Full wwPDB X-ray Structure Validation Report (i)

Oct 3, 2023 – 08:18 AM EDT

PDB ID	:	6PZ1
Title	:	Crystal Structure of human Indoleamine 2,3-Dioxygenase 1 in complex with PF-06840003 in Active Site and Si site
Authors	:	Pham, K.N.; Lewis-Ballester, A.; Yeh, S.R.
Deposited on	:	2019-07-31
Resolution	:	2.65 Å(reported)

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

MolProbity	:	FAILED
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	FAILED
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
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 2.65 Å.

There are no overall percentile quality scores available for this entry.

MolProbity and EDS failed to run properly - the sequence quality summary graphics cannot be shown.

2 Entry composition ⓘ

There are 5 unique types of molecules in this entry. The entry contains 6317 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 Indoleamine 2,3-dioxygenase 1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	376	Total	C	N	O	S	0	0	0
			2977	1914	509	537	17			
1	B	377	Total	C	N	O	S	0	0	0
			2985	1919	509	540	17			

There are 66 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	11	MET	-	initiating methionine	UNP P14902
A	404	LYS	-	expression tag	UNP P14902
A	405	GLY	-	expression tag	UNP P14902
A	406	GLU	-	expression tag	UNP P14902
A	407	LEU	-	expression tag	UNP P14902
A	408	ASN	-	expression tag	UNP P14902
A	409	SER	-	expression tag	UNP P14902
A	410	LYS	-	expression tag	UNP P14902
A	411	LEU	-	expression tag	UNP P14902
A	412	GLU	-	expression tag	UNP P14902
A	413	GLY	-	expression tag	UNP P14902
A	414	LYS	-	expression tag	UNP P14902
A	415	PRO	-	expression tag	UNP P14902
A	416	ILE	-	expression tag	UNP P14902
A	417	PRO	-	expression tag	UNP P14902
A	418	ASN	-	expression tag	UNP P14902
A	419	PRO	-	expression tag	UNP P14902
A	420	LEU	-	expression tag	UNP P14902
A	421	LEU	-	expression tag	UNP P14902
A	422	GLY	-	expression tag	UNP P14902
A	423	LEU	-	expression tag	UNP P14902
A	424	ASP	-	expression tag	UNP P14902
A	425	SER	-	expression tag	UNP P14902
A	426	THR	-	expression tag	UNP P14902
A	427	ARG	-	expression tag	UNP P14902

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Chain	Residue	Modelled	Actual	Comment	Reference
A	428	THR	-	expression tag	UNP P14902
A	429	GLY	-	expression tag	UNP P14902
A	430	HIS	-	expression tag	UNP P14902
A	431	HIS	-	expression tag	UNP P14902
A	432	HIS	-	expression tag	UNP P14902
A	433	HIS	-	expression tag	UNP P14902
A	434	HIS	-	expression tag	UNP P14902
A	435	HIS	-	expression tag	UNP P14902
B	11	MET	-	initiating methionine	UNP P14902
B	404	LYS	-	expression tag	UNP P14902
B	405	GLY	-	expression tag	UNP P14902
B	406	GLU	-	expression tag	UNP P14902
B	407	LEU	-	expression tag	UNP P14902
B	408	ASN	-	expression tag	UNP P14902
B	409	SER	-	expression tag	UNP P14902
B	410	LYS	-	expression tag	UNP P14902
B	411	LEU	-	expression tag	UNP P14902
B	412	GLU	-	expression tag	UNP P14902
B	413	GLY	-	expression tag	UNP P14902
B	414	LYS	-	expression tag	UNP P14902
B	415	PRO	-	expression tag	UNP P14902
B	416	ILE	-	expression tag	UNP P14902
B	417	PRO	-	expression tag	UNP P14902
B	418	ASN	-	expression tag	UNP P14902
B	419	PRO	-	expression tag	UNP P14902
B	420	LEU	-	expression tag	UNP P14902
B	421	LEU	-	expression tag	UNP P14902
B	422	GLY	-	expression tag	UNP P14902
B	423	LEU	-	expression tag	UNP P14902
B	424	ASP	-	expression tag	UNP P14902
B	425	SER	-	expression tag	UNP P14902
B	426	THR	-	expression tag	UNP P14902
B	427	ARG	-	expression tag	UNP P14902
B	428	THR	-	expression tag	UNP P14902
B	429	GLY	-	expression tag	UNP P14902
B	430	HIS	-	expression tag	UNP P14902
B	431	HIS	-	expression tag	UNP P14902
B	432	HIS	-	expression tag	UNP P14902
B	433	HIS	-	expression tag	UNP P14902
B	434	HIS	-	expression tag	UNP P14902
B	435	HIS	-	expression tag	UNP P14902

