



# Full wwPDB X-ray Structure Validation Report ⓘ

May 16, 2020 – 10:23 am BST

PDB ID : 3UR8  
Title : Lower-density crystal structure of potato endo-1,3-beta-glucanase  
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Deposited on : 2011-11-21  
Resolution : 1.26 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

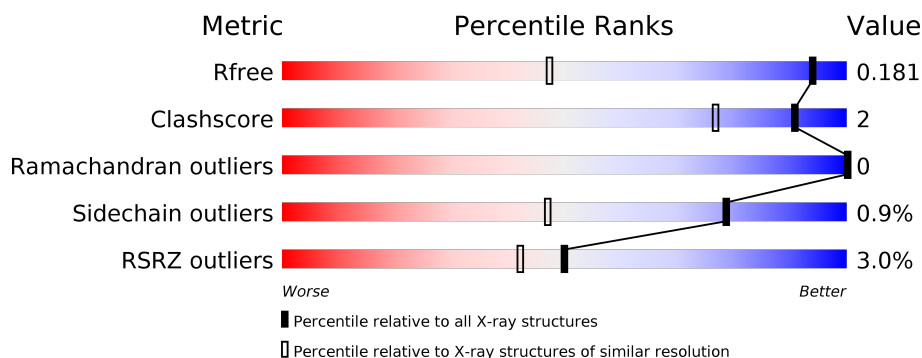
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

## *X-RAY DIFFRACTION*

The reported resolution of this entry is 1.26 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	1023 (1.28-1.24)
Clashscore	141614	1060 (1.28-1.24)
Ramachandran outliers	138981	1029 (1.28-1.24)
Sidechain outliers	138945	1028 (1.28-1.24)
RSRZ outliers	127900	1004 (1.28-1.24)

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	323	<div> <div>2%</div> <div> <div></div> <div>93%</div> <div>6%</div> </div> </div>
1	B	323	<div> <div>4%</div> <div> <div></div> <div>92%</div> <div>6%</div> </div> </div>

## 2 Entry composition

There are 2 unique types of molecules in this entry. The entry contains 5894 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 Glucan endo-1,3-beta-D-glucosidase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	321	Total	C	N	O	S	0	11	0
			2594	1655	450	482	7			
1	B	316	Total	C	N	O	S	0	10	0
			2537	1623	437	472	5			

There are 16 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	339	LEU	-	EXPRESSION TAG	UNP Q70C53
A	340	ASN	-	EXPRESSION TAG	UNP Q70C53
A	341	HIS	-	EXPRESSION TAG	UNP Q70C53
A	342	HIS	-	EXPRESSION TAG	UNP Q70C53
A	343	HIS	-	EXPRESSION TAG	UNP Q70C53
A	344	HIS	-	EXPRESSION TAG	UNP Q70C53
A	345	HIS	-	EXPRESSION TAG	UNP Q70C53
A	346	HIS	-	EXPRESSION TAG	UNP Q70C53
B	339	LEU	-	EXPRESSION TAG	UNP Q70C53
B	340	ASN	-	EXPRESSION TAG	UNP Q70C53
B	341	HIS	-	EXPRESSION TAG	UNP Q70C53
B	342	HIS	-	EXPRESSION TAG	UNP Q70C53
B	343	HIS	-	EXPRESSION TAG	UNP Q70C53
B	344	HIS	-	EXPRESSION TAG	UNP Q70C53
B	345	HIS	-	EXPRESSION TAG	UNP Q70C53
B	346	HIS	-	EXPRESSION TAG	UNP Q70C53

- Molecule 2 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	428	Total	O	0	0
			428	428		
2	B	335	Total	O	0	0
			335	335		

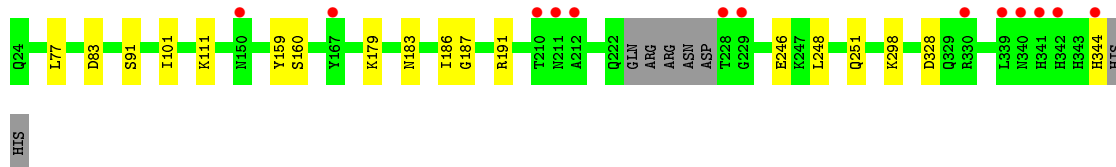
### 3 Residue-property plots [i](#)

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: Glucan endo-1,3-beta-D-glucosidase



- Molecule 1: Glucan endo-1,3-beta-D-glucosidase



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	75.36Å 49.06Å 82.62Å 90.00° 103.56° 90.00°	Depositor
Resolution (Å)	19.54 – 1.26 19.51 – 1.26	Depositor EDS
% Data completeness (in resolution range)	95.0 (19.54-1.26) 95.0 (19.51-1.26)	Depositor EDS
$R_{merge}$	0.06	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	2.33 (at 1.26Å)	Xtriage
Refinement program	REFMAC 5.2.0003	Depositor
R, $R_{free}$	0.142 , 0.182 0.143 , 0.181	Depositor DCC
$R_{free}$ test set	1654 reflections (1.09%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	7.0	Xtriage
Anisotropy	0.116	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.36 , 47.7	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.49$ , $\langle L^2 \rangle = 0.32$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
$F_o, F_c$ correlation	0.97	EDS
Total number of atoms	5894	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	11.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 53.07 % of the origin peak, indicating pseudo-translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo-translational symmetry is equal to 4.4443e-05. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

