Full wwPDB X-ray Structure Validation Report (i)

Sep 25, 2023 – 02:22 PM EDT

PDB ID	:	6AUW
Title	:	Structure of rat neuronal nitric oxide synthase heme domain in complex with 4-Methyl-6-(2-(5-(4-((methylamino)methyl)phenyl)pyridin-3-yl)ethyl)pyridin-2-amine
Authors	:	Li, H.; Poulos, T.L.
Deposited on	:	2017-09-01
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 (i) 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 (i)) were used in the production of this report:

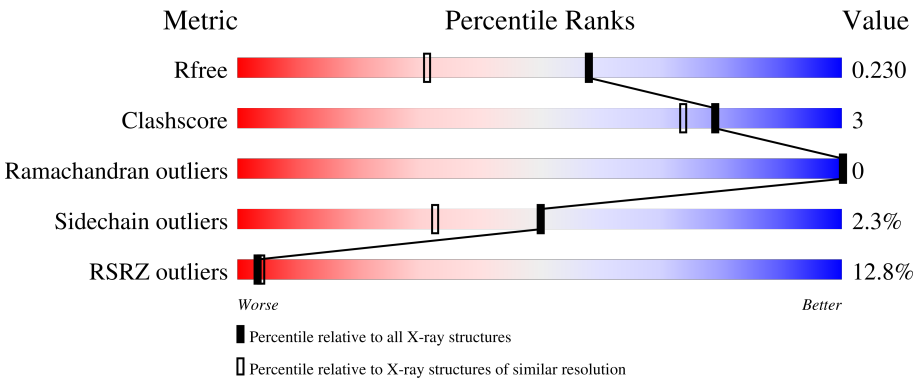
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.35.1
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh &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

1 Overall quality at a glance (i)

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

The reported resolution of this entry is 1.70 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	4298 (1.70-1.70)
Clashscore	141614	4695 (1.70-1.70)
Ramachandran outliers	138981	4610 (1.70-1.70)
Sidechain outliers	138945	4610 (1.70-1.70)
RSRZ outliers	127900	4222 (1.70-1.70)

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	422	18% 86% 9% •
1	B	422	7% 91% 7% •

2 Entry composition (i)

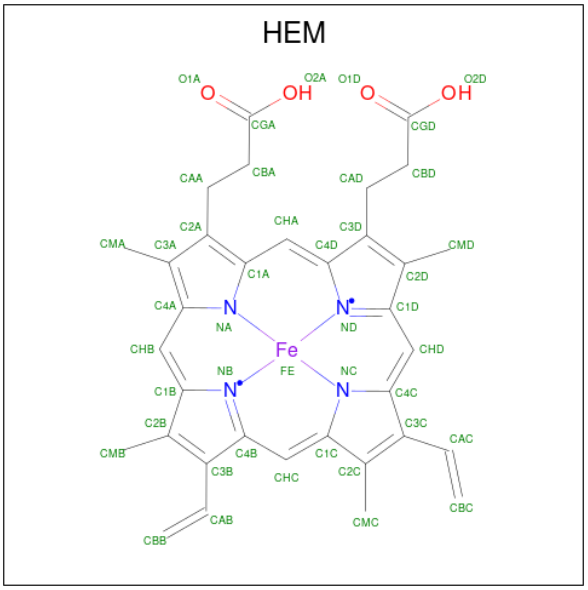
There are 7 unique types of molecules in this entry. The entry contains 7265 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 Nitric oxide synthase, brain.

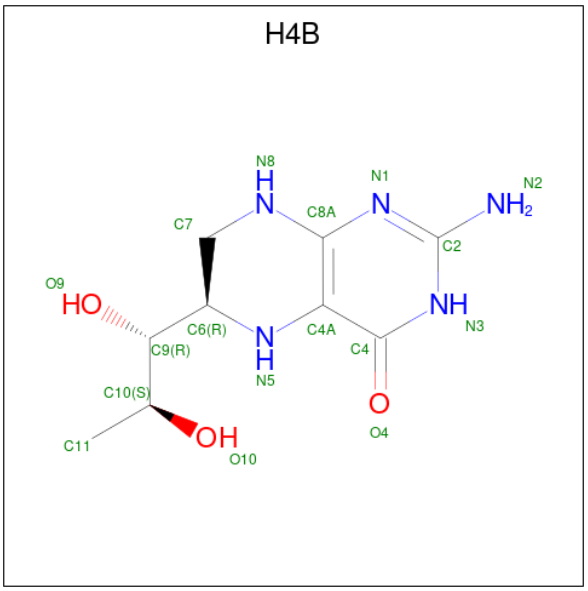
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	407	3326	2130	566	608	22	0	4	0
1	B	411	3365	2156	574	614	21	0	4	0

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



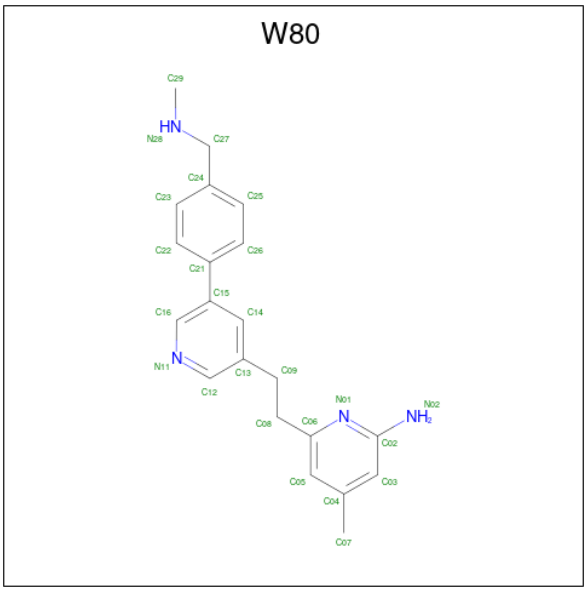
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	Fe	N	O		
2	A	1	43	34	1	4	4	0	0
2	B	1	43	34	1	4	4	0	0

- Molecule 3 is 5,6,7,8-TETRAHYDROBIOPTERIN (three-letter code: H4B) (formula: $C_9H_{15}N_5O_3$).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	N	O		
3	A	1	17	9	5	3	0	0
			Total	C	N	O		
3	B	1	17	9	5	3	0	0

- Molecule 4 is 4-methyl-6-[2-(5-{4-[(methylamino)methyl]phenyl}pyridin-3-yl)ethyl]pyridin-2-amine (three-letter code: W80) (formula: $C_{21}H_{24}N_4$).



