



Full wwPDB X-ray Structure Validation Report ⓘ

Feb 1, 2016 – 09:50 AM GMT

PDB ID : 3JWS
Title : Structure of neuronal nitric oxide synthase R349A mutant heme domain complexed with N1-[(3' S,4'S)-4'-((6"-amino-4"-methylpyridin-2"-yl)methyl)pyrrolidin-3'-yl]-N2-(3'-fluorophenethyl)ethane-1,2-diamine tetrahydrochloride
Authors : Delker, S.L.; Li, H.; Poulos, T.L.
Deposited on : 2009-09-18
Resolution : 1.95 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

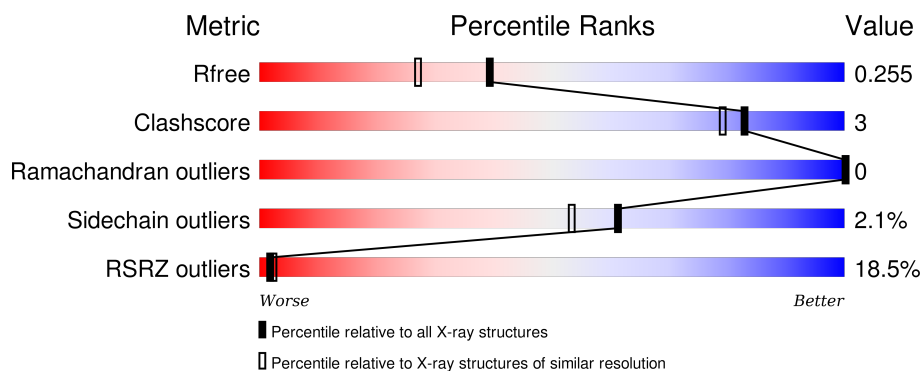
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.95 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	1833 (1.96-1.96)
Clashscore	102246	1953 (1.96-1.96)
Ramachandran outliers	100387	1936 (1.96-1.96)
Sidechain outliers	100360	1936 (1.96-1.96)
RSRZ outliers	91569	1835 (1.96-1.96)

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	<div> <div>23%</div> <div>86%</div> <div>10%</div> <div>.</div> </div>
1	B	422	<div> <div>13%</div> <div>91%</div> <div>6%</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
5	ACT	A	860	-	-	-	X

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.

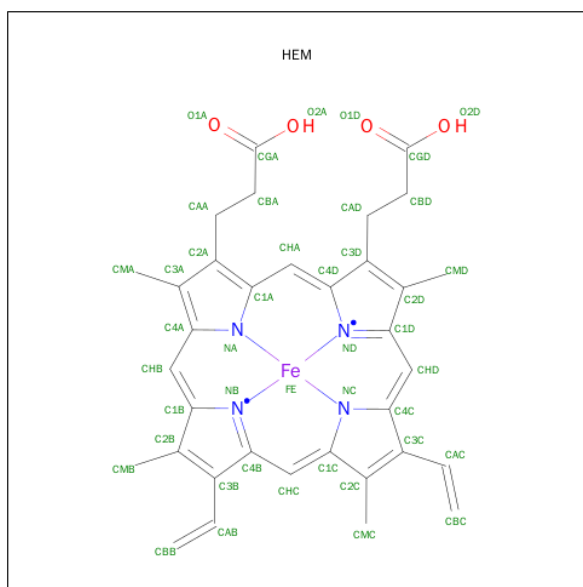
- Molecule 1 is a protein called Nitric oxide synthase, brain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	407	Total 3313	C 2121	N 566	O 605	S 21	0	0	0
1	B	411	Total 3339	C 2137	N 571	O 610	S 21	0	0	0

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	349	ALA	ARG	ENGINEERED	UNP P29476
B	349	ALA	ARG	ENGINEERED	UNP P29476

