



Full wwPDB X-ray Structure Validation Report ⓘ

Aug 5, 2026 – 05:04 AM JST

PDB ID : 5B2W / pdb_00005b2w
Title : Crystal Structure of P450BM3 with N-perfluorododecanoyl-L-tryptophan
Authors : Cong, Z.; Shoji, O.; Kasai, C.; Sugimoto, H.; Shiro, Y.; Watanabe, Y.
Deposited on : 2016-02-03
Resolution : 1.65 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 : 4-5-2 with Phenix2.0
Mogul : 1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix) : 2.0
EDS : 3.0
Buster-report : wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4 : 9.0.015 (Gargrove)
Density-Fitness : 1.0.12
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.50

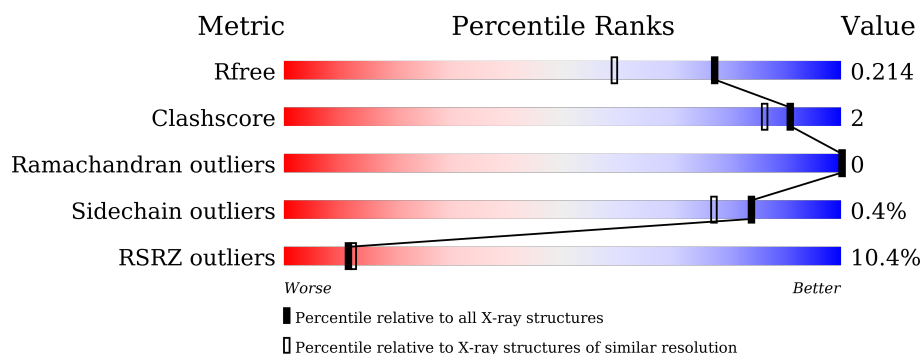
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.65 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}	180053	2563 (1.66-1.66)
Clashscore	190562	2662 (1.66-1.66)
Ramachandran outliers	187476	2621 (1.66-1.66)
Sidechain outliers	187428	2621 (1.66-1.66)
RSRZ outliers	180081	2564 (1.66-1.66)

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	456	10% 94% 5%
1	B	456	11% 96%

2 Entry composition [i](#)

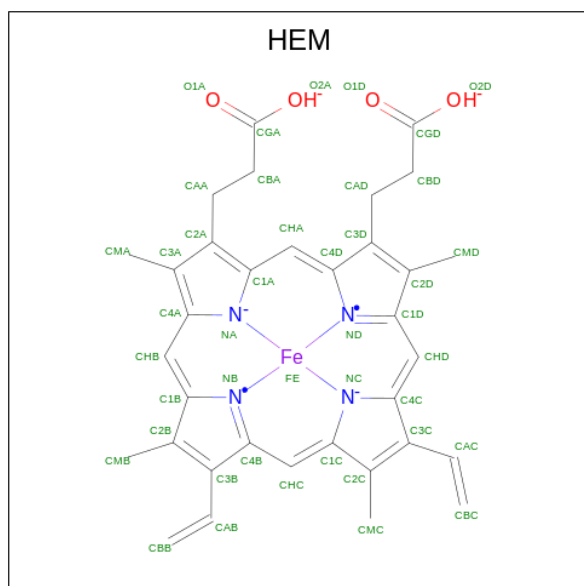
There are 4 unique types of molecules in this entry. The entry contains 8220 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 Bifunctional cytochrome P450/NADPH-P450 reductase.

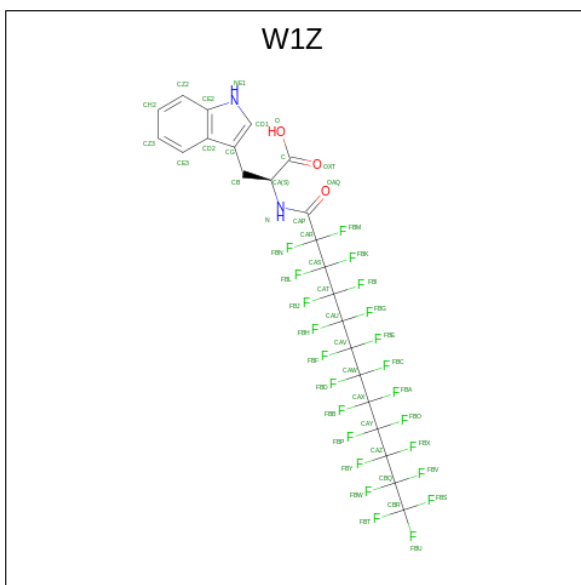
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	452	Total	C	N	O	S	0	7	0
			3699	2360	627	695	17			
1	B	452	Total	C	N	O	S	0	6	0
			3682	2352	623	689	18			

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



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

- Molecule 3 is (2 {S})-3-(1 {H}-indol-3-yl)-2-[2,2,3,3,4,4,5,5,6,6,7,7,8,8,9,9,10,10,11,11,12,12,12-tricosakis(fluoranyl)dodecanoylamino]propanoic acid (CCD ID: W1Z) (formula: $C_{23}H_{11}F_{23}N_2O_3$).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
3	A	1	Total 51	C 23	F 23	N 2	O 3	0	0
3	B	1	Total 51	C 23	F 23	N 2	O 3	0	0

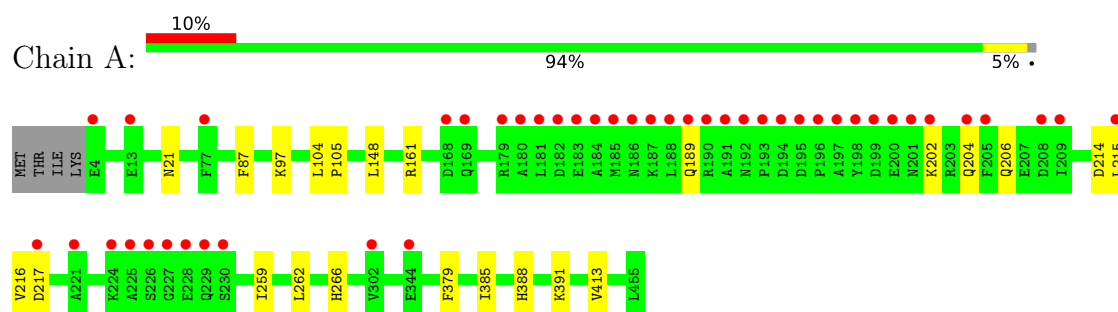
- Molecule 4 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	324	Total O 324 324	0	0
4	B	327	Total O 327 327	0	0

