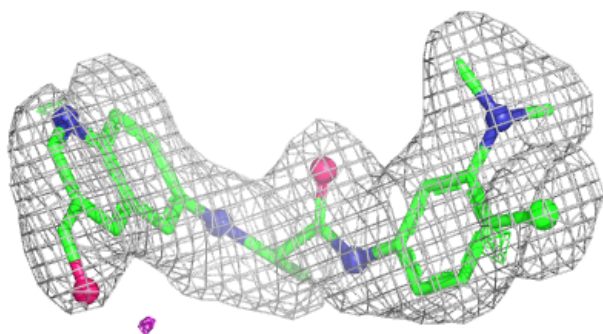
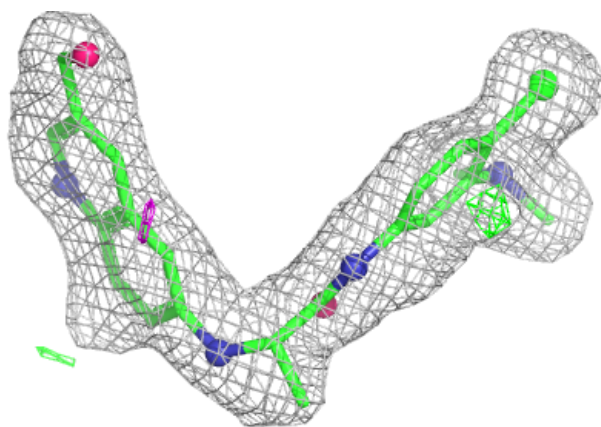
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95<sup>th</sup> percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 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	VP4	F	802	28/28	0.86	0.14	23,28,32,34	0
3	VP4	B	802	28/28	0.88	0.11	14,19,27,28	0
3	VP4	D	802	28/28	0.88	0.12	16,22,29,30	0
3	VP4	A	802	28/28	0.88	0.12	12,18,24,30	0
3	VP4	H	802	28/28	0.88	0.11	26,30,33,35	0
3	VP4	G	802	28/28	0.89	0.12	16,24,33,33	0
3	VP4	C	802	28/28	0.89	0.12	14,22,26,27	0
2	IMP	E	801	23/23	0.93	0.10	13,21,25,26	0
2	IMP	F	801	23/23	0.93	0.10	19,22,25,25	0
3	VP4	E	802	28/28	0.93	0.10	14,24,33,34	0
2	IMP	H	801	23/23	0.94	0.09	15,23,25,26	0
2	IMP	B	801	23/23	0.94	0.09	14,19,26,26	0
2	IMP	D	801	23/23	0.94	0.09	14,23,26,27	0
2	IMP	G	801	23/23	0.95	0.09	10,21,23,23	0
2	IMP	A	801	23/23	0.95	0.08	14,19,21,22	0
2	IMP	C	801	23/23	0.96	0.09	11,20,25,26	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.

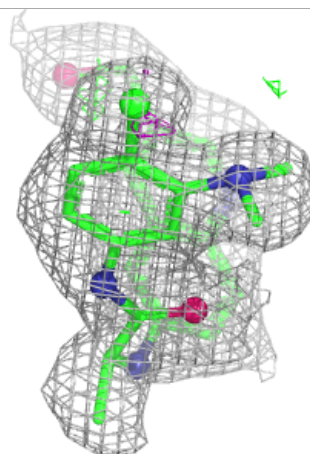
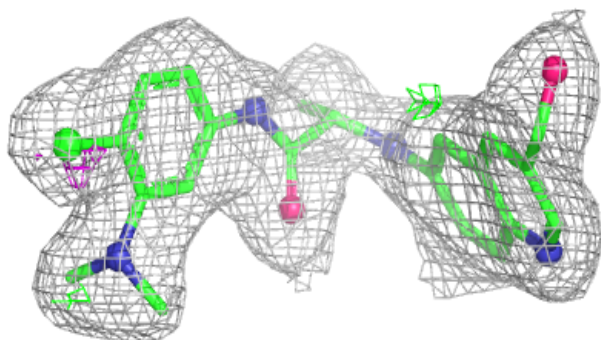
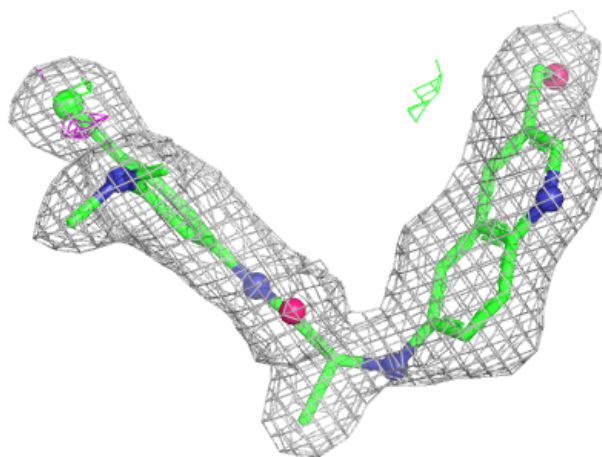
**Electron density around VP4 F 802:**

