Full wwPDB X-ray Structure Validation Report ⓘ

Feb 10, 2024 – 04:31 PM EST

PDB ID	:	2ISJ
Title	:	BluB bound to oxidized FMN
Authors	:	Larsen, N.A.; Taga, M.E.; Howard-Jones, A.R.; Walsh, C.T.; Walker, G.C.
Deposited on	:	2006-10-17
Resolution	:	2.30 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:

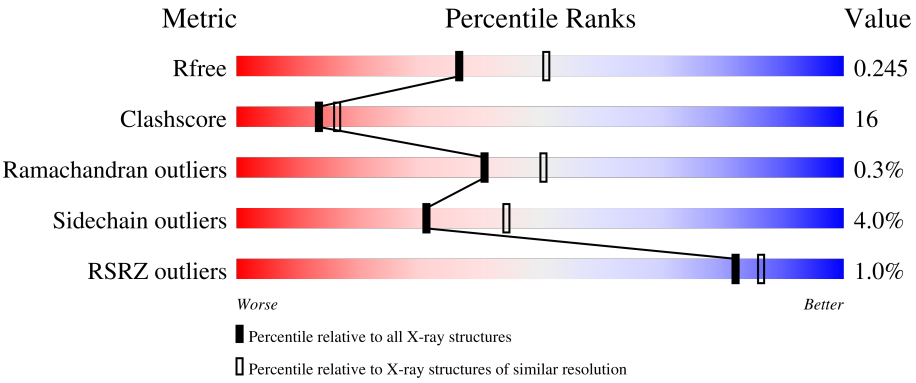
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.36
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.36

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 2.30 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	5042 (2.30-2.30)
Clashscore	141614	5643 (2.30-2.30)
Ramachandran outliers	138981	5575 (2.30-2.30)
Sidechain outliers	138945	5575 (2.30-2.30)
RSRZ outliers	127900	4938 (2.30-2.30)

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 <=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	230	67% 26% • 5%
1	B	230	68% 26% • 5%
1	C	230	71% 21% • 5%
1	D	230	% 77% 17% • 5%
1	E	230	% 69% 24% • 5%

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Mol	Chain	Length	Quality of chain
1	F	230	69% 25% 5%
1	G	230	3% 65% 28% 5%
1	H	230	2% 56% 39% 5%

2 Entry composition (i)

There are 3 unique types of molecules in this entry. The entry contains 14695 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 BluB.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	219	Total	C	N	O	S	0	0	0
			1741	1103	314	317	7			
1	B	219	Total	C	N	O	S	0	0	0
			1741	1103	314	317	7			
1	C	219	Total	C	N	O	S	0	0	0
			1741	1103	314	317	7			
1	D	219	Total	C	N	O	S	0	0	0
			1741	1103	314	317	7			
1	E	219	Total	C	N	O	S	0	0	0
			1741	1103	314	317	7			
1	F	219	Total	C	N	O	S	0	0	0
			1741	1103	314	317	7			
1	G	219	Total	C	N	O	S	0	0	0
			1741	1103	314	317	7			
1	H	219	Total	C	N	O	S	0	0	0
			1741	1103	314	317	7			

There are 24 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-2	GLY	-	cloning artifact	UNP Q92PC8
A	-1	SER	-	cloning artifact	UNP Q92PC8
A	0	HIS	-	cloning artifact	UNP Q92PC8
B	-2	GLY	-	cloning artifact	UNP Q92PC8
B	-1	SER	-	cloning artifact	UNP Q92PC8
B	0	HIS	-	cloning artifact	UNP Q92PC8
C	-2	GLY	-	cloning artifact	UNP Q92PC8
C	-1	SER	-	cloning artifact	UNP Q92PC8
C	0	HIS	-	cloning artifact	UNP Q92PC8
D	-2	GLY	-	cloning artifact	UNP Q92PC8
D	-1	SER	-	cloning artifact	UNP Q92PC8
D	0	HIS	-	cloning artifact	UNP Q92PC8
E	-2	GLY	-	cloning artifact	UNP Q92PC8

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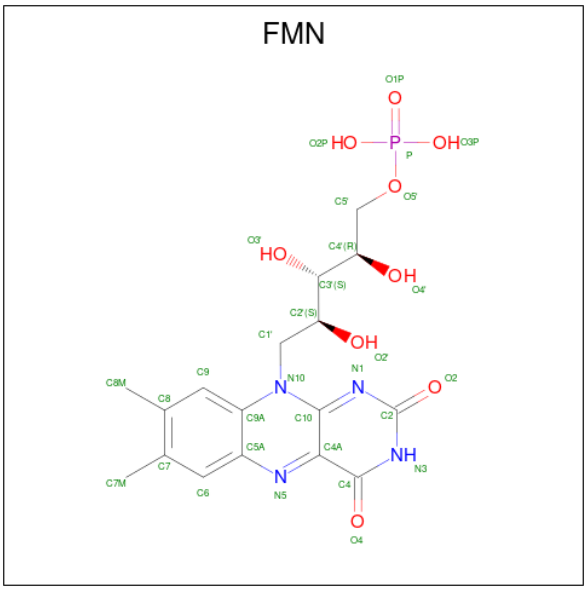
Chain	Residue	Modelled	Actual	Comment	Reference
E	-1	SER	-	cloning artifact	UNP Q92PC8
E	0	HIS	-	cloning artifact	UNP Q92PC8
F	-2	GLY	-	cloning artifact	UNP Q92PC8
F	-1	SER	-	cloning artifact	UNP Q92PC8
F	0	HIS	-	cloning artifact	UNP Q92PC8
G	-2	GLY	-	cloning artifact	UNP Q92PC8
G	-1	SER	-	cloning artifact	UNP Q92PC8
G	0	HIS	-	cloning artifact	UNP Q92PC8
H	-2	GLY	-	cloning artifact	UNP Q92PC8
H	-1	SER	-	cloning artifact	UNP Q92PC8
H	0	HIS	-	cloning artifact	UNP Q92PC8

- Molecule 2 is FLAVIN MONONUCLEOTIDE (three-letter code: FMN) (formula: $C_{17}H_{21}N_4O_9P$).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	A	1	Total	C	N	O	P	0	0
			31	17	4	9	1		
2	B	1	Total	C	N	O	P	0	0
			31	17	4	9	1		
2	C	1	Total	C	N	O	P	0	0
			31	17	4	9	1		
2	D	1	Total	C	N	O	P	0	0
			31	17	4	9	1		
2	E	1	Total	C	N	O	P	0	0
			31	17	4	9	1		
2	F	1	Total	C	N	O	P	0	0
			31	17	4	9	1		

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Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	G	1	Total	C	N	O	P	0	0
			31	17	4	9	1		
2	H	1	Total	C	N	O	P	0	0
			31	17	4	9	1		

- Molecule 3 is water.

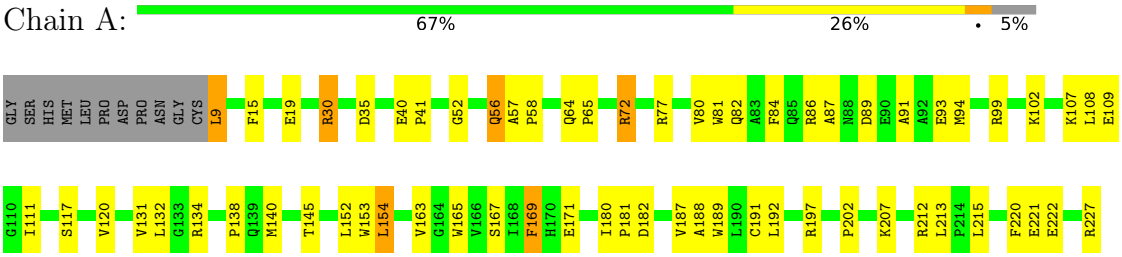
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	88	Total	O	0	0
			88	88		
3	B	86	Total	O	0	0
			86	86		
3	C	69	Total	O	0	0
			69	69		
3	D	87	Total	O	0	0
			87	87		
3	E	59	Total	O	0	0
			59	59		
3	F	55	Total	O	0	0
			55	55		
3	G	36	Total	O	0	0
			36	36		
3	H	39	Total	O	0	0
			39	39		

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.

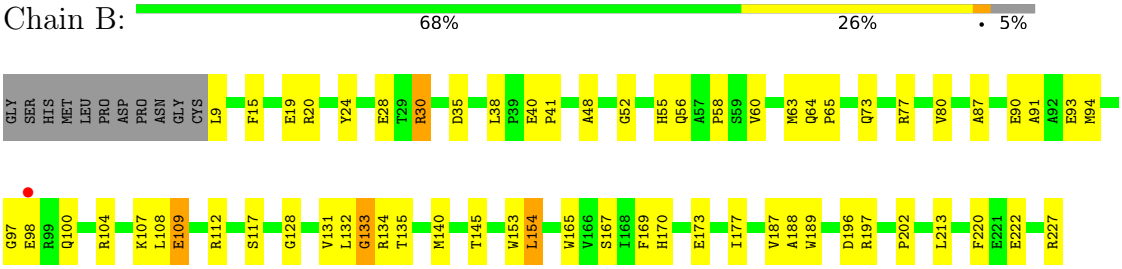
• Molecule 1: BluB

Chain A:



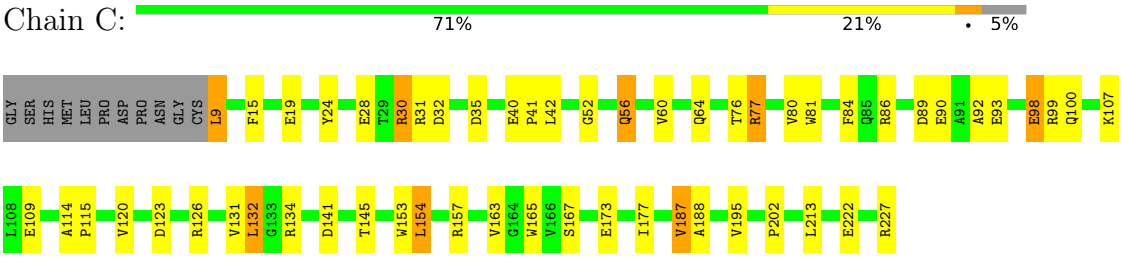
• Molecule 1: BluB

Chain B:



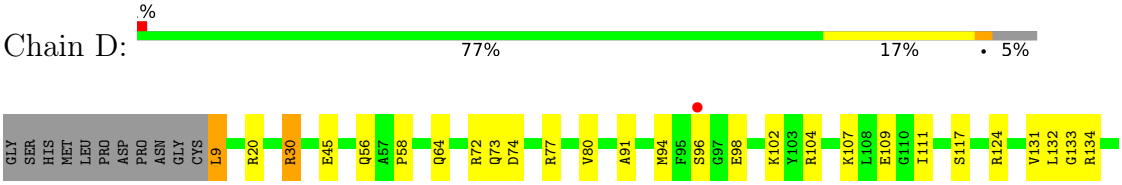
• Molecule 1: BluB

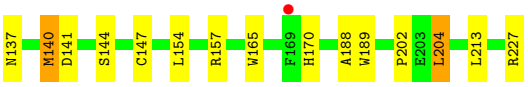
Chain C:



• Molecule 1: BluB

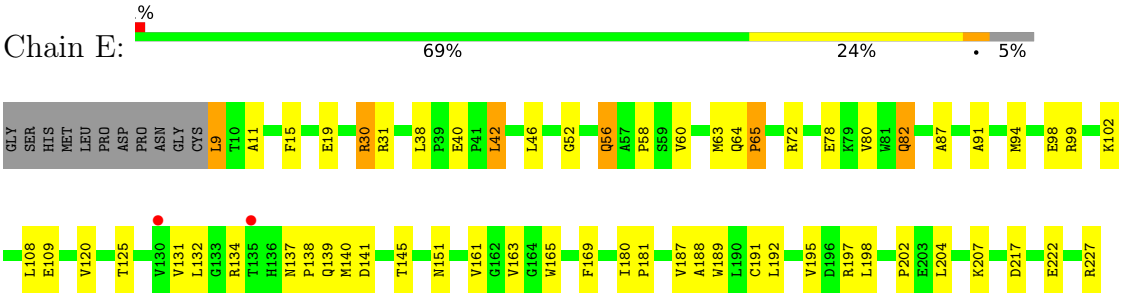
Chain D:





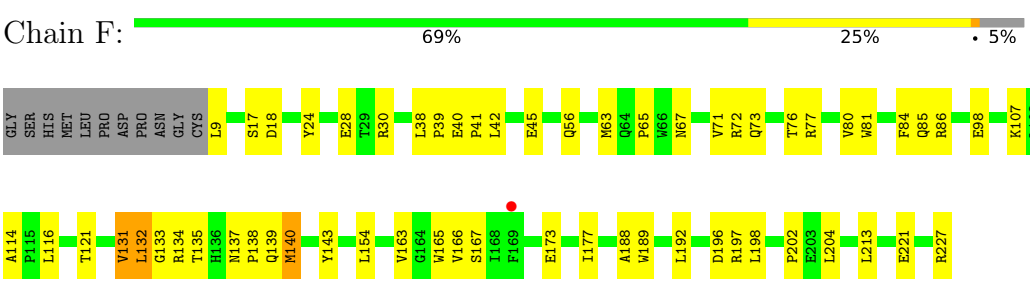
• Molecule 1: BluB

Chain E:



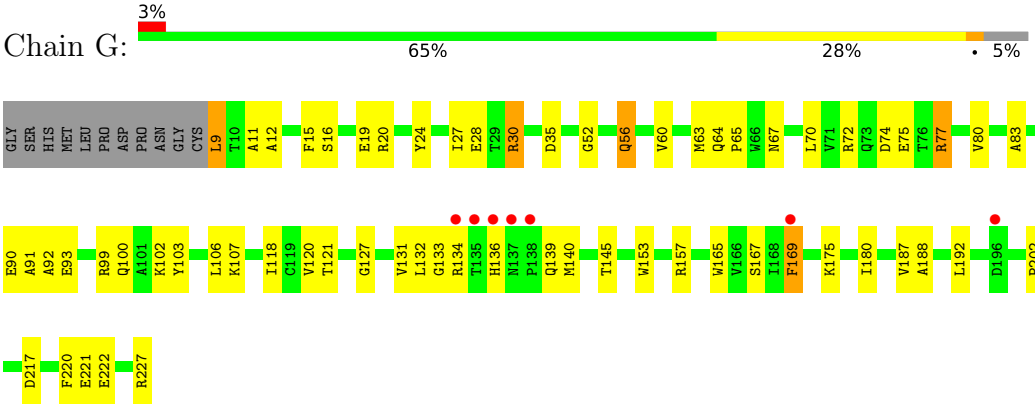
• Molecule 1: BluB

Chain F:



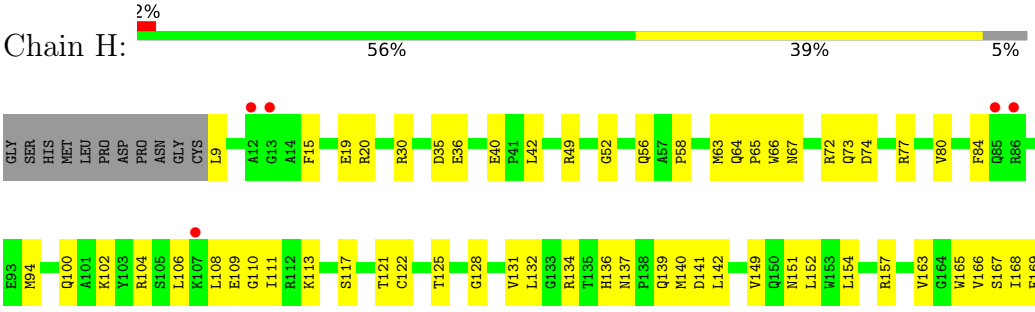
• Molecule 1: BluB

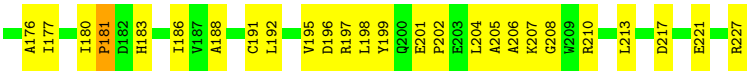
Chain G:



• Molecule 1: BluB

Chain H:




A176
I177
I180
P181
D182
H183
I186
V187
A188
C191
L192
V195
D196
R197
L198
Y199
Q200
E201
P202
E203
L204
A205
A206
K207
G208
W209
R210
L213
D217
E221
R227

4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α, β, γ	65.15Å 172.72Å 92.06Å 90.00° 90.06° 90.00°	Depositor
Resolution (Å)	50.00 – 2.30 48.81 – 2.30	Depositor EDS
% Data completeness (in resolution range)	80.0 (50.00-2.30) 88.4 (48.81-2.30)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	0.07	Depositor
$< I/\sigma(I) >$ [1]	2.69 (at 2.29Å)	Xtriage
Refinement program	CNS 1.1	Depositor
R, R_{free}	0.207 , 0.252 0.200 , 0.245	Depositor DCC
R_{free} test set	3618 reflections (4.52%)	wwPDB-VP
Wilson B-factor (Å^2)	18.0	Xtriage
Anisotropy	0.095	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.31 , 4.8	EDS
L-test for twinning[2]	$< \|L\| > = 0.45$, $< L^2 > = 0.28$	Xtriage
Estimated twinning fraction	0.238 for h,-k,-l	Xtriage
F_o,F_c correlation	0.92	EDS
Total number of atoms	14695	wwPDB-VP
Average B, all atoms (Å^2)	21.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.29% 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: FMN

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	0.38	0/1780	0.65	0/2412
1	B	0.38	0/1780	0.65	1/2412 (0.0%)
1	C	0.39	0/1780	0.64	0/2412
1	D	0.38	0/1780	0.65	1/2412 (0.0%)
1	E	0.33	0/1780	0.59	0/2412
1	F	0.34	0/1780	0.59	0/2412
1	G	0.34	0/1780	0.58	0/2412
1	H	0.32	0/1780	0.58	0/2412
All	All	0.36	0/14240	0.62	2/19296 (0.0%)

There are no bond length outliers.

