



Full wwPDB X-ray Structure Validation Report ⓘ

Oct 4, 2023 – 11:36 AM EDT

PDB ID : 6PP0
Title : Structure of human endothelial nitric oxide synthase heme domain in complex with 7-(3-(Aminomethyl)-4-(cyclobutylmethoxy)phenyl)-4-methylquinolin-2-amine
Authors : Li, H.; Poulos, T.L.
Deposited on : 2019-07-05
Resolution : 1.97 Å(reported)

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

We welcome your comments at validation@mail.wwpdb.org

A user guide is available at

<https://www.wwpdb.org/validation/2017/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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

MolProbity : 4.02b-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

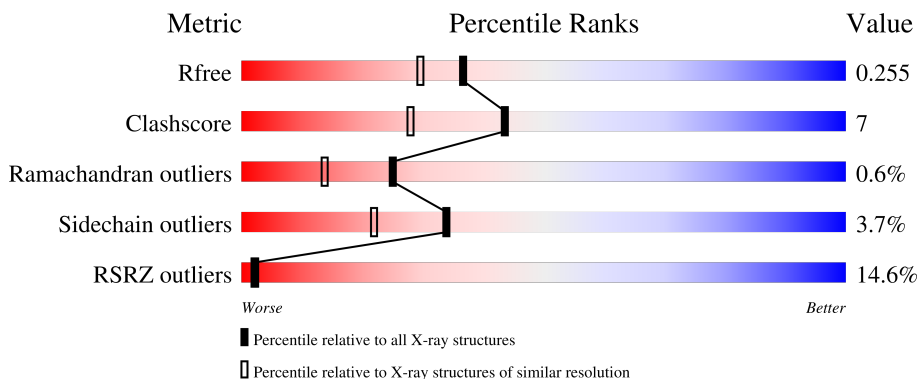
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.97 Å.

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



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	11647 (2.00-1.96)
Clashscore	141614	1014 (1.98-1.98)
Ramachandran outliers	138981	1006 (1.98-1.98)
Sidechain outliers	138945	1006 (1.98-1.98)
RSRZ outliers	127900	11410 (2.00-1.96)

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	

2 Entry composition

There are 10 unique types of molecules in this entry. The entry contains 13897 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	402	3224	2053	568	587	16	0	2	0
1	B	403	3231	2057	570	588	16	0	3	0
1	C	402	3220	2050	567	587	16	0	2	0
1	D	403	3226	2054	569	587	16	0	2	0

There are 4 discrepancies between the modelled and reference sequences:

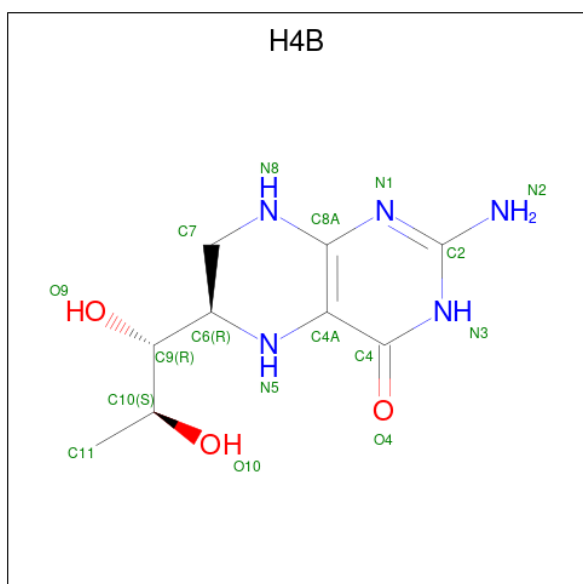
Chain	Residue	Modelled	Actual	Comment	Reference
A	298	GLU	ASP	variant	UNP P29474
B	298	GLU	ASP	variant	UNP P29474
C	298	GLU	ASP	variant	UNP P29474
D	298	GLU	ASP	variant	UNP P29474

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



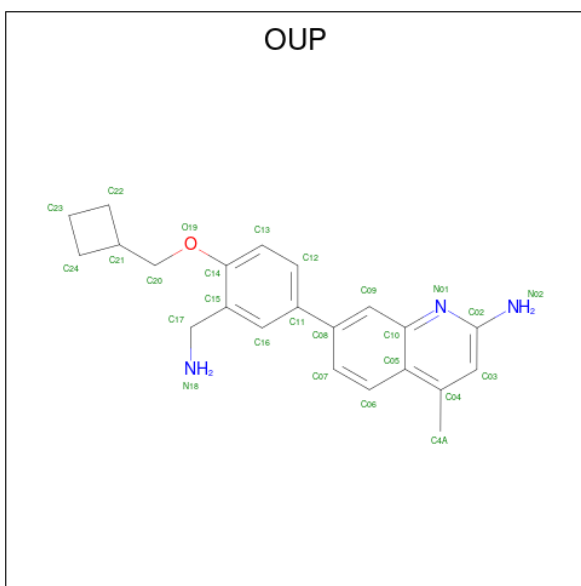
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf		
			Total	C	Fe	N			O	
2	A	1	Total	43	34	1	4	4	0	0
2	B	1	Total	43	34	1	4	4	0	0
2	C	1	Total	43	34	1	4	4	0	0
2	D	1	Total	43	34	1	4	4	0	0

- 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-(cyclobutylmethoxy)phenyl]-4-methylquinolin-2-amine (three-letter code: OUP) (formula: C₂₂H₂₅N₃O) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
4	A	1	Total	C	N	O	0	0
			26	22	3	1		
4	B	1	Total	C	N	O	0	0
			26	22	3	1		
4	C	1	Total	C	N	O	0	0
			26	22	3	1		
4	D	1	Total	C	N	O	0	0
			26	22	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	Total 14	C 8	N 1	O 5	0	0
5	A	1	Total 14	C 8	N 1	O 5	0	0
5	A	1	Total 14	C 8	N 1	O 5	0	0
5	B	1	Total 14	C 8	N 1	O 5	0	0
5	B	1	Total 14	C 8	N 1	O 5	0	0
5	B	1	Total 14	C 8	N 1	O 5	0	0
5	C	1	Total 14	C 8	N 1	O 5	0	0
5	C	1	Total 14	C 8	N 1	O 5	0	0
5	C	1	Total 14	C 8	N 1	O 5	0	0
5	D	1	Total 14	C 8	N 1	O 5	0	0
5	D	1	Total 14	C 8	N 1	O 5	0	0

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

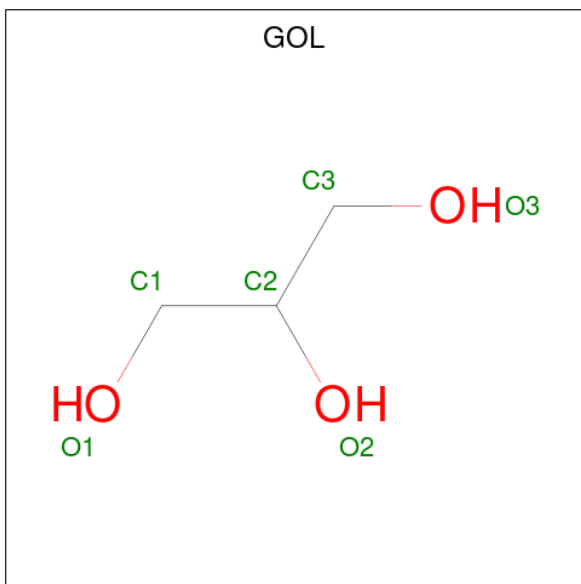
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	A	1	Total 1	Zn 1	0	0

Continued on next page...

Continued from previous page...

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

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



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

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

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

- 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

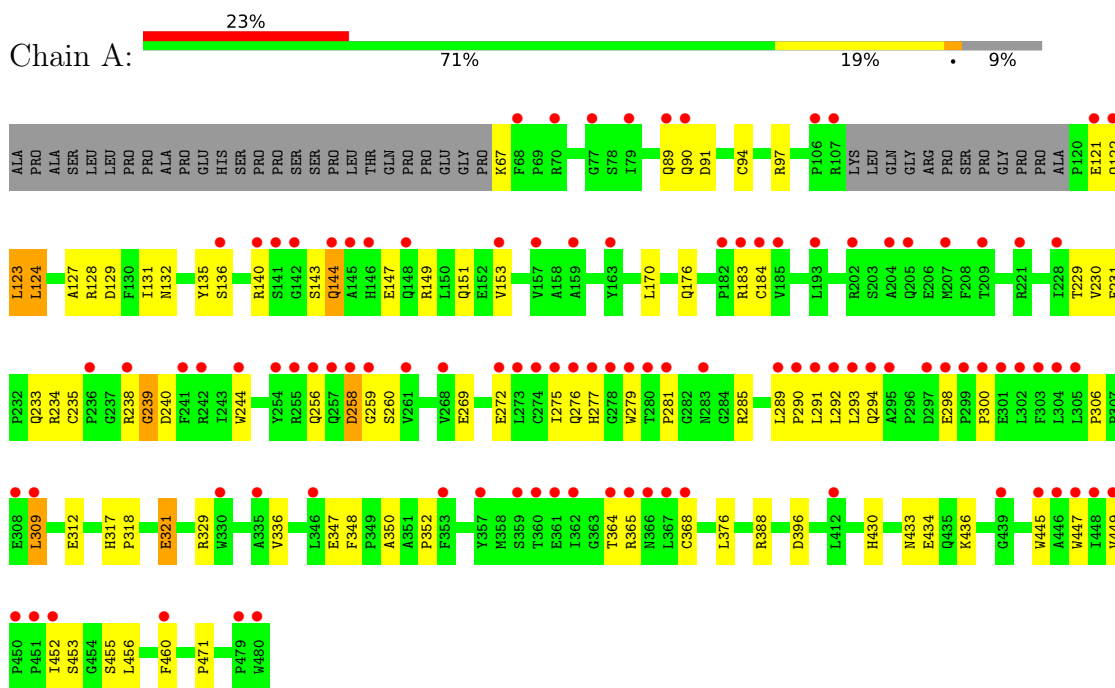
- Molecule 10 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
10	A	80	Total O 80 80	0	0
10	B	137	Total O 137 137	0	0
10	C	111	Total O 111 111	0	0
10	D	148	Total O 148 148	0	0

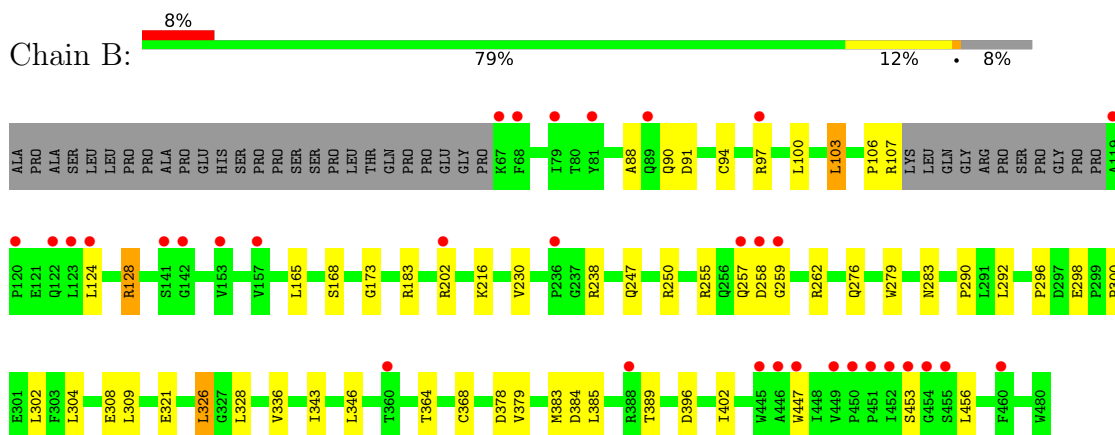
3 Residue-property plots

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.

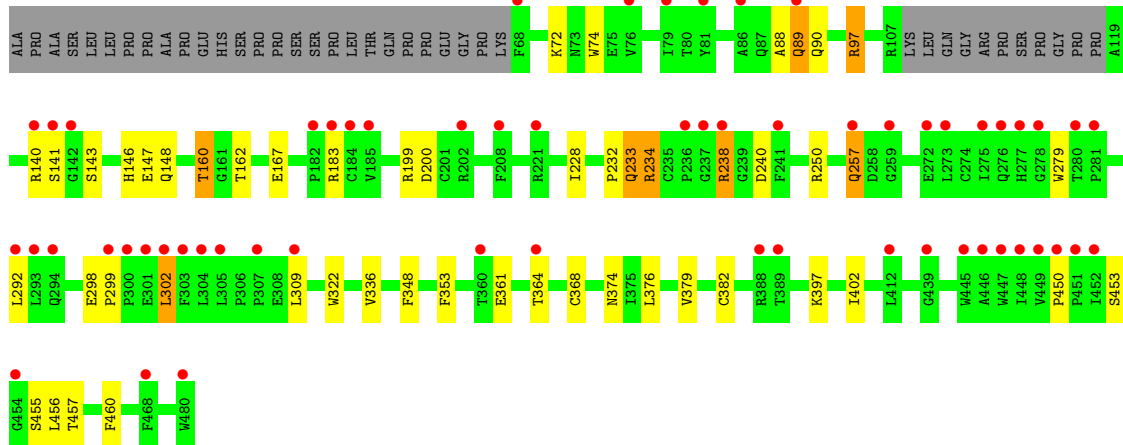
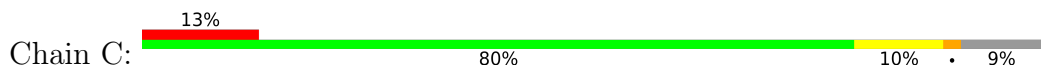
- Molecule 1: Nitric oxide synthase, endothelial



