Full wwPDB X-ray Structure Validation Report (i)

Feb 19, 2016 – 10:53 PM GMT

PDB ID	:	5E29
Title	:	Crystal Structure of Deoxygenated Hemoglobin in Complex with an Allosteric Effector and Nitric Oxide
Authors	:	Safo, M.K.; Deshpande, T.M.
Deposited on	:	2015-09-30
Resolution	:	1.85 Å(reported)

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

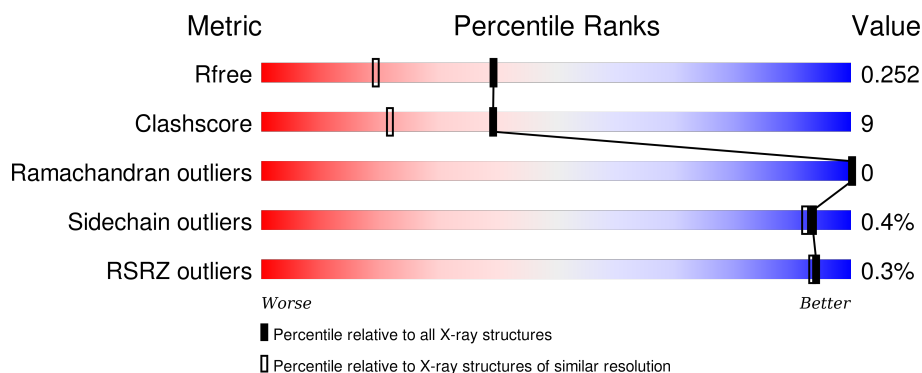|		
MolProbity	:	4.02b-467
Mogul	:	1.7.1 (RC1), CSD as537be (2016)
Xtriage (Phenix)	:	1.9-1692
EDS	:	rb-20026982
Percentile statistics	:	20151230.v01 (using entries in the PDB archive December 30th 2015)
Refmac	:	5.8.0135
CCP4	:	6.5.0
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	rb-20026982

1 Overall quality at a glance (i)

The following experimental techniques were used to determine the structure:
X-RAY DIFFRACTION

The reported resolution of this entry is 1.85 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.

Metric	Percentile Ranks	Value
Rfree		0.252
Clashscore		9
Ramachandran outliers		0
Sidechain outliers		0.4%
RSRZ outliers		0.3%

Worse　　　　　　　　　　　　　　　*Better*

■ Percentile relative to all X-ray structures

▯ Percentile relative to X-ray structures of similar resolution

Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	91344	1745 (1.86-1.86)
Clashscore	102246	1898 (1.86-1.86)
Ramachandran outliers	100387	1875 (1.86-1.86)
Sidechain outliers	100360	1875 (1.86-1.86)
RSRZ outliers	91569	1747 (1.86-1.86)

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 <=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	141	90% ⋯ 10%
1	C	141	86% ⋯ 14%
2	B	145	% · 75% ⋯ 24% ·
2	D	145	% · 86% ⋯ 14%

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	5JN	A	203[A]	-	-	-	X
6	RQ3	A	204	-	-	-	X
6	RQ3	B	202[B]	-	-	-	X

2 Entry composition (i)

There are 9 unique types of molecules in this entry. The entry contains 5613 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 Hemoglobin subunit alpha.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	141	Total	C	N	O	S	0	0	0
			1069	685	187	194	3			
1	C	141	Total	C	N	O	S	0	0	0
			1069	685	187	194	3			

- Molecule 2 is a protein called Hemoglobin subunit beta.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	145	Total	C	N	O	S	0	0	0
			1116	719	194	200	3			
2	D	145	Total	C	N	O	S	0	0	0
			1116	719	194	200	3			