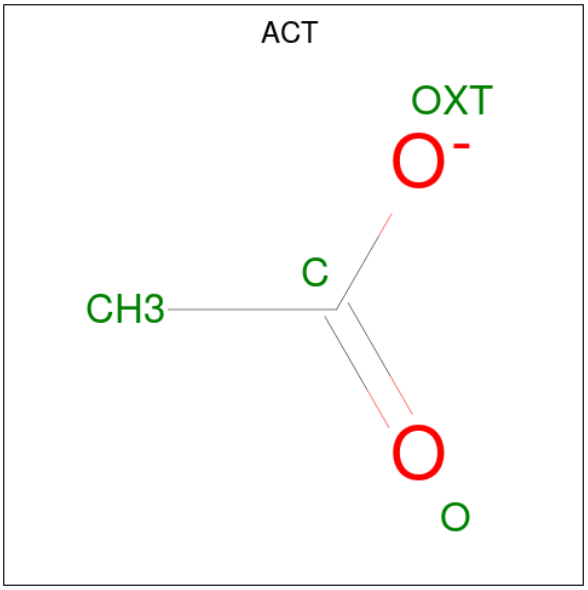
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
			Total	C	N		
4	A	1	25	21	4	0	0

Continued on next page...

Continued from previous page...

Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
			Total	C	N		
4	B	1	25	21	4	0	0

- Molecule 5 is ACETATE ION (three-letter code: ACT) (formula: $C_2H_3O_2$).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
			Total	C	O		
5	A	1	4	2	2	0	0
5	B	1	Total	C	O	0	0
			4	2	2		

- Molecule 6 is ZINC ION (three-letter code: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	Zn		
6	A	1	1	1	0	0

- Molecule 7 is water.

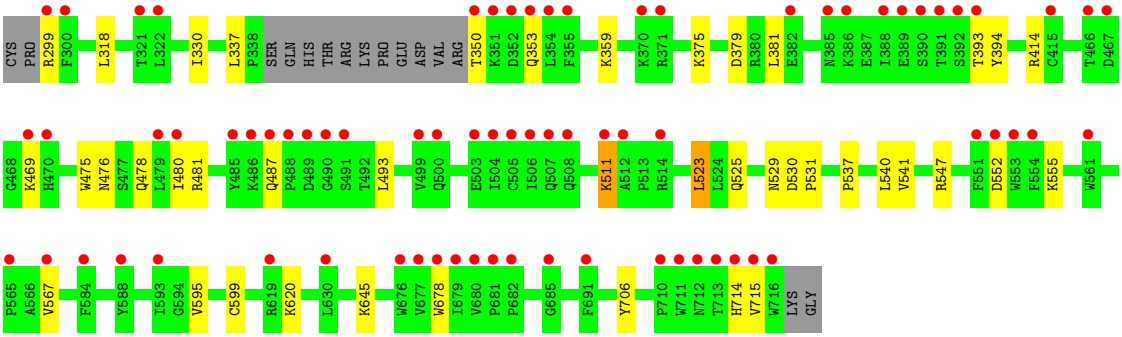
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	O		
7	A	163	163	163	0	0
7	B	232	Total	O	0	0
			232	232		

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.

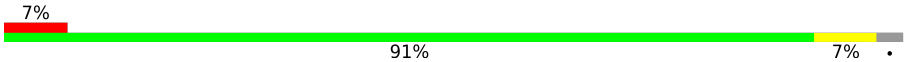
• Molecule 1: Nitric oxide synthase, brain

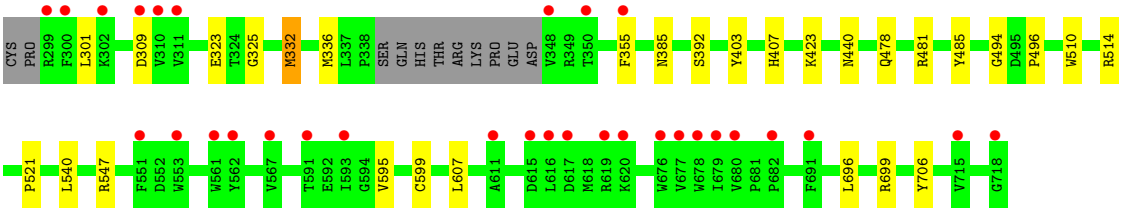
Chain A:



• Molecule 1: Nitric oxide synthase, brain

Chain B:





4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α, β, γ	51.91Å 111.07Å 164.02Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	38.96 – 1.70 38.96 – 1.70	Depositor EDS
% Data completeness (in resolution range)	96.0 (38.96-1.70) 96.6 (38.96-1.70)	Depositor EDS
R_{merge}	0.08	Depositor
R_{sym}	0.08	Depositor
$< I/\sigma(I) >$ [1]	1.25 (at 1.70Å)	Xtriage
Refinement program	PHENIX 1.9_1692	Depositor
R, R_{free}	0.194 , 0.229 0.194 , 0.230	Depositor DCC
R_{free} test set	5065 reflections (4.97%)	wwPDB-VP
Wilson B-factor (Å^2)	30.5	Xtriage
Anisotropy	0.599	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.35 , 52.3	EDS
L-test for twinning[2]	$< \|L\| > = 0.48$, $< L^2 > = 0.31$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.97	EDS
Total number of atoms	7265	wwPDB-VP
Average B, all atoms (Å^2)	55.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.54% 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 (i)

5.1 Standard geometry (i)

Bond lengths and bond angles in the following residue types are not validated in this section: H4B, W80, ACT, HEM, ZN

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	0.35	0/3428	0.49	0/4652
1	B	0.36	0/3471	0.50	0/4706
All	All	0.36	0/6899	0.49	0/9358

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 (i)

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	3326	0	3239	20	0
1	B	3365	0	3284	16	0
2	A	43	0	30	3	0
2	B	43	0	30	3	0
3	A	17	0	15	0	0
3	B	17	0	15	0	0
4	A	25	0	0	1	0
4	B	25	0	0	0	0
5	A	4	0	3	0	0
5	B	4	0	3	0	0
6	A	1	0	0	0	0

Continued on next page...

