



Full wwPDB X-ray Structure Validation Report ⓘ

Feb 13, 2017 – 10:10 am GMT

PDB ID : 4I4G
Title : Crystal structure of CYP3A4 ligated to oxazole-substituted desoxyritonavir
Authors : Sevrioukova, I.F.; Poulos, T.L.
Deposited on : 2012-11-27
Resolution : 2.72 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 : 1.7.2 (RC1), CSD as538be (2017)
Xtriage (Phenix) : 1.9-1692
EDS : trunk28620
Percentile statistics : 20161228.v01 (using entries in the PDB archive December 28th 2016)
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) : recalc28949

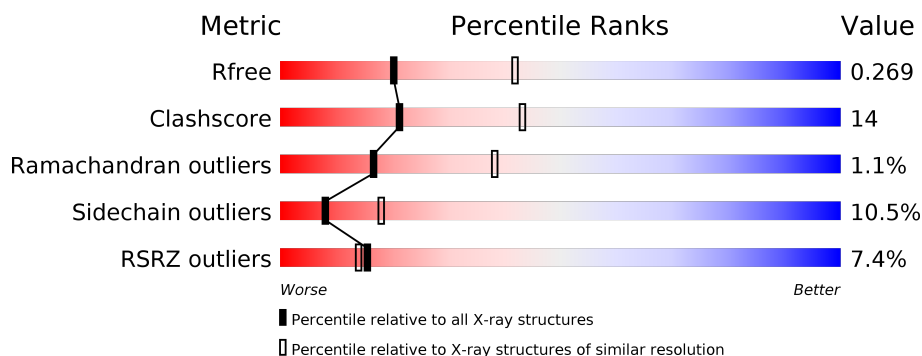
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.72 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}	100719	2649 (2.74-2.70)
Clashscore	112137	2993 (2.74-2.70)
Ramachandran outliers	110173	2946 (2.74-2.70)
Sidechain outliers	110143	2947 (2.74-2.70)
RSRZ outliers	101464	2665 (2.74-2.70)

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	487	

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
3	Z8Z	A	602	-	-	-	X

2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 3792 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.

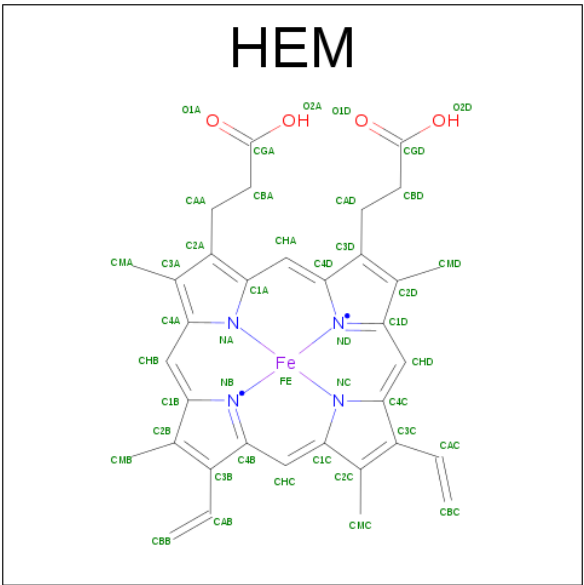
- Molecule 1 is a protein called Cytochrome P450 3A4.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	459	Total	C	N	O	S	0	0	0
			3695	2404	607	660	24			

There are 24 discrepancies between the modelled and reference sequences:

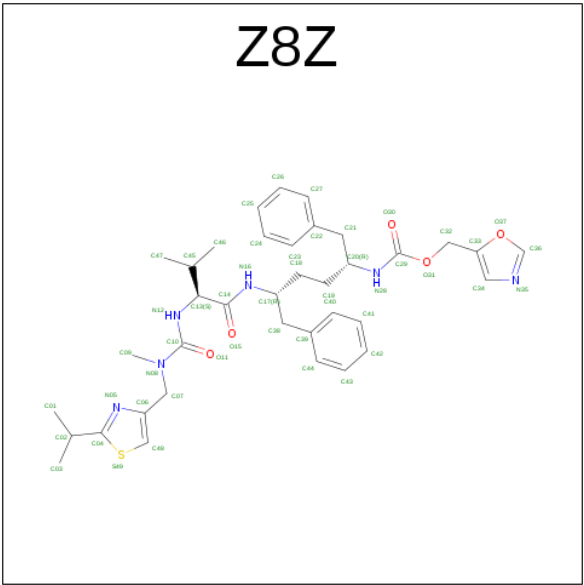
Chain	Residue	Modelled	Actual	Comment	Reference
A	?	-	LEU	DELETION	UNP P08684
A	?	-	ILE	DELETION	UNP P08684
A	?	-	PRO	DELETION	UNP P08684
A	?	-	ASP	DELETION	UNP P08684
A	?	-	LEU	DELETION	UNP P08684
A	?	-	ALA	DELETION	UNP P08684
A	?	-	MET	DELETION	UNP P08684
A	?	-	GLU	DELETION	UNP P08684
A	?	-	THR	DELETION	UNP P08684
A	?	-	TRP	DELETION	UNP P08684
A	?	-	LEU	DELETION	UNP P08684
A	?	-	LEU	DELETION	UNP P08684
A	?	-	LEU	DELETION	UNP P08684
A	?	-	ALA	DELETION	UNP P08684
A	?	-	VAL	DELETION	UNP P08684
A	?	-	SER	DELETION	UNP P08684
A	?	-	LEU	DELETION	UNP P08684
A	?	-	VAL	DELETION	UNP P08684
A	?	-	LEU	DELETION	UNP P08684
A	?	-	LEU	DELETION	UNP P08684
A	504	HIS	-	EXPRESSION TAG	UNP P08684
A	505	HIS	-	EXPRESSION TAG	UNP P08684
A	506	HIS	-	EXPRESSION TAG	UNP P08684
A	507	HIS	-	EXPRESSION TAG	UNP P08684

- 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 N 2 -(METHYL{[2-(PROPAN-2-YL)-1,3-THIAZOL-4-YL]METHYL}CARBAMOYL)-N-[(2R,5R)-5-{[(1,3-OXAZOL-5-YLMETHOXY)CARBONYL]AMINO}-1,6-DIPHENYLHEXAN-2-YL]-L-VALINAMIDE (three-letter code: Z8Z) (formula: C₃₇H₄₈N₆O₅S).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
3	A	1	Total	C	N	O	S	0	0
			49	37	6	5	1		

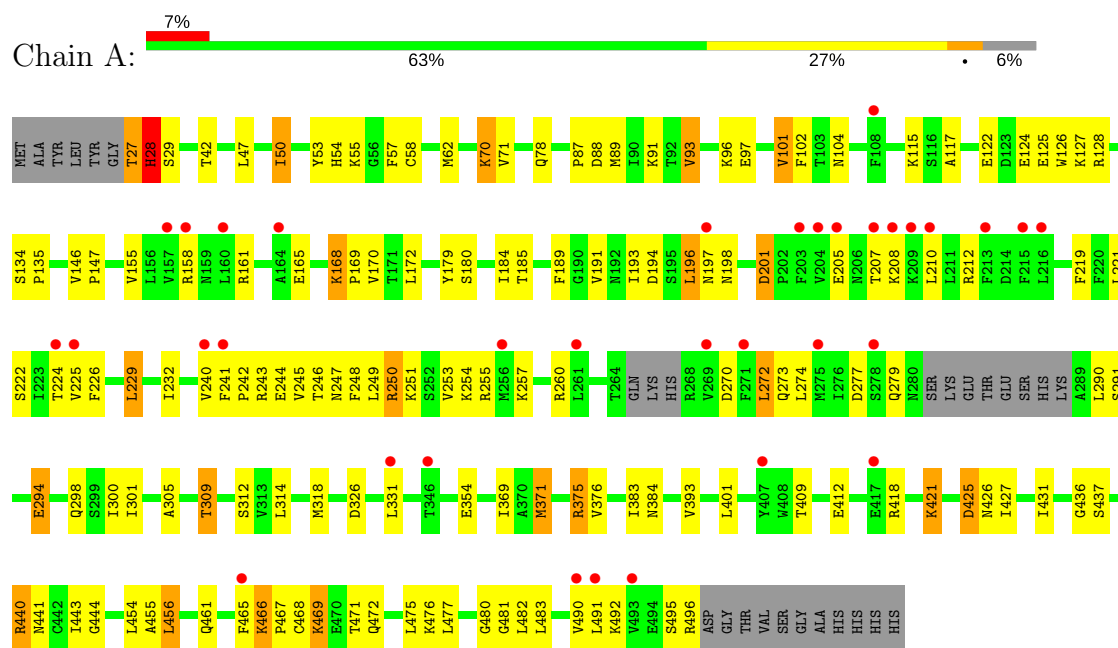
- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	5	Total	O	0	0
			5	5		