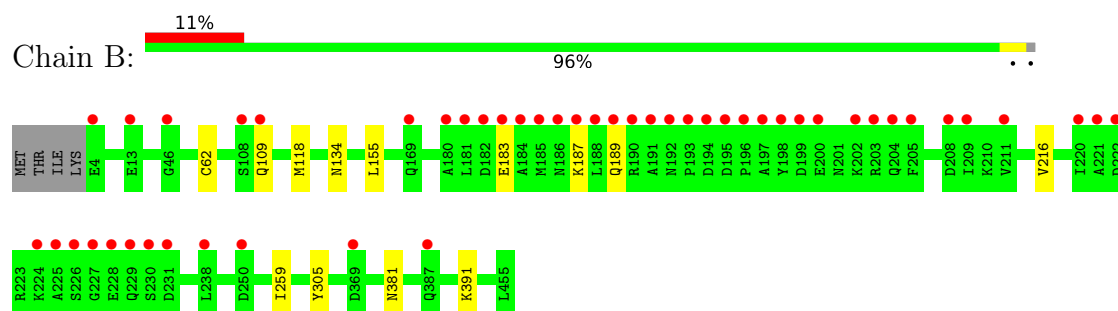
3 Residue-property plots [i](#)

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 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	58.65Å 145.83Å 62.77Å 90.00° 97.58° 90.00°	Depositor
Resolution (Å)	38.65 – 1.65 38.65 – 1.65	Depositor EDS
% Data completeness (in resolution range)	97.0 (38.65-1.65) 97.0 (38.65-1.65)	Depositor EDS
R_{merge}	0.04	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.91 (at 1.65Å)	Xtriage
Refinement program	REFMAC 5.7.0029	Depositor
R, R_{free}	0.185 , 0.208 0.194 , 0.214	Depositor DCC
R_{free} test set	6109 reflections (4.88%)	wwPDB-VP
Wilson B-factor (Å ²)	17.7	Xtriage
Anisotropy	0.076	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.36 , 32.0	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	8220	wwPDB-VP
Average B, all atoms (Å ²)	22.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.51% 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: W1Z, 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	0.44	0/3791	0.68	0/5125
1	B	0.45	0/3782	0.69	2/5112 (0.0%)
All	All	0.44	0/7573	0.68	2/10237 (0.0%)

There are no bond length outliers.

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	381	ASN	CA-C-N	5.05	124.84	119.28
1	B	381	ASN	C-N-CA	5.05	124.84	119.28

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	3699	0	3653	13	0
1	B	3682	0	3653	6	0
2	A	43	0	30	4	0
2	B	43	0	30	3	0
3	A	51	0	0	1	0
3	B	51	0	0	0	0
4	A	324	0	0	1	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
4	B	327	0	0	0	0
All	All	8220	0	7366	25	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 (25) 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:A:161:ARG:H	1:B:134:ASN:HD21	1.33	0.73
1:A:262:LEU:O	1:A:266:HIS:HD2	1.86	0.57
1:B:109:GLN:OE1	1:B:305:TYR:OH	2.22	0.57
1:A:97:LYS:NZ	4:A:602:HOH:O	2.40	0.54
2:A:501:HEM:HBB2	2:A:501:HEM:HMB2	1.89	0.53
1:B:62:CYS:SG	1:B:391:LYS:HE3	2.48	0.53
1:A:388:HIS:HA	1:A:391:LYS:HD3	1.91	0.52
1:B:216:VAL:HG21	1:B:259:ILE:HG13	1.91	0.52
2:A:501:HEM:HMC2	2:A:501:HEM:HBC2	1.90	0.52
1:A:216:VAL:HG21	1:A:259:ILE:HG13	1.93	0.51
2:B:501:HEM:HBC2	2:B:501:HEM:HMC2	1.92	0.51
2:B:501:HEM:HMB2	2:B:501:HEM:HBB2	1.96	0.48
1:A:202:LYS:O	1:A:206:GLN:HG2	2.14	0.47
2:B:501:HEM:HBC2	2:B:501:HEM:CMC	2.46	0.46
1:A:21:ASN:HB2	1:A:189:GLN:HG2	1.97	0.46
2:A:501:HEM:HBB2	2:A:501:HEM:CMB	2.46	0.46
1:A:379:PHE:CD1	1:A:385:ILE:HD11	2.53	0.44
2:A:501:HEM:HBC2	2:A:501:HEM:CMC	2.48	0.44
1:A:148:LEU:HD21	1:A:413:VAL:HG21	2.00	0.43
1:A:189:GLN:C	1:A:189:GLN:HE21	2.26	0.43
1:A:87:PHE:CE1	3:A:502:W1Z:FBX	2.62	0.42
1:B:118[B]:MET:SD	1:B:155:LEU:HD21	2.59	0.41
1:A:214:ASP:O	1:A:217:ASP:HB2	2.21	0.40
1:A:104:LEU:N	1:A:105:PRO:CD	2.84	0.40
1:B:183:GLU:O	1:B:187:LYS:N	2.52	0.40

There are no symmetry-related clashes.

5.3 Torsion angles

5.3.1 Protein backbone

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	457/456 (100%)	440 (96%)	17 (4%)	0	100	100
1	B	456/456 (100%)	443 (97%)	13 (3%)	0	100	100
All	All	913/912 (100%)	883 (97%)	30 (3%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains

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	403/400 (101%)	401 (100%)	2 (0%)	81	72
1	B	402/400 (100%)	401 (100%)	1 (0%)	87	83
All	All	805/800 (101%)	802 (100%)	3 (0%)	84	77

All (3) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	204	GLN
1	A	215	LEU
1	B	189	GLN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (23) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	27	GLN
1	A	70	ASN
1	A	110	GLN
1	A	128	GLN
1	A	169	GLN
1	A	189	GLN
1	A	201	ASN
1	A	213	ASN
1	A	229	GLN
1	A	266	HIS
1	A	288	GLN
1	A	359	GLN
1	B	21	ASN
1	B	134	ASN
1	B	189	GLN
1	B	204	GLN
1	B	213	ASN
1	B	229	GLN
1	B	239	ASN
1	B	283	ASN
1	B	285	HIS
1	B	359	GLN
1	B	387	GLN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains ⓘ

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

5.5 Carbohydrates ⓘ

There are no oligosaccharides in this entry.