- Molecule 2 is PROTOPORPHYRIN IX CONTAINING FE (three-letter code: HEM) (for-

mula: $C_{34}H_{32}FeN_4O_4$) (labeled as "Ligand of Interest" by depositor).
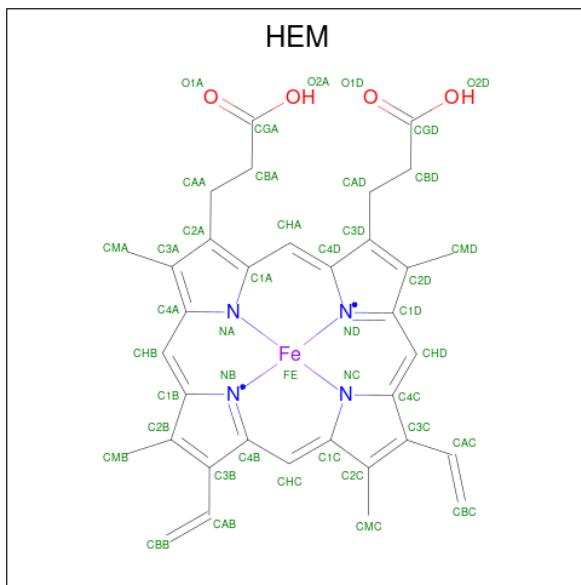
HEM

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 (3R)-3-(5-fluoro-1H-indol-3-yl)pyrrolidine-2,5-dione (three-letter code: AOJ) (formula: $C_{12}H_9FN_2O_2$) (labeled as "Ligand of Interest" by depositor).

AOJ
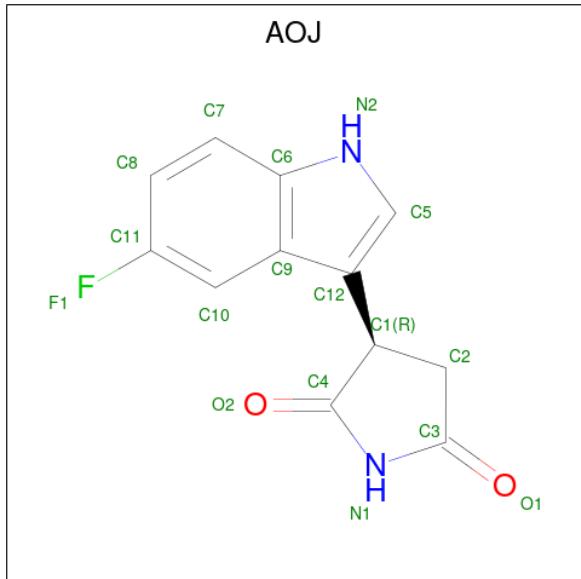
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
3	A	1	Total	C	F	N	O	0	0
			17	12	1	2	2		
3	B	1	Total	C	F	N	O	0	0
			17	12	1	2	2		
3	B	1	Total	C	F	N	O	0	0
			17	12	1	2	2		

- Molecule 4 is GLYCEROL (three-letter code: GOL) (formula: $C_3H_8O_3$).
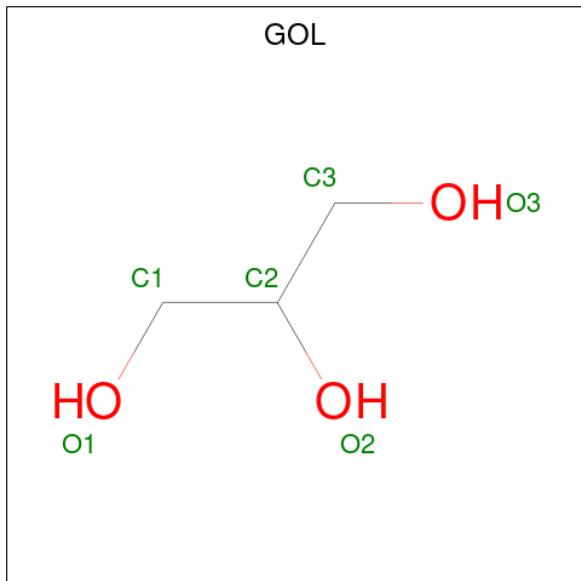
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	A	1	Total	C	O	0	0
			6	3	3		
4	B	1	Total	C	O	0	0
			6	3	3		
4	B	1	Total	C	O	0	0
			6	3	3		
4	B	1	Total	C	O	0	0
			6	3	3		
4	B	1	Total	C	O	0	0
			6	3	3		

- Molecule 5 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	89	Total	O	0	0
			89	89		
5	B	99	Total	O	0	0
			99	99		

MolProbity and EDS failed to run properly - this section is therefore empty.

3   Data and refinement statistics (i)

EDS failed to run properly - this section is therefore incomplete.

