



# wwPDB X-ray Structure Validation Summary Report ⓘ

Mar 5, 2026 – 04:55 AM UTC

PDB ID : 4MY1 / pdb\_00004my1  
Title : Crystal Structure of the Inosine 5'-monophosphate Dehydrogenase, with a Internal Deletion of CBS Domain from Bacillus anthracis str. Ames complexed with P68  
Authors : Kim, Y.; Makowska-Grzyska, M.; Gu, M.; Gorla, S.K.; Hedstrom, L.; Anderson, W.F.; Joachimiak, A.; CSGID; Center for Structural Genomics of Infectious Diseases (CSGID)  
Deposited on : 2013-09-26  
Resolution : 2.60 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 : 4-5-2 with Phenix2.0  
Mogul : 2022.3.0, CSD as543be (2022)  
Xtriage (Phenix) : 2.0  
EDS : 3.0  
Buster-report : wwPDB partial adaption of 1.1.7 (2018)  
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)  
CCP4 : 9.0.010 (Gargrove)  
Density-Fitness : 1.0.12  
Ideal geometry (proteins) : Engh & Huber (2001)

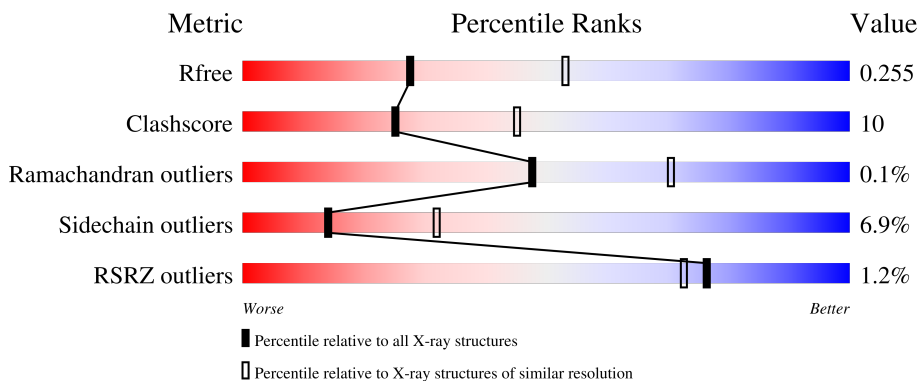
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.60 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))
$R_{free}$	180053	4008 (2.60-2.60)
Clashscore	190562	4347 (2.60-2.60)
Ramachandran outliers	187476	4277 (2.60-2.60)
Sidechain outliers	187428	4277 (2.60-2.60)
RSRZ outliers	180081	4008 (2.60-2.60)

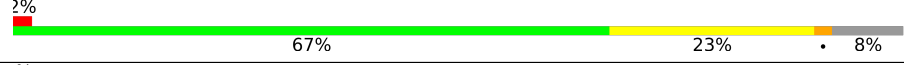
The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for  $\geq 3$ , 2, 1 and 0 types of geometric quality criteria 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	384	
1	B	384	
1	C	384	

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Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
 Validation Pipeline (wwPDB-VP) : 2.49

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Mol	Chain	Length	Quality of chain
1	D	384	 <p>67% 22% 9%</p>
1	E	384	 <p>67% 20% 10%</p>
1	F	384	 <p>67% 23% 8%</p>
1	G	384	 <p>68% 21% 10%</p>
1	H	384	 <p>66% 21% 9%</p>

## 2 Entry composition [i](#)

There are 4 unique types of molecules in this entry. The entry contains 21010 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 Inosine-5'-monophosphate dehydrogenase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	349	2558	1606	448	488	16	0	0	0
1	B	351	2568	1611	450	491	16	0	0	0
1	C	354	2603	1637	455	495	16	0	0	0
1	D	348	2552	1603	447	486	16	0	0	0
1	E	347	2541	1594	445	486	16	0	0	0
1	F	353	2594	1631	453	494	16	0	0	0
1	G	347	2543	1597	445	485	16	0	0	0
1	H	349	2558	1606	448	488	16	0	0	0

There are 208 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-23	MET	-	expression tag	UNP Q81W29
A	-22	HIS	-	expression tag	UNP Q81W29
A	-21	HIS	-	expression tag	UNP Q81W29
A	-20	HIS	-	expression tag	UNP Q81W29
A	-19	HIS	-	expression tag	UNP Q81W29
A	-18	HIS	-	expression tag	UNP Q81W29
A	-17	HIS	-	expression tag	UNP Q81W29
A	-16	SER	-	expression tag	UNP Q81W29
A	-15	SER	-	expression tag	UNP Q81W29
A	-14	GLY	-	expression tag	UNP Q81W29
A	-13	VAL	-	expression tag	UNP Q81W29
A	-12	ASP	-	expression tag	UNP Q81W29
A	-11	LEU	-	expression tag	UNP Q81W29

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Chain	Residue	Modelled	Actual	Comment	Reference
A	-10	GLY	-	expression tag	UNP Q81W29
A	-9	THR	-	expression tag	UNP Q81W29
A	-8	GLU	-	expression tag	UNP Q81W29
A	-7	ASN	-	expression tag	UNP Q81W29
A	-6	LEU	-	expression tag	UNP Q81W29
A	-5	TYR	-	expression tag	UNP Q81W29
A	-4	PHE	-	expression tag	UNP Q81W29
A	-3	GLN	-	expression tag	UNP Q81W29
A	-2	SER	-	expression tag	UNP Q81W29
A	-1	ASN	-	expression tag	UNP Q81W29
A	0	ALA	-	expression tag	UNP Q81W29
A	92	GLY	-	linker	UNP Q81W29
A	220	GLY	-	linker	UNP Q81W29
B	-23	MET	-	expression tag	UNP Q81W29
B	-22	HIS	-	expression tag	UNP Q81W29
B	-21	HIS	-	expression tag	UNP Q81W29
B	-20	HIS	-	expression tag	UNP Q81W29
B	-19	HIS	-	expression tag	UNP Q81W29
B	-18	HIS	-	expression tag	UNP Q81W29
B	-17	HIS	-	expression tag	UNP Q81W29
B	-16	SER	-	expression tag	UNP Q81W29
B	-15	SER	-	expression tag	UNP Q81W29
B	-14	GLY	-	expression tag	UNP Q81W29
B	-13	VAL	-	expression tag	UNP Q81W29
B	-12	ASP	-	expression tag	UNP Q81W29
B	-11	LEU	-	expression tag	UNP Q81W29
B	-10	GLY	-	expression tag	UNP Q81W29
B	-9	THR	-	expression tag	UNP Q81W29
B	-8	GLU	-	expression tag	UNP Q81W29
B	-7	ASN	-	expression tag	UNP Q81W29
B	-6	LEU	-	expression tag	UNP Q81W29
B	-5	TYR	-	expression tag	UNP Q81W29
B	-4	PHE	-	expression tag	UNP Q81W29
B	-3	GLN	-	expression tag	UNP Q81W29
B	-2	SER	-	expression tag	UNP Q81W29
B	-1	ASN	-	expression tag	UNP Q81W29
B	0	ALA	-	expression tag	UNP Q81W29
B	92	GLY	-	linker	UNP Q81W29
B	220	GLY	-	linker	UNP Q81W29
C	-23	MET	-	expression tag	UNP Q81W29
C	-22	HIS	-	expression tag	UNP Q81W29
C	-21	HIS	-	expression tag	UNP Q81W29

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Chain	Residue	Modelled	Actual	Comment	Reference
C	-20	HIS	-	expression tag	UNP Q81W29
C	-19	HIS	-	expression tag	UNP Q81W29
C	-18	HIS	-	expression tag	UNP Q81W29
C	-17	HIS	-	expression tag	UNP Q81W29
C	-16	SER	-	expression tag	UNP Q81W29
C	-15	SER	-	expression tag	UNP Q81W29
C	-14	GLY	-	expression tag	UNP Q81W29
C	-13	VAL	-	expression tag	UNP Q81W29
C	-12	ASP	-	expression tag	UNP Q81W29
C	-11	LEU	-	expression tag	UNP Q81W29
C	-10	GLY	-	expression tag	UNP Q81W29
C	-9	THR	-	expression tag	UNP Q81W29
C	-8	GLU	-	expression tag	UNP Q81W29
C	-7	ASN	-	expression tag	UNP Q81W29
C	-6	LEU	-	expression tag	UNP Q81W29
C	-5	TYR	-	expression tag	UNP Q81W29
C	-4	PHE	-	expression tag	UNP Q81W29
C	-3	GLN	-	expression tag	UNP Q81W29
C	-2	SER	-	expression tag	UNP Q81W29
C	-1	ASN	-	expression tag	UNP Q81W29
C	0	ALA	-	expression tag	UNP Q81W29
C	92	GLY	-	linker	UNP Q81W29
C	220	GLY	-	linker	UNP Q81W29
D	-23	MET	-	expression tag	UNP Q81W29
D	-22	HIS	-	expression tag	UNP Q81W29
D	-21	HIS	-	expression tag	UNP Q81W29
D	-20	HIS	-	expression tag	UNP Q81W29
D	-19	HIS	-	expression tag	UNP Q81W29
D	-18	HIS	-	expression tag	UNP Q81W29
D	-17	HIS	-	expression tag	UNP Q81W29
D	-16	SER	-	expression tag	UNP Q81W29
D	-15	SER	-	expression tag	UNP Q81W29
D	-14	GLY	-	expression tag	UNP Q81W29
D	-13	VAL	-	expression tag	UNP Q81W29
D	-12	ASP	-	expression tag	UNP Q81W29
D	-11	LEU	-	expression tag	UNP Q81W29
D	-10	GLY	-	expression tag	UNP Q81W29
D	-9	THR	-	expression tag	UNP Q81W29
D	-8	GLU	-	expression tag	UNP Q81W29
D	-7	ASN	-	expression tag	UNP Q81W29
D	-6	LEU	-	expression tag	UNP Q81W29
D	-5	TYR	-	expression tag	UNP Q81W29

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Chain	Residue	Modelled	Actual	Comment	Reference
D	-4	PHE	-	expression tag	UNP Q81W29
D	-3	GLN	-	expression tag	UNP Q81W29
D	-2	SER	-	expression tag	UNP Q81W29
D	-1	ASN	-	expression tag	UNP Q81W29
D	0	ALA	-	expression tag	UNP Q81W29
D	92	GLY	-	linker	UNP Q81W29
D	220	GLY	-	linker	UNP Q81W29
E	-23	MET	-	expression tag	UNP Q81W29
E	-22	HIS	-	expression tag	UNP Q81W29
E	-21	HIS	-	expression tag	UNP Q81W29
E	-20	HIS	-	expression tag	UNP Q81W29
E	-19	HIS	-	expression tag	UNP Q81W29
E	-18	HIS	-	expression tag	UNP Q81W29
E	-17	HIS	-	expression tag	UNP Q81W29
E	-16	SER	-	expression tag	UNP Q81W29
E	-15	SER	-	expression tag	UNP Q81W29
E	-14	GLY	-	expression tag	UNP Q81W29
E	-13	VAL	-	expression tag	UNP Q81W29
E	-12	ASP	-	expression tag	UNP Q81W29
E	-11	LEU	-	expression tag	UNP Q81W29
E	-10	GLY	-	expression tag	UNP Q81W29
E	-9	THR	-	expression tag	UNP Q81W29
E	-8	GLU	-	expression tag	UNP Q81W29
E	-7	ASN	-	expression tag	UNP Q81W29
E	-6	LEU	-	expression tag	UNP Q81W29
E	-5	TYR	-	expression tag	UNP Q81W29
E	-4	PHE	-	expression tag	UNP Q81W29
E	-3	GLN	-	expression tag	UNP Q81W29
E	-2	SER	-	expression tag	UNP Q81W29
E	-1	ASN	-	expression tag	UNP Q81W29
E	0	ALA	-	expression tag	UNP Q81W29
E	92	GLY	-	linker	UNP Q81W29
E	220	GLY	-	linker	UNP Q81W29
F	-23	MET	-	expression tag	UNP Q81W29
F	-22	HIS	-	expression tag	UNP Q81W29
F	-21	HIS	-	expression tag	UNP Q81W29
F	-20	HIS	-	expression tag	UNP Q81W29
F	-19	HIS	-	expression tag	UNP Q81W29
F	-18	HIS	-	expression tag	UNP Q81W29
F	-17	HIS	-	expression tag	UNP Q81W29
F	-16	SER	-	expression tag	UNP Q81W29
F	-15	SER	-	expression tag	UNP Q81W29

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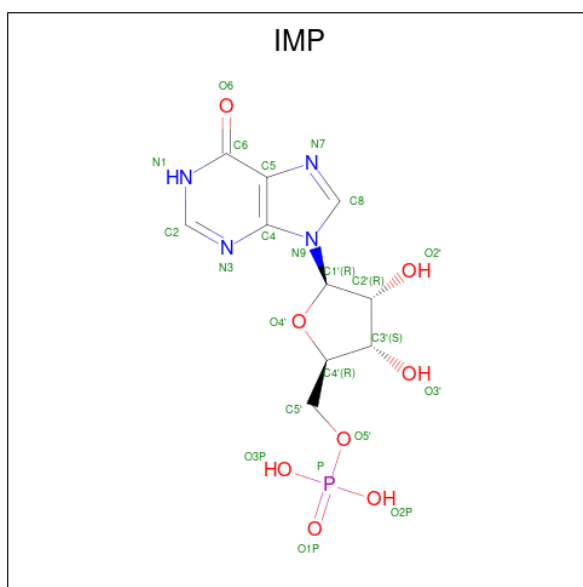
Chain	Residue	Modelled	Actual	Comment	Reference
F	-14	GLY	-	expression tag	UNP Q81W29
F	-13	VAL	-	expression tag	UNP Q81W29
F	-12	ASP	-	expression tag	UNP Q81W29
F	-11	LEU	-	expression tag	UNP Q81W29
F	-10	GLY	-	expression tag	UNP Q81W29
F	-9	THR	-	expression tag	UNP Q81W29
F	-8	GLU	-	expression tag	UNP Q81W29
F	-7	ASN	-	expression tag	UNP Q81W29
F	-6	LEU	-	expression tag	UNP Q81W29
F	-5	TYR	-	expression tag	UNP Q81W29
F	-4	PHE	-	expression tag	UNP Q81W29
F	-3	GLN	-	expression tag	UNP Q81W29
F	-2	SER	-	expression tag	UNP Q81W29
F	-1	ASN	-	expression tag	UNP Q81W29
F	0	ALA	-	expression tag	UNP Q81W29
F	92	GLY	-	linker	UNP Q81W29
F	220	GLY	-	linker	UNP Q81W29
G	-23	MET	-	expression tag	UNP Q81W29
G	-22	HIS	-	expression tag	UNP Q81W29
G	-21	HIS	-	expression tag	UNP Q81W29
G	-20	HIS	-	expression tag	UNP Q81W29
G	-19	HIS	-	expression tag	UNP Q81W29
G	-18	HIS	-	expression tag	UNP Q81W29
G	-17	HIS	-	expression tag	UNP Q81W29
G	-16	SER	-	expression tag	UNP Q81W29
G	-15	SER	-	expression tag	UNP Q81W29
G	-14	GLY	-	expression tag	UNP Q81W29
G	-13	VAL	-	expression tag	UNP Q81W29
G	-12	ASP	-	expression tag	UNP Q81W29
G	-11	LEU	-	expression tag	UNP Q81W29
G	-10	GLY	-	expression tag	UNP Q81W29
G	-9	THR	-	expression tag	UNP Q81W29
G	-8	GLU	-	expression tag	UNP Q81W29
G	-7	ASN	-	expression tag	UNP Q81W29
G	-6	LEU	-	expression tag	UNP Q81W29
G	-5	TYR	-	expression tag	UNP Q81W29
G	-4	PHE	-	expression tag	UNP Q81W29
G	-3	GLN	-	expression tag	UNP Q81W29
G	-2	SER	-	expression tag	UNP Q81W29
G	-1	ASN	-	expression tag	UNP Q81W29
G	0	ALA	-	expression tag	UNP Q81W29
G	92	GLY	-	linker	UNP Q81W29