- 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 43	C 34	Fe 1	N 4	O 4	0	0

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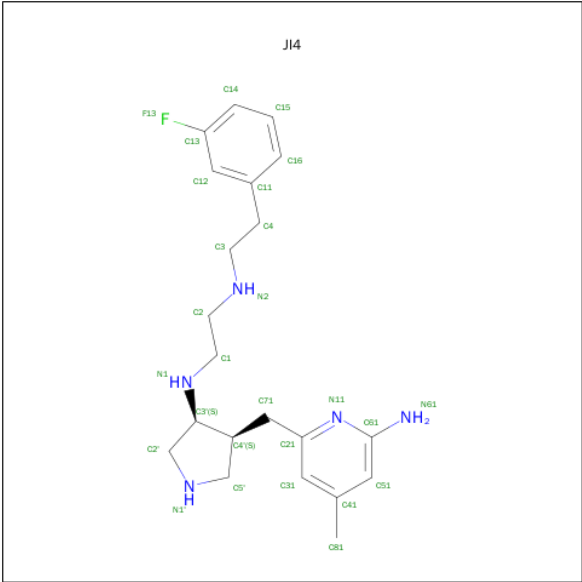
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	B	1	Total	C	Fe	N	O	0	0
			43	34	1	4	4		

- 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 N-{(3S,4S)-4-[(6-AMINO-4-METHYLPYRIDIN-2-YL)METHYL]PYRROLIDIN-3-YL}-N'-[2-(3-FLUOROPHENYL)ETHYL]ETHANE-1,2-DIAMINE (three-letter code: JI4) (formula: $C_{21}H_{30}FN_5$).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
4	A	1	Total	C	F	N	0	0
			27	21	1	5		
4	B	1	Total	C	F	N	0	0
			27	21	1	5		

- Molecule 5 is ACETATE ION (three-letter code: ACT) (formula: C₂H₃O₂).



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 1	Zn 1	0	0

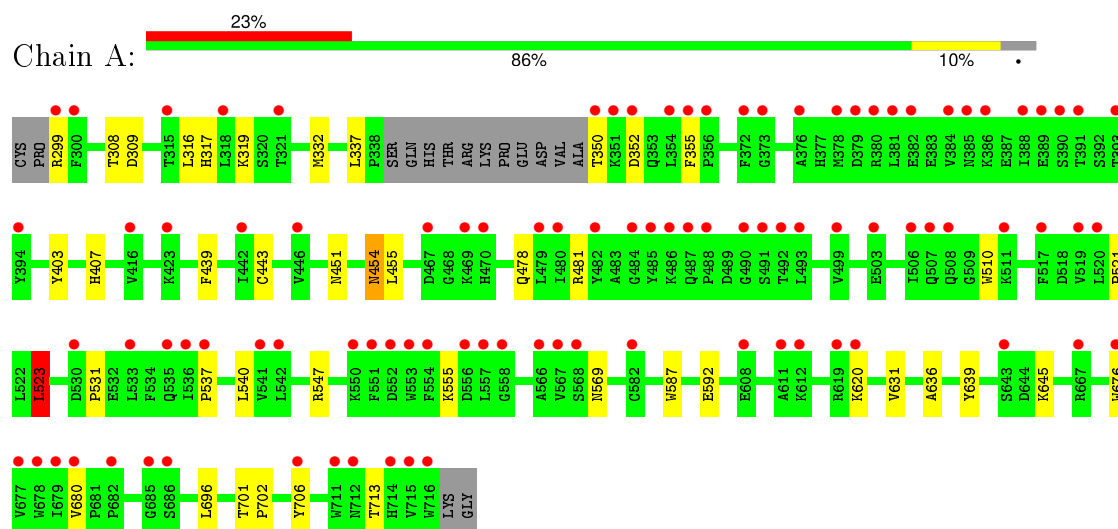
- Molecule 7 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
7	A	134	Total 134	O 134	0	0
7	B	197	Total 197	O 197	0	0

