wwPDB X-ray Structure Validation Summary Report (i)

Sep 2, 2025 – 01:08 PM EDT

PDB ID	:	9Q4Y / pdb_00009q4y
Title	:	Structure of human endothelial nitric oxide synthase heme domain bound with 6-((2,3-difluoro-5-(2-(methylamino)ethyl)phenoxy)methyl)-4-methylpyridin-2-amine
Authors	:	Li, H.; Poulos, T.L.
Deposited on	:	2025-08-20
Resolution	:	2.10 Å(reported)

This is a wwPDB X-ray Structure Validation Summary 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:

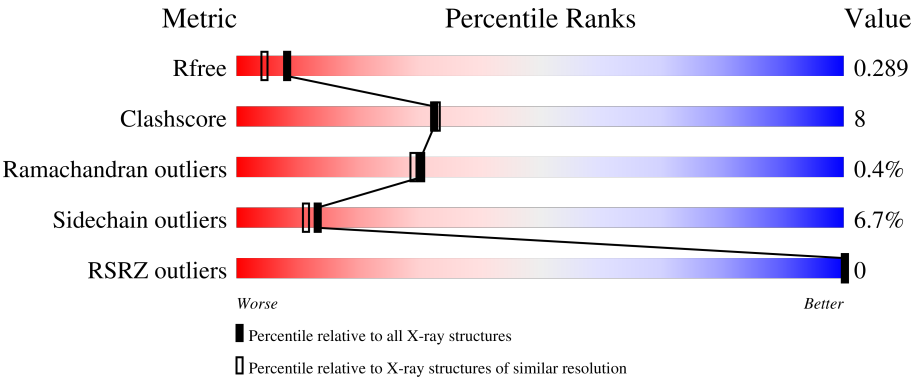
MolProbity	:	4-5-2 with Phenix2.0rc1
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	2.0rc1
EDS	:	3.0
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4	:	9.0.006 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.45.1

1 Overall quality at a glance (i)

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

The reported resolution of this entry is 2.10 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}	164625	6234 (2.10-2.10)
Clashscore	180529	6893 (2.10-2.10)
Ramachandran outliers	177936	6839 (2.10-2.10)
Sidechain outliers	177891	6840 (2.10-2.10)
RSRZ outliers	164620	6234 (2.10-2.10)

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	440	70% 18% • 9%
1	B	440	78% 12% • 9%
1	C	440	70% 18% • 9%
1	D	440	72% 18% • 8%

2 Entry composition (i)

There are 11 unique types of molecules in this entry. The entry contains 13509 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.

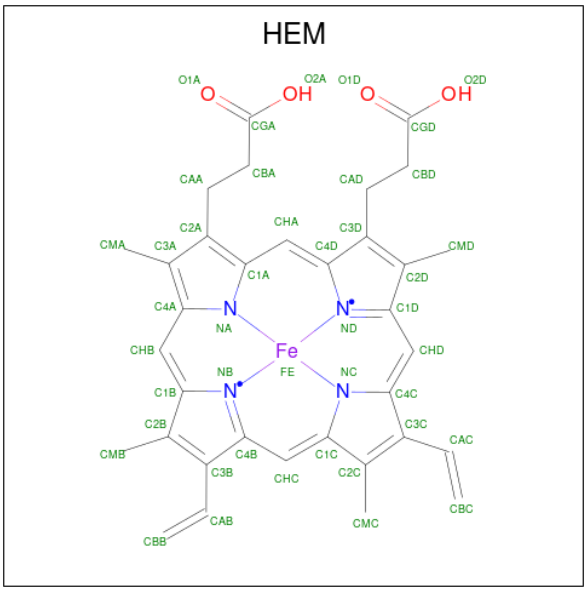
- Molecule 1 is a protein called Nitric oxide synthase 3.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	401	Total	C	N	O	S	0	1	0
			3211	2044	567	584	16			
1	B	402	Total	C	N	O	S	0	3	0
			3220	2051	566	587	16			
1	C	400	Total	C	N	O	S	0	1	0
			3200	2038	563	583	16			
1	D	403	Total	C	N	O	S	0	1	0
			3223	2052	569	586	16			

There are 4 discrepancies between the modelled and reference sequences:

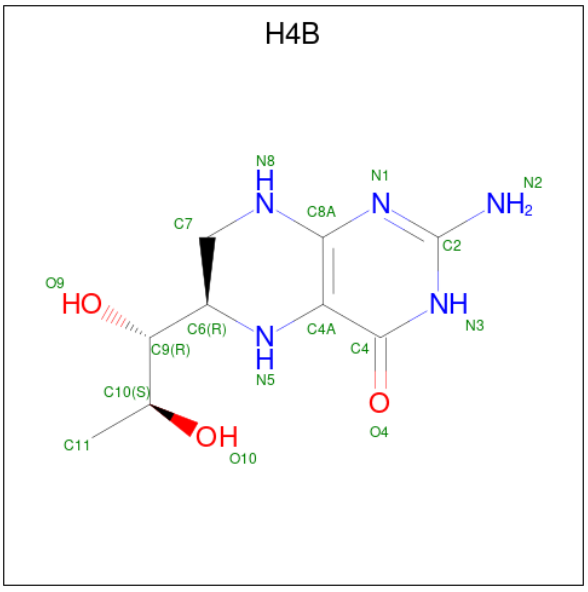
Chain	Residue	Modelled	Actual	Comment	Reference
A	298	GLU	ASP	conflict	UNP P29474
B	298	GLU	ASP	conflict	UNP P29474
C	298	GLU	ASP	conflict	UNP P29474
D	298	GLU	ASP	conflict	UNP P29474

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



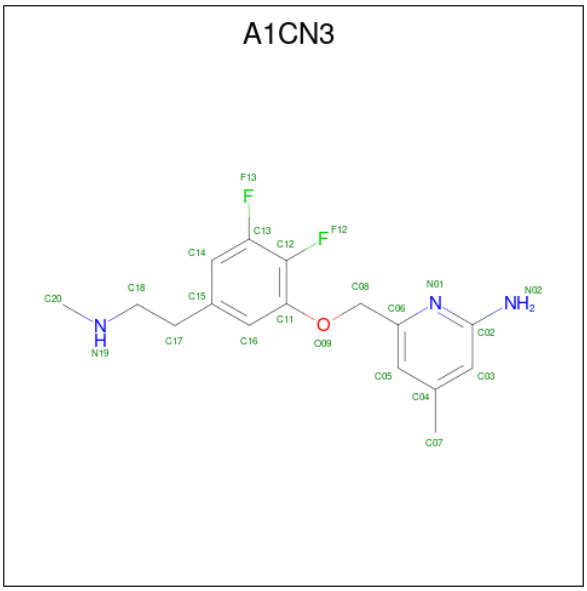
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	A	1	Total	C	Fe	N	O	0	0
			43	34	1	4	4		
2	B	1	Total	C	Fe	N	O	0	0
			43	34	1	4	4		
2	C	1	Total	C	Fe	N	O	0	0
			43	34	1	4	4		
2	D	1	Total	C	Fe	N	O	0	0
			43	34	1	4	4		

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



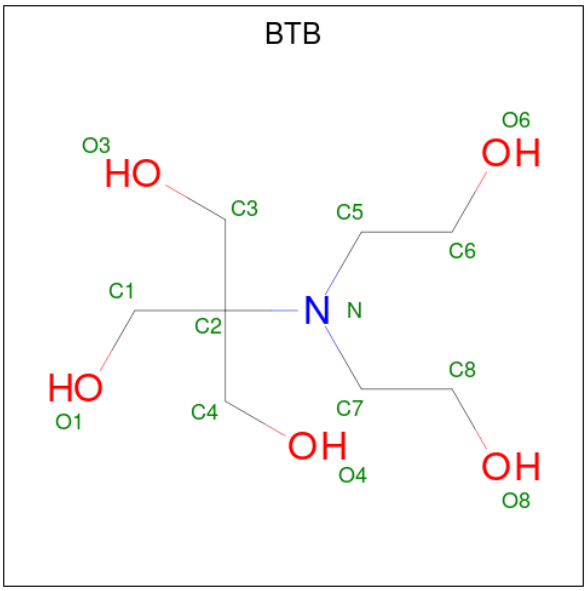
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
3	A	1	Total	C	N	O	0	0
			17	9	5	3		
3	B	1	Total	C	N	O	0	0
			17	9	5	3		
3	C	1	Total	C	N	O	0	0
			17	9	5	3		
3	D	1	Total	C	N	O	0	0
			17	9	5	3		

- Molecule 4 is 6-({2,3-difluoro-5-[2-(methylamino)ethyl]phenoxy}methyl)-4-methylpyridin-2-amine (CCD ID: A1CN3) (formula: $C_{16}H_{19}F_2N_3O$) (labeled as "Ligand of Interest" by depositor).



