



# Full wwPDB X-ray Structure Validation Report ⓘ

Jun 27, 2016 – 02:44 PM EDT

PDB ID : 5I4A  
Title : X-ray crystal structure of Marinitoga piezophila Argonaute in complex with 5' OH guide RNA  
Authors : Doxzen, K.W.; Kaya, E.; Knoll, K.R.; Wilson, R.C.; Strutt, S.C.; Kranzusch, P.J.; Doudna, J.A.  
Deposited on : 2016-02-11  
Resolution : 1.95 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](mailto:validation@mail.wwpdb.org)  
A user guide is available at  
<http://wwpdb.org/validation/2016/XrayValidationReportHelp>  
with specific help available everywhere you see the ⓘ symbol.

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

MolProbity : 4.02b-467  
Mogul : unknown  
Xtriage (Phenix) : 1.9-1692  
EDS : rb-20027790  
Percentile statistics : 20151230.v01 (using entries in the PDB archive December 30th 2015)  
Refmac : 5.8.0135  
CCP4 : 6.5.0  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : rb-20027790

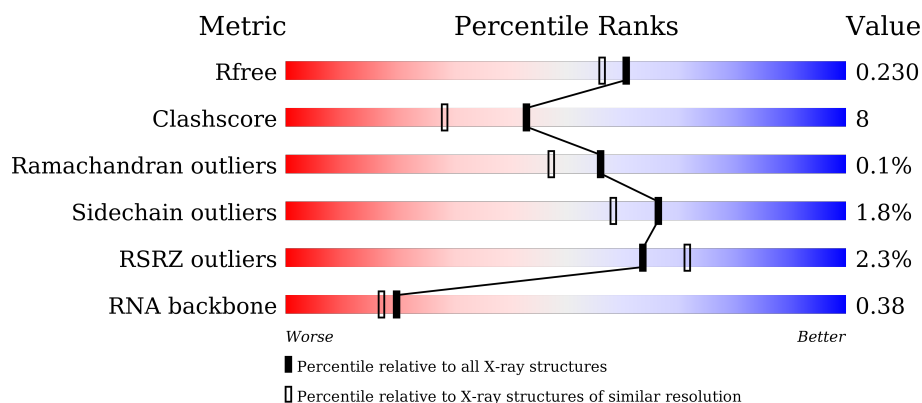
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

## *X-RAY DIFFRACTION*

The reported resolution of this entry is 1.95 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))
$R_{free}$	91344	2910 (1.96-1.92)
Clashscore	102246	3095 (1.96-1.92)
Ramachandran outliers	100387	3062 (1.96-1.92)
Sidechain outliers	100360	3062 (1.96-1.92)
RSRZ outliers	91569	2915 (1.96-1.92)
RNA backbone	2183	1014 (2.70-1.18)

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 on the lower bar indicate the fraction of residues that contain outliers for  $\geq 3$ , 2, 1 and 0 types of geometric quality criteria. 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	642	<div> <div>3%</div> <div>77%</div> <div>21%</div> <div>.</div> </div>
1	C	642	<div> <div>2%</div> <div>79%</div> <div>20%</div> <div>.</div> </div>
2	B	21	<div> <div>5%</div> <div>14%</div> <div>43%</div> <div>5%</div> <div>5%</div> <div>33%</div> </div>
2	D	21	<div> <div>19%</div> <div>24%</div> <div>19%</div> <div>38%</div> </div>

## 2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 11805 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 Argonaute protein.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	631	Total	C	N	O	S	0	0	0
			5311	3492	836	976	7			
1	C	635	Total	C	N	O	S	0	0	0
			5353	3523	841	982	7			

There are 8 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-2	GLY	-	expression tag	UNP H2J4R4
A	-1	ALA	-	expression tag	UNP H2J4R4
A	0	ASN	-	expression tag	UNP H2J4R4
A	1	ALA	-	expression tag	UNP H2J4R4
C	-2	GLY	-	expression tag	UNP H2J4R4
C	-1	ALA	-	expression tag	UNP H2J4R4
C	0	ASN	-	expression tag	UNP H2J4R4
C	1	ALA	-	expression tag	UNP H2J4R4

- Molecule 2 is a RNA chain called RNA (5'-R(\*UP\*AP\*UP\*AP\*CP\*AP\*AP\*CP\*CP\*UP\*AP\*CP\*UP\*U)-3').

