



Full wwPDB X-ray Structure Validation Report ⓘ

Jun 12, 2024 – 04:17 AM EDT

PDB ID : 6NHF
Title : Structure of human endothelial nitric oxide synthase heme domain in complex with (S)-6-(2,3-difluoro-5-(2-(1-methylazetid-2-yl)ethyl)phenethyl)-4-methylpyridin-2-amine
Authors : Chreifi, G.; Li, H.; Poulos, T.L.
Deposited on : 2018-12-21
Resolution : 1.83 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 : 4.02b-467
Mogul : 1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix) : 1.13
EDS : 2.36.2
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) : 2.36.2

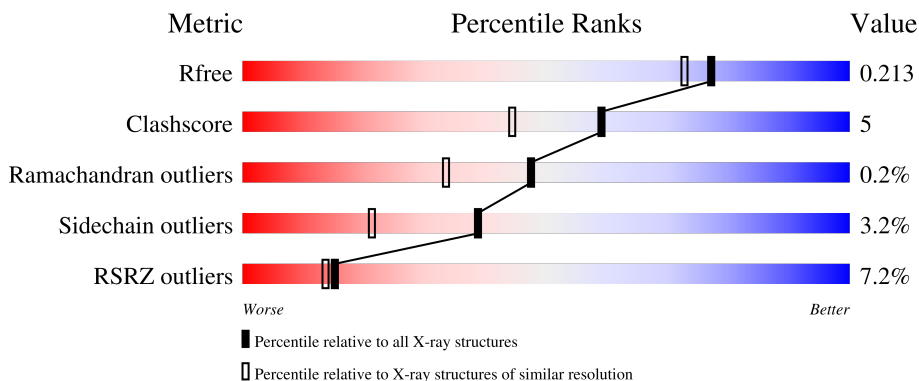
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.83 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	4003 (1.86-1.82)
Clashscore	141614	4233 (1.86-1.82)
Ramachandran outliers	138981	4185 (1.86-1.82)
Sidechain outliers	138945	4186 (1.86-1.82)
RSRZ outliers	127900	3957 (1.86-1.82)

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	 12% 80% 9% 9%
1	B	440	 % 83% 7% 9%
1	C	440	 12% 80% 11% 9%
1	D	440	 % 83% 8% 9%

2 Entry composition [i](#)

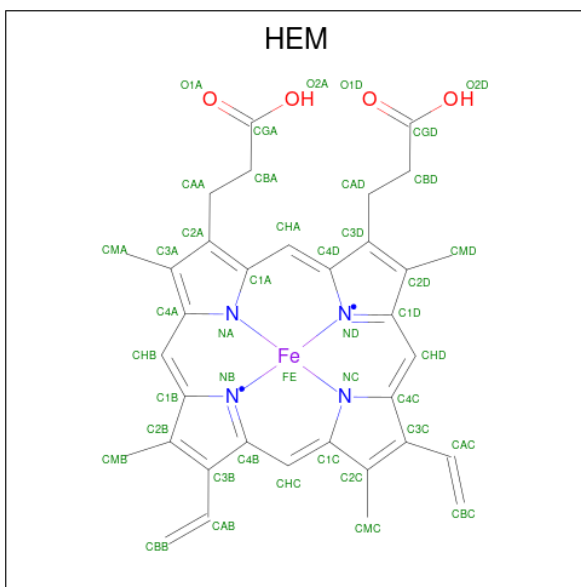
There are 10 unique types of molecules in this entry. The entry contains 13978 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 Endothelial nitric oxide synthase splice variant eNOS13A.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	401	Total 3215	C 2047	N 566	O 586	S 16	0	2	0
1	B	402	Total 3220	C 2051	N 566	O 587	S 16	0	3	0
1	C	402	Total 3218	C 2050	N 565	O 587	S 16	0	2	0
1	D	401	Total 3206	C 2042	N 563	O 585	S 16	0	2	0

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



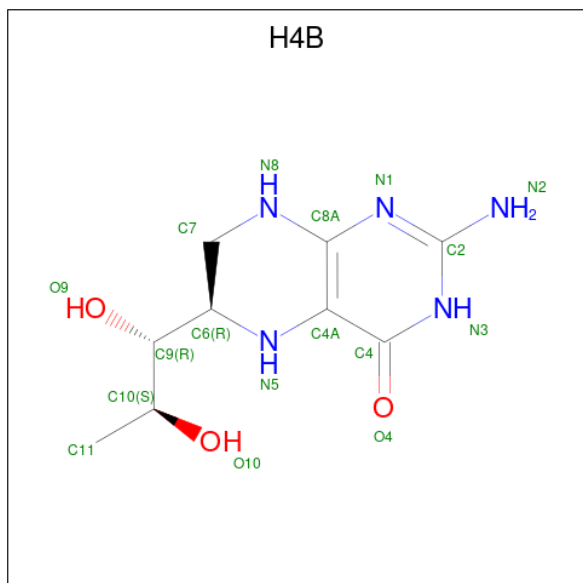
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	
			Total	C	Fe	N			O
2	A	1	Total 43	C 34	Fe 1	N 4	O 4	0	0
2	B	1	Total 43	C 34	Fe 1	N 4	O 4	0	0

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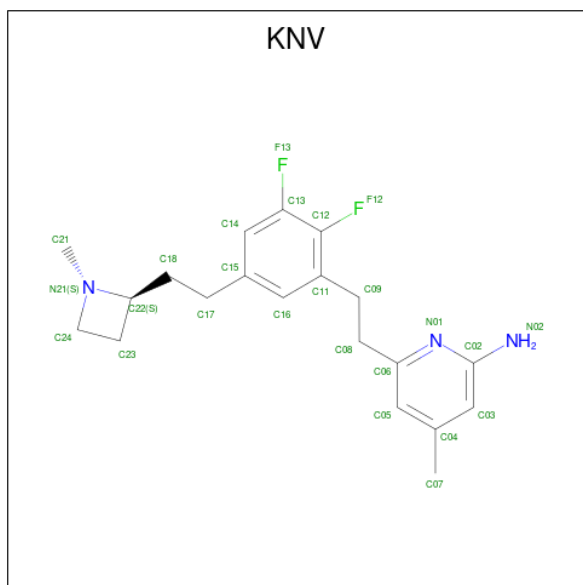
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	
2	C	1	Total	C	Fe	N	O	0	0
			43	34	1	4	4		
2	D	1	Total	C	Fe	N	O	0	0
			43	34	1	4	4		

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



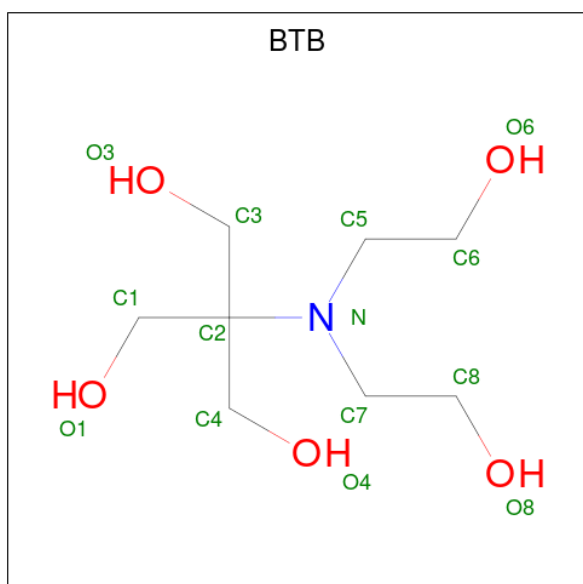
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
3	A	1	Total	C	N	O	0	0
			17	9	5	3		
3	B	1	Total	C	N	O	0	0
			17	9	5	3		
3	C	1	Total	C	N	O	0	0
			17	9	5	3		
3	D	1	Total	C	N	O	0	0
			17	9	5	3		

- Molecule 4 is 6-[2-(2,3-difluoro-5-{2-[(2S)-1-methylazetidin-2-yl]ethyl}phenyl)ethyl]-4-methylpyridin-2-amine (three-letter code: KNV) (formula: $C_{20}H_{25}F_2N_3$).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	F	N		
4	A	1	25	20	2	3	0	0
4	B	1	25	20	2	3	0	0
4	C	1	25	20	2	3	0	0
4	D	1	25	20	2	3	0	0

- Molecule 5 is 2-[BIS-(2-HYDROXY-ETHYL)-AMINO]-2-HYDROXYMETHYL-PROPAN E-1,3-DIOL (three-letter code: BTB) (formula: C₈H₁₉NO₅).



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

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

- Molecule 7 is GLYCEROL (three-letter code: GOL) (formula: C₃H₈O₃).



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

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

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

- Molecule 9 is GADOLINIUM ATOM (three-letter code: GD) (formula: Gd).

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

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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
9	D	1	Total 1	Gd 1	0	0

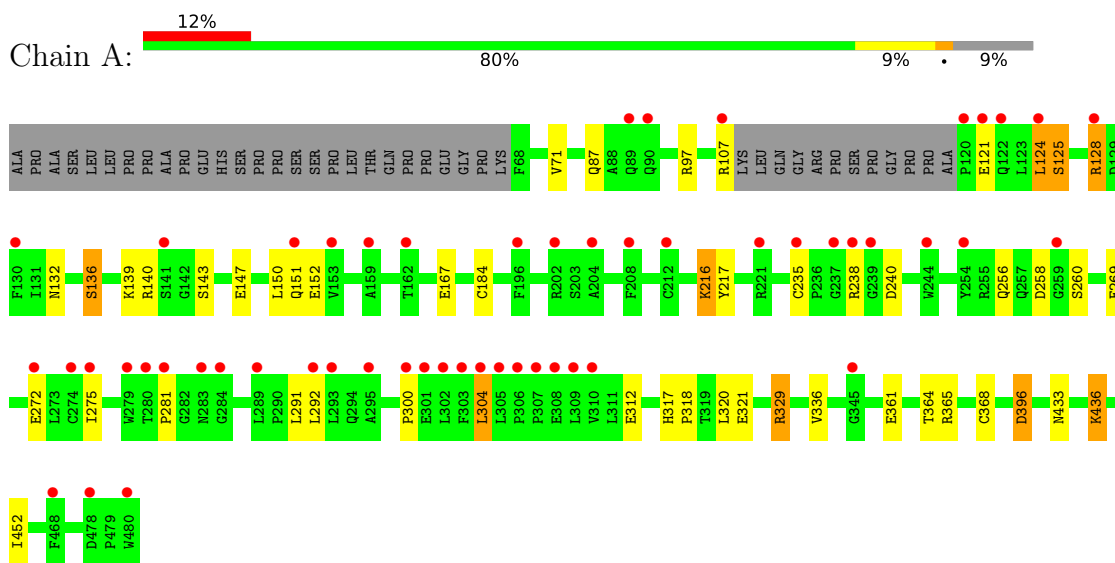
- Molecule 10 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
10	A	126	Total 126	O 126	0	0
10	B	178	Total 178	O 178	0	0
10	C	119	Total 119	O 119	0	0
10	D	180	Total 180	O 180	0	0

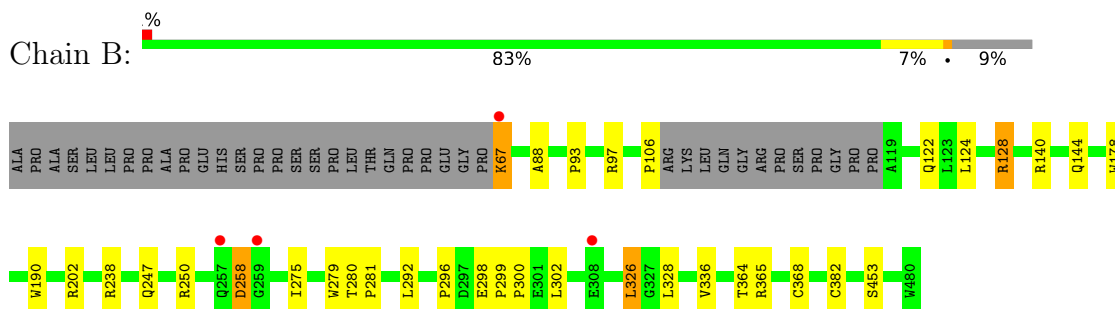
3 Residue-property plots i

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

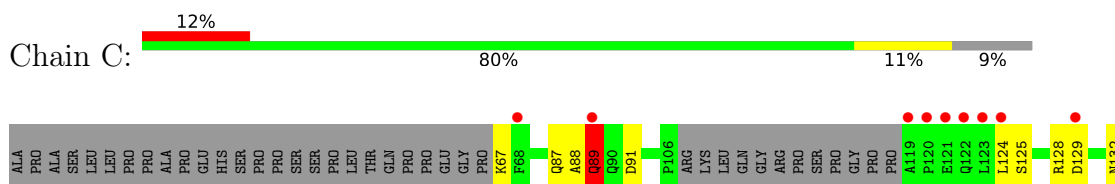
- Molecule 1: Endothelial nitric oxide synthase splice variant eNOS13A

