



# wwPDB X-ray Structure Validation Summary Report ⓘ

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PDB ID : 2B5N / pdb\_00002b5n  
Title : Crystal Structure of the DDB1 BPB Domain  
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Deposited on : 2005-09-28  
Resolution : 2.80 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](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.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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The following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

MolProbity : 4-5-2 with Phenix2.0rc1  
Mogul : 2022.3.0, CSD as543be (2022)  
Xtriage (Phenix) : 2.0rc1  
EDS : 3.0  
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)  
CCP4 : 9.0.006 (Gargrove)  
Density-Fitness : 1.0.12  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.43.1

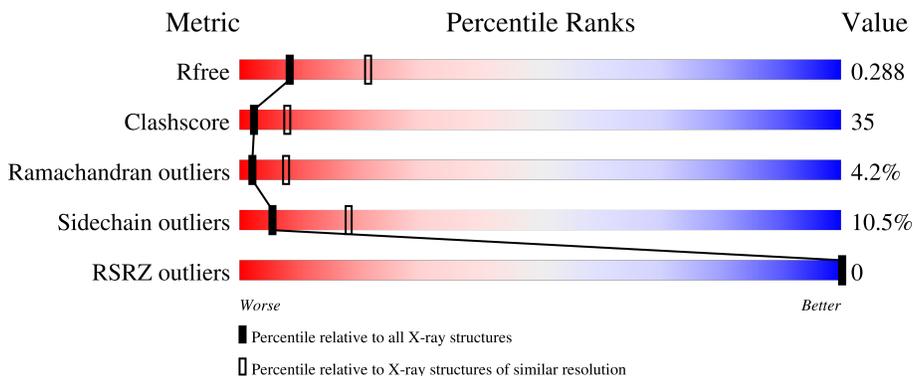
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.80 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))
$R_{free}$	164625	3657 (2.80-2.80)
Clashscore	180529	4123 (2.80-2.80)
Ramachandran outliers	177936	4071 (2.80-2.80)
Sidechain outliers	177891	4073 (2.80-2.80)
RSRZ outliers	164620	3659 (2.80-2.80)

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  $\geq 3$ , 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	323	 41% 46% 7% ..
1	B	323	 46% 43% 7% ..
1	C	323	 44% 42% 11% ..
1	D	323	 45% 44% 9% ..

## 2 Entry composition i

There are 3 unique types of molecules in this entry. The entry contains 9893 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.

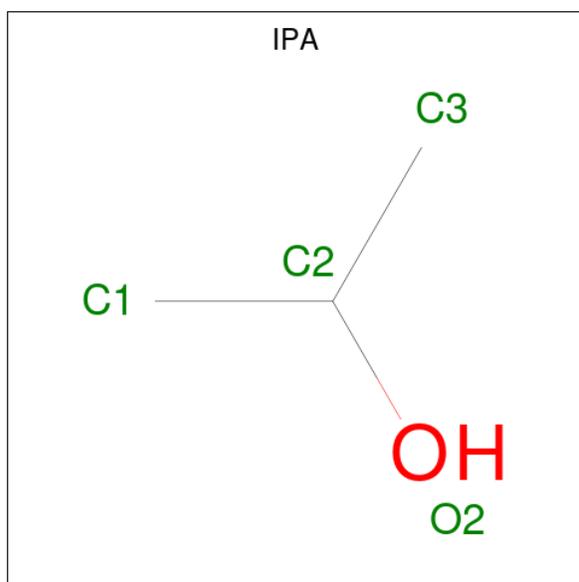
- Molecule 1 is a protein called damage-specific DNA binding protein 1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	312	2421	1535	407	466	13	0	0	0
1	B	321	2486	1570	422	480	14	0	0	0
1	C	320	2478	1564	421	479	14	0	0	0
1	D	320	2482	1568	421	479	14	0	0	0

There are 16 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	387	GLY	-	cloning artifact	GB 13435359
A	388	SER	-	cloning artifact	GB 13435359
A	389	HIS	-	cloning artifact	GB 13435359
A	390	MET	-	initiating methionine	GB 13435359
B	387	GLY	-	cloning artifact	GB 13435359
B	388	SER	-	cloning artifact	GB 13435359
B	389	HIS	-	cloning artifact	GB 13435359
B	390	MET	-	initiating methionine	GB 13435359
C	387	GLY	-	cloning artifact	GB 13435359
C	388	SER	-	cloning artifact	GB 13435359
C	389	HIS	-	cloning artifact	GB 13435359
C	390	MET	-	initiating methionine	GB 13435359
D	387	GLY	-	cloning artifact	GB 13435359
D	388	SER	-	cloning artifact	GB 13435359
D	389	HIS	-	cloning artifact	GB 13435359
D	390	MET	-	initiating methionine	GB 13435359

- Molecule 2 is ISOPROPYL ALCOHOL (CCD ID: IPA) (formula: C<sub>3</sub>H<sub>8</sub>O).



Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	C O		
2	B	1	4	3 1	0	0

- Molecule 3 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	4	Total O 4 4	0	0
3	B	6	Total O 6 6	0	0
3	C	6	Total O 6 6	0	0
3	D	6	Total O 6 6	0	0





## 4 Data and refinement statistics i

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	101.54Å 73.75Å 136.78Å 90.00° 111.73° 90.00°	Depositor
Resolution (Å)	48.80 – 2.80 48.80 – 2.80	Depositor EDS
% Data completeness (in resolution range)	(Not available) (48.80-2.80) 99.4 (48.80-2.80)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	4.75 (at 2.54Å)	Xtrriage
Refinement program	CNS 1.1	Depositor
R, $R_{free}$	0.236 , 0.296 0.238 , 0.288	Depositor DCC
$R_{free}$ test set	2385 reflections (5.28%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	33.2	Xtrriage
Anisotropy	0.543	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.31 , 12.5	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.44$ , $\langle L^2 \rangle = 0.26$	Xtrriage
Estimated twinning fraction	0.164 for h,-k,-h-l	Xtrriage
$F_o, F_c$ correlation	0.95	EDS
Total number of atoms	9893	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	35.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.34% 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](#)

Bond lengths and bond angles in the following residue types are not validated in this section: IPA

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	0.59	2/2467 (0.1%)	1.26	34/3354 (1.0%)
1	B	0.47	1/2534 (0.0%)	1.19	23/3444 (0.7%)
1	C	0.45	0/2526	1.72	28/3433 (0.8%)
1	D	0.40	0/2530	1.04	18/3439 (0.5%)
All	All	0.48	3/10057 (0.0%)	1.33	103/13670 (0.8%)

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	688	PRO	C-N	-5.87	1.26	1.33
1	B	416	ASP	N-CA	5.38	1.52	1.46
1	A	688	PRO	N-CA	5.31	1.54	1.47

The worst 5 of 103 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	571	LEU	CA-C-N	47.88	179.69	119.84
1	C	571	LEU	C-N-CA	47.88	179.69	119.84
1	C	442	GLU	N-CA-C	-28.27	65.29	109.96
1	B	482	GLU	CA-C-N	-14.45	101.78	119.84
1	B	482	GLU	C-N-CA	-14.45	101.78	119.84

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	2421	0	2421	161	0
1	B	2486	0	2477	152	1
1	C	2478	0	2466	186	1
1	D	2482	0	2474	188	1
2	B	4	0	8	2	0
3	A	4	0	0	0	0
3	B	6	0	0	2	1
3	C	6	0	0	0	0
3	D	6	0	0	3	0
All	All	9893	0	9846	682	2

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 35.

The worst 5 of 682 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:D:465:HIS:N	3:D:16:HOH:O	1.64	1.25
1:A:683:ASN:OD1	1:A:688:PRO:O	1.61	1.17
1:A:417:PRO:HG3	1:A:481:GLN:HG2	1.25	1.16
1:A:482:GLU:HB2	1:A:483:PRO:HD3	1.22	1.15
1:A:689:ASP:O	1:A:689:ASP:OD2	1.65	1.15

All (2) 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:B:388:SER:O	1:D:524:GLN:O[2_544]	1.97	0.23
1:C:524:GLN:O	3:B:9:HOH:O[1_454]	2.08	0.12

## 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	308/323 (95%)	253 (82%)	40 (13%)	15 (5%)	2	6
1	B	319/323 (99%)	271 (85%)	35 (11%)	13 (4%)	2	8
1	C	318/323 (98%)	267 (84%)	36 (11%)	15 (5%)	2	6
1	D	318/323 (98%)	260 (82%)	48 (15%)	10 (3%)	3	12
All	All	1263/1292 (98%)	1051 (83%)	159 (13%)	53 (4%)	2	8

5 of 53 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	482	GLU
1	A	514	ARG
1	A	561	TRP
1	A	645	SER
1	B	449	MET

### 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	276/285 (97%)	244 (88%)	32 (12%)	4	15
1	B	283/285 (99%)	255 (90%)	28 (10%)	6	21
1	C	282/285 (99%)	247 (88%)	35 (12%)	4	13
1	D	283/285 (99%)	260 (92%)	23 (8%)	9	29
All	All	1124/1140 (99%)	1006 (90%)	118 (10%)	5	18

5 of 118 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	B	689	ASP
1	D	592	LEU
1	C	463	VAL

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Mol	Chain	Res	Type
1	D	586	ILE
1	D	421	THR

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 59 such sidechains are listed below:

Mol	Chain	Res	Type
1	C	392	ASN
1	D	617	ASN
1	C	520	GLN
1	D	550	ASN
1	D	470	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 oligosaccharides in this entry.

## 5.6 Ligand geometry [i](#)

1 ligand is modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. 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  $|Z| > 2$  is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\# Z  > 2$	Counts	RMSZ	$\# Z  > 2$
2	IPA	B	1001	-	3,3,3	0.25	0	3,3,3	1.84	1 (33%)

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed( $^{\circ}$ )	Ideal( $^{\circ}$ )
2	B	1001	IPA	C3-C2-C1	-2.81	92.38	113.38

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

1 monomer is involved in 2 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	B	1001	IPA	2	0

## 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	312/323 (96%)	-1.69	0 100 100	10, 32, 77, 124	0
1	B	321/323 (99%)	-1.76	0 100 100	6, 25, 77, 129	0
1	C	320/323 (99%)	-1.75	0 100 100	4, 27, 75, 130	0
1	D	320/323 (99%)	-1.70	0 100 100	8, 30, 85, 141	0
All	All	1273/1292 (98%)	-1.72	0 100 100	4, 28, 80, 141	0

There are no RSRZ outliers to report.

### 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](#)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95<sup>th</sup> percentile and maximum values of B factors of atoms in the group. The column labelled ‘Q< 0.9’ lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å <sup>2</sup> )	Q<0.9
2	IPA	B	1001	4/4	0.99	0.07	20,20,20,20	0

## 6.5 Other polymers [i](#)

There are no such residues in this entry.