



Full wwPDB X-ray Structure Validation Report ⓘ

Dec 4, 2023 – 06:17 am GMT

PDB ID : 2CD8
Title : Crystal structure of YC-17-bound cytochrome P450 PikC (CYP107L1)
Authors : Yermalitskaya, L.I.; Kim, Y.; Sherman, D.H.; Waterman, M.R.; Podust, L.M.
Deposited on : 2006-01-20
Resolution : 1.70 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 : **FAILED**
Mogul : 1.8.4, 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

PERCENTILES INFOmissingINFO

1 Entry composition i

There are 4 unique types of molecules in this entry. The entry contains 6456 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 CYTOCHROME P450 MONOOXYGENASE.

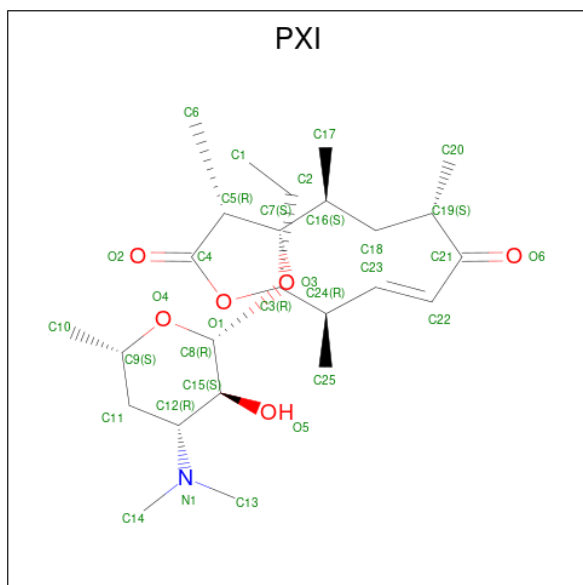
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	392	Total 3024	C 1904	N 543	O 564	S 13	0	0	1
1	B	393	Total 3027	C 1910	N 545	O 559	S 13	0	0	1

- Molecule 2 is PROTOPORPHYRIN IX CONTAINING FE (three-letter code: HEM) (formula: $C_{34}H_{32}FeN_4O_4$).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	
			Total	C	Fe	N			O
2	A	1	Total 43	C 34	Fe 1	N 4	O 4	0	0
2	B	1	Total 43	C 34	Fe 1	N 4	O 4	0	0

- Molecule 3 is 4-[4-(DIMETHYLAMINO)-3-HYDROXY-6-METHYLTETRAHYDRO-2H-PYRAN-2-YL]OXY}-12-ETHYL-3,5,7,11-TETRAMETHYLOXACYCLODODEC-9-ENE-2,8-DIONE (three-letter code: PXI) (formula: $C_{25}H_{43}NO_6$).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	N	O		
3	A	1	32	25	1	6	0	0
3	B	1	32	25	1	6	0	0

- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	O		
4	A	139	139	139	0	0
4	B	116	116	116	0	0

SEQUENCE-PLOTS INFOmissingINFO

2 Data and refinement statistics i

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	58.40Å 92.10Å 67.57Å 90.00° 89.99° 90.00°	Depositor
Resolution (Å)	39.84 – 1.70 39.84 – 1.65	Depositor EDS
% Data completeness (in resolution range)	90.6 (39.84-1.70) 95.3 (39.84-1.65)	Depositor EDS
R_{merge}	0.08	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.24 (at 1.65Å)	Xtrriage
Refinement program	CNS 1.1	Depositor
R, R_{free}	0.290 , 0.333 0.292 , 0.335	Depositor DCC
R_{free} test set	8535 reflections (10.05%)	wwPDB-VP
Wilson B-factor (Å ²)	20.1	Xtrriage
Anisotropy	0.298	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.34 , 22.6	EDS
L-test for twinning ²	$\langle L \rangle = 0.38$, $\langle L^2 \rangle = 0.21$	Xtrriage
Estimated twinning fraction	0.447 for h,-k,-l	Xtrriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	6456	wwPDB-VP
Average B, all atoms (Å ²)	23.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.61% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical values of $\langle |L| \rangle$, $\langle L^2 \rangle$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

3 Model quality [i](#)

3.1 Standard geometry [i](#)

MolProbity failed to run properly - this section is therefore empty.

3.2 Too-close contacts [i](#)

MolProbity failed to run properly - this section is therefore empty.

3.3 Torsion angles [i](#)

3.3.1 Protein backbone [i](#)

MolProbity failed to run properly - this section is therefore empty.

