



Full wwPDB X-ray Structure Validation Report ⓘ

Aug 5, 2026 – 02:12 PM EDT

PDB ID : 3UOF / pdb_00003uof
Title : Mycobacterium tuberculosis bacterioferritin, BfrA
Authors : McMath, L.M.; Goulding, C.W.; TB Structural Genomics Consortium (TB-SGC)
Deposited on : 2011-11-16
Resolution : 2.90 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:

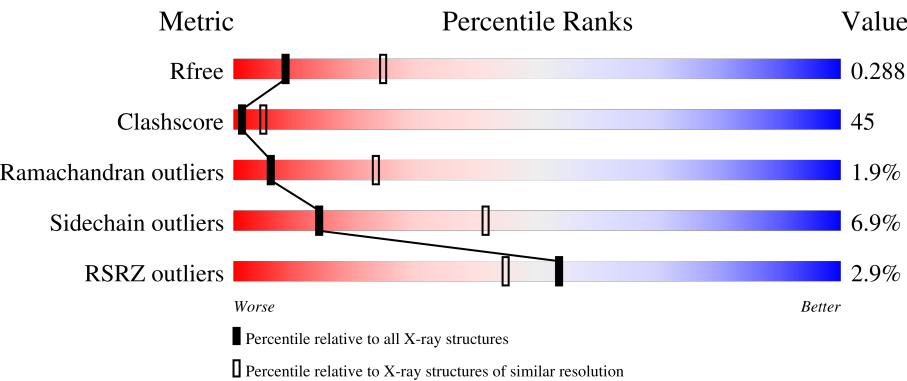
MolProbity : 4-5-2 with Phenix2.0
Mogul : 2022.3.0, CSD as543be (2022)
Xtriage (Phenix) : 2.0
EDS : 3.0
Buster-report : wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4 : 9.0.015 (Gargrove)
Density-Fitness : 1.0.12
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.50

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 2.90 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	2481 (2.90-2.90)
Clashscore	190562	2690 (2.90-2.90)
Ramachandran outliers	187476	2623 (2.90-2.90)
Sidechain outliers	187428	2625 (2.90-2.90)
RSRZ outliers	180081	2481 (2.90-2.90)

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	161	2% 40% 55% ..
1	B	161	2% 38% 56% ..
1	C	161	38% 51% 9% ..
1	D	161	% 48% 45% 6% .
1	E	161	7% 27% 62% 9% ..

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Mol	Chain	Length	Quality of chain
1	F	161	

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	TRS	A	203	-	-	-	X
3	TRS	B	304	-	-	-	X
3	TRS	F	203	-	-	-	X

2 Entry composition

There are 5 unique types of molecules in this entry. The entry contains 8030 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 Bacterioferritin.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	159	Total	C	N	O	S	0	1	0
			1296	808	222	259	7			
1	B	159	Total	C	N	O	S	0	1	0
			1296	808	222	259	7			
1	C	159	Total	C	N	O	S	0	1	0
			1296	808	222	259	7			
1	D	159	Total	C	N	O	S	0	1	0
			1296	808	222	259	7			
1	E	159	Total	C	N	O	S	0	1	0
			1296	808	222	259	7			
1	F	159	Total	C	N	O	S	0	1	0
			1296	808	222	259	7			

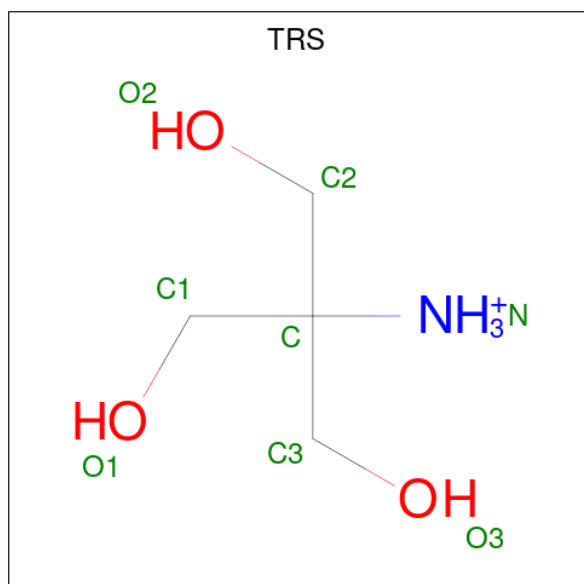
There are 12 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-1	MET	-	expression tag	UNP P63697
A	0	GLY	-	expression tag	UNP P63697
B	-1	MET	-	expression tag	UNP P63697
B	0	GLY	-	expression tag	UNP P63697
C	-1	MET	-	expression tag	UNP P63697
C	0	GLY	-	expression tag	UNP P63697
D	-1	MET	-	expression tag	UNP P63697
D	0	GLY	-	expression tag	UNP P63697
E	-1	MET	-	expression tag	UNP P63697
E	0	GLY	-	expression tag	UNP P63697
F	-1	MET	-	expression tag	UNP P63697
F	0	GLY	-	expression tag	UNP P63697

- Molecule 2 is FE (III) ION (CCD ID: FE) (formula: Fe).

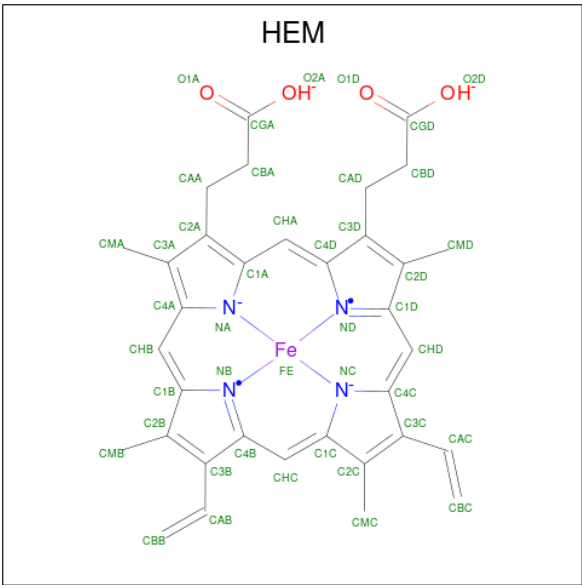
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	A	2	Total Fe 2 2	0	0
2	B	2	Total Fe 2 2	0	0
2	C	2	Total Fe 2 2	0	0
2	D	2	Total Fe 2 2	0	0
2	E	2	Total Fe 2 2	0	0
2	F	2	Total Fe 2 2	0	0

- Molecule 3 is 2-AMINO-2-HYDROXYMETHYL-PROPANE-1,3-DIOL (CCD ID: TRS) (formula: $C_4H_{12}NO_3$).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	1	Total C N O 8 4 1 3	0	0
3	B	1	Total C N O 8 4 1 3	0	0
3	F	1	Total C N O 8 4 1 3	0	0

- Molecule 4 is PROTOPORPHYRIN IX CONTAINING FE (CCD ID: HEM) (formula: $C_{34}H_{32}FeN_4O_4$).



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

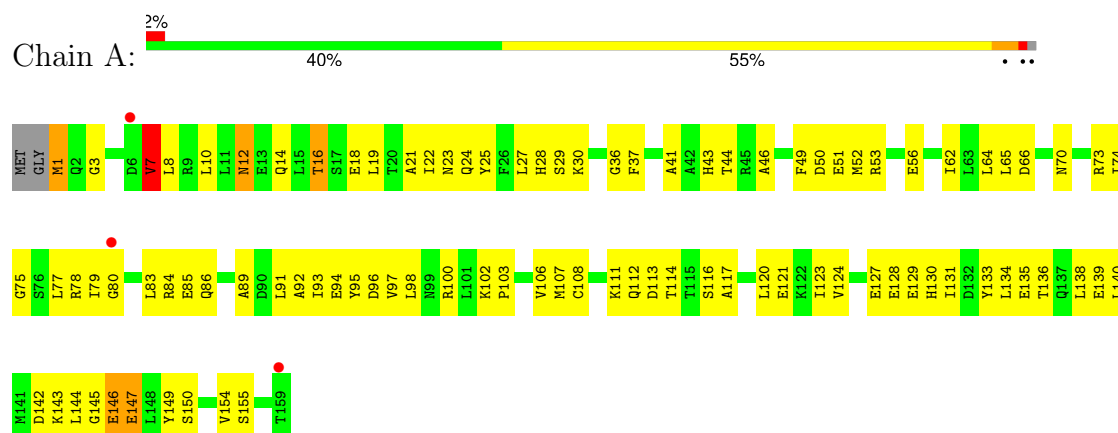
- Molecule 5 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	14	Total	O	0	0
			14	14		
5	B	26	Total	O	0	0
			26	26		
5	C	11	Total	O	0	0
			11	11		
5	D	23	Total	O	0	0
			23	23		
5	E	5	Total	O	0	0
			5	5		
5	F	10	Total	O	0	0
			10	10		

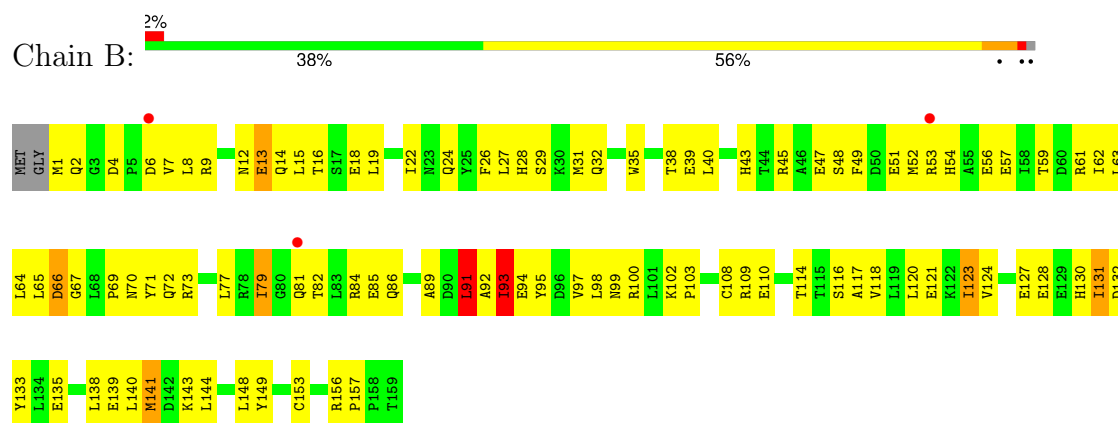
3 Residue-property plots [i](#)

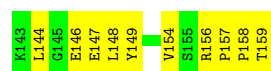
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. 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: Bacterioferritin

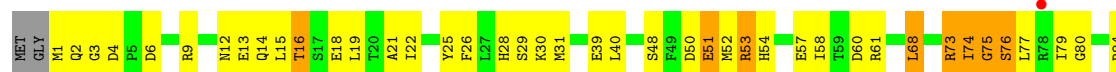


• Molecule 1: Bacterioferritin

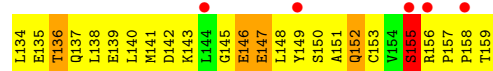
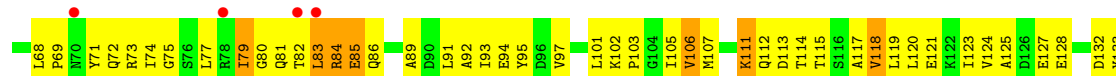
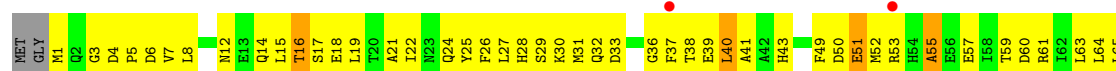




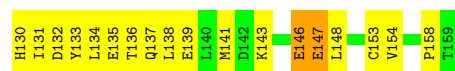
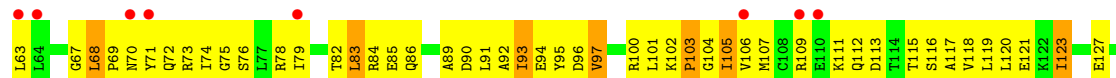
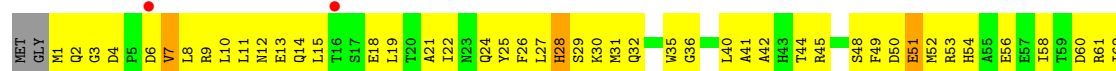
• Molecule 1: Bacterioferritin



• Molecule 1: Bacterioferritin



• Molecule 1: Bacterioferritin



4 Data and refinement statistics

Property	Value	Source
Space group	I 4	Depositor
Cell constants a, b, c, α , β , γ	122.80Å 122.80Å 174.69Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	43.67 – 2.90 43.67 – 2.90	Depositor EDS
% Data completeness (in resolution range)	99.3 (43.67-2.90) 99.4 (43.67-2.90)	Depositor EDS
R_{merge}	0.18	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	4.31 (at 2.90Å)	Xtriage
Refinement program	REFMAC 5.5.0109	Depositor
R, R_{free}	0.208 , 0.298 0.218 , 0.288	Depositor DCC
R_{free} test set	2138 reflections (7.34%)	wwPDB-VP
Wilson B-factor (Å ²)	40.1	Xtriage
Anisotropy	0.069	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.35 , 46.8	EDS
L-test for twinning ²	$\langle L \rangle = 0.43$, $\langle L^2 \rangle = 0.26$	Xtriage
Estimated twinning fraction	0.048 for -1/2*h-1/2*k+1/2*l,-1/2*h-1/2*k-1/2*l,h-k 0.048 for -1/2*h-1/2*k-1/2*l,-1/2*h-1/2*k+1/2*l,-h+k 0.049 for -1/2*h+1/2*k+1/2*l,1/2*h-1/2*k+1/2*l,h+k 0.065 for -1/2*h+1/2*k-1/2*l,1/2*h-1/2*k-1/2*l,-h-k 0.018 for h,-k,-l	Xtriage
Reported twinning fraction	0.904 for 1.000H, 1.000K, L 0.096 for 1.000K, 1.000H, -L	Depositor
Outliers	0 of 28472 reflections	Xtriage
F_o, F_c correlation	0.89	EDS
Total number of atoms	8030	wwPDB-VP
Average B, all atoms (Å ²)	40.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.43% 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: FE, HEM, TRS

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	0/1315	0.98	1/1777 (0.1%)
1	B	0.53	0/1315	0.97	2/1777 (0.1%)
1	C	0.55	0/1315	1.01	3/1777 (0.2%)
1	D	0.58	0/1315	0.93	4/1777 (0.2%)
1	E	0.43	0/1315	0.87	3/1777 (0.2%)
1	F	0.53	0/1315	0.90	2/1777 (0.1%)
All	All	0.52	0/7890	0.94	15/10662 (0.1%)

There are no bond length outliers.

