



Full wwPDB X-ray Structure Validation Report ⓘ

Sep 5, 2023 – 09:48 PM EDT

PDB ID : 4EJJ
Title : Human Cytochrome P450 2A6 in complex with nicotine
Authors : DeVore, N.M.; Scott, E.E.
Deposited on : 2012-04-06
Resolution : 2.30 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 : 2.35
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) : 2.35

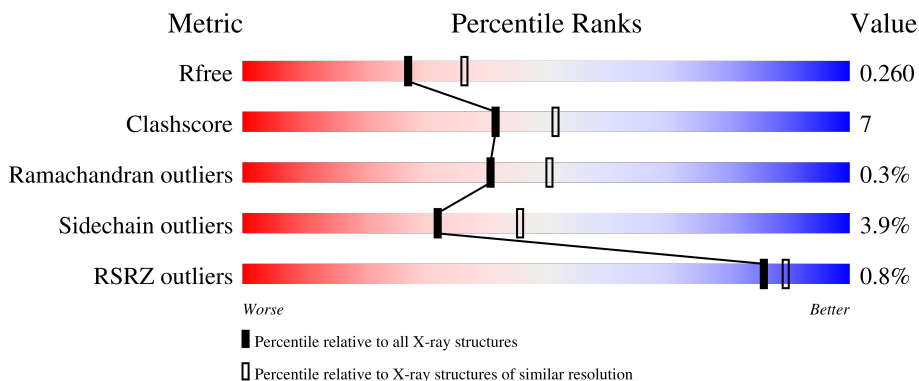
1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.30 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	5042 (2.30-2.30)
Clashscore	141614	5643 (2.30-2.30)
Ramachandran outliers	138981	5575 (2.30-2.30)
Sidechain outliers	138945	5575 (2.30-2.30)
RSRZ outliers	127900	4938 (2.30-2.30)

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	476	 85% 12% ..
1	B	476	 83% 14% .
1	C	476	 82% 14% ..
1	D	476	 77% 19% ..

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard

residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
3	NCT	B	501	-	-	X	-
3	NCT	C	501	-	-	X	-
3	NCT	D	501	-	-	X	-

2 Entry composition [i](#)

There are 4 unique types of molecules in this entry. The entry contains 15429 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 Cytochrome P450 2A6.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	465	3780	2427	655	680	18	0	3	0
1	B	464	3762	2416	649	679	18	0	2	0
1	C	464	3756	2411	648	679	18	0	1	0
1	D	464	3773	2423	655	677	18	0	3	0

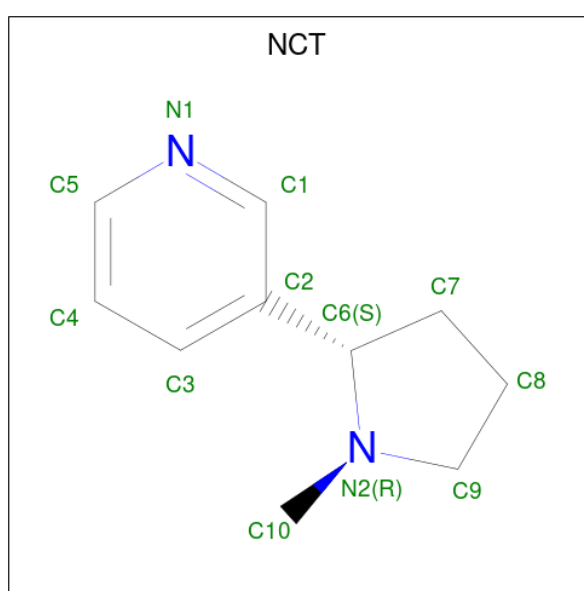
There are 44 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	23	MET	-	initiating methionine	UNP P11509
A	24	ALA	-	expression tag	UNP P11509
A	25	LYS	-	expression tag	UNP P11509
A	26	LYS	-	expression tag	UNP P11509
A	27	THR	-	expression tag	UNP P11509
A	28	SER	-	expression tag	UNP P11509
A	392	TYR	PHE	SEE REMARK 999	UNP P11509
A	495	HIS	-	expression tag	UNP P11509
A	496	HIS	-	expression tag	UNP P11509
A	497	HIS	-	expression tag	UNP P11509
A	498	HIS	-	expression tag	UNP P11509
B	23	MET	-	initiating methionine	UNP P11509
B	24	ALA	-	expression tag	UNP P11509
B	25	LYS	-	expression tag	UNP P11509
B	26	LYS	-	expression tag	UNP P11509
B	27	THR	-	expression tag	UNP P11509
B	28	SER	-	expression tag	UNP P11509
B	392	TYR	PHE	SEE REMARK 999	UNP P11509
B	495	HIS	-	expression tag	UNP P11509
B	496	HIS	-	expression tag	UNP P11509
B	497	HIS	-	expression tag	UNP P11509

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

- Molecule 3 is (S)-3-(1-METHYLPYRROLIDIN-2-YL)PYRIDINE (three-letter code: NCT) (formula: C₁₀H₁₄N₂).



Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	1	Total	C N	0	0
			12	10 2		
3	B	1	Total	C N	0	0
			12	10 2		
3	C	1	Total	C N	0	0
			12	10 2		
3	D	1	Total	C N	0	0
			12	10 2		

- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	51	Total	O	0	0
			51	51		

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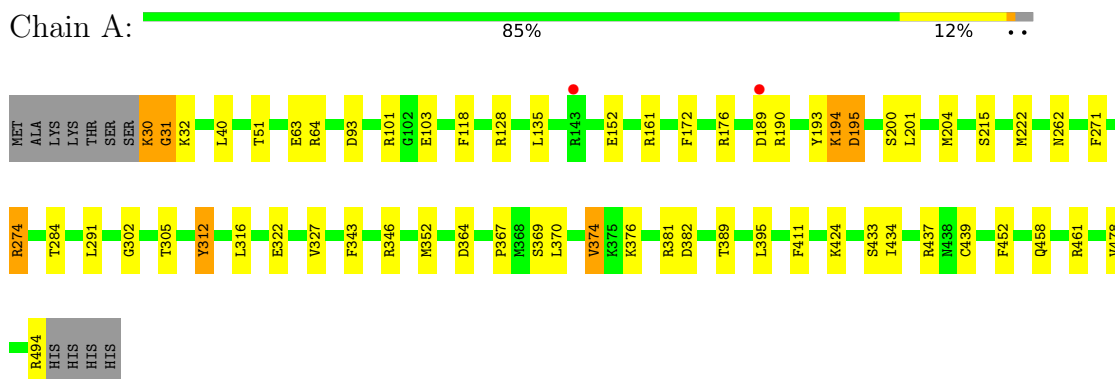
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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	B	29	Total 29	O 29	0	0
4	C	23	Total 23	O 23	0	0
4	D	35	Total 35	O 35	0	0

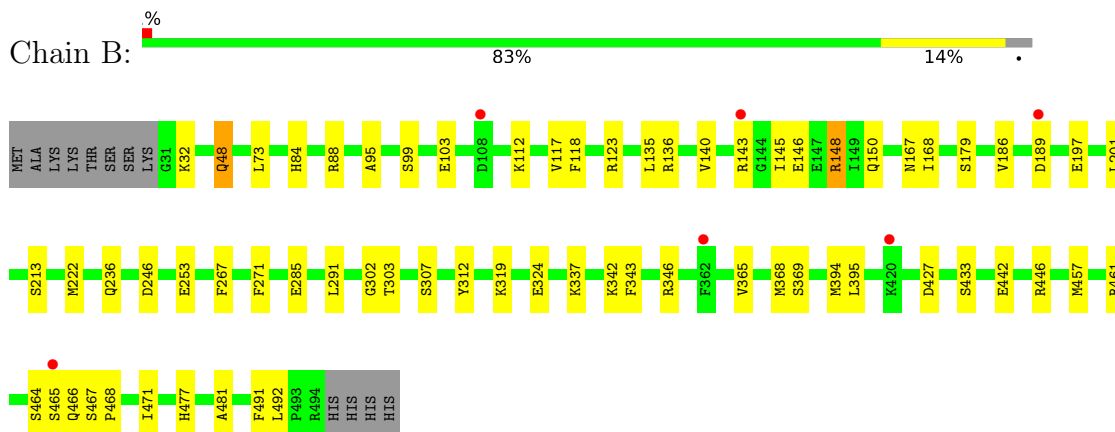
3 Residue-property plots

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.