3.3.2 Protein sidechains [i](#)

MolProbity failed to run properly - this section is therefore empty.

3.3.3 RNA [i](#)

MolProbity failed to run properly - this section is therefore empty.

3.4 Non-standard residues in protein, DNA, RNA chains [i](#)

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

3.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

3.6 Ligand geometry [i](#)

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	HEM	A	419	1	41,50,50	1.68	9 (21%)	45,82,82	1.19	6 (13%)
2	HEM	B	419	1	41,50,50	1.58	7 (17%)	45,82,82	1.41	8 (17%)
3	PXI	B	420	-	33,33,33	2.03	5 (15%)	40,47,47	2.11	12 (30%)
3	PXI	A	420	-	33,33,33	1.87	7 (21%)	40,47,47	2.08	9 (22%)

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	HEM	A	419	1	-	1/12/54/54	-
2	HEM	B	419	1	-	1/12/54/54	-
3	PXI	B	420	-	-	15/43/59/59	0/1/2/2
3	PXI	A	420	-	-	16/43/59/59	0/1/2/2

All (28) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	B	420	PXI	C19-C21	6.45	1.62	1.51
3	B	420	PXI	C16-C7	5.87	1.63	1.53
3	A	420	PXI	C19-C21	5.70	1.61	1.51
3	A	420	PXI	C16-C7	4.59	1.61	1.53
2	B	419	HEM	C3C-CAC	-4.46	1.38	1.47
2	A	419	HEM	C1A-NA	4.38	1.45	1.36
3	A	420	PXI	C24-C3	4.01	1.63	1.53
3	B	420	PXI	C24-C3	3.85	1.62	1.53
2	A	419	HEM	C4A-NA	3.72	1.43	1.36
2	B	419	HEM	CHB-C1B	3.38	1.43	1.35
2	B	419	HEM	CHA-C4D	3.30	1.43	1.35
2	A	419	HEM	CBB-CAB	3.16	1.45	1.30
2	A	419	HEM	CMB-C2B	3.03	1.57	1.50
2	A	419	HEM	C3C-CAC	-2.99	1.41	1.47
3	A	420	PXI	C11-C9	2.95	1.57	1.51
3	B	420	PXI	C11-C9	2.85	1.56	1.51
2	B	419	HEM	CBB-CAB	2.62	1.43	1.30
2	B	419	HEM	C1A-NA	2.61	1.41	1.36

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	419	HEM	CBC-CAC	2.59	1.46	1.29
2	A	419	HEM	CHA-C4D	2.54	1.41	1.35
3	B	420	PXI	O4-C9	2.53	1.49	1.44
2	B	419	HEM	CAB-C3B	-2.45	1.40	1.47
2	A	419	HEM	C1B-C2B	2.38	1.49	1.44
3	A	420	PXI	C5-C4	-2.28	1.46	1.51
2	A	419	HEM	O2A-CGA	-2.09	1.23	1.30
3	A	420	PXI	C15-C12	2.06	1.58	1.53
2	B	419	HEM	C1B-C2B	2.06	1.48	1.44
3	A	420	PXI	O4-C9	2.01	1.48	1.44

All (35) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	420	PXI	C3-O1-C4	7.61	129.32	117.89
3	B	420	PXI	C3-O1-C4	6.88	128.21	117.89
3	A	420	PXI	O3-C7-C5	-6.01	100.68	111.14
3	B	420	PXI	O3-C7-C5	-5.49	101.59	111.14
3	B	420	PXI	C7-C5-C4	3.57	117.30	110.01
3	A	420	PXI	C7-C5-C4	3.35	116.86	110.01
2	B	419	HEM	CAD-C3D-C4D	3.24	130.32	124.66
2	B	419	HEM	C4B-C3B-C2B	-3.19	104.58	107.11
3	B	420	PXI	C10-C9-C11	-3.06	108.59	113.40
3	B	420	PXI	O1-C3-C2	2.97	111.67	106.92
2	B	419	HEM	C4A-C3A-C2A	2.93	109.03	107.00
2	B	419	HEM	CMC-C2C-C3C	2.87	130.05	124.68
3	B	420	PXI	C6-C5-C7	-2.85	106.46	112.92
3	B	420	PXI	C25-C24-C23	-2.85	103.10	109.99
2	B	419	HEM	CAD-C3D-C2D	-2.82	122.62	127.88
2	A	419	HEM	C4A-C3A-C2A	-2.72	105.10	107.00
3	A	420	PXI	O3-C8-O4	2.72	118.26	110.67
2	A	419	HEM	C3B-C2B-C1B	-2.71	104.47	106.49
3	A	420	PXI	C25-C24-C23	-2.69	103.48	109.99
3	B	420	PXI	C13-N1-C12	-2.59	105.33	113.11
2	A	419	HEM	CMA-C3A-C4A	-2.58	124.49	128.46
3	B	420	PXI	O3-C8-O4	2.57	117.85	110.67
2	B	419	HEM	CAA-C2A-C3A	-2.54	119.95	127.25
3	A	420	PXI	C6-C5-C7	-2.49	107.27	112.92
3	A	420	PXI	C10-C9-C11	-2.47	109.53	113.40
3	A	420	PXI	C13-N1-C12	-2.41	105.87	113.11
2	A	419	HEM	CBA-CAA-C2A	-2.37	108.58	112.62
3	A	420	PXI	O1-C3-C2	2.28	110.56	106.92