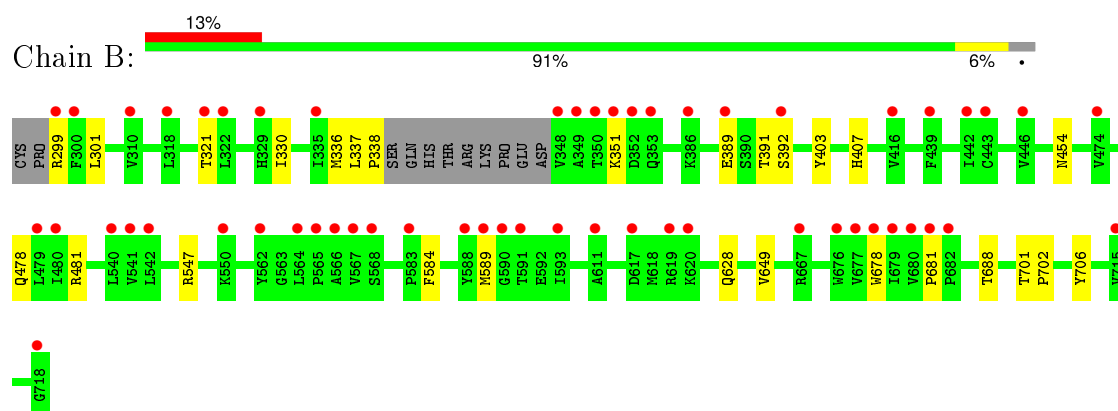
3 Residue-property plots [i](#)

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 ($\text{RSRZ} > 2$). 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	51.94Å 112.19Å 164.47Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	43.92 – 1.95 43.92 – 1.95	Depositor EDS
% Data completeness (in resolution range)	97.8 (43.92-1.95) 97.8 (43.92-1.95)	Depositor EDS
R_{merge}	0.04	Depositor
R_{sym}	0.04	Depositor
$\langle I/\sigma(I) \rangle$ ¹	3.93 (at 1.95Å)	Xtriage
Refinement program	REFMAC 5.5.0089	Depositor
R, R_{free}	0.187 , 0.221 0.225 , 0.255	Depositor DCC
R_{free} test set	3458 reflections (5.26%)	DCC
Wilson B-factor (Å ²)	35.7	Xtriage
Anisotropy	0.203	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.36 , 48.9	EDS
Estimated twinning fraction	No twinning to report.	Xtriage
L-test for twinning ²	$\langle L \rangle = 0.48$, $\langle L^2 \rangle = 0.32$	Xtriage
Outliers	0 of 69230 reflections	Xtriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	7166	wwPDB-VP
Average B, all atoms (Å ²)	48.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.21% 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 [i](#)

5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: HEM, ZN, JI4, H4B, 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	0.55	0/3406	0.60	1/4621 (0.0%)
1	B	0.60	0/3432	0.62	0/4654
All	All	0.57	0/6838	0.61	1/9275 (0.0%)

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	523	LEU	CA-CB-CG	5.07	126.97	115.30

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts [i](#)

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	3313	0	3221	25	0
1	B	3339	0	3251	15	0
2	A	43	0	30	5	0
2	B	43	0	30	3	0
3	A	17	0	15	0	0
3	B	17	0	15	0	0
4	A	27	0	30	2	0
4	B	27	0	30	2	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
5	A	4	0	3	0	0
5	B	4	0	3	0	0
6	A	1	0	0	0	0
7	A	134	0	0	4	0
7	B	197	0	0	1	0
All	All	7166	0	6628	41	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 3.

