



# Full wwPDB X-ray Structure Validation Report ⓘ

Apr 4, 2017 – 11:30 AM EDT

PDB ID : 5JDR  
Title : Structure of PD-L1  
Authors : Zhou, A.; Wei, H.  
Deposited on : 2016-04-17  
Resolution : 2.70 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

<http://wwpdb.org/validation/2016/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) : 1.9-1692  
EDS : rb-20029077  
Percentile statistics : 20161228.v01 (using entries in the PDB archive December 28th 2016)  
Refmac : 5.8.0135  
CCP4 : 6.5.0  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : rb-20029077

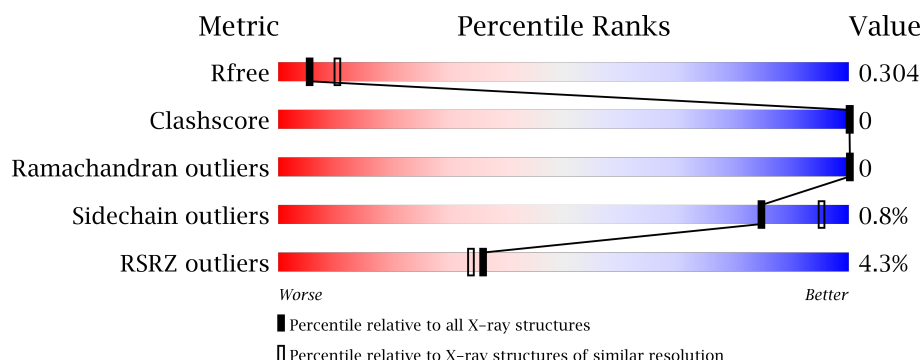
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

## *X-RAY DIFFRACTION*

The reported resolution of this entry is 2.70 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))
$R_{free}$	100719	2259 (2.70-2.70)
Clashscore	112137	2590 (2.70-2.70)
Ramachandran outliers	110173	2550 (2.70-2.70)
Sidechain outliers	110143	2550 (2.70-2.70)
RSRZ outliers	101464	2275 (2.70-2.70)

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. 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	237	<div> <div>5%</div> <div>87%</div> <div>12%</div> </div>
1	B	237	<div> <div>3%</div> <div>88%</div> <div>12%</div> </div>

## 2 Entry composition

There are 2 unique types of molecules in this entry. The entry contains 3380 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 Programmed cell death 1 ligand 1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	209	Total	C	N	O	S	0	1	0
			1690	1067	287	328	8			
1	B	209	Total	C	N	O	S	0	0	0
			1683	1064	286	326	7			

There are 30 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	17	MET	-	expression tag	UNP Q9NZQ7
A	240	ASP	-	expression tag	UNP Q9NZQ7
A	241	LYS	-	expression tag	UNP Q9NZQ7
A	242	LEU	-	expression tag	UNP Q9NZQ7
A	243	ALA	-	expression tag	UNP Q9NZQ7
A	244	ALA	-	expression tag	UNP Q9NZQ7
A	245	ALA	-	expression tag	UNP Q9NZQ7
A	246	LEU	-	expression tag	UNP Q9NZQ7
A	247	GLU	-	expression tag	UNP Q9NZQ7
A	248	HIS	-	expression tag	UNP Q9NZQ7
A	249	HIS	-	expression tag	UNP Q9NZQ7
A	250	HIS	-	expression tag	UNP Q9NZQ7
A	251	HIS	-	expression tag	UNP Q9NZQ7
A	252	HIS	-	expression tag	UNP Q9NZQ7
A	253	HIS	-	expression tag	UNP Q9NZQ7
B	17	MET	-	expression tag	UNP Q9NZQ7
B	240	ASP	-	expression tag	UNP Q9NZQ7
B	241	LYS	-	expression tag	UNP Q9NZQ7
B	242	LEU	-	expression tag	UNP Q9NZQ7
B	243	ALA	-	expression tag	UNP Q9NZQ7
B	244	ALA	-	expression tag	UNP Q9NZQ7
B	245	ALA	-	expression tag	UNP Q9NZQ7
B	246	LEU	-	expression tag	UNP Q9NZQ7
B	247	GLU	-	expression tag	UNP Q9NZQ7
B	248	HIS	-	expression tag	UNP Q9NZQ7

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Chain	Residue	Modelled	Actual	Comment	Reference
B	249	HIS	-	expression tag	UNP Q9NZQ7
B	250	HIS	-	expression tag	UNP Q9NZQ7
B	251	HIS	-	expression tag	UNP Q9NZQ7
B	252	HIS	-	expression tag	UNP Q9NZQ7
B	253	HIS	-	expression tag	UNP Q9NZQ7

