



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 9, 2026 – 01:42 AM UTC

PDB ID : 3S30 / pdb_00003s30
Title : Crystal structure of a putative glycoside hydrolase (BVU_0247) from *Bacteroides vulgatus* ATCC 8482 at 2.46 Å resolution
Authors : Joint Center for Structural Genomics (JCSG)
Deposited on : 2011-05-17
Resolution : 2.46 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

<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>.

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

MolProbity : 4-5-2 with Phenix2.0
Mogul : 2022.3.0, CSD as543be (2022)
Xtriage (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

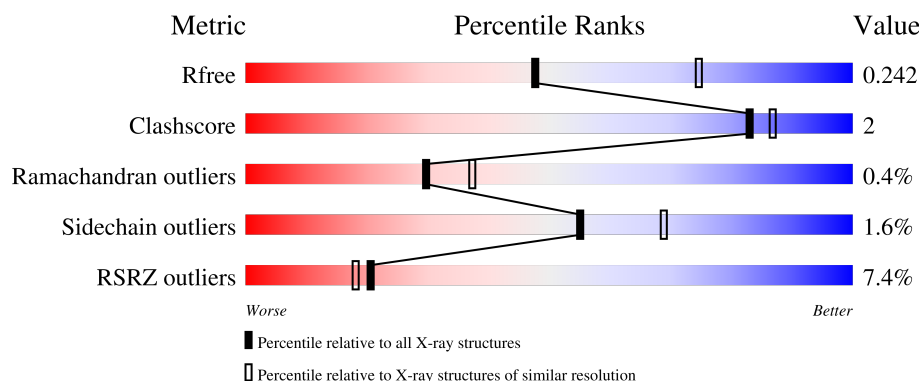
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

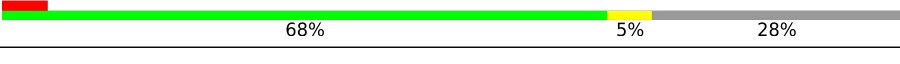
The reported resolution of this entry is 2.46 Å.

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	1190 (2.46-2.46)
Clashscore	190562	1229 (2.46-2.46)
Ramachandran outliers	187476	1218 (2.46-2.46)
Sidechain outliers	187428	1218 (2.46-2.46)
RSRZ outliers	180081	1190 (2.46-2.46)

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 ≥ 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	354	 5% 68% 28%
1	B	354	 5% 68% 5% 28%

2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 4145 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 Hypothetical glycoside hydrolase.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
1	A	254	Total	C	N	O	S	Se	0	1	0
			1981	1266	315	394	2	4			
1	B	256	Total	C	N	O	S	Se	0	0	0
			1994	1274	317	397	2	4			

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	0	GLY	-	expression tag	UNP A6KX05
B	0	GLY	-	expression tag	UNP A6KX05

- Molecule 2 is SODIUM ION (CCD ID: NA) (formula: Na).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	1	Total	Na	0	0
			1	1		
2	B	1	Total	Na	0	0
			1	1		

- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	92	Total	O	0	0
			92	92		
3	B	76	Total	O	0	0
			76	76		

4 Data and refinement statistics

Property	Value	Source
Space group	P 65	Depositor
Cell constants a, b, c, α , β , γ	146.75Å 146.75Å 91.51Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	29.66 – 2.46 29.66 – 2.46	Depositor EDS
% Data completeness (in resolution range)	99.2 (29.66-2.46) 99.1 (29.66-2.46)	Depositor EDS
R_{merge}	0.09	Depositor
R_{sym}	0.09	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.26 (at 2.45Å)	Xtriage
Refinement program	REFMAC 5.5.0110	Depositor
R, R_{free}	0.233 , 0.251 (Not available) , 0.242	Depositor DCC
R_{free} test set	2033 reflections (4.98%)	wwPDB-VP
Wilson B-factor (Å ²)	46.4	Xtriage
Anisotropy	0.105	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.29 , 28.7	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtriage
Estimated twinning fraction	0.033 for h,-h-k,-l	Xtriage
F_o, F_c correlation	0.91	EDS
Total number of atoms	4145	wwPDB-VP
Average B, all atoms (Å ²)	63.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.98% 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

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: NA

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	0.60	0/2029	0.71	0/2749
1	B	0.60	0/2040	0.72	0/2764
All	All	0.60	0/4069	0.72	0/5513

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	A	1981	0	1897	8	0
1	B	1994	0	1906	11	0
2	A	1	0	0	0	0
2	B	1	0	0	0	0
3	A	92	0	0	0	0
3	B	76	0	0	0	0
All	All	4145	0	3803	19	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 2.

