



# Full wwPDB X-ray Structure Validation Report ⓘ

Dec 21, 2021 – 12:10 pm GMT

PDB ID : 7P0N  
Title : Crystal structure of L-Trp/Indoleamine 2,3-dioxygenase 1 (hIDO1) complex with the JK-loop refined in the open conformation  
Authors : Mirgaux, M.; Wouters, J.  
Deposited on : 2021-06-30  
Resolution : 2.50 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 following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

MolProbity : 4.02b-467  
Mogul : 1.8.4, CSD as541be (2020)  
Xtriage (Phenix) : 1.13  
EDS : 2.24  
buster-report : 1.1.7 (2018)  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
Refmac : 5.8.0267  
CCP4 : 7.1.010 (Gargrove)  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.24

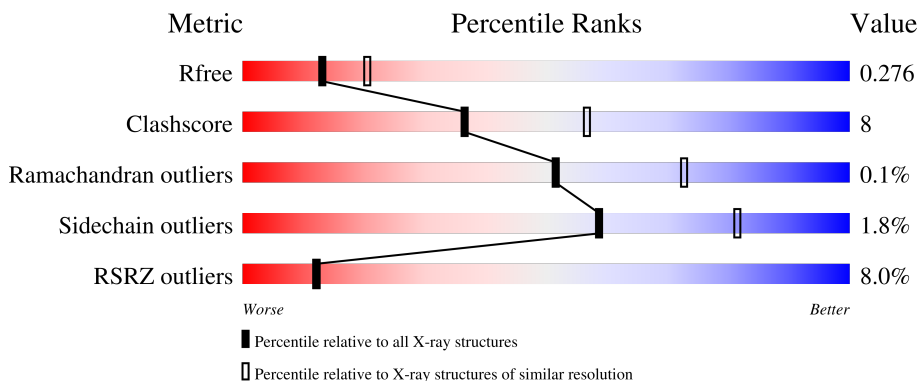
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.50 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	4661 (2.50-2.50)
Clashscore	141614	5346 (2.50-2.50)
Ramachandran outliers	138981	5231 (2.50-2.50)
Sidechain outliers	138945	5233 (2.50-2.50)
RSRZ outliers	127900	4559 (2.50-2.50)

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	405	
1	B	405	
1	C	405	
1	D	405	

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard

residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
3	NFK	A	502	-	-	-	X
4	PO4	A	503	-	-	-	X
4	PO4	C	504	-	-	-	X
5	GOL	B	507	-	-	-	X
5	GOL	C	510	-	-	-	X
7	TRP	C	503	-	-	X	-
7	TRP	D	505	-	-	-	X

## 2 Entry composition [i](#)

There are 9 unique types of molecules in this entry. The entry contains 12712 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
			Total	C	N	O	S			
1	A	370	2924	1880	499	528	17	0	0	0
1	B	375	2954	1896	504	537	17	0	0	0
1	C	374	2959	1899	504	539	17	0	1	0
1	D	375	2954	1896	504	537	17	0	0	0

There are 72 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-1	MET	-	initiating methionine	UNP P14902
A	0	GLY	-	expression tag	UNP P14902
A	1	SER	-	expression tag	UNP P14902
A	2	SER	-	expression tag	UNP P14902
A	3	HIS	-	expression tag	UNP P14902
A	4	HIS	-	expression tag	UNP P14902
A	5	HIS	-	expression tag	UNP P14902
A	6	HIS	-	expression tag	UNP P14902
A	7	HIS	-	expression tag	UNP P14902
A	8	HIS	-	expression tag	UNP P14902
A	9	SER	-	expression tag	UNP P14902
A	10	SER	-	expression tag	UNP P14902
A	11	GLY	-	expression tag	UNP P14902
A	12	SER	-	expression tag	UNP P14902
A	13	ALA	-	expression tag	UNP P14902
A	14	ALA	-	expression tag	UNP P14902
A	116	ALA	LYS	engineered mutation	UNP P14902
A	117	ALA	LYS	engineered mutation	UNP P14902
B	-1	MET	-	initiating methionine	UNP P14902
B	0	GLY	-	expression tag	UNP P14902
B	1	SER	-	expression tag	UNP P14902

*Continued on next page...*

*Continued from previous page...*

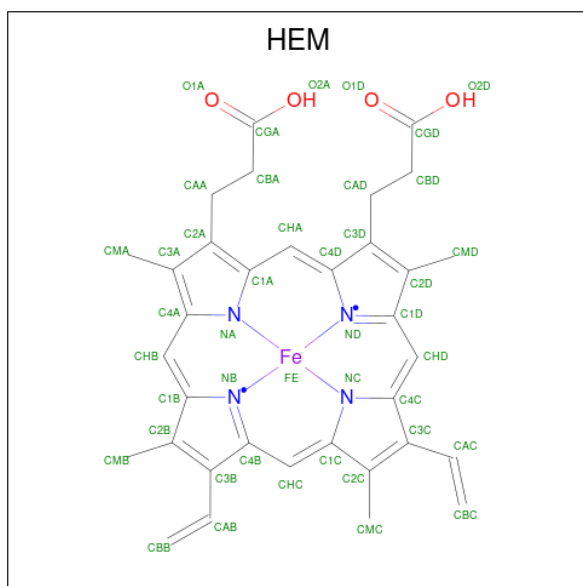
Chain	Residue	Modelled	Actual	Comment	Reference
B	2	SER	-	expression tag	UNP P14902
B	3	HIS	-	expression tag	UNP P14902
B	4	HIS	-	expression tag	UNP P14902
B	5	HIS	-	expression tag	UNP P14902
B	6	HIS	-	expression tag	UNP P14902
B	7	HIS	-	expression tag	UNP P14902
B	8	HIS	-	expression tag	UNP P14902
B	9	SER	-	expression tag	UNP P14902
B	10	SER	-	expression tag	UNP P14902
B	11	GLY	-	expression tag	UNP P14902
B	12	SER	-	expression tag	UNP P14902
B	13	ALA	-	expression tag	UNP P14902
B	14	ALA	-	expression tag	UNP P14902
B	116	ALA	LYS	engineered mutation	UNP P14902
B	117	ALA	LYS	engineered mutation	UNP P14902
C	-1	MET	-	initiating methionine	UNP P14902
C	0	GLY	-	expression tag	UNP P14902
C	1	SER	-	expression tag	UNP P14902
C	2	SER	-	expression tag	UNP P14902
C	3	HIS	-	expression tag	UNP P14902
C	4	HIS	-	expression tag	UNP P14902
C	5	HIS	-	expression tag	UNP P14902
C	6	HIS	-	expression tag	UNP P14902
C	7	HIS	-	expression tag	UNP P14902
C	8	HIS	-	expression tag	UNP P14902
C	9	SER	-	expression tag	UNP P14902
C	10	SER	-	expression tag	UNP P14902
C	11	GLY	-	expression tag	UNP P14902
C	12	SER	-	expression tag	UNP P14902
C	13	ALA	-	expression tag	UNP P14902
C	14	ALA	-	expression tag	UNP P14902
C	116	ALA	LYS	engineered mutation	UNP P14902
C	117	ALA	LYS	engineered mutation	UNP P14902
D	-1	MET	-	initiating methionine	UNP P14902
D	0	GLY	-	expression tag	UNP P14902
D	1	SER	-	expression tag	UNP P14902
D	2	SER	-	expression tag	UNP P14902
D	3	HIS	-	expression tag	UNP P14902
D	4	HIS	-	expression tag	UNP P14902
D	5	HIS	-	expression tag	UNP P14902
D	6	HIS	-	expression tag	UNP P14902
D	7	HIS	-	expression tag	UNP P14902

*Continued on next page...*

Continued from previous page...

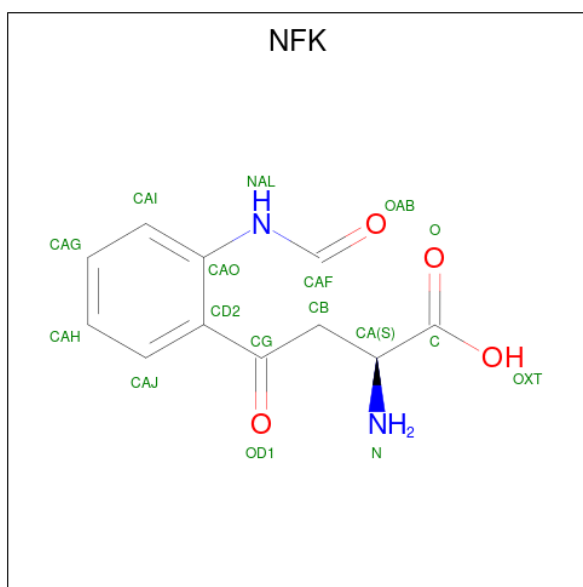
Chain	Residue	Modelled	Actual	Comment	Reference
D	8	HIS	-	expression tag	UNP P14902
D	9	SER	-	expression tag	UNP P14902
D	10	SER	-	expression tag	UNP P14902
D	11	GLY	-	expression tag	UNP P14902
D	12	SER	-	expression tag	UNP P14902
D	13	ALA	-	expression tag	UNP P14902
D	14	ALA	-	expression tag	UNP P14902
D	116	ALA	LYS	engineered mutation	UNP P14902
D	117	ALA	LYS	engineered mutation	UNP P14902

- Molecule 2 is PROTOPORPHYRIN IX CONTAINING FE (three-letter code: HEM) (formula:  $C_{34}H_{32}FeN_4O_4$ ) (labeled as "Ligand of Interest" by depositor).



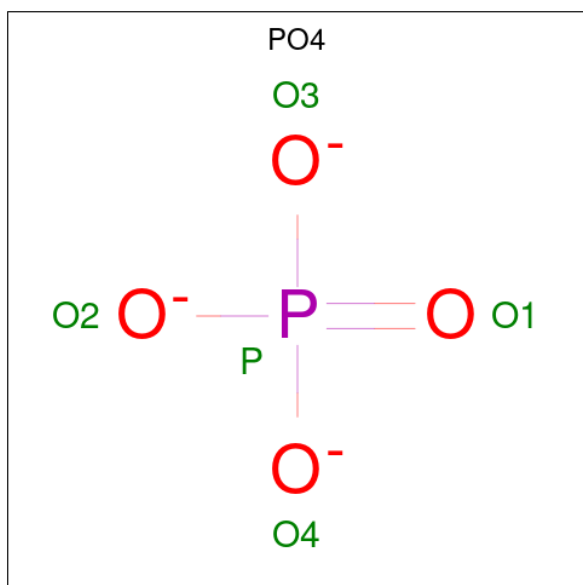
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	
2	A	1	Total	C	Fe	N	O	0	0
			43	34	1	4	4		
2	B	1	Total	C	Fe	N	O	0	0
			43	34	1	4	4		
2	C	1	Total	C	Fe	N	O	0	0
			43	34	1	4	4		
2	D	1	Total	C	Fe	N	O	0	0
			43	34	1	4	4		

- Molecule 3 is N'-Formylkynurenine (three-letter code: NFK) (formula:  $C_{11}H_{12}N_2O_4$ ) (labeled as "Ligand of Interest" by depositor).



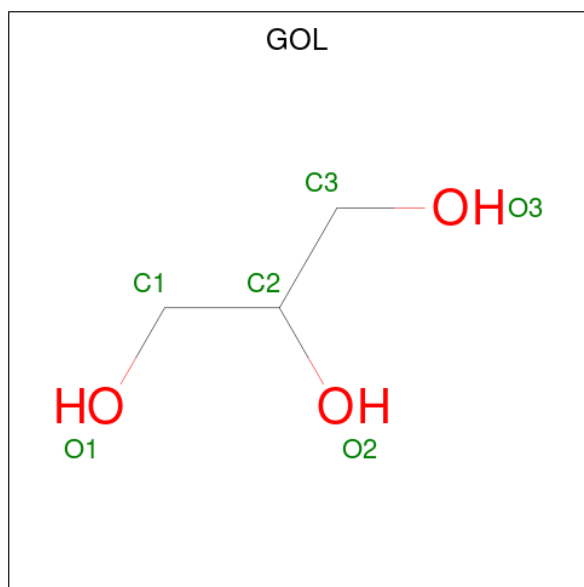
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	N	O		
3	A	1	Total	C	N	O	0	0
			17	11	2	4		
3	C	1	Total	C	N	O	0	0
			17	11	2	4		
3	D	1	Total	C	N	O	0	0
			17	11	2	4		
3	D	1	Total	C	N	O	0	0
			17	11	2	4		

- Molecule 4 is PHOSPHATE ION (three-letter code: PO4) (formula: O<sub>4</sub>P).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	1	Total O P 5 4 1	0	0
4	C	1	Total O P 5 4 1	0	0

- Molecule 5 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
5	A	1	Total C O 6 3 3	0	0
5	A	1	Total C O 6 3 3	0	0
5	A	1	Total C O 6 3 3	0	0
5	A	1	Total C O 6 3 3	0	0
5	A	1	Total C O 6 3 3	0	0
5	A	1	Total C O 6 3 3	0	0
5	B	1	Total C O 6 3 3	0	0
5	B	1	Total C O 6 3 3	0	0
5	B	1	Total C O 6 3 3	0	0
5	B	1	Total C O 6 3 3	0	0

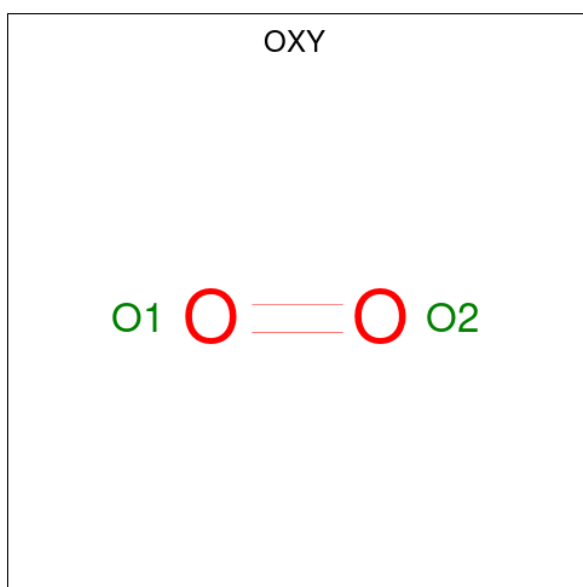
*Continued on next page...*



Continued from previous page...

