



# wwPDB X-ray Structure Validation Summary Report ⓘ

May 21, 2020 – 07:51 am BST

PDB ID : 6RIA  
Title : Bactofilin from *Thermus thermophilus*, F105R mutant crystal structure  
Authors : Lowe, J.; Gonzalez Llamazares, A.  
Deposited on : 2019-04-23  
Resolution : 3.50 Å(reported)

This is a wwPDB X-ray Structure Validation Summary 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.

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

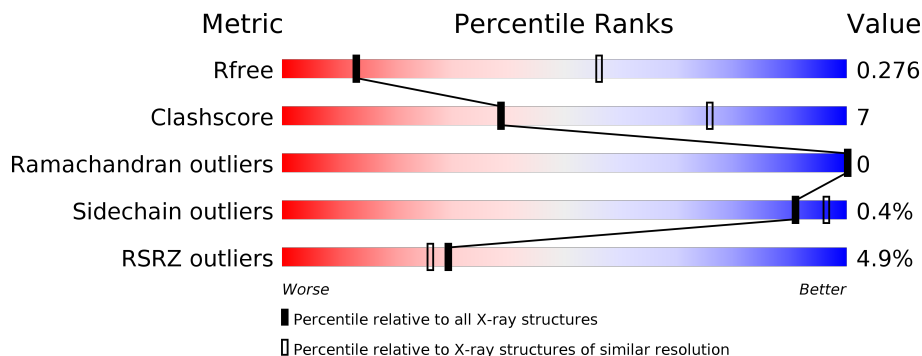
MolProbity : 4.02b-467  
Xtriage (Phenix) : 1.13  
EDS : 2.11  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
Refmac : 5.8.0158  
CCP4 : 7.0.044 (Gargrove)  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.11

# 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 3.50 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))
$R_{free}$	130704	1659 (3.60-3.40)
Clashscore	141614	1036 (3.58-3.42)
Ramachandran outliers	138981	1005 (3.58-3.42)
Sidechain outliers	138945	1006 (3.58-3.42)
RSRZ outliers	127900	1559 (3.60-3.40)

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 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	1	123	
1	2	123	
1	3	123	
1	4	123	
1	5	123	
1	6	123	


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Mol	Chain	Length	Quality of chain
1	A	123	55% 18% 27%
1	B	123	58% 15% 27%
1	C	123	63% 10% 27%
1	D	123	66% 7% 27%
1	E	123	67% 6% 27%
1	F	123	59% 14% 27%
1	G	123	59% 14% 27%
1	H	123	% 62% 11% 27%
1	I	123	55% 18% 27%
1	J	123	63% 11% 27%
1	K	123	54% 19% 27%
1	L	123	55% 18% 27%
1	M	123	% 60% 12% • 27%
1	N	123	% 60% 12% • 27%
1	O	123	% 61% 12% 27%
1	P	123	% 59% 13% • 27%
1	Q	123	59% 14% 27%
1	R	123	% 59% 14% 27%
1	S	123	61% 12% 27%
1	T	123	% 63% 11% 27%
1	U	123	63% 11% 27%
1	V	123	% 55% 18% 27%
1	W	123	62% 11% 27%
1	X	123	61% 12% 27%
1	Y	123	8% 46% 26% • 27%

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Mol	Chain	Length	Quality of chain
1	Z	123	 <p>A horizontal bar chart representing the quality of chain. The bar is divided into four segments: a small red segment at the beginning labeled '2%', followed by a large green segment labeled '50%', a yellow segment labeled '24%', and a grey segment at the end labeled '27%'.</p>

## 2 Entry composition [i](#)

There is only 1 type of molecule in this entry. The entry contains 21663 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 bactofilin.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	90	676	421	120	134	1	0	0	0
1	B	90	677	421	121	134	1	0	0	0
1	C	90	677	421	121	134	1	0	0	0
1	D	90	677	421	121	134	1	0	0	0
1	E	90	677	421	121	134	1	0	0	0
1	F	90	677	421	121	134	1	0	0	0
1	G	90	677	421	121	134	1	0	0	0
1	H	90	677	421	121	134	1	0	0	0
1	I	90	677	421	121	134	1	0	0	0
1	J	90	677	421	121	134	1	0	0	0
1	K	90	677	421	121	134	1	0	0	0
1	L	90	677	421	121	134	1	0	0	0
1	M	90	677	421	121	134	1	0	0	0
1	N	90	677	421	121	134	1	0	0	0
1	O	90	677	421	121	134	1	0	0	0
1	P	90	677	421	121	134	1	0	0	0

