Full wwPDB X-ray Structure Validation Report (i)

Oct 6, 2024 – 06:19 PM EDT

PDB ID	:	3CSL
Title	:	Structure of the Serratia marcescens hemophore receptor HasR in complex with its hemophore HasA and heme
Authors	:	Krieg, S.; Diederichs, K.
Deposited on	:	2008-04-10
Resolution	:	2.70 Å(reported)

The following versions of software and data (see references (i)) were used in the production of this report:

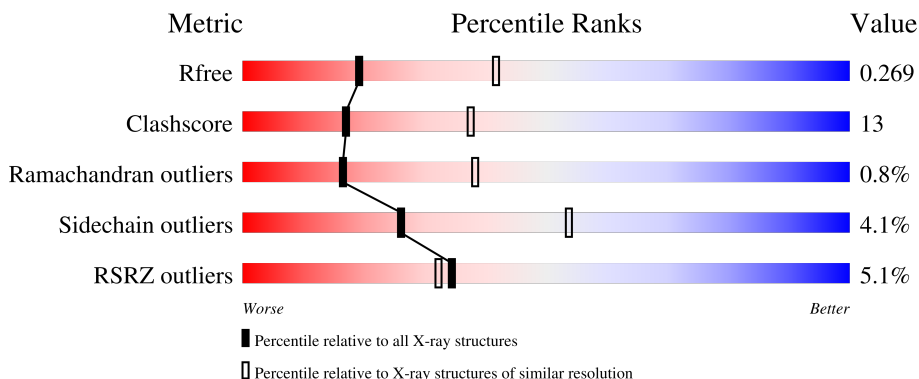|		
MolProbity	:	4.02b-467
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	1.20.1
EDS	:	3.0
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4	:	9.0.003 (Gargrove)
Density-Fitness	:	1.0.11
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.39

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 2.70 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	Percentile Ranks	Value
Rfree		0.269
Clashscore		13
Ramachandran outliers		0.8%
Sidechain outliers		4.1%
RSRZ outliers		5.1%

Worse   *Better*

▮ Percentile relative to all X-ray structures

▯ Percentile relative to X-ray structures of similar resolution

Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	164625	3333 (2.70-2.70)
Clashscore	180529	3684 (2.70-2.70)
Ramachandran outliers	177936	3633 (2.70-2.70)
Sidechain outliers	177891	3633 (2.70-2.70)
RSRZ outliers	164620	3333 (2.70-2.70)

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 <=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	865	4% / 62% / 23% / • / 13%
1	B	865	4% / 62% / 23% / • / 13%
2	C	206	5% / 66% / 13% / 21%
2	D	206	4% / 67% / 11% / 21%

2 Entry composition ⓘ

There are 5 unique types of molecules in this entry. The entry contains 14317 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 HasR protein.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	753	Total	C	N	O	S	0	0	0
			5889	3674	1043	1159	13			
1	B	753	Total	C	N	O	S	0	0	0
			5889	3674	1043	1159	13			

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	645	ALA	GLY	SEE REMARK 999	UNP Q79AD2
B	645	ALA	GLY	SEE REMARK 999	UNP Q79AD2

- Molecule 2 is a protein called Hemophore HasA.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	C	163	Total	C	N	O	S	0	0	0
			1184	743	189	251	1			
2	D	163	Total	C	N	O	S	0	0	0
			1184	743	189	251	1			

There are 38 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
C	-17	MET	-	expression tag	UNP Q54450
C	-16	ARG	-	expression tag	UNP Q54450
C	-15	GLY	-	expression tag	UNP Q54450
C	-14	SER	-	expression tag	UNP Q54450
C	-13	HIS	-	expression tag	UNP Q54450
C	-12	HIS	-	expression tag	UNP Q54450
C	-11	HIS	-	expression tag	UNP Q54450
C	-10	HIS	-	expression tag	UNP Q54450
C	-9	HIS	-	expression tag	UNP Q54450
C	-8	HIS	-	expression tag	UNP Q54450

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Chain	Residue	Modelled	Actual	Comment	Reference
C	-7	GLY	-	expression tag	UNP Q54450
C	-6	ILE	-	expression tag	UNP Q54450
C	-5	ARG	-	expression tag	UNP Q54450
C	-4	MET	-	expression tag	UNP Q54450
C	-3	ARG	-	expression tag	UNP Q54450
C	-2	ALA	-	expression tag	UNP Q54450
C	-1	ARG	-	expression tag	UNP Q54450
C	0	TYR	-	expression tag	UNP Q54450
C	1	PRO	-	expression tag	UNP Q54450
D	-17	MET	-	expression tag	UNP Q54450
D	-16	ARG	-	expression tag	UNP Q54450
D	-15	GLY	-	expression tag	UNP Q54450
D	-14	SER	-	expression tag	UNP Q54450
D	-13	HIS	-	expression tag	UNP Q54450
D	-12	HIS	-	expression tag	UNP Q54450
D	-11	HIS	-	expression tag	UNP Q54450
D	-10	HIS	-	expression tag	UNP Q54450
D	-9	HIS	-	expression tag	UNP Q54450
D	-8	HIS	-	expression tag	UNP Q54450
D	-7	GLY	-	expression tag	UNP Q54450
D	-6	ILE	-	expression tag	UNP Q54450
D	-5	ARG	-	expression tag	UNP Q54450
D	-4	MET	-	expression tag	UNP Q54450
D	-3	ARG	-	expression tag	UNP Q54450
D	-2	ALA	-	expression tag	UNP Q54450
D	-1	ARG	-	expression tag	UNP Q54450
D	0	TYR	-	expression tag	UNP Q54450
D	1	PRO	-	expression tag	UNP Q54450

- Molecule 3 is PROTOPORPHYRIN IX CONTAINING FE (three-letter code: HEM) (formula: $C_{34}H_{32}FeN_4O_4$).

HEM

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

- Molecule 4 is GLYCEROL (three-letter code: GOL) (formula: $C_3H_8O_3$).

GOL

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

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WORLDWIDE
PDB
PROTEIN DATA BANK

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

- Molecule 5 is water.

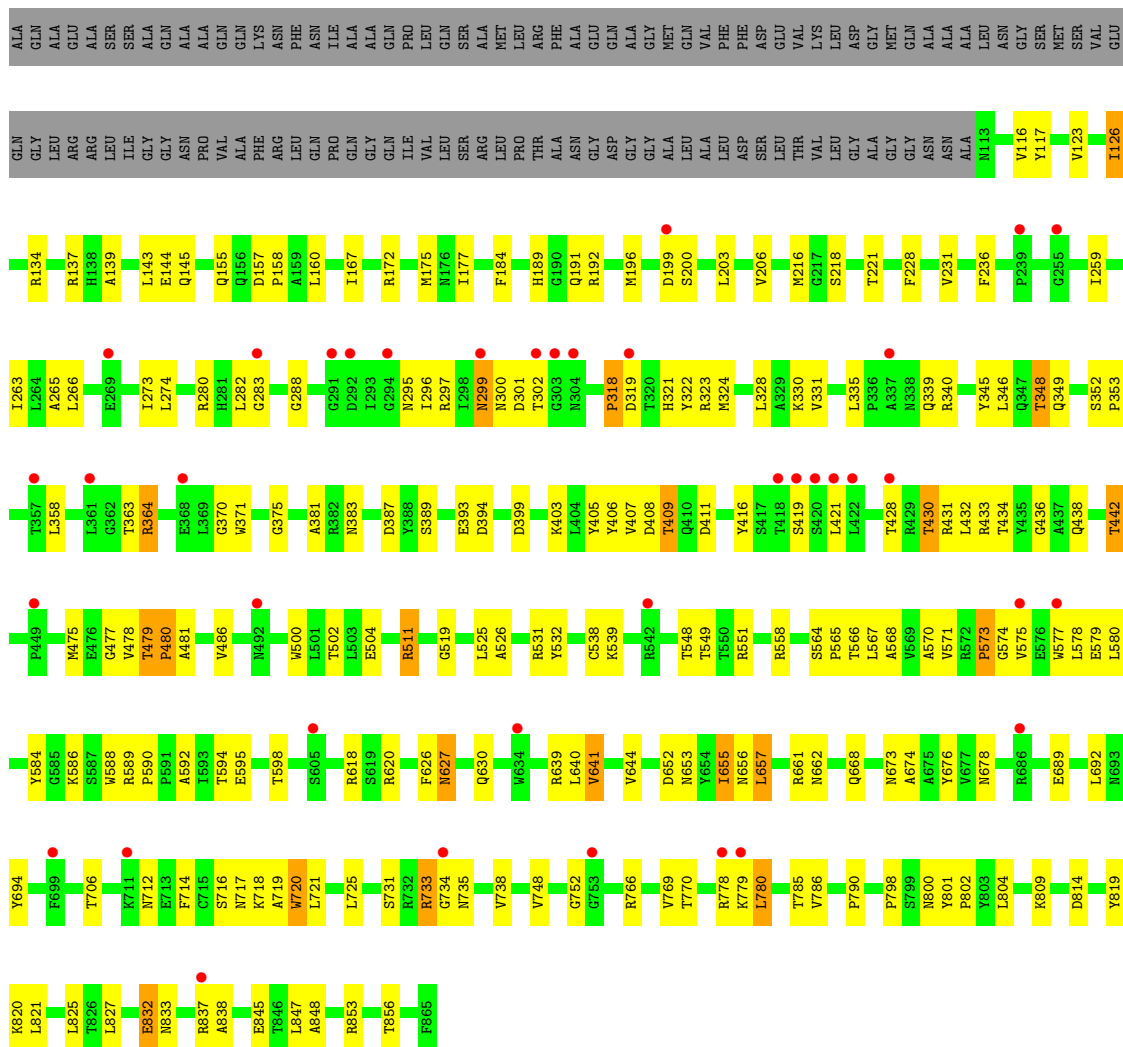| Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	26	Total 26	O 26	0	0
5	B	16	Total 16	O 16	0	0
5	D	1	Total 1	O 1	0	0

