



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 5, 2026 – 05:12 PM UTC

PDB ID : 1L5A / pdb_0000115a
Title : Crystal Structure of VibH, an NRPS Condensation Enzyme
Authors : Keating, T.A.; Marshall, C.G.; Walsh, C.T.; Keating, A.E.
Deposited on : 2002-03-06
Resolution : 2.55 Å(reported)

This is a Full wwPDB X-ray Structure Validation Report for a publicly released PDB entry.

We welcome your comments at validation@mail.wwpdb.org

A user guide is available at

<https://www.wwpdb.org/validation/2017/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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

MolProbity	:	4-5-2 with Phenix2.0
Xtriage (Phenix)	:	2.0
EDS	:	3.0
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4	:	9.0.010 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.49

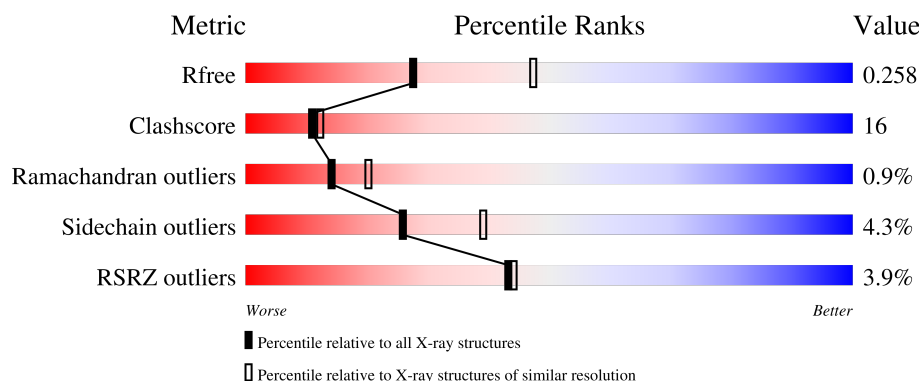
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.55 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	180053	1091 (2.54-2.54)
Clashscore	190562	1120 (2.54-2.54)
Ramachandran outliers	187476	1106 (2.54-2.54)
Sidechain outliers	187428	1106 (2.54-2.54)
RSRZ outliers	180081	1091 (2.54-2.54)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$. The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	436	3% 69% 25% • •
1	B	436	5% 59% 33% 5% •
1	C	436	4% 67% 27% • •

2 Entry composition

There are 2 unique types of molecules in this entry. The entry contains 10312 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 amide synthase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	424	Total	C	N	O	S	0	0	0
			3386	2178	579	619	10			
1	B	424	Total	C	N	O	S	0	0	0
			3376	2165	580	621	10			
1	C	424	Total	C	N	O	S	0	0	0
			3356	2157	575	614	10			

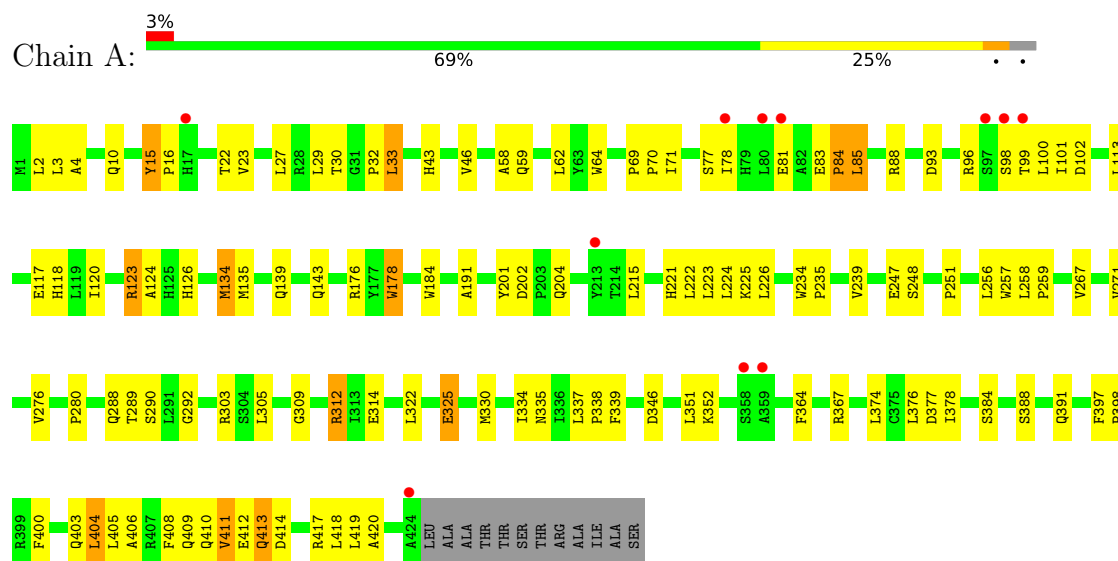
- Molecule 2 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	80	Total	O	0	0
			80	80		
2	B	43	Total	O	0	0
			43	43		
2	C	71	Total	O	0	0
			71	71		