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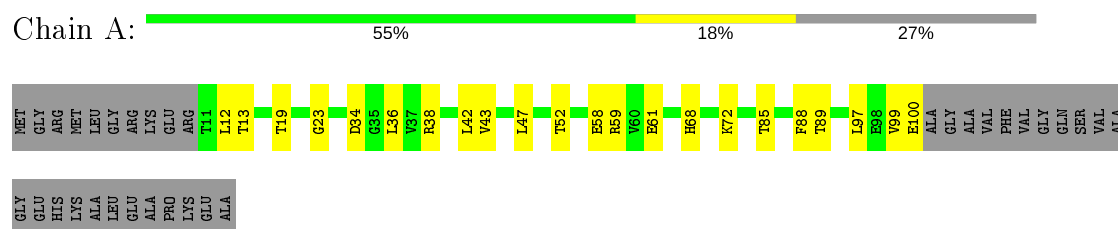
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Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	Q	90	677	421	121	134	1	0	0	0
1	R	90	677	421	121	134	1	0	0	0
1	S	90	677	421	121	134	1	0	0	0
1	T	90	677	421	121	134	1	0	0	0
1	U	90	677	421	121	134	1	0	0	0
1	V	90	677	421	121	134	1	0	0	0
1	W	90	677	421	121	134	1	0	0	0
1	X	90	677	421	121	134	1	0	0	0
1	Y	90	677	421	121	134	1	0	0	0
1	Z	90	677	421	121	134	1	0	0	0
1	1	90	677	421	121	134	1	0	0	0
1	2	90	677	421	121	134	1	0	0	0
1	3	90	677	421	121	134	1	0	0	0
1	4	90	677	421	121	134	1	0	0	0
1	5	90	677	421	121	134	1	0	0	0
1	6	90	677	421	121	134	1	0	0	0

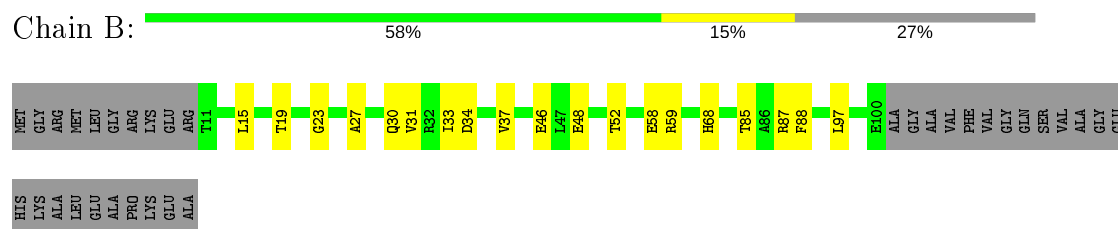
### 3 Residue-property plots [i](#)

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.

