



Full wwPDB EM Validation Report ⓘ

Jul 16, 2025 – 10:37 AM JST

PDB ID : 8H8B / pdb_00008h8b
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 : 4-5-2 with Phenix2.0rc1
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)
MapQ : **FAILED**
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.44

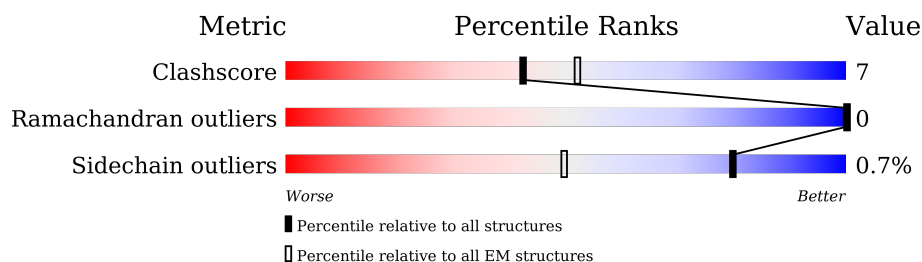
1 Overall quality at a glance

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	210492	15764
Ramachandran outliers	207382	16835
Sidechain outliers	206894	16415

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	 60% 13% 27%

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
1	A	1027	Total	C	N	O	S	0	0
			8344	5251	1439	1641	13		

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

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	0.09	0/8546	0.29	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	106	0
All	All	8344	0	7861	106	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 7.

All (106) 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

Continued on next page...

Continued from previous page...

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:871:ILE:O	1:A:886:TYR:OH	2.27	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

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:214:VAL:HG23	1:A:215:THR:H	1.77	0.48
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:938:GLY:O	1:A:1116:TYR:OH	2.32	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

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
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
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:153:ASP:OD2	1:A:165:THR:OG1	2.33	0.41
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: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 ⓘ

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%)	883 (99%)	6 (1%)	81	90

All (6) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	159	THR
1	A	214	VAL
1	A	493	THR
1	A	573	VAL
1	A	784	VAL
1	A	1170	VAL

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (25) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	401	HIS
1	A	456	ASN
1	A	481	GLN
1	A	622	GLN
1	A	624	GLN
1	A	633	GLN
1	A	639	GLN
1	A	640	GLN
1	A	658	GLN
1	A	694	GLN
1	A	730	ASN
1	A	733	ASN
1	A	737	ASN
1	A	760	GLN
1	A	855	GLN
1	A	868	GLN
1	A	939	ASN
1	A	959	GLN
1	A	1076	GLN

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	A	1089	ASN
1	A	1103	GLN
1	A	1114	ASN
1	A	1115	HIS
1	A	1121	ASN
1	A	1155	GLN

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](#)

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.