Continued from previous page...

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
7	A	163	0	0	0	0
7	B	232	0	0	1	0
All	All	7265	0	6619	38	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 3.

All (38) 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:A:523:LEU:HD22	1:A:531:PRO:HB2	1.65	0.77
2:B:801:HEM:HBB2	2:B:801:HEM:HHC	1.69	0.73
2:A:801:HEM:HBB2	2:A:801:HEM:HHC	1.76	0.68
2:B:801:HEM:HMC2	2:B:801:HEM:HBC2	1.76	0.68
1:A:487:GLN:HE21	1:A:493:LEU:HB2	1.59	0.66
1:A:478:GLN:HB2	1:A:481:ARG:HG3	1.80	0.63
2:A:801:HEM:HMC2	2:A:801:HEM:HBC2	1.79	0.62
1:B:478:GLN:HB2	1:B:481:ARG:HG3	1.82	0.60
1:B:706:TYR:OH	2:B:801:HEM:O1D	2.17	0.55
1:A:330:ILE:HD11	1:B:696:LEU:HB3	1.91	0.53
1:A:475:TRP:HB2	1:A:523:LEU:HB3	1.90	0.53
1:B:595:VAL:O	1:B:599:CYS:HB2	2.11	0.51
1:A:706:TYR:OH	2:A:801:HEM:O1D	2.19	0.50
1:A:299:ARG:HG3	1:A:318:LEU:HD21	1.94	0.49
1:A:530:ASP:HA	1:A:714:HIS:HE2	1.78	0.49
1:A:567:VAL:HG22	4:A:803:W80:C12	2.42	0.49
1:B:494:GLY:O	1:B:496:PRO:HD3	2.14	0.47
1:B:403:TYR:CE1	1:B:407:HIS:CE1	3.02	0.47
1:A:393:THR:OG1	1:A:394:TYR:N	2.46	0.46
1:A:525:GLN:HG3	1:A:529:ASN:O	2.16	0.45
1:A:375:LYS:NZ	1:A:379:ASP:OD1	2.51	0.44
1:B:325:GLY:O	1:B:332:MET:HG3	2.19	0.43
1:B:485:TYR:CE1	1:B:514:ARG:HA	2.54	0.42
1:A:537:PRO:HB2	1:A:540:LEU:HG	2.01	0.42
1:A:330:ILE:HD11	1:B:696:LEU:HD22	2.01	0.42
1:B:355[A]:PHE:CE1	1:B:385:ASN:HB2	2.55	0.42
1:B:510:TRP:CE2	1:B:521:PRO:HD3	2.54	0.42
1:A:414:ARG:HD3	1:A:678:TRP:CD2	2.55	0.42
1:B:301:LEU:HD23	1:B:301:LEU:HA	1.91	0.42
1:A:359:LYS:HE2	1:A:381:LEU:HD21	2.00	0.42
1:A:511:LYS:HE2	1:A:511:LYS:C	2.40	0.41

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:350:THR:N	1:A:353:GLN:OE1	2.53	0.41
1:B:440:ASN:ND2	7:B:919:HOH:O	2.53	0.41
1:A:595:VAL:O	1:A:599:CYS:HB2	2.21	0.41
1:B:323:GLU:O	1:B:699:ARG:HD3	2.21	0.41
1:B:336:MET:HE2	1:B:336:MET:HB2	2.00	0.41
1:A:480:ILE:HD13	1:A:541:VAL:HG13	2.03	0.41
1:B:607:LEU:HD23	1:B:607:LEU:HA	1.96	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	406/422 (96%)	395 (97%)	11 (3%)	0	100	100
1	B	411/422 (97%)	406 (99%)	5 (1%)	0	100	100
All	All	817/844 (97%)	801 (98%)	16 (2%)	0	100	100

There are no Ramachandran outliers to report.

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	366/377 (97%)	355 (97%)	11 (3%)	41	22

Continued on next page...

Continued from previous page...

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	B	370/377 (98%)	364 (98%)	6 (2%)	62	48
All	All	736/754 (98%)	719 (98%)	17 (2%)	50	33

All (17) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	337	LEU
1	A	469	LYS
1	A	476	ASN
1	A	511	LYS
1	A	523	LEU
1	A	547	ARG
1	A	552	ASP
1	A	555	LYS
1	A	620	LYS
1	A	645	LYS
1	A	715	VAL
1	B	309	ASP
1	B	332	MET
1	B	392	SER
1	B	423	LYS
1	B	540	LEU
1	B	547	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (1) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	487	GLN

5.3.3 RNA (i)

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains (i)

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

5.5 Carbohydrates (i)

There are no monosaccharides in this entry.

5.6 Ligand geometry (i)

Of 9 ligands modelled in this entry, 1 is monoatomic - leaving 8 for Mogul analysis.

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	$\#\|Z\| > 2$
4	W80	A	803	-	27,27,27	0.54	0	35,36,36	2.30	12 (34%)
2	HEM	B	801	1	41,50,50	1.86	6 (14%)	45,82,82	1.85	10 (22%)
3	H4B	B	802	-	16,18,18	0.93	0	11,26,26	2.53	5 (45%)
3	H4B	A	802	-	16,18,18	0.78	0	11,26,26	2.54	6 (54%)
4	W80	B	803	-	27,27,27	0.46	0	35,36,36	1.95	10 (28%)
2	HEM	A	801	1	41,50,50	1.90	7 (17%)	45,82,82	1.84	8 (17%)
5	ACT	A	804	-	3,3,3	0.76	0	3,3,3	0.73	0
5	ACT	B	804	-	3,3,3	0.78	0	3,3,3	0.64	0

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
4	W80	A	803	-	-	6/11/12/12	0/3/3/3
2	HEM	B	801	1	-	3/12/54/54	-
3	H4B	B	802	-	-	0/8/17/17	0/2/2/2
3	H4B	A	802	-	-	0/8/17/17	0/2/2/2
4	W80	B	803	-	-	4/11/12/12	0/3/3/3
2	HEM	A	801	1	-	3/12/54/54	-

