



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 9, 2026 – 05:32 PM UTC

PDB ID : 7XYE / pdb_00007xye
Title : The apo structure of Orf1
Authors : Wang, Y.L.; Li, T.L.
Deposited on : 2022-06-01
Resolution : 2.48 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

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

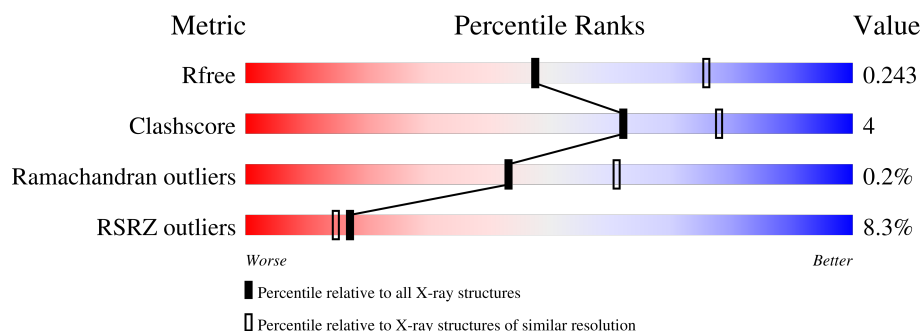
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.48 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	7589 (2.50-2.46)
Clashscore	190562	8295 (2.50-2.46)
Ramachandran outliers	187476	8164 (2.50-2.46)
RSRZ outliers	180081	7593 (2.50-2.46)

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	512	4% 86% 8% 6%
1	B	512	3% 87% 7% 6%
1	C	512	4% 86% 8% 6%
1	D	512	20% 83% 10% 6%
1	E	512	4% 85% 9% 6%
1	F	512	4% 86% 8% 6%

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Mol	Chain	Length	Quality of chain
1	G	512	5% 87% 7% 6%
1	H	512	19% 84% 10% 6%

2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 30371 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 N-formimidoyl fortimicin A synthase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	481	Total	C	N	O	S	0	0	0
			3645	2288	658	687	12			
1	B	482	Total	C	N	O	S	0	0	0
			3654	2293	660	689	12			
1	C	482	Total	C	N	O	S	0	2	0
			3668	2301	662	691	14			
1	D	479	Total	C	N	O	S	0	1	0
			3638	2285	657	683	13			
1	E	481	Total	C	N	O	S	0	0	0
			3645	2288	658	687	12			
1	F	482	Total	C	N	O	S	0	0	0
			3654	2293	660	689	12			
1	G	482	Total	C	N	O	S	0	1	0
			3662	2298	661	690	13			
1	H	479	Total	C	N	O	S	0	1	0
			3638	2285	657	683	13			

There are 168 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-20	MET	-	initiating methionine	UNP A0A125SZC1
A	-19	GLY	-	expression tag	UNP A0A125SZC1
A	-18	SER	-	expression tag	UNP A0A125SZC1
A	-17	SER	-	expression tag	UNP A0A125SZC1
A	-16	HIS	-	expression tag	UNP A0A125SZC1
A	-15	HIS	-	expression tag	UNP A0A125SZC1
A	-14	HIS	-	expression tag	UNP A0A125SZC1
A	-13	HIS	-	expression tag	UNP A0A125SZC1
A	-12	HIS	-	expression tag	UNP A0A125SZC1
A	-11	HIS	-	expression tag	UNP A0A125SZC1
A	-10	SER	-	expression tag	UNP A0A125SZC1
A	-9	SER	-	expression tag	UNP A0A125SZC1
A	-8	GLY	-	expression tag	UNP A0A125SZC1

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Chain	Residue	Modelled	Actual	Comment	Reference
A	-7	LEU	-	expression tag	UNP A0A125SZC1
A	-6	VAL	-	expression tag	UNP A0A125SZC1
A	-5	PRO	-	expression tag	UNP A0A125SZC1
A	-4	ARG	-	expression tag	UNP A0A125SZC1
A	-3	GLY	-	expression tag	UNP A0A125SZC1
A	-2	SER	-	expression tag	UNP A0A125SZC1
A	-1	HIS	-	expression tag	UNP A0A125SZC1
A	0	MET	-	expression tag	UNP A0A125SZC1
B	-20	MET	-	initiating methionine	UNP A0A125SZC1
B	-19	GLY	-	expression tag	UNP A0A125SZC1
B	-18	SER	-	expression tag	UNP A0A125SZC1
B	-17	SER	-	expression tag	UNP A0A125SZC1
B	-16	HIS	-	expression tag	UNP A0A125SZC1
B	-15	HIS	-	expression tag	UNP A0A125SZC1
B	-14	HIS	-	expression tag	UNP A0A125SZC1
B	-13	HIS	-	expression tag	UNP A0A125SZC1
B	-12	HIS	-	expression tag	UNP A0A125SZC1
B	-11	HIS	-	expression tag	UNP A0A125SZC1
B	-10	SER	-	expression tag	UNP A0A125SZC1
B	-9	SER	-	expression tag	UNP A0A125SZC1
B	-8	GLY	-	expression tag	UNP A0A125SZC1
B	-7	LEU	-	expression tag	UNP A0A125SZC1
B	-6	VAL	-	expression tag	UNP A0A125SZC1
B	-5	PRO	-	expression tag	UNP A0A125SZC1
B	-4	ARG	-	expression tag	UNP A0A125SZC1
B	-3	GLY	-	expression tag	UNP A0A125SZC1
B	-2	SER	-	expression tag	UNP A0A125SZC1
B	-1	HIS	-	expression tag	UNP A0A125SZC1
B	0	MET	-	expression tag	UNP A0A125SZC1
C	-20	MET	-	initiating methionine	UNP A0A125SZC1
C	-19	GLY	-	expression tag	UNP A0A125SZC1
C	-18	SER	-	expression tag	UNP A0A125SZC1
C	-17	SER	-	expression tag	UNP A0A125SZC1
C	-16	HIS	-	expression tag	UNP A0A125SZC1
C	-15	HIS	-	expression tag	UNP A0A125SZC1
C	-14	HIS	-	expression tag	UNP A0A125SZC1
C	-13	HIS	-	expression tag	UNP A0A125SZC1
C	-12	HIS	-	expression tag	UNP A0A125SZC1
C	-11	HIS	-	expression tag	UNP A0A125SZC1
C	-10	SER	-	expression tag	UNP A0A125SZC1
C	-9	SER	-	expression tag	UNP A0A125SZC1
C	-8	GLY	-	expression tag	UNP A0A125SZC1

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Chain	Residue	Modelled	Actual	Comment	Reference
C	-7	LEU	-	expression tag	UNP A0A125SZC1
C	-6	VAL	-	expression tag	UNP A0A125SZC1
C	-5	PRO	-	expression tag	UNP A0A125SZC1
C	-4	ARG	-	expression tag	UNP A0A125SZC1
C	-3	GLY	-	expression tag	UNP A0A125SZC1
C	-2	SER	-	expression tag	UNP A0A125SZC1
C	-1	HIS	-	expression tag	UNP A0A125SZC1
C	0	MET	-	expression tag	UNP A0A125SZC1
D	-20	MET	-	initiating methionine	UNP A0A125SZC1
D	-19	GLY	-	expression tag	UNP A0A125SZC1
D	-18	SER	-	expression tag	UNP A0A125SZC1
D	-17	SER	-	expression tag	UNP A0A125SZC1
D	-16	HIS	-	expression tag	UNP A0A125SZC1
D	-15	HIS	-	expression tag	UNP A0A125SZC1
D	-14	HIS	-	expression tag	UNP A0A125SZC1
D	-13	HIS	-	expression tag	UNP A0A125SZC1
D	-12	HIS	-	expression tag	UNP A0A125SZC1
D	-11	HIS	-	expression tag	UNP A0A125SZC1
D	-10	SER	-	expression tag	UNP A0A125SZC1
D	-9	SER	-	expression tag	UNP A0A125SZC1
D	-8	GLY	-	expression tag	UNP A0A125SZC1
D	-7	LEU	-	expression tag	UNP A0A125SZC1
D	-6	VAL	-	expression tag	UNP A0A125SZC1
D	-5	PRO	-	expression tag	UNP A0A125SZC1
D	-4	ARG	-	expression tag	UNP A0A125SZC1
D	-3	GLY	-	expression tag	UNP A0A125SZC1
D	-2	SER	-	expression tag	UNP A0A125SZC1
D	-1	HIS	-	expression tag	UNP A0A125SZC1
D	0	MET	-	expression tag	UNP A0A125SZC1
E	-20	MET	-	initiating methionine	UNP A0A125SZC1
E	-19	GLY	-	expression tag	UNP A0A125SZC1
E	-18	SER	-	expression tag	UNP A0A125SZC1
E	-17	SER	-	expression tag	UNP A0A125SZC1
E	-16	HIS	-	expression tag	UNP A0A125SZC1
E	-15	HIS	-	expression tag	UNP A0A125SZC1
E	-14	HIS	-	expression tag	UNP A0A125SZC1
E	-13	HIS	-	expression tag	UNP A0A125SZC1
E	-12	HIS	-	expression tag	UNP A0A125SZC1
E	-11	HIS	-	expression tag	UNP A0A125SZC1
E	-10	SER	-	expression tag	UNP A0A125SZC1
E	-9	SER	-	expression tag	UNP A0A125SZC1
E	-8	GLY	-	expression tag	UNP A0A125SZC1

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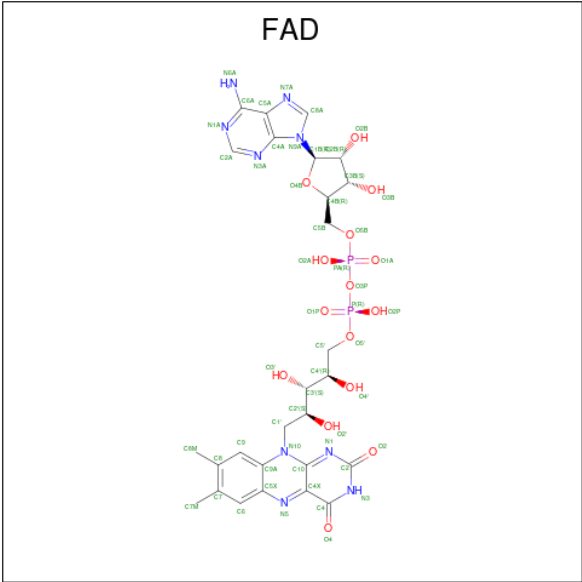
Chain	Residue	Modelled	Actual	Comment	Reference
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E	-6	VAL	-	expression tag	UNP A0A125SZC1
E	-5	PRO	-	expression tag	UNP A0A125SZC1
E	-4	ARG	-	expression tag	UNP A0A125SZC1
E	-3	GLY	-	expression tag	UNP A0A125SZC1
E	-2	SER	-	expression tag	UNP A0A125SZC1
E	-1	HIS	-	expression tag	UNP A0A125SZC1
E	0	MET	-	expression tag	UNP A0A125SZC1
F	-20	MET	-	initiating methionine	UNP A0A125SZC1
F	-19	GLY	-	expression tag	UNP A0A125SZC1
F	-18	SER	-	expression tag	UNP A0A125SZC1
F	-17	SER	-	expression tag	UNP A0A125SZC1
F	-16	HIS	-	expression tag	UNP A0A125SZC1
F	-15	HIS	-	expression tag	UNP A0A125SZC1
F	-14	HIS	-	expression tag	UNP A0A125SZC1
F	-13	HIS	-	expression tag	UNP A0A125SZC1
F	-12	HIS	-	expression tag	UNP A0A125SZC1
F	-11	HIS	-	expression tag	UNP A0A125SZC1
F	-10	SER	-	expression tag	UNP A0A125SZC1
F	-9	SER	-	expression tag	UNP A0A125SZC1
F	-8	GLY	-	expression tag	UNP A0A125SZC1
F	-7	LEU	-	expression tag	UNP A0A125SZC1
F	-6	VAL	-	expression tag	UNP A0A125SZC1
F	-5	PRO	-	expression tag	UNP A0A125SZC1
F	-4	ARG	-	expression tag	UNP A0A125SZC1
F	-3	GLY	-	expression tag	UNP A0A125SZC1
F	-2	SER	-	expression tag	UNP A0A125SZC1
F	-1	HIS	-	expression tag	UNP A0A125SZC1
F	0	MET	-	expression tag	UNP A0A125SZC1
G	-20	MET	-	initiating methionine	UNP A0A125SZC1
G	-19	GLY	-	expression tag	UNP A0A125SZC1
G	-18	SER	-	expression tag	UNP A0A125SZC1
G	-17	SER	-	expression tag	UNP A0A125SZC1
G	-16	HIS	-	expression tag	UNP A0A125SZC1
G	-15	HIS	-	expression tag	UNP A0A125SZC1
G	-14	HIS	-	expression tag	UNP A0A125SZC1
G	-13	HIS	-	expression tag	UNP A0A125SZC1
G	-12	HIS	-	expression tag	UNP A0A125SZC1
G	-11	HIS	-	expression tag	UNP A0A125SZC1
G	-10	SER	-	expression tag	UNP A0A125SZC1
G	-9	SER	-	expression tag	UNP A0A125SZC1
G	-8	GLY	-	expression tag	UNP A0A125SZC1

