



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 5, 2026 – 04:39 PM UTC

PDB ID : 2V0M / pdb_00002v0m
Title : Crystal structure of human P450 3A4 in complex with ketoconazole
Authors : Sjogren, T.; Ekroos, M.
Deposited on : 2007-05-15
Resolution : 2.80 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

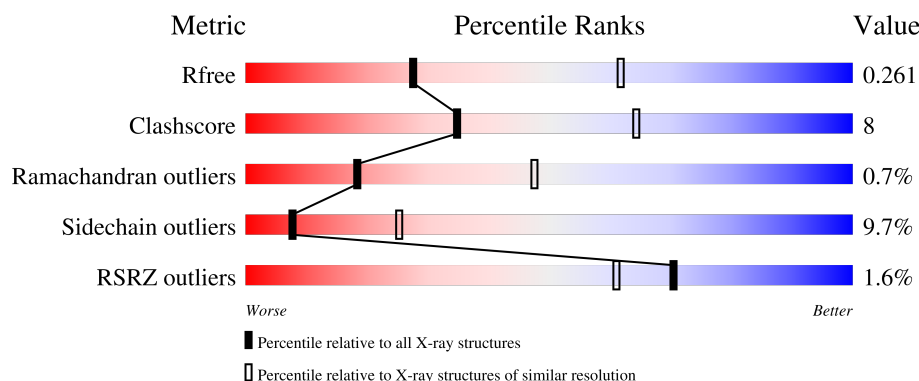
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.80 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	3866 (2.80-2.80)
Clashscore	190562	4276 (2.80-2.80)
Ramachandran outliers	187476	4196 (2.80-2.80)
Sidechain outliers	187428	4198 (2.80-2.80)
RSRZ outliers	180081	3869 (2.80-2.80)

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	485	2% 73% 17% • 6%
1	B	485	% 73% 17% • 7%
1	C	485	2% 74% 18% • •
1	D	485	% 73% 17% • 7%

2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 15068 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 3A4.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	455	Total	C	N	O	S	0	0	0
			3651	2379	596	652	24			
1	B	451	Total	C	N	O	S	0	0	0
			3623	2361	592	646	24			
1	C	465	Total	C	N	O	S	0	0	0
			3734	2425	613	672	24			
1	D	453	Total	C	N	O	S	0	0	0
			3642	2374	594	650	24			

There are 28 discrepancies between the modelled and reference sequences:

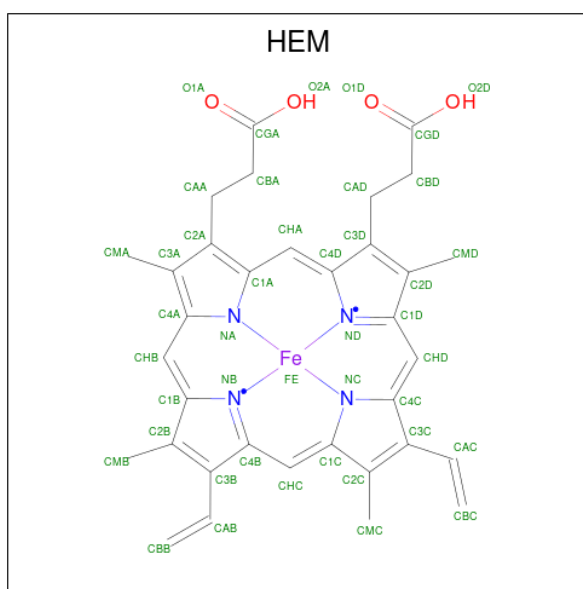
Chain	Residue	Modelled	Actual	Comment	Reference
A	23	MET	-	expression tag	UNP P08684
A	24	ALA	-	expression tag	UNP P08684
A	504	HIS	-	expression tag	UNP P08684
A	505	HIS	-	expression tag	UNP P08684
A	506	HIS	-	expression tag	UNP P08684
A	507	HIS	-	expression tag	UNP P08684
A	392	VAL	TRP	conflict	UNP P08684
B	23	MET	-	expression tag	UNP P08684
B	24	ALA	-	expression tag	UNP P08684
B	504	HIS	-	expression tag	UNP P08684
B	505	HIS	-	expression tag	UNP P08684
B	506	HIS	-	expression tag	UNP P08684
B	507	HIS	-	expression tag	UNP P08684
B	392	VAL	TRP	conflict	UNP P08684
C	23	MET	-	expression tag	UNP P08684
C	24	ALA	-	expression tag	UNP P08684
C	504	HIS	-	expression tag	UNP P08684
C	505	HIS	-	expression tag	UNP P08684
C	506	HIS	-	expression tag	UNP P08684
C	507	HIS	-	expression tag	UNP P08684
C	392	VAL	TRP	conflict	UNP P08684

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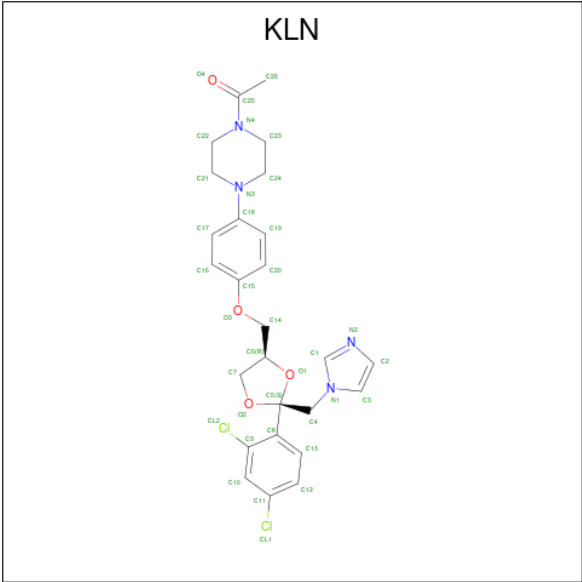
Chain	Residue	Modelled	Actual	Comment	Reference
D	23	MET	-	expression tag	UNP P08684
D	24	ALA	-	expression tag	UNP P08684
D	504	HIS	-	expression tag	UNP P08684
D	505	HIS	-	expression tag	UNP P08684
D	506	HIS	-	expression tag	UNP P08684
D	507	HIS	-	expression tag	UNP P08684
D	392	VAL	TRP	conflict	UNP P08684

- 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 1-ACETYL-4-(4-{[(2S,4R)-2-(2,4-DICHLOROPHENYL)-2-(1H-IMIDAZOL-1-YLMETHYL)-1,3-DIOXOLAN-4-YL]METHOXY}PHENYL)PIPERAZINE (CCD ID: KLN) (formula: $C_{26}H_{28}Cl_2N_4O_4$).

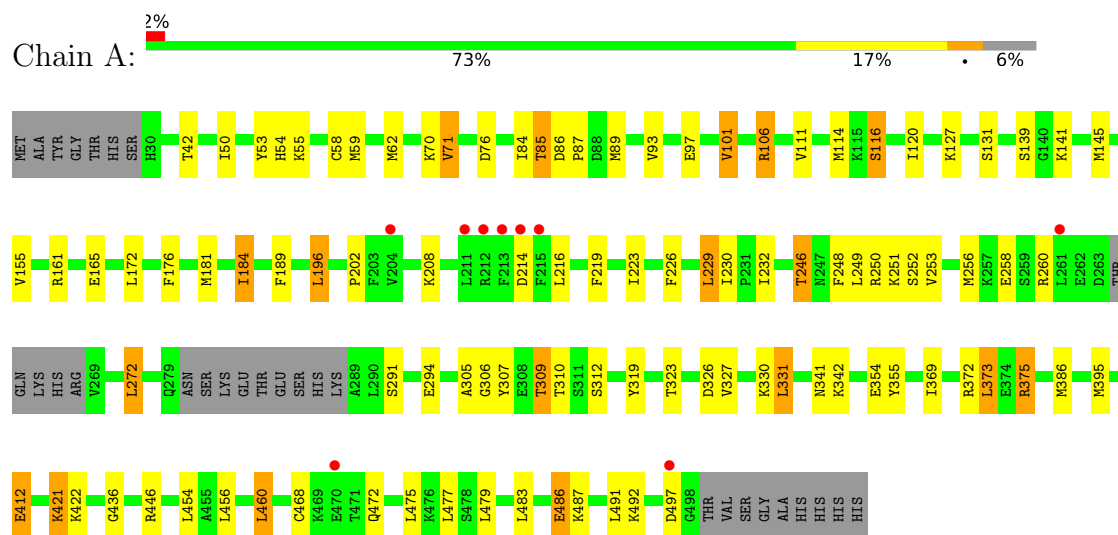


Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	1	Total C Cl N O 36 26 2 4 4	0	0
3	A	1	Total C Cl N O 36 26 2 4 4	0	0
3	B	1	Total C Cl N O 36 26 2 4 4	0	0
3	B	1	Total C N O 22 16 2 4	0	0
3	C	1	Total C Cl N O 36 26 2 4 4	0	0
3	C	1	Total C N O 22 16 2 4	0	0
3	D	1	Total C Cl N O 36 26 2 4 4	0	0
3	D	1	Total C N O 22 16 2 4	0	0

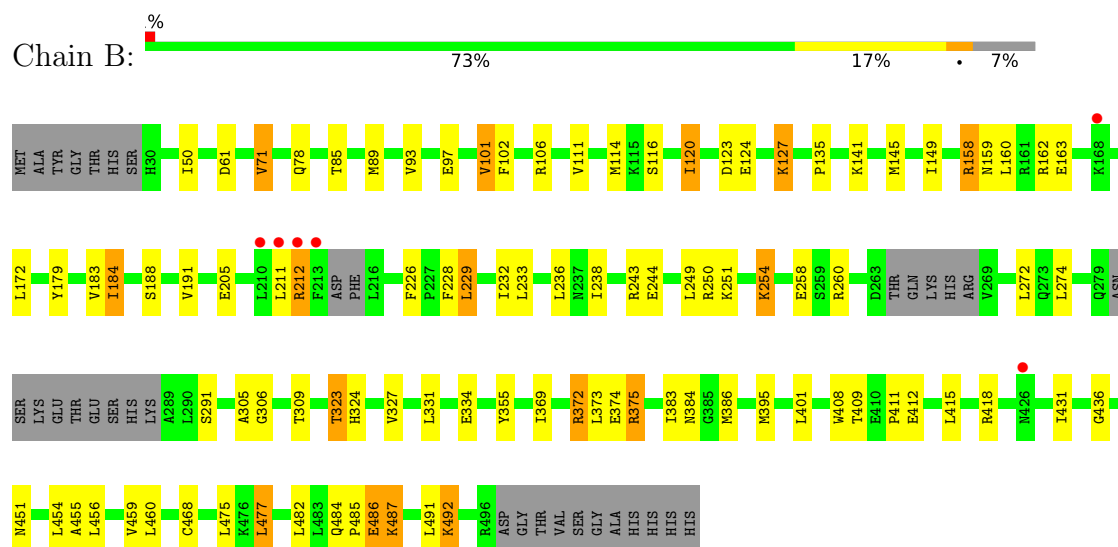
3 Residue-property plots [i](#)

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.

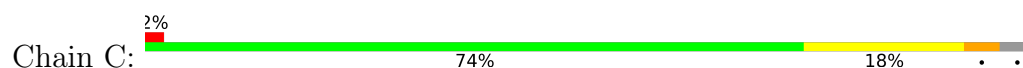
• Molecule 1: CYTOCHROME P450 3A4

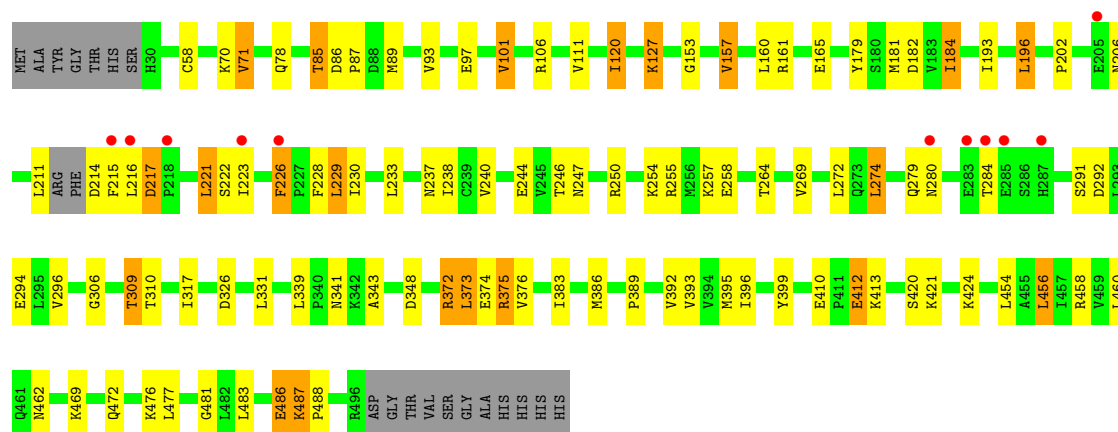


• Molecule 1: CYTOCHROME P450 3A4

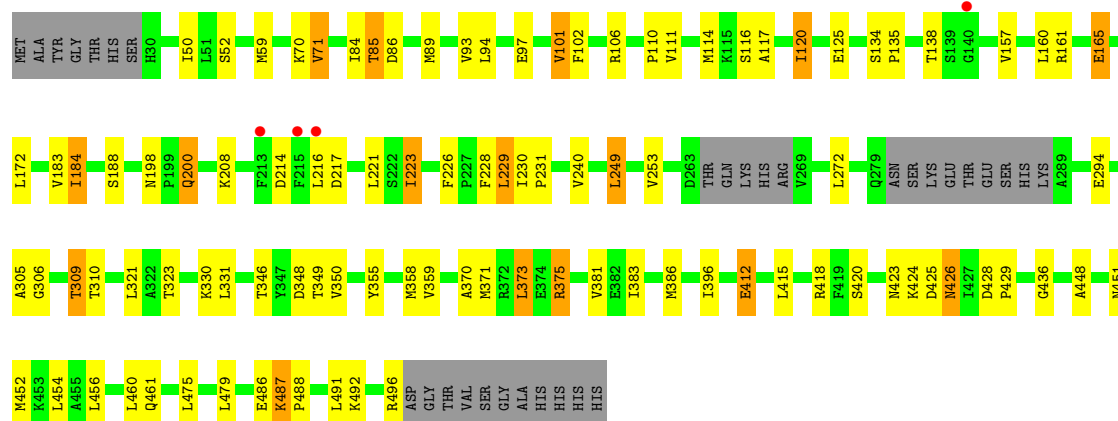
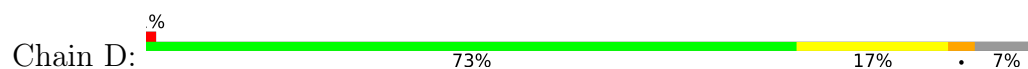


• Molecule 1: CYTOCHROME P450 3A4





● Molecule 1: CYTOCHROME P450 3A4



4 Data and refinement statistics

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α , β , γ	228.94Å 66.36Å 146.42Å 90.00° 102.80° 90.00°	Depositor
Resolution (Å)	30.00 – 2.80 30.00 – 2.80	Depositor EDS
% Data completeness (in resolution range)	97.1 (30.00-2.80) 97.0 (30.00-2.80)	Depositor EDS
R_{merge}	0.10	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	5.64 (at 2.80Å)	Xtriage
Refinement program	REFMAC 5.2	Depositor
R, R_{free}	0.218 , 0.271 0.210 , 0.261	Depositor DCC
R_{free} test set	2654 reflections (4.98%)	wwPDB-VP
Wilson B-factor (Å ²)	37.1	Xtriage
Anisotropy	0.147	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.34 , 27.6	EDS
L-test for twinning ²	$\langle L \rangle = 0.48$, $\langle L^2 \rangle = 0.31$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.91	EDS
Total number of atoms	15068	wwPDB-VP
Average B, all atoms (Å ²)	31.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.66% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

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

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: KLN, HEM

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 5$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	$\# Z > 5$	RMSZ	$\# Z > 5$
1	A	0.51	1/3739 (0.0%)	0.87	0/5059
1	B	0.49	0/3709	0.87	1/5017 (0.0%)
1	C	0.51	0/3823	0.89	0/5172
1	D	0.51	0/3730	0.86	0/5047
All	All	0.51	1/15001 (0.0%)	0.87	1/20295 (0.0%)

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	230	ILE	CA-CB	6.84	1.57	1.54

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	123	ASP	N-CA-C	5.42	116.55	108.31

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	3651	0	3727	50	0
1	B	3623	0	3708	48	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	C	3734	0	3812	63	0
1	D	3642	0	3722	56	0
2	A	43	0	30	6	0
2	B	43	0	30	3	0
2	C	43	0	30	5	0
2	D	43	0	30	5	0
3	A	72	0	56	5	0
3	B	58	0	48	3	0
3	C	58	0	48	9	0
3	D	58	0	48	2	0
All	All	15068	0	15289	228	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 8.

