Full wwPDB X-ray Structure Validation Report ⓘ

Oct 4, 2023 – 11:57 AM EDT

PDB ID	:	6PH3
Title	:	LOV-PAS construct from the LOV-HK sensory protein from Brucella abortus (dark-adapted, construct 15-273)
Authors	:	Rinaldi, J.; Otero, L.H.; Fernandez, I.; Goldbaum, F.A.; Shin, H.; Yang, X.; Klinke, S.
Deposited on	:	2019-06-25
Resolution	:	2.74 Å(reported)

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

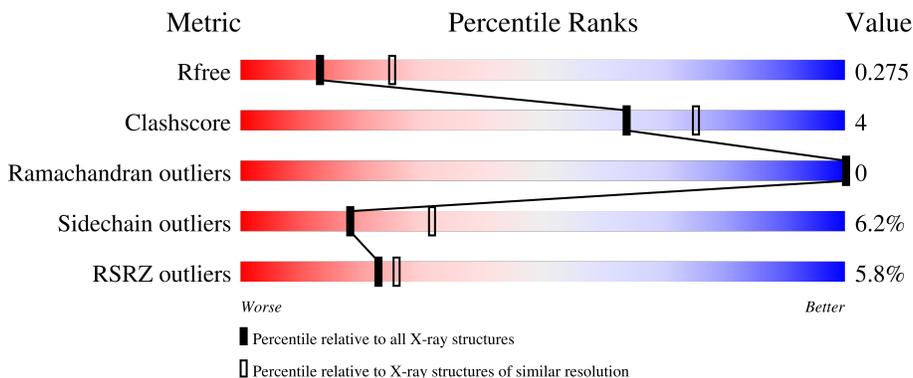|		
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.35.1
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.35.1

1 Overall quality at a glance ⓘ

The following experimental techniques were used to determine the structure:
X-RAY DIFFRACTION

The reported resolution of this entry is 2.74 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	Percentile Ranks	Value
Rfree		0.275
Clashscore		4
Ramachandran outliers		0
Sidechain outliers		6.2%
RSRZ outliers		5.8%

Worse   *Better*

▌ Percentile relative to all X-ray structures

▯ Percentile relative to X-ray structures of similar resolution

Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R$_{free}$	130704	1271 (2.76-2.72)
Clashscore	141614	1322 (2.76-2.72)
Ramachandran outliers	138981	1297 (2.76-2.72)
Sidechain outliers	138945	1298 (2.76-2.72)
RSRZ outliers	127900	1243 (2.76-2.72)

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	266	% 83% 12% • •
1	B	266	3% 84% 12% •
1	C	266	16% 73% 17% • 9%
1	D	266	2% 82% 13% • •

2 Entry composition ⓘ

There are 3 unique types of molecules in this entry. The entry contains 8249 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 Blue-light-activated histidine kinase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	255	Total	C	N	O	S	0	0	0
			2037	1293	357	379	8			
1	B	257	Total	C	N	O	S	0	0	0
			2052	1301	360	383	8			
1	C	241	Total	C	N	O	S	0	0	0
			1927	1225	336	358	8			
1	D	256	Total	C	N	O	S	0	0	0
			2047	1299	360	380	8			

There are 28 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	14	MET	-	initiating methionine	UNP Q8YC53
A	274	HIS	-	expression tag	UNP Q8YC53
A	275	HIS	-	expression tag	UNP Q8YC53
A	276	HIS	-	expression tag	UNP Q8YC53
A	277	HIS	-	expression tag	UNP Q8YC53
A	278	HIS	-	expression tag	UNP Q8YC53
A	279	HIS	-	expression tag	UNP Q8YC53
B	14	MET	-	initiating methionine	UNP Q8YC53
B	274	HIS	-	expression tag	UNP Q8YC53
B	275	HIS	-	expression tag	UNP Q8YC53
B	276	HIS	-	expression tag	UNP Q8YC53
B	277	HIS	-	expression tag	UNP Q8YC53
B	278	HIS	-	expression tag	UNP Q8YC53
B	279	HIS	-	expression tag	UNP Q8YC53
C	14	MET	-	initiating methionine	UNP Q8YC53
C	274	HIS	-	expression tag	UNP Q8YC53
C	275	HIS	-	expression tag	UNP Q8YC53
C	276	HIS	-	expression tag	UNP Q8YC53
C	277	HIS	-	expression tag	UNP Q8YC53
C	278	HIS	-	expression tag	UNP Q8YC53
C	279	HIS	-	expression tag	UNP Q8YC53

WORLDWIDE
PDB
PROTEIN DATA BANK

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Chain	Residue	Modelled	Actual	Comment	Reference
D	14	MET	-	initiating methionine	UNP Q8YC53
D	274	HIS	-	expression tag	UNP Q8YC53
D	275	HIS	-	expression tag	UNP Q8YC53
D	276	HIS	-	expression tag	UNP Q8YC53
D	277	HIS	-	expression tag	UNP Q8YC53
D	278	HIS	-	expression tag	UNP Q8YC53
D	279	HIS	-	expression tag	UNP Q8YC53

- Molecule 2 is FLAVIN MONONUCLEOTIDE (three-letter code: FMN) (formula: $C_{17}H_{21}N_4O_9P$) (labeled as "Ligand of Interest" by depositor).
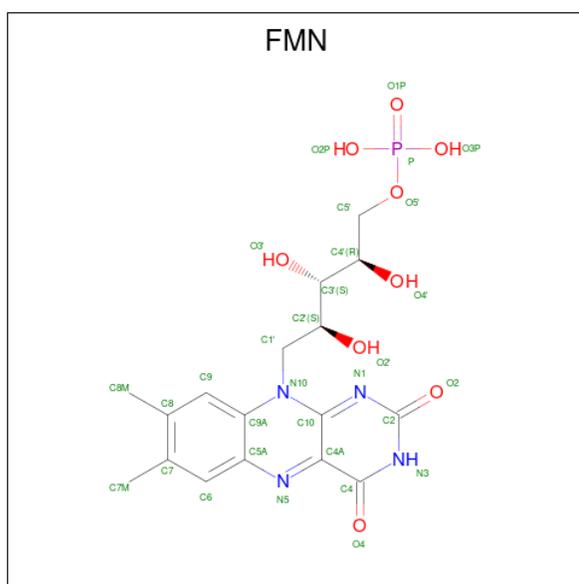
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	A	1	Total 31	C 17	N 4	O 9	P 1	0	0
2	B	1	Total 31	C 17	N 4	O 9	P 1	0	0
2	C	1	Total 31	C 17	N 4	O 9	P 1	0	0
2	D	1	Total 31	C 17	N 4	O 9	P 1	0	0

- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	20	Total 20	O 20	0	0

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| Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	B	16	Total 16	O 16	0	0
3	C	4	Total 4	O 4	0	0
3	D	22	Total 22	O 22	0	0