5.6 Ligand geometry ⓘ

4 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
3	W1Z	A	502	-	52,52,52	1.53	8 (15%)	90,92,92	1.81	22 (24%)
2	HEM	B	501	1	50,50,50	1.46	6 (12%)	66,82,82	1.64	12 (18%)
3	W1Z	B	502	-	52,52,52	1.53	8 (15%)	90,92,92	1.02	5 (5%)
2	HEM	A	501	1	50,50,50	1.42	5 (10%)	66,82,82	1.66	13 (19%)

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
3	W1Z	A	502	-	-	18/108/108/108	0/2/2/2
2	HEM	B	501	1	-	2/14/54/54	-
3	W1Z	B	502	-	-	27/108/108/108	0/2/2/2
2	HEM	A	501	1	-	3/14/54/54	-

All (27) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	B	502	W1Z	CD2-CG	-6.14	1.33	1.44
3	A	502	W1Z	CD2-CG	-6.07	1.33	1.44
3	B	502	W1Z	CD2-CE2	-5.12	1.34	1.41
3	A	502	W1Z	CD2-CE2	-5.04	1.34	1.41
2	A	501	HEM	FE-NB	4.49	2.08	1.94
2	B	501	HEM	FE-NB	4.43	2.08	1.94
2	A	501	HEM	FE-NC	3.95	2.08	1.95
2	B	501	HEM	C1B-NB	-3.94	1.33	1.40
3	B	502	W1Z	CE3-CD2	-3.80	1.33	1.39
2	B	501	HEM	FE-NC	3.78	2.08	1.95
3	A	502	W1Z	CE3-CD2	-3.68	1.34	1.39
3	B	502	W1Z	CZ2-CE2	-3.49	1.33	1.39
2	A	501	HEM	C1B-NB	-3.29	1.34	1.40
3	A	502	W1Z	CZ2-CE2	-3.16	1.34	1.39
2	B	501	HEM	C4B-NB	-2.38	1.33	1.38
3	A	502	W1Z	CE2-NE1	-2.37	1.33	1.37

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	B	502	W1Z	CE2-NE1	-2.36	1.33	1.37
2	B	501	HEM	C1C-C2C	-2.31	1.40	1.45
3	A	502	W1Z	CB-CG	2.31	1.54	1.50
3	B	502	W1Z	CB-CG	2.23	1.54	1.50
3	B	502	W1Z	CD1-NE1	-2.14	1.33	1.37
2	A	501	HEM	C1C-C2C	-2.13	1.41	1.45
3	B	502	W1Z	CD1-CG	-2.12	1.33	1.36
2	A	501	HEM	C4B-NB	-2.10	1.34	1.38
3	A	502	W1Z	CD1-CG	-2.06	1.33	1.36
3	A	502	W1Z	CD1-NE1	-2.06	1.33	1.37
2	B	501	HEM	C3C-C4C	-2.03	1.42	1.46

All (52) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	502	W1Z	FBL-CAS-CAR	-6.79	91.52	108.43
2	B	501	HEM	C1B-NB-C4B	5.81	111.08	105.07
3	A	502	W1Z	FBK-CAS-CAR	-5.73	94.17	108.43
2	A	501	HEM	C1B-NB-C4B	5.15	110.39	105.07
2	B	501	HEM	CHC-C4B-NB	4.51	129.32	124.42
2	A	501	HEM	C4C-NC-C1C	4.41	109.67	105.35
3	A	502	W1Z	CAR-CAS-CAT	-4.29	104.23	116.69
2	A	501	HEM	CHC-C4B-NB	4.09	128.87	124.42
2	B	501	HEM	C4C-NC-C1C	3.99	109.25	105.35
3	A	502	W1Z	FBU-CBR-FBT	3.53	118.31	107.53
2	A	501	HEM	CHD-C1D-ND	3.45	128.17	124.42
3	B	502	W1Z	CA-CB-CG	-3.45	106.86	113.48
3	A	502	W1Z	OAQ-CAP-CAR	3.45	121.06	118.44
3	A	502	W1Z	CA-CB-CG	-3.34	107.07	113.48
2	B	501	HEM	CHD-C1D-ND	3.27	127.97	124.42
3	A	502	W1Z	FBA-CAX-CAW	-3.23	95.29	108.01
2	B	501	HEM	CHA-C4D-ND	3.20	128.33	124.37
2	A	501	HEM	CHD-C1D-C2D	-3.16	120.04	124.98
3	B	502	W1Z	OAQ-CAP-CAR	3.09	120.79	118.44
2	A	501	HEM	CHA-C4D-ND	3.07	128.16	124.37
2	B	501	HEM	CHD-C1D-C2D	-3.02	120.26	124.98
3	A	502	W1Z	FBT-CBR-FBS	2.96	116.58	107.53
3	A	502	W1Z	FBL-CAS-CAT	2.96	119.66	108.01
3	A	502	W1Z	FBU-CBR-FBS	2.94	116.51	107.53
3	A	502	W1Z	FBB-CAX-CAW	-2.92	96.50	108.01
2	A	501	HEM	O2A-CGA-CBA	2.92	123.42	114.03
3	B	502	W1Z	CD2-CG-CD1	2.89	109.28	106.15

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	502	W1Z	FBL-CAS-FBK	2.80	119.43	107.27
3	A	502	W1Z	CD2-CG-CD1	2.75	109.13	106.15
2	B	501	HEM	CHA-C4D-C3D	-2.75	120.17	125.33
3	A	502	W1Z	FBB-CAX-FBA	2.68	118.90	107.27
3	A	502	W1Z	FBA-CAX-CAY	2.66	118.50	108.01
2	A	501	HEM	CHA-C4D-C3D	-2.66	120.33	125.33
2	B	501	HEM	CHB-C1B-NB	2.50	127.46	124.37
2	A	501	HEM	CHB-C1B-NB	2.50	127.45	124.37
3	B	502	W1Z	CG-CD1-NE1	-2.45	107.47	110.31
3	A	502	W1Z	CAW-CAX-CAY	-2.44	106.02	116.51
2	B	501	HEM	C1A-CHA-C4D	-2.39	120.67	126.34
2	A	501	HEM	C1A-CHA-C4D	-2.38	120.69	126.34
3	A	502	W1Z	FBT-CBR-CBQ	-2.38	99.35	110.34
3	A	502	W1Z	CG-CD1-NE1	-2.35	107.58	110.31
2	A	501	HEM	CMD-C2D-C1D	2.34	128.59	125.04
2	B	501	HEM	CHD-C4C-NC	2.30	126.93	124.44
3	A	502	W1Z	FBS-CBR-CBQ	-2.28	99.79	110.34
3	A	502	W1Z	FBK-CAS-CAT	2.28	116.97	108.01
2	B	501	HEM	CMD-C2D-C1D	2.20	128.38	125.04
2	B	501	HEM	CAD-C3D-C4D	2.17	128.45	124.66
2	A	501	HEM	O2D-CGD-CBD	2.16	120.95	114.03
3	A	502	W1Z	FBU-CBR-CBQ	-2.15	100.42	110.34
3	A	502	W1Z	CAS-CAT-CAU	-2.08	107.57	116.51
3	B	502	W1Z	CE3-CD2-CE2	2.02	121.00	118.83
2	A	501	HEM	CAD-C3D-C4D	2.02	128.19	124.66

There are no chirality outliers.