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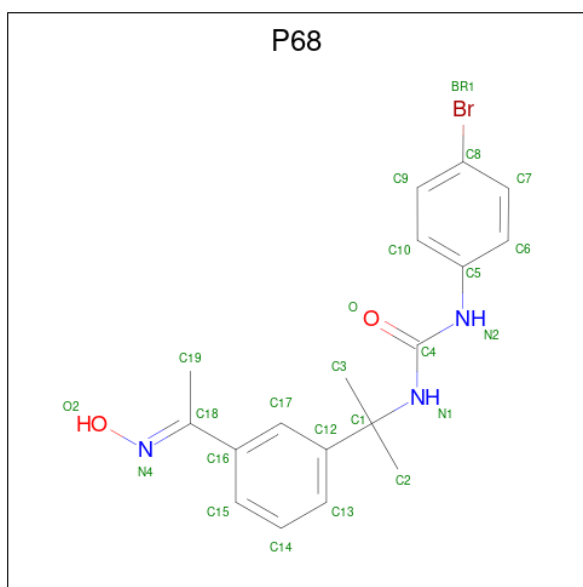
Chain	Residue	Modelled	Actual	Comment	Reference
G	220	GLY	-	linker	UNP Q81W29
H	-23	MET	-	expression tag	UNP Q81W29
H	-22	HIS	-	expression tag	UNP Q81W29
H	-21	HIS	-	expression tag	UNP Q81W29
H	-20	HIS	-	expression tag	UNP Q81W29
H	-19	HIS	-	expression tag	UNP Q81W29
H	-18	HIS	-	expression tag	UNP Q81W29
H	-17	HIS	-	expression tag	UNP Q81W29
H	-16	SER	-	expression tag	UNP Q81W29
H	-15	SER	-	expression tag	UNP Q81W29
H	-14	GLY	-	expression tag	UNP Q81W29
H	-13	VAL	-	expression tag	UNP Q81W29
H	-12	ASP	-	expression tag	UNP Q81W29
H	-11	LEU	-	expression tag	UNP Q81W29
H	-10	GLY	-	expression tag	UNP Q81W29
H	-9	THR	-	expression tag	UNP Q81W29
H	-8	GLU	-	expression tag	UNP Q81W29
H	-7	ASN	-	expression tag	UNP Q81W29
H	-6	LEU	-	expression tag	UNP Q81W29
H	-5	TYR	-	expression tag	UNP Q81W29
H	-4	PHE	-	expression tag	UNP Q81W29
H	-3	GLN	-	expression tag	UNP Q81W29
H	-2	SER	-	expression tag	UNP Q81W29
H	-1	ASN	-	expression tag	UNP Q81W29
H	0	ALA	-	expression tag	UNP Q81W29
H	92	GLY	-	linker	UNP Q81W29
H	220	GLY	-	linker	UNP Q81W29

- Molecule 2 is INOSINIC ACID (CCD ID: 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
			Total	C	N	O	P		
2	A	1	Total 23	10	4	8	1	0	0
2	B	1	Total 23	10	4	8	1	0	0
2	C	1	Total 23	10	4	8	1	0	0
2	D	1	Total 23	10	4	8	1	0	0
2	E	1	Total 23	10	4	8	1	0	0
2	F	1	Total 23	10	4	8	1	0	0
2	G	1	Total 23	10	4	8	1	0	0
2	H	1	Total 23	10	4	8	1	0	0

- Molecule 3 is 1-(4-bromophenyl)-3-(2-{3-[(1E)-N-hydroxyethanimidoyl]phenyl}propan-2-yl) urea (CCD ID: P68) (formula: C<sub>18</sub>H<sub>20</sub>BrN<sub>3</sub>O<sub>2</sub>).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	Br	C	N	O		
3	A	1	Total	Br	C	N	O	0	0
			24	1	18	3	2		
3	B	1	Total	Br	C	N	O	0	0
			24	1	18	3	2		
3	C	1	Total	Br	C	N	O	0	0
			24	1	18	3	2		
3	D	1	Total	Br	C	N	O	0	0
			24	1	18	3	2		
3	E	1	Total	Br	C	N	O	0	0
			24	1	18	3	2		
3	E	1	Total	Br	C	N	O	0	0
			24	1	18	3	2		
3	G	1	Total	Br	C	N	O	0	0
			24	1	18	3	2		
3	H	1	Total	Br	C	N	O	0	0
			24	1	18	3	2		

- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	21	Total	O	0	0
			21	21		
4	B	20	Total	O	0	0
			20	20		
4	C	21	Total	O	0	0
			21	21		
4	D	14	Total	O	0	0
			14	14		

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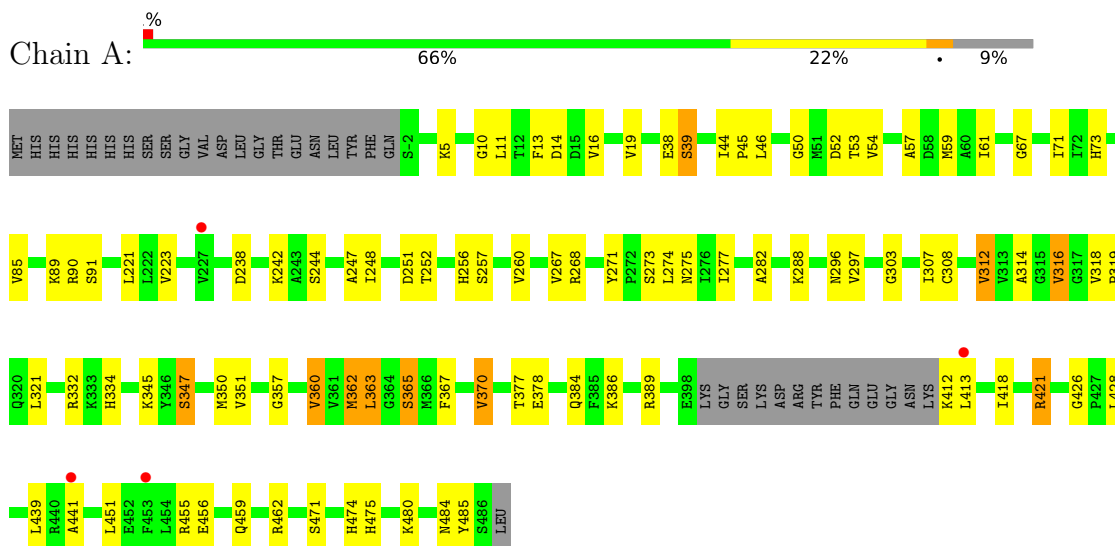
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<b>Mol</b>	<b>Chain</b>	<b>Residues</b>	<b>Atoms</b>	<b>ZeroOcc</b>	<b>AltConf</b>
4	E	9	Total O 9 9	0	0
4	F	7	Total O 7 7	0	0
4	G	10	Total O 10 10	0	0
4	H	15	Total O 15 15	0	0

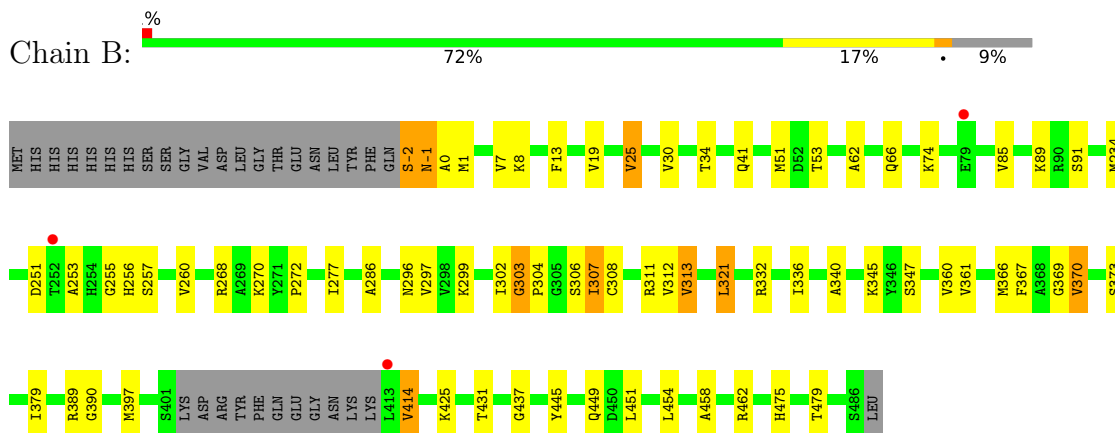
### 3 Residue-property plots [i](#)

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.

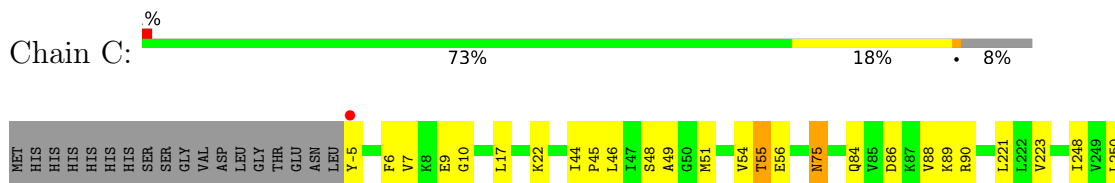
- Molecule 1: Inosine-5'-monophosphate dehydrogenase

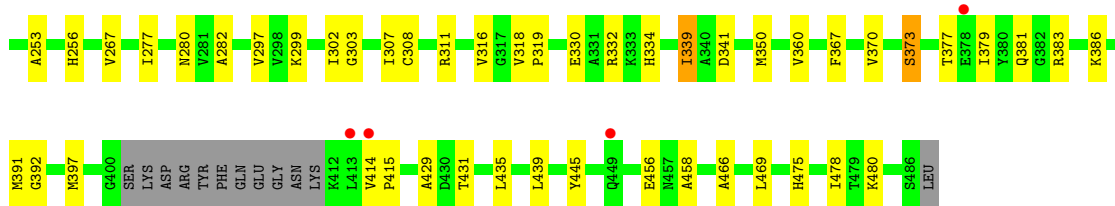


- Molecule 1: Inosine-5'-monophosphate dehydrogenase

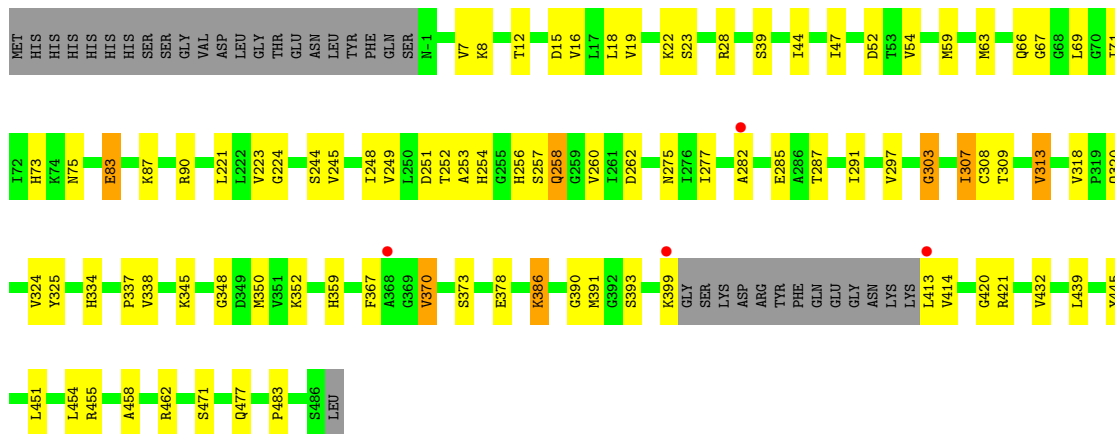


- Molecule 1: Inosine-5'-monophosphate dehydrogenase

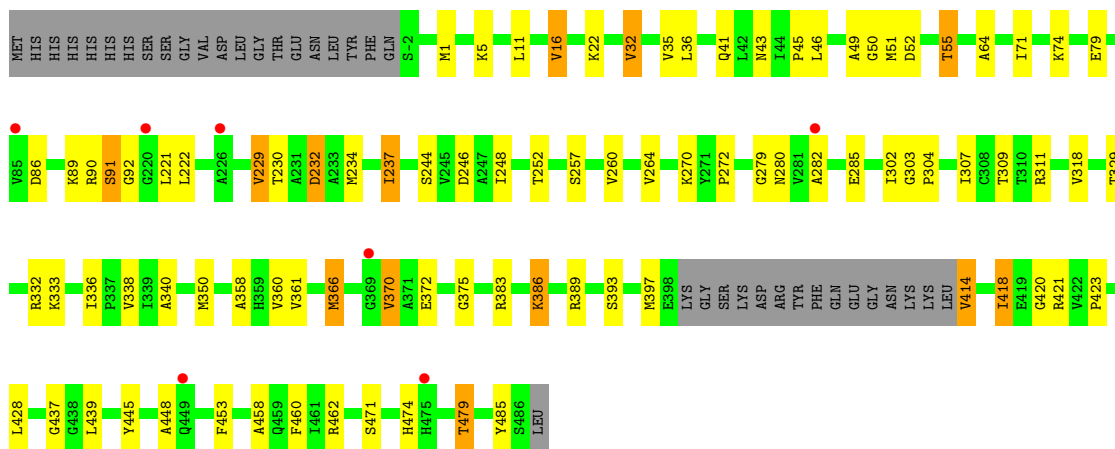




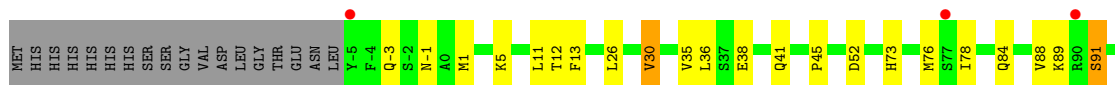
● Molecule 1: Inosine-5'-monophosphate dehydrogenase