3 Residue-property plots ⓘ

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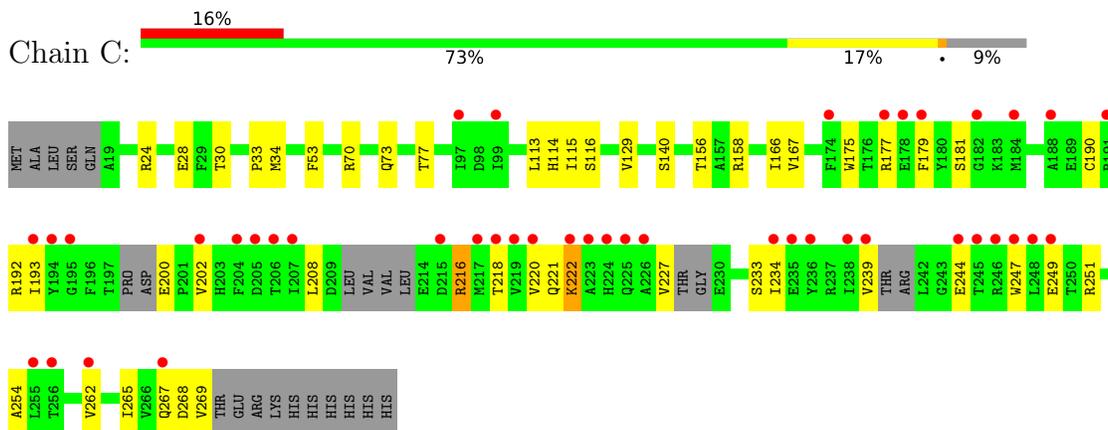
• Molecule 1: Blue-light-activated histidine kinase
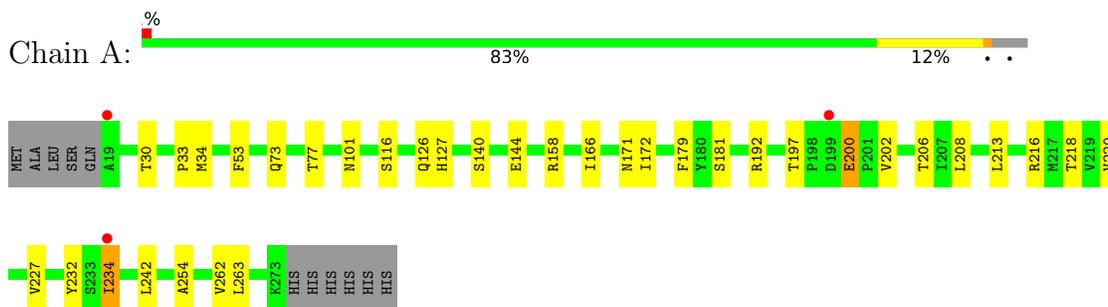
Chain A:

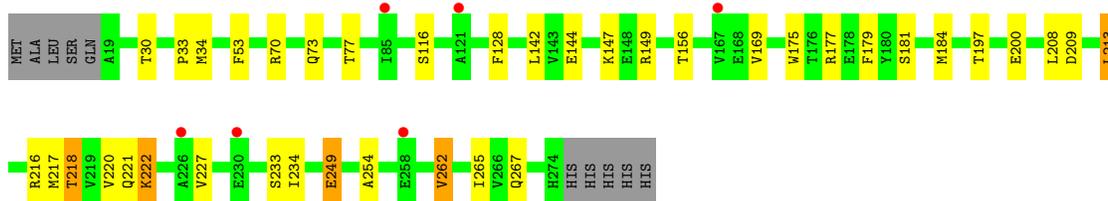• Molecule 1: Blue-light-activated histidine kinase
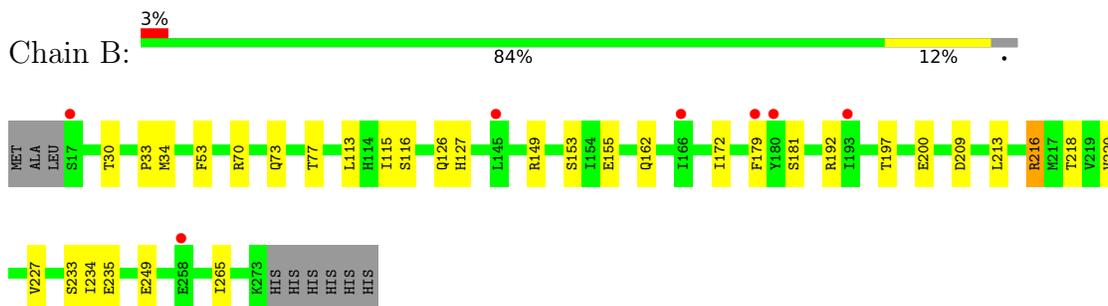
Chain B:

• Molecule 1: Blue-light-activated histidine kinase

Chain C:

• Molecule 1: Blue-light-activated histidine kinase

Chain D:

4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α, β, γ	108.42Å 56.93Å 114.60Å 90.00° 103.36° 90.00°	Depositor
Resolution (Å)	47.70 – 2.74 47.70 – 2.74	Depositor EDS
% Data completeness (in resolution range)	99.2 (47.70-2.74) 99.3 (47.70-2.74)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	0.97 (at 2.73Å)	Xtriage
Refinement program	BUSTER 2.10.2	Depositor
R, R_{free}	0.224 , 0.269 0.235 , 0.275	Depositor DCC
R_{free} test set	1801 reflections (5.00%)	wwPDB-VP
Wilson B-factor (Å^2)	64.3	Xtriage
Anisotropy	0.663	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.31 , 51.5	EDS
L-test for twinning [2]	$< |L| > = 0.49, < L^2 > = 0.32$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.93	EDS
Total number of atoms	8249	wwPDB-VP
Average B, all atoms (Å^2)	74.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 23.45 % of the origin peak, indicating pseudo-translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo-translational symmetry is equal to 4.6494e-03. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

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[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	0.50	0/2081	0.73	0/2825
1	B	0.54	0/2096	0.74	0/2845
1	C	0.50	0/1966	0.73	0/2662
1	D	0.52	0/2092	0.74	0/2840
All	All	0.52	0/8235	0.74	0/11172

There are no bond length outliers.

There are no bond angle outliers.

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	2037	0	2033	17	0
1	B	2052	0	2046	14	0
1	C	1927	0	1909	22	0
1	D	2047	0	2040	22	0
2	A	31	0	19	0	0
2	B	31	0	19	1	0
2	C	31	0	19	1	0
2	D	31	0	19	2	0
3	A	20	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	B	16	0	0	0	0
3	C	4	0	0	0	0
3	D	22	0	0	0	0
All	All	8249	0	8104	69	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 4.