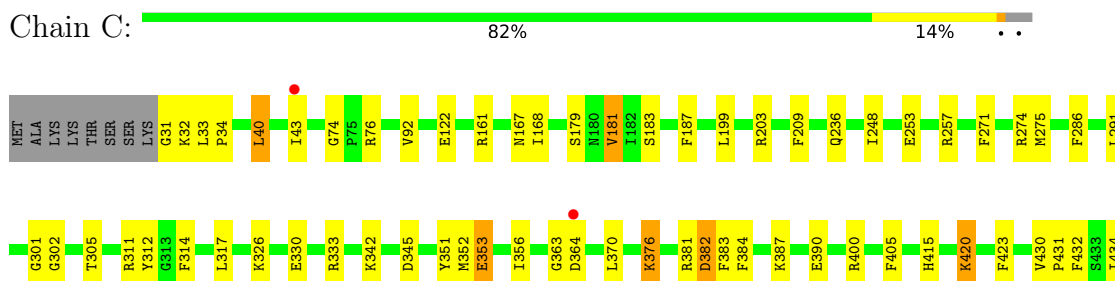
- Molecule 1: Cytochrome P450 2A6



- Molecule 1: Cytochrome P450 2A6

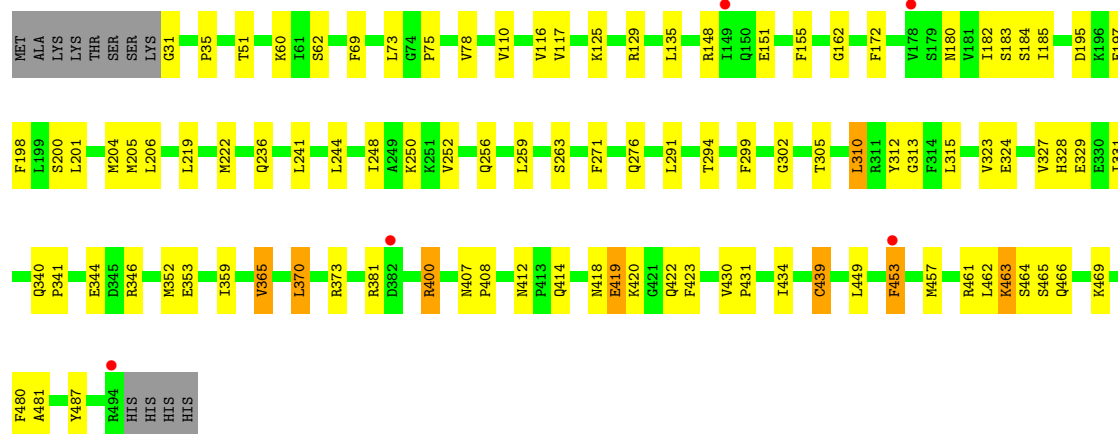
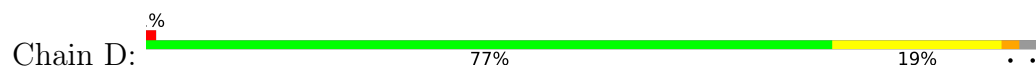


- Molecule 1: Cytochrome P450 2A6





● Molecule 1: Cytochrome P450 2A6



4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	71.21Å 194.04Å 90.27Å 90.00° 102.70° 90.00°	Depositor
Resolution (Å)	97.02 – 2.30 97.02 – 2.30	Depositor EDS
% Data completeness (in resolution range)	100.0 (97.02-2.30) 100.0 (97.02-2.30)	Depositor EDS
R_{merge}	0.08	Depositor
R_{sym}	0.09	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.02 (at 2.29Å)	Xtrriage
Refinement program	REFMAC 6.1.13	Depositor
R, R_{free}	0.203 , 0.264 0.202 , 0.260	Depositor DCC
R_{free} test set	5273 reflections (4.99%)	wwPDB-VP
Wilson B-factor (Å ²)	41.2	Xtrriage
Anisotropy	0.062	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.35 , 40.8	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	15429	wwPDB-VP
Average B, all atoms (Å ²)	41.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.36% 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, NCT

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	1.16	4/3880 (0.1%)	0.96	4/5224 (0.1%)
1	B	1.03	2/3859 (0.1%)	0.92	4/5197 (0.1%)
1	C	1.02	0/3850	0.90	2/5186 (0.0%)
1	D	1.08	3/3873 (0.1%)	0.95	7/5214 (0.1%)
All	All	1.08	9/15462 (0.1%)	0.93	17/20821 (0.1%)

All (9) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	63	GLU	CG-CD	5.72	1.60	1.51
1	D	439	CYS	CB-SG	5.53	1.91	1.82
1	B	253	GLU	CG-CD	5.44	1.60	1.51
1	D	365	VAL	CB-CG1	5.39	1.64	1.52
1	D	31	GLY	N-CA	5.37	1.54	1.46
1	A	452	PHE	CE1-CZ	5.30	1.47	1.37
1	A	312	TYR	CD2-CE2	-5.29	1.31	1.39
1	A	312	TYR	CD1-CE1	-5.22	1.31	1.39
1	B	118	PHE	CE1-CZ	5.05	1.47	1.37

All (17) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	311	ARG	NE-CZ-NH2	-5.91	117.35	120.30
1	B	136	ARG	NE-CZ-NH1	5.58	123.09	120.30
1	D	373	ARG	NE-CZ-NH2	-5.54	117.53	120.30
1	D	381	ARG	NE-CZ-NH2	-5.47	117.56	120.30
1	B	246	ASP	CB-CG-OD1	5.44	123.20	118.30
1	A	478	VAL	CB-CA-C	-5.37	101.19	111.40
1	A	128	ARG	NE-CZ-NH2	-5.31	117.65	120.30
1	D	373	ARG	NE-CZ-NH1	5.28	122.94	120.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	D	370	LEU	CB-CG-CD1	-5.23	102.11	111.00
1	A	93	ASP	CB-CG-OD2	5.21	122.99	118.30
1	D	400[A]	ARG	NE-CZ-NH1	5.14	122.87	120.30
1	D	400[B]	ARG	NE-CZ-NH1	5.14	122.87	120.30
1	D	310	LEU	CB-CG-CD2	5.10	119.67	111.00
1	B	189[A]	ASP	CB-CG-OD1	5.09	122.88	118.30
1	B	189[B]	ASP	CB-CG-OD1	5.09	122.88	118.30
1	A	370	LEU	CB-CG-CD2	-5.06	102.40	111.00
1	C	40	LEU	CA-CB-CG	-5.01	103.79	115.30

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	3780	0	3776	41	0
1	B	3762	0	3751	42	0
1	C	3756	0	3738	53	0
1	D	3773	0	3773	59	0
2	A	43	0	30	4	0
2	B	43	0	30	9	0
2	C	43	0	30	8	0
2	D	43	0	30	7	0
3	A	12	0	14	3	0
3	B	12	0	14	6	0
3	C	12	0	14	6	0
3	D	12	0	14	6	0
4	A	51	0	0	4	0
4	B	29	0	0	3	0
4	C	23	0	0	0	0
4	D	35	0	0	2	0
All	All	15429	0	15214	212	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 7.

All (212) 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)
3:B:501:NCT:H102	3:B:501:NCT:C1	1.66	1.16
3:B:501:NCT:C10	3:B:501:NCT:HC1	1.75	1.16
1:D:419:GLU:OE2	1:D:419:GLU:HA	1.42	1.09
1:C:381:ARG:O	1:C:382:ASP:HB2	1.43	1.07
1:C:43:ILE:O	1:C:74:GLY:HA2	1.52	1.06
3:B:501:NCT:C1	3:B:501:NCT:C10	2.32	0.98
1:B:103:GLU:HG2	4:B:614:HOH:O	1.69	0.91
1:C:457:MET:HA	1:C:457:MET:HE2	1.53	0.89
1:B:112:LYS:HE2	4:B:629:HOH:O	1.73	0.89
3:B:501:NCT:H102	3:B:501:NCT:HC1	0.90	0.88
1:A:30:LYS:O	1:A:31:GLY:O	1.92	0.88
1:D:252:VAL:O	1:D:256:GLN:HG3	1.73	0.88
3:A:501:NCT:HC3	3:A:501:NCT:H102	1.57	0.86
1:C:302:GLY:HA2	2:C:500:HEM:HMC2	1.59	0.84
1:D:302:GLY:HA2	2:D:502:HEM:HMC2	1.61	0.81
1:A:343:PHE:O	1:A:346:ARG:HB2	1.84	0.77
2:C:500:HEM:C4A	3:C:501:NCT:HC81	2.20	0.76
1:C:43:ILE:O	1:C:74:GLY:CA	2.33	0.76
2:C:500:HEM:NA	3:C:501:NCT:HC81	2.01	0.76
1:C:199:LEU:HD21	1:C:203:ARG:HH21	1.52	0.75
1:A:51:THR:HG22	1:A:222:MET:CE	2.19	0.73
1:D:453:PHE:O	1:D:457:MET:HG2	1.88	0.72
1:C:457:MET:HA	1:C:457:MET:CE	2.18	0.72
1:B:461:ARG:HH12	1:B:492:LEU:HD13	1.54	0.71
1:C:342:LYS:O	1:C:345:ASP:HB2	1.90	0.70
1:B:319:LYS:HD2	1:B:468:PRO:O	1.91	0.70
1:D:419:GLU:OE2	1:D:419:GLU:CA	2.28	0.69
1:B:324:GLU:HG3	1:B:457:MET:HE1	1.75	0.69
2:B:500:HEM:C1D	3:B:501:NCT:H101	2.26	0.69
1:C:381:ARG:O	1:C:382:ASP:CB	2.29	0.69
1:D:331:ILE:HD11	1:D:352:MET:HE2	1.75	0.69
1:B:302:GLY:HA2	2:B:500:HEM:HMC3	1.74	0.68
1:D:197:GLU:HG2	4:D:607:HOH:O	1.93	0.68
1:C:302:GLY:HA2	2:C:500:HEM:CMC	2.23	0.68
1:D:305:THR:HG21	3:D:501:NCT:HC92	1.76	0.67
1:A:189:ASP:OD1	1:A:190:ARG:N	2.30	0.64
2:D:502:HEM:HBB2	2:D:502:HEM:HMB2	1.79	0.64
1:A:271:PHE:CD2	1:A:291:LEU:HB2	2.32	0.64
1:A:161:ARG:NH2	1:C:420:LYS:CD	2.60	0.64
1:D:148:ARG:NH2	1:D:151:GLU:OE1	2.29	0.64