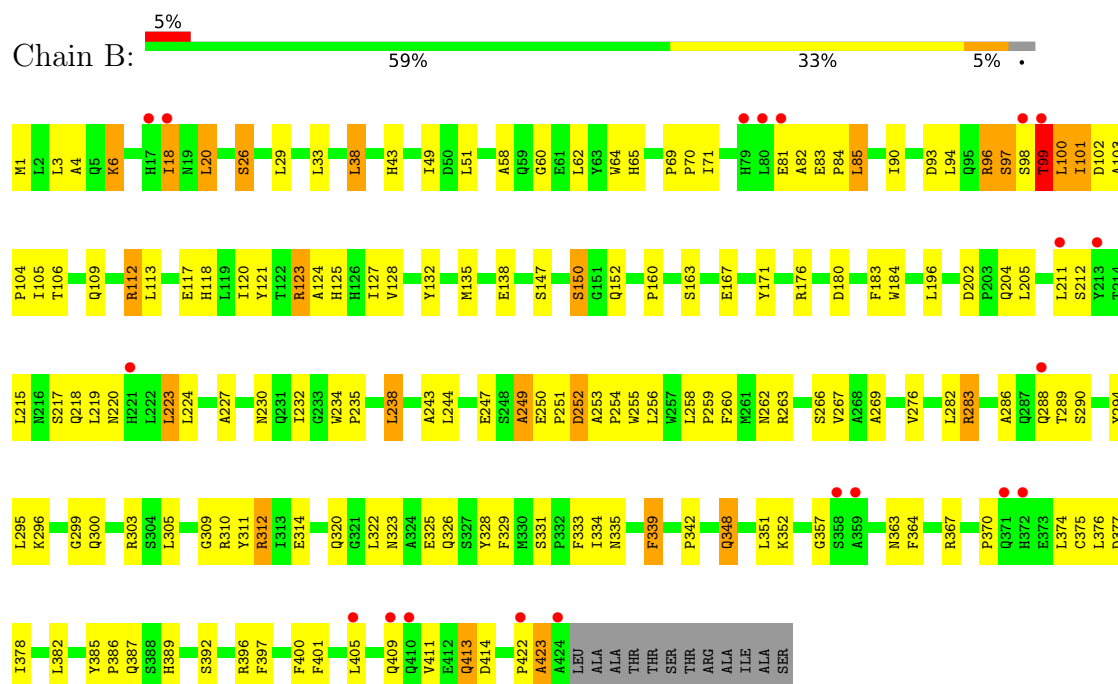
3 Residue-property plots [i](#)

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.

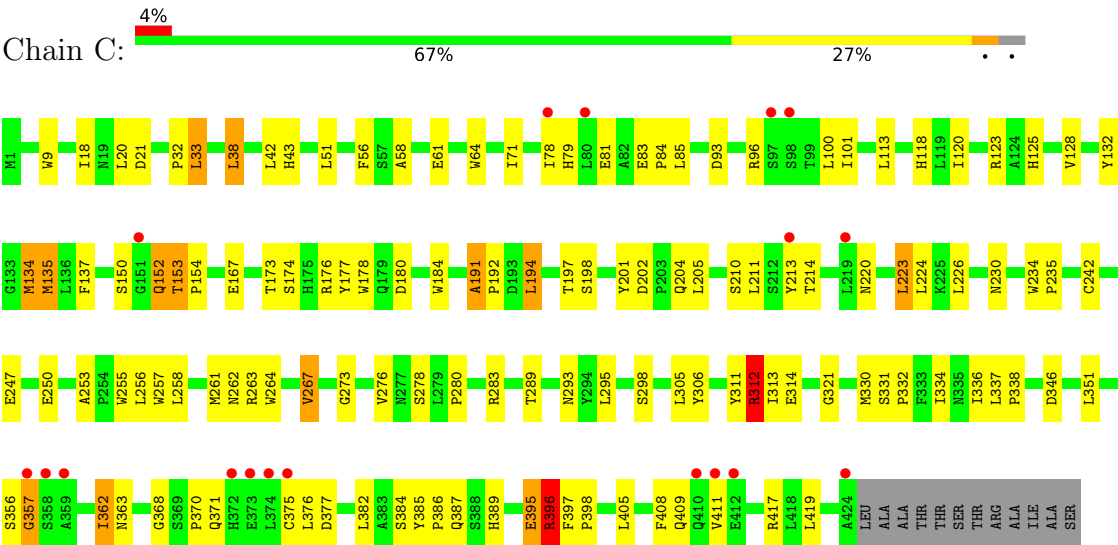
• Molecule 1: amide synthase



• Molecule 1: amide synthase



● Molecule 1: amide synthase



4 Data and refinement statistics

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α , β , γ	132.59Å 161.35Å 115.60Å 90.00° 104.81° 90.00°	Depositor
Resolution (Å)	34.14 – 2.55 34.14 – 2.55	Depositor EDS
% Data completeness (in resolution range)	95.4 (34.14-2.55) 95.5 (34.14-2.55)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	0.05	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.49 (at 2.51Å)	Xtriage
Refinement program	CNS	Depositor
R, R_{free}	0.214 , 0.259 0.213 , 0.258	Depositor DCC
R_{free} test set	7472 reflections (10.10%)	wwPDB-VP
Wilson B-factor (Å ²)	44.9	Xtriage
Anisotropy	0.143	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.31 , 45.4	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	10312	wwPDB-VP
Average B, all atoms (Å ²)	47.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.15% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical values of $\langle |L| \rangle$, $\langle L^2 \rangle$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality

5.1 Standard geometry

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 5$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# $ Z > 5$	RMSZ	# $ Z > 5$
1	A	0.55	1/3487 (0.0%)	0.96	8/4764 (0.2%)
1	B	0.49	0/3475	0.96	19/4748 (0.4%)
1	C	0.57	1/3458 (0.0%)	1.00	13/4730 (0.3%)
All	All	0.54	2/10420 (0.0%)	0.97	40/14242 (0.3%)

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	C	134	MET	SD-CE	-8.44	1.58	1.79
1	A	134	MET	SD-CE	-8.26	1.58	1.79

All (40) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	191	ALA	N-CA-C	10.52	117.43	108.07
1	A	64	TRP	N-CA-C	8.30	122.05	108.52
1	B	150	SER	N-CA-C	-7.76	99.03	110.52
1	C	64	TRP	N-CA-C	7.73	121.12	108.52
1	A	191	ALA	N-CA-C	7.40	114.79	108.13
1	A	15	TYR	CA-C-N	7.39	127.25	119.05
1	A	15	TYR	C-N-CA	7.39	127.25	119.05
1	A	309	GLY	N-CA-C	6.98	122.93	113.99
1	B	18	ILE	N-CA-C	6.61	119.15	109.63
1	B	20	LEU	N-CA-C	6.51	119.37	111.82
1	B	263	ARG	N-CA-C	-6.40	106.01	113.88
1	C	250	GLU	CA-C-N	6.23	125.92	119.56
1	C	250	GLU	C-N-CA	6.23	125.92	119.56
1	C	396	ARG	N-CA-C	6.18	120.55	112.89
1	B	132	TYR	N-CA-C	-6.17	104.47	111.07
1	C	298	SER	N-CA-C	-6.12	104.53	111.14
1	B	6	LYS	CA-C-N	-6.07	112.61	119.28
1	B	6	LYS	C-N-CA	-6.07	112.61	119.28
1	A	337	LEU	CA-C-N	5.90	127.22	119.84