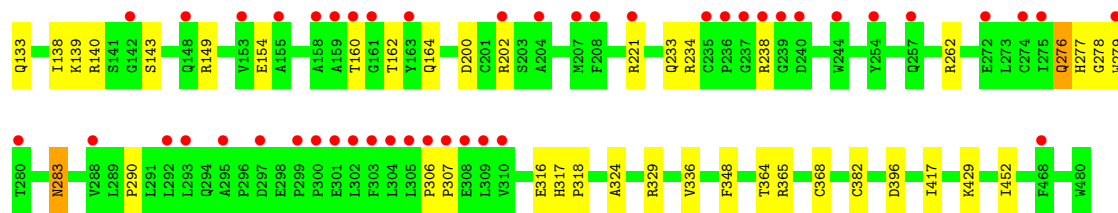


- Molecule 1: Endothelial nitric oxide synthase splice variant eNOS13A

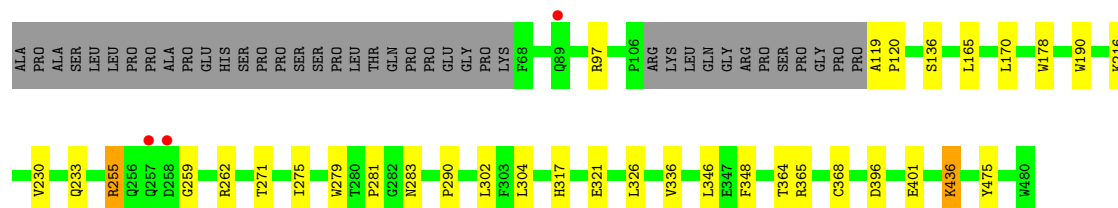
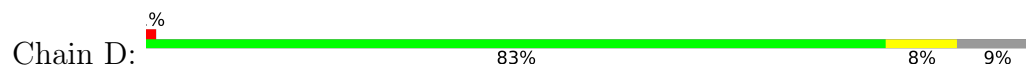


- Molecule 1: Endothelial nitric oxide synthase splice variant eNOS13A





● Molecule 1: Endothelial nitric oxide synthase splice variant eNOS13A



4 Data and refinement statistics i

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	59.34Å 152.56Å 108.52Å 90.00° 90.70° 90.00°	Depositor
Resolution (Å)	49.50 – 1.83 49.50 – 1.83	Depositor EDS
% Data completeness (in resolution range)	99.7 (49.50-1.83) 99.7 (49.50-1.83)	Depositor EDS
R_{merge}	0.12	Depositor
R_{sym}	0.12	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.26 (at 1.83Å)	Xtrriage
Refinement program	PHENIX 1.11.1-2575_1496	Depositor
R, R_{free}	0.183 , 0.219 0.176 , 0.213	Depositor DCC
R_{free} test set	8486 reflections (5.02%)	wwPDB-VP
Wilson B-factor (Å ²)	35.0	Xtrriage
Anisotropy	0.626	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.36 , 54.7	EDS
L-test for twinning ²	$\langle L \rangle = 0.48$, $\langle L^2 \rangle = 0.31$	Xtrriage
Estimated twinning fraction	0.068 for h,-k,-l	Xtrriage
F_o, F_c correlation	0.97	EDS
Total number of atoms	13978	wwPDB-VP
Average B, all atoms (Å ²)	55.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.12% 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: HEM, KNV, ZN, CL, GD, BTB, H4B, GOL

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	0.34	1/3313 (0.0%)	0.49	0/4513
1	B	0.38	0/3321	0.53	0/4525
1	C	0.33	0/3316	0.50	0/4518
1	D	0.40	0/3304	0.55	0/4503
All	All	0.36	1/13254 (0.0%)	0.52	0/18059

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	184	CYS	CB-SG	5.13	1.91	1.82

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	3215	0	3118	28	0
1	B	3220	0	3127	25	0
1	C	3218	0	3122	27	0
1	D	3206	0	3108	25	0
2	A	43	0	30	1	0
2	B	43	0	30	3	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	C	43	0	30	1	0
2	D	43	0	30	3	0
3	A	17	0	15	1	0
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	2	0
4	B	25	0	0	3	0
4	C	25	0	0	1	0
4	D	25	0	0	2	0
5	A	42	0	57	4	0
5	B	42	0	56	8	0
5	C	42	0	56	8	0
5	D	28	0	36	7	0
6	A	1	0	0	0	0
6	C	1	0	0	0	0
7	A	6	0	8	1	0
7	C	6	0	8	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	B	1	0	0	0	0
9	C	1	0	0	0	0
9	D	1	0	0	0	0
10	A	126	0	0	1	0
10	B	178	0	0	0	0
10	C	119	0	0	1	0
10	D	180	0	0	0	0
All	All	13978	0	12876	124	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 5.

All (124) 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:D:290:PRO:HB3	1:D:304:LEU:HD23	1.69	0.75
5:B:504:BTB:H82	5:B:504:BTB:O4	1.87	0.72
1:A:312:GLU:OE2	1:A:329:ARG:NH1	2.22	0.71

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:298:GLU:OE2	5:B:505:BTB:N	2.28	0.66
1:D:275:ILE:HD12	1:D:281:PRO:HG3	1.78	0.66
5:C:504:BTB:O8	5:C:504:BTB:O6	2.12	0.66
2:A:501:HEM:HBB2	2:A:501:HEM:HHC	1.78	0.65
1:B:258:ASP:OD2	1:B:258:ASP:N	2.27	0.65
1:A:433:ASN:HA	1:A:436:LYS:HE3	1.78	0.64
2:B:501:HEM:HHC	2:B:501:HEM:HBB2	1.80	0.64
5:D:504:BTB:O4	5:D:504:BTB:O8	2.17	0.62
1:D:279:TRP:HB2	1:D:302:LEU:HD21	1.81	0.60
1:A:321:GLU:H	1:A:321:GLU:CD	2.04	0.60
1:B:238:ARG:HG2	1:B:296:PRO:HB3	1.84	0.60
1:C:160:THR:HG23	1:C:162:THR:H	1.67	0.59
1:B:336:VAL:HG21	4:B:503:KNV:F12	1.92	0.59
1:B:247:GLN:HB2	1:B:250:ARG:HD3	1.86	0.58
1:A:97:ARG:HG3	1:B:88:ALA:HB3	1.88	0.56
2:C:501:HEM:HBB2	2:C:501:HEM:HHC	1.86	0.56
1:A:167:GLU:OE1	7:A:508:GOL:O3	2.17	0.55
1:A:216:LYS:HG3	1:A:217:TYR:N	2.22	0.55
1:C:129:ASP:HA	1:C:132:ASN:HD22	1.72	0.55
1:C:133:GLN:NE2	10:C:602:HOH:O	2.30	0.55
1:D:336:VAL:HG21	4:D:503:KNV:F12	1.96	0.55
1:A:132:ASN:O	1:A:136:SER:OG	2.24	0.55
1:D:271:THR:O	1:D:275:ILE:HG12	2.05	0.55
1:B:298:GLU:OE1	5:B:505:BTB:H31	2.08	0.55
1:C:91:ASP:OD1	1:D:97:ARG:NH1	2.38	0.54
1:A:147:GLU:HA	1:A:150:LEU:HD12	1.90	0.54
1:C:262:ARG:NH1	1:C:283:ASN:O	2.40	0.54
1:A:107:ARG:HH22	1:B:67:LYS:HA	1.74	0.53
1:A:240:ASP:OD1	10:A:601:HOH:O	2.18	0.53
1:C:336:VAL:HG21	4:C:503:KNV:F12	1.97	0.53
1:A:269:GLU:O	1:A:272:GLU:HG2	2.08	0.53
1:B:298:GLU:HG3	1:B:299:PRO:HD2	1.90	0.53
1:D:170:LEU:HD21	1:D:230:VAL:HG11	1.90	0.53
1:D:255:ARG:NH1	1:D:259:GLY:HA2	2.24	0.53
1:C:200:ASP:OD1	1:C:200:ASP:N	2.42	0.52
1:C:365:ARG:HH12	3:C:502:H4B:C4	2.22	0.52
1:B:93:PRO:HG3	1:B:106:PRO:HB3	1.92	0.52
1:C:276:GLN:O	1:C:278:GLY:N	2.43	0.51
1:A:140:ARG:HG3	1:A:143:SER:HB2	1.92	0.51
1:A:256:GLN:HB2	1:A:260:SER:O	2.10	0.51
1:B:382:CYS:SG	5:C:504:BTB:H42	2.51	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:233:GLN:HB3	1:C:348:PHE:CE2	2.46	0.50
1:C:125:SER:O	1:C:128:ARG:HG3	2.12	0.50
1:D:262:ARG:HD3	1:D:283:ASN:O	2.12	0.50
1:A:365:ARG:HH12	3:A:502:H4B:C4	2.25	0.50
2:B:501:HEM:HBA1	4:B:503:KNV:C08	2.42	0.50
1:C:88:ALA:HB3	1:D:97:ARG:CD	2.43	0.49
1:A:364:THR:O	1:A:368:CYS:HB2	2.11	0.49
1:B:326:LEU:HD12	5:C:504:BTB:H41	1.95	0.49
1:D:119:ALA:N	1:D:120:PRO:HD3	2.28	0.48
5:D:505:BTB:H32	5:D:505:BTB:C6	2.43	0.48
5:B:504:BTB:H51	5:B:504:BTB:H32	1.58	0.48
1:B:279:TRP:HB2	1:B:302:LEU:HD21	1.96	0.48
1:C:138:ILE:O	1:C:140:ARG:HG3	2.13	0.48
1:C:382:CYS:HA	5:C:504:BTB:H12	1.96	0.47
1:D:321:GLU:OE2	5:D:504:BTB:O4	2.33	0.47
1:D:317:HIS:NE2	1:D:401:GLU:OE1	2.42	0.47
1:C:87:GLN:O	1:C:89:GLN:NE2	2.48	0.47
1:A:336:VAL:HG21	4:A:503:KNV:F12	2.05	0.47
1:D:321:GLU:OE1	5:D:504:BTB:O8	2.32	0.47
1:B:178:TRP:CE3	1:B:190:TRP:HA	2.51	0.46
5:B:504:BTB:H12	5:B:504:BTB:H72	1.62	0.46
5:A:506:BTB:H12	5:A:506:BTB:H51	1.50	0.46
1:C:149:ARG:NH2	1:C:164:GLN:O	2.44	0.46
1:C:316[B]:GLU:HG2	1:C:324:ALA:HB2	1.99	0.45
1:B:67:LYS:HE3	1:B:67:LYS:HB2	1.68	0.45
5:C:505:BTB:H11	5:C:505:BTB:H51	1.37	0.45
1:B:326:LEU:HB3	1:B:328:LEU:HG	1.99	0.45
5:B:506:BTB:H11	5:B:506:BTB:H72	1.71	0.45
5:A:505:BTB:H72	5:A:505:BTB:H41	1.43	0.45
1:A:275:ILE:HD11	1:A:281:PRO:HB3	1.99	0.45
5:A:505:BTB:H51	5:A:505:BTB:H11	1.53	0.44
1:D:364:THR:O	1:D:368:CYS:HB2	2.17	0.44
1:D:233:GLN:HB3	1:D:348:PHE:CE2	2.53	0.44
1:D:475:TYR:OH	2:D:501:HEM:O1D	2.29	0.44
1:A:364:THR:HG21	1:A:452:ILE:HG23	1.99	0.44
1:D:178:TRP:CE3	1:D:190:TRP:HA	2.53	0.44
1:B:365:ARG:HH12	3:B:502:H4B:C4	2.31	0.44
5:C:505:BTB:H72	5:C:505:BTB:H42	1.54	0.44
1:D:216:LYS:HB3	1:D:216:LYS:HE2	1.84	0.44
1:A:292:LEU:HD22	1:A:300:PRO:HB2	1.98	0.44
1:D:170:LEU:HD21	1:D:230:VAL:CG1	2.48	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:501:HEM:HBA1	4:D:503:KNV:C08	2.47	0.44
1:A:317:HIS:CG	1:A:318:PRO:HD2	2.53	0.44
1:D:321:GLU:CD	5:D:504:BTB:O8	2.56	0.43
1:C:128:ARG:O	1:C:132:ASN:ND2	2.52	0.43
1:A:361:GLU:OE2	4:A:503:KNV:N02	2.52	0.43
2:B:501:HEM:HBD2	4:B:503:KNV:F13	2.08	0.43
1:B:364:THR:O	1:B:368:CYS:HB2	2.19	0.43
1:C:128:ARG:NH1	1:C:129:ASP:HB2	2.34	0.43
1:C:88:ALA:HB3	1:D:97:ARG:HD3	2.01	0.43
1:C:306:PRO:HA	1:C:307:PRO:HD3	1.95	0.43
5:A:506:BTB:H72	5:A:506:BTB:H41	1.56	0.42
1:B:124:LEU:HB3	1:B:128:ARG:HH12	1.83	0.42
1:B:275:ILE:HG12	1:B:281:PRO:HG3	2.00	0.42
5:B:506:BTB:H32	5:B:506:BTB:H51	1.75	0.42
2:D:501:HEM:HBB2	2:D:501:HEM:HHC	2.00	0.42
1:A:256:GLN:HB3	1:A:258:ASP:H	1.85	0.42
5:B:505:BTB:H12	5:B:505:BTB:H72	1.67	0.42
1:C:364:THR:O	1:C:368:CYS:HB2	2.19	0.42
5:D:505:BTB:H32	5:D:505:BTB:H62	2.01	0.42
1:A:125:SER:HA	1:A:128:ARG:HH11	1.85	0.42
1:C:429:LYS:HD2	1:C:429:LYS:HA	1.78	0.42
1:A:124:LEU:HD23	1:A:128:ARG:HD2	2.01	0.42
1:D:365:ARG:HH12	3:D:502:H4B:C4	2.33	0.42
5:D:504:BTB:H51	5:D:504:BTB:H32	1.59	0.42
1:A:396:ASP:OD2	1:B:453:SER:OG	2.30	0.41
1:C:202:ARG:NH1	1:C:202:ARG:HA	2.35	0.41
1:A:304:LEU:HD12	1:A:304:LEU:HA	1.92	0.41
1:B:292:LEU:HD22	1:B:300:PRO:HB2	2.01	0.41
1:B:280:THR:HA	1:B:281:PRO:HD3	1.96	0.41
1:B:326:LEU:CD1	5:C:504:BTB:H41	2.50	0.41
1:C:364:THR:HG21	1:C:452:ILE:HG23	2.03	0.41
1:D:165:LEU:HG	1:D:346:LEU:HD12	2.02	0.41
1:D:436:LYS:HB3	1:D:436:LYS:HE2	1.67	0.41
5:C:504:BTB:H12	5:C:504:BTB:H51	1.77	0.41
1:A:147:GLU:O	1:A:151:GLN:HG2	2.21	0.40
1:B:250:ARG:HD2	1:B:250:ARG:HA	1.74	0.40
1:C:317:HIS:CG	1:C:318:PRO:HD2	2.56	0.40
1:A:320:LEU:HD23	1:A:320:LEU:HA	1.92	0.40
1:C:279:TRP:CG	1:C:290:PRO:HG3	2.56	0.40

There are no symmetry-related clashes.

