

Full wwPDB/EMDataBank EM Map/Model Validation Report ⓘ

Jan 30, 2019 – 03:05 PM EST

PDB ID : 6ADT
EMDB ID: : EMD-9613
Title : Structure of Seneca Valley Virus in neutral condition
Authors : Lou, Z.Y.; Cao, L.
Deposited on : 2018-08-02
Resolution : 3.22 Å(reported)

This is a Full wwPDB/EMDataBank EM Map/Model Validation Report
for a publicly released PDB/EMDB 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.

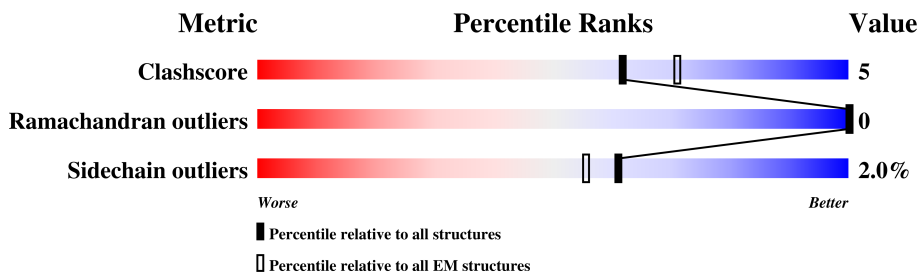
MolProbity : 4.02b-467
Percentile statistics : 20171227.v01 (using entries in the PDB archive December 27th 2017)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et. al. (1996)
Validation Pipeline (wwPDB-VP) : rb-20031633

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 3.22 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	136327	1886
Ramachandran outliers	132723	1663
Sidechain outliers	132532	1531

The table below summarises the geometric issues observed across the polymeric chains. The red, orange, yellow and green segments on the bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria. 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	258	
2	C	239	
3	B	267	
4	D	71	

2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 6177 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 VP1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	258	2017	1297	343	373	4	0	0

- Molecule 2 is a protein called VP3.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
2	C	228	1779	1152	282	334	11	0	0

- Molecule 3 is a protein called VP2.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
3	B	267	2103	1332	356	407	8	0	0

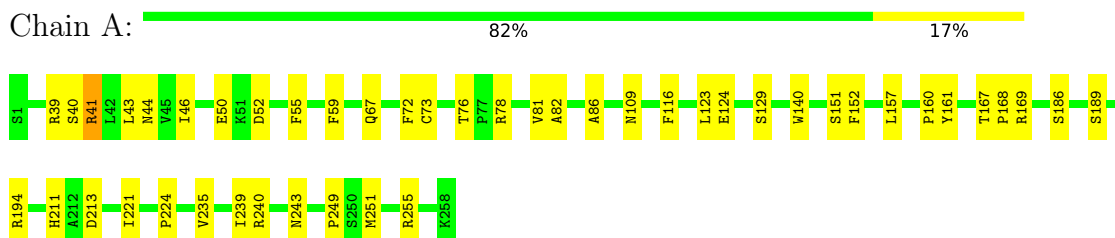
- Molecule 4 is a protein called VP4.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
4	D	35	278	174	47	56	1	0	0

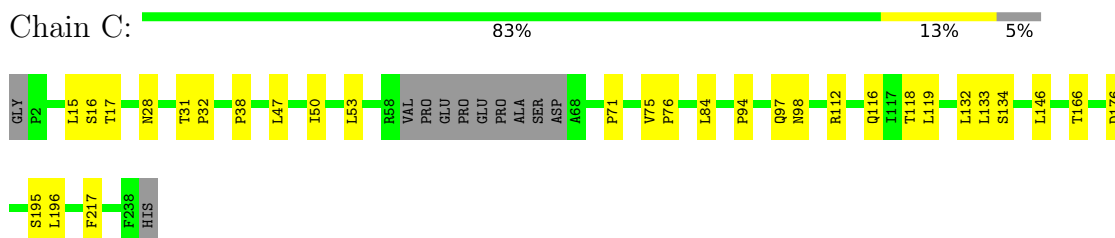
3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA and DNA 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.