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	B	420	PXI	C19-C21-C22	2.25	123.95	118.29
3	B	420	PXI	C9-C11-C12	-2.25	106.52	110.46
2	A	419	HEM	CMD-C2D-C1D	2.13	128.28	125.04
3	B	420	PXI	C8-C15-C12	-2.11	105.73	109.19
2	B	419	HEM	C3B-C2B-C1B	2.09	108.04	106.49
2	A	419	HEM	CMC-C2C-C3C	2.09	128.59	124.68
2	B	419	HEM	C4B-CHC-C1C	2.05	125.27	122.56

There are no chirality outliers.

All (33) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	420	PXI	C23-C24-C3-O1
3	A	420	PXI	C11-C12-N1-C13
3	A	420	PXI	C11-C12-N1-C14
3	A	420	PXI	C15-C12-N1-C13
3	A	420	PXI	C15-C12-N1-C14
3	A	420	PXI	C16-C18-C19-C21
3	B	420	PXI	C23-C24-C3-O1
3	B	420	PXI	C11-C12-N1-C13
3	B	420	PXI	C11-C12-N1-C14
3	B	420	PXI	C15-C12-N1-C13
3	B	420	PXI	C15-C12-N1-C14
3	A	420	PXI	O4-C8-O3-C7
3	B	420	PXI	O4-C8-O3-C7
3	A	420	PXI	C22-C23-C24-C25
3	B	420	PXI	C22-C23-C24-C25
3	B	420	PXI	O6-C21-C22-C23
3	B	420	PXI	C6-C5-C7-O3
3	A	420	PXI	C19-C21-C22-C23
3	B	420	PXI	C19-C21-C22-C23
3	B	420	PXI	C16-C18-C19-C21
3	A	420	PXI	C25-C24-C3-C2
3	A	420	PXI	C25-C24-C3-O1
3	B	420	PXI	C16-C18-C19-C20
3	A	420	PXI	O6-C21-C22-C23
2	B	419	HEM	C2B-C3B-CAB-CBB
3	A	420	PXI	C23-C24-C3-C2
3	B	420	PXI	C23-C24-C3-C2
2	A	419	HEM	C3A-C2A-CAA-CBA
3	A	420	PXI	C16-C18-C19-C20
3	B	420	PXI	C25-C24-C3-O1

