



# Full wwPDB X-ray Structure Validation Report ⓘ

Aug 22, 2020 – 05:42 AM BST

PDB ID : 5VRN  
Title : CRYSTAL STRUCTURE OF THE INHA FROM MYCOBACTERIUM TUBERCULOSIS IN COMPLEX WITH AN12855, EBSI 4333.  
Authors : Abendroth, J.; Edwards, T.E.; Lorimer, D.  
Deposited on : 2017-05-11  
Resolution : 2.55 Å(reported)

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

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

A user guide is available at

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

with specific help available everywhere you see the ⓘ symbol.

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

MolProbity : 4.02b-467  
Mogul : 1.8.5 (274361), CSD as541be (2020)  
Xtriage (Phenix) : 1.13  
EDS : 2.13.1  
buster-report : 1.1.7 (2018)  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
Refmac : 5.8.0158  
CCP4 : 7.0.044 (Gargrove)  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.13.1

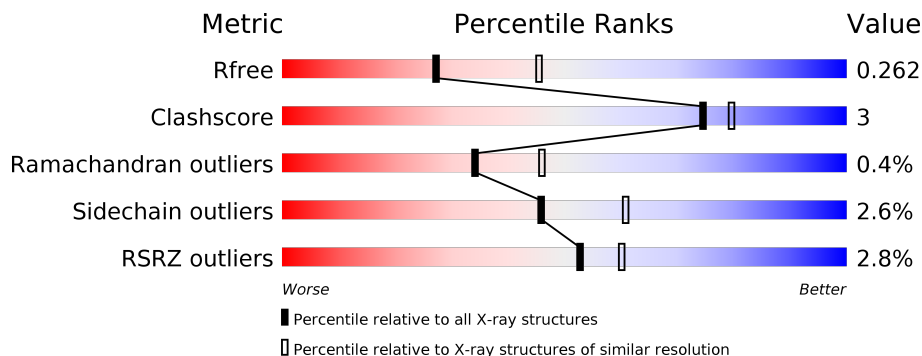
# 1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.55 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



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

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments on the lower bar indicate the fraction of residues that contain outliers for  $\geq 3$ , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions  $\leq 5\%$ . The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	272	<div style="display: flex; align-items: center;"> <div style="width: 100%; height: 10px; background: linear-gradient(to right, red 1%, orange 1%, yellow 8%, green 90%, grey 90%);"></div> <div style="margin-left: 5px;"> <p>%</p> <p>90%</p> <p>8%</p> <p>..</p> </div> </div>
1	B	272	<div style="display: flex; align-items: center;"> <div style="width: 100%; height: 10px; background: linear-gradient(to right, green 89%, yellow 8%, orange 8%, grey 90%);"></div> <div style="margin-left: 5px;"> <p>89%</p> <p>8%</p> <p>..</p> </div> </div>
1	C	272	<div style="display: flex; align-items: center;"> <div style="width: 100%; height: 10px; background: linear-gradient(to right, red 1%, orange 1%, yellow 7%, green 88%, grey 90%);"></div> <div style="margin-left: 5px;"> <p>%</p> <p>88%</p> <p>7%</p> <p>..</p> </div> </div>
1	D	272	<div style="display: flex; align-items: center;"> <div style="width: 100%; height: 10px; background: linear-gradient(to right, red 3%, orange 3%, yellow 7%, green 85%, grey 90%);"></div> <div style="margin-left: 5px;"> <p>3%</p> <p>85%</p> <p>7%</p> <p>8%</p> </div> </div>
1	E	272	<div style="display: flex; align-items: center;"> <div style="width: 100%; height: 10px; background: linear-gradient(to right, red 5%, orange 5%, yellow 8%, green 89%, grey 90%);"></div> <div style="margin-left: 5px;"> <p>5%</p> <p>89%</p> <p>8%</p> <p>..</p> </div> </div>
1	F	272	<div style="display: flex; align-items: center;"> <div style="width: 100%; height: 10px; background: linear-gradient(to right, red 7%, orange 7%, yellow 8%, green 89%, grey 90%);"></div> <div style="margin-left: 5px;"> <p>7%</p> <p>89%</p> <p>8%</p> <p>.</p> </div> </div>

## 2 Entry composition [i](#)

There are 3 unique types of molecules in this entry. The entry contains 11821 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 Enoyl-[acyl-carrier-protein] reductase [NADH].

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	268	Total 1942	C 1230	N 339	O 363	S 10	0	2	0
1	B	267	Total 1933	C 1224	N 339	O 360	S 10	0	2	0
1	C	261	Total 1908	C 1213	N 333	O 353	S 9	0	2	0
1	D	249	Total 1800	C 1143	N 313	O 336	S 8	0	2	0
1	E	268	Total 1922	C 1221	N 333	O 358	S 10	0	2	0
1	F	267	Total 1901	C 1205	N 331	O 355	S 10	0	3	0

There are 18 discrepancies between the modelled and reference sequences:

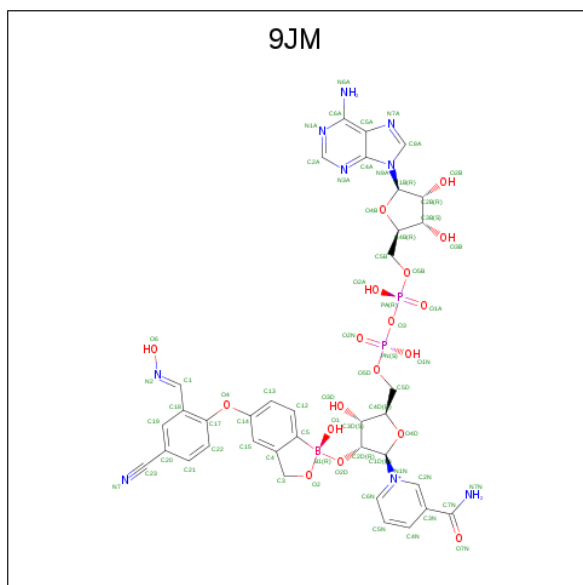
Chain	Residue	Modelled	Actual	Comment	Reference
A	-2	GLY	-	expression tag	UNP P9WGR0
A	-1	SER	-	expression tag	UNP P9WGR0
A	0	HIS	-	expression tag	UNP P9WGR0
B	-2	GLY	-	expression tag	UNP P9WGR0
B	-1	SER	-	expression tag	UNP P9WGR0
B	0	HIS	-	expression tag	UNP P9WGR0
C	-2	GLY	-	expression tag	UNP P9WGR0
C	-1	SER	-	expression tag	UNP P9WGR0
C	0	HIS	-	expression tag	UNP P9WGR0
D	-2	GLY	-	expression tag	UNP P9WGR0
D	-1	SER	-	expression tag	UNP P9WGR0
D	0	HIS	-	expression tag	UNP P9WGR0
E	-2	GLY	-	expression tag	UNP P9WGR0
E	-1	SER	-	expression tag	UNP P9WGR0
E	0	HIS	-	expression tag	UNP P9WGR0
F	-2	GLY	-	expression tag	UNP P9WGR0
F	-1	SER	-	expression tag	UNP P9WGR0

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Chain	Residue	Modelled	Actual	Comment	Reference
F	0	HIS	-	expression tag	UNP P9WGR0

- Molecule 2 is [[(2 {R},3 {S},4 {R},5 {R})-5-(3-aminocarbonylpyridin-1-ium-1-yl)-4-[[5-[4-cyano-2-[(E)-hydroxyiminomethyl]phenoxy]-1-oxidanyl-3 {H}-2,1 $\beta$ ]-benzoxaborol-1-yl]oxy]-3-oxidanyl-oxolan-2-yl]methoxy-oxidanyl-phosphoryl] [(2 {R},3 {S},4 {R},5 {R})-5-(6-aminopurin-9-yl)-3,4-bis(oxidanyl)oxolan-2-yl]methyl hydrogen phosphate (three-letter code: 9JM) (formula: C<sub>36</sub>H<sub>38</sub>BN<sub>9</sub>O<sub>18</sub>P<sub>2</sub>).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	
2	A	1	Total	C	N	O	P	0	0	
			54	28	8	16	2			
2	B	1	Total	C	N	O	P	0	0	
			54	28	8	16	2			
2	C	1	Total	B	C	N	O	P	0	0
			66	1	36	9	18	2		
2	D	1	Total	C	N	O	P	0	0	
			44	21	7	14	2			
2	E	1	Total	C	N	O	P	0	0	
			44	21	7	14	2			
2	F	1	Total	C	N	O	P	0	0	
			44	21	7	14	2			

- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	32	Total	O	0	0
			32	32		

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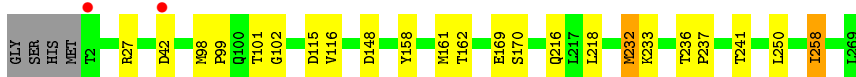
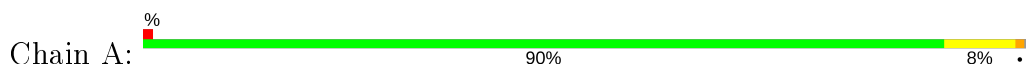
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<b>Mol</b>	<b>Chain</b>	<b>Residues</b>	<b>Atoms</b>	<b>ZeroOcc</b>	<b>AltConf</b>
3	B	31	Total O 31 31	0	0
3	C	19	Total O 19 19	0	0
3	D	11	Total O 11 11	0	0
3	E	10	Total O 10 10	0	0
3	F	6	Total O 6 6	0	0

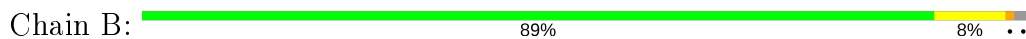
### 3 Residue-property plots [i](#)

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.

