



Full wwPDB X-ray Structure Validation Report ⓘ

May 26, 2020 – 06:21 am BST

PDB ID : 6NG5
Title : Structure of human neuronal nitric oxide synthase R354A/G357D mutant heme domain in complex with (R)-6-(3-fluoro-5-(2-(1-methylpyrrolidin-2-yl)ethyl)phenethyl)-4-methylpyridin-2-amine
Authors : Li, H.; Poulos, T.L.
Deposited on : 2018-12-21
Resolution : 1.96 Å(reported)

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

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

A user guide is available at

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

with specific help available everywhere you see the ⓘ symbol.

The 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 : 2.11
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) : 2.11

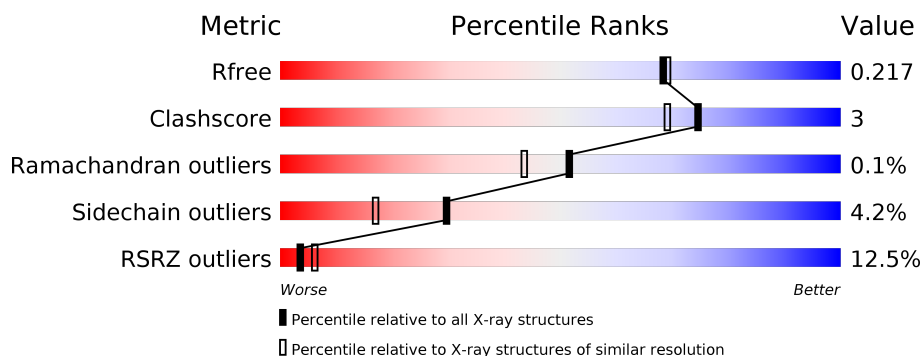
1 Overall quality at a glance ⓘ

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.96 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	2580 (1.96-1.96)
Clashscore	141614	2705 (1.96-1.96)
Ramachandran outliers	138981	2678 (1.96-1.96)
Sidechain outliers	138945	2678 (1.96-1.96)
RSRZ outliers	127900	2539 (1.96-1.96)

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 on 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	421	<div> <div>9%</div> <div>88%</div> <div>10%</div> <div>••</div> </div>
1	B	421	<div> <div>16%</div> <div>88%</div> <div>9%</div> <div>••</div> </div>

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.

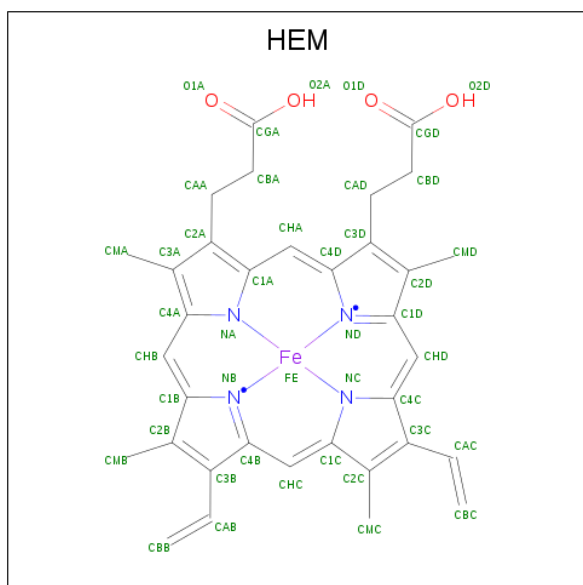
- Molecule 1 is a protein called Nitric oxide synthase, brain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	414	Total 3383	C 2166	N 575	O 619	S 23	0	3	0
1	B	410	Total 3349	C 2145	N 571	O 612	S 21	0	2	0

There are 4 discrepancies between the modelled and reference sequences:

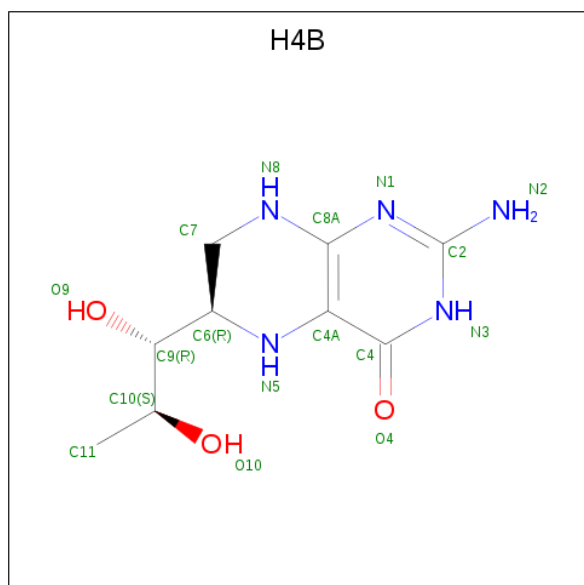
Chain	Residue	Modelled	Actual	Comment	Reference
A	354	ALA	ARG	engineered mutation	UNP P29475
A	357	ASP	GLY	engineered mutation	UNP P29475
B	354	ALA	ARG	engineered mutation	UNP P29475
B	357	ASP	GLY	engineered mutation	UNP P29475

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



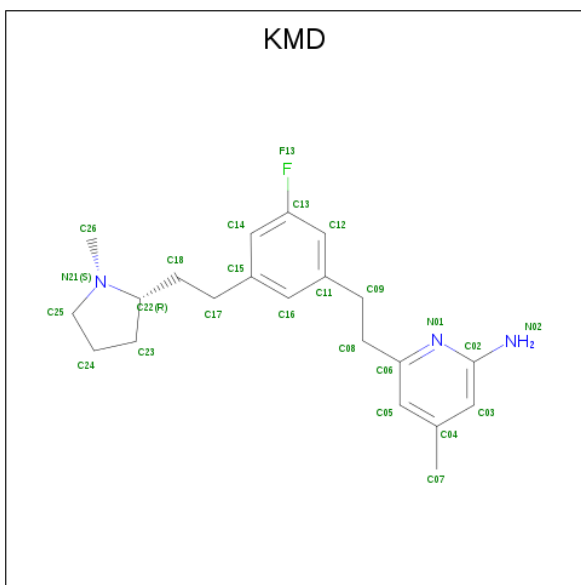
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	A	1	Total 43	C 34	Fe 1	N 4	O 4	0	0
2	B	1	Total 43	C 34	Fe 1	N 4	O 4	0	0

- Molecule 3 is 5,6,7,8-TETRAHYDROBIOPTERIN (three-letter code: H4B) (formula: $C_9H_{15}N_5O_3$).



