



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 20, 2026 – 02:32 PM UTC

PDB ID : 9Q54 / pdb_00009q54
Title : Structure of human endothelial nitric oxide synthase heme domain bound with 6-((2,3-difluoro-5-(2-(3-fluoroazetidin-1-yl)ethyl)phenoxy)methyl)-4-methylpyridin-2-amine
Authors : Li, H.; Poulos, T.L.
Deposited on : 2025-08-20
Resolution : 2.13 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 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

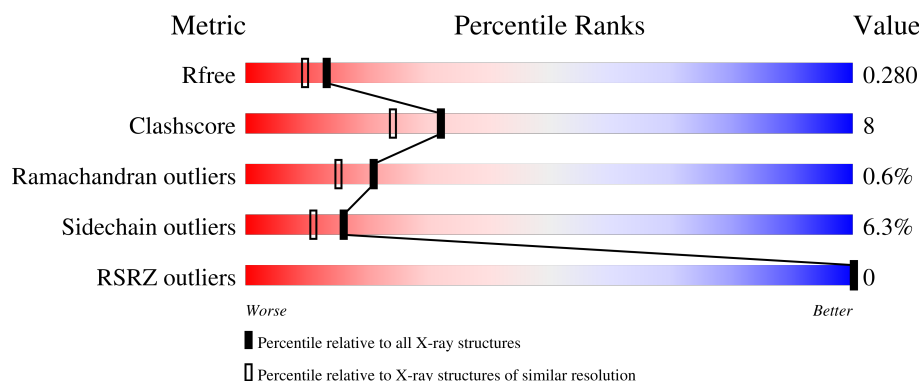
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.13 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	3689 (2.16-2.12)
Clashscore	190562	3812 (2.16-2.12)
Ramachandran outliers	187476	3773 (2.16-2.12)
Sidechain outliers	187428	3772 (2.16-2.12)
RSRZ outliers	180081	3691 (2.16-2.12)

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	440	
1	B	440	
1	C	440	
1	D	440	

2 Entry composition

There are 11 unique types of molecules in this entry. The entry contains 13607 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.

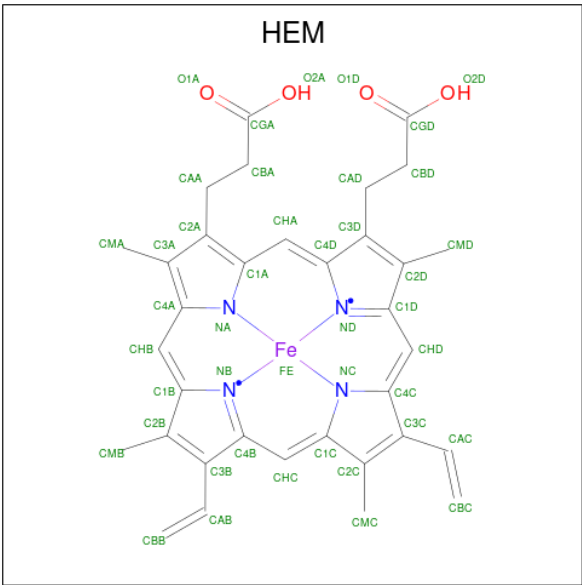
- Molecule 1 is a protein called Nitric oxide synthase 3.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	400	Total	C	N	O	S	0	1	0
			3200	2038	563	583	16			
1	B	402	Total	C	N	O	S	0	1	0
			3212	2046	565	585	16			
1	C	400	Total	C	N	O	S	0	1	0
			3200	2038	563	583	16			
1	D	402	Total	C	N	O	S	0	1	0
			3212	2046	565	585	16			

There are 4 discrepancies between the modelled and reference sequences:

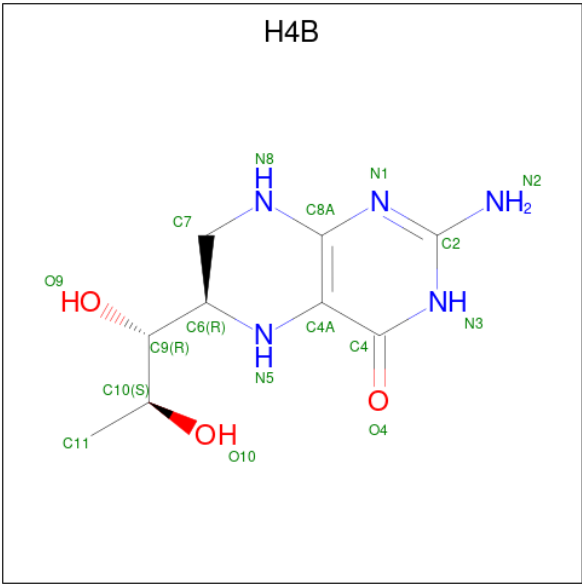
Chain	Residue	Modelled	Actual	Comment	Reference
A	298	GLU	ASP	conflict	UNP P29474
B	298	GLU	ASP	conflict	UNP P29474
C	298	GLU	ASP	conflict	UNP P29474
D	298	GLU	ASP	conflict	UNP P29474

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



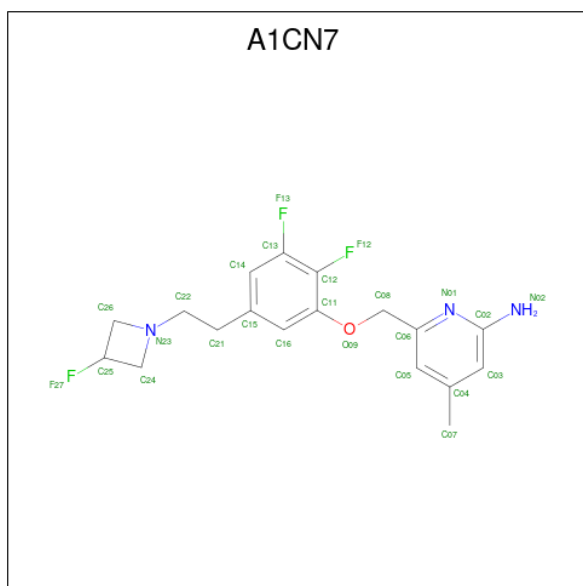
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	A	1	Total 43	C 34	Fe 1	N 4	O 4	0	0
2	B	1	Total 43	C 34	Fe 1	N 4	O 4	0	0
2	C	1	Total 43	C 34	Fe 1	N 4	O 4	0	0
2	D	1	Total 43	C 34	Fe 1	N 4	O 4	0	0

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



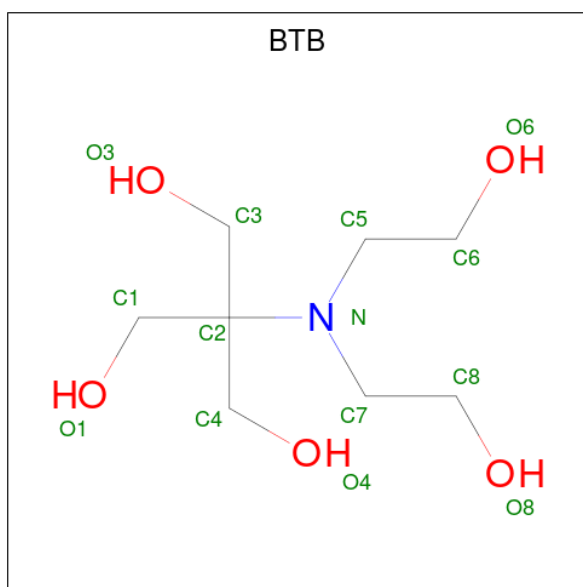
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
3	A	1	Total	C	N	O	0	0
			17	9	5	3		
3	B	1	Total	C	N	O	0	0
			17	9	5	3		
3	C	1	Total	C	N	O	0	0
			17	9	5	3		
3	D	1	Total	C	N	O	0	0
			17	9	5	3		

- Molecule 4 is 6-({2,3-difluoro-5-[2-(3-fluoroazetidin-1-yl)ethyl]phenoxy}methyl)-4-methylpyridin-2-amine (CCD ID: A1CN7) (formula: $C_{18}H_{20}F_3N_3O$) (labeled as "Ligand of Interest" by depositor).



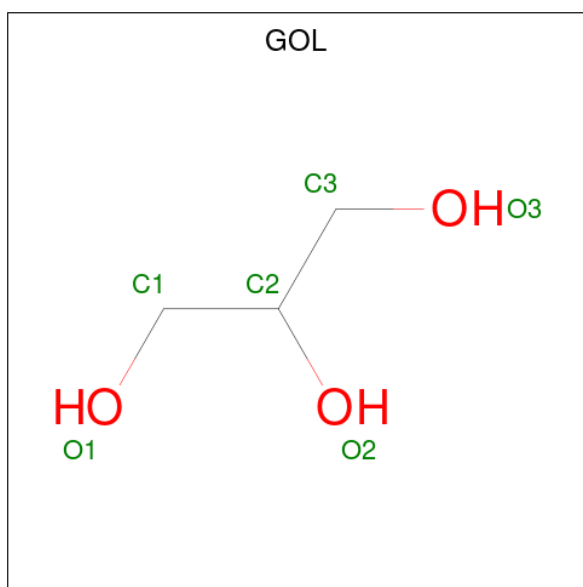
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
4	A	1	Total	C	F	N	O	0	0
			25	18	3	3	1		
4	B	1	Total	C	F	N	O	0	0
			25	18	3	3	1		
4	C	1	Total	C	F	N	O	0	0
			25	18	3	3	1		
4	D	1	Total	C	F	N	O	0	0
			25	18	3	3	1		

- Molecule 5 is 2-[BIS-(2-HYDROXY-ETHYL)-AMINO]-2-HYDROXYMETHYL-PROPAN E-1,3-DIOL (CCD ID: BTB) (formula: $C_8H_{19}NO_5$).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
5	A	1	Total	C	N	O	0	0
			14	8	1	5		
5	A	1	Total	C	N	O	0	0
			14	8	1	5		
5	B	1	Total	C	N	O	0	0
			14	8	1	5		
5	B	1	Total	C	N	O	0	0
			14	8	1	5		
5	C	1	Total	C	N	O	0	0
			14	8	1	5		
5	C	1	Total	C	N	O	0	0
			14	8	1	5		
5	D	1	Total	C	N	O	0	0
			14	8	1	5		
5	D	1	Total	C	N	O	0	0
			14	8	1	5		

- Molecule 6 is GLYCEROL (CCD ID: GOL) (formula: $C_3H_8O_3$).



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

- Molecule 7 is CHLORIDE ION (CCD ID: CL) (formula: Cl).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
7	A	1	Total	Cl	0	0
			1	1		
7	B	1	Total	Cl	0	0
			1	1		
7	C	1	Total	Cl	0	0
			1	1		
7	D	1	Total	Cl	0	0
			1	1		

- Molecule 8 is GADOLINIUM ATOM (CCD ID: GD) (formula: Gd).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
8	A	1	Total Gd 1 1	0	0
8	B	1	Total Gd 1 1	0	0
8	C	1	Total Gd 1 1	0	0
8	D	1	Total Gd 1 1	0	0

- Molecule 9 is ZINC ION (CCD ID: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
9	A	1	Total Zn 1 1	0	0
9	D	1	Total Zn 1 1	0	0

- Molecule 10 is CALCIUM ION (CCD ID: CA) (formula: Ca).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
10	B	1	Total Ca 1 1	0	0

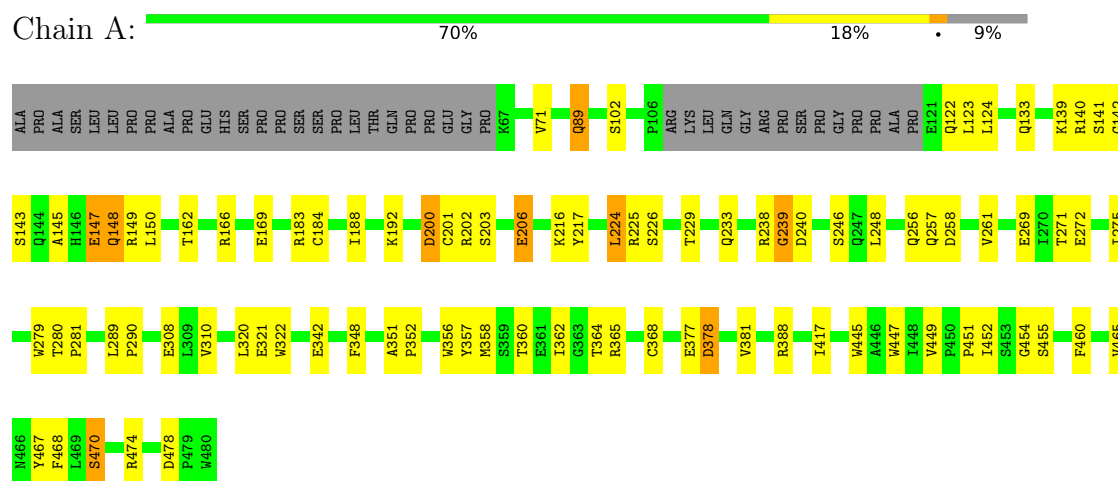
- Molecule 11 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
11	A	58	Total O 58 58	0	0
11	B	93	Total O 93 93	0	0
11	C	56	Total O 56 56	0	0
11	D	83	Total O 83 83	0	0

