Full wwPDB X-ray Structure Validation Report ⓘ

Feb 19, 2025 – 12:00 PM JST

PDB ID	:	8YEN
Title	:	Aldehyde dehydrogenase
Authors	:	Kim, S.B.; Park, H.H.
Deposited on	:	2024-02-22
Resolution	:	2.58 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:

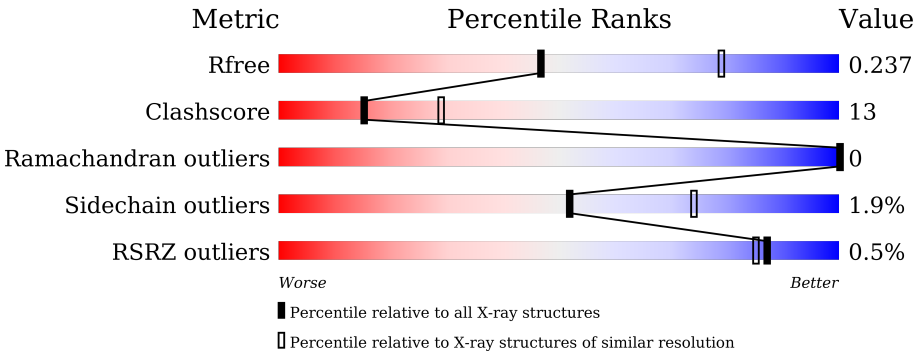
MolProbity	:	4.02b-467
Xtriage (Phenix)	:	1.21
EDS	:	3.0
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4	:	9.0.004 (Gargrove)
Density-Fitness	:	1.0.11
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.41.2

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 2.58 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}	164625	4456 (2.60-2.56)
Clashscore	180529	4905 (2.60-2.56)
Ramachandran outliers	177936	4847 (2.60-2.56)
Sidechain outliers	177891	4847 (2.60-2.56)
RSRZ outliers	164620	4456 (2.60-2.56)

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 <=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	520	% 67% 23% • 8%
1	B	520	64% 27% • 8%

2 Entry composition (i)

There is only 1 type of molecule in this entry. The entry contains 7406 atoms, of which 176 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 Aldehyde dehydrogenase family protein.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
1	A	477	Total	C	H	N	O	S	0	0	0
			3703	2280	88	629	698	8			
1	B	477	Total	C	H	N	O	S	0	0	0
			3703	2280	88	629	698	8			

There are 72 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-35	MET	-	initiating methionine	UNP A0A4P7RFW8
A	-34	GLY	-	expression tag	UNP A0A4P7RFW8
A	-33	SER	-	expression tag	UNP A0A4P7RFW8
A	-32	SER	-	expression tag	UNP A0A4P7RFW8
A	-31	HIS	-	expression tag	UNP A0A4P7RFW8
A	-30	HIS	-	expression tag	UNP A0A4P7RFW8
A	-29	HIS	-	expression tag	UNP A0A4P7RFW8
A	-28	HIS	-	expression tag	UNP A0A4P7RFW8
A	-27	HIS	-	expression tag	UNP A0A4P7RFW8
A	-26	HIS	-	expression tag	UNP A0A4P7RFW8
A	-25	SER	-	expression tag	UNP A0A4P7RFW8
A	-24	SER	-	expression tag	UNP A0A4P7RFW8
A	-23	GLY	-	expression tag	UNP A0A4P7RFW8
A	-22	LEU	-	expression tag	UNP A0A4P7RFW8
A	-21	VAL	-	expression tag	UNP A0A4P7RFW8
A	-20	PRO	-	expression tag	UNP A0A4P7RFW8
A	-19	ARG	-	expression tag	UNP A0A4P7RFW8
A	-18	GLY	-	expression tag	UNP A0A4P7RFW8
A	-17	SER	-	expression tag	UNP A0A4P7RFW8
A	-16	HIS	-	expression tag	UNP A0A4P7RFW8
A	-15	MET	-	expression tag	UNP A0A4P7RFW8
A	-14	ALA	-	expression tag	UNP A0A4P7RFW8
A	-13	SER	-	expression tag	UNP A0A4P7RFW8
A	-12	MET	-	expression tag	UNP A0A4P7RFW8
A	-11	THR	-	expression tag	UNP A0A4P7RFW8

