



wwPDB X-ray Structure Validation Summary Report ⓘ

Mar 7, 2026 – 02:34 AM UTC

PDB ID : 1Q1G / pdb_00001q1g
Title : Crystal structure of Plasmodium falciparum PNP with 5'-methylthio-immucillin-H
Authors : Shi, W.; Ting, L.M.; Kicska, G.A.; Lewandowicz, A.; Tyler, P.C.; Evans, G.B.; Furneaux, R.H.; Kim, K.; Almo, S.C.; Schramm, V.L.
Deposited on : 2003-07-19
Resolution : 2.02 Å(reported)

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

We welcome your comments at validation@mail.wwpdb.org

A user guide is available at

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

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

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

The following versions of software and data (see [references ⓘ](#)) 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)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.49

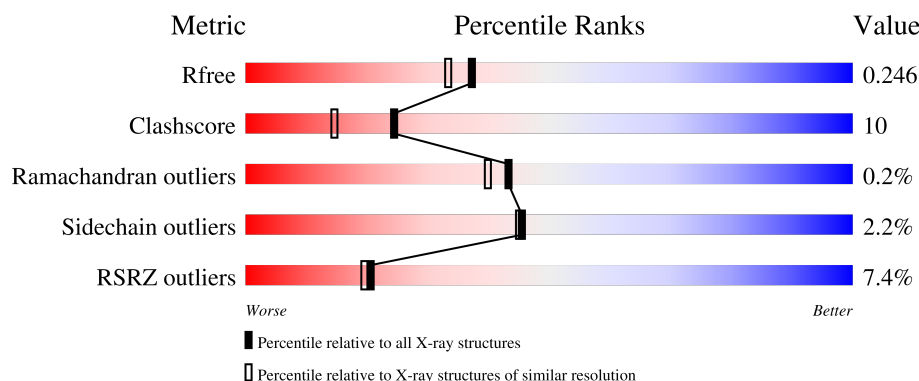
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.02 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	13299 (2.04-2.00)
Clashscore	190562	1022 (2.02-2.02)
Ramachandran outliers	187476	1014 (2.02-2.02)
Sidechain outliers	187428	1014 (2.02-2.02)
RSRZ outliers	180081	13314 (2.04-2.00)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$. 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	276	5% 70% 17% • 12%
1	B	276	11% 69% 17% • 12%
1	C	276	9% 66% 21% • 12%
1	D	276	7% 65% 22% • 12%

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Mol	Chain	Length	Quality of chain
1	E	276	4% 67% 20% • 12%
1	F	276	4% 69% 18% • 12%

2 Entry composition

There are 5 unique types of molecules in this entry. The entry contains 11789 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 Uridine phosphorylase putative.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	243	Total	C	N	O	S	0	0	0
			1861	1179	319	347	16			
1	B	243	Total	C	N	O	S	0	0	0
			1861	1179	319	347	16			
1	C	243	Total	C	N	O	S	0	0	0
			1861	1179	319	347	16			
1	D	243	Total	C	N	O	S	0	0	0
			1861	1179	319	347	16			
1	E	243	Total	C	N	O	S	0	0	0
			1861	1179	319	347	16			
1	F	243	Total	C	N	O	S	0	0	0
			1861	1179	319	347	16			

There are 186 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	0	ALA	-	cloning artifact	UNP Q8I3X4
A	1	LEU	-	cloning artifact	UNP Q8I3X4
A	246	LYS	-	cloning artifact	UNP Q8I3X4
A	247	GLY	-	cloning artifact	UNP Q8I3X4
A	248	GLU	-	cloning artifact	UNP Q8I3X4
A	249	PHE	-	cloning artifact	UNP Q8I3X4
A	250	GLU	-	cloning artifact	UNP Q8I3X4
A	251	ALA	-	cloning artifact	UNP Q8I3X4
A	252	TYR	-	cloning artifact	UNP Q8I3X4
A	253	VAL	-	cloning artifact	UNP Q8I3X4
A	254	GLU	-	cloning artifact	UNP Q8I3X4
A	255	GLN	-	cloning artifact	UNP Q8I3X4
A	256	LYS	-	cloning artifact	UNP Q8I3X4
A	257	LEU	-	cloning artifact	UNP Q8I3X4
A	258	ILE	-	cloning artifact	UNP Q8I3X4
A	259	SER	-	cloning artifact	UNP Q8I3X4
A	260	GLU	-	cloning artifact	UNP Q8I3X4

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Chain	Residue	Modelled	Actual	Comment	Reference
A	261	GLU	-	cloning artifact	UNP Q8I3X4
A	262	ASP	-	cloning artifact	UNP Q8I3X4
A	263	LEU	-	cloning artifact	UNP Q8I3X4
A	264	ASN	-	cloning artifact	UNP Q8I3X4
A	265	SER	-	cloning artifact	UNP Q8I3X4
A	266	ALA	-	cloning artifact	UNP Q8I3X4
A	267	VAL	-	cloning artifact	UNP Q8I3X4
A	268	ASP	-	cloning artifact	UNP Q8I3X4
A	269	HIS	-	expression tag	UNP Q8I3X4
A	270	HIS	-	expression tag	UNP Q8I3X4
A	271	HIS	-	expression tag	UNP Q8I3X4
A	272	HIS	-	expression tag	UNP Q8I3X4
A	273	HIS	-	expression tag	UNP Q8I3X4
A	274	HIS	-	expression tag	UNP Q8I3X4
B	0	ALA	-	cloning artifact	UNP Q8I3X4
B	1	LEU	-	cloning artifact	UNP Q8I3X4
B	246	LYS	-	cloning artifact	UNP Q8I3X4
B	247	GLY	-	cloning artifact	UNP Q8I3X4
B	248	GLU	-	cloning artifact	UNP Q8I3X4
B	249	PHE	-	cloning artifact	UNP Q8I3X4
B	250	GLU	-	cloning artifact	UNP Q8I3X4
B	251	ALA	-	cloning artifact	UNP Q8I3X4
B	252	TYR	-	cloning artifact	UNP Q8I3X4
B	253	VAL	-	cloning artifact	UNP Q8I3X4
B	254	GLU	-	cloning artifact	UNP Q8I3X4
B	255	GLN	-	cloning artifact	UNP Q8I3X4
B	256	LYS	-	cloning artifact	UNP Q8I3X4
B	257	LEU	-	cloning artifact	UNP Q8I3X4
B	258	ILE	-	cloning artifact	UNP Q8I3X4
B	259	SER	-	cloning artifact	UNP Q8I3X4
B	260	GLU	-	cloning artifact	UNP Q8I3X4
B	261	GLU	-	cloning artifact	UNP Q8I3X4
B	262	ASP	-	cloning artifact	UNP Q8I3X4
B	263	LEU	-	cloning artifact	UNP Q8I3X4
B	264	ASN	-	cloning artifact	UNP Q8I3X4
B	265	SER	-	cloning artifact	UNP Q8I3X4
B	266	ALA	-	cloning artifact	UNP Q8I3X4
B	267	VAL	-	cloning artifact	UNP Q8I3X4
B	268	ASP	-	cloning artifact	UNP Q8I3X4
B	269	HIS	-	expression tag	UNP Q8I3X4
B	270	HIS	-	expression tag	UNP Q8I3X4
B	271	HIS	-	expression tag	UNP Q8I3X4

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Chain	Residue	Modelled	Actual	Comment	Reference
B	272	HIS	-	expression tag	UNP Q8I3X4
B	273	HIS	-	expression tag	UNP Q8I3X4
B	274	HIS	-	expression tag	UNP Q8I3X4
C	0	ALA	-	cloning artifact	UNP Q8I3X4
C	1	LEU	-	cloning artifact	UNP Q8I3X4
C	246	LYS	-	cloning artifact	UNP Q8I3X4
C	247	GLY	-	cloning artifact	UNP Q8I3X4
C	248	GLU	-	cloning artifact	UNP Q8I3X4
C	249	PHE	-	cloning artifact	UNP Q8I3X4
C	250	GLU	-	cloning artifact	UNP Q8I3X4
C	251	ALA	-	cloning artifact	UNP Q8I3X4
C	252	TYR	-	cloning artifact	UNP Q8I3X4
C	253	VAL	-	cloning artifact	UNP Q8I3X4
C	254	GLU	-	cloning artifact	UNP Q8I3X4
C	255	GLN	-	cloning artifact	UNP Q8I3X4
C	256	LYS	-	cloning artifact	UNP Q8I3X4
C	257	LEU	-	cloning artifact	UNP Q8I3X4
C	258	ILE	-	cloning artifact	UNP Q8I3X4
C	259	SER	-	cloning artifact	UNP Q8I3X4
C	260	GLU	-	cloning artifact	UNP Q8I3X4
C	261	GLU	-	cloning artifact	UNP Q8I3X4
C	262	ASP	-	cloning artifact	UNP Q8I3X4
C	263	LEU	-	cloning artifact	UNP Q8I3X4
C	264	ASN	-	cloning artifact	UNP Q8I3X4
C	265	SER	-	cloning artifact	UNP Q8I3X4
C	266	ALA	-	cloning artifact	UNP Q8I3X4
C	267	VAL	-	cloning artifact	UNP Q8I3X4
C	268	ASP	-	cloning artifact	UNP Q8I3X4
C	269	HIS	-	expression tag	UNP Q8I3X4
C	270	HIS	-	expression tag	UNP Q8I3X4
C	271	HIS	-	expression tag	UNP Q8I3X4
C	272	HIS	-	expression tag	UNP Q8I3X4
C	273	HIS	-	expression tag	UNP Q8I3X4
C	274	HIS	-	expression tag	UNP Q8I3X4
D	0	ALA	-	cloning artifact	UNP Q8I3X4
D	1	LEU	-	cloning artifact	UNP Q8I3X4
D	246	LYS	-	cloning artifact	UNP Q8I3X4
D	247	GLY	-	cloning artifact	UNP Q8I3X4
D	248	GLU	-	cloning artifact	UNP Q8I3X4
D	249	PHE	-	cloning artifact	UNP Q8I3X4
D	250	GLU	-	cloning artifact	UNP Q8I3X4
D	251	ALA	-	cloning artifact	UNP Q8I3X4

