WORLDWIDE PDB
PROTEIN DATA BANK

wwPDB X-ray Structure Validation Summary Report (i)

Jun 12, 2024 – 05:14 PM EDT

PDB ID	:	3WQ8
Title	:	Monomer structure of hyperthermophilic beta-glucosidase mutant forming a dodecameric structure in the crystal form
Authors	:	Nakabayashi, M.; Kataoka, M.; Watanabe, M.; Ishikawa, K.
Deposited on	:	2014-01-23
Resolution	:	2.81 Å(reported)

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

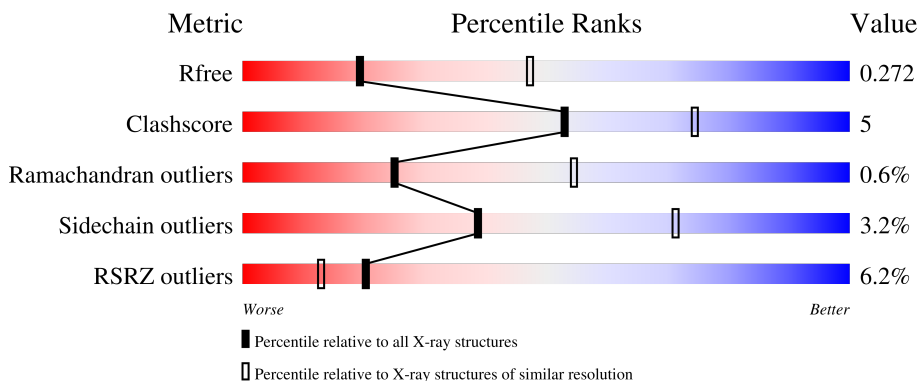|		
MolProbity	:	4.02b-467
Xtriage (Phenix)	:	1.20.1
EDS	:	2.36.2
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.36.2

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 2.81 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	Percentile Ranks	Value
Rfree		0.272
Clashscore		5
Ramachandran outliers		0.6%
Sidechain outliers		3.2%
RSRZ outliers		6.2%

Worse   *Better*

▮ Percentile relative to all X-ray structures

▯ Percentile relative to X-ray structures of similar resolution

Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R$_{free}$	130704	3617 (2.84-2.80)
Clashscore	141614	4060 (2.84-2.80)
Ramachandran outliers	138981	3978 (2.84-2.80)
Sidechain outliers	138945	3980 (2.84-2.80)
RSRZ outliers	127900	3552 (2.84-2.80)

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 >=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 <=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	450	86% 12% •
1	B	450	3% 86% 11% ••
1	C	450	% 85% 13% ••
1	D	450	3% 85% 12% ••
1	E	450	% 84% 14% ••

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Mol	Chain	Length	Quality of chain
1	F	450	29% ... 84% ... 13% ••
1	G	450	88% ... 11% •
1	H	450	3% ... 84% ... 14% •
1	I	450	% ... 85% ... 13% ••
1	J	450	28% ... 82% ... 14% ••
1	K	450	% ... 83% ... 15% ••
1	L	450	2% ... 87% ... 12% •

2 Entry composition ⓘ

There are 2 unique types of molecules in this entry. The entry contains 43762 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 Beta-glucosidase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	448	Total	C	N	O	S	0	0	0
			3657	2383	596	665	13			
1	B	444	Total	C	N	O	S	0	0	0
			3626	2365	589	659	13			
1	C	444	Total	C	N	O	S	0	0	0
			3626	2365	589	659	13			
1	D	444	Total	C	N	O	S	0	0	0
			3626	2365	589	659	13			
1	E	444	Total	C	N	O	S	0	0	0
			3626	2365	589	659	13			
1	F	444	Total	C	N	O	S	0	0	0
			3626	2365	589	659	13			
1	G	448	Total	C	N	O	S	0	0	0
			3657	2383	596	665	13			
1	H	448	Total	C	N	O	S	0	0	0
			3657	2383	596	665	13			
1	I	444	Total	C	N	O	S	0	0	0
			3626	2365	589	659	13			
1	J	444	Total	C	N	O	S	0	0	0
			3626	2365	589	659	13			
1	K	444	Total	C	N	O	S	0	0	0
			3626	2365	589	659	13			
1	L	448	Total	C	N	O	S	0	0	0
			3657	2383	596	665	13			

There are 96 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	0	MET	-	expression tag	UNP Q51723
A	1	ALA	-	expression tag	UNP Q51723
A	170	ALA	ARG	engineered mutation	UNP Q51723
A	220	ALA	ARG	engineered mutation	UNP Q51723
A	227	PHE	TYR	engineered mutation	UNP Q51723

