



Full wwPDB X-ray Structure Validation Report ⓘ

Feb 1, 2016 – 12:42 PM GMT

PDB ID : 3RQL
Title : Structure of the neuronal nitric oxide synthase heme domain in complex with 6-(((3R,4R)-4-(2-((1S,2R/1R,2S)-2-(3-Clorophenyl)cyclopropylamino)ethoxy)pyrrolidin-3-yl)methyl)-4-methylpyridin-2-amine
Authors : Li, H.; Delker, S.L.; Poulos, T.L.
Deposited on : 2011-04-28
Resolution : 1.93 Å(reported)

This is a Full wwPDB X-ray Structure Validation Report for a publicly released PDB entry.
We welcome your comments at validation@mail.wwpdb.org
A user guide is available at
<http://wwpdb.org/validation/2016/XrayValidationReportHelp>
with specific help available everywhere you see the ⓘ symbol.

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

MolProbity : 4.02b-467
Mogul : 1.7 (RC4), CSD as536be (2015)
Xtriage (Phenix) : 1.9-1692
EDS : rb-20026688
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) : trunk26865

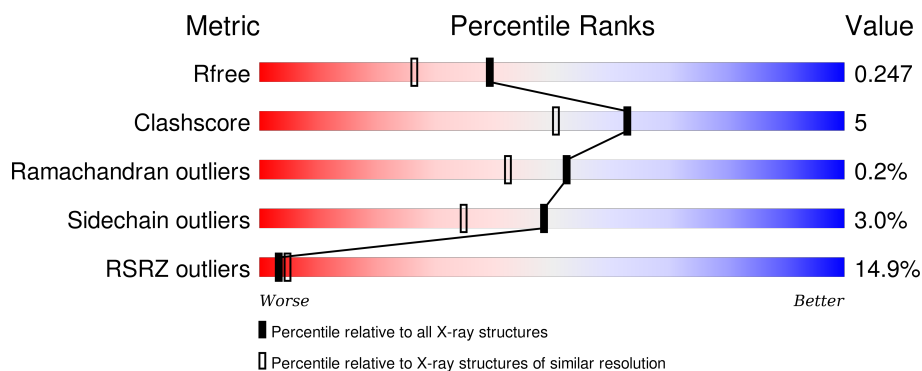
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.93 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	2910 (1.96-1.92)
Clashscore	102246	3095 (1.96-1.92)
Ramachandran outliers	100387	3062 (1.96-1.92)
Sidechain outliers	100360	3062 (1.96-1.92)
RSRZ outliers	91569	2915 (1.96-1.92)

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 ≥ 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	
1	B	422	

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	ACT	A	860	-	-	-	X

2 Entry composition [i](#)

There are 7 unique types of molecules in this entry. The entry contains 7193 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	409	Total	C	N	O	S	0	2	0
			3337	2136	571	608	22			
1	B	411	Total	C	N	O	S	0	4	0
			3359	2149	575	613	22			

- 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: $C_9H_{15}N_5O_3$).



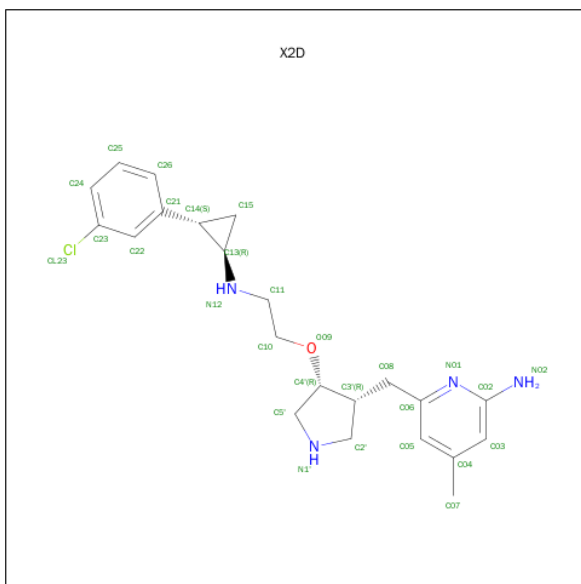
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
3	A	1	Total 17	C 9	N 5	O 3	0	0
3	B	1	Total 17	C 9	N 5	O 3	0	0

- Molecule 4 is ACETATE ION (three-letter code: ACT) (formula: $\text{C}_2\text{H}_3\text{O}_2$).