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



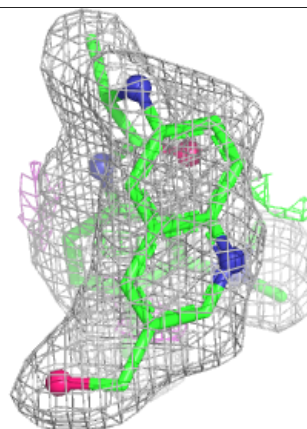
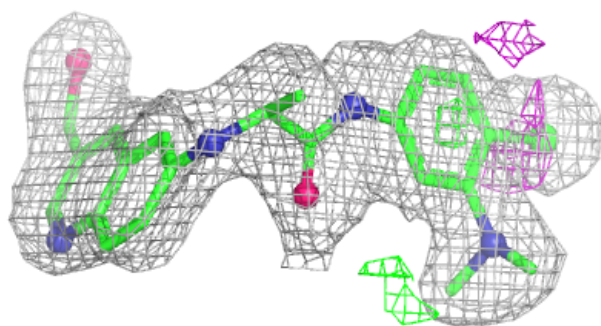
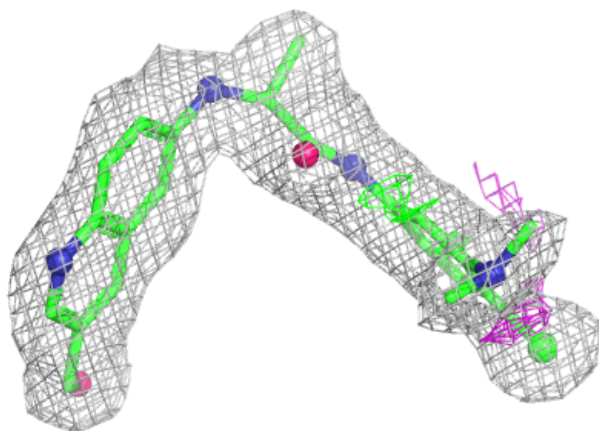
**Electron density around VP4 B 802:**

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



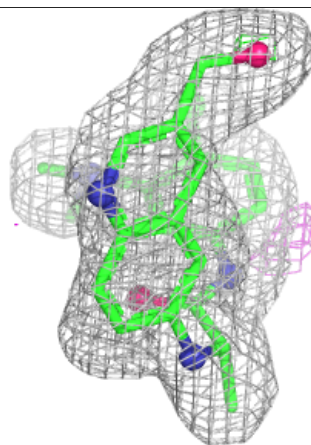
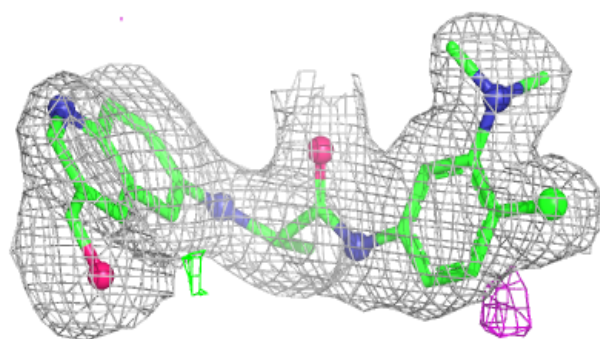
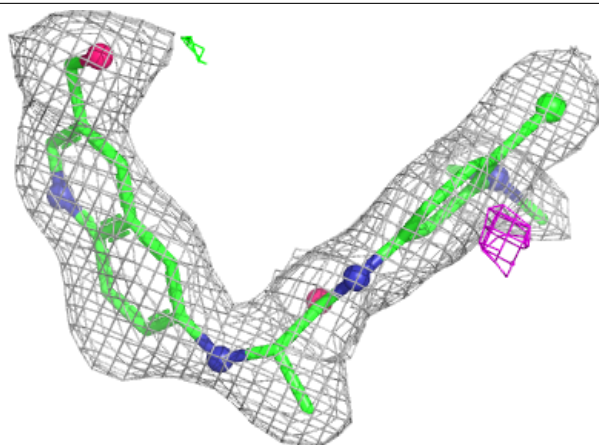
**Electron density around VP4 D 802:**

