



# Full wwPDB X-ray Structure Validation Report ⓘ

Feb 1, 2016 – 04:54 AM GMT

PDB ID : 2OP1  
Title : Crystal structure of plasmodium falciparum enoyl ACP reductase with tri-closan reductase  
Authors : Tsai, H.  
Deposited on : 2007-01-26  
Resolution : 2.60 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](mailto: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.

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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

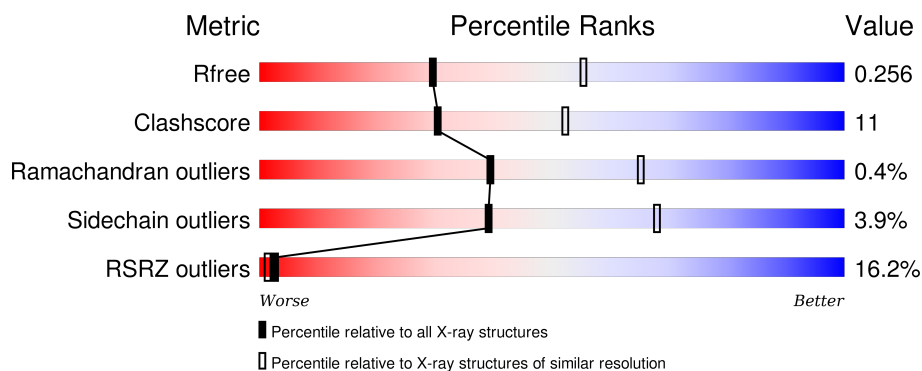
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

## *X-RAY DIFFRACTION*

The reported resolution of this entry is 2.60 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	2328 (2.60-2.60)
Clashscore	102246	2679 (2.60-2.60)
Ramachandran outliers	100387	2635 (2.60-2.60)
Sidechain outliers	100360	2635 (2.60-2.60)
RSRZ outliers	91569	2334 (2.60-2.60)

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  $\geq 3$ , 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	338	
1	B	338	

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
2	NAD	A	450	-	-	-	X
3	8PC	A	500	-	-	X	X
3	8PC	B	500	-	-	X	X

## 2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 4656 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 Enoyl-acyl carrier reductase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	277	Total	C	N	O	S	0	0	0
			2192	1400	366	415	11			
1	B	280	Total	C	N	O	S	0	0	0
			2207	1408	372	416	11			

There are 16 discrepancies between the modelled and reference sequences:

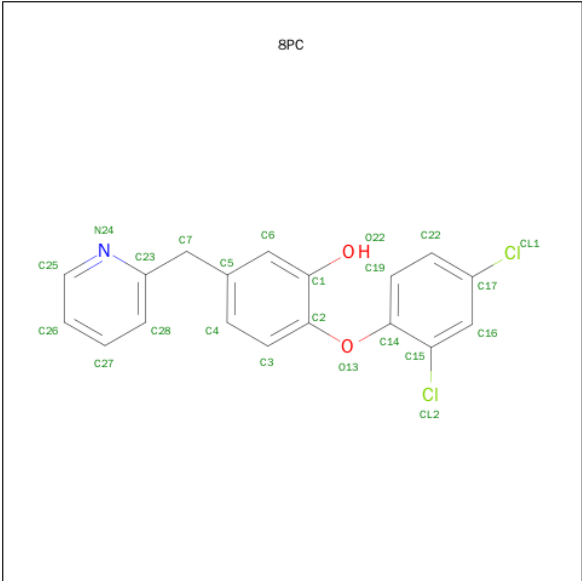
Chain	Residue	Modelled	Actual	Comment	Reference
A	88	MET	-	CLONING ARTIFACT	UNP Q9BH77
A	89	VAL	-	CLONING ARTIFACT	UNP Q9BH77
A	90	HIS	-	EXPRESSION TAG	UNP Q9BH77
A	91	HIS	-	EXPRESSION TAG	UNP Q9BH77
A	92	HIS	-	EXPRESSION TAG	UNP Q9BH77
A	93	HIS	-	EXPRESSION TAG	UNP Q9BH77
A	94	HIS	-	EXPRESSION TAG	UNP Q9BH77
A	95	HIS	-	EXPRESSION TAG	UNP Q9BH77
B	88	MET	-	CLONING ARTIFACT	UNP Q9BH77
B	89	VAL	-	CLONING ARTIFACT	UNP Q9BH77
B	90	HIS	-	EXPRESSION TAG	UNP Q9BH77
B	91	HIS	-	EXPRESSION TAG	UNP Q9BH77
B	92	HIS	-	EXPRESSION TAG	UNP Q9BH77
B	93	HIS	-	EXPRESSION TAG	UNP Q9BH77
B	94	HIS	-	EXPRESSION TAG	UNP Q9BH77
B	95	HIS	-	EXPRESSION TAG	UNP Q9BH77