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	B	197	ARG	NE-CZ-NH1	7.82	124.21	120.30
1	D	170	HIS	N-CA-C	-5.17	97.05	111.00

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	1741	0	1716	81	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	B	1741	0	1716	75	0
1	C	1741	0	1716	60	0
1	D	1741	0	1716	49	0
1	E	1741	0	1716	73	0
1	F	1741	0	1716	66	0
1	G	1741	0	1716	65	0
1	H	1741	0	1716	86	0
2	A	31	0	19	2	0
2	B	31	0	19	6	0
2	C	31	0	19	4	0
2	D	31	0	19	2	0
2	E	31	0	19	7	0
2	F	31	0	19	2	0
2	G	31	0	19	3	0
2	H	31	0	19	3	0
3	A	88	0	0	7	0
3	B	86	0	0	8	0
3	C	69	0	0	8	0
3	D	87	0	0	4	0
3	E	59	0	0	2	0
3	F	55	0	0	2	0
3	G	36	0	0	1	0
3	H	39	0	0	6	0
All	All	14695	0	13880	450	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 16.

All (450) 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:90:GLU:HA	3:C:568:HOH:O	1.47	1.14
1:D:131:VAL:HG13	1:D:134:ARG:HB3	1.39	1.02
1:C:145:THR:HG21	1:C:187:VAL:HG11	1.45	0.99
1:C:64:GLN:HE22	1:D:213:LEU:H	1.11	0.98
1:A:89:ASP:HB2	3:A:889:HOH:O	1.74	0.86
1:A:120:VAL:O	1:A:187:VAL:HG12	1.77	0.85
1:D:20:ARG:HB2	1:D:20:ARG:NH1	1.92	0.84
1:D:20:ARG:HB2	1:D:20:ARG:HH11	1.46	0.80
1:B:131:VAL:HG13	1:B:134:ARG:HB3	1.64	0.79
1:E:11:ALA:HA	1:F:197:ARG:HD2	1.64	0.79

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:131:VAL:HG13	1:C:134:ARG:HB3	1.63	0.78
1:G:222:GLU:HG3	1:H:73:GLN:NE2	1.98	0.78
1:A:213:LEU:H	1:B:64:GLN:HE22	1.28	0.78
1:D:77:ARG:HD3	3:D:671:HOH:O	1.84	0.78
2:G:508:FMN:H6	1:H:140:MET:HE2	1.64	0.78
1:B:187:VAL:HB	3:B:868:HOH:O	1.84	0.77
3:C:1088:HOH:O	1:D:132:LEU:HD22	1.86	0.75
1:H:131:VAL:HG13	1:H:134:ARG:HB3	1.69	0.75
1:E:222:GLU:HG3	1:F:73:GLN:NE2	2.02	0.75
1:A:140:MET:HE2	2:B:501:FMN:H6	1.70	0.74
1:C:92:ALA:O	1:C:100:GLN:HG3	1.87	0.74
1:H:132:LEU:HD22	3:H:1090:HOH:O	1.88	0.73
1:B:24:TYR:O	1:B:28:GLU:HG3	1.88	0.73
1:B:145:THR:HG21	3:B:868:HOH:O	1.89	0.73
2:C:504:FMN:H6	1:D:140:MET:HE2	1.70	0.73
1:H:227:ARG:HG2	1:H:227:ARG:HH11	1.54	0.73
1:B:100:GLN:NE2	1:B:104:ARG:HH21	1.87	0.72
1:E:145:THR:HG21	1:E:187:VAL:HG11	1.71	0.72
1:G:64:GLN:HE22	1:H:213:LEU:H	1.35	0.72
1:A:107:LYS:HE2	1:A:109:GLU:O	1.91	0.71
1:A:182:ASP:HB2	3:A:792:HOH:O	1.90	0.71
1:E:131:VAL:HG13	1:E:134:ARG:HB3	1.71	0.71
1:F:134:ARG:HG2	1:F:138:PRO:HA	1.74	0.70
1:C:222:GLU:HG3	1:D:73:GLN:NE2	2.07	0.70
1:C:24:TYR:O	1:C:28:GLU:HG3	1.91	0.70
1:E:137:ASN:HB2	3:E:934:HOH:O	1.92	0.70
1:C:64:GLN:NE2	1:D:213:LEU:H	1.87	0.70
1:A:15:PHE:HB3	1:A:19:GLU:HB2	1.75	0.69
1:G:87:ALA:CB	1:G:169:PHE:HA	2.22	0.68
1:B:132:LEU:HD23	1:B:133:GLY:H	1.58	0.68
1:A:154:LEU:HD23	1:B:154:LEU:HD23	1.74	0.68
1:A:213:LEU:H	1:B:64:GLN:NE2	1.92	0.68
1:A:140:MET:CE	1:B:167:SER:HB3	2.24	0.68
1:A:87:ALA:CB	1:A:169:PHE:HA	2.24	0.67
1:A:9:LEU:N	1:A:9:LEU:HD23	2.08	0.67
3:C:743:HOH:O	1:D:137:ASN:HB2	1.94	0.67
1:H:196:ASP:O	1:H:197:ARG:HD2	1.94	0.67
1:G:120:VAL:O	1:G:187:VAL:HG12	1.95	0.67
1:B:132:LEU:HD23	1:B:133:GLY:N	2.08	0.67
2:E:506:FMN:HM73	1:F:140:MET:HG3	1.78	0.67
1:C:213:LEU:H	1:D:64:GLN:HE22	1.41	0.66

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:F:77:ARG:HD3	3:F:565:HOH:O	1.94	0.66
1:G:139:GLN:HE21	1:H:139:GLN:HE21	1.43	0.66
1:H:204:LEU:HD13	3:H:764:HOH:O	1.95	0.66
1:H:191:CYS:C	1:H:192:LEU:HD12	2.17	0.65
1:D:131:VAL:CG1	1:D:134:ARG:HB3	2.21	0.65
1:D:202:PRO:HB3	2:D:503:FMN:H5'2	1.77	0.65
1:E:120:VAL:O	1:E:187:VAL:HG12	1.97	0.65
1:A:145:THR:CG2	1:A:187:VAL:HG11	2.28	0.65
1:E:145:THR:CG2	1:E:187:VAL:HG11	2.26	0.65
1:G:30:ARG:HA	1:G:157:ARG:HD3	1.79	0.65
1:C:145:THR:CG2	1:C:187:VAL:HG11	2.24	0.64
1:A:64:GLN:HE22	1:B:213:LEU:H	1.44	0.64
1:E:131:VAL:CG1	1:E:134:ARG:HB3	2.27	0.64
1:E:94:MET:HE3	1:F:135:THR:HB	1.80	0.64
1:A:72:ARG:C	1:A:77:ARG:HH12	2.01	0.64
1:D:107:LYS:HE2	1:D:109:GLU:O	1.98	0.64
1:B:128:GLY:HA3	3:B:1067:HOH:O	1.97	0.63
1:E:102:LYS:HE2	1:E:207:LYS:O	1.99	0.63
1:E:132:LEU:HD22	3:E:572:HOH:O	1.97	0.63
1:D:80:VAL:HG21	1:D:189:TRP:CH2	2.34	0.63
1:F:132:LEU:HD23	1:F:133:GLY:N	2.14	0.63
1:C:77:ARG:HD3	3:C:815:HOH:O	1.99	0.62
1:G:9:LEU:HD23	1:G:9:LEU:N	2.14	0.62
1:B:30:ARG:NH1	2:B:501:FMN:O2P	2.32	0.62
1:H:125:THR:HG23	1:H:183:HIS:HB2	1.83	0.61
1:F:165:TRP:CZ2	1:F:188:ALA:HB2	2.36	0.61
1:E:140:MET:HE3	2:F:505:FMN:H6	1.83	0.61
1:E:91:ALA:HA	1:E:94:MET:HE3	1.82	0.61
1:E:94:MET:CE	1:F:135:THR:HB	2.31	0.61
1:A:167:SER:HB3	1:B:140:MET:HE2	1.81	0.60
2:A:502:FMN:H6	1:B:140:MET:HE2	1.83	0.60
1:A:77:ARG:HD3	3:A:811:HOH:O	1.99	0.60
1:F:24:TYR:O	1:F:28:GLU:HG3	2.01	0.60
1:E:165:TRP:CZ2	1:E:188:ALA:HB2	2.37	0.60
1:G:132:LEU:HD22	3:G:1089:HOH:O	2.00	0.60
1:C:131:VAL:CG1	1:C:134:ARG:HB3	2.30	0.60
1:B:91:ALA:HA	1:B:94:MET:HE3	1.83	0.60
1:C:89:ASP:O	3:C:568:HOH:O	2.15	0.60
1:H:52:GLY:O	1:H:56:GLN:HG2	2.01	0.60
1:G:213:LEU:H	1:H:64:GLN:HE22	1.47	0.59
1:A:140:MET:HE1	1:B:167:SER:HB3	1.82	0.59

