



# Full wwPDB X-ray Structure Validation Report ⓘ

May 17, 2020 – 06:37 pm BST

PDB ID : 6QJF  
Title : Crystal Structure of the third PDZ domain of PSD-95 protein D332P mutant:  
space group C121, structure 1  
Authors : Camara-Artigas, A.  
Deposited on : 2019-01-24  
Resolution : 1.50 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 : 2.11  
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) : 2.11

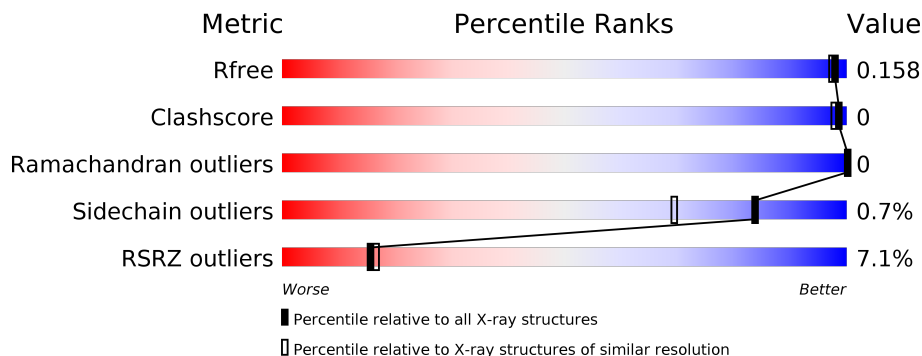
# 1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 1.50 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	2936 (1.50-1.50)
Clashscore	141614	3144 (1.50-1.50)
Ramachandran outliers	138981	3066 (1.50-1.50)
Sidechain outliers	138945	3064 (1.50-1.50)
RSRZ outliers	127900	2884 (1.50-1.50)

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	104	<div style="display: flex; align-items: center;"> <div style="width: 7%; height: 10px; background-color: red; margin-right: 5px;"></div> <div style="width: 85%; height: 10px; background-color: green; margin-right: 5px;"></div> <div style="width: 8%; height: 10px; background-color: grey; margin-right: 5px;"></div> </div> <p style="text-align: center;">92% <span style="float: right;">8%</span></p>
1	B	104	<div style="display: flex; align-items: center;"> <div style="width: 12%; height: 10px; background-color: red; margin-right: 5px;"></div> <div style="width: 83%; height: 10px; background-color: green; margin-right: 5px;"></div> <div style="width: 5%; height: 10px; background-color: yellow; margin-right: 5px;"></div> <div style="width: 2%; height: 10px; background-color: grey; margin-right: 5px;"></div> </div> <p style="text-align: center;">95% <span style="float: right;">• •</span></p>
1	C	104	<div style="display: flex; align-items: center;"> <div style="width: 6%; height: 10px; background-color: red; margin-right: 5px;"></div> <div style="width: 84%; height: 10px; background-color: green; margin-right: 5px;"></div> <div style="width: 6%; height: 10px; background-color: yellow; margin-right: 5px;"></div> <div style="width: 4%; height: 10px; background-color: grey; margin-right: 5px;"></div> </div> <p style="text-align: center;">90% <span style="float: right;">• 6%</span></p>
1	D	104	<div style="display: flex; align-items: center;"> <div style="width: 3%; height: 10px; background-color: red; margin-right: 5px;"></div> <div style="width: 88%; height: 10px; background-color: green; margin-right: 5px;"></div> <div style="width: 5%; height: 10px; background-color: yellow; margin-right: 5px;"></div> <div style="width: 4%; height: 10px; background-color: grey; margin-right: 5px;"></div> </div> <p style="text-align: center;">91% <span style="float: right;">• 8%</span></p>

## 2 Entry composition [i](#)

There are 2 unique types of molecules in this entry. The entry contains 6260 atoms, of which 3000 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 Disks large homolog 4.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	H	N	O			
1	A	96	1450	455	726	132	137	0	0	0
1	B	102	1577	493	791	143	150	0	2	0
1	C	98	1504	470	754	138	142	0	1	0
1	D	96	1454	455	729	133	137	0	0	0