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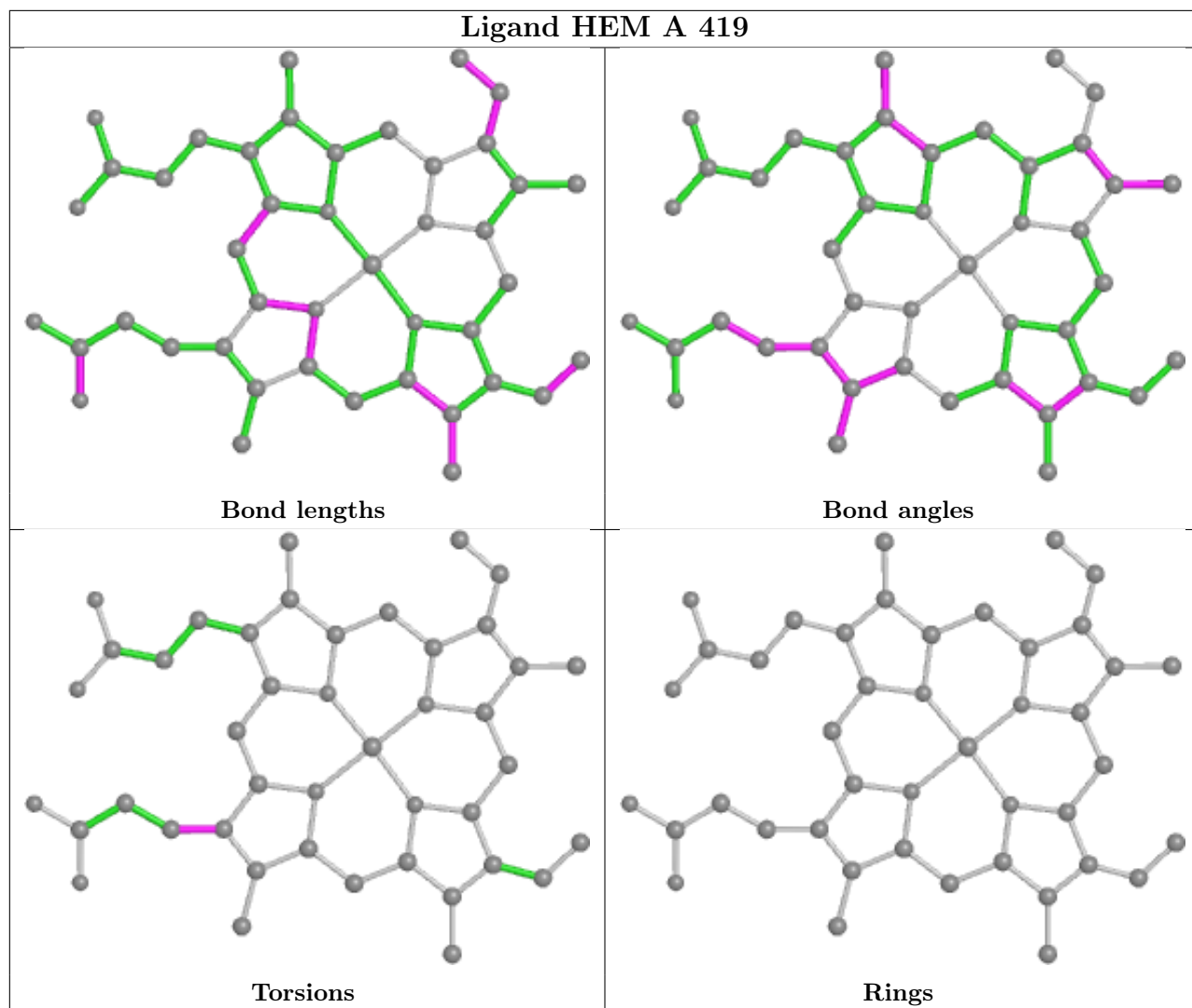
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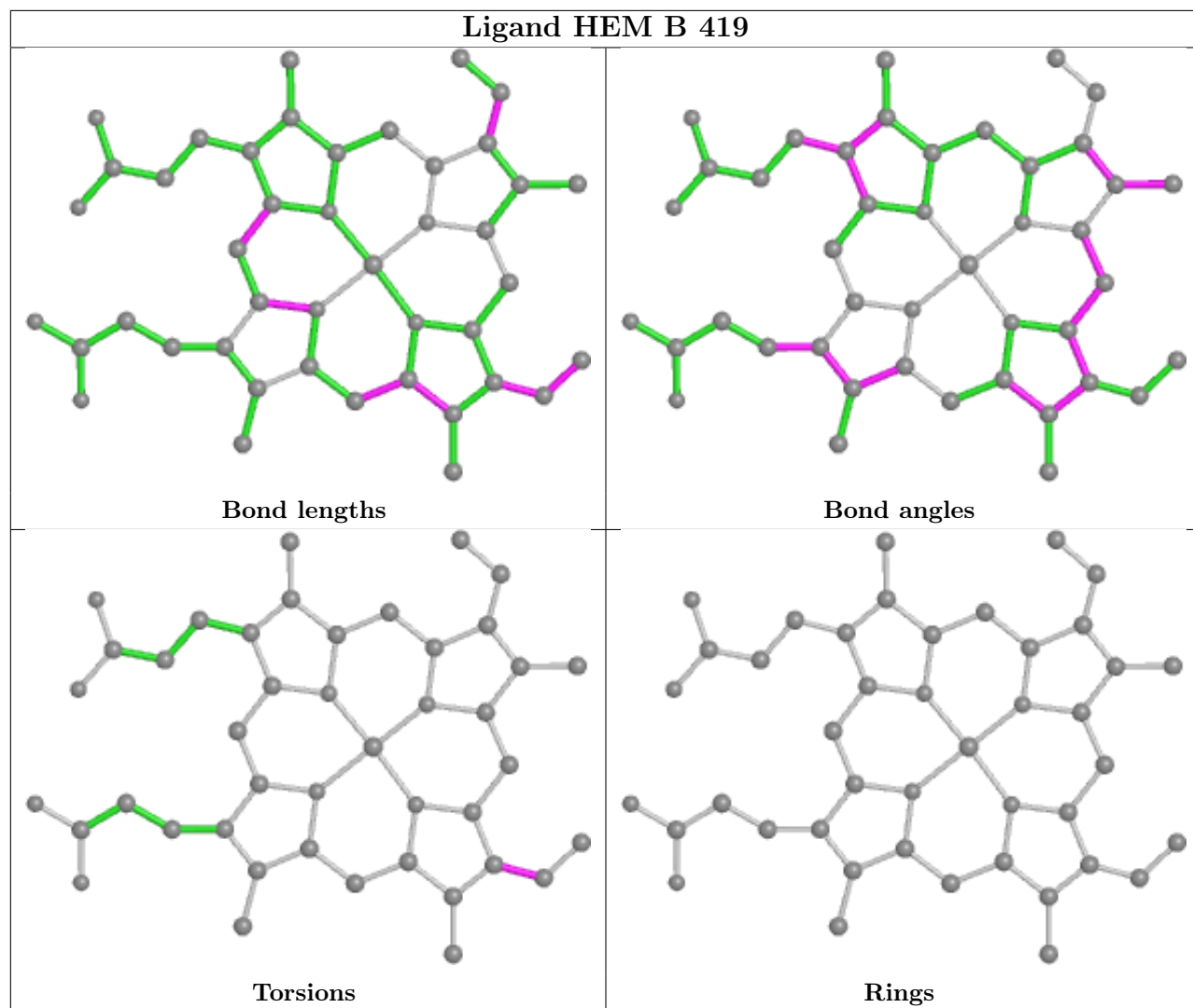
Mol	Chain	Res	Type	Atoms
3	A	420	PXI	C17-C16-C18-C19
3	A	420	PXI	C7-C16-C18-C19
3	B	420	PXI	C4-C5-C7-C16