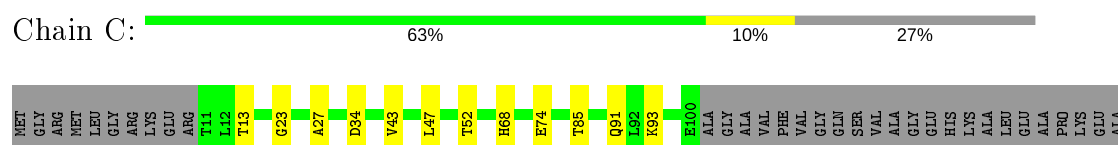
- Molecule 1: bactofilin



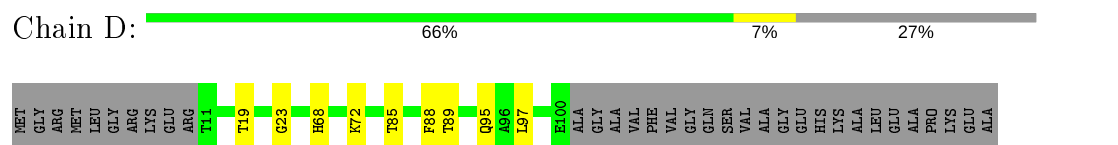
- Molecule 1: bactofilin



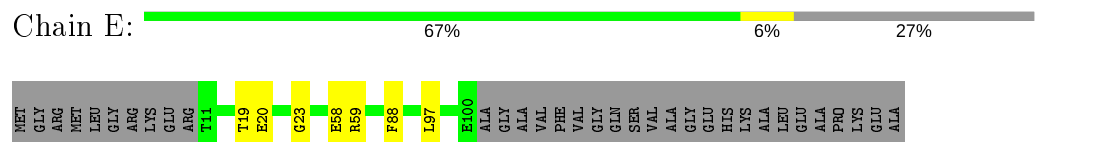
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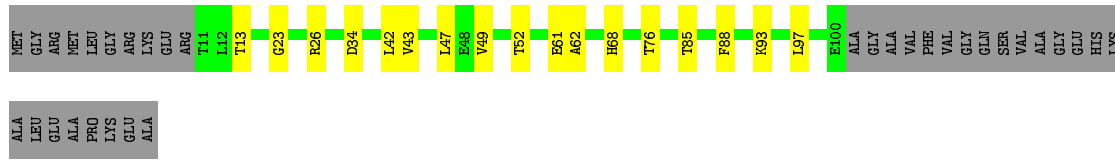
- Molecule 1: bactofilin



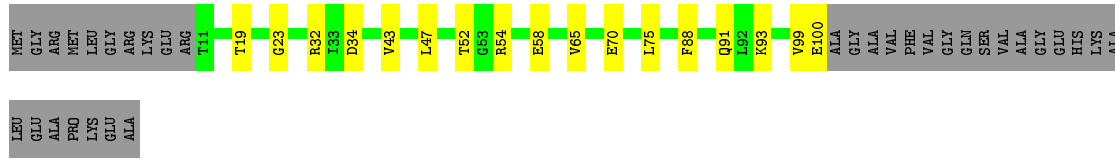
- Molecule 1: bactofilin



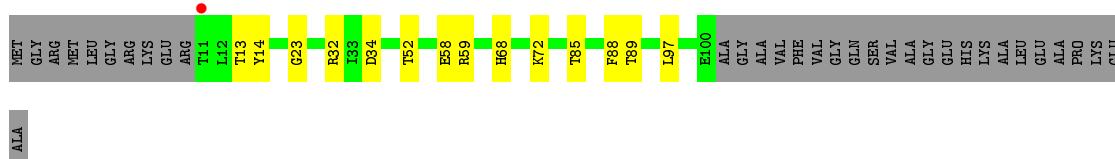
• Molecule 1: bactoflin



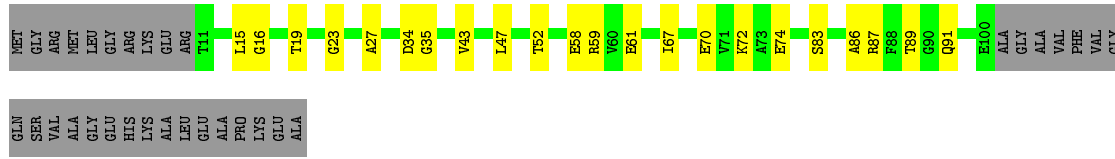
• Molecule 1: bactoflin



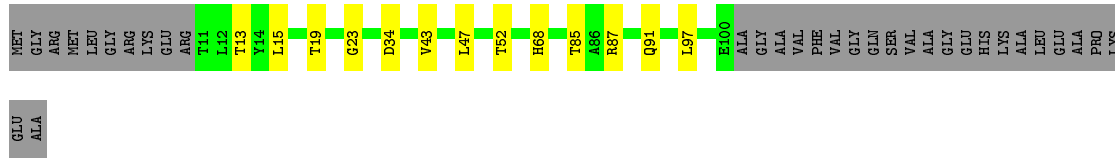
• Molecule 1: bactoflin



• Molecule 1: bactoflin



• Molecule 1: bactoflin



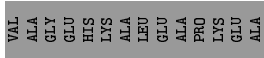
• Molecule 1: bactoflin



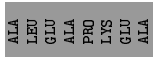




● Molecule 1: bactoflin



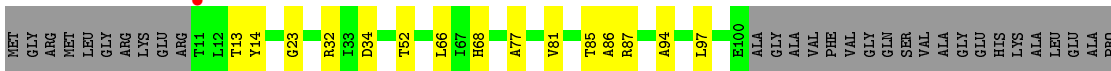
● Molecule 1: bactoflin



● Molecule 1: bactoflin



● Molecule 1: bactoflin



● Molecule 1: bactoflin



LYS  
ALA  
LEU  
GLU  
ALA  
PRO  
LYS  
GLU  
ALA

## ● Molecule 1: bactofilin

Chain Q:  59% 14% 27%MET  
GLY  
ARG  
MET  
LEU  
GLY  
ARG  
LYS  
GLU  
ARG  
T11  
L15  
G23  
D24  
V43  
L47  
T52  
G53  
R54  
R55  
E56  
G57  
E58  
R59  
A62  
H68  
G69  
E70  
T85  
A86  
R87  
F88  
L97  
E100  
ALA  
GLY  
ALA  
VAL  
PHE  
VAL  
GLY  
GLN  
SER  
VAL  
GLY  
GLN  
SER  
LYS  
VAL  
GLY  
HIS  
LYS  
LEU  
GLU  
ALA  
PRO  
LYSALA  
LEU  
GLU  
PRO  
LYS  
GLU  
ALA

