Full wwPDB X-ray Structure Validation Report (i)

Feb 24, 2025 – 08:09 PM JST

PDB ID	:	8YI1
Title	:	Crystal structure of a BAHD acyltransferase Ep07g04462
Authors	:	Ren, R.B.; Yu, L.Y.; Pang, B.
Deposited on	:	2024-02-28
Resolution	:	2.40 Å(reported)

The following versions of software and data (see references (i)) were used in the production of this report:

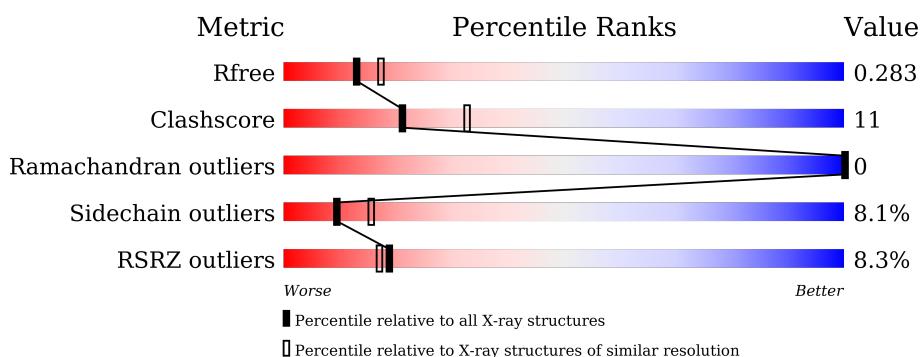|		
MolProbity	:	4.02b-467
Xtriage (Phenix)	:	1.21
EDS	:	3.0
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4	:	9.0.004 (Gargrove)
Density-Fitness	:	1.0.11
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)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

1 Overall quality at a glance ⓘ

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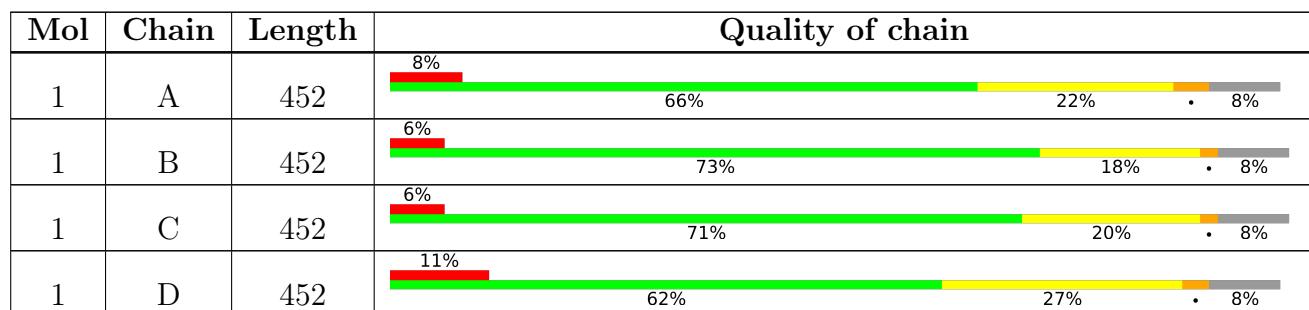*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.40 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	Percentile Ranks	Value
Rfree		0.283
Clashscore		11
Ramachandran outliers		0
Sidechain outliers		8.1%
RSRZ outliers		8.3%

Worse   Better

▌Percentile relative to all X-ray structures

▯Percentile relative to X-ray structures of similar resolution

Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	164625	4642 (2.40-2.40)
Clashscore	180529	5218 (2.40-2.40)
Ramachandran outliers	177936	5158 (2.40-2.40)
Sidechain outliers	177891	5159 (2.40-2.40)
RSRZ outliers	164620	4642 (2.40-2.40)

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	452	8% 66% 22% • 8%
1	B	452	6% 73% 18% • 8%
1	C	452	6% 71% 20% • 8%
1	D	452	11% 62% 27% • 8%

2 Entry composition ⓘ

There are 2 unique types of molecules in this entry. The entry contains 13199 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 BAHD acyltransferase Ep07g04462.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	416	Total 3232	C 2075	N 542	O 592	S 23	0	0	0
1	B	417	Total 3242	C 2080	N 546	O 593	S 23	0	0	0
1	C	418	Total 3237	C 2076	N 546	O 592	S 23	0	0	0
1	D	418	Total 3248	C 2085	N 547	O 593	S 23	0	0	0
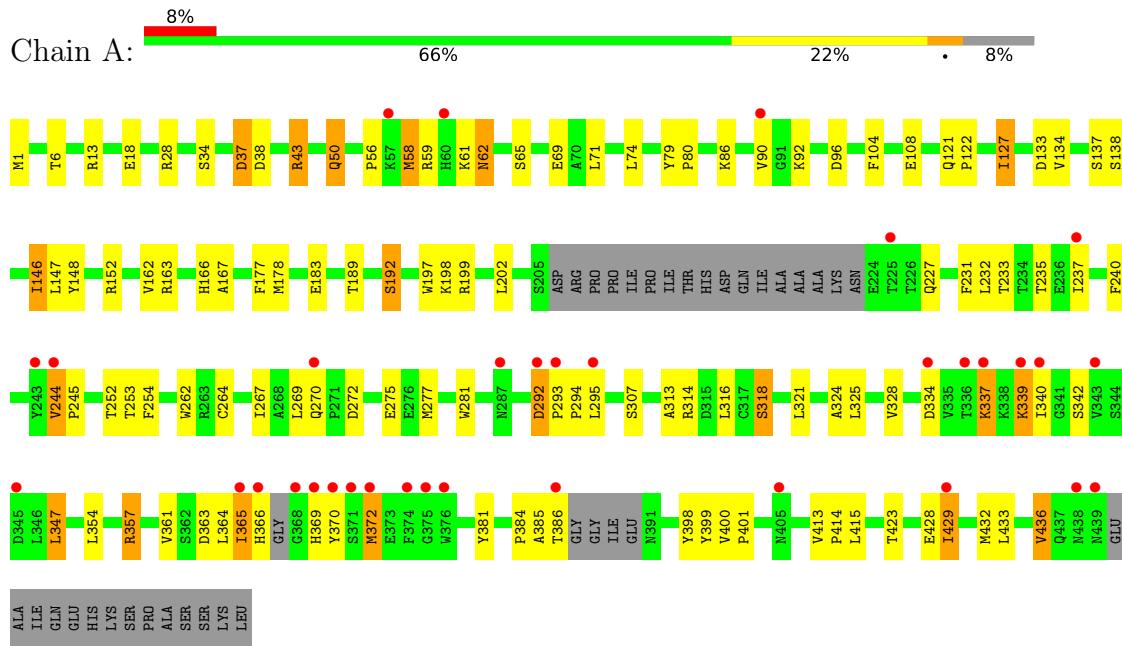
- Molecule 2 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	66	Total 66	O 66	0	0
2	B	62	Total 62	O 62	0	0
2	C	64	Total 64	O 64	0	0
2	D	48	Total 48	O 48	0	0

