Full wwPDB X-ray Structure Validation Report ⓘ

Mar 2, 2026 – 04:02 AM UTC

PDB ID	:	9MWR / pdb_00009mwr
Title	:	Structure of human endothelial nitric oxide synthase heme domain bound with N-(4-(2-((3-(thiazole-2-carboximidamido)benzyl)amino)ethyl)phenyl)thiazole-2-carboximidamide
Authors	:	Li, H.; Poulos, T.L.
Deposited on	:	2025-01-17
Resolution	:	1.97 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:

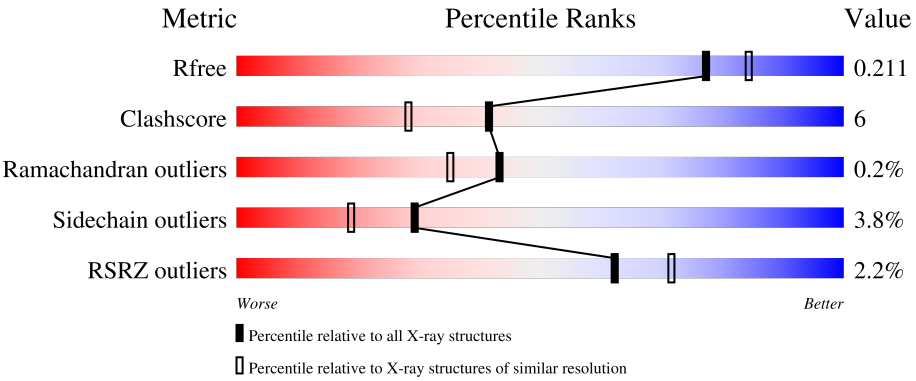
MolProbity	:	4-5-2 with Phenix2.0
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	2.0
EDS	:	3.0
Buster-report	:	wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4	:	9.0.010 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.49

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 1.97 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}	180053	1506 (1.98-1.98)
Clashscore	190562	1534 (1.98-1.98)
Ramachandran outliers	187476	1518 (1.98-1.98)
Sidechain outliers	187428	1518 (1.98-1.98)
RSRZ outliers	180081	1506 (1.98-1.98)

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	3% 75% 15% • 8%
1	B	440	% 81% 10% • 8%
1	C	440	2% 78% 12% • 9%
1	D	440	2% 80% 10% • 8%

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
5	ACT	A	504	-	-	X	-
5	ACT	C	504	-	-	X	-

2 Entry composition (i)

There are 12 unique types of molecules in this entry. The entry contains 14386 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.

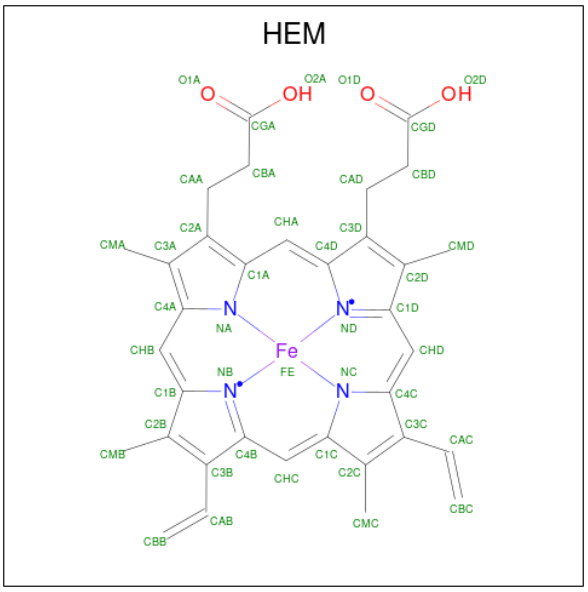
- Molecule 1 is a protein called Nitric oxide synthase, endothelial.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	403	Total	C	N	O	S	0	1	0
			3223	2052	569	586	16			
1	B	403	Total	C	N	O	S	0	3	0
			3229	2056	569	588	16			
1	C	401	Total	C	N	O	S	0	1	0
			3207	2043	564	584	16			
1	D	404	Total	C	N	O	S	0	3	0
			3240	2063	572	589	16			

There are 4 discrepancies between the modelled and reference sequences:

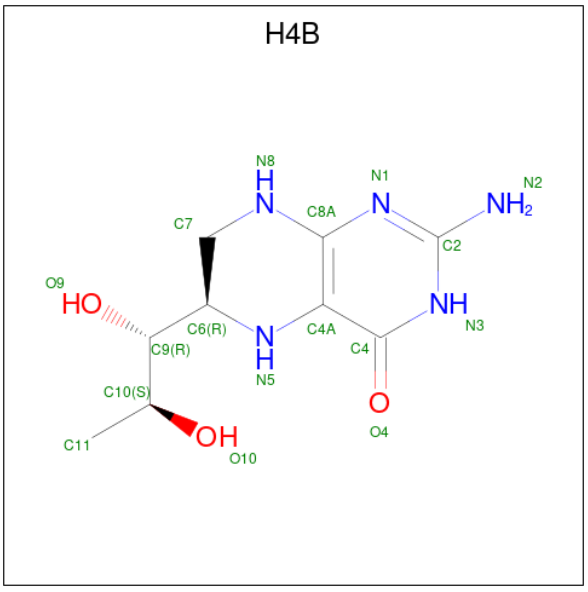
Chain	Residue	Modelled	Actual	Comment	Reference
A	298	GLU	ASP	variant	UNP P29474
B	298	GLU	ASP	variant	UNP P29474
C	298	GLU	ASP	variant	UNP P29474
D	298	GLU	ASP	variant	UNP P29474

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



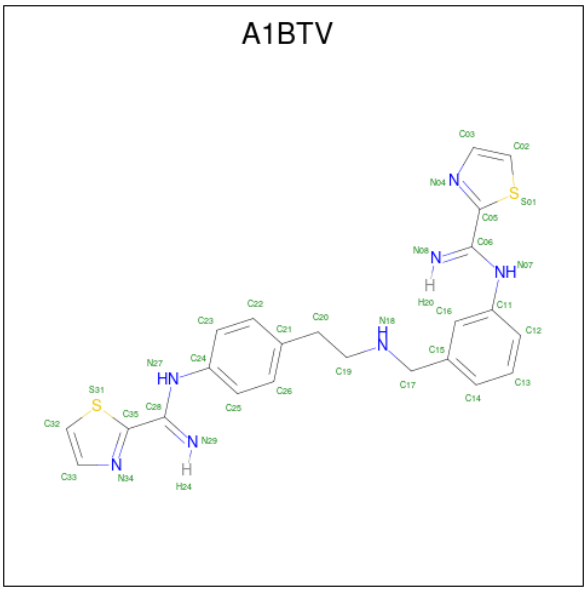
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	A	1	Total	C	Fe	N	O	0	0
			43	34	1	4	4		
2	B	1	Total	C	Fe	N	O	0	0
			43	34	1	4	4		
2	C	1	Total	C	Fe	N	O	0	0
			43	34	1	4	4		
2	D	1	Total	C	Fe	N	O	0	0
			43	34	1	4	4		

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



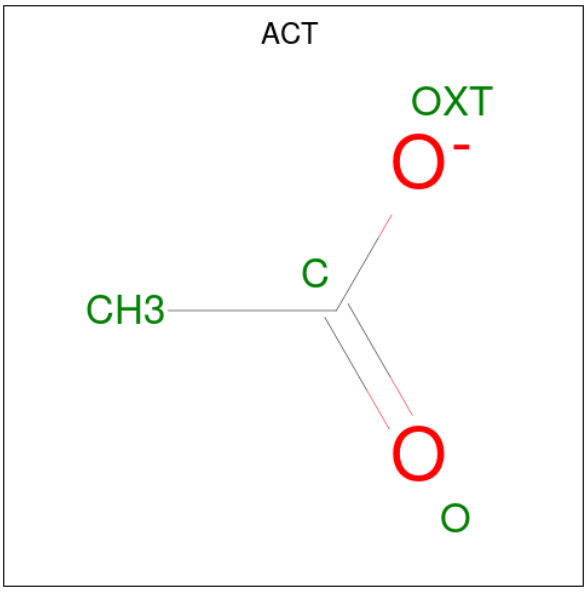
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	1	Total C N O 17 9 5 3	0	0
3	B	1	Total C N O 17 9 5 3	0	0
3	C	1	Total C N O 17 9 5 3	0	0
3	D	1	Total C N O 17 9 5 3	0	0

- Molecule 4 is N-[3-({[2-(4-{[(Z)-imino(1,3-thiazol-2-yl)methyl]amino}phenyl)ethyl]amino}methyl)phenyl]-1,3-thiazole-2-carboximidamide (CCD ID: A1BTV) (formula: $C_{23}H_{23}N_7S_2$) (labeled as "Ligand of Interest" by depositor).



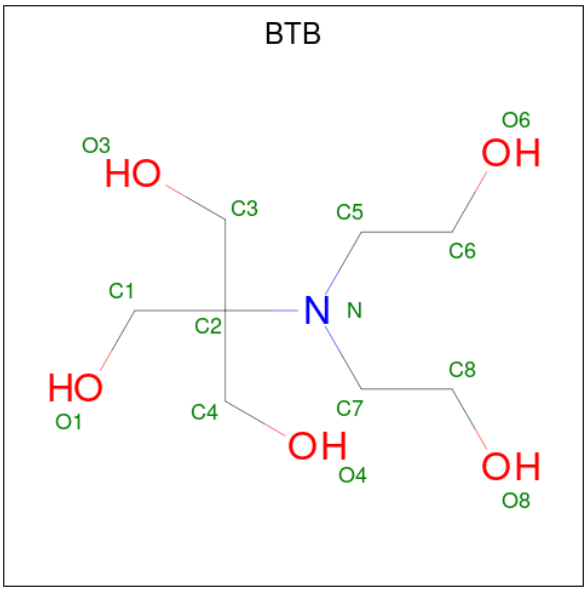
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	1	Total C N S 32 23 7 2	0	0
4	B	1	Total C N S 32 23 7 2	0	0
4	C	1	Total C N S 32 23 7 2	0	0
4	D	1	Total C N S 32 23 7 2	0	0

- Molecule 5 is ACETATE ION (CCD ID: ACT) (formula: $C_2H_3O_2$).



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

- Molecule 6 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
6	A	1	Total C N O 14 8 1 5	0	0

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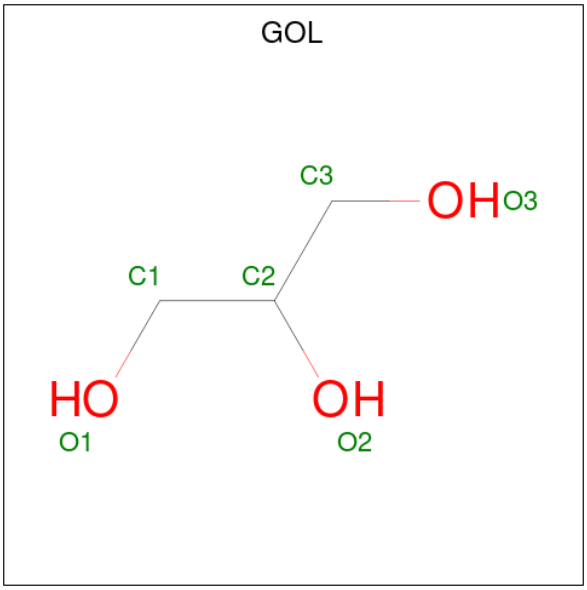
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
6	A	1	Total C N O 14 8 1 5	0	0
6	B	1	Total C N O 14 8 1 5	0	0
6	B	1	Total C N O 14 8 1 5	0	0
6	C	1	Total C N O 14 8 1 5	0	0
6	C	1	Total C N O 14 8 1 5	0	0
6	D	1	Total C N O 14 8 1 5	0	0
6	D	1	Total C N O 14 8 1 5	0	0

- Molecule 7 is GLYCEROL (CCD ID: GOL) (formula: $C_3H_8O_3$).



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

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

- Molecule 8 is CHLORIDE ION (CCD ID: CL) (formula: Cl).

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

- Molecule 9 is GADOLINIUM ATOM (CCD ID: GD) (formula: Gd).

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

- Molecule 10 is ZINC ION (CCD ID: ZN) (formula: Zn).

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

- Molecule 11 is CALCIUM ION (CCD ID: CA) (formula: Ca).

