



Full wwPDB X-ray Structure Validation Report ⓘ

May 16, 2020 – 04:34 am BST

PDB ID : 2ZWZ
Title : alpha-L-fucosidase complexed with inhibitor, Core1
Authors : Wu, H.-J.; Ko, T.-P.; Ho, C.-W.; Lin, C.-H.; Wang, A.H.-J.
Deposited on : 2008-12-19
Resolution : 2.36 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

A user guide is available at

<https://www.wwpdb.org/validation/2017/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

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

MolProbity : 4.02b-467
Mogul : 1.8.5 (274361), CSD as541be (2020)
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

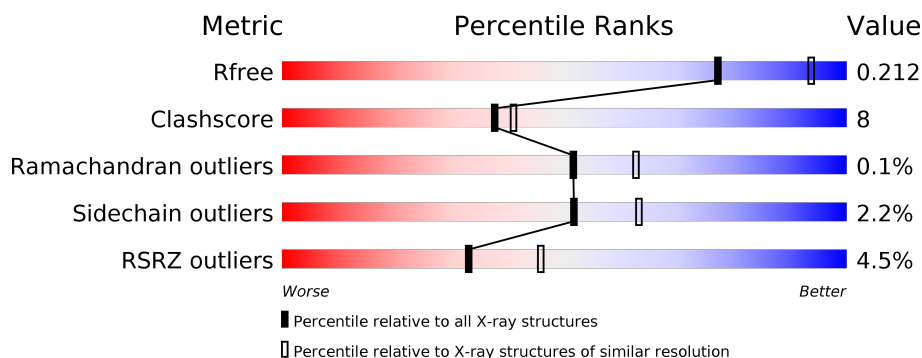
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.36 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	1164 (2.36-2.36)
Clashscore	141614	1232 (2.36-2.36)
Ramachandran outliers	138981	1211 (2.36-2.36)
Sidechain outliers	138945	1212 (2.36-2.36)
RSRZ outliers	127900	1150 (2.36-2.36)

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 ≥ 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	455	<div> <div>4%</div> <div>82%</div> <div>15%</div> <div>• •</div> </div>
1	B	455	<div> <div>5%</div> <div>79%</div> <div>16%</div> <div>• •</div> </div>

2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 7809 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.

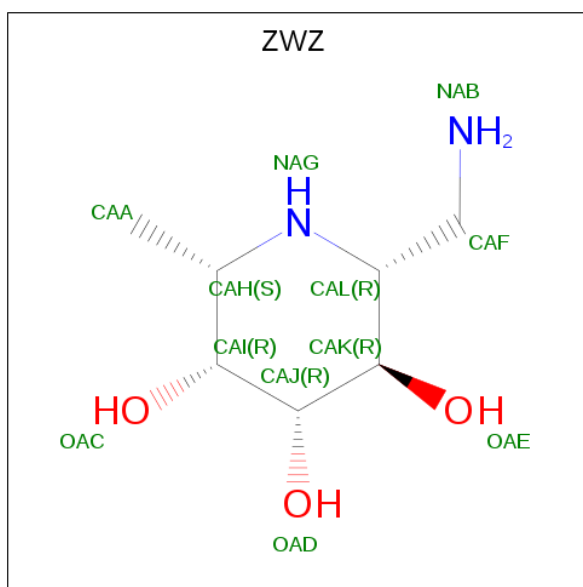
- Molecule 1 is a protein called Alpha-L-fucosidase, putative.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	441	Total	C	N	O	S	0	0	0
			3639	2372	599	660	8			
1	B	441	Total	C	N	O	S	0	0	0
			3639	2372	599	660	8			

There are 12 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	450	HIS	-	EXPRESSION TAG	UNP Q9WYE2
A	451	HIS	-	EXPRESSION TAG	UNP Q9WYE2
A	452	HIS	-	EXPRESSION TAG	UNP Q9WYE2
A	453	HIS	-	EXPRESSION TAG	UNP Q9WYE2
A	454	HIS	-	EXPRESSION TAG	UNP Q9WYE2
A	455	HIS	-	EXPRESSION TAG	UNP Q9WYE2
B	450	HIS	-	EXPRESSION TAG	UNP Q9WYE2
B	451	HIS	-	EXPRESSION TAG	UNP Q9WYE2
B	452	HIS	-	EXPRESSION TAG	UNP Q9WYE2
B	453	HIS	-	EXPRESSION TAG	UNP Q9WYE2
B	454	HIS	-	EXPRESSION TAG	UNP Q9WYE2
B	455	HIS	-	EXPRESSION TAG	UNP Q9WYE2

