Full wwPDB X-ray Structure Validation Report ⓘ

Apr 29, 2025 – 02:22 AM EDT

PDB ID	:	3CKY / pdb_00003cky
Title	:	Structural and Kinetic Properties of a beta-hydroxyacid dehydrogenase involved in nicotinate fermentation
Authors	:	Reitz, S.; Alhapel, A.; Pierik, A.J.; Essen, L.-O.
Deposited on	:	2008-03-18
Resolution	:	2.30 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:

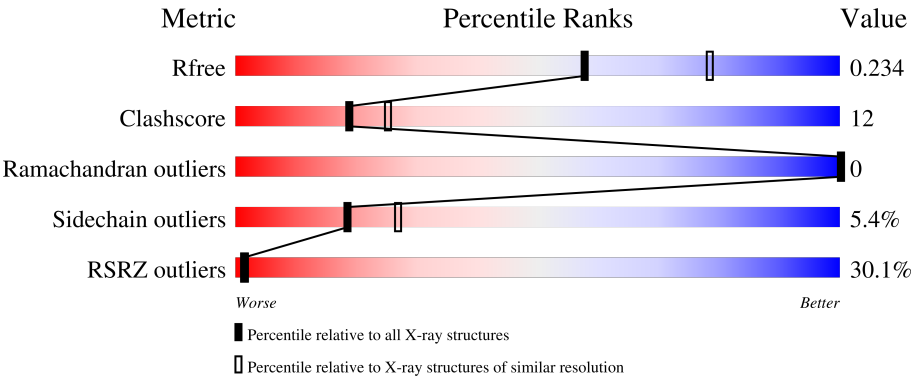
MolProbity	:	4-5-2 with Phenix2.0rc1
Xtriage (Phenix)	:	2.0rc1
EDS	:	3.0
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4	:	9.0.006 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.43.1

1 Overall quality at a glance

The following experimental techniques were used to determine the structure:
X-RAY DIFFRACTION

The reported resolution of this entry is 2.30 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	5963 (2.30-2.30)
Clashscore	180529	6698 (2.30-2.30)
Ramachandran outliers	177936	6640 (2.30-2.30)
Sidechain outliers	177891	6640 (2.30-2.30)
RSRZ outliers	164620	5963 (2.30-2.30)

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	301	24% 79% 18%
1	B	301	11% 81% 16%
1	C	301	46% 80% 17%
1	D	301	32% 65% 13% 20%

2 Entry composition (i)

There are 2 unique types of molecules in this entry. The entry contains 8515 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 2-hydroxymethyl glutarate dehydrogenase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	297	Total	C	N	O	S	3	1	0
			2117	1333	349	412	23			
1	B	296	Total	C	N	O	S	6	1	0
			2113	1331	348	411	23			
1	C	296	Total	C	N	O	S	14	1	0
			2111	1330	348	410	23			
1	D	240	Total	C	N	O	S	0	2	0
			1727	1089	282	338	18			

- Molecule 2 is water.

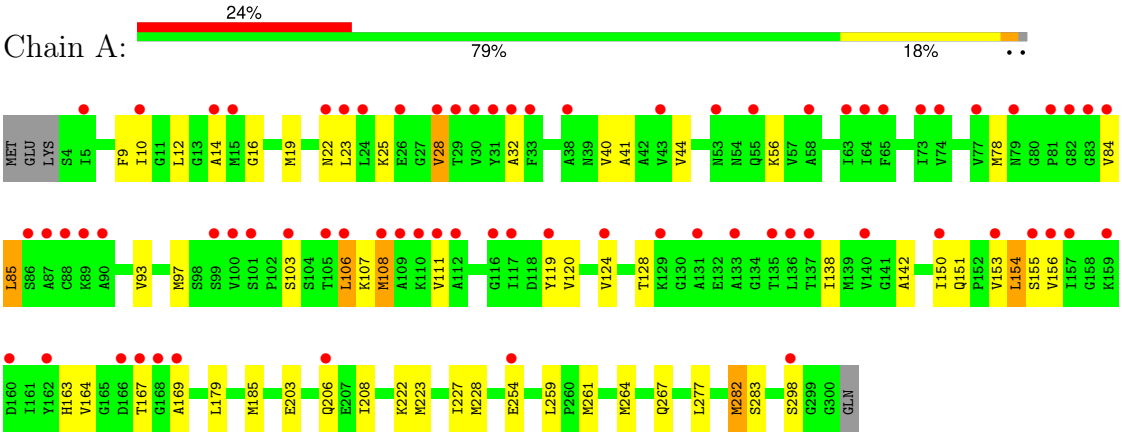
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	123	Total	O	0	0
			123	123		
2	B	158	Total	O	0	0
			158	158		
2	C	96	Total	O	0	0
			96	96		
2	D	70	Total	O	0	0
			70	70		

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.

