



Full wwPDB X-ray Structure Validation Report

Feb 26, 2014 – 05:09 PM GMT

PDB ID : 3V6Q
Title : Crystal structure of the complex of bovine lactoperoxidase with Carbon monoxide at 2.0 Å resolution
Authors : Yamini, S.; Singh, A.K.; Pandey, N.; Sinha, M.; Kaur, P.; Sharma, S.; Singh, T.P.
Deposited on : 2011-12-20
Resolution : 2.00 Å(reported)

This is a full wwPDB 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/ValidationPDFNotes.html>

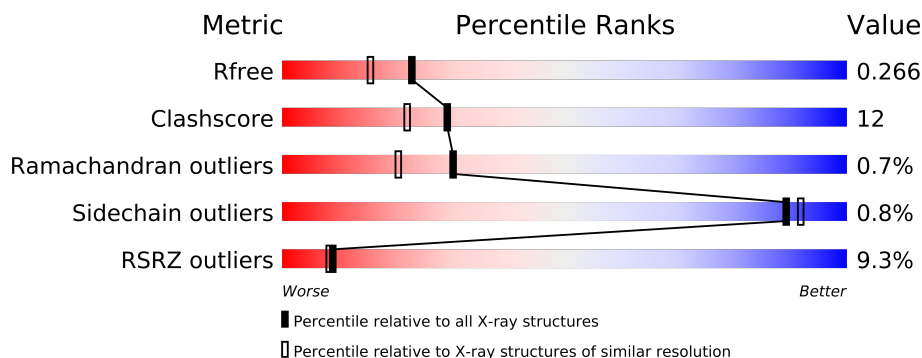
The following versions of software and data (see [references](#)) were used in the production of this report:

MolProbity : 4.02b-467
Mogul : 1.15 2013
Xtriage (Phenix) : dev-1323
EDS : stable22639
Percentile statistics : 21963
Refmac : 5.8.0049
CCP4 : 6.3.0 (Settle)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et. al. (1996)
Validation Pipeline (wwPDB-VP) : stable22683

1 Overall quality at a glance

The reported resolution of this entry is 2.00 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}	66092	4888 (2.00-2.00)
Clashscore	79885	6188 (2.00-2.00)
Ramachandran outliers	78287	6102 (2.00-2.00)
Sidechain outliers	78261	6100 (2.00-2.00)
RSRZ outliers	66119	4890 (2.00-2.00)

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. The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density.

Mol	Chain	Length	Quality of chain
1	A	595	

The following table lists non-polymeric compounds that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Geometry	Electron density
4	NAG	A	606	-	X
6	IOD	A	614	-	X
6	IOD	A	615	-	X
8	MPD	A	617	-	X
9	EDO	A	618	-	X
9	EDO	A	619	-	X

2 Entry composition i

There are 12 unique types of molecules in this entry. The entry contains 5417 atoms, of which 0 are hydrogen and 0 are deuterium.

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 Lactoperoxidase.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
1	A	595	Total	C	N	O	P	S	0	0	0
			4774	3037	847	863	1	26			

- 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		

- Molecule 3 is CALCIUM ION (three-letter code: CA) (formula: Ca).

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

- Molecule 4 is SUGAR (N-ACETYL-D-GLUCOSAMINE) (three-letter code: NAG) (formula: $C_8H_{15}NO_6$).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
4	A	1	Total	C	N	O	0	0
			14	8	1	5		
4	A	1	Total	C	N	O	0	0
			14	8	1	5		

- Molecule 5 is a polymer of unknown type called SUGAR (2-MER).

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
5	A	2	Total	C	N	O	0	0
			28	16	2	10		

- Molecule 6 is IODIDE ION (three-letter code: IOD) (formula: I).

