Full wwPDB X-ray Structure Validation Report ⓘ

Nov 3, 2025 – 03:58 pm GMT

PDB ID	:	9RXH / pdb_00009rxh
Title	:	Cytochrome P450 decarboxylase from Staphylococcus aureus (OleT_Sa) with elaidic acid and acetate bound
Authors	:	Williams, L.J.; Worrall, J.A.R.
Deposited on	:	2025-07-11
Resolution	:	1.83 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:

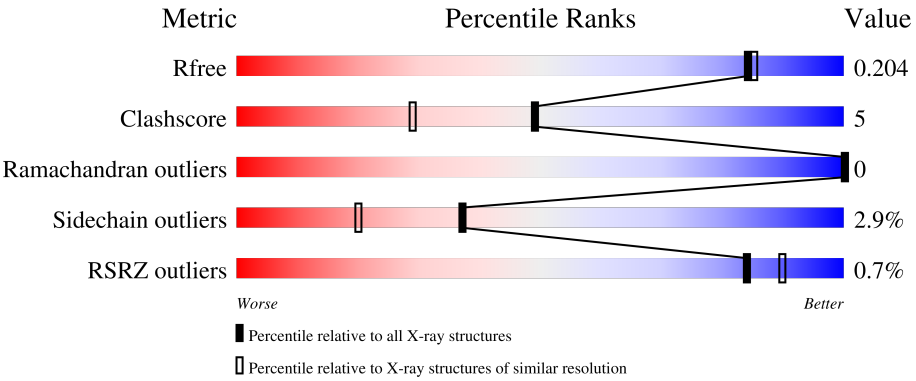
MolProbity	:	4-5-2 with Phenix2.0
Mogul	:	1.8.4, CSD as541be (2020)
Xtriage (Phenix)	:	2.0
EDS	:	3.0
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4	:	9.0.010 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.46

1 Overall quality at a glance (i)

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

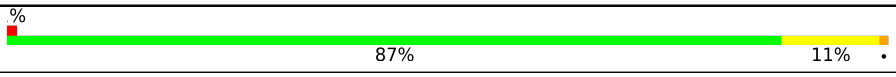
The reported resolution of this entry is 1.83 Å.

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	1150 (1.84-1.84)
Clashscore	180529	1248 (1.84-1.84)
Ramachandran outliers	177936	1240 (1.84-1.84)
Sidechain outliers	177891	1240 (1.84-1.84)
RSRZ outliers	164620	1149 (1.84-1.84)

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	B	429	

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
4	ACT	B	503	-	-	X	-

2 Entry composition

There are 5 unique types of molecules in this entry. The entry contains 3865 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, the ZeroOcc column contains the number of atoms modelled with zero occupancy, the AltConf column contains the number of residues with at least one atom in alternate conformation and the Trace column contains the number of residues modelled with at most 2 atoms.

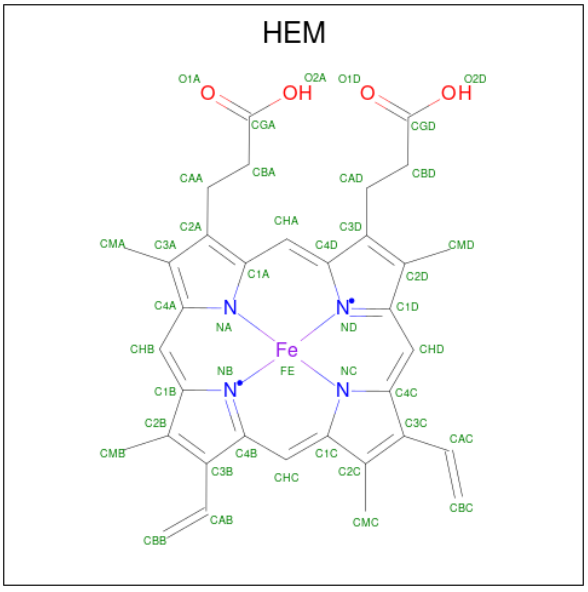
- Molecule 1 is a protein called Cytochrome P450.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	B	428	3513	2239	608	650	16	0	3	0

There is a discrepancy between the modelled and reference sequences:

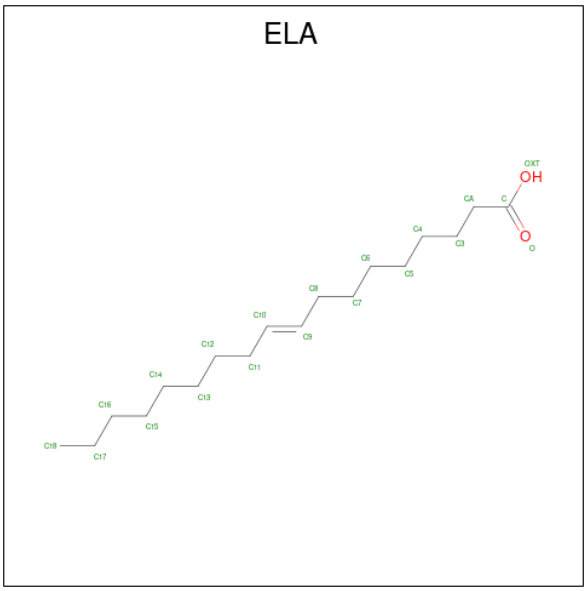
Chain	Residue	Modelled	Actual	Comment	Reference
B	311	LYS	THR	conflict	UNP A0A657XIU7

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



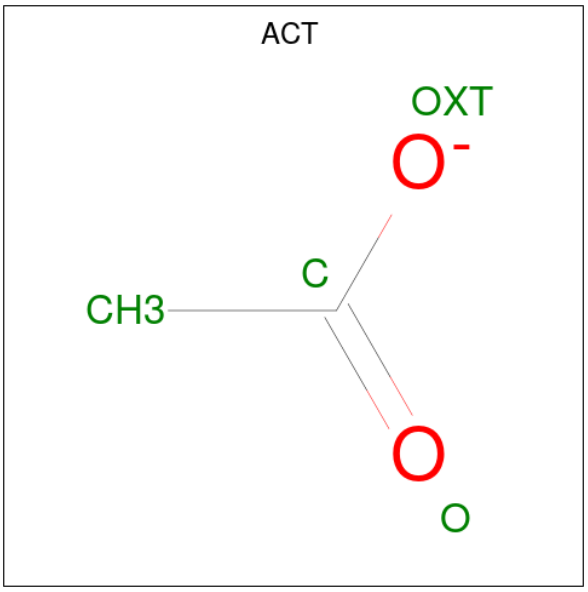
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	Fe	N	O		
2	B	1	86	68	2	8	8	0	1

- Molecule 3 is Elaidic acid (CCD ID: ELA) (formula: $C_{18}H_{34}O_2$) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	B	1	Total C O 20 18 2	0	0

- Molecule 4 is ACETATE ION (CCD ID: ACT) (formula: $C_2H_3O_2$) (labeled as "Ligand of Interest" by depositor).



