



# Full wwPDB X-ray Structure Validation Report ⓘ

Feb 1, 2016 – 05:46 PM GMT

PDB ID : 4JGM  
Title : Crystal structure of RelB double mutants: Y300F/I335V  
Authors : Huang, D.B.; Vu, D.; Ghosh, G.  
Deposited on : 2013-03-01  
Resolution : 3.00 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  
Mogul : 1.7 (RC4), CSD as536be (2015)  
Xtriage (Phenix) : 1.9-1692  
EDS : rb-20026688  
Percentile statistics : 20151230.v01 (using entries in the PDB archive December 30th 2015)  
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) : trunk26865

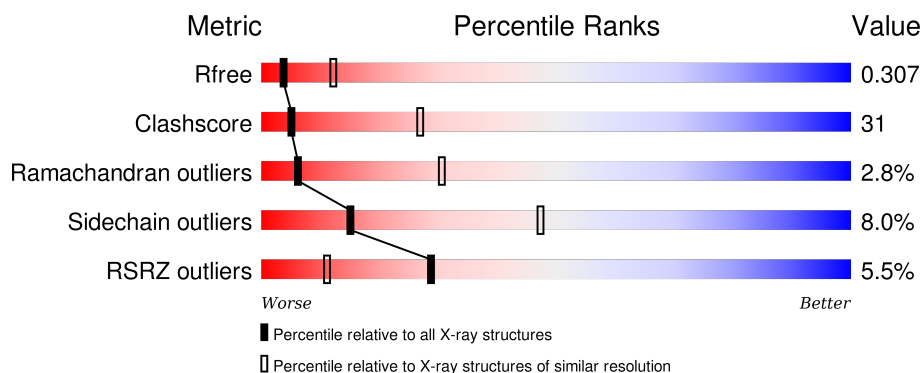
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

## *X-RAY DIFFRACTION*

The reported resolution of this entry is 3.00 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))
$R_{free}$	91344	1578 (3.00-3.00)
Clashscore	102246	1912 (3.00-3.00)
Ramachandran outliers	100387	1853 (3.00-3.00)
Sidechain outliers	100360	1856 (3.00-3.00)
RSRZ outliers	91569	1592 (3.00-3.00)

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	110	<div> <div>5%</div> <div>51%</div> <div>42%</div> <div>5% •</div> </div>

## 2 Entry composition

There are 2 unique types of molecules in this entry. The entry contains 921 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 Transcription factor RelB.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	110	Total	C	N	O	S	0	0	0
			867	548	147	167	5			

There are 10 discrepancies between the modelled and reference sequences:

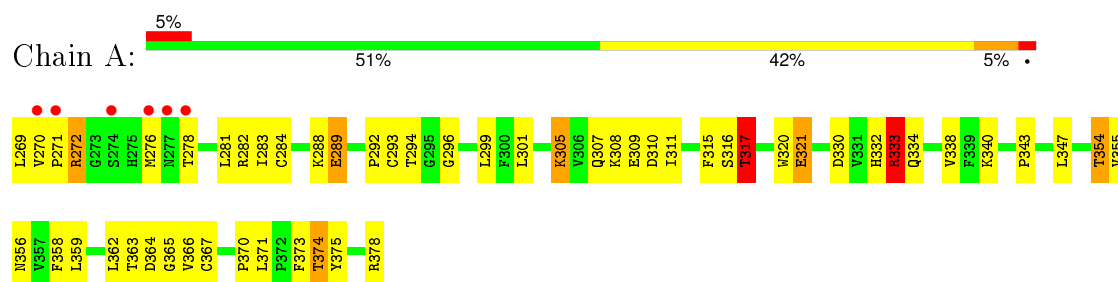
Chain	Residue	Modelled	Actual	Comment	Reference
A	269	LEU	-	EXPRESSION TAG	UNP Q04863
A	270	VAL	-	EXPRESSION TAG	UNP Q04863
A	271	PRO	-	EXPRESSION TAG	UNP Q04863
A	272	ARG	-	EXPRESSION TAG	UNP Q04863
A	273	GLY	-	EXPRESSION TAG	UNP Q04863
A	274	SER	-	EXPRESSION TAG	UNP Q04863
A	275	HIS	-	EXPRESSION TAG	UNP Q04863
A	276	MET	-	EXPRESSION TAG	UNP Q04863
A	300	PHE	TYR	ENGINEERED MUTATION	UNP Q04863
A	335	VAL	ILE	ENGINEERED MUTATION	UNP Q04863

- Molecule 2 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	54	Total	O	0	0
			54	54		



- Molecule 1: Transcription factor RelB



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 31 2 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	65.94Å 65.94Å 65.30Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	29.43 – 3.00 42.99 – 3.00	Depositor EDS
% Data completeness (in resolution range)	87.8 (29.43-3.00) 94.8 (42.99-3.00)	Depositor EDS
$R_{merge}$	0.09	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	3.16 (at 3.01Å)	Xtriage
Refinement program	CNS 1.3	Depositor
R, $R_{free}$	0.211 , 0.292 0.221 , 0.307	Depositor DCC
$R_{free}$ test set	175 reflections (5.29%)	DCC
Wilson B-factor (Å <sup>2</sup> )	85.5	Xtriage
Anisotropy	0.387	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.35 , 75.2	EDS
Estimated twinning fraction	0.063 for -h,-k,l	Xtriage
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.49$ , $\langle L^2 \rangle = 0.33$	Xtriage
Outliers	0 of 3478 reflections	Xtriage
$F_o, F_c$ correlation	0.94	EDS
Total number of atoms	921	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	91.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 9.83% 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, 0.375 respectively for untwinned datasets, and 0.333, 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	0.47	0/886	0.69	1/1204 (0.1%)

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	317	THR	N-CA-C	-5.30	96.69	111.00

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	867	0	853	53	0
2	A	54	0	0	8	0
All	All	921	0	853	53	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 31.