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:248:ILE:O	1:D:252:VAL:HG23	1.99	0.63
1:D:480:PHE:HZ	3:D:501:NCT:H103	1.63	0.63
1:A:494:ARG:C	4:A:613:HOH:O	2.36	0.62
1:B:433:SER:HB3	2:B:500:HEM:HBA1	1.81	0.62
1:D:418:ASN:C	1:D:418:ASN:OD1	2.38	0.62
1:B:179:SER:HB2	1:B:303:THR:HG23	1.80	0.62
1:A:161:ARG:NH2	1:C:420:LYS:HD2	2.14	0.62
1:A:364:ASP:OD2	1:A:367:PRO:HB3	1.99	0.62
1:A:302:GLY:HA2	2:A:500:HEM:HMC2	1.80	0.62
3:A:501:NCT:HC3	3:A:501:NCT:C10	2.28	0.62
1:C:301:GLY:HA2	3:C:501:NCT:H103	1.82	0.61
1:C:31:GLY:HA3	1:C:384:PHE:HB2	1.82	0.61
1:B:461:ARG:NH1	1:B:492:LEU:HD13	2.15	0.61
3:A:501:NCT:C10	3:A:501:NCT:C3	2.78	0.61
1:A:176:ARG:HD2	1:A:193:TYR:CD1	2.36	0.60
1:B:468:PRO:HA	1:B:471:ILE:HD12	1.83	0.60
1:B:103:GLU:CG	4:B:614:HOH:O	2.37	0.60
1:D:302:GLY:HA2	2:D:502:HEM:CMC	2.29	0.60
2:C:500:HEM:C1A	3:C:501:NCT:HC81	2.37	0.60
1:A:274:ARG:HD3	4:A:644:HOH:O	2.02	0.60
3:D:501:NCT:HC3	3:D:501:NCT:C10	2.32	0.59
1:D:151:GLU:HG2	1:D:155:PHE:CE1	2.38	0.59
1:D:327:VAL:HG12	1:D:331:ILE:HD12	1.84	0.59
2:B:500:HEM:HBB2	2:B:500:HEM:HMB2	1.84	0.58
1:C:364:ASP:OD2	1:C:400:ARG:NH2	2.36	0.58
1:D:51:THR:HG22	1:D:222:MET:CE	2.33	0.58
1:A:51:THR:HG22	1:A:222:MET:HE3	1.84	0.58
1:D:353:GLU:HG2	1:D:423:PHE:CD2	2.39	0.58
1:A:51:THR:HG22	1:A:222:MET:HE1	1.85	0.57
1:A:161:ARG:NH2	1:C:420:LYS:HD3	2.19	0.57
1:C:183:SER:O	1:C:187:PHE:HB2	2.04	0.57
1:D:151:GLU:HG2	1:D:155:PHE:HE1	1.69	0.57
1:D:449:LEU:O	1:D:453:PHE:HB2	2.04	0.57
1:C:253:GLU:HB3	1:C:257:ARG:HH12	1.70	0.56
1:A:381:ARG:O	1:A:382:ASP:HB2	2.05	0.56
1:B:369:SER:HB2	1:B:395:LEU:HG	1.87	0.56
1:A:369:SER:HB2	1:A:395:LEU:HG	1.86	0.56
1:A:51:THR:CG2	1:A:222:MET:HE1	2.35	0.56
1:B:123:ARG:HA	1:B:285:GLU:HG3	1.86	0.56
1:A:51:THR:CG2	1:A:222:MET:CE	2.83	0.55
2:B:500:HEM:NA	3:B:501:NCT:HC92	2.21	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:51:THR:HG22	1:D:222:MET:HE3	1.89	0.55
1:D:197:GLU:CG	4:D:607:HOH:O	2.51	0.54
1:C:76:ARG:NH2	1:C:390:GLU:OE2	2.40	0.54
1:D:110:VAL:HG11	1:D:241:LEU:HD22	1.89	0.54
1:C:352:MET:HE3	1:C:454:THR:HA	1.91	0.53
1:A:161:ARG:CZ	1:C:420:LYS:CD	2.87	0.53
1:D:117:VAL:HG22	2:D:502:HEM:HAD1	1.91	0.53
3:D:501:NCT:H103	3:D:501:NCT:HC3	1.90	0.53
1:D:116:VAL:HG12	1:D:294:THR:HG23	1.91	0.52
1:B:186:VAL:HA	1:B:267:PHE:HB3	1.92	0.52
1:B:461:ARG:NH1	1:B:492:LEU:CD1	2.73	0.52
1:B:442:GLU:O	1:B:446:ARG:HG3	2.10	0.52
1:C:376:LYS:HA	1:C:387:LYS:HG3	1.92	0.52
1:C:271:PHE:CD2	1:C:291:LEU:HB2	2.45	0.51
1:D:62:SER:HB3	1:D:69:PHE:CE2	2.44	0.51
1:D:200:SER:O	1:D:204:MET:HG3	2.09	0.51
1:C:353:GLU:HG2	1:C:423:PHE:CD2	2.45	0.51
1:D:195:ASP:HB3	1:D:198:PHE:HB2	1.93	0.51
1:C:364:ASP:O	1:C:482:THR:OG1	2.20	0.51
1:C:122:GLU:HA	1:C:122:GLU:OE2	2.11	0.51
1:B:140:VAL:HA	1:B:145:ILE:HG21	1.92	0.51
1:D:331:ILE:HD11	1:D:352:MET:CE	2.42	0.50
2:A:500:HEM:HMB1	2:A:500:HEM:HBB2	1.92	0.50
1:D:271:PHE:HB3	1:D:291:LEU:HD13	1.94	0.50
1:B:302:GLY:HA2	2:B:500:HEM:CMC	2.40	0.50
1:D:464:SER:OG	1:D:466:GLN:O	2.29	0.50
1:B:433:SER:CB	2:B:500:HEM:HBA1	2.41	0.50
2:B:500:HEM:HBB2	2:B:500:HEM:CMB	2.42	0.50
1:C:253:GLU:HB3	1:C:257:ARG:NH1	2.25	0.50
2:C:500:HEM:C4D	3:C:501:NCT:HC71	2.47	0.50
1:D:62:SER:HB3	1:D:69:PHE:HE2	1.77	0.50
1:B:150:GLN:NE2	1:B:342:LYS:HB3	2.26	0.49
1:C:92:VAL:HG23	1:C:434:ILE:HD12	1.93	0.49
1:C:405:PHE:HB3	1:C:415:HIS:CD2	2.47	0.49
1:A:322:GLU:HB2	4:A:641:HOH:O	2.11	0.49
1:C:181:VAL:HG11	1:C:444:LEU:HD11	1.95	0.49
2:A:500:HEM:HBB2	2:A:500:HEM:CMB	2.43	0.49
1:D:324:GLU:OE2	1:D:462:LEU:HG	2.11	0.48
1:D:310:LEU:HA	1:D:453:PHE:CZ	2.49	0.48
1:C:34:PRO:HA	1:C:383:PHE:CD2	2.49	0.48
1:B:117:VAL:HG22	2:B:500:HEM:HAD1	1.96	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:110:VAL:CG1	1:D:241:LEU:HD22	2.44	0.47
1:A:316:LEU:HD13	1:A:411:PHE:CE1	2.49	0.47
1:C:432:PHE:CD2	1:C:442:GLU:HG3	2.49	0.47
1:B:271:PHE:HB3	1:B:291:LEU:HD13	1.96	0.47
1:A:271:PHE:CE2	1:A:291:LEU:HB2	2.50	0.47
1:A:172:PHE:O	1:A:176:ARG:HG3	2.15	0.47
3:D:501:NCT:HC82	2:D:502:HEM:NC	2.30	0.47
1:B:73:LEU:HB3	1:B:222:MET:HG2	1.97	0.47
1:D:400[B]:ARG:NH1	1:D:408:PRO:O	2.48	0.47
1:A:152:GLU:OE2	1:A:190:ARG:NE	2.48	0.47
1:C:187:PHE:HZ	1:C:248:ILE:HD13	1.79	0.46
1:C:314:PHE:HA	1:C:317:LEU:HD12	1.95	0.46
1:A:458:GLN:O	1:A:494:ARG:NH1	2.48	0.46
1:C:302:GLY:CA	2:C:500:HEM:HMC2	2.39	0.46
1:C:326:LYS:HB3	1:C:351:TYR:CE2	2.50	0.46
1:B:146:GLU:OE1	1:B:342:LYS:HB2	2.16	0.46
1:B:168:ILE:HD11	1:B:491:PHE:HE1	1.81	0.46
1:A:161:ARG:CZ	1:C:420:LYS:HD2	2.46	0.46
1:B:271:PHE:CB	1:B:291:LEU:HD13	2.46	0.46
1:C:430:VAL:N	1:C:431:PRO:CD	2.79	0.45
1:A:40:LEU:HD23	1:A:40:LEU:HA	1.85	0.45
1:B:213:SER:O	1:B:477:HIS:HB3	2.17	0.45
1:C:271:PHE:CE2	1:C:291:LEU:HB2	2.52	0.45
1:B:95:ALA:O	1:B:99:SER:HB3	2.17	0.45
1:C:353:GLU:HG2	1:C:423:PHE:CE2	2.51	0.45
1:B:324:GLU:CG	1:B:457:MET:HE1	2.44	0.44
1:C:43:ILE:C	1:C:74:GLY:HA2	2.31	0.44
1:A:327:VAL:HG13	1:A:352:MET:CE	2.48	0.44
1:D:430:VAL:N	1:D:431:PRO:CD	2.80	0.44
1:A:101:ARG:HG2	1:A:118:PHE:HA	2.00	0.44
1:D:271:PHE:CD2	1:D:291:LEU:HB2	2.52	0.44
1:B:343:PHE:O	1:B:346:ARG:CB	2.66	0.44
1:C:467:SER:O	1:C:468:PRO:C	2.57	0.44
1:D:205:MET:HE3	1:D:299:PHE:CE2	2.53	0.44
1:B:84:HIS:NE2	1:B:427:ASP:HB3	2.32	0.43
1:C:440:PHE:CZ	2:C:500:HEM:HMD1	2.53	0.43
1:D:172:PHE:CZ	1:D:206:LEU:HD22	2.53	0.43
1:A:51:THR:CG2	1:A:222:MET:HE3	2.47	0.43
1:B:267:PHE:CD2	1:B:267:PHE:C	2.91	0.43
1:A:51:THR:O	1:A:215:SER:HA	2.18	0.43
1:B:343:PHE:O	1:B:346:ARG:HB2	2.18	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:365:VAL:O	1:D:481:ALA:HA	2.19	0.43
1:B:197:GLU:O	1:B:201:LEU:HG	2.19	0.43
1:A:194:LYS:HA	1:A:194:LYS:HD3	1.91	0.43
1:A:194:LYS:O	1:A:195:ASP:C	2.57	0.43
1:C:314:PHE:HD2	1:C:317:LEU:HD12	1.83	0.43
1:D:116:VAL:CG1	1:D:294:THR:HG23	2.49	0.43
2:D:502:HEM:HBB2	2:D:502:HEM:CMB	2.49	0.43
1:B:88:ARG:NH2	1:B:427:ASP:O	2.49	0.42
1:B:148:ARG:NH1	1:B:148:ARG:HG3	2.34	0.42
1:C:199:LEU:HD21	1:C:203:ARG:NH2	2.27	0.42
1:C:363:GLY:O	1:C:482:THR:HG21	2.20	0.42
1:D:201:LEU:HD22	1:D:244:LEU:HD23	2.00	0.42
1:D:219:LEU:HD12	1:D:219:LEU:HA	1.89	0.42
1:B:365:VAL:O	1:B:481:ALA:HA	2.19	0.42
1:B:368:MET:HG2	1:B:394:MET:HE1	2.01	0.42
1:D:35:PRO:O	1:D:69:PHE:HB2	2.20	0.42
1:D:439:CYS:HB2	2:D:502:HEM:NA	2.33	0.42
1:B:465:SER:HB2	1:B:466:GLN:HG3	2.01	0.42
1:D:412:ASN:OD1	1:D:414:GLN:HB2	2.20	0.42
1:C:161:ARG:NH2	1:C:459:ASN:OD1	2.53	0.42
1:C:330:GLU:HG3	1:C:333:ARG:NH2	2.35	0.42
1:A:201:LEU:O	1:A:204:MET:HB2	2.20	0.41
1:D:305:THR:CG2	3:D:501:NCT:HC92	2.46	0.41
1:D:328:HIS:O	1:D:329:GLU:C	2.59	0.41
1:A:439:CYS:HB2	2:A:500:HEM:NA	2.35	0.41
1:D:180:ASN:HA	1:D:183:SER:HB2	2.02	0.41
1:D:353:GLU:HG2	1:D:423:PHE:CE2	2.55	0.41
1:A:374:VAL:HG22	1:A:389:THR:O	2.20	0.41
1:C:34:PRO:HA	1:C:383:PHE:CE2	2.55	0.41
1:D:73:LEU:HD12	1:D:78:VAL:HG21	2.02	0.41
1:D:315:LEU:HB2	1:D:487:TYR:CE2	2.55	0.41
1:D:340:GLN:HA	1:D:341:PRO:HD2	1.94	0.41
1:D:313:GLY:HA3	1:D:359:ILE:HD13	2.02	0.41
1:B:319:LYS:NZ	1:B:471:ILE:O	2.46	0.41
1:D:315:LEU:O	1:D:315:LEU:HG	2.20	0.41
1:D:420:LYS:HB2	1:D:422:GLN:HG3	2.03	0.41
1:C:356:ILE:CD1	1:C:450:PHE:HA	2.51	0.41
1:A:200:SER:O	1:A:204:MET:HG3	2.21	0.40
1:A:424:LYS:HB3	1:A:424:LYS:HE2	1.66	0.40
1:C:209:PHE:HZ	3:C:501:NCT:H102	1.86	0.40
1:C:275:MET:HG2	1:C:286:PHE:O	2.21	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:145:ILE:HD12	1:B:145:ILE:HA	1.86	0.40
1:C:271:PHE:HB3	1:C:291:LEU:HD13	2.02	0.40
1:D:182:ILE:O	1:D:185:ILE:HB	2.21	0.40
1:D:323:VAL:O	1:D:327:VAL:HG23	2.21	0.40
1:A:433:SER:O	1:A:434:ILE:HG23	2.21	0.40
1:A:437:ARG:HD3	4:A:630:HOH:O	2.21	0.40
1:B:48:GLN:H	1:B:48:GLN:HG2	1.55	0.40
1:D:463:LYS:HD3	1:D:463:LYS:HA	1.78	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	466/476 (98%)	434 (93%)	30 (6%)	2 (0%)	34	42
1	B	464/476 (98%)	441 (95%)	23 (5%)	0	100	100
1	C	463/476 (97%)	431 (93%)	30 (6%)	2 (0%)	34	42
1	D	465/476 (98%)	433 (93%)	31 (7%)	1 (0%)	47	58
All	All	1858/1904 (98%)	1739 (94%)	114 (6%)	5 (0%)	41	50