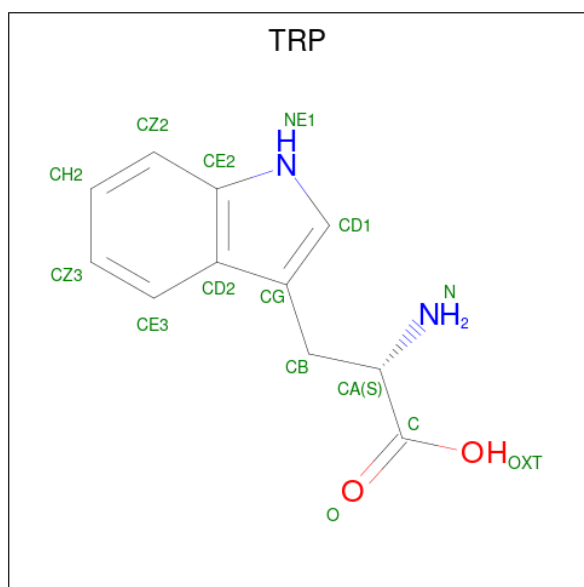
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
5	B	1	Total 6	C 3	O 3	0	0
5	B	1	Total 6	C 3	O 3	0	0
5	C	1	Total 6	C 3	O 3	0	0
5	C	1	Total 6	C 3	O 3	0	0
5	C	1	Total 6	C 3	O 3	0	0
5	C	1	Total 6	C 3	O 3	0	0
5	C	1	Total 6	C 3	O 3	0	0
5	C	1	Total 6	C 3	O 3	0	0
5	C	1	Total 6	C 3	O 3	0	0
5	C	1	Total 6	C 3	O 3	0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

- Molecule 6 is OXYGEN MOLECULE (three-letter code: OXY) (formula: O<sub>2</sub>).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
6	A	1	Total O 2 2	0	0
6	B	1	Total O 2 2	0	0
6	D	1	Total O 2 2	0	0

- Molecule 7 is TRYPTOPHAN (three-letter code: TRP) (formula:  $C_{11}H_{12}N_2O_2$ ) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
7	C	1	Total C N O 15 11 2 2	0	0
7	D	1	Total C N O 15 11 2 2	0	0
7	D	1	Total C N O 15 11 2 2	0	0

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

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

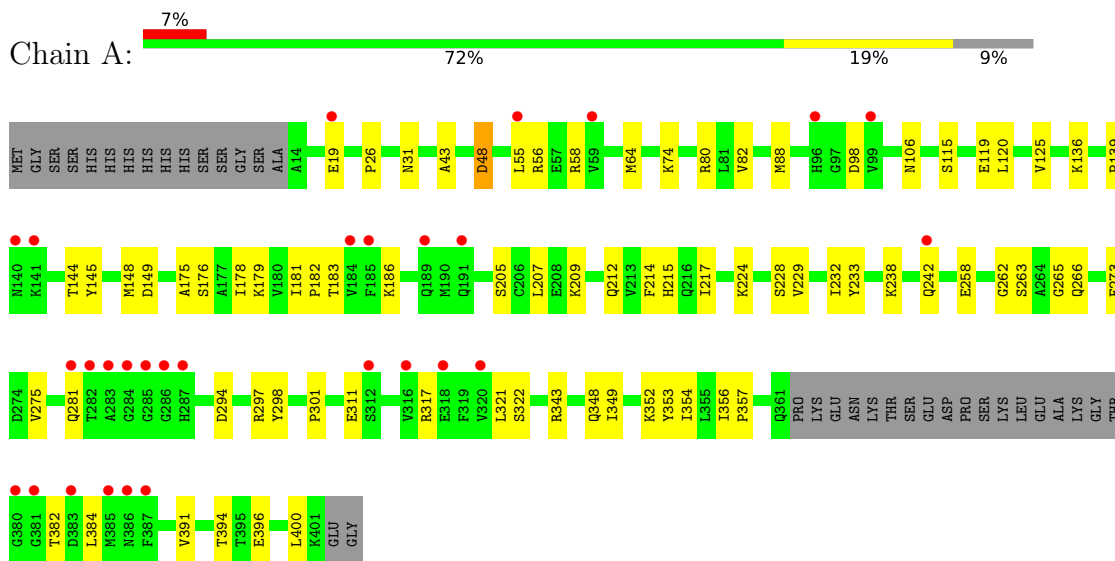
- Molecule 9 is water.

<b>Mol</b>	<b>Chain</b>	<b>Residues</b>	<b>Atoms</b>		<b>ZeroOcc</b>	<b>AltConf</b>
9	A	118	Total 118	O 118	0	0
9	B	134	Total 134	O 134	0	0
9	C	124	Total 124	O 124	0	0
9	D	116	Total 116	O 116	0	0

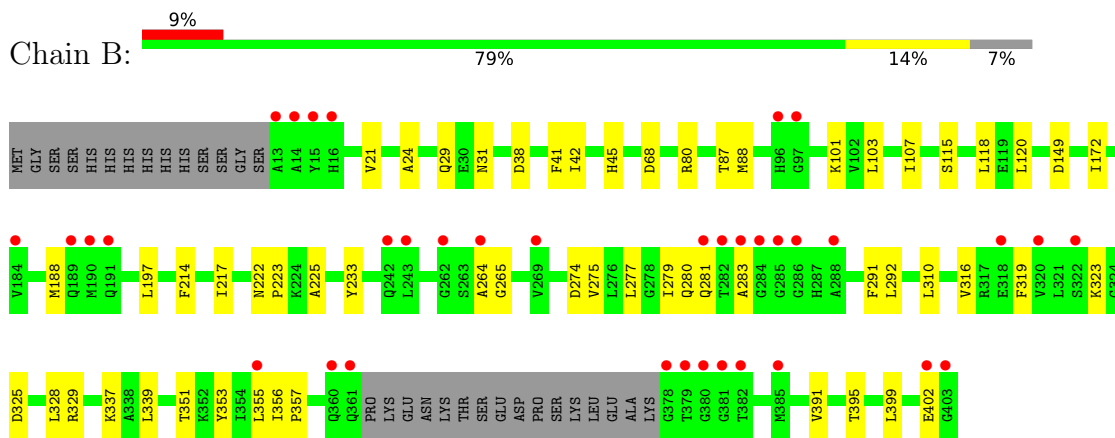
### 3 Residue-property plots

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.

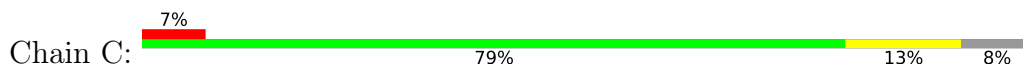
- Molecule 1: Indoleamine 2,3-dioxygenase 1

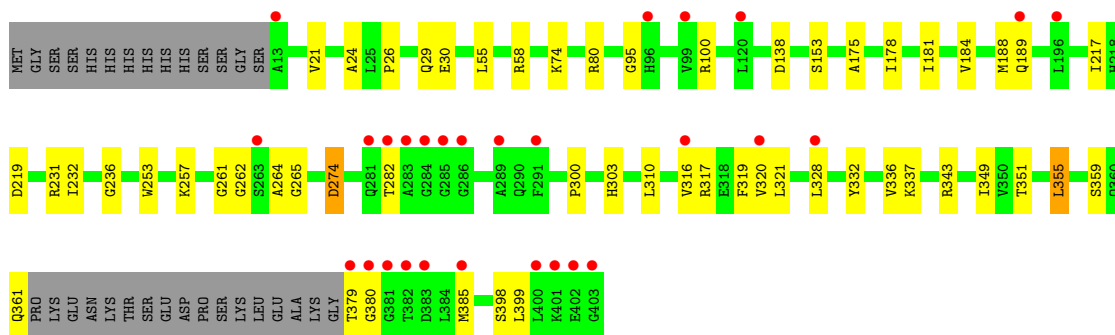


- Molecule 1: Indoleamine 2,3-dioxygenase 1

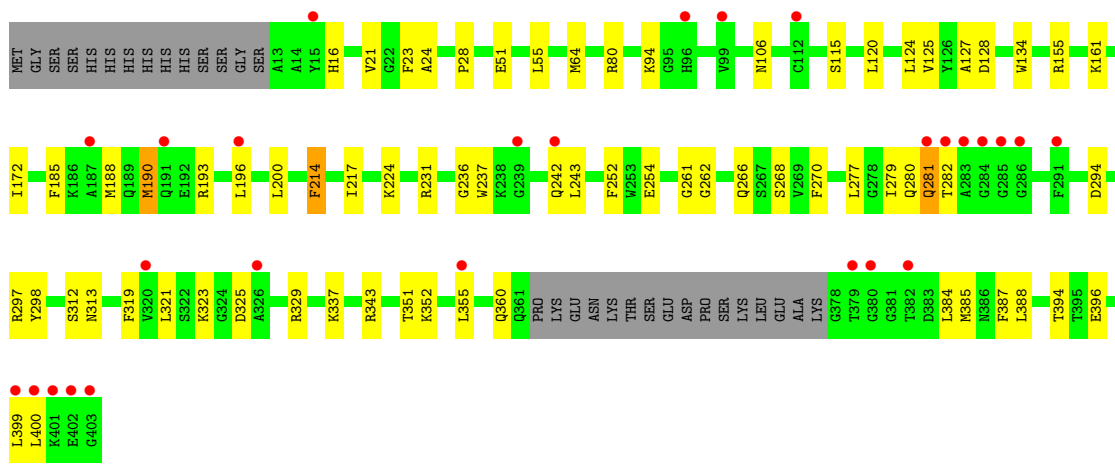
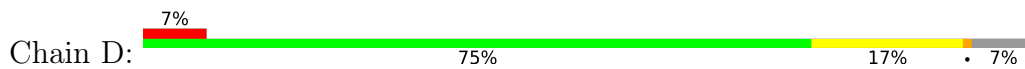


- Molecule 1: Indoleamine 2,3-dioxygenase 1





• Molecule 1: Indoleamine 2,3-dioxygenase 1



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 2	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	81.36Å 114.57Å 220.98Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	49.29 – 2.50 49.29 – 2.50	Depositor EDS
% Data completeness (in resolution range)	99.4 (49.29-2.50) 99.4 (49.29-2.50)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.29 (at 2.51Å)	Xtriage
Refinement program	PHENIX 1.19.2_4158	Depositor
R, $R_{free}$	0.215 , 0.279 0.214 , 0.276	Depositor DCC
$R_{free}$ test set	3582 reflections (5.00%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	52.3	Xtriage
Anisotropy	0.514	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	(Not available) , (Not available)	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.50$ , $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
$F_o, F_c$ correlation	0.95	EDS
Total number of atoms	12712	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	58.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 46.50 % 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 1.1345e-04. 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: CL, NFK, GOL, OXY, HEM, PO4

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	0/2992	0.64	1/4050 (0.0%)
1	B	0.46	0/3022	0.61	0/4089
1	C	0.44	0/3027	0.66	3/4096 (0.1%)
1	D	0.46	0/3022	0.63	0/4089
All	All	0.45	0/12063	0.63	4/16324 (0.0%)

There are no bond length outliers.

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	55	LEU	CA-CB-CG	-6.82	99.61	115.30
1	A	55	LEU	CA-CB-CG	-5.37	102.95	115.30
1	C	138	ASP	CB-CG-OD1	5.34	123.10	118.30
1	C	355	LEU	CA-CB-CG	5.21	127.28	115.30

There are no chirality outliers.

There are no planarity outliers.

### 5.2 Too-close contacts [i](#)

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	2924	0	2932	54	0
1	B	2954	0	2956	36	0
1	C	2959	0	2958	41	0

*Continued on next page...*

Continued from previous page...

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	D	2954	0	2956	51	0
2	A	43	0	30	6	0
2	B	43	0	30	6	0
2	C	43	0	30	3	0
2	D	43	0	30	3	0
3	A	17	0	0	2	0
3	C	17	0	0	0	0
3	D	34	0	0	2	0
4	A	5	0	0	1	0
4	C	5	0	0	0	0
5	A	36	0	48	2	0
5	B	36	0	48	1	0
5	C	42	0	56	3	0
5	D	12	0	16	3	0
6	A	2	0	0	0	0
6	B	2	0	0	0	0
6	D	2	0	0	0	0
7	C	15	0	9	10	0
7	D	30	0	18	4	0
8	C	1	0	0	0	0
8	D	1	0	0	0	0
9	A	118	0	0	5	0
9	B	134	0	0	1	0
9	C	124	0	0	4	0
9	D	116	0	0	2	0
All	All	12712	0	12117	191	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 (191) 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)
2:A:501:HEM:HBB2	2:A:501:HEM:HHC	1.61	0.80
1:D:193:ARG:HG3	1:D:323:LYS:NZ	1.96	0.80
2:B:501:HEM:HHC	2:B:501:HEM:HBB2	1.63	0.80
1:A:19:GLU:OE2	9:A:601:HOH:O	2.02	0.77
1:A:356:ILE:HG12	1:A:357:PRO:HD3	1.66	0.76
1:D:323:LYS:NZ	1:D:325:ASP:OD2	2.19	0.75
2:C:501:HEM:HBB2	2:C:501:HEM:HHC	1.71	0.71
1:B:101:LYS:H	5:B:506:GOL:H32	1.55	0.71

Continued on next page...



*Continued from previous page...*

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:119:GLU:HB2	1:A:301:PRO:HG3	1.73	0.71
1:C:231:ARG:HD2	7:C:503:TRP:O	1.91	0.71
1:D:94:LYS:HB2	5:D:507:GOL:H32	1.72	0.70
1:D:193:ARG:HG3	1:D:323:LYS:HZ2	1.52	0.70
1:D:161:LYS:HB3	7:D:505:TRP:CD1	2.27	0.69
1:B:329:ARG:HE	1:B:402:GLU:HG3	1.58	0.68
1:C:300:PRO:HG2	1:C:303:HIS:ND1	2.08	0.68
1:C:231:ARG:CD	7:C:503:TRP:O	2.42	0.68
1:D:262:GLY:HA3	1:D:266:GLN:NE2	2.10	0.67
1:A:382:THR:HG22	1:A:384:LEU:H	1.60	0.66
1:C:231:ARG:HD2	7:C:503:TRP:OXT	1.95	0.66
1:C:262:GLY:HA2	7:C:503:TRP:HE1	1.61	0.65
1:C:320:VAL:HG13	1:C:328:LEU:HB3	1.78	0.65
1:A:175:ALA:HA	1:A:178:ILE:HD12	1.82	0.62
1:B:329:ARG:NE	1:B:402:GLU:HG3	2.13	0.61
2:A:501:HEM:HHD	2:A:501:HEM:HBC2	1.81	0.61
1:D:190:MET:SD	1:D:190:MET:N	2.73	0.61
1:B:274:ASP:OD2	1:B:281:GLN:HG3	2.01	0.61
1:D:161:LYS:HB3	7:D:505:TRP:HD1	1.67	0.60
1:C:175:ALA:HA	1:C:178:ILE:HD12	1.83	0.60
1:D:355:LEU:HD11	1:D:385:MET:HG3	1.84	0.59
1:D:281:GLN:HA	1:D:394:THR:HG21	1.84	0.59
1:C:262:GLY:HA2	7:C:503:TRP:NE1	2.17	0.59
1:B:217:ILE:CD1	2:B:501:HEM:HBB1	2.32	0.59
1:C:231:ARG:HD2	7:C:503:TRP:C	2.23	0.59
2:D:501:HEM:HBB2	2:D:501:HEM:HHC	1.84	0.59
1:A:48:ASP:OD2	9:A:602:HOH:O	2.16	0.59
1:B:41:PHE:O	1:B:45:HIS:HD2	1.86	0.58
1:D:313:ASN:O	9:D:601:HOH:O	2.17	0.58
1:B:115:SER:HB3	1:B:120:LEU:O	2.03	0.58
1:B:265:GLY:HA2	2:B:501:HEM:C4D	2.38	0.58
1:A:262:GLY:HA2	1:A:266:GLN:HE22	1.67	0.57
1:B:337:LYS:HG3	1:B:399:LEU:HD21	1.86	0.57
1:C:100:ARG:HA	5:C:509:GOL:H32	1.86	0.57
1:D:254:GLU:HG3	7:D:504:TRP:O	2.05	0.57
1:D:115:SER:HB3	1:D:120:LEU:O	2.05	0.57
1:D:196:LEU:O	1:D:200:LEU:HG	2.04	0.56
1:D:270:PHE:HB3	1:D:343:ARG:NH2	2.19	0.56
1:D:185:PHE:HA	1:D:188:MET:HE2	1.88	0.56
1:A:348:GLN:NE2	3:D:503:NFK:O	2.35	0.56
1:A:281:GLN:NE2	1:A:391:VAL:O	2.39	0.55

