



Full wwPDB EM Validation Report ⓘ

May 21, 2024 – 10:06 AM JST

PDB ID : 8H8B
EMDB ID : EMD-34541
Title : Type VI secretion system effector RhsP in its pre-autoproteolysis and monomeric form
Authors : Tang, L.; Dong, S.Q.; Rasheed, N.; Wu, H.W.; Zhou, N.K.; Li, H.D.; Wang, M.L.; Zheng, J.; He, J.; Chao, W.C.H.
Deposited on : 2022-10-22
Resolution : 3.16 Å(reported)

This is a Full wwPDB EM 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/EMValidationReportHelp>

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:

EMDB validation analysis : **FAILED**
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

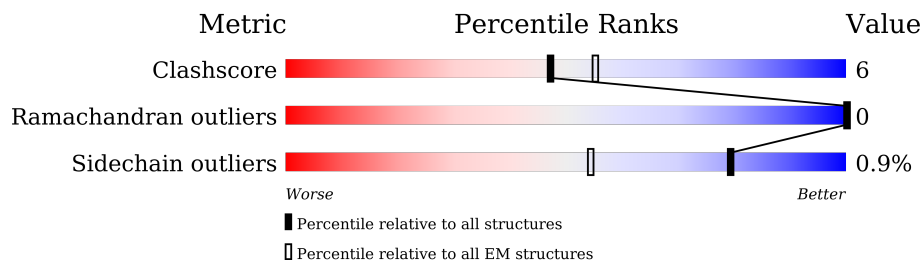
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 3.16 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

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the 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 $\leq 5\%$.

Mol	Chain	Length	Quality of chain
1	A	1402	

2 Entry composition

There is only 1 type of molecule in this entry. The entry contains 8344 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 Putative Rhs-family protein.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	1027	8344	5251	1439	1641	13	0	0

