



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 5, 2026 – 06:55 AM UTC

PDB ID : 4Q3Q / pdb_00004q3q
Title : Crystal structure of Schistosoma mansoni arginase in complex with inhibitor ABH
Authors : Hai, Y.; Edwards, J.E.; Van Zandt, M.C.; Hoffmann, K.F.; Christianson, D.W.
Deposited on : 2014-04-12
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

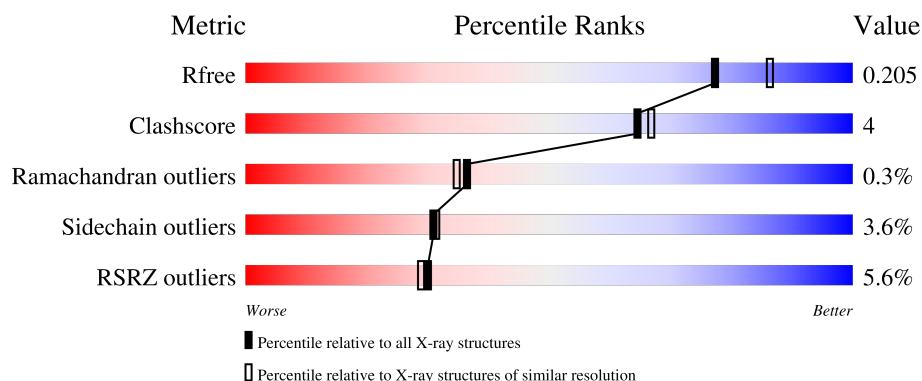
1 Overall quality at a glance

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	385	3% 81% 6% 13%
1	B	385	3% 79% 7% 13%
1	C	385	2% 78% 8% 13%
1	D	385	12% 73% 11% 14%

2 Entry composition

There are 5 unique types of molecules in this entry. The entry contains 11232 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 Arginase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	335	Total	C	N	O	S	0	0	0
			2571	1619	450	487	15			
1	B	335	Total	C	N	O	S	0	0	0
			2571	1619	450	487	15			
1	C	335	Total	C	N	O	S	0	0	0
			2569	1617	449	488	15			
1	D	330	Total	C	N	O	S	0	0	0
			2530	1595	441	479	15			

There are 84 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-20	MET	-	expression tag	UNP Q6WVP6
A	-19	GLY	-	expression tag	UNP Q6WVP6
A	-18	SER	-	expression tag	UNP Q6WVP6
A	-17	SER	-	expression tag	UNP Q6WVP6
A	-16	HIS	-	expression tag	UNP Q6WVP6
A	-15	HIS	-	expression tag	UNP Q6WVP6
A	-14	HIS	-	expression tag	UNP Q6WVP6
A	-13	HIS	-	expression tag	UNP Q6WVP6
A	-12	HIS	-	expression tag	UNP Q6WVP6
A	-11	HIS	-	expression tag	UNP Q6WVP6
A	-10	SER	-	expression tag	UNP Q6WVP6
A	-9	SER	-	expression tag	UNP Q6WVP6
A	-8	GLY	-	expression tag	UNP Q6WVP6
A	-7	LEU	-	expression tag	UNP Q6WVP6
A	-6	VAL	-	expression tag	UNP Q6WVP6
A	-5	PRO	-	expression tag	UNP Q6WVP6
A	-4	ARG	-	expression tag	UNP Q6WVP6
A	-3	GLY	-	expression tag	UNP Q6WVP6
A	-2	SER	-	expression tag	UNP Q6WVP6
A	-1	HIS	-	expression tag	UNP Q6WVP6
A	0	MET	-	expression tag	UNP Q6WVP6