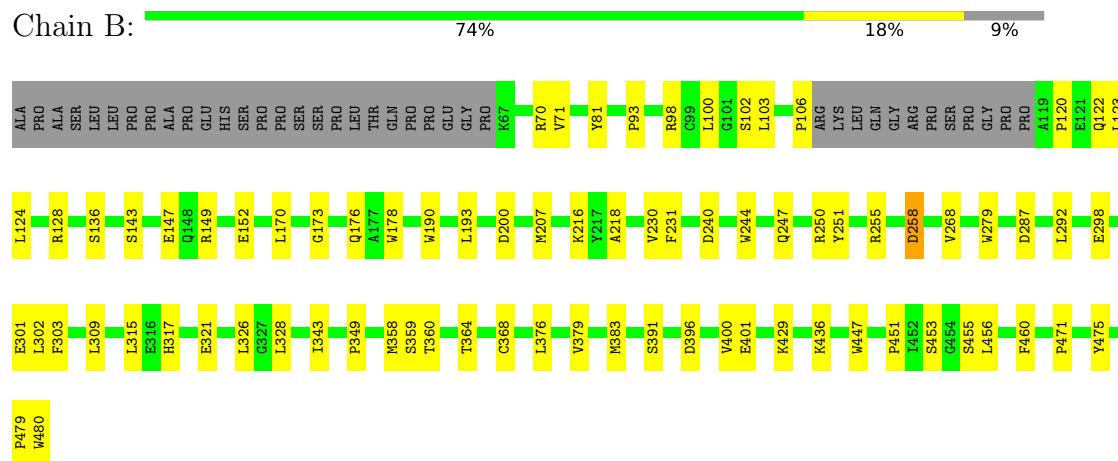
3 Residue-property plots

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red dot above a residue indicates a poor fit to the electron density ($RSRZ > 2$). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

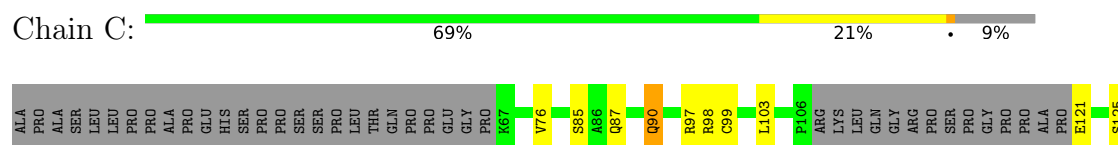
• Molecule 1: Nitric oxide synthase 3

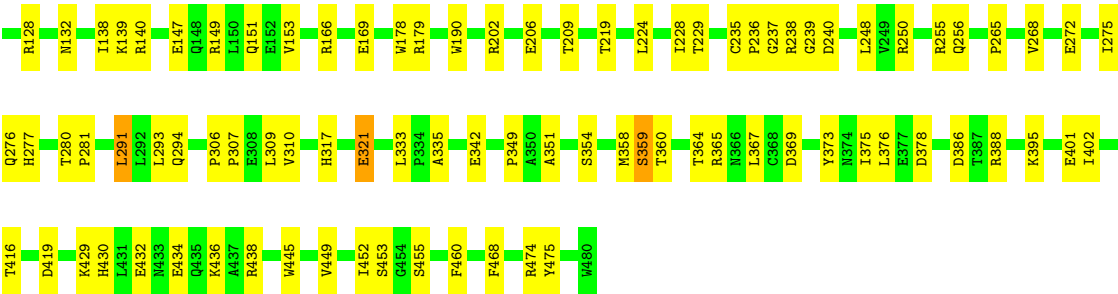


• Molecule 1: Nitric oxide synthase 3

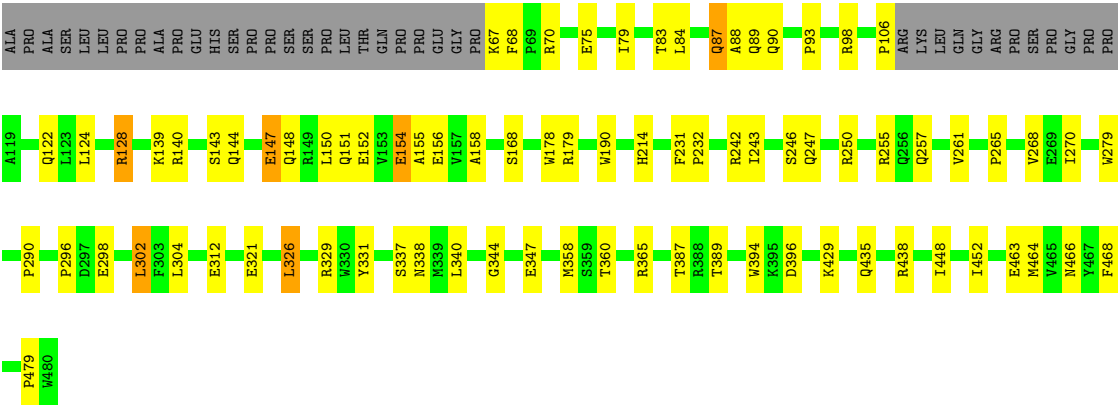


• Molecule 1: Nitric oxide synthase 3





• Molecule 1: Nitric oxide synthase 3



4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	59.92Å 153.25Å 109.12Å 90.00° 90.69° 90.00°	Depositor
Resolution (Å)	38.87 – 2.13 38.87 – 2.13	Depositor EDS
% Data completeness (in resolution range)	94.0 (38.87-2.13) 92.3 (38.87-2.13)	Depositor EDS
R_{merge}	0.13	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.36 (at 2.14Å)	Xtriage
Refinement program	PHENIX (1.10.1_2155: ???)	Depositor
R, R_{free}	0.215 , 0.281 0.214 , 0.280	Depositor DCC
R_{free} test set	5232 reflections (2.76%)	wwPDB-VP
Wilson B-factor (Å ²)	46.0	Xtriage
Anisotropy	0.348	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.34 , 50.7	EDS
L-test for twinning ²	$\langle L \rangle = 0.47$, $\langle L^2 \rangle = 0.30$	Xtriage
Estimated twinning fraction	0.279 for h,-k,-l	Xtriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	13607	wwPDB-VP
Average B, all atoms (Å ²)	66.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.37% 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 [i](#)

5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: A1CN7, CA, H4B, GD, GOL, ZN, BTB, HEM, CL

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	0.35	0/3294	0.57	0/4487
1	B	0.43	0/3307	0.63	0/4506
1	C	0.34	0/3294	0.54	0/4487
1	D	0.41	0/3307	0.62	0/4506
All	All	0.39	0/13202	0.59	0/17986

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 [i](#)

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	3200	0	3104	52	0
1	B	3212	0	3116	44	0
1	C	3200	0	3104	45	1
1	D	3212	0	3116	49	0
2	A	43	0	30	2	0
2	B	43	0	30	3	0
2	C	43	0	30	4	0
2	D	43	0	30	3	0
3	A	17	0	15	2	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	B	17	0	15	1	0
3	C	17	0	15	1	0
3	D	17	0	15	1	0
4	A	25	0	0	0	0
4	B	25	0	0	0	0
4	C	25	0	0	1	0
4	D	25	0	0	1	0
5	A	28	0	37	5	0
5	B	28	0	35	9	1
5	C	28	0	37	4	0
5	D	28	0	36	4	0
6	A	12	0	16	0	0
6	C	12	0	16	0	0
6	D	6	0	8	0	0
7	A	1	0	0	0	0
7	B	1	0	0	0	0
7	C	1	0	0	1	0
7	D	1	0	0	0	0
8	A	1	0	0	0	0
8	B	1	0	0	0	0
8	C	1	0	0	0	0
8	D	1	0	0	0	0
9	A	1	0	0	0	0
9	D	1	0	0	0	0
10	B	1	0	0	0	0
11	A	58	0	0	1	0
11	B	93	0	0	2	0
11	C	56	0	0	3	0
11	D	83	0	0	2	0
All	All	13607	0	12805	208	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 8.

All (208) 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:B:321:GLU:OE1	5:B:504:BTB:O8	1.85	0.93
1:B:247:GLN:HB2	1:B:250:ARG:HD3	1.57	0.85
5:A:504:BTB:O3	5:A:504:BTB:O4	1.90	0.81
2:D:502:HEM:HBB2	2:D:502:HEM:HHC	1.63	0.80

