



Full wwPDB X-ray Structure Validation Report ⓘ

Oct 3, 2023 – 05:59 PM EDT

PDB ID : 6POX
Title : Structure of human endothelial nitric oxide synthase heme domain in complex with 7-(3-(Aminomethyl)-4-ethoxyphenyl)-4-methylquinolin-2-amine
Authors : Chreifi, G.; Li, H.; Poulos, T.L.
Deposited on : 2019-07-05
Resolution : 2.20 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 : 1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix) : 1.13
EDS : 2.35.1
buster-report : 1.1.7 (2018)
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac : 5.8.0158
CCP4 : 7.0.044 (Gargrove)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.35.1

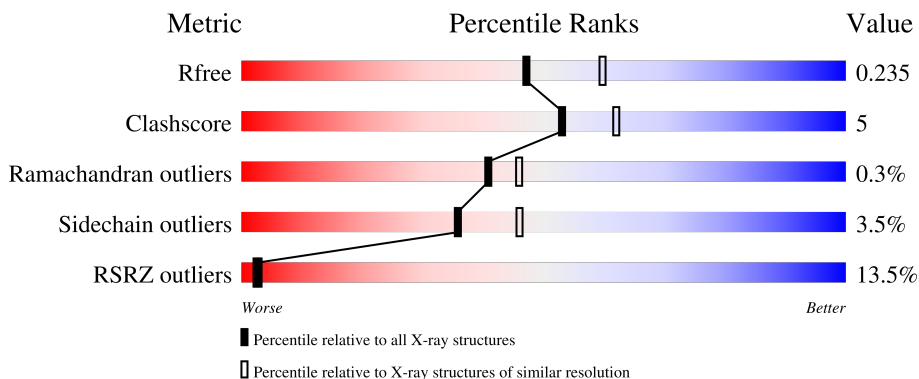
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.20 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	4898 (2.20-2.20)
Clashscore	141614	5594 (2.20-2.20)
Ramachandran outliers	138981	5503 (2.20-2.20)
Sidechain outliers	138945	5504 (2.20-2.20)
RSRZ outliers	127900	4800 (2.20-2.20)

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 $\leq 5\%$. 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	
1	B	440	
1	C	440	
1	D	440	

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
3	H4B	A	502	-	-	-	X
5	BTB	A	506	-	-	X	-

2 Entry composition

There are 10 unique types of molecules in this entry. The entry contains 13738 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.

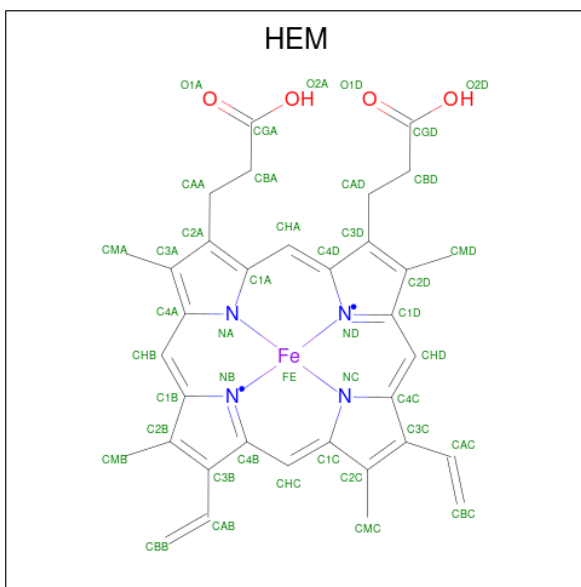
- Molecule 1 is a protein called Nitric oxide synthase, endothelial.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	400	3204	2041	562	585	16	0	2	0
1	B	402	3220	2051	566	587	16	0	3	0
1	C	401	3209	2044	563	586	16	0	2	0
1	D	402	3215	2048	565	586	16	0	2	0

There are 4 discrepancies between the modelled and reference sequences:

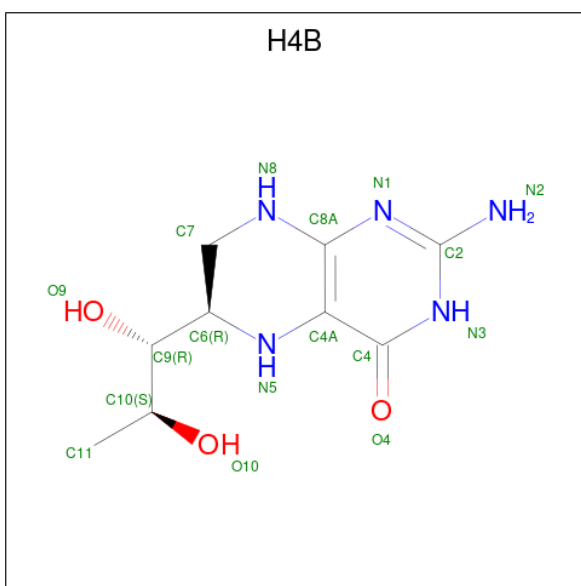
Chain	Residue	Modelled	Actual	Comment	Reference
A	298	GLU	ASP	variant	UNP P29474
B	298	GLU	ASP	variant	UNP P29474
C	298	GLU	ASP	variant	UNP P29474
D	298	GLU	ASP	variant	UNP P29474

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



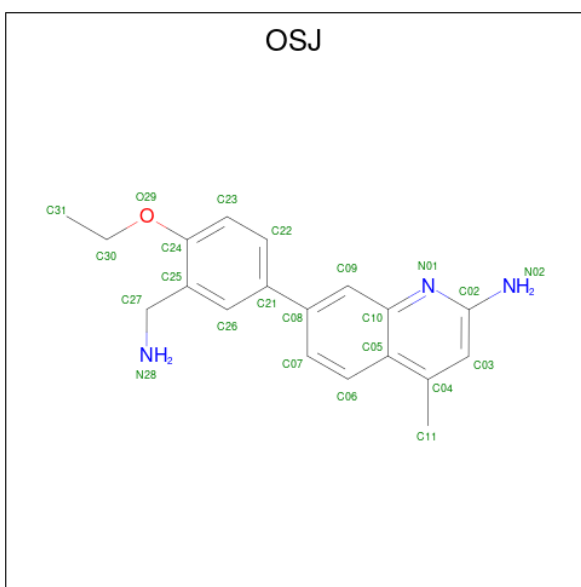
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	
			Total	C	Fe	N			O
2	A	1	Total 43	C 34	Fe 1	N 4	O 4	0	0
2	B	1	Total 43	C 34	Fe 1	N 4	O 4	0	0
2	C	1	Total 43	C 34	Fe 1	N 4	O 4	0	0
2	D	1	Total 43	C 34	Fe 1	N 4	O 4	0	0

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



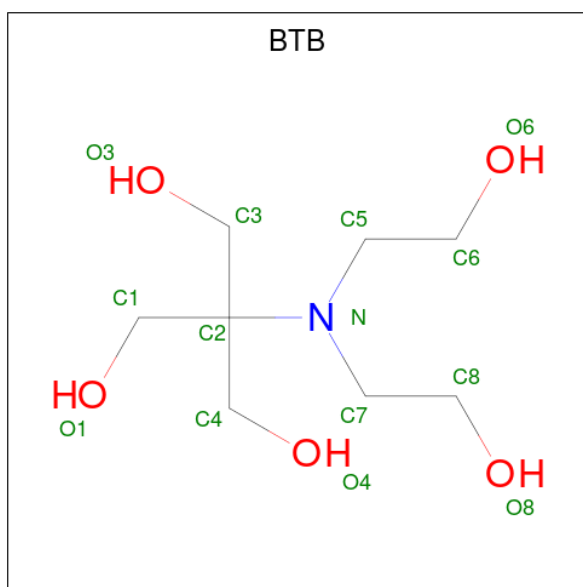
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
3	A	1	Total	C	N	O	0	0
			17	9	5	3		
3	B	1	Total	C	N	O	0	0
			17	9	5	3		
3	C	1	Total	C	N	O	0	0
			17	9	5	3		
3	D	1	Total	C	N	O	0	0
			17	9	5	3		

- Molecule 4 is 7-[3-(aminomethyl)-4-ethoxyphenyl]-4-methylquinolin-2-amine (three-letter code: OSJ) (formula: C₁₉H₂₁N₃O) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
4	A	1	Total	C	N	O	0	0
			23	19	3	1		
4	B	1	Total	C	N	O	0	0
			23	19	3	1		
4	C	1	Total	C	N	O	0	0
			23	19	3	1		
4	D	1	Total	C	N	O	0	0
			23	19	3	1		

- Molecule 5 is 2-[BIS-(2-HYDROXY-ETHYL)-AMINO]-2-HYDROXYMETHYL-PROPAN E-1,3-DIOL (three-letter code: BTB) (formula: C₈H₁₉NO₅).

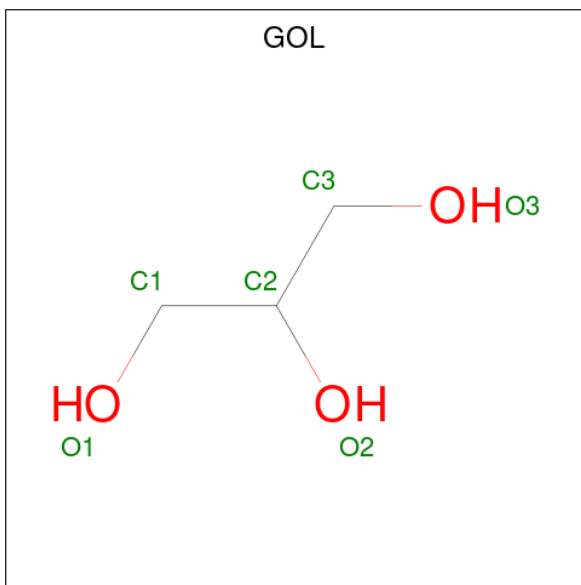


Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	N	O		
5	A	1	14	8	1	5	0	0
5	A	1	14	8	1	5	0	0
5	A	1	14	8	1	5	0	0
5	A	1	14	8	1	5	0	0
5	B	1	14	8	1	5	0	0
5	B	1	14	8	1	5	0	0
5	B	1	14	8	1	5	0	0
5	B	1	14	8	1	5	0	0
5	C	1	14	8	1	5	0	0
5	C	1	14	8	1	5	0	0
5	D	1	14	8	1	5	0	0
5	D	1	14	8	1	5	0	0

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

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

- Molecule 7 is GLYCEROL (three-letter code: GOL) (formula: C₃H₈O₃).



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

- Molecule 8 is CHLORIDE ION (three-letter code: CL) (formula: Cl).

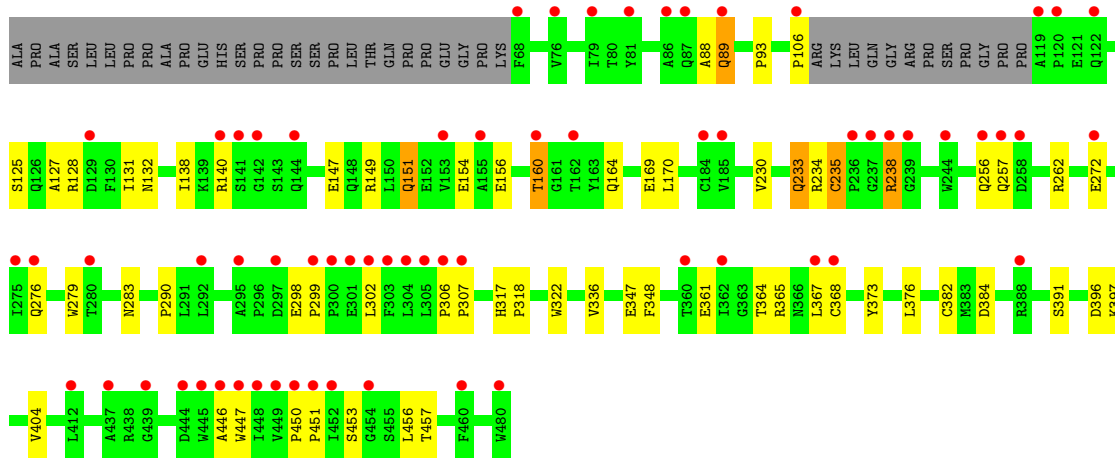
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
8	A	1	Total Cl 1 1	0	0
8	B	1	Total Cl 1 1	0	0
8	C	1	Total Cl 1 1	0	0
8	D	1	Total Cl 1 1	0	0

- Molecule 9 is GADOLINIUM ATOM (three-letter code: GD) (formula: Gd).

