



wwPDB X-ray Structure Validation Summary Report ⓘ

Mar 5, 2026 – 08:47 PM UTC

PDB ID : 3A59 / pdb_00003a59
Title : Structure of Hemoglobin from flightless bird (Struthio camelus)
Authors : Jaimohan, S.M.; Naresh, M.D.; Mandal, A.B.
Deposited on : 2009-08-03
Resolution : 3.41 Å(reported)

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

We welcome your comments at validation@mail.wwpdb.org

A user guide is available at

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

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

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

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

MolProbity : 4-5-2 with Phenix2.0
Mogul : 2022.3.0, CSD as543be (2022)
Xtriage (Phenix) : 2.0
EDS : 3.0
Buster-report : wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4 : 9.0.010 (Gargrove)
Density-Fitness : 1.0.12
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.49

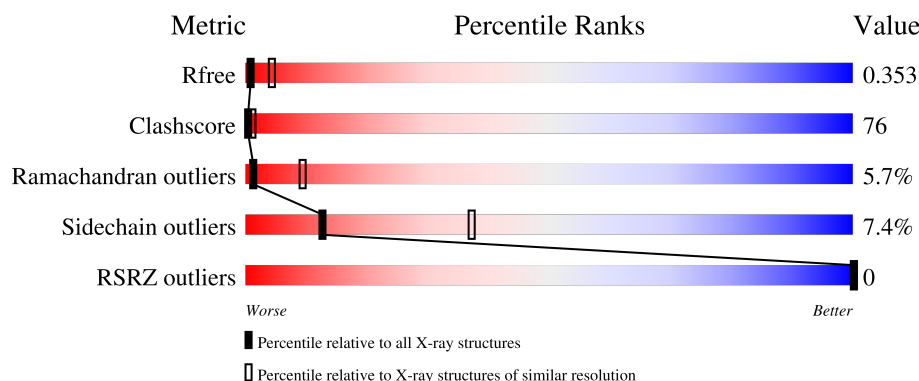
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

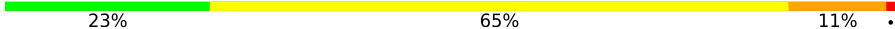
The reported resolution of this entry is 3.41 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



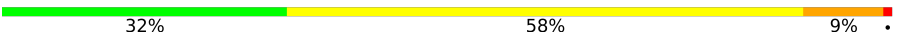
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	180053	1210 (3.48-3.36)
Clashscore	190562	1234 (3.48-3.36)
Ramachandran outliers	187476	1222 (3.48-3.36)
Sidechain outliers	187428	1222 (3.48-3.36)
RSRZ outliers	180081	1210 (3.48-3.36)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$. The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	141	
1	C	141	
1	E	141	
1	G	141	
2	B	146	

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Mol	Chain	Length	Quality of chain
2	D	146	
2	F	146	
2	H	146	

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	HEM	B	150	-	-	X	-
3	HEM	F	150	-	-	X	-

2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 9314 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.

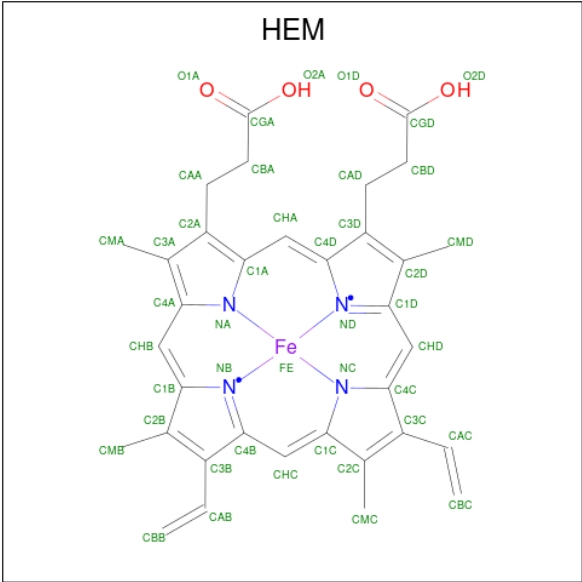
- Molecule 1 is a protein called Hemoglobin subunit alpha-A.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	141	Total	C	N	O	S	0	0	0
			1091	700	190	198	3			
1	C	141	Total	C	N	O	S	0	0	0
			1090	700	190	197	3			
1	E	141	Total	C	N	O	S	0	0	0
			1091	700	190	198	3			
1	G	141	Total	C	N	O	S	0	0	0
			1090	700	190	197	3			

- Molecule 2 is a protein called Hemoglobin subunit beta.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	146	Total	C	N	O	S	0	0	0
			1152	744	203	201	4			
2	D	146	Total	C	N	O	S	0	0	0
			1152	744	203	201	4			
2	F	146	Total	C	N	O	S	0	0	0
			1152	744	203	201	4			
2	H	146	Total	C	N	O	S	0	0	0
			1152	744	203	201	4			

- Molecule 3 is PROTOPORPHYRIN IX CONTAINING FE (CCD ID: HEM) (formula: $C_{34}H_{32}FeN_4O_4$).

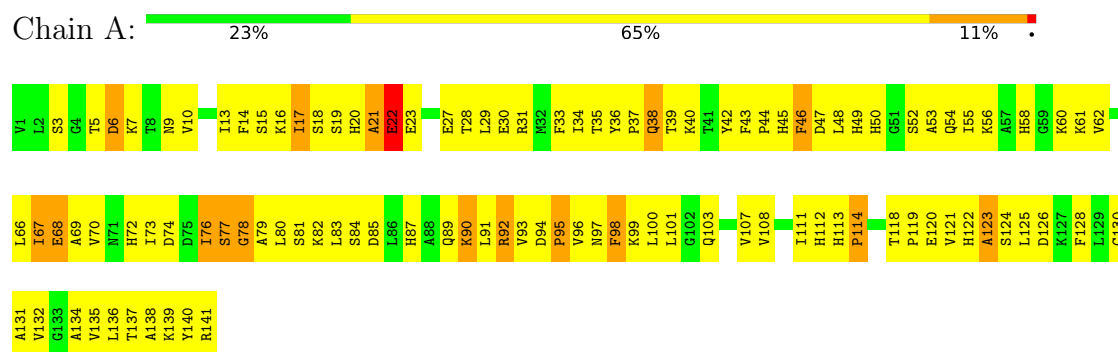


Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
3	A	1	Total	C	Fe	N	O	0	0
			43	34	1	4	4		
3	B	1	Total	C	Fe	N	O	0	0
			43	34	1	4	4		
3	C	1	Total	C	Fe	N	O	0	0
			43	34	1	4	4		
3	D	1	Total	C	Fe	N	O	0	0
			43	34	1	4	4		
3	E	1	Total	C	Fe	N	O	0	0
			43	34	1	4	4		
3	F	1	Total	C	Fe	N	O	0	0
			43	34	1	4	4		
3	G	1	Total	C	Fe	N	O	0	0
			43	34	1	4	4		
3	H	1	Total	C	Fe	N	O	0	0
			43	34	1	4	4		

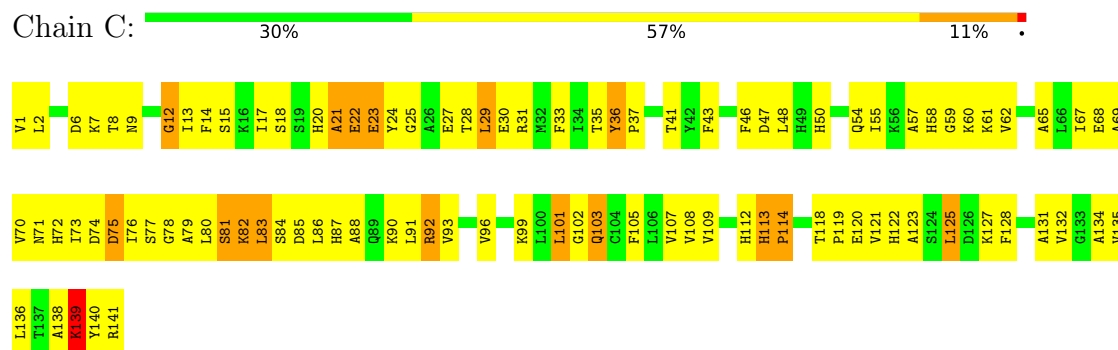
3 Residue-property plots

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.

