Full wwPDB X-ray Structure Validation Report ⓘ

Sep 24, 2024 – 12:09 PM JST

PDB ID	:	8WK5
Title	:	Aldo-keto reductase KmAKR-Y28A/K29H/Y296W/W297H
Authors	:	Xu, S.Y.; Zhou, L.; Xu, Y.; Wang, Y.J.; Zheng, Y.G.
Deposited on	:	2023-09-27
Resolution	:	2.90 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:

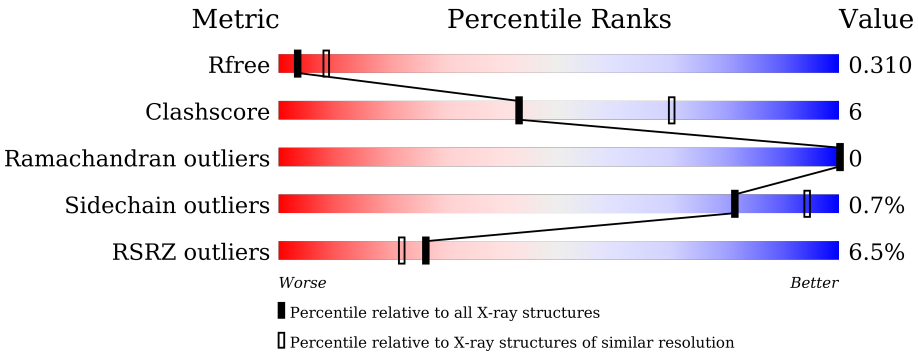
MolProbity	:	4.02b-467
Xtriage (Phenix)	:	1.13
EDS	:	3.0
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4	:	9.0.002 (Gargrove)
Density-Fitness	:	1.0.11
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.38.2

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 2.90 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	2335 (2.90-2.90)
Clashscore	180529	2564 (2.90-2.90)
Ramachandran outliers	177936	2514 (2.90-2.90)
Sidechain outliers	177891	2516 (2.90-2.90)
RSRZ outliers	164620	2337 (2.90-2.90)

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	310	5% 80% 16% .
1	B	310	4% 82% 13% 5%
1	C	310	6% 88% 11% .
1	D	310	10% 83% 13% .

2 Entry composition (i)

There are 2 unique types of molecules in this entry. The entry contains 9687 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 NADPH-dependent alpha-keto amide reductase.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
1	A	299	Total	C	N	O	0	0	0
			2404	1554	384	466			
1	B	296	Total	C	N	O	0	0	0
			2385	1545	381	459			
1	C	307	Total	C	N	O	0	0	0
			2472	1597	396	479			
1	D	299	Total	C	N	O	0	0	0
			2411	1562	388	461			

There are 20 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	28	ALA	TYR	engineered mutation	UNP W0TDP7
A	29	HIS	LYS	engineered mutation	UNP W0TDP7
A	109	ASN	LYS	conflict	UNP W0TDP7
A	296	TRP	TYR	engineered mutation	UNP W0TDP7
A	297	HIS	TRP	engineered mutation	UNP W0TDP7
B	28	ALA	TYR	engineered mutation	UNP W0TDP7
B	29	HIS	LYS	engineered mutation	UNP W0TDP7
B	109	ASN	LYS	conflict	UNP W0TDP7
B	296	TRP	TYR	engineered mutation	UNP W0TDP7
B	297	HIS	TRP	engineered mutation	UNP W0TDP7
C	28	ALA	TYR	engineered mutation	UNP W0TDP7
C	29	HIS	LYS	engineered mutation	UNP W0TDP7
C	109	ASN	LYS	conflict	UNP W0TDP7
C	296	TRP	TYR	engineered mutation	UNP W0TDP7
C	297	HIS	TRP	engineered mutation	UNP W0TDP7
D	28	ALA	TYR	engineered mutation	UNP W0TDP7
D	29	HIS	LYS	engineered mutation	UNP W0TDP7
D	109	ASN	LYS	conflict	UNP W0TDP7
D	296	TRP	TYR	engineered mutation	UNP W0TDP7
D	297	HIS	TRP	engineered mutation	UNP W0TDP7

- Molecule 2 is water.