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:28:GLU:HG2	1:D:56:GLN:OE1	2.01	0.59
1:A:222:GLU:HG3	1:B:73:GLN:NE2	2.16	0.59
1:E:30:ARG:NH2	2:E:506:FMN:O2P	2.35	0.59
1:F:67:ASN:HB2	1:F:121:THR:OG1	2.02	0.59
1:G:15:PHE:HB3	1:G:19:GLU:HB2	1.84	0.59
1:C:154:LEU:HD23	1:D:154:LEU:HD12	1.84	0.59
1:G:132:LEU:HD21	1:H:108:LEU:HD22	1.84	0.59
1:A:227:ARG:HH11	1:A:227:ARG:HG2	1.68	0.59
1:E:139:GLN:HE21	1:F:139:GLN:HE21	1.51	0.58
1:F:42:LEU:HD22	1:F:116:LEU:HD23	1.84	0.58
1:D:102:LYS:HE2	3:D:1077:HOH:O	2.04	0.58
1:H:163:VAL:HG22	1:H:192:LEU:HG	1.86	0.58
1:F:76:THR:O	1:F:80:VAL:HG23	2.03	0.57
1:C:120:VAL:O	1:C:187:VAL:HG13	2.04	0.57
1:E:15:PHE:HB3	1:E:19:GLU:HB2	1.86	0.57
1:E:217:ASP:HA	1:E:227:ARG:HH21	1.70	0.57
1:E:140:MET:HE2	1:F:167:SER:CB	2.34	0.57
1:F:173:GLU:O	1:F:177:ILE:HG13	2.04	0.57
1:G:127:GLY:HA2	1:H:210:ARG:NH1	2.19	0.57
1:C:154:LEU:HD23	1:D:154:LEU:CD1	2.34	0.57
1:A:134:ARG:HG2	1:A:138:PRO:HA	1.87	0.57
1:D:74:ASP:HA	1:D:77:ARG:NH1	2.20	0.57
1:E:80:VAL:HG21	1:E:189:TRP:CH2	2.39	0.57
1:E:87:ALA:CB	1:E:169:PHE:HA	2.35	0.57
1:A:82:GLN:NE2	3:A:551:HOH:O	2.37	0.57
1:A:145:THR:HG22	1:A:187:VAL:HG11	1.87	0.57
1:B:227:ARG:HG2	1:B:227:ARG:HH11	1.70	0.56
1:B:131:VAL:HG11	1:B:134:ARG:NE	2.20	0.56
1:G:64:GLN:NE2	1:H:213:LEU:H	2.01	0.56
1:A:87:ALA:HB2	1:A:169:PHE:HA	1.87	0.56
1:F:227:ARG:HH11	1:F:227:ARG:HG2	1.70	0.56
1:G:52:GLY:O	1:G:56:GLN:HG2	2.05	0.56
1:F:63:MET:CE	1:F:65:PRO:HB3	2.36	0.56
1:G:74:ASP:HA	1:G:77:ARG:NH1	2.20	0.56
1:D:227:ARG:HG2	1:D:227:ARG:HH11	1.70	0.56
1:B:52:GLY:O	1:B:56:GLN:HG2	2.06	0.55
1:E:60:VAL:HG22	1:E:132:LEU:O	2.05	0.55
1:A:64:GLN:NE2	1:B:213:LEU:H	2.04	0.55
1:C:35:ASP:HB2	1:C:107:LYS:HD2	1.88	0.55
1:G:35:ASP:HB2	1:G:107:LYS:HD2	1.89	0.55
1:A:102:LYS:HE2	1:A:207:LYS:O	2.07	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:G:27:ILE:HG23	1:H:151:ASN:ND2	2.22	0.55
1:G:140:MET:HE3	1:H:167:SER:HB3	1.89	0.55
1:F:86:ARG:NH2	1:F:173:GLU:OE1	2.40	0.55
1:E:91:ALA:HA	1:E:94:MET:CE	2.36	0.55
1:F:134:ARG:CG	1:F:138:PRO:HA	2.36	0.55
1:A:52:GLY:O	1:A:56:GLN:HG3	2.07	0.55
1:A:197:ARG:HD2	1:B:9:LEU:HD21	1.88	0.55
1:B:220:PHE:HE1	1:B:227:ARG:HH12	1.55	0.54
1:C:165:TRP:CE2	1:D:140:MET:HE3	2.41	0.54
1:E:204:LEU:HD12	2:E:506:FMN:O4'	2.06	0.54
1:A:140:MET:HE2	1:B:167:SER:HB3	1.89	0.54
1:F:39:PRO:HG2	1:F:40:GLU:OE2	2.06	0.54
1:E:195:VAL:HG21	1:E:198:LEU:HD21	1.88	0.54
1:G:16:SER:OG	1:G:19:GLU:HG3	2.07	0.54
1:D:131:VAL:HG11	1:D:134:ARG:NE	2.23	0.54
1:G:60:VAL:HG22	1:G:132:LEU:O	2.07	0.54
1:H:227:ARG:HG2	1:H:227:ARG:NH1	2.22	0.54
1:A:80:VAL:HG21	1:A:189:TRP:CH2	2.43	0.54
1:A:163:VAL:HG22	1:A:192:LEU:HG	1.89	0.54
1:H:132:LEU:CD2	3:H:1090:HOH:O	2.53	0.54
1:C:165:TRP:CZ2	1:D:140:MET:HE3	2.44	0.53
1:B:131:VAL:CG1	1:B:134:ARG:NE	2.71	0.53
1:C:90:GLU:CA	3:C:568:HOH:O	2.25	0.53
1:E:140:MET:CE	1:F:167:SER:HB3	2.38	0.53
1:H:205:ALA:HA	1:H:210:ARG:O	2.08	0.53
1:E:227:ARG:HG2	1:E:227:ARG:HH11	1.74	0.53
1:H:15:PHE:HB3	1:H:19:GLU:HB2	1.90	0.53
1:A:58:PRO:HG3	1:B:153:TRP:CZ3	2.43	0.53
1:A:165:TRP:CE2	1:B:140:MET:HE3	2.43	0.53
1:E:58:PRO:HD3	1:F:30:ARG:HH21	1.73	0.53
1:G:165:TRP:CZ2	1:G:188:ALA:HB2	2.44	0.53
1:H:74:ASP:OD1	1:H:77:ARG:NH2	2.42	0.53
1:E:9:LEU:HD23	1:E:9:LEU:N	2.24	0.53
1:A:167:SER:HB3	1:B:140:MET:CE	2.38	0.52
1:H:152:LEU:O	1:H:152:LEU:HD23	2.09	0.52
1:A:165:TRP:CZ2	1:A:188:ALA:HB2	2.45	0.52
1:C:202:PRO:HA	2:C:504:FMN:O3P	2.10	0.52
1:E:9:LEU:HB2	1:F:198:LEU:O	2.09	0.52
1:A:30:ARG:HG3	1:A:30:ARG:O	2.10	0.52
1:E:64:GLN:HE22	1:F:213:LEU:H	1.57	0.52
1:G:70:LEU:HD23	1:G:118:ILE:HG12	1.91	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:87:ALA:O	1:B:90:GLU:HG2	2.10	0.52
1:B:165:TRP:CZ2	1:B:188:ALA:HB2	2.44	0.52
1:B:100:GLN:HE21	1:B:104:ARG:HH21	1.56	0.52
1:H:35:ASP:OD1	1:H:113:LYS:HE3	2.10	0.52
1:A:15:PHE:HB3	1:A:19:GLU:CB	2.40	0.52
1:A:165:TRP:CZ2	1:B:140:MET:HE3	2.44	0.52
1:B:15:PHE:HB3	1:B:19:GLU:HB2	1.92	0.52
1:F:84:PHE:CE2	1:F:109:GLU:HG2	2.44	0.52
1:H:42:LEU:HD12	1:H:42:LEU:N	2.25	0.52
1:H:108:LEU:HD13	1:H:168:ILE:CD1	2.40	0.52
1:A:35:ASP:HB2	1:A:107:LYS:CD	2.40	0.52
1:H:201:GLU:HB2	3:H:950:HOH:O	2.10	0.52
1:C:131:VAL:HG11	1:C:134:ARG:NE	2.25	0.51
1:B:38:LEU:HD11	1:B:196:ASP:OD2	2.11	0.51
1:D:9:LEU:N	3:D:622:HOH:O	2.42	0.51
1:G:221:GLU:OE1	1:H:72:ARG:NH2	2.42	0.51
1:B:80:VAL:HG21	1:B:189:TRP:CH2	2.45	0.51
1:B:90:GLU:OE1	1:B:170:HIS:NE2	2.44	0.51
1:H:171:GLU:HG3	1:H:186:ILE:HD12	1.93	0.51
1:F:38:LEU:HB3	1:F:40:GLU:OE1	2.11	0.51
1:G:139:GLN:NE2	1:H:139:GLN:HE21	2.08	0.51
1:E:42:LEU:N	1:E:42:LEU:HD23	2.26	0.51
1:C:173:GLU:O	1:C:177:ILE:HG13	2.10	0.51
1:C:227:ARG:HG2	1:C:227:ARG:HH11	1.76	0.51
1:D:20:ARG:NH1	1:D:20:ARG:CB	2.69	0.51
1:E:197:ARG:HB2	1:F:9:LEU:HD22	1.93	0.51
1:C:52:GLY:O	1:C:56:GLN:HG2	2.11	0.51
1:B:48:ALA:HB3	3:B:607:HOH:O	2.11	0.51
1:C:153:TRP:CD1	1:C:163:VAL:HB	2.46	0.51
1:G:63:MET:CE	1:G:65:PRO:HB3	2.40	0.51
1:H:166:VAL:HG12	1:H:169:PHE:CE1	2.46	0.51
1:H:84:PHE:CE2	1:H:109:GLU:HG2	2.46	0.50
1:A:91:ALA:HA	1:A:94:MET:HE3	1.93	0.50
1:A:108:LEU:HD22	1:B:132:LEU:HD21	1.92	0.50
1:E:58:PRO:CD	1:F:30:ARG:HH21	2.24	0.50
1:G:217:ASP:HA	1:G:227:ARG:HH21	1.74	0.50
1:C:60:VAL:HG22	1:C:132:LEU:O	2.11	0.50
1:D:202:PRO:HA	2:D:503:FMN:O1P	2.12	0.50
1:B:134:ARG:HG3	1:B:140:MET:HB2	1.94	0.50
1:E:139:GLN:NE2	1:F:139:GLN:HE21	2.10	0.50
1:E:140:MET:HE1	1:F:165:TRP:HE1	1.76	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:G:192:LEU:N	1:G:192:LEU:HD12	2.27	0.50
1:B:108:LEU:O	1:B:109:GLU:HB3	2.12	0.50
1:A:35:ASP:HB2	1:A:107:LYS:HD3	1.94	0.50
1:C:98:GLU:HG3	1:C:99:ARG:N	2.27	0.50
1:E:163:VAL:HG22	1:E:192:LEU:HG	1.92	0.50
1:A:140:MET:HE3	1:B:165:TRP:CE2	2.47	0.50
1:C:213:LEU:H	1:D:64:GLN:NE2	2.07	0.50
1:E:46:LEU:HD21	1:E:161:VAL:HG21	1.93	0.50
1:H:49:ARG:HH11	1:H:49:ARG:HG3	1.76	0.50
1:H:77:ARG:CB	1:H:77:ARG:HH11	2.25	0.50
1:C:134:ARG:NH1	1:C:141:ASP:OD2	2.45	0.49
1:E:132:LEU:HD13	1:F:204:LEU:HD21	1.94	0.49
1:G:131:VAL:HG13	1:G:134:ARG:HB3	1.94	0.49
1:C:123:ASP:OD2	1:C:126:ARG:HB2	2.12	0.49
1:C:132:LEU:HD12	1:D:204:LEU:HD21	1.93	0.49
1:B:35:ASP:HB2	1:B:107:LYS:HD2	1.94	0.49
1:E:72:ARG:NH2	1:F:221:GLU:OE1	2.46	0.49
1:G:145:THR:HG22	1:G:187:VAL:HG11	1.93	0.49
1:G:87:ALA:HB2	1:G:169:PHE:HA	1.92	0.49
1:E:222:GLU:OE2	1:F:72:ARG:N	2.41	0.49
1:E:139:GLN:HE21	1:F:139:GLN:NE2	2.11	0.49
1:H:132:LEU:HD23	1:H:132:LEU:C	2.33	0.49
1:A:145:THR:HG21	1:A:187:VAL:HG11	1.94	0.49
1:E:58:PRO:HD3	1:F:30:ARG:NH2	2.28	0.48
1:B:227:ARG:NH2	3:B:718:HOH:O	2.45	0.48
1:C:165:TRP:NE1	1:D:140:MET:CE	2.76	0.48
1:F:17:SER:HB3	1:G:86:ARG:HD2	1.95	0.48
1:G:93:GLU:OE1	1:G:93:GLU:HA	2.14	0.48
1:B:112:ARG:NH2	3:B:597:HOH:O	2.34	0.48
1:E:42:LEU:HB3	1:E:46:LEU:HD23	1.95	0.48
1:C:165:TRP:CZ2	1:C:188:ALA:HB2	2.48	0.48
1:H:131:VAL:HG23	3:H:814:HOH:O	2.14	0.48
1:D:77:ARG:NH1	3:D:857:HOH:O	2.47	0.48
1:E:140:MET:HE2	1:F:167:SER:HB3	1.95	0.48
1:G:167:SER:O	1:H:137:ASN:ND2	2.46	0.48
1:A:9:LEU:N	1:A:9:LEU:CD2	2.77	0.48
1:C:9:LEU:N	1:C:9:LEU:HD23	2.29	0.48
1:H:77:ARG:HH11	1:H:77:ARG:HB3	1.79	0.48
1:A:140:MET:CE	1:B:167:SER:CB	2.92	0.48
1:H:122:CYS:SG	1:H:142:LEU:HD23	2.54	0.48
1:C:76:THR:O	1:C:80:VAL:HG23	2.14	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:F:132:LEU:HD23	1:F:133:GLY:H	1.76	0.47
1:E:58:PRO:N	1:F:30:ARG:HH21	2.12	0.47
1:F:81:TRP:CH2	1:F:85:GLN:HG3	2.49	0.47
1:C:30:ARG:HA	1:C:157:ARG:HD3	1.96	0.47
1:A:167:SER:CB	1:B:140:MET:HE2	2.43	0.47
1:H:202:PRO:HD2	3:H:950:HOH:O	2.14	0.47
1:G:72:ARG:NH2	1:H:221:GLU:OE2	2.46	0.47
1:A:221:GLU:O	1:A:222:GLU:HB2	2.13	0.47
1:C:167:SER:HB3	1:D:140:MET:CE	2.45	0.47
1:F:202:PRO:HB3	2:F:505:FMN:H5'2	1.96	0.47
1:G:165:TRP:CZ2	2:G:508:FMN:HM72	2.50	0.47
1:H:9:LEU:C	1:H:9:LEU:HD23	2.34	0.47
1:H:66:TRP:HA	1:H:121:THR:O	2.15	0.47
1:H:100:GLN:O	1:H:104:ARG:HB2	2.15	0.47
1:A:180:ILE:HA	1:A:181:PRO:HD3	1.76	0.47
1:D:91:ALA:HA	1:D:94:MET:HE3	1.97	0.47
1:D:132:LEU:HD23	1:D:133:GLY:N	2.30	0.47
1:H:80:VAL:HG12	1:H:111:ILE:HD13	1.97	0.47
1:A:30:ARG:O	1:A:30:ARG:NH1	2.48	0.46
1:C:107:LYS:HE2	1:C:109:GLU:O	2.15	0.46
1:G:80:VAL:O	1:G:83:ALA:HB3	2.15	0.46
1:B:100:GLN:NE2	3:B:697:HOH:O	2.47	0.46
1:E:31:ARG:HH21	2:E:506:FMN:P	2.39	0.46
1:E:222:GLU:OE2	1:F:71:VAL:HA	2.15	0.46
1:G:165:TRP:CZ2	1:H:140:MET:HE3	2.50	0.46
1:C:64:GLN:HE22	1:D:213:LEU:N	1.94	0.46
1:B:202:PRO:HB3	2:B:501:FMN:H5'2	1.97	0.46
1:C:167:SER:HB3	1:D:140:MET:HE2	1.98	0.46
1:E:202:PRO:HA	2:E:506:FMN:O3P	2.14	0.46
1:A:227:ARG:HG3	1:E:125:THR:O	2.16	0.46
1:G:127:GLY:HA2	1:H:210:ARG:HH12	1.80	0.46
1:H:141:ASP:OD1	1:H:142:LEU:N	2.48	0.46
1:E:15:PHE:HB3	1:E:19:GLU:CB	2.45	0.46
1:F:137:ASN:OD1	1:F:139:GLN:HB2	2.15	0.46
1:F:140:MET:HE3	1:F:143:TYR:HD2	1.80	0.46
1:C:165:TRP:NE1	1:D:140:MET:HE3	2.31	0.46
1:E:140:MET:HE2	1:F:167:SER:HB2	1.96	0.46
1:G:12:ALA:O	1:H:196:ASP:HA	2.15	0.46
1:B:202:PRO:HB3	2:B:501:FMN:C5'	2.46	0.45
1:F:227:ARG:HG2	1:F:227:ARG:NH1	2.30	0.45
1:A:94:MET:HE3	1:B:135:THR:HB	1.98	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:227:ARG:HG2	1:B:227:ARG:NH1	2.31	0.45
1:E:151:ASN:OD1	1:F:154:LEU:HD11	2.16	0.45
1:E:222:GLU:HG3	1:F:73:GLN:HE21	1.79	0.45
1:G:60:VAL:CG2	1:G:133:GLY:HA3	2.46	0.45
1:A:72:ARG:N	1:B:222:GLU:OE2	2.36	0.45
1:C:15:PHE:HB3	1:C:19:GLU:HB2	1.99	0.45
1:E:52:GLY:O	1:E:56:GLN:HG2	2.16	0.45
1:H:217:ASP:O	1:H:227:ARG:NH2	2.50	0.45
1:C:86:ARG:NH2	1:C:173:GLU:OE1	2.35	0.45
1:G:145:THR:CG2	1:G:187:VAL:HG11	2.46	0.45
1:G:67:ASN:HB2	1:G:121:THR:OG1	2.17	0.45
1:G:86:ARG:O	1:G:90:GLU:HG3	2.17	0.45
1:H:36:GLU:N	1:H:36:GLU:CD	2.70	0.45
1:F:77:ARG:HD2	1:F:111:ILE:O	2.16	0.45
1:G:30:ARG:NH2	1:H:58:PRO:HD3	2.31	0.45
1:A:220:PHE:HE1	1:A:227:ARG:NH1	2.15	0.45
1:D:227:ARG:HH11	1:D:227:ARG:CG	2.29	0.45
1:F:45:GLU:CD	1:F:45:GLU:N	2.70	0.45
1:F:114:ALA:HB1	1:F:192:LEU:O	2.16	0.45
1:A:165:TRP:NE1	1:B:140:MET:HE3	2.32	0.45
1:E:202:PRO:HG3	2:E:506:FMN:O3P	2.17	0.44
1:C:145:THR:HG21	1:C:187:VAL:CG1	2.31	0.44
1:E:78:GLU:OE1	1:E:82:GLN:NE2	2.50	0.44
1:H:177:ILE:O	1:H:177:ILE:HG22	2.16	0.44
1:A:140:MET:HE3	2:B:501:FMN:HM72	1.98	0.44
1:C:9:LEU:N	3:C:642:HOH:O	2.50	0.44
1:F:30:ARG:O	1:F:30:ARG:HG3	2.18	0.44
1:F:131:VAL:HG13	1:F:134:ARG:HB3	2.00	0.44
1:A:30:ARG:HH21	1:B:58:PRO:N	2.16	0.44
1:G:60:VAL:HG13	1:G:60:VAL:O	2.18	0.44
1:H:15:PHE:HB2	1:H:20:ARG:HG3	1.99	0.44
1:E:191:CYS:C	1:E:192:LEU:HD12	2.38	0.44
1:H:92:ALA:C	1:H:94:MET:H	2.19	0.44
1:A:191:CYS:C	1:A:192:LEU:HD12	2.38	0.44
1:B:60:VAL:O	1:B:63:MET:HB2	2.18	0.44
1:C:42:LEU:HD12	1:C:42:LEU:N	2.33	0.44
1:E:38:LEU:HB3	1:E:40:GLU:OE2	2.18	0.44
1:H:192:LEU:HD12	1:H:192:LEU:N	2.32	0.44
1:H:67:ASN:HB2	1:H:121:THR:OG1	2.18	0.44
1:C:153:TRP:CZ3	1:D:58:PRO:HG3	2.54	0.43
1:E:134:ARG:NH1	1:E:141:ASP:OD2	2.51	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:57:ALA:HB1	1:A:58:PRO:HD2	1.99	0.43
1:B:77:ARG:HD3	3:B:902:HOH:O	2.17	0.43
1:C:40:GLU:HA	1:C:41:PRO:HD3	1.92	0.43
1:H:204:LEU:HD22	2:H:507:FMN:O4'	2.18	0.43
1:E:134:ARG:HD2	1:E:138:PRO:O	2.19	0.43
1:H:108:LEU:HD13	1:H:168:ILE:HD11	2.00	0.43
1:C:40:GLU:OE2	1:C:40:GLU:N	2.45	0.43
1:E:180:ILE:HA	1:E:181:PRO:HD3	1.84	0.43
1:A:82:GLN:O	1:A:86:ARG:HG3	2.18	0.43
1:H:165:TRP:CZ2	1:H:188:ALA:HB2	2.54	0.43
1:A:64:GLN:N	1:A:65:PRO:CD	2.81	0.43
1:A:153:TRP:CD1	1:A:163:VAL:HB	2.54	0.43
1:B:35:ASP:HB2	1:B:107:LYS:CD	2.49	0.43
1:A:108:LEU:CD2	1:B:132:LEU:HD21	2.49	0.43
1:B:131:VAL:CG1	1:B:134:ARG:HE	2.31	0.43
1:C:132:LEU:CD1	1:D:204:LEU:HD21	2.49	0.43
1:G:88:ASN:O	1:G:91:ALA:HB3	2.18	0.43
1:H:206:ALA:C	1:H:208:GLY:H	2.22	0.43
1:A:35:ASP:HA	1:A:107:LYS:NZ	2.34	0.43
1:E:131:VAL:CG1	1:E:134:ARG:HE	2.31	0.43
1:E:140:MET:HE1	1:F:165:TRP:NE1	2.34	0.43
1:F:40:GLU:HA	1:F:41:PRO:HD3	1.91	0.43
1:A:81:TRP:O	1:A:84:PHE:HB3	2.19	0.43
1:B:15:PHE:HB2	1:B:20:ARG:HG3	2.00	0.43
1:B:63:MET:CE	1:B:65:PRO:HB3	2.49	0.43
1:C:31:ARG:HH21	2:C:504:FMN:P	2.42	0.43
1:E:40:GLU:CD	1:E:40:GLU:H	2.21	0.43
1:A:40:GLU:HA	1:A:41:PRO:HD3	1.95	0.42
1:A:140:MET:CE	1:B:165:TRP:NE1	2.82	0.42
1:G:35:ASP:HB2	1:G:107:LYS:CD	2.49	0.42
1:G:136:HIS:HE1	1:H:91:ALA:HB2	1.83	0.42
1:H:109:GLU:OE2	1:H:110:GLY:N	2.52	0.42
1:B:173:GLU:O	1:B:177:ILE:HG13	2.19	0.42
1:E:102:LYS:HD2	1:E:102:LYS:HA	1.84	0.42
1:H:149:VAL:HG11	1:H:165:TRP:CZ3	2.54	0.42
1:H:195:VAL:HG21	1:H:198:LEU:HD21	2.01	0.42
1:H:217:ASP:HA	1:H:227:ARG:HH21	1.84	0.42
1:A:215:LEU:HD13	1:B:55:HIS:CG	2.54	0.42
1:E:63:MET:CE	1:E:65:PRO:HB3	2.49	0.42
1:F:227:ARG:HA	1:F:227:ARG:HD3	1.86	0.42
1:G:11:ALA:HB2	1:H:197:ARG:CZ	2.49	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:152:LEU:C	1:A:152:LEU:HD23	2.39	0.42
1:D:20:ARG:CB	1:D:20:ARG:CZ	2.98	0.42
1:H:180:ILE:HA	1:H:181:PRO:HD3	1.86	0.42
1:A:9:LEU:N	3:A:538:HOH:O	2.53	0.42
1:A:91:ALA:HA	1:A:94:MET:CE	2.50	0.42
1:B:40:GLU:HA	1:B:41:PRO:HD3	1.84	0.42
1:C:195:VAL:HG23	1:C:195:VAL:O	2.19	0.42
1:D:144:SER:O	1:D:147:CYS:HB2	2.19	0.42
1:D:30:ARG:HA	1:D:157:ARG:HD3	2.01	0.42
1:C:227:ARG:HE	1:H:128:GLY:HA2	1.85	0.42
1:G:167:SER:HB3	1:H:140:MET:CE	2.49	0.42
1:G:175:LYS:HE3	1:G:180:ILE:HG22	2.02	0.42
1:C:222:GLU:OE2	1:D:72:ARG:N	2.46	0.42
1:E:204:LEU:HD23	1:E:204:LEU:HA	1.90	0.42
1:F:165:TRP:HD1	1:F:166:VAL:N	2.18	0.42
1:G:15:PHE:HE1	1:H:157:ARG:CZ	2.33	0.42
1:B:220:PHE:CE1	1:B:227:ARG:NH1	2.88	0.42
1:F:77:ARG:NE	3:F:618:HOH:O	2.51	0.42
1:G:220:PHE:HE1	1:G:227:ARG:NH1	2.18	0.42
1:A:30:ARG:HH21	1:B:58:PRO:HD3	1.85	0.41
1:A:77:ARG:HD2	1:A:111:ILE:O	2.20	0.41
1:C:81:TRP:O	1:C:84:PHE:HB3	2.20	0.41
1:G:153:TRP:CZ3	1:H:58:PRO:HG3	2.56	0.41
1:A:213:LEU:N	1:B:64:GLN:HE22	2.06	0.41
1:C:93:GLU:HB2	3:C:568:HOH:O	2.20	0.41
1:E:99:ARG:HA	1:E:99:ARG:HD2	1.88	0.41
1:G:102:LYS:O	1:G:106:LEU:HG	2.20	0.41
1:A:202:PRO:HA	2:A:502:FMN:O3P	2.21	0.41
1:B:30:ARG:HH22	2:B:501:FMN:P	2.43	0.41
1:F:165:TRP:CE2	1:F:188:ALA:HB2	2.55	0.41
1:G:202:PRO:HA	2:G:508:FMN:O3P	2.21	0.41
1:A:153:TRP:CZ3	1:B:58:PRO:HG3	2.55	0.41
1:B:64:GLN:N	1:B:65:PRO:CD	2.83	0.41
1:D:131:VAL:CG1	1:D:134:ARG:NE	2.83	0.41
1:F:81:TRP:O	1:F:84:PHE:HB3	2.20	0.41
1:F:196:ASP:O	1:F:197:ARG:HD2	2.20	0.41
1:G:87:ALA:HB1	1:H:136:HIS:CD2	2.55	0.41
1:G:99:ARG:O	1:G:103:TYR:N	2.46	0.41
1:D:80:VAL:HG12	1:D:111:ILE:HD13	2.02	0.41
1:D:124:ARG:NE	1:D:141:ASP:OD2	2.49	0.41
1:H:173:GLU:O	1:H:176:ALA:HB3	2.21	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:192:LEU:HD12	1:E:192:LEU:N	2.36	0.41
1:H:165:TRP:HD1	1:H:166:VAL:N	2.18	0.41
1:A:9:LEU:HA	3:A:538:HOH:O	2.19	0.41
1:D:165:TRP:CZ2	1:D:188:ALA:HB2	2.56	0.41
1:E:11:ALA:HB2	1:F:197:ARG:NH1	2.35	0.41
1:G:75:GLU:H	1:G:75:GLU:CD	2.24	0.41
1:H:49:ARG:HG3	1:H:49:ARG:NH1	2.35	0.41
1:H:89:ASP:C	1:H:91:ALA:H	2.23	0.41
1:H:102:LYS:O	1:H:106:LEU:HG	2.21	0.41
1:A:212:ARG:HA	1:B:64:GLN:HE22	1.87	0.41
1:E:108:LEU:O	1:E:109:GLU:HB3	2.20	0.41
1:A:171:GLU:CD	3:A:1050:HOH:O	2.59	0.40
1:G:102:LYS:HA	1:G:102:LYS:HD2	1.88	0.40
1:G:213:LEU:H	1:H:64:GLN:NE2	2.17	0.40
2:E:506:FMN:C7M	1:F:140:MET:HG3	2.49	0.40
1:F:80:VAL:HG21	1:F:189:TRP:CH2	2.56	0.40
1:G:20:ARG:O	1:G:24:TYR:HD1	2.05	0.40
1:H:165:TRP:CZ2	2:H:507:FMN:HM72	2.56	0.40
1:H:202:PRO:HB3	2:H:507:FMN:H5'2	2.03	0.40
1:A:140:MET:HE2	1:B:167:SER:CB	2.52	0.40
1:A:187:VAL:HG13	1:A:188:ALA:N	2.36	0.40
1:C:32:ASP:N	2:C:504:FMN:O1P	2.54	0.40
1:H:196:ASP:C	1:H:197:ARG:HD2	2.41	0.40
1:C:114:ALA:HA	1:C:115:PRO:HD2	1.92	0.40
1:D:45:GLU:H	1:D:45:GLU:CD	2.25	0.40
1:F:163:VAL:HG22	1:F:192:LEU:HG	2.03	0.40
1:G:9:LEU:HD22	1:H:199:TYR:CE1	2.56	0.40
1:G:24:TYR:O	1:G:28:GLU:HG3	2.21	0.40
1:G:92:ALA:O	1:G:100:GLN:HG3	2.22	0.40
1:H:63:MET:CE	1:H:65:PRO:HB3	2.52	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	217/230 (94%)	214 (99%)	3 (1%)	0	100	100
1	B	217/230 (94%)	208 (96%)	6 (3%)	3 (1%)	11	11
1	C	217/230 (94%)	211 (97%)	6 (3%)	0	100	100
1	D	217/230 (94%)	211 (97%)	6 (3%)	0	100	100
1	E	217/230 (94%)	207 (95%)	10 (5%)	0	100	100
1	F	217/230 (94%)	206 (95%)	11 (5%)	0	100	100
1	G	217/230 (94%)	212 (98%)	5 (2%)	0	100	100
1	H	217/230 (94%)	202 (93%)	13 (6%)	2 (1%)	17	20
All	All	1736/1840 (94%)	1671 (96%)	60 (4%)	5 (0%)	41	50