5.3 Torsion angles [i](#)

5.3.1 Protein backbone [i](#)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	399/440 (91%)	384 (96%)	15 (4%)	0	100	100
1	B	401/440 (91%)	395 (98%)	6 (2%)	0	100	100
1	C	400/440 (91%)	385 (96%)	12 (3%)	3 (1%)	19	7
1	D	399/440 (91%)	389 (98%)	10 (2%)	0	100	100
All	All	1599/1760 (91%)	1553 (97%)	43 (3%)	3 (0%)	47	33

All (3) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	C	277	HIS
1	C	89	GLN
1	C	276	GLN

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	343/373 (92%)	326 (95%)	17 (5%)	24	8
1	B	344/373 (92%)	335 (97%)	9 (3%)	46	29
1	C	343/373 (92%)	330 (96%)	13 (4%)	33	15
1	D	342/373 (92%)	337 (98%)	5 (2%)	65	52
All	All	1372/1492 (92%)	1328 (97%)	44 (3%)	39	21

All (44) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	71	VAL
1	A	87	GLN
1	A	121	GLU
1	A	124	LEU
1	A	125	SER
1	A	128	ARG
1	A	136	SER
1	A	139	LYS
1	A	152	GLU
1	A	216	LYS
1	A	235	CYS
1	A	238	ARG
1	A	291	LEU
1	A	304	LEU
1	A	329	ARG
1	A	396	ASP
1	A	436	LYS
1	B	67	LYS
1	B	97	ARG
1	B	122	GLN
1	B	128	ARG
1	B	140	ARG
1	B	144	GLN
1	B	202	ARG
1	B	258	ASP
1	B	326	LEU
1	C	67	LYS
1	C	89	GLN
1	C	124	LEU
1	C	139	LYS
1	C	143	SER
1	C	154	GLU
1	C	221	ARG
1	C	234	ARG
1	C	238	ARG
1	C	283	ASN
1	C	329	ARG
1	C	396	ASP
1	C	417	ILE
1	D	136	SER
1	D	255	ARG
1	D	326	LEU
1	D	396	ASP

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Mol	Chain	Res	Type
1	D	436	LYS

Sometimes 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 monosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 35 ligands modelled in this entry, 10 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
4	KNV	B	503	-	25,27,27	0.62	0	28,38,38	1.79	6 (21%)
2	HEM	D	501	1	41,50,50	1.58	7 (17%)	45,82,82	1.48	9 (20%)
5	BTB	C	506	-	13,13,13	0.38	0	7,16,16	0.43	0
5	BTB	D	505	-	13,13,13	0.75	0	7,16,16	1.15	1 (14%)
2	HEM	C	501	1	41,50,50	1.58	7 (17%)	45,82,82	1.70	10 (22%)
3	H4B	D	502	-	16,18,18	0.93	1 (6%)	11,26,26	2.61	6 (54%)
2	HEM	B	501	1	41,50,50	1.48	7 (17%)	45,82,82	1.64	10 (22%)
3	H4B	C	502	-	16,18,18	0.96	0	11,26,26	2.59	6 (54%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
5	BTB	A	504	9	13,13,13	0.34	0	7,16,16	0.49	0
2	HEM	A	501	1	41,50,50	1.50	5 (12%)	45,82,82	1.70	9 (20%)
5	BTB	C	504	9	13,13,13	0.37	0	7,16,16	0.49	0
5	BTB	D	504	9	13,13,13	0.38	0	7,16,16	0.61	0
5	BTB	C	505	-	13,13,13	0.44	0	7,16,16	0.78	0
5	BTB	B	505	-	13,13,13	0.42	0	7,16,16	0.49	0
4	KNV	D	503	-	25,27,27	0.58	0	28,38,38	1.97	6 (21%)
3	H4B	B	502	-	16,18,18	0.99	0	11,26,26	2.68	6 (54%)
5	BTB	A	505	-	13,13,13	0.37	0	7,16,16	0.61	0
3	H4B	A	502	-	16,18,18	0.95	0	11,26,26	2.56	6 (54%)
5	BTB	B	504	9	13,13,13	0.47	0	7,16,16	0.97	0
7	GOL	C	508	-	5,5,5	0.41	0	5,5,5	0.20	0
4	KNV	C	503	-	25,27,27	0.47	0	28,38,38	1.89	6 (21%)
5	BTB	B	506	-	13,13,13	0.37	0	7,16,16	0.52	0
5	BTB	A	506	-	13,13,13	0.34	0	7,16,16	0.47	0
7	GOL	A	508	-	5,5,5	0.34	0	5,5,5	0.40	0
4	KNV	A	503	-	25,27,27	0.46	0	28,38,38	1.87	6 (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
4	KNV	B	503	-	-	5/10/19/19	0/3/3/3
2	HEM	D	501	1	-	1/12/54/54	-
5	BTB	C	506	-	-	7/21/21/21	-
5	BTB	D	505	-	-	6/21/21/21	-
2	HEM	C	501	1	-	4/12/54/54	-
3	H4B	D	502	-	-	0/8/17/17	0/2/2/2
2	HEM	B	501	1	-	2/12/54/54	-
3	H4B	C	502	-	-	0/8/17/17	0/2/2/2
5	BTB	A	504	9	-	1/21/21/21	-
2	HEM	A	501	1	-	4/12/54/54	-
5	BTB	C	504	9	-	1/21/21/21	-
5	BTB	D	504	9	-	6/21/21/21	-
5	BTB	C	505	-	-	7/21/21/21	-
5	BTB	B	505	-	-	4/21/21/21	-
4	KNV	D	503	-	-	5/10/19/19	0/3/3/3

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	H4B	B	502	-	-	0/8/17/17	0/2/2/2
5	BTB	A	505	-	-	11/21/21/21	-
3	H4B	A	502	-	-	3/8/17/17	0/2/2/2
5	BTB	B	504	9	-	3/21/21/21	-
7	GOL	C	508	-	-	2/4/4/4	-
4	KNV	C	503	-	-	6/10/19/19	0/3/3/3
5	BTB	B	506	-	-	4/21/21/21	-
5	BTB	A	506	-	-	7/21/21/21	-
7	GOL	A	508	-	-	4/4/4/4	-
4	KNV	A	503	-	-	3/10/19/19	0/3/3/3

All (27) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	C	501	HEM	C3C-C2C	-3.98	1.34	1.40
2	D	501	HEM	C3C-C2C	-3.81	1.35	1.40
2	D	501	HEM	C3C-CAC	3.77	1.55	1.47
2	A	501	HEM	C3C-CAC	3.63	1.55	1.47
2	B	501	HEM	C3C-CAC	3.60	1.55	1.47
2	C	501	HEM	C3C-CAC	3.57	1.55	1.47
2	B	501	HEM	C3C-C2C	-3.36	1.35	1.40
2	D	501	HEM	CAB-C3B	3.14	1.56	1.47
2	A	501	HEM	C3C-C2C	-3.11	1.36	1.40
2	B	501	HEM	CAB-C3B	3.09	1.55	1.47
2	C	501	HEM	CAB-C3B	3.06	1.55	1.47
2	A	501	HEM	CAB-C3B	3.04	1.55	1.47
2	C	501	HEM	CAA-C2A	2.84	1.56	1.52
2	A	501	HEM	CAA-C2A	2.72	1.56	1.52
2	D	501	HEM	FE-NB	2.68	2.10	1.96
2	A	501	HEM	FE-NB	2.51	2.09	1.96
2	D	501	HEM	CMB-C2B	2.50	1.56	1.50
2	D	501	HEM	CMD-C2D	2.49	1.56	1.50
2	C	501	HEM	FE-ND	2.34	2.08	1.96
2	D	501	HEM	CAA-C2A	2.30	1.55	1.52
2	B	501	HEM	CMB-C2B	2.17	1.55	1.50
2	B	501	HEM	CAA-C2A	2.15	1.55	1.52
2	C	501	HEM	CMB-C2B	2.09	1.55	1.50
2	B	501	HEM	CMA-C3A	2.09	1.56	1.51
2	C	501	HEM	CHA-C4D	2.05	1.40	1.35
2	B	501	HEM	C3D-C2D	-2.05	1.32	1.36

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	D	502	H4B	C4A-C4	-2.04	1.38	1.41

All (87) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	D	503	KNV	C02-N01-C06	6.16	122.77	118.10
4	C	503	KNV	C02-N01-C06	5.92	122.58	118.10
4	A	503	KNV	C02-N01-C06	5.63	122.36	118.10
3	D	502	H4B	C8A-C4A-C4	5.56	119.51	114.57
3	C	502	H4B	C8A-C4A-C4	5.49	119.45	114.57
3	A	502	H4B	C8A-C4A-C4	5.24	119.22	114.57
3	B	502	H4B	C8A-C4A-C4	5.14	119.14	114.57
2	C	501	HEM	C4B-CHC-C1C	4.96	129.11	122.56
4	B	503	KNV	C02-N01-C06	4.79	121.73	118.10
4	B	503	KNV	F12-C12-C11	4.32	122.41	117.85
2	A	501	HEM	C4B-CHC-C1C	4.29	128.22	122.56
4	A	503	KNV	F12-C12-C11	4.16	122.25	117.85
4	D	503	KNV	F12-C12-C11	3.94	122.01	117.85
3	B	502	H4B	N1-C2-N3	-3.90	119.30	125.42
4	C	503	KNV	F12-C12-C11	3.66	121.71	117.85
3	B	502	H4B	C2-N3-C4	3.49	121.47	115.93
3	A	502	H4B	N1-C2-N3	-3.41	120.07	125.42
2	A	501	HEM	C1B-NB-C4B	3.27	108.45	105.07
2	C	501	HEM	C3D-C4D-ND	-3.27	106.53	110.17
3	C	502	H4B	N1-C2-N3	-3.25	120.32	125.42
3	D	502	H4B	C2-N3-C4	3.21	121.03	115.93
2	B	501	HEM	CMA-C3A-C4A	-3.20	123.54	128.46
4	C	503	KNV	C05-C06-N01	-3.20	119.50	122.90
2	B	501	HEM	C4B-CHC-C1C	3.18	126.76	122.56
3	D	502	H4B	N1-C2-N3	-3.18	120.43	125.42
2	A	501	HEM	C3B-C2B-C1B	3.15	108.82	106.49
4	D	503	KNV	C05-C06-N01	-3.14	119.57	122.90
2	A	501	HEM	C4A-C3A-C2A	3.12	109.16	107.00
4	B	503	KNV	C05-C06-N01	-3.10	119.62	122.90
2	D	501	HEM	CMA-C3A-C4A	-3.09	123.71	128.46
2	C	501	HEM	CMA-C3A-C4A	-3.08	123.73	128.46
3	A	502	H4B	C2-N3-C4	3.07	120.81	115.93
2	B	501	HEM	CHD-C1D-ND	3.07	127.76	124.43
2	D	501	HEM	C4B-CHC-C1C	3.01	126.53	122.56
3	C	502	H4B	C2-N3-C4	2.98	120.67	115.93
3	B	502	H4B	C2-N1-C8A	2.97	121.20	114.54
4	A	503	KNV	C05-C06-N01	-2.97	119.75	122.90

