



# Full wwPDB X-ray Structure Validation Report ⓘ

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PDB ID : 6VTZ / pdb\_00006vtz  
Title : Structure of a thiolation-reductase di-domain from an archaeal non-ribosomal peptide synthetase  
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Deposited on : 2020-02-13  
Resolution : 2.65 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

<https://www.wwpdb.org/validation/2017/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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

MolProbity : 4-5-2 with Phenix2.0  
Xtrriage (Phenix) : 2.0  
EDS : 3.0  
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)  
CCP4 : 9.0.010 (Gargrove)  
Density-Fitness : 1.0.12  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.49

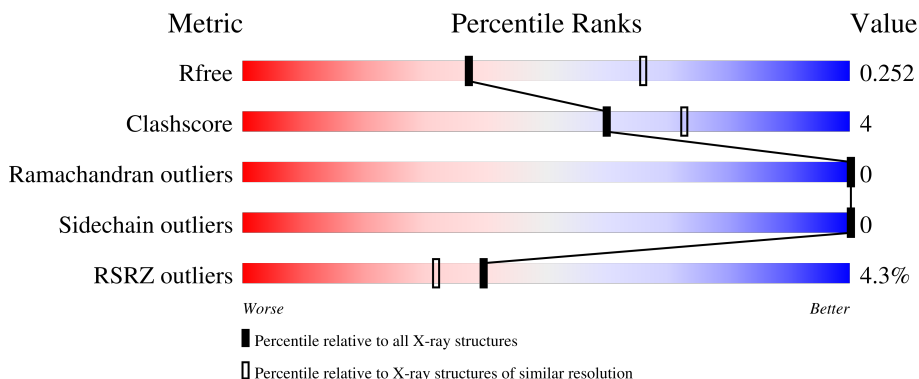
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.65 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))
$R_{free}$	180053	1110 (2.66-2.66)
Clashscore	190562	1141 (2.66-2.66)
Ramachandran outliers	187476	1126 (2.66-2.66)
Sidechain outliers	187428	1126 (2.66-2.66)
RSRZ outliers	180081	1110 (2.66-2.66)

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 of the lower bar indicate the fraction of residues that contain outliers for  $\geq 3$ , 2, 1 and 0 types of geometric quality criteria respectively. 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	491	

## 2 Entry composition

There are 2 unique types of molecules in this entry. The entry contains 2970 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 Non-ribosomal peptide synthetase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	374	2965	1901	475	578	11	0	0	0

There are 4 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	3697	GLY	-	expression tag	UNP D3E027
A	3698	SER	-	expression tag	UNP D3E027
A	3699	GLY	-	expression tag	UNP D3E027
A	3700	ALA	-	expression tag	UNP D3E027

- Molecule 2 is water.

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



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 32 2 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	139.92Å 139.92Å 71.75Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	46.29 – 2.65 46.29 – 2.65	Depositor EDS
% Data completeness (in resolution range)	100.0 (46.29-2.65) 100.0 (46.29-2.65)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.38 (at 2.65Å)	Xtrriage
Refinement program	PHENIX 1.13_2998	Depositor
R, $R_{free}$	0.203 , 0.246 0.213 , 0.252	Depositor DCC
$R_{free}$ test set	1137 reflections (4.78%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	73.9	Xtrriage
Anisotropy	0.063	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.31 , 39.7	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.50$ , $\langle L^2 \rangle = 0.34$	Xtrriage
Estimated twinning fraction	0.023 for -h,-k,l	Xtrriage
$F_o, F_c$ correlation	0.95	EDS
Total number of atoms	2970	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	73.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.28% 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, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

## 5 Model quality [i](#)

### 5.1 Standard geometry [i](#)

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	0.38	0/3023	0.52	1/4094 (0.0%)

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed( $^{\circ}$ )	Ideal( $^{\circ}$ )
1	A	4047	ALA	N-CA-C	5.74	116.12	108.38

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	2965	0	2796	25	0
2	A	5	0	0	0	0
All	All	2970	0	2796	25	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 4.