All (69) 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:156:THR:HG23	1:D:156:THR:HG23	1.64	0.78
1:B:197:THR:HB	1:B:200:GLU:HB3	1.67	0.76
1:A:232:TYR:HE2	1:A:234:ILE:HD11	1.53	0.72
1:D:197:THR:HB	1:D:200:GLU:HB2	1.70	0.71
1:C:70:ARG:HD3	2:C:300:FMN:O3P	1.94	0.67
1:C:24:ARG:HH12	1:C:28:GLU:HG2	1.60	0.64
1:C:156:THR:CG2	1:D:156:THR:HG23	2.29	0.63
1:D:254:ALA:HA	1:D:262:VAL:HA	1.81	0.63
1:B:70:ARG:HD3	2:B:300:FMN:O3P	1.97	0.63
1:A:202:VAL:HG13	1:A:206:THR:OG1	2.00	0.62
1:B:113:LEU:HD21	1:B:115:ILE:HD11	1.83	0.60
1:C:113:LEU:HD21	1:C:115:ILE:HD11	1.83	0.60
1:C:177:ARG:HB3	1:C:262:VAL:CG2	2.32	0.59
1:D:216:ARG:O	1:D:220:VAL:HG23	2.03	0.58
1:B:235:GLU:HG3	1:B:249:GLU:HG3	1.89	0.55
1:A:232:TYR:CE2	1:A:234:ILE:HD11	2.39	0.54
1:A:216:ARG:O	1:A:220:VAL:HG23	2.07	0.54
1:D:177:ARG:HB3	1:D:262:VAL:HG22	1.89	0.54
1:C:239:VAL:HA	1:C:244:GLU:O	2.08	0.53
1:A:254:ALA:HA	1:A:262:VAL:HA	1.90	0.53
1:A:197:THR:HB	1:A:200:GLU:HB3	1.91	0.53
1:B:216:ARG:O	1:B:220:VAL:HG23	2.09	0.53
1:C:177:ARG:HB3	1:C:262:VAL:HG23	1.90	0.53
1:B:213:LEU:HA	1:B:216:ARG:HG3	1.90	0.52
1:C:30:THR:HG21	1:C:34:MET:HE3	1.92	0.52
1:A:208:LEU:HD22	1:A:216:ARG:HD3	1.92	0.52
1:C:216:ARG:O	1:C:220:VAL:HG23	2.10	0.51
1:D:213:LEU:HA	1:D:216:ARG:HG3	1.92	0.51
1:C:73:GLN:HG2	1:C:77:THR:HG21	1.93	0.51
1:A:33:PRO:HB3	1:A:53:PHE:HA	1.93	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:126:GLN:HE21	1:B:127:HIS:HD2	1.57	0.51
1:C:254:ALA:HB2	1:C:262:VAL:HG12	1.92	0.51
1:B:30:THR:HG21	1:B:34:MET:HE3	1.92	0.51
1:C:221:GLN:HE21	1:C:222:LYS:HD2	1.77	0.50
1:A:126:GLN:HE21	1:A:127:HIS:HD2	1.59	0.49
1:A:30:THR:HG21	1:A:34:MET:HE3	1.95	0.49
1:B:33:PRO:HB3	1:B:53:PHE:HA	1.93	0.49
1:B:73:GLN:HG2	1:B:77:THR:HG21	1.94	0.49
1:A:213:LEU:HA	1:A:216:ARG:HG3	1.94	0.49
1:C:166:ILE:HG13	1:C:167:VAL:N	2.28	0.49
1:D:73:GLN:HG2	1:D:77:THR:HG21	1.95	0.48
1:D:208:LEU:HD11	1:D:220:VAL:HG22	1.94	0.48
1:D:30:THR:HG21	1:D:34:MET:HE3	1.96	0.48
1:A:73:GLN:HG2	1:A:77:THR:HG21	1.96	0.48
1:C:33:PRO:HB3	1:C:53:PHE:HA	1.95	0.48
1:C:251:ARG:HD2	1:D:169:VAL:HG13	1.95	0.47
1:C:208:LEU:HD11	1:C:220:VAL:HG22	1.97	0.47
1:C:114:HIS:NE2	1:C:116:SER:HB2	2.30	0.47
1:A:172:ILE:HD11	1:B:172:ILE:HD11	1.97	0.47
1:C:175:TRP:HZ3	1:C:262:VAL:HG23	1.80	0.46
1:D:175:TRP:HZ3	1:D:262:VAL:HG23	1.80	0.46
1:D:249:GLU:HG3	1:D:267:GLN:HB2	1.98	0.46
1:A:197:THR:HB	1:A:200:GLU:CB	2.45	0.46
1:D:33:PRO:HB3	1:D:53:PHE:HA	1.96	0.45
1:D:208:LEU:HD22	1:D:216:ARG:HD3	1.98	0.45
1:D:70:ARG:HD3	2:D:300:FMN:O3P	2.18	0.44
1:C:247:TRP:HB2	1:C:269:VAL:HG22	1.99	0.44
1:D:177:ARG:HB2	1:D:184:MET:HG2	2.00	0.44
1:C:190:CYS:HA	1:C:193:ILE:HD12	2.00	0.44
1:C:179:PHE:CZ	1:C:227:VAL:HB	2.54	0.43
1:D:175:TRP:CZ3	1:D:262:VAL:HG23	2.54	0.43
1:B:179:PHE:CZ	1:B:227:VAL:HB	2.54	0.42
1:A:263:LEU:HD22	1:B:162:GLN:HG2	2.02	0.42
1:A:166:ILE:HA	1:B:265:ILE:HD11	2.01	0.42
1:D:218:THR:O	1:D:222:LYS:HB2	2.18	0.42
1:D:179:PHE:CZ	1:D:227:VAL:HB	2.55	0.42
1:A:179:PHE:CZ	1:A:227:VAL:HB	2.55	0.42
1:D:217:MET:O	1:D:221:GLN:HG2	2.19	0.41
1:D:128:PHE:HB3	2:D:300:FMN:HM71	2.03	0.41

There are no symmetry-related clashes.