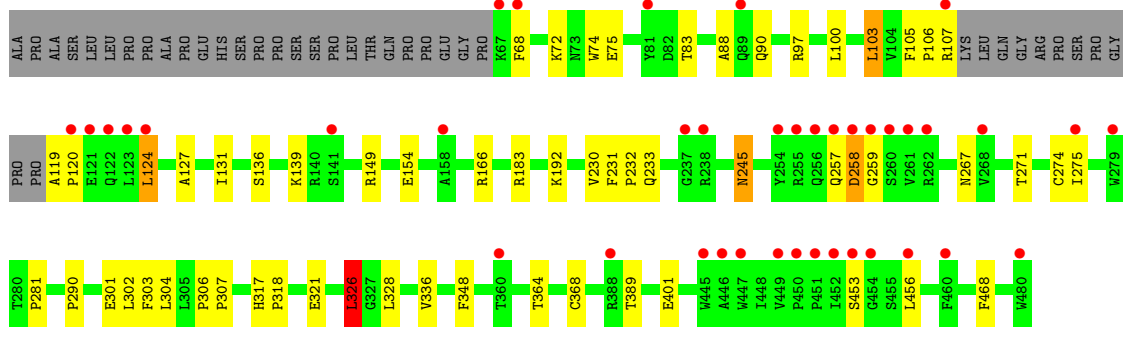
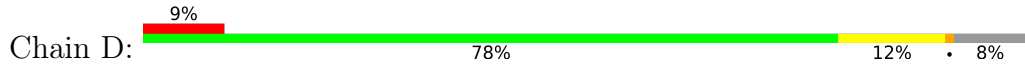
- Molecule 1: Nitric oxide synthase, endothelial



- 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	59.07Å 152.95Å 109.23Å 90.00° 90.89° 90.00°	Depositor
Resolution (Å)	39.79 – 1.97 39.79 – 1.97	Depositor EDS
% Data completeness (in resolution range)	88.5 (39.79-1.97) 88.9 (39.79-1.97)	Depositor EDS
R_{merge}	0.18	Depositor
R_{sym}	0.18	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.18 (at 1.97Å)	Xtrriage
Refinement program	PHENIX (1.11.1-2575_1496: ???)	Depositor
R, R_{free}	0.207 , 0.261 0.202 , 0.255	Depositor DCC
R_{free} test set	6087 reflections (5.02%)	wwPDB-VP
Wilson B-factor (Å ²)	28.8	Xtrriage
Anisotropy	0.317	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.34 , 52.4	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.33$	Xtrriage
Estimated twinning fraction	0.116 for h,-k,-l	Xtrriage
F_o, F_c correlation	0.93	EDS
Total number of atoms	13897	wwPDB-VP
Average B, all atoms (Å ²)	56.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.60% 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: BTB, ZN, GD, OUP, H4B, CL, GOL, 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	0.36	0/3322	0.54	0/4524
1	B	0.40	0/3332	0.56	0/4539
1	C	0.39	0/3318	0.54	0/4521
1	D	0.42	0/3324	0.58	1/4528 (0.0%)
All	All	0.39	0/13296	0.55	1/18112 (0.0%)

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	D	326	LEU	CA-CB-CG	5.43	127.78	115.30

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	3224	0	3131	53	0
1	B	3231	0	3140	31	0
1	C	3220	0	3122	35	0
1	D	3226	0	3134	31	0
2	A	43	0	30	4	0
2	B	43	0	30	4	0

Continued on next page...

Continued from previous page...

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	C	43	0	30	3	0
2	D	43	0	30	4	0
3	A	17	0	15	1	0
3	B	17	0	15	3	0
3	C	17	0	15	0	0
3	D	17	0	15	1	0
4	A	26	0	0	2	0
4	B	26	0	0	2	0
4	C	26	0	0	3	0
4	D	26	0	0	2	0
5	A	42	0	56	5	0
5	B	42	0	54	11	0
5	C	42	0	56	10	0
5	D	28	0	35	5	0
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	1	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	80	0	0	2	0
10	B	137	0	0	3	0
10	C	111	0	0	2	0
10	D	148	0	0	2	0
All	All	13897	0	12924	177	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 7.

All (177) 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:257:GLN:HA	1:B:259:GLY:H	1.31	0.95
1:C:183:ARG:HB2	2:C:501:HEM:HBD2	1.58	0.84
5:B:505:BTB:O8	10:B:601:HOH:O	2.01	0.78

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:105:PHE:O	1:D:107:ARG:N	2.22	0.72
1:B:100:LEU:HB3	1:B:103:LEU:HD22	1.70	0.71
2:C:501:HEM:O2A	4:C:503:OUP:N18	2.22	0.71
1:B:257:GLN:HA	1:B:259:GLY:N	2.06	0.70
1:B:258:ASP:OD2	1:B:258:ASP:N	2.26	0.68
1:A:291:LEU:HD23	1:A:293:LEU:HD21	1.74	0.68
1:C:97:ARG:HG2	1:D:88:ALA:HB3	1.76	0.67
1:A:234:ARG:NH1	1:A:347:GLU:OE1	2.29	0.66
1:A:289:LEU:HD23	1:A:290:PRO:HD2	1.77	0.65
1:B:279:TRP:HB2	1:B:302:LEU:HD21	1.78	0.65
1:C:90:GLN:NE2	10:C:603:HOH:O	2.29	0.65
2:D:501:HEM:O2A	4:D:503:OUP:N18	2.30	0.64
1:A:170:LEU:HD11	1:A:230:VAL:HG11	1.81	0.62
5:B:504:BTB:H61	10:B:669:HOH:O	1.99	0.62
2:A:501:HEM:HBB2	2:A:501:HEM:HHC	1.82	0.61
1:C:167:GLU:OE1	7:C:508:GOL:O3	2.17	0.61
1:A:258:ASP:N	1:A:258:ASP:OD1	2.33	0.61
1:B:321:GLU:OE2	5:B:504:BTB:O4	2.18	0.61
1:B:90:GLN:HG2	1:B:91:ASP:H	1.65	0.61
1:B:183:ARG:HB2	2:B:501:HEM:HBD2	1.83	0.61
1:C:292:LEU:HD21	1:C:302:LEU:HD12	1.83	0.61
1:A:433:ASN:HA	1:A:436:LYS:HE2	1.84	0.60
1:D:321:GLU:OE2	5:D:504:BTB:O4	2.20	0.60
1:A:183:ARG:HB2	2:A:501:HEM:CBD	2.32	0.59
1:D:183:ARG:HB2	2:D:501:HEM:HBD2	1.85	0.59
1:A:176:GLN:HB2	1:A:471:PRO:HG2	1.84	0.59
1:B:290:PRO:HB3	1:B:304:LEU:HD23	1.85	0.58
1:A:321:GLU:H	1:A:321:GLU:CD	2.06	0.58
2:C:501:HEM:HBB2	2:C:501:HEM:HHC	1.85	0.58
5:B:505:BTB:O4	5:B:505:BTB:O1	2.22	0.57
1:C:298:GLU:OE2	5:C:506:BTB:O6	2.21	0.57
1:A:128:ARG:O	1:A:132:ASN:ND2	2.38	0.56
1:D:75:GLU:OE2	10:D:601:HOH:O	2.17	0.56
1:C:298:GLU:HG3	1:C:299:PRO:HD2	1.88	0.55
1:D:119:ALA:N	1:D:120:PRO:HD3	2.22	0.55
1:D:275:ILE:HD11	1:D:281:PRO:HB3	1.88	0.55
2:B:501:HEM:HHC	2:B:501:HEM:HBB2	1.88	0.55
1:D:290:PRO:HB3	1:D:304:LEU:HD23	1.89	0.55
1:C:279:TRP:HB2	1:C:302:LEU:HD11	1.89	0.54
1:B:336:VAL:HG21	4:B:503:OUP:C07	2.38	0.54
1:A:306:PRO:HB2	1:A:309:LEU:HB2	1.89	0.54

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:C:504:BTB:O3	5:C:504:BTB:O4	2.26	0.53
1:D:100:LEU:HB3	1:D:103:LEU:HD22	1.91	0.52
1:C:336:VAL:HG21	4:C:503:OUP:C07	2.40	0.52
2:D:501:HEM:HBB2	2:D:501:HEM:HHC	1.90	0.52
1:B:321:GLU:OE1	5:B:504:BTB:O8	2.27	0.52
1:C:455:SER:HA	1:C:460:PHE:CG	2.44	0.52
1:C:234:ARG:HB2	1:C:240:ASP:OD1	2.10	0.52
1:C:364:THR:O	1:C:368:CYS:HB2	2.10	0.52
1:B:106:PRO:HB3	10:B:687:HOH:O	2.10	0.51
1:B:124:LEU:HB3	1:B:128:ARG:HH12	1.75	0.51
5:B:504:BTB:H81	1:C:374:ASN:O	2.10	0.51
1:C:450:PRO:HG3	1:C:457:THR:HG21	1.92	0.51
1:C:368:CYS:SG	1:C:376:LEU:HD13	2.49	0.51
1:B:326:LEU:HB3	1:B:328:LEU:HG	1.92	0.51
1:A:235:CYS:SG	1:A:238:ARG:HD3	2.50	0.51
1:C:238:ARG:HD2	10:C:692:HOH:O	2.10	0.51
1:C:143:SER:O	1:C:147:GLU:HG2	2.11	0.51
1:A:258:ASP:C	1:A:260:SER:H	2.14	0.50
1:C:88:ALA:HB3	1:D:97:ARG:HD2	1.94	0.49
1:C:199:ARG:O	1:C:232:PRO:HG3	2.12	0.49
1:B:384:ASP:OD1	5:C:505:BTB:H72	2.12	0.49
1:B:238:ARG:HG2	1:B:296:PRO:HB3	1.93	0.49
5:C:505:BTB:H41	5:C:505:BTB:O8	2.12	0.49
1:A:97:ARG:HG3	1:B:88:ALA:HB3	1.94	0.49
1:A:312:GLU:OE2	1:A:329:ARG:NH1	2.45	0.49
1:A:336:VAL:HG21	4:A:503:OUP:C07	2.43	0.49
1:C:228:ILE:HG13	1:C:353:PHE:HB3	1.95	0.49
1:D:326:LEU:HB3	1:D:328:LEU:HG	1.95	0.49
1:A:269:GLU:O	1:A:272:GLU:HG2	2.12	0.49
1:A:89:GLN:O	1:A:91:ASP:N	2.45	0.49
1:A:275:ILE:HG12	1:A:281:PRO:HD3	1.94	0.49
1:A:67:LYS:HD2	10:A:666:HOH:O	2.12	0.48
1:A:135:TYR:HD1	1:A:140:ARG:HB3	1.77	0.48
1:B:298:GLU:OE1	5:B:505:BTB:H31	2.13	0.48
1:A:256:GLN:HG3	1:A:258:ASP:H	1.79	0.48
1:C:361:GLU:OE2	4:C:503:OUP:N02	2.46	0.48
1:D:301:GLU:HB3	1:D:303:PHE:CE1	2.48	0.48
5:C:506:BTB:H42	5:C:506:BTB:H51	1.47	0.48
1:B:364:THR:O	1:B:368:CYS:HB2	2.14	0.47
1:B:379:VAL:O	1:B:383:MET:HG3	2.14	0.47
1:A:231:PHE:HB2	1:A:350:ALA:O	2.14	0.47

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:336:VAL:HG21	4:D:503:OUP:C07	2.44	0.47
1:A:430:HIS:CE1	1:A:434:GLU:HG3	2.49	0.47
5:A:506:BTB:H31	5:A:506:BTB:H51	1.54	0.47
1:B:383:MET:HB2	1:B:385:LEU:HG	1.95	0.47
1:C:453:SER:HB3	1:C:456:LEU:HD12	1.96	0.47
5:D:505:BTB:H51	5:D:505:BTB:H32	1.49	0.47
1:A:364:THR:O	1:A:368:CYS:HB2	2.15	0.47
1:B:453:SER:HB3	1:B:456:LEU:HD12	1.95	0.47
5:A:506:BTB:H52	5:A:506:BTB:H81	1.49	0.46
1:A:147:GLU:O	1:A:151:GLN:HG2	2.15	0.46
1:A:365:ARG:HH12	3:A:502:H4B:C4	2.28	0.46
1:A:368:CYS:SG	1:A:376:LEU:HD13	2.55	0.46
1:C:160:THR:HG23	1:C:162:THR:H	1.79	0.46
1:D:267:ASN:O	1:D:271:THR:OG1	2.29	0.46
1:C:140:ARG:O	1:C:143:SER:OG	2.26	0.46
1:B:379:VAL:HG21	1:B:402:ILE:HD11	1.98	0.46
1:C:322:TRP:CD1	5:C:504:BTB:H62	2.51	0.46
1:A:453:SER:HB3	1:A:456:LEU:HD12	1.97	0.46
5:B:506:BTB:H31	5:B:506:BTB:H51	1.48	0.46
1:A:388:ARG:HA	5:A:505:BTB:H81	1.98	0.45
1:B:292:LEU:HD22	1:B:300:PRO:HB2	1.98	0.45
1:D:127:ALA:O	1:D:131:ILE:HG12	2.17	0.45
1:C:143:SER:HB2	1:C:146:HIS:H	1.82	0.45
5:C:505:BTB:H11	5:C:505:BTB:H51	1.38	0.45
1:D:68:PHE:CD1	1:D:83:THR:HG22	2.51	0.45
1:C:460:PHE:O	3:D:502:H4B:H10	2.16	0.45
5:D:505:BTB:O8	10:D:602:HOH:O	2.21	0.45
1:A:124:LEU:HD21	1:A:128:ARG:NH2	2.32	0.44
1:C:257:GLN:O	1:C:257:GLN:HG3	2.16	0.44
1:A:233:GLN:HG2	10:A:634:HOH:O	2.16	0.44
1:B:247:GLN:HB2	1:B:250:ARG:HD3	2.00	0.44
1:A:244:TRP:NE1	1:A:294:GLN:OE1	2.46	0.44
1:D:233:GLN:HB3	1:D:348:PHE:CE2	2.52	0.44
1:D:364:THR:O	1:D:368:CYS:HB2	2.17	0.44
1:A:229:THR:O	1:A:352:PRO:HD2	2.18	0.44
1:A:279:TRP:CG	1:A:290:PRO:HG3	2.52	0.44
1:C:397:LYS:NZ	1:D:401:GLU:OE2	2.50	0.44
1:B:173:GLY:HA3	1:B:343:ILE:HD13	1.99	0.43
1:A:275:ILE:C	1:A:277:HIS:H	2.22	0.43
2:A:501:HEM:HBC2	2:A:501:HEM:HMC1	1.99	0.43
1:A:233:GLN:HB3	1:A:348:PHE:CE2	2.53	0.43