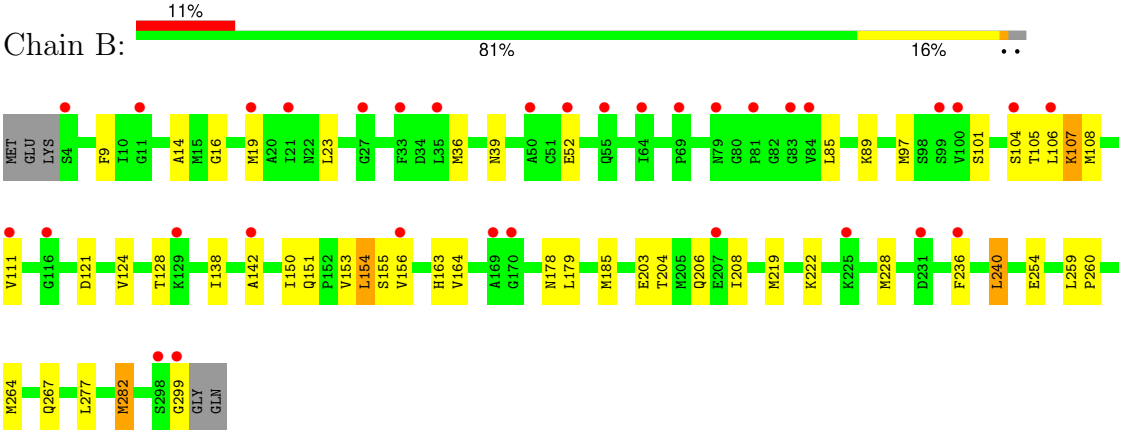
• Molecule 1: 2-hydroxymethyl glutarate dehydrogenase

Chain A:



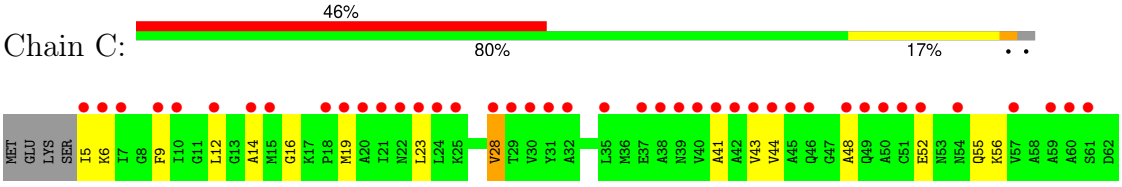
• Molecule 1: 2-hydroxymethyl glutarate dehydrogenase

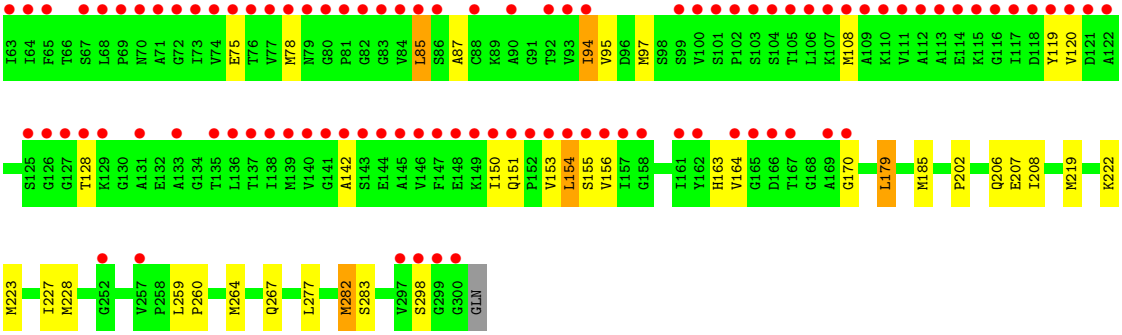
Chain B:



• Molecule 1: 2-hydroxymethyl glutarate dehydrogenase

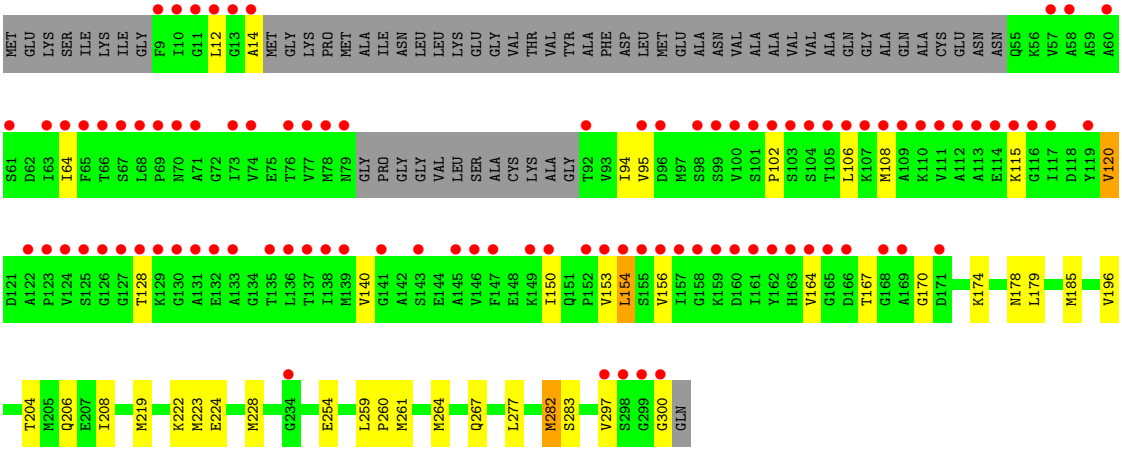
Chain C:





• Molecule 1: 2-hydroxymethyl glutarate dehydrogenase

Chain D:



4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α, β, γ	82.98Å 175.78Å 83.71Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	24.47 – 2.30 24.47 – 2.30	Depositor EDS
% Data completeness (in resolution range)	95.1 (24.47-2.30) 95.1 (24.47-2.30)	Depositor EDS
R_{merge}	0.11	Depositor
R_{sym}	0.11	Depositor
$< I/\sigma(I) >$ [1]	1.69 (at 2.31Å)	Xtriage
Refinement program	REFMAC	Depositor
R, R_{free}	0.194 , 0.222 0.203 , 0.234	Depositor DCC
R_{free} test set	2674 reflections (5.10%)	wwPDB-VP
Wilson B-factor (Å^2)	31.3	Xtriage
Anisotropy	0.136	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.35 , 66.6	EDS
L-test for twinning[2]	$< \|L\| > = 0.48$, $< L^2 > = 0.31$	Xtriage
Estimated twinning fraction	0.019 for l,-k,h	Xtriage
F_o,F_c correlation	0.89	EDS
Total number of atoms	8515	wwPDB-VP
Average B, all atoms (Å^2)	55.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.06% 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	0.60	0/2144	0.79	0/2888
1	B	0.65	0/2140	0.84	0/2883
1	C	0.58	0/2138	0.81	0/2880
1	D	0.56	0/1751	0.78	0/2354
All	All	0.60	0/8173	0.80	0/11005

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

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	2117	0	2174	67	0
1	B	2113	0	2171	55	0
1	C	2111	0	2169	63	0
1	D	1727	0	1772	48	0
2	A	123	0	0	1	0
2	B	158	0	0	3	0
2	C	96	0	0	0	0
2	D	70	0	0	2	0
All	All	8515	0	8286	191	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 12.

All (191) 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:264[A]:MET:SD	1:B:264[A]:MET:HE3	1.73	1.27
1:A:264[A]:MET:HE2	1:B:264[A]:MET:CE	1.77	1.15
1:C:264[B]:MET:HE2	1:D:264[B]:MET:CE	1.76	1.15
1:C:264[B]:MET:HE2	1:D:264[B]:MET:HE1	1.16	1.14
1:C:264[B]:MET:HE1	1:D:264[B]:MET:SD	1.89	1.12
1:B:236:PHE:CE1	1:B:240:LEU:HD13	1.87	1.10
1:C:264[B]:MET:CE	1:D:264[B]:MET:CE	2.31	1.07
1:C:19:MET:HE1	1:C:97:MET:HE1	1.36	1.06
1:A:264[A]:MET:SD	1:B:264[A]:MET:CE	2.43	1.06
1:C:264[B]:MET:CE	1:D:264[B]:MET:SD	2.42	1.06
1:A:264[A]:MET:CE	1:B:264[A]:MET:CE	2.35	1.05
1:A:19:MET:HE1	1:A:97:MET:HE1	1.41	1.02
1:A:78:MET:HE3	1:A:85:LEU:HD13	1.37	1.02
1:A:264[A]:MET:CE	1:B:264[A]:MET:HE3	1.92	0.99
1:B:19:MET:HE1	1:B:97:MET:HE1	1.41	0.99
1:A:264[A]:MET:HE2	1:B:264[A]:MET:HE1	1.41	0.97
1:B:236:PHE:HE1	1:B:240:LEU:HD13	1.29	0.94
1:C:264[B]:MET:CE	1:D:264[B]:MET:HE1	1.97	0.94
1:C:78:MET:CE	1:C:85:LEU:HD13	1.99	0.93
1:C:223:MET:HE3	1:C:228:MET:HE3	1.49	0.91
1:C:264[B]:MET:SD	1:D:264[B]:MET:HE3	2.11	0.90
1:C:78:MET:HE3	1:C:85:LEU:HD13	1.54	0.88
1:A:282:MET:HE3	1:A:283:SER:N	1.91	0.86
1:B:153:VAL:O	1:B:156:VAL:HG12	1.74	0.86
1:A:222:LYS:HE3	1:A:282:MET:HE2	1.59	0.82
1:A:153:VAL:O	1:A:156:VAL:HG12	1.78	0.82
1:A:23:LEU:HD23	1:A:156:VAL:HG11	1.62	0.81
1:A:10:ILE:HD13	1:A:84:VAL:HG21	1.63	0.80
1:C:153:VAL:O	1:C:156:VAL:HG12	1.81	0.80
1:C:264[B]:MET:SD	1:D:264[B]:MET:CE	2.69	0.80
1:B:264[B]:MET:HG3	1:C:264[B]:MET:HG3	1.65	0.79
1:D:153:VAL:O	1:D:156:VAL:HG12	1.83	0.79
1:B:23:LEU:HD23	1:B:156:VAL:HG11	1.65	0.77
1:A:264[B]:MET:HE3	1:B:264[B]:MET:SD	2.25	0.77
1:D:224:GLU:HA	1:D:228:MET:HE2	1.67	0.77
1:C:23:LEU:HD23	1:C:156:VAL:HG11	1.67	0.76
1:A:78:MET:CE	1:A:85:LEU:HD13	2.16	0.75
1:B:36:MET:HE3	1:B:39:ASN:ND2	2.02	0.74
1:A:264[A]:MET:CE	1:B:264[A]:MET:HE1	2.11	0.74
1:A:40:VAL:O	1:A:44:VAL:HG13	1.89	0.72