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

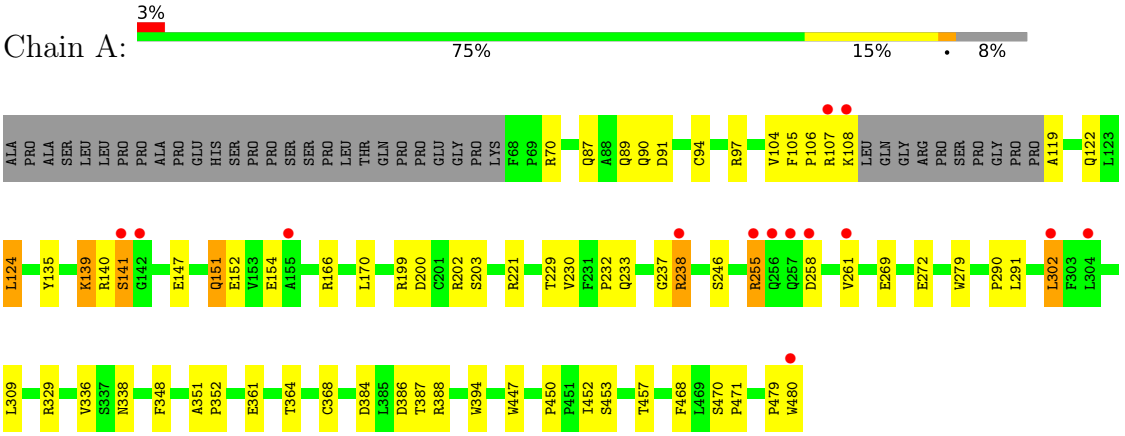
- Molecule 12 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
12	A	209	Total O 209 209	0	0
12	B	272	Total O 272 272	0	0
12	C	192	Total O 192 192	0	0
12	D	260	Total O 260 260	0	0

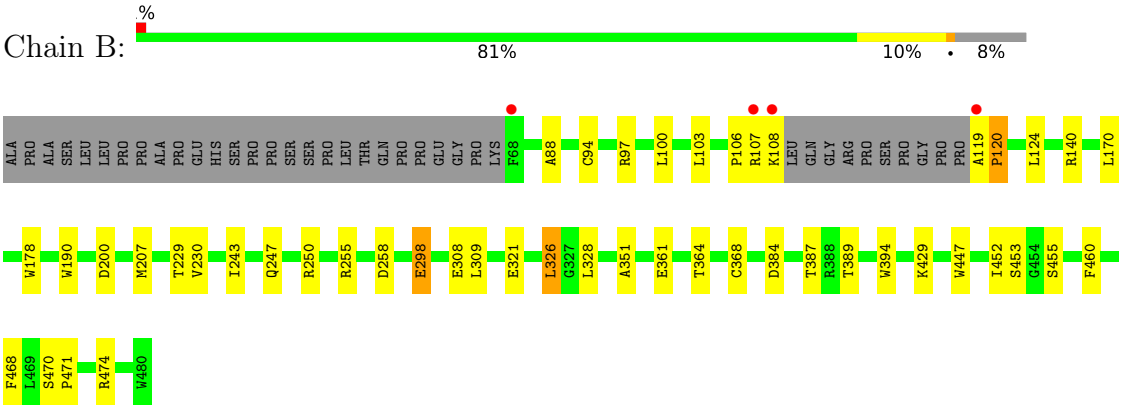
3 Residue-property plots (i)

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.

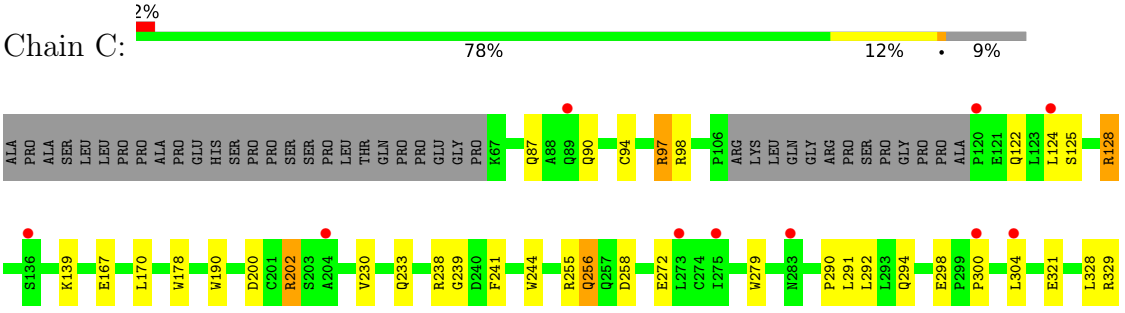
• Molecule 1: Nitric oxide synthase, endothelial

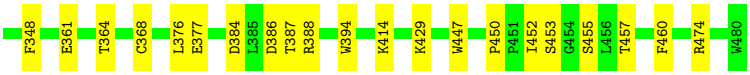


• Molecule 1: Nitric oxide synthase, endothelial

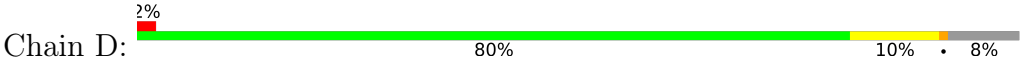


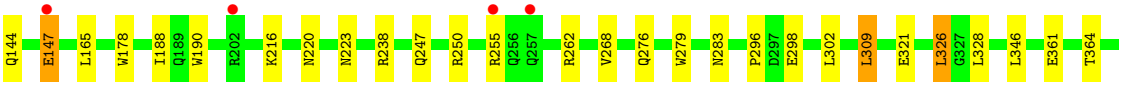
• Molecule 1: Nitric oxide synthase, endothelial

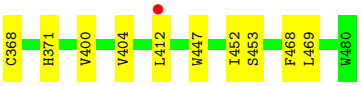




• Molecule 1: Nitric oxide synthase, endothelial







4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α, β, γ	58.79Å 152.09Å 107.62Å 90.00° 90.75° 90.00°	Depositor
Resolution (Å)	49.10 – 1.97 49.10 – 1.97	Depositor EDS
% Data completeness (in resolution range)	96.2 (49.10-1.97) 96.1 (49.10-1.97)	Depositor EDS
R_{merge}	0.09	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.73 (at 1.97Å)	Xtriage
Refinement program	PHENIX (1.11.1_2575: ???)	Depositor
R, R_{free}	0.172 , 0.211 0.171 , 0.211	Depositor DCC
R_{free} test set	6453 reflections (3.40%)	wwPDB-VP
Wilson B-factor (Å^2)	28.1	Xtriage
Anisotropy	0.722	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.37 , 51.1	EDS
L-test for twinning[2]	$< \|L\| > = 0.47$, $< L^2 > = 0.30$	Xtriage
Estimated twinning fraction	0.098 for h,-k,-l	Xtriage
F_o,F_c correlation	0.96	EDS
Total number of atoms	14386	wwPDB-VP
Average B, all atoms (Å^2)	40.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.20% 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: GD, ACT, H4B, A1BTV, GOL, BTB, ZN, CL, CA, HEM

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	0.33	1/3318 (0.0%)	0.63	3/4520 (0.1%)
1	B	0.33	0/3330	0.52	0/4536
1	C	0.26	0/3302	0.48	0/4498
1	D	0.31	0/3341	0.51	0/4550
All	All	0.31	1/13291 (0.0%)	0.54	3/18104 (0.0%)

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	105	PHE	C-N	10.13	1.57	1.33

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	105	PHE	O-C-N	16.37	140.14	121.32
1	A	105	PHE	CA-C-N	-14.37	101.88	119.84
1	A	105	PHE	C-N-CA	-14.37	101.88	119.84

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	3223	0	3129	44	0
1	B	3229	0	3139	28	0
1	C	3207	0	3112	36	0
1	D	3240	0	3153	39	0
2	A	43	0	30	3	0
2	B	43	0	30	2	0
2	C	43	0	30	3	0
2	D	43	0	30	3	0
3	A	17	0	15	1	0
3	B	17	0	15	1	0
3	C	17	0	15	1	0
3	D	17	0	15	1	0
4	A	32	0	0	3	0
4	B	32	0	0	2	0
4	C	32	0	0	3	0
4	D	32	0	0	3	0
5	A	4	0	3	8	0
5	C	4	0	3	8	0
6	A	28	0	37	4	0
6	B	28	0	35	4	0
6	C	28	0	38	6	0
6	D	28	0	34	5	0
7	A	18	0	24	1	0
7	B	12	0	16	0	0
7	C	12	0	16	1	0
7	D	12	0	16	0	0
8	A	1	0	0	0	0
8	B	1	0	0	0	0
8	C	1	0	0	0	0
8	D	1	0	0	0	0
9	A	1	0	0	0	0
9	B	1	0	0	0	0
9	C	1	0	0	0	0
9	D	1	0	0	0	0
10	A	1	0	0	0	0
10	C	1	0	0	0	0
11	A	1	0	0	0	0
11	B	1	0	0	0	0
12	A	209	0	0	5	0
12	B	272	0	0	0	0
12	C	192	0	0	1	0
12	D	260	0	0	3	0
All	All	14386	0	12935	168	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 6.

All (168) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:119:ALA:HB3	1:A:122:GLN:NE2	1.34	1.40
1:A:119:ALA:CB	1:A:122:GLN:HE22	1.50	1.24
1:A:119:ALA:CB	1:A:122:GLN:NE2	2.09	1.10
1:A:119:ALA:HB3	1:A:122:GLN:HE21	1.28	0.95
1:A:119:ALA:HB1	1:A:122:GLN:HE22	1.31	0.92
1:A:70:ARG:NH2	12:A:601:HOH:O	2.18	0.75
2:A:501:HEM:HBB2	2:A:501:HEM:HHC	1.73	0.71
1:D:298:GLU:OE2	6:D:505:BTB:O6	2.11	0.69
1:A:151:GLN:NE2	12:A:603:HOH:O	2.28	0.67
2:A:501:HEM:HMC2	2:A:501:HEM:HBC2	1.77	0.67
1:D:298:GLU:OE1	6:D:505:BTB:O8	2.13	0.66
1:D:247:GLN:HB2	1:D:250:ARG:HD3	1.76	0.66
2:C:501:HEM:HBB2	2:C:501:HEM:HHC	1.78	0.65
1:A:107:ARG:HH21	1:A:468:PHE:HD1	1.44	0.65
2:B:501:HEM:HHC	2:B:501:HEM:HBB2	1.80	0.64
1:A:386:ASP:OD2	1:A:388:ARG:HG2	1.99	0.63
1:C:452:ILE:HB	5:C:504:ACT:H2	1.80	0.63
1:C:384:ASP:OD1	12:C:601:HOH:O	2.15	0.63
6:D:505:BTB:O3	6:D:505:BTB:O1	2.17	0.63
1:B:321:GLU:OE2	6:B:504:BTB:O4	2.16	0.62
2:D:501:HEM:HMC2	2:D:501:HEM:HBC2	1.82	0.60
5:A:504:ACT:H2	1:B:453:SER:N	2.17	0.60
1:B:247:GLN:HB2	1:B:250:ARG:HD3	1.82	0.60
1:A:452:ILE:HB	5:A:504:ACT:H3	1.83	0.60
1:A:453:SER:H	5:A:504:ACT:H1	1.66	0.59
2:C:501:HEM:HBC2	2:C:501:HEM:HMC2	1.83	0.59
1:C:125:SER:HA	1:C:128:ARG:NH1	2.17	0.59
2:B:501:HEM:HBC2	2:B:501:HEM:HMC2	1.85	0.59
5:C:504:ACT:H1	1:D:453:SER:H	1.68	0.59
1:D:298:GLU:OE1	6:D:505:BTB:H31	2.03	0.58
1:C:292:LEU:HD22	1:C:300:PRO:HB2	1.85	0.58
1:C:200:ASP:OD1	1:C:200:ASP:N	2.37	0.58
1:A:453:SER:H	5:A:504:ACT:CH3	2.16	0.58
1:A:152:GLU:OE2	1:A:166:ARG:NH2	2.37	0.57
5:A:504:ACT:H2	1:B:453:SER:H	1.70	0.57
1:B:326:LEU:HB3	1:B:328:LEU:HG	1.86	0.57
1:D:447:TRP:HA	3:D:502:H4B:N1	2.20	0.56