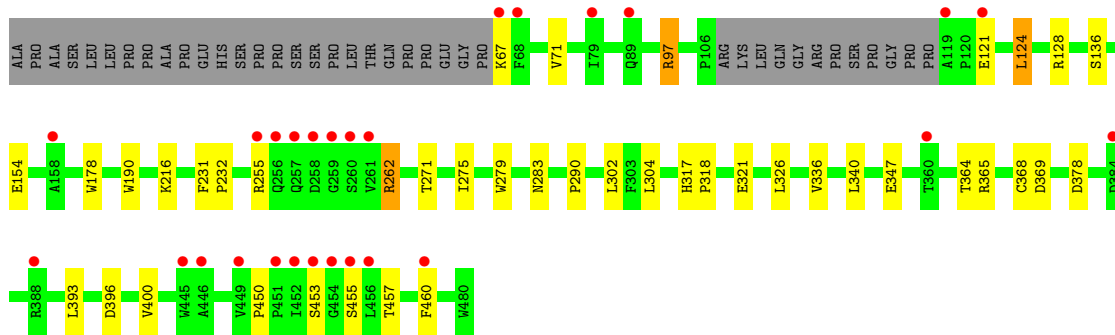
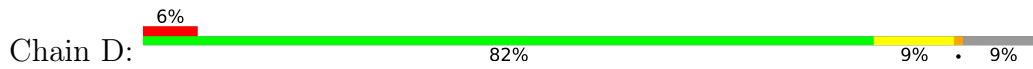
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
9	A	1	Total Gd 1 1	0	0
9	B	1	Total Gd 1 1	0	0
9	C	1	Total Gd 1 1	0	0
9	D	1	Total Gd 1 1	0	0

- Molecule 10 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
10	A	59	Total O 59 59	0	0
10	B	122	Total O 122 122	0	0
10	C	68	Total O 68 68	0	0
10	D	119	Total O 119 119	0	0



• 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	59.72Å 152.57Å 108.71Å 90.00° 90.89° 90.00°	Depositor
Resolution (Å)	39.15 – 2.20 39.15 – 2.20	Depositor EDS
% Data completeness (in resolution range)	99.1 (39.15-2.20) 99.1 (39.15-2.20)	Depositor EDS
R_{merge}	0.10	Depositor
R_{sym}	0.10	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.47 (at 2.20Å)	Xtrriage
Refinement program	PHENIX (1.11.1-2575_1496: ???)	Depositor
R, R_{free}	0.189 , 0.241 0.181 , 0.235	Depositor DCC
R_{free} test set	4891 reflections (4.99%)	wwPDB-VP
Wilson B-factor (Å ²)	40.3	Xtrriage
Anisotropy	0.443	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.36 , 57.2	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtrriage
Estimated twinning fraction	0.086 for h,-k,-l	Xtrriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	13738	wwPDB-VP
Average B, all atoms (Å ²)	57.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.35% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical values of $\langle |L| \rangle$, $\langle L^2 \rangle$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality [i](#)

5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: OSJ, H4B, ZN, GOL, GD, CL, BTB, 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	0.37	0/3302	0.52	0/4499
1	B	0.41	0/3321	0.55	0/4525
1	C	0.37	0/3307	0.51	0/4507
1	D	0.42	0/3313	0.57	0/4514
All	All	0.39	0/13243	0.54	0/18045

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts [i](#)

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	3204	0	3105	33	1
1	B	3220	0	3127	23	0
1	C	3209	0	3109	40	0
1	D	3215	0	3121	23	0
2	A	43	0	30	3	0
2	B	43	0	30	4	0
2	C	43	0	30	1	0
2	D	43	0	30	3	0
3	A	17	0	15	3	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	B	17	0	15	1	0
3	C	17	0	15	1	0
3	D	17	0	15	0	0
4	A	23	0	0	2	0
4	B	23	0	0	1	0
4	C	23	0	0	2	0
4	D	23	0	0	2	0
5	A	56	0	76	11	0
5	B	56	0	73	9	0
5	C	28	0	38	5	0
5	D	28	0	36	5	1
6	A	1	0	0	0	0
6	C	1	0	0	0	0
7	A	6	0	8	1	0
7	C	6	0	8	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	59	0	0	2	0
10	B	122	0	0	1	0
10	C	68	0	0	1	0
10	D	119	0	0	0	0
All	All	13738	0	12881	141	1

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 (141) 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:183:ARG:HB2	2:B:501:HEM:HBD2	1.56	0.88
5:C:505:BTB:HO6	5:C:505:BTB:HO8	1.21	0.83
2:D:501:HEM:HBB2	2:D:501:HEM:HHC	1.65	0.77
1:B:298:GLU:OE2	5:B:505:BTB:N	2.17	0.77
1:A:365:ARG:HH12	3:A:502:H4B:C4	2.01	0.73
1:D:321:GLU:OE2	5:D:504:BTB:O4	2.07	0.73

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:433:ASN:HA	1:A:436:LYS:HE3	1.69	0.72
1:A:68:PHE:N	10:A:601:HOH:O	2.23	0.72
1:D:365:ARG:NH2	1:D:369:ASP:OD2	2.24	0.70
5:A:506:BTB:O4	5:A:506:BTB:O1	2.11	0.69
1:A:312:GLU:OE2	1:A:329:ARG:NH1	2.27	0.66
1:B:247:GLN:HB2	1:B:250:ARG:HD3	1.76	0.66
2:B:501:HEM:O1A	10:B:601:HOH:O	2.13	0.66
1:D:124:LEU:HD11	1:D:154:GLU:HG3	1.77	0.65
1:B:257:GLN:HA	1:B:259:GLY:N	2.12	0.65
1:A:321:GLU:H	1:A:321:GLU:CD	2.00	0.64
1:D:279:TRP:HB2	1:D:302:LEU:HD21	1.80	0.63
5:A:506:BTB:H41	1:C:257:GLN:O	1.99	0.63
1:B:257:GLN:HA	1:B:259:GLY:H	1.64	0.62
1:C:365:ARG:HH12	3:C:502:H4B:C4	2.14	0.60
1:C:235:CYS:SG	1:C:238:ARG:HD3	2.42	0.59
1:C:347:GLU:OE2	10:C:601:HOH:O	2.16	0.58
2:C:501:HEM:HBB2	2:C:501:HEM:HHC	1.85	0.58
1:B:93:PRO:HG3	1:B:106:PRO:HB3	1.86	0.57
1:C:298:GLU:HG3	1:C:299:PRO:HD2	1.86	0.57
1:D:290:PRO:HB3	1:D:304:LEU:HD23	1.86	0.57
5:A:506:BTB:HO1	5:A:506:BTB:HO4	1.51	0.57
1:B:382:CYS:SG	5:B:509:BTB:H42	2.45	0.56
1:B:336:VAL:HG21	4:B:503:OSJ:C07	2.36	0.56
5:C:504:BTB:O3	5:C:504:BTB:O1	2.24	0.56
1:D:271:THR:O	1:D:275:ILE:HG12	2.06	0.56
1:B:242:ARG:NH2	1:B:479:PRO:HD3	2.21	0.56
1:C:233:GLN:HB3	1:C:348:PHE:CE2	2.40	0.56
1:A:170:LEU:HD11	1:A:230:VAL:HG21	1.88	0.55
1:B:144:GLN:NE2	1:B:145:ALA:H	2.05	0.55
1:C:88:ALA:HB3	1:D:97:ARG:HG3	1.87	0.55
1:C:361:GLU:OE2	4:C:503:OSJ:N02	2.40	0.54
1:C:450:PRO:HG2	1:C:457:THR:HG21	1.89	0.53
1:B:121:GLU:OE1	1:B:122:GLN:NE2	2.42	0.53
1:A:70:ARG:NH2	10:A:604:HOH:O	2.42	0.53
1:C:404:VAL:HG23	1:D:393:LEU:HD12	1.91	0.53
1:C:138:ILE:HD12	1:C:140:ARG:HB2	1.92	0.52
2:A:501:HEM:HBB2	2:A:501:HEM:HHC	1.90	0.52
1:C:279:TRP:HB2	1:C:302:LEU:HD11	1.90	0.52
5:B:509:BTB:H12	1:C:382:CYS:HA	1.92	0.51
1:D:336:VAL:HG21	4:D:503:OSJ:C07	2.39	0.51
1:A:132:ASN:O	1:A:136:SER:OG	2.22	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:365:ARG:NH1	3:A:502:H4B:N3	2.55	0.51
1:A:377:GLU:OE1	5:A:505:BTB:H11	2.11	0.50
1:C:336:VAL:HG21	4:C:503:OSJ:C07	2.40	0.50
1:C:364:THR:O	1:C:368:CYS:HB2	2.11	0.50
1:C:397:LYS:HG2	1:D:400:VAL:HG11	1.92	0.50
1:D:178:TRP:CE3	1:D:190:TRP:HA	2.47	0.50
1:B:100:LEU:HB3	1:B:103:LEU:HD22	1.94	0.49
1:C:453:SER:HB3	1:C:456:LEU:HD12	1.94	0.49
1:D:124:LEU:HD13	1:D:128:ARG:NH2	2.28	0.49
2:D:501:HEM:HBD2	2:D:501:HEM:CMD	2.42	0.49
1:A:361:GLU:OE2	4:A:503:OSJ:N02	2.45	0.49
1:A:269:GLU:O	1:A:272:GLU:HG2	2.13	0.49
1:A:256:GLN:HB2	1:A:260:SER:O	2.12	0.48
1:B:279:TRP:HB2	1:B:302:LEU:HD21	1.96	0.48
1:A:275:ILE:HD11	1:A:281:PRO:HB3	1.93	0.48
1:B:279:TRP:CD1	1:B:290:PRO:HG3	2.49	0.48
1:B:124:LEU:HB3	1:B:128:ARG:HH12	1.77	0.47
1:A:455:SER:HA	1:A:460:PHE:CG	2.50	0.47
5:C:504:BTB:H42	5:C:504:BTB:H72	1.67	0.47
1:A:336:VAL:HG21	4:A:503:OSJ:C07	2.45	0.46
1:A:90:GLN:HB2	1:A:468:PHE:CE2	2.51	0.46
5:A:506:BTB:H31	1:C:257:GLN:HB2	1.97	0.46
1:C:156:GLU:OE2	1:C:164:GLN:HG2	2.15	0.46
1:C:446:ALA:HB3	1:C:447:TRP:CE3	2.51	0.46
1:B:326:LEU:HB3	1:B:328:LEU:HG	1.98	0.46
1:A:242:ARG:NH1	1:A:477:PRO:O	2.40	0.46
5:A:506:BTB:H12	5:A:506:BTB:H72	1.63	0.46
1:C:138:ILE:O	1:C:140:ARG:HG3	2.17	0.45
1:C:128:ARG:O	1:C:132:ASN:ND2	2.50	0.45
5:D:505:BTB:H11	5:D:505:BTB:H71	1.49	0.45
5:A:506:BTB:C4	1:C:257:GLN:HB2	2.46	0.45
5:C:504:BTB:H51	5:C:504:BTB:H11	1.37	0.45
5:B:509:BTB:H62	1:C:322:TRP:CD1	2.52	0.44
1:B:298:GLU:OE1	5:B:505:BTB:H32	2.17	0.44
1:B:378:ASP:OD2	5:B:506:BTB:H42	2.18	0.44
1:C:451:PRO:HB2	1:D:455:SER:OG	2.17	0.44
1:B:119:ALA:HB1	1:B:122:GLN:HG2	1.99	0.44
1:B:178:TRP:CE3	1:B:190:TRP:HA	2.53	0.44
1:D:364:THR:O	1:D:368:CYS:HB2	2.17	0.44
2:D:501:HEM:HBA1	4:D:503:OSJ:C09	2.48	0.44
1:A:242:ARG:CZ	1:A:479:PRO:HG3	2.47	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:B:506:BTB:H12	5:B:506:BTB:H72	1.55	0.43
2:B:501:HEM:CGA	3:B:502:H4B:HN3	2.31	0.43
1:A:331:TYR:O	1:A:410:TYR:OH	2.34	0.43
5:B:509:BTB:H12	5:B:509:BTB:H51	1.73	0.43
1:C:262:ARG:NH1	1:C:283:ASN:O	2.51	0.43
7:A:509:GOL:O3	7:A:509:GOL:O1	2.34	0.43
1:C:170:LEU:HD11	1:C:230:VAL:HG21	2.00	0.43
1:C:317:HIS:CG	1:C:318:PRO:HD2	2.54	0.43
1:D:317:HIS:CG	1:D:318:PRO:HD2	2.54	0.43
1:C:128:ARG:HH21	1:C:154:GLU:CD	2.21	0.43
1:D:450:PRO:HG2	1:D:457:THR:HG21	1.99	0.43
1:A:178:TRP:CE3	1:A:190:TRP:HA	2.53	0.43
5:B:506:BTB:H51	5:B:506:BTB:H32	1.40	0.43
1:A:124:LEU:HD23	1:A:128:ARG:HE	1.83	0.42
1:B:261:VAL:HG11	1:B:265:PRO:HA	2.01	0.42
1:C:93:PRO:HG3	1:C:106:PRO:HB3	2.02	0.42
1:A:183:ARG:HB2	2:A:501:HEM:HBD2	2.01	0.42
1:C:367:LEU:HA	1:C:373:TYR:HB2	2.01	0.42
1:A:182:PRO:HD2	2:A:501:HEM:O2D	2.20	0.42
1:D:231:PHE:HB3	1:D:232:PRO:CD	2.50	0.42
5:D:505:BTB:H52	5:D:505:BTB:H81	1.21	0.42
1:A:102:SER:O	3:A:502:H4B:O10	2.38	0.42
1:A:234:ARG:HB2	1:A:240:ASP:OD1	2.20	0.42
5:D:505:BTB:O3	5:D:505:BTB:O1	2.34	0.42
1:A:201:CYS:HA	1:A:206:GLU:OE1	2.20	0.42
1:C:272:GLU:O	1:C:276:GLN:HG3	2.19	0.42
1:C:396:ASP:OD2	1:D:453:SER:OG	2.24	0.42
5:C:505:BTB:H72	5:C:505:BTB:H32	1.78	0.42
1:A:306:PRO:HB2	1:A:309:LEU:HB2	2.02	0.41
1:D:455:SER:HA	1:D:460:PHE:CG	2.55	0.41
5:D:505:BTB:H51	5:D:505:BTB:H32	1.43	0.41
5:A:504:BTB:H11	5:A:504:BTB:H51	1.81	0.41
1:C:127:ALA:O	1:C:131:ILE:HG12	2.20	0.41
1:D:216:LYS:HE3	1:D:216:LYS:HB2	1.71	0.41
1:A:258:ASP:OD1	1:A:258:ASP:N	2.53	0.41
1:C:149:ARG:NE	1:C:169:GLU:OE2	2.46	0.41
1:C:156:GLU:O	1:C:160:THR:HG22	2.20	0.41
1:B:370:PRO:HA	1:B:374:ASN:OD1	2.21	0.41
5:A:504:BTB:H81	5:A:504:BTB:H52	1.76	0.41
1:C:279:TRP:CG	1:C:290:PRO:HG3	2.56	0.41
1:A:127:ALA:O	1:A:131:ILE:HG12	2.21	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:183:ARG:HD3	1:B:447:TRP:CD2	2.56	0.41
1:C:306:PRO:HA	1:C:307:PRO:HD3	1.93	0.41
1:D:262:ARG:HD3	1:D:283:ASN:O	2.21	0.41
1:A:384:ASP:HB3	5:A:506:BTB:O1	2.22	0.40
5:A:505:BTB:H41	5:A:505:BTB:H72	1.52	0.40
1:A:244:TRP:CD1	1:A:479:PRO:HG2	2.56	0.40
2:B:501:HEM:HBB2	2:B:501:HEM:HHC	2.03	0.40
1:C:147:GLU:O	1:C:151:GLN:NE2	2.54	0.40
1:C:368:CYS:SG	1:C:376:LEU:HD13	2.62	0.40
1:A:147:GLU:O	1:A:151:GLN:HG2	2.22	0.40
1:D:340:LEU:HD21	1:D:347:GLU:HG2	2.03	0.40
1:D:67:LYS:HD2	1:D:67:LYS:HA	1.89	0.40

