



# Full wwPDB X-ray Structure Validation Report ⓘ

Jun 18, 2024 – 12:15 PM JST

PDB ID : 8JS5  
Title : Dimeric PAS domains of oxygen sensor FixL with ferric unliganded heme  
Authors : Kamaya, M.; Koteishi, H.; Sawai, H.; Sugimoto, H.; Shiro, Y.  
Deposited on : 2023-06-19  
Resolution : 2.95 Å(reported)

This is a Full wwPDB X-ray Structure Validation Report for a publicly released PDB entry.

We welcome your comments at [validation@mail.wwpdb.org](mailto:validation@mail.wwpdb.org)

A user guide is available at

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

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

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

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

MolProbity : 4.02b-467  
Mogul : 1.8.5 (274361), CSD as541be (2020)  
Xtriage (Phenix) : 1.13  
EDS : 2.37.1  
buster-report : 1.1.7 (2018)  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
Refmac : 5.8.0158  
CCP4 : 7.0.044 (Gargrove)  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.37.1

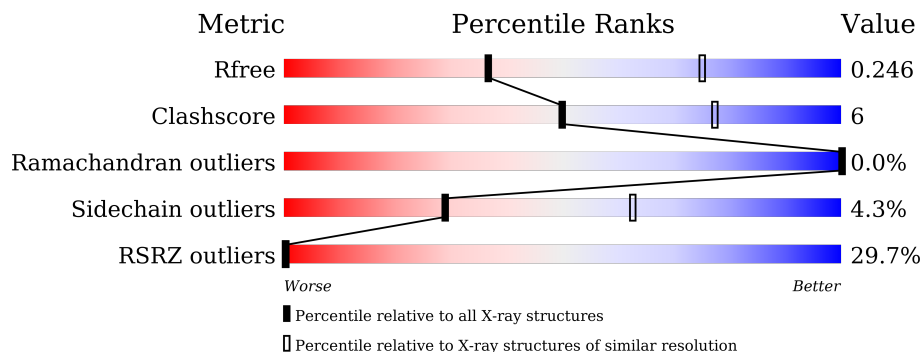
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.95 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.



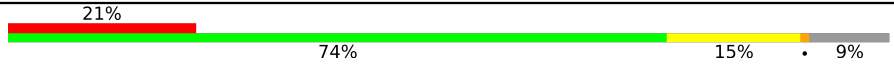

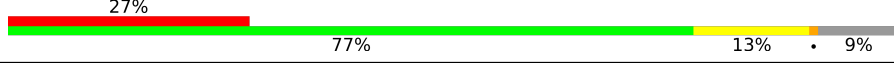
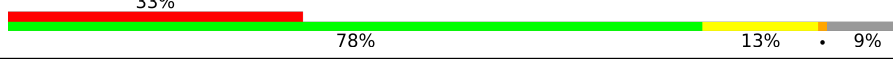
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
$R_{free}$	130704	3104 (3.00-2.92)
Clashscore	141614	3462 (3.00-2.92)
Ramachandran outliers	138981	3340 (3.00-2.92)
Sidechain outliers	138945	3343 (3.00-2.92)
RSRZ outliers	127900	2986 (3.00-2.92)

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	273	 22% 74% 16% • 8%
1	B	273	 29% 77% 15% • 7%
1	C	273	 27% 76% 15% • 8%
1	D	273	 25% 79% 11% • 8%
1	E	273	 36% 77% 14% • 8%
1	F	273	 19% 79% 11% • 9%

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Mol	Chain	Length	Quality of chain
1	G	273	
1	H	273	
1	I	273	
1	J	273	

## 2 Entry composition [i](#)

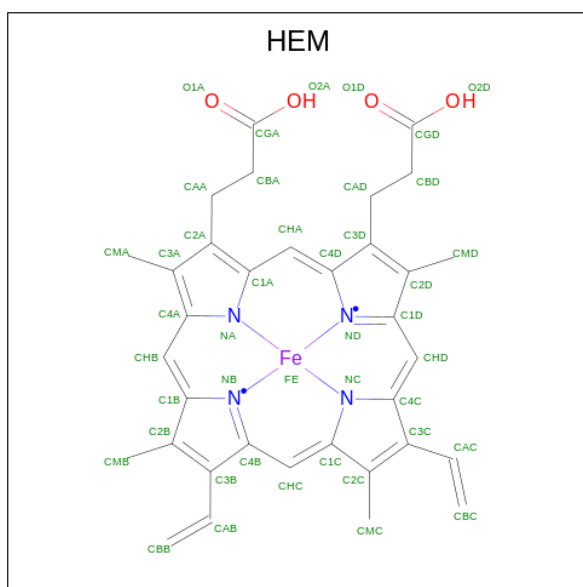
There are 4 unique types of molecules in this entry. The entry contains 20358 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 Sensor protein FixL.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	250	Total 1985	C 1237	N 365	O 379	S 4	0	1	0
1	B	253	Total 2004	C 1249	N 365	O 386	S 4	0	1	0
1	C	252	Total 1990	C 1239	N 364	O 383	S 4	0	0	0
1	D	250	Total 1984	C 1237	N 364	O 379	S 4	0	1	0
1	E	250	Total 1977	C 1232	N 362	O 379	S 4	0	0	0
1	F	248	Total 1970	C 1226	N 363	O 377	S 4	0	1	0
1	G	249	Total 1974	C 1228	N 364	O 378	S 4	0	1	0
1	H	250	Total 1977	C 1232	N 362	O 379	S 4	0	0	0
1	I	249	Total 1966	C 1223	N 361	O 378	S 4	0	0	0
1	J	249	Total 1974	C 1228	N 364	O 378	S 4	0	1	0

- 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		
2	E	1	Total	C	Fe	N	O	0	0
			43	34	1	4	4		
2	F	1	Total	C	Fe	N	O	0	0
			43	34	1	4	4		
2	G	1	Total	C	Fe	N	O	0	0
			43	34	1	4	4		
2	H	1	Total	C	Fe	N	O	0	0
			43	34	1	4	4		
2	I	1	Total	C	Fe	N	O	0	0
			43	34	1	4	4		
2	J	1	Total	C	Fe	N	O	0	0
			43	34	1	4	4		

- Molecule 3 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
3	A	1	Total C O 6 3 3	0	0
3	B	1	Total C O 6 3 3	0	0
3	B	1	Total C O 6 3 3	0	0
3	C	1	Total C O 6 3 3	0	0
3	D	1	Total C O 6 3 3	0	0
3	D	1	Total C O 6 3 3	0	0
3	E	1	Total C O 6 3 3	0	0
3	E	1	Total C O 6 3 3	0	0
3	F	1	Total C O 6 3 3	0	0
3	G	1	Total C O 6 3 3	0	0
3	G	1	Total C O 6 3 3	0	0
3	H	1	Total C O 6 3 3	0	0
3	I	1	Total C O 6 3 3	0	0
3	I	1	Total C O 6 3 3	0	0

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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	C O		
3	J	1	6	3 3	0	0

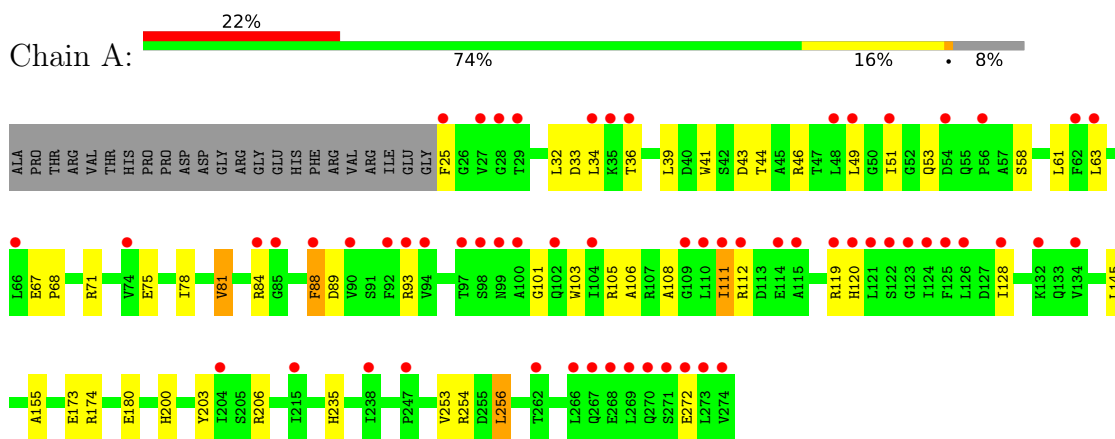
- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	6	Total 6	O 6	0	0
4	B	4	Total 4	O 4	0	0
4	C	3	Total 3	O 3	0	0
4	D	5	Total 5	O 5	0	0
4	E	5	Total 5	O 5	0	0
4	F	5	Total 5	O 5	0	0
4	G	1	Total 1	O 1	0	0
4	H	2	Total 2	O 2	0	0
4	I	3	Total 3	O 3	0	0
4	J	3	Total 3	O 3	0	0

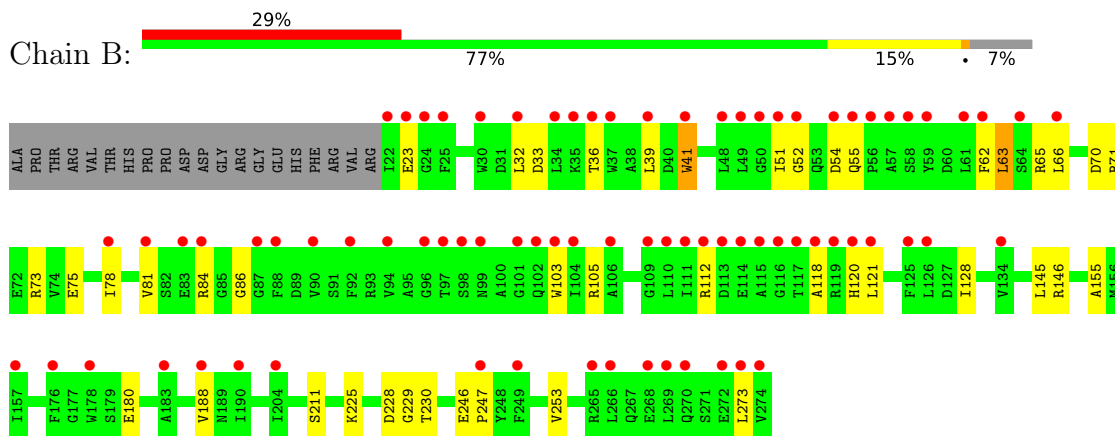
### 3 Residue-property plots [i](#)

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.

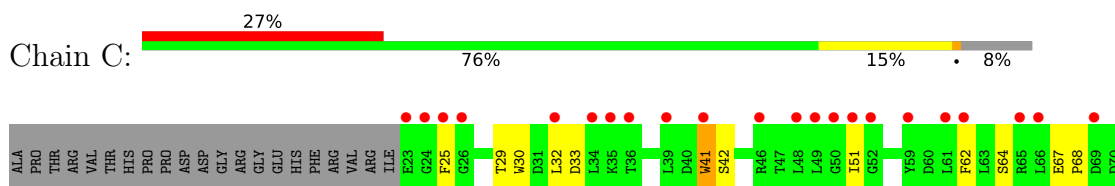
- Molecule 1: Sensor protein FixL



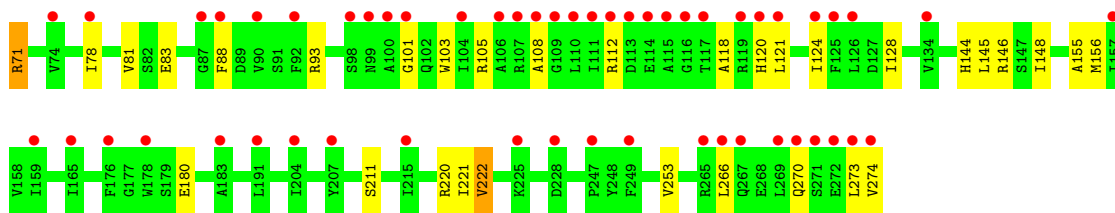
- Molecule 1: Sensor protein FixL



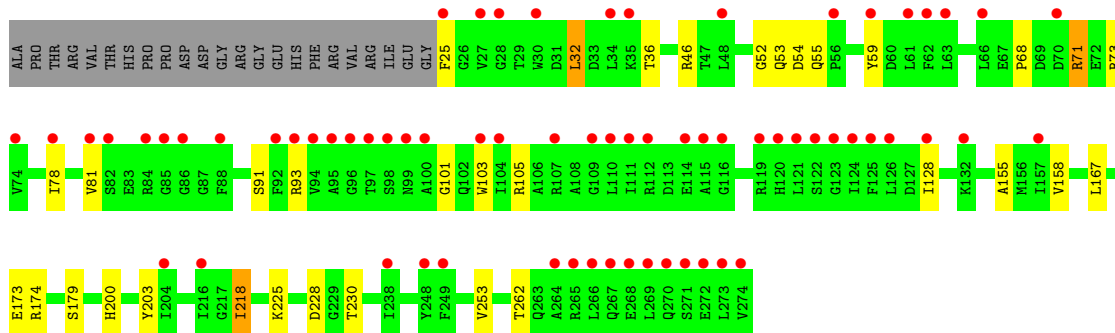
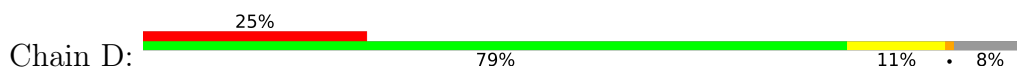
- Molecule 1: Sensor protein FixL



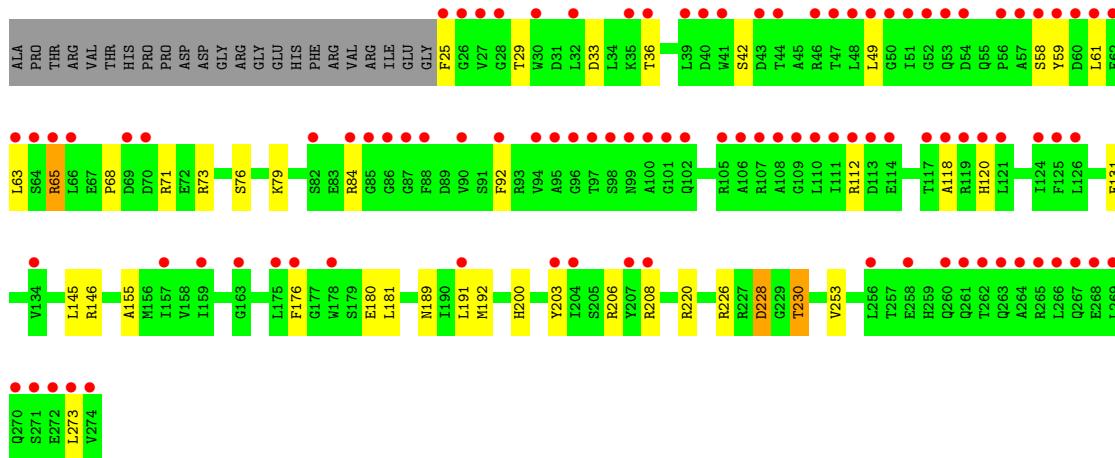
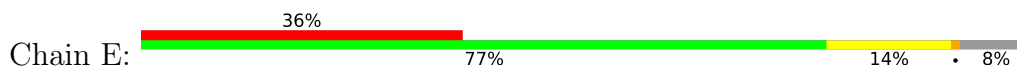




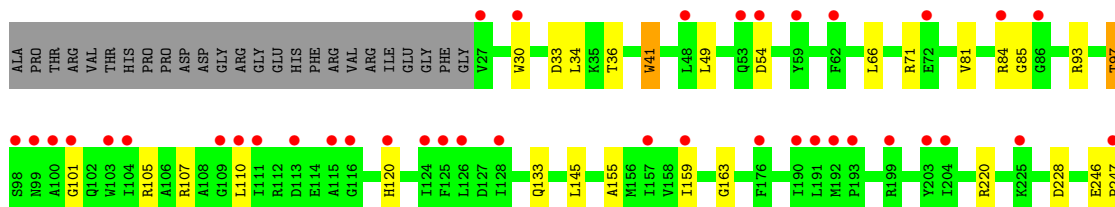
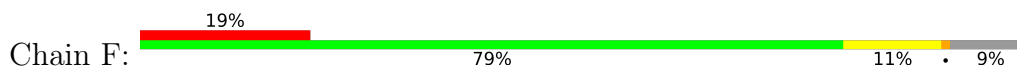
● Molecule 1: Sensor protein FixL

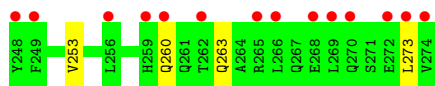


● Molecule 1: Sensor protein FixL

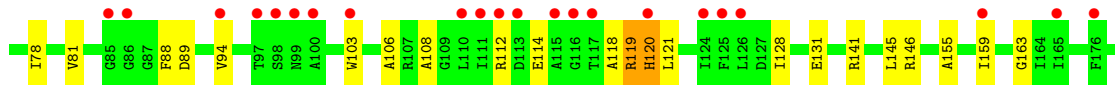
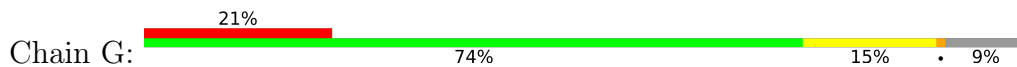


● Molecule 1: Sensor protein FixL

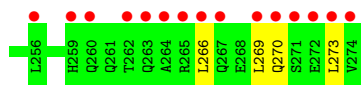
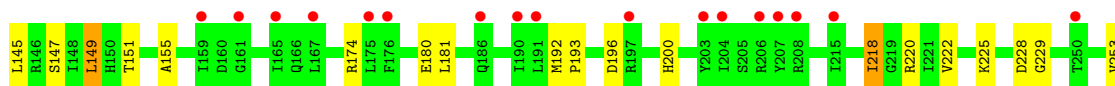
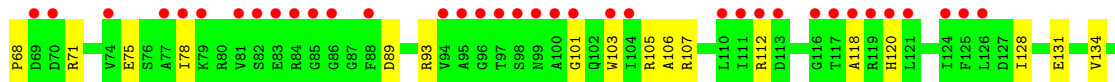
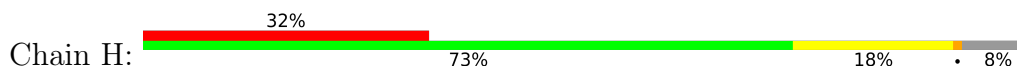




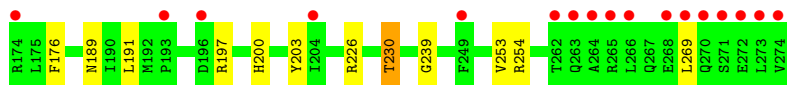
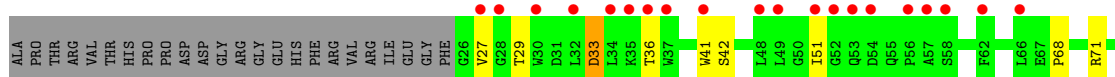
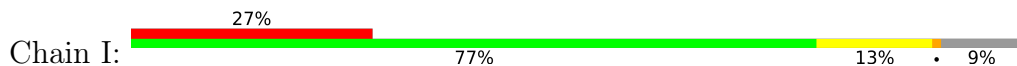
• Molecule 1: Sensor protein FixL