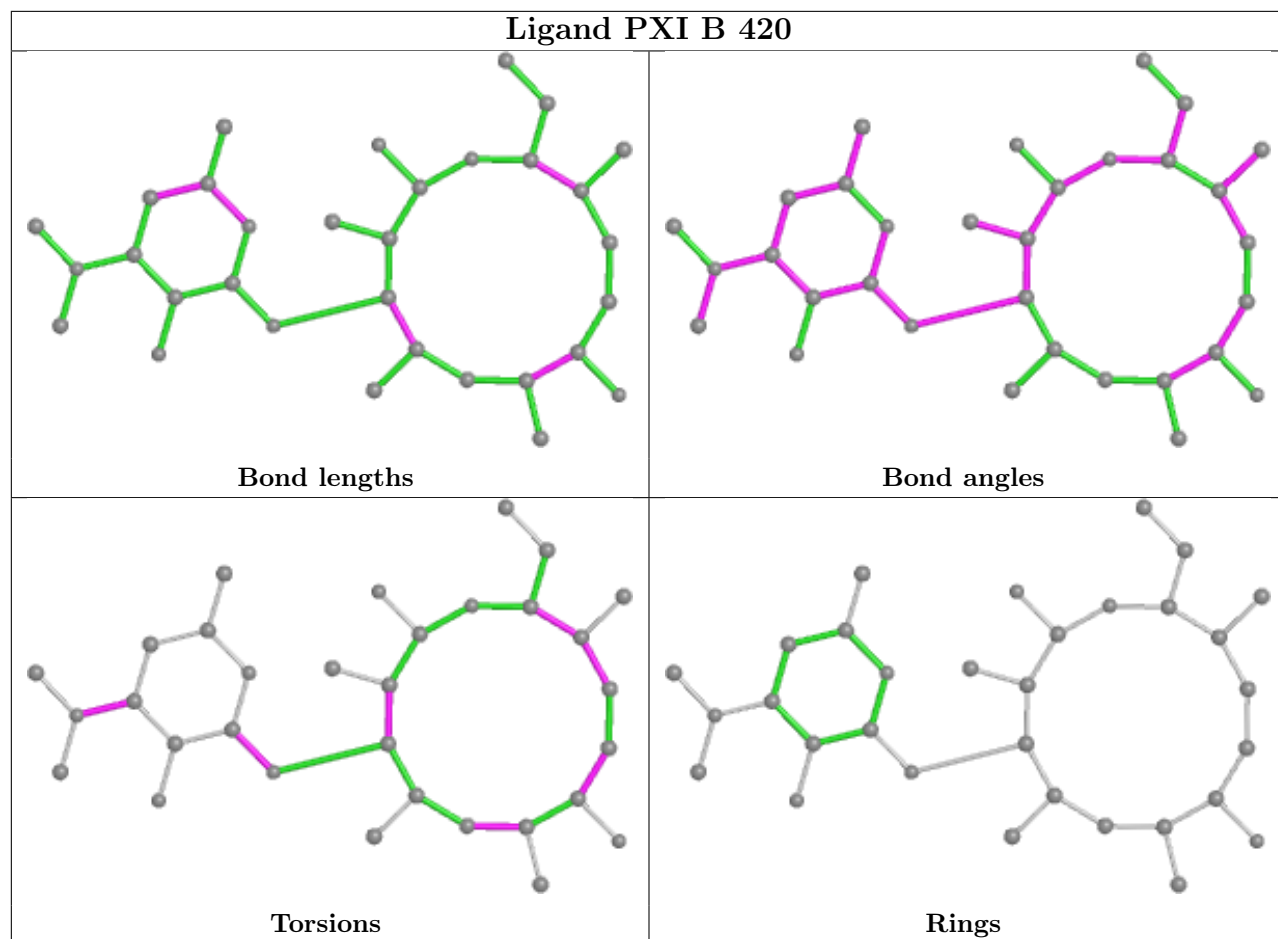
There are no ring outliers.