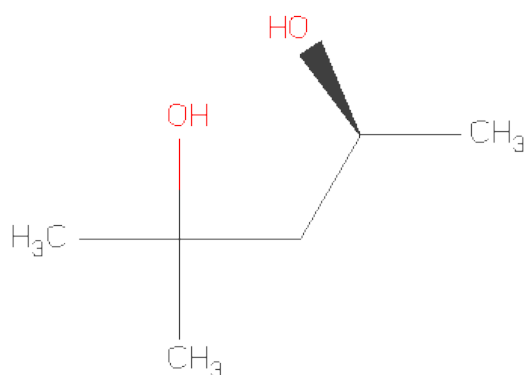
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	A	9	Total	I	0	0
			9	9		

- Molecule 7 is BROMIDE ION (three-letter code: BR) (formula: Br).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
7	A	1	Total	Br	0	0
			1	1		

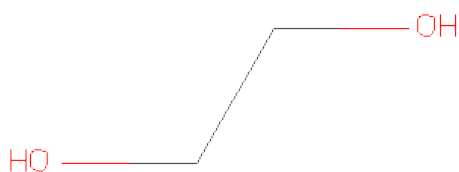
- Molecule 8 is (4S)-2-METHYL-2,4-PENTANEDIOL (three-letter code: MPD) (formula:

C₆H₁₄O₂).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
8	A	1	Total	C	O	0	0
			8	6	2		

- Molecule 9 is 1,2-ETHANEDIOL (three-letter code: EDO) (formula: C₂H₆O₂).



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

- Molecule 10 is THIOCYANATE ION (three-letter code: SCN) (formula: CNS).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
10	A	1	Total	C	N	S	0	0
			3	1	1	1		

- Molecule 11 is CARBON MONOXIDE (three-letter code: CMO) (formula: CO).



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

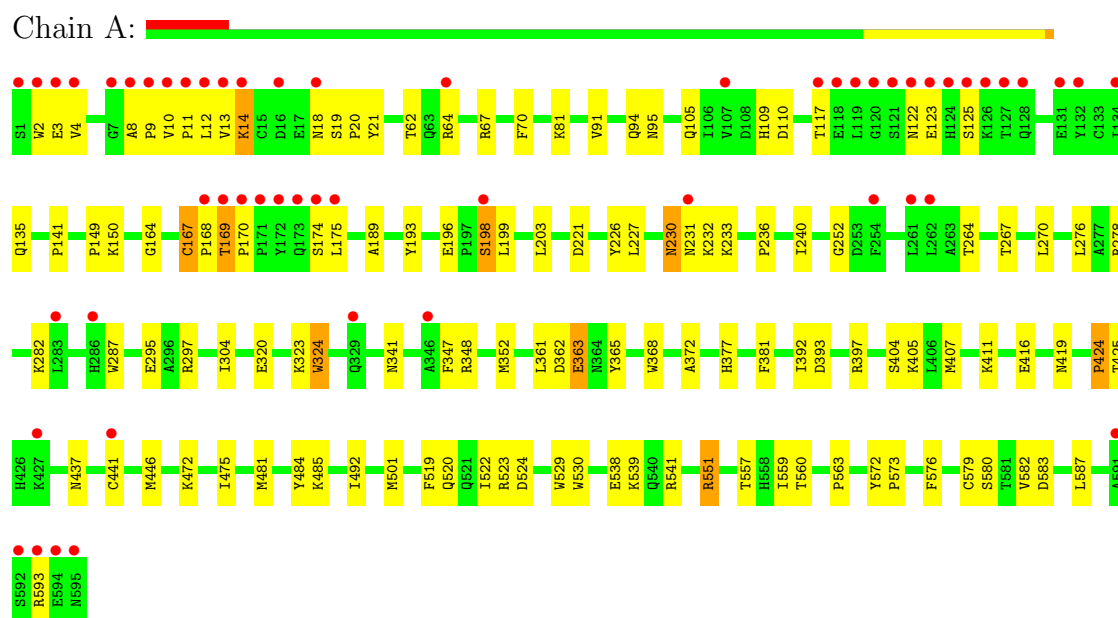
- Molecule 12 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
12	A	512	Total 512	O 512	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 ($\text{RSRZ} > 2$). 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: Lactoperoxidase



4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	54.30Å 80.00Å 76.55Å 90.00° 103.02° 90.00°	Depositor
Resolution (Å)	44.13 – 2.00 44.13 – 2.00	Depositor EDS
% Data completeness (in resolution range)	99.6 (44.13-2.00) 99.6 (44.13-2.00)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	0.05	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.71 (at 2.00Å)	Xtriage
Refinement program	REFMAC 5.5.0109	Depositor
R, R_{free}	0.191 , 0.248 0.227 , 0.266	Depositor DCC
R_{free} test set	2158 reflections (5.32%)	DCC
Wilson B-factor (Å ²)	28.2	Xtriage
Anisotropy	0.620	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.34 , 41.8	EDS
Estimated twinning fraction	No twinning to report.	Xtriage
L-test for twinning	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.34$	Xtriage
Outliers	0 of 42769 reflections	Xtriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	5417	wwPDB-VP
Average B, all atoms (Å ²)	36.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 6.45% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: CMO, MPD, SCN, NAG, SEP, CA, EDO, BR, HEM, IOD