All (5) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	H	207	LYS
1	B	97	GLY
1	B	109	GLU
1	B	133	GLY
1	H	181	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	178/187 (95%)	167 (94%)	11 (6%)	18	25
1	B	178/187 (95%)	172 (97%)	6 (3%)	37	51
1	C	178/187 (95%)	170 (96%)	8 (4%)	27	39
1	D	178/187 (95%)	170 (96%)	8 (4%)	27	39
1	E	178/187 (95%)	171 (96%)	7 (4%)	32	46
1	F	178/187 (95%)	171 (96%)	7 (4%)	32	46

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
1	G	178/187 (95%)	172 (97%)	6 (3%)	37 51
1	H	178/187 (95%)	174 (98%)	4 (2%)	52 69
All	All	1424/1496 (95%)	1367 (96%)	57 (4%)	31 44

All (57) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	9	LEU
1	A	30	ARG
1	A	56	GLN
1	A	72	ARG
1	A	93	GLU
1	A	99	ARG
1	A	117	SER
1	A	131	VAL
1	A	132	LEU
1	A	154	LEU
1	A	169	PHE
1	B	30	ARG
1	B	93	GLU
1	B	98	GLU
1	B	117	SER
1	B	154	LEU
1	B	169	PHE
1	C	9	LEU
1	C	30	ARG
1	C	56	GLN
1	C	77	ARG
1	C	98	GLU
1	C	132	LEU
1	C	154	LEU
1	C	187	VAL
1	D	9	LEU
1	D	30	ARG
1	D	96	SER
1	D	98	GLU
1	D	104	ARG
1	D	117	SER
1	D	140	MET
1	D	204	LEU
1	E	9	LEU

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Mol	Chain	Res	Type
1	E	30	ARG
1	E	42	LEU
1	E	56	GLN
1	E	65	PRO
1	E	82	GLN
1	E	98	GLU
1	F	18	ASP
1	F	56	GLN
1	F	98	GLU
1	F	107	LYS
1	F	131	VAL
1	F	132	LEU
1	F	140	MET
1	G	9	LEU
1	G	30	ARG
1	G	56	GLN
1	G	77	ARG
1	G	169	PHE
1	G	210	ARG
1	H	30	ARG
1	H	40	GLU
1	H	117	SER
1	H	154	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (37) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	56	GLN
1	A	64	GLN
1	A	82	GLN
1	A	85	GLN
1	A	211	GLN
1	B	56	GLN
1	B	64	GLN
1	B	73	GLN
1	B	82	GLN
1	B	100	GLN
1	B	139	GLN
1	B	211	GLN
1	C	56	GLN
1	C	64	GLN
1	D	64	GLN

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Mol	Chain	Res	Type
1	D	73	GLN
1	D	139	GLN
1	E	56	GLN
1	E	64	GLN
1	E	82	GLN
1	E	200	GLN
1	E	211	GLN
1	F	56	GLN
1	F	73	GLN
1	F	82	GLN
1	F	139	GLN
1	F	211	GLN
1	G	56	GLN
1	G	64	GLN
1	G	139	GLN
1	G	211	GLN
1	H	56	GLN
1	H	64	GLN
1	H	73	GLN
1	H	137	ASN
1	H	150	GLN
1	H	211	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

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	FMN	B	501	-	33,33,33	2.31	13 (39%)	48,50,50	1.63	11 (22%)
2	FMN	D	503	-	33,33,33	2.35	14 (42%)	48,50,50	1.50	9 (18%)
2	FMN	E	506	-	33,33,33	2.26	12 (36%)	48,50,50	1.64	10 (20%)
2	FMN	C	504	-	33,33,33	2.18	12 (36%)	48,50,50	1.77	12 (25%)
2	FMN	A	502	-	33,33,33	2.46	14 (42%)	48,50,50	1.76	12 (25%)
2	FMN	H	507	-	33,33,33	2.27	14 (42%)	48,50,50	1.42	7 (14%)
2	FMN	F	505	-	33,33,33	2.35	14 (42%)	48,50,50	1.42	8 (16%)
2	FMN	G	508	-	33,33,33	2.19	10 (30%)	48,50,50	1.78	12 (25%)

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	FMN	B	501	-	-	2/18/18/18	0/3/3/3
2	FMN	D	503	-	-	2/18/18/18	0/3/3/3
2	FMN	E	506	-	-	3/18/18/18	0/3/3/3
2	FMN	C	504	-	-	4/18/18/18	0/3/3/3
2	FMN	A	502	-	-	6/18/18/18	0/3/3/3
2	FMN	H	507	-	-	2/18/18/18	0/3/3/3
2	FMN	F	505	-	-	2/18/18/18	0/3/3/3
2	FMN	G	508	-	-	4/18/18/18	0/3/3/3

All (103) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	502	FMN	C4A-N5	8.18	1.46	1.30
2	D	503	FMN	C4A-N5	7.50	1.45	1.30
2	G	508	FMN	C4A-N5	7.27	1.44	1.30
2	E	506	FMN	C4A-N5	7.21	1.44	1.30
2	F	505	FMN	C4A-N5	7.14	1.44	1.30
2	C	504	FMN	C4A-N5	7.10	1.44	1.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	H	507	FMN	C4A-N5	6.91	1.44	1.30
2	B	501	FMN	C4A-N5	6.74	1.43	1.30
2	A	502	FMN	C6-C7	4.08	1.45	1.39
2	A	502	FMN	C9-C9A	4.02	1.46	1.39
2	F	505	FMN	C9A-N10	3.78	1.47	1.41
2	D	503	FMN	C9A-N10	3.68	1.47	1.41
2	H	507	FMN	C9A-N10	3.63	1.47	1.41
2	B	501	FMN	C9-C9A	3.63	1.45	1.39
2	E	506	FMN	C9A-N10	3.57	1.47	1.41
2	E	506	FMN	C6-C7	3.48	1.44	1.39
2	F	505	FMN	C9-C9A	3.48	1.45	1.39
2	G	508	FMN	C9-C9A	3.47	1.45	1.39
2	E	506	FMN	C9-C9A	3.44	1.45	1.39
2	H	507	FMN	C10-N10	3.43	1.44	1.37
2	G	508	FMN	C6-C7	3.43	1.44	1.39
2	D	503	FMN	C6-C7	3.42	1.44	1.39
2	B	501	FMN	C10-N10	3.35	1.44	1.37
2	H	507	FMN	C9-C9A	3.35	1.45	1.39
2	G	508	FMN	C10-N10	3.31	1.44	1.37
2	C	504	FMN	C9-C9A	3.29	1.45	1.39
2	F	505	FMN	C6-C7	3.27	1.44	1.39
2	D	503	FMN	C9-C9A	3.27	1.45	1.39
2	B	501	FMN	C9A-N10	3.27	1.46	1.41
2	B	501	FMN	C5'-C4'	3.23	1.56	1.51
2	F	505	FMN	C10-N10	3.17	1.44	1.37
2	B	501	FMN	C6-C7	3.11	1.44	1.39
2	A	502	FMN	C2'-C3'	-3.09	1.47	1.53
2	D	503	FMN	C10-N10	3.09	1.44	1.37
2	H	507	FMN	C6-C7	3.09	1.44	1.39
2	E	506	FMN	C10-N10	3.07	1.44	1.37
2	C	504	FMN	C6-C7	3.04	1.44	1.39
2	E	506	FMN	C6-C5A	3.03	1.44	1.40
2	A	502	FMN	C9A-N10	3.02	1.46	1.41
2	B	501	FMN	C4'-C3'	3.02	1.59	1.53
2	B	501	FMN	C10-N1	2.97	1.39	1.33
2	A	502	FMN	C10-N1	2.97	1.39	1.33
2	D	503	FMN	C10-N1	2.97	1.39	1.33
2	E	506	FMN	C10-N1	2.87	1.39	1.33
2	F	505	FMN	C10-N1	2.81	1.39	1.33
2	B	501	FMN	C1'-C2'	2.80	1.56	1.52
2	H	507	FMN	P-O1P	2.79	1.59	1.50
2	B	501	FMN	P-O1P	2.77	1.59	1.50

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	G	508	FMN	C10-N1	2.76	1.38	1.33
2	D	503	FMN	C2'-C3'	-2.71	1.48	1.53
2	C	504	FMN	C6-C5A	2.70	1.44	1.40
2	C	504	FMN	C9A-N10	2.68	1.45	1.41
2	D	503	FMN	C6-C5A	2.67	1.44	1.40
2	G	508	FMN	C6-C5A	2.67	1.44	1.40
2	F	505	FMN	C1'-C2'	2.67	1.56	1.52
2	F	505	FMN	C4-N3	2.66	1.43	1.38
2	E	506	FMN	P-O1P	2.65	1.59	1.50
2	A	502	FMN	C6-C5A	2.64	1.44	1.40
2	A	502	FMN	C4-N3	2.64	1.43	1.38
2	A	502	FMN	C10-N10	2.64	1.43	1.37
2	C	504	FMN	C10-N1	2.63	1.38	1.33
2	D	503	FMN	P-O2P	-2.63	1.44	1.54
2	G	508	FMN	C9A-N10	2.62	1.45	1.41
2	H	507	FMN	C10-N1	2.60	1.38	1.33
2	G	508	FMN	P-O1P	2.60	1.58	1.50
2	F	505	FMN	C6-C5A	2.59	1.44	1.40
2	F	505	FMN	C5A-N5	2.58	1.44	1.39
2	H	507	FMN	C6-C5A	2.56	1.44	1.40
2	F	505	FMN	P-O1P	2.55	1.58	1.50
2	C	504	FMN	C10-N10	2.55	1.42	1.37
2	D	503	FMN	C5'-C4'	2.54	1.55	1.51
2	C	504	FMN	P-O1P	2.49	1.58	1.50
2	D	503	FMN	P-O1P	2.48	1.58	1.50
2	C	504	FMN	C2'-C3'	-2.48	1.48	1.53
2	E	506	FMN	P-O2P	-2.44	1.45	1.54
2	H	507	FMN	C5A-N5	2.43	1.44	1.39
2	H	507	FMN	C4-N3	2.42	1.43	1.38
2	H	507	FMN	P-O2P	-2.42	1.45	1.54
2	H	507	FMN	C9A-C5A	2.40	1.45	1.41
2	B	501	FMN	P-O2P	-2.38	1.45	1.54
2	A	502	FMN	P-O1P	2.38	1.58	1.50
2	A	502	FMN	C1'-C2'	2.37	1.56	1.52
2	D	503	FMN	C5A-N5	2.36	1.44	1.39
2	H	507	FMN	C5'-C4'	2.34	1.55	1.51
2	F	505	FMN	C9A-C5A	2.34	1.45	1.41
2	A	502	FMN	C5A-N5	2.31	1.43	1.39
2	F	505	FMN	P-O2P	-2.28	1.46	1.54
2	H	507	FMN	C1'-C2'	2.24	1.55	1.52
2	B	501	FMN	C6-C5A	2.24	1.43	1.40
2	G	508	FMN	P-O2P	-2.24	1.46	1.54

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	G	508	FMN	C5A-N5	2.23	1.43	1.39
2	B	501	FMN	C4-N3	2.21	1.42	1.38
2	D	503	FMN	C4'-C3'	2.20	1.57	1.53
2	C	504	FMN	C4-N3	2.19	1.42	1.38
2	A	502	FMN	P-O2P	-2.16	1.46	1.54
2	E	506	FMN	C4-N3	2.16	1.42	1.38
2	C	504	FMN	C5A-N5	2.15	1.43	1.39
2	E	506	FMN	C5A-N5	2.13	1.43	1.39
2	E	506	FMN	C2'-C3'	-2.12	1.49	1.53
2	C	504	FMN	O4-C4	-2.08	1.19	1.23
2	F	505	FMN	C9-C8	2.01	1.42	1.39
2	D	503	FMN	C4-N3	2.01	1.42	1.38
2	A	502	FMN	C9A-C5A	2.01	1.44	1.41

All (81) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	G	508	FMN	C5'-C4'-C3'	-5.22	102.11	112.20
2	C	504	FMN	C5'-C4'-C3'	-4.99	102.56	112.20
2	A	502	FMN	C5'-C4'-C3'	-4.97	102.61	112.20
2	B	501	FMN	P-O5'-C5'	4.80	131.52	118.30
2	E	506	FMN	C5'-C4'-C3'	-4.16	104.18	112.20
2	C	504	FMN	O3P-P-O2P	3.80	122.15	107.64
2	A	502	FMN	O3P-P-O2P	3.78	122.08	107.64
2	G	508	FMN	O3P-P-O2P	3.78	122.07	107.64
2	G	508	FMN	O5'-P-O1P	-3.68	96.16	106.47
2	E	506	FMN	O5'-P-O1P	-3.58	96.44	106.47
2	E	506	FMN	O3P-P-O2P	3.45	120.84	107.64
2	D	503	FMN	P-O5'-C5'	3.39	127.64	118.30
2	F	505	FMN	O3P-P-O2P	3.36	120.47	107.64
2	A	502	FMN	O5'-P-O1P	-3.29	97.25	106.47
2	B	501	FMN	O3P-P-O2P	3.27	120.14	107.64
2	A	502	FMN	C4'-C3'-C2'	3.15	119.92	113.36
2	D	503	FMN	O3P-P-O2P	3.15	119.67	107.64
2	H	507	FMN	O3P-P-O2P	3.02	119.18	107.64
2	C	504	FMN	O5'-P-O1P	-3.01	98.03	106.47
2	C	504	FMN	C4'-C3'-C2'	2.97	119.55	113.36
2	G	508	FMN	C4'-C3'-C2'	2.96	119.51	113.36
2	F	505	FMN	C4-N3-C2	-2.95	120.20	125.64
2	C	504	FMN	C4-N3-C2	-2.94	120.21	125.64
2	H	507	FMN	C4-N3-C2	-2.89	120.31	125.64
2	G	508	FMN	C4-N3-C2	-2.88	120.31	125.64