5.3 Torsion angles ⓘ

5.3.1 Protein backbone ⓘ

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	253/266 (95%)	247 (98%)	6 (2%)	0	100	100
1	B	255/266 (96%)	249 (98%)	6 (2%)	0	100	100
1	C	231/266 (87%)	221 (96%)	10 (4%)	0	100	100
1	D	254/266 (96%)	246 (97%)	8 (3%)	0	100	100
All	All	993/1064 (93%)	963 (97%)	30 (3%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains ⓘ

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	222/232 (96%)	210 (95%)	12 (5%)	22	38
1	B	224/232 (97%)	213 (95%)	11 (5%)	25	43
1	C	209/232 (90%)	193 (92%)	16 (8%)	13	23
1	D	223/232 (96%)	208 (93%)	15 (7%)	16	29
All	All	878/928 (95%)	824 (94%)	54 (6%)	18	32

All (54) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	101	ASN
1	A	116	SER

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Mol	Chain	Res	Type
1	A	140	SER
1	A	144	GLU
1	A	158	ARG
1	A	171	ASN
1	A	181	SER
1	A	192	ARG
1	A	200	GLU
1	A	218	THR
1	A	234	ILE
1	A	242	LEU
1	B	116	SER
1	B	149	ARG
1	B	153	SER
1	B	155	GLU
1	B	181	SER
1	B	192	ARG
1	B	209	ASP
1	B	216	ARG
1	B	218	THR
1	B	233	SER
1	B	234	ILE
1	C	129	VAL
1	C	140	SER
1	C	158	ARG
1	C	181	SER
1	C	192	ARG
1	C	200	GLU
1	C	202	VAL
1	C	216	ARG
1	C	218	THR
1	C	222	LYS
1	C	233	SER
1	C	234	ILE
1	C	249	GLU
1	C	265	ILE
1	C	267	GLN
1	C	268	ASP
1	D	116	SER
1	D	142	LEU
1	D	144	GLU
1	D	147	LYS
1	D	149	ARG

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Mol	Chain	Res	Type
1	D	181	SER
1	D	209	ASP
1	D	213	LEU
1	D	218	THR
1	D	222	LYS
1	D	233	SER
1	D	234	ILE
1	D	249	GLU
1	D	262	VAL
1	D	265	ILE

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (8) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	119	HIS
1	A	127	HIS
1	A	132	GLN
1	B	127	HIS
1	C	127	HIS
1	C	221	GLN
1	C	267	GLN
1	D	132	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 ⓘ

4 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	D	300	-	33,33,33	0.40	0	48,50,50	0.63	1 (2%)
2	FMN	B	300	-	33,33,33	0.40	0	48,50,50	0.60	1 (2%)
2	FMN	A	300	-	33,33,33	0.40	0	48,50,50	0.63	1 (2%)
2	FMN	C	300	-	33,33,33	0.46	0	48,50,50	0.62	2 (4%)

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	D	300	-	-	1/18/18/18	0/3/3/3
2	FMN	B	300	-	-	1/18/18/18	0/3/3/3
2	FMN	A	300	-	-	1/18/18/18	0/3/3/3
2	FMN	C	300	-	-	1/18/18/18	0/3/3/3

There are no bond length outliers.

All (5) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	D	300	FMN	O5'-P-O1P	2.47	113.41	106.47
2	A	300	FMN	O5'-P-O1P	2.46	113.37	106.47
2	C	300	FMN	O5'-P-O1P	2.17	112.56	106.47
2	B	300	FMN	O5'-P-O1P	2.12	112.42	106.47
2	C	300	FMN	P-O5'-C5'	2.02	123.85	118.30

There are no chirality outliers.

All (4) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	300	FMN	C4'-C5'-O5'-P
2	B	300	FMN	C4'-C5'-O5'-P

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Mol	Chain	Res	Type	Atoms
2	C	300	FMN	C4'-C5'-O5'-P
2	D	300	FMN	C4'-C5'-O5'-P

There are no ring outliers.

3 monomers are involved in 4 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	D	300	FMN	2	0
2	B	300	FMN	1	0
2	C	300	FMN	1	0

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less 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 D 300

