



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 8, 2026 – 01:57 PM UTC

PDB ID : 4AD3 / pdb_00004ad3
Title : Structure of the GH99 endo-alpha-mannosidase from Bacteroides xylanisolvens in complex with Glucose-1,3-deoxymannojirimycin
Authors : Thompson, A.J.; Williams, R.J.; Hakki, Z.; Alonzi, D.S.; Wennekes, T.; Gloster, T.M.; Songsrirote, K.; Thomas-Oates, J.E.; Wrodnigg, T.M.; Spreitz, J.; Stuetz, A.E.; Butters, T.D.; Williams, S.J.; Davies, G.J.
Deposited on : 2011-12-21
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

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>.

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

MolProbity	:	4-5-2 with Phenix2.0
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	2.0
EDS	:	3.0
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4	:	9.0.010 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.49

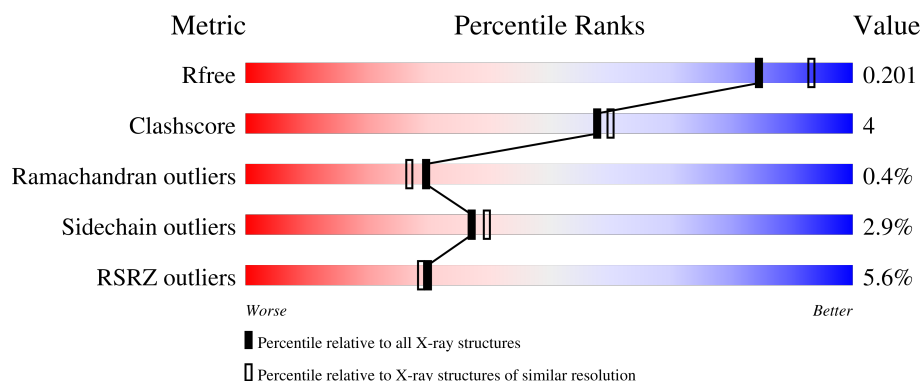
1 Overall quality at a glance

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))
R_{free}	180053	10052 (2.00-2.00)
Clashscore	190562	11152 (2.00-2.00)
Ramachandran outliers	187476	11031 (2.00-2.00)
Sidechain outliers	187428	11029 (2.00-2.00)
RSRZ outliers	180081	10067 (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 ≥ 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	380	83% 7% • 9%
1	B	380	84% 6% • 9%
1	C	380	82% 7% • 9%
1	D	380	19% 77% 11% • 10%

2 Entry composition [i](#)

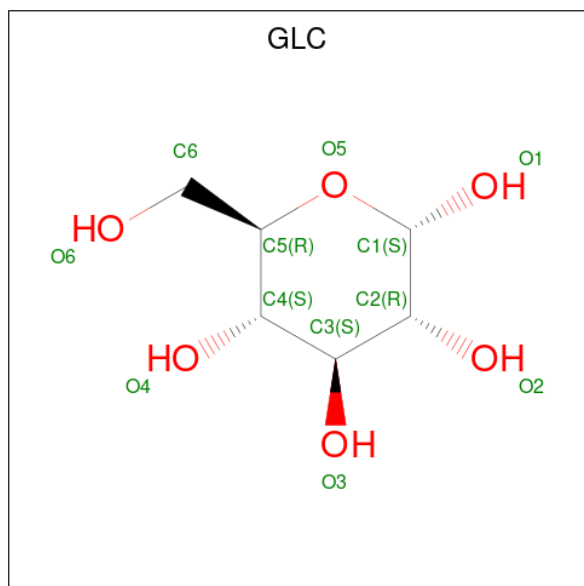
There are 4 unique types of molecules in this entry. The entry contains 12473 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 GLYCOSYL HYDROLASE FAMILY 71.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	345	Total	C	N	O	S	0	4	0
			2814	1814	464	528	8			
1	B	346	Total	C	N	O	S	0	5	0
			2838	1831	470	528	9			
1	C	344	Total	C	N	O	S	0	0	0
			2798	1803	464	523	8			
1	D	342	Total	C	N	O	S	0	0	0
			2561	1640	434	479	8			

- Molecule 2 is alpha-D-glucopyranose (CCD ID: GLC) (formula: C₆H₁₂O₆).



