



Full wwPDB X-ray Structure Validation Report ⓘ

Sep 13, 2023 – 11:49 AM EDT

PDB ID : 4Q42
Title : Crystal structure of Schistosoma mansoni arginase in complex with L-ornithine
Authors : Hai, Y.; Edwards, J.E.; Van Zandt, M.C.; Hoffmann, K.F.; Christianson, D.W.
Deposited on : 2014-04-12
Resolution : 2.05 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

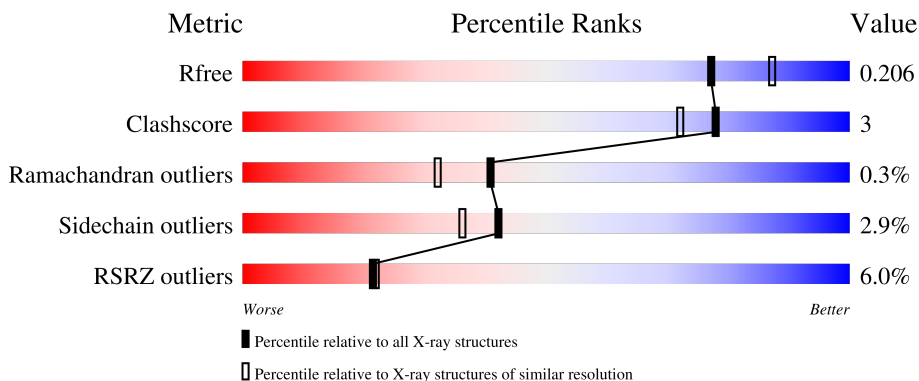
1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.05 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	2684 (2.08-2.04)
Clashscore	141614	2801 (2.08-2.04)
Ramachandran outliers	138981	2768 (2.08-2.04)
Sidechain outliers	138945	2768 (2.08-2.04)
RSRZ outliers	127900	2646 (2.08-2.04)

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	<div style="display: flex; align-items: center;"> <div style="width: 100%; height: 10px; background: linear-gradient(to right, red 0%, orange 1%, yellow 2%, green 82%, grey 87%);"></div> <div style="margin-left: 10px;"> <p>82% 5% 13%</p> </div> </div>
1	B	385	<div style="display: flex; align-items: center;"> <div style="width: 100%; height: 10px; background: linear-gradient(to right, red 3%, orange 4%, yellow 3%, green 82%, grey 87%);"></div> <div style="margin-left: 10px;"> <p>82% 5% 13%</p> </div> </div>
1	C	385	<div style="display: flex; align-items: center;"> <div style="width: 100%; height: 10px; background: linear-gradient(to right, red 2%, orange 3%, yellow 8%, green 79%, grey 87%);"></div> <div style="margin-left: 10px;"> <p>79% 8% 13%</p> </div> </div>
1	D	385	<div style="display: flex; align-items: center;"> <div style="width: 100%; height: 10px; background: linear-gradient(to right, red 15%, orange 16%, yellow 12%, green 74%, grey 87%);"></div> <div style="margin-left: 10px;"> <p>74% 12% 14%</p> </div> </div>

