



# Full wwPDB X-ray Structure Validation Report ⓘ

Feb 19, 2016 – 10:10 PM GMT

PDB ID : 5AD5  
Title : Structure of rat neuronal nitric oxide synthase heme domain in complex with  
7-((3-(2-(Methylamino)ethyl)phenoxy)methyl)quinolin-2- amine  
Authors : Li, H.; Poulos, T.L.  
Deposited on : 2015-08-20  
Resolution : 1.90 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](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 : 1.7.1 (RC1), CSD as537be (2016)  
Xtriage (Phenix) : 1.9-1692  
EDS : rb-20026982  
Percentile statistics : 20151230.v01 (using entries in the PDB archive December 30th 2015)  
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) : rb-20026982

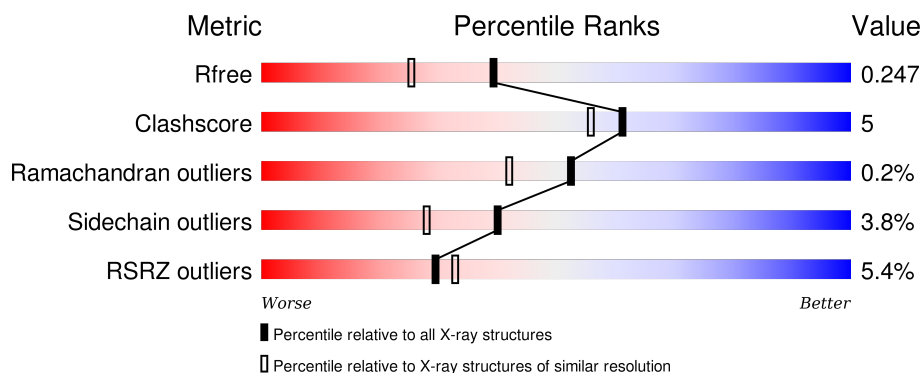
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

## *X-RAY DIFFRACTION*

The reported resolution of this entry is 1.90 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))
$R_{free}$	91344	4755 (1.90-1.90)
Clashscore	102246	5398 (1.90-1.90)
Ramachandran outliers	100387	5338 (1.90-1.90)
Sidechain outliers	100360	5339 (1.90-1.90)
RSRZ outliers	91569	4766 (1.90-1.90)

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 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>9%</div> <div>77%</div> <div>18%</div> <div>• •</div> </div>
1	B	422	<div> <div>2%</div> <div>84%</div> <div>13%</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
4	M94	B	800	-	-	-	X
5	ACT	A	860	-	-	-	X
5	ACT	B	860	-	-	-	X

## 2 Entry composition [i](#)

There are 7 unique types of molecules in this entry. The entry contains 7123 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, BRAIN.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	408	Total	C	N	O	S	0	1	1
			3317	2123	567	605	22			
1	B	411	Total	C	N	O	S	0	3	0
			3362	2154	574	613	21			

- Molecule 2 is PROTOPORPHYRIN IX CONTAINING FE (three-letter code: HEM) (formula:  $C_{34}H_{32}FeN_4O_4$ ).



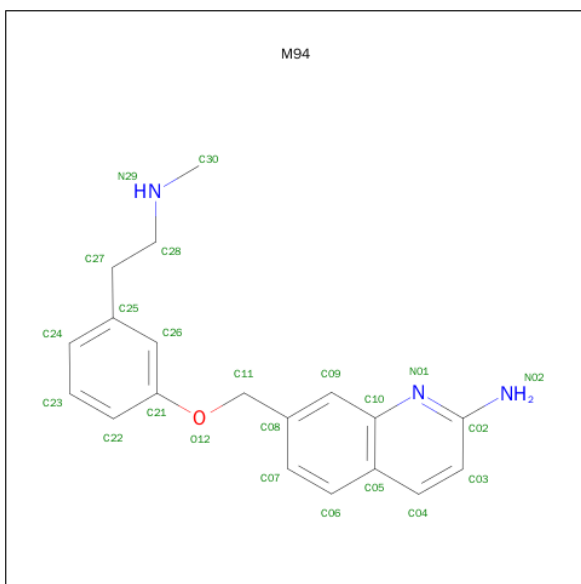
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	A	1	Total	C	Fe	N	O	0	0
			43	34	1	4	4		
2	B	1	Total	C	Fe	N	O	0	0
			43	34	1	4	4		

- Molecule 3 is 5,6,7,8-TETRAHYDROBIOPTERIN (three-letter code: H4B) (formula:  $C_9H_{15}N_5O_3$ ).