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Chain	Residue	Modelled	Actual	Comment	Reference
G	-7	LEU	-	expression tag	UNP A0A125SZC1
G	-6	VAL	-	expression tag	UNP A0A125SZC1
G	-5	PRO	-	expression tag	UNP A0A125SZC1
G	-4	ARG	-	expression tag	UNP A0A125SZC1
G	-3	GLY	-	expression tag	UNP A0A125SZC1
G	-2	SER	-	expression tag	UNP A0A125SZC1
G	-1	HIS	-	expression tag	UNP A0A125SZC1
G	0	MET	-	expression tag	UNP A0A125SZC1
H	-20	MET	-	initiating methionine	UNP A0A125SZC1
H	-19	GLY	-	expression tag	UNP A0A125SZC1
H	-18	SER	-	expression tag	UNP A0A125SZC1
H	-17	SER	-	expression tag	UNP A0A125SZC1
H	-16	HIS	-	expression tag	UNP A0A125SZC1
H	-15	HIS	-	expression tag	UNP A0A125SZC1
H	-14	HIS	-	expression tag	UNP A0A125SZC1
H	-13	HIS	-	expression tag	UNP A0A125SZC1
H	-12	HIS	-	expression tag	UNP A0A125SZC1
H	-11	HIS	-	expression tag	UNP A0A125SZC1
H	-10	SER	-	expression tag	UNP A0A125SZC1
H	-9	SER	-	expression tag	UNP A0A125SZC1
H	-8	GLY	-	expression tag	UNP A0A125SZC1
H	-7	LEU	-	expression tag	UNP A0A125SZC1
H	-6	VAL	-	expression tag	UNP A0A125SZC1
H	-5	PRO	-	expression tag	UNP A0A125SZC1
H	-4	ARG	-	expression tag	UNP A0A125SZC1
H	-3	GLY	-	expression tag	UNP A0A125SZC1
H	-2	SER	-	expression tag	UNP A0A125SZC1
H	-1	HIS	-	expression tag	UNP A0A125SZC1
H	0	MET	-	expression tag	UNP A0A125SZC1

- Molecule 2 is FLAVIN-ADENINE DINUCLEOTIDE (CCD ID: FAD) (formula: $C_{27}H_{33}N_9O_{15}P_2$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	A	1	Total	C	N	O	P	0	0
			53	27	9	15	2		
2	B	1	Total	C	N	O	P	0	0
			53	27	9	15	2		
2	C	1	Total	C	N	O	P	0	0
			53	27	9	15	2		
2	D	1	Total	C	N	O	P	0	0
			53	27	9	15	2		
2	E	1	Total	C	N	O	P	0	0
			53	27	9	15	2		
2	F	1	Total	C	N	O	P	0	0
			53	27	9	15	2		
2	G	1	Total	C	N	O	P	0	0
			53	27	9	15	2		
2	H	1	Total	C	N	O	P	0	0
			53	27	9	15	2		

- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	99	Total	O	0	0
			99	99		
3	B	111	Total	O	0	0
			111	111		
3	C	116	Total	O	0	0
			116	116		
3	D	49	Total	O	0	0
			49	49		

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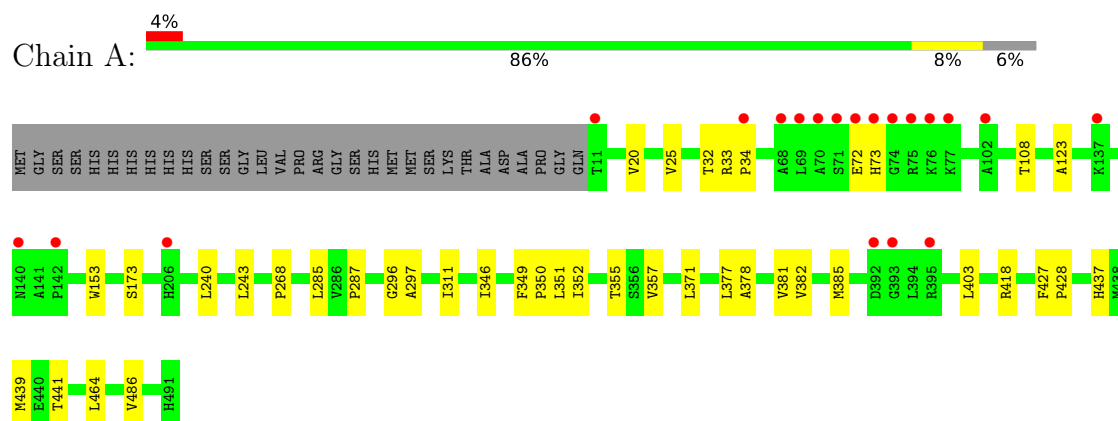
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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	E	98	Total 98	O 98	0	0
3	F	111	Total 111	O 111	0	0
3	G	105	Total 105	O 105	0	0
3	H	54	Total 54	O 54	0	0

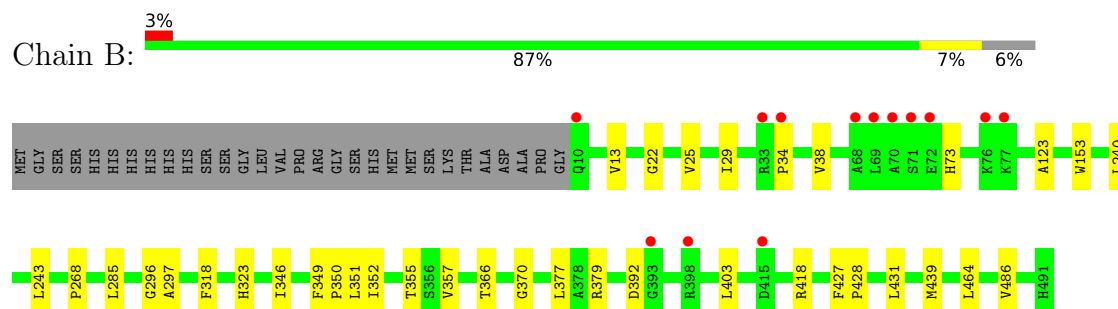
3 Residue-property plots [i](#)

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.

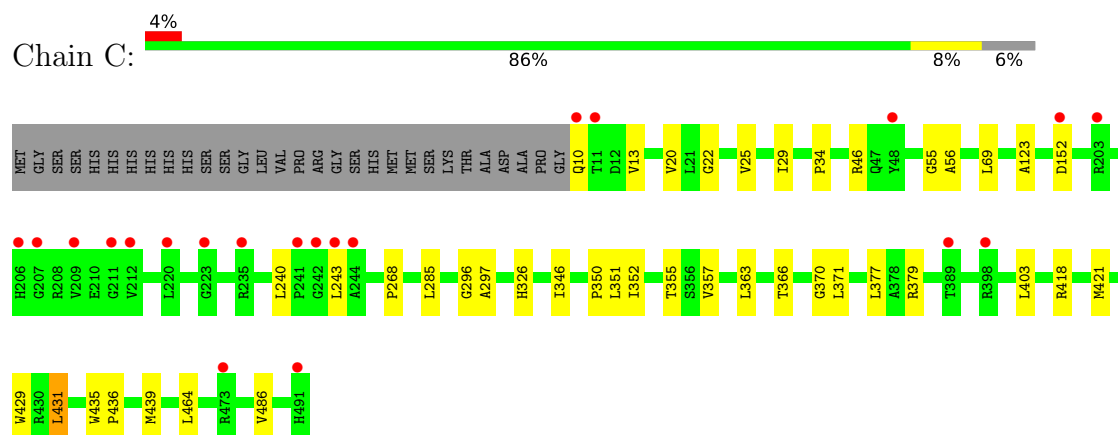
- Molecule 1: N-formimidoyl fortimicin A synthase



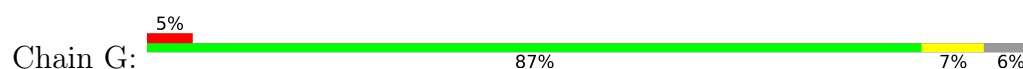
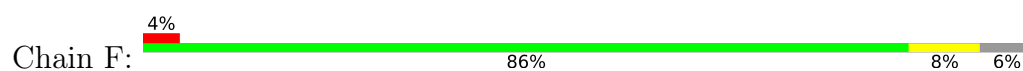
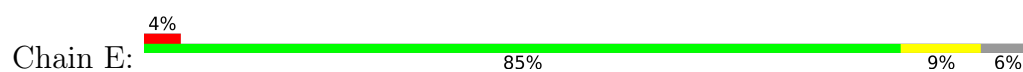
- Molecule 1: N-formimidoyl fortimicin A synthase

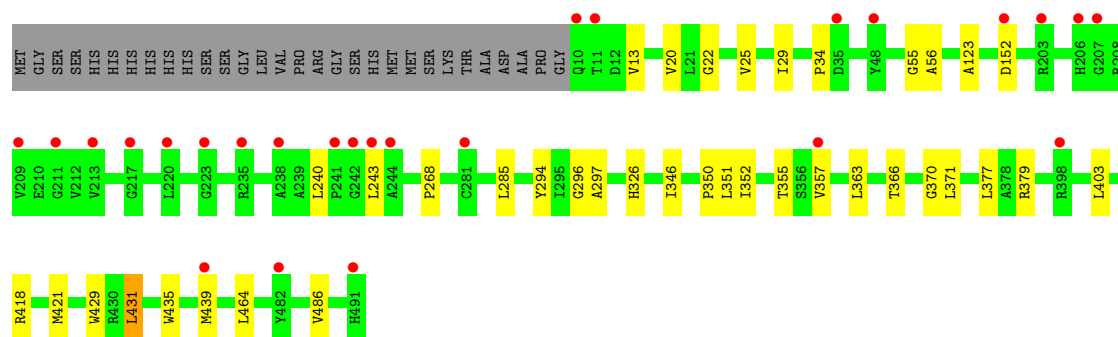


- Molecule 1: N-formimidoyl fortimicin A synthase

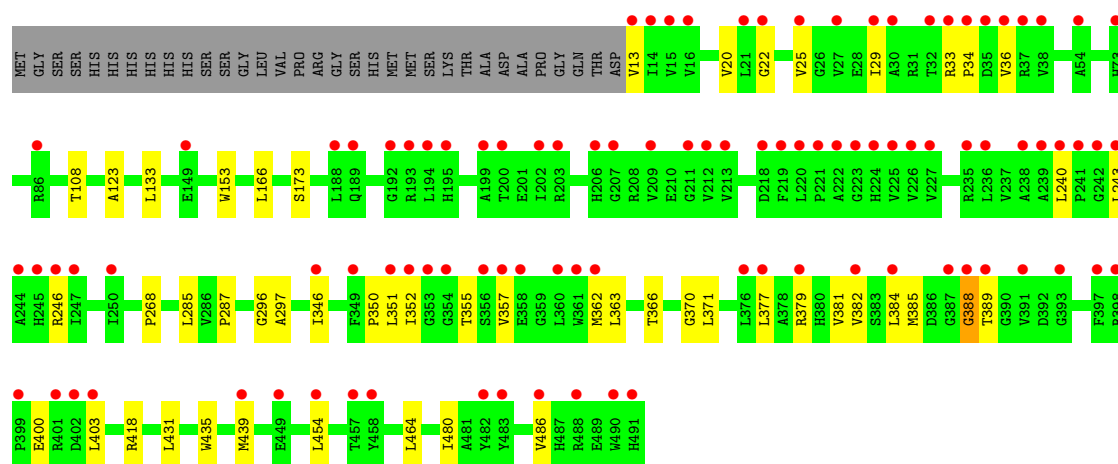
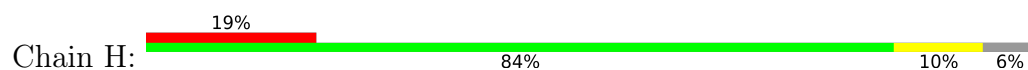


Chain D: 20% 83% 10% 6%





- Molecule 1: N-formimidoyl fortimicin A synthase



4 Data and refinement statistics

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, α , β , γ	103.69Å 108.51Å 134.91Å 90.12° 89.95° 83.75°	Depositor
Resolution (Å)	29.67 – 2.48 29.67 – 2.48	Depositor EDS
% Data completeness (in resolution range)	94.5 (29.67-2.48) 94.5 (29.67-2.48)	Depositor EDS
R_{merge}	0.06	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	3.27 (at 2.48Å)	Xtriage
Refinement program	REFMAC 5.8.0267	Depositor
R, R_{free}	0.220 , 0.247 (Not available) , 0.243	Depositor DCC
R_{free} test set	9567 reflections (4.63%)	wwPDB-VP
Wilson B-factor (Å ²)	34.3	Xtriage
Anisotropy	0.051	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.29 , 19.8	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	0.437 for -h,-k,l 0.007 for -k,-h,-l 0.008 for k,h,-l	Xtriage
F_o, F_c correlation	0.93	EDS
Total number of atoms	30371	wwPDB-VP
Average B, all atoms (Å ²)	44.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.36% 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

5.1 Standard geometry

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

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	1.02	0/3728	1.40	2/5080 (0.0%)
1	B	1.02	0/3737	1.39	3/5092 (0.1%)
1	C	1.04	2/3751 (0.1%)	1.40	3/5110 (0.1%)
1	D	1.01	0/3721	1.39	2/5069 (0.0%)
1	E	1.03	0/3728	1.41	3/5080 (0.1%)
1	F	1.02	0/3737	1.39	4/5092 (0.1%)
1	G	1.04	2/3745 (0.1%)	1.41	3/5102 (0.1%)
1	H	1.01	0/3721	1.40	4/5069 (0.1%)
All	All	1.02	4/29868 (0.0%)	1.40	24/40694 (0.1%)

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	C	431	LEU	N-CA	5.88	1.50	1.46
1	C	326	HIS	CE1-NE2	5.81	1.38	1.32
1	G	326	HIS	CE1-NE2	5.57	1.38	1.32
1	G	431	LEU	N-CA	5.16	1.49	1.46

All (24) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	G	152	ASP	CA-CB-CG	9.91	122.51	112.60
1	C	152	ASP	CA-CB-CG	9.75	122.35	112.60
1	F	434	GLU	CB-CG-CD	8.08	126.33	112.60
1	E	434	GLU	CB-CG-CD	6.33	123.37	112.60
1	F	392	ASP	CA-C-O	-5.54	115.19	121.00
1	H	388	GLY	CA-C-N	5.44	131.93	121.54
1	H	388	GLY	C-N-CA	5.44	131.93	121.54
1	B	392	ASP	CA-C-O	-5.41	115.32	121.00
1	E	34	PRO	CA-C-N	5.13	127.10	120.44