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Chain	Residue	Modelled	Actual	Comment	Reference
D	252	TYR	-	cloning artifact	UNP Q8I3X4
D	253	VAL	-	cloning artifact	UNP Q8I3X4
D	254	GLU	-	cloning artifact	UNP Q8I3X4
D	255	GLN	-	cloning artifact	UNP Q8I3X4
D	256	LYS	-	cloning artifact	UNP Q8I3X4
D	257	LEU	-	cloning artifact	UNP Q8I3X4
D	258	ILE	-	cloning artifact	UNP Q8I3X4
D	259	SER	-	cloning artifact	UNP Q8I3X4
D	260	GLU	-	cloning artifact	UNP Q8I3X4
D	261	GLU	-	cloning artifact	UNP Q8I3X4
D	262	ASP	-	cloning artifact	UNP Q8I3X4
D	263	LEU	-	cloning artifact	UNP Q8I3X4
D	264	ASN	-	cloning artifact	UNP Q8I3X4
D	265	SER	-	cloning artifact	UNP Q8I3X4
D	266	ALA	-	cloning artifact	UNP Q8I3X4
D	267	VAL	-	cloning artifact	UNP Q8I3X4
D	268	ASP	-	cloning artifact	UNP Q8I3X4
D	269	HIS	-	expression tag	UNP Q8I3X4
D	270	HIS	-	expression tag	UNP Q8I3X4
D	271	HIS	-	expression tag	UNP Q8I3X4
D	272	HIS	-	expression tag	UNP Q8I3X4
D	273	HIS	-	expression tag	UNP Q8I3X4
D	274	HIS	-	expression tag	UNP Q8I3X4
E	0	ALA	-	cloning artifact	UNP Q8I3X4
E	1	LEU	-	cloning artifact	UNP Q8I3X4
E	246	LYS	-	cloning artifact	UNP Q8I3X4
E	247	GLY	-	cloning artifact	UNP Q8I3X4
E	248	GLU	-	cloning artifact	UNP Q8I3X4
E	249	PHE	-	cloning artifact	UNP Q8I3X4
E	250	GLU	-	cloning artifact	UNP Q8I3X4
E	251	ALA	-	cloning artifact	UNP Q8I3X4
E	252	TYR	-	cloning artifact	UNP Q8I3X4
E	253	VAL	-	cloning artifact	UNP Q8I3X4
E	254	GLU	-	cloning artifact	UNP Q8I3X4
E	255	GLN	-	cloning artifact	UNP Q8I3X4
E	256	LYS	-	cloning artifact	UNP Q8I3X4
E	257	LEU	-	cloning artifact	UNP Q8I3X4
E	258	ILE	-	cloning artifact	UNP Q8I3X4
E	259	SER	-	cloning artifact	UNP Q8I3X4
E	260	GLU	-	cloning artifact	UNP Q8I3X4
E	261	GLU	-	cloning artifact	UNP Q8I3X4
E	262	ASP	-	cloning artifact	UNP Q8I3X4

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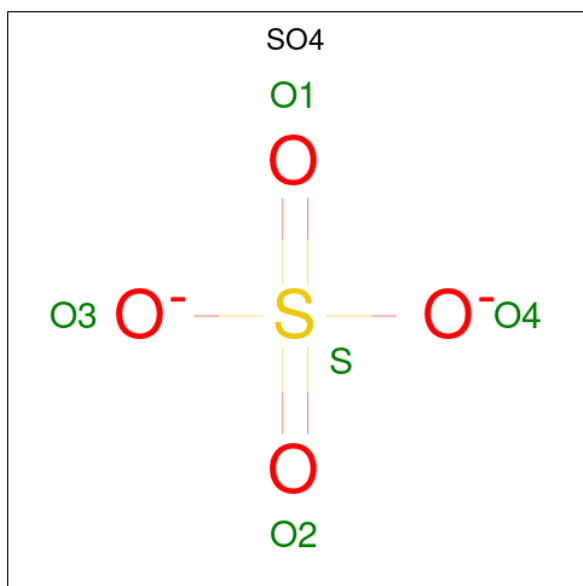
Chain	Residue	Modelled	Actual	Comment	Reference
E	263	LEU	-	cloning artifact	UNP Q8I3X4
E	264	ASN	-	cloning artifact	UNP Q8I3X4
E	265	SER	-	cloning artifact	UNP Q8I3X4
E	266	ALA	-	cloning artifact	UNP Q8I3X4
E	267	VAL	-	cloning artifact	UNP Q8I3X4
E	268	ASP	-	cloning artifact	UNP Q8I3X4
E	269	HIS	-	expression tag	UNP Q8I3X4
E	270	HIS	-	expression tag	UNP Q8I3X4
E	271	HIS	-	expression tag	UNP Q8I3X4
E	272	HIS	-	expression tag	UNP Q8I3X4
E	273	HIS	-	expression tag	UNP Q8I3X4
E	274	HIS	-	expression tag	UNP Q8I3X4
F	0	ALA	-	cloning artifact	UNP Q8I3X4
F	1	LEU	-	cloning artifact	UNP Q8I3X4
F	246	LYS	-	cloning artifact	UNP Q8I3X4
F	247	GLY	-	cloning artifact	UNP Q8I3X4
F	248	GLU	-	cloning artifact	UNP Q8I3X4
F	249	PHE	-	cloning artifact	UNP Q8I3X4
F	250	GLU	-	cloning artifact	UNP Q8I3X4
F	251	ALA	-	cloning artifact	UNP Q8I3X4
F	252	TYR	-	cloning artifact	UNP Q8I3X4
F	253	VAL	-	cloning artifact	UNP Q8I3X4
F	254	GLU	-	cloning artifact	UNP Q8I3X4
F	255	GLN	-	cloning artifact	UNP Q8I3X4
F	256	LYS	-	cloning artifact	UNP Q8I3X4
F	257	LEU	-	cloning artifact	UNP Q8I3X4
F	258	ILE	-	cloning artifact	UNP Q8I3X4
F	259	SER	-	cloning artifact	UNP Q8I3X4
F	260	GLU	-	cloning artifact	UNP Q8I3X4
F	261	GLU	-	cloning artifact	UNP Q8I3X4
F	262	ASP	-	cloning artifact	UNP Q8I3X4
F	263	LEU	-	cloning artifact	UNP Q8I3X4
F	264	ASN	-	cloning artifact	UNP Q8I3X4
F	265	SER	-	cloning artifact	UNP Q8I3X4
F	266	ALA	-	cloning artifact	UNP Q8I3X4
F	267	VAL	-	cloning artifact	UNP Q8I3X4
F	268	ASP	-	cloning artifact	UNP Q8I3X4
F	269	HIS	-	expression tag	UNP Q8I3X4
F	270	HIS	-	expression tag	UNP Q8I3X4
F	271	HIS	-	expression tag	UNP Q8I3X4
F	272	HIS	-	expression tag	UNP Q8I3X4
F	273	HIS	-	expression tag	UNP Q8I3X4

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Chain	Residue	Modelled	Actual	Comment	Reference
F	274	HIS	-	expression tag	UNP Q8I3X4

- Molecule 2 is SULFATE ION (CCD ID: SO4) (formula: O₄S).



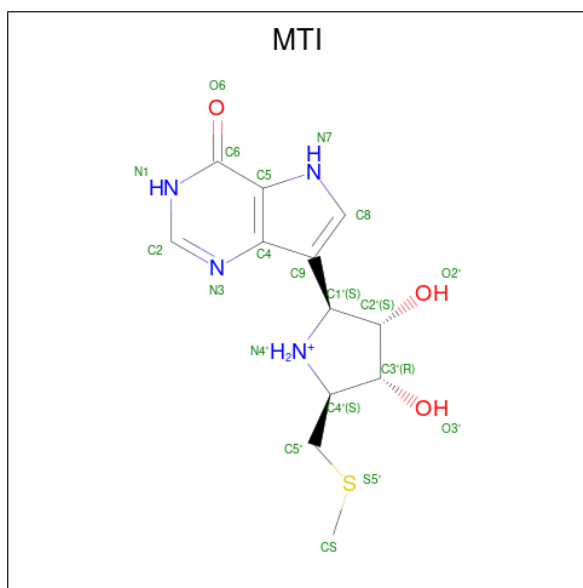
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	A	1	Total	O	S	0	0
			5	4	1		
2	A	1	Total	O	S	0	0
			5	4	1		
2	A	1	Total	O	S	0	0
			5	4	1		
2	A	1	Total	O	S	0	0
			5	4	1		
2	B	1	Total	O	S	0	0
			5	4	1		
2	B	1	Total	O	S	0	0
			5	4	1		
2	B	1	Total	O	S	0	0
			5	4	1		
2	B	1	Total	O	S	0	0
			5	4	1		
2	C	1	Total	O	S	0	0
			5	4	1		
2	C	1	Total	O	S	0	0
			5	4	1		
2	C	1	Total	O	S	0	0
			5	4	1		