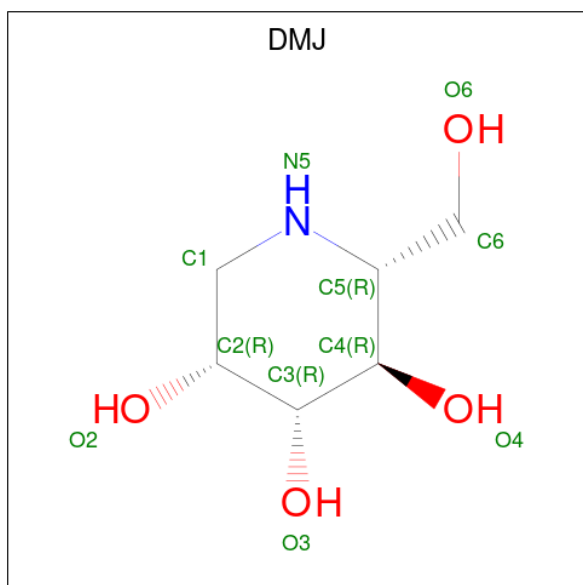
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	A	1	Total	C	O	0	0
			11	6	5		
2	B	1	Total	C	O	0	0
			11	6	5		

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Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	C	1	Total	C	O	0	0
			11	6	5		
2	D	1	Total	C	O	0	0
			11	6	5		

- Molecule 3 is 1-DEOXYMANNOJIRIMYCIN (CCD ID: DMJ) (formula: $C_6H_{13}NO_4$).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
3	A	1	Total	C	N	O	0	0
			11	6	1	4		
3	B	1	Total	C	N	O	0	0
			11	6	1	4		
3	C	1	Total	C	N	O	0	0
			11	6	1	4		
3	D	1	Total	C	N	O	0	0
			11	6	1	4		

- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	417	Total	O	0	0
			417	417		
4	B	443	Total	O	0	0
			443	443		
4	C	387	Total	O	0	0
			387	387		

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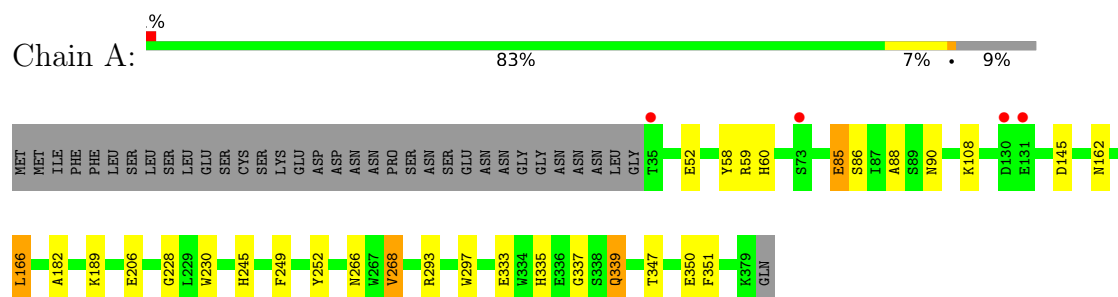
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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	D	127	Total 127	O 127	0	0

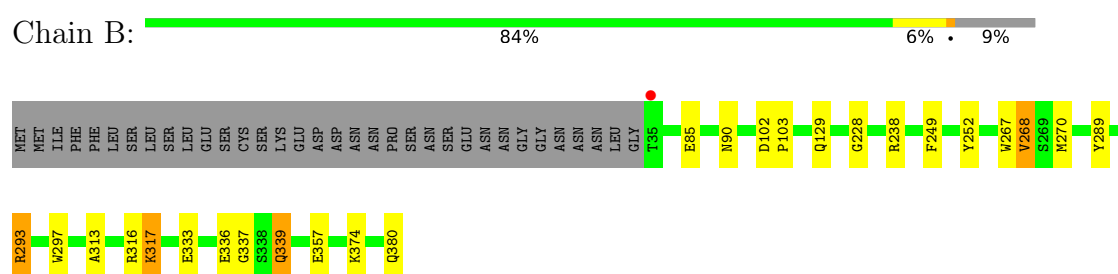
3 Residue-property plots

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.

