Full wwPDB X-ray Structure Validation Report ⓘ

Aug 22, 2020 – 01:48 AM BST

PDB ID	:	5NHG
Title	:	Crystal structure of the human dihydrolipoamide dehydrogenase
Authors	:	Szabo, E.; Mizsei, R.; Wilk, P.; Zambo, Z.; Torocsik, B.; Weiss, M.S.; Adam-Vizi, V.; Ambrus, A.
Deposited on	:	2017-03-21
Resolution	:	2.27 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 following versions of software and data (see references ⓘ) were used in the production of this report:

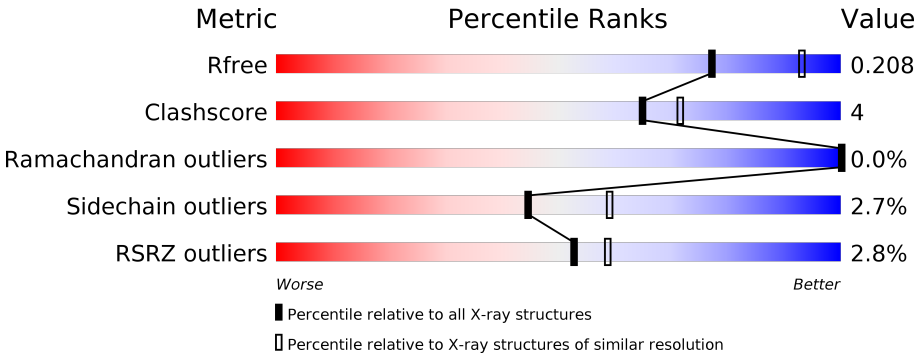
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.13.1
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & 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 2.27 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	6980 (2.30-2.26)
Clashscore	141614	7711 (2.30-2.26)
Ramachandran outliers	138981	7597 (2.30-2.26)
Sidechain outliers	138945	7598 (2.30-2.26)
RSRZ outliers	127900	6849 (2.30-2.26)

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 >=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 <=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	495	88% 7% 5%
1	B	495	89% 5% • 5%
1	C	495	88% 7% 5%
1	D	495	4% 81% 13% • 5%
1	E	495	3% 84% 9% • 5%
1	F	495	3% 87% 8% 5%

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Mol	Chain	Length	Quality of chain
1	G	495	3% 83% 12% 5%
1	H	495	7% 77% 17% 5%

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
4	BTB	C	503	-	-	X	-

2 Entry composition

There are 5 unique types of molecules in this entry. The entry contains 57485 atoms, of which 28705 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 Dihydrolipoyl dehydrogenase, mitochondrial.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
1	A	471	Total	C	H	N	O	S	0	0	0
			7056	2205	3558	605	669	19			
1	B	472	Total	C	H	N	O	S	0	0	0
			7070	2210	3563	607	671	19			
1	C	472	Total	C	H	N	O	S	0	0	0
			7071	2210	3564	607	671	19			
1	D	472	Total	C	H	N	O	S	0	0	0
			7063	2210	3556	607	671	19			
1	E	471	Total	C	H	N	O	S	0	0	0
			7054	2205	3556	605	669	19			
1	F	471	Total	C	H	N	O	S	0	0	0
			7053	2205	3555	605	669	19			
1	G	471	Total	C	H	N	O	S	0	0	0
			7054	2205	3556	605	669	19			
1	H	471	Total	C	H	N	O	S	0	0	0
			7054	2205	3556	605	669	19			

There are 168 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-20	ALA	-	expression tag	UNP P09622
A	-19	SER	-	expression tag	UNP P09622
A	-18	TRP	-	expression tag	UNP P09622
A	-17	SER	-	expression tag	UNP P09622
A	-16	HIS	-	expression tag	UNP P09622
A	-15	PRO	-	expression tag	UNP P09622
A	-14	GLN	-	expression tag	UNP P09622
A	-13	PHE	-	expression tag	UNP P09622
A	-12	GLU	-	expression tag	UNP P09622
A	-11	LYS	-	expression tag	UNP P09622
A	-10	GLY	-	expression tag	UNP P09622
A	-9	ALA	-	expression tag	UNP P09622
A	-8	LEU	-	expression tag	UNP P09622

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Chain	Residue	Modelled	Actual	Comment	Reference
A	-7	GLU	-	expression tag	UNP P09622
A	-6	VAL	-	expression tag	UNP P09622
A	-5	LEU	-	expression tag	UNP P09622
A	-4	PHE	-	expression tag	UNP P09622
A	-3	GLN	-	expression tag	UNP P09622
A	-2	GLY	-	expression tag	UNP P09622
A	-1	PRO	-	expression tag	UNP P09622
A	0	GLY	-	expression tag	UNP P09622
B	-20	ALA	-	expression tag	UNP P09622
B	-19	SER	-	expression tag	UNP P09622
B	-18	TRP	-	expression tag	UNP P09622
B	-17	SER	-	expression tag	UNP P09622
B	-16	HIS	-	expression tag	UNP P09622
B	-15	PRO	-	expression tag	UNP P09622
B	-14	GLN	-	expression tag	UNP P09622
B	-13	PHE	-	expression tag	UNP P09622
B	-12	GLU	-	expression tag	UNP P09622
B	-11	LYS	-	expression tag	UNP P09622
B	-10	GLY	-	expression tag	UNP P09622
B	-9	ALA	-	expression tag	UNP P09622
B	-8	LEU	-	expression tag	UNP P09622
B	-7	GLU	-	expression tag	UNP P09622
B	-6	VAL	-	expression tag	UNP P09622
B	-5	LEU	-	expression tag	UNP P09622
B	-4	PHE	-	expression tag	UNP P09622
B	-3	GLN	-	expression tag	UNP P09622
B	-2	GLY	-	expression tag	UNP P09622
B	-1	PRO	-	expression tag	UNP P09622
B	0	GLY	-	expression tag	UNP P09622
C	-20	ALA	-	expression tag	UNP P09622
C	-19	SER	-	expression tag	UNP P09622
C	-18	TRP	-	expression tag	UNP P09622
C	-17	SER	-	expression tag	UNP P09622
C	-16	HIS	-	expression tag	UNP P09622
C	-15	PRO	-	expression tag	UNP P09622
C	-14	GLN	-	expression tag	UNP P09622
C	-13	PHE	-	expression tag	UNP P09622
C	-12	GLU	-	expression tag	UNP P09622
C	-11	LYS	-	expression tag	UNP P09622
C	-10	GLY	-	expression tag	UNP P09622
C	-9	ALA	-	expression tag	UNP P09622
C	-8	LEU	-	expression tag	UNP P09622

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Chain	Residue	Modelled	Actual	Comment	Reference
C	-7	GLU	-	expression tag	UNP P09622
C	-6	VAL	-	expression tag	UNP P09622
C	-5	LEU	-	expression tag	UNP P09622
C	-4	PHE	-	expression tag	UNP P09622
C	-3	GLN	-	expression tag	UNP P09622
C	-2	GLY	-	expression tag	UNP P09622
C	-1	PRO	-	expression tag	UNP P09622
C	0	GLY	-	expression tag	UNP P09622
D	-20	ALA	-	expression tag	UNP P09622
D	-19	SER	-	expression tag	UNP P09622
D	-18	TRP	-	expression tag	UNP P09622
D	-17	SER	-	expression tag	UNP P09622
D	-16	HIS	-	expression tag	UNP P09622
D	-15	PRO	-	expression tag	UNP P09622
D	-14	GLN	-	expression tag	UNP P09622
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D	-12	GLU	-	expression tag	UNP P09622
D	-11	LYS	-	expression tag	UNP P09622
D	-10	GLY	-	expression tag	UNP P09622
D	-9	ALA	-	expression tag	UNP P09622
D	-8	LEU	-	expression tag	UNP P09622
D	-7	GLU	-	expression tag	UNP P09622
D	-6	VAL	-	expression tag	UNP P09622
D	-5	LEU	-	expression tag	UNP P09622
D	-4	PHE	-	expression tag	UNP P09622
D	-3	GLN	-	expression tag	UNP P09622
D	-2	GLY	-	expression tag	UNP P09622
D	-1	PRO	-	expression tag	UNP P09622
D	0	GLY	-	expression tag	UNP P09622
E	-20	ALA	-	expression tag	UNP P09622
E	-19	SER	-	expression tag	UNP P09622
E	-18	TRP	-	expression tag	UNP P09622
E	-17	SER	-	expression tag	UNP P09622
E	-16	HIS	-	expression tag	UNP P09622
E	-15	PRO	-	expression tag	UNP P09622
E	-14	GLN	-	expression tag	UNP P09622
E	-13	PHE	-	expression tag	UNP P09622
E	-12	GLU	-	expression tag	UNP P09622
E	-11	LYS	-	expression tag	UNP P09622
E	-10	GLY	-	expression tag	UNP P09622
E	-9	ALA	-	expression tag	UNP P09622
E	-8	LEU	-	expression tag	UNP P09622

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Chain	Residue	Modelled	Actual	Comment	Reference
E	-7	GLU	-	expression tag	UNP P09622
E	-6	VAL	-	expression tag	UNP P09622
E	-5	LEU	-	expression tag	UNP P09622
E	-4	PHE	-	expression tag	UNP P09622
E	-3	GLN	-	expression tag	UNP P09622
E	-2	GLY	-	expression tag	UNP P09622
E	-1	PRO	-	expression tag	UNP P09622
E	0	GLY	-	expression tag	UNP P09622
F	-20	ALA	-	expression tag	UNP P09622
F	-19	SER	-	expression tag	UNP P09622
F	-18	TRP	-	expression tag	UNP P09622
F	-17	SER	-	expression tag	UNP P09622
F	-16	HIS	-	expression tag	UNP P09622
F	-15	PRO	-	expression tag	UNP P09622
F	-14	GLN	-	expression tag	UNP P09622
F	-13	PHE	-	expression tag	UNP P09622
F	-12	GLU	-	expression tag	UNP P09622
F	-11	LYS	-	expression tag	UNP P09622
F	-10	GLY	-	expression tag	UNP P09622
F	-9	ALA	-	expression tag	UNP P09622
F	-8	LEU	-	expression tag	UNP P09622
F	-7	GLU	-	expression tag	UNP P09622
F	-6	VAL	-	expression tag	UNP P09622
F	-5	LEU	-	expression tag	UNP P09622
F	-4	PHE	-	expression tag	UNP P09622
F	-3	GLN	-	expression tag	UNP P09622
F	-2	GLY	-	expression tag	UNP P09622
F	-1	PRO	-	expression tag	UNP P09622
F	0	GLY	-	expression tag	UNP P09622
G	-20	ALA	-	expression tag	UNP P09622
G	-19	SER	-	expression tag	UNP P09622
G	-18	TRP	-	expression tag	UNP P09622
G	-17	SER	-	expression tag	UNP P09622
G	-16	HIS	-	expression tag	UNP P09622
G	-15	PRO	-	expression tag	UNP P09622
G	-14	GLN	-	expression tag	UNP P09622
G	-13	PHE	-	expression tag	UNP P09622
G	-12	GLU	-	expression tag	UNP P09622
G	-11	LYS	-	expression tag	UNP P09622
G	-10	GLY	-	expression tag	UNP P09622
G	-9	ALA	-	expression tag	UNP P09622
G	-8	LEU	-	expression tag	UNP P09622

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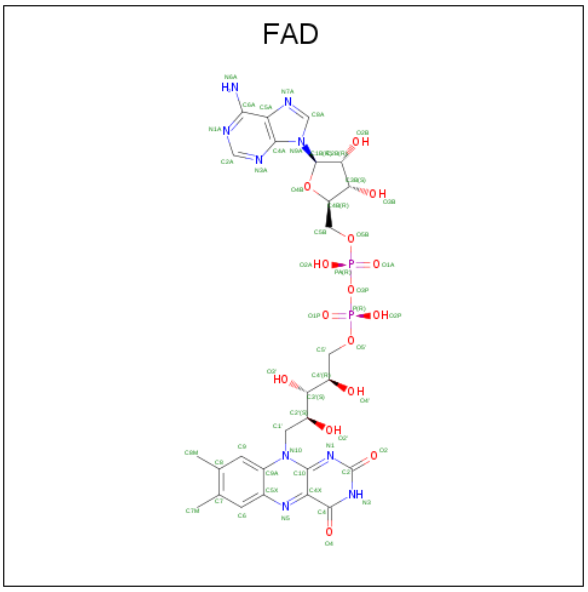
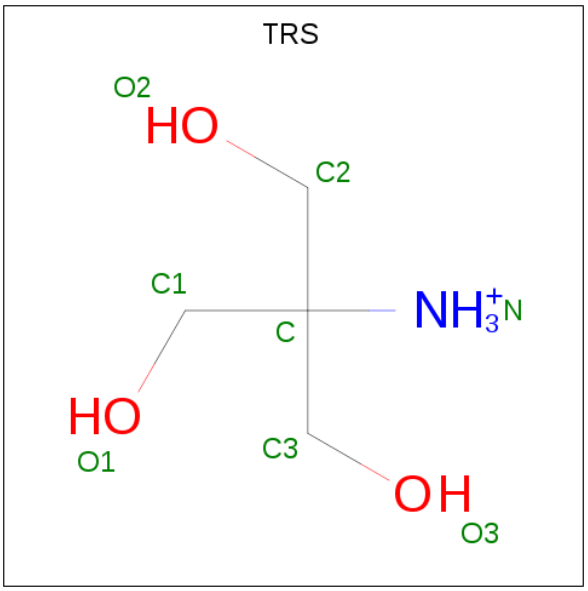
Chain	Residue	Modelled	Actual	Comment	Reference
G	-7	GLU	-	expression tag	UNP P09622
G	-6	VAL	-	expression tag	UNP P09622
G	-5	LEU	-	expression tag	UNP P09622
G	-4	PHE	-	expression tag	UNP P09622
G	-3	GLN	-	expression tag	UNP P09622
G	-2	GLY	-	expression tag	UNP P09622
G	-1	PRO	-	expression tag	UNP P09622
G	0	GLY	-	expression tag	UNP P09622
H	-20	ALA	-	expression tag	UNP P09622
H	-19	SER	-	expression tag	UNP P09622
H	-18	TRP	-	expression tag	UNP P09622
H	-17	SER	-	expression tag	UNP P09622
H	-16	HIS	-	expression tag	UNP P09622
H	-15	PRO	-	expression tag	UNP P09622
H	-14	GLN	-	expression tag	UNP P09622
H	-13	PHE	-	expression tag	UNP P09622
H	-12	GLU	-	expression tag	UNP P09622
H	-11	LYS	-	expression tag	UNP P09622
H	-10	GLY	-	expression tag	UNP P09622
H	-9	ALA	-	expression tag	UNP P09622
H	-8	LEU	-	expression tag	UNP P09622
H	-7	GLU	-	expression tag	UNP P09622
H	-6	VAL	-	expression tag	UNP P09622
H	-5	LEU	-	expression tag	UNP P09622
H	-4	PHE	-	expression tag	UNP P09622
H	-3	GLN	-	expression tag	UNP P09622
H	-2	GLY	-	expression tag	UNP P09622
H	-1	PRO	-	expression tag	UNP P09622
H	0	GLY	-	expression tag	UNP P09622

- Molecule 2 is FLAVIN-ADENINE DINUCLEOTIDE (three-letter code: FAD) (formula: $C_{27}H_{33}N_9O_{15}P_2$).



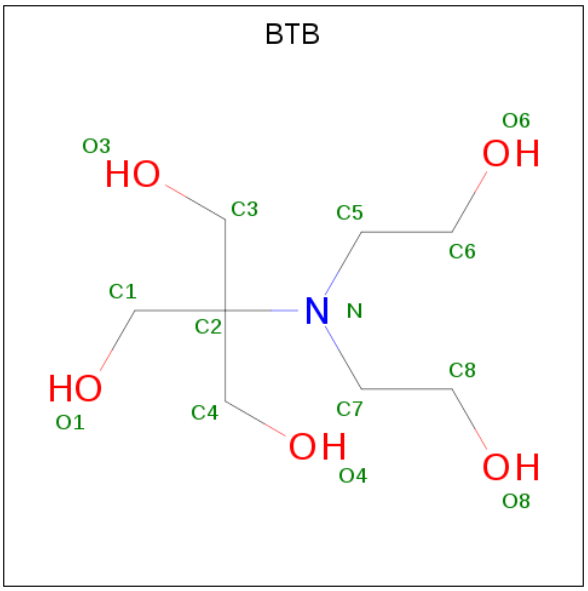
Mol	Chain	Residues	Atoms						ZeroOcc	AltConf
2	A	1	Total	C	H	N	O	P	0	0
			83	27	30	9	15	2		
2	B	1	Total	C	H	N	O	P	0	0
			83	27	30	9	15	2		
2	C	1	Total	C	H	N	O	P	0	0
			83	27	30	9	15	2		
2	D	1	Total	C	H	N	O	P	0	0
			83	27	30	9	15	2		
2	E	1	Total	C	H	N	O	P	0	0
			83	27	30	9	15	2		
2	F	1	Total	C	H	N	O	P	0	0
			83	27	30	9	15	2		
2	G	1	Total	C	H	N	O	P	0	0
			83	27	30	9	15	2		
2	H	1	Total	C	H	N	O	P	0	0
			84	27	31	9	15	2		

- Molecule 3 is 2-AMINO-2-HYDROXYMETHYL-PROPANE-1,3-DIOL (three-letter code: TRS) (formula: $C_4H_{12}NO_3$).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	1	Total C N O 8 4 1 3	0	0
3	A	1	Total C N O 8 4 1 3	0	0
3	C	1	Total C N O 8 4 1 3	0	0
3	E	1	Total C N O 8 4 1 3	0	0
3	E	1	Total C N O 8 4 1 3	0	0
3	F	1	Total C N O 8 4 1 3	0	0
3	G	1	Total C N O 8 4 1 3	0	0

- Molecule 4 is 2-[BIS-(2-HYDROXY-ETHYL)-AMINO]-2-HYDROXYMETHYL-PROPANE-1,3-DIOL (three-letter code: BTB) (formula: $C_8H_{19}NO_5$).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	C	1	Total C N O 14 8 1 5	0	0

- Molecule 5 is water.

