Full wwPDB X-ray Structure Validation Report ⓘ

Apr 23, 2025 – 06:24 PM EDT

PDB ID	:	9CW9 / pdb_00009cw9
Title	:	Structure of human endothelial nitric oxide synthase heme domain bound with 6-(2,3-difluoro-5-((methylamino)methyl)phenyl)-4-methylpyridin-2-amine dihydrochloride
Authors	:	Li, H.; Poulos, T.L.
Deposited on	:	2024-07-29
Resolution	:	2.12 Å(reported)

This is a Full wwPDB X-ray Structure Validation Report for a publicly released PDB entry.

We welcome your comments at *validation@mail.wwpdb.org*
A user guide is available at
https://www.wwpdb.org/validation/2017/XrayValidationReportHelp
with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at
http://www.wwpdb.org/validation/2017/FAQs#types.

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

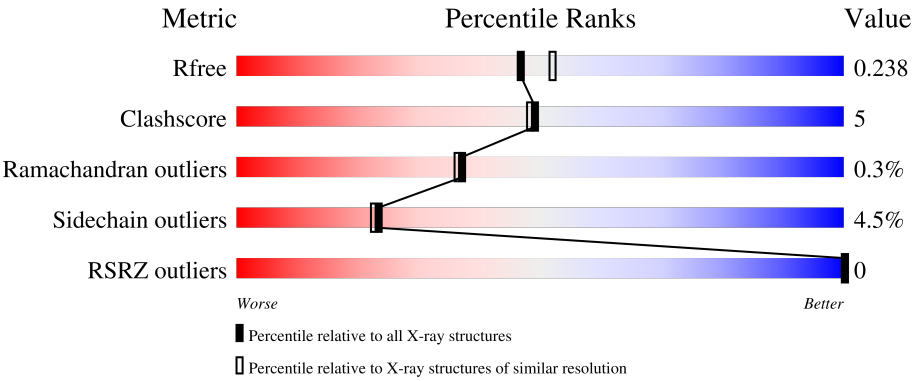
MolProbity	:	4.02b-467
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	2.0rc1
EDS	:	3.0
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4	:	9.0.006 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.42

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 2.12 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	7689 (2.14-2.10)
Clashscore	180529	8431 (2.14-2.10)
Ramachandran outliers	177936	8366 (2.14-2.10)
Sidechain outliers	177891	8367 (2.14-2.10)
RSRZ outliers	164620	7689 (2.14-2.10)

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	77% 13% • 9%
1	B	440	79% 11% • 9%
1	C	440	75% 15% • 9%
1	D	440	82% 9% 9%

2 Entry composition (i)

There are 10 unique types of molecules in this entry. The entry contains 13929 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.

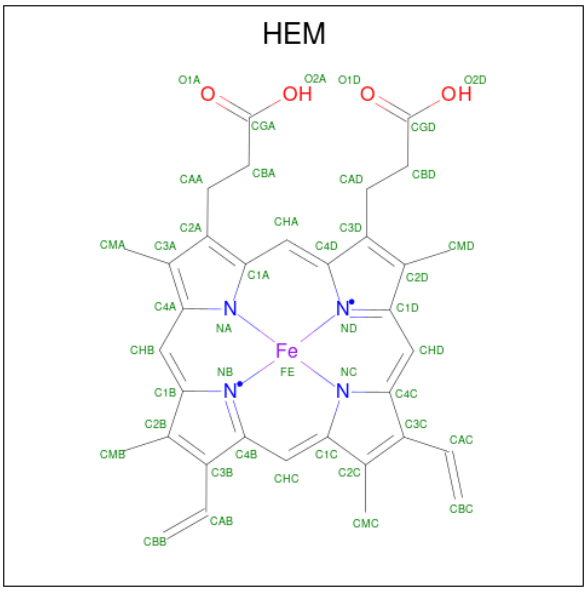
- Molecule 1 is a protein called Nitric oxide synthase, endothelial.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	401	Total	C	N	O	S	0	1	0
			3207	2043	564	584	16			
1	B	401	Total	C	N	O	S	0	3	0
			3211	2045	564	586	16			
1	C	402	Total	C	N	O	S	0	1	0
			3212	2046	565	585	16			
1	D	402	Total	C	N	O	S	0	1	0
			3214	2046	567	585	16			

There are 4 discrepancies between the modelled and reference sequences:

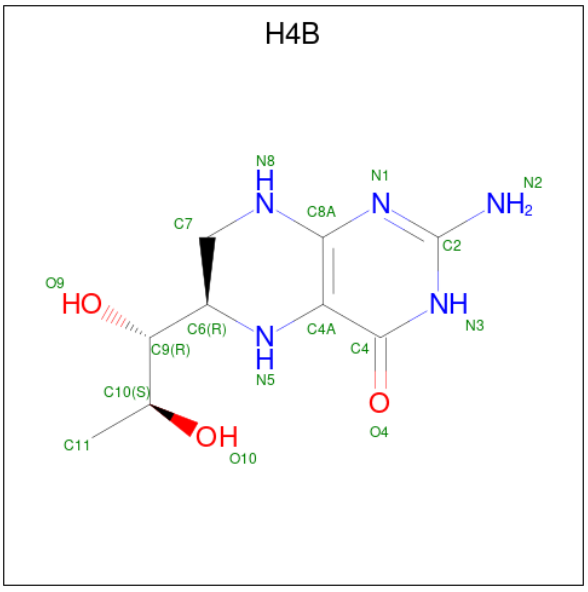
Chain	Residue	Modelled	Actual	Comment	Reference
A	298	GLU	ASP	variant	UNP P29474
B	298	GLU	ASP	variant	UNP P29474
C	298	GLU	ASP	variant	UNP P29474
D	298	GLU	ASP	variant	UNP P29474

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



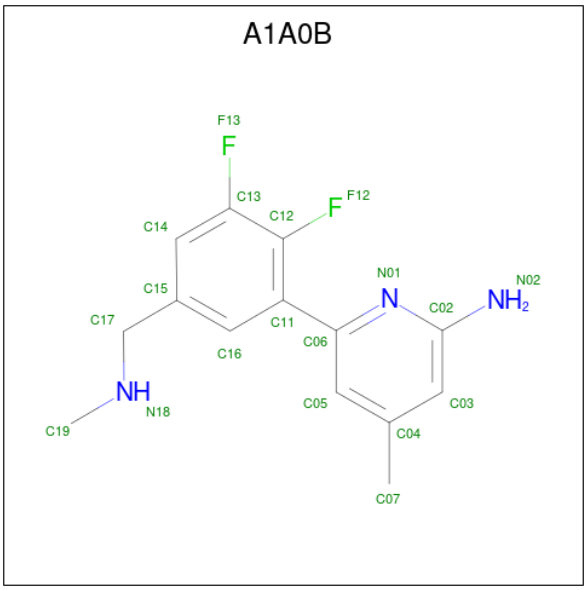
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	A	1	Total	C	Fe	N	O	0	0
			43	34	1	4	4		
2	B	1	Total	C	Fe	N	O	0	0
			43	34	1	4	4		
2	C	1	Total	C	Fe	N	O	0	0
			43	34	1	4	4		
2	D	1	Total	C	Fe	N	O	0	0
			43	34	1	4	4		

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



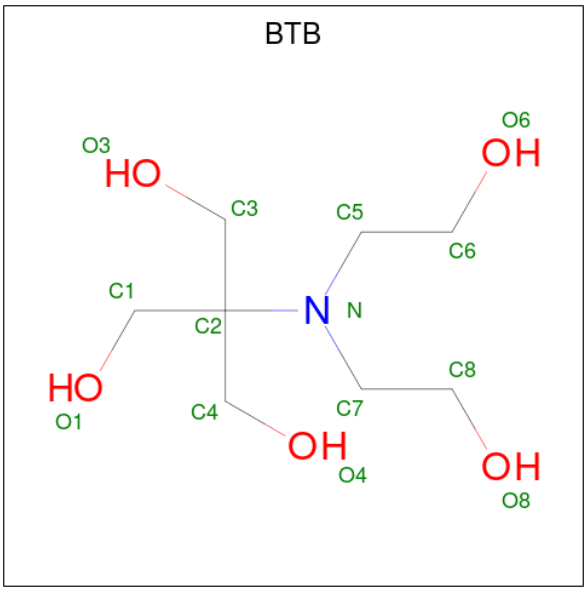
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	1	Total C N O 17 9 5 3	0	0
3	B	1	Total C N O 17 9 5 3	0	0
3	C	1	Total C N O 17 9 5 3	0	0
3	D	1	Total C N O 17 9 5 3	0	0

- Molecule 4 is (6M)-6-{2,3-difluoro-5-[(methylamino)methyl]phenyl}-4-methylpyridin-2-amine (CCD ID: A1A0B) (formula: $C_{14}H_{15}F_2N_3$) (labeled as "Ligand of Interest" by depositor).



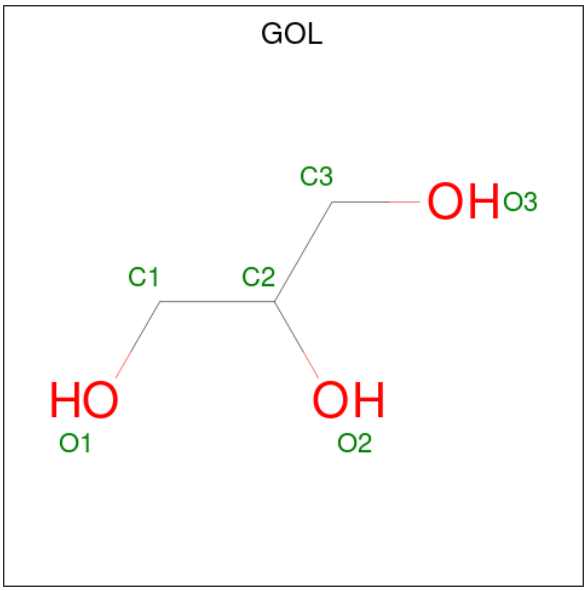
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	1	Total C F N 19 14 2 3	0	0
4	B	1	Total C F N 19 14 2 3	0	0
4	C	1	Total C F N 19 14 2 3	0	0
4	D	1	Total C F N 19 14 2 3	0	0

- 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	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	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	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

- 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 GADOLINIUM ION (CCD ID: GD3) (formula: Gd).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
8	A	1	Total Gd 1 1	0	0
8	B	2	Total Gd 2 2	0	0
8	D	1	Total Gd 1 1	0	0

- Molecule 9 is ZINC ION (CCD ID: ZN) (formula: Zn).

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

- Molecule 10 is water.

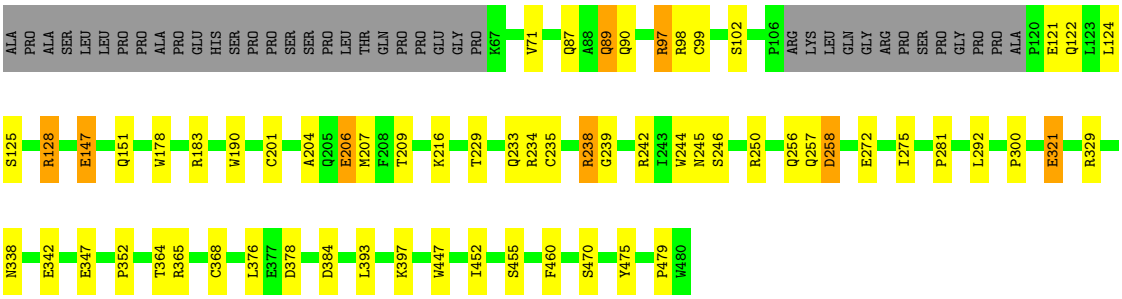
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
10	A	114	Total O 114 114	0	0
10	B	165	Total O 165 165	0	0
10	C	125	Total O 125 125	0	0
10	D	167	Total O 167 167	0	0

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.