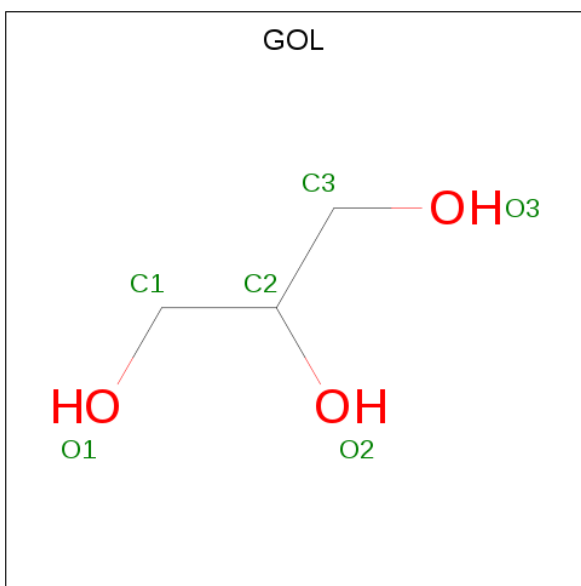
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
3	A	1	Total	C	N	O	0	0
			17	9	5	3		
3	B	1	Total	C	N	O	0	0
			17	9	5	3		

- Molecule 4 is 6-[2-(3-fluoro-5-{2-[(2R)-1-methylpyrrolidin-2-yl]ethyl}phenyl)ethyl]-4-methylpyridin-2-amine (three-letter code: KMD) (formula: $C_{21}H_{28}FN_3$).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
4	A	1	Total	C	F	N	0	0
			25	21	1	3		
4	B	1	Total	C	F	N	0	0
			25	21	1	3		

- Molecule 5 is GLYCEROL (three-letter code: GOL) (formula: $C_3H_8O_3$).



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

- Molecule 6 is ZINC ION (three-letter code: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	A	1	Total 1	Zn 1	0	0

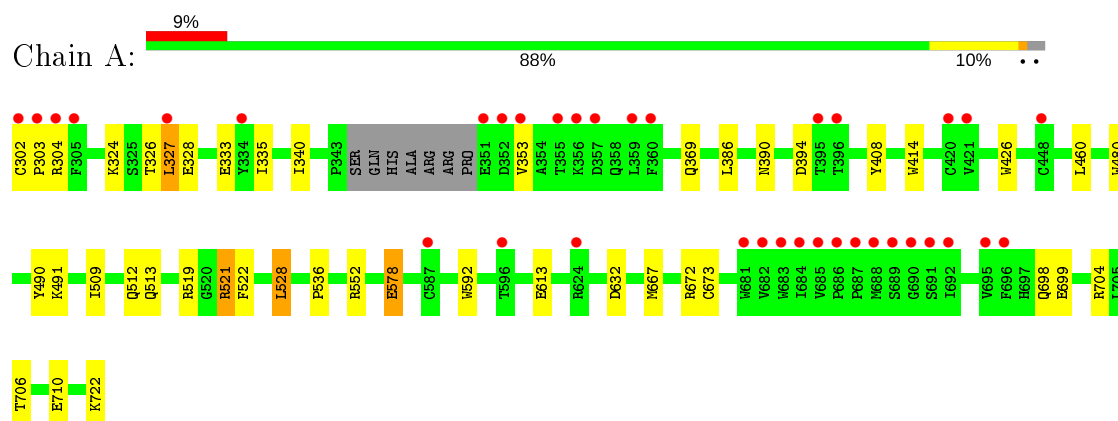
- Molecule 7 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
7	A	315	Total 315	O 315	0	0
7	B	224	Total 224	O 224	0	0

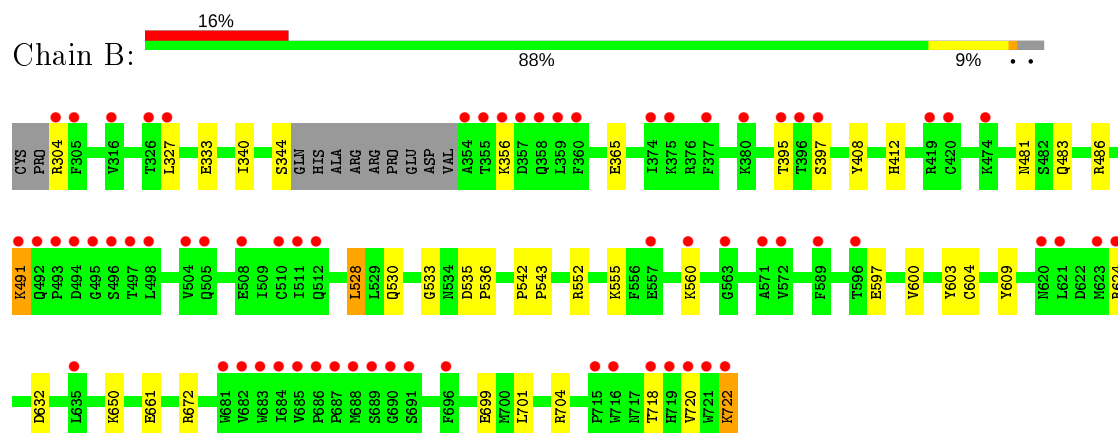
3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA and DNA 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: Nitric oxide synthase, brain



- Molecule 1: Nitric oxide synthase, brain



4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	52.41Å 122.06Å 164.91Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	39.06 – 1.96 39.06 – 1.96	Depositor EDS
% Data completeness (in resolution range)	97.7 (39.06-1.96) 97.9 (39.06-1.96)	Depositor EDS
R_{merge}	0.11	Depositor
R_{sym}	0.11	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.71 (at 1.97Å)	Xtriage
Refinement program	PHENIX (1.11.1-2575_1496: ???)	Depositor
R, R_{free}	0.177 , 0.216 0.177 , 0.217	Depositor DCC
R_{free} test set	3702 reflections (4.92%)	wwPDB-VP
Wilson B-factor (Å ²)	40.9	Xtriage
Anisotropy	0.484	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.33 , 51.3	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.97	EDS
Total number of atoms	7454	wwPDB-VP
Average B, all atoms (Å ²)	56.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.55% 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: GOL, ZN, KMD, H4B, 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	0.38	0/3488	0.54	0/4732
1	B	0.36	0/3450	0.52	0/4679
All	All	0.37	0/6938	0.53	0/9411

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	3383	0	3293	25	0
1	B	3349	0	3262	19	0
2	A	43	0	30	2	0
2	B	43	0	30	1	0
3	A	17	0	15	0	0
3	B	17	0	15	0	0
4	A	25	0	0	0	0
4	B	25	0	0	2	0
5	A	6	0	8	0	0
5	B	6	0	8	0	0
6	A	1	0	0	0	0

Continued on next page...

Continued from previous page...

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
7	A	315	0	0	3	1
7	B	224	0	0	2	1
All	All	7454	0	6661	44	1

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 3.