3 Residue-property plots ⓘ

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 accord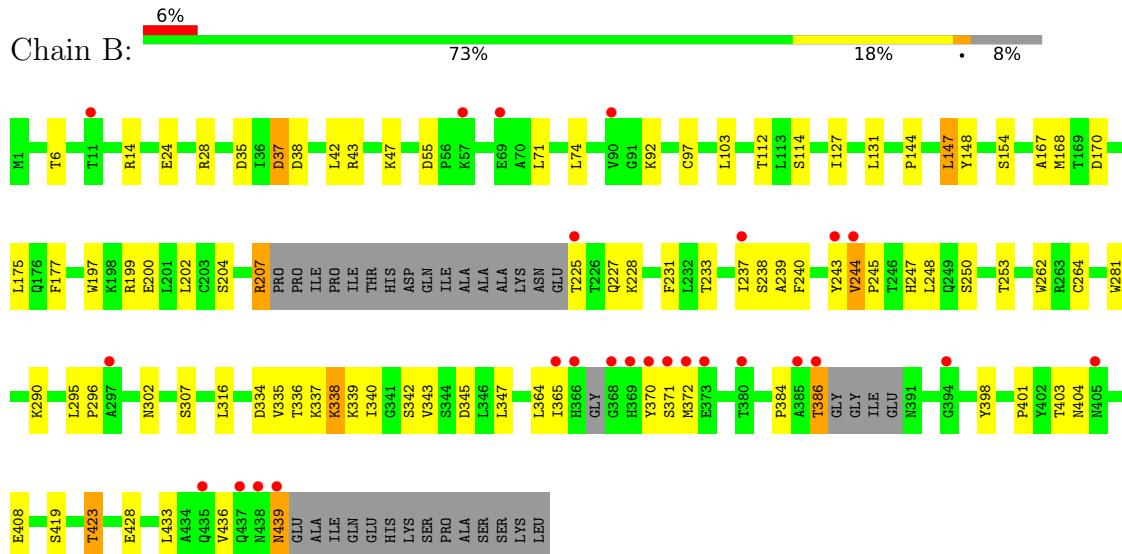ing to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red dot above a residue indicates a poor fit to the electron density (RSRZ > 2). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.
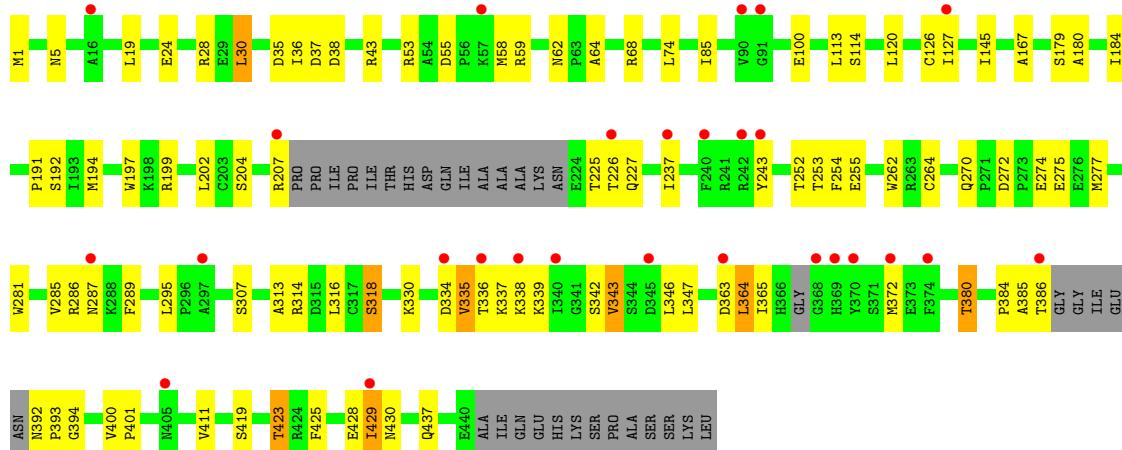
• Molecule 1: BAHD acyltransferase Ep07g04462

Chain A:

• Molecule 1: BAHD acyltransferase Ep07g04462

Chain B:

• Molecule 1: BAHD acyltransferase Ep07g04462

Chain C:

• Molecule 1: BAHD acyltransferase Ep07g04462

Chain D:

4 Data and refinement statistics ⓘ

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, α, β, γ	57.27Å 89.64Å 99.06Å 70.87° 89.61° 89.69°	Depositor
Resolution (Å)	32.99 – 2.40 32.99 – 2.40	Depositor EDS
% Data completeness (in resolution range)	97.3 (32.99-2.40) 97.3 (32.99-2.40)	Depositor EDS
R_{merge}	0.09	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	2.21 (at 2.39Å)	Xtriage
Refinement program	PHENIX (1.19_4092: ???)	Depositor
R, R_{free}	0.232 , 0.284 0.233 , 0.283	Depositor DCC
R_{free} test set	70834 reflections (2.76%)	wwPDB-VP
Wilson B-factor (Å^2)	39.6	Xtriage
Anisotropy	0.232	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.37 , 54.3	EDS
L-test for twinning[2]	$< |L| > = 0.49$, $< L^2 > = 0.32$	Xtriage
Estimated twinning fraction	0.026 for h,-k,-l	Xtriage
F_o,F_c correlation	0.93	EDS
Total number of atoms	13199	wwPDB-VP
Average B, all atoms (Å^2)	52.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 71.68 % of the origin peak, indicating pseudo-translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo-translational symmetry is equal to 2.5160e-06. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

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[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	0.46	0/3310	0.67	0/4503
1	B	0.48	0/3320	0.70	2/4516 (0.0%)
1	C	0.48	0/3314	0.69	1/4508 (0.0%)
1	D	0.44	0/3326	0.68	0/4523
All	All	0.47	0/13270	0.68	3/18050 (0.0%)

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	1
All	All	0	2

There are no bond length outliers.

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	B	370	TYR	N-CA-C	8.10	132.87	111.00
1	B	371	SER	N-CA-C	5.88	126.88	111.00
1	C	243	TYR	CA-CB-CG	5.36	123.58	113.40

There are no chirality outliers.

All (2) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	292	ASP	Peptide
1	D	17	PRO	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	3232	0	3238	76	0
1	B	3242	0	3249	51	0
1	C	3237	0	3240	63	0
1	D	3248	0	3258	93	0
2	A	66	0	0	0	0
2	B	62	0	0	1	0
2	C	64	0	0	5	0
2	D	48	0	0	4	0
All	All	13199	0	12985	281	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 11.

All (281) 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:C:364:LEU:HD23	1:C:384:PRO:CG	1.94	0.98
1:C:364:LEU:HD23	1:C:384:PRO:HG2	1.49	0.93
1:A:38:ASP:O	1:A:43:ARG:NH1	2.05	0.89
1:D:112:THR:HG22	1:D:114:SER:H	1.40	0.86
1:B:38:ASP:O	1:B:43:ARG:NH1	2.10	0.85
1:B:37:ASP:HB3	1:B:302:ASN:HD22	1.43	0.83
1:C:53:ARG:NH2	2:C:501:HOH:O	2.11	0.83
1:A:1:MET:HB2	1:A:429:ILE:HD11	1.60	0.82
1:A:363:ASP:OD1	1:A:365:ILE:HG13	1.80	0.82
1:C:1:MET:HB2	1:C:429:ILE:HD11	1.67	0.76
1:C:364:LEU:HD23	1:C:384:PRO:HG3	1.66	0.76
1:B:295:LEU:HD12	1:B:296:PRO:HD2	1.67	0.75
1:A:244:VAL:HG21	1:A:325:LEU:HD23	1.66	0.75
1:D:1:MET:HB2	1:D:429:ILE:HD11	1.68	0.74
1:D:295:LEU:HD22	1:D:303:LEU:HD11	1.71	0.72
1:B:239:ALA:HB1	1:B:436:VAL:HG11	1.70	0.72
1:D:59:ARG:HD2	1:D:60:HIS:H	1.55	0.72
1:A:13:ARG:NH1	1:A:108:GLU:OE1	2.21	0.72
1:D:191:PRO:O	2:D:501:HOH:O	2.08	0.71

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:35:ASP:OD1	1:B:92:LYS:NZ	2.23	0.71
1:C:365:ILE:HA	1:C:401:PRO:HD3	1.72	0.71
1:A:277:MET:HE3	1:A:313:ALA:HB2	1.74	0.69
1:C:38:ASP:C	1:C:43:ARG:HH12	1.96	0.68
1:D:170:ASP:HB3	1:D:302:ASN:ND2	2.07	0.68
1:D:365:ILE:HA	1:D:401:PRO:HD3	1.74	0.68
1:D:134:VAL:O	1:D:137:SER:OG	2.10	0.68
1:A:38:ASP:OD2	1:A:92:LYS:NZ	2.28	0.67
1:A:314:ARG:O	1:A:318:SER:HB2	1.94	0.67
1:B:14:ARG:NH2	2:B:501:HOH:O	2.25	0.67
1:C:365:ILE:HD13	1:C:401:PRO:HD3	1.76	0.67
1:D:140:ILE:HG23	1:D:165:ASN:HD21	1.59	0.67
1:D:14:ARG:HB3	1:D:107:ALA:HB2	1.78	0.66
1:B:207:ARG:HH11	1:B:207:ARG:CG	2.08	0.65
1:A:237:ILE:HG21	1:A:253:THR:HG23	1.79	0.65
1:A:62:ASN:ND2	1:A:152:ARG:HD2	2.11	0.65
1:A:364:LEU:HG	1:A:384:PRO:HG3	1.78	0.65
1:C:314:ARG:O	1:C:318:SER:OG	2.15	0.65
1:B:419:SER:O	1:B:423:THR:HG22	1.98	0.64
1:C:252:THR:HG22	1:C:254:PHE:H	1.63	0.64
1:A:162:VAL:HG21	1:A:178:MET:HE1	1.79	0.64
1:B:207:ARG:HH11	1:B:207:ARG:HG3	1.63	0.63
1:C:286:ARG:NH2	2:C:505:HOH:O	2.31	0.63
1:D:264:CYS:SG	1:D:428:GLU:HG3	2.38	0.63
1:C:127:ILE:HD13	1:C:386:THR:HG22	1.80	0.63
1:C:392:ASN:HB2	1:C:393:PRO:HD3	1.81	0.63
1:D:400:VAL:HG12	1:D:401:PRO:HD2	1.81	0.62
1:A:133:ASP:HA	1:A:163:ARG:NH2	2.14	0.62
1:B:386:THR:O	1:B:398:TYR:OH	2.07	0.61
1:C:38:ASP:O	1:C:43:ARG:NH1	2.32	0.61
1:C:197:TRP:CE2	1:C:199:ARG:HG3	2.34	0.61
1:B:240:PHE:HD1	1:B:436:VAL:HG21	1.65	0.61
1:C:85:ILE:HG13	1:C:145:ILE:HD11	1.82	0.61
1:D:166:HIS:CE1	1:D:302:ASN:HD21	2.18	0.61
1:A:6:THR:HG23	1:A:6:THR:O	2.00	0.61
1:A:275:GLU:HB2	1:A:277:MET:CE	2.31	0.61
1:D:170:ASP:HB3	1:D:302:ASN:HD22	1.64	0.60
1:D:262:TRP:CE2	1:D:316:LEU:HD11	2.37	0.60
1:D:34:SER:OG	1:D:37:ASP:OD1	2.12	0.60
1:A:369:HIS:O	1:A:372:MET:HE1	2.01	0.59
1:D:112:THR:HG22	1:D:114:SER:N	2.16	0.59