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:106:PRO:HG2	1:A:107:ARG:HD3	1.87	0.56
1:B:106:PRO:HG2	1:B:107:ARG:HD3	1.87	0.56
1:C:321:GLU:H	1:C:321:GLU:CD	2.14	0.55
1:A:104:VAL:O	1:A:106:PRO:HD3	2.07	0.55
1:D:84:LEU:O	1:D:87:GLN:HG2	2.06	0.55
1:B:447:TRP:HA	3:B:502:H4B:N1	2.21	0.55
1:C:377:GLU:OE1	6:C:506:BTB:O3	2.23	0.55
1:B:107:ARG:HH21	1:B:468:PHE:HD1	1.54	0.55
1:C:238:ARG:HD2	1:C:239:GLY:O	2.07	0.55
2:D:501:HEM:HBB2	2:D:501:HEM:HHC	1.88	0.55
1:A:135:TYR:HD1	1:A:140:ARG:HB2	1.72	0.55
1:B:298:GLU:CD	6:B:505:BTB:H42	2.32	0.54
1:A:237:GLY:HA3	7:A:509:GOL:H31	1.89	0.54
1:D:188:ILE:O	12:D:601:HOH:O	2.18	0.54
1:A:453:SER:N	5:A:504:ACT:H1	2.22	0.54
1:B:170:LEU:HD11	1:B:230:VAL:HG11	1.89	0.54
1:A:170:LEU:HD11	1:A:230:VAL:HG11	1.90	0.53
1:C:202:ARG:HA	1:C:241:PHE:HZ	1.74	0.53
1:B:387:THR:HA	1:B:394:TRP:CD1	2.44	0.53
6:C:506:BTB:O3	6:C:506:BTB:O4	2.27	0.53
5:C:504:ACT:H3	1:D:452:ILE:HB	1.90	0.53
1:D:107:ARG:NH2	1:D:468:PHE:HB2	2.24	0.53
1:A:94:CYS:HB3	1:B:94:CYS:HB3	1.90	0.53
1:C:386:ASP:OD2	1:C:388:ARG:HG2	2.08	0.52
1:B:97:ARG:HH11	1:B:97:ARG:HB3	1.73	0.52
1:A:447:TRP:HA	3:A:502:H4B:N1	2.24	0.52
1:C:255:ARG:NH2	1:C:272:GLU:OE2	2.42	0.52
1:C:364:THR:O	1:C:368:CYS:HB2	2.10	0.52
1:C:368:CYS:SG	1:C:376:LEU:HD13	2.50	0.51
1:A:269:GLU:O	1:A:272:GLU:HG2	2.11	0.51
5:A:504:ACT:H2	1:B:452:ILE:HB	1.93	0.51
1:C:453:SER:H	5:C:504:ACT:CH3	2.23	0.51
5:A:504:ACT:CH3	1:B:453:SER:H	2.24	0.50
5:C:504:ACT:H1	1:D:453:SER:N	2.26	0.50
1:C:125:SER:HA	1:C:128:ARG:HH11	1.77	0.49
1:A:124:LEU:HD21	1:A:154:GLU:OE2	2.13	0.49
5:C:504:ACT:CH3	1:D:453:SER:H	2.24	0.49
1:D:321:GLU:OE2	6:D:504:BTB:O4	2.30	0.49
1:D:262:ARG:NE	1:D:283:ASN:O	2.39	0.49
1:A:139:LYS:O	1:A:140:ARG:NH1	2.45	0.49
1:A:384:ASP:OD1	6:A:505:BTB:O3	2.31	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:470:SER:HA	1:A:471:PRO:C	2.37	0.49
1:A:450:PRO:HG2	1:A:457:THR:HG21	1.94	0.49
1:D:238:ARG:HG2	1:D:296:PRO:HB3	1.94	0.49
1:A:364:THR:O	1:A:368:CYS:HB2	2.13	0.49
1:C:97:ARG:HG2	1:C:98:ARG:HG2	1.94	0.49
1:A:97:ARG:HG3	1:B:88:ALA:HB3	1.95	0.48
1:C:128:ARG:HH11	1:C:128:ARG:HB2	1.78	0.48
6:A:505:BTB:H42	1:D:326:LEU:HD12	1.95	0.48
1:D:371:HIS:H	1:D:371:HIS:HD1	1.60	0.48
1:C:94:CYS:HB3	1:D:94:CYS:HB3	1.95	0.48
1:D:100:LEU:HB3	1:D:103:LEU:HD22	1.95	0.48
1:A:246:SER:HA	1:A:338:ASN:HB3	1.95	0.47
1:A:361:GLU:OE1	4:A:503:A1BTV:N07	2.47	0.47
4:B:503:A1BTV:C05	4:B:503:A1BTV:C12	2.91	0.47
1:D:88:ALA:HA	1:D:469:LEU:HD23	1.97	0.47
6:C:505:BTB:O6	6:C:505:BTB:O3	2.29	0.47
6:B:505:BTB:H42	6:B:505:BTB:H72	1.48	0.47
1:A:221:ARG:NH2	12:A:615:HOH:O	2.47	0.46
1:D:361:GLU:OE1	4:D:503:A1BTV:N07	2.48	0.46
1:C:170:LEU:HD11	1:C:230:VAL:HG11	1.98	0.46
1:B:178:TRP:CE3	1:B:190:TRP:HA	2.50	0.46
1:C:279:TRP:CG	1:C:290:PRO:HG3	2.50	0.46
1:C:453:SER:N	5:C:504:ACT:H2	2.31	0.46
1:D:144:GLN:HA	1:D:147:GLU:CG	2.46	0.46
1:C:447:TRP:HA	3:C:502:H4B:N1	2.31	0.45
1:C:453:SER:H	5:C:504:ACT:H2	1.81	0.45
1:B:361:GLU:OE1	4:B:503:A1BTV:N07	2.50	0.45
1:D:250:ARG:HD2	1:D:250:ARG:HA	1.71	0.45
2:D:501:HEM:C4B	4:D:503:A1BTV:S01	3.10	0.45
1:A:479:PRO:HD2	1:A:480:TRP:CZ3	2.52	0.45
6:A:505:BTB:H32	6:A:505:BTB:H51	1.89	0.45
1:B:124:LEU:HD23	1:B:124:LEU:HA	1.85	0.45
1:D:178:TRP:CE3	1:D:190:TRP:HA	2.52	0.44
1:C:388:ARG:HA	6:C:506:BTB:H62	1.99	0.44
6:B:504:BTB:O6	6:B:504:BTB:O8	2.28	0.44
1:C:361:GLU:OE1	4:C:503:A1BTV:N07	2.50	0.44
1:C:450:PRO:HG3	1:C:457:THR:HG21	1.99	0.44
1:D:279:TRP:HB2	1:D:302:LEU:HD21	1.98	0.44
1:A:238:ARG:HH11	1:A:238:ARG:HB3	1.84	0.43
1:B:119:ALA:N	1:B:120:PRO:HD3	2.33	0.43
1:B:207:MET:HE2	1:B:243:ILE:HG13	2.00	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:144:GLN:O	1:D:147:GLU:HG3	2.17	0.43
1:D:220:ASN:HB3	1:D:223:ASN:O	2.17	0.43
1:B:97:ARG:HB3	1:B:97:ARG:NH1	2.33	0.43
1:B:364:THR:O	1:B:368:CYS:HB2	2.17	0.43
1:B:100:LEU:HB3	1:B:103:LEU:HD22	2.00	0.43
1:D:364:THR:O	1:D:368:CYS:HB2	2.17	0.43
1:A:279:TRP:HB2	1:A:302:LEU:HD11	2.00	0.43
1:B:455:SER:HA	1:B:460:PHE:CG	2.54	0.43
4:A:503:A1BTV:C12	4:A:503:A1BTV:C05	2.96	0.43
1:C:455:SER:HA	1:C:460:PHE:CG	2.54	0.43
1:D:67:LYS:HD2	1:D:67:LYS:HA	1.65	0.43
1:B:470:SER:HA	1:B:471:PRO:C	2.44	0.43
1:C:298:GLU:OE2	7:C:508:GOL:O1	2.29	0.43
1:D:216:LYS:NZ	12:D:614:HOH:O	2.50	0.42
1:A:255:ARG:HG3	1:A:261:VAL:HG22	2.01	0.42
1:C:244:TRP:NE1	1:C:294:GLN:OE1	2.41	0.42
6:C:505:BTB:H32	6:C:505:BTB:H51	1.71	0.42
1:C:328:LEU:C	1:C:329:ARG:HG3	2.45	0.42
2:A:501:HEM:C4B	4:A:503:A1BTV:S01	3.12	0.42
1:B:308:GLU:H	1:B:308:GLU:CD	2.24	0.42
1:C:178:TRP:CE3	1:C:190:TRP:HA	2.55	0.42
1:A:233:GLN:HB3	1:A:348:PHE:CE2	2.54	0.42
1:D:106:PRO:HB3	12:D:769:HOH:O	2.19	0.42
1:D:326:LEU:HB3	1:D:328:LEU:HG	2.02	0.42
1:A:90:GLN:HG3	1:A:91:ASP:H	1.84	0.42
1:A:336:VAL:O	1:A:352:PRO:HA	2.20	0.42
6:A:506:BTB:H41	6:A:506:BTB:H72	1.73	0.41
4:C:503:A1BTV:C12	4:C:503:A1BTV:C05	2.96	0.41
1:A:387:THR:HA	1:A:394:TRP:CD1	2.55	0.41
1:B:229:THR:O	1:B:351:ALA:HA	2.20	0.41
2:C:501:HEM:C4B	4:C:503:A1BTV:S01	3.13	0.41
1:D:90:GLN:HB3	1:D:107:ARG:HH12	1.85	0.41
1:D:255:ARG:HH21	1:D:268:VAL:HG11	1.85	0.41
1:C:256:GLN:C	1:C:258:ASP:H	2.27	0.41
6:C:506:BTB:H41	6:C:506:BTB:H72	1.47	0.41
1:D:165:LEU:HG	1:D:346:LEU:HD12	2.03	0.41
1:D:309:LEU:HD12	1:D:309:LEU:HA	1.82	0.41
1:D:400:VAL:O	1:D:404:VAL:HG23	2.20	0.41
1:A:199:ARG:O	1:A:232:PRO:HG3	2.21	0.41
12:A:689:HOH:O	1:C:384:ASP:HB3	2.20	0.41
4:D:503:A1BTV:C12	4:D:503:A1BTV:C05	2.98	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:233:GLN:HB3	1:C:348:PHE:CE2	2.55	0.41
1:C:387:THR:HA	1:C:394:TRP:CD1	2.56	0.41
1:A:229:THR:O	1:A:351:ALA:HA	2.21	0.41
1:A:279:TRP:CG	1:A:290:PRO:HG3	2.57	0.40
1:A:166:ARG:HD2	12:A:681:HOH:O	2.20	0.40
1:D:124:LEU:HD23	1:D:124:LEU:HA	1.82	0.40
1:C:429:LYS:HA	1:C:429:LYS:HD2	1.94	0.40
1:D:107:ARG:HH22	1:D:468:PHE:HB2	1.87	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	400/440 (91%)	388 (97%)	11 (3%)	1 (0%)	36	27
1	B	402/440 (91%)	393 (98%)	7 (2%)	2 (0%)	24	14
1	C	398/440 (90%)	387 (97%)	11 (3%)	0	100	100
1	D	403/440 (92%)	396 (98%)	7 (2%)	0	100	100
All	All	1603/1760 (91%)	1564 (98%)	36 (2%)	3 (0%)	43	35

All (3) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	255	ARG
1	B	120	PRO
1	A	141	SER

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	343/373 (92%)	325 (95%)	18 (5%)	21 9
1	B	345/373 (92%)	334 (97%)	11 (3%)	34 24
1	C	342/373 (92%)	328 (96%)	14 (4%)	27 16
1	D	346/373 (93%)	337 (97%)	9 (3%)	40 32
All	All	1376/1492 (92%)	1324 (96%)	52 (4%)	29 19

All (52) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	87	GLN
1	A	89	GLN
1	A	108	LYS
1	A	124	LEU
1	A	139	LYS
1	A	141	SER
1	A	147	GLU
1	A	151	GLN
1	A	200	ASP
1	A	202	ARG
1	A	203	SER
1	A	238	ARG
1	A	255	ARG
1	A	258	ASP
1	A	291	LEU
1	A	302	LEU
1	A	309	LEU
1	A	329	ARG
1	B	108	LYS
1	B	140	ARG
1	B	200	ASP
1	B	258	ASP
1	B	298	GLU
1	B	309	LEU

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Mol	Chain	Res	Type
1	B	326	LEU
1	B	384	ASP
1	B	389	THR
1	B	429	LYS
1	B	474	ARG
1	C	87	GLN
1	C	90	GLN
1	C	97	ARG
1	C	122	GLN
1	C	124	LEU
1	C	128	ARG
1	C	139	LYS
1	C	167	GLU
1	C	202	ARG
1	C	256	GLN
1	C	291	LEU
1	C	304	LEU
1	C	414	LYS
1	C	474	ARG
1	D	67	LYS
1	D	78	SER
1	D	87	GLN
1	D	103	LEU
1	D	147	GLU
1	D	276	GLN
1	D	309	LEU
1	D	326	LEU
1	D	412	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (6) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	122	GLN
1	C	144	GLN
1	C	164	GLN
1	C	205	GLN
1	C	220	ASN
1	C	277	HIS