3   Residue-property plots ⓘ

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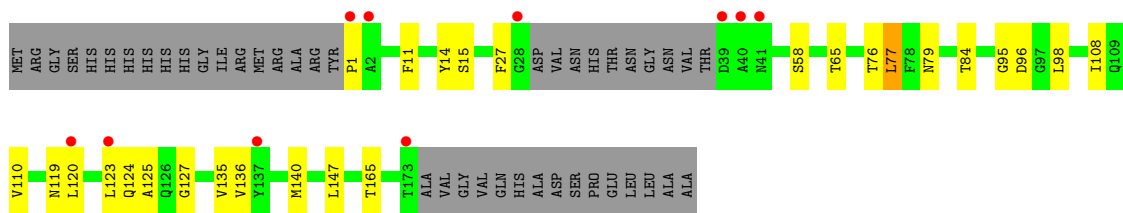
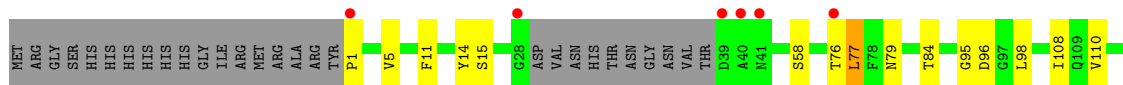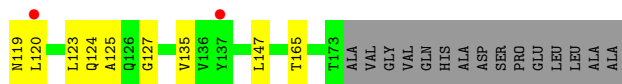- Molecule 1: HasR protein
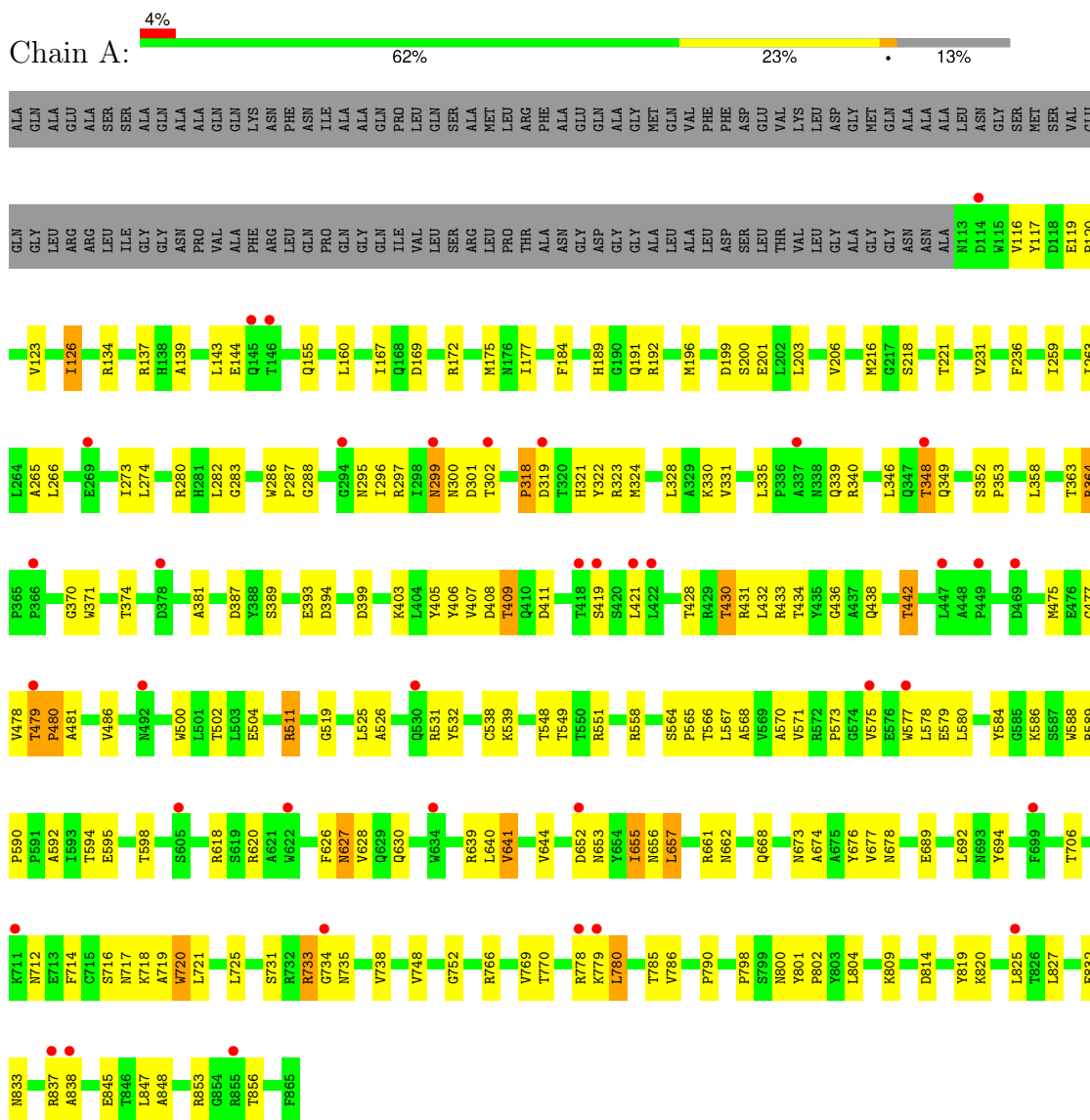
Chain A:

- Molecule 1: HasR protein

Chain B:

● Molecule 2: Hemophore HasA

Chain C:

● Molecule 2: Hemophore HasA

Chain D:

4 Data and refinement statistics ⓘ

Property	Value	Source
Space group	F 2 2 2	Depositor
Cell constants a, b, c, α, β, γ	157.02Å 163.40Å 595.53Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	49.17 – 2.70 49.17 – 2.70	Depositor EDS
% Data completeness (in resolution range)	95.0 (49.17-2.70) 95.0 (49.17-2.70)	Depositor EDS
R_{merge}	0.16	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.51 (at 2.69Å)	Xtriage
Refinement program	PHENIX (phenix.refine)	Depositor
R, R_{free}	0.239 , 0.274 0.235 , 0.269	Depositor DCC
R_{free} test set	4959 reflections (4.99%)	wwPDB-VP
Wilson B-factor (Å^2)	54.8	Xtriage
Anisotropy	0.153	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.32 , 89.7	EDS
L-test for twinning[2]	$< \lvert L \rvert > = 0.42$, $< L^2 > = 0.25$	Xtriage
Estimated twinning fraction	0.074 for -k,-h,-l	Xtriage
F_o,F_c correlation	0.93	EDS
Total number of atoms	14317	wwPDB-VP
Average B, all atoms (Å^2)	98.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.78% of the height of the origin peak. No significant pseudotranslation is detected.*

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[1] Intensities estimated from amplitudes.
[2] Theoretical values of $< \lvert L \rvert >$, $< L^2 >$ 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: GOL, 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	0.21	0/6027	0.38	0/8188
1	B	0.21	0/6027	0.38	0/8188
2	C	0.21	0/1211	0.33	0/1649
2	D	0.21	0/1211	0.33	0/1649
All	All	0.21	0/14476	0.37	0/19674

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts ⓘ

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	5889	0	5597	152	0
1	B	5889	0	5597	150	0
2	C	1184	0	1078	18	0
2	D	1184	0	1078	17	0
3	A	43	0	30	9	0
3	B	43	0	30	8	0
4	A	30	0	40	0	0
4	B	12	0	16	0	0
5	A	26	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
5	B	16	0	0	0	0
5	D	1	0	0	0	0
All	All	14317	0	13466	347	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 13.