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:314:ARG:O	1:D:318:SER:OG	2.18	0.59
1:C:394:GLY:O	2:C:502:HOH:O	2.16	0.59
1:D:244:VAL:HG22	1:D:245:PRO:HD2	1.84	0.59
1:A:277:MET:SD	1:A:357:ARG:HG2	2.43	0.58
1:C:113:LEU:HD21	1:C:380:THR:HG21	1.85	0.58
1:A:71:LEU:HD21	1:A:148:TYR:CZ	2.38	0.58
1:A:56:PRO:HB3	1:D:247:HIS:HB2	1.84	0.58
1:B:336:THR:O	1:B:339:LYS:NZ	2.32	0.58
1:D:18:GLU:HB3	1:D:104:PHE:O	2.03	0.58
1:A:37:ASP:HB3	1:A:167:ALA:O	2.04	0.58
1:C:272:ASP:HB2	1:C:275:GLU:HG3	1.84	0.58
1:D:252:THR:HG22	1:D:254:PHE:H	1.69	0.58
1:D:370:TYR:O	1:D:378:LYS:HG2	2.03	0.57
1:C:285:VAL:HG11	1:C:347:LEU:HD21	1.87	0.57
1:B:244:VAL:HG23	1:B:245:PRO:HD2	1.86	0.56
1:A:62:ASN:HD22	1:A:152:ARG:HD2	1.69	0.56
1:B:290:LYS:O	1:B:340:ILE:HD12	2.05	0.56
1:C:37:ASP:HB3	1:C:167:ALA:O	2.05	0.56
1:D:78:TYR:CE1	1:D:195:PRO:HG3	2.41	0.56
1:D:370:TYR:CD2	1:D:378:LYS:HE3	2.40	0.56
1:B:264:CYS:SG	1:B:428:GLU:HG3	2.45	0.56
1:A:365:ILE:HA	1:A:401:PRO:HD3	1.87	0.56
1:B:365:ILE:HA	1:B:401:PRO:HD3	1.88	0.56
1:A:134:VAL:O	1:A:137:SER:OG	2.20	0.56
1:B:227:GLN:O	1:B:228:LYS:HG3	2.05	0.56
1:B:37:ASP:HB2	1:B:167:ALA:O	2.06	0.56
1:D:237:ILE:HG21	1:D:253:THR:HG23	1.87	0.56
1:C:204:SER:HB2	1:C:207:ARG:HD2	1.87	0.55
1:B:404:ASN:ND2	1:B:408:GLU:OE1	2.39	0.55
1:C:364:LEU:CD2	1:C:384:PRO:HG3	2.33	0.55
1:A:272:ASP:HB2	1:A:275:GLU:HG3	1.89	0.55
1:B:112:THR:HG22	1:B:154:SER:HB2	1.89	0.55
1:A:62:ASN:HD22	1:A:152:ARG:NH1	2.05	0.54
1:B:127:ILE:HG21	1:B:386:THR:HG22	1.89	0.54
1:B:262:TRP:CE2	1:B:316:LEU:HD11	2.42	0.54
1:B:170:ASP:HB3	1:B:302:ASN:OD1	2.06	0.54
1:D:160:LEU:HD21	1:D:178:MET:HE1	1.89	0.54
1:C:338:LYS:HB3	1:C:346:LEU:HD22	1.90	0.54
1:D:425:PHE:O	1:D:429:ILE:HG23	2.08	0.54
1:A:86:LYS:NZ	1:A:96:ASP:OD2	2.41	0.54
1:D:384:PRO:O	2:D:502:HOH:O	2.19	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:244:VAL:HG21	1:A:325:LEU:CD2	2.36	0.53
1:B:364:LEU:HG	1:B:384:PRO:HG3	1.91	0.53
1:C:204:SER:OG	1:C:207:ARG:NE	2.41	0.52
1:A:361:VAL:HG11	1:A:399:TYR:CZ	2.44	0.52
1:D:197:TRP:CE2	1:D:199:ARG:HG3	2.43	0.52
1:C:365:ILE:HD11	1:C:411:VAL:HG22	1.91	0.52
1:A:364:LEU:C	1:A:366:HIS:H	2.13	0.52
1:B:239:ALA:HB1	1:B:436:VAL:CG1	2.39	0.52
1:D:302:ASN:O	1:D:303:LEU:HD23	2.09	0.52
1:A:267:ILE:O	1:A:270:GLN:NE2	2.31	0.52
1:A:370:TYR:HD1	1:A:370:TYR:H	1.58	0.52
1:B:247:HIS:HB2	1:D:56:PRO:HB3	1.92	0.52
1:D:166:HIS:HE1	1:D:302:ASN:HD21	1.57	0.51
1:A:133:ASP:HA	1:A:163:ARG:HH22	1.75	0.51
1:D:339:LYS:HG3	1:D:340:ILE:HG22	1.92	0.51
1:A:262:TRP:CE2	1:A:316:LEU:HD11	2.45	0.51
1:B:439:ASN:N	1:B:439:ASN:OD1	2.42	0.51
1:C:385:ALA:O	1:C:386:THR:OG1	2.27	0.51
1:B:37:ASP:CB	1:B:302:ASN:HD22	2.20	0.51
1:C:365:ILE:HD13	1:C:401:PRO:CD	2.41	0.51
1:D:24:GLU:HG2	1:D:25:PRO:HD2	1.93	0.51
1:C:62:ASN:HD21	1:C:64:ALA:HB3	1.76	0.51
1:B:148:TYR:HH	1:B:177:PHE:HE2	1.60	0.50
1:C:35:ASP:OD2	1:C:204:SER:N	2.44	0.50
1:D:88:SER:OG	1:D:89:PRO:HD2	2.12	0.50
1:A:183:GLU:OE2	1:A:192:SER:OG	2.24	0.50
1:C:289:PHE:HB3	1:C:346:LEU:HD13	1.93	0.50
1:D:364:LEU:HG	1:D:384:PRO:HG3	1.94	0.50
1:B:148:TYR:OH	1:B:177:PHE:HE2	1.94	0.49
1:B:200:GLU:CD	1:B:200:GLU:H	2.13	0.49
1:C:425:PHE:O	1:C:429:ILE:HG23	2.12	0.49
1:D:41:ILE:HG13	1:D:354:LEU:HD21	1.94	0.49
1:D:291:PHE:HA	1:D:341:GLY:O	2.13	0.49
1:A:62:ASN:HD22	1:A:152:ARG:HH11	1.58	0.49
1:C:36:ILE:HG13	1:C:202:LEU:HD13	1.93	0.49
