



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 5, 2026 – 09:45 PM UTC

PDB ID : 7AED / pdb_00007aed
Title : VirB8 domain of PrgL from Enterococcus faecalis pCF10
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Deposited on : 2020-09-17
Resolution : 1.75 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

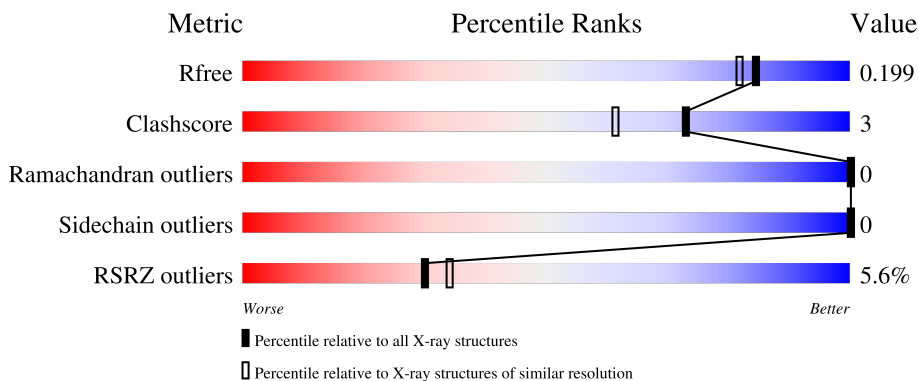
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.75 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	3183 (1.76-1.76)
Clashscore	190562	3299 (1.76-1.76)
Ramachandran outliers	187476	3274 (1.76-1.76)
Sidechain outliers	187428	3274 (1.76-1.76)
RSRZ outliers	180081	3183 (1.76-1.76)

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	195	 7% 63% 7% 23%
1	B	195	 7% 64% 7% 22%

2 Entry composition i

There are 3 unique types of molecules in this entry. The entry contains 2368 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 PrgL.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	128	1054	664	178	210	2	0	2	0
1	B	138	1131	711	189	229	2	0	1	0

There are 36 discrepancies between the modelled and reference sequences:

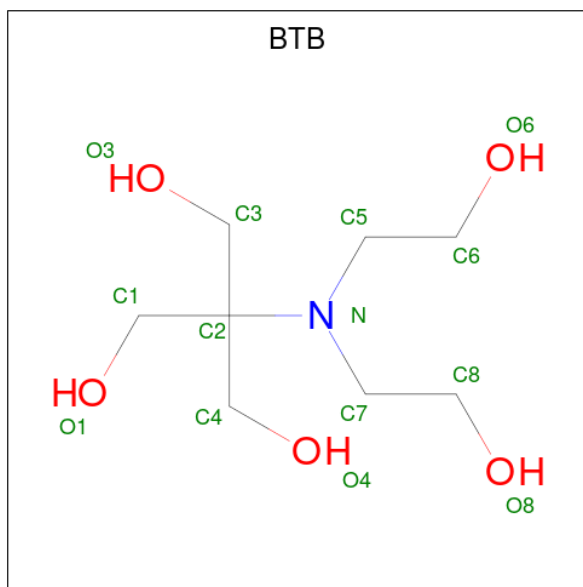
Chain	Residue	Modelled	Actual	Comment	Reference
A	209	LEU	-	expression tag	UNP D1LHF8
A	210	GLU	-	expression tag	UNP D1LHF8
A	211	VAL	-	expression tag	UNP D1LHF8
A	212	LEU	-	expression tag	UNP D1LHF8
A	213	PHE	-	expression tag	UNP D1LHF8
A	214	GLN	-	expression tag	UNP D1LHF8
A	215	GLY	-	expression tag	UNP D1LHF8
A	216	PRO	-	expression tag	UNP D1LHF8
A	217	HIS	-	expression tag	UNP D1LHF8
A	218	HIS	-	expression tag	UNP D1LHF8
A	219	HIS	-	expression tag	UNP D1LHF8
A	220	HIS	-	expression tag	UNP D1LHF8
A	221	HIS	-	expression tag	UNP D1LHF8
A	222	HIS	-	expression tag	UNP D1LHF8
A	223	HIS	-	expression tag	UNP D1LHF8
A	224	HIS	-	expression tag	UNP D1LHF8
A	225	HIS	-	expression tag	UNP D1LHF8
A	226	HIS	-	expression tag	UNP D1LHF8
B	209	LEU	-	expression tag	UNP D1LHF8
B	210	GLU	-	expression tag	UNP D1LHF8
B	211	VAL	-	expression tag	UNP D1LHF8
B	212	LEU	-	expression tag	UNP D1LHF8
B	213	PHE	-	expression tag	UNP D1LHF8
B	214	GLN	-	expression tag	UNP D1LHF8
B	215	GLY	-	expression tag	UNP D1LHF8

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Chain	Residue	Modelled	Actual	Comment	Reference
B	216	PRO	-	expression tag	UNP D1LHF8
B	217	HIS	-	expression tag	UNP D1LHF8
B	218	HIS	-	expression tag	UNP D1LHF8
B	219	HIS	-	expression tag	UNP D1LHF8
B	220	HIS	-	expression tag	UNP D1LHF8
B	221	HIS	-	expression tag	UNP D1LHF8
B	222	HIS	-	expression tag	UNP D1LHF8
B	223	HIS	-	expression tag	UNP D1LHF8
B	224	HIS	-	expression tag	UNP D1LHF8
B	225	HIS	-	expression tag	UNP D1LHF8
B	226	HIS	-	expression tag	UNP D1LHF8