All (5) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	31	GLY
1	D	162	GLY
1	A	195	ASP
1	C	33	LEU
1	C	181	VAL

5.3.2 Protein sidechains [i](#)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	415/422 (98%)	400 (96%)	15 (4%)	35	49
1	B	413/422 (98%)	401 (97%)	12 (3%)	42	58
1	C	412/422 (98%)	397 (96%)	15 (4%)	35	49
1	D	414/422 (98%)	391 (94%)	23 (6%)	21	29
All	All	1654/1688 (98%)	1589 (96%)	65 (4%)	32	46

All (65) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	30	LYS
1	A	32	LYS
1	A	64[A]	ARG
1	A	64[B]	ARG
1	A	103	GLU
1	A	135	LEU
1	A	194	LYS
1	A	262	ASN
1	A	274	ARG
1	A	284	THR
1	A	305	THR
1	A	312	TYR
1	A	374	VAL
1	A	376	LYS
1	A	461	ARG
1	B	32	LYS
1	B	48	GLN
1	B	135	LEU
1	B	143	ARG
1	B	148	ARG
1	B	167	ASN
1	B	236	GLN
1	B	307	SER
1	B	312	TYR

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Mol	Chain	Res	Type
1	B	337	LYS
1	B	464	SER
1	B	467	SER
1	C	32	LYS
1	C	40	LEU
1	C	167	ASN
1	C	168	ILE
1	C	179	SER
1	C	236	GLN
1	C	274	ARG
1	C	305	THR
1	C	312	TYR
1	C	353	GLU
1	C	370	LEU
1	C	376	LYS
1	C	382	ASP
1	C	420	LYS
1	C	463	LYS
1	D	60	LYS
1	D	75	PRO
1	D	125	LYS
1	D	129	ARG
1	D	135	LEU
1	D	184	SER
1	D	236	GLN
1	D	250	LYS
1	D	259	LEU
1	D	263	SER
1	D	276	GLN
1	D	312	TYR
1	D	344	GLU
1	D	346	ARG
1	D	370	LEU
1	D	407	ASN
1	D	419	GLU
1	D	434	ILE
1	D	453	PHE
1	D	461	ARG
1	D	463	LYS
1	D	465	SER
1	D	469	LYS

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

sidechains are listed below:

Mol	Chain	Res	Type
1	C	297	ASN

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](#)

8 ligands are modelled in this entry.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\# Z > 2$	Counts	RMSZ	$\# Z > 2$
2	HEM	B	500	1	41,50,50	2.19	11 (26%)	45,82,82	2.41	14 (31%)
3	NCT	D	501	-	13,13,13	0.64	0	17,17,17	2.36	5 (29%)
2	HEM	A	500	1	41,50,50	2.17	11 (26%)	45,82,82	2.41	15 (33%)
3	NCT	A	501	-	13,13,13	1.15	1 (7%)	17,17,17	2.57	9 (52%)
2	HEM	D	502	1	41,50,50	2.14	10 (24%)	45,82,82	2.18	14 (31%)
3	NCT	C	501	-	13,13,13	0.77	0	17,17,17	2.14	7 (41%)
2	HEM	C	500	1	41,50,50	2.21	11 (26%)	45,82,82	2.06	9 (20%)
3	NCT	B	501	-	13,13,13	1.07	1 (7%)	17,17,17	2.19	5 (29%)

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
2	HEM	B	500	1	-	1/12/54/54	-
3	NCT	D	501	-	-	1/4/14/14	0/2/2/2
2	HEM	A	500	1	-	4/12/54/54	-
3	NCT	A	501	-	-	0/4/14/14	0/2/2/2
2	HEM	D	502	1	-	2/12/54/54	-
3	NCT	C	501	-	-	1/4/14/14	0/2/2/2
2	HEM	C	500	1	-	4/12/54/54	-
3	NCT	B	501	-	-	0/4/14/14	0/2/2/2