All (15) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	7	VAL	N-CA-C	-7.02	103.82	110.42
1	C	17	SER	N-CA-C	-6.40	104.73	112.54
1	E	55	ALA	N-CA-C	6.35	118.76	111.02
1	B	93	ILE	CB-CA-C	-5.88	104.11	112.22
1	C	79	ILE	N-CA-C	5.85	115.25	106.42
1	C	93	ILE	CB-CA-C	-5.55	104.77	112.04
1	B	91	LEU	N-CA-C	-5.29	105.41	111.07
1	D	68	LEU	CA-C-N	5.26	126.42	119.84
1	D	68	LEU	C-N-CA	5.26	126.42	119.84
1	E	55	ALA	CB-CA-C	-5.14	102.75	110.92
1	D	157	PRO	CA-C-N	5.11	126.23	119.84
1	D	157	PRO	C-N-CA	5.11	126.23	119.84
1	F	92	ALA	N-CA-C	5.10	119.79	111.37
1	E	79	ILE	N-CA-C	5.01	114.50	106.88
1	F	93	ILE	CB-CA-C	-5.01	105.47	111.88

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	1296	0	1272	99	2
1	B	1296	0	1272	132	1
1	C	1296	0	1272	104	0
1	D	1296	0	1270	92	1
1	E	1296	0	1272	159	0
1	F	1296	0	1272	148	1
2	A	2	0	0	0	0
2	B	2	0	0	0	0
2	C	2	0	0	0	0
2	D	2	0	0	0	0
2	E	2	0	0	0	0
2	F	2	0	0	0	0
3	A	8	0	12	0	0
3	B	8	0	12	4	0
3	F	8	0	12	1	0
4	B	43	0	30	17	0
4	D	43	0	30	11	0
4	E	43	0	30	12	0
5	A	14	0	0	1	1
5	B	26	0	0	12	3
5	C	11	0	0	4	0
5	D	23	0	0	14	3
5	E	5	0	0	4	0
5	F	10	0	0	2	0
All	All	8030	0	7756	708	6

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 45.

All (708) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:83:LEU:CD1	1:E:141:MET:HE1	1.44	1.47
1:E:83:LEU:CD1	1:E:84:ARG:H	1.25	1.44
1:E:83:LEU:HD12	1:E:84:ARG:N	1.15	1.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:83:LEU:HD13	1:E:141:MET:CE	1.63	1.27
1:E:77:LEU:HD11	1:F:71:TYR:O	1.27	1.23
1:B:4:ASP:O	1:B:7:VAL:HG12	1.45	1.15
1:E:82:THR:H	1:E:85:GLU:HG3	0.98	1.11
1:F:11:LEU:O	1:F:62:ILE:HD11	1.53	1.07
1:F:102:LYS:HB2	1:F:103:PRO:HD3	1.33	1.06
4:D:201:HEM:HBB2	4:D:201:HEM:HHC	1.36	1.06
1:B:35:TRP:CH2	1:B:81:GLN:O	2.10	1.04
1:B:139:GLU:OE1	5:B:418:HOH:O	1.77	1.00
1:E:82:THR:N	1:E:85:GLU:HG3	1.77	0.99
1:D:100:ARG:O	5:D:319:HOH:O	1.82	0.98
1:E:83:LEU:HD12	1:E:84:ARG:CA	1.93	0.97
1:D:98:LEU:O	1:D:102:LYS:HG3	1.66	0.94
1:F:74:ILE:HG13	1:F:75:GLY:H	1.29	0.94
1:E:77:LEU:CD1	1:F:71:TYR:O	2.16	0.94
1:E:28:HIS:CD2	1:E:86:GLN:HG2	2.02	0.94
1:B:143:LYS:HE3	5:B:418:HOH:O	1.67	0.93
1:E:147:GLU:O	1:E:150:SER:HB3	1.68	0.92
1:D:13:GLU:OE1	5:D:320:HOH:O	1.89	0.91
1:C:103:PRO:O	1:C:106:VAL:HG22	1.73	0.88
1:E:69:PRO:HB2	1:F:27:LEU:HD11	1.54	0.88
1:B:94:GLU:CD	1:B:127:GLU:OE1	2.16	0.88
1:B:109:ARG:HE	1:D:109:ARG:HH12	1.15	0.88
1:A:127:GLU:O	1:A:131:ILE:HG13	1.75	0.86
1:B:7:VAL:HG13	1:B:8:LEU:HD12	1.56	0.86
1:C:61:ARG:NH2	1:C:115:THR:HB	1.89	0.86
1:C:8:LEU:HD11	1:C:67:GLY:HA3	1.56	0.86
1:A:24:GLN:HG3	1:A:77:LEU:HD22	1.57	0.86
1:D:9:ARG:HG2	5:D:321:HOH:O	1.75	0.85
1:B:102:LYS:HB2	1:B:103:PRO:HD3	1.57	0.85
1:B:99:ASN:ND2	5:B:409:HOH:O	2.10	0.85
1:A:77:LEU:HD11	1:B:71:TYR:O	1.76	0.85
1:B:128:GLU:OE1	1:D:61:ARG:NH1	2.10	0.85
1:B:95:TYR:OH	1:D:1:MET:HB2	1.76	0.84
1:E:1:MET:HE3	1:E:64:LEU:HD23	1.57	0.84
1:E:83:LEU:CD1	1:E:84:ARG:N	2.04	0.84
1:A:24:GLN:HE21	1:A:77:LEU:HA	1.41	0.83
1:A:24:GLN:NE2	1:A:77:LEU:HA	1.92	0.83
1:A:24:GLN:HE21	1:A:77:LEU:CA	1.91	0.83
1:D:85:GLU:OE2	5:D:314:HOH:O	1.96	0.83
1:A:16:THR:HG21	1:A:73:ARG:HG3	1.61	0.82

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:82:THR:HG23	1:B:85:GLU:H	1.43	0.82
4:B:301:HEM:HBB2	4:B:301:HEM:HHC	1.61	0.82
1:E:121:GLU:O	1:E:124:VAL:HG22	1.79	0.82
1:B:109:ARG:HE	1:D:109:ARG:NH1	1.79	0.81
1:F:102:LYS:CB	1:F:103:PRO:HD3	2.03	0.81
1:E:82:THR:H	1:E:85:GLU:CG	1.90	0.81
1:F:123:ILE:O	1:F:127:GLU:HG2	1.81	0.81
1:B:47:GLU:HG3	1:B:130:HIS:CE1	2.16	0.81
1:F:107:MET:HG3	1:F:111:LYS:NZ	1.96	0.81
3:F:203:TRS:N	5:F:309:HOH:O	2.14	0.80
1:B:35:TRP:CZ2	1:B:81:GLN:O	2.35	0.80
1:E:77:LEU:HD11	1:F:71:TYR:C	2.07	0.79
1:E:95:TYR:OH	1:E:135:GLU:OE2	1.99	0.79
1:E:28:HIS:CG	1:E:86:GLN:HG2	2.18	0.79
1:B:124:VAL:O	1:B:128:GLU:HG3	1.82	0.79
1:F:7:VAL:HG23	1:F:111:LYS:HE3	1.65	0.79
1:C:34:ASN:O	5:C:312:HOH:O	1.99	0.79
1:E:83:LEU:CG	1:E:84:ARG:H	1.94	0.78
1:A:78:ARG:CZ	1:A:92:ALA:HB1	2.13	0.78
1:A:14:GLN:O	1:A:18:GLU:HG2	1.84	0.78
4:E:301:HEM:HHD	4:E:301:HEM:HBC2	1.65	0.78
1:B:53[B]:ARG:HH11	4:B:301:HEM:HMD2	1.49	0.78
1:D:9:ARG:O	5:D:322:HOH:O	2.01	0.78
1:A:23:ASN:HB3	1:B:71:TYR:HB3	1.66	0.77
1:E:1:MET:HE3	1:E:64:LEU:CD2	2.13	0.77
1:E:83:LEU:CD1	1:E:141:MET:CE	2.40	0.77
4:D:201:HEM:HMD1	4:D:201:HEM:HBD2	1.64	0.77
1:E:69:PRO:HB2	1:F:27:LEU:CD1	2.14	0.77
1:E:136:THR:O	1:E:140:LEU:HG	1.84	0.77
1:F:6:ASP:O	1:F:9:ARG:HG2	1.84	0.77
1:B:94:GLU:OE2	1:B:127:GLU:OE1	2.03	0.77
1:E:1:MET:CE	1:E:64:LEU:HD21	2.15	0.77
1:E:16:THR:HG21	1:E:73:ARG:HB2	1.67	0.77
1:A:124:VAL:O	1:A:128:GLU:HG3	1.86	0.76
1:D:89:ALA:O	1:D:92:ALA:HB3	1.85	0.76
1:B:24:GLN:CD	1:B:93:ILE:HD11	2.10	0.76
1:E:83:LEU:HD11	1:E:141:MET:HE1	1.65	0.76
1:F:25:TYR:CE2	1:F:51:GLU:OE2	2.39	0.76
1:C:14:GLN:HE21	1:C:101:LEU:HD11	1.51	0.75
1:E:155:SER:O	1:E:156:ARG:CG	2.33	0.75
1:A:113:ASP:OD2	1:A:116:SER:OG	2.05	0.75

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:80:GLY:HA2	1:A:85:GLU:HG2	1.66	0.75
1:A:145:GLY:O	1:A:146:GLU:C	2.30	0.75
1:B:140:LEU:O	1:B:144:LEU:HB2	1.87	0.75
1:F:61:ARG:NH1	1:F:115:THR:HB	2.01	0.75
4:E:301:HEM:HHC	4:E:301:HEM:HBB2	1.68	0.74
1:B:32:GLN:OE1	1:B:40:LEU:HG	1.86	0.74
1:F:8:LEU:O	1:F:12:ASN:HB2	1.87	0.74
1:E:102:LYS:HB2	1:E:103:PRO:HD3	1.68	0.74
1:D:123:ILE:O	1:D:127:GLU:HG2	1.86	0.74
1:A:102:LYS:HB2	1:A:103:PRO:HD3	1.68	0.74
1:B:7:VAL:HG13	1:B:8:LEU:N	2.01	0.74
1:E:123:ILE:O	1:E:127:GLU:HG2	1.88	0.73
1:E:72:GLN:HE21	1:F:74:ILE:HD11	1.52	0.73
1:B:7:VAL:HG13	1:B:8:LEU:CD1	2.18	0.72
1:C:14:GLN:NE2	1:C:101:LEU:HD11	2.04	0.72
1:E:77:LEU:H	1:F:72:GLN:HE22	1.35	0.72
1:F:9:ARG:HG3	1:F:10:LEU:N	2.04	0.72
1:C:72:GLN:OE1	1:D:76:SER:HA	1.90	0.72
1:E:1:MET:CE	1:E:64:LEU:CD2	2.67	0.71
1:B:65:LEU:O	1:B:66:ASP:HB2	1.89	0.71
1:E:93:ILE:O	1:E:97:VAL:HG23	1.91	0.71
1:B:43:HIS:CE1	5:B:415:HOH:O	2.42	0.71
1:F:107:MET:CG	1:F:111:LYS:NZ	2.53	0.71
1:F:107:MET:CG	1:F:111:LYS:HZ1	2.04	0.71
1:B:13:GLU:HG3	1:B:100:ARG:HE	1.55	0.70
3:B:304:TRS:H12	5:B:421:HOH:O	1.92	0.70
1:D:84:ARG:HA	1:D:87:PHE:HD2	1.55	0.70
1:A:28:HIS:NE2	1:A:86:GLN:HG2	2.06	0.70
1:A:97:VAL:HA	1:A:100:ARG:HH12	1.57	0.70
1:B:6:ASP:O	1:B:9:ARG:HB2	1.93	0.69
1:E:155:SER:O	1:E:156:ARG:HG2	1.92	0.69
1:F:82:THR:O	1:F:85:GLU:N	2.25	0.69
1:A:36:GLY:O	1:A:154:VAL:HG12	1.92	0.69
1:C:114:THR:O	1:C:117:ALA:HB3	1.92	0.69
1:B:47:GLU:HG2	5:B:415:HOH:O	1.91	0.69
1:E:137:GLN:O	1:E:140:LEU:HB2	1.92	0.69
1:D:102:LYS:N	1:D:103:PRO:HD2	2.08	0.69
1:C:34:ASN:HA	5:C:312:HOH:O	1.92	0.68
1:F:94:GLU:OE1	1:F:127:GLU:HB3	1.93	0.68
4:B:301:HEM:HBC2	4:B:301:HEM:HMC2	1.75	0.68
1:C:14:GLN:HE22	1:C:97:VAL:HG13	1.58	0.68