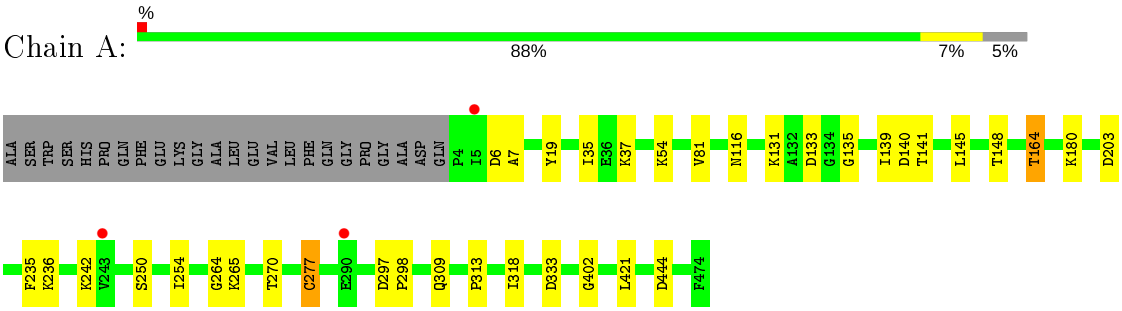
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	A	58	Total O 58 58	0	0
5	B	62	Total O 62 62	0	0
5	C	48	Total O 48 48	0	0
5	D	15	Total O 15 15	0	0
5	E	35	Total O 35 35	0	0
5	F	22	Total O 22 22	0	0
5	G	21	Total O 21 21	0	0
5	H	14	Total O 14 14	0	0

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.

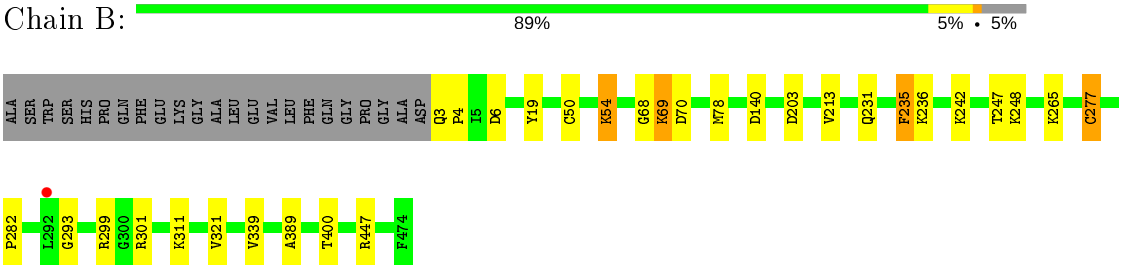
- Molecule 1: Dihydrolipoyl dehydrogenase, mitochondrial

Chain A:



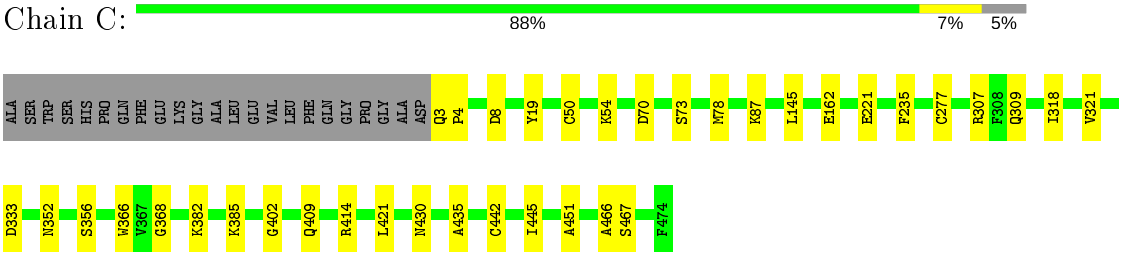
- Molecule 1: Dihydrolipoyl dehydrogenase, mitochondrial

Chain B:



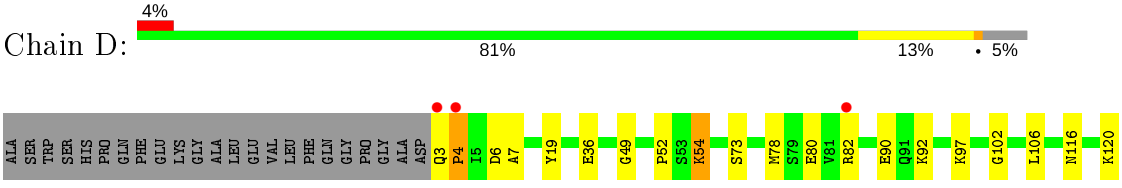
- Molecule 1: Dihydrolipoyl dehydrogenase, mitochondrial

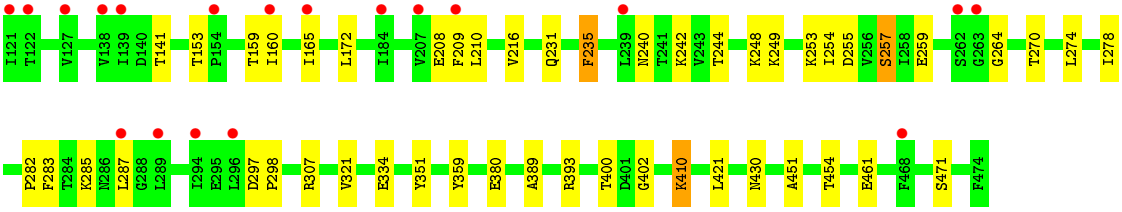
Chain C:



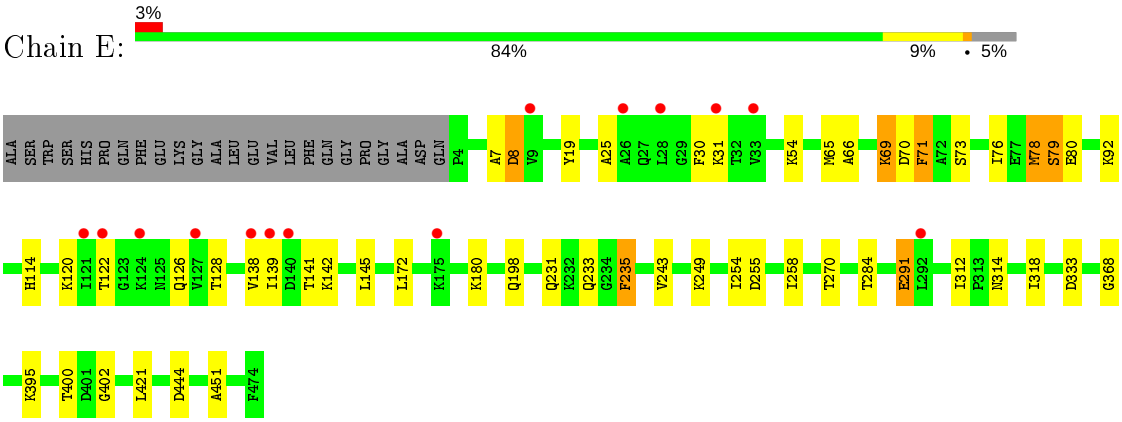
- Molecule 1: Dihydrolipoyl dehydrogenase, mitochondrial

Chain D:

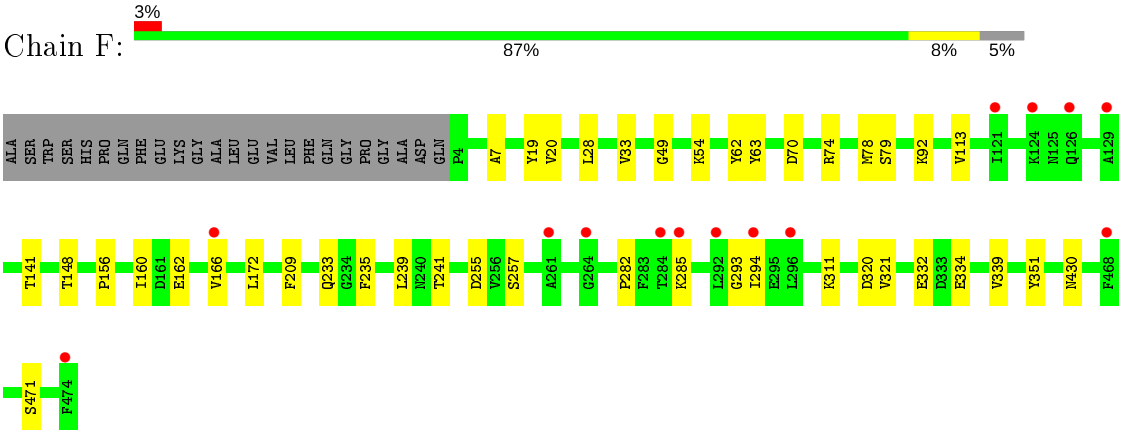




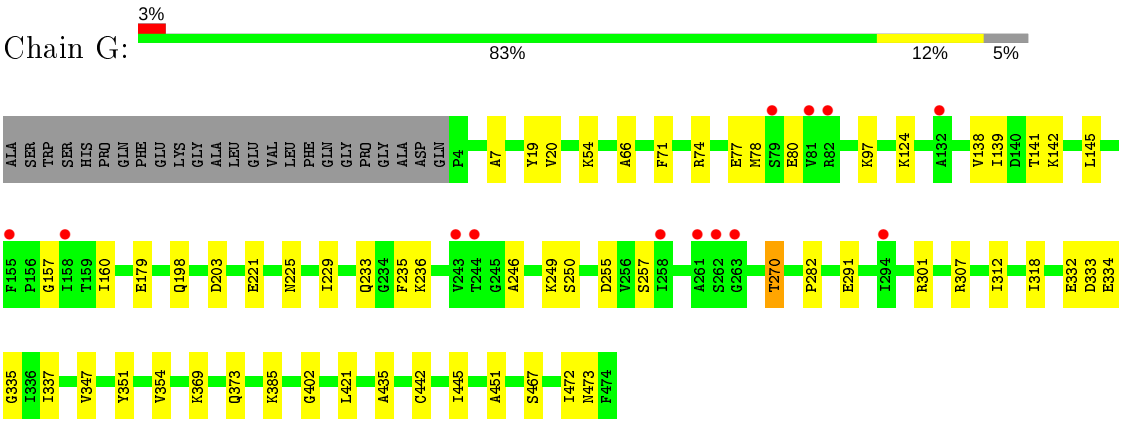
• Molecule 1: Dihydrolipoyl dehydrogenase, mitochondrial



• Molecule 1: Dihydrolipoyl dehydrogenase, mitochondrial

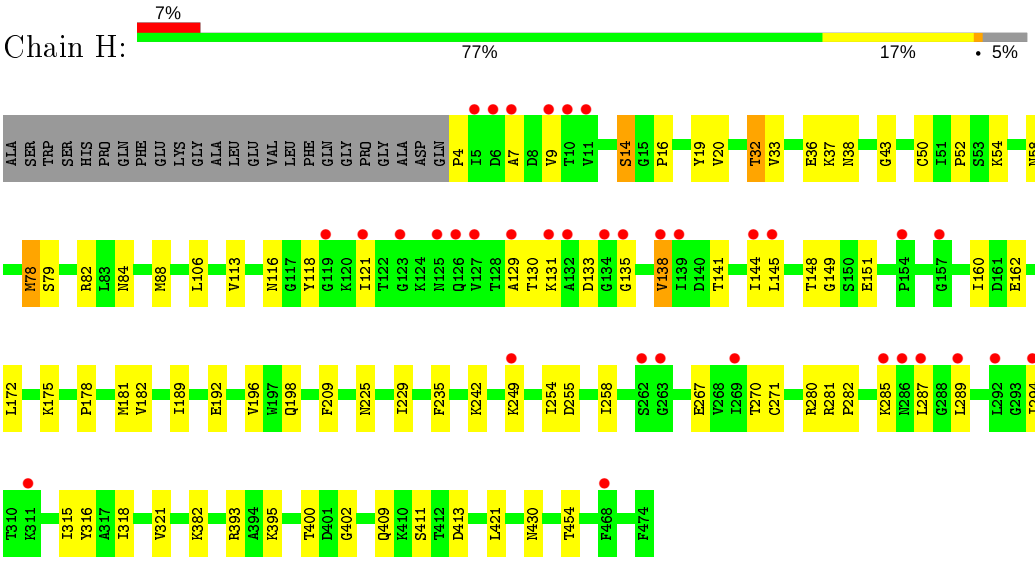


• Molecule 1: Dihydrolipoyl dehydrogenase, mitochondrial



• Molecule 1: Dihydrolipoyl dehydrogenase, mitochondrial

Chain H:


7%
77%
17%
• 5%
ALA SER TRP SER HIS PRO GLN PHE GLU LYS GLY ALA LEU GLU VAL LEU PHE GLN GLY PRO GLY ALA ASP GLN P4 I5 D6 A7 D8 V9 T10 V11 S14 G15 P16 Y19 V20 T32 V33 E36 K37 N38 G43 C50 I51 P52 S53 K54 N58 Y62 F71
M78 S79 R82 L83 N84 M88 L106 V113 N116 G117 Y118 G119 K120 I121 T122 G123 K124 N125 Q126 V127 T128 A129 T130 K131 A132 D133 G134 G135 V138 I139 D140 T141 I144 L145 T148 G149 S150 E151 P154 G157 I160 D161 E162 V166 S167 S168
L172 K175 P178 M181 V182 I189 E192 V196 W197 Q198 F209 N225 I229 F235 K242 K249 I254 D255 I258 S262 G263 E267 V268 I269 T270 C271 R280 R281 P282 K285 N286 L287 G288 L289 L292 G293 I294 T306 Q309
T310 K311 I315 Y316 A317 I318 V321 K382 R393 A394 K395 T400 D401 G402 Q409 K410 S411 T412 D413 L421 M430 T454 F468 F474

4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, α, β, γ	60.06Å 113.54Å 136.88Å 83.18° 84.75° 81.09°	Depositor
Resolution (Å)	46.62 – 2.27 46.62 – 2.27	Depositor EDS
% Data completeness (in resolution range)	93.0 (46.62-2.27) 95.1 (46.62-2.27)	Depositor EDS
R_{merge}	0.06	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.54 (at 2.27Å)	Xtriage
Refinement program	PHENIX	Depositor
R, R_{free}	0.180 , 0.210 0.181 , 0.208	Depositor DCC
R_{free} test set	2310 reflections (1.49%)	wwPDB-VP
Wilson B-factor (Å^2)	48.7	Xtriage
Anisotropy	0.286	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.37 , 44.7	EDS
L-test for twinning[2]	$< \|L\| > = 0.48$, $< L^2 > = 0.31$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.96	EDS
Total number of atoms	57485	wwPDB-VP
Average B, all atoms (Å^2)	74.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 12.76% of the height of the origin peak. No significant pseudotranslation is detected.*

[1] Intensities estimated from amplitudes.