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:192:LYS:HZ1	1:A:226:SER:H	1.34	0.75
1:D:247:GLN:HB2	1:D:250:ARG:HD3	1.69	0.72
1:B:453:SER:HB3	1:B:456:LEU:HD12	1.72	0.72
5:B:504:BTB:O8	11:B:601:HOH:O	2.09	0.70
1:A:133:GLN:NE2	11:A:601:HOH:O	2.24	0.70
1:D:255:ARG:HE	1:D:268:VAL:HG11	1.56	0.69
1:B:317:HIS:NE2	1:B:401:GLU:OE1	2.23	0.68
2:C:501:HEM:HBB2	2:C:501:HEM:HHC	1.74	0.68
1:A:275:ILE:HD11	1:A:281:PRO:HB3	1.75	0.67
1:A:192:LYS:NZ	1:A:226:SER:H	1.94	0.66
1:D:147:GLU:HA	1:D:150:LEU:HD12	1.76	0.66
1:A:148:GLN:OE1	1:A:166:ARG:NH2	2.28	0.65
1:B:321:GLU:OE2	5:B:504:BTB:O4	2.14	0.65
2:A:501:HEM:HBB2	2:A:501:HEM:HHC	1.78	0.65
1:C:97:ARG:HG2	1:C:98:ARG:HG2	1.79	0.64
5:D:506:BTB:O8	5:D:506:BTB:O6	2.12	0.63
1:D:290:PRO:HB3	1:D:304:LEU:HD23	1.81	0.61
1:A:200:ASP:OD1	1:A:200:ASP:N	2.29	0.61
2:B:501:HEM:HBC2	2:B:501:HEM:HMC2	1.83	0.60
1:C:321:GLU:H	1:C:321:GLU:CD	2.08	0.60
1:C:430:HIS:HD2	11:C:618:HOH:O	1.85	0.60
1:D:75:GLU:OE1	11:D:601:HOH:O	2.17	0.60
1:D:242:ARG:NH2	1:D:479:PRO:HD3	2.17	0.59
1:D:144:GLN:O	1:D:147:GLU:HG2	2.03	0.59
1:A:102:SER:O	3:A:502:H4B:O10	2.21	0.58
1:D:90:GLN:HB2	1:D:468:PHE:CD2	2.39	0.58
1:D:93:PRO:HG3	1:D:106:PRO:HB3	1.86	0.58
1:D:124:LEU:HB3	1:D:128:ARG:HH12	1.69	0.57
1:B:173:GLY:HA3	1:B:343:ILE:HD13	1.86	0.57
1:D:84:LEU:HD12	1:D:87:GLN:HG3	1.87	0.57
1:C:250:ARG:NH2	11:C:601:HOH:O	2.22	0.57
1:D:243:ILE:HG21	1:D:337:SER:HB2	1.87	0.57
2:C:501:HEM:HBC2	2:C:501:HEM:HMC2	1.84	0.57
1:B:143:SER:O	1:B:147:GLU:HG2	2.06	0.56
1:C:265:PRO:HA	1:C:268:VAL:HG23	1.87	0.56
1:B:176:GLN:HB2	1:B:471:PRO:HG2	1.88	0.56
2:D:502:HEM:HMC2	2:D:502:HEM:HBC2	1.89	0.55
1:A:365:ARG:HH12	3:A:502:H4B:C4	2.18	0.55
1:A:378:ASP:OD2	1:A:378:ASP:N	2.39	0.55
1:B:279:TRP:HB2	1:B:302:LEU:HD21	1.88	0.55
1:C:236:PRO:C	1:C:238:ARG:H	2.15	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:149:ARG:NH1	1:B:152:GLU:OE1	2.41	0.54
1:C:475:TYR:OH	2:C:501:HEM:O1D	2.24	0.54
1:D:298:GLU:CD	5:D:506:BTB:H42	2.32	0.54
1:B:258:ASP:OD1	1:B:258:ASP:N	2.32	0.53
1:B:358:MET:HE3	1:B:360:THR:OG1	2.09	0.52
1:B:178:TRP:HZ3	1:B:193:LEU:HB2	1.74	0.52
1:C:224:LEU:HB2	1:C:416:THR:HB	1.91	0.52
1:A:89:GLN:HG2	1:A:468:PHE:HE2	1.74	0.52
1:D:321:GLU:OE2	5:D:505:BTB:O4	2.28	0.51
1:A:233:GLN:HB3	1:A:348:PHE:CE2	2.44	0.51
1:A:269:GLU:O	1:A:272:GLU:HG2	2.10	0.51
1:C:375:ILE:HD11	1:C:402:ILE:HD13	1.93	0.51
2:D:502:HEM:HBD1	4:D:504:A1CN7:F12	2.01	0.51
1:A:140:ARG:CZ	1:A:140:ARG:HA	2.41	0.50
1:A:192:LYS:HZ1	1:A:225:ARG:HA	1.76	0.50
1:B:447:TRP:HA	3:B:502:H4B:N1	2.27	0.50
1:A:321:GLU:H	1:A:321:GLU:CD	2.20	0.50
1:B:93:PRO:HG3	1:B:106:PRO:HB3	1.94	0.50
1:B:100:LEU:HB3	1:B:103:LEU:HD13	1.94	0.50
1:C:317:HIS:NE2	1:C:401:GLU:OE1	2.35	0.50
1:A:184:CYS:HB2	2:A:501:HEM:ND	2.26	0.50
1:C:128:ARG:O	1:C:132:ASN:ND2	2.45	0.49
1:C:275:ILE:C	1:C:277:HIS:H	2.20	0.49
1:C:364:THR:HG21	1:C:452:ILE:HG23	1.94	0.49
1:D:148:GLN:O	1:D:152:GLU:N	2.41	0.49
1:A:364:THR:O	1:A:368:CYS:HB2	2.12	0.49
1:B:301:GLU:HB3	1:B:303:PHE:CE1	2.47	0.49
1:C:238:ARG:NH2	1:C:240:ASP:HA	2.28	0.49
1:C:103:LEU:HA	1:D:463:GLU:HG2	1.95	0.49
1:C:147:GLU:O	1:C:151:GLN:NE2	2.36	0.49
1:B:70:ARG:HB2	1:B:81:TYR:CE2	2.48	0.48
1:B:178:TRP:CZ3	1:B:193:LEU:HB2	2.47	0.48
1:C:376:LEU:HD23	1:C:395:LYS:HG2	1.93	0.48
1:C:453:SER:HA	1:D:452:ILE:HG22	1.95	0.48
1:D:279:TRP:HB2	1:D:302:LEU:HD21	1.95	0.48
1:C:166:ARG:HB2	1:C:169:GLU:CD	2.39	0.48
1:A:149:ARG:NE	1:A:169:GLU:OE2	2.46	0.48
1:D:124:LEU:O	1:D:128:ARG:NH1	2.46	0.48
2:B:501:HEM:HHC	2:B:501:HEM:HBB2	1.94	0.48
1:D:178:TRP:CE3	1:D:190:TRP:HA	2.49	0.48
1:C:248:LEU:HD12	1:C:335:ALA:HB1	1.95	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:141:SER:C	1:A:143:SER:H	2.22	0.48
1:A:140:ARG:HA	1:A:140:ARG:NE	2.29	0.47
1:B:379:VAL:O	1:B:383:MET:HG3	2.13	0.47
1:A:238:ARG:HD3	1:A:239:GLY:O	2.13	0.47
1:B:170:LEU:HD11	1:B:230:VAL:HG11	1.96	0.47
1:B:240:ASP:HB3	1:B:349:PRO:HG2	1.95	0.47
1:A:378:ASP:OD1	1:D:321:GLU:HB2	2.14	0.47
1:C:365:ARG:HH12	3:C:502:H4B:C4	2.27	0.47
1:D:246:SER:HA	1:D:338:ASN:HB3	1.97	0.47
1:A:271:THR:OG1	1:A:289:LEU:HD21	2.15	0.47
1:B:255:ARG:HB2	1:B:268:VAL:HG11	1.97	0.47
1:A:192:LYS:HZ1	1:A:226:SER:N	2.07	0.46
5:D:506:BTB:H11	5:D:506:BTB:H51	1.48	0.46
1:B:292:LEU:HA	1:B:301:GLU:O	2.15	0.46
1:B:475:TYR:OH	2:B:501:HEM:O1D	2.31	0.46
1:C:99:CYS:HB3	1:D:466:ASN:HB3	1.98	0.46
5:C:505:BTB:O3	5:C:505:BTB:O4	2.25	0.46
1:A:201:CYS:SG	1:A:206:GLU:HB3	2.55	0.46
1:A:451:PRO:HB2	1:B:455:SER:OG	2.16	0.46
1:B:218:ALA:HB1	11:B:621:HOH:O	2.15	0.46
1:B:251:TYR:HA	1:B:287:ASP:O	2.16	0.46
1:A:216:LYS:HG3	1:A:217:TYR:N	2.29	0.46
1:A:445:TRP:CZ2	1:A:449:VAL:HG21	2.50	0.46
1:A:224:LEU:HD12	1:A:224:LEU:HA	1.85	0.46
5:C:505:BTB:H11	5:C:505:BTB:H51	1.46	0.46
1:C:178:TRP:CE3	1:C:190:TRP:HA	2.51	0.46
1:B:124:LEU:HD23	1:B:124:LEU:HA	1.65	0.45
1:A:141:SER:O	1:A:143:SER:N	2.49	0.45
1:A:320:LEU:HD13	1:A:322:TRP:CZ2	2.52	0.45
1:C:90:GLN:HG3	1:C:468:PHE:CE2	2.52	0.45
1:C:367:LEU:HA	1:C:373:TYR:HB2	1.98	0.45
1:D:150:LEU:O	1:D:154:GLU:HG3	2.16	0.45
1:D:435:GLN:NE2	11:D:611:HOH:O	2.49	0.45
5:C:504:BTB:H32	5:C:504:BTB:H51	1.59	0.45
1:C:386:ASP:OD2	1:C:388:ARG:HG3	2.17	0.45
1:C:365:ARG:O	1:C:369:ASP:HB2	2.18	0.44
1:C:455:SER:HA	1:C:460:PHE:CG	2.52	0.44
1:A:342:GLU:OE1	1:A:470:SER:OG	2.35	0.44
1:B:178:TRP:CE3	1:B:190:TRP:HA	2.52	0.44
1:B:455:SER:HA	1:B:460:PHE:CG	2.52	0.44
1:D:448:ILE:HG21	1:D:464:MET:HE1	1.99	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:229:THR:O	1:A:352:PRO:HD2	2.17	0.44
1:A:238:ARG:HG2	1:A:239:GLY:N	2.32	0.44
1:B:216:LYS:HB2	1:B:309:LEU:HD11	1.99	0.44
1:C:138:ILE:O	1:C:140:ARG:HG2	2.16	0.44
1:D:261:VAL:HG11	1:D:265:PRO:HA	1.99	0.44
1:B:122:GLN:OE1	1:B:122:GLN:N	2.40	0.44
1:C:229:THR:O	1:C:351:ALA:HA	2.18	0.44
1:A:455:SER:OG	1:B:451:PRO:HB2	2.18	0.44
1:D:128:ARG:NH1	1:D:128:ARG:HB2	2.33	0.43
1:D:140:ARG:HB3	1:D:143:SER:OG	2.17	0.43
1:C:236:PRO:O	1:C:238:ARG:N	2.51	0.43
1:D:155:ALA:HA	1:D:158:ALA:HB3	1.99	0.43
1:A:364:THR:HG21	1:A:452:ILE:HG23	2.00	0.43
1:A:357:TYR:CD2	1:A:362:ILE:HD11	2.53	0.43
1:D:214:HIS:C	1:D:214:HIS:CD2	2.96	0.43
1:C:275:ILE:HD11	1:C:281:PRO:HB3	2.00	0.43
1:C:358:MET:HE3	1:C:360:THR:OG1	2.17	0.43
1:C:238:ARG:HG2	1:C:239:GLY:N	2.33	0.43
1:C:359:SER:OG	1:C:419:ASP:HA	2.19	0.43
1:D:87:GLN:H	1:D:87:GLN:HG2	1.53	0.43
1:D:70:ARG:HD2	1:D:79:ILE:HD13	2.01	0.43
1:A:141:SER:C	1:A:143:SER:N	2.76	0.43
1:B:298:GLU:OE1	5:B:505:BTB:H42	2.18	0.43
1:B:315:LEU:HD12	1:B:328:LEU:HB3	2.01	0.43
2:C:501:HEM:HBD1	4:C:503:A1CN7:F12	2.09	0.43
1:A:139:LYS:O	1:A:140:ARG:NE	2.52	0.43
1:D:296:PRO:O	1:D:298:GLU:HG2	2.19	0.43
1:D:365:ARG:HH12	3:D:503:H4B:C4	2.32	0.43
1:A:183:ARG:HD3	1:A:447:TRP:CD2	2.54	0.42
1:D:179:ARG:CZ	1:D:438:ARG:HD3	2.50	0.42
1:A:224:LEU:HD23	1:A:356:TRP:HB3	2.01	0.42
1:D:358:MET:HE3	1:D:360:THR:OG1	2.19	0.42
5:A:504:BTB:H41	5:A:504:BTB:H72	1.74	0.42
1:B:122:GLN:H	1:B:122:GLN:CD	2.24	0.42
1:D:312:GLU:HA	1:D:331:TYR:HA	2.01	0.42
1:D:340:LEU:HD21	1:D:347:GLU:HG2	2.00	0.42
1:A:229:THR:O	1:A:351:ALA:HA	2.20	0.42
1:B:244:TRP:HB2	1:B:292:LEU:HB2	2.02	0.42
1:C:149:ARG:O	1:C:153:VAL:HG22	2.20	0.42
1:C:306:PRO:HA	1:C:307:PRO:HD3	1.95	0.42
1:A:279:TRP:CG	1:A:290:PRO:HG3	2.55	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:301:GLU:HB3	1:B:303:PHE:HE1	1.84	0.42
1:B:479:PRO:HD2	1:B:480:TRP:CE3	2.55	0.42
1:C:219:THR:O	1:C:224:LEU:HD12	2.20	0.42
1:B:368:CYS:SG	1:B:376:LEU:HD13	2.60	0.42
5:B:505:BTB:HO8	5:B:505:BTB:HO3	1.68	0.42
1:C:179:ARG:NH2	1:C:438:ARG:HG3	2.35	0.42
1:C:333:LEU:HA	1:C:333:LEU:HD12	1.71	0.42
1:A:145:ALA:HA	1:A:148:GLN:HE21	1.85	0.41
1:A:248:LEU:HA	1:A:248:LEU:HD23	1.81	0.41
1:C:445:TRP:CZ2	1:C:449:VAL:HG21	2.55	0.41
1:D:255:ARG:HD3	1:D:261:VAL:HG22	2.02	0.41
1:D:247:GLN:CB	1:D:250:ARG:HD3	2.45	0.41
1:A:166:ARG:HB2	1:A:169:GLU:CD	2.45	0.41
1:B:207:MET:HG3	1:B:231:PHE:CE1	2.55	0.41
1:C:291:LEU:HD23	1:C:293:LEU:HD21	2.02	0.41
7:C:508:CL:CL	11:C:601:HOH:O	2.59	0.41
1:D:68:PHE:CD1	1:D:83:THR:HG22	2.55	0.41
1:A:188:ILE:HD12	1:A:188:ILE:HA	1.89	0.41
1:B:250:ARG:HA	1:B:250:ARG:HD2	1.92	0.41
1:D:387:THR:HA	1:D:394:TRP:CD1	2.56	0.41
1:A:455:SER:HA	1:A:460:PHE:CG	2.55	0.41
5:C:505:BTB:H72	5:C:505:BTB:H41	1.60	0.41
1:D:270:ILE:HD12	1:D:270:ILE:HA	1.89	0.41
1:D:429:LYS:HD2	1:D:429:LYS:HA	1.74	0.41
1:A:147:GLU:HA	1:A:150:LEU:HD12	2.03	0.41
1:A:465:VAL:HG12	1:A:467:TYR:HD1	1.85	0.41
1:A:358:MET:HE3	1:A:360:THR:OG1	2.21	0.41
1:C:97:ARG:HG3	1:D:88:ALA:HB3	2.03	0.41
5:A:505:BTB:H72	5:A:505:BTB:O4	2.20	0.41
1:C:240:ASP:OD1	1:C:349:PRO:HG2	2.21	0.41
1:D:279:TRP:CD1	1:D:290:PRO:HG3	2.55	0.41
1:A:377:GLU:O	1:A:381:VAL:HG23	2.21	0.41
5:B:505:BTB:O8	5:B:505:BTB:O6	2.30	0.41
5:A:504:BTB:H72	1:D:326:LEU:HD12	2.03	0.40
5:B:504:BTB:H51	5:B:504:BTB:H11	1.74	0.40
5:A:504:BTB:H71	5:A:504:BTB:H12	1.70	0.40
1:B:298:GLU:OE1	5:B:505:BTB:H72	2.22	0.40
5:B:505:BTB:H42	5:B:505:BTB:H72	1.40	0.40
1:C:432:GLU:HG2	1:C:436:LYS:HE2	2.03	0.40
1:D:231:PHE:HB3	1:D:232:PRO:CD	2.52	0.40

