wwPDB EM Validation Summary Report (i)

May 14, 2024 – 03:04 am BST

PDB ID	:	6RW9
EMDB ID	:	EMD-10035
Title	:	Cryo-EM structure of Morganella morganii TcdA4
Authors	:	Roderer, D.; Leidreiter, F.; Gatsogiannis, C.; Meusch, D.; Benz, R.; Raunser, S.
Deposited on	:	2019-06-04
Resolution	:	3.27 Å(reported)
Based on initial model	:	1VW1

This is a wwPDB EM Validation Summary 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/EMValidationReportHelp
with specific help available everywhere you see the (i) 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 (i)) were used in the production of this report:

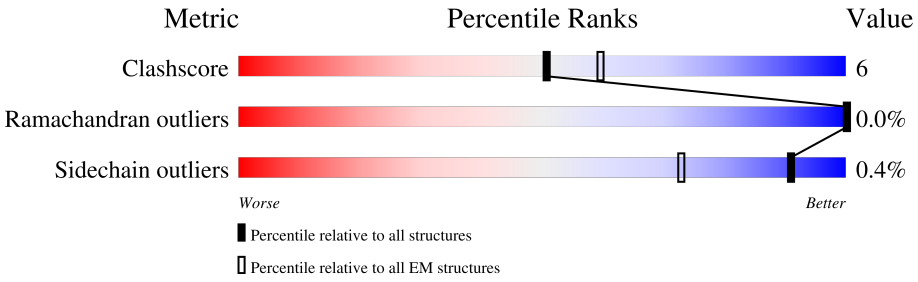
EMDB validation analysis	:	0.0.1.dev92
MolProbity	:	4.02b-467
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
MapQ	:	FAILED
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.36.2

1 Overall quality at a glance (i)

The following experimental techniques were used to determine the structure:
ELECTRON MICROSCOPY

The reported resolution of this entry is 3.27 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)	EM structures (#Entries)
Clashscore	158937	4297
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826

2 Entry composition (i)

There is only 1 type of molecule in this entry. The entry contains 88700 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, 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 Insecticidal toxin protein TcdA4.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	2285	Total	C	N	O	S	0	0
			17740	11194	3070	3415	61		
1	B	2285	Total	C	N	O	S	0	0
			17740	11194	3070	3415	61		
1	C	2285	Total	C	N	O	S	0	0
			17740	11194	3070	3415	61		
1	D	2285	Total	C	N	O	S	0	0
			17740	11194	3070	3415	61		
1	E	2285	Total	C	N	O	S	0	0
			17740	11194	3070	3415	61		

SEQUENCE-PLOTS INFOmissingINFO

3 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C5	Depositor
Number of particles used	247513	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/Å^2$)	60	Depositor
Minimum defocus (nm)	Not provided	
Maximum defocus (nm)	Not provided	
Magnification	Not provided	
Image detector	FEI FALCON II (4k x 4k)	Depositor

4 Model quality (i)

4.1 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	0.38	0/18078	0.61	11/24569 (0.0%)
1	B	0.38	0/18078	0.61	11/24569 (0.0%)
1	C	0.38	0/18078	0.61	11/24569 (0.0%)
1	D	0.38	0/18078	0.61	11/24569 (0.0%)
1	E	0.38	0/18078	0.61	11/24569 (0.0%)
All	All	0.38	0/90390	0.61	55/122845 (0.0%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand.A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	4
1	B	0	4
1	C	0	4
1	D	0	4
1	E	0	4
All	All	0	20

There are no bond length outliers.

The worst 5 of 55 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	C	748	ASP	CB-CG-OD1	7.23	124.81	118.30
1	B	748	ASP	CB-CG-OD1	7.23	124.81	118.30
1	E	748	ASP	CB-CG-OD1	7.23	124.81	118.30
1	D	748	ASP	CB-CG-OD1	7.20	124.78	118.30
1	A	748	ASP	CB-CG-OD1	7.17	124.75	118.30

There are no chirality outliers.