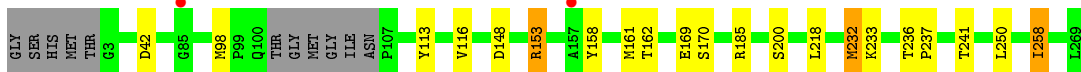
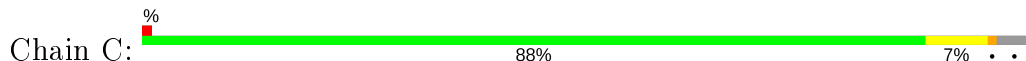
- Molecule 1: Enoyl-[acyl-carrier-protein] reductase [NADH]



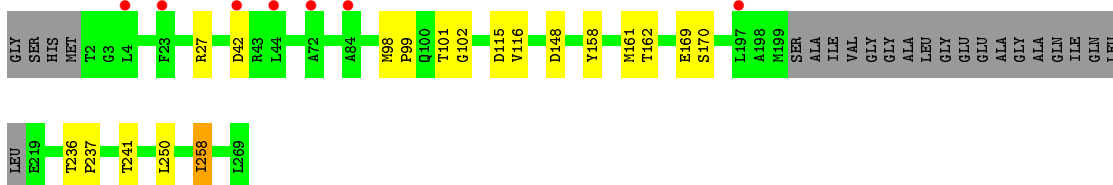
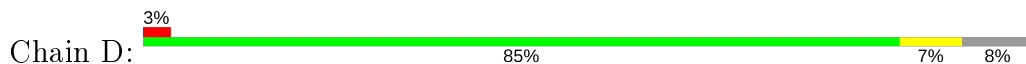
- Molecule 1: Enoyl-[acyl-carrier-protein] reductase [NADH]



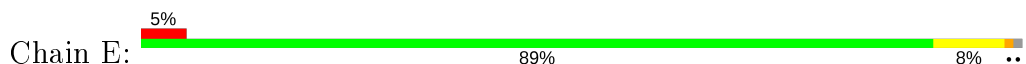
- Molecule 1: Enoyl-[acyl-carrier-protein] reductase [NADH]

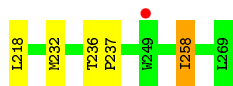


- Molecule 1: Enoyl-[acyl-carrier-protein] reductase [NADH]

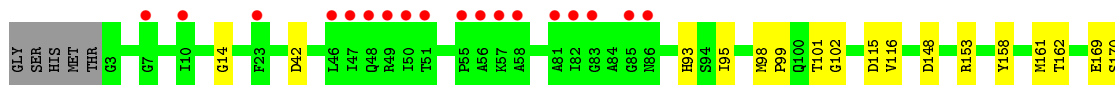
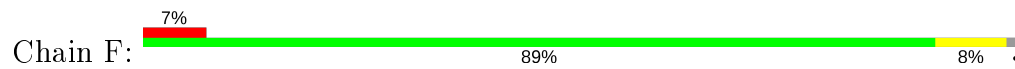


- Molecule 1: Enoyl-[acyl-carrier-protein] reductase [NADH]





● Molecule 1: Enoyl-[acyl-carrier-protein] reductase [NADH]



## 4 Data and refinement statistics

Property	Value	Source
Space group	C 2 2 21	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	81.66Å 100.94Å 377.82Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	48.76 – 2.55 48.76 – 2.55	Depositor EDS
% Data completeness (in resolution range)	99.5 (48.76-2.55) 99.4 (48.76-2.55)	Depositor EDS
$R_{merge}$	0.12	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	4.51 (at 2.54Å)	Xtrriage
Refinement program	REFMAC 5.8.0049	Depositor
R, $R_{free}$	0.235 , 0.273 0.228 , 0.262	Depositor DCC
$R_{free}$ test set	2540 reflections (4.97%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	31.5	Xtrriage
Anisotropy	0.021	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.33 , 47.7	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.38$ , $\langle L^2 \rangle = 0.20$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
$F_o, F_c$ correlation	0.90	EDS
Total number of atoms	11821	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	30.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 19.08% 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: 9JM

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	0.75	0/1986	0.64	0/2702
1	B	0.72	0/1977	0.65	1/2690 (0.0%)
1	C	0.71	0/1951	0.66	1/2652 (0.0%)
1	D	0.65	0/1843	0.64	0/2512
1	E	0.65	0/1966	0.63	0/2679
1	F	0.64	0/1948	0.64	2/2658 (0.1%)
All	All	0.69	0/11671	0.65	4/15893 (0.0%)

There are no bond length outliers.

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	153	ARG	NE-CZ-NH1	5.25	122.92	120.30
1	F	185[A]	ARG	NE-CZ-NH1	5.24	122.92	120.30
1	F	185[B]	ARG	NE-CZ-NH1	5.24	122.92	120.30
1	C	153	ARG	NE-CZ-NH1	5.10	122.85	120.30

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	1942	0	1901	14	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	B	1933	0	1889	14	1
1	C	1908	0	1890	13	0
1	D	1800	0	1738	13	0
1	E	1922	0	1869	15	1
1	F	1901	0	1819	13	0
2	A	54	0	0	0	0
2	B	54	0	0	0	0
2	C	66	0	0	1	0
2	D	44	0	0	0	0
2	E	44	0	0	1	0
2	F	44	0	0	2	0
3	A	32	0	0	1	0
3	B	31	0	0	1	0
3	C	19	0	0	1	0
3	D	11	0	0	0	0
3	E	10	0	0	0	0
3	F	6	0	0	0	0
All	All	11821	0	11106	74	1

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 3.