*Continued on next page...*

*Continued from previous page...*

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:351:THR:HA	1:D:355:LEU:HB2	1.88	0.55
1:A:321:LEU:HD13	1:A:400:LEU:HD13	1.89	0.55
1:D:193:ARG:HG3	1:D:323:LYS:HZ1	1.71	0.55
1:A:263:SER:OG	2:A:501:HEM:O1A	2.22	0.55
1:C:351:THR:HG23	1:C:355:LEU:HD12	1.88	0.55
1:B:277:LEU:HB2	1:B:279:ILE:HD12	1.89	0.54
1:A:183:THR:HA	1:A:186:LYS:HE2	1.89	0.54
1:B:279:ILE:HG22	1:B:281:GLN:HG2	1.88	0.54
1:A:182:PRO:O	1:A:186:LYS:HG3	2.07	0.54
1:A:56:ARG:H	3:A:502:NFK:CAG	2.21	0.53
1:A:145:TYR:OH	4:A:503:PO4:O3	2.14	0.53
1:A:294:ASP:HA	1:A:297:ARG:NH2	2.24	0.53
1:A:64:MET:HB2	1:A:106:ASN:ND2	2.24	0.53
1:A:98:ASP:HB3	3:A:502:NFK:C	2.38	0.53
1:A:265:GLY:HA2	2:A:501:HEM:C3D	2.44	0.53
1:D:384:LEU:O	1:D:388:LEU:HD23	2.09	0.53
1:C:58:ARG:NH1	9:C:601:HOH:O	2.12	0.53
1:D:23:PHE:CE2	1:D:268:SER:HB2	2.43	0.53
1:D:94:LYS:HE3	5:D:507:GOL:H12	1.91	0.53
1:D:387:PHE:HD2	1:D:388:LEU:HD22	1.74	0.53
1:A:31:ASN:ND2	5:A:507:GOL:O3	2.40	0.53
1:D:355:LEU:HD11	1:D:385:MET:CG	2.40	0.52
1:A:238:LYS:HA	1:A:258:GLU:HB3	1.90	0.52
1:A:176:SER:HA	1:A:179:LYS:HE2	1.91	0.52
1:C:153:SER:HB2	5:C:505:GOL:H32	1.91	0.52
1:D:294:ASP:OD1	1:D:297:ARG:HD3	2.10	0.52
1:A:266:GLN:HG2	1:A:298:TYR:HB2	1.91	0.51
1:B:87:THR:HG23	1:B:103:LEU:HD13	1.93	0.51
1:D:124:LEU:HD12	1:D:128:ASP:HB2	1.92	0.50
1:D:217:ILE:CD1	2:D:501:HEM:HBB1	2.41	0.50
1:A:88:MET:HG3	1:A:233:TYR:O	2.12	0.50
1:D:387:PHE:CD2	1:D:388:LEU:HD22	2.46	0.50
1:B:319:PHE:O	1:B:323:LYS:HG2	2.12	0.50
1:C:21:VAL:HB	1:C:24:ALA:HB3	1.94	0.50
1:D:313:ASN:N	1:D:313:ASN:HD22	2.09	0.49
1:D:321:LEU:HD13	1:D:400:LEU:HD22	1.94	0.49
1:A:352:LYS:HD3	1:A:353:TYR:CE2	2.47	0.49
1:A:178:ILE:HA	1:A:181:ILE:HG13	1.95	0.49
1:D:352:LYS:HZ2	3:D:503:NFK:CAO	2.26	0.49
1:D:94:LYS:HG3	5:D:507:GOL:H12	1.95	0.48
1:C:58:ARG:HD2	9:C:601:HOH:O	2.13	0.48

*Continued on next page...*

*Continued from previous page...*

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:351:THR:HA	1:B:355:LEU:HB2	1.96	0.48
1:C:29:GLN:O	1:C:30:GLU:HB2	2.13	0.48
1:D:51:GLU:OE2	1:D:155:ARG:NH2	2.35	0.48
1:D:236:GLY:HA3	1:D:261:GLY:N	2.29	0.47
1:C:178:ILE:HA	1:C:181:ILE:HG13	1.96	0.47
1:D:55:LEU:O	1:D:55:LEU:HG	2.08	0.47
1:A:281:GLN:NE2	1:A:394:THR:HB	2.29	0.47
1:B:280:GLN:HG3	1:B:283:ALA:HB3	1.96	0.47
1:C:264:ALA:H	7:C:503:TRP:HZ2	1.63	0.47
1:C:316:VAL:O	1:C:320:VAL:HG23	2.15	0.47
1:A:262:GLY:HA2	1:A:266:GLN:NE2	2.29	0.47
1:A:58:ARG:NH1	9:A:605:HOH:O	2.43	0.46
1:D:21:VAL:HB	1:D:24:ALA:HB3	1.97	0.46
5:C:505:GOL:O1	5:C:505:GOL:O3	2.33	0.46
1:D:125:VAL:HG23	1:D:127:ALA:H	1.80	0.46
1:A:106:ASN:HB2	9:A:644:HOH:O	2.15	0.46
1:A:80:ARG:HH21	1:A:125:VAL:HG22	1.80	0.46
1:C:355:LEU:HD11	1:C:385:MET:CE	2.46	0.46
1:A:136:LYS:HD3	1:A:139:PRO:HA	1.97	0.46
1:D:294:ASP:O	1:D:297:ARG:HB2	2.15	0.46
1:D:21:VAL:HG12	1:D:172:ILE:HG12	1.97	0.46
1:A:144:THR:O	1:A:148:MET:HG3	2.17	0.45
1:B:325:ASP:HB3	1:B:328:LEU:HB2	1.99	0.45
1:C:26:PRO:O	1:C:74:LYS:NZ	2.44	0.45
1:B:281:GLN:NE2	1:B:391:VAL:HG13	2.32	0.45
2:D:501:HEM:HMC1	2:D:501:HEM:HBC2	1.98	0.45
1:B:21:VAL:HB	1:B:24:ALA:HB3	1.98	0.45
1:C:343:ARG:HD3	2:C:501:HEM:O2D	2.17	0.45
1:C:217:ILE:HG21	1:C:349:ILE:HD12	1.98	0.45
1:B:29:GLN:NE2	1:B:31:ASN:O	2.43	0.45
1:C:379:THR:HG22	1:C:380:GLY:H	1.82	0.45
1:D:266:GLN:HG2	1:D:298:TYR:HB2	1.99	0.45
1:A:275:VAL:HG13	1:A:311:GLU:HG3	1.98	0.44
1:C:231:ARG:O	1:C:231:ARG:HG2	2.17	0.44
1:C:188:MET:HE3	1:C:319:PHE:CD2	2.52	0.44
1:A:217:ILE:HD11	2:A:501:HEM:HBB1	1.99	0.44
1:A:263:SER:HB3	1:A:265:GLY:H	1.83	0.44
1:A:212:GLN:O	1:A:215:HIS:HB2	2.18	0.44
1:B:265:GLY:O	9:B:601:HOH:O	2.21	0.44
1:D:277:LEU:HB2	1:D:279:ILE:CD1	2.48	0.44
1:B:264:ALA:HB1	2:B:501:HEM:C1C	2.53	0.44

*Continued on next page...*

*Continued from previous page...*

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:88:MET:HG3	1:B:233:TYR:O	2.18	0.44
1:C:332:TYR:O	1:C:336:VAL:HG23	2.17	0.44
1:A:317:ARG:O	1:A:321:LEU:HB2	2.18	0.44
1:B:188:MET:SD	1:B:316:VAL:HG22	2.58	0.43
1:D:280:GLN:O	1:D:282:THR:N	2.50	0.43
1:D:396:GLU:O	1:D:399:LEU:HD12	2.18	0.43
1:B:223:PRO:HA	1:B:353:TYR:CD1	2.53	0.43
1:B:107:ILE:HD12	1:B:107:ILE:HG23	1.82	0.43
1:A:275:VAL:CG1	1:A:311:GLU:HG3	2.49	0.43
1:C:189:GLN:NE2	9:C:603:HOH:O	2.37	0.43
1:D:64:MET:HB2	1:D:106:ASN:ND2	2.34	0.43
1:B:217:ILE:HD13	2:B:501:HEM:HBB1	2.00	0.43
7:C:503:TRP:HB2	9:C:672:HOH:O	2.19	0.43
1:D:231:ARG:HD2	9:D:693:HOH:O	2.18	0.43
1:D:325:ASP:O	1:D:329:ARG:HG3	2.19	0.43
1:B:275:VAL:HG11	1:B:310:LEU:HB3	2.01	0.42
1:B:291:PHE:CZ	2:B:501:HEM:HBA1	2.54	0.42
1:A:294:ASP:OD1	1:A:297:ARG:NH2	2.52	0.42
1:D:214:PHE:O	1:D:214:PHE:HD1	2.02	0.42
1:A:115:SER:HB3	1:A:120:LEU:O	2.19	0.42
1:B:21:VAL:HG12	1:B:172:ILE:HG12	2.01	0.42
1:C:265:GLY:HA2	2:C:501:HEM:C3D	2.53	0.42
1:C:184:VAL:O	1:C:188:MET:HG3	2.19	0.42
1:A:229:VAL:O	1:A:232:ILE:HG12	2.19	0.42
1:A:43:ALA:HB2	1:A:82:VAL:HG13	2.00	0.42
1:A:224:LYS:HE2	1:A:228:SER:OG	2.19	0.42
1:A:322:SER:HB3	9:A:674:HOH:O	2.19	0.42
1:B:356:ILE:HB	1:B:357:PRO:HD3	2.01	0.42
7:C:503:TRP:HA	7:C:503:TRP:CE3	2.54	0.42
1:A:19:GLU:H	1:A:19:GLU:CD	2.23	0.41
1:A:354:ILE:C	1:A:357:PRO:HD2	2.40	0.41
1:C:95:GLY:HA3	1:C:232:ILE:HD13	2.02	0.41
1:C:236:GLY:HA3	1:C:261:GLY:N	2.35	0.41
1:D:242:GLN:O	1:D:243:LEU:HD23	2.21	0.41
1:B:339:LEU:HG	1:B:395:THR:HG21	2.03	0.41
1:C:274:ASP:CG	1:C:343:ARG:HH22	2.24	0.41
1:D:337:LYS:HG3	1:D:399:LEU:HD21	2.01	0.41
1:A:26:PRO:O	1:A:74:LYS:NZ	2.48	0.41
1:C:328:LEU:HD23	1:C:328:LEU:HA	1.86	0.41
1:C:337:LYS:HG3	1:C:399:LEU:HD21	2.03	0.41
1:C:253:TRP:CG	1:C:257:LYS:HE2	2.56	0.41

*Continued on next page...*

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:28:PRO:HD3	1:D:134:TRP:CZ2	2.56	0.41
1:B:222:ASN:OD1	1:B:225:ALA:N	2.44	0.41
1:C:317:ARG:NH1	1:C:398:SER:O	2.33	0.41
1:D:188:MET:HG2	1:D:319:PHE:CD2	2.56	0.41
1:C:321:LEU:HA	1:C:321:LEU:HD23	1.82	0.41
1:A:31:ASN:OD1	5:A:507:GOL:H11	2.20	0.40
1:A:207:LEU:HD21	1:A:273:PHE:CE2	2.55	0.40
1:A:321:LEU:HD12	1:A:321:LEU:HA	1.62	0.40
1:A:343:ARG:HD3	2:A:501:HEM:O2D	2.21	0.40
1:B:118:LEU:HD23	1:B:118:LEU:HA	1.80	0.40
1:B:188:MET:HE3	1:B:319:PHE:HB2	2.03	0.40
1:D:252:PHE:O	7:D:504:TRP:HB2	2.22	0.40
1:C:262:GLY:CA	7:C:503:TRP:HE1	2.33	0.40
1:C:359:SER:C	1:C:361:GLN:H	2.24	0.40
1:A:205:SER:O	1:A:209:LYS:HG3	2.22	0.40
1:A:217:ILE:HG21	1:A:349:ILE:HD12	2.03	0.40
1:B:292:LEU:HD23	1:B:292:LEU:HA	2.00	0.40
1:C:310:LEU:HD23	1:C:310:LEU:HA	1.91	0.40
1:B:38:ASP:O	1:B:42:ILE:HG13	2.22	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	366/405 (90%)	345 (94%)	21 (6%)	0	100	100
1	B	371/405 (92%)	354 (95%)	17 (5%)	0	100	100
1	C	371/405 (92%)	350 (94%)	21 (6%)	0	100	100
1	D	371/405 (92%)	342 (92%)	27 (7%)	2 (0%)	29	48
All	All	1479/1620 (91%)	1391 (94%)	86 (6%)	2 (0%)	51	73

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	D	281	GLN
1	D	312	SER

### 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	317/346 (92%)	312 (98%)	5 (2%)	62	84
1	B	319/346 (92%)	314 (98%)	5 (2%)	62	84
1	C	320/346 (92%)	316 (99%)	4 (1%)	69	87
1	D	319/346 (92%)	312 (98%)	7 (2%)	52	77
All	All	1275/1384 (92%)	1254 (98%)	21 (2%)	59	84

All (21) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	48	ASP
1	A	149	ASP
1	A	214	PHE
1	A	242	GLN
1	A	396	GLU
1	B	68	ASP
1	B	80	ARG
1	B	149	ASP
1	B	197	LEU
1	B	214	PHE
1	C	80	ARG
1	C	219	ASP
1	C	274	ASP
1	C	282	THR
1	D	16	HIS
1	D	80	ARG
1	D	190	MET
1	D	214	PHE

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Res	Type
1	D	224	LYS
1	D	237	TRP
1	D	360	GLN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (5) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	106	ASN
1	B	45	HIS
1	C	106	ASN
1	D	106	ASN
1	D	313	ASN

### 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 39 ligands modelled in this entry, 2 are monoatomic - leaving 37 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	OXY	B	508	-	1,1,1	0.33	0	-		

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
5	GOL	C	507	-	5,5,5	0.55	0	5,5,5	0.19	0
2	HEM	C	501	1	27,50,50	1.97	5 (18%)	17,82,82	1.74	5 (29%)
7	TRP	C	503	-	12,16,16	1.43	1 (8%)	12,22,22	1.26	2 (16%)
3	NFK	C	502	-	14,17,17	2.92	3 (21%)	16,22,22	1.52	3 (18%)
5	GOL	A	504	-	5,5,5	0.51	0	5,5,5	0.33	0
5	GOL	B	506	-	5,5,5	0.49	0	5,5,5	0.71	0
5	GOL	A	506	-	5,5,5	0.46	0	5,5,5	0.38	0
5	GOL	C	509	-	5,5,5	0.54	0	5,5,5	0.34	0
5	GOL	B	504	-	5,5,5	0.49	0	5,5,5	0.46	0
6	OXY	A	510	-	1,1,1	0.34	0	-		
5	GOL	D	506	-	5,5,5	0.47	0	5,5,5	0.73	0
5	GOL	B	502	-	5,5,5	0.52	0	5,5,5	0.35	0
5	GOL	C	510	-	5,5,5	0.52	0	5,5,5	0.35	0
2	HEM	A	501	1	27,50,50	1.98	4 (14%)	17,82,82	2.30	8 (47%)
4	PO4	A	503	-	4,4,4	0.89	0	6,6,6	1.02	0
7	TRP	D	504	-	12,16,16	1.37	1 (8%)	12,22,22	0.67	0
5	GOL	A	507	-	5,5,5	0.40	0	5,5,5	0.56	0
5	GOL	A	508	-	5,5,5	0.51	0	5,5,5	0.26	0
5	GOL	B	503	-	5,5,5	0.45	0	5,5,5	0.66	0
5	GOL	C	506	-	5,5,5	0.53	0	5,5,5	0.25	0
5	GOL	C	508	-	5,5,5	0.58	0	5,5,5	0.61	0
5	GOL	B	505	-	5,5,5	0.48	0	5,5,5	0.33	0
5	GOL	A	505	-	5,5,5	0.40	0	5,5,5	0.71	0
3	NFK	A	502	-	14,17,17	2.90	4 (28%)	16,22,22	2.19	8 (50%)
5	GOL	A	509	-	5,5,5	0.55	0	5,5,5	0.46	0
5	GOL	D	507	-	5,5,5	0.49	0	5,5,5	0.36	0
2	HEM	D	501	1	27,50,50	1.94	5 (18%)	17,82,82	2.04	6 (35%)
2	HEM	B	501	1	27,50,50	1.90	5 (18%)	17,82,82	1.75	6 (35%)
6	OXY	D	509	-	1,1,1	0.35	0	-		
5	GOL	C	511	-	5,5,5	0.37	0	5,5,5	1.02	0
3	NFK	D	503	-	14,17,17	2.59	3 (21%)	16,22,22	1.76	2 (12%)
5	GOL	B	507	-	5,5,5	0.56	0	5,5,5	0.37	0
7	TRP	D	505	-	12,16,16	1.51	1 (8%)	12,22,22	1.28	2 (16%)
5	GOL	C	505	-	5,5,5	0.45	0	5,5,5	0.30	0
4	PO4	C	504	-	4,4,4	0.70	0	6,6,6	0.80	0
3	NFK	D	502	-	14,17,17	2.75	5 (35%)	16,22,22	3.09	5 (31%)