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:16:THR:HG21	1:D:73:ARG:HD2	1.74	0.68
1:F:4:ASP:O	1:F:8:LEU:HD13	1.94	0.68
1:B:7:VAL:CG1	1:B:8:LEU:N	2.57	0.68
1:B:49:PHE:HE1	4:B:301:HEM:C1A	2.11	0.67
1:E:133:TYR:O	1:E:137:GLN:HG2	1.93	0.67
1:A:93:ILE:H	1:A:93:ILE:HD12	1.59	0.67
1:E:145:GLY:O	1:E:146:GLU:C	2.37	0.67
1:F:12:ASN:HD21	1:F:69:PRO:HA	1.59	0.67
1:F:74:ILE:HG13	1:F:75:GLY:N	2.05	0.67
1:A:27:LEU:HD23	1:A:79:ILE:HD12	1.77	0.67
1:B:53[B]:ARG:HG3	5:B:411:HOH:O	1.95	0.67
1:B:118:VAL:HG13	3:B:304:TRS:H11	1.77	0.67
1:F:25:TYR:HE2	1:F:51:GLU:OE2	1.76	0.67
1:A:123:ILE:O	1:A:127:GLU:HG2	1.95	0.66
1:B:94:GLU:OE1	1:B:127:GLU:OE1	2.12	0.66
1:A:97:VAL:HA	1:A:100:ARG:NH1	2.11	0.66
1:D:22:ILE:HG13	1:D:51:GLU:HB3	1.77	0.66
1:E:74:ILE:HG13	1:E:75:GLY:H	1.59	0.66
1:D:40:LEU:HB2	1:D:153:CYS:HB3	1.77	0.66
1:B:109:ARG:NE	1:D:109:ARG:NH1	2.44	0.65
1:D:144:LEU:HG	1:D:148:LEU:HD23	1.76	0.65
1:A:37:PHE:HE1	1:A:150:SER:HB3	1.61	0.65
1:B:120:LEU:HA	1:B:123:ILE:HG13	1.77	0.65
1:A:24:GLN:HG2	1:A:77:LEU:HB3	1.78	0.65
1:C:36:GLY:O	1:C:154:VAL:HG12	1.97	0.65
1:C:136:THR:OG1	5:C:305:HOH:O	2.00	0.65
1:B:117:ALA:O	1:B:121:GLU:HG3	1.97	0.65
1:B:71:TYR:HE2	4:B:301:HEM:HBC2	1.61	0.65
1:E:83:LEU:HD13	1:E:141:MET:HE1	0.70	0.65
1:A:117:ALA:O	1:A:121:GLU:HG3	1.96	0.65
1:E:24:GLN:OE1	1:E:93:ILE:HD11	1.97	0.65
1:F:54:HIS:CG	1:F:123:ILE:HD13	2.31	0.65
1:A:24:GLN:NE2	1:A:78:ARG:H	1.96	0.65
1:A:24:GLN:OE1	1:A:93:ILE:HD11	1.97	0.64
1:B:97:VAL:HG21	5:B:408:HOH:O	1.97	0.64
1:F:86:GLN:O	1:F:90:ASP:OD2	2.15	0.64
1:B:12:ASN:OD1	1:B:69:PRO:HA	1.96	0.64
1:D:16:THR:OG1	1:D:73:ARG:HB3	1.97	0.64
1:E:28:HIS:NE2	1:E:86:GLN:HG2	2.13	0.64
1:F:105:ILE:HG22	1:F:106:VAL:N	2.11	0.64
1:F:28:HIS:O	1:F:32:GLN:HG3	1.97	0.64

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:37:PHE:HA	1:E:153:CYS:O	1.98	0.63
1:E:156:ARG:N	1:E:157:PRO:O	2.30	0.63
1:B:7:VAL:CG1	1:B:8:LEU:CD1	2.77	0.63
1:B:28:HIS:CD2	1:B:86:GLN:HE21	2.15	0.63
1:C:70:ASN:HD21	1:C:73:ARG:HB2	1.64	0.63
1:E:27:LEU:HG	1:E:31:MET:HE3	1.80	0.63
1:B:7:VAL:CG1	1:B:8:LEU:H	2.11	0.63
1:B:18:GLU:OE2	1:B:51:GLU:OE1	2.17	0.63
1:B:109:ARG:NE	1:D:109:ARG:HH12	1.93	0.63
1:C:12:ASN:ND2	1:C:62:ILE:HD13	2.14	0.63
1:E:15:LEU:O	1:E:19:LEU:HD12	1.99	0.63
1:E:28:HIS:CE1	1:E:86:GLN:HG2	2.34	0.63
1:E:18:GLU:O	1:E:22:ILE:HG13	1.99	0.63
1:E:72:GLN:HE21	1:F:74:ILE:CD1	2.11	0.62
1:B:89:ALA:O	1:B:92:ALA:HB3	1.98	0.62
1:E:1:MET:HE1	1:E:64:LEU:HD21	1.82	0.62
1:E:71:TYR:CD1	1:F:27:LEU:HD13	2.33	0.62
1:E:158:PRO:O	1:E:159:THR:C	2.42	0.62
1:F:4:ASP:CG	1:F:6:ASP:H	2.06	0.62
1:B:51:GLU:OE1	1:B:51:GLU:HA	2.00	0.62
1:C:1:MET:HE3	1:C:64:LEU:O	2.00	0.62
1:C:102:LYS:HB2	1:C:103:PRO:CD	2.28	0.62
1:B:38:THR:CG2	5:B:413:HOH:O	2.48	0.61
1:D:104:GLY:HA3	5:D:319:HOH:O	1.99	0.61
1:A:3:GLY:HA3	1:A:65:LEU:HB3	1.82	0.61
1:A:98:LEU:HD12	1:A:131:ILE:CD1	2.30	0.61
4:E:301:HEM:CBC	1:F:26:PHE:CZ	2.83	0.61
1:A:139:GLU:O	1:A:143:LYS:HG3	2.01	0.61
1:F:49:PHE:HA	1:F:52:MET:HG3	1.80	0.61
4:E:301:HEM:HBB2	4:E:301:HEM:CHC	2.28	0.61
1:B:102:LYS:HB2	1:B:103:PRO:CD	2.30	0.61
1:D:151:ALA:O	1:D:154:VAL:HG22	2.00	0.61
1:A:56:GLU:OE1	4:B:301:HEM:CMA	2.49	0.60
1:A:70:ASN:OD1	1:A:73:ARG:HG2	2.00	0.60
1:A:98:LEU:HD22	1:A:102:LYS:HE3	1.83	0.60
1:C:28:HIS:NE2	1:C:86:GLN:HG2	2.16	0.60
1:E:57:GLU:HG2	1:E:119:LEU:HD11	1.83	0.60
4:E:301:HEM:HBC1	1:F:26:PHE:CE2	2.36	0.60
1:F:82:THR:OG1	1:F:85:GLU:HG3	2.01	0.60
1:C:111:LYS:O	1:C:112:GLN:HB2	2.01	0.60
1:A:78:ARG:NH1	1:A:92:ALA:HB1	2.17	0.60

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:24:GLN:NE2	1:A:78:ARG:N	2.50	0.60
1:B:148:LEU:HD21	1:C:148:LEU:HD12	1.82	0.60
1:B:13:GLU:CG	1:B:100:ARG:HE	2.14	0.60
1:F:70:ASN:HD22	1:F:73:ARG:HH21	1.48	0.60
1:C:123:ILE:O	1:C:127:GLU:HG2	2.02	0.60
1:E:19:LEU:HA	1:E:22:ILE:HD12	1.82	0.60
1:F:13:GLU:HG2	1:F:100:ARG:NH1	2.17	0.60
1:F:102:LYS:HB2	1:F:103:PRO:CD	2.22	0.60
1:F:18:GLU:OE1	1:F:51:GLU:HG3	2.01	0.60
1:A:94:GLU:HB3	1:A:131:ILE:HG12	1.84	0.59
1:B:131:ILE:O	1:B:135:GLU:HG3	2.01	0.59
1:F:74:ILE:CG1	1:F:75:GLY:H	2.10	0.59
1:B:49:PHE:O	1:B:53[B]:ARG:HG2	2.03	0.59
1:C:21:ALA:O	1:C:22:ILE:C	2.44	0.59
1:E:3:GLY:HA3	1:E:65:LEU:HB3	1.84	0.59
1:B:65:LEU:O	1:B:66:ASP:CB	2.50	0.59
4:D:201:HEM:HBC2	4:D:201:HEM:CMC	2.31	0.59
1:C:25:TYR:CD1	1:C:25:TYR:N	2.71	0.59
1:E:124:VAL:HG23	1:E:125:ALA:N	2.16	0.59
1:E:74:ILE:HG13	1:E:75:GLY:N	2.17	0.59
1:B:53[B]:ARG:NH1	4:B:301:HEM:HBD1	2.17	0.59
1:E:14:GLN:HE21	1:E:101:LEU:HG	1.68	0.59
1:D:9:ARG:CD	5:D:321:HOH:O	2.50	0.58
1:E:145:GLY:O	1:E:147:GLU:N	2.36	0.58
1:F:83:LEU:HA	1:F:86:GLN:HE21	1.67	0.58
1:D:9:ARG:CG	5:D:321:HOH:O	2.41	0.58
1:D:84:ARG:HB2	1:D:141:MET:SD	2.42	0.58
1:E:52:MET:O	1:E:55:ALA:HB3	2.03	0.58
1:E:61:ARG:NH2	1:E:115:THR:HB	2.18	0.58
1:C:95:TYR:OH	1:E:1:MET:HB3	2.03	0.58
1:E:82:THR:O	1:E:83:LEU:C	2.44	0.58
1:B:18:GLU:O	1:B:22:ILE:HG13	2.03	0.58
1:D:141:MET:HE2	1:D:146:GLU:HG2	1.84	0.58
1:E:83:LEU:HD12	1:E:84:ARG:H	0.49	0.58
1:F:26:PHE:CE2	1:F:30:LYS:HG3	2.39	0.58
1:F:40:LEU:HD22	1:F:153:CYS:SG	2.43	0.58
1:A:12:ASN:ND2	1:A:62:ILE:HD13	2.17	0.58
1:C:7:VAL:O	1:C:10:LEU:N	2.37	0.58
1:F:94:GLU:O	1:F:97:VAL:HB	2.04	0.58
1:E:4:ASP:HB3	1:E:7:VAL:HG23	1.85	0.58
1:A:29:SER:HB3	1:A:44:THR:HB	1.84	0.58