2 Entry composition i

There are 5 unique types of molecules in this entry. The entry contains 11048 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	336	2589	1630	454	489	16	0	2	0
1	B	335	2582	1626	453	487	16	0	2	0
1	C	335	2579	1624	450	489	16	0	2	0
1	D	331	2539	1601	443	480	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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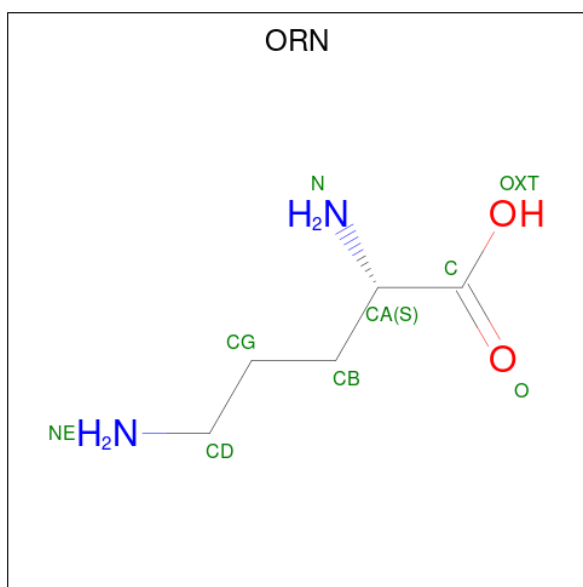
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Chain	Residue	Modelled	Actual	Comment	Reference
D	-20	MET	-	expression tag	UNP Q6WVP6
D	-19	GLY	-	expression tag	UNP Q6WVP6
D	-18	SER	-	expression tag	UNP Q6WVP6
D	-17	SER	-	expression tag	UNP Q6WVP6
D	-16	HIS	-	expression tag	UNP Q6WVP6
D	-15	HIS	-	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 L-ornithine (three-letter code: ORN) (formula: C₅H₁₂N₂O₂).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	N	O		
3	A	1	Total 9	C 5	N 2	O 2	0	0
3	B	1	Total 9	C 5	N 2	O 2	0	0
3	C	1	Total 9	C 5	N 2	O 2	0	0
3	D	1	Total 9	C 5	N 2	O 2	0	0

- Molecule 4 is GLYCEROL (three-letter code: GOL) (formula: C₃H₈O₃).



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

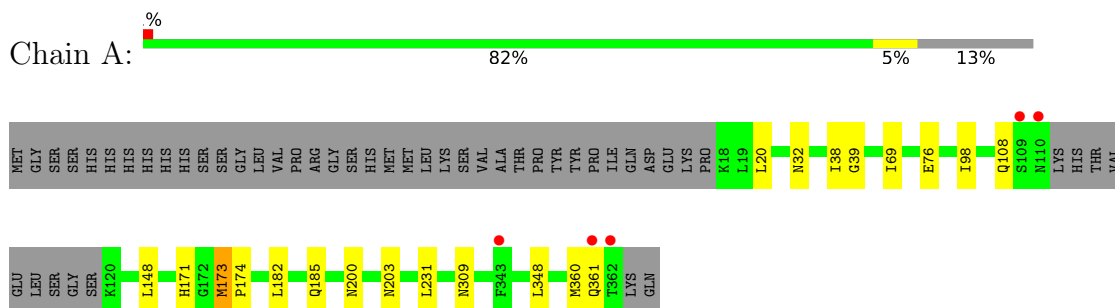
- Molecule 5 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	A	235	Total O 235 235	0	0
5	B	228	Total O 228 228	0	0
5	C	147	Total O 147 147	0	0
5	D	69	Total O 69 69	0	0

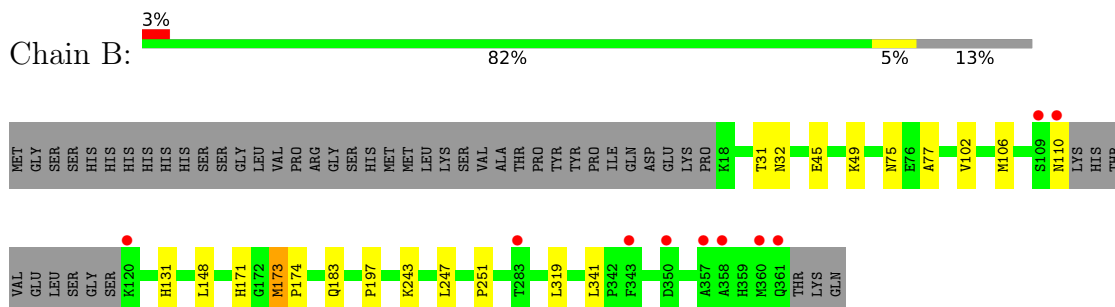
3 Residue-property plots [i](#)

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.