[2] Theoretical values of $< |L| >$, $< L^2 >$ 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: TRS, FAD, BTB

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	0.39	1/3553 (0.0%)	0.58	0/4797
1	B	0.39	1/3562 (0.0%)	0.58	0/4810
1	C	0.38	1/3562 (0.0%)	0.56	0/4810
1	D	0.35	0/3562	0.57	0/4810
1	E	0.38	0/3553	0.60	2/4797 (0.0%)
1	F	0.35	0/3553	0.57	0/4797
1	G	0.36	0/3553	0.57	0/4797
1	H	0.37	1/3553 (0.0%)	0.60	0/4797
All	All	0.37	4/28451 (0.0%)	0.58	2/38415 (0.0%)

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	277	CYS	CB-SG	-6.43	1.71	1.82
1	H	138	VAL	CB-CG1	-6.27	1.39	1.52
1	C	277	CYS	CB-SG	-5.93	1.72	1.81
1	B	277	CYS	CB-SG	-5.39	1.73	1.81

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	E	8	ASP	CB-CG-OD1	7.30	124.87	118.30
1	E	71	PHE	CB-CG-CD2	-5.00	117.30	120.80

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	3498	3558	3555	20	0
1	B	3507	3563	3562	17	2
1	C	3507	3564	3562	21	2
1	D	3507	3556	3562	40	2
1	E	3498	3556	3555	35	2
1	F	3498	3555	3555	26	0
1	G	3498	3556	3555	39	4
1	H	3498	3556	3555	50	0
2	A	53	30	31	1	0
2	B	53	30	31	0	0
2	C	53	30	31	0	0
2	D	53	30	31	2	0
2	E	53	30	31	0	0
2	F	53	30	31	2	0
2	G	53	30	31	0	0
2	H	53	31	31	3	0
3	A	16	0	24	4	0
3	C	8	0	12	0	0
3	E	16	0	24	1	0
3	F	8	0	12	1	0
3	G	8	0	12	0	0
4	C	14	0	19	15	0
5	A	58	0	0	0	0
5	B	62	0	0	3	0
5	C	48	0	0	0	0
5	D	15	0	0	1	0
5	E	35	0	0	0	0
5	F	22	0	0	3	0
5	G	21	0	0	1	0
5	H	14	0	0	2	0
All	All	28780	28705	28812	237	6

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:C:366:TRP:HE1	4:C:503:BTB:H42	1.27	0.97
4:C:503:BTB:H82	4:C:503:BTB:H41	1.43	0.96
1:F:293:GLY:O	1:F:311:LYS:NZ	2.01	0.93
1:E:291:GLU:N	1:E:291:GLU:OE2	2.07	0.88
1:B:203:ASP:OD1	1:B:236:LYS:NZ	2.09	0.85
1:G:77:GLU:OE1	1:H:82:ARG:NH2	2.09	0.85
4:C:503:BTB:C8	4:C:503:BTB:H41	2.08	0.82
4:C:503:BTB:H62	4:C:503:BTB:O1	1.86	0.76
1:A:164:THR:CG2	1:A:254:ILE:HD11	2.16	0.74
1:H:4:PRO:HD2	1:H:138:VAL:HB	1.69	0.74
1:G:142:LYS:NZ	5:G:601:HOH:O	2.22	0.73
1:G:221:GLU:OE2	1:G:385:LYS:NZ	2.21	0.73
1:H:130:THR:OG1	5:H:601:HOH:O	2.06	0.73
1:C:368:GLY:O	4:C:503:BTB:H51	1.88	0.72
1:C:409:GLN:OE1	1:C:414:ARG:NH2	2.22	0.72
1:E:368:GLY:O	3:E:503:TRS:H11	1.91	0.70
3:A:503:TRS:H31	1:E:444:ASP:OD2	1.92	0.70
1:F:320:ASP:O	5:F:601:HOH:O	2.08	0.69
3:A:502:TRS:O1	3:A:502:TRS:O2	2.10	0.69
1:D:80:GLU:OE1	1:D:82:ARG:NE	2.27	0.68
1:F:70:ASP:OD1	1:F:74:ARG:NE	2.27	0.67
1:C:352:ASN:HA	4:C:503:BTB:H61	1.75	0.67
1:G:225:ASN:O	1:G:229:ILE:HD12	1.94	0.66
1:C:451:ALA:H	1:D:430:ASN:HD21	1.44	0.66
1:D:3:GLN:HB2	1:D:4:PRO:CD	2.27	0.65
4:C:503:BTB:H82	4:C:503:BTB:C4	2.23	0.65
1:H:121:ILE:O	5:H:602:HOH:O	2.15	0.65
1:D:334:GLU:OE2	1:D:351:TYR:OH	2.14	0.64
1:C:356:SER:OG	4:C:503:BTB:H82	2.00	0.62
1:D:36:GLU:O	1:D:116:ASN:ND2	2.30	0.61
1:H:58:ASN:O	1:H:62:TYR:CD2	2.55	0.60
3:F:502:TRS:H32	5:F:620:HOH:O	2.02	0.59
1:B:301:ARG:NH1	5:B:603:HOH:O	2.34	0.59
1:H:116:ASN:O	1:H:131:LYS:NZ	2.33	0.59
1:C:368:GLY:O	4:C:503:BTB:C5	2.50	0.59
1:E:8:ASP:CG	1:E:31:LYS:HB3	2.22	0.59
1:H:178:PRO:HG2	1:H:181:MET:HE2	1.84	0.59
1:G:74:ARG:O	1:H:88:MET:HG3	2.03	0.58
1:F:233:GLN:OE1	5:F:602:HOH:O	2.16	0.58
1:H:133:ASP:OD1	1:H:135:GLY:N	2.25	0.58
1:A:444:ASP:OD2	3:A:503:TRS:H11	2.03	0.57
1:G:255:ASP:OD1	1:G:270:THR:HG23	2.05	0.57

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:H:192:GLU:O	1:H:196:VAL:HG23	2.05	0.57
1:G:312:ILE:N	1:G:312:ILE:HD12	2.20	0.57
1:A:164:THR:HG23	1:A:254:ILE:HD11	1.86	0.56
1:G:472:ILE:HD13	1:H:20:VAL:HG13	1.87	0.56
1:H:225:ASN:O	1:H:229:ILE:HD12	2.06	0.56
1:H:33:VAL:HG22	1:H:113:VAL:HB	1.86	0.56
1:H:118:TYR:OH	1:H:285:LYS:O	2.19	0.56
1:C:430:ASN:HD21	1:D:451:ALA:H	1.53	0.55
1:H:249:LYS:HD2	1:H:255:ASP:OD1	2.07	0.55
1:G:249:LYS:HE3	1:G:255:ASP:OD1	2.07	0.55
1:C:221:GLU:OE2	1:C:385:LYS:NZ	2.26	0.55
1:D:3:GLN:HB2	1:D:4:PRO:HD3	1.88	0.54
1:D:3:GLN:CB	1:D:4:PRO:HD3	2.38	0.54
1:D:3:GLN:CB	1:D:4:PRO:CD	2.86	0.54
4:C:503:BTB:H62	4:C:503:BTB:C1	2.38	0.53
1:H:52:PRO:HB2	1:H:172:LEU:HD22	1.90	0.53
4:C:503:BTB:C4	4:C:503:BTB:C8	2.82	0.53
1:E:8:ASP:OD1	1:E:31:LYS:HB3	2.08	0.53
1:E:70:ASP:O	1:E:73:SER:OG	2.25	0.52
1:G:66:ALA:HA	1:G:71:PHE:CD2	2.44	0.52
1:C:70:ASP:O	1:C:73:SER:OG	2.26	0.52
1:G:225:ASN:O	1:G:229:ILE:CD1	2.56	0.52
1:B:247:THR:HG22	1:B:248:LYS:O	2.10	0.52
1:G:337:ILE:HB	1:G:347:VAL:HG13	1.91	0.52
1:D:307:ARG:HD2	1:H:306:THR:HG21	1.92	0.51
1:D:244:THR:OG1	1:D:257:SER:HB2	2.10	0.51
1:H:37:LYS:NZ	1:H:38:ASN:OD1	2.37	0.51
1:E:66:ALA:HA	1:E:71:PHE:CD2	2.45	0.51
1:G:369:LYS:HA	1:G:373:GLN:OE1	2.11	0.51
1:C:356:SER:OG	4:C:503:BTB:C8	2.59	0.51
1:F:7:ALA:O	1:F:141:THR:HA	2.11	0.51
1:E:451:ALA:H	1:F:430:ASN:HD21	1.59	0.50
1:G:198:GLN:NE2	1:G:233:GLN:O	2.45	0.50
1:H:189:ILE:H	1:H:189:ILE:HD12	1.76	0.50
1:A:6:ASP:HA	1:A:140:ASP:O	2.12	0.50
1:E:145:LEU:HD11	1:E:318:ILE:HG12	1.94	0.50
1:D:7:ALA:O	1:D:141:THR:HA	2.12	0.49
1:D:254:ILE:O	1:D:270:THR:HA	2.12	0.49
1:A:37:LYS:NZ	3:A:502:TRS:H22	2.27	0.49
1:D:249:LYS:CD	1:D:255:ASP:OD1	2.60	0.49
1:E:180:LYS:HD3	1:E:270:THR:O	2.13	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:F:28:LEU:HD12	1:F:339:VAL:HG12	1.93	0.49
1:E:7:ALA:O	1:E:141:THR:HA	2.11	0.49
1:G:203:ASP:OD1	1:G:236:LYS:NZ	2.41	0.49
1:H:149:GLY:O	1:H:321:VAL:HG12	2.13	0.49
1:E:92:LYS:NZ	1:E:172:LEU:O	2.46	0.49
1:H:382:LYS:NZ	1:H:413:ASP:OD1	2.29	0.48
4:C:503:BTB:C1	4:C:503:BTB:C6	2.91	0.48
1:D:283:PHE:CZ	1:D:285:LYS:HB3	2.49	0.48
1:D:402:GLY:HA3	1:D:421:LEU:O	2.13	0.48
1:E:71:PHE:HE1	1:F:62:TYR:HB3	1.78	0.48
1:E:8:ASP:O	1:E:142:LYS:HB2	2.13	0.48
1:E:7:ALA:HA	1:E:31:LYS:CG	2.44	0.48
1:B:3:GLN:HB3	1:B:4:PRO:HD2	1.96	0.48
1:D:160:ILE:HD13	5:D:615:HOH:O	2.14	0.48
1:G:402:GLY:HA3	1:G:421:LEU:O	2.14	0.47
1:G:77:GLU:HB3	1:H:82:ARG:NH1	2.30	0.47
1:G:71:PHE:HE2	1:H:71:PHE:HE2	1.63	0.47
1:H:225:ASN:O	1:H:229:ILE:CD1	2.62	0.47
1:C:3:GLN:N	1:C:4:PRO:CD	2.78	0.47
1:D:208:GLU:OE2	1:D:210:LEU:HD13	2.15	0.47
1:H:287:LEU:HD23	1:H:289:LEU:HD11	1.95	0.47
1:D:461:GLU:OE1	1:D:471:SER:HB2	2.15	0.47
1:H:145:LEU:HD11	1:H:318:ILE:HG12	1.96	0.47
1:H:148:THR:O	2:H:500:FAD:H8A	2.14	0.47
1:H:151:GLU:N	1:H:281:ARG:O	2.38	0.47
1:D:231:GLN:HA	1:D:235:PHE:O	2.15	0.47
1:A:35:ILE:HD11	1:A:139:ILE:HD13	1.97	0.46
1:F:33:VAL:HG22	1:F:113:VAL:HB	1.98	0.46
1:E:71:PHE:CE1	1:F:62:TYR:HB3	2.50	0.46
1:G:473:ASN:HA	1:H:106:LEU:CD1	2.45	0.46
1:D:102:GLY:O	1:D:106:LEU:HG	2.15	0.46
1:D:249:LYS:HE3	1:D:253:LYS:HB2	1.96	0.46
1:B:293:GLY:O	1:B:311:LYS:NZ	2.38	0.46
1:A:81:VAL:HG22	1:B:78:MET:HG2	1.98	0.46
1:G:435:ALA:HB1	1:G:445:ILE:HD11	1.98	0.46
1:G:451:ALA:H	1:H:430:ASN:HD21	1.62	0.46
1:G:80:GLU:O	1:H:78:MET:HA	2.16	0.46
1:E:395:LYS:HD2	1:E:400:THR:HG21	1.98	0.46
1:H:14:SER:HB3	1:H:36:GLU:HB2	1.96	0.46
1:A:309:GLN:NE2	1:A:313:PRO:O	2.45	0.46
1:A:180:LYS:HE2	1:A:270:THR:O	2.16	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:389:ALA:HA	1:D:400:THR:HB	1.98	0.46
1:E:80:GLU:O	1:F:78:MET:HA	2.16	0.46
1:A:164:THR:HG22	1:A:254:ILE:HD11	1.95	0.45
1:G:442:CYS:HB2	1:G:467:SER:HB2	1.98	0.45
1:H:160:ILE:HD12	1:H:160:ILE:N	2.32	0.45
1:A:145:LEU:HD11	1:A:318:ILE:HG12	1.98	0.45
1:D:165:ILE:HD13	1:D:274:LEU:HD23	1.98	0.45
1:H:162:GLU:HA	1:H:166:VAL:HG12	1.97	0.45
1:E:312:ILE:HG22	1:E:314:ASN:OD1	2.16	0.45
1:H:9:VAL:HB	1:H:32:THR:HG23	1.99	0.45
1:G:160:ILE:N	1:G:160:ILE:HD12	2.32	0.45
1:D:92:LYS:NZ	1:D:172:LEU:O	2.48	0.45
1:F:239:LEU:O	1:F:241:THR:HG23	2.17	0.45
1:C:307:ARG:NH1	1:C:309:GLN:OE1	2.50	0.45
1:F:49:GLY:HA2	2:F:501:FAD:C7	2.46	0.45
1:G:351:TYR:HA	1:G:354:VAL:HG23	1.99	0.45
1:E:254:ILE:O	1:E:270:THR:HA	2.16	0.44
1:G:124:LYS:HE2	1:G:312:ILE:HG23	1.99	0.44
1:E:249:LYS:HE3	1:E:255:ASP:OD2	2.16	0.44
1:H:144:ILE:HB	1:H:315:ILE:HG12	1.99	0.44
1:D:297:ASP:HB2	1:D:298:PRO:HD2	1.98	0.44
1:G:312:ILE:N	1:G:312:ILE:CD1	2.81	0.44
1:A:297:ASP:HB2	1:A:298:PRO:HD2	1.99	0.44
1:E:120:LYS:HE3	1:E:122:THR:HG22	1.99	0.44
1:F:334:GLU:OE2	1:F:351:TYR:OH	2.21	0.44
1:C:87:LYS:HE3	1:D:73:SER:HA	2.00	0.44
1:D:160:ILE:HD12	1:D:160:ILE:N	2.33	0.44
1:D:153:THR:O	1:D:278:ILE:HD11	2.18	0.44
1:F:20:VAL:HG21	1:F:332:GLU:HG2	2.00	0.44
1:F:156:PRO:C	1:G:157:GLY:HA2	2.38	0.44
1:G:246:ALA:HA	1:G:255:ASP:O	2.18	0.44
1:H:402:GLY:HA3	1:H:421:LEU:O	2.18	0.44
1:B:69:LYS:HD2	1:B:70:ASP:N	2.32	0.44
1:E:198:GLN:NE2	1:E:233:GLN:O	2.51	0.44
1:E:231:GLN:HA	1:E:235:PHE:O	2.18	0.43
1:C:162:GLU:HA	1:C:162:GLU:OE1	2.18	0.43
1:D:52:PRO:HA	1:D:92:LYS:HG3	2.00	0.43
1:E:138:VAL:C	1:E:139:ILE:HD12	2.39	0.43
1:G:334:GLU:OE2	1:G:351:TYR:OH	2.21	0.43
1:E:7:ALA:HA	1:E:31:LYS:HG2	2.00	0.43
1:A:116:ASN:O	1:A:131:LYS:HG2	2.19	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:282:PRO:HG2	1:B:301:ARG:HG3	2.00	0.43
1:D:393:ARG:HD2	1:D:454:THR:HA	2.01	0.43
1:B:3:GLN:HB3	1:B:4:PRO:CD	2.49	0.43
1:D:259:GLU:HB2	1:D:264:GLY:O	2.18	0.43
1:E:79:SER:HB2	1:F:79:SER:OG	2.18	0.43
1:G:291:GLU:N	1:G:291:GLU:OE1	2.37	0.43
1:B:299:ARG:HB2	1:B:301:ARG:HD2	2.00	0.43
1:F:160:ILE:HD12	1:F:160:ILE:N	2.34	0.43
1:F:294:ILE:HA	1:F:311:LYS:HE3	2.01	0.43
1:H:118:TYR:O	1:H:129:ALA:HA	2.19	0.43
1:A:254:ILE:O	1:A:270:THR:HA	2.19	0.43
1:B:68:GLY:O	5:B:601:HOH:O	2.21	0.43
1:B:389:ALA:HA	1:B:400:THR:HB	2.01	0.42
1:H:282:PRO:HB3	1:H:321:VAL:HA	2.01	0.42
1:H:409:GLN:OE1	1:H:411:SER:N	2.51	0.42
1:C:442:CYS:HB2	1:C:467:SER:HB3	2.01	0.42
1:D:249:LYS:HD3	1:D:255:ASP:OD1	2.20	0.42
1:H:43:GLY:HA2	2:H:500:FAD:O3B	2.19	0.42
1:C:145:LEU:HD11	1:C:318:ILE:HG12	2.00	0.42
1:C:435:ALA:HB1	1:C:445:ILE:HD11	2.02	0.42
1:D:49:GLY:HA2	2:D:500:FAD:C7	2.48	0.42
1:E:25:ALA:O	1:E:30:PHE:HB2	2.19	0.42
1:F:282:PRO:HB3	1:F:321:VAL:HA	2.01	0.42
1:H:309:GLN:HG2	1:H:316:TYR:CE2	2.54	0.42
1:G:318:ILE:HD13	1:G:335:GLY:CA	2.49	0.42
1:H:182:VAL:HG23	1:H:271:CYS:HB3	2.02	0.42
1:H:7:ALA:O	1:H:141:THR:HA	2.20	0.42
1:A:133:ASP:OD1	1:A:135:GLY:N	2.39	0.42
1:A:148:THR:O	2:A:501:FAD:H8A	2.20	0.42
1:B:6:ASP:HA	1:B:140:ASP:O	2.18	0.42
1:C:366:TRP:NE1	4:C:503:BTB:H42	2.11	0.42
1:E:402:GLY:HA3	1:E:421:LEU:O	2.19	0.42
1:G:20:VAL:HG21	1:G:332:GLU:HG2	2.01	0.42
1:D:282:PRO:HB3	1:D:321:VAL:HA	2.01	0.42
1:E:71:PHE:HB3	1:E:76:ILE:HB	2.00	0.42
1:A:264:GLY:O	1:A:265:LYS:HB3	2.20	0.42
1:D:120:LYS:HG3	1:D:287:LEU:C	2.40	0.42
1:D:380:GLU:HB3	1:D:410:LYS:HD3	2.02	0.42
1:F:162:GLU:HA	1:F:166:VAL:HG12	2.01	0.42
1:F:294:ILE:HA	1:F:311:LYS:CE	2.49	0.42
1:G:138:VAL:C	1:G:139:ILE:HD12	2.40	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:H:209:PHE:HE2	1:H:242:LYS:HD3	1.85	0.42
1:H:395:LYS:HD2	1:H:400:THR:HG21	2.02	0.42
1:H:254:ILE:O	1:H:270:THR:HA	2.20	0.42
1:A:402:GLY:HA3	1:A:421:LEU:O	2.20	0.41
1:E:243:VAL:HG22	1:E:258:ILE:HG22	2.02	0.41
1:F:148:THR:O	2:F:501:FAD:H8A	2.18	0.41
1:D:54:LYS:HE2	1:D:359:TYR:CD1	2.55	0.41
1:F:92:LYS:NZ	1:F:172:LEU:O	2.41	0.41
1:G:282:PRO:HG3	1:G:301:ARG:HG2	2.02	0.41
1:G:77:GLU:OE2	1:H:84:ASN:ND2	2.52	0.41
1:A:203:ASP:OD1	1:A:236:LYS:NZ	2.46	0.41
1:E:65:MET:C	1:E:71:PHE:HD2	2.23	0.41
1:B:231:GLN:HA	1:B:235:PHE:O	2.20	0.41
2:D:500:FAD:H1'1	2:D:500:FAD:H9	1.90	0.41
1:G:139:ILE:HD12	1:G:139:ILE:N	2.36	0.41
4:C:503:BTB:O8	4:C:503:BTB:O1	2.23	0.41
1:D:249:LYS:HE2	1:D:255:ASP:OD1	2.20	0.41
1:E:80:GLU:N	1:F:79:SER:OG	2.54	0.41
1:H:393:ARG:HD2	1:H:454:THR:HA	2.02	0.41
1:H:16:PRO:HD2	2:H:500:FAD:O5'	2.21	0.41
1:C:402:GLY:HA3	1:C:421:LEU:O	2.20	0.41
1:C:382:LYS:HE2	1:C:466:ALA:O	2.21	0.41
1:E:122:THR:HG21	1:E:128:THR:OG1	2.21	0.41
1:G:145:LEU:HD11	1:G:318:ILE:HG12	2.03	0.41
1:B:54:LYS:HE3	1:B:54:LYS:N	2.37	0.41
1:D:242:LYS:CG	1:D:259:GLU:HG3	2.51	0.41
1:B:213:VAL:HG22	5:B:635:HOH:O	2.21	0.40
1:G:7:ALA:O	1:G:141:THR:HA	2.22	0.40
1:B:265:LYS:HB3	1:B:265:LYS:HE3	1.94	0.40
1:E:76:ILE:CD1	1:F:63:TYR:HB2	2.52	0.40
1:A:7:ALA:O	1:A:141:THR:HA	2.22	0.40