- Molecule 2 is (2R,3R,4R,5R,6S)-2-(aminomethyl)-6-methylpiperidine-3,4,5-triol (three-letter code: ZWZ) (formula: C₇H₁₆N₂O₃).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
2	A	1	Total	C	N	O	0	0
			12	7	2	3		
2	B	1	Total	C	N	O	0	0
			12	7	2	3		

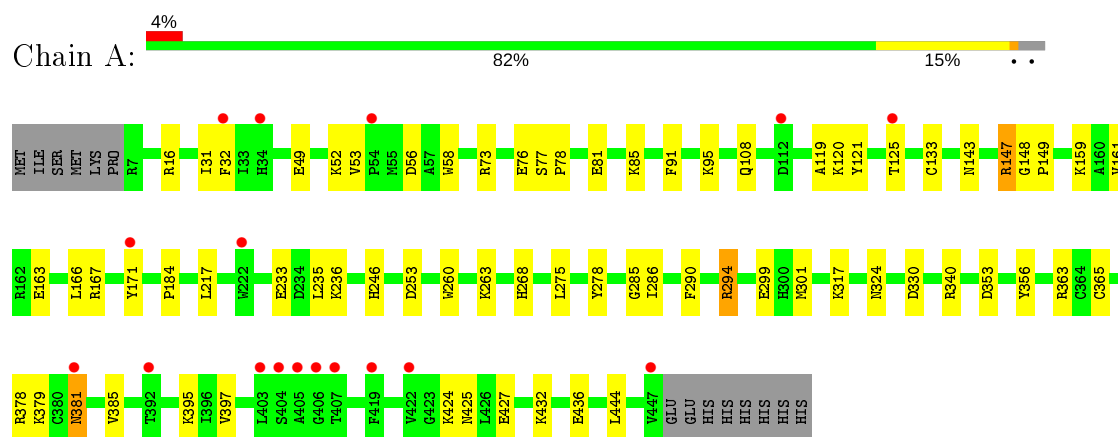
- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	253	Total	O	0	0
			253	253		
3	B	254	Total	O	0	0
			254	254		

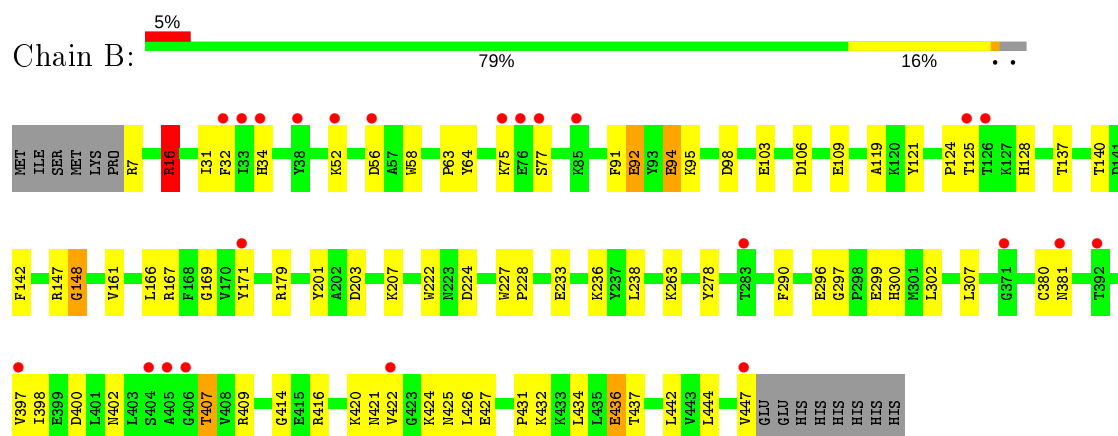
3 Residue-property plots [i](#)

