



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 4, 2026 – 06:27 PM UTC

PDB ID : 3E5B / pdb_00003e5b
Title : 2.4 Å crystal structure of isocitrate lyase from brucella melitensis
Authors : Seattle Structural Genomics Center for Infectious Disease (SSGCID)
Deposited on : 2008-08-13
Resolution : 2.37 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
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

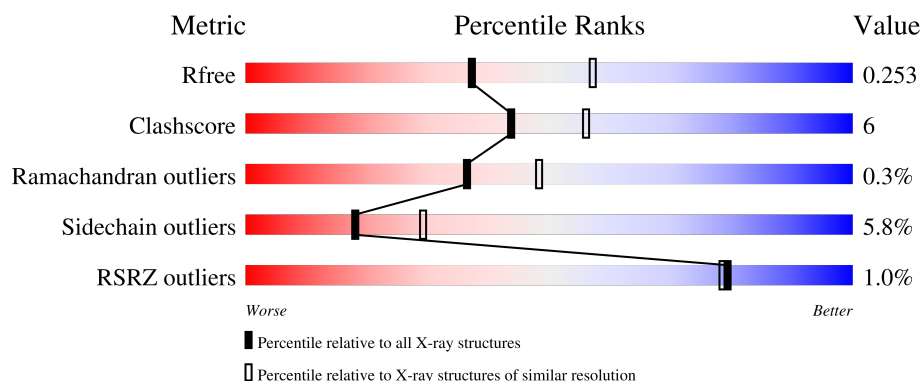
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

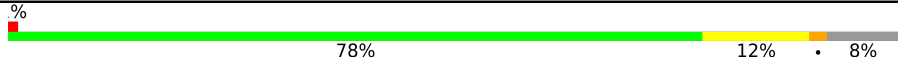
The reported resolution of this entry is 2.37 Å.

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	7164 (2.40-2.36)
Clashscore	190562	7722 (2.40-2.36)
Ramachandran outliers	187476	7626 (2.40-2.36)
Sidechain outliers	187428	7627 (2.40-2.36)
RSRZ outliers	180081	7170 (2.40-2.36)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments 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	433	
1	B	433	
1	C	433	
1	D	433	

2 Entry composition

There are 2 unique types of molecules in this entry. The entry contains 12358 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 isocitrate lyase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	397	Total	C	N	O	S	0	0	0
			3061	1939	531	578	13			
1	B	396	Total	C	N	O	S	0	1	0
			3062	1940	531	578	13			
1	C	398	Total	C	N	O	S	0	0	0
			3068	1943	532	580	13			
1	D	398	Total	C	N	O	S	0	0	0
			3065	1941	532	579	13			

There are 16 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-3	GLY	-	expression tag	UNP Q57BR0
A	-2	PRO	-	expression tag	UNP Q57BR0
A	-1	GLY	-	expression tag	UNP Q57BR0
A	0	SER	-	expression tag	UNP Q57BR0
B	-3	GLY	-	expression tag	UNP Q57BR0
B	-2	PRO	-	expression tag	UNP Q57BR0
B	-1	GLY	-	expression tag	UNP Q57BR0
B	0	SER	-	expression tag	UNP Q57BR0
C	-3	GLY	-	expression tag	UNP Q57BR0
C	-2	PRO	-	expression tag	UNP Q57BR0
C	-1	GLY	-	expression tag	UNP Q57BR0
C	0	SER	-	expression tag	UNP Q57BR0
D	-3	GLY	-	expression tag	UNP Q57BR0
D	-2	PRO	-	expression tag	UNP Q57BR0
D	-1	GLY	-	expression tag	UNP Q57BR0
D	0	SER	-	expression tag	UNP Q57BR0

