



# Full wwPDB X-ray Structure Validation Report ⓘ

Nov 20, 2023 – 04:42 PM JST

PDB ID : 7D0T  
Title : Structure of the CYP102A1 Haem Domain with N-Carboxybenzyl-L-Prolyl-L-Phenylalanine in complex with (S)-1-Indanylamine  
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Deposited on : 2020-09-11  
Resolution : 1.74 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>.

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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 : 2.36  
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) : 2.36

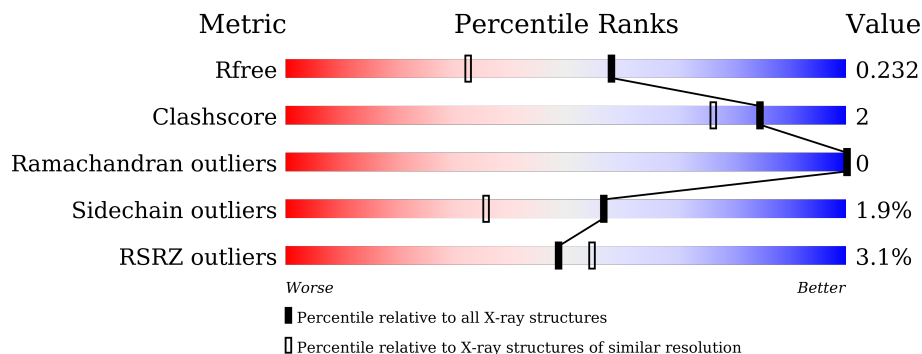
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 1.74 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.

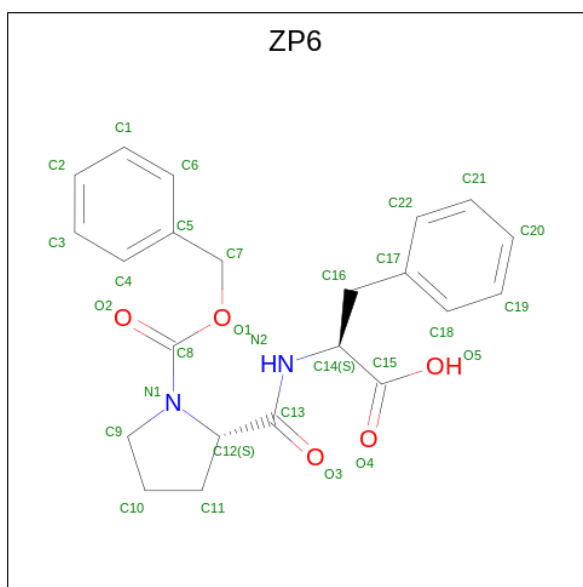


Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
$R_{free}$	130704	3764 (1.76-1.72)
Clashscore	141614	3923 (1.76-1.72)
Ramachandran outliers	138981	3878 (1.76-1.72)
Sidechain outliers	138945	3878 (1.76-1.72)
RSRZ outliers	127900	3705 (1.76-1.72)

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.

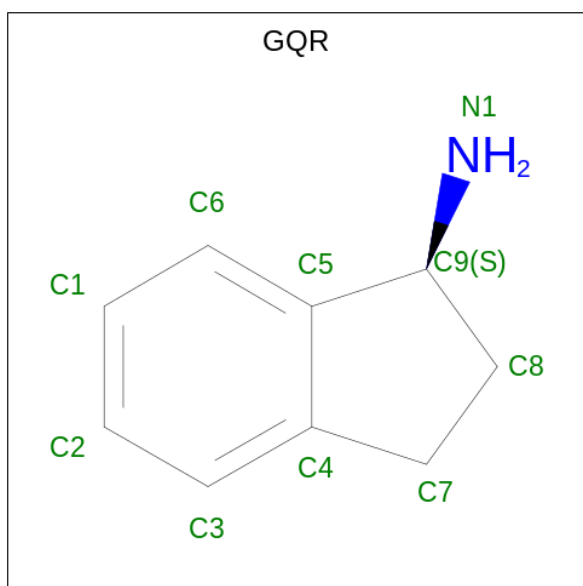
Mol	Chain	Length	Quality of chain
1	A	456	
1	B	456	





Mol	Chain	Residues	Atoms			ZeroOcc	AltConf	
3	A	1	Total	C	N	O	0	0
			29	22	2	5		
3	B	1	Total	C	N	O	0	0
			29	22	2	5		

- Molecule 4 is (1 {S})-2,3-dihydro-1 {H}-inden-1-amine (three-letter code: GQR) (formula: C<sub>9</sub>H<sub>11</sub>N) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf	
4	A	1	Total	C	N		0	0
			10	9	1			

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Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
			Total	C	N		
4	B	1	10	9	1	0	0

- Molecule 5 is GLYCEROL (three-letter code: GOL) (formula:  $C_3H_8O_3$ ).



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

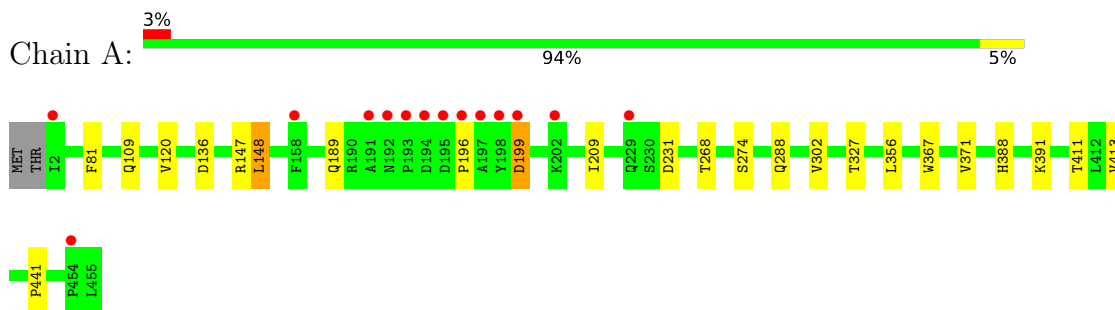
- Molecule 6 is water.

<b>Mol</b>	<b>Chain</b>	<b>Residues</b>	<b>Atoms</b>		<b>ZeroOcc</b>	<b>AltConf</b>
6	A	293	Total 293	O 293	0	0
6	B	279	Total 279	O 279	0	0

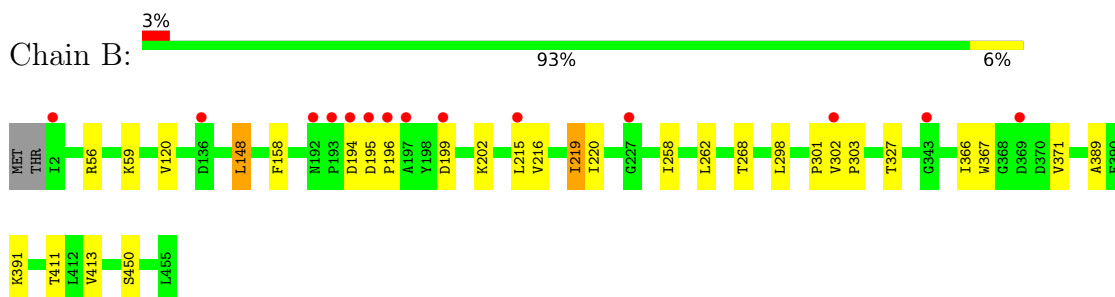
### 3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red dot above a residue indicates a poor fit to the electron density ( $RSRZ > 2$ ). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