- Molecule 3 is NITRIC OXIDE (three-letter code: NO) (formula: NO).
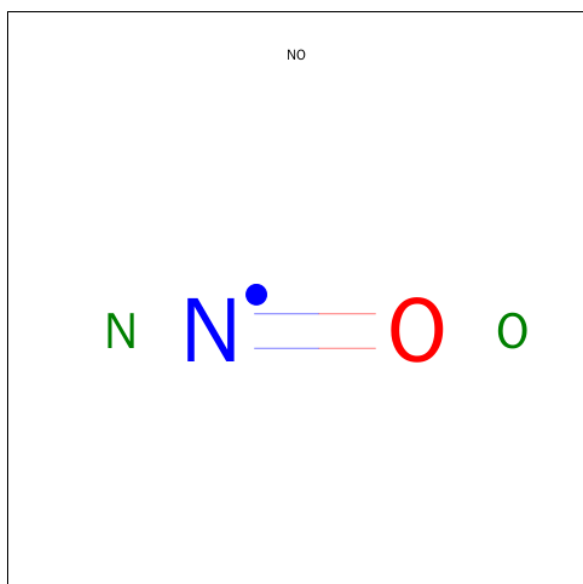
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	A	1	Total	N	O	0	0
			2	1	1		
3	C	1	Total	N	O	0	0
			2	1	1		

- Molecule 4 is PROTOPORPHYRIN IX CONTAINING FE (three-letter code: HEM) (formula: $C_{34}H_{32}FeN_4O_4$).
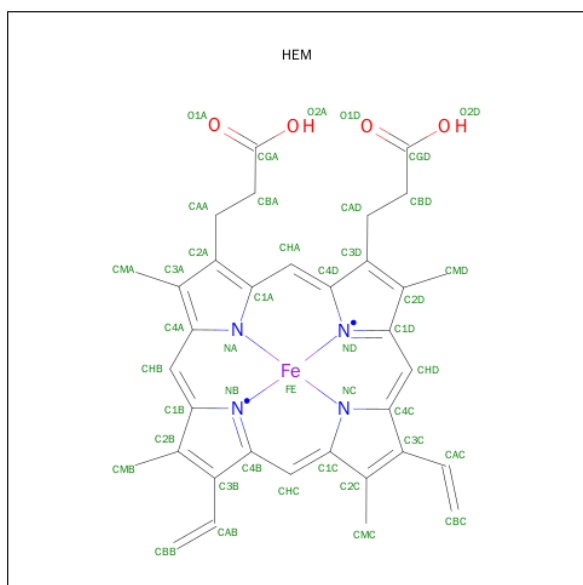
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
4	A	1	Total	C	Fe	N	O	0	0
			43	34	1	4	4		
4	B	1	Total	C	Fe	N	O	0	0
			43	34	1	4	4		
4	C	1	Total	C	Fe	N	O	0	0
			43	34	1	4	4		
4	D	1	Total	C	Fe	N	O	0	0
			43	34	1	4	4		

- Molecule 5 is 2-(nitrooxy)ethyl 2-(4-{2-[(3,5-dimethylphenyl)amino]-2-oxoethyl}phenoxy)-2 -methylpropanoate (three-letter code: 5JN) (formula: $C_{22}H_{26}N_2O_7$).
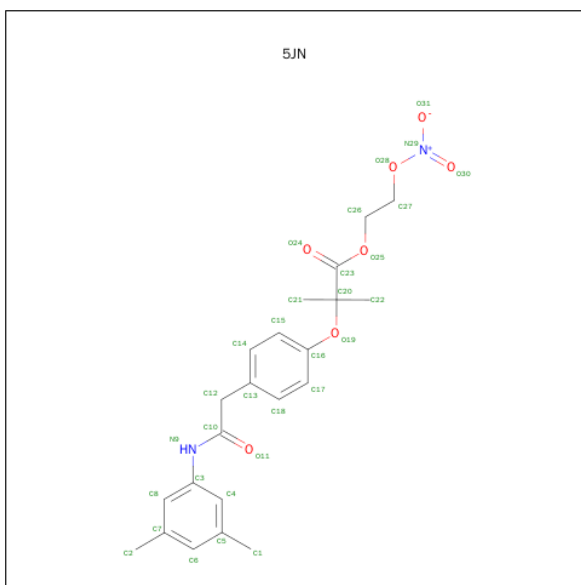
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
5	A	1	Total 31	C 22	N 2	O 7	0	1