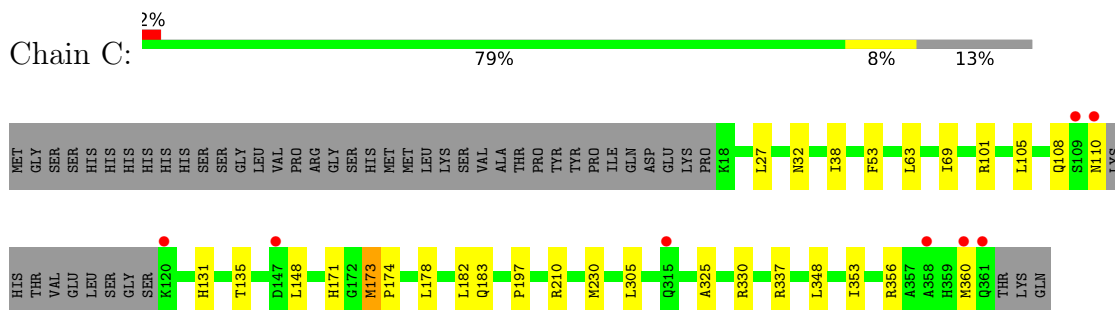
- Molecule 1: Arginase



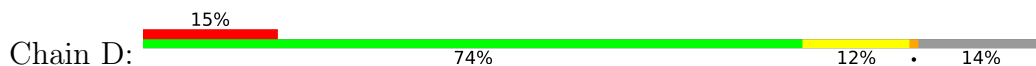
- Molecule 1: Arginase

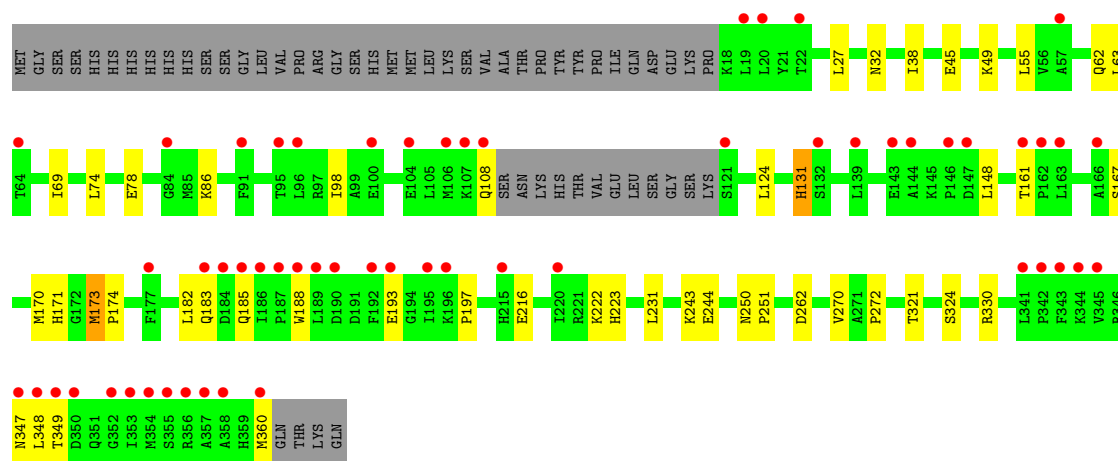


- Molecule 1: Arginase



- Molecule 1: Arginase





4 Data and refinement statistics

Property	Value	Source
Space group	P 21 3	Depositor
Cell constants a, b, c, α , β , γ	178.45Å 178.45Å 178.45Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	49.49 – 2.05 49.49 – 2.05	Depositor EDS
% Data completeness (in resolution range)	94.7 (49.49-2.05) 100.0 (49.49-2.05)	Depositor EDS
R_{merge}	0.13	Depositor
R_{sym}	0.13	Depositor
$\langle I/\sigma(I) \rangle$ ¹	3.65 (at 2.05Å)	Xtrriage
Refinement program	PHENIX (phenix.refine: 1.5_2)	Depositor
R, R_{free}	0.174 , 0.208 0.174 , 0.206	Depositor DCC
R_{free} test set	5911 reflections (5.01%)	wwPDB-VP
Wilson B-factor (Å ²)	27.6	Xtrriage
Anisotropy	0.000	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.34 , 54.3	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.34$	Xtrriage
Estimated twinning fraction	0.021 for l,-k,h	Xtrriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	11048	wwPDB-VP
Average B, all atoms (Å ²)	34.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 1.71% 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: ORN, 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	0.35	0/2642	0.52	0/3579
1	B	0.34	0/2635	0.50	0/3569
1	C	0.29	0/2632	0.46	0/3566
1	D	0.26	0/2586	0.44	0/3505
All	All	0.31	0/10495	0.48	0/14219