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	B	501	FMN	C4-N3-C2	-2.86	120.35	125.64
2	D	503	FMN	C4-N3-C2	-2.84	120.39	125.64
2	A	502	FMN	C4-N3-C2	-2.81	120.44	125.64
2	C	504	FMN	C1'-C2'-C3'	-2.80	101.96	109.79
2	A	502	FMN	C1'-C2'-C3'	-2.72	102.17	109.79
2	E	506	FMN	C4-N3-C2	-2.67	120.71	125.64
2	F	505	FMN	P-O5'-C5'	2.66	125.62	118.30
2	D	503	FMN	O5'-P-O1P	-2.59	99.22	106.47
2	F	505	FMN	O5'-P-O1P	-2.56	99.29	106.47
2	G	508	FMN	C1'-C2'-C3'	-2.53	102.72	109.79
2	H	507	FMN	C8M-C8-C9	-2.45	114.96	119.49
2	C	504	FMN	C8M-C8-C9	-2.45	114.97	119.49
2	E	506	FMN	C4'-C3'-C2'	2.44	118.43	113.36
2	H	507	FMN	P-O5'-C5'	2.42	124.97	118.30
2	A	502	FMN	C9A-C5A-N5	-2.40	119.82	122.43
2	A	502	FMN	C1'-N10-C9A	-2.40	116.52	120.51
2	A	502	FMN	C4-C4A-N5	2.37	121.61	118.23
2	G	508	FMN	C8M-C8-C9	-2.34	115.16	119.49
2	G	508	FMN	C1'-N10-C9A	-2.34	116.61	120.51
2	H	507	FMN	C10-N1-C2	2.32	121.54	116.90
2	E	506	FMN	C8M-C8-C9	-2.31	115.22	119.49
2	E	506	FMN	C9A-C5A-N5	-2.30	119.94	122.43
2	D	503	FMN	C9A-C5A-N5	-2.29	119.94	122.43
2	B	501	FMN	C8M-C8-C9	-2.29	115.25	119.49
2	A	502	FMN	C8M-C8-C9	-2.29	115.26	119.49
2	B	501	FMN	C1'-N10-C9A	-2.28	116.71	120.51
2	C	504	FMN	C1'-N10-C9A	-2.28	116.71	120.51
2	A	502	FMN	C10-N1-C2	2.27	121.45	116.90
2	F	505	FMN	C10-N1-C2	2.27	121.44	116.90
2	F	505	FMN	C8M-C8-C9	-2.25	115.33	119.49
2	B	501	FMN	C10-N1-C2	2.23	121.36	116.90
2	C	504	FMN	C9A-C5A-N5	-2.23	120.01	122.43
2	D	503	FMN	C8M-C8-C9	-2.23	115.38	119.49
2	C	504	FMN	C10-N1-C2	2.22	121.35	116.90
2	D	503	FMN	C4A-C4-N3	2.21	118.81	113.19
2	A	502	FMN	C4A-C4-N3	2.20	118.78	113.19
2	E	506	FMN	C1'-C2'-C3'	-2.20	103.65	109.79
2	B	501	FMN	O5'-C5'-C4'	-2.19	103.52	109.36
2	G	508	FMN	C4-C4A-N5	2.19	121.34	118.23
2	E	506	FMN	C1'-N10-C9A	-2.18	116.88	120.51
2	H	507	FMN	O5'-P-O1P	-2.18	100.36	106.47
2	G	508	FMN	C10-N1-C2	2.18	121.26	116.90

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	G	508	FMN	C9A-C5A-N5	-2.17	120.07	122.43
2	H	507	FMN	C4A-C10-N10	2.17	119.65	116.48
2	D	503	FMN	C10-N1-C2	2.16	121.22	116.90
2	C	504	FMN	C4A-C4-N3	2.15	118.64	113.19
2	E	506	FMN	C10-N1-C2	2.13	121.17	116.90
2	G	508	FMN	C4A-C4-N3	2.10	118.53	113.19
2	B	501	FMN	C4A-C4-N3	2.10	118.53	113.19
2	F	505	FMN	C4A-C10-N10	2.08	119.52	116.48
2	C	504	FMN	C4-C4A-N5	2.06	121.16	118.23
2	D	503	FMN	C4-C4A-N5	2.05	121.15	118.23
2	B	501	FMN	O3'-C3'-C2'	-2.03	103.90	108.81
2	F	505	FMN	C4A-C4-N3	2.01	118.30	113.19
2	B	501	FMN	C9A-C5A-N5	-2.01	120.25	122.43
2	B	501	FMN	C4'-C3'-C2'	2.01	117.53	113.36

There are no chirality outliers.

All (25) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	B	501	FMN	C3'-C4'-C5'-O5'
2	B	501	FMN	O4'-C4'-C5'-O5'
2	D	503	FMN	C3'-C4'-C5'-O5'
2	D	503	FMN	O4'-C4'-C5'-O5'
2	F	505	FMN	C3'-C4'-C5'-O5'
2	F	505	FMN	O4'-C4'-C5'-O5'
2	H	507	FMN	C3'-C4'-C5'-O5'
2	H	507	FMN	O4'-C4'-C5'-O5'
2	G	508	FMN	C2'-C3'-C4'-O4'
2	A	502	FMN	O3'-C3'-C4'-C5'
2	G	508	FMN	O3'-C3'-C4'-C5'
2	A	502	FMN	C2'-C3'-C4'-C5'
2	G	508	FMN	C2'-C3'-C4'-C5'
2	A	502	FMN	C2'-C3'-C4'-O4'
2	C	504	FMN	C2'-C3'-C4'-O4'
2	A	502	FMN	O3'-C3'-C4'-O4'
2	G	508	FMN	O3'-C3'-C4'-O4'
2	C	504	FMN	O3'-C3'-C4'-C5'
2	C	504	FMN	O3'-C3'-C4'-O4'
2	C	504	FMN	C2'-C3'-C4'-C5'
2	A	502	FMN	O2'-C2'-C3'-C4'
2	E	506	FMN	C2'-C3'-C4'-O4'
2	E	506	FMN	O3'-C3'-C4'-O4'

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Mol	Chain	Res	Type	Atoms
2	E	506	FMN	O3'-C3'-C4'-C5'
2	A	502	FMN	C1'-C2'-C3'-O3'

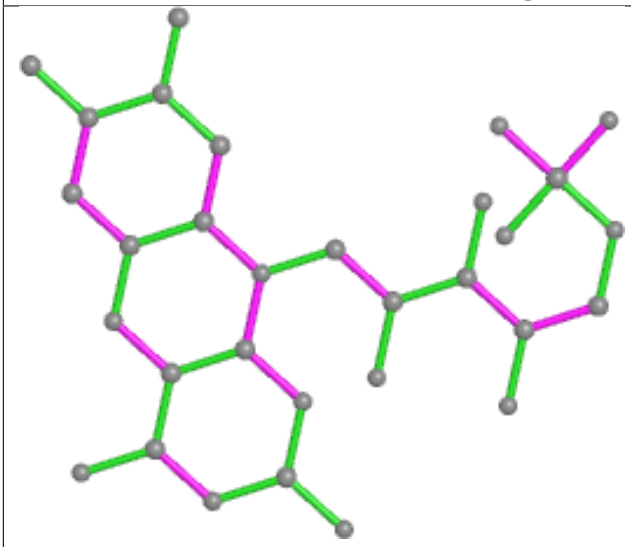
There are no ring outliers.

8 monomers are involved in 29 short contacts:

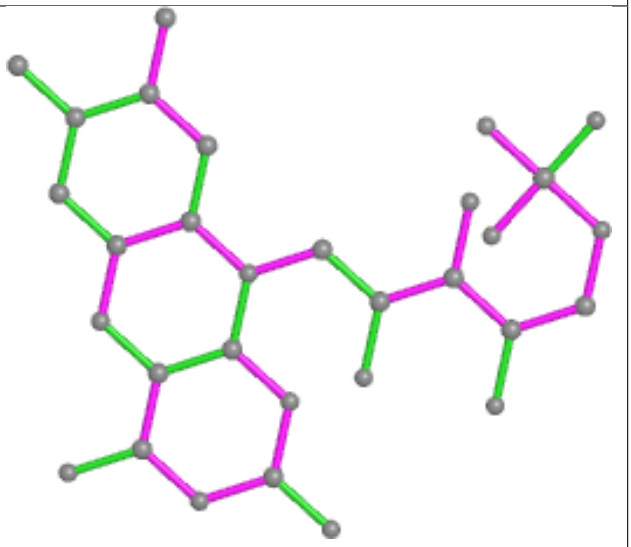
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	B	501	FMN	6	0
2	D	503	FMN	2	0
2	E	506	FMN	7	0
2	C	504	FMN	4	0
2	A	502	FMN	2	0
2	H	507	FMN	3	0
2	F	505	FMN	2	0
2	G	508	FMN	3	0

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

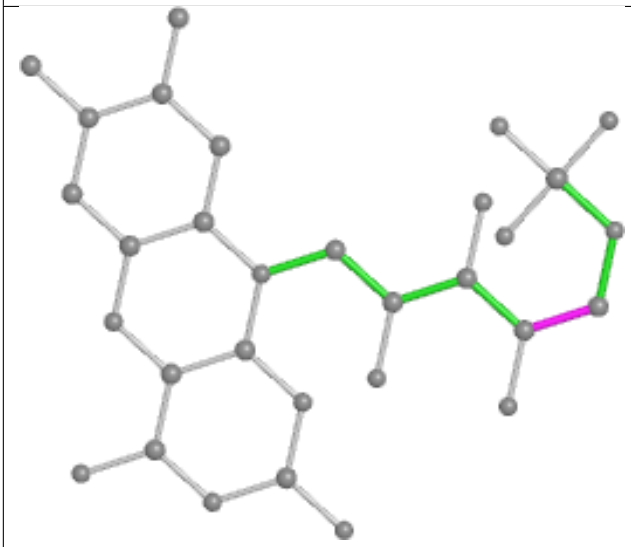
Ligand FMN B 501



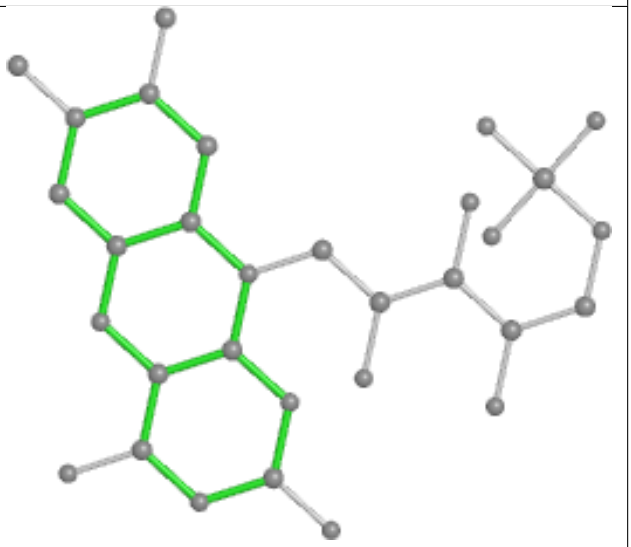
Bond lengths



Bond angles

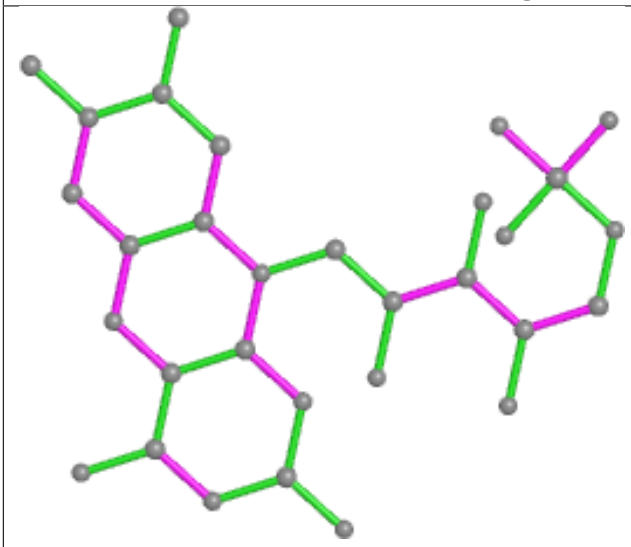


Torsions

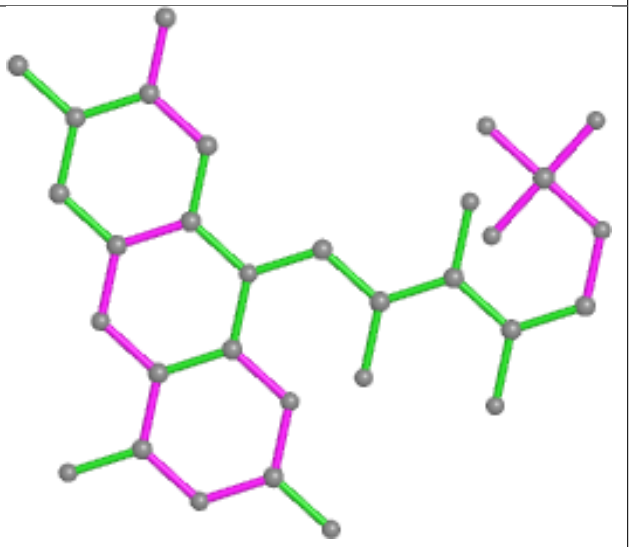


Rings

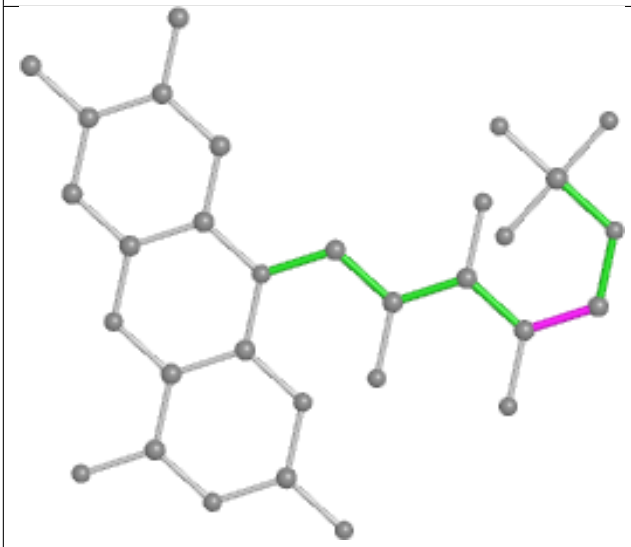
Ligand FMN D 503



Bond lengths



Bond angles



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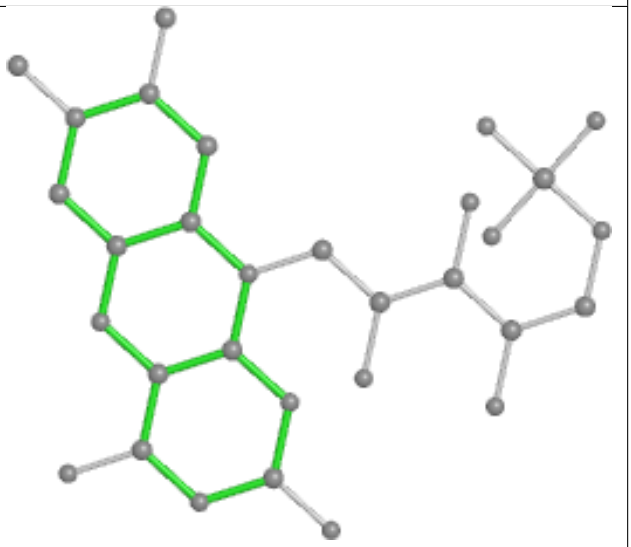
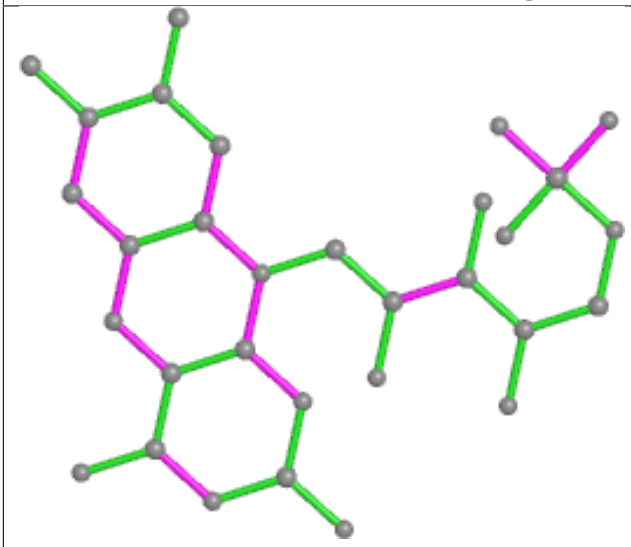
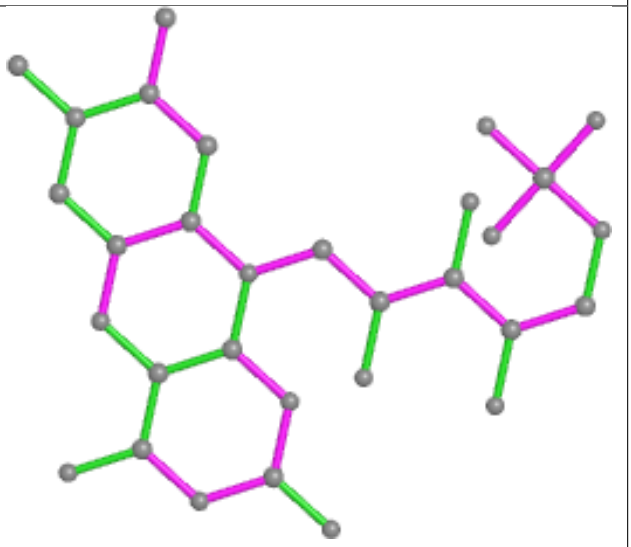