All (41) 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:B:706:TYR:OH	2:B:750:HEM:O1D	1.90	0.89
2:A:750:HEM:HMC2	2:A:750:HEM:HBC2	1.60	0.82
1:A:706:TYR:OH	2:A:750:HEM:O2D	2.03	0.76
1:A:636:ALA:C	7:A:1053:HOH:O	2.27	0.73
1:A:636:ALA:O	7:A:1053:HOH:O	2.14	0.65
1:B:351:LYS:HE2	1:B:392:SER:OG	1.99	0.63
1:A:639:TYR:N	7:A:1053:HOH:O	2.32	0.61
1:A:355:PHE:HB2	7:A:1024:HOH:O	2.02	0.60
1:A:523:LEU:HD22	1:A:531:PRO:HB2	1.85	0.58
1:A:706:TYR:OH	2:A:750:HEM:CGD	2.55	0.54
1:A:337:LEU:HG	4:A:800:JI4:F13	1.98	0.53
1:A:478:GLN:HB2	1:A:481:ARG:HG3	1.91	0.53
2:A:750:HEM:HHC	2:A:750:HEM:HBB2	1.93	0.50
1:B:478:GLN:HB2	1:B:481:ARG:HG3	1.92	0.50
1:B:701:THR:HA	1:B:702:PRO:C	2.33	0.48
1:B:391:THR:O	1:B:392:SER:HB2	2.14	0.47
1:B:403:TYR:CE1	1:B:407:HIS:CE1	3.03	0.47
1:A:537:PRO:HB2	1:A:540:LEU:HG	1.97	0.47
1:A:631:VAL:HG11	1:B:628:GLN:HG2	1.98	0.46
1:A:316:LEU:HD12	1:A:319:LYS:HD2	1.98	0.45
2:A:750:HEM:CMC	2:A:750:HEM:HBC2	2.37	0.45
1:A:308:THR:O	1:A:309:ASP:HB2	2.16	0.45
1:A:455:LEU:HD12	1:A:587:TRP:HB3	2.00	0.44
1:A:510:TRP:CE2	1:A:521:PRO:HD3	2.53	0.44
1:B:337:LEU:HG	4:B:800:JI4:F13	2.08	0.43
2:B:750:HEM:HHC	2:B:750:HEM:HBB2	2.01	0.43
1:A:332:MET:CE	1:B:301:LEU:HD22	2.49	0.43
1:B:338:PRO:HG3	7:B:1172:HOH:O	2.18	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:451:ASN:HB3	1:A:454:ASN:O	2.19	0.43
1:B:678:TRP:HH2	4:B:800:JI4:H4	1.84	0.42
1:A:676:TRP:CE2	1:A:680:VAL:HG21	2.54	0.42
1:A:701:THR:HA	1:A:702:PRO:C	2.40	0.42
1:A:403:TYR:CE1	1:A:407:HIS:CE1	3.08	0.42
1:A:439:PHE:CZ	1:A:443:CYS:SG	3.13	0.41
1:B:584:PHE:CD1	2:B:750:HEM:CAC	3.04	0.41
1:A:696:LEU:HB3	1:B:330:ILE:HD11	2.01	0.41
1:A:352:ASP:OD2	1:A:352:ASP:N	2.54	0.41
1:B:681:PRO:HG2	1:B:688:THR:HG21	2.03	0.41
1:A:592:GLU:OE1	4:A:800:JI4:N11	2.54	0.40
1:A:299:ARG:O	1:A:317:HIS:CE1	2.74	0.40
1:B:589:MET:HA	1:B:649:VAL:O	2.22	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	403/422 (96%)	396 (98%)	7 (2%)	0	100	100
1	B	407/422 (96%)	402 (99%)	5 (1%)	0	100	100
All	All	810/844 (96%)	798 (98%)	12 (2%)	0	100	100

There are no Ramachandran outliers to report.

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	363/376 (96%)	354 (98%)	9 (2%)	55	45
1	B	365/376 (97%)	359 (98%)	6 (2%)	70	66
All	All	728/752 (97%)	713 (98%)	15 (2%)	61	53

All (15) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	350	THR
1	A	454	ASN
1	A	523	LEU
1	A	547	ARG
1	A	555	LYS
1	A	569	ASN
1	A	620	LYS
1	A	645	LYS
1	A	713	THR
1	B	299	ARG
1	B	321	THR
1	B	336	MET
1	B	389	GLU
1	B	454	ASN
1	B	547	ARG

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (21) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	364	GLN
1	A	425	GLN
1	A	440	ASN
1	A	454	ASN
1	A	527	ASN
1	A	569	ASN
1	A	605	ASN
1	A	628	GLN
1	A	642	GLN
1	A	697	ASN
1	B	364	GLN
1	B	385	ASN

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Mol	Chain	Res	Type
1	B	425	GLN
1	B	454	ASN
1	B	507	GLN
1	B	508	GLN
1	B	527	ASN
1	B	535	GLN
1	B	601	ASN
1	B	605	ASN
1	B	697	ASN

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates [i](#)

There are no 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	2.40	10 (33%)	24,82,82	2.75	12 (50%)
3	H4B	A	760	-	13,18,18	1.05	1 (7%)	11,26,26	2.78	6 (54%)
4	J14	A	800	-	26,29,29	0.64	0	30,38,38	1.36	4 (13%)
5	ACT	A	860	-	1,3,3	1.27	0	0,3,3	0.00	-