All (13) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	801	HEM	C3D-C2D	7.42	1.52	1.36
2	B	801	HEM	C3D-C2D	7.28	1.52	1.36
2	B	801	HEM	C3C-C2C	-3.86	1.35	1.40
2	B	801	HEM	C3C-CAC	3.79	1.55	1.47
2	A	801	HEM	C3C-CAC	3.76	1.55	1.47
2	A	801	HEM	C3C-C2C	-3.64	1.35	1.40
2	B	801	HEM	CAB-C3B	2.91	1.55	1.47
2	A	801	HEM	CAB-C3B	2.90	1.55	1.47
2	A	801	HEM	FE-NB	2.72	2.10	1.96
2	A	801	HEM	CMD-C2D	2.22	1.55	1.50
2	B	801	HEM	CMB-C2B	2.12	1.55	1.50
2	B	801	HEM	CMD-C2D	2.12	1.55	1.50
2	A	801	HEM	CMB-C2B	2.04	1.55	1.50

All (51) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
4	A	803	W80	C02-N01-C06	8.00	124.16	118.10
2	B	801	HEM	CBA-CAA-C2A	-5.78	102.76	112.62
4	B	803	W80	C02-N01-C06	5.71	122.43	118.10
3	A	802	H4B	C8A-C4A-C4	5.52	119.47	114.57
3	B	802	H4B	C8A-C4A-C4	5.47	119.43	114.57
4	A	803	W80	C05-C06-N01	-5.32	117.26	122.90
2	B	801	HEM	C4D-ND-C1D	5.22	110.46	105.07
2	A	801	HEM	C4D-ND-C1D	5.17	110.41	105.07
2	A	801	HEM	CBD-CAD-C3D	-4.42	100.33	112.63
4	A	803	W80	C16-C15-C21	-4.00	114.73	121.69
2	B	801	HEM	C4B-CHC-C1C	3.93	127.75	122.56
4	B	803	W80	C05-C06-N01	-3.92	118.74	122.90
2	A	801	HEM	C4B-CHC-C1C	3.62	127.34	122.56
2	A	801	HEM	CBA-CAA-C2A	-3.47	106.69	112.62
2	A	801	HEM	CMD-C2D-C1D	3.33	130.11	125.04
4	B	803	W80	C16-C15-C21	-3.32	115.91	121.69
4	B	803	W80	C09-C13-C12	-3.24	116.61	121.83
3	B	802	H4B	N1-C2-N3	-3.23	120.35	125.42
4	A	803	W80	C14-C15-C16	3.15	120.23	117.11
3	B	802	H4B	C2-N3-C4	3.12	120.88	115.93
4	A	803	W80	C09-C13-C14	3.05	125.55	120.54
3	A	802	H4B	N1-C2-N3	-3.04	120.66	125.42
3	A	802	H4B	C2-N1-C8A	2.89	121.01	114.54
4	B	803	W80	C14-C15-C16	2.88	119.97	117.11
4	A	803	W80	C09-C13-C12	-2.86	117.22	121.83
2	B	801	HEM	CHD-C1D-ND	2.83	127.51	124.43

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	B	801	HEM	CAD-C3D-C4D	2.78	129.52	124.66
3	A	802	H4B	C2-N3-C4	2.77	120.33	115.93
4	B	803	W80	C08-C06-N01	2.74	120.03	115.95
3	B	802	H4B	C2-N1-C8A	2.69	120.57	114.54
4	A	803	W80	C08-C06-C05	2.65	124.73	121.22
4	B	803	W80	C09-C13-C14	2.61	124.82	120.54
2	A	801	HEM	C4C-CHD-C1D	2.59	125.98	122.56
2	A	801	HEM	CMC-C2C-C3C	2.55	129.44	124.68
4	A	803	W80	C14-C15-C21	2.51	125.02	120.86
4	B	803	W80	C15-C14-C13	-2.45	117.85	121.19
4	B	803	W80	C22-C21-C15	-2.45	117.12	121.36
2	B	801	HEM	CMC-C2C-C3C	2.39	129.16	124.68
4	B	803	W80	N02-C02-N01	2.35	120.21	116.49
3	A	802	H4B	C4-C4A-N5	2.30	121.05	119.12
2	B	801	HEM	CMD-C2D-C1D	2.21	128.40	125.04
4	A	803	W80	C15-C14-C13	-2.19	118.20	121.19
3	B	802	H4B	N2-C2-N1	2.16	120.61	117.25
2	B	801	HEM	CBD-CAD-C3D	-2.16	106.62	112.63
4	A	803	W80	C22-C21-C15	-2.14	117.64	121.36
3	A	802	H4B	N2-C2-N3	2.14	120.58	117.25
2	B	801	HEM	C4C-CHD-C1D	2.13	125.37	122.56
2	B	801	HEM	CMA-C3A-C4A	-2.12	125.20	128.46
2	A	801	HEM	C1D-C2D-C3D	-2.05	104.80	106.96
4	A	803	W80	N02-C02-N01	2.04	119.72	116.49
4	A	803	W80	C09-C08-C06	2.01	117.50	112.99

There are no chirality outliers.

All (16) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	A	803	W80	C16-C15-C21-C26
4	A	803	W80	C16-C15-C21-C22
4	A	803	W80	C14-C15-C21-C26
4	A	803	W80	C14-C15-C21-C22
2	A	801	HEM	C2A-CAA-CBA-CGA
2	A	801	HEM	C4B-C3B-CAB-CBB
2	B	801	HEM	C4B-C3B-CAB-CBB
4	B	803	W80	C05-C06-C08-C09
2	A	801	HEM	C1A-C2A-CAA-CBA
4	A	803	W80	C05-C06-C08-C09
4	A	803	W80	N01-C06-C08-C09
4	B	803	W80	N01-C06-C08-C09

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms
4	B	803	W80	C08-C09-C13-C14
2	B	801	HEM	CAA-CBA-CGA-O2A
4	B	803	W80	C08-C09-C13-C12
2	B	801	HEM	CAA-CBA-CGA-O1A