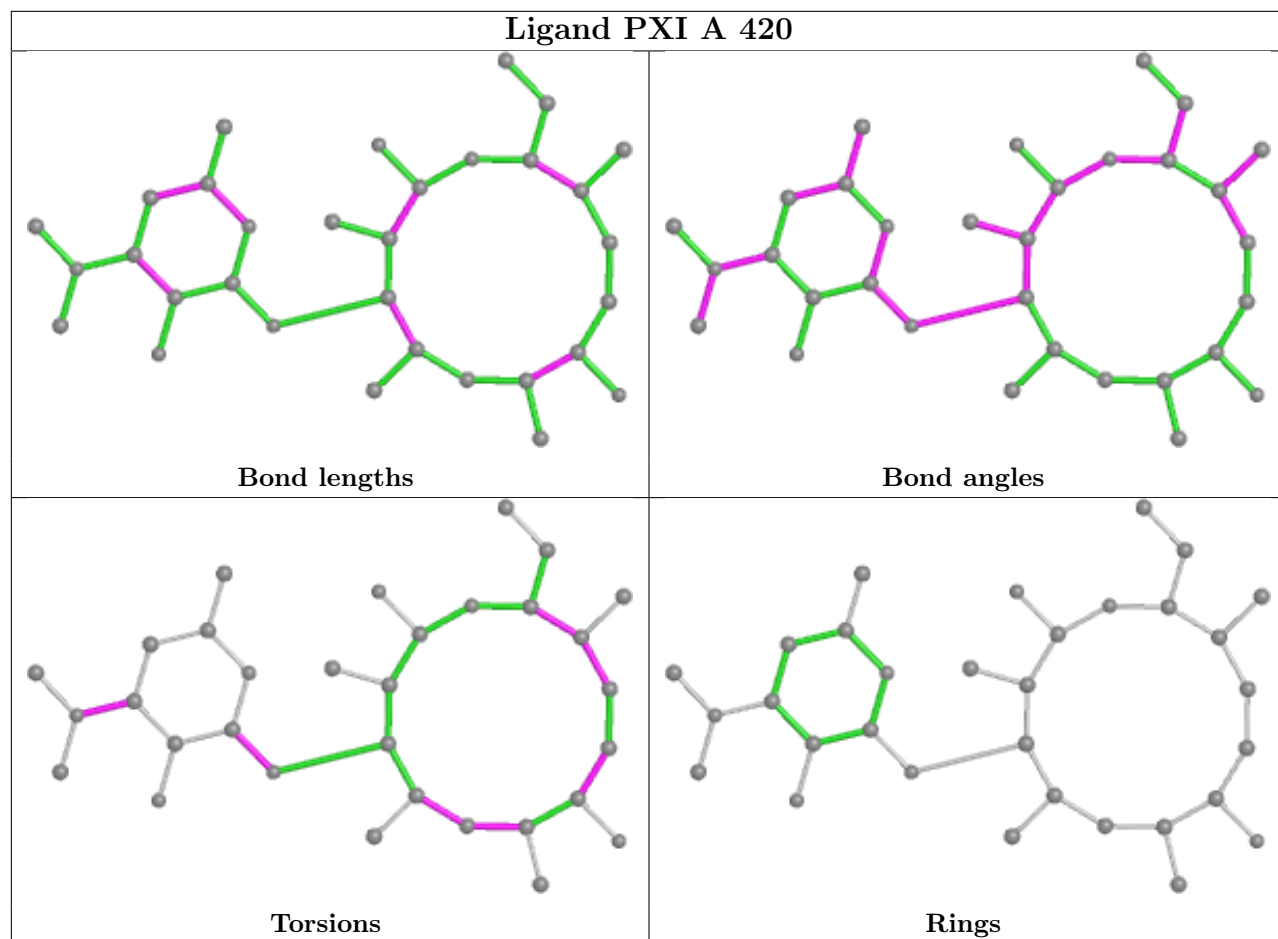
No monomer is involved in short contacts.