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: Alpha-L-fucosidase, putative



- Molecule 1: Alpha-L-fucosidase, putative



4 Data and refinement statistics

Property	Value	Source
Space group	H 3 2	Depositor
Cell constants a, b, c, α , β , γ	180.69Å 180.69Å 169.38Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	30.00 – 2.36 29.40 – 2.36	Depositor EDS
% Data completeness (in resolution range)	94.5 (30.00-2.36) 94.7 (29.40-2.36)	Depositor EDS
R_{merge}	0.07	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	3.34 (at 2.36Å)	Xtriage
Refinement program	CNS	Depositor
R, R_{free}	0.159 , 0.211 0.156 , 0.212	Depositor DCC
R_{free} test set	2066 reflections (5.01%)	wwPDB-VP
Wilson B-factor (Å ²)	31.9	Xtriage
Anisotropy	0.040	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.38 , 65.8	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	7809	wwPDB-VP
Average B, all atoms (Å ²)	35.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.71% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical 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: ZWZ

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	0.96	0/3759	0.89	5/5108 (0.1%)
1	B	0.96	2/3759 (0.1%)	0.92	7/5108 (0.1%)
All	All	0.96	2/7518 (0.0%)	0.91	12/10216 (0.1%)

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	94	GLU	CG-CD	5.15	1.59	1.51
1	B	142	PHE	CE2-CZ	5.06	1.47	1.37

All (12) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	179	ARG	NE-CZ-NH2	8.30	124.45	120.30
1	B	77	SER	N-CA-C	-8.09	89.14	111.00
1	A	294	ARG	NE-CZ-NH2	-7.69	116.46	120.30
1	A	77	SER	N-CA-C	-7.25	91.42	111.00
1	B	16	ARG	NE-CZ-NH1	6.60	123.60	120.30
1	A	294	ARG	NE-CZ-NH1	6.30	123.45	120.30
1	B	179	ARG	NE-CZ-NH1	-6.09	117.26	120.30
1	A	330	ASP	CB-CG-OD2	5.84	123.55	118.30
1	B	16	ARG	NE-CZ-NH2	-5.81	117.40	120.30
1	B	380	CYS	CA-CB-SG	-5.29	104.47	114.00
1	A	147	ARG	NE-CZ-NH1	-5.27	117.67	120.30
1	B	148	GLY	N-CA-C	5.07	125.78	113.10

There are no chirality outliers.

There are no planarity outliers.

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	3639	0	3506	54	0
1	B	3639	0	3506	63	0
2	A	12	0	16	0	0
2	B	12	0	16	2	0
3	A	253	0	0	7	1
3	B	254	0	0	6	0
All	All	7809	0	7044	111	1

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 8.

All (111) 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:16:ARG:HD2	1:B:16:ARG:HH21	1.18	1.04
1:B:434:LEU:O	1:B:437:THR:HG22	1.65	0.97
1:B:297:GLY:H	1:B:300:HIS:HD2	1.18	0.90
1:B:75:LYS:HG3	3:B:468:HOH:O	1.75	0.85
1:A:381:ASN:H	1:A:381:ASN:HD22	1.28	0.79
1:A:16:ARG:HH11	1:B:16:ARG:HE	1.34	0.74
1:A:236:LYS:HE2	3:A:643:HOH:O	1.87	0.74
1:A:381:ASN:N	1:A:381:ASN:HD22	1.85	0.73
1:A:108:GLN:HE22	1:A:163:GLU:HB2	1.55	0.72
1:B:56:ASP:HB2	3:B:475:HOH:O	1.89	0.71
1:B:106:ASP:OD2	1:B:109:GLU:HG3	1.89	0.71
1:B:7:ARG:HD3	3:B:471:HOH:O	1.89	0.71
1:A:16:ARG:HD2	1:B:16:ARG:NH2	2.02	0.69
1:B:297:GLY:H	1:B:300:HIS:CD2	2.09	0.67
1:A:285:GLY:HA2	1:A:324:ASN:HB3	1.77	0.65
1:A:260:TRP:CE2	1:B:16:ARG:HG2	2.32	0.64
1:B:233:GLU:OE1	1:B:236:LYS:HE3	1.99	0.63
1:A:381:ASN:H	1:A:381:ASN:ND2	1.94	0.63
1:B:236:LYS:HE2	3:B:530:HOH:O	1.97	0.63
1:B:91:PHE:CE1	1:B:95:LYS:HD2	2.34	0.62
1:B:106:ASP:CG	1:B:109:GLU:HG3	2.20	0.62