All (53) 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:354:THR:HA	1:A:374:THR:HA	1.67	0.75

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:309:GLU:H	1:A:309:GLU:CD	1.97	0.68
1:A:333:ARG:NH2	1:A:334:GLN:HE21	1.92	0.66
1:A:278:THR:HG22	1:A:367:CYS:O	1.97	0.64
1:A:354:THR:HG22	1:A:374:THR:HB	1.78	0.63
1:A:354:THR:CB	1:A:374:THR:HB	2.28	0.63
1:A:283:ILE:CG2	1:A:371:LEU:HD22	2.30	0.62
1:A:296:GLY:O	1:A:340:LYS:HE3	2.00	0.61
1:A:293:CYS:HA	1:A:375:TYR:CD2	2.37	0.60
1:A:354:THR:CG2	1:A:374:THR:HB	2.33	0.59
1:A:354:THR:HB	1:A:374:THR:HB	1.86	0.58
1:A:269:LEU:HG	1:A:276:MET:HE2	1.86	0.58
1:A:283:ILE:HG22	1:A:371:LEU:HD22	1.85	0.57
1:A:278:THR:HB	1:A:366:VAL:HG11	1.88	0.56
1:A:301:LEU:HD12	1:A:301:LEU:C	2.27	0.54
1:A:305:LYS:HD3	1:A:334:GLN:OE1	2.07	0.54
1:A:364:ASP:OD1	1:A:366:VAL:HG23	2.08	0.53
1:A:307:GLN:HG3	2:A:534:HOH:O	2.08	0.53
1:A:292:PRO:HB3	2:A:549:HOH:O	2.08	0.53
1:A:316:SER:O	1:A:355:VAL:HB	2.11	0.50
1:A:301:LEU:O	1:A:301:LEU:HD12	2.12	0.50
1:A:333:ARG:HH21	1:A:334:GLN:HE21	1.60	0.48
1:A:283:ILE:CD1	1:A:358:PHE:HA	2.44	0.47
1:A:315:PHE:N	1:A:315:PHE:CD1	2.82	0.47
1:A:334:GLN:HG2	2:A:510:HOH:O	2.15	0.47
1:A:332:HIS:O	1:A:334:GLN:N	2.48	0.47
1:A:272:ARG:HH11	1:A:272:ARG:HG2	1.80	0.46
1:A:316:SER:HB3	1:A:321:GLU:HG3	1.97	0.46
1:A:308:LYS:HG2	2:A:510:HOH:O	2.14	0.46
1:A:311:ILE:HD11	1:A:359:LEU:HB3	1.98	0.46
1:A:347:LEU:N	1:A:347:LEU:HD12	2.31	0.46
1:A:283:ILE:HD12	1:A:358:PHE:HA	1.97	0.46
1:A:288:LYS:HB2	1:A:299:LEU:HD22	1.98	0.46
1:A:347:LEU:HD12	1:A:347:LEU:H	1.82	0.45
1:A:309:GLU:N	1:A:309:GLU:CD	2.68	0.45
1:A:333:ARG:NH2	1:A:334:GLN:NE2	2.63	0.44
1:A:310:ASP:OD1	1:A:362:LEU:N	2.51	0.44
1:A:317:THR:HG23	1:A:320:TRP:HE3	1.83	0.44
1:A:370:PRO:O	1:A:371:LEU:HD12	2.17	0.44
1:A:294:THR:O	1:A:343:PRO:HB3	2.17	0.44
1:A:283:ILE:HG21	1:A:371:LEU:HD22	2.00	0.43
1:A:278:THR:HG23	1:A:281:LEU:H	1.83	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:315:PHE:N	1:A:315:PHE:HD1	2.17	0.43
1:A:282:ARG:NH2	1:A:284:CYS:SG	2.92	0.42
1:A:315:PHE:HA	1:A:356:ASN:O	2.20	0.42
1:A:289:GLU:HA	2:A:546:HOH:O	2.20	0.42
1:A:292:PRO:HG2	2:A:518:HOH:O	2.20	0.42
1:A:355:VAL:N	1:A:373:PHE:O	2.47	0.41
1:A:310:ASP:HA	1:A:362:LEU:HD12	2.03	0.41
1:A:270:VAL:HA	1:A:271:PRO:HD3	1.74	0.41
1:A:330:ASP:HB3	1:A:338:VAL:O	2.20	0.41
1:A:284:CYS:HB3	2:A:524:HOH:O	2.21	0.41
1:A:378:ARG:HG2	2:A:503:HOH:O	2.21	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	108 / 110 (98%)	91 (84%)	14 (13%)	3 (3%)	6	30

All (3) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	333	ARG
1	A	363	THR
1	A	365	GLY

### 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	100/100 (100%)	92 (92%)	8 (8%)	15	47

All (8) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	272	ARG
1	A	289	GLU
1	A	305	LYS
1	A	317	THR
1	A	321	GLU
1	A	333	ARG
1	A	354	THR
1	A	374	THR

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (2) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	334	GLN
1	A	356	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 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	110/110 (100%)	0.20	6 (5%)	29 11	66, 84, 147, 149	0

All (6) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	278	THR	6.8
1	A	271	PRO	5.0
1	A	276	MET	4.3
1	A	270	VAL	3.2
1	A	274	SER	2.3
1	A	277	ASN	2.2

### 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.