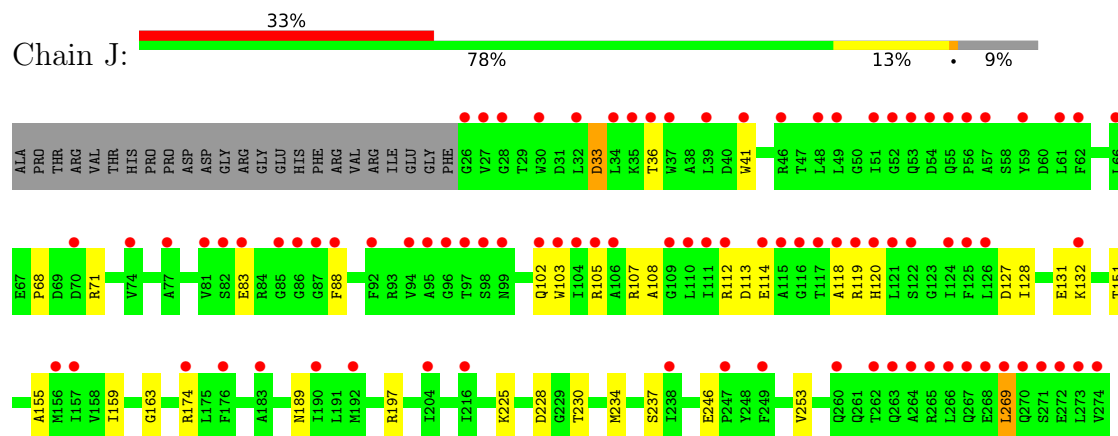
• Molecule 1: Sensor protein FixL



• Molecule 1: Sensor protein FixL



## ● Molecule 1: Sensor protein FixL



## 4 Data and refinement statistics i

Property	Value	Source
Space group	C 2 2 21	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	190.44Å 194.15Å 269.86Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	28.65 – 2.95 47.88 – 2.95	Depositor EDS
% Data completeness (in resolution range)	99.8 (28.65-2.95) 99.8 (47.88-2.95)	Depositor EDS
$R_{merge}$	0.11	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.52 (at 2.96Å)	Xtrriage
Refinement program	PHENIX 1.20.1	Depositor
R, $R_{free}$	0.207 , 0.246 0.208 , 0.246	Depositor DCC
$R_{free}$ test set	5303 reflections (5.07%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	84.2	Xtrriage
Anisotropy	0.212	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.35 , 108.1	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.50$ , $\langle L^2 \rangle = 0.33$	Xtrriage
Estimated twinning fraction	0.087 for -k,-h,-l	Xtrriage
$F_o, F_c$ correlation	0.93	EDS
Total number of atoms	20358	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	149.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.41% of the height of the origin peak. No significant pseudotranslation is detected.*

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

<sup>2</sup>Theoretical values of  $\langle |L| \rangle$ ,  $\langle L^2 \rangle$  for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

## 5 Model quality

### 5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: GOL, HEM

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with  $|Z| > 5$  is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z  >5	RMSZ	# Z  >5
1	A	0.33	0/2027	0.65	0/2740
1	B	0.31	0/2046	0.62	0/2766
1	C	0.31	0/2029	0.63	0/2743
1	D	0.32	0/2027	0.62	0/2741
1	E	0.31	0/2016	0.62	0/2726
1	F	0.30	0/2011	0.63	0/2719
1	G	0.31	0/2015	0.64	0/2724
1	H	0.30	0/2016	0.60	0/2726
1	I	0.29	0/2004	0.62	0/2710
1	J	0.31	0/2015	0.64	0/2724
All	All	0.31	0/20206	0.63	0/27319

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

### 5.2 Too-close contacts

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	1985	0	1940	30	0
1	B	2004	0	1954	22	0
1	C	1990	0	1937	25	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	D	1984	0	1935	20	0
1	E	1977	0	1928	25	0
1	F	1970	0	1929	16	0
1	G	1974	0	1932	26	0
1	H	1977	0	1928	29	0
1	I	1966	0	1919	23	0
1	J	1974	0	1932	20	0
2	A	43	0	30	1	0
2	B	43	0	30	1	0
2	C	43	0	30	1	0
2	D	43	0	30	1	0
2	E	43	0	30	4	0
2	F	43	0	30	1	0
2	G	43	0	30	2	0
2	H	43	0	30	2	0
2	I	43	0	30	1	0
2	J	43	0	30	1	0
3	A	6	0	8	0	0
3	B	12	0	16	2	0
3	C	6	0	8	0	0
3	D	12	0	16	1	0
3	E	12	0	16	2	0
3	F	6	0	8	0	0
3	G	12	0	16	1	0
3	H	6	0	8	2	0
3	I	12	0	16	0	0
3	J	6	0	8	0	0
4	A	6	0	0	0	0
4	B	4	0	0	1	0
4	C	3	0	0	0	0
4	D	5	0	0	0	0
4	E	5	0	0	0	0
4	F	5	0	0	0	0
4	G	1	0	0	0	0
4	H	2	0	0	1	0
4	I	3	0	0	0	0
4	J	3	0	0	1	0
All	All	20358	0	19754	232	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 6.

All (232) 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:C:88:PHE:HB3	1:C:108:ALA:HB3	1.71	0.72
1:D:52:GLY:HA2	1:D:55:GLN:HB2	1.72	0.72
1:F:81:VAL:HA	1:F:85:GLY:HA3	1.72	0.72
1:D:155:ALA:HB3	1:D:253:VAL:HB	1.72	0.71
1:C:33:ASP:HA	1:C:120:HIS:HA	1.73	0.69
1:C:148:ILE:HG22	1:C:156:MET:HE1	1.75	0.68
1:F:33:ASP:HA	1:F:120:HIS:HA	1.76	0.68
1:C:145:LEU:HB2	3:D:302:GOL:H2	1.77	0.66
1:E:29:THR:HG22	1:E:42:SER:HB2	1.77	0.66
1:I:239:GLY:HA3	1:J:151:THR:HG21	1.75	0.66
1:A:93:ARG:HH21	1:A:101:GLY:H	1.42	0.65
1:J:228:ASP:HB2	1:J:230:THR:HG22	1.77	0.65
1:G:33:ASP:HA	1:G:120:HIS:HA	1.77	0.64
1:D:46:ARG:NH1	1:D:55:GLN:O	2.30	0.64
1:B:228:ASP:HB2	1:B:230:THR:HG22	1.79	0.63
1:J:155:ALA:HB3	1:J:253:VAL:HB	1.81	0.63
1:A:67:GLU:HG3	1:A:68:PRO:HD2	1.82	0.62
1:G:63:LEU:O	1:G:71:ARG:NE	2.33	0.62
1:I:155:ALA:HB3	1:I:253:VAL:HB	1.80	0.62
1:G:41:TRP:HZ3	1:G:62:PHE:HB2	1.64	0.62
1:A:58:SER:HB3	1:A:61:LEU:HG	1.80	0.62
2:C:601:HEM:HHC	2:C:601:HEM:HBB2	1.82	0.61
1:D:68:PRO:HA	1:D:71:ARG:HB3	1.83	0.60
1:D:105:ARG:HB2	1:D:128:ILE:HD13	1.83	0.60
1:I:148:ILE:HG22	1:I:156:MET:HE1	1.82	0.60
1:F:93:ARG:HE	1:F:101:GLY:HA3	1.67	0.59
1:J:33:ASP:HA	1:J:120:HIS:HA	1.84	0.59
1:F:105:ARG:HE	1:F:107:ARG:HE	1.50	0.59
1:I:81:VAL:HA	1:I:85:GLY:HA3	1.83	0.59
2:D:303:HEM:HHC	2:D:303:HEM:HBB2	1.84	0.59
1:E:228:ASP:HB2	1:E:230:THR:HG22	1.84	0.59
1:I:269:LEU:HB3	1:J:269:LEU:HB3	1.84	0.59
1:C:273:LEU:HD23	1:C:274:VAL:HG23	1.83	0.59
1:F:159:ILE:HD12	1:F:163:GLY:HA2	1.85	0.59
1:I:112:ARG:HE	1:I:118:ALA:HB2	1.67	0.58
1:A:155:ALA:HB3	1:A:253:VAL:HB	1.85	0.58
1:H:112:ARG:HE	1:H:118:ALA:HB2	1.69	0.58
1:J:174:ARG:NH2	4:J:401:HOH:O	2.36	0.58
1:B:66:LEU:HD11	1:B:70:ASP:HB2	1.85	0.58
1:C:93:ARG:HE	1:C:101:GLY:HA3	1.67	0.58
1:B:81:VAL:HG23	1:B:86:GLY:HA3	1.85	0.58
2:E:601:HEM:HHC	2:E:601:HEM:HBB2	1.84	0.58

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:51:ILE:HG22	1:A:53:GLN:H	1.69	0.58
1:D:93:ARG:HH21	1:D:101:GLY:H	1.51	0.58
1:E:112:ARG:HG2	1:E:118:ALA:HA	1.86	0.58
1:B:75:GLU:HA	1:B:78:ILE:HG12	1.85	0.57
2:H:302:HEM:HBB2	2:H:302:HEM:HHC	1.86	0.57
1:F:97:THR:O	1:F:97:THR:OG1	2.20	0.57
1:G:112:ARG:HG2	1:G:118:ALA:HA	1.86	0.57
2:G:601:HEM:HHC	2:G:601:HEM:HBB2	1.87	0.57
1:H:147:SER:O	1:H:151:THR:HG22	2.05	0.57
1:B:112:ARG:HG2	1:B:118:ALA:HA	1.86	0.57
1:E:220:ARG:NH2	2:E:601:HEM:O1A	2.38	0.57
1:E:145:LEU:HB2	3:E:602:GOL:H2	1.88	0.56
1:D:158:VAL:HB	1:D:167:LEU:HB2	1.86	0.56
2:F:302:HEM:HBB2	2:F:302:HEM:HHC	1.87	0.56
1:E:146:ARG:HH11	1:I:146:ARG:HH22	1.51	0.56
1:B:52:GLY:HA2	1:B:55:GLN:HG2	1.87	0.56
1:D:218:ILE:HB	1:H:218:ILE:HG23	1.88	0.56
1:A:32:LEU:HB2	1:A:39:LEU:HG	1.88	0.55
1:B:225:LYS:HE2	1:B:229:GLY:HA2	1.87	0.55
1:I:33:ASP:HA	1:I:120:HIS:HA	1.89	0.55
1:J:159:ILE:HD12	1:J:163:GLY:HA2	1.87	0.55
1:H:67:GLU:HG2	1:H:68:PRO:HD2	1.89	0.55
2:I:601:HEM:HBB2	2:I:601:HEM:HHC	1.88	0.55
1:H:180:GLU:HG3	1:H:181:LEU:HD22	1.89	0.55
1:C:155:ALA:HB3	1:C:253:VAL:HB	1.89	0.54
1:D:200:HIS:HA	1:D:203:TYR:CD2	2.43	0.54
1:C:266:LEU:HD22	1:D:262:THR:HG23	1.89	0.54
1:G:119:ARG:HG3	1:G:120:HIS:H	1.72	0.54
1:B:33:ASP:HA	1:B:120:HIS:HA	1.90	0.54
1:H:174:ARG:NH2	4:H:401:HOH:O	2.39	0.54
1:H:228:ASP:OD1	1:H:229:GLY:N	2.40	0.54
1:F:66:LEU:HB2	1:F:71:ARG:HB3	1.90	0.54
2:A:601:HEM:HHC	2:A:601:HEM:HBB2	1.89	0.53
1:C:112:ARG:HG2	1:C:118:ALA:HA	1.90	0.53
1:E:76:SER:HA	1:E:79:LYS:HD2	1.90	0.53
1:I:105:ARG:HB2	1:I:128:ILE:HD13	1.90	0.53
1:G:246:GLU:HG2	1:G:247:PRO:HD2	1.91	0.53
1:A:105:ARG:HB2	1:A:128:ILE:HD13	1.91	0.53
1:C:105:ARG:HB2	1:C:128:ILE:HD13	1.90	0.53
1:A:112:ARG:NH1	1:B:23:GLU:OE2	2.41	0.52
1:H:29:THR:H	1:H:42:SER:HB3	1.74	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:H:33:ASP:HA	1:H:120:HIS:HA	1.91	0.52
1:A:84:ARG:HB3	1:A:112:ARG:HH21	1.73	0.52
1:G:88:PHE:HD2	1:G:108:ALA:HB3	1.74	0.52
1:C:30:TRP:HH2	1:C:108:ALA:HB2	1.74	0.52
1:I:189:ASN:HB2	1:I:197:ARG:HG3	1.92	0.52
1:A:200:HIS:HA	1:A:203:TYR:CD2	2.44	0.52
1:F:155:ALA:HB3	1:F:253:VAL:HB	1.91	0.52
1:G:33:ASP:OD1	1:G:33:ASP:N	2.43	0.52
1:E:180:GLU:HG3	1:E:181:LEU:HD12	1.92	0.52
1:J:113:ASP:OD2	1:J:119:ARG:NH2	2.42	0.51
1:G:49:LEU:HD21	1:G:62:PHE:HD1	1.75	0.51
1:A:145:LEU:HB2	3:B:302:GOL:H2	1.93	0.51
1:G:159:ILE:HD12	1:G:163:GLY:HA2	1.92	0.51
1:J:68:PRO:HA	1:J:71:ARG:HG2	1.92	0.51
1:G:103:TRP:HB3	1:G:128:ILE:HG13	1.91	0.51
1:G:252:PHE:HE1	1:H:151:THR:HG23	1.75	0.51
1:I:226:ARG:HE	1:I:230:THR:HG23	1.75	0.51
1:J:131:GLU:N	1:J:131:GLU:OE1	2.39	0.51
1:E:112:ARG:HE	1:E:118:ALA:HB2	1.75	0.51
1:G:141[A]:ARG:HH22	3:G:603:GOL:H12	1.76	0.51
1:B:146:ARG:NH1	4:B:401:HOH:O	2.44	0.50
1:A:78:ILE:HA	1:A:81:VAL:HG12	1.93	0.50
1:A:111:ILE:HG12	1:A:120:HIS:HB2	1.93	0.50
1:D:73:ARG:NH2	1:D:91:SER:O	2.43	0.50
1:J:102:GLN:NE2	1:J:127:ASP:OD1	2.45	0.50
1:D:228:ASP:HB3	1:D:230:THR:H	1.76	0.50
1:B:66:LEU:O	1:B:71:ARG:NH1	2.43	0.50
1:J:105:ARG:HB2	1:J:128:ILE:HD13	1.93	0.50
1:A:33:ASP:HA	1:A:120:HIS:HA	1.93	0.49
1:G:145:LEU:HD13	3:H:301:GOL:H11	1.93	0.49
1:B:51:ILE:HB	1:B:65:ARG:HD2	1.94	0.49
1:A:75:GLU:HA	1:A:78:ILE:HG12	1.94	0.49
1:E:58:SER:HB3	1:E:61:LEU:HG	1.93	0.49
1:E:228:ASP:OD1	1:E:228:ASP:N	2.43	0.49
1:G:220:ARG:HH21	2:G:601:HEM:HBA2	1.78	0.49
3:E:602:GOL:H32	1:F:145:LEU:HD13	1.95	0.49
1:E:131:GLU:OE1	1:E:131:GLU:N	2.44	0.49
1:A:25:PHE:HB2	1:A:44:THR:HG21	1.95	0.48
1:H:193:PRO:HD3	1:H:225:LYS:HB2	1.94	0.48
1:A:34:LEU:N	1:A:119:ARG:O	2.45	0.48
1:H:33:ASP:OD1	1:H:33:ASP:N	2.45	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:J:112:ARG:HE	1:J:118:ALA:HB2	1.78	0.48
1:G:64:SER:HA	1:G:71:ARG:HH21	1.78	0.48
1:G:155:ALA:HB3	1:G:253:VAL:HB	1.95	0.48
1:J:189:ASN:HB2	1:J:197:ARG:HG3	1.96	0.48
1:F:54:ASP:N	1:F:54:ASP:OD1	2.47	0.48
1:I:33:ASP:OD1	1:I:33:ASP:N	2.42	0.48
1:B:32:LEU:HD13	1:B:39:LEU:HD12	1.96	0.48
1:E:273:LEU:HD22	1:F:273:LEU:HD11	1.96	0.48
1:H:270:GLN:HG3	1:H:273:LEU:HD12	1.96	0.48
2:B:303:HEM:HBB2	2:B:303:HEM:HHC	1.96	0.47
1:B:246:GLU:HG3	1:B:247:PRO:HD2	1.96	0.47
1:H:32:LEU:HB3	1:H:39:LEU:HG	1.96	0.47
1:C:146:ARG:HH11	1:G:146:ARG:HH22	1.61	0.47
1:G:200:HIS:HA	1:G:203:TYR:CD2	2.49	0.47
1:H:155:ALA:HB3	1:H:253:VAL:HB	1.96	0.47
1:C:30:TRP:CH2	1:C:108:ALA:HB2	2.50	0.47
1:H:131:GLU:HA	1:H:134:VAL:HG12	1.97	0.47
1:J:88:PHE:HD2	1:J:108:ALA:HB3	1.79	0.47
2:J:302:HEM:HHC	2:J:302:HEM:HBB2	1.97	0.47
1:A:41:TRP:NE1	1:A:46:ARG:HB3	2.29	0.47
1:F:246:GLU:HG3	1:F:247:PRO:HD2	1.97	0.47
1:H:105:ARG:HE	1:H:107:ARG:HD2	1.79	0.47
1:B:105:ARG:HB2	1:B:128:ILE:HD13	1.96	0.47
1:I:29:THR:H	1:I:42:SER:HB3	1.78	0.47
1:C:103:TRP:HB3	1:C:128:ILE:HG13	1.98	0.46
1:E:192:MET:HB3	2:E:601:HEM:CAB	2.45	0.46
1:H:63:LEU:HB3	1:H:71:ARG:HD3	1.98	0.46
1:F:260:GLN:HA	1:F:263:GLN:HB3	1.98	0.46
1:B:63:LEU:HD13	1:B:71:ARG:HG2	1.97	0.46
1:H:222:VAL:HB	2:H:302:HEM:HMB3	1.98	0.46
1:E:146:ARG:HH11	1:I:146:ARG:NH2	2.15	0.45
1:I:27:VAL:HG22	1:J:107:ARG:HH21	1.81	0.45
1:I:200:HIS:HA	1:I:203:TYR:CD2	2.51	0.45
1:E:33:ASP:HA	1:E:120:HIS:HA	1.98	0.45
1:G:131:GLU:OE1	1:G:131:GLU:N	2.44	0.45
1:J:113:ASP:OD1	1:J:114:GLU:N	2.47	0.45
1:D:32:LEU:HD11	1:D:59:TYR:CD1	2.52	0.45
1:D:53:GLN:HG2	1:D:54:ASP:H	1.81	0.45
1:A:32:LEU:HD13	1:A:39:LEU:HD12	1.99	0.45
1:A:174:ARG:HE	1:A:174:ARG:HB2	1.52	0.45
1:J:103:TRP:CD2	1:J:132:LYS:HG3	2.52	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:63:LEU:O	1:A:71:ARG:NH1	2.50	0.45
1:G:60:ASP:OD1	1:G:60:ASP:N	2.43	0.45
1:B:145:LEU:HD13	3:B:302:GOL:H32	1.99	0.45
1:E:155:ALA:HB3	1:E:253:VAL:HB	1.98	0.44
1:H:192:MET:HE3	1:H:196:ASP:HB3	1.98	0.44
1:B:78:ILE:HA	1:B:81:VAL:HG12	1.98	0.44
1:I:154:ASP:CG	1:I:254:ARG:HE	2.21	0.44
1:C:78:ILE:HA	1:C:81:VAL:HG12	1.99	0.44
1:F:30:TRP:HA	1:F:41:TRP:HA	1.98	0.44
1:A:103:TRP:HB3	1:A:128:ILE:HG13	2.00	0.44
1:E:200:HIS:HA	1:E:203:TYR:CD2	2.52	0.44
1:G:78:ILE:HA	1:G:81:VAL:HG12	1.99	0.44
1:G:252:PHE:CE1	1:H:151:THR:HG23	2.51	0.44
1:C:29:THR:HG22	1:C:124:ILE:HG22	2.00	0.43
1:C:64:SER:HA	1:C:71:ARG:HH21	1.82	0.43
1:C:67:GLU:HG2	1:C:68:PRO:HD2	2.00	0.43
1:I:113:ASP:OD2	1:I:119:ARG:NH2	2.50	0.43
1:A:254:ARG:HE	1:A:254:ARG:HB2	1.50	0.43
1:C:41:TRP:HZ3	1:C:62:PHE:HB2	1.83	0.43
1:D:54:ASP:N	1:D:54:ASP:OD1	2.51	0.43
1:A:88:PHE:HD2	1:A:108:ALA:HB3	1.84	0.43
1:D:103:TRP:HB3	1:D:128:ILE:HG13	2.01	0.43
1:G:262:THR:HG23	1:H:266:LEU:HD12	2.00	0.43
1:A:33:ASP:OD1	1:A:33:ASP:N	2.44	0.43
1:A:89:ASP:HA	1:A:106:ALA:O	2.18	0.42
1:B:41:TRP:HZ3	1:B:62:PHE:HB2	1.83	0.42
1:B:103:TRP:HB3	1:B:128:ILE:HG13	2.01	0.42
1:B:155:ALA:HB3	1:B:253:VAL:HB	2.00	0.42
1:C:220:ARG:HD2	1:C:222:VAL:HG12	2.01	0.42
1:D:225:LYS:HE2	1:D:225:LYS:HB3	1.89	0.42
1:D:173:GLU:HG2	1:D:179:SER:HA	2.01	0.42
1:H:145:LEU:O	1:H:149:LEU:HD12	2.19	0.42
1:E:63:LEU:HA	1:E:71:ARG:HH21	1.85	0.42
1:F:273:LEU:HD23	1:F:273:LEU:HA	1.91	0.42
1:I:112:ARG:HG2	1:I:118:ALA:HA	2.01	0.42
1:E:192:MET:HB3	2:E:601:HEM:HAB	2.01	0.42
1:G:145:LEU:HB2	3:H:301:GOL:H2	2.01	0.42
1:E:65:ARG:HD2	1:E:65:ARG:HA	1.47	0.42
1:F:110:LEU:H	1:F:110:LEU:HD23	1.85	0.42
1:E:189:ASN:HA	1:E:192:MET:HE3	2.02	0.42
1:A:173:GLU:OE2	1:A:180:GLU:N	2.48	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:H:192:MET:HE1	1:H:200:HIS:CD2	2.55	0.41
1:I:68:PRO:HA	1:I:71:ARG:HG2	2.01	0.41
1:I:132:LYS:HA	1:I:132:LYS:HD2	1.89	0.41
1:D:93:ARG:HE	1:D:101:GLY:HA3	1.85	0.41
1:E:68:PRO:HA	1:E:71:ARG:HB2	2.03	0.41
1:H:41:TRP:CZ3	1:H:46:ARG:HB2	2.55	0.41
1:I:51:ILE:HD12	1:I:51:ILE:HA	1.98	0.41
1:A:235:HIS:HB2	1:A:256:LEU:HD21	2.02	0.41
1:D:78:ILE:O	1:D:81:VAL:HG22	2.21	0.41
1:E:176:PHE:CE2	1:E:191:LEU:HB3	2.56	0.41
1:H:93:ARG:HD2	1:H:101:GLY:HA3	2.01	0.41
1:I:176:PHE:CG	1:I:191:LEU:HD22	2.56	0.41
1:A:272:GLU:HB3	1:B:273:LEU:HD21	2.03	0.41
1:C:51:ILE:HD12	1:C:51:ILE:HA	1.94	0.41
1:C:144:HIS:CE1	1:C:148:ILE:HD11	2.56	0.41
1:A:119:ARG:HD3	1:A:120:HIS:CE1	2.56	0.41
1:C:29:THR:O	1:C:42:SER:N	2.50	0.41
1:C:266:LEU:O	1:C:270:GLN:HG2	2.21	0.41
1:C:221:ILE:O	1:C:222:VAL:HG22	2.21	0.41
1:H:269:LEU:HD23	1:H:269:LEU:HA	1.91	0.41
1:G:89:ASP:HA	1:G:106:ALA:O	2.21	0.40
1:E:226:ARG:HB2	1:E:230:THR:HG23	2.02	0.40
1:J:234:MET:HB2	1:J:253:VAL:HG13	2.04	0.40
1:H:89:ASP:HA	1:H:106:ALA:O	2.21	0.40
1:H:103:TRP:HB3	1:H:128:ILE:HG13	2.04	0.40
1:J:112:ARG:HG2	1:J:118:ALA:HA	2.03	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	249/273 (91%)	243 (98%)	6 (2%)	0	100	100
1	B	252/273 (92%)	246 (98%)	6 (2%)	0	100	100
1	C	250/273 (92%)	240 (96%)	9 (4%)	1 (0%)	34	69
1	D	249/273 (91%)	246 (99%)	3 (1%)	0	100	100
1	E	248/273 (91%)	243 (98%)	5 (2%)	0	100	100
1	F	247/273 (90%)	239 (97%)	8 (3%)	0	100	100
1	G	248/273 (91%)	243 (98%)	5 (2%)	0	100	100
1	H	248/273 (91%)	243 (98%)	5 (2%)	0	100	100
1	I	247/273 (90%)	241 (98%)	6 (2%)	0	100	100
1	J	248/273 (91%)	238 (96%)	10 (4%)	0	100	100
All	All	2486/2730 (91%)	2422 (97%)	63 (2%)	1 (0%)	100	100