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 43 ligands modelled in this entry, 12 are monoatomic - leaving 31 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	BTB	B	504	9	13,13,13	0.42	0	7,16,16	0.79	0
6	BTB	D	505	-	13,13,13	0.28	0	7,16,16	0.72	0
4	A1BTV	D	503	-	33,35,35	1.20	4 (12%)	37,46,46	2.22	11 (29%)
7	GOL	D	507	-	5,5,5	0.37	0	5,5,5	0.32	0
6	BTB	A	505	9	13,13,13	0.47	0	7,16,16	0.83	0
2	HEM	A	501	1	50,50,50	1.66	8 (16%)	67,82,82	1.31	9 (13%)
7	GOL	C	507	-	5,5,5	0.39	0	5,5,5	0.36	0
4	A1BTV	A	503	-	33,35,35	1.23	6 (18%)	37,46,46	2.28	11 (29%)
3	H4B	A	502	-	17,18,18	1.03	1 (5%)	14,26,26	1.73	3 (21%)
6	BTB	B	505	-	13,13,13	0.49	0	7,16,16	0.98	0
7	GOL	A	509	-	5,5,5	0.42	0	5,5,5	0.40	0
6	BTB	C	506	-	13,13,13	0.40	0	7,16,16	0.64	0
2	HEM	B	501	1	50,50,50	1.64	8 (16%)	67,82,82	1.16	3 (4%)
7	GOL	A	508	-	5,5,5	0.37	0	5,5,5	0.41	0
6	BTB	C	505	9	13,13,13	0.53	0	7,16,16	0.93	0
2	HEM	C	501	1	50,50,50	1.72	7 (14%)	67,82,82	1.25	6 (8%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\|>2$	Counts	RMSZ	$\#\|Z\|>2$
3	H4B	C	502	-	17,18,18	0.94	1 (5%)	14,26,26	1.75	3 (21%)
7	GOL	D	506	-	5,5,5	0.36	0	5,5,5	0.30	0
6	BTB	A	506	-	13,13,13	0.63	0	7,16,16	1.03	0
5	ACT	A	504	-	3,3,3	1.00	0	3,3,3	1.32	1 (33%)
2	HEM	D	501	1	50,50,50	1.58	9 (18%)	67,82,82	1.31	9 (13%)
4	A1BTV	C	503	-	33,35,35	1.19	6 (18%)	37,46,46	2.11	11 (29%)
7	GOL	B	507	-	5,5,5	0.35	0	5,5,5	0.87	0
7	GOL	C	508	-	5,5,5	0.34	0	5,5,5	0.34	0
7	GOL	B	506	-	5,5,5	0.39	0	5,5,5	0.37	0
5	ACT	C	504	-	3,3,3	0.92	0	3,3,3	0.95	0
3	H4B	B	502	-	17,18,18	1.02	0	14,26,26	1.93	5 (35%)
3	H4B	D	502	-	17,18,18	0.91	0	14,26,26	1.94	4 (28%)
4	A1BTV	B	503	-	33,35,35	1.24	6 (18%)	37,46,46	2.08	11 (29%)
7	GOL	A	507	-	5,5,5	0.39	0	5,5,5	0.36	0
6	BTB	D	504	9	13,13,13	0.41	0	7,16,16	0.36	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
6	BTB	B	504	9	-	4/21/21/21	-
6	BTB	D	505	-	-	11/21/21/21	-
4	A1BTV	D	503	-	-	6/15/23/23	0/4/4/4
7	GOL	D	507	-	-	1/4/4/4	-
6	BTB	A	505	9	-	4/21/21/21	-
2	HEM	A	501	1	-	1/14/54/54	-
7	GOL	C	507	-	-	4/4/4/4	-
4	A1BTV	A	503	-	-	6/15/23/23	0/4/4/4
3	H4B	A	502	-	-	0/8/17/17	0/2/2/2
6	BTB	B	505	-	-	11/21/21/21	-
7	GOL	A	509	-	-	4/4/4/4	-
6	BTB	C	506	-	-	10/21/21/21	-
2	HEM	B	501	1	-	1/14/54/54	-
7	GOL	A	508	-	-	4/4/4/4	-
6	BTB	C	505	9	-	7/21/21/21	-
2	HEM	C	501	1	-	2/14/54/54	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	H4B	C	502	-	-	0/8/17/17	0/2/2/2
7	GOL	D	506	-	-	4/4/4/4	-
6	BTB	A	506	-	-	7/21/21/21	-
2	HEM	D	501	1	-	0/14/54/54	-
4	A1BTV	C	503	-	-	5/15/23/23	0/4/4/4
7	GOL	B	507	-	-	2/4/4/4	-
7	GOL	C	508	-	-	4/4/4/4	-
7	GOL	B	506	-	-	1/4/4/4	-
3	H4B	B	502	-	-	0/8/17/17	0/2/2/2
3	H4B	D	502	-	-	0/8/17/17	0/2/2/2
4	A1BTV	B	503	-	-	7/15/23/23	0/4/4/4
7	GOL	A	507	-	-	3/4/4/4	-
6	BTB	D	504	9	-	2/21/21/21	-

All (56) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	501	HEM	FE-NC	5.15	2.12	1.95
2	A	501	HEM	FE-NC	5.14	2.12	1.95
2	A	501	HEM	FE-ND	4.92	2.10	1.94
2	C	501	HEM	FE-NC	4.86	2.11	1.95
2	C	501	HEM	FE-NB	4.80	2.09	1.94
2	C	501	HEM	FE-NA	4.48	2.10	1.95
2	A	501	HEM	FE-NA	4.45	2.09	1.95
2	D	501	HEM	FE-NC	4.40	2.09	1.95
2	C	501	HEM	FE-ND	4.09	2.07	1.94
2	D	501	HEM	FE-ND	4.08	2.07	1.94
2	B	501	HEM	FE-NB	3.80	2.06	1.94
2	B	501	HEM	FE-ND	3.77	2.06	1.94
2	D	501	HEM	FE-NB	3.69	2.06	1.94
2	C	501	HEM	CAC-C3C	3.29	1.56	1.47
2	D	501	HEM	FE-NA	3.28	2.06	1.95
2	D	501	HEM	CAB-C3B	3.19	1.55	1.47
2	B	501	HEM	CAC-C3C	3.19	1.55	1.47
2	A	501	HEM	CAB-C3B	3.14	1.55	1.47
2	C	501	HEM	CAB-C3B	3.14	1.55	1.47
2	A	501	HEM	FE-NB	3.09	2.04	1.94
4	D	503	A1BTV	C24-N27	-2.99	1.35	1.41
4	A	503	A1BTV	C24-N27	-2.87	1.35	1.41
2	B	501	HEM	FE-NA	2.87	2.04	1.95

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	501	HEM	CAC-C3C	2.85	1.55	1.47
4	B	503	A1BTV	C06-N07	-2.82	1.33	1.38
2	B	501	HEM	CAB-C3B	2.80	1.54	1.47
4	B	503	A1BTV	C24-N27	-2.79	1.36	1.41
4	A	503	A1BTV	C11-N07	-2.74	1.36	1.41
4	D	503	A1BTV	C28-N27	-2.72	1.33	1.38
4	A	503	A1BTV	C28-N27	-2.68	1.33	1.38
4	C	503	A1BTV	C24-N27	-2.68	1.36	1.41
4	D	503	A1BTV	C03-C02	2.55	1.40	1.34
4	B	503	A1BTV	C28-N27	-2.51	1.34	1.38
2	D	501	HEM	CMC-C2C	2.50	1.55	1.50
4	C	503	A1BTV	C28-N27	-2.44	1.34	1.38
4	C	503	A1BTV	C33-C32	2.44	1.40	1.34
4	C	503	A1BTV	C03-C02	2.43	1.40	1.34
2	D	501	HEM	CMB-C2B	2.41	1.55	1.50
4	D	503	A1BTV	C33-C32	2.40	1.39	1.34
2	D	501	HEM	CAC-C3C	2.39	1.53	1.47
4	A	503	A1BTV	C33-C32	2.38	1.39	1.34
4	B	503	A1BTV	C33-C32	2.36	1.39	1.34
4	C	503	A1BTV	C11-N07	-2.32	1.37	1.41
4	C	503	A1BTV	C06-N07	-2.32	1.34	1.38
4	A	503	A1BTV	C03-C02	2.26	1.39	1.34
4	B	503	A1BTV	C03-C02	2.26	1.39	1.34
2	B	501	HEM	CMC-C2C	2.20	1.55	1.50
2	A	501	HEM	CMB-C2B	2.18	1.55	1.50
2	B	501	HEM	CMD-C2D	2.17	1.55	1.50
2	D	501	HEM	C2A-C3A	-2.17	1.33	1.38
4	A	503	A1BTV	C06-N07	-2.13	1.34	1.38
2	C	501	HEM	CMC-C2C	2.12	1.55	1.50
2	A	501	HEM	CMC-C2C	2.09	1.55	1.50
3	A	502	H4B	C4-N3	-2.09	1.34	1.38
4	B	503	A1BTV	C11-N07	-2.07	1.37	1.41
3	C	502	H4B	C4-N3	-2.00	1.35	1.38

All (87) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
4	A	503	A1BTV	S31-C35-N34	-6.91	107.84	114.37
4	D	503	A1BTV	S31-C35-N34	-6.11	108.60	114.37
4	B	503	A1BTV	S31-C35-N34	-6.09	108.62	114.37
4	C	503	A1BTV	S31-C35-N34	-5.88	108.82	114.37
4	A	503	A1BTV	C32-S31-C35	5.62	95.48	89.51

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
4	D	503	A1BTV	C32-S31-C35	4.95	94.77	89.51
4	C	503	A1BTV	C32-S31-C35	4.88	94.69	89.51
4	B	503	A1BTV	C32-S31-C35	4.82	94.63	89.51
3	D	502	H4B	C2-N1-C8A	4.27	120.89	113.36
4	D	503	A1BTV	S01-C05-N04	-4.12	110.48	114.37
4	A	503	A1BTV	C33-N34-C35	4.06	115.07	109.83
4	D	503	A1BTV	C02-S01-C05	4.00	93.76	89.51
4	C	503	A1BTV	C02-S01-C05	4.00	93.75	89.51
4	A	503	A1BTV	S01-C05-N04	-3.98	110.61	114.37
3	C	502	H4B	C2-N1-C8A	3.96	120.35	113.36
3	B	502	H4B	C2-N1-C8A	3.96	120.34	113.36
3	A	502	H4B	C2-N1-C8A	3.93	120.29	113.36
4	C	503	A1BTV	S01-C05-N04	-3.86	110.72	114.37
4	D	503	A1BTV	C33-N34-C35	3.69	114.59	109.83
2	C	501	HEM	C3B-C2B-C1B	3.65	109.15	106.41
4	A	503	A1BTV	C33-C32-S31	-3.63	105.64	110.27
4	A	503	A1BTV	C02-S01-C05	3.60	93.33	89.51
4	B	503	A1BTV	C33-N34-C35	3.52	114.37	109.83
4	C	503	A1BTV	C33-N34-C35	3.42	114.25	109.83
4	C	503	A1BTV	C33-C32-S31	-3.30	106.06	110.27
4	D	503	A1BTV	C33-C32-S31	-3.27	106.10	110.27
4	B	503	A1BTV	S01-C05-N04	-3.23	111.32	114.37
4	B	503	A1BTV	C02-S01-C05	3.20	92.91	89.51
4	B	503	A1BTV	C33-C32-S31	-3.20	106.19	110.27
2	B	501	HEM	CBA-CAA-C2A	-3.19	103.72	112.53
2	D	501	HEM	C3B-C2B-C1B	3.16	108.78	106.41
4	D	503	A1BTV	C03-C02-S01	-3.15	106.25	110.27
2	D	501	HEM	CBA-CAA-C2A	-3.15	103.83	112.53
4	D	503	A1BTV	C24-N27-C28	-3.12	121.23	128.41
4	D	503	A1BTV	C17-C15-C14	-3.12	114.57	120.94
4	C	503	A1BTV	C03-C02-S01	-3.04	106.39	110.27
4	B	503	A1BTV	C17-C15-C14	-3.03	114.74	120.94
3	B	502	H4B	O4-C4-C4A	-3.02	119.97	127.26
3	D	502	H4B	O4-C4-C4A	-3.01	119.99	127.26
4	A	503	A1BTV	C17-C15-C14	-2.95	114.92	120.94
2	A	501	HEM	CBA-CAA-C2A	-2.91	104.49	112.53
4	B	503	A1BTV	C15-C17-N18	-2.83	103.89	112.79
3	C	502	H4B	O4-C4-C4A	-2.79	120.53	127.26
4	A	503	A1BTV	C03-C02-S01	-2.71	106.81	110.27
4	B	503	A1BTV	C24-N27-C28	-2.70	122.21	128.41
3	A	502	H4B	O4-C4-C4A	-2.68	120.80	127.26
3	D	502	H4B	C4A-C4-N3	2.65	119.40	112.13

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
4	D	503	A1BTV	C13-C12-C11	2.59	122.71	119.73
2	C	501	HEM	CBA-CAA-C2A	-2.59	105.38	112.53
2	A	501	HEM	C3D-C4D-ND	-2.56	107.36	110.17
3	B	502	H4B	O10-C10-C9	-2.51	105.62	109.77
2	A	501	HEM	C3B-C2B-C1B	2.48	108.27	106.41
2	D	501	HEM	C3D-C4D-ND	-2.47	107.46	110.17
2	D	501	HEM	C3B-C4B-NB	-2.46	107.70	109.47
2	B	501	HEM	C4D-ND-C1D	2.45	108.11	105.21
2	D	501	HEM	CHC-C1C-NC	2.45	127.12	124.45
4	A	503	A1BTV	C24-N27-C28	-2.44	122.79	128.41
4	A	503	A1BTV	C11-N07-C06	-2.43	122.83	128.41
3	D	502	H4B	C2-N3-C4	-2.42	120.73	125.11
2	A	501	HEM	CHA-C4D-ND	2.41	127.35	124.37
4	C	503	A1BTV	C03-N04-C05	2.40	112.93	109.83
2	A	501	HEM	C4D-ND-C1D	2.39	108.03	105.21
4	C	503	A1BTV	C24-N27-C28	-2.39	122.92	128.41
2	A	501	HEM	C3B-C4B-NB	-2.37	107.76	109.47
2	C	501	HEM	CBD-CAD-C3D	-2.36	106.00	112.53
4	A	503	A1BTV	C03-N04-C05	2.36	112.87	109.83
2	A	501	HEM	C2A-C1A-NA	-2.35	107.54	110.15
2	A	501	HEM	C1B-NB-C4B	2.33	107.97	105.21
4	B	503	A1BTV	C03-C02-S01	-2.32	107.31	110.27
2	C	501	HEM	C3B-C4B-NB	-2.31	107.81	109.47
3	A	502	H4B	C4A-C4-N3	2.31	118.48	112.13
4	D	503	A1BTV	C03-N04-C05	2.30	112.80	109.83
2	C	501	HEM	C1B-NB-C4B	2.29	107.91	105.21
3	C	502	H4B	C4A-C4-N3	2.28	118.38	112.13
4	C	503	A1BTV	C17-C15-C14	-2.28	116.29	120.94
2	A	501	HEM	CAD-CBD-CGD	-2.26	107.68	113.67
3	B	502	H4B	C4A-C4-N3	2.24	118.28	112.13
3	B	502	H4B	C2-N3-C4	-2.24	121.05	125.11
2	B	501	HEM	C1B-NB-C4B	2.19	107.80	105.21
2	D	501	HEM	C4D-ND-C1D	2.19	107.80	105.21
2	C	501	HEM	C4D-ND-C1D	2.18	107.79	105.21
2	D	501	HEM	CAD-CBD-CGD	-2.17	107.90	113.67
4	C	503	A1BTV	C11-N07-C06	-2.08	123.63	128.41
5	A	504	ACT	O-C-CH3	-2.08	114.02	122.53
2	D	501	HEM	C1B-NB-C4B	2.07	107.66	105.21
4	B	503	A1BTV	C03-N04-C05	2.07	112.50	109.83
2	D	501	HEM	C2A-C1A-NA	-2.00	107.93	110.15

There are no chirality outliers.