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.









3.7 Other polymers [i](#)

There are no such residues in this entry.

3.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

4 Fit of model and data

4.1 Protein, DNA and RNA chains

Unable to reproduce the depositors R factor - this section is therefore empty.

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

Unable to reproduce the depositors R factor - this section is therefore empty.

4.3 Carbohydrates

Unable to reproduce the depositors R factor - this section is therefore empty.

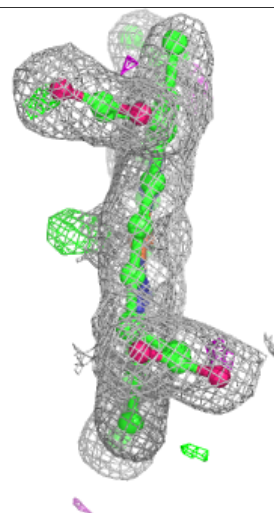
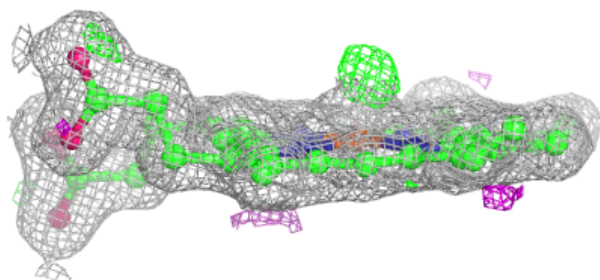
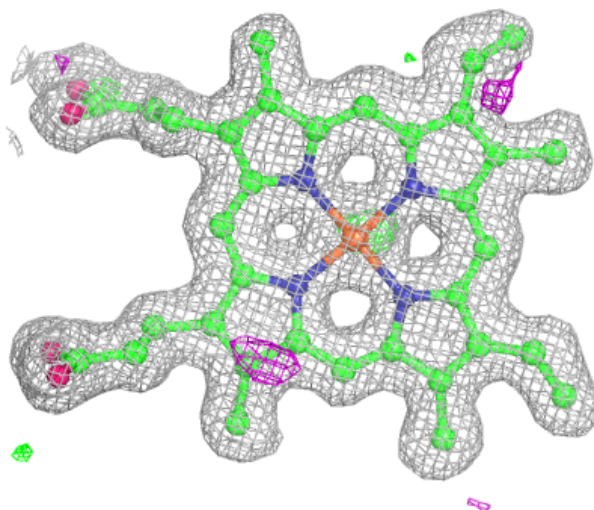
4.4 Ligands

Unable to reproduce the depositors R factor - this section is therefore empty.

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.

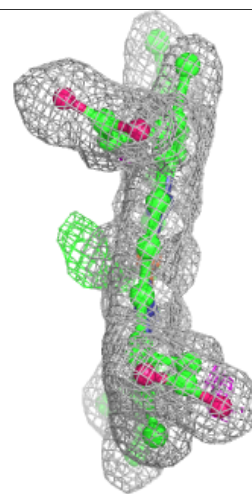
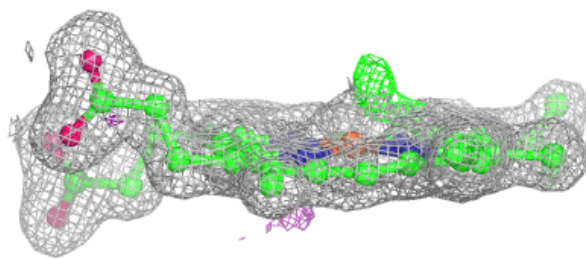
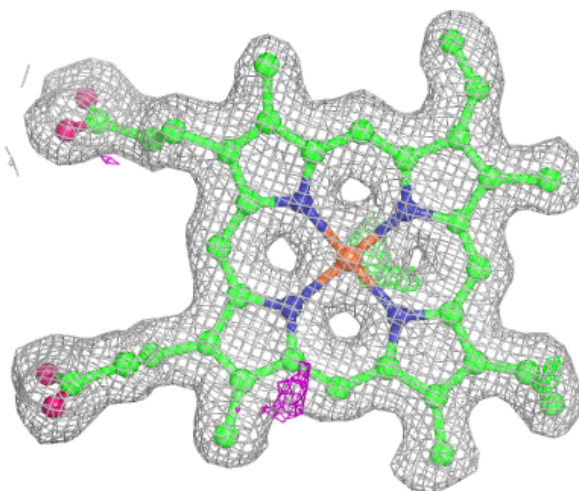
Electron density around HEM A 419:

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



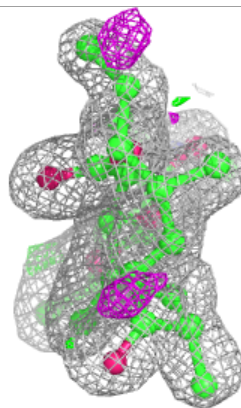
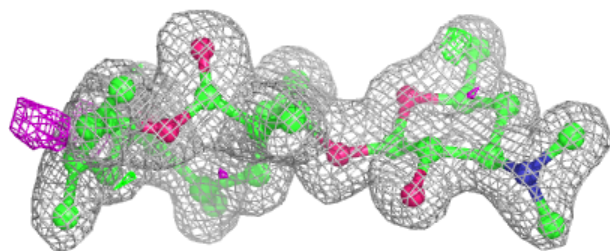
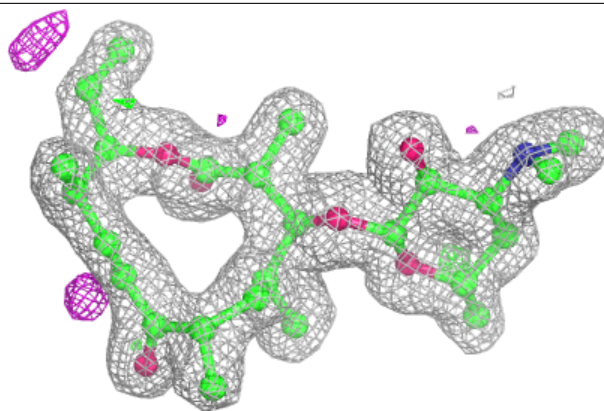
Electron density around HEM B 419:

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

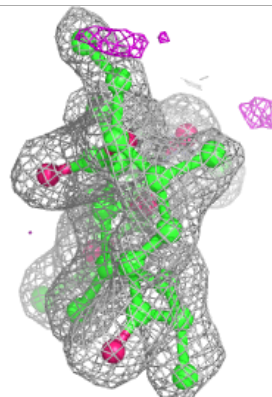
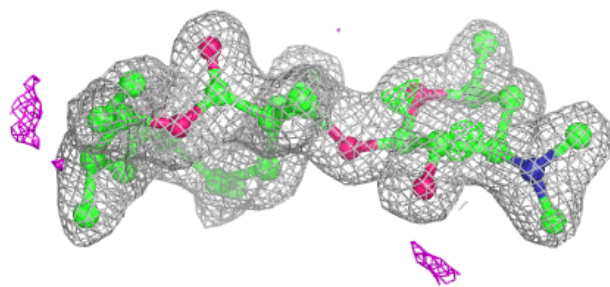
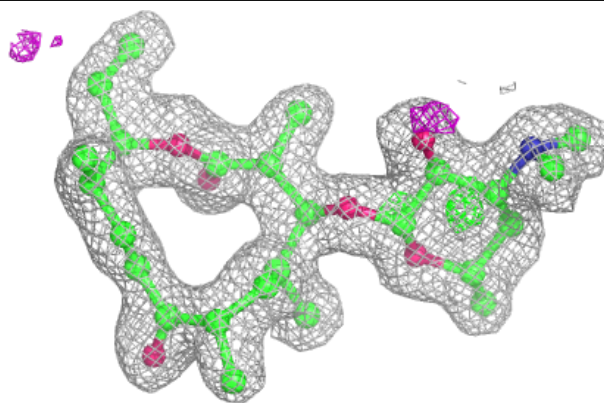


Electron density around PXI A 420:

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

**Electron density around PXI B 420:**

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



4.5 Other polymers

Unable to reproduce the depositors R factor - this section is therefore empty.