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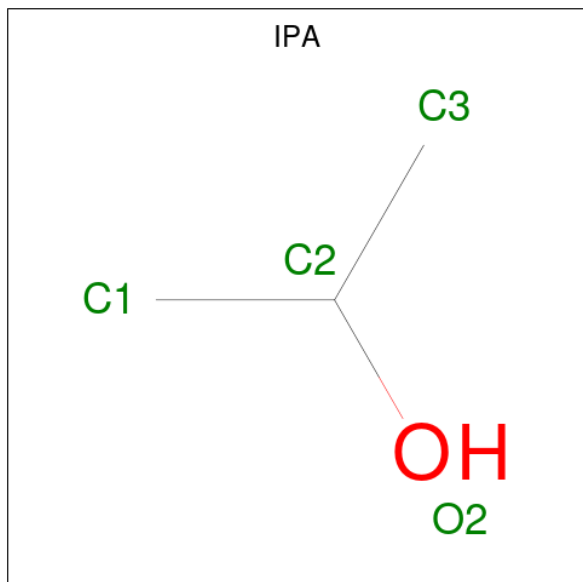
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	D	1	Total	O	S	0	0
			5	4	1		
2	D	1	Total	O	S	0	0
			5	4	1		
2	D	1	Total	O	S	0	0
			5	4	1		
2	D	1	Total	O	S	0	0
			5	4	1		
2	E	1	Total	O	S	0	0
			5	4	1		
2	E	1	Total	O	S	0	0
			5	4	1		
2	E	1	Total	O	S	0	0
			5	4	1		
2	F	1	Total	O	S	0	0
			5	4	1		
2	F	1	Total	O	S	0	0
			5	4	1		
2	F	1	Total	O	S	0	0
			5	4	1		

- Molecule 3 is 3,4-DIHYDROXY-2-[(METHYLSULFANYL)METHYL]-5-(4-OXO-4,5-DIHYDRO-3H-PYRROLO[3,2-D]PYRIMIDIN-7-YL)PYRROLIDINIUM (CCD ID: MTI) (formula: C₁₂H₁₇N₄O₃S).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
3	A	1	Total	C	N	O	S	0	0
			20	12	4	3	1		
3	B	1	Total	C	N	O	S	0	0
			20	12	4	3	1		
3	C	1	Total	C	N	O	S	0	0
			20	12	4	3	1		
3	D	1	Total	C	N	O	S	0	0
			20	12	4	3	1		
3	E	1	Total	C	N	O	S	0	0
			20	12	4	3	1		
3	F	1	Total	C	N	O	S	0	0
			20	12	4	3	1		

- Molecule 4 is ISOPROPYL ALCOHOL (CCD ID: IPA) (formula: C_3H_8O).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	A	1	Total	C	O	0	0
			4	3	1		
4	B	1	Total	C	O	0	0
			4	3	1		
4	B	1	Total	C	O	0	0
			4	3	1		
4	B	1	Total	C	O	0	0
			4	3	1		
4	D	1	Total	C	O	0	0
			4	3	1		
4	D	1	Total	C	O	0	0
			4	3	1		

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Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	E	1	Total	C	O	0	0
			4	3	1		
4	F	1	Total	C	O	0	0
			4	3	1		
4	F	1	Total	C	O	0	0
			4	3	1		

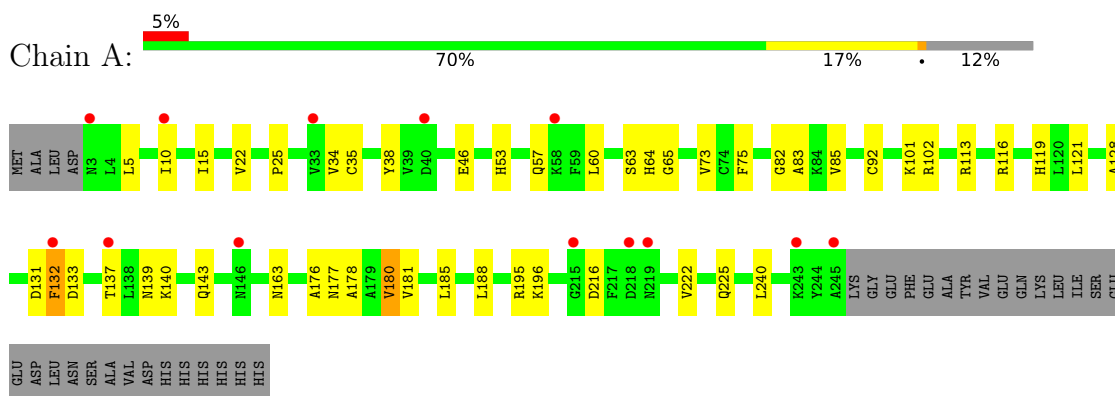
- Molecule 5 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	56	Total	O	0	0
			56	56		
5	B	45	Total	O	0	0
			45	45		
5	C	51	Total	O	0	0
			51	51		
5	D	61	Total	O	0	0
			61	61		
5	E	65	Total	O	0	0
			65	65		
5	F	79	Total	O	0	0
			79	79		

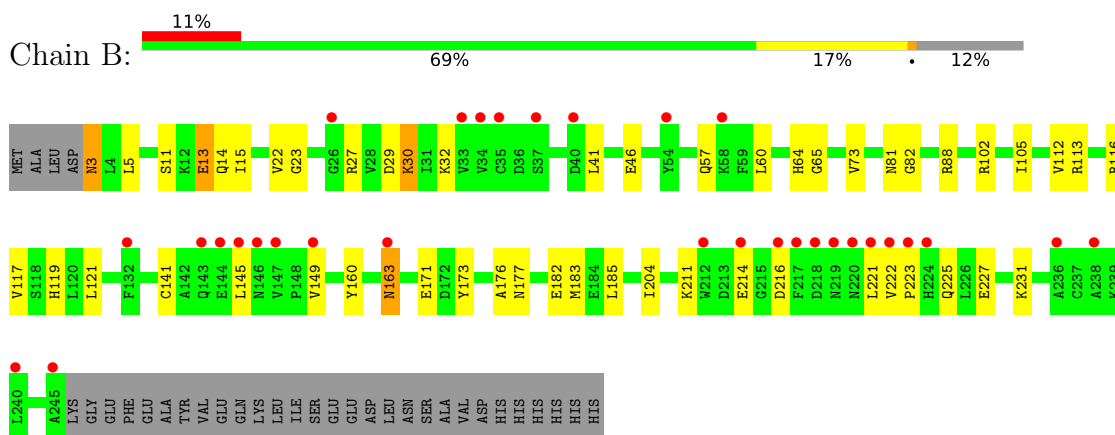
3 Residue-property plots

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

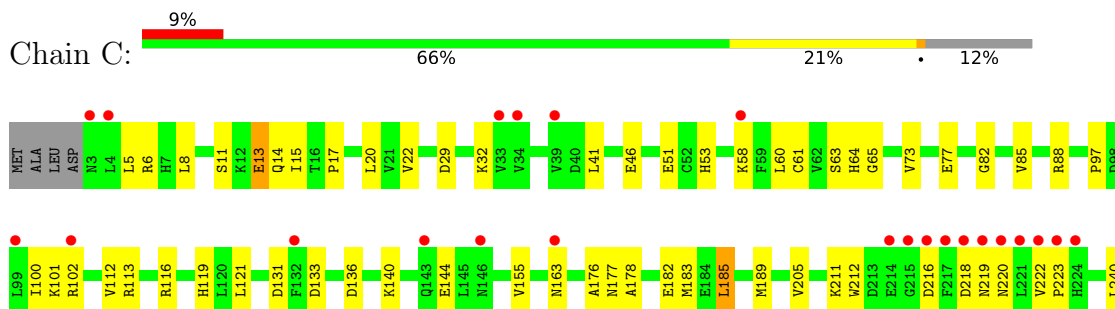
• Molecule 1: Uridine phosphorylase putative