All (1) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:152:GLU:OE2	5:D:505:BTB:O4[2_851]	2.14	0.06

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%)	378 (95%)	18 (4%)	2 (0%)	29	31
1	B	401/440 (91%)	393 (98%)	7 (2%)	1 (0%)	47	55
1	C	399/440 (91%)	386 (97%)	12 (3%)	1 (0%)	41	46
1	D	400/440 (91%)	392 (98%)	8 (2%)	0	100	100
All	All	1598/1760 (91%)	1549 (97%)	45 (3%)	4 (0%)	41	46

All (4) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	90	GLN
1	A	144	GLN
1	B	259	GLY
1	C	89	GLN

5.3.2 Protein sidechains [i](#)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	342/373 (92%)	329 (96%)	13 (4%)	33	42
1	B	344/373 (92%)	330 (96%)	14 (4%)	30	39
1	C	342/373 (92%)	331 (97%)	11 (3%)	39	50
1	D	343/373 (92%)	333 (97%)	10 (3%)	42	54
All	All	1371/1492 (92%)	1323 (96%)	48 (4%)	36	46

All (48) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	90	GLN
1	A	124	LEU
1	A	226	SER
1	A	234	ARG
1	A	235	CYS
1	A	238	ARG
1	A	258	ASP
1	A	291	LEU
1	A	304	LEU
1	A	329	ARG
1	A	342	GLU
1	A	436	LYS
1	A	470	SER
1	B	78	SER
1	B	122	GLN
1	B	128	ARG
1	B	140	ARG
1	B	156	GLU

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Mol	Chain	Res	Type
1	B	168[A]	SER
1	B	168[B]	SER
1	B	230	VAL
1	B	238	ARG
1	B	255	ARG
1	B	258	ASP
1	B	326	LEU
1	B	377	GLU
1	B	396	ASP
1	C	89	GLN
1	C	125	SER
1	C	151	GLN
1	C	160	THR
1	C	233	GLN
1	C	234	ARG
1	C	235	CYS
1	C	238	ARG
1	C	256	GLN
1	C	384	ASP
1	C	391	SER
1	D	71	VAL
1	D	97	ARG
1	D	121	GLU
1	D	124	LEU
1	D	136	SER
1	D	255	ARG
1	D	262	ARG
1	D	326	LEU
1	D	378	ASP
1	D	396	ASP

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

Mol	Chain	Res	Type
1	B	144	GLN

5.3.3 RNA

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 36 ligands modelled in this entry, 10 are monoatomic - leaving 26 for Mogul analysis.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
2	HEM	B	501	1	41,50,50	1.54	6 (14%)	45,82,82	1.76	10 (22%)
4	OSJ	C	503	-	25,25,25	1.09	2 (8%)	34,35,35	1.20	4 (11%)
3	H4B	A	502	-	16,18,18	1.06	0	11,26,26	2.56	5 (45%)
5	BTB	C	505	-	13,13,13	0.38	0	7,16,16	0.55	0
3	H4B	D	502	-	16,18,18	0.91	1 (6%)	11,26,26	2.79	6 (54%)
5	BTB	B	509	9	13,13,13	0.46	0	7,16,16	0.89	0
5	BTB	C	504	-	13,13,13	0.53	0	7,16,16	1.33	1 (14%)
2	HEM	D	501	1	41,50,50	1.51	5 (12%)	45,82,82	1.64	8 (17%)
5	BTB	B	506	-	13,13,13	0.44	0	7,16,16	0.72	0
7	GOL	A	509	-	5,5,5	0.41	0	5,5,5	0.68	0
4	OSJ	A	503	-	25,25,25	1.06	2 (8%)	34,35,35	1.32	4 (11%)
3	H4B	B	502	-	16,18,18	0.97	0	11,26,26	2.67	5 (45%)
5	BTB	D	504	9	13,13,13	0.45	0	7,16,16	0.85	0
5	BTB	A	506	-	13,13,13	1.67	3 (23%)	7,16,16	1.82	3 (42%)
5	BTB	B	505	-	13,13,13	0.44	0	7,16,16	0.70	0
4	OSJ	B	503	-	25,25,25	1.07	2 (8%)	34,35,35	1.26	3 (8%)
5	BTB	A	504	9	13,13,13	0.39	0	7,16,16	0.58	0
7	GOL	C	507	-	5,5,5	0.38	0	5,5,5	0.25	0
5	BTB	B	504	9	13,13,13	0.43	0	7,16,16	0.50	0
5	BTB	A	507	-	13,13,13	0.44	0	7,16,16	0.54	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
4	OSJ	D	503	-	25,25,25	0.98	2 (8%)	34,35,35	1.27	2 (5%)
5	BTB	A	505	-	13,13,13	0.50	0	7,16,16	0.78	0
2	HEM	A	501	1	41,50,50	1.57	6 (14%)	45,82,82	1.63	9 (20%)
5	BTB	D	505	-	13,13,13	0.50	0	7,16,16	0.84	0
3	H4B	C	502	-	16,18,18	1.00	0	11,26,26	2.79	6 (54%)
2	HEM	C	501	1	41,50,50	1.60	6 (14%)	45,82,82	1.81	11 (24%)

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	1	-	3/12/54/54	-
4	OSJ	C	503	-	-	3/9/9/9	0/3/3/3
3	H4B	A	502	-	-	0/8/17/17	0/2/2/2
5	BTB	C	505	-	-	3/21/21/21	-
3	H4B	D	502	-	-	4/8/17/17	0/2/2/2
5	BTB	B	509	9	-	1/21/21/21	-
5	BTB	C	504	-	-	12/21/21/21	-
2	HEM	D	501	1	-	9/12/54/54	-
5	BTB	B	506	-	-	11/21/21/21	-
7	GOL	A	509	-	-	0/4/4/4	-
4	OSJ	A	503	-	-	0/9/9/9	0/3/3/3
3	H4B	B	502	-	-	3/8/17/17	0/2/2/2
5	BTB	D	504	9	-	7/21/21/21	-
5	BTB	A	506	-	-	7/21/21/21	-
5	BTB	B	505	-	-	3/21/21/21	-
4	OSJ	B	503	-	-	1/9/9/9	0/3/3/3
5	BTB	A	504	9	-	2/21/21/21	-
7	GOL	C	507	-	-	4/4/4/4	-
5	BTB	B	504	9	-	0/21/21/21	-
5	BTB	A	507	-	-	6/21/21/21	-
4	OSJ	D	503	-	-	0/9/9/9	0/3/3/3
5	BTB	A	505	-	-	7/21/21/21	-
2	HEM	A	501	1	-	4/12/54/54	-
5	BTB	D	505	-	-	8/21/21/21	-
3	H4B	C	502	-	-	3/8/17/17	0/2/2/2

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	HEM	C	501	1	-	6/12/54/54	-

All (35) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	A	506	BTB	C4-C2	-3.98	1.48	1.53
2	B	501	HEM	C3C-C2C	-3.94	1.34	1.40
2	D	501	HEM	C3C-C2C	-3.89	1.35	1.40
2	A	501	HEM	C3C-C2C	-3.89	1.35	1.40
2	B	501	HEM	C3C-CAC	3.76	1.55	1.47
2	C	501	HEM	C3C-CAC	3.75	1.55	1.47
2	A	501	HEM	C3C-CAC	3.73	1.55	1.47
2	C	501	HEM	C3C-C2C	-3.72	1.35	1.40
2	C	501	HEM	FE-NB	3.61	2.14	1.96
2	D	501	HEM	C3C-CAC	3.53	1.55	1.47
2	A	501	HEM	FE-NB	3.09	2.12	1.96
2	A	501	HEM	CAB-C3B	3.09	1.55	1.47
4	A	503	OSJ	C04-C05	3.07	1.49	1.42
4	C	503	OSJ	C04-C05	3.03	1.49	1.42
2	B	501	HEM	CAB-C3B	3.02	1.55	1.47
2	C	501	HEM	CAB-C3B	2.88	1.55	1.47
2	D	501	HEM	CAB-C3B	2.82	1.55	1.47
4	B	503	OSJ	C04-C05	2.74	1.48	1.42
2	A	501	HEM	FE-ND	2.69	2.10	1.96
2	B	501	HEM	FE-NB	2.67	2.10	1.96
4	D	503	OSJ	C04-C05	2.66	1.48	1.42
5	A	506	BTB	C1-C2	-2.65	1.49	1.53
2	D	501	HEM	FE-NB	2.64	2.09	1.96
2	C	501	HEM	CMD-C2D	2.52	1.56	1.50
5	A	506	BTB	C2-N	-2.47	1.43	1.48
2	D	501	HEM	FE-ND	2.39	2.08	1.96
4	A	503	OSJ	C05-C10	-2.38	1.38	1.42
2	B	501	HEM	FE-ND	2.36	2.08	1.96
2	B	501	HEM	C3B-C2B	-2.30	1.32	1.37
4	B	503	OSJ	C02-N01	2.19	1.36	1.33
2	A	501	HEM	CMD-C2D	2.16	1.55	1.50
4	C	503	OSJ	C05-C10	-2.09	1.39	1.42
4	D	503	OSJ	C02-N01	2.02	1.36	1.33
3	D	502	H4B	C4A-C4	-2.00	1.38	1.41
2	C	501	HEM	CMB-C2B	2.00	1.55	1.50