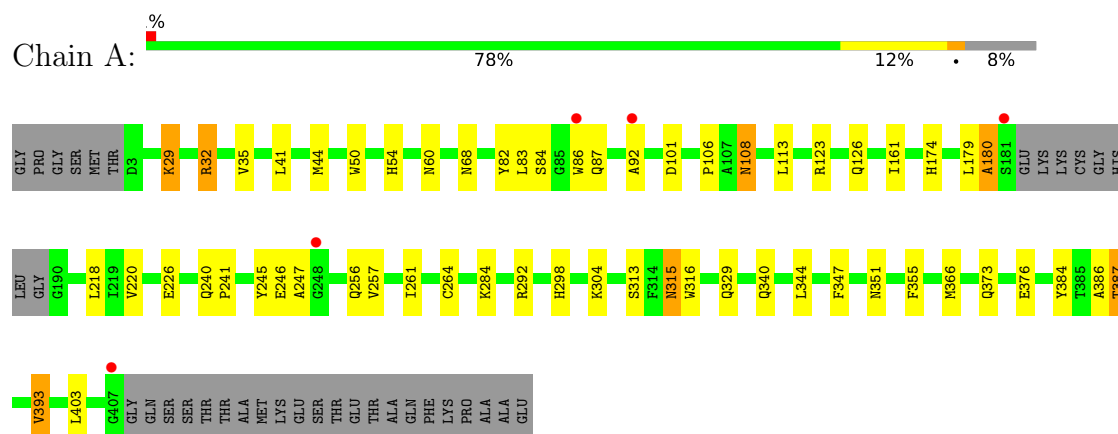
- Molecule 2 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	34	Total 34	O 34	0	0
2	B	36	Total 36	O 36	0	0
2	C	19	Total 19	O 19	0	0
2	D	13	Total 13	O 13	0	0

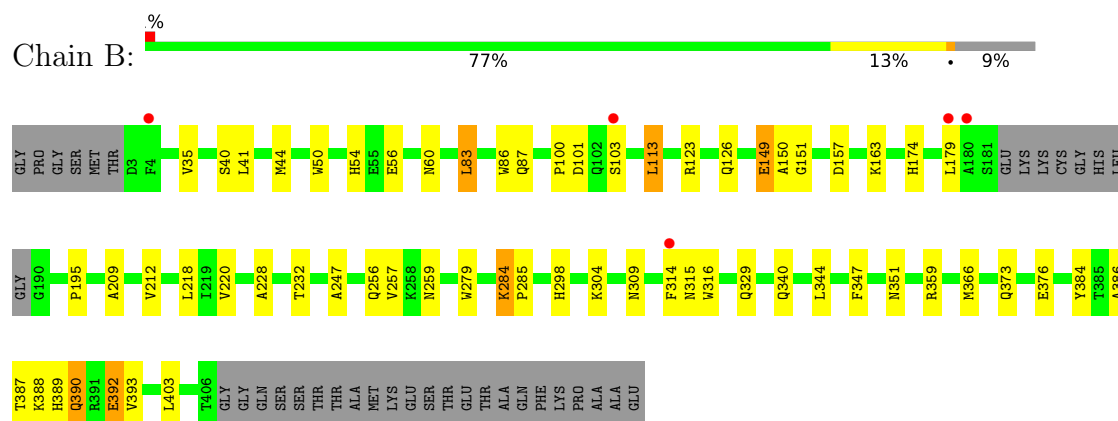
3 Residue-property plots [i](#)

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.