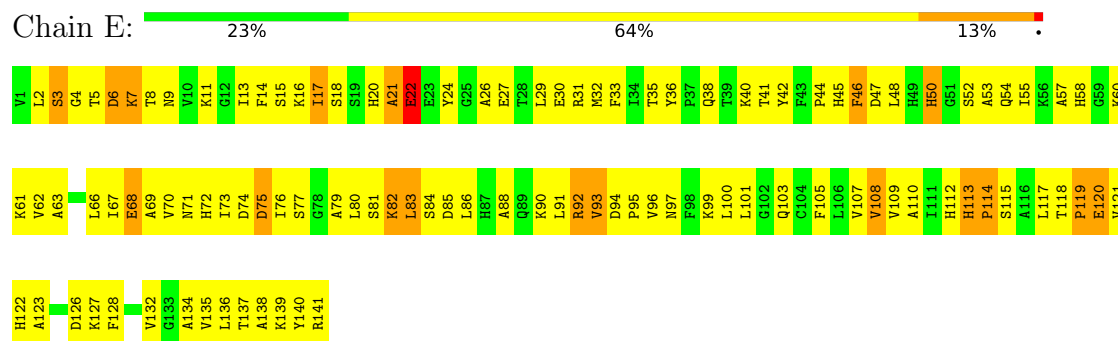
• Molecule 1: Hemoglobin subunit alpha-A



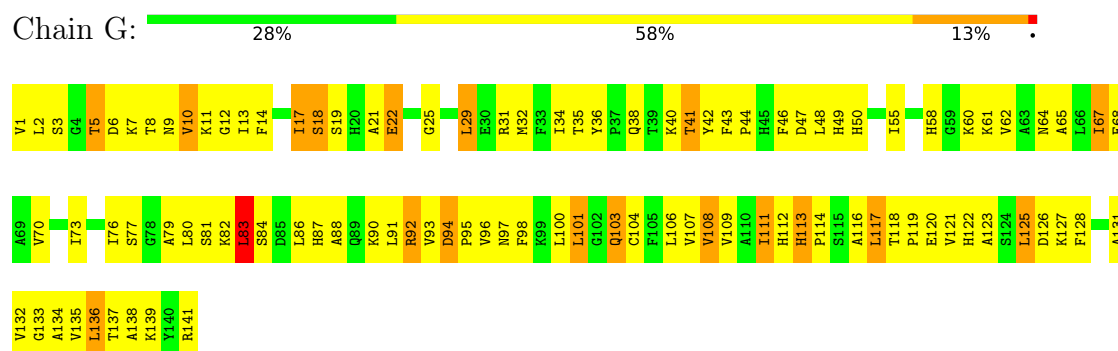
• Molecule 1: Hemoglobin subunit alpha-A



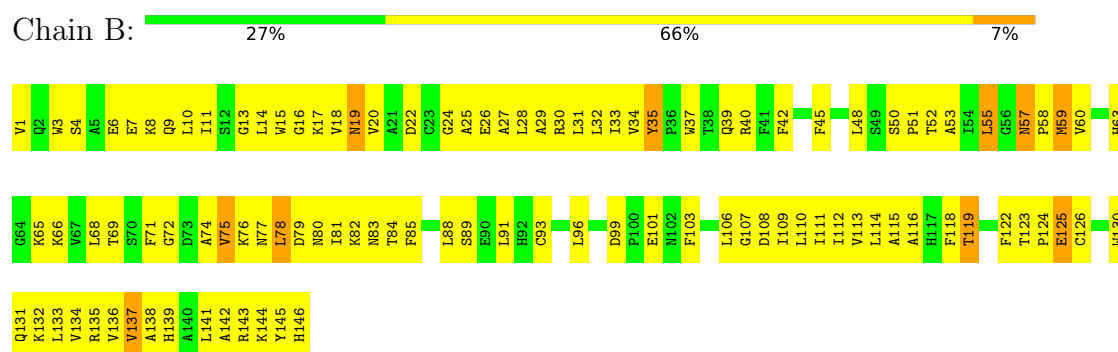
• Molecule 1: Hemoglobin subunit alpha-A



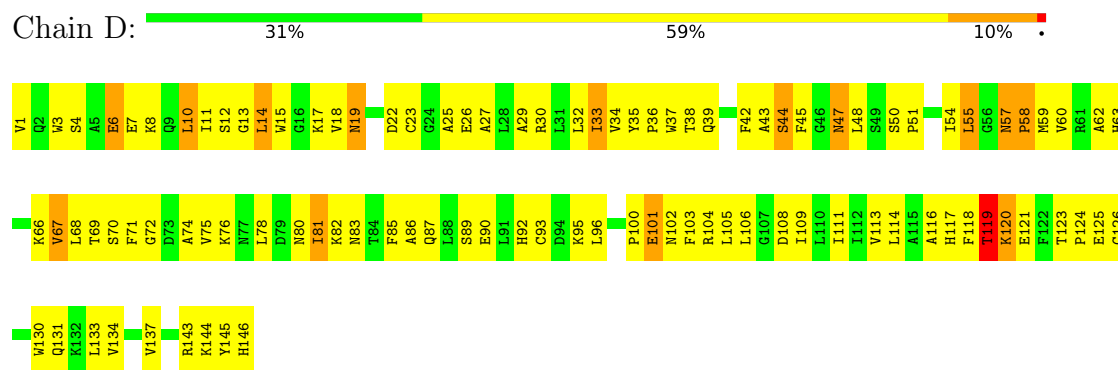
- Molecule 1: Hemoglobin subunit alpha-A



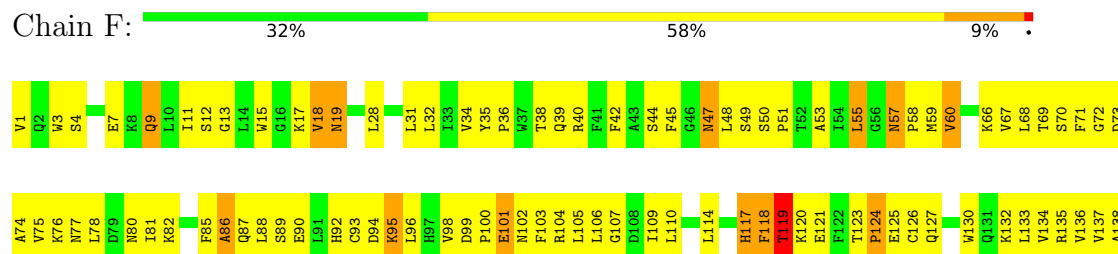
- Molecule 2: Hemoglobin subunit beta



- Molecule 2: Hemoglobin subunit beta



- Molecule 2: Hemoglobin subunit beta



H139
A140
L141
A142
R143
K144
Y145
H146

● Molecule 2: Hemoglobin subunit beta



V1	Q2	W3	S4	A5	E6	E7	K8	Q9	L10	I11	L14	W15	V18	N19	V20	A21	D22	E26	A27	L28	A29	R30	L31	L32	I33	V34	Y35	P36	W37	T38	Q39	R40	F41	F42	F45	G46	N47	L48	S49	S50	P51	I54	L55	G56	N57	P58	M59	V60	H63	G64	K65	K66	V67
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L68	T69	S70	F71	G72	D73	A74	W75	K76	N77	L78	K81	K82	N83	T84	F85	L88	S89	E90	L91	H92	C93	D94	K95	L96	H97	V98	D99	P100	E101	N102	F103	R104	L105	L106	G107	D108	I109	L110	I111	I112	V113	F118	P124	E125	A129	W130	Q131	K132	L133	V136	V137	A138	H139
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A140
L141
A142
R143
K144
Y145
H146

4 Data and refinement statistics

Property	Value	Source
Space group	P 41	Depositor
Cell constants a, b, c, α , β , γ	82.05Å 82.05Å 214.93Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	28.75 – 3.41 28.75 – 3.41	Depositor EDS
% Data completeness (in resolution range)	75.8 (28.75-3.41) 75.8 (28.75-3.41)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.40 (at 3.39Å)	Xtriage
Refinement program	REFMAC 5.5.0066	Depositor
R, R_{free}	0.265 , 0.354 0.266 , 0.353	Depositor DCC
R_{free} test set	1534 reflections (7.99%)	wwPDB-VP
Wilson B-factor (Å ²)	70.3	Xtriage
Anisotropy	0.104	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.35 , 82.8	EDS
L-test for twinning ²	$\langle L \rangle = 0.38$, $\langle L^2 \rangle = 0.21$	Xtriage
Estimated twinning fraction	0.388 for h,-k,-l	Xtriage
F_o, F_c correlation	0.93	EDS
Total number of atoms	9314	wwPDB-VP
Average B, all atoms (Å ²)	47.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 16.37% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

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

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: 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	0.41	0/1116	0.80	0/1510
1	C	0.41	0/1115	0.79	4/1510 (0.3%)
1	E	0.39	0/1116	0.76	4/1510 (0.3%)
1	G	0.41	0/1115	0.78	4/1510 (0.3%)
2	B	0.40	0/1180	0.81	2/1600 (0.1%)
2	D	0.49	0/1180	0.88	4/1600 (0.2%)
2	F	0.56	1/1180 (0.1%)	0.85	5/1600 (0.3%)
2	H	0.39	0/1180	0.81	2/1600 (0.1%)
All	All	0.44	1/9182 (0.0%)	0.81	25/12440 (0.2%)

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	F	119	THR	C-N	9.33	1.46	1.33

The worst 5 of 25 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	F	117	HIS	N-CA-C	-9.15	102.51	114.31
2	D	119	THR	CB-CA-C	-8.67	105.44	117.23
1	C	36	TYR	CA-C-N	7.25	127.25	119.28
1	C	36	TYR	C-N-CA	7.25	127.25	119.28
2	F	118	PHE	O-C-N	7.19	130.94	122.24

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	1091	0	1103	172	0
1	C	1090	0	1106	163	0
1	E	1091	0	1106	190	0
1	G	1090	0	1106	196	0
2	B	1152	0	1166	165	0
2	D	1152	0	1166	173	0
2	F	1152	0	1165	179	0
2	H	1152	0	1166	184	0
3	A	43	0	30	19	0
3	B	43	0	30	22	0
3	C	43	0	30	9	0
3	D	43	0	30	7	0
3	E	43	0	30	8	0
3	F	43	0	30	31	0
3	G	43	0	30	18	0
3	H	43	0	30	19	0
All	All	9314	0	9324	1412	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 76.