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

- Molecule 4 is 7-[[3-[2-(METHYLAMINO)ETHYL]PHENOXY]METHYL]QUINOLIN-2-AMINE (three-letter code: M94) (formula: C<sub>19</sub>H<sub>21</sub>N<sub>3</sub>O).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
4	A	1	Total	C	N	O	0	0
			23	19	3	1		

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Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
4	B	1	Total	C	N	O	0	0
			23	19	3	1		

- Molecule 5 is ACETATE ION (three-letter code: ACT) (formula:  $C_2H_3O_2$ ).



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

- Molecule 6 is ZINC ION (three-letter code: ZN) (formula:  $Zn$ ).

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

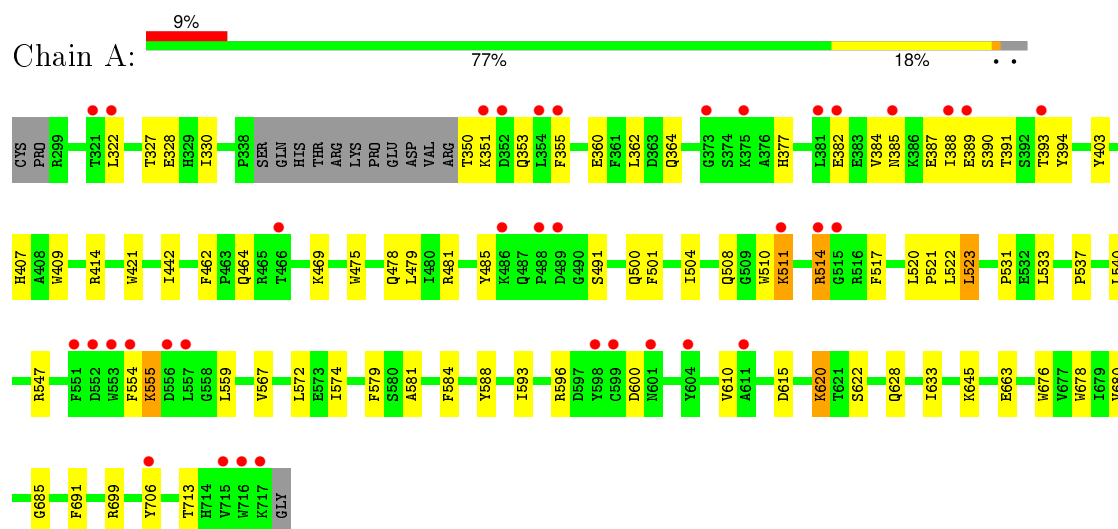
- Molecule 7 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
7	A	117	Total	O	0	0
			117	117		
7	B	152	Total	O	0	0
			152	152		

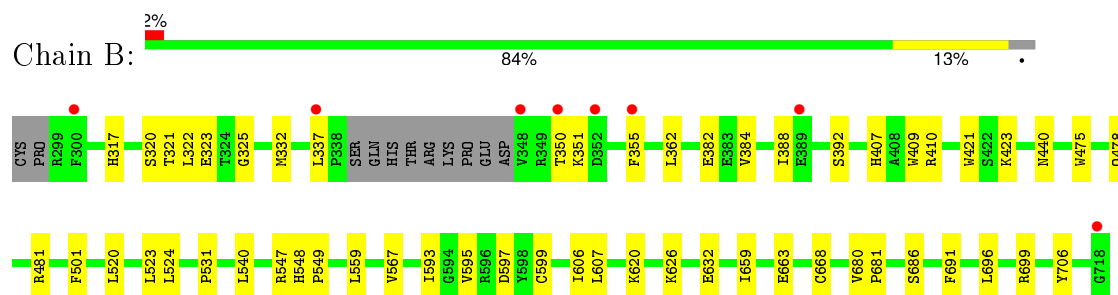
### 3 Residue-property plots

These plots are drawn for all protein, RNA and DNA chains in the entry. The first graphic for a chain summarises the proportions of errors 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, BRAIN