All (1) symmetry-related close contacts are listed below. The label for Atom-2 includes the sym-

metry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:378:ASP:OD2	5:B:504:BTB:O8[1_655]	2.17	0.03

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	397/440 (90%)	373 (94%)	20 (5%)	4 (1%)	12	7
1	B	399/440 (91%)	378 (95%)	20 (5%)	1 (0%)	36	33
1	C	397/440 (90%)	369 (93%)	26 (6%)	2 (0%)	24	19
1	D	399/440 (91%)	381 (96%)	15 (4%)	3 (1%)	16	9
All	All	1592/1760 (90%)	1501 (94%)	81 (5%)	10 (1%)	21	15

All (10) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	D	89	GLN
1	A	123	LEU
1	A	239	GLY
1	B	120	PRO
1	C	237	GLY
1	A	142	GLY
1	C	276	GLN
1	D	154	GLU
1	D	344	GLY
1	A	454	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	341/373 (91%)	314 (92%)	27 (8%)	11	7
1	B	342/373 (92%)	326 (95%)	16 (5%)	23	19
1	C	341/373 (91%)	314 (92%)	27 (8%)	11	7
1	D	342/373 (92%)	325 (95%)	17 (5%)	22	17
All	All	1366/1492 (92%)	1279 (94%)	87 (6%)	16	11

All (87) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	71	VAL
1	A	89	GLN
1	A	122	GLN
1	A	124	LEU
1	A	147	GLU
1	A	148	GLN
1	A	162	THR
1	A	200	ASP
1	A	202	ARG
1	A	203	SER
1	A	206	GLU
1	A	224	LEU
1	A	240	ASP
1	A	246	SER
1	A	256	GLN
1	A	257	GLN
1	A	258	ASP
1	A	261	VAL
1	A	280	THR
1	A	308	GLU
1	A	310	VAL
1	A	378	ASP
1	A	388	ARG
1	A	417	ILE
1	A	470	SER
1	A	474	ARG
1	A	478	ASP
1	B	71	VAL

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Mol	Chain	Res	Type
1	B	98	ARG
1	B	102	SER
1	B	123	LEU
1	B	128	ARG
1	B	136	SER
1	B	200	ASP
1	B	258	ASP
1	B	326	LEU
1	B	359	SER
1	B	364	THR
1	B	391	SER
1	B	396	ASP
1	B	400	VAL
1	B	429	LYS
1	B	436	LYS
1	C	76	VAL
1	C	85	SER
1	C	87	GLN
1	C	90	GLN
1	C	121	GLU
1	C	125	SER
1	C	139	LYS
1	C	202	ARG
1	C	206	GLU
1	C	209	THR
1	C	228	ILE
1	C	235	CYS
1	C	255	ARG
1	C	256	GLN
1	C	272	GLU
1	C	280	THR
1	C	291	LEU
1	C	294	GLN
1	C	309	LEU
1	C	310	VAL
1	C	321	GLU
1	C	342	GLU
1	C	354	SER
1	C	359	SER
1	C	429	LYS
1	C	434	GLU
1	C	474	ARG

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Mol	Chain	Res	Type
1	D	67	LYS
1	D	87	GLN
1	D	98	ARG
1	D	122	GLN
1	D	128	ARG
1	D	139	LYS
1	D	147	GLU
1	D	151	GLN
1	D	156	GLU
1	D	168[A]	SER
1	D	168[B]	SER
1	D	257	GLN
1	D	302	LEU
1	D	326	LEU
1	D	329	ARG
1	D	389	THR
1	D	396	ASP

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (12) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	126	GLN
1	A	132	ASN
1	A	257	GLN
1	A	466	ASN
1	B	194	GLN
1	B	430	HIS
1	C	256	GLN
1	D	122	GLN
1	D	205	GLN
1	D	294	GLN
1	D	421	HIS
1	D	476	GLN

5.3.3 RNA ⓘ

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 oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 36 ligands modelled in this entry, 11 are monoatomic - leaving 25 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	BTB	A	504	8	13,13,13	0.32	0	7,16,16	0.45	0
2	HEM	A	501	1	50,50,50	1.61	9 (18%)	67,82,82	1.55	15 (22%)
2	HEM	C	501	1	50,50,50	1.73	8 (16%)	67,82,82	1.22	6 (8%)
6	GOL	C	506	-	5,5,5	0.46	0	5,5,5	0.50	0
5	BTB	C	505	-	13,13,13	0.59	0	7,16,16	0.91	0
6	GOL	A	506	-	5,5,5	0.48	0	5,5,5	0.42	0
6	GOL	D	507	-	5,5,5	0.40	0	5,5,5	0.16	0
2	HEM	D	502	1	50,50,50	1.49	9 (18%)	67,82,82	1.37	9 (13%)
6	GOL	C	507	-	5,5,5	0.35	0	5,5,5	0.45	0
4	A1CN7	D	504	-	25,27,27	0.73	1 (4%)	31,38,38	1.33	5 (16%)
4	A1CN7	A	503	-	25,27,27	0.72	0	31,38,38	1.73	5 (16%)
3	H4B	A	502	-	17,18,18	0.94	0	14,26,26	1.90	4 (28%)
4	A1CN7	B	503	-	25,27,27	0.72	2 (8%)	31,38,38	1.43	3 (9%)
5	BTB	B	504	8	13,13,13	0.67	0	7,16,16	0.84	0
5	BTB	D	505	8	13,13,13	0.70	0	7,16,16	0.75	0
5	BTB	B	505	-	13,13,13	0.47	0	7,16,16	1.08	0
2	HEM	B	501	1	50,50,50	1.86	7 (14%)	67,82,82	1.69	13 (19%)
5	BTB	A	505	-	13,13,13	0.72	0	7,16,16	0.96	0
3	H4B	C	502	-	17,18,18	0.89	0	14,26,26	1.99	4 (28%)
5	BTB	D	506	-	13,13,13	0.50	0	7,16,16	1.05	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
3	H4B	B	502	-	17,18,18	0.85	0	14,26,26	1.86	4 (28%)
6	GOL	A	507	-	5,5,5	0.47	0	5,5,5	0.37	0
3	H4B	D	503	-	17,18,18	0.83	0	14,26,26	2.23	5 (35%)
4	A1CN7	C	503	-	25,27,27	0.76	2 (8%)	31,38,38	1.53	4 (12%)
5	BTB	C	504	8	13,13,13	0.34	0	7,16,16	0.58	0

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
5	BTB	A	504	8	-	10/21/21/21	-
2	HEM	A	501	1	-	8/14/54/54	-
2	HEM	C	501	1	-	5/14/54/54	-
6	GOL	C	506	-	-	2/4/4/4	-
5	BTB	C	505	-	-	11/21/21/21	-
6	GOL	A	506	-	-	2/4/4/4	-
6	GOL	D	507	-	-	2/4/4/4	-
2	HEM	D	502	1	-	5/14/54/54	-
6	GOL	C	507	-	-	4/4/4/4	-
4	A1CN7	D	504	-	-	0/8/18/18	0/3/3/3
4	A1CN7	A	503	-	-	5/8/18/18	0/3/3/3
3	H4B	A	502	-	-	0/8/17/17	0/2/2/2
4	A1CN7	B	503	-	-	1/8/18/18	0/3/3/3
5	BTB	B	504	8	-	3/21/21/21	-
5	BTB	D	505	8	-	3/21/21/21	-
5	BTB	B	505	-	-	12/21/21/21	-
2	HEM	B	501	1	-	6/14/54/54	-
5	BTB	A	505	-	-	3/21/21/21	-
3	H4B	C	502	-	-	2/8/17/17	0/2/2/2
5	BTB	D	506	-	-	8/21/21/21	-
3	H4B	B	502	-	-	3/8/17/17	0/2/2/2
6	GOL	A	507	-	-	2/4/4/4	-
3	H4B	D	503	-	-	2/8/17/17	0/2/2/2
4	A1CN7	C	503	-	-	3/8/18/18	0/3/3/3
5	BTB	C	504	8	-	7/21/21/21	-

All (38) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	501	HEM	FE-NC	7.78	2.20	1.95
2	C	501	HEM	FE-NB	6.62	2.15	1.94
2	B	501	HEM	FE-NB	6.31	2.14	1.94
2	C	501	HEM	FE-NA	5.19	2.12	1.95
2	A	501	HEM	FE-NA	5.04	2.11	1.95
2	A	501	HEM	FE-NB	4.89	2.10	1.94
2	D	502	HEM	FE-NC	4.39	2.09	1.95
2	D	502	HEM	FE-NB	3.95	2.07	1.94
2	A	501	HEM	FE-NC	3.48	2.06	1.95
2	C	501	HEM	CAB-C3B	3.22	1.56	1.47
2	B	501	HEM	CAC-C3C	3.17	1.55	1.47
2	C	501	HEM	FE-NC	3.08	2.05	1.95
2	D	502	HEM	FE-ND	3.05	2.04	1.94
2	A	501	HEM	CAB-C3B	3.03	1.55	1.47
2	A	501	HEM	CAC-C3C	3.02	1.55	1.47
2	D	502	HEM	CAB-C3B	2.99	1.55	1.47
2	B	501	HEM	CAB-C3B	2.96	1.55	1.47
2	D	502	HEM	FE-NA	2.90	2.04	1.95
2	C	501	HEM	CAC-C3C	2.87	1.55	1.47
2	C	501	HEM	FE-ND	2.74	2.03	1.94
2	A	501	HEM	FE-ND	2.74	2.03	1.94
2	B	501	HEM	CMD-C2D	2.71	1.56	1.50
2	B	501	HEM	FE-ND	2.66	2.03	1.94
2	D	502	HEM	CAC-C3C	2.54	1.54	1.47
2	D	502	HEM	CMC-C2C	2.35	1.55	1.50
4	C	503	A1CN7	C24-N23	-2.31	1.46	1.49
4	C	503	A1CN7	C26-N23	-2.27	1.47	1.49
2	B	501	HEM	CMC-C2C	2.21	1.55	1.50
2	D	502	HEM	CMD-C2D	2.20	1.55	1.50
4	B	503	A1CN7	C24-N23	-2.19	1.47	1.49
2	A	501	HEM	CMB-C2B	2.08	1.55	1.50
2	D	502	HEM	CMB-C2B	2.07	1.55	1.50
4	B	503	A1CN7	C26-N23	-2.06	1.47	1.49
2	C	501	HEM	CMC-C2C	2.04	1.54	1.50
2	A	501	HEM	CMA-C3A	2.02	1.54	1.50
4	D	504	A1CN7	C26-N23	-2.02	1.47	1.49
2	C	501	HEM	CMB-C2B	2.01	1.54	1.50
2	A	501	HEM	C2A-C3A	-2.00	1.33	1.38