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	1.21	3/4891 (0.1%)	0.97	21/6634 (0.3%)

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	2

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	324	TRP	CB-CG	-5.83	1.39	1.50
1	A	404	SER	CB-OG	5.31	1.49	1.42
1	A	320	GLU	CD-OE1	-5.04	1.20	1.25

All (21) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	481	MET	CB-CA-C	-12.85	84.69	110.40
1	A	174	SER	CB-CA-C	-7.74	95.40	110.10
1	A	231	ASN	CB-CA-C	-7.51	95.37	110.40
1	A	593	ARG	N-CA-C	-7.46	90.85	111.00
1	A	240	ILE	CB-CA-C	7.27	126.14	111.60
1	A	230	ASN	CB-CA-C	7.08	124.55	110.40
1	A	10	VAL	C-N-CD	-6.99	105.23	120.60
1	A	231	ASN	N-CA-C	6.93	129.71	111.00
1	A	2	TRP	N-CA-C	6.88	129.59	111.00
1	A	230	ASN	C-N-CA	6.69	138.41	121.70

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	14	LYS	N-CA-C	6.67	129.00	111.00
1	A	110	ASP	CB-CG-OD1	6.52	124.17	118.30
1	A	81	LYS	CB-CA-C	6.06	122.52	110.40
1	A	67	ARG	NE-CZ-NH1	-5.55	117.53	120.30
1	A	582	VAL	CB-CA-C	5.43	121.71	111.40
1	A	169	THR	CB-CA-C	-5.41	96.99	111.60
1	A	472	LYS	CB-CA-C	5.41	121.21	110.40
1	A	174	SER	N-CA-C	5.33	125.40	111.00
1	A	524	ASP	CB-CG-OD1	5.20	122.98	118.30
1	A	551	ARG	NE-CZ-NH2	-5.12	117.74	120.30
1	A	484	TYR	C-N-CA	-5.02	109.16	121.70

There are no chirality outliers.

All (2) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	198	SEP	Mainchain
1	A	230	ASN	Peptide

5.2 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 hydrogens added by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, and the number in parentheses is this value normalized per 1000 atoms of the molecule in the chain. The Symm-Clashes column gives symmetry related clashes, in the same way as for the Clashes column.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	4774	0	4687	115	0
2	A	43	0	30	3	0
3	A	1	0	0	0	0
4	A	28	0	26	0	0
5	A	28	0	25	0	0
6	A	9	0	0	5	0
7	A	1	0	0	0	0
8	A	8	0	13	4	0
9	A	8	0	12	2	0
10	A	3	0	0	0	0
11	A	2	0	0	2	0
12	A	512	0	0	1	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
All	All	5417	0	4793	119	0

Clashscore is defined as the number of clashes calculated for the entry per 1000 atoms (including hydrogens) of the entry. The overall clashscore for this entry is 12.

All (119) close contacts within the same asymmetric unit are listed below.