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
2	HEM	B	750	1	30,50,50	2.11	9 (30%)	24,82,82	2.95	14 (58%)
3	H4B	B	761	-	13,18,18	0.76	0	11,26,26	2.59	5 (45%)
4	JI4	B	800	-	26,29,29	0.65	0	30,38,38	1.83	5 (16%)
5	ACT	B	861	-	1,3,3	1.35	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
4	JI4	A	800	-	-	0/13/23/23	0/3/3/3
5	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	761	-	-	0/8/17/17	0/2/2/2
4	JI4	B	800	-	-	0/13/23/23	0/3/3/3
5	ACT	B	861	-	-	0/0/0/0	0/0/0/0

All (20) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	750	HEM	C3D-C4D	-7.46	1.42	1.51
2	A	750	HEM	C3B-C4B	-6.51	1.46	1.51
2	B	750	HEM	C3B-C4B	-5.49	1.47	1.51
2	B	750	HEM	C3D-C4D	-5.31	1.44	1.51
2	A	750	HEM	C2C-C1C	-3.81	1.45	1.52
2	B	750	HEM	C2C-C1C	-3.70	1.45	1.52
2	A	750	HEM	C2D-C1D	-2.61	1.43	1.51
2	B	750	HEM	C2B-C1B	-2.59	1.43	1.51
2	B	750	HEM	C2D-C1D	-2.28	1.44	1.51
2	A	750	HEM	C2B-C1B	-2.05	1.45	1.51
2	A	750	HEM	CMA-C3A	2.08	1.55	1.51
2	A	750	HEM	C3B-CAB	2.10	1.55	1.51
2	B	750	HEM	C3C-CAC	2.11	1.55	1.51
2	A	750	HEM	FE-NB	2.28	2.09	1.97
2	A	750	HEM	FE-ND	2.36	2.10	1.97
2	B	750	HEM	FE-ND	2.46	2.10	1.97
2	B	750	HEM	C1C-NC	2.51	1.39	1.36
3	A	760	H4B	C2-N2	2.62	1.39	1.34
2	A	750	HEM	FE-NC	2.76	2.06	1.95

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	750	HEM	FE-NC	3.09	2.08	1.95

All (46) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	750	HEM	CBA-CAA-C2A	-7.63	98.86	112.53
2	A	750	HEM	CBA-CAA-C2A	-5.40	102.84	112.53
3	A	760	H4B	N3-C2-N1	-3.93	119.10	125.53
2	A	750	HEM	CBD-CAD-C3D	-3.86	102.33	113.55
2	B	750	HEM	CAA-C2A-C1A	-3.73	122.96	127.01
2	A	750	HEM	CAA-C2A-C1A	-3.45	123.26	127.01
4	B	800	JI4	C31-C21-N11	-3.36	119.17	122.96
2	B	750	HEM	CBD-CAD-C3D	-3.34	103.83	113.55
2	A	750	HEM	C3C-CAC-CBC	-3.01	119.83	124.46
4	A	800	JI4	C31-C21-N11	-3.00	119.57	122.96
2	B	750	HEM	C3C-CAC-CBC	-2.62	120.44	124.46
2	B	750	HEM	CMA-C3A-C4A	-2.27	124.61	128.36
2	A	750	HEM	CMA-C3A-C4A	-2.19	124.75	128.36
2	B	750	HEM	C3B-CAB-CBB	-2.11	121.22	124.46
4	B	800	JI4	C5'-C4'-C3'	-2.08	100.91	103.80
3	B	761	H4B	N3-C2-N1	-2.07	122.14	125.53
2	B	750	HEM	C3B-C4B-NB	-2.01	107.79	111.63
4	A	800	JI4	C3-C4-C11	-2.01	108.67	112.83
4	B	800	JI4	C14-C13-C12	-2.00	120.76	123.35
3	B	761	H4B	C2-N1-C8A	2.10	119.26	114.54
3	B	761	H4B	C4A-C8A-N8	2.35	121.20	118.43
2	B	750	HEM	C2D-C3D-C4D	2.39	105.55	101.50
2	B	750	HEM	C3B-C4B-CHC	2.75	127.04	123.16
2	A	750	HEM	CMD-C2D-C3D	2.77	126.61	114.35
3	A	760	H4B	N2-C2-N3	2.90	122.00	117.20
3	A	760	H4B	C4A-C8A-N8	2.90	121.85	118.43
2	A	750	HEM	C2D-C3D-C4D	2.94	106.49	101.50
2	A	750	HEM	C3B-C4B-CHC	3.16	127.62	123.16
2	B	750	HEM	CMD-C2D-C3D	3.16	128.34	114.35
3	A	760	H4B	C2-N1-C8A	3.19	121.71	114.54
3	B	761	H4B	C4-N3-C2	3.22	120.41	115.94
4	A	800	JI4	C1-N1-C3'	3.73	119.51	113.89
4	A	800	JI4	C61-N11-C21	3.80	120.93	118.23
2	B	750	HEM	CMC-C2C-C3C	3.90	126.27	116.53
2	A	750	HEM	CMB-C2B-C3B	3.91	126.30	116.53
2	A	750	HEM	CAD-C3D-C4D	4.16	127.13	112.47
2	B	750	HEM	CAD-C3D-C2D	4.32	125.63	113.22