All (347) 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:A:137:ARG:HD3	1:A:853:ARG:HD2	1.40	1.03
1:B:137:ARG:HD3	1:B:853:ARG:HD2	1.41	1.01
1:A:779:LYS:HZ3	1:A:820:LYS:HG3	1.30	0.96
1:A:318:PRO:HG2	1:A:371:TRP:HB2	1.48	0.95
3:B:866:HEM:HHC	3:B:866:HEM:HBB2	1.48	0.93
3:A:866:HEM:HHC	3:A:866:HEM:HBB2	1.48	0.93
1:B:318:PRO:HG2	1:B:371:TRP:HB2	1.48	0.91
1:B:779:LYS:HZ3	1:B:820:LYS:HG3	1.36	0.90
1:A:477:GLY:HA2	1:A:480:PRO:HB3	1.57	0.85
1:B:477:GLY:HA2	1:B:480:PRO:HB3	1.58	0.83
1:A:175:MET:HE1	1:A:196:MET:HG2	1.60	0.83
1:B:175:MET:HE1	1:B:196:MET:HG2	1.60	0.83
1:B:539:LYS:HA	1:B:734:GLY:HA2	1.61	0.83
1:A:539:LYS:HA	1:A:734:GLY:HA2	1.61	0.82
1:A:575:VAL:HG22	1:A:577:TRP:H	1.44	0.81
1:B:575:VAL:HG22	1:B:577:TRP:H	1.44	0.80
1:A:144:GLU:HA	1:A:766:ARG:HH12	1.48	0.79
1:B:853:ARG:HH11	1:B:856:THR:HG21	1.46	0.79
1:A:302:THR:HB	2:C:125:ALA:HB2	1.64	0.78
1:A:853:ARG:HH11	1:A:856:THR:HG21	1.47	0.77
1:B:144:GLU:HA	1:B:766:ARG:HH12	1.48	0.77
2:D:123:LEU:HD23	2:D:123:LEU:H	1.50	0.77
3:B:866:HEM:HMC2	3:B:866:HEM:HBC2	1.68	0.76
2:C:123:LEU:H	2:C:123:LEU:HD23	1.50	0.75
3:A:866:HEM:HMC2	3:A:866:HEM:HBC2	1.68	0.75
1:A:137:ARG:HH11	1:A:155:GLN:HB3	1.53	0.74
1:B:137:ARG:HH11	1:B:155:GLN:HB3	1.53	0.73
1:B:504:GLU:HB3	1:B:568:ALA:HB3	1.71	0.72
1:A:297:ARG:HH22	1:A:847:LEU:HA	1.55	0.72
1:B:297:ARG:HH22	1:B:847:LEU:HA	1.55	0.71
1:A:504:GLU:HB3	1:A:568:ALA:HB3	1.73	0.70

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:720:TRP:CD1	1:A:721:LEU:HD13	2.26	0.70
1:B:302:THR:HB	2:D:125:ALA:HB2	1.73	0.69
1:B:720:TRP:CD1	1:B:721:LEU:HD13	2.26	0.69
2:D:76:THR:HG23	2:D:79:ASN:HB3	1.73	0.69
2:C:76:THR:HG23	2:C:79:ASN:HB3	1.73	0.69
3:B:866:HEM:HHA	3:B:866:HEM:CBD	2.23	0.68
3:A:866:HEM:HHA	3:A:866:HEM:CBD	2.23	0.68
1:B:668:GLN:HG3	2:D:58:SER:HB3	1.75	0.67
1:B:177:ILE:HD12	1:B:346:LEU:HD23	1.80	0.64
1:A:668:GLN:HG3	2:C:58:SER:HB3	1.80	0.63
1:B:191:GLN:HG2	1:B:845:GLU:CD	2.19	0.63
1:A:191:GLN:HG2	1:A:845:GLU:CD	2.19	0.62
1:A:177:ILE:HD12	1:A:346:LEU:HD23	1.79	0.62
1:B:411:ASP:HB3	1:B:430:THR:HG23	1.81	0.62
1:B:778:ARG:O	1:B:778:ARG:HG3	1.99	0.62
1:A:322:TYR:HB2	1:A:352:SER:HB2	1.81	0.62
1:B:200:SER:HA	1:B:203:LEU:HD12	1.82	0.61
2:D:96:ASP:HB2	2:D:110:VAL:HG13	1.83	0.61
1:B:172:ARG:NH1	1:B:655:ILE:HD13	2.16	0.60
1:A:411:ASP:HB3	1:A:430:THR:HG23	1.81	0.60
2:C:96:ASP:HB2	2:C:110:VAL:HG13	1.82	0.60
1:A:172:ARG:NH1	1:A:655:ILE:HD13	2.16	0.60
1:B:322:TYR:HB2	1:B:352:SER:HB2	1.82	0.60
2:C:1:PRO:HB3	2:C:119:ASN:HD21	1.67	0.60
2:C:124:GLN:O	2:C:125:ALA:HB3	2.02	0.60
1:B:288:GLY:HA3	1:B:838:ALA:HA	1.84	0.60
1:B:283:GLY:HA2	1:B:321:HIS:HB2	1.84	0.59
1:A:200:SER:HA	1:A:203:LEU:HD12	1.82	0.59
1:A:288:GLY:HA3	1:A:838:ALA:HA	1.83	0.59
3:B:866:HEM:HBC2	3:B:866:HEM:CMC	2.32	0.59
1:B:259:ILE:HD11	1:B:282:LEU:HD21	1.84	0.59
3:A:866:HEM:HBC2	3:A:866:HEM:CMC	2.33	0.59
2:D:124:GLN:O	2:D:125:ALA:HB3	2.02	0.59
1:A:259:ILE:HD11	1:A:282:LEU:HD21	1.84	0.59
1:A:720:TRP:O	1:A:721:LEU:HB2	2.03	0.58
1:A:144:GLU:HA	1:A:766:ARG:NH1	2.18	0.58
1:B:184:PHE:HA	1:B:432:LEU:HD23	1.85	0.58
1:A:407:VAL:HB	1:A:434:THR:HB	1.85	0.58
1:B:720:TRP:O	1:B:721:LEU:HB2	2.03	0.58
1:B:780:LEU:HD23	1:B:819:TYR:HD1	1.68	0.58
1:A:827:LEU:HD23	1:A:827:LEU:H	1.69	0.58