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:102:PRO:O	1:D:106:LEU:HD13	1.91	0.70
1:A:78:MET:HE2	1:A:119:TYR:HE1	1.57	0.70
1:A:264[A]:MET:HG3	1:B:264[A]:MET:HE1	1.75	0.67
1:D:282:MET:HE3	1:D:283:SER:N	2.10	0.67
1:C:185:MET:SD	1:C:282:MET:HE1	2.35	0.67
1:D:224:GLU:HA	1:D:228:MET:CE	2.24	0.65
1:A:208:ILE:HD11	1:D:164:VAL:HG12	1.79	0.65
1:A:208:ILE:CD1	1:D:164:VAL:HG12	2.26	0.65
1:C:12:LEU:HD21	1:C:43:VAL:CG1	2.27	0.65
1:A:259:LEU:H	1:C:267:GLN:NE2	1.94	0.64
1:D:185:MET:SD	1:D:282:MET:HE1	2.38	0.64
1:C:282:MET:HE3	1:C:283:SER:N	2.12	0.63
1:C:264[B]:MET:HE2	1:D:264[B]:MET:SD	2.23	0.63
1:C:223:MET:HE3	1:C:228:MET:CE	2.25	0.62
1:B:36:MET:HE3	1:B:39:ASN:HD21	1.64	0.62
1:D:254:GLU:OE1	2:D:359:HOH:O	2.16	0.62
1:B:23:LEU:CD2	1:B:156:VAL:HG11	2.30	0.61
1:A:78:MET:HE3	1:A:85:LEU:CD1	2.21	0.61
1:A:41:ALA:HA	1:A:44:VAL:HG22	1.80	0.61
1:A:16:GLY:HA2	1:A:19:MET:HE2	1.83	0.60
1:C:41:ALA:HA	1:C:44:VAL:HG12	1.83	0.60
1:A:23:LEU:CD2	1:A:156:VAL:HG11	2.30	0.60
1:D:164:VAL:HG21	1:D:170:GLY:HA2	1.83	0.60
1:B:16:GLY:HA2	1:B:19:MET:HE2	1.84	0.60
1:C:185:MET:HG2	1:C:282:MET:CE	2.31	0.60
1:C:16:GLY:HA2	1:C:19:MET:HE2	1.84	0.60
1:D:185:MET:HG2	1:D:282:MET:CE	2.32	0.59
1:C:12:LEU:HD21	1:C:43:VAL:HG13	1.84	0.59
1:C:164:VAL:HG21	1:C:170:GLY:HA2	1.84	0.59
1:A:9:PHE:HE2	1:A:19:MET:HE3	1.68	0.59
1:B:254:GLU:OE1	2:B:306:HOH:O	2.17	0.59
1:C:78:MET:CE	1:C:85:LEU:CD1	2.80	0.58
1:B:153:VAL:O	1:B:156:VAL:CG1	2.47	0.58
1:C:94:ILE:HG21	1:C:119:TYR:CD1	2.39	0.58
1:A:264[A]:MET:HE2	1:B:264[A]:MET:SD	2.45	0.57
1:B:222:LYS:HE3	1:B:282:MET:HE2	1.86	0.57
1:C:23:LEU:CD2	1:C:156:VAL:HG11	2.33	0.57
1:A:254:GLU:OE1	2:A:355:HOH:O	2.17	0.56
1:B:260:PRO:HB3	1:D:264[A]:MET:HE1	1.87	0.56
1:A:264[A]:MET:CG	1:B:264[A]:MET:HE1	2.36	0.56
1:C:94:ILE:HG23	1:C:119:TYR:HA	1.88	0.56

