



# Full wwPDB X-ray Structure Validation Report ⓘ

Oct 6, 2023 – 01:43 AM EDT

PDB ID : 8FGT  
Title : Structure of human endothelial nitric oxide synthase heme domain in complex with 6-(2,3-difluoro-5-(2-(4-methylpiperazin-1-yl)ethyl)phenethyl)-4-methylpyridin-2-amine  
Authors : Li, H.; Poulos, T.L.  
Deposited on : 2022-12-12  
Resolution : 1.90 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](mailto:validation@mail.wwpdb.org)

A user guide is available at

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

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

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

---

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

MolProbity : 4.02b-467  
Mogul : 1.8.5 (274361), CSD as541be (2020)  
Xtriage (Phenix) : 1.13  
EDS : 2.35.1  
buster-report : 1.1.7 (2018)  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
Refmac : 5.8.0158  
CCP4 : 7.0.044 (Gargrove)  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.35.1

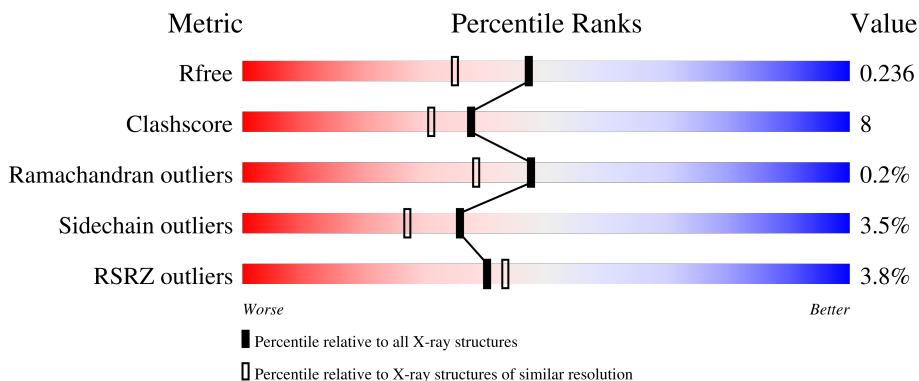
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 1.90 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	6207 (1.90-1.90)
Clashscore	141614	6847 (1.90-1.90)
Ramachandran outliers	138981	6760 (1.90-1.90)
Sidechain outliers	138945	6760 (1.90-1.90)
RSRZ outliers	127900	6082 (1.90-1.90)

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  $\geq 3$ , 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 14142 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	401	3207	2043	564	584	16	0	1	0
1	B	401	3211	2045	564	586	16	0	3	0
1	C	401	3203	2040	563	584	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:

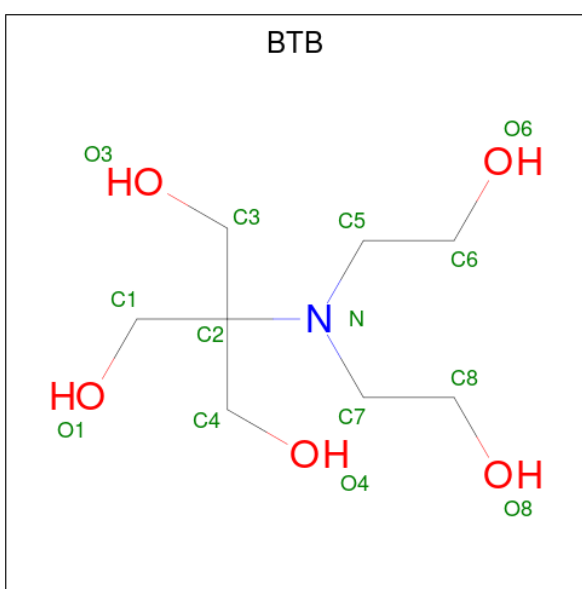
Chain	Residue	Modelled	Actual	Comment	Reference
A	298	GLU	ASP	variant	UNP P29474
B	298	GLU	ASP	variant	UNP P29474
C	298	GLU	ASP	variant	UNP P29474
D	298	GLU	ASP	variant	UNP P29474

- 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 2-[BIS-(2-HYDROXY-ETHYL)-AMINO]-2-HYDROXYMETHYL-PROPAN E-1,3-DIOL (three-letter code: BTB) (formula: C<sub>8</sub>H<sub>19</sub>NO<sub>5</sub>).



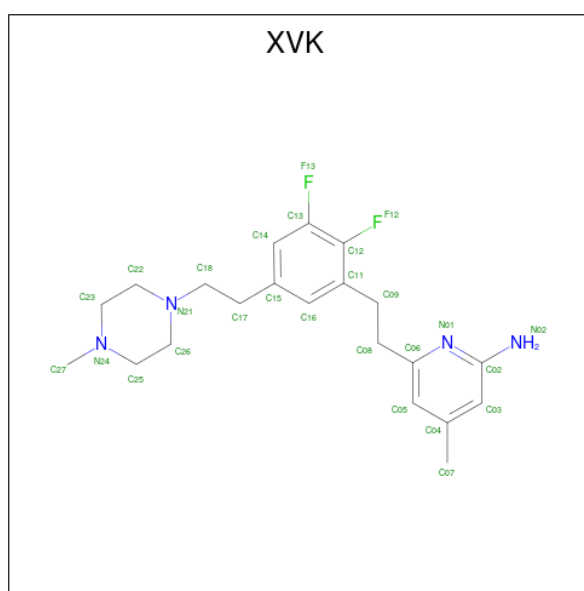
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
4	A	1	Total	C	N	O	0	0
			14	8	1	5		
4	A	1	Total	C	N	O	0	0
			14	8	1	5		
4	A	1	Total	C	N	O	0	0
			14	8	1	5		
4	B	1	Total	C	N	O	0	0
			14	8	1	5		
4	B	1	Total	C	N	O	0	0
			14	8	1	5		
4	C	1	Total	C	N	O	0	0
			14	8	1	5		
4	C	1	Total	C	N	O	0	0
			14	8	1	5		

*Continued on next page...*

Continued from previous page...

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

- Molecule 5 is 6-(2-{2,3-difluoro-5-[2-(4-methylpiperazin-1-yl)ethyl]phenyl}ethyl)-4-methylpyridin-2-amine (three-letter code: XVK) (formula: C<sub>21</sub>H<sub>28</sub>F<sub>2</sub>N<sub>4</sub>) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
5	A	1	Total	C	F	N	0	0
			27	21	2	4		
5	B	1	Total	C	F	N	0	0
			27	21	2	4		
5	C	1	Total	C	F	N	0	0
			27	21	2	4		
5	D	1	Total	C	F	N	0	0
			27	21	2	4		

- Molecule 6 is GLYCEROL (three-letter code: GOL) (formula: C<sub>3</sub>H<sub>8</sub>O<sub>3</sub>).



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	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
6	C	1	Total C O 6 3 3	0	0
6	C	1	Total C O 6 3 3	0	0
6	D	1	Total C O 6 3 3	0	0
6	D	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

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
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 Gd 1 1	0	0
8	B	2	Total Gd 2 2	0	0
8	D	1	Total Gd 1 1	0	0

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

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

- Molecule 10 is water.

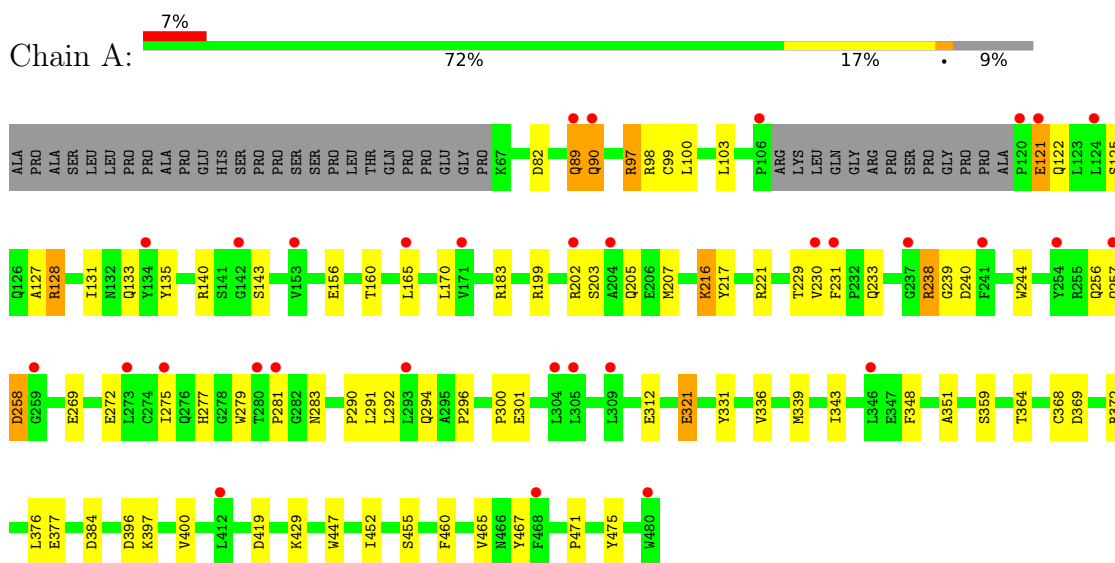
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
10	A	145	Total O 145 145	0	0
10	B	234	Total O 234 234	0	0
10	C	139	Total O 139 139	0	0
10	D	231	Total O 231 231	0	0



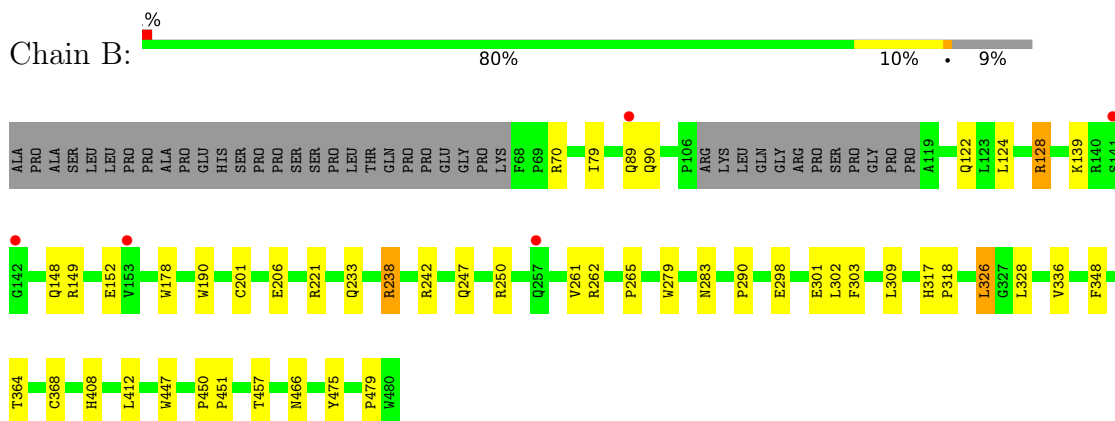
### 3 Residue-property plots

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.

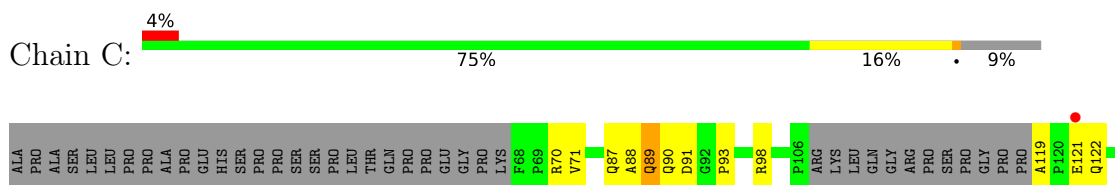
- Molecule 1: Nitric oxide synthase, endothelial

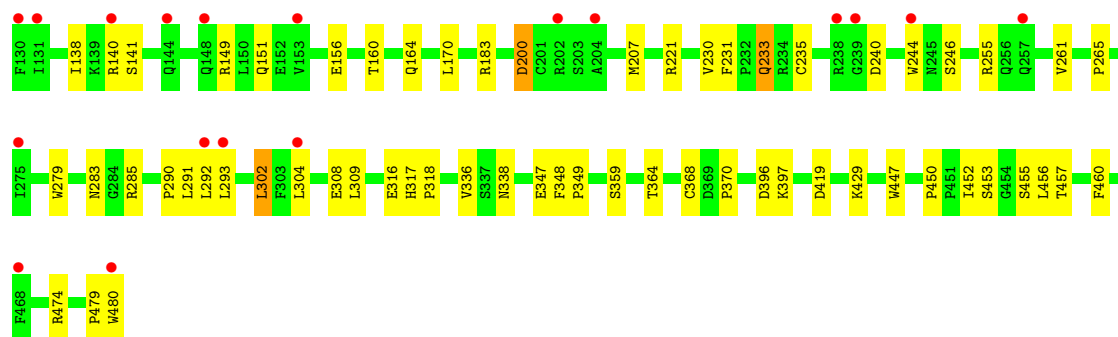


- Molecule 1: Nitric oxide synthase, endothelial

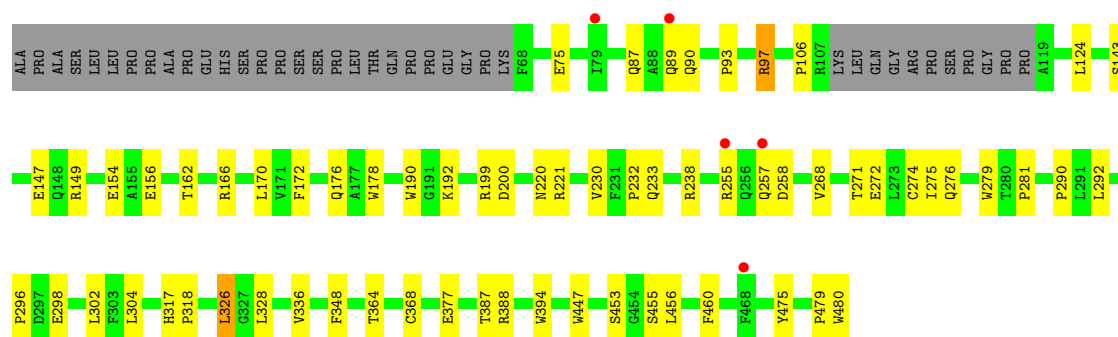
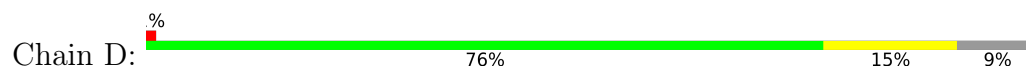


- Molecule 1: Nitric oxide synthase, endothelial





● Molecule 1: Nitric oxide synthase, endothelial



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	58.46Å 151.54Å 107.48Å 90.00° 90.48° 90.00°	Depositor
Resolution (Å)	39.74 – 1.90 39.73 – 1.90	Depositor EDS
% Data completeness (in resolution range)	99.7 (39.74-1.90) 97.5 (39.73-1.90)	Depositor EDS
$R_{merge}$	0.22	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.29 (at 1.89Å)	Xtrriage
Refinement program	PHENIX 1.11.1_2575	Depositor
R, $R_{free}$	0.199 , 0.241 0.194 , 0.236	Depositor DCC
$R_{free}$ test set	7403 reflections (5.05%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	31.3	Xtrriage
Anisotropy	1.093	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.36 , 46.3	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.46$ , $\langle L^2 \rangle = 0.28$	Xtrriage
Estimated twinning fraction	0.199 for h,-k,-l	Xtrriage
$F_o, F_c$ correlation	0.97	EDS
Total number of atoms	14142	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	55.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.08% of the height of the origin peak. No significant pseudotranslation is detected.*

<sup>1</sup>Intensities estimated from amplitudes.