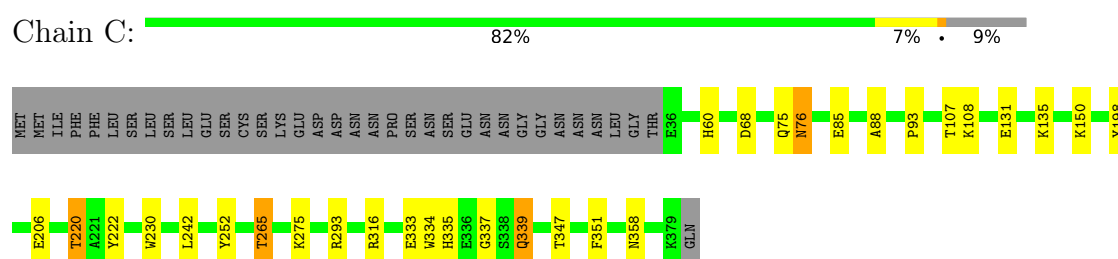
• Molecule 1: GLYCOSYL HYDROLASE FAMILY 71



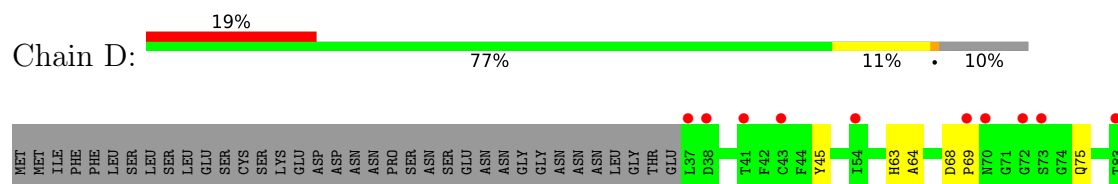
• Molecule 1: GLYCOSYL HYDROLASE FAMILY 71