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	2589	0	2610	9	0
1	B	2582	0	2603	10	0
1	C	2579	0	2594	16	0
1	D	2539	0	2553	25	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	9	0	11	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	B	9	0	11	0	0
3	C	9	0	11	0	0
3	D	9	0	11	0	0
4	A	12	0	16	0	0
4	B	12	0	16	0	0
4	C	12	0	16	0	0
5	A	235	0	0	1	0
5	B	228	0	0	1	0
5	C	147	0	0	1	0
5	D	69	0	0	2	0
All	All	11048	0	10452	60	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 3.

All (60) 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:D:173:MET:N	1:D:174:PRO:HD3	2.01	0.75
1:C:38:ILE:HG22	5:C:592:HOH:O	1.95	0.66
1:D:173:MET:H	1:D:174:PRO:HD3	1.64	0.62
1:D:270:VAL:HG22	1:D:324:SER:OG	2.03	0.58
1:C:69:ILE:HD11	1:C:101:ARG:HG2	1.86	0.58
1:D:183:GLN:HG3	1:D:197:PRO:HG2	1.85	0.57
1:A:38:ILE:HG22	5:A:535:HOH:O	2.04	0.57
1:D:222:LYS:HD2	1:D:223:HIS:CE1	2.40	0.57
1:D:38:ILE:HG22	5:D:525:HOH:O	2.03	0.56
1:D:69:ILE:HD13	1:D:98:ILE:HA	1.87	0.56
1:D:173:MET:N	1:D:174:PRO:CD	2.67	0.56
1:B:75:ASN:HD22	1:B:77:ALA:H	1.53	0.56
1:D:55:LEU:HD13	1:D:330:ARG:HD2	1.89	0.54
1:C:173:MET:N	1:C:174:PRO:CD	2.70	0.54
1:C:356:ARG:O	1:C:360:MET:HG2	2.07	0.53
1:A:173:MET:N	1:A:174:PRO:CD	2.71	0.53
1:C:348:LEU:HD11	1:C:353:ILE:HB	1.90	0.53
1:B:45:GLU:OE1	1:B:49:LYS:HG3	2.11	0.50
1:D:347:ASN:OD1	1:D:349:THR:HB	2.12	0.50
1:B:75:ASN:ND2	1:B:77:ALA:H	2.10	0.49
1:D:188:TRP:CH2	1:D:193:GLU:HB2	2.48	0.48
1:D:148:LEU:C	1:D:148:LEU:HD12	2.33	0.48
1:C:110:ASN:HD22	1:C:110:ASN:N	2.11	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:76:GLU:H	1:A:76:GLU:CD	2.15	0.48
1:B:173:MET:N	1:B:174:PRO:CD	2.77	0.48
1:D:86:LYS:HE2	1:D:167:SER:O	2.14	0.47
1:D:272:PRO:HD2	1:D:321:THR:OG1	2.15	0.47
1:C:183:GLN:HG3	1:C:197:PRO:HG2	1.98	0.46
1:B:183:GLN:HG3	1:B:197:PRO:HG2	1.97	0.46
1:D:347:ASN:ND2	1:D:349:THR:H	2.13	0.46
1:A:200:ASN:H	1:A:203:ASN:ND2	2.13	0.46
1:C:348:LEU:CD1	1:C:353:ILE:HB	2.46	0.46
1:D:131:HIS:CE1	1:D:262:ASP:HB2	2.51	0.45
1:C:210:ARG:HD3	1:C:230:MET:HG3	1.98	0.45
1:B:110:ASN:HD22	1:B:110:ASN:N	2.14	0.45
1:A:348:LEU:HA	1:A:348:LEU:HD23	1.61	0.44