Atom-1	Atom-2	Distance(Å)	Clash(Å)
1:A:12:LEU:CB	1:A:13:VAL:HA	1.61	1.28
1:A:12:LEU:HB3	1:A:13:VAL:CA	1.71	1.20
1:A:12:LEU:CB	1:A:13:VAL:CA	2.30	1.06
1:A:227:LEU:HD22	1:A:270:LEU:CD2	1.87	1.03
1:A:167:CYS:CB	1:A:168:PRO:HD2	1.89	1.02
1:A:168:PRO:HB2	1:A:170:PRO:HD2	1.39	1.01
1:A:227:LEU:CD2	1:A:270:LEU:HD22	1.90	1.01
1:A:167:CYS:HB2	1:A:168:PRO:HD2	1.42	0.98
1:A:227:LEU:HD22	1:A:270:LEU:HD22	0.99	0.97
1:A:167:CYS:CB	1:A:168:PRO:CD	2.42	0.96
1:A:12:LEU:HB2	1:A:13:VAL:HB	1.53	0.90
1:A:167:CYS:HB3	1:A:168:PRO:CD	2.01	0.89
1:A:9:PRO:HD3	1:A:167:CYS:O	1.74	0.87
1:A:3:GLU:HB2	1:A:175:LEU:HD22	1.57	0.84
1:A:3:GLU:CD	1:A:4:VAL:H	1.81	0.83
1:A:551:ARG:HD3	1:A:583:ASP:O	1.80	0.82
1:A:12:LEU:HB2	1:A:13:VAL:CB	2.09	0.80
1:A:91:VAL:HG12	1:A:405:LYS:HG3	1.66	0.77
1:A:167:CYS:HB3	1:A:168:PRO:HD3	1.65	0.77
1:A:12:LEU:HB3	1:A:13:VAL:HA	0.79	0.75
1:A:522:ILE:HD12	1:A:522:ILE:C	2.09	0.73
1:A:3:GLU:HB2	1:A:175:LEU:CD2	2.20	0.71
1:A:19:SER:O	1:A:21:TYR:N	2.22	0.70
1:A:236:PRO:HG3	1:A:424:PRO:HB3	1.74	0.70
1:A:227:LEU:HD23	1:A:227:LEU:N	2.07	0.69
1:A:123:GLU:C	1:A:125:SER:H	1.95	0.68
1:A:117:THR:HG22	1:A:164:GLY:HA2	1.75	0.68
1:A:94:GLN:C	1:A:95:ASN:HD22	1.98	0.67
1:A:12:LEU:HB2	1:A:13:VAL:CA	2.24	0.66
2:A:601:HEM:HBC2	2:A:601:HEM:HMC1	1.76	0.65
1:A:362:ASP:OD1	1:A:362:ASP:C	2.35	0.65
1:A:522:ILE:HD12	1:A:523:ARG:N	2.13	0.64
1:A:381:PHE:CZ	1:A:424:PRO:HG3	2.33	0.64
1:A:199:LEU:HA	8:A:617:MPD:HM2	1.81	0.63
1:A:227:LEU:CD2	1:A:270:LEU:CD2	2.64	0.63

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Atom-1	Atom-2	Distance(Å)	Clash(Å)
1:A:169:THR:N	1:A:170:PRO:CD	2.62	0.62
1:A:278:ARG:O	1:A:282:LYS:HG3	1.99	0.62
1:A:169:THR:OG1	1:A:170:PRO:HD3	2.00	0.62
1:A:12:LEU:CB	1:A:13:VAL:CB	2.72	0.61
1:A:580:SER:CB	6:A:615:IOD:I	3.19	0.61
1:A:3:GLU:CG	1:A:4:VAL:N	2.64	0.60
1:A:323:LYS:HE3	1:A:324:TRP:CZ2	2.38	0.59
1:A:368:TRP:O	1:A:372:ALA:HB2	2.03	0.58
1:A:122:ASN:CG	1:A:122:ASN:O	2.42	0.57
1:A:123:GLU:C	1:A:125:SER:N	2.57	0.57
1:A:3:GLU:OE1	1:A:3:GLU:HA	2.05	0.57
1:A:377:HIS:CD2	9:A:618:EDO:H21	2.41	0.56
1:A:530:TRP:CZ3	1:A:541:ARG:HG2	2.41	0.55
1:A:563:PRO:HD3	1:A:576:PHE:CE2	2.42	0.55
1:A:377:HIS:ND1	1:A:416:GLU:OE2	2.35	0.54
1:A:425:THR:O	1:A:425:THR:HG22	2.08	0.54
1:A:167:CYS:HB3	1:A:168:PRO:HD2	1.71	0.53
1:A:149:PRO:HB2	6:A:614:IOD:I	2.79	0.53
1:A:12:LEU:CD1	1:A:13:VAL:HG23	2.38	0.53
1:A:221:ASP:HB2	1:A:226:TYR:CZ	2.44	0.52
1:A:3:GLU:CD	1:A:4:VAL:N	2.56	0.52
1:A:377:HIS:HD2	9:A:618:EDO:H21	1.73	0.51
1:A:323:LYS:HE3	1:A:324:TRP:CE2	2.46	0.51
1:A:91:VAL:CG2	1:A:411:LYS:HD3	2.41	0.51
1:A:18:ASN:O	1:A:19:SER:C	2.49	0.50
1:A:199:LEU:CA	8:A:617:MPD:HM2	2.42	0.50
1:A:199:LEU:HB2	8:A:617:MPD:HM2	1.93	0.50
1:A:393:ASP:OD1	1:A:557:THR:HB	2.11	0.50
1:A:352:MET:CB	1:A:407:MET:HG2	2.42	0.50
1:A:580:SER:HB3	6:A:615:IOD:I	2.82	0.50
1:A:441:CYS:SG	1:A:492:ILE:HG22	2.52	0.50
1:A:193:TYR:OH	1:A:297:ARG:HA	2.11	0.50
1:A:122:ASN:ND2	1:A:122:ASN:O	2.44	0.49
1:A:407:MET:HB3	1:A:501:MET:CE	2.43	0.49
1:A:362:ASP:OD1	1:A:363:GLU:N	2.46	0.48
1:A:580:SER:HB2	6:A:615:IOD:I	2.83	0.48
1:A:91:VAL:HG22	1:A:411:LYS:CD	2.44	0.47
1:A:352:MET:HB2	1:A:407:MET:HG2	1.95	0.47
1:A:348:ARG:HH11	1:A:437:ASN:ND2	2.12	0.47
1:A:3:GLU:CG	1:A:4:VAL:H	2.23	0.47
1:A:3:GLU:HG3	1:A:4:VAL:N	2.29	0.47
2:A:601:HEM:CMB	2:A:601:HEM:HBB2	2.44	0.47