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	14	Total	C	N	O	P	0	0	0
			220	95	26	86	13			
2	D	13	Total	C	N	O	P	0	0	0
			217	95	30	81	11			

- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	306	Total	O	0	0
			306	306		

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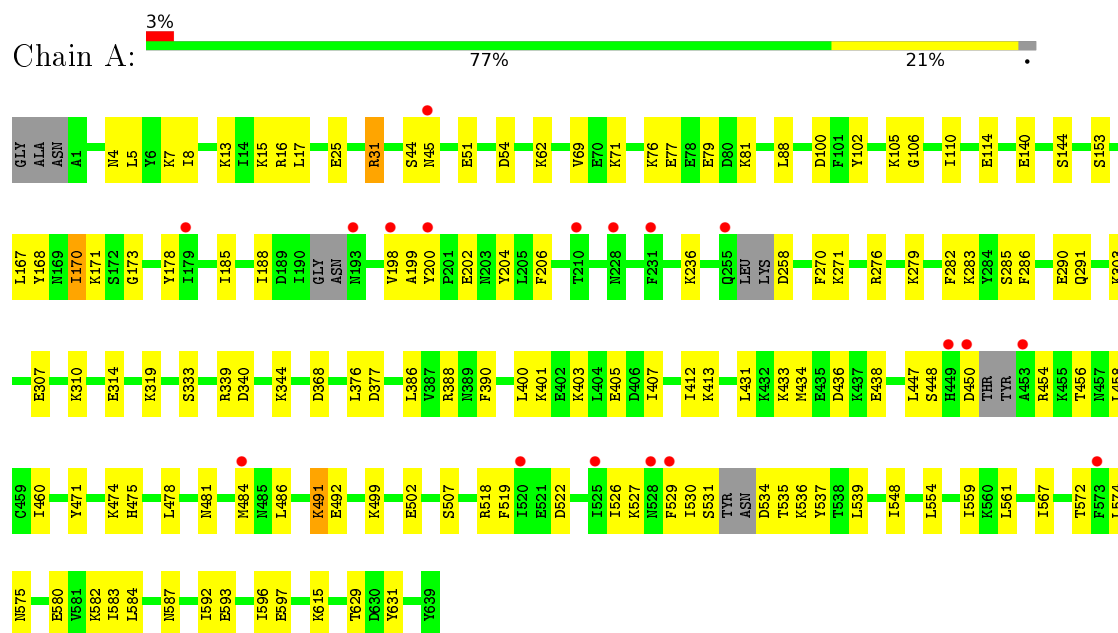
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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	B	25	Total 25	O 25	0	0
3	C	353	Total 353	O 353	0	0
3	D	20	Total 20	O 20	0	0