All (228) 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:C:1499:KLN:C7	3:C:1499:KLN:C6	1.83	1.54
3:C:1499:KLN:C1	3:C:1499:KLN:O2	1.76	1.33
3:C:1499:KLN:C1	3:C:1499:KLN:O1	1.93	1.16
3:A:1501:KLN:CL2	3:A:1501:KLN:H6	1.92	1.05
1:B:71:VAL:HG21	1:B:386:MET:HE1	1.32	1.05
1:D:71:VAL:HG21	1:D:386:MET:HE1	1.41	1.03
1:B:305:ALA:O	1:B:309:THR:HG22	1.67	0.95
1:D:309:THR:HG21	2:D:1497:HEM:CHC	2.04	0.88
3:C:1499:KLN:C7	3:C:1499:KLN:C1	2.52	0.86
1:D:70:LYS:O	1:D:85:THR:HB	1.75	0.86
1:B:184:ILE:HG13	1:B:306:GLY:HA3	1.58	0.85
1:C:309:THR:HG21	2:C:1497:HEM:CHC	2.08	0.83
3:C:1499:KLN:C6	3:C:1499:KLN:C1	2.58	0.82
1:C:71:VAL:HG21	1:C:386:MET:HE1	1.61	0.81
1:D:309:THR:HG23	2:D:1497:HEM:HAB	1.63	0.81
1:C:477:LEU:HD23	1:C:483:LEU:HD11	1.62	0.80
3:A:1501:KLN:CL2	3:A:1501:KLN:C6	2.67	0.80
1:C:246:THR:O	1:C:250:ARG:HB2	1.85	0.76
1:D:161:ARG:O	1:D:165:GLU:HG2	1.86	0.76
1:D:309:THR:HG21	2:D:1497:HEM:HHC	1.69	0.75
1:C:309:THR:HG21	2:C:1497:HEM:HHC	1.68	0.74
1:D:200:GLN:O	1:D:200:GLN:HG3	1.87	0.74
1:A:477:LEU:HD23	1:A:483:LEU:HD11	1.68	0.74

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:309:THR:HG23	2:C:1497:HEM:HAB	1.71	0.73
1:B:61:ASP:OD1	1:B:372:ARG:HD2	1.89	0.72
1:A:71:VAL:HG21	1:A:386:MET:HE1	1.72	0.72
1:C:97:GLU:HB3	1:C:101:VAL:HG13	1.73	0.71
1:D:111:VAL:HG22	1:D:114:MET:HB2	1.71	0.70
1:A:309:THR:HG21	2:A:1499:HEM:CHC	2.22	0.69
2:A:1499:HEM:HBC2	2:A:1499:HEM:HMC2	1.72	0.69
1:B:375:ARG:NH1	2:B:1497:HEM:O1A	2.24	0.68
1:C:226:PHE:HD1	1:C:229:LEU:HD22	1.60	0.67
1:A:202:PRO:HB2	1:A:248:PHE:CZ	2.30	0.67
1:B:158:ARG:HH12	1:B:162:ARG:HH21	1.41	0.66
1:C:70:LYS:O	1:C:85:THR:HB	1.95	0.66
1:D:184:ILE:HG13	1:D:306:GLY:HA3	1.78	0.65
1:D:71:VAL:HG21	1:D:386:MET:CE	2.22	0.65
1:B:183:VAL:HG21	1:B:451:ASN:HD21	1.62	0.65
1:B:327:VAL:HG13	1:B:355:TYR:OH	1.97	0.65
1:C:127:LYS:HE3	1:C:127:LYS:O	1.97	0.64
1:D:373:LEU:HD21	1:D:436:GLY:HA2	1.80	0.63
1:A:305:ALA:O	1:A:309:THR:HG22	1.98	0.63
1:A:375:ARG:NH1	2:A:1499:HEM:O1A	2.31	0.63
1:B:372:ARG:HG2	1:B:395:MET:SD	2.39	0.63
1:D:461:GLN:HA	1:D:496:ARG:HH21	1.64	0.63
1:C:317:ILE:HG21	1:C:456:LEU:HD21	1.81	0.62
1:A:181:MET:HE2	1:A:307:TYR:HB2	1.80	0.62
1:A:375:ARG:HH12	2:A:1499:HEM:CGA	2.13	0.62
1:D:230:ILE:HB	1:D:231:PRO:HD3	1.82	0.62
1:A:54:HIS:CD2	1:A:55:LYS:HG2	2.34	0.62
1:C:226:PHE:CD1	1:C:229:LEU:HD22	2.34	0.61
1:A:246:THR:O	1:A:250:ARG:HB2	2.01	0.60
1:D:110:PRO:HD3	1:D:223:ILE:HD11	1.82	0.60
1:D:370:ALA:O	3:D:1498:KLN:H222	2.00	0.60
1:C:89:MET:HG3	1:C:383:ILE:HD12	1.84	0.59
1:D:358:MET:HE2	1:D:420:SER:HA	1.84	0.59
1:D:172:LEU:HD11	1:D:491:LEU:HD12	1.85	0.59
1:D:375:ARG:NH1	2:D:1497:HEM:O2A	2.36	0.59
1:D:420:SER:O	1:D:424:LYS:HB2	2.03	0.58
1:B:408:TRP:HB2	1:B:411:PRO:HB3	1.85	0.58
2:A:1499:HEM:HBC2	2:A:1499:HEM:CMC	2.34	0.58
1:B:482:LEU:HD11	3:B:1498:KLN:CL2	2.40	0.57
1:C:375:ARG:NH1	2:C:1497:HEM:O2A	2.37	0.57
1:A:229:LEU:HD23	1:B:236:LEU:HD21	1.85	0.57