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

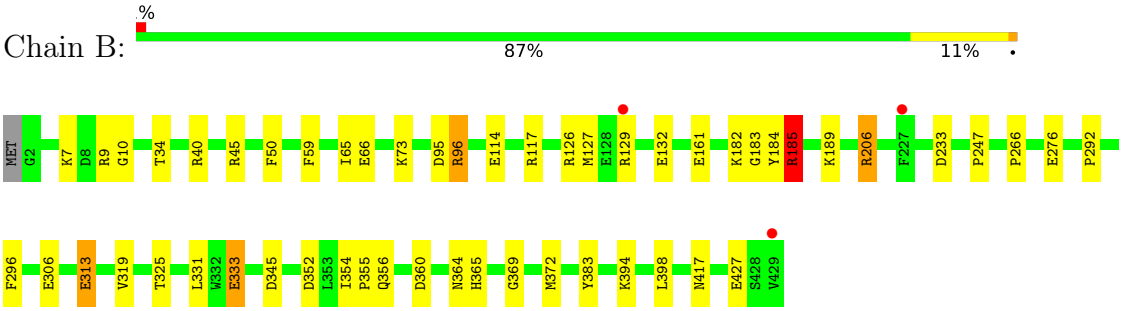
- Molecule 5 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	B	238	Total	O	0	0
			238	238		

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: Cytochrome P450



4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 32 2 1	Depositor
Cell constants a, b, c, α, β, γ	137.79Å 137.79Å 59.21Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	53.04 – 1.83 53.04 – 1.83	Depositor EDS
% Data completeness (in resolution range)	100.0 (53.04-1.83) 100.0 (53.04-1.83)	Depositor EDS
R_{merge}	0.24	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	3.97 (at 1.83Å)	Xtriage
Refinement program	REFMAC 5.8.0430	Depositor
R, R_{free}	0.164 , 0.194 0.175 , 0.204	Depositor DCC
R_{free} test set	3006 reflections (5.26%)	wwPDB-VP
Wilson B-factor (Å^2)	32.8	Xtriage
Anisotropy	0.124	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.34 , 36.5	EDS
L-test for twinning[2]	$< \|L\| > = 0.51$, $< L^2 > = 0.34$	Xtriage
Estimated twinning fraction	0.023 for -h,-k,l	Xtriage
F_o,F_c correlation	0.97	EDS
Total number of atoms	3865	wwPDB-VP
Average B, all atoms (Å^2)	42.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.83% 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: HEM, ELA, ACT

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	B	0.87	1/3590 (0.0%)	1.36	26/4837 (0.5%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand.A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	B	0	4

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	185	ARG	NE-CZ	5.34	1.39	1.33

All (26) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	B	95	ASP	CB-CA-C	-11.36	93.04	110.88
1	B	96	ARG	CA-CB-CG	-8.34	97.43	114.10
1	B	313	GLU	CB-CA-C	7.88	124.04	109.54
1	B	95	ASP	CA-CB-CG	7.69	120.29	112.60
1	B	333	GLU	N-CA-CB	7.46	120.97	109.85
1	B	345	ASP	CB-CA-C	-7.24	99.48	111.13
1	B	189	LYS	CG-CD-CE	6.74	126.81	111.30
1	B	352	ASP	CA-CB-CG	6.55	119.15	112.60
1	B	333	GLU	CB-CA-C	-6.37	99.70	109.89
1	B	114	GLU	CG-CD-OE2	-6.33	103.85	118.40
1	B	266	PRO	CB-CA-C	6.24	119.51	111.46
1	B	206	ARG	NE-CZ-NH1	-6.15	115.35	121.50

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	B	132	GLU	CB-CA-C	-5.92	96.42	109.56
1	B	306	GLU	CB-CG-CD	5.86	122.57	112.60
1	B	185	ARG	CD-NE-CZ	5.78	132.49	124.40
1	B	161	GLU	CG-CD-OE2	-5.73	105.23	118.40
1	B	66	GLU	CG-CD-OE1	-5.66	105.38	118.40
1	B	114	GLU	CG-CD-OE1	5.58	131.23	118.40
1	B	185	ARG	N-CA-CB	5.53	118.34	110.16
1	B	292	PRO	CB-CA-C	-5.40	103.24	110.85
1	B	45	ARG	CG-CD-NE	-5.36	100.22	112.00
1	B	417	ASN	CB-CA-C	-5.35	104.29	111.89
1	B	427	GLU	N-CA-CB	-5.32	101.62	110.39
1	B	34	THR	OG1-CB-CG2	-5.20	98.90	109.30
1	B	325	THR	CA-CB-OG1	-5.04	102.04	109.60
1	B	66	GLU	CG-CD-OE2	5.01	129.93	118.40

There are no chirality outliers.

All (4) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	B	126	ARG	Sidechain
1	B	206	ARG	Sidechain
1	B	40	ARG	Sidechain
1	B	96	ARG	Sidechain

5.2 Too-close contacts (i)

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	B	3513	0	3471	29	0
2	B	86	0	60	15	0
3	B	20	0	33	4	0
4	B	8	0	6	7	0
5	B	238	0	0	2	0
All	All	3865	0	3570	38	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 5.