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Chain	Residue	Modelled	Actual	Comment	Reference
A	-10	GLY	-	expression tag	UNP A0A4P7RFW8
A	-9	GLY	-	expression tag	UNP A0A4P7RFW8
A	-8	GLN	-	expression tag	UNP A0A4P7RFW8
A	-7	GLN	-	expression tag	UNP A0A4P7RFW8
A	-6	MET	-	expression tag	UNP A0A4P7RFW8
A	-5	GLY	-	expression tag	UNP A0A4P7RFW8
A	-4	ARG	-	expression tag	UNP A0A4P7RFW8
A	-3	GLY	-	expression tag	UNP A0A4P7RFW8
A	-2	SER	-	expression tag	UNP A0A4P7RFW8
A	-1	GLU	-	expression tag	UNP A0A4P7RFW8
A	0	PHE	-	expression tag	UNP A0A4P7RFW8
B	-35	MET	-	initiating methionine	UNP A0A4P7RFW8
B	-34	GLY	-	expression tag	UNP A0A4P7RFW8
B	-33	SER	-	expression tag	UNP A0A4P7RFW8
B	-32	SER	-	expression tag	UNP A0A4P7RFW8
B	-31	HIS	-	expression tag	UNP A0A4P7RFW8
B	-30	HIS	-	expression tag	UNP A0A4P7RFW8
B	-29	HIS	-	expression tag	UNP A0A4P7RFW8
B	-28	HIS	-	expression tag	UNP A0A4P7RFW8
B	-27	HIS	-	expression tag	UNP A0A4P7RFW8
B	-26	HIS	-	expression tag	UNP A0A4P7RFW8
B	-25	SER	-	expression tag	UNP A0A4P7RFW8
B	-24	SER	-	expression tag	UNP A0A4P7RFW8
B	-23	GLY	-	expression tag	UNP A0A4P7RFW8
B	-22	LEU	-	expression tag	UNP A0A4P7RFW8
B	-21	VAL	-	expression tag	UNP A0A4P7RFW8
B	-20	PRO	-	expression tag	UNP A0A4P7RFW8
B	-19	ARG	-	expression tag	UNP A0A4P7RFW8
B	-18	GLY	-	expression tag	UNP A0A4P7RFW8
B	-17	SER	-	expression tag	UNP A0A4P7RFW8
B	-16	HIS	-	expression tag	UNP A0A4P7RFW8
B	-15	MET	-	expression tag	UNP A0A4P7RFW8
B	-14	ALA	-	expression tag	UNP A0A4P7RFW8
B	-13	SER	-	expression tag	UNP A0A4P7RFW8
B	-12	MET	-	expression tag	UNP A0A4P7RFW8
B	-11	THR	-	expression tag	UNP A0A4P7RFW8
B	-10	GLY	-	expression tag	UNP A0A4P7RFW8
B	-9	GLY	-	expression tag	UNP A0A4P7RFW8
B	-8	GLN	-	expression tag	UNP A0A4P7RFW8
B	-7	GLN	-	expression tag	UNP A0A4P7RFW8
B	-6	MET	-	expression tag	UNP A0A4P7RFW8
B	-5	GLY	-	expression tag	UNP A0A4P7RFW8