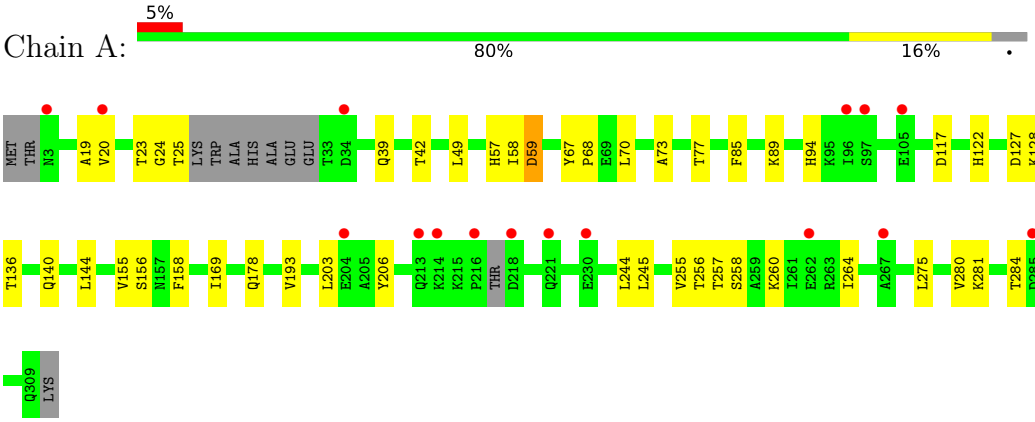
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	A	4	Total O 4 4	0	0
2	B	4	Total O 4 4	0	0
2	C	3	Total O 3 3	0	0
2	D	4	Total O 4 4	0	0

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.

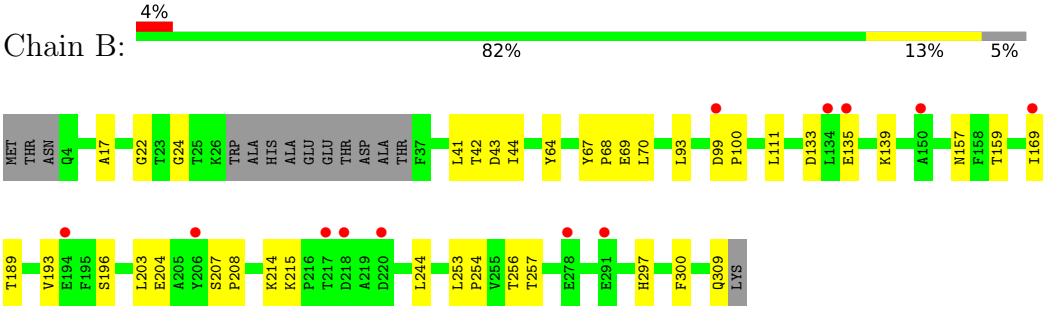
• Molecule 1: NADPH-dependent alpha-keto amide reductase

Chain A:



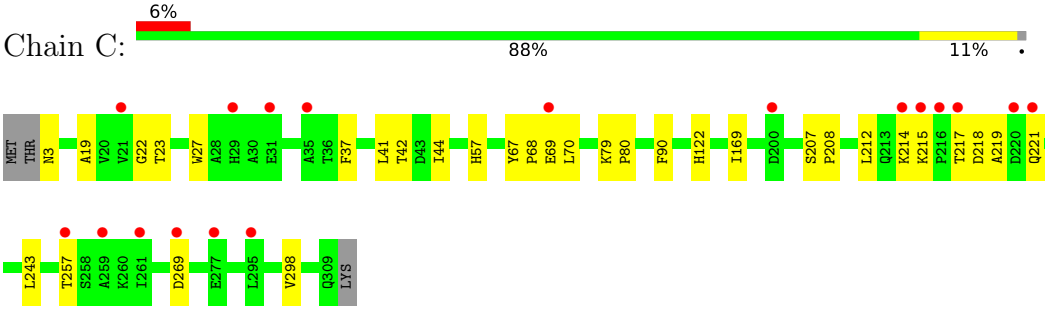
• Molecule 1: NADPH-dependent alpha-keto amide reductase