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Chain	Residue	Modelled	Actual	Comment	Reference
A	447	SER	PHE	engineered mutation	UNP Q51723
A	448	VAL	ARG	engineered mutation	UNP Q51723
A	449	LYS	GLU	engineered mutation	UNP Q51723
B	0	MET	-	expression tag	UNP Q51723
B	1	ALA	-	expression tag	UNP Q51723
B	170	ALA	ARG	engineered mutation	UNP Q51723
B	220	ALA	ARG	engineered mutation	UNP Q51723
B	227	PHE	TYR	engineered mutation	UNP Q51723
B	447	SER	PHE	engineered mutation	UNP Q51723
B	448	VAL	ARG	engineered mutation	UNP Q51723
B	449	LYS	GLU	engineered mutation	UNP Q51723
C	0	MET	-	expression tag	UNP Q51723
C	1	ALA	-	expression tag	UNP Q51723
C	170	ALA	ARG	engineered mutation	UNP Q51723
C	220	ALA	ARG	engineered mutation	UNP Q51723
C	227	PHE	TYR	engineered mutation	UNP Q51723
C	447	SER	PHE	engineered mutation	UNP Q51723
C	448	VAL	ARG	engineered mutation	UNP Q51723
C	449	LYS	GLU	engineered mutation	UNP Q51723
D	0	MET	-	expression tag	UNP Q51723
D	1	ALA	-	expression tag	UNP Q51723
D	170	ALA	ARG	engineered mutation	UNP Q51723
D	220	ALA	ARG	engineered mutation	UNP Q51723
D	227	PHE	TYR	engineered mutation	UNP Q51723
D	447	SER	PHE	engineered mutation	UNP Q51723
D	448	VAL	ARG	engineered mutation	UNP Q51723
D	449	LYS	GLU	engineered mutation	UNP Q51723
E	0	MET	-	expression tag	UNP Q51723
E	1	ALA	-	expression tag	UNP Q51723
E	170	ALA	ARG	engineered mutation	UNP Q51723
E	220	ALA	ARG	engineered mutation	UNP Q51723
E	227	PHE	TYR	engineered mutation	UNP Q51723
E	447	SER	PHE	engineered mutation	UNP Q51723
E	448	VAL	ARG	engineered mutation	UNP Q51723
E	449	LYS	GLU	engineered mutation	UNP Q51723
F	0	MET	-	expression tag	UNP Q51723
F	1	ALA	-	expression tag	UNP Q51723
F	170	ALA	ARG	engineered mutation	UNP Q51723
F	220	ALA	ARG	engineered mutation	UNP Q51723
F	227	PHE	TYR	engineered mutation	UNP Q51723
F	447	SER	PHE	engineered mutation	UNP Q51723
F	448	VAL	ARG	engineered mutation	UNP Q51723

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Chain	Residue	Modelled	Actual	Comment	Reference
F	449	LYS	GLU	engineered mutation	UNP Q51723
G	0	MET	-	expression tag	UNP Q51723
G	1	ALA	-	expression tag	UNP Q51723
G	170	ALA	ARG	engineered mutation	UNP Q51723
G	220	ALA	ARG	engineered mutation	UNP Q51723
G	227	PHE	TYR	engineered mutation	UNP Q51723
G	447	SER	PHE	engineered mutation	UNP Q51723
G	448	VAL	ARG	engineered mutation	UNP Q51723
G	449	LYS	GLU	engineered mutation	UNP Q51723
H	0	MET	-	expression tag	UNP Q51723
H	1	ALA	-	expression tag	UNP Q51723
H	170	ALA	ARG	engineered mutation	UNP Q51723
H	220	ALA	ARG	engineered mutation	UNP Q51723
H	227	PHE	TYR	engineered mutation	UNP Q51723
H	447	SER	PHE	engineered mutation	UNP Q51723
H	448	VAL	ARG	engineered mutation	UNP Q51723
H	449	LYS	GLU	engineered mutation	UNP Q51723
I	0	MET	-	expression tag	UNP Q51723
I	1	ALA	-	expression tag	UNP Q51723
I	170	ALA	ARG	engineered mutation	UNP Q51723
I	220	ALA	ARG	engineered mutation	UNP Q51723
I	227	PHE	TYR	engineered mutation	UNP Q51723
I	447	SER	PHE	engineered mutation	UNP Q51723
I	448	VAL	ARG	engineered mutation	UNP Q51723
I	449	LYS	GLU	engineered mutation	UNP Q51723
J	0	MET	-	expression tag	UNP Q51723
J	1	ALA	-	expression tag	UNP Q51723
J	170	ALA	ARG	engineered mutation	UNP Q51723
J	220	ALA	ARG	engineered mutation	UNP Q51723
J	227	PHE	TYR	engineered mutation	UNP Q51723
J	447	SER	PHE	engineered mutation	UNP Q51723
J	448	VAL	ARG	engineered mutation	UNP Q51723
J	449	LYS	GLU	engineered mutation	UNP Q51723
K	0	MET	-	expression tag	UNP Q51723
K	1	ALA	-	expression tag	UNP Q51723
K	170	ALA	ARG	engineered mutation	UNP Q51723
K	220	ALA	ARG	engineered mutation	UNP Q51723
K	227	PHE	TYR	engineered mutation	UNP Q51723
K	447	SER	PHE	engineered mutation	UNP Q51723
K	448	VAL	ARG	engineered mutation	UNP Q51723
K	449	LYS	GLU	engineered mutation	UNP Q51723
L	0	MET	-	expression tag	UNP Q51723

