



## wwPDB EM Validation Summary Report ⓘ

Jul 15, 2025 – 10:29 PM JST

PDB ID : 8JSL / pdb\_00008jsl  
EMDB ID : EMD-36622  
Title : The structure of EBOV L-VP35-RNA complex  
Authors : Qi, P.; Yi, S.  
Deposited on : 2023-06-20  
Resolution : 2.95 Å(reported)

This is a wwPDB EM Validation Summary Report for a publicly released PDB entry.

We welcome your comments at [validation@mail.wwpdb.org](mailto: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>.

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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

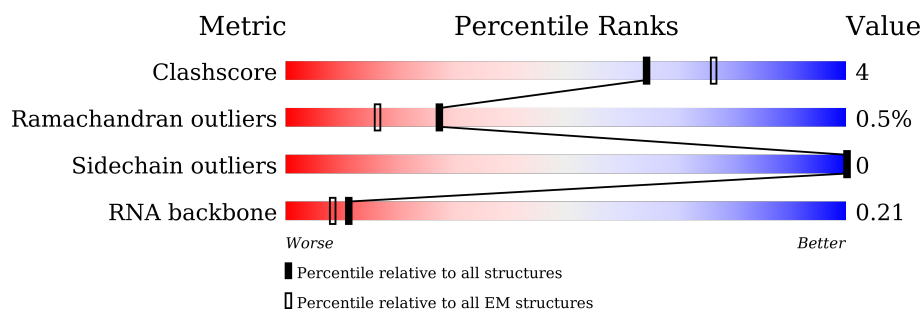
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*ELECTRON MICROSCOPY*

The reported resolution of this entry is 2.95 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
RNA backbone	6643	2191

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  $\geq 3$ , 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	2212	
2	B	340	
2	C	340	
2	D	340	
2	E	340	
3	G	18	

## 2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 14069 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 RNA-directed RNA polymerase L.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	1362	Total	C	N	O	S	0	0
			10897	7002	1853	1986	56		

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	759	ASP	GLY	conflict	UNP A0A1C4HDB0

- Molecule 2 is a protein called Polymerase cofactor VP35.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	B	235	Total	C	N	O	S	1	0
			1799	1129	311	350	9		
2	C	72	Total	C	N	O	S	0	0
			533	333	86	110	4		
2	D	40	Total	C	N	O	S	0	0
			303	192	48	59	4		
2	E	42	Total	C	N	O	S	0	0
			324	203	53	65	3		

- Molecule 3 is a RNA chain called The leader sequence of EBOV.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	G	10	Total	C	N	O	P	0	0
			212	94	34	74	10		