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:214:ASP:HB2	1:C:217:ASP:HB2	1.86	0.57
1:D:375:ARG:HH12	2:D:1497:HEM:CGA	2.18	0.57
1:B:111:VAL:HG22	1:B:114:MET:HB2	1.87	0.57
1:D:84:ILE:HB	1:D:89:MET:HE3	1.87	0.57
1:A:373:LEU:HD21	1:A:436:GLY:HA2	1.86	0.56
1:D:309:THR:HG22	1:D:310:THR:N	2.20	0.56
1:C:226:PHE:HB2	1:C:229:LEU:HB2	1.86	0.56
1:A:330:LYS:HE3	1:A:355:TYR:CE2	2.41	0.56
1:C:153:GLY:O	1:C:157:VAL:HG13	2.04	0.56
3:C:1499:KLN:C6	3:C:1499:KLN:O2	2.53	0.56
1:C:216:LEU:O	1:C:217:ASP:C	2.47	0.56
1:A:114:MET:O	1:A:120:ILE:HD11	2.06	0.56
1:C:372:ARG:HG2	1:C:395:MET:SD	2.47	0.55
1:D:198:ASN:ND2	1:D:200:GLN:H	2.05	0.55
1:D:86:ASP:HB3	1:D:89:MET:HE2	1.87	0.55
1:D:249:LEU:O	1:D:253:VAL:HG23	2.07	0.55
1:A:309:THR:HG21	2:A:1499:HEM:HHC	1.89	0.55
1:C:373:LEU:HB2	1:C:396:ILE:HB	1.89	0.55
1:B:309:THR:HG21	2:B:1497:HEM:CHC	2.36	0.54
1:D:97:GLU:HB3	1:D:101:VAL:HG13	1.89	0.54
1:B:106:ARG:HD3	1:B:374:GLU:OE2	2.08	0.54
1:B:484:GLN:HG2	1:B:485:PRO:HD2	1.88	0.53
1:C:472:GLN:NE2	1:C:476:LYS:H	2.06	0.53
1:D:184:ILE:O	1:D:188:SER:HB2	2.08	0.53
1:C:269:VAL:CG1	1:C:274:LEU:HD13	2.38	0.53
1:A:155:VAL:HB	1:A:196:LEU:HD23	1.90	0.53
1:A:226:PHE:CE2	1:C:226:PHE:CE2	2.96	0.53
1:B:232:ILE:HG12	1:C:228:PHE:CD1	2.44	0.53
1:A:216:LEU:HA	3:A:1501:KLN:CL1	2.46	0.52
1:B:102:PHE:HB3	1:B:375:ARG:HG2	1.91	0.52
1:B:97:GLU:HB3	1:B:101:VAL:HG13	1.90	0.52
1:C:120:ILE:HD13	1:C:120:ILE:O	2.09	0.52
1:D:371:MET:HE3	3:D:1498:KLN:H263	1.91	0.52
1:D:330:LYS:HE3	1:D:355:TYR:CE2	2.45	0.52
1:D:309:THR:CG2	1:D:310:THR:N	2.72	0.52
1:B:226:PHE:HB3	1:B:228:PHE:CE2	2.45	0.51
1:A:76:ASP:OD2	1:A:106:ARG:NH1	2.44	0.51
1:B:172:LEU:HD11	1:B:491:LEU:HD12	1.92	0.51
1:D:423:ASN:O	1:D:426:ASN:ND2	2.44	0.51
1:D:226:PHE:HB3	1:D:228:PHE:CE2	2.46	0.51
1:D:71:VAL:CG2	1:D:386:MET:HE1	2.29	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:415:LEU:O	1:B:418:ARG:HG3	2.11	0.50
1:B:468:CYS:HB3	1:B:492:LYS:HD3	1.94	0.50
3:B:1498:KLN:CL2	3:B:1498:KLN:H4C2	2.48	0.50
1:C:226:PHE:HB3	1:C:228:PHE:CZ	2.47	0.49
1:C:486:GLU:O	1:C:487:LYS:HB2	2.12	0.49
1:B:135:PRO:HB2	1:B:274:LEU:HD21	1.94	0.49
1:B:323:THR:HG23	1:B:324:HIS:ND1	2.27	0.49
1:C:184:ILE:HG13	1:C:306:GLY:HA3	1.95	0.49
1:B:114:MET:O	1:B:120:ILE:HD11	2.13	0.49
1:C:458:ARG:O	1:C:462:ASN:ND2	2.43	0.49
1:C:291:SER:HB3	1:C:294:GLU:HG3	1.94	0.48
3:A:1500:KLN:H20	3:A:1500:KLN:H141	1.56	0.48
1:C:375:ARG:HH12	2:C:1497:HEM:CGA	2.26	0.48
1:C:222:SER:HB3	1:C:226:PHE:CE1	2.49	0.48
1:A:70:LYS:O	1:A:85:THR:HB	2.14	0.48
1:C:410:GLU:OE2	1:C:413:LYS:NZ	2.44	0.48
1:B:89:MET:HG3	1:B:383:ILE:HD12	1.96	0.48
1:C:412:GLU:CD	1:C:412:GLU:H	2.21	0.48
1:A:319:TYR:O	1:A:323:THR:HG22	2.12	0.47
1:A:412:GLU:CD	1:A:412:GLU:H	2.22	0.47
1:D:321:LEU:HD21	1:D:359:VAL:HG11	1.96	0.47
1:B:373:LEU:HD21	1:B:436:GLY:HA2	1.96	0.47
1:A:139:SER:H	1:A:446:ARG:HH22	1.62	0.47
1:C:202:PRO:O	1:C:206:ASN:ND2	2.45	0.47
1:C:181:MET:HG3	1:C:193:ILE:HD11	1.97	0.47
1:D:135:PRO:HA	1:D:138:THR:HG23	1.96	0.47
1:D:198:ASN:C	1:D:198:ASN:HD22	2.23	0.47
1:B:375:ARG:HH12	2:B:1497:HEM:CGA	2.28	0.47
1:A:354:GLU:OE1	1:A:421:LYS:HD3	2.15	0.47
1:A:50:ILE:O	1:A:53:TYR:HB2	2.16	0.46
1:A:327:VAL:HG13	1:A:355:TYR:OH	2.15	0.46
1:C:161:ARG:O	1:C:165:GLU:HG2	2.15	0.46
1:C:339:LEU:HB3	1:C:343:ALA:HB3	1.98	0.46
3:C:1498:KLN:H20	3:C:1498:KLN:H141	1.46	0.46
1:D:50:ILE:HD12	1:D:221:LEU:CD1	2.45	0.46
1:D:486:GLU:O	1:D:487:LYS:HB2	2.14	0.46
1:A:189:PHE:HD2	1:A:272:LEU:HG	1.80	0.46
1:C:182:ASP:OD1	1:C:196:LEU:HB2	2.16	0.46
1:C:309:THR:HG22	1:C:310:THR:N	2.30	0.46
1:A:216:LEU:N	3:A:1501:KLN:CL1	2.86	0.46
1:B:401:LEU:HD22	1:B:431:ILE:HD12	1.98	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:215:PHE:CG	1:C:216:LEU:N	2.84	0.45
1:A:260:ARG:HG3	1:A:272:LEU:HD13	1.98	0.45
1:D:116:SER:HB3	1:D:294:GLU:HG2	1.98	0.45
1:D:214:ASP:HB2	1:D:217:ASP:HB2	1.98	0.45
1:D:412:GLU:CD	1:D:412:GLU:H	2.24	0.45
1:A:184:ILE:HG13	1:A:306:GLY:HA3	1.99	0.45
1:B:468:CYS:CB	1:B:492:LYS:HD3	2.47	0.45
1:B:179:TYR:CE1	1:B:455:ALA:HB2	2.52	0.45
1:B:184:ILE:HD13	1:B:188:SER:OG	2.17	0.45
1:D:346:THR:O	1:D:350:VAL:HG23	2.16	0.45
1:D:183:VAL:HG21	1:D:451:ASN:HD21	1.82	0.44
1:A:116:SER:HB3	1:A:294:GLU:HG2	1.99	0.44
1:C:106:ARG:NH2	1:C:374:GLU:OE1	2.50	0.44
1:A:372:ARG:HG2	1:A:395:MET:SD	2.58	0.44
1:B:486:GLU:O	1:B:487:LYS:HB2	2.18	0.44
1:D:198:ASN:HD22	1:D:200:GLN:H	1.66	0.44
1:A:161:ARG:O	1:A:165:GLU:HG2	2.17	0.44
1:D:102:PHE:HB3	1:D:375:ARG:HG2	1.99	0.44
1:B:211:LEU:O	1:B:212:ARG:HB2	2.17	0.43
1:C:389:PRO:HG2	1:C:392:VAL:CG2	2.48	0.43
1:C:309:THR:CG2	1:C:310:THR:N	2.80	0.43
1:C:481:GLY:HA3	3:C:1499:KLN:H20	2.01	0.43
1:C:86:ASP:HA	1:C:87:PRO:HD2	1.84	0.43
1:C:97:GLU:HB3	1:C:101:VAL:CG1	2.43	0.43
1:D:226:PHE:HB2	1:D:229:LEU:HD22	2.00	0.43
1:D:448:ALA:O	1:D:452:MET:HG3	2.19	0.43
1:A:219:PHE:CE2	1:B:238:ILE:HD11	2.54	0.43
3:C:1499:KLN:C7	3:C:1499:KLN:C14	2.85	0.43
1:D:117:ALA:HB3	1:D:120:ILE:CG2	2.49	0.43
1:B:141:LYS:O	1:B:145:MET:HG3	2.18	0.43
1:B:212:ARG:HA	1:B:212:ARG:HD3	1.81	0.43
1:C:184:ILE:HD13	1:C:184:ILE:O	2.19	0.43
1:A:331:LEU:HD13	1:A:460:LEU:HD23	2.01	0.42
1:B:97:GLU:HB3	1:B:101:VAL:CG1	2.50	0.42
1:B:159:ASN:O	1:B:163:GLU:HG2	2.20	0.42
1:B:250:ARG:O	1:B:254:LYS:HB2	2.19	0.42
1:C:179:TYR:HA	1:C:196:LEU:HD22	2.02	0.42
1:C:389:PRO:HG2	1:C:392:VAL:HG21	2.00	0.42
1:A:252:SER:O	1:A:256:MET:HG3	2.18	0.42
1:A:309:THR:CG2	1:A:310:THR:N	2.83	0.42
1:A:369:ILE:HA	1:A:483:LEU:CB	2.50	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:369:ILE:HA	1:A:483:LEU:HB2	2.02	0.42
1:A:468:CYS:HB3	1:A:492:LYS:HB2	2.00	0.42
1:C:257:LYS:NZ	1:C:292:ASP:OD2	2.53	0.42
1:D:415:LEU:O	1:D:418:ARG:HG3	2.19	0.42
1:B:127:LYS:O	1:B:127:LYS:HE3	2.19	0.42
1:C:58:CYS:HB3	1:C:399:TYR:CD1	2.55	0.42
1:C:383:ILE:O	1:C:383:ILE:HG13	2.20	0.42
1:A:58:CYS:O	1:A:62:MET:HG2	2.19	0.41
1:C:487:LYS:HA	1:C:488:PRO:HD2	1.80	0.41
1:A:54:HIS:HD2	1:A:55:LYS:HG2	1.83	0.41
1:C:223:ILE:HG23	1:C:230:ILE:HD11	2.01	0.41
1:C:376:VAL:HG22	1:C:393:VAL:HG22	2.00	0.41
1:A:84:ILE:HB	1:A:89:MET:HE3	2.02	0.41
1:B:226:PHE:HB2	1:B:229:LEU:HD22	2.03	0.41
1:C:216:LEU:HA	1:C:221:LEU:HG	2.01	0.41
1:D:183:VAL:HG11	1:D:451:ASN:ND2	2.35	0.41
1:D:487:LYS:HA	1:D:488:PRO:HD2	1.86	0.41
1:C:483:LEU:HD12	1:C:483:LEU:HA	1.89	0.41
1:A:141:LYS:O	1:A:145:MET:HG3	2.21	0.41
1:A:472:GLN:HE22	1:A:486:GLU:HG2	1.85	0.41
1:A:253:VAL:HA	1:A:256:MET:HE2	2.03	0.41
1:C:226:PHE:HB3	1:C:228:PHE:CE1	2.56	0.41
1:C:233:LEU:HB3	1:C:238:ILE:HB	2.03	0.41
1:D:165:GLU:HG2	1:D:165:GLU:H	1.76	0.41
1:D:428:ASP:HA	1:D:429:PRO:HD2	1.95	0.41
1:A:86:ASP:HA	1:A:87:PRO:HD3	1.91	0.41
1:A:172:LEU:HD11	1:A:491:LEU:HD12	2.03	0.40
1:A:172:LEU:HD22	1:A:176:PHE:CE1	2.56	0.40
1:B:149:ILE:HG21	1:B:454:LEU:HD23	2.02	0.40
1:B:327:VAL:HG13	1:B:355:TYR:HH	1.83	0.40
1:C:250:ARG:HG3	1:C:296:VAL:HG11	2.02	0.40
1:D:94:LEU:HD22	1:D:375:ARG:NH2	2.36	0.40
1:D:373:LEU:HB2	1:D:396:ILE:HB	2.02	0.40
1:B:477:LEU:HA	1:B:485:PRO:HA	2.03	0.40
3:B:1498:KLN:H20	3:B:1498:KLN:H141	1.47	0.40
1:C:420:SER:O	1:C:424:LYS:HB2	2.21	0.40
1:D:305:ALA:O	1:D:309:THR:HB	2.21	0.40
1:A:97:GLU:HB3	1:A:101:VAL:HG13	2.03	0.40
1:B:228:PHE:CE1	1:B:229:LEU:HD13	2.56	0.40
1:B:233:LEU:HB3	1:B:238:ILE:HB	2.04	0.40
1:C:269:VAL:HG12	1:C:274:LEU:HD13	2.04	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	449/485 (93%)	421 (94%)	25 (6%)	3 (1%)	18	47
1	B	443/485 (91%)	419 (95%)	22 (5%)	2 (0%)	24	55
1	C	461/485 (95%)	431 (94%)	24 (5%)	6 (1%)	9	31
1	D	447/485 (92%)	432 (97%)	14 (3%)	1 (0%)	43	72
All	All	1800/1940 (93%)	1703 (95%)	85 (5%)	12 (1%)	18	47

All (12) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	497	ASP
1	C	341	ASN
1	A	487	LYS
1	B	212	ARG
1	C	279	GLN
1	C	217	ASP
1	C	487	LYS
1	D	487	LYS
1	B	487	LYS
1	C	280	ASN
1	C	284	THR
1	A	341	ASN

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	413/441 (94%)	373 (90%)	40 (10%)	8	25
1	B	411/441 (93%)	370 (90%)	41 (10%)	7	24
1	C	424/441 (96%)	384 (91%)	40 (9%)	8	27
1	D	413/441 (94%)	373 (90%)	40 (10%)	8	25
All	All	1661/1764 (94%)	1500 (90%)	161 (10%)	8	25

All (161) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	42	THR
1	A	59	MET
1	A	71	VAL
1	A	85	THR
1	A	93	VAL
1	A	101	VAL
1	A	106	ARG
1	A	111	VAL
1	A	116	SER
1	A	127	LYS
1	A	131	SER
1	A	184	ILE
1	A	196	LEU
1	A	208	LYS
1	A	214	ASP
1	A	223	ILE
1	A	229	LEU
1	A	232	ILE
1	A	246	THR
1	A	249	LEU
1	A	251	LYS
1	A	258	GLU
1	A	272	LEU
1	A	291	SER
1	A	309	THR
1	A	312	SER
1	A	326	ASP
1	A	331	LEU
1	A	342	LYS
1	A	373	LEU
1	A	375	ARG

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Mol	Chain	Res	Type
1	A	412	GLU
1	A	421	LYS
1	A	422	LYS
1	A	454	LEU
1	A	456	LEU
1	A	460	LEU
1	A	475	LEU
1	A	479	LEU
1	A	486	GLU
1	B	50	ILE
1	B	71	VAL
1	B	78	GLN
1	B	85	THR
1	B	93	VAL
1	B	101	VAL
1	B	116	SER
1	B	120	ILE
1	B	124	GLU
1	B	127	LYS
1	B	158	ARG
1	B	160	LEU
1	B	184	ILE
1	B	191	VAL
1	B	205	GLU
1	B	229	LEU
1	B	243	ARG
1	B	244	GLU
1	B	249	LEU
1	B	251	LYS
1	B	254	LYS
1	B	258	GLU
1	B	260	ARG
1	B	272	LEU
1	B	291	SER
1	B	323	THR
1	B	331	LEU
1	B	334	GLU
1	B	369	ILE
1	B	372	ARG
1	B	375	ARG
1	B	384	ASN
1	B	409	THR

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Mol	Chain	Res	Type
1	B	412	GLU
1	B	456	LEU
1	B	459	VAL
1	B	460	LEU
1	B	475	LEU
1	B	477	LEU
1	B	486	GLU
1	B	492	LYS
1	C	71	VAL
1	C	78	GLN
1	C	85	THR
1	C	93	VAL
1	C	101	VAL
1	C	111	VAL
1	C	120	ILE
1	C	127	LYS
1	C	157	VAL
1	C	160	LEU
1	C	184	ILE
1	C	196	LEU
1	C	211	LEU
1	C	221	LEU
1	C	226	PHE
1	C	229	LEU
1	C	237	ASN
1	C	240	VAL
1	C	244	GLU
1	C	247	ASN
1	C	254	LYS
1	C	255	ARG
1	C	258	GLU
1	C	264	THR
1	C	272	LEU
1	C	274	LEU
1	C	309	THR
1	C	326	ASP
1	C	331	LEU
1	C	348	ASP
1	C	372	ARG
1	C	373	LEU
1	C	375	ARG
1	C	412	GLU

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Mol	Chain	Res	Type
1	C	421	LYS
1	C	454	LEU
1	C	456	LEU
1	C	460	LEU
1	C	469	LYS
1	C	486	GLU
1	D	52	SER
1	D	59	MET
1	D	71	VAL
1	D	85	THR
1	D	93	VAL
1	D	101	VAL
1	D	106	ARG
1	D	120	ILE
1	D	125	GLU
1	D	134	SER
1	D	157	VAL
1	D	160	LEU
1	D	165	GLU
1	D	184	ILE
1	D	200	GLN
1	D	208	LYS
1	D	216	LEU
1	D	223	ILE
1	D	229	LEU
1	D	240	VAL
1	D	249	LEU
1	D	272	LEU
1	D	309	THR
1	D	323	THR
1	D	331	LEU
1	D	348	ASP
1	D	349	THR
1	D	373	LEU
1	D	375	ARG
1	D	381	VAL
1	D	383	ILE
1	D	412	GLU
1	D	425	ASP
1	D	426	ASN
1	D	454	LEU
1	D	456	LEU

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Mol	Chain	Res	Type
1	D	460	LEU
1	D	475	LEU
1	D	479	LEU
1	D	492	LYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (24) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	78	GLN
1	A	329	GLN
1	A	352	GLN
1	A	426	ASN
1	B	65	HIS
1	B	273	GLN
1	B	279	GLN
1	B	451	ASN
1	B	472	GLN
1	C	65	HIS
1	C	279	GLN
1	C	280	ASN
1	C	352	GLN
1	C	426	ASN
1	C	451	ASN
1	C	472	GLN
1	C	484	GLN
1	D	198	ASN
1	D	279	GLN
1	D	341	ASN
1	D	384	ASN
1	D	426	ASN
1	D	451	ASN
1	D	462	ASN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

12 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	C	1497	3,1	50,50,50	2.00	11 (22%)	67,82,82	1.35	8 (11%)
3	KLN	B	1499	-	24,24,40	0.81	0	30,32,57	1.60	6 (20%)
3	KLN	B	1498	2	40,40,40	0.65	1 (2%)	57,57,57	1.51	8 (14%)
3	KLN	C	1498	2	40,40,40	0.65	1 (2%)	57,57,57	1.43	7 (12%)
2	HEM	B	1497	3,1	50,50,50	1.91	9 (18%)	67,82,82	1.32	7 (10%)
3	KLN	D	1499	-	24,24,40	1.00	2 (8%)	30,32,57	1.56	5 (16%)
3	KLN	D	1498	2	40,40,40	0.60	0	57,57,57	1.31	7 (12%)
3	KLN	A	1500	2	40,40,40	0.73	1 (2%)	57,57,57	1.62	11 (19%)
2	HEM	A	1499	3,1	50,50,50	1.96	8 (16%)	67,82,82	1.30	7 (10%)
3	KLN	A	1501	-	40,40,40	0.57	0	57,57,57	1.71	13 (22%)
3	KLN	C	1499	-	22,22,40	2.10	4 (18%)	29,29,57	1.58	8 (27%)
2	HEM	D	1497	3,1	50,50,50	1.88	9 (18%)	67,82,82	1.26	5 (7%)

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	C	1497	3,1	-	4/14/54/54	-
3	KLN	B	1499	-	-	4/13/30/45	0/3/3/5
3	KLN	B	1498	2	-	6/24/45/45	0/5/5/5
3	KLN	C	1498	2	-	5/24/45/45	0/5/5/5

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	HEM	B	1497	3,1	-	0/14/54/54	-
3	KLN	D	1499	-	-	4/13/30/45	0/3/3/5
3	KLN	D	1498	2	-	8/24/45/45	0/5/5/5
3	KLN	A	1500	2	-	6/24/45/45	0/5/5/5
2	HEM	A	1499	3,1	-	4/14/54/54	-
3	KLN	A	1501	-	-	10/24/45/45	0/5/5/5
3	KLN	C	1499	-	-	9/15/25/45	0/2/2/5
2	HEM	D	1497	3,1	-	7/14/54/54	-