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:501:HEM:O2A	4:B:503:OUP:N18	2.51	0.43
5:B:504:BTB:H41	5:B:504:BTB:H72	1.74	0.43
5:D:505:BTB:H52	5:D:505:BTB:H81	1.31	0.43
1:A:140:ARG:HA	1:A:140:ARG:HD3	1.78	0.43
1:A:149:ARG:O	1:A:153:VAL:HG22	2.19	0.43
1:A:455:SER:HA	1:A:460:PHE:CG	2.53	0.43
1:A:277:HIS:NE2	1:A:300:PRO:HG2	2.32	0.43
5:C:506:BTB:H72	5:C:506:BTB:H31	1.48	0.43
1:A:183:ARG:HD3	1:A:447:TRP:CD2	2.54	0.43
1:D:72:LYS:HD3	1:D:74:TRP:CE2	2.54	0.43
1:A:292:LEU:HD23	1:A:292:LEU:HA	1.87	0.42
5:A:506:BTB:H71	5:A:506:BTB:H11	1.38	0.42
5:B:505:BTB:H71	5:B:505:BTB:H12	1.39	0.42
1:C:72:LYS:HD3	1:C:74:TRP:CE2	2.55	0.42
1:C:379:VAL:HG21	1:C:402:ILE:HD11	2.02	0.42
1:D:257:GLN:C	1:D:259:GLY:H	2.22	0.42
1:D:306:PRO:HA	1:D:307:PRO:HD2	1.93	0.42
5:D:505:BTB:H12	5:D:505:BTB:H71	1.50	0.42
1:B:165:LEU:HG	1:B:346:LEU:HD12	2.01	0.42
1:A:184:CYS:HB2	2:A:501:HEM:ND	2.34	0.42
4:A:503:OUP:O19	4:A:503:OUP:N18	2.53	0.42
1:A:127:ALA:O	1:A:131:ILE:HG12	2.20	0.42
7:A:508:GOL:O3	7:A:508:GOL:O1	2.22	0.42
2:D:501:HEM:CMC	2:D:501:HEM:HBC2	2.50	0.42
1:A:445:TRP:CZ2	1:A:449:VAL:HG21	2.55	0.41
5:C:504:BTB:H51	5:C:504:BTB:H32	1.84	0.41
1:D:317:HIS:CG	1:D:318:PRO:HD2	2.55	0.41
1:A:317:HIS:CG	1:A:318:PRO:HD2	2.55	0.41
1:B:447:TRP:HA	3:B:502:H4B:N1	2.35	0.41
1:A:298:GLU:OE1	5:A:506:BTB:H32	2.20	0.41
1:D:124:LEU:HD21	1:D:154:GLU:HG3	2.02	0.41
1:A:91:ASP:OD1	1:B:97:ARG:NH1	2.52	0.41
1:A:122:GLN:HG3	1:A:123:LEU:N	2.35	0.41
2:B:501:HEM:CGA	3:B:502:H4B:HN3	2.33	0.41
3:B:502:H4B:H71	3:B:502:H4B:O10	2.21	0.41
1:C:382:CYS:HA	5:C:504:BTB:H12	2.01	0.41
1:D:453:SER:HB3	1:D:456:LEU:HD12	2.01	0.41
1:A:94:CYS:HB3	1:B:94:CYS:HB3	2.01	0.41
1:A:238:ARG:HG2	1:A:239:GLY:N	2.36	0.41
1:B:262:ARG:NE	1:B:283:ASN:O	2.43	0.41
1:D:90:GLN:HB3	1:D:468:PHE:CD2	2.56	0.41

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:139:LYS:HD2	1:D:139:LYS:N	2.36	0.41
1:D:231:PHE:HB3	1:D:232:PRO:CD	2.50	0.41
1:D:245:ASN:OD1	1:D:245:ASN:N	2.54	0.41
5:B:506:BTB:H72	5:B:506:BTB:H11	1.59	0.41
1:C:233:GLN:HB3	1:C:348:PHE:CE2	2.56	0.41
1:D:149:ARG:HD3	1:D:166:ARG:CZ	2.52	0.40
1:C:97:ARG:HE	1:C:97:ARG:HB3	1.55	0.40
1:D:271:THR:O	1:D:275:ILE:HG12	2.21	0.40
1:A:364:THR:HG21	1:A:452:ILE:HG23	2.02	0.40
1:C:89:GLN:H	1:C:89:GLN:HG2	1.70	0.40

There are no symmetry-related clashes.

5.3 Torsion angles [i](#)

5.3.1 Protein backbone [i](#)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	400/440 (91%)	380 (95%)	14 (4%)	6 (2%)	10	2
1	B	402/440 (91%)	391 (97%)	11 (3%)	0	100	100
1	C	400/440 (91%)	387 (97%)	12 (3%)	1 (0%)	41	29
1	D	401/440 (91%)	390 (97%)	9 (2%)	2 (0%)	29	16
All	All	1603/1760 (91%)	1548 (97%)	46 (3%)	9 (1%)	25	14

All (9) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	90	GLN
1	A	144	GLN
1	C	89	GLN
1	A	143	SER
1	A	239	GLY

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	D	106	PRO
1	A	276	GLN
1	D	258	ASP
1	A	259	GLY

5.3.2 Protein sidechains [i](#)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	344/373 (92%)	332 (96%)	12 (4%)	36	24
1	B	345/373 (92%)	329 (95%)	16 (5%)	27	14
1	C	343/373 (92%)	331 (96%)	12 (4%)	36	24
1	D	344/373 (92%)	333 (97%)	11 (3%)	39	28
All	All	1376/1492 (92%)	1325 (96%)	51 (4%)	34	22

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

Mol	Chain	Res	Type
1	A	121	GLU
1	A	123	LEU
1	A	124	LEU
1	A	129	ASP
1	A	136	SER
1	A	144	GLN
1	A	240	ASP
1	A	258	ASP
1	A	285	ARG
1	A	309	LEU
1	A	321	GLU
1	A	396	ASP
1	B	103	LEU
1	B	107	ARG
1	B	128	ARG
1	B	168[A]	SER
1	B	168[B]	SER

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	B	202	ARG
1	B	216	LYS
1	B	230	VAL
1	B	255	ARG
1	B	276	GLN
1	B	308	GLU
1	B	309	LEU
1	B	326	LEU
1	B	378	ASP
1	B	389	THR
1	B	396	ASP
1	C	97	ARG
1	C	141	SER
1	C	148	GLN
1	C	160	THR
1	C	200	ASP
1	C	233	GLN
1	C	234	ARG
1	C	238	ARG
1	C	250	ARG
1	C	257	GLN
1	C	302	LEU
1	C	309	LEU
1	D	103	LEU
1	D	124	LEU
1	D	136	SER
1	D	192	LYS
1	D	230	VAL
1	D	245	ASN
1	D	258	ASP
1	D	274	CYS
1	D	302	LEU
1	D	326	LEU
1	D	389	THR

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

Mol	Chain	Res	Type
1	A	189	GLN

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 35 ligands modelled in this entry, 10 are monoatomic - leaving 25 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	506	-	13,13,13	0.47	0	7,16,16	0.32	0
5	BTB	A	505	-	13,13,13	0.49	0	7,16,16	0.70	0
5	BTB	A	504	9	13,13,13	0.50	0	7,16,16	1.20	1 (14%)
7	GOL	C	508	-	5,5,5	0.42	0	5,5,5	0.92	0
5	BTB	A	506	-	13,13,13	0.43	0	7,16,16	0.34	0
5	BTB	C	504	9	13,13,13	0.46	0	7,16,16	1.27	1 (14%)
5	BTB	D	505	-	13,13,13	0.48	0	7,16,16	0.88	0
4	OUP	D	503	-	29,29,29	0.83	0	40,41,41	1.30	4 (10%)
4	OUP	A	503	-	29,29,29	0.84	1 (3%)	40,41,41	1.30	6 (15%)
2	HEM	B	501	1	41,50,50	1.46	6 (14%)	45,82,82	1.81	11 (24%)
5	BTB	C	505	-	13,13,13	0.93	1 (7%)	7,16,16	1.55	2 (28%)
5	BTB	D	504	9	13,13,13	0.40	0	7,16,16	0.56	0
2	HEM	A	501	1	41,50,50	1.50	4 (9%)	45,82,82	1.68	11 (24%)
7	GOL	A	508	-	5,5,5	0.40	0	5,5,5	0.20	0
2	HEM	D	501	1	41,50,50	1.55	7 (17%)	45,82,82	1.90	14 (31%)
3	H4B	A	502	-	16,18,18	0.89	0	11,26,26	2.67	6 (54%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
3	H4B	B	502	-	16,18,18	0.90	0	11,26,26	2.74	6 (54%)
5	BTB	B	504	9	13,13,13	0.41	0	7,16,16	0.70	0
3	H4B	D	502	-	16,18,18	0.81	0	11,26,26	2.84	7 (63%)
5	BTB	B	505	-	13,13,13	0.43	0	7,16,16	0.86	0
4	OUP	B	503	-	29,29,29	0.86	0	40,41,41	1.14	2 (5%)
5	BTB	B	506	-	13,13,13	0.38	0	7,16,16	0.54	0
3	H4B	C	502	-	16,18,18	1.05	1 (6%)	11,26,26	2.89	7 (63%)
4	OUP	C	503	-	29,29,29	0.86	0	40,41,41	1.24	2 (5%)
2	HEM	C	501	1	41,50,50	1.56	6 (14%)	45,82,82	1.77	12 (26%)

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	506	-	-	9/21/21/21	-
5	BTB	A	505	-	-	10/21/21/21	-
5	BTB	A	504	9	-	2/21/21/21	-
7	GOL	C	508	-	-	4/4/4/4	-
5	BTB	A	506	-	-	4/21/21/21	-
5	BTB	C	504	9	-	6/21/21/21	-
5	BTB	D	505	-	-	17/21/21/21	-
4	OUP	D	503	-	-	2/11/17/17	0/4/4/4
4	OUP	A	503	-	-	3/11/17/17	0/4/4/4
2	HEM	B	501	1	-	4/12/54/54	-
5	BTB	C	505	-	-	8/21/21/21	-
5	BTB	D	504	9	-	3/21/21/21	-
2	HEM	A	501	1	-	7/12/54/54	-
7	GOL	A	508	-	-	4/4/4/4	-
2	HEM	D	501	1	-	0/12/54/54	-
3	H4B	A	502	-	-	3/8/17/17	0/2/2/2
3	H4B	B	502	-	-	3/8/17/17	0/2/2/2
5	BTB	B	504	9	-	4/21/21/21	-
3	H4B	D	502	-	-	4/8/17/17	0/2/2/2
5	BTB	B	505	-	-	6/21/21/21	-
4	OUP	B	503	-	-	1/11/17/17	0/4/4/4

Continued on next page...

Continued from previous page...

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
5	BTB	B	506	-	-	6/21/21/21	-
3	H4B	C	502	-	-	3/8/17/17	0/2/2/2
4	OUP	C	503	-	-	2/11/17/17	0/4/4/4
2	HEM	C	501	1	-	4/12/54/54	-

All (26) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	501	HEM	C3C-CAC	3.94	1.55	1.47
2	D	501	HEM	C3C-C2C	-3.92	1.34	1.40
2	C	501	HEM	C3C-CAC	3.84	1.55	1.47
2	D	501	HEM	C3C-CAC	3.76	1.55	1.47
2	C	501	HEM	FE-NB	3.69	2.15	1.96
2	B	501	HEM	C3C-C2C	-3.64	1.35	1.40
2	A	501	HEM	C3C-CAC	3.60	1.55	1.47
2	D	501	HEM	FE-NB	3.37	2.13	1.96
2	C	501	HEM	CAB-C3B	3.35	1.56	1.47
2	D	501	HEM	CAB-C3B	3.31	1.56	1.47
2	A	501	HEM	C3C-C2C	-3.18	1.36	1.40
2	A	501	HEM	FE-NB	3.17	2.12	1.96
2	B	501	HEM	CAB-C3B	3.09	1.55	1.47
2	C	501	HEM	C3C-C2C	-2.99	1.36	1.40
2	A	501	HEM	CAB-C3B	2.97	1.55	1.47
5	C	505	BTB	C4-C2	-2.76	1.49	1.53
2	D	501	HEM	FE-ND	2.49	2.09	1.96
2	D	501	HEM	CMD-C2D	2.30	1.55	1.50
2	C	501	HEM	CMB-C2B	2.24	1.55	1.50
3	C	502	H4B	C4A-C4	-2.19	1.38	1.41
2	B	501	HEM	FE-ND	2.12	2.07	1.96
4	A	503	OUP	C05-C10	-2.09	1.39	1.42
2	B	501	HEM	CMD-C2D	2.08	1.55	1.50
2	D	501	HEM	CHB-C1B	2.05	1.40	1.35
2	C	501	HEM	FE-ND	2.01	2.06	1.96
2	B	501	HEM	CMB-C2B	2.01	1.55	1.50

All (92) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	C	502	H4B	C8A-C4A-C4	7.03	120.82	114.57
3	A	502	H4B	C8A-C4A-C4	5.78	119.70	114.57
3	B	502	H4B	C8A-C4A-C4	5.09	119.09	114.57

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	D	502	H4B	C4-C4A-N5	4.81	123.15	119.12
2	C	501	HEM	C4B-CHC-C1C	4.60	128.63	122.56
3	D	502	H4B	C8A-C4A-C4	4.48	118.55	114.57
2	D	501	HEM	CBA-CAA-C2A	-4.45	105.03	112.62
2	D	501	HEM	CBD-CAD-C3D	-4.26	100.80	112.63
4	C	503	OUP	O19-C14-C15	4.17	121.23	115.78
2	B	501	HEM	C4C-CHD-C1D	4.04	127.88	122.56
2	D	501	HEM	C4C-CHD-C1D	3.98	127.81	122.56
2	B	501	HEM	C3B-C2B-C1B	3.96	109.43	106.49
2	B	501	HEM	CBD-CAD-C3D	-3.90	101.80	112.63
3	B	502	H4B	N1-C2-N3	-3.61	119.76	125.42
2	C	501	HEM	CBD-CAD-C3D	-3.60	102.63	112.63
2	B	501	HEM	C1B-NB-C4B	3.56	108.75	105.07
4	D	503	OUP	C04-C05-C10	3.49	119.90	118.01
2	C	501	HEM	C4D-ND-C1D	3.45	108.64	105.07
2	D	501	HEM	C1B-NB-C4B	3.42	108.60	105.07
4	D	503	OUP	C05-C10-N01	-3.41	119.19	122.81
2	C	501	HEM	C1B-NB-C4B	3.40	108.58	105.07
4	B	503	OUP	O19-C14-C15	3.35	120.16	115.78
3	B	502	H4B	C4-C4A-N5	3.33	121.92	119.12
3	D	502	H4B	N1-C2-N3	-3.31	120.23	125.42
3	C	502	H4B	C2-N3-C4	3.29	121.16	115.93
2	D	501	HEM	C3B-C2B-C1B	3.26	108.91	106.49
4	A	503	OUP	C05-C10-N01	-3.22	119.39	122.81
3	B	502	H4B	C2-N3-C4	3.19	121.00	115.93
3	D	502	H4B	C2-N3-C4	3.18	120.99	115.93
2	B	501	HEM	C4D-ND-C1D	3.15	108.33	105.07
2	A	501	HEM	C4D-ND-C1D	3.15	108.33	105.07
3	C	502	H4B	C4A-N5-C6	-3.07	112.80	121.16
3	A	502	H4B	N1-C2-N3	-3.00	120.71	125.42
2	A	501	HEM	C4B-CHC-C1C	3.00	126.52	122.56
2	A	501	HEM	CAD-C3D-C2D	-3.00	122.29	127.88
3	B	502	H4B	C2-N1-C8A	2.98	121.21	114.54
2	A	501	HEM	C1B-NB-C4B	2.97	108.14	105.07
2	D	501	HEM	C4B-CHC-C1C	2.97	126.48	122.56
3	D	502	H4B	N2-C2-N3	2.95	121.84	117.25
3	A	502	H4B	C2-N3-C4	2.95	120.61	115.93
5	C	504	BTB	O3-C3-C2	2.92	119.42	111.44
2	D	501	HEM	C4A-C3A-C2A	2.88	109.00	107.00
2	D	501	HEM	C4D-ND-C1D	2.80	107.97	105.07
2	A	501	HEM	CAD-C3D-C4D	2.78	129.52	124.66
2	B	501	HEM	C3D-C4D-ND	-2.77	107.08	110.17