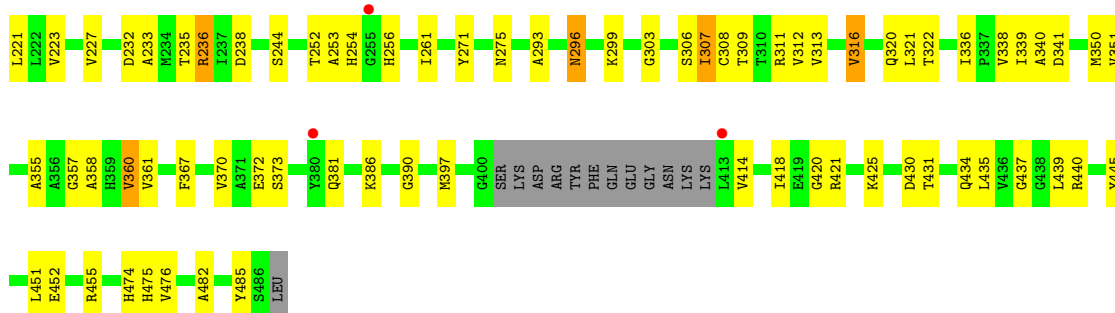


● Molecule 1: Inosine-5'-monophosphate dehydrogenase

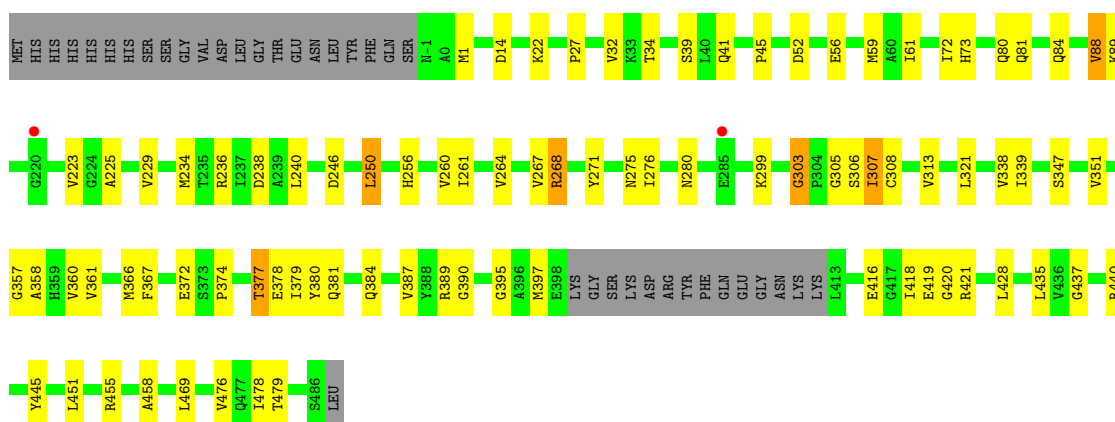


● Molecule 1: Inosine-5'-monophosphate dehydrogenase

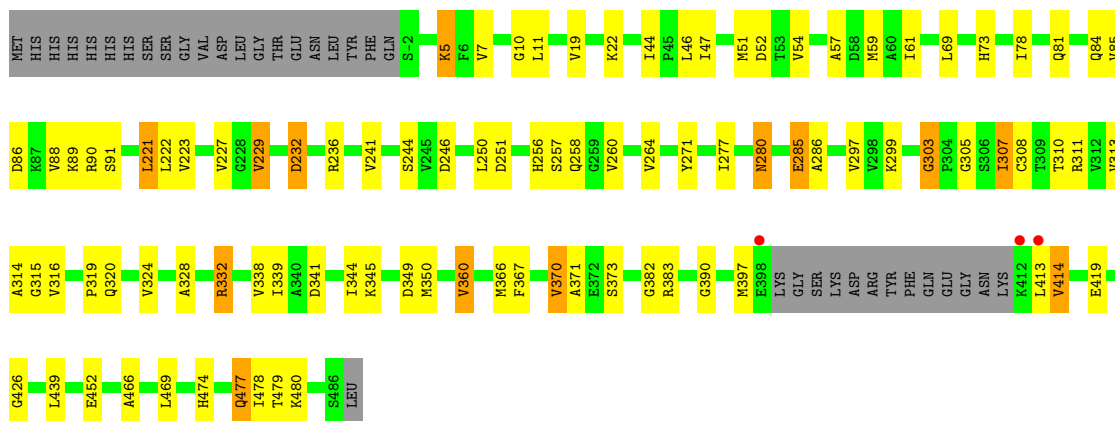




• Molecule 1: Inosine-5'-monophosphate dehydrogenase



• Molecule 1: Inosine-5'-monophosphate dehydrogenase



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	83.22Å 89.39Å 103.99Å 81.13° 89.95° 83.59°	Depositor
Resolution (Å)	36.25 – 2.60 36.25 – 2.60	Depositor EDS
% Data completeness (in resolution range)	97.5 (36.25-2.60) 97.5 (36.25-2.60)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	0.09	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	2.29 (at 2.61Å)	Xtrriage
Refinement program	PHENIX (phenix.refine: 1.8.1_1161)	Depositor
R, $R_{free}$	0.194 , 0.253 0.196 , 0.255	Depositor DCC
$R_{free}$ test set	4416 reflections (4.88%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	45.8	Xtrriage
Anisotropy	0.317	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.30 , 32.2	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.45$ , $\langle L^2 \rangle = 0.28$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
$F_o, F_c$ correlation	0.93	EDS
Total number of atoms	21010	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	60.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 6.64% 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

### 5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: IMP, P68

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	0.62	0/2594	0.95	6/3507 (0.2%)
1	B	0.60	0/2604	0.93	3/3520 (0.1%)
1	C	0.63	0/2641	0.97	4/3569 (0.1%)
1	D	0.57	0/2588	0.93	6/3499 (0.2%)
1	E	0.57	0/2577	0.91	3/3485 (0.1%)
1	F	0.55	0/2632	0.92	5/3558 (0.1%)
1	G	0.57	0/2579	0.92	3/3488 (0.1%)
1	H	0.58	0/2594	0.94	5/3507 (0.1%)
All	All	0.59	0/20809	0.93	35/28133 (0.1%)

There are no bond length outliers.

The worst 5 of 35 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	H	303	GLY	CA-C-N	-7.55	111.76	120.89
1	H	303	GLY	C-N-CA	-7.55	111.76	120.89
1	G	1	MET	N-CA-C	-6.98	104.65	113.72
1	C	7	VAL	N-CA-C	6.72	116.87	110.42
1	C	303	GLY	CA-C-N	-6.68	112.82	120.04

There are no chirality outliers.

There are no planarity outliers.

### 5.2 Too-close contacts

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	2558	0	2613	56	0
1	B	2568	0	2621	46	0
1	C	2603	0	2655	42	0
1	D	2552	0	2608	48	0
1	E	2541	0	2589	75	0
1	F	2594	0	2642	56	0
1	G	2543	0	2595	61	0
1	H	2558	0	2613	67	0
2	A	23	0	11	2	0
2	B	23	0	11	3	0
2	C	23	0	11	3	0
2	D	23	0	11	0	0
2	E	23	0	11	1	0
2	F	23	0	11	1	0
2	G	23	0	11	1	0
2	H	23	0	11	3	0
3	A	24	0	20	5	0
3	B	24	0	20	6	0
3	C	24	0	20	1	0
3	D	24	0	20	1	0
3	E	48	0	40	5	0
3	G	24	0	20	2	0
3	H	24	0	20	3	0
4	A	21	0	0	0	0
4	B	20	0	0	0	0
4	C	21	0	0	0	0
4	D	14	0	0	2	0
4	E	9	0	0	0	0
4	F	7	0	0	0	0
4	G	10	0	0	0	0
4	H	15	0	0	1	0
All	All	21010	0	21184	410	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 10.

The worst 5 of 410 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:H:222:LEU:HA	1:H:246:ASP:OD1	1.64	0.96
1:E:55:THR:HG21	1:E:71:ILE:O	1.67	0.94
3:A:501:P68:H2	3:A:501:P68:O	1.73	0.89

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:307:ILE:HD13	1:B:390:GLY:HA2	1.56	0.85
1:B:307:ILE:HD13	1:B:390:GLY:CA	2.07	0.85

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	345/384 (90%)	332 (96%)	13 (4%)	0	100	100
1	B	347/384 (90%)	334 (96%)	13 (4%)	0	100	100
1	C	350/384 (91%)	339 (97%)	10 (3%)	1 (0%)	36	58
1	D	344/384 (90%)	333 (97%)	11 (3%)	0	100	100
1	E	343/384 (89%)	332 (97%)	11 (3%)	0	100	100
1	F	349/384 (91%)	332 (95%)	17 (5%)	0	100	100
1	G	343/384 (89%)	330 (96%)	12 (4%)	1 (0%)	36	58
1	H	345/384 (90%)	335 (97%)	10 (3%)	0	100	100
All	All	2766/3072 (90%)	2667 (96%)	97 (4%)	2 (0%)	48	70

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	C	429	ALA
1	G	476	VAL

### 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	267/298 (90%)	246 (92%)	21 (8%)	11	26
1	B	268/298 (90%)	248 (92%)	20 (8%)	12	28
1	C	271/298 (91%)	257 (95%)	14 (5%)	21	44
1	D	266/298 (89%)	245 (92%)	21 (8%)	11	26
1	E	265/298 (89%)	246 (93%)	19 (7%)	13	30
1	F	270/298 (91%)	252 (93%)	18 (7%)	15	33
1	G	265/298 (89%)	252 (95%)	13 (5%)	22	47
1	H	267/298 (90%)	246 (92%)	21 (8%)	11	26
All	All	2139/2384 (90%)	1992 (93%)	147 (7%)	14	32

5 of 147 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	G	88	VAL
1	H	397	MET
1	G	268	ARG
1	H	229	VAL
1	C	373	SER

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	G	275	ASN
1	G	381	GLN
1	G	359	HIS
1	G	457	ASN
1	C	477	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 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	D	500	-	25,25,25	1.20	1 (4%)	37,38,38	2.22	11 (29%)
3	P68	C	501	-	25,25,25	0.91	1 (4%)	35,35,35	1.50	4 (11%)
3	P68	D	501	-	25,25,25	0.80	1 (4%)	35,35,35	1.38	2 (5%)
3	P68	G	501	-	25,25,25	0.83	1 (4%)	35,35,35	1.92	5 (14%)
2	IMP	G	500	-	25,25,25	1.11	1 (4%)	37,38,38	2.08	9 (24%)
3	P68	B	501	-	25,25,25	1.45	4 (16%)	35,35,35	1.20	3 (8%)
2	IMP	E	501	-	25,25,25	1.13	1 (4%)	37,38,38	1.97	10 (27%)
2	IMP	C	500	-	25,25,25	1.26	1 (4%)	37,38,38	2.08	9 (24%)
2	IMP	F	500	-	25,25,25	1.12	1 (4%)	37,38,38	2.21	10 (27%)
3	P68	A	501	-	25,25,25	1.58	4 (16%)	35,35,35	1.55	5 (14%)
2	IMP	B	500	-	25,25,25	1.20	2 (8%)	37,38,38	1.83	10 (27%)
2	IMP	A	500	-	25,25,25	1.19	1 (4%)	37,38,38	2.23	11 (29%)
3	P68	E	502	-	25,25,25	1.37	3 (12%)	35,35,35	1.31	2 (5%)
3	P68	E	503	-	25,25,25	0.84	1 (4%)	35,35,35	1.66	7 (20%)
2	IMP	H	500	-	25,25,25	1.10	2 (8%)	37,38,38	1.91	8 (21%)
3	P68	H	501	-	25,25,25	1.48	3 (12%)	35,35,35	1.48	2 (5%)

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	D	500	-	-	0/10/26/26	0/3/3/3
3	P68	C	501	-	-	0/21/21/21	0/2/2/2
3	P68	D	501	-	-	0/21/21/21	0/2/2/2
3	P68	G	501	-	-	0/21/21/21	0/2/2/2
2	IMP	G	500	-	-	0/10/26/26	0/3/3/3
3	P68	B	501	-	-	3/21/21/21	0/2/2/2
2	IMP	E	501	-	-	0/10/26/26	0/3/3/3
2	IMP	C	500	-	-	0/10/26/26	0/3/3/3
2	IMP	F	500	-	-	0/10/26/26	0/3/3/3
3	P68	A	501	-	-	3/21/21/21	0/2/2/2
2	IMP	B	500	-	-	0/10/26/26	0/3/3/3
2	IMP	A	500	-	-	0/10/26/26	0/3/3/3
3	P68	E	502	-	-	3/21/21/21	0/2/2/2
3	P68	E	503	-	-	0/21/21/21	0/2/2/2
2	IMP	H	500	-	-	0/10/26/26	0/3/3/3
3	P68	H	501	-	-	3/21/21/21	0/2/2/2

The worst 5 of 28 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	C	500	IMP	C2-N3	5.09	1.39	1.30
2	D	500	IMP	C2-N3	4.81	1.38	1.30
2	A	500	IMP	C2-N3	4.73	1.38	1.30
2	F	500	IMP	C2-N3	4.60	1.38	1.30
2	B	500	IMP	C2-N3	4.59	1.38	1.30

The worst 5 of 108 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	G	501	P68	O2-N4-C18	9.02	125.23	112.65
3	E	503	P68	O2-N4-C18	6.75	122.08	112.65
3	C	501	P68	O2-N4-C18	6.73	122.05	112.65
2	F	500	IMP	C5-C6-N1	6.55	120.19	110.78
2	C	500	IMP	C5-C6-N1	6.43	120.03	110.78

There are no chirality outliers.

