



Full wwPDB X-ray Structure Validation Report ⓘ

Oct 9, 2023 – 03:38 PM EDT

PDB ID : 7TSM
Title : Structure of human endothelial nitric oxide synthase heme domain in complex with 4-methyl-6-(3-(4-methylpiperazin-1-yl)prop-1-yn-1-yl)pyridin-2-amine bishydrochloride
Authors : Li, H.; Poulos, T.L.
Deposited on : 2022-01-31
Resolution : 1.85 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)
Xtrriage (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

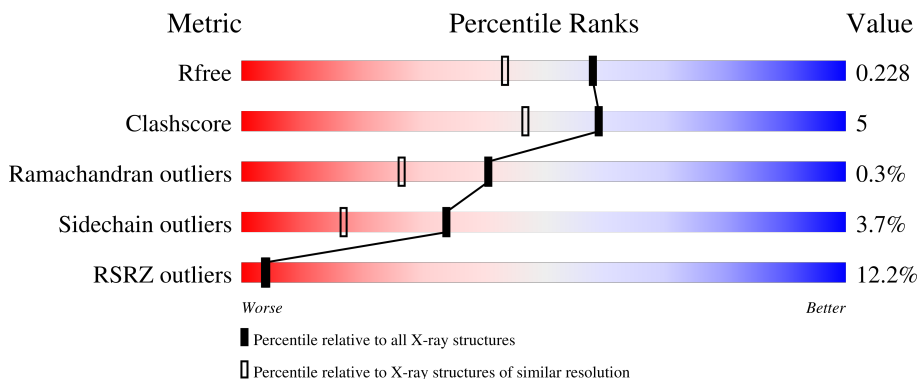
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.85 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	2469 (1.86-1.86)
Clashscore	141614	2625 (1.86-1.86)
Ramachandran outliers	138981	2592 (1.86-1.86)
Sidechain outliers	138945	2592 (1.86-1.86)
RSRZ outliers	127900	2436 (1.86-1.86)

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	 19% 79% 11% • 9%
1	B	440	 6% 82% 8% • 9%
1	C	440	 15% 80% 10% • 9%
1	D	440	 5% 83% 8% • 9%

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
6	GOL	C	507	-	X	-	-

2 Entry composition

There are 10 unique types of molecules in this entry. The entry contains 14153 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	3198	2037	562	583	16	0	1	0
1	B	402	3222	2051	568	587	16	0	3	0
1	C	402	3212	2046	565	585	16	0	1	0
1	D	402	3214	2046	567	585	16	0	1	0

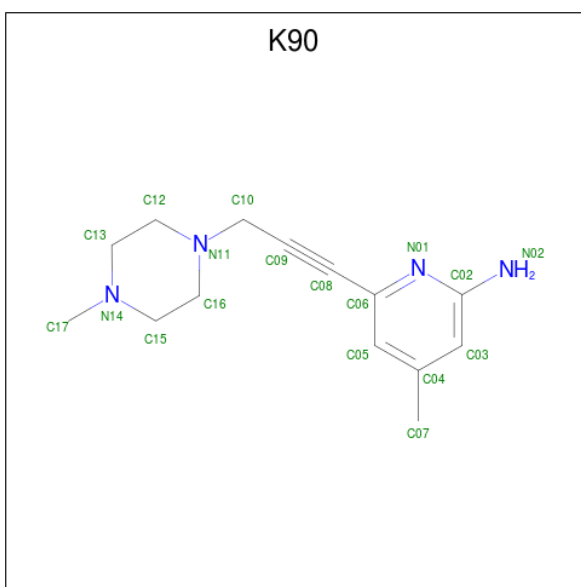
There are 4 discrepancies between the modelled and reference sequences:

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: $C_{34}H_{32}FeN_4O_4$).

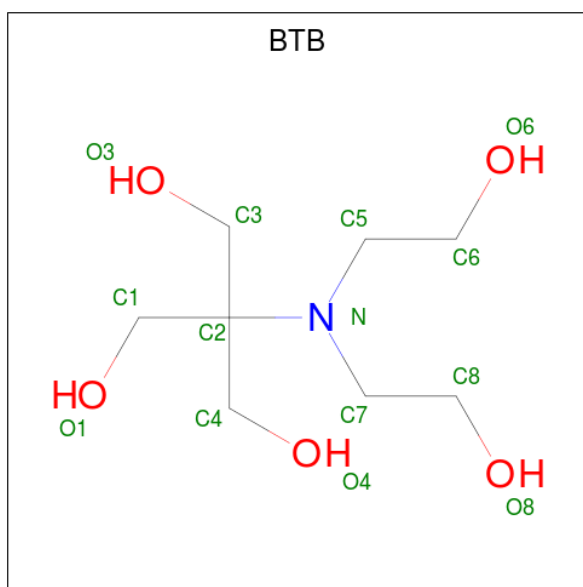
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
3	A	1	Total	C	N	O	0	0
			17	9	5	3		
3	B	1	Total	C	N	O	0	0
			17	9	5	3		
3	C	1	Total	C	N	O	0	0
			17	9	5	3		
3	D	1	Total	C	N	O	0	0
			17	9	5	3		

- Molecule 4 is 4-methyl-6-[3-(4-methylpiperazin-1-yl)prop-1-yn-1-yl]pyridin-2-amine (three-letter code: K90) (formula: C₁₄H₂₀N₄) (labeled as "Ligand of Interest" by depositor).



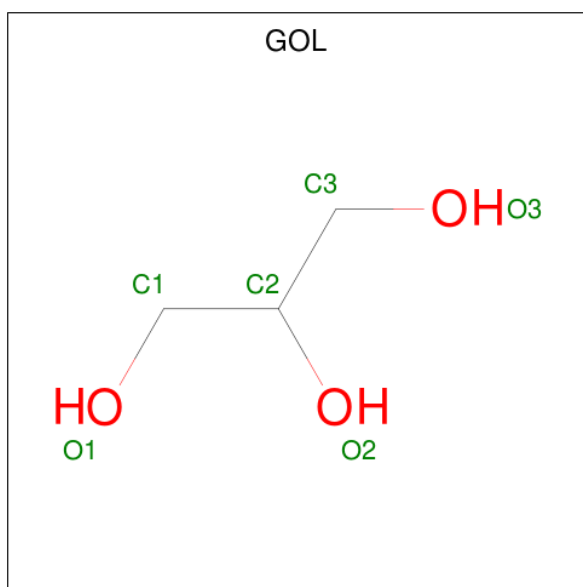
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	A	1	Total	C	N	0	0
			18	14	4		
4	B	1	Total	C	N	0	0
			18	14	4		
4	C	1	Total	C	N	0	0
			18	14	4		
4	D	1	Total	C	N	0	0
			18	14	4		

- 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	Total 14	8	1	5	0	0
5	A	1	Total 14	8	1	5	0	0
5	A	1	Total 14	8	1	5	0	0
5	B	1	Total 14	8	1	5	0	0
5	B	1	Total 14	8	1	5	0	0
5	B	1	Total 14	8	1	5	0	0
5	C	1	Total 14	8	1	5	0	0
5	C	1	Total 14	8	1	5	0	0
5	D	1	Total 14	8	1	5	0	0
5	D	1	Total 14	8	1	5	0	0
5	D	1	Total 14	8	1	5	0	0

- Molecule 6 is GLYCEROL (three-letter code: GOL) (formula: C₃H₈O₃).



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

- Molecule 7 is CHLORIDE ION (three-letter code: CL) (formula: Cl).

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

- Molecule 8 is GADOLINIUM ATOM (three-letter code: GD) (formula: Gd).

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

- Molecule 9 is ZINC ION (three-letter code: ZN) (formula: Zn).

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

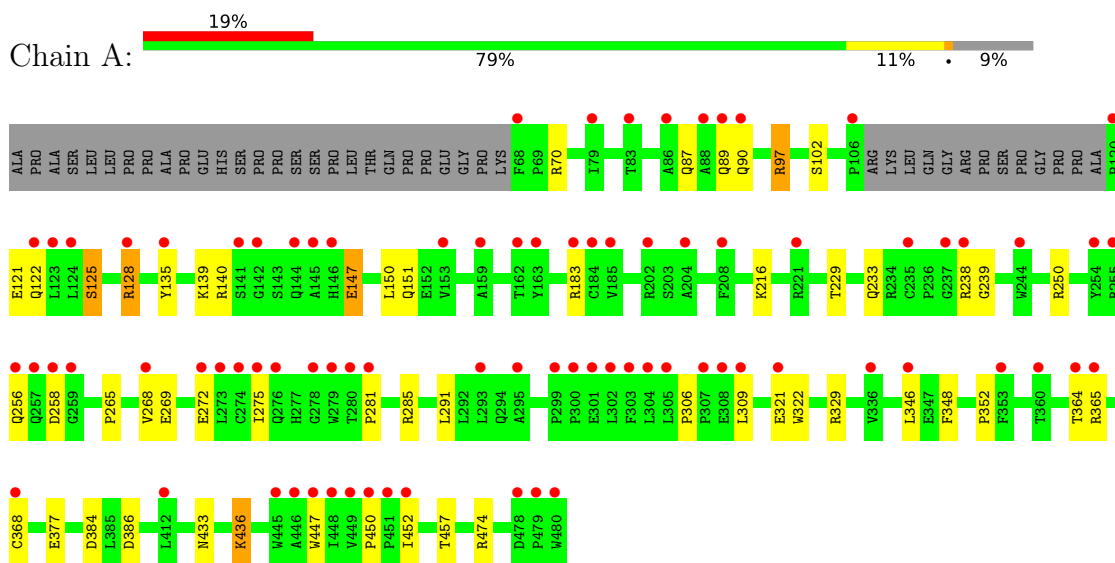
- Molecule 10 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
10	A	134	Total 134	O 134	0	0
10	B	243	Total 243	O 243	0	0
10	C	175	Total 175	O 175	0	0
10	D	249	Total 249	O 249	0	0

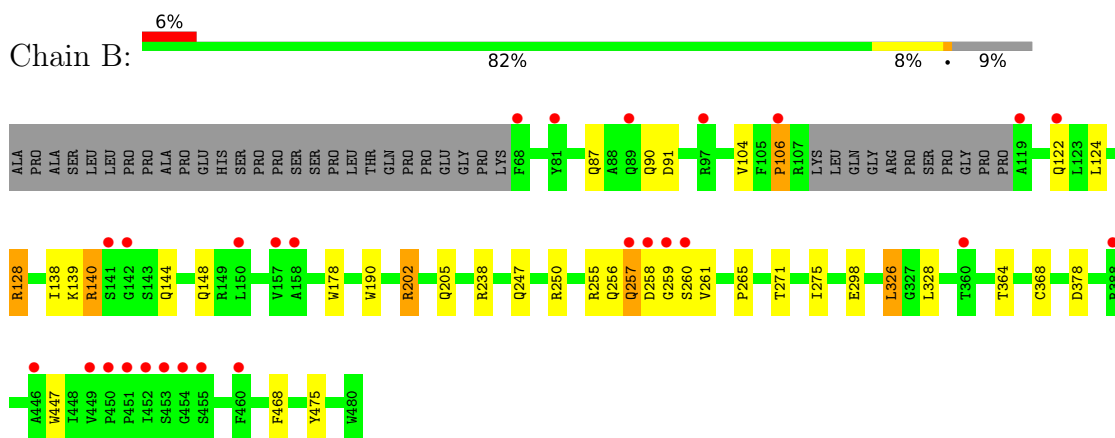
3 Residue-property plots i

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.