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	C	222	VAL

### 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	210/228 (92%)	202 (96%)	8 (4%)	33	66
1	B	212/228 (93%)	202 (95%)	10 (5%)	26	59
1	C	210/228 (92%)	202 (96%)	8 (4%)	33	66
1	D	210/228 (92%)	204 (97%)	6 (3%)	42	73
1	E	209/228 (92%)	197 (94%)	12 (6%)	20	52
1	F	209/228 (92%)	200 (96%)	9 (4%)	29	62
1	G	209/228 (92%)	194 (93%)	15 (7%)	14	42
1	H	209/228 (92%)	201 (96%)	8 (4%)	33	66
1	I	208/228 (91%)	202 (97%)	6 (3%)	42	73

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
1	J	209/228 (92%)	201 (96%)	8 (4%)	33 66
All	All	2095/2280 (92%)	2005 (96%)	90 (4%)	29 62

All (90) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	36	THR
1	A	43	ASP
1	A	49	LEU
1	A	81	VAL
1	A	88	PHE
1	A	111	ILE
1	A	206	ARG
1	A	256	LEU
1	B	36	THR
1	B	41	TRP
1	B	54	ASP
1	B	63	LEU
1	B	73	ARG
1	B	84	ARG
1	B	121	LEU
1	B	180	GLU
1	B	188	VAL
1	B	211	SER
1	C	25	PHE
1	C	32	LEU
1	C	41	TRP
1	C	71	ARG
1	C	83	GLU
1	C	121	LEU
1	C	180	GLU
1	C	211	SER
1	D	25	PHE
1	D	32	LEU
1	D	36	THR
1	D	71	ARG
1	D	174	ARG
1	D	218	ILE
1	E	25	PHE
1	E	36	THR
1	E	49	LEU
1	E	59	TYR

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
1	E	65	ARG
1	E	73	ARG
1	E	84	ARG
1	E	92	PHE
1	E	206	ARG
1	E	208	ARG
1	E	228	ASP
1	E	230	THR
1	F	34	LEU
1	F	36	THR
1	F	41	TRP
1	F	49	LEU
1	F	84	ARG
1	F	97	THR
1	F	133	GLN
1	F	220	ARG
1	F	228	ASP
1	G	31	ASP
1	G	32	LEU
1	G	36	THR
1	G	41	TRP
1	G	43	ASP
1	G	46	ARG
1	G	72	GLU
1	G	94	VAL
1	G	114	GLU
1	G	119	ARG
1	G	120	HIS
1	G	121	LEU
1	G	220	ARG
1	G	222	VAL
1	G	256	LEU
1	H	27	VAL
1	H	33	ASP
1	H	36	THR
1	H	75	GLU
1	H	78	ILE
1	H	149	LEU
1	H	218	ILE
1	H	220	ARG
1	I	33	ASP
1	I	36	THR

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Mol	Chain	Res	Type
1	I	41	TRP
1	I	92	PHE
1	I	121	LEU
1	I	230	THR
1	J	33	ASP
1	J	36	THR
1	J	41	TRP
1	J	83	GLU
1	J	225	LYS
1	J	237	SER
1	J	246	GLU
1	J	269	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (1) such sidechains are listed below:

Mol	Chain	Res	Type
1	C	102	GLN

### 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](#)

25 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	GOL	G	602	-	5,5,5	0.95	0	5,5,5	0.93	0
2	HEM	H	302	1	41,50,50	1.47	4 (9%)	45,82,82	1.58	10 (22%)
3	GOL	I	603	-	5,5,5	0.94	0	5,5,5	0.94	0
2	HEM	J	302	1	41,50,50	1.56	7 (17%)	45,82,82	1.57	9 (20%)
3	GOL	J	301	-	5,5,5	0.87	0	5,5,5	0.96	0
3	GOL	I	602	-	5,5,5	1.13	0	5,5,5	0.97	0
3	GOL	B	302	-	5,5,5	0.93	0	5,5,5	1.01	0
2	HEM	E	601	1	41,50,50	1.48	4 (9%)	45,82,82	1.63	10 (22%)
2	HEM	D	303	1	41,50,50	1.43	4 (9%)	45,82,82	1.42	5 (11%)
2	HEM	A	601	1	41,50,50	1.44	5 (12%)	45,82,82	1.43	5 (11%)
3	GOL	F	301	-	5,5,5	0.79	0	5,5,5	1.09	1 (20%)
2	HEM	B	303	1	41,50,50	1.52	6 (14%)	45,82,82	1.56	11 (24%)
3	GOL	A	602	-	5,5,5	0.73	0	5,5,5	1.21	1 (20%)
3	GOL	E	603	-	5,5,5	1.30	1 (20%)	5,5,5	0.75	0
3	GOL	E	602	-	5,5,5	1.03	0	5,5,5	0.93	0
3	GOL	H	301	-	5,5,5	1.03	0	5,5,5	0.97	0
3	GOL	D	302	-	5,5,5	0.99	0	5,5,5	1.03	0
3	GOL	G	603	-	5,5,5	0.87	0	5,5,5	1.13	0
2	HEM	C	601	1	41,50,50	1.44	5 (12%)	45,82,82	1.55	9 (20%)
2	HEM	F	302	1	41,50,50	1.49	6 (14%)	45,82,82	1.60	9 (20%)
3	GOL	D	301	-	5,5,5	1.02	0	5,5,5	1.11	0
3	GOL	C	602	-	5,5,5	0.96	0	5,5,5	0.95	0
3	GOL	B	301	-	5,5,5	0.78	0	5,5,5	1.09	0
2	HEM	I	601	1	41,50,50	1.51	6 (14%)	45,82,82	1.51	9 (20%)
2	HEM	G	601	1	41,50,50	1.50	5 (12%)	45,82,82	1.51	8 (17%)

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	GOL	G	602	-	-	1/4/4/4	-
2	HEM	H	302	1	-	3/12/54/54	-
3	GOL	I	603	-	-	2/4/4/4	-
2	HEM	J	302	1	-	4/12/54/54	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	GOL	J	301	-	-	2/4/4/4	-
3	GOL	I	602	-	-	1/4/4/4	-
3	GOL	B	302	-	-	0/4/4/4	-
2	HEM	E	601	1	-	4/12/54/54	-
2	HEM	D	303	1	-	1/12/54/54	-
2	HEM	A	601	1	-	4/12/54/54	-
3	GOL	F	301	-	-	2/4/4/4	-
2	HEM	B	303	1	-	4/12/54/54	-
3	GOL	A	602	-	-	4/4/4/4	-
3	GOL	E	603	-	-	0/4/4/4	-
3	GOL	E	602	-	-	0/4/4/4	-
3	GOL	H	301	-	-	2/4/4/4	-
3	GOL	D	302	-	-	2/4/4/4	-
3	GOL	G	603	-	-	2/4/4/4	-
2	HEM	C	601	1	-	5/12/54/54	-
2	HEM	F	302	1	-	3/12/54/54	-
3	GOL	D	301	-	-	0/4/4/4	-
3	GOL	C	602	-	-	2/4/4/4	-
3	GOL	B	301	-	-	4/4/4/4	-
2	HEM	I	601	1	-	1/12/54/54	-
2	HEM	G	601	1	-	2/12/54/54	-

All (53) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	J	302	HEM	C3C-C2C	-4.10	1.34	1.40
2	B	303	HEM	C3C-CAC	4.08	1.56	1.47
2	F	302	HEM	C3C-CAC	4.05	1.56	1.47
2	H	302	HEM	C3C-CAC	4.01	1.56	1.47
2	E	601	HEM	C3C-CAC	3.98	1.56	1.47
2	C	601	HEM	C3C-CAC	3.92	1.55	1.47
2	I	601	HEM	C3C-CAC	3.90	1.55	1.47
2	D	303	HEM	C3C-CAC	3.67	1.55	1.47
2	D	303	HEM	C3C-C2C	-3.67	1.35	1.40
2	H	302	HEM	C3C-C2C	-3.67	1.35	1.40
2	G	601	HEM	C3C-CAC	3.66	1.55	1.47
2	E	601	HEM	C3C-C2C	-3.63	1.35	1.40
2	G	601	HEM	C3C-C2C	-3.63	1.35	1.40
2	J	302	HEM	C3C-CAC	3.62	1.55	1.47

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	F	302	HEM	C3C-C2C	-3.62	1.35	1.40
2	A	601	HEM	C3C-CAC	3.61	1.55	1.47
2	I	601	HEM	C3C-C2C	-3.58	1.35	1.40
2	A	601	HEM	C3C-C2C	-3.53	1.35	1.40
2	B	303	HEM	C3C-C2C	-3.52	1.35	1.40
2	C	601	HEM	C3C-C2C	-3.42	1.35	1.40
2	J	302	HEM	FE-NB	3.01	2.11	1.96
2	I	601	HEM	CAB-C3B	2.98	1.55	1.47
2	C	601	HEM	CAB-C3B	2.97	1.55	1.47
2	D	303	HEM	CAB-C3B	2.96	1.55	1.47
2	G	601	HEM	CAB-C3B	2.95	1.55	1.47
2	J	302	HEM	CAB-C3B	2.90	1.55	1.47
2	B	303	HEM	CAB-C3B	2.88	1.55	1.47
2	H	302	HEM	CAB-C3B	2.82	1.55	1.47
2	B	303	HEM	FE-NB	2.77	2.10	1.96
2	A	601	HEM	CAB-C3B	2.77	1.55	1.47
2	E	601	HEM	CAB-C3B	2.74	1.54	1.47
2	F	302	HEM	CAB-C3B	2.66	1.54	1.47
2	I	601	HEM	FE-ND	2.54	2.09	1.96
2	G	601	HEM	FE-NB	2.53	2.09	1.96
2	J	302	HEM	CAA-C2A	2.40	1.55	1.52
2	F	302	HEM	CAA-C2A	2.33	1.55	1.52
2	J	302	HEM	FE-ND	2.30	2.08	1.96
2	E	601	HEM	CMD-C2D	2.26	1.55	1.50
2	F	302	HEM	FE-NB	2.25	2.08	1.96
2	A	601	HEM	CAA-C2A	2.24	1.55	1.52
2	H	302	HEM	FE-NB	2.21	2.07	1.96
2	C	601	HEM	CAA-C2A	2.21	1.55	1.52
2	I	601	HEM	CAA-C2A	2.19	1.55	1.52
3	E	603	GOL	C3-C2	2.18	1.60	1.51
2	B	303	HEM	CAA-C2A	2.16	1.55	1.52
2	F	302	HEM	CMD-C2D	2.13	1.55	1.50
2	C	601	HEM	CMB-C2B	2.11	1.55	1.50
2	J	302	HEM	CMD-C2D	2.10	1.55	1.50
2	A	601	HEM	CAD-C3D	2.09	1.56	1.51
2	D	303	HEM	CAA-C2A	2.05	1.55	1.52
2	I	601	HEM	CMD-C2D	2.02	1.55	1.50
2	G	601	HEM	CMD-C2D	2.01	1.55	1.50
2	B	303	HEM	CMD-C2D	2.01	1.55	1.50

All (87) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	E	601	HEM	CBA-CAA-C2A	-5.20	103.74	112.62
2	G	601	HEM	C4B-CHC-C1C	3.92	127.74	122.56
2	F	302	HEM	CMA-C3A-C4A	-3.69	122.79	128.46
2	C	601	HEM	CMA-C3A-C4A	-3.49	123.10	128.46
2	D	303	HEM	CMA-C3A-C4A	-3.47	123.13	128.46
2	B	303	HEM	CMA-C3A-C4A	-3.47	123.13	128.46
2	A	601	HEM	C3B-C2B-C1B	3.44	109.04	106.49
2	G	601	HEM	CMC-C2C-C3C	3.40	131.04	124.68
2	A	601	HEM	C4B-CHC-C1C	3.29	126.90	122.56
2	H	302	HEM	C4B-CHC-C1C	3.28	126.89	122.56
2	D	303	HEM	C3B-C2B-C1B	3.27	108.91	106.49
2	I	601	HEM	C4B-CHC-C1C	3.24	126.84	122.56
2	J	302	HEM	CMC-C2C-C3C	3.23	130.72	124.68
2	B	303	HEM	CHC-C4B-C3B	3.22	129.50	124.57
2	J	302	HEM	C1B-NB-C4B	3.12	108.29	105.07
2	J	302	HEM	C3B-C2B-C1B	3.11	108.80	106.49
2	F	302	HEM	CMC-C2C-C3C	3.09	130.47	124.68
2	H	302	HEM	C3B-C2B-C1B	3.09	108.78	106.49
2	J	302	HEM	CMA-C3A-C4A	-3.09	123.71	128.46
2	E	601	HEM	C4B-CHC-C1C	3.08	126.62	122.56
2	I	601	HEM	C1B-NB-C4B	3.08	108.25	105.07
2	F	302	HEM	C4C-CHD-C1D	3.06	126.60	122.56
2	A	601	HEM	CMC-C2C-C3C	3.04	130.37	124.68
2	F	302	HEM	C4B-CHC-C1C	3.04	126.56	122.56
2	C	601	HEM	CMC-C2C-C3C	3.03	130.34	124.68
2	H	302	HEM	C4D-ND-C1D	2.99	108.17	105.07
2	D	303	HEM	CMC-C2C-C3C	2.97	130.23	124.68
2	H	302	HEM	C1B-NB-C4B	2.97	108.14	105.07
2	B	303	HEM	CMC-C2C-C3C	2.96	130.22	124.68
2	E	601	HEM	CMC-C2C-C3C	2.94	130.18	124.68
2	G	601	HEM	CHC-C4B-C3B	2.92	129.04	124.57
2	E	601	HEM	C3B-C2B-C1B	2.92	108.65	106.49
2	B	303	HEM	C3B-C2B-C1B	2.91	108.65	106.49
2	I	601	HEM	C3B-C2B-C1B	2.88	108.62	106.49
2	C	601	HEM	CHC-C4B-C3B	2.88	128.97	124.57
2	J	302	HEM	C4C-CHD-C1D	2.83	126.29	122.56
2	E	601	HEM	C4C-CHD-C1D	2.82	126.27	122.56
2	F	302	HEM	C4D-ND-C1D	2.79	107.95	105.07
2	J	302	HEM	CHC-C4B-C3B	2.78	128.83	124.57
2	C	601	HEM	C1B-NB-C4B	2.74	107.90	105.07
2	I	601	HEM	CMA-C3A-C4A	-2.73	124.27	128.46
2	B	303	HEM	C1B-NB-C4B	2.68	107.84	105.07
2	H	302	HEM	CHC-C4B-C3B	2.66	128.64	124.57

