



# Full wwPDB X-ray Structure Validation Report ⓘ

Nov 3, 2024 – 08:19 AM EST

PDB ID : 1BOL  
Title : THE CRYSTAL STRUCTURE OF RIBONUCLEASE RH FROM RHIZOPUS NIVEUS AT 2.0 Å RESOLUTION  
Authors : Kurihara, H.; Nakamura, K.T.  
Deposited on : 1998-08-05  
Resolution : 2.00 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

<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 : 4.02b-467  
Xtrriage (Phenix) : **NOT EXECUTED**  
EDS : **NOT EXECUTED**  
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.39

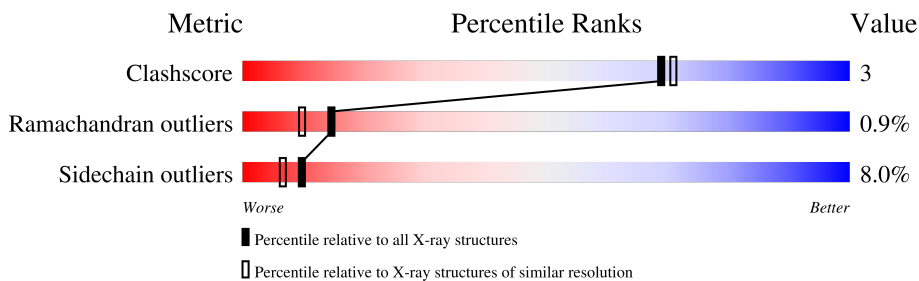
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.00 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))
Clashscore	180529	10737 (2.00-2.00)
Ramachandran outliers	177936	10628 (2.00-2.00)
Sidechain outliers	177891	10627 (2.00-2.00)

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 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  $\leq 5\%$ .

Note EDS was not executed.

Mol	Chain	Length	Quality of chain
1	A	222	

## 2 Entry composition

There is only 1 type of molecule in this entry. The entry contains 1688 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 PROTEIN (RIBONUCLEASE RH).


Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	222	1688	1046	272	356	14	0	0	0

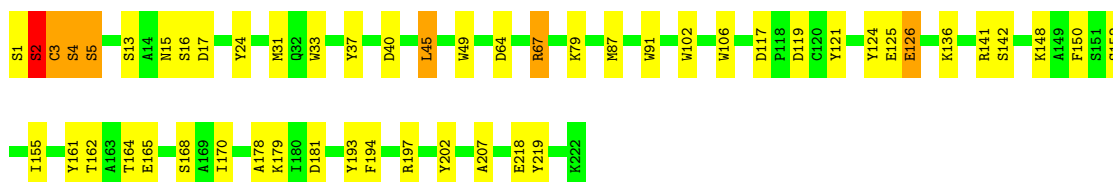
### 3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA, DNA and oligosaccharide 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. 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. 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.

Note EDS was not executed.

- Molecule 1: PROTEIN (RIBONUCLEASE RH)

Chain A:  77% 20%



## 4 Data and refinement statistics

Xtrriage (Phenix) and EDS were not executed - this section is therefore incomplete.

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	67.70Å 72.50Å 44.30Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	8.00 – 2.00	Depositor
% Data completeness (in resolution range)	78.2 (8.00-2.00)	Depositor
$R_{merge}$	0.03	Depositor
$R_{sym}$	(Not available)	Depositor
Refinement program	X-PLOR	Depositor
R, $R_{free}$	0.185 , (Not available)	Depositor
Estimated twinning fraction	No twinning to report.	Xtrriage
Total number of atoms	1688	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	19.0	wwPDB-VP