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	501	HEM	C4D-ND-C1D	2.97	108.14	105.07
4	D	503	KNV	C16-C11-C12	2.93	119.44	116.76
2	C	501	HEM	C4D-ND-C1D	2.89	108.06	105.07
3	A	502	H4B	C2-N1-C8A	2.82	120.87	114.54
3	C	502	H4B	C2-N1-C8A	2.77	120.76	114.54
4	A	503	KNV	C16-C11-C12	2.77	119.30	116.76
2	A	501	HEM	CMA-C3A-C4A	-2.76	124.22	128.46
2	B	501	HEM	CMC-C2C-C3C	2.66	129.66	124.68
2	C	501	HEM	CAD-CBD-CGD	-2.65	107.90	113.60
2	C	501	HEM	C3B-C2B-C1B	2.65	108.45	106.49
4	C	503	KNV	C17-C15-C14	-2.62	116.24	120.54
3	D	502	H4B	C2-N1-C8A	2.60	120.36	114.54
2	C	501	HEM	C1B-NB-C4B	2.54	107.70	105.07
2	B	501	HEM	C3B-C2B-C1B	2.47	108.32	106.49
5	D	505	BTB	C6-C5-N	2.46	121.20	111.59
3	A	502	H4B	C4-C4A-N5	2.41	121.14	119.12
2	B	501	HEM	C3D-C4D-ND	-2.41	107.49	110.17
2	B	501	HEM	C1B-NB-C4B	2.39	107.54	105.07
2	D	501	HEM	C4C-CHD-C1D	2.38	125.69	122.56
2	A	501	HEM	CMC-C2C-C3C	2.37	129.12	124.68
4	A	503	KNV	C18-C17-C15	-2.35	105.01	113.18
2	B	501	HEM	CAD-C3D-C2D	-2.34	123.52	127.88
4	A	503	KNV	C17-C15-C14	-2.34	116.70	120.54
2	B	501	HEM	CAD-CBD-CGD	-2.32	108.60	113.60
2	A	501	HEM	C3D-C4D-ND	-2.31	107.59	110.17
3	C	502	H4B	C4-C4A-N5	2.30	121.05	119.12
2	D	501	HEM	CBD-CAD-C3D	-2.28	106.28	112.63
3	D	502	H4B	C4-C4A-N5	2.27	121.03	119.12
4	B	503	KNV	C17-C15-C14	-2.27	116.82	120.54
3	B	502	H4B	N2-C2-N1	2.26	120.77	117.25
4	D	503	KNV	F13-C13-C12	2.26	121.47	118.30
3	B	502	H4B	C4-C4A-N5	2.23	120.99	119.12
4	C	503	KNV	C08-C06-N01	2.21	119.24	115.95
2	D	501	HEM	CBA-CAA-C2A	-2.21	108.86	112.62
3	C	502	H4B	N2-C2-N3	2.21	120.68	117.25
4	D	503	KNV	C18-C17-C15	-2.19	105.55	113.18
2	A	501	HEM	C2B-C1B-NB	-2.18	107.25	109.84
2	C	501	HEM	CBD-CAD-C3D	-2.15	106.67	112.63
2	D	501	HEM	CMB-C2B-C1B	2.14	128.29	125.04
3	D	502	H4B	N2-C2-N3	2.13	120.57	117.25
2	C	501	HEM	C4A-C3A-C2A	2.13	108.47	107.00
4	B	503	KNV	C18-C17-C15	-2.12	105.80	113.18

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	D	501	HEM	C1B-NB-C4B	2.08	107.22	105.07
2	C	501	HEM	CAD-C3D-C2D	-2.07	124.03	127.88
2	D	501	HEM	C3D-C4D-ND	-2.06	107.87	110.17
4	C	503	KNV	C16-C11-C12	2.05	118.64	116.76
2	B	501	HEM	C4A-C3A-C2A	2.05	108.42	107.00
2	D	501	HEM	CAD-C3D-C2D	-2.04	124.08	127.88
4	B	503	KNV	C16-C11-C12	2.02	118.61	116.76
3	A	502	H4B	N2-C2-N3	2.01	120.39	117.25

There are no chirality outliers.

All (96) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	501	HEM	C1A-C2A-CAA-CBA
2	A	501	HEM	C3A-C2A-CAA-CBA
2	C	501	HEM	C1A-C2A-CAA-CBA
2	C	501	HEM	C3A-C2A-CAA-CBA
2	C	501	HEM	C2A-CAA-CBA-CGA
4	A	503	KNV	C17-C18-C22-C23
4	B	503	KNV	C17-C18-C22-C23
4	B	503	KNV	C17-C18-C22-N21
4	C	503	KNV	C17-C18-C22-C23
4	C	503	KNV	C17-C18-C22-N21
4	C	503	KNV	C15-C17-C18-C22
4	D	503	KNV	C17-C18-C22-N21
5	A	505	BTB	O1-C1-C2-C3
5	A	505	BTB	O1-C1-C2-C4
5	A	505	BTB	O1-C1-C2-N
5	A	505	BTB	C1-C2-N-C5
5	A	505	BTB	C1-C2-N-C7
5	A	505	BTB	C3-C2-N-C5
5	A	505	BTB	C3-C2-N-C7
5	A	505	BTB	C4-C2-N-C5
5	A	505	BTB	C4-C2-N-C7
5	A	506	BTB	C1-C2-C4-O4
5	A	506	BTB	C3-C2-C4-O4
5	A	506	BTB	N-C2-C4-O4
5	A	506	BTB	N-C7-C8-O8
5	B	504	BTB	C1-C2-C4-O4
5	B	504	BTB	C3-C2-C4-O4
5	B	504	BTB	N-C2-C4-O4
5	B	505	BTB	C1-C2-C3-O3

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Mol	Chain	Res	Type	Atoms
5	B	505	BTB	C4-C2-C3-O3
5	B	505	BTB	N-C2-C3-O3
5	B	506	BTB	C1-C2-C3-O3
5	B	506	BTB	C4-C2-C3-O3
5	B	506	BTB	N-C2-C3-O3
5	C	505	BTB	O1-C1-C2-C3
5	C	505	BTB	O1-C1-C2-C4
5	C	505	BTB	O1-C1-C2-N
5	C	505	BTB	C1-C2-C3-O3
5	C	505	BTB	C4-C2-C3-O3
5	C	505	BTB	N-C2-C3-O3
5	C	506	BTB	C1-C2-N-C5
5	C	506	BTB	C1-C2-N-C7
5	C	506	BTB	C3-C2-N-C5
5	C	506	BTB	C3-C2-N-C7
5	C	506	BTB	C4-C2-N-C5
5	C	506	BTB	C4-C2-N-C7
5	D	504	BTB	O1-C1-C2-C3
5	D	504	BTB	O1-C1-C2-C4
5	D	504	BTB	O1-C1-C2-N
5	D	504	BTB	C1-C2-C4-O4
5	D	504	BTB	C3-C2-C4-O4
5	D	504	BTB	N-C2-C4-O4
5	D	505	BTB	C1-C2-C3-O3
5	D	505	BTB	C4-C2-C3-O3
5	D	505	BTB	C8-C7-N-C5
7	A	508	GOL	C1-C2-C3-O3
7	C	508	GOL	O1-C1-C2-C3
2	A	501	HEM	C2A-CAA-CBA-CGA
2	B	501	HEM	C2A-CAA-CBA-CGA
2	D	501	HEM	C2A-CAA-CBA-CGA
5	C	506	BTB	N-C5-C6-O6
7	A	508	GOL	O1-C1-C2-C3
4	B	503	KNV	C08-C09-C11-C16
7	C	508	GOL	O1-C1-C2-O2
4	A	503	KNV	C15-C17-C18-C22
4	B	503	KNV	C15-C17-C18-C22
4	D	503	KNV	C15-C17-C18-C22
7	A	508	GOL	O2-C2-C3-O3
5	C	505	BTB	N-C7-C8-O8
4	A	503	KNV	C08-C09-C11-C16
7	A	508	GOL	O1-C1-C2-O2

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Mol	Chain	Res	Type	Atoms
4	C	503	KNV	C08-C09-C11-C16
4	D	503	KNV	C08-C09-C11-C16
2	A	501	HEM	C4B-C3B-CAB-CBB
2	C	501	HEM	C4B-C3B-CAB-CBB
5	A	505	BTB	C1-C2-C4-O4
5	A	506	BTB	C1-C2-C3-O3
5	A	506	BTB	C4-C2-C3-O3
5	D	505	BTB	C6-C5-N-C2
5	A	504	BTB	O1-C1-C2-N
5	A	506	BTB	N-C2-C3-O3
5	D	505	BTB	N-C2-C3-O3
3	A	502	H4B	C7-C6-C9-C10
3	A	502	H4B	C7-C6-C9-O9
5	D	505	BTB	N-C7-C8-O8
5	C	504	BTB	N-C5-C6-O6
2	B	501	HEM	C4B-C3B-CAB-CBB
4	C	503	KNV	C14-C15-C17-C18
5	B	505	BTB	N-C5-C6-O6
4	C	503	KNV	C16-C15-C17-C18
3	A	502	H4B	N5-C6-C9-O9
4	B	503	KNV	C06-C08-C09-C11
5	A	505	BTB	C3-C2-C4-O4
5	B	506	BTB	C3-C2-C4-O4
4	D	503	KNV	C14-C15-C17-C18
4	D	503	KNV	C16-C15-C17-C18

There are no ring outliers.

22 monomers are involved in 45 short contacts:

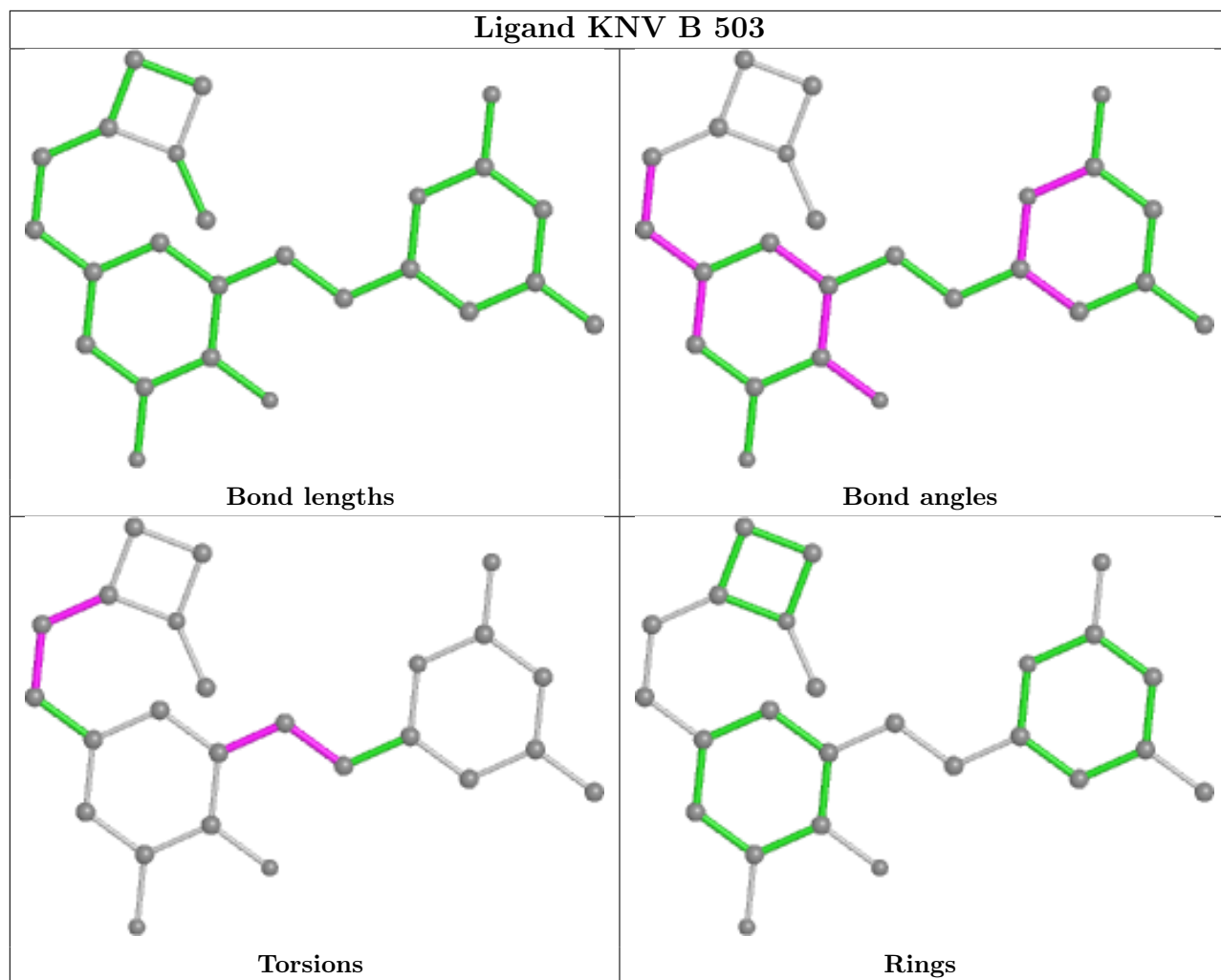
Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	B	503	KNV	3	0
2	D	501	HEM	3	0
5	D	505	BTB	2	0
2	C	501	HEM	1	0
3	D	502	H4B	1	0
2	B	501	HEM	3	0
3	C	502	H4B	1	0
2	A	501	HEM	1	0
5	C	504	BTB	6	0
5	D	504	BTB	5	0
5	C	505	BTB	2	0
5	B	505	BTB	3	0