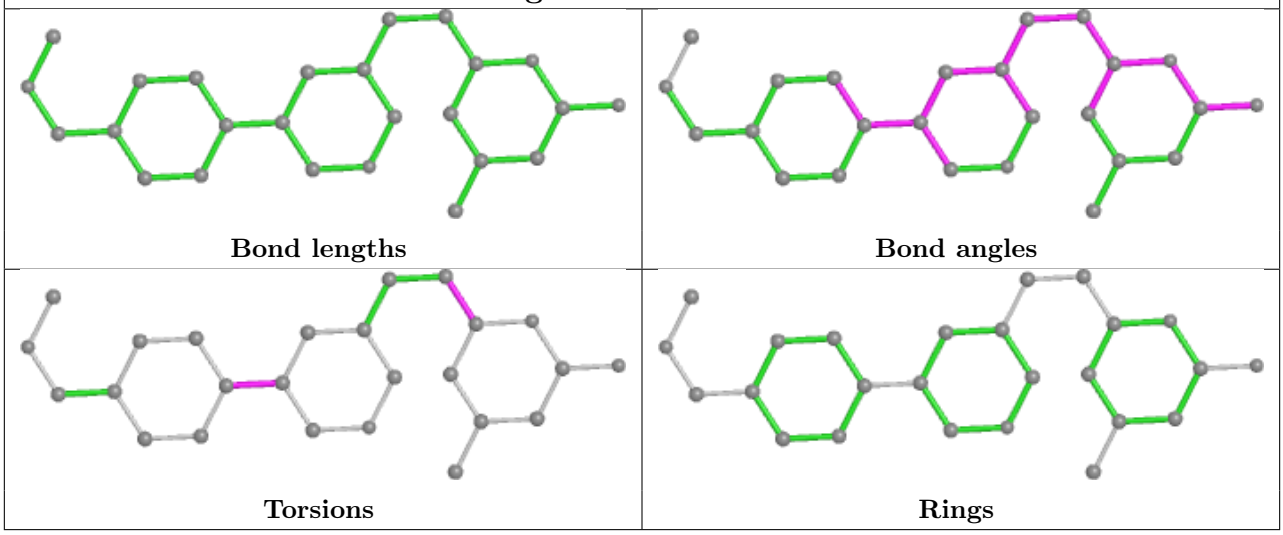
There are no ring outliers.

3 monomers are involved in 7 short contacts:

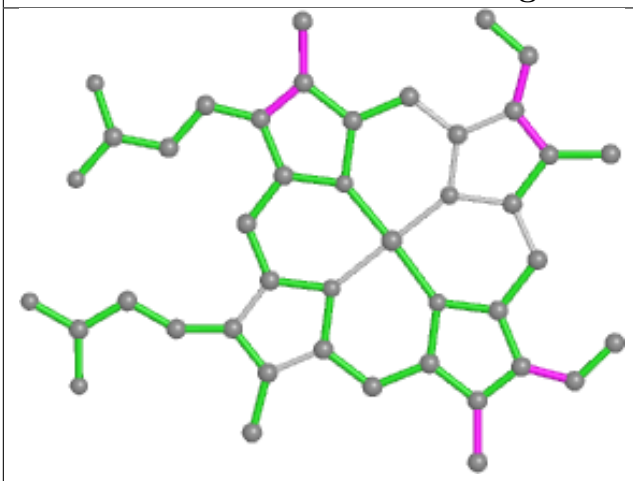
Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	A	803	W80	1	0
2	B	801	HEM	3	0
2	A	801	HEM	3	0

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.