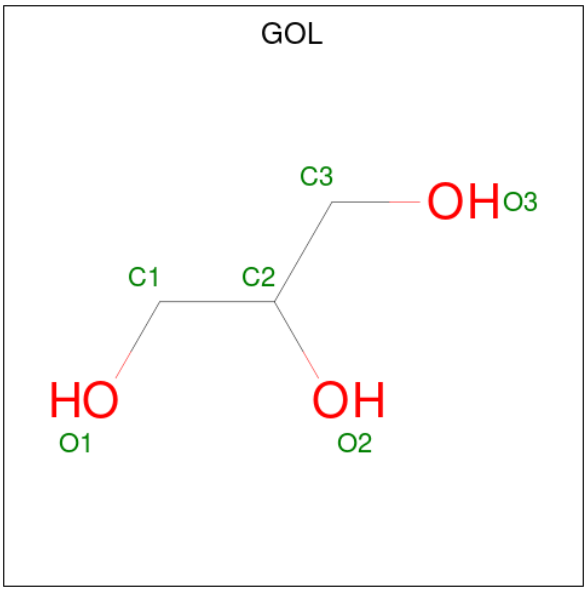
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
4	A	1	Total	C	F	N	O	0	0
			22	16	2	3	1		
4	B	1	Total	C	F	N	O	0	0
			22	16	2	3	1		
4	C	1	Total	C	F	N	O	0	0
			22	16	2	3	1		
4	D	1	Total	C	F	N	O	0	0
			22	16	2	3	1		

- Molecule 5 is 2-[BIS-(2-HYDROXY-ETHYL)-AMINO]-2-HYDROXYMETHYL-PROPANE-1,3-DIOL (CCD ID: BTB) (formula: $C_8H_{19}NO_5$).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	A	1	Total C N O 14 8 1 5	0	0
5	A	1	Total C N O 14 8 1 5	0	0
5	B	1	Total C N O 14 8 1 5	0	0
5	B	1	Total C N O 14 8 1 5	0	0
5	C	1	Total C N O 14 8 1 5	0	0
5	C	1	Total C N O 14 8 1 5	0	0
5	D	1	Total C N O 14 8 1 5	0	0
5	D	1	Total C N O 14 8 1 5	0	0

- Molecule 6 is GLYCEROL (CCD ID: GOL) (formula: $C_3H_8O_3$).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
6	A	1	Total C O 6 3 3	0	0
6	A	1	Total C O 6 3 3	0	0
6	B	1	Total C O 6 3 3	0	0
6	C	1	Total C O 6 3 3	0	0
6	C	1	Total C O 6 3 3	0	0
6	D	1	Total C O 6 3 3	0	0
6	D	1	Total C O 6 3 3	0	0

- Molecule 7 is CHLORIDE ION (CCD ID: CL) (formula: Cl).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
7	A	1	Total Cl 1 1	0	0
7	B	1	Total Cl 1 1	0	0
7	C	1	Total Cl 1 1	0	0
7	D	1	Total Cl 1 1	0	0

- Molecule 8 is ZINC ION (CCD ID: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
8	A	1	Total Zn 1 1	0	0
8	C	1	Total Zn 1 1	0	0

- Molecule 9 is CALCIUM ION (CCD ID: CA) (formula: Ca).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
9	A	1	Total Ca 1 1	0	0
9	B	1	Total Ca 1 1	0	0
9	D	1	Total Ca 1 1	0	0

- Molecule 10 is GADOLINIUM ATOM (CCD ID: GD) (formula: Gd).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
10	B	1	Total Gd 1 1	0	0
10	D	1	Total Gd 1 1	0	0

- Molecule 11 is water.

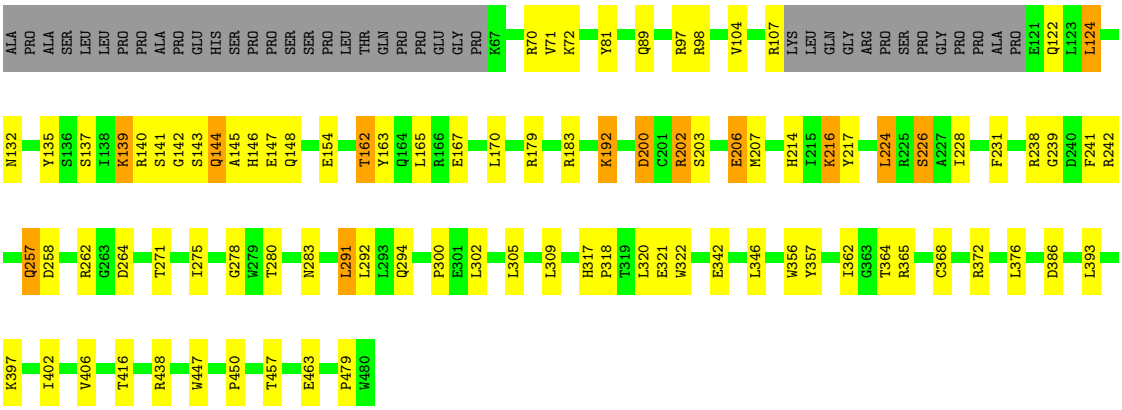
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
11	A	40	Total O 40 40	0	0
11	B	51	Total O 51 51	0	0
11	C	32	Total O 32 32	0	0
11	D	39	Total O 39 39	0	0

3 Residue-property plots (i)

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

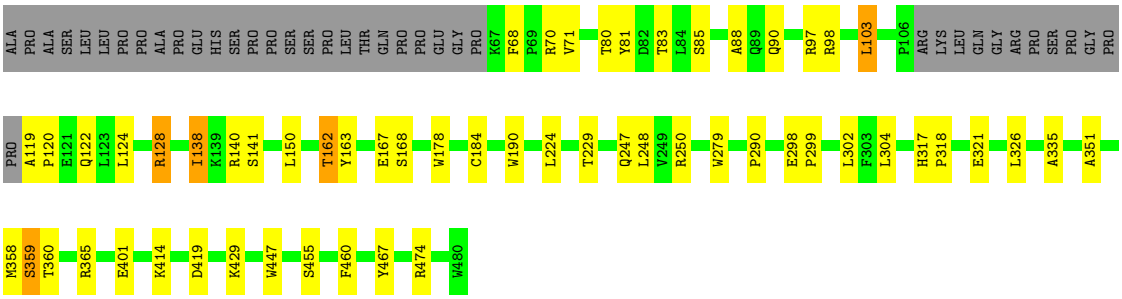
• Molecule 1: Nitric oxide synthase 3

Chain A:



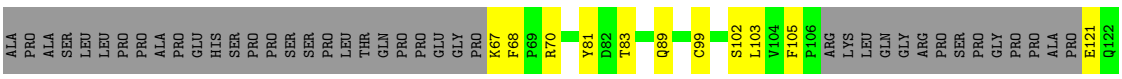
• Molecule 1: Nitric oxide synthase 3

Chain B:



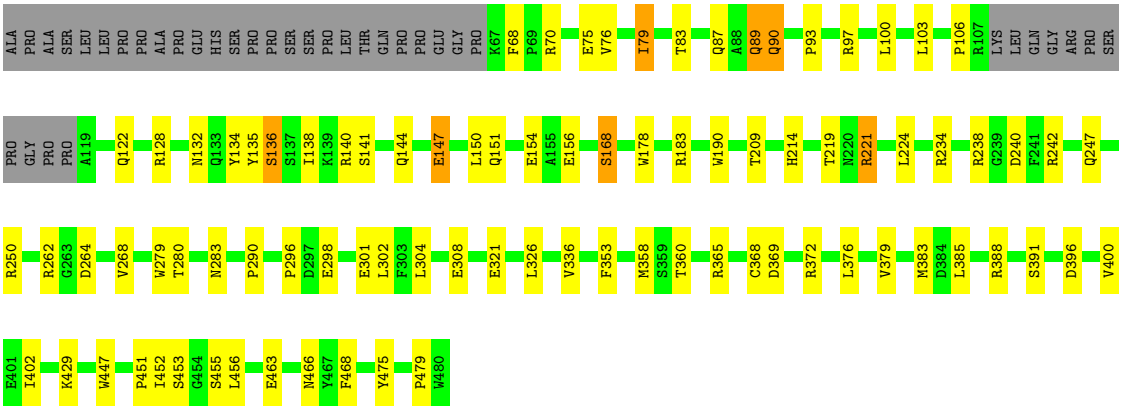
• Molecule 1: Nitric oxide synthase 3

Chain C:



• Molecule 1: Nitric oxide synthase 3

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	59.64Å 152.95Å 108.82Å 90.00° 90.55° 90.00°	Depositor
Resolution (Å)	39.05 – 2.10 39.05 – 2.10	Depositor EDS
% Data completeness (in resolution range)	94.2 (39.05-2.10) 94.5 (39.05-2.10)	Depositor EDS
R_{merge}	0.14	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.45 (at 2.10Å)	Xtriage
Refinement program	PHENIX (1.11.1_2575: ???)	Depositor
R, R_{free}	0.236 , 0.293 0.232 , 0.289	Depositor DCC
R_{free} test set	5348 reflections (2.82%)	wwPDB-VP
Wilson B-factor (Å^2)	45.9	Xtriage
Anisotropy	0.492	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.33 , 53.1	EDS
L-test for twinning[2]	$< \|L\| > = 0.50$, $< L^2 > = 0.33$	Xtriage
Estimated twinning fraction	0.188 for h,-k,-l	Xtriage
F_o,F_c correlation	0.96	EDS
Total number of atoms	13509	wwPDB-VP
Average B, all atoms (Å^2)	75.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.94% 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: BTB, GOL, CA, A1CN3, HEM, H4B, ZN, CL, GD

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	0.31	0/3305	0.52	0/4501
1	B	0.36	0/3321	0.57	0/4525
1	C	0.30	0/3294	0.52	0/4487
1	D	0.35	0/3318	0.57	0/4520
All	All	0.33	0/13238	0.54	0/18033

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	3211	0	3117	52	0
1	B	3220	0	3127	30	0
1	C	3200	0	3104	52	0
1	D	3223	0	3129	57	0
2	A	43	0	30	5	0
2	B	43	0	30	4	0
2	C	43	0	30	4	0
2	D	43	0	30	9	0
3	A	17	0	15	1	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	B	17	0	15	2	0
3	C	17	0	15	3	0
3	D	17	0	15	0	0
4	A	22	0	0	0	0
4	B	22	0	0	0	0
4	C	22	0	0	0	0
4	D	22	0	0	0	0
5	A	28	0	38	7	0
5	B	28	0	35	5	0
5	C	28	0	38	2	0
5	D	28	0	35	6	0
6	A	12	0	16	0	0
6	B	6	0	8	0	0
6	C	12	0	16	1	0
6	D	12	0	16	0	0
7	A	1	0	0	0	0
7	B	1	0	0	0	0
7	C	1	0	0	0	0
7	D	1	0	0	0	0
8	A	1	0	0	0	0
8	C	1	0	0	0	0
9	A	1	0	0	0	0
9	B	1	0	0	0	0
9	D	1	0	0	0	0
10	B	1	0	0	0	0
10	D	1	0	0	0	0
11	A	40	0	0	1	0
11	B	51	0	0	1	0
11	C	32	0	0	1	0
11	D	39	0	0	0	0
All	All	13509	0	12859	204	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 8.