#### • Molecule 1: NITRIC OXIDE SYNTHASE, BRAIN



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	51.66Å 110.94Å 164.09Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	49.28 – 1.90 49.06 – 1.90	Depositor EDS
% Data completeness (in resolution range)	99.3 (49.28-1.90) 99.6 (49.06-1.90)	Depositor EDS
$R_{merge}$	0.14	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.19 (at 1.90Å)	Xtriage
Refinement program	PHENIX (PHENIX.REFINE)	Depositor
R, $R_{free}$	0.196 , 0.239 0.205 , 0.247	Depositor DCC
$R_{free}$ test set	3731 reflections (5.24%)	DCC
Wilson B-factor (Å <sup>2</sup> )	29.9	Xtriage
Anisotropy	0.886	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.36 , 53.3	EDS
Estimated twinning fraction	No twinning to report.	Xtriage
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.48$ , $\langle L^2 \rangle = 0.31$	Xtriage
Outliers	3 of 74981 reflections (0.004%)	Xtriage
$F_o, F_c$ correlation	0.96	EDS
Total number of atoms	7123	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	56.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.26% 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, 0.375 respectively for untwinned datasets, and 0.333, 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, M94

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	0.38	0/3413	0.53	0/4631
1	B	0.39	0/3465	0.54	0/4698
All	All	0.38	0/6878	0.53	0/9329

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	3317	0	3226	44	0
1	B	3362	0	3279	28	0
2	A	43	0	30	3	0
2	B	43	0	30	3	0
3	A	17	0	15	1	0
3	B	17	0	15	0	0
4	A	23	0	21	4	0
4	B	23	0	21	1	0
5	A	4	0	3	0	0
5	B	4	0	3	0	0
6	A	1	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
7	A	117	0	0	1	0
7	B	152	0	0	1	0
All	All	7123	0	6643	74	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 5.