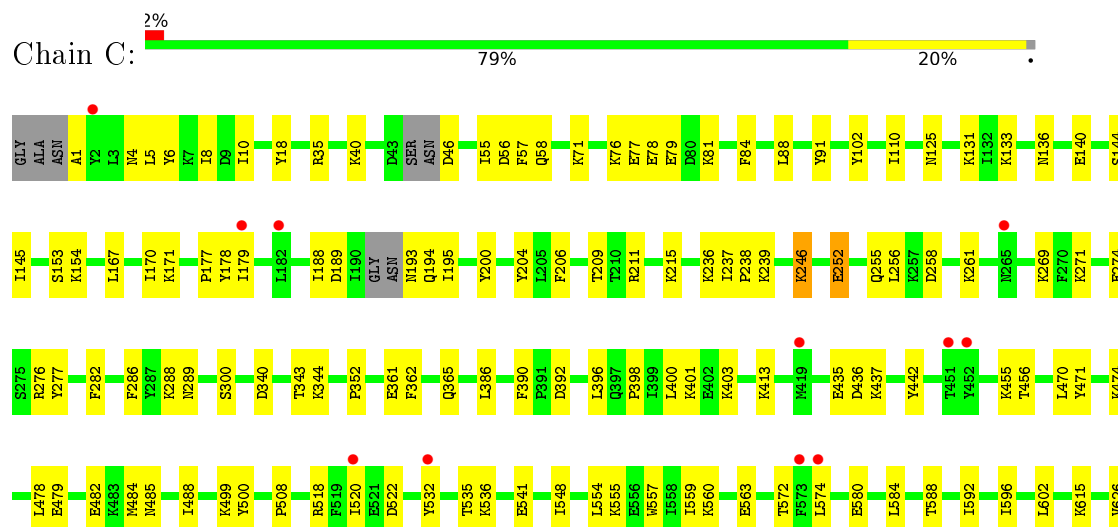
### 3 Residue-property plots

These plots are drawn for all protein, RNA and DNA chains in the entry. The first graphic for a chain summarises the proportions of errors 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: Argonaute protein

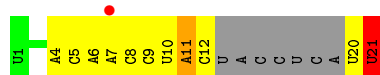
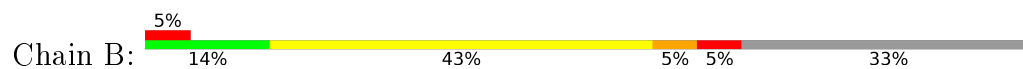


#### • Molecule 1: Argonaute protein

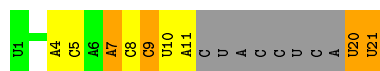




- Molecule 2: RNA (5'-R(\*UP\*AP\*UP\*AP\*CP\*AP\*AP\*CP\*CP\*UP\*AP\*CP\*UP\*U)-3')



- Molecule 2: RNA (5'-R(\*UP\*AP\*UP\*AP\*CP\*AP\*AP\*CP\*CP\*UP\*AP\*CP\*UP\*U)-3')



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	50.88Å 75.42Å 102.22Å 110.87° 90.55° 90.09°	Depositor
Resolution (Å)	48.33 – 1.95 48.33 – 1.95	Depositor EDS
% Data completeness (in resolution range)	95.8 (48.33-1.95) 83.5 (48.33-1.95)	Depositor EDS
$R_{merge}$	0.08	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.52 (at 1.95Å)	Xtriage
Refinement program	PHENIX (1.10_2155: ???)	Depositor
R, $R_{free}$	0.216 , 0.239 0.209 , 0.230	Depositor DCC
$R_{free}$ test set	2014 reflections (2.01%)	DCC
Wilson B-factor (Å <sup>2</sup> )	29.9	Xtriage
Anisotropy	0.128	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.32 , 30.2	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.47$ , $\langle L^2 \rangle = 0.30$	Xtriage
Estimated twinning fraction	0.319 for h,-k,-l 0.026 for -h,k,-k-l 0.022 for -h,-k,k+l	Xtriage
$F_o, F_c$ correlation	0.96	EDS
Total number of atoms	11805	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	42.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.41% of the height of the origin peak. No significant pseudotranslation is detected.*

<sup>1</sup>Intensities estimated from amplitudes.

<sup>2</sup>Theoretical 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 [i](#)

### 5.1 Standard geometry [i](#)

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	0.27	0/5438	0.44	0/7330
1	C	0.27	0/5484	0.43	0/7396
2	B	0.39	0/240	1.03	1/368 (0.3%)
2	D	0.36	0/237	1.07	3/365 (0.8%)
All	All	0.27	0/11399	0.48	4/15459 (0.0%)

There are no bond length outliers.

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	D	20	U	C2-N1-C1'	6.09	125.01	117.70
2	B	21	U	N3-C2-O2	-5.56	118.31	122.20
2	D	20	U	C5-C6-N1	5.41	125.41	122.70
2	D	20	U	O4'-C1'-N1	5.39	112.51	108.20

There are no chirality outliers.

