Full wwPDB X-ray Structure Validation Report ⓘ

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PDB ID	:	7VWK
Title	:	The product template domain of AviM
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Deposited on	:	2021-11-10
Resolution	:	2.00 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 following versions of software and data (see references ⓘ) were used in the production of this report:

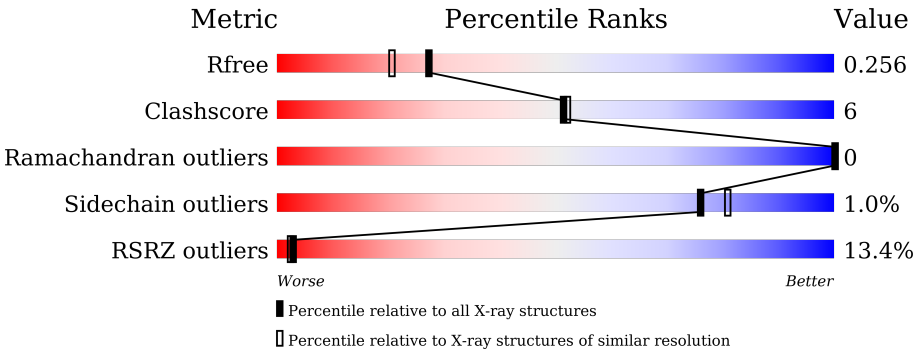
MolProbity	:	4.02b-467
Xtriage (Phenix)	:	1.13
EDS	:	2.28.1
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.28.1

1 Overall quality at a glance (i)

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}	130704	8085 (2.00-2.00)
Clashscore	141614	9178 (2.00-2.00)
Ramachandran outliers	138981	9054 (2.00-2.00)
Sidechain outliers	138945	9053 (2.00-2.00)
RSRZ outliers	127900	7900 (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 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 <=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	260	9% 90% 10%
1	B	260	17% 81% 11% · 8%

2 Entry composition (i)

There are 2 unique types of molecules in this entry. The entry contains 3743 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 Polyketide synthase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	260	Total	C	N	O	S	0	1	0
			1928	1203	351	370	4			
1	B	240	Total	C	N	O	S	0	0	0
			1776	1110	319	343	4			

- Molecule 2 is water.

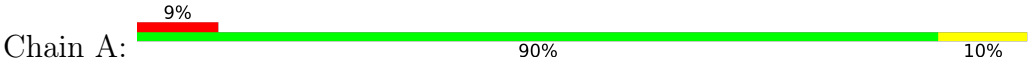
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	27	Total	O	0	0
			27	27		
2	B	12	Total	O	0	0
			12	12		

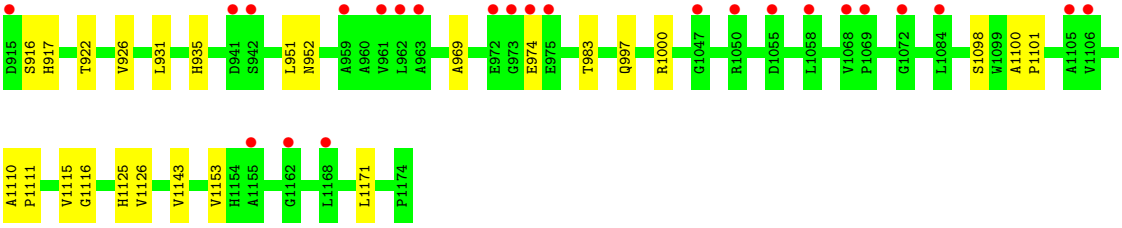
3 Residue-property plots (i)

These plots are drawn for all protein, RNA, DNA and oligosaccharide 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: Polyketide synthase

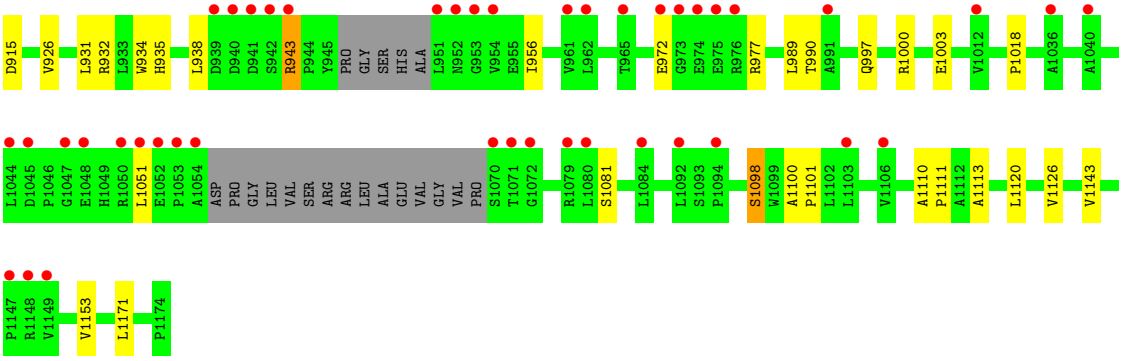
Chain A:





• Molecule 1: Polyketide synthase

Chain B:



4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α, β, γ	51.68Å 58.71Å 82.50Å 90.00° 96.28° 90.00°	Depositor
Resolution (Å)	50.00 – 2.00 29.35 – 2.00	Depositor EDS
% Data completeness (in resolution range)	97.9 (50.00-2.00) 97.9 (29.35-2.00)	Depositor EDS
R_{merge}	0.06	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	2.62 (at 2.00Å)	Xtriage
Refinement program	REFMAC 5.8.0158	Depositor
R, R_{free}	0.202 , 0.253 0.212 , 0.256	Depositor DCC
R_{free} test set	1657 reflections (5.06%)	wwPDB-VP
Wilson B-factor (Å^2)	39.0	Xtriage
Anisotropy	0.064	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.37 , 47.6	EDS
L-test for twinning[2]	$< \|L\| > = 0.50$, $< L^2 > = 0.33$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.96	EDS
Total number of atoms	3743	wwPDB-VP
Average B, all atoms (Å^2)	50.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.70% of the height of the origin peak. No significant pseudotranslation is detected.*

[1] Intensities estimated from amplitudes.

[2] Theoretical values of $< |L| >$, $< L^2 >$ 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

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	0.57	0/1970	0.45	0/2702
1	B	0.48	0/1812	0.44	0/2483
All	All	0.53	0/3782	0.45	0/5185

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	1928	0	1911	19	0
1	B	1776	0	1755	26	0
2	A	27	0	0	0	0
2	B	12	0	0	0	0
All	All	3743	0	3666	41	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 6.

All (41) 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:934:TRP:HZ2	1:B:972:GLU:HG3	1.34	0.92

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:935:HIS:HE1	1:A:997:GLN:HE21	1.33	0.76
1:B:1143:VAL:HG13	1:B:1153:VAL:CG1	2.17	0.75
1:B:934:TRP:CZ2	1:B:972:GLU:HG3	2.22	0.73
1:B:935:HIS:HE1	1:B:997:GLN:HE21	1.37	0.73
1:B:915:ASP:OD1	1:B:1098:SER:HB2	1.89	0.73
1:A:935:HIS:CE1	1:A:997:GLN:HE21	2.07	0.72
1:B:1143:VAL:HG13	1:B:1153:VAL:HG11	1.71	0.71
1:A:1143:VAL:HG13	1:A:1153:VAL:HG11	1.74	0.69
1:B:935:HIS:CE1	1:B:997:GLN:HE21	2.11	0.68
1:A:1143:VAL:HG13	1:A:1153:VAL:CG1	2.22	0.68
1:A:1110:ALA:HA	1:A:1143:VAL:HG11	1.76	0.68
1:A:983:THR:HG22	1:A:1125:HIS:HD2	1.59	0.67
1:B:915:ASP:CG	1:B:1098:SER:HB2	2.17	0.64
1:B:977:ARG:NH2	1:B:1003:GLU:OE2	2.31	0.63
1:B:932:ARG:HE	1:B:1000:ARG:NH1	2.01	0.58
1:B:1110:ALA:HA	1:B:1143:VAL:HG11	1.85	0.58
1:A:983:THR:HG22	1:A:1125:HIS:CD2	2.41	0.56
1:A:931:LEU:HD21	1:B:926:VAL:HG11	1.89	0.54
1:B:956:ILE:HG12	1:B:989:LEU:CD2	2.37	0.54
1:B:1143:VAL:CG1	1:B:1153:VAL:HG11	2.38	0.52
1:A:1115:VAL:HG12	1:A:1116:GLY:N	2.25	0.52
1:A:922:THR:HG23	1:B:1018:PRO:HB2	1.93	0.51
1:B:938:LEU:HD23	1:B:990:THR:HG21	1.93	0.50
1:A:931:LEU:HD22	1:B:931:LEU:HD22	1.93	0.50
1:A:1143:VAL:CG1	1:A:1153:VAL:HG11	2.42	0.49
1:A:916:SER:O	1:A:917:HIS:HB2	2.14	0.47
1:B:1100:ALA:HB3	1:B:1101:PRO:HD3	1.97	0.45
1:A:1126:VAL:HG22	1:A:1171:LEU:HD23	1.99	0.45
1:B:1113:ALA:HB2	1:B:1143:VAL:HG12	2.00	0.44
1:A:926:VAL:HG11	1:B:931:LEU:HD21	2.01	0.42
1:B:1110:ALA:N	1:B:1111:PRO:HD2	2.34	0.42
1:A:1110:ALA:N	1:A:1111:PRO:HD2	2.34	0.42
1:A:1100:ALA:HB3	1:A:1101:PRO:HD3	2.01	0.42
1:B:1126:VAL:HG22	1:B:1171:LEU:HD23	2.01	0.42
1:B:1051:LEU:HB3	1:B:1081:SER:OG	2.20	0.41
1:B:956:ILE:HG12	1:B:989:LEU:HD23	2.03	0.41
1:B:943:ARG:HD2	1:B:943:ARG:HA	1.72	0.41
1:A:969:ALA:O	1:A:1000:ARG:HD3	2.20	0.41
1:B:1120:LEU:HD23	1:B:1120:LEU:HA	1.93	0.41
1:A:951:LEU:O	1:A:952:ASN:C	2.60	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	259/260 (100%)	257 (99%)	2 (1%)	0	100	100
1	B	234/260 (90%)	228 (97%)	6 (3%)	0	100	100
All	All	493/520 (95%)	485 (98%)	8 (2%)	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	201/200 (100%)	199 (99%)	2 (1%)	76	81
1	B	185/200 (92%)	183 (99%)	2 (1%)	73	78
All	All	386/400 (96%)	382 (99%)	4 (1%)	76	81

