



# Full wwPDB X-ray Structure Validation Report ⓘ

Feb 14, 2017 – 05:17 am GMT

PDB ID : 3B3O  
Title : Structure of neuronal nos heme domain in complex with a inhibitor (+-)-n1-{  
cis-4'-[(6"-amino-4"-methylpyridin-2"-yl)methyl]pyrrolidin-3'-yl}-n2-(4'-chlor  
obenzyl)ethane-1,2-diamine  
Authors : Igarashi, J.; Li, H.; Poulos, T.L.  
Deposited on : 2007-10-22  
Resolution : 2.05 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](mailto:validation@mail.wwpdb.org)

A user guide is available at

<http://wwpdb.org/validation/2016/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

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

MolProbity : 4.02b-467  
Mogul : 1.7.2 (RC1), CSD as538be (2017)  
Xtriage (Phenix) : 1.9-1692  
EDS : trunk28620  
Percentile statistics : 20161228.v01 (using entries in the PDB archive December 28th 2016)  
Refmac : 5.8.0135  
CCP4 : 6.5.0  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : recalc28949

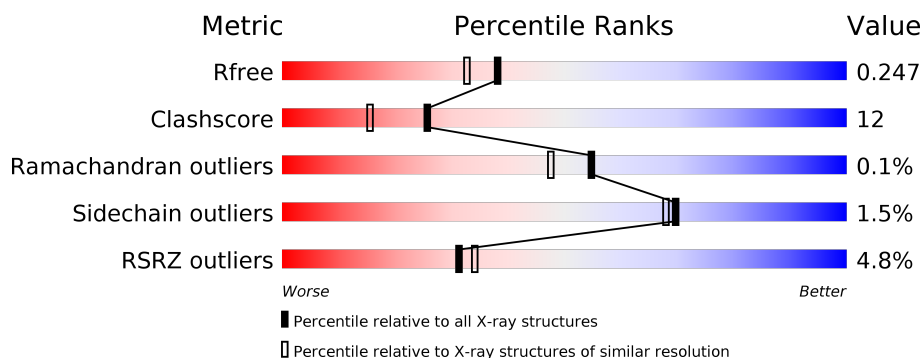
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.05 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))
$R_{free}$	100719	1316 (2.04-2.04)
Clashscore	112137	1394 (2.04-2.04)
Ramachandran outliers	110173	1383 (2.04-2.04)
Sidechain outliers	110143	1383 (2.04-2.04)
RSRZ outliers	101464	1319 (2.04-2.04)

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 on the lower bar indicate the fraction of residues that contain outliers for  $\geq 3$ , 2, 1 and 0 types of geometric quality criteria. 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	422	<div> <div>8%</div> <div>68%</div> <div>27%</div> <div>• •</div> </div>
1	B	422	<div> <div>%</div> <div>83%</div> <div>14%</div> <div>•</div> </div>

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
2	ACT	A	860	-	-	-	X
6	JI3	A	800	-	-	-	X
6	JI3	B	800	-	-	-	X

## 2 Entry composition [i](#)

There are 7 unique types of molecules in this entry. The entry contains 7275 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 Nitric-oxide synthase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	409	Total	C	N	O	S	0	0	0
			3331	2132	571	607	21			
1	B	411	Total	C	N	O	S	0	0	0
			3345	2140	574	610	21			

- Molecule 2 is ACETATE ION (three-letter code: ACT) (formula:  $C_2H_3O_2$ ).

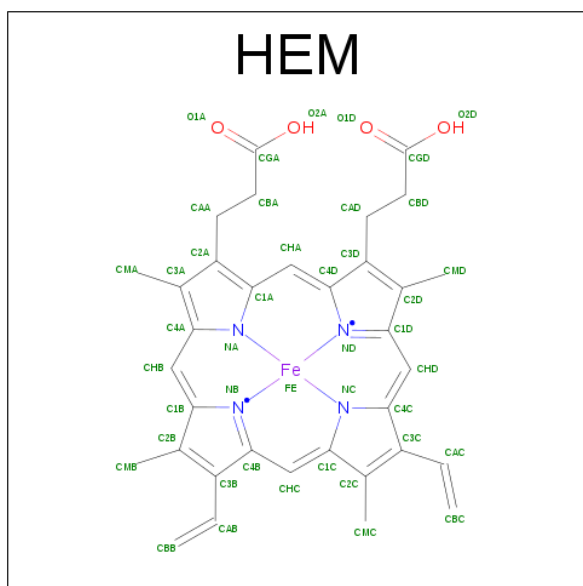


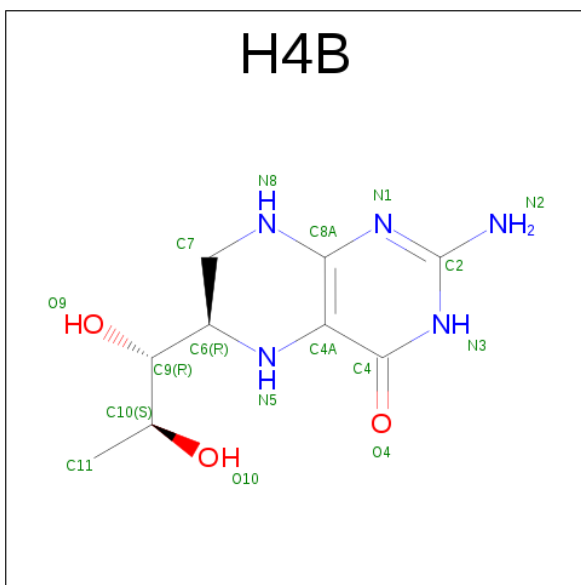
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	A	1	Total	C	O	0	0
			4	2	2		
2	B	1	Total	C	O	0	0
			4	2	2		