- Molecule 2 is NICOTINAMIDE-ADENINE-DINUCLEOTIDE (three-letter code: NAD) (formula: C<sub>21</sub>H<sub>27</sub>N<sub>7</sub>O<sub>14</sub>P<sub>2</sub>).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	A	1	Total	C	N	O	P	0	0
			44	21	7	14	2		
2	B	1	Total	C	N	O	P	0	0
			44	21	7	14	2		

- Molecule 3 is 2-(2,4-DICHLOROPHENOXY)-5-(PYRIDIN-2-YLMETHYL)PHENOL (three-letter code: 8PC) (formula: C<sub>18</sub>H<sub>13</sub>Cl<sub>2</sub>NO<sub>2</sub>).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
3	A	1	Total	C	Cl	N	O	0	0
			23	18	2	1	2		

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Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
3	B	1	Total	C	Cl	N	O	0	0
			23	18	2	1	2		

- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	58	Total	O	0	0
			58	58		
4	B	65	Total	O	0	0
			65	65		

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.

[illegible][illegible]

## 4 Data and refinement statistics

Property	Value	Source
Space group	P 43 21 2	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	131.50 Å   131.50 Å   82.33 Å 90.00°   90.00°   90.00°	Depositor
Resolution (Å)	30.00 – 2.60 30.01 – 2.60	Depositor EDS
% Data completeness (in resolution range)	94.9 (30.00-2.60) 98.9 (30.01-2.60)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.99 (at 2.61 Å)	Xtriage
Refinement program	Phenix and Refmac	Depositor
R, $R_{free}$	0.207   ,   0.270 0.259   ,   0.256	Depositor DCC
$R_{free}$ test set	1148 reflections (5.37%)	DCC
Wilson B-factor (Å <sup>2</sup> )	44.2	Xtriage
Anisotropy	0.279	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.37 , 43.9	EDS
Estimated twinning fraction	No twinning to report.	Xtriage
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.50$ , $\langle L^2 \rangle = 0.34$	Xtriage
Outliers	0 of 22520 reflections	Xtriage
$F_o, F_c$ correlation	0.91	EDS
Total number of atoms	4656	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	38.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.37% of the height of the origin peak. No significant pseudotranslation is detected.*

<sup>1</sup>Intensities estimated from amplitudes.

<sup>2</sup>Theoretical 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: 8PC, NAD

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	0.33	0/2232	0.50	0/3009
1	B	0.31	0/2247	0.53	1/3031 (0.0%)
All	All	0.32	0/4479	0.51	1/6040 (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	B	238	LEU	CA-CB-CG	-6.35	100.70	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	2192	0	2201	60	0
1	B	2207	0	2219	39	0
2	A	44	0	26	4	0
2	B	44	0	26	0	0
3	A	23	0	13	13	0
3	B	23	0	12	8	0
4	A	58	0	0	0	0
4	B	65	0	0	1	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
All	All	4656	0	4497	99	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 11.