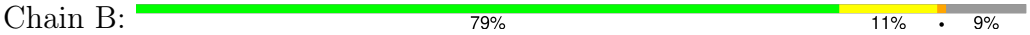
• Molecule 1: Nitric oxide synthase, endothelial

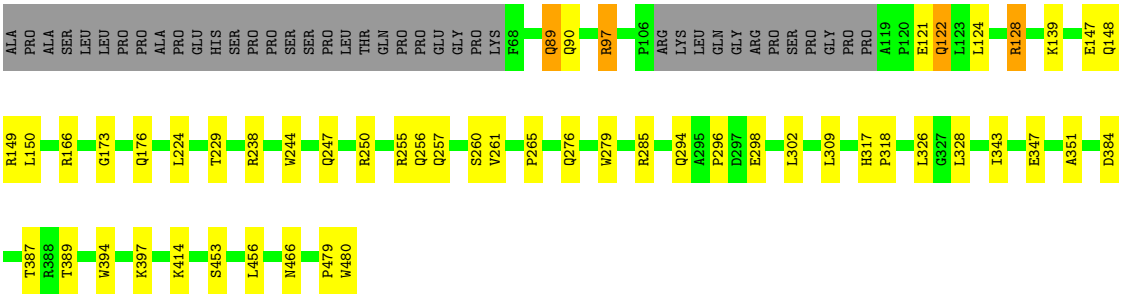
Chain A:



• Molecule 1: Nitric oxide synthase, endothelial

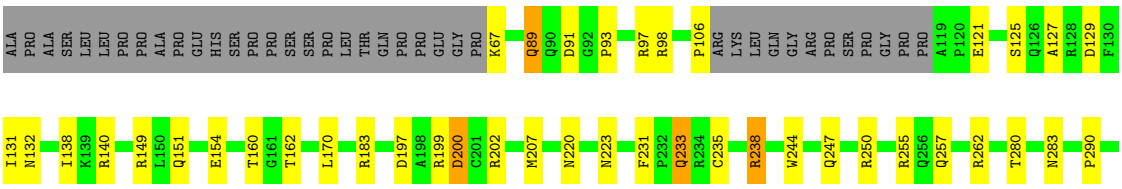
Chain B:





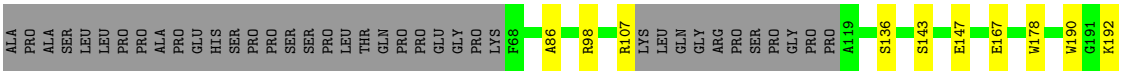
• Molecule 1: Nitric oxide synthase, endothelial

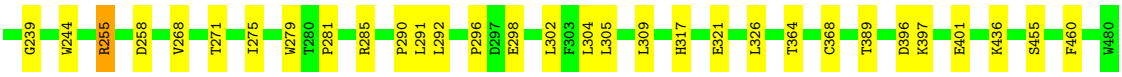
Chain C:



• Molecule 1: Nitric oxide synthase, endothelial

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	59.26Å 152.69Å 108.71Å 90.00° 90.59° 90.00°	Depositor
Resolution (Å)	49.44 – 2.12 49.44 – 2.12	Depositor EDS
% Data completeness (in resolution range)	99.5 (49.44-2.12) 90.2 (49.44-2.12)	Depositor EDS
R_{merge}	0.28	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.41 (at 2.12Å)	Xtriage
Refinement program	PHENIX 1.20.1_4487	Depositor
R, R_{free}	0.215 , 0.256 0.197 , 0.238	Depositor DCC
R_{free} test set	4903 reflections (4.98%)	wwPDB-VP
Wilson B-factor (Å^2)	35.1	Xtriage
Anisotropy	0.716	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.38 , 45.4	EDS
L-test for twinning[2]	$< \|L\| > = 0.47$, $< L^2 > = 0.30$	Xtriage
Estimated twinning fraction	0.156 for h,-k,-l	Xtriage
F_o,F_c correlation	0.97	EDS
Total number of atoms	13929	wwPDB-VP
Average B, all atoms (Å^2)	52.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.36% 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: H4B, A1A0B, CL, ZN, GOL, BTB, HEM, GD3

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	0.36	0/3302	0.57	0/4498
1	B	0.43	0/3312	0.59	0/4514
1	C	0.39	1/3307 (0.0%)	0.58	0/4506
1	D	0.45	0/3309	0.61	0/4509
All	All	0.41	1/13230 (0.0%)	0.59	0/18027

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	C	347	GLU	CB-CG	5.15	1.61	1.52

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	3207	0	3112	36	0
1	B	3211	0	3114	28	0
1	C	3212	0	3116	36	0
1	D	3214	0	3116	22	0
2	A	43	0	30	3	0
2	B	43	0	30	2	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	C	43	0	30	4	0
2	D	43	0	30	2	0
3	A	17	0	15	2	0
3	B	17	0	15	0	0
3	C	17	0	15	1	0
3	D	17	0	15	0	0
4	A	19	0	0	0	0
4	B	19	0	0	0	0
4	C	19	0	0	1	0
4	D	19	0	0	0	0
5	A	42	0	55	9	0
5	B	42	0	51	2	0
5	C	28	0	38	1	0
5	D	28	0	36	4	0
6	A	12	0	16	0	0
6	B	6	0	8	0	0
6	C	24	0	31	0	0
6	D	6	0	8	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	B	2	0	0	0	0
8	D	1	0	0	0	0
9	A	1	0	0	0	0
9	C	1	0	0	0	0
10	A	114	0	0	3	0
10	B	165	0	0	5	0
10	C	125	0	0	3	0
10	D	167	0	0	4	0
All	All	13929	0	12881	139	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 5.

All (139) 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:347:GLU:OE2	10:C:601:HOH:O	1.93	0.84
1:D:397:LYS:NZ	10:D:602:HOH:O	2.20	0.73

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:129:ASP:HA	1:C:132:ASN:HD22	1.55	0.71
1:C:200:ASP:OD1	1:C:200:ASP:N	2.23	0.71
1:C:238:ARG:NH2	10:C:603:HOH:O	2.24	0.70
1:A:89:GLN:HG3	1:A:90:GLN:H	1.58	0.69
1:D:279:TRP:HB2	1:D:302:LEU:HD21	1.73	0.68
5:D:505:BTB:H32	5:D:505:BTB:H62	1.76	0.68
1:A:347:GLU:OE2	10:A:601:HOH:O	2.13	0.67
1:D:290:PRO:HB3	1:D:304:LEU:HD23	1.77	0.65
1:D:167:GLU:OE2	10:D:601:HOH:O	2.15	0.65
1:A:97:ARG:HG2	1:A:98:ARG:HG2	1.79	0.65
1:C:91:ASP:OD1	10:C:602:HOH:O	2.15	0.65
1:B:347:GLU:OE2	10:B:601:HOH:O	2.14	0.64
2:C:501:HEM:HBB2	2:C:501:HEM:HHC	1.80	0.64
2:A:501:HEM:HBB2	2:A:501:HEM:HHC	1.79	0.64
1:A:183:ARG:HD3	1:A:447:TRP:CD2	2.34	0.63
1:A:365:ARG:HH12	3:A:502:H4B:C4	2.11	0.63
1:A:233:GLN:NE2	10:A:605:HOH:O	2.31	0.63
1:B:279:TRP:HB2	1:B:302:LEU:HD21	1.81	0.62
1:D:275:ILE:HD12	1:D:281:PRO:HG3	1.80	0.62
1:B:247:GLN:HB2	1:B:250:ARG:HD3	1.82	0.61
1:D:397:LYS:NZ	10:D:604:HOH:O	2.29	0.61
1:B:298:GLU:CD	5:B:505:BTB:H31	2.21	0.60
1:A:321:GLU:H	1:A:321:GLU:CD	2.04	0.59
1:A:238:ARG:NE	1:A:239:GLY:O	2.37	0.57
1:A:275:ILE:HD11	1:A:281:PRO:HB3	1.87	0.57
2:C:501:HEM:O2D	4:C:503:A1A0B:F13	2.13	0.56
1:D:285:ARG:NH2	10:D:603:HOH:O	2.25	0.56
2:B:501:HEM:HBC2	2:B:501:HEM:HMC2	1.88	0.56
1:D:239:GLY:O	1:D:296:PRO:HB3	2.05	0.56
1:B:453:SER:HB3	1:B:456:LEU:HD12	1.89	0.55
1:C:475:TYR:OH	2:C:501:HEM:O1D	2.23	0.55
5:A:505:BTB:O3	5:A:505:BTB:O4	2.22	0.55
1:A:99:CYS:HB3	1:B:466:ASN:HB3	1.89	0.54
1:C:93:PRO:HG3	1:C:106:PRO:HB3	1.90	0.54
2:D:501:HEM:HMC2	2:D:501:HEM:HBC2	1.89	0.54
1:A:125:SER:HA	1:A:128:ARG:NH1	2.23	0.54
1:A:128:ARG:HH11	1:A:128:ARG:HB2	1.73	0.53
1:C:365:ARG:HH12	3:C:502:H4B:C4	2.22	0.53
1:D:271:THR:O	1:D:275:ILE:HG12	2.08	0.53
1:B:244:TRP:NE1	1:B:294:GLN:OE1	2.39	0.53
1:B:238:ARG:HG2	1:B:296:PRO:HB3	1.90	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:124:LEU:O	1:A:128:ARG:HD3	2.09	0.52
1:B:97:ARG:HH11	1:B:97:ARG:HB3	1.74	0.52
2:C:501:HEM:HBC2	2:C:501:HEM:HMC2	1.92	0.52
1:C:290:PRO:HB3	1:C:304:LEU:HD12	1.92	0.52
1:A:242:ARG:NH2	1:A:479:PRO:HD3	2.26	0.51
1:B:124:LEU:HB3	1:B:128:ARG:HH22	1.75	0.51
1:C:97:ARG:HH21	1:D:86:ALA:HA	1.76	0.51
1:C:262:ARG:NH1	1:C:283:ASN:O	2.44	0.51
2:A:501:HEM:HBC2	2:A:501:HEM:HMC1	1.91	0.51
1:B:149:ARG:HD3	1:B:166:ARG:CZ	2.41	0.50
1:D:178:TRP:CE3	1:D:190:TRP:HA	2.46	0.50
1:B:124:LEU:HB3	1:B:128:ARG:HH12	1.77	0.49
1:C:183:ARG:HD3	1:C:447:TRP:CD2	2.48	0.49
1:B:326:LEU:HB3	1:B:328:LEU:HG	1.95	0.49
1:A:238:ARG:HE	1:A:238:ARG:C	2.16	0.48
1:C:207:MET:HG3	1:C:231:PHE:CZ	2.48	0.48
1:D:143:SER:O	1:D:147:GLU:HG2	2.13	0.48
1:D:298:GLU:OE2	5:D:505:BTB:H52	2.13	0.48
1:C:283:ASN:O	1:C:283:ASN:ND2	2.47	0.48
1:A:384:ASP:OD1	5:A:504:BTB:O3	2.26	0.47
1:A:475:TYR:OH	2:A:501:HEM:O1D	2.30	0.47
1:C:160:THR:HG23	1:C:162:THR:H	1.78	0.47
1:C:364:THR:O	1:C:368:CYS:HB2	2.13	0.47
1:A:89:GLN:HG3	1:A:90:GLN:N	2.28	0.47
1:C:306:PRO:HB2	1:C:308:GLU:OE1	2.14	0.47
1:A:147:GLU:O	1:A:151:GLN:NE2	2.42	0.47
1:A:256:GLN:C	1:A:258:ASP:H	2.17	0.47
1:A:368:CYS:SG	1:A:376:LEU:HD13	2.54	0.47
1:B:397:LYS:NZ	10:B:608:HOH:O	2.48	0.47
5:D:505:BTB:H82	5:D:505:BTB:H51	1.73	0.47
1:C:342:GLU:HG3	1:C:347:GLU:HG2	1.96	0.47
1:A:292:LEU:HD22	1:A:300:PRO:HB2	1.95	0.47
1:B:384:ASP:OD1	1:C:388:ARG:NH1	2.48	0.46
1:B:173:GLY:HA3	1:B:343:ILE:HD13	1.97	0.46
1:D:291:LEU:HD11	1:D:305:LEU:HD21	1.98	0.46
5:A:506:BTB:H11	5:A:506:BTB:H51	1.48	0.46
1:A:234:ARG:HA	1:A:238:ARG:HH22	1.80	0.46
5:A:505:BTB:H72	5:A:505:BTB:H41	1.51	0.45
1:D:321:GLU:OE2	5:D:504:BTB:O4	2.34	0.45
1:B:414:LYS:NZ	10:B:605:HOH:O	2.44	0.45
1:B:261:VAL:HG11	1:B:265:PRO:HA	1.97	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:244:TRP:CZ2	1:A:300:PRO:HG3	2.52	0.45
1:C:127:ALA:O	1:C:131:ILE:HG12	2.17	0.45
1:A:178:TRP:CE3	1:A:190:TRP:HA	2.51	0.45
1:B:285:ARG:HD3	10:B:616:HOH:O	2.17	0.45
5:B:509:BTB:H12	1:C:382:CYS:HA	1.99	0.45
1:C:233:GLN:HB3	1:C:348:PHE:CE2	2.51	0.44
1:A:89:GLN:CG	1:A:90:GLN:N	2.81	0.44
1:C:235:CYS:SG	1:C:238:ARG:HD3	2.58	0.44
1:D:255:ARG:HG2	1:D:268:VAL:HG11	1.99	0.44
1:D:317:HIS:NE2	1:D:401:GLU:OE1	2.42	0.44
1:B:479:PRO:HD2	1:B:480:TRP:CE3	2.53	0.44
1:A:364:THR:HG21	1:A:452:ILE:HG23	2.00	0.43
1:C:244:TRP:CD1	1:C:479:PRO:HG2	2.53	0.43
1:C:220:ASN:HB3	1:C:223:ASN:O	2.18	0.43
1:D:364:THR:O	1:D:368:CYS:HB2	2.18	0.43
5:A:504:BTB:H32	5:A:504:BTB:H51	1.83	0.43
1:C:197:ASP:OD2	1:C:199:ARG:NH2	2.42	0.43
5:A:505:BTB:H11	5:A:505:BTB:H51	1.54	0.43
2:B:501:HEM:HHC	2:B:501:HEM:HBB2	1.99	0.43
1:C:357:TYR:CD2	1:C:362:ILE:HD11	2.53	0.43
1:B:90:GLN:NE2	10:B:611:HOH:O	2.52	0.43
1:B:256:GLN:N	1:B:260:SER:O	2.51	0.43
1:D:107:ARG:HD2	1:D:107:ARG:H	1.84	0.43
1:A:229:THR:O	1:A:352:PRO:HD2	2.19	0.43
1:C:244:TRP:CZ2	1:C:300:PRO:HG3	2.54	0.43
1:D:455:SER:HA	1:D:460:PHE:CG	2.54	0.43
1:A:235:CYS:SG	1:A:238:ARG:HB3	2.59	0.43
1:A:455:SER:HA	1:A:460:PHE:CG	2.54	0.43
5:A:504:BTB:H72	5:A:504:BTB:H12	1.64	0.43
2:D:501:HEM:HBB2	2:D:501:HEM:HHC	2.00	0.43
1:B:317:HIS:CG	1:B:318:PRO:HD2	2.54	0.42
1:A:378:ASP:OD1	10:A:602:HOH:O	2.22	0.42
1:A:201:CYS:SG	1:A:206:GLU:HB3	2.58	0.42
5:A:504:BTB:H41	5:A:504:BTB:C8	2.49	0.42
1:A:102:SER:O	3:A:502:H4B:O10	2.37	0.41
1:B:121:GLU:HB3	1:B:122:GLN:OE1	2.19	0.41
1:D:244:TRP:HB2	1:D:292:LEU:HB2	2.02	0.41
1:A:393:LEU:O	1:A:397:LYS:HG3	2.19	0.41
1:B:302:LEU:HD12	1:B:302:LEU:HA	1.91	0.41
1:B:387:THR:HA	1:B:394:TRP:CD1	2.55	0.41
1:C:450:PRO:HG3	1:C:457:THR:HG21	2.02	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:A:506:BTB:H72	5:A:506:BTB:H41	1.57	0.41
1:C:479:PRO:HD2	1:C:480:TRP:CZ3	2.56	0.41
1:B:229:THR:O	1:B:351:ALA:HA	2.21	0.41
1:C:368:CYS:SG	1:C:376:LEU:HD13	2.61	0.41
1:A:246:SER:HA	1:A:338:ASN:HB3	2.02	0.41
1:B:147:GLU:HA	1:B:150:LEU:HD12	2.03	0.41
1:C:138:ILE:O	1:C:140:ARG:HG2	2.20	0.41
1:C:342:GLU:OE1	1:C:474:ARG:NH2	2.54	0.41
5:C:505:BTB:H61	5:C:505:BTB:O8	2.20	0.41
1:C:247:GLN:HB2	1:C:250:ARG:HG2	2.02	0.41
1:C:364:THR:HG21	1:C:452:ILE:HG23	2.02	0.40
1:D:107:ARG:HD2	1:D:107:ARG:N	2.36	0.40
1:A:204:ALA:HA	1:A:207:MET:HG3	2.04	0.40
1:C:138:ILE:HG13	1:C:140:ARG:HB2	2.02	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	398/440 (90%)	382 (96%)	14 (4%)	2 (0%)	25 22
1	B	400/440 (91%)	389 (97%)	10 (2%)	1 (0%)	37 36
1	C	399/440 (91%)	379 (95%)	18 (4%)	2 (0%)	25 22
1	D	399/440 (91%)	392 (98%)	7 (2%)	0	100 100
All	All	1596/1760 (91%)	1542 (97%)	49 (3%)	5 (0%)	37 36