<sup>2</sup>Theoretical 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: HEM, BTB, CL, GOL, H4B, ZN, GD, XVK

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	0.34	0/3302	0.50	0/4498
1	B	0.40	0/3312	0.53	0/4514
1	C	0.34	0/3298	0.51	0/4495
1	D	0.40	0/3309	0.55	0/4509
All	All	0.37	0/13221	0.52	0/18016

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	3207	0	3112	58	0
1	B	3211	0	3114	34	0
1	C	3203	0	3103	40	0
1	D	3214	0	3116	42	0
2	A	43	0	30	6	0
2	B	43	0	30	7	0
2	C	43	0	30	4	0
2	D	43	0	30	3	0
3	A	17	0	15	0	0

*Continued on next page...*

Continued from previous page...

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	42	0	55	8	0
4	B	28	0	37	5	0
4	C	42	0	55	3	0
4	D	28	0	37	3	0
5	A	27	0	0	5	0
5	B	27	0	0	6	0
5	C	27	0	0	2	0
5	D	27	0	0	2	0
6	A	18	0	24	2	0
6	B	6	0	8	2	0
6	C	24	0	32	1	0
6	D	12	0	16	3	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	2	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	145	0	0	6	0
10	B	234	0	0	6	0
10	C	139	0	0	8	0
10	D	231	0	0	3	0
All	All	14142	0	12889	201	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 8.

All (201) 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:124:LEU:HB3	1:B:128:ARG:HH12	1.46	0.80
1:A:233:GLN:NE2	10:A:601:HOH:O	2.16	0.79
1:C:347:GLU:OE2	10:C:601:HOH:O	2.03	0.75
1:C:88:ALA:HB3	1:D:97:ARG:HD3	1.68	0.74
1:B:326:LEU:HB3	1:B:328:LEU:HG	1.70	0.74

Continued on next page...

*Continued from previous page...*

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:501:HEM:HBD2	5:B:503:XVK:C13	2.18	0.73
1:A:336:VAL:HG21	5:A:504:XVK:C12	2.19	0.72
1:C:87:GLN:O	1:C:89:GLN:NE2	2.22	0.72
1:D:336:VAL:HG21	5:D:503:XVK:C13	2.22	0.70
2:D:501:HEM:HBB2	2:D:501:HEM:HHC	1.75	0.69
1:D:290:PRO:HB3	1:D:304:LEU:HD23	1.76	0.67
1:A:275:ILE:HD11	1:A:281:PRO:HB3	1.75	0.67
1:C:336:VAL:HG21	5:C:503:XVK:C12	2.26	0.66
1:D:336:VAL:HG21	5:D:503:XVK:C12	2.26	0.66
1:B:336:VAL:HG21	5:B:503:XVK:C12	2.26	0.66
1:C:316:GLU:OE1	10:C:602:HOH:O	2.14	0.65
1:A:292:LEU:HD22	1:A:300:PRO:HB2	1.79	0.65
6:B:506:GOL:O2	10:B:601:HOH:O	2.15	0.65
1:A:97:ARG:HG2	1:A:98:ARG:HG2	1.79	0.64
1:A:339:MET:SD	5:A:504:XVK:F13	2.45	0.64
1:B:90:GLN:NE2	10:B:603:HOH:O	2.30	0.64
1:B:70:ARG:HD2	1:B:79:ILE:HD13	1.81	0.61
2:B:501:HEM:HBC2	2:B:501:HEM:HMC2	1.82	0.61
1:A:283:ASN:ND2	10:A:607:HOH:O	2.34	0.61
1:A:377:GLU:OE1	4:A:505:BTB:O3	2.15	0.60
1:B:279:TRP:HB2	1:B:302:LEU:HD21	1.83	0.60
1:A:238:ARG:NH1	10:A:606:HOH:O	2.30	0.60
1:A:321:GLU:H	1:A:321:GLU:CD	2.02	0.60
1:A:475:TYR:OH	2:A:501:HEM:O1D	2.19	0.60
1:A:125:SER:HA	1:A:128:ARG:NH1	2.17	0.60
1:C:200:ASP:OD1	1:C:200:ASP:N	2.35	0.59
2:A:501:HEM:HMC2	2:A:501:HEM:HBC2	1.82	0.59
2:C:501:HEM:HBC2	2:C:501:HEM:HMC2	1.85	0.58
1:D:257:GLN:NE2	10:D:605:HOH:O	2.38	0.57
1:A:128:ARG:HH11	1:A:128:ARG:HB2	1.69	0.56
1:A:133:GLN:NE2	10:A:610:HOH:O	2.37	0.56
1:A:135:TYR:HD1	1:A:140:ARG:HB3	1.70	0.56
1:C:279:TRP:HB2	1:C:302:LEU:HD11	1.87	0.56
1:D:388:ARG:NH2	10:D:604:HOH:O	2.36	0.56
1:D:279:TRP:HB2	1:D:302:LEU:HD21	1.86	0.56
1:C:170:LEU:HD11	1:C:230:VAL:HG21	1.87	0.56
1:B:247:GLN:HB2	1:B:250:ARG:HD3	1.88	0.56
1:C:450:PRO:HG2	1:C:457:THR:HG21	1.88	0.56
1:B:298:GLU:OE1	4:B:505:BTB:H42	2.06	0.55
1:D:271:THR:O	1:D:275:ILE:HG12	2.07	0.55
1:D:143:SER:O	1:D:147:GLU:HG2	2.07	0.55

*Continued on next page...*

*Continued from previous page...*

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:364:THR:O	1:C:368:CYS:HB2	2.06	0.54
2:A:501:HEM:HBD2	5:A:504:XVK:C12	2.37	0.54
1:D:475:TYR:OH	2:D:501:HEM:O1D	2.20	0.54
1:B:336:VAL:HG21	5:B:503:XVK:C13	2.37	0.54
2:A:501:HEM:HBB2	2:A:501:HEM:HHC	1.91	0.52
1:B:262:ARG:NE	1:B:283:ASN:O	2.36	0.52
1:C:233:GLN:NE2	10:C:604:HOH:O	2.31	0.52
1:B:233:GLN:HB3	1:B:348:PHE:CE2	2.45	0.51
1:B:221:ARG:NH1	10:B:611:HOH:O	2.43	0.51
1:C:291:LEU:HB3	1:C:293:LEU:HD21	1.93	0.51
4:A:503:BTB:H82	4:A:503:BTB:H41	1.92	0.51
2:A:501:HEM:HBD2	5:A:504:XVK:C13	2.41	0.51
1:D:124:LEU:HD11	1:D:154:GLU:HG3	1.93	0.51
5:B:503:XVK:C23	6:B:506:GOL:H32	2.41	0.51
1:C:119:ALA:HB1	1:C:122:GLN:HB2	1.92	0.51
1:C:479:PRO:HD2	1:C:480:TRP:CZ3	2.45	0.51
1:A:216:LYS:HG3	1:A:217:TYR:N	2.26	0.50
1:A:99:CYS:HB3	1:B:466:ASN:HB3	1.94	0.50
2:B:501:HEM:HBD2	5:B:503:XVK:C12	2.40	0.50
1:A:127:ALA:O	1:A:131:ILE:HG12	2.12	0.50
1:D:178:TRP:CE3	1:D:190:TRP:HA	2.47	0.50
1:A:183:ARG:HD3	1:A:447:TRP:CD2	2.47	0.49
1:C:347:GLU:OE2	1:C:474:ARG:NH2	2.45	0.49
2:C:501:HEM:HBD2	5:C:503:XVK:C12	2.43	0.49
1:C:453:SER:HB3	1:C:456:LEU:HD12	1.95	0.49
1:D:154:GLU:OE2	6:D:506:GOL:O2	2.19	0.49
1:A:170:LEU:HD11	1:A:230:VAL:HG11	1.94	0.49
2:C:501:HEM:HHA	2:C:501:HEM:HBD1	1.95	0.49
4:A:505:BTB:H51	4:A:505:BTB:H11	1.45	0.48
1:A:97:ARG:HH11	1:A:97:ARG:HB2	1.77	0.48
1:C:207:MET:HG3	1:C:231:PHE:CZ	2.48	0.48
1:D:455:SER:HA	1:D:460:PHE:CG	2.49	0.48
1:C:183:ARG:HD3	1:C:447:TRP:CD2	2.49	0.48
1:D:453:SER:HB3	1:D:456:LEU:HD12	1.95	0.48
1:A:384:ASP:OD1	4:A:503:BTB:O3	2.31	0.48
1:B:298:GLU:HG2	10:B:753:HOH:O	2.14	0.48
1:A:156:GLU:O	1:A:160:THR:OG1	2.25	0.48
4:A:506:BTB:H12	4:A:506:BTB:H72	1.53	0.48
1:B:298:GLU:OE1	4:B:505:BTB:H72	2.14	0.48
1:C:138:ILE:O	1:C:140:ARG:HG2	2.12	0.48
1:C:90:GLN:NE2	10:C:613:HOH:O	2.42	0.47

*Continued on next page...*

*Continued from previous page...*

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:D:505:BTB:O4	4:D:505:BTB:H51	2.14	0.47
1:C:246:SER:HA	1:C:338:ASN:HB3	1.95	0.47
1:D:326:LEU:HB3	1:D:328:LEU:HG	1.95	0.47
1:D:275:ILE:HD12	1:D:281:PRO:HG3	1.97	0.47
1:A:238:ARG:NH2	1:A:240:ASP:OD1	2.48	0.47
4:C:505:BTB:H81	4:C:505:BTB:H52	1.56	0.47
1:C:240:ASP:HB3	1:C:349:PRO:HG2	1.97	0.47
1:A:359:SER:OG	1:A:419:ASP:HA	2.15	0.47
4:A:503:BTB:H51	4:A:503:BTB:H32	1.62	0.46
1:A:89:GLN:HG3	1:A:90:GLN:N	2.29	0.46
1:D:364:THR:O	1:D:368:CYS:HB2	2.16	0.46
1:A:233:GLN:HB3	1:A:348:PHE:CE2	2.51	0.46
1:D:93:PRO:HB3	1:D:106:PRO:HB3	1.98	0.46
1:B:238:ARG:NH2	10:B:618:HOH:O	2.48	0.46
1:A:100:LEU:HB3	1:A:103:LEU:HD22	1.97	0.46
1:C:149:ARG:NH2	1:C:164:GLN:O	2.42	0.46
1:B:317:HIS:CG	1:B:318:PRO:HD2	2.51	0.45
1:A:368:CYS:SG	1:A:376:LEU:HD13	2.57	0.45
1:B:408:HIS:CE1	1:B:412:LEU:HD13	2.51	0.45
1:D:272:GLU:O	1:D:276:GLN:HG2	2.16	0.45
1:A:364:THR:O	1:A:368:CYS:HB2	2.16	0.45
1:C:370:PRO:HG2	1:D:75:GLU:HG3	1.99	0.45
1:A:447:TRP:CZ3	2:A:501:HEM:HBA2	2.52	0.45
1:B:450:PRO:HG3	1:B:457:THR:HG21	1.98	0.45
1:C:359:SER:OG	1:C:419:ASP:HA	2.16	0.45
1:C:156:GLU:OE2	1:C:164:GLN:N	2.45	0.45
1:C:290:PRO:HB3	1:C:304:LEU:HD12	1.99	0.45
1:D:233:GLN:HB3	1:D:348:PHE:CE2	2.51	0.45
1:D:279:TRP:CG	1:D:290:PRO:HG3	2.52	0.45
1:B:242:ARG:NH2	1:B:479:PRO:HD3	2.32	0.45
1:B:250:ARG:HD2	1:B:250:ARG:HA	1.70	0.45
1:D:199:ARG:O	1:D:232:PRO:HG3	2.16	0.45
1:D:220:ASN:O	1:D:221:ARG:HG2	2.17	0.45
4:B:505:BTB:H42	4:B:505:BTB:H72	1.86	0.45
6:C:507:GOL:HO1	6:C:507:GOL:HO2	1.61	0.45
4:B:504:BTB:H61	10:B:741:HOH:O	2.16	0.44
1:A:121:GLU:H	1:A:121:GLU:HG3	1.56	0.44
1:D:149:ARG:HD3	1:D:166:ARG:CZ	2.46	0.44
1:B:301:GLU:HB3	1:B:303:PHE:CE1	2.52	0.44
1:C:364:THR:HG21	1:C:452:ILE:HG23	1.98	0.44
1:C:447:TRP:HA	3:C:502:H4B:N1	2.32	0.44