All (45) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	D	502	HEM	C3D-C2D	8.41	1.54	1.36
2	A	500	HEM	C3D-C2D	8.15	1.54	1.36
2	B	500	HEM	C3D-C2D	7.55	1.52	1.36
2	C	500	HEM	C3D-C2D	7.19	1.52	1.36
2	A	500	HEM	C3C-C2C	-4.92	1.33	1.40
2	C	500	HEM	C3C-CAC	4.87	1.57	1.47
2	C	500	HEM	FE-ND	4.70	2.20	1.96
2	C	500	HEM	C3C-C2C	-4.54	1.34	1.40
2	B	500	HEM	C3C-C2C	-4.20	1.34	1.40
2	B	500	HEM	FE-ND	4.07	2.17	1.96
2	D	502	HEM	C3C-C2C	-4.04	1.34	1.40
2	B	500	HEM	CAA-C2A	3.97	1.57	1.52
2	A	500	HEM	CAB-C3B	3.86	1.58	1.47
2	B	500	HEM	C3C-CAC	3.85	1.55	1.47
2	B	500	HEM	CMB-C2B	3.71	1.58	1.50
2	D	502	HEM	FE-ND	3.54	2.14	1.96
3	B	501	NCT	C2-C6	-3.37	1.46	1.51
3	A	501	NCT	C2-C6	-3.30	1.46	1.51
2	D	502	HEM	CAB-C3B	3.20	1.56	1.47
2	C	500	HEM	CAB-C3B	3.19	1.56	1.47
2	A	500	HEM	FE-ND	3.17	2.12	1.96
2	D	502	HEM	CAA-C2A	3.11	1.56	1.52
2	C	500	HEM	CAA-C2A	2.99	1.56	1.52
2	B	500	HEM	CAB-C3B	2.90	1.55	1.47
2	A	500	HEM	CMB-C2B	2.80	1.56	1.50
2	D	502	HEM	C3C-CAC	2.79	1.53	1.47
2	D	502	HEM	CMC-C2C	2.66	1.57	1.51

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	C	500	HEM	FE-NB	2.66	2.10	1.96
2	A	500	HEM	C4B-NB	-2.65	1.33	1.38
2	D	502	HEM	CMB-C2B	2.62	1.56	1.50
2	B	500	HEM	C1B-NB	-2.62	1.35	1.40
2	C	500	HEM	CMD-C2D	2.60	1.56	1.50
2	A	500	HEM	C3C-CAC	2.59	1.53	1.47
2	D	502	HEM	C4D-ND	-2.56	1.35	1.40
2	C	500	HEM	C1B-NB	-2.54	1.35	1.40
2	A	500	HEM	CAA-C2A	2.53	1.55	1.52
2	A	500	HEM	CHB-C1B	2.40	1.41	1.35
2	B	500	HEM	C4B-NB	-2.36	1.33	1.38
2	B	500	HEM	CMC-C2C	2.36	1.57	1.51
2	A	500	HEM	O2D-CGD	-2.23	1.23	1.30
2	B	500	HEM	FE-NB	2.18	2.07	1.96
2	C	500	HEM	CMB-C2B	2.18	1.55	1.50
2	D	502	HEM	CMD-C2D	2.16	1.55	1.50
2	C	500	HEM	C4D-ND	-2.10	1.36	1.40
2	A	500	HEM	O2A-CGA	-2.09	1.23	1.30

All (78) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	D	502	HEM	C4D-ND-C1D	8.76	114.12	105.07
2	A	500	HEM	C4D-ND-C1D	8.02	113.36	105.07
2	B	500	HEM	C4D-ND-C1D	7.65	112.98	105.07
2	B	500	HEM	C4B-CHC-C1C	7.27	132.16	122.56
2	C	500	HEM	C4D-ND-C1D	7.15	112.46	105.07
2	A	500	HEM	C4B-CHC-C1C	5.85	130.28	122.56
2	C	500	HEM	C4C-CHD-C1D	5.61	129.96	122.56
2	A	500	HEM	C1B-NB-C4B	5.04	110.28	105.07
3	D	501	NCT	C10-N2-C6	5.02	128.09	112.83
2	A	500	HEM	CMA-C3A-C4A	-4.79	121.10	128.46
3	A	501	NCT	C3-C2-C1	4.77	121.95	116.88
3	A	501	NCT	C10-N2-C6	4.64	126.94	112.83
2	B	500	HEM	C4C-CHD-C1D	4.52	128.52	122.56
2	D	502	HEM	C4B-CHC-C1C	4.33	128.28	122.56
3	C	501	NCT	C10-N2-C6	4.13	125.38	112.83
3	D	501	NCT	C2-C6-N2	4.12	122.93	112.37
3	B	501	NCT	C3-C2-C1	4.07	121.21	116.88
2	B	500	HEM	C4A-C3A-C2A	4.05	109.81	107.00
2	C	500	HEM	C4A-C3A-C2A	4.05	109.81	107.00
2	C	500	HEM	C1B-NB-C4B	4.03	109.23	105.07

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	500	HEM	C4C-CHD-C1D	3.96	127.78	122.56
3	D	501	NCT	C7-C6-N2	-3.93	91.48	102.56
3	B	501	NCT	C10-N2-C9	3.83	124.69	112.70
3	B	501	NCT	C4-C3-C2	-3.75	116.00	120.65
2	A	500	HEM	CBA-CAA-C2A	-3.74	106.25	112.62
2	B	500	HEM	CMA-C3A-C4A	-3.65	122.86	128.46
2	D	502	HEM	C2C-C3C-C4C	3.55	109.38	106.90
3	C	501	NCT	C8-C9-N2	-3.54	93.90	103.85
3	A	501	NCT	C10-N2-C9	3.53	123.78	112.70
2	A	500	HEM	C4B-C3B-C2B	3.48	109.88	107.11
3	A	501	NCT	C2-C1-N1	-3.44	118.73	124.14
2	B	500	HEM	O1A-CGA-CBA	-3.30	112.48	123.08
2	D	502	HEM	C4C-CHD-C1D	3.27	126.87	122.56
3	C	501	NCT	C3-C2-C1	3.24	120.33	116.88
2	C	500	HEM	CMA-C3A-C4A	-3.23	123.50	128.46
2	C	500	HEM	CBA-CAA-C2A	-3.21	107.15	112.62
2	D	502	HEM	C1B-NB-C4B	3.11	108.29	105.07
2	B	500	HEM	CMB-C2B-C1B	3.08	129.74	125.04
2	A	500	HEM	CHC-C4B-NB	3.06	127.75	124.43
3	D	501	NCT	C10-N2-C9	3.04	122.24	112.70
2	B	500	HEM	C3B-C2B-C1B	-3.00	104.26	106.49
3	B	501	NCT	C9-N2-C6	2.99	113.42	104.37
2	D	502	HEM	CHD-C1D-ND	2.98	127.67	124.43
3	B	501	NCT	C10-N2-C6	2.98	121.88	112.83
3	A	501	NCT	C1-C2-C6	-2.95	115.17	121.40
3	C	501	NCT	C10-N2-C9	2.93	121.88	112.70
2	B	500	HEM	C1B-NB-C4B	2.93	108.10	105.07
2	B	500	HEM	O2A-CGA-CBA	2.87	123.27	114.03
3	C	501	NCT	C2-C1-N1	-2.85	119.67	124.14
3	D	501	NCT	C5-N1-C1	2.81	121.71	116.85
2	B	500	HEM	C4B-C3B-C2B	2.78	109.32	107.11
3	C	501	NCT	C9-N2-C6	2.75	112.69	104.37
2	B	500	HEM	CAD-CBD-CGD	-2.74	107.71	113.60
2	A	500	HEM	CMA-C3A-C2A	2.70	130.03	124.94
2	C	500	HEM	CAD-C3D-C4D	2.69	129.37	124.66
3	A	501	NCT	C4-C3-C2	-2.67	117.34	120.65
2	D	502	HEM	CMA-C3A-C4A	-2.66	124.38	128.46
3	A	501	NCT	C5-N1-C1	2.64	121.41	116.85
2	C	500	HEM	C4B-CHC-C1C	2.61	126.00	122.56
2	A	500	HEM	C4A-C3A-C2A	2.60	108.80	107.00
2	D	502	HEM	CMC-C2C-C3C	2.57	129.49	124.68
2	B	500	HEM	CMC-C2C-C3C	2.56	129.47	124.68

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	C	501	NCT	C5-N1-C1	2.45	121.09	116.85
2	D	502	HEM	C3C-C4C-NC	-2.43	106.36	110.94
3	A	501	NCT	C7-C6-C2	2.37	118.20	113.61
2	D	502	HEM	C2D-C1D-ND	-2.33	107.09	109.88
2	A	500	HEM	CHD-C1D-ND	2.32	126.95	124.43
2	D	502	HEM	O2A-CGA-CBA	2.32	121.48	114.03
2	D	502	HEM	CBA-CAA-C2A	-2.31	108.67	112.62
2	A	500	HEM	CHA-C4D-ND	2.31	127.23	124.38
2	A	500	HEM	CMB-C2B-C1B	2.28	128.51	125.04
2	D	502	HEM	C3D-C4D-ND	-2.24	107.68	110.17
3	A	501	NCT	C7-C6-N2	-2.17	96.43	102.56
2	A	500	HEM	C2D-C1D-ND	-2.13	107.33	109.88
2	C	500	HEM	C3B-C2B-C1B	2.12	108.06	106.49
2	B	500	HEM	CHB-C1B-NB	-2.09	121.80	124.38
2	A	500	HEM	C3D-C4D-ND	-2.07	107.86	110.17
2	D	502	HEM	C1D-C2D-C3D	-2.07	104.78	106.96

There are no chirality outliers.