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	E	34	PRO	C-N-CA	5.13	127.10	120.44
1	D	34	PRO	CA-C-N	5.07	127.03	120.44
1	D	34	PRO	C-N-CA	5.07	127.03	120.44
1	G	34	PRO	CA-C-N	5.06	127.02	120.44
1	G	34	PRO	C-N-CA	5.06	127.02	120.44
1	A	34	PRO	CA-C-N	5.06	127.02	120.44
1	A	34	PRO	C-N-CA	5.06	127.02	120.44
1	F	34	PRO	CA-C-N	5.05	127.01	120.44
1	F	34	PRO	C-N-CA	5.05	127.01	120.44
1	H	34	PRO	CA-C-N	5.04	126.99	120.44
1	H	34	PRO	C-N-CA	5.04	126.99	120.44
1	C	34	PRO	CA-C-N	5.01	126.96	120.44
1	C	34	PRO	C-N-CA	5.01	126.96	120.44
1	B	34	PRO	CA-C-N	5.00	126.94	120.44
1	B	34	PRO	C-N-CA	5.00	126.94	120.44

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	3645	0	3576	28	0
1	B	3654	0	3584	24	0
1	C	3668	0	3596	32	0
1	D	3638	0	3573	38	0
1	E	3645	0	3576	30	0
1	F	3654	0	3584	26	0
1	G	3662	0	3592	31	0
1	H	3638	0	3573	42	0
2	A	53	0	31	1	0
2	B	53	0	31	1	0
2	C	53	0	31	0	0
2	D	53	0	31	1	0
2	E	53	0	31	1	0
2	F	53	0	31	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	G	53	0	31	0	0
2	H	53	0	31	0	0
3	A	99	0	0	0	0
3	B	111	0	0	1	0
3	C	116	0	0	5	0
3	D	49	0	0	0	0
3	E	98	0	0	1	0
3	F	111	0	0	1	0
3	G	105	0	0	4	0
3	H	54	0	0	1	0
All	All	30371	0	28902	237	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 4.

All (237) 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:431:LEU:CD2	1:H:439[B]:MET:HE1	2.02	0.87
1:G:431:LEU:N	1:G:431:LEU:HD12	1.93	0.84
1:C:431:LEU:HD12	1:C:431:LEU:N	1.93	0.83
1:H:431:LEU:HD23	1:H:439[B]:MET:HE1	1.65	0.77
1:G:352:ILE:HD13	1:G:377:LEU:HD22	1.66	0.76
1:E:108:THR:HG22	1:E:173:SER:OG	1.88	0.74
1:D:108:THR:HG22	1:D:173:SER:OG	1.88	0.74
1:A:108:THR:HG22	1:A:173:SER:OG	1.88	0.74
1:H:431:LEU:HD21	1:H:439[B]:MET:HE1	1.69	0.73
1:C:352:ILE:HD13	1:C:377:LEU:HD22	1.68	0.73
1:H:108:THR:HG22	1:H:173:SER:OG	1.87	0.72
1:H:352:ILE:HD13	1:H:377:LEU:HD22	1.72	0.72
1:G:429:TRP:CD1	1:G:431:LEU:HD11	2.25	0.71
1:C:429:TRP:CD1	1:C:431:LEU:HD11	2.26	0.71
1:D:352:ILE:HD13	1:D:377:LEU:HD22	1.72	0.71
1:G:429:TRP:CH2	1:G:439[B]:MET:HE1	2.27	0.69
1:C:379:ARG:HD3	3:C:877:HOH:O	1.93	0.68
1:D:246:ARG:NH1	1:D:400:GLU:OE1	2.27	0.68
1:H:246:ARG:NH1	1:H:400:GLU:OE1	2.27	0.67
1:H:435:TRP:HB3	1:H:439[B]:MET:HE3	1.76	0.67
1:H:435:TRP:HB3	1:H:439[B]:MET:CE	2.24	0.67
1:H:382:VAL:HA	1:H:385:MET:HE3	1.77	0.66
1:E:69:LEU:HD23	3:E:859:HOH:O	1.95	0.66

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:382:VAL:HA	1:A:385:MET:HE3	1.78	0.66
1:H:435:TRP:C	1:H:439[B]:MET:HE3	2.21	0.66
1:H:379:ARG:HD3	3:H:844:HOH:O	1.95	0.66
1:D:382:VAL:HA	1:D:385:MET:HE3	1.78	0.65
1:C:436:PRO:HA	1:C:439[B]:MET:HE2	1.78	0.65
1:E:382:VAL:HA	1:E:385:MET:HE3	1.77	0.65
1:F:379:ARG:HD3	3:F:905:HOH:O	1.96	0.64
1:D:436:PRO:HA	1:D:439[A]:MET:HE2	1.80	0.64
1:A:72:GLU:OE2	1:A:72:GLU:HA	2.00	0.62
1:E:434:GLU:HG2	3:G:816:HOH:O	2.00	0.62
1:D:355:THR:HG22	1:D:357:VAL:H	1.65	0.61
1:C:355:THR:HG22	1:C:357:VAL:H	1.66	0.61
1:A:355:THR:HG22	1:A:357:VAL:H	1.66	0.61
1:H:355:THR:HG22	1:H:357:VAL:H	1.65	0.61
1:A:439:MET:HE2	1:C:439[B]:MET:SD	2.41	0.60
1:E:123:ALA:HB1	1:E:418:ARG:HD2	1.83	0.60
1:G:355:THR:HG22	1:G:357:VAL:H	1.66	0.60
1:E:355:THR:HG22	1:E:357:VAL:H	1.65	0.60
1:F:355:THR:HG22	1:F:357:VAL:H	1.66	0.60
1:H:381:VAL:HG12	1:H:385:MET:HE2	1.83	0.60
1:A:123:ALA:HB1	1:A:418:ARG:HD2	1.83	0.60
1:E:435:TRP:CZ3	1:G:439[B]:MET:HE3	2.37	0.60
1:B:355:THR:HG22	1:B:357:VAL:H	1.65	0.60
1:A:381:VAL:HG12	1:A:385:MET:HE2	1.84	0.59
1:E:381:VAL:HG12	1:E:385:MET:HE2	1.84	0.59
1:C:123:ALA:HB1	1:C:418:ARG:HD2	1.84	0.59
1:D:381:VAL:HG12	1:D:385:MET:HE2	1.84	0.59
1:C:363:LEU:HD11	1:C:377:LEU:HB3	1.85	0.59
1:G:421:MET:HE1	1:G:439[B]:MET:HE2	1.85	0.59
1:E:382:VAL:HA	1:E:385:MET:CE	2.34	0.58
1:D:123:ALA:HB1	1:D:418:ARG:HD2	1.86	0.58
1:G:363:LEU:HD11	1:G:377:LEU:HB3	1.85	0.58
1:B:123:ALA:HB1	1:B:418:ARG:HD3	1.86	0.58
1:D:382:VAL:HA	1:D:385:MET:CE	2.34	0.57
1:H:435:TRP:HE3	1:H:439[B]:MET:HE2	1.68	0.57
1:F:37:ARG:HG3	1:F:193:ARG:HH21	1.70	0.57
1:G:379:ARG:HD3	3:G:881:HOH:O	2.03	0.57
1:D:421:MET:HE1	1:D:439[A]:MET:CE	2.35	0.57
1:H:123:ALA:HB1	1:H:418:ARG:HD2	1.86	0.57
1:H:382:VAL:HA	1:H:385:MET:CE	2.34	0.57
1:D:108:THR:HG21	1:D:287:PRO:O	2.05	0.56