All (5) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	258	ASP

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Mol	Chain	Res	Type
1	A	257	GLN
1	B	89	GLN
1	C	89	GLN
1	C	454	GLY

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%)	323 (94%)	19 (6%)	17	15
1	B	343/373 (92%)	330 (96%)	13 (4%)	28	29
1	C	342/373 (92%)	322 (94%)	20 (6%)	17	14
1	D	342/373 (92%)	332 (97%)	10 (3%)	37	40
All	All	1369/1492 (92%)	1307 (96%)	62 (4%)	23	22

All (62) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	71	VAL
1	A	87	GLN
1	A	89	GLN
1	A	97	ARG
1	A	121	GLU
1	A	122	GLN
1	A	128	ARG
1	A	147	GLU
1	A	206	GLU
1	A	209	THR
1	A	216	LYS
1	A	238	ARG
1	A	245	ASN
1	A	250	ARG
1	A	272	GLU
1	A	321	GLU
1	A	329	ARG

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Mol	Chain	Res	Type
1	A	342	GLU
1	A	470	SER
1	B	89	GLN
1	B	97	ARG
1	B	122	GLN
1	B	128	ARG
1	B	139	LYS
1	B	148	GLN
1	B	176	GLN
1	B	224	LEU
1	B	255	ARG
1	B	257	GLN
1	B	276	GLN
1	B	309	LEU
1	B	389	THR
1	C	67	LYS
1	C	89	GLN
1	C	98	ARG
1	C	121	GLU
1	C	125	SER
1	C	149	ARG
1	C	151	GLN
1	C	154	GLU
1	C	170	LEU
1	C	200	ASP
1	C	202	ARG
1	C	233	GLN
1	C	238	ARG
1	C	255	ARG
1	C	257	GLN
1	C	280	THR
1	C	329	ARG
1	C	396	ASP
1	C	429	LYS
1	C	470	SER
1	D	98	ARG
1	D	136	SER
1	D	192	LYS
1	D	255	ARG
1	D	258	ASP
1	D	309	LEU
1	D	326	LEU

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Mol	Chain	Res	Type
1	D	389	THR
1	D	396	ASP
1	D	436	LYS

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

Mol	Chain	Res	Type
1	C	294	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 oligosaccharides in this entry.

5.6 Ligand geometry

Of 40 ligands modelled in this entry, 10 are monoatomic - leaving 30 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	$\#\|Z\| > 2$
6	GOL	A	508	-	5,5,5	0.86	0	5,5,5	1.03	0
3	H4B	A	502	-	16,18,18	0.94	0	14,26,26	2.59	6 (42%)
2	HEM	D	501	1	42,50,50	1.58	6 (14%)	46,82,82	1.71	9 (19%)
5	BTB	C	505	-	13,13,13	0.36	0	7,16,16	0.53	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\|>2$	Counts	RMSZ	$\#\|Z\|>2$
3	H4B	C	502	-	16,18,18	0.86	0	14,26,26	2.38	5 (35%)
4	A1A0B	D	503	-	20,20,20	0.62	0	27,28,28	1.64	5 (18%)
4	A1A0B	B	503	-	20,20,20	0.80	1 (5%)	27,28,28	1.54	6 (22%)
5	BTB	A	505	-	13,13,13	0.50	0	7,16,16	0.98	0
5	BTB	A	504	8	13,13,13	0.66	0	7,16,16	1.49	1 (14%)
2	HEM	C	501	1	42,50,50	1.56	8 (19%)	46,82,82	1.70	10 (21%)
5	BTB	D	504	8	13,13,13	0.39	0	7,16,16	0.76	0
3	H4B	D	502	-	16,18,18	0.86	0	14,26,26	2.36	5 (35%)
6	GOL	C	509	-	5,5,5	0.92	0	5,5,5	1.22	1 (20%)
5	BTB	B	504	8	13,13,13	0.46	0	7,16,16	0.73	0
3	H4B	B	502	-	16,18,18	0.96	0	14,26,26	2.51	6 (42%)
5	BTB	C	504	-	13,13,13	0.47	0	7,16,16	0.85	0
5	BTB	D	505	-	13,13,13	0.54	0	7,16,16	1.05	0
2	HEM	A	501	1	42,50,50	1.49	6 (14%)	46,82,82	1.74	14 (30%)
5	BTB	A	506	-	13,13,13	0.34	0	7,16,16	0.54	0
6	GOL	B	506	-	5,5,5	0.74	0	5,5,5	1.08	0
2	HEM	B	501	1	42,50,50	1.57	6 (14%)	46,82,82	1.86	17 (36%)
6	GOL	C	506	-	5,5,5	0.85	0	5,5,5	1.23	1 (20%)
6	GOL	A	507	-	5,5,5	0.83	0	5,5,5	1.07	0
4	A1A0B	A	503	-	20,20,20	0.50	0	27,28,28	1.75	5 (18%)
6	GOL	C	508	-	5,5,5	0.99	0	5,5,5	1.02	0
5	BTB	B	509	8	13,13,13	0.57	0	7,16,16	1.48	1 (14%)
6	GOL	D	506	-	5,5,5	1.09	0	5,5,5	1.00	0
6	GOL	C	507	-	5,5,5	1.45	1 (20%)	5,5,5	1.39	1 (20%)
5	BTB	B	505	-	13,13,13	0.53	0	7,16,16	0.62	0
4	A1A0B	C	503	-	20,20,20	0.39	0	27,28,28	1.80	6 (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
6	GOL	A	508	-	-	3/4/4/4	-
3	H4B	A	502	-	-	3/8/17/17	0/2/2/2
2	HEM	D	501	1	-	3/12/54/54	-
5	BTB	C	505	-	-	4/21/21/21	-
3	H4B	C	502	-	-	0/8/17/17	0/2/2/2

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	A1A0B	D	503	-	-	1/7/7/7	0/2/2/2
4	A1A0B	B	503	-	-	0/7/7/7	0/2/2/2
5	BTB	A	505	-	-	10/21/21/21	-
5	BTB	A	504	8	-	5/21/21/21	-
2	HEM	C	501	1	-	4/12/54/54	-
5	BTB	D	504	8	-	4/21/21/21	-
3	H4B	D	502	-	-	0/8/17/17	0/2/2/2
6	GOL	C	509	-	-	4/4/4/4	-
5	BTB	B	504	8	-	3/21/21/21	-
3	H4B	B	502	-	-	1/8/17/17	0/2/2/2
5	BTB	C	504	-	-	10/21/21/21	-
5	BTB	D	505	-	-	5/21/21/21	-
2	HEM	A	501	1	-	2/12/54/54	-
5	BTB	A	506	-	-	3/21/21/21	-
6	GOL	B	506	-	-	2/4/4/4	-
2	HEM	B	501	1	-	1/12/54/54	-
6	GOL	C	506	-	-	4/4/4/4	-
6	GOL	A	507	-	-	0/4/4/4	-
4	A1A0B	A	503	-	-	0/7/7/7	0/2/2/2
6	GOL	C	508	-	-	2/4/4/4	-
5	BTB	B	509	8	-	8/21/21/21	-
6	GOL	D	506	-	-	2/4/4/4	-
6	GOL	C	507	-	-	2/4/4/4	-
5	BTB	B	505	-	-	10/21/21/21	-
4	A1A0B	C	503	-	-	1/7/7/7	0/2/2/2

All (28) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	D	501	HEM	C3C-C2C	-4.32	1.34	1.40
2	B	501	HEM	C3C-CAC	3.77	1.56	1.47
2	C	501	HEM	C3C-CAC	3.61	1.55	1.47
2	D	501	HEM	C3C-C4C	3.55	1.46	1.41
2	C	501	HEM	C3C-C2C	-3.44	1.35	1.40
2	A	501	HEM	C3C-CAC	3.40	1.55	1.47
2	B	501	HEM	C3C-C4C	3.38	1.46	1.41
2	A	501	HEM	C3C-C2C	-3.37	1.35	1.40
2	C	501	HEM	CAB-C3B	3.37	1.56	1.47

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	501	HEM	CAB-C3B	3.36	1.56	1.47
2	C	501	HEM	C3C-C4C	3.31	1.46	1.41
2	D	501	HEM	C3C-CAC	3.20	1.54	1.47
2	A	501	HEM	CAB-C3B	3.19	1.55	1.47
2	B	501	HEM	C3C-C2C	-3.05	1.36	1.40
2	D	501	HEM	FE-NB	2.96	2.14	1.98
2	D	501	HEM	CAB-C3B	2.83	1.54	1.47
2	A	501	HEM	C3C-C4C	2.78	1.45	1.41
2	B	501	HEM	FE-NB	2.68	2.13	1.98
2	D	501	HEM	CMD-C2D	2.62	1.56	1.50
2	C	501	HEM	CMB-C2B	2.47	1.55	1.50
6	C	507	GOL	O1-C1	-2.41	1.32	1.42
2	A	501	HEM	FE-NB	2.39	2.11	1.98
2	C	501	HEM	FE-NB	2.10	2.09	1.98
4	B	503	A1A0B	C17-N18	2.10	1.49	1.46
2	B	501	HEM	FE-ND	2.05	2.09	1.98
2	A	501	HEM	CMD-C2D	2.05	1.55	1.50
2	C	501	HEM	C2C-C1C	2.04	1.47	1.42
2	C	501	HEM	CHA-C4D	2.01	1.39	1.34

All (99) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	A	502	H4B	C8A-C4A-C4	6.11	120.06	114.50
4	C	503	A1A0B	C06-N01-C02	6.11	122.31	118.52
4	A	503	A1A0B	C06-N01-C02	6.10	122.31	118.52
2	D	501	HEM	CBA-CAA-C2A	-5.73	102.91	112.54
3	B	502	H4B	C8A-C4A-C4	5.73	119.71	114.50
3	C	502	H4B	C8A-C4A-C4	5.37	119.39	114.50
3	D	502	H4B	C8A-C4A-C4	4.82	118.89	114.50
4	B	503	A1A0B	C06-N01-C02	4.81	121.51	118.52
2	B	501	HEM	C4B-CHC-C1C	4.15	128.03	122.56
2	C	501	HEM	C4B-CHC-C1C	3.94	127.76	122.56
3	B	502	H4B	N1-C2-N3	-3.84	119.60	125.48
4	D	503	A1A0B	C06-N01-C02	3.84	120.90	118.52
3	D	502	H4B	C2-N3-C4	3.79	121.23	115.96
2	A	501	HEM	CBA-CAA-C2A	-3.79	106.17	112.54
4	D	503	A1A0B	C11-C12-C13	-3.59	119.59	121.69
3	D	502	H4B	N1-C2-N3	-3.57	120.00	125.48
3	C	502	H4B	N1-C2-N3	-3.57	120.01	125.48
2	B	501	HEM	C4D-ND-C1D	3.52	109.38	105.21
3	B	502	H4B	C2-N3-C4	3.52	120.86	115.96