All (38) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:117[B]:ARG:HH21	1:B:117[B]:ARG:HG3	0.95	1.11
1:B:117[B]:ARG:HH21	1:B:117[B]:ARG:CG	1.71	1.03
1:B:117[B]:ARG:HG3	1:B:117[B]:ARG:NH2	1.73	0.98
2:B:501[A]:HEM:HBC2	2:B:501[A]:HEM:HHD	1.54	0.89
1:B:10:GLY:H	4:B:503:ACT:H3	1.39	0.86
1:B:10:GLY:H	4:B:503:ACT:CH3	1.91	0.83
1:B:9:ARG:HE	4:B:503:ACT:H1	1.53	0.73
1:B:183:GLY:H	1:B:185:ARG:NH1	1.94	0.66
1:B:372:MET:HE2	2:B:501[B]:HEM:HBB1	1.80	0.64
1:B:247:PRO:HB2	2:B:501[A]:HEM:C1C	2.34	0.63
2:B:501[B]:HEM:HBC2	2:B:501[B]:HEM:HHD	1.82	0.62
1:B:183:GLY:H	1:B:185:ARG:HH12	1.46	0.62
1:B:10:GLY:N	4:B:503:ACT:H3	2.15	0.62
2:B:501[A]:HEM:HMA3	3:B:502:ELA:HA1	1.80	0.61
1:B:9:ARG:HE	4:B:503:ACT:CH3	2.13	0.61
1:B:247:PRO:HB2	2:B:501[B]:HEM:C4B	2.38	0.57
1:B:9:ARG:NE	4:B:503:ACT:H1	2.20	0.57
1:B:117[B]:ARG:CG	1:B:117[B]:ARG:NH2	2.45	0.57
2:B:501[A]:HEM:HMB1	2:B:501[A]:HEM:HBB2	1.89	0.53
1:B:184:TYR:HB3	1:B:185:ARG:HH22	1.74	0.53
1:B:369:GLY:HA3	2:B:501[A]:HEM:C3C	2.45	0.51
1:B:59:PHE:HA	1:B:65:ILE:HG13	1.92	0.50
2:B:501[A]:HEM:C3A	3:B:502:ELA:HA1	2.49	0.48
1:B:296:PHE:HB2	1:B:319:VAL:HG13	1.97	0.46
1:B:356:GLN:HA	2:B:501[B]:HEM:HMD1	1.98	0.45
1:B:129[A]:ARG:NH2	5:B:603:HOH:O	2.44	0.45
1:B:10:GLY:H	4:B:503:ACT:H1	1.78	0.44
3:B:502:ELA:H62	3:B:502:ELA:H31	1.65	0.44
1:B:184:TYR:HB3	1:B:185:ARG:NH2	2.32	0.44
1:B:360:ASP:O	1:B:364:ASN:HB2	2.18	0.44
1:B:247:PRO:HB2	2:B:501[A]:HEM:CHC	2.48	0.44
2:B:501[A]:HEM:CMA	3:B:502:ELA:HA1	2.47	0.43
1:B:7:LYS:HE2	5:B:673:HOH:O	2.18	0.43
2:B:501[B]:HEM:HAB	2:B:501[B]:HEM:HMB1	1.58	0.42
2:B:501[A]:HEM:HBC2	2:B:501[A]:HEM:CHD	2.34	0.42
1:B:354:ILE:N	1:B:355:PRO:CD	2.82	0.41
1:B:127:MET:HE1	1:B:383:TYR:HE2	1.85	0.40
1:B:365:HIS:HA	2:B:501[A]:HEM:O1D	2.21	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	B	429/429 (100%)	417 (97%)	12 (3%)	0	100 100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains (i)

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
1	B	377/375 (100%)	366 (97%)	11 (3%)	37 20

All (11) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	B	50	PHE
1	B	73	LYS
1	B	182	LYS
1	B	185	ARG
1	B	233	ASP
1	B	276	GLU
1	B	313	GLU
1	B	331	LEU
1	B	333	GLU
1	B	394	LYS
1	B	398	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (3) such sidechains are listed below:

Mol	Chain	Res	Type
1	B	200	ASN
1	B	263	HIS
1	B	423	ASN

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)

5 ligands are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
4	ACT	B	503	-	3,3,3	1.48	1 (33%)	3,3,3	0.63	0
2	HEM	B	501[A]	1,5	41,50,50	1.46	6 (14%)	45,82,82	1.80	14 (31%)
2	HEM	B	501[B]	1,5	41,50,50	1.53	8 (19%)	45,82,82	2.57	18 (40%)
3	ELA	B	502	-	19,19,19	0.95	1 (5%)	19,19,19	1.64	5 (26%)
4	ACT	B	504	-	3,3,3	1.25	1 (33%)	3,3,3	0.85	0

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	HEM	B	501[A]	1,5	-	1/12/54/54	-
2	HEM	B	501[B]	1,5	-	0/12/54/54	-
3	ELA	B	502	-	-	8/17/17/17	-

All (17) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	B	502	ELA	O-C	3.66	1.34	1.22
2	B	501[A]	HEM	C1D-C2D	-3.17	1.38	1.44
2	B	501[B]	HEM	C1B-C2B	-3.09	1.38	1.44
2	B	501[B]	HEM	C1B-NB	-3.08	1.35	1.40
2	B	501[A]	HEM	C1B-NB	-3.04	1.35	1.40
2	B	501[B]	HEM	FE-NB	3.02	2.11	1.96
2	B	501[A]	HEM	C4D-C3D	-2.98	1.39	1.45
2	B	501[B]	HEM	FE-ND	2.97	2.11	1.96
2	B	501[A]	HEM	C3B-C4B	-2.64	1.39	1.44
2	B	501[B]	HEM	C1A-NA	2.50	1.41	1.36
2	B	501[B]	HEM	C4D-C3D	-2.49	1.40	1.45
2	B	501[B]	HEM	CHA-C4D	2.48	1.41	1.35
2	B	501[A]	HEM	C1B-C2B	-2.46	1.39	1.44
4	B	503	ACT	O-C	2.20	1.32	1.22
2	B	501[B]	HEM	C3C-C2C	-2.10	1.37	1.40
2	B	501[A]	HEM	C2C-C1C	-2.07	1.37	1.42
4	B	504	ACT	CH3-C	2.02	1.57	1.49

All (37) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	B	501[B]	HEM	CAB-C3B-C2B	-6.27	107.95	128.60
2	B	501[B]	HEM	CHC-C4B-NB	-6.08	117.83	124.43
2	B	501[B]	HEM	CHC-C4B-C3B	5.18	132.49	124.57
2	B	501[B]	HEM	CAB-C3B-C4B	4.92	147.40	124.47
2	B	501[A]	HEM	C4B-C3B-C2B	-4.55	103.50	107.11
2	B	501[B]	HEM	C4B-CHC-C1C	4.54	128.54	122.56
2	B	501[B]	HEM	C3B-C2B-C1B	4.40	109.75	106.49
2	B	501[B]	HEM	C4C-CHD-C1D	4.11	127.99	122.56
2	B	501[A]	HEM	C2C-C3C-C4C	-4.06	104.06	106.90
2	B	501[A]	HEM	CAD-CBD-CGD	3.53	121.21	113.60
3	B	502	ELA	OXT-C-O	3.25	131.40	123.30
2	B	501[B]	HEM	CBA-CAA-C2A	3.14	117.98	112.62
3	B	502	ELA	O-C-CA	-3.14	112.99	123.08
2	B	501[B]	HEM	CHB-C1B-NB	3.11	128.23	124.38
2	B	501[B]	HEM	C4B-C3B-C2B	-3.11	104.65	107.11

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	B	501[B]	HEM	CMB-C2B-C3B	-3.01	120.92	128.30
2	B	501[A]	HEM	CHD-C1D-ND	-2.94	121.23	124.43
2	B	501[B]	HEM	C1B-NB-C4B	2.88	108.05	105.07
2	B	501[B]	HEM	CHD-C1D-ND	-2.88	121.31	124.43
2	B	501[B]	HEM	CBD-CAD-C3D	2.79	120.38	112.63
2	B	501[A]	HEM	CHA-C4D-ND	2.79	127.83	124.38
2	B	501[A]	HEM	CMD-C2D-C1D	2.73	129.19	125.04
2	B	501[A]	HEM	C3B-C2B-C1B	2.70	108.49	106.49
2	B	501[B]	HEM	CAA-CBA-CGA	2.67	121.23	113.76
2	B	501[A]	HEM	C4C-CHD-C1D	2.60	125.98	122.56
2	B	501[B]	HEM	CMB-C2B-C1B	2.55	128.92	125.04
2	B	501[A]	HEM	C4B-CHC-C1C	2.53	125.90	122.56
2	B	501[A]	HEM	CMB-C2B-C1B	2.53	128.89	125.04
2	B	501[B]	HEM	O1D-CGD-CBD	-2.43	115.28	123.08
2	B	501[A]	HEM	CMB-C2B-C3B	-2.33	122.60	128.30
3	B	502	ELA	C3-CA-C	2.32	120.31	114.47
3	B	502	ELA	C12-C11-C10	2.29	125.59	112.43
2	B	501[A]	HEM	C4D-ND-C1D	-2.20	102.81	105.07
2	B	501[A]	HEM	CBA-CAA-C2A	2.15	116.29	112.62
3	B	502	ELA	C14-C13-C12	-2.11	103.70	114.42
2	B	501[B]	HEM	CHD-C1D-C2D	2.11	128.27	124.98
2	B	501[A]	HEM	CHA-C4D-C3D	-2.02	121.54	125.33

There are no chirality outliers.