All (46) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	C	1499	KLN	C7-C6	8.25	1.83	1.51
2	C	1497	HEM	C3D-C2D	7.93	1.53	1.36
2	A	1499	HEM	C3D-C2D	7.77	1.53	1.36
2	D	1497	HEM	C3D-C2D	7.67	1.53	1.36
2	B	1497	HEM	C3D-C2D	7.55	1.53	1.36
2	C	1497	HEM	FE-ND	7.10	2.16	1.94
2	A	1499	HEM	FE-ND	5.57	2.12	1.94
2	B	1497	HEM	FE-ND	5.55	2.12	1.94
2	A	1499	HEM	FE-NC	5.09	2.12	1.95
2	D	1497	HEM	FE-ND	5.00	2.10	1.94
2	B	1497	HEM	FE-NA	4.06	2.08	1.95
2	A	1499	HEM	FE-NB	3.62	2.06	1.94
2	D	1497	HEM	FE-NB	3.47	2.05	1.94
2	B	1497	HEM	FE-NC	3.40	2.06	1.95
2	D	1497	HEM	FE-NC	3.35	2.06	1.95
2	C	1497	HEM	FE-NC	3.26	2.05	1.95
2	D	1497	HEM	CAB-C3B	3.14	1.55	1.47
2	B	1497	HEM	FE-NB	3.00	2.04	1.94
2	A	1499	HEM	CAC-C3C	2.95	1.55	1.47
2	C	1497	HEM	CAB-C3B	2.92	1.55	1.47
2	A	1499	HEM	CAB-C3B	2.92	1.55	1.47
3	C	1499	KLN	O3-C14	2.88	1.53	1.44
2	B	1497	HEM	CAC-C3C	2.88	1.55	1.47
2	D	1497	HEM	CAC-C3C	2.87	1.55	1.47
2	B	1497	HEM	CAB-C3B	2.82	1.54	1.47
3	A	1500	KLN	C5-C8	-2.74	1.50	1.53
3	C	1499	KLN	O1-C6	2.66	1.51	1.43
2	C	1497	HEM	CAC-C3C	2.64	1.54	1.47
3	B	1498	KLN	C5-C8	-2.62	1.50	1.53

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	C	1497	HEM	FE-NB	2.58	2.02	1.94
2	C	1497	HEM	FE-NA	2.42	2.03	1.95
2	D	1497	HEM	FE-NA	2.41	2.03	1.95
3	D	1499	KLN	O2-C7	2.38	1.48	1.42
2	C	1497	HEM	CMB-C2B	2.29	1.55	1.50
2	D	1497	HEM	C2A-C3A	-2.23	1.33	1.38
2	A	1499	HEM	CMC-C2C	2.21	1.55	1.50
3	C	1499	KLN	C14-C6	2.20	1.58	1.51
3	D	1499	KLN	C7-C6	2.16	1.58	1.51
2	B	1497	HEM	CMC-C2C	2.14	1.55	1.50
2	C	1497	HEM	CMC-C2C	2.14	1.55	1.50
3	C	1498	KLN	C5-C8	-2.11	1.51	1.53
2	B	1497	HEM	CMB-C2B	2.10	1.55	1.50
2	A	1499	HEM	CMA-C3A	2.10	1.55	1.50
2	D	1497	HEM	CAD-C3D	2.06	1.56	1.51
2	C	1497	HEM	CMD-C2D	2.04	1.55	1.50
2	C	1497	HEM	CMA-C3A	2.02	1.54	1.50

All (92) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	1501	KLN	C14-O3-C15	-6.59	103.34	117.85
3	A	1500	KLN	C5-C4-N1	-5.73	107.77	112.76
2	C	1497	HEM	C4D-ND-C1D	5.48	111.70	105.21
2	B	1497	HEM	C4D-ND-C1D	5.27	111.45	105.21
3	C	1498	KLN	C5-C4-N1	-5.25	108.20	112.76
2	A	1499	HEM	C4D-ND-C1D	5.16	111.32	105.21
2	D	1497	HEM	C4D-ND-C1D	4.86	110.96	105.21
3	B	1498	KLN	C5-C4-N1	-4.82	108.57	112.76
3	A	1501	KLN	C5-C4-N1	-4.26	109.05	112.76
3	B	1498	KLN	C5-C8-C9	-4.23	120.72	123.72
3	D	1498	KLN	C5-C4-N1	-4.09	109.20	112.76
3	A	1500	KLN	C13-C8-C9	4.00	120.77	116.51
3	A	1500	KLN	C23-N4-C22	3.84	120.51	112.68
3	B	1499	KLN	C23-N4-C22	3.75	120.34	112.68
3	D	1499	KLN	C14-O3-C15	-3.74	109.62	117.85
2	D	1497	HEM	CAA-CBA-CGA	-3.68	103.89	113.67
3	B	1499	KLN	C14-O3-C15	-3.63	109.86	117.85
3	D	1499	KLN	C23-N4-C22	3.59	120.01	112.68
3	C	1499	KLN	C14-O3-C15	-3.55	110.03	117.85
3	D	1498	KLN	C14-O3-C15	-3.46	110.24	117.85
3	C	1498	KLN	C14-O3-C15	-3.43	110.29	117.85

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	1501	KLN	C23-N4-C22	3.43	119.69	112.68
3	A	1501	KLN	C17-C18-N3	-3.34	116.75	121.39
3	B	1498	KLN	C13-C8-C9	3.31	120.04	116.51
3	B	1498	KLN	C14-O3-C15	-3.31	110.56	117.85
3	B	1498	KLN	C21-N3-C18	-3.26	109.22	118.11
3	A	1500	KLN	C21-N3-C18	-3.22	109.33	118.11
3	B	1499	KLN	C26-C25-N4	3.14	122.21	118.24
3	C	1498	KLN	C13-C8-C5	-3.11	117.13	119.18
3	A	1501	KLN	C21-N3-C18	-3.07	109.76	118.11
3	C	1499	KLN	C23-N4-C22	3.01	118.82	112.68
3	C	1498	KLN	C13-C8-C9	3.01	119.71	116.51
3	A	1500	KLN	C24-N3-C18	-2.97	110.02	118.11
3	A	1500	KLN	C5-C8-C9	-2.97	121.62	123.72
3	D	1498	KLN	C23-N4-C22	2.90	118.60	112.68
3	D	1499	KLN	C26-C25-N4	2.81	121.80	118.24
3	D	1499	KLN	C17-C18-N3	-2.81	117.49	121.39
3	B	1499	KLN	C21-N3-C18	-2.78	110.54	118.11
3	D	1499	KLN	C21-N3-C18	-2.76	110.58	118.11
3	C	1499	KLN	C26-C25-N4	2.70	121.65	118.24
2	C	1497	HEM	CBA-CAA-C2A	-2.69	105.09	112.53
3	B	1499	KLN	C17-C18-N3	-2.69	117.65	121.39
2	A	1499	HEM	C1B-NB-C4B	2.68	108.38	105.21
3	D	1498	KLN	C21-N3-C18	-2.68	110.81	118.11
3	A	1501	KLN	C8-C9-CL2	2.67	124.92	121.70
3	C	1499	KLN	O1-C6-C14	2.66	118.90	109.70
3	C	1499	KLN	C17-C18-N3	-2.60	117.78	121.39
3	A	1500	KLN	C14-O3-C15	-2.57	112.18	117.85
3	C	1499	KLN	C21-N3-C18	-2.56	111.14	118.11
2	D	1497	HEM	C2A-C1A-NA	-2.55	107.33	110.15
3	B	1498	KLN	C24-N3-C18	-2.51	111.27	118.11
3	A	1501	KLN	C22-C21-N3	-2.50	105.52	110.78
2	B	1497	HEM	CAD-C3D-C4D	2.49	129.04	124.70
3	A	1500	KLN	C24-N3-C21	-2.47	106.02	111.57
3	A	1500	KLN	C10-C9-C8	-2.46	119.51	121.97
3	C	1498	KLN	C23-N4-C22	2.46	117.69	112.68
2	A	1499	HEM	C3B-C2B-C1B	2.41	108.22	106.41
3	C	1499	KLN	O2-C7-C6	-2.39	99.63	110.38
3	A	1500	KLN	C13-C8-C5	-2.37	117.61	119.18
2	A	1499	HEM	C3B-C4B-NB	-2.37	107.77	109.47
2	B	1497	HEM	C2A-C1A-NA	-2.36	107.53	110.15
2	A	1499	HEM	CBA-CAA-C2A	-2.34	106.05	112.53
2	C	1497	HEM	C2A-C1A-NA	-2.34	107.56	110.15

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	1501	KLN	C10-C9-CL2	-2.33	114.63	118.45
3	C	1498	KLN	C26-C25-N4	2.32	121.18	118.24
3	C	1498	KLN	C24-N3-C18	-2.30	111.85	118.11
3	B	1498	KLN	C23-N4-C22	2.29	117.34	112.68
2	B	1497	HEM	C1B-NB-C4B	2.28	107.91	105.21
2	C	1497	HEM	CMD-C2D-C1D	2.27	128.59	125.03
2	A	1499	HEM	C2A-C1A-NA	-2.24	107.66	110.15
2	D	1497	HEM	CAD-C3D-C4D	2.24	128.60	124.70
2	B	1497	HEM	CBD-CAD-C3D	-2.21	106.42	112.53
3	D	1498	KLN	C24-N3-C18	-2.18	112.16	118.11
2	C	1497	HEM	C1B-NB-C4B	2.18	107.79	105.21
3	A	1500	KLN	C2-N2-C1	2.16	109.62	105.47
3	D	1498	KLN	C19-C18-N3	-2.14	118.41	121.39
2	C	1497	HEM	CAD-C3D-C4D	2.14	128.43	124.70
3	A	1501	KLN	C26-C25-N4	2.12	120.93	118.24
3	B	1498	KLN	C2-N2-C1	2.12	109.54	105.47
3	D	1498	KLN	C13-C8-C9	2.11	118.76	116.51
3	A	1501	KLN	O2-C7-C6	-2.10	99.39	103.26
2	C	1497	HEM	C3B-C4B-NB	-2.09	107.96	109.47
2	A	1499	HEM	CAD-C3D-C4D	2.09	128.33	124.70
3	C	1499	KLN	C24-N3-C18	-2.08	112.44	118.11
2	B	1497	HEM	CMD-C2D-C1D	2.06	128.25	125.03
2	D	1497	HEM	C3B-C4B-NB	-2.05	108.00	109.47
3	B	1499	KLN	C24-N3-C21	-2.03	106.99	111.57
2	C	1497	HEM	CHC-C1C-NC	2.03	126.67	124.45
2	B	1497	HEM	C3B-C4B-NB	-2.03	108.01	109.47
3	A	1501	KLN	O3-C14-C6	2.02	112.45	107.79
3	A	1501	KLN	C2-N2-C1	2.02	109.35	105.47
3	A	1501	KLN	C24-N3-C18	-2.00	112.65	118.11

There are no chirality outliers.

All (67) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	D	1497	HEM	C2C-C3C-CAC-CBC
2	D	1497	HEM	C4C-C3C-CAC-CBC
3	A	1500	KLN	O3-C14-C6-O1
3	A	1500	KLN	O3-C14-C6-C7
3	A	1501	KLN	C4-C5-C8-C9
3	A	1501	KLN	C4-C5-C8-C13
3	A	1501	KLN	O2-C5-C8-C9
3	A	1501	KLN	O2-C5-C8-C13

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Mol	Chain	Res	Type	Atoms
3	A	1501	KLN	O3-C14-C6-O1
3	A	1501	KLN	O3-C14-C6-C7
3	B	1498	KLN	O3-C14-C6-O1
3	B	1498	KLN	O3-C14-C6-C7
3	C	1498	KLN	O3-C14-C6-O1
3	C	1498	KLN	O3-C14-C6-C7
3	C	1499	KLN	C14-C6-C7-O2
3	C	1499	KLN	O3-C14-C6-O1
3	D	1498	KLN	O3-C14-C6-O1
3	D	1498	KLN	O3-C14-C6-C7
3	C	1498	KLN	C19-C18-N3-C21
3	C	1498	KLN	C17-C18-N3-C21
3	C	1499	KLN	C20-C15-O3-C14
3	C	1499	KLN	C16-C15-O3-C14
3	B	1499	KLN	C16-C15-O3-C14
3	B	1499	KLN	C20-C15-O3-C14
3	A	1501	KLN	C20-C15-O3-C14
3	D	1499	KLN	C20-C15-O3-C14
3	A	1501	KLN	C16-C15-O3-C14
3	D	1499	KLN	C16-C15-O3-C14
3	C	1499	KLN	O1-C6-C7-O2
3	B	1499	KLN	C17-C18-N3-C21
3	A	1501	KLN	C17-C18-N3-C21
2	C	1497	HEM	C2C-C3C-CAC-CBC
3	C	1499	KLN	C17-C18-N3-C21
3	C	1499	KLN	C6-C14-O3-C15
3	B	1499	KLN	C19-C18-N3-C21
3	C	1498	KLN	C6-C14-O3-C15
3	A	1500	KLN	C6-C14-O3-C15
3	B	1498	KLN	C6-C14-O3-C15
3	D	1498	KLN	C6-C14-O3-C15
3	A	1501	KLN	C19-C18-N3-C21
3	C	1499	KLN	C19-C18-N3-C21
3	D	1499	KLN	C17-C18-N3-C21
3	B	1498	KLN	C17-C18-N3-C21
3	A	1500	KLN	C17-C18-N3-C21
3	C	1499	KLN	O3-C14-C6-C7
3	D	1499	KLN	C19-C18-N3-C21
2	A	1499	HEM	C2B-C3B-CAB-CBB
3	A	1500	KLN	N1-C4-C5-O2
3	B	1498	KLN	N1-C4-C5-O2
3	D	1498	KLN	N1-C4-C5-O2

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Mol	Chain	Res	Type	Atoms
3	B	1498	KLN	C19-C18-N3-C21
3	A	1500	KLN	C19-C18-N3-C21
3	D	1498	KLN	C17-C18-N3-C21
2	C	1497	HEM	C4C-C3C-CAC-CBC
2	D	1497	HEM	CAD-CBD-CGD-O1D
2	D	1497	HEM	CAD-CBD-CGD-O2D
3	D	1498	KLN	C19-C18-N3-C21
2	D	1497	HEM	C3D-CAD-CBD-CGD
2	D	1497	HEM	CAA-CBA-CGA-O1A
2	A	1499	HEM	C4B-C3B-CAB-CBB
2	A	1499	HEM	CAD-CBD-CGD-O1D
3	D	1498	KLN	C5-C4-N1-C1
3	D	1498	KLN	C5-C4-N1-C3
2	D	1497	HEM	CAA-CBA-CGA-O2A
2	A	1499	HEM	CAD-CBD-CGD-O2D
2	C	1497	HEM	CAA-CBA-CGA-O2A
2	C	1497	HEM	CAD-CBD-CGD-O2D