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	337	LEU	C-N-CA	5.90	127.22	119.84
1	B	97	SER	N-CA-C	-5.80	102.69	111.56
1	C	21	ASP	N-CA-C	5.74	117.25	109.11
1	B	64	TRP	N-CA-C	5.72	118.28	109.07
1	B	255	TRP	N-CA-C	5.68	119.32	110.17
1	C	385	TYR	CA-C-N	5.68	126.94	119.84
1	C	385	TYR	C-N-CA	5.68	126.94	119.84
1	A	339	PHE	N-CA-C	5.67	118.67	110.28
1	B	339	PHE	N-CA-C	5.67	118.23	110.24
1	C	312	ARG	N-CA-C	5.61	118.37	109.96
1	B	249	ALA	N-CA-C	-5.56	107.75	114.75
1	B	112	ARG	N-CA-C	-5.48	99.81	108.73
1	B	94	LEU	N-CA-C	-5.33	105.59	111.71
1	C	321	GLY	N-CA-C	5.26	122.87	115.30
1	B	152	GLN	N-CA-C	5.20	117.83	110.50
1	B	49	ILE	N-CA-C	5.19	114.67	106.32
1	C	194	LEU	N-CA-C	-5.18	102.85	110.52
1	B	101	ILE	N-CA-C	5.17	116.36	109.37
1	C	174	SER	N-CA-C	5.14	117.16	110.53
1	B	26	SER	N-CA-C	-5.11	100.70	109.24
1	B	65	HIS	N-CA-C	-5.05	102.86	110.24

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	3386	0	3246	93	0
1	B	3376	0	3222	139	0
1	C	3356	0	3181	98	0
2	A	80	0	0	2	0
2	B	43	0	0	0	0
2	C	71	0	0	1	0
All	All	10312	0	9649	326	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 16.

All (326) 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:138:GLU:HB3	1:B:342:PRO:HG3	1.37	1.03
1:B:348:GLN:HE21	1:B:348:GLN:HA	1.28	0.95
1:A:58:ALA:HA	1:A:101:ILE:HD12	1.49	0.95
1:B:58:ALA:HA	1:B:101:ILE:HD13	1.53	0.91
1:C:96:ARG:NH2	1:C:123:ARG:HD2	1.85	0.91
1:A:303:ARG:HD3	1:C:178:TRP:CZ2	2.06	0.89
1:B:249:ALA:HA	1:B:396:ARG:HH11	1.39	0.86
1:B:249:ALA:HA	1:B:396:ARG:NH1	1.91	0.85
1:A:134:MET:HE2	2:A:461:HOH:O	1.77	0.84
1:B:99:THR:O	1:B:101:ILE:N	2.14	0.80
1:A:96:ARG:HG2	1:A:98:SER:H	1.46	0.80
1:B:93:ASP:OD1	1:B:123:ARG:HD3	1.82	0.79
1:B:243:ALA:HB1	1:B:283:ARG:HG3	1.64	0.79
1:A:178:TRP:CZ2	1:B:303:ARG:HD3	2.20	0.77
1:A:202:ASP:OD1	1:A:204:GLN:HG2	1.86	0.77
1:A:83:GLU:HB2	1:A:84:PRO:HD3	1.66	0.76
1:B:333:PHE:HB3	1:B:363:ASN:OD1	1.86	0.76
1:A:93:ASP:O	1:A:96:ARG:HD2	1.87	0.75
1:C:93:ASP:O	1:C:96:ARG:HG3	1.87	0.74
1:C:242:CYS:SG	1:C:334:ILE:HD12	2.27	0.74
1:B:202:ASP:OD1	1:B:204:GLN:HG2	1.88	0.74
1:C:376:LEU:HD21	1:C:397:PHE:CD2	2.23	0.73
1:C:132:TYR:HD1	1:C:261:MET:HE3	1.55	0.72
1:C:58:ALA:HA	1:C:101:ILE:HD12	1.72	0.72
1:A:411:VAL:HG12	1:A:411:VAL:O	1.90	0.71
1:A:30:THR:HG23	1:A:117:GLU:OE2	1.90	0.71
1:A:33:LEU:HD22	1:A:118:HIS:CE1	2.26	0.70
1:A:176:ARG:HG2	1:A:176:ARG:HH11	1.56	0.70
1:C:83:GLU:HG2	1:C:113:LEU:HD13	1.73	0.70
1:A:417:ARG:O	1:A:420:ALA:HB3	1.91	0.69
1:C:253:ALA:O	1:C:283:ARG:NH1	2.25	0.69
1:B:96:ARG:HG3	1:B:98:SER:HB2	1.75	0.69
1:A:414:ASP:OD2	1:A:417:ARG:HG3	1.93	0.68
1:B:96:ARG:HG3	1:B:98:SER:CB	2.24	0.68
1:A:178:TRP:CH2	1:B:303:ARG:HD3	2.29	0.68
1:B:252:ASP:O	1:B:254:PRO:HD3	1.94	0.67
1:B:351:LEU:HD23	1:B:352:LYS:N	2.10	0.67