All (44) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:528:LEU:HD22	1:A:536:PRO:HB2	1.75	0.67
2:B:801:HEM:HBB2	2:B:801:HEM:HHC	1.79	0.64
2:A:801:HEM:HMC2	2:A:801:HEM:HBC2	1.77	0.64
1:A:326:THR:HG21	1:A:706:THR:HG22	1.79	0.64
2:A:801:HEM:HHC	2:A:801:HEM:HBB2	1.81	0.62
1:A:699:GLU:HB3	1:B:340:ILE:HD13	1.85	0.58
1:A:327:LEU:HB2	1:A:704:ARG:NH1	2.20	0.56
1:B:483:GLN:OE1	1:B:486:ARG:HD2	2.04	0.56
1:A:327:LEU:HB2	1:A:704:ARG:HH11	1.69	0.56
1:B:528:LEU:HD22	1:B:536:PRO:HB2	1.85	0.56
1:B:530:GLN:HE21	1:B:533:GLY:HA2	1.72	0.55
1:A:667:MET:HE1	1:A:698:GLN:HG2	1.89	0.53
1:A:480:TRP:HB2	1:A:528:LEU:HB3	1.91	0.52
1:A:704:ARG:NE	1:A:710:GLU:OE2	2.33	0.52
1:B:661:GLU:HG3	7:B:1007:HOH:O	2.07	0.52
1:A:722:LYS:HE2	7:A:1049:HOH:O	2.10	0.51
1:A:490:TYR:CE1	1:A:519:ARG:HA	2.46	0.51
1:A:578:GLU:OE1	7:A:901:HOH:O	2.19	0.49
1:B:672:ARG:NH1	7:B:903:HOH:O	2.31	0.49
1:A:460:LEU:HD12	1:A:592:TRP:HB3	1.95	0.48
1:A:512:GLN:HG3	7:A:1122:HOH:O	2.12	0.47
1:A:327:LEU:HB2	1:A:704:ARG:HD3	1.97	0.47
1:B:597:GLU:OE2	4:B:803:KMD:N02	2.48	0.46
1:A:414:TRP:CE3	1:A:426:TRP:HA	2.51	0.46
1:A:327:LEU:CB	1:A:704:ARG:HD3	2.46	0.45
1:B:408:TYR:CE1	1:B:412:HIS:CE1	3.05	0.45
1:B:327:LEU:HD12	1:B:704:ARG:HD3	1.98	0.44
1:A:509:ILE:O	1:A:513:GLN:HG2	2.18	0.44
1:A:335:ILE:HD11	1:B:701:LEU:HB3	2.00	0.44
1:B:333:GLU:OE1	1:B:333:GLU:N	2.51	0.43
1:A:304:ARG:HH11	1:A:304:ARG:HB3	1.85	0.42

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:483:GLN:HG2	4:B:803:KMD:C13	2.49	0.42
1:A:327:LEU:HD13	1:A:327:LEU:HA	1.90	0.42
1:B:535:ASP:OD1	1:B:722:LYS:HB3	2.20	0.41
1:A:340:ILE:HD13	1:B:699:GLU:HB3	2.02	0.41
1:B:491:LYS:HE3	1:B:491:LYS:HB2	1.64	0.41
1:A:302:CYS:SG	1:A:303:PRO:HD2	2.60	0.41
1:B:600:VAL:O	1:B:604:CYS:HB2	2.20	0.41
1:A:521:ARG:HG2	1:A:522:PHE:CE1	2.56	0.41
1:A:327:LEU:HD12	1:A:328:GLU:HG2	2.01	0.41
1:B:356:LYS:HE3	1:B:397:SER:OG	2.21	0.40
1:B:603:TYR:HA	1:B:609:TYR:HB2	2.03	0.40
1:B:542:PRO:HA	1:B:543:PRO:HD3	1.94	0.40
1:A:369:GLN:HG2	1:A:408:TYR:OH	2.21	0.40

All (1) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
7:A:1067:HOH:O	7:B:1101:HOH:O[2_995]	2.16	0.04

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	413/421 (98%)	403 (98%)	9 (2%)	1 (0%)	47	38
1	B	408/421 (97%)	400 (98%)	8 (2%)	0	100	100
All	All	821/842 (98%)	803 (98%)	17 (2%)	1 (0%)	51	43

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	353	VAL

5.3.2 Protein sidechains ⓘ

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	373/376 (99%)	357 (96%)	16 (4%)	29	16
1	B	368/376 (98%)	352 (96%)	16 (4%)	29	16
All	All	741/752 (98%)	709 (96%)	32 (4%)	30	16

All (32) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	324	LYS
1	A	327	LEU
1	A	333	GLU
1	A	386	LEU
1	A	390	ASN
1	A	394	ASP
1	A	491	LYS
1	A	521	ARG
1	A	528	LEU
1	A	552	ARG
1	A	578	GLU
1	A	613	GLU
1	A	632	ASP
1	A	672	ARG
1	A	673[A]	CYS
1	A	673[B]	CYS
1	B	304	ARG
1	B	344	SER
1	B	365	GLU
1	B	395	THR
1	B	481	ASN
1	B	491	LYS
1	B	528	LEU

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	B	552	ARG
1	B	555	LYS
1	B	560	LYS
1	B	624	ARG
1	B	632	ASP
1	B	650	LYS
1	B	718	THR
1	B	720	VAL
1	B	722	LYS

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. There are no such sidechains identified.

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 carbohydrates in this entry.

5.6 Ligand geometry [i](#)

Of 9 ligands modelled in this entry, 1 is monoatomic - leaving 8 for Mogul analysis.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\# Z > 2$	Counts	RMSZ	$\# Z > 2$
5	GOL	A	804	-	5,5,5	0.39	0	5,5,5	0.50	0
5	GOL	B	804	-	5,5,5	0.39	0	5,5,5	0.11	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
4	KMD	A	803	-	27,27,27	0.48	0	32,37,37	2.10	6 (18%)
2	HEM	B	801	1	27,50,50	1.99	7 (25%)	17,82,82	1.80	3 (17%)
3	H4B	B	802	-	16,18,18	0.89	0	11,26,26	2.61	5 (45%)
3	H4B	A	802	-	16,18,18	0.72	0	11,26,26	2.58	5 (45%)
2	HEM	A	801	1	27,50,50	1.95	5 (18%)	17,82,82	1.86	3 (17%)
4	KMD	B	803	-	27,27,27	0.47	0	32,37,37	2.15	7 (21%)

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
5	GOL	A	804	-	-	3/4/4/4	-
5	GOL	B	804	-	-	2/4/4/4	-
4	KMD	A	803	-	-	3/10/20/20	0/3/3/3
2	HEM	B	801	1	-	0/6/54/54	-
3	H4B	B	802	-	-	0/8/17/17	0/2/2/2
3	H4B	A	802	-	-	0/8/17/17	0/2/2/2
2	HEM	A	801	1	-	0/6/54/54	-
4	KMD	B	803	-	-	1/10/20/20	0/3/3/3

