



# wwPDB X-ray Structure Validation Summary Report ⓘ

Feb 1, 2016 – 08:37 AM GMT

PDB ID : 3FGB  
Title : Crystal structure of the Q89ZH8\_BACTN protein from Bacteroides thetaio-  
taomicron. Northeast Structural Genomics Consortium target BtR289b.  
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C.; Janjua, H.; Xiao, R.; Acton, T.; Montelione, G.T.; Tong, L.; Hunt, J.F.;  
Northeast Structural Genomics Consortium (NESG)  
Deposited on : 2008-12-05  
Resolution : 2.00 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  
<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

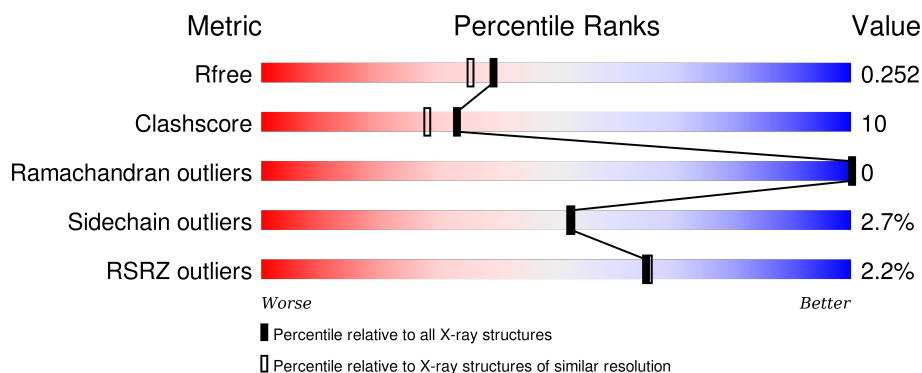
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

## *X-RAY DIFFRACTION*

The reported resolution of this entry is 2.00 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))
$R_{free}$	91344	6249 (2.00-2.00)
Clashscore	102246	7340 (2.00-2.00)
Ramachandran outliers	100387	7248 (2.00-2.00)
Sidechain outliers	100360	7247 (2.00-2.00)
RSRZ outliers	91569	6262 (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  $\geq 3$ , 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	361	<div> <div></div> <div>80%15% . .</div> </div>
1	B	361	<div> <div>3%</div> <div>80%15% . .</div> </div>

## 2 Entry composition [i](#)

There are 2 unique types of molecules in this entry. The entry contains 5957 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 uncharacterized protein Q89ZH8\_BACTN.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
1	A	349	Total	C	N	O	S	Se	0	0	0
			2640	1670	441	523	4	2			
1	B	349	Total	C	N	O	S	Se	0	0	0
			2654	1679	443	526	4	2			

There are 18 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	31	MSE	-	expression tag	UNP Q89ZH8
A	384	LEU	-	expression tag	UNP Q89ZH8
A	385	GLU	-	expression tag	UNP Q89ZH8
A	386	HIS	-	expression tag	UNP Q89ZH8
A	387	HIS	-	expression tag	UNP Q89ZH8
A	388	HIS	-	expression tag	UNP Q89ZH8
A	389	HIS	-	expression tag	UNP Q89ZH8
A	390	HIS	-	expression tag	UNP Q89ZH8
A	391	HIS	-	expression tag	UNP Q89ZH8
B	31	MSE	-	expression tag	UNP Q89ZH8
B	384	LEU	-	expression tag	UNP Q89ZH8
B	385	GLU	-	expression tag	UNP Q89ZH8
B	386	HIS	-	expression tag	UNP Q89ZH8
B	387	HIS	-	expression tag	UNP Q89ZH8
B	388	HIS	-	expression tag	UNP Q89ZH8
B	389	HIS	-	expression tag	UNP Q89ZH8
B	390	HIS	-	expression tag	UNP Q89ZH8
B	391	HIS	-	expression tag	UNP Q89ZH8

- Molecule 2 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	331	Total	O	0	0
			331	331		

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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	B	332	Total 332	O 332	0	0



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	79.48Å 85.08Å 99.43Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	42.93 – 2.00 42.92 – 1.89	Depositor EDS
% Data completeness (in resolution range)	80.2 (42.93-2.00) 92.7 (42.92-1.89)	Depositor EDS
$R_{merge}$	0.13	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	0.79 (at 1.88Å)	Xtriage
Refinement program	CNS 1.2	Depositor
R, $R_{free}$	0.225 , 0.240 0.239 , 0.252	Depositor DCC
$R_{free}$ test set	1805 reflections (4.44%)	DCC
Wilson B-factor (Å <sup>2</sup> )	15.0	Xtriage
Anisotropy	1.068	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.31 , 42.3	EDS
Estimated twinning fraction	No twinning to report.	Xtriage
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.47$ , $\langle L^2 \rangle = 0.31$	Xtriage
Outliers	11 of 104048 reflections (0.011%)	Xtriage
$F_o, F_c$ correlation	0.94	EDS
Total number of atoms	5957	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	20.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 57.94 % of the origin peak, indicating pseudo translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo translational symmetry is equal to 2.1987e-05. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

<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](#)

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	0.36	0/2693	0.65	2/3653 (0.1%)
1	B	0.37	0/2707	0.66	0/3668
All	All	0.37	0/5400	0.66	2/7321 (0.0%)

There are no bond length outliers.

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	383	PRO	N-CA-CB	5.60	110.02	103.30
1	A	43	TYR	N-CA-C	-5.06	97.33	111.00

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	2640	0	2544	55	0
1	B	2654	0	2576	52	0
2	A	331	0	0	13	0
2	B	332	0	0	11	0
All	All	5957	0	5120	107	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 10.

The worst 5 of 107 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:B:144:ILE:HG23	1:B:179:LEU:HD23	1.48	0.94
1:A:36:LEU:HD11	1:A:58:GLU:HB3	1.52	0.91
1:A:196:LEU:O	1:A:196:LEU:HD12	1.78	0.82
1:B:354:VAL:HG12	2:B:688:HOH:O	1.81	0.81
1:B:268:LYS:HG3	2:B:706:HOH:O	1.81	0.80

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	347/361 (96%)	330 (95%)	17 (5%)	0	100	100
1	B	347/361 (96%)	330 (95%)	17 (5%)	0	100	100
All	All	694/722 (96%)	660 (95%)	34 (5%)	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	A	280/297 (94%)	273 (98%)	7 (2%)	55	55
1	B	284/297 (96%)	276 (97%)	8 (3%)	51	50

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
All	All	564/594 (95%)	549 (97%)	15 (3%)	52 52

5 of 15 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	254	SER
1	B	60	ASN
1	B	180	HIS
1	A	196	LEU
1	B	151	LYS

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 16 such sidechains are listed below:

Mol	Chain	Res	Type
1	A	353	GLN
1	B	60	ASN
1	B	243	ASN
1	A	332	ASN
1	B	251	ASN

### 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 ⓘ

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	A	347/361 (96%)	0.38	5 (1%) 78 78	12, 19, 28, 38	0
1	B	347/361 (96%)	0.39	10 (2%) 55 56	11, 18, 27, 31	0
All	All	694/722 (96%)	0.39	15 (2%) 65 66	11, 19, 27, 38	0

The worst 5 of 15 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	120	GLY	6.7
1	B	34	GLN	5.1
1	B	171	LYS	3.6
1	B	213	ASP	2.9
1	B	47	ASP	2.9

### 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.