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Chain	Residue	Modelled	Actual	Comment	Reference
L	1	ALA	-	expression tag	UNP Q51723
L	170	ALA	ARG	engineered mutation	UNP Q51723
L	220	ALA	ARG	engineered mutation	UNP Q51723
L	227	PHE	TYR	engineered mutation	UNP Q51723
L	447	SER	PHE	engineered mutation	UNP Q51723
L	448	VAL	ARG	engineered mutation	UNP Q51723
L	449	LYS	GLU	engineered mutation	UNP Q51723

- Molecule 2 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	14	Total 14	O 14	0	0
2	B	10	Total 10	O 10	0	0
2	C	16	Total 16	O 16	0	0
2	D	11	Total 11	O 11	0	0
2	E	20	Total 20	O 20	0	0
2	F	3	Total 3	O 3	0	0
2	G	11	Total 11	O 11	0	0
2	H	5	Total 5	O 5	0	0
2	I	16	Total 16	O 16	0	0
2	J	2	Total 2	O 2	0	0
2	K	9	Total 9	O 9	0	0
2	L	9	Total 9	O 9	0	0

3 Residue-property plots ⓘ

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 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.
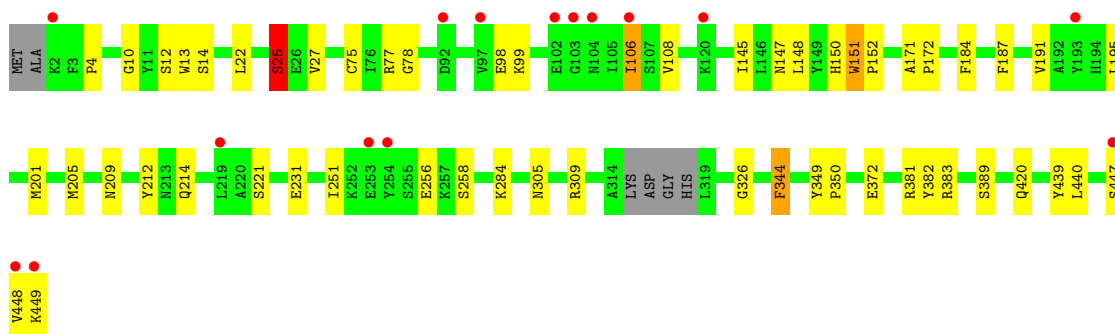
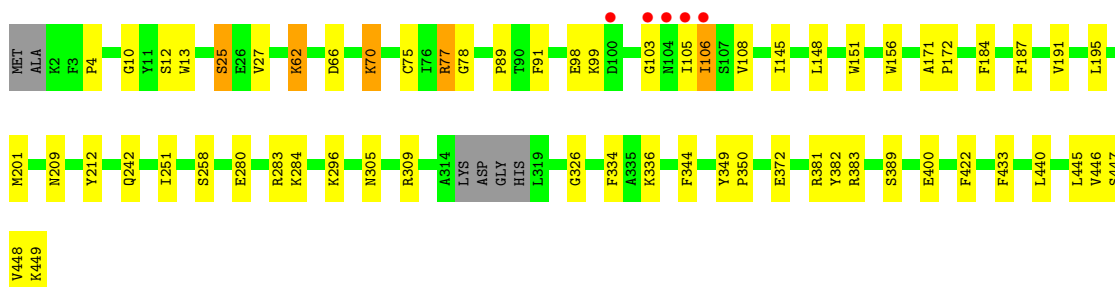• Molecule 1: Beta-glucosidase