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	C	507	-	-	3/4/4/4	-
2	HEM	C	501	1	-	3/6/54/54	-
7	TRP	C	503	-	-	3/3/8/8	0/2/2/2
3	NFK	C	502	-	-	4/11/15/15	0/1/1/1
5	GOL	A	504	-	-	0/4/4/4	-
5	GOL	B	506	-	-	2/4/4/4	-
5	GOL	A	506	-	-	0/4/4/4	-
5	GOL	C	509	-	-	0/4/4/4	-
5	GOL	B	504	-	-	0/4/4/4	-
5	GOL	D	506	-	-	2/4/4/4	-
5	GOL	B	502	-	-	2/4/4/4	-
5	GOL	C	510	-	-	0/4/4/4	-
2	HEM	A	501	1	-	1/6/54/54	-
7	TRP	D	504	-	-	0/3/8/8	0/2/2/2
5	GOL	A	507	-	-	1/4/4/4	-
5	GOL	A	508	-	-	2/4/4/4	-
5	GOL	B	503	-	-	2/4/4/4	-
5	GOL	C	506	-	-	0/4/4/4	-
5	GOL	C	508	-	-	0/4/4/4	-
5	GOL	B	505	-	-	1/4/4/4	-
5	GOL	A	505	-	-	0/4/4/4	-
3	NFK	A	502	-	-	2/11/15/15	0/1/1/1
5	GOL	A	509	-	-	2/4/4/4	-
5	GOL	D	507	-	-	3/4/4/4	-
2	HEM	D	501	1	-	1/6/54/54	-
2	HEM	B	501	1	-	0/6/54/54	-
5	GOL	C	511	-	-	0/4/4/4	-
3	NFK	D	503	-	-	8/11/15/15	0/1/1/1
5	GOL	B	507	-	-	3/4/4/4	-
7	TRP	D	505	-	-	3/3/8/8	0/2/2/2
5	GOL	C	505	-	-	2/4/4/4	-
3	NFK	D	502	-	-	8/11/15/15	0/1/1/1

All (37) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	502	NFK	CAF-NAL	9.45	1.46	1.34
3	C	502	NFK	CAF-NAL	9.41	1.46	1.34

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	D	502	NFK	CAF-NAL	8.57	1.45	1.34
3	D	503	NFK	CAF-NAL	8.28	1.45	1.34
2	A	501	HEM	C3B-C2B	-5.77	1.32	1.40
2	C	501	HEM	C3B-C2B	-5.18	1.33	1.40
2	D	501	HEM	C3B-C2B	-4.72	1.33	1.40
2	B	501	HEM	C3B-C2B	-4.69	1.33	1.40
2	A	501	HEM	C3C-C2C	-4.55	1.34	1.40
2	D	501	HEM	C3C-C2C	-3.94	1.34	1.40
2	D	501	HEM	C3B-CAB	3.90	1.55	1.47
2	D	501	HEM	C3C-CAC	3.88	1.55	1.47
2	C	501	HEM	C3C-C2C	-3.86	1.35	1.40
3	D	502	NFK	CD2-CG	3.85	1.56	1.48
2	B	501	HEM	C3C-CAC	3.84	1.55	1.47
2	A	501	HEM	C3C-CAC	3.73	1.55	1.47
2	C	501	HEM	C3C-CAC	3.70	1.55	1.47
3	C	502	NFK	CAO-NAL	3.70	1.47	1.41
7	D	505	TRP	CB-CG	3.69	1.61	1.51
2	B	501	HEM	C3B-CAB	3.60	1.55	1.47
2	B	501	HEM	C3C-C2C	-3.48	1.35	1.40
2	C	501	HEM	C3B-CAB	3.46	1.55	1.47
3	A	502	NFK	CAO-NAL	3.44	1.46	1.41
7	D	504	TRP	CB-CG	3.34	1.60	1.51
7	C	503	TRP	CB-CG	3.21	1.60	1.51
3	D	503	NFK	CAO-NAL	3.19	1.46	1.41
3	C	502	NFK	OD1-CG	-2.88	1.17	1.22
2	A	501	HEM	C3B-CAB	2.85	1.53	1.47
3	A	502	NFK	OD1-CG	-2.72	1.18	1.22
2	C	501	HEM	CAA-C2A	2.68	1.56	1.52
3	D	503	NFK	CD2-CG	2.58	1.53	1.48
2	B	501	HEM	CAA-C2A	2.47	1.55	1.52
3	D	502	NFK	CAO-NAL	2.45	1.45	1.41
3	A	502	NFK	CD2-CG	2.21	1.53	1.48
3	D	502	NFK	OD1-CG	-2.19	1.18	1.22
2	D	501	HEM	CAD-C3D	2.03	1.55	1.52
3	D	502	NFK	CB-CG	2.02	1.54	1.51

All (47) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	D	502	NFK	CA-CB-CG	7.57	123.34	113.70
3	D	502	NFK	CB-CA-C	6.29	120.87	110.69
3	D	503	NFK	OAB-CAF-NAL	-5.45	118.85	125.80

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	501	HEM	CAA-CBA-CGA	-4.96	104.34	112.67
3	A	502	NFK	CB-CG-CD2	4.72	126.42	119.86
3	D	502	NFK	OAB-CAF-NAL	-4.33	120.28	125.80
3	D	502	NFK	CAO-NAL-CAF	-4.27	118.53	126.63
2	A	501	HEM	CAD-CBD-CGD	-3.70	106.46	112.67
7	D	505	TRP	CB-CA-C	3.55	116.44	110.69
2	D	501	HEM	CAA-CBA-CGA	-3.53	106.75	112.67
3	C	502	NFK	CA-CB-CG	-3.45	109.30	113.70
2	D	501	HEM	CMD-C2D-C1D	-3.42	123.21	128.46
2	D	501	HEM	CMA-C3A-C4A	-3.37	123.29	128.46
3	D	503	NFK	CAO-NAL-CAF	-3.32	120.34	126.63
3	A	502	NFK	CD2-CAO-NAL	3.28	123.50	119.52
2	A	501	HEM	CMA-C3A-C4A	-3.22	123.51	128.46
3	A	502	NFK	OD1-CG-CD2	-3.21	115.15	120.83
3	D	502	NFK	CAI-CAO-NAL	-3.10	117.94	122.59
7	C	503	TRP	CB-CG-CD1	-2.90	124.38	127.97
2	C	501	HEM	CMA-C3A-C4A	-2.89	124.02	128.46
2	A	501	HEM	C1D-C2D-C3D	2.87	108.99	107.00
7	C	503	TRP	CB-CG-CD2	2.87	130.71	126.25
2	A	501	HEM	CBA-CAA-C2A	-2.84	107.25	112.49
2	B	501	HEM	CMA-C3A-C4A	-2.75	124.24	128.46
2	B	501	HEM	CBD-CAD-C3D	-2.73	107.45	112.48
2	B	501	HEM	CAA-CBA-CGA	-2.65	108.22	112.67
2	D	501	HEM	C1D-C2D-C3D	2.64	108.83	107.00
3	A	502	NFK	CAJ-CD2-CG	-2.58	113.39	119.66
2	C	501	HEM	CBD-CAD-C3D	-2.55	107.78	112.48
3	C	502	NFK	CB-CG-CD2	2.48	123.31	119.86
2	B	501	HEM	CBA-CAA-C2A	-2.45	107.97	112.49
3	A	502	NFK	CA-CB-CG	-2.41	110.63	113.70
2	A	501	HEM	C3B-C4B-NB	-2.36	106.16	109.21
3	A	502	NFK	CAI-CAO-NAL	-2.33	119.09	122.59
2	D	501	HEM	C3B-C4B-NB	-2.27	106.27	109.21
2	C	501	HEM	C3B-C4B-NB	-2.27	106.28	109.21
2	D	501	HEM	CBA-CAA-C2A	-2.27	108.31	112.49
2	C	501	HEM	C1D-C2D-C3D	2.18	108.51	107.00
2	B	501	HEM	C3B-C4B-NB	-2.14	106.44	109.21
3	C	502	NFK	OAB-CAF-NAL	-2.11	123.11	125.80
2	B	501	HEM	C1D-C2D-C3D	2.10	108.46	107.00
2	A	501	HEM	C3C-C4C-NC	-2.07	107.03	110.94
7	D	505	TRP	CB-CG-CD2	2.07	129.46	126.25
3	A	502	NFK	CAJ-CD2-CAO	2.06	121.15	118.81
2	A	501	HEM	CMA-C3A-C2A	2.04	128.78	124.94

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	502	NFK	OD1-CG-CB	-2.02	118.42	120.76
2	C	501	HEM	CBA-CAA-C2A	2.01	116.19	112.49

There are no chirality outliers.

All (58) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	C	501	HEM	C1A-C2A-CAA-CBA
2	C	501	HEM	C3A-C2A-CAA-CBA
2	D	501	HEM	C2A-CAA-CBA-CGA
3	A	502	NFK	CAO-CD2-CG-CB
3	A	502	NFK	CAO-CD2-CG-OD1
3	D	502	NFK	CD2-CAO-NAL-CAF
3	D	502	NFK	CAI-CAO-NAL-CAF
5	B	506	GOL	O1-C1-C2-C3
5	C	505	GOL	C1-C2-C3-O3
5	C	507	GOL	C1-C2-C3-O3
5	D	507	GOL	C1-C2-C3-O3
7	C	503	TRP	N-CA-CB-CG
7	C	503	TRP	C-CA-CB-CG
7	C	503	TRP	CA-CB-CG-CD1
7	D	505	TRP	N-CA-CB-CG
7	D	505	TRP	C-CA-CB-CG
3	C	502	NFK	CAI-CAO-NAL-CAF
3	D	503	NFK	CAI-CAO-NAL-CAF
5	A	508	GOL	O2-C2-C3-O3
5	C	505	GOL	O2-C2-C3-O3
5	A	508	GOL	C1-C2-C3-O3
5	A	509	GOL	C1-C2-C3-O3
5	B	502	GOL	C1-C2-C3-O3
5	B	503	GOL	C1-C2-C3-O3
5	B	507	GOL	C1-C2-C3-O3
5	D	506	GOL	C1-C2-C3-O3
5	A	509	GOL	O2-C2-C3-O3
5	B	502	GOL	O2-C2-C3-O3
5	B	506	GOL	O1-C1-C2-O2
5	D	506	GOL	O2-C2-C3-O3
5	D	507	GOL	O2-C2-C3-O3
3	D	502	NFK	CA-CB-CG-OD1
3	D	502	NFK	CA-CB-CG-CD2
3	D	502	NFK	CAJ-CD2-CG-OD1
3	D	502	NFK	CAO-CD2-CG-OD1

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Res	Type	Atoms
3	D	502	NFK	C-CA-CB-CG
5	B	505	GOL	O1-C1-C2-C3
3	C	502	NFK	CAJ-CD2-CG-OD1
3	D	503	NFK	CAJ-CD2-CG-OD1
3	D	503	NFK	CAJ-CD2-CG-CB
7	D	505	TRP	CA-CB-CG-CD1
3	C	502	NFK	CD2-CAO-NAL-CAF
3	D	503	NFK	CD2-CAO-NAL-CAF
5	C	507	GOL	O2-C2-C3-O3
3	C	502	NFK	CAO-CD2-CG-OD1
3	D	503	NFK	CAO-CD2-CG-OD1
5	D	507	GOL	O1-C1-C2-C3
5	B	503	GOL	O2-C2-C3-O3
3	D	503	NFK	CAO-CD2-CG-CB
3	D	502	NFK	CAJ-CD2-CG-CB
5	B	507	GOL	O1-C1-C2-C3
2	A	501	HEM	C2A-CAA-CBA-CGA
5	B	507	GOL	O2-C2-C3-O3
5	A	507	GOL	O1-C1-C2-O2
2	C	501	HEM	C2A-CAA-CBA-CGA
5	C	507	GOL	O1-C1-C2-O2
3	D	503	NFK	CA-CB-CG-OD1
3	D	503	NFK	CA-CB-CG-CD2

There are no ring outliers.

15 monomers are involved in 46 short contacts:

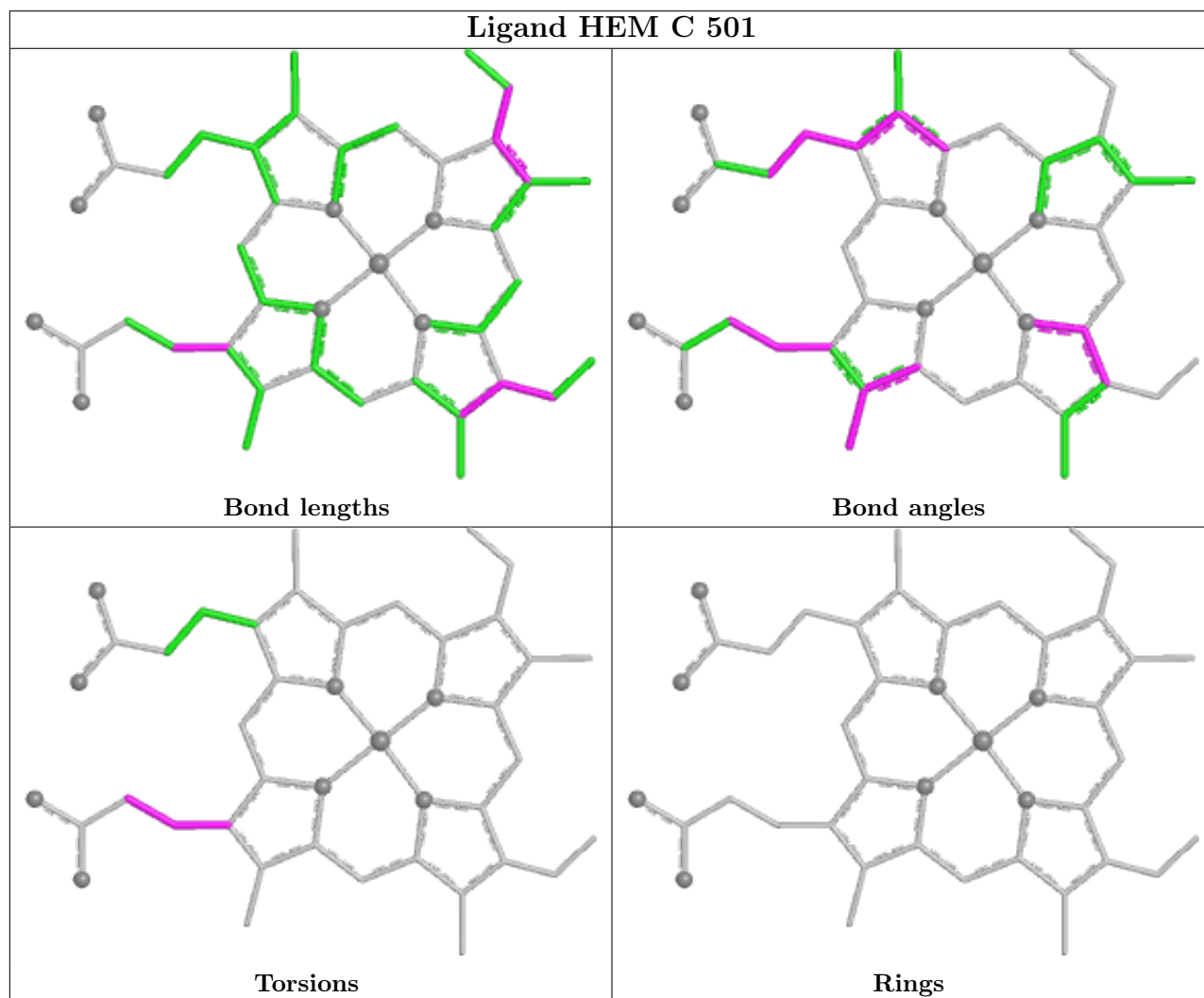
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	C	501	HEM	3	0
7	C	503	TRP	10	0
5	B	506	GOL	1	0
5	C	509	GOL	1	0
2	A	501	HEM	6	0
4	A	503	PO4	1	0
7	D	504	TRP	2	0
5	A	507	GOL	2	0
3	A	502	NFK	2	0
5	D	507	GOL	3	0
2	D	501	HEM	3	0
2	B	501	HEM	6	0
3	D	503	NFK	2	0
7	D	505	TRP	2	0