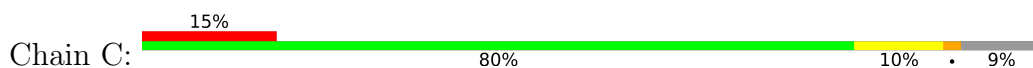
- Molecule 1: Nitric oxide synthase, endothelial

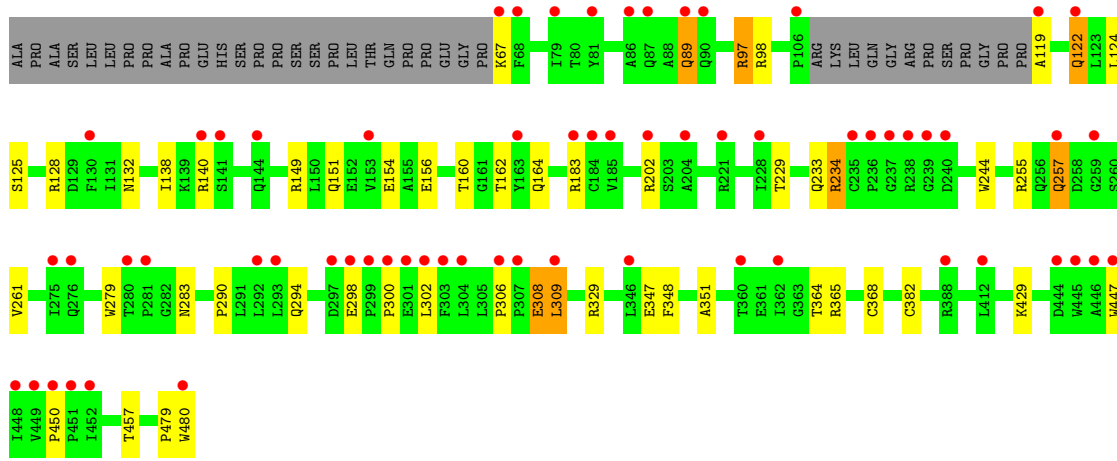


- Molecule 1: Nitric oxide synthase, endothelial

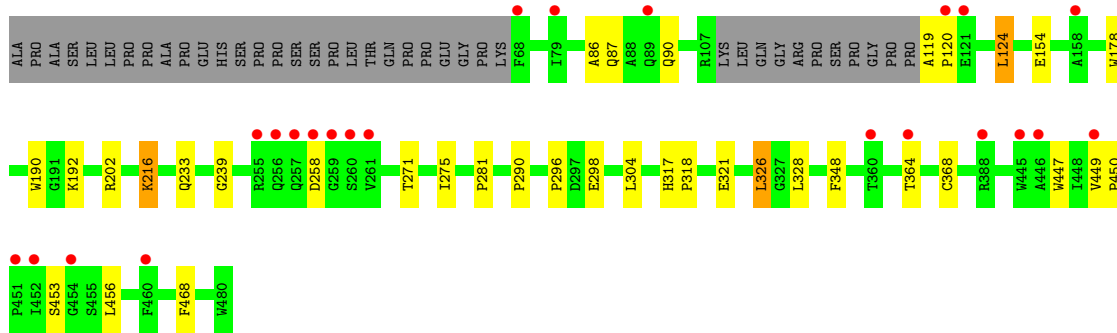
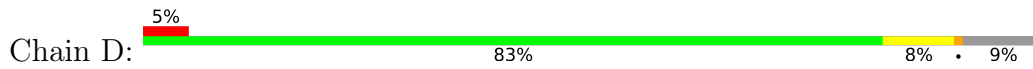


- Molecule 1: Nitric oxide synthase, endothelial





● 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	59.68Å 153.12Å 108.79Å 90.00° 90.66° 90.00°	Depositor
Resolution (Å)	39.10 – 1.85 39.09 – 1.85	Depositor EDS
% Data completeness (in resolution range)	98.1 (39.10-1.85) 98.2 (39.09-1.85)	Depositor EDS
R_{merge}	0.10	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.51 (at 1.85Å)	Xtrriage
Refinement program	PHENIX 1.11.1_2575	Depositor
R, R_{free}	0.199 , 0.237 0.191 , 0.228	Depositor DCC
R_{free} test set	8201 reflections (5.03%)	wwPDB-VP
Wilson B-factor (Å ²)	33.7	Xtrriage
Anisotropy	0.811	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.34 , 55.3	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.33$	Xtrriage
Estimated twinning fraction	0.068 for h,-k,-l	Xtrriage
F_o, F_c correlation	0.97	EDS
Total number of atoms	14153	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 3.30% 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: K90, H4B, HEM, ZN, GD, CL, BTB, GOL

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	0/3293	0.50	0/4487
1	B	0.40	0/3323	0.53	0/4528
1	C	0.34	0/3307	0.51	0/4506
1	D	0.41	0/3309	0.54	0/4509
All	All	0.37	0/13232	0.52	0/18030

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	3198	0	3099	31	0
1	B	3222	0	3127	21	0
1	C	3212	0	3116	27	0
1	D	3214	0	3116	23	0
2	A	43	0	30	1	0
2	B	43	0	30	3	0
2	C	43	0	30	1	0
2	D	43	0	30	1	0
3	A	17	0	15	2	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	1	0
4	A	18	0	0	0	0
4	B	18	0	0	0	0
4	C	18	0	0	0	0
4	D	18	0	0	0	0
5	A	42	0	57	8	0
5	B	42	0	54	8	0
5	C	28	0	37	4	0
5	D	42	0	56	10	0
6	A	12	0	16	0	0
6	B	6	0	8	0	0
6	C	12	0	16	1	0
7	A	1	0	0	0	0
7	B	1	0	0	0	0
7	C	1	0	0	0	0
7	D	1	0	0	0	0
8	A	1	0	0	0	0
8	B	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	C	1	0	0	0	0
10	A	134	0	0	3	0
10	B	243	0	0	3	1
10	C	175	0	0	1	0
10	D	249	0	0	2	1
All	All	14153	0	12882	124	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 (124) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:C:504:BTB:O3	10:C:601:HOH:O	1.87	0.90
1:C:382:CYS:HA	5:C:504:BTB:H12	1.67	0.77
1:C:128:ARG:NH2	1:C:154:GLU:OE2	2.18	0.76
1:D:275:ILE:HD12	1:D:281:PRO:HG3	1.68	0.74
1:B:247:GLN:HB2	1:B:250:ARG:HD3	1.70	0.72

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:501:HEM:HBB2	2:D:501:HEM:HHC	1.73	0.70
5:A:504:BTB:O3	10:A:601:HOH:O	2.10	0.69
1:B:298:GLU:OE2	5:B:505:BTB:N	2.27	0.68
1:B:378:ASP:OD2	10:B:601:HOH:O	2.13	0.66
1:D:124:LEU:HD11	1:D:154:GLU:HG3	1.78	0.65
1:A:322:TRP:CD1	5:A:504:BTB:H61	2.32	0.65
1:C:128:ARG:O	1:C:132:ASN:ND2	2.30	0.65
1:A:321:GLU:H	1:A:321:GLU:CD	2.02	0.62
1:B:90:GLN:HB3	1:B:468:PHE:CD2	2.35	0.61
1:D:298:GLU:OE1	5:D:505:BTB:H52	2.03	0.59
5:B:509:BTB:H32	5:B:509:BTB:O8	2.02	0.59
1:A:239:GLY:O	10:A:602:HOH:O	2.16	0.59
1:D:119:ALA:N	1:D:120:PRO:HD3	2.18	0.59
2:B:501:HEM:HBC2	2:B:501:HEM:HMC2	1.86	0.57
2:A:501:HEM:HBB2	2:A:501:HEM:HHC	1.86	0.57
1:A:102:SER:O	3:A:502:H4B:O10	2.23	0.57
1:D:290:PRO:HB3	1:D:304:LEU:HD23	1.87	0.57
1:C:160:THR:HG23	1:C:162:THR:H	1.71	0.56
1:C:365:ARG:HH12	3:C:502:H4B:C4	2.19	0.55
1:C:156:GLU:O	1:C:160:THR:HG22	2.06	0.55
1:D:453:SER:HB3	1:D:456:LEU:HD12	1.89	0.55
1:A:306:PRO:HB2	1:A:309:LEU:HB2	1.89	0.55
1:B:124:LEU:HB3	1:B:128:ARG:HH12	1.71	0.54
1:C:279:TRP:HB2	1:C:302:LEU:HD11	1.89	0.54
1:C:298:GLU:OE2	5:C:505:BTB:H11	2.06	0.54
1:D:90:GLN:HB3	1:D:468:PHE:CD2	2.42	0.54
5:B:505:BTB:O3	5:B:505:BTB:O1	2.07	0.54
1:A:365:ARG:HH12	3:A:502:H4B:C4	2.21	0.53
1:A:147:GLU:HA	1:A:150:LEU:HD12	1.90	0.53
2:B:501:HEM:HHC	2:B:501:HEM:HBB2	1.90	0.52
1:A:238:ARG:NE	1:A:239:GLY:O	2.42	0.52
5:D:504:BTB:H61	10:D:773:HOH:O	2.09	0.52
1:A:364:THR:HG21	1:A:452:ILE:HG23	1.92	0.52
1:D:239:GLY:O	1:D:296:PRO:HB3	2.10	0.52
1:A:125:SER:HA	1:A:128:ARG:NH1	2.24	0.52
1:A:233:GLN:HB3	1:A:348:PHE:CE2	2.44	0.52
1:A:275:ILE:HD11	1:A:281:PRO:HB3	1.92	0.52
1:B:364:THR:O	1:B:368:CYS:HB2	2.10	0.51
1:C:183:ARG:HD3	1:C:447:TRP:CD2	2.46	0.51
2:C:501:HEM:HBB2	2:C:501:HEM:HHC	1.93	0.50
1:D:271:THR:O	1:D:275:ILE:HG12	2.11	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:135:TYR:HD1	1:A:140:ARG:HB3	1.77	0.50
1:A:433:ASN:O	1:A:436:LYS:HG3	2.12	0.50
1:C:234:ARG:NH1	1:C:347:GLU:OE1	2.45	0.49
1:A:147:GLU:O	1:A:151:GLN:NE2	2.21	0.49
1:B:256:GLN:HB2	1:B:260:SER:O	2.13	0.49
1:D:178:TRP:CE3	1:D:190:TRP:HA	2.48	0.49
1:A:150:LEU:HB2	1:A:151:GLN:NE2	2.27	0.48
1:B:138:ILE:HG13	1:B:140:ARG:HB2	1.95	0.48
5:D:505:BTB:H61	5:D:505:BTB:H32	1.96	0.48
5:B:509:BTB:O4	5:B:509:BTB:O3	2.22	0.48
1:C:294:GLN:HB2	1:C:300:PRO:HB3	1.96	0.48
1:C:364:THR:O	1:C:368:CYS:HB2	2.14	0.47
1:A:450:PRO:HG2	1:A:457:THR:HG21	1.97	0.47
5:C:504:BTB:H72	5:C:504:BTB:H41	1.62	0.47
1:D:321:GLU:OE2	5:D:504:BTB:O4	2.32	0.47
1:C:233:GLN:HB3	1:C:348:PHE:CE2	2.50	0.47
1:C:479:PRO:HD2	1:C:480:TRP:CZ3	2.49	0.46
5:B:505:BTB:O6	5:B:505:BTB:H11	2.15	0.46
5:D:506:BTB:H72	5:D:506:BTB:H12	1.56	0.46
1:A:183:ARG:HD3	1:A:447:TRP:CD2	2.50	0.46
1:D:202:ARG:NH1	10:D:603:HOH:O	2.26	0.46
1:A:97:ARG:HH11	1:A:97:ARG:HB2	1.80	0.46
1:C:97:ARG:NH2	1:D:86:ALA:HA	2.31	0.45
1:C:306:PRO:HD2	1:C:309:LEU:HD12	1.99	0.45
1:B:447:TRP:HA	3:B:502:H4B:N1	2.30	0.45
1:A:258:ASP:N	1:A:258:ASP:OD1	2.50	0.45
1:B:298:GLU:HG2	10:B:796:HOH:O	2.16	0.45
5:A:505:BTB:H41	5:A:505:BTB:H72	1.58	0.45
1:B:326:LEU:HB3	1:B:328:LEU:HG	1.97	0.45
1:C:156:GLU:OE2	1:C:164:GLN:HG2	2.17	0.45
1:B:261:VAL:HG11	1:B:265:PRO:HA	2.00	0.44
1:C:450:PRO:HG2	1:C:457:THR:HG21	1.99	0.44
1:A:229:THR:O	1:A:352:PRO:HD2	2.18	0.44
1:B:178:TRP:CE3	1:B:190:TRP:HA	2.53	0.44
1:A:265:PRO:HA	1:A:268:VAL:HG23	2.00	0.44
5:A:506:BTB:H72	5:A:506:BTB:H41	1.43	0.44
5:B:505:BTB:H52	5:B:505:BTB:H82	1.43	0.44
1:A:384:ASP:HB3	6:C:507:GOL:H12	1.99	0.43
1:A:386:ASP:CB	1:C:257:GLN:HE22	2.31	0.43
1:A:250:ARG:NH2	10:A:606:HOH:O	2.37	0.43
5:B:505:BTB:H41	5:B:505:BTB:H71	1.63	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:D:504:BTB:H32	5:D:504:BTB:H51	1.77	0.43
1:D:364:THR:O	1:D:368:CYS:HB2	2.19	0.43
1:B:205:GLN:HG3	10:B:760:HOH:O	2.18	0.43
1:A:139:LYS:HB2	1:A:139:LYS:HE3	1.75	0.43
1:D:233:GLN:HB3	1:D:348:PHE:CE2	2.54	0.43
1:B:90:GLN:HG3	1:B:91:ASP:N	2.33	0.43
1:D:326:LEU:HB3	1:D:328:LEU:HG	2.00	0.43
1:A:269:GLU:O	1:A:272:GLU:HG2	2.19	0.43
1:A:377:GLU:OE1	5:A:505:BTB:O3	2.36	0.43
5:A:504:BTB:H32	5:A:504:BTB:H51	1.63	0.43
1:A:233:GLN:OE1	1:A:346:LEU:HD13	2.18	0.43
1:C:255:ARG:HG3	1:C:261:VAL:HG22	2.01	0.43
1:D:447:TRP:HA	3:D:502:H4B:N1	2.34	0.43
1:C:308:GLU:O	1:C:308:GLU:HG2	2.20	0.42
1:D:298:GLU:OE2	5:D:505:BTB:H42	2.19	0.42
1:A:364:THR:O	1:A:368:CYS:HB2	2.20	0.42
1:D:449:VAL:HA	1:D:450:PRO:HD3	1.93	0.42
1:C:244:TRP:CD1	1:C:479:PRO:HG2	2.54	0.42
1:C:279:TRP:CG	1:C:290:PRO:HG3	2.55	0.42
1:B:90:GLN:HG3	1:B:91:ASP:H	1.85	0.42
1:B:238:ARG:HE	1:B:238:ARG:HB3	1.51	0.41
1:B:271:THR:O	1:B:275:ILE:HG13	2.20	0.41
1:A:386:ASP:HB2	1:C:257:GLN:HE22	1.84	0.41
5:B:509:BTB:H62	5:B:509:BTB:H71	1.88	0.41
1:D:298:GLU:CD	5:D:505:BTB:H42	2.41	0.41
1:D:298:GLU:CD	5:D:505:BTB:H52	2.41	0.41
5:A:505:BTB:H51	5:A:505:BTB:H11	1.56	0.41
1:C:138:ILE:O	1:C:140:ARG:HG2	2.21	0.41
1:B:104:VAL:O	1:B:106:PRO:HD3	2.21	0.41
1:C:119:ALA:HB1	1:C:122:GLN:HB2	2.02	0.41
1:D:216:LYS:HB3	1:D:216:LYS:HE2	1.89	0.41
1:D:317:HIS:CG	1:D:318:PRO:HD2	2.56	0.41
5:D:505:BTB:H82	5:D:505:BTB:H51	1.69	0.40
5:A:505:BTB:O3	5:A:505:BTB:O4	2.22	0.40
1:C:229:THR:O	1:C:351:ALA:HA	2.22	0.40
1:B:202:ARG:O	1:B:202:ARG:HG3	2.22	0.40
1:B:475:TYR:OH	2:B:501:HEM:O1D	2.32	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)
10:B:612:HOH:O	10:D:609:HOH:O[1_456]	2.19	0.01