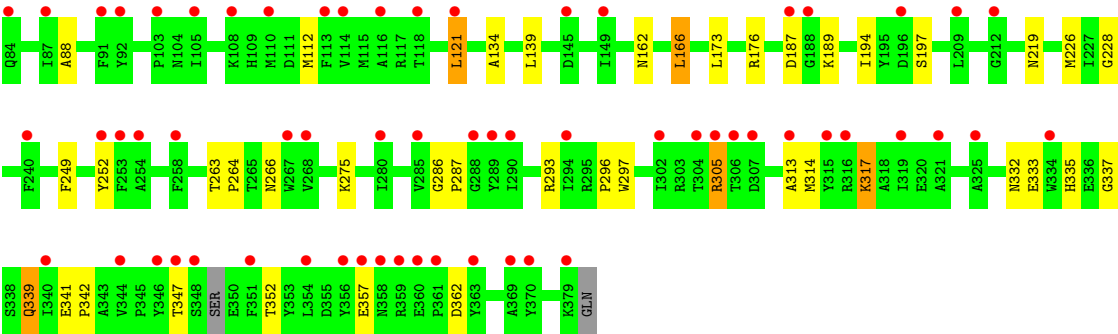


• Molecule 1: GLYCOSYL HYDROLASE FAMILY 71



• Molecule 1: GLYCOSYL HYDROLASE FAMILY 71





4 Data and refinement statistics

Property	Value	Source
Space group	P 31 2 1	Depositor
Cell constants a, b, c, α , β , γ	222.48 Å 222.48 Å 84.72 Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	46.49 – 2.00 46.49 – 2.00	Depositor EDS
% Data completeness (in resolution range)	99.7 (46.49-2.00) 96.3 (46.49-2.00)	Depositor EDS
R_{merge}	0.15	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.80 (at 2.00 Å)	Xtriage
Refinement program	REFMAC 5.6.0086	Depositor
R, R_{free}	0.175 , 0.202 0.175 , 0.201	Depositor DCC
R_{free} test set	7754 reflections (4.97%)	wwPDB-VP
Wilson B-factor (Å ²)	27.6	Xtriage
Anisotropy	0.010	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.34 , 52.1	EDS
L-test for twinning ²	$\langle L \rangle = 0.46$, $\langle L^2 \rangle = 0.28$	Xtriage
Estimated twinning fraction	0.036 for -h,-k,l	Xtriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	12473	wwPDB-VP
Average B, all atoms (Å ²)	31.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.34% 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

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: GLC, DMJ

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	0.73	0/2918	0.80	0/3977
1	B	0.71	0/2945	0.79	4/4011 (0.1%)
1	C	0.71	0/2890	0.82	0/3936
1	D	0.61	0/2643	0.87	3/3621 (0.1%)
All	All	0.69	0/11396	0.82	7/15545 (0.0%)

There are no bond length outliers.

All (7) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	D	296	PRO	N-CA-CB	5.78	109.85	103.26
1	B	268	VAL	N-CA-CB	5.56	118.11	110.54
1	D	332	ASN	N-CA-C	5.31	116.67	110.41
1	D	189	LYS	N-CA-C	5.14	116.55	110.07
1	B	357	GLU	CB-CA-C	-5.10	110.30	117.23
1	B	238	ARG	CA-C-N	-5.00	113.89	119.19
1	B	238	ARG	C-N-CA	-5.00	113.89	119.19

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	2814	0	2657	24	0
1	B	2838	0	2697	13	0
1	C	2798	0	2649	32	0
1	D	2561	0	2223	28	1
2	A	11	0	10	0	0
2	B	11	0	10	0	0
2	C	11	0	10	0	0
2	D	11	0	10	0	0
3	A	11	0	12	0	0
3	B	11	0	12	0	0
3	C	11	0	12	0	0
3	D	11	0	12	0	0
4	A	417	0	0	9	0
4	B	443	0	0	2	0
4	C	387	0	0	13	0
4	D	127	0	0	2	0
All	All	12473	0	10314	96	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 4.

All (96) 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:59:ARG:HD2	4:A:2019:HOH:O	1.55	1.04
1:A:347:THR:HG22	4:A:2376:HOH:O	1.63	0.97
1:C:265:THR:CG2	4:C:2275:HOH:O	2.15	0.93
1:C:68:ASP:H	1:C:75:GLN:HE22	1.17	0.92
1:C:60:HIS:HD2	1:C:335:HIS:HE1	1.22	0.85
1:C:60:HIS:HD2	1:C:335:HIS:CE1	1.94	0.84
1:C:265:THR:HG23	4:C:2275:HOH:O	1.76	0.83
1:B:85:GLU:HG2	4:B:2396:HOH:O	1.80	0.81
1:D:68:ASP:H	1:D:75:GLN:HE22	1.29	0.80
1:D:313:ALA:O	1:D:317:LYS:HG3	1.86	0.76
1:C:220:THR:CG2	1:C:222:TYR:H	1.99	0.74
1:C:220:THR:HG23	1:C:222:TYR:H	1.54	0.72
1:C:275:LYS:HG3	4:C:2281:HOH:O	1.88	0.72
1:C:60:HIS:CD2	1:C:335:HIS:HE1	2.07	0.72
1:C:198:TYR:HD2	4:C:2221:HOH:O	1.76	0.69
1:D:339:GLN:NE2	1:D:339:GLN:H	1.92	0.66
1:D:263:THR:HB	1:D:266:ASN:ND2	2.11	0.66
1:D:286:GLY:H	1:D:314:MET:HE3	1.60	0.65