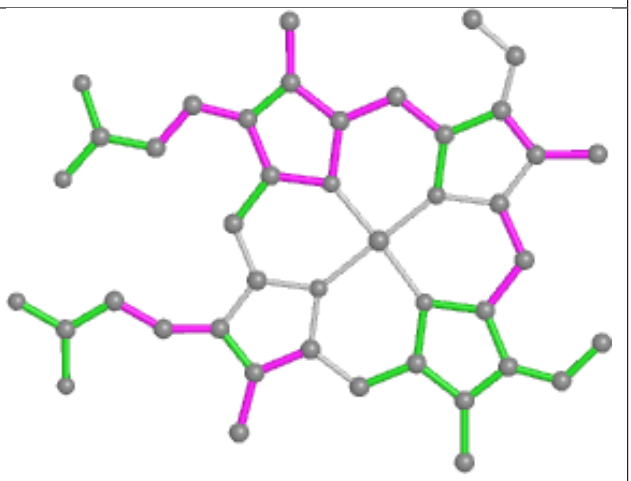
Ligand W80 A 803



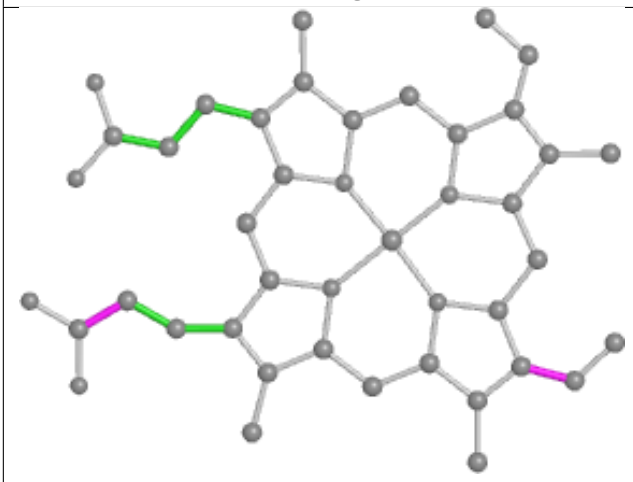
Ligand HEM B 801



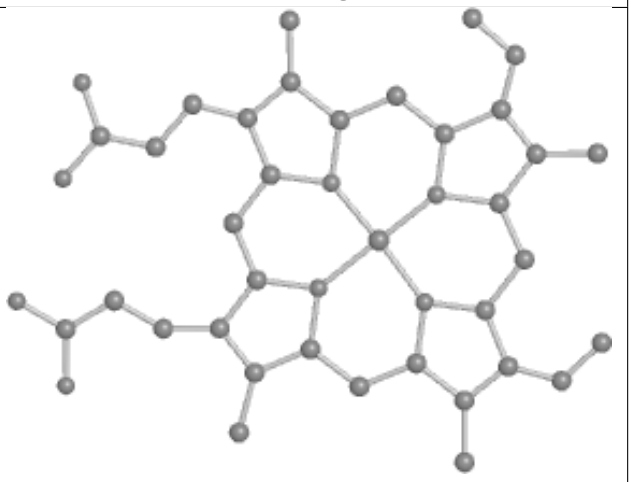
Bond lengths



Bond angles

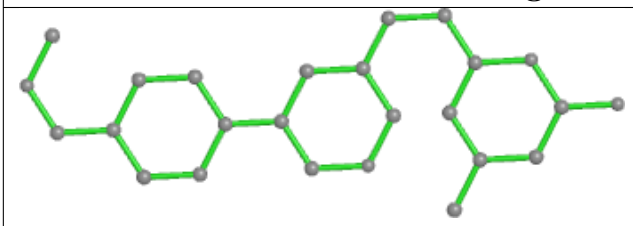


Torsions

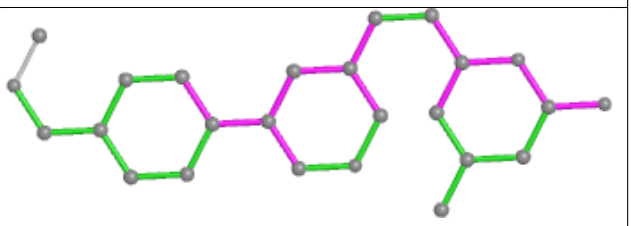


Rings

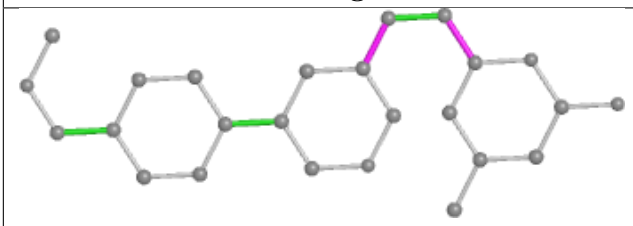
Ligand W80 B 803



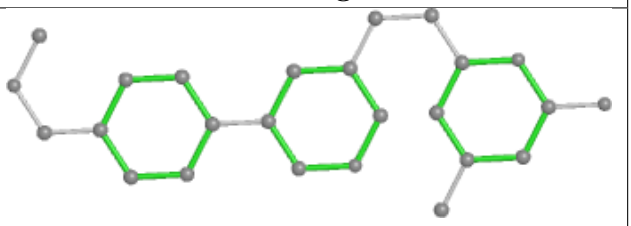
Bond lengths



Bond angles

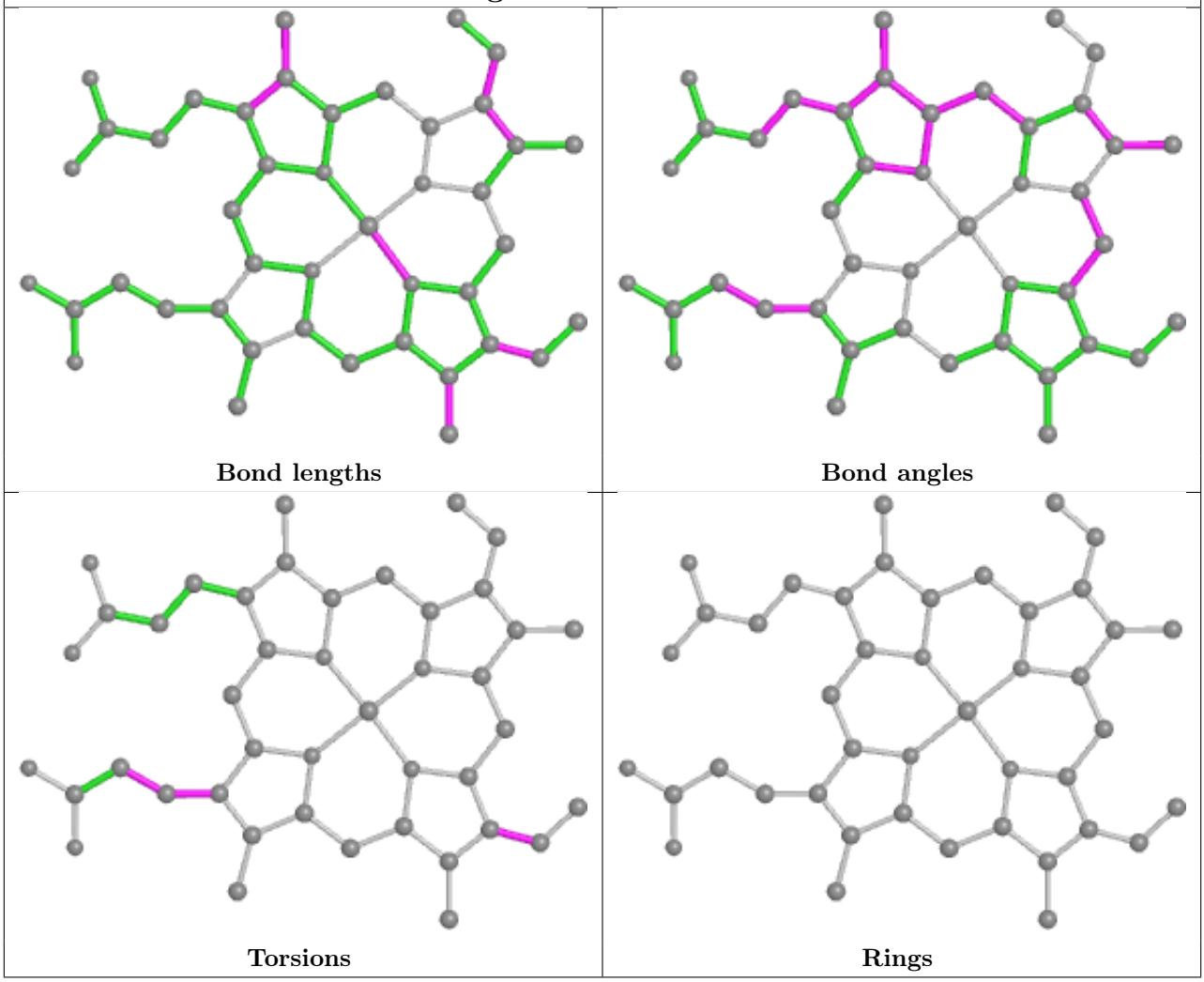


Torsions



Rings

Ligand HEM A 801



5.7 Other polymers (i)

There are no such residues in this entry.

5.8 Polymer linkage issues (i)

There are no chain breaks in this entry.