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	397/440 (90%)	383 (96%)	13 (3%)	1 (0%)	41	26
1	B	401/440 (91%)	389 (97%)	9 (2%)	3 (1%)	22	9
1	C	399/440 (91%)	384 (96%)	14 (4%)	1 (0%)	41	26
1	D	399/440 (91%)	394 (99%)	5 (1%)	0	100	100
All	All	1596/1760 (91%)	1550 (97%)	41 (3%)	5 (0%)	41	26

All (5) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	257	GLN
1	C	89	GLN
1	A	89	GLN
1	B	259	GLY
1	B	106	PRO

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	341/373 (91%)	325 (95%)	16 (5%)	26	10

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	B	344/373 (92%)	332 (96%)	12 (4%)	36	18
1	C	342/373 (92%)	325 (95%)	17 (5%)	24	9
1	D	342/373 (92%)	336 (98%)	6 (2%)	59	45
All	All	1369/1492 (92%)	1318 (96%)	51 (4%)	34	17

All (51) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	70	ARG
1	A	87	GLN
1	A	90	GLN
1	A	97	ARG
1	A	121	GLU
1	A	122	GLN
1	A	125	SER
1	A	128	ARG
1	A	147	GLU
1	A	216	LYS
1	A	256	GLN
1	A	285	ARG
1	A	291	LEU
1	A	329	ARG
1	A	436	LYS
1	A	474	ARG
1	B	87	GLN
1	B	122	GLN
1	B	128	ARG
1	B	139	LYS
1	B	140	ARG
1	B	144	GLN
1	B	148	GLN
1	B	202	ARG
1	B	255	ARG
1	B	257	GLN
1	B	258	ASP
1	B	326	LEU
1	C	67	LYS
1	C	89	GLN
1	C	97	ARG
1	C	98	ARG
1	C	122	GLN

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Mol	Chain	Res	Type
1	C	124	LEU
1	C	125	SER
1	C	149	ARG
1	C	151	GLN
1	C	202	ARG
1	C	234	ARG
1	C	257	GLN
1	C	283	ASN
1	C	308	GLU
1	C	309	LEU
1	C	329	ARG
1	C	429	LYS
1	D	87	GLN
1	D	124	LEU
1	D	192	LYS
1	D	216	LYS
1	D	258	ASP
1	D	326	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. There are no such sidechains identified.

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 monosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 38 ligands modelled in this entry, 10 are monoatomic - leaving 28 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
5	BTB	C	505	-	13,13,13	0.47	0	7,16,16	0.91	0
2	HEM	C	501	1	41,50,50	1.51	7 (17%)	45,82,82	1.83	10 (22%)
3	H4B	B	502	-	16,18,18	0.94	0	11,26,26	2.75	6 (54%)
4	K90	A	503	-	19,19,19	2.12	1 (5%)	25,25,25	1.69	5 (20%)
2	HEM	A	501	1	41,50,50	1.49	6 (14%)	45,82,82	1.76	11 (24%)
5	BTB	D	505	-	13,13,13	0.53	0	7,16,16	1.20	1 (14%)
5	BTB	A	506	-	13,13,13	0.44	0	7,16,16	0.67	0
5	BTB	B	504	8	13,13,13	0.48	0	7,16,16	0.52	0
5	BTB	A	505	-	13,13,13	0.61	0	7,16,16	0.90	0
3	H4B	D	502	-	16,18,18	0.93	1 (6%)	11,26,26	2.58	6 (54%)
5	BTB	C	504	8	13,13,13	0.47	0	7,16,16	1.04	0
5	BTB	D	506	-	13,13,13	0.44	0	7,16,16	0.63	0
5	BTB	B	505	-	13,13,13	0.52	0	7,16,16	1.00	0
3	H4B	A	502	-	16,18,18	1.01	0	11,26,26	2.61	5 (45%)
2	HEM	D	501	1	41,50,50	1.53	6 (14%)	45,82,82	1.58	11 (24%)
6	GOL	B	506	-	5,5,5	0.37	0	5,5,5	0.23	0
5	BTB	B	509	-	13,13,13	0.47	0	7,16,16	0.59	0
4	K90	D	503	-	19,19,19	2.28	1 (5%)	25,25,25	1.70	7 (28%)
4	K90	C	503	-	19,19,19	2.11	1 (5%)	25,25,25	1.55	6 (24%)
3	H4B	C	502	-	16,18,18	0.91	0	11,26,26	2.76	6 (54%)
4	K90	B	503	-	19,19,19	2.12	1 (5%)	25,25,25	1.61	6 (24%)
2	HEM	B	501	1	41,50,50	1.52	6 (14%)	45,82,82	1.62	8 (17%)
5	BTB	A	504	8	13,13,13	0.34	0	7,16,16	0.58	0
6	GOL	A	508	-	5,5,5	0.57	0	5,5,5	0.67	0
5	BTB	D	504	8	13,13,13	0.36	0	7,16,16	0.59	0
6	GOL	C	507	-	5,5,5	0.76	0	5,5,5	2.77	2 (40%)
6	GOL	C	506	-	5,5,5	0.34	0	5,5,5	0.42	0
6	GOL	A	507	-	5,5,5	0.38	0	5,5,5	0.29	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
5	BTB	C	505	-	-	7/21/21/21	-
2	HEM	C	501	1	-	0/12/54/54	-
3	H4B	B	502	-	-	0/8/17/17	0/2/2/2
4	K90	A	503	-	-	3/5/16/16	0/2/2/2
2	HEM	A	501	1	-	3/12/54/54	-
5	BTB	D	505	-	-	8/21/21/21	-
5	BTB	A	506	-	-	5/21/21/21	-
5	BTB	B	504	8	-	1/21/21/21	-
5	BTB	A	505	-	-	12/21/21/21	-
3	H4B	D	502	-	-	0/8/17/17	0/2/2/2
5	BTB	C	504	8	-	3/21/21/21	-
5	BTB	D	506	-	-	12/21/21/21	-
5	BTB	B	505	-	-	9/21/21/21	-
3	H4B	A	502	-	-	3/8/17/17	0/2/2/2
2	HEM	D	501	1	-	1/12/54/54	-
6	GOL	B	506	-	-	2/4/4/4	-
5	BTB	B	509	-	-	6/21/21/21	-
4	K90	D	503	-	-	3/5/16/16	0/2/2/2
4	K90	C	503	-	-	3/5/16/16	0/2/2/2
3	H4B	C	502	-	-	0/8/17/17	0/2/2/2
4	K90	B	503	-	-	3/5/16/16	0/2/2/2
2	HEM	B	501	1	-	1/12/54/54	-
5	BTB	A	504	8	-	5/21/21/21	-
6	GOL	A	508	-	-	2/4/4/4	-
5	BTB	D	504	8	-	3/21/21/21	-
6	GOL	C	507	-	-	4/4/4/4	-
6	GOL	C	506	-	-	2/4/4/4	-
6	GOL	A	507	-	-	4/4/4/4	-

All (30) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	D	503	K90	C06-C08	-9.41	1.28	1.44
4	C	503	K90	C06-C08	-9.06	1.29	1.44
4	A	503	K90	C06-C08	-8.95	1.29	1.44
4	B	503	K90	C06-C08	-8.88	1.29	1.44
2	D	501	HEM	C3C-C2C	-3.73	1.35	1.40
2	C	501	HEM	C3C-CAC	3.67	1.55	1.47

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	501	HEM	C3C-CAC	3.59	1.55	1.47
2	A	501	HEM	C3C-CAC	3.56	1.55	1.47
2	D	501	HEM	FE-NB	3.50	2.14	1.96
2	A	501	HEM	C3C-C2C	-3.43	1.35	1.40
2	B	501	HEM	CAB-C3B	3.35	1.56	1.47
2	A	501	HEM	CAB-C3B	3.28	1.56	1.47
2	B	501	HEM	C3C-C2C	-3.17	1.36	1.40
2	C	501	HEM	C3C-C2C	-3.16	1.36	1.40
2	C	501	HEM	CAB-C3B	3.12	1.55	1.47
2	B	501	HEM	FE-NB	3.09	2.12	1.96
2	D	501	HEM	CAB-C3B	3.00	1.55	1.47
2	D	501	HEM	C3C-CAC	2.95	1.53	1.47
2	C	501	HEM	FE-ND	2.62	2.09	1.96
2	A	501	HEM	FE-NB	2.56	2.09	1.96
2	B	501	HEM	FE-ND	2.42	2.08	1.96
2	B	501	HEM	CMB-C2B	2.19	1.55	1.50
2	D	501	HEM	CMB-C2B	2.12	1.55	1.50
3	D	502	H4B	C4A-C4	-2.09	1.38	1.41
2	A	501	HEM	CAA-C2A	2.08	1.55	1.52
2	C	501	HEM	FE-NB	2.08	2.07	1.96
2	C	501	HEM	CMB-C2B	2.07	1.55	1.50
2	C	501	HEM	CAA-C2A	2.06	1.55	1.52
2	D	501	HEM	CMD-C2D	2.02	1.55	1.50
2	A	501	HEM	FE-ND	2.01	2.06	1.96