- Molecule 2 is 2-[BIS-(2-HYDROXY-ETHYL)-AMINO]-2-HYDROXYMETHYL-PROPAN E-1,3-DIOL (CCD ID: BTB) (formula: C₈H₁₉NO₅).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	N	O		
2	A	1	14	8	1	5	0	0
2	B	1	14	8	1	5	0	0

- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	O		
3	A	93	93	93	0	0

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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	B	62	Total	O	0	0
			62	62		

4 Data and refinement statistics

Property	Value	Source
Space group	H 3	Depositor
Cell constants a, b, c, α , β , γ	124.52Å 124.52Å 66.43Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	34.74 – 1.75 34.74 – 1.75	Depositor EDS
% Data completeness (in resolution range)	99.8 (34.74-1.75) 99.8 (34.74-1.75)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.36 (at 1.75Å)	Xtrriage
Refinement program	PHENIX 1.15.2-3472	Depositor
R, R_{free}	0.179 , 0.198 0.180 , 0.199	Depositor DCC
R_{free} test set	2033 reflections (5.27%)	wwPDB-VP
Wilson B-factor (Å ²)	35.3	Xtrriage
Anisotropy	0.087	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.32 , 34.9	EDS
L-test for twinning ²	$\langle L \rangle = 0.51$, $\langle L^2 \rangle = 0.34$	Xtrriage
Estimated twinning fraction	0.015 for h,-h-k,-l	Xtrriage
F_o, F_c correlation	0.97	EDS
Total number of atoms	2368	wwPDB-VP
Average B, all atoms (Å ²)	45.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.84% 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 [i](#)

5.1 Standard geometry [i](#)

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

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	0.32	0/1068	0.53	0/1447
1	B	0.24	0/1147	0.47	0/1555
All	All	0.28	0/2215	0.50	0/3002

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 [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	1054	0	1056	6	0
1	B	1131	0	1121	10	0
2	A	14	0	19	0	0
2	B	14	0	19	1	0
3	A	93	0	0	2	0
3	B	62	0	0	1	0
All	All	2368	0	2215	14	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 3.

All (14) 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:139:LYS:HE3	1:B:142:ASN:HD22	1.49	0.76
1:A:123[A]:ASN:ND2	3:A:401:HOH:O	2.24	0.70
1:A:97:GLN:HE22	1:B:185:PRO:HB2	1.61	0.64
1:B:106:TYR:CZ	1:B:140:ARG:HB2	2.42	0.54
1:B:96:LYS:NZ	3:B:403:HOH:O	2.36	0.51
1:A:176:THR:HB	1:B:176:THR:CG2	2.40	0.50
1:B:178:THR:O	1:B:182:GLN:HG2	2.17	0.45
1:A:61:LYS:HG3	3:A:438:HOH:O	2.19	0.42
1:B:83:VAL:HG12	1:B:169:VAL:HB	2.01	0.42
1:B:133:LYS:HA	1:B:150:GLN:O	2.21	0.41
1:A:176:THR:HB	1:B:176:THR:HG23	2.03	0.41
1:A:87:MET:HE3	1:A:87:MET:HA	2.03	0.41
2:B:301:BTB:H32	2:B:301:BTB:H71	1.84	0.41
1:B:162:LYS:HA	1:B:162:LYS:HD3	1.87	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	128/195 (66%)	127 (99%)	1 (1%)	0	100	100
1	B	137/195 (70%)	136 (99%)	1 (1%)	0	100	100
All	All	265/390 (68%)	263 (99%)	2 (1%)	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	119/179 (66%)	119 (100%)	0	100	100
1	B	128/179 (72%)	128 (100%)	0	100	100
All	All	247/358 (69%)	247 (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. All (5) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	97	GLN
1	A	152	ASN
1	B	101	GLN
1	B	142	ASN
1	B	152	ASN

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](#)

2 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	BTB	B	301	-	13,13,13	0.53	0	7,16,16	0.55	0
2	BTB	A	301	-	13,13,13	0.56	0	7,16,16	0.61	0

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	BTB	B	301	-	-	5/21/21/21	-
2	BTB	A	301	-	-	6/21/21/21	-

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (11) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	301	BTB	O1-C1-C2-C3
2	A	301	BTB	O1-C1-C2-N
2	A	301	BTB	C1-C2-C3-O3
2	A	301	BTB	C4-C2-C3-O3
2	A	301	BTB	N-C2-C3-O3
2	B	301	BTB	C1-C2-C4-O4
2	B	301	BTB	C3-C2-C4-O4
2	B	301	BTB	N-C2-C4-O4
2	A	301	BTB	N-C5-C6-O6
2	B	301	BTB	N-C5-C6-O6
2	B	301	BTB	O1-C1-C2-N

There are no ring outliers.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	B	301	BTB	1	0

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, 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	128/195 (65%)	0.07	2 (1%) 70 77	16, 36, 56, 81	3 (2%)
1	B	138/195 (70%)	0.79	13 (9%) 14 17	16, 48, 77, 98	1 (0%)
All	All	266/390 (68%)	0.44	15 (5%) 30 34	16, 42, 71, 98	4 (1%)

All (15) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	181	LEU	4.1
1	B	185	PRO	3.6
1	B	147	LEU	3.6
1	B	189	ASN	3.3
1	B	99	VAL	2.9
1	B	179	ASN	2.9
1	B	103	TYR	2.9
1	B	145	GLY	2.8
1	A	178	THR	2.7
1	B	180	GLU	2.3
1	B	106	TYR	2.2
1	B	70	LYS	2.2
1	A	179	ASN	2.2
1	B	183	GLU	2.1
1	B	182	GLN	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(Å ²)	Q<0.9
2	BTB	B	301	14/14	0.88	0.13	55,60,64,65	0
2	BTB	A	301	14/14	0.90	0.12	38,41,46,47	0

6.5 Other polymers [i](#)

There are no such residues in this entry.