All (9) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	B	502	ELA	C3-C4-C5-C6
3	B	502	ELA	C13-C14-C15-C16
3	B	502	ELA	C4-C5-C6-C7
3	B	502	ELA	C6-C7-C8-C9
3	B	502	ELA	C10-C11-C12-C13
3	B	502	ELA	C5-C6-C7-C8
3	B	502	ELA	OXT-C-CA-C3
3	B	502	ELA	O-C-CA-C3
2	B	501[A]	HEM	CAA-CBA-CGA-O2A

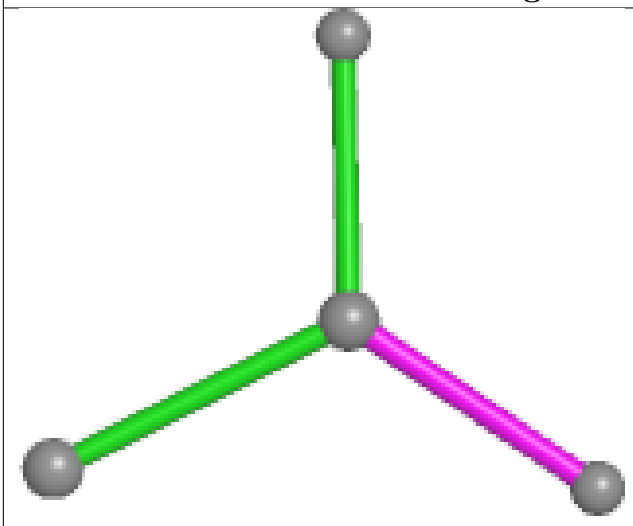
There are no ring outliers.

4 monomers are involved in 23 short contacts:

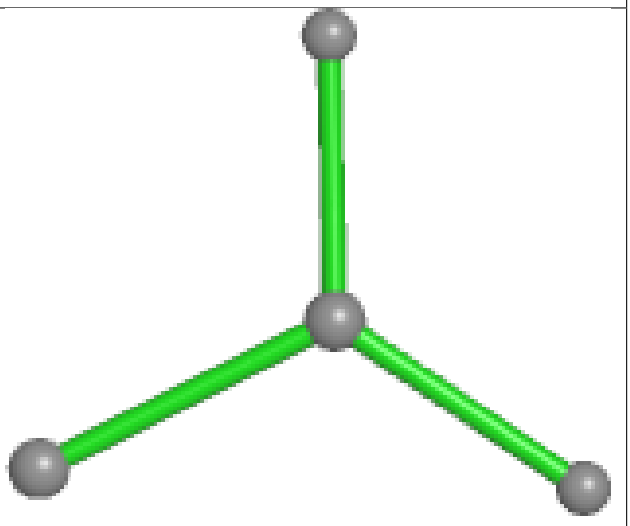
Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	B	503	ACT	7	0
2	B	501[A]	HEM	10	0
2	B	501[B]	HEM	5	0
3	B	502	ELA	4	0

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.