All (74) 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:A:101:THR:HG21	1:A:115:ASP:OD2	1.83	0.79
1:E:101:THR:HG21	1:E:115:ASP:OD2	1.82	0.79
1:D:101:THR:HG21	1:D:115:ASP:OD2	1.84	0.78
1:B:101:THR:HG21	1:B:115:ASP:OD2	1.82	0.77
1:F:101:THR:HG21	1:F:115:ASP:OD2	1.85	0.76
1:B:185[B]:ARG:HD3	3:B:416:HOH:O	1.86	0.74
1:F:93:HIS:CE1	1:F:95[B]:ILE:HG12	2.31	0.66
1:C:258:ILE:HD13	1:D:258:ILE:HD13	1.78	0.66
1:A:258:ILE:HD13	1:B:258:ILE:HD13	1.80	0.63
1:E:258:ILE:HD13	1:F:258:ILE:HD13	1.81	0.62
1:F:98:MET:HE2	1:F:102:GLY:HA3	1.87	0.56
1:B:98:MET:HE2	1:B:102:GLY:HA3	1.87	0.56
1:B:98:MET:HB3	1:B:103:MET:HG2	1.87	0.55
1:C:185[B]:ARG:HD3	3:C:408:HOH:O	2.06	0.55
1:B:99:PRO:HB2	1:B:101:THR:HG22	1.89	0.55
1:D:98:MET:HE2	1:D:102:GLY:HA3	1.87	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:202:ILE:HG12	1:E:207:LEU:HD13	1.89	0.54
1:E:98:MET:HE2	1:E:102:GLY:HA3	1.88	0.54
1:A:98:MET:HE2	1:A:102:GLY:HA3	1.90	0.53
1:E:99:PRO:HB2	1:E:101:THR:HG22	1.91	0.53
1:D:99:PRO:HB2	1:D:101:THR:HG22	1.91	0.53
1:F:99:PRO:HB2	1:F:101:THR:HG22	1.91	0.53
1:C:232:MET:HE3	1:C:233:LYS:HG2	1.90	0.52
1:C:158:TYR:CZ	1:C:161:MET:HG3	2.44	0.52
1:F:158:TYR:HD2	1:F:162:THR:HG1	1.56	0.52
1:A:99:PRO:HB2	1:A:101:THR:HG22	1.92	0.52
1:B:158:TYR:HD2	1:B:162:THR:HG1	1.57	0.50
1:B:158:TYR:CZ	1:B:161:MET:HG3	2.47	0.49
1:C:236:THR:HB	1:C:237:PRO:HD3	1.93	0.49
1:E:158:TYR:CZ	1:E:161:MET:HG3	2.47	0.49
1:C:158:TYR:HD2	1:C:162:THR:HG1	1.58	0.49
1:E:148:ASP:OD2	1:E:169:GLU:OE2	2.31	0.49
1:F:14:GLY:O	2:F:300:9JM:O3B	2.31	0.49
2:F:300:9JM:O1N	2:F:300:9JM:N7N	2.46	0.48
1:D:158:TYR:HD2	1:D:162:THR:HG1	1.60	0.48
1:C:148:ASP:OD2	1:C:169:GLU:OE2	2.31	0.48
1:F:236:THR:HB	1:F:237:PRO:HD3	1.96	0.48
1:D:148:ASP:OD2	1:D:169:GLU:OE2	2.32	0.47
1:D:236:THR:HB	1:D:237:PRO:HD3	1.96	0.47
1:D:158:TYR:CZ	1:D:161:MET:HG3	2.48	0.47
1:E:158:TYR:HD2	1:E:162:THR:HG1	1.60	0.47
1:A:148:ASP:OD2	1:A:169:GLU:OE2	2.33	0.47
1:A:158:TYR:CZ	1:A:161:MET:HG3	2.50	0.47
1:E:236:THR:HB	1:E:237:PRO:HD3	1.96	0.47
1:B:148:ASP:OD2	1:B:169:GLU:OE2	2.32	0.46
1:E:98:MET:CE	1:E:116:VAL:HA	2.45	0.46
1:A:236:THR:HB	1:A:237:PRO:HD3	1.96	0.46
1:C:158:TYR:OH	2:C:300:9JM:C12	2.62	0.46
1:A:27[B]:ARG:NH1	3:A:405:HOH:O	2.46	0.46
1:F:148:ASP:OD2	1:F:169:GLU:OE2	2.33	0.46
1:B:98:MET:CE	1:B:116:VAL:HA	2.44	0.46
1:A:158:TYR:HD2	1:A:162:THR:HG1	1.62	0.45
1:B:236:THR:HB	1:B:237:PRO:HD3	1.98	0.45
1:F:158:TYR:CZ	1:F:161:MET:HG3	2.51	0.45
1:D:27[B]:ARG:HH21	1:D:27[B]:ARG:HD3	1.56	0.44
1:A:232:MET:HE3	1:A:233:LYS:HG2	1.99	0.44
1:C:241:THR:HG23	1:D:250:LEU:HD23	1.99	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:98:MET:HE1	1:A:116:VAL:HA	2.00	0.44
1:E:65:VAL:HG22	2:E:300:9JM:N1A	2.33	0.44
1:C:98:MET:CE	1:C:116:VAL:HA	2.48	0.44
1:E:98:MET:HE1	1:E:116:VAL:HA	1.99	0.43
1:A:98:MET:CE	1:A:116:VAL:HA	2.49	0.43
1:A:241:THR:HG23	1:B:250:LEU:HD23	2.00	0.43
1:F:98:MET:CE	1:F:116:VAL:HA	2.49	0.43
1:A:250:LEU:HD23	1:B:241:THR:HG23	2.00	0.43
1:D:98:MET:CE	1:D:116:VAL:HA	2.49	0.43
1:C:113:TYR:CE2	1:E:121:HIS:HB2	2.54	0.42
1:B:98:MET:HB3	1:B:103:MET:HE2	2.00	0.42
1:E:100:GLN:NE2	1:E:207:LEU:HD21	2.34	0.42
1:C:250:LEU:HD23	1:D:241:THR:HG23	2.01	0.41
1:C:153:ARG:HE	1:F:153:ARG:NH2	2.19	0.41
1:F:158:TYR:HD2	1:F:162:THR:OG1	2.03	0.41
1:D:98:MET:HE1	1:D:116:VAL:HA	2.03	0.41
1:E:65:VAL:HG21	1:E:95:ILE:HD11	2.03	0.40

All (1) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:86:ASN:ND2	1:E:53:ARG:O[5_545]	1.99	0.21

## 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	268/272 (98%)	258 (96%)	9 (3%)	1 (0%)	34	46
1	B	267/272 (98%)	257 (96%)	9 (3%)	1 (0%)	34	46
1	C	259/272 (95%)	249 (96%)	9 (4%)	1 (0%)	34	46

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	D	247/272 (91%)	237 (96%)	9 (4%)	1 (0%)	34	46
1	E	268/272 (98%)	258 (96%)	9 (3%)	1 (0%)	34	46
1	F	268/272 (98%)	258 (96%)	9 (3%)	1 (0%)	34	46
All	All	1577/1632 (97%)	1517 (96%)	54 (3%)	6 (0%)	34	46

All (6) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	42	ASP
1	B	42	ASP
1	D	42	ASP
1	E	42	ASP
1	F	42	ASP
1	C	42	ASP

### 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	188/207 (91%)	183 (97%)	5 (3%)	44	59
1	B	186/207 (90%)	180 (97%)	6 (3%)	39	53
1	C	187/207 (90%)	182 (97%)	5 (3%)	44	59
1	D	173/207 (84%)	171 (99%)	2 (1%)	71	81
1	E	183/207 (88%)	178 (97%)	5 (3%)	44	59
1	F	177/207 (86%)	172 (97%)	5 (3%)	43	58
All	All	1094/1242 (88%)	1066 (97%)	28 (3%)	46	61

All (28) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	170	SER
1	A	216	GLN

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Mol	Chain	Res	Type
1	A	218	LEU
1	A	232	MET
1	A	258	ILE
1	B	103	MET
1	B	170	SER
1	B	216	GLN
1	B	218	LEU
1	B	232	MET
1	B	258	ILE
1	C	170	SER
1	C	200	SER
1	C	218	LEU
1	C	232	MET
1	C	258	ILE
1	D	170	SER
1	D	258	ILE
1	E	170	SER
1	E	207	LEU
1	E	218	LEU
1	E	232	MET
1	E	258	ILE
1	F	170	SER
1	F	214	GLN
1	F	218	LEU
1	F	232	MET
1	F	258	ILE

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (7) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	66	GLN
1	B	35	GLN
1	B	66	GLN
1	C	66	GLN
1	D	66	GLN
1	E	100	GLN
1	F	66	GLN

### 5.3.3 RNA

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 monosaccharides in this entry.

## 5.6 Ligand geometry [i](#)

6 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	9JM	C	300	-	62,73,73	1.94	12 (19%)	77,110,110	1.58	12 (15%)
2	9JM	E	300	-	42,48,73	1.81	7 (16%)	50,73,110	1.39	7 (14%)
2	9JM	D	300	-	42,48,73	1.57	6 (14%)	50,73,110	1.47	4 (8%)
2	9JM	B	300	-	52,58,73	1.94	12 (23%)	62,85,110	1.58	10 (16%)
2	9JM	A	300	-	52,58,73	1.66	10 (19%)	62,85,110	1.32	3 (4%)
2	9JM	F	300	-	42,48,73	1.92	10 (23%)	50,73,110	1.32	5 (10%)

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	9JM	C	300	-	-	9/35/88/88	0/8/8/8
2	9JM	E	300	-	-	10/26/62/88	0/5/5/8
2	9JM	D	300	-	-	11/26/62/88	0/5/5/8
2	9JM	B	300	-	-	13/29/65/88	0/6/6/8
2	9JM	A	300	-	-	12/29/65/88	0/6/6/8
2	9JM	F	300	-	-	9/26/62/88	0/5/5/8