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	D	502	H4B	C2-N1-C8A	2.75	120.70	114.54
4	D	503	OUP	O19-C14-C15	2.71	119.32	115.78
2	D	501	HEM	O2A-CGA-CBA	2.71	122.73	114.03
3	A	502	H4B	C4-C4A-N5	2.70	121.39	119.12
3	C	502	H4B	N1-C2-N3	-2.70	121.19	125.42
2	C	501	HEM	C3D-C4D-ND	-2.68	107.18	110.17
3	A	502	H4B	C2-N1-C8A	2.67	120.52	114.54
5	C	505	BTB	O4-C4-C2	-2.64	104.22	111.44
4	A	503	OUP	C16-C15-C14	2.63	121.02	118.26
2	A	501	HEM	C3D-C4D-ND	-2.63	107.24	110.17
2	B	501	HEM	CMC-C2C-C3C	2.55	129.46	124.68
2	D	501	HEM	CMC-C2C-C3C	2.54	129.43	124.68
2	A	501	HEM	C4A-C3A-C2A	2.53	108.76	107.00
5	C	505	BTB	O1-C1-C2	-2.53	104.52	111.44
2	B	501	HEM	CHB-C1B-NB	2.52	127.50	124.38
5	A	504	BTB	O3-C3-C2	2.52	118.34	111.44
4	C	503	OUP	C05-C10-N01	-2.51	120.15	122.81
4	A	503	OUP	C20-O19-C14	2.51	123.86	118.27
2	A	501	HEM	CMC-C2C-C3C	2.50	129.36	124.68
2	C	501	HEM	C3B-C2B-C1B	2.49	108.33	106.49
2	C	501	HEM	CBA-CAA-C2A	-2.45	108.44	112.62
2	D	501	HEM	C3D-C4D-ND	-2.45	107.44	110.17
2	B	501	HEM	C2B-C1B-NB	-2.44	106.94	109.84
2	C	501	HEM	CHC-C4B-C3B	2.44	128.31	124.57
2	D	501	HEM	CHC-C4B-C3B	2.41	128.26	124.57
2	A	501	HEM	CMA-C3A-C4A	-2.40	124.78	128.46
2	B	501	HEM	CAA-CBA-CGA	-2.39	107.05	113.76
4	A	503	OUP	C04-C05-C10	2.39	119.30	118.01
2	A	501	HEM	C3B-C2B-C1B	2.38	108.25	106.49
2	C	501	HEM	CMA-C3A-C4A	-2.37	124.83	128.46
4	A	503	OUP	C03-C04-C05	2.35	120.09	117.78
3	C	502	H4B	C4A-C4-N3	-2.32	117.40	124.01
4	D	503	OUP	C03-C04-C05	2.32	120.06	117.78
4	B	503	OUP	C04-C05-C10	2.31	119.26	118.01
3	A	502	H4B	N2-C2-N3	2.28	120.80	117.25
2	C	501	HEM	C2D-C1D-ND	-2.27	107.16	109.88
3	B	502	H4B	N2-C2-N3	2.25	120.75	117.25
2	A	501	HEM	C4C-CHD-C1D	2.22	125.48	122.56
2	D	501	HEM	O1A-CGA-CBA	-2.21	115.98	123.08
3	C	502	H4B	N2-C2-N3	2.18	120.64	117.25
2	D	501	HEM	C2B-C1B-NB	-2.17	107.27	109.84
2	C	501	HEM	CMC-C2C-C3C	2.17	128.74	124.68

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	D	502	H4B	C4A-N5-C6	-2.14	115.35	121.16
2	C	501	HEM	CAD-CBD-CGD	2.07	118.06	113.60
4	A	503	OUP	O19-C14-C15	2.07	118.49	115.78
2	B	501	HEM	C4B-CHC-C1C	2.03	125.24	122.56
3	C	502	H4B	C2-N1-C8A	2.01	119.05	114.54

There are no chirality outliers.

All (119) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	B	502	H4B	C7-C6-C9-O9
3	B	502	H4B	C7-C6-C9-C10
3	C	502	H4B	C7-C6-C9-O9
3	C	502	H4B	C7-C6-C9-C10
3	D	502	H4B	N5-C6-C9-O9
3	D	502	H4B	N5-C6-C9-C10
3	D	502	H4B	C7-C6-C9-O9
3	D	502	H4B	C7-C6-C9-C10
4	B	503	OUP	O19-C20-C21-C22
4	C	503	OUP	O19-C20-C21-C22
5	A	504	BTB	C1-C2-C4-O4
5	A	504	BTB	C3-C2-C4-O4
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	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	C1-C2-C4-O4
5	A	506	BTB	C8-C7-N-C5
5	B	504	BTB	O1-C1-C2-C3
5	B	504	BTB	O1-C1-C2-C4
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	505	BTB	N-C5-C6-O6
5	C	504	BTB	C1-C2-C4-O4
5	C	504	BTB	C3-C2-C4-O4

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms
5	C	504	BTB	N-C2-C4-O4
5	C	505	BTB	O1-C1-C2-C3
5	C	505	BTB	O1-C1-C2-C4
5	C	505	BTB	O1-C1-C2-N
5	C	505	BTB	C1-C2-C4-O4
5	C	505	BTB	C3-C2-C4-O4
5	C	505	BTB	N-C2-C4-O4
5	C	506	BTB	C1-C2-C4-O4
5	C	506	BTB	C3-C2-C4-O4
5	C	506	BTB	N-C2-C4-O4
5	C	506	BTB	C1-C2-N-C5
5	C	506	BTB	C1-C2-N-C7
5	C	506	BTB	C3-C2-N-C5
5	C	506	BTB	C3-C2-N-C7
5	C	506	BTB	C4-C2-N-C5
5	C	506	BTB	C4-C2-N-C7
5	D	504	BTB	O1-C1-C2-C3
5	D	504	BTB	O1-C1-C2-C4
5	D	505	BTB	O1-C1-C2-C3
5	D	505	BTB	O1-C1-C2-C4
5	D	505	BTB	O1-C1-C2-N
5	D	505	BTB	C1-C2-C3-O3
5	D	505	BTB	C4-C2-C3-O3
5	D	505	BTB	N-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	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-C7
5	D	505	BTB	C8-C7-N-C5
7	A	508	GOL	O1-C1-C2-O2
7	A	508	GOL	O1-C1-C2-C3
5	C	505	BTB	N-C7-C8-O8
5	B	504	BTB	N-C7-C8-O8
2	A	501	HEM	C3D-CAD-CBD-CGD
7	A	508	GOL	C1-C2-C3-O3
7	C	508	GOL	O1-C1-C2-C3
7	C	508	GOL	C1-C2-C3-O3
5	A	505	BTB	N-C5-C6-O6
2	A	501	HEM	C2A-CAA-CBA-CGA

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms
7	A	508	GOL	O2-C2-C3-O3
7	C	508	GOL	O1-C1-C2-O2
5	B	506	BTB	N-C7-C8-O8
5	C	504	BTB	N-C5-C6-O6
5	B	506	BTB	N-C5-C6-O6
2	B	501	HEM	C2A-CAA-CBA-CGA
7	C	508	GOL	O2-C2-C3-O3
5	D	505	BTB	N-C7-C8-O8
4	D	503	OUP	C13-C14-O19-C20
5	C	505	BTB	N-C5-C6-O6
2	A	501	HEM	C4B-C3B-CAB-CBB
2	C	501	HEM	C4B-C3B-CAB-CBB
3	B	502	H4B	N5-C6-C9-O9
3	C	502	H4B	N5-C6-C9-O9
4	A	503	OUP	C13-C14-O19-C20
5	C	504	BTB	C1-C2-C3-O3
4	C	503	OUP	O19-C20-C21-C24
2	A	501	HEM	C1A-C2A-CAA-CBA
2	A	501	HEM	C3A-C2A-CAA-CBA
4	D	503	OUP	C15-C14-O19-C20
5	A	506	BTB	N-C2-C4-O4
5	B	504	BTB	O1-C1-C2-N
5	B	505	BTB	O1-C1-C2-N
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	C4-C2-N-C7
5	D	504	BTB	O1-C1-C2-N
5	D	505	BTB	C1-C2-N-C5
5	D	505	BTB	C4-C2-N-C5
4	A	503	OUP	C16-C15-C17-N18
2	C	501	HEM	C3D-CAD-CBD-CGD
3	A	502	H4B	C7-C6-C9-O9
4	A	503	OUP	C15-C14-O19-C20
2	A	501	HEM	CAD-CBD-CGD-O2D
2	A	501	HEM	CAD-CBD-CGD-O1D
2	C	501	HEM	CAA-CBA-CGA-O1A
2	C	501	HEM	CAA-CBA-CGA-O2A
2	B	501	HEM	C4B-C3B-CAB-CBB
3	A	502	H4B	C7-C6-C9-C10
3	A	502	H4B	N5-C6-C9-O9
5	A	506	BTB	C3-C2-C4-O4

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms
5	C	504	BTB	C4-C2-C3-O3
2	B	501	HEM	CAA-CBA-CGA-O1A
2	B	501	HEM	CAA-CBA-CGA-O2A

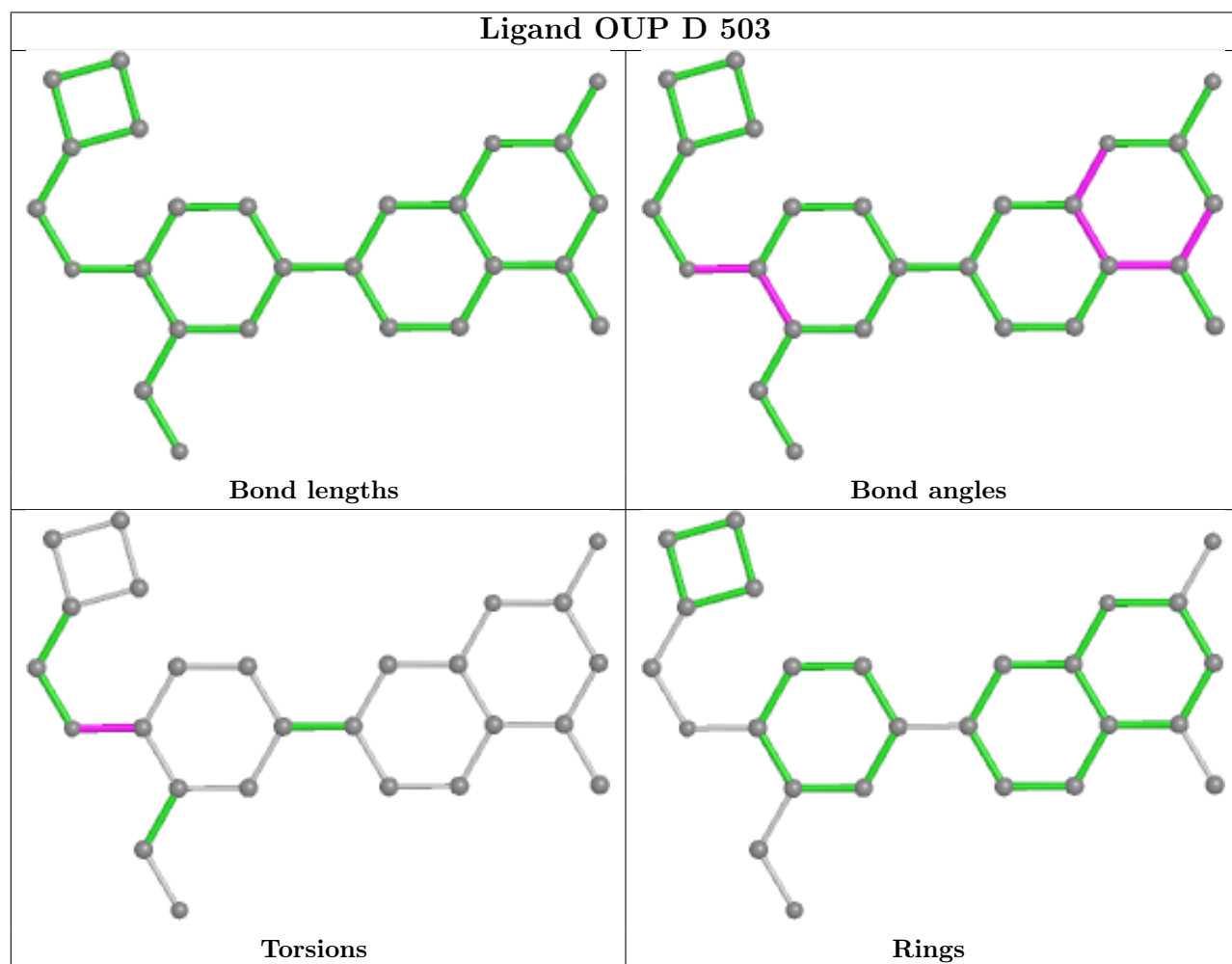
There are no ring outliers.