1:D:164:TYR:CE1	1:D:174:LEU:HD22	2.48	0.49
1:B:243:TYR:HB2	1:B:436:VAL:HG22	1.95	0.49
1:C:43:ARG:NH2	2:C:507:HOH:O	2.36	0.49
1:D:292:ASP:HB3	1:D:293:PRO:HD2	1.95	0.49
1:B:197:TRP:CE2	1:B:199:ARG:HG3	2.48	0.48
1:C:180:ALA:O	1:C:184:ILE:HG12	2.13	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:127:ILE:HD11	1:A:385:ALA:HB1	1.95	0.48
1:B:281:TRP:CE2	1:B:307:SER:OG	2.67	0.48
1:C:419:SER:O	1:C:423:THR:HG23	2.14	0.48
1:D:103:LEU:HB3	1:D:147:LEU:HD13	1.96	0.48
1:D:182:GLY:HA2	1:D:374:PHE:CD1	2.49	0.48
1:A:244:VAL:HG22	1:A:245:PRO:HD2	1.95	0.48
1:B:103:LEU:HB3	1:B:147:LEU:HD23	1.96	0.48
1:A:197:TRP:CE2	1:A:199:ARG:HG3	2.49	0.48
1:A:264:CYS:SG	1:A:428:GLU:HG3	2.54	0.48
1:B:337:LYS:O	1:B:338:LYS:HD2	2.12	0.48
1:D:419:SER:O	1:D:423:THR:HG23	2.13	0.48
1:D:227:GLN:C	1:D:228:LYS:HG2	2.35	0.48
1:A:292:ASP:HB3	1:A:293:PRO:HD3	1.94	0.48
1:D:111:VAL:HG13	1:D:153:LEU:HD22	1.95	0.48
1:D:79:TYR:CG	1:D:80:PRO:HD3	2.48	0.47
1:A:231:PHE:CE2	1:A:233:THR:HG22	2.50	0.47
1:C:281:TRP:CE2	1:C:307:SER:OG	2.68	0.47
1:A:433:LEU:O	1:A:436:VAL:HG12	2.14	0.47
1:A:34:SER:HB2	1:A:202:LEU:HB2	1.97	0.47
1:D:87:GLU:HB3	1:D:93:LEU:HD23	1.97	0.47
1:C:237:ILE:HG21	1:C:253:THR:HG23	1.95	0.47
1:C:274:GLU:CD	1:C:274:GLU:H	2.17	0.47
1:D:81:PHE:HE1	1:D:168:MET:HG2	1.79	0.47
1:A:65:SER:O	1:A:69:GLU:HG2	2.16	0.46
1:B:37:ASP:HA	1:B:42:LEU:HD12	1.96	0.46
1:A:364:LEU:C	1:A:366:HIS:N	2.69	0.46
1:D:198:LYS:HA	1:D:198:LYS:HD3	1.68	0.46
1:C:197:TRP:NE1	1:C:199:ARG:HG3	2.30	0.46
1:A:166:HIS:ND1	1:A:166:HIS:O	2.47	0.46
1:D:324:ALA:O	1:D:328:VAL:HG23	2.16	0.46
1:B:28:ARG:HD2	1:B:97:CYS:O	2.14	0.46
1:B:347:LEU:HD23	1:B:347:LEU:HA	1.77	0.46
1:A:198:LYS:HA	1:A:198:LYS:HD3	1.68	0.46
1:A:354:LEU:HD23	1:A:354:LEU:HA	1.74	0.45
1:C:295:LEU:HD21	1:C:343:VAL:HG11	1.99	0.45
1:D:34:SER:HB2	1:D:202:LEU:HB2	1.99	0.45
1:B:244:VAL:CG2	1:B:248:LEU:HB2	2.46	0.45
1:C:30:LEU:HD23	1:C:30:LEU:HA	1.76	0.45
1:C:252:THR:HB	1:C:255:GLU:H	1.81	0.45
1:B:231:PHE:CE2	1:B:233:THR:HG22	2.52	0.45
1:C:43:ARG:NE	2:C:507:HOH:O	2.41	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:79:TYR:CG	1:A:80:PRO:HD3	2.52	0.45
1:A:339:LYS:HE2	1:A:339:LYS:HB3	1.79	0.45
1:D:81:PHE:CE1	1:D:168:MET:HG2	2.52	0.45
1:D:292:ASP:HB3	1:D:293:PRO:CD	2.46	0.45
1:D:432:MET:HE3	1:D:432:MET:HB3	1.90	0.45
1:B:71:LEU:HD21	1:B:148:TYR:CD2	2.52	0.45
1:A:277:MET:CE	1:A:313:ALA:HB2	2.46	0.45
1:D:42:LEU:HD22	1:D:166:HIS:CE1	2.52	0.45
1:D:385:ALA:O	1:D:386:THR:OG1	2.30	0.45
1:D:330:LYS:O	1:D:334:ASP:OD1	2.34	0.44
1:D:353:PRO:O	2:D:504:HOH:O	2.21	0.44
1:C:180:ALA:HB1	1:C:191:PRO:HB3	1.99	0.44
1:A:122:PRO:HG2	1:A:400:VAL:HG21	1.99	0.44
1:B:240:PHE:O	1:B:244:VAL:HG12	2.16	0.44
1:D:180:ALA:HB1	1:D:191:PRO:HB3	1.99	0.44
1:D:235:THR:HG23	2:D:505:HOH:O	2.18	0.44
1:D:202:LEU:HD11	1:D:343:VAL:HG12	1.99	0.44
1:D:274:GLU:H	1:D:274:GLU:HG2	1.54	0.44
1:A:324:ALA:O	1:A:328:VAL:HG23	2.18	0.44
1:D:112:THR:HG23	1:D:155:CYS:HB3	1.99	0.44
1:D:196:VAL:HG21	1:D:296:PRO:HB2	2.00	0.44
1:B:237:ILE:HG21	1:B:253:THR:HG23	2.00	0.44
1:C:277:MET:HE3	1:C:313:ALA:HB2	1.99	0.44
1:B:342:SER:HB2	1:B:345:ASP:HB2	2.00	0.43
1:A:146:ILE:HG13	1:A:147:LEU:N	2.33	0.43
1:A:275:GLU:HB2	1:A:277:MET:HE1	2.00	0.43
1:A:415:LEU:HA	1:A:415:LEU:HD23	1.71	0.43
1:A:18:GLU:HG3	1:A:104:PHE:HB3	2.01	0.43
1:B:35:ASP:OD2	1:B:204:SER:N	2.52	0.43
