



# Full wwPDB X-ray Structure Validation Report ⓘ

Aug 7, 2020 – 12:10 AM BST

PDB ID : 7BQ9  
Title : Crystal structure of ASFV p15  
Authors : Fu, D.; Chen, C.; Guo, Y.  
Deposited on : 2020-03-24  
Resolution : 2.61 Å(reported)

This is a Full wwPDB X-ray Structure Validation 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/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

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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 : 2.13.1  
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) : 2.13.1

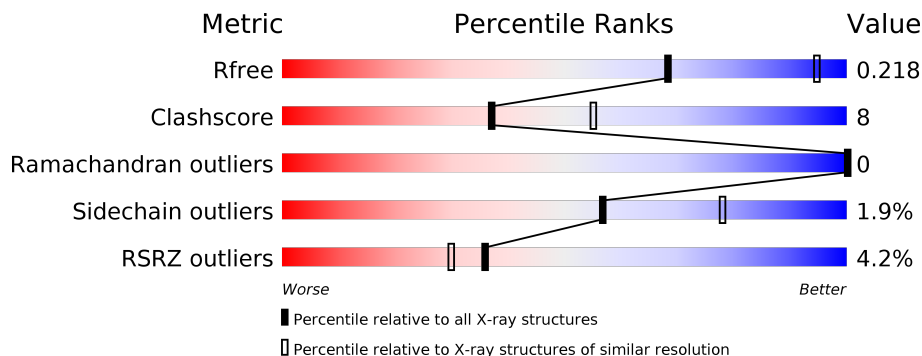
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.61 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	3797 (2.64-2.60)
Clashscore	141614	4168 (2.64-2.60)
Ramachandran outliers	138981	4093 (2.64-2.60)
Sidechain outliers	138945	4093 (2.64-2.60)
RSRZ outliers	127900	3731 (2.64-2.60)

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 on the lower 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  $\leq 5\%$ . 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	194	 % 65% 13% 21%
1	B	194	 6% 66% 12% 21%

## 2 Entry composition i

There is only 1 type of molecule in this entry. The entry contains 2408 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 60 kDa polyprotein.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	B	153	1204	781	197	220	6	0	0	0
1	A	153	1204	781	197	220	6	0	0	0

There are 70 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	-3	ARG	-	expression tag	UNP A0A0A1DY09
B	-2	SER	-	expression tag	UNP A0A0A1DY09
B	-1	PRO	-	expression tag	UNP A0A0A1DY09
B	0	TRP	-	expression tag	UNP A0A0A1DY09
B	160	LEU	-	expression tag	UNP A0A0A1DY09
B	161	GLU	-	expression tag	UNP A0A0A1DY09
B	162	SER	-	expression tag	UNP A0A0A1DY09
B	163	ARG	-	expression tag	UNP A0A0A1DY09
B	164	GLY	-	expression tag	UNP A0A0A1DY09
B	165	PRO	-	expression tag	UNP A0A0A1DY09
B	166	PHE	-	expression tag	UNP A0A0A1DY09
B	167	GLU	-	expression tag	UNP A0A0A1DY09
B	168	GLY	-	expression tag	UNP A0A0A1DY09
B	169	LYS	-	expression tag	UNP A0A0A1DY09
B	170	PRO	-	expression tag	UNP A0A0A1DY09
B	171	ILE	-	expression tag	UNP A0A0A1DY09
B	172	PRO	-	expression tag	UNP A0A0A1DY09
B	173	ASN	-	expression tag	UNP A0A0A1DY09
B	174	PRO	-	expression tag	UNP A0A0A1DY09
B	175	LEU	-	expression tag	UNP A0A0A1DY09
B	176	LEU	-	expression tag	UNP A0A0A1DY09
B	177	GLY	-	expression tag	UNP A0A0A1DY09
B	178	LEU	-	expression tag	UNP A0A0A1DY09
B	179	ASP	-	expression tag	UNP A0A0A1DY09
B	180	SER	-	expression tag	UNP A0A0A1DY09