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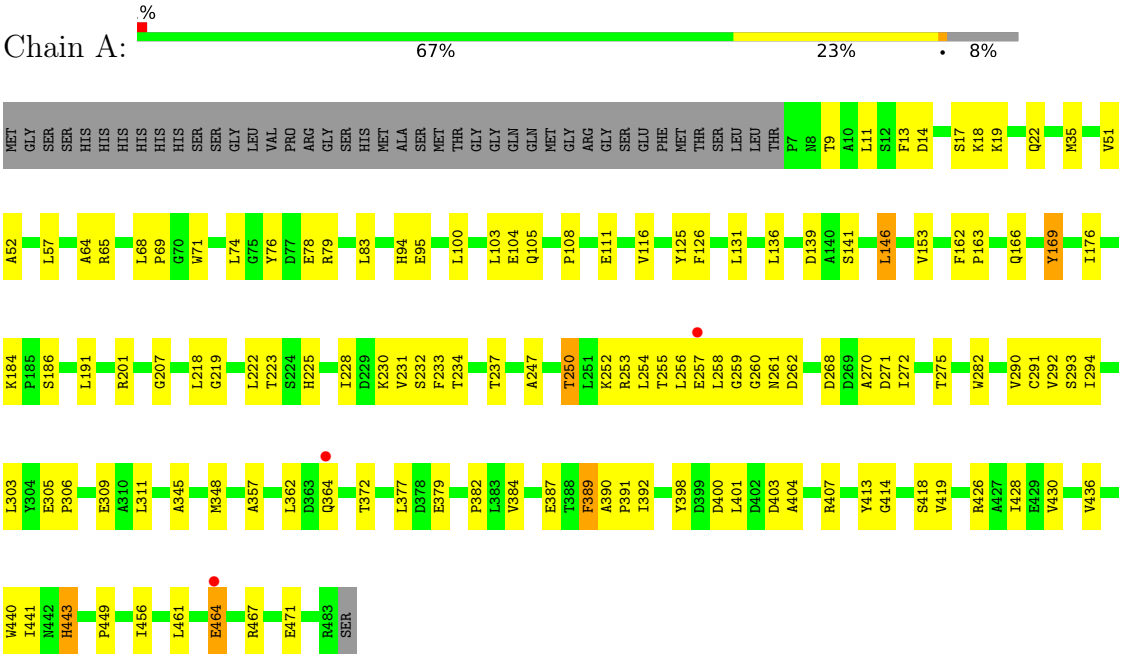
Chain	Residue	Modelled	Actual	Comment	Reference
B	-4	ARG	-	expression tag	UNP A0A4P7RFW8
B	-3	GLY	-	expression tag	UNP A0A4P7RFW8
B	-2	SER	-	expression tag	UNP A0A4P7RFW8
B	-1	GLU	-	expression tag	UNP A0A4P7RFW8
B	0	PHE	-	expression tag	UNP A0A4P7RFW8

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.

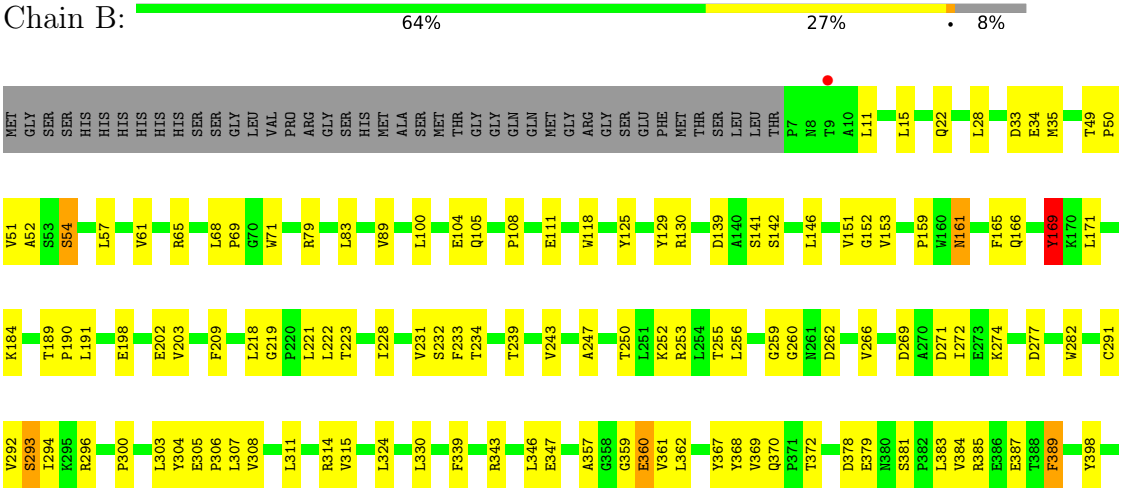
• Molecule 1: Aldehyde dehydrogenase family protein

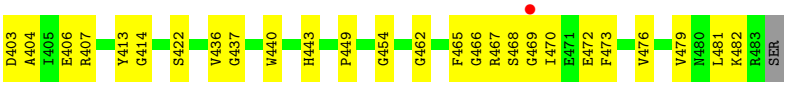
Chain A:



• Molecule 1: Aldehyde dehydrogenase family protein

Chain B:




D403
A404
I405
E406
R407
Y413
G414
S422
V436
G437
W440
H443
P449
G454
G462
F465
G466
R467
S468
G469
I470
E471
E472
F473
V476
V479
N480
L481
K482
R483
SER

4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α, β, γ	93.31Å 48.62Å 112.64Å 90.00° 105.88° 90.00°	Depositor
Resolution (Å)	29.92 – 2.58 29.92 – 2.58	Depositor EDS
% Data completeness (in resolution range)	99.0 (29.92-2.58) 98.9 (29.92-2.58)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.32 (at 2.57Å)	Xtriage
Refinement program	PHENIX 1.17_3644	Depositor
R, R_{free}	0.189 , 0.234 0.191 , 0.237	Depositor DCC
R_{free} test set	1849 reflections (5.00%)	wwPDB-VP
Wilson B-factor (Å^2)	56.8	Xtriage
Anisotropy	0.344	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.37 , 35.7	EDS
L-test for twinning[2]	$< \|L\| > = 0.51$, $< L^2 > = 0.34$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.95	EDS
Total number of atoms	7406	wwPDB-VP
Average B, all atoms (Å^2)	56.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.83% of the height of the origin peak. No significant pseudotranslation is detected.*

[1] Intensities estimated from amplitudes.

[2] Theoretical values of $< |L| >$, $< L^2 >$ 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	0.51	0/3689	0.67	2/5029 (0.0%)
1	B	0.53	3/3689 (0.1%)	0.69	6/5029 (0.1%)
All	All	0.52	3/7378 (0.0%)	0.68	8/10058 (0.1%)

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	202	GLU	CD-OE1	6.02	1.32	1.25
1	B	406	GLU	CG-CD	5.90	1.60	1.51
1	B	360	GLU	CG-CD	-5.84	1.43	1.51

All (8) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	464	GLU	CA-CB-CG	-7.12	97.72	113.40
1	B	347	GLU	CA-CB-CG	-5.89	100.44	113.40
1	B	202	GLU	CA-CB-CG	5.78	126.12	113.40
1	B	360	GLU	CA-CB-CG	-5.69	100.88	113.40
1	B	347	GLU	OE1-CD-OE2	5.61	130.03	123.30
1	B	360	GLU	OE1-CD-OE2	5.40	129.78	123.30
1	A	146	LEU	CA-CB-CG	5.21	127.28	115.30
1	B	169	TYR	CA-CB-CG	5.07	123.03	113.40

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	3615	88	3571	90	0
1	B	3615	88	3571	106	0
All	All	7230	176	7142	192	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 13.

All (192) 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:B:57:LEU:HD11	1:B:222:LEU:HD13	1.32	1.09
1:B:359:GLY:O	1:B:360:GLU:HG2	1.67	0.94
1:A:136:LEU:HD11	1:A:146:LEU:HB2	1.58	0.85
1:B:250:THR:HG21	1:B:252:LYS:HZ2	1.44	0.82
1:A:362:LEU:HB3	1:A:364:GLN:HG3	1.60	0.82
1:B:15:LEU:HD21	1:B:191:LEU:HD21	1.64	0.79
1:B:250:THR:HG21	1:B:252:LYS:NZ	1.96	0.79
1:B:467:ARG:HH11	1:B:467:ARG:HG2	1.45	0.79
1:A:22:GLN:OE1	1:A:52:ALA:HB2	1.84	0.78
1:A:232:SER:HA	1:A:255:THR:HG22	1.69	0.74
1:B:166:GLN:HG2	1:B:169:TYR:OH	1.86	0.74
1:B:108:PRO:HD2	1:B:111:GLU:OE2	1.88	0.73
1:B:387:GLU:OE1	1:B:389:PHE:HE1	1.73	0.72
1:B:272:ILE:HD11	1:B:303:LEU:HD22	1.72	0.71
1:B:171:LEU:HD12	1:B:209:PHE:CE1	2.26	0.70
1:B:57:LEU:HD11	1:B:222:LEU:CD1	2.16	0.69
1:A:414:GLY:HA2	1:A:436:VAL:HG12	1.73	0.69
1:B:219:GLY:O	1:B:223:THR:HG23	1.92	0.68
1:B:49:THR:HG23	1:B:50:PRO:HD2	1.74	0.68
1:A:234:THR:HG23	1:A:257:GLU:HB3	1.76	0.67
1:A:68:LEU:HB3	1:A:69:PRO:HD3	1.77	0.66
1:B:22:GLN:OE1	1:B:52:ALA:HB2	1.94	0.65
1:A:387:GLU:OE2	1:A:389:PHE:HE1	1.79	0.65
1:B:118:TRP:HB3	1:B:165:PHE:CE1	2.32	0.65
1:B:362:LEU:HD13	1:B:368:TYR:HB3	1.77	0.64
1:A:219:GLY:O	1:A:223:THR:HG23	1.97	0.64
1:B:28:LEU:HD21	1:B:198:GLU:HG2	1.79	0.64
1:B:166:GLN:HG2	1:B:169:TYR:CZ	2.33	0.64
1:A:35:MET:HE3	1:A:51:VAL:HG21	1.80	0.63
1:B:104:GLU:HG3	1:B:105:GLN:N	2.13	0.63
1:B:292:VAL:HG21	1:B:440:TRP:HH2	1.64	0.62
1:A:250:THR:HG23	1:A:252:LYS:HG3	1.80	0.62