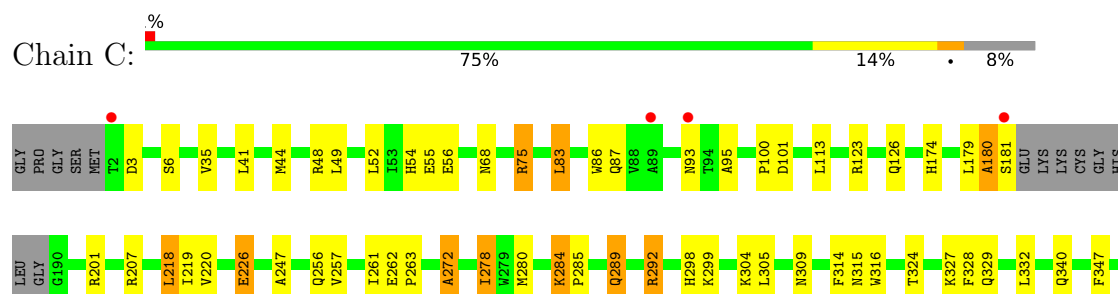
• Molecule 1: isocitrate lyase



• Molecule 1: isocitrate lyase

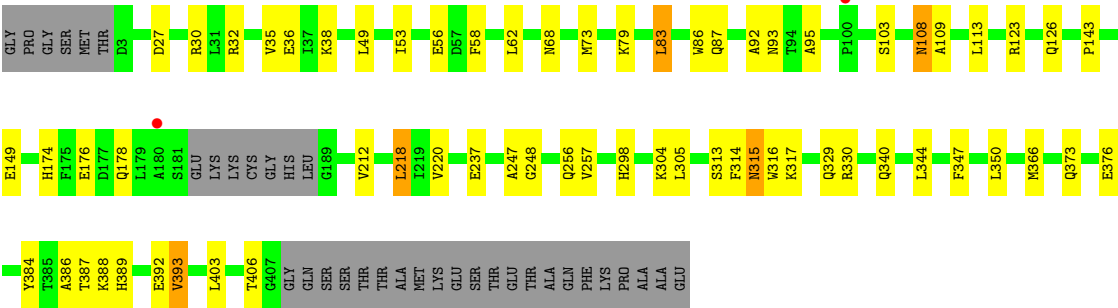
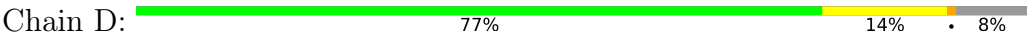


• Molecule 1: isocitrate lyase





● Molecule 1: isocitrate lyase



4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	77.25Å 137.21Å 182.45Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	20.00 – 2.37 20.00 – 2.37	Depositor EDS
% Data completeness (in resolution range)	98.2 (20.00-2.37) 97.9 (20.00-2.37)	Depositor EDS
R_{merge}	0.12	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.71 (at 2.38Å)	Xtriage
Refinement program	REFMAC	Depositor
R, R_{free}	0.207 , 0.251 0.206 , 0.253	Depositor DCC
R_{free} test set	3913 reflections (5.03%)	wwPDB-VP
Wilson B-factor (Å ²)	52.7	Xtriage
Anisotropy	0.079	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.30 , 16.6	EDS
L-test for twinning ²	$\langle L \rangle = 0.48$, $\langle L^2 \rangle = 0.31$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	12358	wwPDB-VP
Average B, all atoms (Å ²)	57.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.20% 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

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	0.63	0/3127	0.90	1/4232 (0.0%)
1	B	0.62	0/3131	0.91	3/4238 (0.1%)
1	C	0.59	0/3134	0.89	4/4242 (0.1%)
1	D	0.58	1/3131 (0.0%)	0.89	2/4237 (0.0%)
All	All	0.61	1/12523 (0.0%)	0.90	10/16949 (0.1%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	1
1	D	0	2
All	All	0	3

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	D	92	ALA	CA-CB	5.67	1.57	1.53

All (10) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	247	ALA	N-CA-C	8.53	121.71	111.82
1	D	247	ALA	N-CA-C	8.29	119.94	111.07
1	A	247	ALA	N-CA-C	6.70	119.93	111.69
1	C	272	ALA	N-CA-C	5.43	120.31	113.25
1	B	284	LYS	CA-C-N	5.42	126.27	119.98
1	B	284	LYS	C-N-CA	5.42	126.27	119.98
1	C	284	LYS	CA-C-N	5.30	125.55	119.83
1	C	284	LYS	C-N-CA	5.30	125.55	119.83
1	D	109	ALA	N-CA-C	5.29	117.12	111.36

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	247	ALA	N-CA-C	5.06	117.58	111.40

There are no chirality outliers.

All (3) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	92	ALA	Peptide
1	D	108	ASN	Peptide
1	D	388	LYS	Peptide

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	3061	0	2984	36	0
1	B	3062	0	2987	44	0
1	C	3068	0	2991	45	0
1	D	3065	0	2987	43	0
2	A	34	0	0	0	0
2	B	36	0	0	0	0
2	C	19	0	0	0	0
2	D	13	0	0	0	0
All	All	12358	0	11949	147	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 6.

All (147) 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:386:ALA:HA	1:D:392:GLU:HG3	1.44	0.99
1:C:386:ALA:HA	1:C:392:GLU:HG3	1.58	0.85
1:D:123:ARG:HH11	1:D:126:GLN:HE22	1.21	0.85
1:B:386:ALA:HA	1:B:392:GLU:HG3	1.57	0.84
1:B:390:GLN:HA	1:B:390:GLN:HE21	1.40	0.84