Bond lengths

Bond angles

Torsions

Rings

Ligand FMN B 300

Bond lengths

Bond angles

Torsions

Rings

Ligand FMN A 300

Bond lengths

Bond angles

Torsions

Rings

Ligand FMN C 300

Bond lengths

Bond angles

Torsions

Rings
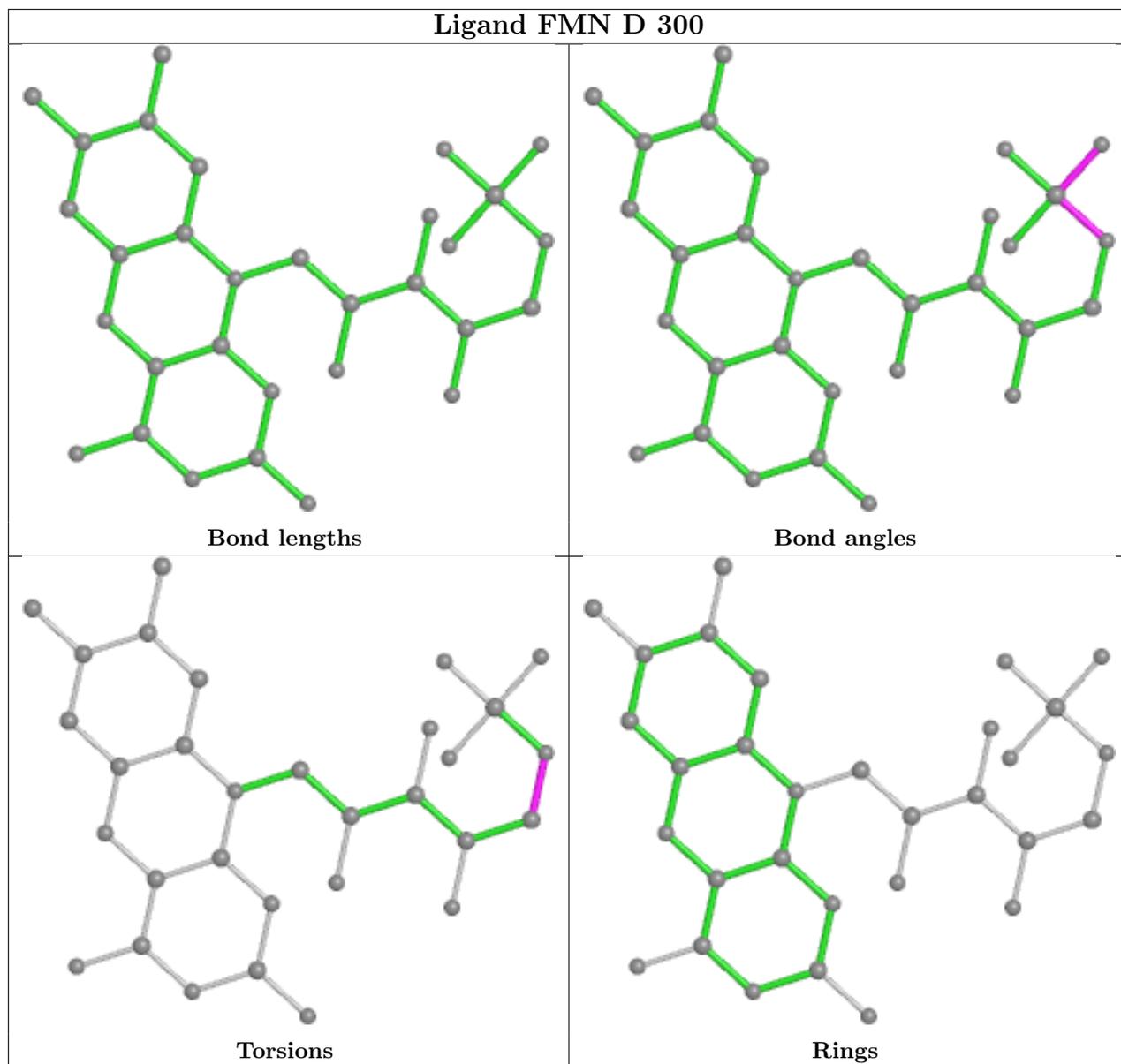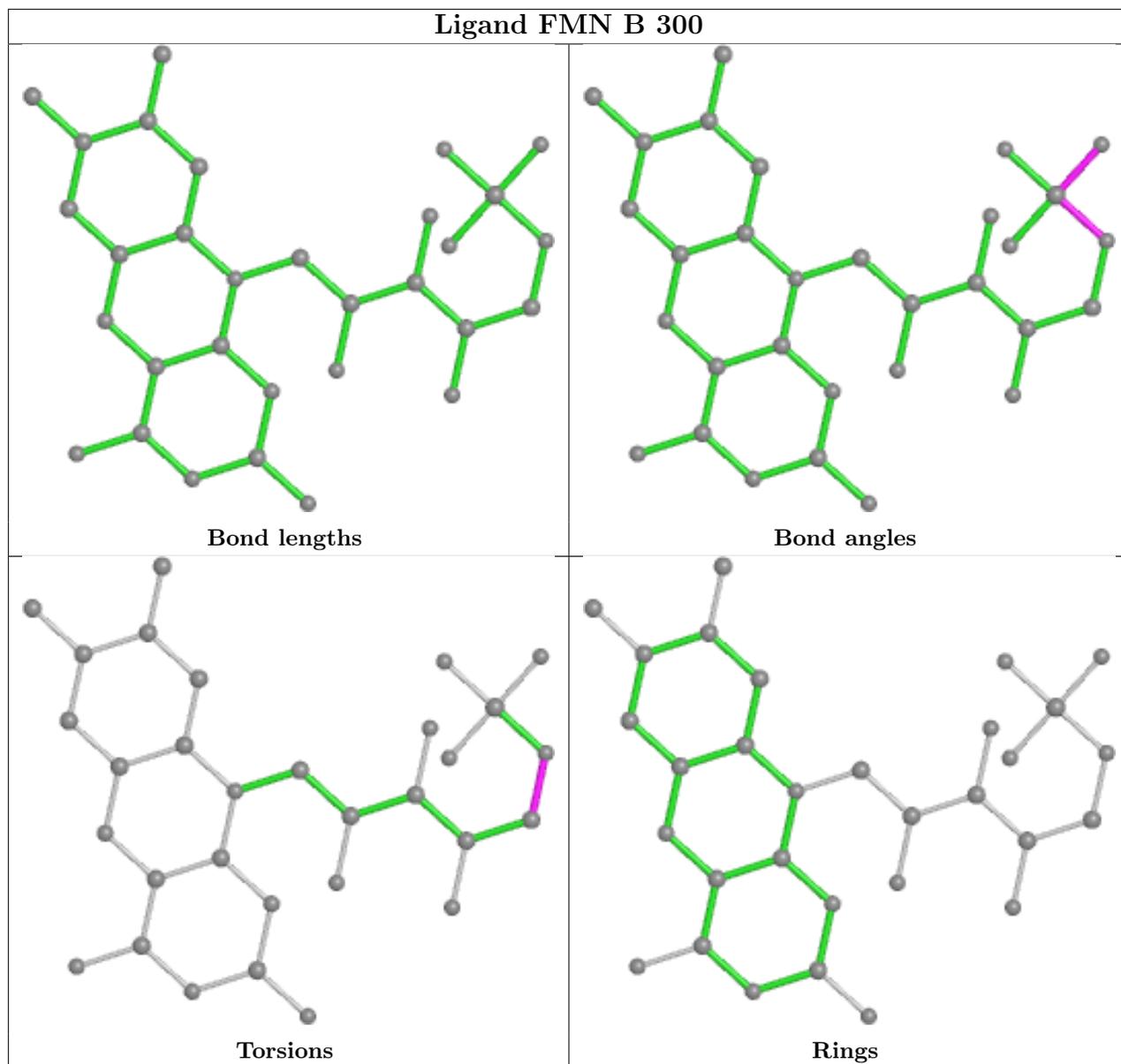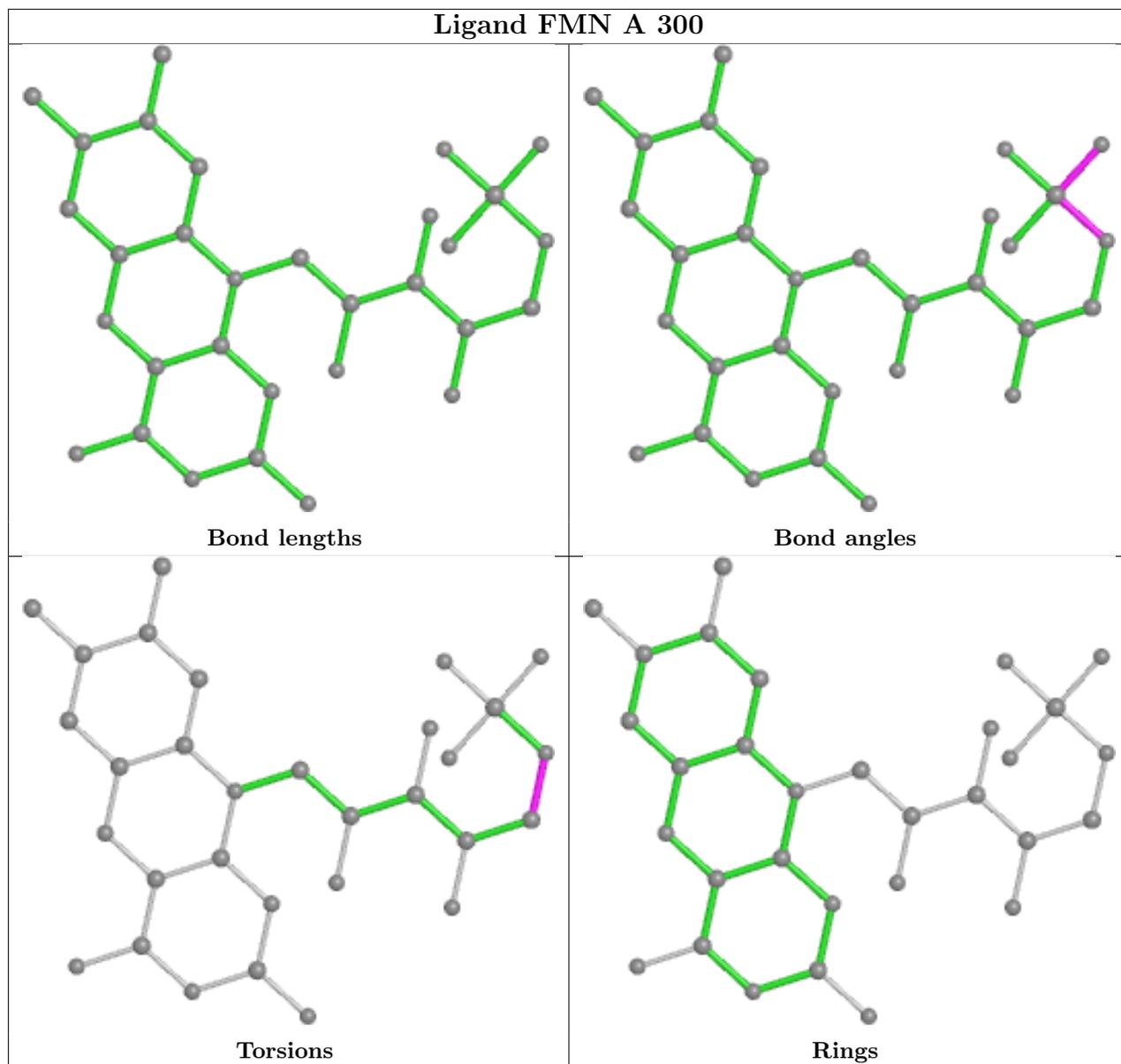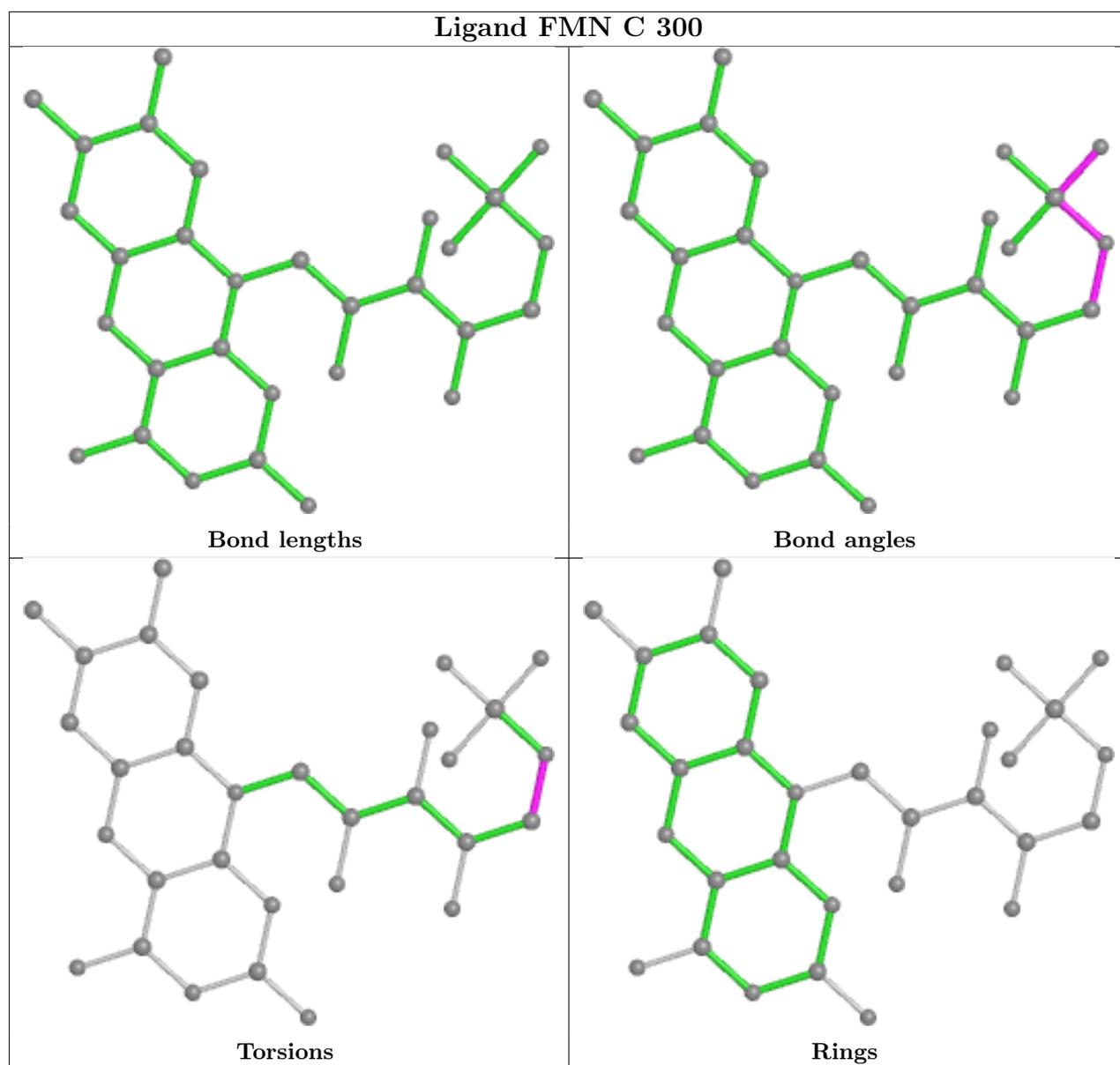
5.7 Other polymers ⓘ