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:144:GLU:HA	1:B:766:ARG:NH1	2.18	0.58
1:A:184:PHE:HA	1:A:432:LEU:HD23	1.84	0.58
1:A:283:GLY:HA2	1:A:321:HIS:HB2	1.85	0.58
1:A:780:LEU:HD23	1:A:819:TYR:HD1	1.68	0.58
1:A:589:ARG:HH12	1:A:655:ILE:HD12	1.69	0.57
1:B:407:VAL:HB	1:B:434:THR:HB	1.86	0.57
1:B:502:THR:HB	1:B:570:ALA:HB3	1.86	0.57
1:B:779:LYS:NZ	1:B:820:LYS:HG3	2.15	0.57
1:B:589:ARG:HH12	1:B:655:ILE:HD12	1.69	0.57
1:A:477:GLY:CA	1:A:480:PRO:HB3	2.32	0.57
1:A:475:MET:HA	1:A:478:VAL:HG23	1.86	0.57
2:D:1:PRO:HB3	2:D:119:ASN:HD21	1.69	0.57
1:A:364:ARG:HD2	1:A:364:ARG:O	2.05	0.57
1:B:477:GLY:CA	1:B:480:PRO:HB3	2.33	0.57
1:B:167:ILE:CG2	1:B:172:ARG:HB3	2.35	0.56
1:A:126:ILE:HG23	1:A:206:VAL:HB	1.87	0.56
1:A:167:ILE:CG2	1:A:172:ARG:HB3	2.36	0.56
1:B:475:MET:HA	1:B:478:VAL:HG23	1.87	0.56
1:B:725:LEU:HB3	1:B:738:VAL:HG11	1.87	0.56
1:B:431:ARG:HD3	1:B:433:ARG:HE	1.70	0.56
1:A:725:LEU:HB3	1:A:738:VAL:HG11	1.88	0.56
1:B:216:MET:SD	1:B:438:GLN:HB2	2.46	0.56
1:A:431:ARG:HD3	1:A:433:ARG:HE	1.70	0.55
1:B:126:ILE:HG23	1:B:206:VAL:HB	1.87	0.55
2:D:95:GLY:HA3	2:D:108:ILE:HG21	1.89	0.55
1:A:526:ALA:HB2	1:A:531:ARG:HA	1.89	0.55
1:B:265:ALA:HB2	1:B:274:LEU:HD23	1.88	0.55
1:B:364:ARG:HD2	1:B:364:ARG:O	2.05	0.55
1:A:297:ARG:NH2	1:A:847:LEU:HA	2.22	0.55
1:A:475:MET:SD	1:A:478:VAL:HG21	2.46	0.55
1:A:502:THR:HB	1:A:570:ALA:HB3	1.88	0.55
1:B:827:LEU:HD23	1:B:827:LEU:H	1.70	0.55
2:C:95:GLY:HA3	2:C:108:ILE:HG21	1.88	0.55
1:A:216:MET:SD	1:A:438:GLN:HB2	2.47	0.55
1:B:539:LYS:HA	1:B:734:GLY:CA	2.36	0.55
1:A:265:ALA:HB2	1:A:274:LEU:HD23	1.88	0.54
1:A:548:THR:HG22	1:A:549:THR:N	2.22	0.54
1:B:348:THR:HG23	1:B:381:ALA:HB3	1.89	0.54
1:B:780:LEU:O	1:B:780:LEU:HD13	2.08	0.54
1:A:780:LEU:HD13	1:A:780:LEU:O	2.08	0.54
2:D:1:PRO:CB	2:D:119:ASN:HD21	2.21	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:548:THR:HG22	1:B:549:THR:N	2.22	0.54
1:A:328:LEU:HD21	1:A:330:LYS:HE3	1.90	0.53
1:B:526:ALA:HB2	1:B:531:ARG:HA	1.90	0.53
1:A:348:THR:HG23	1:A:381:ALA:HB3	1.89	0.53
1:B:475:MET:SD	1:B:478:VAL:HG21	2.48	0.53
2:C:1:PRO:CB	2:C:119:ASN:HD21	2.21	0.53
2:D:135:VAL:HG23	2:D:147:LEU:HB2	1.91	0.53
1:A:539:LYS:HA	1:A:734:GLY:CA	2.36	0.53
3:B:866:HEM:HHA	3:B:866:HEM:HBD1	1.89	0.53
3:A:866:HEM:HHA	3:A:866:HEM:HBD1	1.90	0.52
1:B:328:LEU:HD21	1:B:330:LYS:HE3	1.90	0.52
1:B:640:LEU:HD23	1:B:694:TYR:HB2	1.91	0.52
2:C:135:VAL:HG23	2:C:147:LEU:HB2	1.90	0.52
1:B:770:THR:HG22	1:B:785:THR:HG23	1.91	0.52
1:A:231:VAL:HG13	1:A:236:PHE:HE2	1.75	0.52
1:B:297:ARG:NH2	1:B:847:LEU:HA	2.22	0.52
1:A:319:ASP:HB3	1:A:353:PRO:HB2	1.92	0.51
1:B:319:ASP:HB3	1:B:353:PRO:HB2	1.92	0.51
1:A:321:HIS:CE1	1:A:353:PRO:HG2	2.45	0.51
1:A:770:THR:HG22	1:A:785:THR:HG23	1.91	0.51
1:B:577:TRP:CZ3	1:B:630:GLN:HG2	2.46	0.51
1:B:321:HIS:CE1	1:B:353:PRO:HG2	2.46	0.51
1:B:566:THR:C	1:B:567:LEU:HD12	2.31	0.51
1:B:231:VAL:HG13	1:B:236:PHE:HE2	1.76	0.51
1:A:577:TRP:CZ3	1:A:630:GLN:HG2	2.46	0.51
1:A:280:ARG:HD3	1:A:322:TYR:OH	2.11	0.50
3:A:866:HEM:HHA	3:A:866:HEM:HBD2	1.92	0.50
1:A:640:LEU:HD23	1:A:694:TYR:HB2	1.92	0.50
1:A:116:VAL:HG13	1:A:123:VAL:HG13	1.94	0.50
1:A:566:THR:C	1:A:567:LEU:HD12	2.32	0.50
1:B:589:ARG:O	1:B:589:ARG:HG3	2.12	0.50
1:B:769:VAL:HG13	1:B:786:VAL:HB	1.93	0.50
1:A:589:ARG:HG3	1:A:589:ARG:O	2.12	0.50
1:B:406:TYR:CE1	1:B:408:ASP:HB2	2.47	0.50
1:A:845:GLU:HG2	1:A:848:ALA:H	1.77	0.49
1:A:589:ARG:HH12	1:A:655:ILE:CD1	2.25	0.49
1:A:655:ILE:HG22	1:A:678:ASN:ND2	2.27	0.49
1:B:126:ILE:CG2	1:B:206:VAL:HB	2.42	0.49
1:B:655:ILE:HG22	1:B:678:ASN:ND2	2.27	0.49
1:B:845:GLU:HG2	1:B:848:ALA:H	1.77	0.49
1:A:126:ILE:CG2	1:A:206:VAL:HB	2.42	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:280:ARG:HD3	1:B:322:TYR:OH	2.12	0.49
3:B:866:HEM:HHA	3:B:866:HEM:HBD2	1.92	0.49
2:D:58:SER:HB2	2:D:98:LEU:HD12	1.95	0.49
1:A:769:VAL:HG13	1:A:786:VAL:HB	1.93	0.49
1:B:589:ARG:HH12	1:B:655:ILE:CD1	2.25	0.49
1:B:295:ASN:O	1:B:299:ASN:HB3	2.13	0.49
1:A:406:TYR:CE1	1:A:408:ASP:HB2	2.47	0.49
2:D:84:THR:HG21	2:D:127:GLY:HA2	1.95	0.48
1:A:189:HIS:HB2	1:A:191:GLN:NE2	2.29	0.48
1:B:116:VAL:HG13	1:B:123:VAL:HG13	1.95	0.48
1:B:189:HIS:HB2	1:B:191:GLN:NE2	2.29	0.48
1:A:716:SER:O	1:A:748:VAL:HG23	2.14	0.48
1:A:779:LYS:NZ	1:A:820:LYS:HG3	2.15	0.48
1:A:579:GLU:HB3	1:A:627:ASN:ND2	2.29	0.48
1:A:798:PRO:HB2	1:A:800:ASN:OD1	2.14	0.48
1:B:579:GLU:HB3	1:B:627:ASN:ND2	2.29	0.48
1:B:725:LEU:HB3	1:B:738:VAL:CG1	2.44	0.48
1:B:405:TYR:CZ	1:B:436:GLY:HA3	2.49	0.48
1:B:716:SER:O	1:B:748:VAL:HG23	2.14	0.48
2:C:58:SER:HB2	2:C:98:LEU:HD12	1.95	0.48
1:B:199:ASP:O	1:B:200:SER:HB3	2.14	0.47
1:B:564:SER:HB3	1:B:586:LYS:O	2.13	0.47
1:B:731:SER:OG	1:B:733:ARG:HG2	2.14	0.47
2:C:84:THR:HG21	2:C:127:GLY:HA2	1.95	0.47
1:A:295:ASN:O	1:A:299:ASN:HB3	2.13	0.47
1:A:511:ARG:O	1:A:511:ARG:HG3	2.14	0.47
1:A:731:SER:OG	1:A:733:ARG:HG2	2.14	0.47
1:B:519:GLY:HA3	1:B:551:ARG:NH1	2.29	0.47
1:A:399:ASP:HB3	1:A:442:THR:HG23	1.96	0.47
1:B:399:ASP:HB3	1:B:442:THR:HG23	1.96	0.47
1:A:139:ALA:HB1	1:A:160:LEU:HD22	1.97	0.47
1:A:519:GLY:HA3	1:A:551:ARG:NH1	2.30	0.47
1:B:363:THR:HG23	1:B:364:ARG:HG3	1.97	0.47
1:B:511:ARG:O	1:B:511:ARG:HG3	2.14	0.47
2:C:15:SER:HA	2:C:165:THR:HA	1.97	0.47
1:A:335:LEU:HB2	1:A:339:GLN:HB2	1.96	0.47
1:A:363:THR:HG23	1:A:364:ARG:HG3	1.97	0.47
1:A:405:TYR:CZ	1:A:436:GLY:HA3	2.50	0.47
1:A:564:SER:HB3	1:A:586:LYS:O	2.13	0.47
1:A:322:TYR:CB	1:A:352:SER:HB2	2.45	0.47
1:B:661:ARG:O	1:B:673:ASN:HB2	2.15	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:661:ARG:HD3	1:A:718:LYS:HA	1.97	0.47
1:B:300:ASN:C	1:B:302:THR:H	2.18	0.47
1:A:199:ASP:O	1:A:200:SER:HB3	2.15	0.47
1:A:300:ASN:C	1:A:302:THR:H	2.19	0.47
1:B:335:LEU:HB2	1:B:339:GLN:HB2	1.96	0.47
1:A:798:PRO:HD2	1:A:801:TYR:CE1	2.50	0.46
1:B:798:PRO:HB2	1:B:800:ASN:OD1	2.14	0.46
1:A:725:LEU:HB3	1:A:738:VAL:CG1	2.44	0.46
1:B:798:PRO:HD2	1:B:801:TYR:CE1	2.50	0.46
1:A:393:GLU:O	1:A:394:ASP:HB2	2.16	0.46
2:D:15:SER:HA	2:D:165:THR:HA	1.97	0.46
2:D:124:GLN:O	2:D:125:ALA:CB	2.64	0.46
1:B:661:ARG:HD3	1:B:718:LYS:HA	1.97	0.46