All (13) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	D	501	NCT	C1-C2-C6-N2
2	C	500	HEM	CAA-CBA-CGA-O1A
2	A	500	HEM	CAA-CBA-CGA-O1A
2	C	500	HEM	CAD-CBD-CGD-O1D
2	C	500	HEM	CAA-CBA-CGA-O2A
3	C	501	NCT	C1-C2-C6-C7
2	A	500	HEM	CAD-CBD-CGD-O1D
2	A	500	HEM	CAA-CBA-CGA-O2A
2	C	500	HEM	CAD-CBD-CGD-O2D
2	D	502	HEM	CAA-CBA-CGA-O1A
2	A	500	HEM	CAD-CBD-CGD-O2D
2	D	502	HEM	CAA-CBA-CGA-O2A
2	B	500	HEM	CAA-CBA-CGA-O2A

There are no ring outliers.

8 monomers are involved in 42 short contacts:

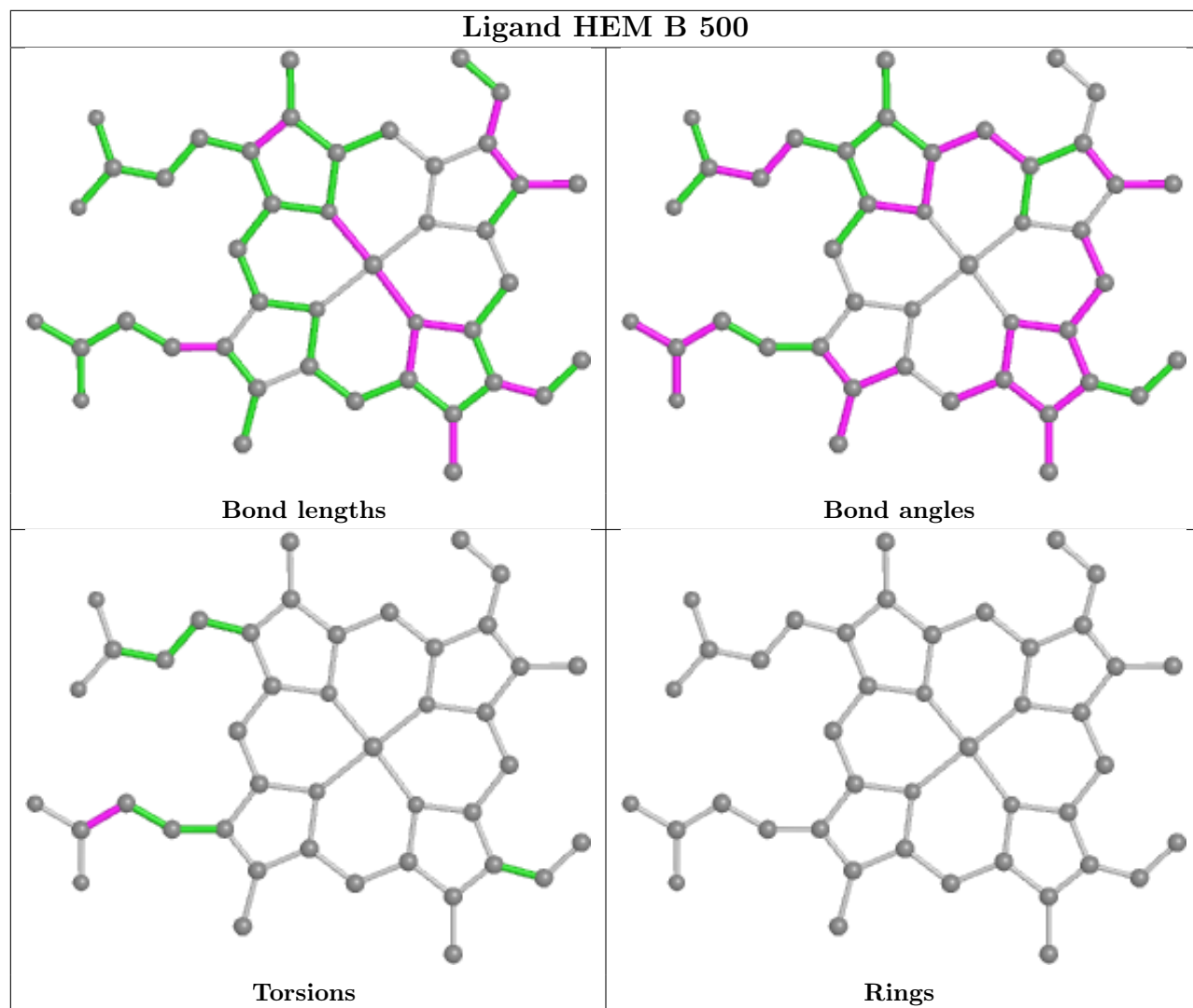
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	B	500	HEM	9	0
3	D	501	NCT	6	0