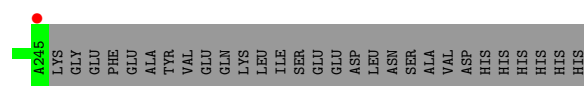


• Molecule 1: Uridine phosphorylase putative

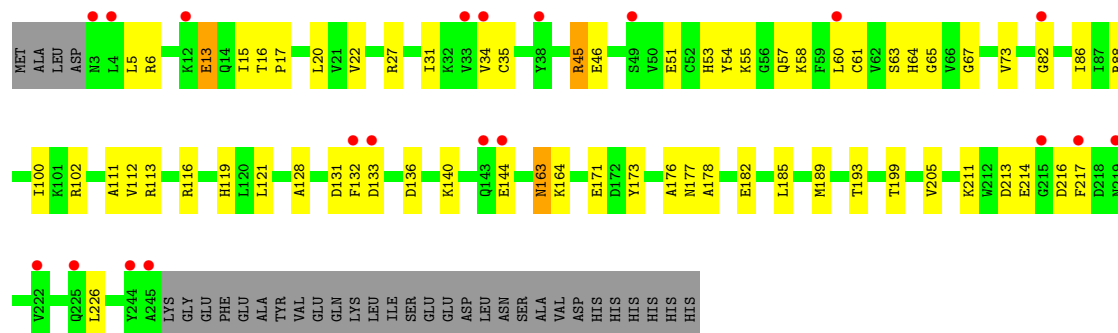


• Molecule 1: Uridine phosphorylase putative

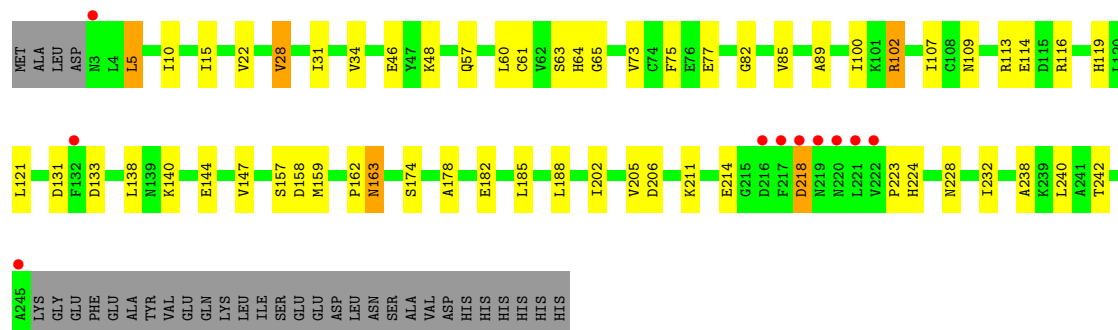




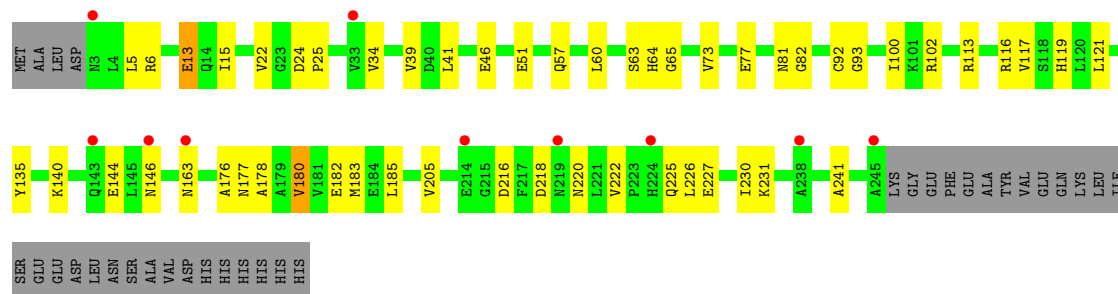
- Molecule 1: Uridine phosphorylase putative



- Molecule 1: Uridine phosphorylase putative



- Molecule 1: Uridine phosphorylase putative



4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	86.44Å 91.73Å 238.94Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	30.00 – 2.02 30.00 – 2.02	Depositor EDS
% Data completeness (in resolution range)	88.8 (30.00-2.02) 91.5 (30.00-2.02)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	0.05	Depositor
$\langle I/\sigma(I) \rangle$ ¹	3.97 (at 2.03Å)	Xtriage
Refinement program	CNS	Depositor
R, R_{free}	0.211 , 0.242 0.215 , 0.246	Depositor DCC
R_{free} test set	11403 reflections (10.01%)	wwPDB-VP
Wilson B-factor (Å ²)	23.0	Xtriage
Anisotropy	0.478	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.38 , 46.9	EDS
L-test for twinning ²	$\langle L \rangle = 0.48$, $\langle L^2 \rangle = 0.30$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	11789	wwPDB-VP
Average B, all atoms (Å ²)	29.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.44% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical 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: IPA, SO4, MTI

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	0.37	0/1893	0.89	3/2561 (0.1%)
1	B	0.36	0/1893	0.90	2/2561 (0.1%)
1	C	0.37	0/1893	0.91	7/2561 (0.3%)
1	D	0.36	0/1893	0.94	5/2561 (0.2%)
1	E	0.38	0/1893	0.91	6/2561 (0.2%)
1	F	0.38	0/1893	0.90	5/2561 (0.2%)
All	All	0.37	0/11358	0.91	28/15366 (0.2%)

There are no bond length outliers.

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

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	D	82	GLY	N-CA-C	8.47	122.64	113.58
1	C	82	GLY	N-CA-C	6.62	121.54	113.79
1	B	82	GLY	N-CA-C	6.44	120.47	113.58
1	A	185	LEU	N-CA-C	6.14	117.64	111.07
1	F	185	LEU	N-CA-C	6.06	117.56	111.07

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	1861	0	1882	38	0
1	B	1861	0	1882	40	0
1	C	1861	0	1882	38	0
1	D	1861	0	1882	44	0
1	E	1861	0	1882	40	0
1	F	1861	0	1882	40	0
2	A	20	0	0	1	0
2	B	20	0	0	0	0
2	C	15	0	0	0	0
2	D	20	0	0	1	0
2	E	15	0	0	0	0
2	F	20	0	0	0	0
3	A	20	0	17	1	0
3	B	20	0	17	4	0
3	C	20	0	17	1	0
3	D	20	0	17	0	0
3	E	20	0	17	2	0
3	F	20	0	17	1	0
4	A	4	0	8	0	0
4	B	12	0	24	1	0
4	D	8	0	16	1	0
4	E	4	0	8	0	0
4	F	8	0	16	1	0
5	A	56	0	0	2	0
5	B	45	0	0	1	0
5	C	51	0	0	1	0
5	D	61	0	0	3	0
5	E	65	0	0	3	0
5	F	79	0	0	2	0
All	All	11789	0	11466	227	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 227 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:5:LEU:HD11	1:C:15:ILE:HD11	1.49	0.94
1:D:163:ASN:HD22	1:D:164:LYS:H	1.20	0.89
1:E:102:ARG:HH11	1:E:102:ARG:HB2	1.37	0.86
1:A:133:ASP:O	1:A:137:THR:HG23	1.76	0.84
1:B:5:LEU:HD11	1:B:15:ILE:HD11	1.61	0.83

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	241/276 (87%)	231 (96%)	10 (4%)	0	100	100
1	B	241/276 (87%)	234 (97%)	6 (2%)	1 (0%)	30	22
1	C	241/276 (87%)	228 (95%)	12 (5%)	1 (0%)	30	22
1	D	241/276 (87%)	230 (95%)	11 (5%)	0	100	100
1	E	241/276 (87%)	234 (97%)	6 (2%)	1 (0%)	30	22
1	F	241/276 (87%)	233 (97%)	8 (3%)	0	100	100
All	All	1446/1656 (87%)	1390 (96%)	53 (4%)	3 (0%)	43	40

All (3) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	223	PRO
1	E	223	PRO
1	C	223	PRO

5.3.2 Protein sidechains [i](#)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	206/235 (88%)	203 (98%)	3 (2%)	57	59
1	B	206/235 (88%)	199 (97%)	7 (3%)	32	28

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	C	206/235 (88%)	203 (98%)	3 (2%)	57	59
1	D	206/235 (88%)	202 (98%)	4 (2%)	50	50
1	E	206/235 (88%)	200 (97%)	6 (3%)	37	34
1	F	206/235 (88%)	202 (98%)	4 (2%)	50	50
All	All	1236/1410 (88%)	1209 (98%)	27 (2%)	45	45

5 of 27 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	D	121	LEU
1	E	28	VAL
1	F	121	LEU
1	D	182	GLU
1	E	102	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 34 such sidechains are listed below:

Mol	Chain	Res	Type
1	F	44	ASN
1	F	53	HIS
1	F	119	HIS
1	C	119	HIS
1	C	81	ASN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates ⓘ

There are no oligosaccharides in this entry.

5.6 Ligand geometry

37 ligands are modelled in this entry.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# $ Z > 2$	Counts	RMSZ	# $ Z > 2$
4	IPA	A	503	-	3,3,3	0.35	0	3,3,3	0.39	0
2	SO4	A	401	-	4,4,4	1.83	2 (50%)	6,6,6	0.80	0
2	SO4	B	410	-	4,4,4	1.86	2 (50%)	6,6,6	0.83	0
2	SO4	F	409	-	4,4,4	1.83	2 (50%)	6,6,6	0.82	0
4	IPA	E	506	-	3,3,3	0.26	0	3,3,3	0.34	0
2	SO4	A	413	-	4,4,4	1.86	2 (50%)	6,6,6	0.83	0
2	SO4	A	418	-	4,4,4	1.87	2 (50%)	6,6,6	0.83	0
3	MTI	C	303	-	22,22,22	2.03	8 (36%)	20,32,32	1.97	5 (25%)
2	SO4	C	422	-	4,4,4	1.86	2 (50%)	6,6,6	0.83	0
4	IPA	B	502	-	3,3,3	0.35	0	3,3,3	0.37	0
4	IPA	F	505	-	3,3,3	0.34	0	3,3,3	0.37	0
2	SO4	F	406	-	4,4,4	1.80	2 (50%)	6,6,6	0.76	0
2	SO4	B	417	-	4,4,4	1.84	2 (50%)	6,6,6	0.83	0
4	IPA	F	504	-	3,3,3	0.32	0	3,3,3	0.34	0
2	SO4	D	404	-	4,4,4	1.84	2 (50%)	6,6,6	0.81	0
2	SO4	F	419	-	4,4,4	1.87	2 (50%)	6,6,6	0.85	0
4	IPA	D	507	-	3,3,3	0.32	0	3,3,3	0.35	0
2	SO4	E	415	-	4,4,4	1.80	2 (50%)	6,6,6	0.83	0
2	SO4	C	403	-	4,4,4	1.82	2 (50%)	6,6,6	0.77	0
3	MTI	F	306	-	22,22,22	2.00	8 (36%)	20,32,32	1.97	5 (25%)
2	SO4	D	408	-	4,4,4	1.78	1 (25%)	6,6,6	0.78	0
2	SO4	B	407	-	4,4,4	1.83	1 (25%)	6,6,6	0.86	0
2	SO4	F	411	-	4,4,4	1.79	2 (50%)	6,6,6	0.84	0
2	SO4	C	416	-	4,4,4	1.85	1 (25%)	6,6,6	0.80	0
2	SO4	E	405	-	4,4,4	1.84	2 (50%)	6,6,6	0.80	0
2	SO4	A	414	-	4,4,4	1.85	2 (50%)	6,6,6	0.75	0
3	MTI	E	305	-	22,22,22	2.10	8 (36%)	20,32,32	1.93	5 (25%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
2	SO4	E	420	-	4,4,4	1.87	2 (50%)	6,6,6	0.84	0
3	MTI	D	304	-	22,22,22	2.00	8 (36%)	20,32,32	1.98	5 (25%)
2	SO4	B	402	-	4,4,4	1.81	2 (50%)	6,6,6	0.83	0
3	MTI	A	301	-	22,22,22	2.01	8 (36%)	20,32,32	1.94	5 (25%)
4	IPA	D	509	-	3,3,3	0.34	0	3,3,3	0.35	0
4	IPA	B	501	-	3,3,3	0.33	0	3,3,3	0.36	0
3	MTI	B	302	-	22,22,22	2.06	9 (40%)	20,32,32	1.91	5 (25%)
4	IPA	B	508	-	3,3,3	0.38	0	3,3,3	0.38	0
2	SO4	D	412	-	4,4,4	1.85	2 (50%)	6,6,6	0.84	0
2	SO4	D	421	-	4,4,4	1.89	2 (50%)	6,6,6	0.84	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
3	MTI	D	304	-	-	4/7/23/23	0/3/3/3
3	MTI	A	301	-	-	5/7/23/23	0/3/3/3
3	MTI	B	302	-	-	6/7/23/23	0/3/3/3
3	MTI	F	306	-	-	6/7/23/23	0/3/3/3
3	MTI	C	303	-	-	6/7/23/23	0/3/3/3
3	MTI	E	305	-	-	6/7/23/23	0/3/3/3