- Molecule 3 is ZINC ION (three-letter code: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	1	Total	Zn	0	0
			1	1		

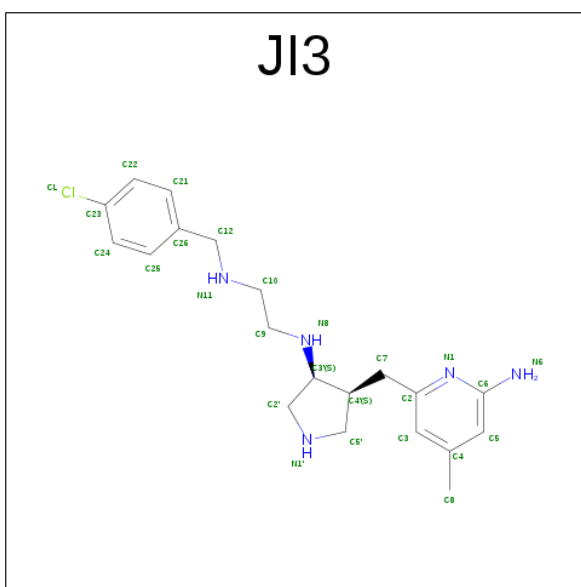
- Molecule 4 is PROTOPORPHYRIN IX CONTAINING FE (three-letter code: HEM) (formula:  $C_{34}H_{32}FeN_4O_4$ ).





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

- Molecule 6 is N-{(3S,4S)-4-[(6-AMINO-4-METHYLPYRIDIN-2-YL)METHYL]PYRROLIDIN-3-YL}-N'-(4-CHLOROBENZYL)ETHANE-1,2-DIAMINE (three-letter code: JI3) (formula: C<sub>20</sub>H<sub>28</sub>ClN<sub>5</sub>).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
6	A	1	Total	C	Cl	N	0	0
			26	20	1	5		

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Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
6	B	1	Total	C	Cl	N	0	0
			26	20	1	5		

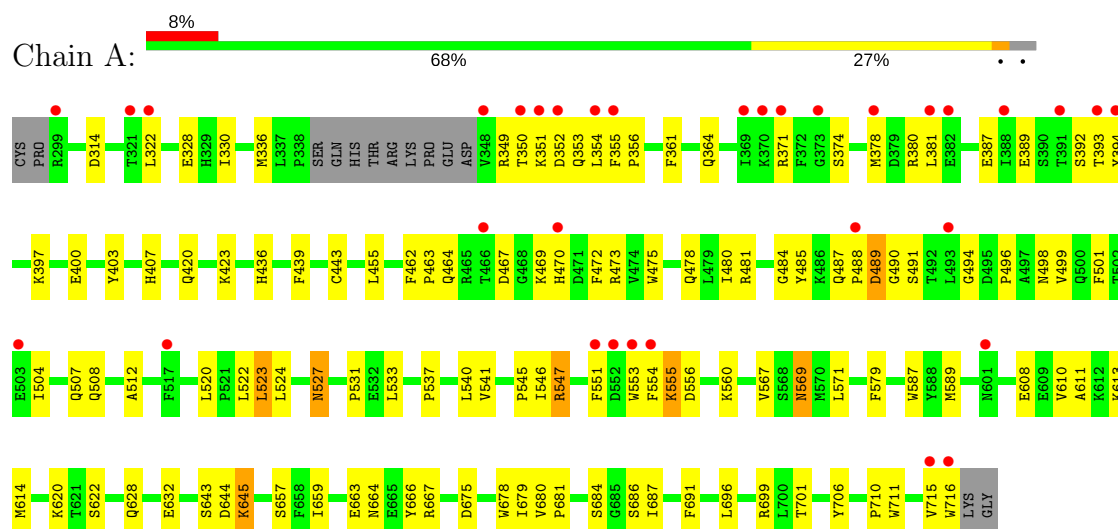
- Molecule 7 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
7	A	172	Total	O	0	0
			172	172		
7	B	246	Total	O	0	0
			246	246		