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Atom-1	Atom-2	Distance(Å)	Clash(Å)
1:A:189:ALA:HB2	1:A:304:ILE:HD12	1.97	0.47
1:A:91:VAL:HG22	1:A:411:LYS:HD3	1.97	0.46
1:A:62:THR:HG22	1:A:64:ARG:HG2	1.97	0.46
1:A:559:ILE:HG23	6:A:611:IOD:I	2.85	0.46
1:A:8:ALA:HB3	1:A:167:CYS:HA	1.98	0.46
1:A:523:ARG:HG3	1:A:529:TRP:CE2	2.51	0.46
1:A:407:MET:HE3	1:A:407:MET:C	2.37	0.45
1:A:168:PRO:CB	1:A:170:PRO:HD2	2.28	0.45
1:A:538:GLU:HG3	1:A:539:LYS:N	2.32	0.44
1:A:196:GLU:HB3	1:A:198:SEP:O3P	2.18	0.44
1:A:362:ASP:O	1:A:365:TYR:N	2.44	0.44
1:A:227:LEU:N	1:A:227:LEU:CD2	2.79	0.44
1:A:3:GLU:CB	1:A:175:LEU:CD2	2.93	0.44
1:A:276:LEU:HD23	1:A:587:LEU:HD11	2.00	0.44
1:A:150:LYS:NZ	1:A:419:ASN:O	2.45	0.43
1:A:227:LEU:HD21	1:A:267:THR:HA	2.00	0.43
1:A:70:PHE:CG	1:A:485:LYS:HB2	2.54	0.43
1:A:109:HIS:NE2	11:A:621:CMO:O	2.49	0.43
1:A:560:THR:HA	1:A:579:CYS:SG	2.59	0.43
1:A:13:VAL:HG22	1:A:14:LYS:N	2.33	0.43
1:A:9:PRO:CD	1:A:167:CYS:O	2.57	0.43
1:A:441:CYS:SG	1:A:446:MET:HG3	2.58	0.42
1:A:105:GLN:HE21	11:A:621:CMO:C	2.33	0.42
1:A:12:LEU:HD12	1:A:13:VAL:HG23	2.01	0.42
1:A:95:ASN:N	1:A:95:ASN:HD22	2.16	0.42
1:A:232:LYS:HG3	1:A:233:LYS:N	2.35	0.41
1:A:135:GLN:HB2	1:A:141:PRO:HD2	2.02	0.41
1:A:522:ILE:CD1	1:A:522:ILE:C	2.84	0.41
1:A:361:LEU:O	1:A:397:ARG:HD2	2.20	0.41
1:A:19:SER:C	1:A:21:TYR:H	2.16	0.41
1:A:519:PHE:HA	1:A:522:ILE:HG13	2.02	0.41
1:A:287:TRP:CZ3	1:A:295:GLU:HG2	2.55	0.41
1:A:9:PRO:HG3	12:A:704:HOH:O	2.20	0.41
1:A:563:PRO:HD3	1:A:576:PHE:CD2	2.55	0.41
2:A:601:HEM:HBC2	2:A:601:HEM:CMC	2.46	0.41
1:A:341:ASN:HB3	1:A:446:MET:CE	2.51	0.41
1:A:264:THR:HG23	1:A:392:ILE:HB	2.02	0.41
1:A:175:LEU:HA	1:A:175:LEU:HD12	1.75	0.40
1:A:572:TYR:CG	1:A:573:PRO:HA	2.57	0.40
1:A:203:LEU:HD11	1:A:252:GLY:HA2	2.04	0.40
1:A:3:GLU:OE1	1:A:3:GLU:CA	2.65	0.40
8:A:617:MPD:H4	8:A:617:MPD:HM1	1.90	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	592/595 (100%)	568 (96%)	20 (3%)	4 (1%)	30 20