5 of 12 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	501	P68	C2-C1-N1-C4
3	A	501	P68	C3-C1-N1-C4
3	A	501	P68	C12-C1-N1-C4

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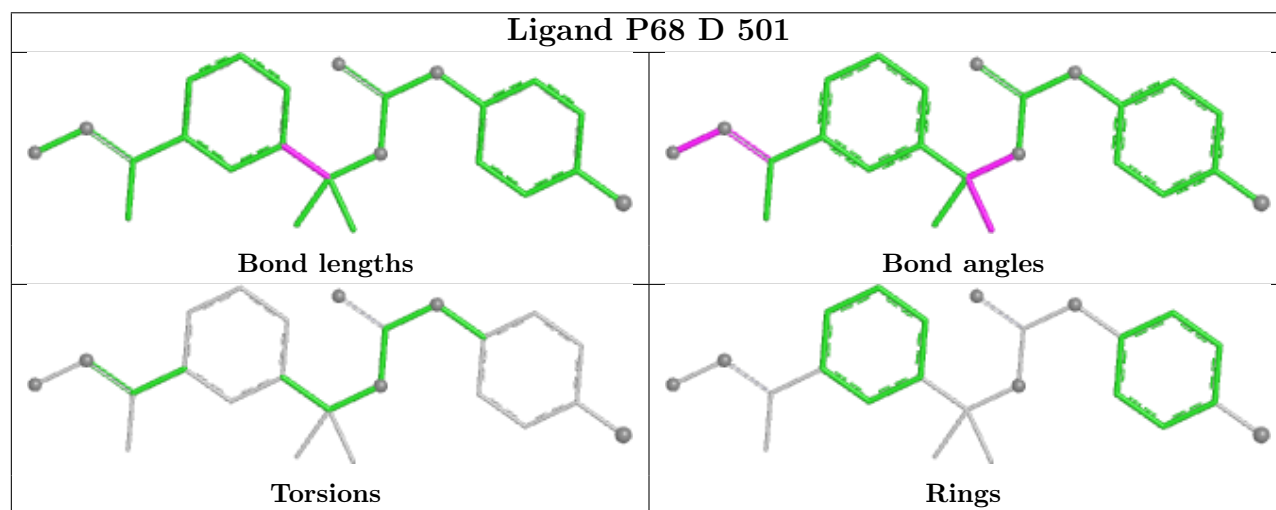
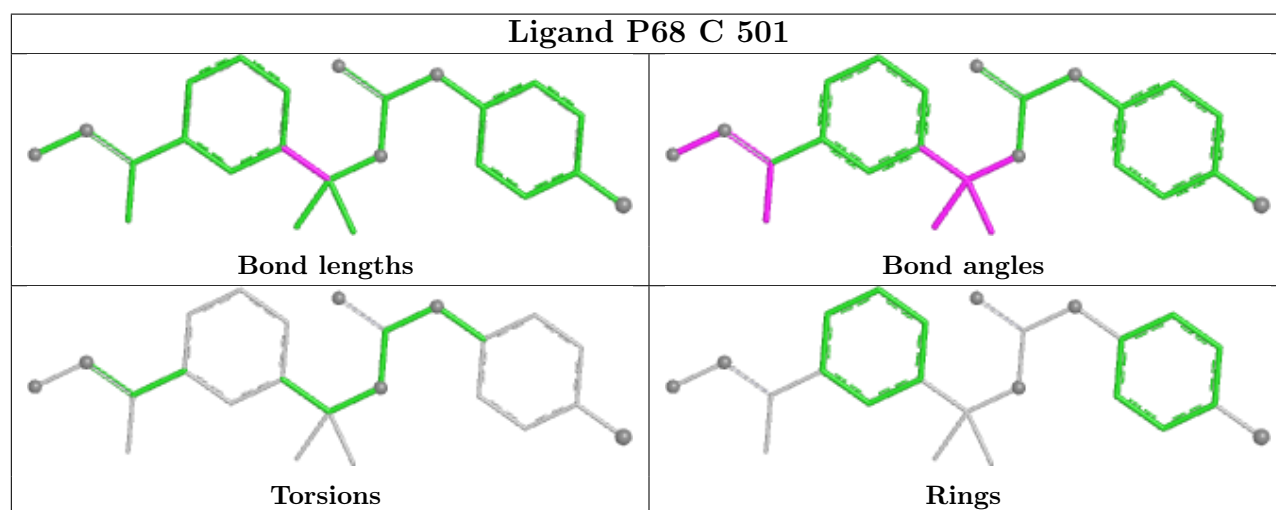
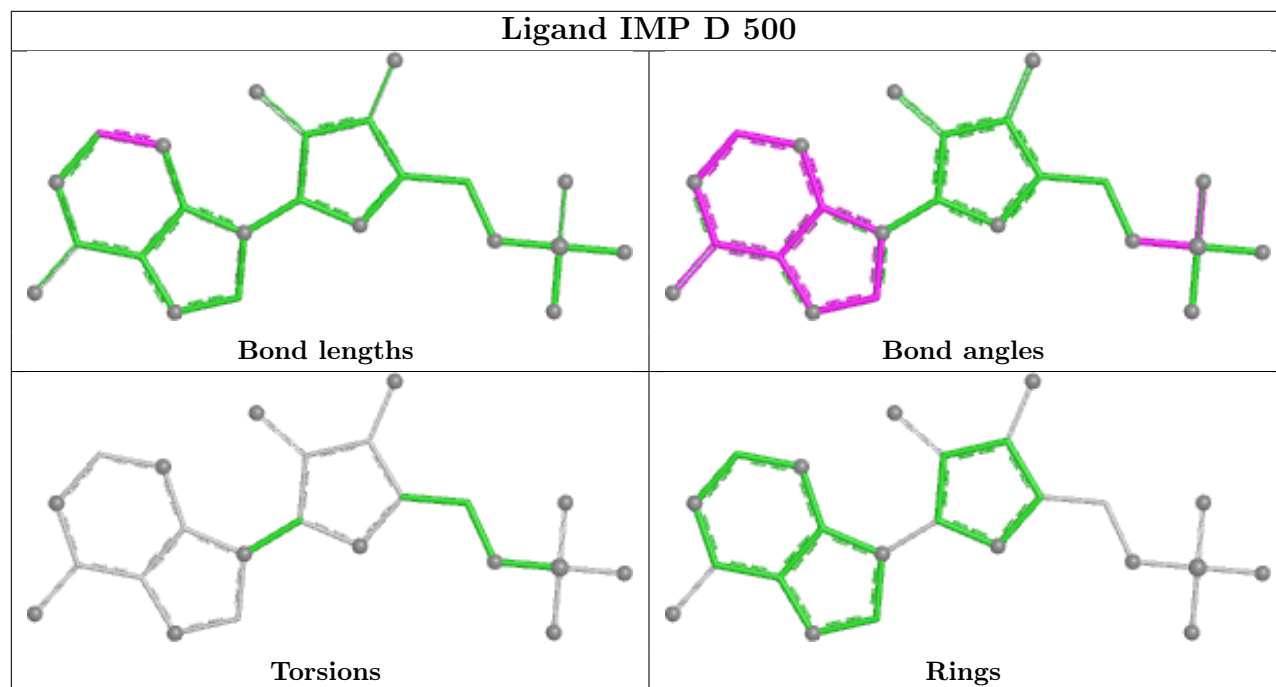
Mol	Chain	Res	Type	Atoms
3	B	501	P68	C3-C1-N1-C4
3	H	501	P68	C3-C1-N1-C4

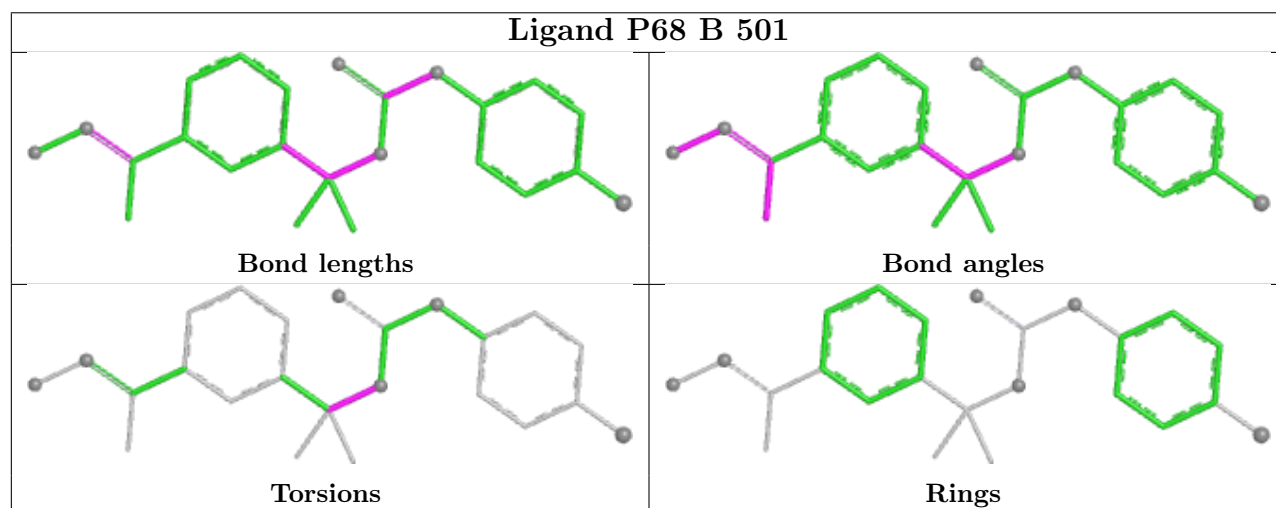
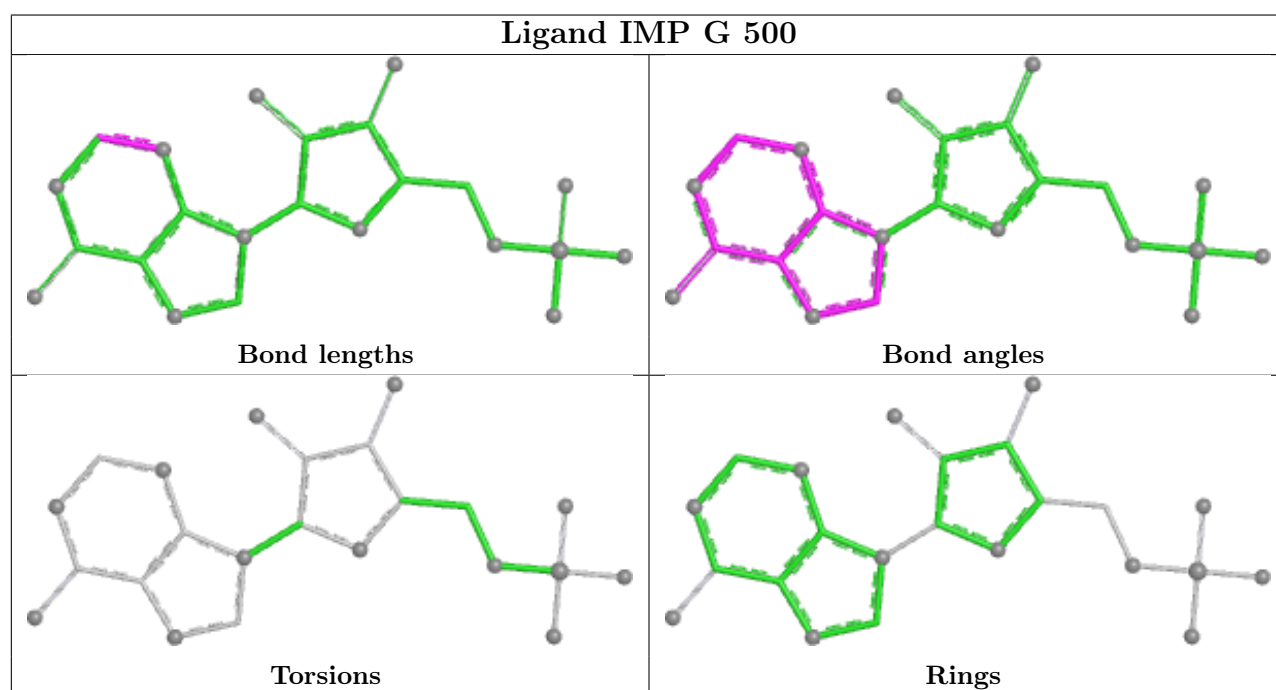
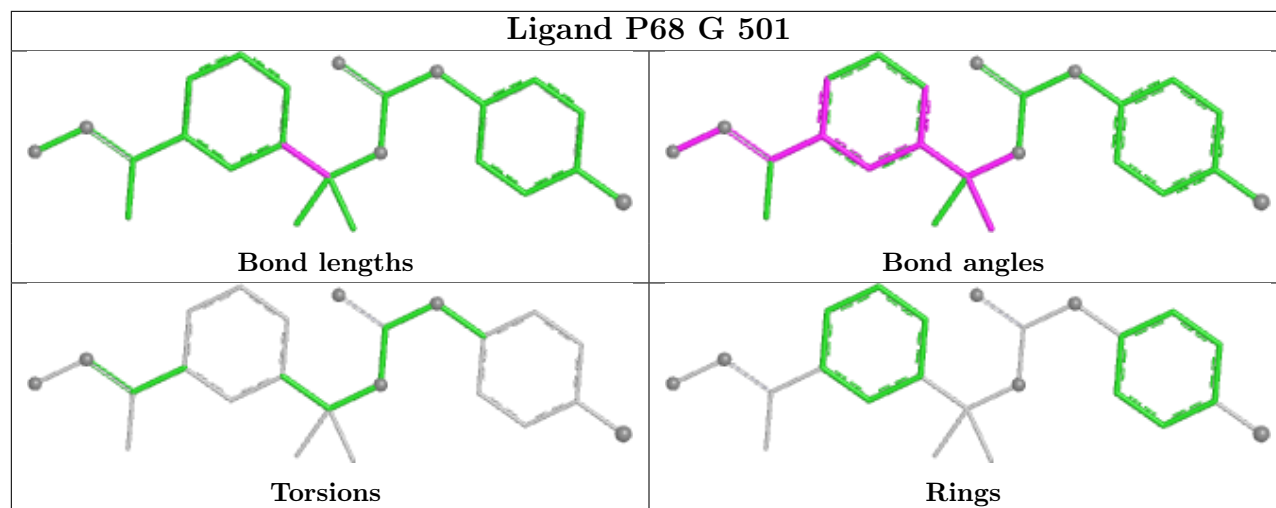
There are no ring outliers.