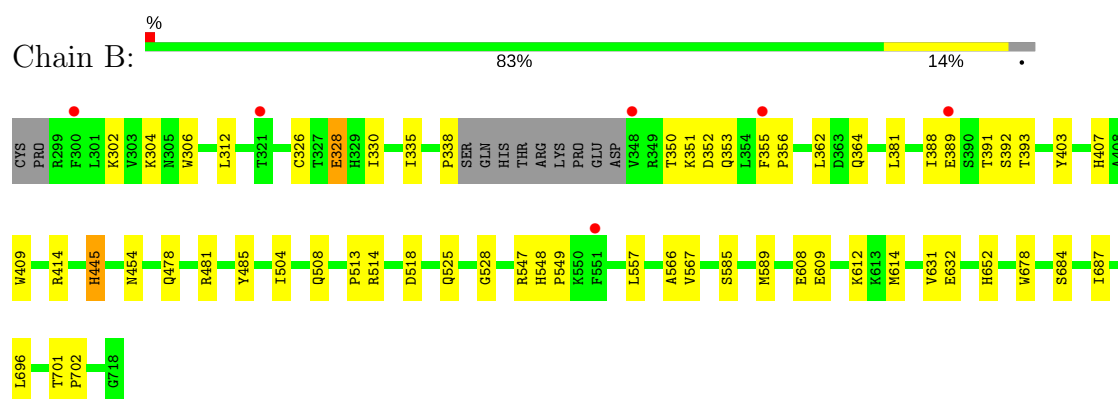
### 3 Residue-property plots

These plots are drawn for all protein, RNA and DNA 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: Nitric-oxide synthase



#### • Molecule 1: Nitric-oxide synthase





## 4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	52.21Å 111.53Å 164.84Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	49.77 – 2.05 49.77 – 2.04	Depositor EDS
% Data completeness (in resolution range)	97.9 (49.77-2.05) 97.4 (49.77-2.04)	Depositor EDS
$R_{merge}$	0.05	Depositor
$R_{sym}$	0.05	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	2.27 (at 2.05Å)	Xtriage
Refinement program	CNS 1.1	Depositor
R, $R_{free}$	0.213 , 0.253 0.208 , 0.247	Depositor DCC
$R_{free}$ test set	3001 reflections (5.25%)	DCC
Wilson B-factor (Å <sup>2</sup> )	31.4	Xtriage
Anisotropy	0.683	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.38 , 56.5	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.49$ , $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
$F_o, F_c$ correlation	0.95	EDS
Total number of atoms	7275	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	43.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.48% of the height of the origin peak. No significant pseudotranslation is detected.*

<sup>1</sup>Intensities estimated from amplitudes.

<sup>2</sup>Theoretical 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: HEM, ZN, ACT, H4B, JI3

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	0.44	0/3424	0.65	1/4645 (0.0%)
1	B	0.46	0/3438	0.65	2/4661 (0.0%)
All	All	0.45	0/6862	0.65	3/9306 (0.0%)

There are no bond length outliers.

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	589	MET	N-CA-C	-5.97	94.89	111.00
1	B	589	MET	N-CA-C	-5.15	97.09	111.00
1	B	326	CYS	CA-CB-SG	5.00	123.00	114.00

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	3331	0	3243	113	0
1	B	3345	0	3259	47	0
2	A	4	0	3	0	0
2	B	4	0	3	0	0
3	A	1	0	0	0	0
4	A	43	0	30	1	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
4	B	43	0	30	6	0
5	A	17	0	15	1	0
5	B	17	0	15	0	0
6	A	26	0	28	1	0
6	B	26	0	28	3	0
7	A	172	0	0	10	0
7	B	246	0	0	6	0
All	All	7275	0	6654	161	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 12.

All (161) 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:523:LEU:HD22	1:A:531:PRO:HB2	1.40	1.04
1:A:350:THR:HB	1:A:353:GLN:HG3	1.58	0.86
1:B:355:PHE:HZ	1:B:389:GLU:HG3	1.41	0.84
1:A:487:GLN:HB3	1:A:488:PRO:HD2	1.57	0.83
1:A:467:ASP:OD2	1:A:469:LYS:HB2	1.86	0.76
1:B:350:THR:HG22	1:B:352:ASP:H	1.52	0.72
1:A:545:PRO:HG2	1:A:547:ARG:NH2	2.04	0.72
1:B:355:PHE:CZ	1:B:389:GLU:HG3	2.26	0.70
1:A:545:PRO:HG2	1:A:547:ARG:HH21	1.58	0.69
1:A:475:TRP:HB2	1:A:523:LEU:HB3	1.74	0.69
1:A:473:ARG:NH2	1:A:710:PRO:HD3	2.09	0.68
1:A:555:LYS:HB3	1:A:555:LYS:NZ	2.07	0.68
1:A:620:LYS:HE3	1:A:622:SER:OG	1.94	0.67
1:A:488:PRO:C	1:A:490:GLY:H	1.98	0.66
1:A:350:THR:HG22	1:A:352:ASP:H	1.60	0.66
1:A:522:LEU:HB3	7:A:1019:HOH:O	1.97	0.65
1:A:523:LEU:CD2	1:A:531:PRO:HB2	2.23	0.64
1:B:478:GLN:HB2	1:B:481:ARG:HG3	1.79	0.64
1:A:501:PHE:CD2	1:A:520:LEU:HD13	2.34	0.62
1:A:371:ARG:HG3	1:A:371:ARG:HH21	1.63	0.62
1:A:489:ASP:C	1:A:491:SER:H	2.01	0.61
1:A:696:LEU:HD22	1:B:330:ILE:HD11	1.82	0.61
1:B:504:ILE:O	1:B:508:GLN:HG2	2.02	0.60
1:A:355:PHE:CZ	1:A:381:LEU:HD11	2.36	0.60
1:A:380:ARG:NH1	1:A:397:LYS:HG2	2.18	0.59
1:A:555:LYS:HB3	1:A:555:LYS:HZ3	1.68	0.58