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 the various outlier classes 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: Cytochrome P450 3A4



4 Data and refinement statistics

Property	Value	Source
Space group	I 2 2 2	Depositor
Cell constants a, b, c, α , β , γ	76.66Å 99.58Å 126.38Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	49.79 – 2.72 49.79 – 2.72	Depositor EDS
% Data completeness (in resolution range)	99.8 (49.79-2.72) 99.9 (49.79-2.72)	Depositor EDS
R_{merge}	0.07	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.67 (at 2.73Å)	Xtriage
Refinement program	REFMAC 5.6.0117	Depositor
R, R_{free}	0.203 , 0.270 0.202 , 0.269	Depositor DCC
R_{free} test set	661 reflections (5.20%)	DCC
Wilson B-factor (Å ²)	78.3	Xtriage
Anisotropy	0.042	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.31 , 55.3	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	3792	wwPDB-VP
Average B, all atoms (Å ²)	91.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.97% 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, 0.333 respectively for untwinned datasets, and 0.375, 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, Z8Z

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	0.50	0/3784	0.68	2/5119 (0.0%)

There are no bond length outliers.

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed($^{\circ}$)	Ideal($^{\circ}$)
1	A	375	ARG	NE-CZ-NH1	6.70	123.65	120.30
1	A	375	ARG	NE-CZ-NH2	-5.96	117.32	120.30

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	3695	0	3778	97	0
2	A	43	0	30	11	0
3	A	49	0	48	10	0
4	A	5	0	0	0	0
All	All	3792	0	3856	104	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 14.

All (104) 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:469:LYS:HA	1:A:469:LYS:HE2	1.50	0.90
1:A:27:THR:O	1:A:28:HIS:HB2	1.75	0.85
1:A:222:SER:O	1:A:226:PHE:HB2	1.79	0.82
1:A:27:THR:O	1:A:28:HIS:CB	2.31	0.78
1:A:221:LEU:O	1:A:225:VAL:HG23	1.87	0.75
1:A:472:GLN:NE2	1:A:476:LYS:H	1.85	0.74
1:A:469:LYS:HA	1:A:469:LYS:CE	2.12	0.73
1:A:89:MET:HA	1:A:384:ASN:ND2	2.03	0.72
2:A:601:HEM:C1D	3:A:602:Z8Z:H4	2.24	0.72
1:A:409:THR:O	1:A:418:ARG:NH2	2.23	0.70
1:A:210:LEU:HD13	1:A:245:VAL:HG11	1.73	0.69
2:A:601:HEM:ND	3:A:602:Z8Z:H4	2.09	0.66
1:A:161:ARG:O	1:A:165:GLU:HG2	1.97	0.65
1:A:472:GLN:HE21	1:A:475:LEU:HA	1.60	0.64
1:A:126:TRP:CZ2	1:A:440:ARG:HG2	2.32	0.64
1:A:248:PHE:HD1	1:A:249:LEU:HD12	1.62	0.64
1:A:251:LYS:HA	1:A:254:LYS:HB3	1.79	0.63
1:A:248:PHE:CD1	1:A:249:LEU:HD12	2.34	0.63
1:A:246:THR:O	1:A:250:ARG:HB2	1.98	0.63
1:A:314:LEU:HD22	1:A:456:LEU:HD13	1.81	0.63
3:A:602:Z8Z:N28	3:A:602:Z8Z:H18	2.15	0.62
1:A:309:THR:HB	2:A:601:HEM:HAB	1.82	0.60
2:A:601:HEM:ND	3:A:602:Z8Z:C34	2.64	0.60
1:A:247:ASN:HA	1:A:250:ARG:HB2	1.85	0.59
1:A:58:CYS:SG	1:A:371:MET:HG2	2.42	0.59
1:A:117:ALA:HB1	1:A:301:ILE:HG13	1.83	0.59
1:A:87:PRO:HG3	1:A:431:ILE:HD11	1.85	0.59
1:A:172:LEU:HD11	1:A:491:LEU:HD12	1.84	0.58
1:A:229:LEU:HA	1:A:232:ILE:HD12	1.85	0.58
1:A:27:THR:HB	1:A:78:GLN:HE22	1.67	0.58
1:A:168:LYS:NZ	1:A:168:LYS:HB3	2.18	0.58
1:A:425:ASP:OD2	1:A:425:ASP:N	2.33	0.58
1:A:279:GLN:HG2	1:A:290:LEU:O	2.03	0.57
1:A:134:SER:HA	1:A:443:ILE:HD11	1.85	0.57
1:A:472:GLN:HE22	1:A:476:LYS:H	1.52	0.57
3:A:602:Z8Z:C40	3:A:602:Z8Z:H26	2.18	0.57
1:A:224:THR:HG23	3:A:602:Z8Z:H43	1.86	0.57
1:A:305:ALA:O	1:A:309:THR:OG1	2.23	0.56
1:A:54:HIS:CE1	1:A:55:LYS:HG2	2.40	0.56
1:A:170:VAL:O	1:A:490:VAL:HA	2.06	0.56