All (77) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	A	503	A1CN7	C02-N01-C06	5.69	122.33	118.07
4	C	503	A1CN7	C02-N01-C06	5.18	121.94	118.07
2	B	501	HEM	CBA-CAA-C2A	-5.07	98.52	112.53
3	D	503	H4B	C11-C10-C9	-4.83	106.20	112.11
4	B	503	A1CN7	C02-N01-C06	4.75	121.62	118.07
2	B	501	HEM	C3B-C2B-C1B	4.69	109.93	106.41
3	B	502	H4B	C2-N1-C8A	4.34	121.03	113.36
3	C	502	H4B	C2-N1-C8A	4.29	120.92	113.36
2	D	502	HEM	CBA-CAA-C2A	-4.26	100.77	112.53
3	D	503	H4B	C2-N1-C8A	4.16	120.70	113.36
4	A	503	A1CN7	N02-C02-N01	3.99	123.01	116.59
3	A	502	H4B	C2-N1-C8A	3.97	120.36	113.36
2	A	501	HEM	CAD-C3D-C4D	-3.54	118.52	124.70
2	D	502	HEM	C4D-ND-C1D	3.44	109.28	105.21
2	B	501	HEM	C3D-C4D-ND	-3.42	106.42	110.17
3	A	502	H4B	O4-C4-C4A	-3.41	119.03	127.26
4	D	504	A1CN7	O09-C11-C12	3.29	120.89	115.92
2	B	501	HEM	C4D-ND-C1D	3.15	108.94	105.21
3	C	502	H4B	O4-C4-C4A	-3.13	119.72	127.26
2	A	501	HEM	C2A-C1A-NA	-3.10	106.72	110.15
2	B	501	HEM	C3A-C4A-NA	-3.09	105.19	110.14
3	A	502	H4B	C2-N3-C4	-3.04	119.60	125.11
2	A	501	HEM	CAD-C3D-C2D	3.04	133.56	127.87
2	B	501	HEM	C2A-C1A-NA	-2.98	106.85	110.15
4	D	504	A1CN7	N02-C02-N01	2.89	121.23	116.59
2	B	501	HEM	C4A-NA-C1A	2.89	110.53	105.82
2	B	501	HEM	CHC-C1C-NC	2.88	127.59	124.45
2	B	501	HEM	C2B-C1B-NB	-2.80	106.62	109.84
4	C	503	A1CN7	N02-C02-N01	2.79	121.07	116.59
2	A	501	HEM	C4D-ND-C1D	2.78	108.50	105.21
3	B	502	H4B	O4-C4-C4A	-2.78	120.56	127.26
4	B	503	A1CN7	O09-C11-C12	2.77	120.09	115.92
3	C	502	H4B	C4A-C4-N3	2.73	119.64	112.13
2	C	501	HEM	C3B-C2B-C1B	2.73	108.46	106.41
2	D	502	HEM	C3D-C4D-ND	-2.72	107.19	110.17
2	C	501	HEM	CBA-CAA-C2A	-2.66	105.18	112.53
2	A	501	HEM	CAD-CBD-CGD	-2.65	106.64	113.67
3	C	502	H4B	C2-N3-C4	-2.65	120.31	125.11
3	A	502	H4B	C4A-C4-N3	2.64	119.37	112.13
2	B	501	HEM	C1B-NB-C4B	2.63	108.32	105.21
3	B	502	H4B	C4A-C4-N3	2.62	119.34	112.13
2	D	502	HEM	CHD-C1D-ND	2.61	127.23	124.42
2	C	501	HEM	C3B-C4B-NB	-2.59	107.61	109.47

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	D	503	H4B	C4A-C4-N3	2.59	119.24	112.13
2	B	501	HEM	CMC-C2C-C1C	-2.55	120.24	124.73
2	D	502	HEM	C2A-C1A-NA	-2.54	107.33	110.15
2	A	501	HEM	CHA-C4D-ND	2.47	127.43	124.37
2	D	502	HEM	C2D-C1D-ND	-2.47	107.05	109.90
2	B	501	HEM	CHD-C1D-ND	2.41	127.01	124.42
4	C	503	A1CN7	O09-C11-C12	2.39	119.53	115.92
2	A	501	HEM	C3B-C2B-C1B	2.37	108.19	106.41
2	A	501	HEM	C1B-NB-C4B	2.37	108.01	105.21
4	A	503	A1CN7	C05-C06-N01	-2.37	120.03	122.73
2	A	501	HEM	CBA-CAA-C2A	-2.37	105.99	112.53
3	D	503	H4B	C2-N3-C4	-2.33	120.88	125.11
4	D	504	A1CN7	C08-C06-C05	-2.32	117.84	121.30
4	A	503	A1CN7	C07-C04-C03	-2.32	117.78	120.92
2	A	501	HEM	C3D-C4D-ND	-2.31	107.64	110.17
2	A	501	HEM	C3B-C4B-NB	-2.30	107.81	109.47
2	B	501	HEM	C4A-C3A-C2A	2.30	109.45	106.82
3	D	503	H4B	O4-C4-C4A	-2.30	121.72	127.26
2	A	501	HEM	CMD-C2D-C1D	-2.30	121.44	125.03
2	D	502	HEM	C3B-C4B-NB	-2.29	107.82	109.47
2	C	501	HEM	C1B-NB-C4B	2.27	107.90	105.21
2	D	502	HEM	CAD-CBD-CGD	-2.27	107.66	113.67
3	B	502	H4B	C2-N3-C4	-2.26	121.01	125.11
2	A	501	HEM	CHC-C1C-NC	2.24	126.89	124.45
4	A	503	A1CN7	C25-C24-N23	2.23	89.92	88.46
2	A	501	HEM	CBD-CAD-C3D	2.13	118.43	112.53
2	D	502	HEM	C3B-C2B-C1B	2.13	108.01	106.41
4	D	504	A1CN7	C08-C06-N01	2.08	119.88	115.69
2	A	501	HEM	CAA-CBA-CGA	-2.05	108.23	113.67
4	B	503	A1CN7	C25-C24-N23	2.03	89.79	88.46
4	C	503	A1CN7	C08-C06-N01	2.03	119.78	115.69
2	C	501	HEM	O1A-CGA-CBA	-2.03	116.67	123.09
4	D	504	A1CN7	C03-C02-N02	-2.02	117.47	121.81
2	C	501	HEM	CBD-CAD-C3D	-2.01	106.97	112.53

There are no chirality outliers.

All (109) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	501	HEM	C4D-C3D-CAD-CBD
3	B	502	H4B	C7-C6-C9-O9
3	B	502	H4B	C7-C6-C9-C10

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Mol	Chain	Res	Type	Atoms
4	A	503	A1CN7	C12-C11-O09-C08
5	A	504	BTB	O1-C1-C2-C3
5	A	504	BTB	O1-C1-C2-C4
5	A	504	BTB	O1-C1-C2-N
5	A	504	BTB	C1-C2-C3-O3
5	A	504	BTB	C4-C2-C3-O3
5	A	504	BTB	N-C2-C3-O3
5	A	504	BTB	C1-C2-C4-O4
5	A	504	BTB	C3-C2-C4-O4
5	A	504	BTB	N-C2-C4-O4
5	A	505	BTB	N-C2-C3-O3
5	B	504	BTB	O1-C1-C2-C3
5	B	504	BTB	O1-C1-C2-C4
5	B	504	BTB	O1-C1-C2-N
5	B	505	BTB	C1-C2-C3-O3
5	B	505	BTB	C4-C2-C3-O3
5	B	505	BTB	N-C2-C3-O3
5	B	505	BTB	C1-C2-N-C5
5	B	505	BTB	C1-C2-N-C7
5	B	505	BTB	C3-C2-N-C5
5	B	505	BTB	C3-C2-N-C7
5	B	505	BTB	C4-C2-N-C5
5	B	505	BTB	C4-C2-N-C7
5	C	504	BTB	C1-C2-C3-O3
5	C	504	BTB	C4-C2-C3-O3
5	C	504	BTB	N-C2-C3-O3
5	C	504	BTB	C1-C2-C4-O4
5	C	504	BTB	C3-C2-C4-O4
5	C	504	BTB	N-C2-C4-O4
5	C	505	BTB	C1-C2-C4-O4
5	C	505	BTB	C3-C2-C4-O4
5	C	505	BTB	N-C2-C4-O4
5	C	505	BTB	C1-C2-N-C5
5	C	505	BTB	C1-C2-N-C7
5	C	505	BTB	C3-C2-N-C5
5	C	505	BTB	C3-C2-N-C7
5	C	505	BTB	C4-C2-N-C5
5	C	505	BTB	C4-C2-N-C7
5	D	505	BTB	O1-C1-C2-C3
5	D	505	BTB	O1-C1-C2-C4
5	D	505	BTB	O1-C1-C2-N
5	D	506	BTB	O1-C1-C2-N

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Mol	Chain	Res	Type	Atoms
5	D	506	BTB	C1-C2-C3-O3
5	D	506	BTB	C4-C2-C3-O3
5	D	506	BTB	N-C2-C3-O3
6	A	506	GOL	C1-C2-C3-O3
6	A	507	GOL	O1-C1-C2-C3
6	C	506	GOL	C1-C2-C3-O3
6	D	507	GOL	O1-C1-C2-C3
2	A	501	HEM	C2D-C3D-CAD-CBD
2	A	501	HEM	C2A-CAA-CBA-CGA
2	C	501	HEM	C2A-CAA-CBA-CGA
2	D	502	HEM	C3D-CAD-CBD-CGD
5	D	506	BTB	N-C5-C6-O6
5	A	505	BTB	N-C7-C8-O8
5	B	505	BTB	N-C5-C6-O6
6	C	507	GOL	O1-C1-C2-C3
6	C	507	GOL	C1-C2-C3-O3
5	C	505	BTB	N-C7-C8-O8
4	A	503	A1CN7	C15-C21-C22-N23
4	B	503	A1CN7	C15-C21-C22-N23
5	C	504	BTB	N-C7-C8-O8
5	D	506	BTB	N-C7-C8-O8
5	A	505	BTB	C1-C2-C3-O3
6	A	506	GOL	O2-C2-C3-O3
6	C	506	GOL	O2-C2-C3-O3
6	D	507	GOL	O1-C1-C2-O2
5	B	505	BTB	N-C7-C8-O8
5	C	505	BTB	N-C5-C6-O6
4	C	503	A1CN7	C15-C21-C22-N23
6	A	507	GOL	O1-C1-C2-O2
6	C	507	GOL	O1-C1-C2-O2
2	C	501	HEM	C3D-CAD-CBD-CGD
5	A	504	BTB	N-C7-C8-O8
2	A	501	HEM	C4B-C3B-CAB-CBB
2	B	501	HEM	C4B-C3B-CAB-CBB
2	C	501	HEM	C4B-C3B-CAB-CBB
2	D	502	HEM	C4B-C3B-CAB-CBB
4	A	503	A1CN7	C16-C11-O09-C08
5	B	505	BTB	N-C2-C4-O4
4	C	503	A1CN7	C14-C15-C21-C22
4	C	503	A1CN7	C16-C15-C21-C22
2	B	501	HEM	C3D-CAD-CBD-CGD
4	A	503	A1CN7	C14-C15-C21-C22

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Mol	Chain	Res	Type	Atoms
4	A	503	A1CN7	C16-C15-C21-C22
6	C	507	GOL	O2-C2-C3-O3
2	D	502	HEM	CAA-CBA-CGA-O2A
2	A	501	HEM	CAA-CBA-CGA-O1A
2	D	502	HEM	CAA-CBA-CGA-O1A
2	A	501	HEM	CAA-CBA-CGA-O2A
2	B	501	HEM	CAA-CBA-CGA-O2A
3	C	502	H4B	C7-C6-C9-C10
2	B	501	HEM	CAA-CBA-CGA-O1A
2	A	501	HEM	CAD-CBD-CGD-O1D
3	D	503	H4B	O10-C10-C9-O9
2	B	501	HEM	CAD-CBD-CGD-O2D
5	D	506	BTB	O1-C1-C2-C4
2	C	501	HEM	CAD-CBD-CGD-O2D
3	B	502	H4B	N5-C6-C9-O9
2	C	501	HEM	CAD-CBD-CGD-O1D
2	D	502	HEM	CAD-CBD-CGD-O1D
3	C	502	H4B	C7-C6-C9-O9
2	B	501	HEM	CAD-CBD-CGD-O1D
2	A	501	HEM	CAD-CBD-CGD-O2D
3	D	503	H4B	O10-C10-C9-C6
5	D	506	BTB	C1-C2-N-C7

There are no ring outliers.