Chain B:



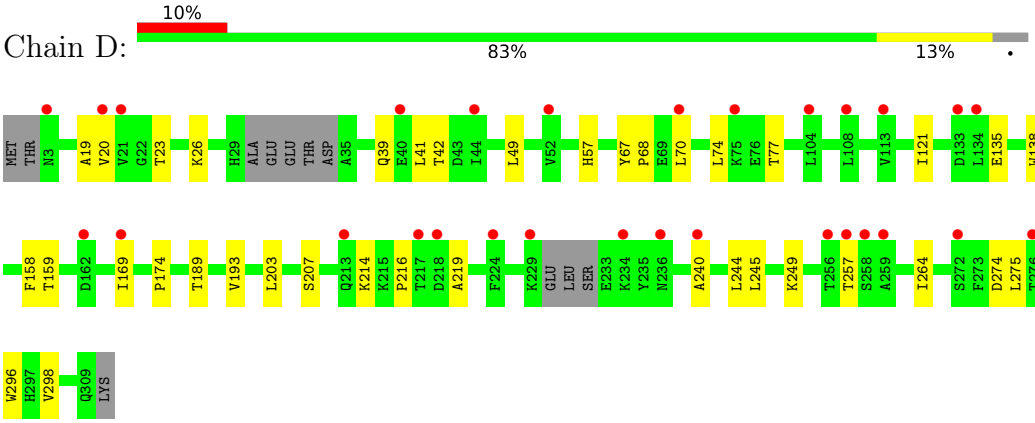
• Molecule 1: NADPH-dependent alpha-keto amide reductase

Chain C:



• Molecule 1: NADPH-dependent alpha-keto amide reductase

Chain D:


10%
83%
13%
MET THR N3 A19 V20 V21 G22 T23 K26 H29 ALA GLU GLU THR ASP A35 Q39 E40 L41 T42 D43 I44 L49 V52 H57 Y67 P68 E69 L70 L74 K75 E76 T77 L104 L108 V113 I121 D133 L134 E135 W138 L141 V155
F158 T159 D162 I169 P174 T189 V193 L203 S207 Q213 K214 K215 P216 T217 D218 A219 F224 K229 GLU LEU SER E233 K234 Y235 N236 A240 L244 L245 K249 T256 T257 S258 A259 I264 S272 F273 D274 L275 T276 E277 E278 L295
W296 H297 V298 Q309 LYS

4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α, β, γ	67.62Å 115.98Å 83.83Å 90.00° 102.31° 90.00°	Depositor
Resolution (Å)	57.86 – 2.90 57.86 – 2.90	Depositor EDS
% Data completeness (in resolution range)	98.1 (57.86-2.90) 98.1 (57.86-2.90)	Depositor EDS
R_{merge}	0.44	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.97 (at 2.91Å)	Xtriage
Refinement program	REFMAC 5.8.0419	Depositor
R, R_{free}	0.268 , 0.312 0.267 , 0.310	Depositor DCC
R_{free} test set	1362 reflections (4.88%)	wwPDB-VP
Wilson B-factor (Å^2)	21.2	Xtriage
Anisotropy	1.026	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.30 , 30.2	EDS
L-test for twinning[2]	$< \|L\| > = 0.46$, $< L^2 > = 0.28$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.84	EDS
Total number of atoms	9687	wwPDB-VP
Average B, all atoms (Å^2)	34.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.31% 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	0.37	0/2454	0.51	1/3325 (0.0%)
1	B	0.36	0/2436	0.50	0/3300
1	C	0.36	0/2527	0.50	0/3428
1	D	0.36	0/2464	0.50	0/3339
All	All	0.36	0/9881	0.50	1/13392 (0.0%)