- Molecule 6 is 2-{4-[(3,5-DIMETHYLANILINO)-CARBONYL-METHYL]-PHENOXY}-2-M ETHYLPROPIONIC ACID (three-letter code: RQ3) (formula: $C_{20}H_{23}NO_4$).
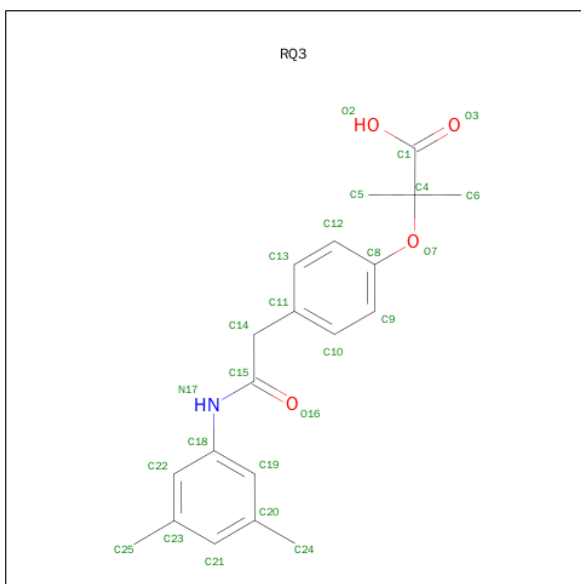
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
6	A	1	Total 25	C 20	N 1	O 4	0	0
6	B	1	Total 25	C 20	N 1	O 4	0	1

- Molecule 7 is NITRATE ION (three-letter code: NO3) (formula: NO_3).
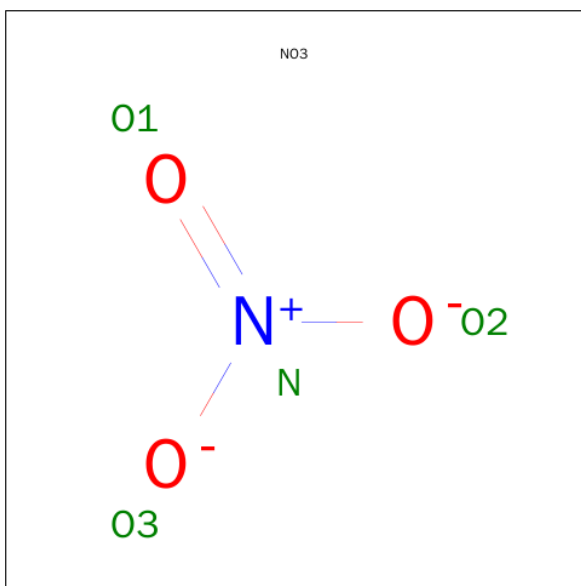
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
7	B	1	Total 4	N 1	O 3		0	0
7	D	1	Total 4	N 1	O 3		0	0

- Molecule 8 is CACODYLATE ION (three-letter code: CAC) (formula: $C_2H_6AsO_2$).
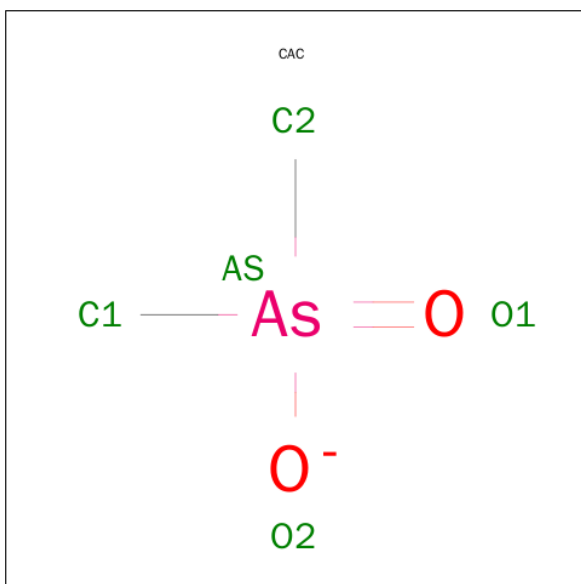
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
8	D	1	Total 5	As 1	C 2	O 2	0	0

- Molecule 9 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
9	A	221	Total 221	O 221	0	0
9	B	220	Total 220	O 220	0	0
9	C	262	Total 262	O 262	0	0
9	D	270	Total 270	O 270	0	0

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: Hemoglobin subunit alpha

Chain A:
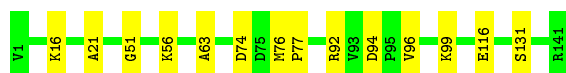
- Molecule 1: Hemoglobin subunit alpha

Chain C:

- Molecule 2: Hemoglobin subunit beta

Chain B:

- Molecule 2: Hemoglobin subunit beta

Chain D:
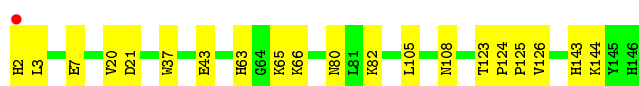
4　Data and refinement statistics (i)

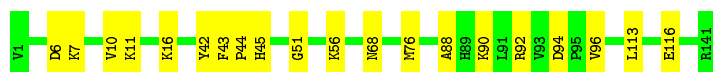| Property	Value	Source
Space group	P 21 21 2	Depositor
Cell constants a, b, c, α, β, γ	95.88Å　　98.42Å　　65.44Å 90.00°　　90.00°　　90.00°	Depositor
Resolution (Å)	29.54　–　1.85 29.54　–　1.85	Depositor EDS
% Data completeness (in resolution range)	98.1 (29.54-1.85) 98.2 (29.54-1.85)	Depositor EDS
R_{merge}	0.08	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	3.96 (at 1.85Å)	Xtriage
Refinement program	CNS	Depositor
R, R_{free}	0.198　,　0.253 0.197　,　0.252	Depositor DCC
R_{free} test set	2669 reflections (5.34%)	DCC
Wilson B-factor (Å^2)	18.5	Xtriage
Anisotropy	0.150	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.30 , 60.4	EDS
Estimated twinning fraction	0.045 for k,h,-l	Xtriage
L-test for twinning[2]	$< |L| > = 0.38, < L^2 > = 0.21$	Xtriage
Outliers	0 of 52628 reflections	Xtriage
F_o,F_c correlation	0.95	EDS
Total number of atoms	5613	wwPDB-VP
Average B, all atoms (Å^2)	25.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 6.51% of the height of the origin peak. No significant pseudotranslation is detected.*

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[1]Intensities estimated from amplitudes.

[2]Theoretical values of $< |L| >$, $< L^2 >$ 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: RQ3, NO, 5JN, CAC, HEM, NO3

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	0.39	0/1097	0.56	0/1491
1	C	0.42	0/1097	0.59	0/1491
2	B	0.40	0/1146	0.57	0/1556
2	D	0.44	0/1146	0.59	0/1556
All	All	0.41	0/4486	0.58	0/6094

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 (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	1069	0	1073	11	0
1	C	1069	0	1073	18	0
2	B	1116	0	1106	36	0
2	D	1116	0	1106	18	0
3	A	2	0	0	0	0
3	C	2	0	0	0	0
4	A	43	0	30	0	0
4	B	43	0	30	3	0
4	C	43	0	30	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
4	D	43	0	30	2	0
5	A	31	0	19	2	0
6	A	25	0	22	0	0
6	B	25	0	17	1	0
7	B	4	0	0	1	0
7	D	4	0	0	0	0
8	D	5	0	0	1	0
9	A	221	0	0	2	0
9	B	220	0	0	11	0
9	C	262	0	0	8	0
9	D	270	0	0	8	0
All	All	5613	0	4536	82	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 9.