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

- Molecule 5 is 6-{[(3R,4R)-4-(2-{[(1R,2S)-2-(3-CHLOROPHENYL)CYCLOPROPYL]AMINO}ETHOXY)PYRROLIDIN-3-YL]METHYL}-4-METHYLPYRIDIN-2-AMINE (three-letter code: X2D) (formula: C₂₂H₂₉ClN₄O).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
5	A	1	Total	C	Cl	N	O	0	0
			28	22	1	4	1		
5	B	1	Total	C	Cl	N	O	0	0
			28	22	1	4	1		

- 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		

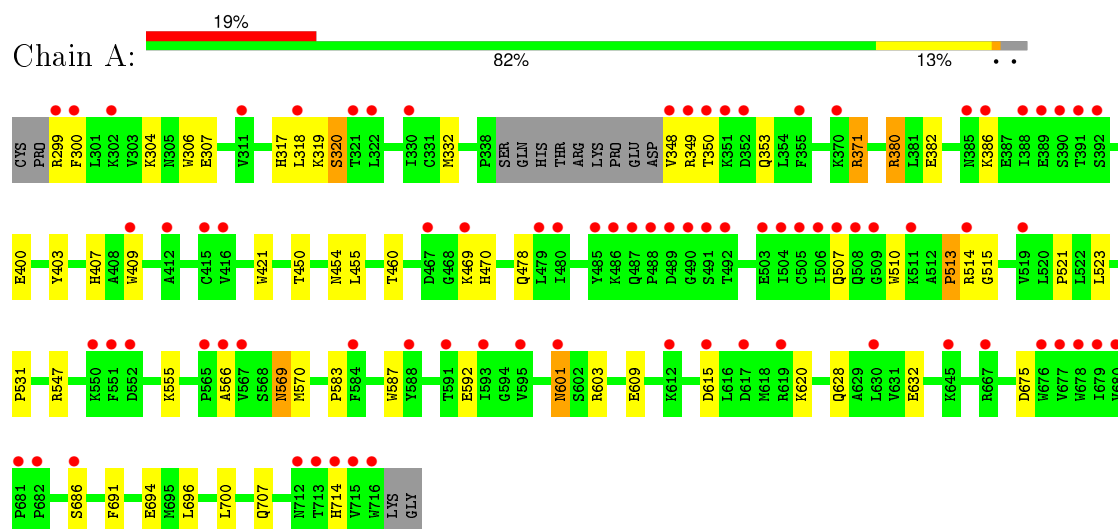
- Molecule 7 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
7	A	131	Total	O	0	0
			131	131		
7	B	181	Total	O	0	0
			181	181		