All (111) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	A	503	A1BTV	N18-C19-C20-C21
4	C	503	A1BTV	N18-C19-C20-C21
4	D	503	A1BTV	N18-C19-C20-C21
6	A	505	BTB	C1-C2-C4-O4
6	A	505	BTB	C3-C2-C4-O4
6	A	505	BTB	N-C2-C4-O4
6	A	506	BTB	O1-C1-C2-C3
6	A	506	BTB	O1-C1-C2-C4
6	A	506	BTB	O1-C1-C2-N
6	A	506	BTB	C1-C2-C4-O4
6	A	506	BTB	C3-C2-C4-O4
6	A	506	BTB	N-C2-C4-O4
6	B	504	BTB	O1-C1-C2-C3
6	B	504	BTB	O1-C1-C2-C4
6	B	504	BTB	O1-C1-C2-N
6	B	505	BTB	C1-C2-C3-O3
6	B	505	BTB	C4-C2-C3-O3
6	B	505	BTB	N-C2-C3-O3
6	B	505	BTB	C1-C2-N-C5
6	B	505	BTB	C1-C2-N-C7
6	B	505	BTB	C3-C2-N-C5
6	B	505	BTB	C3-C2-N-C7
6	B	505	BTB	C4-C2-N-C5
6	B	505	BTB	C4-C2-N-C7
6	C	505	BTB	O1-C1-C2-C3
6	C	505	BTB	O1-C1-C2-C4
6	C	505	BTB	O1-C1-C2-N
6	C	505	BTB	C1-C2-C4-O4
6	C	505	BTB	C3-C2-C4-O4
6	C	505	BTB	N-C2-C4-O4
6	C	506	BTB	O1-C1-C2-C3
6	C	506	BTB	O1-C1-C2-C4
6	C	506	BTB	C1-C2-N-C5
6	C	506	BTB	C1-C2-N-C7
6	C	506	BTB	C3-C2-N-C5
6	C	506	BTB	C3-C2-N-C7
6	C	506	BTB	C4-C2-N-C5
6	C	506	BTB	C4-C2-N-C7
6	D	505	BTB	O1-C1-C2-C3
6	D	505	BTB	O1-C1-C2-C4
6	D	505	BTB	O1-C1-C2-N
6	D	505	BTB	N-C2-C3-O3

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Mol	Chain	Res	Type	Atoms
6	D	505	BTB	C1-C2-C4-O4
6	D	505	BTB	C3-C2-C4-O4
6	D	505	BTB	N-C2-C4-O4
7	A	507	GOL	O1-C1-C2-C3
7	A	508	GOL	C1-C2-C3-O3
7	A	509	GOL	O1-C1-C2-O2
7	A	509	GOL	O1-C1-C2-C3
7	B	507	GOL	C1-C2-C3-O3
7	C	507	GOL	O1-C1-C2-O2
7	C	507	GOL	O1-C1-C2-C3
7	C	508	GOL	C1-C2-C3-O3
7	D	506	GOL	O1-C1-C2-C3
4	B	503	A1BTV	N18-C19-C20-C21
6	B	505	BTB	N-C5-C6-O6
6	C	506	BTB	N-C7-C8-O8
4	D	503	A1BTV	C15-C17-N18-C19
6	A	505	BTB	N-C5-C6-O6
6	D	505	BTB	N-C5-C6-O6
7	A	508	GOL	O2-C2-C3-O3
4	C	503	A1BTV	C15-C17-N18-C19
7	A	509	GOL	C1-C2-C3-O3
7	C	508	GOL	O1-C1-C2-C3
6	B	505	BTB	N-C7-C8-O8
7	A	507	GOL	O1-C1-C2-O2
7	C	508	GOL	O1-C1-C2-O2
6	D	504	BTB	C6-C5-N-C7
7	B	507	GOL	O2-C2-C3-O3
7	C	508	GOL	O2-C2-C3-O3
7	D	506	GOL	O1-C1-C2-O2
4	A	503	A1BTV	C15-C17-N18-C19
4	B	503	A1BTV	C15-C17-N18-C19
4	A	503	A1BTV	C25-C24-N27-C28
4	A	503	A1BTV	C23-C24-N27-C28
6	D	505	BTB	N-C7-C8-O8
6	D	505	BTB	C4-C2-C3-O3
7	A	509	GOL	O2-C2-C3-O3
7	D	507	GOL	O1-C1-C2-O2
4	B	503	A1BTV	C19-C20-C21-C22
4	A	503	A1BTV	C19-C20-C21-C22
4	D	503	A1BTV	C19-C20-C21-C22
4	A	503	A1BTV	C19-C20-C21-C26
4	B	503	A1BTV	C19-C20-C21-C26

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Mol	Chain	Res	Type	Atoms
4	D	503	A1BTV	C19-C20-C21-C26
6	D	504	BTB	N-C5-C6-O6
4	D	503	A1BTV	C25-C24-N27-C28
7	B	506	GOL	O2-C2-C3-O3
7	C	507	GOL	O2-C2-C3-O3
7	A	508	GOL	O1-C1-C2-C3
7	C	507	GOL	C1-C2-C3-O3
7	D	506	GOL	C1-C2-C3-O3
2	A	501	HEM	C4B-C3B-CAB-CBB
4	B	503	A1BTV	C23-C24-N27-C28
6	C	506	BTB	O1-C1-C2-N
4	D	503	A1BTV	C23-C24-N27-C28
4	B	503	A1BTV	N08-C06-N07-C11
4	B	503	A1BTV	C25-C24-N27-C28
2	C	501	HEM	C4B-C3B-CAB-CBB
4	C	503	A1BTV	C25-C24-N27-C28
4	C	503	A1BTV	C23-C24-N27-C28
6	A	506	BTB	N-C7-C8-O8
7	D	506	GOL	O2-C2-C3-O3
2	B	501	HEM	C4B-C3B-CAB-CBB
7	A	507	GOL	O2-C2-C3-O3
6	B	504	BTB	C4-C2-C3-O3
6	C	505	BTB	N-C7-C8-O8
7	A	508	GOL	O1-C1-C2-O2
6	D	505	BTB	C6-C5-N-C7
4	C	503	A1BTV	C19-C20-C21-C22
2	C	501	HEM	C2A-CAA-CBA-CGA

There are no ring outliers.

24 monomers are involved in 60 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
6	B	504	BTB	2	0
6	D	505	BTB	4	0
4	D	503	A1BTV	3	0
6	A	505	BTB	3	0
2	A	501	HEM	3	0
4	A	503	A1BTV	3	0
3	A	502	H4B	1	0
6	B	505	BTB	2	0
7	A	509	GOL	1	0
6	C	506	BTB	4	0

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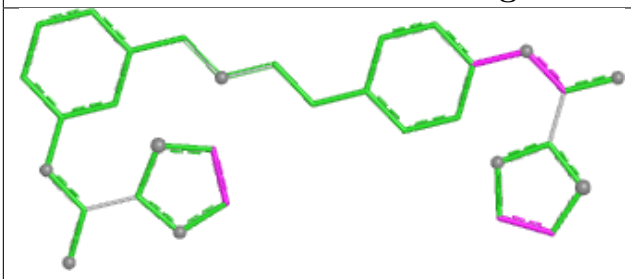
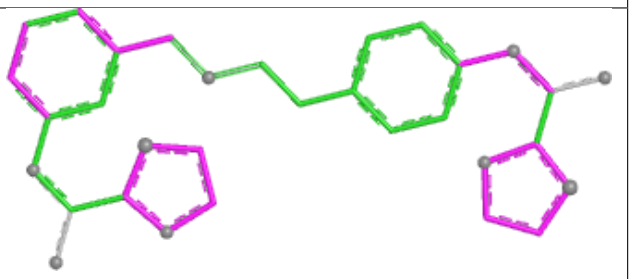
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	B	501	HEM	2	0
6	C	505	BTB	2	0
2	C	501	HEM	3	0
3	C	502	H4B	1	0
6	A	506	BTB	1	0
5	A	504	ACT	8	0
2	D	501	HEM	3	0
4	C	503	A1BTV	3	0
7	C	508	GOL	1	0
5	C	504	ACT	8	0
3	B	502	H4B	1	0
3	D	502	H4B	1	0
4	B	503	A1BTV	2	0
6	D	504	BTB	1	0

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.