All (57) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	C	300	9JM	C20-C23	-7.63	1.27	1.44
2	B	300	9JM	O4D-C1D	6.32	1.49	1.41
2	E	300	9JM	C7N-N7N	6.19	1.44	1.33
2	C	300	9JM	C4-C5	-5.59	1.33	1.40
2	A	300	9JM	C7N-N7N	5.52	1.43	1.33
2	F	300	9JM	C6N-N1N	5.32	1.48	1.35
2	D	300	9JM	C6N-N1N	4.58	1.46	1.35
2	B	300	9JM	C6A-N6A	4.57	1.50	1.34
2	A	300	9JM	C6N-N1N	4.52	1.46	1.35
2	F	300	9JM	C6A-N6A	4.51	1.50	1.34
2	C	300	9JM	C6N-N1N	4.47	1.46	1.35
2	E	300	9JM	C6N-N1N	4.45	1.46	1.35
2	B	300	9JM	C7N-N7N	4.36	1.41	1.33
2	C	300	9JM	C7N-N7N	4.02	1.40	1.33
2	C	300	9JM	C6A-N6A	4.00	1.48	1.34
2	F	300	9JM	C7N-N7N	4.00	1.40	1.33
2	D	300	9JM	C7N-N7N	3.98	1.40	1.33
2	D	300	9JM	C6A-N6A	3.97	1.48	1.34
2	B	300	9JM	C6N-N1N	3.93	1.45	1.35
2	B	300	9JM	C3N-C7N	-3.89	1.44	1.50
2	F	300	9JM	O4D-C1D	3.76	1.46	1.41
2	E	300	9JM	C6A-N6A	3.69	1.47	1.34
2	E	300	9JM	C6N-C5N	3.64	1.46	1.38
2	F	300	9JM	C6N-C5N	3.54	1.46	1.38
2	A	300	9JM	C6A-N6A	3.52	1.46	1.34
2	F	300	9JM	C2D-C1D	-3.52	1.48	1.53
2	E	300	9JM	C4A-N3A	-3.31	1.31	1.35
2	A	300	9JM	C18-C1	3.28	1.52	1.45
2	B	300	9JM	O4-C17	3.28	1.43	1.36
2	C	300	9JM	C2A-N3A	3.25	1.37	1.32
2	B	300	9JM	C6N-C5N	3.19	1.45	1.38
2	B	300	9JM	O4B-C1B	3.18	1.45	1.41
2	A	300	9JM	C6N-C5N	2.95	1.45	1.38
2	F	300	9JM	C8A-N7A	2.92	1.39	1.34
2	C	300	9JM	C12-C5	-2.82	1.36	1.40
2	F	300	9JM	C2A-N3A	2.79	1.36	1.32
2	B	300	9JM	C8A-N7A	2.79	1.39	1.34
2	F	300	9JM	C2B-C1B	-2.78	1.49	1.53
2	E	300	9JM	C3N-C7N	2.73	1.54	1.50
2	A	300	9JM	O4B-C1B	2.62	1.44	1.41
2	D	300	9JM	C6N-C5N	2.61	1.44	1.38
2	B	300	9JM	C2D-C3D	-2.50	1.46	1.53

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	300	9JM	C5A-N7A	-2.47	1.30	1.39
2	B	300	9JM	C3B-C2B	-2.45	1.46	1.53
2	C	300	9JM	C6N-C5N	2.44	1.44	1.38
2	C	300	9JM	O4D-C1D	2.43	1.44	1.41
2	A	300	9JM	C2D-C3D	-2.42	1.46	1.53
2	A	300	9JM	O4-C17	2.40	1.41	1.36
2	D	300	9JM	C2A-N3A	2.33	1.35	1.32
2	E	300	9JM	C2D-C3D	-2.26	1.47	1.53
2	D	300	9JM	C6A-C5A	2.16	1.51	1.43
2	F	300	9JM	C2A-N1A	2.13	1.37	1.33
2	A	300	9JM	C2A-N1A	2.12	1.37	1.33
2	C	300	9JM	O4D-C4D	2.10	1.49	1.45
2	C	300	9JM	C15-C4	-2.09	1.35	1.39
2	C	300	9JM	C1-N2	-2.06	1.23	1.27
2	B	300	9JM	C18-C17	-2.06	1.37	1.40

All (41) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	300	9JM	O6-N2-C1	5.06	120.80	111.86
2	D	300	9JM	C5N-C6N-N1N	-4.78	113.54	120.40
2	C	300	9JM	C5N-C6N-N1N	-4.76	113.57	120.40
2	E	300	9JM	C5N-C6N-N1N	-4.70	113.66	120.40
2	B	300	9JM	C5N-C6N-N1N	-4.53	113.90	120.40
2	F	300	9JM	C5N-C6N-N1N	-4.52	113.92	120.40
2	B	300	9JM	O6-N2-C1	4.39	119.61	111.86
2	E	300	9JM	N3A-C2A-N1A	-4.33	121.90	128.68
2	A	300	9JM	C5N-C6N-N1N	-4.32	114.21	120.40
2	C	300	9JM	N3A-C2A-N1A	-4.29	121.98	128.68
2	C	300	9JM	C17-O4-C14	4.26	128.63	118.00
2	C	300	9JM	O6-N2-C1	4.23	119.33	111.86
2	B	300	9JM	N3A-C2A-N1A	-4.22	122.09	128.68
2	A	300	9JM	N3A-C2A-N1A	-4.16	122.17	128.68
2	F	300	9JM	N3A-C2A-N1A	-4.03	122.39	128.68
2	C	300	9JM	C13-C12-C5	-3.87	118.12	122.85
2	D	300	9JM	N3A-C2A-N1A	-3.80	122.74	128.68
2	D	300	9JM	C3N-C7N-N7N	3.25	121.65	117.75
2	D	300	9JM	C4A-C5A-N7A	-3.12	106.15	109.40
2	B	300	9JM	O4B-C1B-C2B	-3.03	102.50	106.93
2	F	300	9JM	PN-O3-PA	-3.01	122.51	132.83
2	C	300	9JM	O4B-C1B-C2B	-2.94	102.62	106.93
2	C	300	9JM	C12-C5-C4	2.89	121.42	117.66

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	E	300	9JM	O4D-C1D-C2D	-2.72	102.95	106.93
2	B	300	9JM	PN-O3-PA	-2.71	123.54	132.83
2	E	300	9JM	C1B-N9A-C4A	-2.62	122.05	126.64
2	F	300	9JM	C4A-C5A-N7A	-2.54	106.76	109.40
2	B	300	9JM	C17-C18-C1	-2.49	118.14	121.71
2	B	300	9JM	C4A-C5A-N7A	-2.49	106.80	109.40
2	B	300	9JM	C2N-C3N-C4N	2.47	121.06	118.26
2	E	300	9JM	C4A-C5A-N7A	-2.41	106.89	109.40
2	C	300	9JM	C3N-C7N-N7N	2.35	120.56	117.75
2	B	300	9JM	C1B-N9A-C4A	-2.24	122.70	126.64
2	B	300	9JM	C3N-C7N-N7N	2.22	120.42	117.75
2	C	300	9JM	C6N-C5N-C4N	2.14	122.55	119.44
2	C	300	9JM	C4A-C5A-N7A	-2.12	107.19	109.40
2	F	300	9JM	C2N-C3N-C4N	2.11	120.65	118.26
2	C	300	9JM	C19-C18-C1	2.07	122.65	119.59
2	C	300	9JM	C17-C18-C1	-2.04	117.39	120.33
2	E	300	9JM	C6N-C5N-C4N	2.02	122.38	119.44
2	E	300	9JM	PN-O3-PA	-2.01	125.94	132.83

There are no chirality outliers.