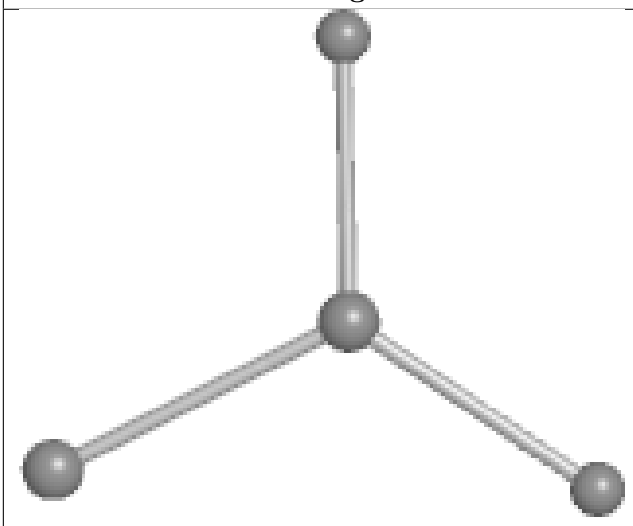
Ligand ACT B 503



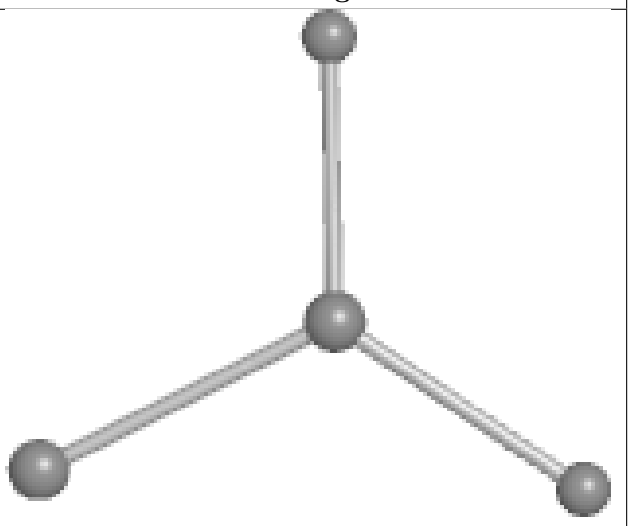
Bond lengths



Bond angles

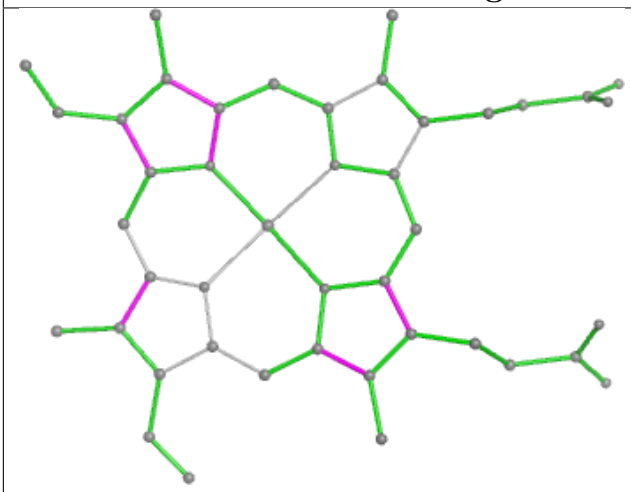


Torsions

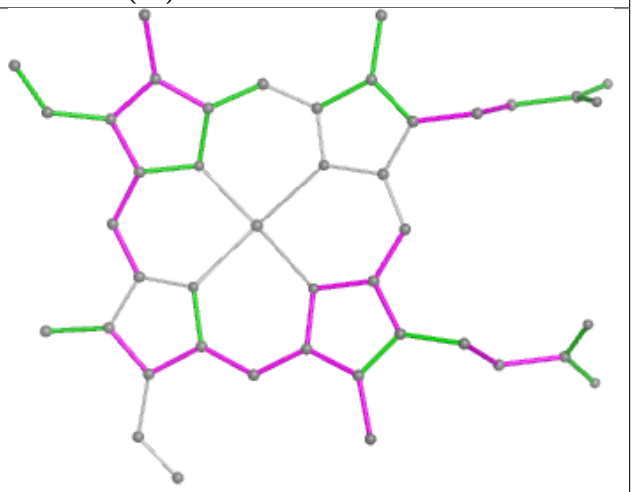


Rings

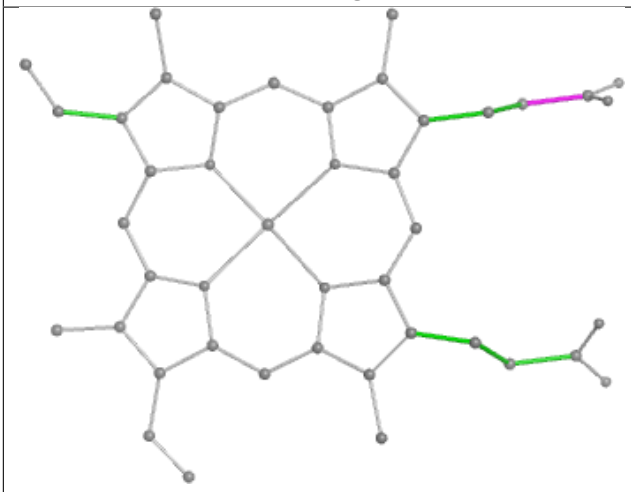
Ligand HEM B 501 (A)



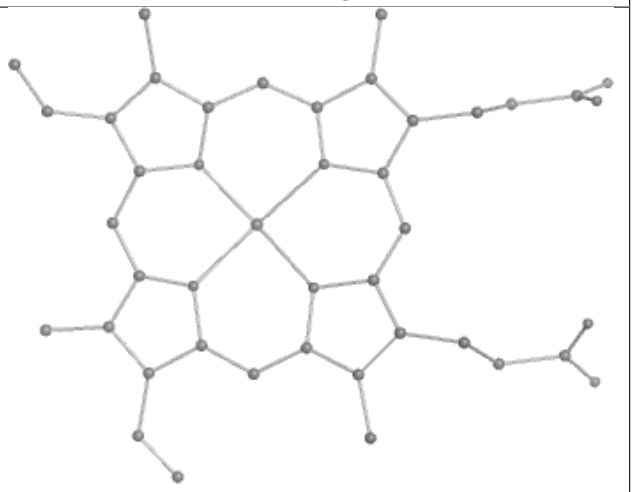
Bond lengths



Bond angles

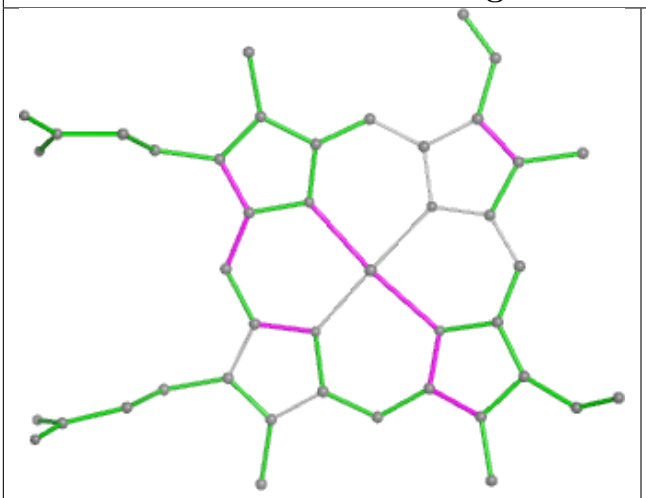


Torsions

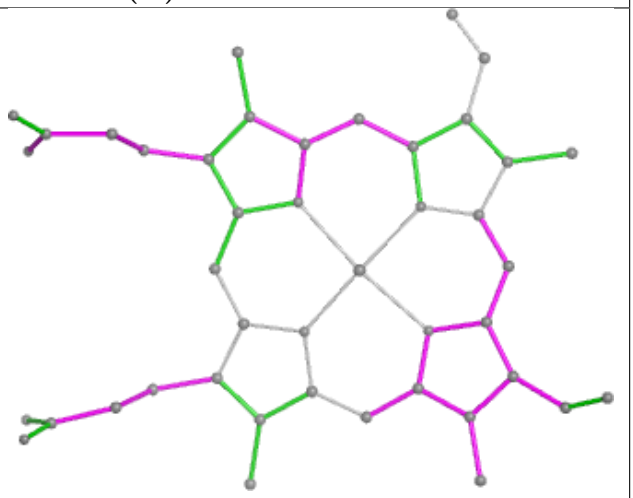


Rings

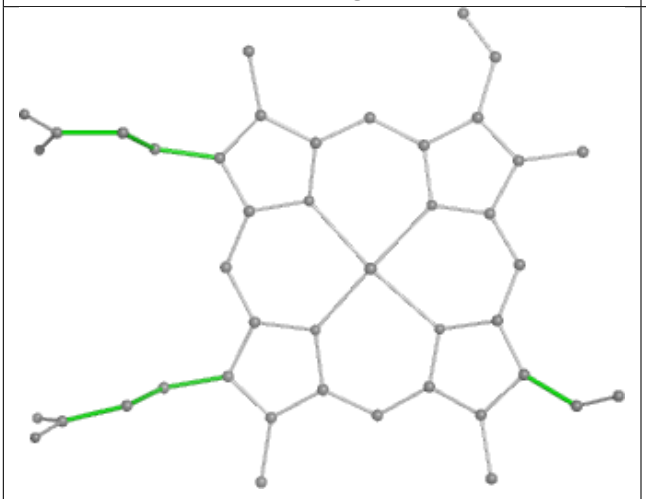
Ligand HEM B 501 (B)