All (77) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	C	502	H4B	C8A-C4A-C4	6.22	120.09	114.57
3	B	502	H4B	C8A-C4A-C4	5.61	119.55	114.57
3	A	502	H4B	C8A-C4A-C4	5.42	119.39	114.57
2	B	501	HEM	CBA-CAA-C2A	-5.27	103.63	112.62
3	D	502	H4B	C8A-C4A-C4	5.11	119.11	114.57
2	D	501	HEM	CBA-CAA-C2A	-4.65	104.69	112.62
4	B	503	OSJ	O29-C24-C25	4.13	121.18	115.78
2	C	501	HEM	C4B-CHC-C1C	4.10	127.97	122.56
2	C	501	HEM	CBA-CAA-C2A	-3.94	105.89	112.62
3	D	502	H4B	C2-N3-C4	3.92	122.15	115.93
3	D	502	H4B	N1-C2-N3	-3.78	119.49	125.42
2	B	501	HEM	CBD-CAD-C3D	-3.77	102.14	112.63
3	B	502	H4B	N1-C2-N3	-3.60	119.78	125.42
3	A	502	H4B	N1-C2-N3	-3.59	119.78	125.42
2	A	501	HEM	C4B-CHC-C1C	3.55	127.24	122.56
2	C	501	HEM	C4D-ND-C1D	3.49	108.68	105.07
2	C	501	HEM	C1B-NB-C4B	3.46	108.65	105.07
4	C	503	OSJ	O29-C24-C25	3.45	120.29	115.78
2	A	501	HEM	C3B-C2B-C1B	3.41	109.02	106.49
4	A	503	OSJ	C05-C10-N01	-3.31	119.30	122.81
2	A	501	HEM	C1B-NB-C4B	3.29	108.48	105.07
3	C	502	H4B	N1-C2-N3	-3.24	120.33	125.42
3	A	502	H4B	C2-N3-C4	3.24	121.07	115.93
2	B	501	HEM	C3B-C2B-C1B	3.22	108.87	106.49
3	C	502	H4B	C2-N3-C4	3.18	120.98	115.93
3	B	502	H4B	C2-N3-C4	3.14	120.91	115.93
2	C	501	HEM	CMA-C3A-C4A	-3.10	123.70	128.46
3	B	502	H4B	C2-N1-C8A	3.05	121.38	114.54
2	D	501	HEM	C4C-CHD-C1D	3.03	126.56	122.56
5	A	506	BTB	O4-C4-C2	-3.02	103.18	111.44
2	C	501	HEM	C3B-C2B-C1B	2.96	108.68	106.49
2	D	501	HEM	CMC-C2C-C3C	2.94	130.17	124.68
2	A	501	HEM	C4C-CHD-C1D	2.84	126.30	122.56
2	D	501	HEM	CMA-C3A-C4A	-2.83	124.12	128.46
2	A	501	HEM	C4D-ND-C1D	2.81	107.97	105.07
3	D	502	H4B	C4-C4A-N5	2.80	121.47	119.12
3	A	502	H4B	C2-N1-C8A	2.80	120.81	114.54
2	B	501	HEM	CHC-C4B-C3B	2.78	128.82	124.57
5	C	504	BTB	C8-C7-N	-2.77	100.77	111.59
2	B	501	HEM	C4D-ND-C1D	2.75	107.91	105.07
2	A	501	HEM	CAA-CBA-CGA	-2.73	106.10	113.76
3	C	502	H4B	C2-N1-C8A	2.71	120.62	114.54
4	B	503	OSJ	O29-C24-C23	-2.64	118.26	123.97

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	D	502	H4B	C2-N1-C8A	2.63	120.44	114.54
4	A	503	OSJ	O29-C24-C25	2.61	119.20	115.78
2	B	501	HEM	C1B-NB-C4B	2.61	107.77	105.07
2	A	501	HEM	CBD-CAD-C3D	-2.61	105.39	112.63
4	B	503	OSJ	C06-C05-C10	2.60	121.24	118.33
2	A	501	HEM	C4A-C3A-C2A	2.60	108.80	107.00
2	D	501	HEM	C4B-CHC-C1C	2.60	125.98	122.56
4	D	503	OSJ	C06-C05-C10	2.59	121.23	118.33
3	C	502	H4B	N2-C2-N3	2.55	121.22	117.25
4	D	503	OSJ	O29-C24-C25	2.52	119.07	115.78
4	A	503	OSJ	N02-C02-N01	2.50	120.33	118.26
4	C	503	OSJ	N02-C02-N01	2.49	120.32	118.26
5	A	506	BTB	C6-C5-N	2.42	121.02	111.59
2	C	501	HEM	CBD-CAD-C3D	2.41	119.33	112.63
2	C	501	HEM	C4A-C3A-C2A	2.37	108.64	107.00
2	C	501	HEM	CHC-C4B-C3B	2.34	128.16	124.57
2	C	501	HEM	C3D-C4D-ND	-2.34	107.56	110.17
2	D	501	HEM	C4D-ND-C1D	2.31	107.46	105.07
2	B	501	HEM	CAB-C3B-C2B	-2.30	121.04	128.60
2	B	501	HEM	C4C-CHD-C1D	2.27	125.55	122.56
3	B	502	H4B	N2-C2-N1	2.25	120.76	117.25
4	A	503	OSJ	C30-O29-C24	2.24	122.94	118.05
2	B	501	HEM	C3D-C4D-ND	-2.21	107.71	110.17
2	D	501	HEM	C3B-C2B-C1B	2.20	108.12	106.49
2	C	501	HEM	C2B-C1B-NB	-2.15	107.29	109.84
3	A	502	H4B	N2-C2-N3	2.13	120.56	117.25
2	D	501	HEM	CMD-C2D-C1D	-2.12	121.81	125.04
3	C	502	H4B	C4-C4A-N5	2.11	120.89	119.12
4	C	503	OSJ	O29-C24-C23	-2.08	119.46	123.97
5	A	506	BTB	O1-C1-C2	-2.08	105.74	111.44
2	B	501	HEM	CMA-C3A-C4A	-2.06	125.29	128.46
3	D	502	H4B	N2-C2-N1	2.06	120.46	117.25
2	A	501	HEM	C3D-C4D-ND	-2.05	107.89	110.17
4	C	503	OSJ	C05-C10-N01	-2.05	120.64	122.81

There are no chirality outliers.

All (107) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	501	HEM	C1A-C2A-CAA-CBA
2	A	501	HEM	C3A-C2A-CAA-CBA
2	C	501	HEM	C2D-C3D-CAD-CBD

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Mol	Chain	Res	Type	Atoms
2	C	501	HEM	C4D-C3D-CAD-CBD
2	D	501	HEM	C2D-C3D-CAD-CBD
3	D	502	H4B	N5-C6-C9-O9
3	D	502	H4B	C7-C6-C9-O9
3	D	502	H4B	C7-C6-C9-C10
5	A	505	BTB	O1-C1-C2-C3
5	A	505	BTB	O1-C1-C2-C4
5	A	505	BTB	O1-C1-C2-N
5	A	506	BTB	O1-C1-C2-C3
5	A	506	BTB	O1-C1-C2-C4
5	A	506	BTB	C1-C2-C3-O3
5	A	506	BTB	C4-C2-C3-O3
5	A	506	BTB	N-C2-C3-O3
5	A	506	BTB	C6-C5-N-C7
5	A	507	BTB	C1-C2-C3-O3
5	A	507	BTB	C4-C2-C3-O3
5	A	507	BTB	N-C2-C3-O3
5	A	507	BTB	C1-C2-C4-O4
5	A	507	BTB	C3-C2-C4-O4
5	B	505	BTB	C1-C2-C3-O3
5	B	505	BTB	C4-C2-C3-O3
5	B	505	BTB	N-C2-C3-O3
5	B	506	BTB	C1-C2-C3-O3
5	B	506	BTB	C4-C2-C3-O3
5	B	506	BTB	C1-C2-N-C5
5	B	506	BTB	C1-C2-N-C7
5	B	506	BTB	C3-C2-N-C5
5	B	506	BTB	C3-C2-N-C7
5	B	506	BTB	C4-C2-N-C5
5	B	506	BTB	C4-C2-N-C7
5	C	504	BTB	C1-C2-N-C5
5	C	504	BTB	C1-C2-N-C7
5	C	504	BTB	C3-C2-N-C5
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	C1-C2-C3-O3
5	C	505	BTB	C4-C2-C3-O3
5	C	505	BTB	N-C2-C3-O3
5	D	504	BTB	O1-C1-C2-C3
5	D	504	BTB	O1-C1-C2-C4
5	D	504	BTB	C1-C2-C4-O4

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Mol	Chain	Res	Type	Atoms
5	D	504	BTB	C3-C2-C4-O4
5	D	504	BTB	N-C2-C4-O4
5	D	505	BTB	C1-C2-N-C5
5	D	505	BTB	C1-C2-N-C7
5	D	505	BTB	C3-C2-N-C5
5	D	505	BTB	C3-C2-N-C7
5	D	505	BTB	C4-C2-N-C5
5	D	505	BTB	C4-C2-N-C7
5	D	505	BTB	C8-C7-N-C5
7	C	507	GOL	O1-C1-C2-C3
7	C	507	GOL	C1-C2-C3-O3
2	D	501	HEM	C4D-C3D-CAD-CBD
5	B	509	BTB	N-C5-C6-O6
5	A	506	BTB	N-C7-C8-O8
5	C	504	BTB	N-C5-C6-O6
4	B	503	OSJ	C31-C30-O29-C24
2	D	501	HEM	C2A-CAA-CBA-CGA
7	C	507	GOL	O2-C2-C3-O3
4	C	503	OSJ	C31-C30-O29-C24
5	D	504	BTB	N-C5-C6-O6
5	D	505	BTB	N-C7-C8-O8
5	B	506	BTB	N-C5-C6-O6
5	C	504	BTB	N-C7-C8-O8
2	D	501	HEM	C3D-CAD-CBD-CGD
2	D	501	HEM	C4B-C3B-CAB-CBB
3	B	502	H4B	C7-C6-C9-O9
7	C	507	GOL	O1-C1-C2-O2
3	B	502	H4B	C7-C6-C9-C10
4	C	503	OSJ	C23-C24-O29-C30
4	C	503	OSJ	C25-C24-O29-C30
5	A	504	BTB	C8-C7-N-C5
2	C	501	HEM	C4B-C3B-CAB-CBB
3	C	502	H4B	C7-C6-C9-O9
2	C	501	HEM	C2A-CAA-CBA-CGA
5	A	505	BTB	C1-C2-N-C5
5	A	505	BTB	C1-C2-N-C7
5	A	505	BTB	C4-C2-N-C7
5	A	507	BTB	N-C2-C4-O4
5	B	506	BTB	N-C2-C3-O3
5	C	504	BTB	O1-C1-C2-N
5	D	504	BTB	O1-C1-C2-N
3	C	502	H4B	C7-C6-C9-C10

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Mol	Chain	Res	Type	Atoms
3	D	502	H4B	N5-C6-C9-C10
5	A	505	BTB	N-C7-C8-O8
5	B	506	BTB	N-C7-C8-O8
2	C	501	HEM	CAA-CBA-CGA-O1A
2	D	501	HEM	CAA-CBA-CGA-O1A
2	B	501	HEM	C3D-CAD-CBD-CGD
2	C	501	HEM	CAA-CBA-CGA-O2A
2	D	501	HEM	CAA-CBA-CGA-O2A
2	D	501	HEM	CAD-CBD-CGD-O1D
2	D	501	HEM	CAD-CBD-CGD-O2D
5	A	504	BTB	N-C7-C8-O8
2	B	501	HEM	CAA-CBA-CGA-O1A
2	B	501	HEM	CAA-CBA-CGA-O2A
2	A	501	HEM	C4B-C3B-CAB-CBB
5	C	504	BTB	C6-C5-N-C7
3	B	502	H4B	N5-C6-C9-O9
3	C	502	H4B	N5-C6-C9-O9
5	C	504	BTB	O1-C1-C2-C3
5	C	504	BTB	O1-C1-C2-C4
2	A	501	HEM	CAA-CBA-CGA-O2A

There are no ring outliers.