- Molecule 1: Bifunctional cytochrome P450/NADPH-P450 reductase



- Molecule 1: Bifunctional cytochrome P450/NADPH-P450 reductase



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	58.58Å 128.07Å 147.89Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	48.45 – 1.74 48.41 – 1.74	Depositor EDS
% Data completeness (in resolution range)	99.4 (48.45-1.74) 99.5 (48.41-1.74)	Depositor EDS
$R_{merge}$	0.21	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.76 (at 1.74Å)	Xtrriage
Refinement program	REFMAC 5.8.0266	Depositor
R, $R_{free}$	0.199 , 0.226 0.206 , 0.232	Depositor DCC
$R_{free}$ test set	5685 reflections (4.98%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	18.5	Xtrriage
Anisotropy	0.440	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.37 , 40.1	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.47$ , $\langle L^2 \rangle = 0.30$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
$F_o, F_c$ correlation	0.96	EDS
Total number of atoms	8255	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	25.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 47.88 % of the origin peak, indicating pseudo-translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo-translational symmetry is equal to 9.3209e-05. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

<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: ZP6, GQR, 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	0.73	0/3838	0.80	0/5188
1	B	0.73	0/3813	0.82	0/5154
All	All	0.73	0/7651	0.81	0/10342

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	3740	0	3712	12	0
1	B	3725	0	3692	17	0
2	A	43	0	30	2	0
2	B	43	0	30	4	0
3	A	29	0	0	0	0
3	B	29	0	0	0	0
4	A	10	0	0	0	0
4	B	10	0	0	0	0
5	A	30	0	40	2	0
5	B	24	0	32	3	0
6	A	293	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
6	B	279	0	0	0	0
All	All	8255	0	7536	35	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 2.

All (35) 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:367:TRP:HB2	1:B:371:VAL:HG12	1.74	0.70
1:B:195:ASP:OD1	1:B:196:PRO:HD2	1.92	0.69
2:B:502:HEM:HMC1	2:B:502:HEM:HBC2	1.76	0.68
1:B:411:THR:OG1	5:B:507:GOL:H12	1.95	0.66
1:B:450:SER:H	5:B:506:GOL:H12	1.62	0.64
1:A:388:HIS:HA	1:A:391:LYS:HD3	1.80	0.64
1:A:268[B]:THR:O	1:A:327[B]:THR:HG21	2.00	0.62
1:A:411:THR:OG1	5:A:505:GOL:H12	2.00	0.61
2:A:501:HEM:HBC2	2:A:501:HEM:HMC1	1.81	0.61
1:A:147:ARG:HG2	5:A:504:GOL:H2	1.83	0.61
1:A:148:LEU:HD21	1:A:413:VAL:HG21	1.85	0.59
1:A:268[A]:THR:O	1:A:327[A]:THR:HG21	2.03	0.59
1:A:120:VAL:HG11	1:A:302:VAL:HG13	1.84	0.58
1:B:158:PHE:HE1	1:B:262:LEU:HD21	1.71	0.55
1:B:120:VAL:HG11	1:B:302:VAL:HG13	1.89	0.55
1:B:148:LEU:HD21	1:B:413:VAL:HG21	1.90	0.53
1:A:367:TRP:HB2	1:A:371:VAL:HG12	1.89	0.52
1:B:220[B]:ILE:HD11	1:B:258:ILE:HD12	1.93	0.51
1:B:220[B]:ILE:HD11	1:B:258:ILE:CD1	2.43	0.48
1:B:450:SER:H	5:B:506:GOL:C1	2.24	0.48
1:B:195:ASP:OD1	1:B:196:PRO:CD	2.60	0.48
2:B:502:HEM:HMB2	2:B:502:HEM:HBB2	1.95	0.48
1:A:81:PHE:HB3	1:A:209:ILE:HG12	1.96	0.48
2:B:502:HEM:HBC2	2:B:502:HEM:CMC	2.43	0.47
1:B:56:ARG:HA	1:B:59:LYS:HE2	1.97	0.46
1:B:268[B]:THR:HG22	1:B:327:THR:HG23	1.98	0.46
1:A:274:SER:HB3	1:A:441[B]:PRO:HG2	1.98	0.45
2:A:501:HEM:HBC2	2:A:501:HEM:CMC	2.47	0.44
1:B:216:VAL:O	1:B:220[B]:ILE:HG12	2.17	0.44
1:B:158:PHE:CD2	1:B:219:ILE:HG21	2.52	0.44
2:B:502:HEM:HBB2	2:B:502:HEM:CMB	2.48	0.43
1:A:196:PRO:HA	1:A:199:ASP:OD1	2.18	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:356:LEU:HD12	1:A:356:LEU:HA	1.94	0.42
1:B:366:ILE:HG21	1:B:389:ALA:HB1	2.02	0.41
1:B:298:LEU:HD22	1:B:303:PRO:HB3	2.03	0.41

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	463/456 (102%)	448 (97%)	15 (3%)	0	100	100
1	B	460/456 (101%)	449 (98%)	11 (2%)	0	100	100
All	All	923/912 (101%)	897 (97%)	26 (3%)	0	100	100

There are no Ramachandran outliers to report.

### 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	409/400 (102%)	402 (98%)	7 (2%)	60	41
1	B	406/400 (102%)	398 (98%)	8 (2%)	55	33
All	All	815/800 (102%)	800 (98%)	15 (2%)	57	38

All (15) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	109	GLN
1	A	136	ASP
1	A	148	LEU
1	A	189	GLN
1	A	199	ASP
1	A	231	ASP
1	A	288	GLN
1	B	148	LEU
1	B	194	ASP
1	B	199	ASP
1	B	202	LYS
1	B	215	LEU
1	B	219	ILE
1	B	301	PRO
1	B	391	LYS

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](#)

15 ligands are modelled in this entry.

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	GOL	A	508	-	5,5,5	0.12	0	5,5,5	0.36	0
4	GQR	A	503	2	11,11,11	2.65	1 (9%)	11,15,15	2.96	7 (63%)
5	GOL	B	506	-	5,5,5	0.11	0	5,5,5	0.31	0
3	ZP6	B	503	-	31,31,31	1.25	1 (3%)	41,41,41	1.30	2 (4%)
4	GQR	B	504	2	11,11,11	2.35	3 (27%)	11,15,15	1.95	3 (27%)
5	GOL	B	505	-	5,5,5	0.09	0	5,5,5	0.31	0
2	HEM	B	502	4,1	41,50,50	1.21	5 (12%)	45,82,82	1.95	14 (31%)
2	HEM	A	501	4,1	41,50,50	1.36	5 (12%)	45,82,82	1.73	11 (24%)
5	GOL	B	501	-	5,5,5	0.16	0	5,5,5	0.33	0
5	GOL	A	506	-	5,5,5	0.14	0	5,5,5	0.24	0
5	GOL	A	507	-	5,5,5	0.11	0	5,5,5	0.40	0
5	GOL	B	507	-	5,5,5	0.17	0	5,5,5	0.48	0
5	GOL	A	504	-	5,5,5	0.13	0	5,5,5	0.41	0
5	GOL	A	505	-	5,5,5	0.14	0	5,5,5	0.41	0
3	ZP6	A	502	-	31,31,31	1.28	2 (6%)	41,41,41	1.18	5 (12%)

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	GOL	A	508	-	-	4/4/4/4	-
5	GOL	B	506	-	-	4/4/4/4	-
4	GQR	A	503	2	-	-	0/2/2/2
3	ZP6	B	503	-	-	0/25/35/35	0/3/3/3
4	GQR	B	504	2	-	-	0/2/2/2
5	GOL	B	505	-	-	2/4/4/4	-
2	HEM	B	502	4,1	-	2/12/54/54	-
2	HEM	A	501	4,1	-	2/12/54/54	-
5	GOL	B	501	-	-	3/4/4/4	-
5	GOL	A	506	-	-	2/4/4/4	-
5	GOL	A	507	-	-	0/4/4/4	-
5	GOL	B	507	-	-	4/4/4/4	-
5	GOL	A	504	-	-	0/4/4/4	-
5	GOL	A	505	-	-	4/4/4/4	-
3	ZP6	A	502	-	-	0/25/35/35	0/3/3/3