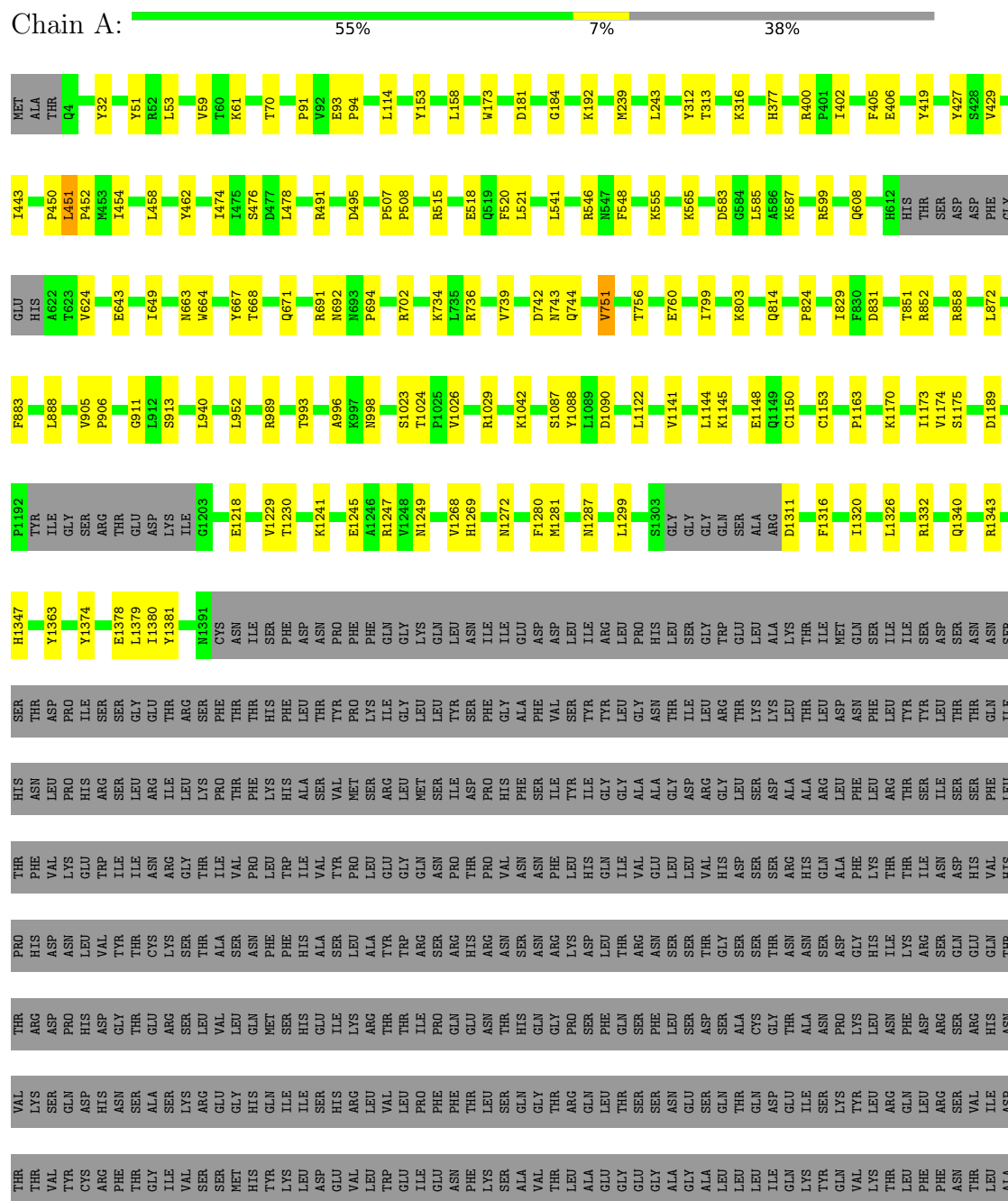
- Molecule 4 is ZINC ION (CCD ID: ZN) (formula: Zn) (labeled as "Ligand of Interest" by depositor).

Mol	Chain	Residues	Atoms		AltConf
4	A	1	Total	Zn	0
			1	1	

### 3 Residue-property plots

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: RNA-directed RNA polymerase L



[illegible]

- Molecule 2: Polymerase cofactor VP35

Chain B:  60% 9% 31%

L144	L148	E165	H166	E178	K184	L242	D257	I258	F263	C275	Q279	I280	F292	F293	V294	L311	V325	C326	V327	L330	D331	D332	G333	T335	L336	L340															
GLN	THR	LYS	PRO	ASN	THR	ARG	LYS	MET	ASN	THR	GLN	ASP	ILE	CYS	ASN	HIS	SER	GLY	PHE	GLU	GLU	VAL	VAL	GLN	THR	ILE	ALA	ALA	ALA	ASP	GLU	ASN	ASN	PRO	GLY	LEU	CYS	TYR	ALA	GLN	MET