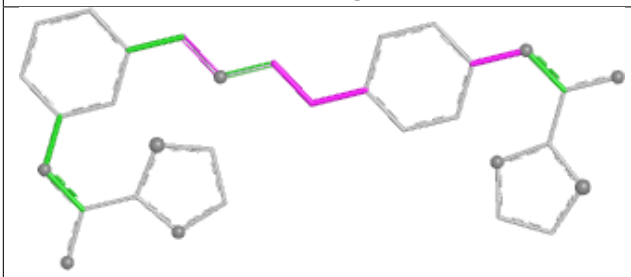
Ligand A1BTV D 503



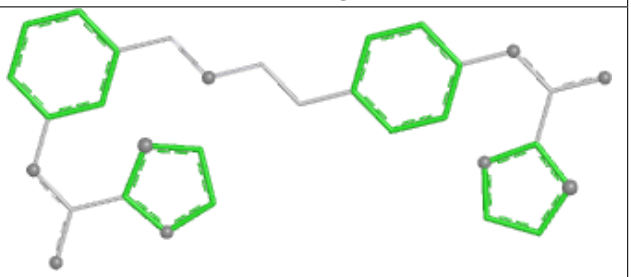
Bond lengths



Bond angles

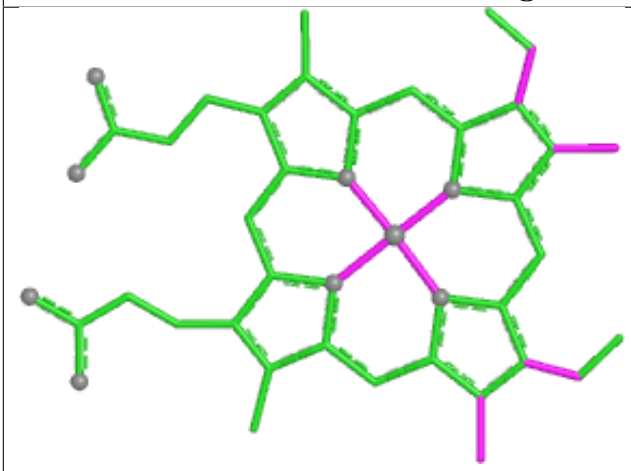


Torsions

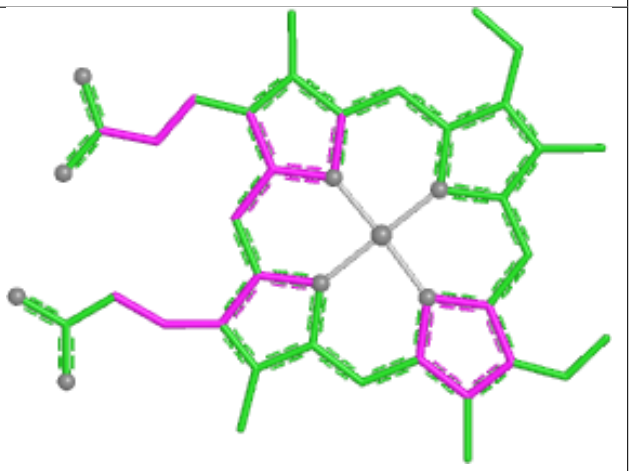


Rings

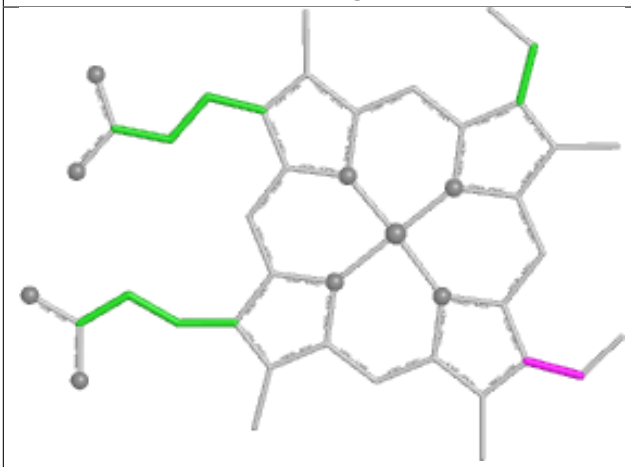
Ligand HEM A 501



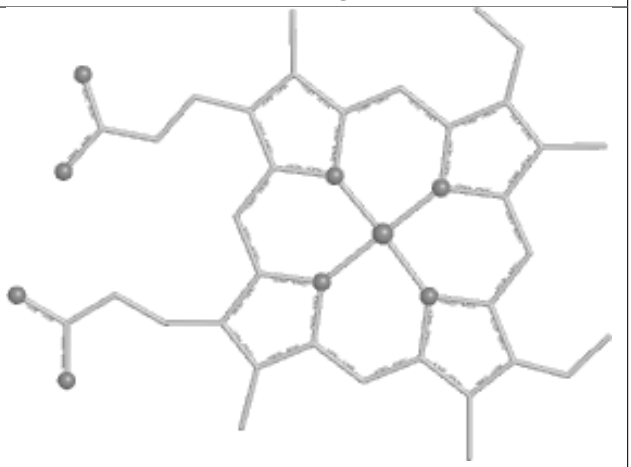
Bond lengths



Bond angles

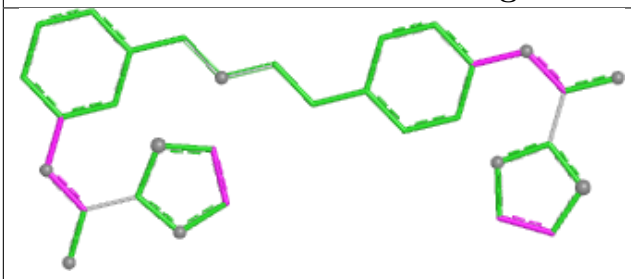


Torsions

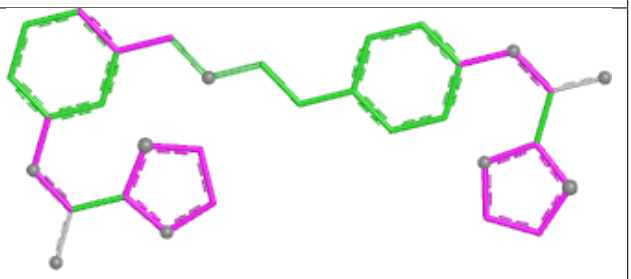


Rings

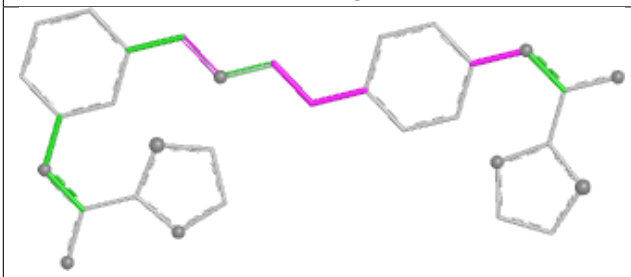
Ligand A1BTV A 503



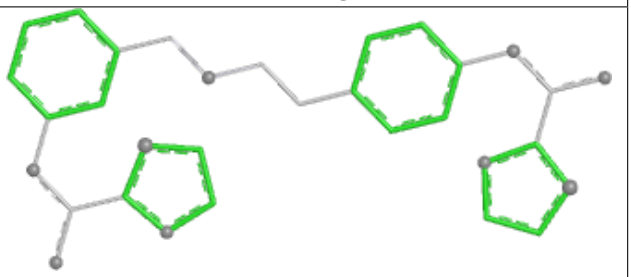
Bond lengths



Bond angles

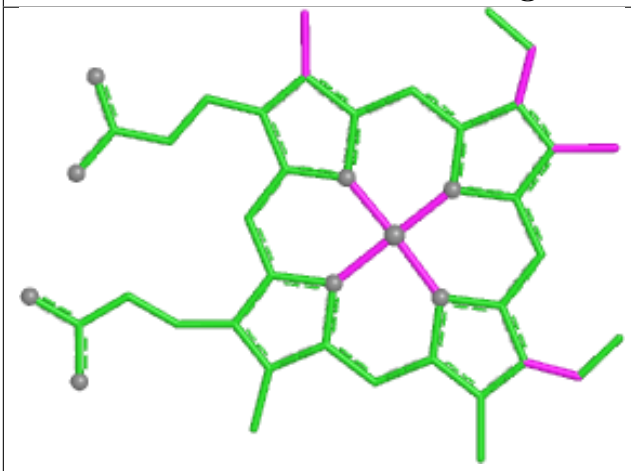


Torsions

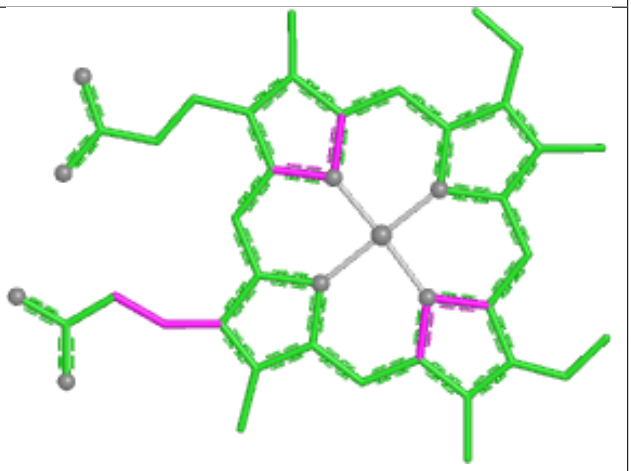


Rings

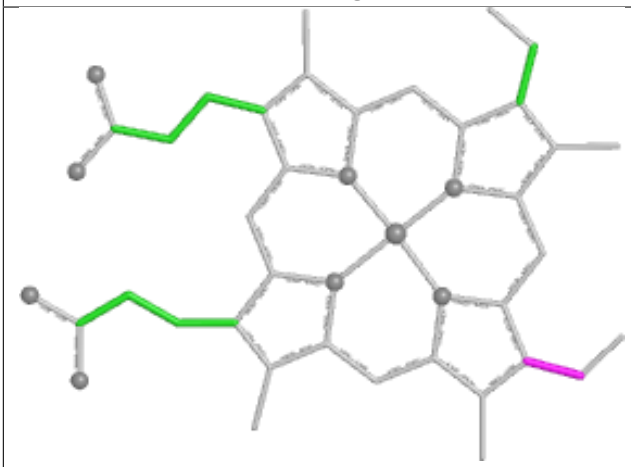
Ligand HEM B 501



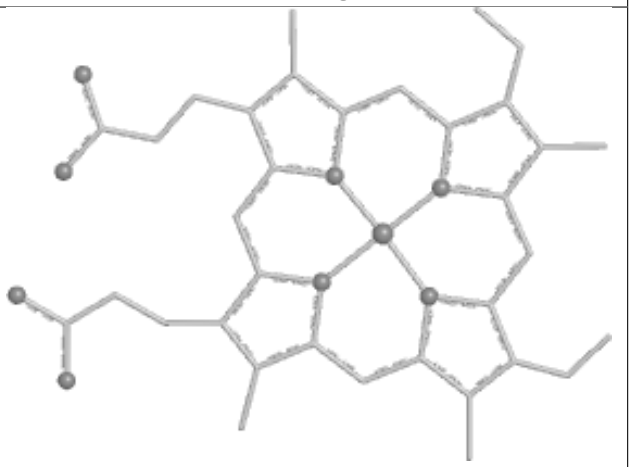
Bond lengths



Bond angles

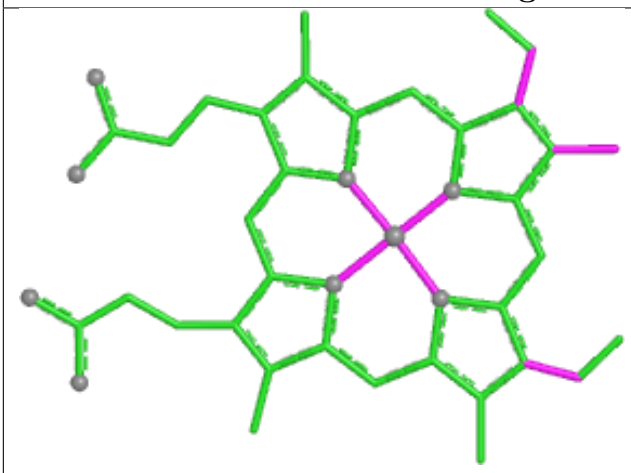


Torsions

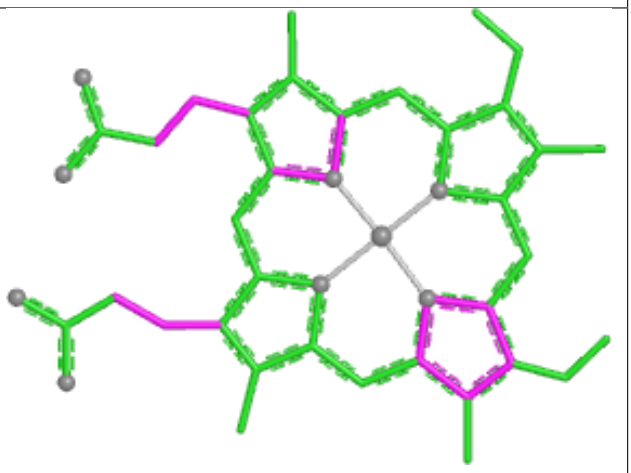


Rings

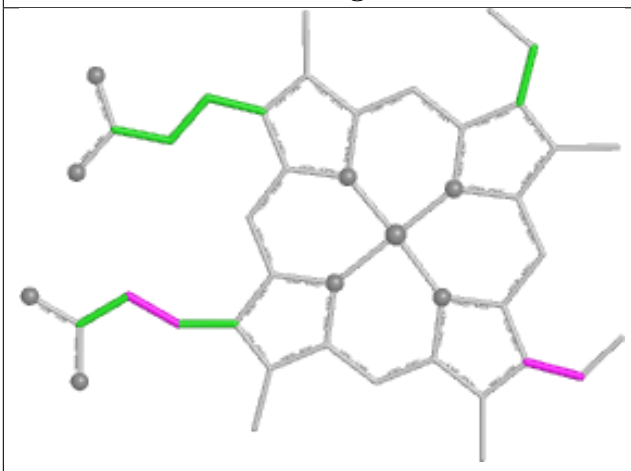
Ligand HEM C 501



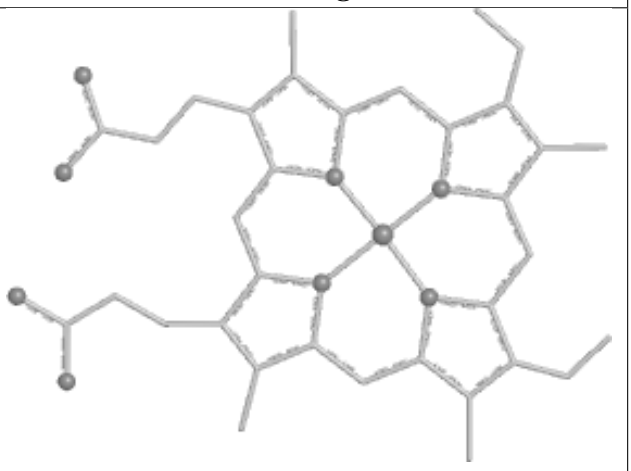
Bond lengths



Bond angles

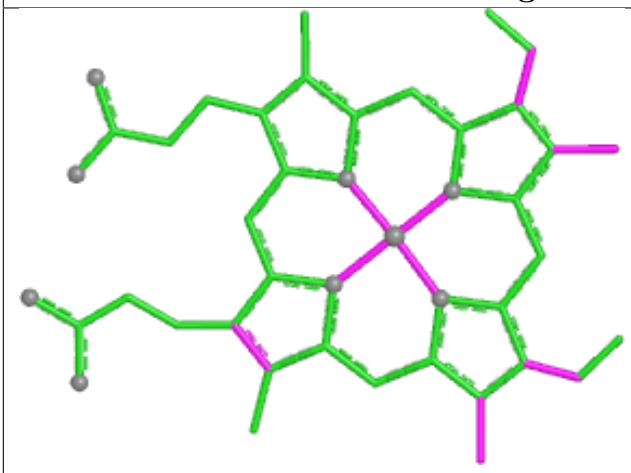


Torsions



Rings

Ligand HEM D 501



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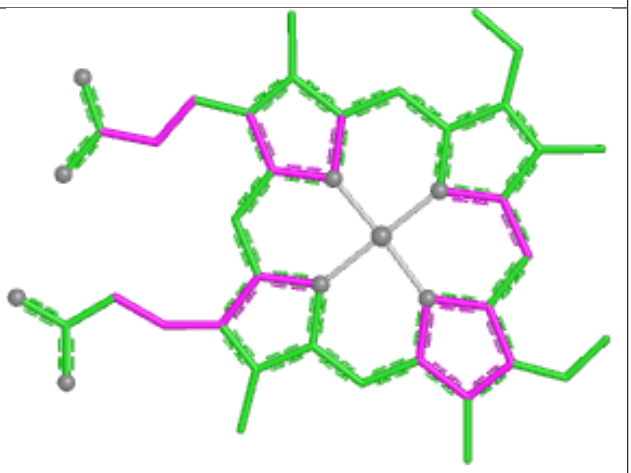
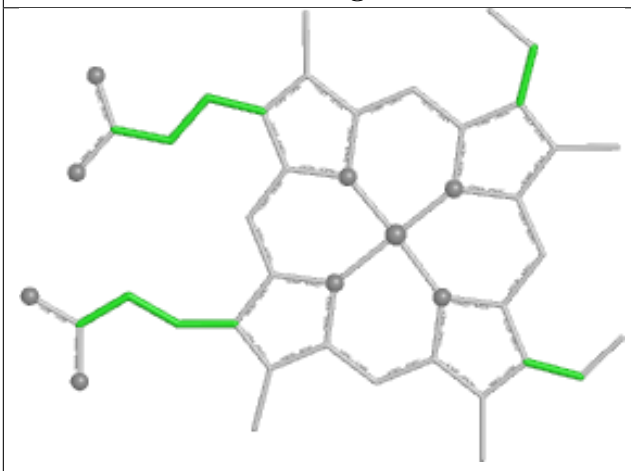