All (12) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	801	HEM	C3C-C2C	-4.64	1.33	1.40
2	B	801	HEM	C3B-C2B	-4.41	1.34	1.40
2	A	801	HEM	C3B-C2B	-4.26	1.34	1.40
2	B	801	HEM	C3C-C2C	-4.02	1.34	1.40
2	A	801	HEM	C3B-CAB	3.78	1.55	1.47
2	B	801	HEM	C3B-CAB	3.65	1.55	1.47
2	B	801	HEM	C3C-CAC	3.63	1.55	1.47
2	A	801	HEM	C4B-NB	2.73	1.41	1.36
2	A	801	HEM	C3C-CAC	2.55	1.53	1.47
2	B	801	HEM	C4B-NB	2.18	1.40	1.36
2	B	801	HEM	CAA-C2A	2.04	1.55	1.52
2	B	801	HEM	CMC-C2C	2.01	1.56	1.51

All (29) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	A	803	KMD	C09-C08-C06	-7.74	95.64	112.99
4	B	803	KMD	C09-C08-C06	-6.71	97.94	112.99
3	B	802	H4B	C4-C4A-C8A	5.92	119.83	114.57
4	B	803	KMD	C02-N01-C06	5.88	122.56	118.10
2	A	801	HEM	CBA-CAA-C2A	-5.70	101.97	112.49
2	B	801	HEM	CBA-CAA-C2A	-5.01	103.25	112.49
4	A	803	KMD	C02-N01-C06	4.95	121.86	118.10
3	A	802	H4B	C4-C4A-C8A	4.16	118.26	114.57
3	A	802	H4B	C4-C4A-N5	3.98	122.46	119.12
3	A	802	H4B	C4-N3-C2	3.42	121.36	115.93
4	B	803	KMD	C05-C06-N01	-3.39	119.30	122.90
3	A	802	H4B	N3-C2-N1	-3.28	120.28	125.42
4	B	803	KMD	C14-C13-C12	-3.27	119.39	123.52
3	B	802	H4B	C4-N3-C2	3.18	120.98	115.93
2	A	801	HEM	CBD-CAD-C3D	-3.05	106.86	112.48
3	B	802	H4B	N3-C2-N1	-2.88	120.89	125.42
4	A	803	KMD	C14-C13-C12	-2.81	119.97	123.52
3	A	802	H4B	C2-N1-C8A	2.61	120.38	114.54
4	A	803	KMD	C05-C06-N01	-2.54	120.20	122.90
4	A	803	KMD	C07-C04-C05	-2.51	117.22	120.94
2	B	801	HEM	CMA-C3A-C4A	-2.49	124.64	128.46
3	B	802	H4B	C2-N1-C8A	2.40	119.91	114.54
4	B	803	KMD	C08-C06-N01	2.39	119.51	115.95
2	B	801	HEM	CBD-CAD-C3D	-2.35	108.15	112.48
4	B	803	KMD	N02-C02-N01	2.34	120.19	116.49
2	A	801	HEM	CMC-C2C-C3C	2.31	129.00	124.68
4	A	803	KMD	C08-C06-N01	2.29	119.36	115.95
3	B	802	H4B	C4-C4A-N5	2.17	120.94	119.12
4	B	803	KMD	C11-C12-C13	2.07	120.69	118.81

There are no chirality outliers.

All (9) torsion outliers are listed below:

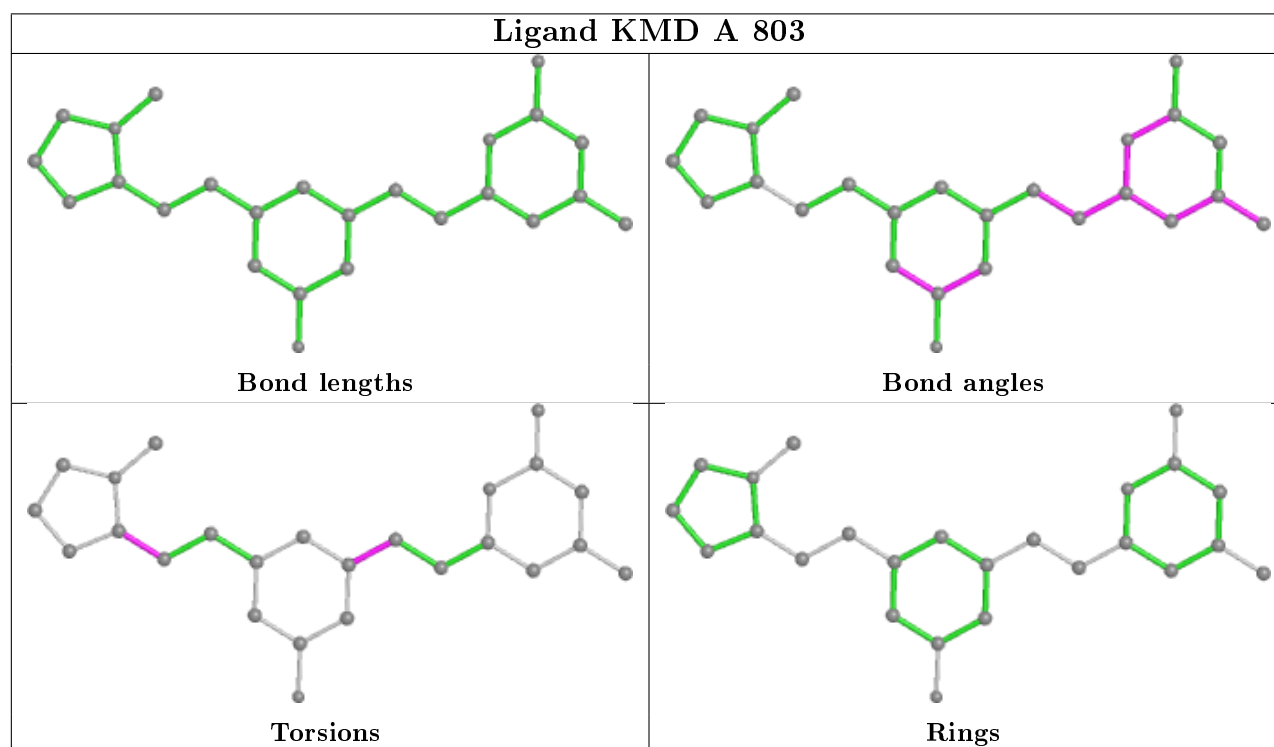
Mol	Chain	Res	Type	Atoms
5	A	804	GOL	O1-C1-C2-C3
5	B	804	GOL	O1-C1-C2-C3
5	A	804	GOL	O1-C1-C2-O2
5	B	804	GOL	O1-C1-C2-O2
5	A	804	GOL	O2-C2-C3-O3
4	A	803	KMD	C17-C18-C22-C23
4	A	803	KMD	C08-C09-C11-C16
4	A	803	KMD	C08-C09-C11-C12
4	B	803	KMD	C08-C09-C11-C16