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:264[A]:MET:HG3	1:B:264[A]:MET:CE	2.35	0.56
1:B:9:PHE:HE2	1:B:19:MET:HE3	1.71	0.55
1:B:267:GLN:NE2	1:D:259:LEU:H	2.05	0.55
1:A:264[A]:MET:CG	1:B:264[A]:MET:CE	2.85	0.55
1:D:206:GLN:HG3	1:D:223:MET:HG2	1.90	0.54
1:C:206:GLN:HG3	1:C:223:MET:HG2	1.89	0.54
1:A:259:LEU:H	1:C:267:GLN:HE21	1.55	0.54
1:A:264[A]:MET:HE1	1:C:260:PRO:CB	2.38	0.54
1:C:9:PHE:HE2	1:C:19:MET:HE3	1.71	0.53
1:D:224:GLU:CA	1:D:228:MET:HE2	2.36	0.53
1:D:174:LYS:HD2	1:D:178:ASN:HD21	1.74	0.52
1:A:106:LEU:HD13	1:A:167:THR:HG22	1.91	0.52
1:A:264[A]:MET:HE1	1:C:260:PRO:HB3	1.91	0.52
1:A:264[A]:MET:SD	1:B:264[A]:MET:HE1	2.42	0.52
1:C:23:LEU:HB3	1:C:28:VAL:CG2	2.40	0.52
1:A:203:GLU:HG3	1:A:228:MET:HE1	1.92	0.51
1:C:94:ILE:CG2	1:C:119:TYR:CD1	2.93	0.51
1:C:55:GLN:HG3	1:C:87:ALA:HB2	1.92	0.51
1:A:185:MET:SD	1:A:282:MET:HE1	2.51	0.51
1:C:185:MET:CG	1:C:282:MET:HE1	2.41	0.51
1:B:151:GLN:NE2	1:B:155:SER:OG	2.43	0.50
1:B:264[B]:MET:SD	1:D:264[B]:MET:HE2	2.51	0.50
1:B:142:ALA:O	1:B:163:HIS:HE1	1.95	0.50
1:A:103:SER:HG	1:A:254:GLU:CD	2.19	0.50
1:D:204:THR:O	1:D:208:ILE:HD13	2.11	0.50
1:A:153:VAL:O	1:A:156:VAL:CG1	2.56	0.50
1:A:22:ASN:HA	1:A:25:LYS:HZ2	1.75	0.49
1:B:259:LEU:H	1:D:267:GLN:NE2	2.10	0.49
1:C:153:VAL:O	1:C:156:VAL:CG1	2.57	0.49
1:B:14:ALA:HB1	1:B:128:THR:HG21	1.93	0.49
1:C:14:ALA:HB1	1:C:128:THR:HG21	1.94	0.49
1:C:222:LYS:HE3	1:C:282:MET:HE2	1.93	0.49
1:B:236:PHE:CE1	1:B:240:LEU:CD1	2.79	0.49
1:A:108:MET:HA	1:A:108:MET:HE2	1.94	0.49
1:C:12:LEU:HD21	1:C:43:VAL:HG11	1.95	0.49
1:C:202:PRO:C	1:C:228:MET:HE2	2.38	0.49
1:B:185:MET:HG2	1:B:282:MET:CE	2.43	0.49
1:B:203:GLU:HG3	1:B:228:MET:HE1	1.96	0.48
1:B:299:GLY:C	2:B:450:HOH:O	2.55	0.48
1:A:10:ILE:CD1	1:A:84:VAL:HG21	2.41	0.48
1:A:282:MET:HE3	1:A:282:MET:C	2.38	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:151:GLN:NE2	1:C:155:SER:OG	2.47	0.48
1:C:41:ALA:O	1:C:44:VAL:HG12	2.14	0.48
1:A:206:GLN:HG3	1:A:223:MET:HG2	1.95	0.48
1:B:264[B]:MET:HE1	1:D:260:PRO:HB3	1.96	0.48
1:C:14:ALA:HB1	1:C:128:THR:CG2	2.44	0.47
1:D:222:LYS:HE3	1:D:282:MET:HE2	1.96	0.47
1:A:23:LEU:O	1:A:28:VAL:HG13	2.14	0.47
1:A:14:ALA:HB1	1:A:128:THR:HG21	1.96	0.47
1:D:300:GLY:HA2	2:D:362:HOH:O	2.14	0.47
1:C:44:VAL:HG23	1:C:48:ALA:O	2.15	0.47
1:D:196:VAL:HG21	1:D:297:VAL:HG22	1.97	0.46
1:A:267:GLN:NE2	1:C:259:LEU:H	2.13	0.46
1:A:282:MET:HE3	1:A:283:SER:CA	2.46	0.46
1:C:185:MET:HG2	1:C:282:MET:HE1	1.98	0.46
1:C:206:GLN:HB2	1:C:228:MET:HE1	1.97	0.46
1:B:185:MET:HG2	1:B:282:MET:HE3	1.98	0.45
1:D:64:ILE:HD12	1:D:94:ILE:CD1	2.46	0.45
1:C:206:GLN:HA	1:C:219:MET:HE2	1.99	0.45
1:B:14:ALA:HB1	1:B:128:THR:CG2	2.46	0.45
1:B:107:LYS:HD2	1:B:108:MET:HE2	1.99	0.45
1:D:150:ILE:HG13	1:D:154:LEU:HD22	1.98	0.45
1:D:174:LYS:HD2	1:D:178:ASN:ND2	2.31	0.45
1:A:108:MET:O	1:A:111:VAL:HG22	2.16	0.45
1:A:78:MET:CE	1:A:85:LEU:CD1	2.90	0.44
1:A:151:GLN:NE2	1:A:155:SER:OG	2.50	0.44
1:B:206:GLN:HA	1:B:219:MET:HE2	1.98	0.44
1:A:14:ALA:HB1	1:A:128:THR:CG2	2.47	0.44
1:A:78:MET:HE2	1:A:119:TYR:CE1	2.45	0.44
1:D:185:MET:CG	1:D:282:MET:HE1	2.47	0.44
1:A:164:VAL:HG23	1:A:169:ALA:CB	2.48	0.44
1:B:105:THR:HG21	1:B:121:ASP:HB3	2.00	0.44
1:D:106:LEU:HD12	1:D:167:THR:HG22	1.99	0.44
1:A:12:LEU:HD11	1:A:32:ALA:HB1	1.99	0.44
1:B:259:LEU:H	1:D:267:GLN:HE21	1.66	0.44
1:C:78:MET:HE2	1:C:119:TYR:HE1	1.83	0.44
1:C:142:ALA:O	1:C:163:HIS:HE1	2.00	0.44
1:D:14:ALA:HB1	1:D:128:THR:HG21	1.99	0.44
1:A:103:SER:OG	1:A:254:GLU:CD	2.61	0.43
1:A:41:ALA:O	1:A:44:VAL:HG22	2.19	0.43
1:A:108:MET:HA	1:A:108:MET:CE	2.47	0.43
1:B:264[B]:MET:CG	1:C:264[B]:MET:HG3	2.43	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:179:LEU:C	1:C:179:LEU:HD23	2.42	0.43
1:B:108:MET:O	1:B:111:VAL:HG22	2.18	0.43
1:C:150:ILE:HG13	1:C:154:LEU:HD22	2.00	0.43
1:B:178:ASN:HB3	2:B:311:HOH:O	2.18	0.43
1:A:142:ALA:O	1:A:163:HIS:HE1	2.02	0.43
1:B:150:ILE:HG13	1:B:154:LEU:HD22	2.01	0.43
1:C:227:ILE:O	1:C:298:SER:HA	2.18	0.43
1:C:94:ILE:HD12	1:C:95:VAL:N	2.34	0.42
1:D:108:MET:HA	1:D:108:MET:HE2	2.00	0.42
1:A:261:MET:HE3	1:D:261:MET:HE3	2.01	0.42
1:A:106:LEU:HD13	1:A:167:THR:CG2	2.49	0.42
1:C:202:PRO:HB2	1:C:228:MET:HE2	2.00	0.42
1:A:150:ILE:HG13	1:A:154:LEU:HD22	2.01	0.42
1:A:227:ILE:O	1:A:298:SER:HA	2.20	0.42
1:B:124:VAL:HG12	1:B:138:ILE:HG12	2.00	0.42
1:B:164:VAL:HG12	1:C:208:ILE:HD11	2.01	0.42
1:C:23:LEU:HB3	1:C:28:VAL:HG21	2.01	0.42
1:D:95:VAL:HA	1:D:120:VAL:HG22	2.02	0.42
1:D:208:ILE:N	1:D:208:ILE:HD12	2.34	0.42
1:D:206:GLN:HA	1:D:219:MET:HE2	2.02	0.42
1:D:14:ALA:HB1	1:D:128:THR:CG2	2.49	0.42
1:C:55:GLN:CG	1:C:87:ALA:HB2	2.50	0.42
1:A:124:VAL:HG12	1:A:138:ILE:HG12	2.02	0.41
1:A:93:VAL:HG11	1:A:150:ILE:HG21	2.02	0.41
1:B:267:GLN:HE21	1:D:259:LEU:H	1.69	0.40
1:D:140:VAL:O	1:D:164:VAL:HG22	2.21	0.40
1:B:101:SER:O	1:B:104:SER:HB3	2.20	0.40
1:B:264[B]:MET:HG2	1:D:264[B]:MET:HE1	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	296/301 (98%)	294 (99%)	2 (1%)	0	100	100
1	B	295/301 (98%)	293 (99%)	2 (1%)	0	100	100
1	C	295/301 (98%)	290 (98%)	5 (2%)	0	100	100
1	D	236/301 (78%)	230 (98%)	6 (2%)	0	100	100
All	All	1122/1204 (93%)	1107 (99%)	15 (1%)	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	221/224 (99%)	210 (95%)	11 (5%)	20	30
1	B	221/224 (99%)	209 (95%)	12 (5%)	18	27
1	C	220/224 (98%)	205 (93%)	15 (7%)	13	18
1	D	183/224 (82%)	176 (96%)	7 (4%)	28	42
All	All	845/896 (94%)	800 (95%)	45 (5%)	18	28