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Chain	Residue	Modelled	Actual	Comment	Reference
B	-20	MET	-	expression tag	UNP Q6WVP6
B	-19	GLY	-	expression tag	UNP Q6WVP6
B	-18	SER	-	expression tag	UNP Q6WVP6
B	-17	SER	-	expression tag	UNP Q6WVP6
B	-16	HIS	-	expression tag	UNP Q6WVP6
B	-15	HIS	-	expression tag	UNP Q6WVP6
B	-14	HIS	-	expression tag	UNP Q6WVP6
B	-13	HIS	-	expression tag	UNP Q6WVP6
B	-12	HIS	-	expression tag	UNP Q6WVP6
B	-11	HIS	-	expression tag	UNP Q6WVP6
B	-10	SER	-	expression tag	UNP Q6WVP6
B	-9	SER	-	expression tag	UNP Q6WVP6
B	-8	GLY	-	expression tag	UNP Q6WVP6
B	-7	LEU	-	expression tag	UNP Q6WVP6
B	-6	VAL	-	expression tag	UNP Q6WVP6
B	-5	PRO	-	expression tag	UNP Q6WVP6
B	-4	ARG	-	expression tag	UNP Q6WVP6
B	-3	GLY	-	expression tag	UNP Q6WVP6
B	-2	SER	-	expression tag	UNP Q6WVP6
B	-1	HIS	-	expression tag	UNP Q6WVP6
B	0	MET	-	expression tag	UNP Q6WVP6
C	-20	MET	-	expression tag	UNP Q6WVP6
C	-19	GLY	-	expression tag	UNP Q6WVP6
C	-18	SER	-	expression tag	UNP Q6WVP6
C	-17	SER	-	expression tag	UNP Q6WVP6
C	-16	HIS	-	expression tag	UNP Q6WVP6
C	-15	HIS	-	expression tag	UNP Q6WVP6
C	-14	HIS	-	expression tag	UNP Q6WVP6
C	-13	HIS	-	expression tag	UNP Q6WVP6
C	-12	HIS	-	expression tag	UNP Q6WVP6
C	-11	HIS	-	expression tag	UNP Q6WVP6
C	-10	SER	-	expression tag	UNP Q6WVP6
C	-9	SER	-	expression tag	UNP Q6WVP6
C	-8	GLY	-	expression tag	UNP Q6WVP6
C	-7	LEU	-	expression tag	UNP Q6WVP6
C	-6	VAL	-	expression tag	UNP Q6WVP6
C	-5	PRO	-	expression tag	UNP Q6WVP6
C	-4	ARG	-	expression tag	UNP Q6WVP6
C	-3	GLY	-	expression tag	UNP Q6WVP6
C	-2	SER	-	expression tag	UNP Q6WVP6
C	-1	HIS	-	expression tag	UNP Q6WVP6
C	0	MET	-	expression tag	UNP Q6WVP6

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Chain	Residue	Modelled	Actual	Comment	Reference
D	-20	MET	-	expression tag	UNP Q6WVP6
D	-19	GLY	-	expression tag	UNP Q6WVP6
D	-18	SER	-	expression tag	UNP Q6WVP6
D	-17	SER	-	expression tag	UNP Q6WVP6
D	-16	HIS	-	expression tag	UNP Q6WVP6
D	-15	HIS	-	expression tag	UNP Q6WVP6
D	-14	HIS	-	expression tag	UNP Q6WVP6
D	-13	HIS	-	expression tag	UNP Q6WVP6
D	-12	HIS	-	expression tag	UNP Q6WVP6
D	-11	HIS	-	expression tag	UNP Q6WVP6
D	-10	SER	-	expression tag	UNP Q6WVP6
D	-9	SER	-	expression tag	UNP Q6WVP6
D	-8	GLY	-	expression tag	UNP Q6WVP6
D	-7	LEU	-	expression tag	UNP Q6WVP6
D	-6	VAL	-	expression tag	UNP Q6WVP6
D	-5	PRO	-	expression tag	UNP Q6WVP6
D	-4	ARG	-	expression tag	UNP Q6WVP6
D	-3	GLY	-	expression tag	UNP Q6WVP6
D	-2	SER	-	expression tag	UNP Q6WVP6
D	-1	HIS	-	expression tag	UNP Q6WVP6
D	0	MET	-	expression tag	UNP Q6WVP6

- Molecule 2 is MANGANESE (II) ION (CCD ID: MN) (formula: Mn).

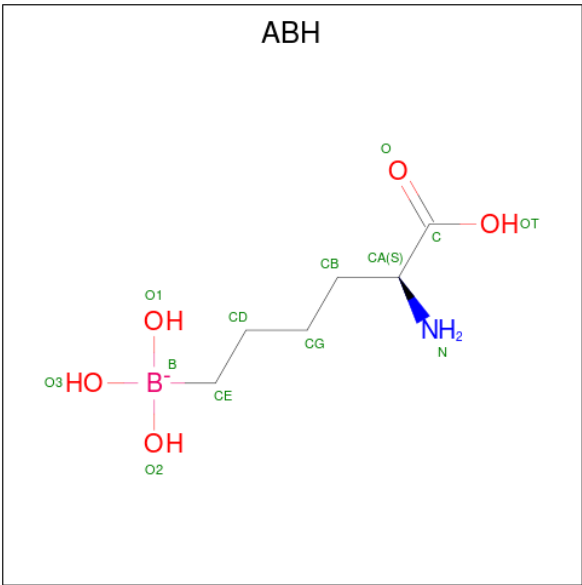
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	A	2	Total Mn 2 2	0	0
2	B	2	Total Mn 2 2	0	0
2	C	2	Total Mn 2 2	0	0
2	D	2	Total Mn 2 2	0	0

