



Full wwPDB X-ray Structure Validation Report ⓘ

Sep 13, 2023 – 05:13 AM EDT

PDB ID : 4Q3Q
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 : 4.02b-467
Mogul : 1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix) : 1.13
EDS : 2.35.1
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) : 2.35.1

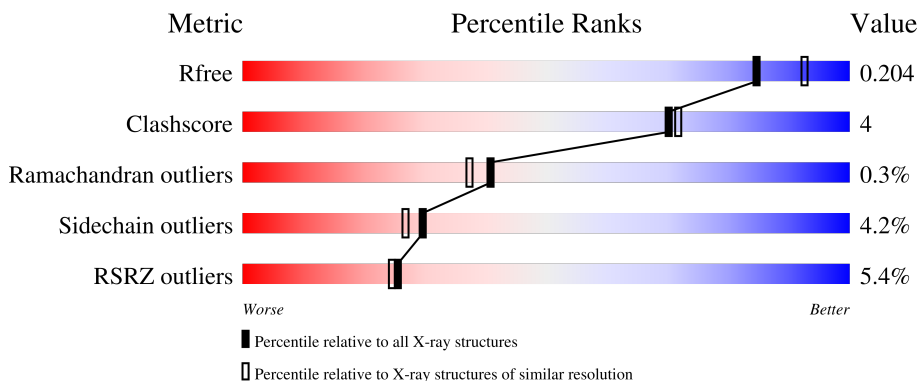
1 Overall quality at a glance

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}	130704	8085 (2.00-2.00)
Clashscore	141614	9178 (2.00-2.00)
Ramachandran outliers	138981	9054 (2.00-2.00)
Sidechain outliers	138945	9053 (2.00-2.00)
RSRZ outliers	127900	7900 (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	 15% 82% 6% 13%
1	B	385	 2% 79% 6% 13%
1	C	385	 1% 78% 8% 13%
1	D	385	 15% 74% 10% 14%

2 Entry composition i

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
			Total	C	N	O	S			
1	A	335	2571	1619	450	487	15	0	0	0
1	B	335	2571	1619	450	487	15	0	0	0
1	C	335	2569	1617	449	488	15	0	0	0
1	D	330	2530	1595	441	479	15	0	0	0

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 (three-letter code: MN) (formula: Mn).

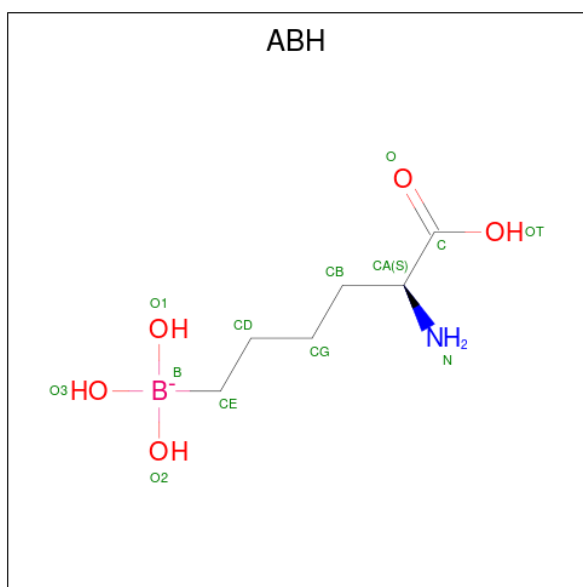
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	A	2	Total Mn 2 2	0	0
2	B	2	Total Mn 2 2	0	0
2	C	2	Total Mn 2 2	0	0
2	D	2	Total Mn 2 2	0	0

- Molecule 3 is GLYCEROL (three-letter code: 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 (three-letter code: ABH) (formula: C₆H₁₅BNO₅).