Bond angles



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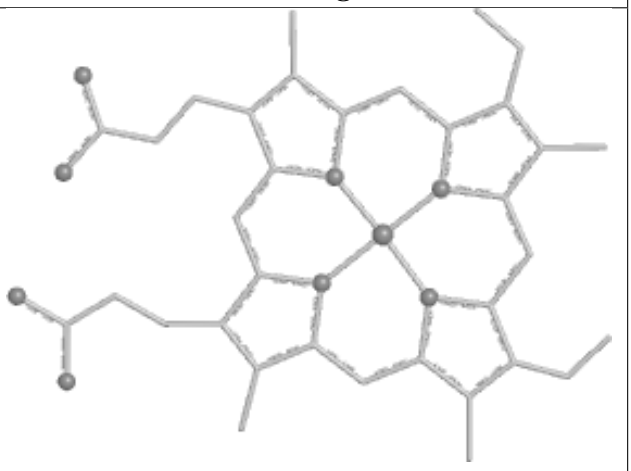
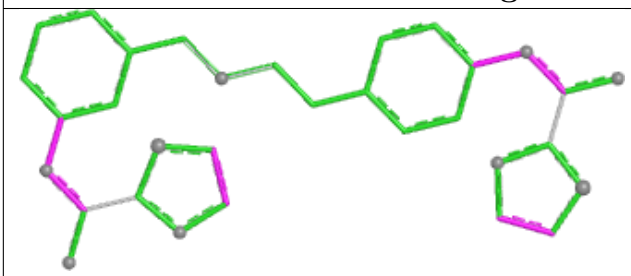
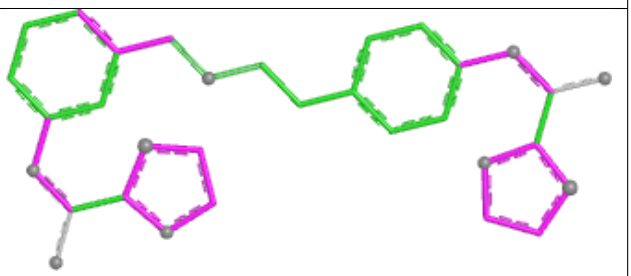


Rings

Ligand A1BTV C 503

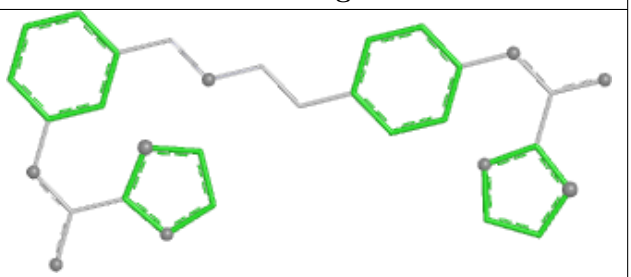


Bond lengths



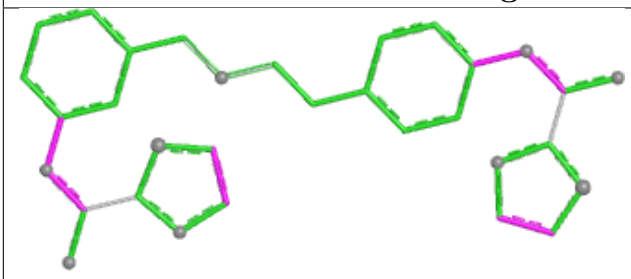
Bond angles

Torsions

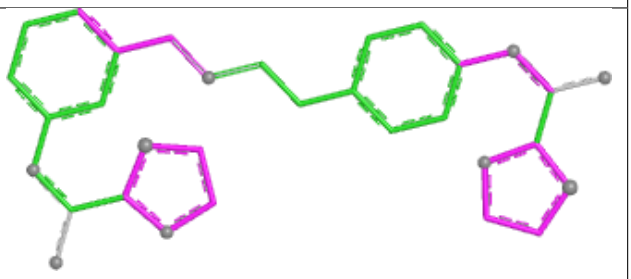


Rings

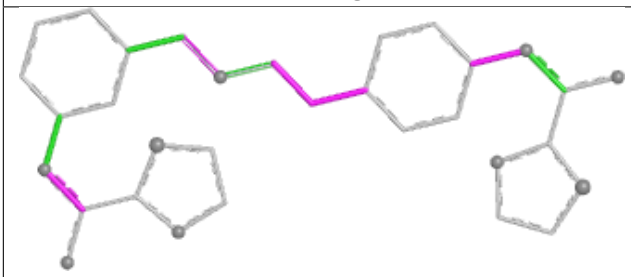
Ligand A1BTV B 503



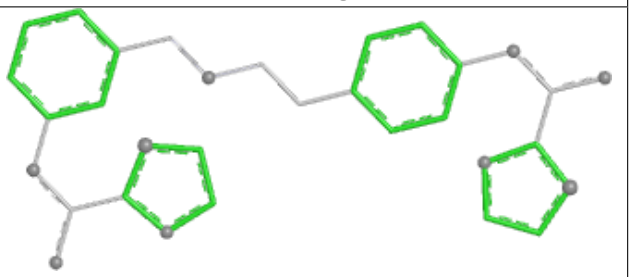
Bond lengths



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	403/440 (91%)	0.28	14 (3%) 47 57	17, 40, 76, 109	1 (0%)
1	B	403/440 (91%)	-0.09	4 (0%) 79 86	18, 30, 56, 101	3 (0%)
1	C	401/440 (91%)	0.29	10 (2%) 58 68	18, 42, 78, 109	1 (0%)
1	D	404/440 (91%)	-0.01	8 (1%) 65 74	16, 31, 65, 108	3 (0%)
All	All	1611/1760 (91%)	0.12	36 (2%) 62 71	16, 35, 73, 109	8 (0%)

All (36) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	119	ALA	4.9
1	A	107	ARG	4.2
1	C	120	PRO	3.9
1	A	108	LYS	3.6
1	B	107	ARG	3.6
1	C	275	ILE	3.4
1	D	108	LYS	3.1
1	A	141	SER	3.1
1	D	257	GLN	3.0
1	A	155	ALA	2.7
1	A	142	GLY	2.7
1	D	89	GLN	2.6
1	D	119	ALA	2.6
1	C	300	PRO	2.5
1	C	124	LEU	2.5
1	B	108	LYS	2.5
1	C	204	ALA	2.4
1	A	238	ARG	2.4
1	D	255	ARG	2.3
1	C	136	SER	2.3
1	A	256	GLN	2.3

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Mol	Chain	Res	Type	RSRZ
1	D	202	ARG	2.2
1	A	257	GLN	2.2
1	B	68	PHE	2.2
1	C	89	GLN	2.2
1	A	255	ARG	2.1
1	A	302	LEU	2.1
1	A	258	ASP	2.1
1	C	304	LEU	2.1
1	A	261	VAL	2.1
1	A	304	LEU	2.0
1	A	480	TRP	2.0
1	C	273	LEU	2.0
1	D	412	LEU	2.0
1	D	147	GLU	2.0
1	C	283	ASN	2.0

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

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

6.3 Carbohydrates (i)

There are no oligosaccharides in this entry.

6.4 Ligands (i)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 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
7	GOL	C	507	6/6	0.57	0.16	73,78,81,86	0
7	GOL	C	508	6/6	0.58	0.18	75,77,80,81	0
7	GOL	A	509	6/6	0.62	0.13	62,71,72,72	0
7	GOL	A	508	6/6	0.68	0.13	73,73,77,77	0
7	GOL	D	506	6/6	0.73	0.16	72,75,77,79	0
6	BTB	D	505	14/14	0.75	0.17	46,65,70,71	0
6	BTB	B	505	14/14	0.75	0.18	65,71,74,75	0
7	GOL	B	506	6/6	0.76	0.13	57,61,62,64	0

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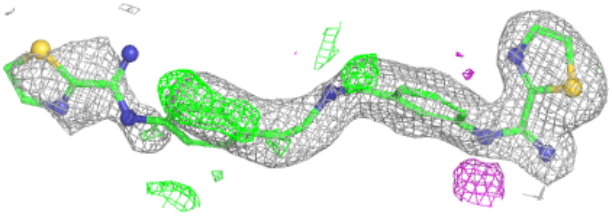
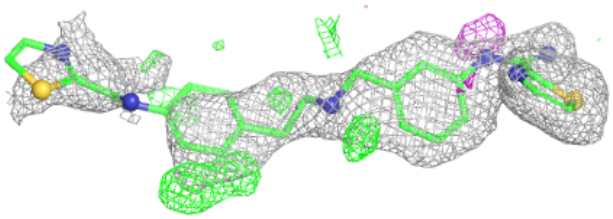
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
6	BTB	C	506	14/14	0.77	0.16	63,85,92,92	0
6	BTB	C	505	14/14	0.77	0.18	77,90,99,100	0
7	GOL	A	507	6/6	0.77	0.13	58,63,68,69	0
6	BTB	A	506	14/14	0.81	0.18	45,69,80,86	0
6	BTB	B	504	14/14	0.83	0.16	30,59,69,73	0
7	GOL	B	507	6/6	0.84	0.20	63,66,69,70	0
5	ACT	C	504	4/4	0.86	0.24	46,49,53,56	0
6	BTB	D	504	14/14	0.87	0.16	33,48,66,74	0
7	GOL	D	507	6/6	0.87	0.18	51,55,61,62	0
4	A1BTV	C	503	32/32	0.90	0.16	26,60,118,123	0
4	A1BTV	A	503	32/32	0.91	0.14	25,57,100,107	0
6	BTB	A	505	14/14	0.91	0.14	22,73,84,88	0
9	GD	A	511	1/1	0.91	0.16	107,107,107,107	0
9	GD	C	510	1/1	0.92	0.14	131,131,131,131	0
5	ACT	A	504	4/4	0.93	0.12	28,29,42,45	0
4	A1BTV	B	503	32/32	0.94	0.13	15,50,114,120	0
3	H4B	C	502	17/17	0.94	0.08	30,37,50,50	0
4	A1BTV	D	503	32/32	0.94	0.14	19,57,121,126	0
3	H4B	A	502	17/17	0.95	0.07	24,31,41,43	0
3	H4B	D	502	17/17	0.96	0.06	23,29,38,39	0
3	H4B	B	502	17/17	0.96	0.07	25,31,35,45	0
2	HEM	C	501	43/43	0.97	0.07	20,30,44,49	0
8	CL	B	508	1/1	0.97	0.10	34,34,34,34	0
2	HEM	D	501	43/43	0.98	0.06	15,22,34,36	0
8	CL	C	509	1/1	0.98	0.06	40,40,40,40	0
2	HEM	A	501	43/43	0.98	0.07	20,28,43,50	0
9	GD	B	509	1/1	0.98	0.04	38,38,38,38	0
8	CL	A	510	1/1	0.98	0.09	44,44,44,44	0
11	CA	B	510	1/1	0.98	0.04	39,39,39,39	0
2	HEM	B	501	43/43	0.99	0.05	16,20,33,37	0
9	GD	D	509	1/1	0.99	0.03	36,36,36,36	0
10	ZN	C	511	1/1	0.99	0.02	30,30,30,30	0
11	CA	A	513	1/1	0.99	0.03	27,27,27,27	0
8	CL	D	508	1/1	0.99	0.07	33,33,33,33	0
10	ZN	A	512	1/1	1.00	0.02	26,26,26,26	0

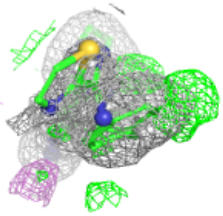
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

Electron density around A1BTV 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)

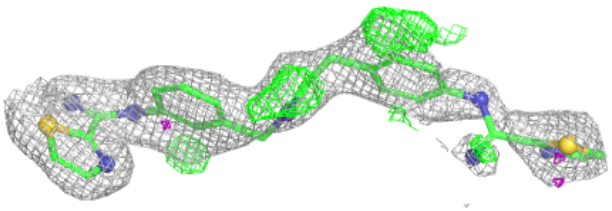


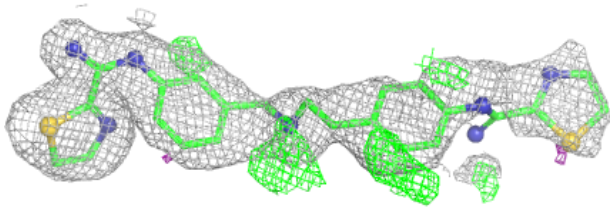


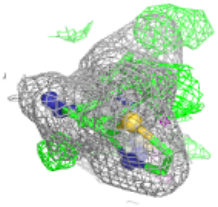


Electron density around A1BTV A 503:

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

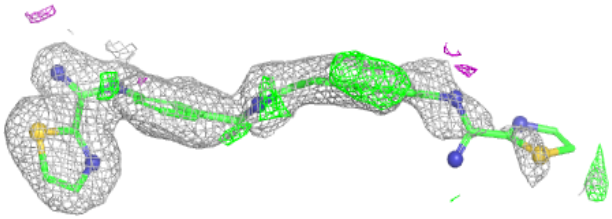


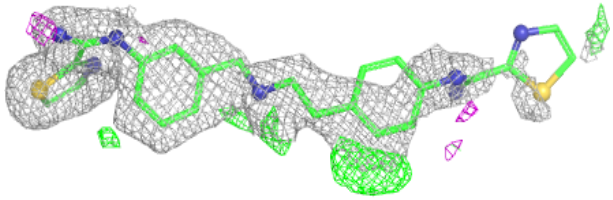


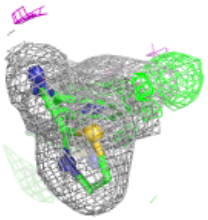


Electron density around A1BTV B 503:

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

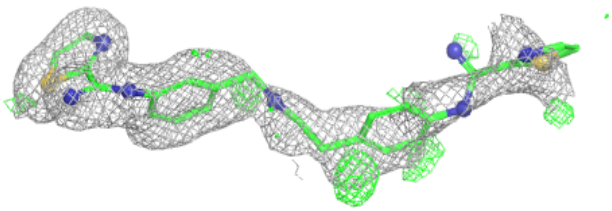


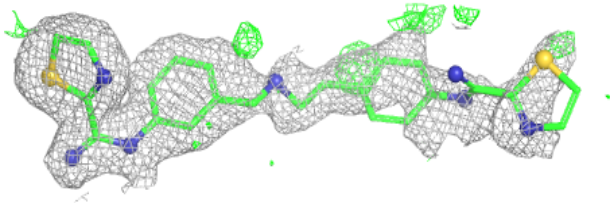


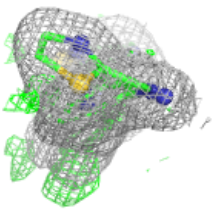


Electron density around A1BTV D 503:

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

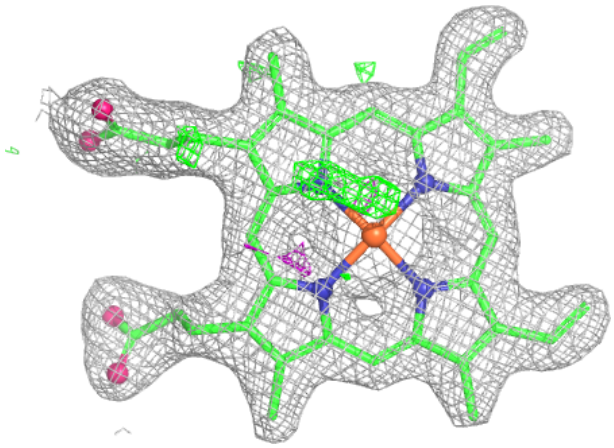


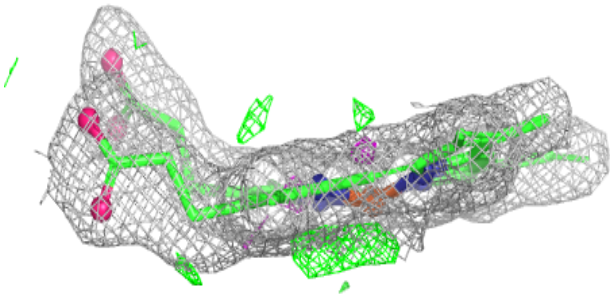


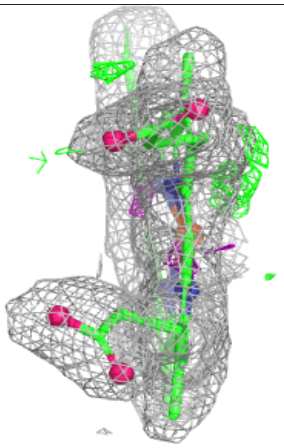


Electron density around HEM C 501:

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

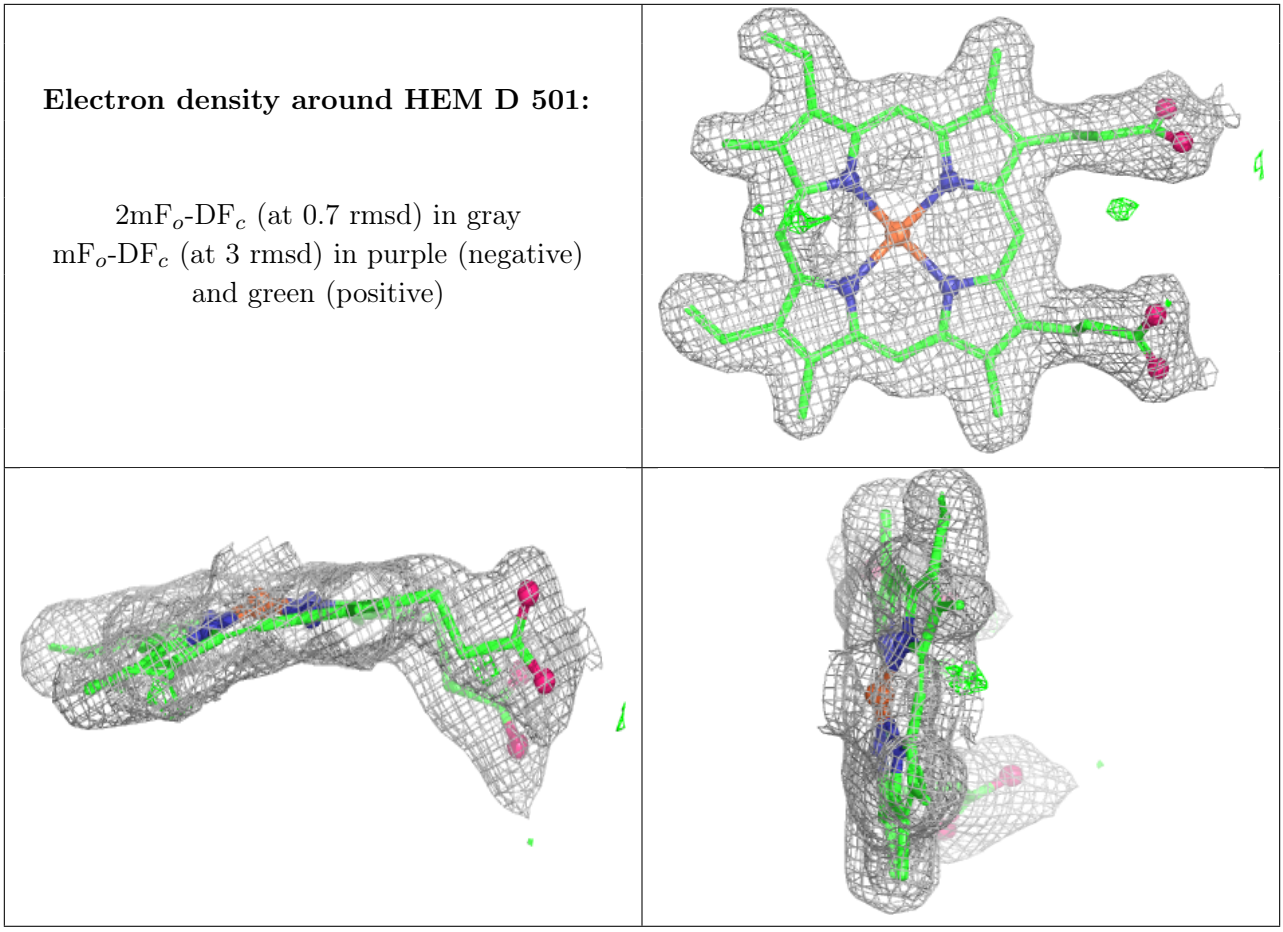






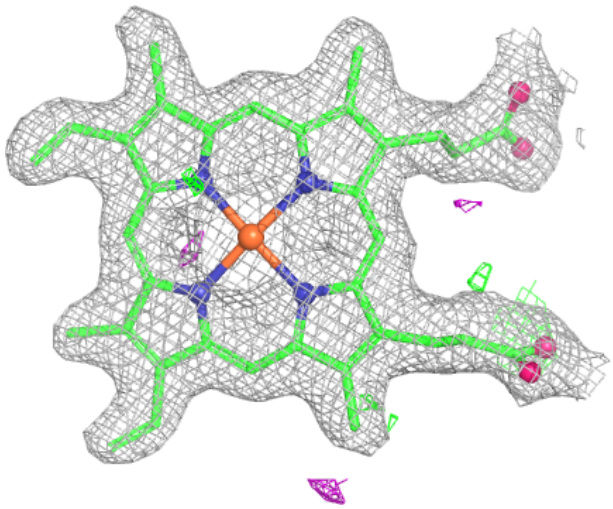
Electron density around HEM D 501:

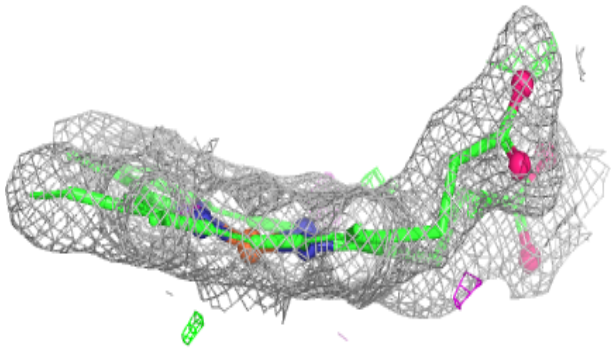
$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)

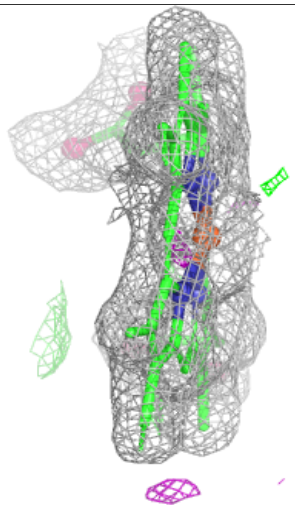


Electron density around HEM A 501:

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

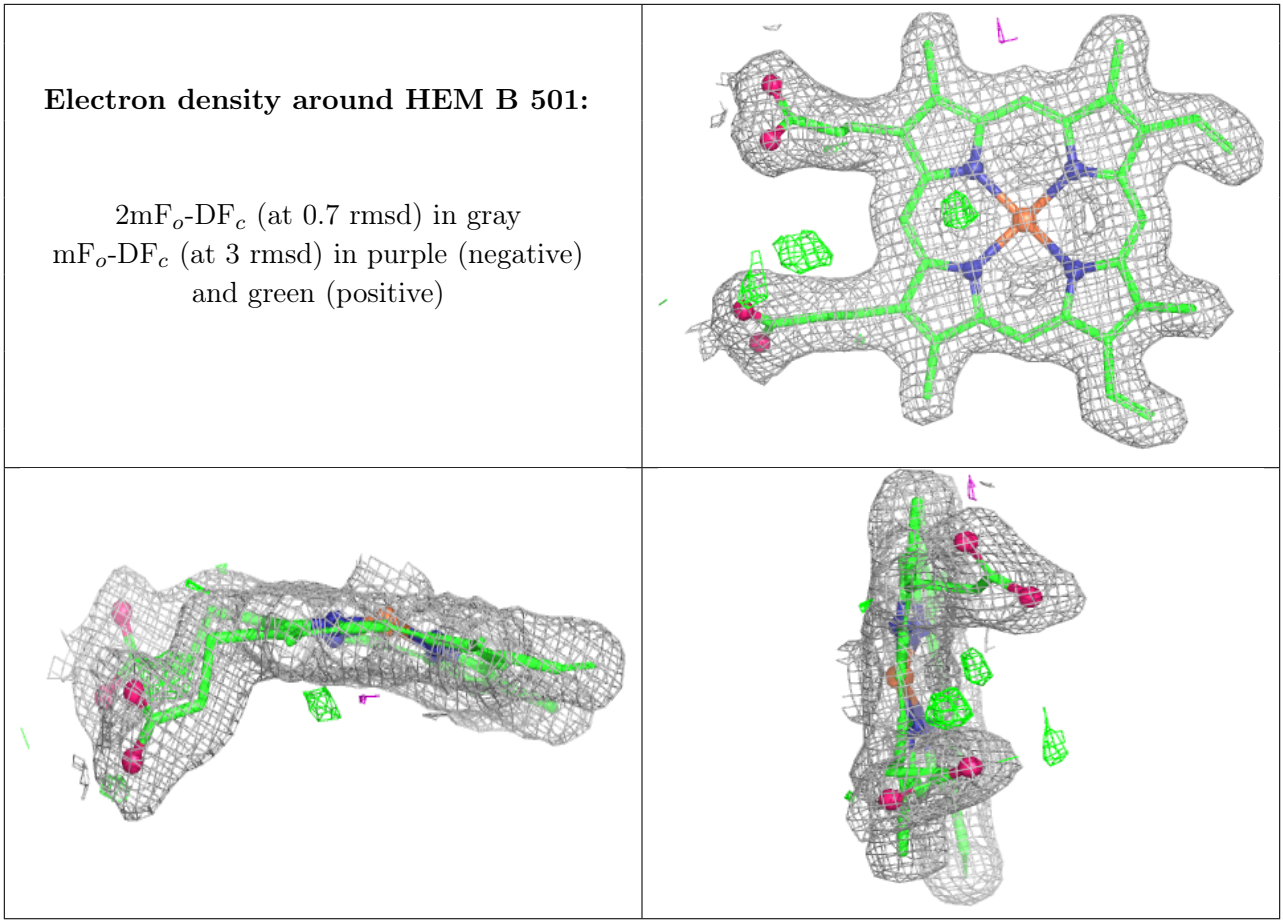






Electron density around HEM B 501:

$2mF_o$-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.