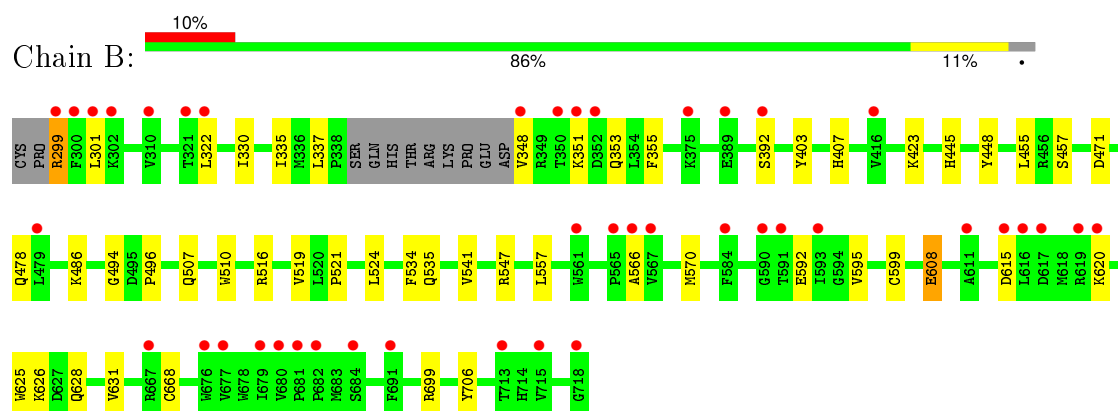
3 Residue-property plots

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, α , β , γ	51.70Å 110.78Å 163.93Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	38.64 – 1.93 37.80 – 1.93	Depositor EDS
% Data completeness (in resolution range)	99.1 (38.64-1.93) 99.1 (37.80-1.93)	Depositor EDS
R_{merge}	0.05	Depositor
R_{sym}	0.05	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.67 (at 1.92Å)	Xtriage
Refinement program	REFMAC 5.5.0109	Depositor
R, R_{free}	0.190 , 0.235 0.207 , 0.247	Depositor DCC
R_{free} test set	3533 reflections (5.21%)	DCC
Wilson B-factor (Å ²)	38.2	Xtriage
Anisotropy	0.116	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.37 , 49.5	EDS
Estimated twinning fraction	No twinning to report.	Xtriage
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtriage
Outliers	2 of 71609 reflections (0.003%)	Xtriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	7193	wwPDB-VP
Average B, all atoms (Å ²)	49.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.81% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical values of $\langle |L| \rangle$, $\langle L^2 \rangle$ for acentric reflections are 0.5, 0.375 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: X2D, ZN, H4B, HEM, ACT

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	0.76	0/3436	0.76	2/4661 (0.0%)
1	B	0.83	1/3464 (0.0%)	0.78	2/4696 (0.0%)
All	All	0.80	1/6900 (0.0%)	0.77	4/9357 (0.0%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	1

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	570	MET	CG-SD	-5.89	1.65	1.81

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	615	ASP	CB-CG-OD2	-8.48	110.67	118.30
1	B	570	MET	CA-CB-CG	-7.70	100.21	113.30
1	A	570	MET	CA-CB-CG	-6.45	102.33	113.30
1	B	471	ASP	CB-CG-OD2	5.27	123.05	118.30

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	513	PRO	Peptide

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	3337	0	3253	43	0
1	B	3359	0	3280	29	1
2	A	43	0	30	1	0
2	B	43	0	30	3	0
3	A	17	0	15	0	0
3	B	17	0	15	0	0
4	A	4	0	3	0	0
4	B	4	0	3	0	0
5	A	28	0	29	2	0
5	B	28	0	29	2	0
6	A	1	0	0	0	0
7	A	131	0	0	3	0
7	B	181	0	0	9	1
All	All	7193	0	6687	72	1

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 (72) 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:350:THR:H	1:A:353:GLN:NE2	1.67	0.90
1:A:299:ARG:HB2	1:A:318:LEU:HD21	1.53	0.90
1:A:592:GLU:OE2	5:A:800:X2D:H14	1.81	0.80
2:B:750:HEM:HHC	2:B:750:HEM:HBB2	1.65	0.79
5:A:800:X2D:H26	7:A:1004:HOH:O	1.88	0.72
1:B:592:GLU:OE1	5:B:800:X2D:H14	1.90	0.71
1:B:355:PHE:HB3	7:B:1046:HOH:O	1.90	0.71
1:B:322:LEU:HD22	1:B:699:ARG:HH21	1.58	0.68
1:A:371:ARG:CG	1:A:371:ARG:HH21	2.07	0.67
1:A:382:GLU:HG3	1:A:386:LYS:HE2	1.75	0.67