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:2:GLN:HG3	1:D:3:GLY:N	2.19	0.57
1:E:132:ASP:O	1:E:136:THR:HB	2.04	0.57
1:F:135:GLU:O	1:F:139:GLU:HG3	2.04	0.57
1:B:39:GLU:HB3	1:C:157:PRO:HD3	1.85	0.57
1:B:93:ILE:O	1:B:97:VAL:HG23	2.03	0.57
1:E:4:ASP:OD1	1:E:6:ASP:HB2	2.04	0.57
1:C:103:PRO:O	1:C:106:VAL:N	2.37	0.57
1:E:69:PRO:CB	1:F:27:LEU:HD11	2.30	0.57
1:A:24:GLN:HE21	1:A:78:ARG:N	2.03	0.57
1:C:102:LYS:HB2	1:C:103:PRO:HD2	1.85	0.57
4:D:201:HEM:HBB2	4:D:201:HEM:CHC	2.17	0.57
1:B:118:VAL:CG1	3:B:304:TRS:H11	2.33	0.57
1:F:24:GLN:HE22	1:F:90:ASP:HA	1.69	0.57
1:F:82:THR:O	1:F:83:LEU:C	2.47	0.57
1:E:26:PHE:CD2	4:E:301:HEM:HMB3	2.38	0.57
1:E:33:ASP:OD1	1:E:38:THR:HG22	2.04	0.57
1:D:14:GLN:HE21	1:D:18:GLU:HG2	1.70	0.57
1:B:127:GLU:O	1:B:131:ILE:HG13	2.05	0.56
1:A:89:ALA:O	1:A:92:ALA:HB3	2.05	0.56
1:B:28:HIS:CD2	1:B:86:GLN:HG3	2.40	0.56
1:E:137:GLN:NE2	1:E:149:TYR:OH	2.32	0.56
1:E:16:THR:HG22	1:E:73:ARG:O	2.05	0.56
1:E:36:GLY:C	1:E:38:THR:H	2.14	0.56
1:B:28:HIS:HD2	1:B:86:GLN:HE21	1.53	0.56
1:F:82:THR:H	1:F:85:GLU:HB2	1.71	0.56
1:A:56:GLU:OE2	1:B:45:ARG:NH1	2.38	0.56
1:A:93:ILE:O	1:A:97:VAL:HG23	2.05	0.56
1:B:49:PHE:HE1	4:B:301:HEM:C2A	2.24	0.56
1:D:156:ARG:O	1:D:156:ARG:HG3	2.05	0.56
1:F:12:ASN:CG	1:F:70:ASN:H	2.13	0.56
1:E:89:ALA:O	1:E:92:ALA:HB3	2.06	0.56
1:A:28:HIS:CD2	1:A:86:GLN:HG2	2.40	0.56
1:B:70:ASN:OD1	1:B:73:ARG:HB3	2.06	0.56
4:E:301:HEM:HBC1	1:F:26:PHE:CZ	2.41	0.56
1:B:27:LEU:O	1:B:31:MET:HB2	2.06	0.55
1:D:98:LEU:HD11	1:D:128:GLU:HG2	1.87	0.55
4:D:201:HEM:HBC2	4:D:201:HEM:HMC1	1.88	0.55
1:E:124:VAL:O	1:E:128:GLU:HG3	2.05	0.55
1:A:22:ILE:HD11	1:A:52:MET:HA	1.88	0.55
1:F:82:THR:O	1:F:84:ARG:N	2.40	0.55
1:B:53[B]:ARG:HH11	4:B:301:HEM:HBD1	1.71	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:7:VAL:CG1	1:B:8:LEU:HD13	2.36	0.55
1:E:28:HIS:HA	1:E:86:GLN:HE21	1.71	0.55
1:B:103:PRO:HA	1:D:112:GLN:HE22	1.70	0.55
1:D:48:SER:O	1:D:52:MET:HG3	2.07	0.55
1:A:24:GLN:OE1	1:A:93:ILE:CD1	2.54	0.55
1:A:52:MET:HB3	4:B:301:HEM:C1B	2.42	0.55
1:A:140:LEU:HD22	1:A:144:LEU:HD13	1.88	0.55
1:E:26:PHE:CE2	4:E:301:HEM:HMB3	2.41	0.55
1:A:24:GLN:CG	1:A:77:LEU:HB3	2.37	0.55
1:B:28:HIS:CD2	1:B:86:GLN:CG	2.90	0.55
1:C:128:GLU:OE1	1:E:115:THR:OG1	2.13	0.55
1:E:102:LYS:CB	1:E:103:PRO:HD3	2.36	0.55
1:A:66:ASP:OD1	1:A:66:ASP:O	2.25	0.54
1:A:146:GLU:O	1:A:147:GLU:C	2.49	0.54
1:C:72:GLN:HA	1:C:72:GLN:NE2	2.23	0.54
1:E:151:ALA:C	1:E:153:CYS:H	2.16	0.54
1:B:28:HIS:CG	1:B:86:GLN:HG2	2.43	0.54
1:F:7:VAL:HA	1:F:107:MET:CE	2.38	0.54
1:F:118:VAL:HA	1:F:121:GLU:OE1	2.07	0.54
1:C:28:HIS:CD2	1:C:86:GLN:HG2	2.43	0.54
1:F:25:TYR:CD2	1:F:51:GLU:OE2	2.60	0.54
1:B:24:GLN:OE1	1:B:93:ILE:HD11	2.08	0.54
1:C:62:ILE:HG22	1:C:69:PRO:HD3	1.89	0.54
1:D:135:GLU:HB2	5:D:318:HOH:O	2.08	0.54
1:E:61:ARG:CZ	1:E:115:THR:HB	2.37	0.54
1:F:28:HIS:CD2	1:F:86:GLN:HG2	2.43	0.54
1:A:18:GLU:OE1	1:A:51:GLU:OE1	2.26	0.54
1:A:145:GLY:O	1:A:147:GLU:N	2.41	0.54
1:A:149:TYR:C	1:A:149:TYR:CD2	2.84	0.54
1:C:79:ILE:O	1:C:79:ILE:HG23	2.08	0.54
1:B:71:TYR:HE2	4:B:301:HEM:CBC	2.21	0.53
1:C:94:GLU:O	1:C:98:LEU:HD12	2.08	0.53
1:D:80:GLY:HA3	1:D:86:GLN:CG	2.38	0.53
1:E:27:LEU:HD23	1:E:79:ILE:HD13	1.89	0.53
1:A:94:GLU:OE1	1:A:127:GLU:OE1	2.25	0.53
1:E:77:LEU:CD1	1:F:71:TYR:C	2.75	0.53
1:D:127:GLU:OE1	1:D:127:GLU:HA	2.08	0.53
1:E:14:GLN:NE2	1:E:101:LEU:HG	2.23	0.53
1:E:83:LEU:HD12	1:E:84:ARG:CB	2.39	0.53
1:B:54:HIS:O	1:B:57:GLU:HB2	2.09	0.53
1:D:104:GLY:CA	5:D:319:HOH:O	2.57	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:F:132:ASP:OD1	5:F:301:HOH:O	2.19	0.53
1:A:100:ARG:O	1:A:100:ARG:HG2	2.08	0.53
1:C:102:LYS:HD2	1:E:112:GLN:O	2.08	0.53
1:C:105:ILE:CD1	1:E:114:THR:HG21	2.39	0.52
1:F:107:MET:HE3	1:F:111:LYS:HZ1	1.74	0.52
1:B:28:HIS:O	1:B:32:GLN:HG3	2.09	0.52
1:B:91:LEU:HD21	1:B:135:GLU:HG2	1.90	0.52
1:F:25:TYR:OH	1:F:94:GLU:HG2	2.09	0.52
1:B:62:ILE:HG21	1:B:69:PRO:HG3	1.90	0.52
1:B:84:ARG:N	1:B:141:MET:HE1	2.23	0.52
1:B:102:LYS:CB	1:B:103:PRO:HD3	2.35	0.52
1:F:15:LEU:HD21	1:F:71:TYR:CE2	2.44	0.52
1:F:56:GLU:O	1:F:60:ASP:HB2	2.09	0.52
1:F:4:ASP:OD2	1:F:6:ASP:HB3	2.10	0.52
1:F:113:ASP:C	1:F:113:ASP:OD1	2.50	0.52
1:F:133:TYR:CE1	1:F:137:GLN:NE2	2.78	0.52
1:C:50:ASP:HA	1:C:53[B]:ARG:HH21	1.74	0.52
1:F:6:ASP:O	1:F:107:MET:HE1	2.09	0.52
1:B:7:VAL:HG13	1:B:8:LEU:H	1.72	0.52
1:D:61:ARG:NH1	1:D:115:THR:HB	2.25	0.52
1:E:1:MET:HB2	5:E:401:HOH:O	2.10	0.52
1:B:109:ARG:NH2	1:D:109:ARG:HH22	2.08	0.52
1:C:53[B]:ARG:CZ	4:D:201:HEM:O1A	2.57	0.52
1:D:103:PRO:HG2	1:D:104:GLY:H	1.74	0.52
1:C:98:LEU:O	1:C:102:LYS:HG2	2.10	0.52
4:B:301:HEM:HBC2	4:B:301:HEM:CMC	2.40	0.51
4:D:201:HEM:HHC	4:D:201:HEM:CBB	2.23	0.51
1:F:21:ALA:O	1:F:22:ILE:C	2.48	0.51
1:F:27:LEU:HD23	1:F:79:ILE:HD12	1.91	0.51
1:E:137:GLN:HA	1:E:140:LEU:HD12	1.92	0.51
1:C:4:ASP:OD2	1:C:4:ASP:C	2.53	0.51
1:E:52:MET:HB3	4:E:301:HEM:CHD	2.41	0.51
1:F:19:LEU:HA	1:F:22:ILE:HD12	1.91	0.51
1:F:84:ARG:HG3	1:F:138:LEU:CD2	2.41	0.51
1:F:95:TYR:O	1:F:96:ASP:C	2.53	0.51
1:E:55:ALA:O	1:E:59:THR:OG1	2.27	0.51
1:C:14:GLN:O	1:C:18:GLU:HB2	2.11	0.51
1:E:148:LEU:O	1:E:151:ALA:N	2.41	0.51
1:F:27:LEU:HG	1:F:31:MET:HE3	1.92	0.51
1:A:21:ALA:HB1	1:A:25:TYR:CE2	2.46	0.51
1:E:124:VAL:CG2	1:E:125:ALA:N	2.73	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:40:LEU:HB2	1:B:153:CYS:HB3	1.93	0.51
1:B:62:ILE:CG2	1:B:69:PRO:HG3	2.41	0.51
1:E:19:LEU:HD21	1:E:71:TYR:CD2	2.45	0.51
1:F:7:VAL:HG23	1:F:111:LYS:CE	2.40	0.51
1:E:91:LEU:HG	1:E:134:LEU:HB3	1.93	0.50
1:F:12:ASN:OD1	1:F:70:ASN:N	2.43	0.50
1:A:29:SER:CB	1:A:44:THR:HB	2.41	0.50
1:A:116:SER:O	1:A:120:LEU:HG	2.11	0.50
1:A:142:ASP:O	5:A:312:HOH:O	2.17	0.50
1:B:7:VAL:HG23	1:B:108:CYS:SG	2.51	0.50
1:C:10:LEU:HD22	1:C:107:MET:HE3	1.93	0.50
1:E:51:GLU:HA	1:E:51:GLU:OE1	2.10	0.50
1:F:8:LEU:HD23	1:F:67:GLY:HA3	1.93	0.50
1:E:28:HIS:HA	1:E:86:GLN:NE2	2.27	0.50
1:F:29:SER:HB3	1:F:44:THR:HG22	1.93	0.50
1:F:36:GLY:O	1:F:154:VAL:HG12	2.11	0.50
1:D:22:ILE:HD11	1:D:52:MET:HA	1.94	0.50
1:D:53[B]:ARG:NH1	4:D:201:HEM:O2D	2.44	0.50
1:E:127:GLU:HA	1:E:127:GLU:OE1	2.12	0.50
1:E:140:LEU:HD12	1:E:149:TYR:HE1	1.77	0.50
1:E:36:GLY:C	1:E:38:THR:N	2.70	0.50
1:E:139:GLU:O	1:E:143:LYS:HG3	2.11	0.50
1:F:106:VAL:HG13	1:F:107:MET:N	2.26	0.50
1:D:39:GLU:OE1	1:D:155:SER:HB3	2.11	0.50
1:E:60:ASP:OD2	5:E:405:HOH:O	2.20	0.50
1:E:107:MET:O	1:E:111:LYS:CG	2.60	0.50
1:A:7:VAL:O	1:A:10:LEU:N	2.44	0.50
1:B:15:LEU:O	1:B:19:LEU:HG	2.12	0.50
1:C:74:ILE:HG23	1:C:74:ILE:O	2.11	0.50
1:A:138:LEU:O	1:A:139:GLU:C	2.55	0.50
1:C:140:LEU:HD21	1:F:35:TRP:O	2.11	0.50
1:B:14:GLN:HA	1:B:14:GLN:OE1	2.11	0.50
1:D:22:ILE:HG12	1:D:52:MET:HG2	1.94	0.50
1:D:139:GLU:O	1:D:143:LYS:HG3	2.12	0.49
1:E:83:LEU:O	1:E:84:ARG:C	2.54	0.49
1:F:50:ASP:HA	1:F:53[B]:ARG:HD2	1.94	0.49
1:D:74:ILE:O	1:D:75:GLY:O	2.30	0.49
1:B:24:GLN:NE2	1:B:93:ILE:HD11	2.26	0.49
1:C:89:ALA:O	1:C:92:ALA:HB3	2.12	0.49
1:F:107:MET:HG3	1:F:111:LYS:HZ3	1.72	0.49
1:A:50:ASP:O	1:A:53[A]:ARG:HB3	2.12	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:53[B]:ARG:O	1:D:57:GLU:HG3	2.11	0.49
1:A:7:VAL:O	1:A:8:LEU:C	2.56	0.49
1:B:24:GLN:HB2	1:B:77:LEU:HD22	1.93	0.49
1:D:98:LEU:HD21	1:D:124:VAL:HG13	1.95	0.49
1:F:109:ARG:HH12	1:F:117:ALA:HB3	1.77	0.49
1:F:54:HIS:CD2	1:F:123:ILE:HD13	2.47	0.49
1:B:61:ARG:NH1	1:B:64:LEU:HD22	2.28	0.49
1:B:132:ASP:OD1	1:B:132:ASP:C	2.56	0.49
1:D:85:GLU:HG3	5:D:314:HOH:O	2.13	0.49
1:A:25:TYR:OH	1:A:94:GLU:OE2	2.30	0.48
1:C:2:GLN:HG3	1:C:3:GLY:N	2.27	0.48
1:C:25:TYR:OH	1:C:94:GLU:OE2	2.27	0.48
1:D:48:SER:O	1:D:51:GLU:HB2	2.13	0.48
1:B:26:PHE:O	1:B:29:SER:OG	2.26	0.48
1:F:24:GLN:NE2	1:F:90:ASP:HA	2.27	0.48
1:F:54:HIS:CE1	1:F:123:ILE:HG23	2.47	0.48
1:B:59:THR:O	1:B:63:LEU:HG	2.13	0.48
1:B:70:ASN:ND2	1:B:72:GLN:H	2.11	0.48
1:F:130:HIS:O	1:F:134:LEU:HG	2.14	0.48
1:F:135:GLU:OE1	1:F:135:GLU:HA	2.12	0.48
1:A:1:MET:HE3	1:A:64:LEU:CD2	2.43	0.48
1:F:100:ARG:HG3	1:F:101:LEU:N	2.27	0.48
1:A:24:GLN:HE21	1:A:77:LEU:C	2.21	0.48
1:D:12:ASN:CB	5:D:322:HOH:O	2.61	0.48
1:D:152:GLN:HA	1:D:152:GLN:NE2	2.29	0.48
1:F:25:TYR:CD1	1:F:90:ASP:OD1	2.66	0.48
1:B:99:ASN:O	1:B:103:PRO:HD2	2.13	0.48
1:D:80:GLY:HA3	1:D:86:GLN:HG3	1.95	0.48
1:E:28:HIS:O	1:E:31:MET:HB2	2.13	0.48
1:E:50:ASP:O	1:E:53[A]:ARG:HB3	2.14	0.48
1:E:152:GLN:N	1:E:152:GLN:OE1	2.46	0.48
1:E:155:SER:O	1:E:156:ARG:HG3	2.10	0.48
1:C:8:LEU:HD11	1:C:67:GLY:CA	2.37	0.48
1:F:26:PHE:CE2	1:F:30:LYS:CG	2.96	0.48
1:A:74:ILE:HG23	1:A:75:GLY:O	2.14	0.48
1:C:61:ARG:CZ	1:C:115:THR:HB	2.44	0.48
1:D:102:LYS:N	1:D:103:PRO:CD	2.77	0.48
1:F:32:GLN:HG2	1:F:86:GLN:HE22	1.77	0.48
1:B:28:HIS:CD2	1:B:86:GLN:NE2	2.82	0.48
1:A:22:ILE:HD13	1:A:52:MET:HG2	1.95	0.47
1:E:69:PRO:CB	1:F:27:LEU:CD1	2.88	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:F:1:MET:SD	1:F:2:GLN:N	2.87	0.47
1:A:95:TYR:O	1:A:96:ASP:C	2.58	0.47
1:D:97:VAL:O	1:D:101:LEU:HB2	2.13	0.47
1:F:21:ALA:HB3	1:F:51:GLU:HG2	1.96	0.47
1:C:18:GLU:HG2	1:C:58:ILE:HD12	1.96	0.47
1:C:140:LEU:O	1:C:144:LEU:HB2	2.13	0.47
1:B:109:ARG:HB2	5:B:401:HOH:O	2.14	0.47
1:C:17:SER:HB3	1:C:100:ARG:HH22	1.79	0.47
1:C:139:GLU:O	1:C:142:ASP:N	2.47	0.47
1:E:14:GLN:OE1	1:E:17:SER:OG	2.29	0.47
1:C:139:GLU:C	1:C:141:MET:N	2.69	0.47
1:D:137:GLN:O	1:D:141:MET:N	2.47	0.47
1:E:21:ALA:HB1	1:E:25:TYR:CE2	2.49	0.47
1:E:86:GLN:O	1:E:89:ALA:N	2.48	0.47
1:B:149:TYR:CE1	1:C:158:PRO:HG2	2.50	0.47
1:B:138:LEU:HD23	1:B:138:LEU:HA	1.54	0.47
1:F:13:GLU:HG2	1:F:100:ARG:HH12	1.77	0.47
1:D:51:GLU:OE1	1:D:51:GLU:HA	2.15	0.47
1:B:29:SER:C	1:B:31:MET:N	2.73	0.47
1:D:101:LEU:O	1:D:105:ILE:HG13	2.15	0.47
1:F:12:ASN:ND2	1:F:69:PRO:HA	2.27	0.46
1:E:16:THR:HA	1:E:19:LEU:HD12	1.98	0.46
1:E:43:HIS:HD2	1:E:43:HIS:O	1.97	0.46