All (45) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	28	VAL
1	A	56	LYS
1	A	85	LEU
1	A	106	LEU
1	A	107	LYS
1	A	108	MET
1	A	120	VAL
1	A	154	LEU
1	A	179	LEU
1	A	277	LEU
1	A	282	MET
1	B	52	GLU
1	B	85	LEU

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Mol	Chain	Res	Type
1	B	89	LYS
1	B	106	LEU
1	B	107	LYS
1	B	154	LEU
1	B	179	LEU
1	B	204	THR
1	B	208	ILE
1	B	240	LEU
1	B	277	LEU
1	B	282	MET
1	C	5	ILE
1	C	6	LYS
1	C	28	VAL
1	C	52	GLU
1	C	56	LYS
1	C	75	GLU
1	C	85	LEU
1	C	94	ILE
1	C	108	MET
1	C	120	VAL
1	C	154	LEU
1	C	179	LEU
1	C	207	GLU
1	C	277	LEU
1	C	282	MET
1	D	12	LEU
1	D	115	LYS
1	D	120	VAL
1	D	154	LEU
1	D	179	LEU
1	D	277	LEU
1	D	282	MET

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (23) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	55	GLN
1	A	79	ASN
1	A	151	GLN
1	A	163	HIS
1	A	241	GLN
1	A	256	ASN

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Mol	Chain	Res	Type
1	A	267	GLN
1	B	39	ASN
1	B	79	ASN
1	B	151	GLN
1	B	163	HIS
1	B	267	GLN
1	B	291	GLN
1	C	79	ASN
1	C	151	GLN
1	C	163	HIS
1	C	241	GLN
1	C	267	GLN
1	D	79	ASN
1	D	151	GLN
1	D	163	HIS
1	D	241	GLN
1	D	267	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 (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	297/301 (98%)	1.32	72 (24%) 2 2	24, 62, 74, 77	2 (0%)
1	B	296/301 (98%)	1.16	33 (11%) 12 13	24, 62, 74, 77	3 (1%)
1	C	296/301 (98%)	2.04	139 (46%) 0 0	24, 61, 74, 77	5 (1%)
1	D	240/301 (79%)	1.77	96 (40%) 1 1	24, 47, 68, 76	2 (0%)
All	All	1129/1204 (93%)	1.56	340 (30%) 1 1	24, 60, 74, 77	12 (1%)

All (340) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	32	ALA	7.1
1	C	300	GLY	7.1
1	D	14	ALA	6.4
1	C	35	LEU	6.4
1	C	117	ILE	6.0
1	C	41	ALA	6.0
1	C	5	ILE	5.5
1	D	150	ILE	5.5
1	C	29	THR	5.4
1	D	99	SER	5.4
1	D	153	VAL	5.3
1	D	103	SER	5.3
1	A	81	PRO	5.2
1	C	90	ALA	5.0
1	C	156	VAL	5.0
1	C	166	ASP	5.0
1	C	131	ALA	4.9
1	C	150	ILE	4.9
1	C	119	TYR	4.9
1	C	113	ALA	4.9
1	C	30	VAL	4.8