1:C:110:ASN:N	1:C:110:ASN:ND2	2.65	0.44
1:D:250:ASN:N	1:D:251:PRO:HD3	2.32	0.44
1:B:243:LYS:NZ	1:B:247:LEU:HD11	2.32	0.43
1:C:105:LEU:O	1:C:108:GLN:HG2	2.19	0.43
1:A:69:ILE:HD13	1:A:98:ILE:HA	2.00	0.43
1:D:161:THR:HG21	1:D:185:GLN:HB3	2.01	0.43
1:C:53:PHE:CD2	1:C:63:LEU:HD23	2.54	0.43
1:C:148:LEU:HD12	1:C:148:LEU:C	2.38	0.43
1:D:45:GLU:O	1:D:49:LYS:HG3	2.19	0.43
1:D:170:MET:HA	1:D:173:MET:HE3	2.00	0.43
1:A:148:LEU:C	1:A:148:LEU:HD12	2.39	0.42
1:B:148:LEU:HD12	1:B:148:LEU:C	2.39	0.42
1:A:200:ASN:H	1:A:203:ASN:HD22	1.67	0.42
1:C:27:LEU:HD11	1:C:69:ILE:CD1	2.50	0.42
1:D:216:GLU:HA	5:D:510:HOH:O	2.20	0.42
1:C:305:LEU:HD21	1:C:325:ALA:HB1	2.01	0.41
1:D:243:LYS:HE3	1:D:244:GLU:OE2	2.20	0.41
1:D:74:LEU:HB3	1:D:78:GLU:HB2	2.01	0.41
1:A:39:GLY:HA3	1:A:309:ASN:OD1	2.21	0.41
1:B:102:VAL:O	1:B:106:MET:HG2	2.21	0.41
1:D:55:LEU:CD1	1:D:330:ARG:HD2	2.49	0.41
1:D:45:GLU:HG2	1:D:49:LYS:HG3	2.02	0.41
1:C:135:THR:HA	1:C:178:LEU:HD11	2.03	0.40
1:B:251:PRO:HG3	5:B:725:HOH:O	2.21	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	334/385 (87%)	328 (98%)	5 (2%)	1 (0%)	41	32
1	B	333/385 (86%)	326 (98%)	6 (2%)	1 (0%)	41	32
1	C	333/385 (86%)	323 (97%)	9 (3%)	1 (0%)	41	32
1	D	327/385 (85%)	314 (96%)	12 (4%)	1 (0%)	41	32
All	All	1327/1540 (86%)	1291 (97%)	32 (2%)	4 (0%)	41	32

All (4) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	D	173	MET
1	A	173	MET
1	B	173	MET
1	C	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	285/327 (87%)	276 (97%)	9 (3%)	39	32
1	B	284/327 (87%)	278 (98%)	6 (2%)	53	48
1	C	284/327 (87%)	278 (98%)	6 (2%)	53	48
1	D	278/327 (85%)	266 (96%)	12 (4%)	29	22
All	All	1131/1308 (86%)	1098 (97%)	33 (3%)	42	36

All (33) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	20	LEU
1	A	32	ASN
1	A	108	GLN
1	A	171	HIS
1	A	182	LEU
1	A	185	GLN
1	A	231	LEU
1	A	360	MET
1	A	361	GLN
1	B	31	THR
1	B	32	ASN
1	B	131	HIS
1	B	171	HIS
1	B	319	LEU
1	B	341	LEU
1	C	32	ASN
1	C	131	HIS
1	C	171	HIS
1	C	182	LEU
1	C	330	ARG
1	C	337	ARG
1	D	27	LEU
1	D	32	ASN
1	D	62	GLN
1	D	63	LEU
1	D	108	GLN
1	D	124	LEU
1	D	131	HIS
1	D	171	HIS
1	D	182	LEU
1	D	231	LEU
1	D	348	LEU
1	D	360	MET