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:328:GLU:H	1:A:328:GLU:CD	2.08	0.57
1:A:569:ASN:H	1:A:569:ASN:HD22	1.53	0.57
1:A:322:LEU:HB2	1:A:699:ARG:HB2	1.86	0.57
1:B:393:THR:HG23	7:B:983:HOH:O	2.06	0.56
1:A:504:ILE:O	1:A:508:GLN:HG2	2.05	0.56
1:A:480:ILE:HD13	1:A:541:VAL:HG13	1.88	0.55
1:A:551:PHE:HE1	1:A:614:MET:HE3	1.71	0.55
1:B:514:ARG:HD2	7:B:1069:HOH:O	2.07	0.55
1:A:628:GLN:HG3	1:B:631:VAL:HG11	1.88	0.55
1:B:391:THR:O	1:B:392:SER:HB2	2.07	0.55
1:B:513:PRO:HG2	1:B:518:ASP:OD2	2.08	0.54
1:B:350:THR:O	1:B:353:GLN:HG2	2.06	0.54
1:A:488:PRO:C	1:A:490:GLY:N	2.62	0.53
1:A:485:TYR:CE2	1:A:512:ALA:HB1	2.44	0.53
1:A:659:ILE:O	1:A:663:GLU:HG3	2.09	0.53
1:A:322:LEU:HD13	1:A:699:ARG:HH21	1.74	0.53
1:B:478:GLN:HB2	1:B:481:ARG:CG	2.39	0.53
1:B:304:LYS:NZ	7:B:1085:HOH:O	2.42	0.53
1:A:478:GLN:HB2	1:A:481:ARG:HG3	1.91	0.52
1:A:545:PRO:HD2	1:A:644:ASP:OD2	2.08	0.52
1:A:501:PHE:HD2	1:A:520:LEU:HD13	1.73	0.52
1:A:551:PHE:HB3	1:A:553:TRP:NE1	2.25	0.52
1:B:513:PRO:HG2	1:B:518:ASP:CG	2.29	0.52
1:A:322:LEU:HD13	1:A:699:ARG:NH2	2.25	0.52
1:A:380:ARG:HD3	1:A:400:GLU:OE1	2.09	0.52
1:A:614:MET:HE3	1:A:632:GLU:HG3	1.91	0.52
1:A:355:PHE:N	1:A:356:PRO:HD2	2.25	0.52
1:A:569:ASN:N	1:A:569:ASN:HD22	2.08	0.52
1:A:701:THR:HG23	7:A:1039:HOH:O	2.09	0.52
1:A:715:VAL:HG23	1:A:715:VAL:O	2.09	0.52
1:A:551:PHE:HB3	1:A:553:TRP:CE2	2.46	0.51
1:A:487:GLN:HB3	1:A:488:PRO:CD	2.37	0.51
1:A:537:PRO:HB2	1:A:540:LEU:HG	1.92	0.51
1:A:608:GLU:HB2	7:A:1060:HOH:O	2.09	0.51
1:A:470:HIS:HB3	1:A:527:ASN:ND2	2.26	0.51
1:A:547:ARG:NH1	1:A:643:SER:HB2	2.26	0.50
1:A:374:SER:O	1:A:378:MET:HG2	2.12	0.50
1:A:675:ASP:O	1:A:679:ILE:HG12	2.11	0.50
1:A:488:PRO:O	1:A:490:GLY:N	2.44	0.50
4:B:750:HEM:HBC2	4:B:750:HEM:CMC	2.42	0.50
1:B:525:GLN:HE21	1:B:528:GLY:HA2	1.75	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:485:TYR:CZ	1:B:514:ARG:HA	2.47	0.50
1:A:455:LEU:HD12	1:A:587:TRP:HB3	1.92	0.49
1:A:554:PHE:HB3	7:A:1057:HOH:O	2.12	0.49
1:B:631:VAL:HB	7:B:961:HOH:O	2.12	0.49
1:B:355:PHE:N	1:B:356:PRO:HD2	2.28	0.49
1:A:524:LEU:O	1:A:531:PRO:HA	2.13	0.49
1:A:455:LEU:HD12	1:A:587:TRP:CB	2.43	0.49
1:A:508:GLN:OE1	1:A:716:TRP:CH2	2.66	0.49
1:B:364:GLN:NE2	7:B:1054:HOH:O	2.46	0.49
1:A:523:LEU:HG	1:A:533:LEU:CD2	2.42	0.48
1:A:353:GLN:O	1:A:356:PRO:HG2	2.14	0.48
1:B:566:ALA:HB2	1:B:585:SER:HB3	1.96	0.48
1:A:350:THR:HG22	1:A:351:LYS:N	2.29	0.48
1:B:701:THR:HA	1:B:702:PRO:C	2.34	0.48
1:A:684:SER:HB3	1:A:687:ILE:HG12	1.95	0.47
1:A:351:LYS:HE2	1:A:392:SER:HA	1.96	0.47
1:A:567:VAL:HG23	6:A:800:JI3:H3	1.96	0.47
1:B:614:MET:CE	1:B:632:GLU:HG3	2.45	0.47
1:A:498:ASN:HA	7:A:1028:HOH:O	2.15	0.47
1:A:551:PHE:CD2	1:A:551:PHE:N	2.81	0.47
1:B:362:LEU:HD12	1:B:381:LEU:HD23	1.96	0.47
1:A:489:ASP:C	1:A:491:SER:N	2.69	0.47
1:A:684:SER:HB3	1:A:687:ILE:CG1	2.44	0.46
1:B:302:LYS:HA	1:B:312:LEU:O	2.15	0.46
1:B:684:SER:HB3	1:B:687:ILE:HD11	1.97	0.46
4:B:750:HEM:O2A	6:B:800:JI3:H102	2.16	0.46
1:A:403:TYR:CE1	1:A:407:HIS:CE1	3.04	0.46
1:B:328:GLU:H	1:B:328:GLU:CD	2.19	0.46
1:A:571:LEU:C	1:A:571:LEU:HD23	2.36	0.45