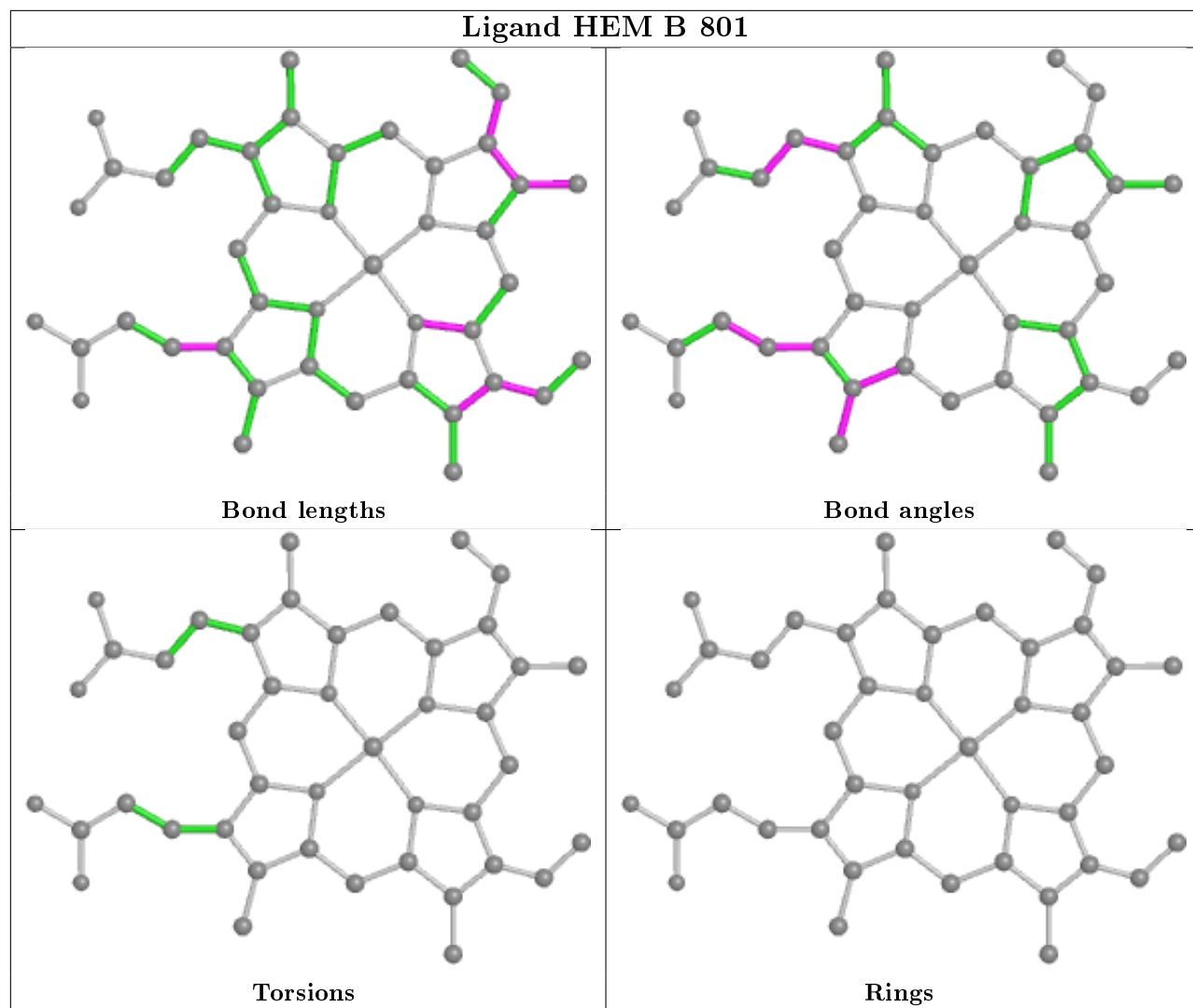
There are no ring outliers.

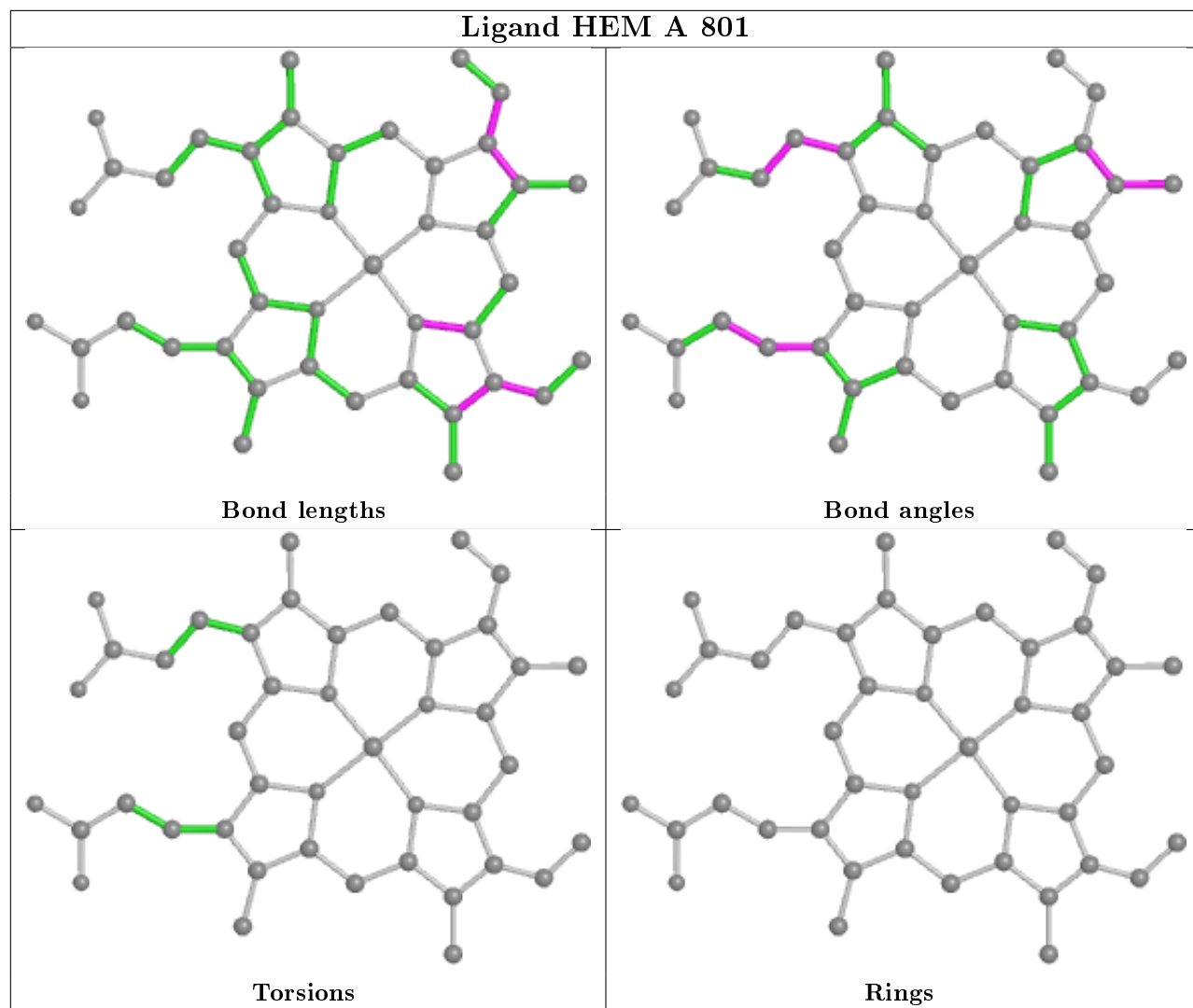
3 monomers are involved in 5 short contacts:

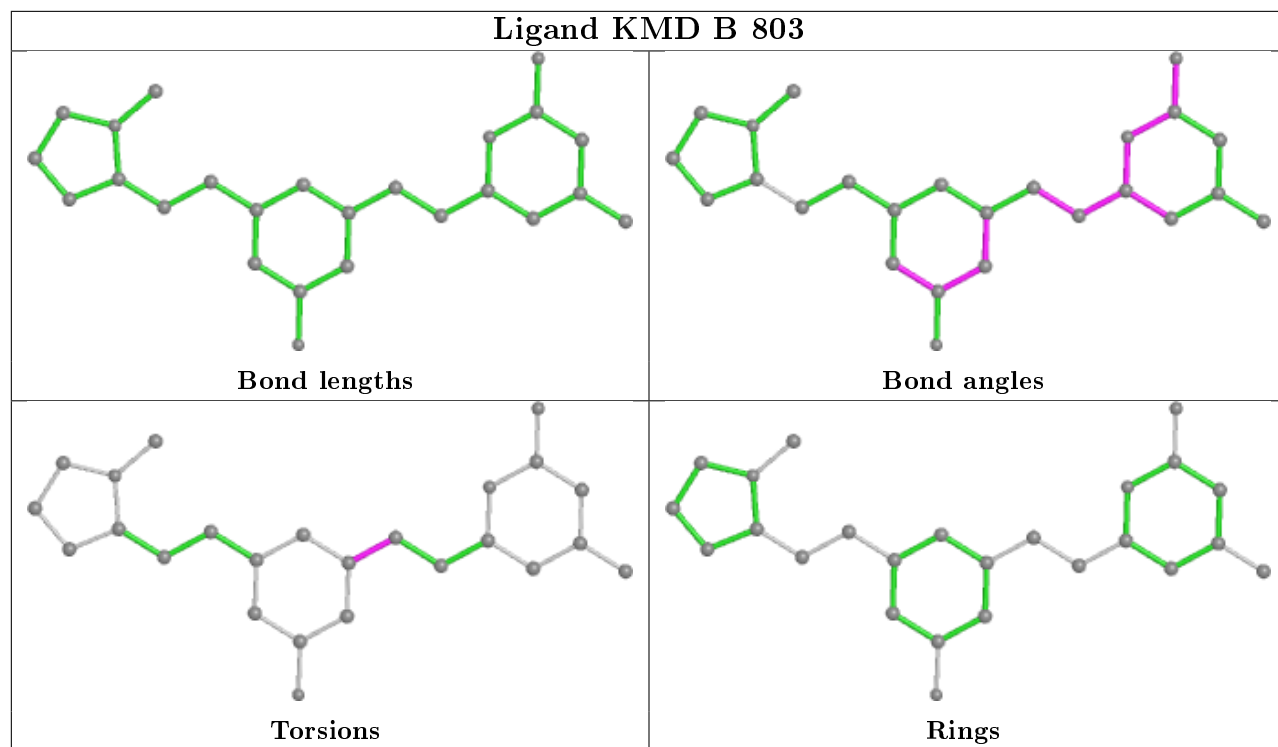
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	B	801	HEM	1	0
2	A	801	HEM	2	0
4	B	803	KMD	2	0

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, 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	414/421 (98%)	0.45	36 (8%) 10 16	30, 48, 81, 141	0
1	B	410/421 (97%)	0.83	67 (16%) 1 2	33, 56, 100, 135	0
All	All	824/842 (97%)	0.64	103 (12%) 3 6	30, 51, 93, 141	0

All (103) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	721	TRP	6.8
1	A	352	ASP	6.1
1	A	302	CYS	5.4
1	B	716	TRP	5.2
1	B	720	VAL	5.1
1	B	493	PRO	5.1
1	A	305	PHE	4.8
1	B	624	ARG	4.6
1	A	353	VAL	4.4
1	B	360	PHE	4.4
1	A	685	VAL	4.3
1	B	685	VAL	4.2
1	B	686	PRO	4.2
1	B	357	ASP	4.2
1	B	683	TRP	4.1
1	B	496	SER	4.1
1	B	304	ARG	4.1
1	B	327	LEU	4.0
1	A	682	VAL	3.9
1	B	682	VAL	3.9
1	A	696	PHE	3.9
1	A	681	TRP	3.8
1	B	396	THR	3.8
1	B	395	THR	3.6

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
1	B	557	GLU	3.6
1	A	304	ARG	3.6
1	B	358	GLN	3.6
1	B	688	MET	3.6
1	B	498	LEU	3.5
1	B	722	LYS	3.5
1	B	508	GLU	3.4
1	B	510	CYS	3.4
1	A	684	ILE	3.3
1	B	690	GLY	3.2
1	B	560	LYS	3.2
1	B	497	THR	3.2
1	B	684	ILE	3.2
1	B	305	PHE	3.1
1	B	355	THR	3.1
1	B	719	HIS	3.1
1	A	686	PRO	3.1
1	B	511	ILE	3.0
1	A	687	PRO	3.0
1	B	572	VAL	2.9
1	A	692	ILE	2.9
1	A	689	SER	2.9
1	A	303	PRO	2.9
1	B	687	PRO	2.9
1	A	395	THR	2.9
1	B	589	PHE	2.8
1	A	355	THR	2.7
1	A	357	ASP	2.7
1	A	688	MET	2.7
1	B	495	GLY	2.7
1	A	360	PHE	2.7
1	B	681	TRP	2.7
1	B	356	LYS	2.6
1	B	596	THR	2.6
1	A	356	LYS	2.6
1	B	620	ASN	2.6
1	B	397	SER	2.6
1	B	326	THR	2.6
1	A	683	TRP	2.6
1	B	571	ALA	2.6
1	B	635	LEU	2.6
1	B	623	MET	2.5