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Chain	Residue	Modelled	Actual	Comment	Reference
B	181	THR	-	expression tag	UNP A0A0A1DY09
B	182	ARG	-	expression tag	UNP A0A0A1DY09
B	183	THR	-	expression tag	UNP A0A0A1DY09
B	184	GLY	-	expression tag	UNP A0A0A1DY09
B	185	HIS	-	expression tag	UNP A0A0A1DY09
B	186	HIS	-	expression tag	UNP A0A0A1DY09
B	187	HIS	-	expression tag	UNP A0A0A1DY09
B	188	HIS	-	expression tag	UNP A0A0A1DY09
B	189	HIS	-	expression tag	UNP A0A0A1DY09
B	190	HIS	-	expression tag	UNP A0A0A1DY09
A	-3	ARG	-	expression tag	UNP A0A0A1DY09
A	-2	SER	-	expression tag	UNP A0A0A1DY09
A	-1	PRO	-	expression tag	UNP A0A0A1DY09
A	0	TRP	-	expression tag	UNP A0A0A1DY09
A	160	LEU	-	expression tag	UNP A0A0A1DY09
A	161	GLU	-	expression tag	UNP A0A0A1DY09
A	162	SER	-	expression tag	UNP A0A0A1DY09
A	163	ARG	-	expression tag	UNP A0A0A1DY09
A	164	GLY	-	expression tag	UNP A0A0A1DY09
A	165	PRO	-	expression tag	UNP A0A0A1DY09
A	166	PHE	-	expression tag	UNP A0A0A1DY09
A	167	GLU	-	expression tag	UNP A0A0A1DY09
A	168	GLY	-	expression tag	UNP A0A0A1DY09
A	169	LYS	-	expression tag	UNP A0A0A1DY09
A	170	PRO	-	expression tag	UNP A0A0A1DY09
A	171	ILE	-	expression tag	UNP A0A0A1DY09
A	172	PRO	-	expression tag	UNP A0A0A1DY09
A	173	ASN	-	expression tag	UNP A0A0A1DY09
A	174	PRO	-	expression tag	UNP A0A0A1DY09
A	175	LEU	-	expression tag	UNP A0A0A1DY09
A	176	LEU	-	expression tag	UNP A0A0A1DY09
A	177	GLY	-	expression tag	UNP A0A0A1DY09
A	178	LEU	-	expression tag	UNP A0A0A1DY09
A	179	ASP	-	expression tag	UNP A0A0A1DY09
A	180	SER	-	expression tag	UNP A0A0A1DY09
A	181	THR	-	expression tag	UNP A0A0A1DY09
A	182	ARG	-	expression tag	UNP A0A0A1DY09
A	183	THR	-	expression tag	UNP A0A0A1DY09
A	184	GLY	-	expression tag	UNP A0A0A1DY09
A	185	HIS	-	expression tag	UNP A0A0A1DY09
A	186	HIS	-	expression tag	UNP A0A0A1DY09
A	187	HIS	-	expression tag	UNP A0A0A1DY09

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<b>Chain</b>	<b>Residue</b>	<b>Modelled</b>	<b>Actual</b>	<b>Comment</b>	<b>Reference</b>
A	188	HIS	-	expression tag	UNP A0A0A1DY09
A	189	HIS	-	expression tag	UNP A0A0A1DY09
A	190	HIS	-	expression tag	UNP A0A0A1DY09



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 21 3	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	116.74Å 116.74Å 116.74Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	47.66 – 2.61 47.66 – 2.61	Depositor EDS
% Data completeness (in resolution range)	99.6 (47.66-2.61) 93.1 (47.66-2.61)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	0.54 (at 2.61Å)	Xtrriage
Refinement program	PHENIX 1.15.2_3472	Depositor
R, $R_{free}$	0.181 , 0.218 0.181 , 0.218	Depositor DCC
$R_{free}$ test set	1630 reflections (9.99%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	81.9	Xtrriage
Anisotropy	0.000	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.35 , 69.4	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.50$ , $\langle L^2 \rangle = 0.33$	Xtrriage
Estimated twinning fraction	0.042 for l,-k,h	Xtrriage
$F_o, F_c$ correlation	0.96	EDS
Total number of atoms	2408	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	94.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.50% of the height of the origin peak. No significant pseudotranslation is detected.*

<sup>1</sup>Intensities estimated from amplitudes.

<sup>2</sup>Theoretical 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	0.49	0/1235	0.66	2/1675 (0.1%)
1	B	0.45	0/1235	0.59	1/1675 (0.1%)
All	All	0.47	0/2470	0.63	3/3350 (0.1%)

There are no bond length outliers.

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	-1	PRO	N-CA-CB	5.90	110.38	103.30
1	A	-1	PRO	N-CA-CB	5.64	110.07	103.30
1	A	96	THR	C-N-CA	-5.12	111.55	122.30

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	1204	0	1219	23	1
1	B	1204	0	1219	16	0
All	All	2408	0	2438	38	1

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 8.