All (6) 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:D:97:LYS:NZ	1:E:78:MET:O[1_554]	2.05	0.15
1:C:8:ASP:OD1	1:G:307:ARG:HH12[1_655]	1.48	0.12
1:D:90:GLU:OE1	1:E:69:LYS:HZ3[1_554]	1.48	0.12
1:B:78:MET:O	1:G:97:LYS:HZ1[1_645]	1.53	0.07

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:78:MET:O	1:G:97:LYS:NZ[1_645]	2.15	0.05
1:C:8:ASP:OD1	1:G:307:ARG:NH1[1_655]	2.18	0.02

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	469/495 (95%)	460 (98%)	9 (2%)	0	100	100
1	B	470/495 (95%)	464 (99%)	6 (1%)	0	100	100
1	C	470/495 (95%)	462 (98%)	8 (2%)	0	100	100
1	D	470/495 (95%)	462 (98%)	7 (2%)	1 (0%)	47	57
1	E	469/495 (95%)	459 (98%)	10 (2%)	0	100	100
1	F	469/495 (95%)	460 (98%)	9 (2%)	0	100	100
1	G	469/495 (95%)	462 (98%)	7 (2%)	0	100	100
1	H	469/495 (95%)	461 (98%)	8 (2%)	0	100	100
All	All	3755/3960 (95%)	3690 (98%)	64 (2%)	1 (0%)	100	100

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	D	4	PRO

5.3.2 Protein sidechains (i)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
1	A	371/389 (95%)	363 (98%)	8 (2%)	52 66
1	B	372/389 (96%)	362 (97%)	10 (3%)	44 59
1	C	372/389 (96%)	365 (98%)	7 (2%)	57 71
1	D	372/389 (96%)	360 (97%)	12 (3%)	39 52
1	E	371/389 (95%)	360 (97%)	11 (3%)	41 54
1	F	371/389 (95%)	363 (98%)	8 (2%)	52 66
1	G	371/389 (95%)	362 (98%)	9 (2%)	49 63
1	H	371/389 (95%)	355 (96%)	16 (4%)	29 38
All	All	2971/3112 (96%)	2890 (97%)	81 (3%)	44 59

All (81) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	19	TYR
1	A	54	LYS
1	A	164	THR
1	A	235	PHE
1	A	242	LYS
1	A	250	SER
1	A	277	CYS
1	A	333	ASP
1	B	19	TYR
1	B	50	CYS
1	B	54	LYS
1	B	69	LYS
1	B	235	PHE
1	B	242	LYS
1	B	277	CYS
1	B	321	VAL
1	B	339	VAL
1	B	447	ARG
1	C	19	TYR
1	C	50	CYS
1	C	54	LYS
1	C	78	MET
1	C	235	PHE
1	C	321	VAL
1	C	333	ASP
1	D	6	ASP
1	D	19	TYR

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Mol	Chain	Res	Type
1	D	54	LYS
1	D	78	MET
1	D	159	THR
1	D	209	PHE
1	D	216	VAL
1	D	235	PHE
1	D	240	ASN
1	D	248	LYS
1	D	257	SER
1	D	410	LYS
1	E	19	TYR
1	E	54	LYS
1	E	69	LYS
1	E	78	MET
1	E	79	SER
1	E	114	HIS
1	E	126	GLN
1	E	235	PHE
1	E	284	THR
1	E	291	GLU
1	E	333	ASP
1	F	19	TYR
1	F	54	LYS
1	F	209	PHE
1	F	235	PHE
1	F	255	ASP
1	F	257	SER
1	F	285	LYS
1	F	471	SER
1	G	19	TYR
1	G	54	LYS
1	G	78	MET
1	G	179	GLU
1	G	235	PHE
1	G	250	SER
1	G	257	SER
1	G	270	THR
1	G	333	ASP
1	H	14	SER
1	H	19	TYR
1	H	32	THR
1	H	50	CYS

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Mol	Chain	Res	Type
1	H	54	LYS
1	H	78	MET
1	H	79	SER
1	H	168	SER
1	H	175	LYS
1	H	198	GLN
1	H	235	PHE
1	H	258	ILE
1	H	267	GLU
1	H	280	ARG
1	H	294	ILE
1	H	306	THR

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (2) such sidechains are listed below:

Mol	Chain	Res	Type
1	C	225	ASN
1	H	137	GLN

5.3.3 RNA

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates

There are no monosaccharides in this entry.

5.6 Ligand geometry

16 ligands are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond

length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
3	TRS	C	502	-	7,7,7	0.25	0	9,9,9	0.62	0
3	TRS	E	502	-	7,7,7	0.28	0	9,9,9	0.39	0
2	FAD	D	500	-	51,58,58	1.22	5 (9%)	60,89,89	2.19	7 (11%)
3	TRS	E	503	-	7,7,7	0.24	0	9,9,9	0.51	0
4	BTB	C	503	-	13,13,13	0.67	0	7,16,16	1.01	0
2	FAD	H	500	-	51,58,58	1.23	6 (11%)	60,89,89	2.23	8 (13%)
3	TRS	A	503	-	7,7,7	0.20	0	9,9,9	0.48	0
3	TRS	F	502	-	7,7,7	0.33	0	9,9,9	0.90	0
2	FAD	C	501	-	51,58,58	1.22	5 (9%)	60,89,89	2.20	7 (11%)
3	TRS	A	502	-	7,7,7	0.30	0	9,9,9	0.41	0
2	FAD	A	501	-	51,58,58	1.20	6 (11%)	60,89,89	2.20	8 (13%)
2	FAD	B	500	-	51,58,58	1.29	6 (11%)	60,89,89	2.21	7 (11%)
2	FAD	G	501	-	51,58,58	1.22	5 (9%)	60,89,89	2.21	7 (11%)
2	FAD	E	501	-	51,58,58	1.21	5 (9%)	60,89,89	2.21	7 (11%)
3	TRS	G	502	-	7,7,7	0.26	0	9,9,9	0.45	0
2	FAD	F	501	-	51,58,58	1.21	5 (9%)	60,89,89	2.23	8 (13%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	TRS	C	502	-	-	9/9/9/9	-
3	TRS	E	502	-	-	0/9/9/9	-
2	FAD	D	500	-	-	5/30/50/50	0/6/6/6
3	TRS	E	503	-	-	9/9/9/9	-
4	BTB	C	503	-	-	8/21/21/21	-
2	FAD	H	500	-	-	5/30/50/50	0/6/6/6
3	TRS	A	503	-	-	7/9/9/9	-
3	TRS	F	502	-	-	0/9/9/9	-
2	FAD	C	501	-	-	3/30/50/50	0/6/6/6
3	TRS	A	502	-	-	7/9/9/9	-
2	FAD	A	501	-	-	2/30/50/50	0/6/6/6
2	FAD	B	500	-	-	2/30/50/50	0/6/6/6

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	FAD	G	501	-	-	5/30/50/50	0/6/6/6
2	FAD	E	501	-	-	3/30/50/50	0/6/6/6
3	TRS	G	502	-	-	5/9/9/9	-
2	FAD	F	501	-	-	3/30/50/50	0/6/6/6

All (43) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	H	500	FAD	C4X-C10	5.62	1.44	1.38
2	F	501	FAD	C4X-C10	5.59	1.44	1.38
2	D	500	FAD	C4X-C10	5.58	1.44	1.38
2	G	501	FAD	C4X-C10	5.56	1.44	1.38
2	B	500	FAD	C4X-C10	5.51	1.44	1.38
2	C	501	FAD	C4X-C10	5.46	1.44	1.38
2	E	501	FAD	C4X-C10	5.37	1.44	1.38
2	A	501	FAD	C4X-C10	5.33	1.44	1.38
2	B	500	FAD	C4-N3	3.58	1.39	1.33
2	G	501	FAD	C4-N3	3.03	1.38	1.33
2	D	500	FAD	C4-N3	3.00	1.38	1.33
2	F	501	FAD	C4-N3	2.98	1.38	1.33
2	E	501	FAD	C4-N3	2.93	1.38	1.33
2	H	500	FAD	C4-N3	2.92	1.38	1.33
2	H	500	FAD	C4X-N5	-2.71	1.29	1.33
2	C	501	FAD	C4-C4X	2.69	1.46	1.41
2	B	500	FAD	C4X-N5	-2.69	1.29	1.33
2	G	501	FAD	C4-C4X	2.69	1.46	1.41
2	C	501	FAD	C5X-N5	2.64	1.39	1.35
2	A	501	FAD	C4X-N5	-2.63	1.29	1.33
2	C	501	FAD	C4-N3	2.61	1.37	1.33
2	A	501	FAD	C4-N3	2.59	1.37	1.33
2	D	500	FAD	C4-C4X	2.58	1.45	1.41
2	F	501	FAD	C9A-N10	2.49	1.41	1.38
2	D	500	FAD	C5X-N5	2.43	1.39	1.35
2	E	501	FAD	C4X-N5	-2.42	1.29	1.33
2	B	500	FAD	C4-C4X	2.39	1.45	1.41
2	F	501	FAD	C4-C4X	2.39	1.45	1.41
2	D	500	FAD	C9A-N10	2.38	1.41	1.38
2	H	500	FAD	C9A-N10	2.38	1.41	1.38
2	G	501	FAD	C9A-N10	2.37	1.41	1.38
2	E	501	FAD	C4-C4X	2.35	1.45	1.41
2	F	501	FAD	C5X-N5	2.32	1.39	1.35

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	501	FAD	C4-C4X	2.32	1.45	1.41
2	H	500	FAD	C4-C4X	2.31	1.45	1.41
2	C	501	FAD	C9A-N10	2.30	1.41	1.38
2	B	500	FAD	C5X-N5	2.28	1.39	1.35
2	A	501	FAD	C5X-N5	2.27	1.39	1.35
2	G	501	FAD	C5X-N5	2.27	1.39	1.35
2	E	501	FAD	C9A-N10	2.25	1.41	1.38
2	A	501	FAD	C9A-N10	2.15	1.41	1.38
2	B	500	FAD	C9A-N10	2.15	1.41	1.38
2	H	500	FAD	C5X-N5	2.14	1.38	1.35

All (59) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	D	500	FAD	C4-N3-C2	12.77	125.93	115.14
2	C	501	FAD	C4-N3-C2	12.74	125.90	115.14
2	A	501	FAD	C4-N3-C2	12.74	125.89	115.14
2	G	501	FAD	C4-N3-C2	12.72	125.88	115.14
2	H	500	FAD	C4-N3-C2	12.69	125.85	115.14
2	B	500	FAD	C4-N3-C2	12.64	125.81	115.14
2	F	501	FAD	C4-N3-C2	12.62	125.80	115.14
2	E	501	FAD	C4-N3-C2	12.57	125.76	115.14
2	C	501	FAD	C4X-C4-N3	-7.09	113.74	123.43
2	E	501	FAD	C4X-C4-N3	-6.98	113.88	123.43
2	G	501	FAD	C4X-C4-N3	-6.96	113.91	123.43
2	H	500	FAD	C4X-C4-N3	-6.94	113.94	123.43
2	B	500	FAD	C4X-C4-N3	-6.93	113.96	123.43
2	A	501	FAD	C4X-C4-N3	-6.87	114.04	123.43
2	F	501	FAD	C4X-C4-N3	-6.85	114.06	123.43
2	D	500	FAD	C4X-C4-N3	-6.83	114.09	123.43
2	B	500	FAD	C10-C4X-N5	4.89	124.64	121.26
2	H	500	FAD	C10-C4X-N5	4.81	124.58	121.26
2	E	501	FAD	C10-C4X-N5	4.78	124.56	121.26
2	A	501	FAD	C10-C4X-N5	4.76	124.55	121.26
2	F	501	FAD	C10-C4X-N5	4.72	124.52	121.26
2	G	501	FAD	C10-C4X-N5	4.52	124.38	121.26
2	D	500	FAD	C10-C4X-N5	4.50	124.37	121.26
2	C	501	FAD	C10-C4X-N5	4.27	124.21	121.26
2	B	500	FAD	C4-C4X-C10	-3.92	117.36	119.95
2	C	501	FAD	C4-C4X-C10	-3.82	117.42	119.95
2	G	501	FAD	C4-C4X-C10	-3.81	117.43	119.95
2	F	501	FAD	C4-C4X-C10	-3.74	117.48	119.95

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	D	500	FAD	C4-C4X-C10	-3.70	117.50	119.95
2	A	501	FAD	C4-C4X-C10	-3.68	117.51	119.95
2	H	500	FAD	C1'-N10-C9A	3.66	121.17	118.29
2	E	501	FAD	C4-C4X-C10	-3.62	117.55	119.95
2	F	501	FAD	C1'-N10-C9A	3.57	121.10	118.29
2	E	501	FAD	C1'-N10-C9A	3.56	121.09	118.29
2	H	500	FAD	C4-C4X-C10	-3.53	117.61	119.95
2	B	500	FAD	C4X-C10-N10	-3.48	116.72	120.30
2	D	500	FAD	C4X-C10-N10	-3.48	116.73	120.30
2	E	501	FAD	C4X-C10-N10	-3.43	116.78	120.30
2	F	501	FAD	C4X-C10-N10	-3.39	116.82	120.30
2	B	500	FAD	C1'-N10-C9A	3.36	120.94	118.29
2	C	501	FAD	C1'-N10-C9A	3.35	120.93	118.29
2	A	501	FAD	C4X-C10-N10	-3.35	116.86	120.30
2	G	501	FAD	C4X-C10-N10	-3.32	116.89	120.30
2	G	501	FAD	C1'-N10-C9A	3.31	120.89	118.29
2	H	500	FAD	C4X-C10-N10	-3.28	116.93	120.30
2	A	501	FAD	C1'-N10-C9A	3.25	120.85	118.29
2	C	501	FAD	C4X-C10-N10	-3.18	117.03	120.30
2	D	500	FAD	C1'-N10-C9A	2.98	120.64	118.29
2	F	501	FAD	O2P-P-O1P	2.56	124.89	112.24
2	H	500	FAD	O2P-P-O1P	2.45	124.34	112.24
2	E	501	FAD	C5A-C6A-N6A	2.40	123.99	120.35
2	D	500	FAD	C5A-C6A-N6A	2.31	123.87	120.35
2	G	501	FAD	C5A-C6A-N6A	2.26	123.79	120.35
2	F	501	FAD	C5A-C6A-N6A	2.26	123.78	120.35
2	C	501	FAD	C5A-C6A-N6A	2.22	123.73	120.35
2	B	500	FAD	C5A-C6A-N6A	2.21	123.71	120.35
2	H	500	FAD	C5A-C6A-N6A	2.10	123.54	120.35
2	A	501	FAD	C5A-C6A-N6A	2.10	123.54	120.35
2	A	501	FAD	O2P-P-O1P	2.02	122.24	112.24

There are no chirality outliers.