*Continued on next page...*



*Continued from previous page...*

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:396:ASP:O	1:A:400:VAL:HG23	2.18	0.44
2:B:501:HEM:HBD1	2:B:501:HEM:HHA	1.99	0.44
1:C:244:TRP:CD1	1:C:479:PRO:HG2	2.53	0.44
1:C:455:SER:HA	1:C:460:PHE:CG	2.53	0.44
2:B:501:HEM:HBA1	5:B:503:XVK:C09	2.48	0.44
1:C:91:ASP:OD1	1:D:97:ARG:NH2	2.34	0.44
4:A:503:BTB:H12	4:A:503:BTB:H72	1.83	0.44
4:C:504:BTB:H51	4:C:504:BTB:H12	1.76	0.44
1:A:269:GLU:O	1:A:272:GLU:HG2	2.17	0.43
1:B:201:CYS:HA	1:B:206:GLU:OE2	2.18	0.43
1:B:326:LEU:HD12	4:C:504:BTB:H41	1.98	0.43
1:A:384:ASP:O	6:A:512:GOL:H12	2.18	0.43
1:C:70:ARG:NE	10:C:618:HOH:O	2.49	0.43
1:A:455:SER:HA	1:A:460:PHE:CG	2.53	0.43
1:B:364:THR:O	1:B:368:CYS:HB2	2.19	0.43
1:A:165:LEU:O	1:A:199:ARG:NH1	2.38	0.43
1:A:455:SER:OG	1:B:451:PRO:HB2	2.18	0.43
2:C:501:HEM:HBB2	2:C:501:HEM:HHC	2.00	0.43
1:A:292:LEU:HD23	1:A:292:LEU:HA	1.87	0.43
1:A:343:ILE:HA	1:A:471:PRO:HB3	2.01	0.43
1:B:178:TRP:CE3	1:B:190:TRP:HA	2.54	0.43
1:D:447:TRP:HA	3:D:502:H4B:N1	2.33	0.43
1:D:90:GLN:NE2	10:D:618:HOH:O	2.51	0.43
1:A:397:LYS:NZ	10:A:612:HOH:O	2.41	0.43
1:D:170:LEU:HD11	1:D:230:VAL:HG11	2.00	0.43
1:D:292:LEU:HD23	1:D:292:LEU:HA	1.92	0.43
4:B:505:BTB:H11	4:B:505:BTB:H51	1.37	0.42
1:C:93:PRO:HD2	10:C:734:HOH:O	2.20	0.42
1:A:364:THR:HG21	1:A:452:ILE:HG23	2.01	0.42
1:A:277:HIS:NE2	1:A:300:PRO:HG2	2.34	0.42
1:D:317:HIS:CG	1:D:318:PRO:HD2	2.54	0.42
1:A:207:MET:HA	1:A:231:PHE:CE1	2.54	0.42
4:A:506:BTB:H31	4:A:506:BTB:H51	1.74	0.42
1:B:149:ARG:NH1	1:B:152:GLU:OE1	2.51	0.42
1:C:292:LEU:HD23	1:C:292:LEU:HA	1.93	0.42
1:A:82:ASP:OD2	10:A:602:HOH:O	2.21	0.42
1:A:256:GLN:C	1:A:258:ASP:H	2.22	0.42
1:D:172:PHE:CZ	1:D:176:GLN:HG3	2.54	0.42
1:D:387:THR:HA	1:D:394:TRP:CD1	2.55	0.42
1:B:279:TRP:CD1	1:B:290:PRO:HG3	2.55	0.42
1:D:97:ARG:HA	1:D:97:ARG:HE	1.85	0.42

*Continued on next page...*

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:229:THR:O	1:A:351:ALA:HA	2.20	0.42
1:A:258:ASP:OD1	1:A:258:ASP:N	2.53	0.41
1:B:475:TYR:OH	2:B:501:HEM:O1D	2.29	0.41
1:B:139:LYS:N	1:B:139:LYS:HD2	2.35	0.41
1:C:233:GLN:HB3	1:C:348:PHE:CE2	2.55	0.41
1:D:274:CYS:SG	1:D:290:PRO:HG2	2.60	0.41
1:C:285:ARG:NH1	10:C:605:HOH:O	2.31	0.41
1:D:156:GLU:HG2	1:D:162:THR:O	2.21	0.41
1:A:257:GLN:O	6:A:508:GOL:O2	2.37	0.41
1:B:261:VAL:HG11	1:B:265:PRO:HA	2.03	0.41
6:D:506:GOL:HO2	6:D:506:GOL:HO1	1.63	0.41
1:C:71:VAL:HG12	10:C:697:HOH:O	2.20	0.41
1:C:317:HIS:CG	1:C:318:PRO:HD2	2.56	0.41
1:D:238:ARG:HE	1:D:296:PRO:HB2	1.85	0.41
1:D:298:GLU:CD	4:D:505:BTB:H41	2.41	0.41
1:A:221:ARG:HE	1:A:221:ARG:HB3	1.62	0.41
1:D:178:TRP:CZ3	2:D:501:HEM:HMC3	2.56	0.41
1:A:244:TRP:NE1	1:A:294:GLN:OE1	2.44	0.41
1:B:279:TRP:CG	1:B:290:PRO:HG3	2.56	0.41
1:D:377:GLU:OE2	6:D:507:GOL:H32	2.21	0.41
2:B:501:HEM:HHC	2:B:501:HEM:HBB2	2.03	0.40
1:C:261:VAL:HG11	1:C:265:PRO:HA	2.02	0.40
4:D:505:BTB:H72	4:D:505:BTB:H11	1.70	0.40
1:B:447:TRP:HA	3:B:502:H4B:N1	2.36	0.40
1:A:140:ARG:HG3	1:A:143:SER:HB2	2.03	0.40
1:A:312:GLU:HA	1:A:331:TYR:HA	2.03	0.40
1:A:336:VAL:HG21	5:A:504:XVK:C13	2.51	0.40
1:A:465:VAL:HG12	1:A:467:TYR:HD1	1.87	0.40
1:D:479:PRO:HD2	1:D:480:TRP:CE3	2.55	0.40
1:A:239:GLY:O	1:A:296:PRO:HB3	2.21	0.40
1:A:369:ASP:HB2	1:A:372:ARG:HB2	2.03	0.40
1:A:279:TRP:CG	1:A:290:PRO:HG3	2.56	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	398/440 (90%)	383 (96%)	15 (4%)	0	100	100
1	B	400/440 (91%)	390 (98%)	9 (2%)	1 (0%)	41	31
1	C	398/440 (90%)	386 (97%)	12 (3%)	0	100	100
1	D	399/440 (91%)	387 (97%)	10 (2%)	2 (0%)	29	18
All	All	1595/1760 (91%)	1546 (97%)	46 (3%)	3 (0%)	47	38

All (3) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	D	89	GLN
1	D	255	ARG
1	B	89	GLN

### 5.3.2 Protein sidechains [i](#)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	342/373 (92%)	326 (95%)	16 (5%)	26	16
1	B	343/373 (92%)	337 (98%)	6 (2%)	60	57
1	C	341/373 (91%)	323 (95%)	18 (5%)	22	13
1	D	342/373 (92%)	335 (98%)	7 (2%)	55	51
All	All	1368/1492 (92%)	1321 (97%)	47 (3%)	36	28

All (47) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	89	GLN
1	A	90	GLN
1	A	97	ARG

*Continued on next page...*

*Continued from previous page...*

<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
1	A	121	GLU
1	A	122	GLN
1	A	128	ARG
1	A	202	ARG
1	A	203	SER
1	A	205	GLN
1	A	216	LYS
1	A	238	ARG
1	A	258	ASP
1	A	291	LEU
1	A	301	GLU
1	A	321	GLU
1	A	429	LYS
1	B	122	GLN
1	B	128	ARG
1	B	148	GLN
1	B	238	ARG
1	B	309	LEU
1	B	326	LEU
1	C	89	GLN
1	C	98	ARG
1	C	121	GLU
1	C	141	SER
1	C	151	GLN
1	C	160	THR
1	C	200	ASP
1	C	221	ARG
1	C	233	GLN
1	C	235	CYS
1	C	255	ARG
1	C	283	ASN
1	C	302	LEU
1	C	308	GLU
1	C	309	LEU
1	C	396	ASP
1	C	397	LYS
1	C	429	LYS
1	D	87	GLN
1	D	97	ARG
1	D	192	LYS
1	D	200	ASP
1	D	258	ASP

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Res	Type
1	D	268	VAL
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 42 ligands modelled in this entry, 10 are monoatomic - leaving 32 for Mogul analysis.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
6	GOL	A	507	-	5,5,5	0.41	0	5,5,5	0.33	0
5	XVK	D	503	-	29,29,29	0.40	0	39,40,40	1.55	7 (17%)
6	GOL	C	508	-	5,5,5	0.36	0	5,5,5	0.19	0
3	H4B	C	502	-	16,18,18	1.00	1 (6%)	11,26,26	2.69	5 (45%)
5	XVK	B	503	-	29,29,29	0.40	0	39,40,40	1.67	7 (17%)
4	BTB	C	505	-	13,13,13	0.49	0	7,16,16	0.53	0
6	GOL	C	510	-	5,5,5	0.36	0	5,5,5	0.30	0
4	BTB	D	505	-	13,13,13	0.51	0	7,16,16	0.95	1 (14%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
2	HEM	A	501	1	41,50,50	1.47	5 (12%)	45,82,82	1.70	8 (17%)
4	BTB	A	505	-	13,13,13	0.50	0	7,16,16	0.85	0
5	XVK	A	504	-	29,29,29	0.37	0	39,40,40	1.57	7 (17%)
6	GOL	C	509	-	5,5,5	0.36	0	5,5,5	0.15	0
4	BTB	A	506	-	13,13,13	0.35	0	7,16,16	0.54	0
6	GOL	D	506	-	5,5,5	0.34	0	5,5,5	0.31	0
4	BTB	C	506	-	13,13,13	0.33	0	7,16,16	0.30	0
6	GOL	B	506	-	5,5,5	0.41	0	5,5,5	0.36	0
3	H4B	D	502	-	16,18,18	0.87	1 (6%)	11,26,26	2.64	5 (45%)
2	HEM	C	501	1	41,50,50	1.53	7 (17%)	45,82,82	1.72	6 (13%)
4	BTB	B	504	8	13,13,13	0.38	0	7,16,16	0.38	0
6	GOL	D	507	-	5,5,5	0.40	0	5,5,5	0.25	0
6	GOL	A	512	-	5,5,5	0.68	0	5,5,5	2.00	2 (40%)
3	H4B	B	502	-	16,18,18	0.81	0	11,26,26	2.51	5 (45%)
2	HEM	D	501	1	41,50,50	1.52	5 (12%)	45,82,82	1.70	7 (15%)
4	BTB	A	503	8	13,13,13	0.54	0	7,16,16	1.52	2 (28%)
6	GOL	C	507	-	5,5,5	0.38	0	5,5,5	0.32	0
4	BTB	B	505	-	13,13,13	0.64	0	7,16,16	0.89	0
2	HEM	B	501	1	41,50,50	1.51	4 (9%)	45,82,82	1.60	11 (24%)
6	GOL	A	508	-	5,5,5	0.37	0	5,5,5	0.49	0
4	BTB	D	504	8	13,13,13	0.36	0	7,16,16	0.58	0
5	XVK	C	503	-	29,29,29	0.36	0	39,40,40	1.71	8 (20%)
4	BTB	C	504	8	13,13,13	0.43	0	7,16,16	0.52	0
3	H4B	A	502	-	16,18,18	0.85	0	11,26,26	2.54	5 (45%)

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
6	GOL	A	507	-	-	2/4/4/4	-
5	XVK	D	503	-	-	2/10/20/20	0/3/3/3
6	GOL	C	508	-	-	2/4/4/4	-
3	H4B	C	502	-	-	0/8/17/17	0/2/2/2
5	XVK	B	503	-	-	2/10/20/20	0/3/3/3
4	BTB	C	505	-	-	12/21/21/21	-
6	GOL	C	510	-	-	4/4/4/4	-
4	BTB	D	505	-	-	5/21/21/21	-

Continued on next page...

Continued from previous page...

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	HEM	A	501	1	-	4/12/54/54	-
4	BTB	A	505	-	-	13/21/21/21	-
5	XVK	A	504	-	-	1/10/20/20	0/3/3/3
6	GOL	C	509	-	-	4/4/4/4	-
4	BTB	A	506	-	-	4/21/21/21	-
6	GOL	D	506	-	-	2/4/4/4	-
4	BTB	C	506	-	-	7/21/21/21	-
6	GOL	B	506	-	-	2/4/4/4	-
3	H4B	D	502	-	-	0/8/17/17	0/2/2/2
2	HEM	C	501	1	-	3/12/54/54	-
4	BTB	B	504	8	-	3/21/21/21	-
6	GOL	D	507	-	-	2/4/4/4	-
6	GOL	A	512	-	-	3/4/4/4	-
3	H4B	B	502	-	-	0/8/17/17	0/2/2/2
2	HEM	D	501	1	-	1/12/54/54	-
4	BTB	A	503	8	-	3/21/21/21	-
6	GOL	C	507	-	-	3/4/4/4	-
4	BTB	B	505	-	-	14/21/21/21	-
2	HEM	B	501	1	-	6/12/54/54	-
6	GOL	A	508	-	-	2/4/4/4	-
4	BTB	D	504	8	-	3/21/21/21	-
5	XVK	C	503	-	-	1/10/20/20	0/3/3/3
4	BTB	C	504	8	-	4/21/21/21	-
3	H4B	A	502	-	-	0/8/17/17	0/2/2/2

All (23) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	D	501	HEM	C3C-C2C	-4.61	1.34	1.40
2	C	501	HEM	C3C-CAC	3.84	1.55	1.47
2	B	501	HEM	C3C-C2C	-3.55	1.35	1.40
2	C	501	HEM	C3C-C2C	-3.53	1.35	1.40
2	A	501	HEM	C3C-C2C	-3.46	1.35	1.40
2	A	501	HEM	C3C-CAC	3.46	1.54	1.47
2	D	501	HEM	C3C-CAC	3.35	1.54	1.47
2	B	501	HEM	C3C-CAC	3.27	1.54	1.47
2	B	501	HEM	CAB-C3B	3.17	1.56	1.47
2	C	501	HEM	CAB-C3B	3.11	1.55	1.47

Continued on next page...