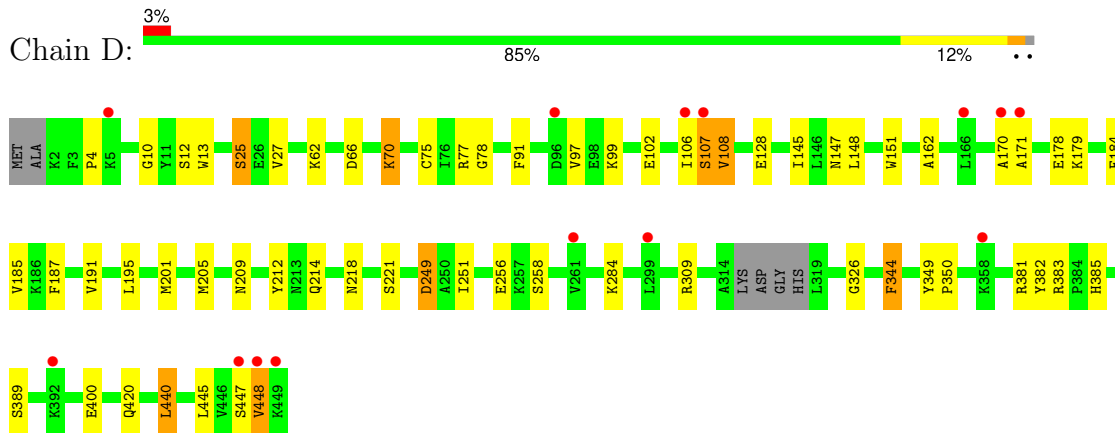Chain A:
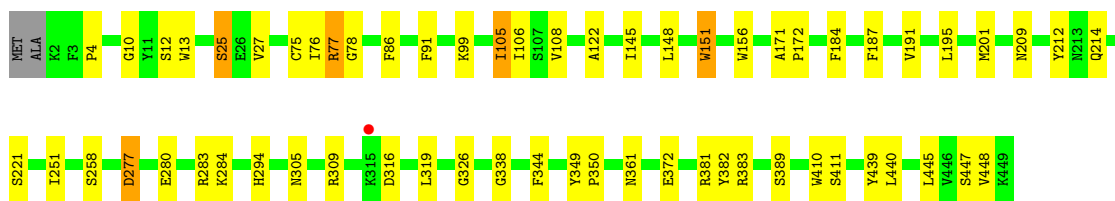
• Molecule 1: Beta-glucosidase

Chain B:

• Molecule 1: Beta-glucosidase

Chain C:

• Molecule 1: Beta-glucosidase

Chain D:

• Molecule 1: Beta-glucosidase

Chain E:

• Molecule 1: Beta-glucosidase

Chain F:

• Molecule 1: Beta-glucosidase

Chain G:

• Molecule 1: Beta-glucosidase
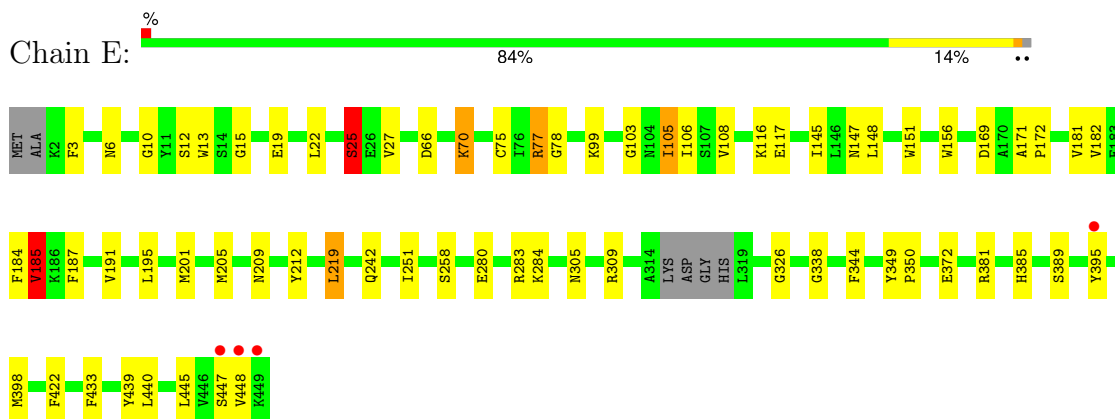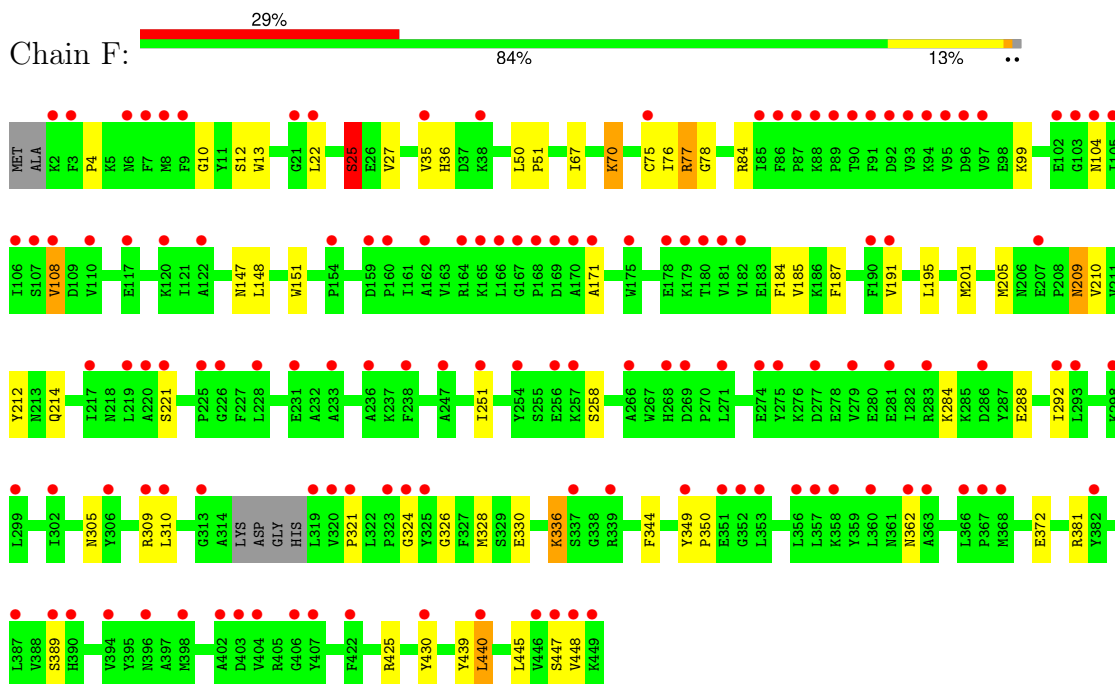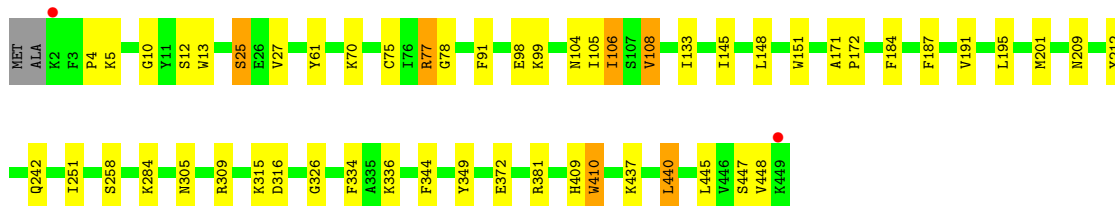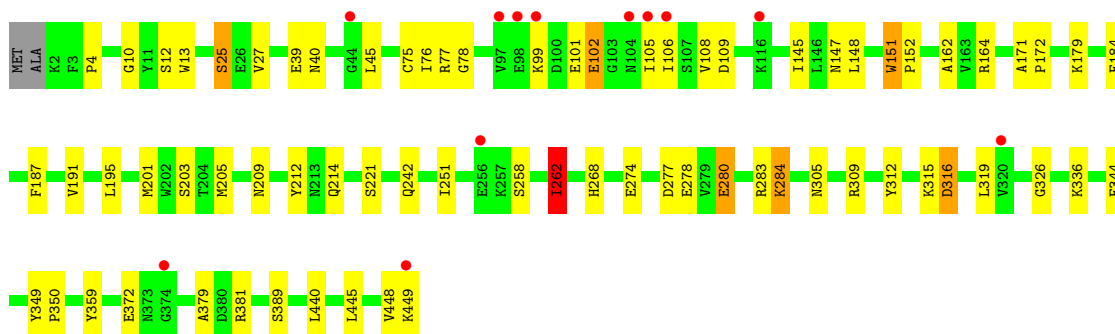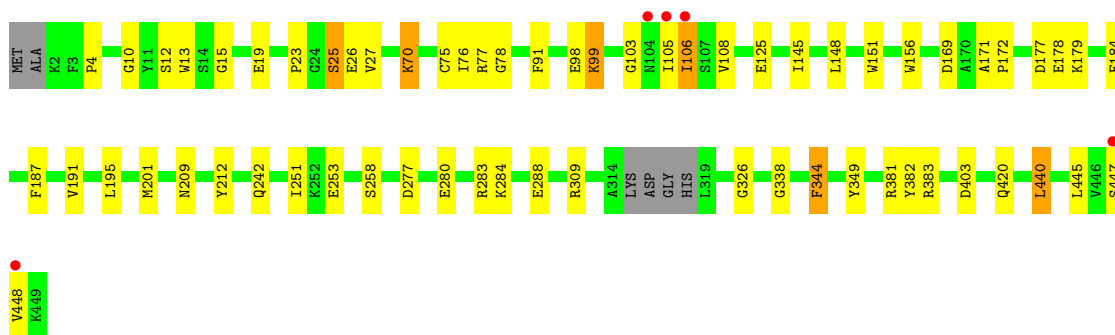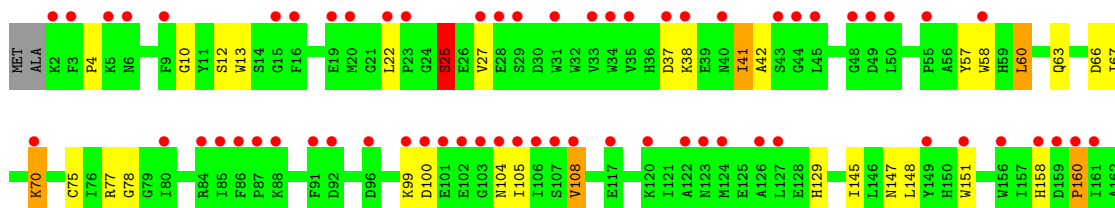
Chain H:

• Molecule 1: Beta-glucosidase

Chain I:

• Molecule 1: Beta-glucosidase

Chain J:

V163 R164 K165 L166 G167 P168 D169 A170 A171 P172 A173 G174 W175 L176 D177 E178 K179 V182 E183 F184 V185 K186 F187 V191 A192 Y193 H194 L195 M201 M205 P208 N209 Y212 N213 Q214 G215 Y216 A220 S221 F227 L228 E231 A232 A233 F238 I241 Q242 I245

I251 S258 V261 I262 Y263 A264 F265 A266 W267 L271 A272 E273 V279 K284 Y287 E288 F289 V290 T291 I292 S295 L299 D300 W301 Y306 R309 A314 LYS ASP GLY HIS L319 G326 E330 F344 Y349 P350 N355 L356 L357 N361

L366 P367 E372 R381 L387 V388 S389 H390 L391 Y395 N396 A397 M398 K399 D403 V404 R405 H409 W418 A419 Q420 V431 D432 F433 E434 K437 R438 Y439 L445 V446 S447 V448 K449

- Molecule 1: Beta-glucosidase

Chain K:

%

83% 15%

MET ALA K2 F3 P4 K6 N6 F9 G10 Y11 S12 W13 S14 Q17 S25 E26 V27 E39 I67 K70 C75 I76 R77 G78 F86 F91 V97 E98 K99 E102 G103 N104 I105 I106 S107 V108 A122 I145 L146 N147 L148 Y149 H150 W151 A171 P172

E178 F184 F187 V191 L195 M201 M205 N209 Y212 N213 Q214 S221 Q242 I251 S258 A264 E274 D277 E278 V279 E280 R283 K284 N305 R309 A314 LYS ASP GLY HIS L319 G326 F334 F344 G338

P350 E372 R381 Y382 R383 S389 H409 W410 E417 W418 K437 L440 S447 V448 K449

- Molecule 1: Beta-glucosidase

Chain L:

2%

87% 12%

MET ALA K2 G10 Y11 S12 W13 S14 S25 E26 V27 D66 I67 K70 C75 I76 R77 G78 F91 K99 D100 E101 N104 I105 I106 S107 V108 K116 I145 L146 N147 L148 Y149 H150 W151 K179 F184 V185 K186 F187 V191 L195 M201 N206

N209 Y212 N213 Q214 N218 S221 I251 S258 D269 K284 R309 D316 L319 G326 K336 F344 Y349 P350 A379 D380 R381 Y386 S389 H390 N396 H409 W410 L445 V446 S447 V448 K449

4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, α, β, γ	97.36Å 148.87Å 148.56Å 120.08° 94.00° 99.70°	Depositor
Resolution (Å)	48.28 – 2.81 48.28 – 2.81	Depositor EDS
% Data completeness (in resolution range)	96.4 (48.28-2.81) 96.5 (48.28-2.81)	Depositor EDS
R_{merge}	0.11	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	4.10 (at 2.81Å)	Xtriage
Refinement program	REFMAC 5.7.0029	Depositor
R, R_{free}	0.243 , 0.275 0.241 , 0.272	Depositor DCC
R_{free} test set	8299 reflections (5.02%)	wwPDB-VP
Wilson B-factor (Å^2)	49.0	Xtriage
Anisotropy	0.139	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.31 , 50.4	EDS
L-test for twinning[2]	$< |L| > = 0.45, < L^2 > = 0.27$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.89	EDS
Total number of atoms	43762	wwPDB-VP
Average B, all atoms (Å^2)	61.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.26% of the height of the origin peak. No significant pseudotranslation is detected.*

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[1] Intensities estimated from amplitudes.