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:386:ALA:HA	1:C:392:GLU:CG	2.13	0.77
1:B:309[B]:ASN:HD22	1:B:309[B]:ASN:H	1.33	0.76
1:C:390:GLN:O	1:C:395:THR:HG23	1.88	0.74
1:D:386:ALA:HA	1:D:392:GLU:CG	2.17	0.73
1:C:123:ARG:HH11	1:C:126:GLN:HE22	1.37	0.70
1:C:86:TRP:CD1	1:C:101:ASP:HB2	2.27	0.69
1:D:315:ASN:C	1:D:315:ASN:HD22	2.00	0.69
1:D:93:ASN:HD22	1:D:95:ALA:H	1.40	0.68
1:D:53:ILE:HD12	1:D:305:LEU:HD13	1.78	0.66
1:A:174:HIS:HB3	1:A:220:VAL:HB	1.78	0.66
1:D:87:GLN:NE2	1:D:347:PHE:H	1.93	0.66
1:C:87:GLN:NE2	1:C:347:PHE:H	1.94	0.66
1:C:226:GLU:HG3	1:C:280:MET:HE3	1.76	0.66
1:B:315:ASN:C	1:B:315:ASN:HD22	2.04	0.65
1:A:355:PHE:CE1	1:C:75:ARG:HG2	2.32	0.65
1:A:87:GLN:NE2	1:A:347:PHE:H	1.94	0.65
1:A:29:LYS:HA	1:A:32:ARG:HD2	1.79	0.64
1:C:49:LEU:HD23	1:C:218:LEU:HG	1.79	0.63
1:D:376:GLU:HB3	1:D:387:THR:HG23	1.81	0.63
1:B:123:ARG:HH11	1:B:126:GLN:HE22	1.48	0.61
1:A:86:TRP:CD1	1:A:101:ASP:HB2	2.35	0.61
1:A:313:SER:HB3	1:C:389:HIS:CE1	2.36	0.61
1:C:390:GLN:HG3	1:C:395:THR:HG21	1.83	0.60
1:A:316:TRP:H	1:C:373:GLN:HE22	1.49	0.60
1:A:68:ASN:HD22	1:C:351:ASN:HD21	1.48	0.60
1:A:355:PHE:HE1	1:C:75:ARG:HG2	1.66	0.60
1:D:376:GLU:HB3	1:D:387:THR:CG2	2.31	0.60
1:A:376:GLU:HB3	1:A:387:THR:HG23	1.84	0.60
1:B:87:GLN:NE2	1:B:347:PHE:H	2.00	0.59
1:A:50:TRP:O	1:A:54:HIS:HD2	1.85	0.59
1:D:123:ARG:NH1	1:D:126:GLN:HE22	1.97	0.58
1:D:176:GLU:HG3	1:D:178:GLN:HG2	1.85	0.58
1:C:93:ASN:HD22	1:C:95:ALA:H	1.52	0.58
1:C:262:GLU:HB2	1:C:263:PRO:HD3	1.86	0.57
1:B:316:TRP:H	1:D:373:GLN:HE22	1.52	0.57
1:B:279:TRP:HE1	1:B:309[B]:ASN:ND2	2.04	0.56
1:D:123:ARG:HH11	1:D:126:GLN:NE2	1.99	0.56
1:B:50:TRP:O	1:B:54:HIS:HD2	1.90	0.55
1:A:108:ASN:HD22	1:A:108:ASN:H	1.55	0.55
1:B:174:HIS:HB3	1:B:220:VAL:HB	1.88	0.55
1:B:316:TRP:CZ2	1:D:366:MET:HE2	2.42	0.55