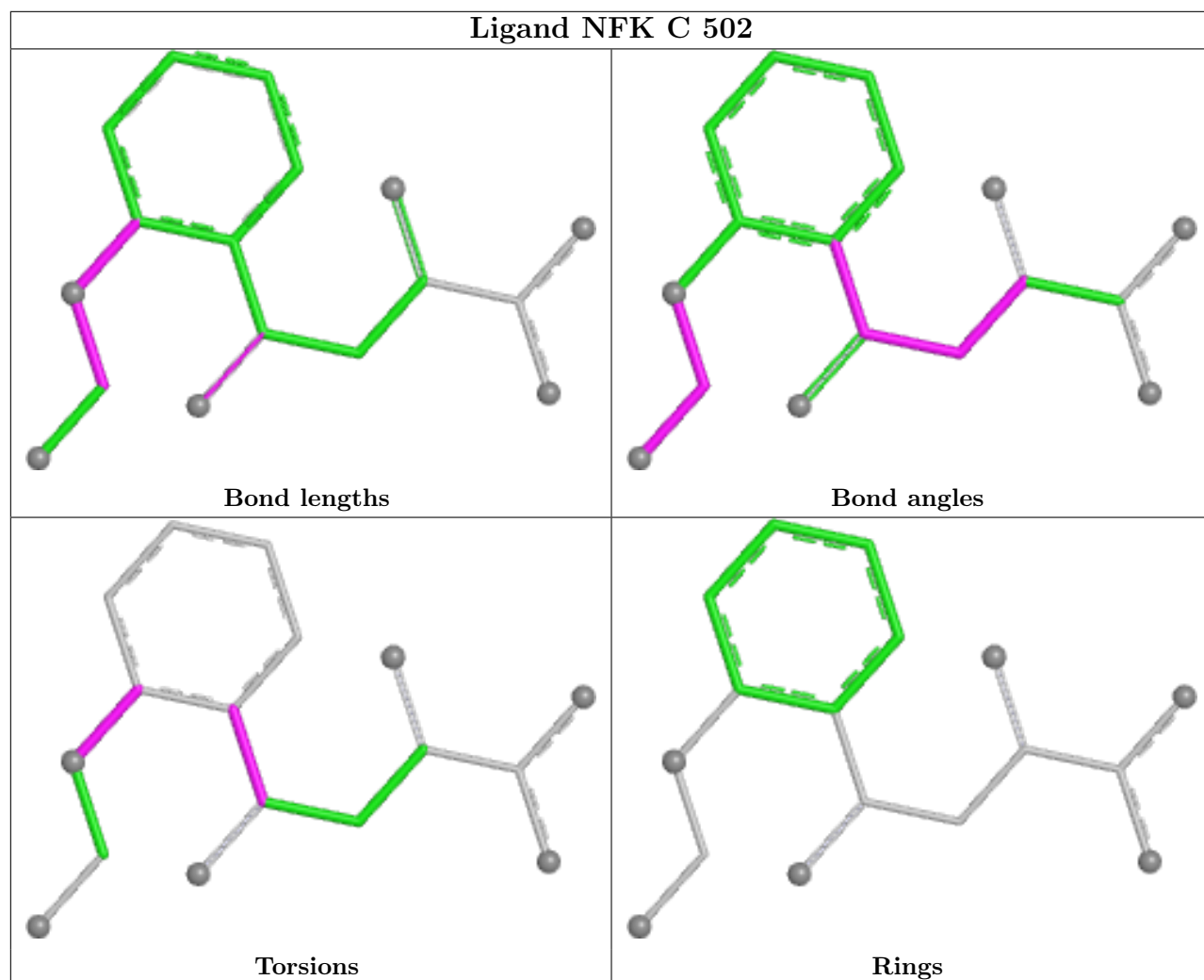
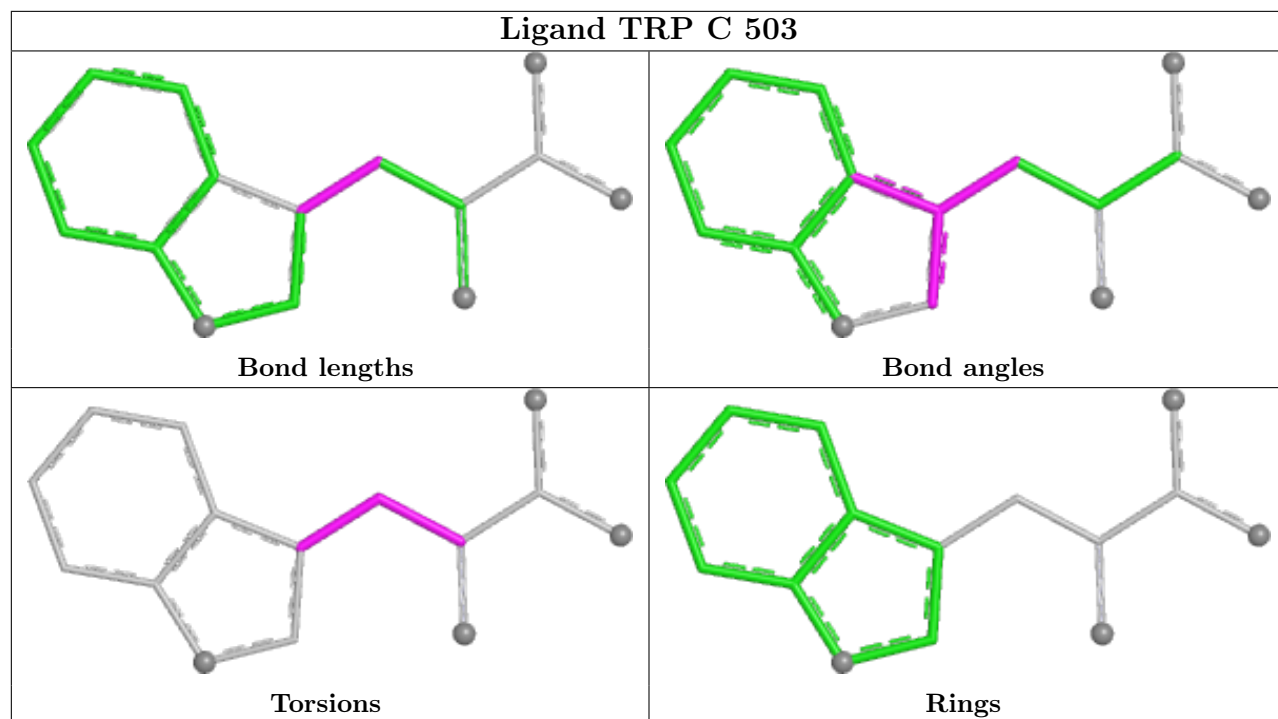
*Continued on next page...*

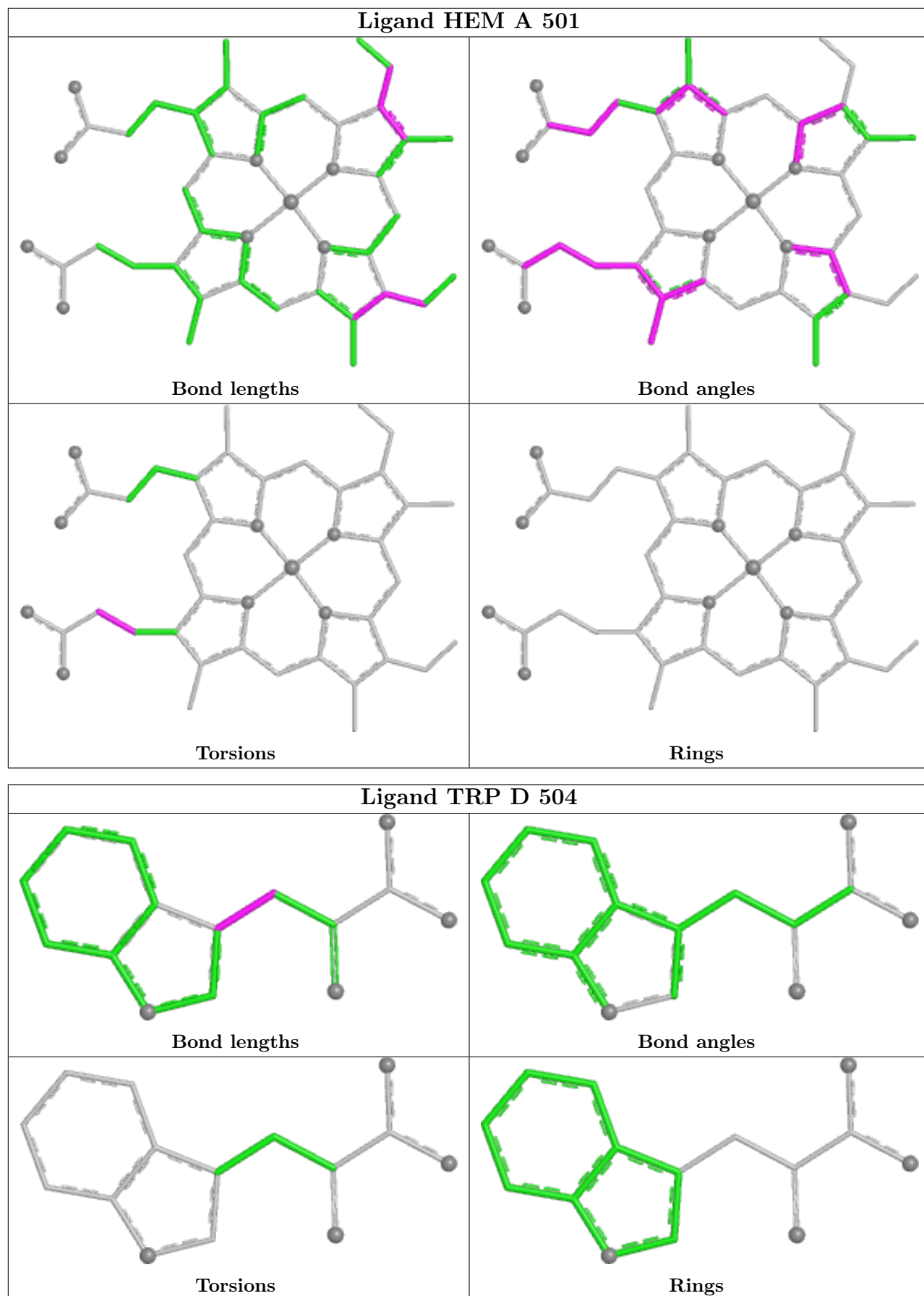
*Continued from previous page...*

Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	C	505	GOL	2	0

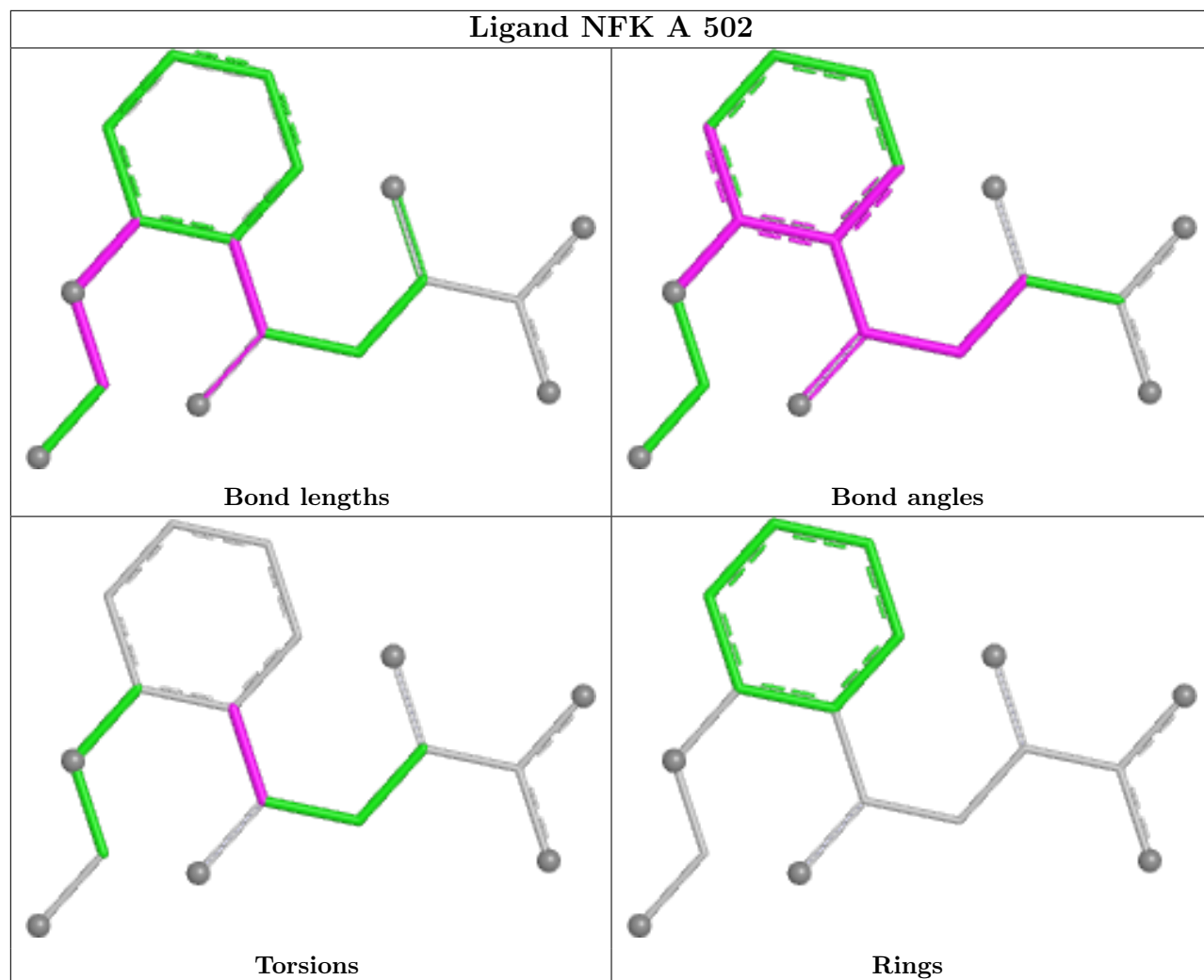
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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