All (90) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	502	H4B	C8A-C4A-C4	5.82	119.74	114.57
3	B	502	H4B	C8A-C4A-C4	5.80	119.72	114.57
3	C	502	H4B	C8A-C4A-C4	5.66	119.60	114.57
2	C	501	HEM	C4B-CHC-C1C	4.97	129.12	122.56
6	C	507	GOL	O1-C1-C2	-4.80	87.19	110.20
3	D	502	H4B	C8A-C4A-C4	4.74	118.78	114.57
2	A	501	HEM	C4B-CHC-C1C	4.24	128.16	122.56
4	A	503	K90	C05-C06-N01	-4.14	119.37	123.61
2	C	501	HEM	CBA-CAA-C2A	-4.09	105.63	112.62
2	B	501	HEM	C4B-CHC-C1C	3.87	127.67	122.56
6	C	507	GOL	O2-C2-C1	-3.81	92.34	109.12
4	B	503	K90	C10-N11-C16	-3.74	107.36	111.71
2	D	501	HEM	C4B-CHC-C1C	3.71	127.45	122.56
4	D	503	K90	C10-N11-C16	-3.69	107.42	111.71

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	501	HEM	C4D-ND-C1D	3.63	108.83	105.07
3	D	502	H4B	C2-N3-C4	3.60	121.66	115.93
2	A	501	HEM	C4D-ND-C1D	3.59	108.78	105.07
3	B	502	H4B	N1-C2-N3	-3.58	119.81	125.42
4	B	503	K90	C05-C06-N01	-3.56	119.96	123.61
3	D	502	H4B	N1-C2-N3	-3.55	119.84	125.42
4	A	503	K90	C06-N01-C02	3.52	122.63	116.90
3	C	502	H4B	N1-C2-N3	-3.52	119.90	125.42
3	C	502	H4B	C2-N3-C4	3.46	121.42	115.93
2	A	501	HEM	C3B-C2B-C1B	3.38	109.00	106.49
2	C	501	HEM	C4D-ND-C1D	3.38	108.57	105.07
4	C	503	K90	C05-C06-N01	-3.37	120.16	123.61
2	D	501	HEM	C4D-ND-C1D	3.34	108.52	105.07
3	A	502	H4B	N1-C2-N3	-3.31	120.23	125.42
2	A	501	HEM	C1B-NB-C4B	3.30	108.49	105.07
3	B	502	H4B	C2-N3-C4	3.19	121.00	115.93
2	B	501	HEM	C1B-NB-C4B	3.14	108.32	105.07
4	D	503	K90	C17-N14-C15	-3.10	106.02	110.66
4	C	503	K90	C08-C06-N01	3.10	121.56	116.55
4	C	503	K90	C10-N11-C12	-3.05	108.16	111.71
4	B	503	K90	C06-N01-C02	3.03	121.84	116.90
2	D	501	HEM	CBA-CAA-C2A	-3.03	107.44	112.62
3	B	502	H4B	C2-N1-C8A	2.99	121.25	114.54
2	D	501	HEM	C4C-CHD-C1D	2.96	126.47	122.56
2	C	501	HEM	C1B-NB-C4B	2.92	108.09	105.07
3	A	502	H4B	C2-N3-C4	2.92	120.56	115.93
2	C	501	HEM	C3D-C4D-ND	-2.90	106.94	110.17
2	B	501	HEM	CHC-C4B-C3B	2.83	128.90	124.57
3	C	502	H4B	C2-N1-C8A	2.83	120.87	114.54
3	A	502	H4B	C2-N1-C8A	2.81	120.84	114.54
2	B	501	HEM	C3B-C2B-C1B	2.79	108.56	106.49
4	B	503	K90	C08-C06-N01	2.77	121.02	116.55
4	A	503	K90	N02-C02-N01	2.76	120.85	116.49
4	D	503	K90	C08-C06-N01	2.70	120.91	116.55
2	B	501	HEM	CBA-CAA-C2A	-2.67	108.06	112.62
4	D	503	K90	C10-N11-C12	-2.67	108.61	111.71
3	D	502	H4B	C2-N1-C8A	2.66	120.50	114.54
2	D	501	HEM	C1B-NB-C4B	2.63	107.79	105.07
4	B	503	K90	C12-C13-N14	-2.62	107.84	110.80
4	C	503	K90	C10-N11-C16	-2.60	108.68	111.71
4	A	503	K90	C10-N11-C16	-2.59	108.70	111.71
4	D	503	K90	C15-N14-C13	2.58	113.13	109.52

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	C	503	K90	C06-N01-C02	2.57	121.09	116.90
2	B	501	HEM	C3D-C4D-ND	-2.54	107.33	110.17
4	C	503	K90	N02-C02-N01	2.54	120.50	116.49
2	A	501	HEM	CMA-C3A-C4A	-2.51	124.60	128.46
4	A	503	K90	C17-N14-C15	-2.45	106.99	110.66
2	C	501	HEM	CBD-CAD-C3D	-2.44	105.86	112.63
2	A	501	HEM	C2D-C1D-ND	-2.39	107.02	109.88
4	D	503	K90	C06-N01-C02	2.36	120.74	116.90
2	D	501	HEM	C3D-C4D-ND	-2.35	107.55	110.17
2	D	501	HEM	C2C-C3C-C4C	2.35	108.54	106.90
2	C	501	HEM	CMC-C2C-C3C	2.32	129.02	124.68
3	C	502	H4B	C4-C4A-N5	2.31	121.06	119.12
2	C	501	HEM	CMA-C3A-C4A	-2.30	124.93	128.46
2	A	501	HEM	C3D-C4D-ND	-2.29	107.61	110.17
2	B	501	HEM	CMC-C2C-C3C	2.28	128.94	124.68
2	A	501	HEM	CBD-CAD-C3D	-2.27	106.31	112.63
3	D	502	H4B	N2-C2-N1	2.27	120.79	117.25
4	D	503	K90	C05-C06-N01	-2.27	121.28	123.61
3	D	502	H4B	C4-C4A-N5	2.27	121.02	119.12
2	C	501	HEM	CHC-C4B-C3B	2.23	127.98	124.57
3	B	502	H4B	C4-C4A-N5	2.22	120.98	119.12
2	D	501	HEM	CHC-C4B-C3B	2.21	127.95	124.57
2	A	501	HEM	C2C-C3C-C4C	2.18	108.42	106.90
2	D	501	HEM	CMA-C3A-C4A	-2.14	125.18	128.46
2	A	501	HEM	CMC-C2C-C3C	2.11	128.63	124.68
2	C	501	HEM	C2D-C1D-ND	-2.11	107.35	109.88
3	C	502	H4B	N2-C2-N3	2.11	120.53	117.25
5	D	505	BTB	C6-C5-N	2.10	119.79	111.59
2	D	501	HEM	C4A-C3A-C2A	2.10	108.45	107.00
3	B	502	H4B	N2-C2-N1	2.09	120.50	117.25
2	D	501	HEM	CBD-CAD-C3D	-2.07	106.87	112.63
2	A	501	HEM	CHD-C1D-C2D	2.04	128.16	124.98
3	A	502	H4B	C4-C4A-N5	2.02	120.82	119.12
4	B	503	K90	C10-N11-C12	-2.02	109.36	111.71

There are no chirality outliers.

All (105) 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
3	A	502	H4B	C7-C6-C9-O9

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Mol	Chain	Res	Type	Atoms
3	A	502	H4B	C7-C6-C9-C10
4	A	503	K90	C09-C10-N11-C12
4	A	503	K90	C09-C10-N11-C16
4	B	503	K90	C09-C10-N11-C12
4	B	503	K90	C09-C10-N11-C16
4	C	503	K90	C09-C10-N11-C12
4	C	503	K90	C09-C10-N11-C16
4	D	503	K90	C09-C10-N11-C12
4	D	503	K90	C09-C10-N11-C16
5	A	504	BTB	C1-C2-C3-O3
5	A	504	BTB	C4-C2-C3-O3
5	A	504	BTB	N-C2-C3-O3
5	A	505	BTB	O1-C1-C2-C4
5	A	505	BTB	C1-C2-C4-O4
5	A	505	BTB	C3-C2-C4-O4
5	A	505	BTB	N-C2-C4-O4
5	A	505	BTB	C1-C2-N-C5
5	A	505	BTB	C1-C2-N-C7
5	A	505	BTB	C3-C2-N-C5
5	A	505	BTB	C3-C2-N-C7
5	A	505	BTB	C4-C2-N-C5
5	A	505	BTB	C4-C2-N-C7
5	A	506	BTB	O1-C1-C2-C3
5	A	506	BTB	O1-C1-C2-C4
5	A	506	BTB	O1-C1-C2-N
5	B	505	BTB	O1-C1-C2-C3
5	B	505	BTB	O1-C1-C2-C4
5	B	505	BTB	O1-C1-C2-N
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	505	BTB	C8-C7-N-C5
5	B	509	BTB	C1-C2-C4-O4
5	B	509	BTB	C3-C2-C4-O4
5	B	509	BTB	N-C2-C4-O4
5	C	504	BTB	C1-C2-C4-O4
5	C	504	BTB	C3-C2-C4-O4
5	C	504	BTB	N-C2-C4-O4
5	C	505	BTB	C1-C2-C4-O4
5	D	504	BTB	O1-C1-C2-C3
5	D	504	BTB	O1-C1-C2-C4
5	D	504	BTB	O1-C1-C2-N

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Mol	Chain	Res	Type	Atoms
5	D	505	BTB	C1-C2-C3-O3
5	D	505	BTB	C4-C2-C3-O3
5	D	505	BTB	C1-C2-C4-O4
5	D	505	BTB	C3-C2-C4-O4
5	D	505	BTB	N-C2-C4-O4
5	D	505	BTB	C6-C5-N-C2
5	D	506	BTB	O1-C1-C2-C3
5	D	506	BTB	O1-C1-C2-C4
5	D	506	BTB	O1-C1-C2-N
5	D	506	BTB	C1-C2-C3-O3
5	D	506	BTB	C1-C2-N-C5
5	D	506	BTB	C1-C2-N-C7
5	D	506	BTB	C3-C2-N-C5
5	D	506	BTB	C3-C2-N-C7
5	D	506	BTB	C4-C2-N-C5
5	D	506	BTB	C4-C2-N-C7
6	A	507	GOL	O1-C1-C2-C3
6	A	507	GOL	C1-C2-C3-O3
6	A	508	GOL	C1-C2-C3-O3
6	B	506	GOL	O1-C1-C2-C3
6	C	506	GOL	O1-C1-C2-C3
6	C	507	GOL	O1-C1-C2-C3
6	C	507	GOL	C1-C2-C3-O3
5	A	504	BTB	N-C7-C8-O8
5	A	506	BTB	N-C5-C6-O6
5	C	505	BTB	N-C7-C8-O8
6	C	506	GOL	O1-C1-C2-O2
5	D	505	BTB	N-C5-C6-O6
6	A	507	GOL	O1-C1-C2-O2
6	A	507	GOL	O2-C2-C3-O3
6	A	508	GOL	O2-C2-C3-O3
6	B	506	GOL	O1-C1-C2-O2
6	C	507	GOL	O2-C2-C3-O3
5	B	505	BTB	N-C5-C6-O6
5	A	505	BTB	N-C7-C8-O8
6	C	507	GOL	O1-C1-C2-O2
5	D	506	BTB	N-C7-C8-O8
5	B	505	BTB	N-C7-C8-O8
2	B	501	HEM	C4B-C3B-CAB-CBB
2	D	501	HEM	C4B-C3B-CAB-CBB
5	A	505	BTB	O1-C1-C2-C3
5	C	505	BTB	C1-C2-C3-O3