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
1	A	327	LEU	2.5
1	B	492	GLN	2.5
1	B	377	PHE	2.5
1	B	689	SER	2.5
1	B	494	ASP	2.4
1	B	505	GLN	2.4
1	B	374	ILE	2.4
1	B	474	LYS	2.4
1	B	715	PRO	2.4
1	B	359	LEU	2.4
1	B	420	CYS	2.4
1	A	695	VAL	2.4
1	B	491	LYS	2.4
1	A	359	LEU	2.4
1	A	624	ARG	2.3
1	A	596	THR	2.3
1	B	512	GLN	2.3
1	B	621	LEU	2.3
1	B	718	THR	2.3
1	A	421	VAL	2.3
1	B	696	PHE	2.3
1	B	316	VAL	2.2
1	B	504	VAL	2.2
1	A	420	CYS	2.2
1	A	690	GLY	2.2
1	A	334	TYR	2.2
1	A	448	CYS	2.2
1	A	691	SER	2.2
1	B	380	LYS	2.2
1	B	354	ALA	2.2
1	A	396	THR	2.1
1	B	691	SER	2.1
1	A	587	CYS	2.1
1	B	563	GLY	2.1
1	B	375	LYS	2.0
1	A	351	GLU	2.0
1	B	419	ARG	2.0

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

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

6.3 Carbohydrates [i](#)

There are no carbohydrates in this entry.

6.4 Ligands [i](#)

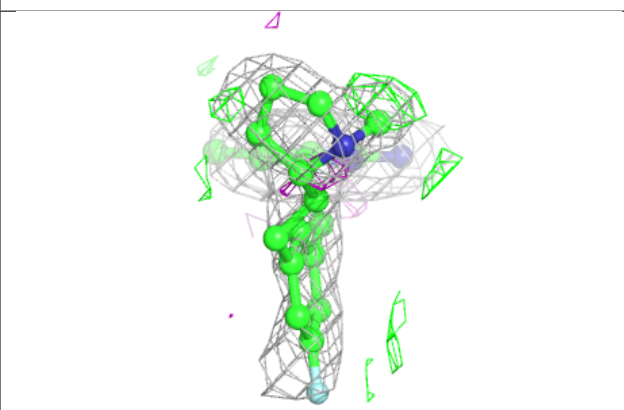
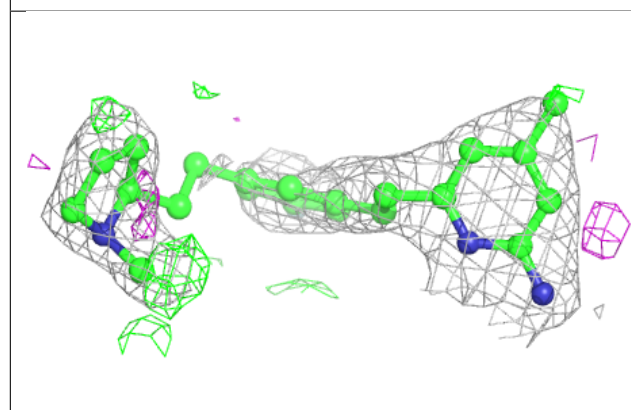
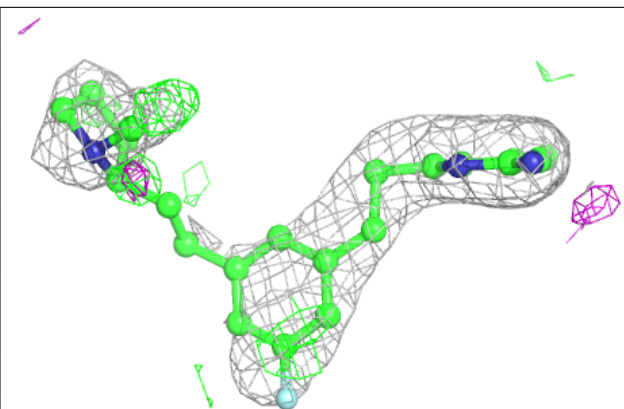
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
5	GOL	B	804	6/6	0.61	0.29	74,87,94,105	0
5	GOL	A	804	6/6	0.88	0.19	68,72,73,73	0
4	KMD	B	803	25/25	0.90	0.33	35,73,98,99	0
4	KMD	A	803	25/25	0.91	0.20	31,59,77,79	0
3	H4B	B	802	17/17	0.95	0.19	34,45,65,67	0
3	H4B	A	802	17/17	0.97	0.13	34,42,47,53	0
2	HEM	A	801	43/43	0.98	0.19	26,35,48,55	0
2	HEM	B	801	43/43	0.98	0.20	30,39,57,73	0
6	ZN	A	805	1/1	1.00	0.11	41,41,41,41	0

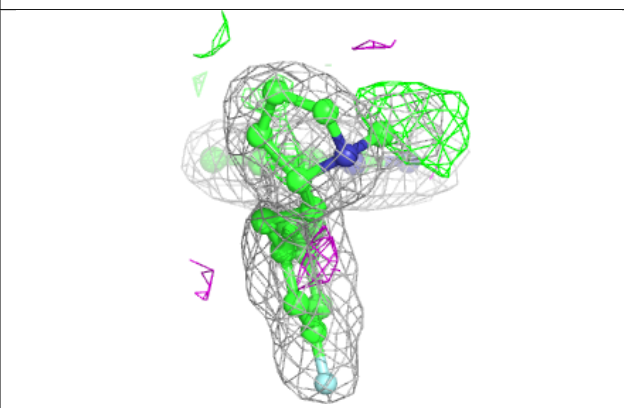
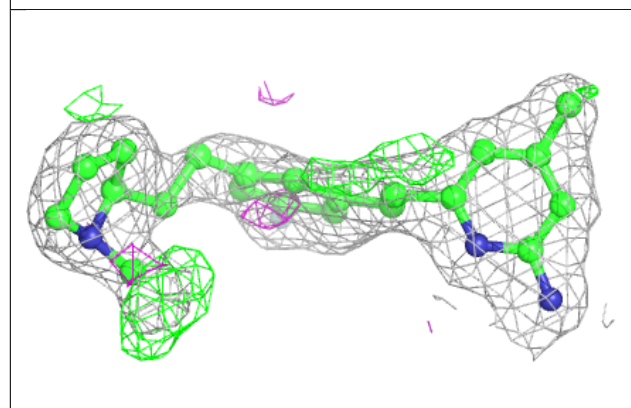
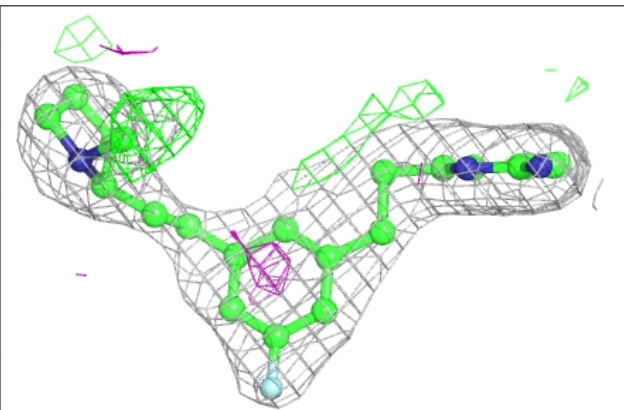
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