There are no planarity outliers.

### 5.2 Too-close contacts [i](#)

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	5311	0	5342	91	1
1	C	5353	0	5388	81	1
2	B	220	0	110	10	0
2	D	217	0	116	11	0
3	A	306	0	0	27	1

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	B	25	0	0	1	0
3	C	353	0	0	15	1
3	D	20	0	0	1	0
All	All	11805	0	10956	181	2

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 8.

All (181) 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:200:TYR:HD1	1:A:202:GLU:OE2	1.48	0.96
1:A:271:LYS:NZ	3:A:707:HOH:O	2.05	0.90
1:A:438:GLU:OE1	3:A:702:HOH:O	1.92	0.88
1:A:200:TYR:CD1	1:A:202:GLU:OE2	2.27	0.88
1:A:290:GLU:OE1	3:A:703:HOH:O	1.93	0.87
1:C:470:LEU:O	3:C:701:HOH:O	1.91	0.87
1:C:133:LYS:NZ	2:D:10:U:OP1	2.08	0.86
1:A:502:GLU:OE2	3:A:704:HOH:O	1.93	0.85
1:A:572:THR:HG22	1:A:574:LEU:H	1.39	0.85
1:C:555:LYS:NZ	3:C:703:HOH:O	2.03	0.84
2:D:21:U:OP1	3:D:101:HOH:O	1.98	0.82
1:A:475:HIS:NE2	1:A:492:GLU:OE2	2.13	0.81
2:B:21:U:O3'	3:B:101:HOH:O	1.97	0.81
1:C:193:ASN:N	3:C:710:HOH:O	2.16	0.79
1:A:283:LYS:NZ	3:A:701:HOH:O	1.92	0.78
1:C:78:GLU:OE1	3:C:702:HOH:O	2.00	0.77
1:A:271:LYS:O	3:A:705:HOH:O	2.03	0.75
1:A:25:GLU:OE1	3:A:706:HOH:O	2.05	0.75
1:A:114:GLU:OE1	1:A:236:LYS:NZ	2.20	0.74
1:C:300:SER:HB2	1:C:352:PRO:HG3	1.69	0.73
1:C:455:LYS:NZ	1:C:479:GLU:OE1	2.21	0.73
1:C:194:GLN:OE1	3:C:705:HOH:O	2.06	0.73
1:A:448:SER:OG	3:A:708:HOH:O	2.08	0.71
1:C:46:ASP:N	3:C:713:HOH:O	2.24	0.71
1:C:288:LYS:NZ	3:C:706:HOH:O	2.08	0.70
1:A:593:GLU:OE2	3:A:709:HOH:O	2.09	0.70
1:A:471:TYR:HB2	1:A:499:LYS:HG3	1.73	0.70
1:A:436:ASP:O	3:A:710:HOH:O	2.09	0.69
1:A:580:GLU:OE2	3:A:711:HOH:O	2.10	0.69
1:A:454:ARG:O	3:A:712:HOH:O	2.10	0.69