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	B	501	HEM	CBA-CAA-C2A	-3.50	106.65	112.54
3	A	502	H4B	C2-N3-C4	3.44	120.74	115.96
2	D	501	HEM	C4C-CHD-C1D	3.42	127.08	122.56
2	A	501	HEM	C4B-CHC-C1C	3.42	127.08	122.56
3	A	502	H4B	N1-C2-N3	-3.42	120.24	125.48
4	D	503	A1A0B	C15-C17-N18	-3.34	104.63	112.67
4	A	503	A1A0B	C15-C17-N18	-3.32	104.70	112.67
2	B	501	HEM	C1B-NB-C4B	3.30	109.11	105.21
2	A	501	HEM	C3B-C2B-C1B	3.28	108.87	106.41
3	C	502	H4B	C2-N3-C4	3.25	120.48	115.96
2	C	501	HEM	C3B-C4B-NB	-3.22	107.16	109.47
2	C	501	HEM	C1B-NB-C4B	3.21	109.01	105.21
5	B	509	BTB	O3-C3-C2	3.17	118.85	111.40
2	C	501	HEM	C3B-C2B-C1B	3.11	108.75	106.41
2	D	501	HEM	C4A-C3A-C2A	3.07	109.13	107.00
4	A	503	A1A0B	C11-C12-C13	-3.06	119.90	121.69
2	B	501	HEM	C3B-C2B-C1B	3.06	108.71	106.41
5	A	504	BTB	O3-C3-C2	3.05	118.57	111.40
2	C	501	HEM	C3D-C4D-ND	-3.03	106.85	110.17
2	B	501	HEM	C3B-C4B-NB	-3.02	107.30	109.47
4	D	503	A1A0B	N02-C02-N01	3.00	121.41	116.59
2	C	501	HEM	C4D-ND-C1D	2.99	108.75	105.21
3	B	502	H4B	C2-N1-C8A	2.91	121.50	114.59
2	B	501	HEM	C3D-C4D-ND	-2.90	107.00	110.17
3	A	502	H4B	C11-C10-C9	-2.84	108.63	112.11
2	D	501	HEM	C4D-ND-C1D	2.83	108.55	105.21
4	B	503	A1A0B	C15-C17-N18	-2.80	105.94	112.67
2	A	501	HEM	C1B-NB-C4B	2.75	108.46	105.21
3	D	502	H4B	C2-N1-C8A	2.75	121.12	114.59
3	C	502	H4B	N2-C2-N3	2.74	121.34	117.22
3	C	502	H4B	C2-N1-C8A	2.73	121.07	114.59
2	A	501	HEM	C3B-C4B-NB	-2.70	107.53	109.47
4	B	503	A1A0B	C11-C12-C13	-2.70	120.11	121.69
4	A	503	A1A0B	C05-C06-N01	-2.70	119.21	122.34
2	D	501	HEM	CMA-C3A-C4A	-2.69	124.51	128.46
2	B	501	HEM	CHC-C4B-C3B	2.66	128.63	124.57
2	A	501	HEM	C4C-CHD-C1D	2.63	126.03	122.56
2	D	501	HEM	C3D-C4D-ND	-2.61	107.31	110.17
4	C	503	A1A0B	F13-C13-C12	2.59	121.83	118.32
4	C	503	A1A0B	C11-C12-C13	-2.58	120.18	121.69
3	A	502	H4B	C2-N1-C8A	2.56	120.67	114.59
2	D	501	HEM	CMC-C2C-C3C	2.52	129.71	124.68

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	A	501	HEM	C4D-ND-C1D	2.49	108.15	105.21
3	A	502	H4B	N2-C2-N3	2.46	120.90	117.22
4	B	503	A1A0B	C05-C06-N01	-2.44	119.51	122.34
2	B	501	HEM	C4A-C3A-C2A	2.43	108.69	107.00
2	B	501	HEM	C2D-C1D-ND	-2.40	107.13	109.90
2	D	501	HEM	C4B-CHC-C1C	2.40	125.73	122.56
2	A	501	HEM	C3D-C4D-ND	-2.39	107.55	110.17
2	C	501	HEM	C2B-C1B-NB	-2.38	107.10	109.84
2	B	501	HEM	CAD-CBD-CGD	-2.36	107.41	113.67
2	A	501	HEM	CBD-CAD-C3D	-2.35	106.03	112.53
2	B	501	HEM	CHA-C4D-ND	2.33	127.26	124.37
3	D	502	H4B	C4-C4A-N5	2.33	121.89	118.57
2	A	501	HEM	CMA-C3A-C4A	-2.33	125.05	128.46
2	A	501	HEM	C4A-C3A-C2A	2.32	108.61	107.00
2	D	501	HEM	C1B-NB-C4B	2.31	107.94	105.21
6	C	509	GOL	C3-C2-C1	-2.30	103.37	111.80
4	B	503	A1A0B	F13-C13-C12	2.26	121.38	118.32
2	B	501	HEM	CMC-C2C-C3C	2.25	129.19	124.68
2	C	501	HEM	CBD-CAD-C3D	-2.20	106.45	112.53
2	A	501	HEM	CMC-C2C-C3C	2.16	129.00	124.68
4	B	503	A1A0B	N02-C02-N01	2.15	120.04	116.59
2	A	501	HEM	C2B-C1B-NB	-2.14	107.39	109.84
3	B	502	H4B	C11-C10-C9	-2.12	109.52	112.11
4	C	503	A1A0B	C06-C11-C12	-2.11	121.72	124.24
6	C	507	GOL	O1-C1-C2	-2.11	100.86	110.38
2	B	501	HEM	C4C-CHD-C1D	2.09	125.31	122.56
2	B	501	HEM	O2D-CGD-CBD	2.08	120.58	114.00
4	A	503	A1A0B	N02-C02-N01	2.08	119.93	116.59
6	C	506	GOL	C3-C2-C1	-2.07	104.19	111.80
2	B	501	HEM	C2B-C1B-NB	-2.07	107.46	109.84
4	C	503	A1A0B	C17-C15-C14	-2.07	116.21	120.63
3	B	502	H4B	N2-C2-N1	2.07	120.32	117.22
2	B	501	HEM	O1D-CGD-CBD	-2.05	116.58	123.09
4	D	503	A1A0B	F13-C13-C12	2.04	121.09	118.32
4	C	503	A1A0B	N02-C02-N01	2.02	119.84	116.59
2	C	501	HEM	CHA-C4D-ND	2.01	126.87	124.37
2	A	501	HEM	CHD-C1D-ND	2.01	126.60	124.44
2	C	501	HEM	CMC-C2C-C3C	2.01	128.69	124.68

There are no chirality outliers.

All (97) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	502	H4B	C7-C6-C9-C10
4	C	503	A1A0B	C15-C17-N18-C19
4	D	503	A1A0B	C15-C17-N18-C19
5	A	504	BTB	C1-C2-C4-O4
5	A	504	BTB	C3-C2-C4-O4
5	A	504	BTB	N-C2-C4-O4
5	A	505	BTB	C1-C2-C4-O4
5	A	505	BTB	C1-C2-N-C5
5	A	505	BTB	C1-C2-N-C7
5	A	505	BTB	C3-C2-N-C5
5	A	505	BTB	C3-C2-N-C7
5	A	505	BTB	C4-C2-N-C5
5	A	505	BTB	C4-C2-N-C7
5	A	506	BTB	O1-C1-C2-N
5	B	504	BTB	O1-C1-C2-C3
5	B	504	BTB	O1-C1-C2-C4
5	B	504	BTB	O1-C1-C2-N
5	B	505	BTB	O1-C1-C2-N
5	B	505	BTB	C1-C2-N-C5
5	B	505	BTB	C1-C2-N-C7
5	B	505	BTB	C3-C2-N-C5
5	B	505	BTB	C3-C2-N-C7
5	B	505	BTB	C4-C2-N-C5
5	B	505	BTB	C4-C2-N-C7
5	B	509	BTB	O1-C1-C2-C3
5	B	509	BTB	O1-C1-C2-C4
5	B	509	BTB	O1-C1-C2-N
5	B	509	BTB	C1-C2-C3-O3
5	B	509	BTB	C4-C2-C3-O3
5	B	509	BTB	N-C2-C3-O3
5	C	504	BTB	C3-C2-C4-O4
5	C	504	BTB	N-C2-C4-O4
5	C	505	BTB	O1-C1-C2-C3
5	C	505	BTB	O1-C1-C2-C4
5	C	505	BTB	N-C5-C6-O6
5	D	504	BTB	O1-C1-C2-N
5	D	504	BTB	C3-C2-C4-O4
5	D	505	BTB	C1-C2-C3-O3
5	D	505	BTB	C4-C2-C3-O3
5	D	505	BTB	N-C2-C3-O3
6	A	508	GOL	O1-C1-C2-C3
6	B	506	GOL	O1-C1-C2-C3
6	C	506	GOL	C1-C2-C3-O3

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Mol	Chain	Res	Type	Atoms
6	C	507	GOL	C1-C2-C3-O3
6	C	508	GOL	O1-C1-C2-O2
6	C	508	GOL	O1-C1-C2-C3
6	C	509	GOL	C1-C2-C3-O3
5	A	505	BTB	N-C7-C8-O8
5	B	505	BTB	N-C5-C6-O6
2	C	501	HEM	C2A-CAA-CBA-CGA
5	C	504	BTB	N-C5-C6-O6
6	A	508	GOL	O1-C1-C2-O2
6	C	506	GOL	O1-C1-C2-C3
6	C	509	GOL	O1-C1-C2-C3
6	D	506	GOL	C1-C2-C3-O3
5	B	505	BTB	O1-C1-C2-C4
6	C	507	GOL	O2-C2-C3-O3
5	A	506	BTB	N-C5-C6-O6
5	B	505	BTB	N-C7-C8-O8
2	C	501	HEM	C3A-C2A-CAA-CBA
2	C	501	HEM	C1A-C2A-CAA-CBA
3	A	502	H4B	C7-C6-C9-O9
5	A	504	BTB	N-C7-C8-O8
6	B	506	GOL	O1-C1-C2-O2
6	C	506	GOL	O2-C2-C3-O3
5	D	504	BTB	O1-C1-C2-C4
6	C	506	GOL	O1-C1-C2-O2
6	C	509	GOL	O2-C2-C3-O3
6	A	508	GOL	O2-C2-C3-O3
6	C	509	GOL	O1-C1-C2-O2
6	D	506	GOL	O2-C2-C3-O3
5	B	509	BTB	N-C7-C8-O8
2	A	501	HEM	C4B-C3B-CAB-CBB
2	B	501	HEM	C4B-C3B-CAB-CBB
2	C	501	HEM	C4B-C3B-CAB-CBB
5	D	505	BTB	C6-C5-N-C2
5	A	506	BTB	O1-C1-C2-C4
5	C	504	BTB	C1-C2-N-C5
5	C	504	BTB	C1-C2-N-C7
5	C	504	BTB	C3-C2-N-C7
5	C	504	BTB	C4-C2-N-C5
5	C	504	BTB	C4-C2-N-C7
5	C	505	BTB	O1-C1-C2-N
5	D	504	BTB	N-C2-C4-O4
2	A	501	HEM	C2A-CAA-CBA-CGA

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Mol	Chain	Res	Type	Atoms
3	B	502	H4B	C7-C6-C9-O9
5	A	505	BTB	C3-C2-C4-O4
5	D	505	BTB	N-C5-C6-O6
2	D	501	HEM	C3D-CAD-CBD-CGD
5	A	505	BTB	N-C5-C6-O6
2	D	501	HEM	CAA-CBA-CGA-O2A
2	D	501	HEM	CAA-CBA-CGA-O1A
5	C	504	BTB	C1-C2-C4-O4
3	A	502	H4B	N5-C6-C9-O9
5	A	504	BTB	C3-C2-N-C5
5	B	509	BTB	N-C2-C4-O4
5	C	504	BTB	C3-C2-N-C5

There are no ring outliers.

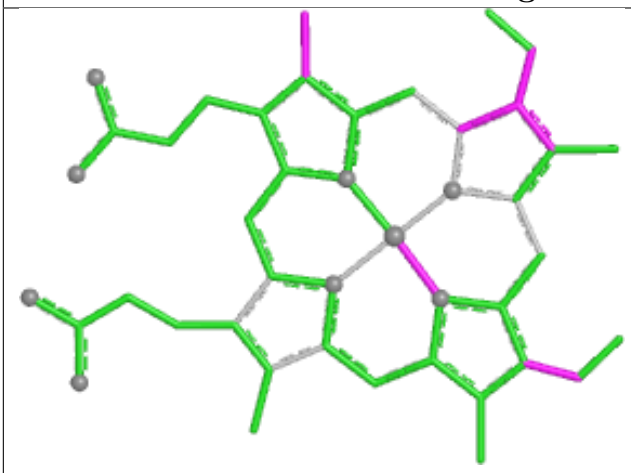
15 monomers are involved in 30 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	502	H4B	2	0
2	D	501	HEM	2	0
5	C	505	BTB	1	0
3	C	502	H4B	1	0
5	A	505	BTB	3	0
5	A	504	BTB	4	0
2	C	501	HEM	4	0
5	D	504	BTB	1	0
5	D	505	BTB	3	0
2	A	501	HEM	3	0
5	A	506	BTB	2	0
2	B	501	HEM	2	0
5	B	509	BTB	1	0
5	B	505	BTB	1	0
4	C	503	A1A0B	1	0

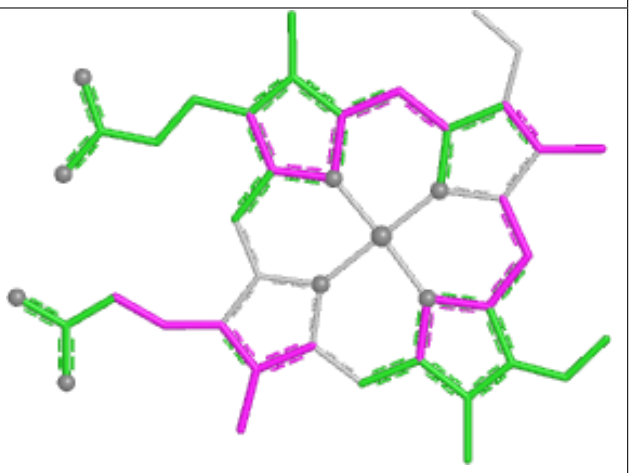
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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