All (17) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	A	503	GQR	C5-C9	-8.44	1.43	1.51
4	B	504	GQR	C5-C9	-6.56	1.44	1.51
3	B	503	ZP6	O1-C8	5.32	1.44	1.34
3	A	502	ZP6	O1-C8	5.21	1.44	1.34
2	B	502	HEM	C1B-NB	-3.55	1.34	1.40
2	A	501	HEM	C1B-NB	-3.52	1.34	1.40
2	A	501	HEM	C4D-ND	-3.43	1.34	1.40
2	A	501	HEM	C4B-NB	-2.98	1.32	1.38
4	B	504	GQR	C7-C4	-2.57	1.47	1.51
2	A	501	HEM	CHA-C4D	2.33	1.40	1.35
4	B	504	GQR	C9-N1	2.27	1.52	1.47
2	B	502	HEM	CHB-C1B	2.23	1.40	1.35
2	A	501	HEM	C4D-C3D	2.12	1.48	1.45
2	B	502	HEM	O1A-CGA	2.03	1.28	1.22
2	B	502	HEM	C3C-C2C	-2.02	1.37	1.40
3	A	502	ZP6	C2-C3	2.01	1.43	1.38
2	B	502	HEM	C4D-ND	-2.01	1.36	1.40

All (42) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	502	HEM	C1B-NB-C4B	5.46	110.71	105.07
4	A	503	GQR	C8-C7-C4	-5.33	98.12	103.31
2	B	502	HEM	CHC-C4B-NB	4.82	129.67	124.43
2	A	501	HEM	C1B-NB-C4B	4.38	109.60	105.07
4	A	503	GQR	C1-C6-C5	-4.18	115.70	121.01
3	B	503	ZP6	O1-C8-N1	4.12	115.57	111.05
4	A	503	GQR	C7-C4-C5	3.94	114.71	110.63
3	B	503	ZP6	O1-C8-O2	-3.74	118.41	124.78
2	A	501	HEM	CHC-C4B-NB	3.73	128.49	124.43
4	B	504	GQR	C2-C3-C4	-3.54	115.61	120.89
4	A	503	GQR	C6-C5-C4	3.43	124.90	120.80
2	A	501	HEM	O2A-CGA-CBA	3.25	124.49	114.03
2	B	502	HEM	CAD-C3D-C4D	3.25	130.33	124.66
4	B	504	GQR	C6-C5-C9	-3.20	124.02	129.74
2	B	502	HEM	O2A-CGA-CBA	3.14	124.12	114.03
3	A	502	ZP6	O1-C8-O2	-3.03	119.62	124.78
2	A	501	HEM	O1A-CGA-CBA	-2.80	114.09	123.08
3	A	502	ZP6	O1-C8-N1	2.76	114.08	111.05
2	B	502	HEM	C3D-C4D-ND	2.69	113.16	110.17
3	A	502	ZP6	C16-C14-N2	-2.64	105.22	110.79
2	B	502	HEM	CHB-C1B-NB	2.61	127.61	124.38
2	A	501	HEM	CHD-C1D-ND	2.60	127.26	124.43

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	A	503	GQR	C6-C5-C9	-2.58	125.13	129.74
2	B	502	HEM	CMA-C3A-C4A	-2.53	124.58	128.46
4	B	504	GQR	C1-C6-C5	-2.51	117.82	121.01
2	A	501	HEM	CMA-C3A-C4A	-2.51	124.61	128.46
2	A	501	HEM	CHB-C1B-NB	2.44	127.40	124.38
2	A	501	HEM	C4B-CHC-C1C	2.44	125.78	122.56
4	A	503	GQR	C1-C2-C3	2.40	123.84	120.19
4	A	503	GQR	C2-C3-C4	-2.36	117.36	120.89
2	B	502	HEM	CBD-CAD-C3D	-2.34	106.11	112.63
3	A	502	ZP6	C18-C17-C22	2.33	121.83	118.17
2	B	502	HEM	O2D-CGD-CBD	2.31	121.46	114.03
2	B	502	HEM	C3C-C4C-NC	-2.30	106.61	110.94
2	B	502	HEM	C4B-CHC-C1C	2.27	125.56	122.56
2	A	501	HEM	O2D-CGD-CBD	2.24	121.22	114.03
2	B	502	HEM	C2C-C3C-C4C	2.18	108.42	106.90
2	B	502	HEM	CHA-C4D-C3D	-2.16	121.28	125.33
2	A	501	HEM	CBD-CAD-C3D	-2.14	106.68	112.63
2	B	502	HEM	O1A-CGA-CBA	-2.12	116.28	123.08
2	A	501	HEM	CHA-C4D-ND	2.06	126.93	124.38
3	A	502	ZP6	C14-N2-C13	2.05	126.06	121.67

There are no chirality outliers.

All (27) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
5	A	505	GOL	C1-C2-C3-O3
5	A	505	GOL	O2-C2-C3-O3
5	A	508	GOL	O1-C1-C2-O2
5	A	508	GOL	O1-C1-C2-C3
5	B	501	GOL	C1-C2-C3-O3
5	B	501	GOL	O2-C2-C3-O3
5	B	506	GOL	O1-C1-C2-O2
5	B	506	GOL	O1-C1-C2-C3
5	B	507	GOL	O1-C1-C2-C3
5	B	506	GOL	O2-C2-C3-O3
5	A	505	GOL	O1-C1-C2-C3
5	A	506	GOL	O1-C1-C2-C3
5	A	508	GOL	C1-C2-C3-O3
5	B	501	GOL	O1-C1-C2-C3
5	B	506	GOL	C1-C2-C3-O3
5	B	507	GOL	C1-C2-C3-O3
5	A	506	GOL	O1-C1-C2-O2