All (4) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	20	PRO
1	A	167	CYS
1	A	11	PRO
1	A	424	PRO

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	517/517 (100%)	513 (99%)	4 (1%)	89 92

All (4) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	347	PHE
1	A	363	GLU
1	A	475	ILE
1	A	520	GLN

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (7) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	95	ASN
1	A	128	GLN
1	A	138	ASN
1	A	364	ASN
1	A	426	HIS
1	A	468	GLN
1	A	497	ASN

5.3.3 RNA ⓘ

There are no RNA chains in this entry.

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

1 non-standard protein/DNA/RNA residue is 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	$\# Z > 2$
1	SEP	A	198	1	9,9,10	6.79	1 (11%)	10,12,14	1.70	1 (10%)

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
1	SEP	A	198	1	-	0/6/8/10	0/0/0/0

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	198	SEP	O-C	20.27	1.25	1.11

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	198	SEP	C-CA-N	-4.38	109.45	113.83

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

5.5 Carbohydrates i

2 carbohydrates 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$
5	NAG	A	604	1,5	12,14,15	0.91	1 (8%)	15,19,21	1.85	6 (40%)
5	NAG	A	605	5	12,14,15	0.80	0	15,19,21	1.80	3 (20%)

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
5	NAG	A	604	1,5	-	0/6/23/26	0/1/1/1
5	NAG	A	605	5	-	0/6/23/26	0/1/1/1

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	A	604	NAG	O5-C5	-2.36	1.41	1.45

All (9) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	A	605	NAG	O5-C5-C4	4.79	116.73	110.65

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	A	604	NAG	O4-C4-C3	-3.28	103.01	110.35
5	A	605	NAG	O5-C5-C6	2.75	109.87	106.98
5	A	604	NAG	O5-C5-C4	-2.68	107.25	110.65
5	A	604	NAG	C3-C2-N2	-2.64	107.74	111.76
5	A	604	NAG	C2-N2-C7	2.63	127.50	123.09
5	A	604	NAG	O6-C6-C5	-2.27	103.56	111.36
5	A	604	NAG	O3-C3-C2	-2.17	104.54	109.09
5	A	605	NAG	O3-C3-C4	-2.11	105.62	110.35

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

5.6 Ligand geometry

Of 19 ligands modelled in this entry, 11 are 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	601	1,11	49,50,50	2.39	17 (34%)	46,82,82	3.22	17 (36%)
4	NAG	A	603	1	12,14,15	1.00	1 (8%)	15,19,21	2.44	5 (33%)
4	NAG	A	606	1	12,14,15	0.64	0	15,19,21	2.42	3 (20%)
8	MPD	A	617	-	7,7,7	4.01	3 (42%)	10,10,10	1.14	0
9	EDO	A	618	-	3,3,3	1.05	0	2,2,2	1.34	0
9	EDO	A	619	-	3,3,3	0.62	0	2,2,2	1.24	0
10	SCN	A	620	-	2,2,2	1.79	1 (50%)	1,1,1	0.97	0
11	CMO	A	621	2	0,1,1	0.00	-	0,0,0	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	601	1,11	-	0/14/114/114	0/0/8/8
4	NAG	A	603	1	-	0/6/23/26	0/1/1/1
4	NAG	A	606	1	-	0/6/23/26	0/1/1/1
8	MPD	A	617	-	-	0/5/5/5	0/0/0/0
9	EDO	A	618	-	-	0/1/1/1	0/0/0/0
9	EDO	A	619	-	-	0/1/1/1	0/0/0/0
10	SCN	A	620	-	-	0/0/0/0	0/0/0/0
11	CMO	A	621	2	-	0/0/0/0	0/0/0/0