1:A:678:TRP:HA	5:A:760:H4B:N1	2.31	0.45
1:A:387:GLU:OE1	1:A:394:TYR:HA	2.16	0.45
1:A:314:ASP:HB2	1:A:666:TYR:HE2	1.82	0.45
1:A:489:ASP:O	1:A:489:ASP:OD2	2.34	0.45
1:A:464:GLN:HB3	1:A:579:PHE:CE2	2.52	0.45
1:A:657:SER:HB2	7:A:1068:HOH:O	2.17	0.45
1:B:414:ARG:HD3	1:B:678:TRP:CD2	2.52	0.45
1:A:480:ILE:HA	7:A:974:HOH:O	2.16	0.45
1:A:330:ILE:HD11	1:B:696:LEU:HB3	1.98	0.45
1:A:686:SER:HA	1:A:691:PHE:CG	2.51	0.45
1:B:684:SER:HB3	1:B:687:ILE:CG1	2.47	0.45
1:A:361:PHE:O	1:A:364:GLN:HG2	2.17	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:614:MET:CE	1:A:632:GLU:HG3	2.46	0.44
1:A:494:GLY:O	1:A:496:PRO:HD3	2.17	0.44
1:A:608:GLU:O	1:A:611:ALA:HB3	2.18	0.44
1:B:445:HIS:C	1:B:445:HIS:CD2	2.91	0.44
1:A:462:PHE:HB3	1:A:463:PRO:CD	2.48	0.44
1:A:336:MET:HG3	1:B:306:TRP:NE1	2.32	0.44
1:A:610:VAL:O	1:A:614:MET:HG3	2.16	0.44
1:B:388:ILE:O	1:B:392:SER:N	2.43	0.44
1:A:507:GLN:HG2	1:A:507:GLN:O	2.16	0.44
1:B:557:LEU:HD23	1:B:609:GLU:OE1	2.18	0.43
1:A:569:ASN:H	1:A:569:ASN:ND2	2.15	0.43
1:A:508:GLN:NE2	1:A:508:GLN:HA	2.33	0.43
1:B:409:TRP:CH2	4:B:750:HEM:HMC3	2.53	0.43
1:A:523:LEU:HG	1:A:533:LEU:HD21	2.00	0.43
1:A:354:LEU:HD11	1:A:394:TYR:HE2	1.84	0.43
1:A:371:ARG:HG3	1:A:371:ARG:NH2	2.32	0.43
1:B:548:HIS:CG	1:B:549:PRO:HD2	2.53	0.43
1:A:463:PRO:HB2	1:A:472:PHE:CE1	2.54	0.42
1:A:684:SER:HB3	1:A:687:ILE:HD11	2.00	0.42
1:B:355:PHE:HZ	1:B:389:GLU:CG	2.22	0.42
1:B:409:TRP:CZ3	4:B:750:HEM:HMC3	2.54	0.42
1:A:478:GLN:HB2	1:A:481:ARG:CG	2.48	0.42
1:A:553:TRP:CZ3	1:A:613:LYS:HB3	2.54	0.42
1:B:328:GLU:OE1	1:B:328:GLU:N	2.51	0.42
1:B:567:VAL:HG23	6:B:800:JI3:H3	2.01	0.42
1:A:485:TYR:HE2	1:A:512:ALA:HB1	1.82	0.42
1:B:362:LEU:CD1	1:B:381:LEU:HD23	2.49	0.42
1:A:439:PHE:CZ	1:A:443:CYS:SG	3.13	0.42
1:A:680:VAL:HA	1:A:681:PRO:HD3	1.89	0.42
1:A:706:TYR:HD1	7:A:956:HOH:O	2.02	0.42
1:B:351:LYS:HE2	1:B:392:SER:HA	2.01	0.42
1:B:652:HIS:ND1	7:B:1103:HOH:O	2.37	0.42
1:A:420:GLN:OE1	1:A:423:LYS:HE2	2.19	0.42
1:A:436:HIS:ND1	7:A:1052:HOH:O	2.36	0.42
1:A:664:ASN:HA	1:A:667:ARG:NH1	2.34	0.42
1:A:546:ILE:HG12	1:A:560:LYS:HA	2.02	0.42
1:B:608:GLU:O	1:B:612:LYS:HG3	2.20	0.42
1:A:393:THR:OG1	1:A:394:TYR:N	2.53	0.41
1:B:684:SER:HB3	1:B:687:ILE:HG12	2.01	0.41
1:A:355:PHE:HZ	1:A:381:LEU:HD11	1.79	0.41
1:B:403:TYR:CE1	1:B:407:HIS:CE1	3.08	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:B:750:HEM:C1C	6:B:800:JI3:H83	2.56	0.41
1:A:350:THR:N	1:A:353:GLN:OE1	2.50	0.41
4:B:750:HEM:HBC2	4:B:750:HEM:HMC1	2.03	0.41
1:A:645:LYS:HB2	1:A:645:LYS:HE3	1.90	0.41
1:A:484:GLY:O	1:A:499:VAL:HA	2.21	0.41
1:B:335:ILE:HB	1:B:338:PRO:HG3	2.02	0.40
1:A:351:LYS:HE2	1:A:392:SER:CA	2.52	0.40
1:A:553:TRP:O	1:A:556:ASP:HB2	2.21	0.40
1:A:475:TRP:CZ3	1:A:711:TRP:HB3	2.56	0.40
4:A:750:HEM:HMC2	4:A:750:HEM:HBC2	2.03	0.40
1:A:349:ARG:HG3	1:A:349:ARG:HH11	1.86	0.40
1:A:524:LEU:CD2	7:A:1019:HOH:O	2.68	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	405/422 (96%)	376 (93%)	28 (7%)	1 (0%)	51	42
1	B	407/422 (96%)	397 (98%)	10 (2%)	0	100	100
All	All	812/844 (96%)	773 (95%)	38 (5%)	1 (0%)	55	47