*Continued from previous page...*

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	501	HEM	CAB-C3B	3.07	1.55	1.47
2	D	501	HEM	CAB-C3B	2.97	1.55	1.47
2	D	501	HEM	FE-NB	2.86	2.11	1.96
2	B	501	HEM	FE-NB	2.86	2.11	1.96
2	A	501	HEM	FE-NB	2.60	2.09	1.96
2	D	501	HEM	CMD-C2D	2.57	1.56	1.50
2	C	501	HEM	FE-NB	2.41	2.08	1.96
2	C	501	HEM	FE-ND	2.24	2.08	1.96
2	C	501	HEM	CMB-C2B	2.19	1.55	1.50
3	C	502	H4B	C4A-C4	-2.14	1.38	1.41
2	A	501	HEM	CAA-C2A	2.07	1.55	1.52
3	D	502	H4B	C4A-C4	-2.03	1.38	1.41
2	C	501	HEM	CAA-C2A	2.01	1.55	1.52

All (86) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	C	502	H4B	C8A-C4A-C4	5.91	119.82	114.57
2	D	501	HEM	CBA-CAA-C2A	-5.84	102.66	112.62
3	D	502	H4B	C8A-C4A-C4	5.46	119.42	114.57
3	B	502	H4B	C8A-C4A-C4	5.35	119.33	114.57
3	A	502	H4B	C8A-C4A-C4	5.34	119.31	114.57
2	C	501	HEM	C4B-CHC-C1C	5.20	129.41	122.56
5	C	503	XVK	C02-N01-C06	4.86	121.78	118.10
5	D	503	XVK	C02-N01-C06	4.73	121.69	118.10
2	A	501	HEM	C4B-CHC-C1C	4.58	128.60	122.56
5	A	504	XVK	C02-N01-C06	4.57	121.56	118.10
5	B	503	XVK	C02-N01-C06	4.56	121.56	118.10
2	C	501	HEM	CBA-CAA-C2A	-4.12	105.59	112.62
5	B	503	XVK	C08-C06-N01	4.11	122.07	115.95
2	B	501	HEM	CMC-C2C-C3C	3.92	132.01	124.68
6	A	512	GOL	O2-C2-C1	-3.75	92.60	109.12
5	B	503	XVK	C05-C06-N01	-3.59	119.09	122.90
2	D	501	HEM	CMC-C2C-C3C	3.51	131.24	124.68
3	D	502	H4B	C2-N3-C4	3.50	121.49	115.93
3	C	502	H4B	N1-C2-N3	-3.46	119.98	125.42
2	C	501	HEM	C4D-ND-C1D	3.46	108.64	105.07
5	C	503	XVK	C16-C11-C12	3.43	119.90	116.76
5	D	503	XVK	C05-C06-N01	-3.42	119.27	122.90
5	A	504	XVK	C08-C06-N01	3.37	120.97	115.95
2	A	501	HEM	C3B-C2B-C1B	3.34	108.96	106.49
2	A	501	HEM	C4D-ND-C1D	3.31	108.50	105.07

*Continued on next page...*



*Continued from previous page...*

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	B	503	XVK	C16-C11-C12	3.27	119.76	116.76
5	D	503	XVK	C16-C11-C12	3.22	119.71	116.76
5	D	503	XVK	C08-C06-N01	3.19	120.70	115.95
2	C	501	HEM	C1B-NB-C4B	3.19	108.37	105.07
3	A	502	H4B	N1-C2-N3	-3.16	120.46	125.42
2	A	501	HEM	C1B-NB-C4B	3.13	108.31	105.07
2	B	501	HEM	C3B-C2B-C1B	3.13	108.81	106.49
3	C	502	H4B	C2-N3-C4	3.12	120.89	115.93
3	A	502	H4B	C2-N3-C4	3.10	120.86	115.93
2	D	501	HEM	CBD-CAD-C3D	-3.09	104.03	112.63
3	D	502	H4B	N1-C2-N3	-3.08	120.59	125.42
3	B	502	H4B	N1-C2-N3	-3.03	120.67	125.42
5	A	504	XVK	C05-C06-N01	-3.01	119.71	122.90
5	A	504	XVK	C16-C11-C12	2.94	119.45	116.76
3	B	502	H4B	C2-N1-C8A	2.93	121.10	114.54
2	B	501	HEM	C4D-ND-C1D	2.92	108.09	105.07
2	D	501	HEM	C4C-CHD-C1D	2.92	126.41	122.56
2	D	501	HEM	CMA-C3A-C4A	-2.90	124.01	128.46
5	C	503	XVK	C18-C17-C15	-2.89	103.91	112.16
2	C	501	HEM	C3D-C4D-ND	-2.88	106.96	110.17
5	C	503	XVK	C08-C06-N01	2.88	120.24	115.95
5	C	503	XVK	C05-C06-N01	-2.86	119.87	122.90
4	A	503	BTB	O3-C3-C2	2.85	119.25	111.44
5	D	503	XVK	F12-C12-C11	2.83	120.84	117.85
5	C	503	XVK	C09-C08-C06	-2.82	106.68	112.99
2	D	501	HEM	C3B-C2B-C1B	2.79	108.56	106.49
3	C	502	H4B	C2-N1-C8A	2.78	120.77	114.54
2	A	501	HEM	C4A-C3A-C2A	2.72	108.89	107.00
5	C	503	XVK	C26-C25-N24	-2.70	107.76	110.80
3	A	502	H4B	C2-N1-C8A	2.64	120.47	114.54
3	B	502	H4B	C2-N3-C4	2.64	120.12	115.93
2	B	501	HEM	C4B-CHC-C1C	2.62	126.02	122.56
2	A	501	HEM	C3D-C4D-ND	-2.61	107.26	110.17
2	B	501	HEM	C3D-C4D-ND	-2.61	107.26	110.17
3	D	502	H4B	C2-N1-C8A	2.59	120.34	114.54
5	A	504	XVK	N02-C02-N01	2.55	120.53	116.49
3	B	502	H4B	C4-C4A-N5	2.55	121.26	119.12
2	A	501	HEM	CMC-C2C-C3C	2.55	129.44	124.68
2	B	501	HEM	CAD-C3D-C2D	-2.50	123.22	127.88
5	D	503	XVK	C26-C25-N24	-2.44	108.05	110.80
2	B	501	HEM	C1B-NB-C4B	2.44	107.59	105.07
4	A	503	BTB	O4-C4-C2	2.41	118.03	111.44

*Continued on next page...*

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
6	A	512	GOL	O1-C1-C2	-2.39	98.75	110.20
5	C	503	XVK	C27-N24-C25	-2.39	107.09	110.66
5	B	503	XVK	F12-C12-C11	2.38	120.36	117.85
5	B	503	XVK	C18-C17-C15	-2.34	105.48	112.16
5	A	504	XVK	C18-C17-C15	-2.33	105.50	112.16
2	D	501	HEM	C4D-ND-C1D	2.27	107.42	105.07
2	C	501	HEM	CMA-C3A-C4A	-2.23	125.04	128.46
5	A	504	XVK	C26-C25-N24	-2.17	108.36	110.80
3	D	502	H4B	C4-C4A-N5	2.16	120.93	119.12
3	C	502	H4B	C4A-N5-C6	-2.15	115.31	121.16
5	D	503	XVK	C08-C09-C11	-2.13	109.37	112.81
2	A	501	HEM	CMA-C3A-C4A	-2.10	125.23	128.46
3	A	502	H4B	C4-C4A-N5	2.10	120.88	119.12
2	B	501	HEM	CAD-CBD-CGD	-2.09	109.11	113.60
2	B	501	HEM	CMA-C3A-C4A	-2.07	125.28	128.46
4	D	505	BTB	O1-C1-C2	-2.06	105.80	111.44
5	B	503	XVK	N02-C02-N01	2.05	119.73	116.49
2	B	501	HEM	CAB-C3B-C2B	-2.04	121.89	128.60
2	B	501	HEM	C4A-C3A-C2A	2.03	108.41	107.00

There are no chirality outliers.

All (114) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	501	HEM	C1A-C2A-CAA-CBA
2	A	501	HEM	C3A-C2A-CAA-CBA
2	B	501	HEM	C1A-C2A-CAA-CBA
4	A	503	BTB	C1-C2-C4-O4
4	A	503	BTB	N-C2-C4-O4
4	A	505	BTB	C4-C2-C3-O3
4	A	505	BTB	C1-C2-C4-O4
4	A	505	BTB	C3-C2-C4-O4
4	A	505	BTB	N-C2-C4-O4
4	A	505	BTB	C1-C2-N-C5
4	A	505	BTB	C1-C2-N-C7
4	A	505	BTB	C3-C2-N-C5
4	A	505	BTB	C3-C2-N-C7
4	A	505	BTB	C4-C2-N-C5
4	A	505	BTB	C4-C2-N-C7
4	A	506	BTB	C1-C2-C3-O3
4	B	504	BTB	O1-C1-C2-C3
4	B	504	BTB	O1-C1-C2-C4

Continued on next page...

*Continued from previous page...*

Mol	Chain	Res	Type	Atoms
4	B	504	BTB	O1-C1-C2-N
4	B	505	BTB	O1-C1-C2-C3
4	B	505	BTB	O1-C1-C2-C4
4	B	505	BTB	O1-C1-C2-N
4	B	505	BTB	C1-C2-C3-O3
4	B	505	BTB	C4-C2-C3-O3
4	B	505	BTB	N-C2-C3-O3
4	B	505	BTB	C1-C2-N-C5
4	B	505	BTB	C1-C2-N-C7
4	B	505	BTB	C3-C2-N-C5
4	B	505	BTB	C3-C2-N-C7
4	B	505	BTB	C4-C2-N-C5
4	B	505	BTB	C4-C2-N-C7
4	C	504	BTB	O1-C1-C2-C3
4	C	504	BTB	O1-C1-C2-C4
4	C	504	BTB	O1-C1-C2-N
4	C	504	BTB	C4-C2-C3-O3
4	C	505	BTB	C1-C2-C3-O3
4	C	505	BTB	C4-C2-C3-O3
4	C	505	BTB	C1-C2-C4-O4
4	C	505	BTB	C3-C2-C4-O4
4	C	505	BTB	N-C2-C4-O4
4	C	505	BTB	C8-C7-N-C5
4	C	506	BTB	C1-C2-C3-O3
4	C	506	BTB	C4-C2-C3-O3
4	C	506	BTB	N-C2-C3-O3
4	C	506	BTB	C1-C2-C4-O4
4	C	506	BTB	C3-C2-C4-O4
4	C	506	BTB	N-C2-C4-O4
4	D	504	BTB	O1-C1-C2-C3
4	D	504	BTB	O1-C1-C2-C4
4	D	504	BTB	O1-C1-C2-N
4	D	505	BTB	C1-C2-C3-O3
4	D	505	BTB	N-C5-C6-O6
4	D	505	BTB	N-C7-C8-O8
5	A	504	XVK	C06-C08-C09-C11
5	B	503	XVK	C06-C08-C09-C11
5	C	503	XVK	C06-C08-C09-C11
5	D	503	XVK	C06-C08-C09-C11
6	A	508	GOL	O1-C1-C2-C3
6	A	512	GOL	O1-C1-C2-C3
6	B	506	GOL	O1-C1-C2-O2

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Res	Type	Atoms
6	B	506	GOL	O1-C1-C2-C3
6	C	507	GOL	C1-C2-C3-O3
6	C	509	GOL	O1-C1-C2-C3
6	C	510	GOL	O1-C1-C2-C3
6	C	510	GOL	C1-C2-C3-O3
6	D	506	GOL	O1-C1-C2-C3
6	D	507	GOL	O1-C1-C2-O2
6	D	507	GOL	O1-C1-C2-C3
4	C	506	BTB	N-C5-C6-O6
2	A	501	HEM	C2A-CAA-CBA-CGA
6	A	507	GOL	O2-C2-C3-O3
6	A	508	GOL	O1-C1-C2-O2
6	A	512	GOL	O2-C2-C3-O3
6	C	507	GOL	O2-C2-C3-O3
6	C	509	GOL	O1-C1-C2-O2
4	A	506	BTB	N-C7-C8-O8
4	C	505	BTB	N-C5-C6-O6
4	A	505	BTB	N-C7-C8-O8
6	A	507	GOL	C1-C2-C3-O3
6	C	509	GOL	C1-C2-C3-O3
4	B	505	BTB	N-C7-C8-O8
6	C	509	GOL	O2-C2-C3-O3
2	B	501	HEM	C4D-C3D-CAD-CBD
2	C	501	HEM	C4D-C3D-CAD-CBD
2	C	501	HEM	C2D-C3D-CAD-CBD
4	B	505	BTB	N-C5-C6-O6
2	B	501	HEM	C2A-CAA-CBA-CGA
6	C	510	GOL	O2-C2-C3-O3
6	D	506	GOL	O1-C1-C2-O2
2	B	501	HEM	C2D-C3D-CAD-CBD
5	D	503	XVK	C15-C17-C18-N21
6	A	512	GOL	O1-C1-C2-O2
2	D	501	HEM	C4B-C3B-CAB-CBB
6	C	508	GOL	O1-C1-C2-O2
6	C	510	GOL	O1-C1-C2-O2
6	C	508	GOL	O1-C1-C2-C3
4	A	503	BTB	C3-C2-C4-O4
4	D	505	BTB	C4-C2-C3-O3
2	B	501	HEM	C3A-C2A-CAA-CBA
4	A	506	BTB	N-C2-C3-O3
4	C	505	BTB	N-C2-C3-O3
4	C	505	BTB	C1-C2-N-C5