All (4) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	974	GLU
1	A	1098	SER
1	B	943	ARG
1	B	1098	SER

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (6) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	935	HIS
1	A	993	GLN
1	A	1125	HIS
1	B	935	HIS
1	B	993	GLN
1	B	1125	HIS

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 monosaccharides in this entry.

5.6 Ligand geometry

There are no ligands in this entry.

5.7 Other polymers

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

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, 95^{th} 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	260/260 (100%)	0.50	24 (9%)	9 8	24, 41, 73, 120	0
1	B	240/260 (92%)	1.01	43 (17%)	1 1	28, 54, 98, 134	0
All	All	500/520 (96%)	0.74	67 (13%)	3 2	24, 46, 88, 134	0

All (67) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	973	GLY	9.0
1	B	975	GLU	8.2
1	B	940	ASP	6.7
1	B	941	ASP	6.1
1	B	1148	ARG	5.9
1	A	1069	PRO	5.4
1	B	1071	THR	5.1
1	B	954	VAL	4.8
1	A	1058	LEU	4.6
1	B	1052	GLU	4.5
1	B	1072	GLY	4.5
1	B	952	ASN	4.4
1	B	1040	ALA	4.1
1	A	1072	GLY	4.0
1	A	915	ASP	3.8
1	B	973	GLY	3.8
1	A	974	GLU	3.7
1	B	1054	ALA	3.7
1	B	943	ARG	3.5
1	B	1051	LEU	3.5
1	A	975	GLU	3.5
1	B	1053	PRO	3.4
1	B	1147	PRO	3.4
1	B	942	SER	3.4

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Mol	Chain	Res	Type	RSRZ
1	B	1149	VAL	3.4
1	B	1106	VAL	3.3
1	B	1080	LEU	3.3
1	B	1050	ARG	3.1
1	B	953	GLY	3.1
1	B	939	ASP	3.0
1	B	1092	LEU	3.0
1	B	1036	ALA	3.0
1	A	1068	VAL	2.9
1	B	1045	ASP	2.8
1	B	951	LEU	2.8
1	A	941	ASP	2.8
1	A	962	LEU	2.7
1	A	1168	LEU	2.7
1	A	1047	GLY	2.7
1	A	1050	ARG	2.7
1	B	991	ALA	2.7
1	B	1070	SER	2.6
1	A	972	GLU	2.6
1	A	963	ALA	2.6
1	A	1106	VAL	2.5
1	B	961	VAL	2.5
1	B	1094	PRO	2.5
1	A	942	SER	2.5
1	A	1105	ALA	2.5
1	A	959	ALA	2.4
1	B	962	LEU	2.4
1	B	1048	GLU	2.4
1	B	972	GLU	2.4
1	B	974	GLU	2.3
1	B	1044	LEU	2.2
1	B	1079	ARG	2.2
1	A	961	VAL	2.2
1	B	1084	LEU	2.2
1	B	1103	LEU	2.2
1	B	1047	GLY	2.1
1	B	965	THR	2.1
1	B	1012	VAL	2.1
1	A	1084	LEU	2.0
1	B	976	ARG	2.0
1	A	1162	GLY	2.0
1	A	1155	ALA	2.0

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Mol	Chain	Res	Type	RSRZ
1	A	1055	ASP	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 monosaccharides 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.