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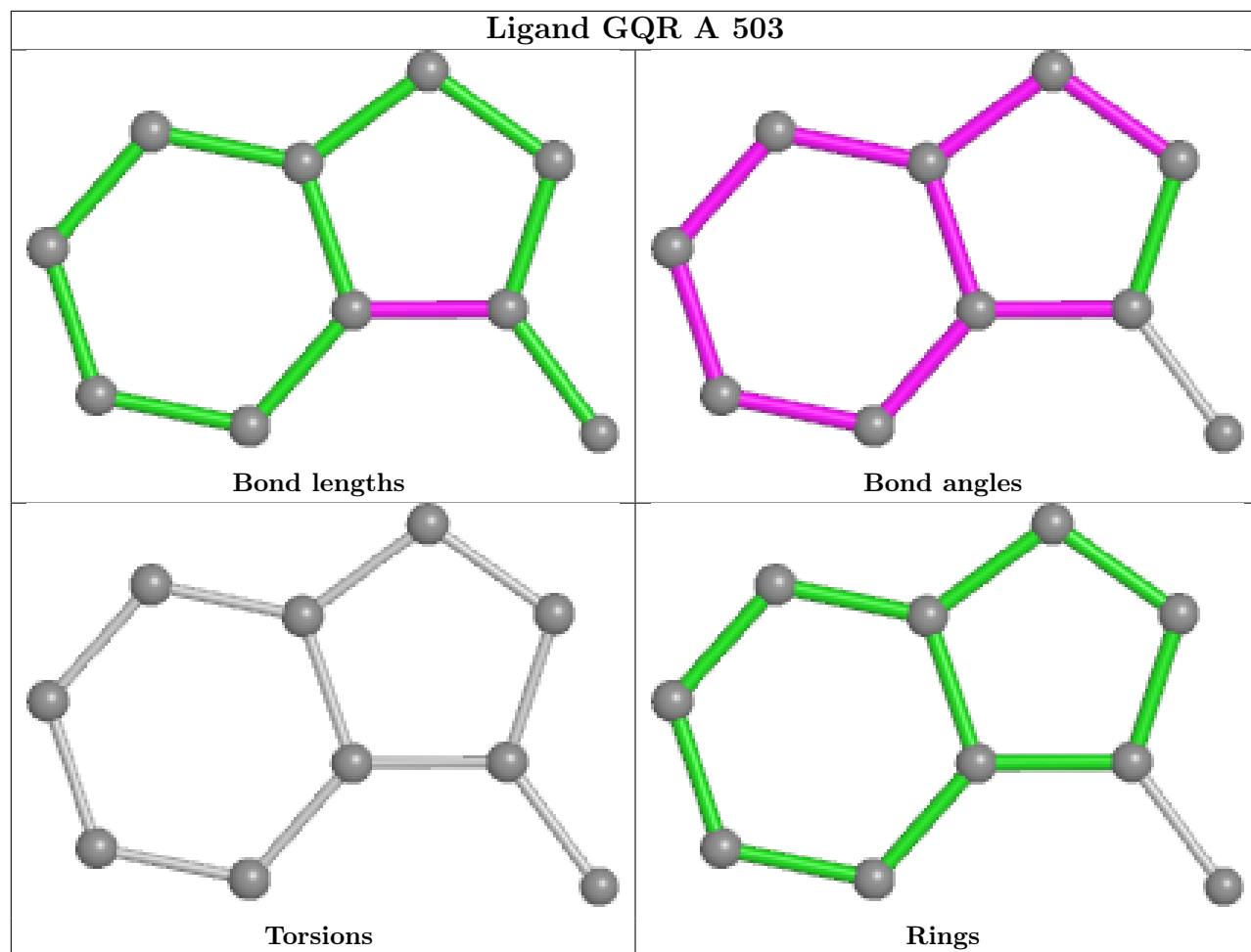
Mol	Chain	Res	Type	Atoms
5	B	507	GOL	O1-C1-C2-O2
5	B	507	GOL	O2-C2-C3-O3
5	B	505	GOL	O1-C1-C2-C3
5	A	505	GOL	O1-C1-C2-O2
2	B	502	HEM	CAD-CBD-CGD-O2D
5	B	505	GOL	O1-C1-C2-O2
2	A	501	HEM	CAD-CBD-CGD-O2D
2	A	501	HEM	CAD-CBD-CGD-O1D
2	B	502	HEM	CAD-CBD-CGD-O1D
5	A	508	GOL	O2-C2-C3-O3

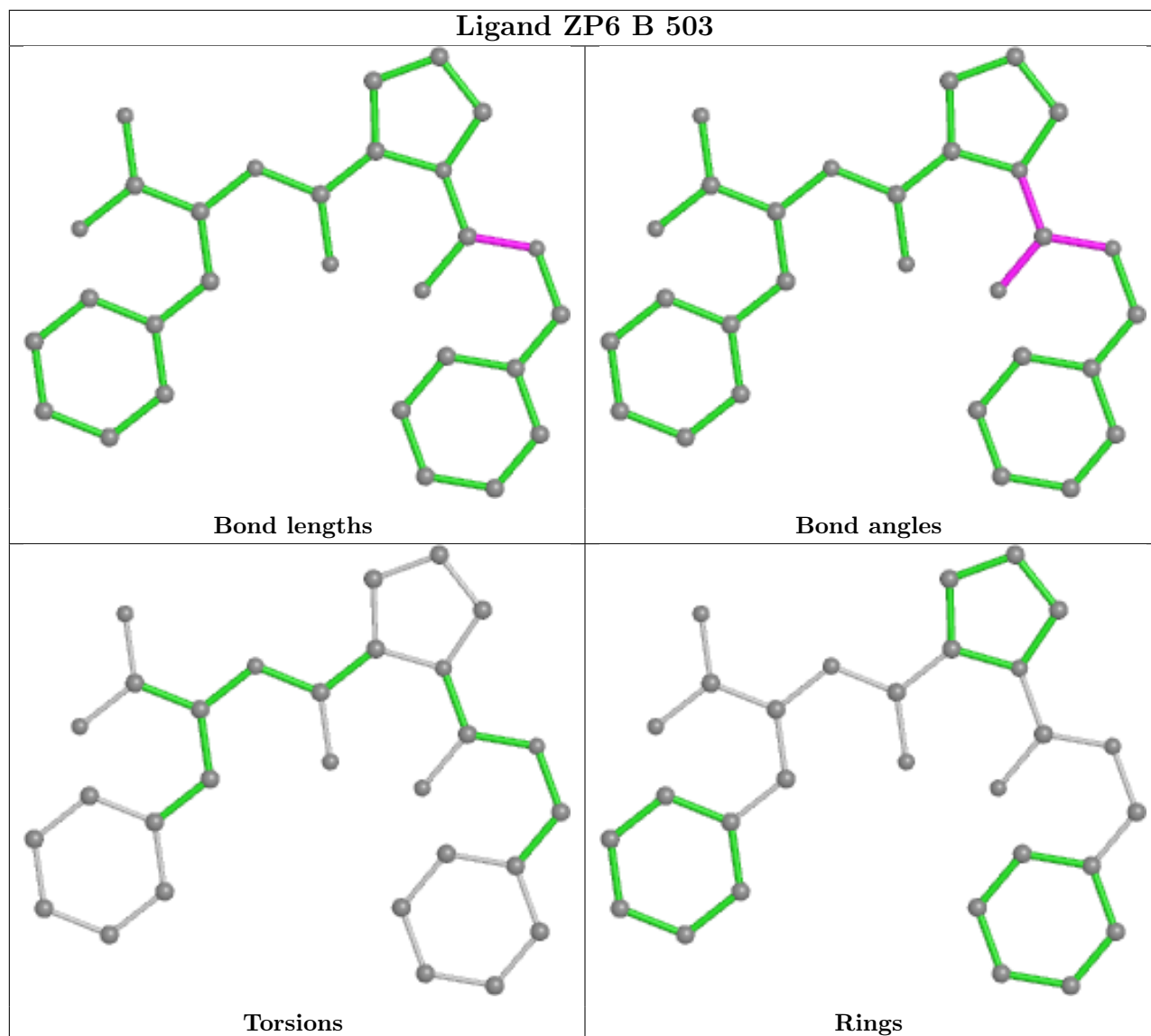
There are no ring outliers.