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	206	TYR	N-CA-CB	-5.33	101.01	110.60

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	2404	0	2416	42	0
1	B	2385	0	2408	34	0
1	C	2472	0	2477	20	0
1	D	2411	0	2425	25	0
2	A	4	0	0	0	0
2	B	4	0	0	0	0
2	C	3	0	0	0	0
2	D	4	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
All	All	9687	0	9726	118	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 (118) 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:A:155:VAL:HG11	1:A:158:PHE:CG	2.08	0.89
1:A:155:VAL:CG1	1:A:158:PHE:CD1	2.66	0.79
1:B:135:GLU:HG2	1:B:169:ILE:HD13	1.65	0.78
1:A:155:VAL:HG11	1:A:158:PHE:CD2	2.19	0.77
1:A:23:THR:HG21	1:A:70:LEU:HD11	1.67	0.74
1:D:20:VAL:HG12	1:D:264:ILE:HG23	1.70	0.74
1:B:22:GLY:HA3	1:B:257:THR:HG22	1.72	0.72
1:D:20:VAL:CG1	1:D:264:ILE:HG23	2.23	0.69
1:A:155:VAL:CG1	1:A:158:PHE:CG	2.75	0.69
1:B:135:GLU:HG2	1:B:169:ILE:CD1	2.28	0.62
1:A:20:VAL:CG1	1:A:264:ILE:HG23	2.30	0.62
1:D:135:GLU:HG3	1:D:169:ILE:HG21	1.81	0.62
1:A:298:VAL:O	1:A:302:THR:HG23	1.99	0.62
1:B:244:LEU:HD21	1:B:256:THR:CG2	2.30	0.61
1:A:49:LEU:HB2	1:A:77:THR:HG21	1.85	0.58
1:C:27:TRP:HZ2	1:D:257:THR:O	1.86	0.57
1:A:244:LEU:HD21	1:A:256:THR:HG21	1.85	0.56
1:D:245:LEU:O	1:D:249:LYS:HG2	2.05	0.56
1:A:49:LEU:HD21	1:A:58:ILE:HD11	1.86	0.56
1:D:245:LEU:HD21	1:D:274:ASP:HA	1.87	0.56
1:B:196:SER:CB	1:B:203:LEU:HD21	2.35	0.56
1:A:20:VAL:HG12	1:A:264:ILE:HG23	1.86	0.56
1:A:24:GLY:O	1:A:25:THR:HG23	2.07	0.55
1:C:42:THR:HG22	1:C:69:GLU:CA	2.36	0.55
1:D:49:LEU:HD13	1:D:77:THR:HG21	1.90	0.54
1:D:121:ILE:HG13	1:D:141:LEU:HD11	1.88	0.54
1:B:41:LEU:O	1:B:44:ILE:HG22	2.08	0.54
1:B:214:LYS:O	1:B:215:LYS:C	2.46	0.53
1:C:226:GLN:O	1:C:230:GLU:HG3	2.07	0.53
1:A:128:LYS:HB3	1:D:298:VAL:HG12	1.91	0.53
1:A:23:THR:HG23	1:A:59:ASP:O	2.08	0.53
1:B:42:THR:HG22	1:B:69:GLU:CA	2.40	0.52
1:A:155:VAL:CG1	1:A:158:PHE:CE1	2.93	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:193:VAL:HA	1:B:203:LEU:HD11	1.91	0.51
