



wwPDB X-ray Structure Validation Summary Report ⓘ

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PDB ID : 2JDQ / pdb_00002jdg
Title : C-terminal domain of influenza A virus polymerase PB2 subunit in complex with human importin alpha5
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Deposited on : 2007-01-11
Resolution : 2.20 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	:	4-5-2 with Phenix2.0
Xtriage (Phenix)	:	2.0
EDS	:	3.0
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4	:	9.0.010 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.49

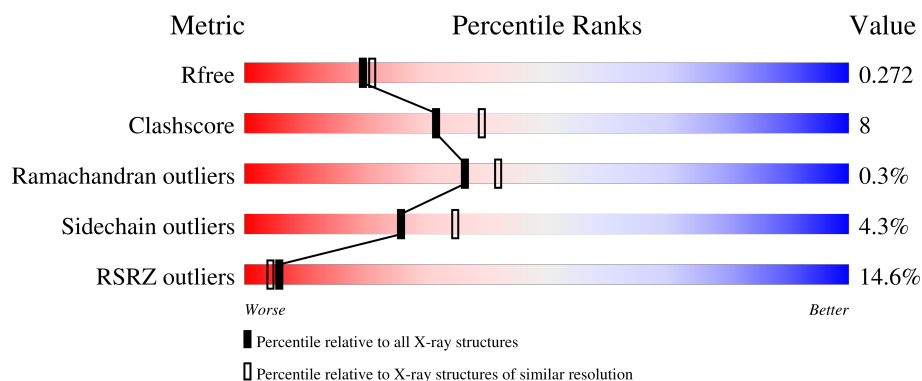
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.20 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}	180053	6164 (2.20-2.20)
Clashscore	190562	6851 (2.20-2.20)
Ramachandran outliers	187476	6768 (2.20-2.20)
Sidechain outliers	187428	6769 (2.20-2.20)
RSRZ outliers	180081	6166 (2.20-2.20)

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	450	
1	B	450	
2	D	83	
2	E	83	

2 Entry composition [i](#)

There are 3 unique types of molecules in this entry. The entry contains 7862 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 IMPORTIN ALPHA-1 SUBUNIT.

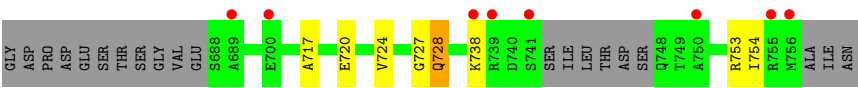
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	424	Total	C	N	O	S	0	0	0
			3296	2094	554	630	18			
1	B	426	Total	C	N	O	S	0	0	0
			3313	2103	556	636	18			

- Molecule 2 is a protein called POLYMERASE BASIC PROTEIN 2.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	D	63	Total	C	N	O	S	0	0	0
			488	304	95	87	2			
2	E	65	Total	C	N	O	S	0	0	0
			500	312	96	90	2			

- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	131	Total	O	0	0
			131	131		
3	B	98	Total	O	0	0
			98	98		
3	D	14	Total	O	0	0
			14	14		
3	E	22	Total	O	0	0
			22	22		



● Molecule 2: POLYMERASE BASIC PROTEIN 2



4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	94.97Å 100.55Å 151.84Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	30.00 – 2.20 30.00 – 2.20	Depositor EDS
% Data completeness (in resolution range)	99.6 (30.00-2.20) 99.5 (30.00-2.20)	Depositor EDS
R_{merge}	0.09	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.09 (at 2.20Å)	Xtriage
Refinement program	REFMAC 5.2.0019	Depositor
R, R_{free}	0.206 , 0.247 0.242 , 0.272	Depositor DCC
R_{free} test set	2970 reflections (3.99%)	wwPDB-VP
Wilson B-factor (Å ²)	37.6	Xtriage
Anisotropy	0.675	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.32 , 42.1	EDS
L-test for twinning ²	$\langle L \rangle = 0.47$, $\langle L^2 \rangle = 0.30$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.91	EDS
Total number of atoms	7862	wwPDB-VP
Average B, all atoms (Å ²)	21.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.96% 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	0.82	3/3354 (0.1%)	0.97	3/4558 (0.1%)
1	B	0.72	0/3371	0.88	1/4581 (0.0%)
2	D	0.57	0/489	0.75	0/649
2	E	0.62	0/501	0.73	0/666
All	All	0.75	3/7715 (0.0%)	0.91	4/10454 (0.0%)