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



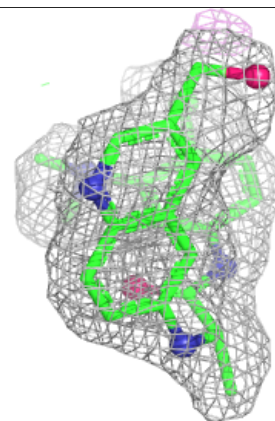
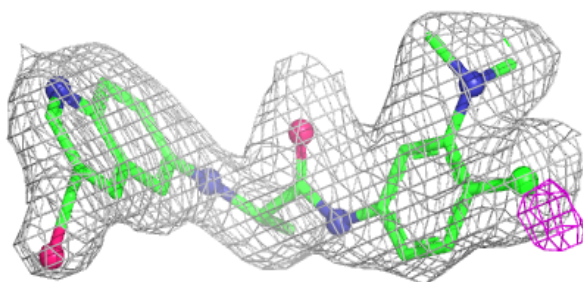
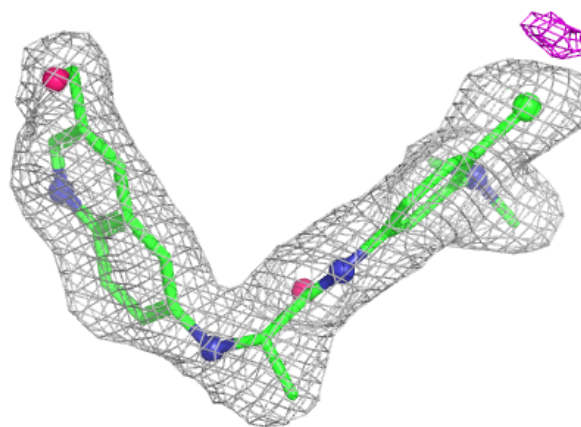
**Electron density around VP4 A 802:**

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



**Electron density around VP4 H 802:**

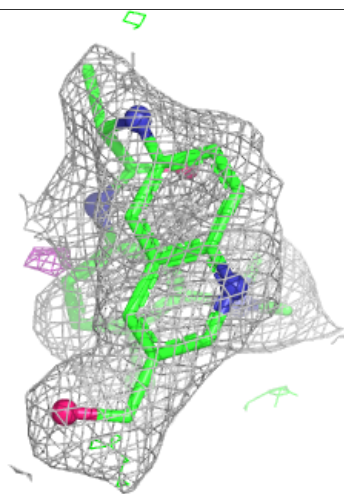
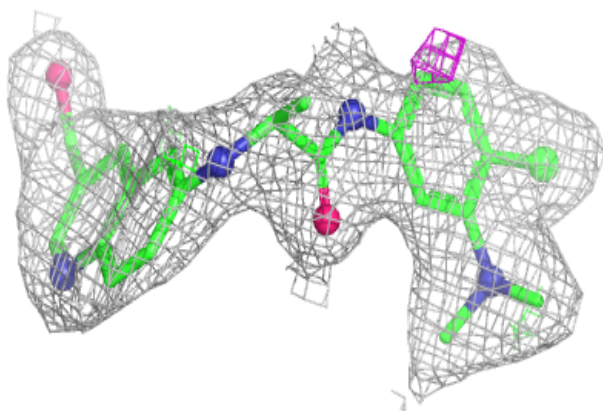
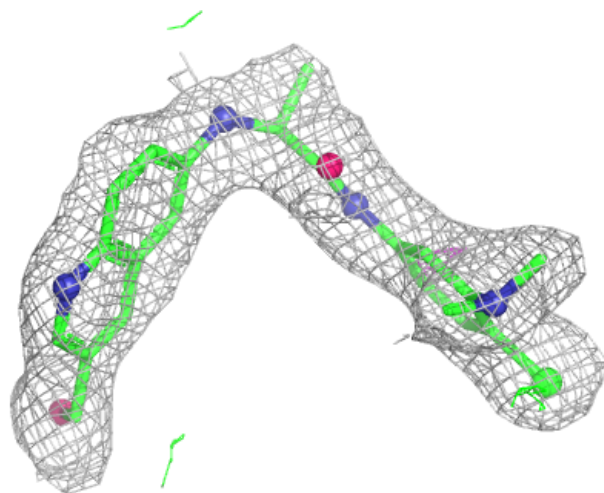
$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)