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:481:ASN:HB3	1:A:484:MET:HE2	1.76	0.68
1:C:239:LYS:O	3:C:707:HOH:O	2.11	0.67
1:C:580:GLU:OE1	3:C:709:HOH:O	2.12	0.66
1:C:8:ILE:HD13	1:C:88:LEU:HD21	1.77	0.66
1:A:526:ILE:HG22	1:A:530:ILE:HD11	1.78	0.66
1:A:333:SER:O	3:A:713:HOH:O	2.14	0.66
1:A:405:GLU:OE1	3:A:714:HOH:O	2.14	0.66
1:C:276:ARG:NH2	1:C:277:TYR:OH	2.29	0.66
1:C:400:LEU:HD12	1:C:403:LYS:HE3	1.79	0.65
1:C:572:THR:HB	1:C:615:LYS:HE3	1.78	0.65
1:C:35:ARG:NH1	1:C:35:ARG:HB3	2.12	0.65
1:C:102:TYR:HB2	1:C:110:ILE:HB	1.80	0.64
1:A:499:LYS:NZ	3:A:704:HOH:O	2.31	0.64
1:A:575:ASN:ND2	3:A:722:HOH:O	2.31	0.64
1:A:554:LEU:HD22	1:A:559:ILE:HD11	1.81	0.63
1:C:456:THR:HG21	1:C:485:ASN:OD1	1.99	0.62
1:A:8:ILE:HD13	1:A:88:LEU:HD21	1.81	0.62
1:A:170:ILE:HG23	1:A:171:LYS:HD2	1.81	0.62
1:A:530:ILE:HD13	1:A:539:LEU:HD21	1.80	0.62
1:A:69:VAL:HG12	1:A:71:LYS:H	1.65	0.61
2:D:20:U:H2'	2:D:21:U:H4'	1.82	0.61
1:C:532:TYR:O	1:C:535:THR:OG1	2.14	0.60
1:A:534:ASP:N	3:A:726:HOH:O	2.35	0.59
1:A:5:LEU:HD21	1:A:548:ILE:HG12	1.85	0.59
1:A:615:LYS:NZ	2:B:5:C:OP1	2.35	0.59
1:A:77:GLU:OE2	1:A:81:LYS:HG2	2.03	0.59
1:C:436:ASP:OD1	1:C:437:LYS:NZ	2.34	0.59
1:A:102:TYR:HB2	1:A:110:ILE:HB	1.83	0.59
1:A:15:LYS:HE3	1:A:17:LEU:HD21	1.84	0.58
1:A:44:SER:OG	1:A:45:ASN:N	2.37	0.58
1:A:486:LEU:HD21	1:A:526:ILE:HG12	1.85	0.57
1:A:582:LYS:NZ	1:A:584:LEU:HD23	2.19	0.57
1:C:1:ALA:HB3	1:C:256:LEU:HD23	1.85	0.57
1:C:40:LYS:NZ	3:C:724:HOH:O	2.38	0.56
1:A:199:ALA:HB3	2:B:21:U:O2'	2.05	0.56
1:C:435:GLU:OE1	3:C:711:HOH:O	2.18	0.56
1:C:344:LYS:O	1:C:344:LYS:HG2	2.06	0.56
1:A:486:LEU:CD2	1:A:526:ILE:HG12	2.37	0.55
1:C:76:LYS:HB2	1:C:79:GLU:HG3	1.88	0.55
1:A:527:LYS:HG2	1:A:537:TYR:OH	2.07	0.55