All (73) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	C	502	TRS	C1-C-C2-O2
3	C	502	TRS	N-C-C2-O2
3	C	502	TRS	C1-C-C3-O3
2	D	500	FAD	C5B-O5B-PA-O2A
3	E	503	TRS	N-C-C1-O1
3	E	503	TRS	C1-C-C2-O2

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Mol	Chain	Res	Type	Atoms
3	E	503	TRS	C3-C-C2-O2
3	E	503	TRS	N-C-C2-O2
3	E	503	TRS	N-C-C3-O3
4	C	503	BTB	O1-C1-C2-C3
4	C	503	BTB	O1-C1-C2-C4
4	C	503	BTB	O1-C1-C2-N
4	C	503	BTB	C4-C2-C3-O3
4	C	503	BTB	N-C2-C3-O3
4	C	503	BTB	C6-C5-N-C2
4	C	503	BTB	C8-C7-N-C2
2	H	500	FAD	C5B-O5B-PA-O2A
3	A	503	TRS	N-C-C1-O1
3	A	503	TRS	C1-C-C2-O2
3	A	503	TRS	C3-C-C2-O2
3	A	503	TRS	N-C-C2-O2
3	A	503	TRS	C1-C-C3-O3
3	A	503	TRS	C2-C-C3-O3
3	A	503	TRS	N-C-C3-O3
3	A	502	TRS	C2-C-C1-O1
3	A	502	TRS	C3-C-C1-O1
3	A	502	TRS	N-C-C1-O1
3	A	502	TRS	C1-C-C2-O2
3	A	502	TRS	N-C-C2-O2
3	A	502	TRS	N-C-C3-O3
2	C	501	FAD	PA-O3P-P-O5'
2	A	501	FAD	O4B-C4B-C5B-O5B
2	G	501	FAD	C5B-O5B-PA-O2A
2	E	501	FAD	O4B-C4B-C5B-O5B
2	E	501	FAD	PA-O3P-P-O5'
2	B	500	FAD	O4B-C4B-C5B-O5B
2	D	500	FAD	O4B-C4B-C5B-O5B
2	D	500	FAD	C3B-C4B-C5B-O5B
2	H	500	FAD	O4B-C4B-C5B-O5B
2	H	500	FAD	C3B-C4B-C5B-O5B
2	A	501	FAD	C3B-C4B-C5B-O5B
2	G	501	FAD	O4B-C4B-C5B-O5B
2	G	501	FAD	C3B-C4B-C5B-O5B
2	B	500	FAD	C3B-C4B-C5B-O5B
2	F	501	FAD	O4B-C4B-C5B-O5B
2	E	501	FAD	C3B-C4B-C5B-O5B
2	C	501	FAD	O4B-C4B-C5B-O5B
3	C	502	TRS	C3-C-C2-O2

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Mol	Chain	Res	Type	Atoms
3	E	503	TRS	C2-C-C1-O1
3	E	503	TRS	C2-C-C3-O3
2	F	501	FAD	PA-O3P-P-O5'
4	C	503	BTB	N-C5-C6-O6
2	D	500	FAD	C5B-O5B-PA-O3P
2	H	500	FAD	C5B-O5B-PA-O3P
2	G	501	FAD	C5B-O5B-PA-O3P
3	C	502	TRS	N-C-C1-O1
3	C	502	TRS	C2-C-C3-O3
3	C	502	TRS	N-C-C3-O3
3	A	502	TRS	C3-C-C2-O2
3	G	502	TRS	C1-C-C2-O2
3	G	502	TRS	C3-C-C2-O2
3	G	502	TRS	N-C-C3-O3
2	D	500	FAD	C5B-O5B-PA-O1A
2	H	500	FAD	C5B-O5B-PA-O1A
2	G	501	FAD	C5B-O5B-PA-O1A
2	F	501	FAD	C3B-C4B-C5B-O5B
3	C	502	TRS	C2-C-C1-O1
3	C	502	TRS	C3-C-C1-O1
3	E	503	TRS	C3-C-C1-O1
3	E	503	TRS	C1-C-C3-O3
3	G	502	TRS	C2-C-C3-O3
2	C	501	FAD	C3B-C4B-C5B-O5B
3	G	502	TRS	N-C-C2-O2

There are no ring outliers.

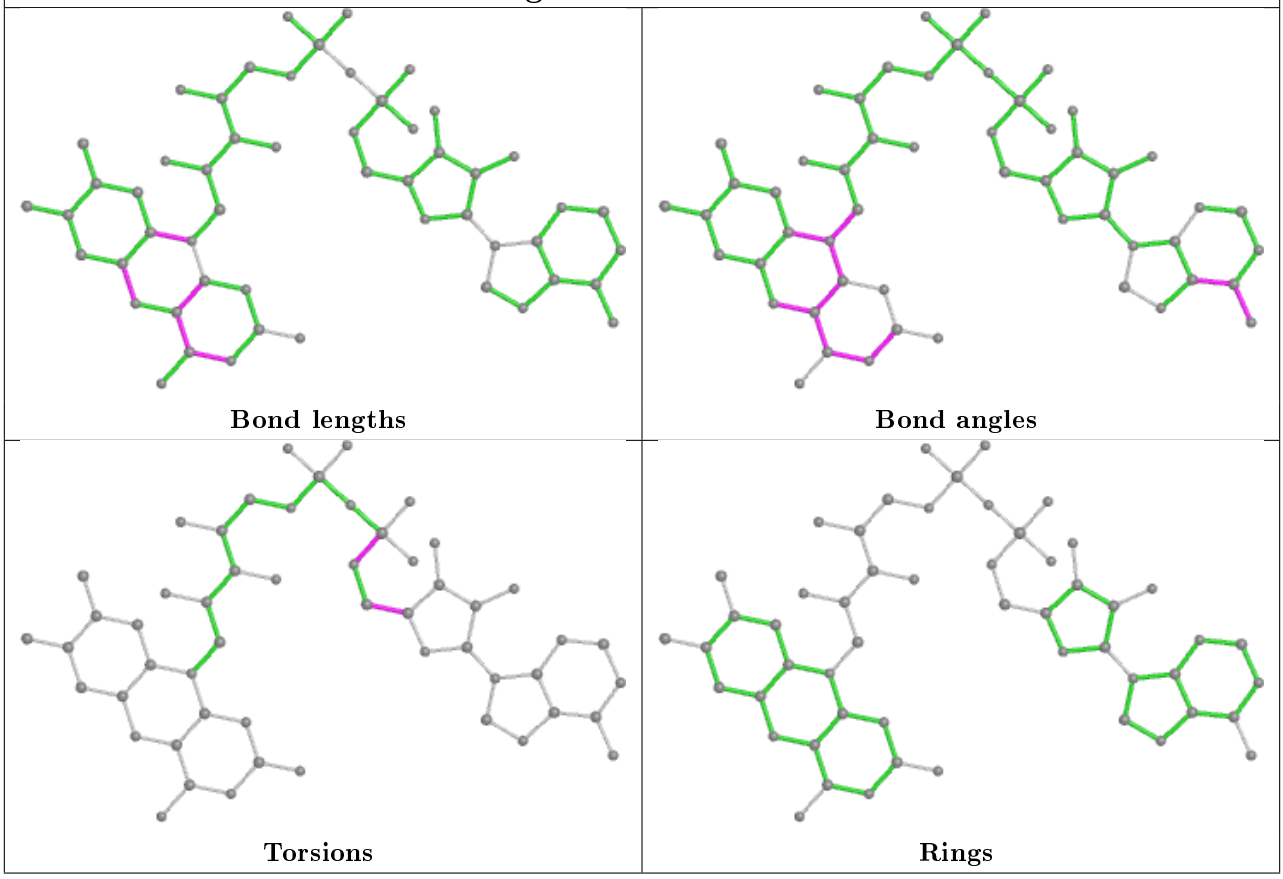
9 monomers are involved in 29 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	D	500	FAD	2	0
3	E	503	TRS	1	0
4	C	503	BTB	15	0
2	H	500	FAD	3	0
3	A	503	TRS	2	0
3	F	502	TRS	1	0
3	A	502	TRS	2	0
2	A	501	FAD	1	0
2	F	501	FAD	2	0

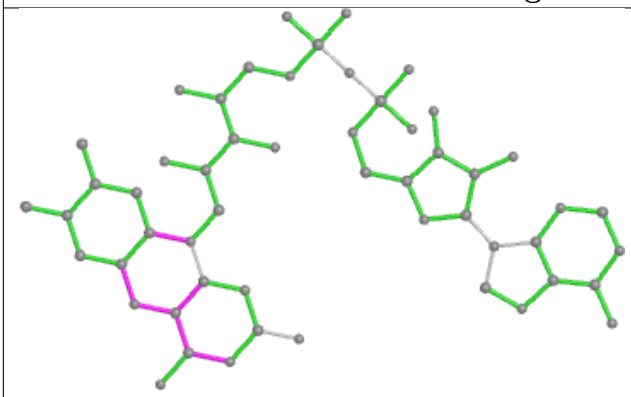
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In

addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less then 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.

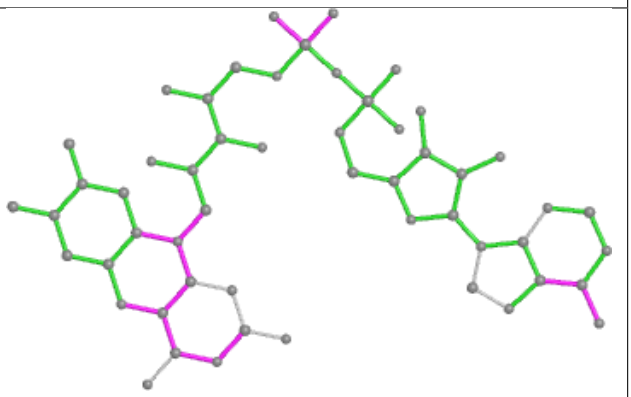
Ligand FAD D 500



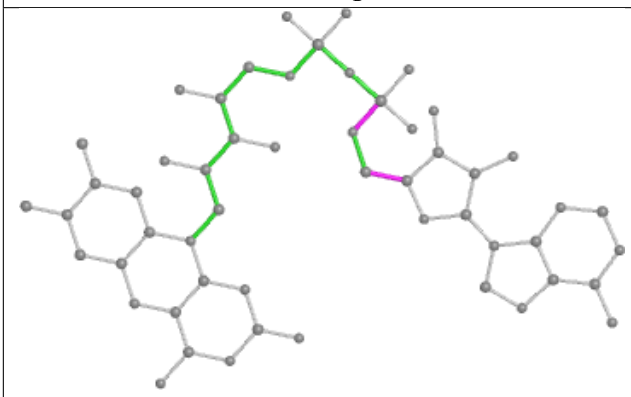
Ligand FAD H 500



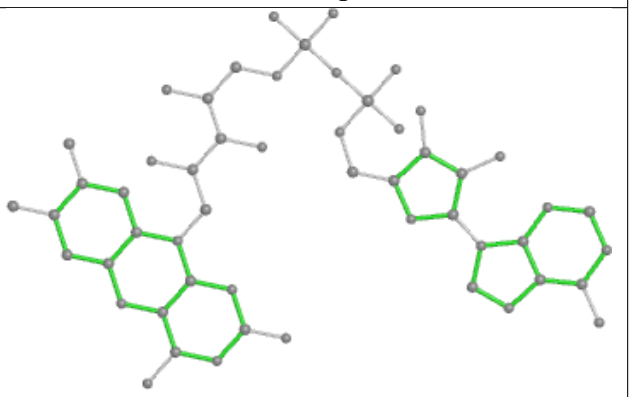
Bond lengths



Bond angles

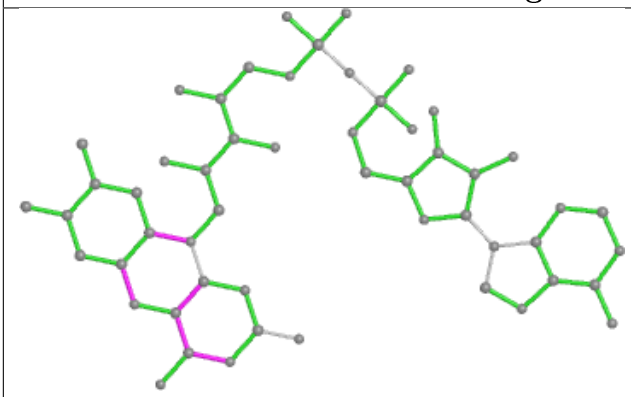


Torsions

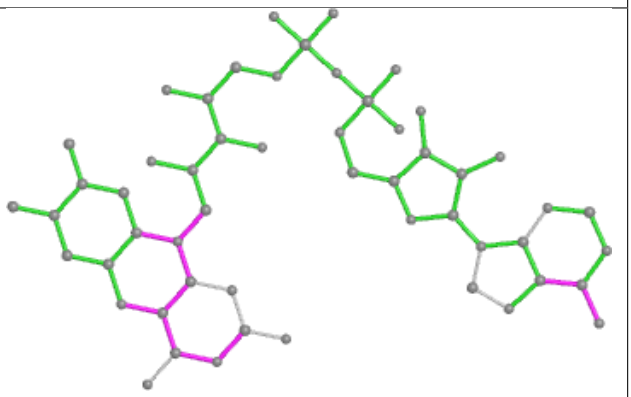


Rings

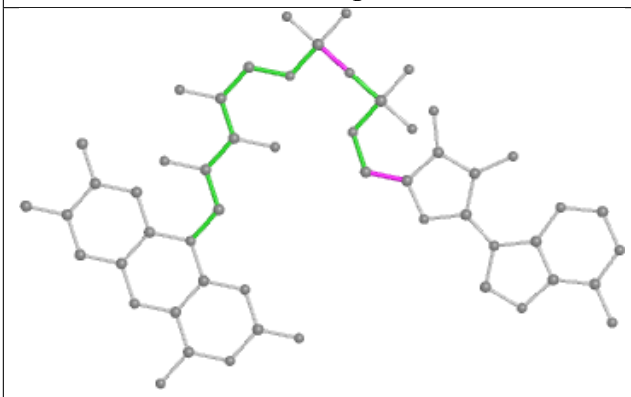
Ligand FAD C 501



Bond lengths



Bond angles



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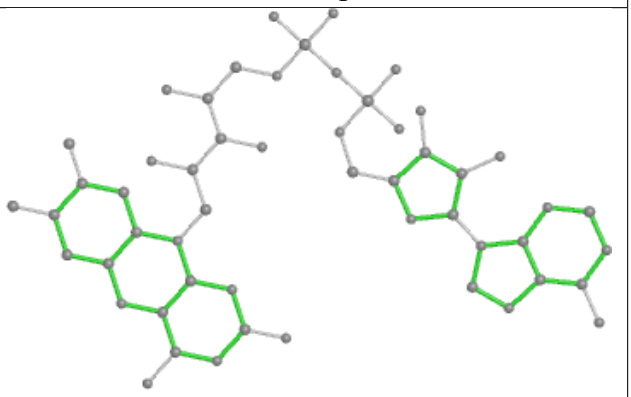
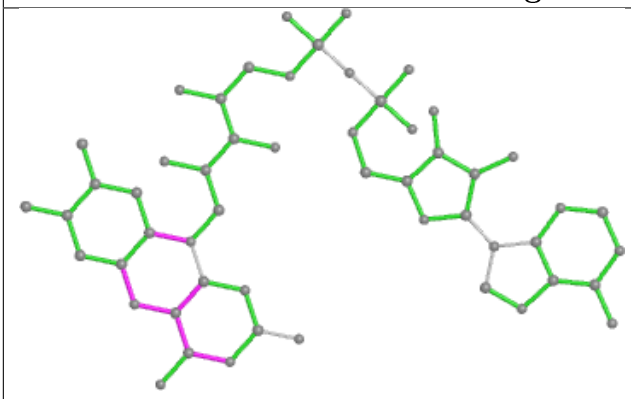
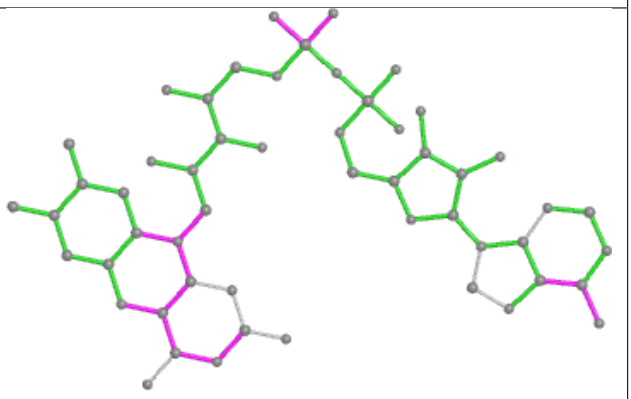