All (99) 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:401:ARG:HG2	1:A:401:ARG:HH11	1.14	1.09
1:A:369:ILE:HA	3:A:500:8PC:H27	1.42	1.01
3:A:500:8PC:H28	3:A:500:8PC:H4	1.47	0.97
1:A:259:GLN:HE21	1:A:401:ARG:NH2	1.63	0.95
1:B:188:ASN:HB3	1:B:189:MET:HG2	1.49	0.93
1:A:401:ARG:HG2	1:A:401:ARG:NH1	1.78	0.93
1:B:188:ASN:HB3	1:B:189:MET:HB2	1.49	0.92
1:B:188:ASN:CB	1:B:189:MET:HB2	2.00	0.91
1:B:188:ASN:HB3	1:B:189:MET:CB	2.01	0.91
1:A:259:GLN:NE2	1:A:401:ARG:HH22	1.68	0.91
1:B:188:ASN:HB3	1:B:189:MET:CG	2.05	0.86
1:A:111:TYR:HE2	2:A:450:NAD:C2N	1.88	0.86
1:A:259:GLN:HE21	1:A:401:ARG:HH22	0.86	0.85
1:A:401:ARG:CG	1:A:401:ARG:HH11	1.92	0.81
1:B:184:ASN:ND2	1:B:186:ARG:H	1.84	0.74
1:A:369:ILE:CA	3:A:500:8PC:H27	2.17	0.74
1:B:319:ALA:CB	3:B:500:8PC:CL2	2.73	0.73
1:B:319:ALA:HB1	3:B:500:8PC:CL2	2.27	0.71
1:A:252:PHE:O	1:A:256:MET:HG3	1.90	0.71
1:B:323:ILE:HD12	3:B:500:8PC:H27	1.71	0.71
1:A:218:ASN:HB3	1:A:240:LYS:HD3	1.74	0.68
1:B:188:ASN:CA	1:B:189:MET:HB2	2.24	0.67
1:A:153:ILE:HB	1:A:157:LYS:HB3	1.75	0.67
1:A:201:LEU:HD22	1:A:205:LYS:HE3	1.76	0.67
1:B:367:THR:HA	1:B:370:ASP:OD2	1.96	0.65
1:A:259:GLN:NE2	1:A:401:ARG:NH2	2.37	0.65
3:A:500:8PC:C28	3:A:500:8PC:H4	2.25	0.65
1:A:136:ASN:HB2	1:A:186:ARG:NH1	2.13	0.64
3:A:500:8PC:C4	3:A:500:8PC:H28	2.26	0.64
1:A:222:VAL:HG21	3:A:500:8PC:H22	1.79	0.63
1:B:184:ASN:HD22	1:B:186:ARG:H	1.47	0.62
1:B:281:MET:HG3	3:B:500:8PC:H22	1.81	0.62
1:A:369:ILE:HA	3:A:500:8PC:C27	2.25	0.61