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:294:GLU:O	1:A:298:GLN:HG2	2.06	0.55
1:A:468:CYS:HB3	1:A:492:LYS:HD2	1.88	0.55
3:A:602:Z8Z:N28	3:A:602:Z8Z:H13	2.22	0.55
1:A:53:TYR:CD2	1:A:57:PHE:HB3	2.43	0.54
1:A:219:PHE:HE1	1:A:240:VAL:HG12	1.72	0.54
1:A:194:ASP:OD1	1:A:197:ASN:HB2	2.09	0.53
1:A:270:ASP:H	1:A:273:GLN:HB3	1.74	0.53
1:A:249:LEU:O	1:A:253:VAL:HG23	2.09	0.53
1:A:97:GLU:HB3	1:A:101:VAL:CG1	2.39	0.53
1:A:242:PRO:C	1:A:244:GLU:H	2.13	0.53
1:A:219:PHE:CE1	1:A:240:VAL:HG12	2.45	0.52
1:A:318:MET:HE2	1:A:465:PHE:CD2	2.45	0.51
1:A:89:MET:HA	1:A:384:ASN:HD22	1.76	0.51
1:A:249:LEU:HD23	1:A:300:ILE:HG12	1.94	0.50
1:A:471:THR:OG1	1:A:490:VAL:O	2.28	0.49
1:A:375:ARG:NH2	2:A:601:HEM:O1A	2.41	0.49
1:A:242:PRO:C	1:A:244:GLU:N	2.66	0.49
1:A:27:THR:HB	1:A:78:GLN:NE2	2.27	0.49
1:A:179:TYR:CE1	1:A:455:ALA:HB2	2.47	0.49
1:A:189:PHE:HA	1:A:272:LEU:HB2	1.95	0.49
1:A:354:GLU:HG3	1:A:421:LYS:HE3	1.95	0.48
1:A:461:GLN:HA	1:A:496:ARG:HH21	1.78	0.47
1:A:117:ALA:HB1	1:A:301:ILE:CG1	2.44	0.47
1:A:102:PHE:HB3	1:A:375:ARG:HB3	1.97	0.47
1:A:369:ILE:HD11	2:A:601:HEM:CMB	2.44	0.47
1:A:375:ARG:HH22	2:A:601:HEM:CGA	2.26	0.47
1:A:155:VAL:HB	1:A:196:LEU:HD23	1.96	0.46
1:A:185:THR:O	1:A:189:PHE:HD1	1.98	0.46
1:A:369:ILE:HD11	2:A:601:HEM:C2B	2.51	0.46
1:A:89:MET:O	1:A:93:VAL:HG13	2.15	0.46
1:A:207:THR:O	1:A:210:LEU:HB2	2.15	0.45
1:A:89:MET:HA	1:A:384:ASN:HD21	1.78	0.45
1:A:134:SER:OG	1:A:135:PRO:HD3	2.15	0.45
1:A:198:ASN:HB3	1:A:201:ASP:HB2	1.99	0.45
1:A:191:VAL:HG12	1:A:193:ILE:HG23	1.98	0.44
1:A:425:ASP:C	1:A:427:ILE:H	2.19	0.44
1:A:125:GLU:OE1	1:A:128:ARG:NH2	2.51	0.44
1:A:274:LEU:O	1:A:277:ASP:HB2	2.17	0.44
1:A:371:MET:SD	1:A:483:LEU:HB2	2.58	0.44
1:A:376:VAL:HG22	1:A:393:VAL:HG22	1.99	0.44
1:A:309:THR:HB	2:A:601:HEM:CAB	2.48	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:146:VAL:HB	1:A:147:PRO:HD3	1.99	0.43
3:A:602:Z8Z:H26	3:A:602:Z8Z:H25	1.82	0.43
1:A:224:THR:HG23	3:A:602:Z8Z:C03	2.48	0.43
1:A:401:LEU:HB3	1:A:431:ILE:HG23	2.00	0.43
1:A:477:LEU:HD13	1:A:483:LEU:HD11	2.00	0.43
1:A:242:PRO:O	1:A:244:GLU:N	2.52	0.42
1:A:441:ASN:C	1:A:441:ASN:OD1	2.57	0.42
1:A:444:GLY:HA3	2:A:601:HEM:C3C	2.54	0.42
1:A:436:GLY:HA3	2:A:601:HEM:O2A	2.19	0.42
1:A:168:LYS:HA	1:A:169:PRO:HD3	1.91	0.42
1:A:91:LYS:HE3	1:A:96:LYS:HE3	2.02	0.41
1:A:466:LYS:HE3	1:A:467:PRO:HD2	2.02	0.41
1:A:70:LYS:HE2	1:A:70:LYS:HB2	1.81	0.41
1:A:210:LEU:HD23	3:A:602:Z8Z:H11	2.02	0.41
1:A:251:LYS:HG3	1:A:254:LYS:HD2	2.02	0.41
1:A:184:ILE:HA	1:A:184:ILE:HD12	1.93	0.41
1:A:104:ASN:HB3	1:A:122:GLU:HG2	2.02	0.41
1:A:158:ARG:HH22	1:A:197:ASN:HD21	1.69	0.41
1:A:189:PHE:O	1:A:260:ARG:NH2	2.54	0.41
1:A:47:LEU:O	1:A:50:ILE:HB	2.21	0.41
1:A:93:VAL:HG12	1:A:383:ILE:CD1	2.51	0.41
1:A:50:ILE:HG12	1:A:225:VAL:HG22	2.03	0.40
1:A:279:GLN:NE2	1:A:291:SER:O	2.55	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	453/487 (93%)	412 (91%)	36 (8%)	5 (1%)	17 38