All (50) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	502	W1Z	OAQ-CAP-CAR-FBM
3	A	502	W1Z	N-CAP-CAR-FBM
3	A	502	W1Z	OAQ-CAP-CAR-FBN
3	A	502	W1Z	N-CAP-CAR-FBN
3	B	502	W1Z	OAQ-CAP-CAR-CAS
3	B	502	W1Z	OAQ-CAP-CAR-FBM
3	B	502	W1Z	N-CAP-CAR-FBM
3	B	502	W1Z	FBH-CAU-CAV-FBE
3	A	502	W1Z	FBL-CAS-CAT-FBJ
3	B	502	W1Z	FBP-CAY-CAZ-FBX
3	B	502	W1Z	CAT-CAU-CAV-CAW
3	A	502	W1Z	FBC-CAW-CAX-FBA

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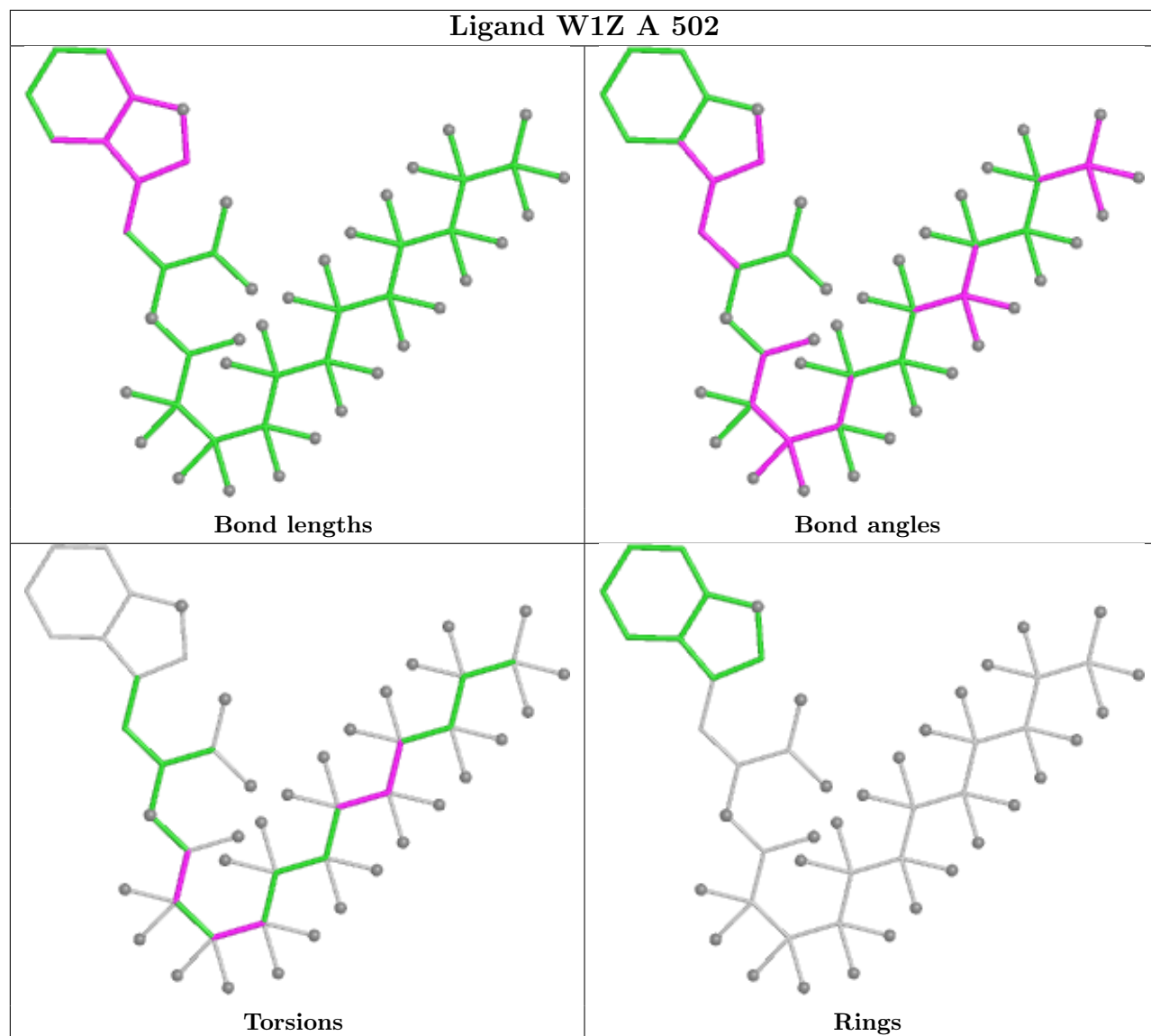
Mol	Chain	Res	Type	Atoms
3	B	502	W1Z	FBG-CAU-CAV-FBE
3	B	502	W1Z	FBH-CAU-CAV-FBF
3	B	502	W1Z	FBH-CAU-CAV-CAW
3	B	502	W1Z	CAT-CAU-CAV-FBE
3	B	502	W1Z	FBG-CAU-CAV-FBF
3	A	502	W1Z	FBL-CAS-CAT-CAU
3	B	502	W1Z	FBO-CAY-CAZ-FBX
3	A	502	W1Z	FBL-CAS-CAT-FBI
3	A	502	W1Z	CAW-CAX-CAY-CAZ
3	B	502	W1Z	OAQ-CAP-CAR-FBN
3	B	502	W1Z	N-CAP-CAR-FBN
3	A	502	W1Z	CAV-CAW-CAX-CAY
3	B	502	W1Z	CAV-CAW-CAX-FBB
3	B	502	W1Z	FBG-CAU-CAV-CAW
3	B	502	W1Z	CAX-CAY-CAZ-FBX
3	A	502	W1Z	CAW-CAX-CAY-FBP
3	B	502	W1Z	FBC-CAW-CAX-CAY
3	A	502	W1Z	FBB-CAX-CAY-CAZ
3	B	502	W1Z	FBP-CAY-CAZ-FBY
3	A	502	W1Z	FBC-CAW-CAX-CAY
3	B	502	W1Z	CAT-CAU-CAV-FBF
3	B	502	W1Z	FBO-CAY-CAZ-FBY
3	A	502	W1Z	FBD-CAW-CAX-FBA
3	B	502	W1Z	FBP-CAY-CAZ-CBQ
3	B	502	W1Z	CAX-CAY-CAZ-CBQ
3	A	502	W1Z	CAV-CAW-CAX-FBA
3	B	502	W1Z	CAV-CAW-CAX-CAY
2	B	501	HEM	CAD-CBD-CGD-O1D
3	A	502	W1Z	FBC-CAW-CAX-FBB
2	B	501	HEM	CAD-CBD-CGD-O2D
2	A	501	HEM	CAD-CBD-CGD-O2D
3	A	502	W1Z	FBD-CAW-CAX-FBB
2	A	501	HEM	CAD-CBD-CGD-O1D
3	B	502	W1Z	FBO-CAY-CAZ-CBQ
3	A	502	W1Z	FBD-CAW-CAX-CAY
3	B	502	W1Z	CAX-CAY-CAZ-FBY
3	B	502	W1Z	CA-CB-CG-CD2
2	A	501	HEM	CAA-CBA-CGA-O2A