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:431:LEU:HD11	1:D:431:LEU:HD11	1.86	0.56
1:H:108:THR:HG21	1:H:287:PRO:O	2.05	0.56
1:A:382:VAL:HA	1:A:385:MET:CE	2.34	0.56
1:G:431:LEU:HD12	1:G:431:LEU:H	1.70	0.56
1:A:108:THR:HG21	1:A:287:PRO:O	2.06	0.55
1:E:108:THR:HG21	1:E:287:PRO:O	2.06	0.55
1:A:73:HIS:HB3	1:A:349:PHE:CZ	2.41	0.55
1:F:123:ALA:HB1	1:F:418:ARG:HD2	1.88	0.55
1:G:123:ALA:HB1	1:G:418:ARG:HD2	1.88	0.54
1:B:73:HIS:HB3	1:B:349:PHE:CZ	2.43	0.53
1:F:73:HIS:HB3	1:F:349:PHE:CZ	2.43	0.53
1:F:352:ILE:HD13	1:F:377:LEU:HD22	1.91	0.53
1:B:431:LEU:CD1	1:D:431:LEU:HD11	2.40	0.52
1:C:46:ARG:HD3	3:C:893:HOH:O	2.09	0.52
1:H:435:TRP:CE3	1:H:439[B]:MET:HE2	2.45	0.52
1:B:352:ILE:HD13	1:B:377:LEU:HD22	1.92	0.52
1:A:439:MET:CE	1:C:439[B]:MET:SD	2.98	0.52
1:B:431:LEU:HD11	1:D:431:LEU:CD1	2.39	0.52
1:B:379:ARG:HD3	3:B:861:HOH:O	2.09	0.51
1:B:29:ILE:HG22	1:B:38:VAL:HG21	1.91	0.51
1:F:431:LEU:HD11	1:H:431:LEU:HD11	1.91	0.51
1:H:384:LEU:HA	1:H:388:GLY:HA2	1.91	0.51
1:G:429:TRP:CG	1:G:431:LEU:HD11	2.46	0.51
1:F:323:HIS:HE1	3:G:813:HOH:O	1.94	0.51
1:F:431:LEU:HD11	1:H:431:LEU:CD1	2.41	0.51
1:G:268:PRO:HG3	1:G:285:LEU:HD22	1.93	0.50
1:E:346:ILE:HG13	1:E:464:LEU:CD2	2.42	0.50
1:C:268:PRO:HG3	1:C:285:LEU:HD22	1.94	0.50
1:H:33:ARG:HB3	1:H:36:VAL:HG22	1.94	0.50
1:C:429:TRP:CG	1:C:431:LEU:HD11	2.47	0.50
1:E:268:PRO:HG3	1:E:285:LEU:HD22	1.94	0.50
1:D:33:ARG:HB3	1:D:36:VAL:HG22	1.94	0.50
1:H:346:ILE:HG13	1:H:464:LEU:CD2	2.42	0.50
1:B:323:HIS:HE1	3:C:848:HOH:O	1.95	0.49
1:C:421:MET:HE1	1:C:439[B]:MET:CE	2.41	0.49
1:H:268:PRO:HG3	1:H:285:LEU:HD22	1.95	0.49
1:B:439:MET:HE2	1:D:439[A]:MET:SD	2.53	0.49
1:A:346:ILE:HG13	1:A:464:LEU:CD2	2.42	0.49
1:C:431:LEU:HD12	1:C:431:LEU:H	1.72	0.49
1:D:268:PRO:HG3	1:D:285:LEU:HD22	1.95	0.49
1:F:346:ILE:HG13	1:F:464:LEU:CD2	2.42	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:F:268:PRO:HG3	1:F:285:LEU:HD22	1.95	0.48
1:D:346:ILE:HG13	1:D:464:LEU:CD2	2.43	0.48
1:D:246:ARG:NH1	1:D:400:GLU:HG2	2.29	0.48
1:F:431:LEU:CD1	1:H:431:LEU:HD11	2.44	0.48
1:G:13:VAL:HG11	1:G:29:ILE:HD13	1.95	0.48
1:H:246:ARG:NH1	1:H:400:GLU:HG2	2.28	0.48
1:C:13:VAL:HG11	1:C:29:ILE:HD13	1.96	0.48
1:B:346:ILE:HG13	1:B:464:LEU:CD2	2.43	0.47
1:A:268:PRO:HG3	1:A:285:LEU:HD22	1.95	0.47
1:C:10:GLN:NE2	3:C:803:HOH:O	2.47	0.47
1:G:346:ILE:HG13	1:G:464:LEU:CD2	2.44	0.47
1:A:352:ILE:HD13	1:A:377:LEU:HD22	1.97	0.47
1:C:431:LEU:N	1:C:431:LEU:CD1	2.71	0.47
1:D:108:THR:CG2	1:D:287:PRO:O	2.63	0.47
1:A:25:VAL:HG23	1:A:378:ALA:HA	1.97	0.46
1:C:69:LEU:HD23	3:C:840:HOH:O	2.14	0.46
1:D:240:LEU:HB2	1:D:243:LEU:HD22	1.97	0.46
1:C:346:ILE:HG13	1:C:464:LEU:CD2	2.45	0.46
1:F:22:GLY:O	1:F:25:VAL:HG12	2.16	0.46
1:B:268:PRO:HG3	1:B:285:LEU:HD22	1.95	0.46
1:C:352:ILE:HD13	1:C:377:LEU:CD2	2.43	0.46
1:H:22:GLY:O	1:H:25:VAL:HG12	2.15	0.46
1:D:22:GLY:O	1:D:25:VAL:HG12	2.15	0.46
1:C:240:LEU:HB2	1:C:243:LEU:HD22	1.98	0.46
1:H:108:THR:CG2	1:H:287:PRO:O	2.63	0.46
1:E:439:MET:HE2	1:G:435:TRP:CE3	2.50	0.46
1:E:352:ILE:HD13	1:E:377:LEU:HD22	1.98	0.46
1:G:403:LEU:HG	1:G:486:VAL:HG11	1.98	0.46
1:A:240:LEU:HB2	1:A:243:LEU:HD22	1.98	0.45
1:G:352:ILE:HD13	1:G:377:LEU:CD2	2.42	0.45
1:A:108:THR:CG2	1:A:287:PRO:O	2.65	0.45
1:B:22:GLY:O	1:B:25:VAL:HG12	2.16	0.45
1:E:434:GLU:CG	3:G:816:HOH:O	2.62	0.45
1:H:133:LEU:HD13	1:H:166:LEU:HD22	1.98	0.45
1:C:22:GLY:O	1:C:25:VAL:HG12	2.17	0.45
1:B:13:VAL:HG11	1:B:29:ILE:HD13	1.99	0.45
1:G:240:LEU:HB2	1:G:243:LEU:HD22	1.98	0.45
1:H:240:LEU:HB2	1:H:243:LEU:HD22	1.99	0.45
1:E:25:VAL:HG23	1:E:378:ALA:HA	1.98	0.44
1:B:351:LEU:N	1:B:351:LEU:HD12	2.32	0.44
1:E:108:THR:CG2	1:E:287:PRO:O	2.65	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:F:351:LEU:HD12	1:F:351:LEU:N	2.32	0.44
1:H:366:THR:HB	1:H:370:GLY:CA	2.48	0.44
1:C:429:TRP:CH2	1:C:439[B]:MET:HE1	2.53	0.44
1:E:240:LEU:HB2	1:E:243:LEU:HD22	1.98	0.44
1:F:13:VAL:HG11	1:F:29:ILE:HD13	2.00	0.44
1:E:346:ILE:HG13	1:E:464:LEU:HD21	2.00	0.44
1:F:403:LEU:HG	1:F:486:VAL:HG11	2.00	0.44
1:G:22:GLY:O	1:G:25:VAL:HG12	2.17	0.44
1:D:429:TRP:CH2	1:D:439[A]:MET:HE1	2.53	0.44
1:E:351:LEU:N	1:E:351:LEU:HD12	2.33	0.44
1:D:133:LEU:HD13	1:D:166:LEU:HD22	1.98	0.44
1:F:362:MET:HE2	1:F:362:MET:HB2	1.81	0.44
1:H:403:LEU:HG	1:H:486:VAL:HG11	2.00	0.44
1:C:403:LEU:HG	1:C:486:VAL:HG11	1.98	0.44
1:F:240:LEU:HB2	1:F:243:LEU:HD22	1.99	0.44
1:D:366:THR:HB	1:D:370:GLY:CA	2.48	0.43
1:B:240:LEU:HB2	1:B:243:LEU:HD22	1.99	0.43
1:H:13:VAL:HG11	1:H:29:ILE:HD13	2.00	0.43
1:G:439[B]:MET:HE2	1:G:439[B]:MET:HB2	1.79	0.43
1:H:351:LEU:HD12	1:H:351:LEU:N	2.34	0.43
1:A:351:LEU:HD12	1:A:351:LEU:N	2.33	0.43
1:D:351:LEU:N	1:D:351:LEU:HD12	2.33	0.43
1:D:439[A]:MET:HE2	1:D:439[A]:MET:HB2	1.71	0.43
1:A:439:MET:HE2	1:C:435:TRP:CE3	2.54	0.43
1:D:13:VAL:HG11	1:D:29:ILE:HD13	2.01	0.43
1:E:362:MET:HE2	1:E:362:MET:HB2	1.80	0.43
1:H:363:LEU:HD11	1:H:377:LEU:HB3	2.00	0.43
1:E:403:LEU:HG	1:E:486:VAL:HG11	2.01	0.43
1:G:296:GLY:HA3	1:G:297:ALA:HB2	2.01	0.43
1:B:431:LEU:CD1	1:D:431:LEU:CD1	2.97	0.43
1:G:351:LEU:N	1:G:351:LEU:HD12	2.34	0.43
1:H:362:MET:HE2	1:H:362:MET:HB2	1.84	0.43
1:D:296:GLY:HA3	1:D:297:ALA:HB2	2.01	0.42
1:H:296:GLY:HA3	1:H:297:ALA:HB2	2.01	0.42
1:C:351:LEU:HD12	1:C:351:LEU:N	2.33	0.42
1:D:86:ARG:HD2	1:F:206:HIS:O	2.18	0.42
1:A:346:ILE:HG13	1:A:464:LEU:HD21	2.01	0.42
1:B:350:PRO:C	1:B:351:LEU:HD12	2.45	0.42
1:G:366:THR:HB	1:G:370:GLY:CA	2.50	0.42
1:G:20:VAL:HG11	1:G:371:LEU:HA	2.01	0.42
1:A:350:PRO:C	1:A:351:LEU:HD12	2.44	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:403:LEU:HG	1:B:486:VAL:HG11	2.00	0.42
1:G:431:LEU:N	1:G:431:LEU:CD1	2.70	0.42
1:G:350:PRO:C	1:G:351:LEU:HD12	2.45	0.42
2:D:701:FAD:H9	2:D:701:FAD:H1'2	1.84	0.42
1:F:350:PRO:C	1:F:351:LEU:HD12	2.44	0.42
1:B:296:GLY:HA3	1:B:297:ALA:HB2	2.02	0.42
1:C:350:PRO:C	1:C:351:LEU:HD12	2.45	0.42
1:C:20:VAL:HG11	1:C:371:LEU:HA	2.02	0.42
1:C:366:THR:HB	1:C:370:GLY:CA	2.49	0.42
1:D:403:LEU:HG	1:D:486:VAL:HG11	2.00	0.42
1:G:435:TRP:HE3	1:G:439[B]:MET:SD	2.43	0.41
1:A:403:LEU:HG	1:A:486:VAL:HG11	2.01	0.41
2:A:701:FAD:H9	2:A:701:FAD:H1'2	1.76	0.41
2:E:701:FAD:H9	2:E:701:FAD:H1'2	1.74	0.41
1:E:20:VAL:HG11	1:E:371:LEU:HA	2.03	0.41
1:G:55:GLY:N	1:G:56:ALA:HA	2.35	0.41
1:C:55:GLY:N	1:C:56:ALA:HA	2.35	0.41
1:D:350:PRO:C	1:D:351:LEU:HD12	2.45	0.41
1:H:350:PRO:C	1:H:351:LEU:HD12	2.45	0.41
1:C:296:GLY:HA3	1:C:297:ALA:HB2	2.02	0.41
1:F:431:LEU:CD1	1:H:431:LEU:CD1	2.99	0.41
1:D:363:LEU:HD11	1:D:377:LEU:HB3	2.02	0.41
1:E:32:THR:HG22	1:E:33:ARG:HG2	2.03	0.41
1:E:350:PRO:C	1:E:351:LEU:HD12	2.45	0.41
1:F:296:GLY:HA3	1:F:297:ALA:HB2	2.02	0.41
1:A:311:ILE:HG23	1:B:318:PHE:HB3	2.03	0.41
1:A:427:PHE:N	1:A:428:PRO:HA	2.36	0.41
1:D:427:PHE:N	1:D:428:PRO:HA	2.36	0.41
1:D:479:LEU:HD13	1:D:479:LEU:HA	1.95	0.41
1:E:296:GLY:HA3	1:E:297:ALA:HB2	2.02	0.41
1:E:427:PHE:N	1:E:428:PRO:HA	2.36	0.41
1:F:439:MET:HE2	1:H:435:TRP:CE3	2.55	0.41
1:E:311:ILE:HG23	1:F:318:PHE:HB3	2.03	0.41
1:E:149:GLU:HG2	1:E:150:SER:N	2.36	0.40
1:F:374:SER:N	1:F:375:PRO:HD2	2.37	0.40
1:A:32:THR:HG22	1:A:33:ARG:HG2	2.03	0.40
1:A:296:GLY:HA3	1:A:297:ALA:HB2	2.03	0.40
1:B:366:THR:HB	1:B:370:GLY:CA	2.51	0.40
1:B:427:PHE:N	1:B:428:PRO:HA	2.36	0.40
1:G:55:GLY:HA2	1:G:294:TYR:CD2	2.57	0.40
1:D:20:VAL:HG11	1:D:371:LEU:HA	2.03	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:437:HIS:O	1:E:441:THR:HG23	2.21	0.40
1:G:429:TRP:CH2	1:G:439[B]:MET:CE	3.01	0.40
1:H:20:VAL:HG11	1:H:371:LEU:HA	2.03	0.40
1:A:20:VAL:HG11	1:A:371:LEU:HA	2.03	0.40
1:A:437:HIS:O	1:A:441:THR:HG23	2.21	0.40
1:F:366:THR:HB	1:F:370:GLY:CA	2.51	0.40
1:H:454:LEU:HA	1:H:480:ILE:HG12	2.04	0.40
2:B:701:FAD:H9	2:B:701:FAD:H1'2	1.76	0.40
1:D:454:LEU:HA	1:D:480:ILE:HG12	2.04	0.40

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	479/512 (94%)	466 (97%)	12 (2%)	1 (0%)	43	61
1	B	480/512 (94%)	466 (97%)	13 (3%)	1 (0%)	43	61
1	C	482/512 (94%)	468 (97%)	14 (3%)	0	100	100
1	D	478/512 (93%)	464 (97%)	13 (3%)	1 (0%)	43	61
1	E	479/512 (94%)	464 (97%)	13 (3%)	2 (0%)	30	46
1	F	480/512 (94%)	466 (97%)	13 (3%)	1 (0%)	43	61
1	G	481/512 (94%)	467 (97%)	14 (3%)	0	100	100
1	H	478/512 (93%)	462 (97%)	14 (3%)	2 (0%)	30	46
All	All	3837/4096 (94%)	3723 (97%)	106 (3%)	8 (0%)	43	61

All (8) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	H	389	THR

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Mol	Chain	Res	Type
1	H	153	TRP
1	A	153	TRP
1	D	153	TRP
1	E	71	SER
1	E	153	TRP
1	F	153	TRP
1	B	153	TRP

5.3.2 Protein sidechains [i](#)

There are no protein residues with a non-rotameric sidechain to report in this entry.

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](#)

8 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	FAD	A	701	-	58,58,58	0.82	2 (3%)	85,89,89	0.92	4 (4%)
2	FAD	C	701	-	58,58,58	0.71	0	85,89,89	0.73	2 (2%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
2	FAD	D	701	-	58,58,58	0.70	0	85,89,89	0.73	2 (2%)
2	FAD	F	701	-	58,58,58	0.75	1 (1%)	85,89,89	0.83	2 (2%)
2	FAD	G	701	-	58,58,58	0.72	2 (3%)	85,89,89	0.76	3 (3%)
2	FAD	B	701	-	58,58,58	0.65	0	85,89,89	0.83	2 (2%)
2	FAD	E	701	-	58,58,58	0.83	1 (1%)	85,89,89	0.96	3 (3%)
2	FAD	H	701	-	58,58,58	0.71	1 (1%)	85,89,89	0.74	1 (1%)

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	FAD	A	701	-	-	3/34/50/50	0/6/6/6
2	FAD	C	701	-	-	9/34/50/50	0/6/6/6
2	FAD	D	701	-	-	2/34/50/50	0/6/6/6
2	FAD	F	701	-	-	5/34/50/50	0/6/6/6
2	FAD	G	701	-	-	2/34/50/50	0/6/6/6
2	FAD	B	701	-	-	5/34/50/50	0/6/6/6
2	FAD	E	701	-	-	2/34/50/50	0/6/6/6
2	FAD	H	701	-	-	2/34/50/50	0/6/6/6

All (7) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	701	FAD	PA-O3P	3.98	1.63	1.59
2	E	701	FAD	PA-O3P	3.91	1.63	1.59
2	F	701	FAD	PA-O3P	3.13	1.62	1.59
2	H	701	FAD	PA-O3P	2.35	1.62	1.59
2	G	701	FAD	P-O3P	2.29	1.62	1.59
2	G	701	FAD	PA-O3P	2.07	1.61	1.59
2	A	701	FAD	C1'-C2'	-2.00	1.49	1.52

All (19) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	E	701	FAD	C4'-C3'-C2'	3.67	119.67	113.57
2	A	701	FAD	C4'-C3'-C2'	3.36	119.17	113.57
2	A	701	FAD	O2A-PA-O1A	2.83	125.63	112.44

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	701	FAD	C4'-C3'-C2'	2.68	118.03	113.57
2	E	701	FAD	O2A-PA-O1A	2.66	124.82	112.44
2	E	701	FAD	C4-N3-C2	-2.46	121.28	125.64
2	F	701	FAD	C4-N3-C2	-2.42	121.34	125.64
2	B	701	FAD	C4-N3-C2	-2.38	121.41	125.64
2	A	701	FAD	C4-N3-C2	-2.31	121.54	125.64
2	F	701	FAD	O2A-PA-O1A	2.25	122.89	112.44
2	C	701	FAD	O2P-P-O1P	2.24	122.88	112.44
2	D	701	FAD	C4'-C3'-C2'	2.23	117.28	113.57
2	G	701	FAD	O2P-P-O1P	2.12	122.31	112.44
2	H	701	FAD	C4-N3-C2	-2.06	121.98	125.64
2	C	701	FAD	C4-N3-C2	-2.05	122.00	125.64
2	D	701	FAD	C4-N3-C2	-2.04	122.01	125.64
2	A	701	FAD	C4X-C4-N3	2.03	118.43	113.25
2	G	701	FAD	C4-N3-C2	-2.03	122.03	125.64
2	G	701	FAD	C4X-C4-N3	2.02	118.41	113.25

There are no chirality outliers.