The worst 5 of 1412 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:D:57:ASN:CG	2:D:60:VAL:HG23	1.30	1.57
2:H:3:TRP:CZ3	2:H:132:LYS:HE2	1.37	1.57
2:F:42:PHE:CE1	3:F:150:HEM:HMD1	1.44	1.52
1:C:82:LYS:CE	1:C:83:LEU:HD12	1.46	1.44
2:D:119:THR:CG2	2:D:120:LYS:H	1.04	1.40

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	139/141 (99%)	105 (76%)	18 (13%)	16 (12%)	0	2
1	C	139/141 (99%)	100 (72%)	29 (21%)	10 (7%)	1	5
1	E	139/141 (99%)	103 (74%)	22 (16%)	14 (10%)	0	3
1	G	139/141 (99%)	106 (76%)	28 (20%)	5 (4%)	2	16
2	B	144/146 (99%)	119 (83%)	20 (14%)	5 (4%)	3	16
2	D	144/146 (99%)	124 (86%)	15 (10%)	5 (4%)	3	16
2	F	144/146 (99%)	119 (83%)	20 (14%)	5 (4%)	3	16
2	H	144/146 (99%)	126 (88%)	14 (10%)	4 (3%)	4	19
All	All	1132/1148 (99%)	902 (80%)	166 (15%)	64 (6%)	1	9

5 of 64 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	17	ILE
1	A	19	SER
1	A	50	HIS
1	A	77	SER
1	A	78	GLY

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	118/118 (100%)	110 (93%)	8 (7%)	14	39

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	C	118/118 (100%)	110 (93%)	8 (7%)	14	39
1	E	118/118 (100%)	112 (95%)	6 (5%)	21	47
1	G	118/118 (100%)	103 (87%)	15 (13%)	4	17
2	B	121/121 (100%)	112 (93%)	9 (7%)	13	37
2	D	121/121 (100%)	112 (93%)	9 (7%)	13	37
2	F	121/121 (100%)	112 (93%)	9 (7%)	13	37
2	H	121/121 (100%)	114 (94%)	7 (6%)	18	43
All	All	956/956 (100%)	885 (93%)	71 (7%)	13	37

5 of 71 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	G	101	LEU
1	G	108	VAL
2	H	14	LEU
1	C	139	LYS
1	C	125	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 45 such sidechains are listed below:

Mol	Chain	Res	Type
2	F	2	GLN
2	F	117	HIS
2	F	9	GLN
2	F	57	ASN
1	G	58	HIS

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

8 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	HEM	D	150	2	50,50,50	1.93	10 (20%)	67,82,82	1.39	7 (10%)
3	HEM	H	150	2	50,50,50	1.87	9 (18%)	67,82,82	1.34	7 (10%)
3	HEM	E	150	1	50,50,50	1.88	7 (14%)	67,82,82	1.32	3 (4%)
3	HEM	F	150	2	50,50,50	1.99	10 (20%)	67,82,82	1.37	7 (10%)
3	HEM	B	150	2	50,50,50	1.95	9 (18%)	67,82,82	1.44	8 (11%)
3	HEM	A	150	1	50,50,50	2.00	7 (14%)	67,82,82	1.43	7 (10%)
3	HEM	G	150	1	50,50,50	1.97	8 (16%)	67,82,82	1.48	7 (10%)
3	HEM	C	150	1	50,50,50	2.08	9 (18%)	67,82,82	1.30	4 (5%)

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	HEM	D	150	2	-	12/14/54/54	-
3	HEM	H	150	2	-	9/14/54/54	-
3	HEM	E	150	1	-	7/14/54/54	-
3	HEM	F	150	2	-	8/14/54/54	-
3	HEM	B	150	2	-	7/14/54/54	-
3	HEM	A	150	1	-	7/14/54/54	-
3	HEM	G	150	1	-	7/14/54/54	-
3	HEM	C	150	1	-	10/14/54/54	-

The worst 5 of 69 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	B	150	HEM	C3D-C2D	8.20	1.54	1.36
3	C	150	HEM	C3D-C2D	8.14	1.54	1.36
3	D	150	HEM	C3D-C2D	8.07	1.54	1.36
3	A	150	HEM	C3D-C2D	7.98	1.54	1.36
3	F	150	HEM	C3D-C2D	7.93	1.53	1.36

The worst 5 of 50 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	B	150	HEM	C4D-ND-C1D	6.04	112.36	105.21
3	D	150	HEM	C4D-ND-C1D	5.89	112.18	105.21
3	A	150	HEM	C4D-ND-C1D	5.83	112.11	105.21
3	G	150	HEM	C4D-ND-C1D	5.73	111.99	105.21
3	H	150	HEM	C4D-ND-C1D	5.64	111.89	105.21

There are no chirality outliers.

5 of 67 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	150	HEM	C2C-C3C-CAC-CBC
3	B	150	HEM	C2A-CAA-CBA-CGA
3	C	150	HEM	C2B-C3B-CAB-CBB
3	C	150	HEM	C2C-C3C-CAC-CBC
3	D	150	HEM	C1A-C2A-CAA-CBA

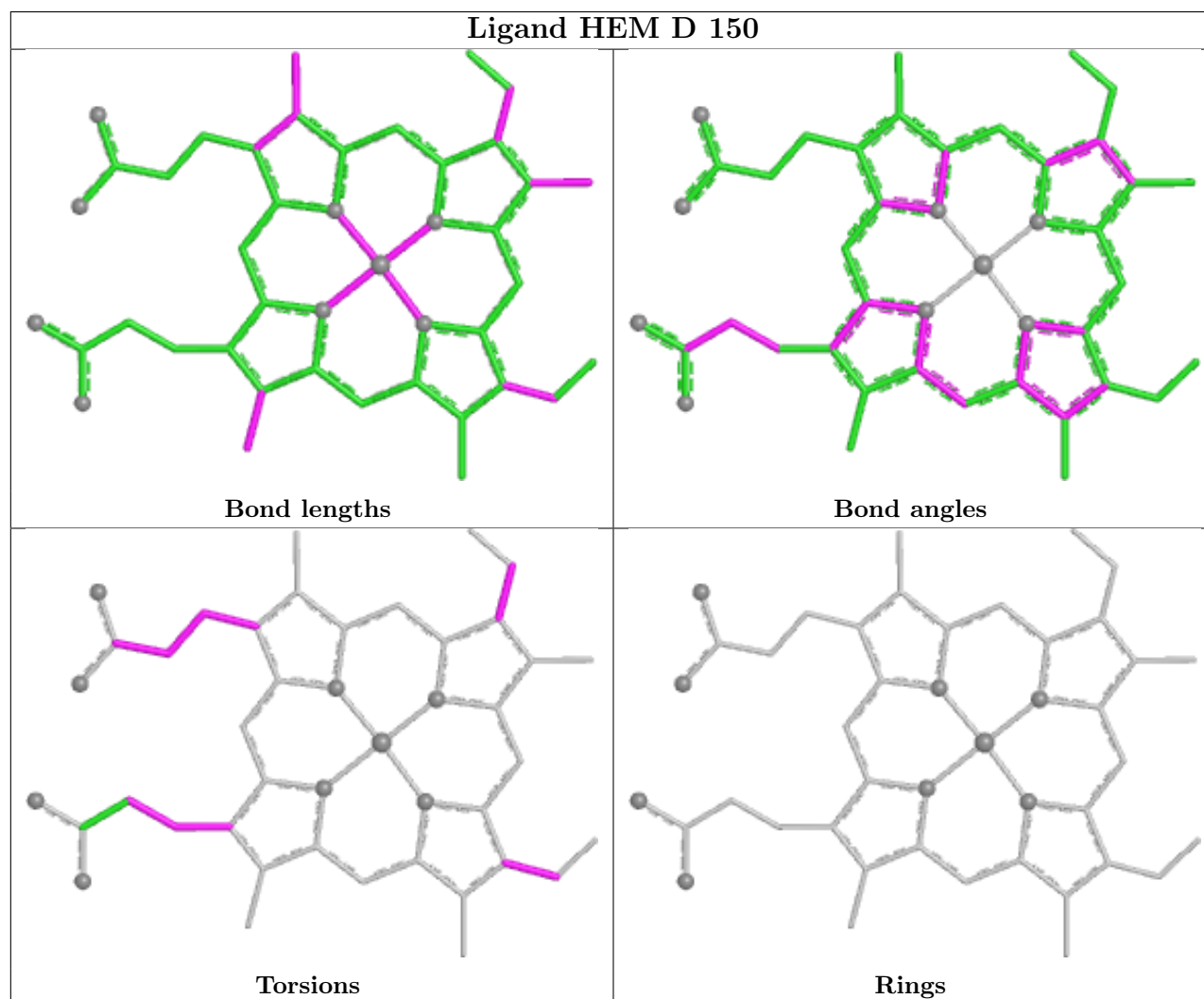
There are no ring outliers.