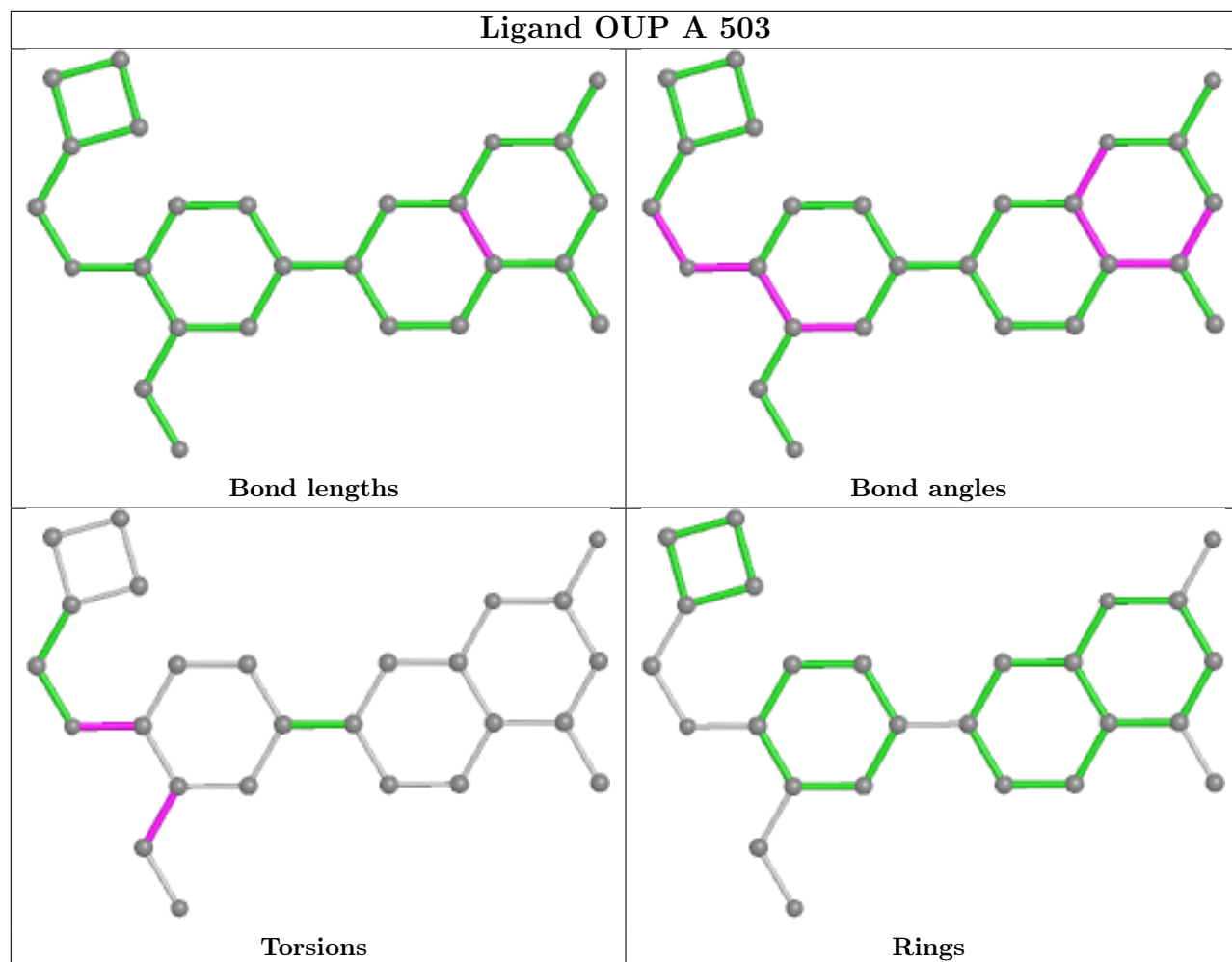
23 monomers are involved in 58 short contacts:

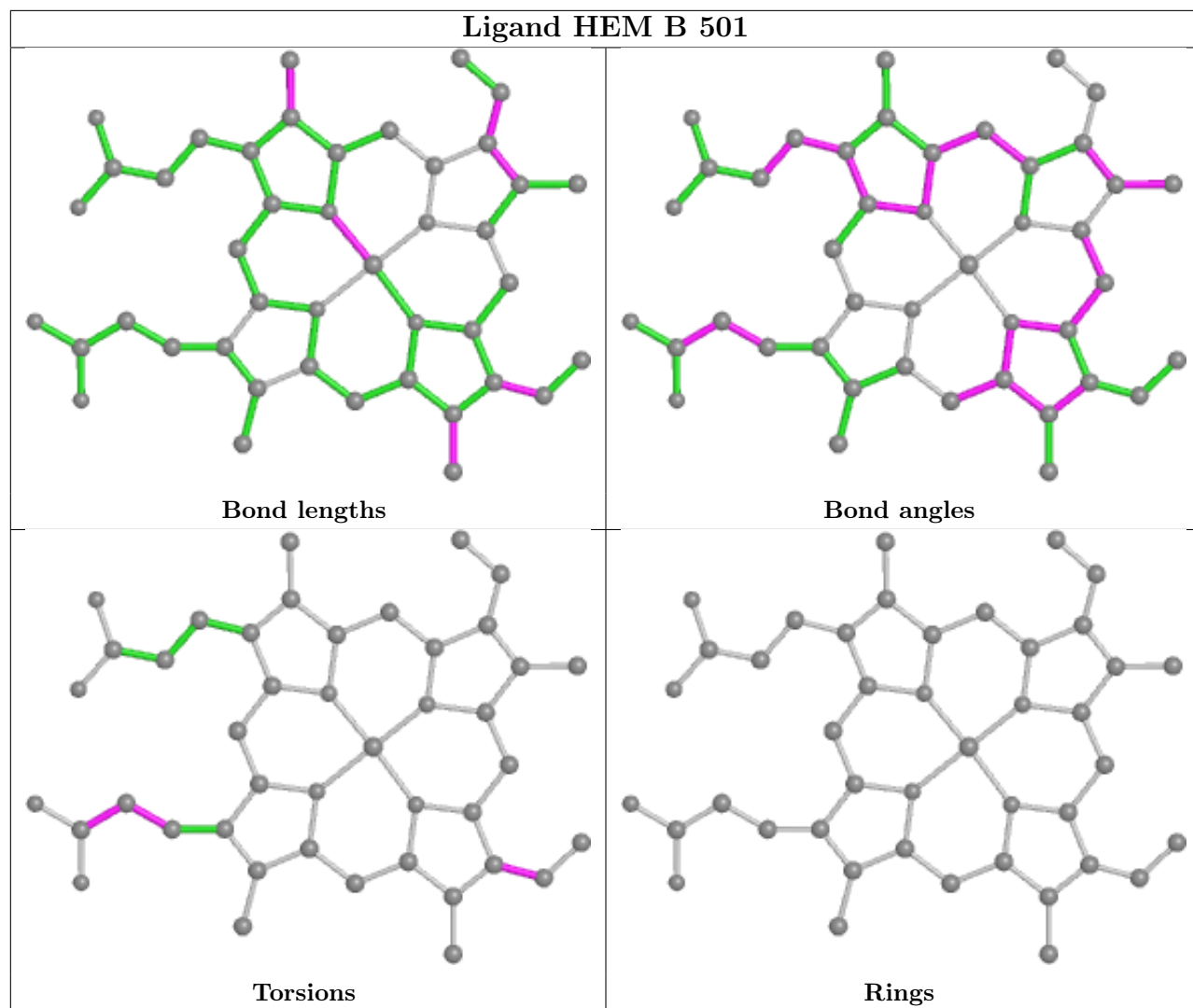
Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	C	506	BTB	3	0
5	A	505	BTB	1	0
7	C	508	GOL	1	0
5	A	506	BTB	4	0
5	C	504	BTB	4	0
5	D	505	BTB	4	0
4	D	503	OUP	2	0
4	A	503	OUP	2	0
2	B	501	HEM	4	0
5	C	505	BTB	3	0
5	D	504	BTB	1	0
2	A	501	HEM	4	0
7	A	508	GOL	1	0
2	D	501	HEM	4	0
3	A	502	H4B	1	0
3	B	502	H4B	3	0
5	B	504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

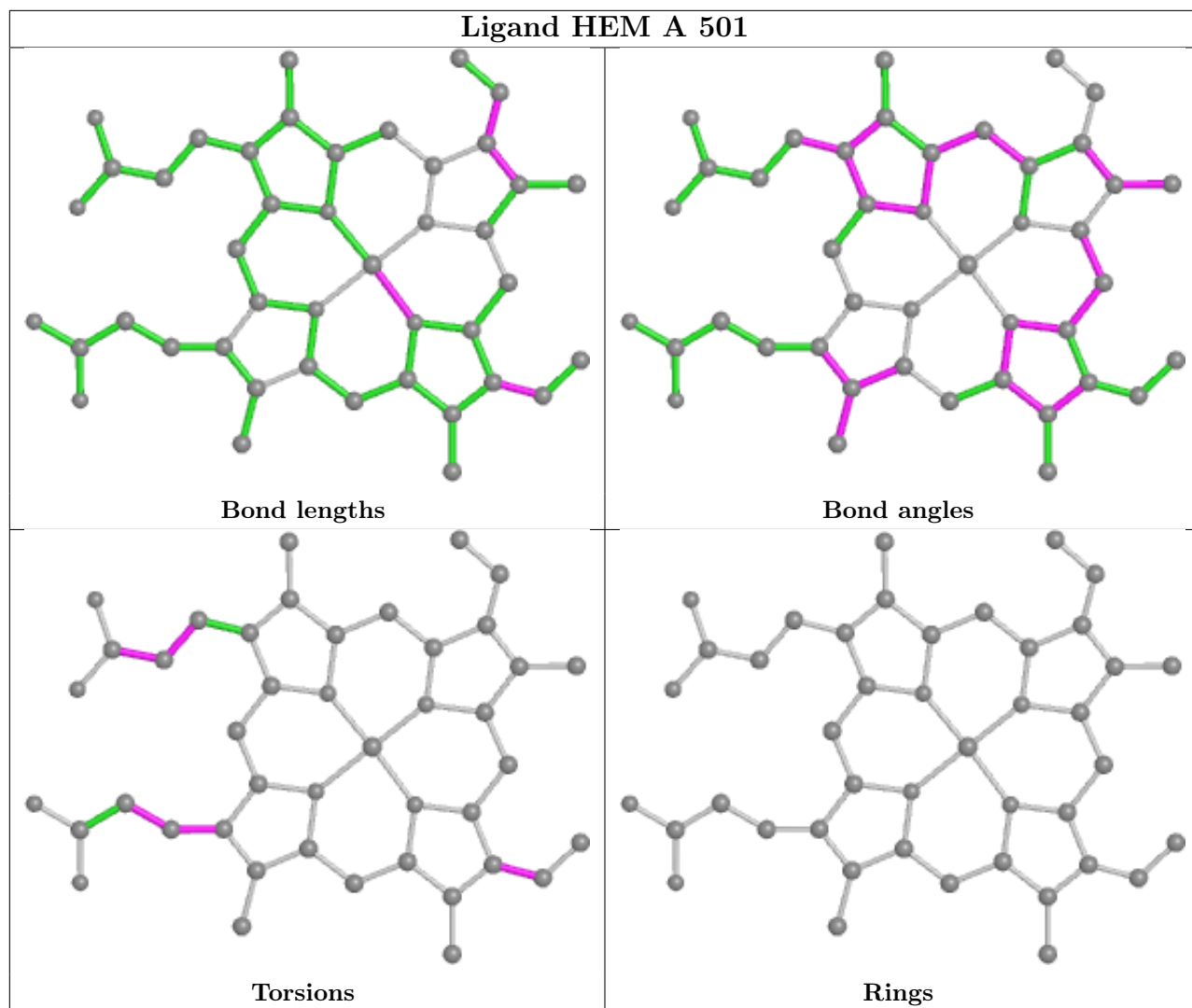
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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

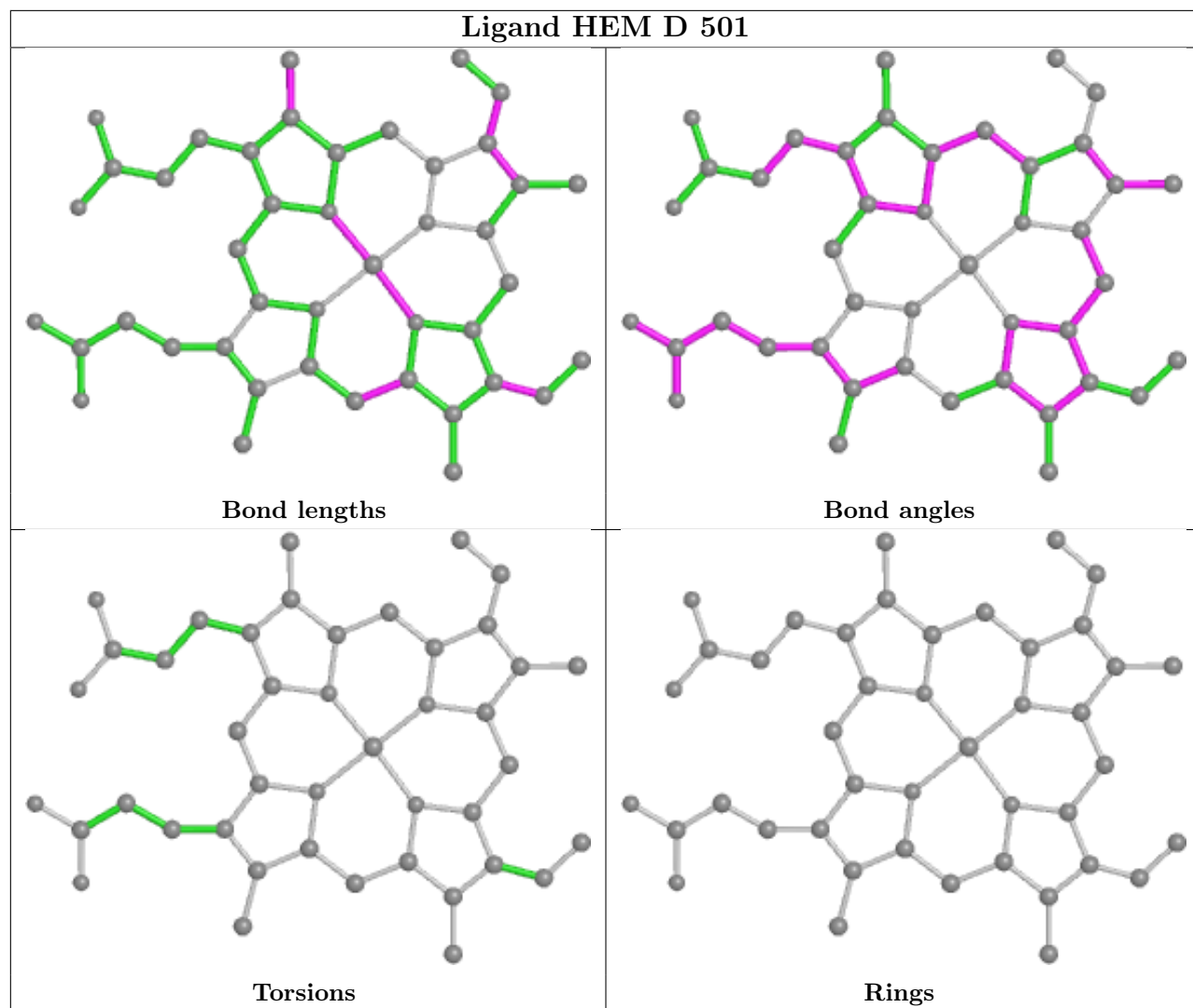
The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