All (25) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance ( $\text{\AA}$ )	Clash overlap ( $\text{\AA}$ )
1:A:4048:MET:HE2	1:A:4096:VAL:HG11	1.45	0.97

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:3909:THR:OG1	1:A:3948:LYS:HE2	1.87	0.74
1:A:4021:TYR:O	1:A:4175:ARG:NH1	2.27	0.68
1:A:4048:MET:CE	1:A:4096:VAL:HG11	2.23	0.64
1:A:4053:ALA:HB1	1:A:4093:ARG:HG3	1.81	0.63
1:A:3826:LEU:HB2	1:A:3907:ILE:HD13	1.87	0.57
1:A:3854:LEU:HD13	1:A:3865:ARG:HD3	1.90	0.53
1:A:4036:LEU:HD13	1:A:4180:LEU:HD11	1.92	0.50
1:A:3892:ASP:OD1	1:A:3894:THR:OG1	2.23	0.49
1:A:4092:HIS:O	1:A:4096:VAL:HG13	2.14	0.47
1:A:4099:LEU:HA	1:A:4099:LEU:HD23	1.66	0.47
1:A:3846:GLU:O	1:A:3885:ARG:NH2	2.48	0.47
1:A:4049:ASN:OD1	1:A:4051:ALA:N	2.50	0.45
1:A:3877:ASP:OD1	1:A:3879:THR:HG23	2.16	0.44
1:A:4048:MET:CE	1:A:4096:VAL:HG21	2.48	0.44
1:A:3822:LEU:HD21	1:A:4070:LEU:HD22	2.00	0.44
1:A:4180:LEU:HD23	1:A:4180:LEU:HA	1.85	0.44
1:A:4026:PHE:CG	1:A:4027:GLN:N	2.86	0.43
1:A:3822:LEU:HD12	1:A:3822:LEU:HA	1.89	0.42
1:A:3808:GLU:HB3	1:A:4078:LYS:HD3	2.01	0.42
1:A:4086:ASN:HA	1:A:4165:TRP:CD2	2.55	0.41
1:A:4116:GLN:O	1:A:4120:GLN:HG3	2.21	0.41
1:A:4086:ASN:HA	1:A:4165:TRP:CG	2.56	0.41
1:A:3916:LEU:HD23	1:A:3926:ILE:HA	2.03	0.41
1:A:4182:LYS:HB2	1:A:4182:LYS:HE3	1.89	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	370/491 (75%)	352 (95%)	18 (5%)	0	<b>100</b> <b>100</b>

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	311/437 (71%)	311 (100%)	0	100   100

There are no protein residues with a non-rotameric sidechain to report.

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. There are no such sidechains identified.

### 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 oligosaccharides in this entry.

### 5.6 Ligand geometry [i](#)

There are no ligands in this entry.

### 5.7 Other polymers [i](#)

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 [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, 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	374/491 (76%)	0.07	16 (4%) 40 32	47, 70, 101, 129	0

All (16) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	4119	GLU	3.4
1	A	4118	TYR	2.8
1	A	4121	ASN	2.8
1	A	4187	GLU	2.8
1	A	3904	ASP	2.7
1	A	3919	HIS	2.6
1	A	3907	ILE	2.5
1	A	4115	LYS	2.4
1	A	3791	ASP	2.4
1	A	3920	TYR	2.3
1	A	4112	GLU	2.3
1	A	4116	GLN	2.1
1	A	3973	TYR	2.1
1	A	4113	GLU	2.1
1	A	3918	LYS	2.1
1	A	4117	ILE	2.1

### 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 oligosaccharides in this entry.

## 6.4 Ligands

There are no ligands in this entry.

## 6.5 Other polymers

There are no such residues in this entry.