## ● Molecule 1: bactofilin

Chain R:  % 59% 14% 27%MET  
GLY  
ARG  
MET  
LEU  
GLY  
ARG  
LYS  
GLU  
ARG  
T11  
L15  
G23  
R32  
I33  
D34  
V43  
L47  
E48  
V49  
T52  
H68  
K72  
T85  
F88  
T89  
G90  
Q91  
I92  
K93  
E100  
ALA  
GLY  
ALA  
VAL  
PHE  
VAL  
GLY  
GLN  
SER  
VAL  
GLY  
HIS  
LYS  
LEU  
GLU  
ALA  
PRO  
LYSALA  
PRO  
LYS  
GLU  
ALA

## ● Molecule 1: bactofilin

Chain S:  61% 12% 27%MET  
GLY  
ARG  
MET  
LEU  
GLY  
ARG  
LYS  
GLU  
ARG  
T11  
G23  
D24  
E46  
T52  
E58  
R59  
H68  
K72  
T85  
F88  
T89  
G90  
Q91  
R93  
L97  
E100  
ALA  
GLY  
VAL  
VAL  
PHE  
VAL  
GLY  
GLN  
SER  
VAL  
GLY  
HIS  
LYS  
LEU  
GLU  
ALA  
PRO  
LYSGLU  
ALA

## ● Molecule 1: bactofilin

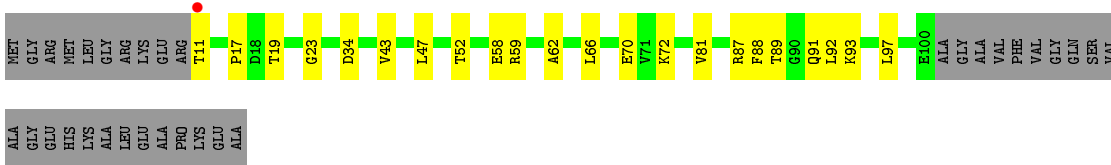
Chain T:  % 63% 11% 27%MET  
GLY  
ARG  
MET  
LEU  
GLY  
ARG  
LYS  
GLU  
ARG  
T11  
G23  
E58  
R59  
L66  
I67  
H68  
K72  
V81  
T85  
F88  
T89  
L92  
L97  
E98  
V99  
E100  
ALA  
GLY  
VAL  
PHE  
VAL  
VAL  
GLY  
GLN  
SER  
VAL  
VAL  
GLY  
GLY  
HIS  
LYS  
VAL  
GLY  
LEU  
GLU  
ALA  
PRO  
LYS  
ALA

## ● Molecule 1: bactofilin

Chain U:  63% 11% 27%MET  
GLY  
MET  
LEU  
GLY  
LYS  
GLU  
T11  
L12  
T13  
L22  
G23  
D24  
R38  
T52  
G53  
R54  
V55  
E56  
I67  
H68  
L75  
T85  
E100  
ALA  
GLY  
VAL  
PHE  
VAL  
GLY  
GLN  
SER  
VAL  
VAL  
GLY  
GLY  
HIS  
LYS  
LEU  
GLU  
ALA  
PRO  
LYS  
GLU  
ALA

## ● Molecule 1: bactofilin

Chain V:  % 55% 18% 27%



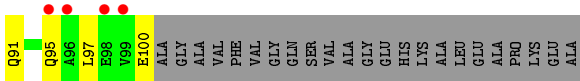
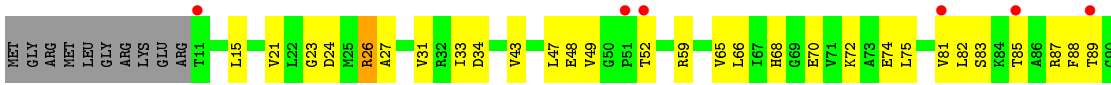
• Molecule 1: bactoflin



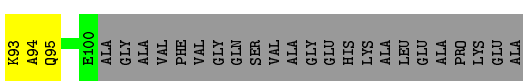
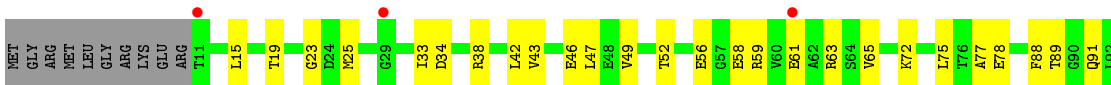
• Molecule 1: bactoflin