All (74) 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	1.60	0.82
2:B:750:HEM:HHC	2:B:750:HEM:HBB2	1.67	0.75
2:B:750:HEM:HBC2	2:B:750:HEM:HMC2	1.75	0.69
2:A:750:HEM:HBB2	2:A:750:HEM:HHC	1.76	0.68
1:B:478:GLN:HB2	1:B:481:ARG:HG3	1.76	0.66
2:A:750:HEM:HMC2	2:A:750:HEM:HBC2	1.82	0.62
1:A:628:GLN:NE2	1:B:632:GLU:OE2	2.33	0.61
1:A:350:THR:N	1:A:353:GLN:OE1	2.32	0.61
1:A:351:LYS:NZ	1:A:389:GLU:O	2.34	0.61
1:A:414:ARG:NH1	1:A:706:TYR:OH	2.38	0.57
1:B:567:VAL:HG21	4:B:800:M94:C07	2.35	0.56
1:A:330:ILE:HD11	1:B:696:LEU:HD22	1.87	0.56
1:A:478:GLN:HB2	1:A:481:ARG:HG3	1.90	0.54
1:A:475:TRP:HB2	1:A:523:LEU:HB3	1.90	0.53
3:A:760:H4B:O4	4:A:800:M94:N29	2.35	0.53
1:A:322:LEU:HB2	1:A:699:ARG:HB2	1.91	0.52
1:A:567:VAL:HG21	4:A:800:M94:C07	2.39	0.52
1:A:678:TRP:HH2	4:A:800:M94:H271	1.73	0.52
1:A:330:ILE:HD11	1:B:696:LEU:HB3	1.91	0.52
1:A:362:LEU:HD11	1:A:384:VAL:HG21	1.93	0.51
1:A:555:LYS:N	7:A:2075:HOH:O	2.43	0.50
1:A:464:GLN:HB3	1:A:579:PHE:CE2	2.46	0.50
1:B:317:HIS:O	1:B:320:SER:HB3	2.12	0.49
1:A:620:LYS:HB2	1:A:620:LYS:NZ	2.27	0.48
1:B:362:LEU:HD11	1:B:384:VAL:HG21	1.95	0.48
1:A:584:PHE:HE1	4:A:800:M94:H06	1.78	0.48
1:A:511:LYS:HB3	1:A:511:LYS:NZ	2.27	0.48
1:B:659:ILE:O	1:B:663:GLU:HG3	2.14	0.47
1:A:522:LEU:O	1:A:533:LEU:HA	2.15	0.47
1:A:387:GLU:O	1:A:391:THR:OG1	2.27	0.46
1:A:485:TYR:CZ	1:A:514:ARG:HA	2.50	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:572:LEU:HD21	1:A:574:ILE:HD11	1.96	0.46
1:A:596:ARG:O	1:A:600:ASP:HB2	2.16	0.46
1:B:595:VAL:O	1:B:599:CYS:HB2	2.15	0.46
1:B:440:ASN:ND2	7:B:2051:HOH:O	2.44	0.45
1:B:607:LEU:HD13	1:B:626:LYS:HG2	1.98	0.45
1:A:475:TRP:CZ2	1:A:531:PRO:HG3	2.52	0.45
1:A:355:PHE:HD1	1:A:388:ILE:HD12	1.81	0.45
1:A:500:GLN:O	1:A:504:ILE:HG13	2.16	0.45
1:B:686:SER:HA	1:B:691:PHE:CG	2.52	0.44
1:A:393:THR:OG1	1:A:394:TYR:N	2.48	0.44
1:A:409:TRP:CE3	1:A:421:TRP:HA	2.53	0.44
1:B:548:HIS:NE2	1:B:632:GLU:OE1	2.47	0.44
1:A:501:PHE:HD2	1:A:520:LEU:HD13	1.83	0.44
1:B:407:HIS:CE1	1:B:410:ARG:HH11	2.34	0.44
1:B:548:HIS:CG	1:B:549:PRO:HD2	2.53	0.44
1:A:510:TRP:CE2	1:A:521:PRO:HD3	2.53	0.44
1:B:322:LEU:HD13	1:B:699:ARG:NH2	2.33	0.44
1:A:517:PHE:HE2	1:A:559:LEU:HA	1.83	0.43
1:B:706:TYR:OH	2:B:750:HEM:O1D	2.29	0.43
1:A:676:TRP:CE2	1:A:680:VAL:HG21	2.53	0.43
1:B:325:GLY:O	1:B:332:MET:HG3	2.18	0.43
1:A:360:GLU:O	1:A:364:GLN:HG2	2.18	0.43
1:B:351:LYS:HB3	1:B:351:LYS:HE2	1.80	0.43
1:B:323:GLU:O	1:B:699:ARG:HD3	2.19	0.43
1:A:355:PHE:CE1	1:A:385:ASN:HB2	2.54	0.42
1:A:610:VAL:HG21	1:A:633:ILE:HD11	2.01	0.42
1:B:593:ILE:HA	1:B:597:ASP:HB2	2.02	0.42
1:B:475:TRP:HB2	1:B:523:LEU:HB3	2.01	0.42
1:A:462:PHE:HB2	1:A:581:ALA:HB3	2.01	0.42
1:A:403:TYR:CE1	1:A:407:HIS:CE1	3.08	0.42
1:B:559:LEU:HD11	1:B:606:ILE:HD12	2.01	0.42
1:B:409:TRP:CE3	1:B:421:TRP:HA	2.54	0.41
1:B:501:PHE:HD2	1:B:520:LEU:HD13	1.84	0.41
1:A:537:PRO:HB2	1:A:540:LEU:HG	2.02	0.41
1:A:588:TYR:CD2	1:A:593:ILE:HD11	2.55	0.41
1:A:676:TRP:CZ2	1:A:680:VAL:HG21	2.55	0.41
1:A:685:GLY:O	1:A:691:PHE:HB2	2.21	0.41
1:B:680:VAL:HA	1:B:681:PRO:HD3	1.91	0.41
1:B:355[A]:PHE:HD1	1:B:388:ILE:HD12	1.86	0.40
1:B:524:LEU:O	1:B:531:PRO:HA	2.22	0.40
1:A:706:TYR:OH	2:A:750:HEM:O2D	2.40	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:322:LEU:HD23	1:A:322:LEU:HA	1.91	0.40
1:A:442:ILE:HG23	1:A:479:LEU:HD13	2.04	0.40

There are no symmetry-related clashes.