All (22) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
8	A	617	MPD	C1-C2	-6.70	1.28	1.52
2	A	601	HEM	FE-NA	6.44	2.20	1.92
8	A	617	MPD	O2-C2	-5.89	1.27	1.44
8	A	617	MPD	CM-C2	-5.41	1.32	1.52
2	A	601	HEM	C3C-CAC	5.04	1.56	1.40
2	A	601	HEM	C4A-C3A	5.00	1.46	1.40
2	A	601	HEM	FE-NB	4.61	2.14	1.97
2	A	601	HEM	C3B-CAB	4.39	1.54	1.40
2	A	601	HEM	C3B-C2B	-4.33	1.36	1.43
2	A	601	HEM	C3C-C2C	-4.33	1.36	1.43
2	A	601	HEM	CHB-C1B	3.93	1.41	1.35
2	A	601	HEM	FE-ND	3.92	2.12	1.97
2	A	601	HEM	CMC-C2C	3.17	1.57	1.47
2	A	601	HEM	C3D-C2D	2.82	1.48	1.43
2	A	601	HEM	C2B-C1B	2.77	1.45	1.44
2	A	601	HEM	FE-NC	2.73	2.08	1.97
2	A	601	HEM	C3D-C4D	2.69	1.45	1.44
10	A	620	SCN	C-S	2.47	1.79	1.63
2	A	601	HEM	CMB-C2B	2.33	1.54	1.47
4	A	603	NAG	O7-C7	2.28	1.28	1.23
2	A	601	HEM	CMD-C2D	2.12	1.54	1.47
2	A	601	HEM	C2D-C1D	2.02	1.45	1.44

All (25) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	601	HEM	C3B-C4B-NB	-12.75	104.88	114.00
2	A	601	HEM	C4D-ND-C1D	7.98	113.33	105.16
2	A	601	HEM	C1B-NB-C4B	7.71	113.05	105.16
4	A	603	NAG	O5-C5-C6	7.61	114.96	106.98
4	A	606	NAG	C3-C2-N2	-6.28	102.20	111.76

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	601	HEM	C2D-C1D-ND	-5.40	106.56	112.93
4	A	606	NAG	O5-C5-C6	5.29	112.53	106.98
2	A	601	HEM	CBA-CAA-C2A	-4.92	104.03	112.69
2	A	601	HEM	C3A-C4A-NA	-4.84	105.76	109.41
2	A	601	HEM	CBD-CAD-C3D	-3.89	105.89	114.37
2	A	601	HEM	C4C-NC-C1C	3.85	109.54	105.53
2	A	601	HEM	CHB-C1B-NB	3.44	129.03	124.31
2	A	601	HEM	CHC-C4B-NB	3.23	127.27	124.58
2	A	601	HEM	C4A-NA-C1A	3.22	111.00	106.76
4	A	606	NAG	C3-C4-C5	-3.17	104.54	110.20
2	A	601	HEM	CHA-C4D-ND	2.71	128.02	124.31
2	A	601	HEM	CMA-C3A-C4A	-2.64	124.56	128.62
4	A	603	NAG	O3-C3-C4	-2.53	104.69	110.35
4	A	603	NAG	C8-C7-N2	-2.43	111.36	116.11
2	A	601	HEM	CAD-CBD-CGD	-2.41	105.97	113.48
4	A	603	NAG	C3-C4-C5	-2.37	105.97	110.20
2	A	601	HEM	CHD-C4C-NC	2.11	126.56	124.73
2	A	601	HEM	C4A-C3A-C2A	2.09	108.45	107.00
2	A	601	HEM	C2A-C1A-NA	-2.04	106.90	109.73
4	A	603	NAG	C6-C5-C4	-2.04	108.07	113.00