Rings

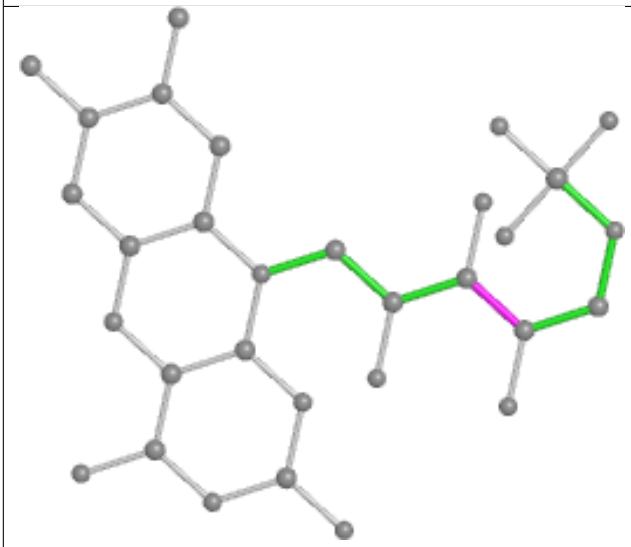
Ligand FMN E 506



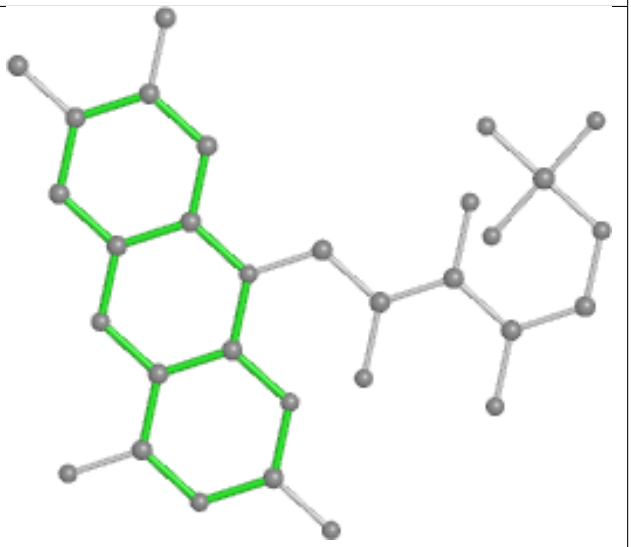
Bond lengths



Bond angles

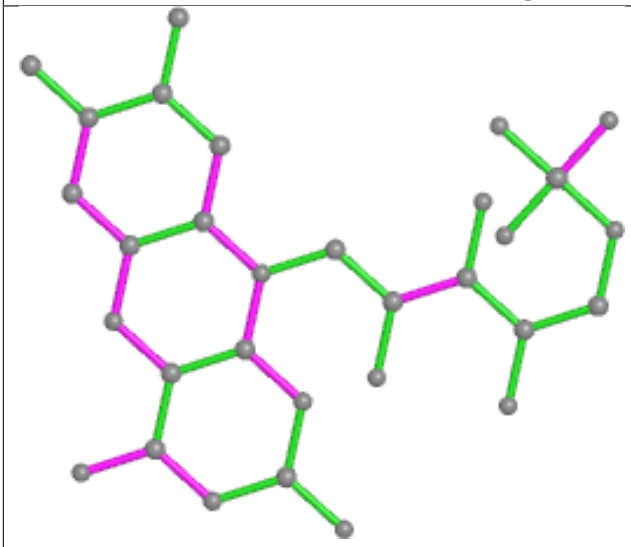


Torsions

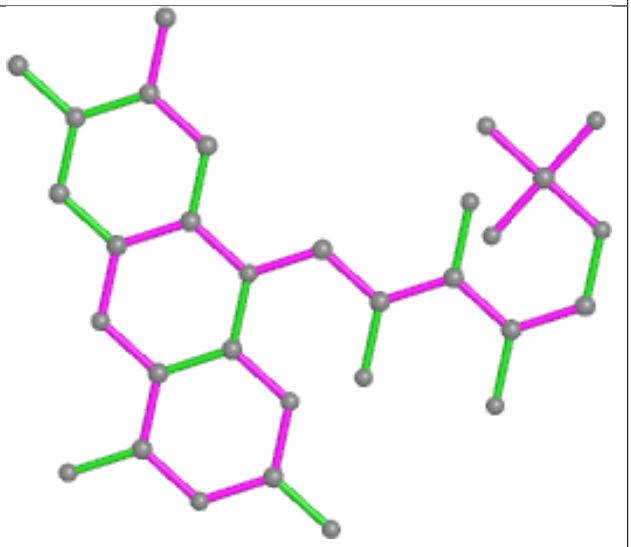


Rings

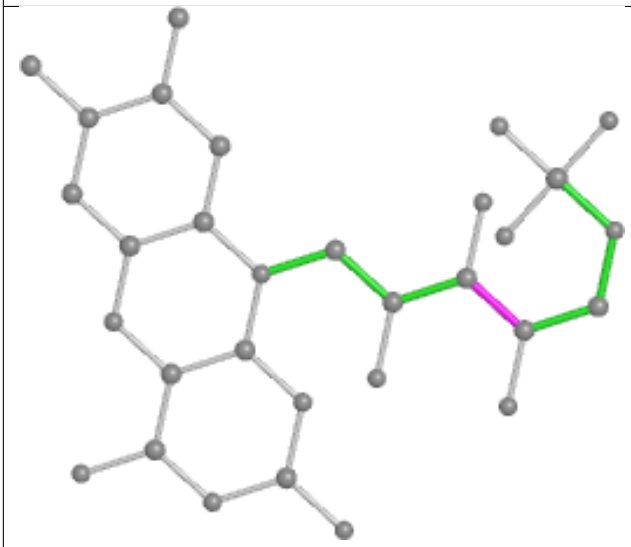
Ligand FMN C 504



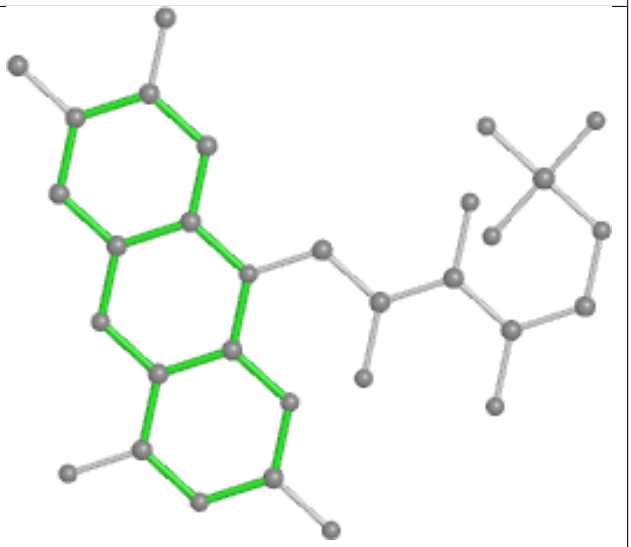
Bond lengths



Bond angles

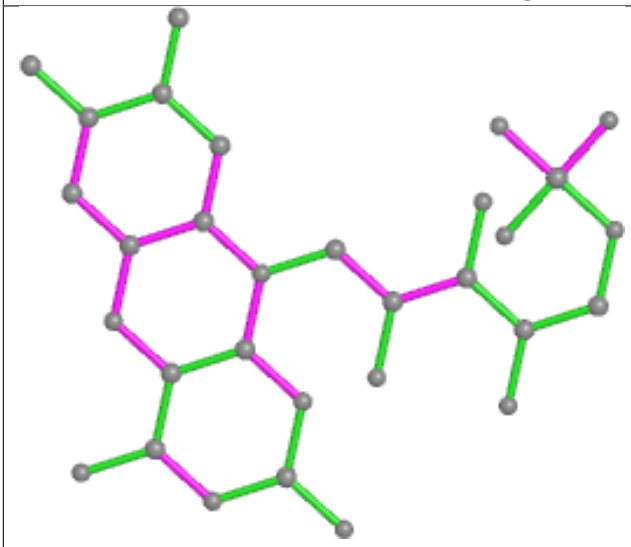


Torsions

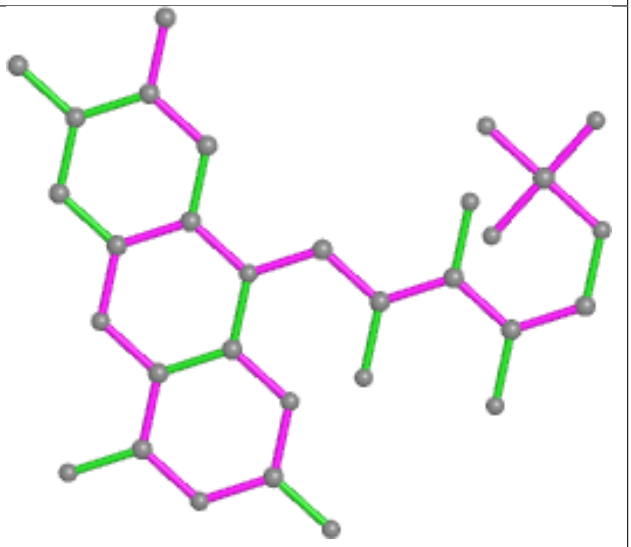


Rings

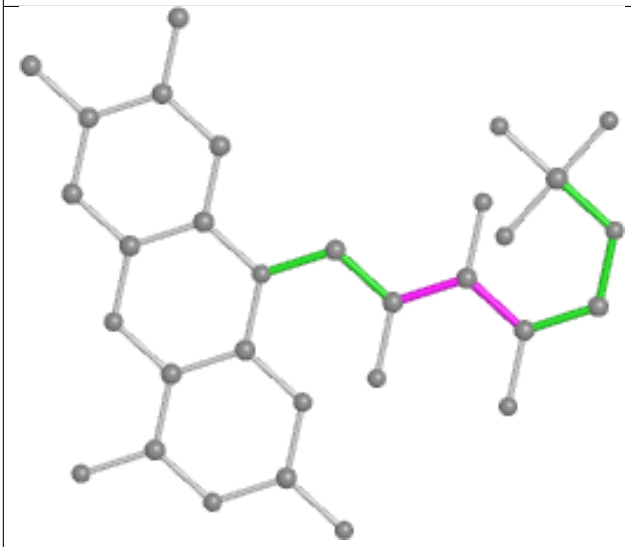
Ligand FMN A 502



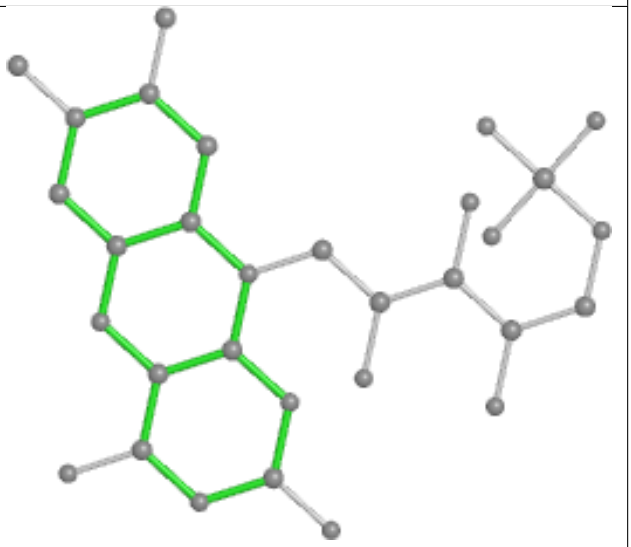
Bond lengths



Bond angles

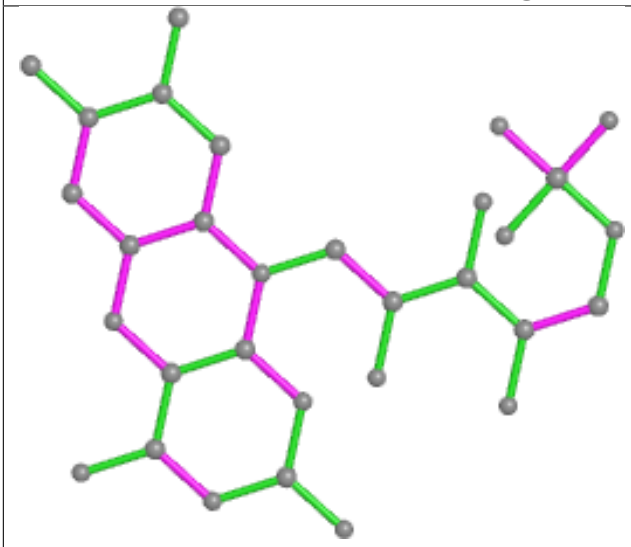


Torsions

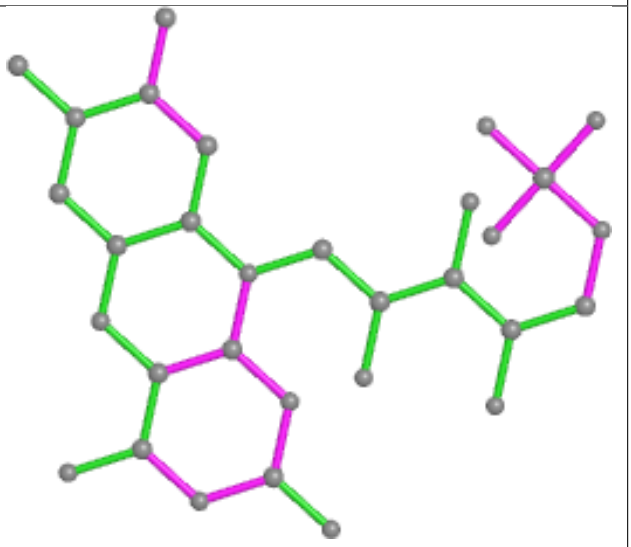


Rings

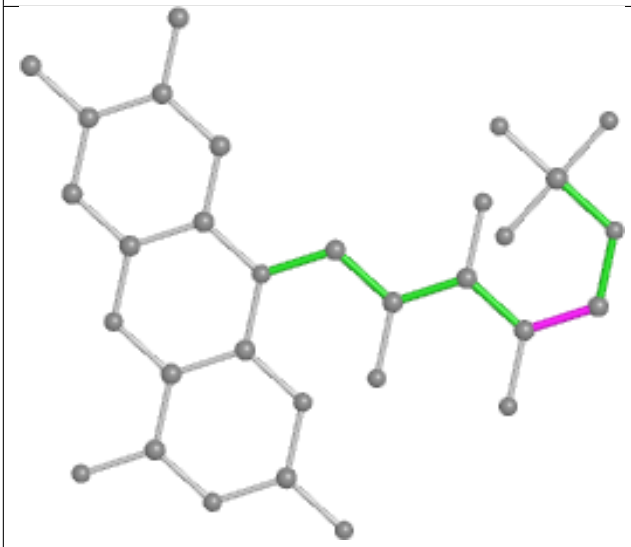
Ligand FMN H 507



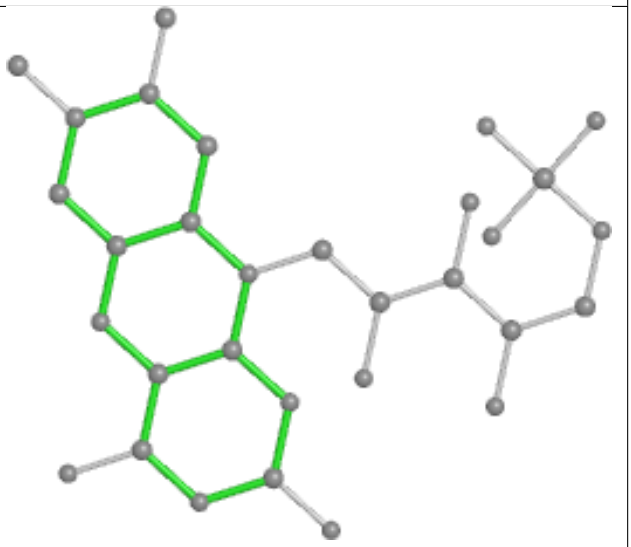
Bond lengths



Bond angles

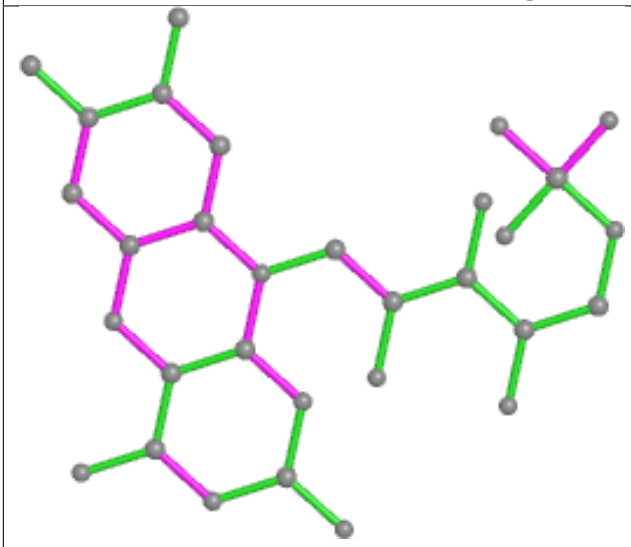


Torsions

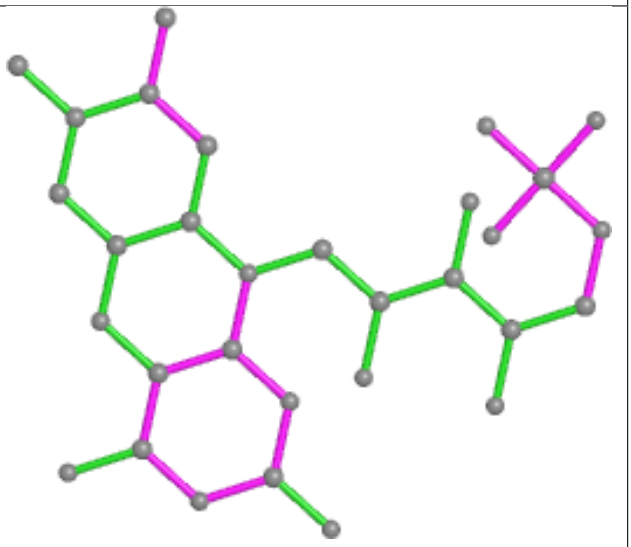


Rings

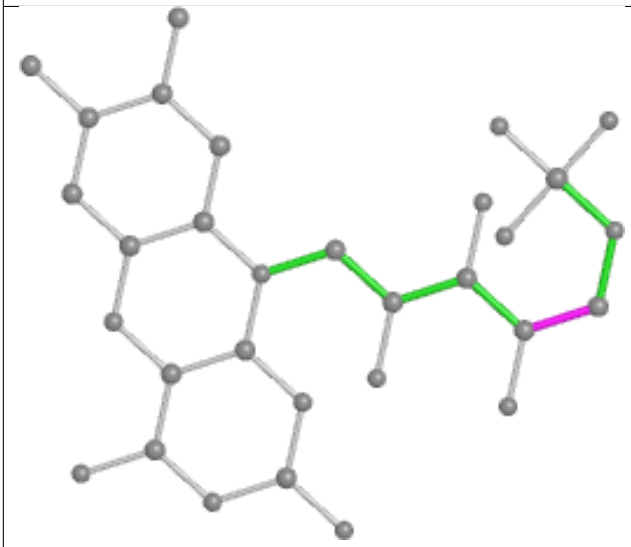
Ligand FMN F 505



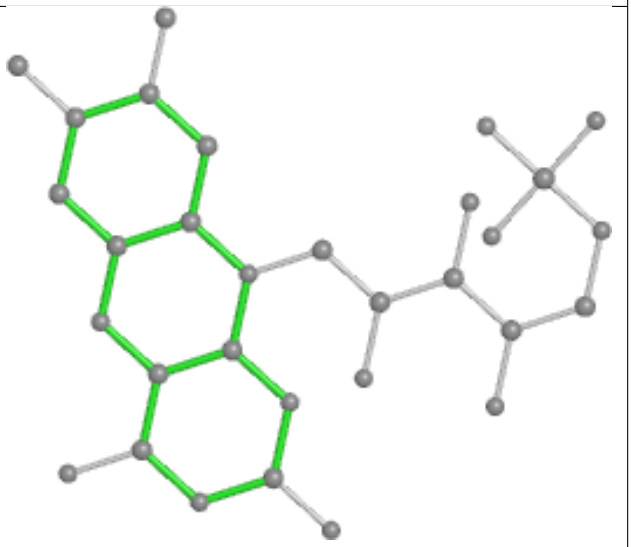
Bond lengths



Bond angles

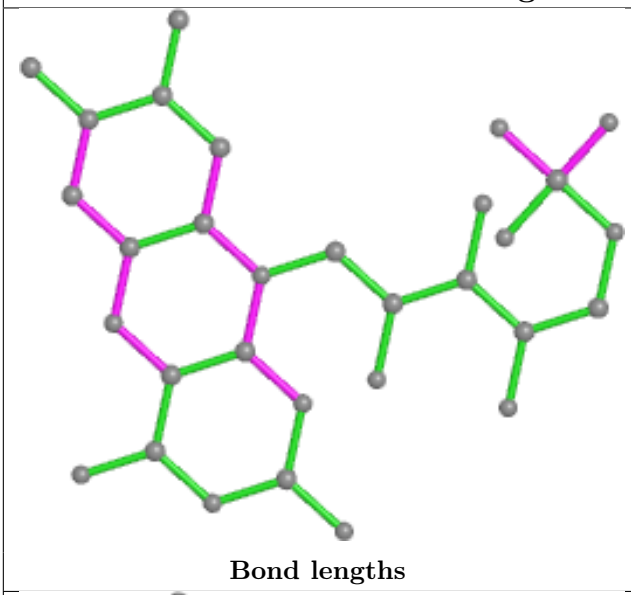


Torsions

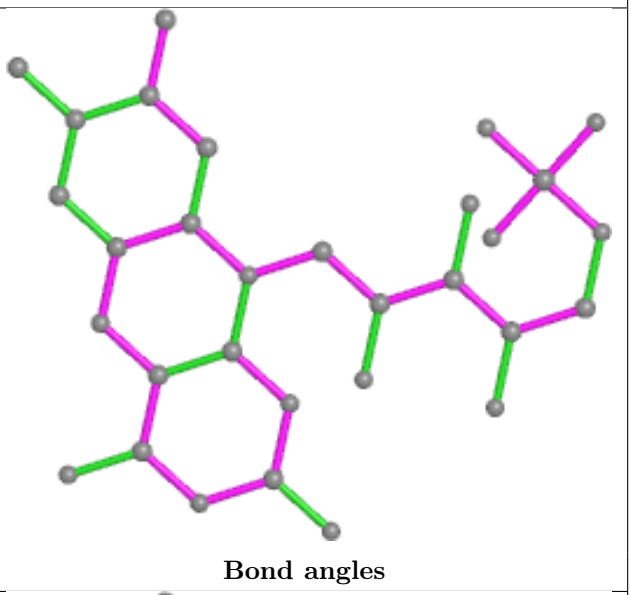


Rings

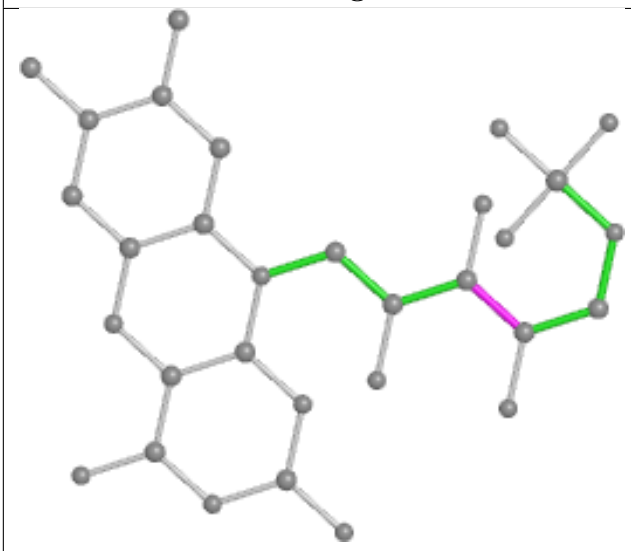
Ligand FMN G 508



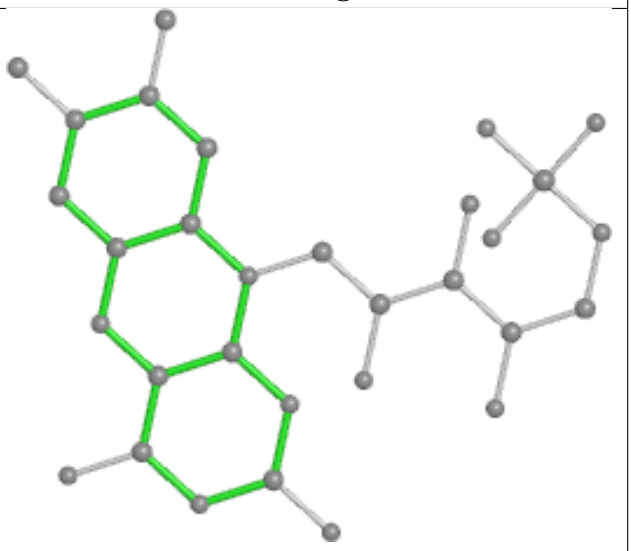
Bond lengths



Bond angles



Torsions



Rings

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	219/230 (95%)	-0.51	0 100 100	2, 12, 27, 45	0
1	B	219/230 (95%)	-0.46	1 (0%) 91 94	3, 14, 34, 48	0
1	C	219/230 (95%)	-0.42	0 100 100	4, 15, 35, 43	0
1	D	219/230 (95%)	-0.49	2 (0%) 84 88	2, 14, 31, 45	0