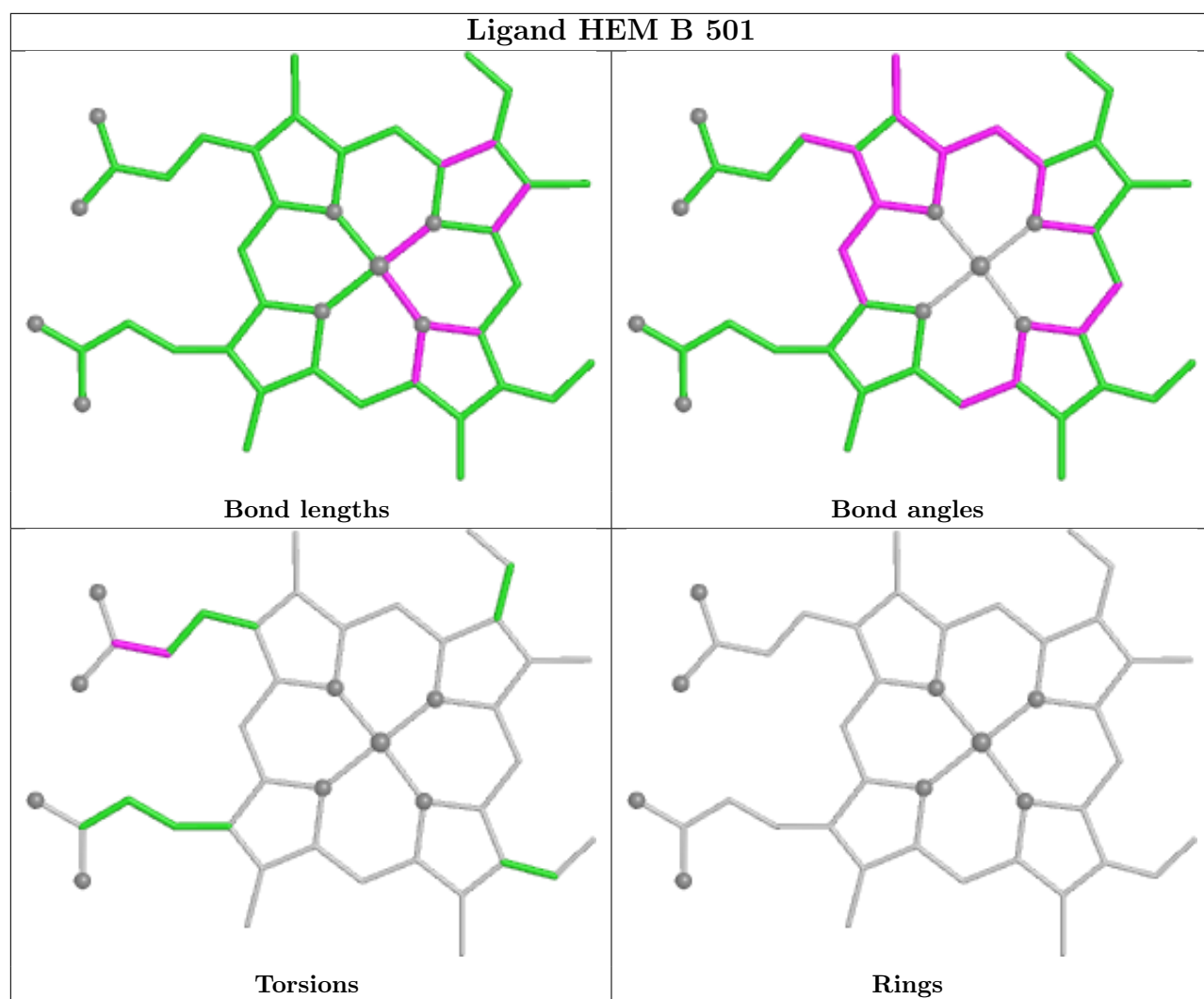
There are no ring outliers.