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:240:GLN:HG2	1:A:245:TYR:OH	2.06	0.54
1:D:384:TYR:CZ	1:D:386:ALA:HB3	2.43	0.54
1:D:174:HIS:HB3	1:D:220:VAL:HB	1.89	0.53
1:A:298:HIS:HE1	1:A:304:LYS:O	1.91	0.53
1:B:376:GLU:HB3	1:B:387:THR:CG2	2.39	0.53
1:B:373:GLN:HE22	1:D:316:TRP:H	1.54	0.52
1:B:41:LEU:HA	1:B:44:MET:HE3	1.90	0.52
1:B:285:PRO:HD2	1:B:314:PHE:CD1	2.45	0.52
1:A:41:LEU:HD23	1:A:44:MET:CE	2.40	0.52
1:B:60:ASN:HA	1:B:340:GLN:O	2.10	0.52
1:B:41:LEU:HD23	1:B:44:MET:HE3	1.92	0.51
1:B:329:GLN:HA	1:B:340:GLN:HE22	1.76	0.51
1:B:87:GLN:NE2	1:B:344:LEU:HA	2.26	0.51
1:B:351:ASN:HD21	1:D:68:ASN:HD22	1.59	0.51
1:D:386:ALA:CA	1:D:392:GLU:HG3	2.31	0.51
1:B:83:LEU:C	1:B:83:LEU:HD12	2.36	0.50
1:B:86:TRP:HB3	1:B:344:LEU:HD21	1.93	0.50
1:B:103:SER:HB3	1:B:149:GLU:HG2	1.94	0.50
1:C:174:HIS:HB3	1:C:220:VAL:HB	1.93	0.50
1:C:272:ALA:HA	1:C:278:ILE:HD11	1.94	0.50
1:D:314:PHE:O	1:D:316:TRP:CD1	2.64	0.50
1:C:285:PRO:HD2	1:C:314:PHE:CD1	2.47	0.50
1:A:329:GLN:HA	1:A:340:GLN:HE22	1.78	0.49
1:C:41:LEU:HD23	1:C:44:MET:HE3	1.94	0.49
1:C:261:ILE:HD12	1:C:289:GLN:HG2	1.94	0.49
1:D:86:TRP:HB3	1:D:344:LEU:HD21	1.94	0.49
1:B:86:TRP:CD1	1:B:101:ASP:HB2	2.47	0.49
1:C:315:ASN:HD22	1:C:315:ASN:C	2.20	0.49
1:B:40:SER:HB3	1:B:44:MET:HE2	1.94	0.49
1:B:366:MET:HG2	1:D:329:GLN:HG3	1.96	0.48
1:B:390:GLN:HA	1:B:390:GLN:NE2	2.20	0.48
1:A:82:TYR:HE2	1:A:84:SER:HB2	1.77	0.48
1:A:87:GLN:HE22	1:A:347:PHE:H	1.60	0.48
1:C:386:ALA:CA	1:C:392:GLU:HG3	2.39	0.48
1:C:207:ARG:CZ	1:C:219:ILE:HD12	2.44	0.47
1:A:351:ASN:HD21	1:C:68:ASN:HD22	1.61	0.47
1:B:309[B]:ASN:H	1:B:309[B]:ASN:ND2	2.06	0.47
1:C:377:PHE:CE1	1:C:387:THR:HG21	2.50	0.47
1:A:393:VAL:CG1	1:C:100:PRO:HA	2.44	0.47
1:B:228:ALA:O	1:B:259:ASN:HB3	2.14	0.47
1:C:324:THR:HA	1:C:327:LYS:HE2	1.97	0.47

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:315:ASN:C	1:D:315:ASN:ND2	2.72	0.47
1:B:100:PRO:HA	1:D:393:VAL:CG1	2.45	0.46
1:C:384:TYR:CZ	1:C:386:ALA:HB3	2.51	0.46
1:D:79:LYS:O	1:D:143:PRO:HD2	2.16	0.46
1:D:329:GLN:HA	1:D:340:GLN:HE22	1.81	0.46
1:B:389:HIS:CE1	1:D:313:SER:HB3	2.51	0.46
1:A:315:ASN:C	1:A:315:ASN:HD22	2.24	0.45
1:C:329:GLN:HA	1:C:340:GLN:HE22	1.81	0.45
1:D:49:LEU:HD23	1:D:218:LEU:HG	1.98	0.45
1:A:384:TYR:CZ	1:A:386:ALA:HB3	2.52	0.45
1:D:32:ARG:HA	1:D:212:VAL:HG13	1.98	0.45
1:D:27:ASP:OD1	1:D:30:ARG:NH2	2.49	0.45
1:A:174:HIS:CB	1:A:220:VAL:HB	2.45	0.45
1:B:298:HIS:HE1	1:B:304:LYS:O	2.00	0.45
1:D:87:GLN:HE21	1:D:347:PHE:H	1.65	0.45
1:B:86:TRP:CE3	1:B:344:LEU:HD22	2.52	0.44
1:B:151:GLY:O	1:B:157:ASP:HB3	2.17	0.44
1:C:54:HIS:CE1	1:C:305:LEU:HD11	2.52	0.44
1:A:373:GLN:HE22	1:C:316:TRP:HD1	1.66	0.44
1:A:68:ASN:ND2	1:C:351:ASN:HD21	2.15	0.44
1:D:62:LEU:HB2	1:D:73:MET:HE2	1.99	0.44
1:A:41:LEU:HD23	1:A:44:MET:HE3	2.00	0.44
1:B:174:HIS:CB	1:B:220:VAL:HB	2.47	0.43
1:B:83:LEU:HD13	1:B:113:LEU:HD13	1.99	0.43
1:B:366:MET:HE2	1:D:316:TRP:CZ2	2.53	0.43
1:D:87:GLN:NE2	1:D:347:PHE:N	2.65	0.43
1:A:313:SER:HB3	1:C:389:HIS:HE1	1.82	0.43
1:C:48:ARG:O	1:C:52:LEU:HG	2.19	0.43
1:A:123:ARG:HH11	1:A:126:GLN:HE22	1.66	0.43
1:C:390:GLN:C	1:C:395:THR:HG23	2.44	0.42
1:B:41:LEU:HD23	1:B:44:MET:CE	2.50	0.42
1:C:179:LEU:O	1:C:180:ALA:CB	2.67	0.42
1:D:248:GLY:O	1:D:256:GLN:HG3	2.20	0.42
1:D:83:LEU:C	1:D:83:LEU:HD12	2.45	0.42
1:A:60:ASN:HA	1:A:340:GLN:O	2.19	0.42
1:C:261:ILE:HG21	1:C:292:ARG:CZ	2.48	0.42
1:D:36:GLU:OE2	1:D:38:LYS:NZ	2.52	0.42
1:A:366:MET:HG2	1:C:329:GLN:HG3	2.01	0.42
1:B:163:LYS:HG3	1:B:209:ALA:HB1	2.01	0.42
1:A:87:GLN:NE2	1:A:344:LEU:HA	2.34	0.42
1:C:201:ARG:HD3	1:D:406:THR:HG22	2.02	0.42

