



wwPDB X-ray Structure Validation Summary Report ⓘ

Dec 12, 2023 – 07:03 pm GMT

PDB ID : 2YIB
Title : Structure of the RNA polymerase VP1 from Infectious Pancreatic Necrosis Virus
Authors : Graham, S.C.; Sarin, L.P.; Bahar, M.W.; Myers, R.A.; Stuart, D.I.; Bamford, D.H.; Grimes, J.M.
Deposited on : 2011-05-11
Resolution : 3.80 Å(reported)

This is a wwPDB X-ray Structure 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/XrayValidationReportHelp>

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:

MolProbity : 4.02b-467
Xtriage (Phenix) : 1.13
EDS : 2.36
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac : 5.8.0158
CCP4 : 7.0.044 (Gargrove)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.36

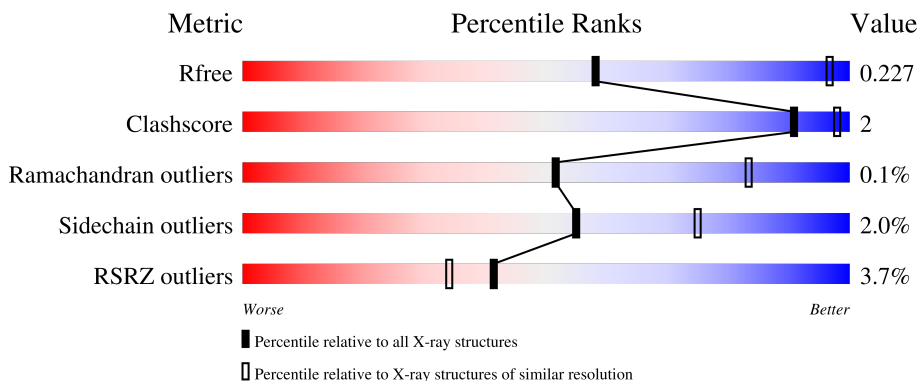
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 3.80 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)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	1212 (4.00-3.60)
Clashscore	141614	1288 (4.00-3.60)
Ramachandran outliers	138981	1243 (4.00-3.60)
Sidechain outliers	138945	1237 (4.00-3.60)
RSRZ outliers	127900	1121 (4.00-3.60)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower 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 $\leq 5\%$. The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	853	 87% 6% 8%
1	B	853	 87% 6% 8%
1	C	853	 86% 7% 8%
2	D	770	 94% 5%

2 Entry composition [i](#)

There are 2 unique types of molecules in this entry. The entry contains 24183 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, the ZeroOcc column contains the number of atoms modelled with zero occupancy, 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.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	789	6159	3908	1038	1187	26	0	0	0
1	B	789	6155	3906	1038	1185	26	0	0	0
1	C	789	6159	3908	1038	1187	26	0	0	0

There are 24 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	846	VAL	-	expression tag	UNP P22173
A	847	GLU	-	expression tag	UNP P22173
A	848	HIS	-	expression tag	UNP P22173
A	849	HIS	-	expression tag	UNP P22173
A	850	HIS	-	expression tag	UNP P22173
A	851	HIS	-	expression tag	UNP P22173
A	852	HIS	-	expression tag	UNP P22173
A	853	HIS	-	expression tag	UNP P22173
B	846	VAL	-	expression tag	UNP P22173
B	847	GLU	-	expression tag	UNP P22173
B	848	HIS	-	expression tag	UNP P22173
B	849	HIS	-	expression tag	UNP P22173
B	850	HIS	-	expression tag	UNP P22173
B	851	HIS	-	expression tag	UNP P22173
B	852	HIS	-	expression tag	UNP P22173
B	853	HIS	-	expression tag	UNP P22173
C	846	VAL	-	expression tag	UNP P22173
C	847	GLU	-	expression tag	UNP P22173
C	848	HIS	-	expression tag	UNP P22173
C	849	HIS	-	expression tag	UNP P22173
C	850	HIS	-	expression tag	UNP P22173
C	851	HIS	-	expression tag	UNP P22173
C	852	HIS	-	expression tag	UNP P22173