18 monomers are involved in 40 short contacts:

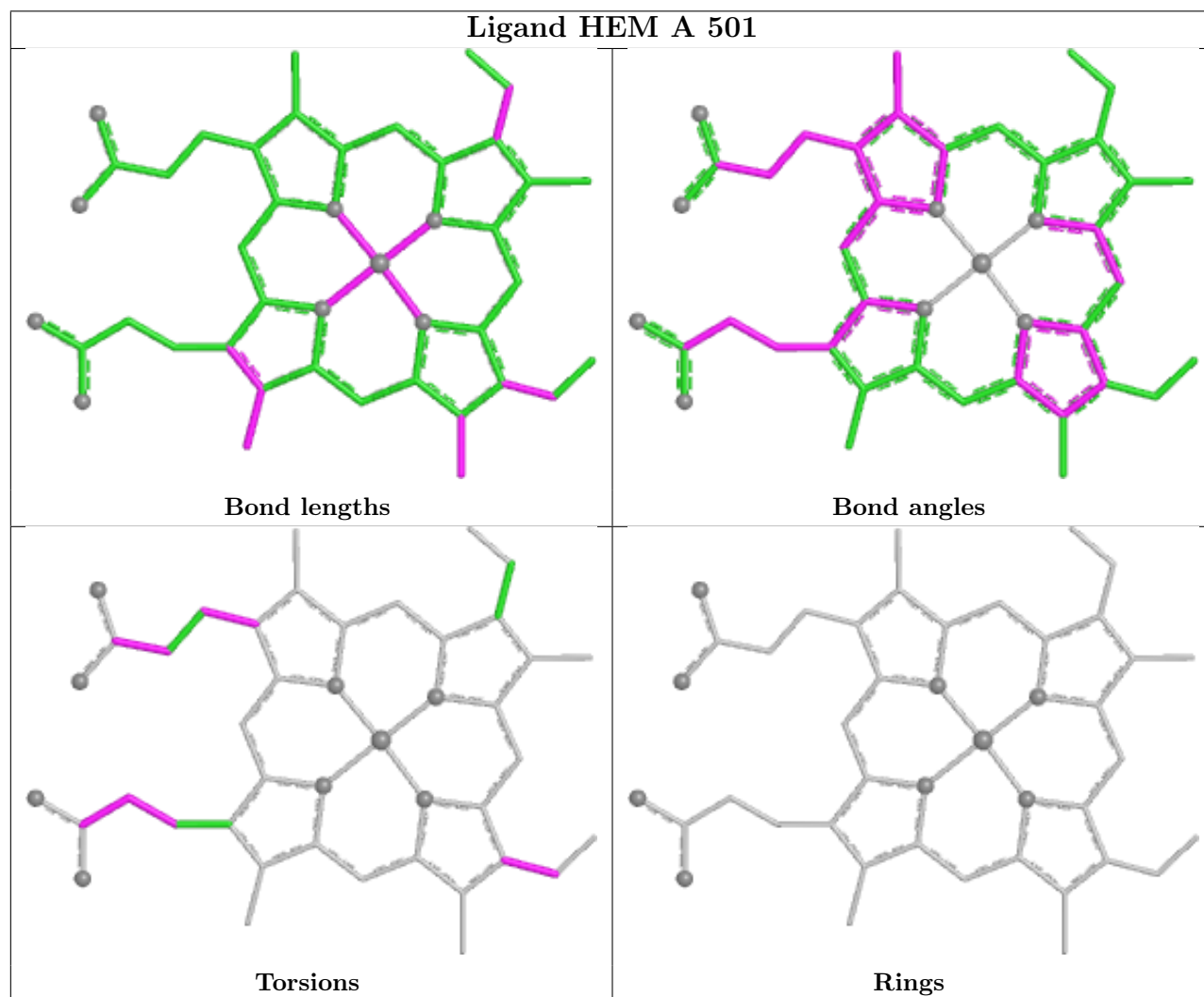
Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	A	504	BTB	4	0
2	A	501	HEM	2	0
2	C	501	HEM	4	0
5	C	505	BTB	3	0
2	D	502	HEM	3	0
4	D	504	A1CN7	1	0
3	A	502	H4B	2	0
5	B	504	BTB	4	1
5	D	505	BTB	1	0
5	B	505	BTB	5	0
2	B	501	HEM	3	0
5	A	505	BTB	1	0
3	C	502	H4B	1	0
5	D	506	BTB	3	0
3	B	502	H4B	1	0

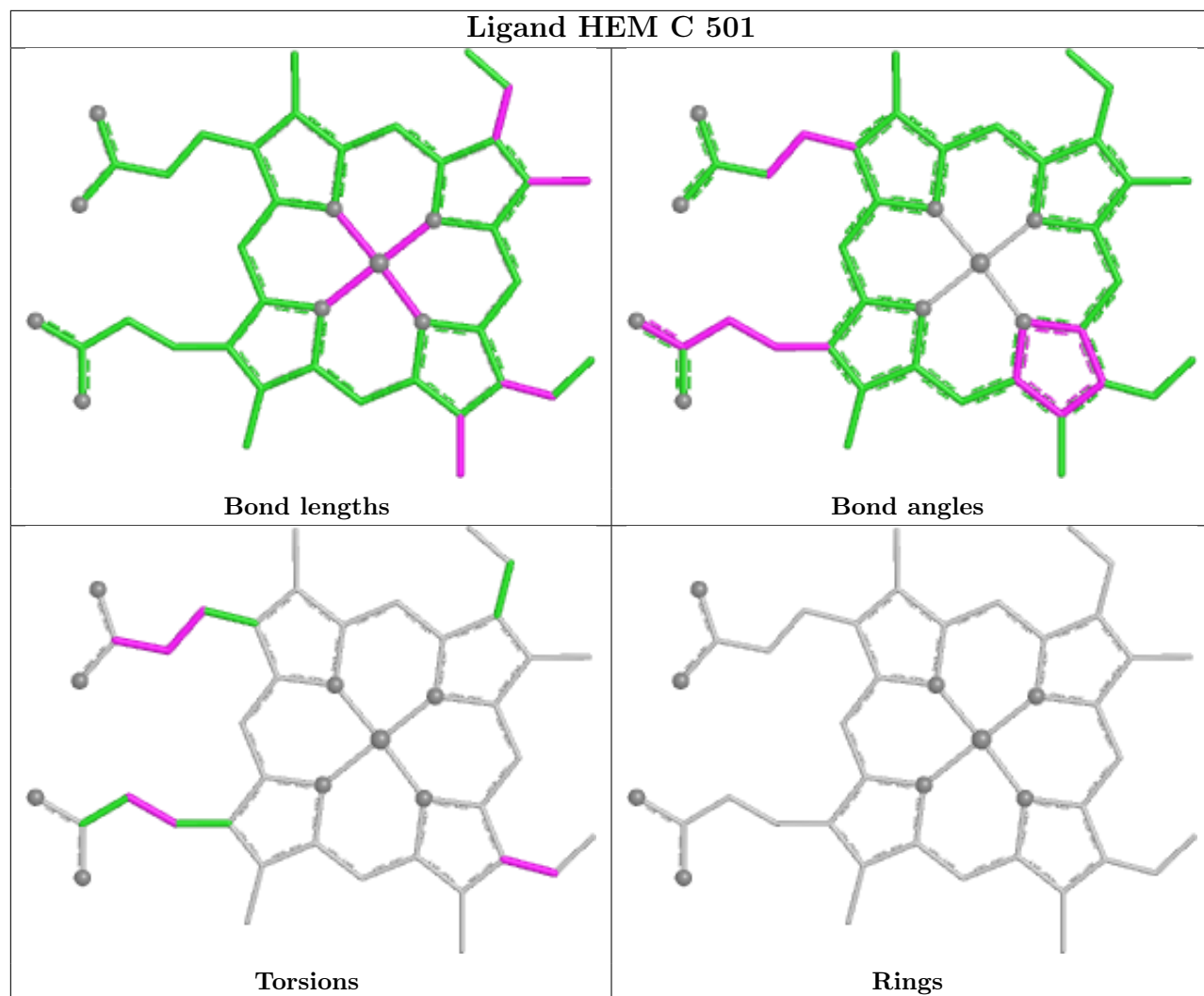
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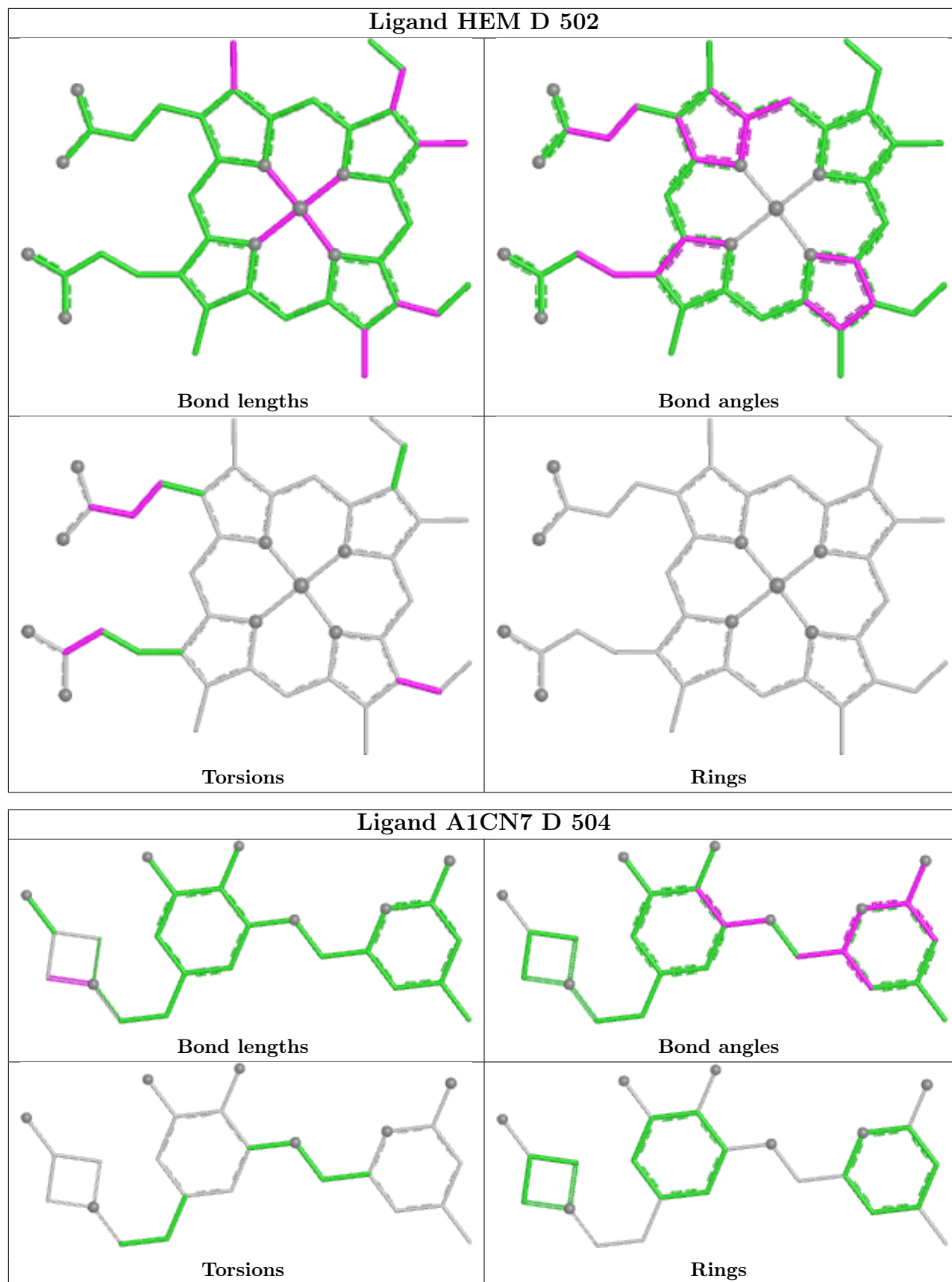
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Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	D	503	H4B	1	0
4	C	503	A1CN7	1	0
5	C	504	BTB	1	0

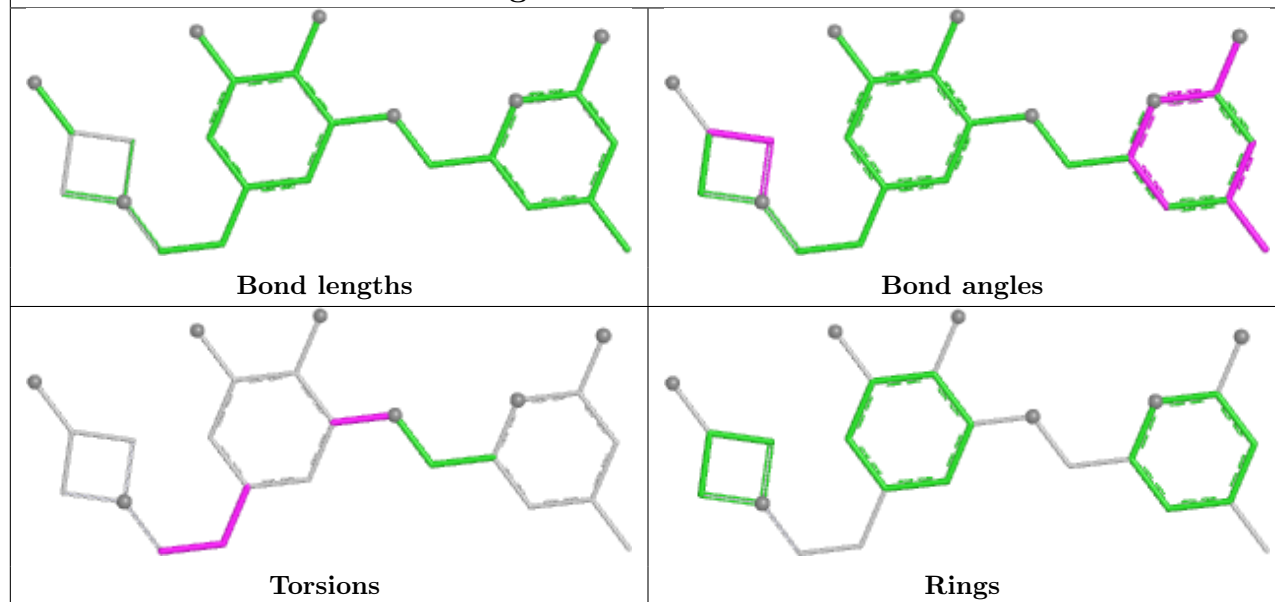
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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