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:259:GLY:HA2	1:B:291:CYS:HB2	1.81	0.61
1:A:282:TRP:HB2	1:A:294:ILE:HD12	1.82	0.61
1:B:379:GLU:O	1:B:379:GLU:HG3	2.01	0.61
1:A:228:ILE:HB	1:A:252:LYS:HE3	1.83	0.60
1:B:362:LEU:H	1:B:362:LEU:HD12	1.67	0.60
1:B:233:PHE:HB3	1:B:256:LEU:HD23	1.83	0.60
1:A:247:ALA:HB1	1:A:252:LYS:HB2	1.83	0.59
1:B:271:ASP:OD2	1:B:274:LYS:HB2	2.03	0.59
1:B:232:SER:HA	1:B:255:THR:HG22	1.85	0.58
1:A:418:SER:HA	1:A:440:TRP:O	2.03	0.58
1:A:233:PHE:HB3	1:A:256:LEU:HD23	1.85	0.58
1:B:304:TYR:O	1:B:308:VAL:HG23	2.03	0.58
1:B:146:LEU:HD13	1:B:476:VAL:HG13	1.85	0.58
1:A:387:GLU:OE2	1:A:389:PHE:CE1	2.57	0.58
1:A:237:THR:HA	1:A:258:LEU:HD13	1.86	0.57
1:B:307:LEU:HD12	1:B:307:LEU:O	2.04	0.57
1:B:11:LEU:HD21	1:B:100:LEU:HD21	1.88	0.56
1:B:469:GLY:HA2	1:B:472:GLU:HG3	1.87	0.56
1:B:28:LEU:CD2	1:B:198:GLU:HG2	2.35	0.56
1:B:466:GLY:O	1:B:470:ILE:HG22	2.06	0.56
1:B:247:ALA:HB1	1:B:252:LYS:HB2	1.88	0.55
1:B:346:LEU:HD13	1:B:360:GLU:HA	1.87	0.55
1:A:419:VAL:O	1:A:441:ILE:O	2.24	0.55
1:B:68:LEU:HB3	1:B:69:PRO:HD3	1.90	0.54
1:A:166:GLN:HA	1:A:169:TYR:CE2	2.43	0.54
1:A:260:GLY:HA2	1:A:413:TYR:CG	2.42	0.54
1:B:68:LEU:HD21	1:B:152:GLY:HA2	1.90	0.54
1:A:57:LEU:HD11	1:A:222:LEU:HD13	1.89	0.54
1:B:272:ILE:HD11	1:B:303:LEU:CD2	2.37	0.53
1:B:467:ARG:HG2	1:B:467:ARG:NH1	2.21	0.53
1:A:126:PHE:O	1:A:176:ILE:HG12	2.07	0.53
1:A:225:HIS:HB3	1:A:228:ILE:HG12	1.90	0.53
1:B:35:MET:HE3	1:B:51:VAL:HG21	1.90	0.53
1:A:139:ASP:OD1	1:A:141:SER:N	2.41	0.53
1:A:68:LEU:HD12	1:A:68:LEU:O	2.09	0.52
1:A:262:ASP:HB2	1:A:293:SER:O	2.10	0.52
1:B:266:VAL:O	1:B:300:PRO:HD3	2.09	0.52
1:A:83:LEU:HD22	1:A:176:ILE:HD13	1.91	0.52
1:B:159:PRO:HD3	1:B:234:THR:HB	1.90	0.52
1:A:71:TRP:CE2	1:A:79:ARG:HD2	2.43	0.52
1:A:292:VAL:HG21	1:A:440:TRP:HH2	1.74	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:398:TYR:CG	1:B:404:ALA:HB2	2.44	0.52
1:B:65:ARG:HG2	1:B:153:VAL:HG21	1.92	0.52
1:B:292:VAL:HG21	1:B:440:TRP:CH2	2.45	0.51
1:A:290:VAL:HB	1:A:293:SER:HB2	1.93	0.51
1:A:456:ILE:HA	1:B:253:ARG:HH22	1.76	0.51
1:B:269:ASP:O	1:B:422:SER:OG	2.26	0.51
1:B:139:ASP:OD1	1:B:141:SER:N	2.42	0.51
1:B:146:LEU:CD1	1:B:476:VAL:HG13	2.41	0.51
1:B:104:GLU:OE2	1:B:189:THR:HA	2.10	0.51
1:A:290:VAL:HG12	1:A:292:VAL:H	1.76	0.50
1:A:398:TYR:CG	1:A:404:ALA:HB2	2.47	0.50
1:B:129:TYR:O	1:B:130:ARG:NH1	2.40	0.50
1:B:231:VAL:HG23	1:B:252:LYS:HD3	1.93	0.50