*Continued on next page...*

*Continued from previous page...*

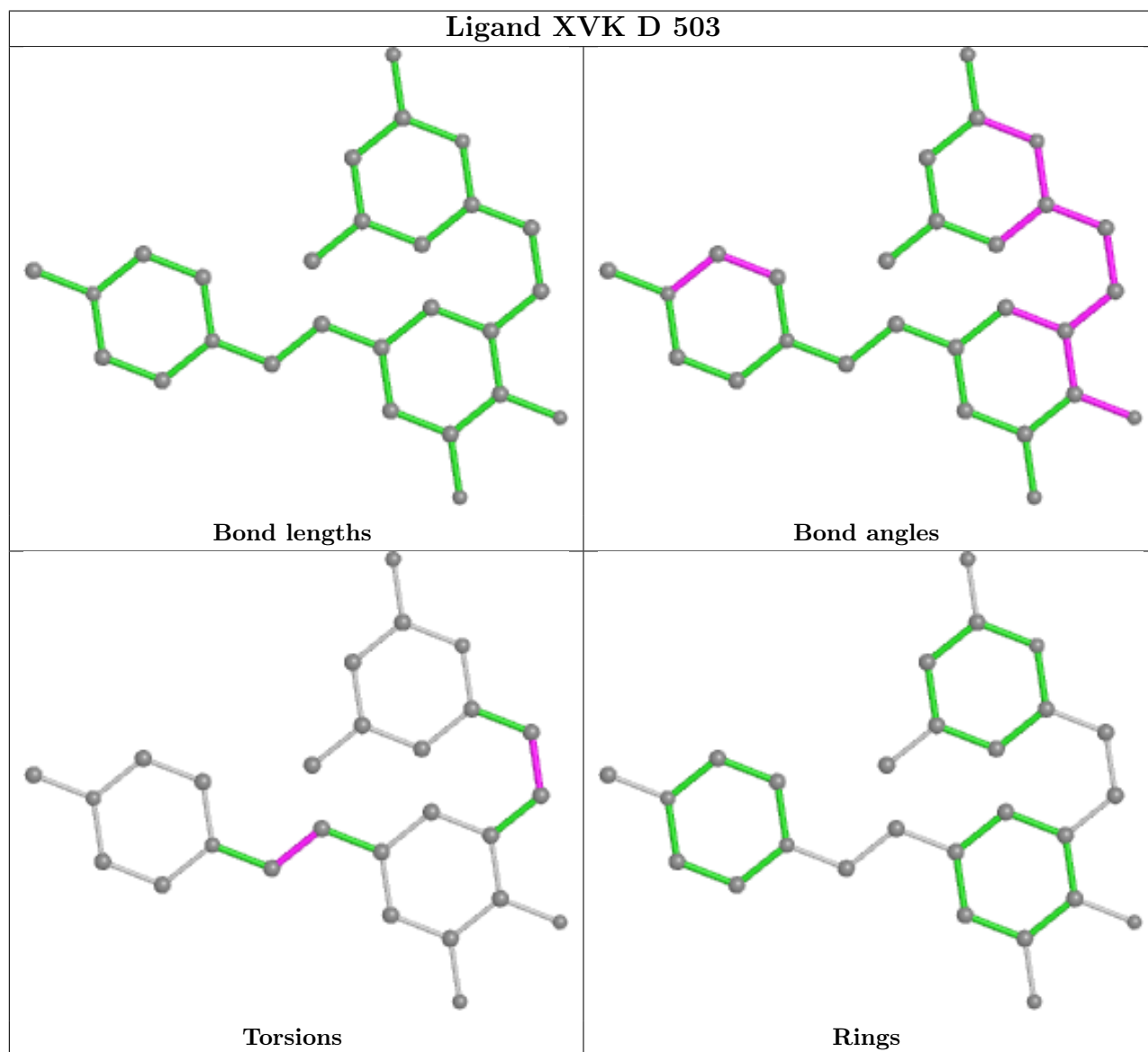
Mol	Chain	Res	Type	Atoms
4	C	505	BTB	C3-C2-N-C7
4	C	505	BTB	C4-C2-N-C5
4	C	505	BTB	C4-C2-N-C7
4	D	505	BTB	N-C2-C3-O3
5	B	503	XVK	C15-C17-C18-N21
2	B	501	HEM	C4B-C3B-CAB-CBB
2	C	501	HEM	C2A-CAA-CBA-CGA
4	A	505	BTB	N-C5-C6-O6
2	A	501	HEM	C4B-C3B-CAB-CBB
4	A	505	BTB	O1-C1-C2-C4
4	A	506	BTB	C4-C2-C3-O3
6	C	507	GOL	O1-C1-C2-O2

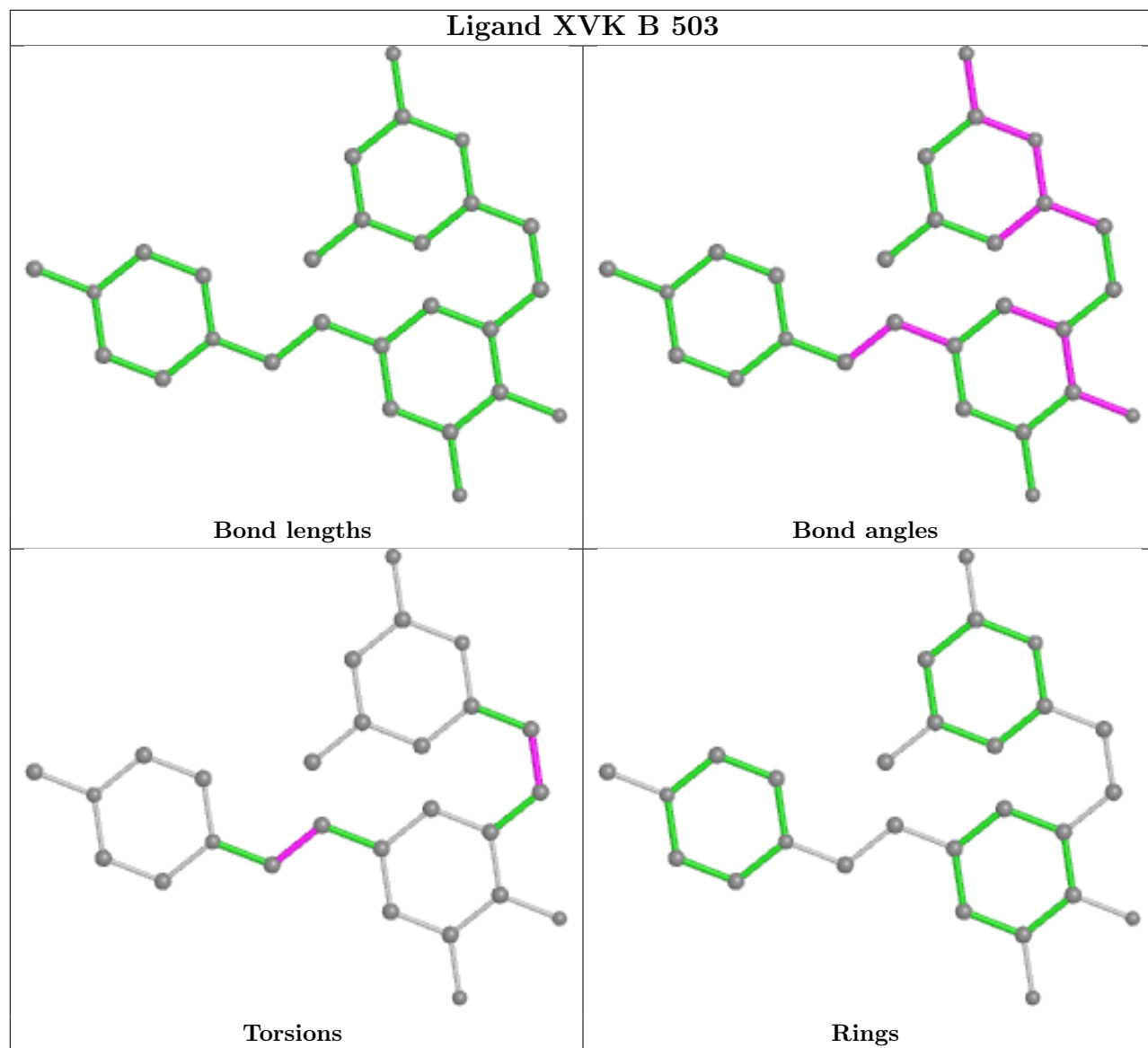
There are no ring outliers.

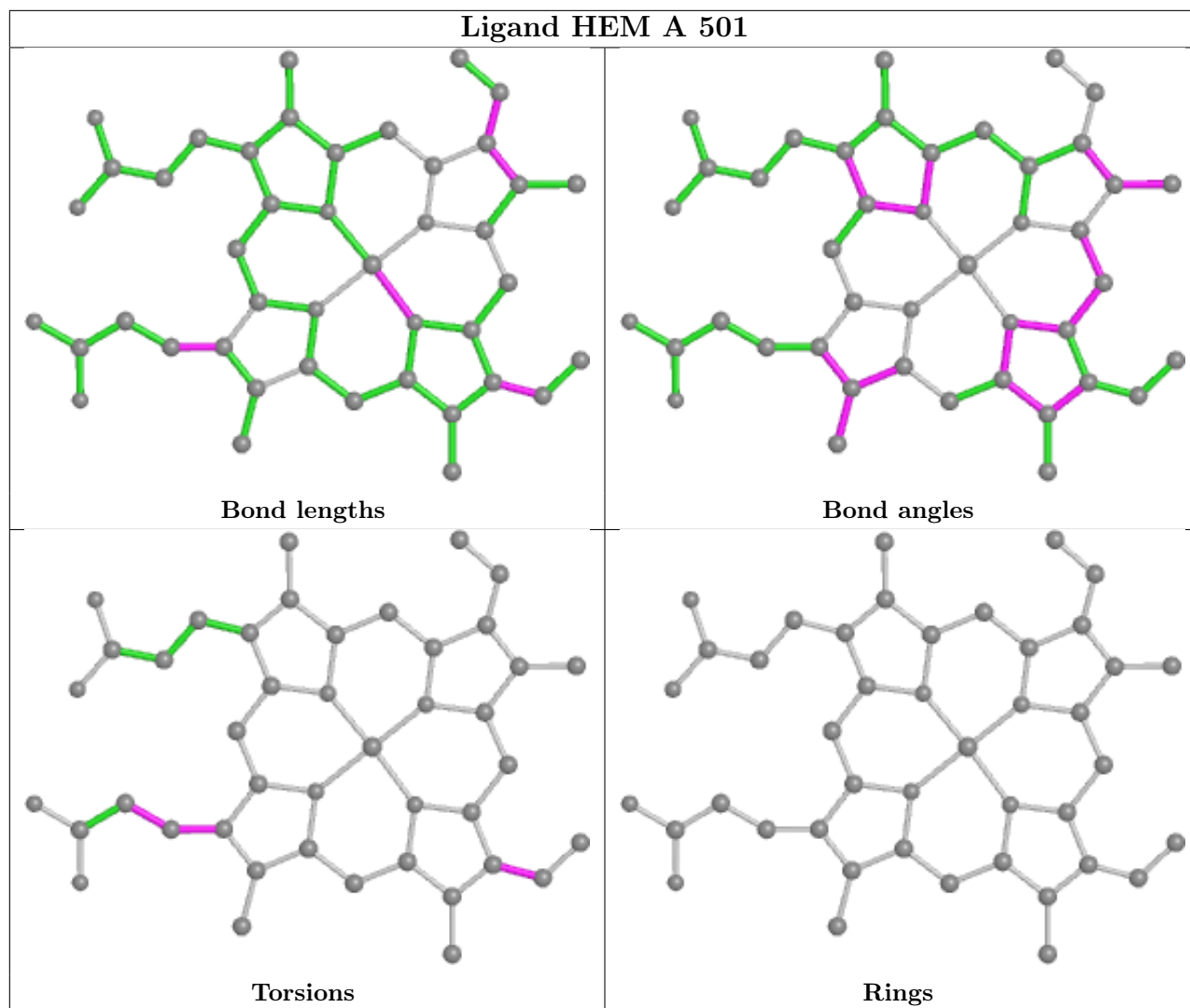
25 monomers are involved in 58 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	D	503	XVK	2	0
3	C	502	H4B	1	0
5	B	503	XVK	6	0
4	C	505	BTB	1	0
4	D	505	BTB	3	0
2	A	501	HEM	6	0
4	A	505	BTB	2	0
5	A	504	XVK	5	0
4	A	506	BTB	2	0
6	D	506	GOL	2	0
6	B	506	GOL	2	0
3	D	502	H4B	1	0
2	C	501	HEM	4	0
4	B	504	BTB	1	0
6	D	507	GOL	1	0
6	A	512	GOL	1	0
3	B	502	H4B	1	0
2	D	501	HEM	3	0
4	A	503	BTB	4	0
6	C	507	GOL	1	0
4	B	505	BTB	4	0
2	B	501	HEM	7	0
6	A	508	GOL	1	0
5	C	503	XVK	2	0
4	C	504	BTB	2	0

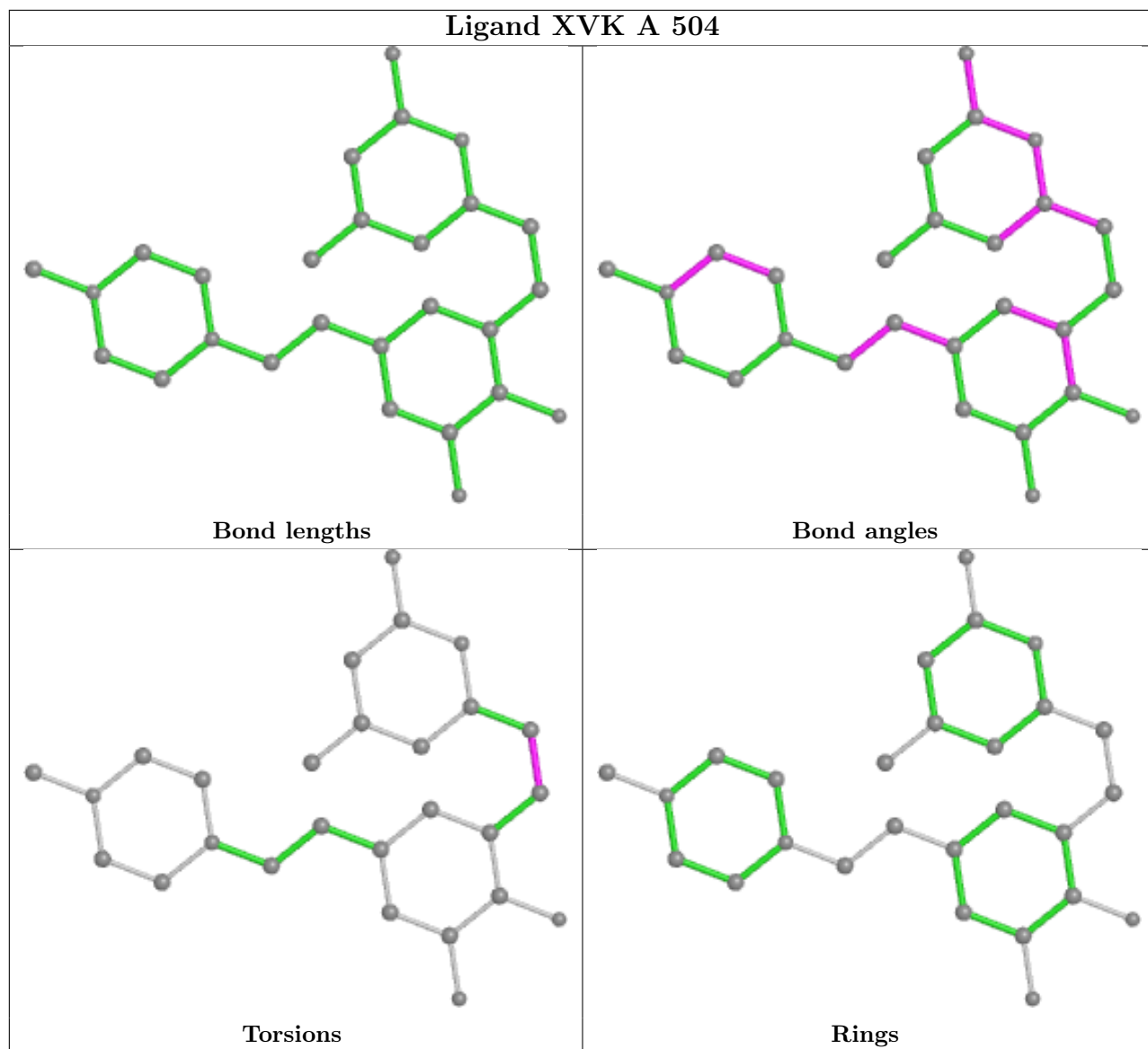
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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