- Molecule 3 is GLYCEROL (CCD ID: GOL) (formula: C₃H₈O₃).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	A	1	Total	C	O	0	0
			6	3	3		
3	A	1	Total	C	O	0	0
			6	3	3		
3	B	1	Total	C	O	0	0
			6	3	3		
3	B	1	Total	C	O	0	0
			6	3	3		
3	C	1	Total	C	O	0	0
			6	3	3		
3	C	1	Total	C	O	0	0
			6	3	3		

- Molecule 4 is 2(S)-AMINO-6-BORONOHEXANOIC ACID (CCD ID: ABH) (formula: $C_6H_{15}BNO_5$).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
4	A	1	Total	B	C	N	O	0	0
			13	1	6	1	5		
4	B	1	Total	B	C	N	O	0	0
			13	1	6	1	5		
4	C	1	Total	B	C	N	O	0	0
			13	1	6	1	5		
4	D	1	Total	B	C	N	O	0	0
			13	1	6	1	5		

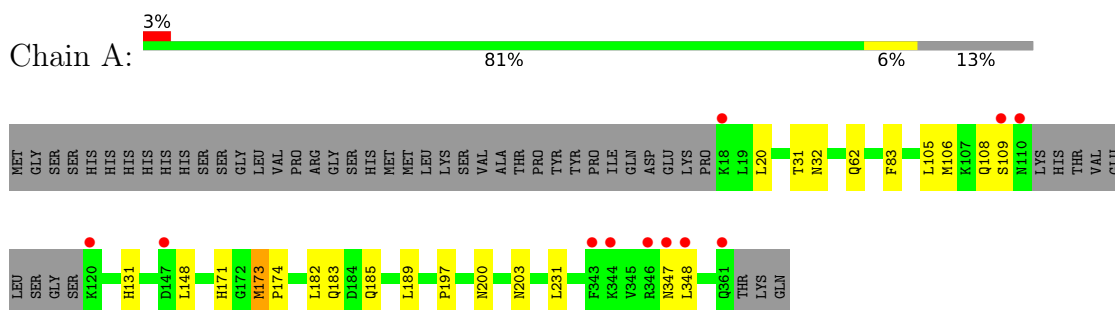
- Molecule 5 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	299	Total	O	0	0
			299	299		
5	B	285	Total	O	0	0
			285	285		
5	C	229	Total	O	0	0
			229	229		
5	D	82	Total	O	0	0
			82	82		

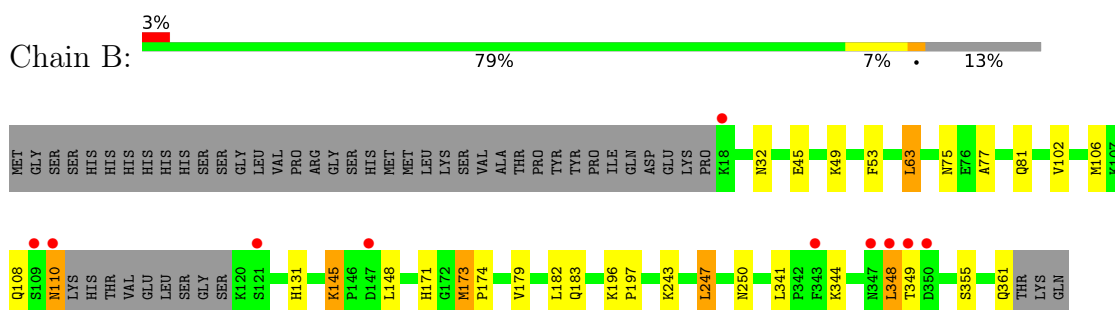
3 Residue-property plots [i](#)

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 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.