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:277:TYR:HE1	3:A:500:8PC:C6	2.13	0.61
1:A:258:PRO:O	1:A:259:GLN:HG2	2.02	0.60
1:A:219:ALA:N	3:A:500:8PC:CL1	2.70	0.59
1:A:379:TYR:HA	1:B:301:ARG:NH2	2.17	0.59
1:A:111:TYR:CE2	2:A:450:NAD:C2N	2.79	0.59
1:B:201:LEU:HD11	1:B:205:LYS:HE2	1.84	0.59
1:B:252:PHE:O	1:B:256:MET:HG3	2.02	0.58
1:A:258:PRO:C	1:A:259:GLN:HG2	2.24	0.58
1:B:259:GLN:HG2	1:B:304:ASN:ND2	2.20	0.57
1:A:259:GLN:HG3	1:A:401:ARG:NH2	2.20	0.56
1:A:369:ILE:HD13	3:A:500:8PC:H28	1.88	0.56
1:A:378:LYS:HD2	1:A:379:TYR:CE2	2.41	0.55
3:B:500:8PC:C4	3:B:500:8PC:H28	2.36	0.55
1:A:378:LYS:HD2	1:A:379:TYR:CZ	2.41	0.55
1:A:301:ARG:NH2	1:B:379:TYR:HA	2.21	0.55
1:A:314:PRO:HA	2:A:450:NAD:O7N	2.06	0.54
1:B:281:MET:HG3	3:B:500:8PC:C22	2.39	0.53
1:A:161:ILE:HD13	1:A:164:MET:CE	2.38	0.53
1:B:105:ILE:HD11	1:B:113:TRP:HE3	1.75	0.52
1:A:111:TYR:HE2	2:A:450:NAD:C3N	2.23	0.51
1:A:277:TYR:CE1	3:A:500:8PC:C6	2.93	0.51
1:A:149:ASN:O	1:A:152:ILE:HG12	2.12	0.50
1:B:264:SER:C	1:B:265:LEU:HD12	2.32	0.49
1:A:131:TRP:CE2	1:A:133:PRO:HG2	2.47	0.49
1:A:105:ILE:HD11	1:A:113:TRP:HE3	1.78	0.48
3:A:500:8PC:C28	3:A:500:8PC:C4	2.82	0.48
1:A:111:TYR:OH	1:A:313:GLY:O	2.32	0.47
1:A:131:TRP:CG	1:A:133:PRO:HD2	2.48	0.47
1:B:160:ASN:HD22	1:B:160:ASN:C	2.17	0.47
1:A:210:ASN:HA	1:A:260:SER:OG	2.14	0.47
1:A:256:MET:HE1	1:A:260:SER:HB3	1.97	0.47
1:B:210:ASN:HA	1:B:260:SER:OG	2.15	0.47
1:B:166:PRO:HD2	4:B:606:HOH:O	2.14	0.47
1:A:184:ASN:HD22	1:A:187:TYR:HD2	1.62	0.47
1:A:379:TYR:HA	1:B:301:ARG:HH22	1.80	0.46
1:B:137:ILE:CD1	1:B:140:LYS:HE2	2.45	0.46
1:A:179:GLU:CD	1:A:182:LYS:HD3	2.37	0.46
1:B:133:PRO:O	1:B:186:ARG:HD3	2.16	0.46
1:B:137:ILE:HD12	1:B:140:LYS:HE2	1.99	0.45
1:A:416:GLY:O	1:A:419:ILE:HG12	2.17	0.45
1:A:184:ASN:ND2	1:A:187:TYR:HD2	2.14	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:118:GLU:HG3	1:A:393:SER:N	2.32	0.45
1:A:131:TRP:CZ2	1:A:133:PRO:HG2	2.52	0.45
1:A:301:ARG:HH21	1:B:379:TYR:C	2.21	0.44
1:A:136:ASN:HB2	1:A:186:ARG:HH12	1.83	0.43
1:B:166:PRO:HB2	1:B:193:TYR:HB3	1.99	0.43
1:B:147:PHE:O	1:B:151:MET:HG3	2.18	0.43
1:A:137:ILE:HD12	1:A:186:ARG:HH12	1.83	0.43
1:A:314:PRO:HB2	1:A:373:ILE:HG12	2.01	0.43
1:A:210:ASN:HD22	1:A:211:MET:HG3	1.84	0.43
1:B:135:TYR:O	1:B:139:MET:HG2	2.19	0.43
1:A:184:ASN:HD22	1:A:187:TYR:H	1.67	0.42
1:B:277:TYR:OH	3:B:500:8PC:O22	2.20	0.42
1:B:416:GLY:O	1:B:419:ILE:HG12	2.20	0.42
1:A:277:TYR:CE1	3:A:500:8PC:H6	2.55	0.42
1:B:212:LEU:HD21	1:B:248:LEU:HG	2.02	0.42
1:A:161:ILE:HD13	1:A:164:MET:HE3	2.01	0.42
1:A:137:ILE:HD12	1:A:186:ARG:NH1	2.35	0.41
1:A:301:ARG:HH21	1:B:379:TYR:HA	1.84	0.41
1:A:315:LEU:HD11	1:A:388:SER:HB3	2.02	0.41
1:B:319:ALA:HB1	3:B:500:8PC:C15	2.51	0.41
1:B:236:ASP:O	1:B:240:LYS:HG2	2.21	0.41
1:B:301:ARG:HA	1:B:301:ARG:HD3	1.80	0.40
1:A:221:GLU:HB3	1:A:224:LYS:HD3	2.04	0.40
1:A:315:LEU:HD11	1:A:388:SER:CB	2.51	0.40
1:A:161:ILE:HG21	1:A:164:MET:HE2	2.02	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	271/338 (80%)	261 (96%)	9 (3%)	1 (0%)	39 65

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	B	274/338 (81%)	261 (95%)	12 (4%)	1 (0%)	39	65
All	All	545/676 (81%)	522 (96%)	21 (4%)	2 (0%)	39	65

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	189	MET
1	A	185	LYS

### 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	241/297 (81%)	233 (97%)	8 (3%)	45	73
1	B	241/297 (81%)	230 (95%)	11 (5%)	33	61
All	All	482/594 (81%)	463 (96%)	19 (4%)	39	68

All (19) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	210	ASN
1	A	226	LEU
1	A	227	LEU
1	A	248	LEU
1	A	259	GLN
1	A	283	SER
1	A	382	LEU
1	A	401	ARG
1	B	160	ASN
1	B	162	LEU
1	B	189	MET
1	B	190	LEU
1	B	191	GLN
1	B	227	LEU

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Mol	Chain	Res	Type
1	B	238	LEU
1	B	324	ASN
1	B	382	LEU
1	B	422	LEU
1	B	424	ASP

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (16) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	136	ASN
1	A	184	ASN
1	A	200	ASN
1	A	203	HIS
1	A	210	ASN
1	A	254	ASN
1	A	259	GLN
1	A	302	ASN
1	B	160	ASN
1	B	184	ASN
1	B	200	ASN
1	B	203	HIS
1	B	254	ASN
1	B	302	ASN
1	B	324	ASN
1	B	409	GLN

### 5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

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

## 5.5 Carbohydrates ⓘ

There are no carbohydrates in this entry.