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, 95th percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled 'Q< 0.9' lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2			OWAB(Å^2)	Q<0.9
1	A	255/266 (95%)	0.29	3 (1%)	79	83	45, 65, 94, 114	0
1	B	257/266 (96%)	0.33	7 (2%)	54	61	44, 68, 95, 130	0
1	C	241/266 (90%)	0.94	43 (17%)	1	1	51, 81, 136, 147	0
1	D	256/266 (96%)	0.33	6 (2%)	60	67	48, 68, 95, 121	0
All	All	1009/1064 (94%)	0.47	59 (5%)	23	26	44, 69, 117, 147	0

All (59) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	236	TYR	7.8
1	C	245	THR	6.3
1	C	219	VAL	6.2
1	C	179	PHE	5.7
1	C	234	ILE	5.1
1	C	194	TYR	5.1
1	C	205	ASP	4.8
1	C	224	HIS	4.6
1	C	202	VAL	4.5
1	C	220	VAL	4.3
1	D	85	ILE	4.2
1	C	193	ILE	3.8
1	D	226	ALA	3.7
1	C	244	GLU	3.7
1	C	246	ARG	3.6
1	C	223	ALA	3.6
1	C	238	ILE	3.6
1	B	180	TYR	3.5
1	C	256	THR	3.5
1	C	226	ALA	3.5
1	C	178	GLU	3.4