1:A:580:LEU:HD23	1:A:626:PHE:HB3	1.98	0.46
3:A:866:HEM:HBD1	3:A:866:HEM:CHA	2.46	0.46
1:B:322:TYR:CB	1:B:352:SER:HB2	2.46	0.46
3:B:866:HEM:HBD1	3:B:866:HEM:CHA	2.46	0.46
1:A:324:MET:HA	1:A:349:GLN:O	2.16	0.46
1:A:661:ARG:O	1:A:673:ASN:HB2	2.15	0.46
1:B:387:ASP:OD2	1:B:403:LYS:HD3	2.16	0.46
1:B:580:LEU:HD23	1:B:626:PHE:HB3	1.97	0.46
1:B:779:LYS:HG2	1:B:820:LYS:HZ3	1.81	0.46
1:B:479:THR:O	1:B:594:THR:HA	2.16	0.46
1:B:393:GLU:O	1:B:394:ASP:HB2	2.16	0.45
1:A:117:TYR:CG	1:A:641:VAL:HG22	2.51	0.45
1:A:137:ARG:NH1	1:A:155:GLN:HB3	2.26	0.45
1:A:374:THR:HG21	3:A:866:HEM:HAA2	1.97	0.45
1:A:779:LYS:HG2	1:A:820:LYS:HZ3	1.80	0.45
1:B:500:TRP:O	1:B:571:VAL:HA	2.17	0.45
1:B:780:LEU:HD23	1:B:819:TYR:CD1	2.51	0.45
1:A:500:TRP:O	1:A:571:VAL:HA	2.17	0.45
1:B:117:TYR:CG	1:B:641:VAL:HG22	2.52	0.45
1:B:324:MET:HA	1:B:349:GLN:O	2.16	0.45
1:A:752:GLY:HA2	1:A:801:TYR:OH	2.17	0.45
1:B:802:PRO:HG3	2:D:77:LEU:CD2	2.46	0.45
1:B:137:ARG:NH1	1:B:155:GLN:HB3	2.26	0.45
1:B:283:GLY:HA2	1:B:321:HIS:CB	2.47	0.45
1:B:752:GLY:HA2	1:B:801:TYR:OH	2.17	0.45
1:B:837:ARG:NH2	1:B:837:ARG:HB2	2.32	0.45
2:C:124:GLN:O	2:C:125:ALA:CB	2.64	0.45
1:A:480:PRO:HG3	1:A:598:THR:HA	1.99	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:779:LYS:HA	1:A:779:LYS:HD2	1.67	0.45
1:B:479:THR:OG1	1:B:480:PRO:HA	2.17	0.45
1:A:283:GLY:HA2	1:A:321:HIS:CB	2.47	0.45
1:A:387:ASP:OD2	1:A:403:LYS:HD3	2.16	0.44
1:A:479:THR:O	1:A:594:THR:HA	2.16	0.44
1:B:733:ARG:HG3	1:B:735:ASN:H	1.82	0.44
1:A:579:GLU:HB3	1:A:627:ASN:HD21	1.81	0.44
1:A:589:ARG:HA	1:A:590:PRO:HD3	1.84	0.44
1:A:479:THR:OG1	1:A:480:PRO:HA	2.17	0.44
1:A:548:THR:HG22	1:A:549:THR:H	1.82	0.44
1:B:139:ALA:HB1	1:B:160:LEU:HD22	1.98	0.44
1:B:339:GLN:HA	1:B:389:SER:O	2.18	0.44
1:B:579:GLU:HB3	1:B:627:ASN:HD21	1.81	0.44
1:A:733:ARG:HG3	1:A:735:ASN:HB2	2.00	0.44
1:A:231:VAL:HG11	1:A:263:ILE:HD13	1.99	0.44
1:B:480:PRO:HG3	1:B:598:THR:HA	1.99	0.44
1:B:644:VAL:HA	1:B:689:GLU:O	2.18	0.44
1:A:652:ASP:O	1:A:653:ASN:HB2	2.18	0.44
1:A:657:LEU:HD21	1:A:674:ALA:HB1	2.00	0.44
1:A:733:ARG:HG3	1:A:735:ASN:H	1.82	0.44
1:A:837:ARG:NH2	1:A:837:ARG:HB2	2.32	0.44
1:A:218:SER:O	1:A:221:THR:HB	2.18	0.43
1:A:592:ALA:HB3	1:A:595:GLU:HG2	2.00	0.43
1:A:644:VAL:HA	1:A:689:GLU:O	2.18	0.43
1:A:853:ARG:HH11	1:A:856:THR:CG2	2.26	0.43
1:B:657:LEU:HD21	1:B:674:ALA:HB1	2.00	0.43
1:A:119:GLU:HA	1:A:120:PRO:HD3	1.80	0.43
1:A:480:PRO:HB2	1:A:481:ALA:H	1.43	0.43
1:A:656:ASN:HB2	1:A:714:PHE:CE1	2.53	0.43
1:A:339:GLN:HA	1:A:389:SER:O	2.18	0.43
1:A:778:ARG:O	1:A:778:ARG:HG3	2.19	0.43
1:B:588:TRP:CH2	1:B:590:PRO:HG3	2.54	0.43
1:B:652:ASP:O	1:B:653:ASN:HB2	2.17	0.43
1:B:662:ASN:ND2	1:B:718:LYS:HE3	2.34	0.43
1:A:595:GLU:HA	1:A:676:TYR:CD1	2.52	0.43
1:A:405:TYR:CE2	1:A:436:GLY:HA3	2.53	0.43
1:B:218:SER:O	1:B:221:THR:HB	2.18	0.43
1:B:589:ARG:HA	1:B:590:PRO:HD3	1.84	0.43
1:B:231:VAL:HG11	1:B:263:ILE:HD13	2.00	0.43
1:B:595:GLU:HA	1:B:676:TYR:CD1	2.53	0.43
1:B:656:ASN:HB2	1:B:714:PHE:CE1	2.53	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:548:THR:HG22	1:B:549:THR:H	1.82	0.43
1:A:577:TRP:CD1	1:A:578:LEU:HB2	2.54	0.43
1:A:588:TRP:CH2	1:A:590:PRO:HG3	2.54	0.43
3:A:866:HEM:HHC	3:A:866:HEM:CBB	2.34	0.43
1:B:577:TRP:CD1	1:B:578:LEU:HB2	2.54	0.42
1:B:592:ALA:HB3	1:B:595:GLU:HG2	2.00	0.42
1:A:299:ASN:C	1:A:301:ASP:H	2.23	0.42
1:A:407:VAL:O	1:A:433:ARG:HA	2.19	0.42
3:B:866:HEM:CBD	3:B:866:HEM:CHA	2.92	0.42
1:A:662:ASN:ND2	1:A:718:LYS:HE3	2.34	0.42
1:B:405:TYR:CE2	1:B:436:GLY:HA3	2.53	0.42
1:B:733:ARG:HG3	1:B:735:ASN:HB2	2.00	0.42
1:B:184:PHE:HB2	1:B:409:THR:HG21	2.02	0.42
1:B:419:SER:OG	1:B:421:LEU:HD23	2.19	0.42
1:A:184:PHE:HB2	1:A:409:THR:HG21	2.01	0.42
1:A:273:ILE:HD13	1:A:331:VAL:HG22	2.01	0.42
1:A:286:TRP:HA	1:A:287:PRO:HD3	1.87	0.42
1:B:299:ASN:C	1:B:301:ASP:H	2.23	0.42
1:A:479:THR:O	1:A:594:THR:HG23	2.20	0.42
1:B:145:GLN:HE21	1:B:145:GLN:HB3	1.72	0.42
1:A:419:SER:OG	1:A:421:LEU:HD23	2.19	0.42
1:B:640:LEU:HD22	1:B:641:VAL:H	1.84	0.42
1:A:296:ILE:HG22	1:A:804:LEU:HD13	2.02	0.42
1:A:532:TYR:CE1	1:A:538:CYS:HA	2.55	0.42
1:B:273:ILE:HD13	1:B:331:VAL:HG22	2.01	0.42
1:B:296:ILE:HG22	1:B:804:LEU:HD13	2.02	0.42
1:B:564:SER:HA	1:B:565:PRO:HD3	1.76	0.42
1:A:358:LEU:HD12	1:A:370:GLY:O	2.20	0.41
1:B:779:LYS:HA	1:B:779:LYS:HD2	1.67	0.41
1:A:169:ASP:O	1:A:172:ARG:HD2	2.20	0.41
1:A:584:TYR:HE2	1:A:620:ARG:HD3	1.85	0.41
1:B:573:PRO:HB2	1:B:574:GLY:H	1.74	0.41
1:B:790:PRO:O	1:B:809:LYS:HB3	2.20	0.41
1:B:358:LEU:HD12	1:B:370:GLY:O	2.20	0.41
1:A:640:LEU:HD22	1:A:641:VAL:H	1.85	0.41
1:A:847:LEU:HA	1:A:847:LEU:HD12	1.89	0.41
1:B:300:ASN:C	1:B:302:THR:N	2.74	0.41
1:B:584:TYR:HE2	1:B:620:ARG:HD3	1.85	0.41
1:A:288:GLY:HA3	1:A:838:ALA:CA	2.49	0.41
1:B:479:THR:O	1:B:594:THR:HG23	2.21	0.41
2:D:11:PHE:HA	2:D:14:TYR:HD2	1.86	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:628:VAL:O	1:A:641:VAL:HA	2.20	0.41
1:A:790:PRO:O	1:A:809:LYS:HB3	2.20	0.41
1:B:134:ARG:HD2	1:B:814:ASP:OD2	2.21	0.41
2:C:27:PHE:HD1	2:C:65:THR:HG22	1.86	0.41
1:A:717:ASN:O	1:A:719:ALA:N	2.48	0.41
1:B:407:VAL:O	1:B:433:ARG:HA	2.20	0.41
2:C:136:VAL:O	2:C:140:MET:HG3	2.21	0.41
1:A:199:ASP:C	1:A:201:GLU:H	2.24	0.41
1:A:538:CYS:O	1:A:539:LYS:HB2	2.20	0.41
1:A:564:SER:HA	1:A:565:PRO:HD3	1.76	0.41
1:B:538:CYS:O	1:B:539:LYS:HB2	2.20	0.41
1:B:821:LEU:HD12	1:B:821:LEU:HA	1.93	0.41
2:D:76:THR:CG2	2:D:79:ASN:HB3	2.48	0.41
1:A:802:PRO:HG3	2:C:77:LEU:CD2	2.51	0.41
1:B:717:ASN:O	1:B:719:ALA:N	2.48	0.41
1:A:134:ARG:HD2	1:A:814:ASP:OD2	2.21	0.40
1:B:692:LEU:C	1:B:692:LEU:HD23	2.42	0.40
2:C:11:PHE:HA	2:C:14:TYR:HD2	1.86	0.40
1:B:345:TYR:HA	1:B:383:ASN:O	2.21	0.40
1:B:375:GLY:HA2	1:B:416:TYR:CD1	2.57	0.40
1:B:832:GLU:HB2	1:B:856:THR:HB	2.03	0.40
1:A:692:LEU:C	1:A:692:LEU:HD23	2.42	0.40
1:B:157:ASP:HA	1:B:158:PRO:HD3	1.93	0.40
1:B:177:ILE:HA	1:B:228:PHE:O	2.22	0.40
1:B:480:PRO:HB2	1:B:481:ALA:H	1.43	0.40
1:B:532:TYR:CE1	1:B:538:CYS:HA	2.55	0.40
1:A:655:ILE:HA	1:A:677:VAL:O	2.21	0.40
1:A:300:ASN:C	1:A:302:THR:N	2.74	0.40
1:A:780:LEU:HD23	1:A:819:TYR:CD1	2.51	0.40