Rings

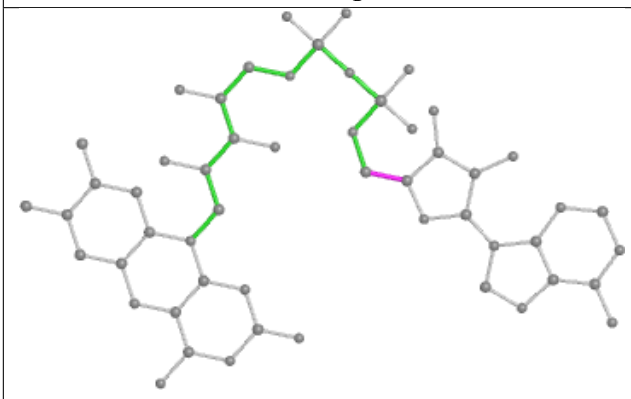
Ligand FAD A 501



Bond lengths



Bond angles



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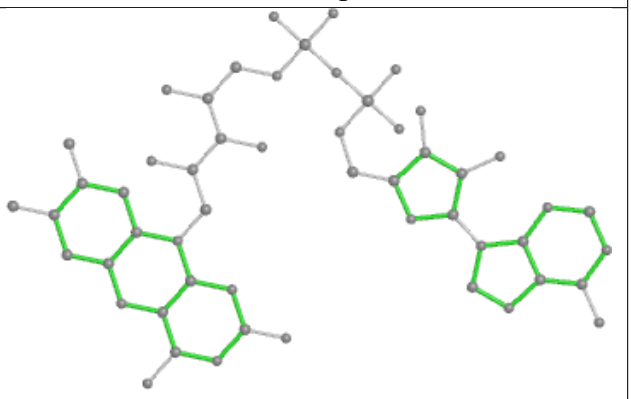
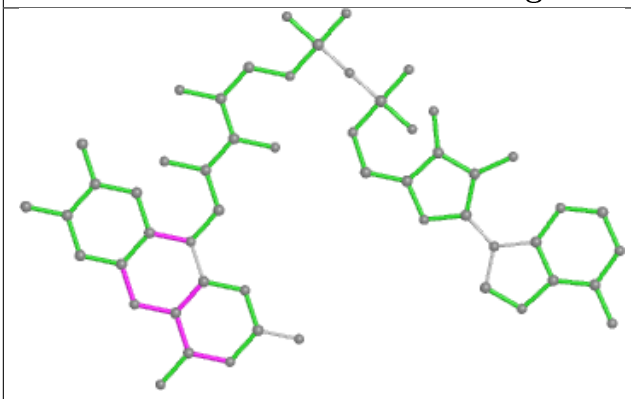
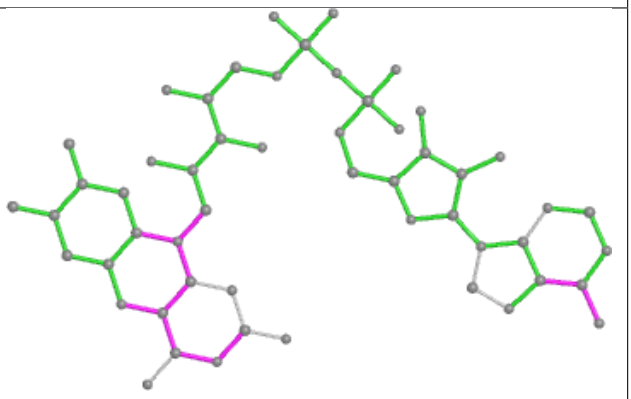


Rings

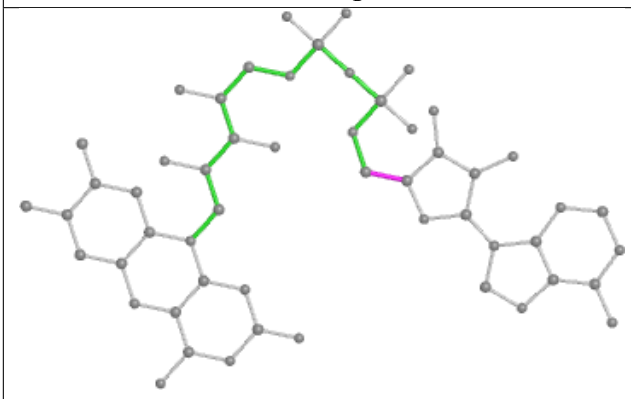
Ligand FAD B 500



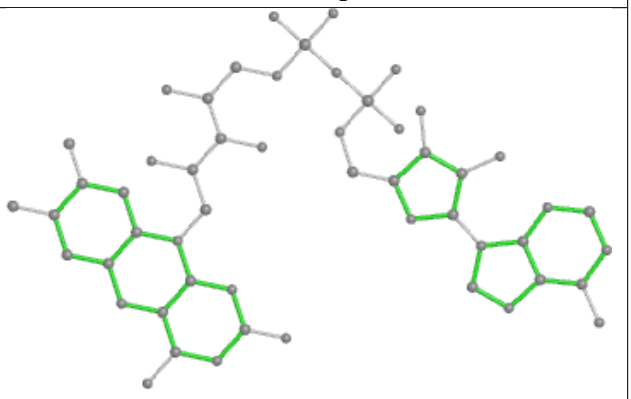
Bond lengths



Bond angles

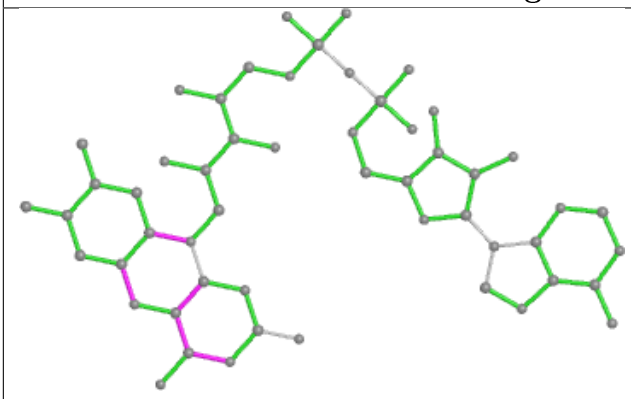


Torsions

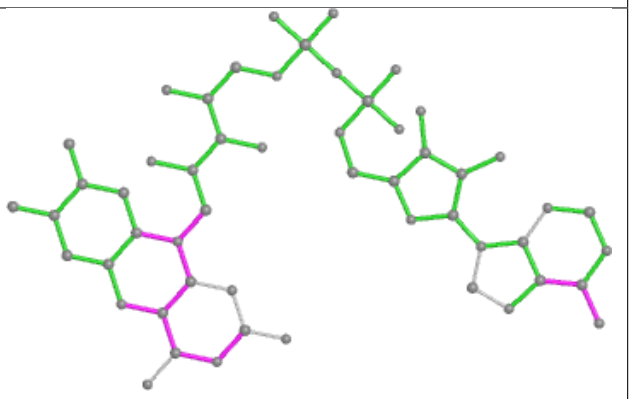


Rings

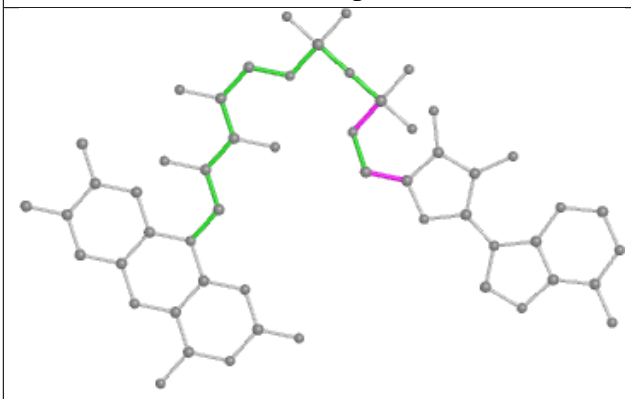
Ligand FAD G 501



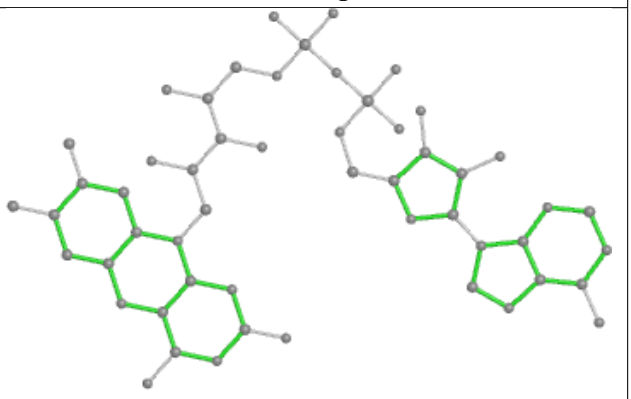
Bond lengths



Bond angles

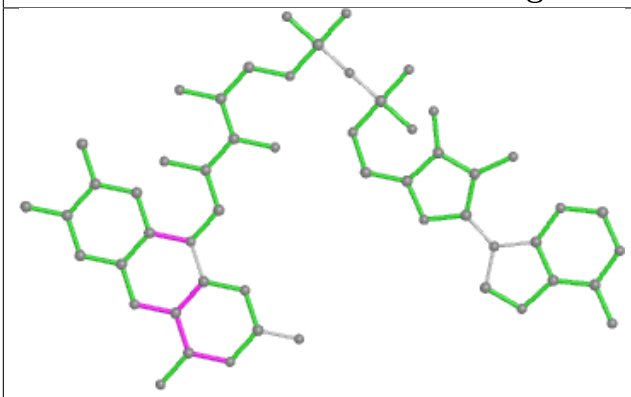


Torsions

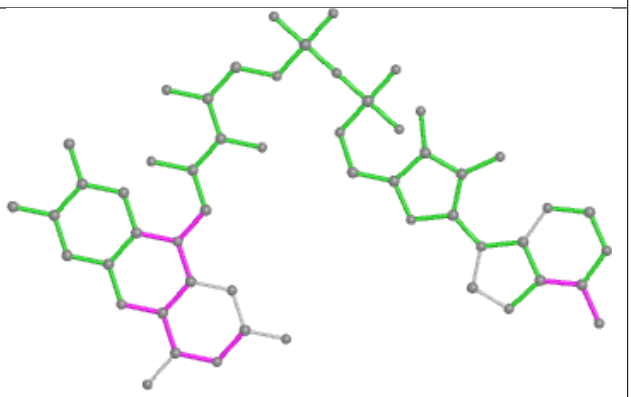


Rings

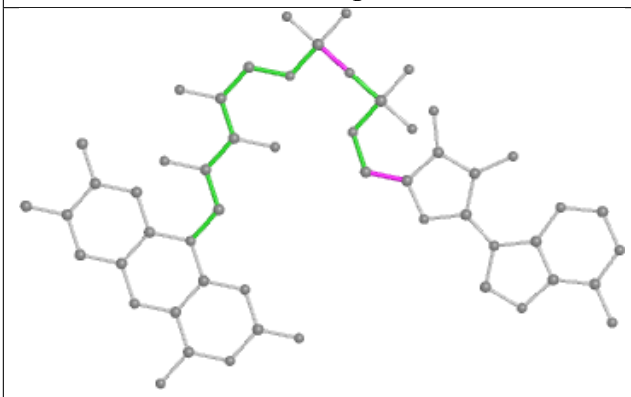
Ligand FAD E 501



Bond lengths



Bond angles



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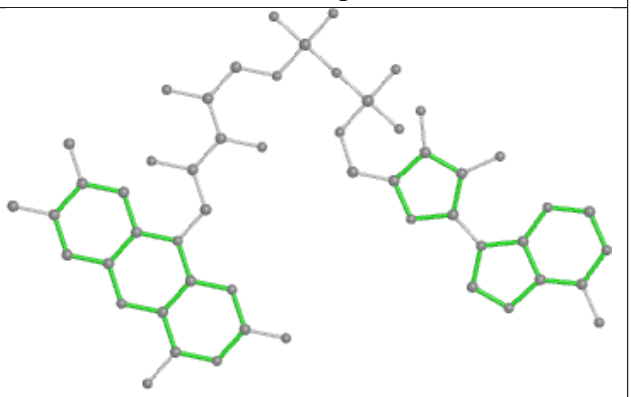
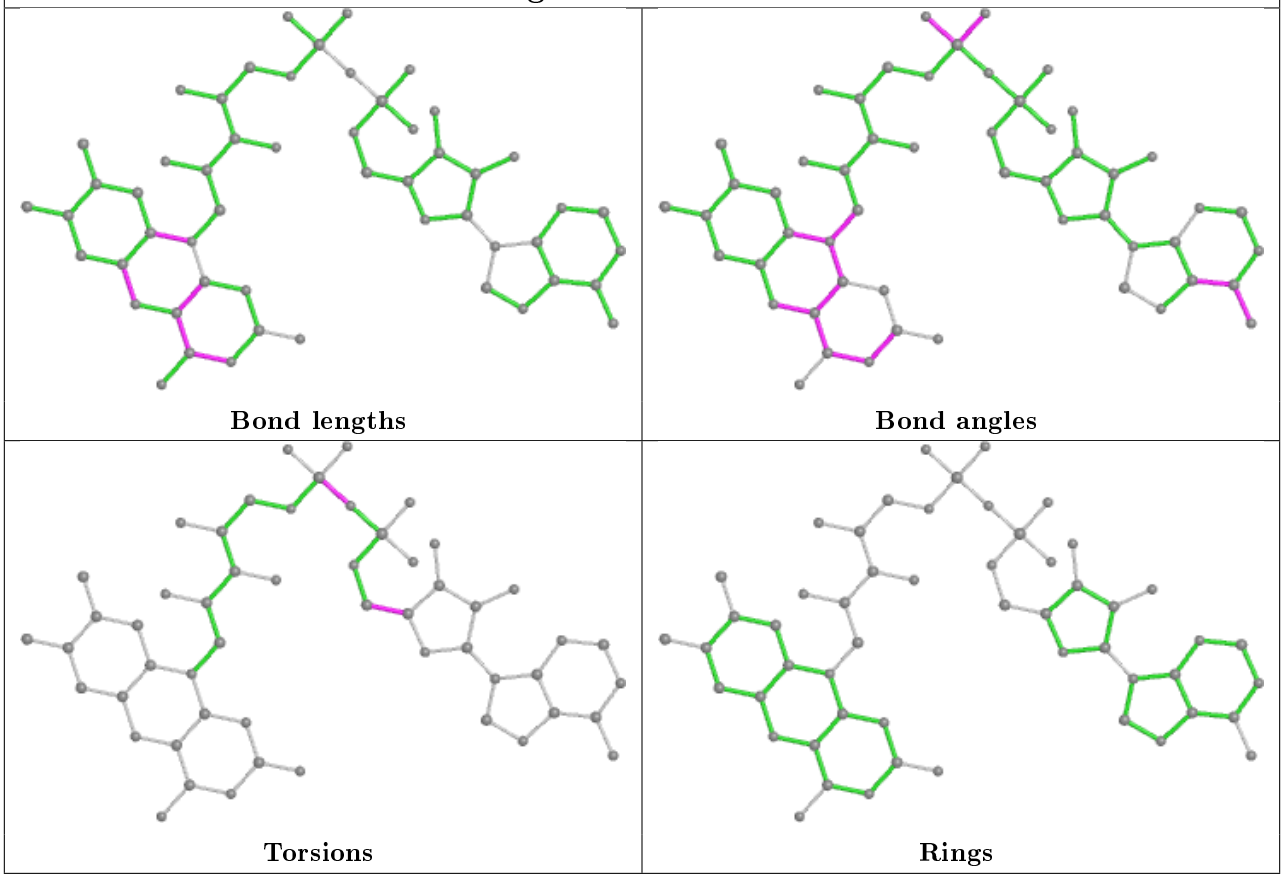


Rings

Ligand FAD F 501



5.7 Other polymers

There are no such residues in this entry.