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Mol	Chain	Res	Type	RSRZ
1	C	255	LEU	3.3
1	C	207	ILE	3.2
1	C	215	ASP	3.2
1	C	191	ARG	3.2
1	C	248	LEU	3.1
1	C	217	MET	3.1
1	C	235	GLU	3.1
1	A	19	ALA	3.1
1	D	258	GLU	2.9
1	C	182	GLY	2.9
1	C	247	TRP	2.9
1	C	218	THR	2.9
1	C	225	GLN	2.8
1	B	145	LEU	2.7
1	C	99	ILE	2.7
1	C	177	ARG	2.7
1	C	222	LYS	2.6
1	C	206	THR	2.6
1	C	184	MET	2.5
1	A	199	ASP	2.5
1	B	179	PHE	2.5
1	C	188	ALA	2.5
1	A	234	ILE	2.4
1	B	17	SER	2.4
1	C	262	VAL	2.4
1	B	166	ILE	2.3
1	C	204	PHE	2.3
1	B	193	ILE	2.3
1	D	167	VAL	2.2
1	C	97	ILE	2.2
1	C	249	GLU	2.1
1	D	121	ALA	2.1
1	C	195	GLY	2.1
1	B	258	GLU	2.1
1	C	239	VAL	2.1
1	D	230	GLU	2.1
1	C	174	PHE	2.1
1	C	267	GLN	2.0

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

There are no non-standard protein/DNA/RNA residues in this entry.
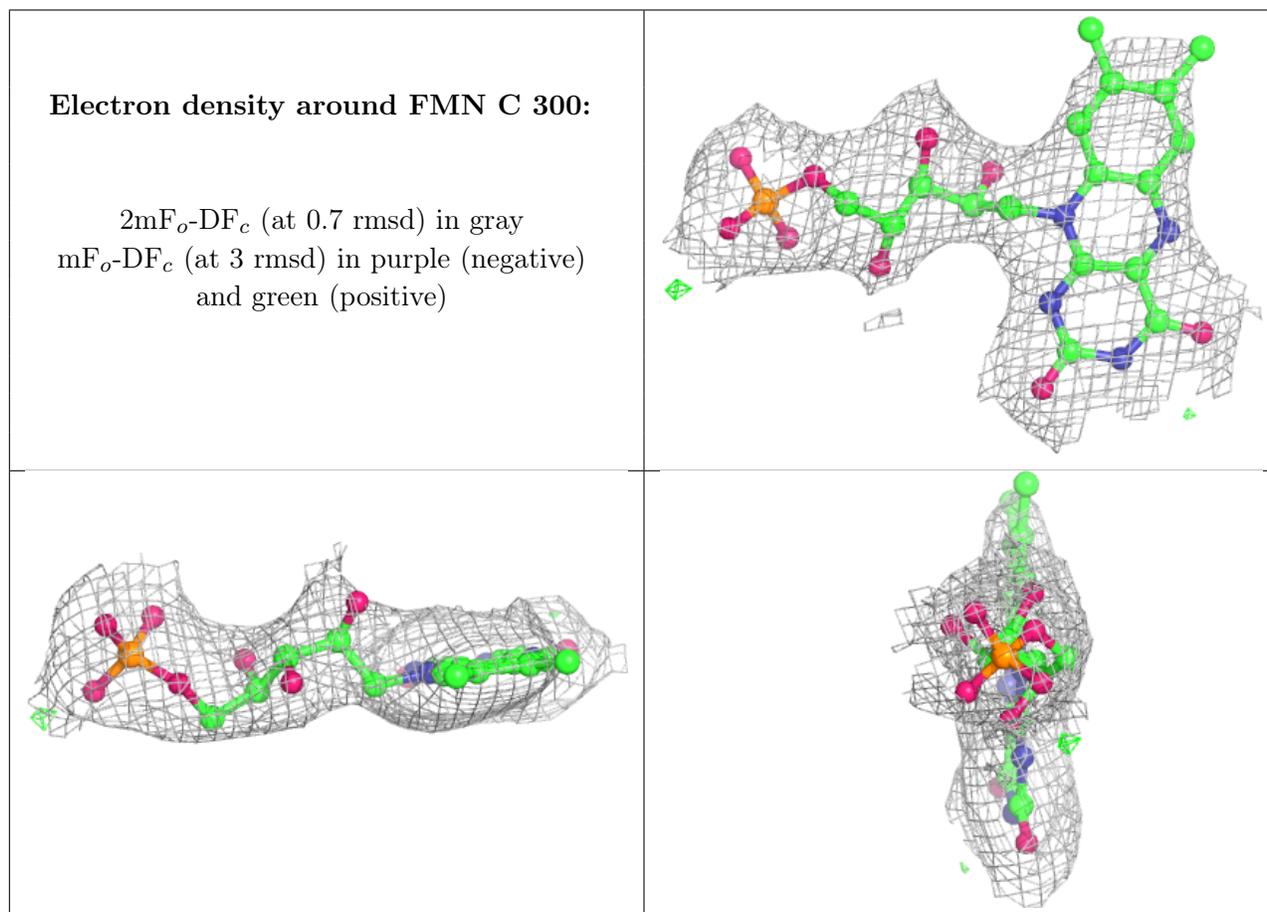
6.3 Carbohydrates (i)