All (30) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	C	701	FAD	C5B-O5B-PA-O2A
2	F	701	FAD	O4'-C4'-C5'-O5'
2	C	701	FAD	O4B-C4B-C5B-O5B
2	C	701	FAD	C3B-C4B-C5B-O5B
2	F	701	FAD	C2B-C1B-N9A-C8A
2	A	701	FAD	O4B-C4B-C5B-O5B
2	B	701	FAD	C2B-C1B-N9A-C8A
2	C	701	FAD	C2B-C1B-N9A-C8A
2	G	701	FAD	C2B-C1B-N9A-C8A
2	B	701	FAD	C2'-C1'-N10-C10
2	C	701	FAD	C5B-O5B-PA-O1A
2	C	701	FAD	C5B-O5B-PA-O3P
2	E	701	FAD	C2B-C1B-N9A-C8A
2	G	701	FAD	O4B-C4B-C5B-O5B
2	A	701	FAD	C2B-C1B-N9A-C8A
2	A	701	FAD	C3B-C4B-C5B-O5B
2	B	701	FAD	O4B-C1B-N9A-C8A
2	F	701	FAD	O4B-C4B-C5B-O5B
2	D	701	FAD	C2B-C1B-N9A-C8A
2	C	701	FAD	C2B-C1B-N9A-C4A
2	C	701	FAD	O4B-C1B-N9A-C8A

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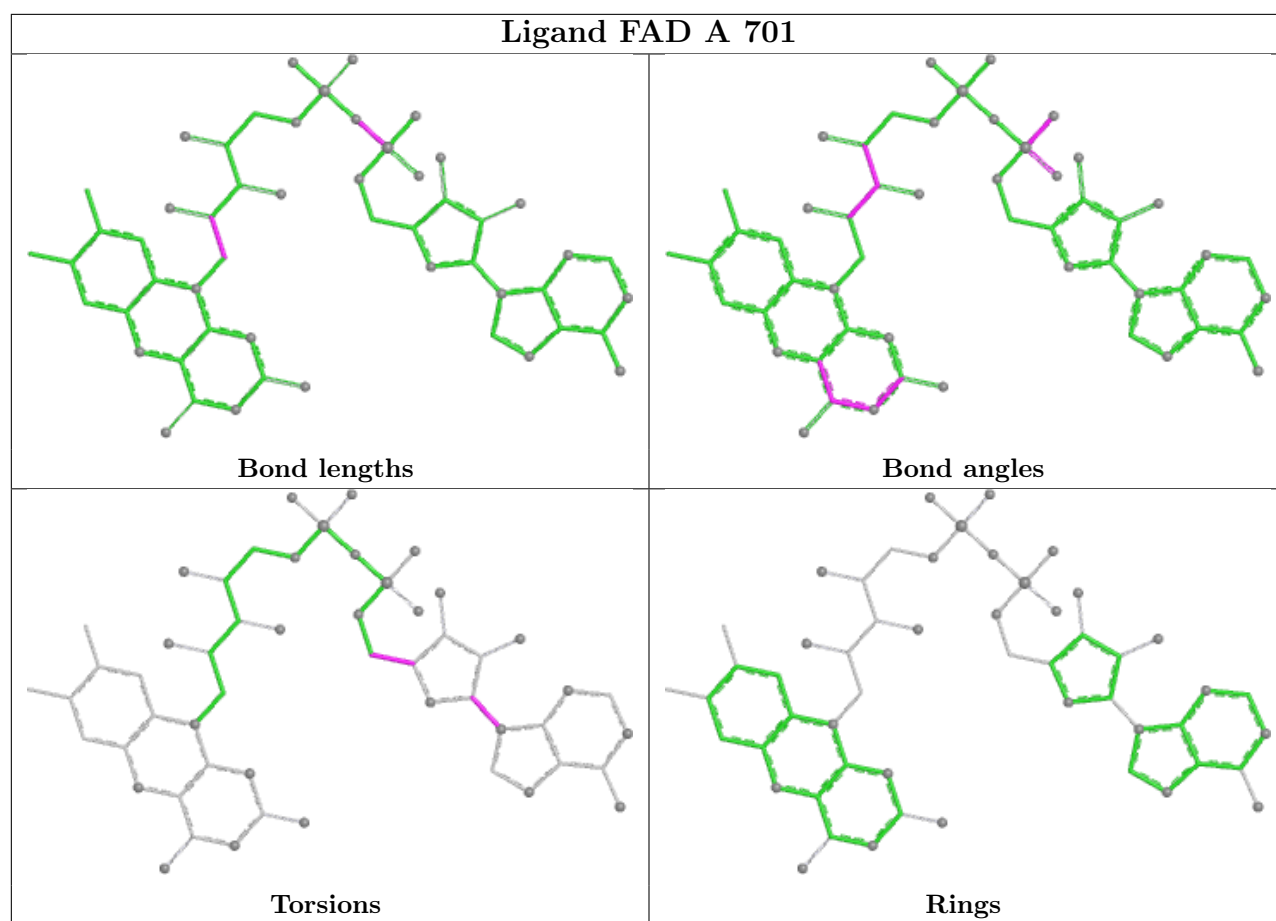
Mol	Chain	Res	Type	Atoms
2	E	701	FAD	O4B-C1B-N9A-C8A
2	F	701	FAD	O4B-C1B-N9A-C8A
2	H	701	FAD	C2B-C1B-N9A-C8A
2	B	701	FAD	O4B-C4B-C5B-O5B
2	H	701	FAD	O4B-C4B-C5B-O5B
2	B	701	FAD	C2B-C1B-N9A-C4A
2	F	701	FAD	C2B-C1B-N9A-C4A
2	C	701	FAD	N10-C1'-C2'-O2'
2	D	701	FAD	N10-C1'-C2'-O2'

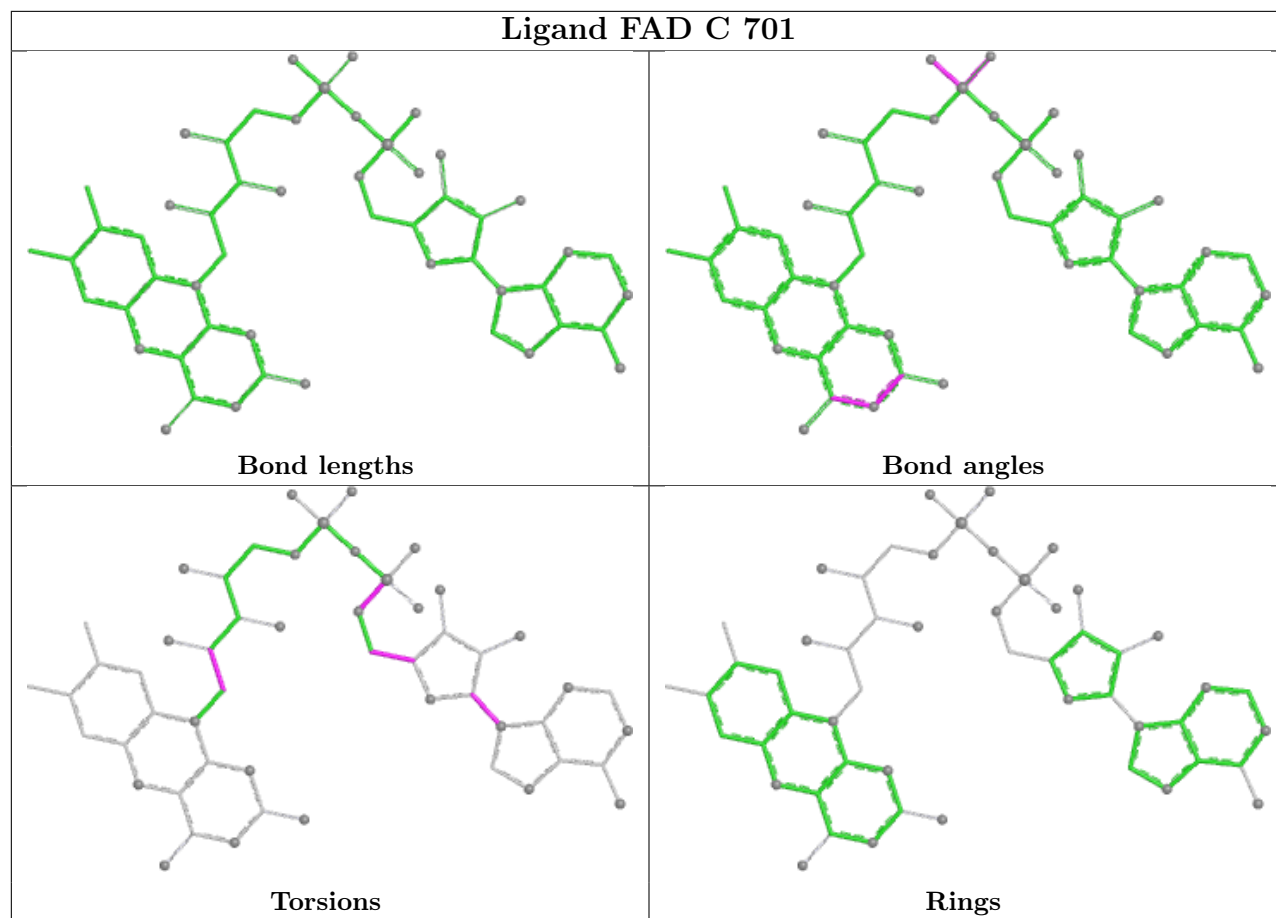
There are no ring outliers.

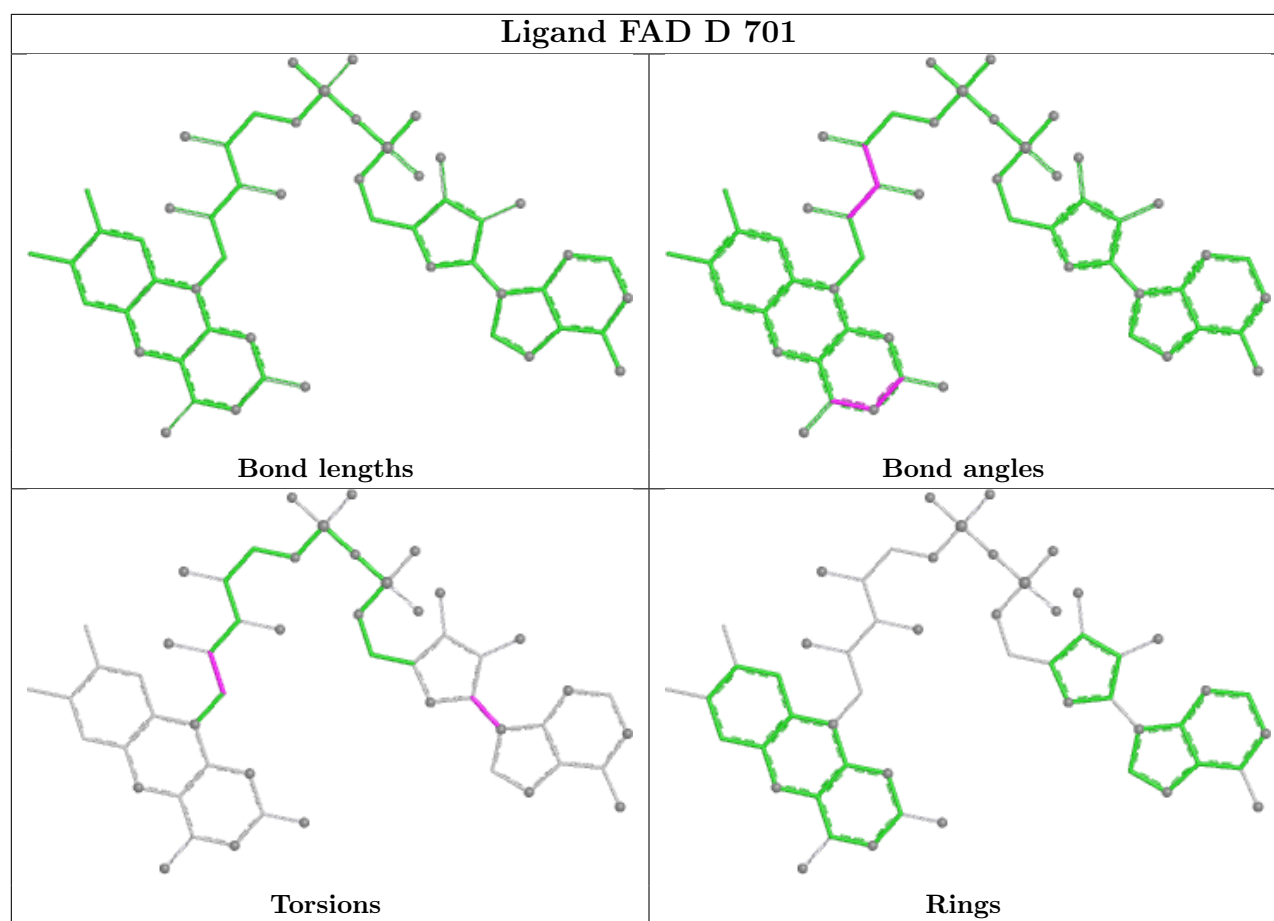
4 monomers are involved in 4 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	701	FAD	1	0
2	D	701	FAD	1	0
2	B	701	FAD	1	0
2	E	701	FAD	1	0