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:513:PRO:O	1:A:515:GLY:N	2.28	0.65
1:A:569:ASN:O	1:A:707:GLN:HG2	1.98	0.63
1:B:355:PHE:CB	7:B:1046:HOH:O	2.48	0.59
1:A:380:ARG:HD3	1:A:400:GLU:OE1	2.02	0.59
1:A:371:ARG:HG3	1:A:371:ARG:HH21	1.66	0.59
1:A:317:HIS:O	1:A:320:SER:HB3	2.03	0.58
1:A:601:ASN:HB2	7:A:1020:HOH:O	2.02	0.58
1:A:350:THR:N	1:A:353:GLN:NE2	2.45	0.57
5:B:800:X2D:H26	7:B:1004:HOH:O	2.04	0.57
1:A:371:ARG:CG	1:A:371:ARG:NH2	2.66	0.56
1:A:350:THR:H	1:A:353:GLN:HE21	1.53	0.56
1:A:469:LYS:O	1:A:470:HIS:HD2	1.89	0.55
1:B:478:GLN:HA	1:B:566:ALA:O	2.08	0.53
1:B:507:GLN:NE2	7:B:1114:HOH:O	2.36	0.53
1:A:609:GLU:HG3	7:A:1008:HOH:O	2.07	0.53
1:A:694:GLU:HB3	1:B:335:ILE:HD13	1.90	0.53
2:A:750:HEM:HBB2	2:A:750:HEM:HHC	1.90	0.53
1:B:299:ARG:CZ	1:B:299:ARG:HB3	2.38	0.52
1:B:608:GLU:HB2	7:B:1164:HOH:O	2.11	0.51
1:B:510:TRP:CE2	1:B:521:PRO:HD3	2.46	0.51
1:A:332:MET:CE	1:B:301:LEU:HD22	2.41	0.51
1:B:519:VAL:HG21	1:B:541:VAL:HG11	1.93	0.50
1:A:332:MET:HE3	1:B:301:LEU:HD22	1.95	0.48
1:A:460:THR:O	1:A:583:PRO:HD2	2.13	0.48
1:A:632:GLU:OE2	1:B:628:GLN:NE2	2.41	0.48
1:B:615:ASP:HA	7:B:1047:HOH:O	2.14	0.47
1:A:349:ARG:HA	1:A:353:GLN:HE22	1.80	0.47
2:B:750:HEM:CHC	2:B:750:HEM:HBB2	2.39	0.47
1:A:409:TRP:CE3	1:A:421:TRP:HA	2.49	0.47
1:B:348:VAL:HG12	7:B:1013:HOH:O	2.15	0.46
1:B:595:VAL:O	1:B:599:CYS:HB2	2.15	0.46
1:B:403:TYR:CE1	1:B:407:HIS:CE1	3.03	0.46
1:A:371:ARG:HG2	1:A:371:ARG:NH2	2.31	0.45
1:A:603:ARG:HH11	1:A:603:ARG:HG3	1.81	0.45
1:A:299:ARG:O	1:A:318:LEU:HD11	2.16	0.45
1:A:350:THR:N	1:A:353:GLN:HE21	2.11	0.45
1:B:337:LEU:HD21	1:B:706:TYR:CD2	2.53	0.44
1:A:675:ASP:OD2	1:A:675:ASP:C	2.56	0.44
1:A:307:GLU:HG3	7:B:1050:HOH:O	2.17	0.44
1:B:516:ARG:NH2	1:B:557:LEU:O	2.51	0.43
1:B:445:HIS:C	1:B:445:HIS:CD2	2.92	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:625:TRP:CZ3	1:B:626:LYS:HG2	2.54	0.43
1:A:349:ARG:HA	1:A:353:GLN:NE2	2.33	0.43
1:A:628:GLN:HG3	1:B:631:VAL:HG11	2.00	0.42
1:A:696:LEU:HB3	1:B:330:ILE:HD11	2.02	0.42
1:A:320:SER:HA	1:A:700:LEU:HD23	2.00	0.42
1:A:450:THR:HA	1:A:455:LEU:HD22	2.01	0.42
1:B:535:GLN:HG3	7:B:1090:HOH:O	2.19	0.42
1:B:494:GLY:O	1:B:496:PRO:HD3	2.20	0.42
2:B:750:HEM:HHC	2:B:750:HEM:CBB	2.41	0.42
1:A:455:LEU:HD12	1:A:587:TRP:HB3	2.02	0.42
1:B:524:LEU:HD12	1:B:534:PHE:CD1	2.55	0.41
1:A:523:LEU:HD22	1:A:531:PRO:HB2	2.01	0.41
1:A:299:ARG:HB2	1:A:318:LEU:CD2	2.35	0.41
1:A:304:LYS:HE2	1:A:306:TRP:CE3	2.54	0.41
1:A:478:GLN:HA	1:A:566:ALA:O	2.20	0.41
1:A:510:TRP:CE2	1:A:521:PRO:HD3	2.56	0.41
1:A:403:TYR:CE1	1:A:407:HIS:CE1	3.09	0.41
1:A:686:SER:HA	1:A:691:PHE:CG	2.55	0.40
1:A:469:LYS:C	1:A:470:HIS:CD2	2.95	0.40
1:B:423:LYS:O	1:B:457[B]:SER:OG	2.38	0.40
1:B:448:TYR:CD2	1:B:448:TYR:C	2.94	0.40