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:83:GLU:HB2	1:C:84:PRO:HD3	1.76	0.67
1:B:247:GLU:HG2	1:B:286:ALA:HB3	1.76	0.67
1:B:367:ARG:HB2	1:B:367:ARG:NH1	2.10	0.67
1:C:234:TRP:CG	1:C:235:PRO:HD3	2.30	0.67
1:B:18:ILE:HD12	1:B:20:LEU:HG	1.78	0.66
1:B:33:LEU:HD21	1:B:38:LEU:HG	1.77	0.66
1:B:367:ARG:HH12	1:B:375:CYS:HB2	1.61	0.65
1:B:96:ARG:HD3	1:B:123:ARG:NH1	2.12	0.65
1:B:411:VAL:HG12	1:B:411:VAL:O	1.95	0.65
1:A:58:ALA:HB3	1:A:59:GLN:HE22	1.63	0.64
1:B:138:GLU:HB3	1:B:342:PRO:CG	2.20	0.64
1:A:408:PHE:CD1	1:A:418:LEU:HD22	2.33	0.64
1:A:234:TRP:CG	1:A:235:PRO:HD3	2.32	0.64
1:B:215:LEU:HD22	1:B:219:LEU:HD23	1.79	0.64
1:C:220:ASN:HB3	1:C:370:PRO:O	1.97	0.64
1:A:58:ALA:HB3	1:A:59:GLN:NE2	2.13	0.64
1:B:411:VAL:HG12	1:B:414:ASP:HB3	1.81	0.63
1:A:367:ARG:HD3	1:A:377:ASP:OD2	1.99	0.63
1:B:348:GLN:HA	1:B:348:GLN:NE2	2.09	0.63
1:B:405:LEU:HD23	1:B:405:LEU:O	1.99	0.62
1:A:292:GLY:HA2	1:A:419:LEU:HD22	1.79	0.62
1:C:134:MET:HE2	2:C:443:HOH:O	2.00	0.62
1:C:289:THR:HG22	1:C:293:ASN:HB3	1.81	0.62
1:A:257:TRP:CE3	1:A:330:MET:HG2	2.34	0.62
1:A:123:ARG:HG2	1:A:124:ALA:N	2.14	0.62
1:C:276:VAL:O	1:C:312:ARG:NH2	2.31	0.61
1:C:184:TRP:CH2	1:C:305:LEU:HD22	2.34	0.61
1:A:405:LEU:O	1:A:409:GLN:HG2	2.00	0.61
1:B:81:GLU:O	1:B:85:LEU:HB2	2.00	0.61
1:B:250:GLU:N	1:B:251:PRO:HD3	2.14	0.61
1:C:405:LEU:O	1:C:408:PHE:HB3	1.99	0.61
1:A:201:TYR:CE1	1:A:384:SER:HB3	2.35	0.61
1:A:376:LEU:HD21	1:A:378:ILE:HD11	1.83	0.61
1:B:105:ILE:HG23	1:B:106:THR:HG23	1.83	0.61
1:C:150:SER:OG	1:C:152:GLN:HG3	2.01	0.61
1:C:43:HIS:HA	1:C:71:ILE:HD11	1.82	0.60
1:C:202:ASP:OD1	1:C:204:GLN:HG2	2.00	0.60
1:B:323:ASN:OD1	1:B:326:GLN:HG3	2.01	0.60
1:B:283:ARG:CB	1:B:283:ARG:HH11	2.14	0.60
1:A:96:ARG:NE	1:A:98:SER:HB3	2.17	0.60
1:A:222:LEU:HD21	1:A:404:LEU:HD22	1.83	0.60