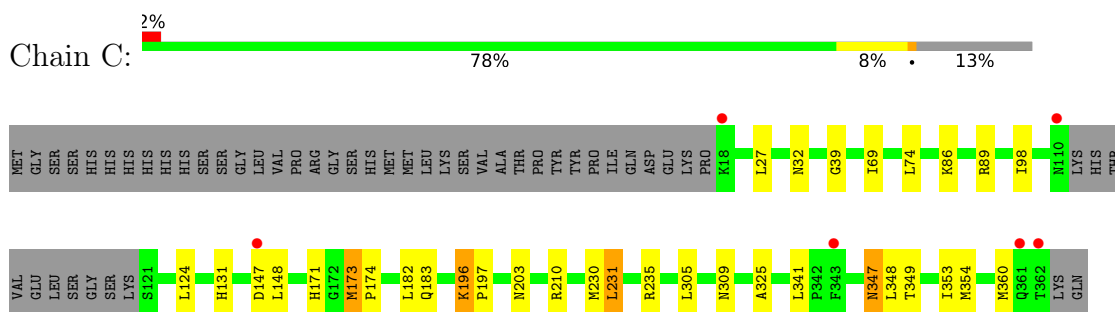
- Molecule 1: Arginase



- Molecule 1: Arginase

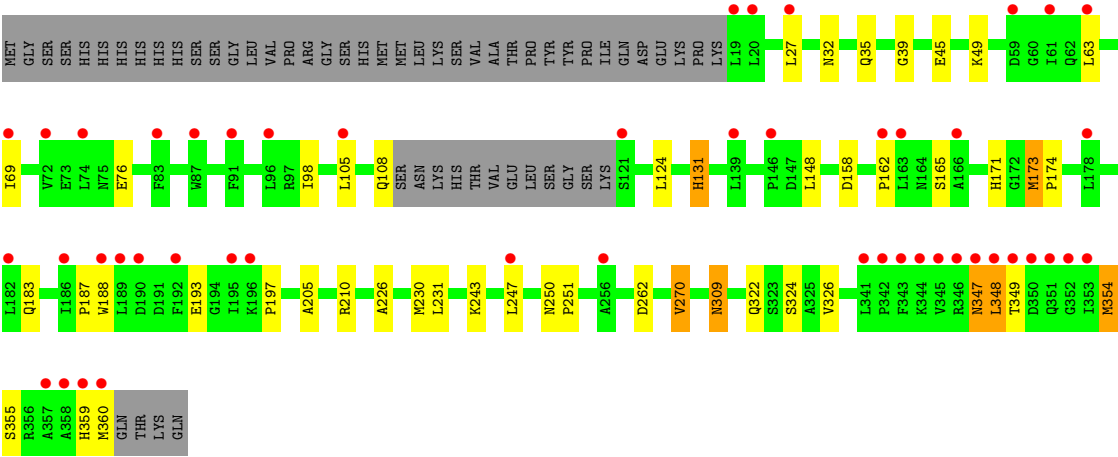


- Molecule 1: Arginase



- Molecule 1: Arginase





4 Data and refinement statistics

Property	Value	Source
Space group	P 21 3	Depositor
Cell constants a, b, c, α , β , γ	178.22Å 178.22Å 178.22Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	49.43 – 2.00 49.43 – 2.00	Depositor EDS
% Data completeness (in resolution range)	93.7 (49.43-2.00) 100.0 (49.43-2.00)	Depositor EDS
R_{merge}	0.15	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.69 (at 2.00Å)	Xtriage
Refinement program	PHENIX (phenix.refine: 1.5_2)	Depositor
R, R_{free}	0.168 , 0.202 0.172 , 0.205	Depositor DCC
R_{free} test set	6341 reflections (5.01%)	wwPDB-VP
Wilson B-factor (Å ²)	24.7	Xtriage
Anisotropy	0.000	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.34 , 51.2	EDS
L-test for twinning ²	$\langle L \rangle = 0.51$, $\langle L^2 \rangle = 0.34$	Xtriage
Estimated twinning fraction	0.022 for l,-k,h	Xtriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	11232	wwPDB-VP
Average B, all atoms (Å ²)	32.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 1.73% 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: GOL, ABH, MN

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	0.56	0/2618	0.77	0/3547
1	B	0.55	0/2618	0.80	4/3547 (0.1%)
1	C	0.48	0/2616	0.77	0/3546
1	D	0.40	0/2577	0.76	4/3494 (0.1%)
All	All	0.50	0/10429	0.78	8/14134 (0.1%)

There are no bond length outliers.

All (8) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	145	LYS	CA-C-N	6.93	126.91	119.28
1	B	145	LYS	C-N-CA	6.93	126.91	119.28
1	D	309	ASN	CA-C-N	6.19	125.87	119.56
1	D	309	ASN	C-N-CA	6.19	125.87	119.56
1	B	250	ASN	CA-C-N	5.40	125.22	119.28
1	B	250	ASN	C-N-CA	5.40	125.22	119.28
1	D	35	GLN	CA-C-N	5.22	124.72	119.19
1	D	35	GLN	C-N-CA	5.22	124.72	119.19

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	2571	0	2585	15	0
1	B	2571	0	2585	19	0
1	C	2569	0	2579	20	0
1	D	2530	0	2540	26	0
2	A	2	0	0	0	0
2	B	2	0	0	0	0
2	C	2	0	0	0	0
2	D	2	0	0	0	0
3	A	12	0	16	0	0
3	B	12	0	16	1	0
3	C	12	0	16	1	0
4	A	13	0	12	1	0
4	B	13	0	12	1	0
4	C	13	0	12	1	0
4	D	13	0	13	1	0
5	A	299	0	0	2	0
5	B	285	0	0	0	0
5	C	229	0	0	1	0
5	D	82	0	0	0	0
All	All	11232	0	10386	80	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 4.