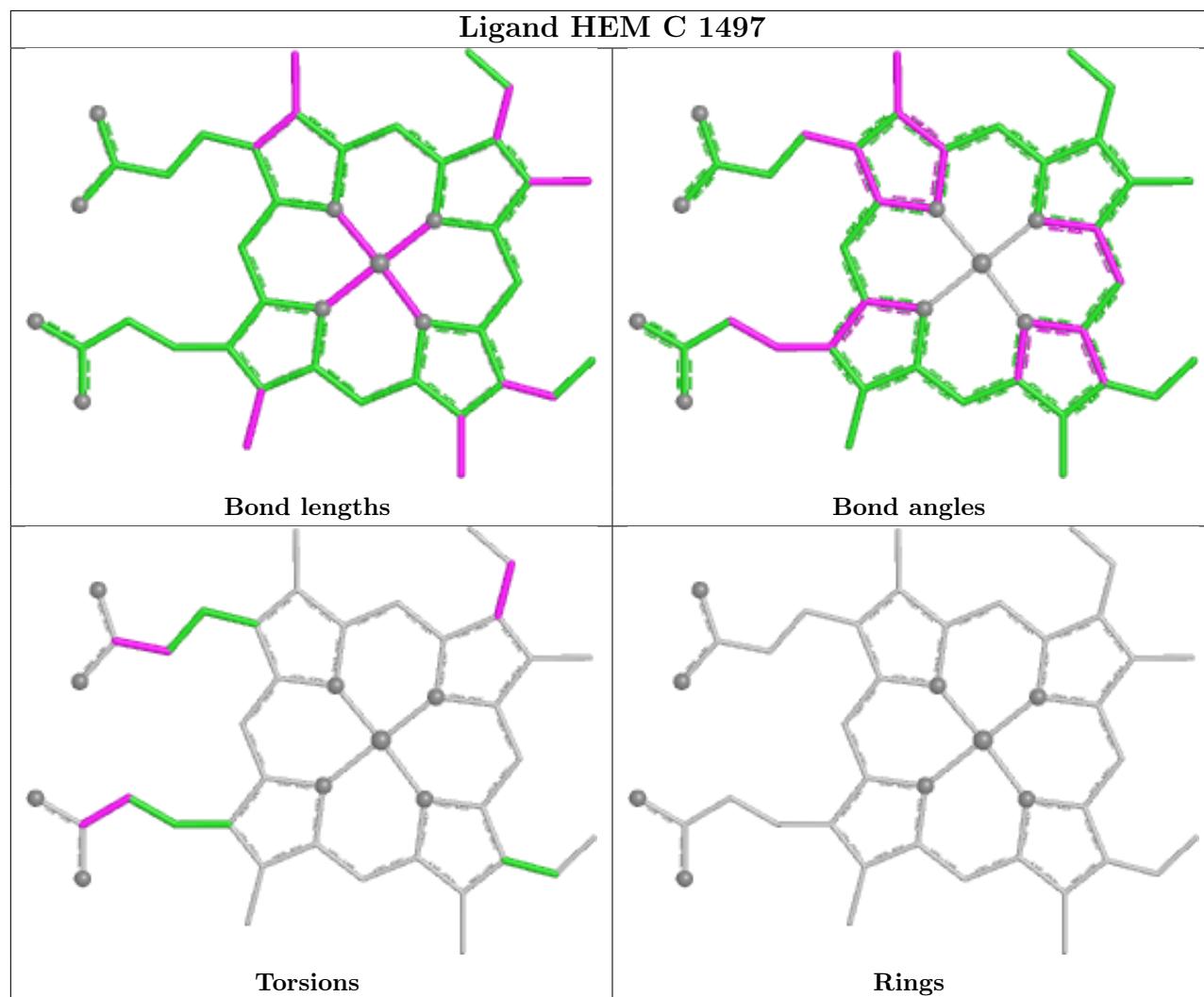
There are no ring outliers.

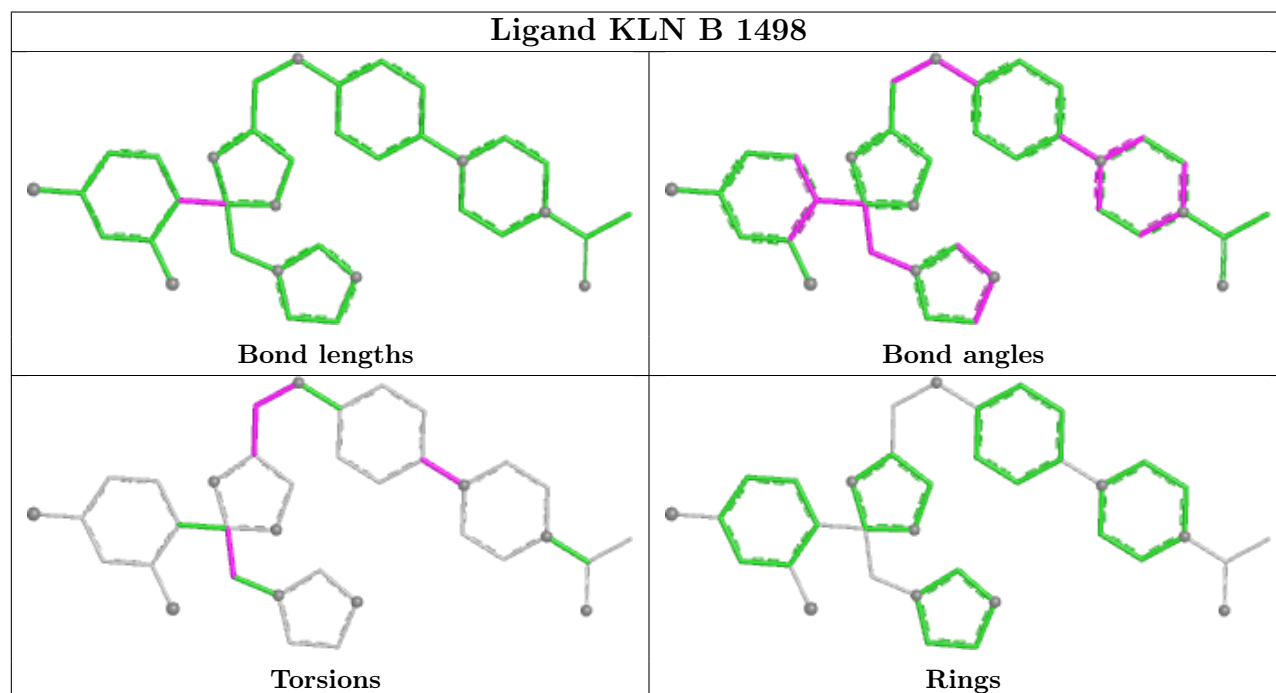
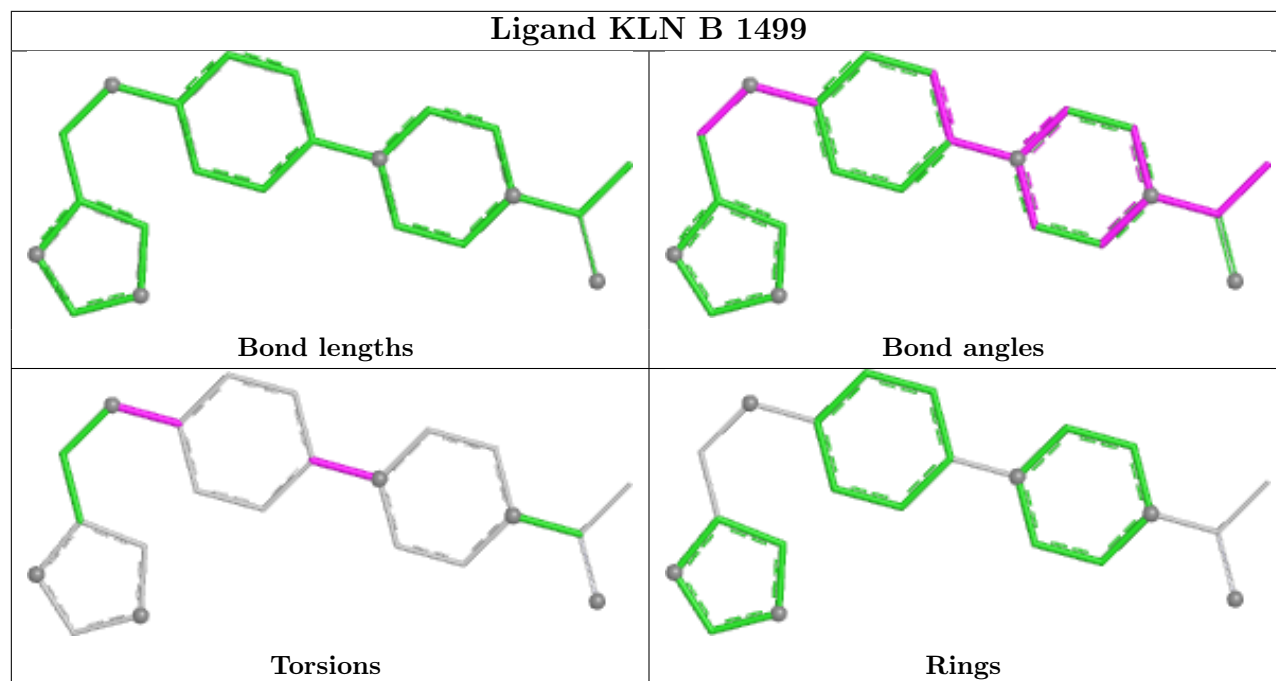
10 monomers are involved in 38 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	C	1497	HEM	5	0
3	B	1498	KLN	3	0
3	C	1498	KLN	1	0
2	B	1497	HEM	3	0
3	D	1498	KLN	2	0
3	A	1500	KLN	1	0
2	A	1499	HEM	6	0
3	A	1501	KLN	4	0
3	C	1499	KLN	8	0
2	D	1497	HEM	5	0

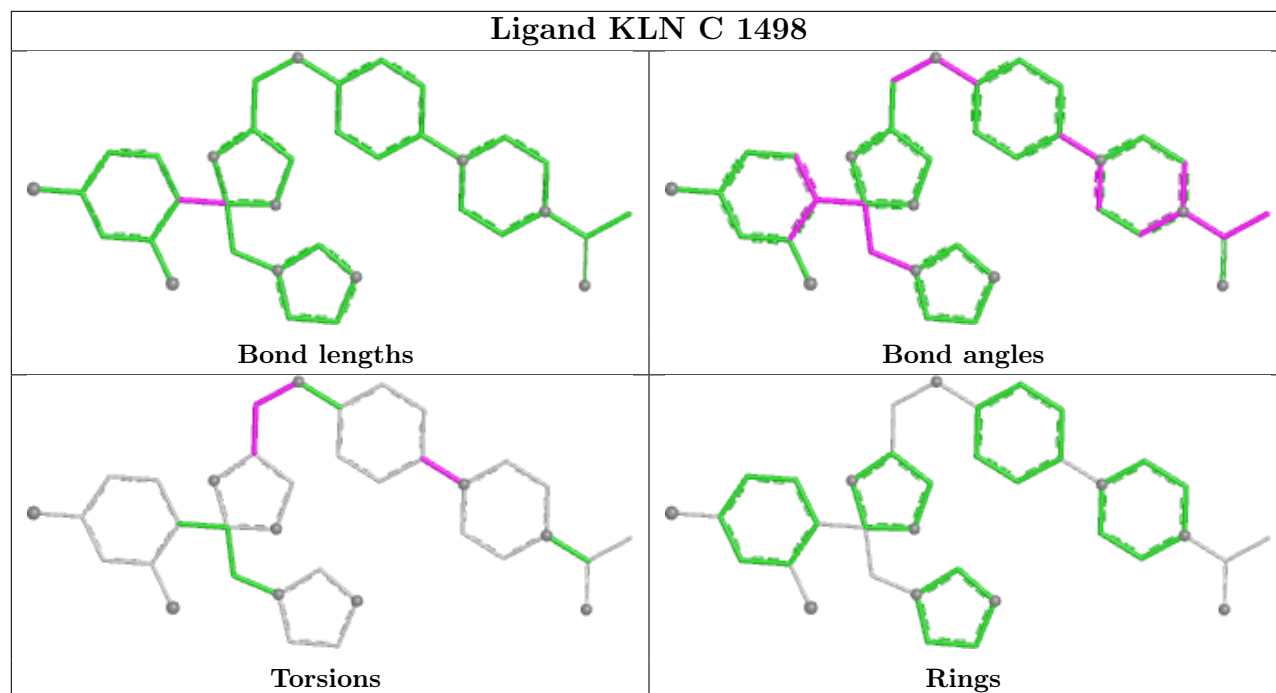
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included.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