1:F:116:SER:O	1:F:120:LEU:HG	2.15	0.46
1:A:94:GLU:OE1	1:A:127:GLU:HB3	2.14	0.46
1:C:4:ASP:OD1	1:C:111:LYS:HB3	2.16	0.46
1:D:50:ASP:O	1:D:53[A]:ARG:HB3	2.15	0.46
1:E:75:GLY:O	1:F:72:GLN:OE1	2.34	0.46
1:E:80:GLY:HA2	1:E:85:GLU:HB3	1.98	0.46
1:C:20:THR:HG23	1:C:77:LEU:HD23	1.98	0.46
1:D:28:HIS:CD2	1:D:86:GLN:HG2	2.50	0.46
1:F:28:HIS:CD2	1:F:86:GLN:CG	2.98	0.46
1:A:107:MET:HE3	1:A:108:CYS:N	2.31	0.46
1:C:7:VAL:C	1:C:9:ARG:N	2.74	0.46
1:C:52:MET:HB3	4:D:201:HEM:C1B	2.51	0.46
1:C:102:LYS:CB	1:C:103:PRO:CD	2.92	0.46
1:F:40:LEU:HB2	1:F:153:CYS:SG	2.56	0.46
1:A:52:MET:HB3	4:B:301:HEM:CHB	2.45	0.46
1:B:40:LEU:CB	1:B:153:CYS:HB3	2.46	0.46
1:B:49:PHE:CE1	4:B:301:HEM:C2A	3.03	0.46
1:F:15:LEU:O	1:F:19:LEU:HG	2.15	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:29:SER:HB2	1:A:41:ALA:O	2.16	0.46
1:E:1:MET:HA	5:E:401:HOH:O	2.15	0.46
1:F:14:GLN:HG3	1:F:58:ILE:HD13	1.97	0.46
1:F:26:PHE:HE2	1:F:30:LYS:HG3	1.79	0.46
1:F:29:SER:HB3	1:F:44:THR:CG2	2.45	0.46
1:F:50:ASP:O	1:F:53[B]:ARG:HB2	2.16	0.46
1:B:118:VAL:HA	1:B:121:GLU:OE1	2.15	0.46
1:C:49:PHE:CD2	1:C:49:PHE:N	2.84	0.46
1:C:68:LEU:C	1:C:68:LEU:HD12	2.39	0.46
1:E:1:MET:CA	5:E:401:HOH:O	2.62	0.46
1:B:38:THR:HG23	5:B:413:HOH:O	2.14	0.45
1:E:52:MET:HE2	4:E:301:HEM:NB	2.30	0.45
1:A:49:PHE:HA	1:A:52:MET:SD	2.55	0.45
1:F:12:ASN:ND2	1:F:70:ASN:H	2.13	0.45
1:F:62:ILE:CG2	1:F:67:GLY:O	2.64	0.45
1:C:49:PHE:N	1:C:49:PHE:HD2	2.14	0.45
1:C:148:LEU:HD21	1:F:148:LEU:HD13	1.98	0.45
1:D:53[B]:ARG:HG2	4:D:201:HEM:O2D	2.17	0.45
1:F:70:ASN:HD21	1:F:73:ARG:HE	1.64	0.45
1:C:15:LEU:HD23	1:C:70:ASN:O	2.16	0.45
1:D:156:ARG:HA	1:D:157:PRO:HA	1.64	0.45
1:E:94:GLU:OE1	1:E:94:GLU:HA	2.16	0.45
1:C:149:TYR:CE1	1:F:158:PRO:HG2	2.52	0.45
1:D:18:GLU:OE1	1:D:51:GLU:OE1	2.34	0.45
1:D:95:TYR:OH	1:D:135:GLU:OE2	2.34	0.45
1:F:106:VAL:CG1	1:F:107:MET:N	2.79	0.45
1:F:61:ARG:HH12	1:F:115:THR:HB	1.76	0.45
1:B:14:GLN:HE22	1:B:97:VAL:CG1	2.29	0.45
3:B:304:TRS:C1	5:B:421:HOH:O	2.56	0.45
1:C:10:LEU:HD21	1:C:104:GLY:HA3	1.97	0.45
1:E:83:LEU:CD1	1:E:84:ARG:HB2	2.47	0.45
1:F:7:VAL:O	1:F:10:LEU:N	2.50	0.45
1:F:10:LEU:HD21	1:F:104:GLY:HA3	1.98	0.45
1:D:98:LEU:HD23	1:D:98:LEU:HA	1.86	0.45
4:E:301:HEM:HBC2	4:E:301:HEM:CHD	2.40	0.45
1:D:2:GLN:HG3	1:D:3:GLY:H	1.79	0.45
1:D:6:ASP:O	1:D:9:ARG:HB3	2.17	0.45
1:D:54:HIS:O	1:D:58:ILE:HG13	2.16	0.45
1:F:131:ILE:O	1:F:135:GLU:HG2	2.17	0.45
1:C:56:GLU:CG	1:D:26:PHE:HZ	2.30	0.45
1:D:85:GLU:CG	5:D:314:HOH:O	2.65	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:127:GLU:OE1	1:D:127:GLU:CA	2.64	0.44
1:E:83:LEU:HD12	1:E:84:ARG:HB2	1.99	0.44
1:A:100:ARG:NH1	1:A:100:ARG:HB3	2.32	0.44
1:C:9:ARG:O	1:C:13:GLU:HB2	2.18	0.44
1:A:91:LEU:CD2	1:A:131:ILE:HG23	2.48	0.44
1:B:102:LYS:CB	1:B:103:PRO:CD	2.94	0.44
1:C:25:TYR:N	1:C:25:TYR:HD1	2.12	0.44
1:D:110:GLU:C	1:D:112:GLN:H	2.26	0.44
1:E:4:ASP:O	1:E:5:PRO:C	2.60	0.44
1:E:53[A]:ARG:O	1:E:57:GLU:HB2	2.17	0.44
1:F:109:ARG:NH2	1:F:121:GLU:OE2	2.47	0.44
1:A:111:LYS:O	1:A:112:GLN:HB2	2.17	0.44
1:B:13:GLU:HG3	1:B:100:ARG:NE	2.28	0.44
1:B:67:GLY:O	1:B:69:PRO:HD3	2.18	0.44
1:C:105:ILE:HD12	1:E:114:THR:HG21	1.99	0.44
1:E:101:LEU:O	1:E:105:ILE:HG13	2.17	0.44
1:F:8:LEU:H	1:F:8:LEU:CD1	2.31	0.44
1:F:15:LEU:O	1:F:15:LEU:HD12	2.18	0.44
1:A:120:LEU:O	1:A:124:VAL:HG23	2.17	0.44
1:B:82:THR:O	1:B:86:GLN:HB2	2.17	0.44
1:C:7:VAL:O	1:C:9:ARG:N	2.50	0.44
1:E:8:LEU:O	1:E:12:ASN:HB2	2.17	0.44
1:D:31:MET:HE1	1:D:79:ILE:HG21	2.00	0.44
1:A:43:HIS:O	1:A:46:ALA:HB3	2.18	0.44
1:B:28:HIS:CG	1:B:86:GLN:CG	3.01	0.44
1:A:131:ILE:O	1:A:135:GLU:HG2	2.18	0.44
1:B:156:ARG:HA	1:B:157:PRO:HA	1.76	0.44
1:E:113:ASP:OD1	1:E:113:ASP:C	2.61	0.44
1:E:31:MET:HE1	1:E:79:ILE:HG21	2.00	0.44
1:E:39:GLU:OE2	1:E:39:GLU:N	2.51	0.44
1:A:28:HIS:CD2	1:A:86:GLN:NE2	2.86	0.43
1:E:155:SER:HB2	1:E:156:ARG:H	1.51	0.43
1:A:24:GLN:O	1:A:28:HIS:HB2	2.18	0.43
1:C:71:TYR:O	1:D:77:LEU:HD11	2.18	0.43
1:D:4:ASP:OD1	1:D:6:ASP:HB2	2.17	0.43
1:D:19:LEU:HD23	1:D:22:ILE:HD12	2.00	0.43
1:E:32:GLN:HE21	1:E:40:LEU:CD2	2.31	0.43
1:E:107:MET:O	1:E:111:LYS:HG3	2.17	0.43
1:F:78:ARG:O	1:F:89:ALA:HB1	2.18	0.43
1:C:105:ILE:HD13	1:C:121:GLU:HG3	2.00	0.43
1:C:121:GLU:O	1:C:124:VAL:HB	2.18	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:156:ARG:HA	1:C:157:PRO:HA	1.87	0.43
1:D:12:ASN:HB2	5:D:322:HOH:O	2.18	0.43
1:D:25:TYR:CD1	1:D:25:TYR:N	2.84	0.43
1:E:72:GLN:O	1:F:74:ILE:CD1	2.67	0.43
1:C:101:LEU:O	1:C:102:LYS:C	2.62	0.43
1:D:84:ARG:H	1:D:141:MET:HE1	1.83	0.43
1:E:107:MET:O	1:E:111:LYS:HG2	2.18	0.43
1:B:123:ILE:O	1:B:127:GLU:HG2	2.19	0.43
1:C:34:ASN:C	5:C:312:HOH:O	2.57	0.43
1:D:118:VAL:O	1:D:119:LEU:C	2.61	0.43
1:E:28:HIS:CD2	1:E:86:GLN:HE21	2.36	0.43
1:F:84:ARG:NE	1:F:146:GLU:OE2	2.46	0.43
1:A:14:GLN:OE1	1:A:100:ARG:NH1	2.52	0.43
1:B:16:THR:C	1:B:18:GLU:N	2.76	0.43
1:A:12:ASN:OD1	1:A:70:ASN:N	2.43	0.43
1:B:6:ASP:HA	1:B:9:ARG:HB2	2.01	0.43
1:D:61:ARG:CZ	1:D:115:THR:HB	2.49	0.43
1:E:82:THR:O	1:E:84:ARG:N	2.52	0.43
1:E:103:PRO:HA	1:E:106:VAL:HG23	2.01	0.43
1:F:40:LEU:C	1:F:42:ALA:N	2.76	0.43
1:F:68:LEU:HD13	1:F:68:LEU:HA	1.72	0.43
1:E:29:SER:HB2	1:E:41:ALA:O	2.19	0.43
1:E:72:GLN:O	1:F:74:ILE:HD13	2.19	0.43
1:F:61:ARG:NE	1:F:116:SER:OG	2.50	0.43
1:B:7:VAL:HG12	1:B:8:LEU:HD13	2.01	0.43
1:F:2:GLN:CG	1:F:3:GLY:N	2.82	0.43
1:A:37:PHE:O	1:A:41:ALA:N	2.45	0.42
1:C:124:VAL:HG12	1:C:125:ALA:N	2.33	0.42
1:F:133:TYR:O	1:F:136:THR:OG1	2.35	0.42
1:C:4:ASP:HA	1:C:5:PRO:HD3	1.89	0.42
1:C:22:ILE:HD11	1:C:52:MET:HA	2.00	0.42
1:F:18:GLU:O	1:F:21:ALA:N	2.51	0.42
1:A:18:GLU:O	1:A:19:LEU:C	2.62	0.42
1:C:95:TYR:O	1:C:96:ASP:C	2.61	0.42
1:E:14:GLN:HE21	1:E:101:LEU:CG	2.30	0.42
1:E:114:THR:O	1:E:117:ALA:HB3	2.18	0.42
1:F:4:ASP:OD2	1:F:111:LYS:HE3	2.20	0.42
1:F:7:VAL:HG13	1:F:11:LEU:HG	2.02	0.42
1:B:45:ARG:NE	1:B:49:PHE:HE2	2.18	0.42
1:E:114:THR:O	1:E:118:VAL:HG23	2.19	0.42
1:F:82:THR:C	1:F:84:ARG:N	2.78	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:8:LEU:HD23	1:A:8:LEU:HA	1.78	0.42
1:A:102:LYS:HB2	1:A:103:PRO:CD	2.46	0.42
1:B:28:HIS:CD2	1:B:79:ILE:HG23	2.55	0.42
1:D:15:LEU:O	1:D:15:LEU:HD12	2.19	0.42
1:D:22:ILE:HG23	1:D:52:MET:HE2	2.00	0.42
1:D:26:PHE:O	1:D:30:LYS:HG2	2.19	0.42
1:E:50:ASP:HA	1:E:53[B]:ARG:HG3	2.00	0.42
1:D:80:GLY:HA3	1:D:86:GLN:HG2	2.01	0.42
1:A:84:ARG:O	1:A:85:GLU:C	2.62	0.42
1:C:85:GLU:O	1:C:88:GLU:N	2.53	0.42
1:C:113:ASP:CG	1:C:116:SER:HB2	2.44	0.42
1:D:28:HIS:O	1:D:29:SER:C	2.62	0.42
1:E:43:HIS:C	1:E:43:HIS:CD2	2.97	0.42
1:F:18:GLU:O	1:F:19:LEU:C	2.62	0.42
1:B:62:ILE:HG22	1:B:67:GLY:O	2.19	0.42
1:B:70:ASN:HD21	1:B:72:GLN:HB3	1.84	0.42
1:C:105:ILE:HG21	1:E:114:THR:HG21	2.02	0.42
1:E:31:MET:HE1	1:E:79:ILE:CG2	2.50	0.42
1:F:8:LEU:CD1	1:F:8:LEU:N	2.83	0.42
1:A:133:TYR:O	1:A:134:LEU:C	2.63	0.41
1:B:43:HIS:CE1	1:B:133:TYR:CZ	3.07	0.41
1:C:32:GLN:NE2	1:C:86:GLN:OE1	2.45	0.41
1:C:139:GLU:O	1:C:141:MET:N	2.53	0.41
1:C:146:GLU:O	1:C:147:GLU:C	2.60	0.41
1:E:68:LEU:O	1:E:69:PRO:C	2.62	0.41
1:E:120:LEU:O	1:E:124:VAL:HG13	2.20	0.41
1:B:8:LEU:N	1:B:8:LEU:CD1	2.83	0.41
1:A:129:GLU:O	1:A:130:HIS:C	2.63	0.41
1:C:1:MET:HE2	1:C:1:MET:HB3	1.71	0.41
1:C:72:GLN:HA	1:C:72:GLN:HE21	1.84	0.41
1:E:111:LYS:O	1:E:112:GLN:HB2	2.20	0.41
1:F:107:MET:CE	1:F:111:LYS:HZ1	2.32	0.41
1:C:38:THR:HG21	1:C:159:THR:HB	2.01	0.41
1:D:19:LEU:HA	1:D:22:ILE:HD12	2.03	0.41
1:E:137:GLN:NE2	1:E:140:LEU:HD12	2.35	0.41
1:F:45:ARG:O	1:F:48:SER:HB3	2.20	0.41
1:E:63:LEU:HD23	1:E:63:LEU:HA	1.91	0.41
1:B:91:LEU:CD2	1:B:135:GLU:HG2	2.50	0.41
1:C:21:ALA:CB	1:C:51:GLU:HG2	2.50	0.41
1:C:28:HIS:ND1	1:C:90:ASP:OD1	2.53	0.41
1:D:26:PHE:CZ	4:D:201:HEM:HMB1	2.56	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:57:GLU:O	1:D:60:ASP:HB2	2.21	0.41
1:E:49:PHE:O	1:E:53[B]:ARG:HG2	2.21	0.41
1:F:40:LEU:O	1:F:41:ALA:C	2.63	0.41
1:F:111:LYS:HE2	1:F:111:LYS:HB2	1.90	0.41
1:A:16:THR:C	1:A:18:GLU:N	2.77	0.41
1:C:17:SER:HB3	1:C:100:ARG:NH2	2.36	0.41
1:C:98:LEU:HD13	1:C:131:ILE:CD1	2.50	0.41
1:E:18:GLU:O	1:E:19:LEU:C	2.63	0.41
1:F:91:LEU:HD22	1:F:95:TYR:HE2	1.85	0.41
1:C:105:ILE:O	1:C:109:ARG:HG3	2.21	0.41
1:D:21:ALA:O	1:D:22:ILE:C	2.62	0.41
4:E:301:HEM:CBC	1:F:26:PHE:CE1	3.03	0.41
1:F:24:GLN:HE22	1:F:89:ALA:C	2.29	0.41
1:A:83:LEU:O	1:A:84:ARG:C	2.64	0.41
1:A:113:ASP:OD2	1:A:116:SER:CB	2.69	0.41
1:B:52:MET:HB3	4:B:301:HEM:CHD	2.50	0.41
1:B:114:THR:O	1:B:118:VAL:HG23	2.21	0.41
1:C:10:LEU:O	1:C:13:GLU:N	2.53	0.41
1:C:124:VAL:O	1:C:125:ALA:C	2.63	0.41
1:E:95:TYR:C	1:E:97:VAL:N	2.77	0.41
1:F:107:MET:HG2	1:F:111:LYS:NZ	2.33	0.41
1:F:111:LYS:O	1:F:112:GLN:HB2	2.21	0.41
1:E:156:ARG:HA	1:E:157:PRO:HA	1.93	0.41
1:A:91:LEU:HD23	1:A:131:ILE:HG23	2.02	0.40
1:B:28:HIS:NE2	1:B:79:ILE:HA	2.35	0.40
1:B:70:ASN:ND2	1:B:72:GLN:HB3	2.36	0.40
1:C:139:GLU:C	1:C:141:MET:H	2.29	0.40
1:A:107:MET:O	1:A:111:LYS:HG2	2.22	0.40
1:B:2:GLN:HA	1:B:65:LEU:O	2.20	0.40
1:B:48:SER:O	1:B:52:MET:HG3	2.21	0.40
1:B:98:LEU:O	1:B:102:LYS:HD2	2.21	0.40
1:C:49:PHE:C	1:C:51:GLU:N	2.77	0.40
1:C:133:TYR:O	1:C:137:GLN:HG2	2.22	0.40
1:E:28:HIS:ND1	1:E:86:GLN:HG2	2.35	0.40
1:E:29:SER:O	1:E:30:LYS:C	2.64	0.40
1:E:138:LEU:C	1:E:140:LEU:N	2.79	0.40
1:A:30:LYS:HD2	1:B:56:GLU:HG3	2.03	0.40
1:B:71:TYR:CE2	4:B:301:HEM:CBC	3.02	0.40
1:C:73:ARG:HE	1:C:73:ARG:HB3	1.68	0.40
1:D:61:ARG:HA	1:D:61:ARG:HD2	1.90	0.40
1:F:138:LEU:O	1:F:141:MET:HB2	2.21	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:79:ILE:O	1:A:79:ILE:HG22	2.21	0.40
1:B:116:SER:O	1:B:120:LEU:HG	2.21	0.40
1:C:17:SER:CB	1:C:100:ARG:HH22	2.34	0.40
1:F:7:VAL:HG22	1:F:107:MET:HE2	2.02	0.40
1:A:56:GLU:OE1	4:B:301:HEM:HMA1	2.21	0.40
1:C:27:LEU:HD23	1:C:79:ILE:CD1	2.51	0.40
1:C:27:LEU:HD23	1:C:79:ILE:HD13	2.04	0.40
1:F:109:ARG:HH12	1:F:117:ALA:CB	2.33	0.40