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	489	ASP

### 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	365/377 (97%)	358 (98%)	7 (2%)	62	58
1	B	366/377 (97%)	362 (99%)	4 (1%)	78	77
All	All	731/754 (97%)	720 (98%)	11 (2%)	70	68

All (11) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	389	GLU
1	A	523	LEU
1	A	527	ASN
1	A	547	ARG
1	A	555	LYS
1	A	569	ASN
1	A	645	LYS
1	B	328	GLU
1	B	445	HIS
1	B	454	ASN
1	B	547	ARG

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

Mol	Chain	Res	Type
1	A	407	HIS
1	A	454	ASN
1	A	507	GLN
1	A	527	ASN
1	A	569	ASN
1	A	605	ASN
1	A	642	GLN
1	A	697	ASN
1	B	364	GLN
1	B	425	GLN
1	B	454	ASN

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Mol	Chain	Res	Type
1	B	507	GLN
1	B	508	GLN
1	B	535	GLN
1	B	601	ASN
1	B	605	ASN
1	B	697	ASN
1	B	712	ASN

### 5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

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

### 5.5 Carbohydrates ⓘ

There are no carbohydrates in this entry.

### 5.6 Ligand geometry ⓘ

Of 9 ligands modelled in this entry, 1 is monoatomic - leaving 8 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	A	750	1	28,50,50	1.83	9 (32%)	17,82,82	1.70	4 (23%)
5	H4B	A	760	-	14,18,18	2.39	4 (28%)	12,26,26	3.93	7 (58%)
6	JI3	A	800	-	24,28,28	2.48	15 (62%)	30,37,37	1.94	5 (16%)
2	ACT	A	860	-	1,3,3	2.60	1 (100%)	0,3,3	0.00	-
4	HEM	B	750	1	28,50,50	1.83	6 (21%)	17,82,82	1.95	5 (29%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
5	H4B	B	760	-	14,18,18	2.41	4 (28%)	12,26,26	3.98	7 (58%)
6	JI3	B	800	-	24,28,28	2.48	12 (50%)	30,37,37	2.19	5 (16%)
2	ACT	B	860	-	1,3,3	4.43	1 (100%)	0,3,3	0.00	-