## 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	0.97	1/1732 (0.1%)	1.66	30/2357 (1.3%)

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	2	SER	CA-CB	5.87	1.61	1.52

All (30) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	141	ARG	NE-CZ-NH2	-13.61	113.49	120.30
1	A	67	ARG	NE-CZ-NH2	-10.55	115.03	120.30
1	A	67	ARG	NE-CZ-NH1	9.56	125.08	120.30
1	A	106	TRP	CD1-CG-CD2	8.76	113.31	106.30
1	A	141	ARG	NE-CZ-NH1	6.97	123.78	120.30
1	A	148	LYS	CA-CB-CG	6.94	128.66	113.40
1	A	106	TRP	CE2-CD2-CG	-6.79	101.87	107.30
1	A	106	TRP	CG-CD1-NE1	-6.54	103.56	110.10
1	A	45	LEU	CB-CG-CD2	-6.33	100.23	111.00
1	A	91	TRP	CD1-CG-CD2	6.32	111.35	106.30
1	A	49	TRP	CE2-CD2-CG	-6.31	102.25	107.30
1	A	219	TYR	CB-CG-CD2	-6.17	117.30	121.00
1	A	119	ASP	CB-CG-OD1	5.94	123.65	118.30
1	A	24	TYR	CB-CG-CD1	-5.70	117.58	121.00
1	A	197	ARG	NE-CZ-NH1	5.67	123.14	120.30
1	A	37	TYR	CB-CG-CD1	-5.62	117.63	121.00
1	A	126	GLU	OE1-CD-OE2	-5.62	116.56	123.30
1	A	33	TRP	CE2-CD2-CG	-5.50	102.90	107.30
1	A	49	TRP	CD1-CG-CD2	5.49	110.69	106.30
1	A	218	GLU	OE1-CD-OE2	-5.44	116.77	123.30
1	A	3	CYS	N-CA-C	-5.41	96.39	111.00
1	A	91	TRP	CE2-CD2-CG	-5.37	103.00	107.30
1	A	5	SER	CA-C-N	5.29	128.83	117.20

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	87	MET	CA-CB-CG	-5.24	104.39	113.30
1	A	102	TRP	CE2-CD2-CG	-5.24	103.11	107.30
1	A	117	ASP	CB-CG-OD1	5.16	122.94	118.30
1	A	161	TYR	CB-CG-CD2	-5.14	117.91	121.00
1	A	4	SER	N-CA-CB	-5.11	102.83	110.50
1	A	102	TRP	CD1-CG-CD2	5.10	110.38	106.30
1	A	5	SER	N-CA-C	5.08	124.71	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	1688	0	1529	11	0
All	All	1688	0	1529	11	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 3.

All (11) 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:15:ASN:ND2	1:A:17:ASP:HB3	2.17	0.60
1:A:64:ASP:OD2	1:A:67:ARG:HD3	2.09	0.52
1:A:121:TYR:HB2	1:A:124:TYR:HB2	1.92	0.51
1:A:150:PHE:HB3	1:A:155:ILE:HB	1.94	0.49
1:A:193:TYR:CD1	1:A:207:ALA:HA	2.49	0.47
1:A:170:ILE:HG21	1:A:178:ALA:CB	2.45	0.47
1:A:162:THR:HG23	1:A:165:GLU:H	1.78	0.47
1:A:170:ILE:HG21	1:A:178:ALA:HB2	1.98	0.45
1:A:1:SER:O	1:A:2:SER:HB2	2.16	0.45
1:A:194:PHE:CD2	1:A:202:TYR:HB3	2.55	0.42
1:A:179:LYS:NZ	1:A:181:ASP:OD2	2.53	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	220/222 (99%)	205 (93%)	13 (6%)	2 (1%)	14 10

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	2	SER
1	A	4	SER

### 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	188/188 (100%)	173 (92%)	15 (8%)	10 6

All (15) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	3	CYS
1	A	5	SER
1	A	13	SER
1	A	16	SER
1	A	31	MET
1	A	40	ASP

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Mol	Chain	Res	Type
1	A	45	LEU
1	A	79	LYS
1	A	125	GLU
1	A	126	GLU
1	A	136	LYS
1	A	142	SER
1	A	152	SER
1	A	164	THR
1	A	168	SER

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

Mol	Chain	Res	Type
1	A	15	ASN
1	A	46	HIS

### 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

There are no chain breaks in this entry.

## 6 Fit of model and data [i](#)

### 6.1 Protein, DNA and RNA chains [i](#)

EDS was not executed - this section is therefore empty.

### 6.2 Non-standard residues in protein, DNA, RNA chains [i](#)

EDS was not executed - this section is therefore empty.

### 6.3 Carbohydrates [i](#)

EDS was not executed - this section is therefore empty.

### 6.4 Ligands [i](#)

EDS was not executed - this section is therefore empty.

### 6.5 Other polymers [i](#)

EDS was not executed - this section is therefore empty.