All (64) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	C	300	9JM	C5B-O5B-PA-O2A
2	C	300	9JM	C5D-O5D-PN-O1N
2	C	300	9JM	C5D-O5D-PN-O2N
2	C	300	9JM	O4D-C1D-N1N-C2N
2	E	300	9JM	C5B-O5B-PA-O2A
2	E	300	9JM	C5B-O5B-PA-O1A
2	E	300	9JM	C5D-O5D-PN-O1N
2	E	300	9JM	C5D-O5D-PN-O2N
2	E	300	9JM	O4D-C1D-N1N-C2N
2	D	300	9JM	C5B-O5B-PA-O2A
2	D	300	9JM	C5B-O5B-PA-O1A
2	D	300	9JM	PA-O3-PN-O5D
2	D	300	9JM	C5D-O5D-PN-O2N
2	D	300	9JM	O4D-C1D-N1N-C2N
2	B	300	9JM	C5D-O5D-PN-O1N
2	B	300	9JM	C5D-O5D-PN-O2N
2	B	300	9JM	O4D-C1D-N1N-C2N
2	B	300	9JM	O4D-C1D-N1N-C6N
2	B	300	9JM	C2D-C1D-N1N-C2N

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Mol	Chain	Res	Type	Atoms
2	B	300	9JM	C2D-C1D-N1N-C6N
2	A	300	9JM	C5B-O5B-PA-O2A
2	A	300	9JM	PN-O3-PA-O5B
2	A	300	9JM	C5D-O5D-PN-O1N
2	A	300	9JM	C5D-O5D-PN-O2N
2	A	300	9JM	O4D-C1D-N1N-C2N
2	A	300	9JM	O4D-C1D-N1N-C6N
2	A	300	9JM	C2D-C1D-N1N-C6N
2	F	300	9JM	C5B-O5B-PA-O2A
2	F	300	9JM	PN-O3-PA-O5B
2	F	300	9JM	C5D-O5D-PN-O1N
2	F	300	9JM	C5D-O5D-PN-O2N
2	F	300	9JM	O4D-C1D-N1N-C2N
2	E	300	9JM	O4B-C4B-C5B-O5B
2	E	300	9JM	C3B-C4B-C5B-O5B
2	B	300	9JM	C4N-C3N-C7N-O7N
2	B	300	9JM	C4N-C3N-C7N-N7N
2	B	300	9JM	C2N-C3N-C7N-O7N
2	B	300	9JM	C2N-C3N-C7N-N7N
2	C	300	9JM	PN-O3-PA-O5B
2	E	300	9JM	PN-O3-PA-O5B
2	C	300	9JM	C5D-O5D-PN-O3
2	B	300	9JM	C5D-O5D-PN-O3
2	A	300	9JM	C5D-O5D-PN-O3
2	F	300	9JM	C5B-O5B-PA-O3
2	D	300	9JM	C5D-O5D-PN-O1N
2	D	300	9JM	O4B-C4B-C5B-O5B
2	D	300	9JM	PN-O3-PA-O5B
2	B	300	9JM	PN-O3-PA-O5B
2	D	300	9JM	C4B-C5B-O5B-PA
2	B	300	9JM	O4B-C4B-C5B-O5B
2	E	300	9JM	C5B-O5B-PA-O3
2	E	300	9JM	C5D-O5D-PN-O3
2	D	300	9JM	C5B-O5B-PA-O3
2	D	300	9JM	C5D-O5D-PN-O3
2	A	300	9JM	C5B-O5B-PA-O3
2	A	300	9JM	C2D-C1D-N1N-C2N
2	F	300	9JM	C5D-O5D-PN-O3
2	A	300	9JM	O4B-C4B-C5B-O5B
2	F	300	9JM	O4B-C4B-C5B-O5B
2	C	300	9JM	C5B-O5B-PA-O1A
2	A	300	9JM	C5B-O5B-PA-O1A

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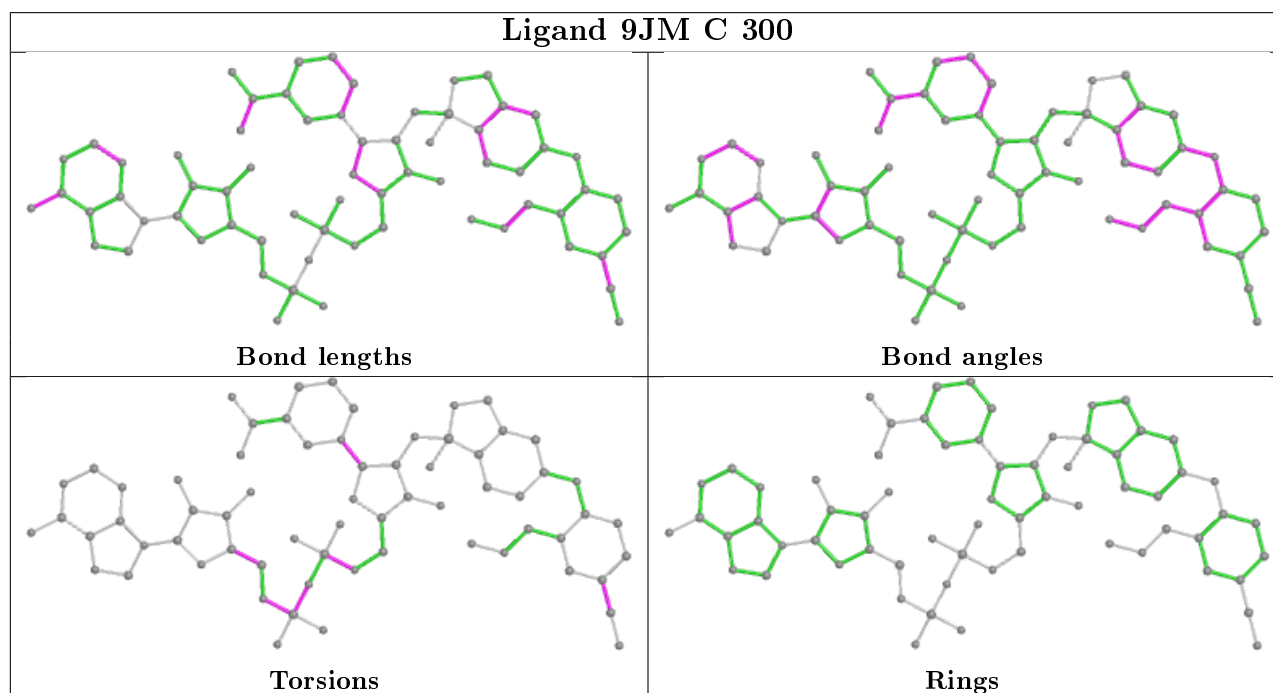
Mol	Chain	Res	Type	Atoms
2	F	300	9JM	C5B-O5B-PA-O1A
2	C	300	9JM	O4B-C4B-C5B-O5B
2	C	300	9JM	C19-C20-C23-N7

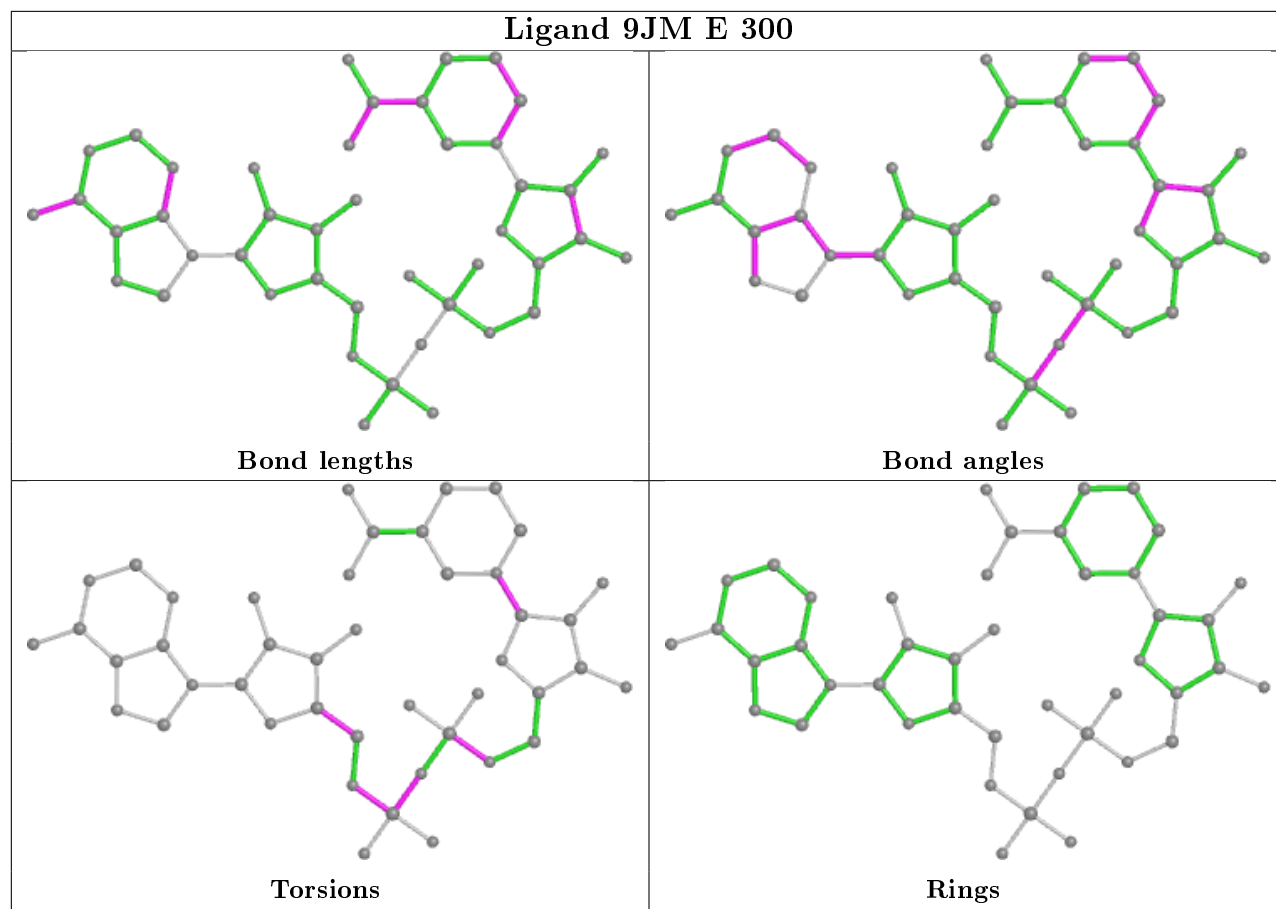
There are no ring outliers.