1:B:207:ARG:CG	1:B:207:ARG:NH1	2.72	0.43
1:A:281:TRP:CE2	1:A:307:SER:OG	2.71	0.43
1:B:240:PHE:CD1	1:B:436:VAL:HG21	2.50	0.43
1:D:79:TYR:CD2	1:D:80:PRO:HD3	2.54	0.43
1:D:432:MET:O	1:D:436:VAL:HG23	2.19	0.43
1:A:58:MET:O	1:A:61:LYS:HB2	2.19	0.43
1:A:398:TYR:O	1:A:414:PRO:HD2	2.18	0.43
1:D:111:VAL:O	1:D:153:LEU:HB3	2.19	0.43
1:A:295:LEU:HD13	1:A:295:LEU:HA	1.87	0.43
1:D:31:LYS:HE3	1:D:197:TRP:CG	2.53	0.43
1:D:326:GLU:OE2	1:D:330:LYS:NZ	2.36	0.43
1:A:50:GLN:HA	1:A:381:TYR:O	2.19	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:191:PRO:HD2	1:C:194:MET:SD	2.59	0.42
1:C:204:SER:CB	1:C:207:ARG:CD	2.97	0.42
1:C:338:LYS:HB3	1:C:346:LEU:CD2	2.50	0.42
1:C:347:LEU:HD23	1:C:347:LEU:HA	1.85	0.42
1:B:148:TYR:OH	1:B:177:PHE:CE2	2.72	0.42
1:D:166:HIS:HE1	1:D:302:ASN:ND2	2.18	0.42
1:D:364:LEU:HD23	1:D:398:TYR:HB2	2.01	0.42
1:A:6:THR:O	1:A:6:THR:CG2	2.65	0.42
1:A:347:LEU:HD23	1:A:347:LEU:HA	1.87	0.42
1:D:418:ARG:HG3	1:D:418:ARG:HH11	1.84	0.42
1:C:19:LEU:HD13	1:C:100:GLU:O	2.20	0.42
1:D:37:ASP:HB3	1:D:167:ALA:O	2.19	0.42
1:B:47:LYS:HE3	1:B:131:LEU:HD23	2.02	0.42
1:C:38:ASP:CA	1:C:43:ARG:HH12	2.33	0.42
1:D:265:HIS:CE1	1:D:395:LEU:HB2	2.55	0.42
1:D:291:PHE:CE1	1:D:343:VAL:HA	2.55	0.42
1:A:148:TYR:HH	1:A:177:PHE:HE1	1.67	0.42
1:A:269:LEU:HA	1:A:269:LEU:HD23	1.65	0.42
1:A:413:VAL:HG23	1:A:413:VAL:O	2.20	0.42
1:C:204:SER:CB	1:C:207:ARG:HD2	2.50	0.42
1:C:429:ILE:HG13	1:C:430:ASN:N	2.35	0.42
1:C:62:ASN:ND2	1:C:64:ALA:HB3	2.34	0.41
1:D:234:THR:HG23	1:D:410:GLY:HA2	2.01	0.41
1:D:356:VAL:HG13	1:D:357:ARG:N	2.35	0.41
1:C:55:ASP:OD2	1:C:58:MET:HG2	2.20	0.41
1:C:264:CYS:SG	1:C:428:GLU:HG3	2.61	0.41
1:A:237:ILE:O	1:A:240:PHE:HB2	2.21	0.41
1:A:292:ASP:O	1:A:294:PRO:HD3	2.21	0.41
1:C:262:TRP:CE2	1:C:316:LEU:HD11	2.55	0.41
1:D:103:LEU:HD23	1:D:103:LEU:HA	1.73	0.41
1:D:290:LYS:O	1:D:340:ILE:HG13	2.21	0.41
1:A:339:LYS:HG2	1:A:340:ILE:N	2.36	0.41
1:C:254:PHE:CE2	1:C:363:ASP:HB2	2.56	0.41
1:C:307:SER:HB3	1:C:335:VAL:CG2	2.50	0.41
1:C:330:LYS:O	1:C:334:ASP:OD1	2.39	0.41
1:A:252:THR:HG22	1:A:254:PHE:H	1.86	0.41
1:A:1:MET:CE	1:A:429:ILE:HG12	2.51	0.41
1:D:120:LEU:HD21	1:D:381:TYR:HB2	2.03	0.41
1:D:264:CYS:SG	1:D:429:ILE:HG22	2.61	0.41
1:D:291:PHE:CE1	1:D:343:VAL:HG13	2.56	0.41
1:A:337:LYS:HB2	1:A:337:LYS:HE2	1.89	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:230:PHE:O	1:D:412:VAL:HA	2.21	0.41
1:A:321:LEU:HD22	1:A:432:MET:HE1	2.03	0.40
1:C:1:MET:HE1	1:C:429:ILE:HG12	2.03	0.40
1:D:87:GLU:CB	1:D:93:LEU:HD23	2.50	0.40
1:D:257:LEU:HD23	1:D:257:LEU:HA	1.81	0.40
1:D:338:LYS:HB3	1:D:346:LEU:HD21	2.03	0.40
1:A:1:MET:SD	1:A:232:LEU:HD21	2.61	0.40
1:A:432:MET:HE3	1:A:432:MET:HB3	1.88	0.40
1:B:37:ASP:HB3	1:B:302:ASN:HB2	2.03	0.40
1:D:45:HIS:HB3	1:D:163:ARG:HD3	2.02	0.40
1:D:75:LEU:HD21	1:D:102:VAL:HG13	2.03	0.40
1:D:197:TRP:NE1	1:D:199:ARG:HG3	2.35	0.40
1:D:334:ASP:OD1	1:D:334:ASP:N	2.53	0.40
1:D:34:SER:HB2	1:D:202:LEU:CB	2.51	0.40
1:D:260:CYS:SG	1:D:432:MET:HE1	2.61	0.40
1:C:365:ILE:O	1:C:365:ILE:CG2	2.70	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	408/452 (90%)	391 (96%)	17 (4%)	0	100	100
1	B	409/452 (90%)	400 (98%)	9 (2%)	0	100	100
1	C	410/452 (91%)	400 (98%)	10 (2%)	0	100	100
1	D	410/452 (91%)	393 (96%)	17 (4%)	0	100	100
All	All	1637/1808 (90%)	1584 (97%)	53 (3%)	0	100	100