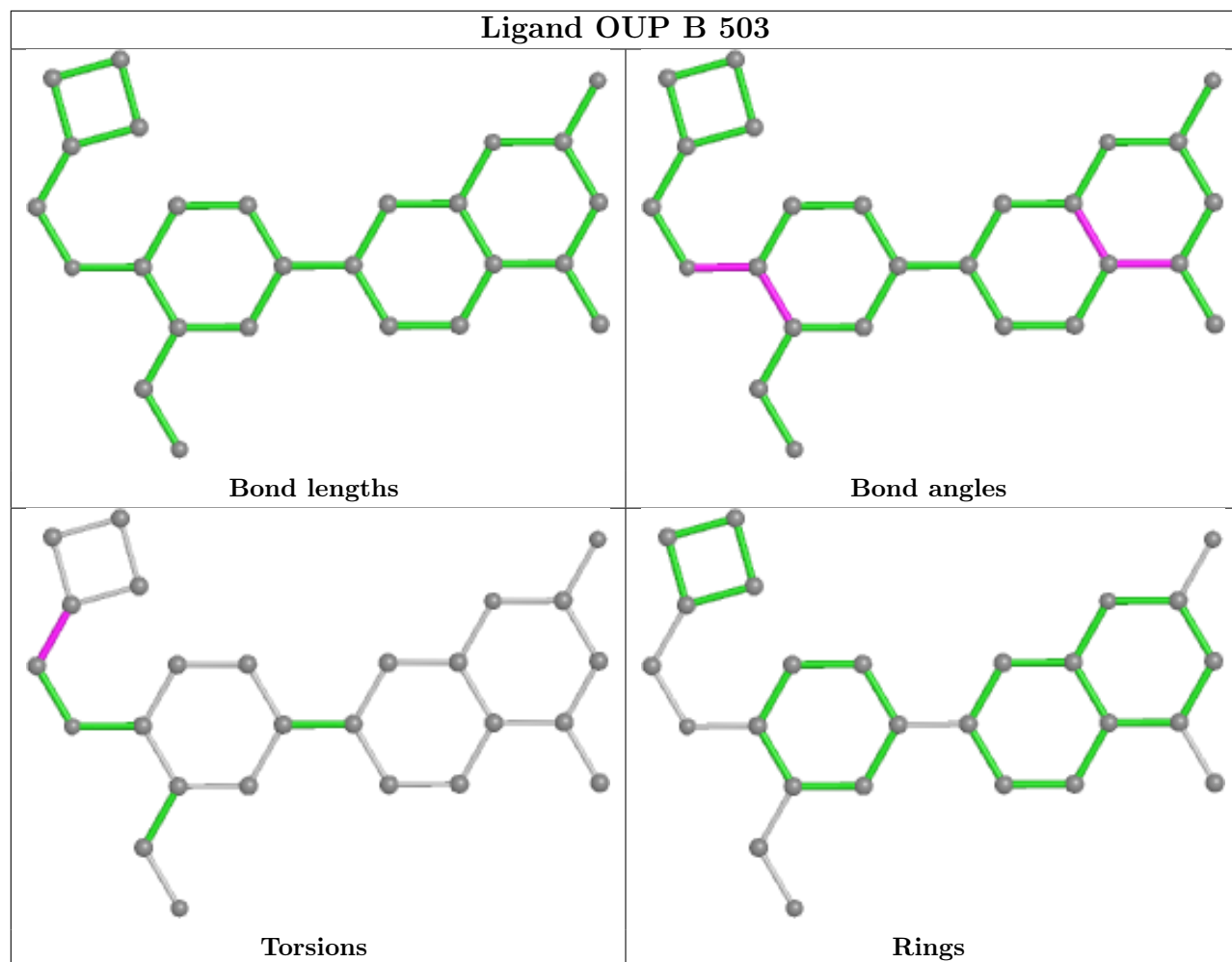


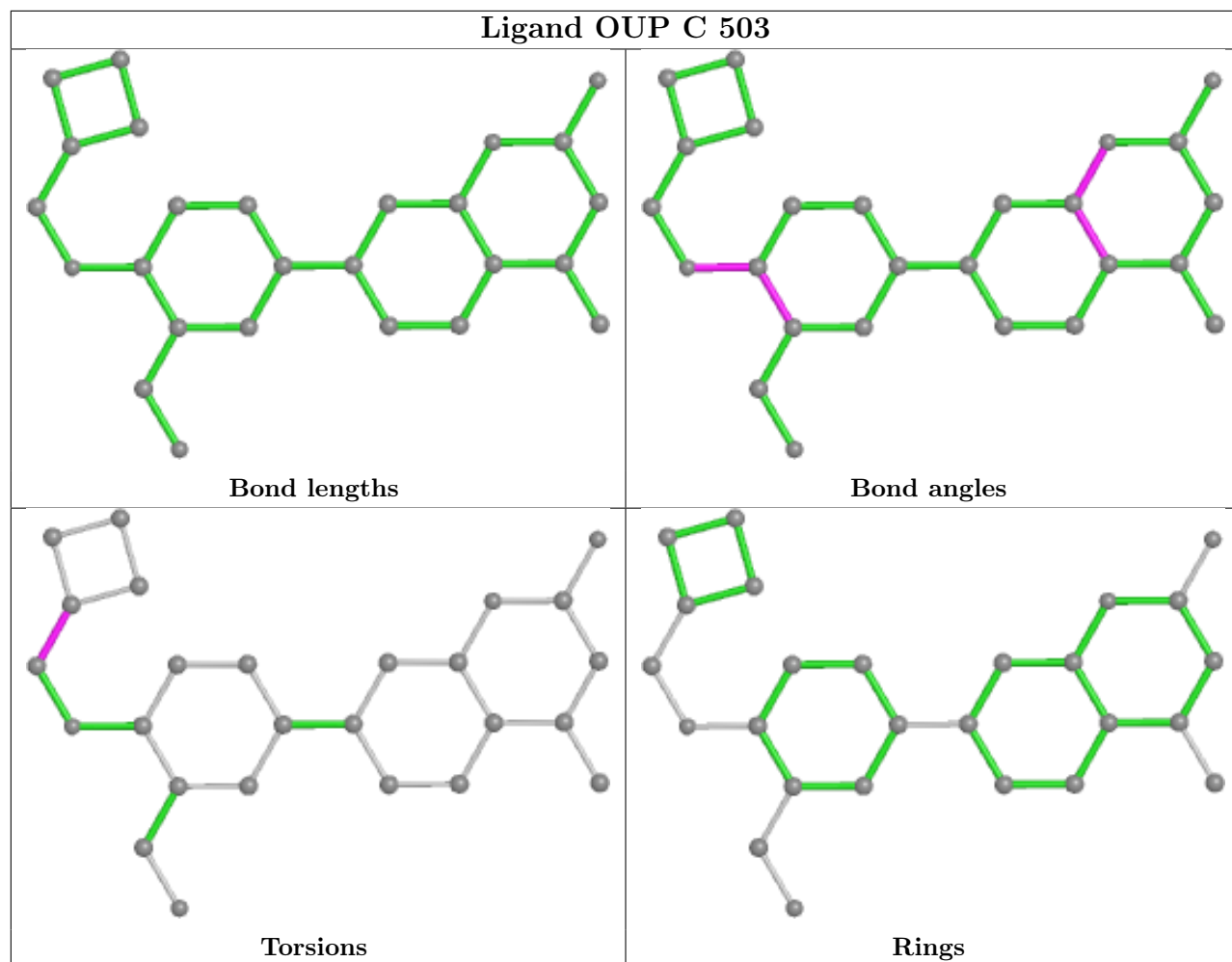


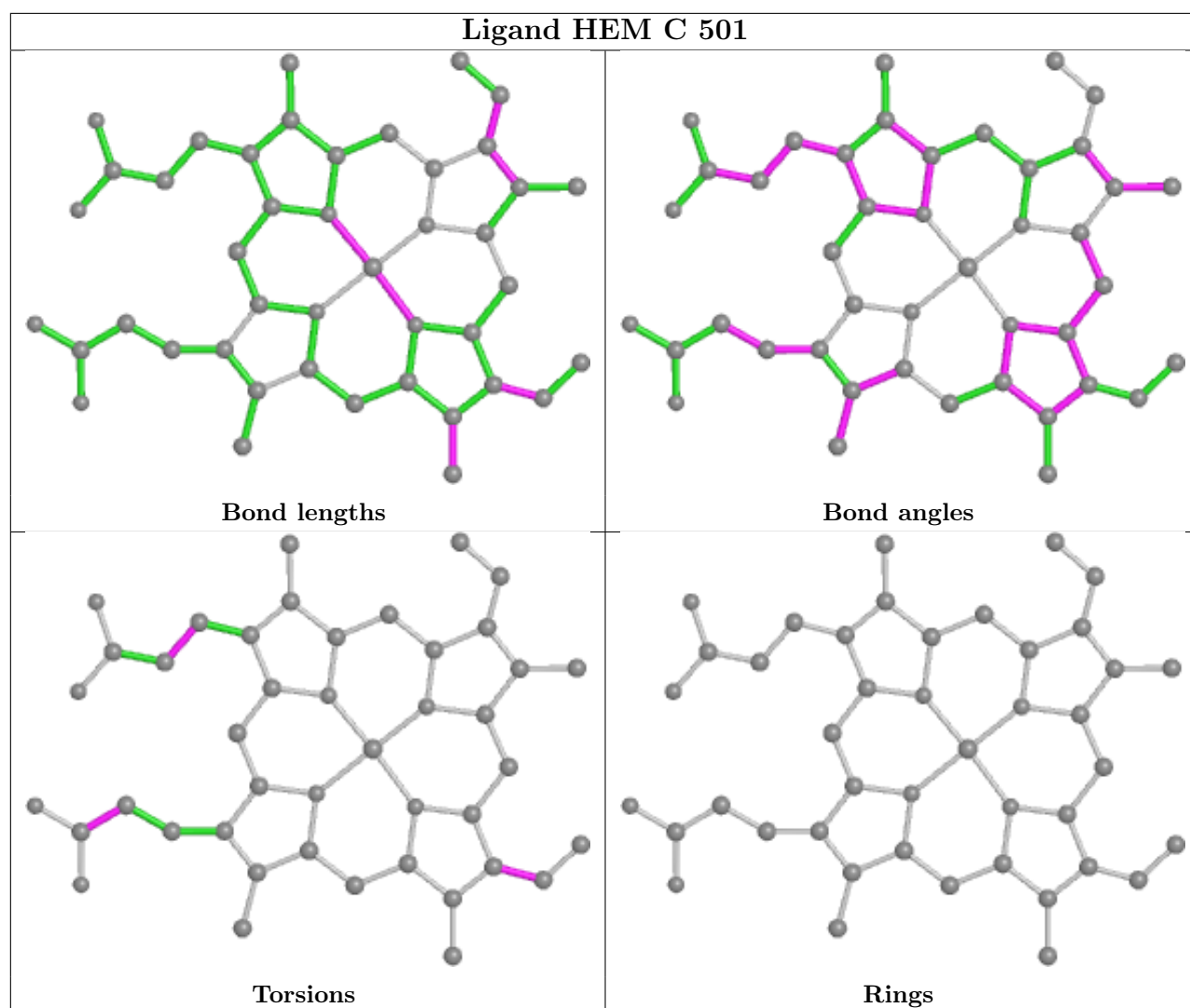












5.7 Other polymers [i](#)

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	402/440 (91%)	1.36	103 (25%) 0 0	32, 63, 116, 144	0
1	B	403/440 (91%)	0.58	33 (8%) 11 13	28, 45, 82, 134	0
1	C	402/440 (91%)	0.89	59 (14%) 2 2	29, 51, 90, 135	0
1	D	403/440 (91%)	0.67	40 (9%) 7 8	28, 46, 81, 139	0
All	All	1610/1760 (91%)	0.88	235 (14%) 2 2	28, 50, 99, 144	0

All (235) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	D	259	GLY	7.6
1	D	257	GLN	7.5
1	A	145	ALA	6.2
1	B	68	PHE	6.1
1	A	447	TRP	5.6
1	A	281	PRO	5.5
1	D	255	ARG	5.5
1	C	68	PHE	5.3
1	D	260	SER	5.2
1	A	452	ILE	5.1
1	A	259	GLY	5.1
1	A	480	TRP	5.0
1	C	275	ILE	4.9
1	A	303	PHE	4.8
1	A	448	ILE	4.8
1	D	256	GLN	4.8
1	C	257	GLN	4.7
1	A	141	SER	4.7
1	A	302	LEU	4.7
1	A	257	GLN	4.7
1	D	258	ASP	4.6

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
1	C	300	PRO	4.6
1	B	258	ASP	4.6
1	A	451	PRO	4.5
1	C	79	ILE	4.5
1	D	452	ILE	4.5
1	B	89	GLN	4.5
1	B	79	ILE	4.5
1	A	275	ILE	4.4
1	A	280	THR	4.4
1	D	121	GLU	4.4
1	A	254	TYR	4.4
1	B	460	PHE	4.4
1	A	256	GLN	4.3
1	A	278	GLY	4.3
1	A	204	ALA	4.3
1	A	163	TYR	4.3
1	C	280	THR	4.3
1	B	259	GLY	4.2
1	A	185	VAL	4.2
1	C	447	TRP	4.2
1	A	273	LEU	4.2
1	C	81	TYR	4.2
1	D	89	GLN	4.2
1	A	353	PHE	4.1
1	C	480	TRP	4.1
1	B	67	LYS	4.1
1	C	238	ARG	4.1
1	D	67	LYS	4.0
1	A	346	LEU	4.0
1	C	446	ALA	4.0
1	A	140	ARG	3.9
1	C	304	LEU	3.9
1	A	272	GLU	3.9
1	C	448	ILE	3.8
1	A	238	ARG	3.8
1	A	293	LEU	3.8
1	C	451	PRO	3.8
1	A	107	ARG	3.8
1	A	153	VAL	3.8
1	A	297	ASP	3.7
1	A	445	TRP	3.7
1	A	157	VAL	3.7