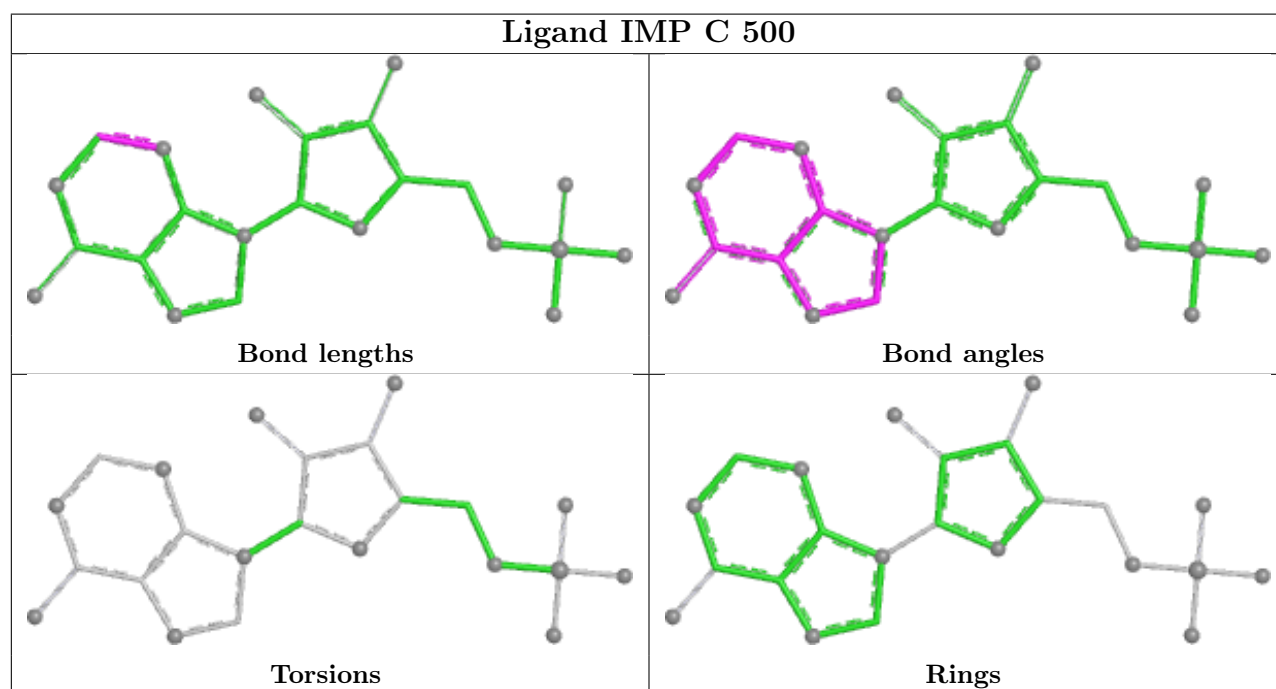
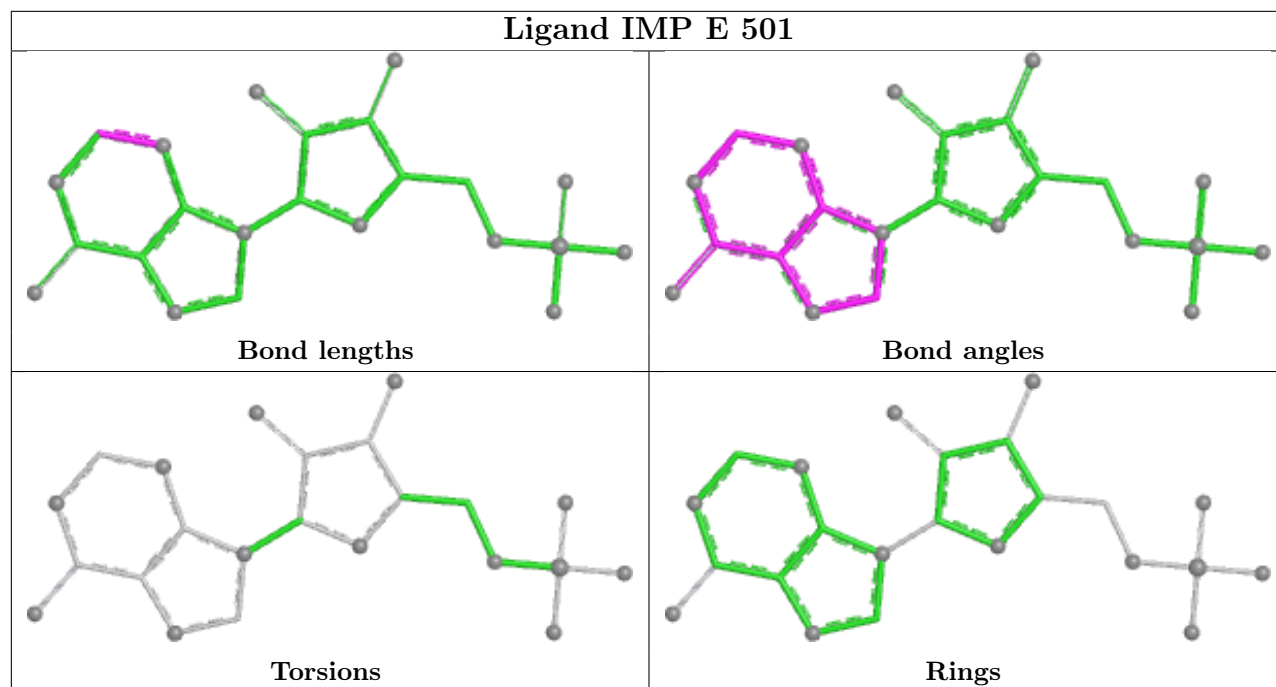
14 monomers are involved in 37 short contacts:

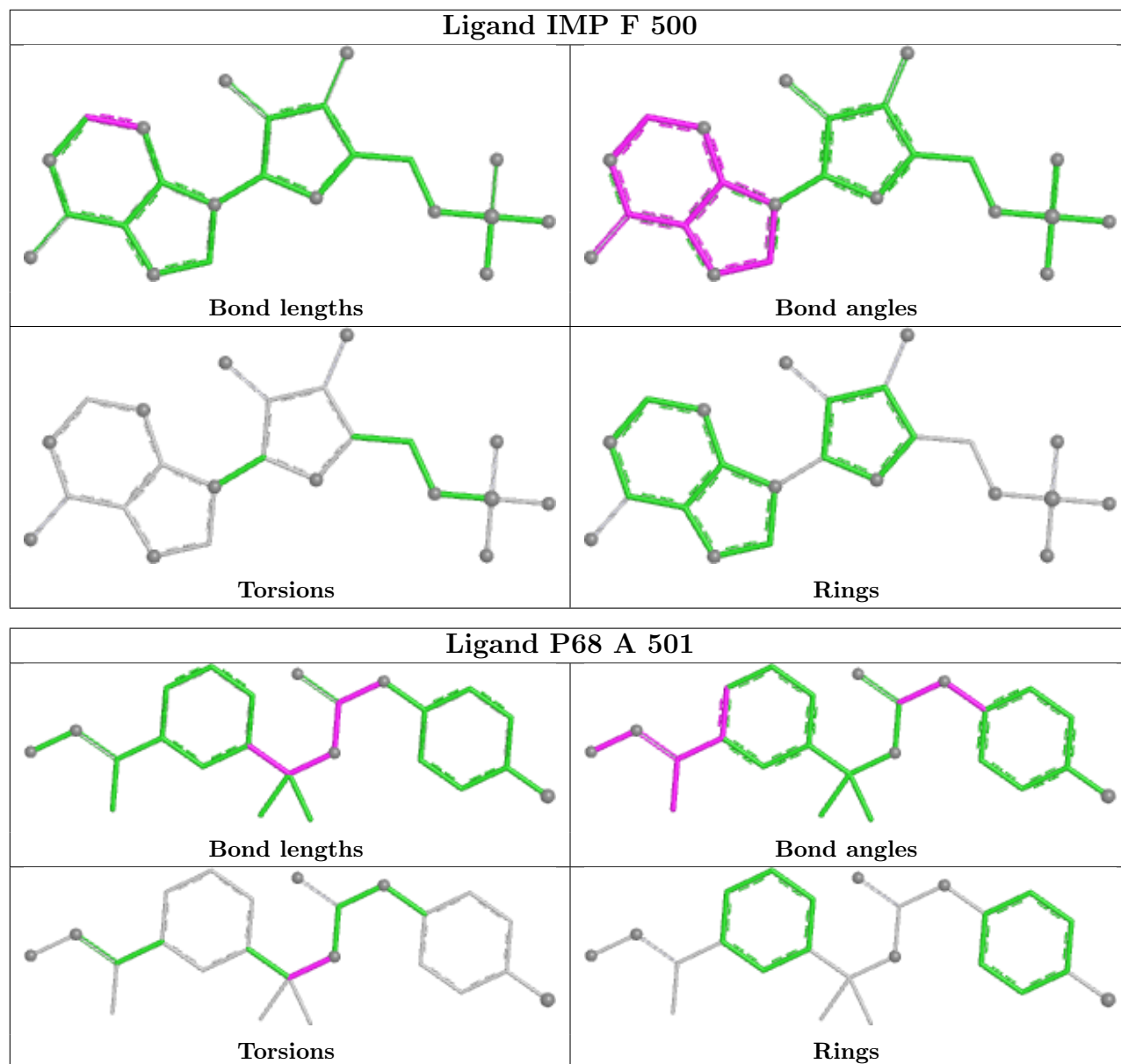
Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	C	501	P68	1	0
3	D	501	P68	1	0
3	G	501	P68	2	0
2	G	500	IMP	1	0
3	B	501	P68	6	0
2	E	501	IMP	1	0
2	C	500	IMP	3	0
2	F	500	IMP	1	0
3	A	501	P68	5	0
2	B	500	IMP	3	0
2	A	500	IMP	2	0
3	E	502	P68	5	0
2	H	500	IMP	3	0
3	H	501	P68	3	0

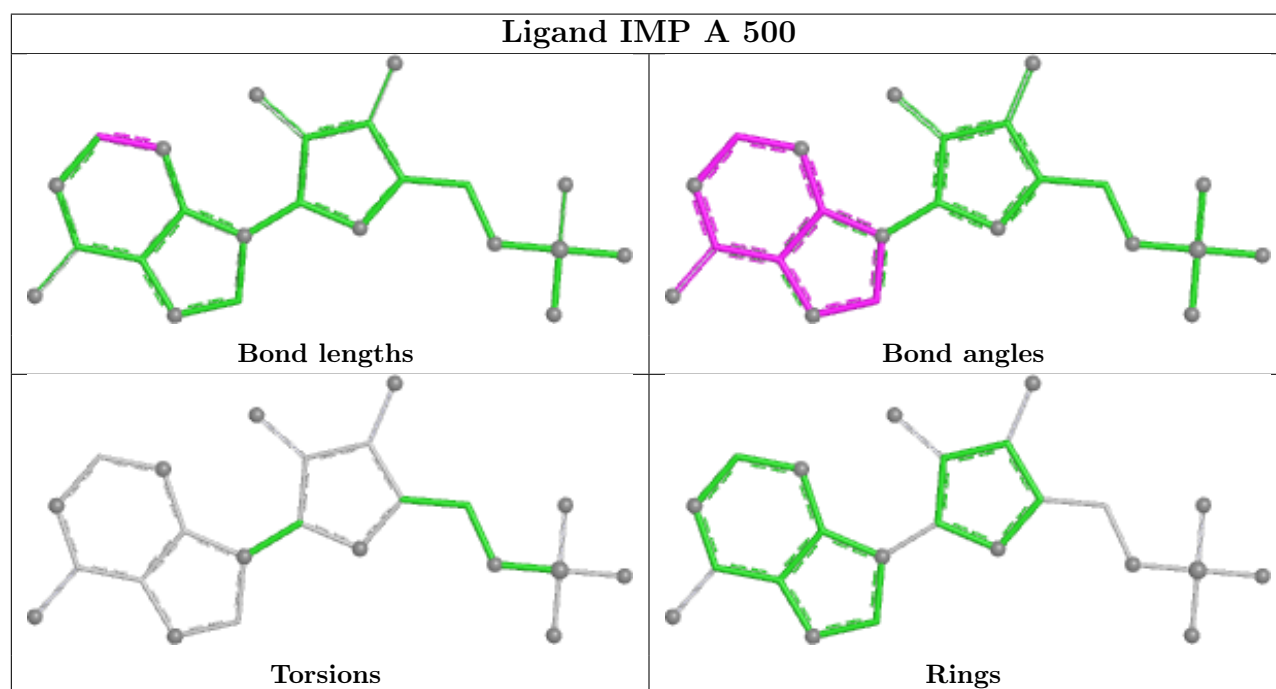
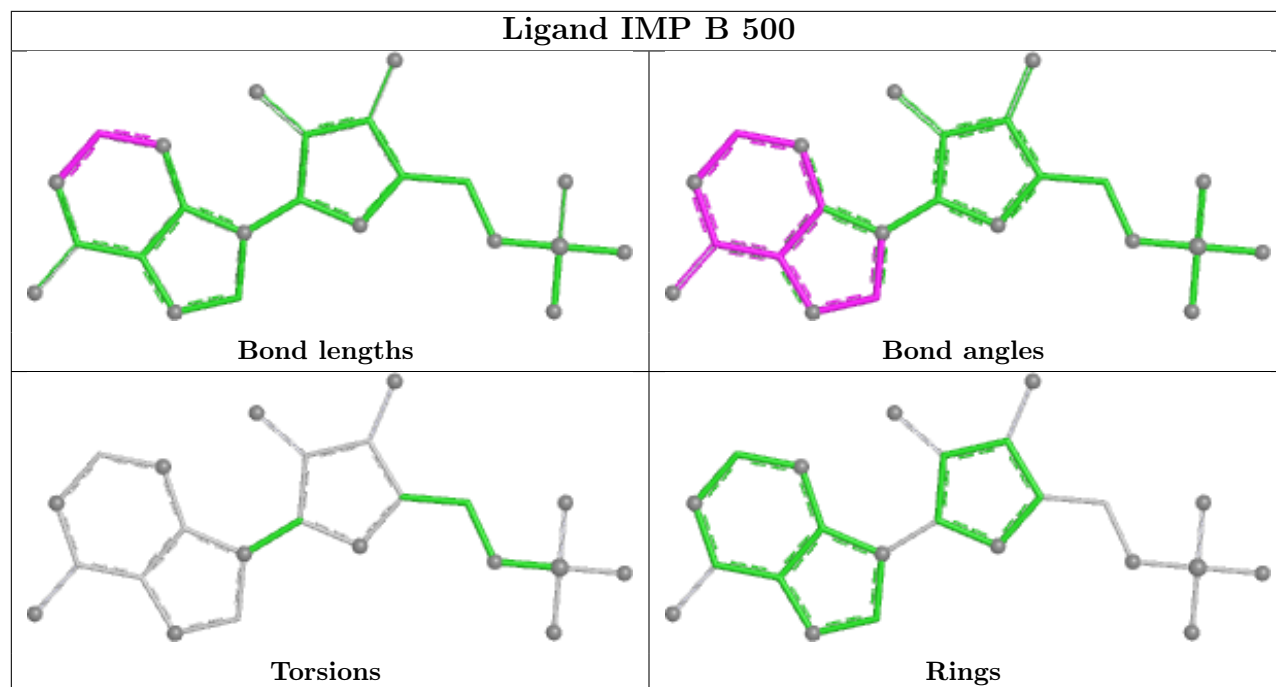
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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