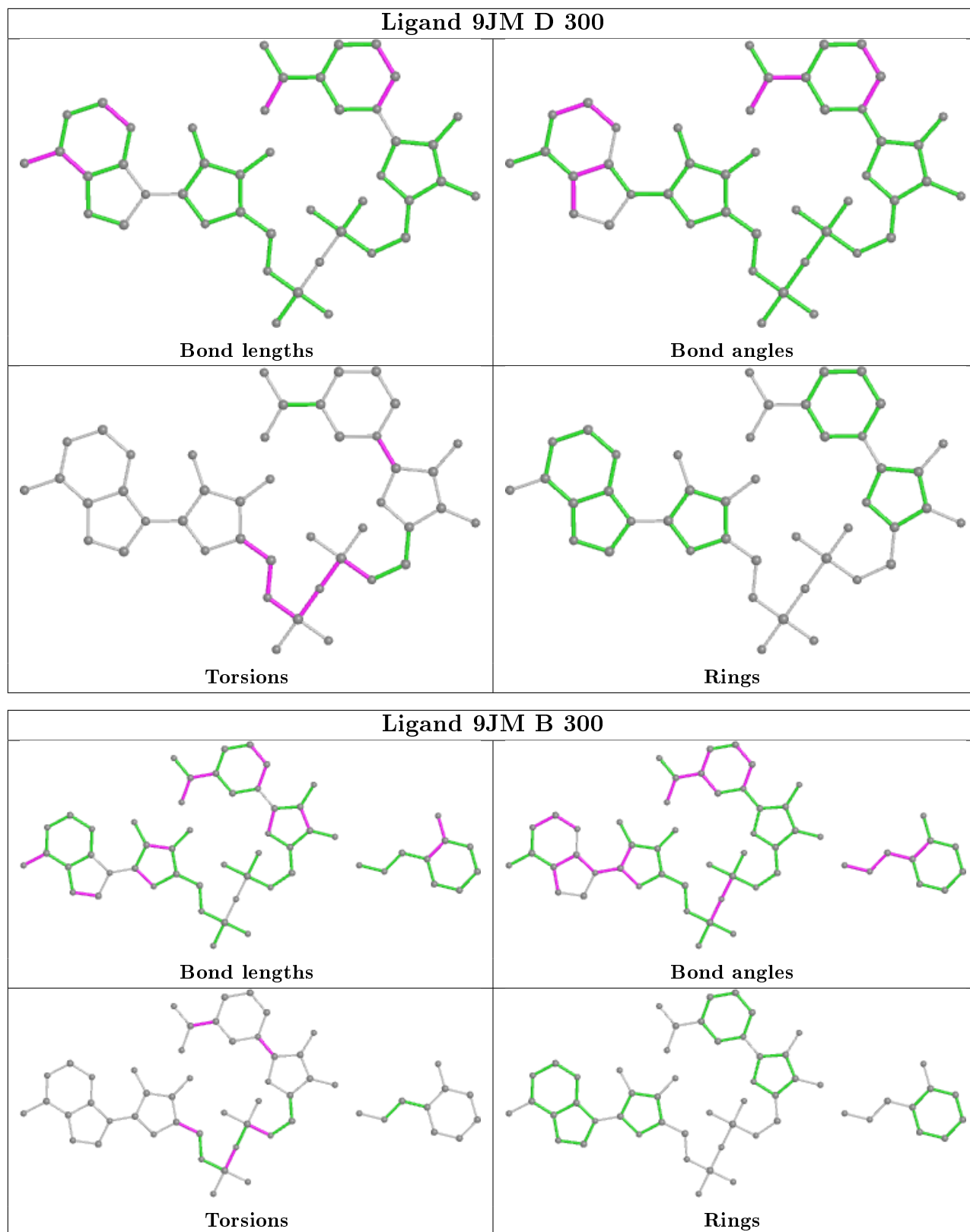
3 monomers are involved in 4 short contacts:

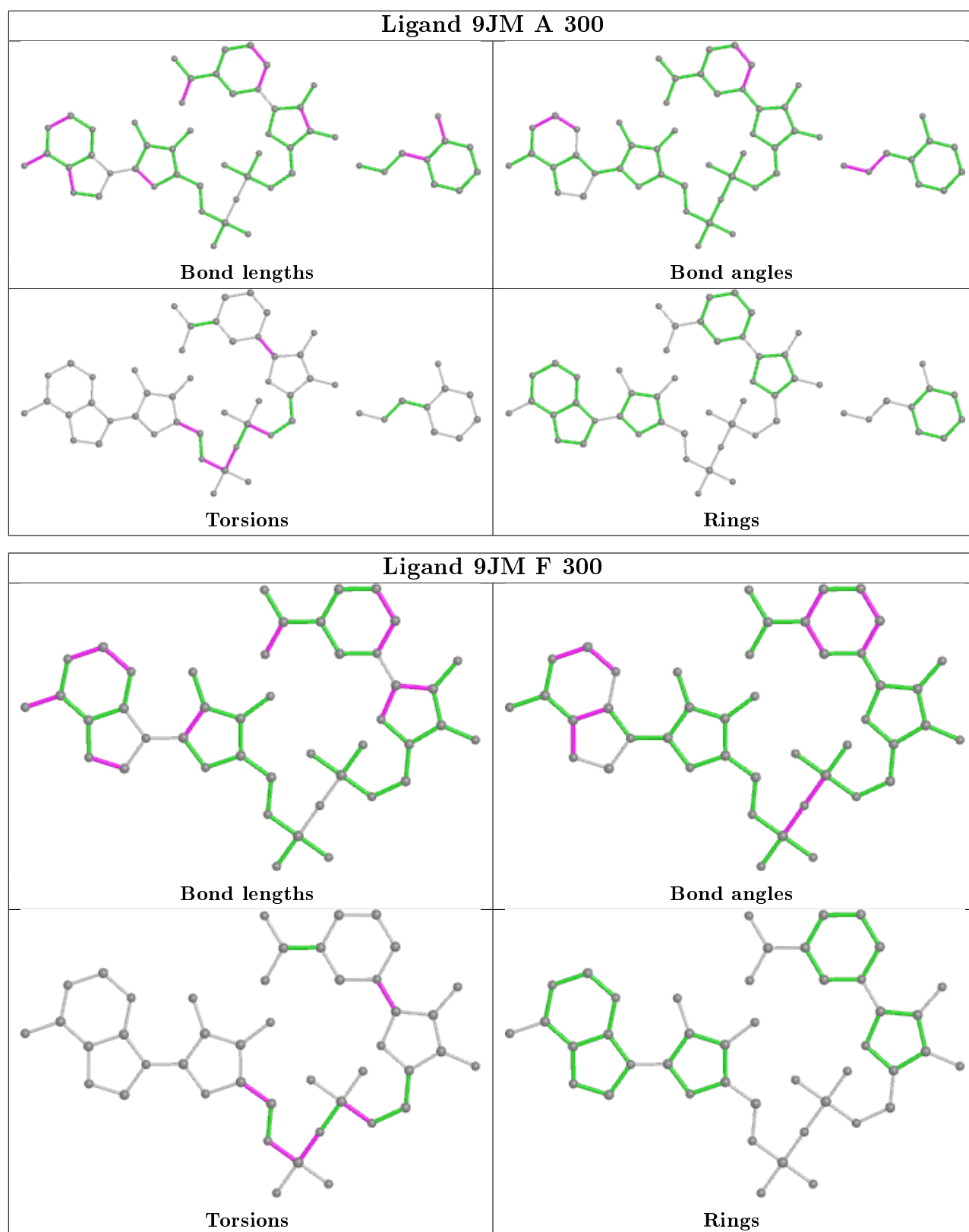
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	C	300	9JM	1	0
2	E	300	9JM	1	0
2	F	300	9JM	2	0

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

There are no chain breaks in this entry.