The worst 5 of 204 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)
5:B:505:BTB:HO8	5:B:505:BTB:HO6	1.23	0.83
1:B:247:GLN:HB2	1:B:250:ARG:HD3	1.66	0.77
1:B:279:TRP:HB2	1:B:302:LEU:HD21	1.67	0.75

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:C:501:HEM:HBC2	2:C:501:HEM:HMC2	1.71	0.73
1:C:365:ARG:HH12	3:C:502:H4B:C4	2.03	0.72

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	398/440 (90%)	377 (95%)	20 (5%)	1 (0%)	37	37
1	B	401/440 (91%)	389 (97%)	11 (3%)	1 (0%)	44	45
1	C	397/440 (90%)	370 (93%)	24 (6%)	3 (1%)	16	13
1	D	400/440 (91%)	380 (95%)	18 (4%)	2 (0%)	25	23
All	All	1596/1760 (91%)	1516 (95%)	73 (5%)	7 (0%)	30	29

5 of 7 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	120	PRO
1	A	142	GLY
1	C	203	SER
1	D	144	GLN
1	C	144	GLN

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	342/373 (92%)	315 (92%)	27 (8%)	10 7
1	B	344/373 (92%)	325 (94%)	19 (6%)	18 16
1	C	341/373 (91%)	315 (92%)	26 (8%)	11 8
1	D	343/373 (92%)	320 (93%)	23 (7%)	13 11
All	All	1370/1492 (92%)	1275 (93%)	95 (7%)	13 10

5 of 95 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	C	203	SER
1	C	478	ASP
1	C	224	LEU
1	C	280	THR
1	D	89	GLN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 9 such sidechains are listed below:

Mol	Chain	Res	Type
1	D	126	GLN
1	D	164	GLN
1	B	433	ASN
1	C	87	GLN
1	C	148	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 oligosaccharides in this entry.

5.6 Ligand geometry (i)

Of 38 ligands modelled in this entry, 11 are monoatomic - leaving 27 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	$\#\|Z\| > 2$
2	HEM	C	501	1	42,50,50	1.55	6 (14%)	46,82,82	1.79	9 (19%)
4	A1CN3	C	503	-	23,23,23	0.44	0	28,31,31	1.61	6 (21%)
5	BTB	D	505	-	13,13,13	0.68	0	7,16,16	1.22	1 (14%)
5	BTB	B	504	10	13,13,13	0.79	0	7,16,16	1.72	1 (14%)
6	GOL	A	507	-	5,5,5	0.32	0	5,5,5	0.47	0
6	GOL	C	507	-	5,5,5	0.38	0	5,5,5	0.28	0
3	H4B	B	502	-	16,18,18	0.93	0	14,26,26	2.51	7 (50%)
5	BTB	C	505	-	13,13,13	0.59	0	7,16,16	1.28	1 (14%)
2	HEM	B	501	1	42,50,50	1.53	9 (21%)	46,82,82	1.85	14 (30%)
2	HEM	D	501	1	42,50,50	1.59	6 (14%)	46,82,82	1.70	11 (23%)
5	BTB	A	504	-	13,13,13	0.56	0	7,16,16	1.07	0
5	BTB	B	505	-	13,13,13	0.46	0	7,16,16	1.02	0
6	GOL	D	507	-	5,5,5	0.39	0	5,5,5	0.23	0
6	GOL	A	506	-	5,5,5	0.39	0	5,5,5	0.38	0
6	GOL	B	506	-	5,5,5	0.40	0	5,5,5	0.41	0
3	H4B	A	502	-	16,18,18	0.83	0	14,26,26	2.37	5 (35%)
2	HEM	A	501	1	42,50,50	1.52	6 (14%)	46,82,82	1.80	12 (26%)
6	GOL	D	506	-	5,5,5	0.32	0	5,5,5	0.49	0
5	BTB	D	504	10	13,13,13	0.77	0	7,16,16	1.67	2 (28%)
5	BTB	C	504	-	13,13,13	0.48	0	7,16,16	1.06	0
4	A1CN3	A	503	-	23,23,23	0.54	0	28,31,31	1.46	3 (10%)
3	H4B	D	502	-	16,18,18	0.90	0	14,26,26	2.70	6 (42%)
3	H4B	C	502	-	16,18,18	0.98	0	14,26,26	2.44	5 (35%)
4	A1CN3	B	503	-	23,23,23	0.47	0	28,31,31	1.40	2 (7%)
5	BTB	A	505	-	13,13,13	0.79	0	7,16,16	1.70	2 (28%)
6	GOL	C	506	-	5,5,5	0.35	0	5,5,5	0.50	0
4	A1CN3	D	503	-	23,23,23	0.46	0	28,31,31	1.33	4 (14%)

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	C	501	1	-	6/12/54/54	-
4	A1CN3	C	503	-	-	3/9/9/9	0/2/2/2
5	BTB	D	505	-	-	6/21/21/21	-
5	BTB	B	504	10	-	3/21/21/21	-
6	GOL	A	507	-	-	4/4/4/4	-
6	GOL	C	507	-	-	1/4/4/4	-
3	H4B	B	502	-	-	3/8/17/17	0/2/2/2
5	BTB	C	505	-	-	9/21/21/21	-
2	HEM	B	501	1	-	6/12/54/54	-
2	HEM	D	501	1	-	5/12/54/54	-
5	BTB	A	504	-	-	9/21/21/21	-
5	BTB	B	505	-	-	4/21/21/21	-
6	GOL	D	507	-	-	2/4/4/4	-
6	GOL	A	506	-	-	2/4/4/4	-
6	GOL	B	506	-	-	2/4/4/4	-
3	H4B	A	502	-	-	3/8/17/17	0/2/2/2
2	HEM	A	501	1	-	4/12/54/54	-
6	GOL	D	506	-	-	2/4/4/4	-
5	BTB	D	504	10	-	0/21/21/21	-
5	BTB	C	504	-	-	12/21/21/21	-
4	A1CN3	A	503	-	-	1/9/9/9	0/2/2/2
3	H4B	D	502	-	-	3/8/17/17	0/2/2/2
3	H4B	C	502	-	-	1/8/17/17	0/2/2/2
4	A1CN3	B	503	-	-	4/9/9/9	0/2/2/2
5	BTB	A	505	-	-	12/21/21/21	-
6	GOL	C	506	-	-	3/4/4/4	-
4	A1CN3	D	503	-	-	1/9/9/9	0/2/2/2

The worst 5 of 27 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	D	501	HEM	C3C-C2C	-4.78	1.33	1.40
2	C	501	HEM	C3C-C2C	-3.86	1.35	1.40
2	B	501	HEM	C3C-C2C	-3.53	1.35	1.40

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	501	HEM	C3C-C4C	3.49	1.46	1.41
2	D	501	HEM	CAB-C3B	3.46	1.56	1.47

The worst 5 of 91 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	D	502	H4B	C8A-C4A-C4	6.44	120.36	114.50
3	C	502	H4B	C8A-C4A-C4	6.07	120.02	114.50
2	C	501	HEM	CBA-CAA-C2A	-5.83	102.74	112.54
3	A	502	H4B	C8A-C4A-C4	5.80	119.77	114.50
3	B	502	H4B	C8A-C4A-C4	5.47	119.48	114.50

There are no chirality outliers.

5 of 111 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	501	HEM	C2D-C3D-CAD-CBD
2	A	501	HEM	C4D-C3D-CAD-CBD
2	B	501	HEM	C3D-CAD-CBD-CGD
3	B	502	H4B	C7-C6-C9-O9
3	B	502	H4B	C7-C6-C9-C10

There are no ring outliers.