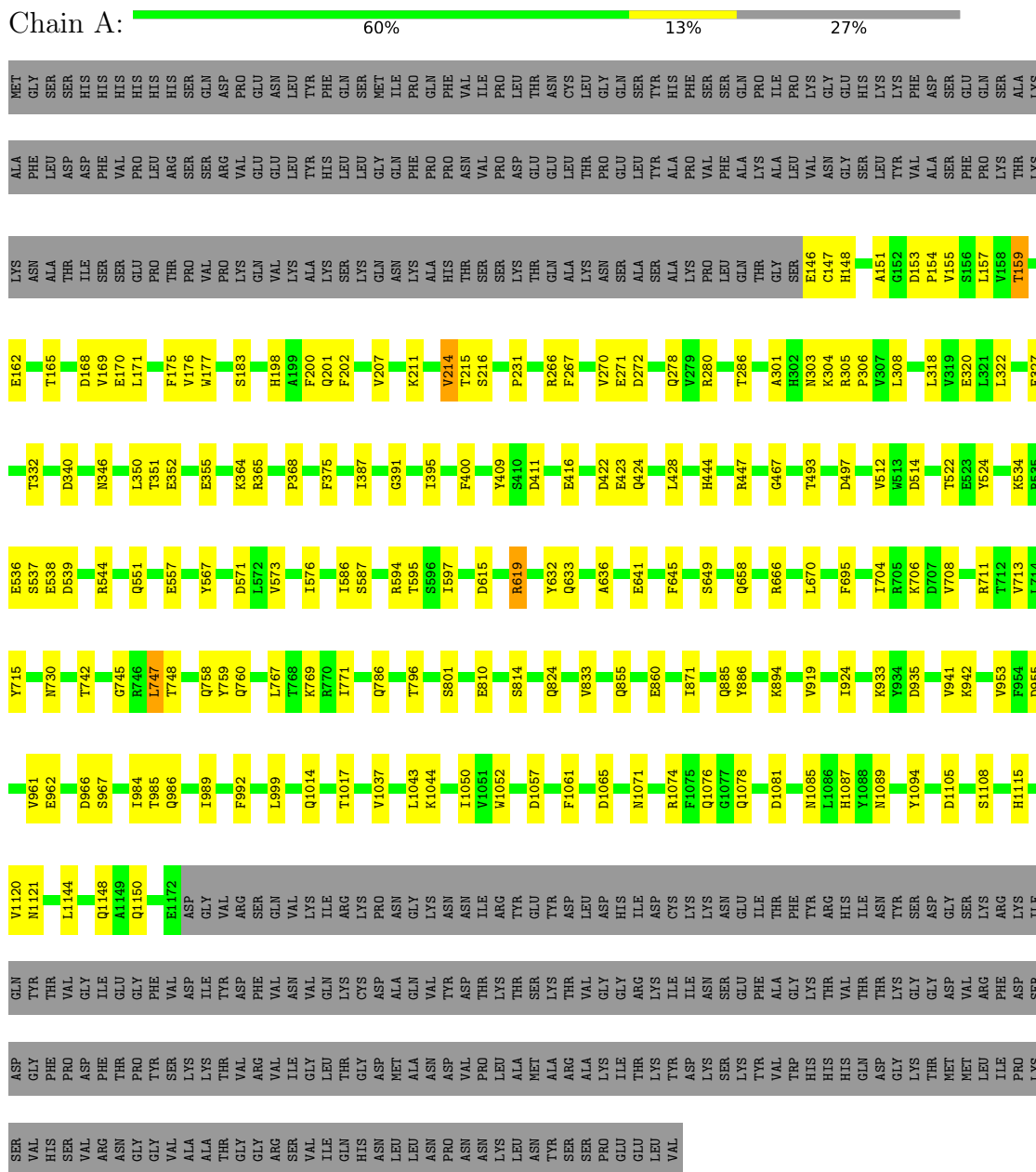
There are 24 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-20	MET	-	initiating methionine	UNP Q87PI5
A	-19	GLY	-	expression tag	UNP Q87PI5
A	-18	SER	-	expression tag	UNP Q87PI5
A	-17	SER	-	expression tag	UNP Q87PI5
A	-16	HIS	-	expression tag	UNP Q87PI5
A	-15	HIS	-	expression tag	UNP Q87PI5
A	-14	HIS	-	expression tag	UNP Q87PI5
A	-13	HIS	-	expression tag	UNP Q87PI5
A	-12	HIS	-	expression tag	UNP Q87PI5
A	-11	HIS	-	expression tag	UNP Q87PI5
A	-10	SER	-	expression tag	UNP Q87PI5
A	-9	GLN	-	expression tag	UNP Q87PI5
A	-8	ASP	-	expression tag	UNP Q87PI5
A	-7	PRO	-	expression tag	UNP Q87PI5
A	-6	GLU	-	expression tag	UNP Q87PI5
A	-5	ASN	-	expression tag	UNP Q87PI5
A	-4	LEU	-	expression tag	UNP Q87PI5
A	-3	TYR	-	expression tag	UNP Q87PI5
A	-2	PHE	-	expression tag	UNP Q87PI5
A	-1	GLN	-	expression tag	UNP Q87PI5
A	0	SER	-	expression tag	UNP Q87PI5
A	161	ALA	GLU	engineered mutation	UNP Q87PI5
A	1127	ALA	ASP	engineered mutation	UNP Q87PI5
A	1354	ALA	HIS	engineered mutation	UNP Q87PI5

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. 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. 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: Putative Rhs-family protein



4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	738487	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TALOS ARCTICA	Depositor
Voltage (kV)	200	Depositor
Electron dose ($e^-/\text{\AA}^2$)	60	Depositor
Minimum defocus (nm)	1000	Depositor
Maximum defocus (nm)	2000	Depositor
Magnification	Not provided	
Image detector	GATAN K3 BIOQUANTUM (6k x 4k)	Depositor

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	0.24	0/8546	0.43	0/11570

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	8344	0	7861	104	0
All	All	8344	0	7861	104	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 (104) 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:409:TYR:O	1:A:416:GLU:HA	1.78	0.83
1:A:304:LYS:HG2	1:A:551:GLN:HG3	1.71	0.72
1:A:355:GLU:HB3	1:A:364:LYS:HG2	1.75	0.68
1:A:266:ARG:HB3	1:A:278:GLN:HB3	1.75	0.67
1:A:953:VAL:HB	1:A:962:GLU:HG2	1.77	0.66