## 6 Fit of model and data

### 6.1 Protein, DNA and RNA chains

In the following table, the column labelled ‘#RSRZ> 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 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	268/272 (98%)	-0.12	2 (0%) 87 90	10, 22, 42, 51	0
1	B	267/272 (98%)	0.09	1 (0%) 92 96	11, 24, 48, 62	0
1	C	261/272 (95%)	0.21	2 (0%) 86 89	14, 27, 42, 63	0
1	D	249/272 (91%)	0.31	7 (2%) 53 60	16, 33, 54, 63	0
1	E	268/272 (98%)	0.41	14 (5%) 27 32	16, 32, 54, 76	0
1	F	267/272 (98%)	0.54	19 (7%) 16 19	19, 38, 59, 77	0
All	All	1580/1632 (96%)	0.24	45 (2%) 53 60	10, 29, 53, 77	0

All (45) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	84	ALA	3.9
1	F	81	ALA	3.8
1	E	74	LEU	3.6
1	E	2	THR	3.2
1	F	57	LYS	3.2
1	F	55	PRO	3.2
1	E	249	TRP	3.2
1	E	86	ASN	3.2
1	D	42	ASP	3.1
1	F	56	ALA	3.0
1	E	43	ARG	3.0
1	F	23	PHE	3.0
1	C	85	GLY	3.0
1	F	10	ILE	3.0
1	E	80	GLU	2.9
1	F	86	ASN	2.9
1	F	85	GLY	2.8
1	F	50	ILE	2.8
1	F	82	ILE	2.8

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Mol	Chain	Res	Type	RSRZ
1	D	23	PHE	2.7
1	C	157	ALA	2.7
1	F	7	GLY	2.7
1	A	42	ASP	2.6
1	F	58	ALA	2.5
1	F	204	GLY	2.5
1	F	49	ARG	2.5
1	E	47	ILE	2.4
1	F	51	THR	2.4
1	D	72	ALA	2.4
1	D	44	LEU	2.3
1	A	2	THR	2.3
1	D	4	LEU	2.3
1	E	75	ALA	2.2
1	F	46	LEU	2.2
1	F	83	GLY	2.2
1	E	83	GLY	2.2
1	D	197	LEU	2.2
1	F	48	GLN	2.2
1	E	72	ALA	2.1
1	F	47	ILE	2.1
1	D	84	ALA	2.1
1	E	50	ILE	2.1
1	E	141	GLY	2.1
1	E	41	PHE	2.0
1	E	45	ARG	2.0

## 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](#)

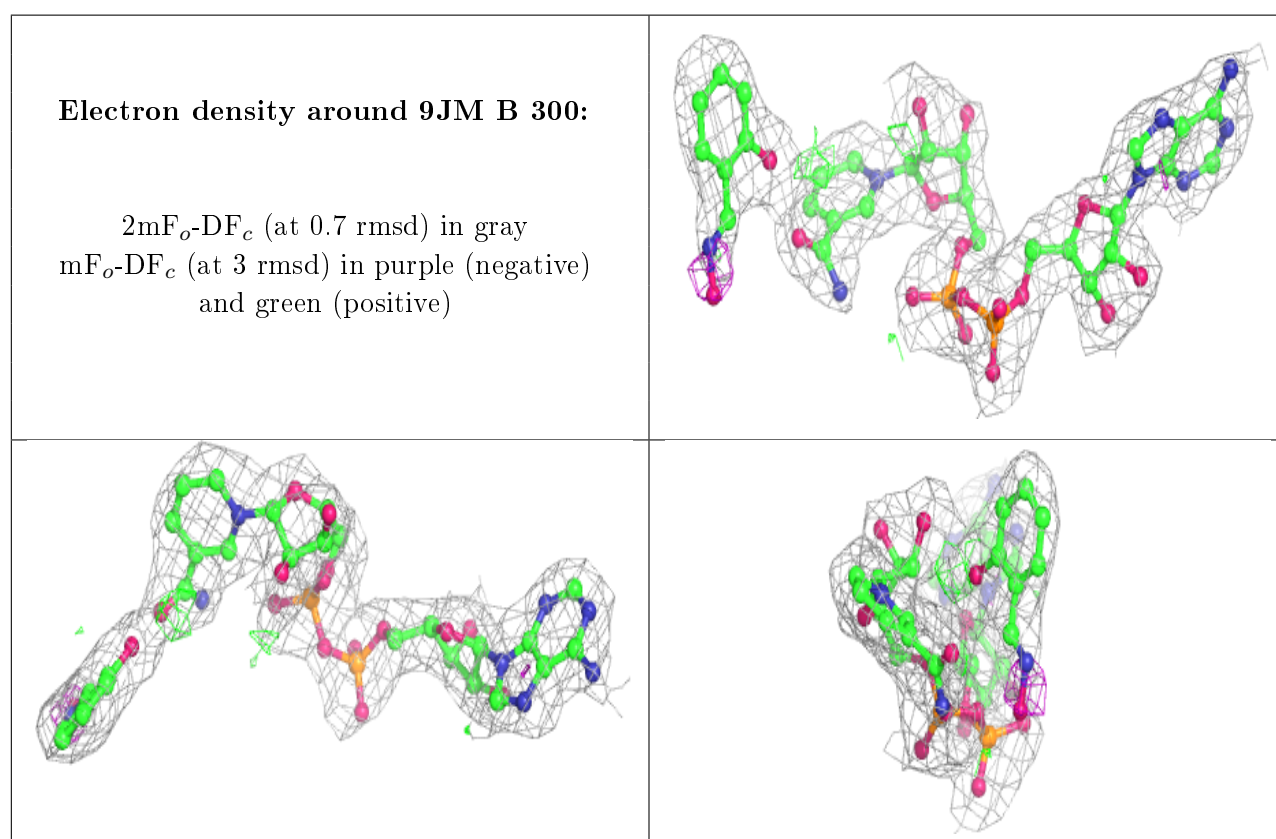
There are no monosaccharides in this entry.

## 6.4 Ligands [i](#)

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

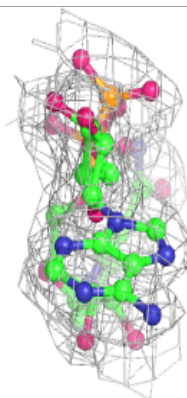
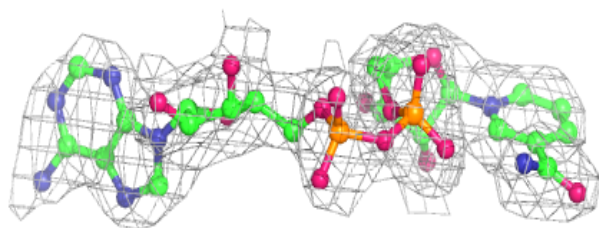
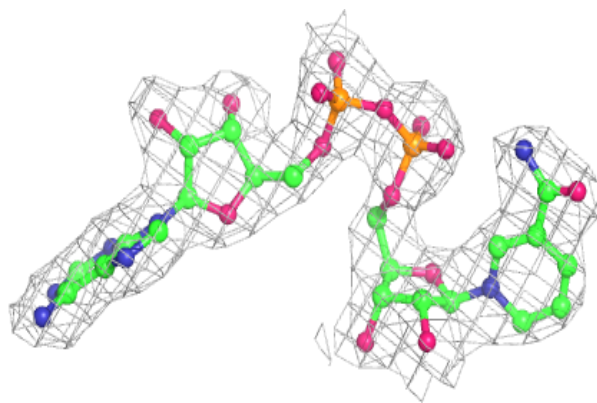
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors( $\text{\AA}^2$ )	Q<0.9
2	9JM	B	300	54/66	0.93	0.16	20,28,32,37	0
2	9JM	D	300	44/66	0.94	0.14	27,30,32,32	0
2	9JM	E	300	44/66	0.94	0.16	24,27,28,29	0
2	9JM	F	300	44/66	0.94	0.15	25,35,38,40	0
2	9JM	A	300	54/66	0.95	0.14	19,23,33,35	0
2	9JM	C	300	66/66	0.95	0.16	18,23,31,34	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.