6 Fit of model and data (i)

6.1 Protein, DNA and RNA chains (i)

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	407/422 (96%)	0.98	74 (18%) 1 1	29, 59, 104, 149	0
1	B	411/422 (97%)	0.32	31 (7%) 14 16	29, 46, 76, 103	0
All	All	818/844 (96%)	0.65	105 (12%) 3 4	29, 51, 97, 149	0

All (105) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	715	VAL	11.0
1	A	488	PRO	8.4
1	A	716	TRP	8.4
1	B	348	VAL	8.1
1	B	300	PHE	7.3
1	A	355	PHE	7.3
1	B	350	THR	6.6
1	A	300	PHE	5.6
1	A	507	GLN	5.2
1	B	616	LEU	5.1
1	A	388	ILE	5.0
1	A	714	HIS	5.0
1	A	486	LYS	4.9
1	A	713	THR	4.7
1	A	489	ASP	4.6
1	B	677	VAL	4.5
1	A	551	PHE	4.5
1	A	351	LYS	4.5
1	A	503	GLU	4.4
1	A	490	GLY	4.4
1	A	678	TRP	4.4
1	A	352	ASP	4.3
1	A	619	ARG	4.3
1	A	508	GLN	4.3

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
1	A	392	SER	4.2
1	A	391	THR	4.2
1	A	677	VAL	4.2
1	B	611	ALA	4.1
1	A	487	GLN	4.1
1	A	322	LEU	4.0
1	B	619	ARG	3.9
1	A	679	ILE	3.8
1	A	389	GLU	3.8
1	A	676	TRP	3.7
1	A	711	TRP	3.6
1	B	718	GLY	3.6
1	A	479	LEU	3.6
1	A	680	VAL	3.6
1	A	504	ILE	3.6
1	A	491	SER	3.6
1	A	321	THR	3.5
1	A	506	ILE	3.5
1	A	712	ASN	3.5
1	A	386	LYS	3.3
1	B	680	VAL	3.3
1	A	505	CYS	3.3
1	B	310	VAL	3.2
1	A	390	SER	3.2
1	A	480	ILE	3.2
1	A	567	VAL	3.2
1	B	676	TRP	3.1
1	A	385	ASN	3.1
1	A	350	THR	3.1
1	B	691	PHE	3.1
1	A	467	ASP	3.1
1	B	678	TRP	3.1
1	A	593	ILE	3.0
1	A	469	LYS	3.0
1	A	354	LEU	2.9
1	A	514	ARG	2.9
1	B	679	ILE	2.9
1	A	485	TYR	2.9
1	B	620	LYS	2.8
1	A	681	PRO	2.8
1	A	554	PHE	2.8
1	B	617	ASP	2.8

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
1	B	299	ARG	2.8
1	A	710	PRO	2.7
1	A	393	THR	2.7
1	A	588	TYR	2.7
1	A	511	LYS	2.7
1	A	299	ARG	2.7
1	B	561	TRP	2.7
1	A	691	PHE	2.7
1	A	466	THR	2.6
1	B	553	TRP	2.6
1	A	470	HIS	2.6
1	A	500	GLN	2.6
1	A	553	TRP	2.6
1	B	355[A]	PHE	2.6
1	A	584	PHE	2.6
1	B	682	PRO	2.6
1	A	370	LYS	2.5
1	B	615	ASP	2.4
1	A	512	ALA	2.3
1	A	415	CYS	2.3
1	B	562	TYR	2.3
1	B	302	LYS	2.3
1	A	565	PRO	2.3
1	B	551	PHE	2.2
1	A	682	PRO	2.2
1	A	499	VAL	2.2
1	B	311	VAL	2.2
1	B	715	VAL	2.2
1	A	685	GLY	2.2
1	A	371	ARG	2.2
1	A	552	ASP	2.2
1	A	353	GLN	2.1
1	A	561	TRP	2.1
1	A	630	LEU	2.1
1	B	593	ILE	2.1
1	B	591	THR	2.0
1	B	309	ASP	2.0
1	A	382	GLU	2.0
1	B	567	VAL	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)

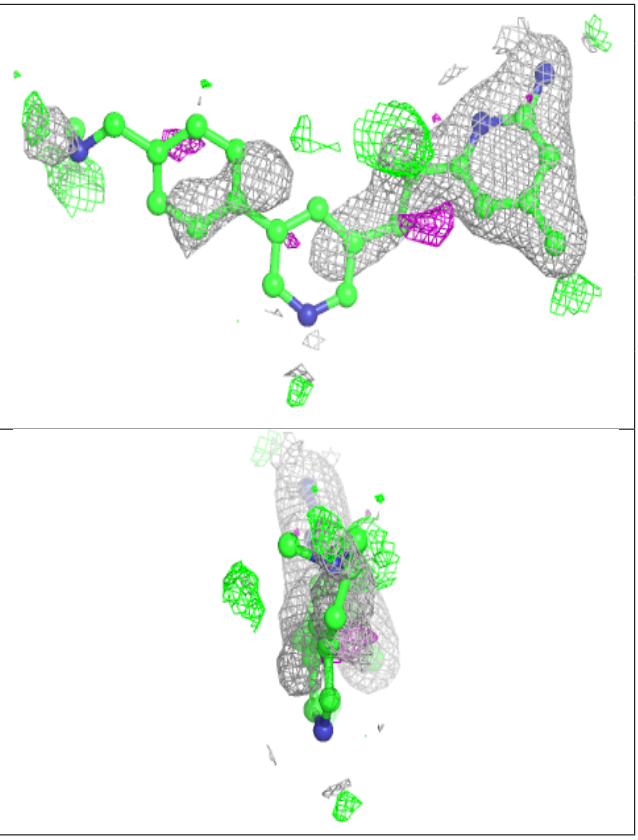
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
3	H4B	A	802	17/17	0.91	0.14	37,48,53,53	0
4	W80	B	803	25/25	0.91	0.32	35,117,127,129	0
4	W80	A	803	25/25	0.92	0.36	31,114,130,134	0
3	H4B	B	802	17/17	0.94	0.12	34,43,48,50	0
5	ACT	A	804	4/4	0.95	0.14	73,75,78,80	0
2	HEM	B	801	43/43	0.97	0.15	27,37,64,69	0
5	ACT	B	804	4/4	0.97	0.09	57,71,72,75	0
2	HEM	A	801	43/43	0.98	0.18	29,38,65,74	0
6	ZN	A	805	1/1	1.00	0.06	37,37,37,37	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.