All (80) 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:C:347:ASN:HD22	1:C:349:THR:H	1.31	0.75
1:D:171:HIS:CE1	4:D:403:ABH:HCE1	2.22	0.75
1:D:173:MET:N	1:D:174:PRO:HD3	2.03	0.74
1:D:348:LEU:HD11	1:D:355:SER:HB3	1.71	0.72
1:C:171:HIS:CE1	4:C:405:ABH:HCE1	2.25	0.72
1:C:74:LEU:CD1	1:C:89:ARG:HG2	2.21	0.70
1:A:106:MET:HE1	5:A:682:HOH:O	1.94	0.68
1:B:348:LEU:HD12	1:B:349:THR:N	2.09	0.68
1:C:69:ILE:HD13	1:C:98:ILE:HA	1.78	0.66
1:D:347:ASN:HD22	1:D:349:THR:H	1.44	0.65
1:B:110:ASN:HD21	1:B:145:LYS:HE2	1.65	0.60
1:A:171:HIS:CE1	4:A:405:ABH:HCE1	2.37	0.60
1:C:148:LEU:HD12	1:C:148:LEU:C	2.27	0.59
1:D:69:ILE:HD13	1:D:98:ILE:HA	1.84	0.58
1:D:243:LYS:O	1:D:247:LEU:HD13	2.03	0.58

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:348:LEU:HD11	1:B:355:SER:HB3	1.87	0.57
1:C:183:GLN:HG3	1:C:197:PRO:HG2	1.86	0.57
1:D:39:GLY:HA3	1:D:309:ASN:OD1	2.05	0.57
1:D:354:MET:HE1	1:D:359:HIS:ND1	2.20	0.56
1:B:171:HIS:CE1	4:B:405:ABH:HCE1	2.40	0.56
1:D:105:LEU:O	1:D:108:GLN:HG2	2.06	0.56
1:D:173:MET:N	1:D:174:PRO:CD	2.68	0.55
1:C:173:MET:N	1:C:174:PRO:CD	2.69	0.55
1:A:200:ASN:H	1:A:203:ASN:ND2	2.05	0.54
1:D:158:ASP:HB3	1:D:174:PRO:HD2	1.88	0.54
1:A:148:LEU:C	1:A:148:LEU:HD12	2.34	0.53
1:B:75:ASN:HD22	1:B:77:ALA:H	1.55	0.53
1:C:203:ASN:ND2	5:C:632:HOH:O	2.40	0.53
1:C:74:LEU:HD12	1:C:89:ARG:HG2	1.91	0.52
1:B:183:GLN:HG3	1:B:197:PRO:HG2	1.92	0.51
1:A:173:MET:N	1:A:174:PRO:CD	2.73	0.51
1:A:347:ASN:ND2	1:A:348:LEU:N	2.59	0.51
1:A:200:ASN:H	1:A:203:ASN:HD22	1.60	0.50
1:B:75:ASN:ND2	1:B:77:ALA:H	2.08	0.49
1:D:348:LEU:HD12	1:D:348:LEU:C	2.37	0.49
1:B:173:MET:N	1:B:174:PRO:CD	2.75	0.49
1:C:39:GLY:HA3	1:C:309:ASN:OD1	2.13	0.49
1:B:243:LYS:HE3	1:B:247:LEU:HD13	1.94	0.48
1:D:183:GLN:HG3	1:D:197:PRO:HG2	1.95	0.48
1:B:148:LEU:HD12	1:B:148:LEU:C	2.39	0.48
1:B:179:VAL:CG1	1:B:182:LEU:HD13	2.44	0.47
1:D:270:VAL:HG13	1:D:324:SER:OG	2.14	0.47
1:C:348:LEU:C	1:C:348:LEU:HD23	2.38	0.47
1:D:165:SER:CB	1:D:173:MET:HE2	2.45	0.47
1:A:105:LEU:O	1:A:108:GLN:HG2	2.14	0.47
1:A:347:ASN:HD22	1:A:348:LEU:H	1.62	0.47
1:D:210:ARG:HD3	1:D:230:MET:HG3	1.96	0.47
1:C:305:LEU:HD21	1:C:325:ALA:HB1	1.95	0.47
1:D:250:ASN:N	1:D:251:PRO:HD3	2.30	0.47
1:B:348:LEU:HD12	1:B:348:LEU:C	2.40	0.47
1:C:86:LYS:HA	3:C:403:GOL:H11	1.96	0.47
1:C:348:LEU:HD21	1:C:353:ILE:O	2.15	0.46
1:C:305:LEU:CD2	1:C:325:ALA:HB1	2.47	0.45
1:D:162:PRO:HG2	1:D:187:PRO:HD2	1.98	0.45
1:C:347:ASN:HB3	1:C:349:THR:HG22	1.97	0.45
1:D:173:MET:H	1:D:174:PRO:HD3	1.77	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:148:LEU:C	1:D:148:LEU:HD12	2.42	0.44
1:A:109:SER:HB2	5:A:661:HOH:O	2.16	0.44
1:B:53:PHE:CE2	1:B:63:LEU:HD13	2.53	0.44
1:B:196:LYS:HA	1:B:197:PRO:HD3	1.85	0.44
1:D:347:ASN:ND2	1:D:349:THR:HG22	2.33	0.44
1:A:347:ASN:HD22	1:A:348:LEU:N	2.15	0.43
1:C:231:LEU:CD1	1:C:235:ARG:HH21	2.32	0.43
1:C:210:ARG:HD3	1:C:230:MET:HG3	2.00	0.43
1:C:347:ASN:ND2	1:C:349:THR:HG22	2.33	0.43
1:D:131:HIS:CE1	1:D:262:ASP:HB2	2.54	0.42
1:A:20:LEU:HD12	1:A:20:LEU:HA	1.94	0.42
1:D:322:GLN:O	1:D:326:VAL:HG23	2.19	0.42
1:B:45:GLU:HG3	1:B:49:LYS:HD3	2.02	0.42
1:B:81:GLN:HG2	3:B:403:GOL:H11	2.01	0.42
1:B:102:VAL:O	1:B:106:MET:HG2	2.19	0.42
1:A:83:PHE:HE2	1:A:189:LEU:HD21	1.84	0.42
1:A:183:GLN:HG3	1:A:197:PRO:HG2	2.01	0.42
1:D:188:TRP:CH2	1:D:193:GLU:HB2	2.55	0.42
1:A:83:PHE:CE2	1:A:189:LEU:HD21	2.56	0.41
1:B:344:LYS:C	1:B:344:LYS:HD3	2.46	0.41
1:C:196:LYS:HA	1:C:197:PRO:HD3	1.84	0.41
1:B:45:GLU:OE1	1:B:49:LYS:HG3	2.21	0.40
1:D:205:ALA:HA	1:D:226:ALA:O	2.21	0.40
1:D:45:GLU:OE2	1:D:49:LYS:HE3	2.22	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	331/385 (86%)	324 (98%)	6 (2%)	1 (0%)	36 35