22 monomers are involved in 53 short contacts:

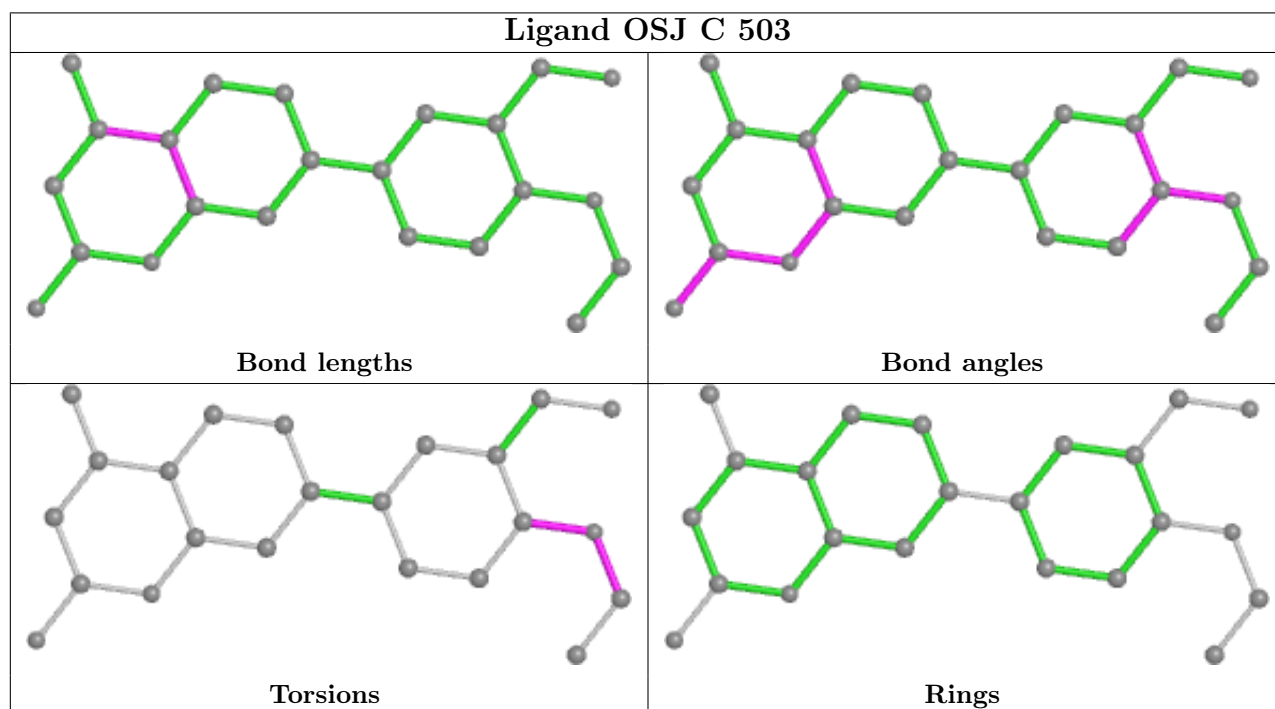
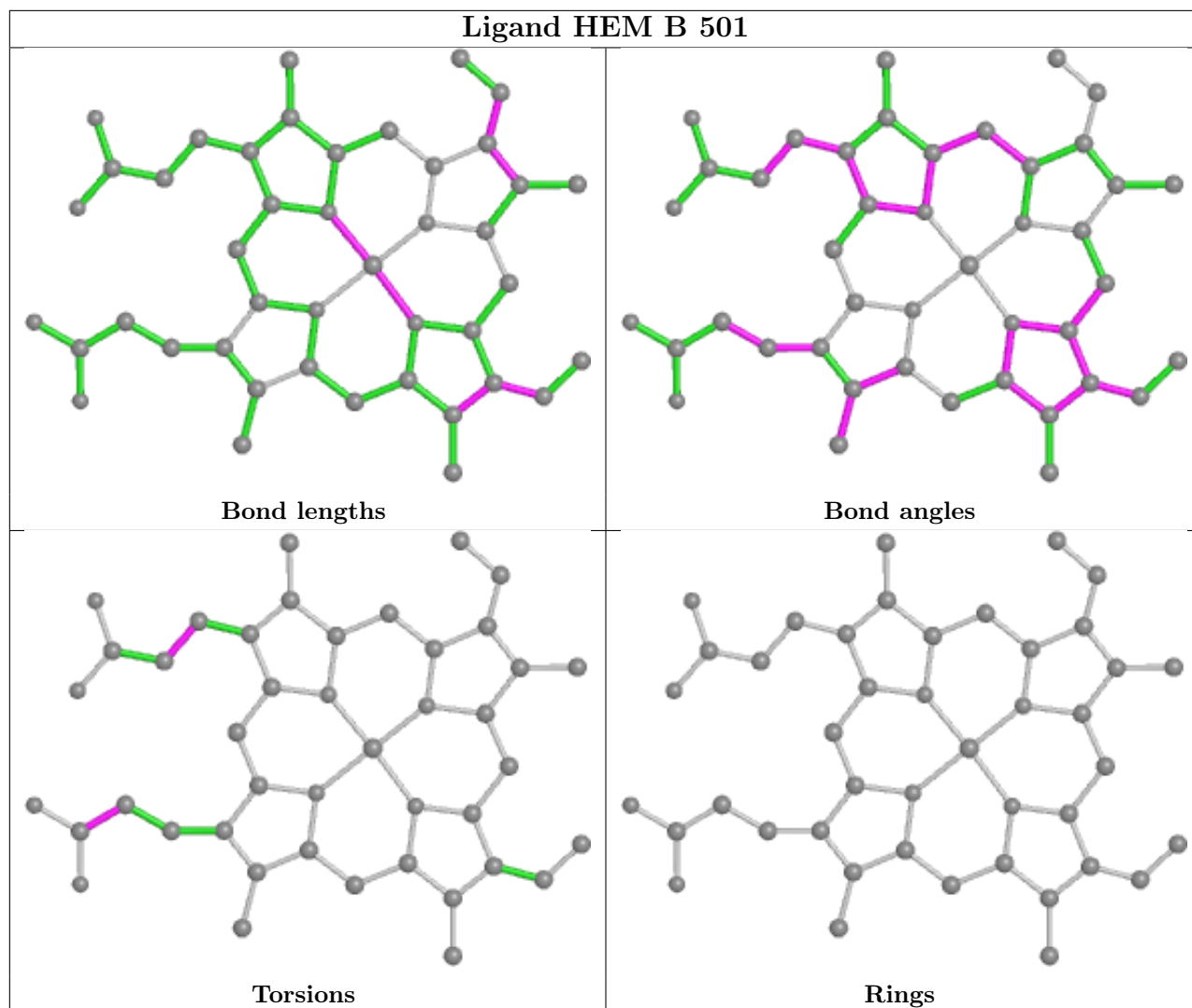
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	B	501	HEM	4	0
4	C	503	OSJ	2	0
3	A	502	H4B	3	0
5	C	505	BTB	2	0
5	B	509	BTB	4	0
5	C	504	BTB	3	0
2	D	501	HEM	3	0
5	B	506	BTB	3	0
7	A	509	GOL	1	0
4	A	503	OSJ	2	0
3	B	502	H4B	1	0
5	D	504	BTB	1	0
5	A	506	BTB	7	0
5	B	505	BTB	2	0
4	B	503	OSJ	1	0
5	A	504	BTB	2	0
4	D	503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