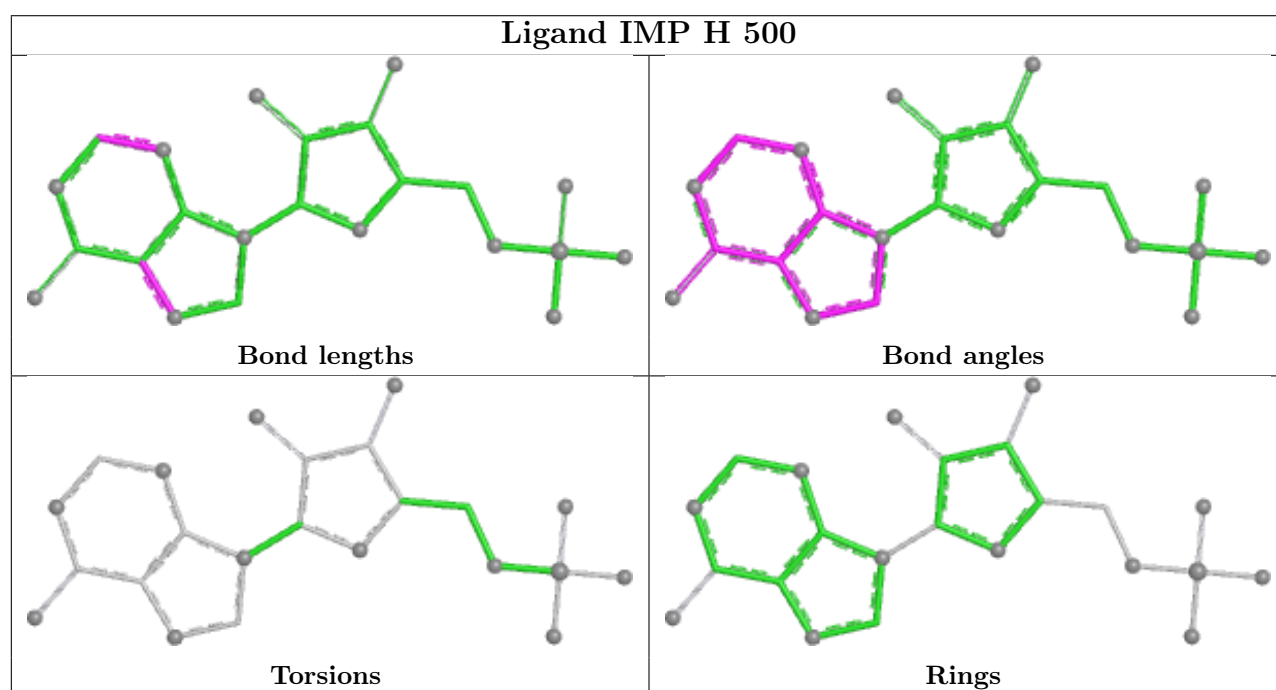
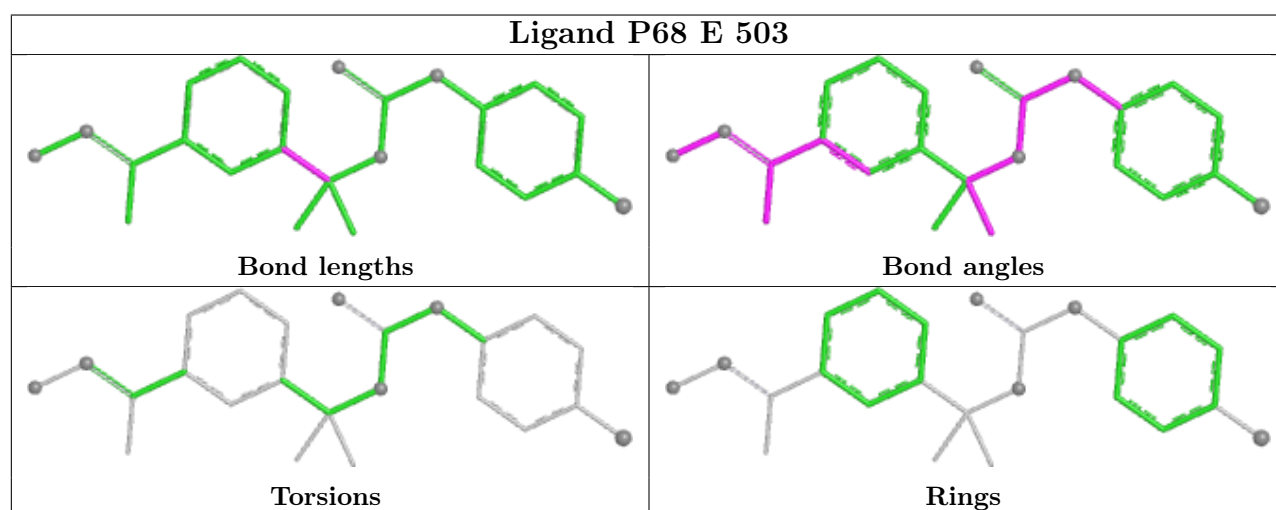
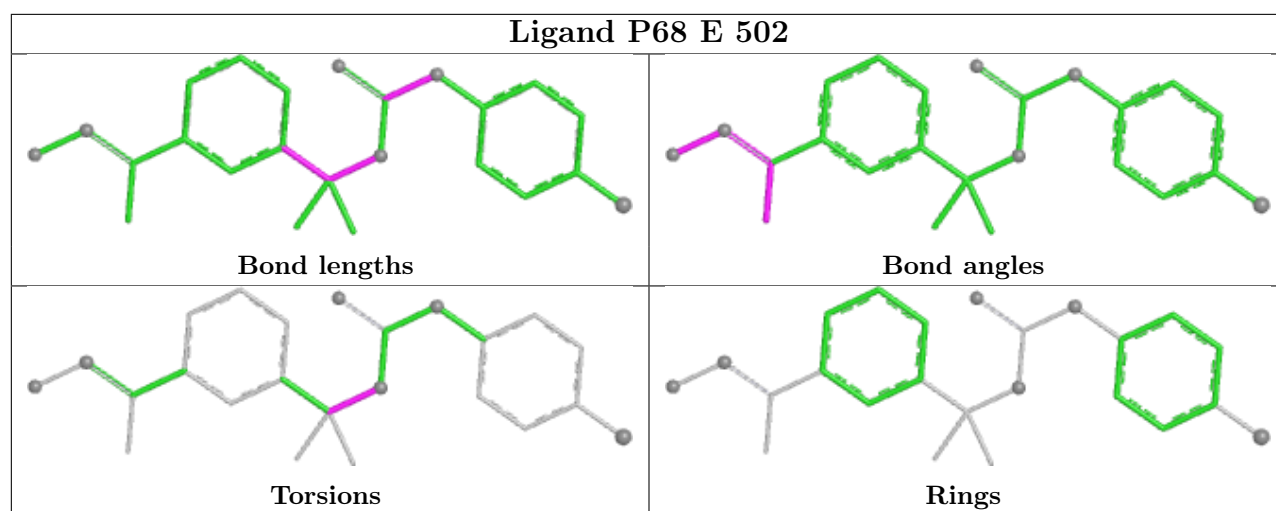


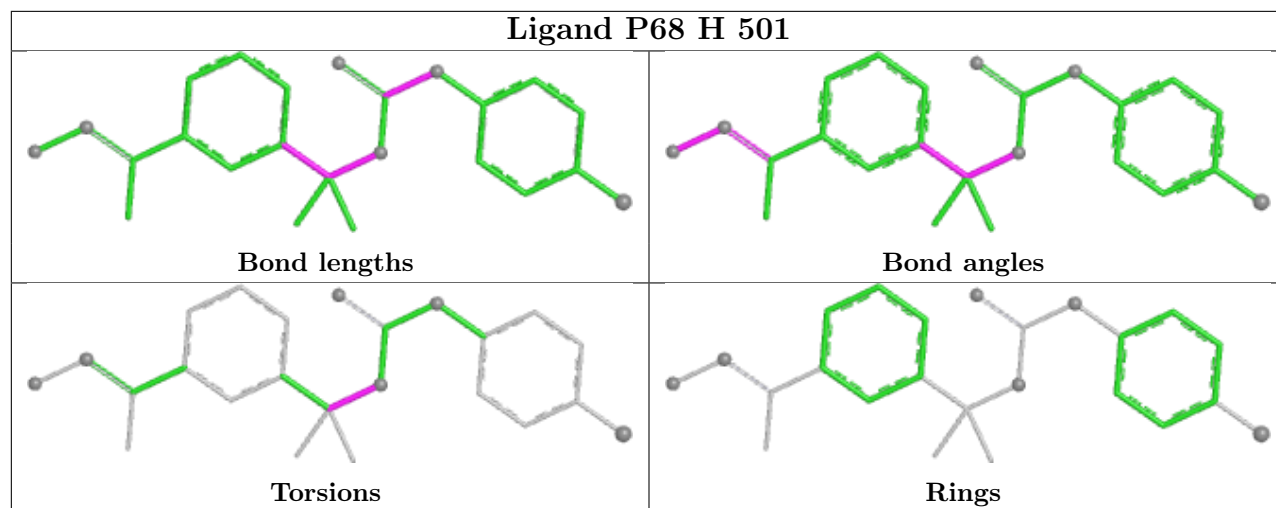












## 5.7 Other polymers [\(i\)](#)

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	349/384 (90%)	0.15	4 (1%) 78 74	37, 54, 79, 93	1 (0%)
1	B	351/384 (91%)	0.16	3 (0%) 81 78	40, 54, 77, 93	2 (0%)
1	C	354/384 (92%)	0.07	5 (1%) 73 69	38, 51, 80, 114	2 (0%)
1	D	348/384 (90%)	0.18	4 (1%) 78 74	39, 57, 81, 96	2 (0%)
1	E	347/384 (90%)	0.42	7 (2%) 65 60	46, 66, 92, 107	1 (0%)
1	F	353/384 (91%)	0.31	6 (1%) 69 64	40, 60, 89, 114	0
1	G	347/384 (90%)	0.24	2 (0%) 85 83	44, 60, 77, 95	2 (0%)
1	H	349/384 (90%)	0.28	3 (0%) 81 78	39, 59, 85, 120	1 (0%)
All	All	2798/3072 (91%)	0.23	34 (1%) 76 73	37, 58, 84, 120	11 (0%)

The worst 5 of 34 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	F	413	LEU	5.0
1	H	413	LEU	4.3
1	B	413	LEU	3.2
1	E	369	GLY	3.2
1	F	77	SER	3.0

### 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 oligosaccharides in this entry.

## 6.4 Ligands

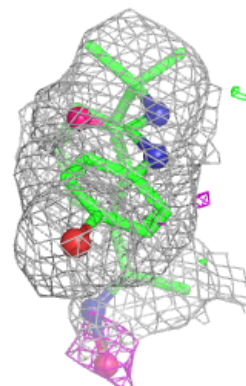
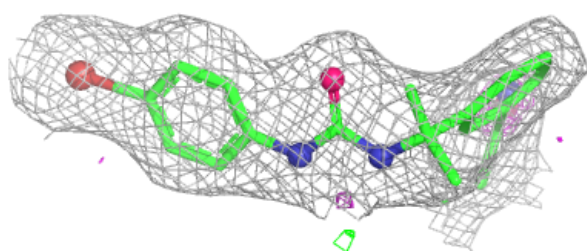
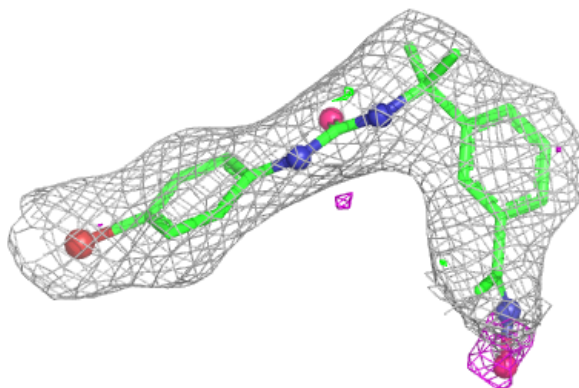
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95<sup>th</sup> percentile and maximum values of B factors of atoms in the group. The column labelled 'Q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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors( $\text{\AA}^2$ )	Q<0.9
3	P68	H	501	24/24	0.88	0.12	55,56,57,128	0
3	P68	E	503	24/24	0.89	0.12	61,62,63,129	0
3	P68	E	502	24/24	0.89	0.12	68,68,70,137	0
3	P68	C	501	24/24	0.90	0.11	55,55,58,113	0
3	P68	D	501	24/24	0.91	0.11	60,60,61,111	0
3	P68	A	501	24/24	0.92	0.12	58,58,59,72	1
3	P68	G	501	24/24	0.93	0.10	58,59,60,119	0
3	P68	B	501	24/24	0.93	0.10	55,56,57,117	0
2	IMP	E	501	23/23	0.95	0.09	51,59,60,60	0
2	IMP	A	500	23/23	0.96	0.07	42,45,47,47	0
2	IMP	F	500	23/23	0.96	0.07	48,49,50,50	0
2	IMP	G	500	23/23	0.96	0.07	47,50,51,51	0
2	IMP	H	500	23/23	0.96	0.07	42,49,50,50	0
2	IMP	B	500	23/23	0.97	0.06	40,45,46,46	0
2	IMP	C	500	23/23	0.97	0.06	38,42,43,43	0
2	IMP	D	500	23/23	0.97	0.07	42,48,49,49	0