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:397:VAL:CG1	1:B:425:ASN:HD22	2.13	0.61
1:A:236:LYS:NZ	1:A:236:LYS:HB2	2.17	0.60
1:B:402:ASN:HA	1:B:421:ASN:OD1	2.01	0.60
1:B:409:ARG:NH1	1:B:414:GLY:O	2.34	0.60
1:B:397:VAL:HG22	1:B:427:GLU:HG2	1.85	0.58
1:A:236:LYS:CE	3:A:643:HOH:O	2.48	0.58
1:A:260:TRP:CZ2	1:B:16:ARG:HG2	2.40	0.57
1:A:16:ARG:HH11	1:B:16:ARG:NE	2.03	0.56
1:B:16:ARG:HG3	1:B:16:ARG:O	2.06	0.56
1:B:297:GLY:N	1:B:300:HIS:HD2	1.99	0.54
1:B:124:PRO:HD2	1:B:169:GLY:O	2.07	0.54
1:B:398:ILE:HD12	1:B:426:LEU:HD23	1.89	0.54
1:A:286:ILE:HG22	1:A:301:MET:HE2	1.91	0.53
1:A:217:LEU:HD11	1:A:246:HIS:HB2	1.90	0.52
1:A:108:GLN:NE2	1:A:163:GLU:HB2	2.23	0.51
1:B:121:TYR:HB3	1:B:167:ARG:HB2	1.92	0.51
1:B:432:LYS:HG3	1:B:436:GLU:OE1	2.10	0.51
1:B:397:VAL:HG12	1:B:425:ASN:HD22	1.74	0.51
1:A:233:GLU:OE1	1:A:236:LYS:HE3	2.11	0.50
1:B:203:ASP:O	1:B:207:LYS:HG3	2.12	0.50
1:B:302:LEU:HD13	1:B:307:LEU:HD23	1.92	0.50
1:B:407:THR:HA	3:B:698:HOH:O	2.10	0.50
1:B:263:LYS:HD3	1:B:278:TYR:CE1	2.47	0.50
1:B:442:LEU:HD11	1:B:444:LEU:HD21	1.94	0.50
1:A:253:ASP:CG	1:A:263:LYS:HA	2.33	0.49
1:A:73:ARG:HB2	1:A:184:PRO:HB3	1.94	0.49
1:A:236:LYS:HZ2	1:A:236:LYS:HB2	1.77	0.49
1:A:263:LYS:HD3	1:A:278:TYR:CE1	2.48	0.49
1:B:227:TRP:CG	1:B:228:PRO:HD2	2.48	0.49
1:A:301:MET:CE	1:A:340:ARG:HD2	2.43	0.49
1:B:92:GLU:HB3	1:B:94:GLU:OE2	2.14	0.48
1:A:31:ILE:HG12	1:A:119:ALA:CB	2.44	0.47
1:B:98:ASP:OD1	1:B:147:ARG:NH2	2.36	0.47
1:A:161:VAL:HG13	1:A:166:LEU:HB2	1.97	0.47
1:B:58:TRP:CH2	1:B:63:PRO:HG2	2.50	0.47
1:A:163:GLU:HG3	3:A:673:HOH:O	2.15	0.47
1:B:171:TYR:C	1:B:171:TYR:CD2	2.89	0.47
1:B:238:LEU:C	1:B:238:LEU:HD23	2.35	0.47
1:B:400:ASP:HA	1:B:424:LYS:O	2.16	0.46
1:B:420:LYS:HE3	1:B:422:VAL:CG2	2.46	0.46
1:B:91:PHE:CZ	1:B:95:LYS:HD2	2.51	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:431:PRO:HD2	1:B:434:LEU:HD12	1.97	0.45
1:A:52:LYS:HG2	1:A:268:HIS:CD2	2.51	0.45
1:A:159:LYS:NZ	3:A:565:HOH:O	2.49	0.45