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	H	302	HEM	C4C-CHD-C1D	2.66	126.07	122.56
2	A	601	HEM	CMA-C3A-C4A	-2.64	124.41	128.46
2	H	302	HEM	CAA-CBA-CGA	-2.63	106.39	113.76
2	G	601	HEM	C1B-NB-C4B	2.63	107.79	105.07
2	I	601	HEM	CHC-C4B-C3B	2.62	128.59	124.57
2	J	302	HEM	C4B-CHC-C1C	2.61	126.01	122.56
2	A	601	HEM	C1B-NB-C4B	2.60	107.76	105.07
2	E	601	HEM	CAA-CBA-CGA	-2.60	106.46	113.76
2	H	302	HEM	CMA-C3A-C4A	-2.59	124.49	128.46
2	J	302	HEM	C4D-ND-C1D	2.56	107.72	105.07
2	I	601	HEM	CAA-CBA-CGA	-2.55	106.61	113.76
2	F	302	HEM	C1B-NB-C4B	2.54	107.70	105.07
2	H	302	HEM	CMC-C2C-C3C	2.54	129.42	124.68
2	E	601	HEM	C1B-NB-C4B	2.53	107.69	105.07
2	I	601	HEM	C4C-CHD-C1D	2.52	125.88	122.56
2	F	302	HEM	CHC-C4B-C3B	2.48	128.36	124.57
2	F	302	HEM	C3B-C2B-C1B	2.47	108.32	106.49
2	C	601	HEM	C4C-CHD-C1D	2.43	125.76	122.56
2	C	601	HEM	CAA-CBA-CGA	-2.42	106.97	113.76
2	C	601	HEM	C3B-C2B-C1B	2.40	108.27	106.49
2	G	601	HEM	C3B-C2B-C1B	2.40	108.27	106.49
2	G	601	HEM	CBA-CAA-C2A	2.38	116.69	112.62
2	E	601	HEM	CHC-C4B-C3B	2.38	128.21	124.57
2	I	601	HEM	C4D-ND-C1D	2.35	107.50	105.07
2	G	601	HEM	C4D-ND-C1D	2.33	107.48	105.07
2	J	302	HEM	CAA-CBA-CGA	-2.32	107.26	113.76
2	C	601	HEM	CMA-C3A-C2A	2.31	129.31	124.94
2	B	303	HEM	CAA-CBA-CGA	-2.28	107.35	113.76
2	C	601	HEM	C4B-CHC-C1C	2.28	125.57	122.56
2	B	303	HEM	C4C-CHD-C1D	2.27	125.55	122.56
2	F	302	HEM	CMA-C3A-C2A	2.24	129.17	124.94
2	D	303	HEM	CAA-CBA-CGA	-2.20	107.60	113.76
2	D	303	HEM	C4C-CHD-C1D	2.19	125.45	122.56
2	I	601	HEM	CMC-C2C-C3C	2.18	128.76	124.68
2	G	601	HEM	C4C-CHD-C1D	2.12	125.36	122.56
2	E	601	HEM	C4D-ND-C1D	2.11	107.25	105.07
2	B	303	HEM	CMA-C3A-C2A	2.09	128.88	124.94
2	B	303	HEM	CHD-C1D-ND	2.09	126.70	124.43
2	B	303	HEM	CAB-C3B-C2B	-2.06	121.81	128.60
2	E	601	HEM	CHD-C1D-ND	2.06	126.67	124.43
2	B	303	HEM	C4B-CHC-C1C	2.05	125.27	122.56
3	A	602	GOL	C3-C2-C1	-2.03	103.83	111.70

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	H	302	HEM	CHD-C1D-ND	2.02	126.63	124.43
3	F	301	GOL	C3-C2-C1	-2.01	103.87	111.70

There are no chirality outliers.

All (55) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	602	GOL	O1-C1-C2-C3
3	B	301	GOL	C1-C2-C3-O3
3	D	302	GOL	C1-C2-C3-O3
3	F	301	GOL	O1-C1-C2-C3
3	G	603	GOL	C1-C2-C3-O3
3	H	301	GOL	C1-C2-C3-O3
3	I	603	GOL	C1-C2-C3-O3
3	J	301	GOL	O1-C1-C2-C3
3	A	602	GOL	C1-C2-C3-O3
3	B	301	GOL	O1-C1-C2-C3
3	C	602	GOL	O1-C1-C2-C3
3	G	602	GOL	C1-C2-C3-O3
3	A	602	GOL	O1-C1-C2-O2
3	D	302	GOL	O2-C2-C3-O3
3	G	603	GOL	O2-C2-C3-O3
3	I	603	GOL	O2-C2-C3-O3
3	J	301	GOL	O1-C1-C2-O2
3	B	301	GOL	O2-C2-C3-O3
3	F	301	GOL	O1-C1-C2-O2
3	H	301	GOL	O2-C2-C3-O3
2	E	601	HEM	C3D-CAD-CBD-CGD
2	F	302	HEM	C3D-CAD-CBD-CGD
2	B	303	HEM	C3D-CAD-CBD-CGD
2	C	601	HEM	C3D-CAD-CBD-CGD
2	H	302	HEM	C3D-CAD-CBD-CGD
3	A	602	GOL	O2-C2-C3-O3
3	I	602	GOL	O2-C2-C3-O3
2	A	601	HEM	C4B-C3B-CAB-CBB
2	B	303	HEM	C4B-C3B-CAB-CBB
2	C	601	HEM	C4B-C3B-CAB-CBB
2	D	303	HEM	C4B-C3B-CAB-CBB
2	E	601	HEM	C4B-C3B-CAB-CBB
2	F	302	HEM	C4B-C3B-CAB-CBB
2	G	601	HEM	C4B-C3B-CAB-CBB
2	H	302	HEM	C4B-C3B-CAB-CBB

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Mol	Chain	Res	Type	Atoms
2	I	601	HEM	C4B-C3B-CAB-CBB
2	J	302	HEM	C4B-C3B-CAB-CBB
2	C	601	HEM	C1A-C2A-CAA-CBA
3	B	301	GOL	O1-C1-C2-O2
2	G	601	HEM	C3D-CAD-CBD-CGD
2	C	601	HEM	CAA-CBA-CGA-O1A
3	C	602	GOL	O1-C1-C2-O2
2	C	601	HEM	CAA-CBA-CGA-O2A
2	J	302	HEM	C3D-CAD-CBD-CGD
2	A	601	HEM	CAD-CBD-CGD-O2D
2	H	302	HEM	CAA-CBA-CGA-O2A
2	A	601	HEM	CAA-CBA-CGA-O2A
2	B	303	HEM	CAA-CBA-CGA-O2A
2	A	601	HEM	CAD-CBD-CGD-O1D
2	B	303	HEM	CAA-CBA-CGA-O1A
2	F	302	HEM	CAA-CBA-CGA-O2A
2	J	302	HEM	CAA-CBA-CGA-O1A
2	J	302	HEM	CAA-CBA-CGA-O2A
2	E	601	HEM	CAA-CBA-CGA-O2A
2	E	601	HEM	CAA-CBA-CGA-O1A

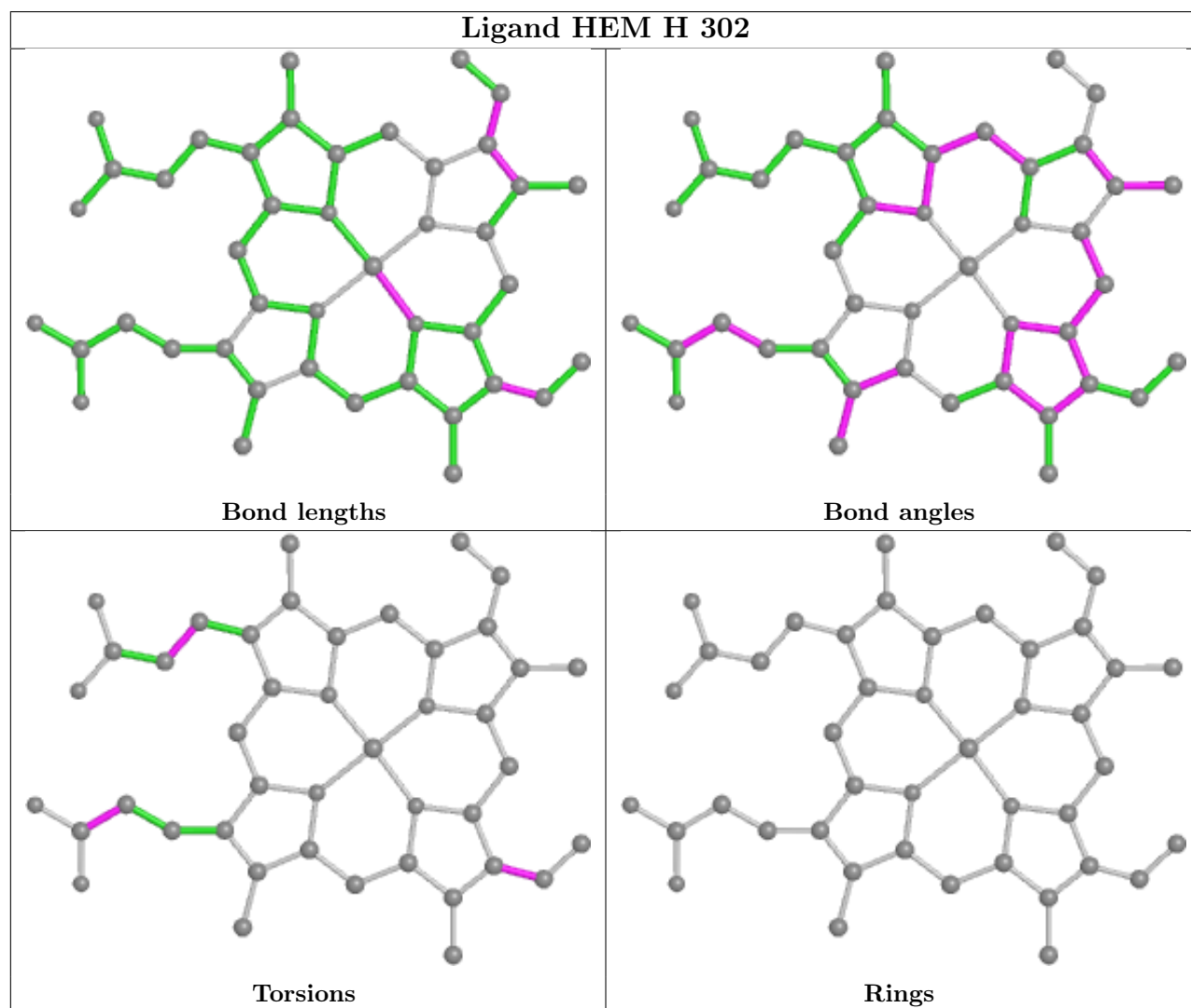
There are no ring outliers.

15 monomers are involved in 23 short contacts:

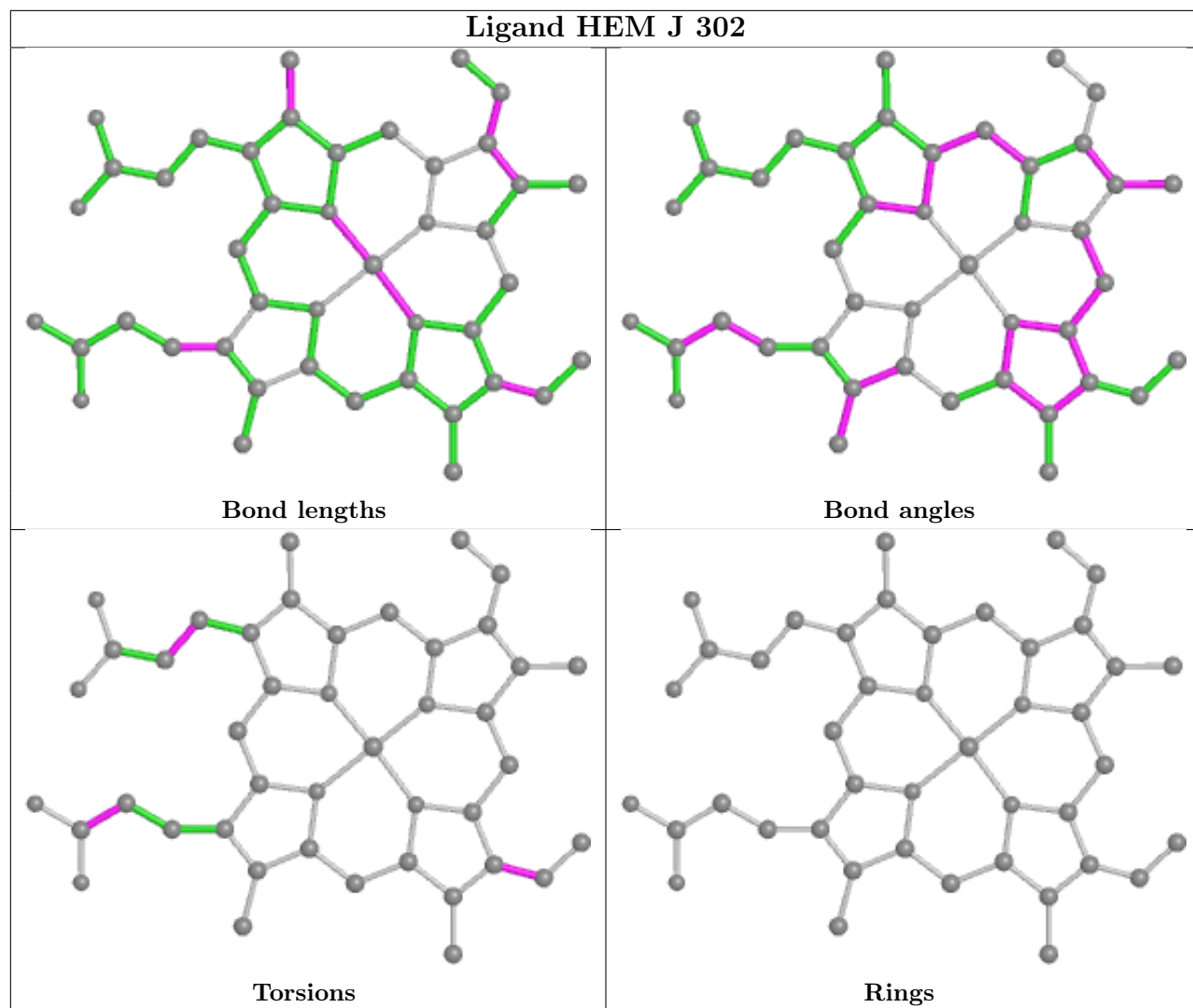
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	H	302	HEM	2	0
2	J	302	HEM	1	0
3	B	302	GOL	2	0
2	E	601	HEM	4	0
2	D	303	HEM	1	0
2	A	601	HEM	1	0
2	B	303	HEM	1	0
3	E	602	GOL	2	0
3	H	301	GOL	2	0
3	D	302	GOL	1	0
3	G	603	GOL	1	0
2	C	601	HEM	1	0
2	F	302	HEM	1	0
2	I	601	HEM	1	0
2	G	601	HEM	2	0

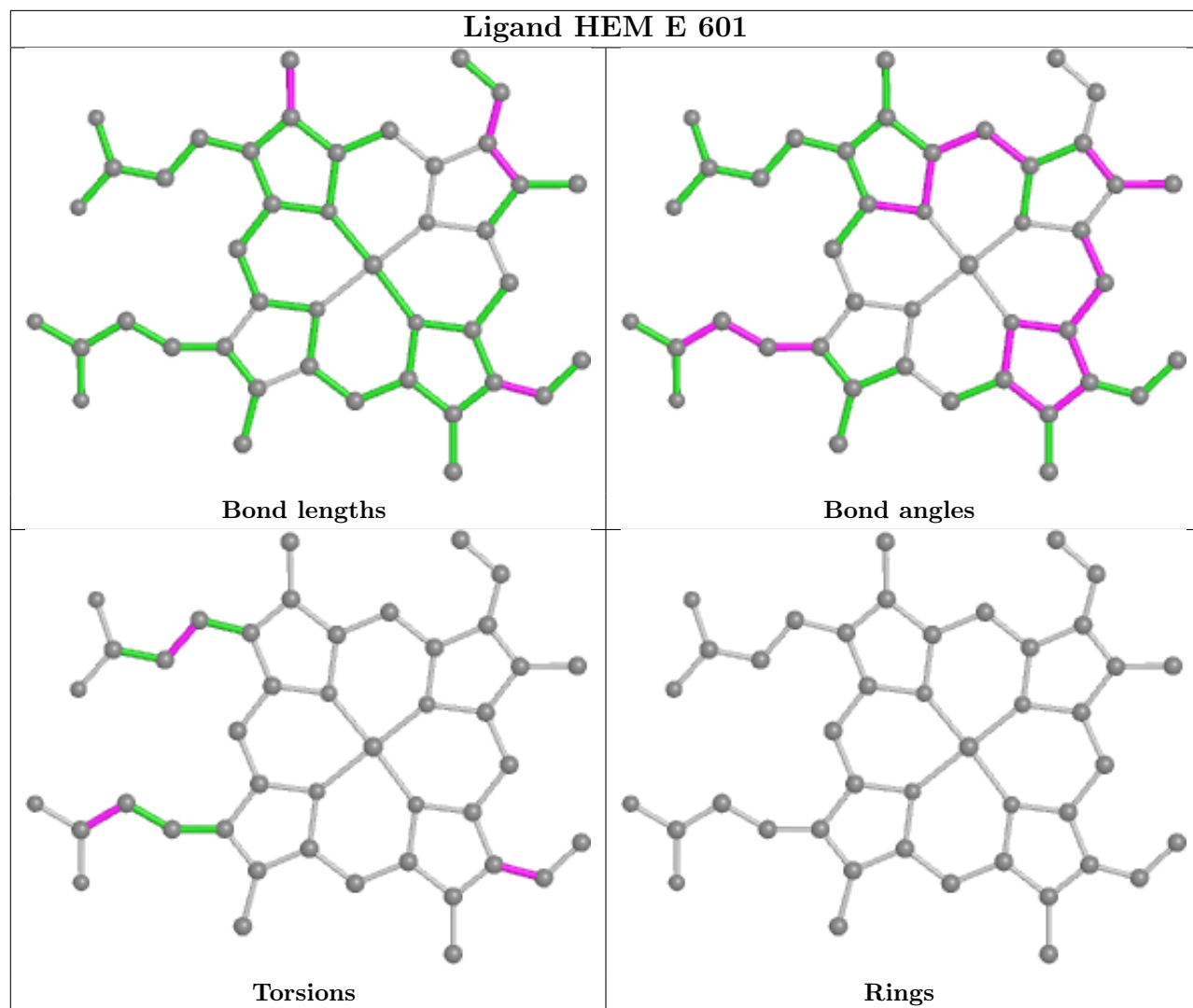
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths,