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (20) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	81	GLN
1	A	108	GLN
1	A	110	ASN
1	A	203	ASN

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Mol	Chain	Res	Type
1	A	322	GLN
1	B	75	ASN
1	B	81	GLN
1	B	108	GLN
1	B	110	ASN
1	C	81	GLN
1	C	108	GLN
1	C	110	ASN
1	C	203	ASN
1	C	327	HIS
1	C	359	HIS
1	D	62	GLN
1	D	81	GLN
1	D	108	GLN
1	D	223	HIS
1	D	322	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 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
4	GOL	B	405	-	5,5,5	0.27	0	5,5,5	0.59	0
3	ORN	B	403	-	7,8,8	0.72	0	8,9,9	0.88	0
4	GOL	C	404	-	5,5,5	0.41	0	5,5,5	0.33	0
4	GOL	A	405	-	5,5,5	0.28	0	5,5,5	0.38	0
3	ORN	A	403	-	7,8,8	0.80	0	8,9,9	0.71	0
3	ORN	C	403	-	7,8,8	0.72	0	8,9,9	0.86	0
4	GOL	C	405	-	5,5,5	0.33	0	5,5,5	0.36	0
4	GOL	A	404	-	5,5,5	0.37	0	5,5,5	0.55	0
4	GOL	B	404	-	5,5,5	0.39	0	5,5,5	0.34	0
3	ORN	D	403	-	7,8,8	0.75	0	8,9,9	0.82	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
4	GOL	B	405	-	-	4/4/4/4	-
3	ORN	B	403	-	-	0/8/8/8	-
4	GOL	C	404	-	-	4/4/4/4	-
4	GOL	A	405	-	-	0/4/4/4	-
3	ORN	A	403	-	-	2/8/8/8	-
3	ORN	C	403	-	-	0/8/8/8	-
4	GOL	C	405	-	-	2/4/4/4	-
4	GOL	A	404	-	-	2/4/4/4	-
4	GOL	B	404	-	-	2/4/4/4	-
3	ORN	D	403	-	-	0/8/8/8	-

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (16) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	A	404	GOL	O1-C1-C2-C3
4	B	404	GOL	O1-C1-C2-C3
4	B	405	GOL	O1-C1-C2-C3
4	C	404	GOL	O1-C1-C2-O2
4	C	404	GOL	O1-C1-C2-C3

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Mol	Chain	Res	Type	Atoms
4	B	405	GOL	O1-C1-C2-O2
4	B	405	GOL	C1-C2-C3-O3
4	C	404	GOL	C1-C2-C3-O3
4	C	405	GOL	C1-C2-C3-O3
4	B	404	GOL	O1-C1-C2-O2
4	B	405	GOL	O2-C2-C3-O3
4	C	404	GOL	O2-C2-C3-O3
4	A	404	GOL	O1-C1-C2-O2
3	A	403	ORN	O-C-CA-CB
3	A	403	ORN	OXT-C-CA-CB
4	C	405	GOL	O2-C2-C3-O3

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	336/385 (87%)	-0.07	5 (1%) 73 75	13, 22, 45, 76	0
1	B	335/385 (87%)	0.14	10 (2%) 50 53	13, 22, 49, 79	0
1	C	335/385 (87%)	-0.04	8 (2%) 59 61	24, 32, 51, 81	0
1	D	331/385 (85%)	0.88	57 (17%) 1 1	30, 46, 75, 83	10 (3%)
All	All	1337/1540 (86%)	0.23	80 (5%) 21 22	13, 30, 60, 83	10 (0%)