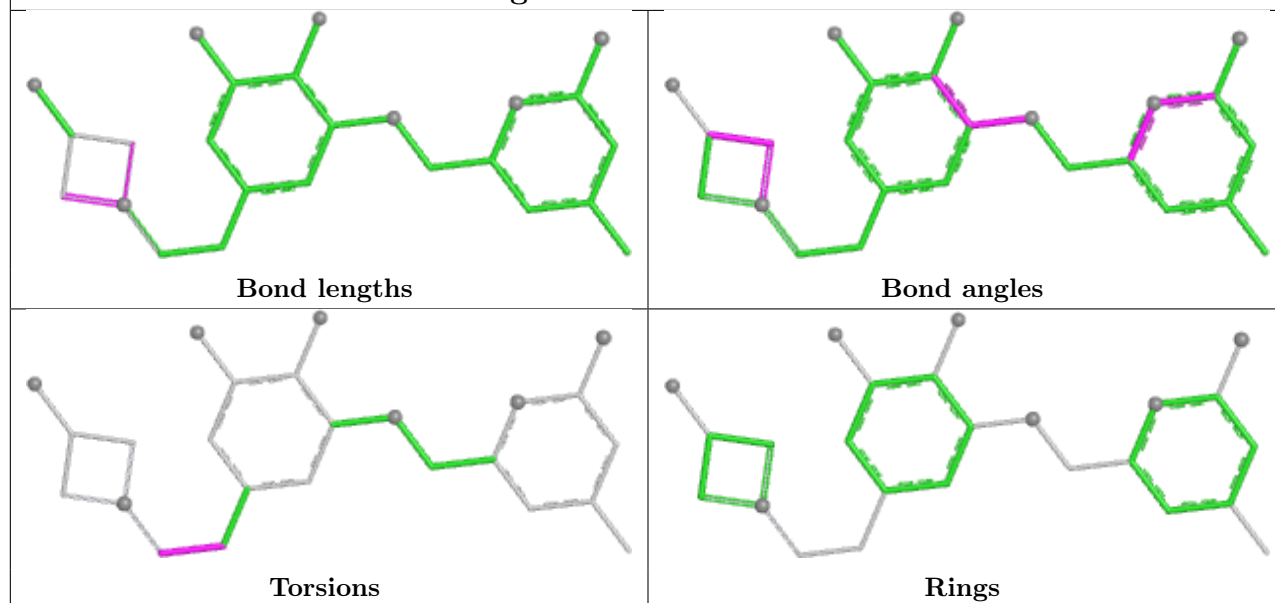


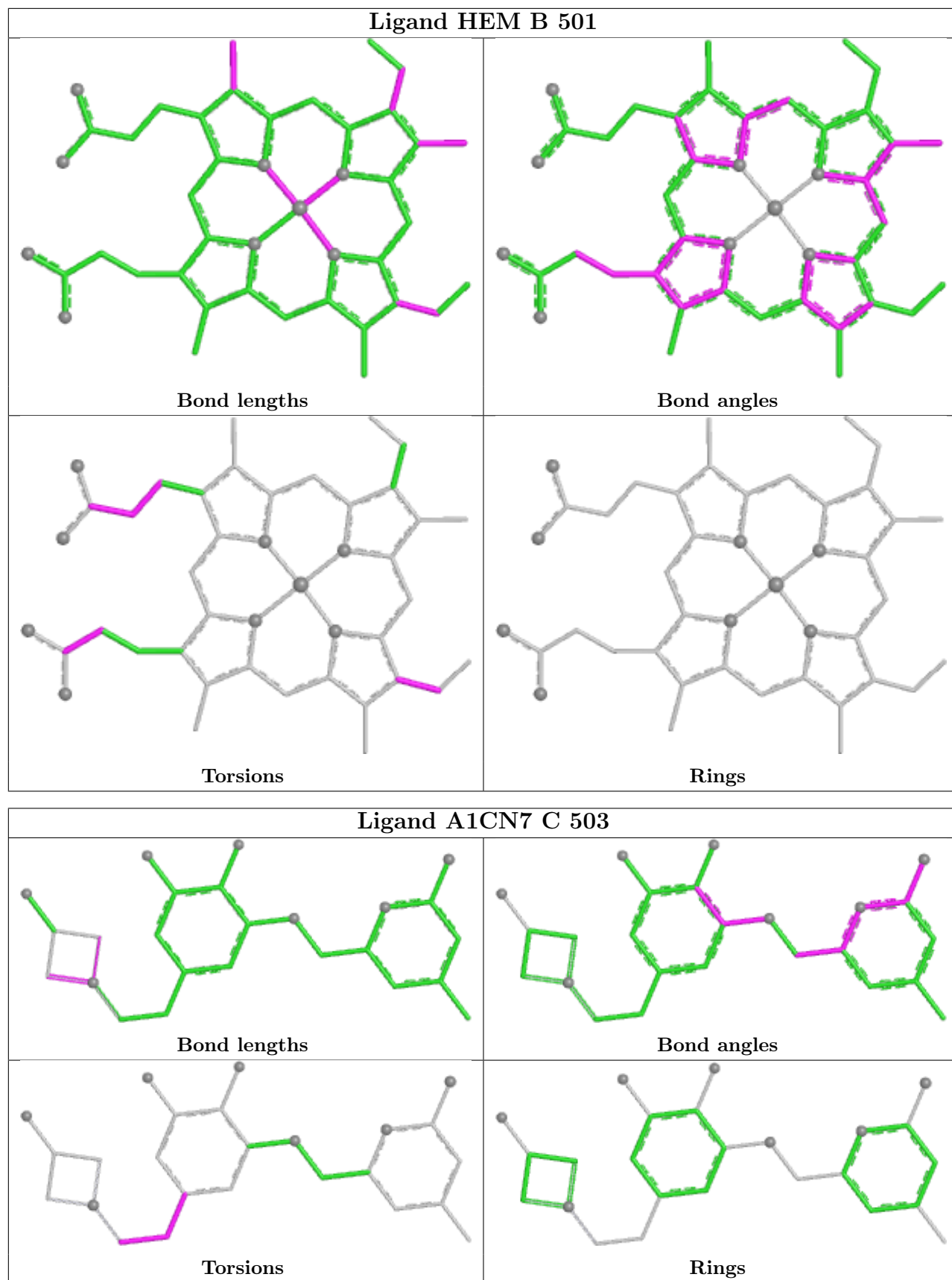


Ligand A1CN7 A 503



Ligand A1CN7 B 503





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	400/440 (90%)	-0.93	0 100 100	36, 68, 113, 141	1 (0%)
1	B	402/440 (91%)	-1.18	0 100 100	34, 54, 86, 133	1 (0%)
1	C	400/440 (90%)	-0.76	0 100 100	33, 72, 122, 145	1 (0%)
1	D	402/440 (91%)	-1.07	0 100 100	34, 53, 96, 139	1 (0%)
All	All	1604/1760 (91%)	-0.99	0 100 100	33, 61, 110, 145	4 (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(Å ²)	Q<0.9
4	A1CN7	C	503	25/25	0.97	0.09	59,106,127,148	0
5	BTB	D	506	14/14	0.97	0.04	61,83,98,99	0
6	GOL	C	507	6/6	0.97	0.05	94,96,101,106	0
3	H4B	C	502	17/17	0.98	0.06	62,78,98,99	0

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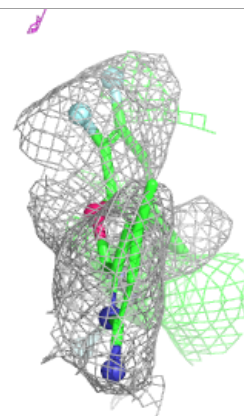
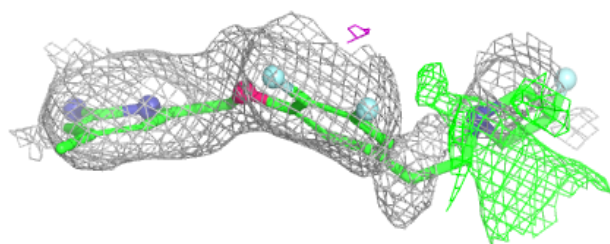
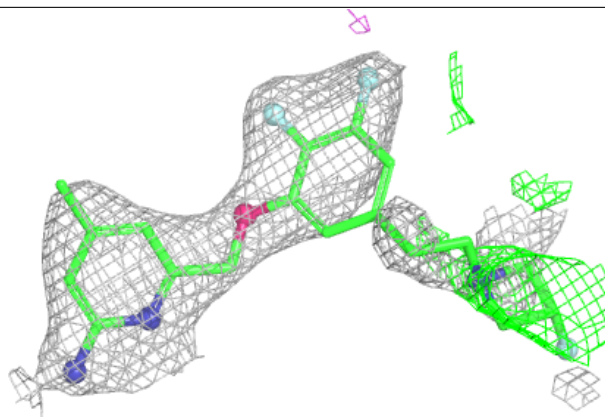
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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
4	A1CN7	D	504	25/25	0.98	0.08	37,97,138,145	0
5	BTB	A	505	14/14	0.98	0.04	66,77,85,87	0
5	BTB	B	505	14/14	0.98	0.04	56,91,94,94	0
5	BTB	C	505	14/14	0.98	0.04	67,82,91,101	0
4	A1CN7	A	503	25/25	0.98	0.07	49,104,134,141	0
6	GOL	A	507	6/6	0.98	0.03	80,82,85,88	0
6	GOL	C	506	6/6	0.98	0.04	57,76,77,84	0
4	A1CN7	B	503	25/25	0.98	0.07	37,96,122,130	0
5	BTB	B	504	14/14	0.99	0.06	56,83,94,94	0
2	HEM	C	501	43/43	0.99	0.04	50,70,89,109	0
5	BTB	C	504	14/14	0.99	0.06	80,106,114,116	0
3	H4B	A	502	17/17	0.99	0.06	68,81,102,102	0
5	BTB	D	505	14/14	0.99	0.04	49,71,99,113	0
3	H4B	B	502	17/17	0.99	0.05	47,68,77,79	0
6	GOL	A	506	6/6	0.99	0.03	49,62,65,65	0
2	HEM	B	501	43/43	0.99	0.04	24,44,83,110	0
5	BTB	A	504	14/14	0.99	0.04	75,81,93,95	0
3	H4B	D	503	17/17	0.99	0.04	42,79,96,96	0
6	GOL	D	507	6/6	0.99	0.05	74,78,82,88	0
7	CL	A	508	1/1	0.99	0.04	73,73,73,73	0
7	CL	B	506	1/1	0.99	0.03	70,70,70,70	0
7	CL	C	508	1/1	0.99	0.04	76,76,76,76	0
7	CL	D	508	1/1	0.99	0.04	64,64,64,64	0
10	CA	B	508	1/1	0.99	0.03	61,61,61,61	0
2	HEM	A	501	43/43	1.00	0.04	46,66,100,109	0
8	GD	A	509	1/1	1.00	0.01	125,125,125,125	0
8	GD	B	507	1/1	1.00	0.01	62,62,62,62	0
8	GD	C	509	1/1	1.00	0.02	149,149,149,149	0
8	GD	D	509	1/1	1.00	0.02	70,70,70,70	0
9	ZN	A	510	1/1	1.00	0.01	57,57,57,57	0
9	ZN	D	501	1/1	1.00	0.01	56,56,56,56	0
2	HEM	D	502	43/43	1.00	0.04	26,41,84,94	0

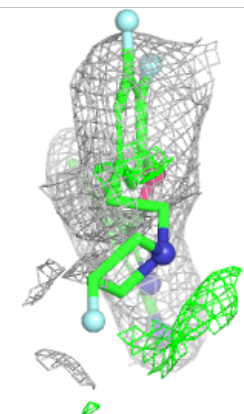
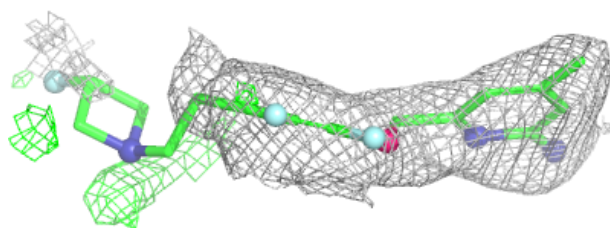
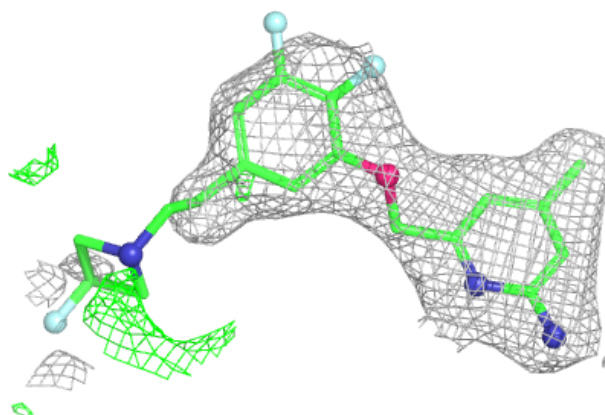
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