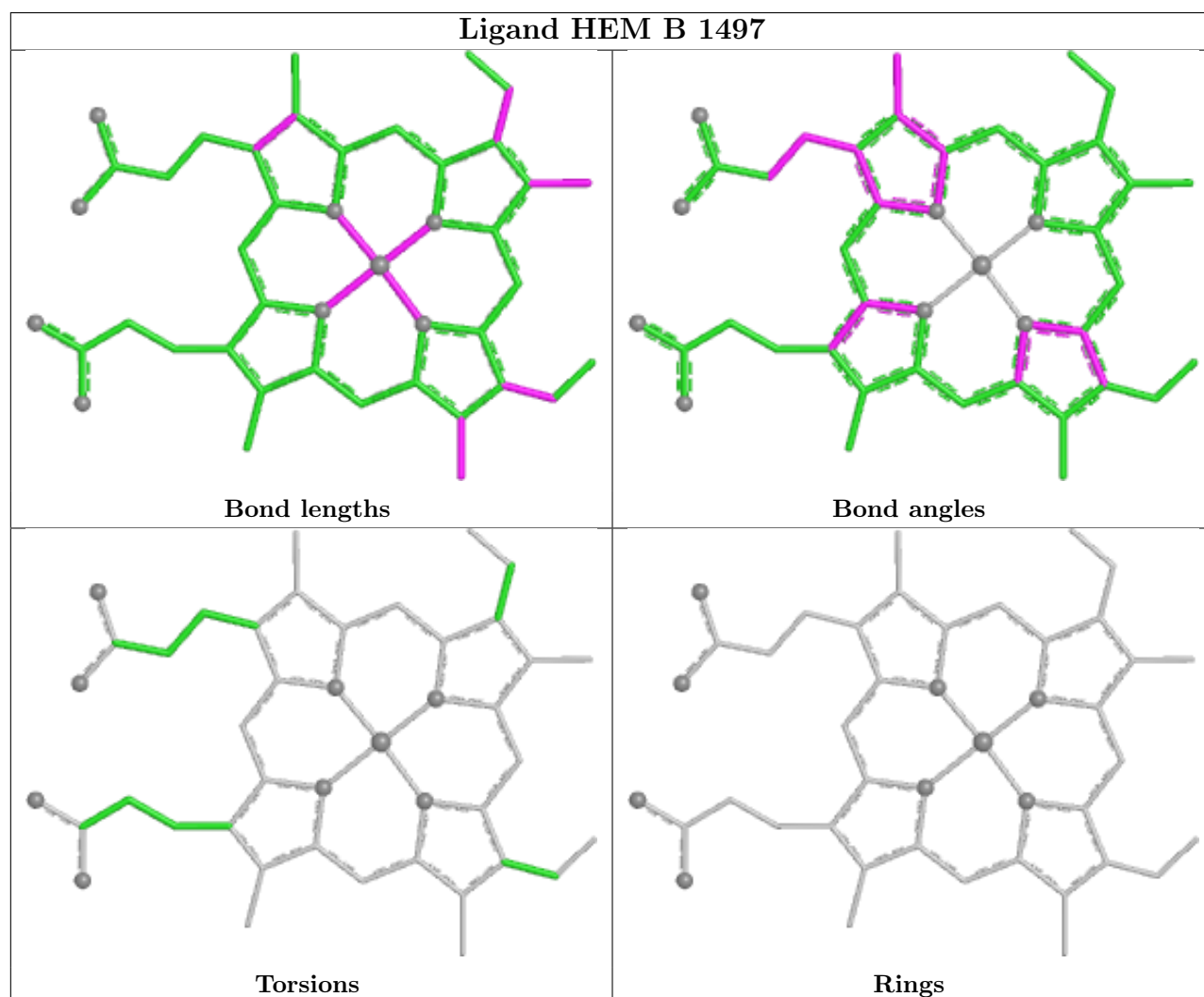




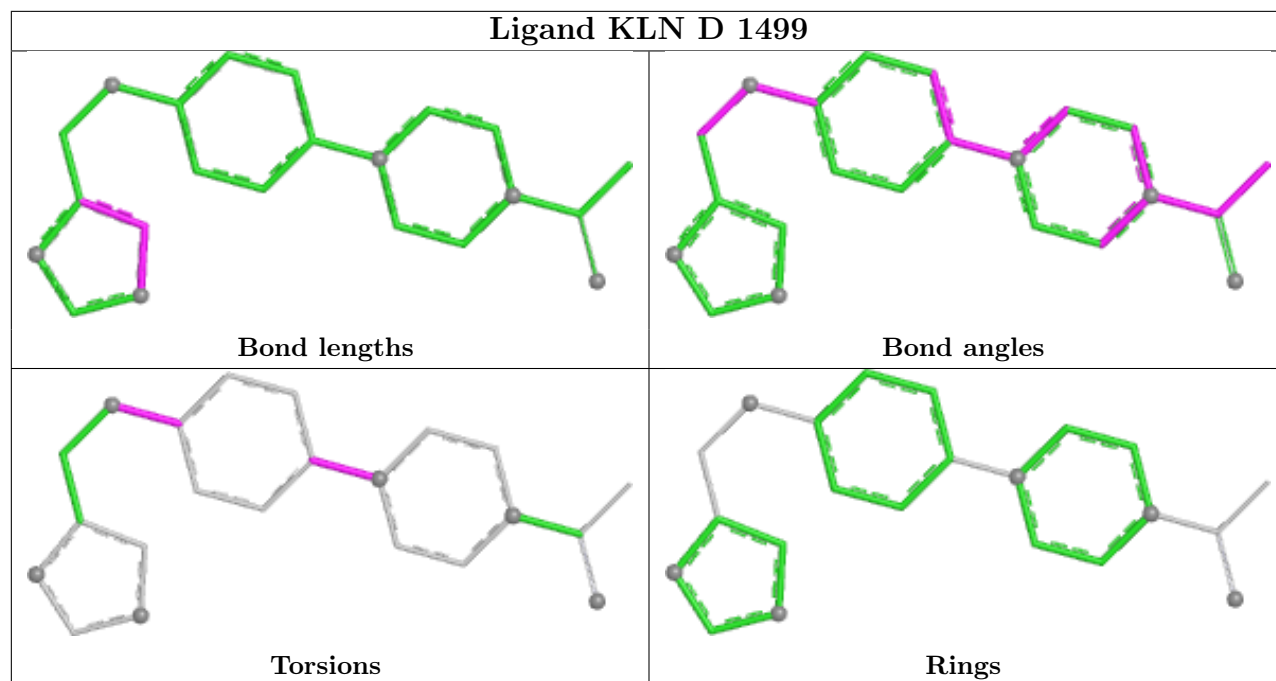
Ligand KLN C 1498



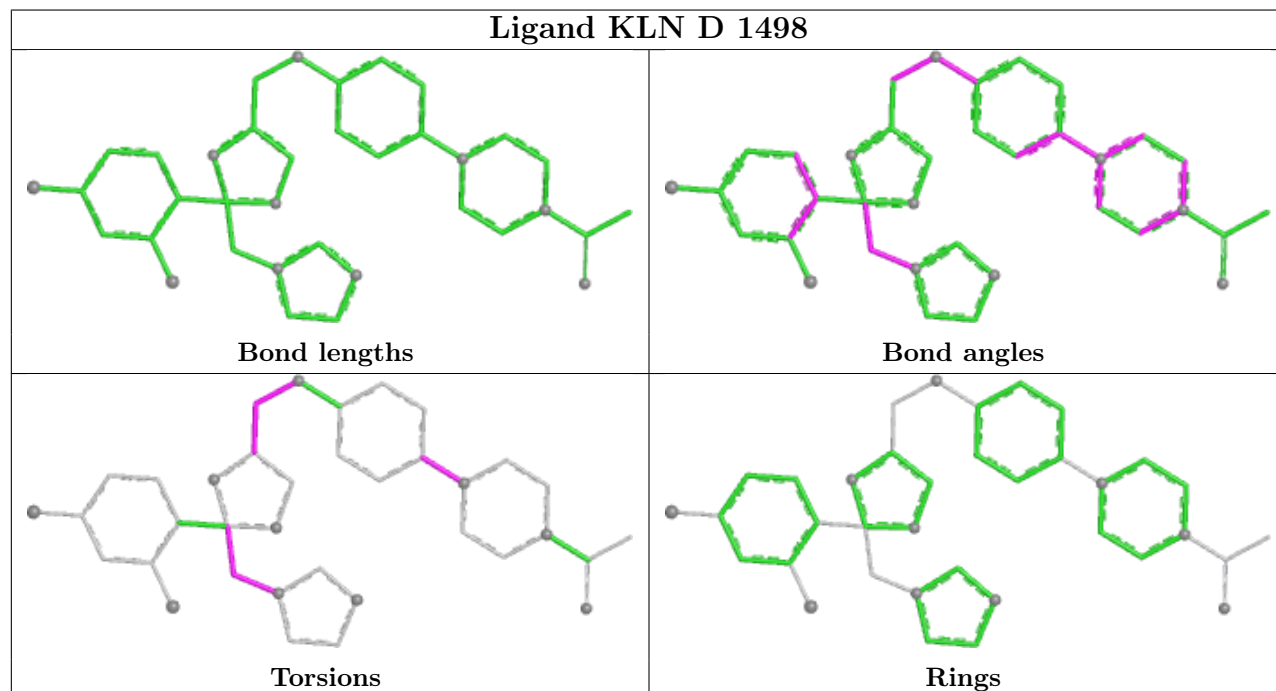
Ligand HEM B 1497



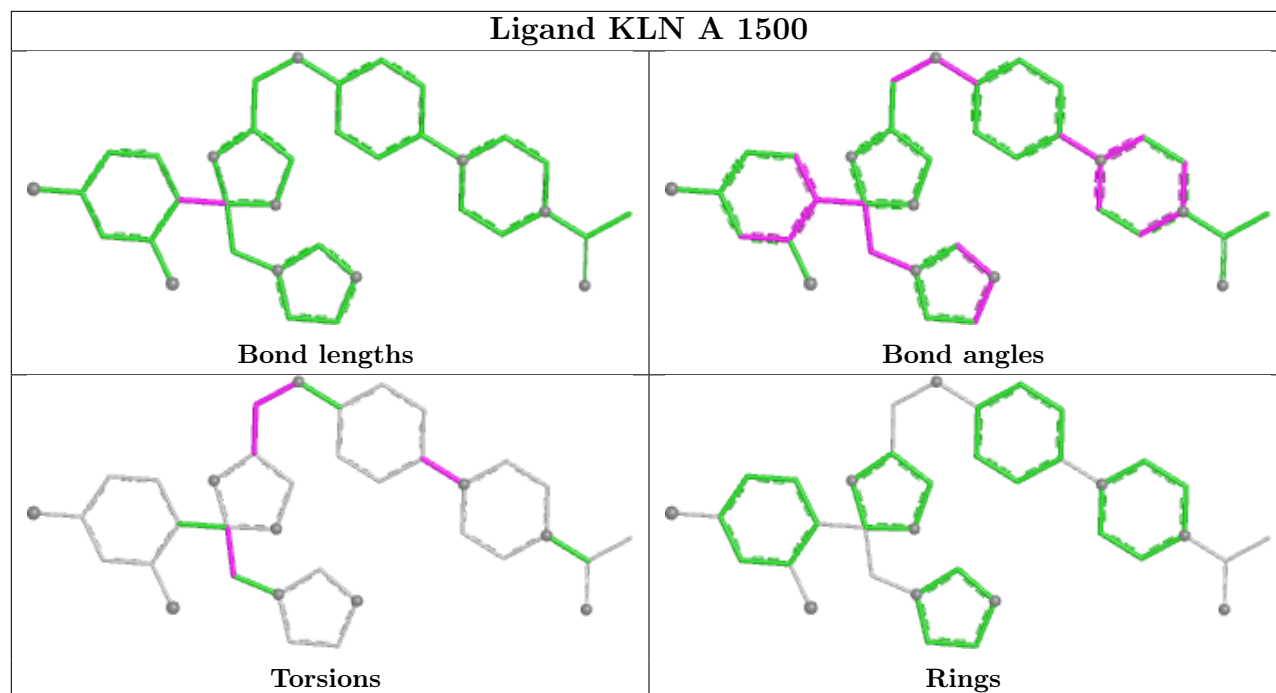
Ligand KLN D 1499



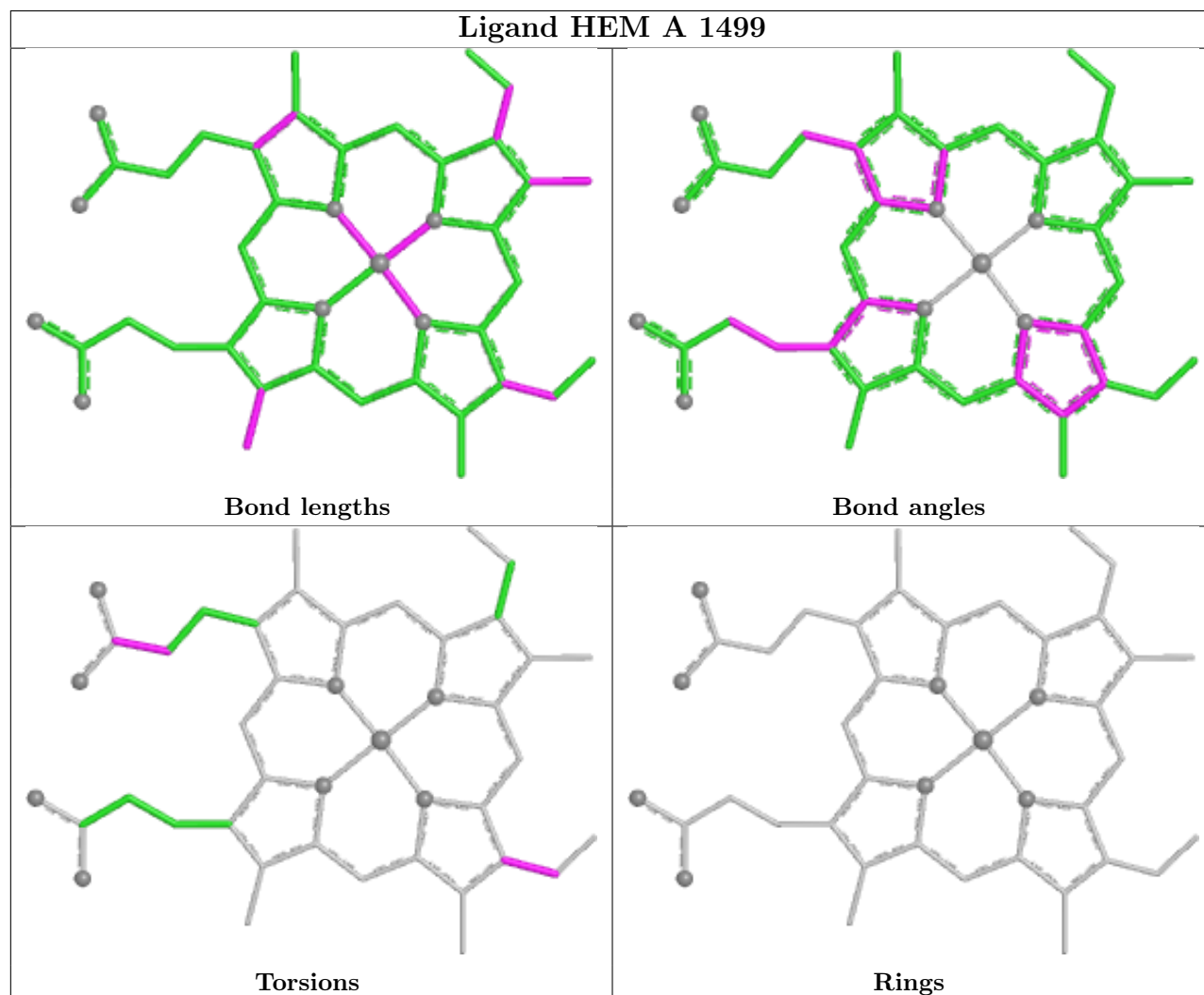
Ligand KLN D 1498

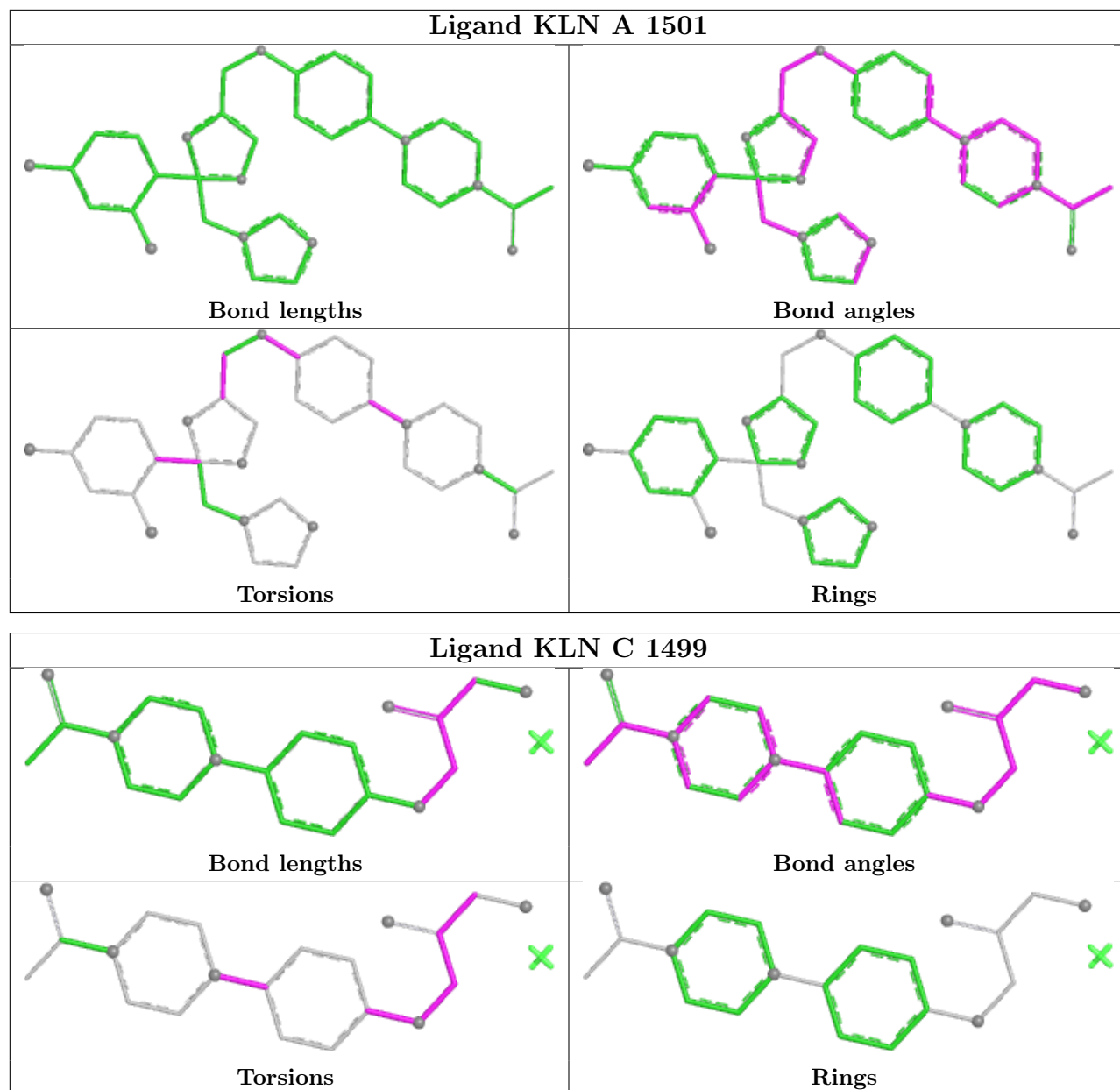


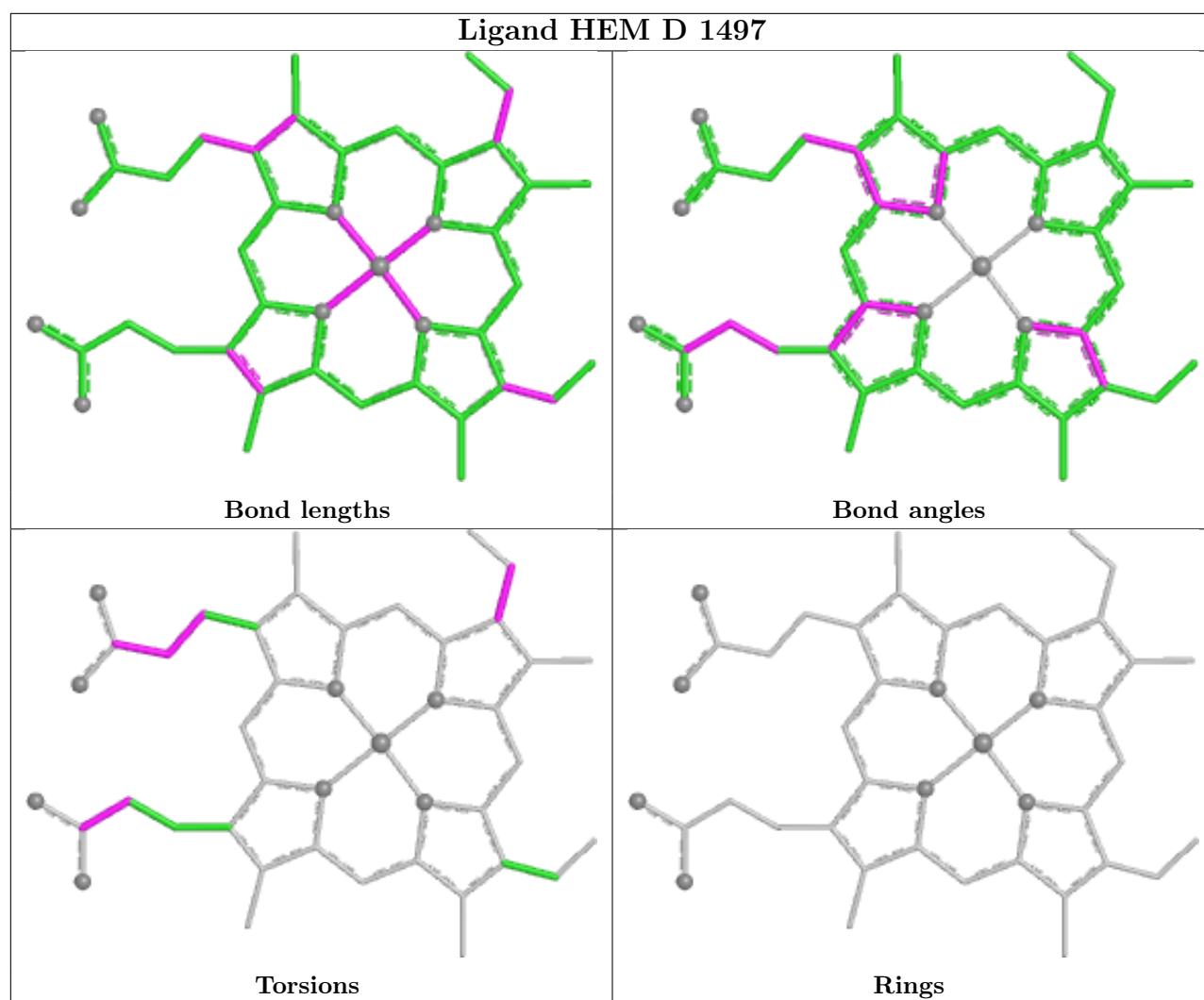
Ligand KLN A 1500



Ligand HEM A 1499







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	455/485 (93%)	0.05	9 (1%) 65 56	12, 34, 59, 65	0
1	B	451/485 (92%)	0.12	6 (1%) 75 66	11, 34, 58, 66	0
1	C	465/485 (95%)	-0.13	11 (2%) 59 49	11, 27, 49, 76	0
1	D	453/485 (93%)	-0.23	4 (0%) 81 74	9, 23, 47, 58	0
All	All	1824/1940 (94%)	-0.05	30 (1%) 70 61	9, 29, 57, 76	0

All (30) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	216	LEU	5.4
1	B	213	PHE	4.2
1	A	497	ASP	4.0
1	C	287	HIS	3.5
1	C	284	THR	3.5
1	A	215	PHE	3.4
1	A	211	LEU	3.3
1	D	216	LEU	3.3
1	A	213	PHE	3.0
1	D	213	PHE	3.0
1	C	280	ASN	2.9
1	C	215	PHE	2.7
1	C	218	PRO	2.7
1	C	226	PHE	2.7
1	D	140	GLY	2.6
1	B	426	ASN	2.5
1	B	210	LEU	2.5
1	B	211	LEU	2.5
1	D	215	PHE	2.5
1	C	205	GLU	2.4
1	B	168	LYS	2.4

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Mol	Chain	Res	Type	RSRZ
1	B	212	ARG	2.3
1	A	261	LEU	2.2
1	C	285	GLU	2.2
1	A	212	ARG	2.2
1	A	214	ASP	2.2
1	C	283	GLU	2.1
1	C	223	ILE	2.1
1	A	204	VAL	2.0
1	A	470	GLU	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 oligosaccharides in this entry.