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

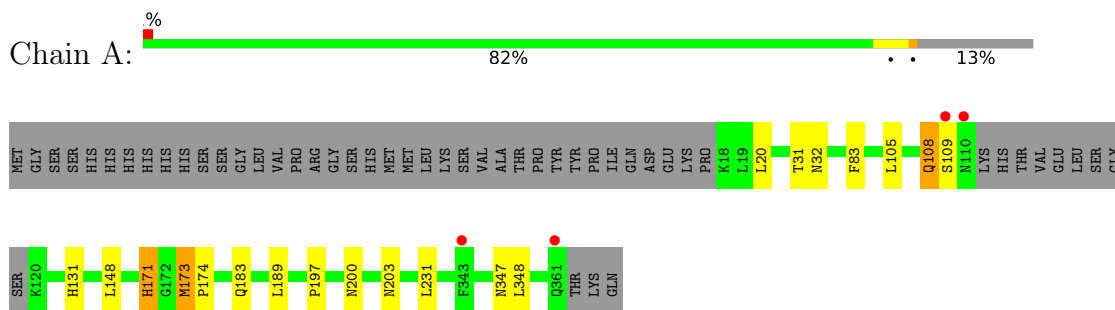
- Molecule 5 is water.

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

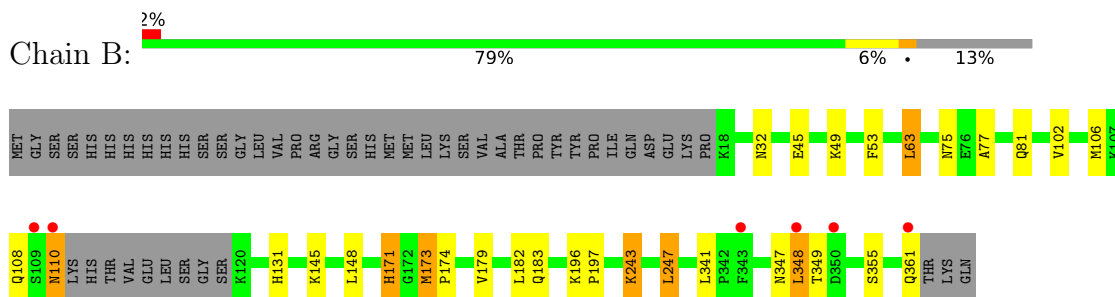
3 Residue-property plots [i](#)

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.