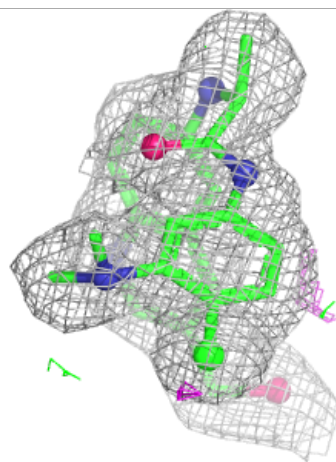
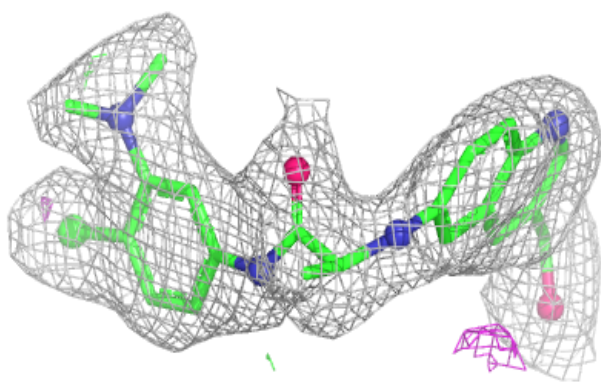
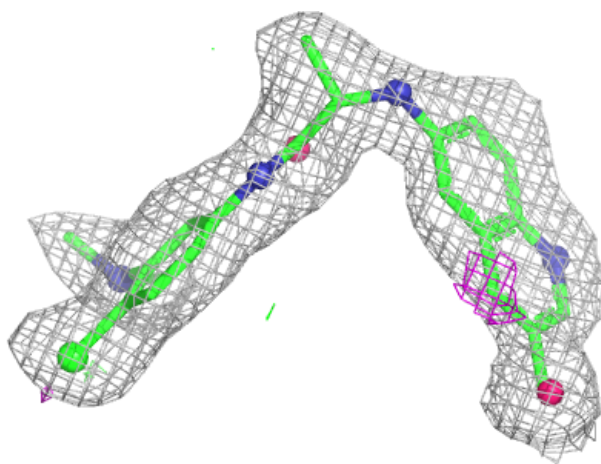
**Electron density around VP4 G 802:**

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



**Electron density around VP4 C 802:**

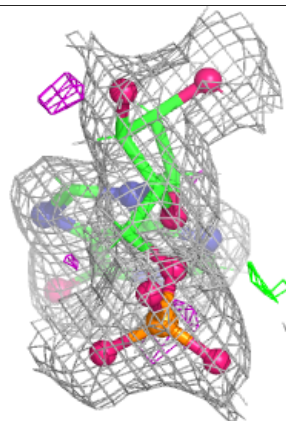
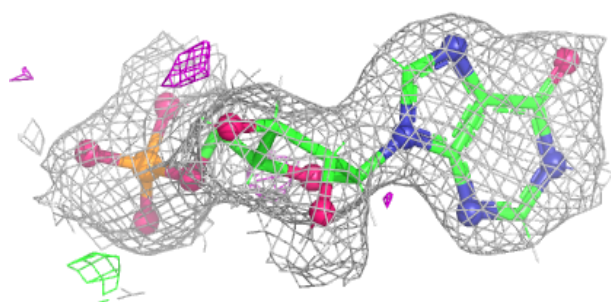
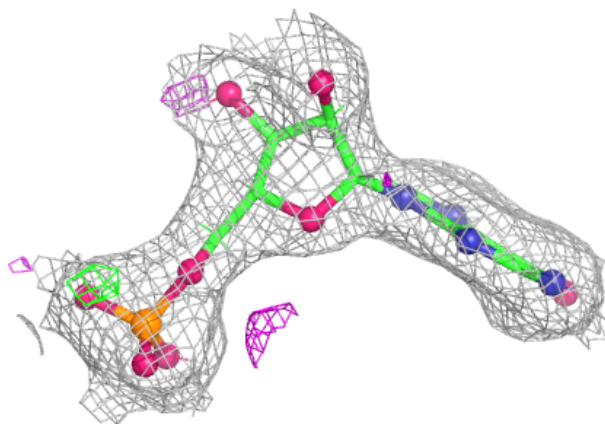
$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)