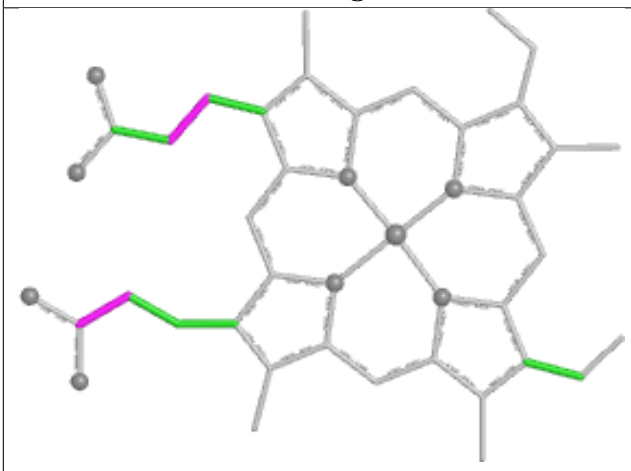
Ligand HEM D 501



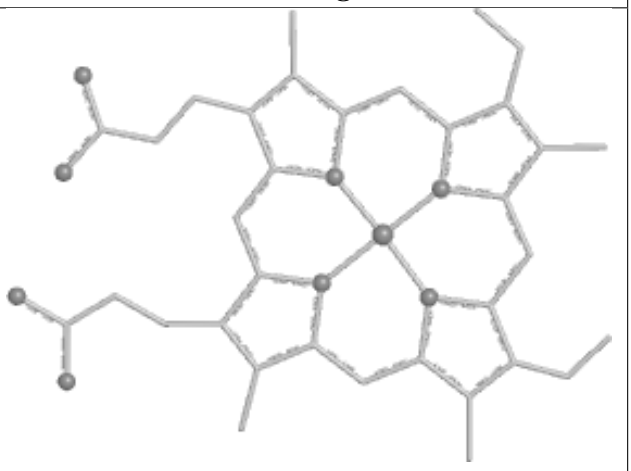
Bond lengths



Bond angles

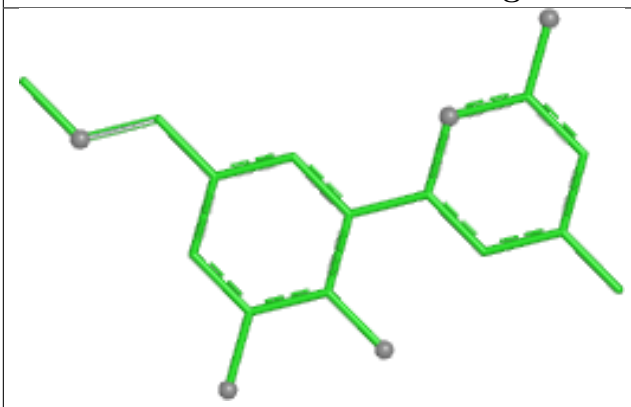


Torsions

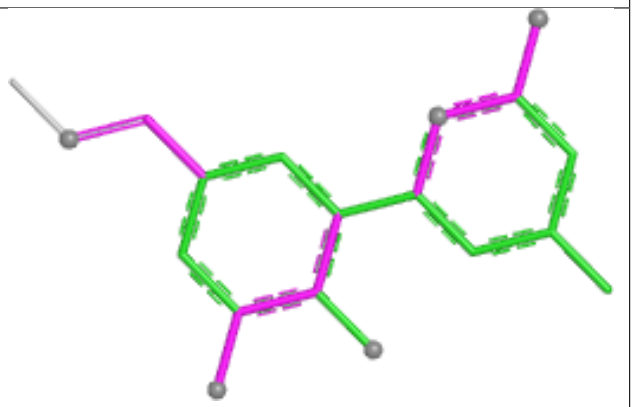


Rings

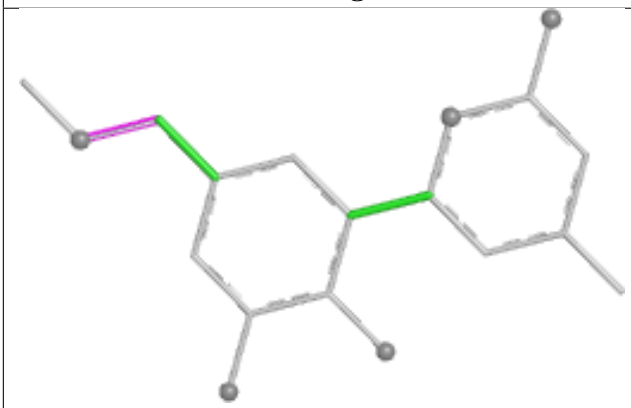
Ligand A1A0B D 503



Bond lengths



Bond angles



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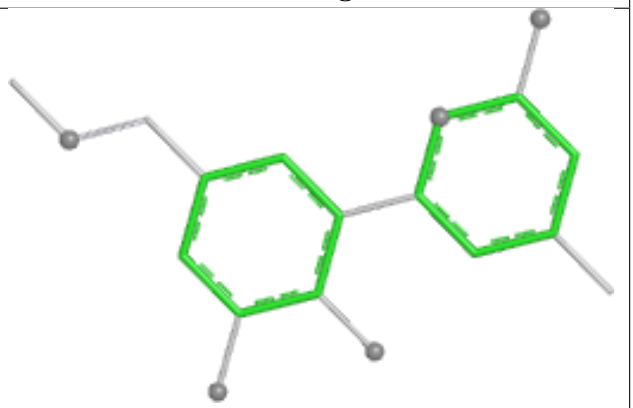
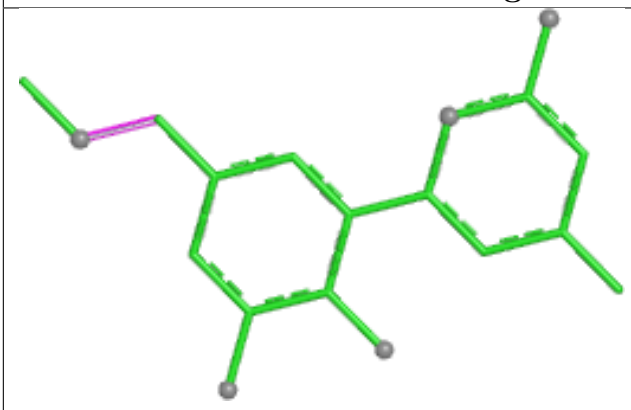
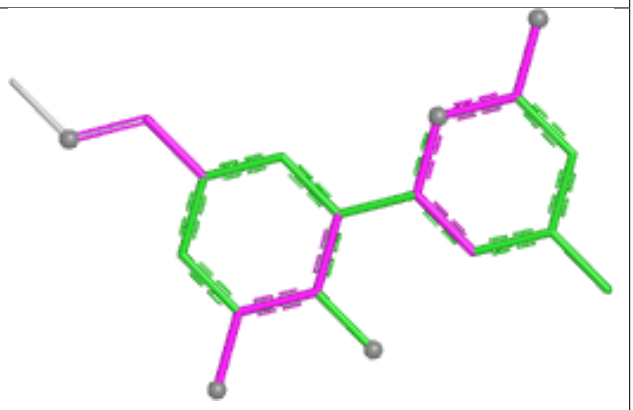