There are no symmetry-related clashes.

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	751/865 (87%)	678 (90%)	67 (9%)	6 (1%)	16	38
1	B	751/865 (87%)	679 (90%)	66 (9%)	6 (1%)	16	38
2	C	159/206 (77%)	150 (94%)	8 (5%)	1 (1%)	22	45
2	D	159/206 (77%)	150 (94%)	7 (4%)	2 (1%)	10	26
All	All	1820/2142 (85%)	1657 (91%)	148 (8%)	15 (1%)	16	38

All (15) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	318	PRO
1	A	480	PRO
1	A	573	PRO
1	B	318	PRO
1	B	480	PRO
1	B	573	PRO
1	A	733	ARG
1	A	832	GLU
1	B	733	ARG
1	B	832	GLU
2	C	77	LEU
2	D	77	LEU
1	A	299	ASN
1	B	299	ASN
2	D	5	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	616/695 (89%)	587 (95%)	29 (5%)	22	49
1	B	616/695 (89%)	587 (95%)	29 (5%)	22	49
2	C	124/158 (78%)	123 (99%)	1 (1%)	79	91
2	D	124/158 (78%)	123 (99%)	1 (1%)	79	91
All	All	1480/1706 (87%)	1420 (96%)	60 (4%)	26	54

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

Mol	Chain	Res	Type
1	A	126	ILE
1	A	143	LEU
1	A	192	ARG
1	A	266	LEU
1	A	323	ARG
1	A	340	ARG
1	A	348	THR
1	A	364	ARG
1	A	409	THR
1	A	428	THR
1	A	430	THR
1	A	442	THR
1	A	479	THR
1	A	486	VAL
1	A	511	ARG
1	A	525	LEU
1	A	558	ARG
1	A	618	ARG
1	A	627	ASN
1	A	639	ARG
1	A	641	VAL
1	A	655	ILE
1	A	657	LEU
1	A	706	THR
1	A	712	ASN
1	A	720	TRP
1	A	780	LEU
1	A	825	LEU
1	A	833	ASN
1	B	126	ILE
1	B	143	LEU
1	B	192	ARG
1	B	266	LEU
1	B	323	ARG
1	B	340	ARG
1	B	348	THR
1	B	364	ARG
1	B	409	THR
1	B	428	THR
1	B	430	THR
1	B	442	THR
1	B	479	THR

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Mol	Chain	Res	Type
1	B	486	VAL
1	B	511	ARG
1	B	525	LEU
1	B	558	ARG
1	B	618	ARG
1	B	627	ASN
1	B	639	ARG
1	B	641	VAL
1	B	655	ILE
1	B	657	LEU
1	B	706	THR
1	B	712	ASN
1	B	720	TRP
1	B	780	LEU
1	B	825	LEU
1	B	833	ASN
2	C	120	LEU
2	D	120	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (10) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	300	ASN
1	A	608	GLN
1	A	627	ASN
1	B	193	ASN
1	B	608	GLN
1	B	627	ASN
2	C	119	ASN
2	C	126	GLN
2	D	119	ASN
2	D	126	GLN

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 ⓘ

There are no oligosaccharides in this entry.

5.6 Ligand geometry ⓘ

9 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	#$|Z| > 2$
4	GOL	B	867	-	5,5,5	0.38	0	5,5,5	0.29	0
4	GOL	A	868	-	5,5,5	0.38	0	5,5,5	0.22	0
4	GOL	B	868	-	5,5,5	0.37	0	5,5,5	0.27	0
4	GOL	A	871	-	5,5,5	0.37	0	5,5,5	0.26	0
4	GOL	A	869	-	5,5,5	0.38	0	5,5,5	0.30	0
4	GOL	A	867	-	5,5,5	0.36	0	5,5,5	0.17	0
4	GOL	A	870	-	5,5,5	0.37	0	5,5,5	0.25	0
3	HEM	A	866	1	42,50,50	1.93	7 (16%)	46,82,82	1.63	8 (17%)
3	HEM	B	866	1	42,50,50	1.93	6 (14%)	46,82,82	1.59	8 (17%)

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	GOL	B	867	-	-	2/4/4/4	-
4	GOL	A	868	-	-	3/4/4/4	-
4	GOL	B	868	-	-	2/4/4/4	-
4	GOL	A	871	-	-	2/4/4/4	-
4	GOL	A	869	-	-	2/4/4/4	-
4	GOL	A	867	-	-	2/4/4/4	-
4	GOL	A	870	-	-	2/4/4/4	-
3	HEM	A	866	1	-	5/12/54/54	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	HEM	B	866	1	-	5/12/54/54	-

All (13) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	B	866	HEM	C3D-C2D	7.90	1.53	1.36
3	A	866	HEM	C3D-C2D	7.86	1.53	1.36
3	A	866	HEM	C3C-C2C	-4.34	1.34	1.40
3	B	866	HEM	C3C-C2C	-4.33	1.34	1.40
3	B	866	HEM	C3C-CAC	3.34	1.55	1.47
3	A	866	HEM	C3C-CAC	3.33	1.55	1.47
3	A	866	HEM	CAB-C3B	2.85	1.55	1.47
3	B	866	HEM	CAB-C3B	2.82	1.54	1.47
3	A	866	HEM	C3C-C4C	2.64	1.45	1.41
3	B	866	HEM	C3C-C4C	2.54	1.45	1.41
3	B	866	HEM	CMB-C2B	2.10	1.55	1.50
3	A	866	HEM	CMB-C2B	2.04	1.54	1.50
3	A	866	HEM	CMD-C2D	2.01	1.54	1.50

All (16) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	866	HEM	C4D-ND-C1D	5.21	111.37	105.21
3	B	866	HEM	C4D-ND-C1D	5.10	111.24	105.21
3	A	866	HEM	C4B-CHC-C1C	3.18	126.76	122.56
3	B	866	HEM	C4B-CHC-C1C	3.12	126.67	122.56
3	A	866	HEM	C4C-CHD-C1D	3.09	126.63	122.56
3	B	866	HEM	C4C-CHD-C1D	2.99	126.51	122.56
3	A	866	HEM	C3B-C4B-NB	-2.50	107.67	109.47
3	A	866	HEM	C1B-NB-C4B	2.42	108.07	105.21
3	B	866	HEM	C3B-C2B-C1B	2.30	108.14	106.41
3	A	866	HEM	C3B-C2B-C1B	2.28	108.12	106.41
3	B	866	HEM	CAD-C3D-C4D	2.27	128.65	124.70
3	A	866	HEM	CAD-C3D-C4D	2.23	128.59	124.70
3	B	866	HEM	CBA-CAA-C2A	-2.15	108.92	112.54
3	A	866	HEM	CBA-CAA-C2A	-2.11	108.99	112.54
3	B	866	HEM	C1B-NB-C4B	2.11	107.70	105.21
3	B	866	HEM	C3B-C4B-NB	-2.07	107.98	109.47

There are no chirality outliers.

All (25) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	866	HEM	C2D-C3D-CAD-CBD
3	A	866	HEM	C4D-C3D-CAD-CBD
3	B	866	HEM	C2D-C3D-CAD-CBD
3	B	866	HEM	C4D-C3D-CAD-CBD
4	A	867	GOL	O1-C1-C2-C3
4	A	868	GOL	O1-C1-C2-C3
4	A	869	GOL	O1-C1-C2-C3
4	A	871	GOL	O1-C1-C2-C3
4	B	867	GOL	O1-C1-C2-C3
4	B	868	GOL	O1-C1-C2-C3
4	A	868	GOL	O1-C1-C2-O2
4	B	868	GOL	O1-C1-C2-O2
4	A	870	GOL	O1-C1-C2-C3
3	A	866	HEM	C2A-CAA-CBA-CGA
3	B	866	HEM	C2A-CAA-CBA-CGA
4	A	867	GOL	O1-C1-C2-O2
4	A	869	GOL	O1-C1-C2-O2
4	A	871	GOL	O1-C1-C2-O2
4	B	867	GOL	O1-C1-C2-O2
4	A	870	GOL	O1-C1-C2-O2
3	A	866	HEM	C4B-C3B-CAB-CBB
3	B	866	HEM	C4B-C3B-CAB-CBB
3	A	866	HEM	C3D-CAD-CBD-CGD
3	B	866	HEM	C3D-CAD-CBD-CGD
4	A	868	GOL	O2-C2-C3-O3

There are no ring outliers.