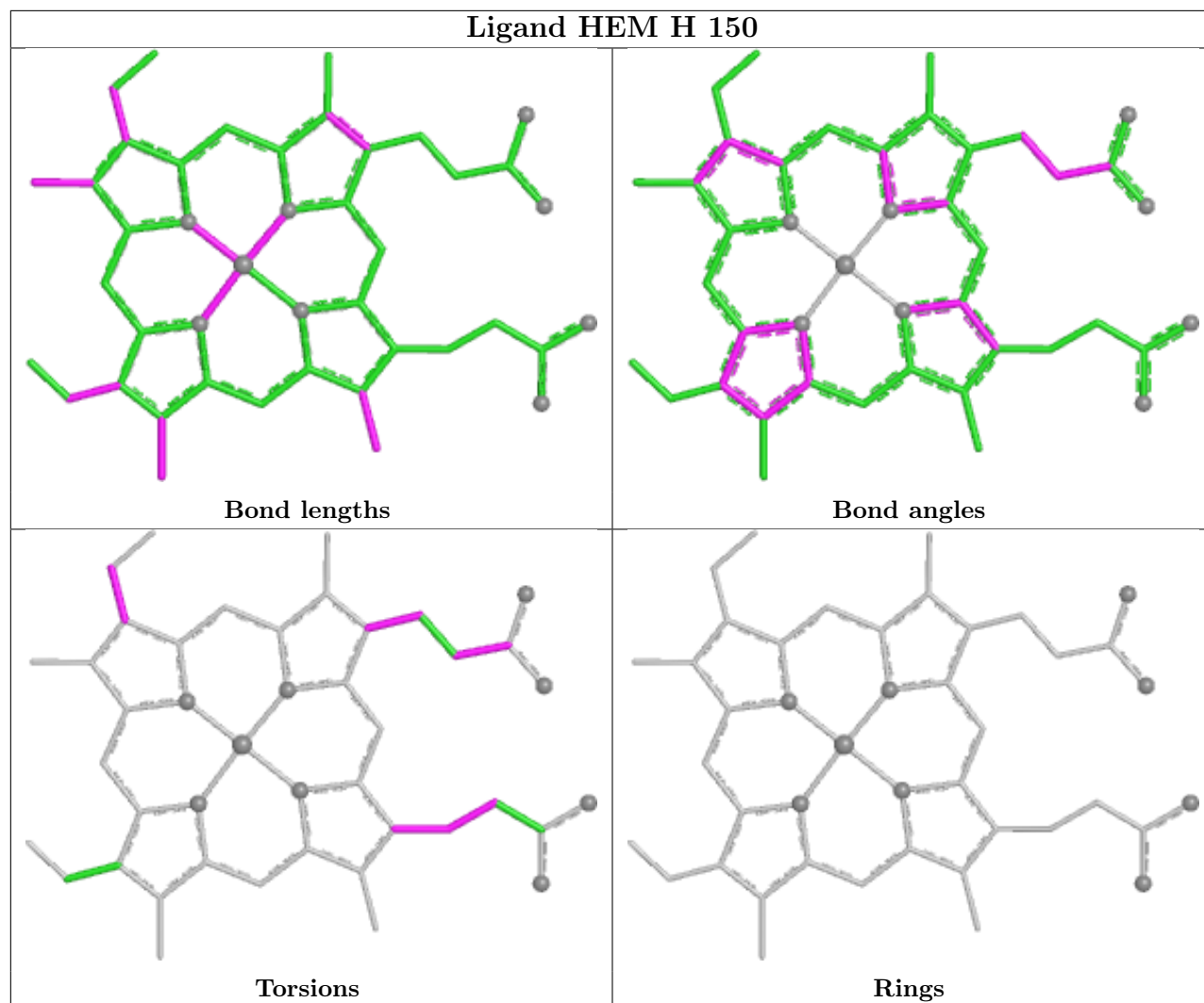
8 monomers are involved in 133 short contacts:

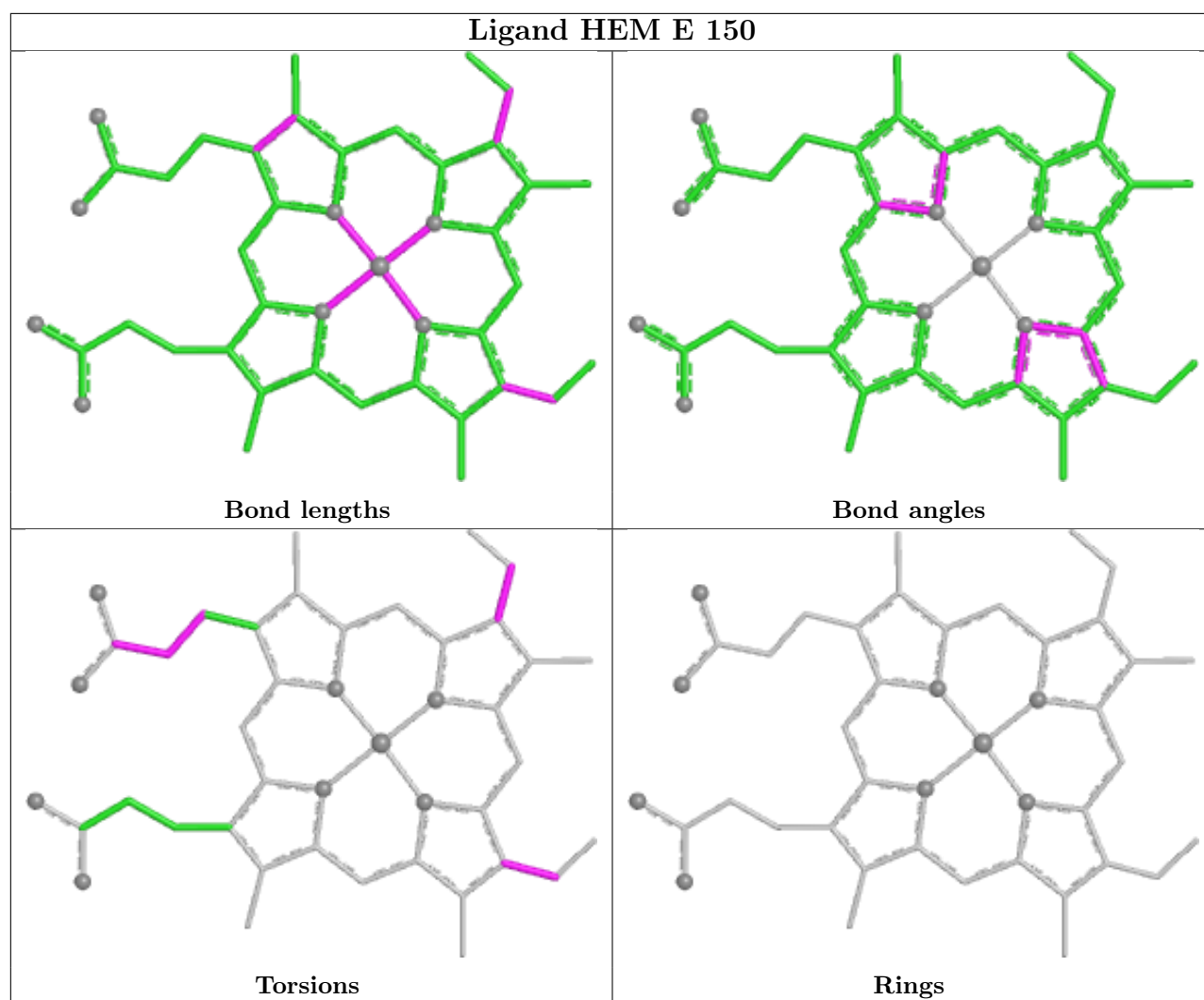
Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	D	150	HEM	7	0
3	H	150	HEM	19	0
3	E	150	HEM	8	0
3	F	150	HEM	31	0
3	B	150	HEM	22	0
3	A	150	HEM	19	0
3	G	150	HEM	18	0
3	C	150	HEM	9	0