16 monomers are involved in 49 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	C	501	HEM	4	0
5	D	505	BTB	4	0
5	B	504	BTB	3	0
6	C	507	GOL	1	0
3	B	502	H4B	2	0
5	C	505	BTB	1	0
2	B	501	HEM	4	0
2	D	501	HEM	9	0
5	A	504	BTB	4	0
5	B	505	BTB	2	0
3	A	502	H4B	1	0
2	A	501	HEM	5	0
5	D	504	BTB	2	0
5	C	504	BTB	1	0
3	C	502	H4B	3	0

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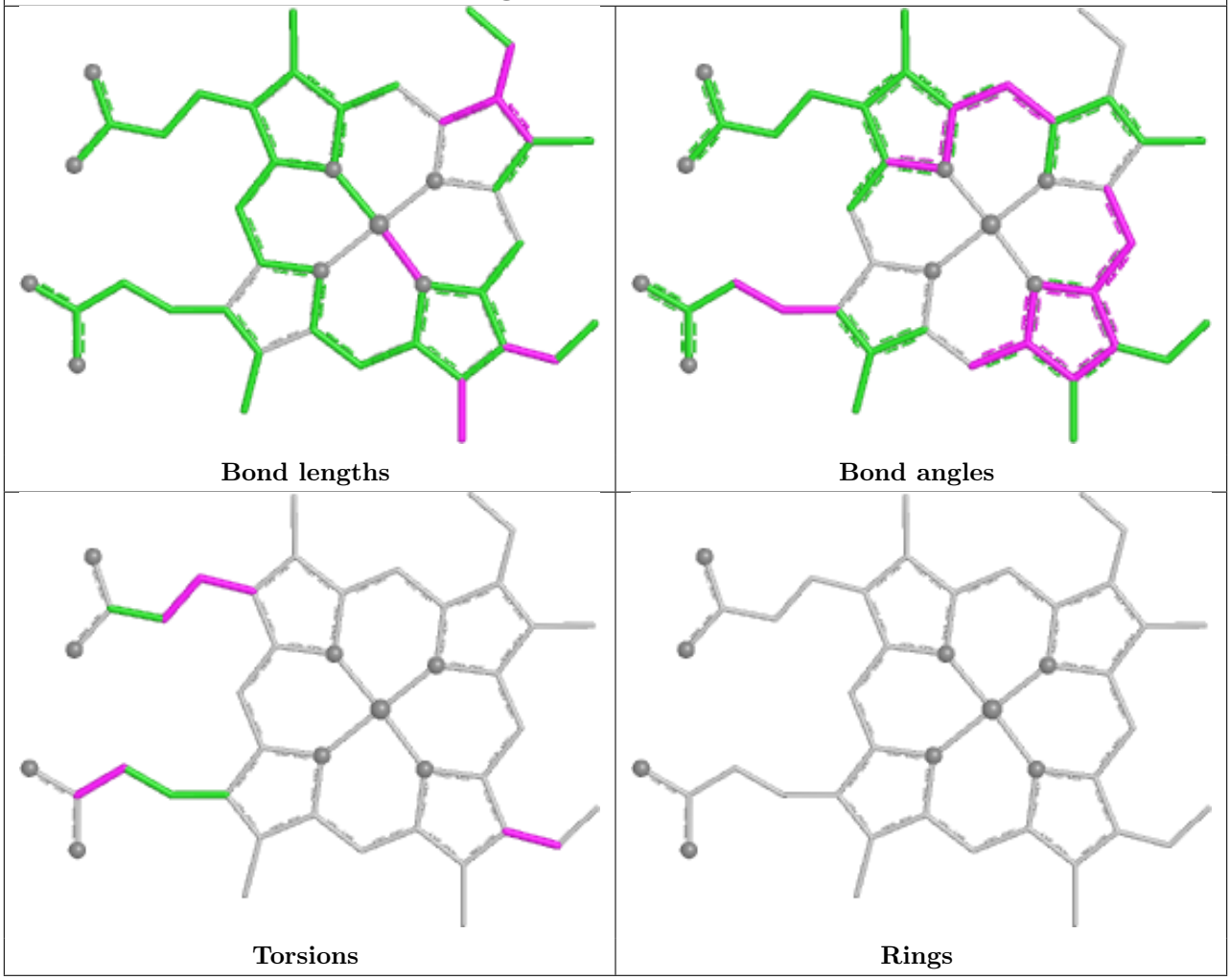
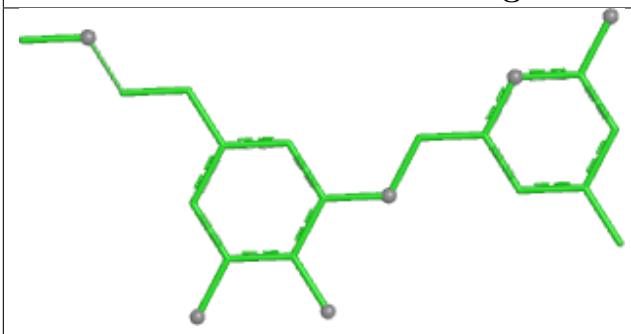
Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	A	505	BTB	3	0

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.