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:201:TYR:CE1	1:C:384:SER:HB3	2.37	0.59
1:A:303:ARG:HD3	1:C:178:TRP:CE2	2.36	0.58
1:B:220:ASN:OD1	1:B:374:LEU:HD21	2.04	0.58
1:A:248:SER:O	1:A:251:PRO:HD3	2.03	0.58
1:C:312:ARG:HD3	1:C:314:GLU:OE1	2.04	0.58
1:A:99:THR:HG22	1:A:100:LEU:N	2.19	0.58
1:B:276:VAL:O	1:B:312:ARG:NH2	2.33	0.58
1:C:226:LEU:HD22	1:C:419:LEU:HD21	1.84	0.58
1:A:93:ASP:OD1	1:A:123:ARG:HD3	2.04	0.58
1:B:147:SER:O	1:B:150:SER:O	2.22	0.58
1:B:100:LEU:HD21	1:B:125:HIS:CD2	2.39	0.58
1:C:395:GLU:HG3	1:C:396:ARG:N	2.17	0.57
1:C:214:THR:HG1	1:C:375:CYS:HG	1.43	0.57
1:B:247:GLU:O	1:B:251:PRO:HG3	2.05	0.57
1:C:9:TRP:HH2	1:C:101:ILE:HD13	1.70	0.56
1:A:101:ILE:HG22	1:A:102:ASP:OD2	2.05	0.56
1:A:364:PHE:HD2	1:A:378:ILE:HD12	1.69	0.56
1:A:43:HIS:HA	1:A:71:ILE:HD11	1.88	0.56
1:B:376:LEU:HD21	1:B:397:PHE:CD2	2.40	0.56
1:A:258:LEU:HD23	1:A:334:ILE:CG2	2.35	0.56
1:B:160:PRO:O	1:B:163:SER:HB2	2.06	0.56
1:C:93:ASP:OD1	1:C:123:ARG:HD3	2.06	0.56
1:A:397:PHE:HB3	1:A:398:PRO:HD3	1.88	0.55
1:B:101:ILE:HG22	1:B:102:ASP:OD2	2.06	0.55
1:C:167:GLU:OE1	1:C:267:VAL:HG22	2.05	0.55
1:C:153:THR:HG23	1:C:154:PRO:HD2	1.86	0.55
1:C:184:TRP:HH2	1:C:305:LEU:HD22	1.72	0.55
1:B:219:LEU:HD21	1:B:401:PHE:CD2	2.41	0.55
1:C:96:ARG:HD2	1:C:96:ARG:O	2.07	0.55
1:B:43:HIS:HA	1:B:71:ILE:HD11	1.88	0.54
1:B:99:THR:O	1:B:100:LEU:C	2.50	0.54
1:C:247:GLU:HA	1:C:283:ARG:HH21	1.71	0.54
1:B:259:PRO:HG3	1:B:335:ASN:OD1	2.08	0.54
1:A:215:LEU:HD12	1:A:374:LEU:HD23	1.88	0.54
1:B:62:LEU:HD23	1:B:62:LEU:C	2.32	0.54
1:C:81:GLU:O	1:C:85:LEU:HG	2.08	0.54
1:C:278:SER:HB2	1:C:330:MET:CE	2.38	0.54
1:A:303:ARG:HD2	2:A:468:HOH:O	2.08	0.54
1:A:409:GLN:C	1:A:411:VAL:H	2.16	0.53
1:C:356:SER:O	1:C:357:GLY:C	2.49	0.53
1:C:405:LEU:O	1:C:409:GLN:HG2	2.09	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:247:GLU:HA	1:C:283:ARG:NH2	2.23	0.53
1:A:414:ASP:HB3	1:A:417:ARG:HD3	1.91	0.53
1:A:364:PHE:CD2	1:A:378:ILE:HD12	2.43	0.53
1:B:283:ARG:HB3	1:B:283:ARG:NH1	2.23	0.53
1:C:313:ILE:HG12	1:C:330:MET:HE3	1.91	0.53
1:C:338:PRO:HA	1:C:368:GLY:O	2.09	0.53
1:C:376:LEU:HD12	1:C:377:ASP:N	2.24	0.53
1:A:139:GLN:O	1:A:143:GLN:HG3	2.09	0.53
1:B:243:ALA:HA	1:B:283:ARG:HD2	1.91	0.53
1:A:276:VAL:O	1:A:312:ARG:NH2	2.34	0.53
1:A:29:LEU:HD12	1:A:33:LEU:CD1	2.39	0.53
1:B:51:LEU:HG	1:B:128:VAL:HB	1.91	0.52
1:C:258:LEU:HD23	1:C:334:ILE:HG23	1.91	0.52
1:B:18:ILE:HD13	1:B:204:GLN:HB3	1.91	0.52
1:C:33:LEU:C	1:C:33:LEU:HD23	2.35	0.52
1:A:414:ASP:CB	1:A:417:ARG:HD3	2.39	0.52
1:B:18:ILE:CD1	1:B:204:GLN:HB3	2.39	0.52
1:B:232:ILE:CD1	1:B:299:GLY:HA3	2.38	0.52
1:A:221:HIS:O	1:A:225:LYS:HD3	2.09	0.52
1:B:232:ILE:HD12	1:B:299:GLY:HA3	1.91	0.52
1:C:43:HIS:HA	1:C:71:ILE:CD1	2.39	0.52
1:B:223:LEU:HD11	1:B:238:LEU:HD13	1.92	0.52
1:B:253:ALA:O	1:B:283:ARG:NH1	2.43	0.52
1:B:296:LYS:O	1:B:300:GLN:HG3	2.10	0.52
1:B:382:LEU:HD22	1:B:387:GLN:HB2	1.92	0.52
1:B:215:LEU:HD22	1:B:219:LEU:CD2	2.41	0.51
1:C:278:SER:HB2	1:C:330:MET:HE1	1.91	0.51
1:C:397:PHE:HB3	1:C:398:PRO:HD3	1.92	0.51
1:C:362:ILE:HD13	1:C:363:ASN:N	2.25	0.51
1:B:1:MET:HE3	1:B:60:GLY:O	2.11	0.51
1:B:367:ARG:HB2	1:B:367:ARG:HH11	1.74	0.51
1:C:258:LEU:CD2	1:C:334:ILE:HG23	2.41	0.51
1:A:46:VAL:CG1	1:A:69:PRO:HD2	2.40	0.51
1:B:83:GLU:HB2	1:B:84:PRO:HD3	1.93	0.51
1:B:405:LEU:HD23	1:B:405:LEU:C	2.36	0.51
1:C:224:LEU:HD11	1:C:371:GLN:HG3	1.92	0.51
1:A:408:PHE:HD1	1:A:418:LEU:HD22	1.74	0.51
1:C:100:LEU:HD21	1:C:125:HIS:CD2	2.46	0.51
1:A:176:ARG:HH11	1:A:176:ARG:CG	2.23	0.51
1:B:367:ARG:O	1:B:374:LEU:HA	2.11	0.50
1:B:312:ARG:HD3	1:B:314:GLU:OE1	2.10	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:123:ARG:HG2	1:B:124:ALA:N	2.26	0.50