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	750	HEM	CMB-C2B-C3B	4.35	127.38	116.53
3	A	760	H4B	C4-N3-C2	4.37	122.01	115.94
2	A	750	HEM	CAD-C3D-C2D	4.58	126.37	113.22
2	B	750	HEM	CAD-C3D-C4D	4.60	128.70	112.47
3	A	760	H4B	C4-C4A-C8A	4.61	118.73	114.56
2	A	750	HEM	CMC-C2C-C3C	4.82	128.57	116.53
4	B	800	JI4	C1-N1-C3'	5.22	121.76	113.89
4	B	800	JI4	C61-N11-C21	5.86	122.40	118.23
3	B	761	H4B	C4-C4A-C8A	6.62	120.56	114.56

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

4 monomers are involved in 12 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	750	HEM	5	0
4	A	800	JI4	2	0
2	B	750	HEM	3	0
4	B	800	JI4	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	407/422 (96%)	1.37	96 (23%) 1 1	26, 51, 96, 119	0
1	B	411/422 (97%)	0.91	55 (13%) 4 7	26, 40, 64, 88	0
All	All	818/844 (96%)	1.14	151 (18%) 2 2	26, 45, 88, 119	0

All (151) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	715	VAL	8.2
1	A	716	TRP	7.4
1	A	388	ILE	6.4
1	A	355	PHE	6.2
1	A	619	ARG	6.0
1	A	352	ASP	5.9
1	B	350	THR	5.9
1	B	348	VAL	5.9
1	A	470	HIS	5.9
1	A	506	ILE	5.7
1	B	300	PHE	5.7
1	A	389	GLU	5.2
1	B	619	ARG	4.7
1	A	488	PRO	4.5
1	A	390	SER	4.5
1	A	386	LYS	4.5
1	A	486	LYS	4.4
1	B	351	LYS	4.4
1	A	391	THR	4.3
1	B	479	LEU	4.2
1	A	503	GLU	4.2
1	B	564	LEU	4.2
1	A	469	LYS	4.2
1	B	677	VAL	4.1

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Mol	Chain	Res	Type	RSRZ
1	B	567	VAL	4.0
1	A	511	LYS	4.0
1	A	553	TRP	4.0
1	A	382	GLU	3.9
1	A	612	LYS	3.9
1	B	321	THR	3.9
1	A	351	LYS	3.8
1	A	384	VAL	3.8
1	B	667	ARG	3.8
1	A	385	ASN	3.8
1	A	479	LEU	3.7
1	B	566	ALA	3.7
1	A	551	PHE	3.7
1	A	490	GLY	3.6
1	A	321	THR	3.5
1	B	446	VAL	3.5
1	B	541	VAL	3.5
1	A	676	TRP	3.5
1	B	442	ILE	3.4
1	A	508	GLN	3.4
1	B	318	LEU	3.3
1	A	356	PRO	3.2
1	A	567	VAL	3.2
1	A	677	VAL	3.2
1	B	676	TRP	3.2
1	B	352	ASP	3.2
1	A	714	HIS	3.2
1	A	541	VAL	3.1
1	A	507	GLN	3.1
1	A	712	ASN	3.1
1	A	376	ALA	3.1
1	A	556	ASP	3.1
1	A	679	ILE	3.0
1	B	329	HIS	3.0
1	B	680	VAL	3.0
1	A	354	LEU	3.0
1	A	485	TYR	3.0
1	A	499	VAL	3.0
1	A	517	PHE	3.0
1	B	480	ILE	3.0
1	A	350	THR	2.9
1	B	349	ALA	2.9