All (19) 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:211:MSE:SE	1:A:229:MSE:HA	2.40	0.72
1:A:209:VAL:HG23	1:A:211:MSE:HG3	1.73	0.69
1:B:211:MSE:SE	1:B:229:MSE:HA	2.53	0.58
1:B:304:MSE:CE	1:B:307:ALA:HB2	2.34	0.57
1:A:249:LEU:HD11	1:A:373:LEU:HD11	1.89	0.53
1:B:171:LEU:HB3	1:B:229:MSE:HE3	1.94	0.49
1:B:304:MSE:HE2	1:B:307:ALA:HB2	1.95	0.47
1:A:209:VAL:HG23	1:A:211:MSE:CG	2.45	0.46
1:B:274:PHE:CZ	1:B:313:THR:HG22	2.50	0.46
1:A:304:MSE:HE1	1:A:306:ALA:O	2.16	0.45
1:A:211:MSE:SE	1:A:228:ALA:O	2.85	0.45
1:B:211:MSE:SE	1:B:229:MSE:HG2	2.67	0.44
1:B:162:TRP:CD2	1:B:218:LEU:HD21	2.53	0.43
1:B:306:ALA:HB2	1:B:328:TYR:CD2	2.53	0.43
1:A:211:MSE:HE2	1:A:360:PHE:CZ	2.53	0.43
1:B:274:PHE:CE1	1:B:313:THR:HG22	2.53	0.43
1:B:304:MSE:HE1	1:B:307:ALA:HB2	2.02	0.42
1:B:209:VAL:HG23	1:B:211:MSE:HG3	2.01	0.41
1:A:162:TRP:CD2	1:A:218:LEU:HD21	2.56	0.41

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	253/354 (72%)	245 (97%)	7 (3%)	1 (0%)	30	37
1	B	254/354 (72%)	243 (96%)	10 (4%)	1 (0%)	30	37
All	All	507/708 (72%)	488 (96%)	17 (3%)	2 (0%)	30	37

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	204	SER
1	B	204	SER

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	214/296 (72%)	210 (98%)	4 (2%)	50	64
1	B	215/296 (73%)	212 (99%)	3 (1%)	59	72
All	All	429/592 (72%)	422 (98%)	7 (2%)	55	69

All (7) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	211	MSE
1	A	245	GLU
1	A	313	THR
1	A	335	ILE
1	B	240	THR
1	B	245	GLU
1	B	338	GLN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (4) such sidechains are listed below:

Mol	Chain	Res	Type
1	B	179	ASN
1	B	196	GLN
1	B	303	ASN
1	B	338	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 oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 2 ligands modelled in this entry, 2 are monoatomic - leaving 0 for Mogul analysis.

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

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	250/354 (70%)	0.63	19 (7%)	20 17	36, 60, 88, 114	1 (0%)
1	B	252/354 (71%)	0.68	18 (7%)	22 19	46, 62, 92, 121	0
All	All	502/708 (70%)	0.65	37 (7%)	20 18	36, 61, 90, 121	1 (0%)

All (37) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	125	THR	8.9
1	B	123	PRO	4.4
1	B	125	THR	4.3
1	B	191	THR	3.7
1	A	203	GLY	3.7
1	A	204	SER	3.5
1	A	285	LYS	3.5
1	B	204	SER	3.2
1	B	126	LYS	3.1
1	B	203	GLY	3.1
1	A	313	THR	3.1
1	B	264	ASN	3.0
1	A	378	LYS	3.0
1	B	192	GLY	3.0
1	B	378	LYS	3.0
1	A	192	GLY	2.8
1	B	285	LYS	2.8
1	A	126	LYS	2.8
1	A	286	ASP	2.7
1	A	377	CYS	2.5
1	A	329	GLU	2.5
1	A	265	GLY	2.4
1	B	262	TYR	2.4
1	A	244	TYR	2.4

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Mol	Chain	Res	Type	RSRZ
1	A	191	THR	2.3
1	A	338	GLN	2.3
1	A	262	TYR	2.3
1	A	341	ALA	2.3
1	B	332	GLY	2.2
1	A	179	ASN	2.2
1	B	248	LYS	2.2
1	B	338	GLN	2.1
1	B	342	ASN	2.1
1	A	190	ARG	2.1
1	B	331	TYR	2.1
1	B	329	GLU	2.0
1	B	247	ILE	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 oligosaccharides 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. 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	B-factors($\text{\AA}^2$)	Q<0.9
2	NA	B	384	1/1	0.62	0.23	56,56,56,56	0
2	NA	A	383	1/1	0.86	0.21	47,47,47,47	0

6.5 Other polymers [i](#)

There are no such residues in this entry.