1:C:132:TYR:O	1:C:135:MET:HG3	2.11	0.50
1:B:230:ASN:HD21	1:B:295:LEU:HD12	1.76	0.50
1:B:244:LEU:HD13	1:B:294:TYR:CD2	2.46	0.50
1:C:96:ARG:CZ	1:C:123:ARG:HD2	2.40	0.50
1:A:351:LEU:HD23	1:A:352:LYS:N	2.26	0.50
1:C:289:THR:HG23	1:C:293:ASN:OD1	2.12	0.50
1:A:93:ASP:OD2	1:A:123:ARG:NH1	2.44	0.50
1:A:27:LEU:HB2	1:A:120:ILE:HB	1.94	0.50
1:C:214:THR:OG1	1:C:375:CYS:SG	2.62	0.50
1:C:210:SER:OG	1:C:211:LEU:N	2.45	0.49
1:A:312:ARG:HD3	1:A:314:GLU:OE1	2.13	0.49
1:B:364:PHE:CD2	1:B:378:ILE:HD12	2.47	0.49
1:A:4:ALA:HB2	1:A:312:ARG:HD2	1.94	0.49
1:B:38:LEU:HD11	1:B:120:ILE:HD11	1.94	0.49
1:C:78:ILE:HG13	1:C:79:HIS:N	2.27	0.49
1:C:96:ARG:HD2	1:C:96:ARG:C	2.37	0.49
1:B:364:PHE:HD2	1:B:378:ILE:CD1	2.25	0.49
1:B:97:SER:OG	1:B:98:SER:N	2.44	0.49
1:B:320:GLN:HG3	1:B:328:TYR:OH	2.13	0.49
1:B:282:LEU:HD13	1:B:282:LEU:C	2.38	0.49
1:A:33:LEU:C	1:A:33:LEU:HD23	2.38	0.49
1:A:267:VAL:O	1:A:271:VAL:HG23	2.13	0.49
1:B:26:SER:OG	1:B:352:LYS:HB3	2.12	0.49
1:B:135:MET:HG3	1:B:339:PHE:CD1	2.48	0.49
1:C:18:ILE:HD13	1:C:204:GLN:HB3	1.95	0.49
1:B:290:SER:HA	1:B:422:PRO:HA	1.95	0.49
1:B:127:ILE:HG23	1:B:128:VAL:HG13	1.95	0.48
1:A:397:PHE:O	1:A:400:PHE:HB3	2.14	0.48
1:B:244:LEU:HD13	1:B:294:TYR:CE2	2.49	0.48
1:A:62:LEU:C	1:A:62:LEU:HD23	2.38	0.48
1:B:364:PHE:HD2	1:B:378:ILE:HD12	1.78	0.48
1:B:81:GLU:HG3	1:B:84:PRO:HB2	1.95	0.48
1:C:128:VAL:O	1:C:273:GLY:HA2	2.13	0.48
1:C:331:SER:HA	1:C:332:PRO:C	2.38	0.48
1:B:171:TYR:CE2	1:B:310:ARG:HG2	2.48	0.48
1:B:397:PHE:O	1:B:400:PHE:HB3	2.13	0.48
1:C:191:ALA:HB1	1:C:192:PRO:HD2	1.95	0.48
1:B:224:LEU:HG	1:B:370:PRO:HB2	1.96	0.48
1:B:243:ALA:O	1:B:283:ARG:HD2	2.14	0.47
1:A:406:ALA:C	1:A:408:PHE:N	2.69	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:18:ILE:CD1	1:C:204:GLN:HB3	2.44	0.47
1:C:33:LEU:HD11	1:C:38:LEU:HG	1.95	0.47
1:B:202:ASP:HB3	1:B:205:LEU:HD12	1.96	0.47
1:C:264:TRP:HB3	1:C:306:TYR:OH	2.14	0.47
1:B:234:TRP:CZ2	1:B:370:PRO:HD2	2.49	0.47
1:C:33:LEU:HD22	1:C:118:HIS:CE1	2.50	0.47
1:A:239:VAL:CG1	1:A:258:LEU:HD21	2.44	0.47
1:C:42:LEU:HG	1:C:71:ILE:HD13	1.95	0.47
1:C:205:LEU:HD23	1:C:205:LEU:HA	1.72	0.47
1:B:230:ASN:ND2	1:B:295:LEU:HD12	2.30	0.46
1:B:252:ASP:OD2	1:B:252:ASP:N	2.48	0.46
1:A:15:TYR:N	1:A:16:PRO:HD3	2.29	0.46
1:B:184:TRP:HH2	1:B:305:LEU:HD22	1.80	0.46
1:C:134:MET:CE	1:C:137:PHE:CD2	2.98	0.46
1:C:257:TRP:CZ3	1:C:280:PRO:HD3	2.51	0.46
1:B:283:ARG:HH11	1:B:283:ARG:HB3	1.80	0.46
1:C:132:TYR:CD2	1:C:263:ARG:HG3	2.51	0.46
1:C:234:TRP:CD1	1:C:235:PRO:HD3	2.51	0.46
1:C:257:TRP:CZ3	1:C:330:MET:HE2	2.51	0.46
1:A:257:TRP:CZ3	1:A:280:PRO:HD3	2.50	0.45
1:A:289:THR:HG22	1:A:290:SER:N	2.31	0.45
1:B:98:SER:O	1:B:100:LEU:N	2.49	0.45
1:B:351:LEU:HD23	1:B:351:LEU:C	2.40	0.45
1:A:32:PRO:HD2	1:A:346:ASP:O	2.16	0.45
1:A:81:GLU:O	1:A:85:LEU:HB2	2.16	0.45
1:B:348:GLN:HE21	1:B:348:GLN:CA	2.08	0.45
1:C:38:LEU:HD11	1:C:120:ILE:HD11	1.98	0.45
1:A:388:SER:O	1:A:391:GLN:HB2	2.17	0.45
1:C:211:LEU:C	1:C:211:LEU:HD23	2.42	0.45
1:A:257:TRP:CZ3	1:A:330:MET:HG2	2.52	0.45
1:B:250:GLU:N	1:B:251:PRO:CD	2.80	0.45
1:B:260:PHE:CD2	1:B:309:GLY:HA3	2.52	0.45
1:C:411:VAL:HG11	1:C:417:ARG:CB	2.46	0.45
1:C:261:MET:O	1:C:262:ASN:HB2	2.16	0.45
1:B:234:TRP:CG	1:B:235:PRO:HD3	2.52	0.45
1:B:283:ARG:CB	1:B:283:ARG:NH1	2.80	0.45
1:C:220:ASN:N	1:C:220:ASN:HD22	2.15	0.45
1:A:22:THR:HG22	1:A:23:VAL:N	2.32	0.44
1:B:389:HIS:O	1:B:392:SER:HB3	2.17	0.44
1:A:403:GLN:O	1:A:406:ALA:N	2.51	0.44
1:B:96:ARG:HD2	1:B:98:SER:CB	2.47	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:224:LEU:O	1:B:227:ALA:HB3	2.18	0.44
1:C:132:TYR:CD1	1:C:261:MET:HE3	2.44	0.44
1:B:183:PHE:C	1:B:183:PHE:CD2	2.95	0.44
1:A:69:PRO:HA	1:A:70:PRO:HD3	1.90	0.44