## 5.3 Torsion angles [i](#)

### 5.3.1 Protein backbone [i](#)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	405/422 (96%)	385 (95%)	18 (4%)	2 (0%)	34	21
1	B	410/422 (97%)	398 (97%)	12 (3%)	0	100	100
All	All	815/844 (97%)	783 (96%)	30 (4%)	2 (0%)	52	42

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	514	ARG
1	A	491	SER

### 5.3.2 Protein sidechains [i](#)

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

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

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	364/377 (97%)	346 (95%)	18 (5%)	31	18
1	B	369/377 (98%)	359 (97%)	10 (3%)	52	43

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
All	All	733/754 (97%)	705 (96%)	28 (4%)	40	28

All (28) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	327	THR
1	A	328	GLU
1	A	377	HIS
1	A	382	GLU
1	A	390	SER
1	A	469	LYS
1	A	508	GLN
1	A	511	LYS
1	A	523	LEU
1	A	547	ARG
1	A	554	PHE
1	A	555	LYS
1	A	615	ASP
1	A	620	LYS
1	A	622	SER
1	A	645	LYS
1	A	663	GLU
1	A	713	THR
1	B	321	THR
1	B	337	LEU
1	B	350	THR
1	B	382	GLU
1	B	392	SER
1	B	423	LYS
1	B	540	LEU
1	B	547	ARG
1	B	620	LYS
1	B	668	CYS

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (2) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	377	HIS
1	B	407	HIS

### 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$
2	HEM	A	750	1	24,50,50	2.36	7 (29%)	16,82,82	1.91	3 (18%)
3	H4B	A	760	-	15,18,18	0.86	0	12,26,26	2.56	6 (50%)
4	M94	A	800	-	25,25,25	0.96	1 (4%)	33,33,33	0.99	2 (6%)
5	ACT	A	860	-	0,3,3	0.00	-	0,3,3	0.00	-
2	HEM	B	750	1	24,50,50	2.27	7 (29%)	16,82,82	1.88	3 (18%)
3	H4B	B	760	-	15,18,18	0.87	0	12,26,26	2.34	5 (41%)
4	M94	B	800	-	25,25,25	0.92	1 (4%)	33,33,33	1.12	3 (9%)
5	ACT	B	860	-	0,3,3	0.00	-	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
2	HEM	A	750	1	-	0/6/54/54	0/0/8/8

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	H4B	A	760	-	-	0/8/17/17	0/2/2/2
4	M94	A	800	-	-	0/9/9/9	0/3/3/3
5	ACT	A	860	-	-	0/0/0/0	0/0/0/0
2	HEM	B	750	1	-	0/6/54/54	0/0/8/8
3	H4B	B	760	-	-	0/8/17/17	0/2/2/2
4	M94	B	800	-	-	0/9/9/9	0/3/3/3
5	ACT	B	860	-	-	0/0/0/0	0/0/0/0

All (16) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	750	HEM	C3B-C2B	-4.90	1.34	1.40
2	B	750	HEM	C3B-C2B	-4.88	1.34	1.40
2	A	750	HEM	C3C-C2C	-4.79	1.34	1.40
2	B	750	HEM	C3C-C2C	-4.16	1.35	1.40
4	B	800	M94	C09-C10	-2.15	1.38	1.41
4	A	800	M94	C09-C10	-2.07	1.38	1.41
2	A	750	HEM	CMC-C2C	2.11	1.56	1.51
2	B	750	HEM	C4D-ND	2.26	1.39	1.36
2	B	750	HEM	CMD-C2D	2.27	1.56	1.51
2	A	750	HEM	C4D-ND	3.17	1.41	1.36
2	B	750	HEM	C3B-CAB	3.42	1.55	1.47
2	A	750	HEM	C3B-CAB	3.60	1.55	1.47
2	A	750	HEM	C3C-CAC	3.67	1.55	1.47
2	B	750	HEM	C3C-CAC	3.76	1.55	1.47
2	A	750	HEM	C3D-C2D	5.05	1.52	1.37
2	B	750	HEM	C3D-C2D	5.09	1.52	1.37

All (22) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	750	HEM	CBA-CAA-C2A	-4.80	104.04	112.49
2	A	750	HEM	CBA-CAA-C2A	-4.71	104.21	112.49
3	A	760	H4B	N3-C2-N1	-3.54	119.72	125.51
2	B	750	HEM	CAD-CBD-CGD	-3.19	106.57	112.78
2	A	750	HEM	CBD-CAD-C3D	-3.19	106.87	112.47
3	B	760	H4B	N3-C2-N1	-3.17	120.33	125.51
4	B	800	M94	C03-C02-N01	-2.67	119.41	122.22
4	A	800	M94	C03-C02-N01	-2.60	119.48	122.22
4	B	800	M94	C28-C27-C25	-2.48	107.31	112.83
2	A	750	HEM	CAD-CBD-CGD	-2.41	108.09	112.78
2	B	750	HEM	CMA-C3A-C4A	-2.03	124.87	128.31