There are no Ramachandran outliers to report.

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	356/388 (92%)	325 (91%)	31 (9%)	8	13
1	B	357/388 (92%)	331 (93%)	26 (7%)	11	20
1	C	355/388 (92%)	324 (91%)	31 (9%)	8	13
1	D	357/388 (92%)	329 (92%)	28 (8%)	10	17
All	All	1425/1552 (92%)	1309 (92%)	116 (8%)	9	15

All (116) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	28	ARG
1	A	37	ASP
1	A	43	ARG
1	A	50	GLN
1	A	58	MET
1	A	59	ARG
1	A	62	ASN
1	A	74	LEU
1	A	90	VAL
1	A	121	GLN
1	A	127	ILE
1	A	138	SER
1	A	146	ILE
1	A	189	THR
1	A	192	SER
1	A	227	GLN
1	A	235	THR
1	A	244	VAL
1	A	318	SER
1	A	334	ASP
1	A	337	LYS
1	A	339	LYS
1	A	342	SER
1	A	347	LEU

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Mol	Chain	Res	Type
1	A	357	ARG
1	A	365	ILE
1	A	372	MET
1	A	386	THR
1	A	423	THR
1	A	429	ILE
1	A	436	VAL
1	B	6	THR
1	B	24	GLU
1	B	37	ASP
1	B	55	ASP
1	B	74	LEU
1	B	114	SER
1	B	144	PRO
1	B	147	LEU
1	B	168	MET
1	B	175	LEU
1	B	202	LEU
1	B	207	ARG
1	B	225	THR
1	B	238	SER
1	B	244	VAL
1	B	250	SER
1	B	334	ASP
1	B	335	VAL
1	B	338	LYS
1	B	343	VAL
1	B	372	MET
1	B	386	THR
1	B	403	THR
1	B	423	THR
1	B	433	LEU
1	B	439	ASN
1	C	5	ASN
1	C	24	GLU
1	C	28	ARG
1	C	30	LEU
1	C	59	ARG
1	C	68	ARG
1	C	74	LEU
1	C	114	SER
1	C	120	LEU

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Mol	Chain	Res	Type
1	C	126	CYS
1	C	179	SER
1	C	192	SER
1	C	225	THR
1	C	226	THR
1	C	227	GLN
1	C	270	GLN
1	C	287	ASN
1	C	318	SER
1	C	335	VAL
1	C	336	THR
1	C	337	LYS
1	C	339	LYS
1	C	342	SER
1	C	343	VAL
1	C	364	LEU
1	C	372	MET
1	C	380	THR
1	C	400	VAL
1	C	423	THR
1	C	429	ILE
1	C	437	GLN
1	D	30	LEU
1	D	76	VAL
1	D	85	ILE
1	D	110	ASP
1	D	120	LEU
1	D	175	LEU
1	D	196	VAL
1	D	202	LEU
1	D	206	ASP
1	D	225	THR
1	D	244	VAL
1	D	274	GLU
1	D	303	LEU
1	D	314	ARG
1	D	318	SER
1	D	320	PRO
1	D	334	ASP
1	D	335	VAL
1	D	336	THR
1	D	337	LYS