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	B	331/385 (86%)	324 (98%)	6 (2%)	1 (0%)	36	35
1	C	331/385 (86%)	322 (97%)	8 (2%)	1 (0%)	36	35
1	D	326/385 (85%)	318 (98%)	7 (2%)	1 (0%)	36	35
All	All	1319/1540 (86%)	1288 (98%)	27 (2%)	4 (0%)	36	35

All (4) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	173	MET
1	B	173	MET
1	C	173	MET
1	D	173	MET

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	282/327 (86%)	275 (98%)	7 (2%)	42	45
1	B	282/327 (86%)	273 (97%)	9 (3%)	34	35
1	C	282/327 (86%)	270 (96%)	12 (4%)	26	25
1	D	277/327 (85%)	265 (96%)	12 (4%)	26	25
All	All	1123/1308 (86%)	1083 (96%)	40 (4%)	31	31

All (40) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	31	THR
1	A	32	ASN
1	A	62	GLN
1	A	131	HIS
1	A	182	LEU
1	A	185	GLN
1	A	231	LEU

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Mol	Chain	Res	Type
1	B	32	ASN
1	B	63	LEU
1	B	108	GLN
1	B	110	ASN
1	B	131	HIS
1	B	247	LEU
1	B	341	LEU
1	B	348	LEU
1	B	361	GLN
1	C	27	LEU
1	C	32	ASN
1	C	124	LEU
1	C	131	HIS
1	C	147	ASP
1	C	182	LEU
1	C	196	LYS
1	C	231	LEU
1	C	341	LEU
1	C	347	ASN
1	C	354	MET
1	C	360	MET
1	D	27	LEU
1	D	32	ASN
1	D	63	LEU
1	D	76	GLU
1	D	124	LEU
1	D	131	HIS
1	D	231	LEU
1	D	270	VAL
1	D	347	ASN
1	D	348	LEU
1	D	354	MET
1	D	360	MET