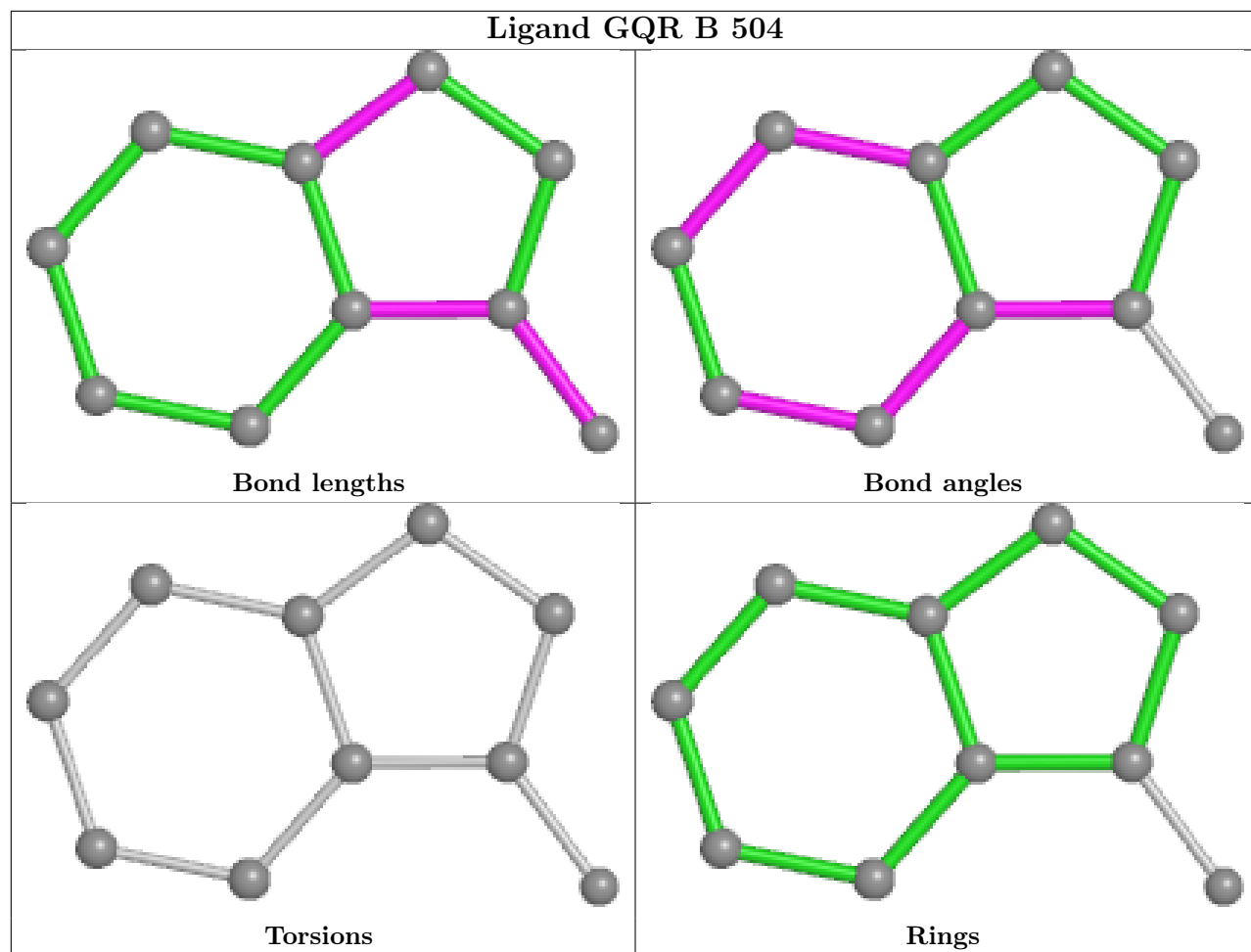
6 monomers are involved in 11 short contacts:

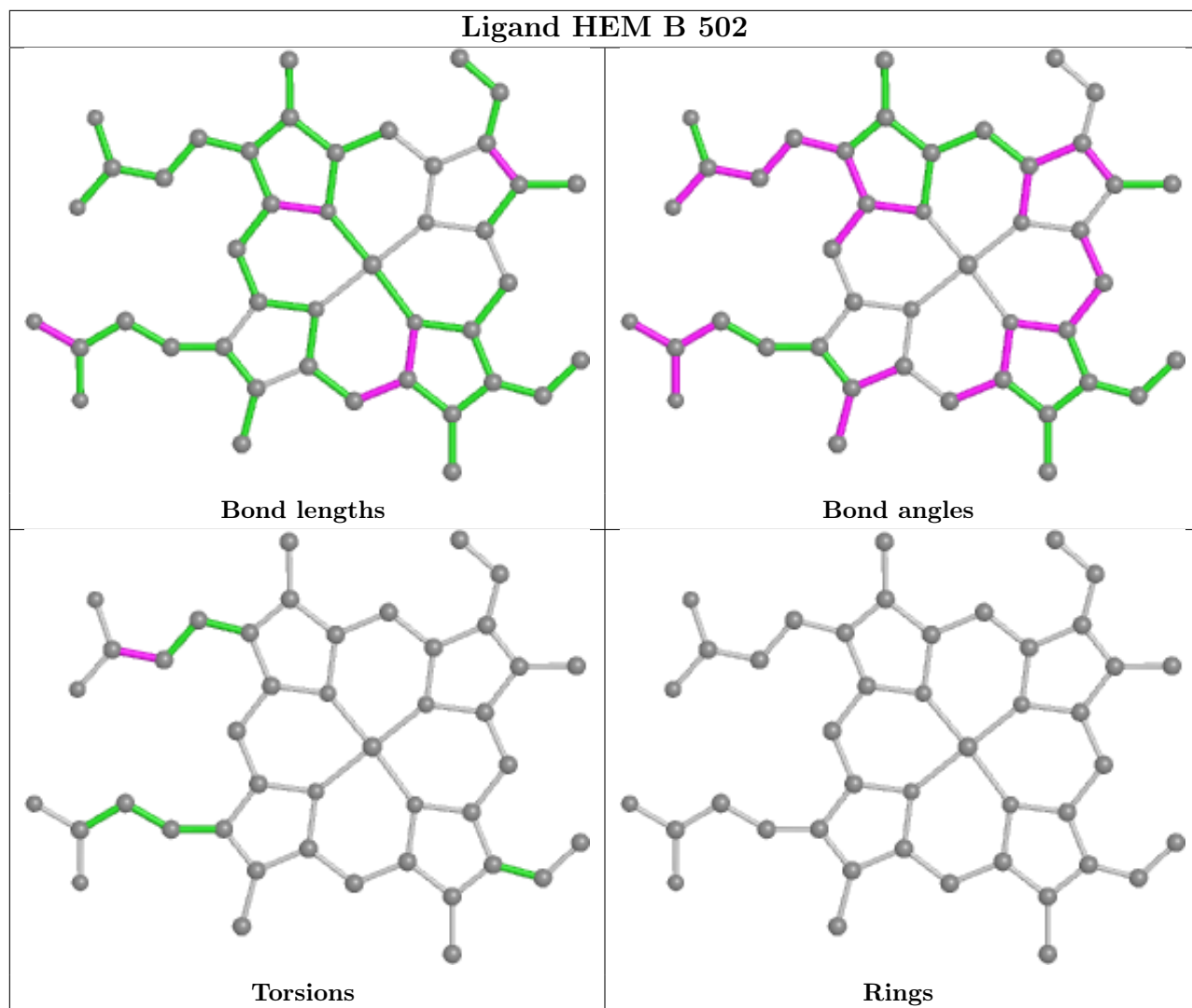
Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	B	506	GOL	2	0
2	B	502	HEM	4	0
2	A	501	HEM	2	0
5	B	507	GOL	1	0
5	A	504	GOL	1	0
5	A	505	GOL	1	0