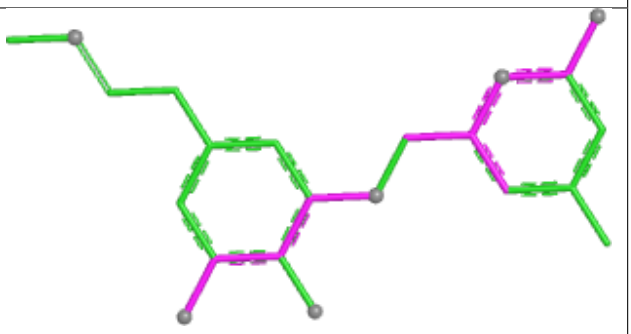
Ligand HEM C 501



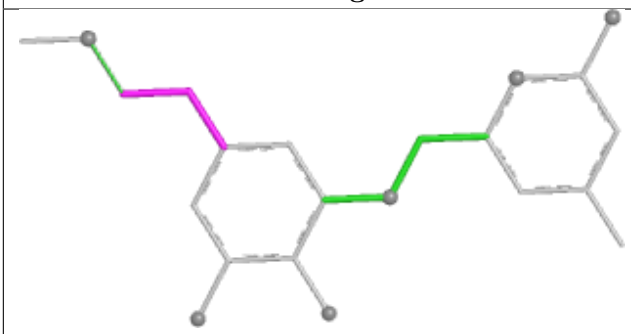
Ligand A1CN3 C 503



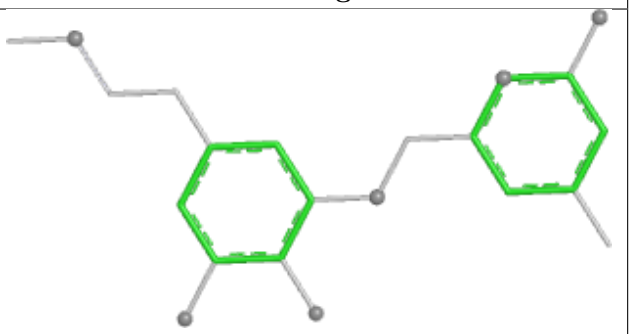
Bond lengths



Bond angles

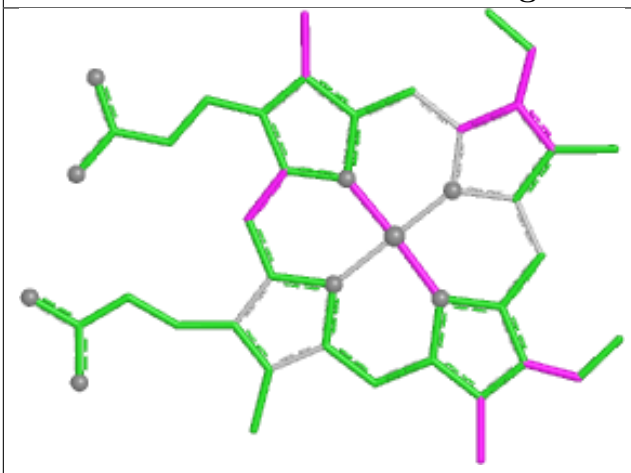


Torsions

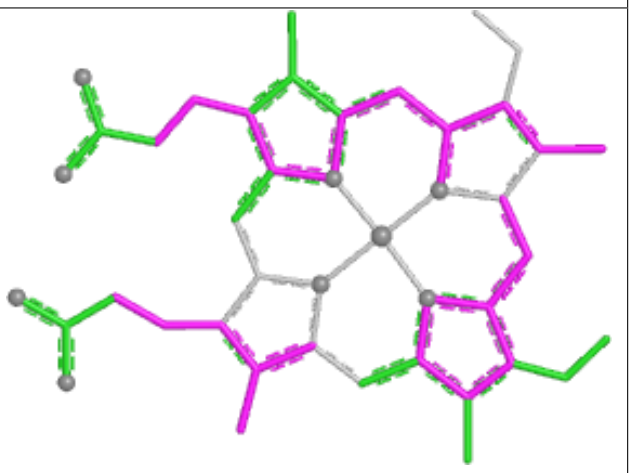


Rings

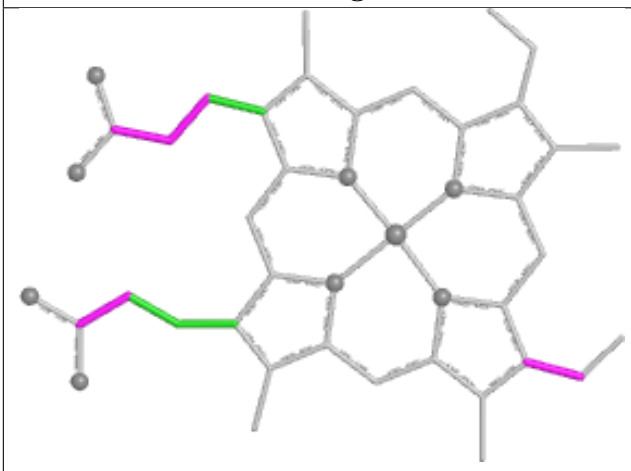
Ligand HEM B 501



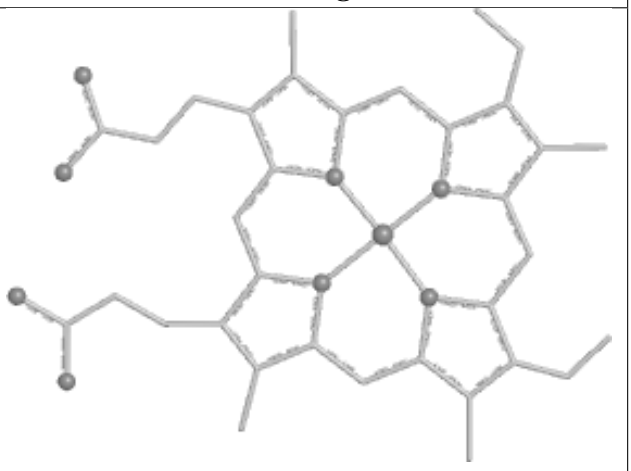
Bond lengths



Bond angles

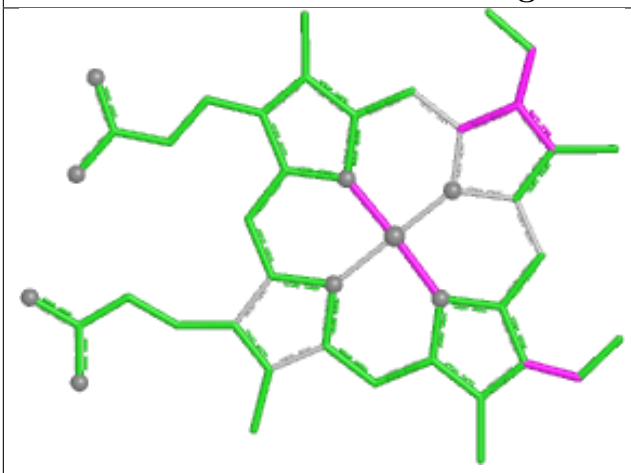


Torsions

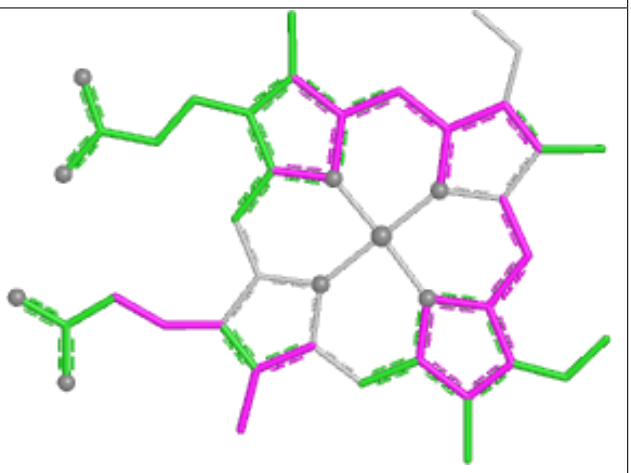


Rings

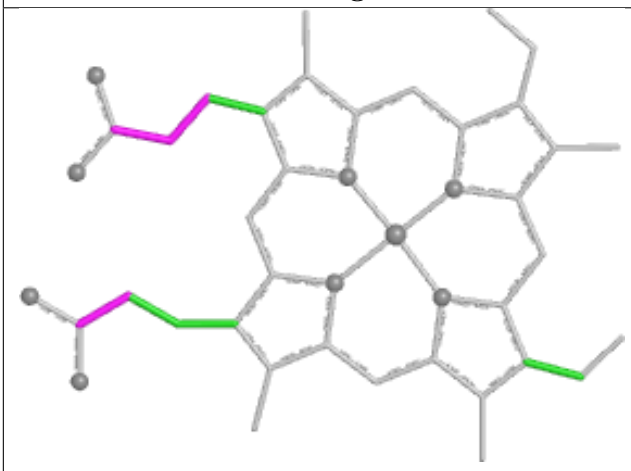
Ligand HEM D 501



Bond lengths



Bond angles



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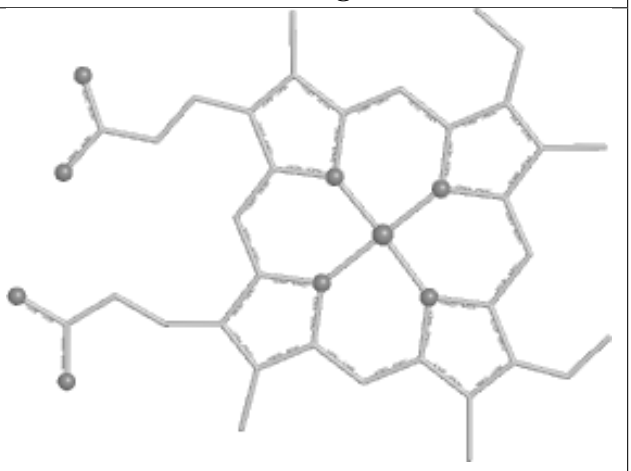
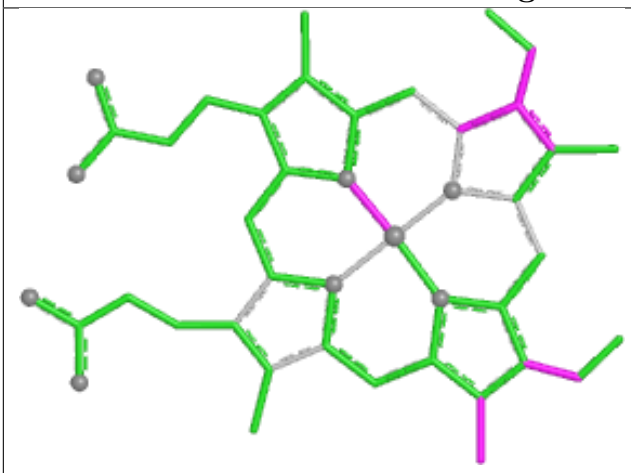
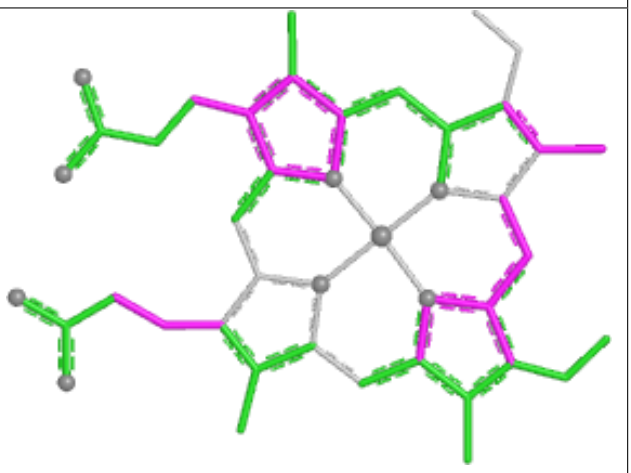