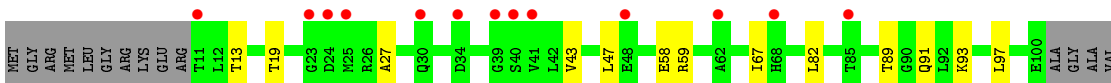
• Molecule 1: bactoflin



• Molecule 1: bactoflin



• Molecule 1: bactoflin



PHE  
VAL  
GLY  
GLN  
SER  
VAL  
ALA  
GLY  
GLU  
GLU  
HIS  
LYS  
ALA  
LEU  
GLU  
ALA  
PRO  
LYS  
GLU  
ALA

• Molecule 1: bactofilin



MET  
GLY  
ARG  
MET  
LEU  
GLY  
VAL  
ARG  
LYS  
GLU  
ARG  
T11  
L12  
T13  
T19  
E20  
V21  
L22  
G23  
A27  
K28  
G29  
D30  
V31  
D34  
G35  
V43  
E44  
E46  
L47  
T52  
G53  
R54  
V55  
E58  
R59  
V60  
E61  
S64  
K72  
A73  
T76  
L82  
S83  
R84  
T85  
F88  
T89  
G90

R93  
A94  
Q95  
A96  
L97  
R98  
V99  
E100  
ALA  
GLY  
ALA  
VAL  
PHE  
VAL  
GLY  
GLN  
SER  
VAL  
VAL  
ALA  
GLY  
GLU  
ALA  
PRO  
LYS  
GLU  
ALA

• Molecule 1: bactofilin



MET  
GLY  
ARG  
MET  
LEU  
GLY  
ARG  
LYS  
GLU  
ARG  
T11  
L12  
T13  
D18  
T19  
G23  
D24  
R26  
A27  
K28  
G29  
R32  
G35  
E44  
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R63  
L66  
L67  
H68  
G69  
A77  
V81  
T85  
A86  
R87  
F88  
T89  
G90  
A94  
L97

R98  
V99  
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PHE  
VAL  
GLY  
GLN  
SER  
VAL  
ALA  
GLY  
GLU  
ALA  
PRO  
LYS  
GLU  
ALA

• Molecule 1: bactofilin



MET  
GLY  
ARG  
MET  
LEU  
GLY  
ARG  
LYS  
GLU  
ARG  
T11  
L12  
T13  
T19  
E20  
V21  
L22  
G23  
T33  
L36  
V37  
R38  
P61  
T52  
G53  
E56  
E57  
E58  
V65  
H68  
G69  
E74  
L75  
T76  
A77  
T85  
F88  
T89  
A94  
Q95  
A96  
L97  
E98  
V99  
E100  
ALA  
GLY  
ALA  
VAL

PHE  
VAL  
GLY  
GLN  
SER  
VAL  
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HIS  
LYS  
ALA  
LEU  
GLU

• Molecule 1: bactofilin

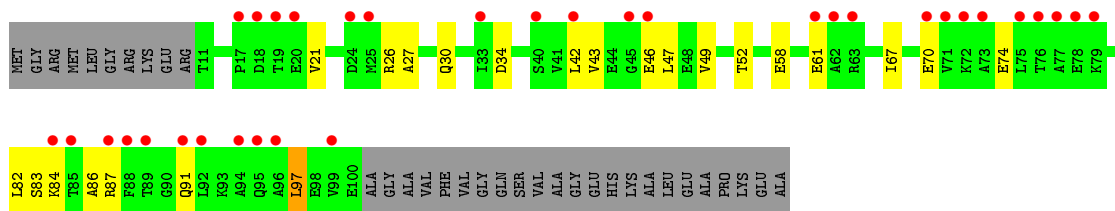


MET  
GLY  
ARG  
MET  
LEU  
ARG  
LYS  
GLU  
ARG  
T11  
T19  
E20  
V21  
D24  
M25  
K28  
G29  
D34  
G35  
L36  
V37  
S40  
E46  
T52  
G53  
R54  
V55  
E56  
G57  
E58  
E61  
A62  
R63  
S64  
H68  
G69  
E70  
V71  
K72  
A73  
E74  
L75  
T76  
A77  
E78  
K79  
V80  
V81  
L82  
S83