1:A:377:LEU:CD2	1:A:384:VAL:HG13	2.41	0.50
1:A:104:GLU:HG3	1:A:105:GLN:N	2.27	0.50
1:B:296:ARG:HD3	1:B:384:VAL:HG23	1.94	0.50
1:B:357:ALA:O	1:B:372:THR:HA	2.12	0.49
1:A:467:ARG:O	1:A:471:GLU:HG3	2.12	0.49
1:B:250:THR:O	1:B:250:THR:CG2	2.60	0.49
1:B:359:GLY:C	1:B:360:GLU:HG2	2.33	0.49
1:B:437:GLY:HA3	1:B:454:GLY:O	2.13	0.49
1:A:108:PRO:HD2	1:A:111:GLU:OE1	2.13	0.49
1:B:277:ASP:OD1	1:B:314:ARG:NE	2.32	0.48
1:B:151:VAL:HG22	1:B:473:PHE:O	2.14	0.48
1:B:403:ASP:O	1:B:407:ARG:HG3	2.13	0.48
1:B:359:GLY:O	1:B:360:GLU:CG	2.54	0.47
1:B:239:THR:O	1:B:243:VAL:HG23	2.14	0.47
1:B:71:TRP:CE2	1:B:79:ARG:HD2	2.50	0.47
1:B:57:LEU:O	1:B:61:VAL:HG23	2.14	0.47
1:B:465:PHE:O	1:B:468:SER:O	2.32	0.47
1:A:125:TYR:CD2	1:A:449:PRO:HB2	2.50	0.47
1:B:305:GLU:N	1:B:306:PRO:HD2	2.30	0.47
1:B:387:GLU:OE1	1:B:389:PHE:CE1	2.61	0.47
1:A:230:LYS:HG3	1:A:253:ARG:HB3	1.97	0.47
1:A:426:ARG:O	1:A:430:VAL:HG23	2.14	0.46
1:A:94:HIS:HA	1:A:116:VAL:HG11	1.97	0.46
1:B:339:PHE:CD1	1:B:367:TYR:HB3	2.50	0.46
1:B:161:ASN:HD21	1:B:389:PHE:HE2	1.62	0.46
1:B:462:GLY:HA3	1:B:472:GLU:OE2	2.15	0.46
1:A:76:TYR:OH	1:A:131:LEU:HB2	2.16	0.46
1:B:89:VAL:HG21	1:B:203:VAL:HG21	1.98	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:184:LYS:HB3	1:B:184:LYS:HE3	1.81	0.46
1:B:360:GLU:O	1:B:370:GLN:HB2	2.15	0.46
1:B:467:ARG:HH11	1:B:467:ARG:CG	2.22	0.46
1:A:309:GLU:OE1	1:A:309:GLU:HA	2.16	0.45
1:A:104:GLU:OE1	1:A:191:LEU:N	2.49	0.45
1:A:184:LYS:HD2	1:A:218:LEU:HB3	1.98	0.45
1:A:184:LYS:HG3	1:A:218:LEU:HD23	1.98	0.45
1:B:260:GLY:HA2	1:B:413:TYR:CD1	2.52	0.45
1:A:345:ALA:HB3	1:A:392:ILE:HD13	1.99	0.45
1:A:357:ALA:O	1:A:372:THR:HA	2.15	0.45
1:B:159:PRO:HD2	1:B:166:GLN:OE1	2.16	0.44
1:A:443:HIS:HB3	1:B:482:LYS:HD2	1.99	0.44
1:A:400:ASP:OD1	1:A:401:LEU:N	2.50	0.44
1:A:428:ILE:HG23	1:B:479:VAL:HG11	2.00	0.44
1:B:33:ASP:OD1	1:B:34:GLU:N	2.44	0.44
1:A:230:LYS:HG2	1:A:231:VAL:N	2.32	0.44
1:B:57:LEU:CD1	1:B:222:LEU:HD13	2.24	0.44
1:B:100:LEU:HD23	1:B:100:LEU:HA	1.69	0.44
1:A:95:GLU:HA	1:A:95:GLU:OE1	2.18	0.44
1:A:103:LEU:HD23	1:A:103:LEU:HA	1.86	0.44
1:B:218:LEU:HD12	1:B:218:LEU:HA	1.86	0.44
1:B:125:TYR:CD1	1:B:449:PRO:HB2	2.53	0.44
1:B:166:GLN:HA	1:B:169:TYR:CE2	2.53	0.44
1:A:261:ASN:HB2	1:A:413:TYR:HD2	1.83	0.43
1:B:228:ILE:HB	1:B:252:LYS:HE3	2.00	0.43
1:A:166:GLN:HG2	1:A:169:TYR:CE2	2.53	0.43
1:B:282:TRP:HB2	1:B:294:ILE:HD12	2.00	0.43