All (82) 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)
2:B:13:ALA:HB3	9:B:301:HOH:O	1.58	1.03
1:C:56:LYS:HE2	9:C:476:HOH:O	1.82	0.79
2:B:143:HIS:HD2	2:B:144:LYS:NZ	1.82	0.76
2:B:43:GLU:HG3	9:B:305:HOH:O	1.88	0.74
2:B:97:HIS:NE2	7:B:203:NO3:O2	2.21	0.74
1:C:7:LYS:O	1:C:11:LYS:HG3	1.90	0.72
1:C:113:LEU:HB3	1:C:116:GLU:HG2	1.73	0.71
2:D:66:LYS:HD3	4:D:201:HEM:HAA2	1.73	0.69
1:C:16:LYS:HD3	9:C:523:HOH:O	1.94	0.67
2:D:65:LYS:HE2	9:D:478:HOH:O	1.96	0.65
2:B:37:TRP:HB2	1:C:92:ARG:HB3	1.80	0.63
1:C:96:VAL:HB	9:C:420:HOH:O	1.98	0.62
2:D:2:HIS:CD2	2:D:3:LEU:H	2.16	0.62
1:C:6:ASP:O	1:C:10:VAL:HG13	2.01	0.61
2:B:10:ALA:HA	9:B:301:HOH:O	2.01	0.61
1:C:90:LYS:HG2	9:C:504:HOH:O	2.01	0.60
2:D:143:HIS:HD2	2:D:144:LYS:NZ	2.03	0.57
1:A:74:ASP:HB2	9:A:401:HOH:O	2.04	0.57
2:B:6:GLU:CD	2:B:6:GLU:H	2.06	0.57
2:B:19:ASN:HD22	2:B:19:ASN:C	2.08	0.57
2:D:2:HIS:HD2	2:D:3:LEU:H	1.52	0.56
2:B:143:HIS:HD2	2:B:144:LYS:HZ2	1.52	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:D:63:HIS:CE1	4:D:201:HEM:HBD2	2.42	0.55
2:B:6:GLU:HG3	9:B:422:HOH:O	2.07	0.55
2:B:80:ASN:ND2	2:B:83:GLY:H	2.05	0.54
2:B:75:LEU:HD21	2:B:133:VAL:HG11	1.88	0.54
2:B:53:ALA:O	2:B:57:ASN:HB2	2.08	0.53
2:D:123:THR:OG1	2:D:126:VAL:HG23	2.08	0.53
2:B:143:HIS:HD2	2:B:144:LYS:HZ1	1.55	0.53
1:A:16:LYS:HE3	1:A:116:GLU:OE2	2.08	0.53
2:D:80:ASN:HB2	9:D:433:HOH:O	2.08	0.53
2:D:3:LEU:HD22	2:D:7:GLU:HB3	1.91	0.53
1:C:42:TYR:C	1:C:44:PRO:HD3	2.28	0.52
2:B:117:HIS:HE1	9:B:342:HOH:O	1.93	0.52
2:B:120:LYS:HG3	9:B:451:HOH:O	2.13	0.49
2:B:143:HIS:CD2	2:B:144:LYS:NZ	2.71	0.49
2:B:143:HIS:CD2	2:B:144:LYS:HZ2	2.29	0.49
1:C:51:GLY:O	1:C:56:LYS:HE3	2.12	0.49
1:C:45:HIS:HB2	9:C:501:HOH:O	2.13	0.49
8:D:202:CAC:AS	9:D:310:HOH:O	2.90	0.49
1:A:131:SER:HA	5:A:203[A]:5JN:O30	2.13	0.48
1:C:88:ALA:HB2	9:C:389:HOH:O	2.12	0.48
2:D:82:LYS:HG2	9:D:424:HOH:O	2.13	0.48
2:B:66:LYS:HD3	4:B:201:HEM:HAA2	1.95	0.48
1:A:16:LYS:HG2	1:A:116:GLU:OE2	2.13	0.48
1:A:116:GLU:N	1:A:116:GLU:OE1	2.44	0.48
1:C:43:PHE:N	1:C:44:PRO:HD3	2.27	0.48
1:A:99:LYS:NZ	9:A:307:HOH:O	2.46	0.48
2:D:2:HIS:CD2	2:D:3:LEU:N	2.81	0.47
2:B:82:LYS:HE3	9:B:337:HOH:O	2.13	0.47
2:D:124:PRO:HB2	2:D:125:PRO:HD3	1.96	0.47
2:B:92:HIS:HA	2:B:96:LEU:HB2	1.97	0.47
2:B:101:GLU:HG2	1:C:94:ASP:OD2	2.15	0.46
1:A:21:ALA:HB1	1:A:63:ALA:HB1	1.97	0.46
1:A:76:MET:N	1:A:77:PRO:CD	2.79	0.46
2:B:43:GLU:HG2	9:B:365:HOH:O	2.15	0.46
1:A:94:ASP:OD2	1:A:96:VAL:HG22	2.17	0.45
1:A:51:GLY:O	1:A:56:LYS:HE3	2.17	0.45
1:C:94:ASP:OD2	1:C:96:VAL:HG13	2.16	0.44
2:B:80:ASN:HD21	2:B:83:GLY:H	1.66	0.43
2:B:104:ARG:HH22	2:B:139:ASN:ND2	2.16	0.43
2:B:15:TRP:CD2	2:B:75:LEU:HD12	2.54	0.42
2:B:77:HIS:N	2:B:77:HIS:CD2	2.86	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:143:HIS:CD2	2:B:144:LYS:HZ1	2.37	0.42
1:C:68:ASN:HB3	9:C:334:HOH:O	2.19	0.42
5:A:203[A]:5JN:H24	9:B:424:HOH:O	2.20	0.42
9:B:396:HOH:O	1:C:45:HIS:HD2	2.03	0.41
2:D:20:VAL:HG12	9:D:379:HOH:O	2.19	0.41
2:B:5:PRO:HD2	2:B:6:GLU:OE2	2.20	0.41
1:A:92:ARG:HB3	2:D:37:TRP:HB2	2.03	0.41
1:C:76:MET:HE3	9:C:407:HOH:O	2.21	0.41
2:D:21:ASP:HB3	2:D:65:LYS:HE3	2.02	0.41
2:B:124:PRO:HB2	2:B:125:PRO:HD3	2.02	0.41
2:B:37:TRP:CZ3	6:B:202[B]:RQ3:H61	2.55	0.41
2:D:105:LEU:HA	9:D:303:HOH:O	2.21	0.41
2:B:25:GLY:HA3	9:B:378:HOH:O	2.20	0.41
2:B:99:ASP:HA	2:B:100:PRO:HD3	1.94	0.41
2:D:108:ASN:ND2	9:D:303:HOH:O	2.37	0.40
2:D:43:GLU:HB2	9:D:418:HOH:O	2.20	0.40
2:B:45:PHE:HA	2:B:59:LYS:HD2	2.03	0.40
2:B:67:VAL:HG13	4:B:201:HEM:C2B	2.55	0.40
2:B:67:VAL:HG13	4:B:201:HEM:C1B	2.56	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	139/141 (99%)	134 (96%)	5 (4%)	0	100	100
1	C	139/141 (99%)	135 (97%)	4 (3%)	0	100	100
2	B	143/145 (99%)	138 (96%)	5 (4%)	0	100	100
2	D	143/145 (99%)	140 (98%)	3 (2%)	0	100	100
All	All	564/572 (99%)	547 (97%)	17 (3%)	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	113/113 (100%)	113 (100%)	0	100	100
1	C	113/113 (100%)	113 (100%)	0	100	100
2	B	117/117 (100%)	115 (98%)	2 (2%)	68	54
2	D	117/117 (100%)	117 (100%)	0	100	100
All	All	460/460 (100%)	458 (100%)	2 (0%)	93	92