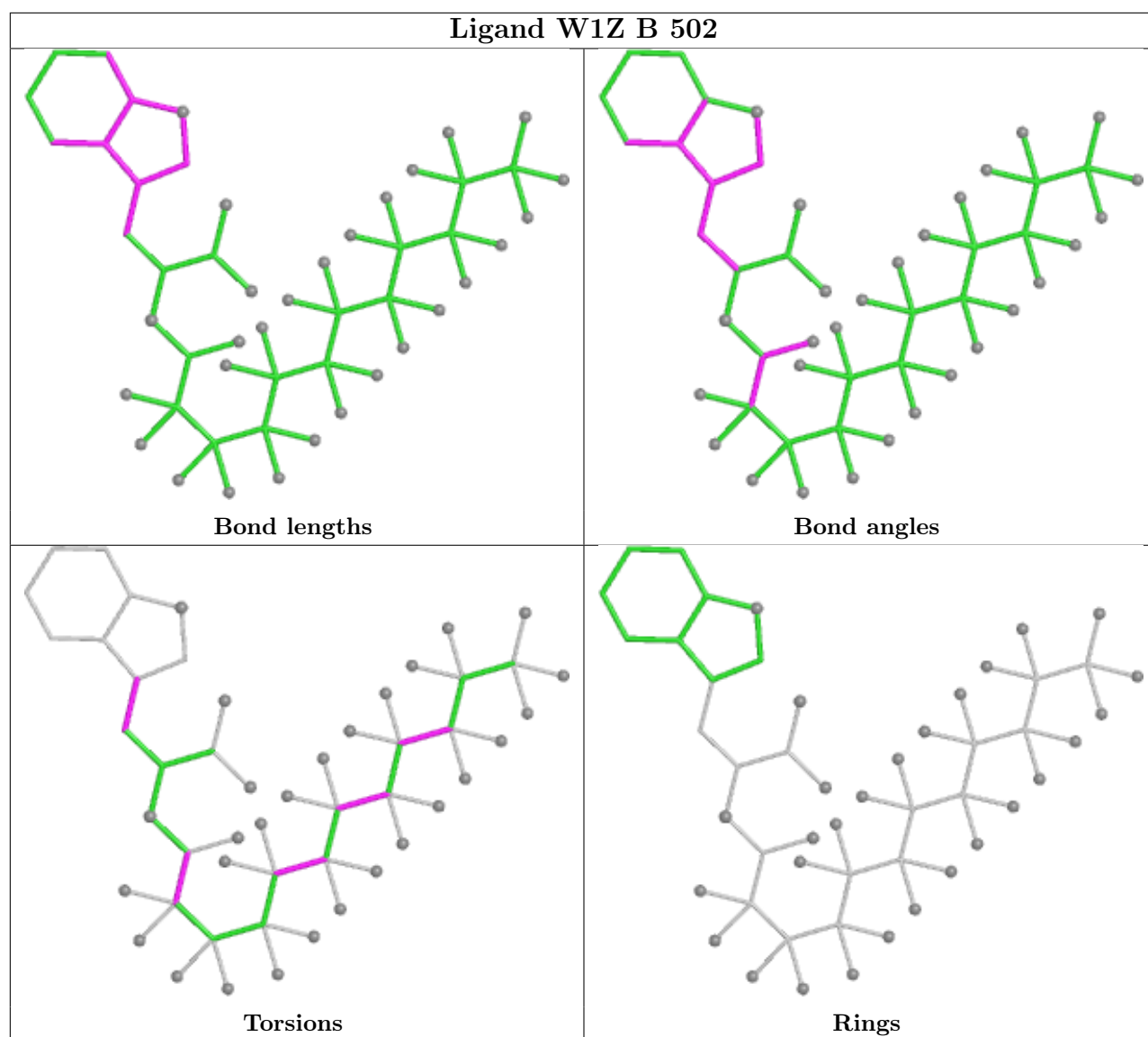
3 monomers are involved in 8 short contacts:

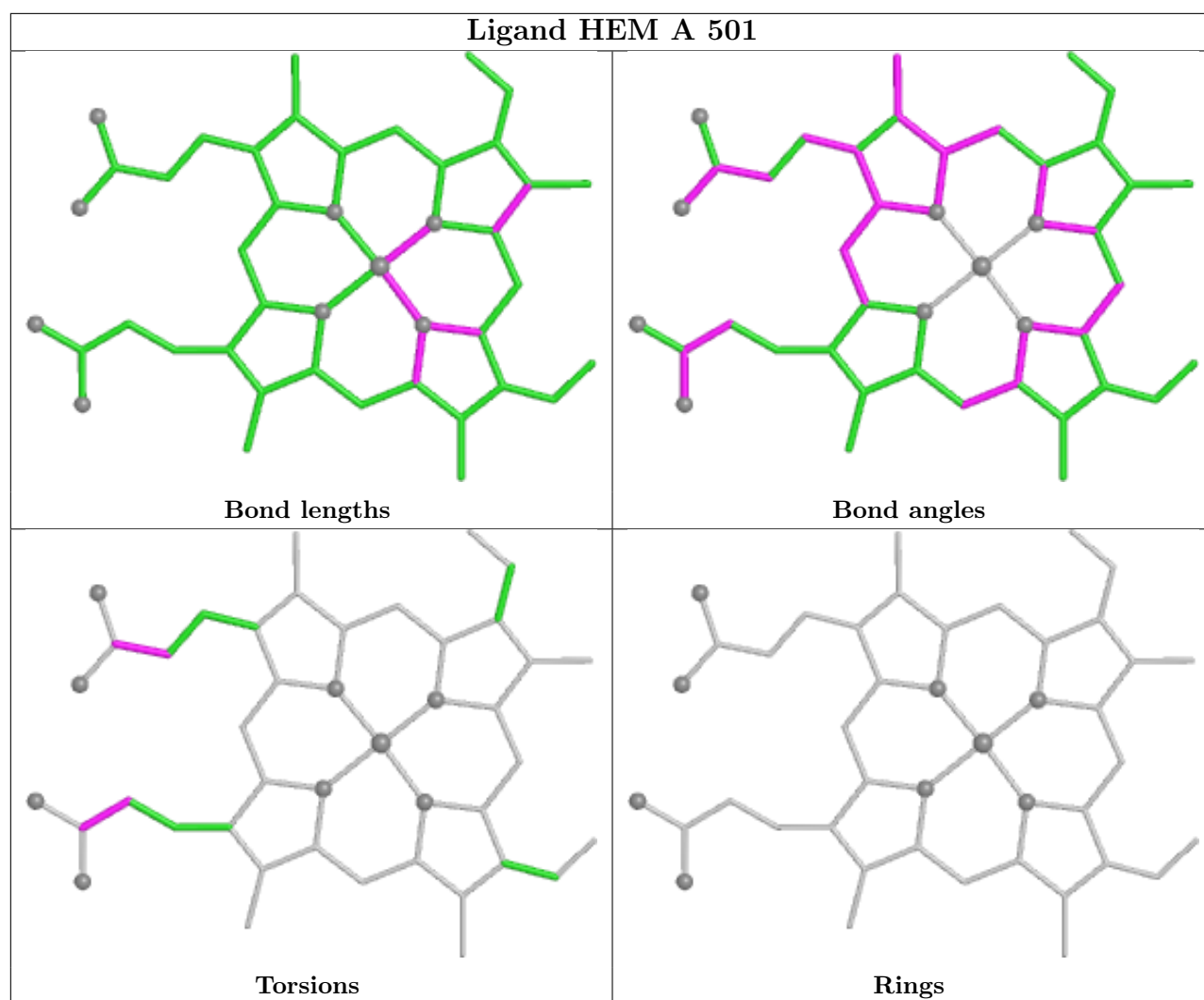
Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	502	W1Z	1	0
2	B	501	HEM	3	0
2	A	501	HEM	4	0