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α, β, γ	87.48Å 97.86Å 131.97Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	40.00 – 2.65	Depositor
% Data completeness (in resolution range)	99.6 (40.00-2.65)	Depositor
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.55 (at 2.65Å)	Xtriage
Refinement program	REFMAC 5.8.0238	Depositor
R, R_{free}	0.220 , 0.270	Depositor
Wilson B-factor (Å^2)	78.0	Xtriage
Anisotropy	0.118	Xtriage
L-test for twinning[2]	$< |L| > = 0.51$, $< L^2 > = 0.35$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
Total number of atoms	6317	wwPDB-VP
Average B, all atoms (Å^2)	90.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.67% of the height of the origin peak. No significant pseudotranslation is detected.*

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[1]Intensities estimated from amplitudes.
[2]Theoretical values of $< |L| >$, $< L^2 >$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

4 Model quality ⓘ

4.1 Standard geometry ⓘ

MolProbity failed to run properly - this section is therefore empty.

4.2 Too-close contacts ⓘ

MolProbity failed to run properly - this section is therefore empty.

4.3 Torsion angles ⓘ

4.3.1 Protein backbone ⓘ

MolProbity failed to run properly - this section is therefore empty.

4.3.2 Protein sidechains ⓘ

MolProbity failed to run properly - this section is therefore empty.

4.3.3 RNA ⓘ

MolProbity failed to run properly - this section is therefore empty.

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

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

4.5 Carbohydrates ⓘ

There are no monosaccharides in this entry.

4.6 Ligand geometry ⓘ

10 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	AOJ	B	503	-	17,19,19	2.15	5 (29%)	19,28,28	2.01	7 (36%)
3	AOJ	A	502	-	17,19,19	2.08	5 (29%)	19,28,28	1.93	5 (26%)
3	AOJ	B	502	-	17,19,19	2.13	5 (29%)	19,28,28	1.95	5 (26%)
2	HEM	A	501	1	41,50,50	1.33	5 (12%)	45,82,82	1.74	9 (20%)
4	GOL	B	506	-	5,5,5	0.10	0	5,5,5	0.27	0
4	GOL	B	507	-	5,5,5	0.10	0	5,5,5	0.28	0
2	HEM	B	501	1	41,50,50	1.32	5 (12%)	45,82,82	1.79	11 (24%)
4	GOL	B	505	-	5,5,5	0.10	0	5,5,5	0.28	0
4	GOL	B	504	-	5,5,5	0.10	0	5,5,5	0.28	0
4	GOL	A	503	-	5,5,5	0.10	0	5,5,5	0.33	0

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	AOJ	B	503	-	-	0/0/16/16	0/3/3/3
3	AOJ	A	502	-	-	0/0/16/16	0/3/3/3
3	AOJ	B	502	-	-	0/0/16/16	0/3/3/3
2	HEM	A	501	1	-	4/12/54/54	-
4	GOL	B	506	-	-	0/4/4/4	-
4	GOL	B	507	-	-	2/4/4/4	-
2	HEM	B	501	1	-	4/12/54/54	-
4	GOL	B	505	-	-	2/4/4/4	-
4	GOL	B	504	-	-	2/4/4/4	-
4	GOL	A	503	-	-	2/4/4/4	-

All (25) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	B	502	AOJ	C12-C9	6.08	1.47	1.40
3	B	503	AOJ	C12-C9	5.79	1.47	1.40
3	A	502	AOJ	C12-C9	5.73	1.47	1.40
3	B	503	AOJ	C4-N1	-3.87	1.32	1.37
2	B	501	HEM	C1B-NB	-3.29	1.34	1.40

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	501	HEM	C4D-ND	-3.25	1.34	1.40
2	A	501	HEM	C1B-NB	-3.21	1.34	1.40
3	A	502	AOJ	C4-N1	-3.20	1.33	1.37
2	B	501	HEM	FE-NB	3.03	2.11	1.96
2	A	501	HEM	FE-NB	3.02	2.11	1.96
2	B	501	HEM	C4D-ND	-3.00	1.35	1.40
3	B	502	AOJ	C4-N1	-2.99	1.33	1.37
3	B	503	AOJ	C3-N1	-2.78	1.33	1.37
3	A	502	AOJ	C3-N1	-2.78	1.33	1.37
3	B	502	AOJ	C3-N1	-2.62	1.33	1.37
2	B	501	HEM	CHB-C1B	2.54	1.41	1.35
2	A	501	HEM	CHB-C1B	2.46	1.41	1.35
3	B	502	AOJ	C10-C11	2.40	1.40	1.36
3	B	503	AOJ	C10-C11	2.32	1.39	1.36
3	A	502	AOJ	C10-C11	2.30	1.39	1.36
2	A	501	HEM	C1D-ND	-2.21	1.34	1.38
2	B	501	HEM	C1D-ND	-2.17	1.34	1.38
3	B	502	AOJ	C9-C6	2.17	1.48	1.42
3	A	502	AOJ	C9-C6	2.10	1.48	1.42
3	B	503	AOJ	C9-C6	2.06	1.48	1.42