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Mol	Chain	Res	Type
1	D	345	ASP
1	D	370	TYR
1	D	373	GLU
1	D	400	VAL
1	D	406	LYS
1	D	423	THR
1	D	429	ILE
1	D	432	MET

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (3) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	45	HIS
1	C	249	GLN
1	D	302	ASN

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, 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(Å²)	Q<0.9
1	A	416/452 (92%)	0.62	34 (8%)	19	17	24, 49, 84, 111	0
1	B	417/452 (92%)	0.56	26 (6%)	28	25	26, 47, 78, 100	0
1	C	418/452 (92%)	0.53	27 (6%)	26	24	27, 47, 76, 98	0
1	D	418/452 (92%)	0.92	51 (12%)	10	8	26, 55, 98, 121	0
All	All	1669/1808 (92%)	0.66	138 (8%)	19	17	24, 49, 87, 121	0

All (138) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	D	372	MET	5.5
1	D	340	ILE	4.9
1	B	225	THR	4.5
1	B	372	MET	4.2
1	B	244	VAL	4.1
1	D	334	ASP	3.9
1	A	372	MET	3.8
1	D	295	LEU	3.7
1	A	369	HIS	3.6
1	C	369	HIS	3.6
1	D	374	PHE	3.6
1	D	293	PRO	3.6
1	C	207	ARG	3.5
1	D	333	HIS	3.5
1	A	295	LEU	3.5
1	D	207	ARG	3.5
1	B	369	HIS	3.5
1	C	243	TYR	3.4
1	C	372	MET	3.4
1	C	237	ILE	3.4
1	D	297	ALA	3.4

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Mol	Chain	Res	Type	RSRZ
1	A	386	THR	3.3
1	C	340	ILE	3.3
1	D	369	HIS	3.3
1	C	370	TYR	3.2
1	D	373	GLU	3.2
1	A	375	GLY	3.1
1	A	334	ASP	3.0
1	D	440	GLU	3.0
1	B	386	THR	3.0
1	A	370	TYR	3.0
1	A	337	LYS	3.0
1	A	293	PRO	3.0
1	D	300	TYR	2.9
1	B	365	ILE	2.9
1	A	374	PHE	2.9
1	A	225	THR	2.9
1	D	298	GLY	2.9
1	B	405	ASN	2.9
1	B	438	ASN	2.9
1	C	336	THR	2.9
1	D	368	GLY	2.9
1	B	243	TYR	2.9
1	D	296	PRO	2.9
1	B	90	VAL	2.9
1	C	334	ASP	2.9
1	A	438	ASN	2.8
1	C	240	PHE	2.8
1	D	60	HIS	2.8
1	A	243	TYR	2.8
1	D	335	VAL	2.8
1	C	363	ASP	2.8
1	A	429	ILE	2.8
1	C	386	THR	2.8
1	D	405	ASN	2.8
1	D	243	TYR	2.8
1	B	368	GLY	2.7
1	A	244	VAL	2.7
1	C	338	LYS	2.7
1	A	345	ASP	2.7
1	B	57	LYS	2.7
1	C	345	ASP	2.7
1	D	89	PRO	2.7

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Mol	Chain	Res	Type	RSRZ
1	A	368	GLY	2.7
1	A	439	ASN	2.6
1	C	287	ASN	2.6
1	C	405	ASN	2.6
1	D	99	GLY	2.6
1	B	437	GLN	2.6
1	A	90	VAL	2.6
1	D	292	ASP	2.6
1	D	345	ASP	2.6
1	D	200	GLU	2.6
1	B	370	TYR	2.6
1	A	340	ILE	2.6
1	C	91	GLY	2.6
1	B	385	ALA	2.5
1	C	16	ALA	2.5
1	B	237	ILE	2.5
1	C	127	ILE	2.5
1	A	292	ASP	2.5
1	D	370	TYR	2.5
1	D	371	SER	2.5
1	A	270	GLN	2.5
1	B	394	GLY	2.5
1	B	11	THR	2.5
1	D	343	VAL	2.5
1	D	439	ASN	2.4
1	D	181	LEU	2.4
1	D	196	VAL	2.4
1	C	374	PHE	2.4
1	D	188	ALA	2.4
1	A	60	HIS	2.4
1	A	343	VAL	2.4
1	C	368	GLY	2.4
1	D	339	LYS	2.3
1	A	371	SER	2.3
1	D	366	HIS	2.3
1	A	339	LYS	2.3
1	C	297	ALA	2.3
1	D	206	ASP	2.3
1	D	338	LYS	2.3
1	D	114	SER	2.3
1	C	90	VAL	2.3
1	B	297	ALA	2.3

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Mol	Chain	Res	Type	RSRZ
1	D	198	LYS	2.2
1	D	337	LYS	2.2
1	B	439	ASN	2.2
1	D	195	PRO	2.2
1	B	69	GLU	2.2
1	B	373	GLU	2.2
1	A	376	TRP	2.2
1	A	237	ILE	2.2
1	D	346	LEU	2.2
1	B	380	THR	2.2
1	A	405	ASN	2.2
1	B	366	HIS	2.2
1	C	242	ARG	2.1
1	C	57	LYS	2.1
1	D	182	GLY	2.1
1	C	226	THR	2.1
1	B	435	GLN	2.1
1	A	287	ASN	2.1
1	D	90	VAL	2.1
1	D	112	THR	2.1
1	D	32	PRO	2.1
1	A	365	ILE	2.1
1	B	371	SER	2.1
1	D	227	GLN	2.1
1	A	366	HIS	2.1
1	A	57	LYS	2.0
1	A	336	THR	2.0
1	D	85	ILE	2.0
1	D	59	ARG	2.0
1	D	79	TYR	2.0
1	D	344	SER	2.0
1	C	429	ILE	2.0
1	D	199	ARG	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 ⓘ

There are no ligands in this entry.

6.5 Other polymers ⓘ

There are no such residues in this entry.