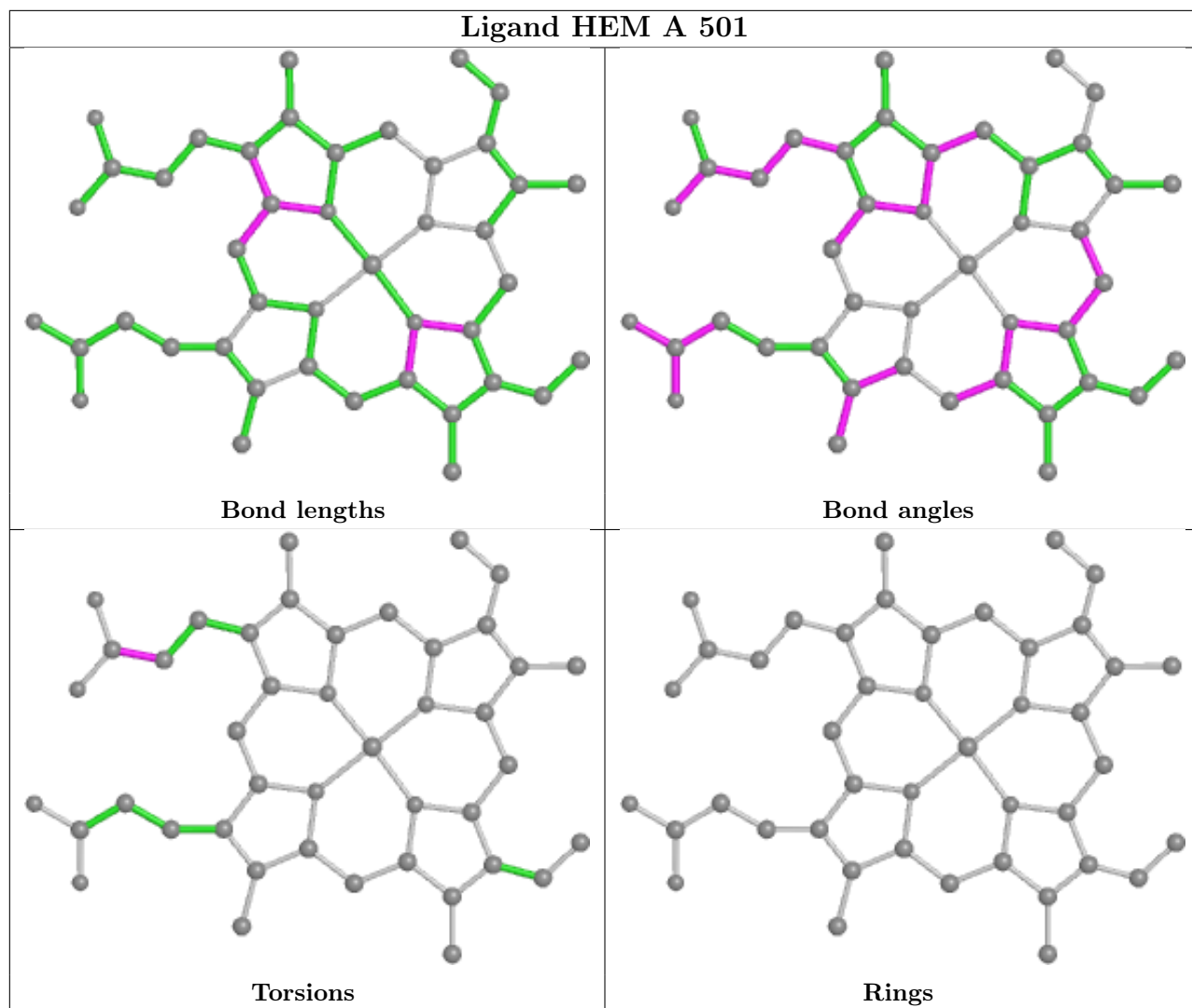
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.

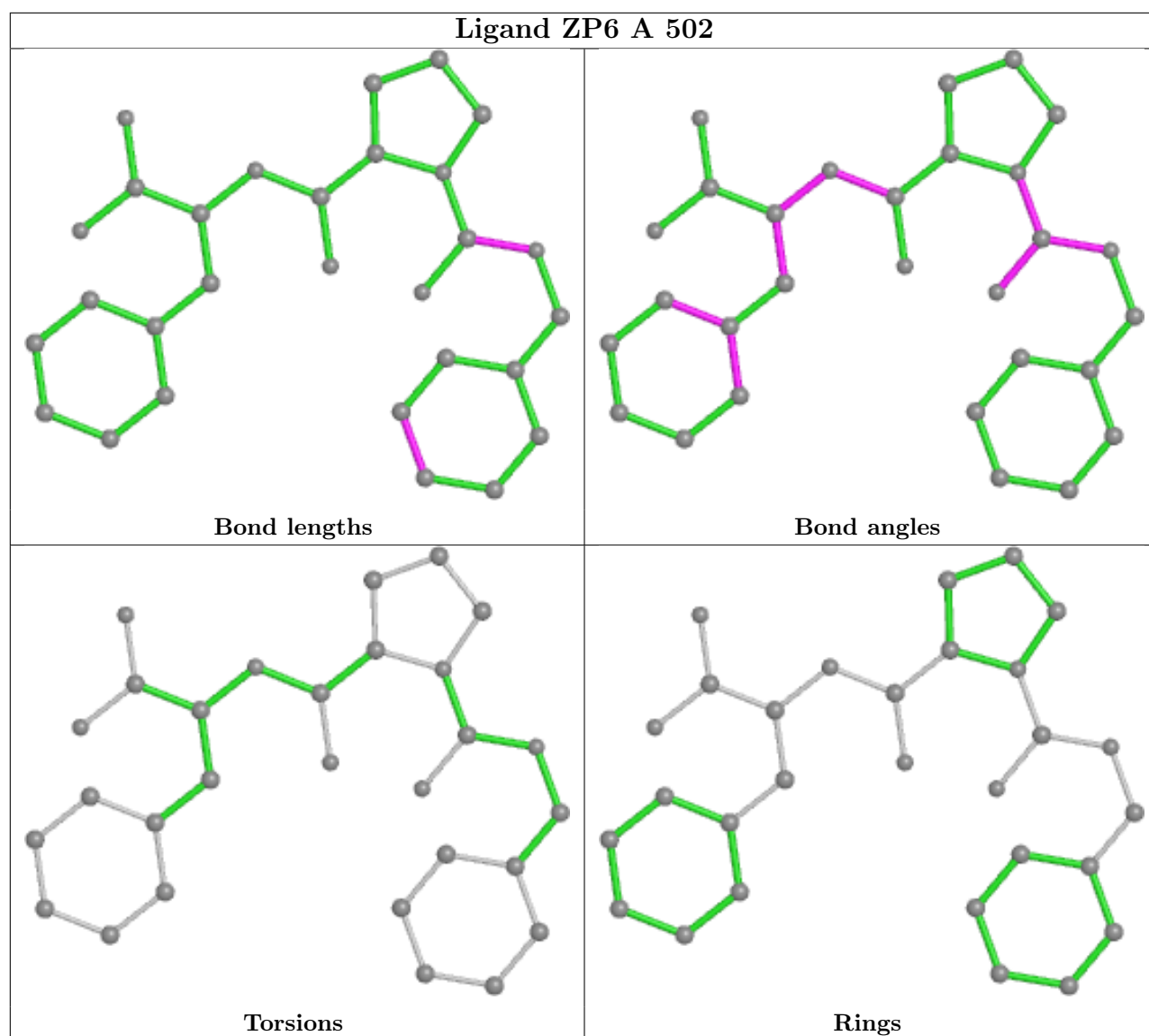












## 5.7 Other polymers [i](#)

There are no such residues in this entry.