All (1) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:668[B]:CYS:SG	7:B:1012:HOH:O[1_455]	2.07	0.13

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	407/422 (96%)	393 (97%)	12 (3%)	2 (0%)	34	20
1	B	411/422 (97%)	405 (98%)	6 (2%)	0	100	100
All	All	818/844 (97%)	798 (98%)	18 (2%)	2 (0%)	52	42

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	514	ARG
1	A	714	HIS

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	367/377 (97%)	354 (96%)	13 (4%)	43	28
1	B	370/377 (98%)	361 (98%)	9 (2%)	57	46
All	All	737/754 (98%)	715 (97%)	22 (3%)	48	35

All (22) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	300	PHE
1	A	319	LYS
1	A	320	SER
1	A	348	VAL
1	A	371	ARG
1	A	380	ARG
1	A	454	ASN
1	A	507	GLN
1	A	547	ARG
1	A	555	LYS
1	A	569	ASN
1	A	601	ASN
1	A	620	LYS
1	B	299	ARG

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Mol	Chain	Res	Type
1	B	351	LYS
1	B	353	GLN
1	B	392	SER
1	B	455	LEU
1	B	486	LYS
1	B	547	ARG
1	B	608	GLU
1	B	620	LYS

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	353	GLN
1	A	454	ASN
1	A	470	HIS
1	A	507	GLN
1	A	527	ASN
1	A	569	ASN
1	A	601	ASN
1	A	605	ASN
1	A	697	ASN
1	B	364	GLN
1	B	385	ASN
1	B	454	ASN
1	B	507	GLN
1	B	508	GLN
1	B	601	ASN
1	B	605	ASN
1	B	642	GLN
1	B	697	ASN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates [i](#)

There are no carbohydrates in this entry.

5.6 Ligand geometry [i](#)

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	30,50,50	2.34	11 (36%)	24,82,82	2.74	11 (45%)
3	H4B	A	760	-	13,18,18	0.61	0	11,26,26	2.49	6 (54%)
5	X2D	A	800	-	26,31,31	1.07	2 (7%)	30,43,43	2.35	7 (23%)
4	ACT	A	860	-	1,3,3	1.24	0	0,3,3	0.00	-
2	HEM	B	750	1	30,50,50	2.22	10 (33%)	24,82,82	2.95	15 (62%)
3	H4B	B	760	-	13,18,18	1.01	0	11,26,26	2.65	3 (27%)
5	X2D	B	800	-	26,31,31	0.90	1 (3%)	30,43,43	2.00	6 (20%)
4	ACT	B	860	-	1,3,3	1.75	0	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	-	0/10/54/54	0/0/8/8
3	H4B	A	760	-	-	0/8/17/17	0/2/2/2
5	X2D	A	800	-	-	0/13/30/30	0/3/4/4
4	ACT	A	860	-	-	0/0/0/0	0/0/0/0
2	HEM	B	750	1	-	0/10/54/54	0/0/8/8
3	H4B	B	760	-	-	0/8/17/17	0/2/2/2
5	X2D	B	800	-	-	0/13/30/30	0/3/4/4
4	ACT	B	860	-	-	0/0/0/0	0/0/0/0