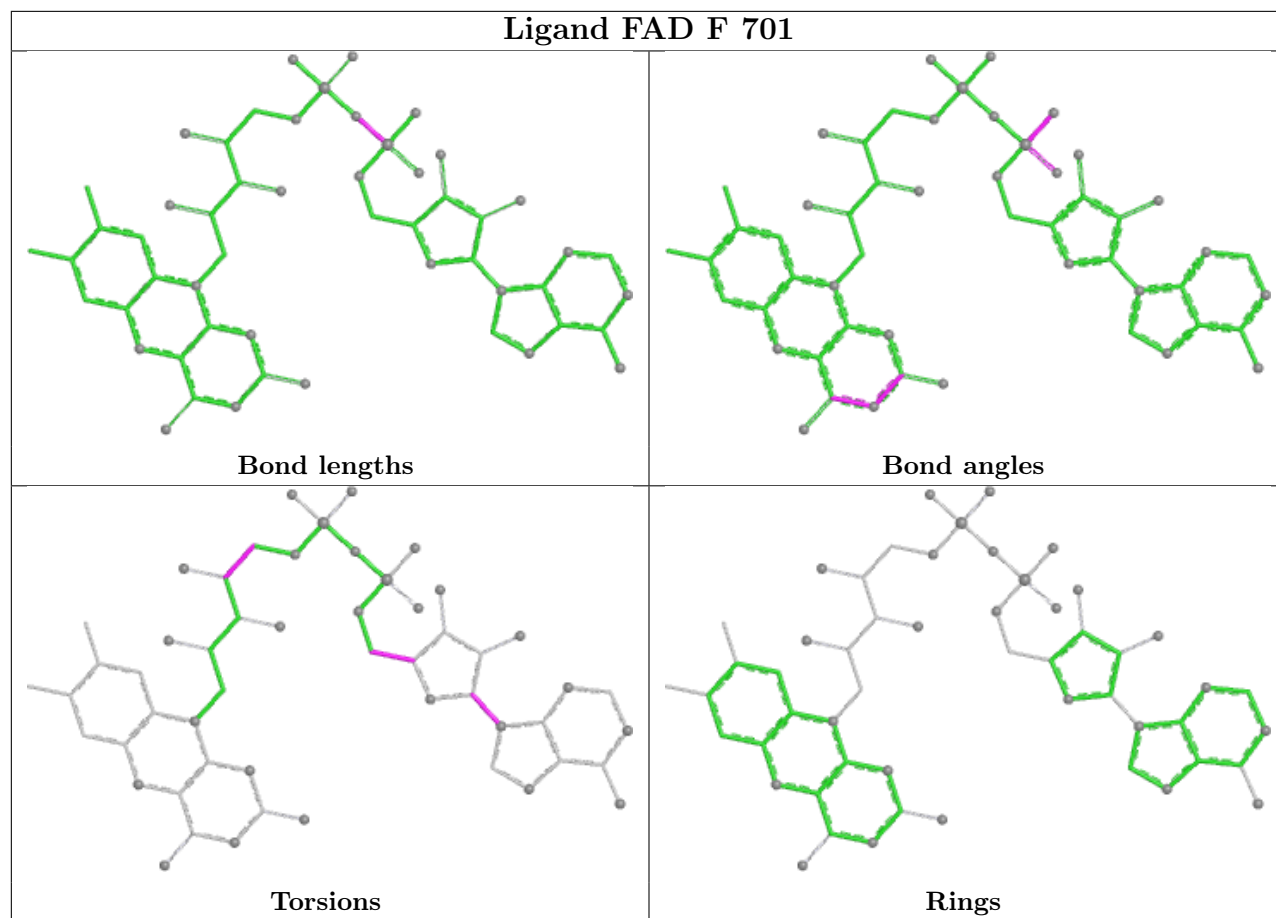
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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