1:B:311:LEU:O	1:B:315:VAL:HG23	2.17	0.43
1:A:232:SER:HA	1:A:255:THR:CG2	2.43	0.43
1:B:189:THR:N	1:B:190:PRO:HD3	2.34	0.43
1:B:311:LEU:HD23	1:B:311:LEU:HA	1.70	0.43
1:A:311:LEU:HA	1:A:311:LEU:HD23	1.68	0.43
1:A:456:ILE:HA	1:B:253:ARG:NH2	2.33	0.43
1:A:464:GLU:HA	1:A:464:GLU:OE1	2.17	0.43
1:A:19:LYS:HB3	1:A:19:LYS:HE3	1.80	0.43
1:A:390:ALA:HB1	1:A:391:PRO:HD2	2.01	0.43
1:A:403:ASP:OD2	1:A:407:ARG:NH1	2.48	0.43
1:B:292:VAL:O	1:B:292:VAL:HG13	2.18	0.43
1:B:378:ASP:O	1:B:381:SER:HB3	2.18	0.43
1:A:64:ALA:HA	1:A:207:GLY:O	2.19	0.43
1:A:166:GLN:HG2	1:A:169:TYR:OH	2.19	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:348:MET:SD	1:A:382:PRO:HB2	2.59	0.43
1:B:262:ASP:HB2	1:B:293:SER:O	2.19	0.43
1:A:166:GLN:HG2	1:A:169:TYR:CZ	2.53	0.43
1:A:65:ARG:HG2	1:A:153:VAL:HG21	2.01	0.43
1:A:247:ALA:CB	1:A:254:LEU:HD11	2.48	0.43
1:B:324:LEU:HA	1:B:324:LEU:HD23	1.68	0.43
1:B:481:LEU:HD12	1:B:482:LYS:N	2.34	0.43
1:B:83:LEU:HD23	1:B:83:LEU:HA	1.86	0.42
1:B:381:SER:O	1:B:385:ARG:HG2	2.19	0.42
1:B:61:VAL:HG22	1:B:228:ILE:HD11	2.01	0.42
1:B:339:PHE:O	1:B:343:ARG:HG3	2.20	0.42
1:A:257:GLU:C	1:A:258:LEU:HD23	2.39	0.42
1:A:100:LEU:O	1:A:104:GLU:HG2	2.20	0.42
1:B:361:VAL:HG12	1:B:369:VAL:HG22	2.01	0.42
1:B:414:GLY:HA2	1:B:436:VAL:HG12	2.01	0.42
1:B:250:THR:O	1:B:250:THR:HG22	2.19	0.42
1:A:104:GLU:OE1	1:A:191:LEU:HB3	2.19	0.42
1:A:401:LEU:HD23	1:A:401:LEU:HA	1.84	0.41
1:A:9:THR:HB	1:A:11:LEU:HG	2.01	0.41
1:A:271:ASP:O	1:A:275:THR:HG23	2.20	0.41
1:A:259:GLY:HA2	1:A:291:CYS:HB2	2.01	0.41
1:B:232:SER:HA	1:B:255:THR:CG2	2.48	0.41
1:B:383:LEU:HD23	1:B:383:LEU:HA	1.89	0.41
1:A:270:ALA:HB1	1:A:275:THR:HG21	2.03	0.41
1:A:362:LEU:HD23	1:A:362:LEU:HA	1.79	0.41
1:A:379:GLU:OE2	1:A:407:ARG:NH2	2.52	0.41
1:A:74:LEU:HG	1:A:78:GLU:HB2	2.03	0.41
1:A:257:GLU:O	1:A:258:LEU:HD23	2.20	0.41
1:B:54:SER:HB2	1:B:221:LEU:CD1	2.51	0.41
1:A:13:PHE:CE2	1:A:18:LYS:HD3	2.56	0.41
1:A:14:ASP:OD2	1:A:17:SER:OG	2.24	0.41
1:A:201:ARG:NH1	1:A:201:ARG:HG2	2.36	0.41
1:A:461:LEU:HA	1:A:461:LEU:HD23	1.85	0.41
1:A:250:THR:CG2	1:A:252:LYS:HG3	2.50	0.41
1:A:162:PHE:N	1:A:163:PRO:HD3	2.36	0.40
1:A:305:GLU:N	1:A:306:PRO:HD2	2.36	0.40
1:A:272:ILE:HD11	1:A:303:LEU:HD22	2.03	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	475/520 (91%)	464 (98%)	11 (2%)	0	100	100
1	B	475/520 (91%)	464 (98%)	11 (2%)	0	100	100
All	All	950/1040 (91%)	928 (98%)	22 (2%)	0	100	100