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	333	VAL	C-O	-7.09	1.15	1.24
1	A	329	ILE	CA-CB	6.35	1.62	1.54
1	A	374	GLN	N-CA	5.27	1.52	1.46

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	337	CYS	N-CA-C	-8.57	101.83	112.88
1	B	394	PHE	N-CA-C	5.60	117.39	111.28
1	A	233	VAL	CB-CA-C	-5.42	104.75	112.22
1	A	333	VAL	CB-CA-C	-5.01	105.47	112.04

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	3296	0	3331	46	0
1	B	3313	0	3341	61	0
2	D	488	0	528	5	0
2	E	500	0	540	20	0
3	A	131	0	0	4	0
3	B	98	0	0	1	0
3	D	14	0	0	0	0
3	E	22	0	0	5	0
All	All	7862	0	7740	124	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 8.

The worst 5 of 124 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:E:691:LEU:HD11	2:E:726:ILE:HD12	1.46	0.97
1:A:122:ILE:HG21	1:A:164:ILE:HD13	1.48	0.92
2:E:694:PHE:O	3:E:2007:HOH:O	1.90	0.88
1:B:306:MET:HA	1:B:306:MET:HE2	1.57	0.86
1:B:201:THR:HG21	1:B:245:PRO:HD2	1.55	0.86

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	422/450 (94%)	414 (98%)	7 (2%)	1 (0%)	43	51
1	B	424/450 (94%)	414 (98%)	10 (2%)	0	100	100
2	D	59/83 (71%)	57 (97%)	1 (2%)	1 (2%)	7	5
2	E	61/83 (74%)	60 (98%)	0	1 (2%)	7	6

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
All	All	966/1066 (91%)	945 (98%)	18 (2%)	3 (0%)	36	42

All (3) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	327	ASP
2	E	728	GLN
2	D	728	GLN

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 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	368/387 (95%)	354 (96%)	14 (4%)	29	40
1	B	370/387 (96%)	354 (96%)	16 (4%)	26	35
2	D	52/69 (75%)	49 (94%)	3 (6%)	18	22
2	E	53/69 (77%)	50 (94%)	3 (6%)	18	23
All	All	843/912 (92%)	807 (96%)	36 (4%)	26	35

5 of 36 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	B	494	GLN
2	E	732	VAL
1	B	495	LYS
2	D	754	ILE
1	A	428	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 23 such sidechains are listed below:

Mol	Chain	Res	Type
1	B	223	GLN
1	B	372	GLN

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Mol	Chain	Res	Type
1	B	345	HIS
1	B	485	GLN
1	A	380	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 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.

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	424/450 (94%)	0.46	30 (7%) 22 19	2, 23, 36, 44	0
1	B	426/450 (94%)	1.11	95 (22%) 2 1	2, 24, 41, 52	0
2	D	63/83 (75%)	0.95	8 (12%) 8 6	15, 22, 56, 62	0
2	E	65/83 (78%)	0.99	10 (15%) 5 4	8, 16, 40, 44	0
All	All	978/1066 (91%)	0.81	143 (14%) 6 4	2, 22, 40, 62	0

The worst 5 of 143 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	508	ASP	6.2
1	B	332	GLN	4.8
1	A	507	GLU	4.5
1	B	334	ILE	4.4
1	A	498	ASP	4.3

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 oligosaccharides 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.