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, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
2	FMN	C	300	31/31	0.94	0.20	67,71,76,78	0
2	FMN	D	300	31/31	0.94	0.20	43,59,73,77	0
2	FMN	A	300	31/31	0.95	0.20	48,61,69,74	0
2	FMN	B	300	31/31	0.96	0.19	53,59,79,84	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.
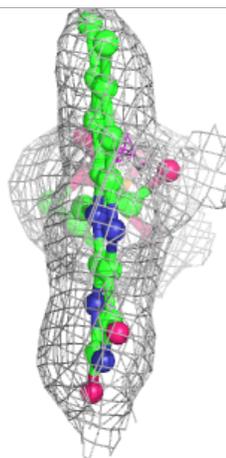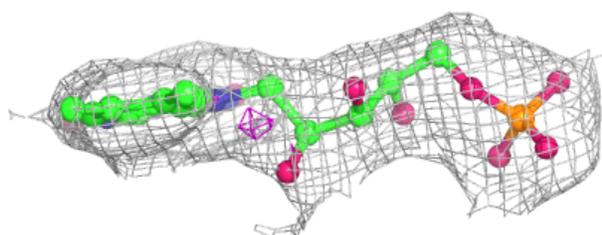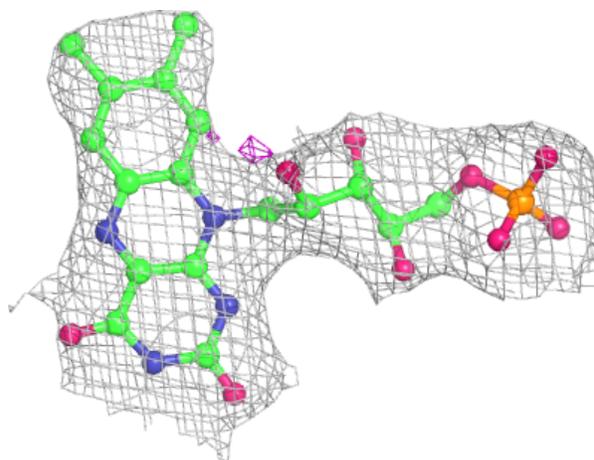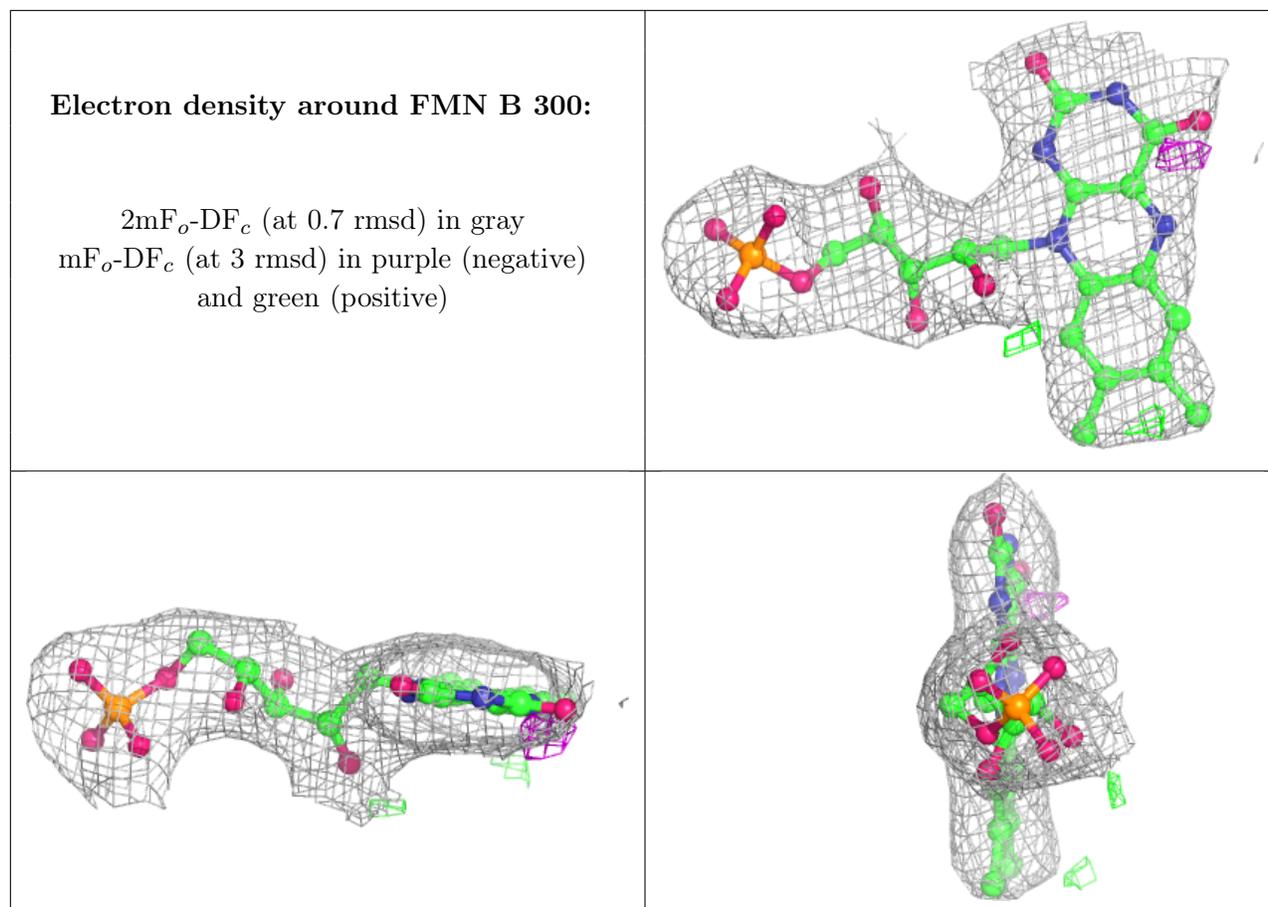

Electron density around FMN C 300:

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

Electron density around FMN D 300:

$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)
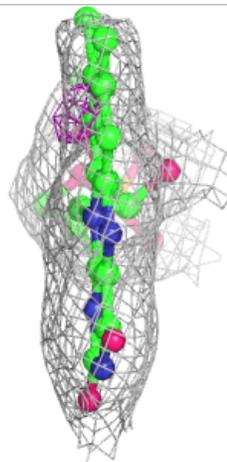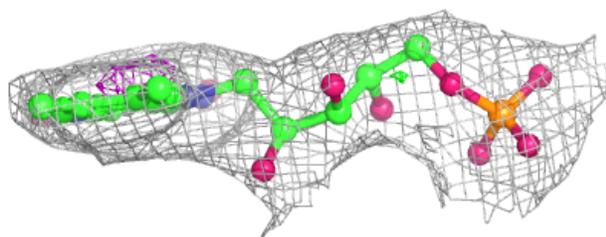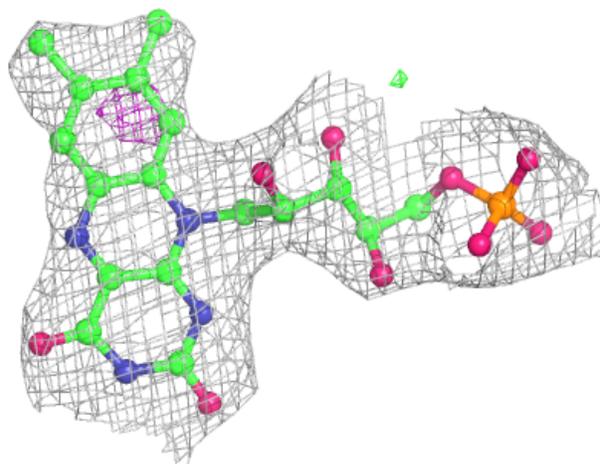
Electron density around FMN A 300:

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

Electron density around FMN B 300:

2mF$_o$-DF$_c$ (at 0.7 rmsd) in gray
mF$_o$-DF$_c$ (at 3 rmsd) in purple (negative)
and green (positive)

6.5 Other polymers ⓘ

There are no such residues in this entry.