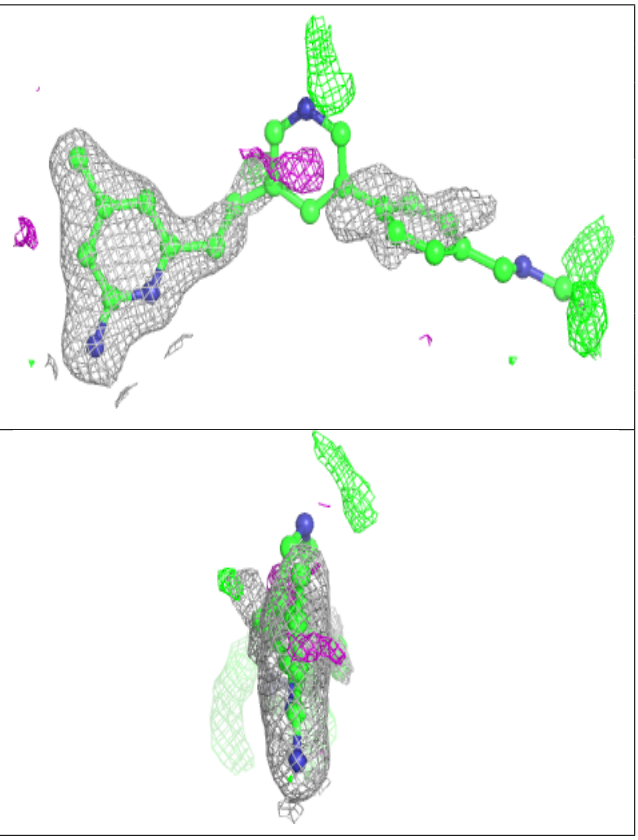
Electron density around W80 B 803:

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



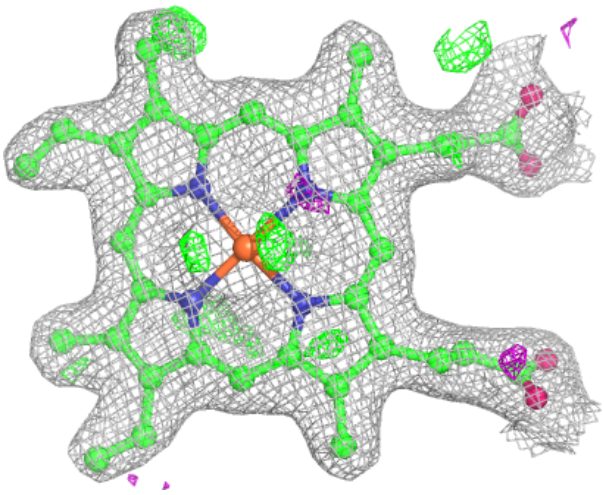
Electron density around W80 A 803:

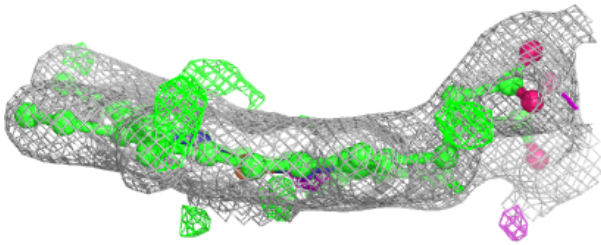
$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)

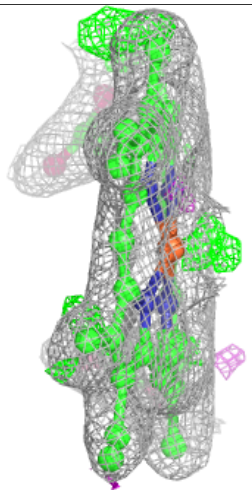


Electron density around HEM B 801:

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

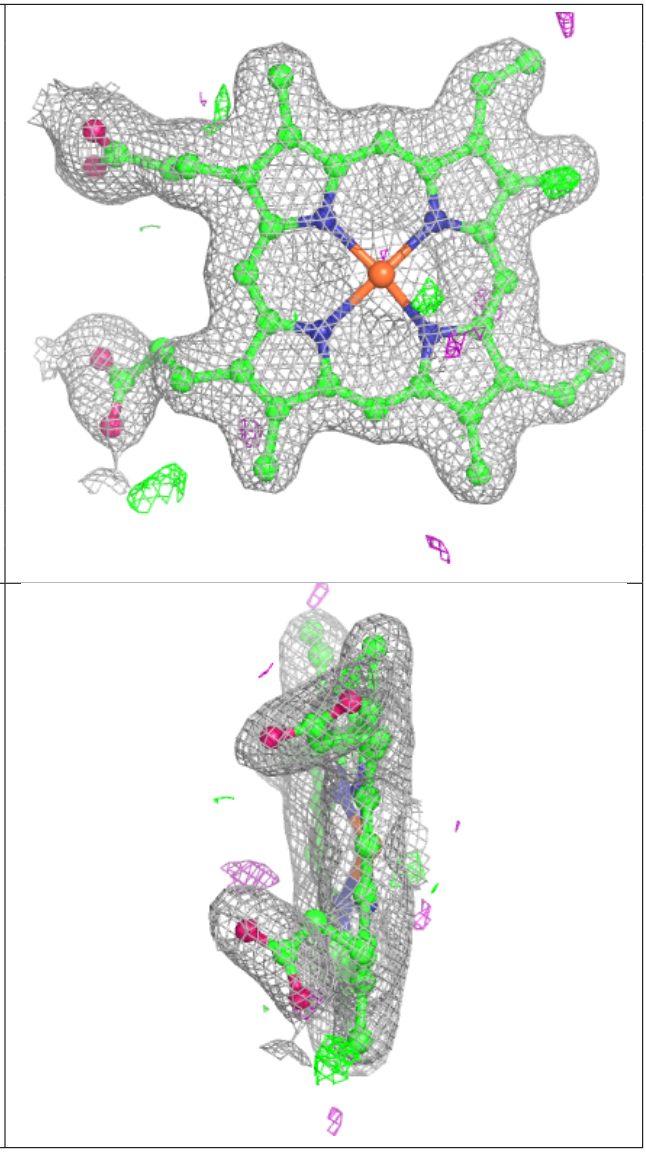






Electron density around HEM A 801:

$2mF_o$-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.