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:170:GLU:HG2	1:A:176:VAL:HG23	1.78	0.66
1:A:919:VAL:HG12	1:A:924:ILE:HA	1.78	0.65
1:A:1043:LEU:HB3	1:A:1052:TRP:HB3	1.80	0.64
1:A:1148:GLN:HG2	1:A:1150:GLN:HG3	1.79	0.63
1:A:711:ARG:HD3	1:A:730:ASN:HD22	1.64	0.63
1:A:824:GLN:HB3	1:A:833:VAL:HB	1.82	0.61
1:A:801:SER:HB2	1:A:810:GLU:HB3	1.83	0.60
1:A:760:GLN:HB2	1:A:769:LYS:HB3	1.84	0.60
1:A:855:GLN:HG2	1:A:860:GLU:HG2	1.85	0.58
1:A:933:LYS:HB3	1:A:942:LYS:HB3	1.84	0.58
1:A:758:GLN:HG3	1:A:771:ILE:HB	1.86	0.58
1:A:162:GLU:H	1:A:183:SER:HB3	1.69	0.57
1:A:146:GLU:HB2	1:A:155:VAL:HB	1.85	0.57
1:A:387:ILE:HA	1:A:400:PHE:HD2	1.72	0.55
1:A:1057:ASP:OD1	1:A:1061:PHE:N	2.40	0.55
1:A:270:VAL:HG23	1:A:271:GLU:H	1.73	0.54
1:A:985:THR:HG22	1:A:986:GLN:H	1.72	0.54
1:A:885:GLN:HB2	1:A:894:LYS:HG2	1.89	0.53
1:A:742:THR:OG1	1:A:745:GLY:O	2.25	0.53
1:A:1014:GLN:HB2	1:A:1017:THR:HB	1.91	0.53
1:A:544:ARG:HB2	1:A:557:GLU:HB3	1.88	0.53
1:A:1037:VAL:O	1:A:1076:GLN:NE2	2.41	0.53
1:A:301:ALA:HA	1:A:306:PRO:HA	1.91	0.53
1:A:619:ARG:HH22	1:A:636:ALA:HA	1.73	0.53
1:A:1044:LYS:HE2	1:A:1050:ILE:HG12	1.91	0.52
1:A:539:ASP:OD1	1:A:786:GLN:NE2	2.41	0.52
1:A:305:ARG:NH2	1:A:571:ASP:OD2	2.42	0.52
1:A:512:VAL:HG12	1:A:524:TYR:HB2	1.92	0.52
1:A:350:LEU:HB3	1:A:368:PRO:HG3	1.92	0.52
1:A:171:LEU:HB2	1:A:175:PHE:HB3	1.93	0.51
1:A:615:ASP:OD1	1:A:619:ARG:N	2.35	0.51
1:A:1087:HIS:HB2	1:A:1094:TYR:HB3	1.92	0.51
1:A:594:ARG:HD3	1:A:597:ILE:HD11	1.93	0.51
1:A:157:LEU:HG	1:A:159:THR:H	1.76	0.51
1:A:1081:ASP:O	1:A:1085:ASN:N	2.43	0.51
1:A:271:GLU:HG2	1:A:272:ASP:N	2.26	0.50
1:A:1120:VAL:HG13	1:A:1121:ASN:HD22	1.77	0.49
1:A:320:GLU:HG2	1:A:332:THR:HA	1.95	0.49
1:A:576:ILE:HD12	1:A:1144:LEU:HD22	1.95	0.48
1:A:992:PHE:HB3	1:A:999:LEU:HD11	1.95	0.48
1:A:214:VAL:HG23	1:A:215:THR:H	1.77	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:168:ASP:HB2	1:A:177:TRP:HD1	1.78	0.48
1:A:1071:ASN:O	1:A:1074:ARG:NH1	2.47	0.48
1:A:587:SER:O	1:A:595:THR:OG1	2.23	0.48
1:A:955:ASP:HB3	1:A:961:VAL:HG11	1.96	0.47
1:A:537:SER:OG	1:A:538:GLU:N	2.46	0.47
1:A:759:TYR:HB3	1:A:767:LEU:HD11	1.96	0.47
1:A:207:VAL:HB	1:A:216:SER:HB3	1.97	0.47
1:A:346:ASN:N	1:A:350:LEU:O	2.38	0.47
1:A:748:THR:HA	1:A:759:TYR:HB2	1.95	0.47
1:A:666:ARG:HH11	1:A:670:LEU:HD12	1.80	0.46
1:A:198:HIS:HD2	1:A:200:PHE:H	1.62	0.46
1:A:153:ASP:OD2	1:A:165:THR:N	2.46	0.46
1:A:147:CYS:SG	1:A:148:HIS:N	2.87	0.46
1:A:365:ARG:HG2	1:A:375:PHE:HE2	1.80	0.46
1:A:278:GLN:HG2	1:A:280:ARG:HG3	1.97	0.46
1:A:586:ILE:HD11	1:A:1144:LEU:HD11	1.98	0.46
1:A:447:ARG:HH22	1:A:467:GLY:HA2	1.81	0.45
1:A:514:ASP:HB3	1:A:522:THR:HB	1.97	0.45
1:A:169:VAL:HG22	1:A:177:TRP:HB3	1.99	0.45