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:264:PRO:HB2	1:D:317:LYS:HD3	1.78	0.65
1:D:45:TYR:HB3	1:D:121:LEU:HD13	1.79	0.65
1:C:108:LYS:NZ	4:C:2118:HOH:O	2.32	0.62
1:B:316:ARG:HH21	1:C:358:ASN:HD21	1.47	0.62
1:C:107:THR:HG22	4:C:2056:HOH:O	1.99	0.62
1:C:85:GLU:HG2	4:C:2349:HOH:O	2.01	0.61
1:A:60:HIS:ND1	1:A:335:HIS:HE1	1.98	0.61
1:C:293:ARG:HD3	1:C:351:PHE:CE1	2.36	0.60
1:A:339:GLN:NE2	1:A:339:GLN:H	2.00	0.58
1:D:287:PRO:HB2	1:D:305:ARG:NH1	2.19	0.58
1:C:68:ASP:N	1:C:75:GLN:HE22	1.96	0.57
1:D:337:GLY:HA2	1:D:339:GLN:HE22	1.69	0.56
1:C:347:THR:HG22	4:C:2344:HOH:O	2.05	0.55
1:D:63:HIS:HD2	1:D:64:ALA:O	1.88	0.55
1:A:90:ASN:HD21	1:A:293:ARG:H	1.52	0.54
1:A:293:ARG:HD2	4:A:2329:HOH:O	2.07	0.54
1:C:60:HIS:CD2	1:C:335:HIS:CE1	2.85	0.54
1:D:339:GLN:H	1:D:339:GLN:HE21	1.55	0.54
1:A:60:HIS:ND1	1:A:335:HIS:CE1	2.77	0.52
1:A:337:GLY:HA2	1:A:339:GLN:HE22	1.73	0.52
1:A:293:ARG:HD3	1:A:351:PHE:CE1	2.44	0.51
1:C:220:THR:HG22	1:C:222:TYR:H	1.74	0.51
1:A:88:ALA:O	1:A:335:HIS:HD2	1.93	0.51
1:D:341:GLU:HG2	1:D:342:PRO:HD2	1.92	0.51
1:D:293:ARG:HB2	4:D:2027:HOH:O	2.10	0.51
1:D:194:ILE:HD11	1:D:226:MET:HE3	1.93	0.51
1:C:337:GLY:HA2	1:C:339:GLN:HE22	1.76	0.50
1:C:293:ARG:HD2	4:C:2301:HOH:O	2.10	0.50
1:B:337:GLY:HA2	1:B:339:GLN:HE22	1.77	0.50
1:B:380:GLN:NE2	4:B:2441:HOH:O	2.46	0.49
1:B:339:GLN:NE2	1:B:339:GLN:H	2.11	0.49
1:A:86:SER:HB2	1:A:350:GLU:HG3	1.95	0.49
1:D:297:TRP:CD1	1:D:297:TRP:H	2.31	0.48
1:D:286:GLY:O	1:D:314:MET:HE3	2.14	0.48
1:D:347:THR:HB	1:D:352:THR:HG22	1.95	0.47
1:A:245:HIS:HD2	4:A:2280:HOH:O	1.96	0.47
1:C:68:ASP:H	1:C:75:GLN:NE2	1.99	0.47
1:A:230:TRP:C	1:A:230:TRP:CD1	2.92	0.47
1:C:76:ASN:CG	1:C:76:ASN:O	2.56	0.47
1:A:268[A]:VAL:HG13	4:A:2296:HOH:O	2.15	0.47