## 5.6 Ligand geometry

4 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	NAD	A	450	-	38,48,48	1.33	6 (15%)	47,73,73	1.70	9 (19%)
3	8PC	A	500	-	25,25,25	0.92	2 (8%)	34,34,34	1.22	2 (5%)
2	NAD	B	450	-	38,48,48	1.30	6 (15%)	47,73,73	1.71	8 (17%)
3	8PC	B	500	-	25,25,25	0.90	2 (8%)	34,34,34	0.98	1 (2%)

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	NAD	A	450	-	-	0/22/62/62	0/5/5/5
3	8PC	A	500	-	-	0/8/8/8	0/3/3/3
2	NAD	B	450	-	-	0/22/62/62	0/5/5/5
3	8PC	B	500	-	-	0/8/8/8	0/3/3/3

All (16) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	450	NAD	C7N-N7N	-3.21	1.26	1.33
2	B	450	NAD	C7N-N7N	-3.14	1.26	1.33
2	A	450	NAD	C2A-N1A	-2.98	1.28	1.33
2	B	450	NAD	C2A-N1A	-2.74	1.28	1.33
2	B	450	NAD	C2A-N3A	-2.43	1.27	1.32
2	A	450	NAD	C2A-N3A	-2.38	1.28	1.32
2	B	450	NAD	O4B-C1B	2.00	1.43	1.41
2	A	450	NAD	O4D-C1D	2.14	1.43	1.41
2	A	450	NAD	O4B-C1B	2.15	1.43	1.41
3	B	500	8PC	C17-CL1	2.39	1.80	1.74
3	A	500	8PC	C17-CL1	2.48	1.80	1.74

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	450	NAD	O4D-C1D	2.49	1.44	1.41
3	B	500	8PC	C15-CL2	2.74	1.80	1.73
3	A	500	8PC	C15-CL2	2.97	1.80	1.73
2	B	450	NAD	O7N-C7N	4.15	1.33	1.24
2	A	450	NAD	O7N-C7N	4.22	1.33	1.24

All (20) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	450	NAD	N3A-C2A-N1A	-5.19	124.92	128.89
2	A	450	NAD	C4A-C5A-N7A	-4.85	105.02	109.48
2	A	450	NAD	PN-O3-PA	-4.70	119.53	132.73
2	A	450	NAD	N3A-C2A-N1A	-4.35	125.56	128.89
2	B	450	NAD	C4A-C5A-N7A	-4.09	105.71	109.48
2	B	450	NAD	PN-O3-PA	-3.26	123.57	132.73
2	B	450	NAD	C2B-C1B-N9A	-3.09	109.57	114.29
2	B	450	NAD	O7N-C7N-N7N	-2.69	118.80	122.59
2	A	450	NAD	O7N-C7N-N7N	-2.69	118.81	122.59
2	A	450	NAD	C2B-C1B-N9A	-2.43	110.58	114.29
3	B	500	8PC	C25-N24-C23	2.47	120.75	117.36
2	A	450	NAD	C2A-N1A-C6A	2.62	123.44	118.77
2	B	450	NAD	C2A-N1A-C6A	2.78	123.74	118.77
2	A	450	NAD	O4B-C1B-N9A	2.84	114.04	108.10
2	A	450	NAD	C3N-C7N-N7N	2.93	121.02	117.82
3	A	500	8PC	C25-N24-C23	2.97	121.44	117.36
2	A	450	NAD	O4D-C1D-N1N	3.21	111.66	108.13
3	A	500	8PC	O13-C2-C1	3.68	123.36	116.12
2	B	450	NAD	C3N-C7N-N7N	3.89	122.07	117.82
2	B	450	NAD	O4D-C1D-N1N	4.10	112.64	108.13