Electron density around A1CN7 C 503:

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

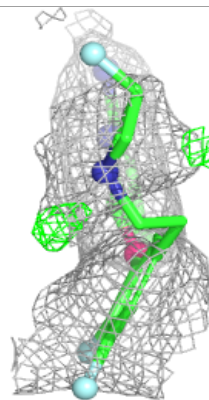
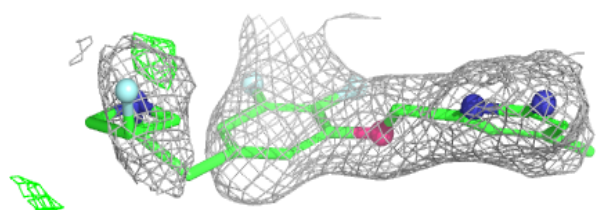
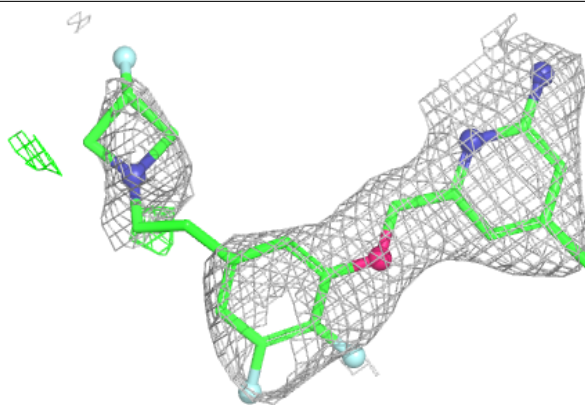
**Electron density around A1CN7 D 504:**

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

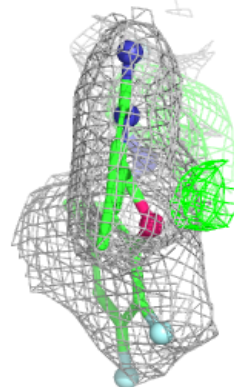
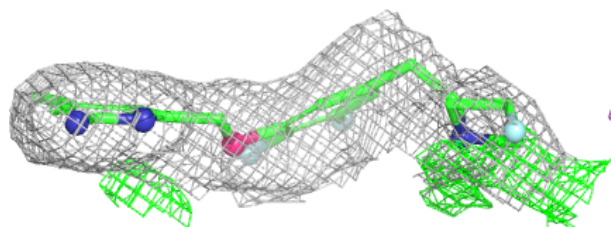
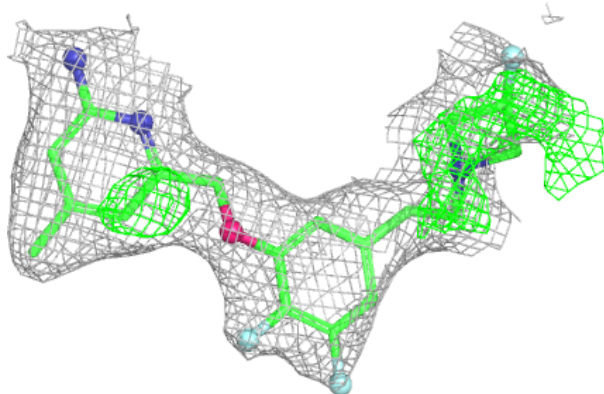


Electron density around A1CN7 A 503:

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

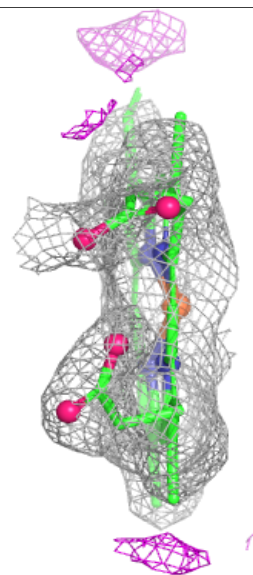
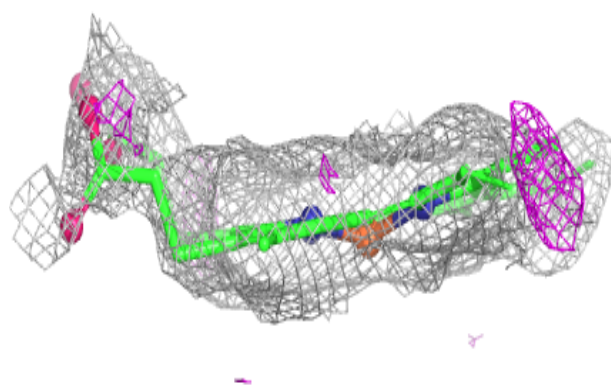
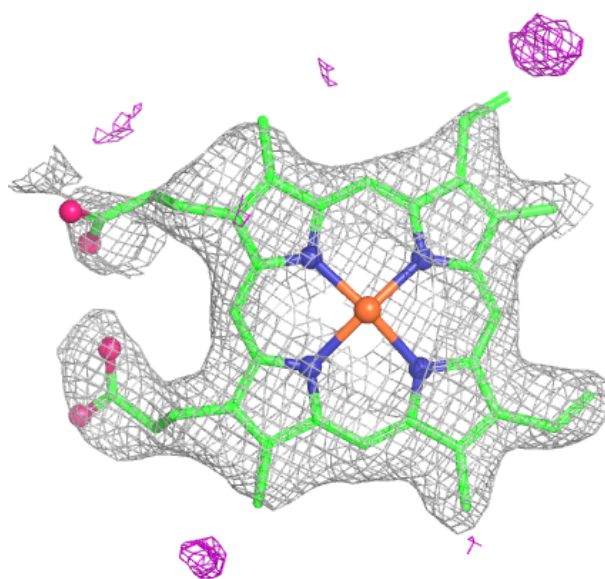
**Electron density around A1CN7 B 503:**

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



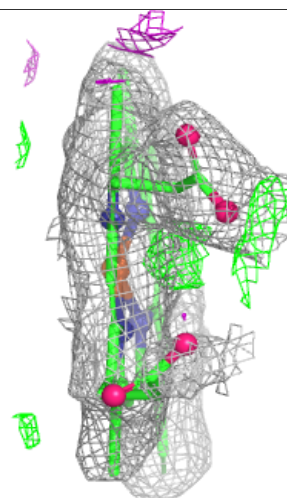
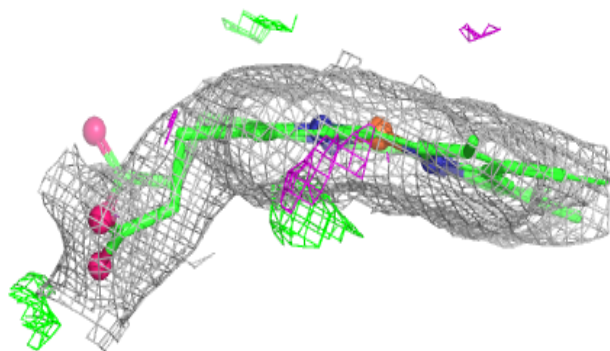
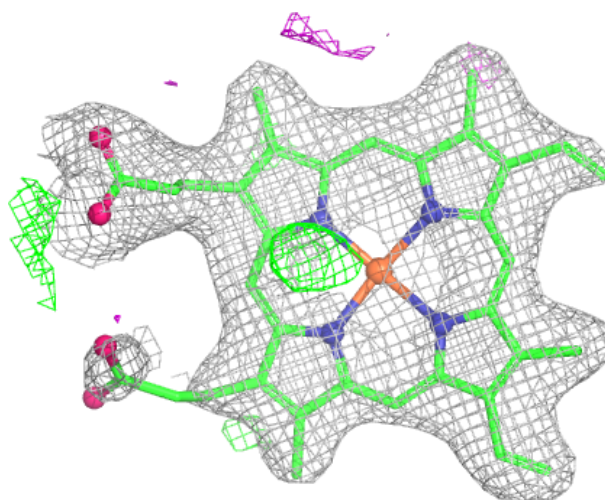
Electron density around HEM C 501:

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 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



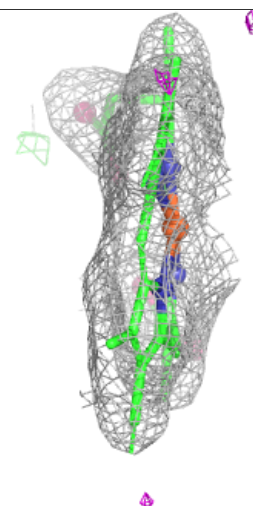
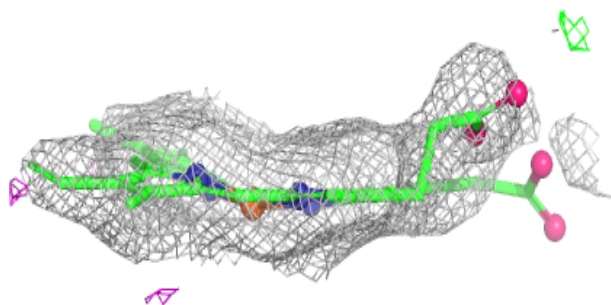
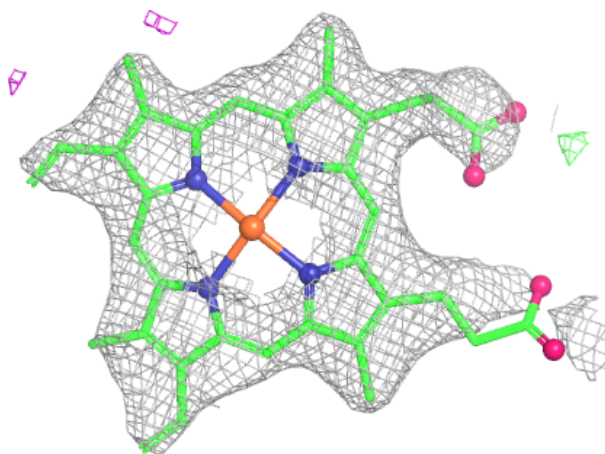
Electron density around HEM B 501:

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



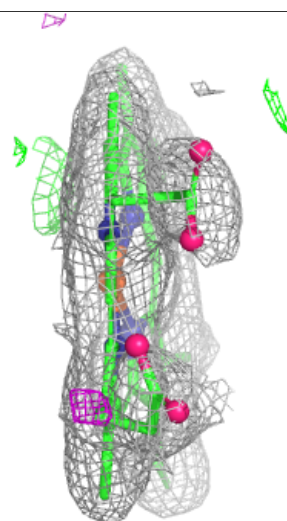
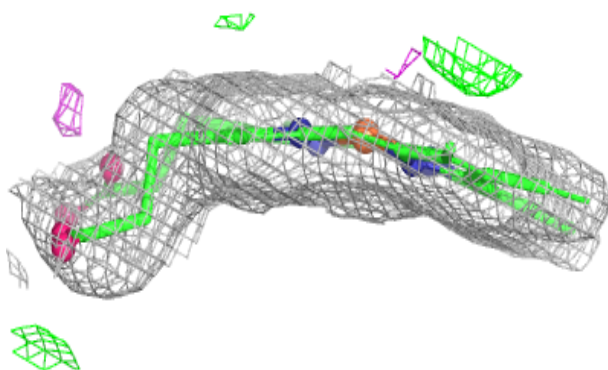
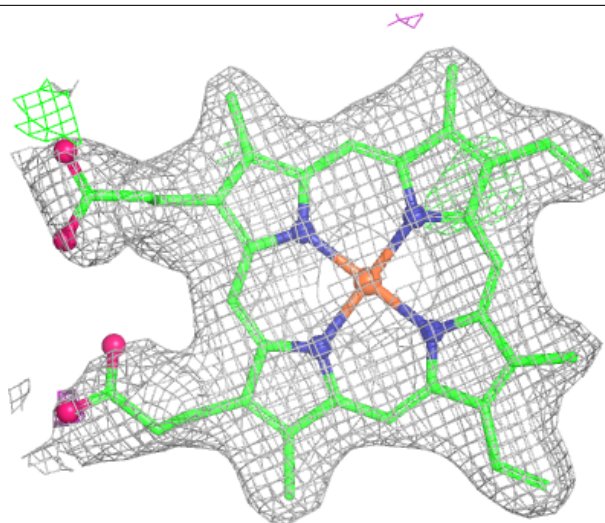
Electron density around HEM A 501:

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



Electron density around HEM D 502:

$2mF_o-DF_c$ (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.