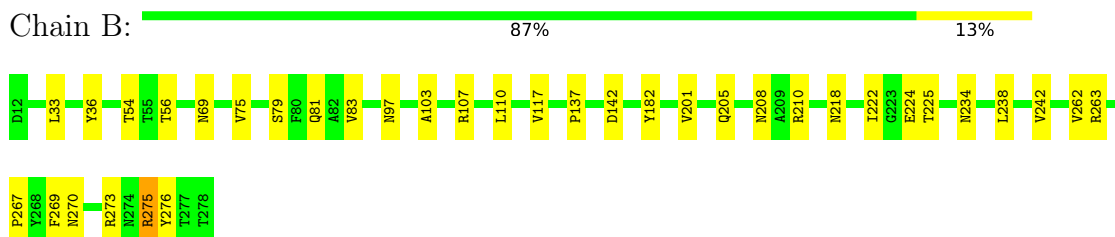
- Molecule 1: VP1



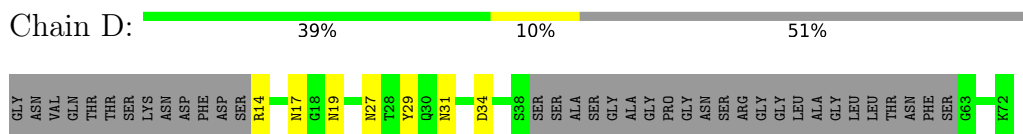
- Molecule 2: VP3



- Molecule 3: VP2



- Molecule 4: VP4



4 Experimental information

Property	Value	Source
Reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	Depositor
Number of particles used	11096	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TECNAI ARCTICA	Depositor
Voltage (kV)	200	Depositor
Electron dose ($e^-/\text{\AA}^2$)	1.63	Depositor
Minimum defocus (nm)	Not provided	Depositor
Maximum defocus (nm)	Not provided	Depositor
Magnification	Not provided	Depositor
Image detector	FEI FALCON II (4k 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 >2	RMSZ	# Z >2
1	A	0.41	0/2080	0.55	0/2838
2	C	0.39	0/1835	0.57	1/2520 (0.0%)
3	B	0.40	0/2162	0.57	0/2961
4	D	0.31	0/283	0.47	0/380
All	All	0.40	0/6360	0.56	1/8699 (0.0%)

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	C	196	LEU	CA-CB-CG	5.83	128.71	115.30

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	2017	0	1957	31	0
2	C	1779	0	1743	21	0
3	B	2103	0	2029	18	0
4	D	278	0	254	3	0
All	All	6177	0	5983	60	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 5.