5 of 20 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	1484	TYR	Peptide
1	A	1708	SER	Peptide
1	A	1722	VAL	Peptide
1	A	845	GLN	Peptide
1	B	845	GLN	Peptide

4.2 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	17740	0	17523	224	0
1	B	17740	0	17523	210	0
1	C	17740	0	17523	211	0
1	D	17740	0	17523	222	0
1	E	17740	0	17523	234	0
All	All	88700	0	87615	1037	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.

The worst 5 of 1037 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:1786:VAL:HG12	1:A:1788:PRO:HD2	1.72	0.72
1:C:1786:VAL:HG12	1:C:1788:PRO:HD2	1.72	0.72
1:E:1786:VAL:HG12	1:E:1788:PRO:HD2	1.72	0.71
1:B:1786:VAL:HG12	1:B:1788:PRO:HD2	1.72	0.70
1:D:1786:VAL:HG12	1:D:1788:PRO:HD2	1.72	0.70

There are no symmetry-related clashes.

4.3 Torsion angles (i)

4.3.1 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 PDB entries followed by that with respect to all EM

entries.

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	2273/2469 (92%)	2119 (93%)	153 (7%)	1 (0%)	100	100
1	B	2273/2469 (92%)	2120 (93%)	152 (7%)	1 (0%)	100	100
1	C	2273/2469 (92%)	2119 (93%)	153 (7%)	1 (0%)	100	100
1	D	2273/2469 (92%)	2118 (93%)	154 (7%)	1 (0%)	100	100
1	E	2273/2469 (92%)	2119 (93%)	153 (7%)	1 (0%)	100	100
All	All	11365/12345 (92%)	10595 (93%)	765 (7%)	5 (0%)	100	100

All (5) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	1709	VAL
1	B	1709	VAL
1	C	1709	VAL
1	D	1709	VAL
1	E	1709	VAL

4.3.2 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 PDB entries followed by that with respect to all EM entries.

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	1886/2101 (90%)	1879 (100%)	7 (0%)	91	95
1	B	1886/2101 (90%)	1879 (100%)	7 (0%)	91	95
1	C	1886/2101 (90%)	1879 (100%)	7 (0%)	91	95
1	D	1886/2101 (90%)	1879 (100%)	7 (0%)	91	95
1	E	1886/2101 (90%)	1879 (100%)	7 (0%)	91	95
All	All	9430/10505 (90%)	9395 (100%)	35 (0%)	91	95

5 of 35 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	E	304	ARG
1	E	904	ASN
1	E	1259	VAL
1	B	1710	ASN
1	B	1259	VAL

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 108 such sidechains are listed below:

Mol	Chain	Res	Type
1	C	1883	GLN
1	D	1188	ASN
1	E	1580	ASN
1	C	2353	ASN
1	D	222	ASN

4.3.3 RNA

There are no RNA molecules in this entry.

4.4 Non-standard residues in protein, DNA, RNA chains

There are no non-standard protein/DNA/RNA residues in this entry.

4.5 Carbohydrates

There are no monosaccharides in this entry.

4.6 Ligand geometry

There are no ligands in this entry.

4.7 Other polymers

There are no such residues in this entry.

4.8 Polymer linkage issues

There are no chain breaks in this entry.

5 Map visualisation

This section contains visualisations of the EMDB entry EMD-10035. These allow visual inspection of the internal detail of the map and identification of artifacts.

No raw map or half-maps were deposited for this entry and therefore no images, graphs, etc. pertaining to the raw map can be shown.

5.1 Orthogonal projections

This section was not generated.

5.2 Central slices

This section was not generated.

5.3 Largest variance slices

This section was not generated.

5.4 Orthogonal standard-deviation projections (False-color)

This section was not generated.

5.5 Orthogonal surface views

This section was not generated.

5.6 Mask visualisation

This section was not generated. No masks/segmentation were deposited.

6 Map analysis

This section contains the results of statistical analysis of the map.

6.1 Map-value distribution

This section was not generated.

6.2 Volume estimate versus contour level

This section was not generated.

6.3 Rotationally averaged power spectrum

This section was not generated. The rotationally averaged power spectrum had issues being displayed.

7 Fourier-Shell correlation (i)

This section was not generated. No FSC curve or half-maps provided.

8 Map-model fit

This section was not generated.