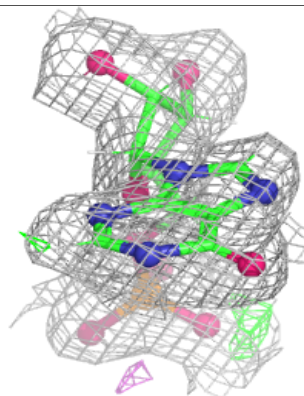
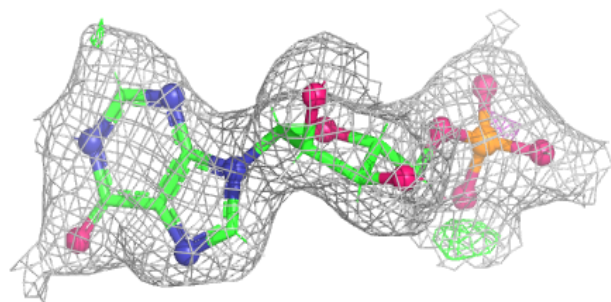
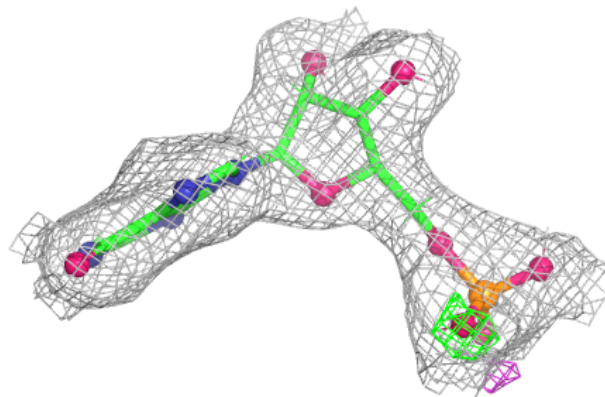


**Electron density around IMP E 801:**

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

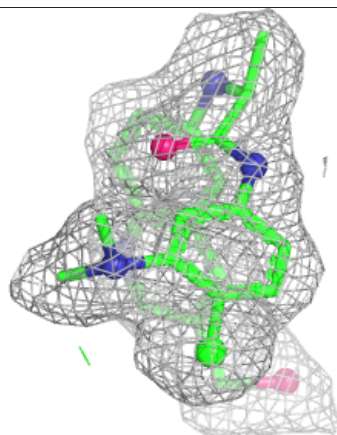
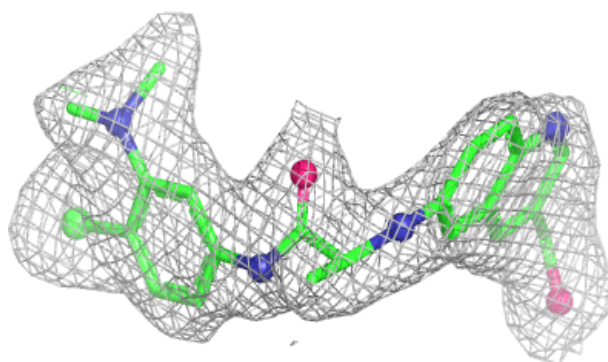
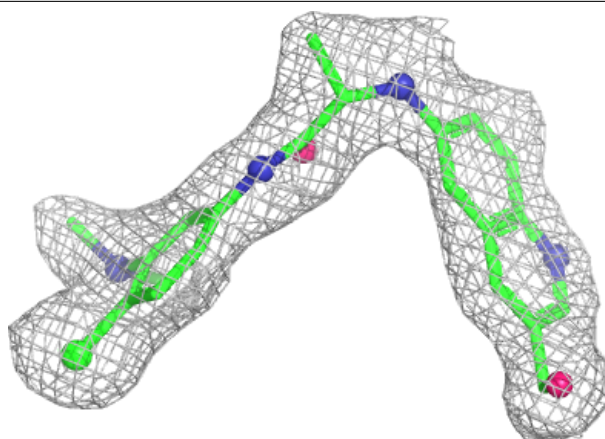
**Electron density around IMP F 801:**