All (6) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:B:423:HOH:O	5:D:310:HOH:O[4_555]	0.59	1.61
5:A:314:HOH:O	5:D:311:HOH:O[4_555]	0.71	1.49
1:B:6:ASP:OD1	1:F:76:SER:OG[6_544]	1.06	1.14
1:A:1:MET:N	5:D:309:HOH:O[4_555]	1.36	0.84
1:A:121:GLU:O	5:B:420:HOH:O[4_555]	1.59	0.61
1:D:139:GLU:OE1	5:B:423:HOH:O[3_555]	2.05	0.15

5.3 Torsion angles

5.3.1 Protein backbone

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	158/161 (98%)	140 (89%)	16 (10%)	2 (1%)	9	32
1	B	158/161 (98%)	141 (89%)	16 (10%)	1 (1%)	21	51
1	C	158/161 (98%)	133 (84%)	22 (14%)	3 (2%)	6	23
1	D	158/161 (98%)	140 (89%)	16 (10%)	2 (1%)	9	32
1	E	158/161 (98%)	117 (74%)	35 (22%)	6 (4%)	2	10
1	F	158/161 (98%)	129 (82%)	25 (16%)	4 (2%)	4	17

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles
All	All	948/966 (98%)	800 (84%)	130 (14%)	18 (2%)	6 23

All (18) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	146	GLU
1	B	66	ASP
1	D	74	ILE
1	E	83	LEU
1	E	146	GLU
1	A	147	GLU
1	D	75	GLY
1	E	147	GLU
1	E	155	SER
1	F	83	LEU
1	C	8	LEU
1	F	103	PRO
1	C	22	ILE
1	C	140	LEU
1	E	84	ARG
1	E	142	ASP
1	F	147	GLU
1	F	97	VAL

5.3.2 Protein sidechains ⓘ

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
1	A	143/143 (100%)	135 (94%)	8 (6%)	19 50
1	B	143/143 (100%)	134 (94%)	9 (6%)	16 45
1	C	143/143 (100%)	130 (91%)	13 (9%)	9 28
1	D	143/143 (100%)	136 (95%)	7 (5%)	22 54
1	E	143/143 (100%)	132 (92%)	11 (8%)	12 35
1	F	143/143 (100%)	131 (92%)	12 (8%)	10 31

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
All	All	858/858 (100%)	798 (93%)	60 (7%)	14	40

All (60) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	1	MET
1	A	7	VAL
1	A	12	ASN
1	A	16	THR
1	A	106	VAL
1	A	114	THR
1	A	136	THR
1	A	155	SER
1	B	1	MET
1	B	13	GLU
1	B	79	ILE
1	B	91	LEU
1	B	93	ILE
1	B	110	GLU
1	B	123	ILE
1	B	131	ILE
1	B	141	MET
1	C	8	LEU
1	C	12	ASN
1	C	51	GLU
1	C	68	LEU
1	C	78	ARG
1	C	94	GLU
1	C	98	LEU
1	C	100	ARG
1	C	107	MET
1	C	123	ILE
1	C	124	VAL
1	C	131	ILE
1	C	141	MET
1	D	16	THR
1	D	51	GLU
1	D	53[A]	ARG
1	D	53[B]	ARG
1	D	68	LEU
1	D	73	ARG
1	D	76	SER

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Mol	Chain	Res	Type
1	E	16	THR
1	E	40	LEU
1	E	51	GLU
1	E	81	GLN
1	E	85	GLU
1	E	106	VAL
1	E	111	LYS
1	E	118	VAL
1	E	136	THR
1	E	152	GLN
1	E	155	SER
1	F	7	VAL
1	F	28	HIS
1	F	51	GLU
1	F	63	LEU
1	F	68	LEU
1	F	93	ILE
1	F	105	ILE
1	F	119	LEU
1	F	123	ILE
1	F	143	LYS
1	F	146	GLU
1	F	147	GLU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (18) such sidechains are listed below:

Mol	Chain	Res	Type
1	B	2	GLN
1	B	43	HIS
1	B	86	GLN
1	B	130	HIS
1	C	152	GLN
1	D	112	GLN
1	D	152	GLN
1	E	43	HIS
1	E	70	ASN
1	E	72	GLN
1	E	86	GLN
1	E	112	GLN
1	E	137	GLN
1	F	24	GLN
1	F	28	HIS

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Mol	Chain	Res	Type
1	F	54	HIS
1	F	72	GLN
1	F	86	GLN

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 oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 18 ligands modelled in this entry, 12 are monoatomic - leaving 6 for Mogul analysis.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\# Z > 2$	Counts	RMSZ	$\# Z > 2$
4	HEM	D	201	1	50,50,50	2.37	10 (20%)	67,82,82	1.48	9 (13%)
3	TRS	F	203	-	7,7,7	0.41	0	9,9,9	0.87	0
3	TRS	B	304	-	7,7,7	0.44	0	9,9,9	0.81	0
3	TRS	A	203	-	7,7,7	0.35	0	9,9,9	0.56	0
4	HEM	B	301	1	50,50,50	2.19	11 (22%)	67,82,82	1.53	9 (13%)
4	HEM	E	301	-	50,50,50	2.33	9 (18%)	67,82,82	1.63	10 (14%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns.

'-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	HEM	D	201	1	-	6/14/54/54	-
3	TRS	F	203	-	-	7/9/9/9	-
3	TRS	B	304	-	-	4/9/9/9	-
3	TRS	A	203	-	-	6/9/9/9	-
4	HEM	B	301	1	-	5/14/54/54	-
4	HEM	E	301	-	-	10/14/54/54	-

All (30) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	D	201	HEM	C3D-C2D	8.72	1.55	1.36
4	B	301	HEM	C3D-C2D	8.43	1.54	1.36
4	E	301	HEM	C3D-C2D	8.42	1.54	1.36
4	D	201	HEM	FE-NC	7.11	2.18	1.95
4	E	301	HEM	FE-NB	6.86	2.16	1.94
4	D	201	HEM	FE-ND	6.81	2.15	1.94
4	B	301	HEM	FE-NB	6.54	2.15	1.94
4	D	201	HEM	FE-NB	6.05	2.13	1.94
4	E	301	HEM	FE-ND	5.99	2.13	1.94
4	E	301	HEM	FE-NA	5.53	2.13	1.95
4	B	301	HEM	FE-ND	5.41	2.11	1.94
4	E	301	HEM	FE-NC	5.18	2.12	1.95
4	B	301	HEM	FE-NA	4.64	2.10	1.95
4	B	301	HEM	FE-NC	3.51	2.06	1.95
4	D	201	HEM	FE-NA	3.22	2.05	1.95
4	B	301	HEM	CAB-C3B	2.91	1.55	1.47
4	B	301	HEM	CAC-C3C	2.89	1.55	1.47
4	E	301	HEM	CAC-C3C	2.82	1.54	1.47
4	E	301	HEM	CAB-C3B	2.74	1.54	1.47
4	D	201	HEM	CAB-C3B	2.73	1.54	1.47
4	D	201	HEM	CAC-C3C	2.69	1.54	1.47
4	D	201	HEM	CMA-C3A	2.42	1.55	1.50
4	B	301	HEM	CMC-C2C	2.35	1.55	1.50
4	B	301	HEM	CMD-C2D	2.32	1.55	1.50
4	D	201	HEM	CMC-C2C	2.31	1.55	1.50
4	D	201	HEM	CMD-C2D	2.26	1.55	1.50
4	E	301	HEM	CMA-C3A	2.19	1.55	1.50
4	B	301	HEM	CMB-C2B	2.14	1.55	1.50
4	B	301	HEM	CMA-C3A	2.05	1.55	1.50
4	E	301	HEM	CMD-C2D	2.02	1.54	1.50