All (5) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	28	HIS
1	A	243	ARG
1	A	481	GLY
1	A	426	ASN
1	A	480	GLY

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	420/443 (95%)	376 (90%)	44 (10%)	8 18

All (44) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	27	THR
1	A	28	HIS
1	A	29	SER
1	A	42	THR
1	A	50	ILE
1	A	62	MET
1	A	70	LYS
1	A	71	VAL
1	A	88	ASP
1	A	93	VAL
1	A	101	VAL
1	A	115	LYS
1	A	124	GLU
1	A	127	LYS
1	A	168	LYS
1	A	180	SER
1	A	196	LEU
1	A	201	ASP
1	A	205	GLU
1	A	208	LYS
1	A	212	ARG
1	A	229	LEU

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Mol	Chain	Res	Type
1	A	241	PHE
1	A	250	ARG
1	A	255	ARG
1	A	257	LYS
1	A	272	LEU
1	A	294	GLU
1	A	309	THR
1	A	312	SER
1	A	326	ASP
1	A	331	LEU
1	A	371	MET
1	A	412	GLU
1	A	421	LYS
1	A	425	ASP
1	A	437	SER
1	A	440	ARG
1	A	454	LEU
1	A	456	LEU
1	A	466	LYS
1	A	469	LYS
1	A	482	LEU
1	A	495	SER

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	78	GLN
1	A	352	GLN
1	A	384	ASN
1	A	426	ASN
1	A	451	ASN
1	A	461	GLN
1	A	472	GLN

5.3.3 RNA ⓘ

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](#)

2 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	$\# Z > 2$
2	HEM	A	601	1,3	28,50,50	3.20	12 (42%)	17,82,82	3.56	9 (52%)
3	Z8Z	A	602	2	45,52,52	1.10	2 (4%)	50,69,69	1.74	12 (24%)

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	1,3	-	0/6/54/54	0/0/8/8
3	Z8Z	A	602	2	-	4/46/50/50	0/3/4/4

All (14) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	601	HEM	C4D-ND	-3.39	1.32	1.36
2	A	601	HEM	C1A-CHA	2.00	1.45	1.40
3	A	602	Z8Z	C48-S49	2.03	1.73	1.70
2	A	601	HEM	C1D-CHD	2.16	1.45	1.40
2	A	601	HEM	C4B-CHC	2.19	1.46	1.40
2	A	601	HEM	C3D-C2D	2.71	1.45	1.37