1:C:213:TYR:CZ	1:C:398:PRO:HB3	2.53	0.44
1:B:247:GLU:OE1	1:B:247:GLU:HA	2.17	0.44
1:B:385:TYR:HA	1:B:386:PRO:HD3	1.86	0.44
1:C:180:ASP:HB3	1:C:311:TYR:HB2	2.00	0.44
1:C:223:LEU:HD13	1:C:234:TRP:HB2	2.00	0.43
1:A:96:ARG:HG2	1:A:98:SER:N	2.24	0.43
1:B:219:LEU:HD22	1:B:401:PHE:HB3	2.01	0.43
1:C:313:ILE:HG12	1:C:330:MET:CE	2.47	0.43
1:A:176:ARG:CG	1:A:176:ARG:NH1	2.82	0.43
1:A:234:TRP:CD2	1:A:235:PRO:HD3	2.53	0.43
1:A:406:ALA:O	1:A:409:GLN:N	2.52	0.43
1:B:258:LEU:HD23	1:B:334:ILE:CG2	2.48	0.43
1:B:196:LEU:HD21	1:B:322:LEU:HD21	2.01	0.43
1:A:222:LEU:HG	1:A:226:LEU:HD12	2.01	0.43
1:C:382:LEU:HD13	1:C:387:GLN:HG3	2.01	0.43
1:B:112:ARG:HG3	1:B:118:HIS:NE2	2.34	0.42
1:A:414:ASP:HB3	1:A:417:ARG:HB2	2.01	0.42
1:B:113:LEU:HB2	1:B:117:GLU:HB2	2.01	0.42
1:B:167:GLU:OE2	1:B:266:SER:OG	2.28	0.42
1:A:247:GLU:HA	1:A:247:GLU:OE1	2.19	0.42
1:B:176:ARG:NH2	1:B:180:ASP:OD1	2.52	0.42
1:B:29:LEU:HA	1:B:348:GLN:O	2.19	0.42
1:B:93:ASP:O	1:B:96:ARG:HB3	2.18	0.42
1:B:223:LEU:HD21	1:B:238:LEU:HD13	2.00	0.42
1:B:376:LEU:HD12	1:B:377:ASP:N	2.34	0.42
1:B:103:ALA:O	1:B:104:PRO:C	2.62	0.42
1:C:230:ASN:HD21	1:C:295:LEU:HD12	1.83	0.42
1:A:4:ALA:HB2	1:A:312:ARG:CD	2.49	0.42
1:B:260:PHE:CE2	1:B:309:GLY:HA3	2.54	0.42
1:C:18:ILE:CD1	1:C:20:LEU:HD21	2.49	0.42
1:C:289:THR:CG2	1:C:293:ASN:HB3	2.47	0.42
1:A:84:PRO:O	1:A:88:ARG:HG3	2.20	0.42
1:B:90:ILE:HG23	1:B:121:TYR:CE1	2.55	0.42
1:C:18:ILE:HD12	1:C:20:LEU:HD21	2.02	0.42
1:C:336:ILE:O	1:C:337:LEU:HD23	2.19	0.42
1:B:243:ALA:CA	1:B:283:ARG:HD2	2.50	0.42
1:C:191:ALA:HB1	1:C:192:PRO:CD	2.50	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:59:GLN:N	1:A:59:GLN:CD	2.78	0.42
1:A:184:TRP:HH2	1:A:305:LEU:HD22	1.85	0.42
1:C:32:PRO:HD2	1:C:346:ASP:O	2.20	0.42
1:C:51:LEU:HD23	1:C:128:VAL:O	2.20	0.42
1:A:2:LEU:O	1:A:3:LEU:C	2.62	0.42
1:A:239:VAL:HG13	1:A:258:LEU:HD21	2.00	0.42
1:B:305:LEU:O	1:B:309:GLY:N	2.53	0.42
1:A:4:ALA:HB2	1:A:312:ARG:NE	2.35	0.41
1:A:99:THR:CG2	1:A:100:LEU:N	2.83	0.41
1:A:412:GLU:O	1:A:413:GLN:C	2.63	0.41
1:B:3:LEU:HD12	1:B:6:LYS:HD2	2.02	0.41
1:C:56:PHE:HA	1:C:61:GLU:O	2.20	0.41
1:B:286:ALA:HB1	1:B:423:ALA:HB1	2.01	0.41
1:A:184:TRP:CH2	1:A:305:LEU:HD22	2.54	0.41
1:B:180:ASP:HB3	1:B:311:TYR:HB2	2.02	0.41
1:B:283:ARG:HH11	1:B:283:ARG:HB2	1.85	0.41
1:A:77:SER:HA	1:A:113:LEU:O	2.21	0.41
1:C:202:ASP:OD1	1:C:202:ASP:C	2.64	0.41
1:A:224:LEU:O	1:A:225:LYS:C	2.63	0.41
1:A:325:GLU:N	1:A:325:GLU:OE1	2.54	0.41
1:B:51:LEU:HD23	1:B:128:VAL:O	2.21	0.41
1:B:211:LEU:HD23	1:B:212:SER:N	2.35	0.41
1:B:288:GLN:O	1:B:289:THR:HG23	2.20	0.41
1:C:176:ARG:O	1:C:177:TYR:C	2.62	0.41
1:B:267:VAL:C	1:B:269:ALA:N	2.79	0.41
1:B:234:TRP:CE2	1:B:370:PRO:HD2	2.55	0.41
1:A:234:TRP:CD1	1:A:235:PRO:HD3	2.56	0.41
1:B:109:GLN:HB2	1:B:121:TYR:HB3	2.03	0.41
1:B:238:LEU:HD12	1:B:238:LEU:HA	1.74	0.41
1:B:374:LEU:HD23	1:B:374:LEU:N	2.36	0.41
1:B:329:PHE:CE2	1:B:331:SER:HB3	2.56	0.41
1:B:413:GLN:HE21	1:B:413:GLN:HB2	1.57	0.41
1:C:194:LEU:HD23	1:C:255:TRP:CD1	2.56	0.41
1:B:286:ALA:O	1:B:423:ALA:HB3	2.22	0.40
1:A:408:PHE:CE2	1:A:413:GLN:HB3	2.56	0.40
1:B:409:GLN:C	1:B:411:VAL:H	2.28	0.40
1:C:386:PRO:HB2	1:C:389:HIS:HB2	2.04	0.40
1:B:4:ALA:HB2	1:B:312:ARG:NE	2.37	0.40
1:B:18:ILE:HD12	1:B:20:LEU:CG	2.48	0.40
1:B:69:PRO:HA	1:B:70:PRO:HD3	1.90	0.40
1:B:217:SER:O	1:B:218:GLN:C	2.64	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:9:TRP:HH2	1:C:101:ILE:CD1	2.34	0.40
1:C:197:THR:O	1:C:198:SER:C	2.64	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	422/436 (97%)	399 (94%)	19 (4%)	4 (1%)	14	20
1	B	422/436 (97%)	380 (90%)	37 (9%)	5 (1%)	10	13
1	C	422/436 (97%)	395 (94%)	25 (6%)	2 (0%)	24	34
All	All	1266/1308 (97%)	1174 (93%)	81 (6%)	11 (1%)	14	20