[2] Theoretical values of $< |L| >$, $< L^2 >$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5   Model quality ⓘ

5.1   Standard geometry ⓘ

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	0.77	0/3776	0.80	4/5124 (0.1%)
1	B	0.60	0/3743	0.71	0/5079
1	C	0.75	0/3743	0.77	2/5079 (0.0%)
1	D	0.63	2/3743 (0.1%)	0.75	2/5079 (0.0%)
1	E	0.72	0/3743	0.77	3/5079 (0.1%)
1	F	0.55	1/3743 (0.0%)	0.74	7/5079 (0.1%)
1	G	0.73	1/3776 (0.0%)	0.76	1/5124 (0.0%)
1	H	0.62	1/3776 (0.0%)	0.76	6/5124 (0.1%)
1	I	0.72	0/3743	0.77	5/5079 (0.1%)
1	J	0.54	0/3743	0.75	6/5079 (0.1%)
1	K	0.71	1/3743 (0.0%)	0.77	3/5079 (0.1%)
1	L	0.61	1/3776 (0.0%)	0.74	2/5124 (0.0%)
All	All	0.67	7/45048 (0.0%)	0.76	41/61128 (0.1%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	2
1	B	0	1
1	C	0	1
1	D	0	1
1	E	0	1
1	F	0	2
1	G	0	1
1	H	0	1
1	I	0	1
1	J	0	1
1	K	0	1
1	L	0	1
All	All	0	14

The worst 5 of 7 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	H	39	GLU	CD-OE2	-6.01	1.19	1.25
1	K	39	GLU	CD-OE2	-5.65	1.19	1.25
1	D	128	GLU	CB-CG	5.43	1.62	1.52
1	L	316	ASP	CB-CG	5.39	1.63	1.51
1	D	128	GLU	CD-OE2	5.33	1.31	1.25

The worst 5 of 41 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	E	219	LEU	CA-CB-CG	11.57	141.91	115.30
1	H	277	ASP	CB-CG-OD1	10.20	127.48	118.30
1	A	277	ASP	CB-CG-OD2	-9.47	109.78	118.30
1	G	5	LYS	CD-CE-NZ	9.35	133.21	111.70
1	I	277	ASP	CB-CG-OD2	-8.94	110.25	118.30

There are no chirality outliers.

5 of 14 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	25	SER	Peptide
1	A	448	VAL	Peptide
1	B	25	SER	Peptide
1	C	25	SER	Peptide
1	D	25	SER	Peptide

5.2 Too-close contacts ⓘ

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	3657	0	3505	34	1
1	B	3626	0	3477	31	1
1	C	3626	0	3477	39	0
1	D	3626	0	3477	32	0
1	E	3626	0	3477	58	0
1	F	3626	0	3477	48	0
1	G	3657	0	3505	38	2

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	H	3657	0	3505	50	1
1	I	3626	0	3477	55	0
1	J	3626	0	3477	74	0
1	K	3626	0	3477	52	2
1	L	3657	0	3505	43	2
2	A	14	0	0	0	0
2	B	10	0	0	0	0
2	C	16	0	0	0	0
2	D	11	0	0	1	0
2	E	20	0	0	2	0
2	F	3	0	0	0	0
2	G	11	0	0	0	0
2	H	5	0	0	0	1
2	I	16	0	0	1	0
2	J	2	0	0	1	0
2	K	9	0	0	2	0
2	L	9	0	0	1	0
All	All	43762	0	41836	464	5

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 5.

The worst 5 of 464 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:I:440:LEU:CD1	1:J:445:LEU:HD11	1.59	1.31
1:I:440:LEU:HD11	1:J:445:LEU:CD1	1.79	1.11
1:E:182:VAL:O	1:E:185:VAL:HG23	1.50	1.11
1:J:60:LEU:HB3	1:J:63:GLN:OE1	1.51	1.11
1:J:366:LEU:HD23	1:J:367:PRO:HD2	1.19	1.10

All (5) 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:K:274:GLU:O	1:L:316:ASP:OD2[1_655]	1.81	0.39
1:G:316:ASP:OD2	1:H:274:GLU:O[1_655]	1.92	0.28
1:G:316:ASP:OD2	2:H:504:HOH:O[1_655]	2.03	0.17
1:K:277:ASP:OD2	1:L:316:ASP:N[1_655]	2.09	0.11
1:A:277:ASP:OD2	1:B:231:GLU:OE1[1_655]	2.18	0.02