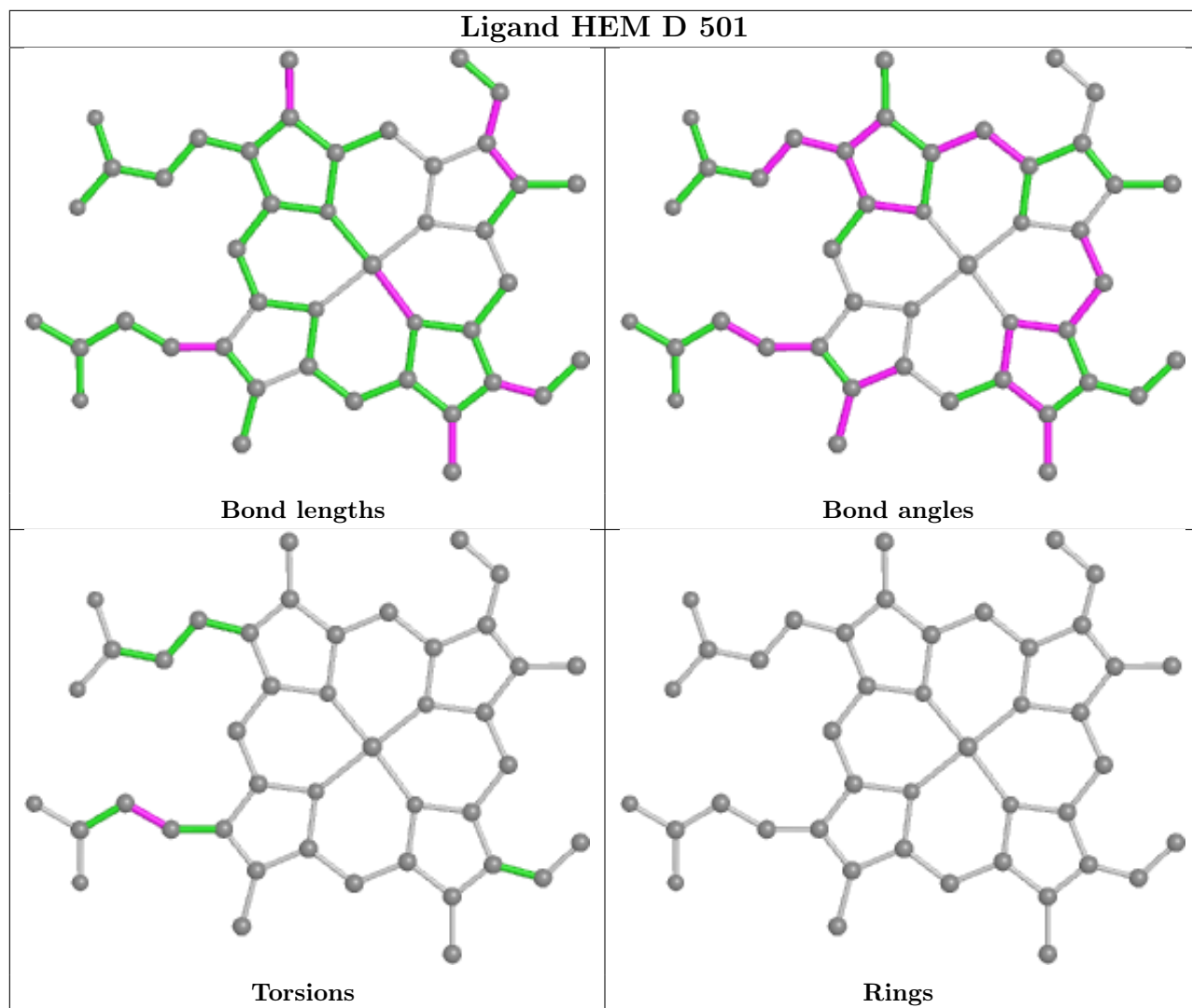
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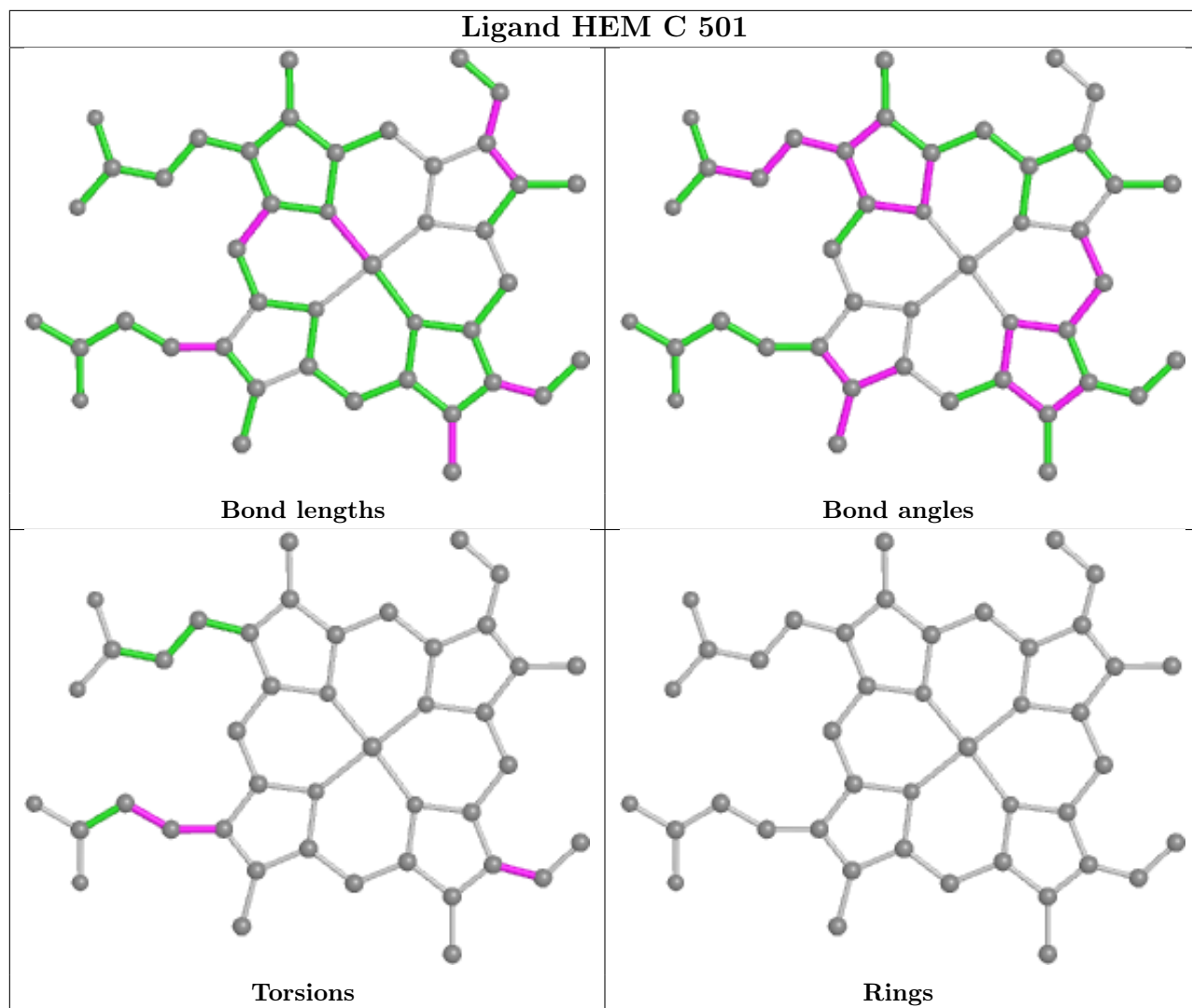
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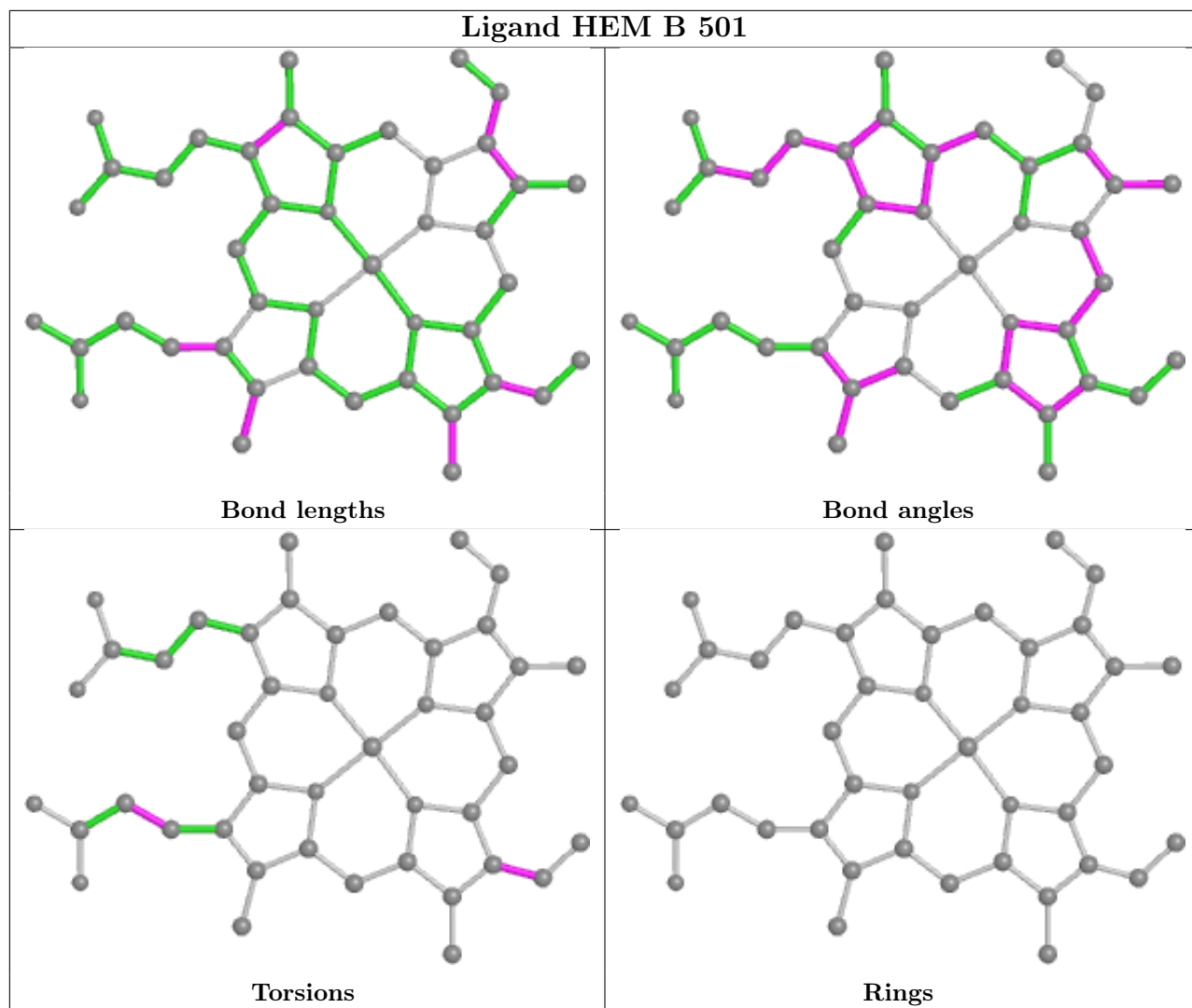
Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	D	503	KNV	2	0
3	B	502	H4B	1	0
5	A	505	BTB	2	0
3	A	502	H4B	1	0
5	B	504	BTB	3	0
4	C	503	KNV	1	0
5	B	506	BTB	2	0
5	A	506	BTB	2	0
7	A	508	GOL	1	0
4	A	503	KNV	2	0

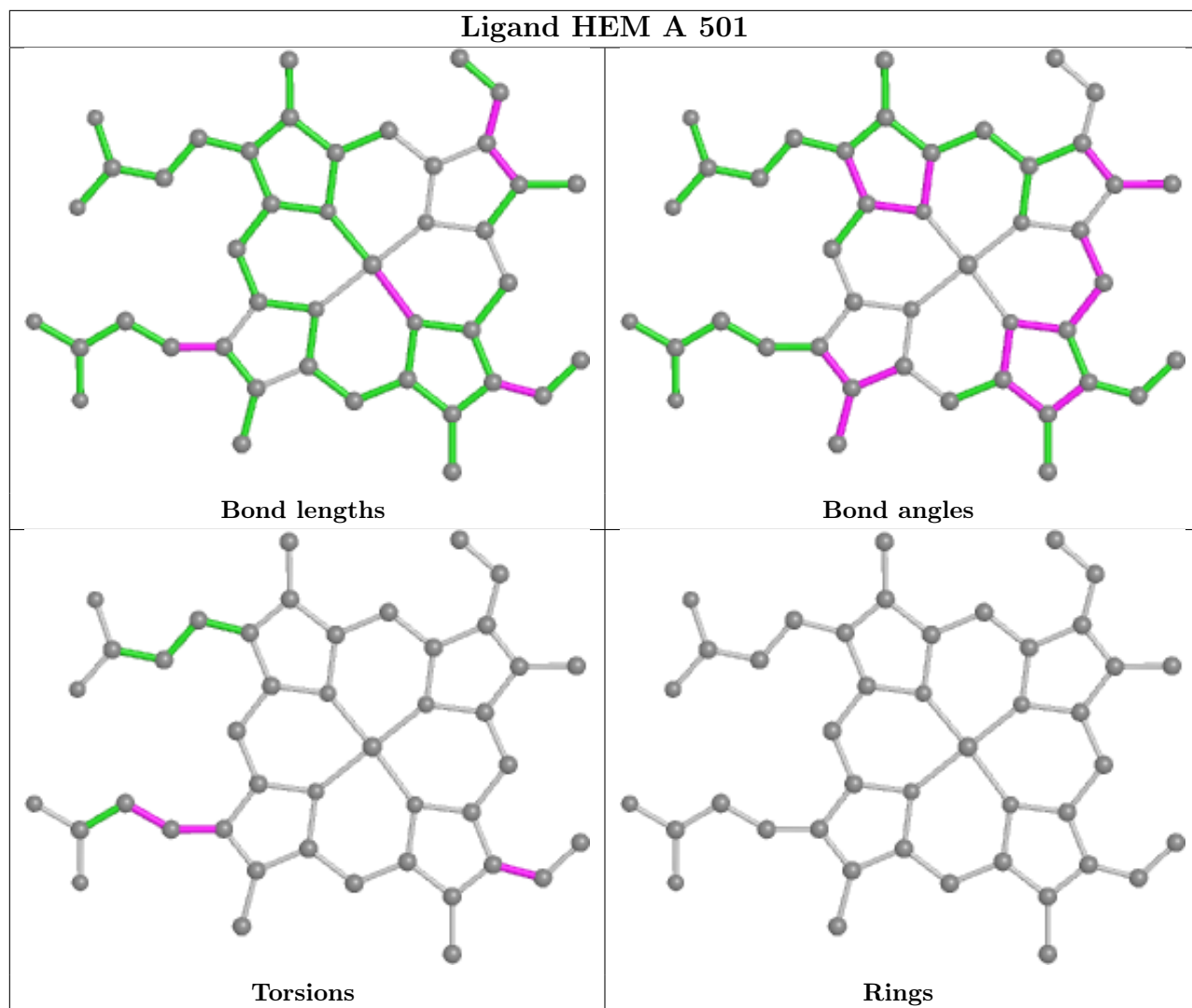
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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