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Chain	Residue	Modelled	Actual	Comment	Reference
C	853	HIS	-	expression tag	UNP P22173

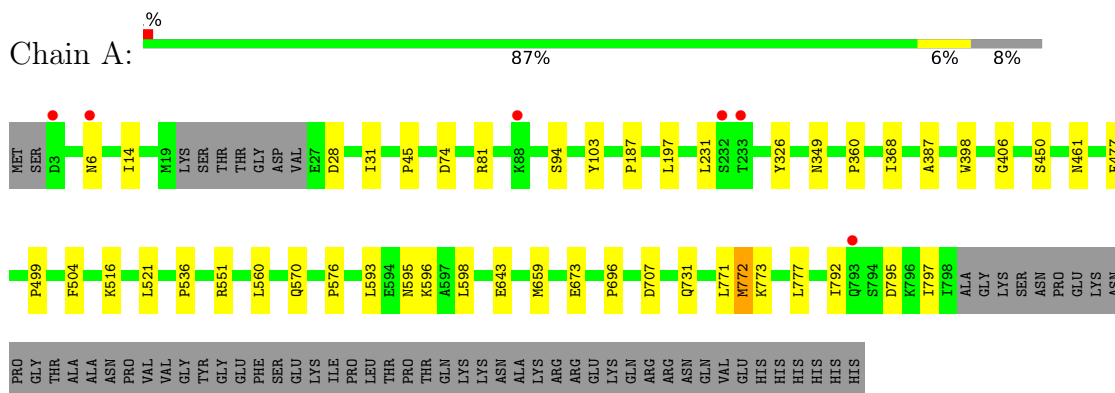
- Molecule 2 is a protein called RNA-DIRECTED RNA POLYMERASE.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace	
			Total	C	N	O				S
2	D	761	5710	3622	966	1097	25	415	0	0

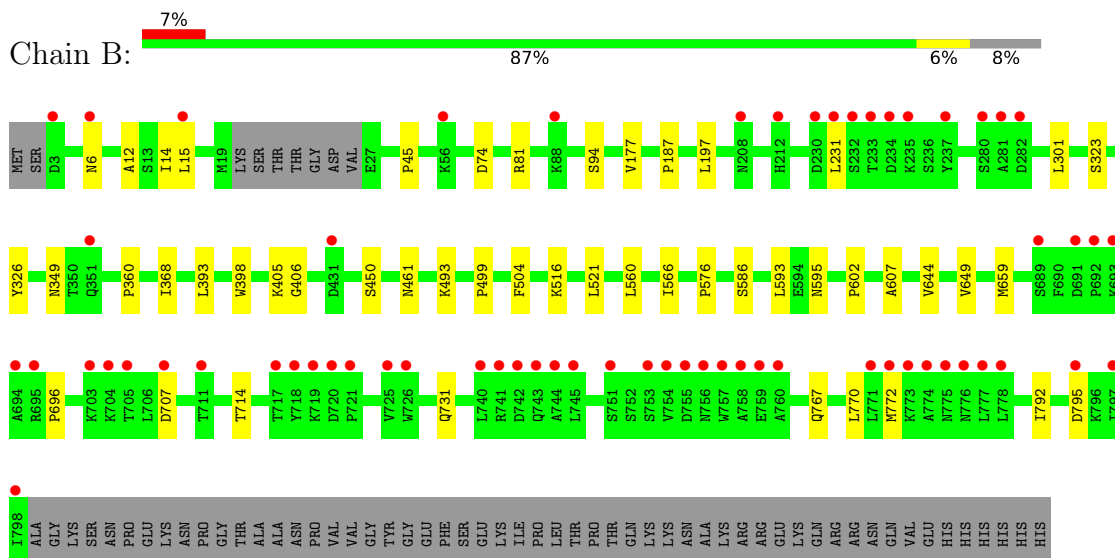
3 Residue-property plots [i](#)

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 and electron density. 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. A red dot above a residue indicates a poor fit to the electron density ($RSRZ > 2$). 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.