Rings

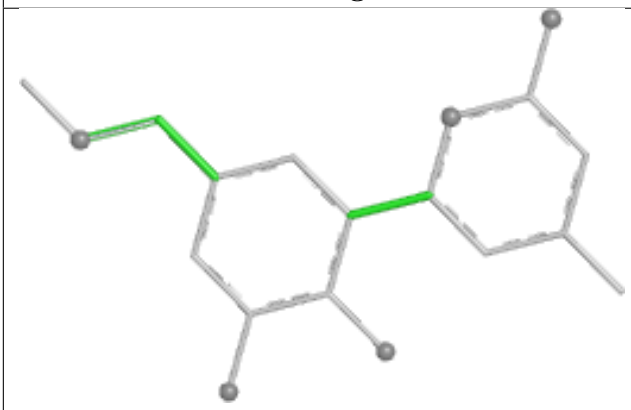
Ligand A1A0B B 503



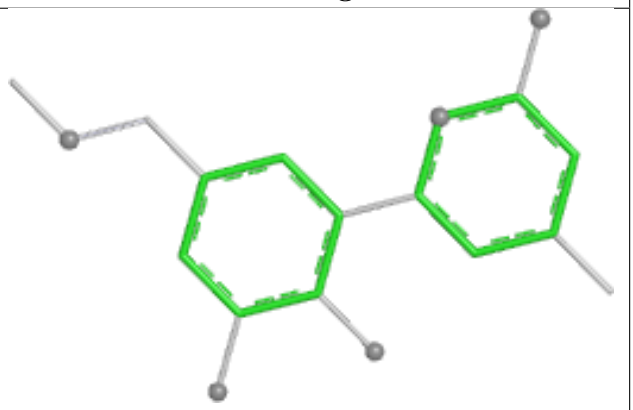
Bond lengths



Bond angles

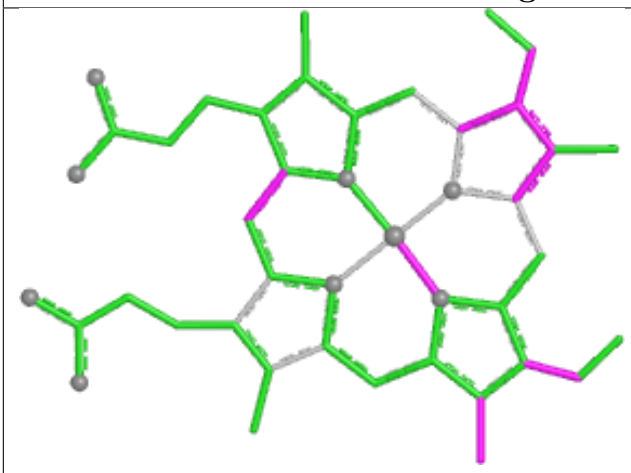


Torsions

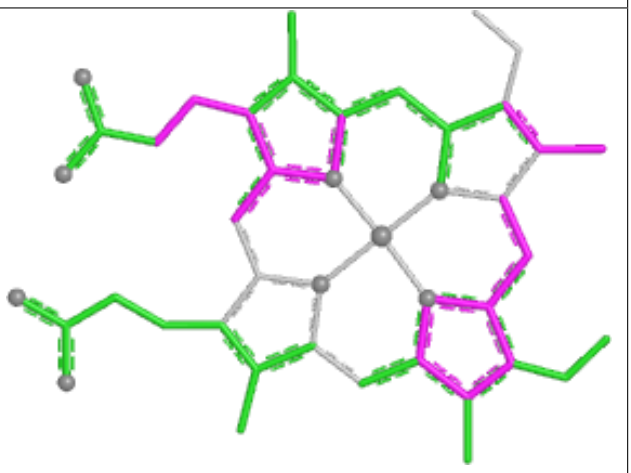


Rings

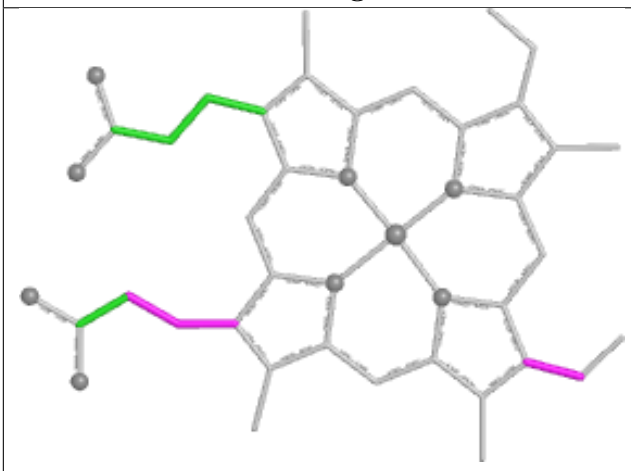
Ligand HEM C 501



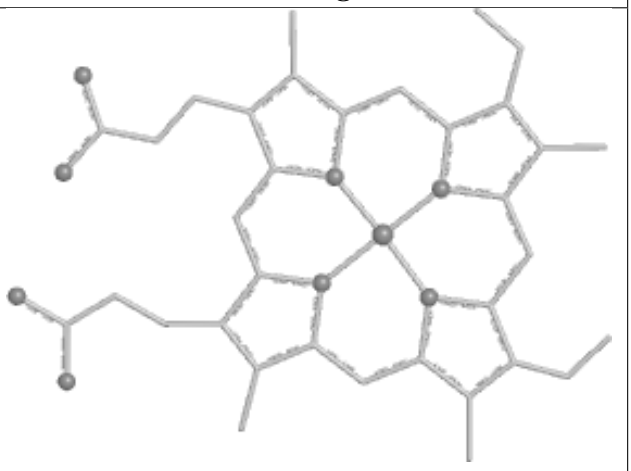
Bond lengths



Bond angles

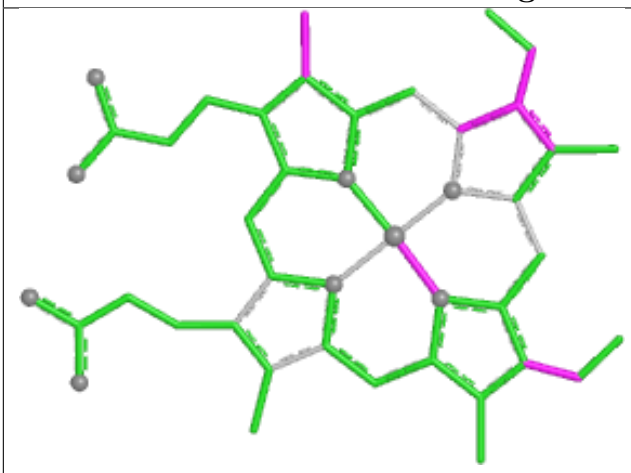


Torsions

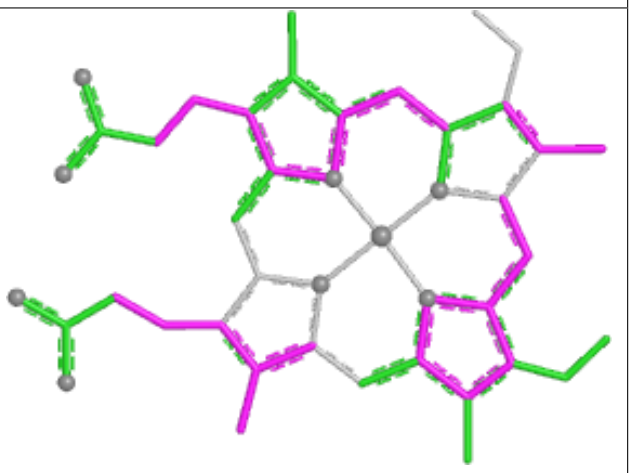


Rings

Ligand HEM A 501



Bond lengths



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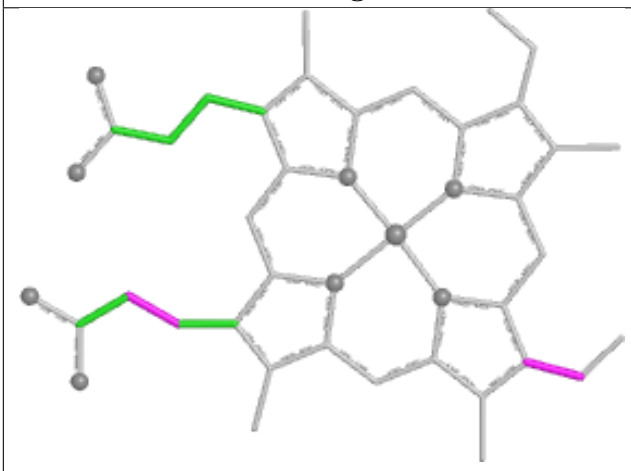
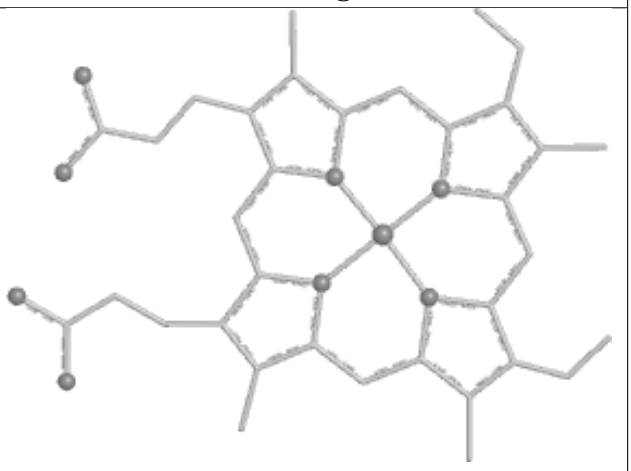
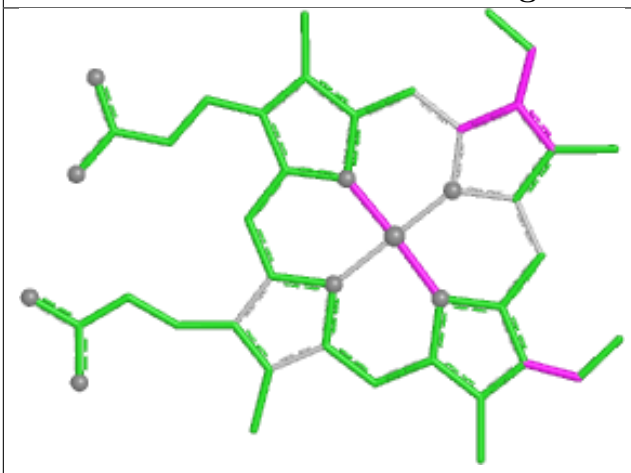


Torsions

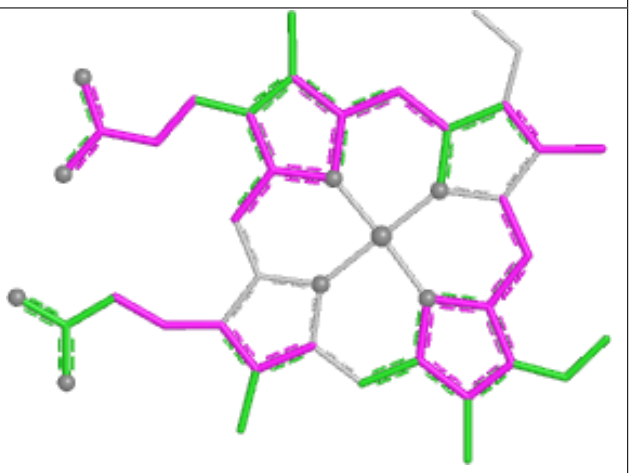


Rings

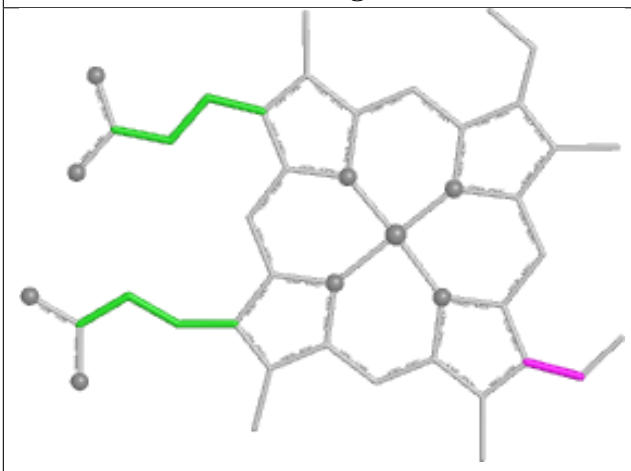
Ligand HEM B 501



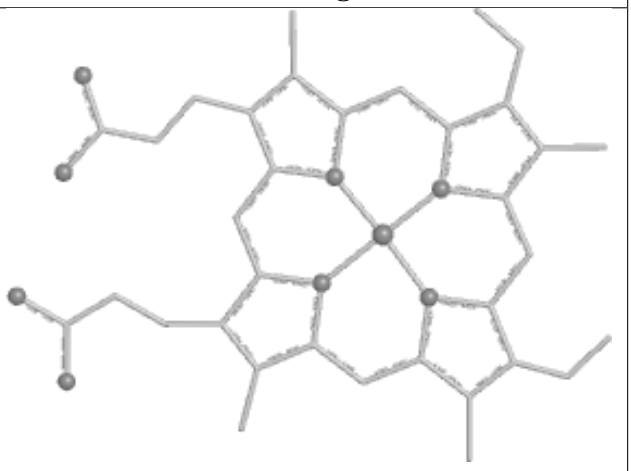
Bond lengths



Bond angles

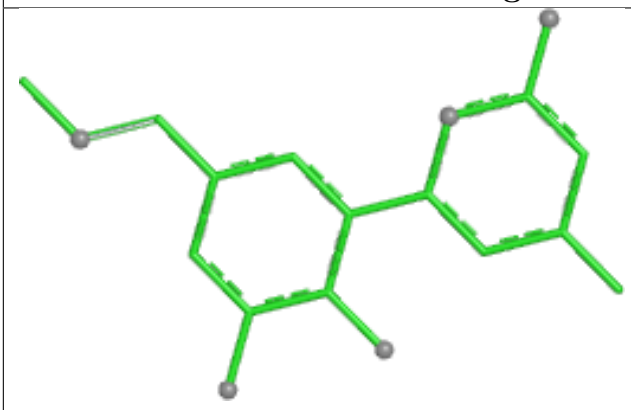


Torsions

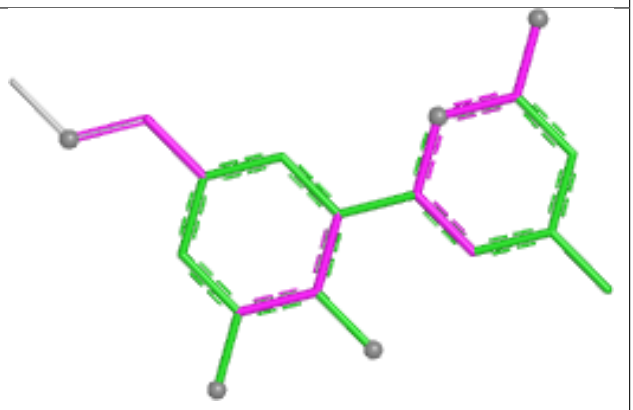


Rings

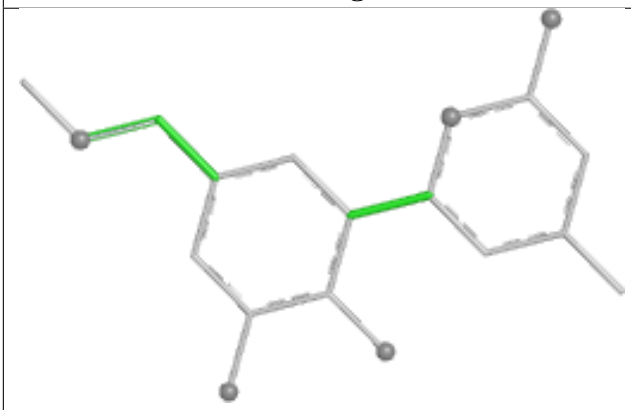
Ligand A1A0B A 503



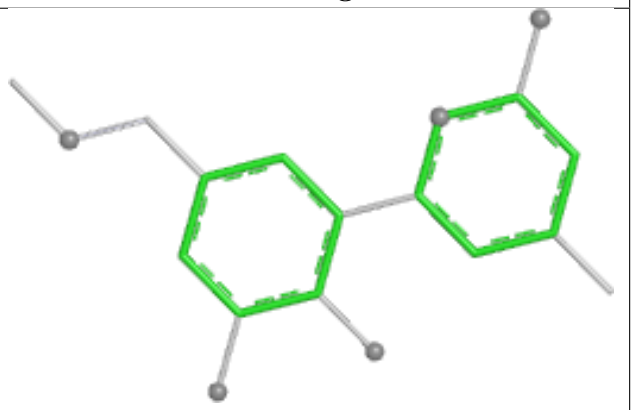
Bond lengths



Bond angles

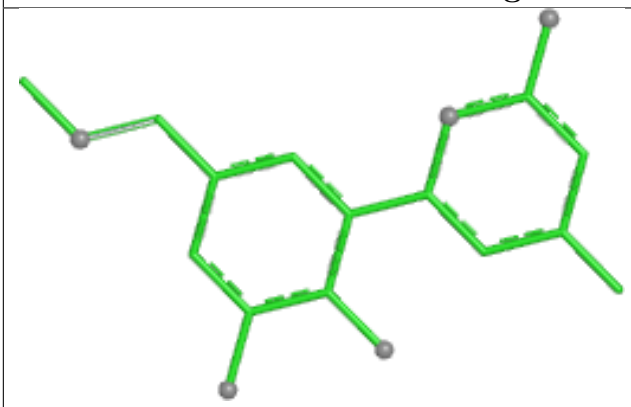


Torsions

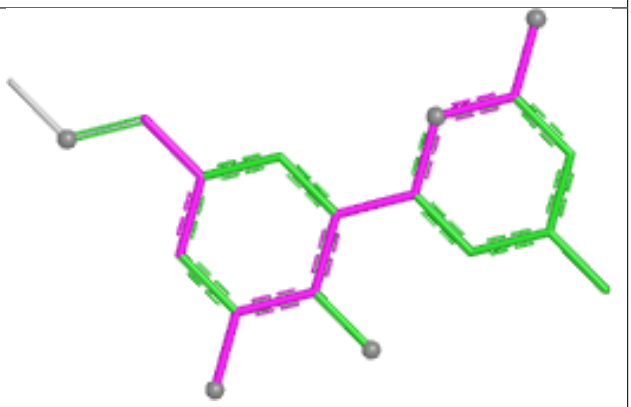


Rings

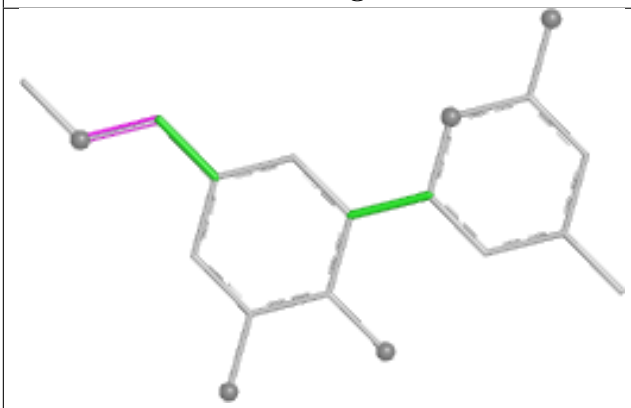
Ligand A1A0B C 503



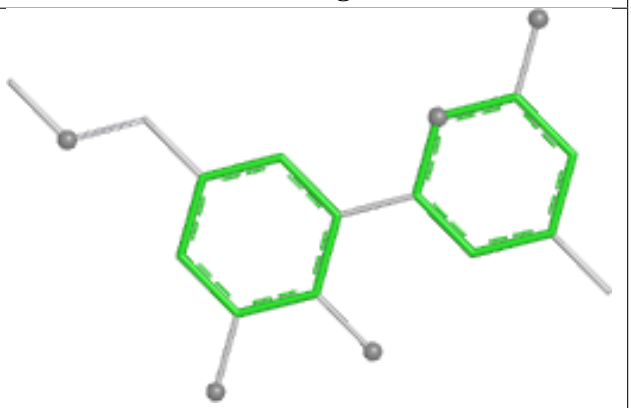
Bond lengths



Bond angles



Torsions



Rings

5.7 Other polymers

There are no such residues in this entry.