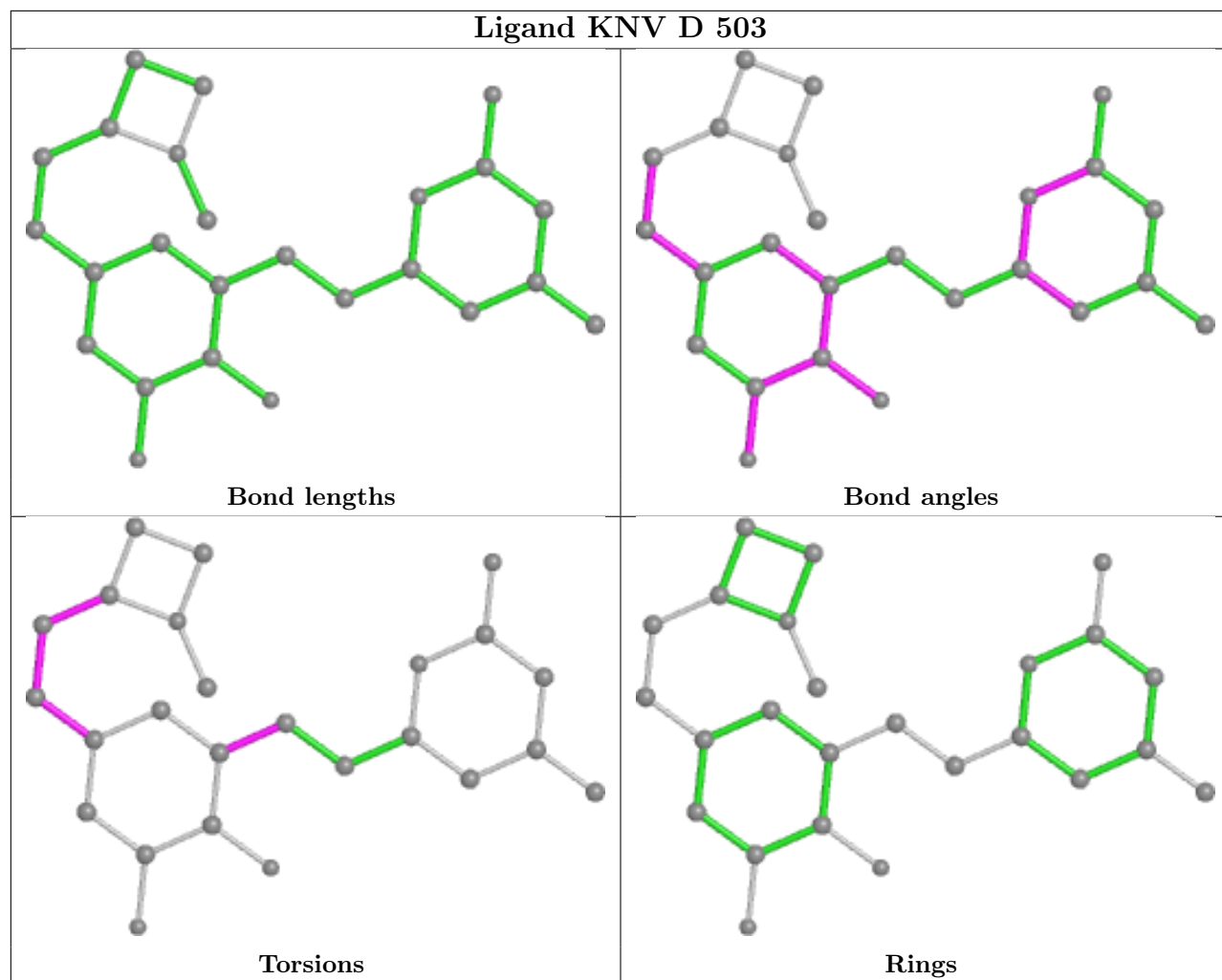


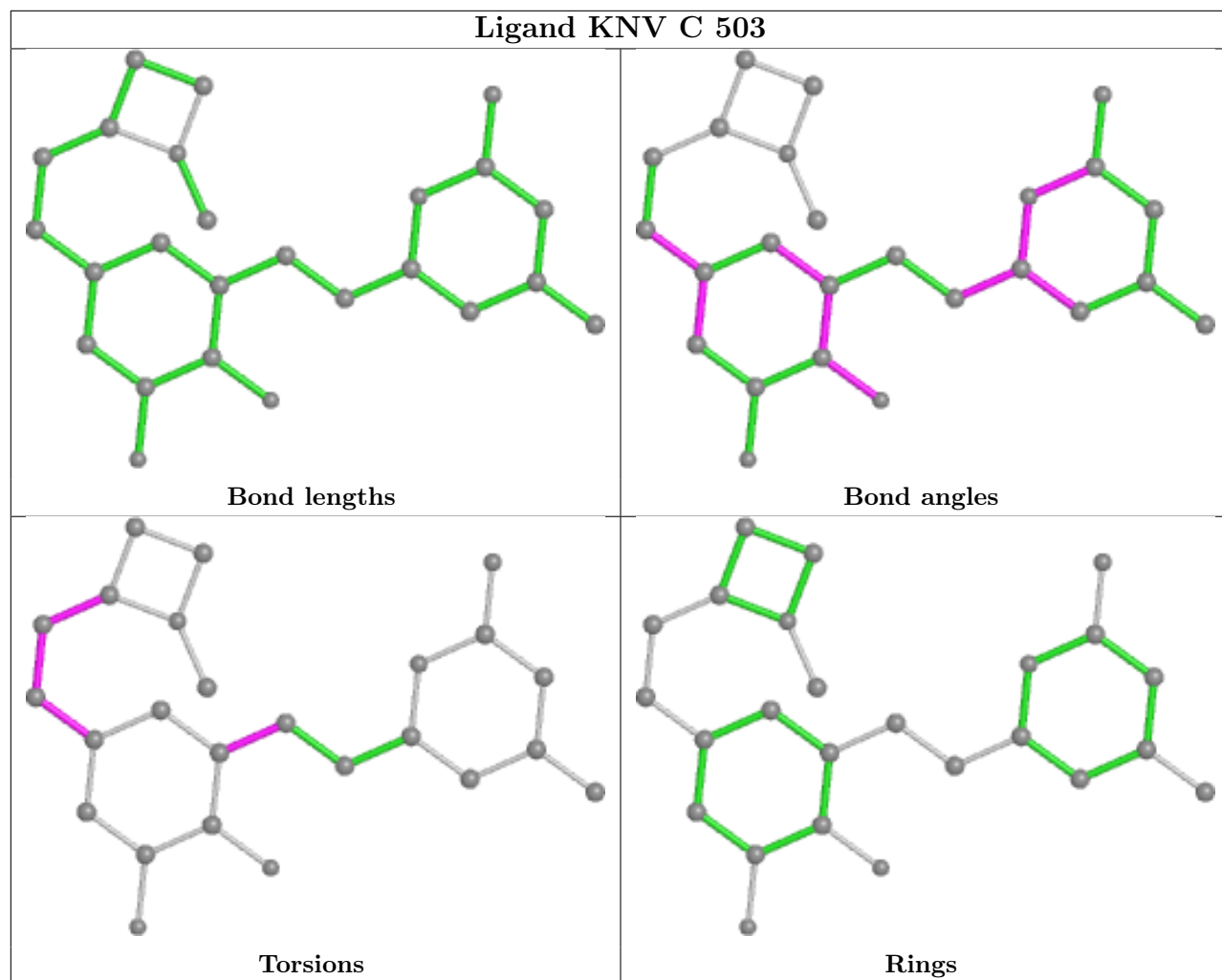


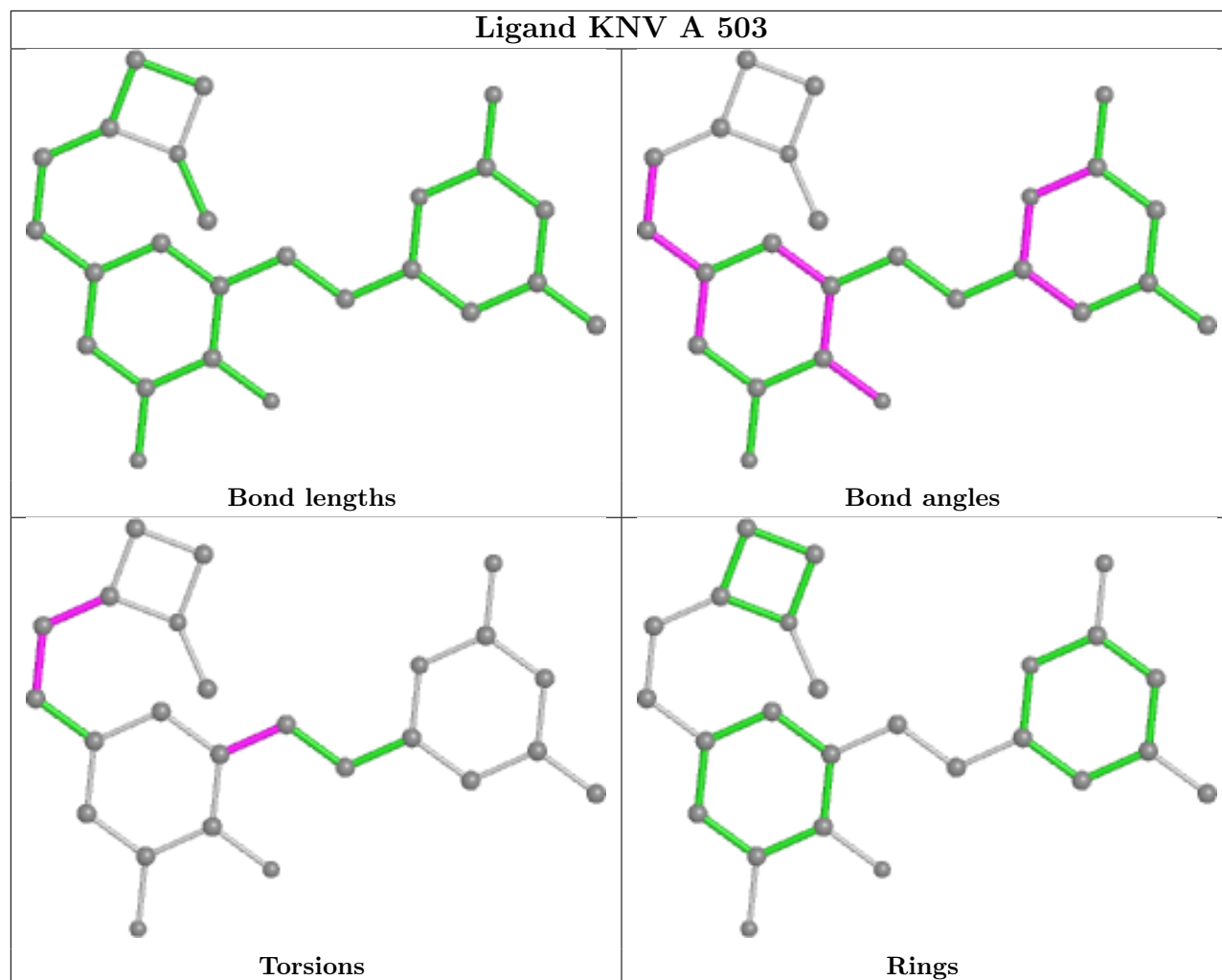












5.7 Other polymers [i](#)

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	401/440 (91%)	0.67	54 (13%) 3 2	33, 60, 106, 136	0
1	B	402/440 (91%)	0.05	4 (0%) 82 82	27, 42, 77, 109	0
1	C	402/440 (91%)	0.56	55 (13%) 3 2	31, 57, 102, 136	0
1	D	401/440 (91%)	0.01	3 (0%) 87 87	26, 41, 70, 124	0
All	All	1606/1760 (91%)	0.32	116 (7%) 15 14	26, 49, 98, 136	0

All (116) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	204	ALA	7.0
1	C	160	THR	5.1
1	A	304	LEU	5.0
1	C	304	LEU	4.8
1	A	275	ILE	4.6
1	B	67	LYS	4.6
1	C	202	ARG	4.6
1	C	204	ALA	4.6
1	A	280	THR	4.4
1	C	236	PRO	4.3
1	C	238	ARG	4.2
1	A	89	GLN	4.2
1	A	279	TRP	4.2
1	C	153	VAL	4.1
1	C	309	LEU	4.0
1	C	307	PRO	4.0
1	A	303	PHE	3.8
1	C	207	MET	3.8
1	C	302	LEU	3.8
1	C	122	GLN	3.8
1	C	142	GLY	3.7