1:C:77:GLU:OE2	1:C:81:LYS:HE3	2.07	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:10:ILE:HD11	1:C:84:PHE:CZ	2.43	0.54
1:C:10:ILE:HD11	1:C:84:PHE:HZ	1.73	0.54
1:C:131:LYS:NZ	2:D:9:C:OP1	2.39	0.54
1:A:582:LYS:HZ2	1:A:584:LEU:HD23	1.73	0.54
1:C:6:TYR:CD1	1:C:145:ILE:HD13	2.43	0.54
1:C:560:LYS:NZ	3:C:704:HOH:O	2.04	0.54
1:A:400:LEU:HD12	1:A:403:LYS:HE3	1.89	0.53
1:C:269:LYS:HG2	1:C:274:GLU:HG2	1.91	0.53
1:C:153:SER:HB3	1:C:206:PHE:HB2	1.90	0.53
1:A:291:GLN:NE2	3:A:723:HOH:O	2.32	0.53
1:A:471:TYR:OH	1:A:492:GLU:OE1	2.17	0.53
1:C:5:LEU:HD21	1:C:548:ILE:HG12	1.91	0.53
1:A:561:LEU:HD11	1:A:567:ILE:HD11	1.91	0.52
1:A:16:ARG:NH1	1:A:51:GLU:OE2	2.39	0.52
2:B:11:A:O2'	2:B:12:C:O5'	2.23	0.52
1:A:167:LEU:HD12	1:A:188:ILE:HG22	1.92	0.52
1:A:198:VAL:HG11	1:A:204:TYR:CE1	2.45	0.52
1:C:471:TYR:HB2	1:C:499:LYS:HG3	1.92	0.52
1:C:261:LYS:HG2	1:C:557:TRP:CE3	2.45	0.52
2:D:20:U:H2'	2:D:21:U:C4'	2.39	0.51
1:A:631:TYR:OH	3:A:716:HOH:O	2.18	0.51
1:C:167:LEU:HG	1:C:178:TYR:HB2	1.92	0.51
1:C:200:TYR:HD1	2:D:21:U:HO3'	1.59	0.51
1:A:276:ARG:HD3	3:A:762:HOH:O	2.09	0.51
1:C:478:LEU:HD13	1:C:488:ILE:HD12	1.93	0.51
1:A:531:SER:HA	1:A:535:THR:HG22	1.93	0.50
1:C:136:ASN:ND2	1:C:140:GLU:O	2.42	0.50
1:A:271:LYS:HB2	1:A:286:PHE:O	2.11	0.50
1:A:76:LYS:HB2	1:A:79:GLU:HG3	1.93	0.50
1:A:474:LYS:NZ	1:A:629:THR:O	2.45	0.50
1:A:303:LYS:HD3	1:A:307:GLU:OE2	2.11	0.50
1:A:13:LYS:HD2	1:A:54:ASP:OD2	2.11	0.50
1:A:310:LYS:NZ	1:A:314:GLU:OE2	2.44	0.50
1:C:35:ARG:HB3	1:C:35:ARG:HH11	1.76	0.50
1:A:31:ARG:HH12	2:B:20:U:H5'	1.77	0.49
1:A:491:LYS:HD3	1:A:491:LYS:N	2.27	0.49
1:A:597:GLU:OE1	3:A:715:HOH:O	2.18	0.49
1:C:209:THR:OG1	2:D:7:A:OP2	2.13	0.49
1:A:583:ILE:HG13	1:A:592:ILE:HG23	1.95	0.49
1:A:167:LEU:HG	1:A:178:TYR:HB2	1.94	0.48
1:A:526:ILE:HA	1:A:529:PHE:CE2	2.49	0.48