R84  
R87  
F88  
Q91  
A94  
Q95  
A96  
V99  
E100  
ALA  
GLY  
VAL  
PHE  
VAL  
VAL  
GLY  
GLN  
SER  
VAL  
VAL  
ALA  
GLY  
GLU  
ALA  
PRO  
LYS  
GLU  
ALA

• Molecule 1: bactofilin





## 4 Data and refinement statistics

Property	Value	Source
Space group	I 21 21 21	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	191.87Å 244.90Å 505.92Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	49.89 – 3.50 49.89 – 3.50	Depositor EDS
% Data completeness (in resolution range)	96.0 (49.89-3.50) 99.0 (49.89-3.50)	Depositor EDS
$R_{merge}$	0.12	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	2.46 (at 3.48Å)	Xtrriage
Refinement program	PHENIX (1.14_3260: ???)	Depositor
R, $R_{free}$	0.283 , 0.307 0.278 , 0.276	Depositor DCC
$R_{free}$ test set	7389 reflections (5.00%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	72.7	Xtrriage
Anisotropy	1.479	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.30 , 57.2	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.38$ , $\langle L^2 \rangle = 0.21$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
$F_o, F_c$ correlation	0.90	EDS
Total number of atoms	21663	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	113.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.36% 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	1	0.24	0/681	0.52	0/917
1	2	0.24	0/681	0.53	0/917
1	3	0.24	0/681	0.54	0/917
1	4	0.30	0/681	0.56	0/917
1	5	0.24	0/681	0.54	0/917
1	6	0.25	0/681	0.55	0/917
1	A	0.25	0/680	0.52	0/915
1	B	0.25	0/681	0.54	0/917
1	C	0.26	0/681	0.55	0/917
1	D	0.26	0/681	0.56	0/917
1	E	0.26	0/681	0.53	0/917
1	F	0.27	0/681	0.58	0/917
1	G	0.26	0/681	0.57	0/917
1	H	0.25	0/681	0.53	0/917
1	I	0.28	0/681	0.56	0/917
1	J	0.32	0/681	0.58	0/917
1	K	0.26	0/681	0.55	0/917
1	L	0.26	0/681	0.54	0/917
1	M	0.25	0/681	0.53	0/917
1	N	0.25	0/681	0.53	0/917
1	O	0.25	0/681	0.54	0/917
1	P	0.24	0/681	0.56	0/917
1	Q	0.25	0/681	0.53	0/917
1	R	0.25	0/681	0.55	0/917
1	S	0.26	0/681	0.52	0/917
1	T	0.25	0/681	0.54	0/917
1	U	0.27	0/681	0.56	0/917
1	V	0.26	0/681	0.55	0/917
1	W	0.27	0/681	0.57	0/917
1	X	0.26	0/681	0.56	0/917
1	Y	0.26	0/681	0.54	0/917
1	Z	0.24	0/681	0.54	0/917
All	All	0.26	0/21791	0.55	0/29342

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

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	1	677	0	703	11	0
1	2	677	0	703	17	0
1	3	677	0	703	17	2
1	4	677	0	703	18	0
1	5	677	0	703	11	0
1	6	677	0	703	15	0
1	A	676	0	702	15	0
1	B	677	0	703	15	0
1	C	677	0	703	7	0
1	D	677	0	703	8	0
1	E	677	0	703	5	2
1	F	677	0	703	13	0
1	G	677	0	703	12	0
1	H	677	0	703	9	0
1	I	677	0	703	18	0
1	J	677	0	703	11	0
1	K	677	0	703	17	0
1	L	677	0	703	17	0
1	M	677	0	703	12	0
1	N	677	0	703	12	0
1	O	677	0	703	10	0
1	P	677	0	703	11	0
1	Q	677	0	703	13	0
1	R	677	0	703	12	0
1	S	677	0	703	12	0
1	T	677	0	703	9	0
1	U	677	0	703	10	0
1	V	677	0	703	19	0
1	W	677	0	703	13	0
1	X	677	0	703	12	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	Y	677	0	703	24	0
1	Z	677	0	703	21	0
All	All	21663	0	22495	330	2

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 7.