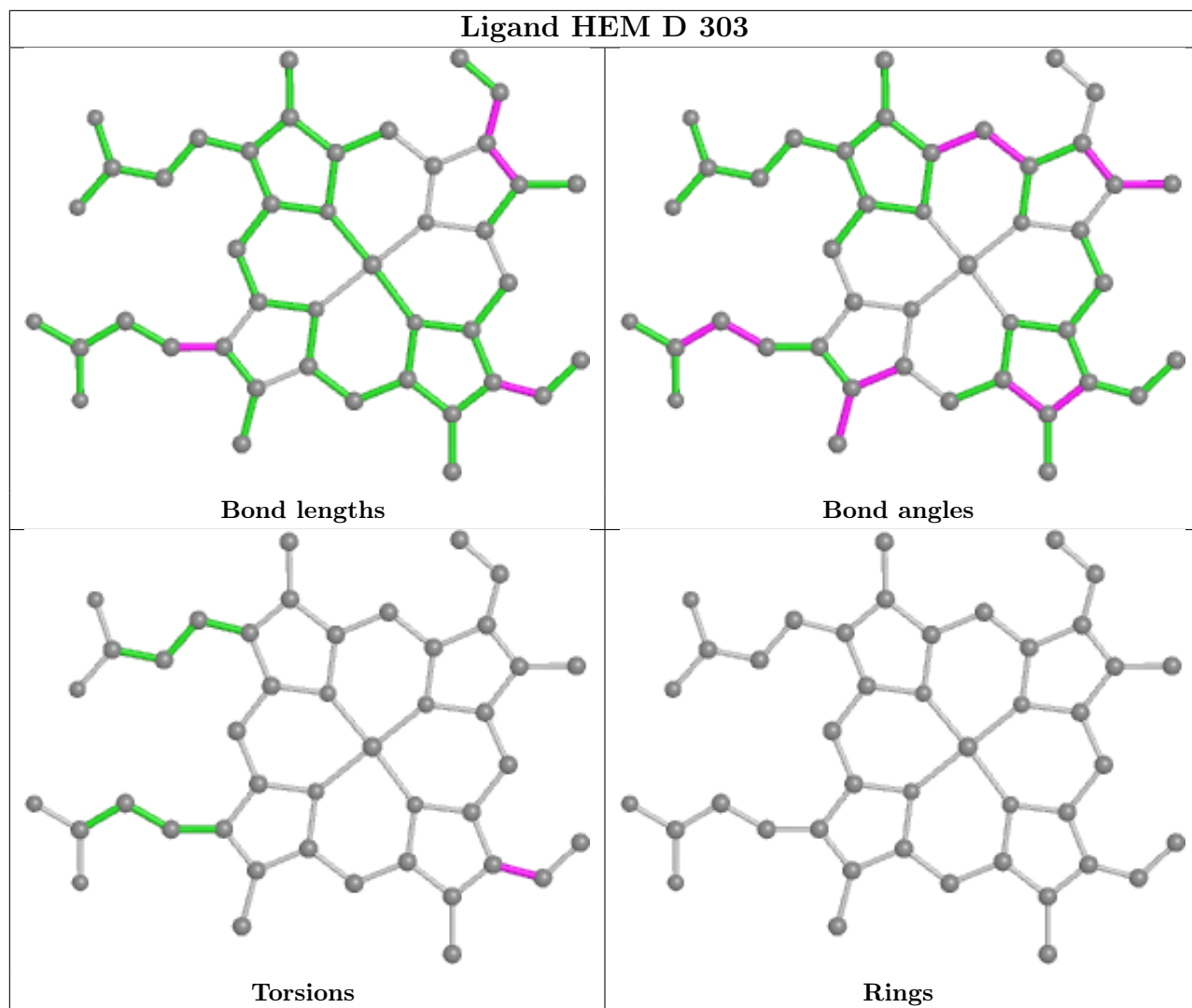
bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within 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.