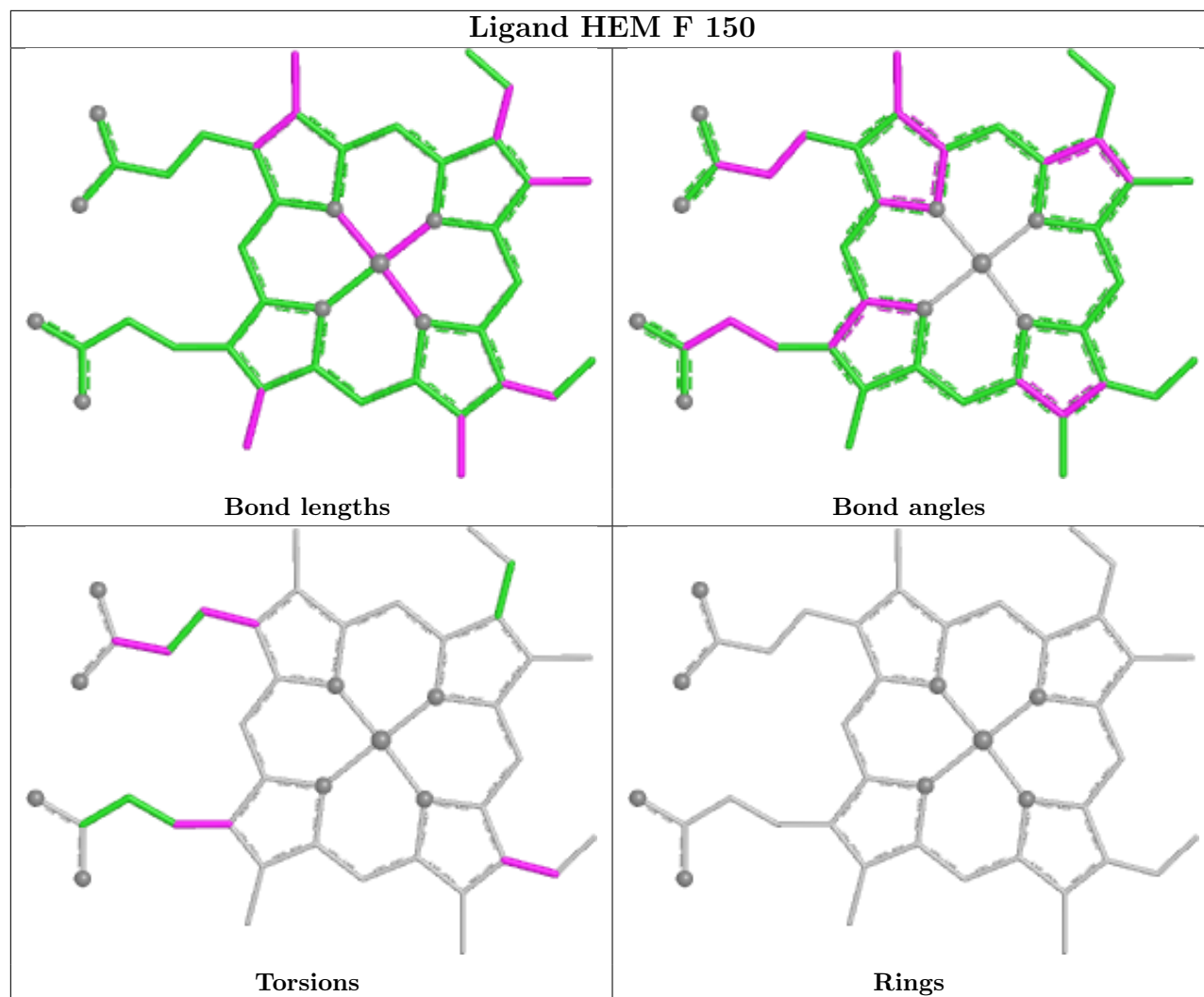
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will

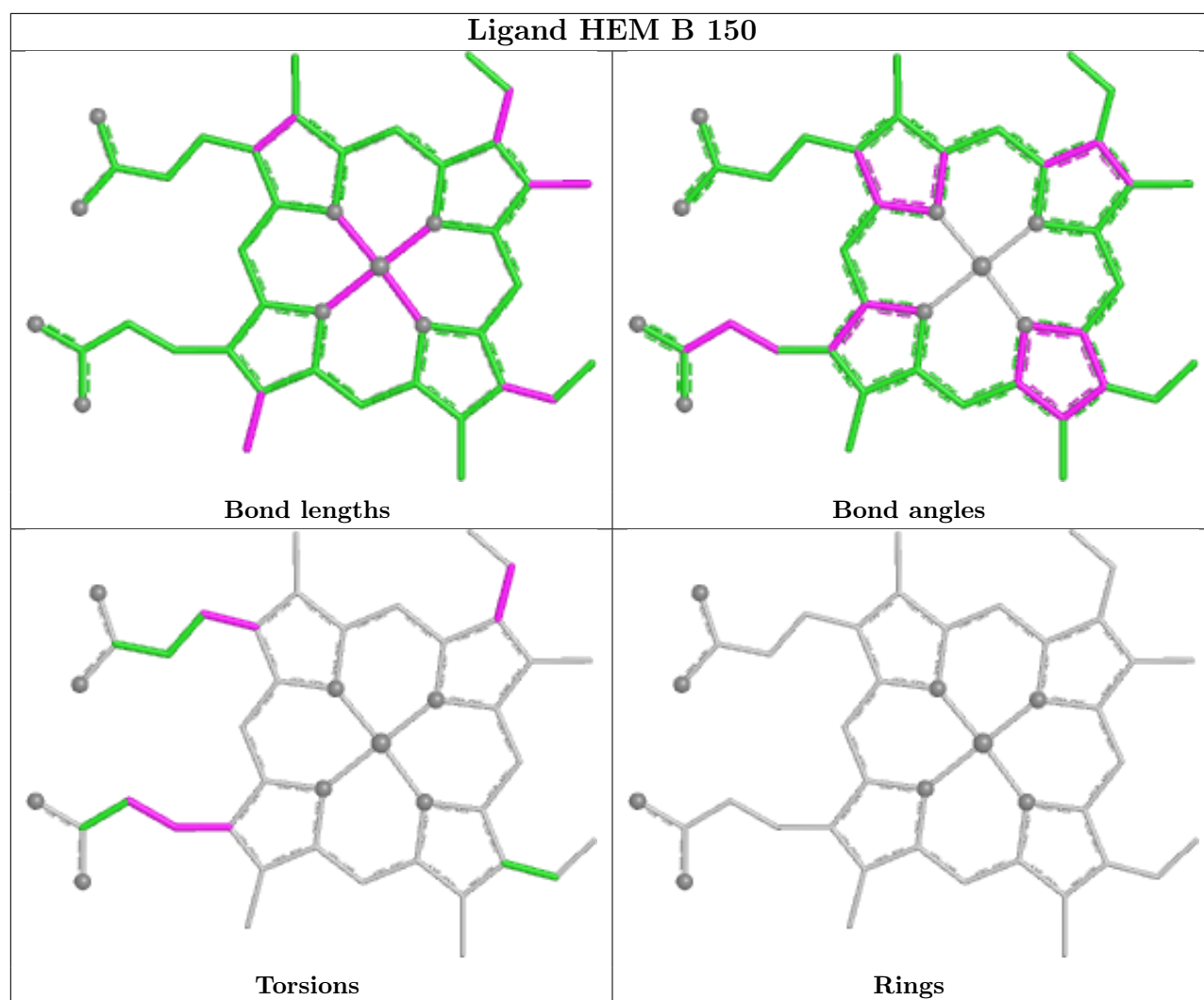
also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted 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.