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Mol	Chain	Res	Type	RSRZ
1	C	169	ALA	4.8
1	D	298	SER	4.8
1	C	69	PRO	4.8
1	D	111	VAL	4.7
1	C	299	GLY	4.6
1	C	157	ILE	4.6
1	B	299	GLY	4.6
1	D	116	GLY	4.5
1	D	106	LEU	4.5
1	D	100	VAL	4.5
1	C	45	ALA	4.5
1	C	65	PHE	4.5
1	D	57	VAL	4.4
1	D	117	ILE	4.4
1	D	157	ILE	4.4
1	D	9	PHE	4.3
1	C	68	LEU	4.2
1	C	116	GLY	4.2
1	C	22	ASN	4.1
1	B	169	ALA	4.1
1	D	109	ALA	4.1
1	C	142	ALA	4.1
1	D	65	PHE	4.0
1	C	93	VAL	4.0
1	C	111	VAL	4.0
1	D	135	THR	4.0
1	C	165	GLY	4.0
1	D	10	ILE	4.0
1	C	50	ALA	4.0
1	C	145	ALA	4.0
1	D	162	TYR	3.9
1	C	133	ALA	3.9
1	C	59	ALA	3.9
1	D	107	LYS	3.9
1	C	136	LEU	3.9
1	C	43	VAL	3.9
1	C	100	VAL	3.9
1	A	112	ALA	3.9
1	D	161	ILE	3.8
1	A	82	GLY	3.8
1	C	148	GLU	3.8
1	C	109	ALA	3.8

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Mol	Chain	Res	Type	RSRZ
1	D	154	LEU	3.8
1	D	128	THR	3.7
1	C	24	LEU	3.7
1	D	68	LEU	3.7
1	C	21	ILE	3.7
1	D	78	MET	3.7
1	C	42	ALA	3.7
1	C	82	GLY	3.7
1	D	104	SER	3.6
1	C	23	LEU	3.6
1	C	106	LEU	3.6
1	D	108	MET	3.6
1	C	153	VAL	3.6
1	B	81	PRO	3.6
1	C	105	THR	3.6
1	C	52	GLU	3.6
1	D	156	VAL	3.5
1	C	31	TYR	3.5
1	B	4	SER	3.5
1	C	158	GLY	3.5
1	C	9	PHE	3.5
1	D	168	GLY	3.5
1	D	63	ILE	3.5
1	D	105	THR	3.5
1	A	28	VAL	3.5
1	C	71	ALA	3.4
1	C	112	ALA	3.4
1	D	137	THR	3.4
1	C	25	LYS	3.4
1	C	7	ILE	3.4
1	C	101	SER	3.3
1	A	26	GLU	3.3
1	C	6	LYS	3.3
1	C	127	GLY	3.3
1	D	158	GLY	3.3
1	C	38	ALA	3.3
1	D	160	ASP	3.3
1	C	164	VAL	3.3
1	C	12	LEU	3.3
1	C	48	ALA	3.3
1	D	131	ALA	3.3
1	C	28	VAL	3.3

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Mol	Chain	Res	Type	RSRZ
1	C	44	VAL	3.3
1	C	61	SER	3.3
1	D	127	GLY	3.3
1	C	103	SER	3.3
1	D	300	GLY	3.3
1	A	88	CYS	3.3
1	D	101	SER	3.2
1	C	63	ILE	3.2
1	D	152	PRO	3.2
1	D	143	SER	3.2
1	C	74	VAL	3.2
1	D	114	GLU	3.2
1	C	86	SER	3.2
1	D	67	SER	3.2
1	A	73	ILE	3.2
1	C	94	ILE	3.2
1	D	64	ILE	3.2
1	D	66	THR	3.2
1	C	143	SER	3.2
1	D	61	SER	3.2
1	D	169	ALA	3.1
1	C	114	GLU	3.1
1	D	132	GLU	3.1
1	C	88	CYS	3.1
1	C	76	THR	3.1
1	B	298	SER	3.1
1	D	98	SER	3.1
1	C	162	TYR	3.1
1	D	11	GLY	3.1
1	D	79	ASN	3.1
1	C	49	GLN	3.0
1	C	85	LEU	3.0
1	D	145	ALA	3.0
1	C	67	SER	3.0
1	C	108	MET	3.0
1	C	149	LYS	3.0
1	D	133	ALA	3.0
1	C	18	PRO	3.0
1	C	102	PRO	3.0
1	A	111	VAL	3.0
1	D	113	ALA	3.0
1	C	154	LEU	2.9

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Mol	Chain	Res	Type	RSRZ
1	D	74	VAL	2.9
1	A	63	ILE	2.9
1	A	117	ILE	2.9
1	A	79	ASN	2.9
1	A	99	SER	2.9
1	B	111	VAL	2.9
1	D	102	PRO	2.9
1	D	115	LYS	2.9
1	D	124	VAL	2.9
1	D	146	VAL	2.9
1	C	73	ILE	2.9
1	A	31	TYR	2.9
1	A	119	TYR	2.9
1	B	104	SER	2.9
1	D	155	SER	2.9
1	D	171	ASP	2.8
1	B	50	ALA	2.8
1	C	19	MET	2.8
1	C	110	LYS	2.8
1	B	33	PHE	2.8
1	C	152	PRO	2.8
1	B	129	LYS	2.8
1	C	64	ILE	2.8
1	C	75	GLU	2.8
1	D	60	ALA	2.8
1	C	80	GLY	2.8
1	D	12	LEU	2.8
1	D	136	LEU	2.8
1	C	155	SER	2.8
1	D	147	PHE	2.8
1	A	169	ALA	2.8
1	C	14	ALA	2.8
1	C	170	GLY	2.8
1	A	23	LEU	2.8
1	A	5	ILE	2.7
1	A	89	LYS	2.7
1	D	125	SER	2.7
1	C	118	ASP	2.7
1	C	40	VAL	2.7
1	C	151	GLN	2.7
1	C	125	SER	2.7
1	D	96	ASP	2.7