<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	0.88	1/2705 (0.0%)	0.90	6/3671 (0.2%)
1	B	0.80	1/2635 (0.0%)	0.85	2/3578 (0.1%)
All	All	0.84	2/5340 (0.0%)	0.87	8/7249 (0.1%)

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	41	GLN	CG-CD	6.48	1.66	1.51
1	B	91	SER	CB-OG	-5.47	1.35	1.42

All (8) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	123	ARG	NE-CZ-NH1	6.66	123.63	120.30
1	A	130	ARG	NE-CZ-NH2	-6.58	117.01	120.30
1	A	227	ASP	CB-CG-OD2	6.46	124.11	118.30
1	B	328	ASP	CB-CG-OD1	6.02	123.72	118.30
1	A	123	ARG	NE-CZ-NH2	-5.54	117.53	120.30
1	A	241[A]	MET	CB-CG-SD	5.45	128.76	112.40
1	A	241[B]	MET	CB-CG-SD	5.45	128.76	112.40
1	B	83	ASP	CB-CG-OD2	5.02	122.82	118.30

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	2594	0	2514	10	0
1	B	2537	0	2448	7	0
2	A	428	0	0	3	0
2	B	335	0	0	2	0
All	All	5894	0	4962	17	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 2.

All (17) 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:160[B]:SER:OG	2:A:753:HOH:O	1.68	1.12
1:B:160[B]:SER:OG	2:B:762:HOH:O	1.68	1.10
1:B:111[B]:LYS:HD3	2:B:758:HOH:O	1.77	0.82
1:A:136[B]:MET:HE1	1:A:185:ILE:HG23	1.76	0.67
1:A:242:TYR:CE1	1:A:255[A]:ILE:HG12	2.35	0.61
1:B:246:GLU:HG3	1:B:251:GLN:HG3	1.81	0.61
1:A:224:ARG:NH1	2:A:720:HOH:O	2.39	0.56
1:B:186[B]:ILE:HD12	1:B:248:LEU:HD12	1.92	0.51
1:A:136[B]:MET:HG3	1:A:154:VAL:CG1	2.42	0.50
1:A:267:HIS:CG	1:A:268:PRO:HD2	2.49	0.47
1:A:328:ASP:OD1	1:A:330:ARG:HG3	2.15	0.47
1:B:77:LEU:HD23	1:B:101[B]:ILE:HD11	1.97	0.46
1:B:179:LYS:O	1:B:183:ASN:HB2	2.18	0.44
1:A:242:TYR:CZ	1:A:255[A]:ILE:HG12	2.54	0.43
1:B:187:GLY:O	1:B:191:ARG:HG3	2.20	0.41
1:A:334:GLN:NE2	2:A:518:HOH:O	2.54	0.40

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	328/323 (102%)	318 (97%)	10 (3%)	0	100	100
1	B	318/323 (98%)	310 (98%)	8 (2%)	0	100	100
All	All	646/646 (100%)	628 (97%)	18 (3%)	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	285/278 (102%)	283 (99%)	2 (1%)	84	57
1	B	277/278 (100%)	274 (99%)	3 (1%)	73	39
All	All	562/556 (101%)	557 (99%)	5 (1%)	78	47

All (5) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	159	TYR
1	A	176	GLU
1	B	159	TYR
1	B	298	LYS
1	B	344	HIS

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (8) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	150	ASN
1	A	334	GLN
1	B	61	HIS
1	B	82	GLN
1	B	150	ASN
1	B	222	GLN
1	B	284	ASN
1	B	340	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	321/323 (99%)	-0.14	6 (1%) 66 57	2, 7, 18, 29	1 (0%)
1	B	316/323 (97%)	0.06	13 (4%) 37 30	5, 12, 23, 32	0
All	All	637/646 (98%)	-0.04	19 (2%) 50 42	2, 10, 22, 32	1 (0%)

All (19) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	339	LEU	6.5
1	B	339	LEU	5.3
1	B	228	THR	5.2
1	B	340	ASN	5.2
1	B	342	HIS	5.1
1	B	211	ASN	5.1
1	B	167	TYR	5.0
1	B	341	HIS	4.3
1	A	341	HIS	3.9
1	B	344	HIS	3.6
1	B	229	GLY	3.3
1	B	330	ARG	3.2
1	A	340	ASN	3.1
1	A	343	HIS	3.1
1	B	210	THR	2.5
1	B	150	ASN	2.5
1	A	330	ARG	2.5
1	B	212	ALA	2.1
1	A	223	GLN	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.