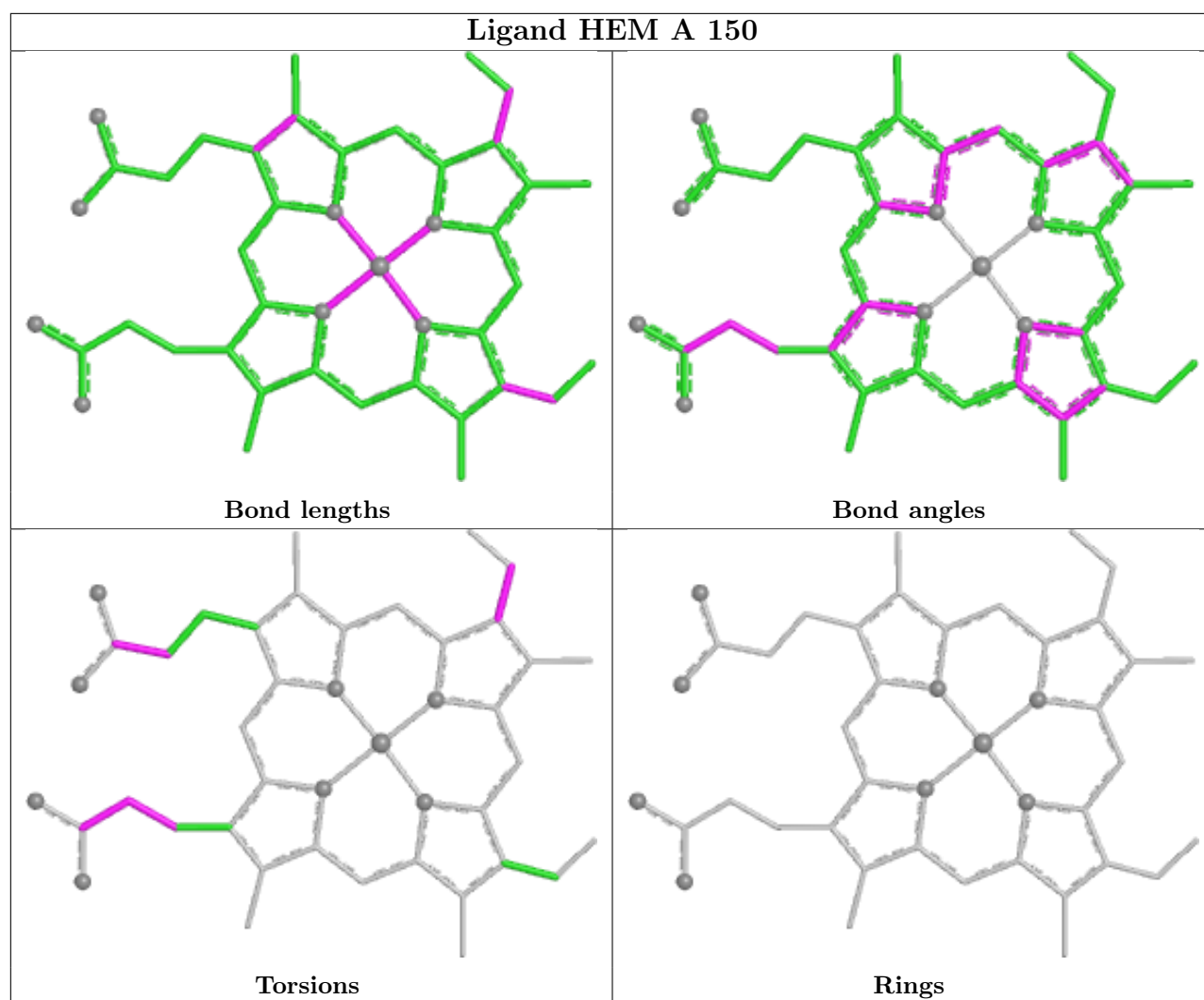


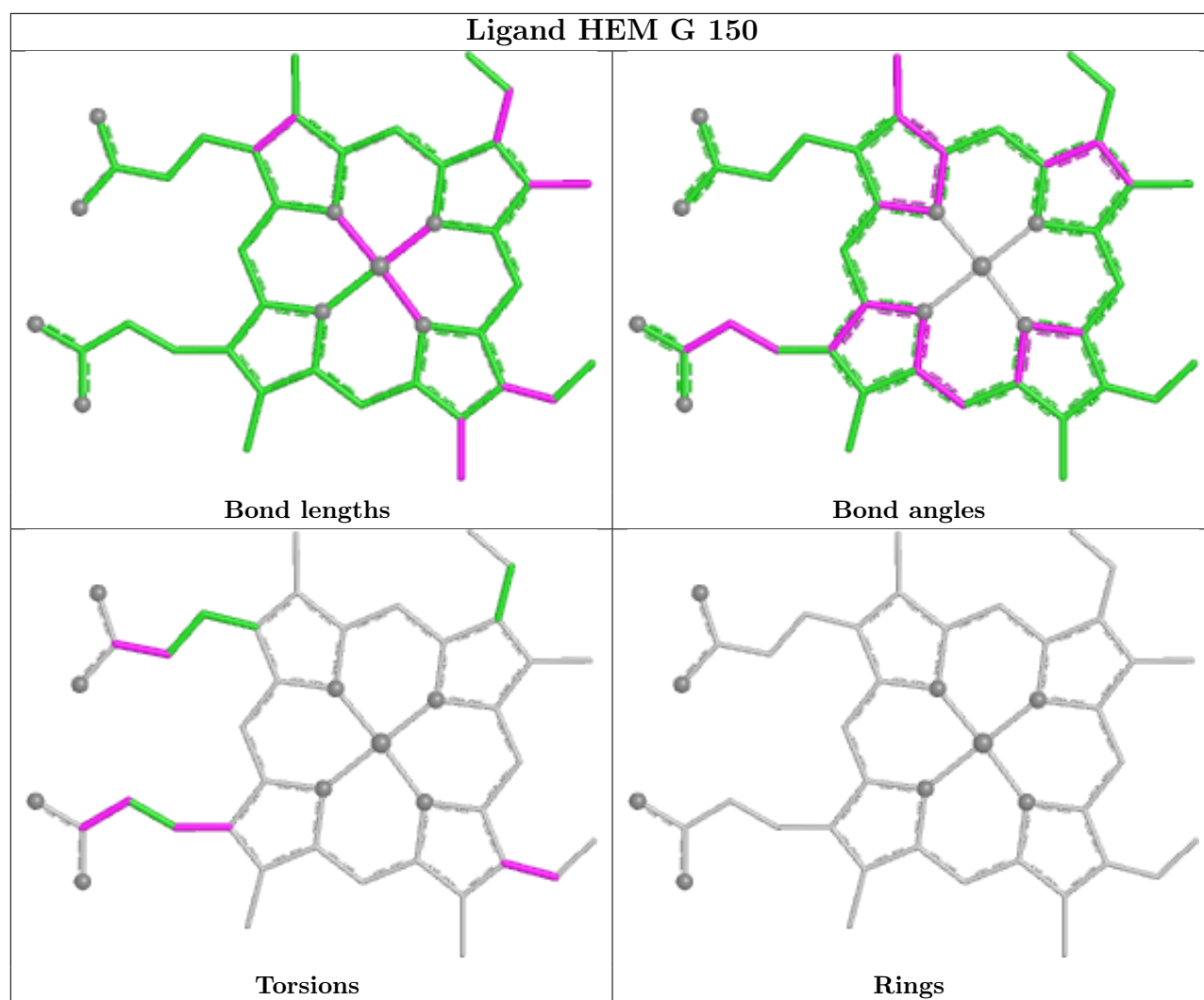


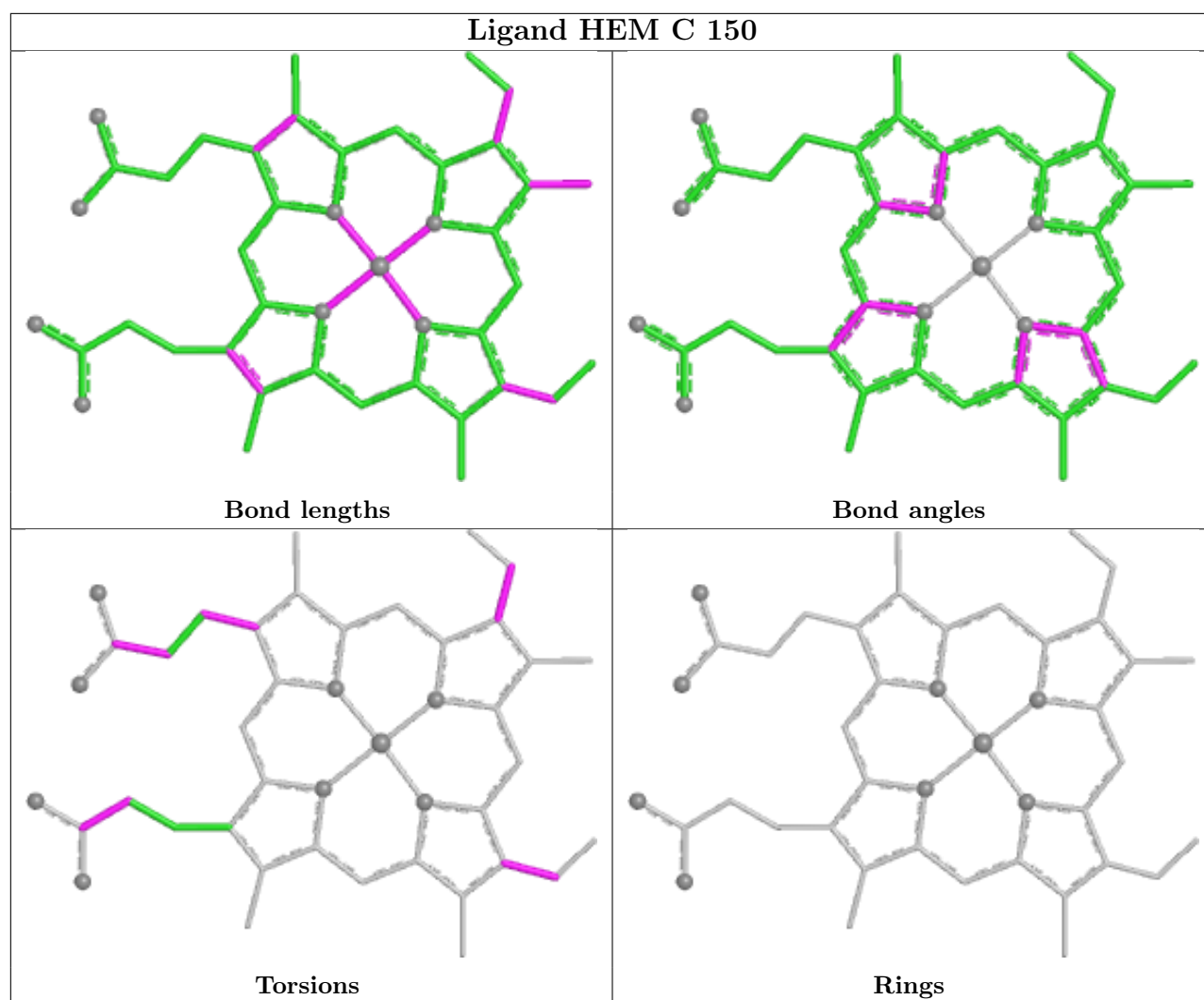












5.7 Other polymers [i](#)

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 [i](#)

6.1 Protein, DNA and RNA chains [i](#)

In the following table, the column labelled ‘#RSRZ> 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95th percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled ‘Q< 0.9’ lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
1	A	141/141 (100%)	-1.35	0 100 100	26, 49, 67, 68	0
1	C	141/141 (100%)	-1.40	0 100 100	31, 49, 64, 68	0
1	E	141/141 (100%)	-1.37	0 100 100	29, 50, 71, 71	0
1	G	141/141 (100%)	-1.30	0 100 100	31, 49, 66, 67	0
2	B	146/146 (100%)	-1.39	0 100 100	28, 43, 61, 67	0
2	D	146/146 (100%)	-1.42	0 100 100	31, 49, 64, 70	0
2	F	146/146 (100%)	-1.42	0 100 100	31, 45, 60, 68	0
2	H	146/146 (100%)	-1.39	0 100 100	28, 47, 58, 65	0
All	All	1148/1148 (100%)	-1.38	0 100 100	26, 48, 66, 71	0

There are no RSRZ outliers to report.