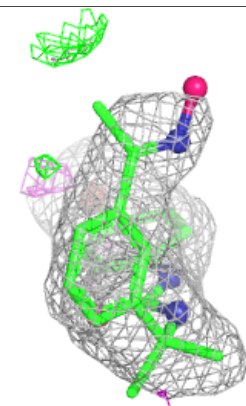
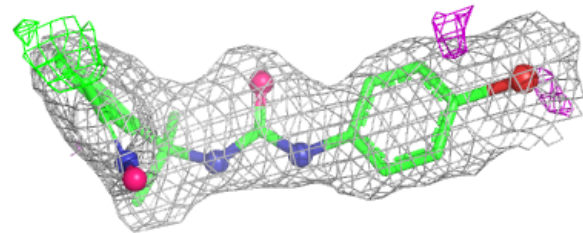
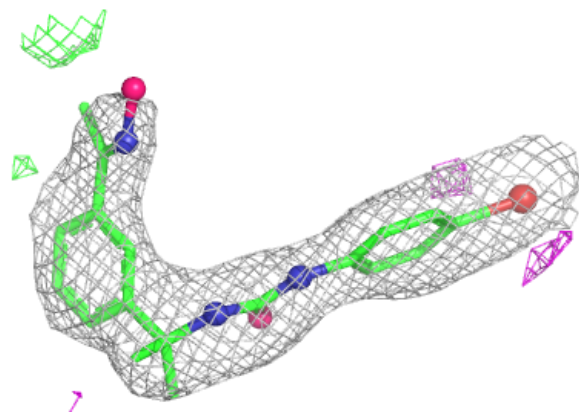
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation to approximate a three-dimensional view.

**Electron density around P68 H 501:**

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

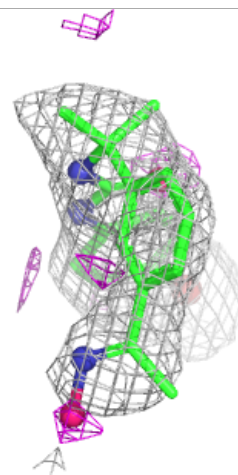
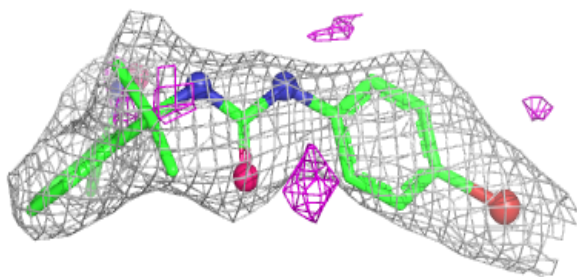
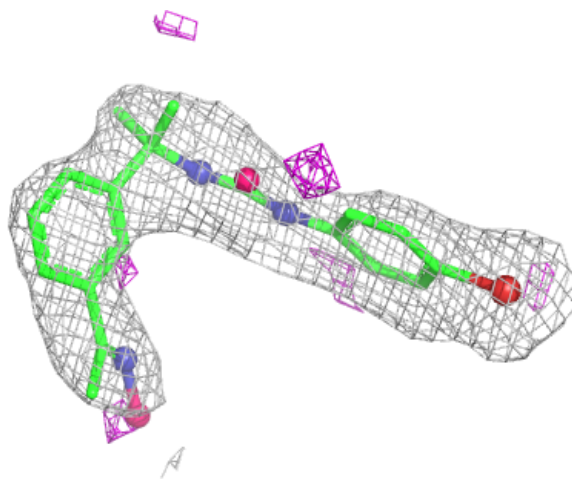
**Electron density around P68 E 503:**

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



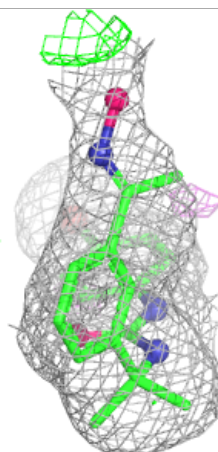
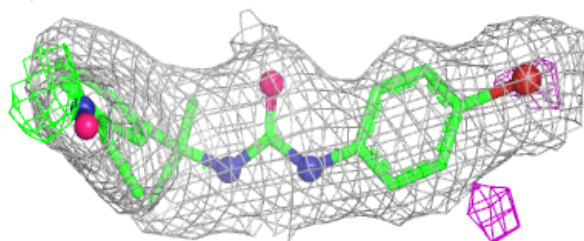
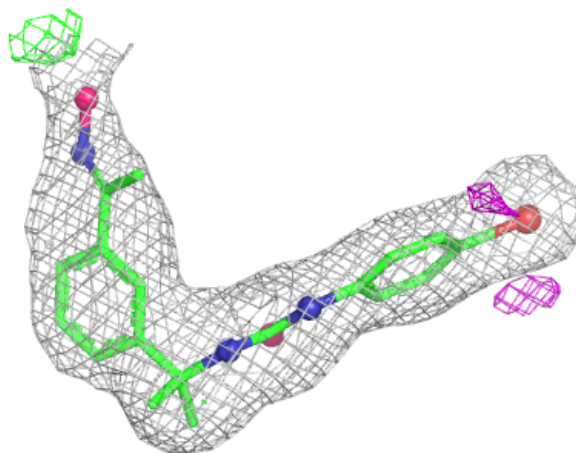
**Electron density around P68 E 502:**

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



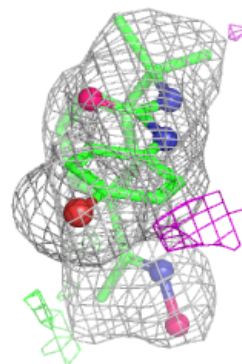
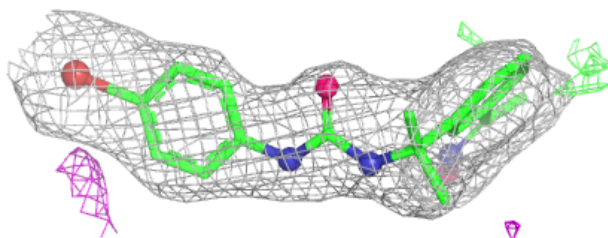
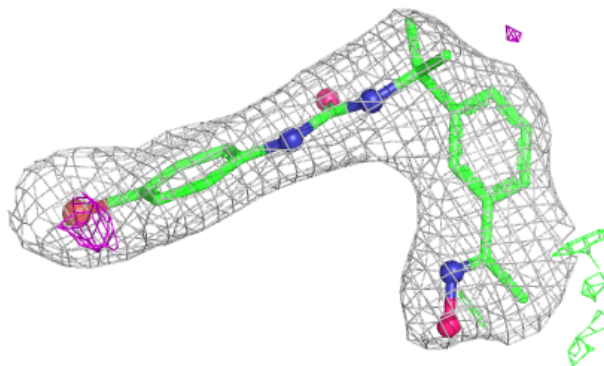
**Electron density around P68 C 501:**

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

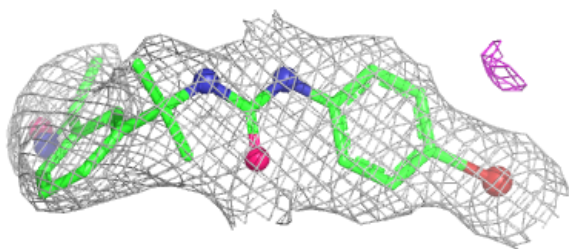
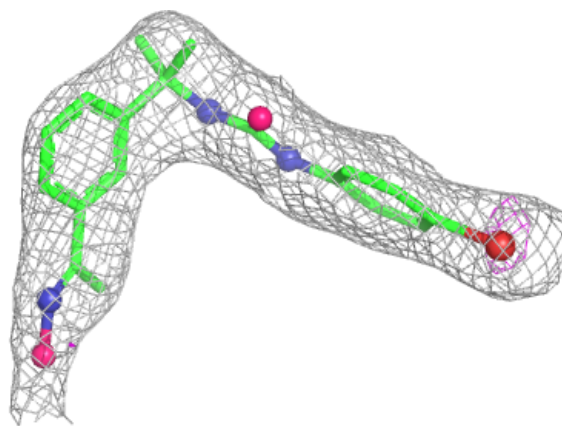


**Electron density around P68 D 501:**

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

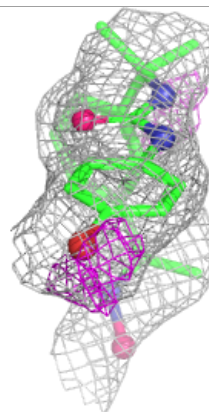
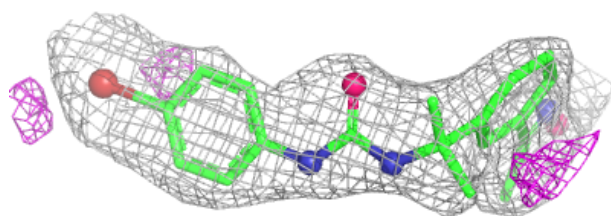
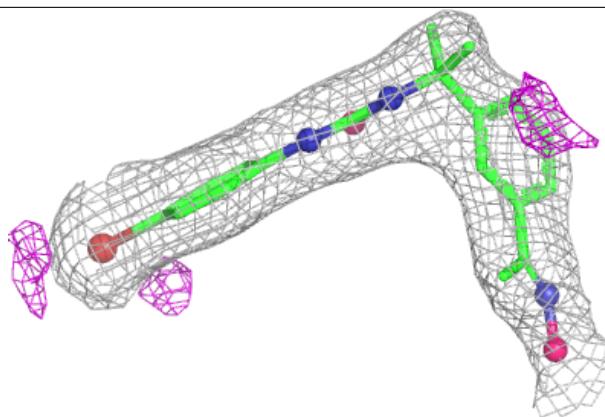
**Electron density around P68 A 501:**

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

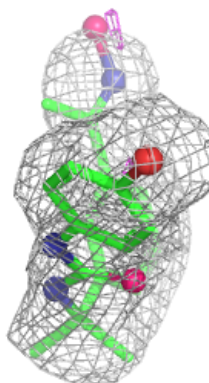
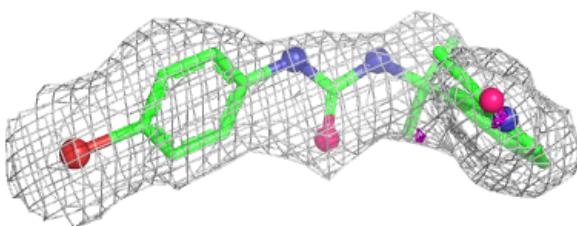
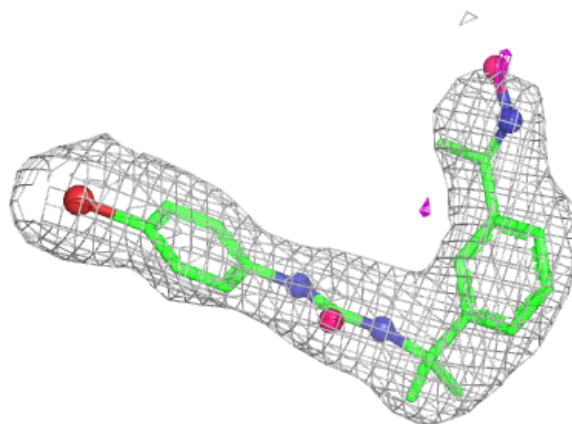


**Electron density around P68 G 501:**

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

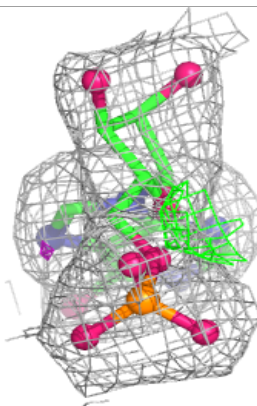
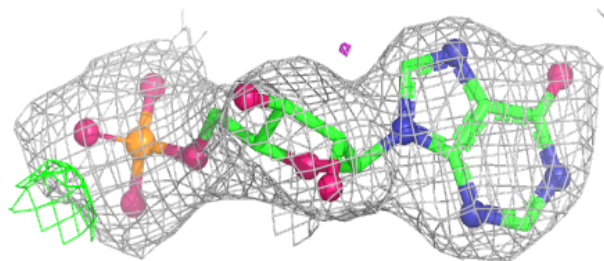
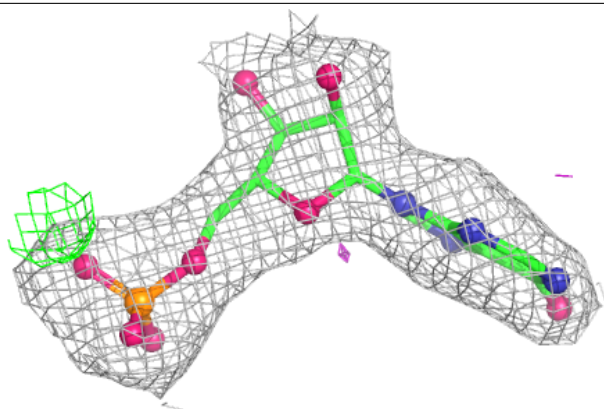
**Electron density around P68 B 501:**