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	A	750	1	-	0/6/54/54	0/0/8/8
5	H4B	A	760	-	-	0/8/17/17	0/2/2/2
6	JI3	A	800	-	-	0/12/22/22	0/3/3/3
2	ACT	A	860	-	-	0/0/0/0	0/0/0/0
4	HEM	B	750	1	-	0/6/54/54	0/0/8/8
5	H4B	B	760	-	-	0/8/17/17	0/2/2/2
6	JI3	B	800	-	-	0/12/22/22	0/3/3/3
2	ACT	B	860	-	-	0/0/0/0	0/0/0/0

All (52) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	B	750	HEM	C3C-C2C	-4.24	1.34	1.40
4	B	750	HEM	C3B-CAB	-4.13	1.39	1.47
4	B	750	HEM	C3B-C2B	-3.53	1.35	1.40
4	B	750	HEM	C3C-CAC	-2.89	1.42	1.47
4	A	750	HEM	C3C-CAC	-2.75	1.42	1.47
4	A	750	HEM	C3B-C2B	-2.75	1.36	1.40
4	A	750	HEM	C3B-CAB	-2.65	1.42	1.47
6	B	800	JI3	C25-C26	2.07	1.43	1.38
6	A	800	JI3	C4'-C3'	2.16	1.56	1.53
6	A	800	JI3	C25-C26	2.17	1.43	1.38
6	A	800	JI3	C23-CL	2.20	1.79	1.74
6	A	800	JI3	C21-C26	2.23	1.43	1.38
5	A	760	H4B	C8A-N1	2.28	1.38	1.34
4	A	750	HEM	C4C-NC	2.39	1.39	1.36
6	B	800	JI3	C25-C24	2.42	1.43	1.38
6	B	800	JI3	C22-C21	2.43	1.43	1.38
4	A	750	HEM	C1A-NA	2.47	1.41	1.36
6	A	800	JI3	C25-C24	2.47	1.43	1.38
6	A	800	JI3	C2-N1	2.53	1.39	1.34
5	B	760	H4B	C8A-N1	2.54	1.38	1.34

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
6	A	800	JI3	C22-C21	2.58	1.43	1.38
2	A	860	ACT	CH3-C	2.60	1.52	1.48
4	A	750	HEM	C4D-ND	2.61	1.39	1.36
4	B	750	HEM	CMD-C2D	2.67	1.57	1.51
4	B	750	HEM	C1B-NB	2.83	1.40	1.36
6	B	800	JI3	C22-C23	2.85	1.43	1.38
6	B	800	JI3	C6-N1	2.90	1.40	1.35
6	A	800	JI3	C24-C23	2.91	1.43	1.38
4	A	750	HEM	C1C-NC	2.92	1.40	1.36
6	B	800	JI3	C2-N1	3.02	1.40	1.34
6	A	800	JI3	C6-N1	3.03	1.40	1.35
4	A	750	HEM	C1D-ND	3.13	1.42	1.36
6	B	800	JI3	C24-C23	3.15	1.44	1.38
6	A	800	JI3	C22-C23	3.19	1.44	1.38
6	A	800	JI3	C7-C4'	3.36	1.58	1.53
6	B	800	JI3	C3-C2	3.38	1.45	1.38
6	A	800	JI3	C3-C2	3.44	1.45	1.38
6	B	800	JI3	C5-C6	3.59	1.46	1.40
6	A	800	JI3	C5-C6	3.69	1.46	1.40
6	A	800	JI3	C5-C4	3.90	1.45	1.39
4	A	750	HEM	C1B-NB	3.95	1.41	1.36
6	A	800	JI3	C3-C4	4.10	1.46	1.39
5	B	760	H4B	C4A-N5	4.26	1.47	1.37
6	B	800	JI3	C7-C4'	4.30	1.60	1.53
6	B	800	JI3	C3-C4	4.36	1.46	1.39
6	B	800	JI3	C5-C4	4.40	1.46	1.39
2	B	860	ACT	CH3-C	4.43	1.54	1.48
5	A	760	H4B	C4A-N5	4.46	1.47	1.37
5	A	760	H4B	C6-N5	4.60	1.55	1.45
5	B	760	H4B	C6-N5	4.66	1.55	1.45
5	A	760	H4B	C4-N3	5.48	1.43	1.33
5	B	760	H4B	C4-N3	5.65	1.43	1.33

All (33) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
6	B	800	JI3	C4-C3-C2	-4.70	117.31	120.26
5	A	760	H4B	N3-C2-N1	-4.55	118.07	125.45
5	B	760	H4B	N3-C2-N1	-4.50	118.16	125.45
4	B	750	HEM	C1D-C2D-C3D	-4.22	104.06	107.00
4	B	750	HEM	C4A-C3A-C2A	-3.87	104.31	107.00
4	B	750	HEM	CBA-CAA-C2A	-3.73	105.36	112.48