1:A:155:VAL:HG12	1:A:156:SER:N	2.26	0.51
1:C:212:LEU:HD22	1:C:215:LYS:HE2	1.94	0.50
1:A:193:VAL:HA	1:A:203:LEU:HD11	1.93	0.50
1:A:280:VAL:O	1:A:284:THR:HG23	2.11	0.50
1:B:42:THR:HG22	1:B:69:GLU:HA	1.94	0.50
1:D:207:SER:HG	1:D:296:TRP:HE1	1.59	0.50
1:A:155:VAL:HG13	1:A:158:PHE:CE1	2.47	0.49
1:D:19:ALA:HA	1:D:57:HIS:HB3	1.95	0.49
1:B:135:GLU:CD	1:B:169:ILE:HB	2.33	0.49
1:D:245:LEU:HD23	1:D:275:LEU:HG	1.95	0.49
1:C:22:GLY:HA3	1:C:257:THR:HG22	1.95	0.48
1:D:23:THR:HG22	1:D:41:LEU:HD21	1.95	0.48
1:A:155:VAL:HG12	1:A:158:PHE:CD1	2.47	0.48
1:B:42:THR:HG22	1:B:69:GLU:CB	2.43	0.48
1:C:42:THR:HG22	1:C:69:GLU:HA	1.95	0.48
1:C:217:THR:O	1:C:218:ASP:HB2	2.13	0.48
1:A:244:LEU:HD21	1:A:256:THR:CG2	2.44	0.48
1:C:42:THR:HG22	1:C:69:GLU:CB	2.43	0.48
1:D:159:THR:HG22	1:D:189:THR:HG21	1.96	0.48
1:C:42:THR:HG22	1:C:69:GLU:HB3	1.95	0.47
1:A:73:ALA:O	1:A:77:THR:HG23	2.14	0.47
1:D:39:GLN:HA	1:D:42:THR:HG22	1.97	0.47
1:A:135:GLU:CG	1:A:169:ILE:HD13	2.45	0.47
1:B:17:ALA:O	1:B:254:PRO:HD2	2.15	0.46
1:C:23:THR:HG21	1:C:70:LEU:HD13	1.97	0.46
1:A:19:ALA:HA	1:A:57:HIS:HB3	1.98	0.46
1:D:67:TYR:N	1:D:68:PRO:CD	2.78	0.46
1:D:138:TRP:CH2	1:D:174:PRO:HB3	2.51	0.46
1:A:257:THR:O	1:A:258:SER:HB2	2.16	0.45
1:B:93:LEU:HD11	1:B:300:PHE:CZ	2.52	0.45
1:C:219:ALA:C	1:C:221:GLN:H	2.19	0.45
1:B:99:ASP:HB2	1:B:100:PRO:HD2	1.99	0.45
1:B:67:TYR:N	1:B:68:PRO:CD	2.80	0.45
1:A:23:THR:HG22	1:A:70:LEU:HD21	1.99	0.45
1:C:41:LEU:O	1:C:44:ILE:HG22	2.16	0.45
1:B:93:LEU:HD11	1:B:300:PHE:HZ	1.82	0.45
1:A:85:PHE:CE1	1:A:117:ASP:HB3	2.52	0.45
1:A:281:LYS:O	1:A:284:THR:OG1	2.30	0.45
1:D:214:LYS:HE3	1:D:295:LEU:HD21	1.99	0.44
1:A:140:GLN:O	1:A:144:LEU:HG	2.18	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:89:LYS:HE2	1:A:178:GLN:OE1	2.17	0.44
1:B:70:LEU:HB3	1:B:111:LEU:CD2	2.48	0.44
1:C:37:PHE:CZ	1:C:42:THR:HG21	2.53	0.44
1:B:244:LEU:HD21	1:B:256:THR:HG21	1.98	0.44
1:B:157:ASN:OD1	1:B:188:GLN:NE2	2.50	0.43
1:D:155:VAL:HB	1:D:158:PHE:CD1	2.53	0.43
1:A:94:HIS:HA	1:A:127:ASP:OD2	2.19	0.43