All (11) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	100	LEU
1	B	423	ALA
1	A	413	GLN
1	A	410	GLN
1	B	82	ALA
1	A	259	PRO
1	B	99	THR
1	C	152	GLN
1	A	411	VAL
1	C	357	GLY
1	B	357	GLY

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	356/377 (94%)	338 (95%)	18 (5%)	21	33
1	B	354/377 (94%)	339 (96%)	15 (4%)	26	40
1	C	349/377 (93%)	336 (96%)	13 (4%)	30	45
All	All	1059/1131 (94%)	1013 (96%)	46 (4%)	26	39

All (46) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	10	GLN
1	A	33	LEU
1	A	78	ILE
1	A	84	PRO
1	A	85	LEU
1	A	123	ARG
1	A	126	HIS
1	A	135	MET
1	A	178	TRP
1	A	223	LEU
1	A	256	LEU
1	A	288	GLN
1	A	312	ARG
1	A	322	LEU
1	A	325	GLU
1	A	335	ASN
1	A	338	PRO
1	A	404	LEU
1	B	38	LEU
1	B	85	LEU
1	B	96	ARG
1	B	99	THR
1	B	123	ARG
1	B	223	LEU
1	B	238	LEU
1	B	252	ASP

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Mol	Chain	Res	Type
1	B	256	LEU
1	B	262	ASN
1	B	283	ARG
1	B	312	ARG
1	B	325	GLU
1	B	348	GLN
1	B	413	GLN
1	C	33	LEU
1	C	38	LEU
1	C	135	MET
1	C	153	THR
1	C	173	THR
1	C	223	LEU
1	C	256	LEU
1	C	267	VAL
1	C	312	ARG
1	C	351	LEU
1	C	362	ILE
1	C	395	GLU
1	C	396	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (36) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	10	GLN
1	A	59	GLN
1	A	65	HIS
1	A	74	GLN
1	A	89	GLN
1	A	126	HIS
1	A	146	GLN
1	A	363	ASN
1	A	371	GLN
1	A	372	HIS
1	A	391	GLN
1	A	413	GLN
1	B	12	HIS
1	B	19	ASN
1	B	65	HIS
1	B	162	GLN
1	B	175	HIS
1	B	182	GLN

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Mol	Chain	Res	Type
1	B	228	ASN
1	B	230	ASN
1	B	262	ASN
1	B	297	GLN
1	B	320	GLN
1	B	348	GLN
1	B	389	HIS
1	B	413	GLN
1	C	25	HIS
1	C	152	GLN
1	C	185	GLN
1	C	220	ASN
1	C	230	ASN
1	C	363	ASN
1	C	372	HIS
1	C	387	GLN
1	C	391	GLN
1	C	403	GLN

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains [i](#)

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

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

There are no ligands in this entry.

5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues ⓘ

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(Å ²)	Q<0.9
1	A	424/436 (97%)	-0.13	11 (2%) 57 58	19, 40, 74, 96	0
1	B	424/436 (97%)	0.33	20 (4%) 36 36	26, 52, 90, 100	0
1	C	424/436 (97%)	-0.02	18 (4%) 40 41	18, 41, 78, 100	0
All	All	1272/1308 (97%)	0.06	49 (3%) 43 44	18, 44, 82, 100	0

All (49) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	424	ALA	5.8
1	A	424	ALA	5.3
1	C	411	VAL	5.2
1	C	373	GLU	4.9
1	C	424	ALA	4.7
1	B	358	SER	4.5
1	C	374	LEU	4.2
1	B	99	THR	4.2
1	B	80	LEU	4.0
1	A	80	LEU	3.4
1	C	80	LEU	3.4
1	B	213	TYR	3.2
1	C	98	SER	3.2
1	B	288	GLN	3.2
1	B	422	PRO	3.1
1	C	213	TYR	3.0
1	C	78	ILE	3.0
1	B	79	HIS	3.0
1	C	358	SER	3.0
1	B	98	SER	2.9
1	A	358	SER	2.9
1	B	18	ILE	2.9
1	B	359	ALA	2.8

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Mol	Chain	Res	Type	RSRZ
1	A	81	GLU	2.8
1	A	97	SER	2.7
1	B	405	LEU	2.7
1	B	81	GLU	2.6
1	B	409	GLN	2.5
1	C	97	SER	2.5
1	A	359	ALA	2.4
1	B	371	GLN	2.4
1	C	219	LEU	2.4
1	B	17	HIS	2.4
1	A	99	THR	2.3
1	B	211	LEU	2.3
1	B	372	HIS	2.3
1	B	410	GLN	2.3
1	A	98	SER	2.3
1	A	213	TYR	2.3
1	C	372	HIS	2.2
1	C	151	GLY	2.2
1	C	375	CYS	2.2
1	A	78	ILE	2.2
1	B	221	HIS	2.1
1	A	17	HIS	2.1
1	C	410	GLN	2.1
1	C	357	GLY	2.0
1	C	412	GLU	2.0
1	C	359	ALA	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 oligosaccharides in this entry.

6.4 Ligands [i](#)

There are no ligands in this entry.

6.5 Other polymers [i](#)

There are no such residues in this entry.