1:A:395:LYS:HE2	1:A:427:GLU:CD	2.36	0.45
1:A:148:GLY:HA3	1:A:149:PRO:HD3	1.83	0.45
1:B:407:THR:HB	1:B:416:ARG:NH1	2.31	0.45
1:A:378:ARG:HG2	1:A:379:LYS:N	2.31	0.45
1:A:236:LYS:NZ	1:A:236:LYS:CB	2.78	0.45
1:A:363:ARG:NH1	1:A:365:CYS:O	2.49	0.45
1:B:224:ASP:OD2	2:B:902:ZWZ:HAF	2.17	0.45
1:B:125:THR:HA	1:B:171:TYR:HB3	1.98	0.45
1:B:137:THR:HG21	1:B:140:THR:HG22	1.99	0.45
1:A:81:GLU:O	1:A:85:LYS:HG3	2.18	0.44
1:A:290:PHE:HA	1:A:324:ASN:ND2	2.32	0.44
1:B:34:HIS:CG	1:B:290:PHE:HB3	2.53	0.44
1:A:397:VAL:HG22	1:A:427:GLU:HG3	2.00	0.43
1:B:98:ASP:CG	1:B:147:ARG:HH21	2.17	0.43
1:B:296:GLU:HA	1:B:300:HIS:CD2	2.54	0.43
1:A:147:ARG:HD2	3:A:549:HOH:O	2.19	0.43
1:B:407:THR:HB	1:B:416:ARG:HH11	1.84	0.43
1:A:120:LYS:HE2	1:A:356:TYR:CE2	2.53	0.43
1:A:424:LYS:HG3	1:A:425:ASN:OD1	2.19	0.43
1:B:31:ILE:HG12	1:B:119:ALA:CB	2.49	0.42
1:B:91:PHE:CD1	1:B:95:LYS:HD2	2.54	0.42
1:A:121:TYR:HB3	1:A:167:ARG:HB2	2.00	0.42
1:A:385:VAL:HB	1:A:444:LEU:HB2	2.02	0.42
1:A:49:GLU:HA	3:A:526:HOH:O	2.19	0.42
1:B:103:GLU:HB3	3:B:584:HOH:O	2.20	0.42
1:B:161:VAL:HG13	1:B:166:LEU:HB2	2.01	0.42
1:B:94:GLU:CD	1:B:94:GLU:H	2.21	0.42
1:A:125:THR:HA	1:A:171:TYR:HB3	2.01	0.42
1:A:53:VAL:HB	1:A:58:TRP:HE3	1.85	0.42
1:A:91:PHE:CE2	1:A:95:LYS:HB3	2.55	0.42
1:A:120:LYS:HA	1:A:166:LEU:HD22	2.02	0.41
1:A:233:GLU:HB2	3:A:592:HOH:O	2.20	0.41
1:B:302:LEU:CD1	1:B:307:LEU:HD23	2.50	0.41
1:A:171:TYR:C	1:A:171:TYR:CD2	2.94	0.41
1:A:275:LEU:HD23	1:A:317:LYS:HA	2.01	0.41
1:B:432:LYS:HE3	1:B:436:GLU:OE1	2.20	0.41
1:A:108:GLN:HE22	1:A:163:GLU:CB	2.26	0.41
1:A:91:PHE:C	1:A:91:PHE:CD2	2.94	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:128:HIS:CE1	2:B:902:ZWZ:OAD	2.74	0.41
1:A:235:LEU:HD23	1:A:235:LEU:HA	1.91	0.41
1:B:201:TYR:CE2	1:B:228:PRO:HG3	2.55	0.41
1:B:407:THR:HG23	1:B:447:VAL:O	2.21	0.41
1:B:227:TRP:CD2	1:B:228:PRO:HD2	2.56	0.41
1:B:64:TYR:CZ	1:B:290:PHE:HE1	2.39	0.41
1:A:133:CYS:O	1:A:143:ASN:HA	2.22	0.40
1:A:432:LYS:O	1:A:436:GLU:HG3	2.22	0.40