2 monomers are involved in 17 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	866	HEM	9	0
3	B	866	HEM	8	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 then 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 HEM A 866

Bond lengths

Bond angles

Torsions

Rings

Ligand HEM B 866

Bond lengths — Bond angles — Torsions — Rings
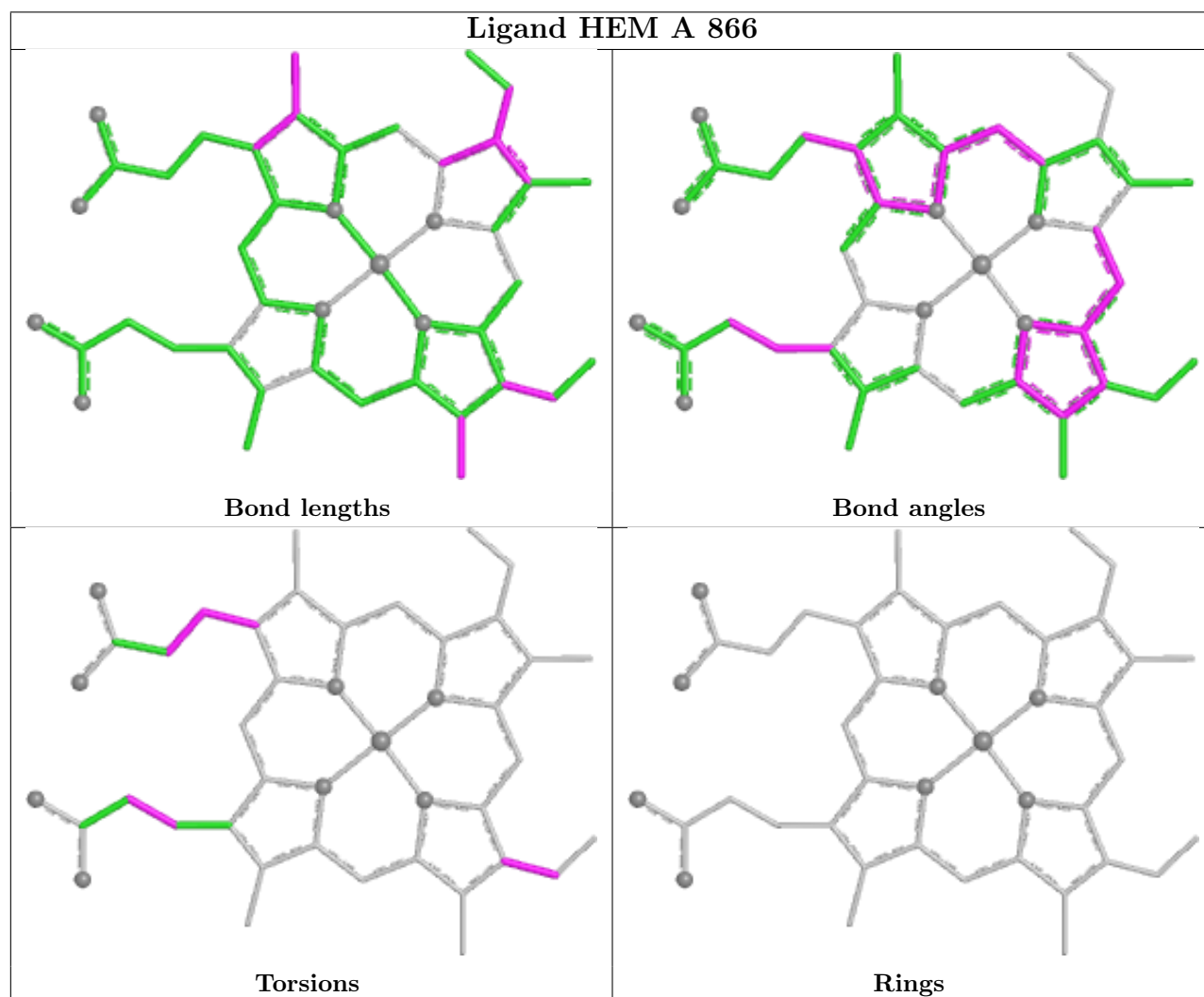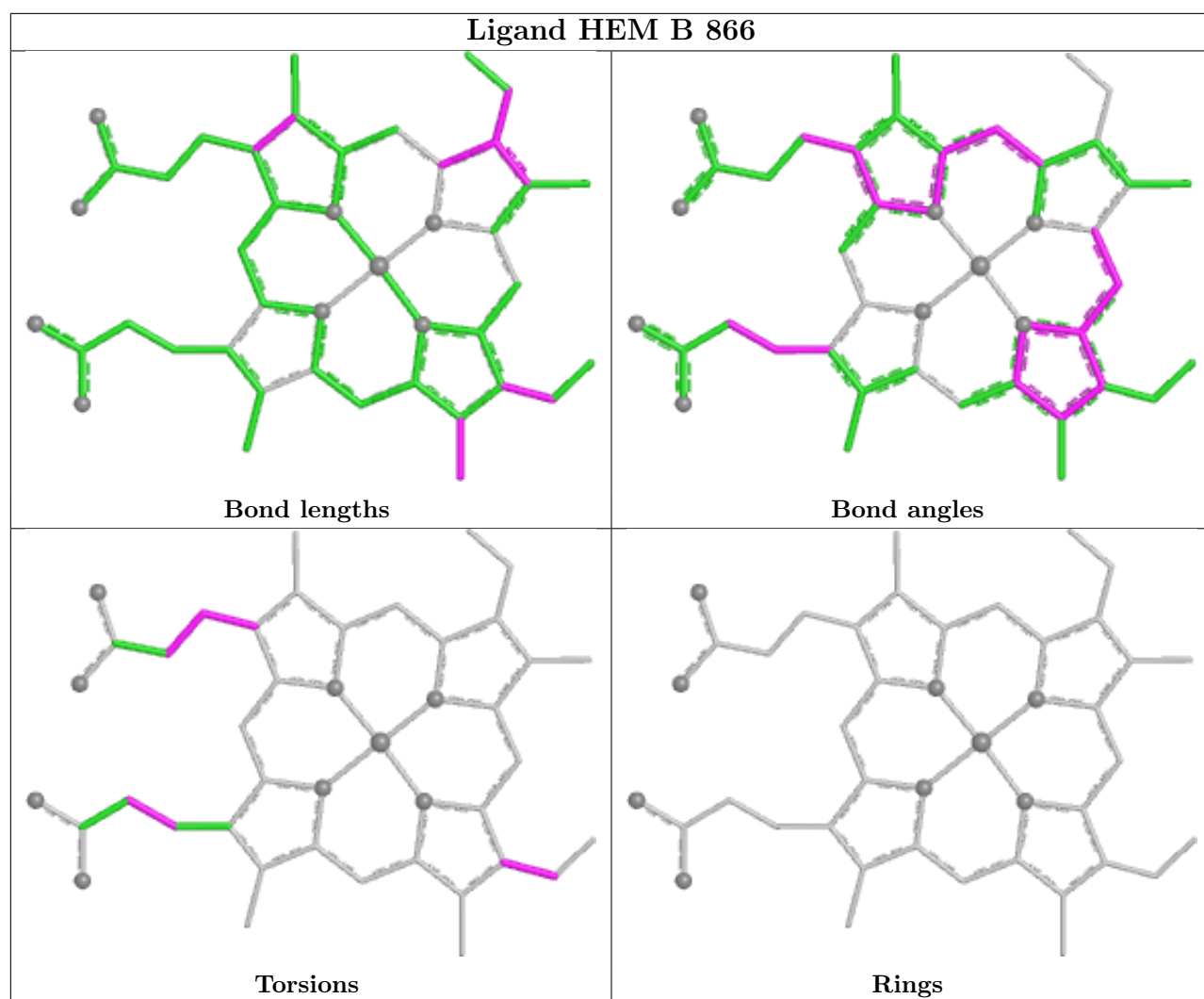
5.7 Other polymers ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues ⓘ

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	753/865 (87%)	0.49	37 (4%)	36	34	53, 91, 133, 199	0
1	B	753/865 (87%)	0.46	38 (5%)	35	33	61, 91, 134, 196	0
2	C	163/206 (79%)	0.54	10 (6%)	28	26	82, 109, 141, 179	0
2	D	163/206 (79%)	0.45	8 (4%)	36	34	82, 109, 141, 179	0
All	All	1832/2142 (85%)	0.48	93 (5%)	34	32	53, 94, 138, 199	0

All (93) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	C	1	PRO	5.2
1	B	421	LEU	5.1
2	C	40	ALA	4.7
1	A	418	THR	4.4
2	D	1	PRO	4.3
1	B	418	THR	4.3
2	D	137	TYR	4.2
2	D	120	LEU	4.1
2	C	137	TYR	4.1
1	A	577	TRP	4.0
1	A	605	SER	3.9
1	A	422	LEU	3.9
2	C	28	GLY	3.9
2	D	40	ALA	3.9
1	A	634	TRP	3.8
2	D	39	ASP	3.7
2	C	120	LEU	3.6
1	B	302	THR	3.6
1	B	577	TRP	3.5
1	A	575	VAL	3.4
1	B	428	THR	3.3