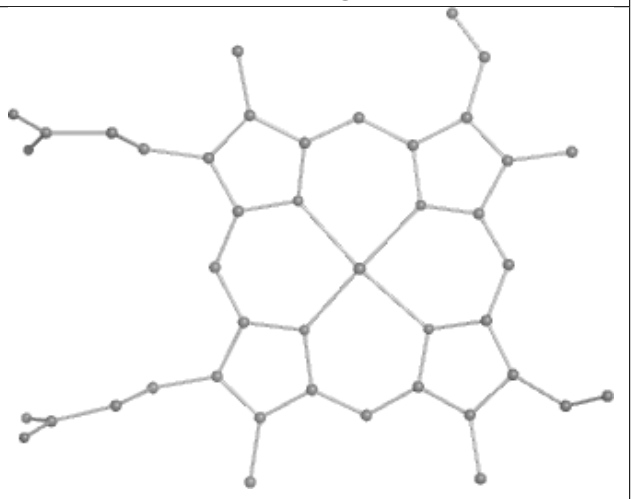
Bond lengths



Bond angles

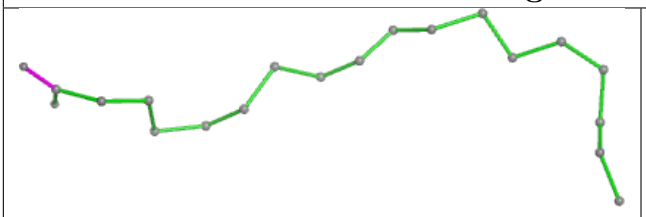


Torsions

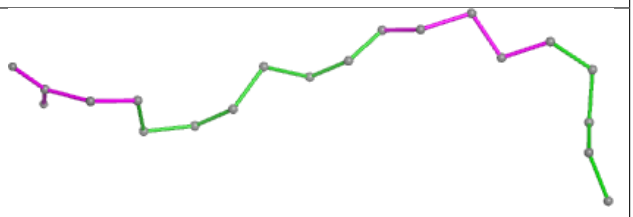


Rings

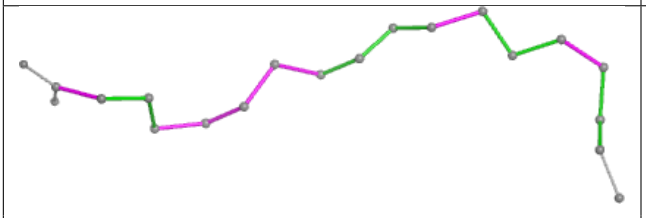
Ligand ELA B 502



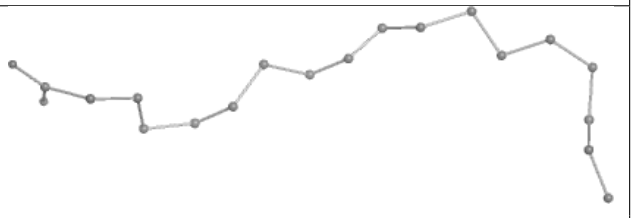
Bond lengths



Bond angles

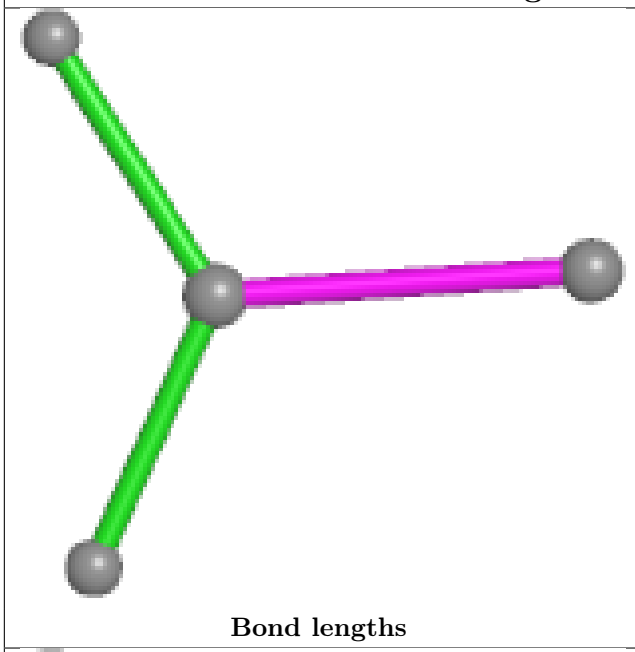


Torsions

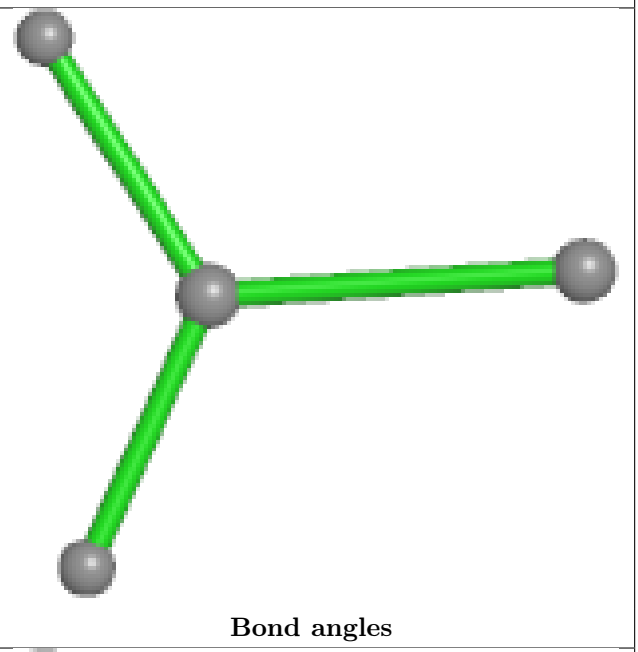


Rings

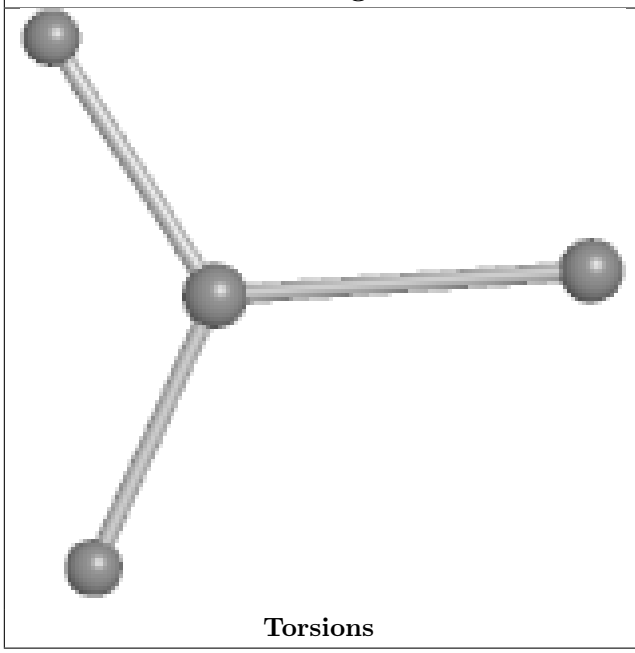
Ligand ACT B 504



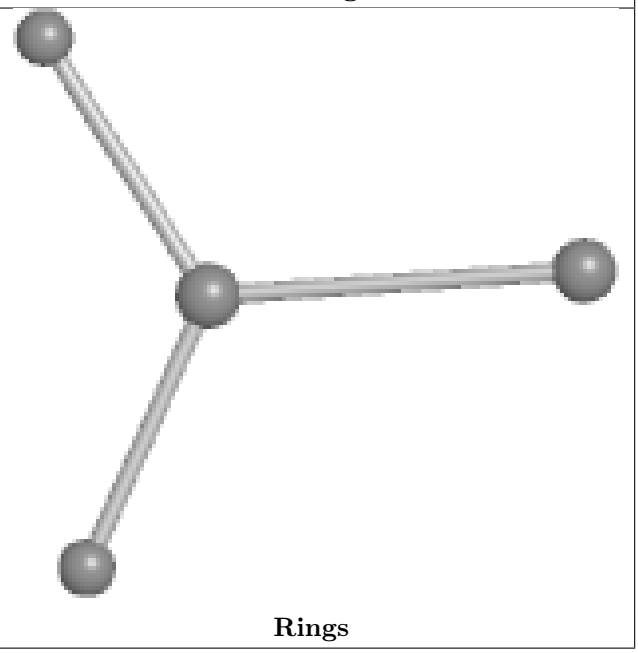
Bond lengths



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	B	428/429 (99%)	-0.21	3 (0%) 84 90	17, 39, 62, 88	3 (0%)

All (3) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	227	PHE	3.1
1	B	129[A]	ARG	2.6
1	B	429	VAL	2.1

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

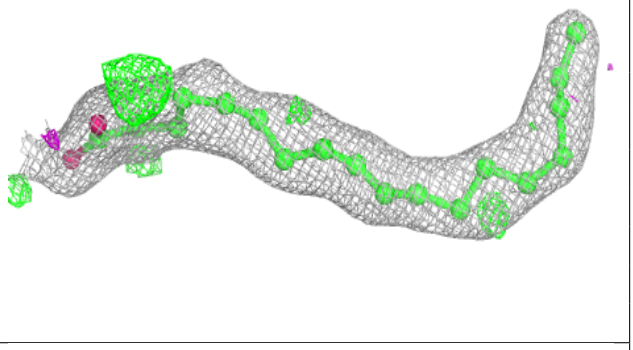