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
6	A	800	JI3	C4-C3-C2	-3.56	118.03	120.26
5	A	760	H4B	C4A-C4-N3	-3.56	113.46	123.91
4	A	750	HEM	CBA-CAA-C2A	-3.53	105.74	112.48
5	B	760	H4B	C4A-C4-N3	-3.52	113.55	123.91
5	A	760	H4B	C4A-N5-C6	-3.50	111.62	121.16
5	B	760	H4B	C4A-N5-C6	-3.42	111.84	121.16
4	A	750	HEM	CBD-CAD-C3D	-3.09	106.57	112.47
6	A	800	JI3	C2'-C3'-N8	-2.86	109.12	113.95
6	B	800	JI3	C2'-C3'-N8	-2.81	109.20	113.95
6	A	800	JI3	C3-C2-N1	-2.61	120.08	122.91
6	B	800	JI3	C3-C2-N1	-2.50	120.20	122.91
4	A	750	HEM	C1D-C2D-C3D	-2.37	105.35	107.00
4	B	750	HEM	CMA-C3A-C2A	2.12	128.94	124.94
4	B	750	HEM	CMD-C2D-C3D	2.12	128.94	124.94
4	A	750	HEM	C4A-C3A-C2A	2.15	108.49	107.00
6	A	800	JI3	C3-C4-C5	2.47	121.14	118.09
6	B	800	JI3	C3-C4-C5	2.77	121.51	118.09
5	B	760	H4B	N2-C2-N1	3.05	122.12	117.24
5	A	760	H4B	N2-C2-N1	3.12	122.23	117.24
5	B	760	H4B	C2-N1-C8A	3.40	122.16	114.51
5	A	760	H4B	C2-N1-C8A	3.70	122.84	114.51
5	B	760	H4B	C4-N3-C2	6.18	124.95	116.06
5	A	760	H4B	C4-N3-C2	6.23	125.02	116.06
6	A	800	JI3	C6-N1-C2	7.69	123.61	118.17
5	A	760	H4B	C4-C4A-C8A	8.50	122.26	114.56
6	B	800	JI3	C6-N1-C2	8.62	124.26	118.17
5	B	760	H4B	C4-C4A-C8A	9.04	122.75	114.56

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

5 monomers are involved in 10 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	A	750	HEM	1	0
5	A	760	H4B	1	0
6	A	800	JI3	1	0
4	B	750	HEM	6	0
6	B	800	JI3	3	0

## 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, 95<sup>th</sup> 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 <sup>2</sup> )	Q<0.9
1	A	409/422 (96%)	0.57	33 (8%) 13 13	22, 46, 76, 94	0
1	B	411/422 (97%)	0.14	6 (1%) 74 77	22, 36, 63, 79	0
All	All	820/844 (97%)	0.36	39 (4%) 31 34	22, 40, 73, 94	0

All (39) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	355	PHE	5.3
1	A	348	VAL	5.1
1	A	716	TRP	4.2
1	A	351	LYS	4.1
1	B	348	VAL	3.9
1	A	381	LEU	3.8
1	A	393	THR	3.7
1	B	355	PHE	3.4
1	A	373	GLY	3.4
1	A	370	LYS	3.2
1	A	488	PRO	3.2
1	B	300	PHE	3.2
1	A	553	TRP	3.2
1	B	321	THR	3.2
1	A	388	ILE	3.1
1	A	551	PHE	3.1
1	A	391	THR	3.1
1	A	352	ASP	2.8
1	A	394	TYR	2.5
1	A	715	VAL	2.5
1	A	371	ARG	2.5
1	A	554	PHE	2.4
1	A	493	LEU	2.4
1	A	299	ARG	2.4

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Mol	Chain	Res	Type	RSRZ
1	B	389	GLU	2.4
1	A	470	HIS	2.4
1	A	382	GLU	2.3
1	A	378	MET	2.3
1	A	601	ASN	2.3
1	A	321	THR	2.2
1	A	517	PHE	2.2
1	A	322	LEU	2.1
1	A	354	LEU	2.1
1	A	503	GLU	2.1
1	B	551	PHE	2.1
1	A	466	THR	2.1
1	A	350	THR	2.0
1	A	369	ILE	2.0
1	A	552	ASP	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 carbohydrates 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. LLDF column lists the quality of electron density of the group with respect to its neighbouring residues in protein, DNA or RNA chains. The B-factors column lists the minimum, median, 95<sup>th</sup> 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	LLDF	B-factors(Å <sup>2</sup> )	Q<0.9
2	ACT	A	860	4/4	0.97	0.27	15.55	52,52,53,54	0
6	JI3	B	800	26/26	0.91	0.19	3.04	23,32,68,75	0
6	JI3	A	800	26/26	0.92	0.18	2.04	23,33,65,71	0
2	ACT	B	860	4/4	0.97	0.16	1.76	37,39,40,41	0
5	H4B	B	760	17/17	0.97	0.15	1.19	22,26,30,30	0
3	ZN	A	900	1/1	1.00	0.11	0.51	30,30,30,30	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	LLDF	B-factors( $\text{\AA}^2$ )	Q<0.9
4	HEM	A	750	43/43	0.98	0.12	0.08	20,26,33,41	0
5	H4B	A	760	17/17	0.96	0.12	-0.65	28,31,32,34	0
4	HEM	B	750	43/43	0.98	0.13	-0.67	21,24,34,40	0

## 6.5 Other polymers [i](#)

There are no such residues in this entry.