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

3 monomers are involved in 25 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	450	NAD	4	0
3	A	500	8PC	13	0
3	B	500	8PC	8	0



## 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, 95<sup>th</sup> 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 <sup>2</sup> )	Q<0.9
1	A	277/338 (81%)	1.14	51 (18%) <b>2</b> <b>1</b>	19, 34, 69, 91	0
1	B	280/338 (82%)	0.98	39 (13%) <b>4</b> <b>2</b>	19, 35, 72, 94	0
All	All	557/676 (82%)	1.06	90 (16%) <b>3</b> <b>1</b>	19, 34, 72, 94	0

All (90) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	368	PHE	7.7
1	A	367	THR	6.6
1	A	181	THR	6.5
1	A	374	GLU	6.3
1	B	145	GLY	5.5
1	A	178	ASP	5.4
1	A	186	ARG	4.8
1	A	184	ASN	4.8
1	B	207	GLY	4.5
1	A	369	ILE	4.4
1	A	371	TYR	4.4
1	A	183	ASN	4.4
1	A	185	LYS	4.4
1	B	158	LYS	4.3
1	B	123	ASN	4.2
1	A	373	ILE	4.1
1	B	144	ASN	4.1
1	B	149	ASN	4.1
1	B	146	LYS	4.1
1	B	143	LYS	4.0
1	B	367	THR	3.9
1	B	104	GLY	3.8
1	B	102	ILE	3.7
1	A	189	MET	3.7

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Mol	Chain	Res	Type	RSRZ
1	A	180	GLU	3.7
1	A	156	ASP	3.7
1	B	213	VAL	3.6
1	B	175	ASN	3.5
1	A	97	GLU	3.4
1	A	179	GLU	3.3
1	A	316	LYS	3.3
1	A	103	ALA	3.2
1	A	383	ARG	3.2
1	B	179	GLU	3.2
1	A	144	ASN	3.2
1	B	188	ASN	3.2
1	B	129	GLY	3.2
1	B	324	ASN	3.1
1	B	148	ASP	3.1
1	B	160	ASN	3.1
1	B	212	LEU	3.0
1	B	103	ALA	3.0
1	A	182	LYS	3.0
1	B	371	TYR	2.9
1	A	177	ILE	2.9
1	A	220	LYS	2.8
1	B	368	PHE	2.8
1	A	188	ASN	2.7
1	A	157	LYS	2.7
1	A	102	ILE	2.7
1	B	152	ILE	2.7
1	A	370	ASP	2.6
1	B	322	ALA	2.6
1	B	141	ASN	2.6
1	B	214	HIS	2.6
1	A	224	LYS	2.6
1	A	160	ASN	2.6
1	A	175	ASN	2.5
1	B	137	ILE	2.5
1	A	140	LYS	2.5
1	A	127	ILE	2.5
1	A	223	GLN	2.5
1	A	101	PHE	2.4
1	B	370	ASP	2.4
1	B	142	TYR	2.4
1	A	129	GLY	2.4

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Mol	Chain	Res	Type	RSRZ
1	B	215	SER	2.3
1	A	377	GLU	2.3
1	A	258	PRO	2.3
1	B	263	ILE	2.3
1	A	158	LYS	2.2
1	B	164	MET	2.2
1	B	254	ASN	2.2
1	A	424	ASP	2.2
1	B	115	ILE	2.2
1	A	230	SER	2.2
1	A	314	PRO	2.1
1	A	398	LEU	2.1
1	A	152	ILE	2.1
1	A	122	ARG	2.1
1	A	401	ARG	2.1
1	B	147	PHE	2.1
1	A	123	ASN	2.1
1	A	124	VAL	2.1
1	B	317	SER	2.1
1	A	199	ALA	2.1
1	A	98	ASP	2.0
1	B	374	GLU	2.0
1	B	208	LYS	2.0
1	A	222	VAL	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, 95<sup>th</sup> 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( $\text{\AA}^2$ )	Q<0.9
2	NAD	A	450	44/44	0.70	0.66	6.23	25,37,45,48	44
3	8PC	B	500	23/23	0.83	0.44	3.72	13,27,41,54	0
3	8PC	A	500	23/23	0.65	0.52	1.55	28,44,55,59	0
2	NAD	B	450	44/44	0.86	0.24	0.22	29,35,45,48	0

## 6.5 Other polymers [i](#)

There are no such residues in this entry.