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Mol	Chain	Res	Type	RSRZ
1	B	837	ARG	3.3
2	C	39	ASP	3.2
1	B	422	LEU	3.2
1	B	294	GLY	3.2
1	B	575	VAL	3.2
1	A	421	LEU	3.1
1	B	734	GLY	3.1
1	A	299	ASN	3.1
1	A	779	LYS	3.1
1	B	449	PRO	3.0
1	B	634	TRP	2.9
1	B	292	ASP	2.9
2	D	41	ASN	2.8
1	A	449	PRO	2.8
1	B	779	LYS	2.8
1	A	302	THR	2.7
1	B	299	ASN	2.7
1	A	778	ARG	2.7
1	A	469	ASP	2.7
2	D	76	THR	2.7
1	A	530	GLN	2.6
1	B	337	ALA	2.6
1	A	447	LEU	2.6
1	B	269	GLU	2.6
1	A	734	GLY	2.6
1	A	337	ALA	2.5
1	A	378	ASP	2.5
1	B	711	LYS	2.4
1	A	492	ASN	2.4
2	C	173	THR	2.4
1	A	711	LYS	2.4
1	A	855	ARG	2.4
1	B	419	SER	2.4
1	B	605	SER	2.4
1	B	291	GLY	2.4
1	B	239	PRO	2.4
2	D	28	GLY	2.4
1	B	368	GLU	2.3
1	B	542	ARG	2.3
1	A	294	GLY	2.3
1	A	319	ASP	2.3
1	A	366	PRO	2.3

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Mol	Chain	Res	Type	RSRZ
1	A	114	ASP	2.3
1	A	837	ARG	2.3
1	B	778	ARG	2.3
1	B	319	ASP	2.3
1	B	361	LEU	2.3
1	B	420	SER	2.3
2	C	41	ASN	2.2
1	A	622	TRP	2.2
1	B	492	ASN	2.2
2	C	123	LEU	2.2
1	B	686	ARG	2.2
1	A	838	ALA	2.2
2	C	2	ALA	2.2
1	B	304	ASN	2.2
1	A	145	GLN	2.2
1	A	825	LEU	2.2
1	B	753	GLY	2.2
1	A	419	SER	2.1
1	A	146	THR	2.1
1	A	479	THR	2.1
1	A	348	THR	2.1
1	B	699	PHE	2.1
1	B	303	GLY	2.1
1	B	199	ASP	2.1
1	A	269	GLU	2.0
1	B	255	GLY	2.0
1	B	283	GLY	2.0
1	B	357	THR	2.0
1	A	699	PHE	2.0
1	A	652	ASP	2.0

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

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

6.3　Carbohydrates ⓘ

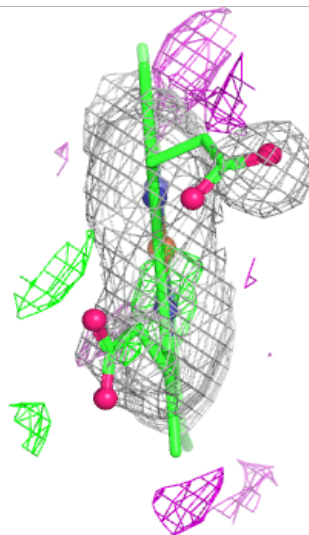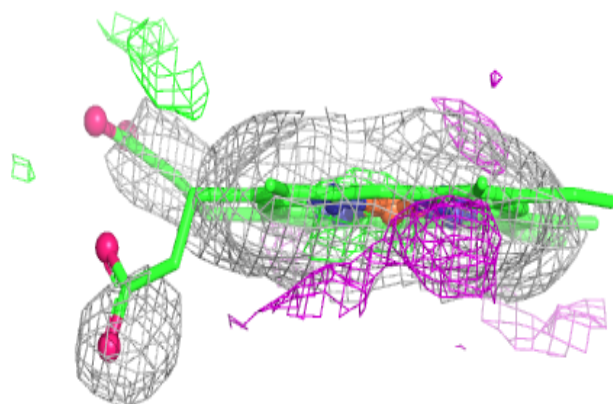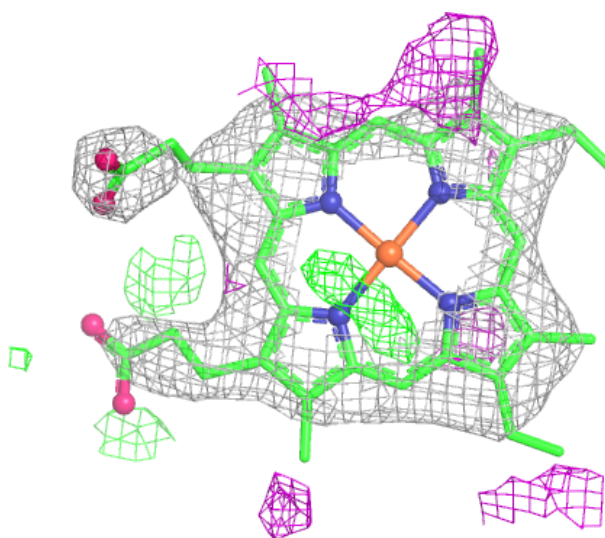There are no monosaccharides in this entry.

6.4 Ligands ⓘ

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.
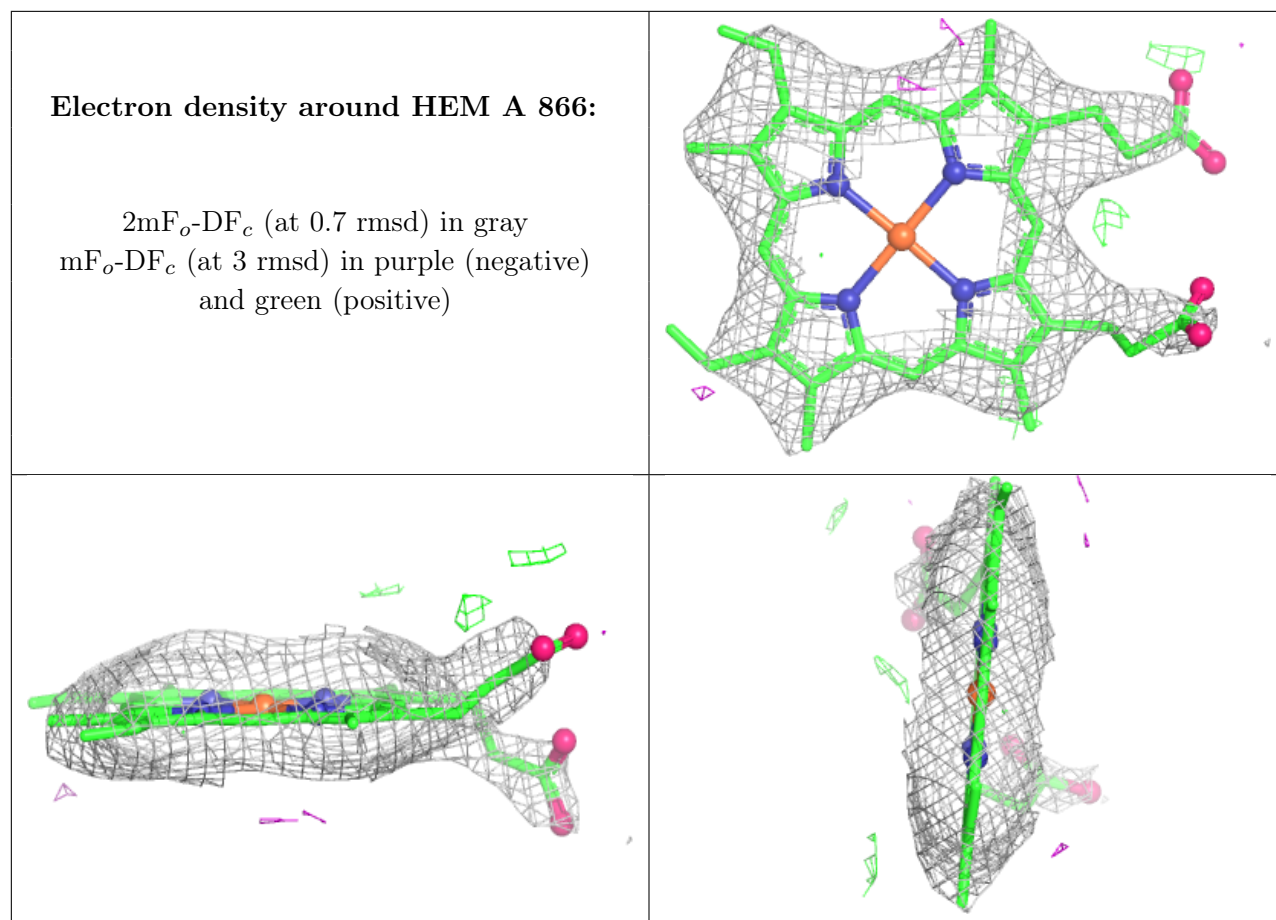
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
4	GOL	A	871	6/6	0.80	0.22	60,120,142,145	0
4	GOL	A	867	6/6	0.82	0.15	68,74,118,119	0
4	GOL	A	868	6/6	0.88	0.16	49,82,113,137	0
4	GOL	B	868	6/6	0.91	0.18	73,109,123,124	0
4	GOL	A	869	6/6	0.92	0.15	105,119,128,128	0
4	GOL	B	867	6/6	0.93	0.14	65,89,122,123	0
4	GOL	A	870	6/6	0.93	0.12	101,122,137,144	0
3	HEM	B	866	43/43	0.97	0.14	38,80,148,169	0
3	HEM	A	866	43/43	0.98	0.11	42,79,148,171	0

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

Electron density around HEM B 866:

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

Electron density around HEM A 866:

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

6.5 Other polymers ⓘ

There are no such residues in this entry.