6.4 Ligands [i](#)

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

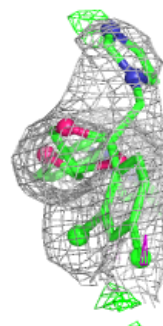
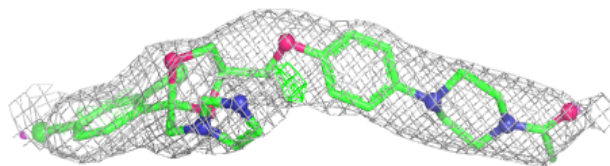
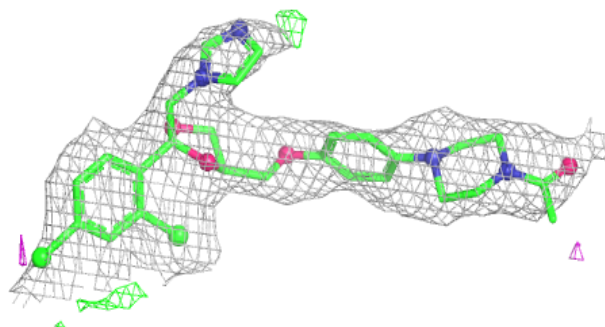
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
3	KLN	A	1501	36/36	0.84	0.16	63,73,78,78	0
3	KLN	C	1499	22/36	0.84	0.16	55,58,60,60	0
3	KLN	A	1500	36/36	0.87	0.12	31,33,37,38	0
3	KLN	B	1499	22/36	0.88	0.11	36,40,45,45	0
3	KLN	D	1499	22/36	0.88	0.14	54,59,62,63	0
3	KLN	B	1498	36/36	0.89	0.10	26,32,35,37	0
3	KLN	C	1498	36/36	0.91	0.11	24,31,35,36	0
3	KLN	D	1498	36/36	0.94	0.09	19,25,27,28	0
2	HEM	A	1499	43/43	0.97	0.07	13,15,18,20	0
2	HEM	D	1497	43/43	0.98	0.07	7,9,11,12	0
2	HEM	B	1497	43/43	0.98	0.06	9,11,12,14	0
2	HEM	C	1497	43/43	0.98	0.06	10,11,12,12	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.

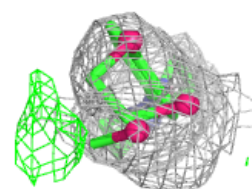
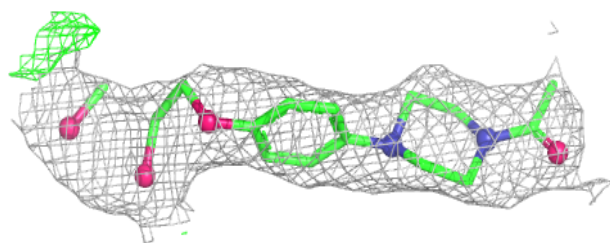
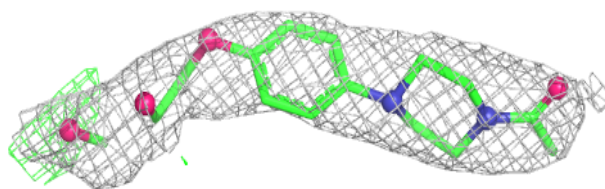
Electron density around KLN A 1501:

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

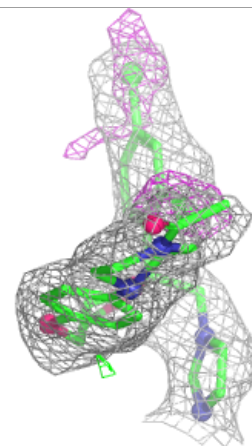
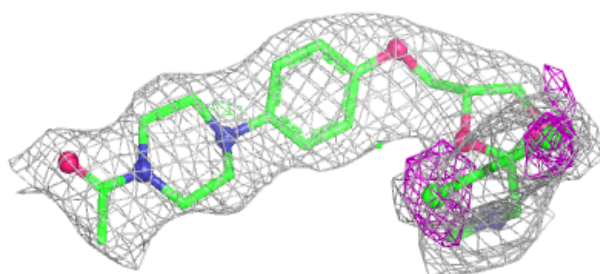
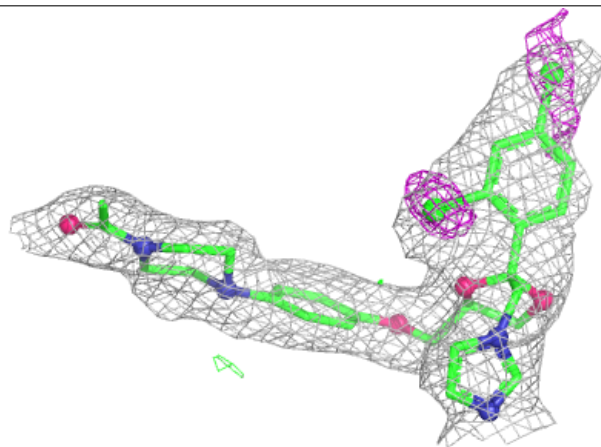


Electron density around KLN C 1499:

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

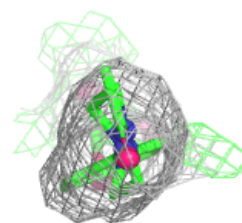
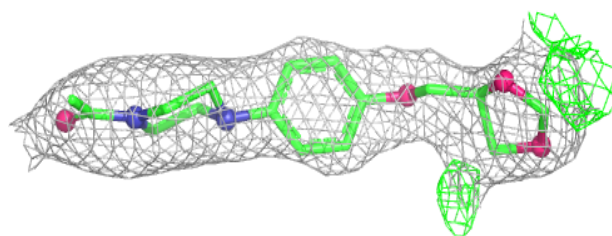
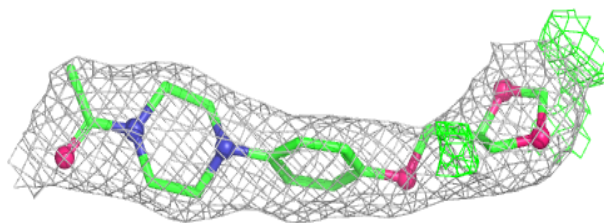
**Electron density around KLN A 1500:**