All (24) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	750	HEM	C3B-C4B	-6.75	1.45	1.51
2	A	750	HEM	C3D-C4D	-5.07	1.45	1.51
2	B	750	HEM	C3B-C4B	-4.66	1.47	1.51
2	B	750	HEM	C3D-C4D	-4.56	1.45	1.51
2	B	750	HEM	C2C-C1C	-4.15	1.44	1.52
2	A	750	HEM	C2C-C1C	-3.96	1.45	1.52
2	A	750	HEM	C2D-C1D	-2.70	1.43	1.51
2	B	750	HEM	C2B-C1B	-2.32	1.44	1.51
2	A	750	HEM	C2B-C1B	-2.18	1.44	1.51
2	B	750	HEM	C2D-C1D	-2.07	1.45	1.51
2	A	750	HEM	CMA-C3A	2.08	1.55	1.51
2	B	750	HEM	FE-ND	2.24	2.09	1.97
2	A	750	HEM	CHC-C1C	2.25	1.41	1.36
2	B	750	HEM	CMA-C3A	2.39	1.56	1.51
5	A	800	X2D	C23-CL23	2.43	1.80	1.74
5	A	800	X2D	C15-C14	2.49	1.54	1.50
5	B	800	X2D	C15-C14	2.60	1.54	1.50
2	A	750	HEM	FE-ND	2.73	2.11	1.97
2	B	750	HEM	FE-NB	2.78	2.12	1.97
2	A	750	HEM	FE-NC	3.06	2.07	1.95
2	A	750	HEM	FE-NB	3.10	2.13	1.97
2	A	750	HEM	C1C-NC	3.44	1.40	1.36
2	B	750	HEM	C1C-NC	3.92	1.40	1.36
2	B	750	HEM	FE-NC	4.45	2.13	1.95

All (48) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	A	800	X2D	C15-C14-C21	-7.57	108.73	122.30
5	B	800	X2D	C15-C14-C21	-6.90	109.94	122.30
5	A	800	X2D	C15-C13-N12	-5.38	103.48	118.20
2	B	750	HEM	CBA-CAA-C2A	-5.29	103.05	112.53
2	A	750	HEM	CBA-CAA-C2A	-4.62	104.25	112.53
2	B	750	HEM	CBD-CAD-C3D	-4.07	101.70	113.55
5	B	800	X2D	C15-C13-N12	-3.80	107.82	118.20
2	B	750	HEM	C3B-C4B-NB	-3.46	105.01	111.63
2	A	750	HEM	CBD-CAD-C3D	-2.80	105.42	113.55
2	B	750	HEM	C3C-CAC-CBC	-2.72	120.28	124.46
3	A	760	H4B	N3-C2-N1	-2.61	121.26	125.53
5	A	800	X2D	C22-C23-CL23	-2.58	115.93	119.14
5	A	800	X2D	C05-C06-N01	-2.52	120.11	122.96
2	B	750	HEM	C2C-C1C-NC	-2.52	105.96	110.21
2	A	750	HEM	CAA-CBA-CGA	-2.43	108.30	112.75