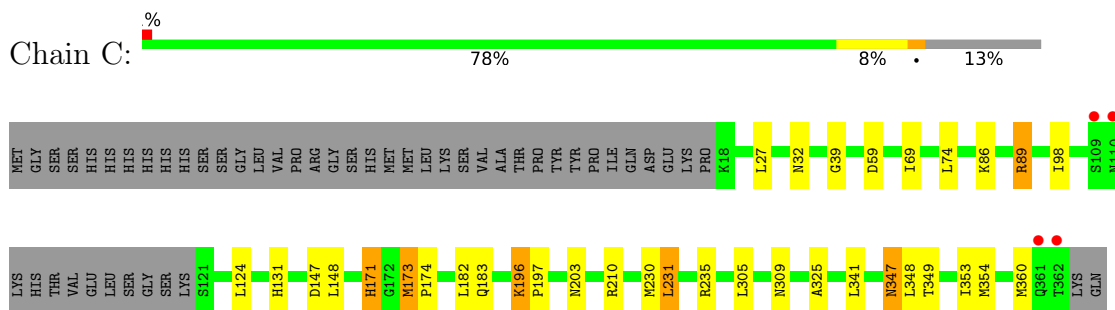
- Molecule 1: Arginase



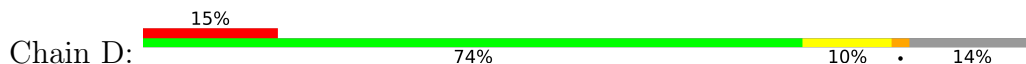
- Molecule 1: Arginase

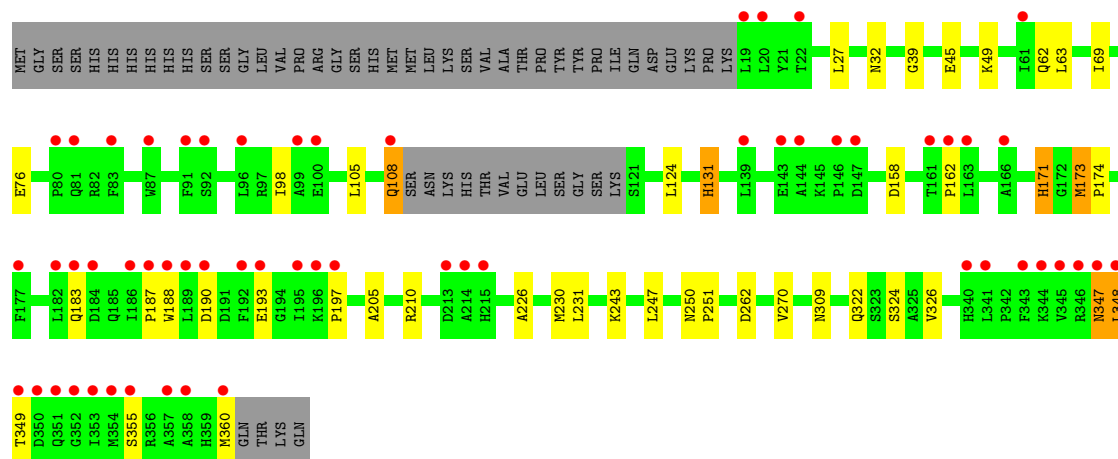


- Molecule 1: Arginase



- Molecule 1: Arginase





4 Data and refinement statistics i

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)	Xtrriage
Refinement program	PHENIX (phenix.refine: 1.5_2)	Depositor
R, R_{free}	0.168 , 0.202 0.171 , 0.204	Depositor DCC
R_{free} test set	6341 reflections (5.01%)	wwPDB-VP
Wilson B-factor (Å ²)	24.7	Xtrriage
Anisotropy	0.000	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.33 , 58.0	EDS
L-test for twinning ²	$\langle L \rangle = 0.51$, $\langle L^2 \rangle = 0.34$	Xtrriage
Estimated twinning fraction	0.022 for l,-k,h	Xtrriage
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

Xtrriage'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: ABH, MN, GOL

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	0.45	0/2618	0.56	0/3547
1	B	0.43	0/2618	0.55	0/3547
1	C	0.37	0/2616	0.54	0/3546
1	D	0.33	0/2577	0.45	0/3494
All	All	0.39	0/10429	0.53	0/14134

There are no bond length outliers.

There are no bond angle outliers.

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	14	0
1	B	2571	0	2585	18	0
1	C	2569	0	2579	20	0
1	D	2530	0	2540	23	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

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
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	1	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	75	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 (75) 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: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: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
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: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:C:148:LEU:HD12	1:C:148:LEU:C	2.27	0.54
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

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
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: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:A:148:LEU:C	1:A:148:LEU:HD12	2.34	0.48
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: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: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: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:348:LEU:HD12	1:D:348:LEU:C	2.37	0.45
1:D:173:MET:H	1:D:174:PRO:HD3	1.77	0.45
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:B:148:LEU:HD12	1:B:148:LEU:C	2.39	0.43
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:C:348:LEU:C	1:C:348:LEU:HD23	2.38	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

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
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:B:348:LEU:HD12	1:B:348:LEU:C	2.40	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: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%)	41 37
1	B	331/385 (86%)	324 (98%)	6 (2%)	1 (0%)	41 37
1	C	331/385 (86%)	322 (97%)	8 (2%)	1 (0%)	41 37
1	D	326/385 (85%)	318 (98%)	7 (2%)	1 (0%)	41 37
All	All	1319/1540 (86%)	1288 (98%)	27 (2%)	4 (0%)	41 37

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 [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	282/327 (86%)	276 (98%)	6 (2%)	53	57
1	B	282/327 (86%)	270 (96%)	12 (4%)	29	26
1	C	282/327 (86%)	267 (95%)	15 (5%)	22	18
1	D	277/327 (85%)	263 (95%)	14 (5%)	24	19
All	All	1123/1308 (86%)	1076 (96%)	47 (4%)	30	27

All (47) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	31	THR
1	A	32	ASN
1	A	108	GLN
1	A	131	HIS
1	A	171	HIS
1	A	231	LEU
1	B	32	ASN
1	B	63	LEU
1	B	108	GLN
1	B	110	ASN
1	B	131	HIS
1	B	171	HIS
1	B	243	LYS
1	B	247	LEU
1	B	341	LEU
1	B	347	ASN
1	B	348	LEU
1	B	361	GLN
1	C	27	LEU
1	C	32	ASN
1	C	59	ASP
1	C	89	ARG
1	C	124	LEU
1	C	131	HIS