The worst 5 of 90 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	C	303	MTI	C2-N3	4.97	1.39	1.30
3	F	306	MTI	C2-N3	4.89	1.39	1.30
3	E	305	MTI	C2-N3	4.87	1.39	1.30
3	A	301	MTI	C2-N3	4.85	1.39	1.30
3	D	304	MTI	C2-N3	4.73	1.38	1.30

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

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	301	MTI	C9-C8-N7	4.81	115.62	108.70
3	C	303	MTI	C9-C8-N7	4.81	115.62	108.70
3	E	305	MTI	C9-C8-N7	4.74	115.52	108.70

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	F	306	MTI	C9-C8-N7	4.71	115.48	108.70
3	D	304	MTI	C9-C8-N7	4.71	115.48	108.70

There are no chirality outliers.

5 of 33 torsion outliers are listed below:

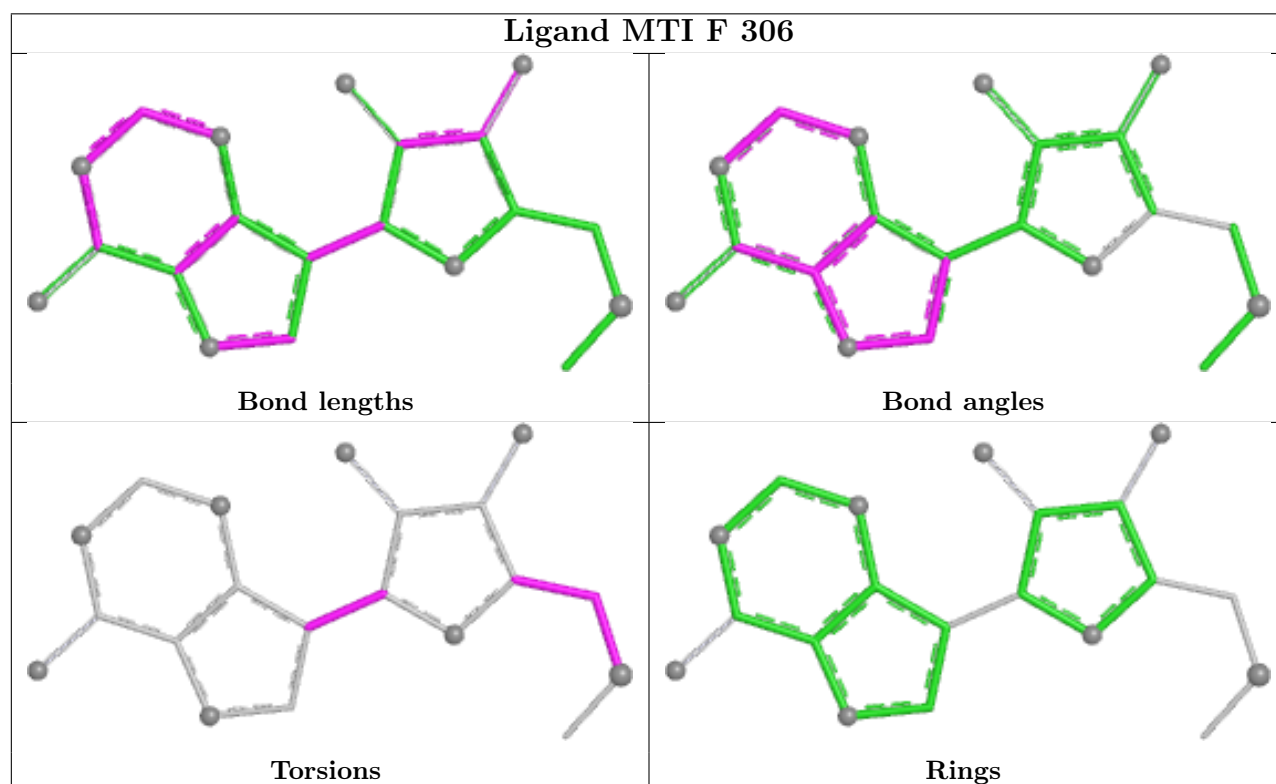
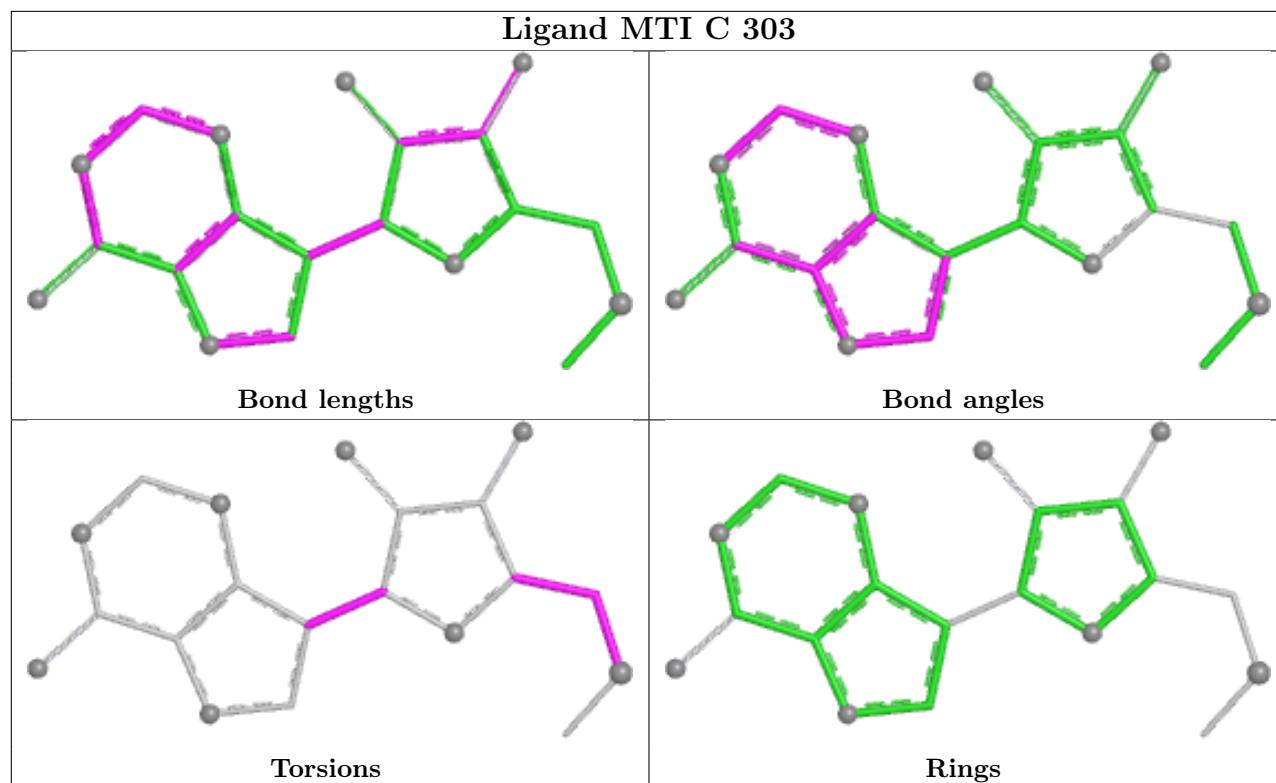
Mol	Chain	Res	Type	Atoms
3	A	301	MTI	C2'-C1'-C9-C8
3	A	301	MTI	C2'-C1'-C9-C4
3	B	302	MTI	C2'-C1'-C9-C8
3	B	302	MTI	C2'-C1'-C9-C4
3	C	303	MTI	C4'-C5'-S5'-CS

There are no ring outliers.