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	750	HEM	C3B-C4B-NB	-2.33	107.17	111.63
5	B	800	X2D	C05-C06-N01	-2.31	120.35	122.96
2	A	750	HEM	CAA-C2A-C1A	-2.25	124.57	127.01
5	A	800	X2D	C21-C14-C13	-2.18	116.88	121.50
2	B	750	HEM	C3B-CAB-CBB	-2.03	121.34	124.46
5	B	800	X2D	C10-C11-N12	2.04	116.97	111.60
2	B	750	HEM	C2D-C3D-C4D	2.29	105.38	101.50
3	A	760	H4B	N2-C2-N1	2.36	121.11	117.20
3	B	760	H4B	C4A-C8A-N8	2.43	121.29	118.43
5	B	800	X2D	C11-N12-C13	2.47	117.61	113.89
2	B	750	HEM	CMD-C2D-C3D	2.47	125.28	114.35
2	B	750	HEM	C4B-CHC-C1C	2.52	130.04	125.82
5	A	800	X2D	N02-C02-N01	2.68	121.39	116.50
3	A	760	H4B	C2-N1-C8A	2.73	120.68	114.54
3	A	760	H4B	C4-N3-C2	2.89	119.95	115.94
2	A	750	HEM	CMD-C2D-C3D	3.13	128.20	114.35
2	B	750	HEM	C2C-C1C-CHC	3.22	128.58	123.68
2	B	750	HEM	C3B-C4B-CHC	3.24	127.72	123.16
3	A	760	H4B	C4A-C8A-N8	3.32	122.34	118.43
3	B	760	H4B	C4-N3-C2	3.50	120.80	115.94
2	B	750	HEM	CAD-C3D-C2D	3.50	123.28	113.22
2	B	750	HEM	CMC-C2C-C3C	3.75	125.89	116.53
2	A	750	HEM	CMB-C2B-C3B	4.11	126.79	116.53
2	A	750	HEM	CAD-C3D-C4D	4.13	127.04	112.47
5	B	800	X2D	C02-N01-C06	4.19	121.21	118.23
2	A	750	HEM	CMC-C2C-C3C	4.84	128.62	116.53
2	A	750	HEM	C3B-C4B-CHC	4.98	130.17	123.16
2	B	750	HEM	CMB-C2B-C3B	5.11	129.28	116.53
2	A	750	HEM	CAD-C3D-C2D	5.28	128.39	113.22
3	A	760	H4B	C4-C4A-C8A	5.30	119.36	114.56
2	B	750	HEM	CAD-C3D-C4D	5.33	131.28	112.47
5	A	800	X2D	C02-N01-C06	5.34	122.03	118.23
3	B	760	H4B	C4-C4A-C8A	6.96	120.87	114.56

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

4 monomers are involved in 8 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	750	HEM	1	0

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Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	A	800	X2D	2	0
2	B	750	HEM	3	0
5	B	800	X2D	2	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, 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	409/422 (96%)	1.06	80 (19%) 1 2	27, 52, 90, 117	0
1	B	411/422 (97%)	0.51	42 (10%) 9 13	27, 42, 66, 83	0
All	All	820/844 (97%)	0.78	122 (14%) 3 5	27, 47, 83, 117	0

All (122) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	300	PHE	10.2
1	A	488	PRO	7.7
1	A	300	PHE	6.5
1	A	716	TRP	6.4
1	A	348	VAL	6.1
1	A	713	THR	5.9
1	A	355	PHE	5.8
1	A	715	VAL	5.7
1	A	486	LYS	5.7
1	B	348	VAL	5.2
1	A	352	ASP	5.1
1	B	619	ARG	4.6
1	A	712	ASN	4.5
1	A	552	ASP	4.3
1	A	299	ARG	4.2
1	A	321	THR	4.2
1	A	506	ILE	4.2
1	A	619	ARG	4.0
1	A	351	LYS	4.0
1	A	322	LEU	3.9
1	A	388	ILE	3.9
1	B	310	VAL	3.8
1	A	386	LYS	3.8
1	A	503	GLU	3.8