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Mol	Chain	Res	Type	RSRZ
1	C	147	PHE	2.7
1	A	156	VAL	2.7
1	A	87	ALA	2.7
1	B	170	GLY	2.7
1	D	141	GLY	2.7
1	B	35	LEU	2.7
1	A	140	VAL	2.7
1	A	133	ALA	2.7
1	C	140	VAL	2.7
1	D	129	LYS	2.7
1	D	159	LYS	2.7
1	A	137	THR	2.6
1	C	92	THR	2.6
1	C	139	MET	2.6
1	A	10	ILE	2.6
1	C	120	VAL	2.6
1	C	104	SER	2.6
1	D	166	ASP	2.6
1	A	30	VAL	2.6
1	D	164	VAL	2.6
1	A	90	ALA	2.6
1	C	81	PRO	2.6
1	A	55	GLN	2.6
1	C	107	LYS	2.6
1	B	116	GLY	2.6
1	C	72	GLY	2.6
1	C	146	VAL	2.6
1	B	225	LYS	2.6
1	A	32	ALA	2.5
1	A	100	VAL	2.5
1	C	122	ALA	2.5
1	D	112	ALA	2.5
1	A	65	PHE	2.5
1	B	236	PHE	2.5
1	C	129	LYS	2.5
1	D	119	TYR	2.5
1	C	138	ILE	2.5
1	A	254	GLU	2.5
1	D	138	ILE	2.5
1	A	160	ASP	2.5
1	C	78	MET	2.5
1	C	51	CYS	2.5

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Mol	Chain	Res	Type	RSRZ
1	C	252	GLY	2.5
1	D	71	ALA	2.5
1	D	92	THR	2.5
1	C	161	ILE	2.4
1	D	126	GLY	2.4
1	A	131	ALA	2.4
1	A	106	LEU	2.4
1	C	77	VAL	2.4
1	C	128	THR	2.4
1	A	86	SER	2.4
1	C	10	ILE	2.4
1	A	168	GLY	2.4
1	C	126	GLY	2.4
1	C	141	GLY	2.4
1	D	165	GLY	2.4
1	A	84	VAL	2.4
1	C	79	ASN	2.4
1	C	115	LYS	2.4
1	D	110	LYS	2.4
1	C	135	THR	2.4
1	A	64	ILE	2.4
1	C	298	SER	2.4
1	D	130	GLY	2.4
1	A	22	ASN	2.4
1	C	37	GLU	2.3
1	A	298	SER	2.3
1	C	46	GLN	2.3
1	A	74	VAL	2.3
1	A	124	VAL	2.3
1	C	297	VAL	2.3
1	D	139	MET	2.3
1	D	297	VAL	2.3
1	B	55	GLN	2.3
1	D	13	GLY	2.3
1	A	58	ALA	2.3
1	A	110	LYS	2.3
1	C	20	ALA	2.3
1	C	54	ASN	2.3
1	A	135	THR	2.3
1	B	156	VAL	2.3
1	C	137	THR	2.3
1	B	83	GLY	2.3

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Mol	Chain	Res	Type	RSRZ
1	D	234	GLY	2.3
1	C	15	MET	2.3
1	C	57	VAL	2.2
1	C	167	THR	2.2
1	D	95	VAL	2.2
1	B	231	ASP	2.2
1	D	70	ASN	2.2
1	A	38	ALA	2.2
1	C	60	ALA	2.2
1	A	29	THR	2.2
1	B	100	VAL	2.2
1	C	257	VAL	2.2
1	D	77	VAL	2.2
1	D	73	ILE	2.2
1	B	27	GLY	2.2
1	B	207	GLU	2.2
1	C	39	ASN	2.2
1	A	77	VAL	2.2
1	C	84	VAL	2.2
1	A	206	GLN	2.2
1	A	129	LYS	2.2
1	A	159	LYS	2.2
1	C	121	ASP	2.2
1	B	64	ILE	2.2
1	A	136	LEU	2.2
1	B	79	ASN	2.2
1	D	163	HIS	2.2
1	D	122	ALA	2.2
1	A	105	THR	2.2
1	A	33	PHE	2.2
1	A	103	SER	2.1
1	A	150	ILE	2.1
1	B	52	GLU	2.1
1	D	76	THR	2.1
1	D	149	LYS	2.1
1	A	101	SER	2.1
1	A	24	LEU	2.1
1	C	70	ASN	2.1
1	B	142	ALA	2.1
1	A	43	VAL	2.1
1	A	108	MET	2.1
1	A	166	ASP	2.1

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Mol	Chain	Res	Type	RSRZ
1	A	83	GLY	2.1
1	B	11	GLY	2.1
1	C	83	GLY	2.1
1	A	157	ILE	2.1
1	B	106	LEU	2.1
1	D	123	PRO	2.1
1	A	167	THR	2.1
1	A	116	GLY	2.1
1	C	99	SER	2.1
1	A	53	ASN	2.1
1	D	69	PRO	2.1
1	B	19	MET	2.1
1	C	144	GLU	2.0
1	A	162	TYR	2.0
1	B	84	VAL	2.0
1	D	299	GLY	2.0
1	B	21	ILE	2.0
1	A	14	ALA	2.0
1	A	109	ALA	2.0
1	D	58	ALA	2.0
1	A	153	VAL	2.0
1	A	155	SER	2.0
1	B	99	SER	2.0
1	B	69	PRO	2.0
1	A	15	MET	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.