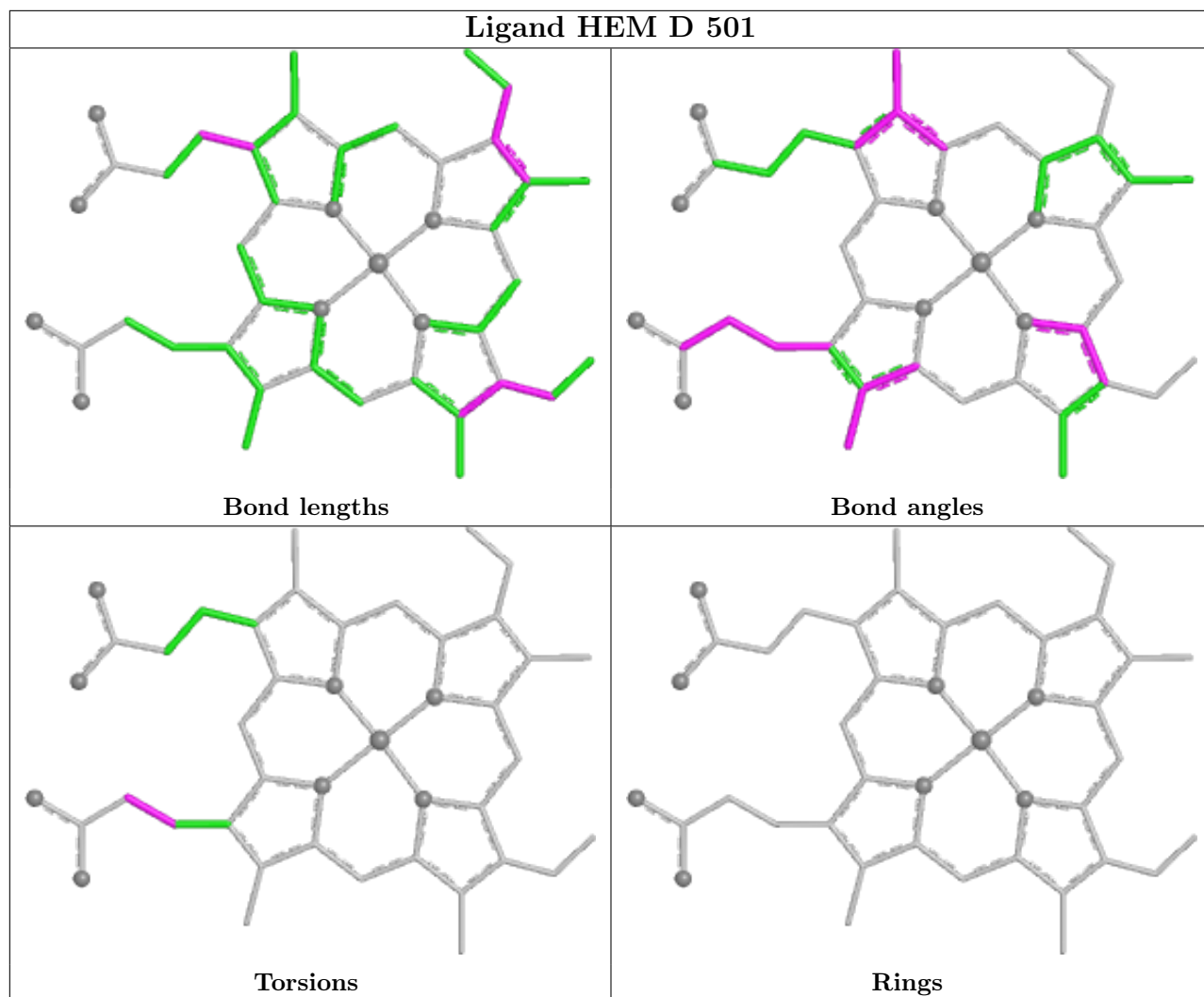


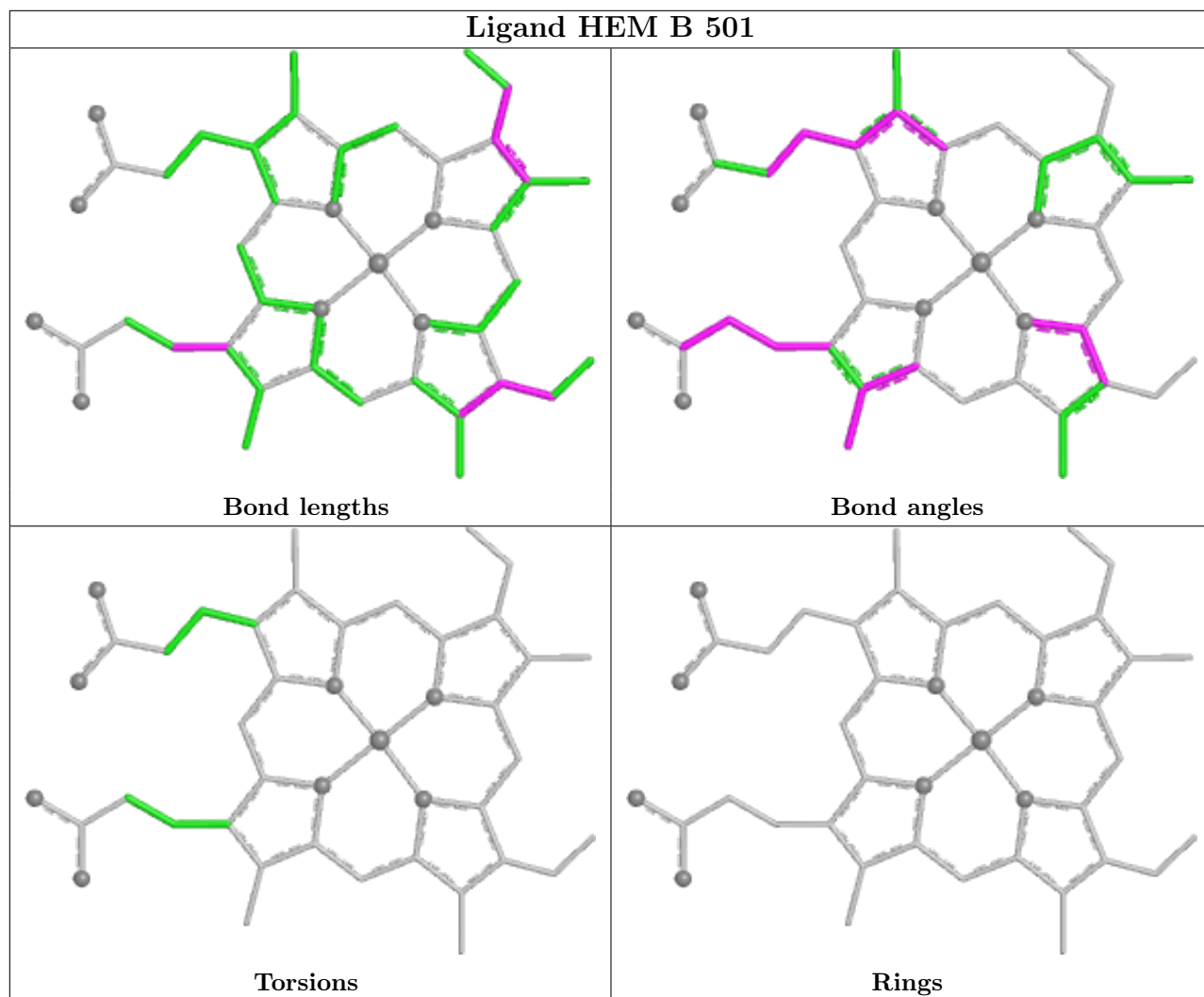


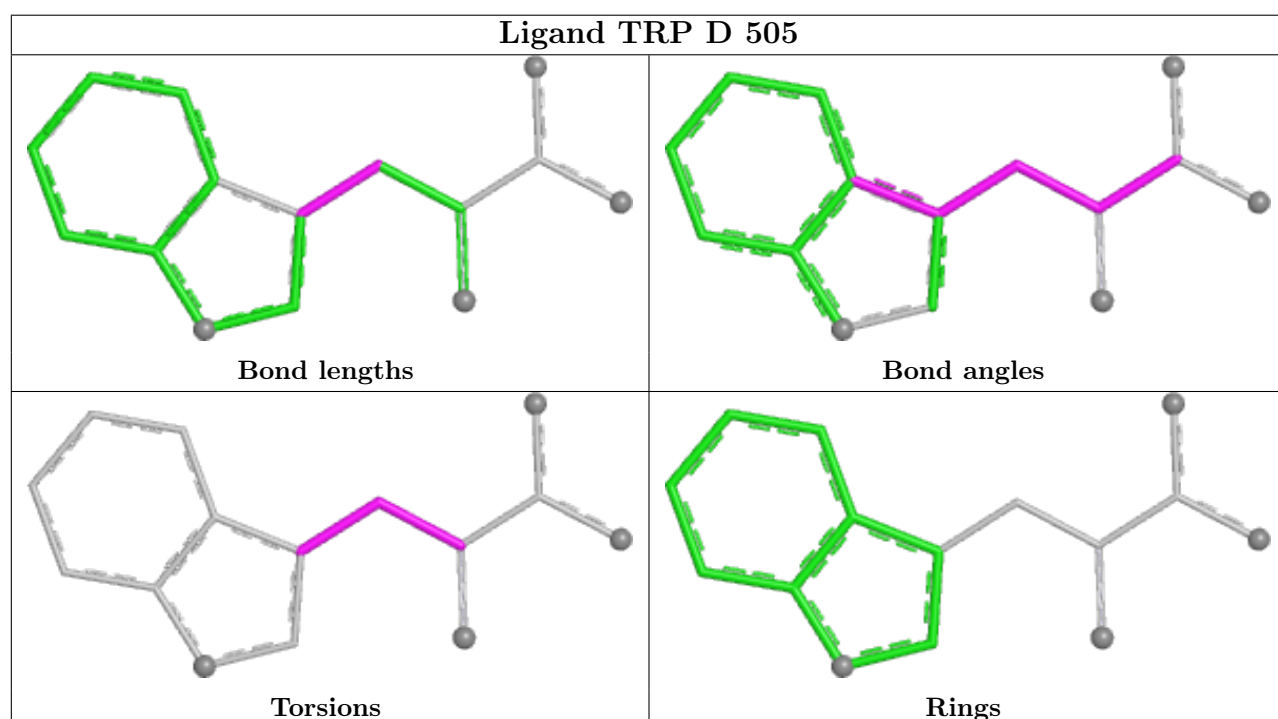
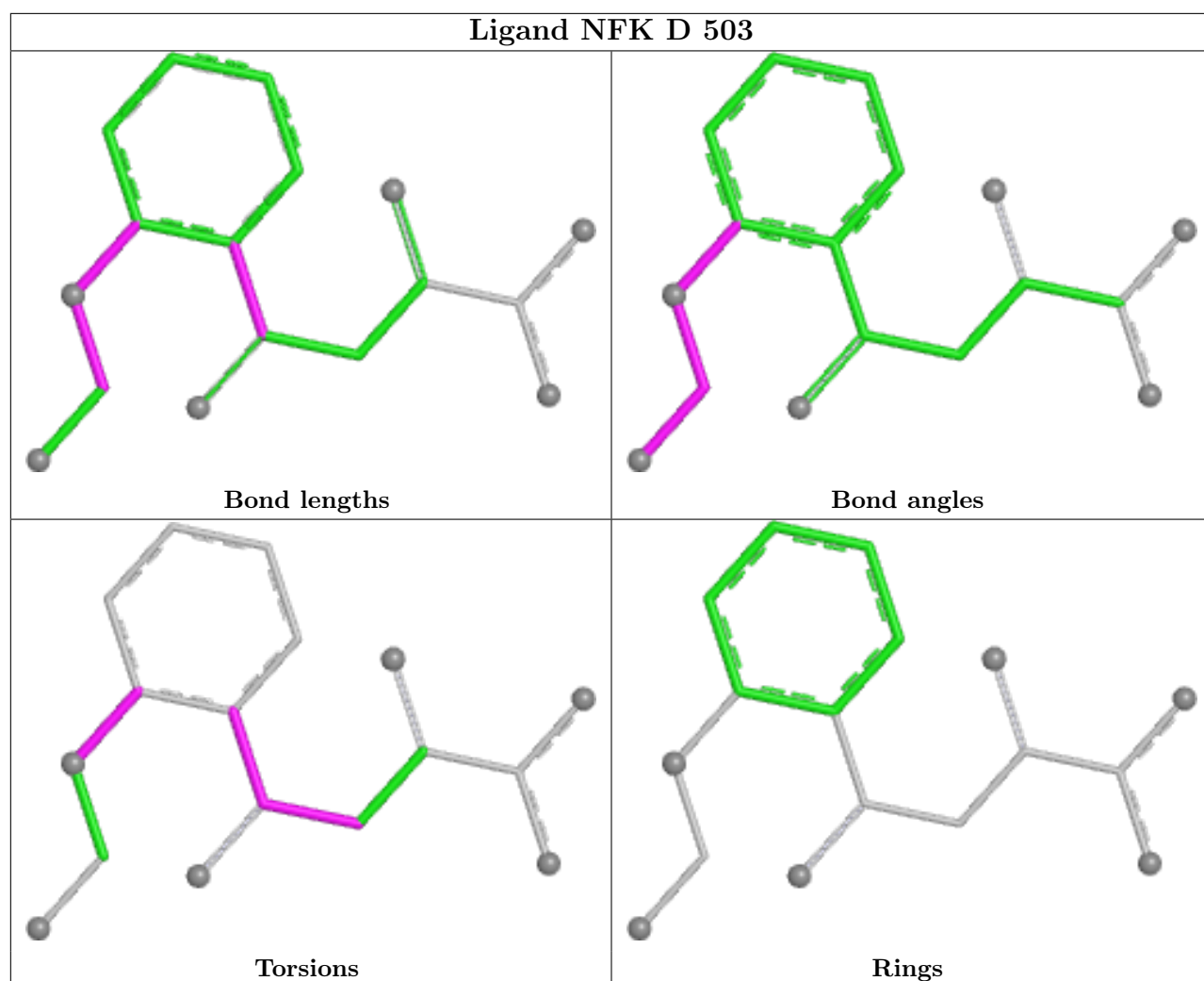


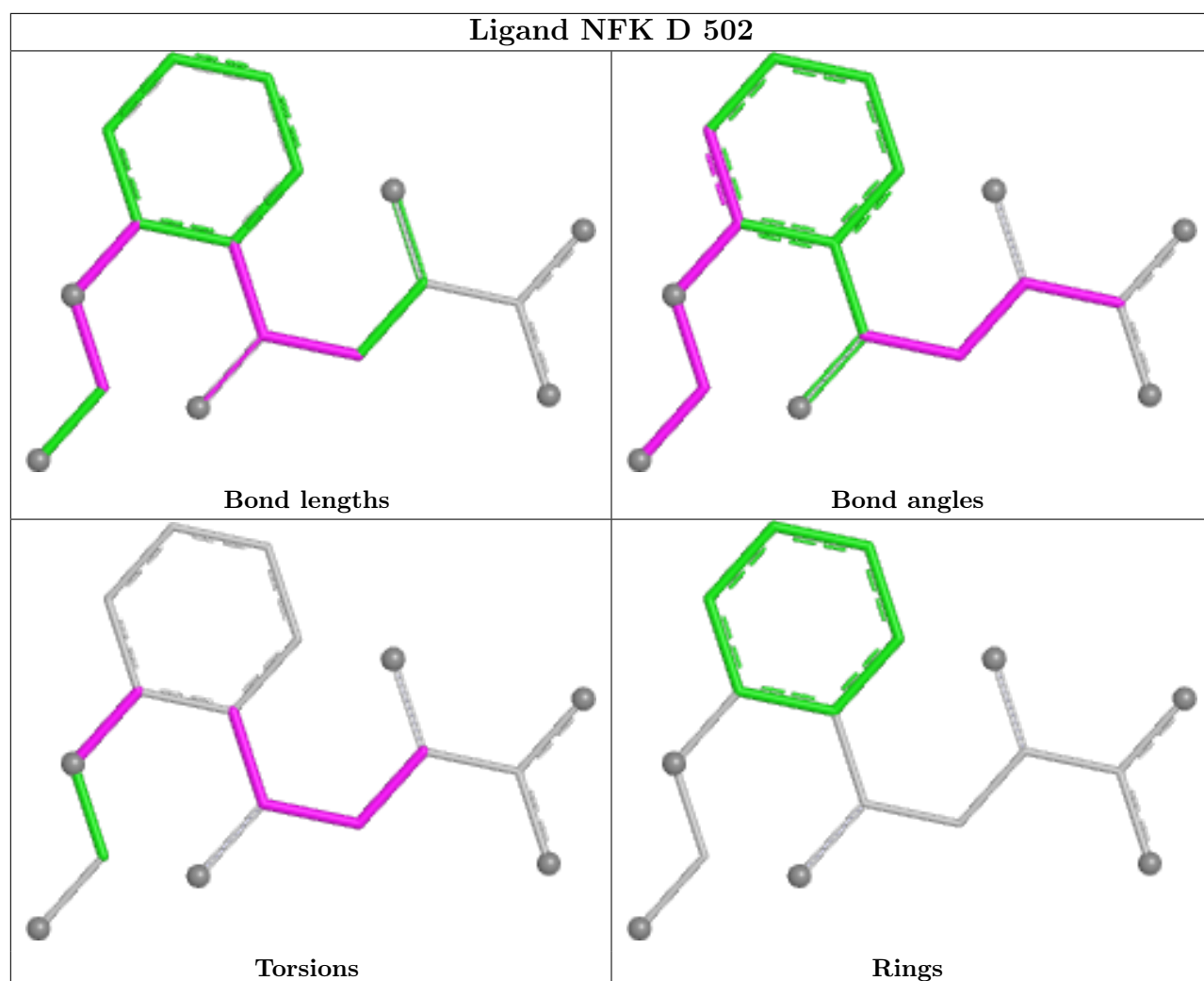












## 5.7 Other polymers [i](#)

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

### 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	370/405 (91%)	0.58	29 (7%) 13 13	37, 56, 82, 106	0
1	B	375/405 (92%)	0.67	36 (9%) 8 7	37, 56, 89, 118	0
1	C	374/405 (92%)	0.62	28 (7%) 14 14	38, 55, 83, 112	0
1	D	375/405 (92%)	0.71	27 (7%) 15 16	38, 58, 86, 122	0
All	All	1494/1620 (92%)	0.65	120 (8%) 12 12	37, 56, 86, 122	0