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Mol	Chain	Res	Type	RSRZ
1	B	718	GLY	2.9
1	B	299	ARG	2.9
1	B	588	TYR	2.9
1	B	389	GLU	2.8
1	B	679	ILE	2.8
1	B	591	THR	2.8
1	B	443	CYS	2.8
1	B	678	TRP	2.8
1	B	620	LYS	2.8
1	A	394	TYR	2.8
1	A	487	GLN	2.8
1	A	667	ARG	2.8
1	A	536	ILE	2.7
1	A	381	LEU	2.7
1	A	493	LEU	2.7
1	B	565	PRO	2.7
1	A	550	LYS	2.7
1	A	682	PRO	2.7
1	A	680	VAL	2.7
1	A	373	GLY	2.7
1	A	557	LEU	2.7
1	B	474	VAL	2.6
1	B	611	ALA	2.6
1	B	542	LEU	2.6
1	A	537	PRO	2.6
1	A	608	GLU	2.6
1	A	380	ARG	2.6
1	A	706	TYR	2.6
1	A	492	THR	2.5
1	B	568	SER	2.5
1	A	519	VAL	2.5
1	B	593	ILE	2.5
1	B	617	ASP	2.5
1	A	611	ALA	2.5
1	B	416	VAL	2.5
1	B	589	MET	2.5
1	A	299	ARG	2.5
1	B	392	SER	2.5
1	A	520	LEU	2.5
1	A	530	ASP	2.5
1	A	442	ILE	2.5
1	A	446	VAL	2.4

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Mol	Chain	Res	Type	RSRZ
1	A	315	THR	2.4
1	A	678	TRP	2.4
1	A	582	CYS	2.4
1	A	552	ASP	2.4
1	B	550	LYS	2.4
1	A	378	MET	2.4
1	B	353	GLN	2.4
1	A	393	THR	2.3
1	A	620	LYS	2.3
1	A	379	ASP	2.3
1	A	533	LEU	2.3
1	A	685	GLY	2.3
1	B	590	GLY	2.3
1	A	300	PHE	2.3
1	B	583	PRO	2.3
1	B	715	VAL	2.3
1	A	372	PHE	2.3
1	A	467	ASP	2.3
1	A	554	PHE	2.3
1	B	562	TYR	2.2
1	A	491	SER	2.2
1	B	682	PRO	2.2
1	B	681	PRO	2.2
1	B	439	PHE	2.2
1	A	535	GLN	2.2
1	A	711	TRP	2.2
1	B	310	VAL	2.2
1	B	335	ILE	2.1
1	A	423	LYS	2.1
1	A	686	SER	2.1
1	A	318	LEU	2.1
1	A	558	GLY	2.1
1	A	566	ALA	2.1
1	A	482	TYR	2.1
1	B	322	LEU	2.1
1	A	484	GLY	2.1
1	A	480	ILE	2.0
1	A	542	LEU	2.0
1	A	568	SER	2.0
1	A	643	SER	2.0
1	B	540	LEU	2.0
1	A	416	VAL	2.0

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Mol	Chain	Res	Type	RSRZ
1	B	386	LYS	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
5	ACT	A	860	4/4	0.96	0.23	7.11	54,55,56,56	0
4	JI4	A	800	27/27	0.93	0.19	0.60	34,39,65,67	0
4	JI4	B	800	27/27	0.94	0.22	0.55	33,36,57,59	0
3	H4B	B	761	17/17	0.96	0.21	0.48	26,30,34,36	0
2	HEM	A	750	43/43	0.97	0.17	0.37	29,31,43,45	0
2	HEM	B	750	43/43	0.97	0.17	0.19	26,30,44,48	0
5	ACT	B	861	4/4	0.96	0.13	0.13	51,52,52,52	0
3	H4B	A	760	17/17	0.96	0.16	-0.27	29,32,37,39	0
6	ZN	A	900	1/1	0.99	0.11	-0.87	36,36,36,36	0

6.5 Other polymers [i](#)

There are no such residues in this entry.