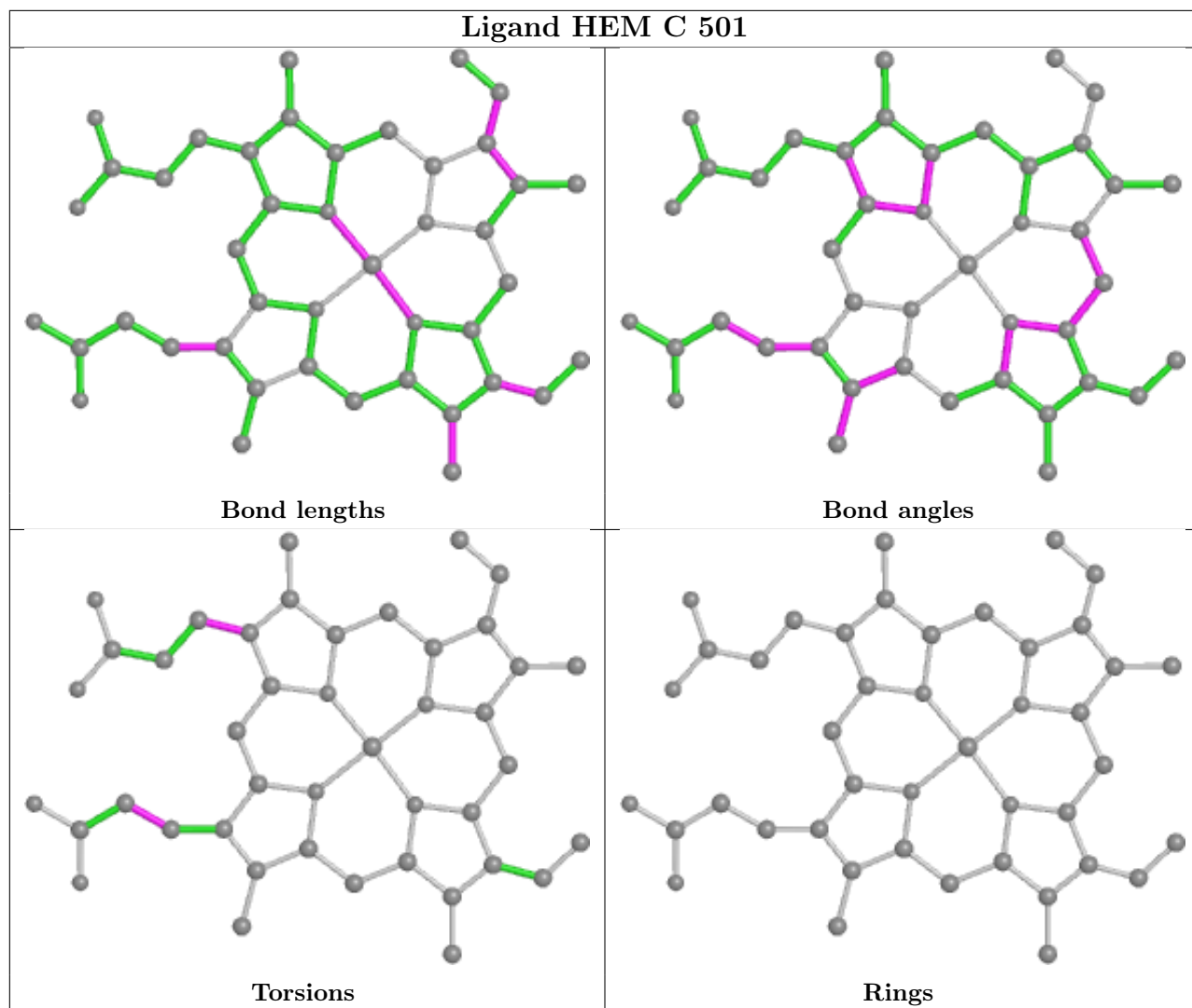


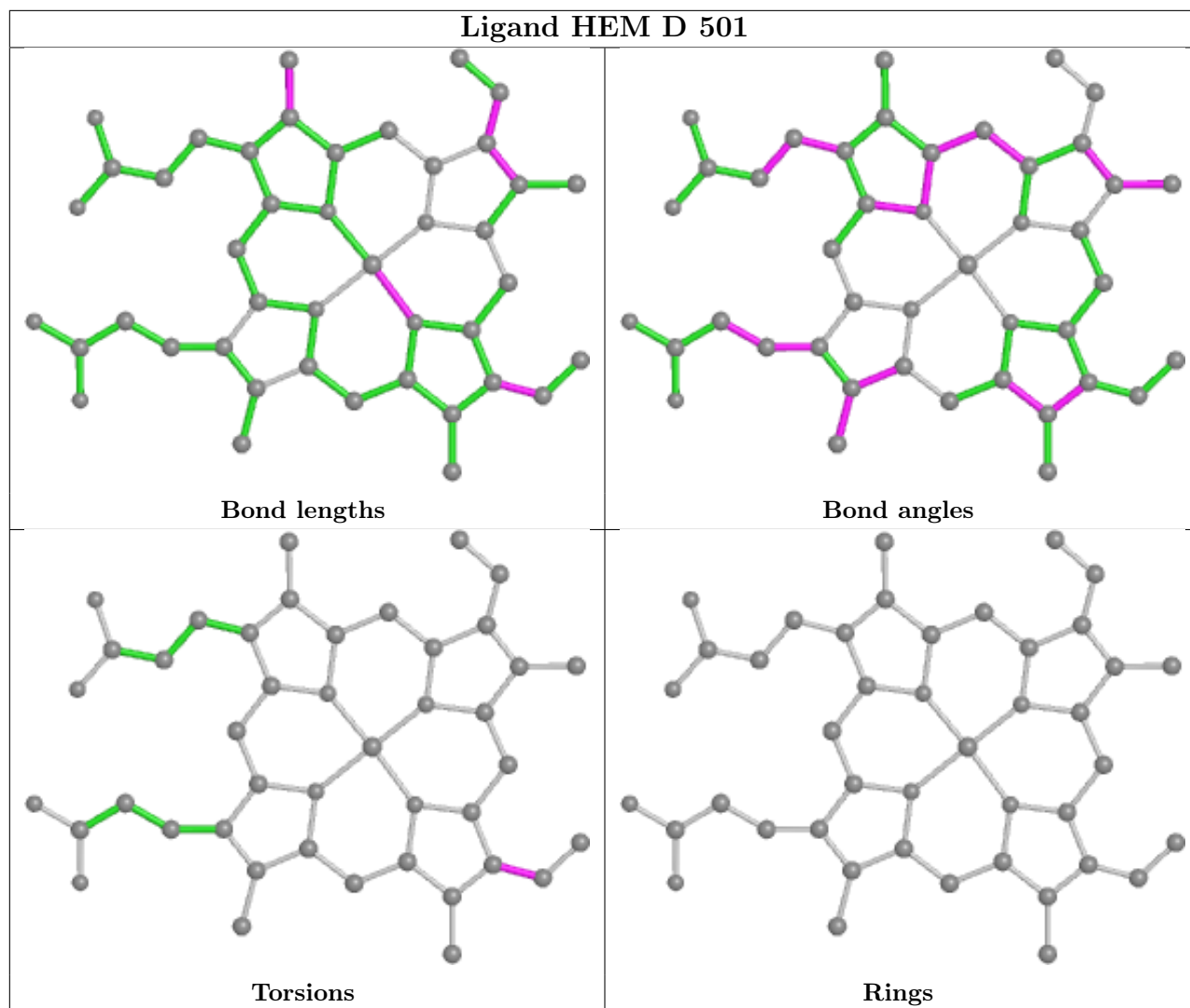


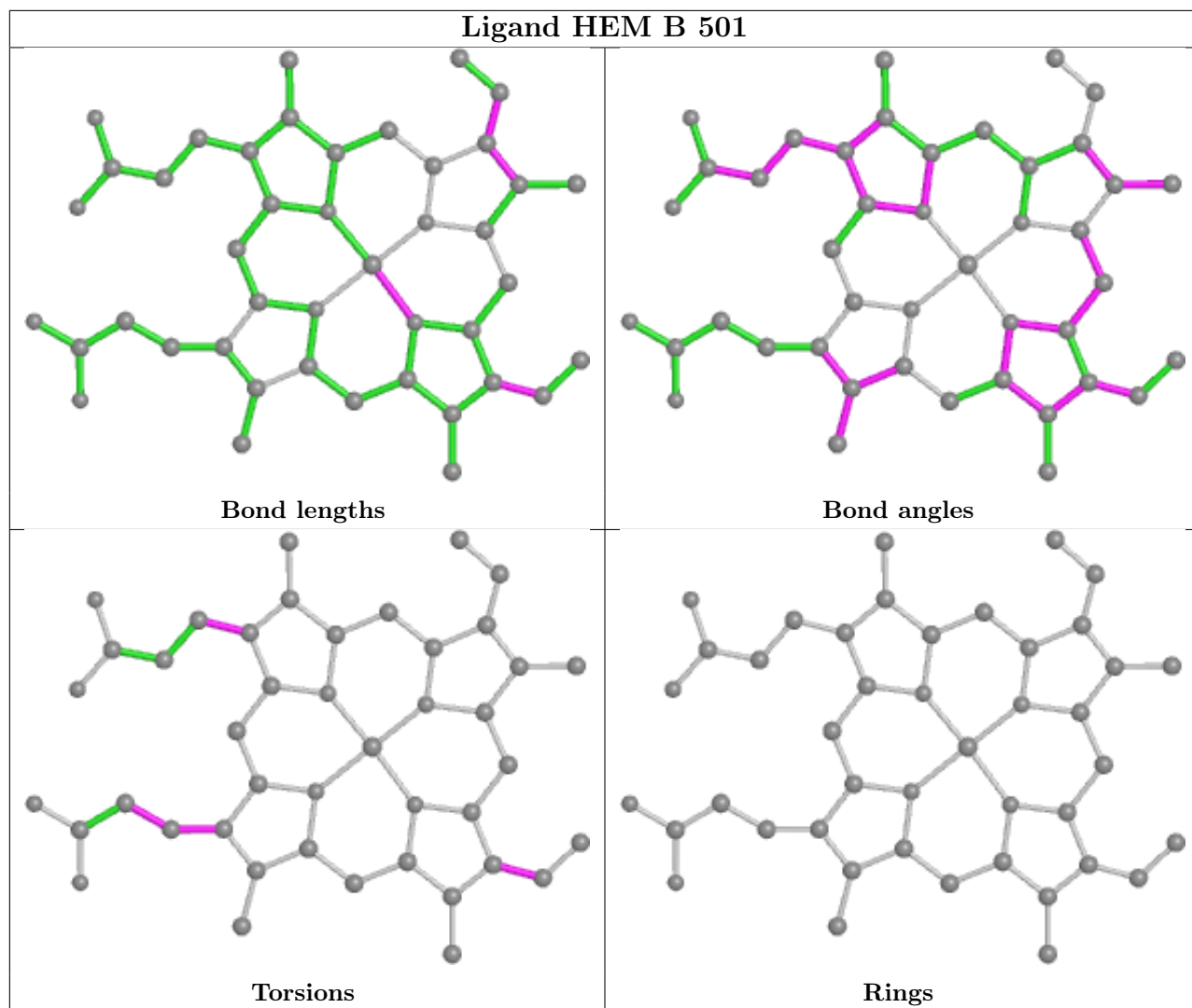


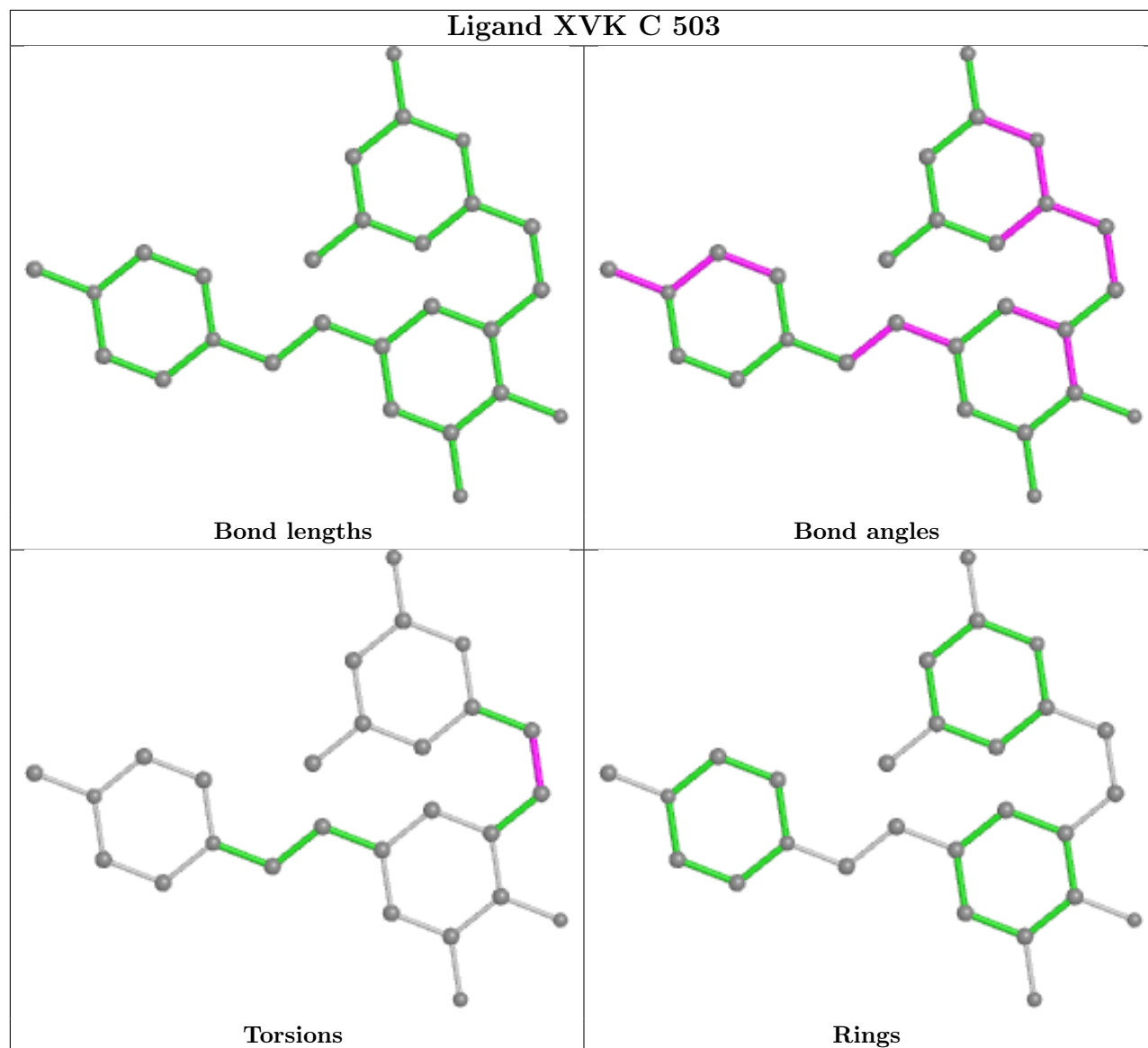












## 5.7 Other polymers [\(i\)](#)

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, 95<sup>th</sup> 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 <sup>2</sup> )	Q<0.9
1	A	401/440 (91%)	0.58	32 (7%) 12 13	27, 60, 108, 126	0
1	B	401/440 (91%)	0.18	5 (1%) 79 81	27, 43, 79, 110	0
1	C	401/440 (91%)	0.47	19 (4%) 31 34	29, 59, 99, 124	0
1	D	402/440 (91%)	0.12	5 (1%) 79 81	28, 43, 71, 114	0
All	All	1605/1760 (91%)	0.34	61 (3%) 40 43	27, 51, 96, 126	0

All (61) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	204	ALA	6.3
1	A	480	TRP	5.9
1	C	204	ALA	5.2
1	A	142	GLY	4.7
1	B	89	GLN	4.2
1	C	480	TRP	4.2
1	C	238	ARG	4.1
1	A	153	VAL	4.1
1	C	140	ARG	4.0
1	A	281	PRO	3.8
1	B	142	GLY	3.6
1	C	257	GLN	3.6
1	C	292	LEU	3.5
1	C	293	LEU	3.3
1	A	254	TYR	3.3
1	D	255	ARG	3.2
1	C	468	PHE	3.2
1	A	304	LEU	3.1
1	B	257	GLN	3.1
1	C	304	LEU	3.1
1	A	89	GLN	3.0

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Res	Type	RSRZ
1	D	257	GLN	3.0
1	D	468	PHE	2.9
1	A	259	GLY	2.9
1	B	153	VAL	2.9
1	A	468	PHE	2.9
1	A	280	THR	2.9
1	A	106	PRO	2.8
1	C	153	VAL	2.8
1	A	165	LEU	2.7
1	A	412	LEU	2.7
1	A	293	LEU	2.7
1	A	275	ILE	2.7
1	A	120	PRO	2.7
1	C	202	ARG	2.7
1	C	148	GLN	2.6
1	D	89	GLN	2.6
1	A	124	LEU	2.6
1	C	130	PHE	2.6
1	C	144	GLN	2.5
1	A	241	PHE	2.4
1	A	121	GLU	2.4
1	C	244	TRP	2.4
1	A	346	LEU	2.4
1	A	134	TYR	2.3
1	A	305	LEU	2.3
1	D	79	ILE	2.3
1	C	239	GLY	2.3
1	A	309	LEU	2.3
1	A	257	GLN	2.3
1	A	90	GLN	2.2
1	B	141[A]	SER	2.1
1	C	131	ILE	2.1
1	A	273	LEU	2.1
1	A	237	GLY	2.1
1	A	231	PHE	2.1
1	A	202	ARG	2.1
1	A	171	VAL	2.1
1	C	275	ILE	2.1
1	A	230	VAL	2.0
1	C	121	GLU	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, 95<sup>th</sup> 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 <sup>2</sup> )	Q<0.9
6	GOL	C	509	6/6	0.70	0.14	72,74,80,88	0
6	GOL	C	510	6/6	0.74	0.14	84,86,90,93	0
6	GOL	D	506	6/6	0.77	0.12	68,76,81,83	0