All (120) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	282	THR	10.9
1	B	283	ALA	8.4
1	D	283	ALA	8.2
1	A	283	ALA	8.1
1	D	282	THR	8.0
1	C	284	GLY	6.7
1	D	284	GLY	6.5
1	D	379	THR	6.5
1	C	282	THR	6.4
1	D	380	GLY	6.3
1	C	283	ALA	6.0
1	D	320	VAL	5.8
1	A	381	GLY	5.8
1	A	282	THR	5.8
1	B	382	THR	5.5
1	C	285	GLY	5.5
1	C	13	ALA	5.0
1	B	285	GLY	4.7
1	A	385	MET	4.7
1	B	281	GLN	4.6
1	B	360	GLN	4.5

*Continued on next page...*

*Continued from previous page...*

<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>	<b>RSRZ</b>
1	B	385	MET	4.5
1	B	262	GLY	4.5
1	D	401	LYS	4.5
1	C	286	GLY	4.4
1	D	403	GLY	4.4
1	A	320	VAL	4.3
1	B	379	THR	4.3
1	A	281	GLN	4.2
1	C	320	VAL	4.2
1	D	382	THR	4.2
1	C	383	ASP	4.0
1	B	381	GLY	4.0
1	C	403	GLY	4.0
1	B	361	GLN	4.0
1	D	187	ALA	4.0
1	C	379	THR	3.9
1	C	381	GLY	3.9
1	C	402	GLU	3.9
1	B	14	ALA	3.8
1	C	189	GLN	3.8
1	B	320	VAL	3.8
1	B	378	GLY	3.8
1	B	189	GLN	3.8
1	B	380	GLY	3.8
1	D	242	GLN	3.7
1	D	15	TYR	3.7
1	B	355	LEU	3.6
1	C	380	GLY	3.5
1	A	59	VAL	3.5
1	A	380	GLY	3.4
1	B	16	HIS	3.4
1	D	291	PHE	3.3
1	A	312	SER	3.3
1	B	288	ALA	3.2
1	B	97	GLY	3.2
1	B	15	TYR	3.1
1	D	402	GLU	3.1
1	A	189	GLN	3.0
1	B	96	HIS	3.0
1	B	322	SER	3.0
1	C	289	ALA	3.0
1	D	399	LEU	2.9

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Res	Type	RSRZ
1	A	96	HIS	2.9
1	C	316	VAL	2.7
1	A	141	LYS	2.7
1	D	326	ALA	2.7
1	A	19	GLU	2.6
1	A	140	ASN	2.6
1	B	318	GLU	2.6
1	D	239	GLY	2.5
1	B	190	MET	2.5
1	D	191	GLN	2.5
1	C	291	PHE	2.5
1	B	269	VAL	2.5
1	B	403	GLY	2.5
1	A	99	VAL	2.4
1	B	242	GLN	2.4
1	A	318	GLU	2.4
1	A	242	GLN	2.4
1	A	387	PHE	2.4
1	C	328	LEU	2.4
1	D	400	LEU	2.4
1	A	184	VAL	2.4
1	C	96	HIS	2.4
1	A	185	PHE	2.3
1	C	281	GLN	2.3
1	A	284	GLY	2.3
1	D	96	HIS	2.3
1	D	285	GLY	2.2
1	C	263	SER	2.2
1	D	286	GLY	2.2
1	A	287	HIS	2.2
1	C	382	THR	2.2
1	D	281	GLN	2.2
1	C	401	LYS	2.2
1	A	386	ASN	2.2
1	B	243	LEU	2.2
1	B	286	GLY	2.2
1	C	400	LEU	2.2
1	B	402	GLU	2.2
1	A	383	ASP	2.1
1	D	112	CYS	2.1
1	C	385	MET	2.1
1	B	13	ALA	2.1

*Continued on next page...*



*Continued from previous page...*

Mol	Chain	Res	Type	RSRZ
1	C	196	LEU	2.1
1	D	99	VAL	2.1
1	D	196	LEU	2.1
1	D	355	LEU	2.1
1	A	285	GLY	2.1
1	C	99	VAL	2.1
1	C	120	LEU	2.1
1	B	284	GLY	2.1
1	B	264	ALA	2.0
1	B	184	VAL	2.0
1	A	286	GLY	2.0
1	A	191	GLN	2.0
1	A	316	VAL	2.0
1	A	55	LEU	2.0
1	B	191	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.

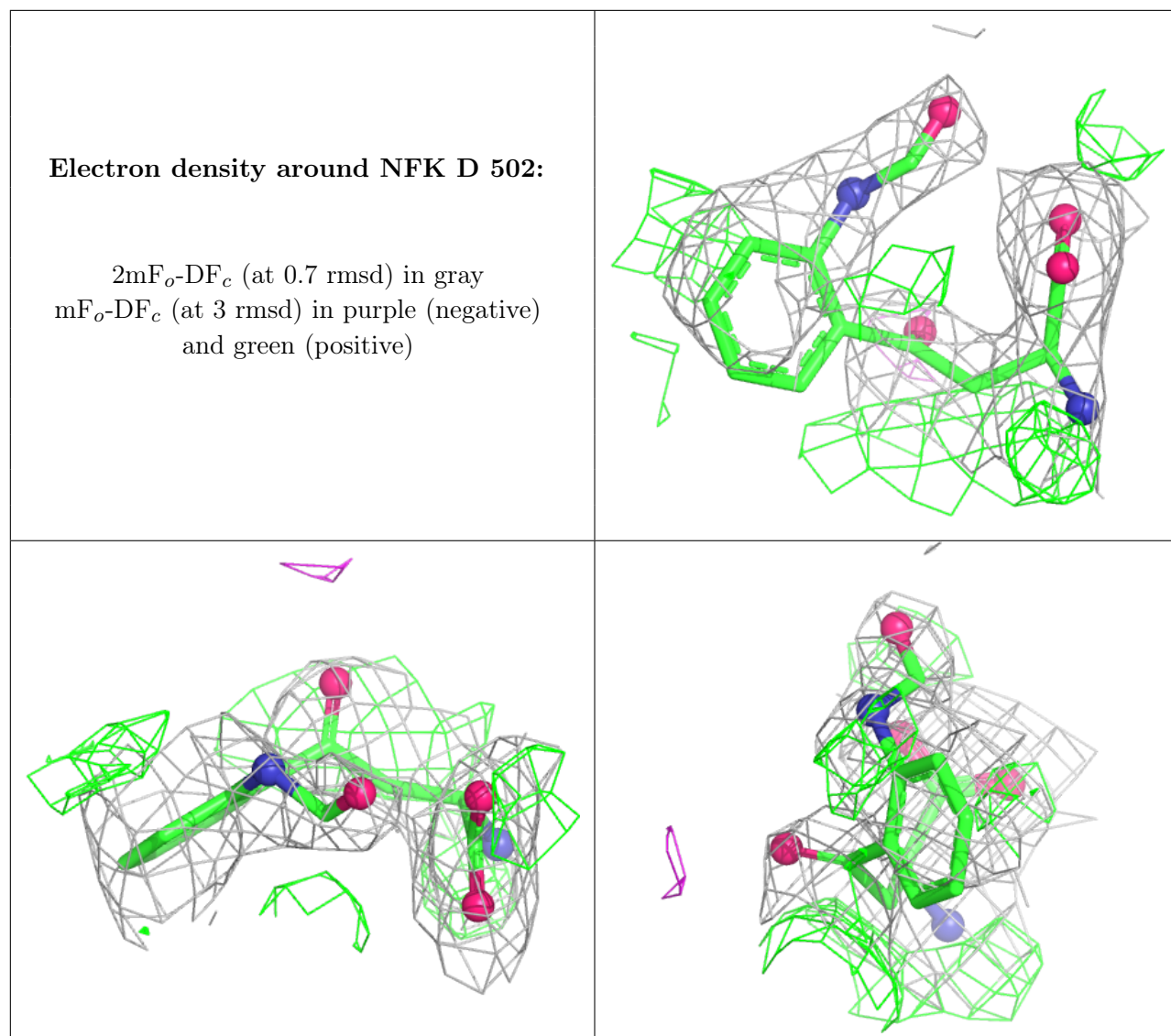
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å <sup>2</sup> )	Q<0.9
3	NFK	D	502	17/17	0.60	0.34	47,59,68,69	17
5	GOL	C	511	6/6	0.60	0.29	50,59,62,64	0
5	GOL	C	510	6/6	0.63	0.48	74,81,82,85	0
5	GOL	D	507	6/6	0.66	0.40	62,72,78,80	0
7	TRP	D	505	15/15	0.66	0.42	46,54,61,64	15
8	CL	D	508	1/1	0.66	0.17	96,96,96,96	0
5	GOL	A	504	6/6	0.68	0.34	60,62,67,71	0
7	TRP	D	504	15/15	0.69	0.35	54,60,62,64	15

*Continued on next page...*

Continued from previous page...

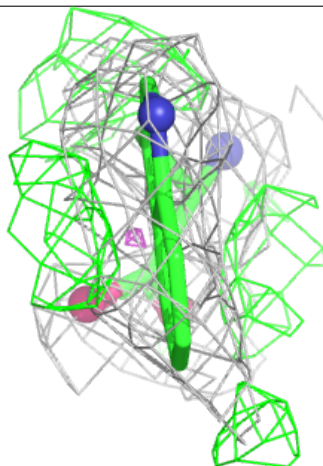
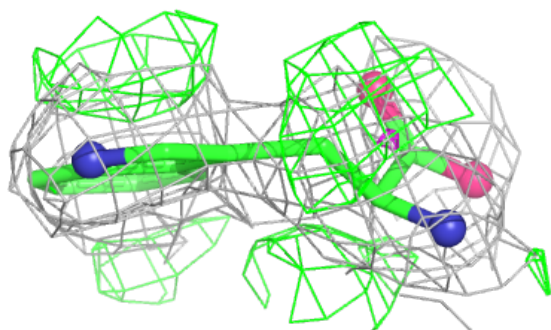
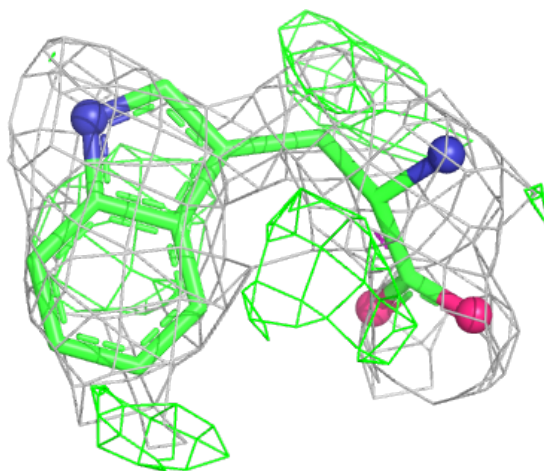
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å <sup>2</sup> )	Q<0.9
4	PO4	A	503	5/5	0.70	0.47	53,54,63,63	5
5	GOL	B	507	6/6	0.70	0.42	56,60,64,65	6
4	PO4	C	504	5/5	0.71	0.61	88,89,100,114	0
5	GOL	A	508	6/6	0.72	0.23	63,66,70,70	0
3	NFK	C	502	17/17	0.73	0.28	61,71,76,76	17
3	NFK	A	502	17/17	0.74	0.51	57,63,70,72	17
3	NFK	D	503	17/17	0.76	0.26	60,73,80,85	17
5	GOL	A	506	6/6	0.77	0.29	65,66,67,78	6
5	GOL	C	507	6/6	0.78	0.29	58,63,66,69	0
6	OXY	A	510	2/2	0.80	0.38	74,74,74,75	0
7	TRP	C	503	15/15	0.81	0.37	63,73,77,78	15
5	GOL	C	505	6/6	0.83	0.25	51,58,60,62	0
5	GOL	C	509	6/6	0.84	0.19	64,67,72,77	0
5	GOL	B	506	6/6	0.85	0.20	56,58,58,71	6
5	GOL	C	508	6/6	0.87	0.25	60,62,68,71	0
8	CL	C	512	1/1	0.87	0.30	105,105,105,105	0
5	GOL	B	502	6/6	0.87	0.22	50,57,61,63	0
5	GOL	A	507	6/6	0.88	0.14	60,63,70,77	0
5	GOL	C	506	6/6	0.88	0.17	61,66,68,77	0
5	GOL	D	506	6/6	0.89	0.20	57,61,63,65	0
6	OXY	B	508	2/2	0.90	0.37	74,74,74,78	0
5	GOL	B	504	6/6	0.90	0.22	55,58,60,61	0
2	HEM	C	501	43/43	0.91	0.20	49,63,74,79	0
5	GOL	A	505	6/6	0.92	0.22	51,56,57,60	0
5	GOL	B	503	6/6	0.92	0.26	54,57,58,63	0
2	HEM	B	501	43/43	0.92	0.19	51,67,77,81	0
5	GOL	A	509	6/6	0.93	0.25	59,62,67,68	0
5	GOL	B	505	6/6	0.93	0.27	64,66,70,75	0
2	HEM	D	501	43/43	0.93	0.19	55,66,78,88	0
2	HEM	A	501	43/43	0.93	0.18	50,64,77,83	0
6	OXY	D	509	2/2	0.94	0.24	74,74,74,86	0

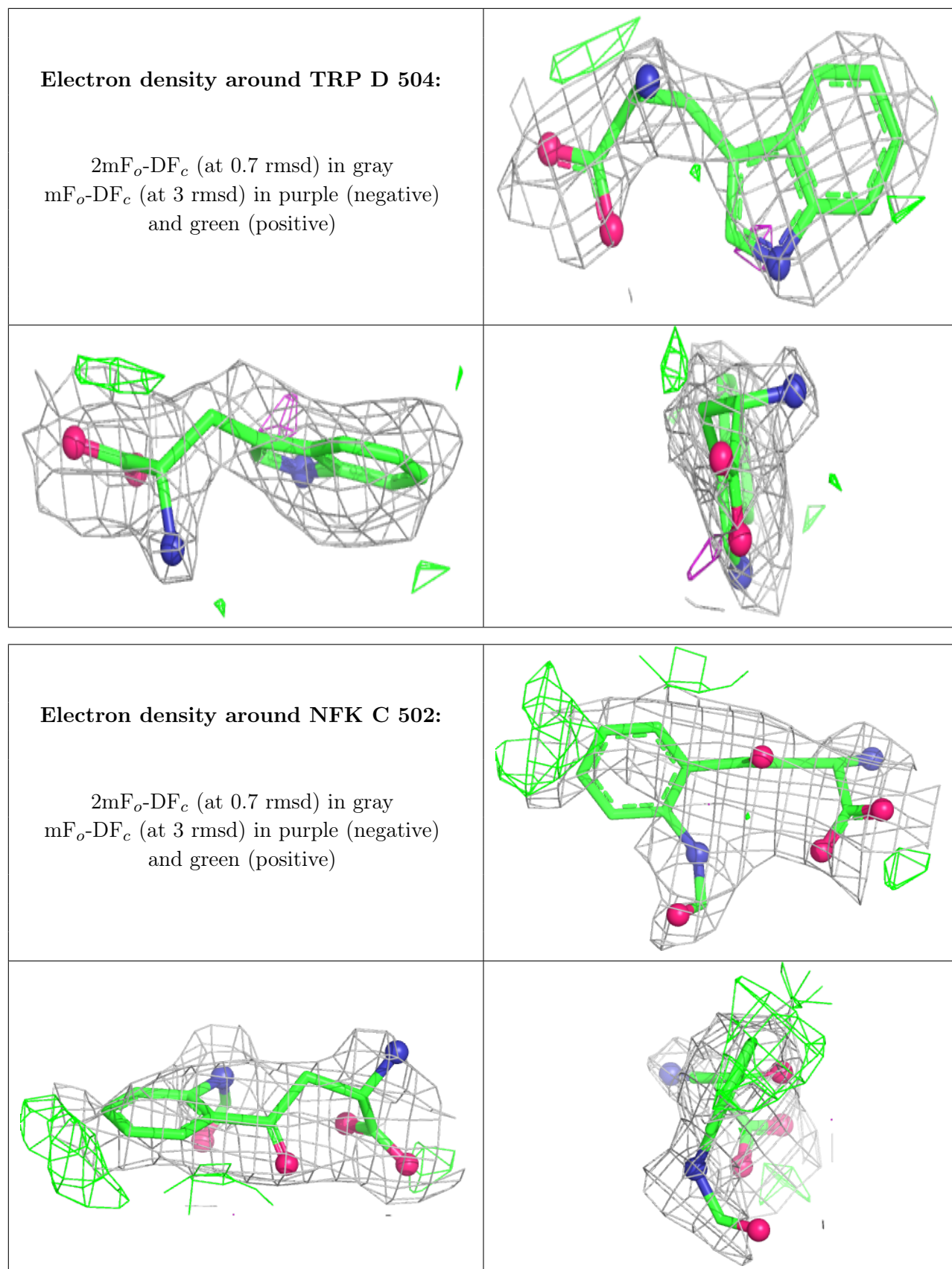
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation to approximate a three-dimensional view.