Rings

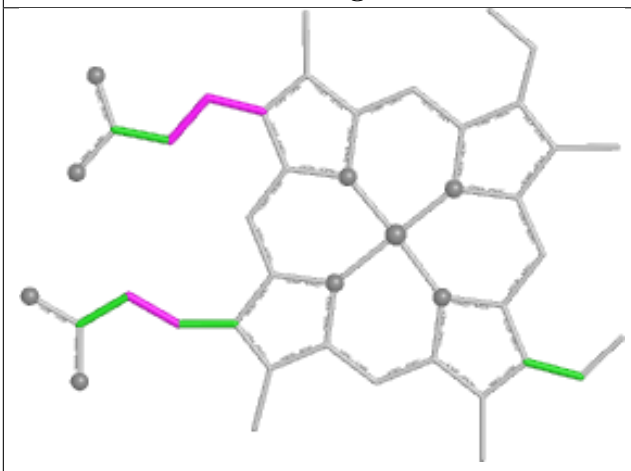
Ligand HEM A 501



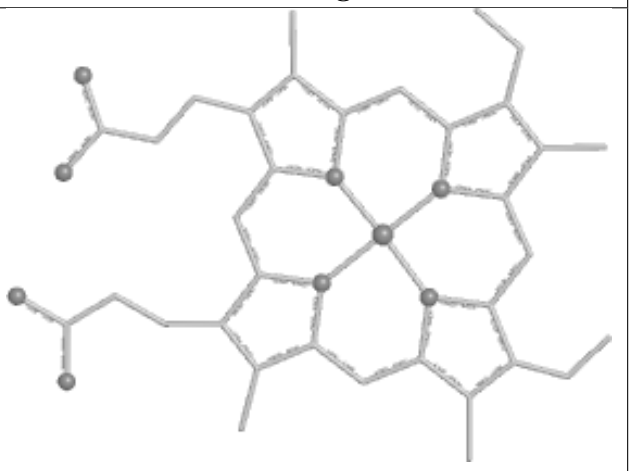
Bond lengths



Bond angles

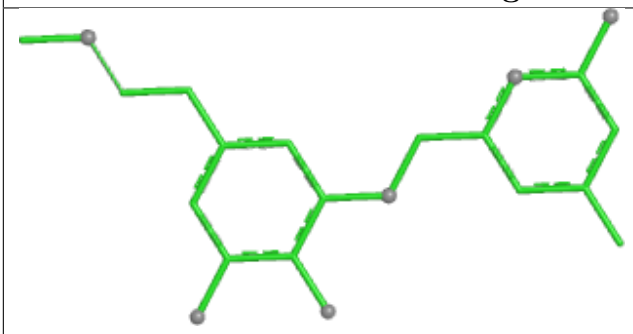


Torsions

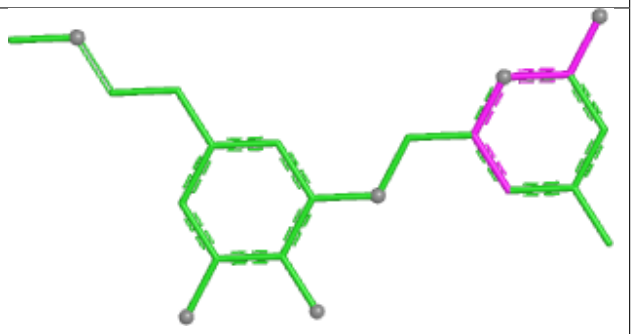


Rings

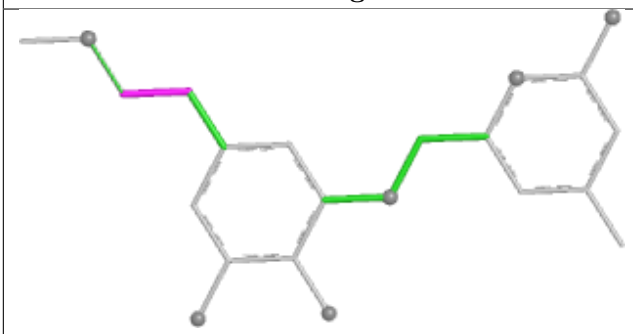
Ligand A1CN3 A 503



Bond lengths



Bond angles



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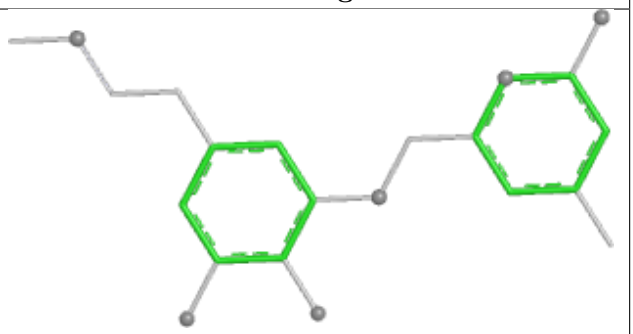
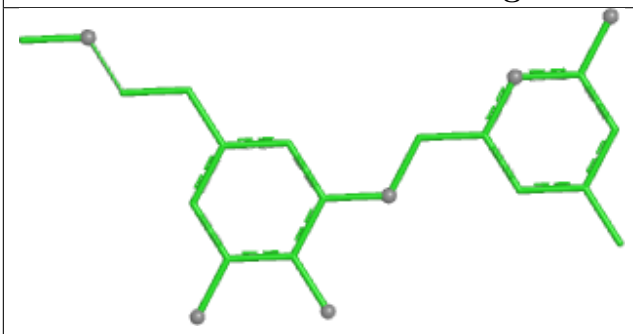
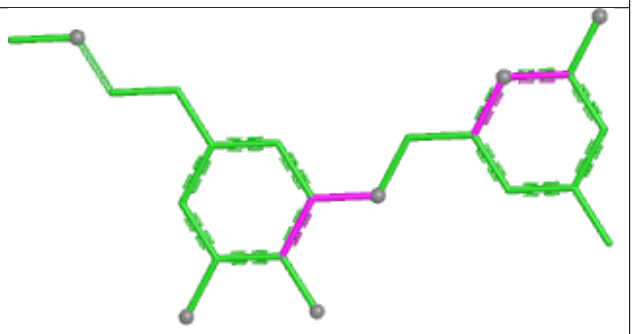


Rings

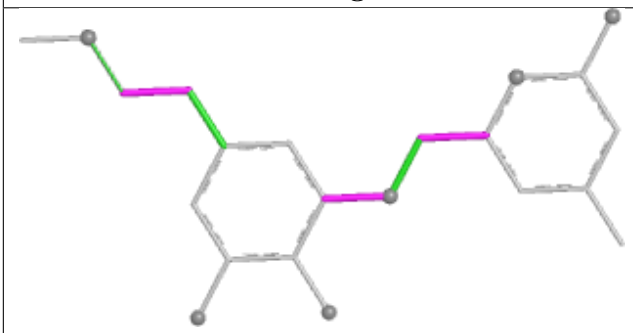
Ligand A1CN3 B 503



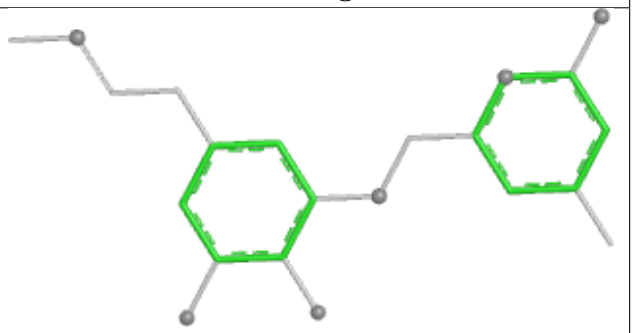
Bond lengths



Bond angles

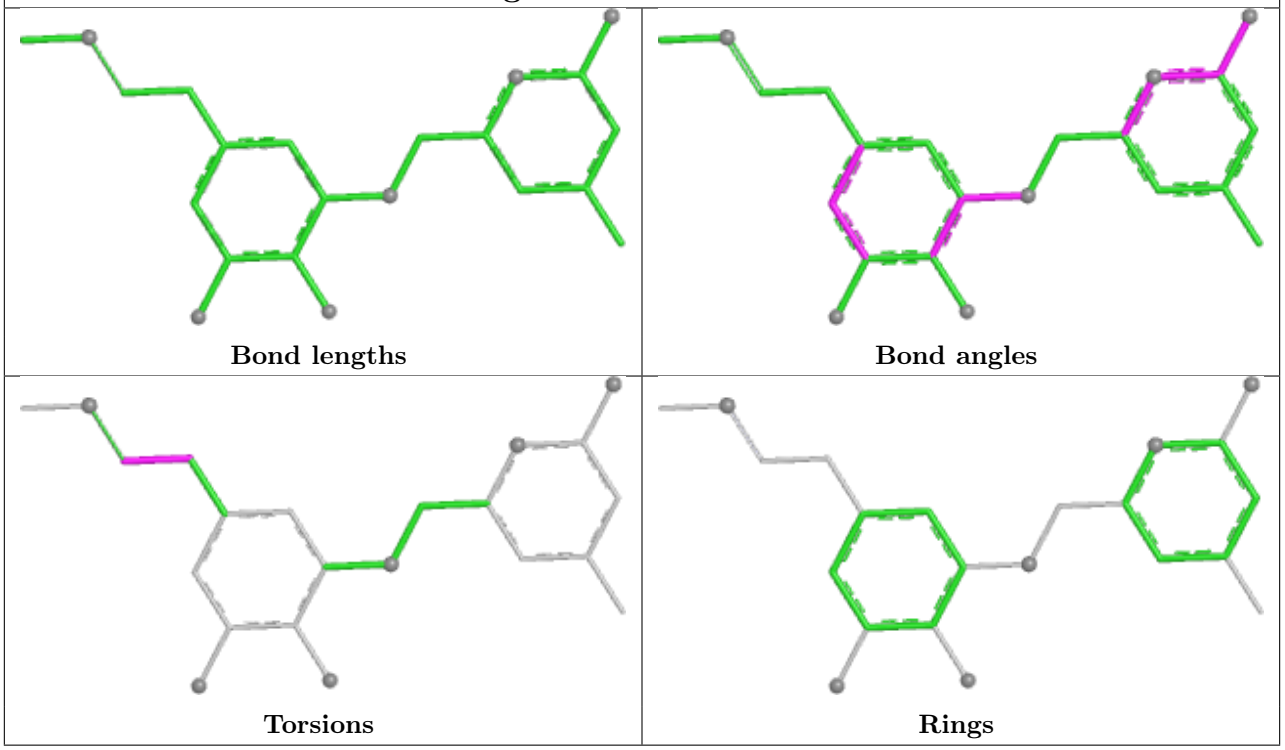


Torsions



Rings

Ligand A1CN3 D 503



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

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	401/440 (91%)	-0.96	0	100	100	44, 81, 118, 155	1 (0%)
1	B	402/440 (91%)	-1.27	0	100	100	39, 64, 98, 138	3 (0%)
1	C	400/440 (90%)	-1.02	0	100	100	40, 79, 124, 158	1 (0%)
1	D	403/440 (91%)	-1.14	0	100	100	39, 61, 107, 141	1 (0%)
All	All	1606/1760 (91%)	-1.09	0	100	100	39, 70, 117, 158	6 (0%)

There are no RSRZ outliers to report.

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

There are no oligosaccharides in this entry.