All (2) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	B	2	HIS
2	B	19	ASN

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (14) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	9	ASN
1	A	87	HIS
2	B	19	ASN
2	B	63	HIS
2	B	77	HIS
2	B	80	ASN
2	B	117	HIS
2	B	139	ASN
2	B	143	HIS
1	C	20	HIS
2	D	2	HIS
2	D	77	HIS
2	D	80	ASN
2	D	143	HIS

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)

12 ligands are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the chemical component dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	#$|Z| > 2$	Counts	RMSZ	#$|Z| > 2$
3	NO	A	201	4	0,1,1	0.00	-	0,0,0	0.00	-
4	HEM	A	202	3	24,50,50	1.77	7 (29%)	16,82,82	1.06	1 (6%)
5	5JN	A	203[A]	-	29,32,32	1.93	13 (44%)	38,44,44	1.23	2 (5%)
6	RQ3	A	204	-	23,26,26	3.02	10 (43%)	33,37,37	1.58	7 (21%)
4	HEM	B	201	2	24,50,50	1.62	6 (25%)	16,82,82	1.42	1 (6%)
6	RQ3	B	202[B]	-	23,26,26	2.26	11 (47%)	33,37,37	1.36	2 (6%)
7	NO3	B	203	-	1,3,3	6.28	1 (100%)	0,3,3	0.00	-
3	NO	C	201	4	0,1,1	0.00	-	0,0,0	0.00	-
4	HEM	C	202	3	24,50,50	1.41	5 (20%)	16,82,82	1.03	1 (6%)
4	HEM	D	201	2	24,50,50	1.77	6 (25%)	16,82,82	1.22	2 (12%)
8	CAC	D	202	-	0,4,4	0.00	-	0,6,6	0.00	-
7	NO3	D	203	-	1,3,3	6.27	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
3	NO	A	201	4	-	0/0/0/0	0/0/0/0
4	HEM	A	202	3	-	0/6/54/54	0/0/8/8
5	5JN	A	203[A]	-	-	0/25/26/26	0/2/2/2
6	RQ3	A	204	-	-	0/13/19/19	0/2/2/2
4	HEM	B	201	2	-	0/6/54/54	0/0/8/8
6	RQ3	B	202[B]	-	-	0/13/19/19	0/2/2/2
7	NO3	B	203	-	-	0/0/0/0	0/0/0/0
3	NO	C	201	4	-	0/0/0/0	0/0/0/0
4	HEM	C	202	3	-	0/6/54/54	0/0/8/8
4	HEM	D	201	2	-	0/6/54/54	0/0/8/8
8	CAC	D	202	-	-	0/0/0/0	0/0/0/0
7	NO3	D	203	-	-	0/0/0/0	0/0/0/0