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Mol	Chain	Res	Type	RSRZ
1	B	350	THR	3.7
1	A	678	TRP	3.7
1	A	551	PHE	3.7
1	B	715	VAL	3.6
1	A	487	GLN	3.6
1	A	593	ILE	3.6
1	B	301	LEU	3.6
1	A	349	ARG	3.5
1	A	415	CYS	3.4
1	A	507	GLN	3.4
1	A	491	SER	3.4
1	A	679	ILE	3.4
1	A	390	SER	3.4
1	A	682	PRO	3.3
1	A	567	VAL	3.3
1	A	492	THR	3.2
1	A	490	GLY	3.2
1	A	514	ARG	3.2
1	B	680	VAL	3.1
1	B	667	ARG	3.1
1	A	714	HIS	3.1
1	B	616	LEU	3.1
1	A	416	VAL	3.1
1	A	392	SER	3.1
1	A	385	ASN	3.1
1	B	299	ARG	3.0
1	B	351	LYS	3.0
1	A	479	LEU	3.0
1	A	591	THR	2.9
1	A	511	LYS	2.9
1	B	561	TRP	2.9
1	A	489	ASP	2.9
1	A	677	VAL	2.9
1	A	480	ILE	2.9
1	A	389	GLU	2.9
1	A	588	TYR	2.9
1	B	691	PHE	2.8
1	A	330	ILE	2.8
1	A	469	LYS	2.8
1	A	504	ILE	2.8
1	A	391	THR	2.8
1	A	311	VAL	2.8

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Mol	Chain	Res	Type	RSRZ
1	A	595	VAL	2.8
1	A	615	ASP	2.7
1	A	508	GLN	2.7
1	A	350	THR	2.7
1	A	676	TRP	2.7
1	A	550	LYS	2.6
1	A	680	VAL	2.6
1	A	681	PRO	2.6
1	A	584	PHE	2.6
1	B	611	ALA	2.6
1	B	677	VAL	2.6
1	B	620	LYS	2.5
1	A	617	ASP	2.5
1	A	565	PRO	2.5
1	A	667	ARG	2.5
1	A	509	GLY	2.5
1	A	412	ALA	2.4
1	B	682	PRO	2.4
1	A	302	LYS	2.4
1	B	375	LYS	2.4
1	B	567	VAL	2.4
1	B	352	ASP	2.4
1	A	505	CYS	2.4
1	B	322	LEU	2.4
1	B	584	PHE	2.4
1	A	318	LEU	2.3
1	B	593	ILE	2.3
1	B	591	THR	2.3
1	A	612	LYS	2.3
1	A	645	LYS	2.3
1	B	713	THR	2.3
1	B	718	GLY	2.3
1	B	389	GLU	2.2
1	A	370	LYS	2.2
1	B	321	THR	2.2
1	A	686	SER	2.2
1	A	601	ASN	2.2
1	B	590	GLY	2.1
1	B	479	LEU	2.1
1	B	617	ASP	2.1
1	B	681	PRO	2.1
1	B	676	TRP	2.1

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Mol	Chain	Res	Type	RSRZ
1	A	519	VAL	2.1
1	A	467	ASP	2.1
1	B	416	VAL	2.1
1	A	409	TRP	2.1
1	A	566	ALA	2.1
1	B	615	ASP	2.1
1	B	684	SER	2.1
1	B	679	ILE	2.0
1	A	485	TYR	2.0
1	B	392	SER	2.0
1	A	630	LEU	2.0
1	B	565	PRO	2.0
1	B	302	LYS	2.0
1	B	566	ALA	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, 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	LLDF	B-factors(Å ²)	Q<0.9
4	ACT	A	860	4/4	0.92	0.33	9.85	59,60,62,64	0
4	ACT	B	860	4/4	0.94	0.13	1.43	48,50,51,52	0
2	HEM	A	750	43/43	0.97	0.23	1.16	29,34,38,39	0
2	HEM	B	750	43/43	0.98	0.18	0.90	25,32,39,44	0
5	X2D	B	800	28/28	0.93	0.20	0.87	35,41,45,52	0
3	H4B	B	760	17/17	0.97	0.18	0.83	28,33,38,40	0
3	H4B	A	760	17/17	0.94	0.19	0.57	30,33,40,40	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	LLDF	B-factors(\AA^2)	Q<0.9
5	X2D	A	800	28/28	0.90	0.16	-0.44	27,33,36,46	0
6	ZN	A	900	1/1	1.00	0.06	-1.71	38,38,38,38	0

6.5 Other polymers [i](#)

There are no such residues in this entry.