6	GOL	B	506	6/6	0.78	0.19	75,79,80,81	0
5	XVK	A	504	27/27	0.78	0.31	48,109,130,144	0
4	BTB	A	506	14/14	0.81	0.12	96,103,107,108	0
5	XVK	C	503	27/27	0.82	0.33	39,94,128,140	0
4	BTB	C	506	14/14	0.83	0.13	72,89,99,99	0
4	BTB	D	504	14/14	0.84	0.16	36,71,83,86	0
6	GOL	A	508	6/6	0.84	0.16	62,75,81,89	0
4	BTB	B	505	14/14	0.84	0.18	45,64,72,76	0
4	BTB	B	504	14/14	0.85	0.14	44,60,72,73	0
6	GOL	D	507	6/6	0.85	0.14	70,74,76,82	0
6	GOL	C	508	6/6	0.88	0.11	65,75,81,86	0
5	XVK	B	503	27/27	0.89	0.23	29,96,110,118	0
4	BTB	D	505	14/14	0.89	0.21	51,68,81,82	0
4	BTB	A	505	14/14	0.89	0.16	56,74,87,92	0
5	XVK	D	503	27/27	0.91	0.23	26,96,108,109	0
4	BTB	C	505	14/14	0.92	0.22	29,60,77,81	0
6	GOL	C	507	6/6	0.93	0.16	43,60,65,65	0
3	H4B	C	502	17/17	0.94	0.13	32,46,51,52	0
4	BTB	A	503	14/14	0.94	0.12	42,77,88,92	0
3	H4B	B	502	17/17	0.95	0.10	31,40,48,50	0
6	GOL	A	512	6/6	0.95	0.17	19,38,63,70	0
6	GOL	A	507	6/6	0.95	0.14	42,56,64,66	0
2	HEM	A	501	43/43	0.96	0.12	37,51,68,72	0
8	GD	B	509	1/1	0.96	0.12	82,82,82,82	0

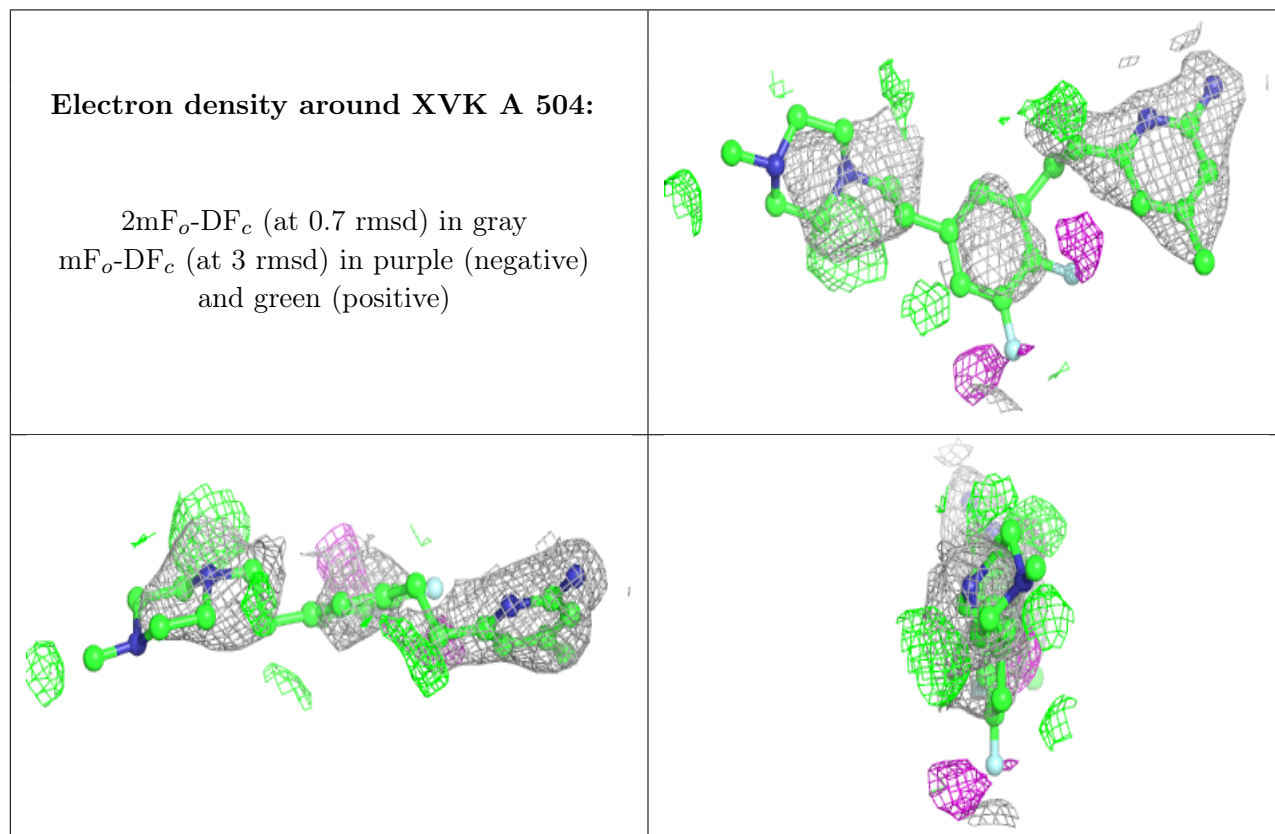
*Continued on next page...*



Continued from previous page...

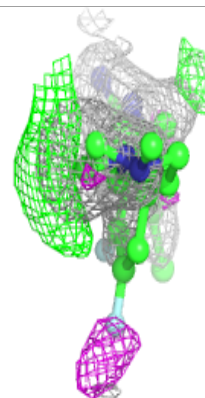
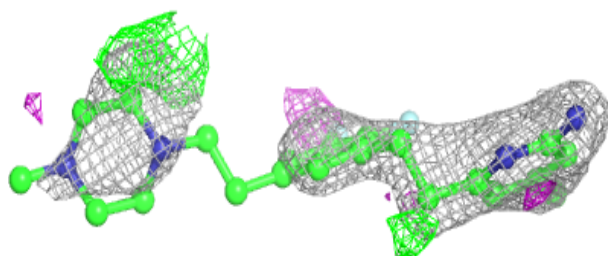
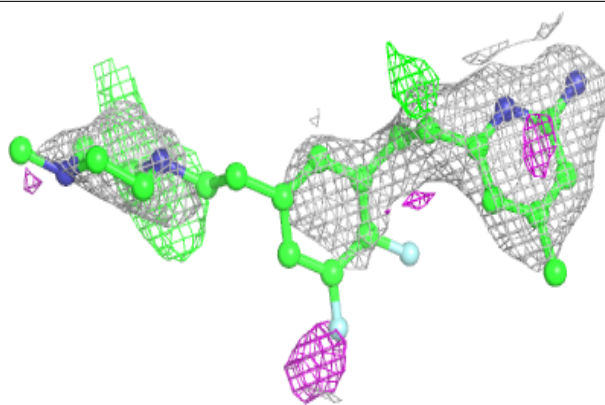
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors( $\text{\AA}^2$ )	Q<0.9
2	HEM	C	501	43/43	0.97	0.11	31,43,59,67	0
4	BTB	C	504	14/14	0.97	0.13	20,65,70,78	0
7	CL	D	508	1/1	0.97	0.10	41,41,41,41	0
8	GD	A	510	1/1	0.97	0.10	78,78,78,78	1
3	H4B	D	502	17/17	0.97	0.10	35,43,48,51	0
7	CL	B	507	1/1	0.98	0.09	43,43,43,43	0
7	CL	C	511	1/1	0.98	0.10	50,50,50,50	0
2	HEM	B	501	43/43	0.98	0.11	24,32,53,71	0
2	HEM	D	501	43/43	0.98	0.11	24,31,49,62	0
3	H4B	A	502	17/17	0.98	0.10	41,48,53,55	0
8	GD	D	509	1/1	0.98	0.16	48,48,48,48	0
7	CL	A	509	1/1	0.99	0.06	55,55,55,55	0
8	GD	B	508	1/1	0.99	0.14	45,45,45,45	0
9	ZN	A	511	1/1	0.99	0.11	41,41,41,41	0
9	ZN	C	512	1/1	1.00	0.10	34,34,34,34	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.