- Molecule 2: Polymerase cofactor VP35

Chain C:  20% . 79%

ASP	ILE	VAL	LEU	ASP	ILE	GLN	THR	MET
PRO	ARG	VAL	VAL	GLY	ILE	THR	THR	THR
ALA	ALA	ILE	VAL	ILE	GLU	PRO	ARG	ARG
CYS	CYS	VAL	CYS	SER	SER	PRO	LYS	LYS
GLN	GLN	LYS	LYS	ARG	ARG	LYS	ARG	GLY
LYS	LYS	LEU	GLY	THR	GLU	ARG	GLY	GLY
LEU	LEU	LYS	LYS	THR	VAL	ASN	HIS	HIS
PRO	PRO	SER	SER	PRO	PRO	GLN	VAL	VAL
ARG	ARG	ASN	ASN	GLN	GLN	THR	ALA	ALA
VAL	VAL	LEU	LEU	VAL	VAL	THR	THR	THR
PRO	PRO	LEU	LEU	VAL	VAL	THR	GLN	GLN
SER	SER	ASP	ASP	ASP	ASP	ASP	ASN	ASN
PRO	PRO	ILE	ILE	GLU	GLU	PRO	ILE	ILE
LYS	LYS	HIS	HIS	ALA	ALA	CYS	ASP	ASP
ILE	ILE	ASP	ASP	PHE	PHE	CYS	ARG	ARG
ASP	ASP	ALA	ALA	ASN	ASN	ASN	MET	MET
ARG	ARG	GLU	GLU	ASN	ASN	HIS	PRO	PRO
GLY	GLY	PHE	PHE	LEU	LEU	SER	GLY	GLY
TRP	TRP	GLN	GLN	ASP	ASP	PHE	PRO	PRO
VAL	VAL	ALA	ALA	SER	SER	GLU	GLU	GLU
CYS	CYS	SER	SER	THR	THR	GLU	LEU	LEU
VAL	VAL	LEU	LEU	THR	THR	VAL	SER	SER
PHE	PHE	ALA	ALA	SER	SER	VAL	GLY	GLY
LEU	LEU	GLN	GLN	ASP	ASP	THR	THR	THR
GLN	GLN	LEU	LEU	GLY	GLY	THR	THR	THR
ASP	ASP	SER	SER	GLU	GLU	ALA	GLN	GLN
GLY	GLY	PRO	PRO	ASN	ASN	SER	SER	SER
LYS	LYS	GLN	GLN	PHE	PHE	LEU	LEU	LEU
THR	THR	CYS	CYS	GLY	GLY	ALA	MET	MET
LEU	LEU	ALA	ALA	LYS	LYS	THR	THR	THR
GLY	GLY	LEU	LEU	PRO	PRO	VAL	GLY	GLY
LEU	LEU	ILE	ILE	ASP	ASP	VAL	ARG	ARG
LYS	LYS	GLN	GLN	ILE	ILE	GLN	ILE	ILE
ILE	ILE	THR	THR	ALA	ALA	GLN	VAL	VAL
		LYS	LYS	LYS	LYS	THR	ASN	ASN
		ARG	ARG	ASP	ASP	ILE	ASP	ASP
		VAL	VAL	PRO	PRO	ALA	PHE	PHE
		ILE	ILE	ILE	ILE	GLU	CYS	CYS
		PHE	PHE	ILE	ILE	SER	ASP	ASP
		GLN	GLN	GLN	GLN	LEU	ILE	ILE
		ASP	ASP	TYP	TYP	LEU	GLU	GLU
		ALA	ALA	ASP	ASP	E108	ASN	ASN
		PRO	PRO	ALA	ALA	L114	PRO	PRO
		VAL	VAL	PRO	PRO	K141	GLY	GLY
		VAL	VAL	VAL	VAL		LEU	LEU
		ILE	ILE	ILE	ILE	S174	CYS	CYS
		HIS	HIS	ILE	ILE	L175	TYP	TYP
		ILE	ILE	ILE	ILE	ALA	ALA	ALA
		ARG	ARG	ILE	ILE	E178	SER	SER
		SER	SER	ALA	ALA	S179	GLN	GLN
		PHE	PHE	PHE	PHE	ALA	MET	MET
		HIS	HIS	THR	THR	THR	THR	THR
		GLN	GLN	GLN	GLN	ILE	GLN	GLN