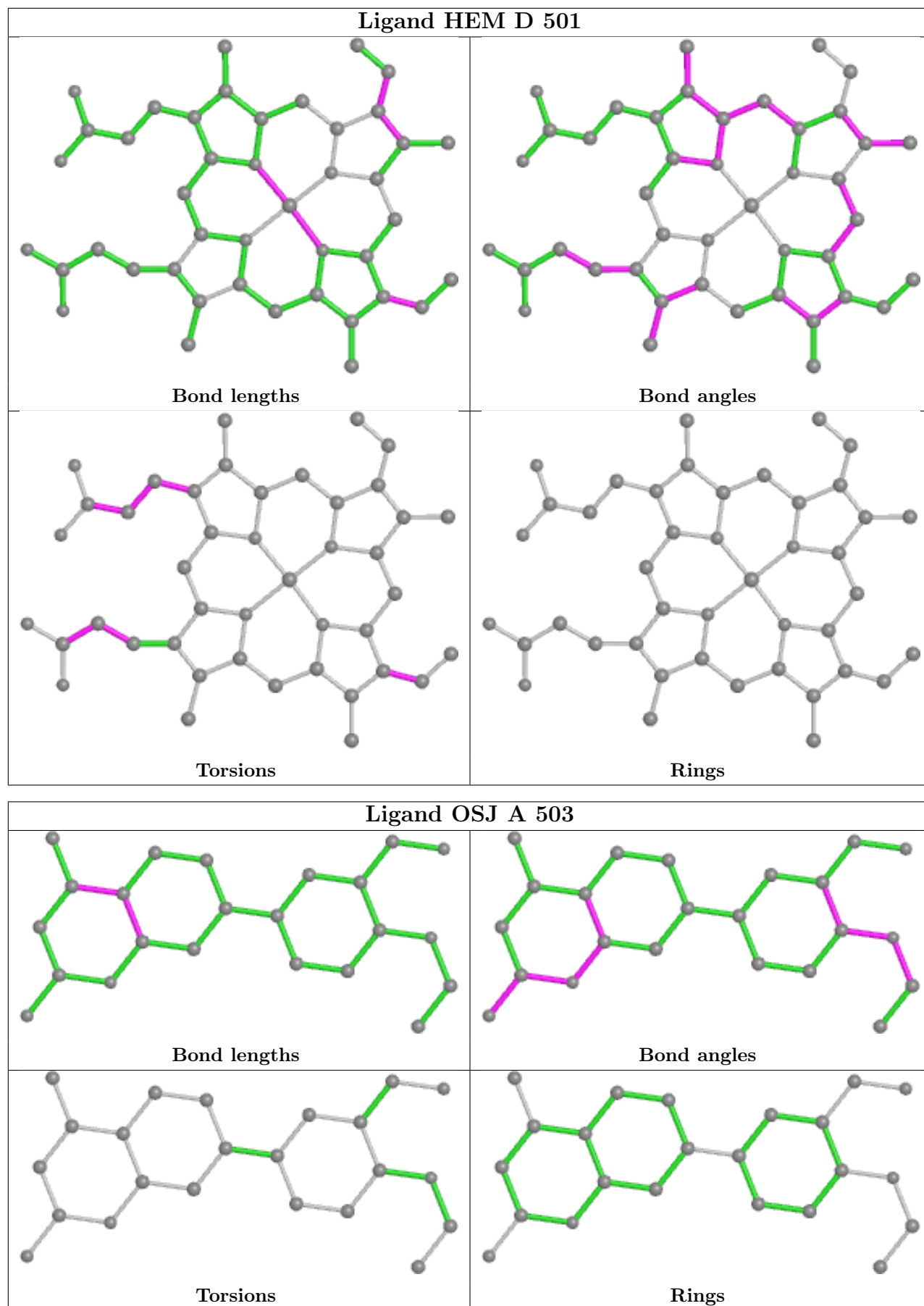
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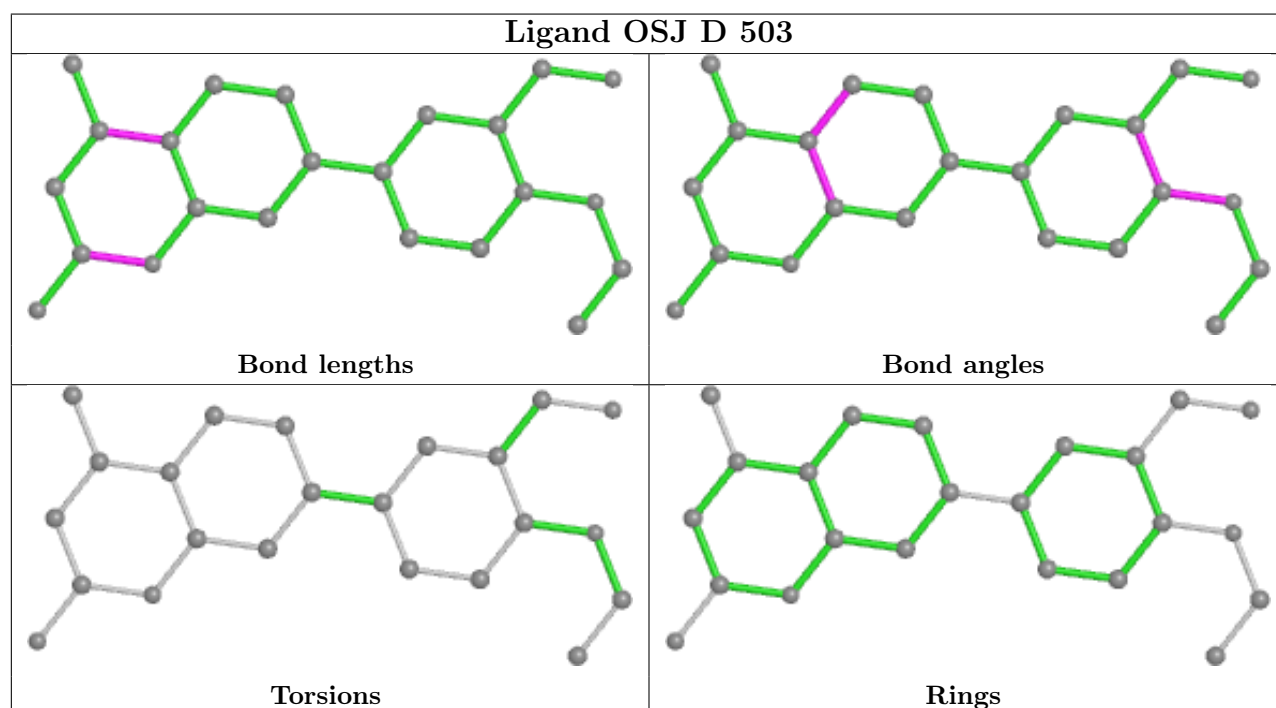
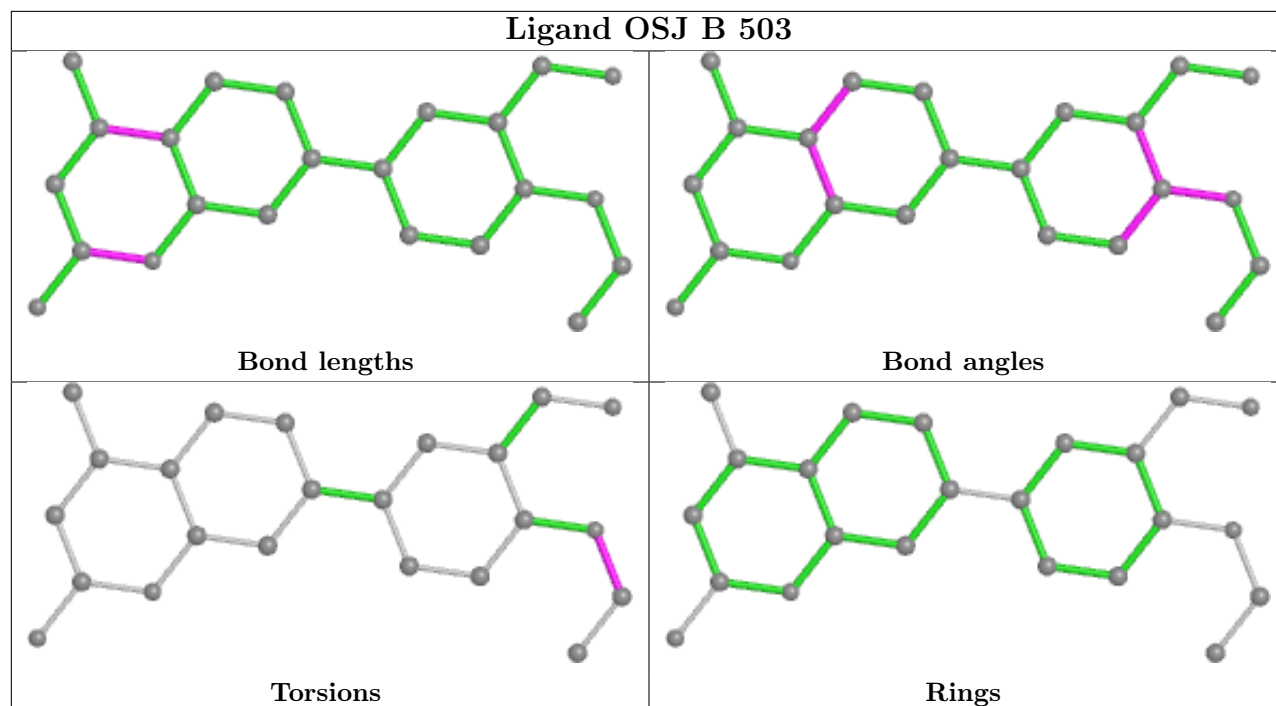
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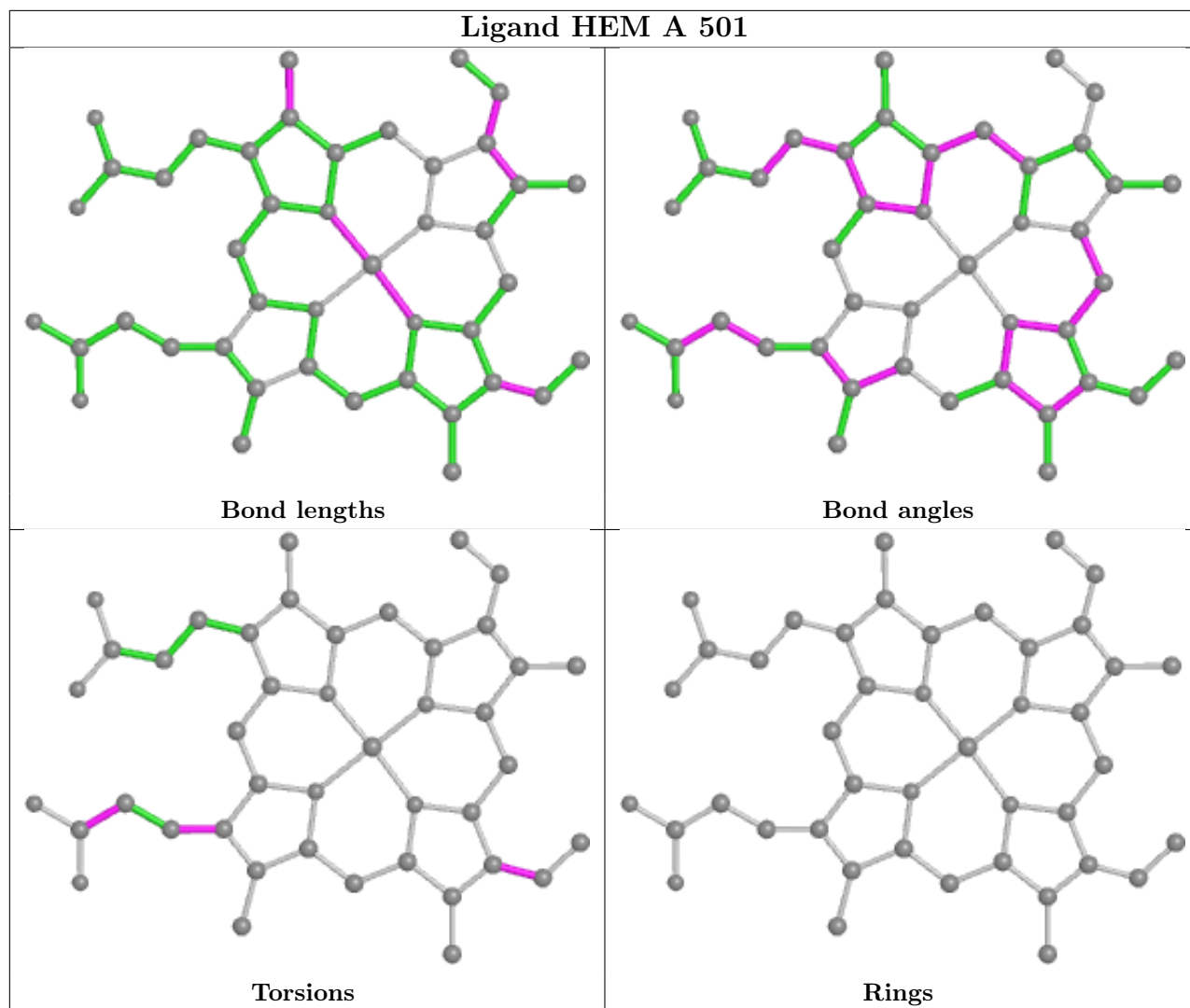
Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	A	505	BTB	2	0
2	A	501	HEM	3	0
5	D	505	BTB	4	1
3	C	502	H4B	1	0
2	C	501	HEM	1	0

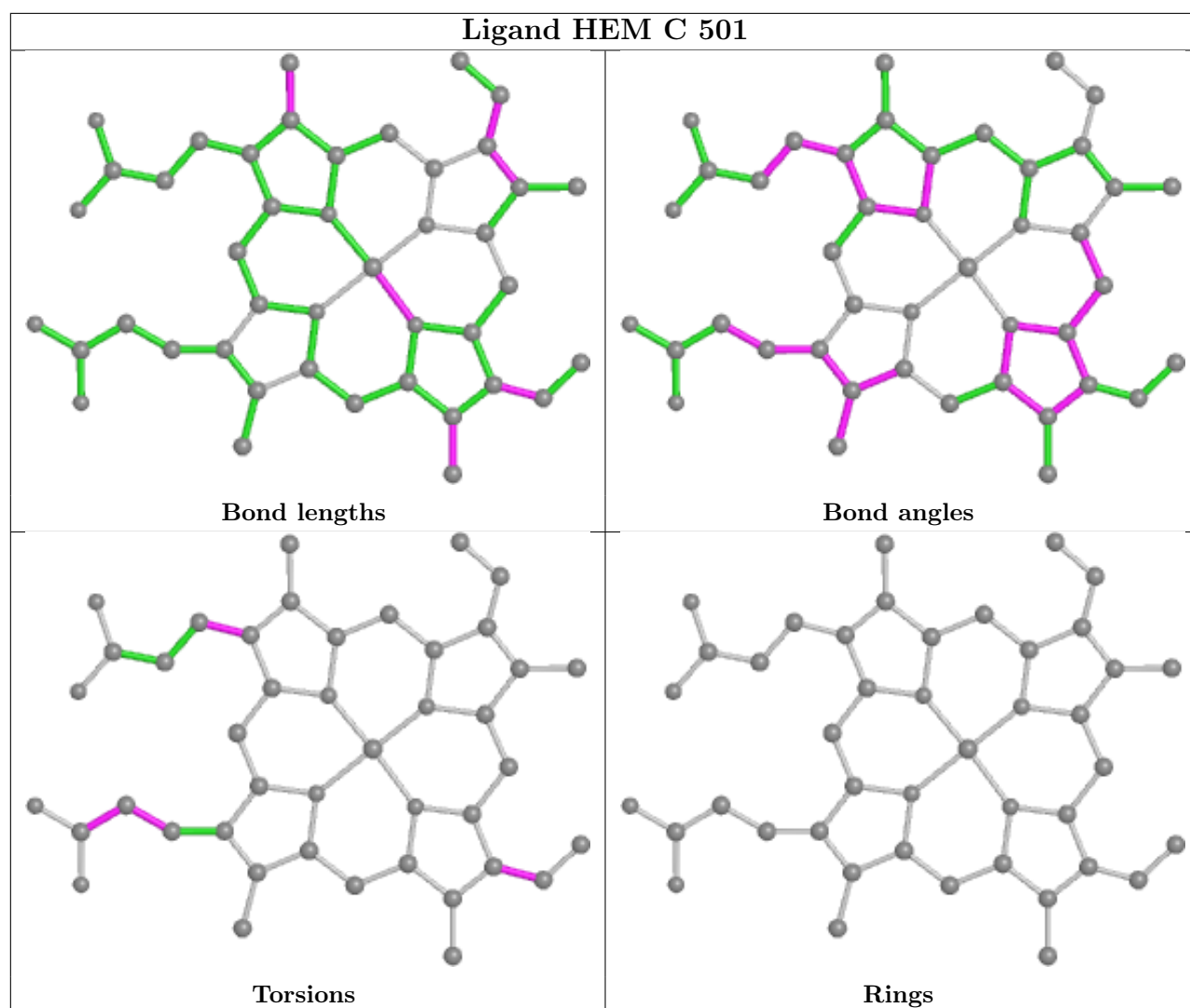
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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











5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

6 Fit of model and data [i](#)

6.1 Protein, DNA and RNA chains [i](#)

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

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
1	A	400/440 (90%)	1.12	96 (24%) 0 0	32, 64, 116, 155	0
1	B	402/440 (91%)	0.33	28 (6%) 16 15	25, 43, 78, 129	0
1	C	401/440 (91%)	0.84	66 (16%) 1 1	31, 57, 104, 146	0
1	D	402/440 (91%)	0.26	27 (6%) 17 16	26, 43, 76, 141	0
All	All	1605/1760 (91%)	0.64	217 (13%) 3 2	25, 51, 103, 155	0

All (217) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	237	GLY	8.0
1	A	480	TRP	6.4
1	A	204	ALA	5.9
1	A	89	GLN	5.8
1	A	259	GLY	5.7
1	C	257	GLN	5.6
1	A	145	ALA	5.4
1	B	67	LYS	5.3
1	A	448	ILE	5.0
1	C	119	ALA	4.9
1	B	258	ASP	4.8
1	C	480	TRP	4.7
1	C	439	GLY	4.7
1	A	153	VAL	4.7
1	C	448	ILE	4.6
1	C	153	VAL	4.6
1	C	301	GLU	4.6
1	A	280	THR	4.6
1	D	89	GLN	4.6
1	C	275	ILE	4.5
1	A	244	TRP	4.4