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Mol	Chain	Res	Type
1	C	147	ASP
1	C	171	HIS
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	62	GLN
1	D	63	LEU
1	D	76	GLU
1	D	108	GLN
1	D	124	LEU
1	D	131	HIS
1	D	171	HIS
1	D	190	ASP
1	D	231	LEU
1	D	347	ASN
1	D	348	LEU
1	D	360	MET

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (22) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	81	GLN
1	A	110	ASN
1	A	203	ASN
1	A	322	GLN
1	A	347	ASN
1	B	75	ASN
1	B	81	GLN
1	B	110	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

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Mol	Chain	Res	Type
1	D	62	GLN
1	D	81	GLN
1	D	108	GLN
1	D	185	GLN
1	D	218	HIS
1	D	322	GLN
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 monosaccharides 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	A	404	-	5,5,5	0.38	0	5,5,5	0.57	0
4	ABH	D	403	2	8,12,12	0.78	0	12,16,16	1.50	3 (25%)
4	ABH	B	405	2	8,12,12	0.83	0	12,16,16	1.21	2 (16%)
3	GOL	B	404	-	5,5,5	0.42	0	5,5,5	0.31	0
4	ABH	A	405	2	8,12,12	0.82	0	12,16,16	1.49	3 (25%)
4	ABH	C	405	2	8,12,12	0.82	0	12,16,16	1.31	2 (16%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
3	GOL	C	404	-	5,5,5	0.37	0	5,5,5	0.26	0
3	GOL	B	403	-	5,5,5	0.25	0	5,5,5	0.36	0
3	GOL	C	403	-	5,5,5	0.29	0	5,5,5	0.47	0
3	GOL	A	403	-	5,5,5	0.36	0	5,5,5	0.53	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
3	GOL	A	404	-	-	0/4/4/4	-
4	ABH	D	403	2	-	1/9/12/12	-
4	ABH	B	405	2	-	1/9/12/12	-
3	GOL	B	404	-	-	2/4/4/4	-
4	ABH	A	405	2	-	1/9/12/12	-
4	ABH	C	405	2	-	1/9/12/12	-
3	GOL	C	404	-	-	2/4/4/4	-
3	GOL	B	403	-	-	2/4/4/4	-
3	GOL	C	403	-	-	0/4/4/4	-
3	GOL	A	403	-	-	1/4/4/4	-

There are no bond length outliers.

All (10) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
4	D	403	ABH	O3-B-O1	-2.84	98.98	109.18
4	A	405	ABH	O3-B-O1	-2.79	99.14	109.18
4	D	403	ABH	O3-B-O2	-2.76	99.27	109.18
4	C	405	ABH	O3-B-O1	-2.75	99.30	109.18
4	A	405	ABH	O3-B-O2	-2.60	99.84	109.18
4	D	403	ABH	O2-B-O1	2.48	118.09	109.18
4	B	405	ABH	O3-B-O1	-2.37	100.67	109.18
4	A	405	ABH	O2-B-O1	2.27	117.34	109.18
4	B	405	ABH	O3-B-O2	-2.12	101.56	109.18
4	C	405	ABH	O3-B-O2	-2.12	101.57	109.18

There are no chirality outliers.

All (11) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	B	403	GOL	O1-C1-C2-C3
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	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
3	A	403	GOL	O1-C1-C2-C3

There are no ring outliers.

6 monomers are involved in 6 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	D	403	ABH	1	0
4	B	405	ABH	1	0
4	A	405	ABH	1	0
4	C	405	ABH	1	0
3	B	403	GOL	1	0
3	C	403	GOL	1	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	335/385 (87%)	-0.54	4 (1%) 79 78	11, 20, 42, 64	0
1	B	335/385 (87%)	-0.35	6 (1%) 68 66	12, 21, 47, 77	0
1	C	335/385 (87%)	-0.45	4 (1%) 79 78	20, 28, 47, 69	0
1	D	330/385 (85%)	0.82	58 (17%) 1 1	31, 47, 80, 93	10 (3%)
All	All	1335/1540 (86%)	-0.13	72 (5%) 25 24	11, 27, 62, 93	10 (0%)