The worst 5 of 330 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:R:91:GLN:HE22	1:R:93:LYS:HG3	1.35	0.90
1:2:46:GLU:HG3	1:2:64:SER:HB2	1.65	0.79
1:V:91:GLN:HE22	1:V:93:LYS:HG3	1.46	0.79
1:J:68:HIS:O	1:J:85:THR:OG1	2.05	0.75
1:K:23:GLY:HA3	1:L:23:GLY:HA3	1.69	0.74

All (2) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:20:GLU:OE2	1:3:26:ARG:NH1[7_656]	1.37	0.83
1:E:20:GLU:CD	1:3:26:ARG:NH1[7_656]	1.97	0.23

## 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	1	88/123 (72%)	80 (91%)	8 (9%)	0	100   100
1	2	88/123 (72%)	80 (91%)	8 (9%)	0	100   100
1	3	88/123 (72%)	83 (94%)	5 (6%)	0	100   100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	4	88/123 (72%)	82 (93%)	6 (7%)	0	100	100
1	5	88/123 (72%)	82 (93%)	6 (7%)	0	100	100
1	6	88/123 (72%)	82 (93%)	6 (7%)	0	100	100
1	A	88/123 (72%)	80 (91%)	8 (9%)	0	100	100
1	B	88/123 (72%)	83 (94%)	5 (6%)	0	100	100
1	C	88/123 (72%)	81 (92%)	7 (8%)	0	100	100
1	D	88/123 (72%)	83 (94%)	5 (6%)	0	100	100
1	E	88/123 (72%)	80 (91%)	8 (9%)	0	100	100
1	F	88/123 (72%)	81 (92%)	7 (8%)	0	100	100
1	G	88/123 (72%)	81 (92%)	7 (8%)	0	100	100
1	H	88/123 (72%)	82 (93%)	6 (7%)	0	100	100
1	I	88/123 (72%)	80 (91%)	8 (9%)	0	100	100
1	J	88/123 (72%)	83 (94%)	5 (6%)	0	100	100
1	K	88/123 (72%)	79 (90%)	9 (10%)	0	100	100
1	L	88/123 (72%)	81 (92%)	7 (8%)	0	100	100
1	M	88/123 (72%)	82 (93%)	6 (7%)	0	100	100
1	N	88/123 (72%)	82 (93%)	6 (7%)	0	100	100
1	O	88/123 (72%)	82 (93%)	6 (7%)	0	100	100
1	P	88/123 (72%)	82 (93%)	6 (7%)	0	100	100
1	Q	88/123 (72%)	80 (91%)	8 (9%)	0	100	100
1	R	88/123 (72%)	82 (93%)	6 (7%)	0	100	100
1	S	88/123 (72%)	82 (93%)	6 (7%)	0	100	100
1	T	88/123 (72%)	81 (92%)	7 (8%)	0	100	100
1	U	88/123 (72%)	82 (93%)	6 (7%)	0	100	100
1	V	88/123 (72%)	81 (92%)	7 (8%)	0	100	100
1	W	88/123 (72%)	81 (92%)	7 (8%)	0	100	100
1	X	88/123 (72%)	81 (92%)	7 (8%)	0	100	100
1	Y	88/123 (72%)	83 (94%)	5 (6%)	0	100	100
1	Z	88/123 (72%)	82 (93%)	6 (7%)	0	100	100
All	All	2816/3936 (72%)	2606 (92%)	210 (8%)	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	1	72/94 (77%)	72 (100%)	0	100	100
1	2	72/94 (77%)	72 (100%)	0	100	100
1	3	72/94 (77%)	71 (99%)	1 (1%)	67	85
1	4	72/94 (77%)	72 (100%)	0	100	100
1	5	72/94 (77%)	72 (100%)	0	100	100
1	6	72/94 (77%)	71 (99%)	1 (1%)	67	85
1	A	71/94 (76%)	71 (100%)	0	100	100
1	B	72/94 (77%)	72 (100%)	0	100	100
1	C	72/94 (77%)	71 (99%)	1 (1%)	67	85
1	D	72/94 (77%)	72 (100%)	0	100	100
1	E	72/94 (77%)	72 (100%)	0	100	100
1	F	72/94 (77%)	72 (100%)	0	100	100
1	G	72/94 (77%)	72 (100%)	0	100	100
1	H	72/94 (77%)	72 (100%)	0	100	100
1	I	72/94 (77%)	71 (99%)	1 (1%)	67	85
1	J	72/94 (77%)	71 (99%)	1 (1%)	67	85
1	K	72/94 (77%)	72 (100%)	0	100	100
1	L	72/94 (77%)	72 (100%)	0	100	100
1	M	72/94 (77%)	71 (99%)	1 (1%)	67	85
1	N	72/94 (77%)	71 (99%)	1 (1%)	67	85
1	O	72/94 (77%)	72 (100%)	0	100	100
1	P	72/94 (77%)	71 (99%)	1 (1%)	67	85
1	Q	72/94 (77%)	72 (100%)	0	100	100
1	R	72/94 (77%)	72 (100%)	0	100	100
1	S	72/94 (77%)	72 (100%)	0	100	100
1	T	72/94 (77%)	72 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	U	72/94 (77%)	72 (100%)	0	100	100
1	V	72/94 (77%)	72 (100%)	0	100	100
1	W	72/94 (77%)	72 (100%)	0	100	100
1	X	72/94 (77%)	72 (100%)	0	100	100
1	Y	72/94 (77%)	71 (99%)	1 (1%)	67	85
1	Z	72/94 (77%)	72 (100%)	0	100	100
All	All	2303/3008 (77%)	2294 (100%)	9 (0%)	91	96