All (38) 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:102:VAL:HG11	1:A:105:THR:CG2	1.61	1.28
1:A:102:VAL:HG11	1:A:105:THR:HG23	1.40	1.01
1:B:91:GLU:OE2	1:B:99:LYS:NZ	1.98	0.96
1:A:102:VAL:CG1	1:A:105:THR:HG23	1.97	0.95
1:A:102:VAL:CG1	1:A:105:THR:CG2	2.45	0.93
1:A:102:VAL:HG11	1:A:105:THR:HG22	1.55	0.89
1:B:92:ILE:HD12	1:B:92:ILE:O	1.79	0.81
1:B:24:ILE:CD1	1:B:58:LYS:HG2	2.19	0.72
1:B:24:ILE:HD12	1:B:58:LYS:HG2	1.71	0.71
1:B:87:GLU:OE1	1:B:87:GLU:N	2.26	0.67
1:A:41:HIS:O	1:A:132:ARG:NH1	2.36	0.58
1:A:91:GLU:OE2	1:A:99:LYS:NZ	2.19	0.57
1:B:123:ALA:HB2	1:A:107:ALA:HA	1.87	0.57
1:B:84:THR:HB	1:B:85:PRO:CD	2.35	0.56
1:B:84:THR:HB	1:B:85:PRO:HD2	1.89	0.55
1:A:41:HIS:CE1	1:A:132:ARG:HH12	2.24	0.54
1:A:41:HIS:HE1	1:A:132:ARG:HH22	1.56	0.53
1:B:28:LEU:HD13	1:B:70:ILE:HG12	1.91	0.52
1:A:3:ASN:HB3	1:A:16:GLN:NE2	2.24	0.52
1:A:102:VAL:CG1	1:A:105:THR:HG22	2.28	0.52
1:A:102:VAL:HG11	1:A:105:THR:HG21	1.80	0.48
1:A:102:VAL:HG12	1:A:105:THR:HG23	1.88	0.48
1:A:24:ILE:HD11	1:A:62:TYR:HE2	1.79	0.47
1:B:76:LEU:HD23	1:B:143:MET:HG3	1.97	0.47
1:B:92:ILE:HD12	1:B:92:ILE:C	2.35	0.46
1:A:99:LYS:HE2	1:A:101:GLU:OE1	2.16	0.46
1:B:92:ILE:CD1	1:B:100:LEU:HB2	2.46	0.46
1:A:24:ILE:HD11	1:A:62:TYR:CE2	2.52	0.45
1:B:148:PRO:HA	1:B:149:PRO:HD3	1.85	0.44
1:A:30:MET:HB3	1:A:30:MET:HE2	1.89	0.43
1:A:84:THR:HB	1:A:85:PRO:HD2	2.00	0.43
1:A:84:THR:HB	1:A:85:PRO:CD	2.48	0.43
1:B:50:GLN:H	1:B:50:GLN:HG2	1.67	0.43
1:A:73:LEU:HA	1:A:73:LEU:HD23	1.89	0.42
1:B:111:ILE:HG12	1:B:118:VAL:HG22	2.01	0.42
1:B:102:VAL:HG11	1:B:105:THR:HG23	2.00	0.42
1:A:114:ASN:ND2	1:A:144:PRO:HB3	2.35	0.41
1:A:41:HIS:HD2	1:A:80:PHE:HD2	1.69	0.41

All (1) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:8:CYS:SG	1:A:29:CYS:SG[9_555]	1.51	0.69

### 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	151/194 (78%)	143 (95%)	8 (5%)	0	100	100
1	B	151/194 (78%)	147 (97%)	4 (3%)	0	100	100
All	All	302/388 (78%)	290 (96%)	12 (4%)	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 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	132/168 (79%)	129 (98%)	3 (2%)	50	73
1	B	132/168 (79%)	130 (98%)	2 (2%)	65	82
All	All	264/336 (79%)	259 (98%)	5 (2%)	57	78

All (5) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	B	9	LYS
1	B	88	PHE
1	A	52	LYS

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Mol	Chain	Res	Type
1	A	88	PHE
1	A	131	ARG

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. There are no such sidechains identified.

### 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.

## 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, 95<sup>th</sup> 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 <sup>2</sup> )	Q<0.9
1	A	153/194 (78%)	0.13	1 (0%) 87 85	61, 86, 131, 160	0
1	B	153/194 (78%)	0.50	12 (7%) 13 9	66, 92, 139, 167	0
All	All	306/388 (78%)	0.32	13 (4%) 36 30	61, 89, 136, 167	0

All (13) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	39	TYR	6.0
1	A	39	TYR	4.9
1	B	146	GLU	4.5
1	B	98	VAL	3.9
1	B	145	LEU	3.5
1	B	38	LYS	3.3
1	B	151	LYS	3.0
1	B	37	ALA	2.7
1	B	102	VAL	2.4
1	B	93	GLY	2.2
1	B	100	LEU	2.1
1	B	148	PRO	2.1
1	B	150	TYR	2.0

### 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

There are no ligands in this entry.

## 6.5 Other polymers

There are no such residues in this entry.