There are no Ramachandran outliers to report.

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	378/413 (92%)	372 (98%)	6 (2%)	58	78
1	B	378/413 (92%)	370 (98%)	8 (2%)	48	71
All	All	756/826 (92%)	742 (98%)	14 (2%)	52	74

All (14) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	169	TYR
1	A	186	SER
1	A	250	THR
1	A	268	ASP
1	A	389	PHE
1	A	443	HIS
1	B	54	SER
1	B	142	SER

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Mol	Chain	Res	Type
1	B	161	ASN
1	B	169	TYR
1	B	293	SER
1	B	330	LEU
1	B	389	PHE
1	B	443	HIS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (2) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	364	GLN
1	B	340	GLN

5.3.3 RNA

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains

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

5.5 Carbohydrates

There are no oligosaccharides in this entry.

5.6 Ligand geometry

There are no ligands in this entry.

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, 95^{th} 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	477/520 (91%)	-0.25	3 (0%)	85	83	38, 51, 70, 83	0
1	B	477/520 (91%)	-0.17	2 (0%)	89	87	41, 57, 77, 109	0
All	All	954/1040 (91%)	-0.21	5 (0%)	87	85	38, 55, 74, 109	0

All (5) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	464	GLU	5.0
1	A	257	GLU	2.9
1	B	9	THR	2.7
1	A	364	GLN	2.2
1	B	469	GLY	2.1

6.2 Non-standard residues in protein, DNA, RNA chains

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

6.3 Carbohydrates

There are no monosaccharides in this entry.

6.4 Ligands

There are no ligands in this entry.

6.5 Other polymers

There are no such residues in this entry.