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (23) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	62	GLN
1	A	81	GLN
1	A	203	ASN
1	A	347	ASN
1	A	351	GLN

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Mol	Chain	Res	Type
1	B	75	ASN
1	B	81	GLN
1	B	110	ASN
1	B	200	ASN
1	B	203	ASN
1	B	347	ASN
1	C	108	GLN
1	C	203	ASN
1	C	347	ASN
1	C	351	GLN
1	C	361	GLN
1	D	62	GLN
1	D	81	GLN
1	D	108	GLN
1	D	185	GLN
1	D	218	HIS
1	D	335	HIS
1	D	347	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 oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 18 ligands modelled in this entry, 8 are monoatomic - leaving 10 for Mogul analysis.

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	$\# Z > 2$
3	GOL	C	404	-	5,5,5	0.38	0	5,5,5	0.29	0
3	GOL	C	403	-	5,5,5	0.29	0	5,5,5	0.52	0
3	GOL	A	403	-	5,5,5	0.37	0	5,5,5	0.57	0
4	ABH	B	405	2	11,12,12	1.38	1 (9%)	10,16,16	1.15	1 (10%)
3	GOL	A	404	-	5,5,5	0.39	0	5,5,5	0.61	0
3	GOL	B	404	-	5,5,5	0.43	0	5,5,5	0.35	0
4	ABH	D	403	2	11,12,12	1.52	3 (27%)	10,16,16	1.45	3 (30%)
4	ABH	C	405	2	11,12,12	1.39	1 (9%)	10,16,16	1.26	1 (10%)
3	GOL	B	403	-	5,5,5	0.26	0	5,5,5	0.39	0
4	ABH	A	405	2	11,12,12	1.44	2 (18%)	10,16,16	1.44	3 (30%)

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
3	GOL	C	404	-	-	2/4/4/4	-
3	GOL	C	403	-	-	0/4/4/4	-
3	GOL	A	403	-	-	0/4/4/4	-
4	ABH	B	405	2	-	1/9/12/12	-
3	GOL	A	404	-	-	0/4/4/4	-
3	GOL	B	404	-	-	2/4/4/4	-
4	ABH	D	403	2	-	1/9/12/12	-
4	ABH	C	405	2	-	1/9/12/12	-
3	GOL	B	403	-	-	2/4/4/4	-
4	ABH	A	405	2	-	1/9/12/12	-

All (7) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	B	405	ABH	B-O3	3.36	1.54	1.47
4	C	405	ABH	B-O3	3.23	1.54	1.47
4	D	403	ABH	B-O3	3.10	1.54	1.47
4	A	405	ABH	B-O3	3.10	1.54	1.47
4	D	403	ABH	B-O2	2.38	1.52	1.47
4	D	403	ABH	B-O1	2.29	1.52	1.47
4	A	405	ABH	B-O2	2.13	1.52	1.47

All (8) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	D	403	ABH	O3-B-O1	-2.60	98.98	108.94
4	A	405	ABH	O3-B-O1	-2.56	99.14	108.94
4	D	403	ABH	O3-B-O2	-2.53	99.27	108.94
4	C	405	ABH	O3-B-O1	-2.52	99.30	108.94
4	D	403	ABH	O2-B-O1	2.39	118.09	108.94
4	A	405	ABH	O3-B-O2	-2.38	99.84	108.94
4	A	405	ABH	O2-B-O1	2.20	117.34	108.94
4	B	405	ABH	O3-B-O1	-2.16	100.67	108.94

There are no chirality outliers.

All (10) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	B	404	GOL	O1-C1-C2-C3
3	C	404	GOL	O1-C1-C2-C3
4	B	405	ABH	CG-CD-CE-B
4	C	405	ABH	CG-CD-CE-B
3	B	404	GOL	O1-C1-C2-O2
3	B	403	GOL	O1-C1-C2-C3
3	C	404	GOL	O1-C1-C2-O2
4	A	405	ABH	CG-CD-CE-B
4	D	403	ABH	CG-CD-CE-B
3	B	403	GOL	O1-C1-C2-O2

There are no ring outliers.