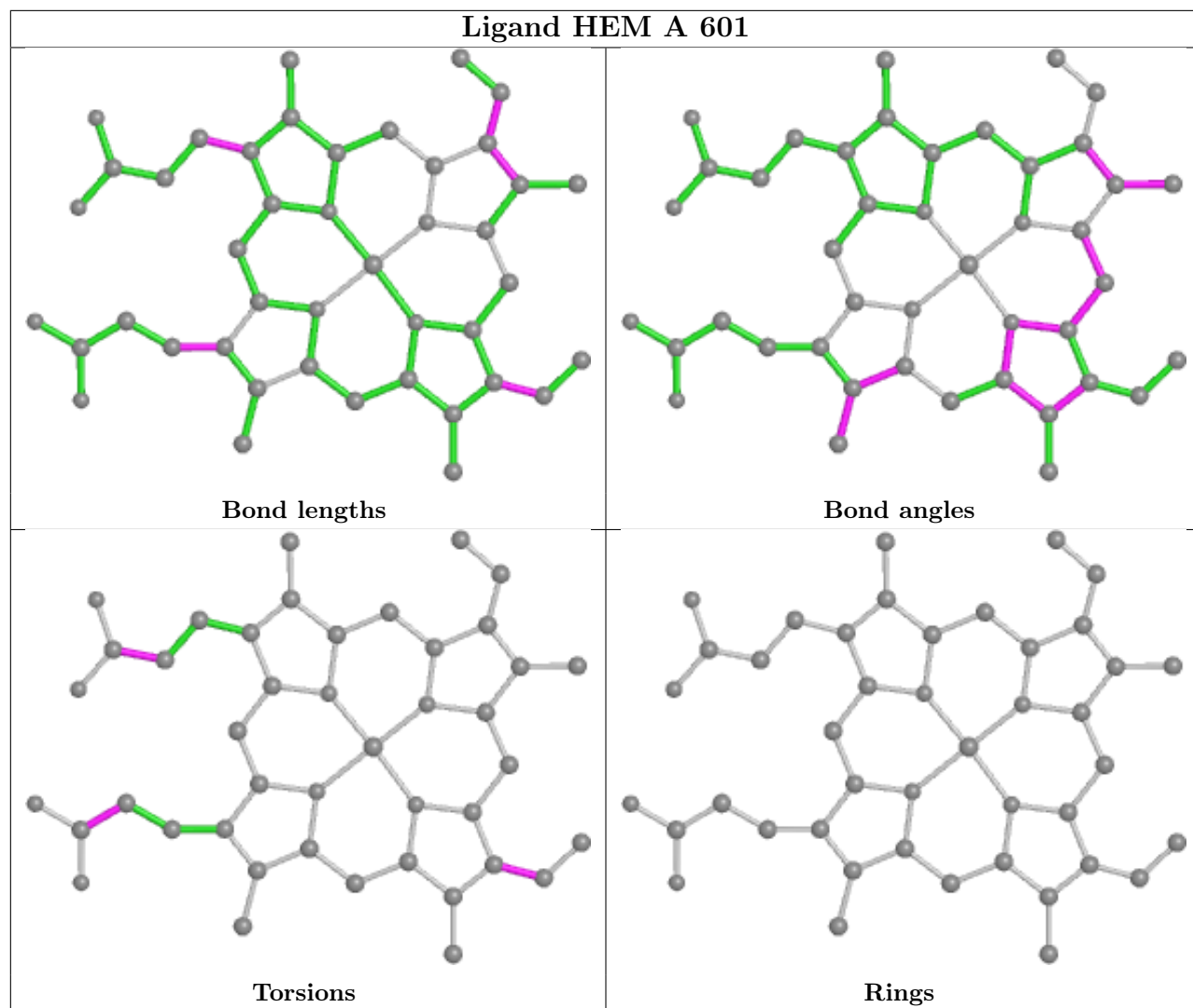


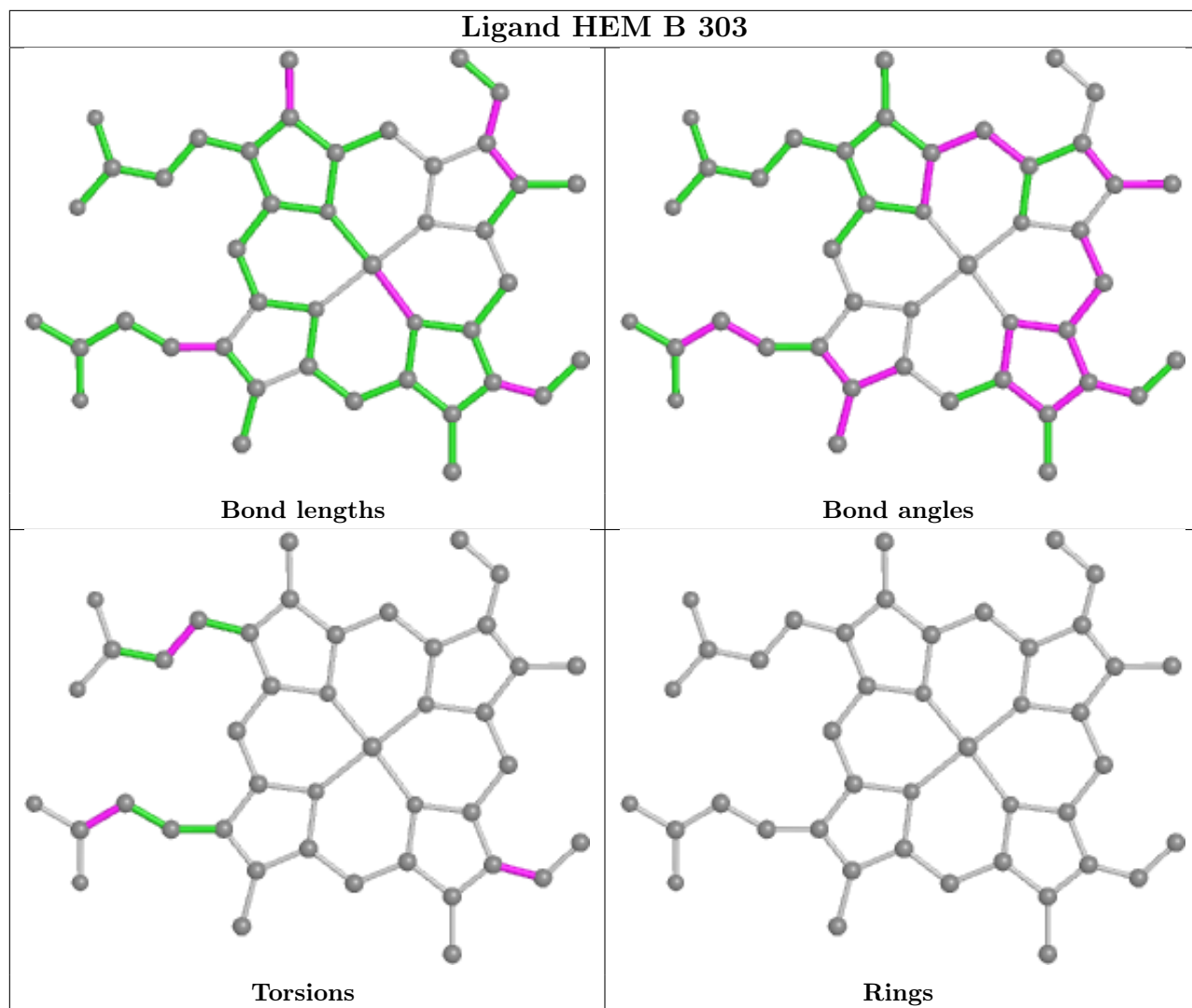


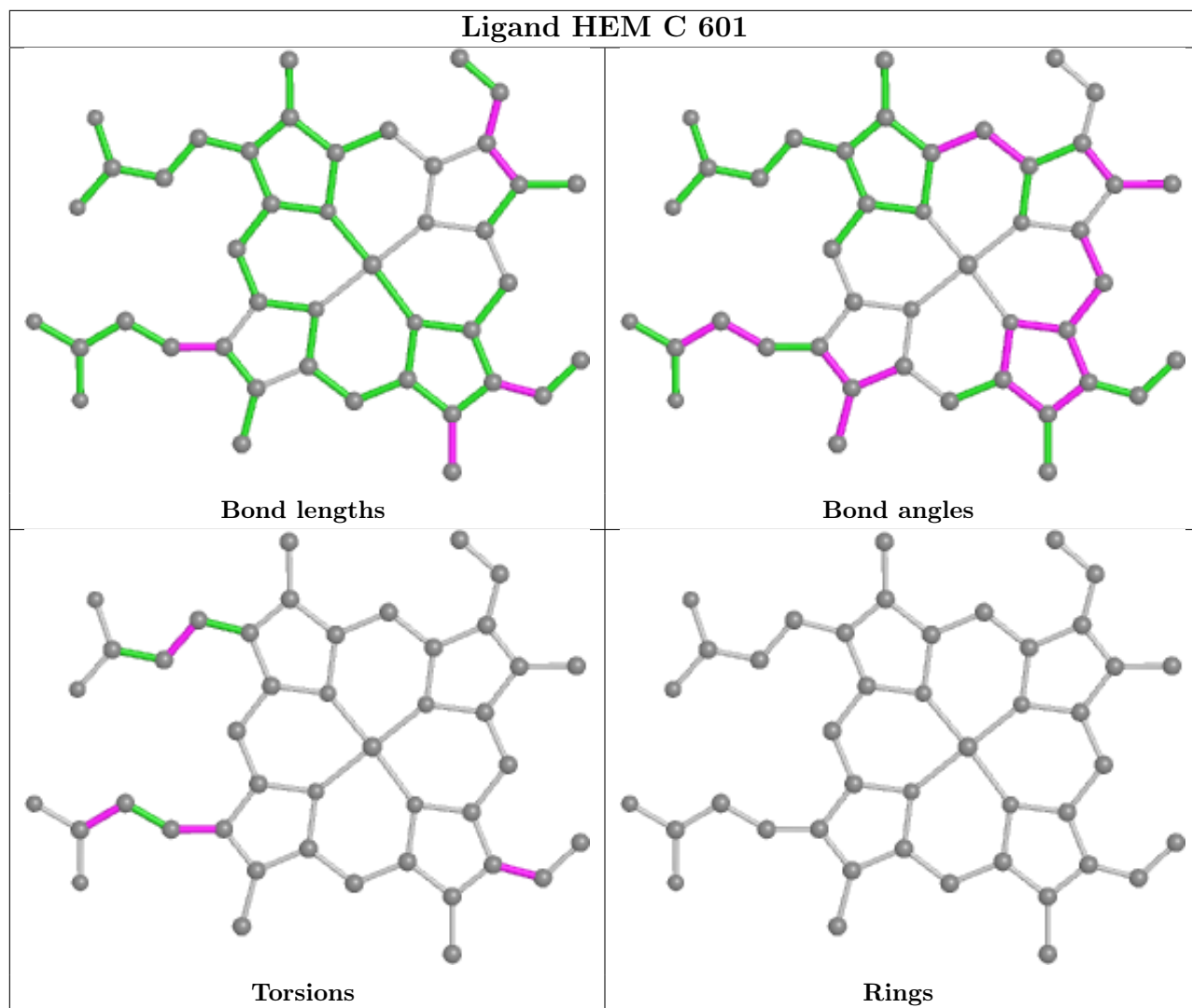


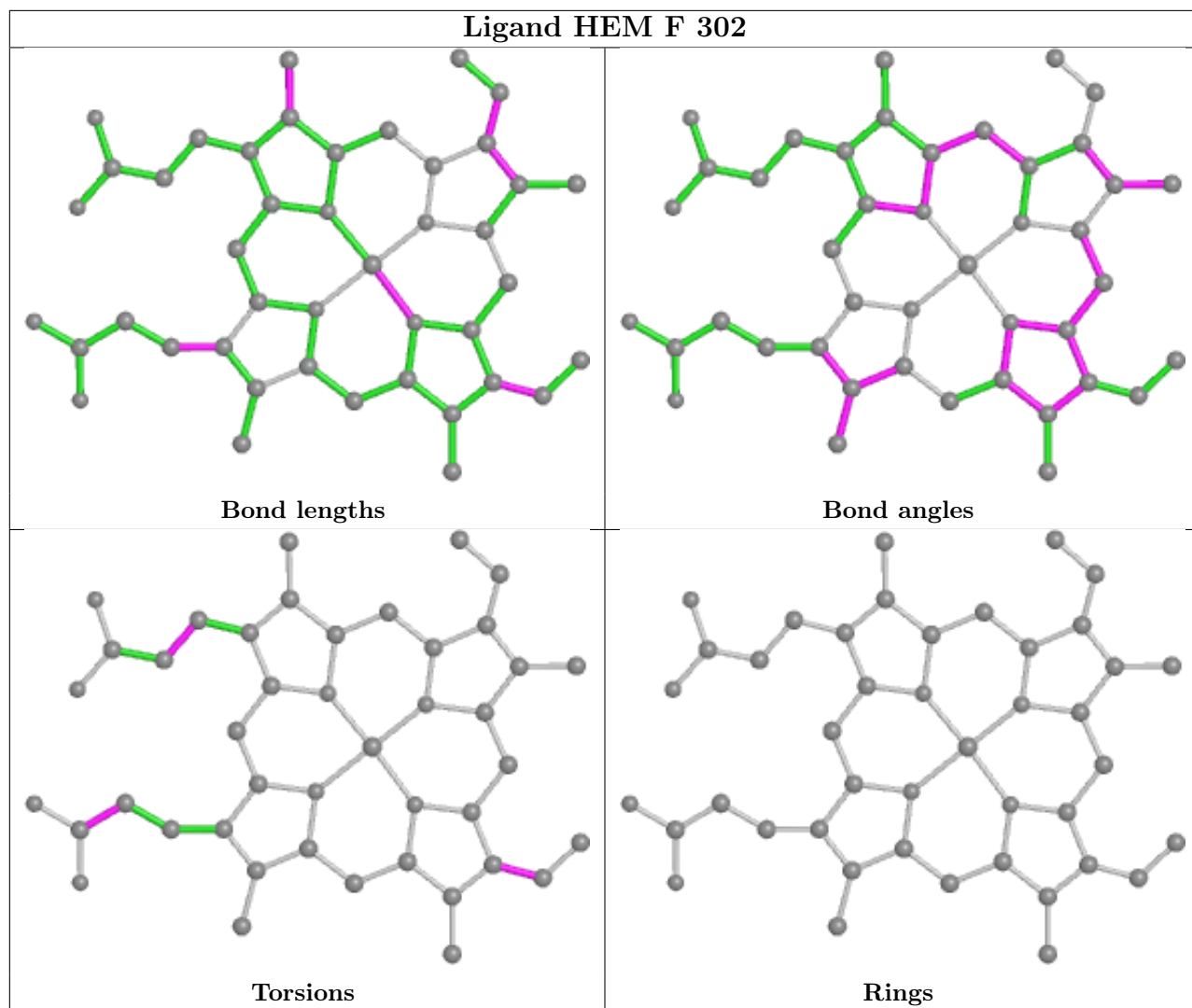


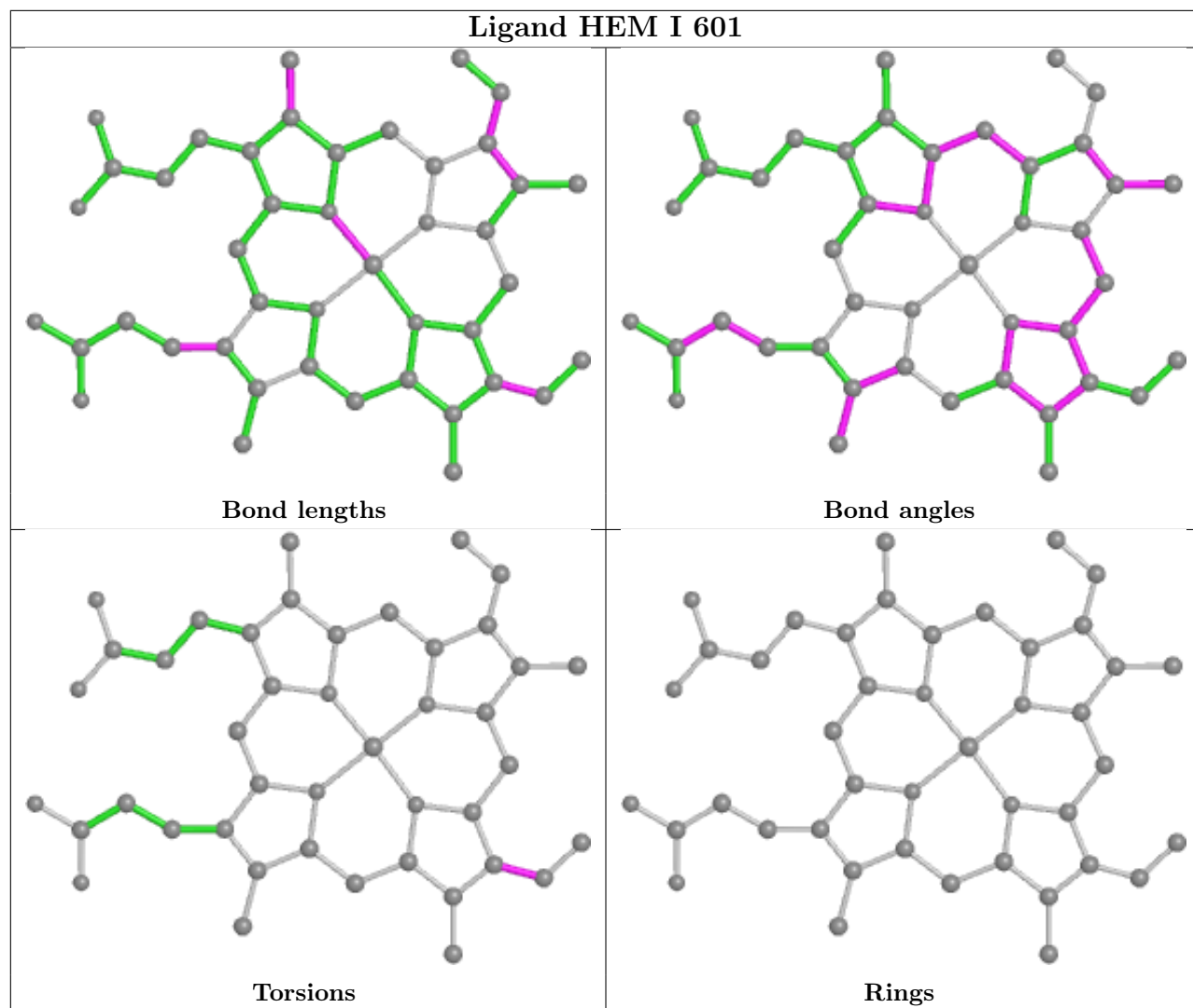




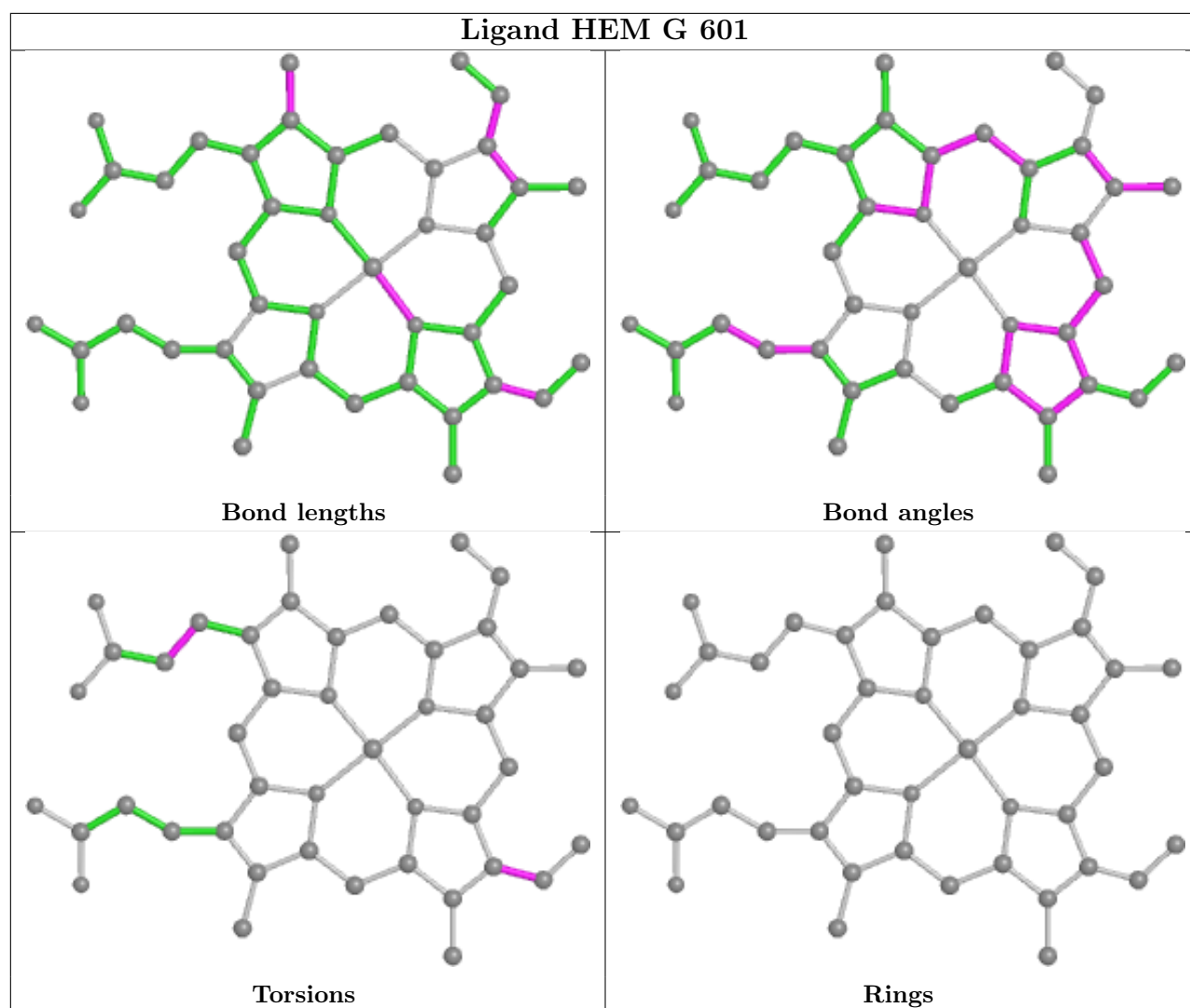












## 5.7 Other polymers [i](#)

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	250/273 (91%)	1.62	60 (24%) 0 0	60, 117, 245, 307	0
1	B	253/273 (92%)	1.88	78 (30%) 0 0	63, 131, 254, 312	0
1	C	252/273 (92%)	2.02	75 (29%) 0 0	66, 130, 249, 387	0
1	D	250/273 (91%)	1.77	68 (27%) 0 0	62, 114, 259, 303	0
1	E	250/273 (91%)	2.73	99 (39%) 0 0	72, 136, 288, 334	0
1	F	248/273 (90%)	1.37	53 (21%) 0 0	73, 126, 233, 288	0
1	G	249/273 (91%)	1.44	57 (22%) 0 0	74, 122, 241, 317	0
1	H	250/273 (91%)	2.22	88 (35%) 0 0	71, 133, 272, 343	0
1	I	249/273 (91%)	2.19	75 (30%) 0 0	77, 145, 262, 363	0
1	J	249/273 (91%)	2.27	90 (36%) 0 0	76, 148, 263, 362	0
All	All	2500/2730 (91%)	1.95	743 (29%) 0 0	60, 128, 262, 387	0

All (743) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	J	111	ILE	23.4
1	G	274	VAL	22.4
1	E	86	GLY	22.0
1	I	269	LEU	21.9
1	C	271	SER	21.8
1	E	51	ILE	21.4
1	B	116	GLY	18.7
1	B	269	LEU	18.3
1	H	112	ARG	18.1
1	H	51	ILE	17.4
1	J	271	SER	16.9
1	I	111	ILE	16.6
1	B	117	THR	16.5

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Mol	Chain	Res	Type	RSRZ
1	J	112	ARG	16.5
1	J	116	GLY	16.0
1	H	111	ILE	15.7
1	E	111	ILE	15.4
1	C	62	PHE	15.2
1	H	62	PHE	15.0
1	D	111	ILE	14.7
1	D	270	GLN	14.4
1	F	269	LEU	14.1
1	E	125	PHE	13.6
1	C	111	ILE	13.4
1	E	264	ALA	13.4
1	E	97	THR	13.1
1	G	273	LEU	12.9
1	A	270	GLN	12.7
1	D	110	LEU	12.7
1	E	50	GLY	12.7
1	J	125	PHE	12.5
1	I	118	ALA	12.5
1	H	48	LEU	12.5
1	I	86	GLY	12.4
1	H	98	SER	12.4
1	E	52	GLY	12.2
1	C	266	LEU	12.1
1	A	62	PHE	12.1
1	I	274	VAL	12.0
1	E	48	LEU	11.9
1	D	112	ARG	11.6
1	I	125	PHE	11.2
1	E	112	ARG	11.1
1	D	273	LEU	11.0
1	I	48	LEU	10.9
1	C	116	GLY	10.9
1	C	273	LEU	10.8
1	E	62	PHE	10.8
1	E	270	GLN	10.7
1	J	273	LEU	10.7
1	H	273	LEU	10.7
1	C	125	PHE	10.4
1	B	115	ALA	10.4
1	H	110	LEU	10.3
1	E	60	ASP	10.3

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>	<b>RSRZ</b>
1	F	274	VAL	10.3
1	E	61	LEU	10.2
1	D	269	LEU	10.1
1	J	62	PHE	10.1
1	E	49	LEU	10.0
1	H	52	GLY	9.9
1	C	272	GLU	9.8
1	D	121	LEU	9.8
1	C	51	ILE	9.6
1	J	126	LEU	9.6
1	E	100	ALA	9.6
1	H	97	THR	9.6
1	J	117	THR	9.5
1	I	110	LEU	9.4
1	J	120	HIS	9.1
1	H	271	SER	9.1
1	E	274	VAL	9.0
1	J	121	LEU	8.8
1	J	86	GLY	8.7
1	F	110	LEU	8.7
1	I	270	GLN	8.7
1	I	62	PHE	8.6
1	H	266	LEU	8.6
1	E	117	THR	8.6
1	A	111	ILE	8.6
1	I	112	ARG	8.5
1	E	267	GLN	8.4
1	J	272	GLU	8.4
1	D	274	VAL	8.4
1	A	121	LEU	8.3
1	D	62	PHE	8.2
1	J	56	PRO	8.1
1	C	99	ASN	8.1
1	E	271	SER	8.0
1	A	266	LEU	8.0
1	J	110	LEU	8.0
1	E	118	ALA	7.9
1	I	272	GLU	7.9
1	E	70	ASP	7.9
1	E	263	GLN	7.9
1	D	266	LEU	7.8
1	C	274	VAL	7.7

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>	<b>RSRZ</b>
1	J	27	VAL	7.7
1	J	41	TRP	7.7
1	I	273	LEU	7.6
1	G	266	LEU	7.6
1	I	97	THR	7.5
1	A	269	LEU	7.5
1	I	268	GLU	7.4
1	F	273	LEU	7.4
1	I	87	GLY	7.4
1	B	274	VAL	7.4
1	I	52	GLY	7.4
1	C	112	ARG	7.4
1	J	270	GLN	7.3
1	J	274	VAL	7.3
1	C	50	GLY	7.3
1	H	270	GLN	7.3
1	E	54	ASP	7.3
1	C	270	GLN	7.2
1	I	56	PRO	7.2
1	G	271	SER	7.2
1	C	113	ASP	7.2
1	E	88	PHE	7.1
1	G	269	LEU	7.1
1	I	92	PHE	7.1
1	C	110	LEU	7.0
1	I	120	HIS	7.0
1	E	266	LEU	7.0
1	B	62	PHE	7.0
1	H	49	LEU	7.0
1	A	115	ALA	7.0
1	E	85	GLY	6.9
1	E	265	ARG	6.9
1	A	112	ARG	6.8
1	B	273	LEU	6.8
1	G	111	ILE	6.8
1	H	84	ARG	6.8
1	F	270	GLN	6.7
1	A	27	VAL	6.7
1	C	49	LEU	6.6
1	A	110	LEU	6.6
1	E	39	LEU	6.6
1	J	115	ALA	6.6

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>	<b>RSRZ</b>
1	C	121	LEU	6.6
1	B	121	LEU	6.5
1	E	273	LEU	6.5
1	H	274	VAL	6.5
1	E	66	LEU	6.5
1	I	121	LEU	6.5
1	D	267	GLN	6.4
1	H	85	GLY	6.4
1	I	98	SER	6.4
1	E	268	GLU	6.3
1	A	35	LYS	6.2
1	E	63	LEU	6.2
1	E	96	GLY	6.2
1	B	266	LEU	6.2
1	J	266	LEU	6.2
1	G	270	GLN	6.2
1	I	32	LEU	6.2
1	C	115	ALA	6.2
1	J	52	GLY	6.2
1	H	101	GLY	6.2
1	H	265	ARG	6.1
1	B	98	SER	6.1
1	C	35	LYS	6.1
1	C	48	LEU	6.1
1	D	268	GLU	6.1
1	I	126	LEU	6.0
1	D	98	SER	6.0
1	B	49	LEU	6.0
1	C	267	GLN	5.9
1	B	41	TRP	5.9
1	C	120	HIS	5.9
1	J	28	GLY	5.9
1	I	41	TRP	5.9
1	B	48	LEU	5.9
1	H	269	LEU	5.9
1	E	269	LEU	5.9
1	B	102	GLN	5.9
1	H	50	GLY	5.8
1	D	27	VAL	5.8
1	F	259	HIS	5.8
1	B	51	ILE	5.8
1	B	125	PHE	5.8

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>	<b>RSRZ</b>
1	B	101	GLY	5.8
1	D	94	VAL	5.7
1	H	34	LEU	5.7
1	H	118	ALA	5.7
1	E	95	ALA	5.7
1	H	117	THR	5.7
1	H	119	ARG	5.7
1	C	34	LEU	5.6
1	J	85	GLY	5.6
1	A	109	GLY	5.6
1	J	122	SER	5.6
1	A	123	GLY	5.6
1	D	99	ASN	5.5
1	J	262	THR	5.5
1	I	28	GLY	5.5
1	I	266	LEU	5.5
1	F	111	ILE	5.5
1	F	86	GLY	5.5
1	J	267	GLN	5.4
1	H	121	LEU	5.4
1	A	98	SER	5.4
1	H	99	ASN	5.3
1	H	262	THR	5.3
1	G	116	GLY	5.3
1	J	57	ALA	5.3
1	I	30	TRP	5.3
1	H	27	VAL	5.3
1	C	25	PHE	5.2
1	J	48	LEU	5.2
1	D	66	LEU	5.2
1	I	27	VAL	5.2
1	H	86	GLY	5.2
1	E	119	ARG	5.2
1	C	39	LEU	5.2
1	E	46	ARG	5.2
1	J	118	ALA	5.1
1	E	272	GLU	5.1
1	I	49	LEU	5.1
1	D	35	LYS	5.1
1	B	118	ALA	5.1
1	E	28	GLY	5.1
1	H	82	SER	5.1

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>	<b>RSRZ</b>
1	J	94	VAL	5.1
1	B	34	LEU	5.1
1	C	88	PHE	5.1
1	F	115	ALA	5.1
1	B	97	THR	5.0
1	E	98	SER	5.0
1	C	52	GLY	5.0
1	J	109	GLY	5.0
1	E	36	THR	5.0
1	B	120	HIS	5.0
1	D	34	LEU	5.0
1	H	260	GLN	5.0
1	F	266	LEU	5.0
1	E	56	PRO	5.0
1	B	57	ALA	5.0
1	H	54	ASP	5.0
1	C	98	SER	4.9
1	C	41	TRP	4.9
1	F	98	SER	4.9
1	G	126	LEU	4.9
1	G	41	TRP	4.9
1	J	264	ALA	4.9
1	H	61	LEU	4.9
1	B	112	ARG	4.9
1	F	113	ASP	4.9
1	D	81	VAL	4.9
1	E	59	TYR	4.9
1	H	113	ASP	4.8
1	A	122	SER	4.8
1	B	113	ASP	4.8
1	E	106	ALA	4.8
1	G	113	ASP	4.8
1	A	54	ASP	4.8
1	I	81	VAL	4.7
1	C	109	GLY	4.7
1	I	88	PHE	4.7
1	A	66	LEU	4.7
1	A	268	GLU	4.7
1	D	123	GLY	4.7
1	H	83	GLU	4.7
1	I	117	THR	4.6
1	I	104	ILE	4.6

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>	<b>RSRZ</b>
1	C	119	ARG	4.6
1	E	65	ARG	4.6
1	B	50	GLY	4.6
1	B	96	GLY	4.6
1	C	108	ALA	4.6
1	A	120	HIS	4.5
1	G	125	PHE	4.5
1	F	204	ILE	4.5
1	E	260	GLN	4.5
1	I	34	LEU	4.5
1	A	28	GLY	4.5
1	A	126	LEU	4.5
1	J	32	LEU	4.5
1	H	272	GLU	4.5
1	E	110	LEU	4.5
1	E	84	ARG	4.5
1	A	271	SER	4.5
1	D	116	GLY	4.4
1	J	34	LEU	4.4
1	B	81	VAL	4.4
1	F	262	THR	4.4
1	E	40	ASP	4.4
1	I	37	TRP	4.4
1	A	84	ARG	4.4
1	A	124	ILE	4.4
1	B	59	TYR	4.4
1	J	119	ARG	4.3
1	B	92	PHE	4.3
1	J	104	ILE	4.3
1	B	99	ASN	4.3
1	H	120	HIS	4.3
1	E	64	SER	4.3
1	B	114	GLU	4.3
1	J	36	THR	4.3
1	B	126	LEU	4.3
1	A	100	ALA	4.2
1	H	204	ILE	4.2
1	I	51	ILE	4.2
1	B	58	SER	4.2
1	C	126	LEU	4.2
1	E	126	LEU	4.2
1	B	87	GLY	4.2