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:390:GLN:O	1:C:395:THR:CG2	2.65	0.42
1:D:298:HIS:HE1	1:D:304:LYS:O	2.03	0.41
1:B:390:GLN:HE22	1:D:86:TRP:HE1	1.68	0.41
1:A:123:ARG:HH11	1:A:126:GLN:NE2	2.18	0.41
1:A:226:GLU:N	1:A:264:CYS:SG	2.93	0.41
1:A:240:GLN:N	1:A:241:PRO:CD	2.84	0.41
1:C:83:LEU:HD12	1:C:83:LEU:C	2.46	0.41
1:D:49:LEU:O	1:D:53:ILE:HG12	2.21	0.41
1:B:149:GLU:HB3	1:B:150:ALA:H	1.68	0.41
1:C:328:PHE:CE2	1:C:332:LEU:HD11	2.55	0.41
1:A:106:PRO:HB2	1:A:108:ASN:ND2	2.37	0.40
1:A:179:LEU:O	1:A:180:ALA:HB3	2.21	0.40
1:B:195:PRO:HD3	1:B:232:THR:OG1	2.21	0.40
1:C:179:LEU:O	1:C:180:ALA:HB3	2.21	0.40
1:D:58:PHE:HE2	1:D:330:ARG:HD2	1.87	0.40
1:B:376:GLU:HB3	1:B:387:THR:HG23	2.03	0.40
1:B:384:TYR:CZ	1:B:386:ALA:HB3	2.56	0.40
1:C:298:HIS:HE1	1:C:304:LYS:O	2.03	0.40
1:D:350:LEU:C	1:D:350:LEU:HD23	2.46	0.40

There are no symmetry-related clashes.

5.3 Torsion angles

5.3.1 Protein backbone

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the backbone conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	393/433 (91%)	383 (98%)	9 (2%)	1 (0%)	36	48
1	B	393/433 (91%)	380 (97%)	13 (3%)	0	100	100
1	C	394/433 (91%)	379 (96%)	14 (4%)	1 (0%)	36	48
1	D	394/433 (91%)	378 (96%)	14 (4%)	2 (0%)	24	34
All	All	1574/1732 (91%)	1520 (97%)	50 (3%)	4 (0%)	36	48

All (4) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	180	ALA
1	C	180	ALA
1	D	389	HIS
1	D	108	ASN

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	300/327 (92%)	282 (94%)	18 (6%)	17	28
1	B	301/327 (92%)	284 (94%)	17 (6%)	19	30
1	C	301/327 (92%)	279 (93%)	22 (7%)	13	20
1	D	300/327 (92%)	287 (96%)	13 (4%)	26	41
All	All	1202/1308 (92%)	1132 (94%)	70 (6%)	18	29