1:D:228:GLY:O	1:D:249:PHE:HA	2.14	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:150:LYS:NZ	4:C:2180:HOH:O	2.41	0.47
1:D:162:ASN:O	1:D:166:LEU:HB2	2.17	0.45
1:A:145:ASP:HB2	1:A:182:ALA:HB2	1.99	0.45
1:D:121:LEU:HD12	1:D:121:LEU:C	2.42	0.45
1:D:134:ALA:HB1	1:D:176:ARG:HH21	1.81	0.45
1:D:287:PRO:O	1:D:305:ARG:HD2	2.16	0.45
1:C:316:ARG:NH2	4:C:2327:HOH:O	2.46	0.45
1:C:88:ALA:O	1:C:335:HIS:HD2	1.99	0.45
1:B:267:TRP:HD1	1:B:270[A]:MET:HE3	1.83	0.44
1:A:266:ASN:ND2	4:A:2300:HOH:O	2.51	0.44
1:C:293:ARG:HD3	1:C:351:PHE:CZ	2.53	0.44
1:D:362:ASP:HA	4:D:2117:HOH:O	2.16	0.44
1:D:88:ALA:O	1:D:335:HIS:HD2	2.01	0.44
1:B:297:TRP:CD1	1:B:297:TRP:H	2.36	0.43
1:D:45:TYR:CB	1:D:121:LEU:HD13	2.47	0.43
1:B:313:ALA:O	1:B:317:LYS:HD3	2.18	0.43
1:A:245:HIS:HE1	4:A:2122:HOH:O	2.02	0.42
1:B:289:TYR:CE2	1:B:336[B]:GLU:HB2	2.54	0.42
1:C:265:THR:HB	4:C:2269:HOH:O	2.20	0.42
1:B:90:ASN:HD21	1:B:293:ARG:H	1.68	0.42
1:A:162:ASN:O	1:A:166:LEU:HB2	2.19	0.41
1:B:228:GLY:O	1:B:249:PHE:HA	2.21	0.41
1:C:230:TRP:CD1	1:C:230:TRP:C	2.99	0.41
1:D:112:MET:HE2	1:D:342:PRO:HG2	2.02	0.41
1:A:52:GLU:HB2	1:A:58:TYR:CE2	2.55	0.41
1:C:339:GLN:NE2	1:C:339:GLN:H	2.19	0.41
1:A:85[A]:GLU:CD	1:A:85[A]:GLU:H	2.28	0.41
1:B:102:ASP:HA	1:B:103:PRO:HD2	1.96	0.41
1:C:76:ASN:HB2	4:C:2040:HOH:O	2.20	0.41
1:D:68:ASP:HA	1:D:69:PRO:HD3	1.93	0.41
1:C:93:PRO:HA	1:C:334:TRP:CH2	2.57	0.40
1:B:289:TYR:CE2	1:B:336[A]:GLU:HB3	2.56	0.40
1:D:263:THR:HB	1:D:266:ASN:HD22	1.82	0.40
1:A:189:LYS:HD2	4:A:2093:HOH:O	2.20	0.40
1:A:297:TRP:CD1	1:A:297:TRP:H	2.38	0.40
1:A:108:LYS:NZ	4:A:2107:HOH:O	2.55	0.40
1:A:228:GLY:O	1:A:249:PHE:HA	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)
1:D:187:ASP:O	1:D:219:ASN:ND2[6_554]	2.04	0.16