5.8 Polymer linkage issues

There are no chain breaks in this entry.

6 Fit of model and data

6.1 Protein, DNA and RNA chains

In the following table, the column labelled '#RSRZ> 2' contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95^{th} percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled 'Q< 0.9' lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2			OWAB(Å^2)	Q<0.9
1	A	401/440 (91%)	-1.33	0	100	100	26, 56, 102, 122	1 (0%)
1	B	401/440 (91%)	-1.52	0	100	100	22, 41, 73, 118	3 (0%)
1	C	402/440 (91%)	-1.36	0	100	100	25, 53, 97, 119	1 (0%)
1	D	402/440 (91%)	-1.53	0	100	100	26, 40, 66, 126	1 (0%)
All	All	1606/1760 (91%)	-1.44	0	100	100	22, 47, 91, 126	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 monosaccharides 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	D	506	6/6	0.95	0.04	68,70,71,74	0
6	GOL	A	508	6/6	0.96	0.04	87,88,90,95	0
5	BTB	C	505	14/14	0.97	0.04	86,93,97,98	0
6	GOL	C	509	6/6	0.97	0.04	77,86,90,94	0

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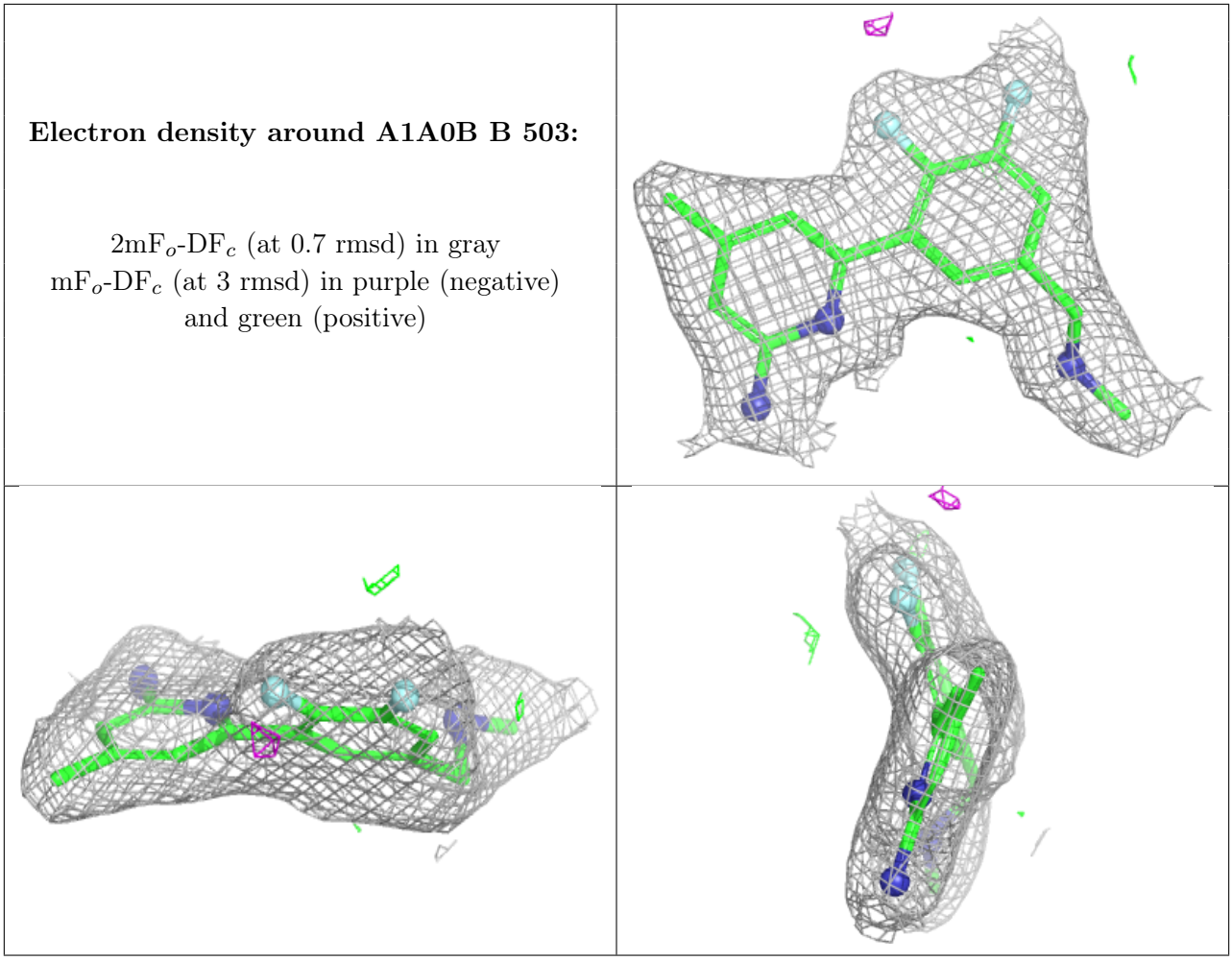
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
5	BTB	D	505	14/14	0.97	0.04	69,75,80,84	0
4	A1A0B	B	503	19/19	0.98	0.04	27,40,53,55	0
4	A1A0B	C	503	19/19	0.98	0.04	41,52,65,67	0
6	GOL	C	506	6/6	0.98	0.03	68,71,76,76	0
5	BTB	A	506	14/14	0.98	0.03	84,96,99,100	0
3	H4B	A	502	17/17	0.98	0.04	44,47,53,57	0
3	H4B	D	502	17/17	0.99	0.03	37,45,49,57	0
5	BTB	B	504	14/14	0.99	0.04	43,51,57,58	0
5	BTB	B	505	14/14	0.99	0.03	74,80,84,86	0
5	BTB	B	509	14/14	0.99	0.04	30,55,67,79	0
5	BTB	C	504	14/14	0.99	0.04	54,65,74,75	0
4	A1A0B	A	503	19/19	0.99	0.04	42,50,64,68	0
5	BTB	D	504	14/14	0.99	0.04	43,53,66,68	0
3	H4B	B	502	17/17	0.99	0.03	36,44,48,48	0
6	GOL	A	507	6/6	0.99	0.03	54,66,75,76	0
3	H4B	C	502	17/17	0.99	0.03	41,46,51,56	0
6	GOL	B	506	6/6	0.99	0.04	48,48,53,55	0
4	A1A0B	D	503	19/19	0.99	0.04	29,40,60,65	0
6	GOL	C	507	6/6	0.99	0.03	33,55,56,73	0
6	GOL	C	508	6/6	0.99	0.03	62,65,71,74	0
5	BTB	A	504	14/14	0.99	0.04	44,58,63,67	0
5	BTB	A	505	14/14	0.99	0.03	71,77,83,83	0
2	HEM	C	501	43/43	1.00	0.03	37,43,63,75	0
2	HEM	D	501	43/43	1.00	0.03	25,32,55,71	0
2	HEM	A	501	43/43	1.00	0.03	40,48,65,85	0
2	HEM	B	501	43/43	1.00	0.03	23,32,50,55	0
7	CL	A	509	1/1	1.00	0.02	50,50,50,50	0
7	CL	B	507	1/1	1.00	0.01	44,44,44,44	0
7	CL	C	510	1/1	1.00	0.02	44,44,44,44	0
7	CL	D	507	1/1	1.00	0.01	36,36,36,36	0
8	GD3	A	510	1/1	1.00	0.01	62,62,62,62	1
8	GD3	B	508	1/1	1.00	0.01	43,43,43,43	0
8	GD3	B	510	1/1	1.00	0.01	57,57,57,57	1
8	GD3	D	508	1/1	1.00	0.01	45,45,45,45	0
9	ZN	A	511	1/1	1.00	0.01	42,42,42,42	0
9	ZN	C	511	1/1	1.00	0.01	34,34,34,34	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.

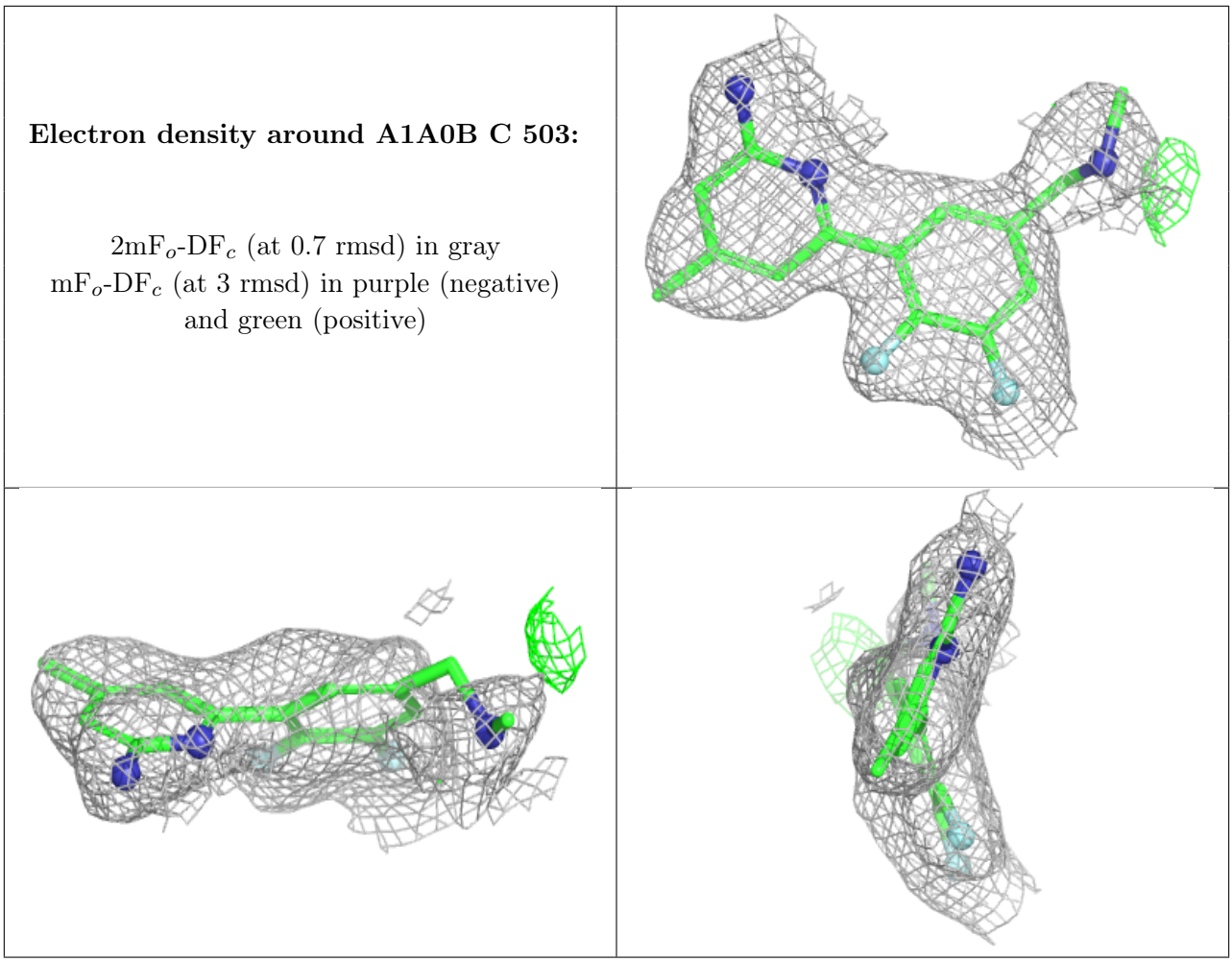
Electron density around A1A0B B 503:

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



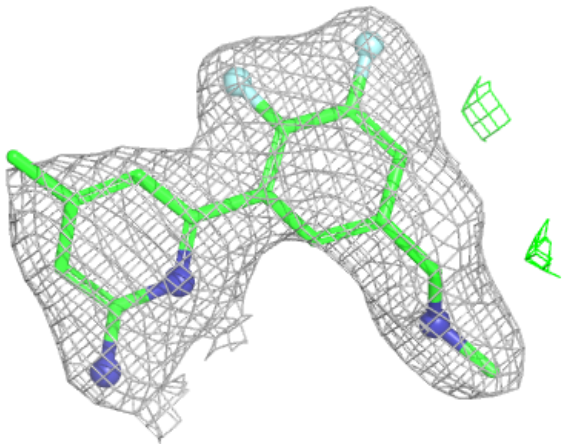
Electron density around A1A0B C 503:

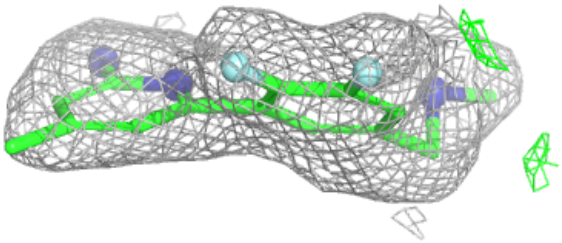
$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)

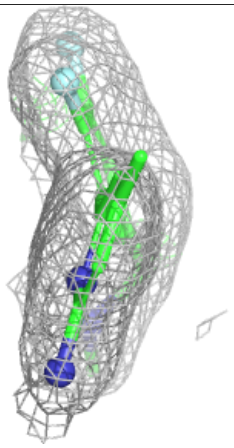


Electron density around A1A0B A 503:

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

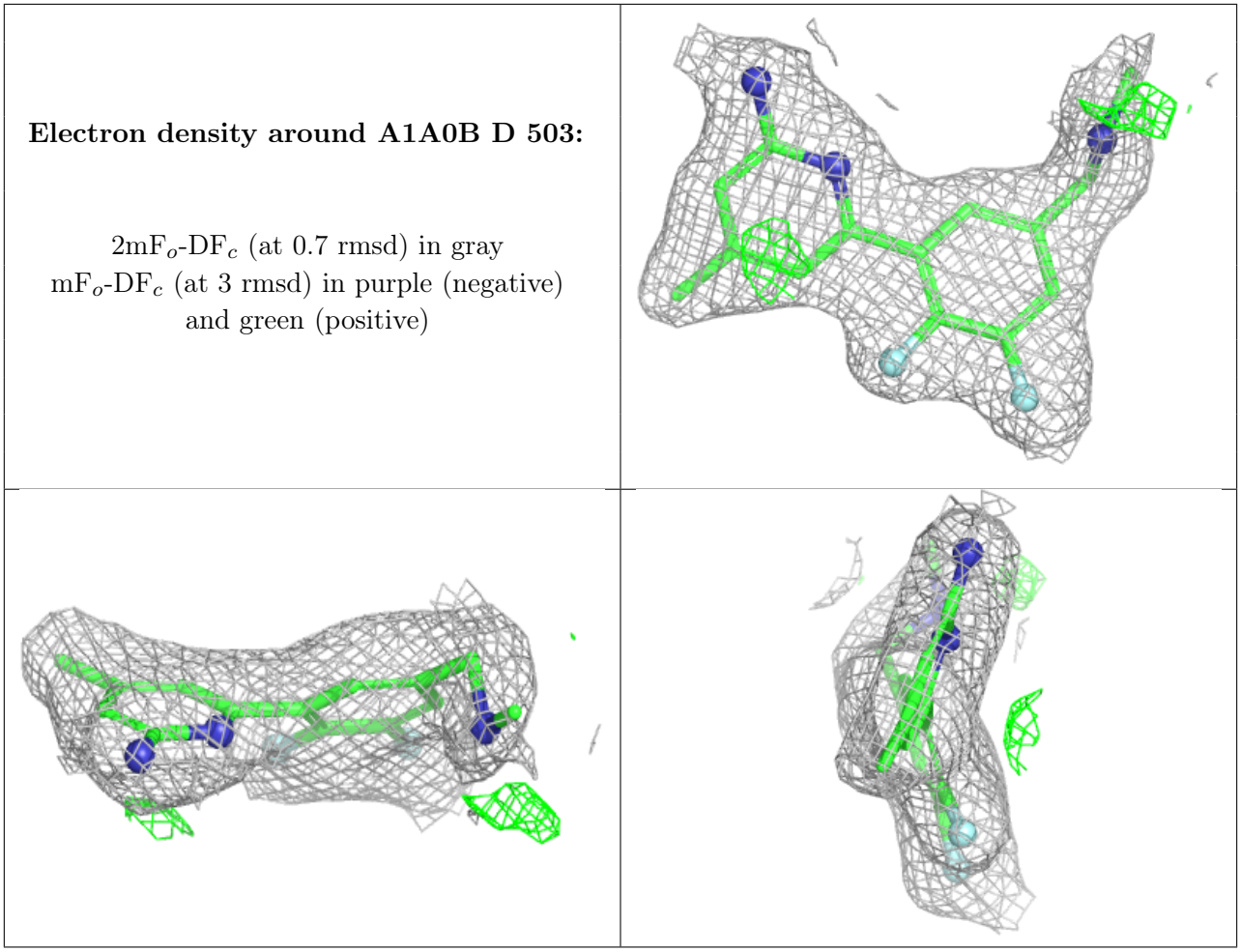






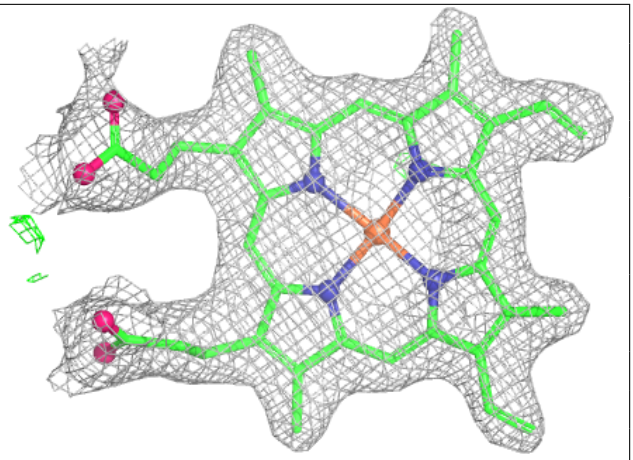
Electron density around A1A0B D 503:

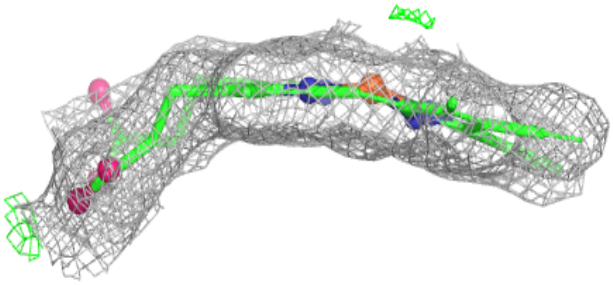
$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)

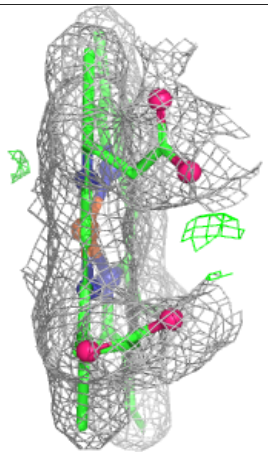


Electron density around HEM C 501:

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







Electron density around HEM D 501:

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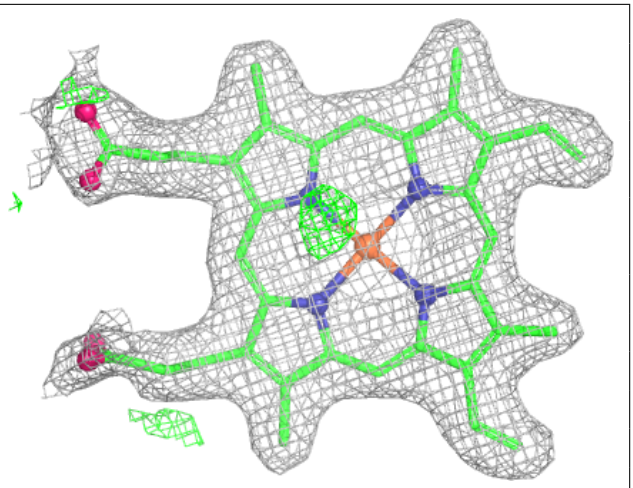
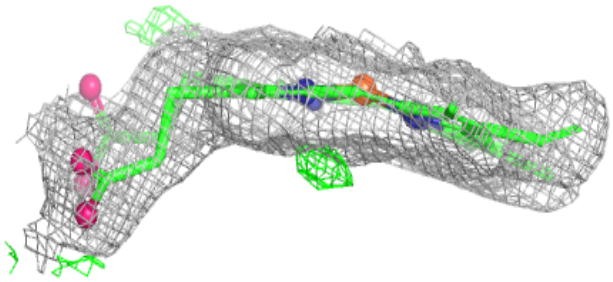
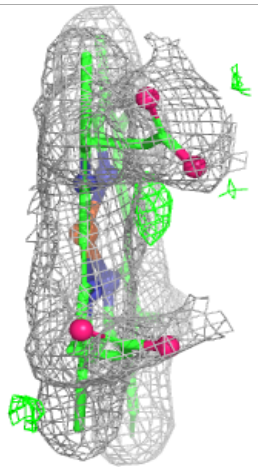
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)

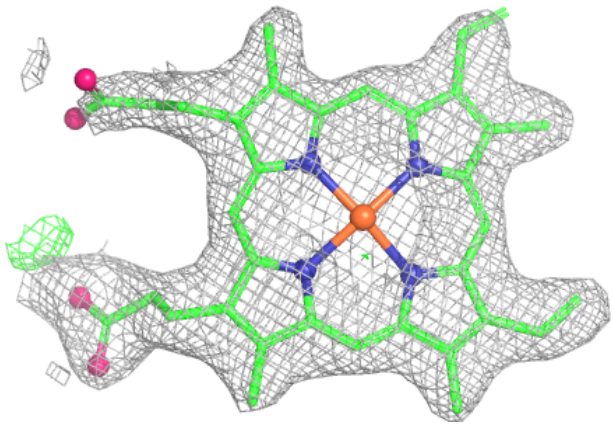


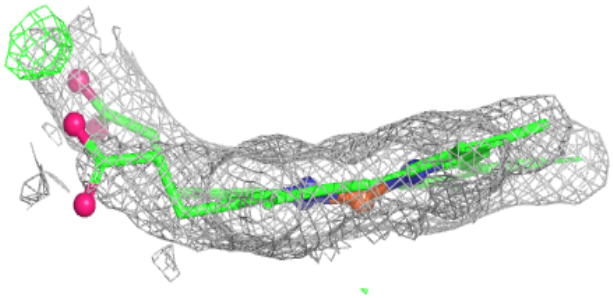


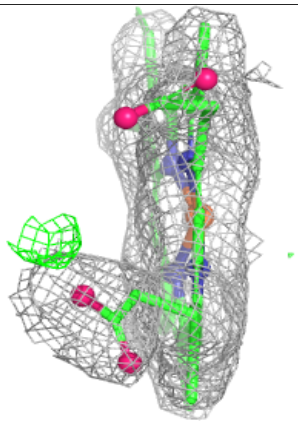


Electron density around HEM A 501:

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

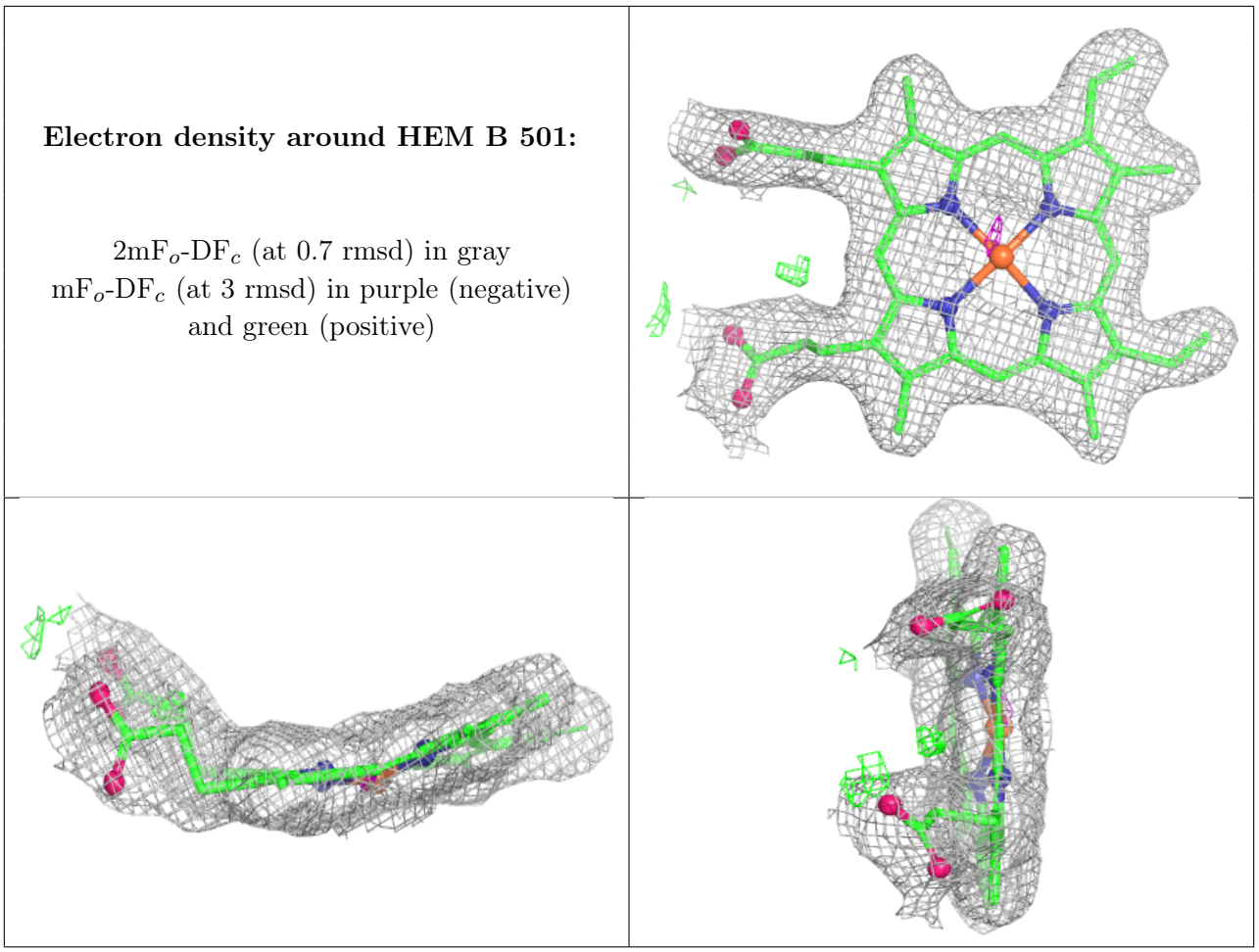






Electron density around HEM B 501:

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



6.5 Other polymers (i)

There are no such residues in this entry.