All (70) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	29	LYS
1	A	32	ARG
1	A	35	VAL
1	A	83	LEU
1	A	108	ASN
1	A	113	LEU
1	A	161	ILE
1	A	218	LEU
1	A	246	GLU
1	A	256	GLN
1	A	257	VAL
1	A	261	ILE
1	A	284	LYS
1	A	292	ARG
1	A	315	ASN
1	A	387	THR

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	A	393	VAL
1	A	403	LEU
1	B	35	VAL
1	B	56	GLU
1	B	83	LEU
1	B	113	LEU
1	B	149	GLU
1	B	179	LEU
1	B	212	VAL
1	B	218	LEU
1	B	256	GLN
1	B	257	VAL
1	B	284	LYS
1	B	359	ARG
1	B	388	LYS
1	B	390	GLN
1	B	392	GLU
1	B	393	VAL
1	B	403	LEU
1	C	3	ASP
1	C	6	SER
1	C	35	VAL
1	C	55	GLU
1	C	56	GLU
1	C	75	ARG
1	C	83	LEU
1	C	113	LEU
1	C	181	SER
1	C	218	LEU
1	C	226	GLU
1	C	256	GLN
1	C	257	VAL
1	C	278	ILE
1	C	284	LYS
1	C	289	GLN
1	C	292	ARG
1	C	299	LYS
1	C	309	ASN
1	C	387	THR
1	C	393	VAL
1	C	395	THR
1	D	35	VAL

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	D	56	GLU
1	D	83	LEU
1	D	103	SER
1	D	113	LEU
1	D	149	GLU
1	D	218	LEU
1	D	237	GLU
1	D	257	VAL
1	D	315	ASN
1	D	317	LYS
1	D	393	VAL
1	D	403	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (48) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	54	HIS
1	A	68	ASN
1	A	87	GLN
1	A	108	ASN
1	A	126	GLN
1	A	204	ASN
1	A	298	HIS
1	A	315	ASN
1	A	340	GLN
1	A	373	GLN
1	A	374	GLN
1	A	390	GLN
1	B	54	HIS
1	B	72	GLN
1	B	87	GLN
1	B	126	GLN
1	B	178	GLN
1	B	204	ASN
1	B	289	GLN
1	B	298	HIS
1	B	315	ASN
1	B	340	GLN
1	B	373	GLN
1	B	374	GLN
1	B	390	GLN
1	C	68	ASN

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	C	87	GLN
1	C	93	ASN
1	C	126	GLN
1	C	204	ASN
1	C	240	GLN
1	C	298	HIS
1	C	315	ASN
1	C	319	ASN
1	C	340	GLN
1	C	373	GLN
1	C	374	GLN
1	D	54	HIS
1	D	68	ASN
1	D	87	GLN
1	D	93	ASN
1	D	122	GLN
1	D	126	GLN
1	D	256	GLN
1	D	298	HIS
1	D	315	ASN
1	D	340	GLN
1	D	373	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](#)

There are no ligands in this entry.

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 [i](#)

6.1 Protein, DNA and RNA chains [i](#)

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	397/433 (91%)	-0.12	5 (1%) 75 74	39, 54, 66, 74	0
1	B	396/433 (91%)	-0.05	5 (1%) 75 74	30, 53, 69, 75	1 (0%)
1	C	398/433 (91%)	0.11	4 (1%) 79 78	45, 59, 75, 85	0
1	D	398/433 (91%)	0.07	2 (0%) 87 86	47, 59, 77, 86	0
All	All	1589/1732 (91%)	0.00	16 (1%) 79 78	30, 57, 73, 86	1 (0%)

All (16) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	D	100	PRO	4.2
1	B	180	ALA	2.9
1	A	86	TRP	2.9
1	D	180	ALA	2.9
1	C	2	THR	2.8
1	A	92	ALA	2.7
1	A	407	GLY	2.6
1	C	93	ASN	2.2
1	A	181	SER	2.2
1	B	179	LEU	2.2
1	A	248	GLY	2.2
1	C	89	ALA	2.2
1	B	103	SER	2.2
1	B	314	PHE	2.1
1	C	181	SER	2.1
1	B	4	PHE	2.1

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](#)

There are no ligands in this entry.

6.5 Other polymers [i](#)

There are no such residues in this entry.