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:592:ILE:O	1:A:596:ILE:HG12	2.14	0.47
1:C:474:LYS:NZ	1:C:629:THR:O	2.47	0.47
1:C:170:ILE:HG13	1:C:171:LYS:HD2	1.96	0.47
1:C:518:ARG:HG3	1:C:520:ILE:HD11	1.96	0.47
1:C:91:TYR:OH	1:C:246:LYS:HD3	2.15	0.47
1:C:282:PHE:CZ	1:C:413:LYS:HB3	2.50	0.47
1:C:57:PHE:HA	3:C:715:HOH:O	2.14	0.47
1:C:271:LYS:HB2	1:C:286:PHE:O	2.14	0.46
1:C:211:ARG:HB3	2:D:7:A:OP2	2.15	0.46
1:A:388:ARG:HD2	1:A:631:TYR:CE2	2.50	0.46
2:D:8:C:H5''	2:D:9:C:OP2	2.15	0.46
2:B:4:A:H2'	2:B:5:C:O4'	2.15	0.46
1:C:340:ASP:OD2	1:C:343:THR:HG23	2.16	0.46
1:C:179:ILE:HD13	1:C:195:ILE:HG23	1.97	0.46
1:A:282:PHE:CZ	1:A:413:LYS:HB3	2.50	0.46
1:C:177:PRO:HD2	1:C:189:ASP:HB3	1.98	0.46
1:C:18:TYR:CZ	1:C:71:LYS:HE2	2.51	0.46
1:C:167:LEU:HD12	1:C:188:ILE:HG22	1.98	0.45
1:C:563:GLU:OE1	3:C:704:HOH:O	2.21	0.45
1:C:541:GLU:OE2	1:C:584:LEU:HD11	2.16	0.45
1:C:536:LYS:HB3	1:C:588:THR:HA	1.97	0.45
1:A:106:GLY:HA3	2:B:9:C:H5'	1.97	0.45
1:A:168:TYR:HE1	1:A:173:GLY:HA2	1.81	0.45
1:A:319:LYS:HG2	3:A:870:HOH:O	2.17	0.45
1:C:76:LYS:HD3	1:C:79:GLU:OE2	2.16	0.44
1:A:518:ARG:NH2	2:B:12:C:OP1	2.48	0.44
1:C:474:LYS:HD2	1:C:626:VAL:HG12	2.00	0.44
1:A:279:LYS:HE3	3:A:783:HOH:O	2.17	0.44
1:A:522:ASP:O	1:A:526:ILE:HG13	2.17	0.44
1:A:447:LEU:HD12	1:A:458:LEU:HD13	1.99	0.44
1:A:340:ASP:O	1:A:344:LYS:N	2.51	0.44
1:A:519:PHE:CD1	1:A:584:LEU:HD12	2.53	0.44
1:C:386:LEU:O	1:C:390:PHE:HB2	2.17	0.44
1:A:536:LYS:NZ	3:A:743:HOH:O	2.51	0.43
1:A:376:LEU:O	3:A:717:HOH:O	2.21	0.43
1:C:56:ASP:OD1	1:C:58:GLN:NE2	2.51	0.43
1:A:44:SER:HB2	3:A:904:HOH:O	2.18	0.43
1:C:362:PHE:O	1:C:365:GLN:HG3	2.19	0.43
1:C:442:TYR:CD1	1:C:602:LEU:HD11	2.54	0.43
1:A:185:ILE:HG13	1:A:185:ILE:O	2.19	0.43
1:A:386:LEU:O	1:A:390:PHE:HB2	2.19	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:153:SER:HB3	1:A:206:PHE:HB2	2.01	0.42
1:C:401:LYS:HE2	1:C:401:LYS:HB3	1.80	0.42
1:C:500:TYR:CG	1:C:508:PRO:HG3	2.54	0.42
1:C:343:THR:O	1:C:344:LYS:HB3	2.20	0.42
1:C:1:ALA:N	3:C:736:HOH:O	2.50	0.42
1:A:7:LYS:NZ	1:A:140:GLU:OE1	2.41	0.42
1:A:270:PHE:HB3	1:A:285:SER:O	2.20	0.41
2:B:9:C:H5"	2:B:10:U:OP1	2.20	0.41
1:A:105:LYS:O	2:B:8:C:O2'	2.33	0.41
1:C:286:PHE:HB2	1:C:289:ASN:HB2	2.01	0.41
1:A:433:LYS:NZ	3:A:715:HOH:O	2.36	0.41
1:A:377:ASP:HA	1:A:401:LYS:HE2	2.02	0.41
1:A:4:ASN:O	1:A:144:SER:HA	2.20	0.41
1:C:237:ILE:HB	1:C:238:PRO:HD3	2.02	0.41
1:C:10:ILE:CG2	1:C:55:ILE:HD11	2.50	0.41
1:C:4:ASN:O	1:C:144:SER:HA	2.20	0.41
1:A:431:LEU:HB2	1:A:434:MET:HB2	2.02	0.41
1:C:520:ILE:O	1:C:520:ILE:HG22	2.20	0.41
1:C:215:LYS:HE3	1:C:215:LYS:HB2	1.78	0.41
2:D:4:A:H2'	2:D:5:C:O4'	2.21	0.41
1:C:484:MET:HE3	1:C:484:MET:HB2	1.91	0.41
1:C:554:LEU:HD13	1:C:559:ILE:HD11	2.02	0.41
1:C:125:ASN:OD1	1:C:154:LYS:HG3	2.21	0.40
1:C:592:ILE:O	1:C:596:ILE:HG12	2.21	0.40
1:C:204:TYR:OH	2:D:21:U:O2	2.39	0.40
1:C:396:LEU:HG	1:C:398:PRO:HD3	2.04	0.40
1:A:407:ILE:HA	1:A:412:ILE:HD11	2.04	0.40
1:A:456:THR:N	1:A:478:LEU:O	2.54	0.40