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

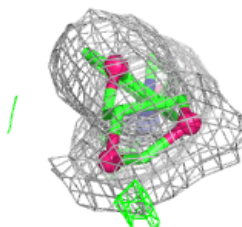
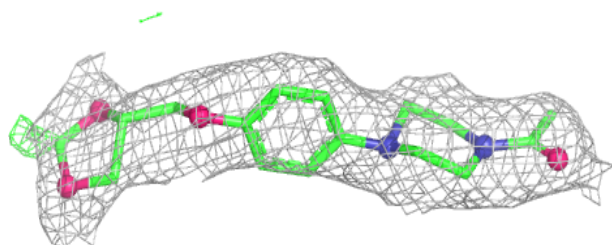
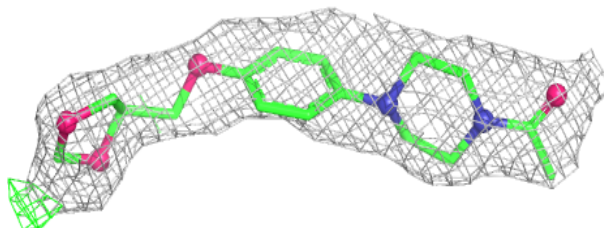


Electron density around KLN B 1499:

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

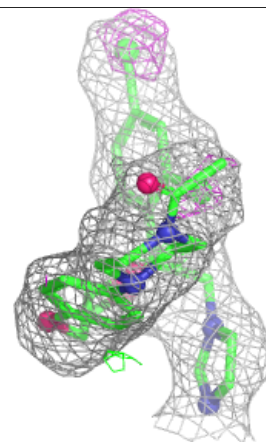
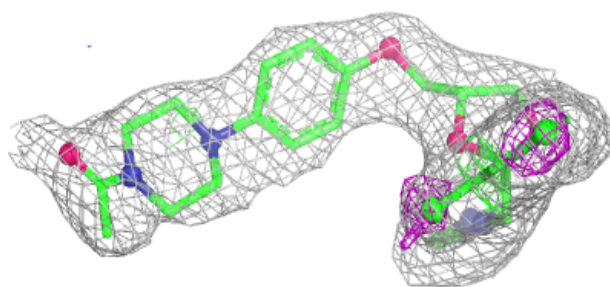
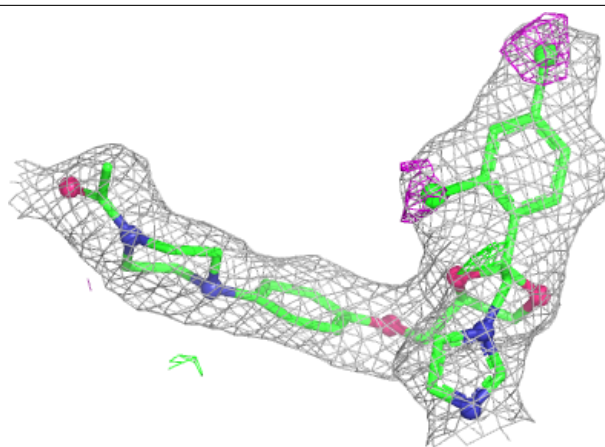
**Electron density around KLN D 1499:**

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



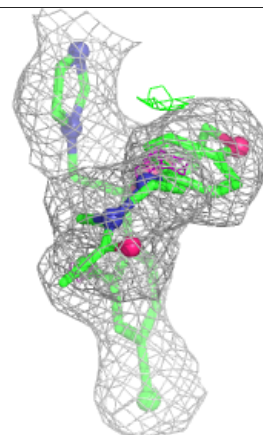
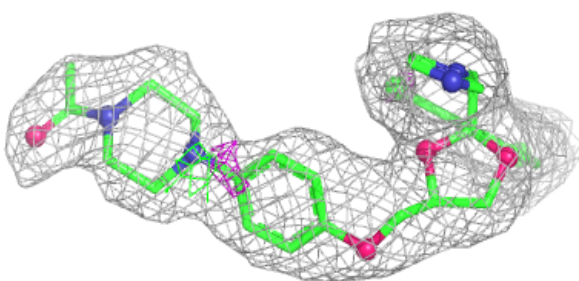
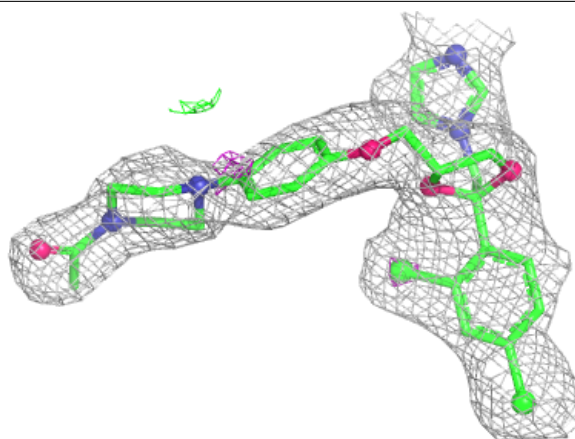
Electron density around KLN B 1498:

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



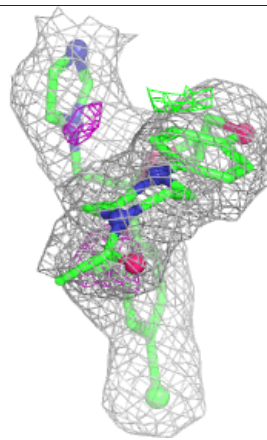
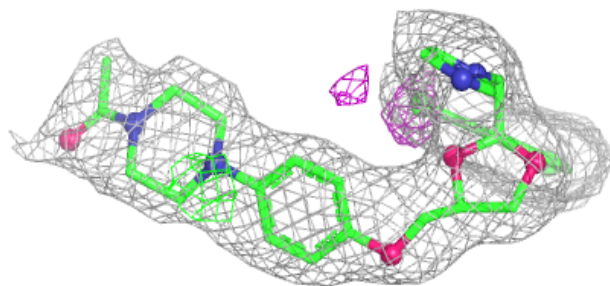
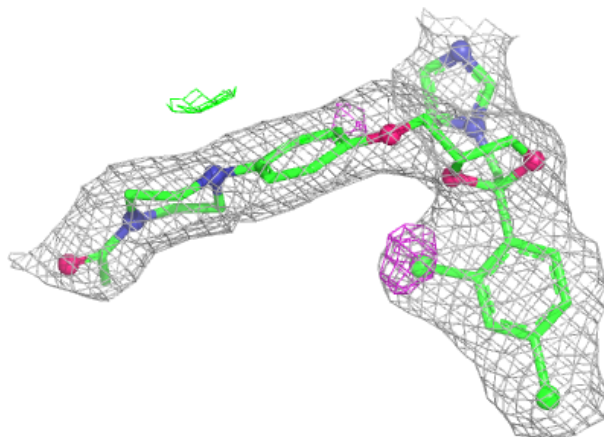
Electron density around KLN C 1498:

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



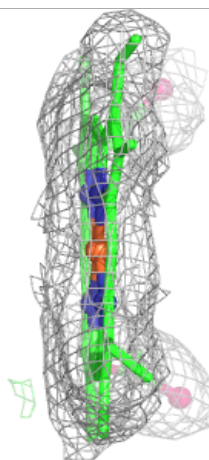
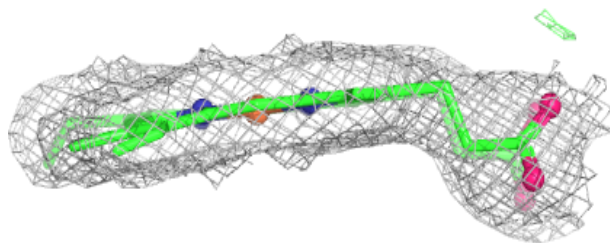
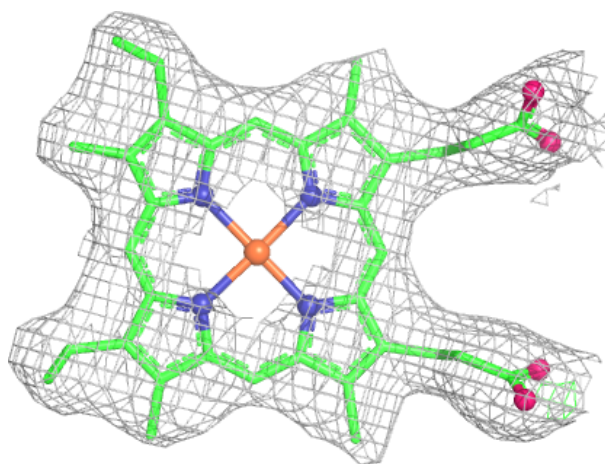
Electron density around KLN D 1498:

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



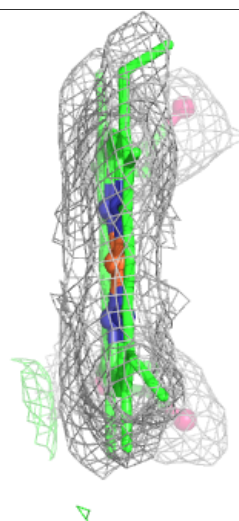
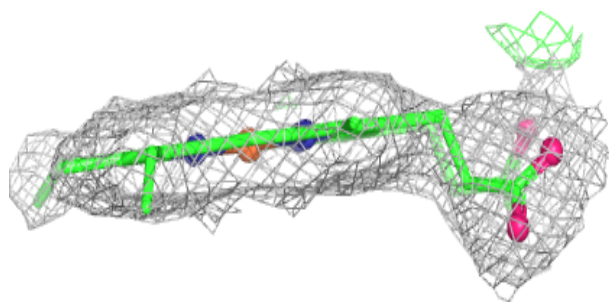
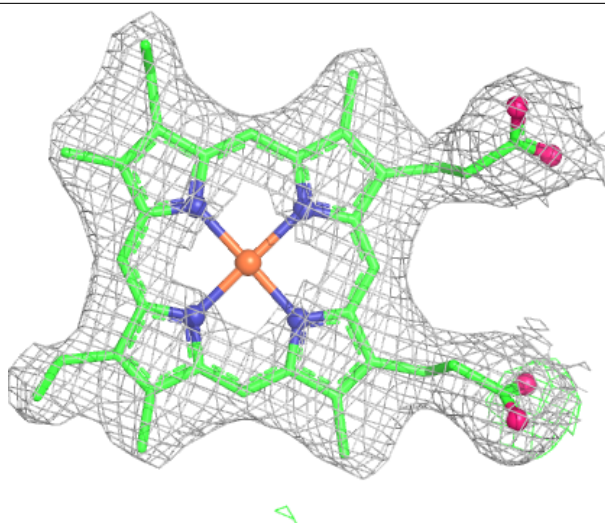
Electron density around HEM A 1499:

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



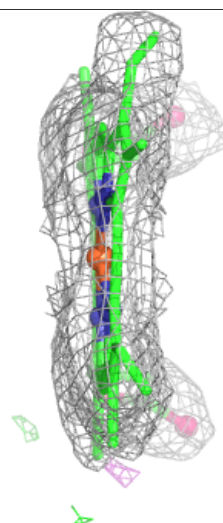
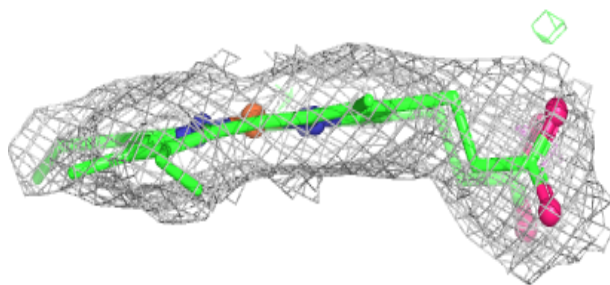
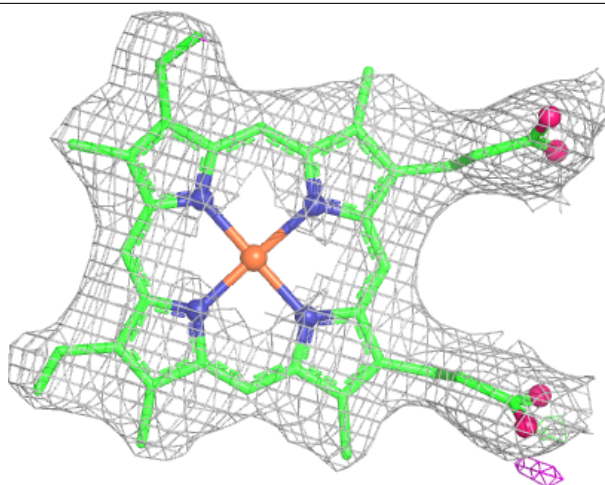
Electron density around HEM D 1497:

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



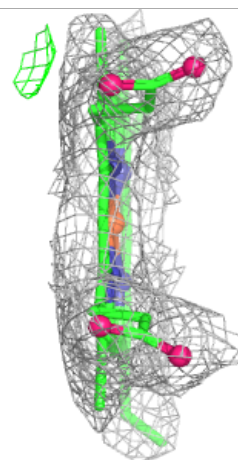
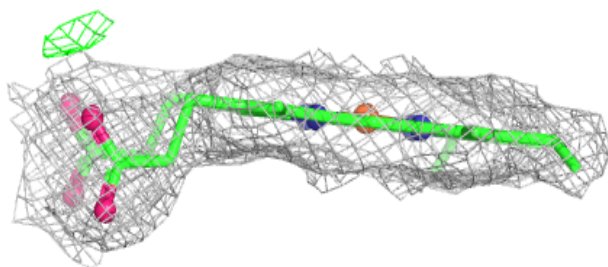
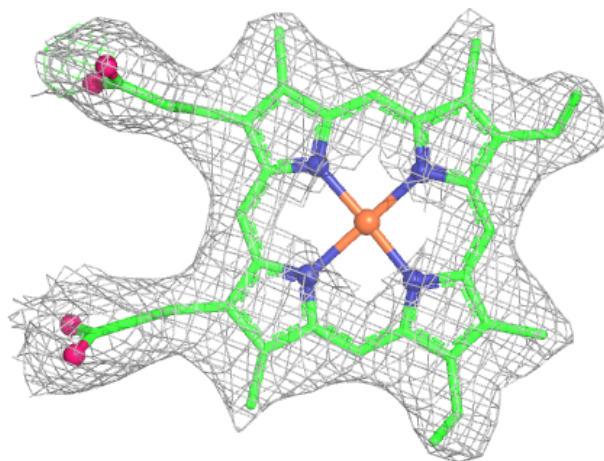
Electron density around HEM B 1497:

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



Electron density around HEM C 1497:

$2mF_o-DF_c$ (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.