1:A:146:GLU:HA	1:A:409:TYR:CE1	2.51	0.45
1:A:1108:SER:HB2	1:A:1115:HIS:CD2	2.51	0.45
1:A:796:THR:O	1:A:814:SER:OG	2.29	0.45
1:A:747:LEU:HD23	1:A:747:LEU:H	1.82	0.45
1:A:286:THR:H	1:A:303:ASN:HD21	1.66	0.44
1:A:340:ASP:N	1:A:340:ASP:OD1	2.50	0.44
1:A:1078:GLN:HE21	1:A:1089:ASN:HD21	1.64	0.44
1:A:198:HIS:CE1	1:A:201:GLN:HG3	2.53	0.44
1:A:1081:ASP:O	1:A:1085:ASN:CA	2.66	0.44
1:A:645:PHE:HB2	1:A:649:SER:HB2	2.00	0.44
1:A:211:LYS:HB3	1:A:211:LYS:HE3	1.74	0.43
1:A:351:THR:H	1:A:368:PRO:HB3	1.83	0.43
1:A:202:PHE:HB3	1:A:267:PHE:HZ	1.82	0.43
1:A:984:ILE:HG12	1:A:989:ILE:HD12	1.98	0.43
1:A:935:ASP:HB3	1:A:941:VAL:HG21	2.00	0.43
1:A:706:LYS:HB2	1:A:713:VAL:HG23	1.99	0.43
1:A:633:GLN:O	1:A:641:GLU:HG2	2.19	0.43
1:A:1081:ASP:O	1:A:1085:ASN:HA	2.18	0.43
1:A:151:ALA:HB2	1:A:395:ILE:HD11	2.00	0.42
1:A:567:TYR:HA	1:A:573:VAL:HA	2.01	0.42
1:A:1105:ASP:N	1:A:1105:ASP:OD2	2.42	0.42
1:A:322:LEU:HD23	1:A:327:GLU:HG2	2.01	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:411:ASP:OD2	1:A:658:GLN:NE2	2.53	0.42
1:A:444:HIS:O	1:A:444:HIS:ND1	2.53	0.42
1:A:695:PHE:HE1	1:A:706:LYS:HG2	1.85	0.42
1:A:704:ILE:O	1:A:715:TYR:N	2.47	0.42
1:A:966:ASP:OD1	1:A:967:SER:N	2.53	0.41
1:A:215:THR:HA	1:A:231:PRO:HG3	2.01	0.41
1:A:352:GLU:OE2	1:A:365:ARG:NH2	2.54	0.41
1:A:534:LYS:HG3	1:A:536:GLU:HB2	2.01	0.41
1:A:871:ILE:O	1:A:886:TYR:OH	2.27	0.41
1:A:391:GLY:HA3	1:A:395:ILE:HG13	2.02	0.41
1:A:148:HIS:HB2	1:A:154:PRO:HG3	2.00	0.41
1:A:198:HIS:NE2	1:A:201:GLN:HG3	2.36	0.40
1:A:175:PHE:HE2	1:A:308:LEU:HD22	1.86	0.40
1:A:422:ASP:HB3	1:A:428:LEU:HD11	2.03	0.40
1:A:708:VAL:O	1:A:708:VAL:HG13	2.22	0.40
1:A:423:GLU:HG2	1:A:424:GLN:HG3	2.02	0.40
1:A:632:TYR:HE1	1:A:1150:GLN:HG2	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 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	1025/1402 (73%)	960 (94%)	65 (6%)	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 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	889/1220 (73%)	881 (99%)	8 (1%)	78 91

All (8) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	159	THR
1	A	214	VAL
1	A	318	LEU
1	A	493	THR
1	A	497	ASP
1	A	619	ARG
1	A	747	LEU
1	A	1065	ASP

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (16) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	198	HIS
1	A	456	ASN
1	A	481	GLN
1	A	622	GLN
1	A	624	GLN
1	A	633	GLN
1	A	730	ASN
1	A	760	GLN
1	A	772	GLN
1	A	799	ASN
1	A	855	GLN
1	A	937	GLN
1	A	959	GLN
1	A	1089	ASN
1	A	1115	HIS
1	A	1121	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 monosaccharides in this entry.

5.6 Ligand geometry [i](#)

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.