1:B:22:GLY:HA3	1:B:257:THR:CG2	2.46	0.43
1:C:90:PHE:O	1:C:122:HIS:HB2	2.19	0.43
1:A:67:TYR:N	1:A:68:PRO:CD	2.82	0.43
1:A:135:GLU:HG2	1:A:169:ILE:HD13	2.00	0.43
1:B:159:THR:HG22	1:B:189:THR:HG21	2.00	0.43
1:B:169:ILE:HG22	1:B:169:ILE:O	2.18	0.43
1:B:184:PHE:HA	1:B:309:GLN:NE2	2.33	0.43
1:B:204:GLU:HG2	1:B:253:LEU:HB3	2.01	0.43
1:B:135:GLU:CG	1:B:169:ILE:HG21	2.49	0.43
1:A:169:ILE:O	1:A:169:ILE:HG22	2.19	0.43
1:B:42:THR:HG22	1:B:69:GLU:HB3	2.01	0.43
1:B:135:GLU:HG3	1:B:139:LYS:HE2	1.99	0.43
1:C:67:TYR:N	1:C:68:PRO:CD	2.81	0.43
1:C:169:ILE:HG22	1:C:169:ILE:O	2.19	0.43
1:B:253:LEU:C	1:B:253:LEU:HD23	2.40	0.42
1:A:169:ILE:O	1:A:169:ILE:CG2	2.68	0.42
1:B:133:ASP:OD1	1:B:133:ASP:N	2.53	0.42
1:A:19:ALA:HB3	1:A:255:VAL:HG22	2.01	0.42
1:A:245:LEU:HD23	1:A:275:LEU:HG	2.01	0.42
1:C:19:ALA:HA	1:C:57:HIS:HB3	2.01	0.42
1:B:135:GLU:OE1	1:B:169:ILE:HB	2.20	0.42
1:B:207:SER:N	1:B:208:PRO:CD	2.83	0.42
1:C:207:SER:N	1:C:208:PRO:CD	2.83	0.41
1:D:169:ILE:O	1:D:169:ILE:HG22	2.20	0.41
1:A:260:LYS:NZ	1:B:43:ASP:OD2	2.39	0.41
1:D:193:VAL:HA	1:D:203:LEU:HD11	2.03	0.41
1:A:23:THR:CG2	1:A:70:LEU:HD21	2.51	0.41
1:A:39:GLN:O	1:A:42:THR:HG22	2.21	0.41
1:C:212:LEU:HG	1:C:243:LEU:HD12	2.02	0.41
1:D:70:LEU:O	1:D:74:LEU:HG	2.20	0.41
1:B:24:GLY:HA2	1:B:64:TYR:CG	2.56	0.41
1:C:79:LYS:HA	1:C:80:PRO:HD3	1.97	0.41
1:A:24:GLY:O	1:A:25:THR:CG2	2.69	0.41
1:D:23:THR:HG21	1:D:70:LEU:HG	2.03	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:216:PRO:HG2	1:D:219:ALA:HB2	2.03	0.41
1:A:133:ASP:OD1	1:A:136:THR:OG1	2.28	0.40
1:D:240:ALA:O	1:D:244:LEU:HG	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	293/310 (94%)	288 (98%)	5 (2%)	0	100	100
1	B	292/310 (94%)	288 (99%)	4 (1%)	0	100	100
1	C	305/310 (98%)	297 (97%)	8 (3%)	0	100	100
1	D	293/310 (94%)	286 (98%)	7 (2%)	0	100	100
All	All	1183/1240 (95%)	1159 (98%)	24 (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	268/277 (97%)	266 (99%)	2 (1%)	81	94
1	B	266/277 (96%)	265 (100%)	1 (0%)	89	97