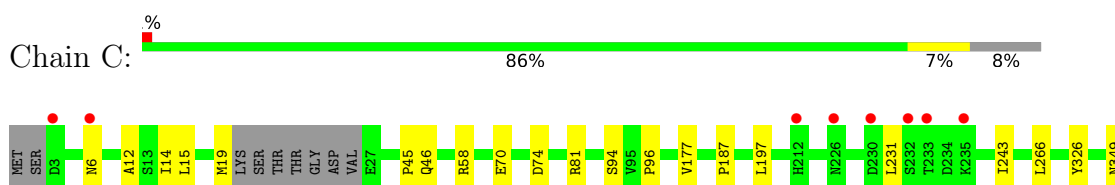
• Molecule 1: RNA-DIRECTED RNA POLYMERASE

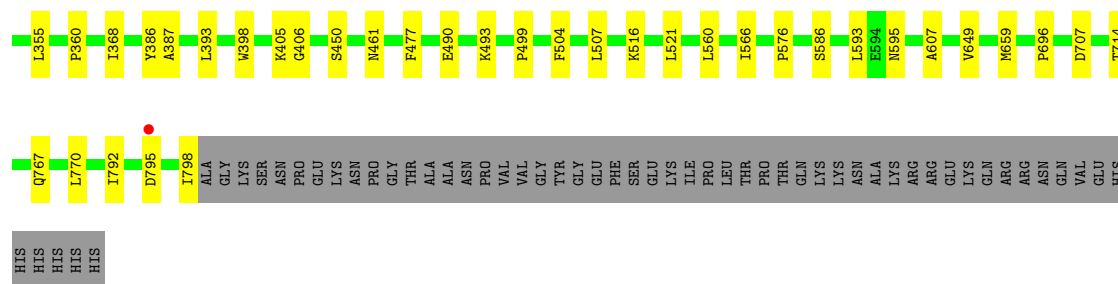


• Molecule 1: RNA-DIRECTED RNA POLYMERASE



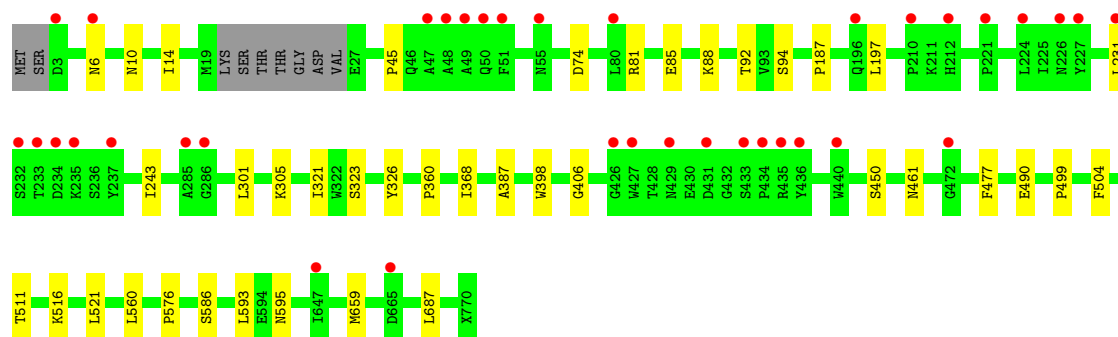
• Molecule 1: RNA-DIRECTED RNA POLYMERASE





- Molecule 2: RNA-DIRECTED RNA POLYMERASE

Chain D: 94% 5% 5%



4 Data and refinement statistics i

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	119.74Å 195.45Å 197.38Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	44.43 – 3.80 44.43 – 3.80	Depositor EDS
% Data completeness (in resolution range)	(Not available) (44.43-3.80) 98.1 (44.43-3.80)	Depositor EDS
R_{merge}	0.30	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.91 (at 3.77Å)	Xtrriage
Refinement program	BUSTER 2.9.2	Depositor
R, R_{free}	0.184 , 0.213 0.202 , 0.227	Depositor DCC
R_{free} test set	2307 reflections (5.07%)	wwPDB-VP
Wilson B-factor (Å ²)	88.6	Xtrriage
Anisotropy	0.182	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.35 , 94.4	EDS
L-test for twinning ²	$\langle L \rangle = 0.41$, $\langle L^2 \rangle = 0.23$	Xtrriage
Estimated twinning fraction	0.056 for -h,l,k	Xtrriage
F_o, F_c correlation	0.91	EDS
Total number of atoms	24183	wwPDB-VP
Average B, all atoms (Å ²)	99.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 1.98% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical values of $\langle |L| \rangle$, $\langle L^2 \rangle$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