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	B	760	H4B	C4A-C8A-N8	2.21	120.60	118.26
3	B	760	H4B	C2-N1-C8A	2.54	120.34	114.63
3	A	760	H4B	N2-C2-N3	2.59	121.47	117.20
3	A	760	H4B	C2-N1-C8A	2.81	120.93	114.63
4	A	800	M94	C02-N01-C10	2.99	121.26	117.60
4	B	800	M94	C02-N01-C10	3.08	121.37	117.60
3	A	760	H4B	C4A-C8A-N8	3.34	121.79	118.26
3	B	760	H4B	C4-N3-C2	3.80	120.33	115.88
3	A	760	H4B	C4-C4A-C8A	4.28	118.38	114.61
3	A	760	H4B	C4-N3-C2	4.39	121.03	115.88
3	B	760	H4B	C4-C4A-C8A	4.76	118.80	114.61

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

5 monomers are involved in 11 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	750	HEM	3	0
3	A	760	H4B	1	0
4	A	800	M94	4	0
2	B	750	HEM	3	0
4	B	800	M94	1	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	408/422 (96%)	0.68	36 (8%) 12 14	27, 59, 112, 173	0
1	B	411/422 (97%)	0.35	8 (1%) 70 73	25, 47, 80, 109	0
All	All	819/844 (97%)	0.51	44 (5%) 29 33	25, 52, 104, 173	0

All (44) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	717	LYS	20.4
1	A	715	VAL	9.6
1	A	551	PHE	5.5
1	A	554	PHE	5.2
1	A	355	PHE	4.5
1	A	322	LEU	4.3
1	A	716	TRP	4.3
1	A	557	LEU	4.1
1	A	321	THR	4.1
1	A	389	GLU	4.0
1	B	350	THR	4.0
1	A	382	GLU	3.6
1	A	604	TYR	3.4
1	A	488	PRO	3.3
1	B	352	ASP	3.1
1	B	348	VAL	3.1
1	A	388	ILE	3.1
1	A	601	ASN	2.9
1	B	718	GLY	2.9
1	A	553	TRP	2.7
1	A	373	GLY	2.6
1	B	389	GLU	2.6
1	A	489	ASP	2.6
1	A	515	GLY	2.5

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Mol	Chain	Res	Type	RSRZ
1	B	337	LEU	2.5
1	A	552	ASP	2.4
1	A	514	ARG	2.4
1	A	385	ASN	2.4
1	B	300	PHE	2.4
1	A	611	ALA	2.3
1	A	393	THR	2.3
1	A	556	ASP	2.3
1	A	352	ASP	2.3
1	A	706	TYR	2.3
1	B	355[A]	PHE	2.2
1	A	511	LYS	2.2
1	A	598	TYR	2.1
1	A	599	CYS	2.1
1	A	375	LYS	2.1
1	A	466	THR	2.1
1	A	351	LYS	2.1
1	A	381	LEU	2.1
1	A	486	LYS	2.1
1	A	354	LEU	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
5	ACT	A	860	4/4	0.89	0.23	11.57	60,62,65,68	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	LLDF	B-factors( $\text{\AA}^2$ )	Q<0.9
4	M94	B	800	23/23	0.91	0.20	4.10	34,49,97,101	0
5	ACT	B	860	4/4	0.86	0.16	3.18	68,72,73,74	0
3	H4B	A	760	17/17	0.90	0.17	1.85	34,55,62,65	0
4	M94	A	800	23/23	0.92	0.17	1.79	33,42,98,100	0
2	HEM	B	750	43/43	0.98	0.16	1.73	24,33,52,74	0
2	HEM	A	750	43/43	0.98	0.12	-0.02	21,33,57,70	0
3	H4B	B	760	17/17	0.95	0.12	-0.20	37,48,63,69	0
6	ZN	A	900	1/1	0.99	0.07	-2.19	43,43,43,43	0

## 6.5 Other polymers ⓘ

There are no such residues in this entry.