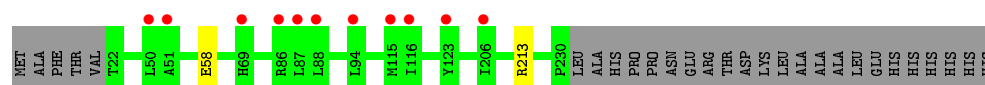
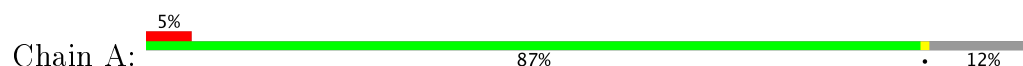
- Molecule 2 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	A	6	Total O 6 6	0	0
2	B	1	Total O 1 1	0	0

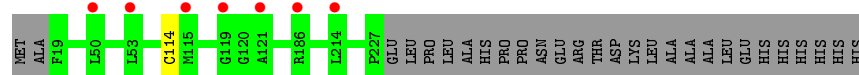
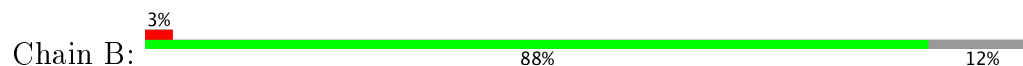
### 3 Residue-property plots [i](#)

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 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: Programmed cell death 1 ligand 1



- Molecule 1: Programmed cell death 1 ligand 1



## 4 Data and refinement statistics

Property	Value	Source
Space group	C 2 2 21	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	72.24Å 91.51Å 141.83Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	70.92 – 2.70 56.70 – 2.70	Depositor EDS
% Data completeness (in resolution range)	99.9 (70.92-2.70) 99.9 (56.70-2.70)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	2.31 (at 2.69Å)	Xtriage
Refinement program	REFMAC 5.8.0103	Depositor
R, $R_{free}$	0.227 , 0.276 0.254 , 0.304	Depositor DCC
$R_{free}$ test set	683 reflections (5.43%)	DCC
Wilson B-factor (Å <sup>2</sup> )	47.0	Xtriage
Anisotropy	0.784	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.34 , 44.1	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.47$ , $\langle L^2 \rangle = 0.30$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
$F_o, F_c$ correlation	0.90	EDS
Total number of atoms	3380	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	51.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.07% 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

### 5.1 Standard geometry

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	0.38	0/1721	0.63	0/2335
1	B	0.37	0/1714	0.61	0/2326
All	All	0.38	0/3435	0.62	0/4661

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

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	1690	0	1680	0	0
1	B	1683	0	1673	0	0
2	A	6	0	0	0	0
2	B	1	0	0	0	0
All	All	3380	0	3353	0	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 0.

There are no clashes within the asymmetric unit.

There are no symmetry-related clashes.

## 5.3 Torsion angles

### 5.3.1 Protein backbone

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	208/237 (88%)	197 (95%)	11 (5%)	0	100	100
1	B	207/237 (87%)	200 (97%)	7 (3%)	0	100	100
All	All	415/474 (88%)	397 (96%)	18 (4%)	0	100	100

There are no Ramachandran outliers to report.

### 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	191/213 (90%)	189 (99%)	2 (1%)	80	93
1	B	190/213 (89%)	189 (100%)	1 (0%)	91	97
All	All	381/426 (89%)	378 (99%)	3 (1%)	85	95

All (3) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	58	GLU
1	A	213	ARG
1	B	114	CYS

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 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.

## 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	209/237 (88%)	0.57	11 (5%) 27 25	28, 56, 99, 113	0
1	B	209/237 (88%)	0.33	7 (3%) 47 46	20, 43, 61, 69	0
All	All	418/474 (88%)	0.45	18 (4%) 36 34	20, 46, 95, 113	0

All (18) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	115	MET	3.8
1	A	50	LEU	3.6
1	A	123	TYR	3.6
1	B	121	ALA	3.5
1	A	94	LEU	3.2
1	B	119	GLY	3.2
1	B	53	LEU	2.8
1	A	69	HIS	2.7
1	A	86	ARG	2.6
1	A	116	ILE	2.6
1	B	214	LEU	2.4
1	B	50	LEU	2.4
1	A	206	ILE	2.3
1	A	51	ALA	2.3
1	A	87	LEU	2.1
1	B	186	ARG	2.1
1	B	115	MET	2.1
1	A	88	LEU	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 carbohydrates 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.