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Mol	Chain	Res	Type	RSRZ
1	A	302	LEU	4.4
1	B	388	ARG	4.4
1	A	141	SER	4.3
1	A	307	PRO	4.2
1	A	122	GLN	4.1
1	B	449	VAL	4.0
1	A	412	LEU	4.0
1	B	89	GLN	4.0
1	C	122	GLN	4.0
1	A	151	GLN	4.0
1	C	300	PRO	3.9
1	D	67	LYS	3.9
1	A	447	TRP	3.9
1	A	275	ILE	3.9
1	A	142	GLY	3.9
1	C	303	PHE	3.8
1	A	254	TYR	3.8
1	A	449	VAL	3.8
1	A	279	TRP	3.8
1	C	447	TRP	3.8
1	A	273	LEU	3.8
1	B	452	ILE	3.7
1	A	451	PRO	3.7
1	A	304	LEU	3.7
1	C	412	LEU	3.7
1	C	79	ILE	3.7
1	D	121	GLU	3.7
1	A	128	ARG	3.6
1	C	142	GLY	3.6
1	A	235	CYS	3.6
1	A	162	THR	3.6
1	C	185	VAL	3.6
1	A	452	ILE	3.6
1	B	68	PHE	3.5
1	A	305	LEU	3.5
1	C	68	PHE	3.5
1	D	257	GLN	3.5
1	A	238	ARG	3.5
1	C	297	ASP	3.5
1	A	257	GLN	3.5
1	A	276	GLN	3.5
1	A	120	PRO	3.5

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Mol	Chain	Res	Type	RSRZ
1	C	449	VAL	3.4
1	A	84	LEU	3.3
1	C	236	PRO	3.3
1	C	452	ILE	3.3
1	C	451	PRO	3.3
1	C	89	GLN	3.3
1	D	259	GLY	3.2
1	B	460	PHE	3.2
1	C	450	PRO	3.2
1	B	259	GLY	3.2
1	C	81	TYR	3.2
1	A	185	VAL	3.2
1	D	449	VAL	3.2
1	A	439	GLY	3.1
1	A	308	GLU	3.1
1	C	280	THR	3.1
1	A	272	GLU	3.1
1	D	453	SER	3.1
1	B	446	ALA	3.1
1	C	237	GLY	3.1
1	D	452	ILE	3.1
1	A	86	ALA	3.1
1	A	446	ALA	3.1
1	A	450	PRO	3.1
1	C	306	PRO	3.1
1	B	158	ALA	3.0
1	D	256	GLN	3.0
1	B	121	GLU	3.0
1	C	141	SER	3.0
1	B	450	PRO	2.9
1	A	221	ARG	2.9
1	D	255	ARG	2.9
1	A	292	LEU	2.9
1	C	360	THR	2.9
1	A	281	PRO	2.9
1	A	121	GLU	2.9
1	D	454	GLY	2.9
1	C	446	ALA	2.9
1	D	260	SER	2.9
1	D	258	ASP	2.8
1	A	479	PRO	2.8
1	B	120	PRO	2.8

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Mol	Chain	Res	Type	RSRZ
1	C	238	ARG	2.8
1	A	68	PHE	2.8
1	A	300	PRO	2.8
1	A	90	GLN	2.8
1	A	445	TRP	2.8
1	D	158	ALA	2.8
1	A	360	THR	2.8
1	A	268	VAL	2.8
1	C	388	ARG	2.8
1	C	304	LEU	2.8
1	A	77	GLY	2.7
1	B	454	GLY	2.7
1	A	134	TYR	2.7
1	B	453	SER	2.7
1	B	455	SER	2.7
1	A	295	ALA	2.7
1	C	305	LEU	2.7
1	A	364	THR	2.7
1	A	256	GLN	2.7
1	C	272	GLU	2.7
1	C	302	LEU	2.7
1	D	360	THR	2.7
1	A	152	GLU	2.6
1	B	124	LEU	2.6
1	A	184	CYS	2.6
1	A	124	LEU	2.6
1	A	444	ASP	2.6
1	C	144	GLN	2.6
1	C	445	TRP	2.6
1	B	260	SER	2.6
1	B	362	ILE	2.6
1	A	208	PHE	2.6
1	C	454	GLY	2.6
1	B	451	PRO	2.6
1	A	297	ASP	2.6
1	B	257	GLN	2.6
1	C	129	ASP	2.5
1	B	360	THR	2.5
1	A	367	LEU	2.5
1	D	446	ALA	2.5
1	C	307	PRO	2.5
1	A	241	PHE	2.5

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Mol	Chain	Res	Type	RSRZ
1	C	239	GLY	2.5
1	D	456	LEU	2.4
1	D	388	ARG	2.4
1	D	445	TRP	2.4
1	A	335	ALA	2.4
1	C	295	ALA	2.4
1	C	76	VAL	2.4
1	D	455	SER	2.4
1	C	256	GLN	2.4
1	A	293	LEU	2.4
1	A	303	PHE	2.4
1	A	146	HIS	2.4
1	A	236	PRO	2.4
1	A	183	ARG	2.4
1	B	97	ARG	2.4
1	A	274	CYS	2.3
1	A	255	ARG	2.3
1	C	140	ARG	2.3
1	B	141[A]	SER	2.3
1	A	123	LEU	2.3
1	D	68	PHE	2.3
1	C	244	TRP	2.3
1	C	155	ALA	2.3
1	C	437	ALA	2.3
1	A	140	ARG	2.3
1	C	299	PRO	2.3
1	C	87	GLN	2.3
1	A	365	ARG	2.3
1	C	106	PRO	2.3
1	C	120	PRO	2.3
1	D	384	ASP	2.2
1	A	79	ILE	2.2
1	A	160	THR	2.2
1	A	336	VAL	2.2
1	A	353	PHE	2.2
1	B	386	ASP	2.2
1	C	444	ASP	2.2
1	A	127	ALA	2.2
1	C	86	ALA	2.2
1	D	119	ALA	2.2
1	A	301	GLU	2.2
1	A	478	ASP	2.2

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Mol	Chain	Res	Type	RSRZ
1	A	436	LYS	2.2
1	A	83	THR	2.2
1	C	160	THR	2.2
1	A	138	ILE	2.2
1	C	292	LEU	2.1
1	D	261	VAL	2.1
1	B	92	GLY	2.1
1	D	460	PHE	2.1
1	A	222	GLY	2.1
1	C	276	GLN	2.1
1	A	278	GLY	2.1
1	C	162	THR	2.1
1	C	368	CYS	2.1
1	C	362	ILE	2.1
1	C	184	CYS	2.1
1	C	367	LEU	2.1
1	A	258	ASP	2.0
1	A	148	GLN	2.0
1	D	451	PRO	2.0
1	A	129	ASP	2.0
1	A	150	LEU	2.0
1	C	460	PHE	2.0
1	A	182	PRO	2.0
1	A	334	PRO	2.0
1	B	448	ILE	2.0
1	D	79	ILE	2.0
1	A	368	CYS	2.0
1	C	258	ASP	2.0

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

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

6.3 Carbohydrates [i](#)

There are no monosaccharides in this entry.

6.4 Ligands [i](#)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum,

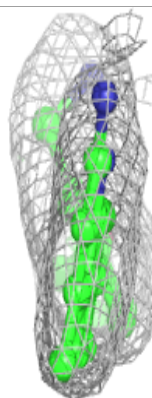
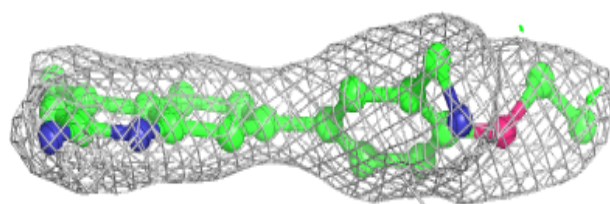
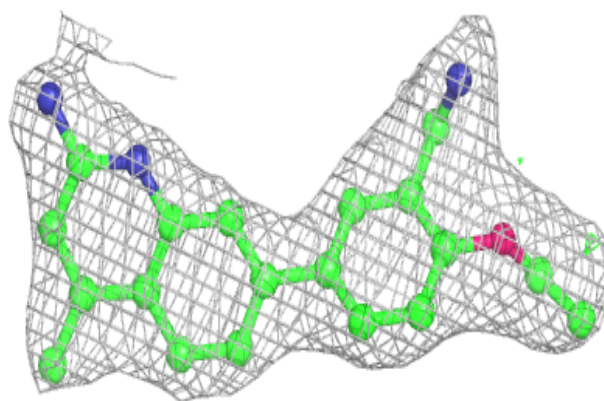
median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
3	H4B	A	502	17/17	0.58	0.50	88,110,128,131	0
9	GD	A	511	1/1	0.73	0.05	151,151,151,151	0
3	H4B	C	502	17/17	0.81	0.33	76,92,107,109	0
5	BTB	A	507	14/14	0.81	0.18	93,99,109,111	0
5	BTB	B	506	14/14	0.81	0.21	100,110,117,117	0
3	H4B	B	502	17/17	0.81	0.27	58,83,107,107	0
5	BTB	A	504	14/14	0.85	0.41	84,102,116,122	0
5	BTB	B	509	14/14	0.85	0.35	42,88,98,100	0
5	BTB	B	504	14/14	0.85	0.19	40,59,78,82	0
5	BTB	C	505	14/14	0.86	0.17	91,106,109,111	0
5	BTB	D	504	14/14	0.87	0.22	39,76,94,97	0
5	BTB	C	504	14/14	0.88	0.17	58,77,91,99	0
3	H4B	D	502	17/17	0.88	0.25	57,81,106,107	0
4	OSJ	C	503	23/23	0.89	0.32	44,52,66,69	0
9	GD	C	509	1/1	0.89	0.07	147,147,147,147	0
5	BTB	A	505	14/14	0.91	0.14	79,88,96,97	0
7	GOL	C	507	6/6	0.91	0.27	61,73,82,86	0
5	BTB	B	505	14/14	0.91	0.25	43,71,85,86	0
4	OSJ	A	503	23/23	0.91	0.38	52,63,81,86	0
5	BTB	D	505	14/14	0.92	0.18	63,78,94,96	0
7	GOL	A	509	6/6	0.93	0.21	50,69,76,81	0
5	BTB	A	506	14/14	0.94	0.23	22,62,82,84	0
8	CL	B	507	1/1	0.95	0.16	49,49,49,49	0
2	HEM	A	501	43/43	0.95	0.25	41,61,87,102	0
4	OSJ	D	503	23/23	0.95	0.20	31,45,67,72	0
2	HEM	C	501	43/43	0.96	0.25	34,49,84,97	0
8	CL	D	506	1/1	0.97	0.13	47,47,47,47	0
8	CL	A	510	1/1	0.97	0.22	67,67,67,67	0
4	OSJ	B	503	23/23	0.97	0.18	32,39,62,66	0
2	HEM	B	501	43/43	0.98	0.15	24,34,75,100	0
2	HEM	D	501	43/43	0.98	0.14	20,33,72,83	0
8	CL	C	508	1/1	0.98	0.25	53,53,53,53	0
9	GD	B	508	1/1	0.99	0.13	50,50,50,50	0
6	ZN	A	508	1/1	0.99	0.08	53,53,53,53	0
9	GD	D	507	1/1	0.99	0.12	50,50,50,50	0
6	ZN	C	506	1/1	1.00	0.09	43,43,43,43	0

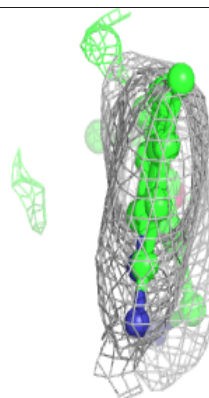
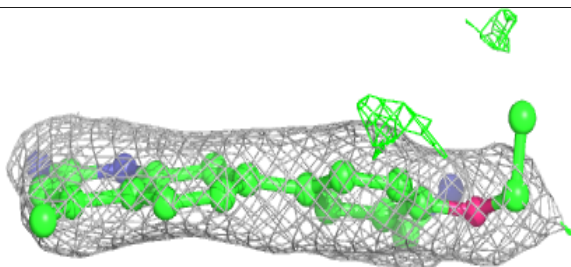
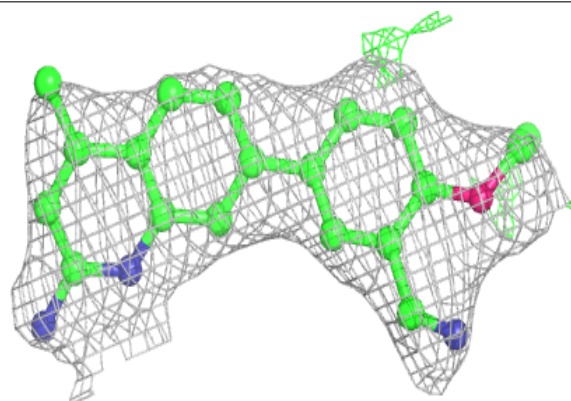
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

Electron density around OSJ 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)