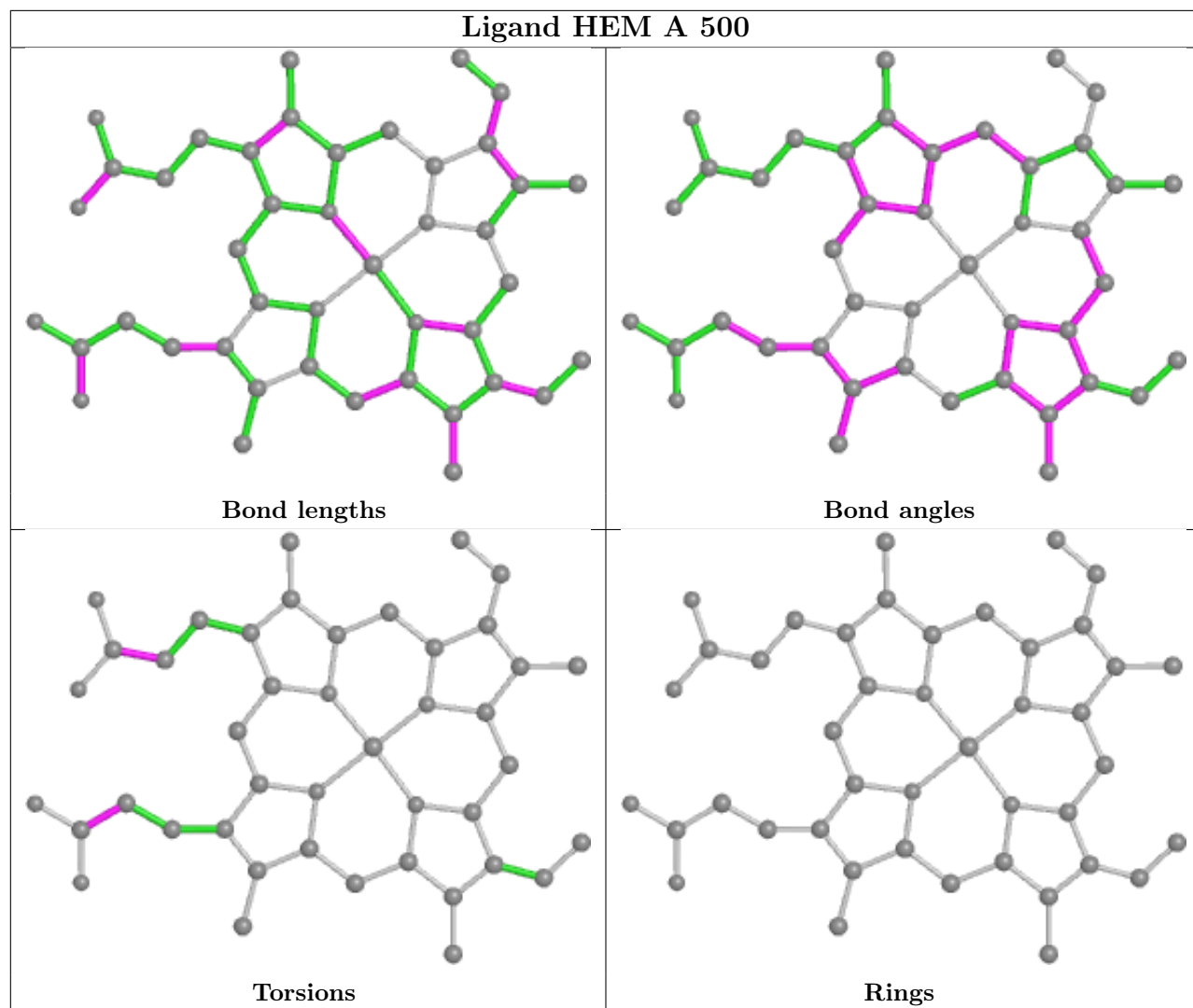
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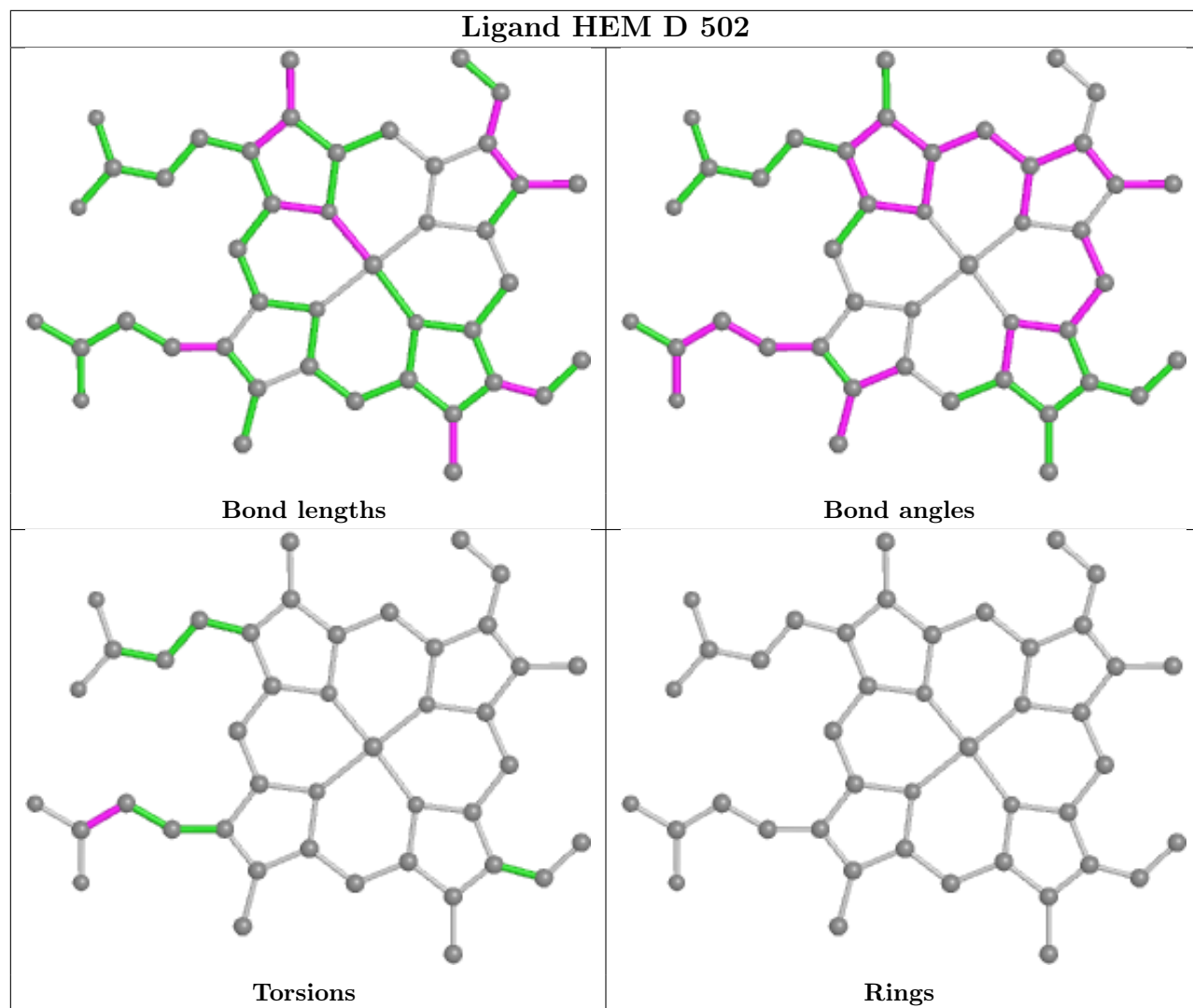
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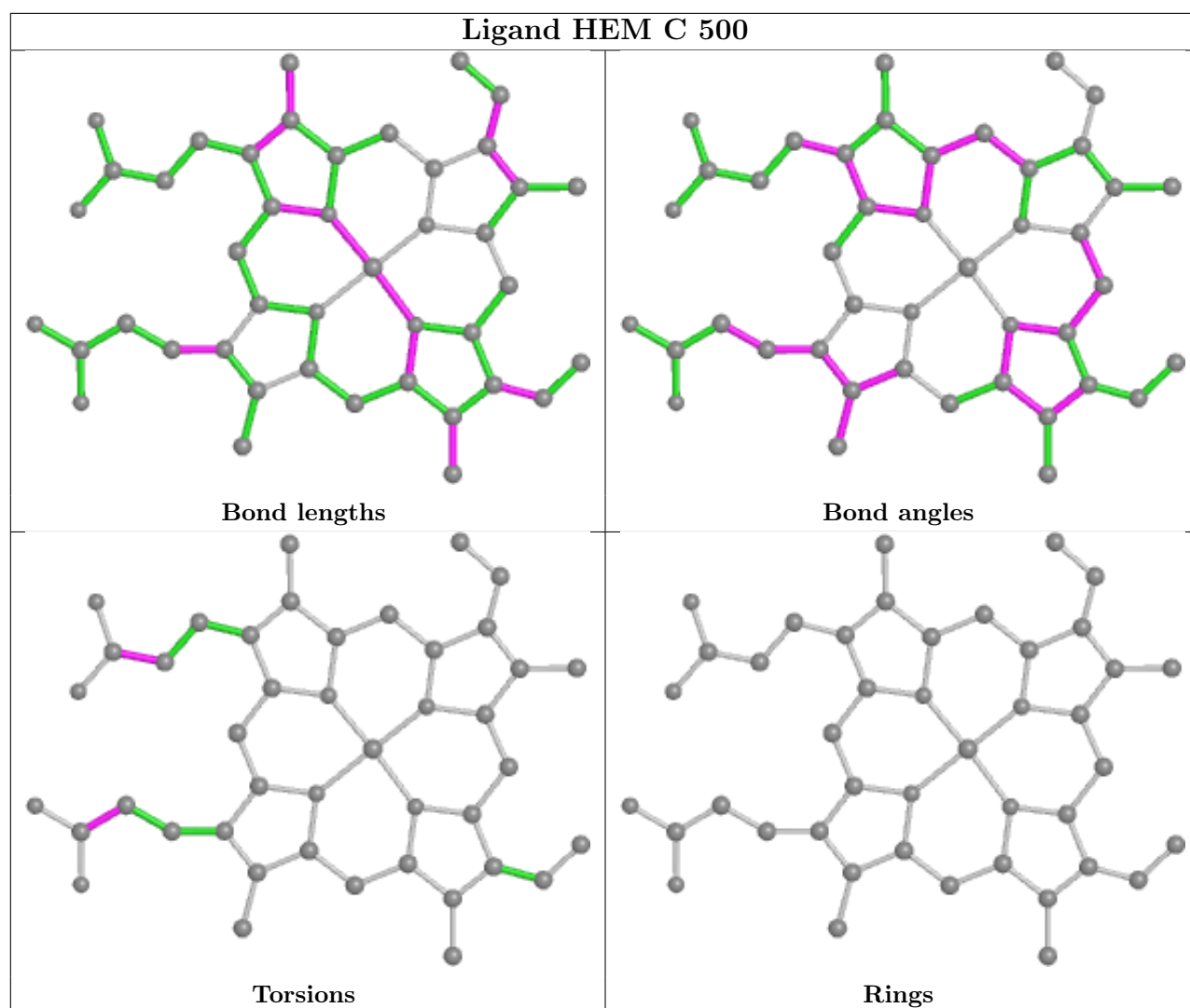
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	500	HEM	4	0
3	A	501	NCT	3	0
2	D	502	HEM	7	0
3	C	501	NCT	6	0
2	C	500	HEM	8	0
3	B	501	NCT	6	0

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.









5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

6 Fit of model and data [i](#)

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

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

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
1	A	465/476 (97%)	0.14	2 (0%) 92 95	18, 33, 54, 65	0
1	B	464/476 (97%)	0.18	6 (1%) 77 81	22, 40, 58, 70	0
1	C	464/476 (97%)	0.22	2 (0%) 92 95	22, 44, 60, 67	0
1	D	464/476 (97%)	0.30	5 (1%) 80 85	20, 41, 65, 74	0
All	All	1857/1904 (97%)	0.21	15 (0%) 86 89	18, 40, 61, 74	0

All (15) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	D	382	ASP	3.2
1	A	189	ASP	2.8
1	B	420	LYS	2.7
1	B	108	ASP	2.6
1	B	189[A]	ASP	2.4
1	B	143	ARG	2.4
1	C	364	ASP	2.3
1	D	453	PHE	2.2
1	C	43	ILE	2.1
1	B	362	PHE	2.1
1	A	143	ARG	2.1
1	D	178	VAL	2.1
1	D	494	ARG	2.0
1	B	465	SER	2.0
1	D	149	ILE	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

There are no monosaccharides in this entry.