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	347/380 (91%)	335 (96%)	11 (3%)	1 (0%)	36	35
1	B	349/380 (92%)	339 (97%)	9 (3%)	1 (0%)	36	35
1	C	342/380 (90%)	331 (97%)	10 (3%)	1 (0%)	36	35
1	D	338/380 (89%)	325 (96%)	11 (3%)	2 (1%)	21	17
All	All	1376/1520 (90%)	1330 (97%)	41 (3%)	5 (0%)	30	27

All (5) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	D	252	TYR
1	A	252	TYR
1	B	252	TYR
1	C	252	TYR
1	D	357	GLU

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	296/328 (90%)	288 (97%)	8 (3%)	39	42

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	B	299/328 (91%)	292 (98%)	7 (2%)	44	49
1	C	294/328 (90%)	285 (97%)	9 (3%)	35	37
1	D	233/328 (71%)	223 (96%)	10 (4%)	26	25
All	All	1122/1312 (86%)	1088 (97%)	34 (3%)	37	38

All (34) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	85[A]	GLU
1	A	85[B]	GLU
1	A	166	LEU
1	A	206	GLU
1	A	268[A]	VAL
1	A	268[B]	VAL
1	A	333	GLU
1	A	339	GLN
1	B	129	GLN
1	B	268	VAL
1	B	293	ARG
1	B	317	LYS
1	B	333	GLU
1	B	339	GLN
1	B	374	LYS
1	C	76	ASN
1	C	131	GLU
1	C	135	LYS
1	C	206	GLU
1	C	220	THR
1	C	242	LEU
1	C	265	THR
1	C	333	GLU
1	C	339	GLN
1	D	121	LEU
1	D	139	LEU
1	D	166	LEU
1	D	173	LEU
1	D	197	SER
1	D	275	LYS
1	D	305	ARG
1	D	317	LYS
1	D	333	GLU

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Mol	Chain	Res	Type
1	D	339	GLN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (37) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	90	ASN
1	A	94	GLN
1	A	169	ASN
1	A	179	ASN
1	A	243	ASN
1	A	245	HIS
1	A	266	ASN
1	A	335	HIS
1	A	339	GLN
1	B	70	ASN
1	B	90	ASN
1	B	94	GLN
1	B	169	ASN
1	B	179	ASN
1	B	271	GLN
1	B	339	GLN
1	B	380	GLN
1	C	57	GLN
1	C	60	HIS
1	C	75	GLN
1	C	90	ASN
1	C	94	GLN
1	C	237	GLN
1	C	245	HIS
1	C	309	GLN
1	C	335	HIS
1	C	339	GLN
1	C	358	ASN
1	D	63	HIS
1	D	75	GLN
1	D	94	GLN
1	D	129	GLN
1	D	179	ASN
1	D	219	ASN
1	D	266	ASN
1	D	335	HIS
1	D	339	GLN

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](#)

8 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	GLC	A	500	3	11,11,12	0.58	0	15,15,17	1.09	1 (6%)
3	DMJ	B	501	2	11,11,11	0.63	0	13,15,15	1.09	1 (7%)
3	DMJ	D	501	2	11,11,11	0.65	0	13,15,15	1.49	1 (7%)
2	GLC	B	500	3	11,11,12	0.56	0	15,15,17	1.21	2 (13%)
2	GLC	D	500	3	11,11,12	0.66	0	15,15,17	0.80	1 (6%)
2	GLC	C	500	3	11,11,12	0.59	0	15,15,17	0.98	1 (6%)
3	DMJ	A	501	2	11,11,11	0.74	0	13,15,15	1.19	1 (7%)
3	DMJ	C	501	2	11,11,11	0.71	0	13,15,15	1.28	1 (7%)

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	GLC	A	500	3	-	0/2/19/22	0/1/1/1
3	DMJ	B	501	2	-	0/2/19/19	0/1/1/1
3	DMJ	D	501	2	-	0/2/19/19	0/1/1/1
2	GLC	B	500	3	-	0/2/19/22	0/1/1/1
2	GLC	D	500	3	-	2/2/19/22	0/1/1/1
2	GLC	C	500	3	-	0/2/19/22	0/1/1/1
3	DMJ	A	501	2	-	0/2/19/19	0/1/1/1
3	DMJ	C	501	2	-	0/2/19/19	0/1/1/1

There are no bond length outliers.

All (9) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	D	501	DMJ	C1-N5-C5	4.56	119.73	109.71
3	C	501	DMJ	C1-N5-C5	4.12	118.75	109.71
3	A	501	DMJ	C1-N5-C5	3.30	116.95	109.71
3	B	501	DMJ	C1-N5-C5	3.26	116.86	109.71
2	B	500	GLC	C1-O5-C5	2.99	116.19	112.19
2	C	500	GLC	C1-O5-C5	2.95	116.14	112.19
2	A	500	GLC	C1-O5-C5	2.85	116.00	112.19
2	D	500	GLC	C1-O5-C5	2.43	115.45	112.19
2	B	500	GLC	O5-C1-C2	-2.20	105.53	110.79

There are no chirality outliers.

All (2) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	D	500	GLC	O5-C5-C6-O6
2	D	500	GLC	C4-C5-C6-O6

There are no ring outliers.

No monomer is involved in short contacts.