**Electron density around TRP D 505:**

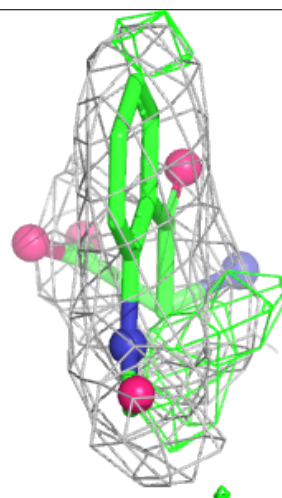
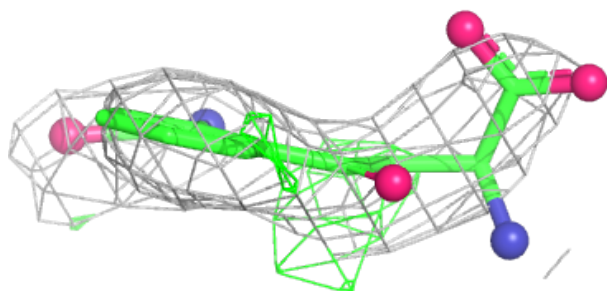
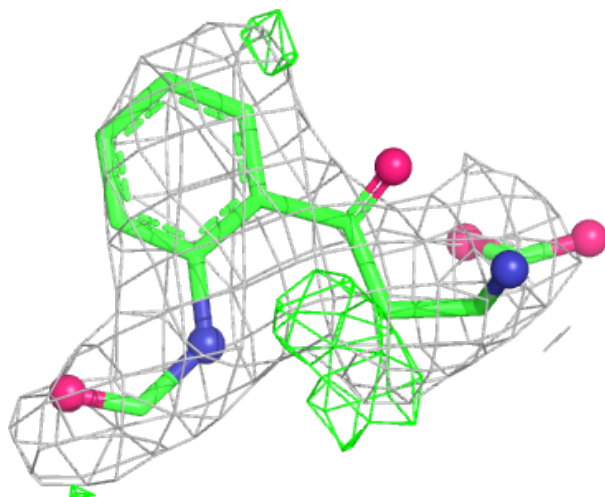
$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)



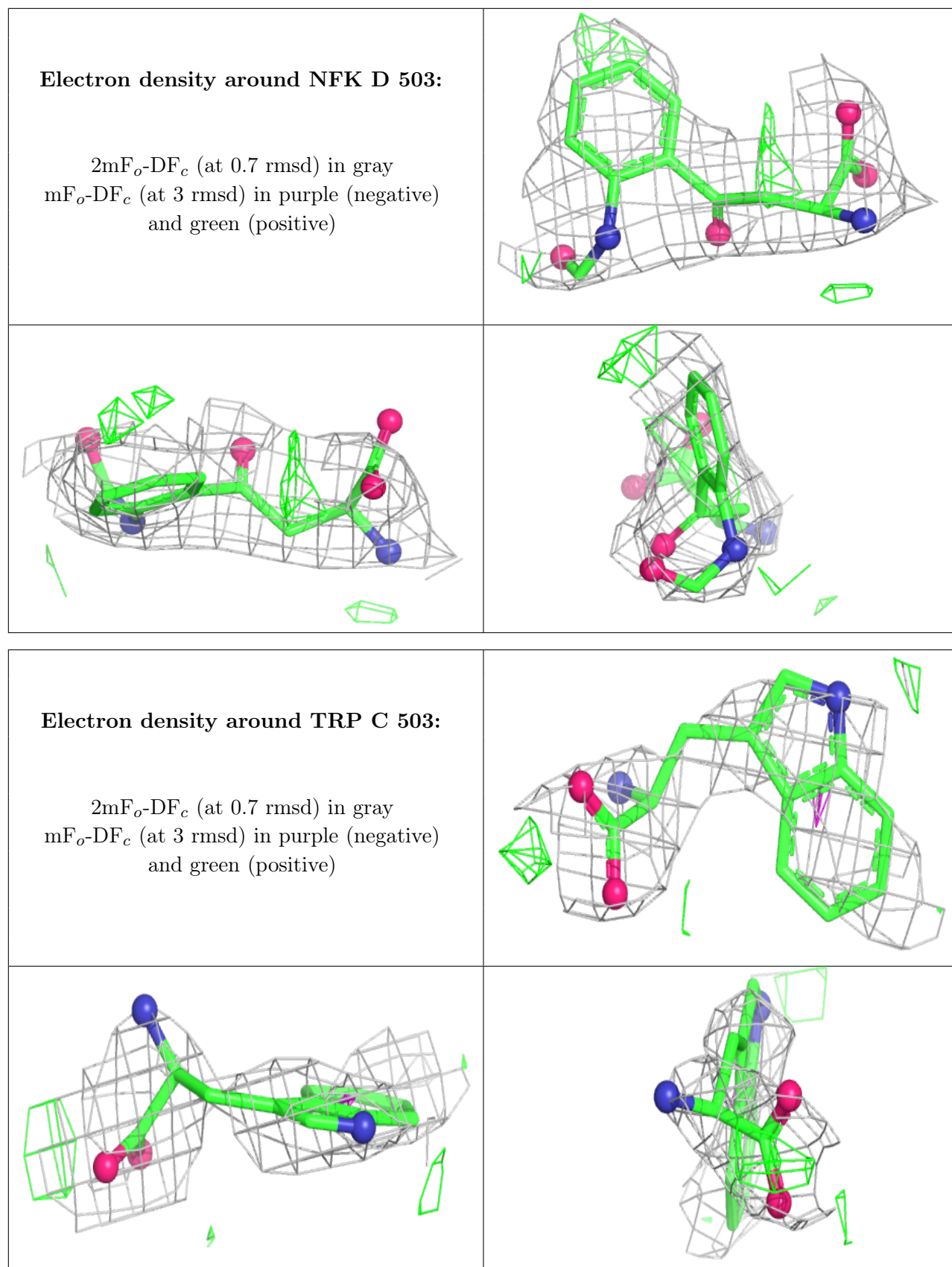


**Electron density around NFK A 502:**

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

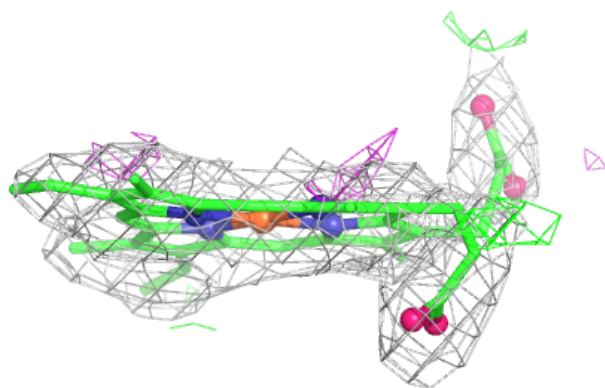
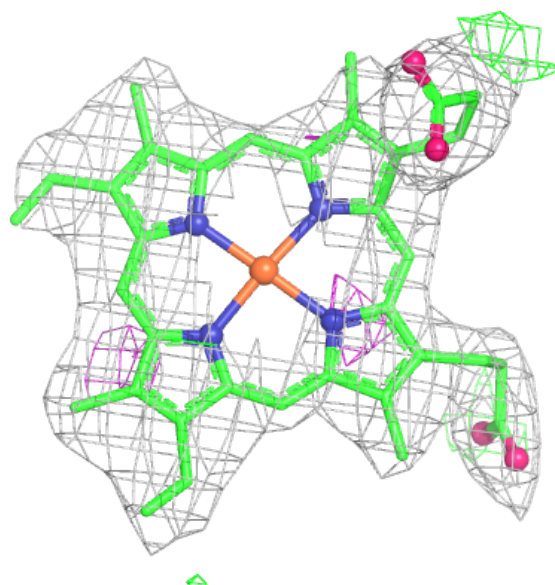






**Electron density around HEM C 501:**

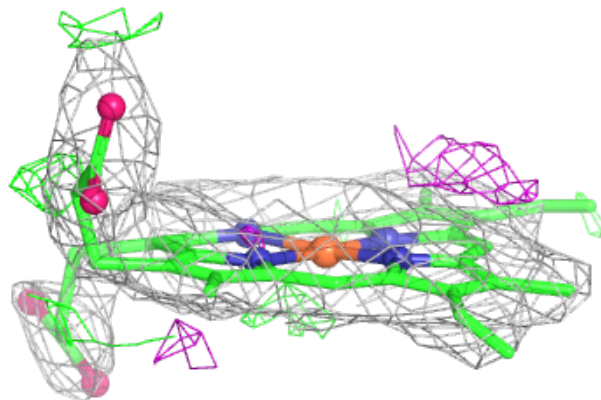
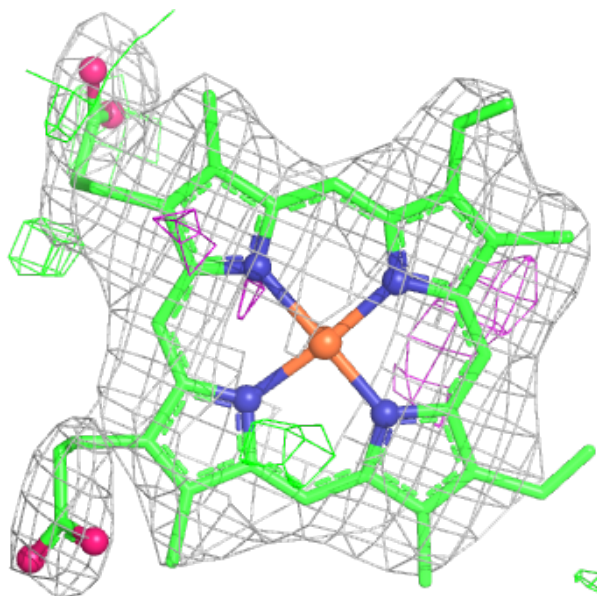
$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)





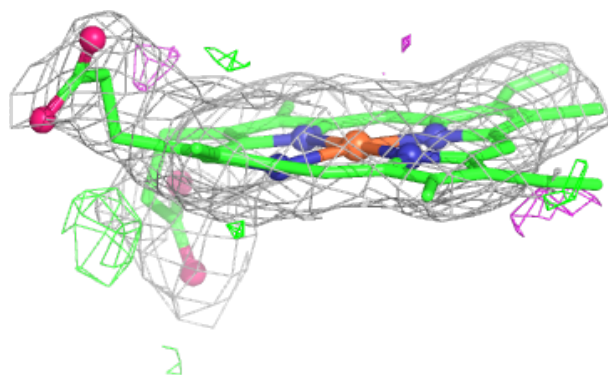
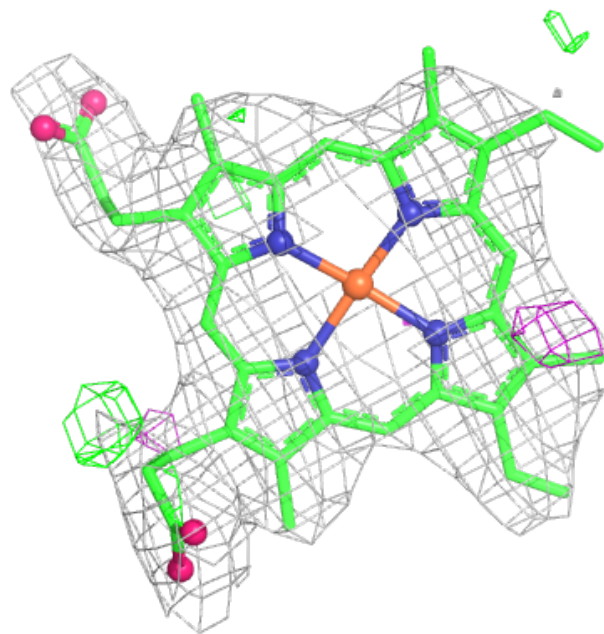
**Electron density around HEM B 501:**

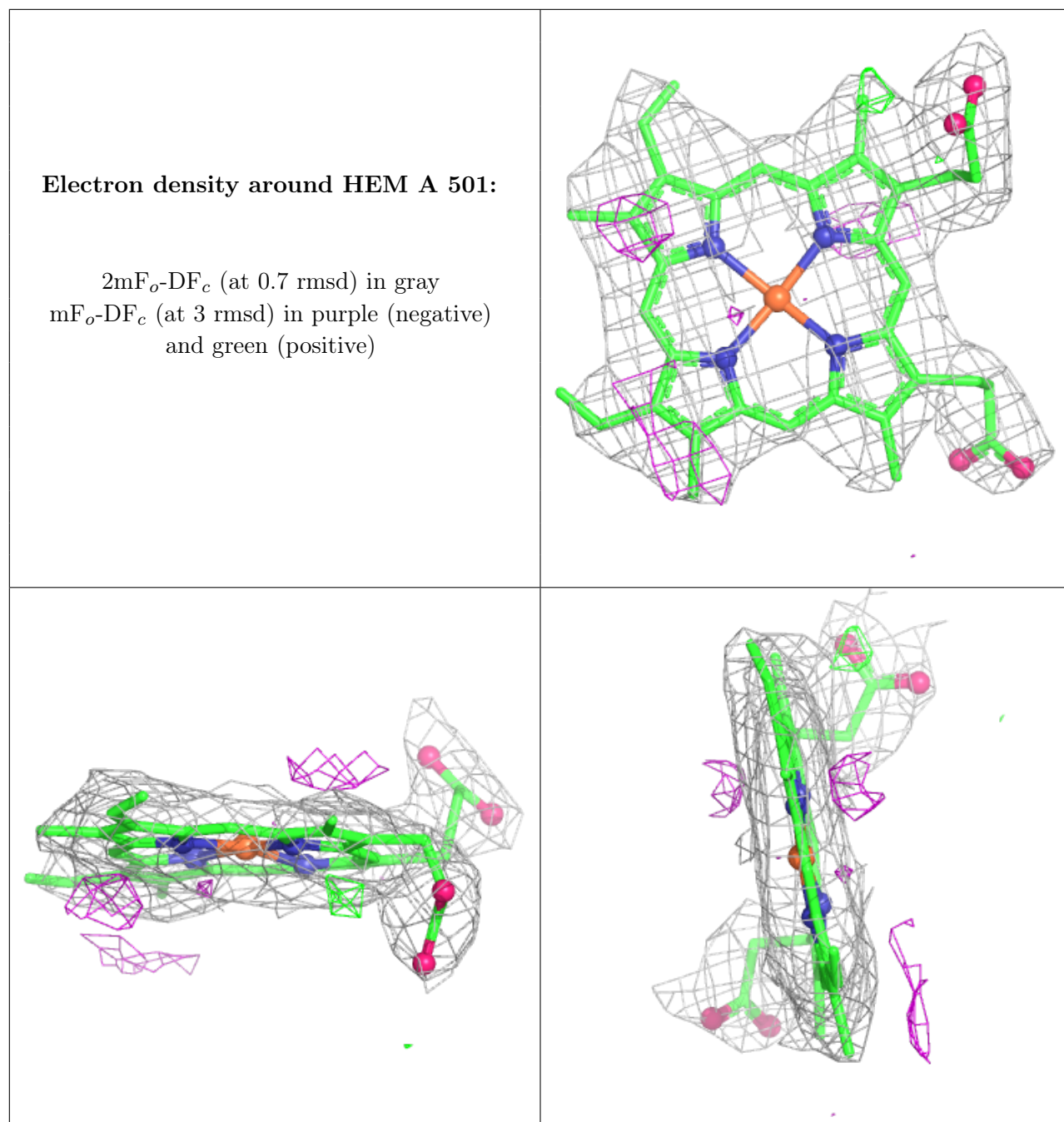
$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)



**Electron density around HEM D 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.