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>	<b>RSRZ</b>
1	E	26	GLY	4.2
1	I	116	GLY	4.2
1	G	263	GLN	4.2
1	C	104	ILE	4.2
1	G	39	LEU	4.1
1	G	48	LEU	4.1
1	D	97	THR	4.1
1	A	94	VAL	4.1
1	F	126	LEU	4.1
1	G	98	SER	4.1
1	G	97	THR	4.1
1	I	204	ILE	4.0
1	J	102	GLN	4.0
1	I	271	SER	4.0
1	F	101	GLY	4.0
1	H	70	ASP	4.0
1	H	74	VAL	4.0
1	A	125	PHE	4.0
1	A	262	THR	4.0
1	J	105	ARG	4.0
1	J	204	ILE	4.0
1	B	110	LEU	4.0
1	E	41	TRP	4.0
1	B	54	ASP	4.0
1	C	23	GLU	3.9
1	A	119	ARG	3.9
1	A	48	LEU	3.9
1	H	125	PHE	3.9
1	A	273	LEU	3.9
1	J	49	LEU	3.9
1	C	117	THR	3.9
1	A	274	VAL	3.9
1	B	39	LEU	3.9
1	B	36	THR	3.9
1	I	57	ALA	3.9
1	B	84	ARG	3.8
1	J	92	PHE	3.8
1	F	99	ASN	3.8
1	B	52	GLY	3.8
1	E	43	ASP	3.8
1	G	264	ALA	3.8
1	C	101	GLY	3.8

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>	<b>RSRZ</b>
1	E	262	THR	3.8
1	C	26	GLY	3.8
1	F	53	GLN	3.8
1	D	100	ALA	3.8
1	I	264	ALA	3.8
1	B	111	ILE	3.8
1	E	47	THR	3.8
1	I	122	SER	3.8
1	E	113	ASP	3.7
1	H	264	ALA	3.7
1	C	269	LEU	3.7
1	G	117	THR	3.7
1	J	39	LEU	3.7
1	H	25	PHE	3.7
1	C	92	PHE	3.7
1	F	54	ASP	3.7
1	H	96	GLY	3.7
1	G	249	PHE	3.7
1	C	204	ILE	3.7
1	E	90	VAL	3.7
1	H	65	ARG	3.7
1	G	260	GLN	3.7
1	B	22	ILE	3.7
1	C	114	GLU	3.7
1	C	87	GLY	3.7
1	D	86	GLY	3.7
1	I	85	GLY	3.7
1	J	30	TRP	3.7
1	I	66	LEU	3.7
1	B	249	PHE	3.6
1	H	32	LEU	3.6
1	I	124	ILE	3.6
1	J	51	ILE	3.6
1	F	272	GLU	3.6
1	G	49	LEU	3.6
1	E	82	SER	3.6
1	B	78	ILE	3.6
1	A	114	GLU	3.6
1	H	53	GLN	3.6
1	J	106	ALA	3.6
1	J	87	GLY	3.6
1	I	91	SER	3.6

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>	<b>RSRZ</b>
1	I	109	GLY	3.6
1	E	69	ASP	3.6
1	J	54	ASP	3.5
1	H	79	LYS	3.5
1	E	94	VAL	3.5
1	I	74	VAL	3.5
1	I	35	LYS	3.5
1	C	66	LEU	3.5
1	G	62	PHE	3.5
1	B	204	ILE	3.5
1	E	107	ARG	3.5
1	H	78	ILE	3.5
1	C	24	GLY	3.4
1	B	103	TRP	3.4
1	C	32	LEU	3.4
1	E	27	VAL	3.4
1	D	30	TRP	3.4
1	E	58	SER	3.4
1	F	265	ARG	3.4
1	E	87	GLY	3.4
1	A	49	LEU	3.4
1	B	64	SER	3.4
1	A	267	GLN	3.4
1	B	66	LEU	3.3
1	J	114	GLU	3.3
1	D	124	ILE	3.3
1	E	57	ALA	3.3
1	F	125	PHE	3.3
1	H	126	LEU	3.3
1	I	263	GLN	3.3
1	D	122	SER	3.3
1	G	99	ASN	3.3
1	I	36	THR	3.3
1	J	81	VAL	3.3
1	I	103	TRP	3.3
1	A	102	GLN	3.3
1	F	48	LEU	3.3
1	I	265	ARG	3.3
1	C	59	TYR	3.3
1	C	36	THR	3.3
1	D	132	LYS	3.3
1	E	35	LYS	3.3

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Mol	Chain	Res	Type	RSRZ
1	J	77	ALA	3.3
1	G	190	ILE	3.2
1	D	74	VAL	3.2
1	J	26	GLY	3.2
1	D	271	SER	3.2
1	D	204	ILE	3.2
1	B	272	GLU	3.2
1	F	59	TYR	3.2
1	E	121	LEU	3.2
1	J	97	THR	3.2
1	D	119	ARG	3.2
1	G	112	ARG	3.2
1	E	124	ILE	3.1
1	E	120	HIS	3.1
1	F	249	PHE	3.1
1	F	116	GLY	3.1
1	A	92	PHE	3.1
1	G	204	ILE	3.1
1	A	85	GLY	3.1
1	H	56	PRO	3.1
1	H	63	LEU	3.1
1	J	66	LEU	3.1
1	A	93	ARG	3.1
1	H	88	PHE	3.1
1	A	63	LEU	3.1
1	J	59	TYR	3.1
1	D	126	LEU	3.0
1	F	124	ILE	3.0
1	A	97	THR	3.0
1	I	79	LYS	3.0
1	C	61	LEU	3.0
1	B	35	LYS	3.0
1	B	30	TRP	3.0
1	E	261	GLN	3.0
1	J	263	GLN	3.0
1	A	56	PRO	3.0
1	J	103	TRP	3.0
1	J	99	ASN	3.0
1	J	269	LEU	3.0
1	C	107	ARG	3.0
1	H	36	THR	3.0
1	I	114	GLU	3.0

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>	<b>RSRZ</b>
1	B	119	ARG	3.0
1	D	107	ARG	2.9
1	D	109	GLY	2.9
1	G	272	GLU	2.9
1	D	59	TYR	2.9
1	D	70	ASP	2.9
1	B	104	ILE	2.9
1	D	265	ARG	2.9
1	I	262	THR	2.9
1	C	249	PHE	2.9
1	G	188	VAL	2.9
1	D	103	TRP	2.9
1	F	103	TRP	2.9
1	E	105	ARG	2.9
1	H	267	GLN	2.9
1	B	268	GLU	2.9
1	H	94	VAL	2.9
1	G	259	HIS	2.9
1	H	104	ILE	2.9
1	D	272	GLU	2.9
1	A	204	ILE	2.8
1	I	96	GLY	2.8
1	C	106	ALA	2.8
1	J	55	GLN	2.8
1	D	78	ILE	2.8
1	E	204	ILE	2.8
1	I	54	ASP	2.8
1	G	27	VAL	2.8
1	B	55	GLN	2.8
1	A	90	VAL	2.8
1	J	82	SER	2.8
1	D	120	HIS	2.8
1	G	250	THR	2.8
1	D	92	PHE	2.8
1	D	264	ALA	2.8
1	D	82	SER	2.8
1	H	190	ILE	2.8
1	C	46	ARG	2.8
1	D	125	PHE	2.8
1	B	106	ALA	2.8
1	J	88	PHE	2.8
1	J	35	LYS	2.8

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>	<b>RSRZ</b>
1	A	215	ILE	2.7
1	C	265	ARG	2.7
1	C	247	PRO	2.7
1	G	159	ILE	2.7
1	G	66	LEU	2.7
1	G	30	TRP	2.7
1	E	102	GLN	2.7
1	G	57	ALA	2.7
1	F	120	HIS	2.7
1	F	192	MET	2.7
1	A	88	PHE	2.7
1	A	99	ASN	2.7
1	I	128	ILE	2.7
1	F	256	LEU	2.7
1	F	176	PHE	2.6
1	G	50	GLY	2.6
1	B	25	PHE	2.6
1	H	69	ASP	2.6
1	C	191	LEU	2.6
1	F	203	TYR	2.6
1	E	44	THR	2.6
1	A	51	ILE	2.6
1	E	30	TRP	2.6
1	E	99	ASN	2.6
1	I	113	ASP	2.6
1	G	100	ALA	2.6
1	H	95	ALA	2.6
1	I	99	ASN	2.6
1	J	46	ARG	2.6
1	J	124	ILE	2.6
1	J	157	ILE	2.6
1	C	176	PHE	2.6
1	D	84	ARG	2.6
1	I	249	PHE	2.6
1	B	23	GLU	2.5
1	H	66	LEU	2.5
1	F	109	GLY	2.5
1	C	90	VAL	2.5
1	J	70	ASP	2.5
1	A	128	ILE	2.5
1	C	159	ILE	2.5
1	J	61	LEU	2.5

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>	<b>RSRZ</b>
1	J	132	LYS	2.5
1	E	157	ILE	2.5
1	I	93	ARG	2.5
1	A	36	THR	2.5
1	D	88	PHE	2.5
1	A	272	GLU	2.5
1	C	225	LYS	2.5
1	D	93	ARG	2.5
1	I	53	GLN	2.5
1	F	128	ILE	2.5
1	I	119	ARG	2.5
1	G	115	ALA	2.5
1	G	61	LEU	2.5
1	J	238	ILE	2.5
1	F	104	ILE	2.4
1	J	98	SER	2.4
1	H	81	VAL	2.4
1	I	132	LYS	2.4
1	B	157	ILE	2.4
1	H	203	TYR	2.4
1	B	88	PHE	2.4
1	H	161	GLY	2.4
1	B	24	GLY	2.4
1	G	85	GLY	2.4
1	F	225	LYS	2.4
1	H	263	GLN	2.4
1	J	268	GLU	2.4
1	D	63	LEU	2.4
1	H	259	HIS	2.4
1	I	161	GLY	2.4
1	D	95	ALA	2.4
1	G	34	LEU	2.4
1	G	110	LEU	2.4
1	H	100	ALA	2.4
1	D	48	LEU	2.4
1	E	109	GLY	2.4
1	F	72	GLU	2.4
1	F	268	GLU	2.4
1	J	83	GLU	2.4
1	H	206	ARG	2.4
1	D	96	GLY	2.3
1	E	176	PHE	2.3

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>	<b>RSRZ</b>
1	J	249	PHE	2.3
1	I	108	ALA	2.3
1	C	124	ILE	2.3
1	E	159	ILE	2.3
1	F	159	ILE	2.3
1	A	25	PHE	2.3
1	A	134	VAL	2.3
1	E	134	VAL	2.3
1	B	247	PRO	2.3
1	A	238	ILE	2.3
1	B	32	LEU	2.3
1	G	124	ILE	2.3
1	B	94	VAL	2.3
1	C	134	VAL	2.3
1	J	53	GLN	2.3
1	A	34	LEU	2.3
1	D	128	ILE	2.3
1	J	190	ILE	2.3
1	B	61	LEU	2.3
1	H	124	ILE	2.3
1	B	265	ARG	2.3
1	B	188	VAL	2.3
1	C	74	VAL	2.3
1	I	134	VAL	2.3
1	H	215	ILE	2.3
1	F	100	ALA	2.3
1	D	104	ILE	2.3
1	D	216	ILE	2.3
1	B	90	VAL	2.3
1	E	108	ALA	2.3
1	E	203	TYR	2.3
1	H	28	GLY	2.3
1	B	270	GLN	2.3
1	I	58	SER	2.3
1	C	178	TRP	2.3
1	H	60	ASP	2.3
1	H	175	LEU	2.3
1	F	157	ILE	2.3
1	B	83	GLU	2.3
1	B	37	TRP	2.2
1	D	56	PRO	2.2
1	E	191	LEU	2.2

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>	<b>RSRZ</b>
1	J	260	GLN	2.2
1	A	29	THR	2.2
1	E	256	LEU	2.2
1	I	115	ALA	2.2
1	B	178	TRP	2.2
1	D	248	TYR	2.2
1	F	30	TRP	2.2
1	H	250	THR	2.2
1	C	165	ILE	2.2
1	C	69	ASP	2.2
1	E	163	GLY	2.2
1	G	86	GLY	2.2
1	G	262	THR	2.2
1	D	249	PHE	2.2
1	G	120	HIS	2.2
1	J	216	ILE	2.2
1	C	207	TYR	2.2
1	B	109	GLY	2.2
1	E	178	TRP	2.2
1	J	96	GLY	2.2
1	F	62	PHE	2.2
1	J	247	PRO	2.2
1	A	74	VAL	2.2
1	G	103	TRP	2.2
1	G	225	LYS	2.2
1	H	103	TRP	2.2
1	H	197	ARG	2.2
1	G	165	ILE	2.2
1	F	248	TYR	2.2
1	D	28	GLY	2.2
1	F	84	ARG	2.2
1	H	159	ILE	2.2
1	F	27	VAL	2.2
1	E	25	PHE	2.1
1	H	176	PHE	2.1
1	I	196	ASP	2.1
1	J	95	ALA	2.1
1	E	114	GLU	2.1
1	J	192	MET	2.1
1	H	116	GLY	2.1
1	C	228	ASP	2.1
1	E	175	LEU	2.1

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>	<b>RSRZ</b>
1	G	176	PHE	2.1
1	H	256	LEU	2.1
1	D	115	ALA	2.1
1	J	174	ARG	2.1
1	G	56	PRO	2.1
1	H	191	LEU	2.1
1	A	104	ILE	2.1
1	C	100	ALA	2.1
1	H	77	ALA	2.1
1	D	85	GLY	2.1
1	E	208	ARG	2.1
1	I	174	ARG	2.1
1	C	157	ILE	2.1
1	C	183	ALA	2.1
1	J	74	VAL	2.1
1	G	203	TYR	2.1
1	G	208	ARG	2.1
1	J	265	ARG	2.1
1	E	53	GLN	2.1
1	B	183	ALA	2.1
1	H	165	ILE	2.1
1	I	193	PRO	2.1
1	F	199	ARG	2.1
1	G	207	TYR	2.1
1	C	215	ILE	2.1
1	D	238	ILE	2.1
1	F	190	ILE	2.1
1	J	183	ALA	2.1
1	E	258	GLU	2.1
1	D	114	GLU	2.1
1	D	157	ILE	2.1
1	A	247	PRO	2.1
1	G	94	VAL	2.1
1	J	156	MET	2.1
1	E	32	LEU	2.0
1	F	260	GLN	2.0
1	A	132	LYS	2.0
1	E	101	GLY	2.0
1	B	176	PHE	2.0
1	F	193	PRO	2.0
1	G	32	LEU	2.0
1	H	167	LEU	2.0

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Mol	Chain	Res	Type	RSRZ
1	C	65	ARG	2.0
1	E	207	TYR	2.0
1	J	37	TRP	2.0
1	B	56	PRO	2.0
1	D	25	PHE	2.0
1	E	92	PHE	2.0
1	J	176	PHE	2.0
1	D	61	LEU	2.0
1	H	186	GLN	2.0
1	B	190	ILE	2.0
1	C	78	ILE	2.0
1	H	207	TYR	2.0
1	B	134	VAL	2.0
1	H	208	ARG	2.0
1	F	191	LEU	2.0
1	F	247	PRO	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	GOL	E	603	6/6	0.89	0.33	81,85,97,98	0
3	GOL	B	301	6/6	0.90	0.37	80,90,93,105	0
3	GOL	G	602	6/6	0.90	0.34	84,94,104,112	0
3	GOL	D	301	6/6	0.91	0.31	76,87,97,108	0
3	GOL	A	602	6/6	0.93	0.44	75,92,99,99	0
3	GOL	I	603	6/6	0.93	0.32	98,103,110,113	0
3	GOL	J	301	6/6	0.93	0.31	86,99,106,110	0

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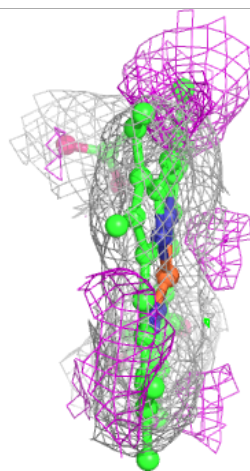
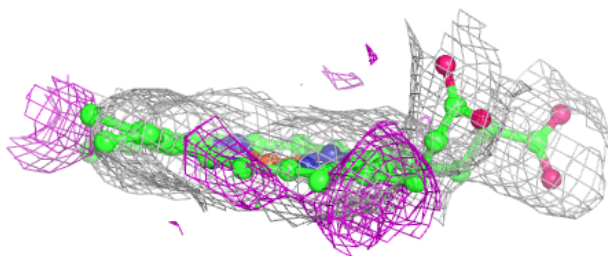
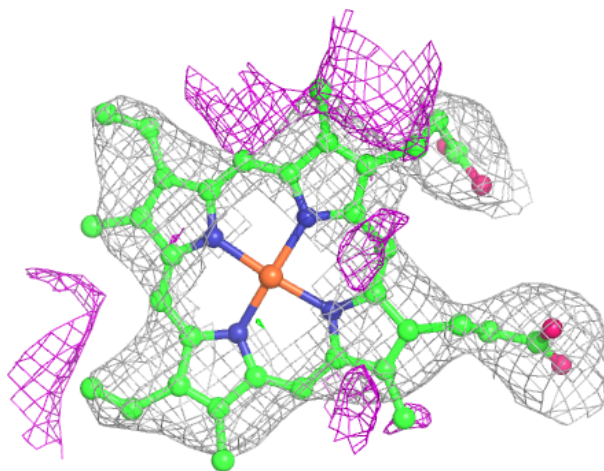
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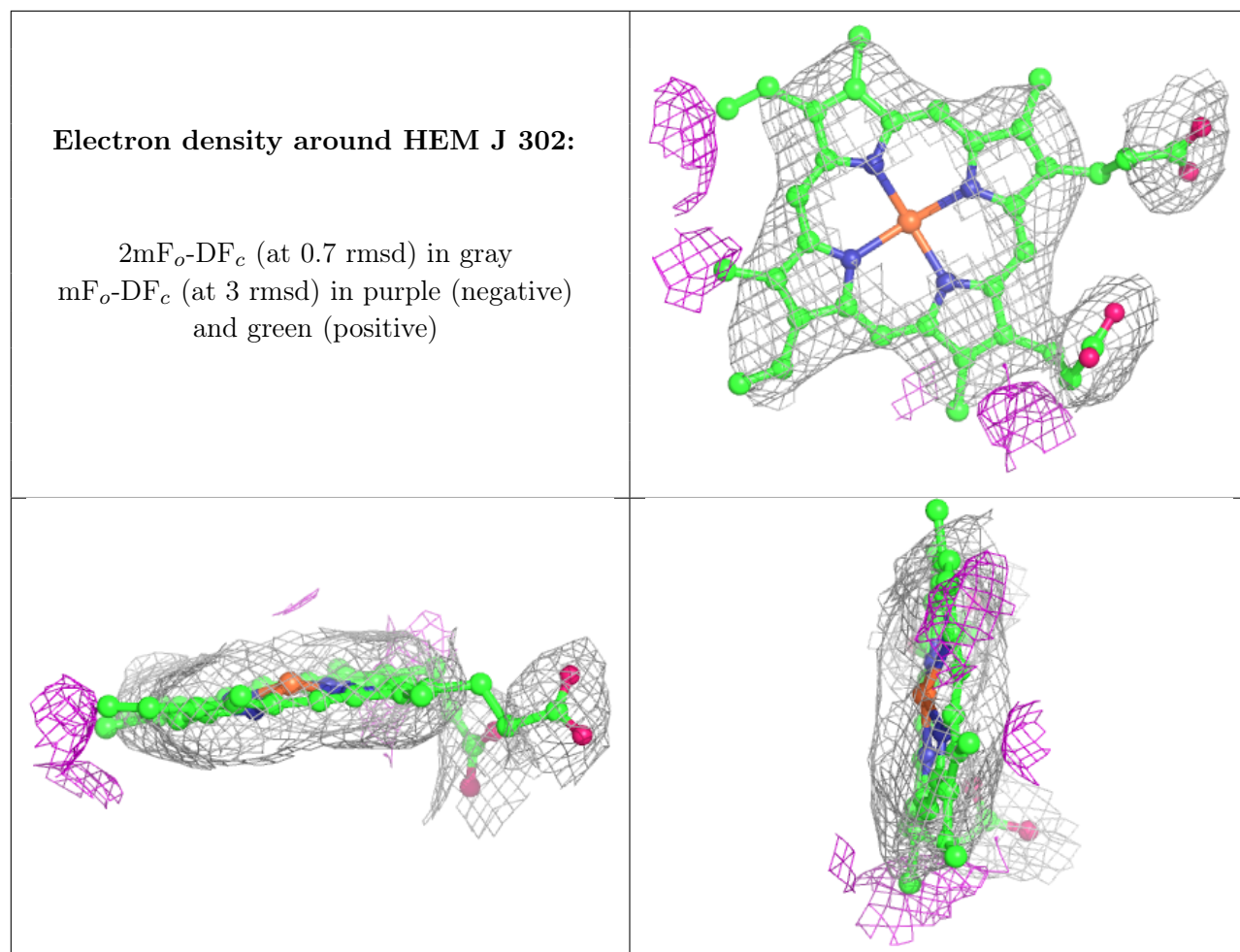
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å <sup>2</sup> )	Q<0.9
3	GOL	F	301	6/6	0.94	0.24	83,94,98,110	0
3	GOL	G	603	6/6	0.94	0.31	78,105,112,113	0
3	GOL	C	602	6/6	0.95	0.37	74,83,87,111	0
2	HEM	A	601	43/43	0.96	0.36	60,82,102,121	0
3	GOL	B	302	6/6	0.96	0.42	83,98,100,100	0
2	HEM	J	302	43/43	0.97	0.36	76,100,130,147	0
2	HEM	D	303	43/43	0.97	0.39	65,81,98,120	0
2	HEM	F	302	43/43	0.97	0.36	73,98,130,150	0
2	HEM	G	601	43/43	0.97	0.43	76,96,131,140	0
3	GOL	E	602	6/6	0.98	0.56	87,95,99,99	0
2	HEM	C	601	43/43	0.98	0.35	64,86,123,127	0
2	HEM	B	303	43/43	0.98	0.34	64,83,118,124	0
2	HEM	H	302	43/43	0.98	0.36	69,100,115,134	0
2	HEM	I	601	43/43	0.98	0.37	73,99,131,149	0
3	GOL	H	301	6/6	0.98	0.52	78,86,93,97	0
3	GOL	I	602	6/6	0.98	0.58	92,98,107,111	0
2	HEM	E	601	43/43	0.98	0.41	76,103,136,149	0
3	GOL	D	302	6/6	0.98	0.55	81,96,97,98	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 HEM A 601:**