5.8 Polymer linkage issues

There are no chain breaks in this entry.

6 Fit of model and data

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^{th} 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	471/495 (95%)	0.05	3 (0%) 89 91	34, 54, 87, 118	0
1	B	472/495 (95%)	0.01	1 (0%) 95 96	32, 52, 82, 125	0
1	C	472/495 (95%)	0.03	0 100 100	33, 54, 86, 102	0
1	D	472/495 (95%)	0.36	22 (4%) 31 37	39, 77, 114, 152	0
1	E	471/495 (95%)	0.24	14 (2%) 50 56	39, 65, 105, 133	0
1	F	471/495 (95%)	0.21	14 (2%) 50 56	42, 68, 106, 129	0
1	G	471/495 (95%)	0.20	13 (2%) 53 59	39, 69, 110, 142	0
1	H	471/495 (95%)	0.51	37 (7%) 12 16	39, 80, 125, 154	0
All	All	3771/3960 (95%)	0.20	104 (2%) 53 59	32, 64, 108, 154	0

All (104) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	H	5	ILE	6.5
1	H	121	ILE	5.9
1	H	287	LEU	5.4
1	H	127	VAL	5.3
1	H	139	ILE	5.0
1	G	261	ALA	5.0
1	F	468	PHE	4.9
1	G	132	ALA	4.9
1	H	294	ILE	4.5
1	D	262	SER	4.5
1	H	289	LEU	4.4
1	D	139	ILE	4.1
1	G	263	GLY	4.1
1	H	134	GLY	4.1
1	H	135	GLY	4.1
1	D	468	PHE	4.0

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Mol	Chain	Res	Type	RSRZ
1	H	262	SER	3.9
1	D	287	LEU	3.9
1	G	294	ILE	3.7
1	F	166	VAL	3.7
1	F	264	GLY	3.6
1	H	129	ALA	3.6
1	H	286	ASN	3.6
1	H	132	ALA	3.5
1	G	82	ARG	3.5
1	G	158	ILE	3.5
1	H	144	ILE	3.5
1	H	126	GLN	3.5
1	E	124	LYS	3.4
1	F	292	LEU	3.4
1	E	140	ASP	3.4
1	G	258	ILE	3.4
1	H	154	PRO	3.3
1	D	138	VAL	3.3
1	H	6	ASP	3.3
1	D	294	ILE	3.1
1	G	244	THR	3.0
1	G	79	SER	3.0
1	H	263	GLY	2.9
1	D	263	GLY	2.9
1	G	262	SER	2.9
1	D	82	ARG	2.8
1	H	7	ALA	2.8
1	H	138	VAL	2.8
1	G	81	VAL	2.8
1	E	292	LEU	2.8
1	D	209	PHE	2.7
1	E	122	THR	2.7
1	E	121	ILE	2.7
1	H	468	PHE	2.7
1	E	138	VAL	2.7
1	H	157	GLY	2.7
1	D	154	PRO	2.6
1	A	5	ILE	2.6
1	B	292	LEU	2.6
1	D	160	ILE	2.6
1	D	122	THR	2.5
1	H	62	TYR	2.5

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Mol	Chain	Res	Type	RSRZ
1	H	269	ILE	2.5
1	E	127	VAL	2.5
1	F	296	LEU	2.5
1	H	131	LYS	2.5
1	G	155	PHE	2.5
1	F	121	ILE	2.4
1	D	165	ILE	2.4
1	H	119	GLY	2.4
1	F	474	PHE	2.4
1	D	3	GLN	2.4
1	D	127	VAL	2.3
1	H	11	VAL	2.3
1	E	139	ILE	2.3
1	H	292	LEU	2.3
1	F	124	LYS	2.3
1	D	121	ILE	2.3
1	D	239	LEU	2.3
1	D	296	LEU	2.3
1	E	31	LYS	2.3
1	E	26	ALA	2.3
1	H	10	THR	2.3
1	F	126	GLN	2.3
1	H	9	VAL	2.3
1	H	125	ASN	2.3
1	H	285	LYS	2.2
1	A	243	VAL	2.2
1	E	9	VAL	2.2
1	D	4	PRO	2.2
1	H	311	LYS	2.2
1	F	261	ALA	2.2
1	H	249	LYS	2.2
1	H	145	LEU	2.2
1	E	175	LYS	2.1
1	F	284	THR	2.1
1	H	123	GLY	2.1
1	D	289	LEU	2.1
1	F	294	ILE	2.0
1	G	243	VAL	2.0
1	F	285	LYS	2.0
1	D	184	ILE	2.0
1	A	290	GLU	2.0
1	D	207	VAL	2.0

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Mol	Chain	Res	Type	RSRZ
1	E	33	VAL	2.0
1	H	71	PHE	2.0
1	E	28	LEU	2.0
1	F	129	ALA	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^{th} 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.

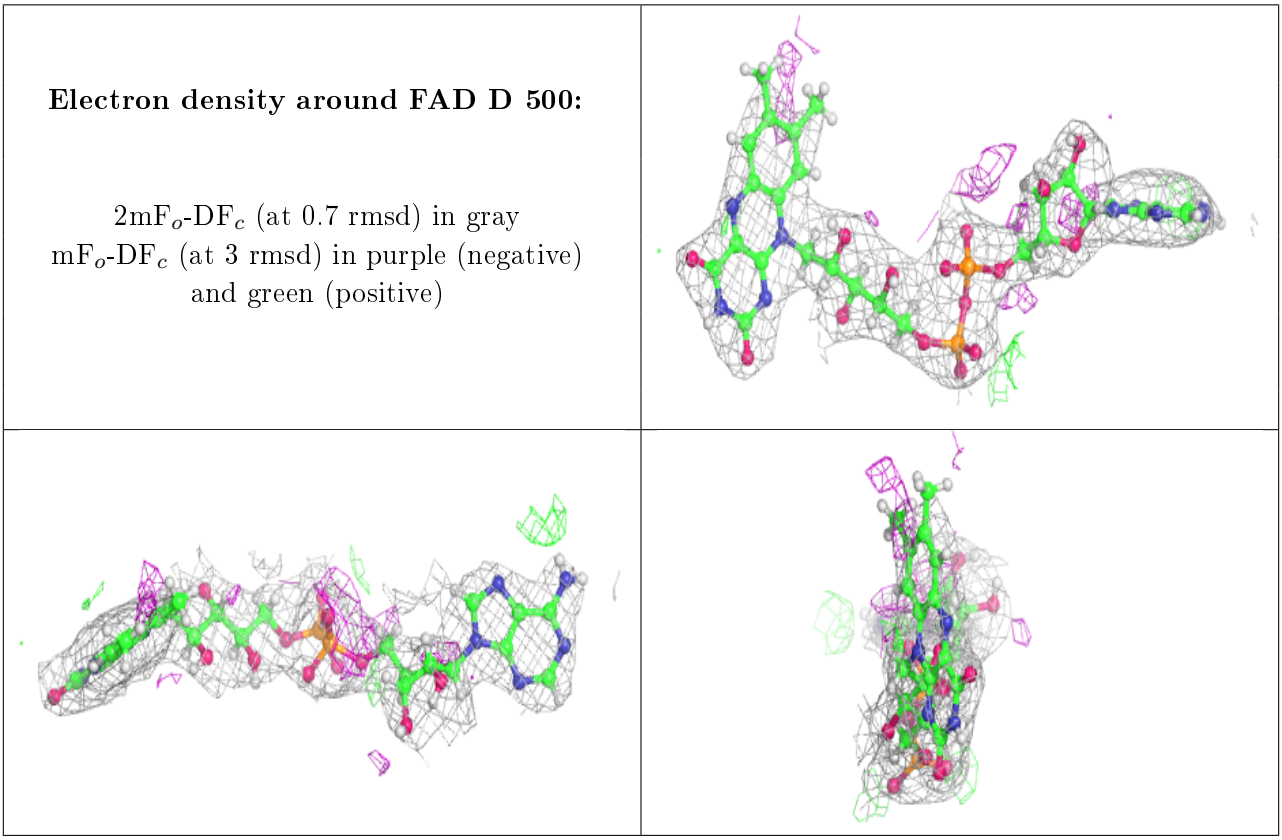
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
3	TRS	A	502	8/8	0.68	0.23	58,66,70,70	0
3	TRS	C	502	8/8	0.76	0.24	58,65,70,70	0
3	TRS	G	502	8/8	0.79	0.22	78,83,84,84	0
3	TRS	E	503	8/8	0.80	0.20	71,76,80,80	0
3	TRS	F	502	8/8	0.81	0.24	64,67,69,70	0
4	BTB	C	503	14/14	0.82	0.28	75,83,86,86	0
3	TRS	A	503	8/8	0.84	0.37	71,78,80,81	0
3	TRS	E	502	8/8	0.86	0.21	75,80,83,84	0
2	FAD	D	500	53/53	0.94	0.14	51,68,87,87	0
2	FAD	H	500	53/53	0.94	0.12	40,65,90,94	0
2	FAD	F	501	53/53	0.95	0.11	40,61,88,91	0
2	FAD	G	501	53/53	0.96	0.13	49,64,81,86	0
2	FAD	E	501	53/53	0.97	0.13	42,58,70,81	0
2	FAD	C	501	53/53	0.97	0.14	34,46,55,59	0
2	FAD	A	501	53/53	0.98	0.13	36,49,59,65	0
2	FAD	B	500	53/53	0.98	0.14	37,46,55,63	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.

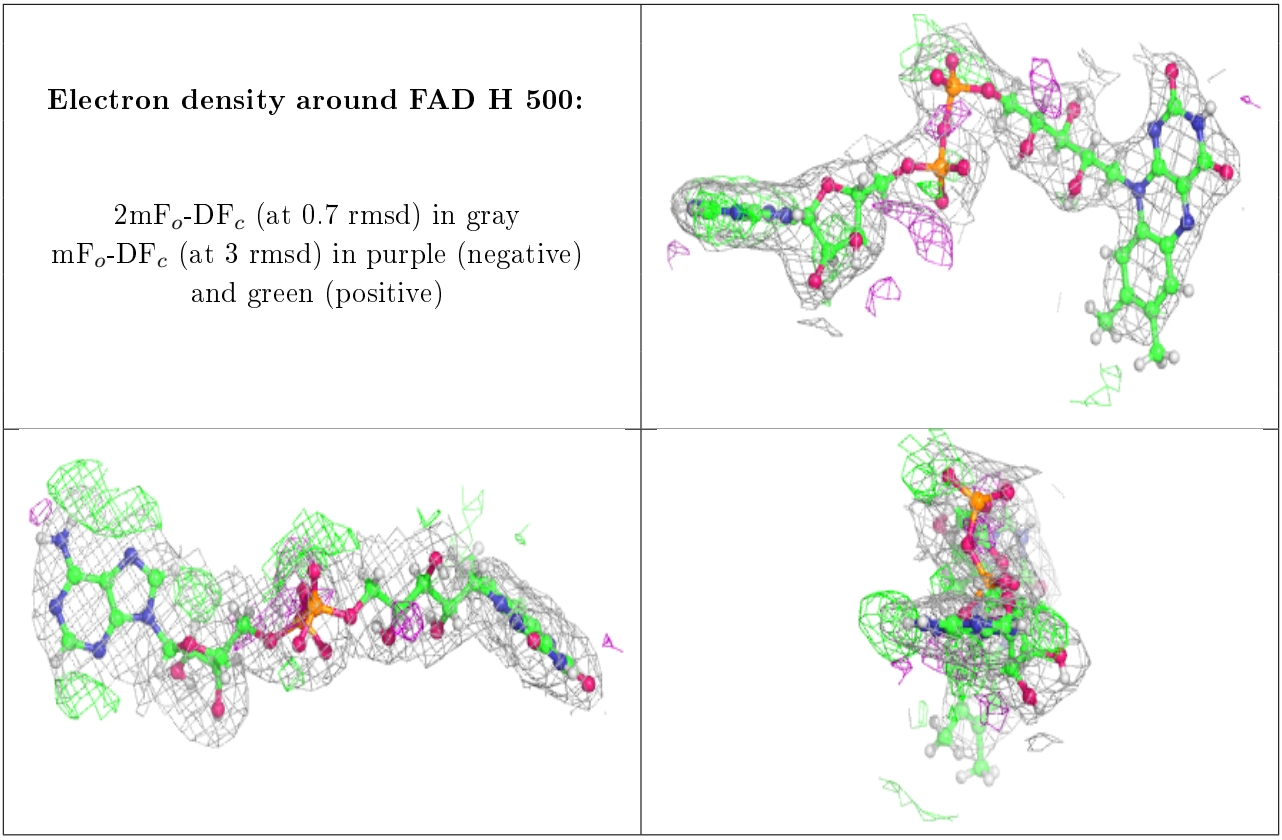
Electron density around FAD D 500:

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



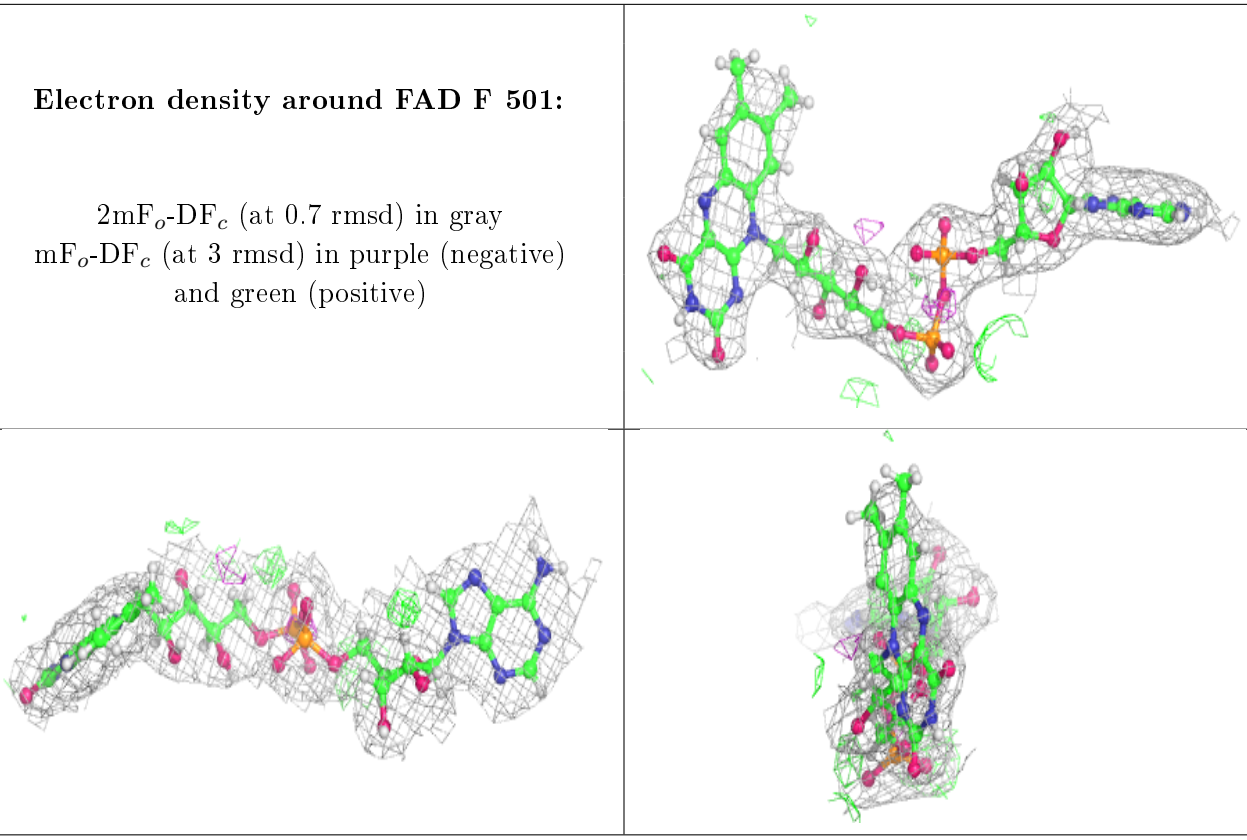
Electron density around FAD H 500:

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



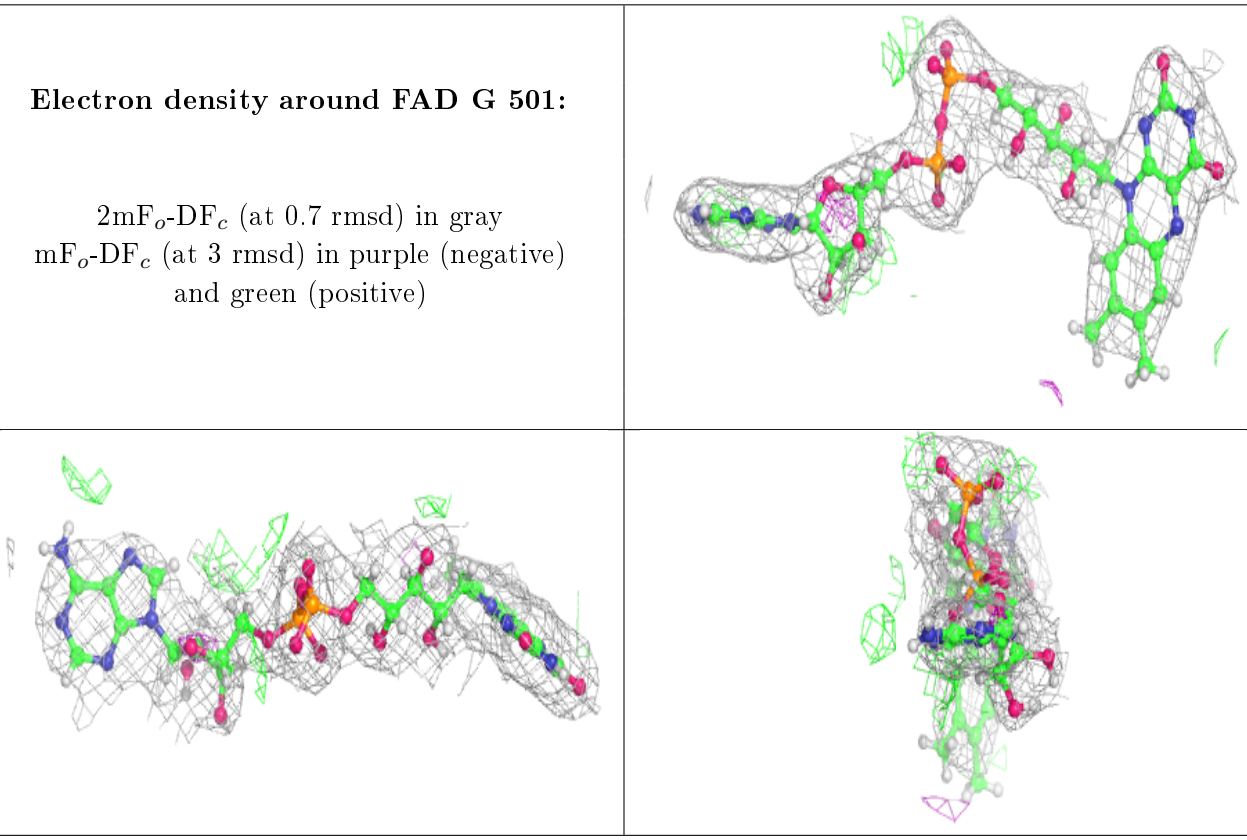
Electron density around FAD F 501:

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



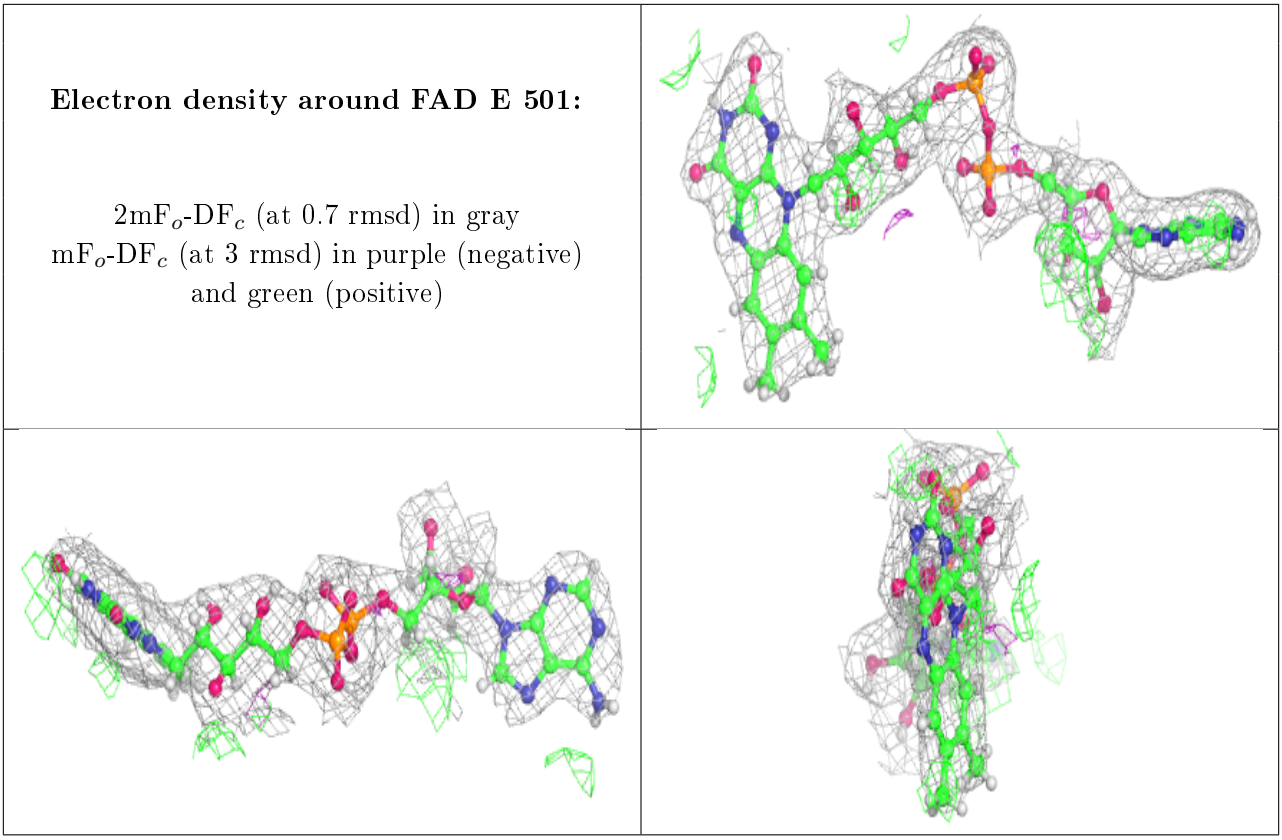
Electron density around FAD G 501:

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



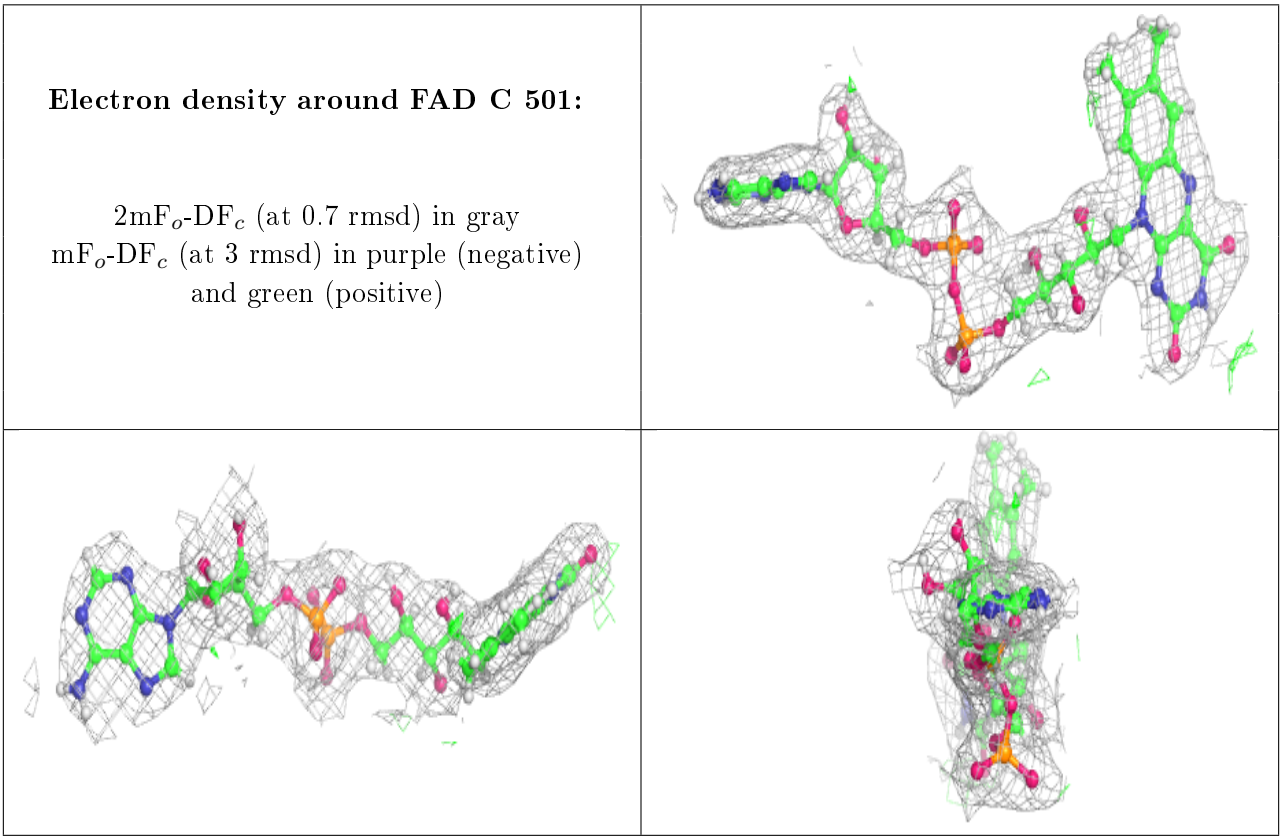
Electron density around FAD E 501:

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



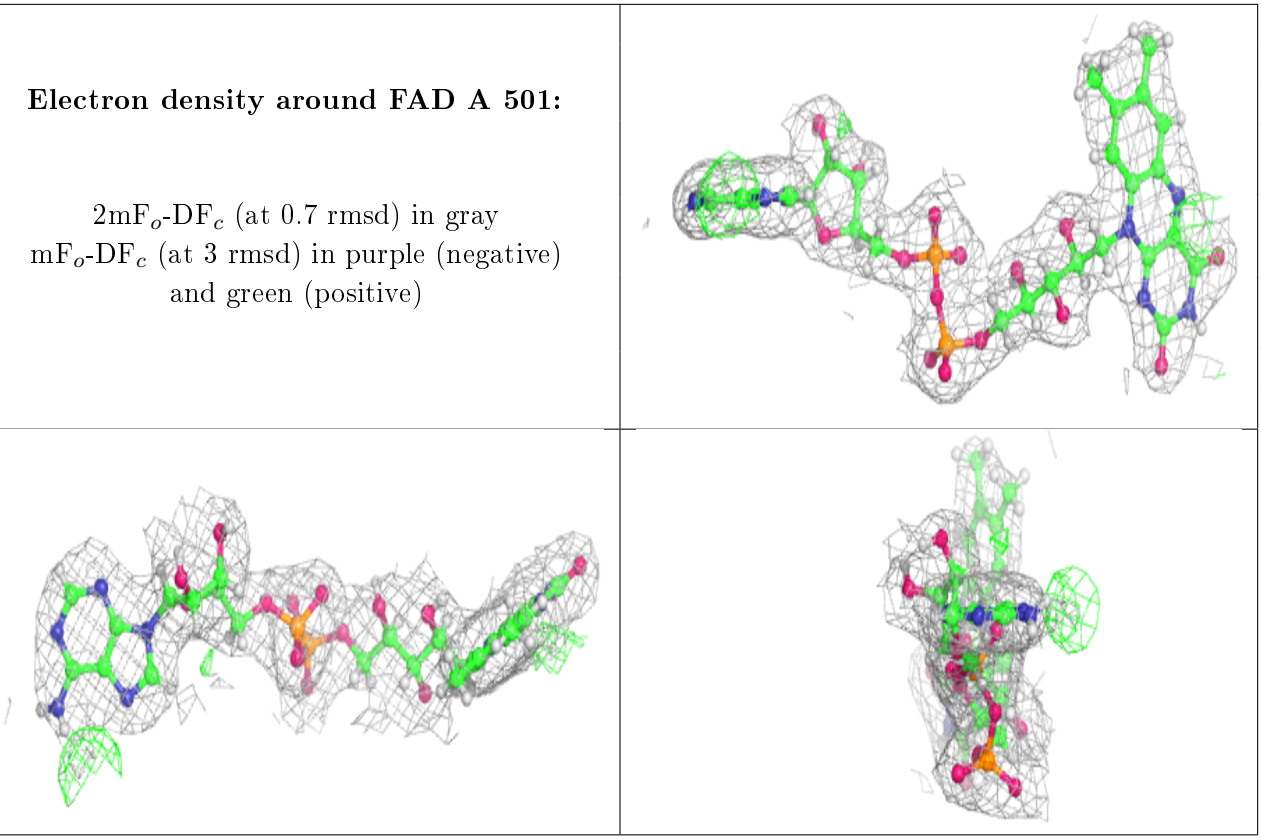
Electron density around FAD C 501:

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



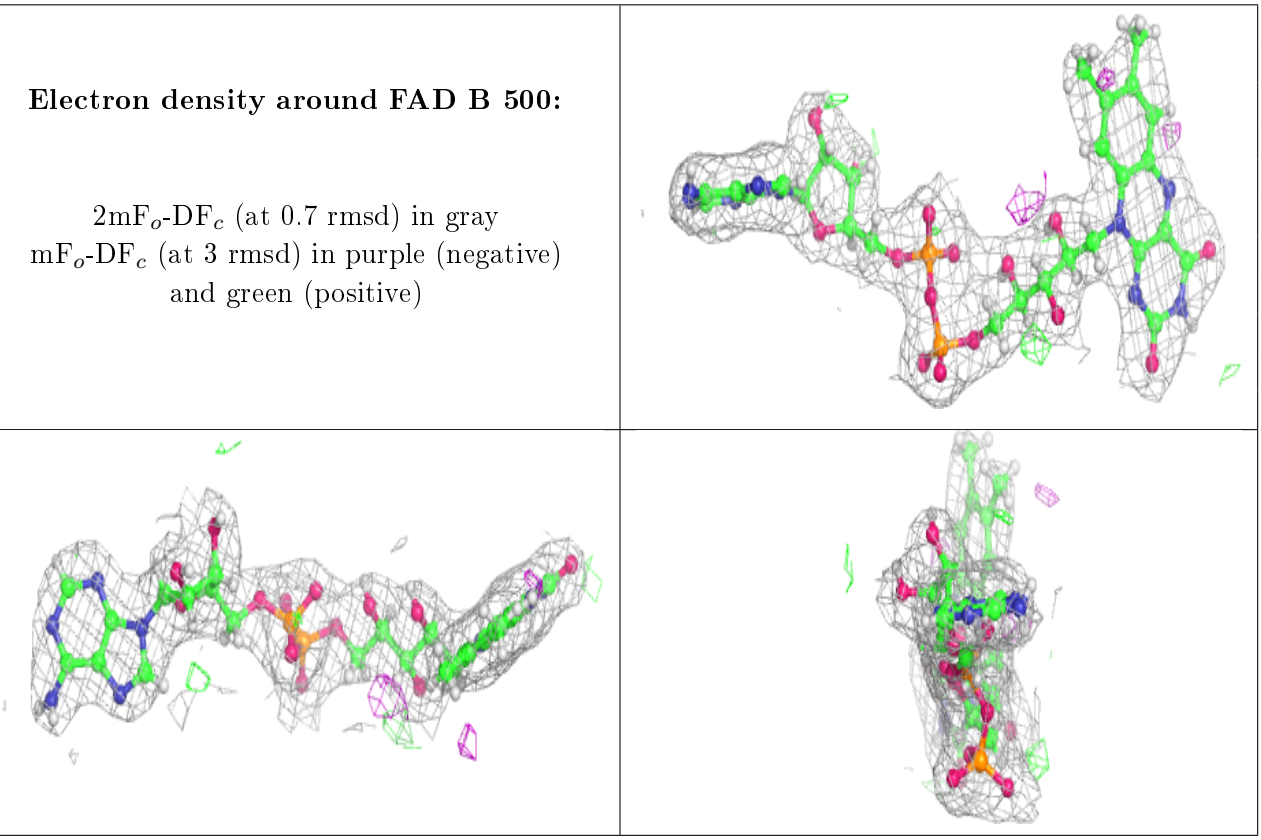
Electron density around FAD A 501:

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



Electron density around FAD B 500:

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



6.5 Other polymers (i)

There are no such residues in this entry.