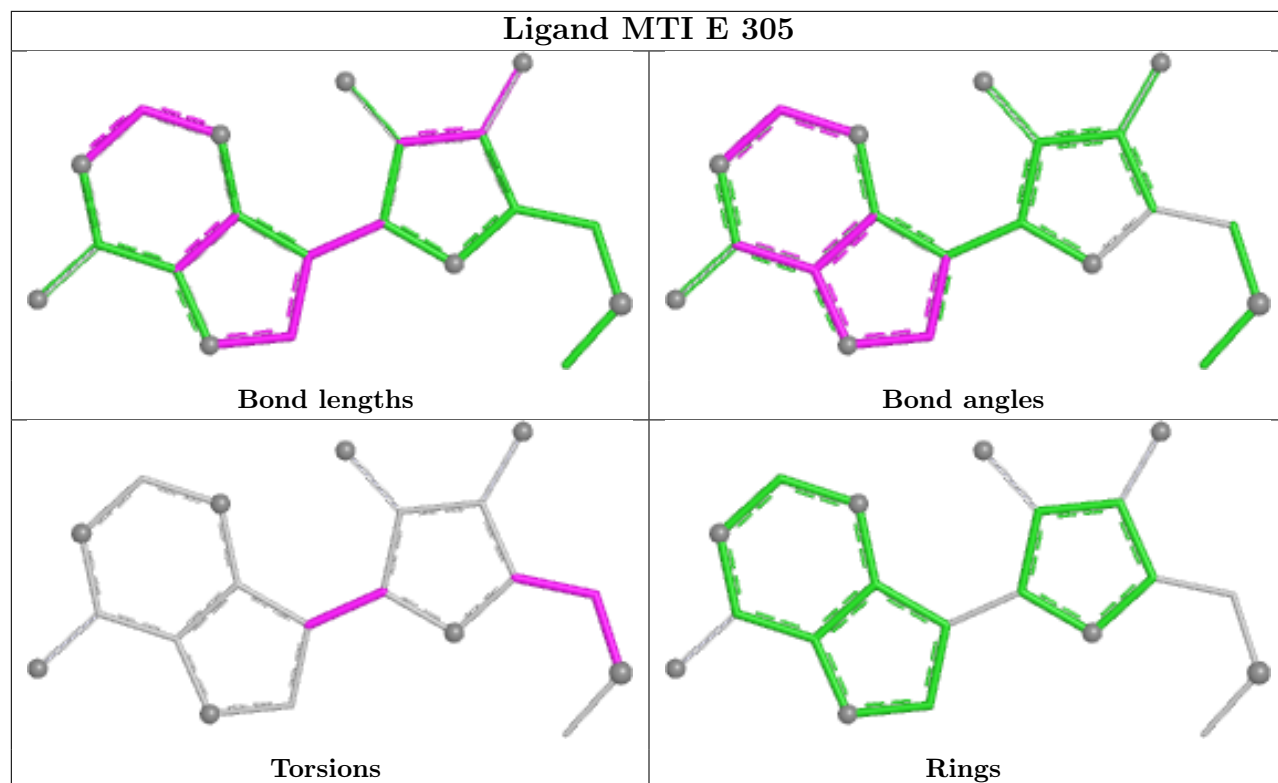
10 monomers are involved in 14 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	413	SO4	1	0
3	C	303	MTI	1	0
4	F	504	IPA	1	0
3	F	306	MTI	1	0
3	E	305	MTI	2	0
3	A	301	MTI	1	0
4	D	509	IPA	1	0
4	B	501	IPA	1	0
3	B	302	MTI	4	0
2	D	412	SO4	1	0

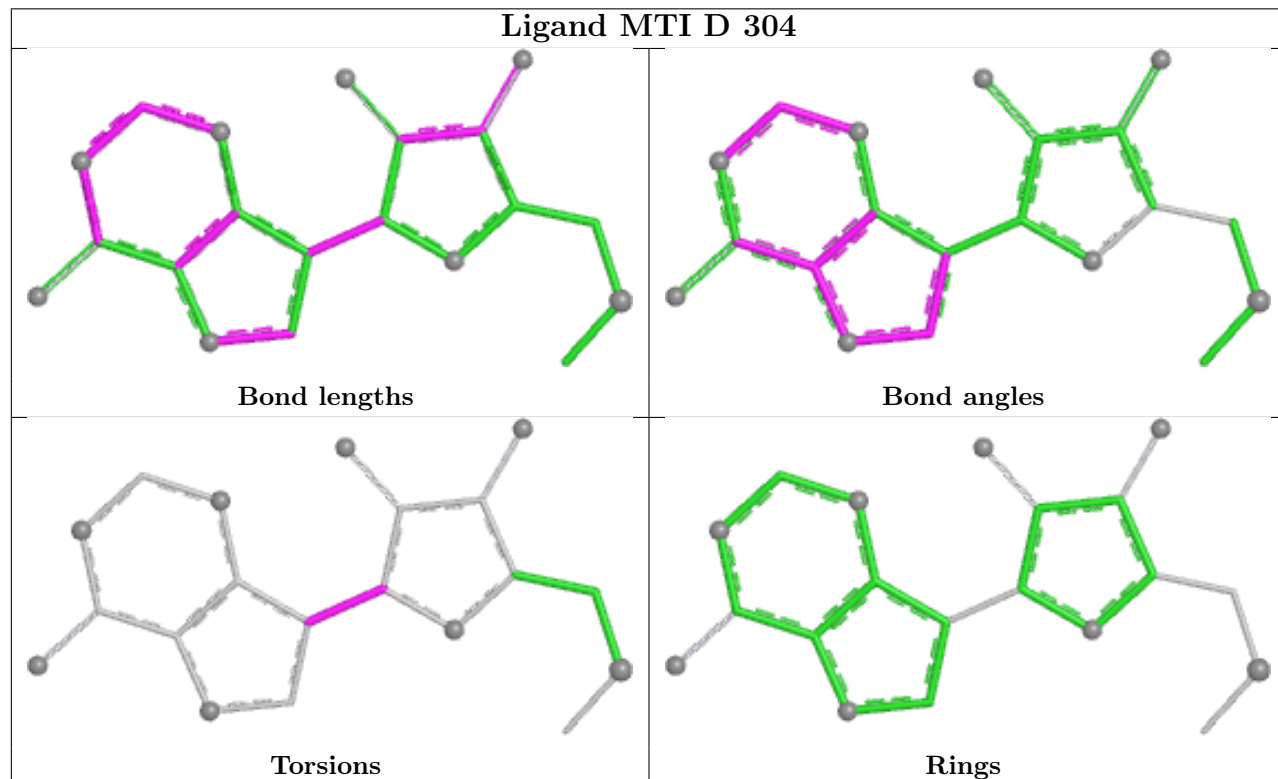
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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

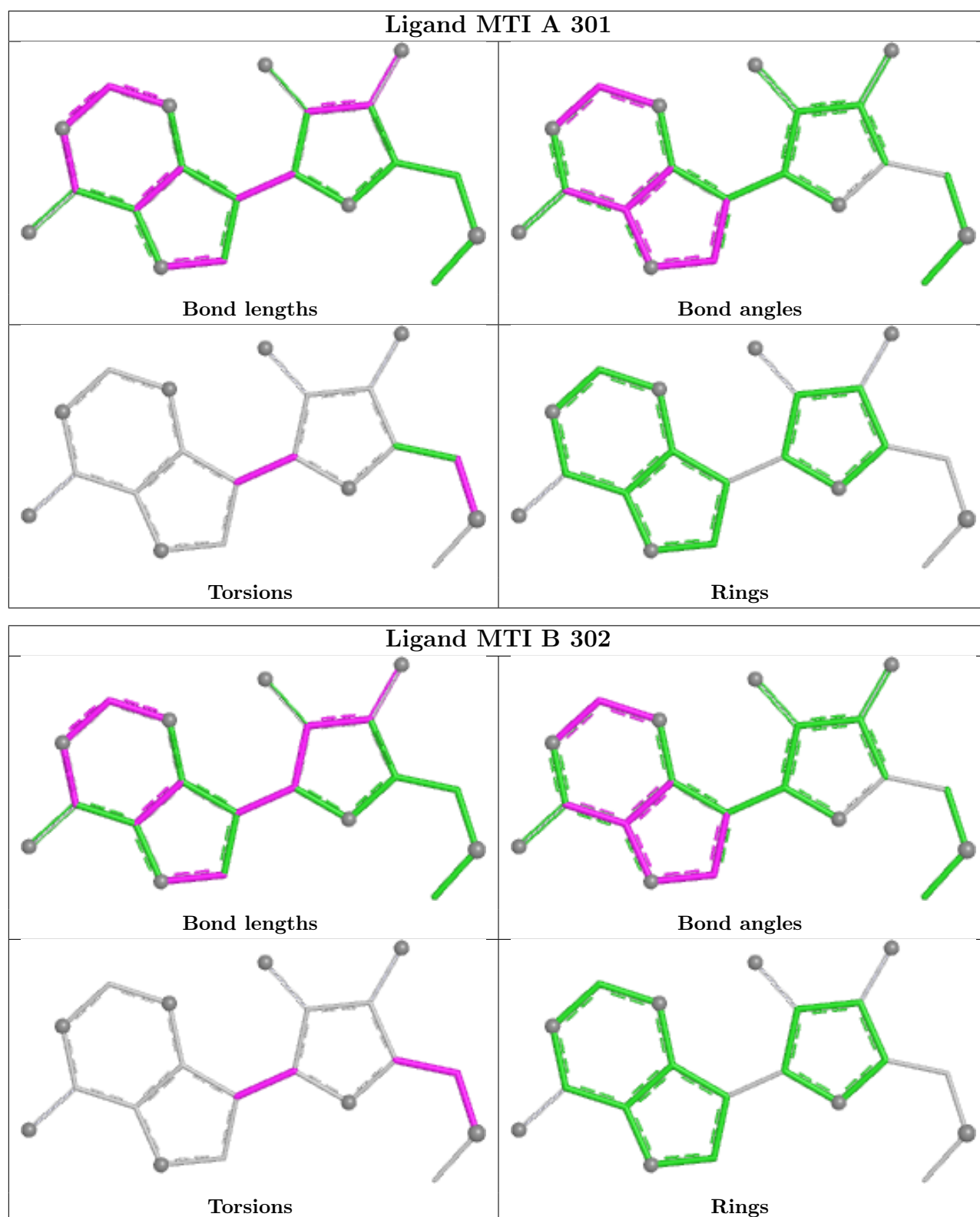


Ligand MTI E 305



Ligand MTI D 304





5.7 Other polymers ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues ⓘ

There are no chain breaks in this entry.