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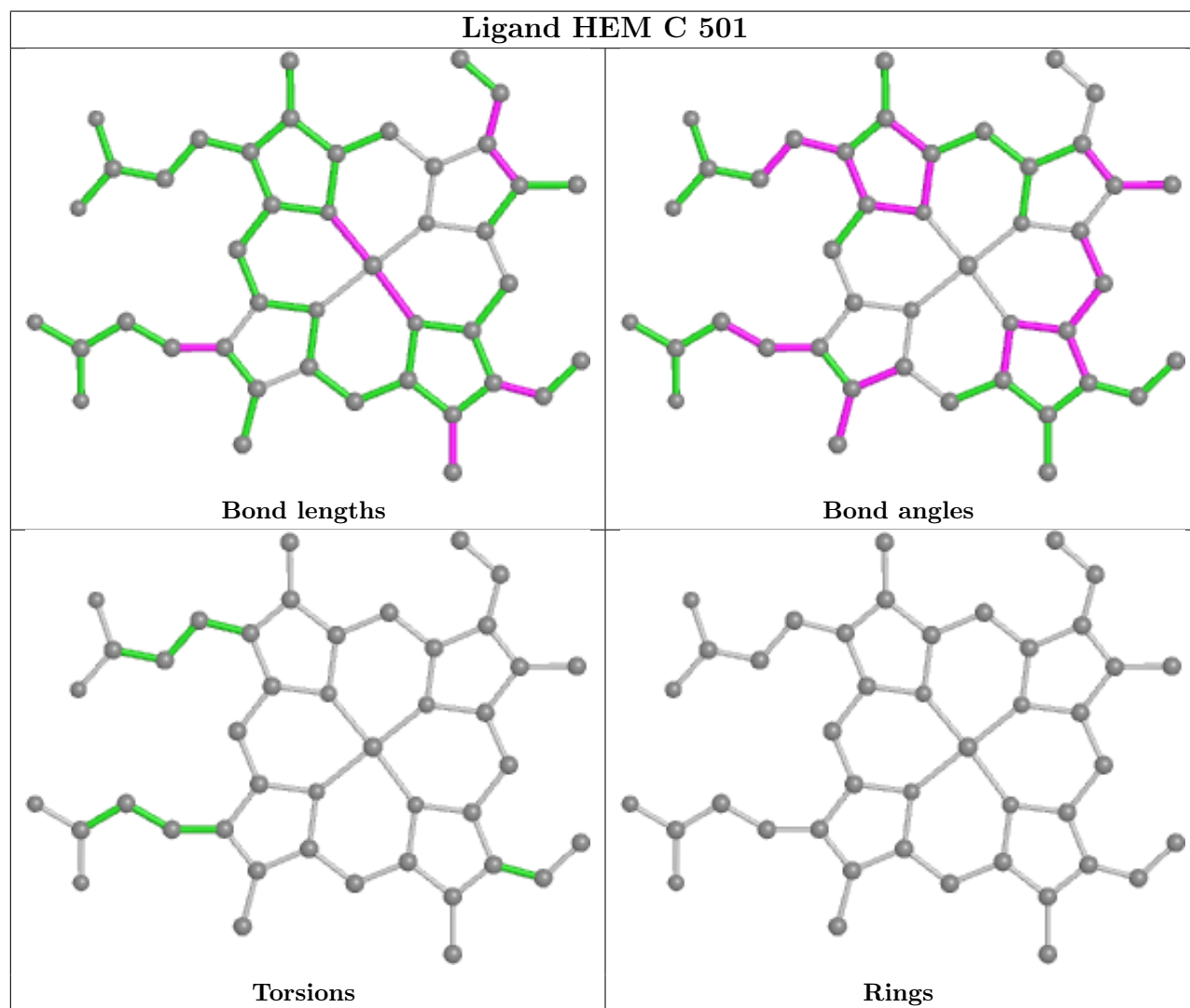
Mol	Chain	Res	Type	Atoms
5	C	505	BTB	C3-C2-C4-O4
5	D	506	BTB	C4-C2-C3-O3
2	A	501	HEM	C2A-CAA-CBA-CGA
5	A	504	BTB	O1-C1-C2-N
5	B	504	BTB	O1-C1-C2-N
5	B	509	BTB	N-C2-C3-O3
5	C	505	BTB	N-C2-C3-O3
5	C	505	BTB	N-C2-C4-O4
5	D	505	BTB	N-C2-C3-O3
5	B	509	BTB	N-C7-C8-O8
4	A	503	K90	N01-C06-C08-C09
4	B	503	K90	N01-C06-C08-C09
4	C	503	K90	N01-C06-C08-C09
4	D	503	K90	N01-C06-C08-C09
3	A	502	H4B	N5-C6-C9-O9
5	A	506	BTB	C1-C2-C4-O4
5	B	509	BTB	C1-C2-C3-O3
5	C	505	BTB	C4-C2-C3-O3

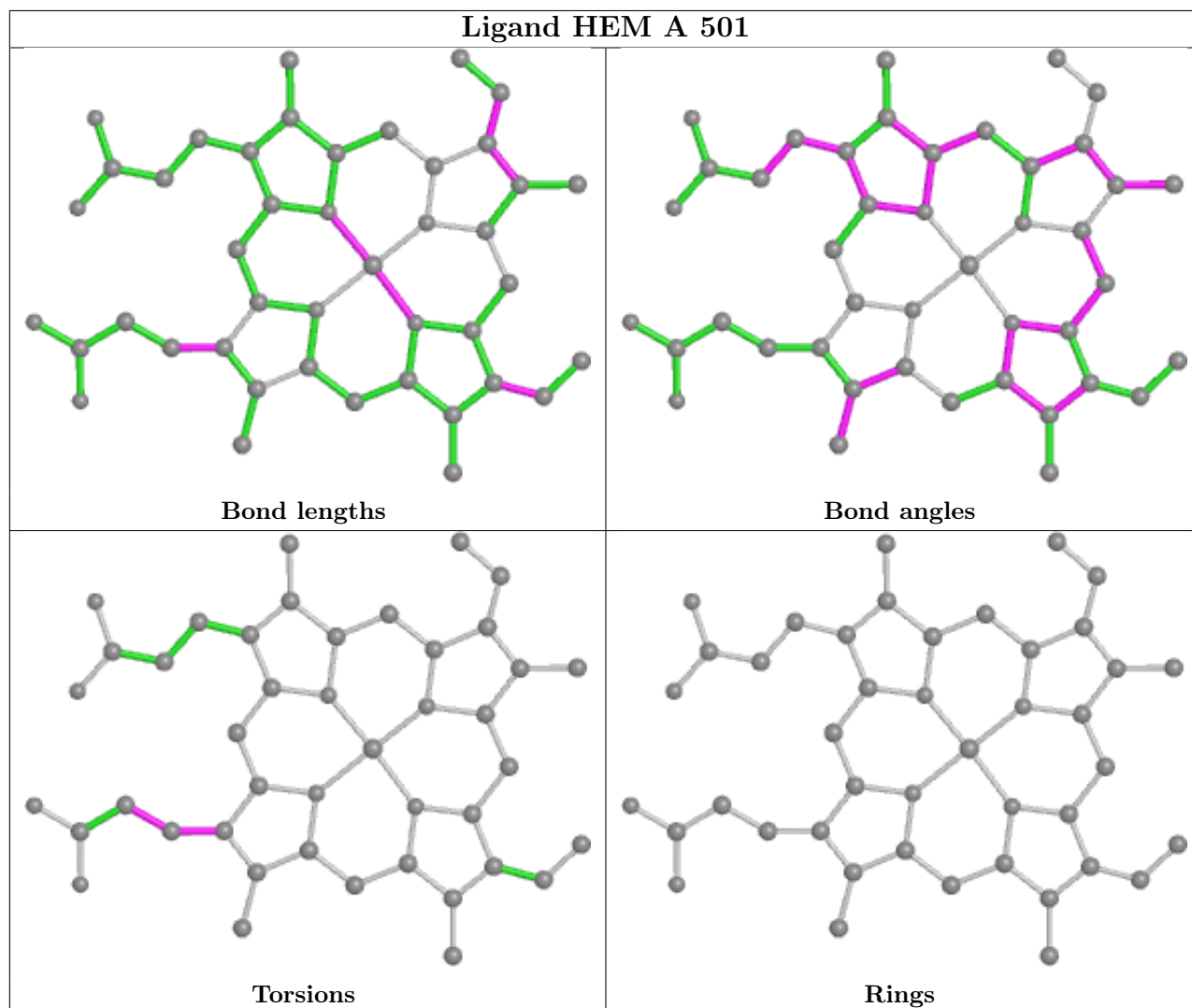
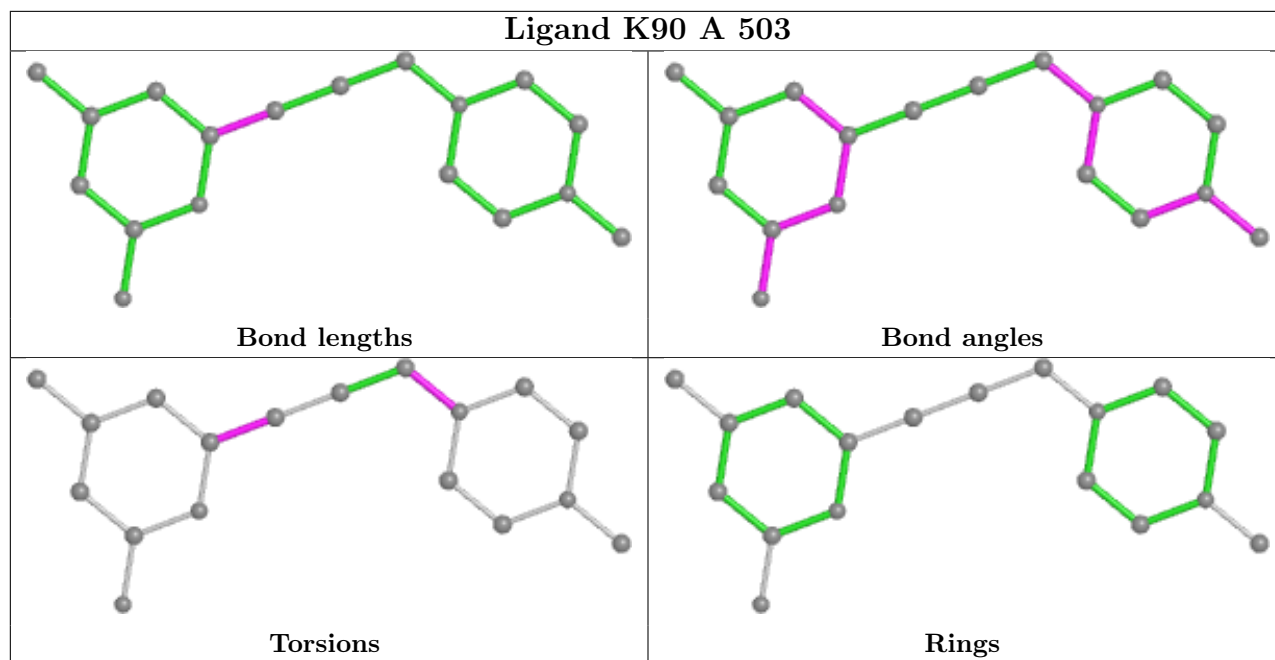
There are no ring outliers.

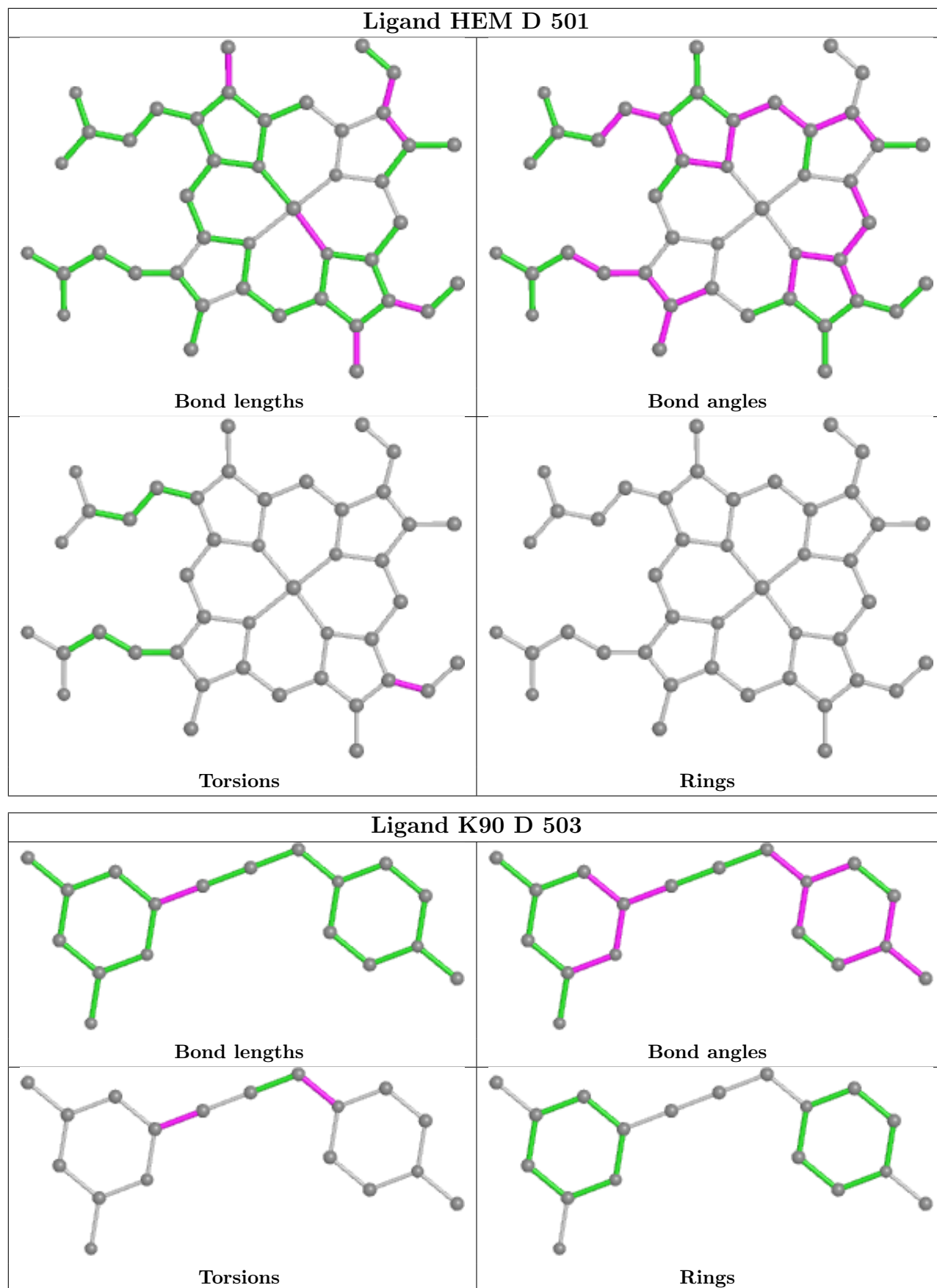
19 monomers are involved in 42 short contacts:

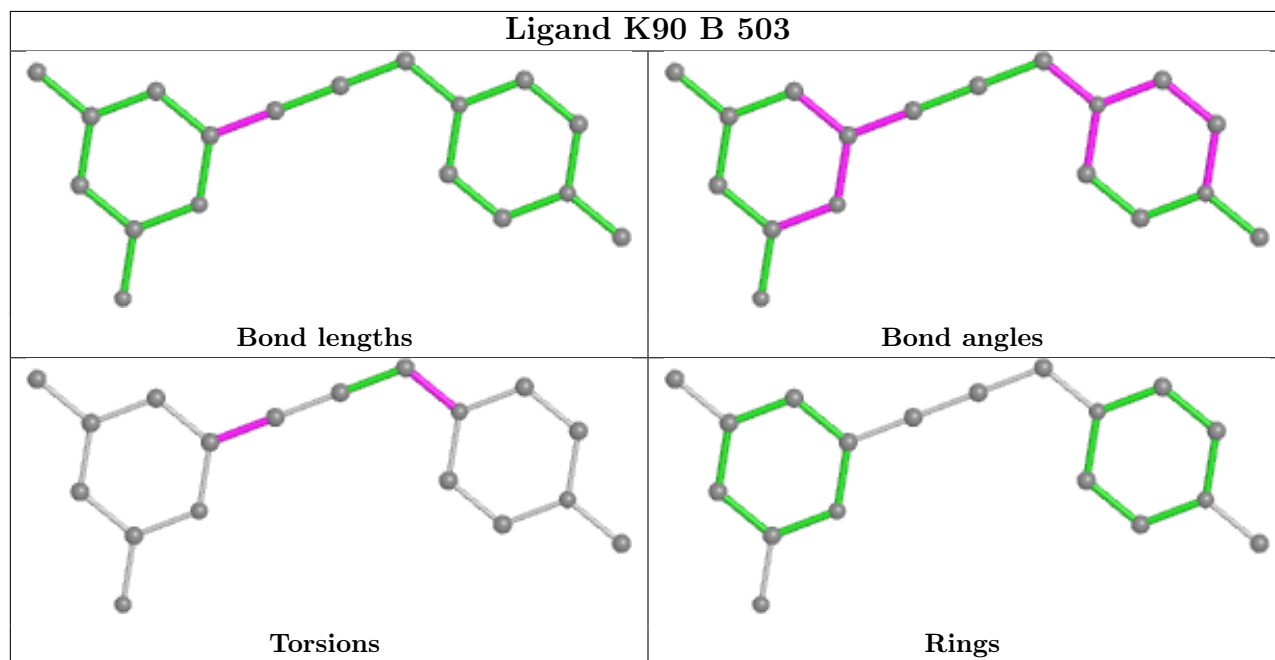
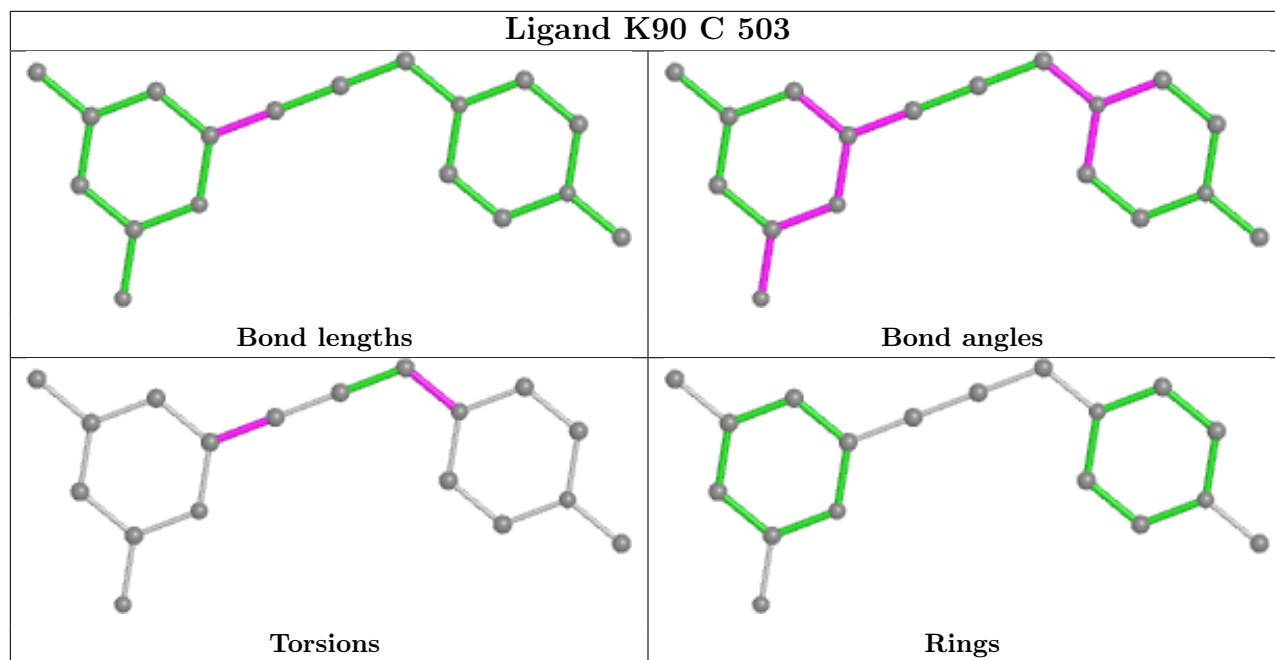
Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	C	505	BTB	1	0
2	C	501	HEM	1	0
3	B	502	H4B	1	0
2	A	501	HEM	1	0
5	D	505	BTB	6	0
5	A	506	BTB	1	0
5	A	505	BTB	4	0
3	D	502	H4B	1	0
5	C	504	BTB	3	0
5	D	506	BTB	1	0
5	B	505	BTB	5	0
3	A	502	H4B	2	0
2	D	501	HEM	1	0
5	B	509	BTB	3	0
3	C	502	H4B	1	0
2	B	501	HEM	3	0
5	A	504	BTB	3	0
5	D	504	BTB	3	0
6	C	507	GOL	1	0

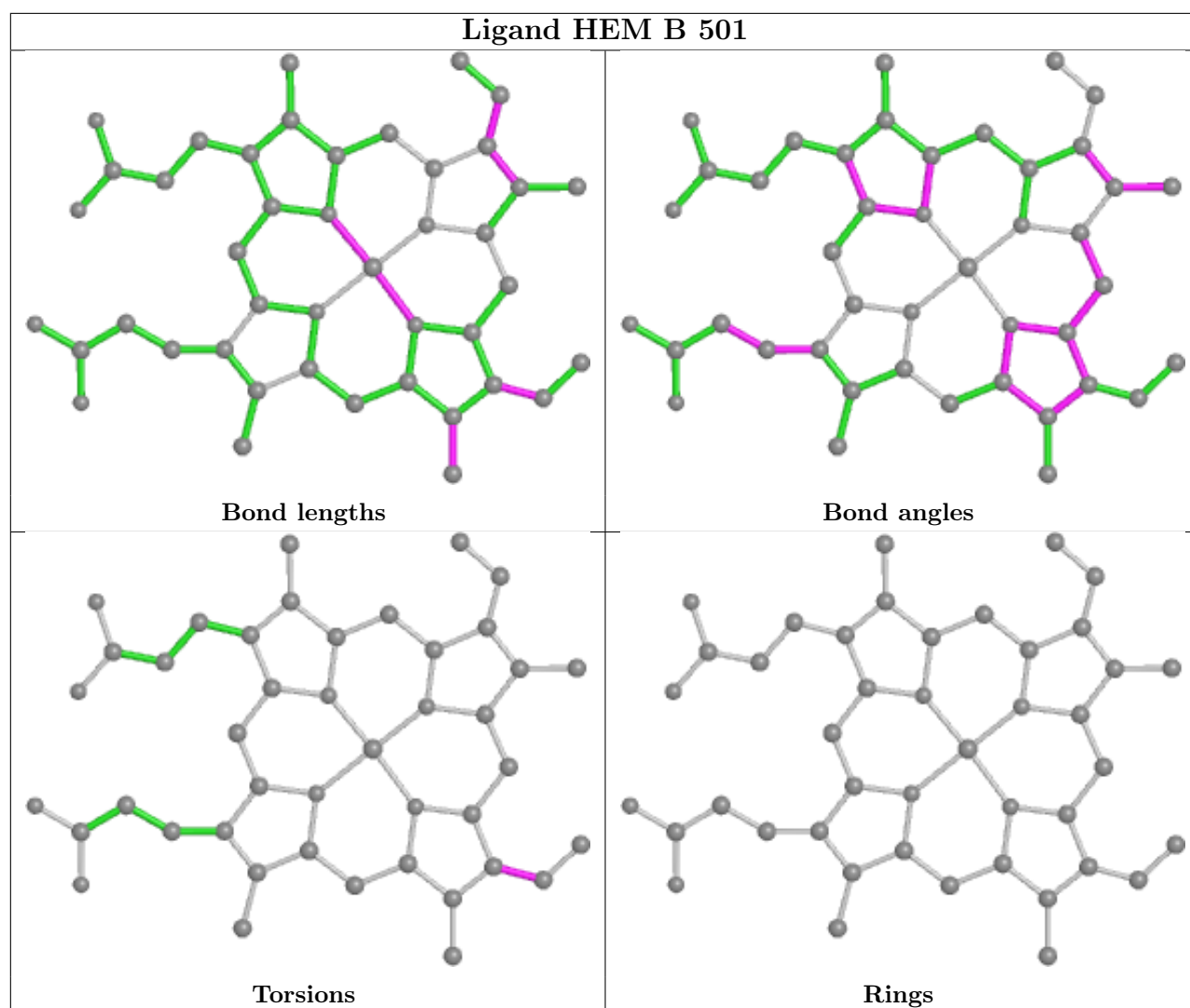
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. 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%)	0.97	82 (20%) 1 1	32, 63, 119, 143	0
1	B	402/440 (91%)	0.13	27 (6%) 17 17	27, 43, 85, 131	0
1	C	402/440 (91%)	0.74	64 (15%) 1 2	31, 59, 104, 142	0
1	D	402/440 (91%)	0.02	23 (5%) 23 23	28, 43, 74, 124	0
All	All	1606/1760 (91%)	0.46	196 (12%) 4 4	27, 51, 103, 143	0

All (196) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	153	VAL	6.4
1	A	480	TRP	6.0
1	A	304	LEU	6.0
1	A	142	GLY	5.9
1	A	447	TRP	5.2
1	C	68	PHE	5.1
1	A	275	ILE	5.1
1	C	448	ILE	5.1
1	A	238	ARG	5.0
1	A	300	PRO	5.0
1	C	257	GLN	4.8
1	B	257	GLN	4.5
1	A	452	ILE	4.5
1	C	238	ARG	4.5
1	D	257	GLN	4.5
1	D	89	GLN	4.4
1	A	89	GLN	4.4
1	A	244	TRP	4.4
1	A	448	ILE	4.3
1	A	280	THR	4.3
1	D	256	GLN	4.3