5.3 Torsion angles ⓘ

5.3.1 Protein backbone ⓘ

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	446/450 (99%)	430 (96%)	13 (3%)	3 (1%)	22	51
1	B	440/450 (98%)	424 (96%)	13 (3%)	3 (1%)	22	51
1	C	440/450 (98%)	422 (96%)	15 (3%)	3 (1%)	22	51
1	D	440/450 (98%)	423 (96%)	15 (3%)	2 (0%)	29	59
1	E	440/450 (98%)	422 (96%)	16 (4%)	2 (0%)	29	59
1	F	440/450 (98%)	423 (96%)	15 (3%)	2 (0%)	29	59
1	G	446/450 (99%)	427 (96%)	16 (4%)	3 (1%)	22	51
1	H	446/450 (99%)	428 (96%)	14 (3%)	4 (1%)	17	44
1	I	440/450 (98%)	423 (96%)	14 (3%)	3 (1%)	22	51
1	J	440/450 (98%)	423 (96%)	15 (3%)	2 (0%)	29	59
1	K	440/450 (98%)	426 (97%)	11 (2%)	3 (1%)	22	51
1	L	446/450 (99%)	428 (96%)	16 (4%)	2 (0%)	34	64
All	All	5304/5400 (98%)	5099 (96%)	173 (3%)	32 (1%)	25	54

5 of 32 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	151	TRP
1	B	151	TRP
1	C	151	TRP
1	D	151	TRP
1	E	151	TRP

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	378/379 (100%)	365 (97%)	13 (3%)	37	69
1	B	375/379 (99%)	365 (97%)	10 (3%)	44	77
1	C	375/379 (99%)	363 (97%)	12 (3%)	39	71
1	D	375/379 (99%)	358 (96%)	17 (4%)	27	59
1	E	375/379 (99%)	360 (96%)	15 (4%)	31	64
1	F	375/379 (99%)	363 (97%)	12 (3%)	39	71
1	G	378/379 (100%)	367 (97%)	11 (3%)	42	74
1	H	378/379 (100%)	366 (97%)	12 (3%)	39	71
1	I	375/379 (99%)	362 (96%)	13 (4%)	36	68
1	J	375/379 (99%)	365 (97%)	10 (3%)	44	77
1	K	375/379 (99%)	362 (96%)	13 (4%)	36	68
1	L	378/379 (100%)	370 (98%)	8 (2%)	53	82
All	All	4512/4548 (99%)	4366 (97%)	146 (3%)	39	71

5 of 146 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	J	25	SER
1	L	284	LYS
1	J	258	SER
1	K	106	ILE
1	D	400	GLU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 41 such sidechains are listed below:

Mol	Chain	Res	Type
1	H	355	ASN
1	K	355	ASN
1	I	150	HIS
1	K	147	ASN
1	L	150	HIS

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains ⓘ

There are no non-standard protein/DNA/RNA residues in this entry.

5.5 Carbohydrates ⓘ

There are no monosaccharides in this entry.

5.6 Ligand geometry ⓘ

There are no ligands in this entry.

5.7 Other polymers ⓘ

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 ⓘ

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, 95th 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(Å²)	Q<0.9
1	A	448/450 (99%)	-0.41	1 (0%)	95	94	12, 38, 79, 120	0
1	B	444/450 (98%)	0.03	15 (3%)	45	35	33, 61, 106, 149	0
1	C	444/450 (98%)	-0.39	5 (1%)	80	75	16, 40, 72, 160	0
1	D	444/450 (98%)	-0.07	14 (3%)	47	37	26, 59, 95, 139	0
1	E	444/450 (98%)	-0.28	4 (0%)	84	80	19, 42, 78, 159	0
1	F	444/450 (98%)	1.51	132 (29%)	0	0	43, 99, 143, 186	0
1	G	448/450 (99%)	-0.40	2 (0%)	92	91	22, 41, 74, 134	0
1	H	448/450 (99%)	-0.11	12 (2%)	54	44	31, 57, 97, 168	0
1	I	444/450 (98%)	-0.34	5 (1%)	80	75	14, 42, 76, 146	0
1	J	444/450 (98%)	1.35	127 (28%)	0	0	54, 109, 165, 225	0
1	K	444/450 (98%)	-0.27	5 (1%)	80	75	19, 45, 75, 147	0
1	L	448/450 (99%)	-0.06	9 (2%)	65	56	24, 58, 98, 149	0
All	All	5344/5400 (98%)	0.05	331 (6%)	20	13	12, 52, 126, 225	0

The worst 5 of 331 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	E	449	LYS	10.9
1	F	366	LEU	10.5
1	F	367	PRO	9.7
1	J	122	ALA	9.5
1	F	448	VAL	9.1

6.2 Non-standard residues in protein, DNA, RNA chains ⓘ

There are no non-standard protein/DNA/RNA residues in this entry.

6.3 Carbohydrates ⓘ

There are no monosaccharides in this entry.

6.4 Ligands ⓘ

There are no ligands in this entry.

6.5 Other polymers ⓘ

There are no such residues in this entry.