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	0.47	0/6296	0.64	0/8573
1	B	0.44	0/6292	0.65	0/8568
1	C	0.48	0/6296	0.66	0/8573
2	D	0.46	0/5420	0.65	0/7383
All	All	0.46	0/24304	0.65	0/33097

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	6159	0	6090	23	0
1	B	6155	0	6086	24	0
1	C	6159	0	6090	26	0
2	D	5710	0	5296	21	0
All	All	24183	0	23562	79	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 2.

The worst 5 of 79 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:B:644:VAL:HG22	2:D:92:THR:CG2	1.90	1.01
1:B:644:VAL:HG22	2:D:92:THR:HG21	1.54	0.88
1:B:644:VAL:HG22	2:D:92:THR:HG23	1.61	0.81
1:C:187:PRO:HB3	1:C:197:LEU:HD11	1.73	0.70
1:A:187:PRO:HB3	1:A:197:LEU:HD11	1.74	0.69

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 X-ray entries followed by that with respect to entries of similar resolution.

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	785/853 (92%)	761 (97%)	23 (3%)	1 (0%)	51	83
1	B	785/853 (92%)	761 (97%)	23 (3%)	1 (0%)	51	83
1	C	785/853 (92%)	758 (97%)	26 (3%)	1 (0%)	51	83
2	D	674/770 (88%)	651 (97%)	22 (3%)	1 (0%)	51	83
All	All	3029/3329 (91%)	2931 (97%)	94 (3%)	4 (0%)	51	83

All (4) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	D	406	GLY
1	B	406	GLY
1	C	406	GLY
1	A	406	GLY

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 X-ray entries followed by that with respect to entries of similar resolution.

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	669/739 (90%)	656 (98%)	13 (2%)	57	76
1	B	668/739 (90%)	654 (98%)	14 (2%)	53	74
1	C	669/739 (90%)	654 (98%)	15 (2%)	52	72
2	D	573/593 (97%)	563 (98%)	10 (2%)	60	78
All	All	2579/2810 (92%)	2527 (98%)	52 (2%)	55	75

5 of 52 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	C	14	ILE
1	C	450	SER
2	D	516	LYS
1	C	15	LEU
1	C	231	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (3) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	731	GLN
1	C	46	GLN
1	C	768	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 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](#)

The following chains have linkage breaks:

Mol	Chain	Number of breaks
2	D	3

All chain breaks are listed below:

Model	Chain	Residue-1	Atom-1	Residue-2	Atom-2	Distance (Å)
1	D	687:LEU	C	688:UNK	N	3.36
1	D	767:UNK	C	768:UNK	N	1.03
1	D	700:UNK	C	701:UNK	N	1.02

6 Fit of model and data [i](#)

6.1 Protein, DNA and RNA chains [i](#)

In the following table, the column labelled ‘#RSRZ > 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95th percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled ‘Q < 0.9’ lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
1	A	789/853 (92%)	-0.15	6 (0%) 86 81	50, 80, 118, 174	0
1	B	789/853 (92%)	0.30	63 (7%) 12 10	62, 113, 183, 214	0
1	C	789/853 (92%)	-0.06	9 (1%) 80 74	49, 85, 131, 179	0
2	D	678/770 (88%)	0.21	36 (5%) 26 23	58, 103, 162, 190	0
All	All	3045/3329 (91%)	0.07	114 (3%) 41 34	49, 93, 158, 214	0

The worst 5 of 114 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	3	ASP	6.3
1	C	3	ASP	6.3
1	B	692	PRO	5.9
1	B	755	ASP	5.5
1	B	721	PRO	5.3

6.2 Non-standard residues in protein, DNA, RNA chains [i](#)

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

6.3 Carbohydrates [i](#)

There are no monosaccharides in this entry.

6.4 Ligands [i](#)

There are no ligands in this entry.

6.5 Other polymers [i](#)

There are no such residues in this entry.