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

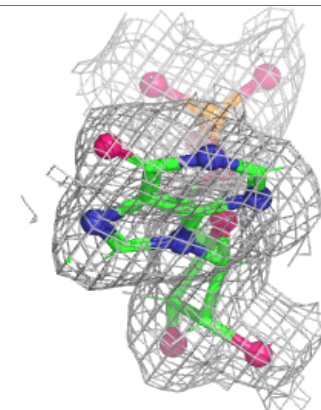
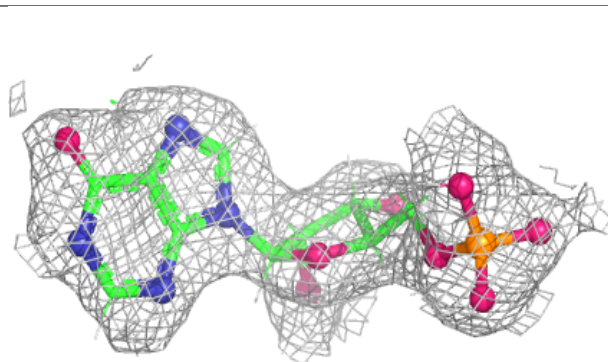
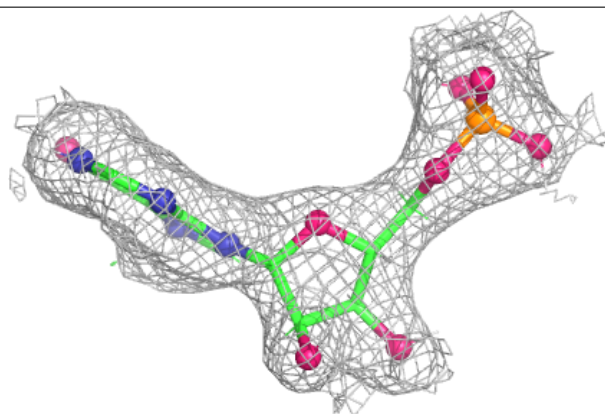


**Electron density around VP4 E 802:**

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

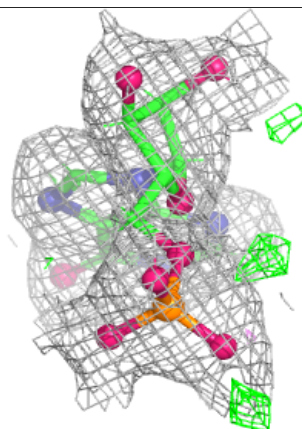
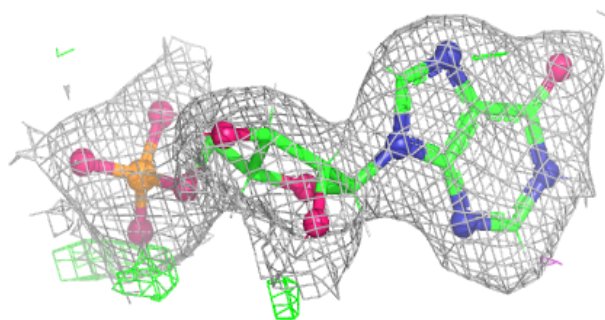
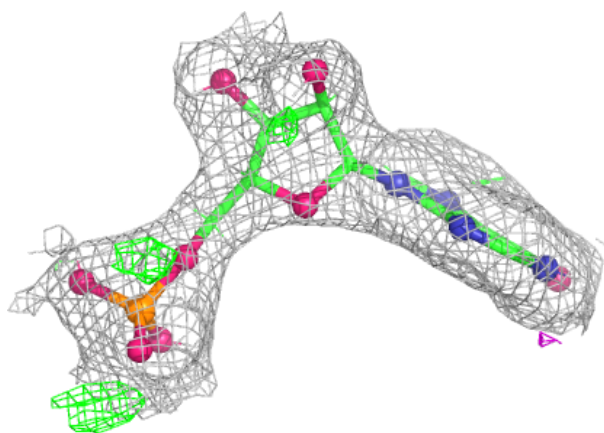
**Electron density around IMP H 801:**