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, 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	452/456 (99%)	0.35	45 (9%) 12 13	6, 18, 48, 64	7 (1%)
1	B	452/456 (99%)	0.46	49 (10%) 11 11	8, 19, 51, 85	6 (1%)
All	All	904/912 (99%)	0.40	94 (10%) 11 12	6, 18, 48, 85	13 (1%)

All (94) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	191	ALA	10.3
1	B	193	PRO	7.2
1	B	197	ALA	6.7
1	A	191	ALA	6.4
1	A	193	PRO	6.3
1	B	186	ASN	5.7
1	A	197	ALA	5.3
1	B	196	PRO	5.3
1	B	188	LEU	5.0
1	B	195	ASP	4.9
1	A	189	GLN	4.7
1	A	188	LEU	4.7
1	A	225	ALA	4.5
1	A	186	ASN	4.5
1	A	205	PHE	4.5
1	A	198	TYR	4.3
1	B	189	GLN	4.3
1	B	182	ASP	4.2
1	B	198	TYR	4.2
1	A	227	GLY	4.1
1	A	190	ARG	4.1
1	A	187	LYS	3.9
1	B	192	ASN	3.9
1	B	225	ALA	3.9

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Mol	Chain	Res	Type	RSRZ
1	A	181	LEU	3.8
1	B	194	ASP	3.8
1	B	190	ARG	3.8
1	A	182	ASP	3.7
1	A	195	ASP	3.7
1	A	184	ALA	3.7
1	A	180	ALA	3.7
1	B	184	ALA	3.5
1	A	192	ASN	3.5
1	B	227	GLY	3.5
1	B	200	GLU	3.4
1	B	181	LEU	3.3
1	A	201	ASN	3.3
1	B	205	PHE	3.3
1	A	226	SER	3.2
1	B	202	LYS	3.2
1	B	204	GLN	3.2
1	B	180	ALA	3.2
1	B	108	SER	3.2
1	A	196	PRO	3.2
1	A	221	ALA	3.2
1	B	228[A]	GLU	3.2
1	B	229	GLN	3.1
1	A	228	GLU	3.1
1	B	199	ASP	3.1
1	A	204	GLN	3.0
1	A	183	GLU	3.0
1	A	215	LEU	3.0
1	B	211	VAL	2.9
1	B	203	ARG	2.9
1	B	231	ASP	2.8
1	A	200	GLU	2.8
1	B	185	MET	2.8
1	B	187	LYS	2.8
1	A	230	SER	2.8
1	A	4	GLU	2.7
1	A	185	MET	2.7
1	B	222	ASP	2.7
1	B	250	ASP	2.7
1	B	224	LYS	2.7
1	A	199	ASP	2.7
1	A	194	ASP	2.6

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Mol	Chain	Res	Type	RSRZ
1	B	109	GLN	2.6
1	B	221	ALA	2.5
1	B	208	ASP	2.5
1	A	168	ASP	2.5
1	A	202	LYS	2.5
1	B	209	ILE	2.5
1	A	13[A]	GLU	2.4
1	B	4	GLU	2.4
1	B	387	GLN	2.4
1	A	169	GLN	2.4
1	A	209	ILE	2.4
1	B	220	ILE	2.3
1	B	46	GLY	2.2
1	A	229	GLN	2.2
1	A	344	GLU	2.2
1	B	238	LEU	2.2
1	B	169	GLN	2.1
1	A	217	ASP	2.1
1	A	179	ARG	2.1
1	A	224	LYS	2.1
1	A	77	PHE	2.1
1	A	302	VAL	2.1
1	A	208	ASP	2.1
1	B	369	ASP	2.1
1	B	226	SER	2.0
1	B	13	GLU	2.0
1	B	183	GLU	2.0
1	B	230	SER	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 oligosaccharides in this entry.

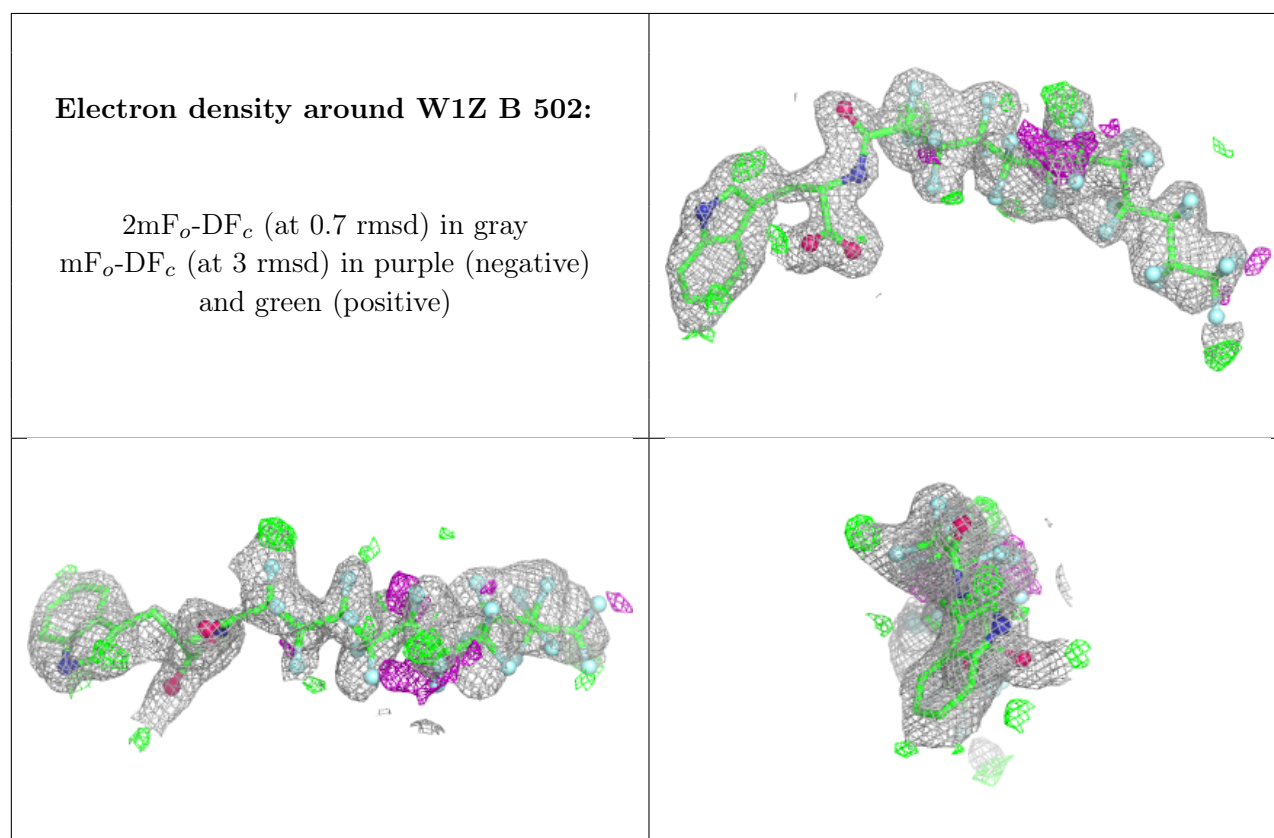
6.4 Ligands [i](#)