- Molecule 2: Polymerase cofactor VP35

Chain D:  9% . 88%

MET	THR	THR	ARG	THR	LYS	GLY	ARG	GLY	HIS	GLN	THR	VAL	ALA	ALA	THR	THR	ASN	ASP	ASP	MET	MET	PRO	PRO	PRO	GLU	LEU	SER	GLY	TRP	ILE	SER	GLU	GLN	LEU	MET	THR	GLY	ARG	ILE	PRO	VAL	ASP	PHE	CYP	ASP	ILE	ASN	GLU	ASN	ASN	PRO	ASN	GLY	LEU	CYS	Tyr	ALA	ALA	SER	GLN	MET
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## 4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, Not provided	
Number of particles used	642661	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 ( $e^-/\text{\AA}^2$ )	60	Depositor
Minimum defocus (nm)	1000	Depositor
Maximum defocus (nm)	3000	Depositor
Magnification	Not provided	
Image detector	GATAN K3 (6k x 4k)	Depositor

## 5 Model quality

### 5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: ZN

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	0.12	0/11168	0.30	1/15169 (0.0%)
2	B	0.11	0/1836	0.32	0/2496
2	C	0.16	0/544	0.31	0/745
2	D	0.14	0/305	0.41	0/412
2	E	0.11	0/326	0.29	0/440
3	G	0.09	0/235	0.20	0/364
All	All	0.12	0/14414	0.30	1/19626 (0.0%)

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	51	TYR	N-CA-C	-5.49	107.58	114.56

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	10897	0	10861	84	0
2	B	1799	0	1777	22	0
2	C	533	0	502	4	0
2	D	303	0	316	7	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	E	324	0	329	7	0
3	G	212	0	107	0	0
4	A	1	0	0	0	0
All	All	14069	0	13892	110	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 4.

The worst 5 of 110 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)
2:B:263:PHE:HB2	2:B:280:ILE:HD11	1.69	0.74
1:A:1153:CYS:SG	1:A:1347:HIS:HE1	2.10	0.73
2:B:275:CYS:O	2:B:279:GLN:NE2	2.27	0.68
2:B:125:ALA:HB1	2:E:124:MET:HE3	1.74	0.68
1:A:114:LEU:HD22	1:A:858:ARG:HD3	1.77	0.66

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	1354/2212 (61%)	1261 (93%)	85 (6%)	8 (1%)	22	46
2	B	234/340 (69%)	220 (94%)	14 (6%)	0	100	100
2	C	70/340 (21%)	65 (93%)	5 (7%)	0	100	100
2	D	38/340 (11%)	37 (97%)	1 (3%)	0	100	100
2	E	40/340 (12%)	38 (95%)	2 (5%)	0	100	100
All	All	1736/3572 (49%)	1621 (93%)	107 (6%)	8 (0%)	27	50

5 of 8 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	451	LEU
1	A	751	VAL
1	A	1174	VAL
1	A	851	THR
1	A	829	ILE

### 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	1210/1994 (61%)	1210 (100%)	0	100	100
2	B	197/294 (67%)	197 (100%)	0	100	100
2	C	55/294 (19%)	55 (100%)	0	100	100
2	D	35/294 (12%)	35 (100%)	0	100	100
2	E	37/294 (13%)	37 (100%)	0	100	100
All	All	1534/3170 (48%)	1534 (100%)	0	100	100

There are no protein residues with a non-rotameric sidechain to report.

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 11 such sidechains are listed below:

Mol	Chain	Res	Type
1	A	1204	GLN
1	A	1257	GLN
2	B	279	GLN
2	B	132	ASN
1	A	998	ASN

### 5.3.3 RNA [i](#)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
3	G	9/18 (50%)	3 (33%)	0

All (3) RNA backbone outliers are listed below:

Mol	Chain	Res	Type
3	G	1	G
3	G	7	C
3	G	8	C

There are no RNA pucker outliers to report.

## 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](#)

Of 1 ligands modelled in this entry, 1 is monoatomic - leaving 0 for Mogul analysis.

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

## 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.