1	E	219/230 (95%)	-0.22	2 (0%) 84 88	9, 23, 41, 50	0
1	F	219/230 (95%)	-0.22	1 (0%) 91 94	8, 24, 40, 51	0
1	G	219/230 (95%)	-0.06	7 (3%) 47 54	12, 26, 44, 51	0
1	H	219/230 (95%)	0.07	5 (2%) 60 67	9, 32, 50, 55	0
All	All	1752/1840 (95%)	-0.29	18 (1%) 82 86	2, 19, 42, 55	0

All (18) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	G	196	ASP	3.6
1	E	130	VAL	2.9
1	G	135	THR	2.8
1	F	169	PHE	2.7
1	H	13	GLY	2.7
1	H	12	ALA	2.6
1	G	169	PHE	2.5
1	G	137	ASN	2.4
1	G	136	HIS	2.4
1	H	85	GLN	2.2
1	G	138	PRO	2.2
1	H	107	LYS	2.1
1	G	134	ARG	2.1
1	E	135	THR	2.1
1	D	169	PHE	2.1
1	H	86	ARG	2.0

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Mol	Chain	Res	Type	RSRZ
1	B	98	GLU	2.0
1	D	96	SER	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)

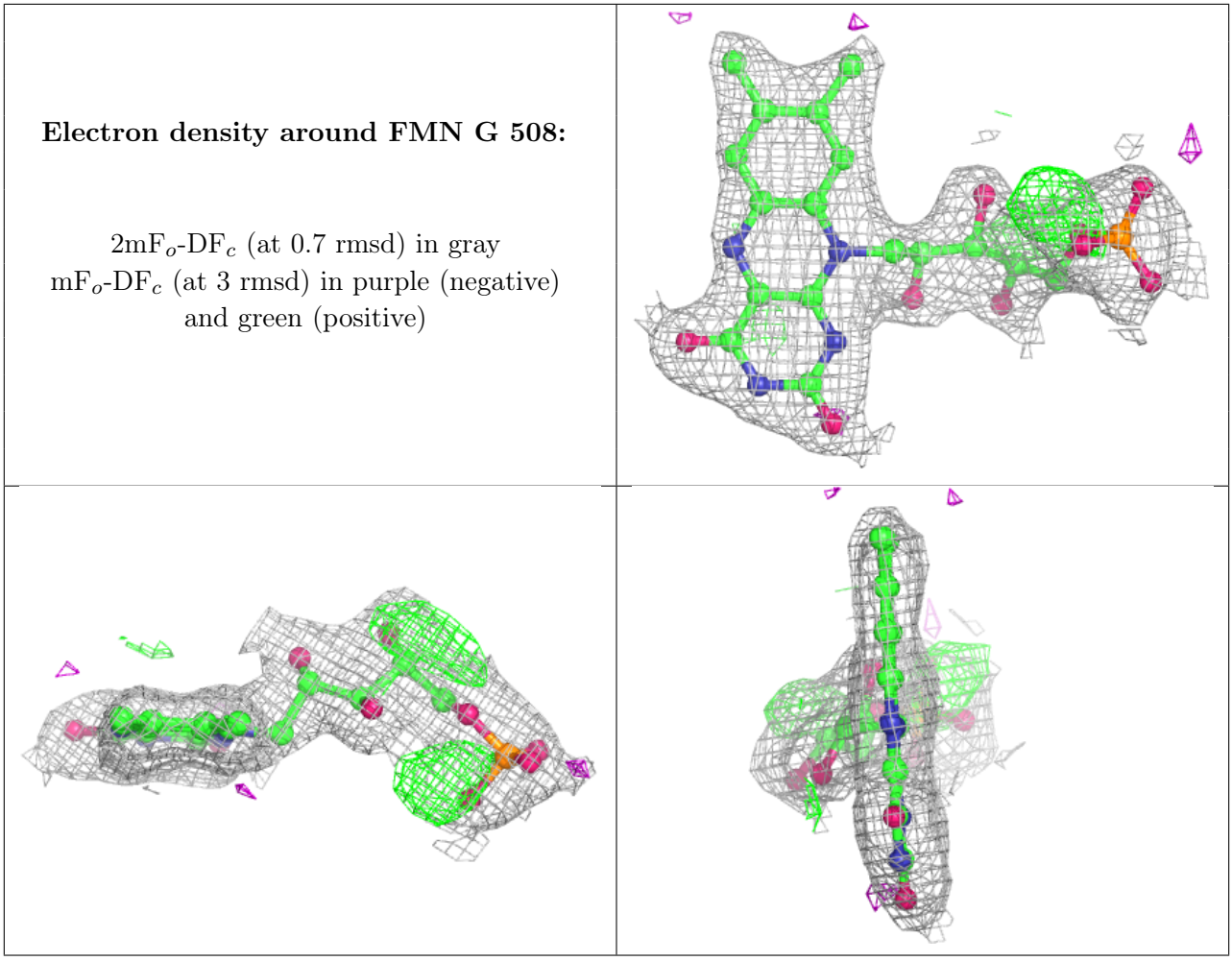
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95^{th} percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' 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
2	FMN	G	508	31/31	0.91	0.16	17,22,27,30	0
2	FMN	H	507	31/31	0.91	0.15	18,26,27,29	0
2	FMN	E	506	31/31	0.93	0.13	9,15,30,34	0
2	FMN	F	505	31/31	0.94	0.14	17,21,32,34	0
2	FMN	C	504	31/31	0.94	0.12	2,5,22,30	0
2	FMN	A	502	31/31	0.94	0.12	2,6,25,32	0
2	FMN	B	501	31/31	0.95	0.11	1,6,13,17	0
2	FMN	D	503	31/31	0.96	0.12	1,3,15,22	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.

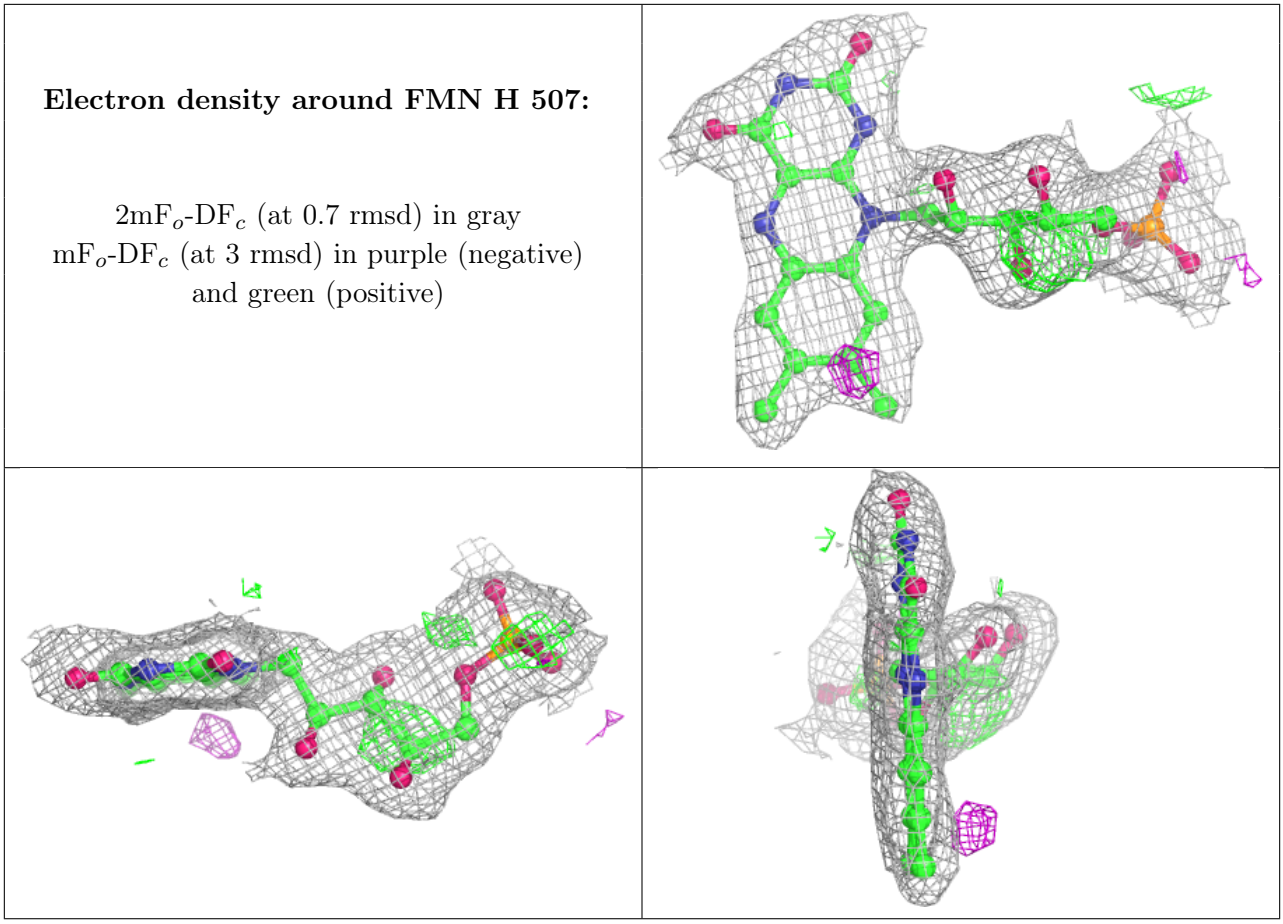
Electron density around FMN G 508:

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



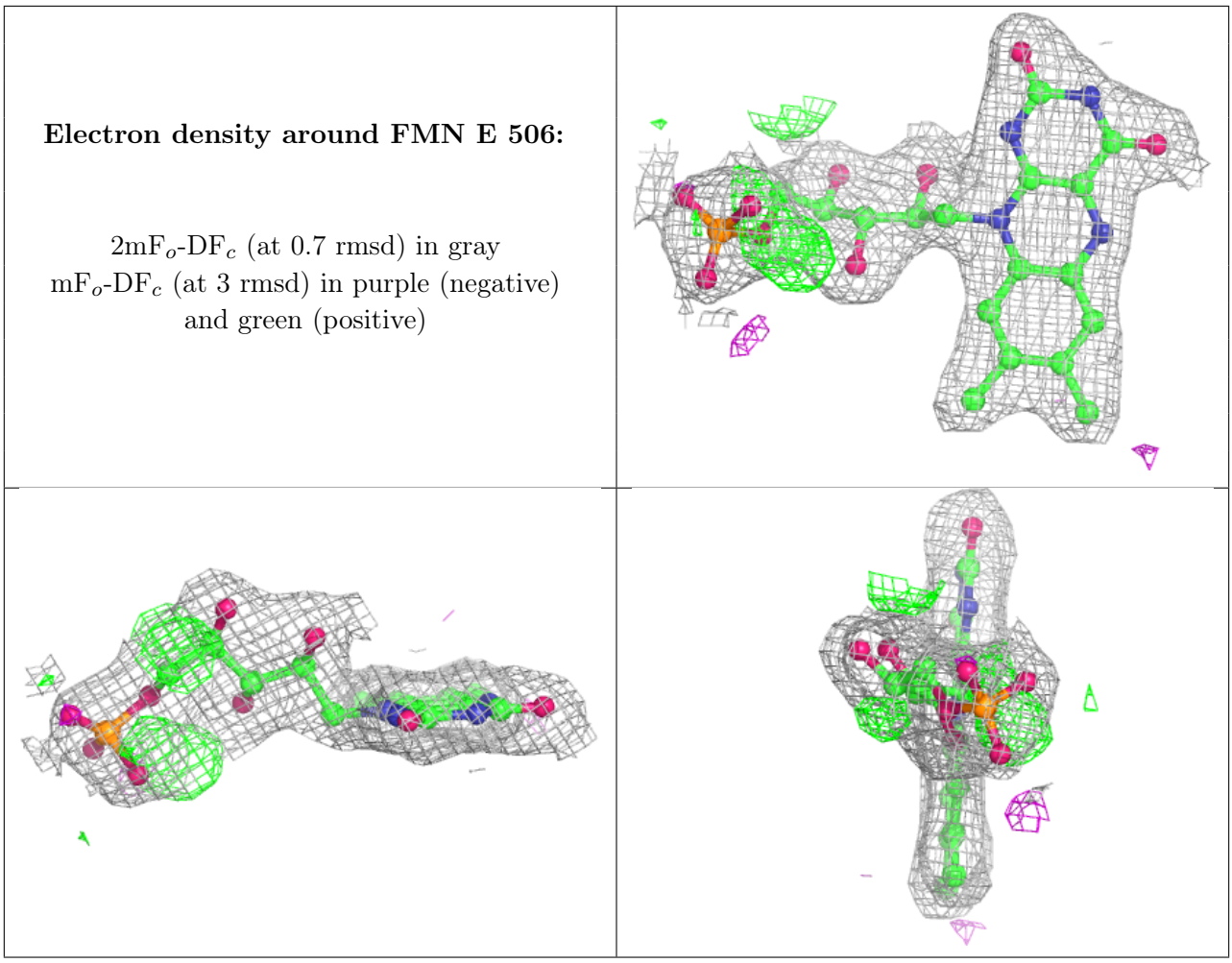
Electron density around FMN H 507:

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



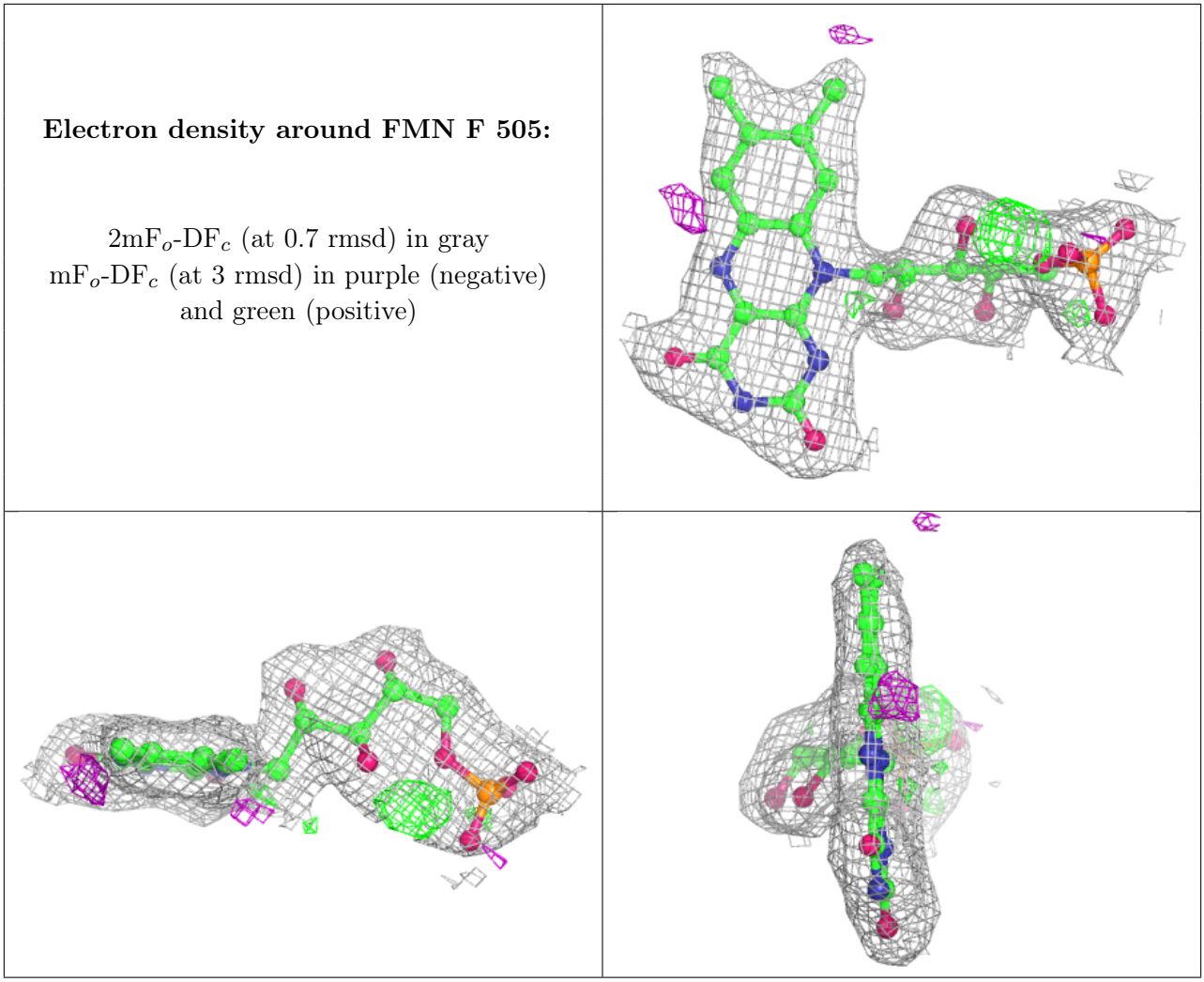
Electron density around FMN E 506:

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



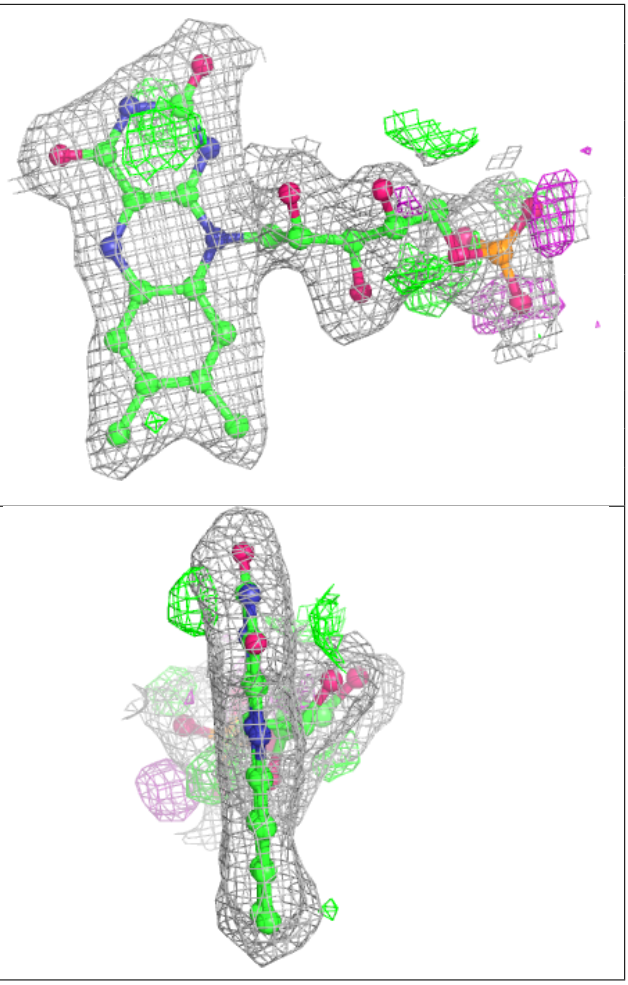
Electron density around FMN F 505:

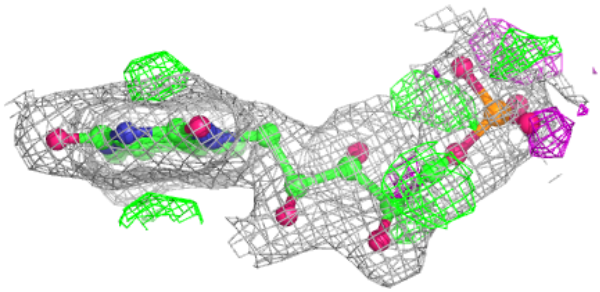
$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)



Electron density around FMN C 504:

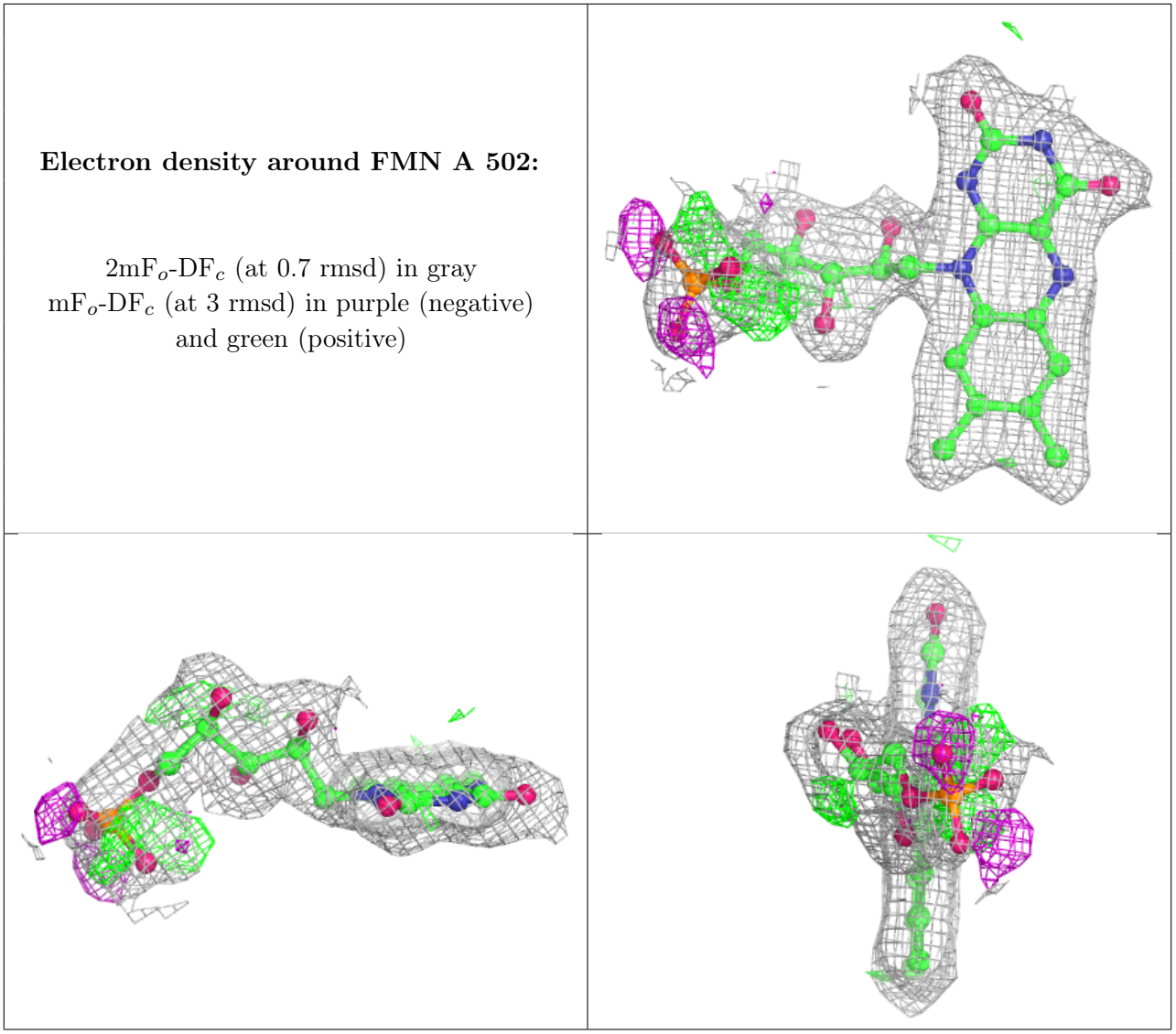
$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)





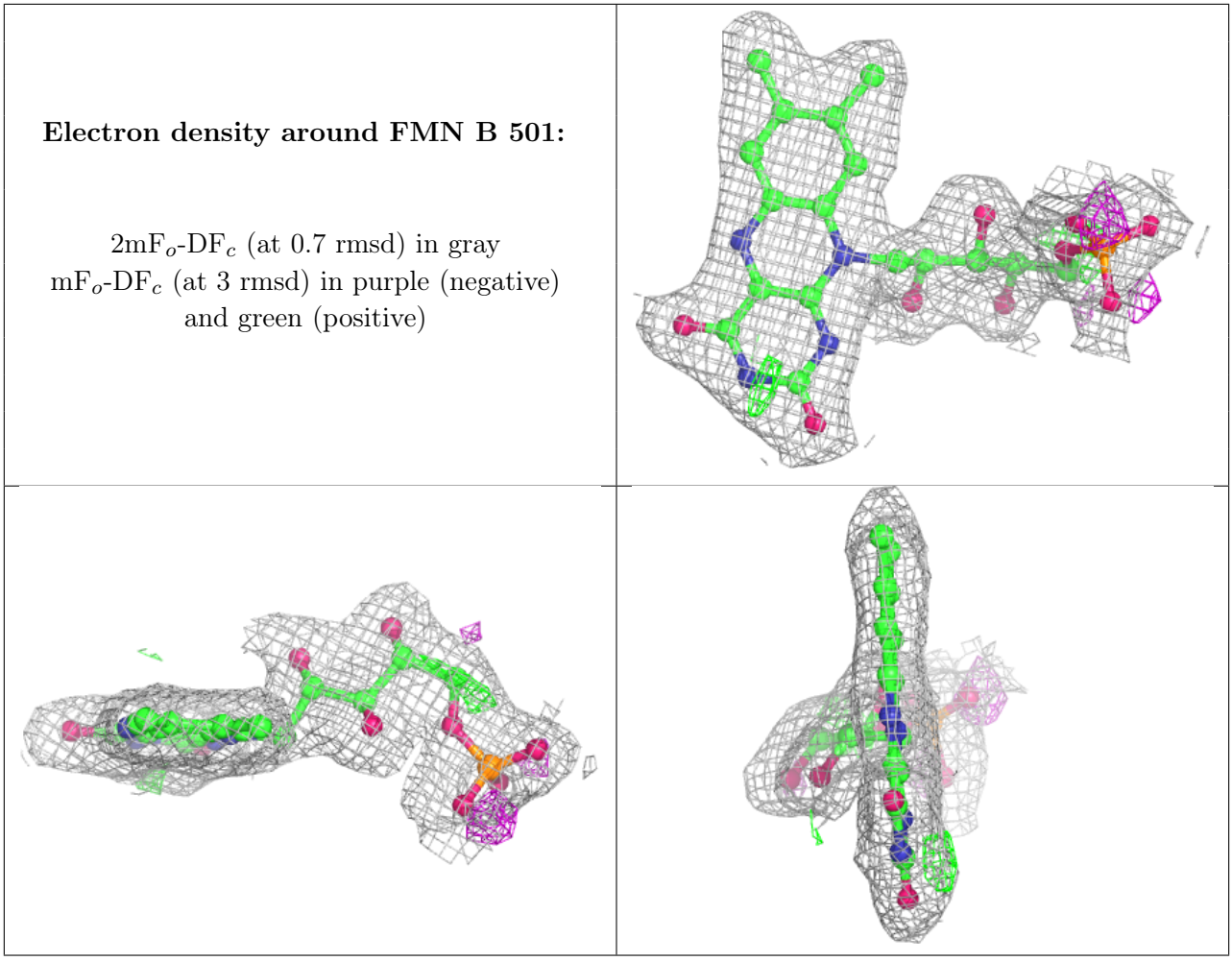
Electron density around FMN A 502:

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



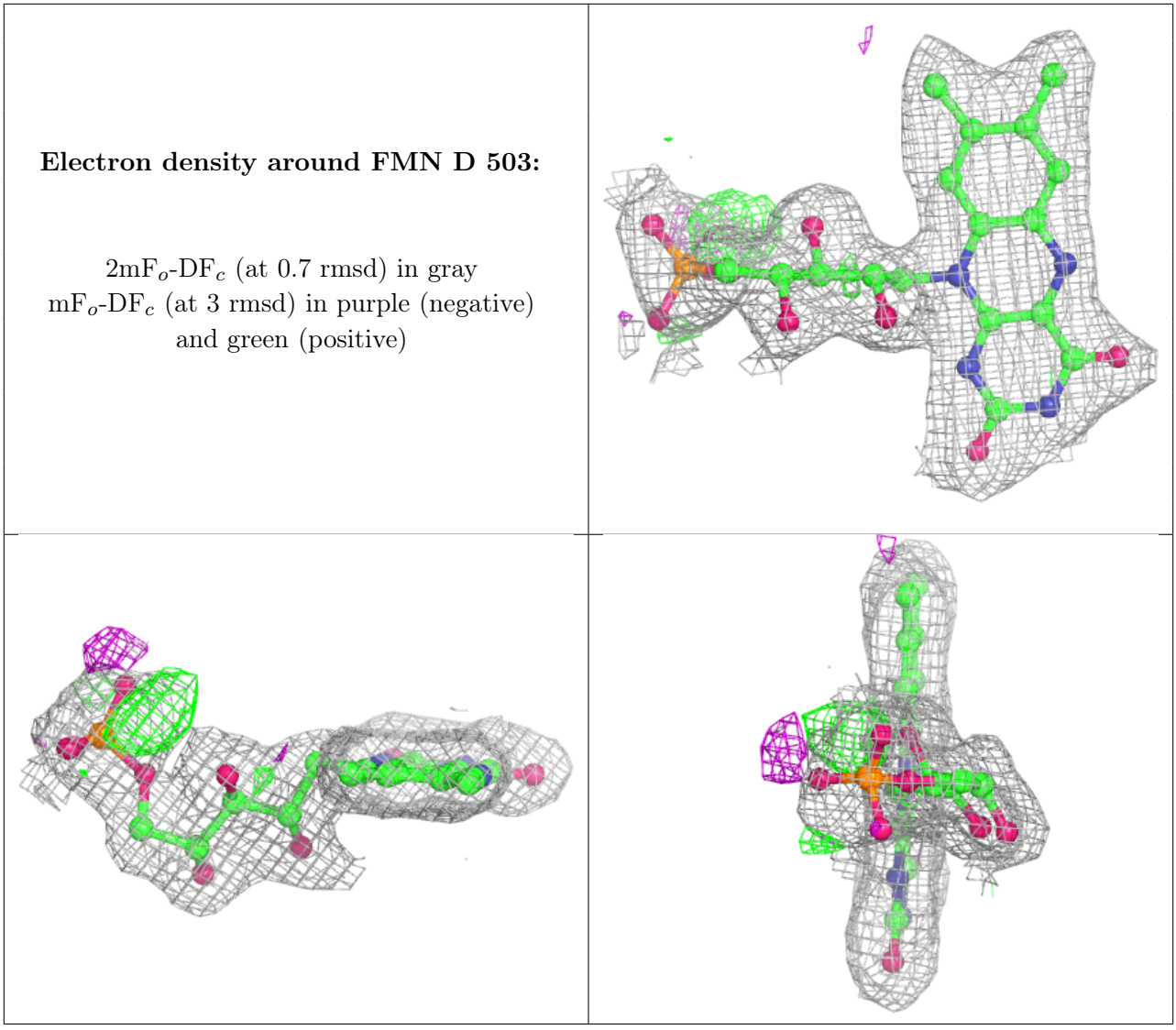
Electron density around FMN B 501:

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



Electron density around FMN D 503:

$2mF_o$-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.