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95^{th} percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9'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

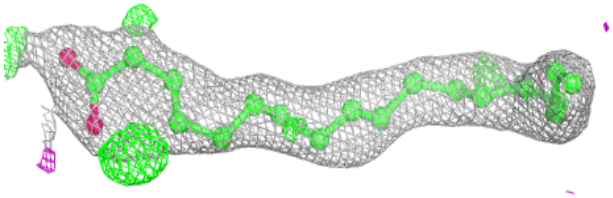
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
3	ELA	B	502	20/20	0.92	0.17	40,49,64,68	0
4	ACT	B	504	4/4	0.97	0.08	31,35,37,38	0
2	HEM	B	501[A]	43/43	0.98	0.06	23,29,34,35	43
4	ACT	B	503	4/4	0.98	0.05	27,36,37,41	0
2	HEM	B	501[B]	43/43	0.98	0.06	25,29,36,37	43

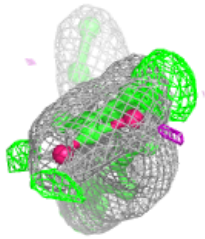
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

Electron density around ELA B 502:

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

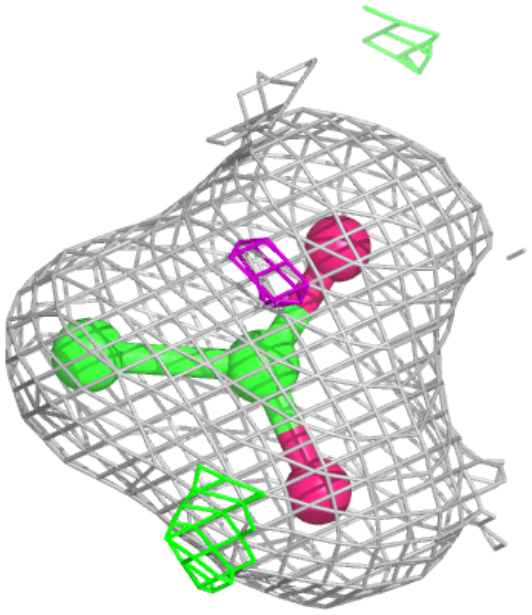


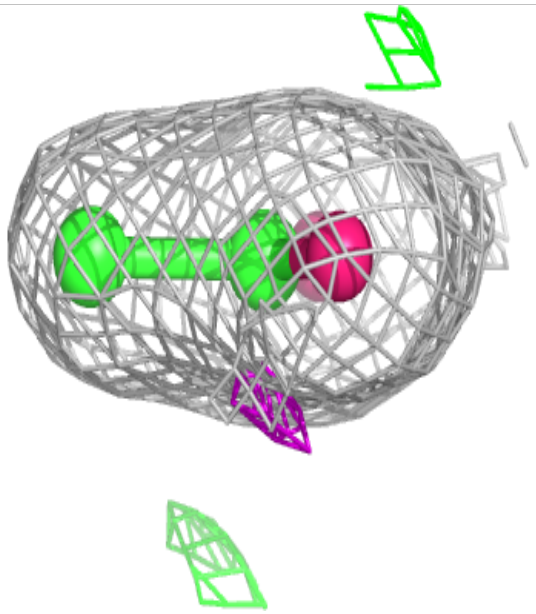


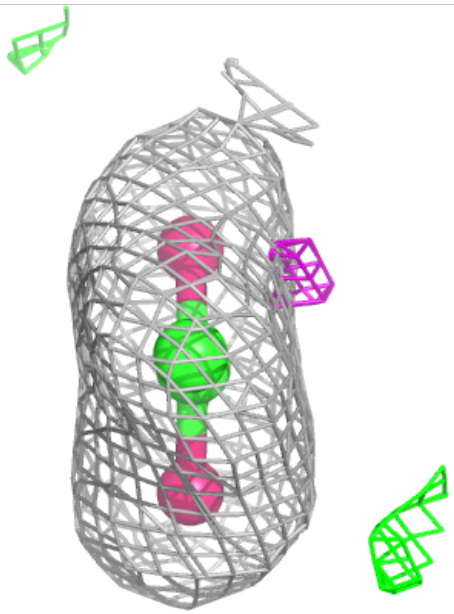


Electron density around ACT B 504:

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

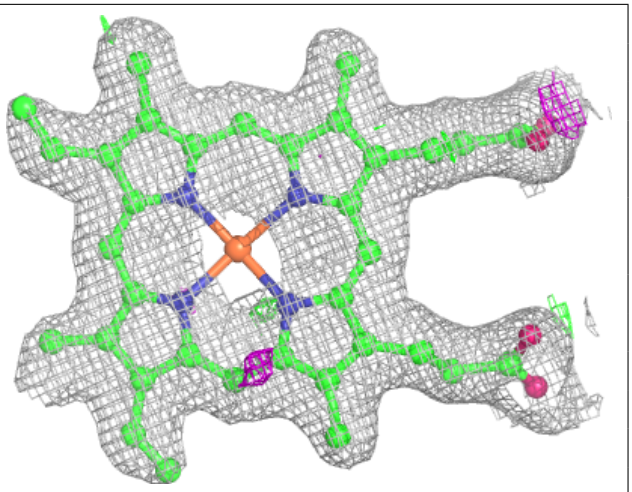


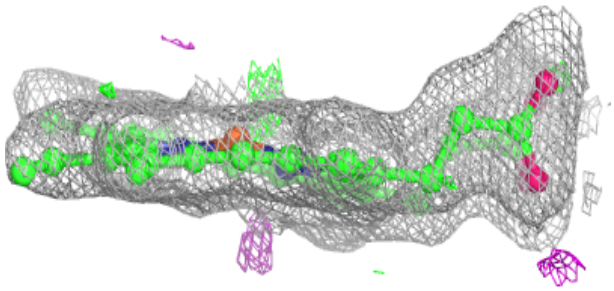


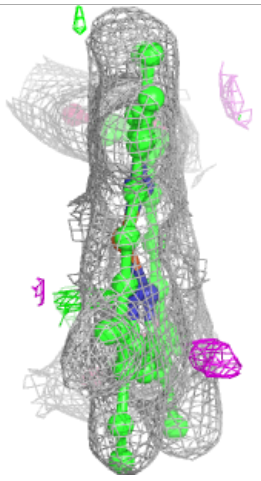


Electron density around HEM B 501 (A):

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

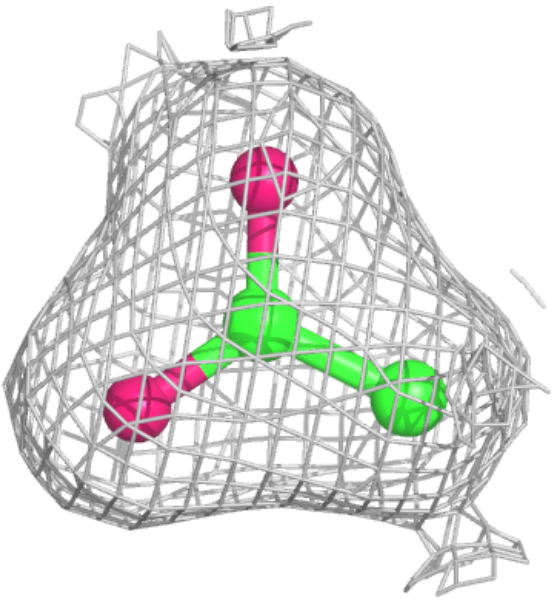


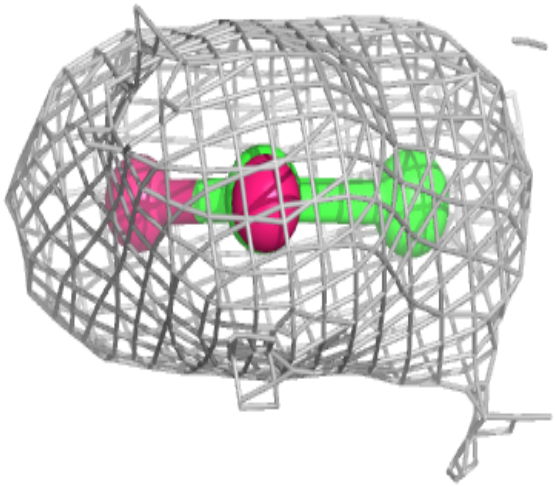


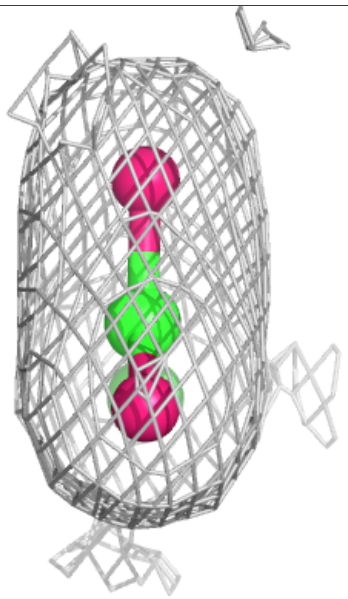


Electron density around ACT B 503:

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

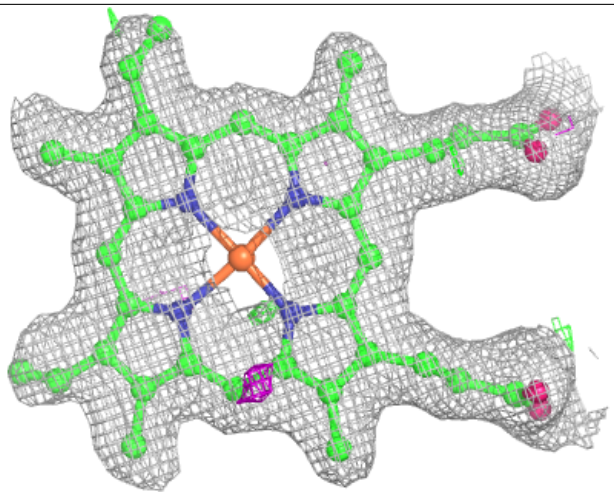


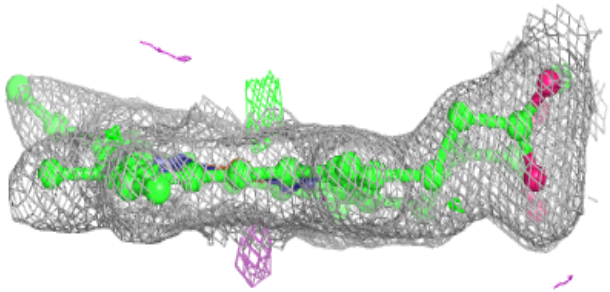


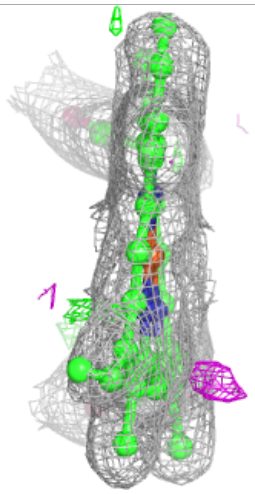


Electron density around HEM B 501 (B):

$2mF_o$-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.