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	601	HEM	C2A-C3A	2.80	1.46	1.37
2	A	601	HEM	C1A-NA	4.58	1.46	1.36
2	A	601	HEM	C4A-NA	4.91	1.46	1.36
2	A	601	HEM	C3B-C2B	5.24	1.47	1.40
2	A	601	HEM	C3C-C2C	5.74	1.47	1.40
3	A	602	Z8Z	O31-C29	6.24	1.47	1.35
2	A	601	HEM	C4C-NC	7.37	1.45	1.36
2	A	601	HEM	C1C-NC	8.73	1.47	1.36

All (21) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	601	HEM	C1D-C2D-C3D	-9.48	100.40	107.00
2	A	601	HEM	CBD-CAD-C3D	-5.11	102.72	112.47
2	A	601	HEM	CAA-CBA-CGA	-4.48	105.01	112.66
3	A	602	Z8Z	C39-C38-C17	-3.13	107.09	113.99
2	A	601	HEM	C4A-C3A-C2A	-3.11	104.83	107.00
3	A	602	Z8Z	O31-C29-O30	-3.08	118.03	124.22
3	A	602	Z8Z	C19-C20-C21	-3.04	106.14	111.26
3	A	602	Z8Z	C13-C14-N16	-2.92	110.21	116.53
2	A	601	HEM	CBA-CAA-C2A	-2.20	108.28	112.48
3	A	602	Z8Z	C03-C02-C04	-2.08	106.00	112.09
3	A	602	Z8Z	C19-C20-N28	2.46	114.15	110.58
3	A	602	Z8Z	C32-O31-C29	2.70	122.28	115.91
2	A	601	HEM	CMC-C2C-C3C	2.77	130.03	124.89
3	A	602	Z8Z	C18-C17-N16	3.17	115.17	110.58
2	A	601	HEM	CMD-C2D-C3D	3.23	131.03	124.94
3	A	602	Z8Z	O31-C29-N28	3.47	117.99	110.54
3	A	602	Z8Z	C17-N16-C14	3.62	129.01	123.20
3	A	602	Z8Z	C20-N28-C29	4.22	128.72	122.22
2	A	601	HEM	CMB-C2B-C3B	4.27	132.82	124.89
3	A	602	Z8Z	C02-C04-N05	4.34	133.30	124.96
2	A	601	HEM	C3B-C4B-NB	4.89	115.53	109.21

There are no chirality outliers.

All (4) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	A	602	Z8Z	N12-C10-N08-C09
3	A	602	Z8Z	O11-C10-N08-C09
3	A	602	Z8Z	O11-C10-N12-C13
3	A	602	Z8Z	N08-C10-N12-C13

There are no ring outliers.

2 monomers are involved in 18 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	601	HEM	11	0
3	A	602	Z8Z	10	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	459/487 (94%)	0.32	34 (7%) 15 14	47, 87, 145, 187	0

All (34) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	210	LEU	8.7
1	A	216	LEU	7.9
1	A	240	VAL	5.4
1	A	269	VAL	4.4
1	A	241	PHE	4.0
1	A	203	PHE	3.9
1	A	108	PHE	3.8
1	A	213	PHE	3.6
1	A	256	MET	3.6
1	A	205	GLU	3.6
1	A	207	THR	3.2
1	A	493	VAL	3.2
1	A	491	LEU	3.1
1	A	158	ARG	3.0
1	A	271	PHE	3.0
1	A	209	LYS	2.8
1	A	215	PHE	2.7
1	A	164	ALA	2.7
1	A	204	VAL	2.6
1	A	490	VAL	2.6
1	A	331	LEU	2.5
1	A	278	SER	2.5
1	A	346	THR	2.5
1	A	157	VAL	2.4
1	A	160	LEU	2.3
1	A	197	ASN	2.3
1	A	224	THR	2.3

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Mol	Chain	Res	Type	RSRZ
1	A	225	VAL	2.2
1	A	407	TYR	2.2
1	A	261	LEU	2.2
1	A	208	LYS	2.1
1	A	275	MET	2.1
1	A	465	PHE	2.1
1	A	417	GLU	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
3	Z8Z	A	602	49/49	0.88	0.41	1.06	59,149,211,229	0
2	HEM	A	601	43/43	0.98	0.21	1.05	47,56,61,68	0

6.5 Other polymers [i](#)

There are no such residues in this entry.