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Mol	Chain	Res	Type	RSRZ
1	A	122	GLN	3.7
1	C	237	GLY	3.7
1	A	107	ARG	3.6
1	C	254	TYR	3.6
1	C	293	LEU	3.6
1	A	153	VAL	3.6
1	A	305	LEU	3.5
1	A	480	TRP	3.5
1	C	303	PHE	3.5
1	A	307	PRO	3.5
1	A	293	LEU	3.5
1	C	119	ALA	3.5
1	C	305	LEU	3.5
1	B	257	GLN	3.4
1	A	308	GLU	3.4
1	C	279	TRP	3.4
1	C	301	GLU	3.3
1	C	297	ASP	3.2
1	A	202	ARG	3.2
1	A	345	GLY	3.2
1	C	306	PRO	3.1
1	A	302	LEU	3.1
1	C	280	THR	3.1
1	C	163	TYR	3.0
1	A	120	PRO	3.0
1	A	90	GLN	3.0
1	C	275	ILE	3.0
1	A	295	ALA	3.0
1	A	238	ARG	2.9
1	A	208	PHE	2.9
1	A	254	TYR	2.9
1	C	308	GLU	2.8
1	A	221	ARG	2.8
1	A	244	TRP	2.8
1	A	237	GLY	2.8
1	A	141	SER	2.8
1	D	258	ASP	2.8
1	C	148	GLN	2.8
1	C	155	ALA	2.8
1	A	300	PRO	2.8
1	A	468	PHE	2.8
1	C	124	LEU	2.7

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Mol	Chain	Res	Type	RSRZ
1	A	292	LEU	2.7
1	C	120	PRO	2.7
1	A	196	PHE	2.7
1	D	257	GLN	2.7
1	A	274	CYS	2.7
1	A	281	PRO	2.6
1	C	158	ALA	2.6
1	A	283	ASN	2.6
1	C	240	ASP	2.6
1	A	301	GLU	2.6
1	C	129	ASP	2.6
1	B	308	GLU	2.5
1	D	89	GLN	2.5
1	A	309	LEU	2.5
1	A	130	PHE	2.5
1	C	272	GLU	2.5
1	B	259	GLY	2.5
1	A	259	GLY	2.4
1	A	478	ASP	2.4
1	C	89	GLN	2.4
1	A	212	CYS	2.4
1	C	288	VAL	2.4
1	C	244	TRP	2.4
1	C	221	ARG	2.4
1	C	239	GLY	2.4
1	C	300	PRO	2.4
1	C	292	LEU	2.3
1	C	310	VAL	2.3
1	C	274	CYS	2.3
1	A	159	ALA	2.3
1	C	257	GLN	2.3
1	A	272	GLU	2.3
1	A	239	GLY	2.3
1	A	289	LEU	2.3
1	C	468	PHE	2.2
1	A	310	VAL	2.2
1	C	121	GLU	2.2
1	A	162	THR	2.2
1	C	159	ALA	2.2
1	A	151	GLN	2.1
1	A	121	GLU	2.1
1	A	306	PRO	2.1

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Mol	Chain	Res	Type	RSRZ
1	A	235	CYS	2.1
1	A	128	ARG	2.1
1	C	68	PHE	2.1
1	C	208	PHE	2.1
1	C	123	LEU	2.1
1	C	235	CYS	2.1
1	C	295	ALA	2.1
1	A	124	LEU	2.0
1	A	284	GLY	2.0
1	C	161	GLY	2.0
1	C	299	PRO	2.0

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

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

6.3 Carbohydrates [i](#)

There are no monosaccharides in this entry.

6.4 Ligands [i](#)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 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
5	BTB	B	506	14/14	0.67	0.23	92,107,112,112	0
5	BTB	C	506	14/14	0.69	0.18	90,98,109,110	0
7	GOL	A	508	6/6	0.70	0.23	59,78,87,92	0
7	GOL	C	508	6/6	0.75	0.18	81,89,91,92	0
5	BTB	A	506	14/14	0.78	0.16	95,105,114,114	0
5	BTB	A	505	14/14	0.80	0.18	84,103,111,111	0
5	BTB	D	504	14/14	0.80	0.20	51,74,92,96	0
9	GD	A	510	1/1	0.80	0.11	132,132,132,132	0
5	BTB	C	505	14/14	0.83	0.21	65,81,88,88	0
5	BTB	B	504	14/14	0.83	0.14	50,63,75,82	0
3	H4B	A	502	17/17	0.84	0.17	71,86,97,99	0
3	H4B	C	502	17/17	0.84	0.19	61,81,94,98	0

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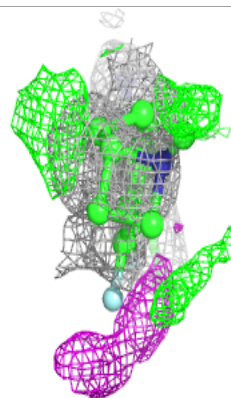
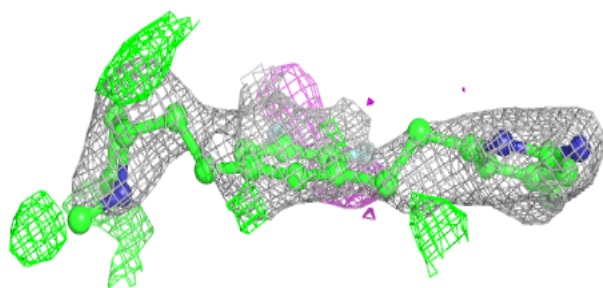
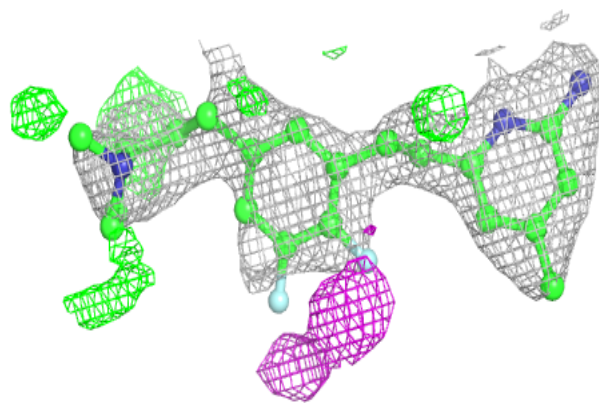
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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
4	KNV	C	503	25/25	0.86	0.19	39,104,114,119	0
5	BTB	D	505	14/14	0.87	0.19	68,78,93,97	0
5	BTB	A	504	14/14	0.88	0.20	92,106,111,113	0
3	H4B	D	502	17/17	0.88	0.11	46,59,67,70	0
5	BTB	C	504	14/14	0.89	0.22	36,85,92,93	0
3	H4B	B	502	17/17	0.89	0.12	43,63,72,74	0
4	KNV	A	503	25/25	0.90	0.16	40,100,111,120	0
4	KNV	B	503	25/25	0.91	0.20	30,108,128,129	0
5	BTB	B	505	14/14	0.92	0.20	34,66,76,80	0
4	KNV	D	503	25/25	0.92	0.20	31,110,135,137	0
9	GD	C	510	1/1	0.93	0.10	119,119,119,119	0
8	CL	A	509	1/1	0.95	0.08	68,68,68,68	0
8	CL	D	506	1/1	0.96	0.06	49,49,49,49	0
9	GD	D	507	1/1	0.96	0.15	50,50,50,50	0
2	HEM	A	501	43/43	0.97	0.11	36,49,89,95	0
2	HEM	C	501	43/43	0.97	0.10	31,41,87,96	0
9	GD	B	508	1/1	0.97	0.14	47,47,47,47	0
8	CL	B	507	1/1	0.97	0.07	50,50,50,50	0
8	CL	C	509	1/1	0.97	0.07	57,57,57,57	0
2	HEM	D	501	43/43	0.98	0.11	24,29,72,81	0
2	HEM	B	501	43/43	0.98	0.12	23,30,74,85	0
6	ZN	A	507	1/1	0.99	0.09	43,43,43,43	0
6	ZN	C	507	1/1	1.00	0.12	38,38,38,38	0

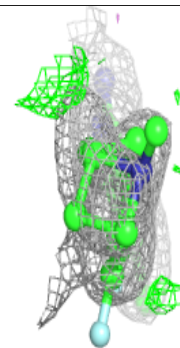
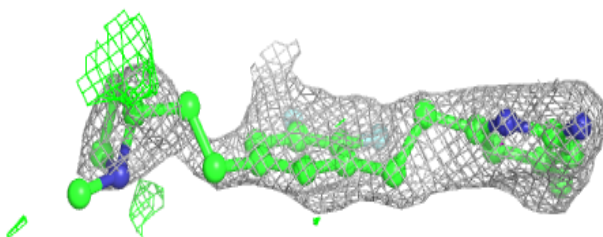
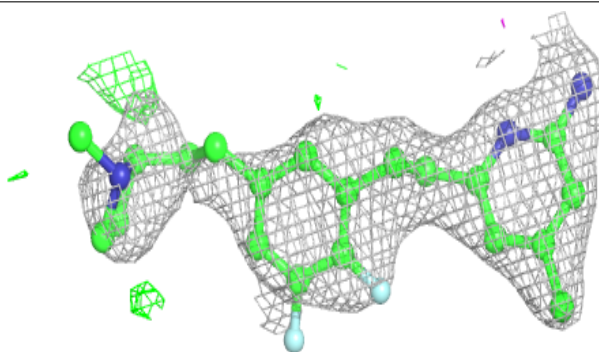
The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation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

Electron density around KNV 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)

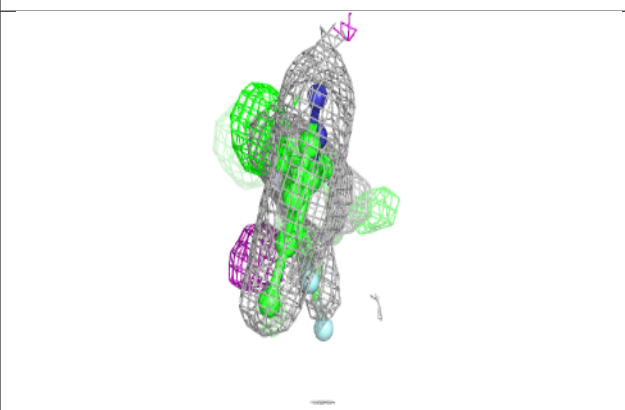
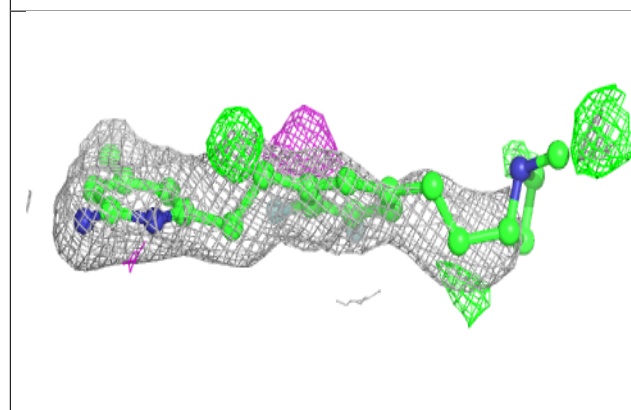
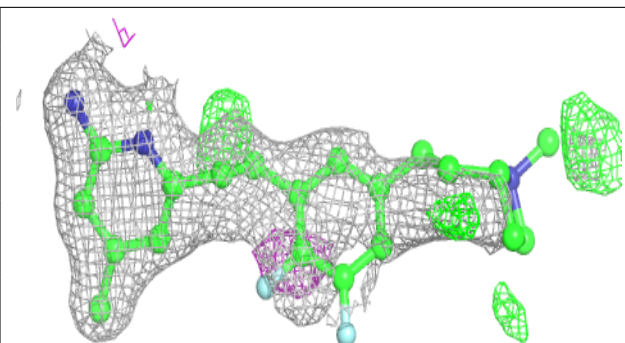
**Electron density around KNV A 503:**

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

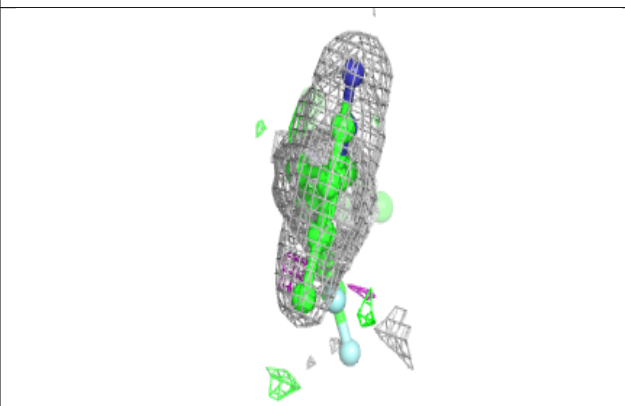
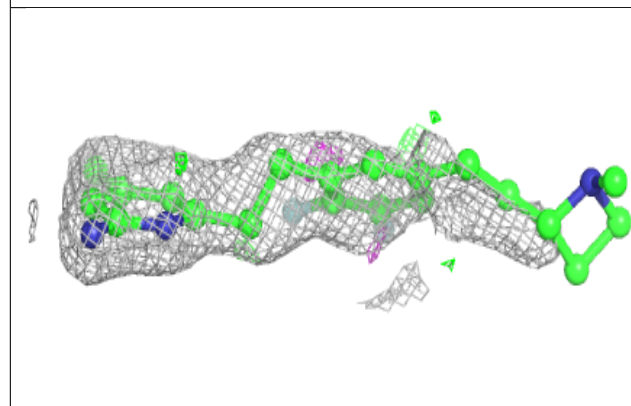
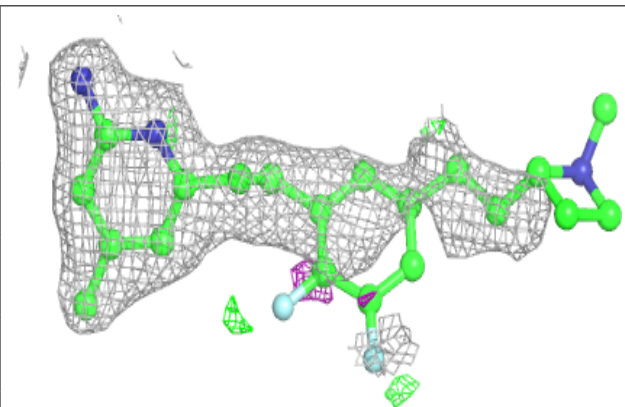