All (72) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	D	350	ASP	6.7
1	D	345	VAL	5.4
1	D	357	ALA	5.4
1	D	343	PHE	5.3
1	D	353	ILE	4.8
1	D	188	TRP	4.5
1	C	362	THR	4.5
1	D	346	ARG	4.3
1	D	358	ALA	4.3
1	D	190	ASP	4.3
1	D	344	LYS	4.2
1	B	110	ASN	4.1
1	B	343	PHE	4.1
1	D	196	LYS	4.0
1	D	184	ASP	3.9
1	D	91	PHE	3.8
1	C	361	GLN	3.8
1	D	360	MET	3.8
1	B	361	GLN	3.5
1	B	109	SER	3.5
1	D	352	GLY	3.2

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Mol	Chain	Res	Type	RSRZ
1	D	96	LEU	3.2
1	D	146	PRO	3.2
1	D	193	GLU	3.2
1	D	197	PRO	3.2
1	D	147	ASP	3.2
1	C	110	ASN	3.1
1	D	347	ASN	3.0
1	D	189	LEU	3.0
1	D	139	LEU	3.0
1	D	87	TRP	3.0
1	D	214	ALA	2.9
1	D	163	LEU	2.9
1	D	92	SER	2.8
1	D	166	ALA	2.8
1	D	192	PHE	2.8
1	D	351	GLN	2.8
1	D	341	LEU	2.8
1	D	144	ALA	2.7
1	D	354	MET	2.7
1	B	348	LEU	2.7
1	D	182	LEU	2.7
1	C	109	SER	2.7
1	D	161	THR	2.7
1	D	61	ILE	2.6
1	D	22	THR	2.6
1	B	350	ASP	2.6
1	A	343	PHE	2.6
1	D	162	PRO	2.6
1	D	340	HIS	2.5
1	D	108	GLN	2.5
1	D	213	ASP	2.5
1	D	355	SER	2.5
1	A	110	ASN	2.5
1	D	349	THR	2.5
1	D	187	PRO	2.4
1	D	186	ILE	2.4
1	D	83	PHE	2.4
1	D	183	GLN	2.4
1	D	215	HIS	2.3
1	D	19	LEU	2.2
1	D	348	LEU	2.2
1	D	143	GLU	2.2

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Mol	Chain	Res	Type	RSRZ
1	D	100	GLU	2.2
1	D	177	PHE	2.1
1	D	195	ILE	2.1
1	D	20	LEU	2.1
1	D	99	ALA	2.1
1	A	109	SER	2.0
1	A	361	GLN	2.0
1	D	80	PRO	2.0
1	D	81	GLN	2.0

6.2 Non-standard residues in protein, DNA, RNA chains [i](#)

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

6.3 Carbohydrates [i](#)

There are no monosaccharides 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
4	ABH	D	403	13/13	0.85	0.22	34,45,54,55	0
3	GOL	C	403	6/6	0.93	0.12	28,37,47,58	1
3	GOL	C	404	6/6	0.93	0.15	37,42,43,47	1
4	ABH	C	405	13/13	0.93	0.10	19,28,33,34	0
3	GOL	B	403	6/6	0.93	0.18	25,36,43,55	1
4	ABH	B	405	13/13	0.94	0.10	17,23,30,30	0
3	GOL	A	404	6/6	0.94	0.09	28,35,36,41	0
3	GOL	A	403	6/6	0.94	0.13	22,32,45,53	1
3	GOL	B	404	6/6	0.95	0.13	27,38,39,41	1
4	ABH	A	405	13/13	0.96	0.08	18,24,27,28	0
2	MN	D	401	1/1	0.99	0.04	29,29,29,29	1
2	MN	D	402	1/1	0.99	0.05	29,29,29,29	1
2	MN	A	401	1/1	1.00	0.11	16,16,16,16	0
2	MN	A	402	1/1	1.00	0.10	15,15,15,15	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
2	MN	B	401	1/1	1.00	0.12	17,17,17,17	0
2	MN	B	402	1/1	1.00	0.13	15,15,15,15	0
2	MN	C	401	1/1	1.00	0.09	23,23,23,23	0
2	MN	C	402	1/1	1.00	0.11	22,22,22,22	0

6.5 Other polymers [i](#)

There are no such residues in this entry.