There are 12 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	300	MET	-	initiating methionine	UNP P78352
A	301	GLY	-	expression tag	UNP P78352
A	332	PRO	ASP	engineered mutation	UNP P78352
B	300	MET	-	initiating methionine	UNP P78352
B	301	GLY	-	expression tag	UNP P78352
B	332	PRO	ASP	engineered mutation	UNP P78352
C	300	MET	-	initiating methionine	UNP P78352
C	301	GLY	-	expression tag	UNP P78352
C	332	PRO	ASP	engineered mutation	UNP P78352
D	300	MET	-	initiating methionine	UNP P78352
D	301	GLY	-	expression tag	UNP P78352
D	332	PRO	ASP	engineered mutation	UNP P78352

- Molecule 2 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	63	Total	O	0	0
			63	63		
2	B	79	Total	O	0	0
			79	79		

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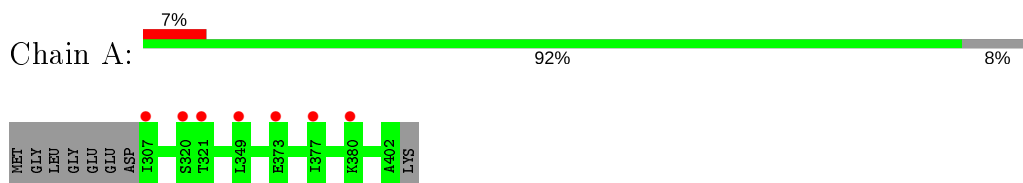
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<b>Mol</b>	<b>Chain</b>	<b>Residues</b>	<b>Atoms</b>	<b>ZeroOcc</b>	<b>AltConf</b>
2	C	71	Total O 71 71	0	0
2	D	62	Total O 62 62	0	0

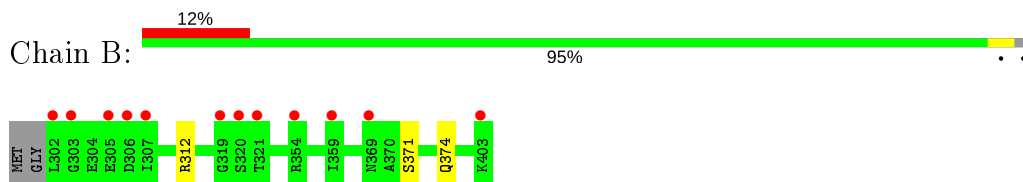
### 3 Residue-property plots [\(i\)](#)

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.