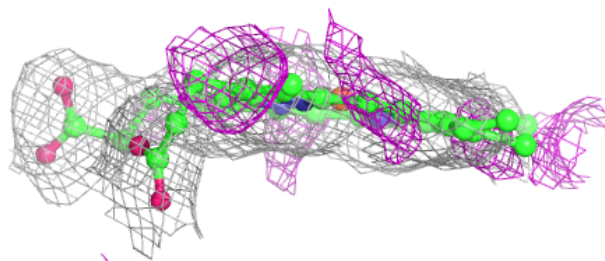
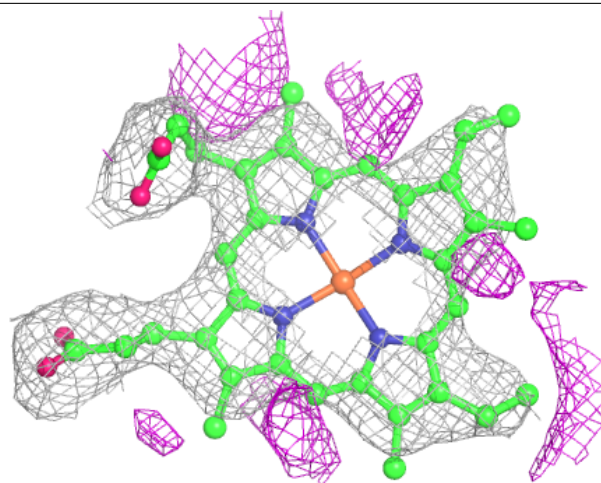
$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)





**Electron density around HEM D 303:**

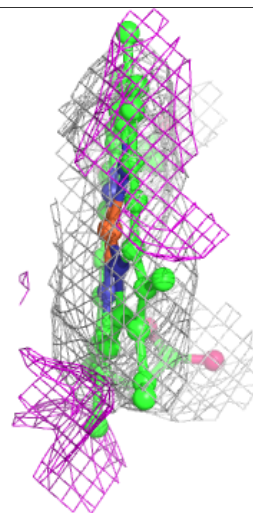
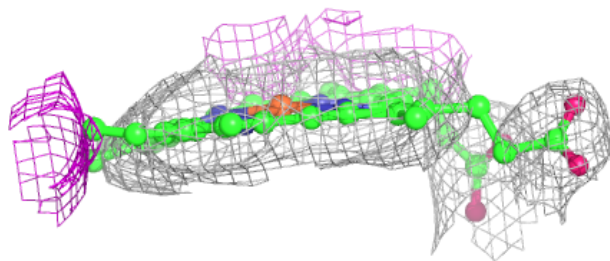
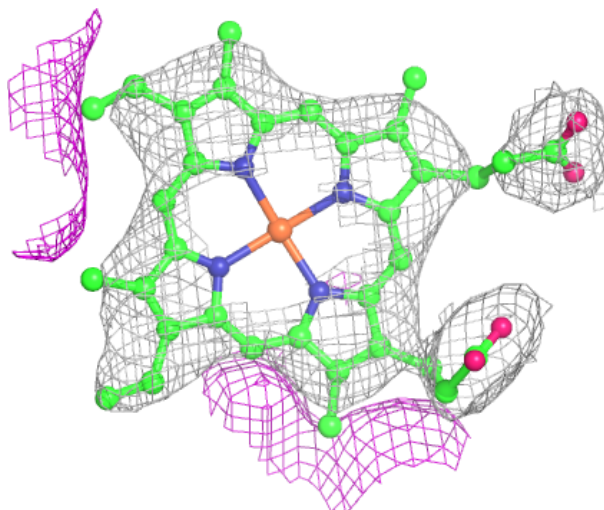
$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)





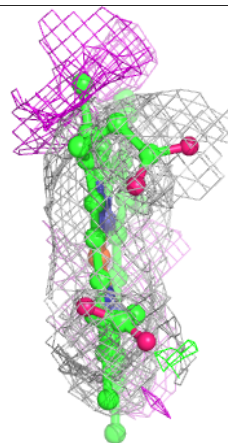
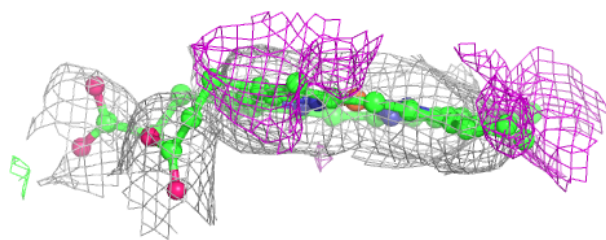
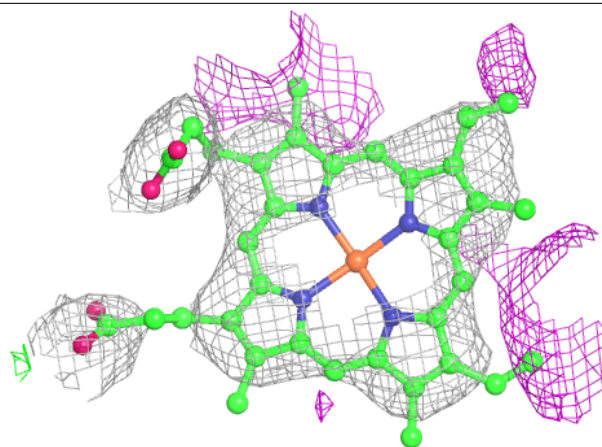
**Electron density around HEM F 302:**

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



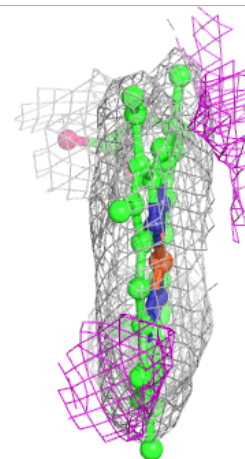
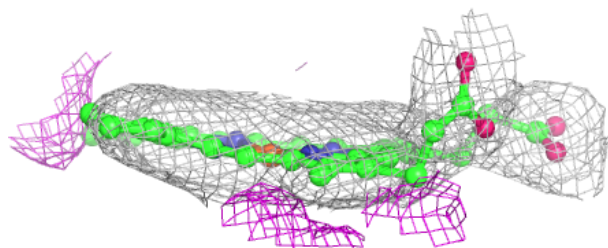
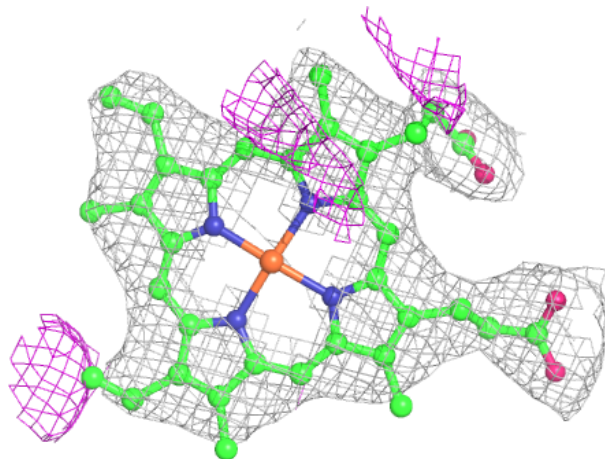
**Electron density around HEM G 601:**

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



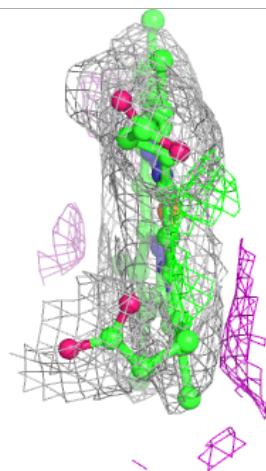
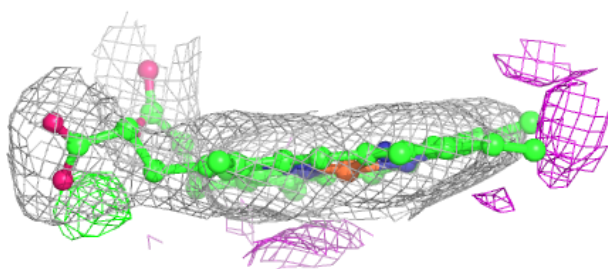
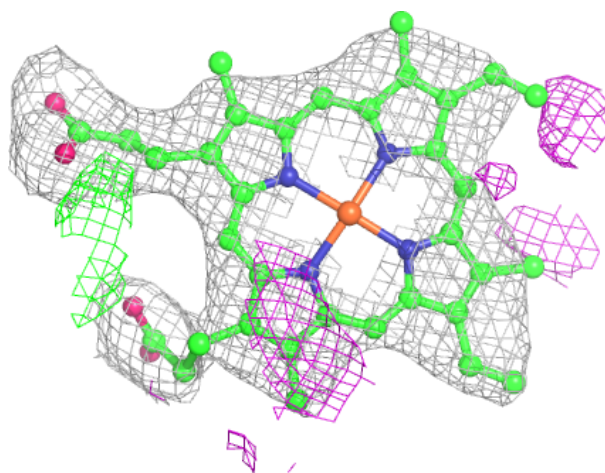
**Electron density around HEM C 601:**

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



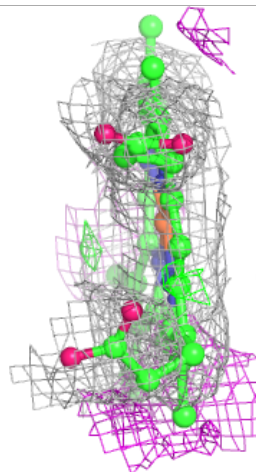
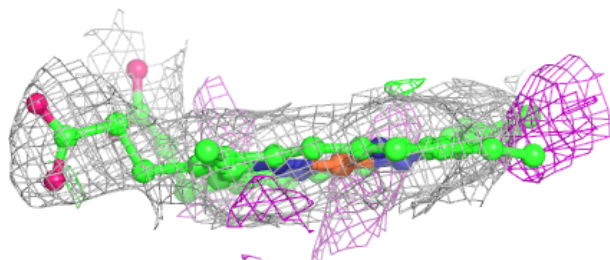
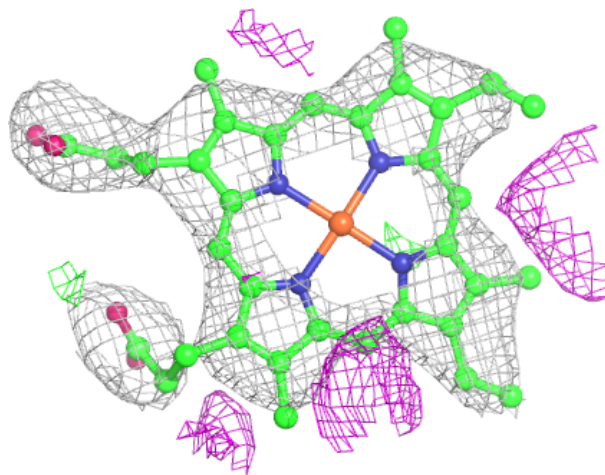
**Electron density around HEM B 303:**

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



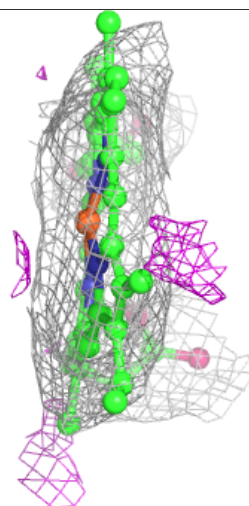
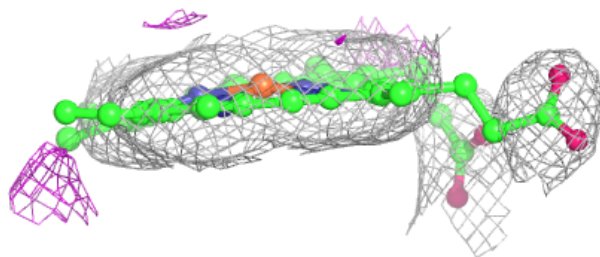
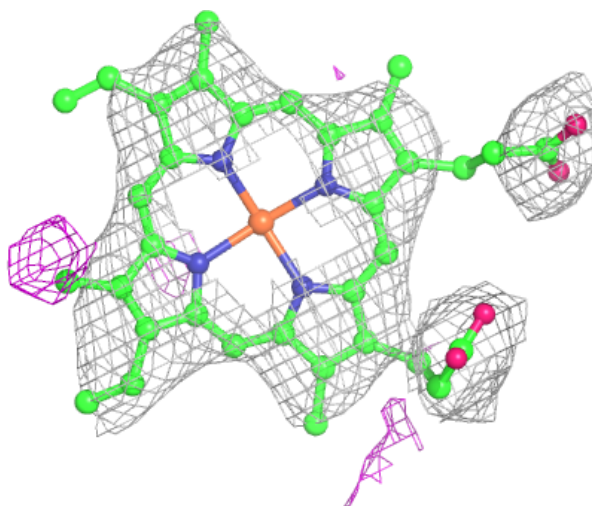
**Electron density around HEM H 302:**

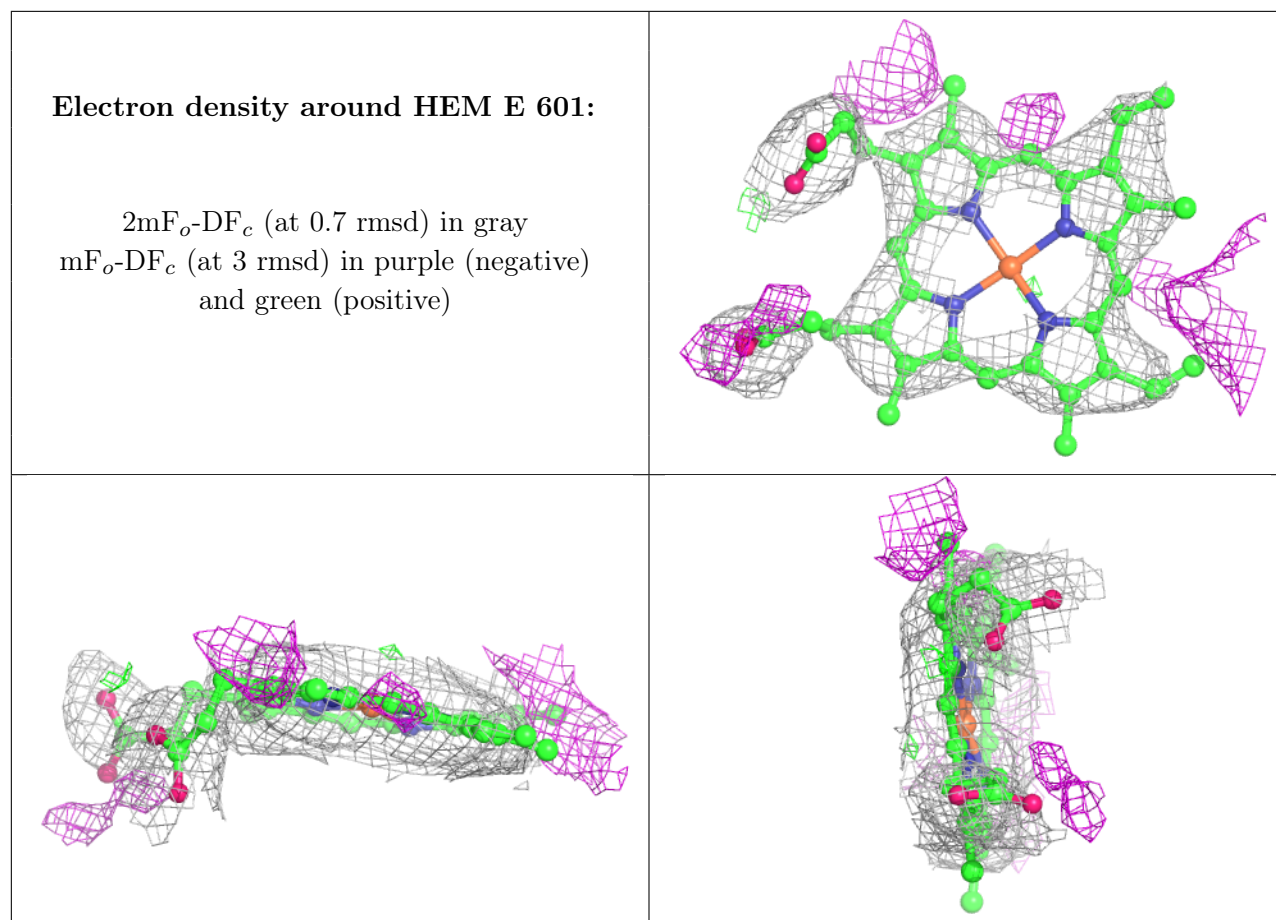
$2mF_o-DF_c$  (at 0.7 rmsd) in gray  
 $mF_o-DF_c$  (at 3 rmsd) in purple (negative)  
and green (positive)



**Electron density around HEM I 601:**

$2mF_o-DF_c$  (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.