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

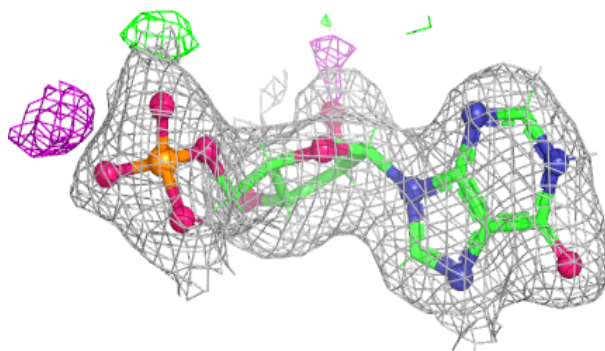
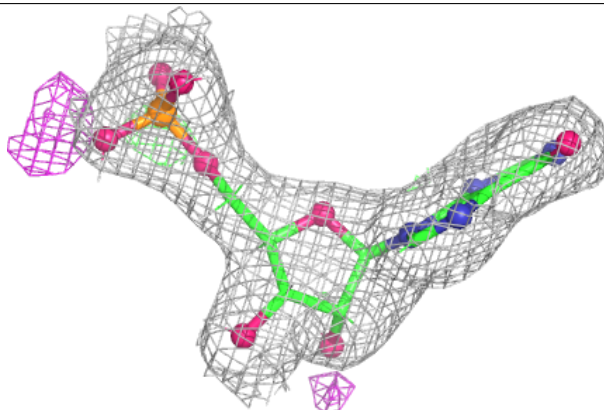


**Electron density around IMP B 801:**

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

**Electron density around IMP D 801:**

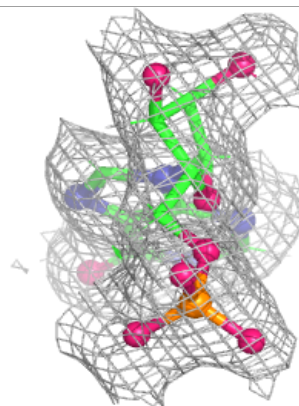
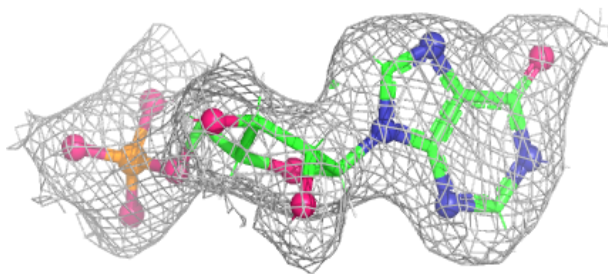
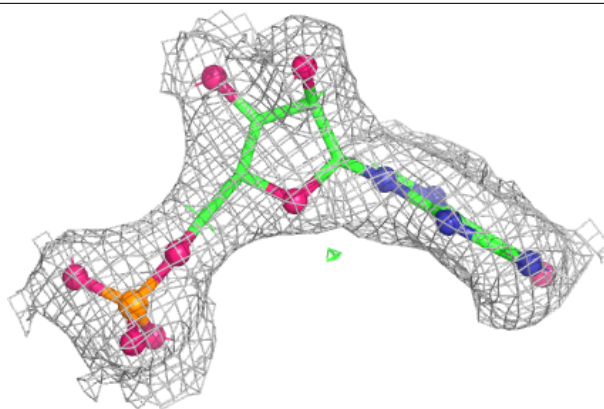
$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)



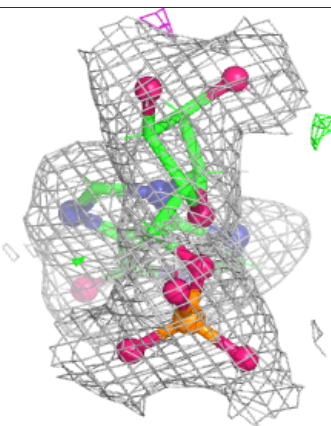
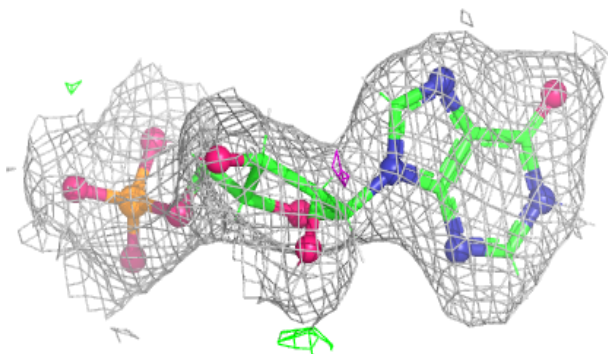
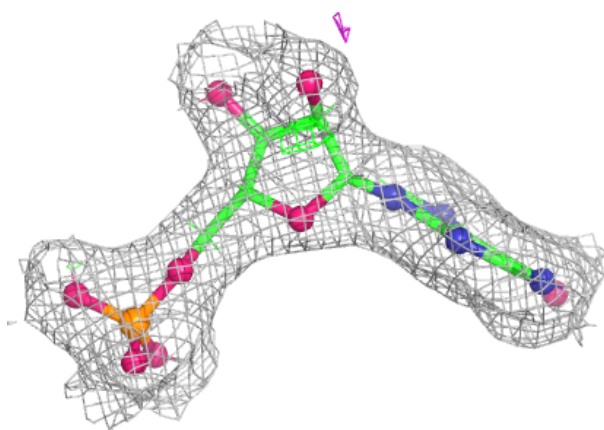