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

5.7 Other polymers ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues

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	595/595 (100%)	0.54	55 (9%) 9 8	20, 32, 66, 99	0

All (55) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	2	TRP	11.9
1	A	121	SER	11.3
1	A	1	SER	11.1
1	A	172	TYR	10.9
1	A	174	SER	10.3
1	A	8	ALA	10.1
1	A	173	GLN	9.5
1	A	4	VAL	9.3
1	A	595	ASN	9.2
1	A	12	LEU	9.1
1	A	124	HIS	9.1
1	A	13	VAL	8.5
1	A	119	LEU	8.3
1	A	120	GLY	7.6
1	A	10	VAL	7.6
1	A	170	PRO	7.4
1	A	122	ASN	7.2
1	A	168	PRO	6.1
1	A	118	GLU	6.0
1	A	126	LYS	5.8
1	A	7	GLY	5.1
1	A	132	TYR	5.1
1	A	171	PRO	5.0
1	A	593	ARG	4.7
1	A	594	GLU	4.7
1	A	125	SER	4.1
1	A	11	PRO	4.1

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Mol	Chain	Res	Type	RSRZ
1	A	18	ASN	4.0
1	A	127	THR	3.9
1	A	123	GLU	3.8
1	A	169	THR	3.6
1	A	254	PHE	3.6
1	A	198	SEP	3.6
1	A	262	LEU	3.4
1	A	9	PRO	3.3
1	A	3	GLU	3.3
1	A	16	ASP	3.2
1	A	131	GLU	3.1
1	A	128	GLN	3.0
1	A	286	HIS	3.0
1	A	64	ARG	3.0
1	A	231	ASN	2.9
1	A	134	ILE	2.8
1	A	117	THR	2.7
1	A	175	LEU	2.7
1	A	592	SER	2.7
1	A	441	CYS	2.6
1	A	591	ALA	2.5
1	A	427	LYS	2.5
1	A	329	GLN	2.5
1	A	346	ALA	2.4
1	A	14	LYS	2.1
1	A	283	LEU	2.1
1	A	107	VAL	2.1
1	A	261	LEU	2.0

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

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	RSR	LLDF	B-factors(Å ²)	Q<0.9
1	SEP	A	198	10/11	0.45	8.54	51,52,53,54	0

6.3 Carbohydrates ⓘ

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	RSR	LLDF	B-factors(Å ²)	Q<0.9
5	NAG	A	605	14/15	0.34	4.50	34,37,40,46	0
5	NAG	A	604	14/15	0.12	-0.23	29,31,34,38	0

6.4 Ligands ⓘ

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	RSR	LLDF	B-factors(Å ²)	Q<0.9
6	IOD	A	614	1/1	0.32	24.42	39,39,39,39	0
4	NAG	A	606	14/15	0.25	21.00	31,34,38,41	0
9	EDO	A	618	4/4	0.39	15.49	26,26,27,28	0
6	IOD	A	615	1/1	0.29	4.94	39,39,39,39	0
9	EDO	A	619	4/4	0.29	2.93	26,28,33,34	0
8	MPD	A	617	8/8	0.36	2.84	18,26,33,37	0
4	NAG	A	603	14/15	0.15	1.24	25,32,34,37	0
2	HEM	A	601	43/43	0.20	0.82	16,22,26,27	0
6	IOD	A	609	1/1	0.16	0.74	36,36,36,36	0
11	CMO	A	621	2/2	0.21	0.24	33,33,33,36	0
6	IOD	A	611	1/1	0.14	0.15	37,37,37,37	0
10	SCN	A	620	3/3	0.16	-0.04	34,34,34,34	0
6	IOD	A	608	1/1	0.09	-0.53	34,34,34,34	0
6	IOD	A	612	1/1	0.10	-1.03	35,35,35,35	0
6	IOD	A	607	1/1	0.07	-1.59	23,23,23,23	0
7	BR	A	616	1/1	0.07	-2.45	29,29,29,29	0
3	CA	A	602	1/1	0.08	-2.51	24,24,24,24	0
6	IOD	A	613	1/1	0.01	-4.12	29,29,29,29	0
6	IOD	A	610	1/1	0.02	-11.65	31,31,31,31	0

6.5 Other polymers ⓘ

There are no such residues in this entry.