6 monomers are involved in 6 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	C	403	GOL	1	0
4	B	405	ABH	1	0
4	D	403	ABH	1	0
4	C	405	ABH	1	0
3	B	403	GOL	1	0
4	A	405	ABH	1	0

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(Å ²)	Q<0.9
1	A	335/385 (87%)	-0.51	11 (3%) 49 48	11, 20, 42, 64	0
1	B	335/385 (87%)	-0.44	10 (2%) 52 51	12, 21, 47, 77	0
1	C	335/385 (87%)	-0.15	6 (1%) 67 67	20, 28, 46, 69	0
1	D	330/385 (85%)	1.26	48 (14%) 6 5	31, 47, 70, 85	10 (3%)
All	All	1335/1540 (86%)	0.04	75 (5%) 30 29	11, 27, 60, 85	10 (0%)

All (75) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	D	349	THR	12.7
1	D	351	GLN	11.2
1	D	348	LEU	10.7
1	D	350	ASP	9.4
1	D	345	VAL	8.3
1	D	344	LYS	6.4
1	D	347	ASN	6.1
1	C	362	THR	5.5
1	D	346	ARG	5.1
1	D	360	MET	5.0
1	A	343	PHE	4.9
1	D	343	PHE	4.6
1	B	343	PHE	4.5
1	D	163	LEU	4.4
1	D	359	HIS	4.3
1	B	348	LEU	4.1
1	B	109	SER	4.0
1	D	83	PHE	3.8
1	A	110	ASN	3.7
1	D	352	GLY	3.6
1	D	353	ILE	3.6

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Mol	Chain	Res	Type	RSRZ
1	C	18	LYS	3.4
1	D	357	ALA	3.4
1	D	19	LEU	3.4
1	A	109	SER	3.3
1	B	121	SER	3.2
1	B	147	ASP	3.2
1	C	343	PHE	3.2
1	B	18	LYS	3.2
1	B	110	ASN	3.1
1	D	139	LEU	3.1
1	B	347	ASN	3.0
1	C	147	ASP	3.0
1	D	189	LEU	3.0
1	D	186	ILE	2.9
1	D	61	ILE	2.8
1	A	120	LYS	2.8
1	B	349	THR	2.8
1	D	192	PHE	2.8
1	C	361	GLN	2.7
1	D	188	TRP	2.7
1	D	166	ALA	2.6
1	A	18	LYS	2.6
1	D	162	PRO	2.6
1	D	72	VAL	2.6
1	D	247	LEU	2.6
1	A	147	ASP	2.5
1	D	69	ILE	2.5
1	D	74	LEU	2.5
1	D	358	ALA	2.4
1	D	178	LEU	2.4
1	C	110	ASN	2.4
1	A	347	ASN	2.4
1	D	63	LEU	2.3
1	D	91	PHE	2.3
1	B	350	ASP	2.3
1	D	182	LEU	2.3
1	D	195	ILE	2.2
1	D	105	LEU	2.2
1	A	361	GLN	2.2
1	D	121	SER	2.2
1	D	190	ASP	2.2
1	D	96	LEU	2.2

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Mol	Chain	Res	Type	RSRZ
1	D	87	TRP	2.2
1	D	196	LYS	2.1
1	D	146	PRO	2.1
1	A	344	LYS	2.1
1	D	20	LEU	2.1
1	D	341	LEU	2.1
1	A	346	ARG	2.1
1	D	256	ALA	2.1
1	D	59	ASP	2.0
1	D	342	PRO	2.0
1	A	348	LEU	2.0
1	D	27	LEU	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	GOL	C	403	6/6	0.85	0.15	28,37,47,58	1
4	ABH	D	403	13/13	0.85	0.14	34,45,54,55	0
3	GOL	B	403	6/6	0.86	0.16	25,36,43,55	1
3	GOL	A	403	6/6	0.90	0.14	22,32,45,53	1
3	GOL	C	404	6/6	0.91	0.11	37,42,43,47	1
3	GOL	B	404	6/6	0.92	0.10	27,38,39,41	1
3	GOL	A	404	6/6	0.92	0.10	28,35,36,41	0
4	ABH	C	405	13/13	0.93	0.10	19,28,33,34	0
4	ABH	B	405	13/13	0.94	0.09	17,23,30,30	0
4	ABH	A	405	13/13	0.95	0.08	18,24,27,28	0
2	MN	D	401	1/1	0.99	0.03	29,29,29,29	1

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
2	MN	D	402	1/1	0.99	0.04	29,29,29,29	1
2	MN	C	401	1/1	0.99	0.01	23,23,23,23	0
2	MN	B	402	1/1	1.00	0.02	15,15,15,15	0
2	MN	A	401	1/1	1.00	0.02	16,16,16,16	0
2	MN	C	402	1/1	1.00	0.01	22,22,22,22	0
2	MN	A	402	1/1	1.00	0.01	15,15,15,15	0
2	MN	B	401	1/1	1.00	0.02	17,17,17,17	0

6.5 Other polymers [i](#)

There are no such residues in this entry.