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	345/380 (90%)	-0.49	4 (1%) 76 76	13, 24, 38, 71	4 (1%)
1	B	346/380 (91%)	-0.52	1 (0%) 90 89	10, 23, 37, 55	5 (1%)
1	C	344/380 (90%)	-0.49	0 100 100	16, 23, 39, 59	0
1	D	342/380 (90%)	1.28	72 (21%) 2 2	28, 49, 67, 78	0
All	All	1377/1520 (90%)	-0.06	77 (5%) 30 29	10, 26, 57, 78	9 (0%)

All (77) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	D	348	SER	5.3
1	D	73	SER	4.9
1	D	87	ILE	4.3
1	D	370	TYR	4.0
1	D	294	ILE	4.0
1	D	149	ILE	3.7
1	D	340	ILE	3.7
1	D	37	LEU	3.7
1	D	304	THR	3.7
1	B	35	THR	3.6
1	D	306	THR	3.6
1	D	118	THR	3.5
1	D	363	TYR	3.4
1	D	344	VAL	3.4
1	D	84	GLN	3.3
1	D	54	ILE	3.3
1	D	70	ASN	3.2
1	D	105	ILE	3.2
1	D	302	ILE	3.1
1	D	319	ILE	3.1
1	D	315	TYR	3.1

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Mol	Chain	Res	Type	RSRZ
1	D	321	ALA	3.0
1	D	290	ILE	3.0
1	D	240	PHE	3.0
1	D	356	TYR	2.9
1	D	354	LEU	2.9
1	D	305	ARG	2.9
1	D	113	PHE	2.8
1	D	209	LEU	2.8
1	D	38	ASP	2.7
1	D	360	GLU	2.7
1	A	35	THR	2.7
1	D	359	ARG	2.7
1	D	258	PHE	2.7
1	D	72	GLY	2.7
1	D	116	ALA	2.7
1	D	253	PHE	2.6
1	D	267	TRP	2.6
1	D	285	VAL	2.6
1	D	43	CYS	2.6
1	D	187	ASP	2.6
1	D	196	ASP	2.6
1	D	316	ARG	2.6
1	D	188	GLY	2.5
1	D	361	PRO	2.5
1	D	103	PRO	2.5
1	A	130	ASP	2.5
1	D	289	TYR	2.4
1	A	73	SER	2.4
1	D	358	ASN	2.4
1	D	357	GLU	2.4
1	D	280	ILE	2.4
1	D	69	PRO	2.4
1	D	307	ASP	2.4
1	D	288	GLY	2.3
1	D	145	ASP	2.3
1	D	92	TYR	2.3
1	D	346	TYR	2.3
1	D	252	TYR	2.3
1	D	334	TRP	2.3
1	D	379	LYS	2.3
1	D	110	MET	2.3
1	D	83	THR	2.3

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Mol	Chain	Res	Type	RSRZ
1	D	41	THR	2.2
1	D	347	THR	2.2
1	D	212	GLY	2.2
1	D	313	ALA	2.2
1	D	91	PHE	2.1
1	D	325	ALA	2.1
1	D	369	ALA	2.1
1	D	108	LYS	2.1
1	D	268	VAL	2.1
1	D	351	PHE	2.1
1	A	131	GLU	2.0
1	D	254	ALA	2.1
1	D	121	LEU	2.0
1	D	114	VAL	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 oligosaccharides 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
3	DMJ	D	501	11/11	0.93	0.09	37,38,39,41	0
2	GLC	D	500	11/12	0.94	0.10	38,39,41,42	0
2	GLC	C	500	11/12	0.97	0.06	22,24,27,28	0
2	GLC	A	500	11/12	0.97	0.04	23,25,28,30	0
3	DMJ	A	501	11/11	0.97	0.05	20,22,23,23	0
2	GLC	B	500	11/12	0.97	0.05	20,22,24,24	0
3	DMJ	C	501	11/11	0.98	0.06	20,21,22,22	0
3	DMJ	B	501	11/11	0.98	0.05	19,21,21,22	0

6.5 Other polymers [i](#)

There are no such residues in this entry.