Electron density around KMD B 803:

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

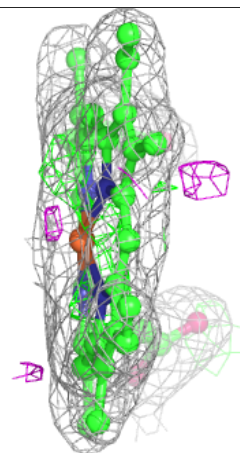
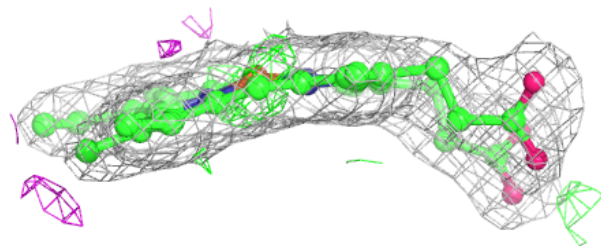
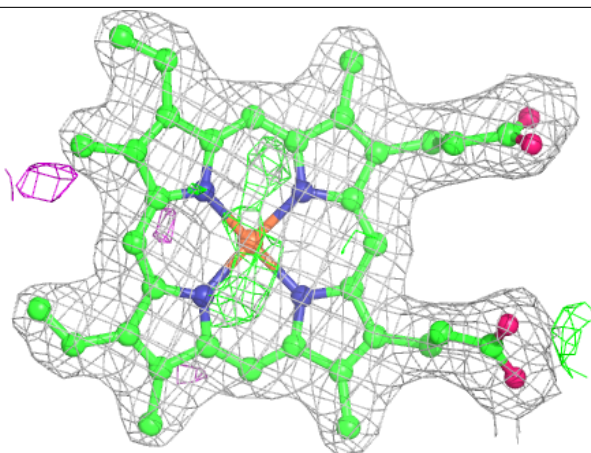
**Electron density around KMD A 803:**

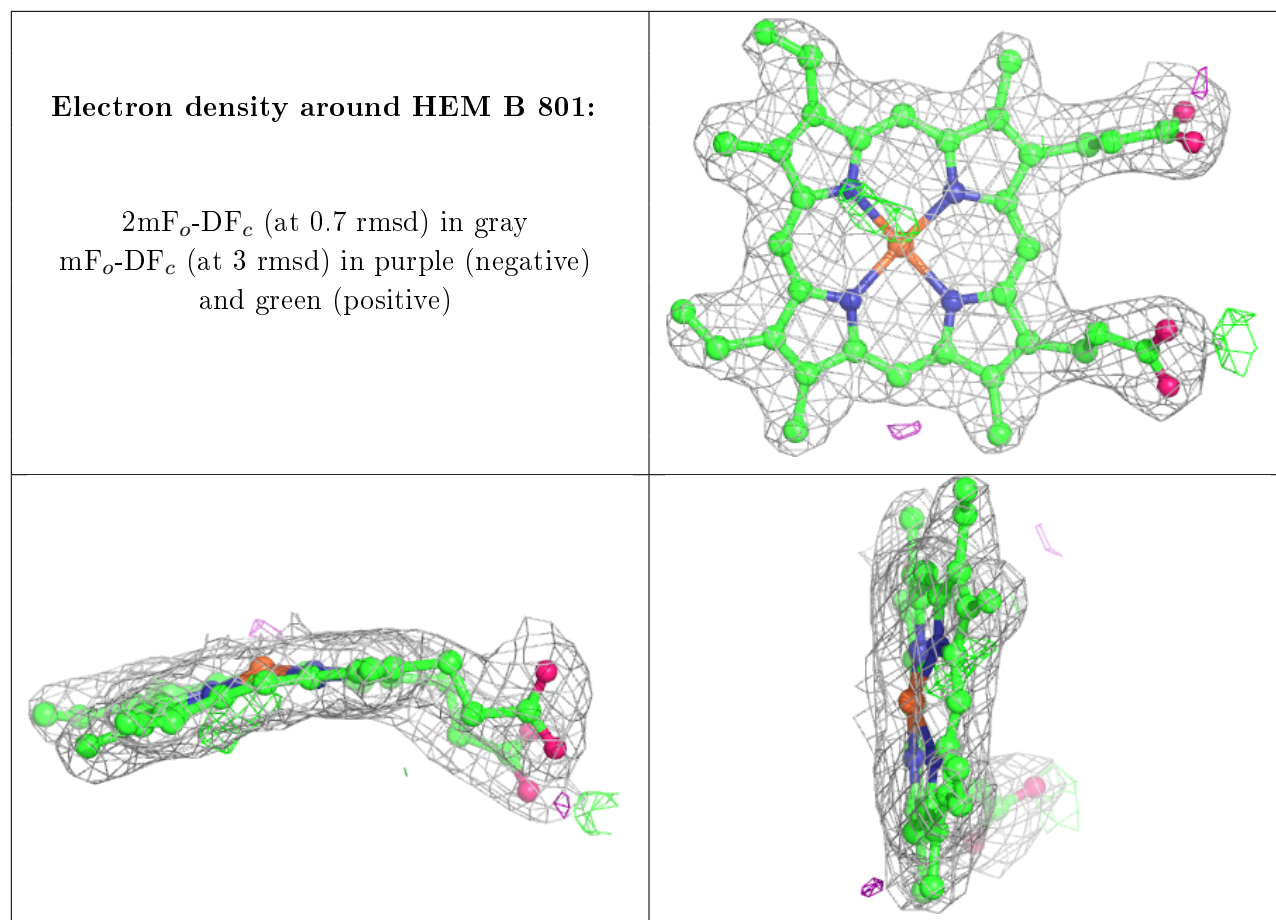
$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



Electron density around HEM A 801:

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





6.5 Other polymers ⓘ

There are no such residues in this entry.