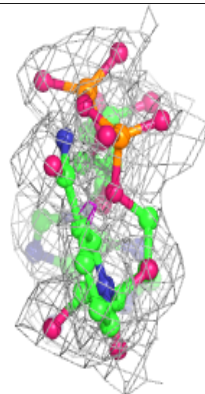
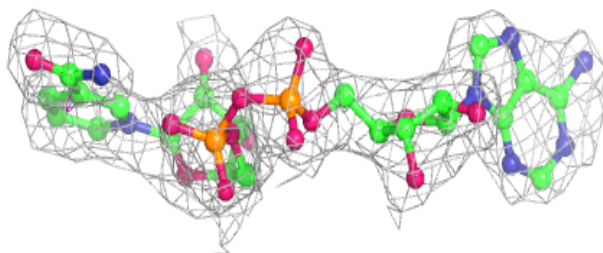
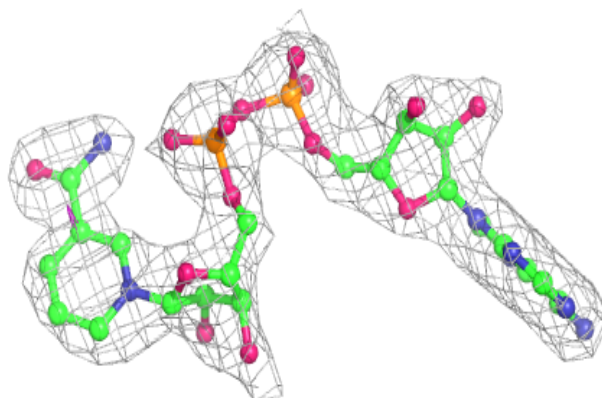


**Electron density around 9JM D 300:**

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

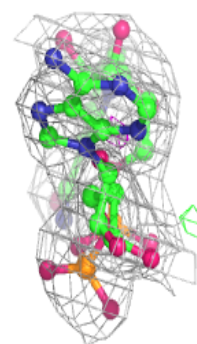
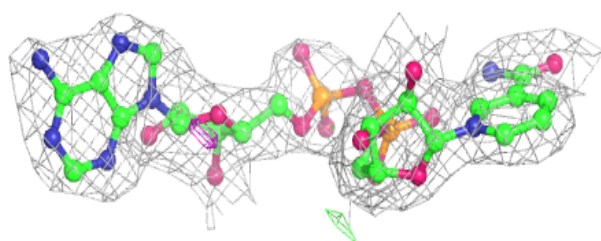
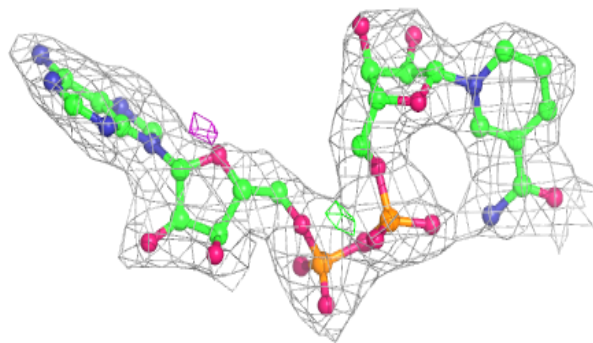
**Electron density around 9JM E 300:**

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

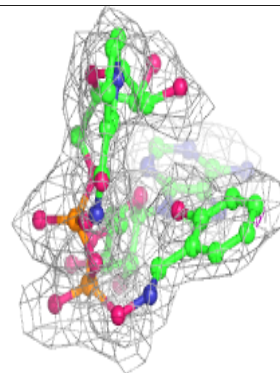
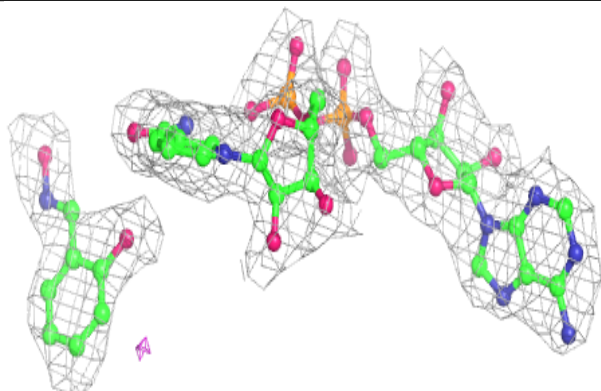
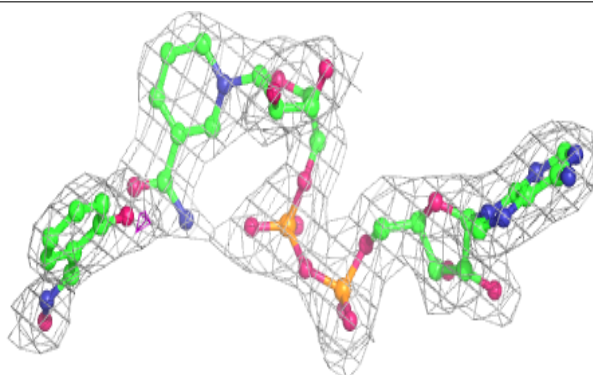


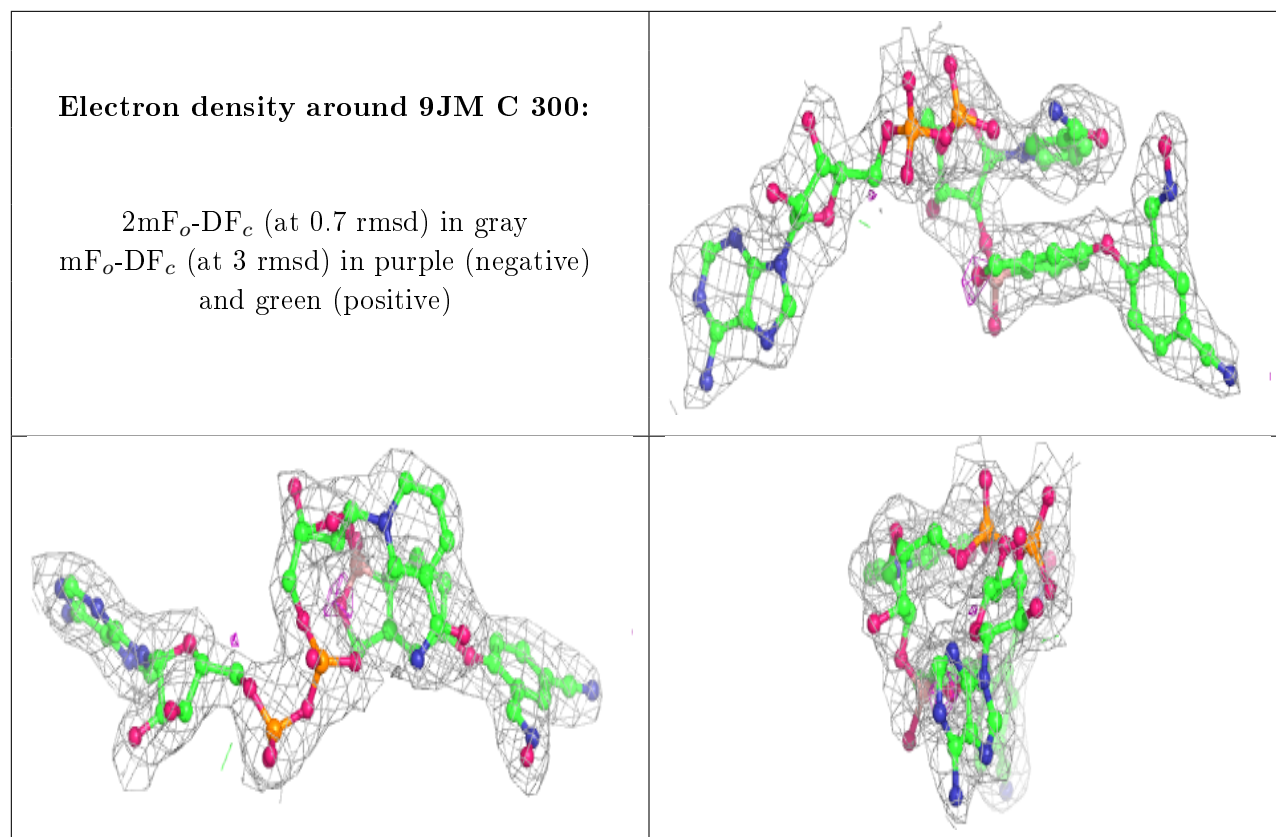
**Electron density around 9JM F 300:**

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

**Electron density around 9JM A 300:**

$2mF_o-DF_c$  (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.