## 5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

## 6 Fit of model and data

### 6.1 Protein, DNA and RNA chains

In the following table, the column labelled ‘#RSRZ > 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95<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	454/456 (99%)	-0.19	14 (3%) 49 55	14, 22, 48, 93	0
1	B	454/456 (99%)	-0.24	14 (3%) 49 55	13, 22, 43, 61	0
All	All	908/912 (99%)	-0.21	28 (3%) 49 55	13, 22, 46, 93	0

All (28) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	2	ILE	5.4
1	A	2	ILE	5.3
1	A	196	PRO	4.9
1	A	191	ALA	4.7
1	A	193	PRO	4.5
1	A	197	ALA	4.4
1	B	197	ALA	3.7
1	B	196	PRO	3.6
1	A	194	ASP	3.2
1	B	192	ASN	3.1
1	A	199	ASP	3.1
1	A	192	ASN	3.0
1	B	193	PRO	2.9
1	A	195	ASP	2.8
1	B	194	ASP	2.7
1	B	369	ASP	2.7
1	B	215	LEU	2.6
1	B	227	GLY	2.5
1	B	195	ASP	2.4
1	B	302	VAL	2.3
1	B	136	ASP	2.3
1	B	199	ASP	2.3
1	A	158	PHE	2.2
1	A	202	LYS	2.2

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Mol	Chain	Res	Type	RSRZ
1	B	343	GLY	2.1
1	A	198	TYR	2.1
1	A	454	PRO	2.0
1	A	229	GLN	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](#)

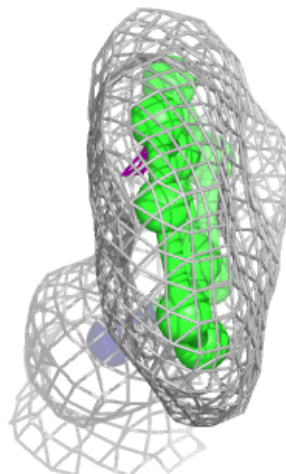
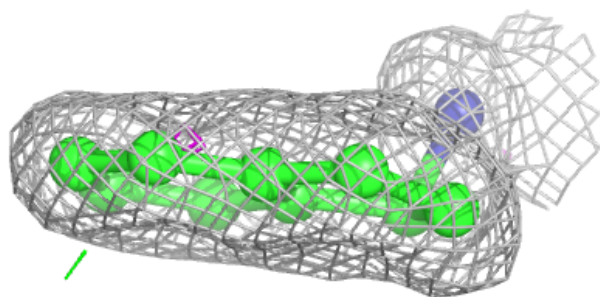
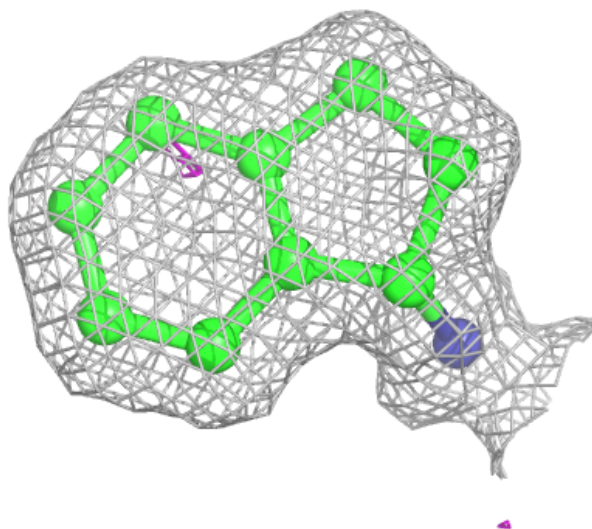
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95<sup>th</sup> percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 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
5	GOL	A	504	6/6	0.78	0.15	56,57,58,61	0
5	GOL	A	505	6/6	0.79	0.17	40,44,47,49	0
5	GOL	B	505	6/6	0.80	0.19	50,54,60,66	0
5	GOL	B	506	6/6	0.80	0.17	42,43,46,46	0
5	GOL	B	507	6/6	0.81	0.16	35,43,46,47	0
5	GOL	A	507	6/6	0.83	0.13	42,44,51,51	0
5	GOL	B	501	6/6	0.90	0.23	31,55,66,74	0
5	GOL	A	506	6/6	0.91	0.18	24,40,41,47	0
5	GOL	A	508	6/6	0.92	0.17	27,39,48,48	0
4	GQR	B	504	10/10	0.95	0.08	16,17,19,20	0
3	ZP6	A	502	29/29	0.95	0.10	22,31,35,37	0
3	ZP6	B	503	29/29	0.96	0.07	19,24,28,30	0
4	GQR	A	503	10/10	0.96	0.08	17,18,20,21	0
2	HEM	B	502	43/43	0.99	0.09	13,14,17,24	0
2	HEM	A	501	43/43	0.99	0.07	13,15,17,24	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.

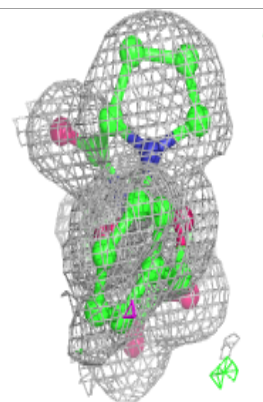
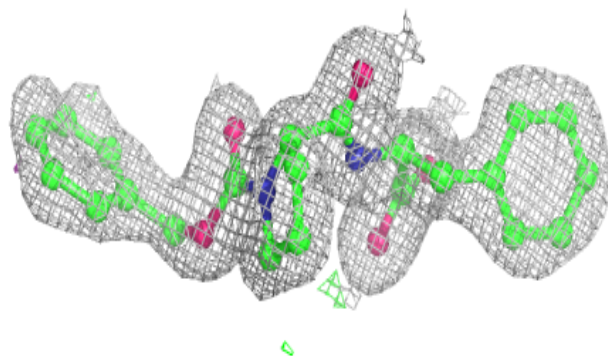
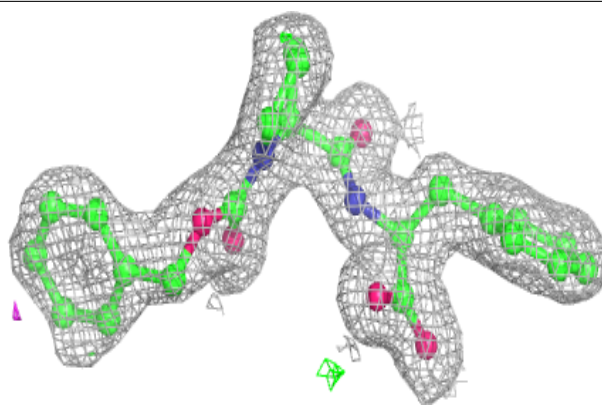
**Electron density around GQR B 504:**

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

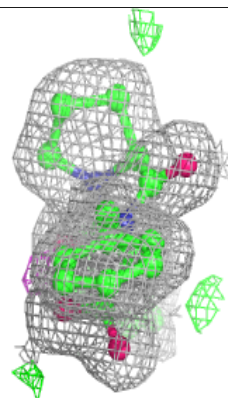
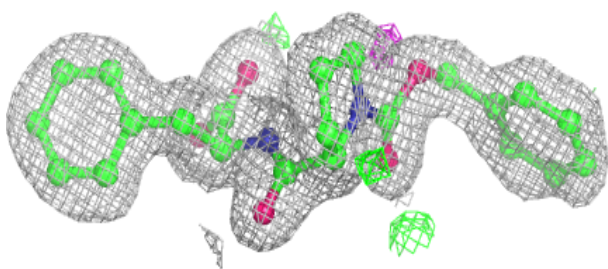
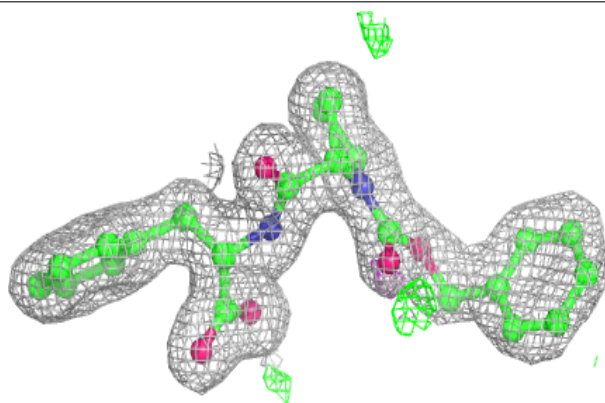