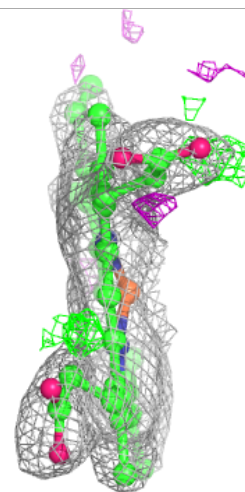
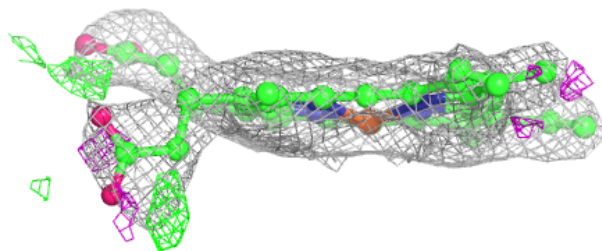
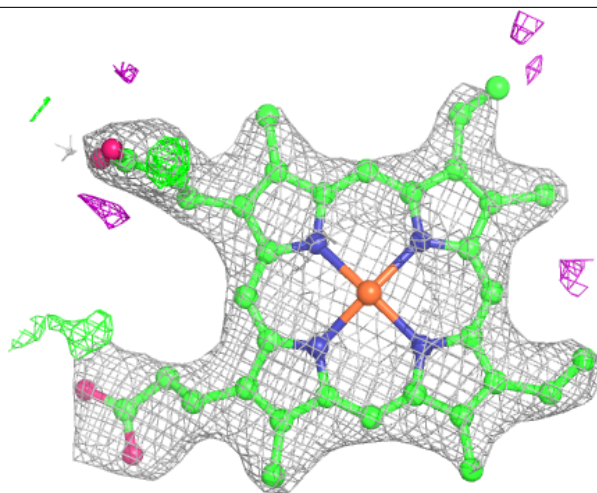
**Electron density around OSJ A 503:**

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



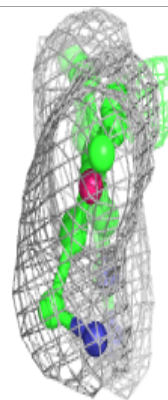
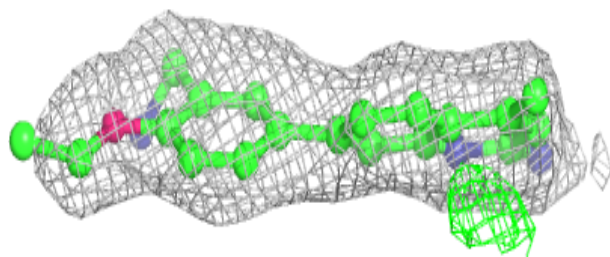
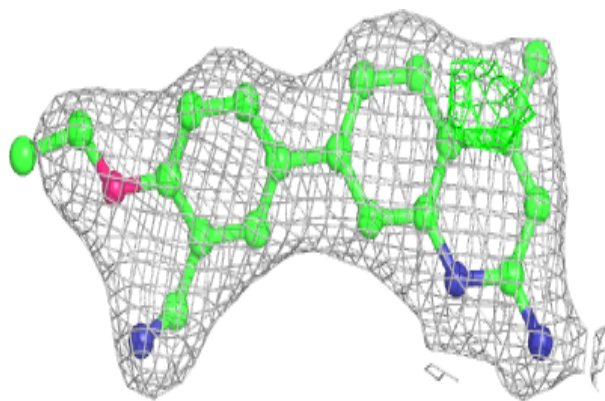
Electron density around HEM A 501:

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

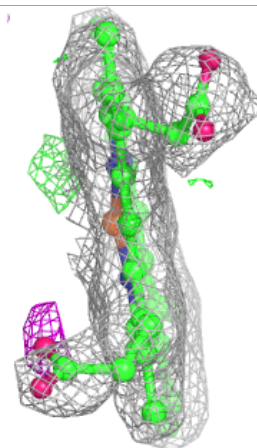
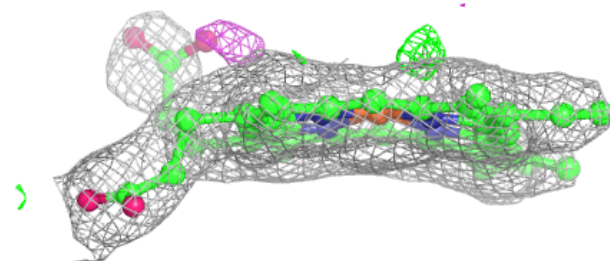
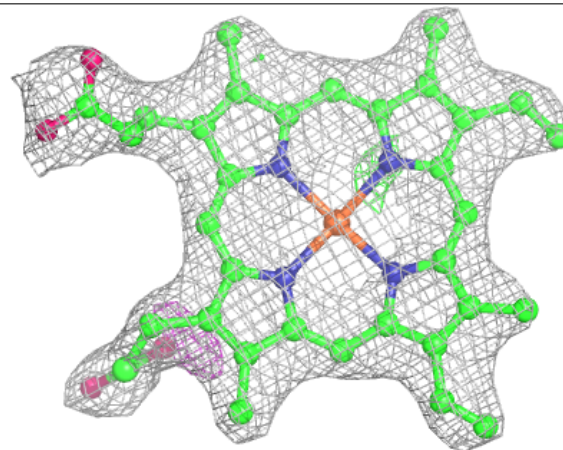


Electron density around OSJ D 503:

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

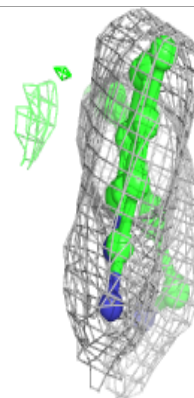
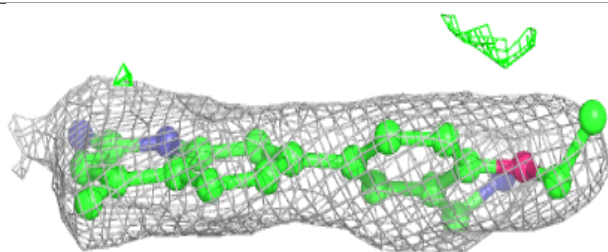
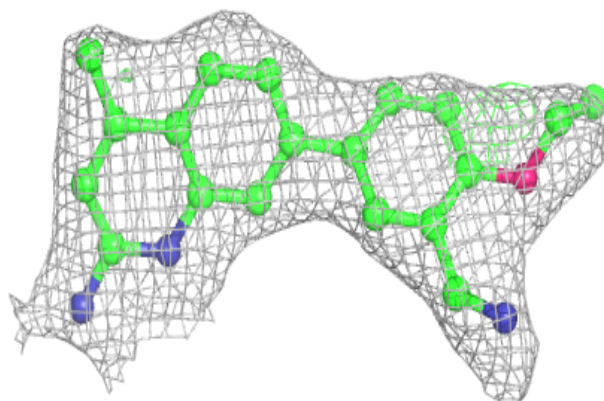
**Electron density around HEM C 501:**

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



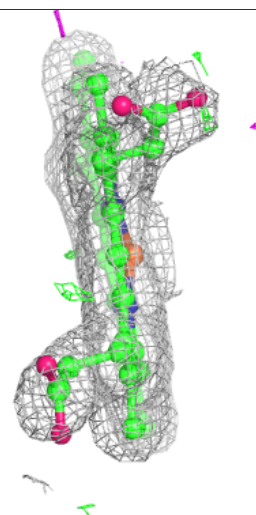
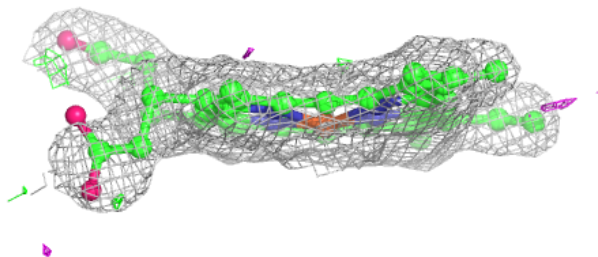
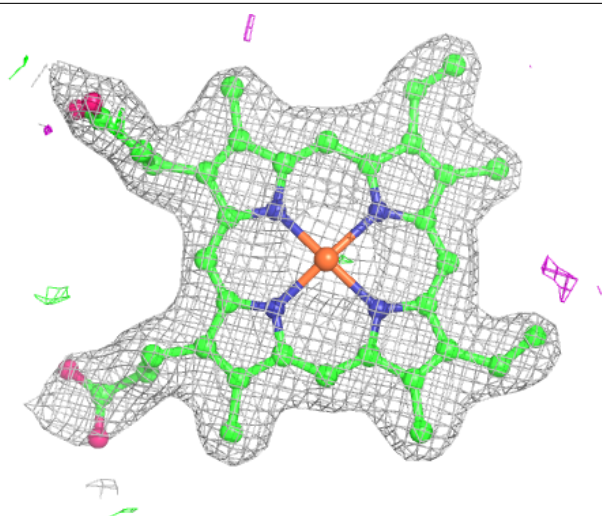
Electron density around OSJ B 503:

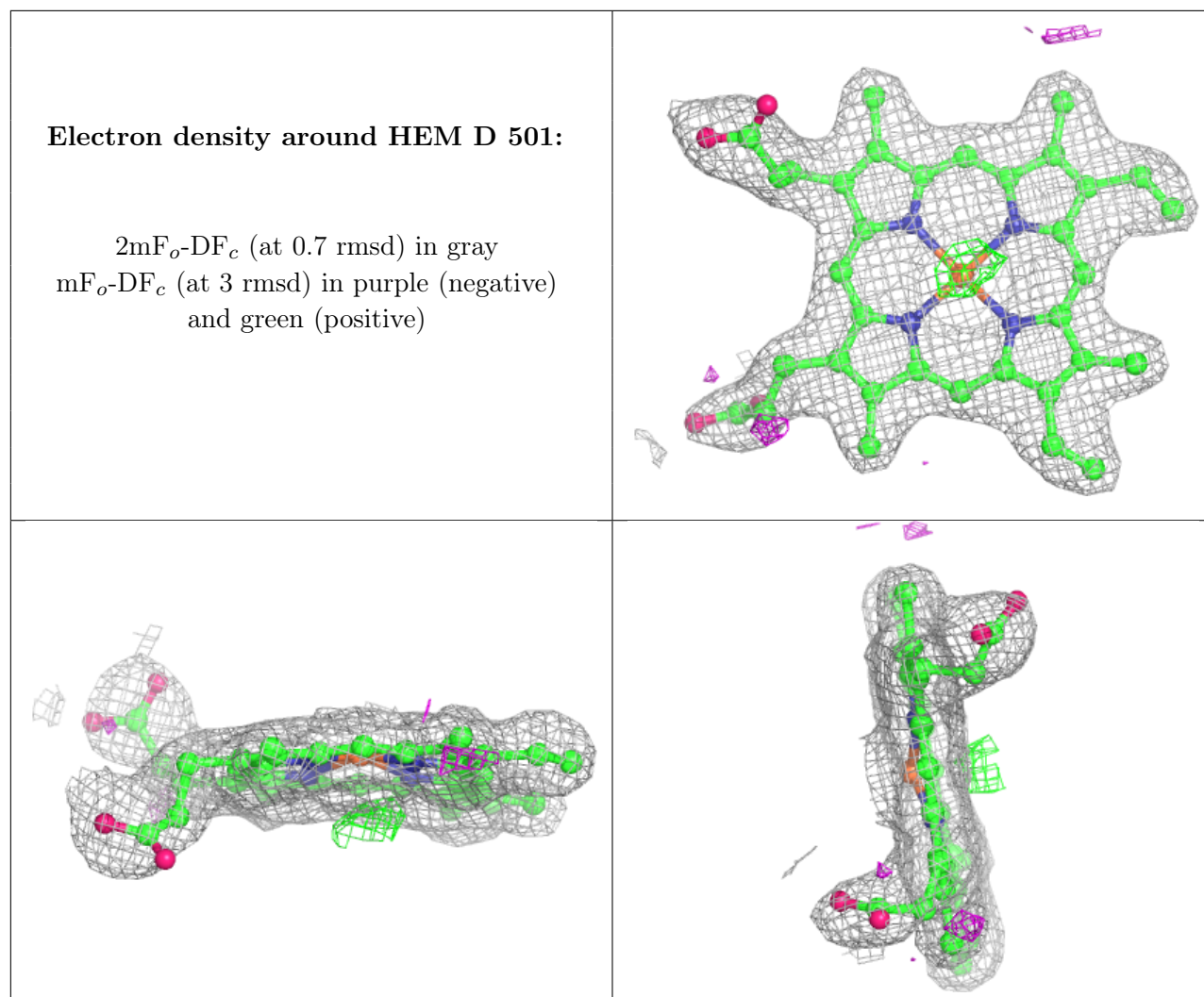
$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



Electron density around HEM B 501:

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





6.5 Other polymers [i](#)

There are no such residues in this entry.