6.2 Non-standard residues in protein, DNA, RNA chains [i](#)

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

6.3 Carbohydrates [i](#)

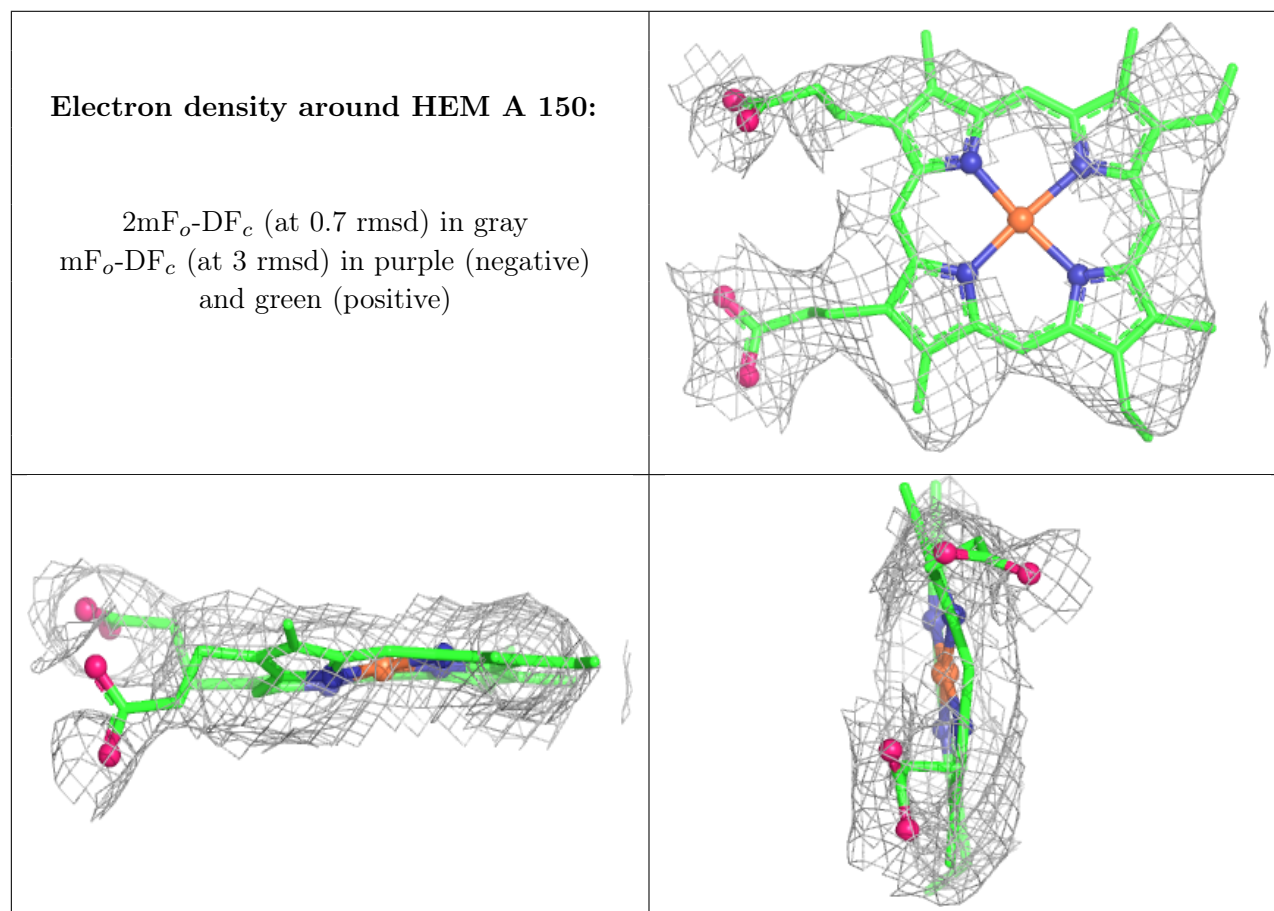
There are no oligosaccharides in this entry.

6.4 Ligands [i](#)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled ‘Q< 0.9’ lists the number of atoms with occupancy less than 0.9.

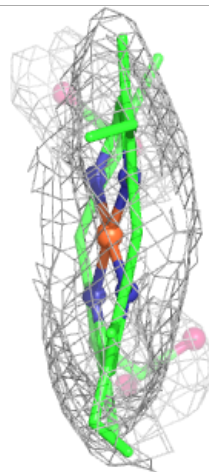
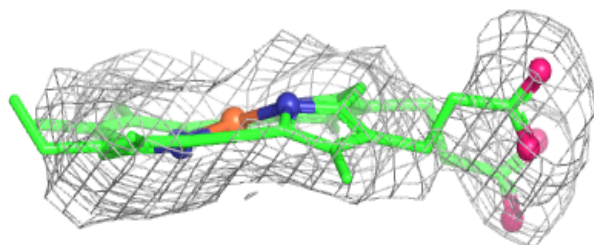
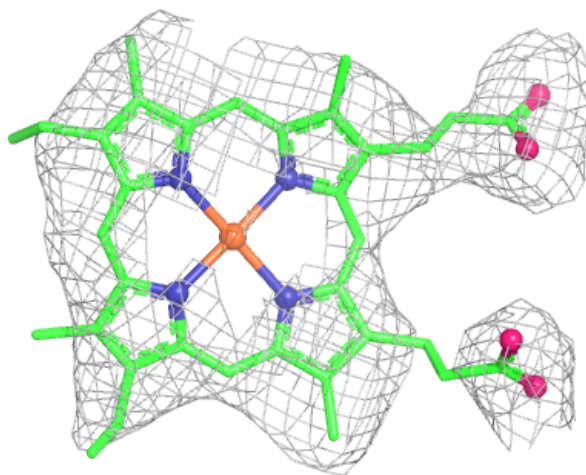
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
3	HEM	A	150	43/43	0.99	0.04	34,36,39,41	0
3	HEM	C	150	43/43	0.99	0.03	37,39,41,42	0
3	HEM	D	150	43/43	0.99	0.05	44,45,50,52	0
3	HEM	E	150	43/43	0.99	0.04	35,37,40,41	0
3	HEM	F	150	43/43	0.99	0.04	41,43,45,45	0
3	HEM	H	150	43/43	0.99	0.04	45,46,50,52	0
3	HEM	G	150	43/43	1.00	0.02	28,32,35,37	0
3	HEM	B	150	43/43	1.00	0.03	44,45,46,46	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.



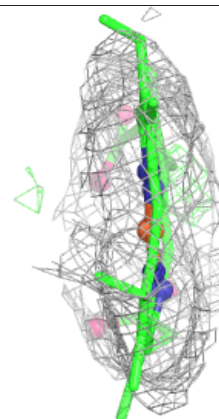
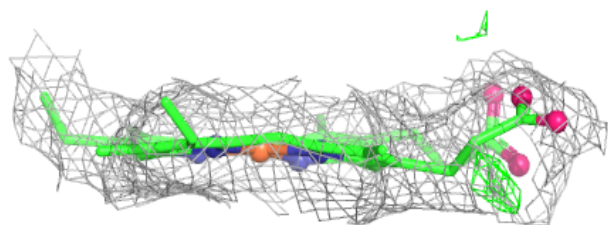
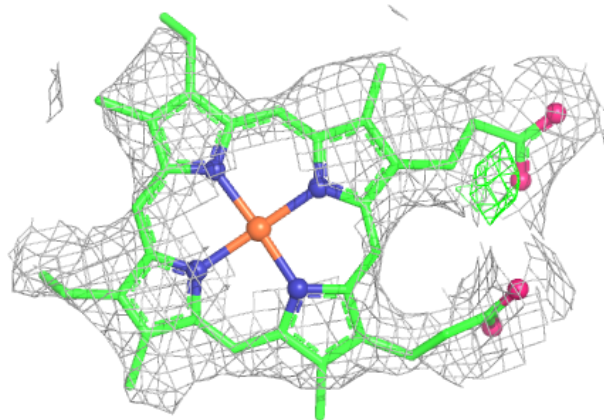
Electron density around HEM C 150:

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



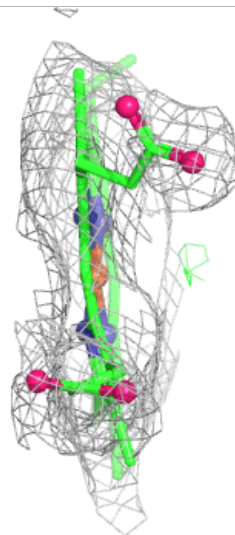
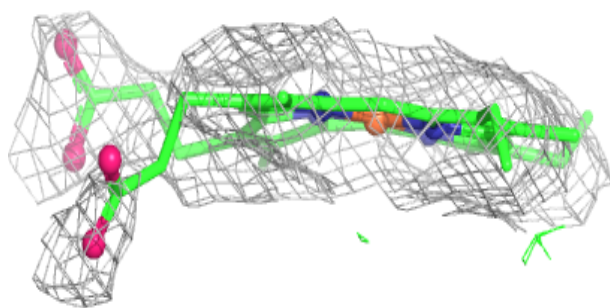
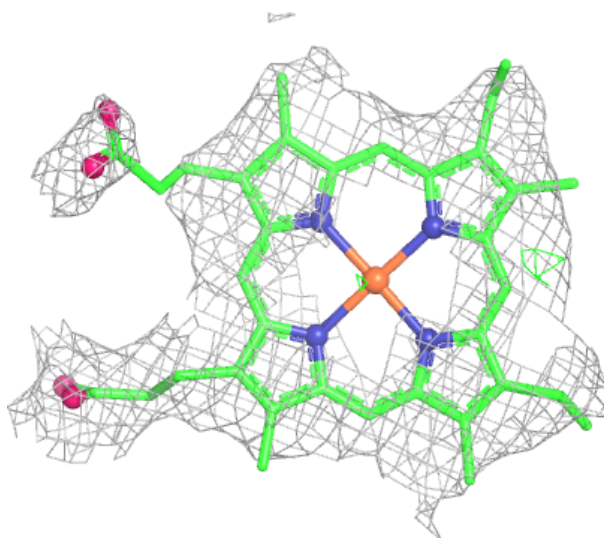
Electron density around HEM D 150:

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



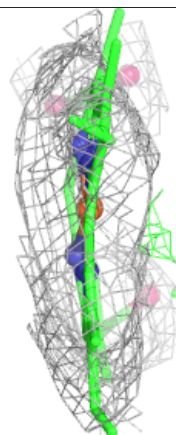
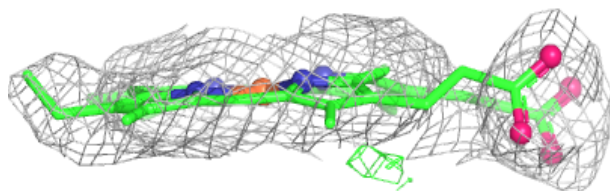
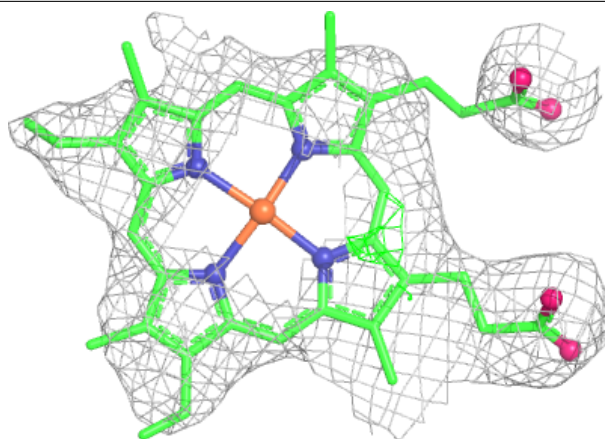
Electron density around HEM E 150:

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



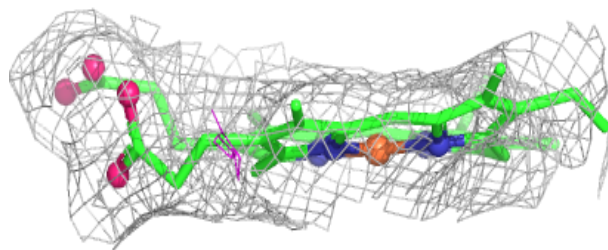
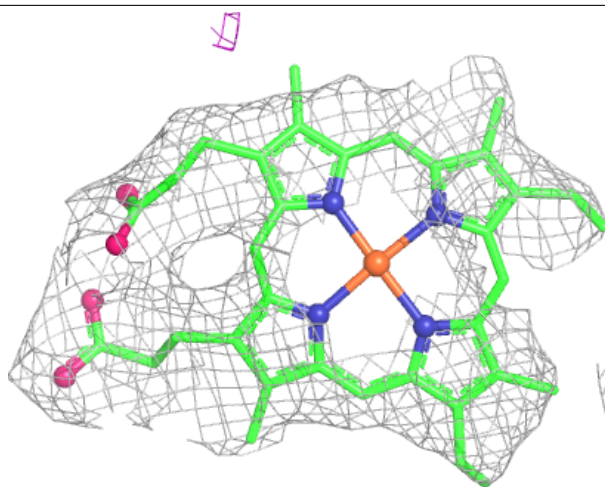
Electron density around HEM F 150:

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



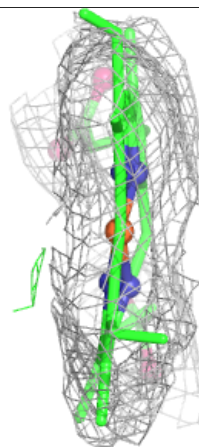
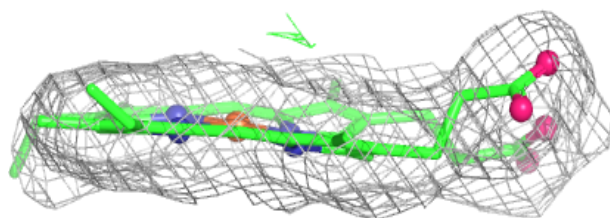
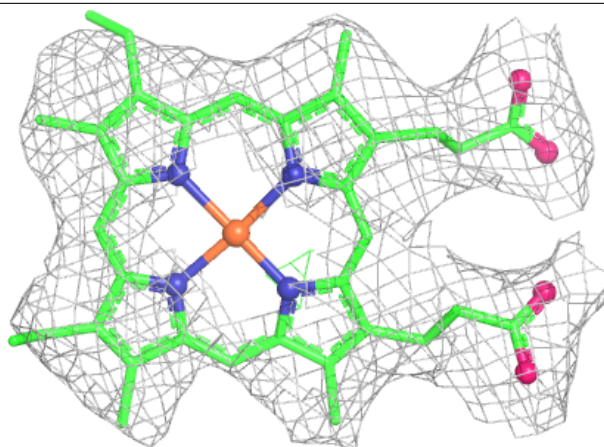
Electron density around HEM H 150:

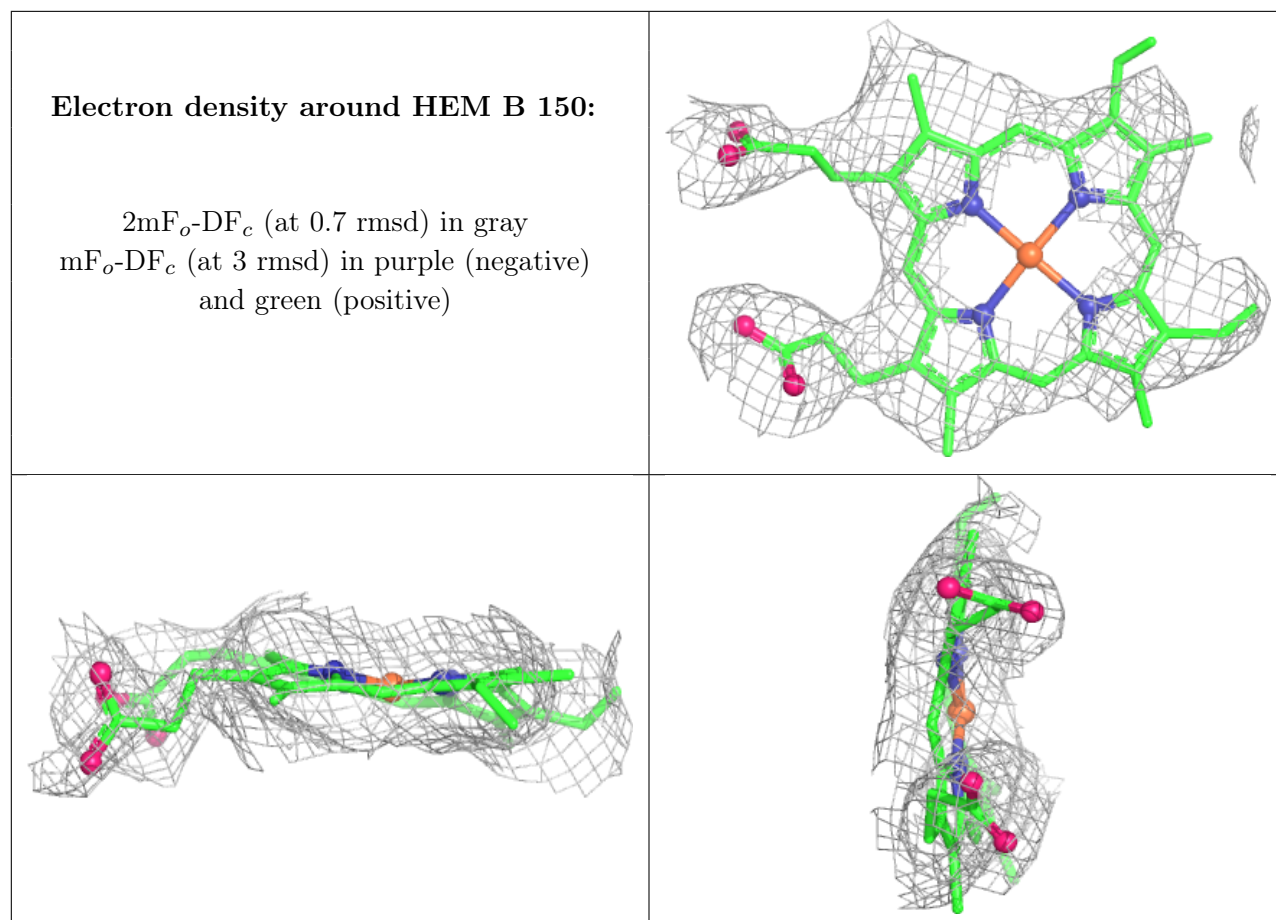
$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



Electron density around HEM G 150:

$2mF_o-DF_c$ (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.