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
1	B	157	VAL	3.7
1	B	451	PRO	3.7
1	A	244	TRP	3.6
1	C	445	TRP	3.6
1	A	300	PRO	3.6
1	C	141	SER	3.5
1	D	446	ALA	3.5
1	C	292	LEU	3.5
1	A	68	PHE	3.5
1	B	454	GLY	3.5
1	D	261	VAL	3.5
1	D	107	ARG	3.5
1	B	141[A]	SER	3.4
1	C	449	VAL	3.4
1	C	202	ARG	3.4
1	D	262	ARG	3.4
1	C	184	CYS	3.4
1	A	274	CYS	3.3
1	A	364	THR	3.3
1	A	207	MET	3.3
1	A	242	ARG	3.3
1	A	268	VAL	3.2
1	A	449	VAL	3.2
1	A	276	GLN	3.2
1	A	184	CYS	3.2
1	D	460	PHE	3.2
1	B	452	ILE	3.2
1	D	123	LEU	3.2
1	A	146	HIS	3.2
1	D	454	GLY	3.2
1	B	455	SER	3.2
1	A	283	ASN	3.2
1	A	412	LEU	3.1
1	A	295	ALA	3.1
1	A	144	GLN	3.1
1	A	368	CYS	3.1
1	A	277	HIS	3.1
1	B	449	VAL	3.1
1	B	447	TRP	3.0
1	C	140	ARG	3.0
1	A	305	LEU	3.0
1	A	446	ALA	3.0

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
1	B	120	PRO	3.0
1	C	364	THR	2.9
1	B	119	ALA	2.9
1	A	309	LEU	2.9
1	D	68	PHE	2.9
1	A	159	ALA	2.9
1	A	357	TYR	2.9
1	C	142	GLY	2.9
1	B	257	GLN	2.9
1	A	479	PRO	2.9
1	C	452	ILE	2.9
1	A	360	THR	2.9
1	B	360	THR	2.9
1	C	439	GLY	2.9
1	D	238	ARG	2.8
1	A	292	LEU	2.8
1	A	241	PHE	2.8
1	D	268	VAL	2.8
1	C	273	LEU	2.8
1	A	89	GLN	2.8
1	C	237	GLY	2.8
1	C	277	HIS	2.8
1	C	293	LEU	2.7
1	D	451	PRO	2.7
1	D	445	TRP	2.7
1	B	97	ARG	2.7
1	C	307	PRO	2.7
1	B	453	SER	2.7
1	A	279	TRP	2.7
1	D	449	VAL	2.7
1	C	360	THR	2.7
1	A	122	GLN	2.7
1	A	79	ILE	2.6
1	C	241	PHE	2.6
1	A	304	LEU	2.6
1	B	446	ALA	2.6
1	C	76	VAL	2.6
1	A	294	GLN	2.6
1	B	122	GLN	2.6
1	A	362	ILE	2.6
1	A	335	ALA	2.5
1	D	275	ILE	2.5

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
1	C	388	ARG	2.5
1	B	81	TYR	2.5
1	A	365	ARG	2.5
1	C	294	GLN	2.5
1	D	120	PRO	2.5
1	D	456	LEU	2.5
1	A	298	GLU	2.5
1	A	289	LEU	2.5
1	A	450	PRO	2.5
1	D	447	TRP	2.5
1	C	89	GLN	2.5
1	A	367	LEU	2.5
1	B	123	LEU	2.5
1	C	302	LEU	2.5
1	A	290	PRO	2.4
1	A	148	GLN	2.4
1	C	272	GLU	2.4
1	A	221	ARG	2.4
1	C	468	PHE	2.4
1	A	255	ARG	2.4
1	A	106	PRO	2.4
1	C	450	PRO	2.4
1	C	305	LEU	2.4
1	D	158	ALA	2.4
1	C	299	PRO	2.4
1	C	276	GLN	2.4
1	D	81	TYR	2.4
1	A	70	ARG	2.4
1	D	254	TYR	2.3
1	A	236	PRO	2.3
1	A	136	SER	2.3
1	A	366	ASN	2.3
1	A	142	GLY	2.3
1	C	182	PRO	2.3
1	C	301	GLU	2.3
1	A	90	GLN	2.3
1	B	153	VAL	2.3
1	C	259	GLY	2.3
1	C	236	PRO	2.3
1	D	450	PRO	2.3
1	D	141[A]	SER	2.3
1	A	77	GLY	2.3

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
1	B	142	GLY	2.3
1	D	480	TRP	2.3
1	D	360	THR	2.3
1	A	301	GLU	2.3
1	A	460	PHE	2.2
1	A	359	SER	2.2
1	D	279	TRP	2.2
1	D	388	ARG	2.2
1	C	309	LEU	2.2
1	C	303	PHE	2.2
1	A	209	THR	2.2
1	B	388	ARG	2.2
1	C	208	PHE	2.2
1	D	453	SER	2.2
1	B	445	TRP	2.2
1	C	278	GLY	2.2
1	C	454	GLY	2.2
1	A	205	GLN	2.2
1	C	185	VAL	2.2
1	A	308	GLU	2.1
1	A	121	GLU	2.1
1	D	124	LEU	2.1
1	C	183	ARG	2.1
1	D	237	GLY	2.1
1	C	86	ALA	2.1
1	A	183	ARG	2.1
1	B	202	ARG	2.1
1	A	182	PRO	2.1
1	A	258	ASP	2.1
1	A	228	ILE	2.1
1	A	291	LEU	2.1
1	A	299	PRO	2.1
1	A	202	ARG	2.1
1	A	261	VAL	2.1
1	A	193	LEU	2.1
1	B	236	PRO	2.1
1	A	439	GLY	2.1
1	C	221	ARG	2.0
1	A	330	TRP	2.0
1	B	124	LEU	2.0
1	C	412	LEU	2.0
1	A	361	GLU	2.0

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
1	D	122	GLN	2.0
1	B	450	PRO	2.0
1	C	281	PRO	2.0
1	C	389	THR	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.

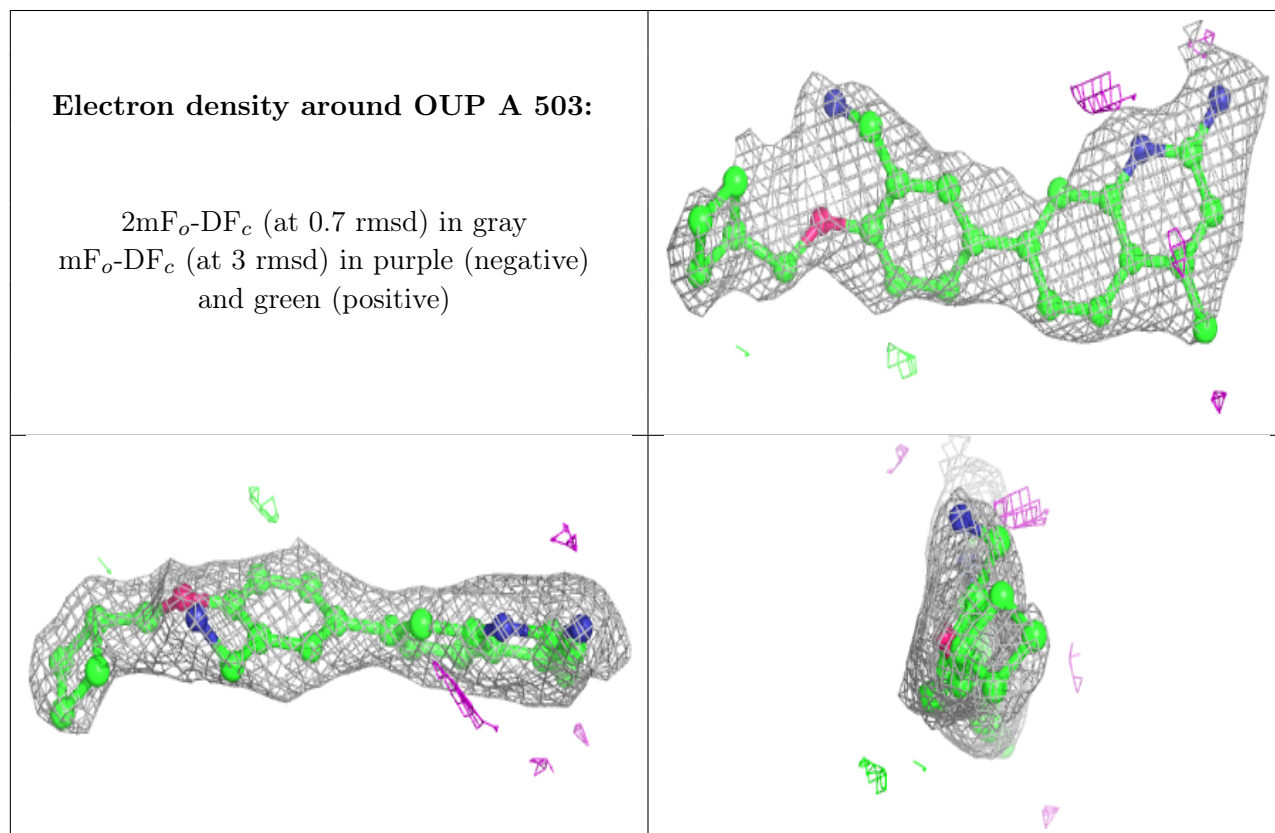
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
5	BTB	A	506	14/14	0.57	0.32	97,113,121,121	0
5	BTB	B	506	14/14	0.64	0.30	76,100,108,112	0
5	BTB	C	506	14/14	0.68	0.23	85,109,122,123	0
7	GOL	A	508	6/6	0.73	0.21	71,83,84,87	0
5	BTB	D	504	14/14	0.81	0.19	35,66,75,78	0
5	BTB	B	504	14/14	0.83	0.16	32,60,86,98	0
3	H4B	B	502	17/17	0.84	0.22	41,58,74,77	0
5	BTB	D	505	14/14	0.85	0.21	59,79,83,84	0
5	BTB	A	505	14/14	0.85	0.17	70,89,102,102	0
3	H4B	A	502	17/17	0.86	0.29	54,63,82,84	0
3	H4B	C	502	17/17	0.86	0.29	38,58,72,76	0
7	GOL	C	508	6/6	0.86	0.20	48,73,77,83	0
3	H4B	D	502	17/17	0.88	0.21	37,60,72,77	0
8	CL	D	506	1/1	0.88	0.19	55,55,55,55	0
8	CL	C	509	1/1	0.89	0.17	52,52,52,52	0
4	OUP	A	503	26/26	0.89	0.36	36,71,87,99	0
5	BTB	B	505	14/14	0.90	0.21	35,74,84,93	0
5	BTB	A	504	14/14	0.90	0.21	34,72,85,93	0
4	OUP	D	503	26/26	0.90	0.18	29,54,72,72	0

Continued on next page...

Continued from previous page...

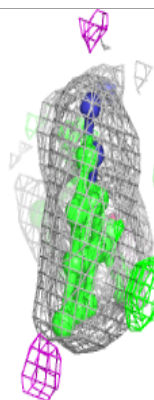
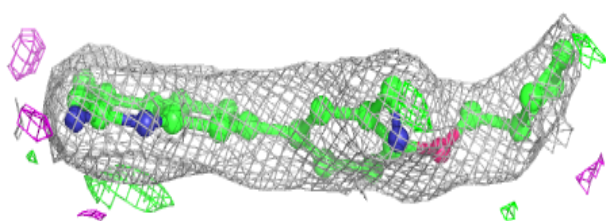
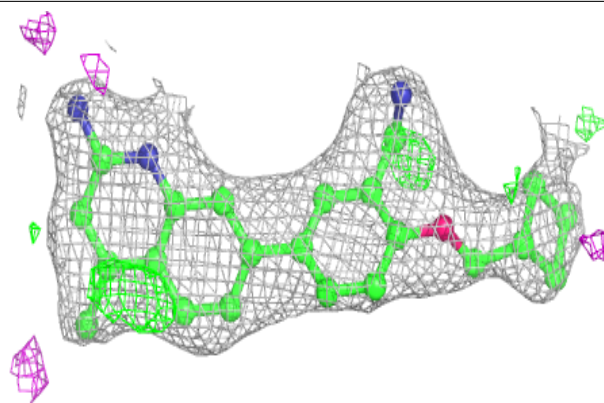
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
4	OUP	C	503	26/26	0.91	0.25	38,56,66,68	0
4	OUP	B	503	26/26	0.92	0.15	30,52,72,78	0
8	CL	B	507	1/1	0.93	0.15	52,52,52,52	0
5	BTB	C	505	14/14	0.93	0.15	46,64,88,90	0
5	BTB	C	504	14/14	0.93	0.22	35,63,81,90	0
2	HEM	A	501	43/43	0.94	0.23	37,58,88,97	0
2	HEM	C	501	43/43	0.95	0.21	30,44,70,81	0
2	HEM	B	501	43/43	0.96	0.13	28,37,60,70	0
2	HEM	D	501	43/43	0.96	0.13	22,35,56,63	0
8	CL	A	509	1/1	0.97	0.23	53,53,53,53	0
9	GD	A	510	1/1	0.97	0.07	77,77,77,77	0
9	GD	D	507	1/1	0.98	0.13	50,50,50,50	0
6	ZN	A	507	1/1	0.99	0.09	45,45,45,45	0
9	GD	B	508	1/1	0.99	0.10	48,48,48,48	0
9	GD	C	510	1/1	0.99	0.05	79,79,79,79	0
6	ZN	C	507	1/1	0.99	0.10	40,40,40,40	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.