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Mol	Chain	Res	Type	RSRZ
1	C	447	TRP	4.2
1	B	142	GLY	4.2
1	C	304	LEU	4.2
1	C	480	TRP	4.2
1	D	259	GLY	4.1
1	C	89	GLN	4.1
1	B	388	ARG	4.0
1	C	202	ARG	4.0
1	A	281	PRO	4.0
1	B	158	ALA	3.9
1	A	204	ALA	3.8
1	C	144	GLN	3.8
1	B	449	VAL	3.8
1	A	259	GLY	3.8
1	D	452	ILE	3.8
1	C	452	ILE	3.7
1	A	120	PRO	3.7
1	C	184	CYS	3.7
1	C	236	PRO	3.6
1	C	360	THR	3.6
1	C	275	ILE	3.5
1	A	145	ALA	3.5
1	A	360	THR	3.5
1	A	254	TYR	3.5
1	A	293	LEU	3.5
1	A	141	SER	3.5
1	B	460	PHE	3.4
1	A	446	ALA	3.4
1	C	450	PRO	3.4
1	B	454	GLY	3.4
1	B	452	ILE	3.4
1	A	302	LEU	3.4
1	A	451	PRO	3.3
1	C	119	ALA	3.3
1	C	79	ILE	3.3
1	C	449	VAL	3.3
1	C	300	PRO	3.3
1	C	451	PRO	3.3
1	B	89	GLN	3.3
1	A	449	VAL	3.3
1	A	184	CYS	3.3
1	C	204	ALA	3.2

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Mol	Chain	Res	Type	RSRZ
1	A	221	ARG	3.2
1	D	260	SER	3.2
1	D	258	ASP	3.2
1	C	299	PRO	3.1
1	A	303	PHE	3.1
1	C	445	TRP	3.1
1	B	259	GLY	3.1
1	A	235	CYS	3.1
1	B	260	SER	3.1
1	A	295	ALA	3.1
1	A	123	LEU	3.1
1	D	449	VAL	3.0
1	A	237	GLY	3.0
1	B	119	ALA	3.0
1	A	305	LEU	3.0
1	A	450	PRO	3.0
1	C	412	LEU	2.9
1	A	146	HIS	2.9
1	A	301	GLU	2.9
1	C	239	GLY	2.9
1	A	185	VAL	2.9
1	A	163	TYR	2.9
1	A	364	THR	2.9
1	A	256	GLN	2.9
1	A	445	TRP	2.9
1	C	297	ASP	2.9
1	C	140	ARG	2.9
1	A	122	GLN	2.8
1	C	346	LEU	2.8
1	B	81	TYR	2.8
1	A	279	TRP	2.8
1	A	272	GLU	2.8
1	A	479	PRO	2.8
1	C	81	TYR	2.8
1	C	302	LEU	2.8
1	D	255	ARG	2.8
1	D	446	ALA	2.8
1	A	68	PHE	2.8
1	A	90	GLN	2.8
1	A	128	ARG	2.8
1	C	292	LEU	2.7
1	C	309	LEU	2.7

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Mol	Chain	Res	Type	RSRZ
1	B	360	THR	2.7
1	C	280	THR	2.7
1	B	258	ASP	2.7
1	A	346	LEU	2.7
1	C	221	ARG	2.7
1	A	268	VAL	2.6
1	C	301	GLU	2.6
1	B	157	VAL	2.6
1	A	336	VAL	2.6
1	A	257	GLN	2.6
1	A	276	GLN	2.6
1	B	97	ARG	2.6
1	B	453	SER	2.6
1	C	185	VAL	2.6
1	B	68	PHE	2.5
1	D	460	PHE	2.5
1	A	86	ALA	2.5
1	A	412	LEU	2.5
1	A	274	CYS	2.5
1	A	353	PHE	2.5
1	C	303	PHE	2.5
1	A	135	TYR	2.5
1	A	255	ARG	2.5
1	D	451	PRO	2.5
1	B	446	ALA	2.5
1	C	237	GLY	2.5
1	A	308	GLU	2.5
1	C	240	ASP	2.4
1	C	153	VAL	2.4
1	A	106	PRO	2.4
1	B	141[A]	SER	2.4
1	C	298	GLU	2.4
1	D	121	GLU	2.4
1	A	183	ARG	2.4
1	C	141	SER	2.4
1	A	162	THR	2.4
1	D	79	ILE	2.4
1	C	307	PRO	2.4
1	A	79	ILE	2.4
1	D	454	GLY	2.4
1	C	276	GLN	2.4
1	C	293	LEU	2.4

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Mol	Chain	Res	Type	RSRZ
1	A	88	ALA	2.4
1	D	388	ARG	2.4
1	C	306	PRO	2.4
1	C	86	ALA	2.3
1	A	258	ASP	2.3
1	C	183	ARG	2.3
1	C	90	GLN	2.3
1	C	388	ARG	2.3
1	C	446	ALA	2.3
1	A	368	CYS	2.3
1	B	450	PRO	2.3
1	B	451	PRO	2.3
1	D	68	PHE	2.3
1	A	365	ARG	2.3
1	A	478	ASP	2.3
1	A	159	ALA	2.3
1	D	120	PRO	2.3
1	A	83	THR	2.2
1	B	150	LEU	2.2
1	D	445	TRP	2.2
1	A	202	ARG	2.2
1	C	235	CYS	2.2
1	B	455	SER	2.2
1	C	122	GLN	2.2
1	D	360	THR	2.2
1	A	124	LEU	2.1
1	A	278	GLY	2.1
1	C	67	LYS	2.1
1	C	444	ASP	2.1
1	A	299	PRO	2.1
1	C	281	PRO	2.1
1	A	309	LEU	2.1
1	D	261	VAL	2.1
1	C	259	GLY	2.1
1	A	307	PRO	2.1
1	A	144	GLN	2.1
1	A	321	GLU	2.1
1	D	364	THR	2.1
1	C	362	ILE	2.1
1	A	208	PHE	2.1
1	C	87	GLN	2.1
1	A	273	LEU	2.1

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Mol	Chain	Res	Type	RSRZ
1	C	106	PRO	2.1
1	C	130	PHE	2.0
1	D	158	ALA	2.0
1	C	163	TYR	2.0
1	B	106	PRO	2.0
1	B	122	GLN	2.0
1	C	228	ILE	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
5	BTB	C	505	14/14	0.68	0.17	87,104,109,110	0
5	BTB	A	506	14/14	0.78	0.18	89,97,99,99	0
8	GD	A	510	1/1	0.81	0.11	147,147,147,147	1
6	GOL	B	506	6/6	0.82	0.10	71,76,78,80	0
5	BTB	B	505	14/14	0.83	0.24	44,75,84,92	0
5	BTB	D	504	14/14	0.84	0.15	49,67,78,79	0
5	BTB	A	505	14/14	0.85	0.14	66,79,87,90	0
5	BTB	D	505	14/14	0.86	0.22	52,75,85,95	0
5	BTB	D	506	14/14	0.86	0.21	84,91,99,103	0
3	H4B	C	502	17/17	0.88	0.23	54,63,70,73	0
5	BTB	A	504	14/14	0.89	0.29	64,94,102,104	0
5	BTB	B	504	14/14	0.89	0.12	46,55,71,78	0
3	H4B	A	502	17/17	0.89	0.28	65,71,79,81	0
6	GOL	A	508	6/6	0.90	0.22	64,74,87,88	0
6	GOL	A	507	6/6	0.91	0.24	70,74,86,91	0
5	BTB	B	509	14/14	0.91	0.14	44,77,85,87	0

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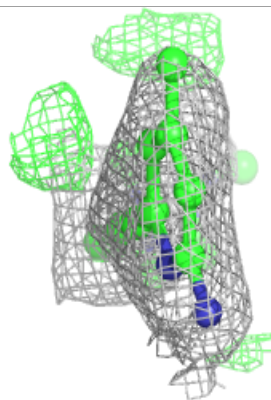
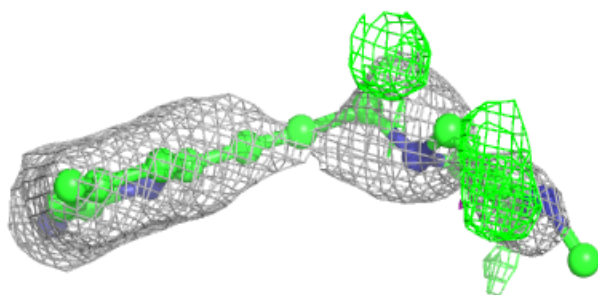
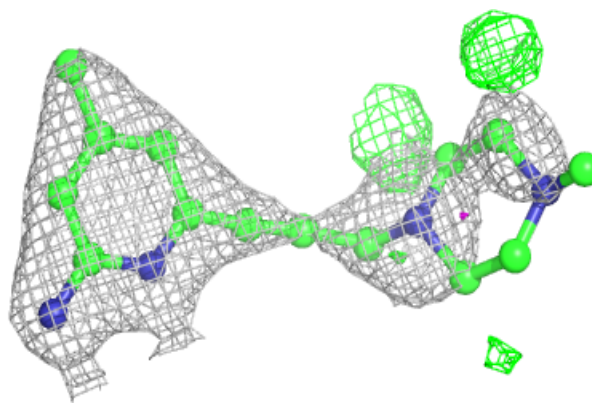
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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
5	BTB	C	504	14/14	0.91	0.24	35,82,96,101	0
4	K90	A	503	18/18	0.91	0.31	38,69,103,105	0
6	GOL	C	506	6/6	0.92	0.20	46,66,70,73	0
3	H4B	B	502	17/17	0.92	0.16	36,50,58,61	0
4	K90	B	503	18/18	0.93	0.20	30,44,100,102	0
3	H4B	D	502	17/17	0.94	0.15	40,52,56,62	0
8	GD	C	509	1/1	0.94	0.05	78,78,78,78	1
4	K90	D	503	18/18	0.95	0.18	25,42,91,95	0
6	GOL	C	507	6/6	0.95	0.14	22,30,66,67	0
7	CL	A	509	1/1	0.95	0.18	65,65,65,65	0
2	HEM	A	501	43/43	0.95	0.21	36,50,79,98	0
4	K90	C	503	18/18	0.95	0.29	38,64,116,116	0
8	GD	D	508	1/1	0.96	0.11	50,50,50,50	0
7	CL	C	508	1/1	0.97	0.18	60,60,60,60	0
2	HEM	C	501	43/43	0.97	0.19	35,42,66,76	0
9	ZN	A	511	1/1	0.97	0.09	44,44,44,44	0
2	HEM	B	501	43/43	0.98	0.13	25,32,56,71	0
8	GD	B	508	1/1	0.98	0.10	45,45,45,45	0
7	CL	B	507	1/1	0.98	0.07	45,45,45,45	0
2	HEM	D	501	43/43	0.98	0.11	25,31,56,61	0
7	CL	D	507	1/1	0.98	0.08	50,50,50,50	0
9	ZN	C	510	1/1	1.00	0.08	39,39,39,39	0

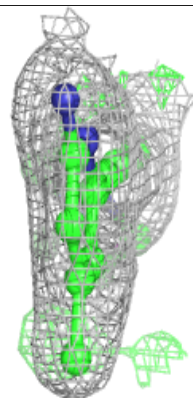
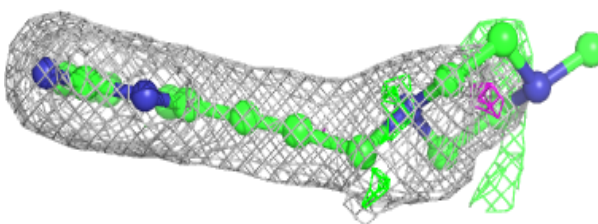
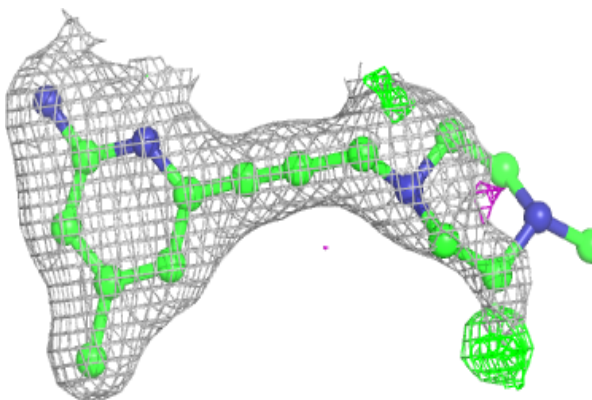
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

Electron density around K90 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)