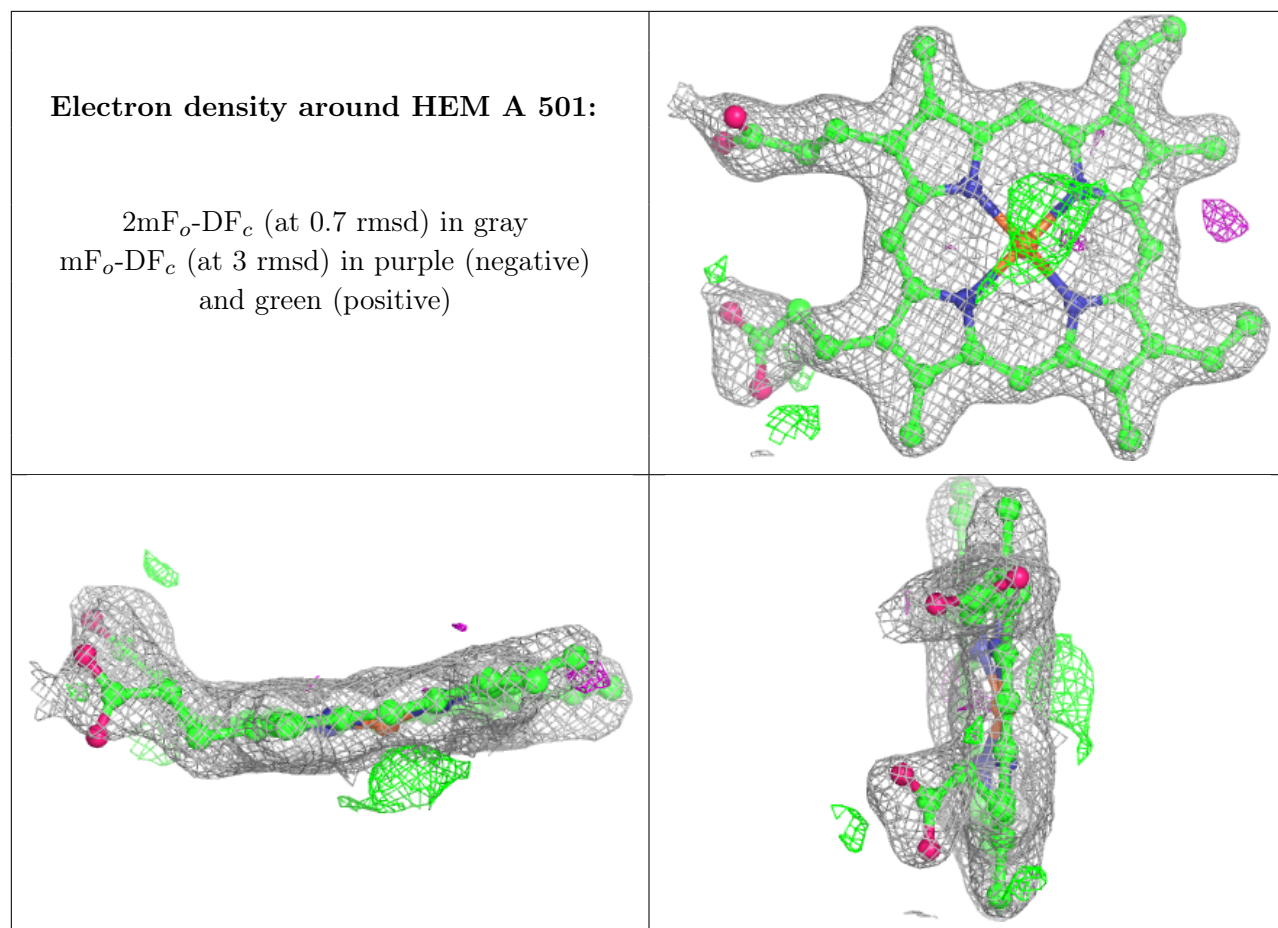
Electron density around KNV B 503:

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

**Electron density around KNV D 503:**

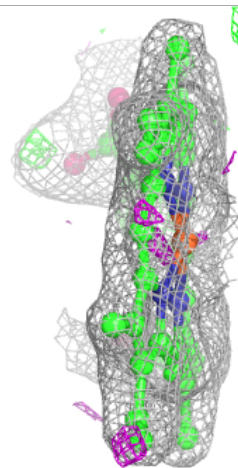
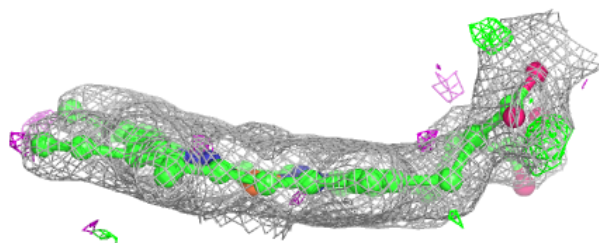
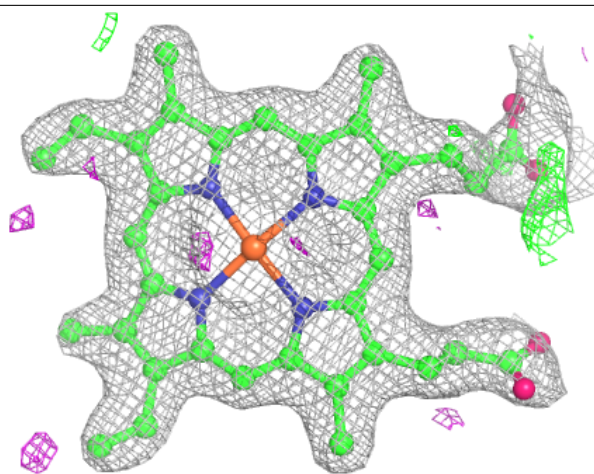
$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)

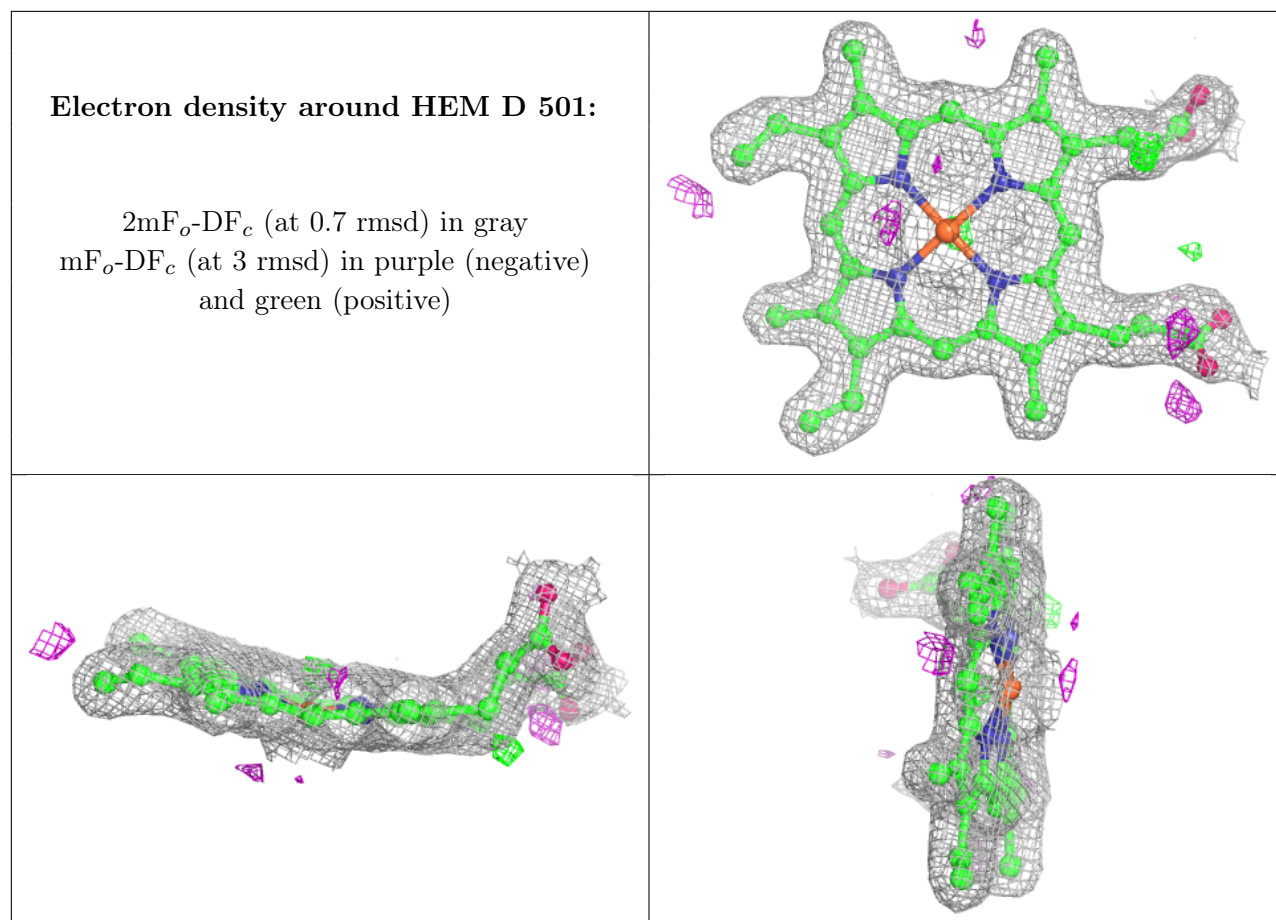


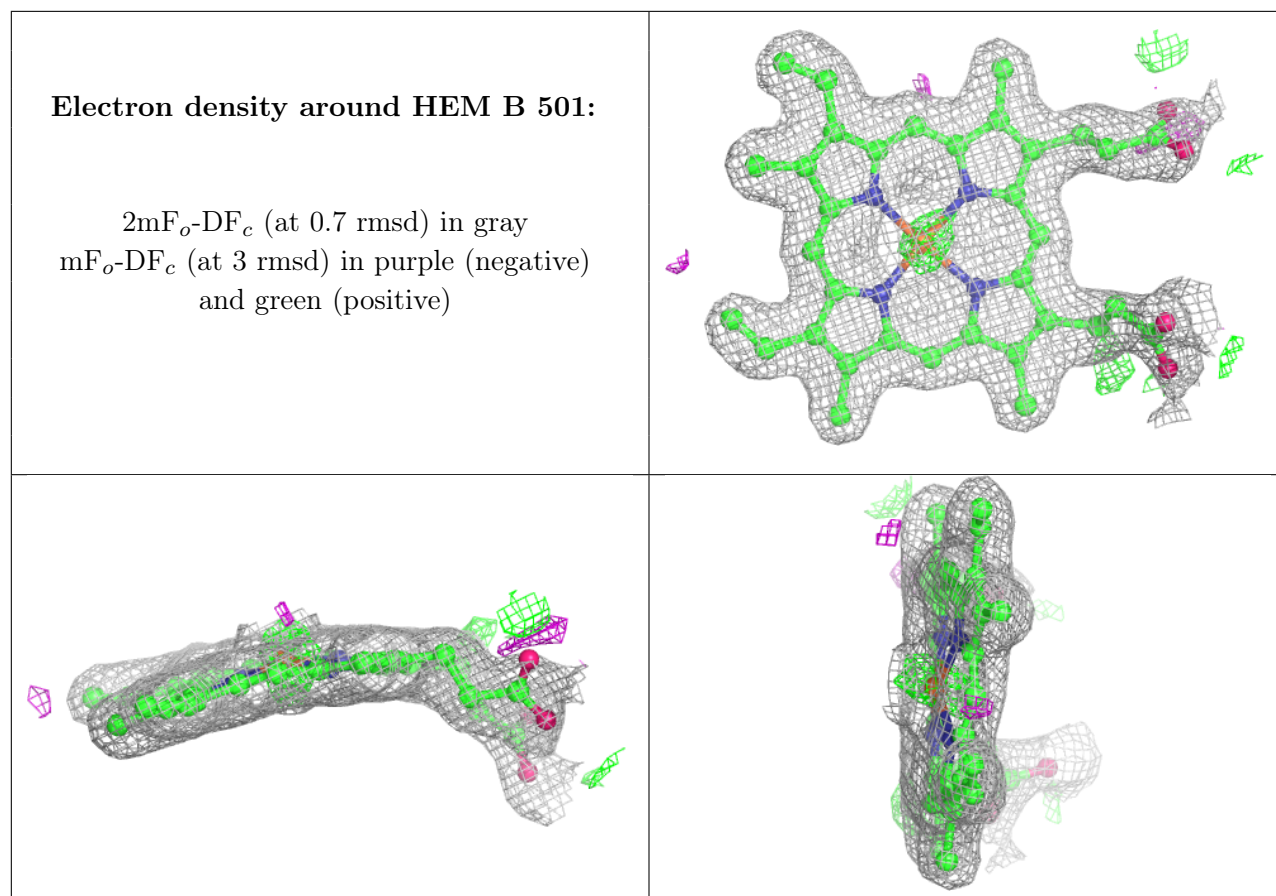


Electron density around HEM C 501:

$2mF_o-DF_c$ (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.