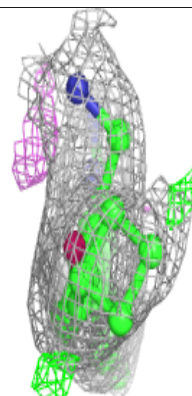
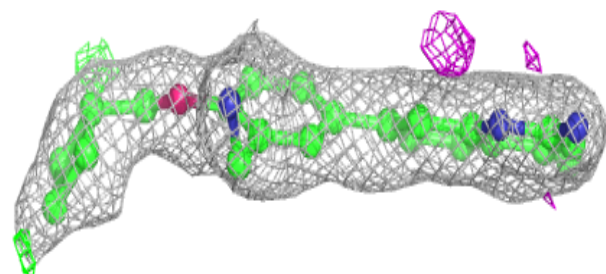
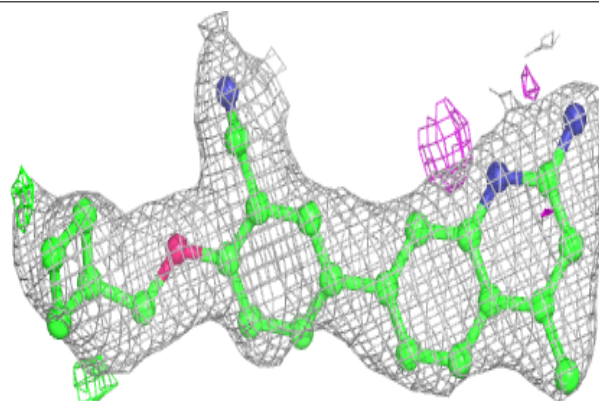


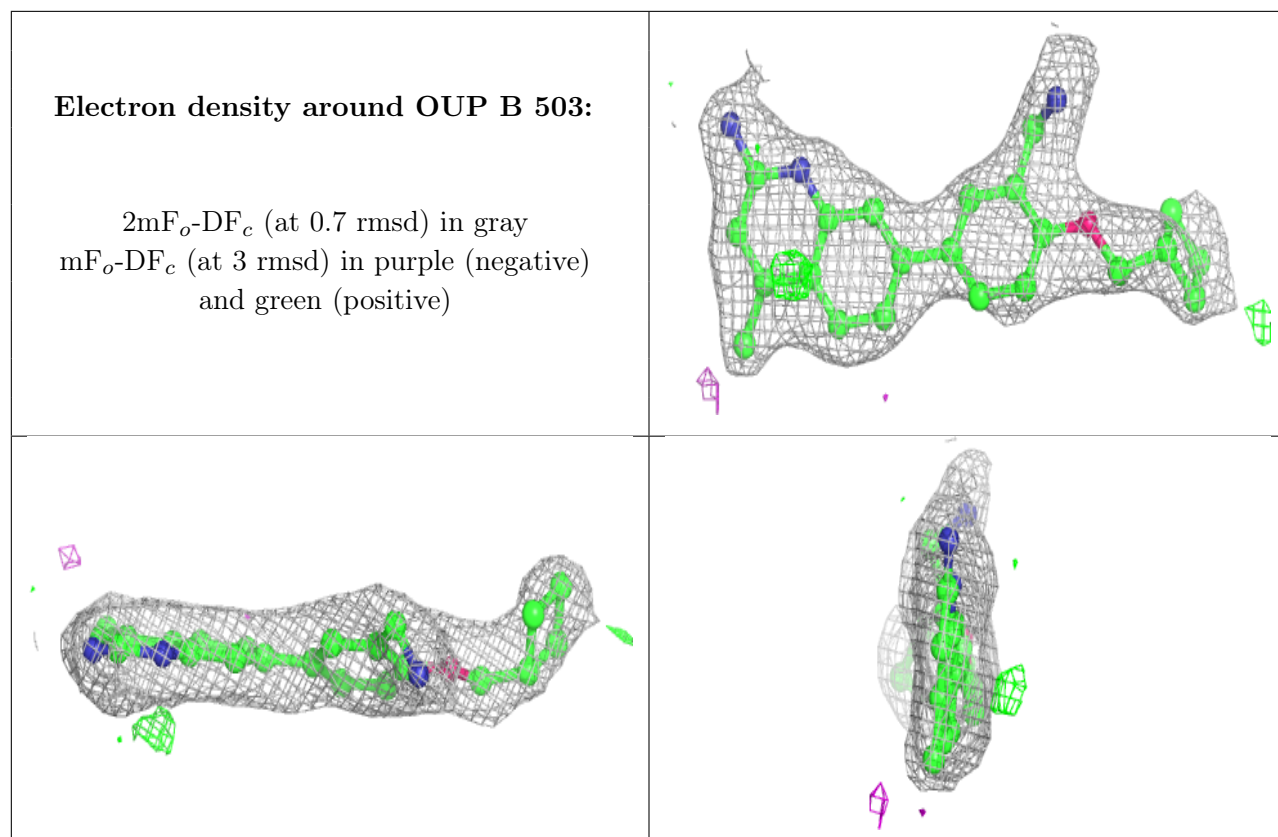
Electron density around OUP D 503:

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

**Electron density around OUP C 503:**

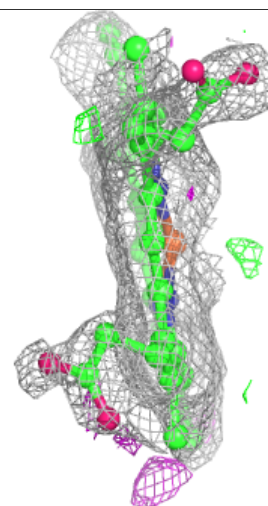
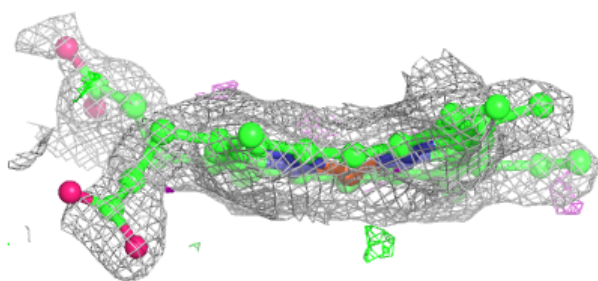
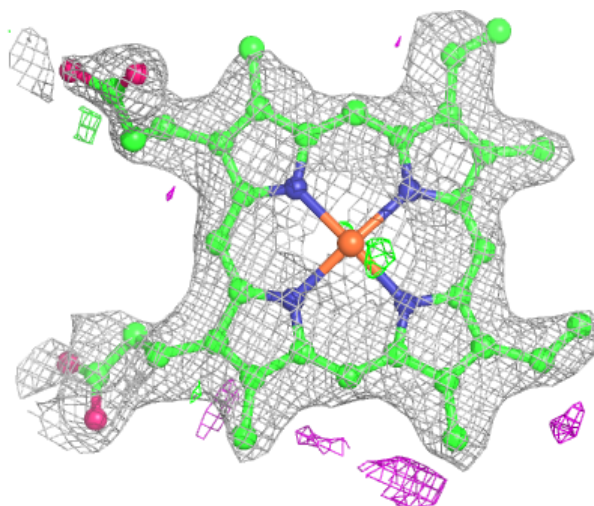
$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)





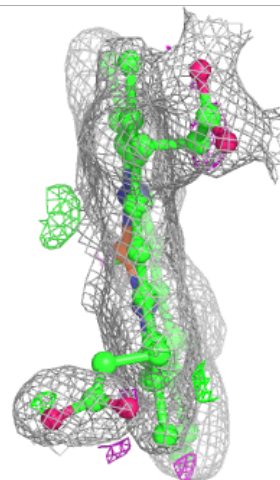
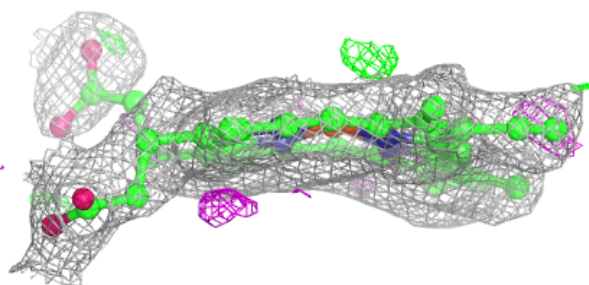
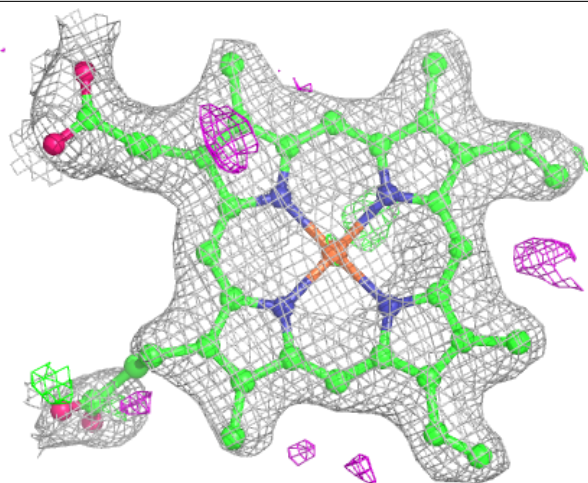
Electron density around HEM A 501:

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



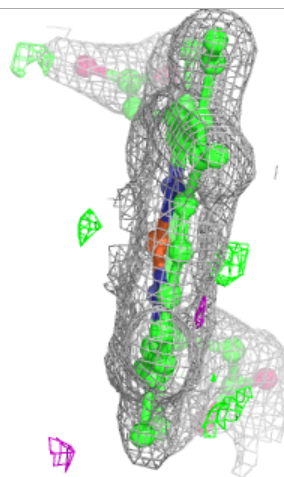
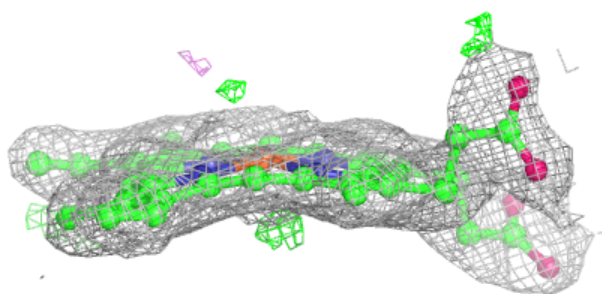
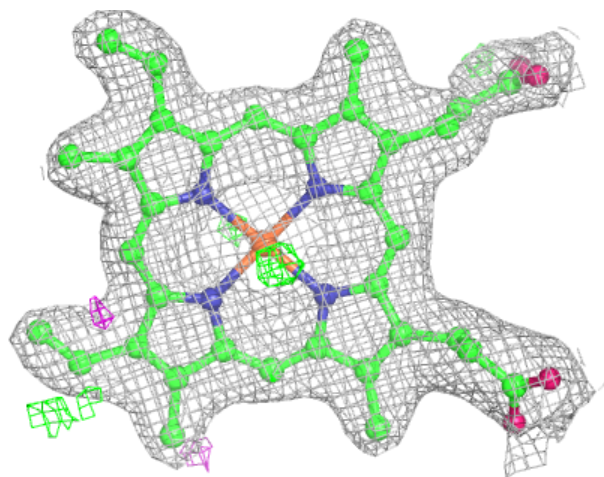
Electron density around HEM C 501:

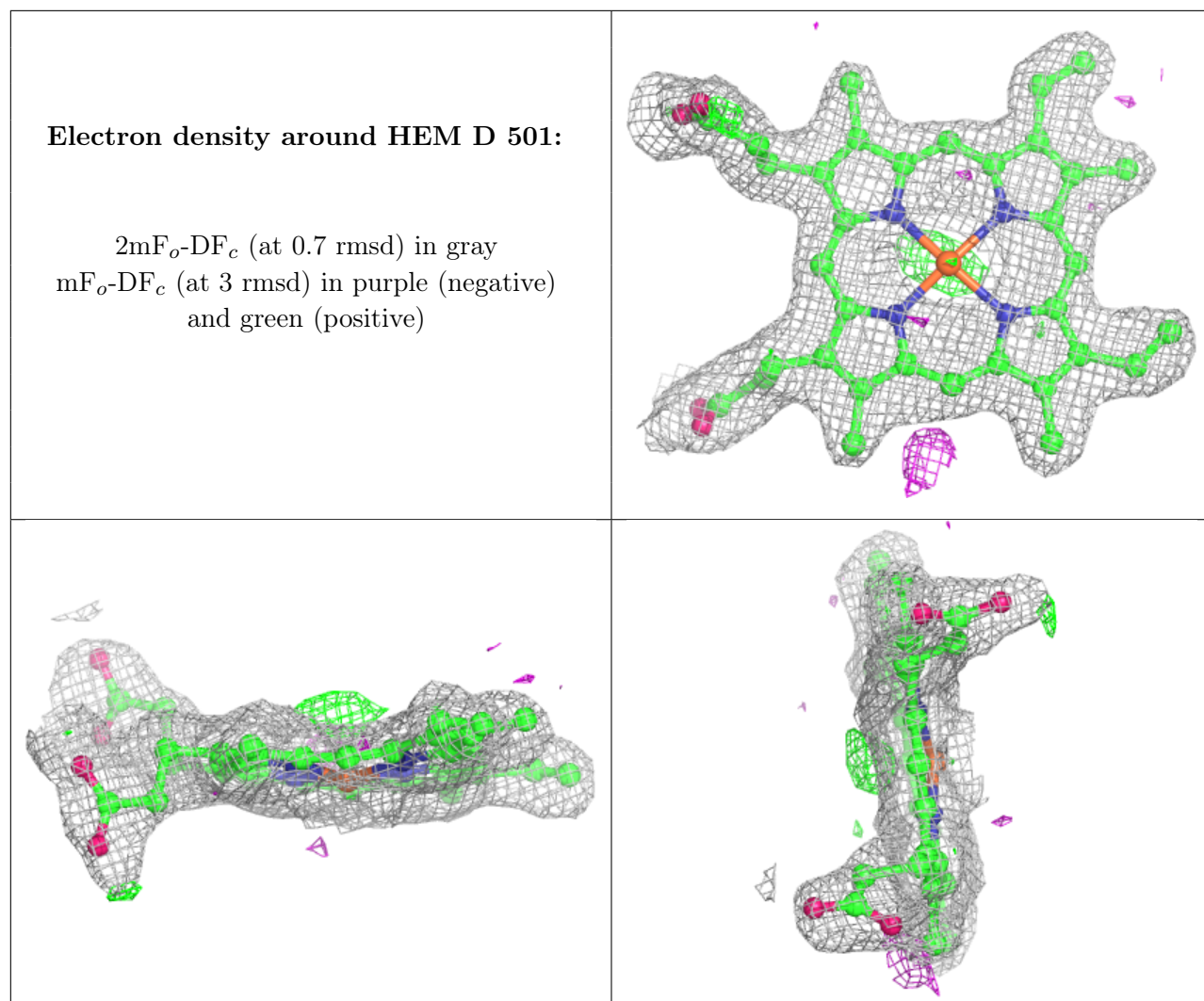
$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



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.