5 of 9 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	N	87	ARG
1	6	97	LEU
1	Y	26	ARG
1	J	87	ARG
1	P	91	GLN

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (2) such sidechains are listed below:

Mol	Chain	Res	Type
1	R	91	GLN
1	V	91	GLN

### 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](#)

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 [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, 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	1	90/123 (73%)	1.33	13 (14%) 2 3	146, 167, 182, 193	0
1	2	90/123 (73%)	1.33	21 (23%) 0 0	161, 184, 197, 204	0
1	3	90/123 (73%)	1.03	10 (11%) 5 6	131, 151, 164, 170	0
1	4	90/123 (73%)	0.86	7 (7%) 13 13	127, 141, 157, 186	0
1	5	90/123 (73%)	1.80	35 (38%) 0 0	179, 194, 206, 222	0
1	6	90/123 (73%)	1.80	34 (37%) 0 0	183, 202, 215, 223	0
1	A	90/123 (73%)	0.14	0 100 100	66, 90, 115, 140	0
1	B	90/123 (73%)	0.15	0 100 100	69, 100, 122, 156	0
1	C	90/123 (73%)	0.08	0 100 100	59, 86, 114, 165	0
1	D	90/123 (73%)	0.19	0 100 100	52, 84, 116, 147	0
1	E	90/123 (73%)	0.18	0 100 100	59, 90, 119, 131	0
1	F	90/123 (73%)	0.18	0 100 100	64, 89, 119, 131	0
1	G	90/123 (73%)	0.23	0 100 100	58, 84, 107, 140	0
1	H	90/123 (73%)	0.19	1 (1%) 80 75	65, 89, 110, 155	0
1	I	90/123 (73%)	0.11	0 100 100	54, 75, 109, 119	0
1	J	90/123 (73%)	0.19	0 100 100	57, 83, 109, 119	0
1	K	90/123 (73%)	0.21	0 100 100	60, 90, 117, 149	0
1	L	90/123 (73%)	0.29	0 100 100	66, 94, 120, 131	0
1	M	90/123 (73%)	0.43	1 (1%) 80 75	86, 110, 137, 141	0
1	N	90/123 (73%)	0.24	0 100 100	74, 106, 135, 149	0
1	O	90/123 (73%)	0.49	1 (1%) 80 75	99, 124, 145, 155	0
1	P	90/123 (73%)	0.48	1 (1%) 80 75	89, 121, 142, 158	0
1	Q	90/123 (73%)	0.17	0 100 100	56, 102, 126, 154	0
1	R	90/123 (73%)	0.27	1 (1%) 80 75	92, 118, 140, 151	0

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Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å <sup>2</sup> )	Q<0.9
1	S	90/123 (73%)	0.21	0 <b>100</b> <b>100</b>	58, 85, 116, 151	0
1	T	90/123 (73%)	0.27	1 (1%) 80 75	65, 97, 120, 143	0
1	U	90/123 (73%)	0.16	0 <b>100</b> <b>100</b>	54, 76, 108, 119	0
1	V	90/123 (73%)	0.11	1 (1%) 80 75	56, 81, 111, 131	0
1	W	90/123 (73%)	0.17	0 <b>100</b> <b>100</b>	54, 80, 106, 122	0
1	X	90/123 (73%)	0.09	0 <b>100</b> <b>100</b>	58, 84, 110, 122	0
1	Y	90/123 (73%)	0.87	10 (11%) 5 6	119, 148, 165, 175	0
1	Z	90/123 (73%)	0.76	3 (3%) 46 41	127, 153, 167, 172	0
All	All	2880/3936 (73%)	0.47	140 (4%) 29 26	52, 103, 193, 223	0

The worst 5 of 140 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	1	24	ASP	6.8
1	6	95	GLN	5.4
1	R	11	THR	4.7
1	Y	11	THR	4.6
1	1	40	SER	4.5

## 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](#)

There are no ligands in this entry.

## 6.5 Other polymers [i](#)

There are no such residues in this entry.