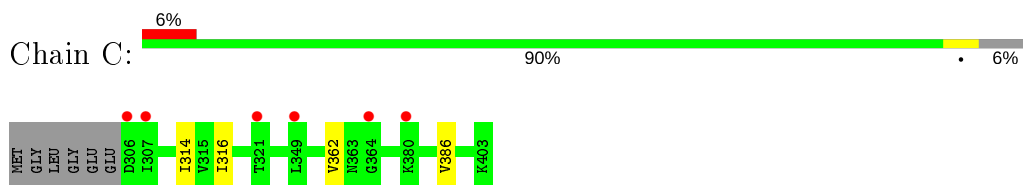
- Molecule 1: Disks large homolog 4



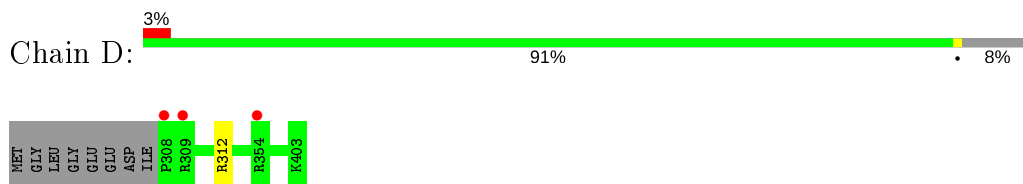
- Molecule 1: Disks large homolog 4



- Molecule 1: Disks large homolog 4



- Molecule 1: Disks large homolog 4



## 4 Data and refinement statistics

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	151.90Å 31.71Å 71.65Å 90.00° 99.51° 90.00°	Depositor
Resolution (Å)	19.62 – 1.50 19.62 – 1.50	Depositor EDS
% Data completeness (in resolution range)	97.1 (19.62-1.50) 97.1 (19.62-1.50)	Depositor EDS
$R_{merge}$	0.05	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	2.23 (at 1.50Å)	Xtrriage
Refinement program	PHENIX	Depositor
R, $R_{free}$	0.152 , 0.199 0.157 , 0.158	Depositor DCC
$R_{free}$ test set	2657 reflections (5.01%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	16.4	Xtrriage
Anisotropy	0.502	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.47 , 50.3	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.49$ , $\langle L^2 \rangle = 0.32$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
$F_o, F_c$ correlation	0.97	EDS
Total number of atoms	6260	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	24.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 7.05% 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	0.29	0/736	0.49	0/993
1	B	0.41	0/801	0.65	0/1079
1	C	0.44	0/765	0.51	0/1029
1	D	0.27	0/737	0.48	0/992
All	All	0.37	0/3039	0.54	0/4093

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	724	726	726	0	0
1	B	786	791	790	1	0
1	C	750	754	756	2	0
1	D	725	729	729	0	0
2	A	63	0	0	0	0
2	B	79	0	0	0	0
2	C	71	0	0	0	0
2	D	62	0	0	0	0
All	All	3260	3000	3001	3	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.

All (3) 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:C:362:VAL:HG23	1:C:386:VAL:CG1	2.41	0.51
1:B:371:SER:OG	1:B:374:GLN:HG3	2.16	0.45
1:C:314:ILE:HG22	1:C:316:ILE:HG23	2.02	0.41

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	94/104 (90%)	93 (99%)	1 (1%)	0	100	100
1	B	102/104 (98%)	100 (98%)	2 (2%)	0	100	100
1	C	97/104 (93%)	97 (100%)	0	0	100	100
1	D	94/104 (90%)	93 (99%)	1 (1%)	0	100	100
All	All	387/416 (93%)	383 (99%)	4 (1%)	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	74/80 (92%)	74 (100%)	0	100	100

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	B	81/80 (101%)	80 (99%)	1 (1%)	71	48
1	C	77/80 (96%)	77 (100%)	0	100	100
1	D	74/80 (92%)	73 (99%)	1 (1%)	67	42
All	All	306/320 (96%)	304 (99%)	2 (1%)	84	69

All (2) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	B	312	ARG
1	D	312	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 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

### 6.1 Protein, DNA and RNA chains

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	96/104 (92%)	0.22	7 (7%) 15 16	13, 20, 36, 44	0
1	B	102/104 (98%)	0.44	12 (11%) 4 4	12, 19, 38, 54	0
1	C	98/104 (94%)	0.30	6 (6%) 21 23	13, 20, 34, 50	0
1	D	96/104 (92%)	0.12	3 (3%) 49 54	12, 19, 35, 56	0
All	All	392/416 (94%)	0.27	28 (7%) 16 17	12, 19, 37, 56	0

All (28) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	302	LEU	10.9
1	B	321	THR	8.1
1	B	306	ASP	6.5
1	B	320	SER	6.1
1	C	306	ASP	5.5
1	D	308	PRO	5.2
1	C	321	THR	4.7
1	A	377	ILE	4.6
1	B	307	ILE	4.5
1	A	307	ILE	4.0
1	D	309	ARG	3.8
1	B	403	LYS	3.4
1	C	307	ILE	3.3
1	C	349	LEU	3.3
1	B	369	ASN	3.0
1	A	321	THR	2.8
1	D	354	ARG	2.7
1	C	380	LYS	2.6
1	C	364	GLY	2.6
1	B	354	ARG	2.5
1	A	349	LEU	2.5

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Mol	Chain	Res	Type	RSRZ
1	B	319	GLY	2.4
1	A	373	GLU	2.3
1	B	303	GLY	2.3
1	A	320	SER	2.3
1	B	305	GLU	2.2
1	A	380	LYS	2.1
1	B	359	ILE	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.