All (28) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	E	301	HEM	C4D-ND-C1D	6.43	112.82	105.21
4	B	301	HEM	C4D-ND-C1D	6.15	112.48	105.21
4	D	201	HEM	C4D-ND-C1D	6.10	112.43	105.21
4	E	301	HEM	C3B-C4B-NB	-3.56	106.91	109.47
4	B	301	HEM	C3B-C4B-NB	-3.48	106.97	109.47
4	E	301	HEM	C2A-C1A-NA	-3.15	106.66	110.15
4	B	301	HEM	CHD-C4C-NC	3.05	127.78	124.45
4	B	301	HEM	C1B-NB-C4B	2.96	108.72	105.21
4	E	301	HEM	C1B-NB-C4B	2.94	108.68	105.21
4	D	201	HEM	C1B-NB-C4B	2.71	108.41	105.21
4	D	201	HEM	C2A-C1A-NA	-2.70	107.16	110.15
4	D	201	HEM	C3B-C4B-NB	-2.68	107.55	109.47
4	B	301	HEM	C2A-C1A-NA	-2.63	107.24	110.15
4	D	201	HEM	C3B-C2B-C1B	2.61	108.37	106.41
4	E	301	HEM	C3B-C2B-C1B	2.59	108.36	106.41
4	D	201	HEM	C4C-C3C-C2C	2.48	108.96	106.81
4	B	301	HEM	C3B-C2B-C1B	2.46	108.26	106.41
4	D	201	HEM	C2B-C1B-NB	-2.33	107.16	109.84
4	D	201	HEM	CHC-C4B-NB	2.30	126.90	124.42
4	B	301	HEM	C3D-C4D-ND	-2.20	107.76	110.17
4	B	301	HEM	CAD-CBD-CGD	-2.16	107.95	113.67
4	E	301	HEM	CAD-C3D-C4D	2.11	128.38	124.70
4	E	301	HEM	C2B-C1B-NB	-2.09	107.43	109.84
4	E	301	HEM	C4C-C3C-C2C	2.09	108.63	106.81
4	B	301	HEM	C4C-C3C-C2C	2.07	108.61	106.81
4	D	201	HEM	C4A-NA-C1A	2.06	109.19	105.82
4	E	301	HEM	C2D-C1D-ND	-2.02	107.57	109.90
4	E	301	HEM	C3D-C4D-ND	-2.01	107.97	110.17

There are no chirality outliers.

All (38) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	203	TRS	C1-C-C2-O2
3	A	203	TRS	C3-C-C2-O2
3	A	203	TRS	N-C-C2-O2
3	F	203	TRS	C2-C-C1-O1
3	F	203	TRS	C3-C-C1-O1
3	F	203	TRS	N-C-C1-O1
3	F	203	TRS	C1-C-C2-O2
3	F	203	TRS	C3-C-C2-O2

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Mol	Chain	Res	Type	Atoms
3	F	203	TRS	N-C-C2-O2
4	B	301	HEM	C2A-CAA-CBA-CGA
4	D	201	HEM	C4D-C3D-CAD-CBD
4	D	201	HEM	C2D-C3D-CAD-CBD
4	B	301	HEM	C3D-CAD-CBD-CGD
4	E	301	HEM	C3D-CAD-CBD-CGD
4	D	201	HEM	C3A-C2A-CAA-CBA
4	D	201	HEM	C4B-C3B-CAB-CBB
4	B	301	HEM	C4D-C3D-CAD-CBD
4	B	301	HEM	C2D-C3D-CAD-CBD
3	A	203	TRS	N-C-C1-O1
3	B	304	TRS	N-C-C1-O1
4	E	301	HEM	C1A-C2A-CAA-CBA
4	B	301	HEM	C4B-C3B-CAB-CBB
4	E	301	HEM	C4B-C3B-CAB-CBB
4	E	301	HEM	C4C-C3C-CAC-CBC
4	D	201	HEM	C3D-CAD-CBD-CGD
3	A	203	TRS	C2-C-C1-O1
3	B	304	TRS	C2-C-C1-O1
4	D	201	HEM	C1A-C2A-CAA-CBA
4	E	301	HEM	C2A-CAA-CBA-CGA
3	A	203	TRS	C3-C-C1-O1
3	B	304	TRS	C3-C-C1-O1
3	B	304	TRS	C1-C-C3-O3
3	F	203	TRS	C1-C-C3-O3
4	E	301	HEM	CAD-CBD-CGD-O2D
4	E	301	HEM	CAD-CBD-CGD-O1D
4	E	301	HEM	CAA-CBA-CGA-O1A
4	E	301	HEM	C3A-C2A-CAA-CBA
4	E	301	HEM	CAA-CBA-CGA-O2A

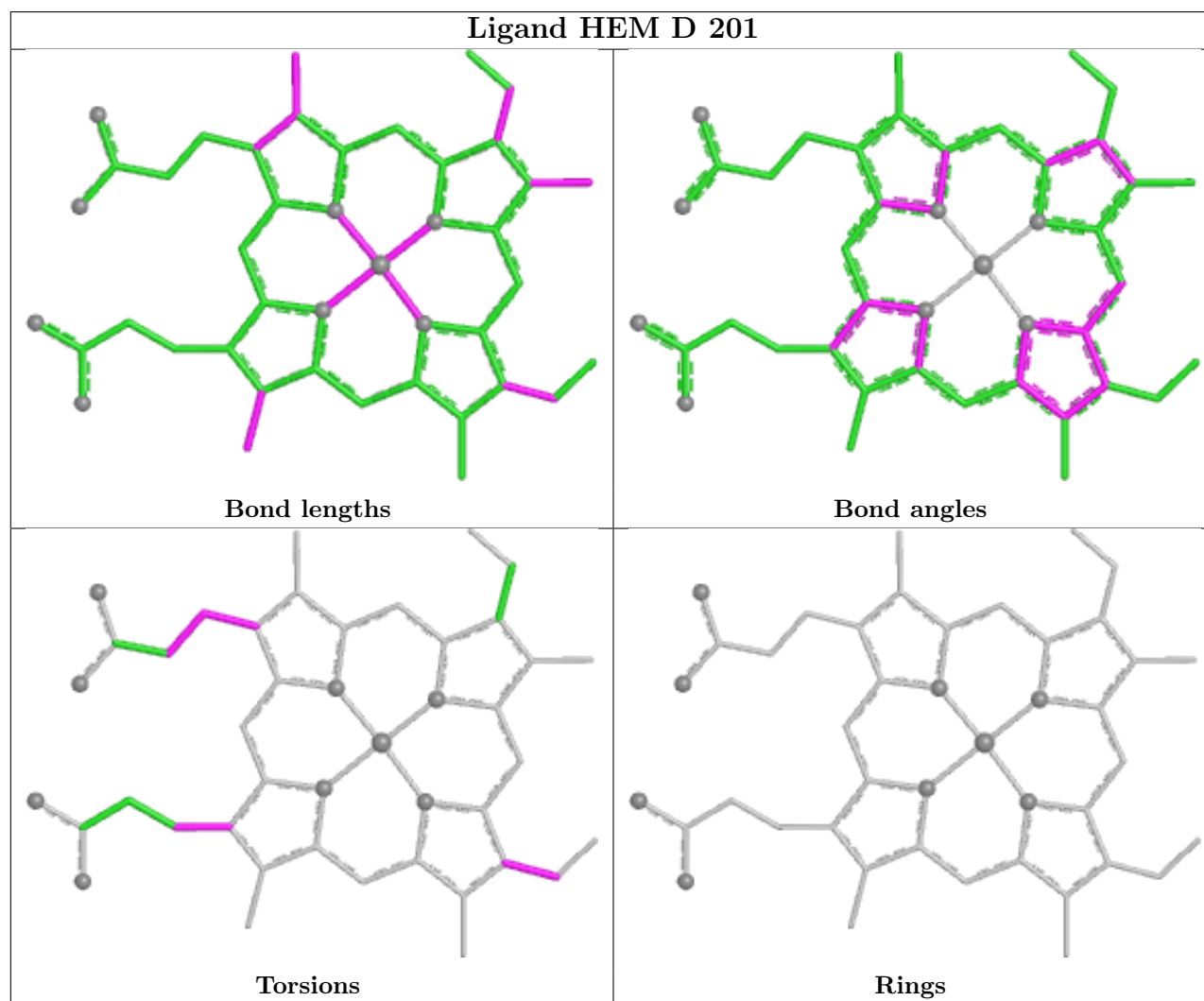
There are no ring outliers.

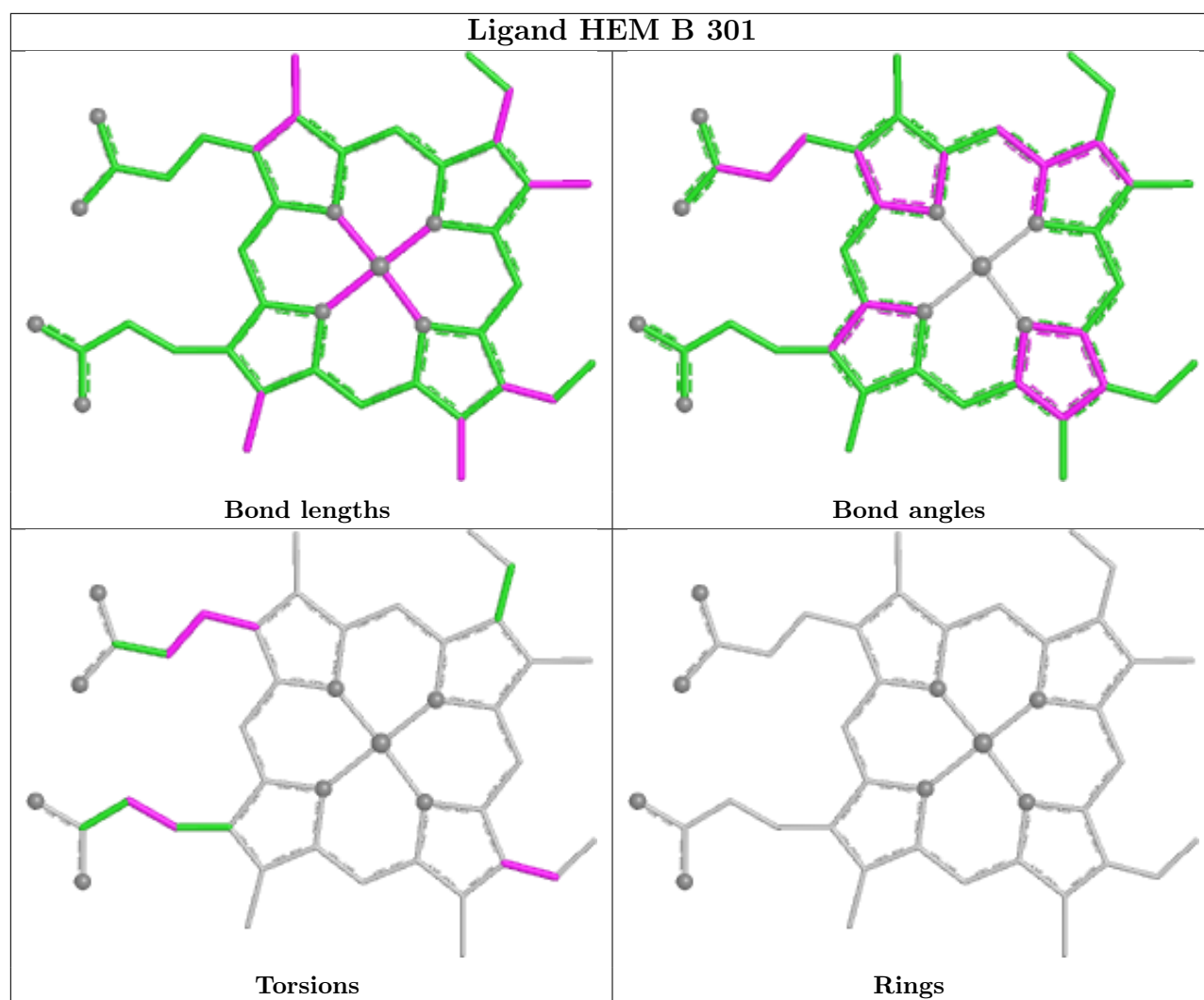
5 monomers are involved in 45 short contacts:

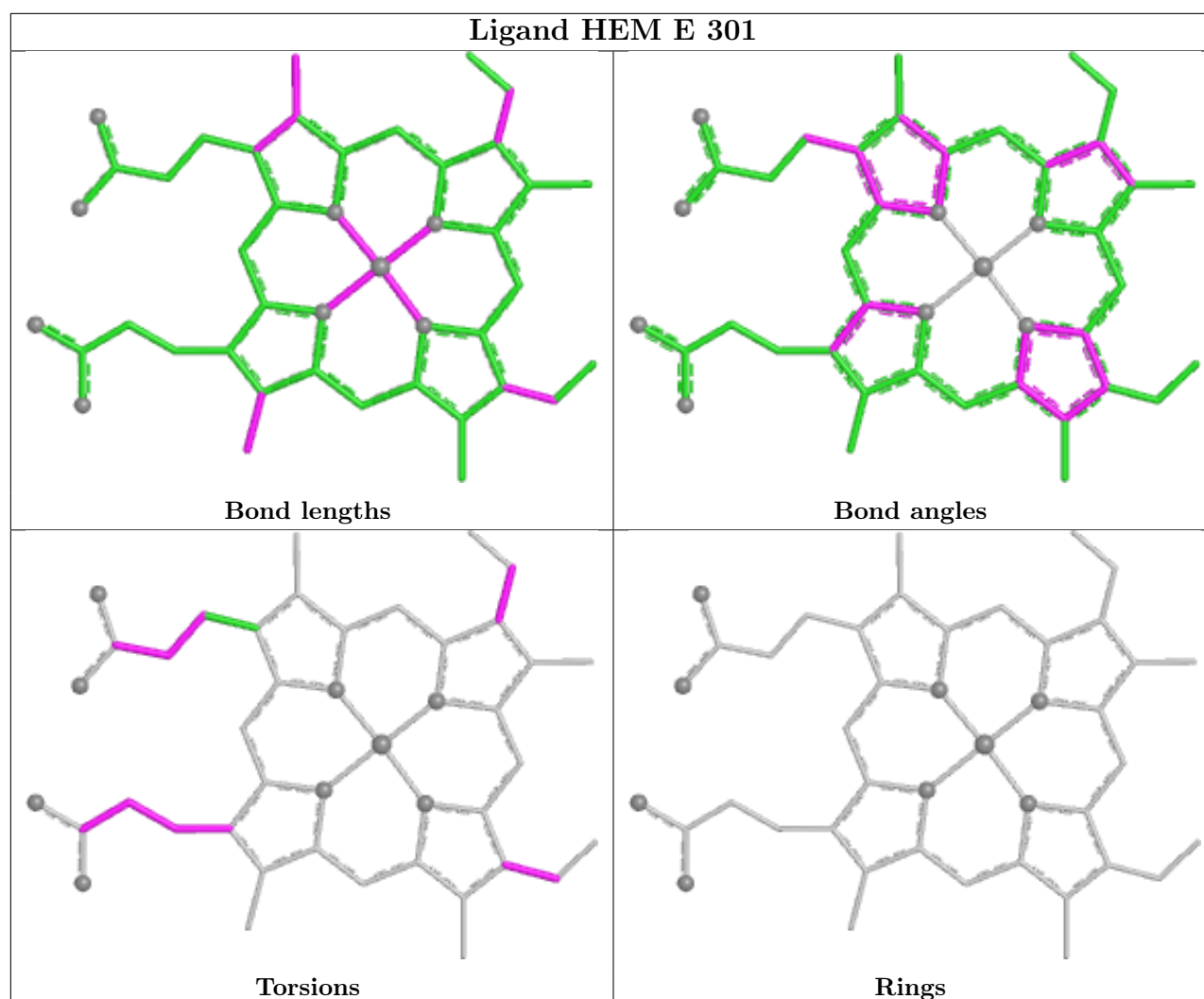
Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	D	201	HEM	11	0
3	F	203	TRS	1	0
3	B	304	TRS	4	0
4	B	301	HEM	17	0
4	E	301	HEM	12	0

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths,

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







5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

6 Fit of model and data ⓘ

6.1 Protein, DNA and RNA chains ⓘ

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

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
1	A	159/161 (98%)	-0.02	3 (1%) 66 58	15, 37, 50, 67	1 (0%)
1	B	159/161 (98%)	-0.05	3 (1%) 66 58	17, 33, 48, 65	1 (0%)
1	C	159/161 (98%)	-0.10	0 100 100	16, 33, 51, 60	1 (0%)
1	D	159/161 (98%)	-0.16	1 (0%) 85 81	14, 31, 44, 59	1 (0%)
1	E	159/161 (98%)	0.59	11 (6%) 23 18	22, 54, 74, 87	1 (0%)
1	F	159/161 (98%)	0.34	10 (6%) 26 20	22, 40, 70, 79	1 (0%)
All	All	954/966 (98%)	0.10	28 (2%) 53 45	14, 36, 64, 87	6 (0%)

All (28) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	D	78	ARG	4.8
1	F	71	TYR	3.7
1	B	81	GLN	3.6
1	E	156	ARG	2.9
1	E	70	ASN	2.9
1	F	109	ARG	2.9
1	F	16	THR	2.7
1	F	110	GLU	2.7
1	E	82	THR	2.6
1	E	53[A]	ARG	2.5
1	B	53[A]	ARG	2.5
1	A	6	ASP	2.5
1	F	106	VAL	2.5
1	E	83	LEU	2.4
1	E	155	SER	2.4
1	F	64	LEU	2.4
1	E	37	PHE	2.3
1	F	79	ILE	2.3
1	F	70	ASN	2.3

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Mol	Chain	Res	Type	RSRZ
1	B	6	ASP	2.2
1	A	80	GLY	2.1
1	A	159	THR	2.1
1	E	144	LEU	2.1
1	F	63	LEU	2.1
1	E	78	ARG	2.1
1	E	149	TYR	2.1
1	F	6	ASP	2.0
1	E	158	PRO	2.0

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

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

6.3 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

6.4 Ligands [i](#)

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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
3	TRS	F	203	8/8	0.25	0.68	30,41,50,54	8
3	TRS	A	203	8/8	0.44	0.65	34,49,56,57	8
3	TRS	B	304	8/8	0.49	0.65	27,49,61,63	8
4	HEM	E	301	43/43	0.79	0.20	43,65,75,77	0
2	FE	C	202	1/1	0.81	0.44	81,81,81,81	1
2	FE	C	201	1/1	0.83	0.32	47,47,47,47	1
4	HEM	B	301	43/43	0.83	0.18	37,54,63,64	0
2	FE	D	203	1/1	0.83	0.27	83,83,83,83	1
4	HEM	D	201	43/43	0.85	0.16	27,47,58,63	0
2	FE	B	303	1/1	0.87	0.13	48,48,48,48	1
2	FE	E	303	1/1	0.90	0.13	53,53,53,53	1
2	FE	E	302	1/1	0.94	0.08	78,78,78,78	1
2	FE	A	201	1/1	0.94	0.07	44,44,44,44	1
2	FE	F	201	1/1	0.94	0.07	36,36,36,36	1

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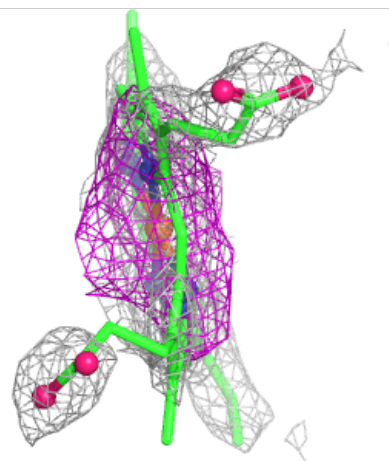
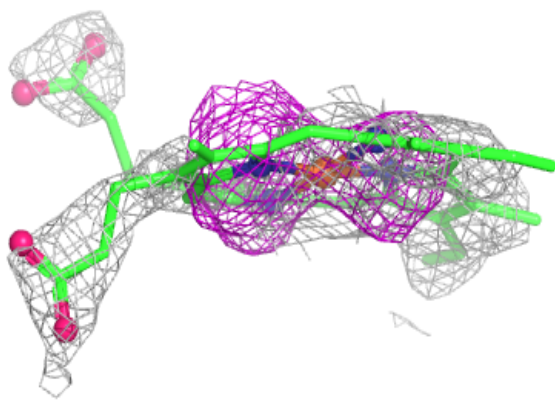
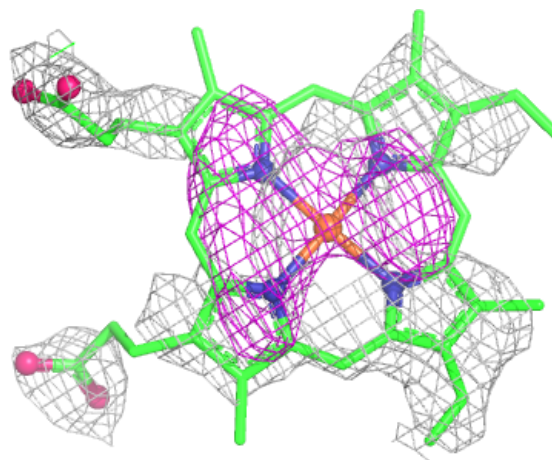
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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
2	FE	A	202	1/1	0.96	0.04	49,49,49,49	1
2	FE	F	202	1/1	0.96	0.14	30,30,30,30	1
2	FE	B	302	1/1	0.98	0.04	41,41,41,41	1
2	FE	D	202	1/1	0.99	0.03	50,50,50,50	1

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.

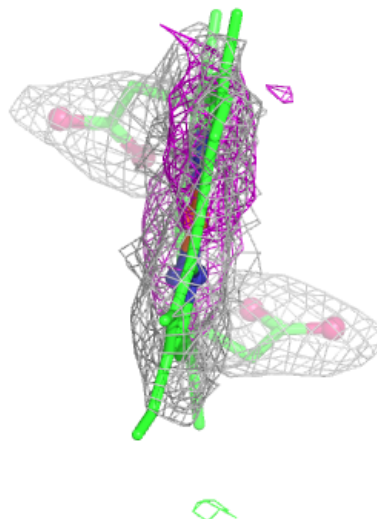
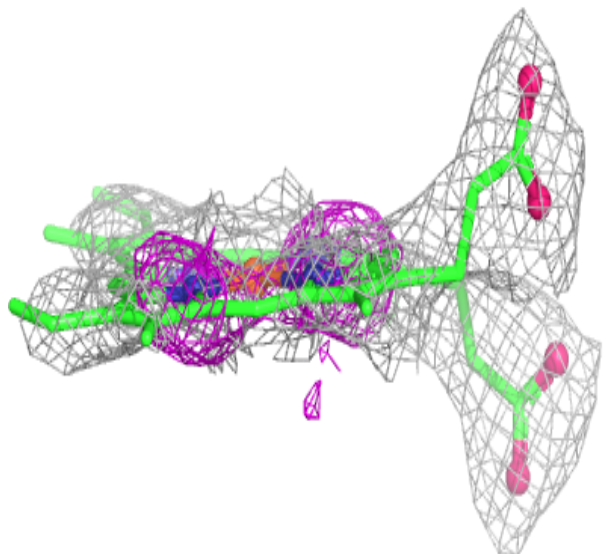
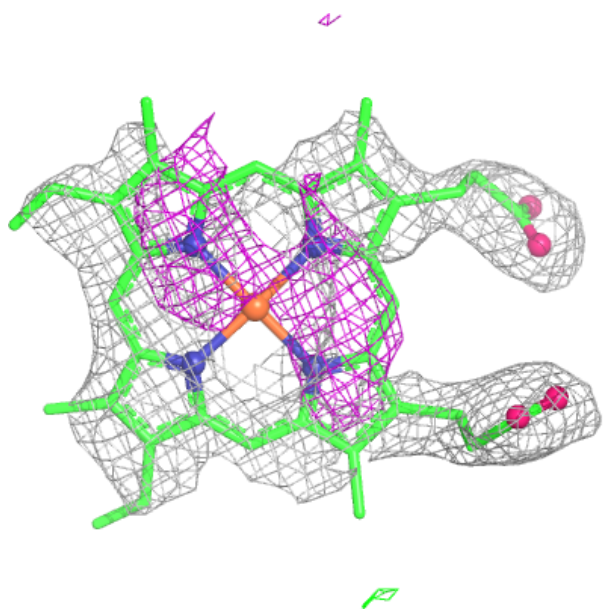
Electron density around HEM E 301:

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



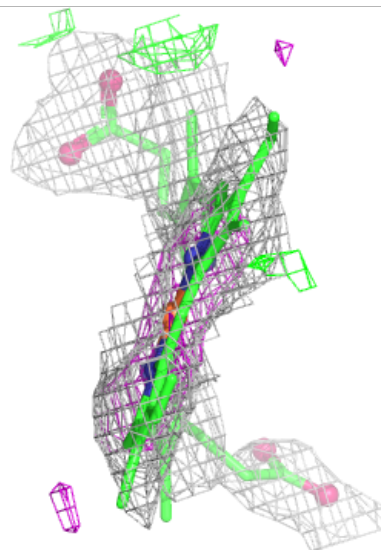
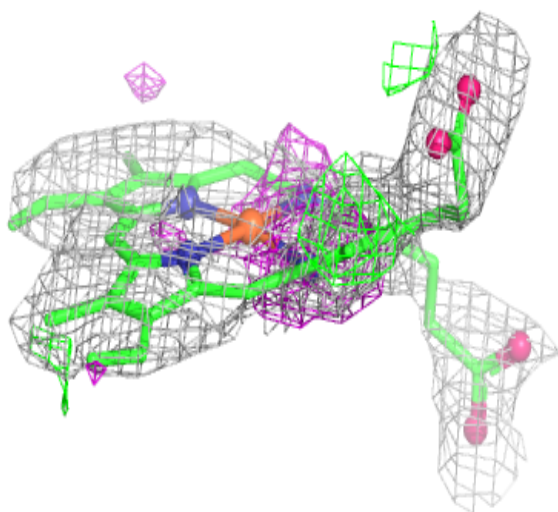
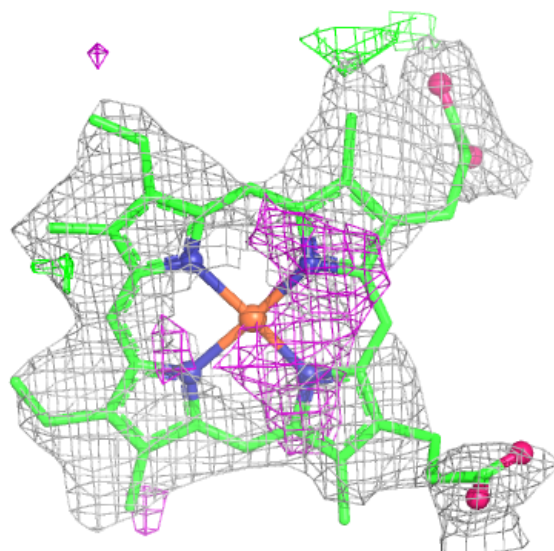
Electron density around HEM B 301:

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



Electron density around HEM D 201:

$2mF_o-DF_c$ (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.