6.4 Ligands

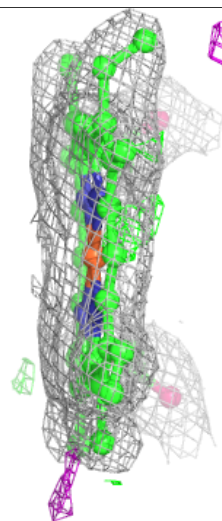
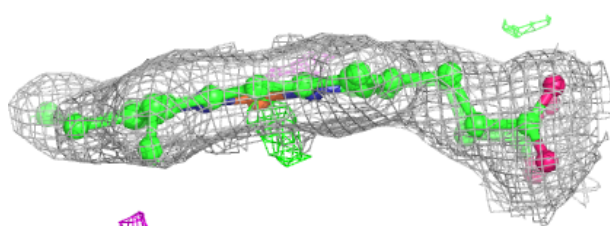
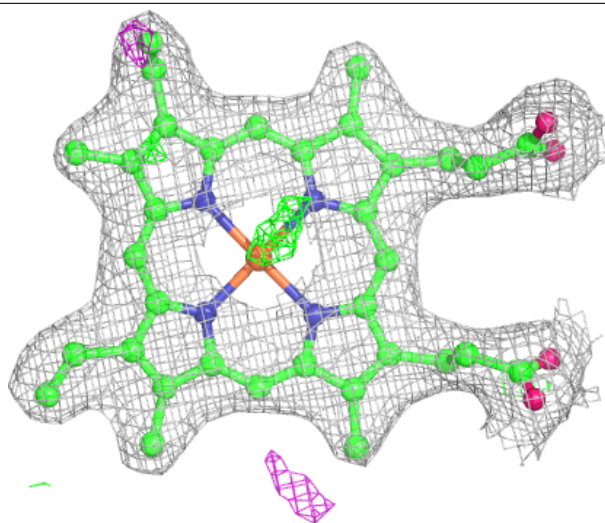
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
3	NCT	D	501	12/12	0.91	0.24	60,64,66,66	0
3	NCT	C	501	12/12	0.93	0.20	52,57,63,63	0
3	NCT	A	501	12/12	0.95	0.23	45,48,49,49	0
3	NCT	B	501	12/12	0.96	0.21	51,53,57,57	0
2	HEM	A	500	43/43	0.98	0.15	19,26,30,31	0
2	HEM	B	500	43/43	0.98	0.15	24,31,35,41	0
2	HEM	C	500	43/43	0.98	0.15	31,38,42,45	0
2	HEM	D	502	43/43	0.98	0.14	24,33,39,47	0

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

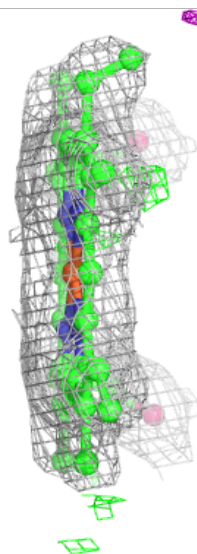
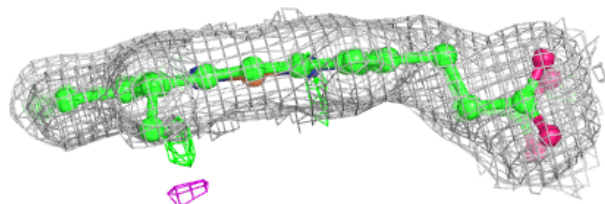
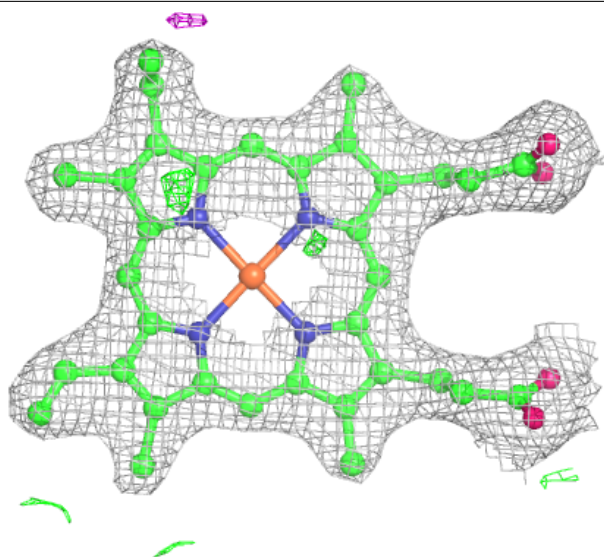
Electron density around HEM A 500:

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



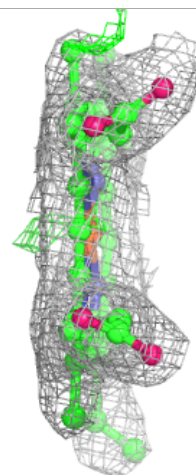
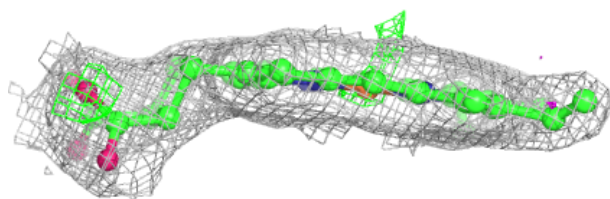
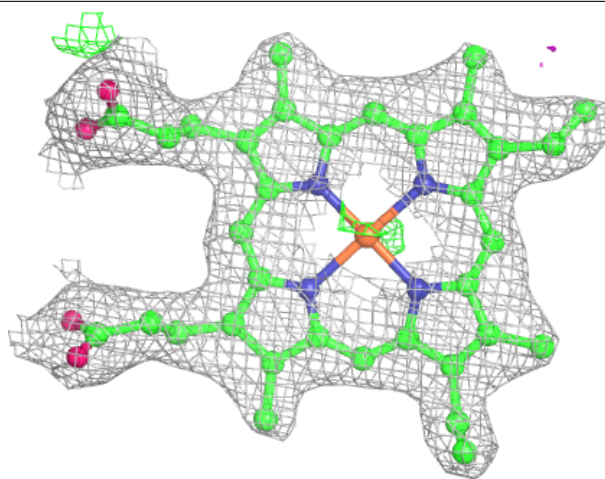
Electron density around HEM B 500:

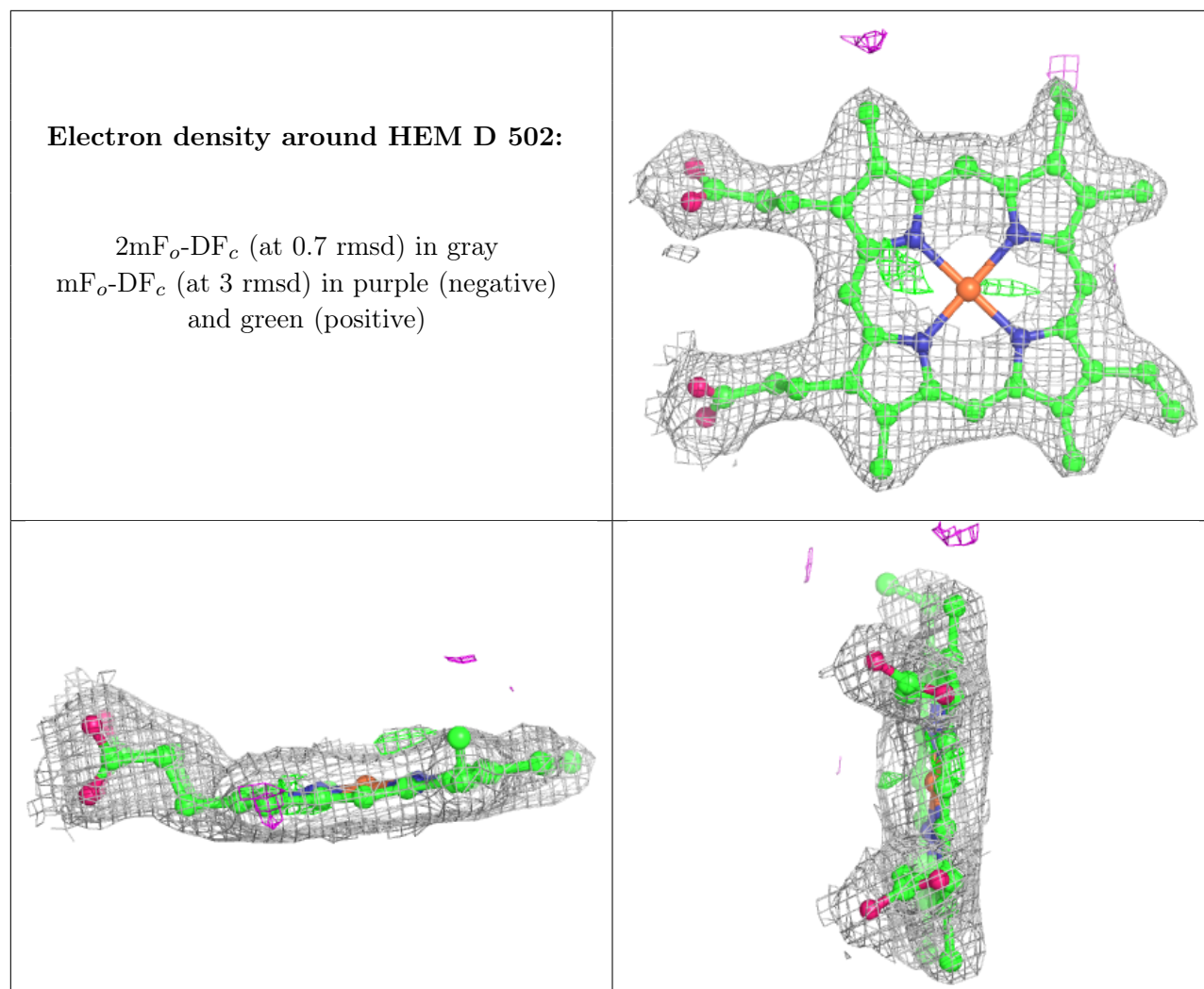
$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



Electron density around HEM C 500:

$2mF_o-DF_c$ (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.