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

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

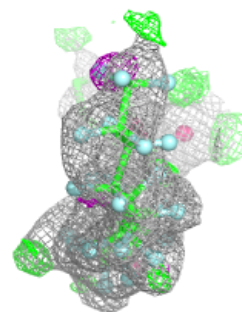
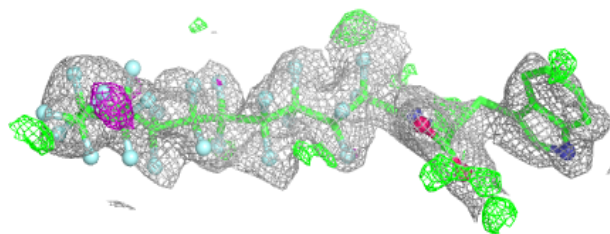
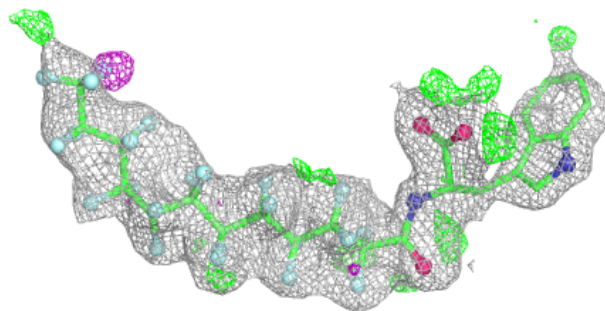
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
3	W1Z	B	502	51/51	0.71	0.19	29,37,53,55	51
3	W1Z	A	502	51/51	0.80	0.17	28,35,51,54	51
2	HEM	A	501	43/43	0.97	0.07	12,13,14,16	0
2	HEM	B	501	43/43	0.97	0.07	12,13,14,17	0

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.



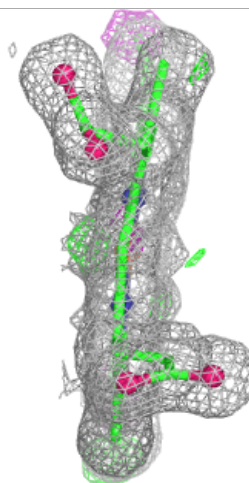
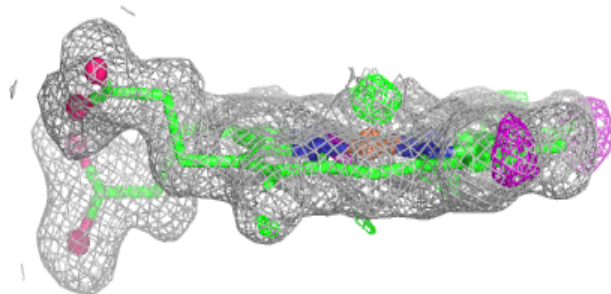
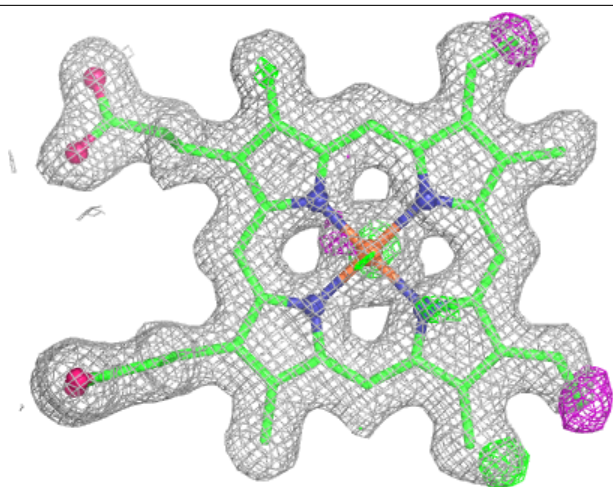
Electron density around W1Z A 502:

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



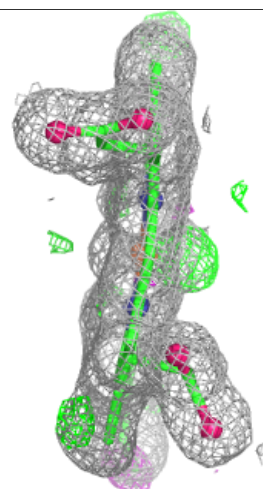
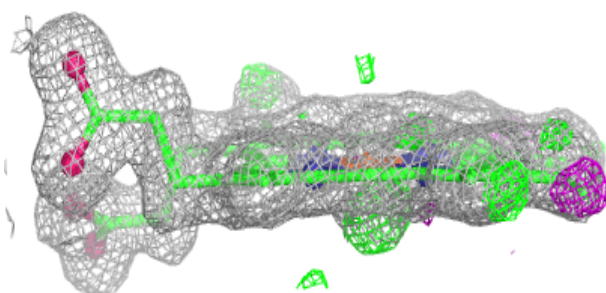
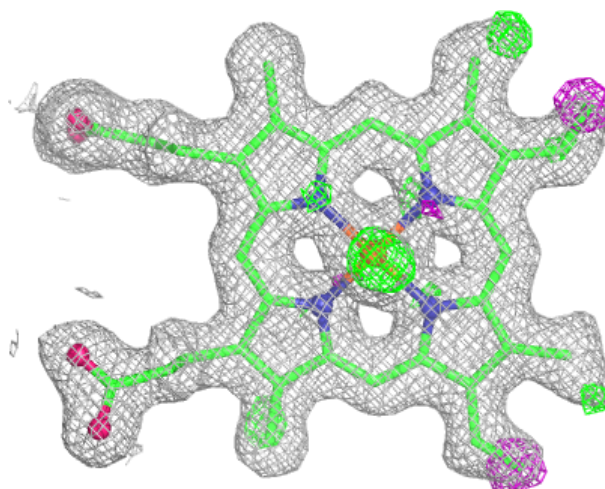
Electron density around HEM A 501:

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



Electron density around HEM 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.