6 Fit of model and data [i](#)

6.1 Protein, DNA and RNA chains [i](#)

In the following table, the column labelled ‘#RSRZ> 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95th percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled ‘Q< 0.9’ lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
1	A	243/276 (88%)	0.43	13 (5%) 32 31	14, 29, 47, 57	0
1	B	243/276 (88%)	0.88	31 (12%) 7 6	14, 33, 51, 62	0
1	C	243/276 (88%)	0.53	24 (9%) 13 12	12, 29, 48, 62	0
1	D	243/276 (88%)	0.44	20 (8%) 17 17	11, 28, 47, 58	0
1	E	243/276 (88%)	0.12	10 (4%) 41 41	10, 24, 45, 63	0
1	F	243/276 (88%)	0.05	10 (4%) 41 41	11, 24, 41, 51	0
All	All	1458/1656 (88%)	0.41	108 (7%) 20 19	10, 27, 48, 63	0

The worst 5 of 108 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	132	PHE	6.2
1	C	217	PHE	5.1
1	B	245	ALA	4.9
1	D	245	ALA	4.8
1	E	217	PHE	4.6

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 ⓘ

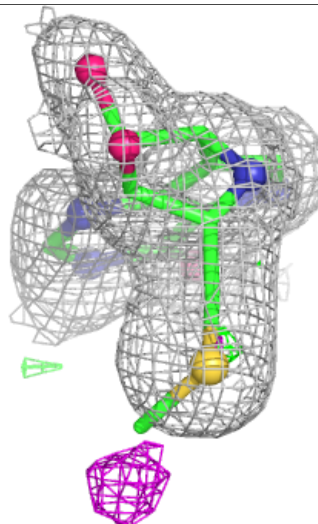
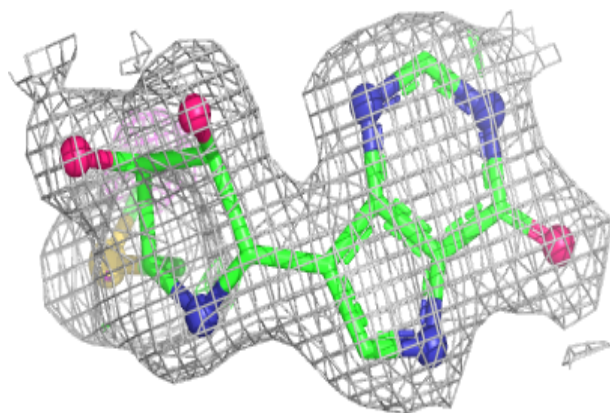
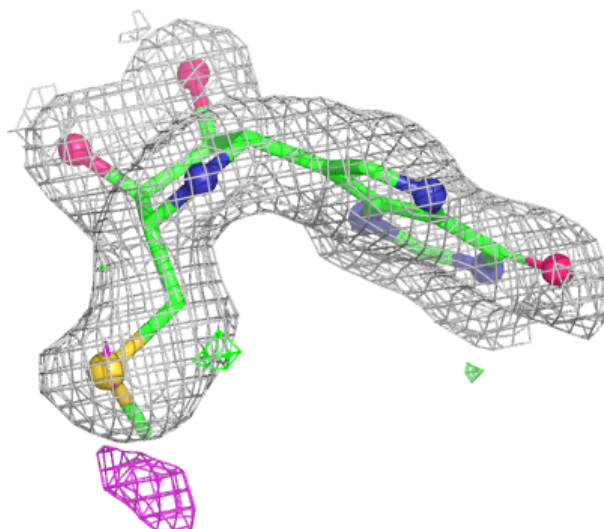
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
4	IPA	B	501	4/4	0.54	0.26	29,30,30,31	0
4	IPA	F	505	4/4	0.57	0.20	24,26,27,28	0
4	IPA	B	508	4/4	0.58	0.20	24,24,25,26	0
4	IPA	D	509	4/4	0.62	0.19	24,24,24,27	0
4	IPA	E	506	4/4	0.65	0.19	23,24,26,26	0
2	SO4	A	413	5/5	0.66	0.15	65,65,66,66	0
4	IPA	A	503	4/4	0.67	0.19	23,24,25,26	0
4	IPA	F	504	4/4	0.71	0.17	15,18,21,23	0
4	IPA	B	502	4/4	0.74	0.15	21,21,22,24	0
2	SO4	B	410	5/5	0.80	0.12	69,70,70,70	0
4	IPA	D	507	4/4	0.80	0.13	19,21,22,22	0
2	SO4	A	418	5/5	0.80	0.14	59,59,59,62	0
2	SO4	D	421	5/5	0.82	0.14	56,57,58,58	0
2	SO4	B	417	5/5	0.85	0.14	69,70,70,71	0
2	SO4	D	412	5/5	0.86	0.13	52,52,54,54	0
2	SO4	F	419	5/5	0.87	0.17	48,51,52,52	0
3	MTI	C	303	20/20	0.90	0.10	25,30,41,44	0
2	SO4	E	420	5/5	0.91	0.14	44,46,47,48	0
3	MTI	B	302	20/20	0.91	0.11	27,34,46,48	0
3	MTI	E	305	20/20	0.93	0.09	26,28,37,42	0
3	MTI	A	301	20/20	0.93	0.08	19,22,34,36	0
2	SO4	F	411	5/5	0.93	0.12	40,41,44,44	0
2	SO4	B	402	5/5	0.93	0.11	40,40,42,42	0
3	MTI	D	304	20/20	0.93	0.08	19,20,33,36	0
2	SO4	C	422	5/5	0.94	0.09	44,45,48,48	0
2	SO4	A	401	5/5	0.94	0.09	32,32,35,35	0
2	SO4	F	406	5/5	0.95	0.10	23,24,26,27	0
2	SO4	C	403	5/5	0.95	0.09	30,31,34,35	0
3	MTI	F	306	20/20	0.95	0.08	18,20,32,34	0
2	SO4	E	415	5/5	0.96	0.11	20,22,26,27	0
2	SO4	D	408	5/5	0.96	0.10	18,25,25,27	0
2	SO4	A	414	5/5	0.96	0.08	22,26,28,29	0
2	SO4	D	404	5/5	0.96	0.08	29,29,30,30	0
2	SO4	C	416	5/5	0.97	0.09	25,26,27,29	0
2	SO4	B	407	5/5	0.97	0.07	25,27,29,31	0
2	SO4	F	409	5/5	0.98	0.09	20,23,29,30	0
2	SO4	E	405	5/5	0.98	0.07	26,27,27,28	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.

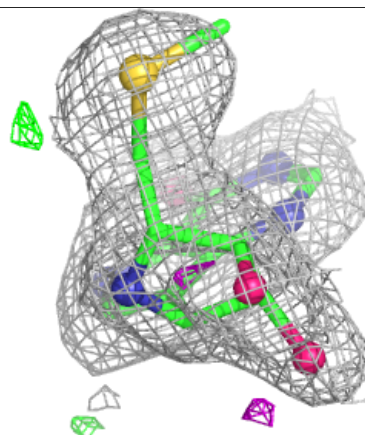
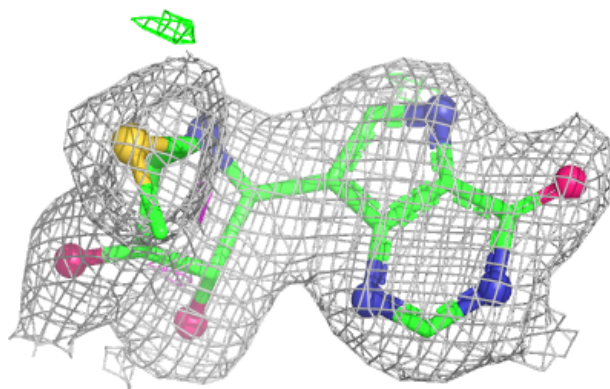
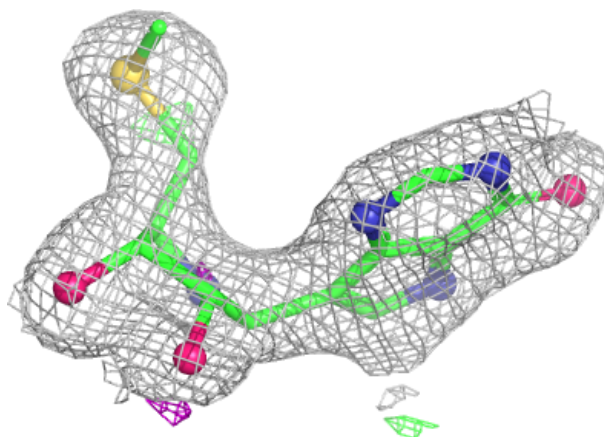
Electron density around MTI C 303:

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



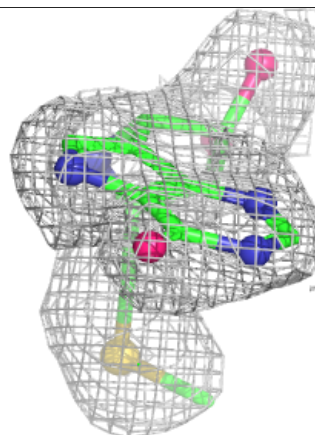
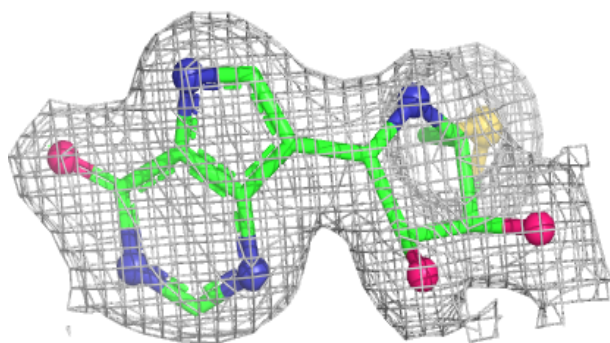
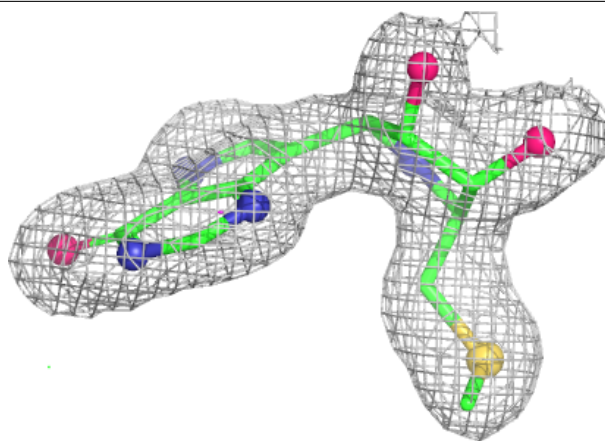
Electron density around MTI B 302:

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



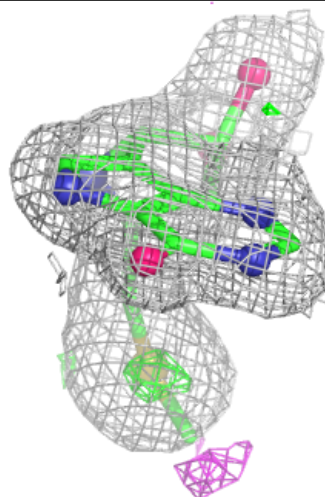
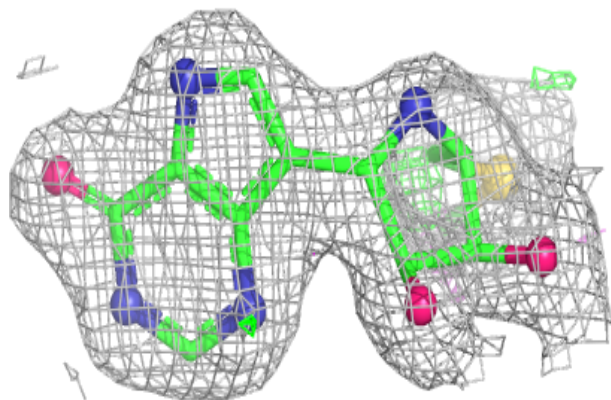
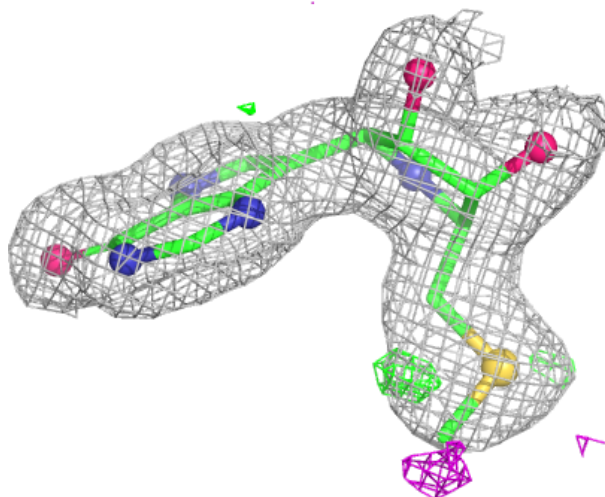
Electron density around MTI E 305:

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



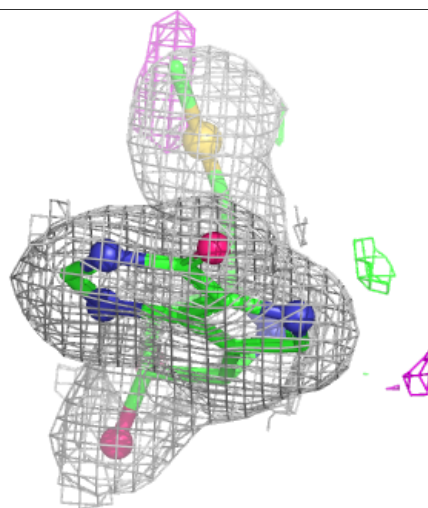
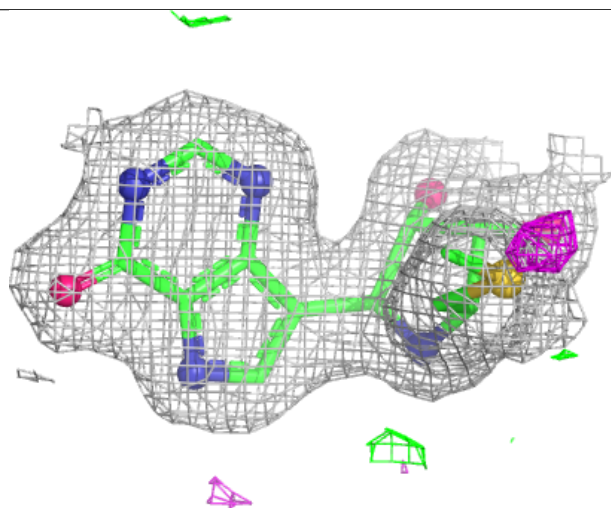
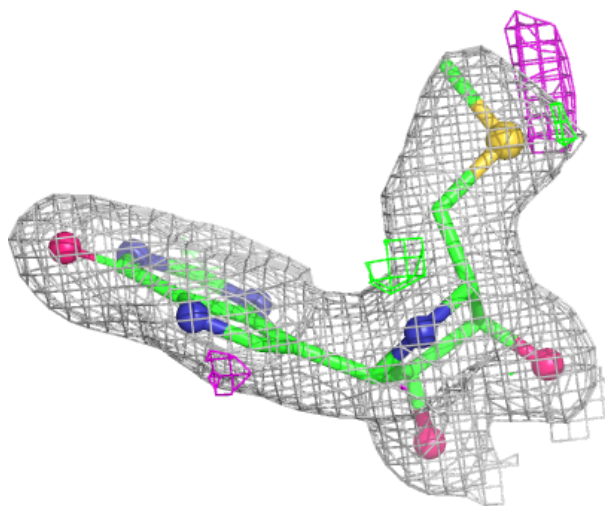
Electron density around MTI A 301:

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



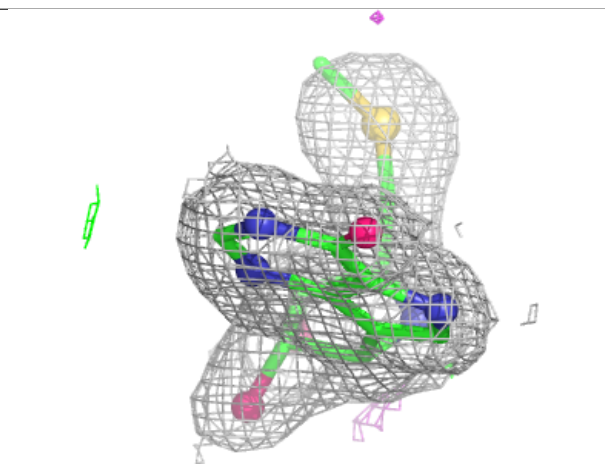
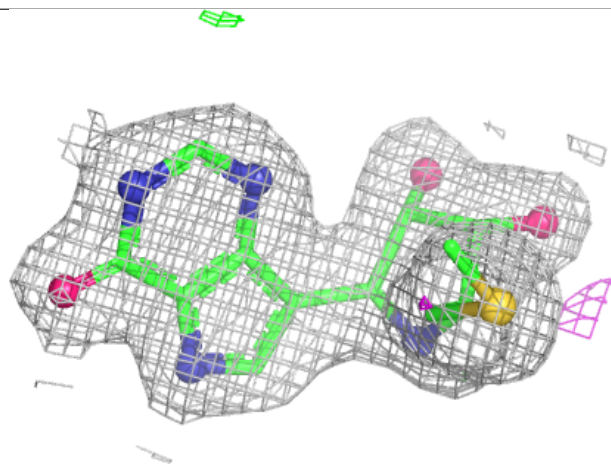
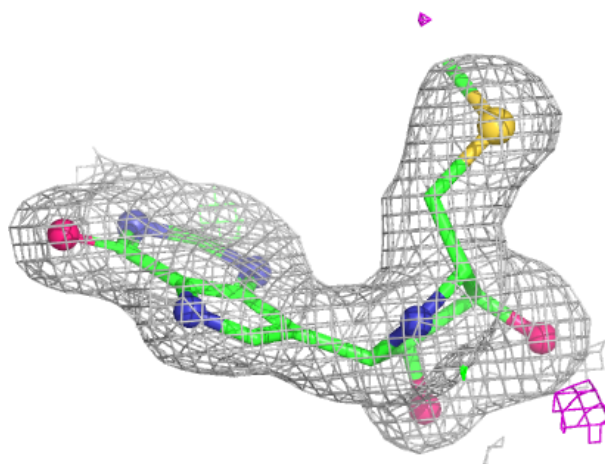
Electron density around MTI D 304:

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



Electron density around MTI F 306:

$2mF_o-DF_c$ (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.