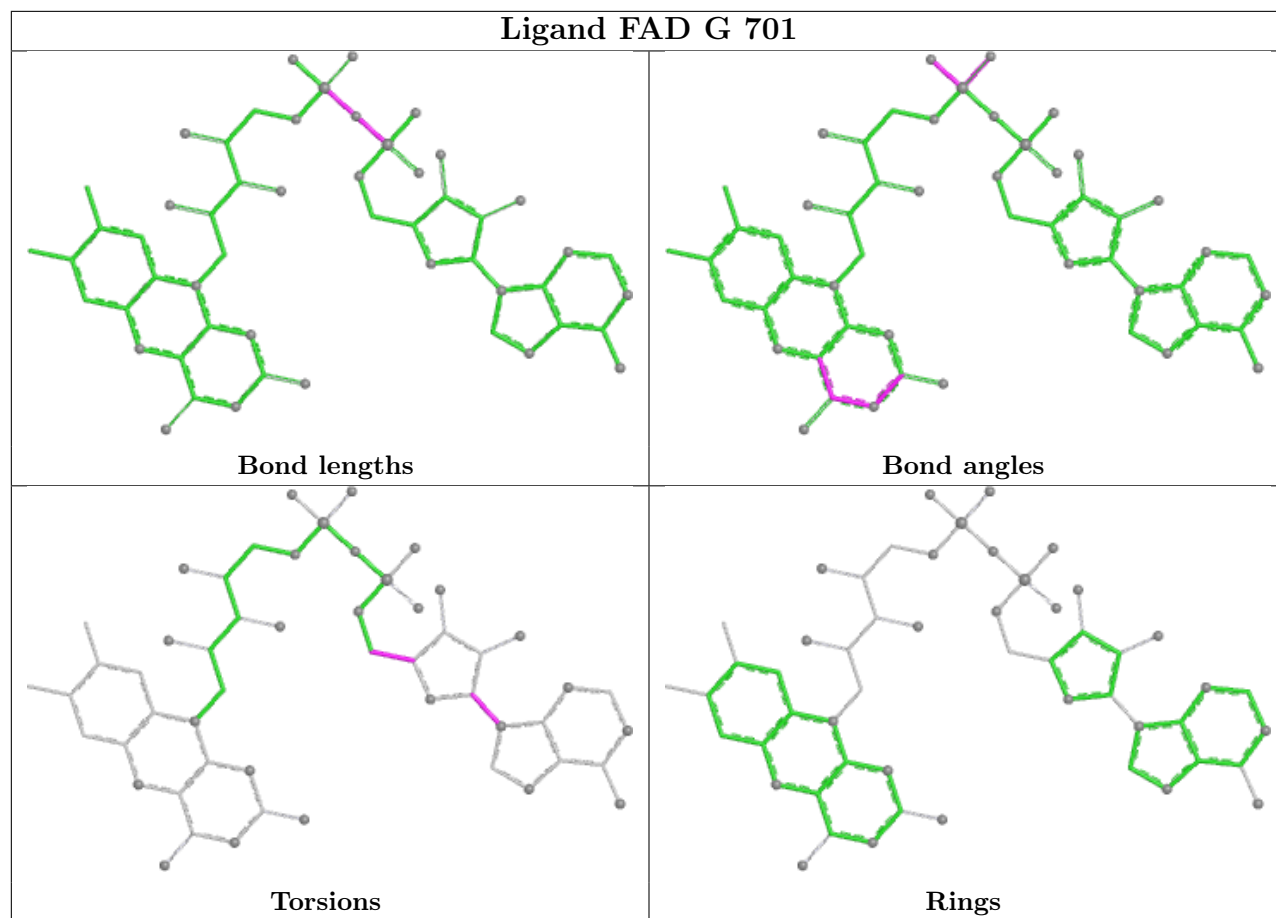


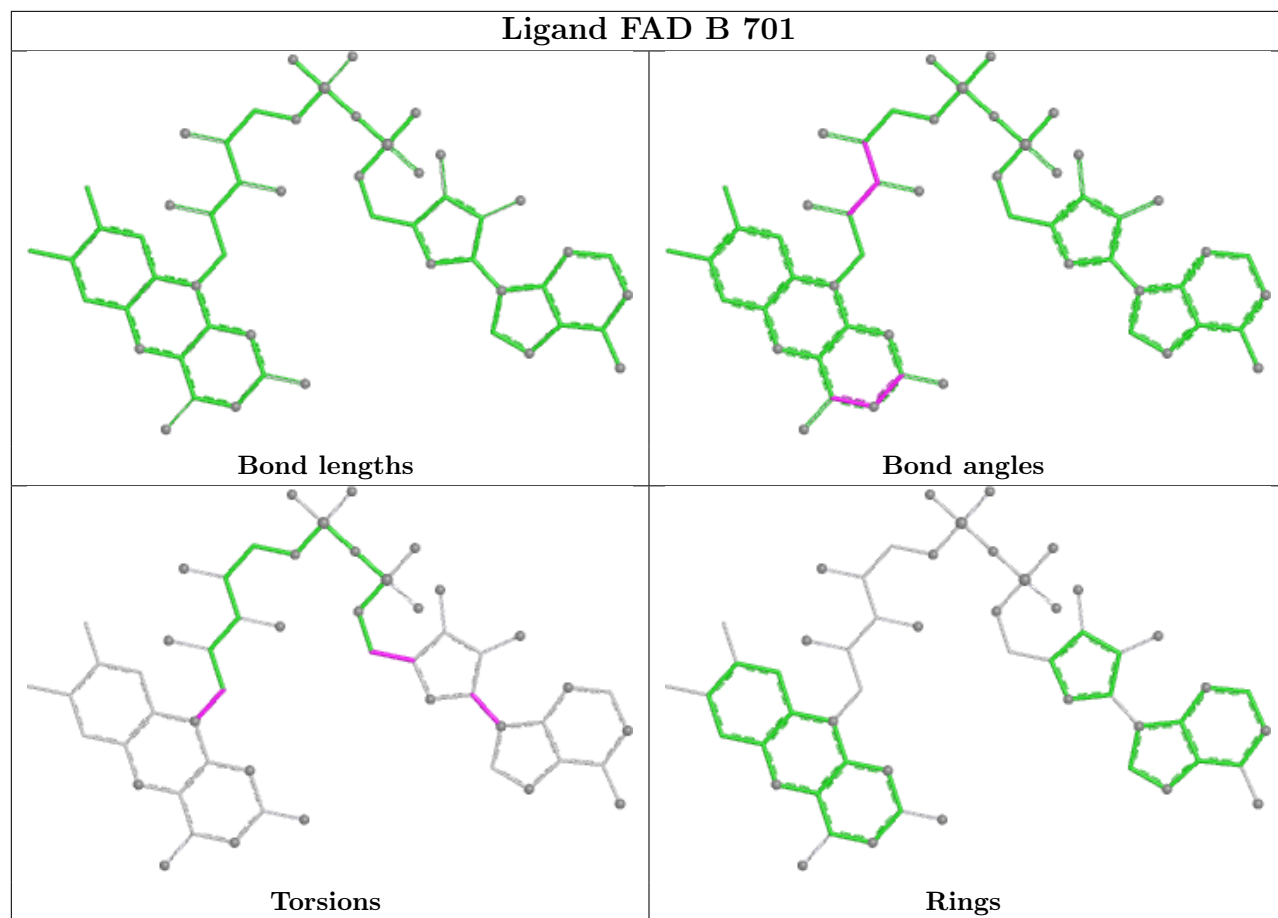


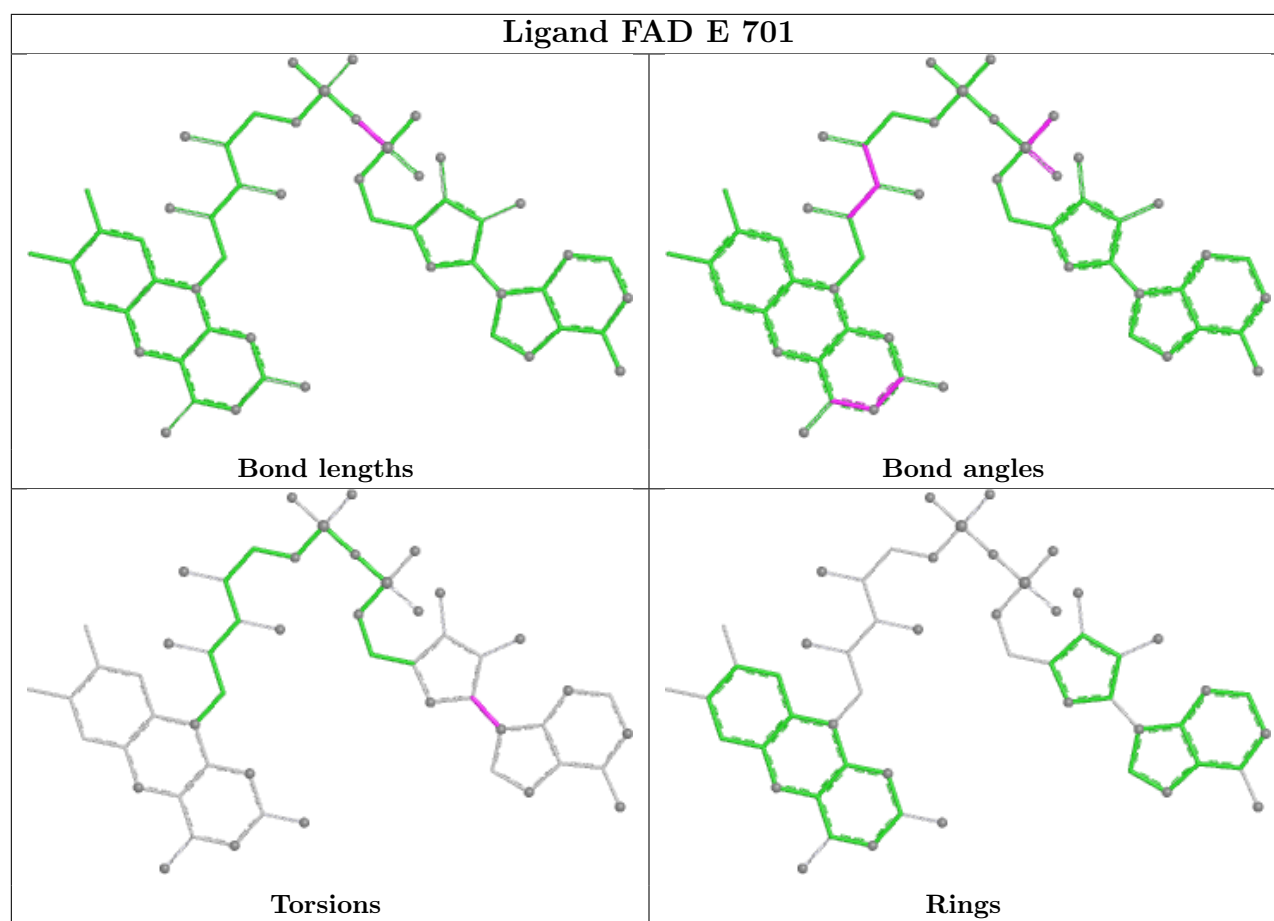


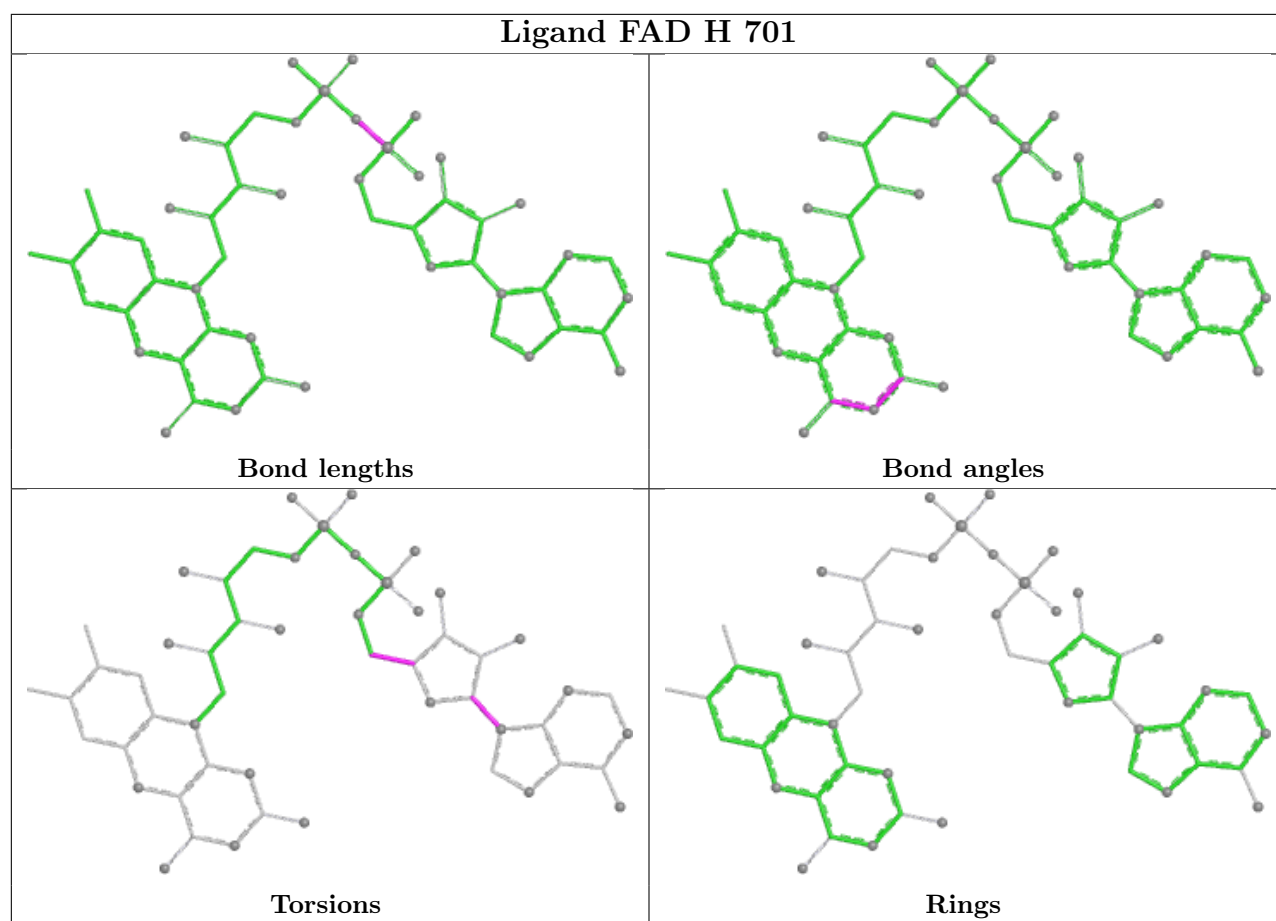
Ligand FAD F 701











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

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, 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	481/512 (93%)	0.38	20 (4%)	40	36	20, 37, 70, 106	0
1	B	482/512 (94%)	0.23	13 (2%)	56	52	17, 35, 67, 87	0
1	C	482/512 (94%)	0.42	21 (4%)	39	35	17, 37, 75, 100	2 (0%)
1	D	479/512 (93%)	1.11	101 (21%)	2	2	21, 54, 104, 125	1 (0%)
1	E	481/512 (93%)	0.39	20 (4%)	40	36	19, 37, 67, 97	0
1	F	482/512 (94%)	0.26	19 (3%)	43	39	18, 34, 67, 85	0
1	G	482/512 (94%)	0.44	26 (5%)	31	28	18, 38, 75, 100	1 (0%)
1	H	479/512 (93%)	1.06	99 (20%)	2	2	20, 55, 103, 120	1 (0%)
All	All	3848/4096 (93%)	0.53	319 (8%)	17	15	17, 39, 86, 125	5 (0%)

All (319) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	H	242	GLY	6.1
1	D	242	GLY	5.4
1	D	244	ALA	5.3
1	B	77	LYS	5.0
1	A	71	SER	4.8
1	H	457	THR	4.8
1	D	241	PRO	4.7
1	H	241	PRO	4.6
1	G	242	GLY	4.6
1	D	457	THR	4.5
1	E	68	ALA	4.3
1	D	391	VAL	4.3
1	D	387	GLY	4.2
1	C	242	GLY	4.2
1	H	393	GLY	4.1
1	H	389	THR	4.1

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Mol	Chain	Res	Type	RSRZ
1	A	77	LYS	4.0
1	H	34	PRO	4.0
1	D	36	VAL	3.9
1	D	397	PHE	3.9
1	D	243	LEU	3.9
1	D	388	GLY	3.8
1	D	34	PRO	3.8
1	D	458	TYR	3.8
1	H	391	VAL	3.8
1	D	354	GLY	3.8
1	F	71	SER	3.7
1	E	70	ALA	3.7
1	F	77	LYS	3.7
1	H	33	ARG	3.7
1	E	77	LYS	3.7
1	G	152	ASP	3.7
1	H	361	TRP	3.6
1	A	75	ARG	3.6
1	D	376	LEU	3.6
1	H	211	GLY	3.6
1	G	206	HIS	3.5
1	A	68	ALA	3.5
1	A	69	LEU	3.5
1	B	71	SER	3.5
1	A	74	GLY	3.5
1	C	206	HIS	3.5
1	D	225	VAL	3.5
1	D	393	GLY	3.5
1	H	244	ALA	3.5
1	E	71	SER	3.4
1	H	402	ASP	3.4
1	H	239	ALA	3.4
1	D	206	HIS	3.4
1	D	362	MET	3.4
1	H	362	MET	3.4
1	D	239	ALA	3.4
1	D	213	VAL	3.3
1	H	207	GLY	3.3
1	H	245	HIS	3.3
1	C	211	GLY	3.3
1	C	152	ASP	3.3
1	D	194	LEU	3.3

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Mol	Chain	Res	Type	RSRZ
1	H	37	ARG	3.3
1	H	398	ARG	3.3
1	H	225	VAL	3.3
1	H	29	ILE	3.3
1	F	398	ARG	3.2
1	H	243	LEU	3.2
1	D	245	HIS	3.2
1	D	226	VAL	3.2
1	A	11	THR	3.2
1	D	361	TRP	3.2
1	D	33	ARG	3.2
1	C	241	PRO	3.2
1	H	357	VAL	3.2
1	D	389	THR	3.2
1	B	398	ARG	3.2
1	C	209	VAL	3.2
1	C	223	GLY	3.2
1	D	16	VAL	3.2
1	A	393	GLY	3.2
1	D	13	VAL	3.2
1	E	11	THR	3.2
1	H	202	ILE	3.2
1	D	402	ASP	3.1
1	A	206	HIS	3.1
1	G	223	GLY	3.1
1	D	37	ARG	3.1
1	D	193	ARG	3.1
1	A	137	LYS	3.1
1	D	490	TRP	3.1
1	H	36	VAL	3.1
1	D	202	ILE	3.1
1	G	235	ARG	3.1
1	E	73	HIS	3.1
1	D	384	LEU	3.1
1	F	69	LEU	3.1
1	D	38	VAL	3.1
1	D	211	GLY	3.1
1	H	387	GLY	3.1
1	H	13	VAL	3.1
1	C	244	ALA	3.0
1	D	379	ARG	3.0
1	D	207	GLY	3.0

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Mol	Chain	Res	Type	RSRZ
1	F	74	GLY	3.0
1	H	206	HIS	3.0
1	G	10	GLN	3.0
1	D	32	THR	3.0
1	H	38	VAL	2.9
1	A	73	HIS	2.9
1	H	219	PHE	2.9
1	E	393	GLY	2.9
1	H	388	GLY	2.9
1	D	357	VAL	2.9
1	E	69	LEU	2.9
1	H	224	HIS	2.9
1	D	351	LEU	2.9
1	D	394	LEU	2.9
1	A	76	LYS	2.8
1	E	206	HIS	2.8
1	D	22	GLY	2.8
1	D	486	VAL	2.8
1	H	458	TYR	2.8
1	D	25	VAL	2.8
1	H	360	LEU	2.8
1	H	384	LEU	2.8
1	C	235	ARG	2.8
1	E	74	GLY	2.8
1	B	69	LEU	2.8
1	F	72	GLU	2.7
1	H	193	ARG	2.7
1	D	195	HIS	2.7
1	D	104	GLY	2.7
1	A	34	PRO	2.7
1	D	209	VAL	2.7
1	D	227	VAL	2.7
1	D	482	TYR	2.7
1	H	213	VAL	2.7
1	D	222	ALA	2.7
1	H	54	ALA	2.7
1	H	15	VAL	2.7
1	H	209	VAL	2.7
1	H	490	TRP	2.7
1	A	72	GLU	2.7
1	D	449	GLU	2.7
1	C	207	GLY	2.7

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Mol	Chain	Res	Type	RSRZ
1	H	354	GLY	2.7
1	E	137	LYS	2.7
1	D	183	LEU	2.7
1	C	10	GLN	2.7
1	E	34	PRO	2.6
1	F	241	PRO	2.6
1	G	241	PRO	2.6
1	A	70	ALA	2.6
1	G	244	ALA	2.6
1	H	247	ILE	2.6
1	D	219	PHE	2.6
1	D	360	LEU	2.6
1	G	11	THR	2.6
1	D	246	ARG	2.6
1	H	221	PRO	2.6
1	H	449	GLU	2.6
1	C	212	VAL	2.6
1	B	70	ALA	2.6
1	F	68	ALA	2.6
1	H	32	THR	2.6
1	H	195	HIS	2.6
1	H	379	ARG	2.5
1	D	382	VAL	2.5
1	E	139	ALA	2.5
1	H	200	THR	2.5
1	G	398	ARG	2.5
1	H	235	ARG	2.5
1	H	352	ILE	2.5
1	H	240	LEU	2.5
1	E	76	LYS	2.5
1	H	491	HIS	2.5
1	H	246	ARG	2.5
1	B	415	ASP	2.5
1	D	216	ASP	2.5
1	D	40	LEU	2.5
1	D	240	LEU	2.5
1	G	491	HIS	2.5
1	A	140	ASN	2.5
1	D	30	ALA	2.5
1	D	221	PRO	2.5
1	H	483	TYR	2.5
1	H	14	ILE	2.5

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Mol	Chain	Res	Type	RSRZ
1	C	243	LEU	2.5
1	H	236	LEU	2.5
1	H	377	LEU	2.5
1	D	200	THR	2.5
1	C	220	LEU	2.4
1	D	224	HIS	2.4
1	H	397	PHE	2.4
1	H	238	ALA	2.4
1	D	353	GLY	2.4
1	D	392	ASP	2.4
1	H	250	ILE	2.4
1	D	188	LEU	2.4
1	H	227	VAL	2.4
1	D	481	ALA	2.4
1	H	222	ALA	2.4
1	D	29	ILE	2.4
1	D	247	ILE	2.4
1	F	392	ASP	2.4
1	H	194	LEU	2.4
1	C	48	TYR	2.4
1	F	70	ALA	2.4
1	D	26	GLY	2.4
1	D	41	LEU	2.4
1	D	403	LEU	2.4
1	G	243	LEU	2.4
1	B	68	ALA	2.4
1	B	72	GLU	2.4
1	H	488	ARG	2.3
1	H	73	HIS	2.3
1	H	220	LEU	2.3
1	H	382	VAL	2.3
1	H	486	VAL	2.3
1	E	434	GLU	2.3
1	F	33	ARG	2.3
1	C	491	HIS	2.3
1	D	220	LEU	2.3
1	E	67	HIS	2.3
1	G	439[A]	MET	2.3
1	F	76	LYS	2.3
1	D	27	VAL	2.3
1	G	48	TYR	2.3
1	H	16	VAL	2.3

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Mol	Chain	Res	Type	RSRZ
1	H	358	GLU	2.3
1	C	389	THR	2.3
1	H	203	ARG	2.3
1	H	401	ARG	2.3
1	G	211	GLY	2.3
1	H	353	GLY	2.3
1	D	14	ILE	2.3
1	G	482	TYR	2.3
1	E	140	ASN	2.3
1	C	11	THR	2.3
1	G	220	LEU	2.3
1	G	35	ASP	2.3
1	D	54	ALA	2.2
1	D	483	TYR	2.3
1	H	149	GLU	2.2
1	D	212	VAL	2.2
1	H	439[A]	MET	2.2
1	D	235	ARG	2.2
1	D	350	PRO	2.2
1	D	238	ALA	2.2
1	E	102	ALA	2.2
1	B	10	GLN	2.2
1	G	217	GLY	2.2
1	H	188	LEU	2.2
1	H	35	ASP	2.2
1	H	30	ALA	2.2
1	G	207	GLY	2.2
1	D	28	GLU	2.2
1	F	35	ASP	2.2
1	C	398	ARG	2.2
1	D	488	ARG	2.2
1	F	395	ARG	2.2
1	H	399	PRO	2.2
1	B	76	LYS	2.2
1	F	206	HIS	2.1
1	F	10	GLN	2.1
1	G	238	ALA	2.1
1	D	236	LEU	2.1
1	H	21	LEU	2.1
1	H	346	ILE	2.1
1	D	72	GLU	2.1
1	A	392	ASP	2.1