All (37) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	B	501	HEM	CHC-C4B-NB	5.22	130.10	124.43
3	B	502	AOJ	C12-C9-C6	-4.95	101.68	106.83
3	A	502	AOJ	C12-C9-C6	-4.89	101.74	106.83
2	A	501	HEM	CHC-C4B-NB	4.80	129.64	124.43
3	B	503	AOJ	C12-C9-C6	-4.73	101.91	106.83
2	B	501	HEM	C1B-NB-C4B	3.75	108.95	105.07
2	A	501	HEM	C1B-NB-C4B	3.75	108.95	105.07
2	A	501	HEM	CHD-C1D-ND	3.73	128.48	124.43
3	B	502	AOJ	C1-C2-C3	-3.68	102.55	105.58
2	B	501	HEM	CHD-C1D-ND	3.63	128.38	124.43
3	B	503	AOJ	O1-C3-C2	-3.32	122.01	126.39
3	A	502	AOJ	C1-C2-C3	-3.20	102.95	105.58
2	B	501	HEM	C4B-C3B-C2B	-3.14	104.62	107.11
2	A	501	HEM	CHD-C1D-C2D	-3.12	120.11	124.98
2	B	501	HEM	CHD-C1D-C2D	-3.03	120.25	124.98
2	A	501	HEM	CHA-C4D-ND	2.87	127.93	124.38
3	A	502	AOJ	C10-C9-C6	2.66	121.90	118.26
3	B	503	AOJ	C10-C9-C6	2.64	121.87	118.26

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	B	503	AOJ	O1-C3-N1	2.56	128.45	125.00
2	A	501	HEM	C4B-C3B-C2B	-2.53	105.10	107.11
3	B	503	AOJ	C7-C8-C11	2.52	121.62	118.74
3	A	502	AOJ	C7-C8-C11	2.51	121.61	118.74
2	B	501	HEM	CAD-C3D-C4D	2.49	129.00	124.66
3	B	502	AOJ	C10-C9-C6	2.45	121.61	118.26
2	A	501	HEM	CHB-C1B-NB	2.42	127.37	124.38
2	B	501	HEM	CHC-C4B-C3B	-2.41	120.88	124.57
3	B	502	AOJ	C7-C8-C11	2.40	121.49	118.74
3	B	503	AOJ	C2-C1-C4	-2.40	102.47	103.64
3	B	502	AOJ	C12-C1-C4	2.36	118.26	112.14
2	B	501	HEM	CHA-C4D-ND	2.35	127.29	124.38
2	B	501	HEM	CHB-C1B-NB	2.26	127.18	124.38
3	B	503	AOJ	C1-C2-C3	-2.21	103.76	105.58
2	A	501	HEM	O2D-CGD-CBD	2.21	121.13	114.03
2	B	501	HEM	O2D-CGD-CBD	2.20	121.09	114.03
2	B	501	HEM	C3B-C2B-C1B	2.11	108.05	106.49
2	A	501	HEM	CHA-C4D-C3D	-2.10	121.39	125.33
3	A	502	AOJ	O1-C3-C2	-2.03	123.71	126.39

There are no chirality outliers.

All (16) torsion outliers are listed below:

| Mol	Chain	Res	Type	Atoms
4	A	503	GOL	O1-C1-C2-C3
4	B	507	GOL	C1-C2-C3-O3
4	B	504	GOL	C1-C2-C3-O3
4	A	503	GOL	O1-C1-C2-O2
4	B	504	GOL	O2-C2-C3-O3
4	B	507	GOL	O2-C2-C3-O3
4	B	505	GOL	O1-C1-C2-O2
2	B	501	HEM	CAD-CBD-CGD-O1D
2	A	501	HEM	CAA-CBA-CGA-O1A
2	A	501	HEM	CAA-CBA-CGA-O2A
2	B	501	HEM	CAD-CBD-CGD-O2D
4	B	505	GOL	O1-C1-C2-C3
2	A	501	HEM	CAD-CBD-CGD-O1D
2	B	501	HEM	CAA-CBA-CGA-O2A
2	B	501	HEM	CAA-CBA-CGA-O1A
2	A	501	HEM	CAD-CBD-CGD-O2D

There are no ring outliers.

No monomer is involved in short contacts.

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 then 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.