All (2) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:76:LYS:NZ	1:C:252:GLU:OE1[1_565]	1.86	0.34
3:A:901:HOH:O	3:C:887:HOH:O[1_556]	2.01	0.19

## 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	621/642 (97%)	597 (96%)	24 (4%)	0	100	100
1	C	629/642 (98%)	609 (97%)	19 (3%)	1 (0%)	52	42
All	All	1250/1284 (97%)	1206 (96%)	43 (3%)	1 (0%)	56	47

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	C	522	ASP

### 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	592/600 (99%)	580 (98%)	12 (2%)	63	53
1	C	596/600 (99%)	587 (98%)	9 (2%)	72	66
All	All	1188/1200 (99%)	1167 (98%)	21 (2%)	66	58

All (21) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	31	ARG
1	A	62	LYS
1	A	100	ASP
1	A	170	ILE
1	A	258	ASP

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Mol	Chain	Res	Type
1	A	339	ARG
1	A	368	ASP
1	A	450	ASP
1	A	460	ILE
1	A	491	LYS
1	A	507	SER
1	A	587	ASN
1	C	236	LYS
1	C	246	LYS
1	C	252	GLU
1	C	255	GLN
1	C	258	ASP
1	C	361	GLU
1	C	392	ASP
1	C	482	GLU
1	C	574	LEU

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. There are no such sidechains identified.

### 5.3.3 RNA [i](#)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
2	B	10/21 (47%)	3 (30%)	1 (10%)
2	D	10/21 (47%)	4 (40%)	0
All	All	20/42 (47%)	7 (35%)	1 (5%)

All (7) RNA backbone outliers are listed below:

Mol	Chain	Res	Type
2	B	6	A
2	B	7	A
2	B	21	U
2	D	7	A
2	D	9	C
2	D	11	A
2	D	21	U

All (1) RNA pucker outliers are listed below:

Mol	Chain	Res	Type
2	B	11	A

## 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 carbohydrates 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<sup>th</sup> 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 <sup>2</sup> )	Q<0.9
1	A	631/642 (98%)	0.13	18 (2%) 55 63	17, 41, 64, 74	0
1	C	635/642 (98%)	-0.03	11 (1%) 73 79	16, 38, 63, 75	0
2	B	14/21 (66%)	0.16	1 (7%) 19 27	27, 70, 89, 90	0
2	D	13/21 (61%)	0.08	0 100 100	26, 65, 86, 93	0
All	All	1293/1326 (97%)	0.05	30 (2%) 64 72	16, 40, 65, 93	0

All (30) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	200	TYR	4.8
1	A	45	ASN	4.7
1	A	228	ASN	4.1
1	C	573	PHE	3.5
1	A	198	VAL	3.2
1	A	528	ASN	3.2
1	A	210	THR	3.1
1	C	452	TYR	3.0
1	A	450	ASP	2.9
1	A	484	MET	2.9
1	A	525	ILE	2.9
1	C	520	ILE	2.9
1	C	451	THR	2.9
1	C	265	ASN	2.8
1	A	255	GLN	2.6
1	A	193	ASN	2.5
1	A	449	HIS	2.4
1	A	453	ALA	2.4
1	C	2	TYR	2.3
1	A	179	ILE	2.3
1	C	179	ILE	2.3

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Mol	Chain	Res	Type	RSRZ
1	C	532	TYR	2.3
1	A	520	ILE	2.3
1	A	529	PHE	2.3
1	A	573	PHE	2.2
1	A	231	PHE	2.2
1	C	182	LEU	2.1
1	C	574	LEU	2.1
2	B	7	A	2.1
1	C	419	MET	2.1

## 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 carbohydrates 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.