All (60) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	A	202	HEM	C3C-CAC	-4.16	1.38	1.47
6	A	204	RQ3	C14-C15	-3.92	1.42	1.51
6	A	204	RQ3	C14-C11	-3.78	1.45	1.51
4	A	202	HEM	C3B-CAB	-3.57	1.40	1.47
5	A	203[A]	5JN	C12-C10	-3.49	1.43	1.51
4	B	201	HEM	C3B-C2B	-3.34	1.36	1.40
4	B	201	HEM	C3B-CAB	-3.31	1.40	1.47
4	D	201	HEM	C3B-C2B	-3.29	1.36	1.40
6	B	202[B]	RQ3	C14-C15	-3.25	1.43	1.51
4	D	201	HEM	C3B-CAB	-3.24	1.40	1.47
4	D	201	HEM	C3C-CAC	-3.07	1.41	1.47
4	A	202	HEM	C3C-C2C	-3.03	1.36	1.40
4	C	202	HEM	C3B-CAB	-2.97	1.41	1.47
4	C	202	HEM	C3C-CAC	-2.96	1.41	1.47
4	C	202	HEM	C3C-C2C	-2.75	1.36	1.40
4	B	201	HEM	C3C-CAC	-2.74	1.41	1.47
5	A	203[A]	5JN	C10-N9	-2.28	1.30	1.35
5	A	203[A]	5JN	C3-N9	-2.10	1.37	1.41
5	A	203[A]	5JN	C18-C13	2.01	1.43	1.38
5	A	203[A]	5JN	C6-C5	2.05	1.42	1.39
4	A	202	HEM	CBC-CAC	2.06	1.44	1.28
4	D	201	HEM	CBC-CAC	2.08	1.44	1.28
4	C	202	HEM	CBB-CAB	2.09	1.44	1.28
5	A	203[A]	5JN	C8-C7	2.12	1.42	1.39
4	C	202	HEM	CAD-C3D	2.14	1.55	1.52

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
6	B	202[B]	RQ3	C19-C18	2.14	1.43	1.39
4	A	202	HEM	CMA-C3A	2.14	1.56	1.51
4	B	201	HEM	CBC-CAC	2.15	1.44	1.28
6	B	202[B]	RQ3	C12-C8	2.17	1.43	1.38
4	A	202	HEM	CBB-CAB	2.20	1.45	1.28
5	A	203[A]	5JN	C4-C5	2.25	1.43	1.39
4	A	202	HEM	C1B-NB	2.25	1.39	1.36
6	B	202[B]	RQ3	C22-C23	2.27	1.43	1.39
5	A	203[A]	5JN	C4-C3	2.30	1.43	1.39
4	B	201	HEM	C1B-NB	2.30	1.39	1.36
6	B	202[B]	RQ3	C13-C12	2.31	1.43	1.38
5	A	203[A]	5JN	C17-C16	2.31	1.43	1.38
6	A	204	RQ3	C6-C4	2.31	1.57	1.52
6	B	202[B]	RQ3	C14-C11	2.50	1.55	1.51
5	A	203[A]	5JN	O19-C20	2.56	1.48	1.45
6	A	204	RQ3	C21-C23	2.62	1.43	1.39
5	A	203[A]	5JN	C8-C3	2.63	1.43	1.39
5	A	203[A]	5JN	C15-C16	2.69	1.44	1.38
6	B	202[B]	RQ3	C9-C8	2.74	1.44	1.38
6	B	202[B]	RQ3	C19-C20	2.83	1.44	1.39
6	B	202[B]	RQ3	C22-C18	2.98	1.44	1.39
4	B	201	HEM	C1C-NC	3.01	1.40	1.36
4	D	201	HEM	C1B-NB	3.02	1.40	1.36
6	A	204	RQ3	C21-C20	3.24	1.44	1.39
6	A	204	RQ3	C10-C9	3.34	1.45	1.38
6	B	202[B]	RQ3	O7-C4	3.35	1.49	1.45
4	D	201	HEM	C4C-NC	3.47	1.41	1.36
6	A	204	RQ3	O7-C4	3.85	1.50	1.45
5	A	203[A]	5JN	C15-C14	4.00	1.46	1.38
6	A	204	RQ3	C22-C18	4.69	1.47	1.39
6	B	202[B]	RQ3	C10-C9	4.71	1.48	1.38
6	A	204	RQ3	C9-C8	4.86	1.48	1.38
7	D	203	NO3	O1-N	6.27	1.40	1.23
7	B	203	NO3	O1-N	6.28	1.40	1.23
6	A	204	RQ3	C13-C11	8.40	1.57	1.38