6.4 Ligands

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
6	GOL	B	506	6/6	0.95	0.04	85,89,92,93	0
5	BTB	B	505	14/14	0.96	0.04	69,103,112,115	0
5	BTB	C	504	14/14	0.97	0.05	95,108,113,120	0
6	GOL	A	507	6/6	0.97	0.04	92,101,104,108	0

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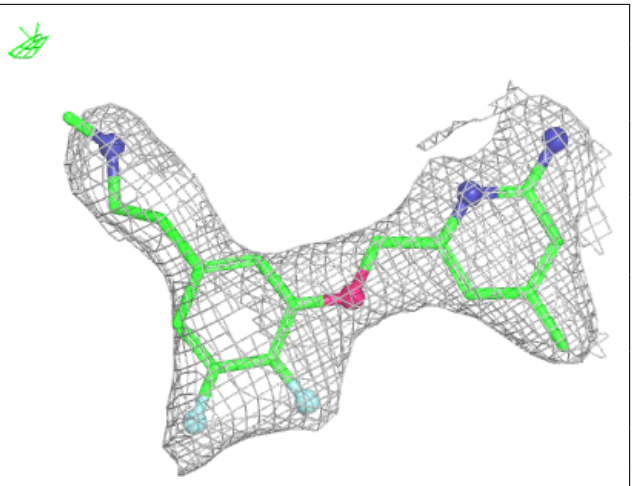
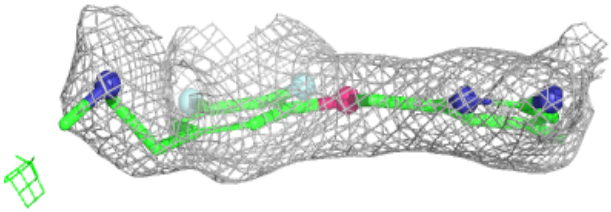
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
3	H4B	C	502	17/17	0.97	0.11	95,107,132,134	0
6	GOL	C	507	6/6	0.97	0.03	82,91,98,99	0
3	H4B	B	502	17/17	0.98	0.06	62,80,108,110	0
3	H4B	A	502	17/17	0.98	0.12	108,127,153,154	0
6	GOL	A	506	6/6	0.98	0.03	55,62,69,73	0
4	A1CN3	A	503	22/22	0.98	0.05	49,87,98,103	0
4	A1CN3	C	503	22/22	0.98	0.06	53,77,102,105	0
6	GOL	C	506	6/6	0.98	0.03	52,83,89,90	0
5	BTB	A	504	14/14	0.98	0.05	51,87,101,106	0
6	GOL	D	506	6/6	0.98	0.03	84,87,88,95	0
5	BTB	C	505	14/14	0.99	0.03	60,85,94,98	0
5	BTB	D	504	14/14	0.99	0.05	49,74,94,96	0
5	BTB	D	505	14/14	0.99	0.03	79,86,101,103	0
4	A1CN3	D	503	22/22	0.99	0.04	53,73,90,98	0
2	HEM	C	501	43/43	0.99	0.04	48,83,99,114	0
5	BTB	A	505	14/14	0.99	0.04	53,78,88,90	0
5	BTB	B	504	14/14	0.99	0.05	58,84,96,97	0
4	A1CN3	B	503	22/22	0.99	0.05	41,87,100,102	0
3	H4B	D	502	17/17	0.99	0.06	63,90,115,117	0
6	GOL	D	507	6/6	0.99	0.05	76,82,91,95	0
7	CL	A	508	1/1	0.99	0.03	64,64,64,64	0
7	CL	C	508	1/1	0.99	0.05	68,68,68,68	0
7	CL	D	508	1/1	0.99	0.03	52,52,52,52	0
9	CA	B	509	1/1	0.99	0.03	60,60,60,60	0
7	CL	B	507	1/1	1.00	0.03	59,59,59,59	0
2	HEM	B	501	43/43	1.00	0.04	41,59,79,92	0
2	HEM	A	501	43/43	1.00	0.04	50,74,99,106	0
8	ZN	A	509	1/1	1.00	0.01	60,60,60,60	0
8	ZN	C	509	1/1	1.00	0.01	68,68,68,68	0
9	CA	A	510	1/1	1.00	0.01	54,54,54,54	0
2	HEM	D	501	43/43	1.00	0.04	41,57,89,107	0
9	CA	D	510	1/1	1.00	0.05	88,88,88,88	0
10	GD	B	508	1/1	1.00	0.01	62,62,62,62	0
10	GD	D	509	1/1	1.00	0.02	65,65,65,65	0

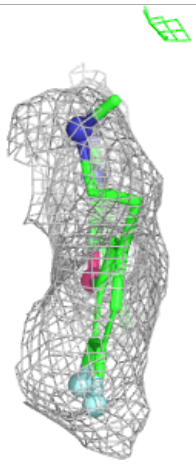
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation to approximate a three-dimensional view.

Electron density around A1CN3 A 503:

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

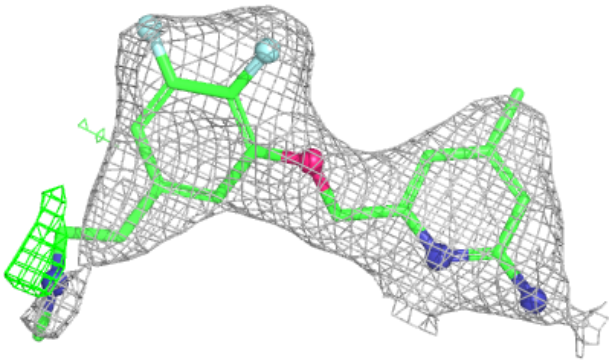


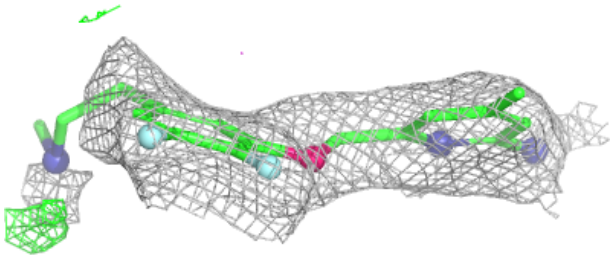


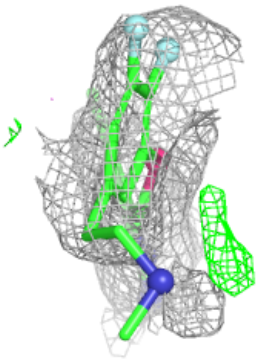


Electron density around A1CN3 C 503:

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

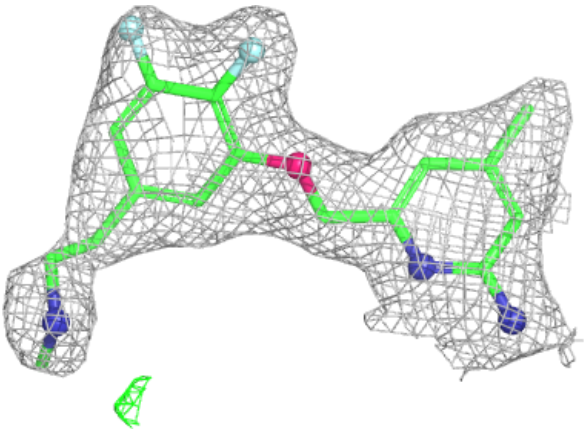


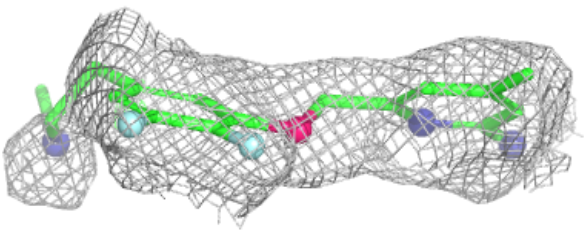


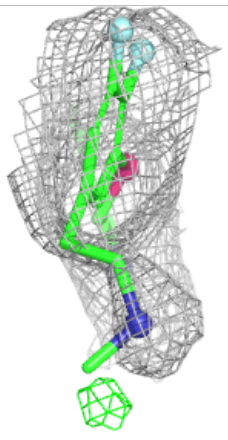


Electron density around A1CN3 D 503:

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

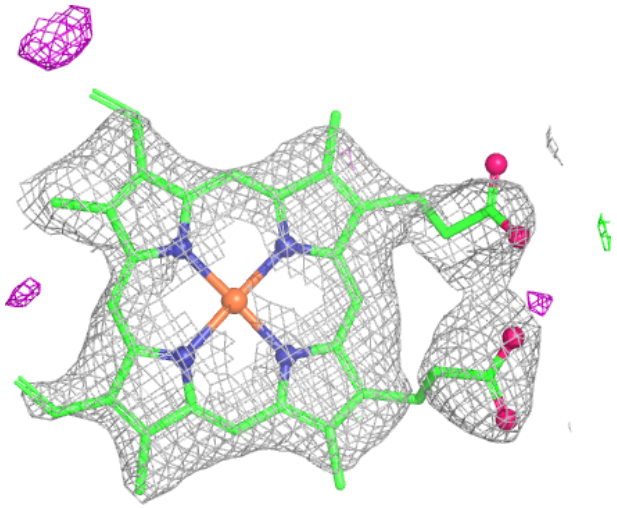


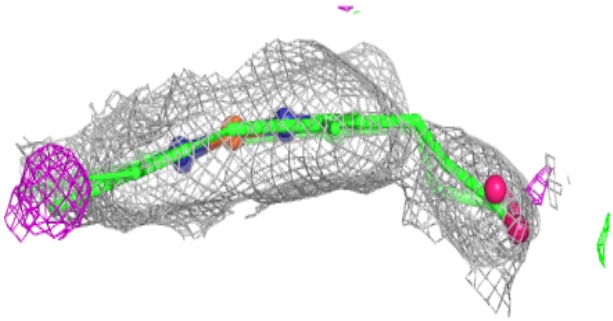


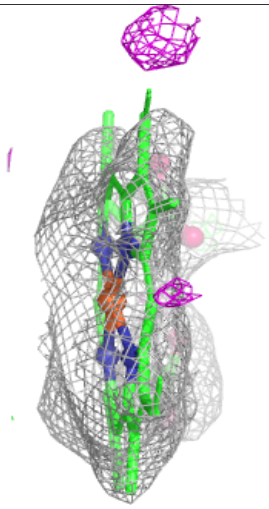


Electron density around HEM C 501:

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

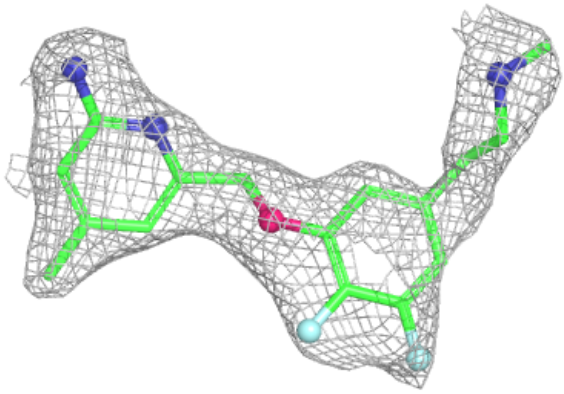


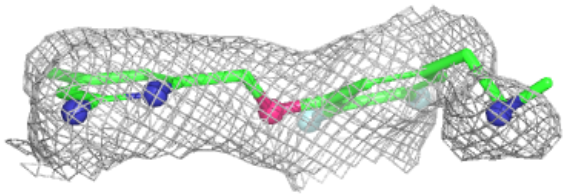


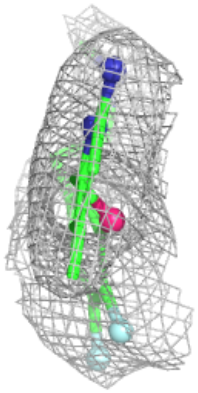


Electron density around A1CN3 B 503:

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

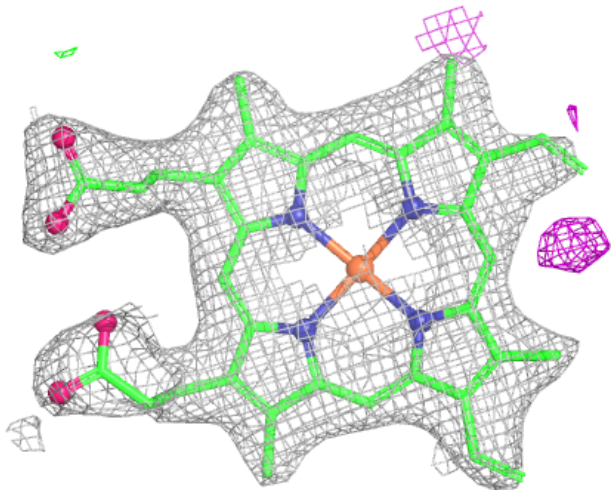


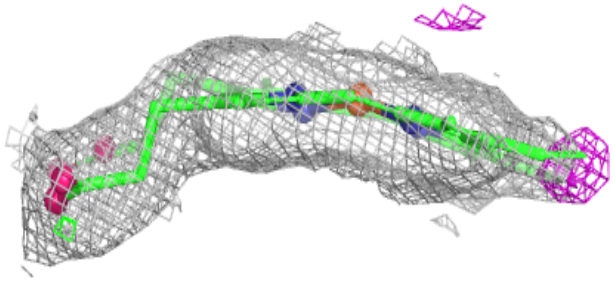


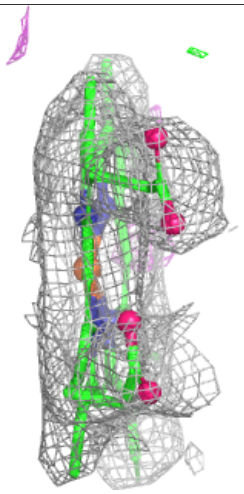


Electron density around HEM B 501:

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

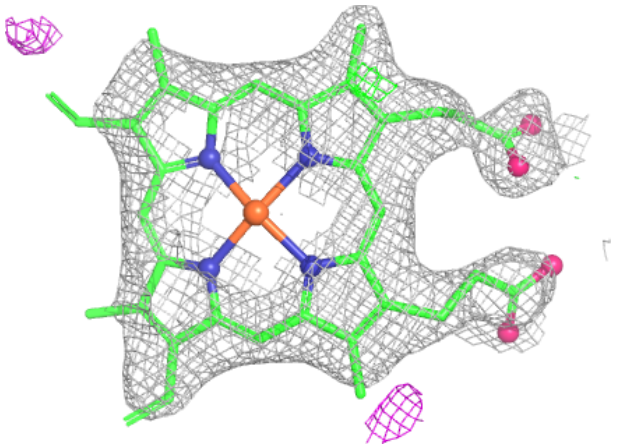


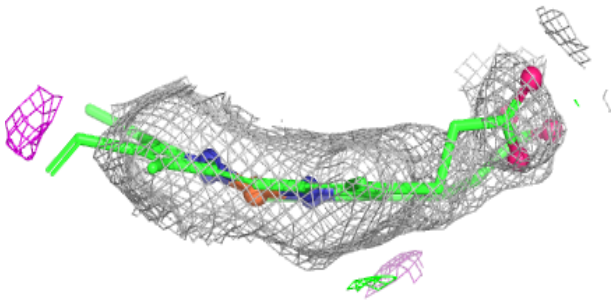


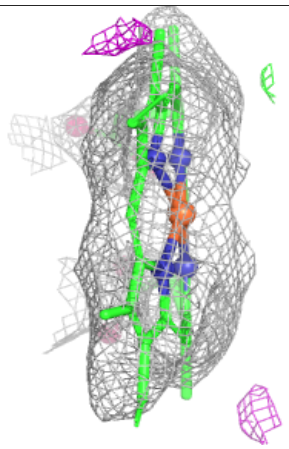


Electron density around HEM A 501:

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

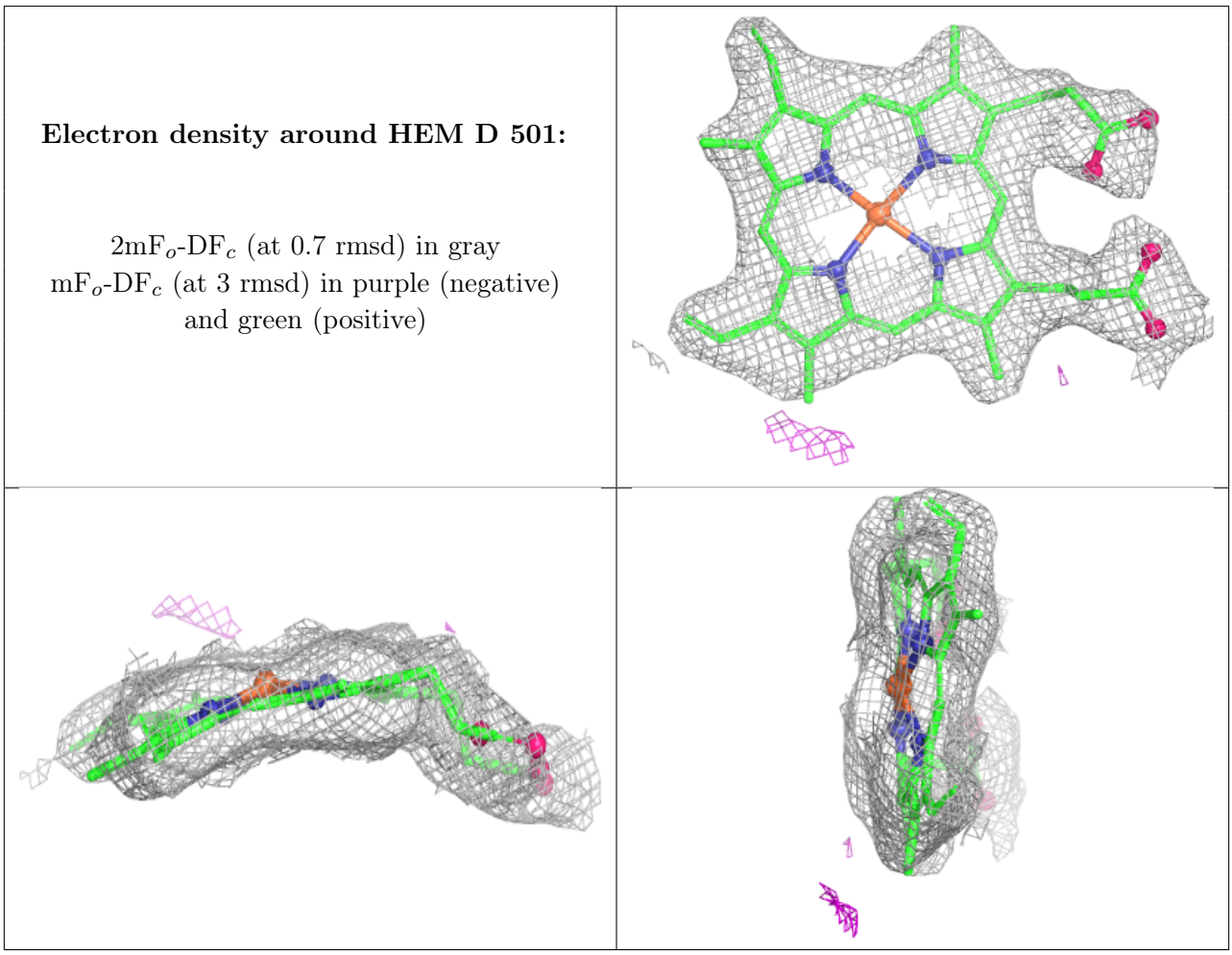






Electron density around HEM D 501:

$2mF_o$-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.