**Electron density around ZP6 A 502:**

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

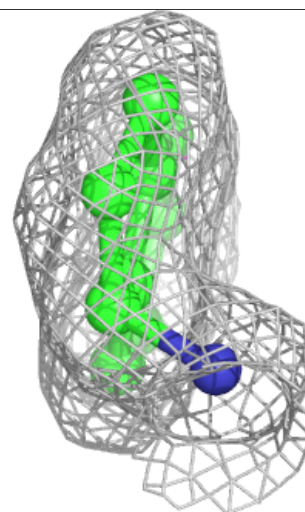
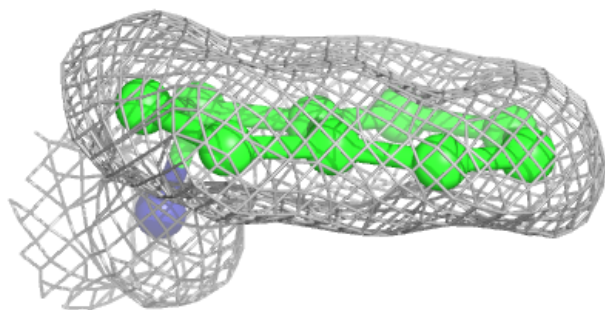
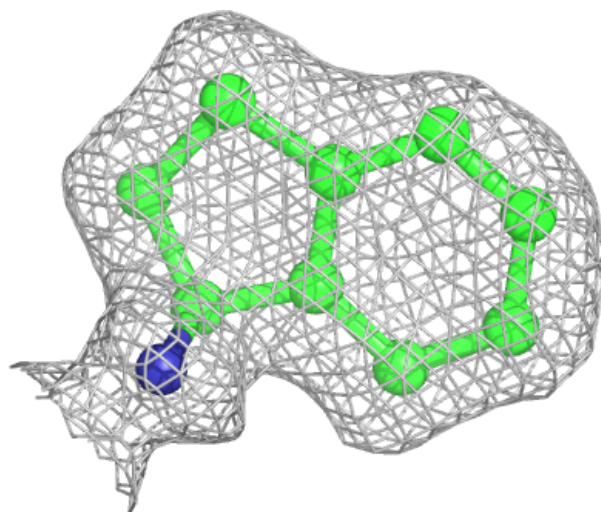
**Electron density around ZP6 B 503:**

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



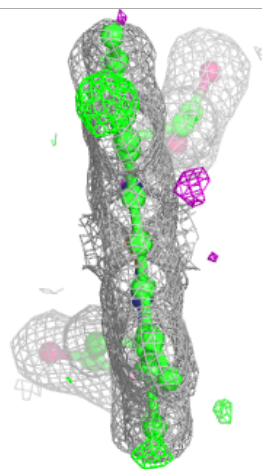
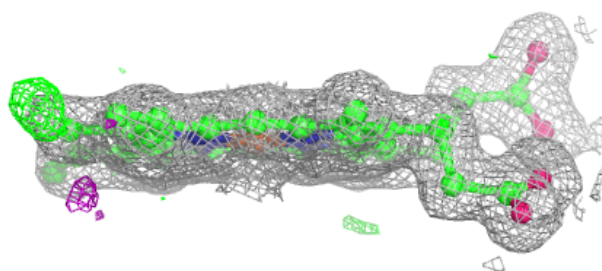
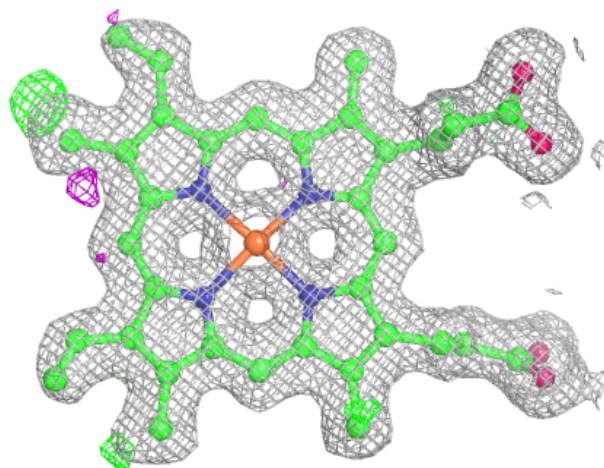
**Electron density around GQR A 503:**

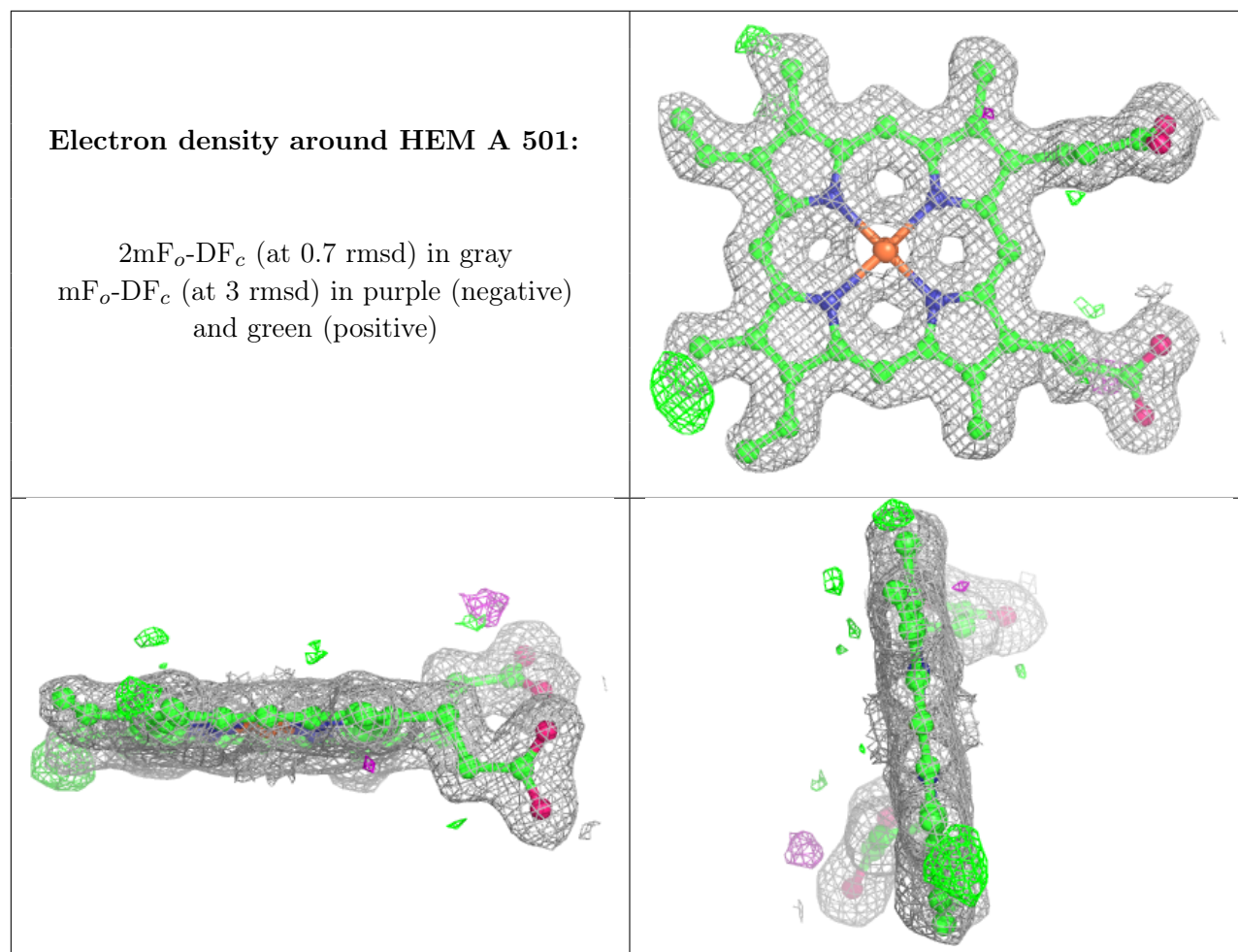
$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)



**Electron density around HEM B 502:**

$2mF_o-DF_c$  (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.