All (1) 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)
3:A:478:HOH:O	3:A:478:HOH:O[3_555]	0.66	1.54

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	439/455 (96%)	418 (95%)	21 (5%)	0	100	100
1	B	439/455 (96%)	422 (96%)	16 (4%)	1 (0%)	47	56
All	All	878/910 (96%)	840 (96%)	37 (4%)	1 (0%)	51	63

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	148	GLY

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	381/395 (96%)	373 (98%)	8 (2%)	53	65
1	B	381/395 (96%)	372 (98%)	9 (2%)	49	59
All	All	762/790 (96%)	745 (98%)	17 (2%)	52	63

All (17) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	32	PHE
1	A	56	ASP
1	A	76	GLU
1	A	78	PRO
1	A	294	ARG
1	A	299	GLU
1	A	353	ASP
1	A	381	ASN
1	B	16	ARG
1	B	32	PHE
1	B	52	LYS
1	B	92	GLU
1	B	222	TRP
1	B	299	GLU
1	B	381	ASN
1	B	407	THR
1	B	436	GLU

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (6) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	61	GLN
1	A	108	GLN
1	A	381	ASN
1	A	402	ASN
1	B	108	GLN

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Mol	Chain	Res	Type
1	B	300	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 carbohydrates in this entry.

5.6 Ligand geometry [i](#)

2 ligands are 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	ZWZ	B	902	-	11,12,12	0.75	1 (9%)	15,17,17	0.63	0
2	ZWZ	A	901	-	11,12,12	0.69	1 (9%)	15,17,17	0.86	0

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	ZWZ	B	902	-	-	0/0/22/22	0/1/1/1
2	ZWZ	A	901	-	-	0/0/22/22	0/1/1/1

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	902	ZWZ	CAH-NAG	2.24	1.48	1.45
2	A	901	ZWZ	CAH-NAG	2.06	1.47	1.45

There are no bond angle outliers.

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	902	ZWZ	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

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(Å ²)	Q<0.9
1	A	441/455 (96%)	-0.16	17 (3%) 39 52	18, 32, 57, 74	0
1	B	441/455 (96%)	-0.08	23 (5%) 27 39	19, 32, 57, 70	0
All	All	882/910 (96%)	-0.12	40 (4%) 33 46	18, 32, 57, 74	0

All (40) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	406	GLY	4.7
1	B	406	GLY	4.5
1	B	404	SER	4.2
1	B	171	TYR	3.6
1	A	404	SER	3.5
1	A	405	ALA	3.5
1	A	171	TYR	3.2
1	A	392	THR	3.2
1	B	56	ASP	3.2
1	B	405	ALA	3.1
1	B	85	LYS	2.8
1	A	447	VAL	2.7
1	A	381	ASN	2.7
1	B	125	THR	2.7
1	B	371	GLY	2.7
1	A	125	THR	2.7
1	B	76	GLU	2.6
1	B	32	PHE	2.6
1	A	34	HIS	2.5
1	A	222	TRP	2.5
1	B	126	THR	2.5
1	A	419	PHE	2.4
1	B	34	HIS	2.4
1	B	33	ILE	2.3

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Mol	Chain	Res	Type	RSRZ
1	B	381	ASN	2.3
1	A	403	LEU	2.3
1	A	112	ASP	2.3
1	B	38	TYR	2.3
1	B	52	LYS	2.2
1	B	283	THR	2.2
1	A	32	PHE	2.2
1	A	422	VAL	2.2
1	B	392	THR	2.2
1	B	422	VAL	2.1
1	B	447	VAL	2.1
1	B	77	SER	2.1
1	B	75	LYS	2.1
1	A	54	PRO	2.1
1	B	397	VAL	2.0
1	A	407	THR	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](#)

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, 95th 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 ²)	Q<0.9
2	ZWZ	B	902	12/12	0.96	0.28	25,28,30,31	0
2	ZWZ	A	901	12/12	0.97	0.27	21,25,28,33	0

6.5 Other polymers [i](#)

There are no such residues in this entry.