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

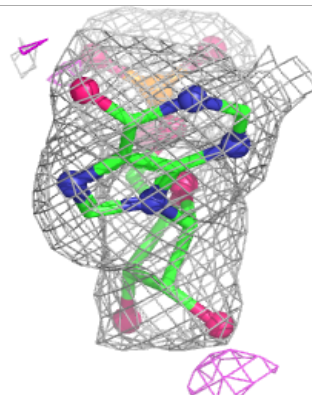
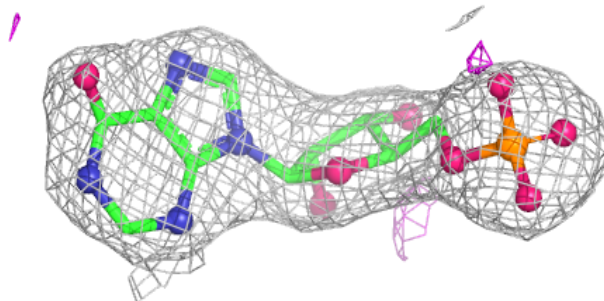
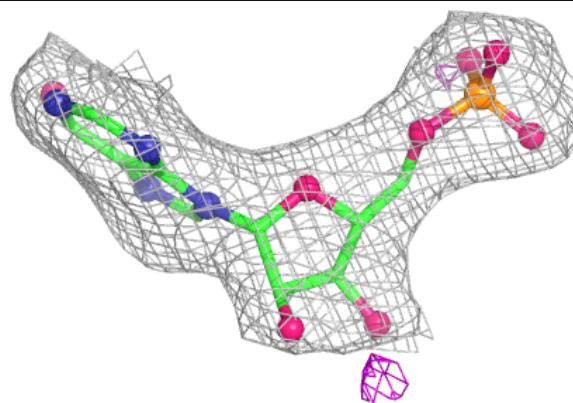


**Electron density around IMP E 501:**

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

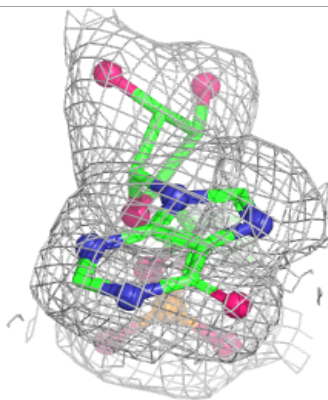
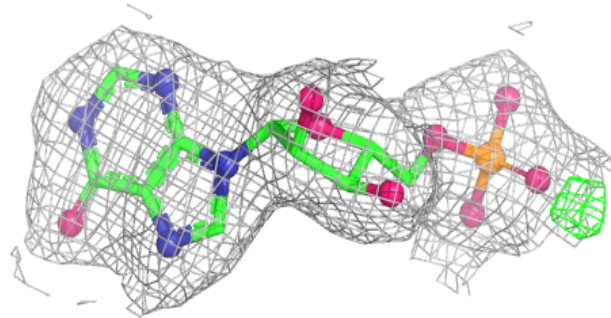
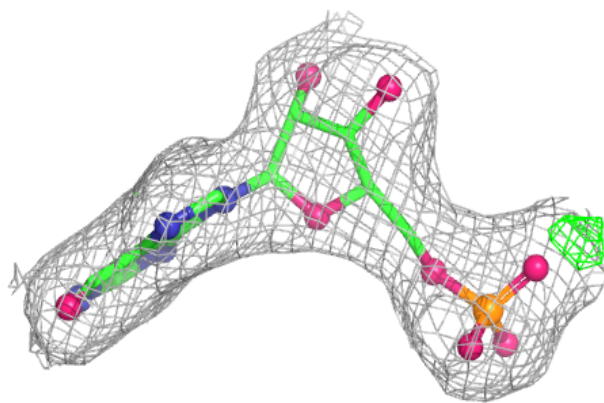
**Electron density around IMP A 500:**

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

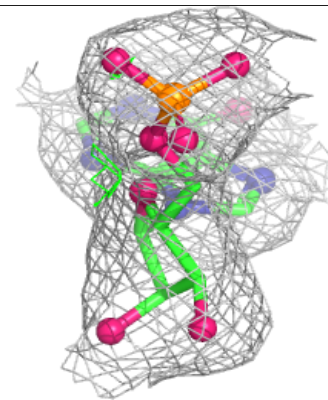
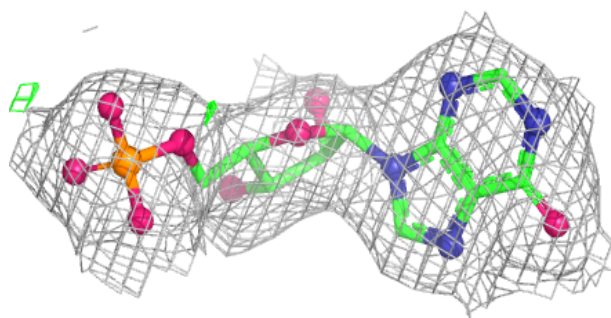
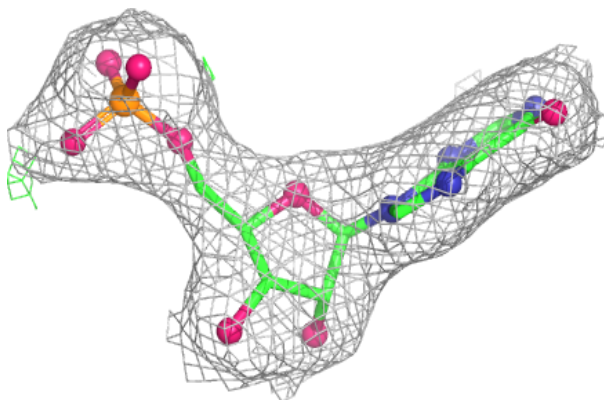


**Electron density around IMP F 500:**

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

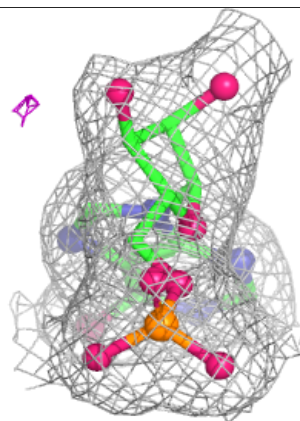
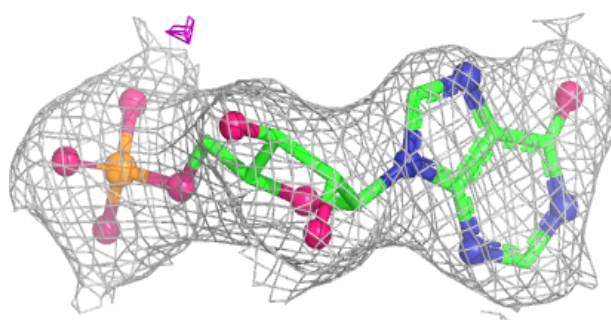
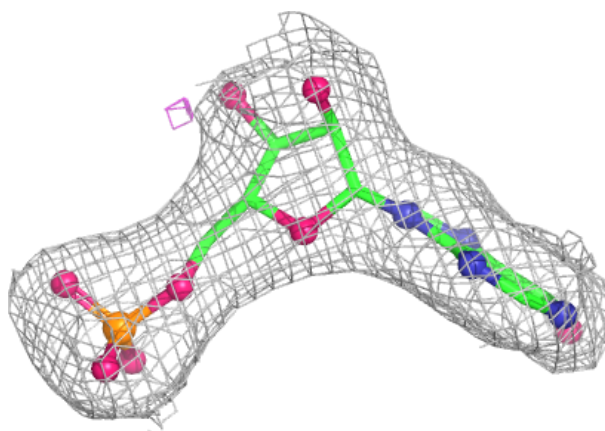
**Electron density around IMP G 500:**

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

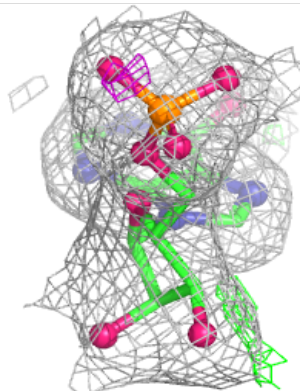
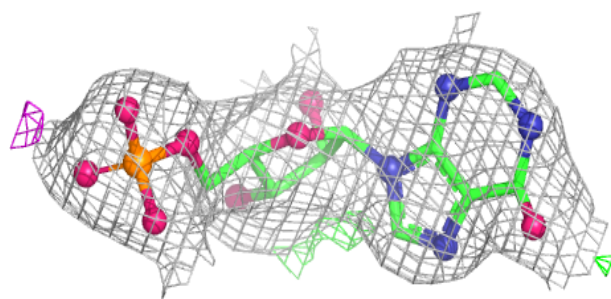
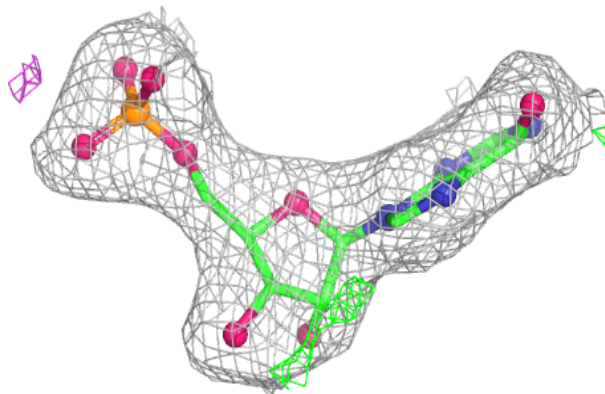


**Electron density around IMP H 500:**

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

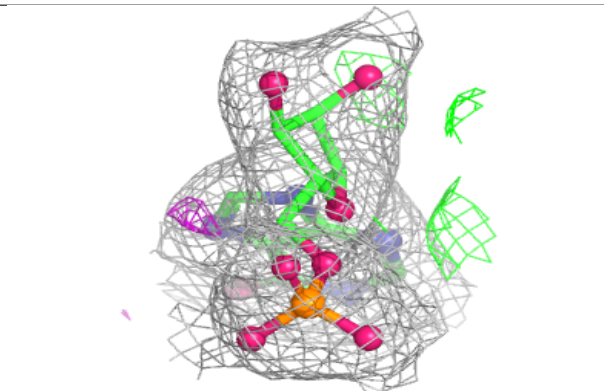
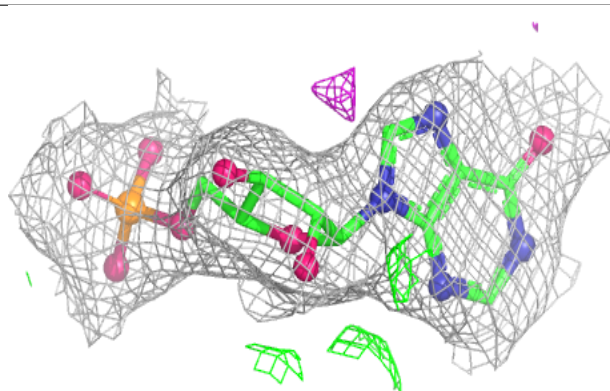
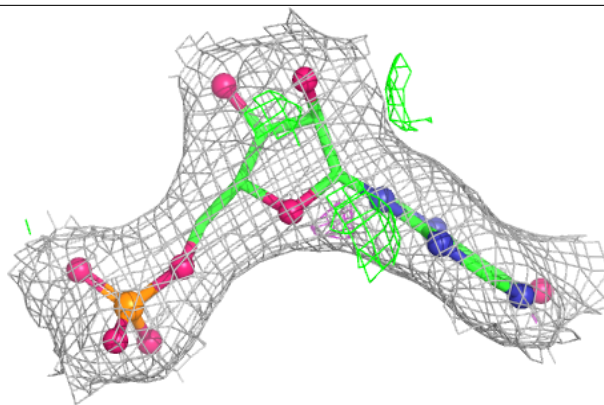
**Electron density around IMP B 500:**

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

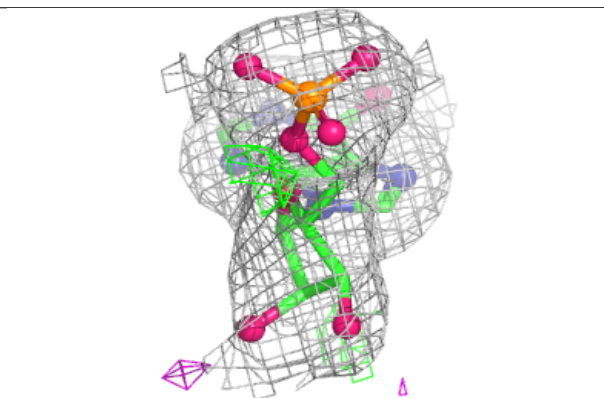
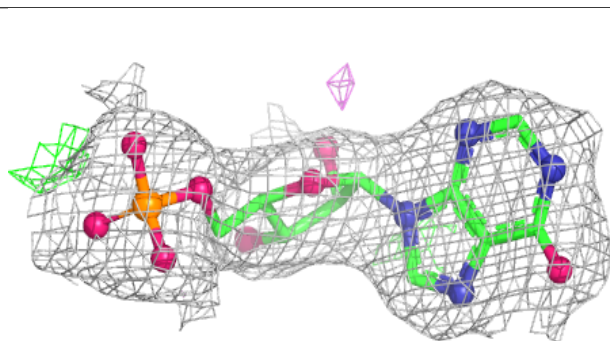
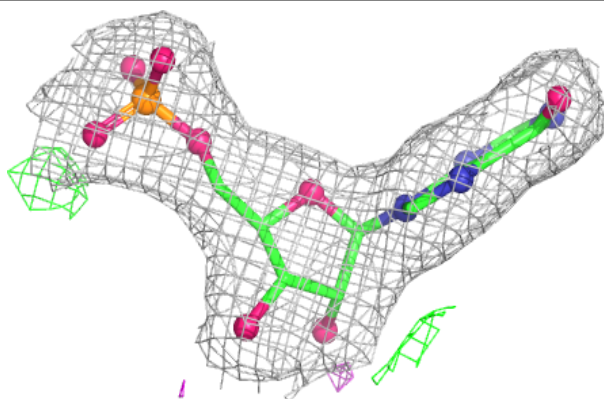


**Electron density around IMP C 500:**

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

**Electron density around IMP D 500:**

$2mF_o-DF_c$  (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.