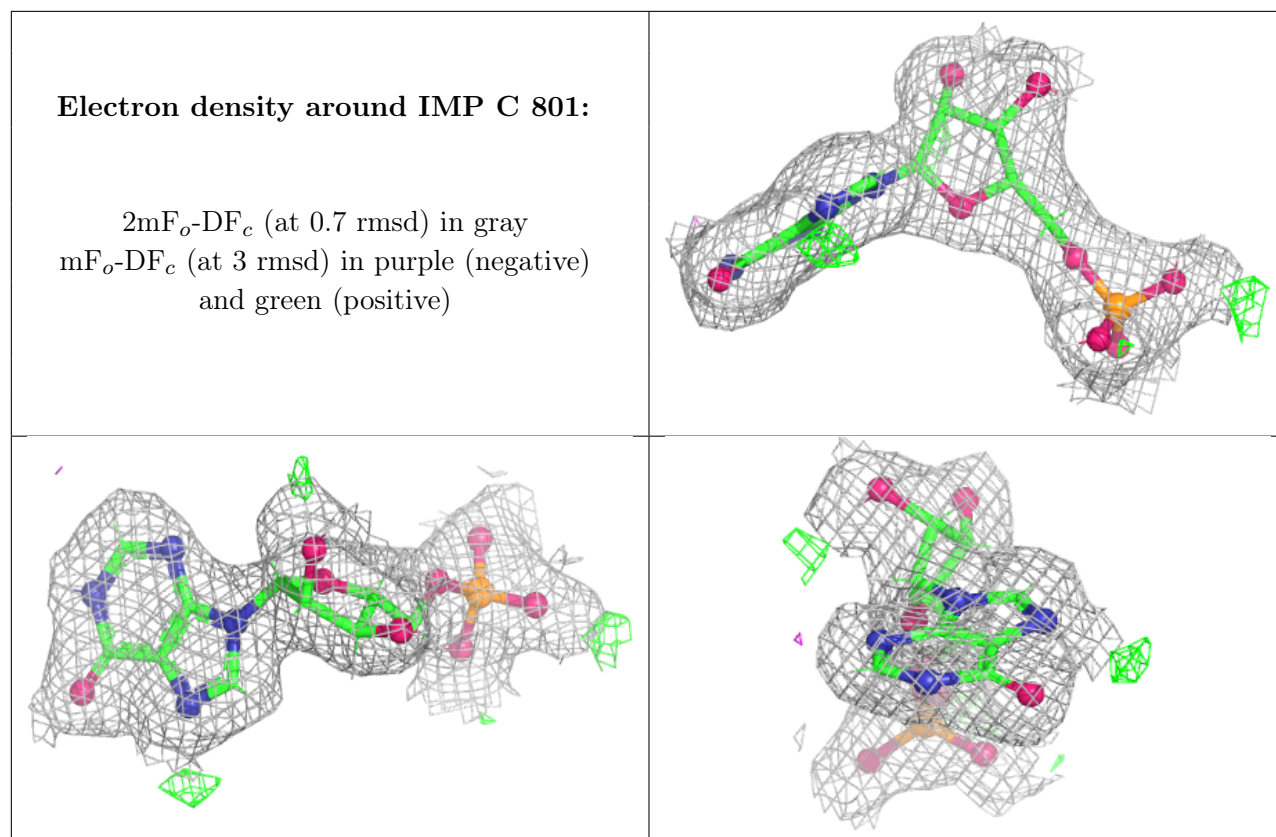
**Electron density around IMP G 801:**

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

**Electron density around IMP A 801:**

$2mF_o-DF_c$  (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.