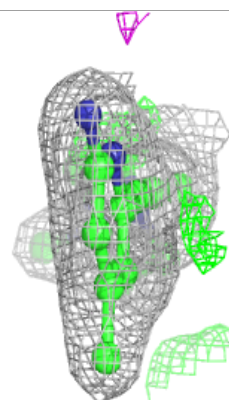
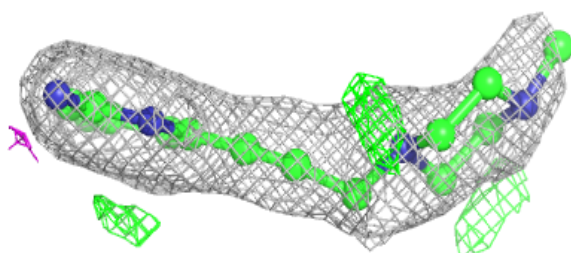
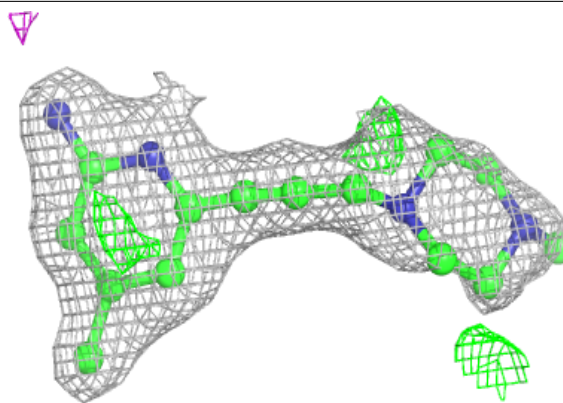
**Electron density around K90 B 503:**

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



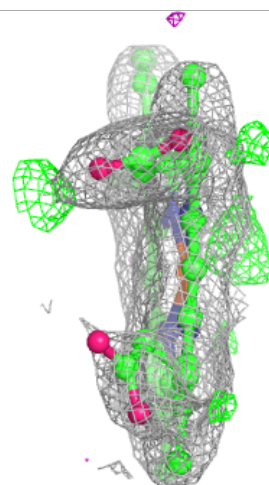
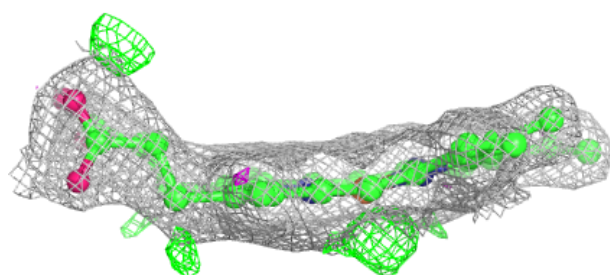
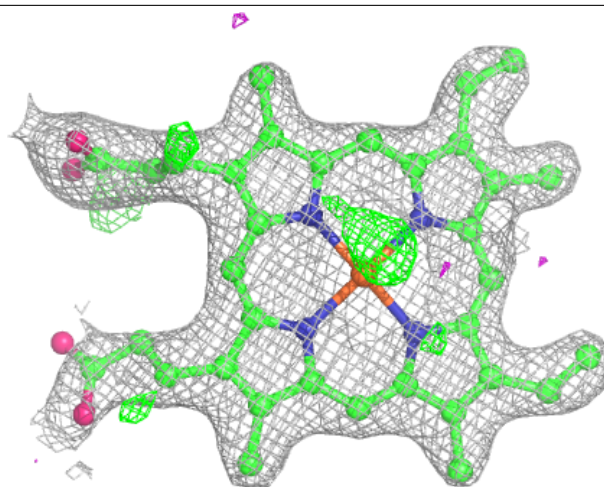
Electron density around K90 D 503:

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



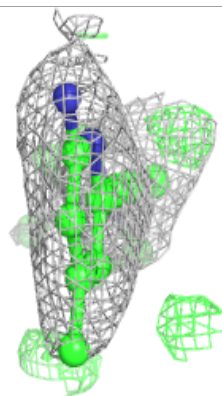
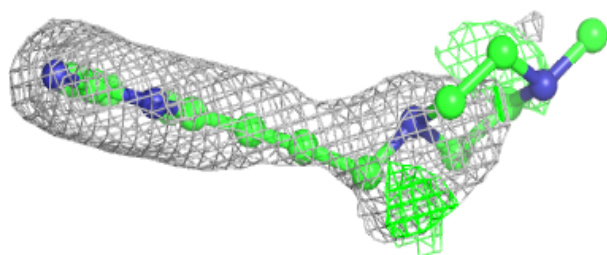
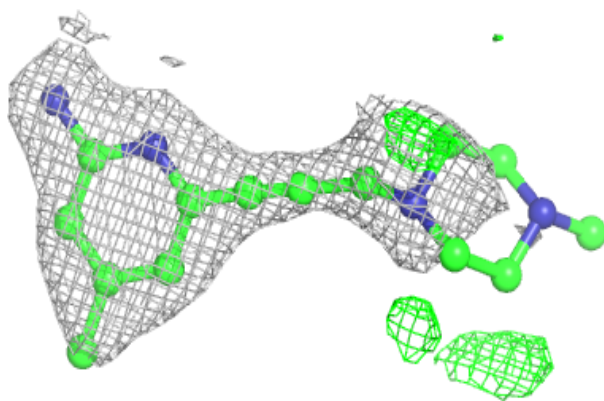
Electron density around HEM A 501:

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

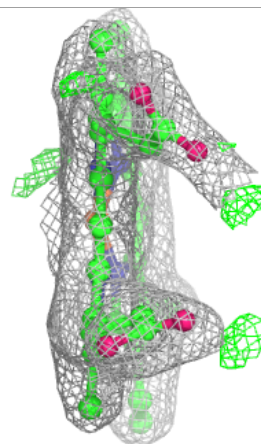
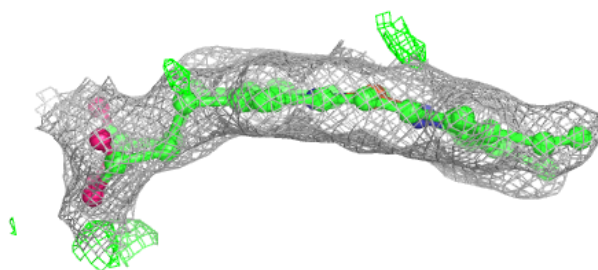
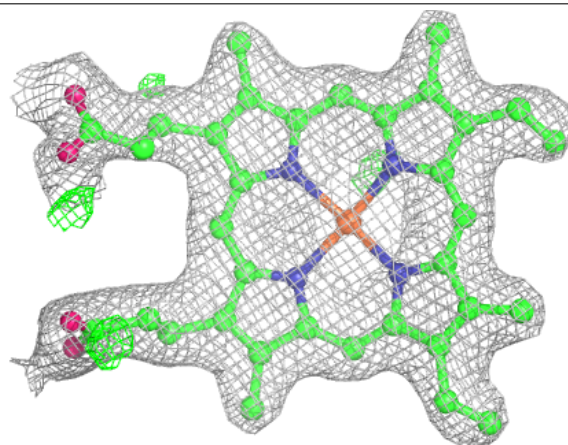


Electron density around K90 C 503:

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

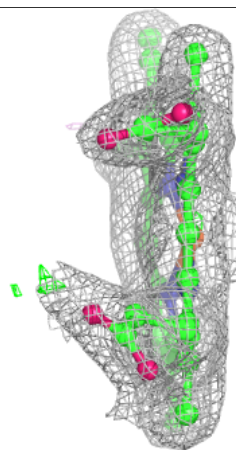
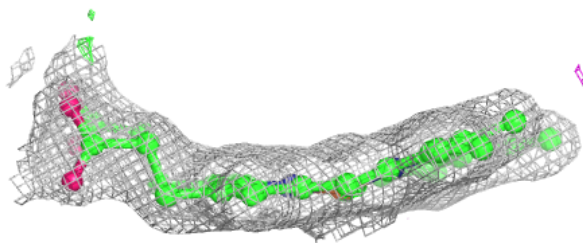
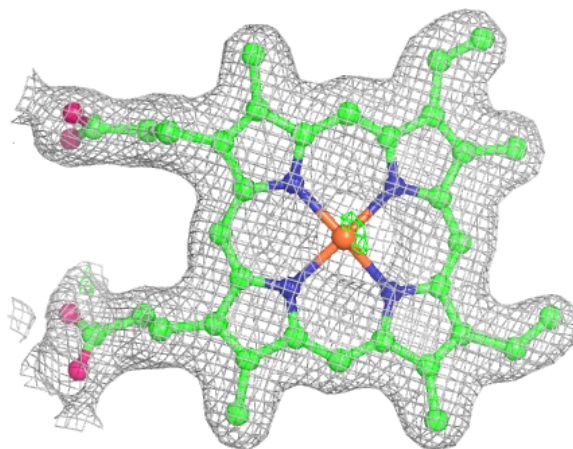
**Electron density around HEM C 501:**

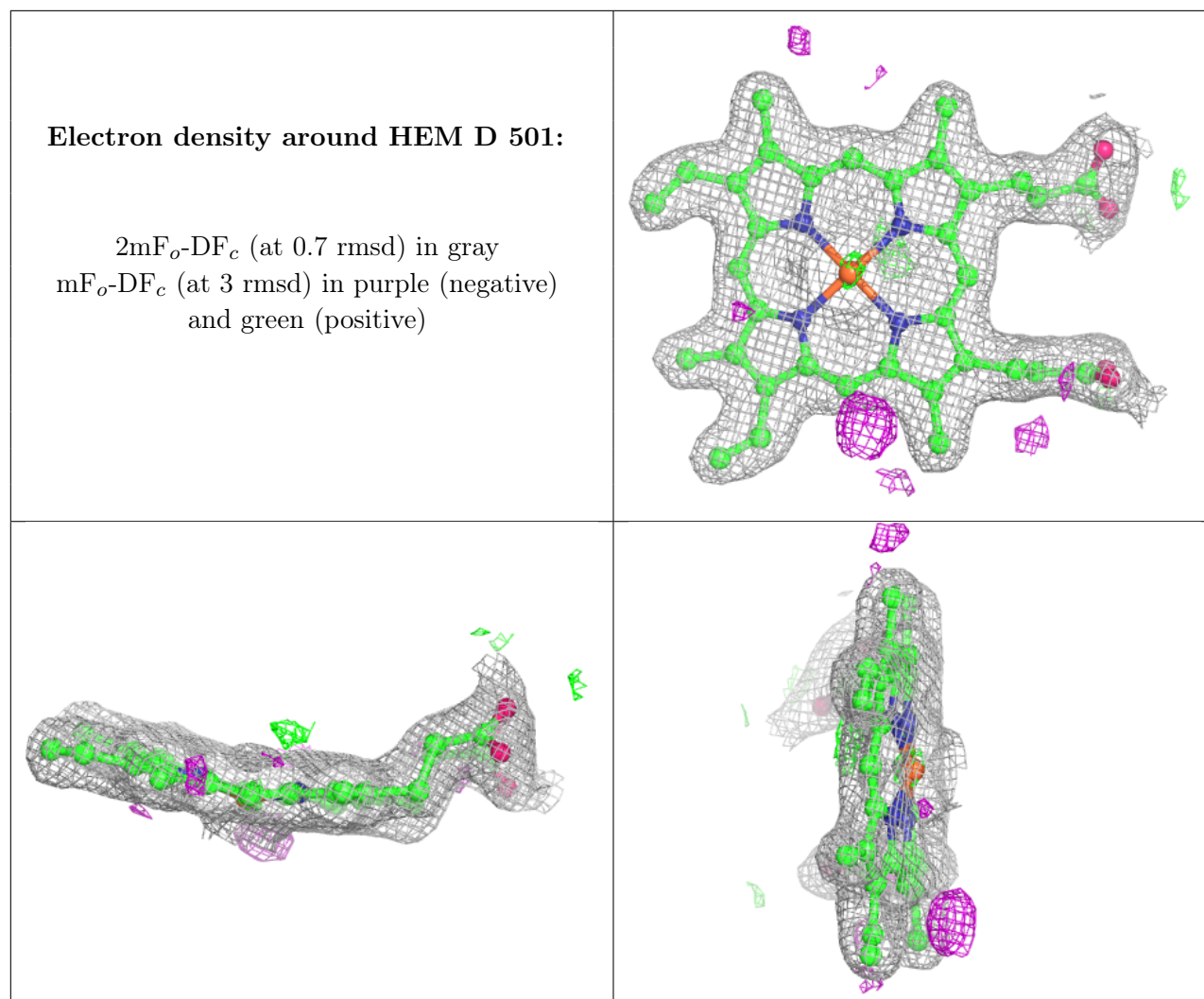
$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



Electron density around HEM 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.