All (80) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	D	357	ALA	7.4
1	A	362	THR	5.4
1	D	188	TRP	5.2
1	D	358	ALA	5.0
1	D	354	MET	4.9
1	D	360	MET	4.7
1	C	110	ASN	4.6
1	D	189	LEU	4.5
1	B	109	SER	4.4
1	D	343	PHE	4.2
1	D	353	ILE	4.2
1	B	361	GLN	4.1
1	D	192	PHE	3.9
1	C	109	SER	3.9
1	D	190	ASP	3.8
1	B	358	ALA	3.7
1	D	344	LYS	3.7
1	D	345	VAL	3.6
1	D	177	PHE	3.5
1	D	184	ASP	3.5
1	B	343	PHE	3.4

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Mol	Chain	Res	Type	RSRZ
1	C	360	MET	3.1
1	B	110	ASN	3.1
1	D	341	LEU	3.0
1	C	361	GLN	3.0
1	D	355	SER	3.0
1	D	352	GLY	2.9
1	D	96	LEU	2.9
1	A	343	PHE	2.9
1	A	109	SER	2.8
1	D	19	LEU	2.8
1	D	108	GLN	2.8
1	D	196	LYS	2.8
1	D	193	GLU	2.8
1	D	166	ALA	2.8
1	D	342	PRO	2.8
1	C	120	LYS	2.8
1	D	163	LEU	2.8
1	D	349	THR	2.6
1	D	146	PRO	2.6
1	B	360	MET	2.6
1	D	121	SER	2.6
1	C	315	GLN	2.6
1	D	147	ASP	2.6
1	D	183	GLN	2.6
1	D	185	GLN	2.6
1	D	143	GLU	2.6
1	D	161	THR	2.5
1	B	120	LYS	2.5
1	D	84	GLY	2.5
1	D	91	PHE	2.5
1	D	187	PRO	2.5
1	A	110	ASN	2.5
1	D	100	GLU	2.5
1	D	186	ILE	2.5
1	D	106	MET	2.4
1	D	139	LEU	2.4
1	D	195	ILE	2.4
1	D	107	LYS	2.4
1	A	361	GLN	2.3
1	C	358	ALA	2.3
1	B	357	ALA	2.2
1	D	350	ASP	2.2

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Mol	Chain	Res	Type	RSRZ
1	D	22	THR	2.2
1	B	350	ASP	2.2
1	D	348	LEU	2.2
1	D	215	HIS	2.2
1	D	95	THR	2.1
1	D	144	ALA	2.1
1	D	356	ARG	2.1
1	D	64	THR	2.1
1	D	347	ASN	2.1
1	D	220	ILE	2.1
1	D	104	GLU	2.1
1	B	283	THR	2.1
1	D	20	LEU	2.1
1	D	57	ALA	2.1
1	D	132	SER	2.0
1	C	147	ASP	2.0
1	D	162	PRO	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
3	ORN	D	403	9/9	0.85	0.22	47,50,58,58	0
4	GOL	C	404	6/6	0.90	0.18	39,47,52,57	0
3	ORN	C	403	9/9	0.91	0.13	32,36,39,41	0
4	GOL	A	405	6/6	0.92	0.14	25,37,48,50	0
3	ORN	B	403	9/9	0.92	0.13	25,29,30,35	0
4	GOL	C	405	6/6	0.92	0.14	34,49,55,55	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
4	GOL	A	404	6/6	0.93	0.12	29,37,41,47	0
3	ORN	A	403	9/9	0.93	0.13	26,30,34,34	0
4	GOL	B	404	6/6	0.94	0.16	30,39,45,50	0
4	GOL	B	405	6/6	0.94	0.16	27,42,47,51	0
2	MN	D	401	1/1	0.98	0.05	40,40,40,40	0
2	MN	C	401	1/1	0.99	0.07	27,27,27,27	0
2	MN	D	402	1/1	0.99	0.04	38,38,38,38	0
2	MN	B	402	1/1	1.00	0.17	17,17,17,17	0
2	MN	A	401	1/1	1.00	0.15	18,18,18,18	0
2	MN	C	402	1/1	1.00	0.09	28,28,28,28	0
2	MN	A	402	1/1	1.00	0.15	18,18,18,18	0
2	MN	B	401	1/1	1.00	0.13	17,17,17,17	0

6.5 Other polymers [i](#)

There are no such residues in this entry.