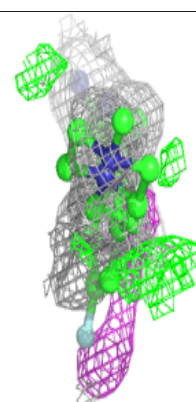
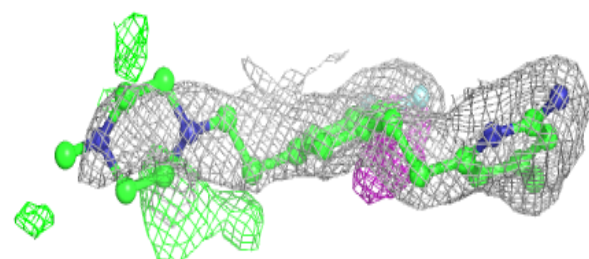
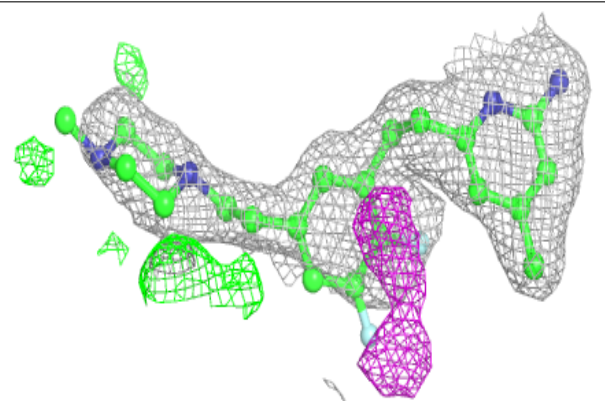


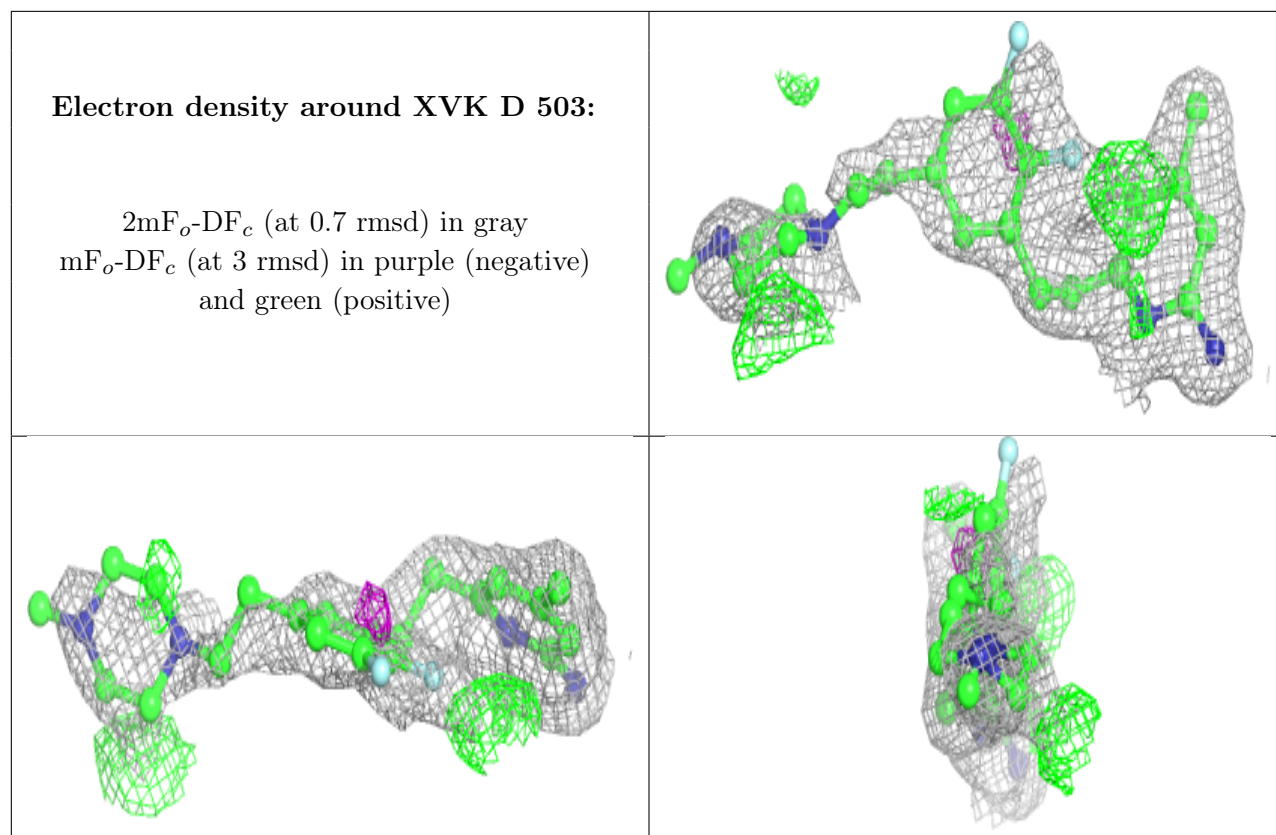
**Electron density around XVK C 503:**

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

**Electron density around XVK B 503:**

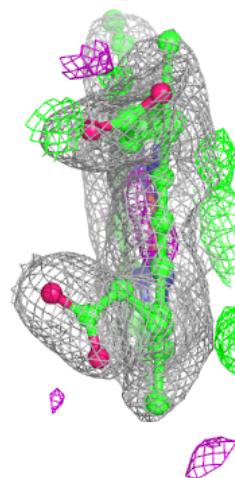
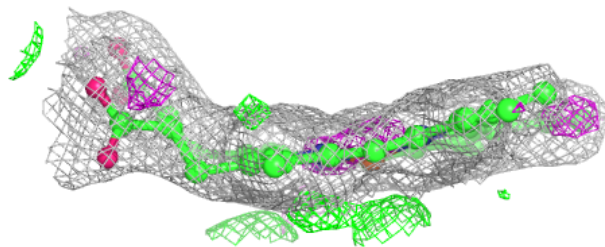
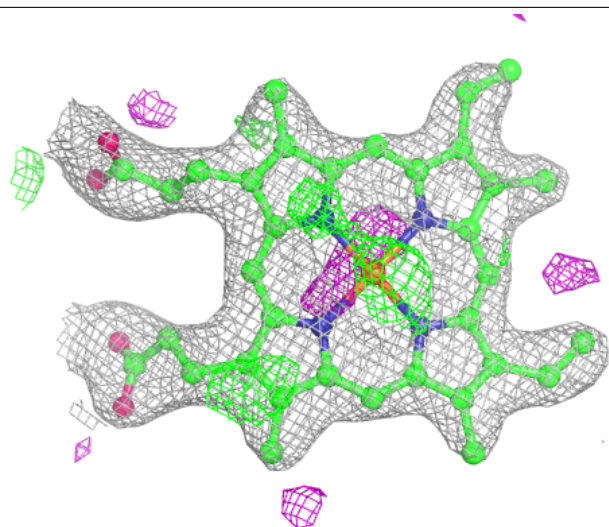
$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)





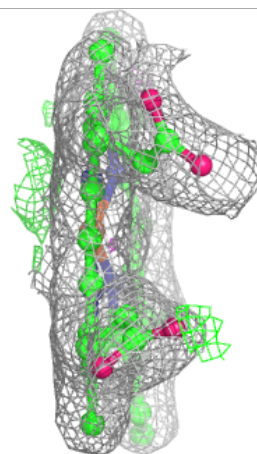
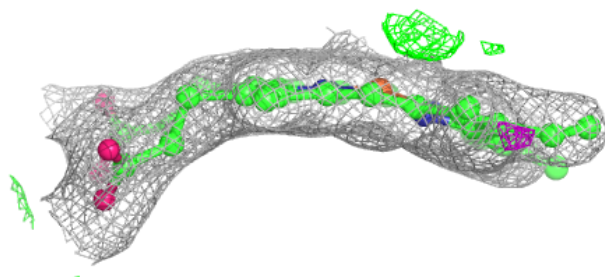
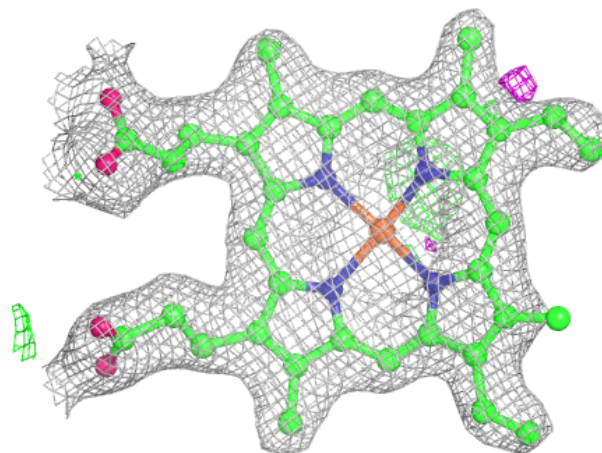
**Electron density around HEM A 501:**

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



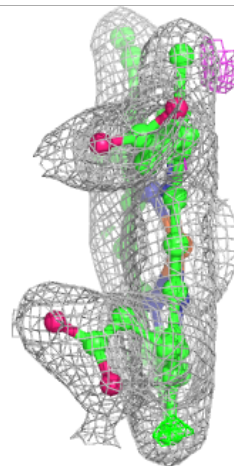
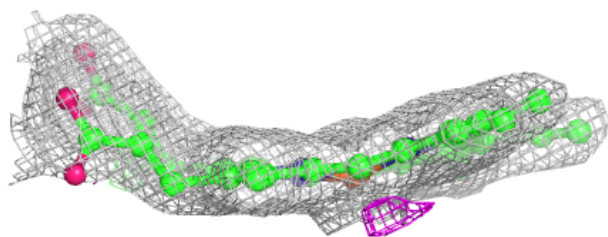
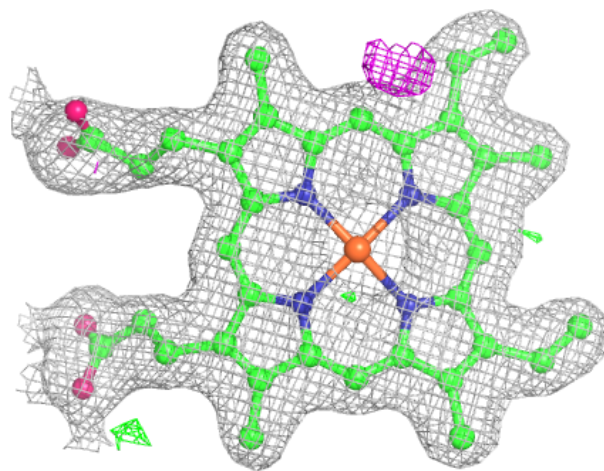
**Electron density around HEM C 501:**

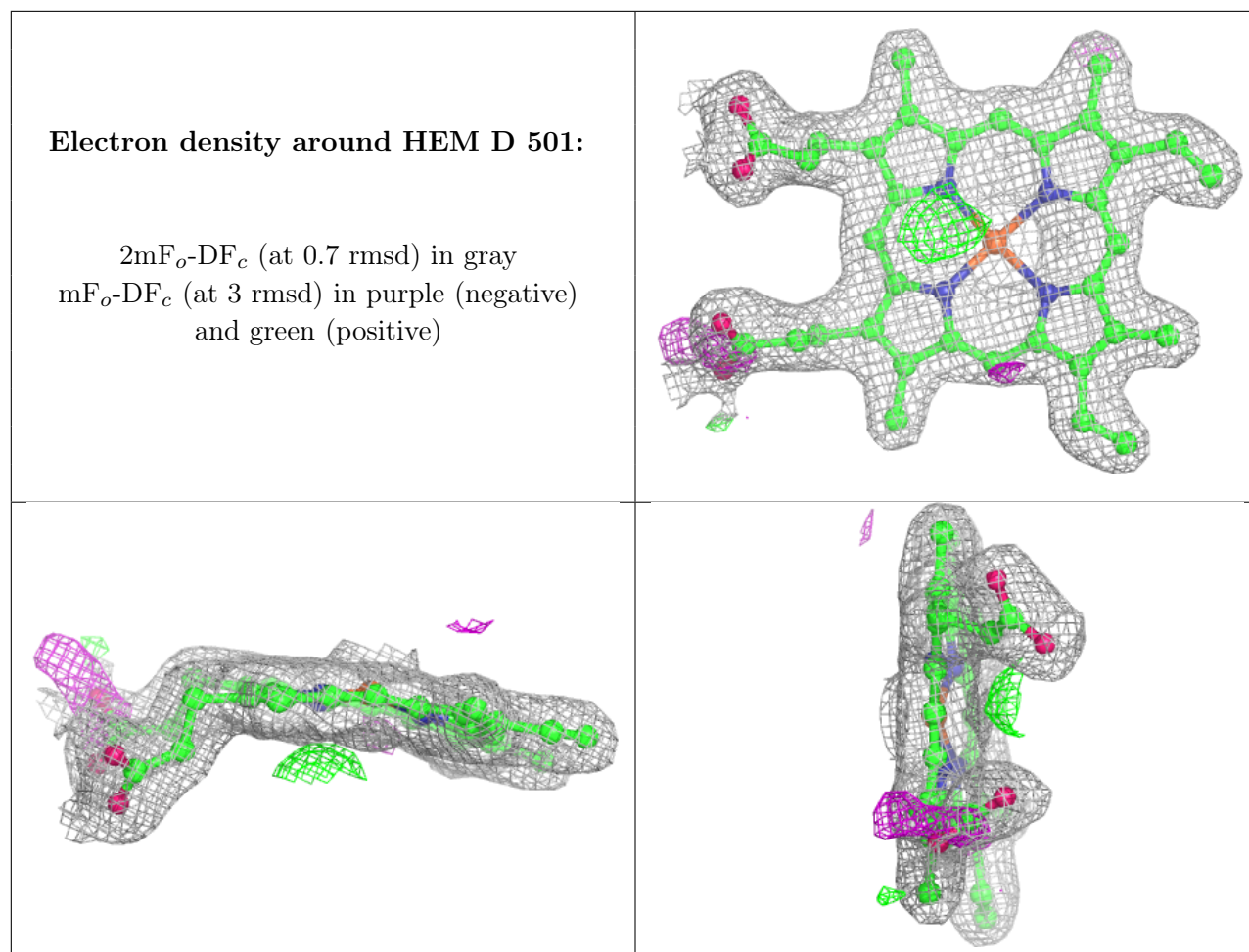
$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)



**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.