Ligand AOJ B 503

Bond lengths

Bond angles

Torsions

Rings

Ligand AOJ A 502

Bond lengths

Bond angles

Torsions

Rings

Ligand AOJ B 502

Bond lengths

Bond angles

Torsions

Rings

Ligand HEM A 501

Bond lengths

Bond angles

Torsions

Rings

Ligand HEM B 501
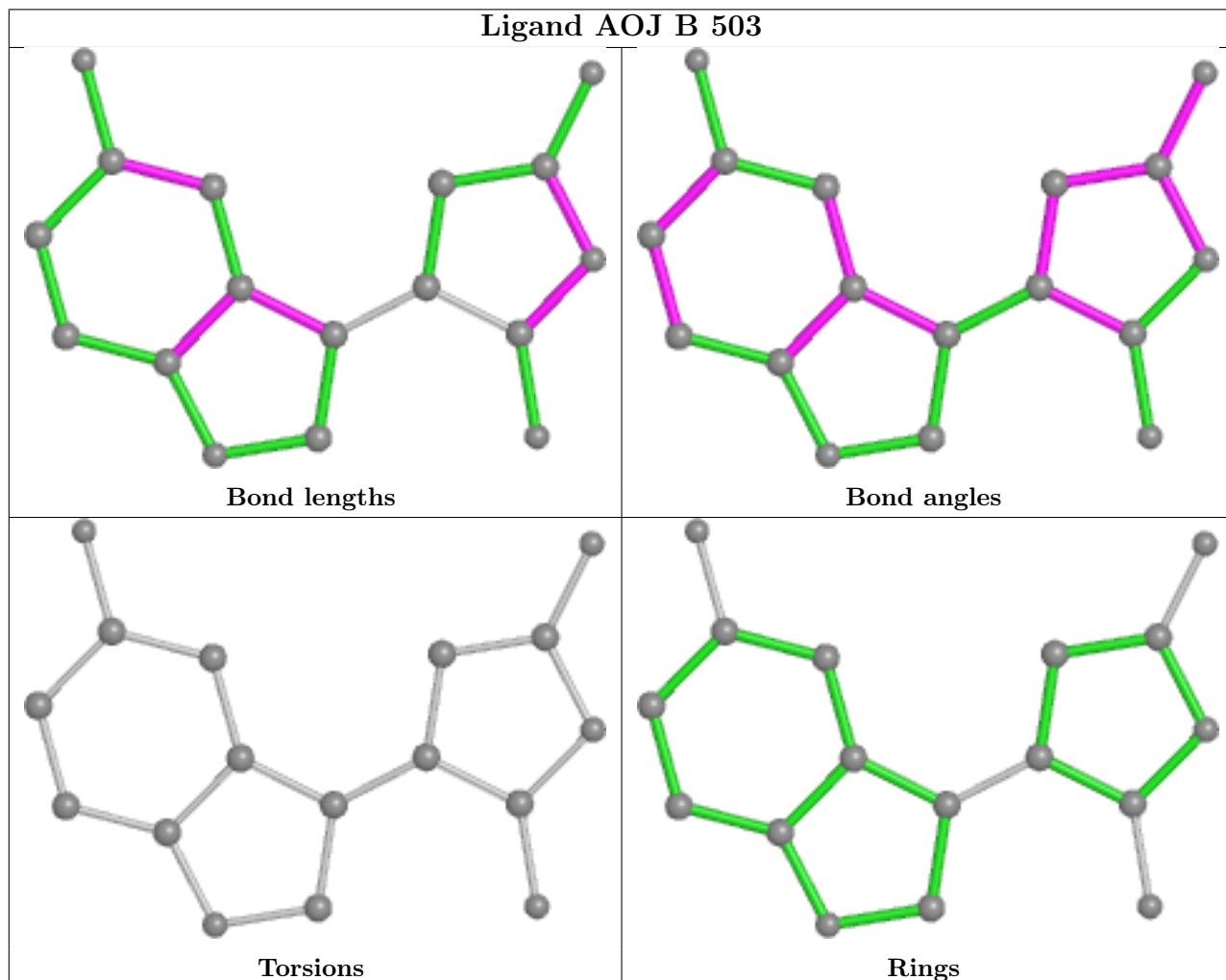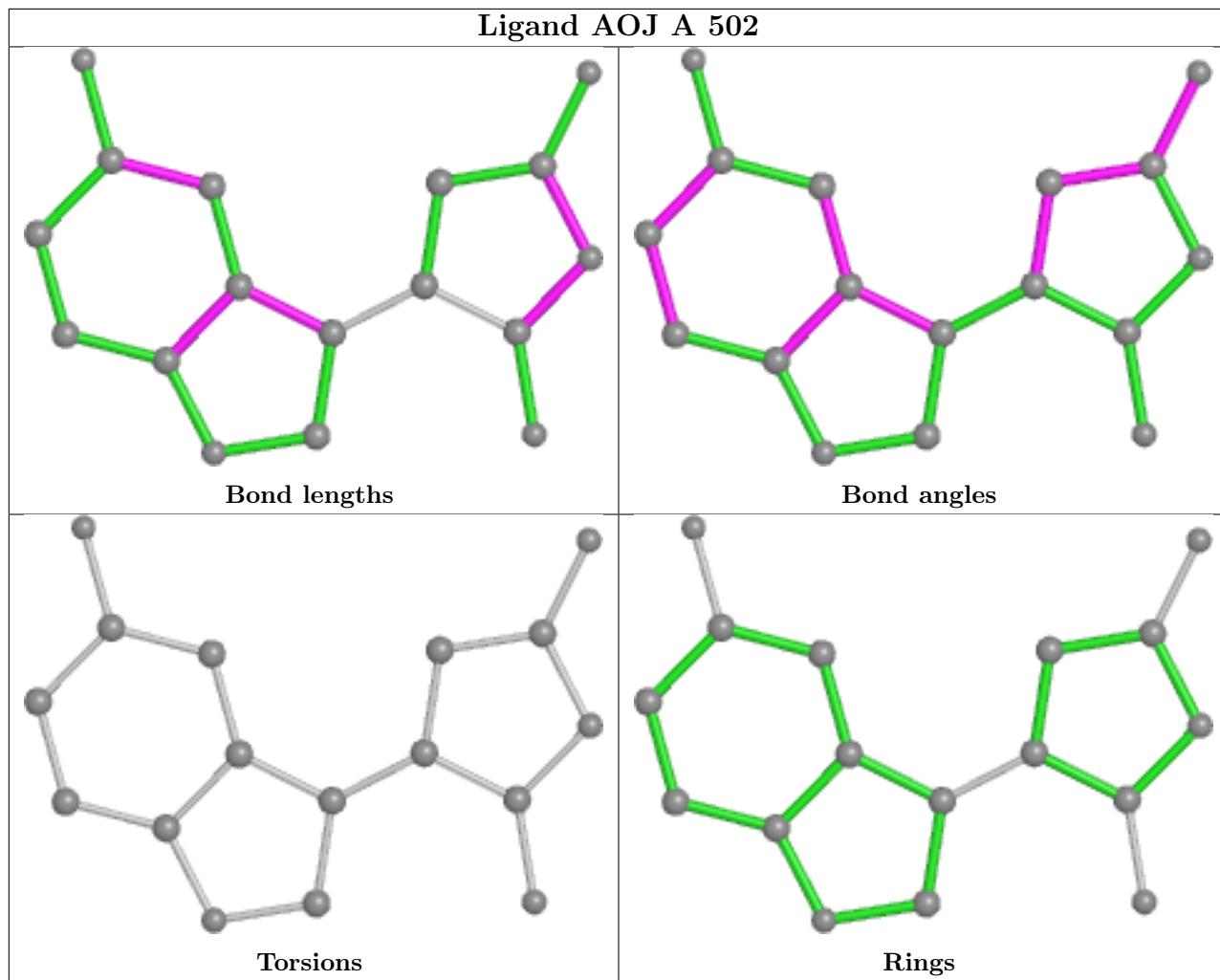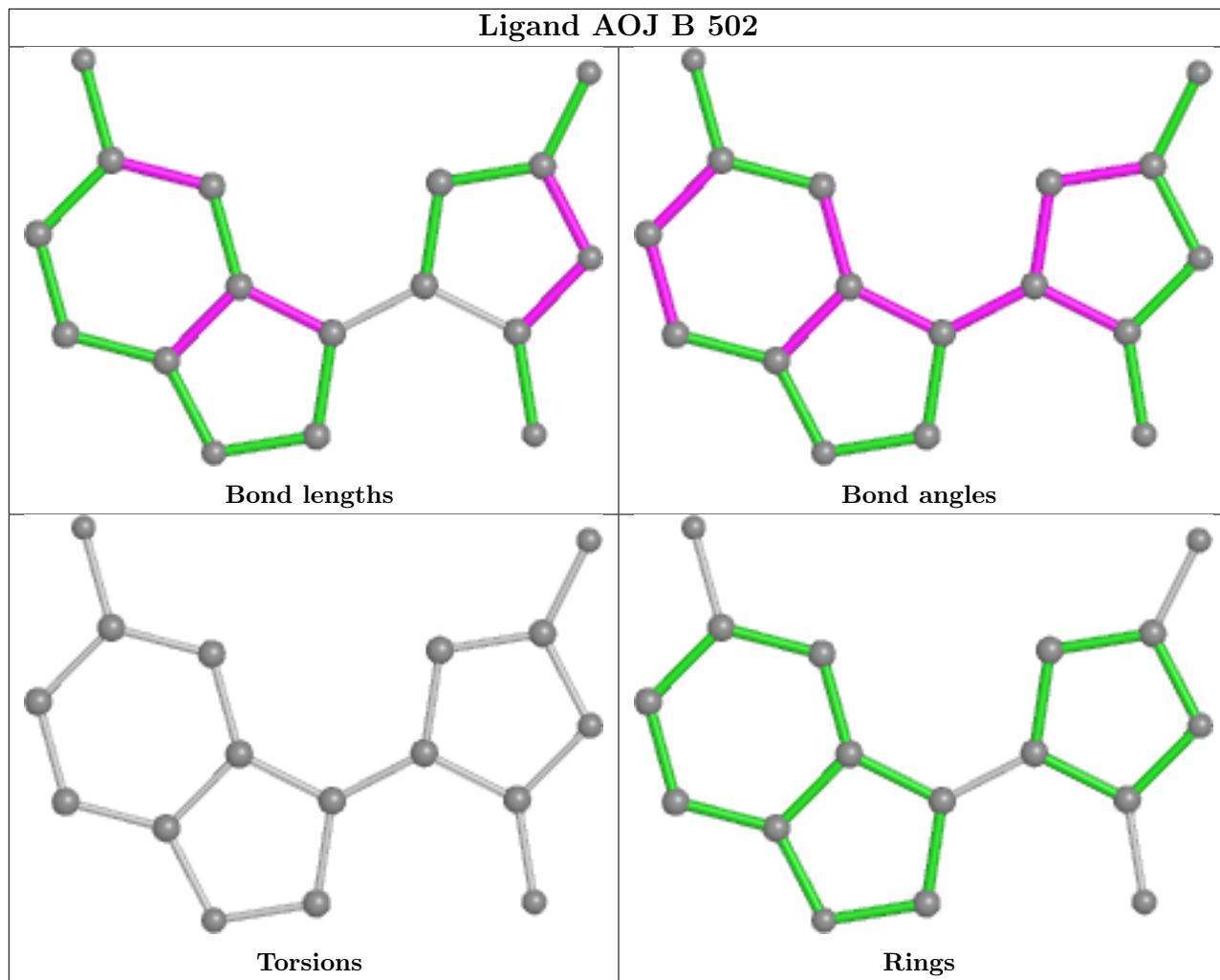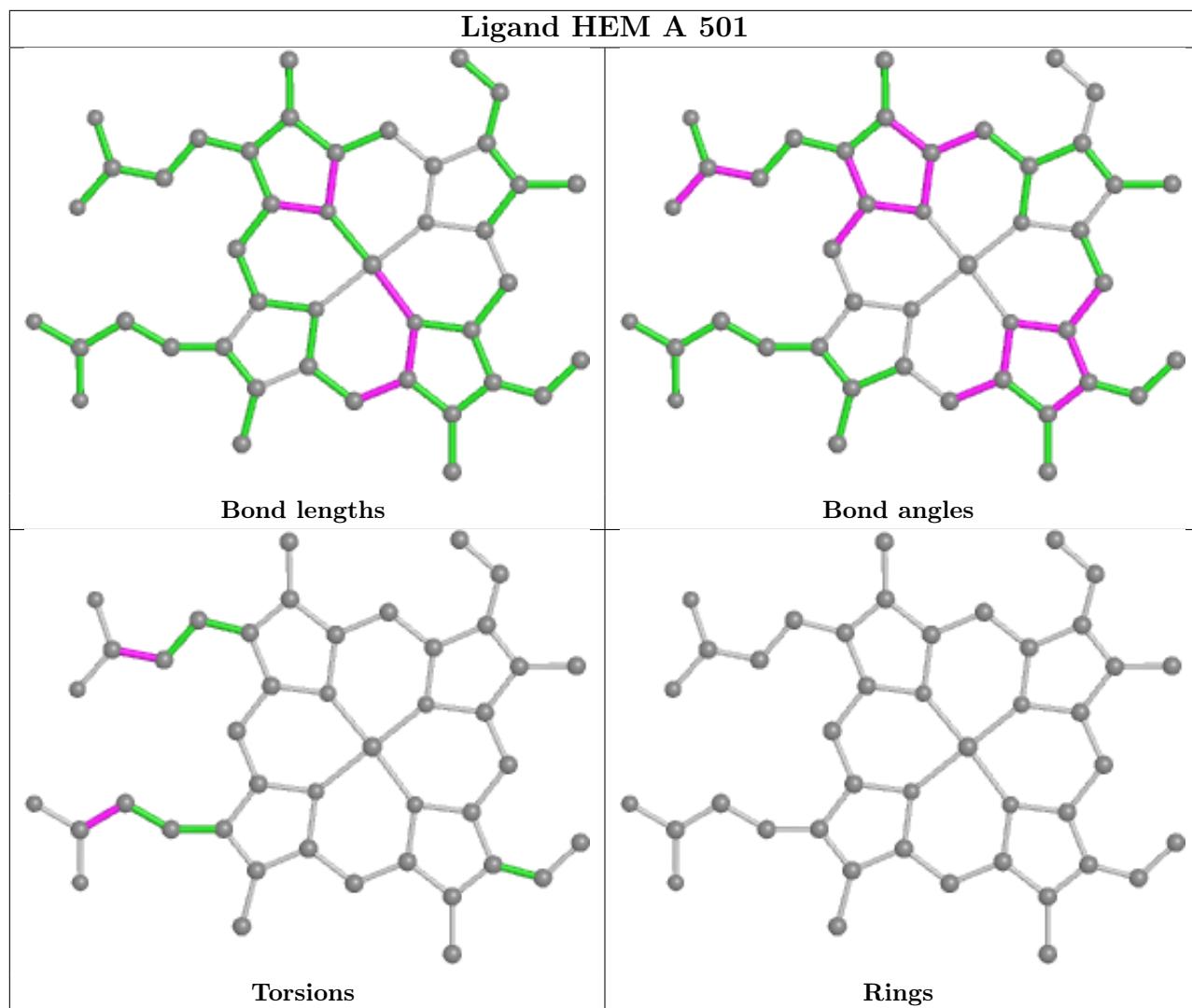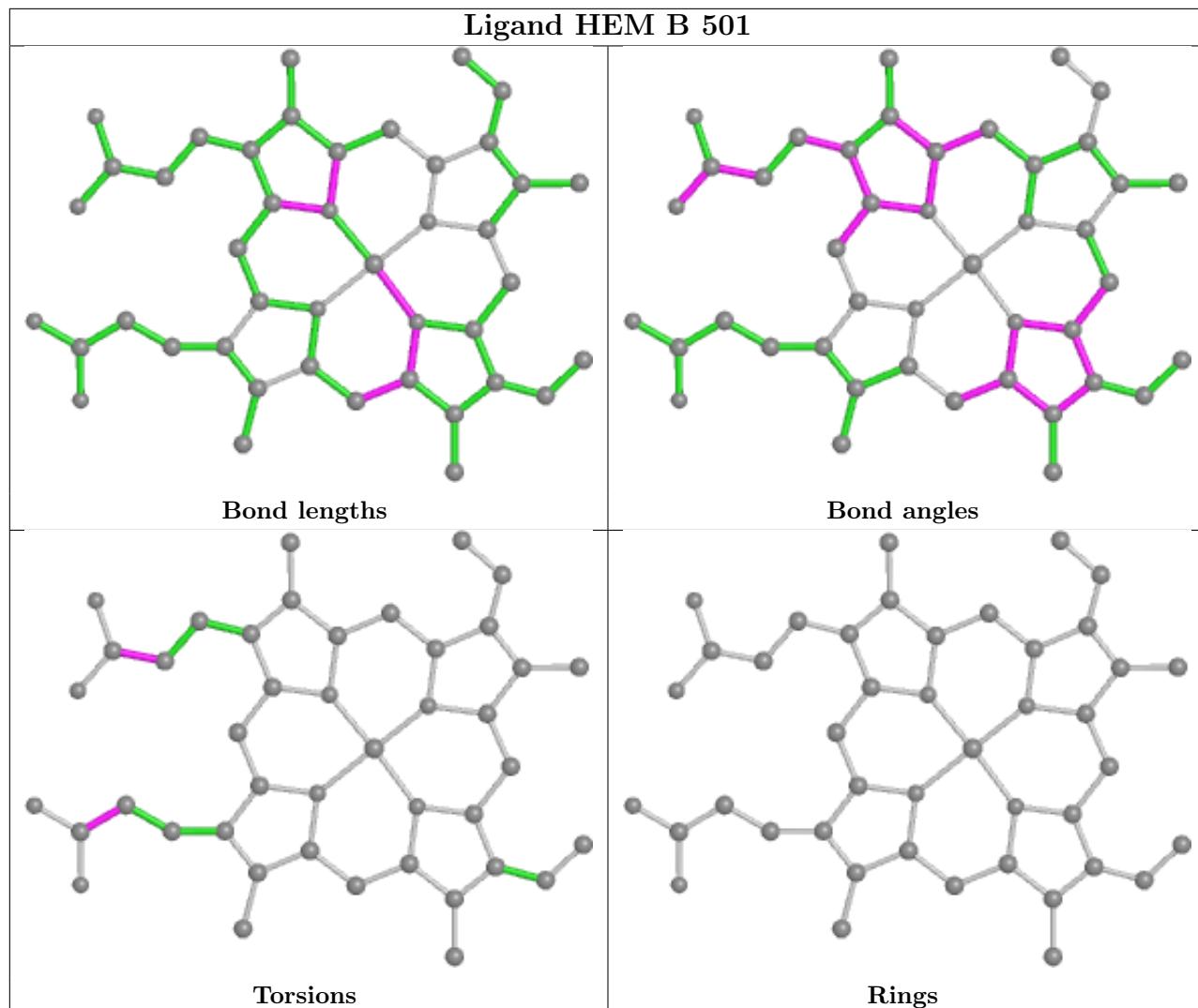
4.7 Other polymers ⓘ

There are no such residues in this entry.

4.8 Polymer linkage issues ⓘ

There are no chain breaks in this entry.

5 Fit of model and data ⓘ

5.1 Protein, DNA and RNA chains ⓘ

EDS failed to run properly - this section is therefore empty.

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

EDS failed to run properly - this section is therefore empty.

5.3 Carbohydrates ⓘ

EDS failed to run properly - this section is therefore empty.

5.4 Ligands ⓘ

EDS failed to run properly - this section is therefore empty.

5.5 Other polymers ⓘ

EDS failed to run properly - this section is therefore empty.