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles
1	C	274/277 (99%)	270 (98%)	4 (2%)	60 85
1	D	267/277 (96%)	266 (100%)	1 (0%)	89 97
All	All	1075/1108 (97%)	1067 (99%)	8 (1%)	81 94

All (8) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	59	ASP
1	A	122	HIS
1	B	297	HIS
1	C	3	ASN
1	C	214	LYS
1	C	269	ASP
1	C	298	VAL
1	D	26	LYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (8) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	13	ASN
1	A	152	ASN
1	A	222	GLN
1	A	268	GLN
1	B	122	HIS
1	B	309	GLN
1	C	3	ASN
1	D	122	HIS

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

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	299/310 (96%)	0.53	16 (5%)	32	28	13, 31, 60, 95	0
1	B	296/310 (95%)	0.51	12 (4%)	42	35	12, 30, 51, 65	0
1	C	307/310 (99%)	0.59	18 (5%)	29	25	15, 32, 60, 95	0
1	D	299/310 (96%)	0.86	32 (10%)	12	11	15, 39, 70, 100	0
All	All	1201/1240 (96%)	0.62	78 (6%)	26	22	12, 33, 63, 100	0

All (78) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	D	257	THR	4.3
1	D	277	GLU	4.0
1	D	133	ASP	3.8
1	D	213	GLN	3.8
1	D	258	SER	3.5
1	A	218	ASP	3.4
1	A	105	GLU	3.4
1	D	20	VAL	3.4
1	D	40	GLU	3.4
1	C	220	ASP	3.3
1	A	216	PRO	3.2
1	D	256	THR	3.0
1	A	204	GLU	3.0
1	D	44	ILE	2.9
1	C	29	HIS	2.9
1	D	70	LEU	2.9
1	A	34	ASP	2.8
1	C	31	GLU	2.8
1	D	134	LEU	2.8
1	A	3	ASN	2.8
1	D	234	LYS	2.8

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Mol	Chain	Res	Type	RSRZ
1	B	278	GLU	2.7
1	B	218	ASP	2.7
1	D	259	ALA	2.7
1	C	21	VAL	2.6
1	C	269	ASP	2.6
1	B	134	LEU	2.6
1	D	236	ASN	2.6
1	B	99	ASP	2.6
1	A	221	GLN	2.5
1	C	217	THR	2.5
1	D	224	PHE	2.5
1	B	135	GLU	2.5
1	C	257	THR	2.5
1	C	259	ALA	2.5
1	A	230	GLU	2.5
1	D	217	THR	2.5
1	D	104	LEU	2.4
1	A	262	GLU	2.4
1	D	141	LEU	2.4
1	D	52	VAL	2.4
1	B	217	THR	2.4
1	D	276	THR	2.4
1	D	21	VAL	2.3
1	D	272	SER	2.3
1	D	240	ALA	2.3
1	A	267	ALA	2.3
1	C	215	LYS	2.3
1	A	20	VAL	2.3
1	A	96	ILE	2.3
1	B	194	GLU	2.2
1	C	295	LEU	2.2
1	C	277	GLU	2.2
1	D	229	LYS	2.2
1	C	200	ASP	2.2
1	D	218	ASP	2.2
1	A	97	SER	2.2
1	B	206	TYR	2.2
1	B	291	GLU	2.2
1	D	108	LEU	2.2
1	D	3	ASN	2.1
1	A	214	LYS	2.1
1	D	278	GLU	2.1

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Mol	Chain	Res	Type	RSRZ
1	C	261	ILE	2.1
1	B	220	ASP	2.1
1	C	214	LYS	2.1
1	A	285	ASP	2.1
1	A	213	GLN	2.1
1	B	169	ILE	2.1
1	C	221	GLN	2.1
1	C	69	GLU	2.1
1	D	162	ASP	2.0
1	D	113	VAL	2.0
1	D	75	LYS	2.0
1	B	150	ALA	2.0
1	C	35	ALA	2.0
1	C	216	PRO	2.0
1	D	169	ILE	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)

There are no ligands in this entry.

6.5 Other polymers (i)

There are no such residues in this entry.