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Mol	Chain	Res	Type	RSRZ
1	B	34	PRO	2.1
1	H	27	VAL	2.1
1	H	189	GLN	2.1
1	D	228	ALA	2.1
1	H	22	GLY	2.1
1	H	376	LEU	2.1
1	C	203	ARG	2.1
1	D	86	ARG	2.1
1	H	86	ARG	2.1
1	D	101	ALA	2.1
1	H	199	ALA	2.1
1	D	21	LEU	2.1
1	E	376	LEU	2.1
1	H	454	LEU	2.1
1	D	214	THR	2.1
1	A	395	ARG	2.1
1	C	473	ARG	2.1
1	D	249	ARG	2.1
1	G	203	ARG	2.1
1	D	251	TYR	2.1
1	A	142	PRO	2.1
1	G	209	VAL	2.1
1	G	357	VAL	2.1
1	H	212	VAL	2.1
1	D	464	LEU	2.1
1	H	351	LEU	2.1
1	H	192	GLY	2.1
1	D	35	ASP	2.1
1	H	218	ASP	2.1
1	D	356	SER	2.1
1	H	356	SER	2.1
1	F	73	HIS	2.1
1	H	25	VAL	2.0
1	H	349	PHE	2.0
1	A	102	ALA	2.0
1	H	403	LEU	2.0
1	D	385	MET	2.0
1	D	408	SER	2.0
1	F	67	HIS	2.0
1	E	83	GLN	2.0
1	G	281	CYS	2.0
1	B	33	ARG	2.0

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Mol	Chain	Res	Type	RSRZ
1	D	398	ARG	2.0
1	D	473	ARG	2.0
1	G	213	VAL	2.0
1	H	226	VAL	2.0
1	D	484	ALA	2.0
1	B	393	GLY	2.0
1	F	140	ASN	2.0
1	H	223	GLY	2.0
1	H	482	TYR	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 oligosaccharides in this entry.

6.4 Ligands [i](#)

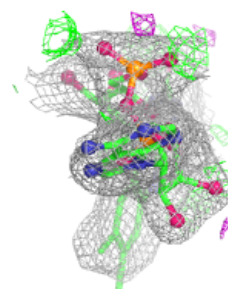
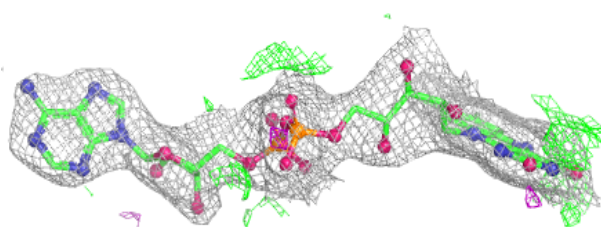
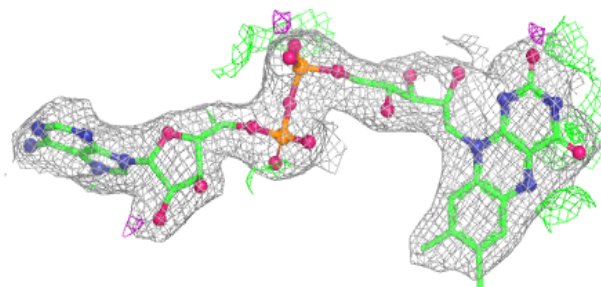
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
2	FAD	D	701	53/53	0.91	0.10	46,57,70,71	0
2	FAD	G	701	53/53	0.92	0.10	37,49,54,57	0
2	FAD	H	701	53/53	0.92	0.10	42,54,68,69	0
2	FAD	C	701	53/53	0.93	0.10	38,49,58,60	0
2	FAD	E	701	53/53	0.96	0.07	21,29,34,39	0
2	FAD	F	701	53/53	0.96	0.07	22,27,30,36	0
2	FAD	A	701	53/53	0.96	0.07	21,29,34,39	0
2	FAD	B	701	53/53	0.96	0.07	22,28,33,35	0

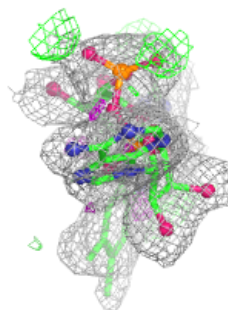
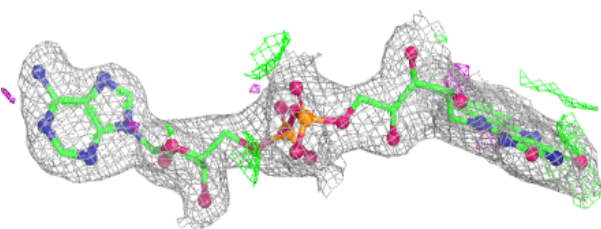
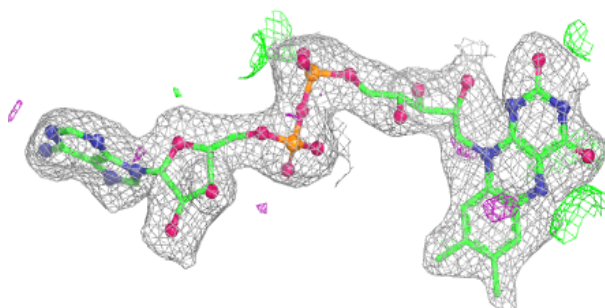
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

Electron density around FAD D 701:

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

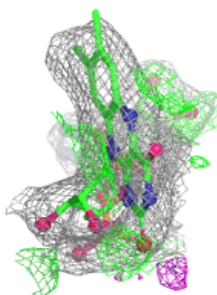
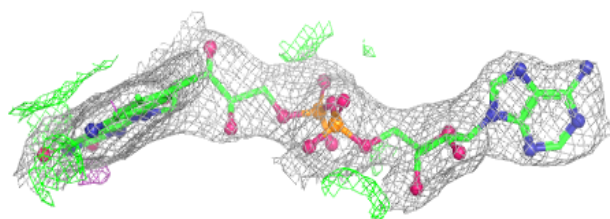
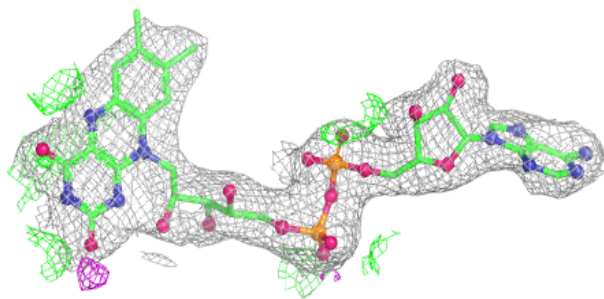
**Electron density around FAD G 701:**

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

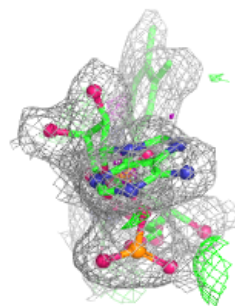
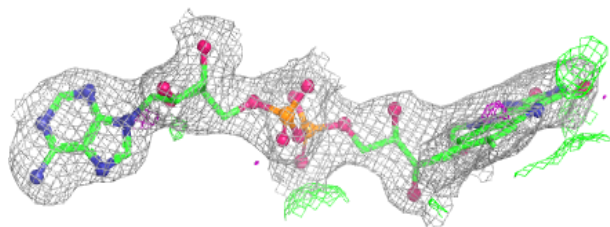
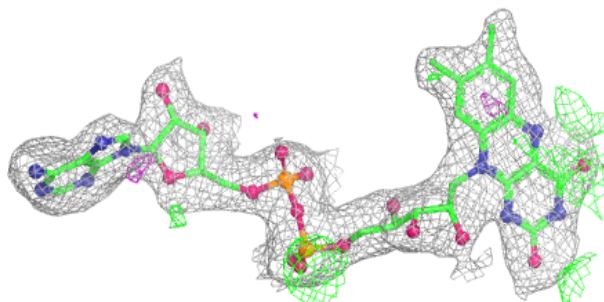


Electron density around FAD H 701:

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

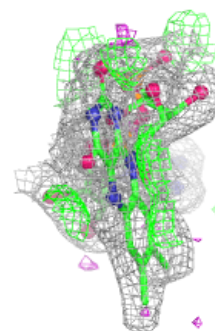
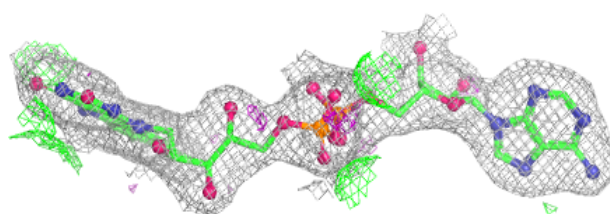
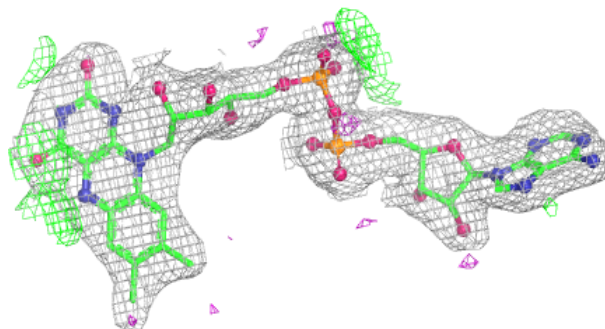
**Electron density around FAD C 701:**

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

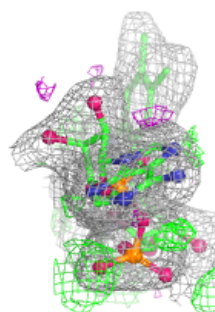
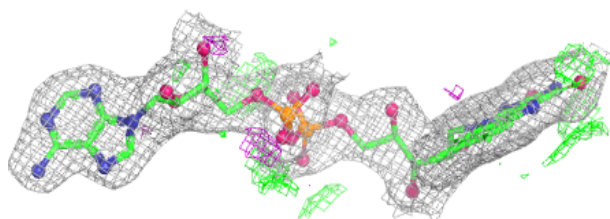
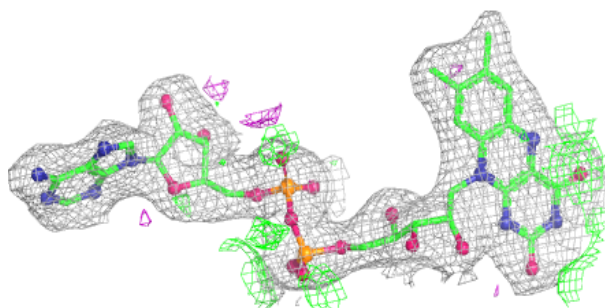


Electron density around FAD E 701:

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

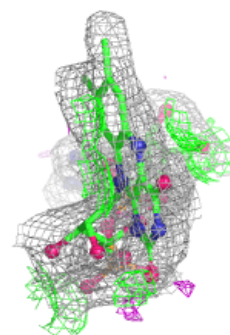
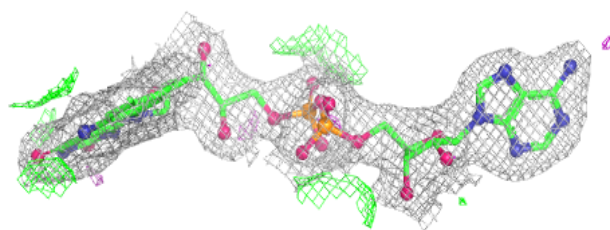
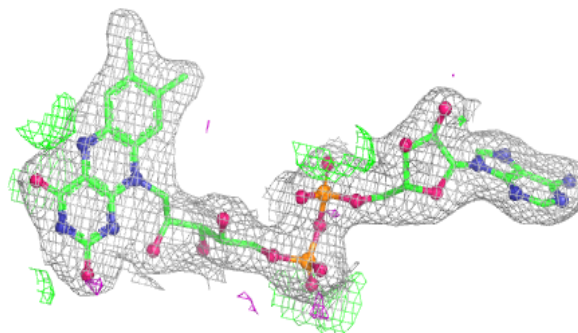
**Electron density around FAD F 701:**

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

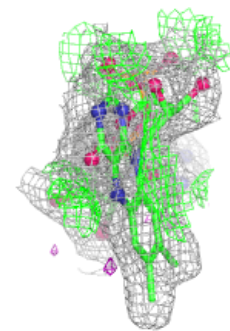
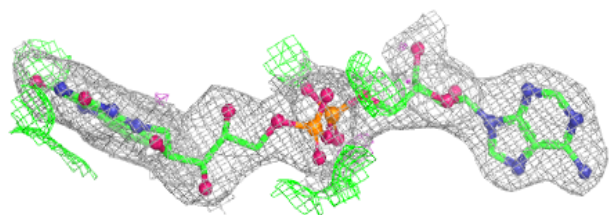
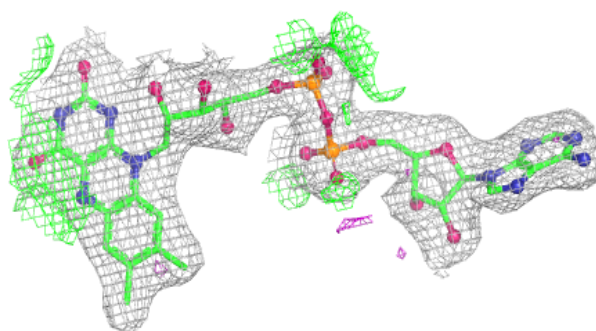


Electron density around FAD A 701:

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

**Electron density around FAD B 701:**

$2mF_o-DF_c$ (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.