All (16) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	B	201	HEM	CBA-CAA-C2A	-3.18	106.90	112.49
6	B	202[B]	RQ3	C5-C4-C1	-2.54	106.51	111.70
6	A	204	RQ3	C5-C4-C1	-2.49	106.62	111.70

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
6	A	204	RQ3	C14-C11-C13	-2.32	117.44	120.88
6	A	204	RQ3	C6-C4-C5	-2.24	106.55	110.28
4	D	201	HEM	CMA-C3A-C4A	-2.21	124.55	128.31
4	A	202	HEM	CBD-CAD-C3D	-2.19	108.62	112.47
6	A	204	RQ3	C9-C10-C11	-2.06	118.12	121.02
4	D	201	HEM	CMA-C3A-C2A	2.02	129.45	125.24
6	A	204	RQ3	C18-N17-C15	2.02	131.37	127.49
6	A	204	RQ3	C21-C20-C19	2.09	120.75	118.09
4	C	202	HEM	CMB-C2B-C3B	2.21	129.42	125.09
5	A	203[A]	5JN	O25-C23-C20	3.02	117.11	111.54
5	A	203[A]	5JN	C20-O19-C16	4.52	128.87	121.11
6	B	202[B]	RQ3	C4-O7-C8	5.16	129.97	121.11
6	A	204	RQ3	C4-O7-C8	5.66	130.84	121.11

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

6 monomers are involved in 10 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	A	203[A]	5JN	2	0
4	B	201	HEM	3	0
6	B	202[B]	RQ3	1	0
7	B	203	NO3	1	0
4	D	201	HEM	2	0
8	D	202	CAC	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 (i)

6.1 Protein, DNA and RNA chains (i)

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	141/141 (100%)	-0.52	0	100	100	13, 21, 32, 40	0
1	C	141/141 (100%)	-0.63	0	100	100	12, 19, 28, 39	0
2	B	145/145 (100%)	-0.32	1 (0%)	89	88	15, 25, 41, 60	0
2	D	145/145 (100%)	-0.50	1 (0%)	89	88	12, 19, 34, 60	0
All	All	572/572 (100%)	-0.49	2 (0%)	94	93	12, 21, 35, 60	0

All (2) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	D	2	HIS	3.9
2	B	2	HIS	2.2

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.

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	LLDF	B-factors(Å^2)	Q<0.9
6	RQ3	A	204	25/25	0.80	0.24	10.02	31,40,47,50	25
5	5JN	A	203[A]	31/31	0.75	0.28	8.68	31,34,41,48	31
6	RQ3	B	202[B]	25/25	0.74	0.27	8.40	29,33,40,47	25
3	NO	A	201	2/2	0.99	0.09	0.75	17,17,17,19	0
4	HEM	D	201	43/43	0.98	0.08	-0.30	10,15,22,25	0
4	HEM	A	202	43/43	0.98	0.07	-0.53	7,18,29,39	0
4	HEM	C	202	43/43	0.98	0.07	-0.58	10,16,37,44	0
4	HEM	B	201	43/43	0.97	0.08	-0.75	15,25,42,44	0
7	NO3	D	203	4/4	0.90	0.15	-	25,41,49,49	0
8	CAC	D	202	5/5	0.86	0.14	-	93,93,95,100	0
7	NO3	B	203	4/4	0.89	0.19	-	45,46,53,59	0
3	NO	C	201	2/2	1.00	0.04	-	17,17,17,19	0

6.5 Other polymers (i)

There are no such residues in this entry.