All (60) 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:76:THR:HG22	1:A:78:ARG:H	1.60	0.67
2:C:116:GLN:HE21	2:C:166:THR:HB	1.67	0.60
3:B:224:GLU:HG3	3:B:225:THR:HG23	1.84	0.59
1:A:123:LEU:HD11	1:A:239:ILE:HB	1.85	0.59
3:B:83:VAL:HB	3:B:238:LEU:HB3	1.85	0.58
2:C:119:LEU:HD11	2:C:133:LEU:HD21	1.86	0.56
1:A:129:SER:HA	1:A:235:VAL:HG23	1.87	0.55
1:A:255:ARG:H	2:C:98:ASN:HD21	1.53	0.54
2:C:76:PRO:HD2	2:C:84:LEU:HD11	1.89	0.54
3:B:103:ALA:O	3:B:107:ARG:NH1	2.40	0.53
3:B:33:LEU:HB2	3:B:205:GLN:HE21	1.74	0.53
2:C:134:SER:OG	2:C:195:SER:OG	2.28	0.52
2:C:15:LEU:HD23	2:C:17:THR:H	1.75	0.52
1:A:40:SER:HB2	2:C:16:SER:HB2	1.92	0.52
1:A:46:ILE:HG21	1:A:73:CYS:HB2	1.91	0.51
2:C:118:THR:HB	2:C:217:PHE:HB2	1.92	0.51
1:A:50:GLU:HG2	1:A:221:ILE:HD12	1.93	0.51
3:B:117:VAL:HG12	3:B:262:VAL:HG22	1.93	0.51
2:C:31:THR:OG1	4:D:34:ASP:OD1	2.28	0.51
1:A:124:GLU:HB3	1:A:240:ARG:HB3	1.92	0.50
1:A:43:LEU:HD22	1:A:239:ILE:HD13	1.92	0.50
1:A:81:VAL:HG12	1:A:86:ALA:HB2	1.93	0.50
2:C:94:PRO:HA	2:C:97:GLN:HG3	1.94	0.49
1:A:39:ARG:HB2	2:C:17:THR:HG22	1.95	0.49
1:A:240:ARG:NH2	2:C:16:SER:O	2.46	0.48
1:A:194:ARG:NH1	1:A:251:MET:O	2.46	0.48
2:C:38:PRO:HD2	3:B:222:ILE:HG22	1.94	0.48
1:A:243:ASN:OD1	4:D:31:ASN:ND2	2.46	0.48
1:A:55:PHE:HA	1:A:72:PHE:HE2	1.78	0.48
1:A:140:TRP:HE3	1:A:168:PRO:HD2	1.79	0.48
2:C:50:ILE:HG21	3:B:201:VAL:HA	1.96	0.47
1:A:151:SER:HA	1:A:160:PRO:HA	1.96	0.47
3:B:56:THR:HB	3:B:267:PRO:HD2	1.95	0.47
1:A:116:PHE:O	1:A:194:ARG:NH2	2.47	0.47
3:B:137:PRO:HB3	3:B:222:ILE:HD11	1.97	0.46
1:A:249:PRO:HB3	2:C:47:LEU:HD21	1.98	0.46
1:A:186:SER:OG	1:A:211:HIS:O	2.27	0.45
1:A:167:THR:OG1	1:A:169:ARG:NH2	2.50	0.45
1:A:67:GLN:NE2	3:B:182:TYR:OH	2.49	0.45
3:B:54:THR:HB	3:B:269:PHE:HB2	1.99	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:B:275:ARG:NH1	3:B:276:TYR:O	2.50	0.44
1:A:157:LEU:HD13	1:A:224:PRO:HG3	2.00	0.44
3:B:75:VAL:HG11	3:B:242:VAL:HG21	1.99	0.44
1:A:46:ILE:HD13	1:A:73:CYS:HB2	1.98	0.44
1:A:152:PHE:HB2	1:A:161:TYR:CZ	2.53	0.44
1:A:249:PRO:HD2	3:B:36:TYR:HE1	1.83	0.44
2:C:75:VAL:HG22	2:C:84:LEU:HD21	2.00	0.43
2:C:112:ARG:NH1	2:C:176:ASP:O	2.49	0.43
1:A:52:ASP:N	1:A:52:ASP:OD1	2.50	0.43
3:B:69:ASN:H	3:B:81:GLN:HE22	1.66	0.43
2:C:132:LEU:HD13	2:C:146:LEU:HD21	2.01	0.42
2:C:53:LEU:HD22	2:C:71:PRO:HB2	2.02	0.42
1:A:213:ASP:N	1:A:213:ASP:OD1	2.52	0.42
1:A:59:PHE:HZ	1:A:82:ALA:HB3	1.84	0.41
2:C:28:ASN:HB2	4:D:29:TYR:HE1	1.86	0.41
3:B:142:ASP:OD1	3:B:142:ASP:N	2.53	0.41
1:A:41:ARG:HB2	1:A:109:ASN:HD22	1.86	0.41
3:B:75:VAL:HG13	3:B:79:SER:HB2	2.03	0.41
1:A:189:SER:HA	2:C:32:PRO:HG2	2.03	0.40
3:B:110:LEU:HB2	3:B:270:ASN:HB2	2.03	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	256/258 (99%)	246 (96%)	10 (4%)	0	100	100
2	C	224/239 (94%)	209 (93%)	15 (7%)	0	100	100
3	B	265/267 (99%)	245 (92%)	20 (8%)	0	100	100
4	D	31/71 (44%)	28 (90%)	3 (10%)	0	100	100
All	All	776/835 (93%)	728 (94%)	48 (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	218/218 (100%)	216 (99%)	2 (1%)	81 92
2	C	203/212 (96%)	203 (100%)	0	100 100
3	B	236/236 (100%)	228 (97%)	8 (3%)	40 73
4	D	30/56 (54%)	26 (87%)	4 (13%)	4 19
All	All	687/722 (95%)	673 (98%)	14 (2%)	61 82

All (14) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	41	ARG
1	A	44	ASN
3	B	97	ASN
3	B	208	ASN
3	B	210	ARG
3	B	218	ASN
3	B	234	ASN
3	B	263	ARG
3	B	273	ARG
3	B	275	ARG
4	D	14	ARG
4	D	17	ASN
4	D	19	ASN
4	D	27	ASN

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (14) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	4	ASN
1	A	44	ASN
1	A	109	ASN

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Mol	Chain	Res	Type
2	C	98	ASN
2	C	110	ASN
2	C	162	ASN
3	B	97	ASN
3	B	208	ASN
3	B	218	ASN
3	B	270	ASN
4	D	17	ASN
4	D	19	ASN
4	D	27	ASN
4	D	31	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 carbohydrates 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.