Full wwPDB X-ray Structure Validation Report ⓘ

Dec 16, 2024 – 01:07 AM EST

PDB ID	:	5UX0
Title	:	X-ray crystal structure of Marinitoga piezophila Argonaute in complex with 5' OH guide RNA and target DNA
Authors	:	Doxzen, K.W.; Doudna, J.A.
Deposited on	:	2017-02-21
Resolution	:	3.20 Å(reported)

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

We welcome your comments at *validation@mail.wwpdb.org*
A user guide is available at
https://www.wwpdb.org/validation/2017/XrayValidationReportHelp
with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at
http://www.wwpdb.org/validation/2017/FAQs#types.

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

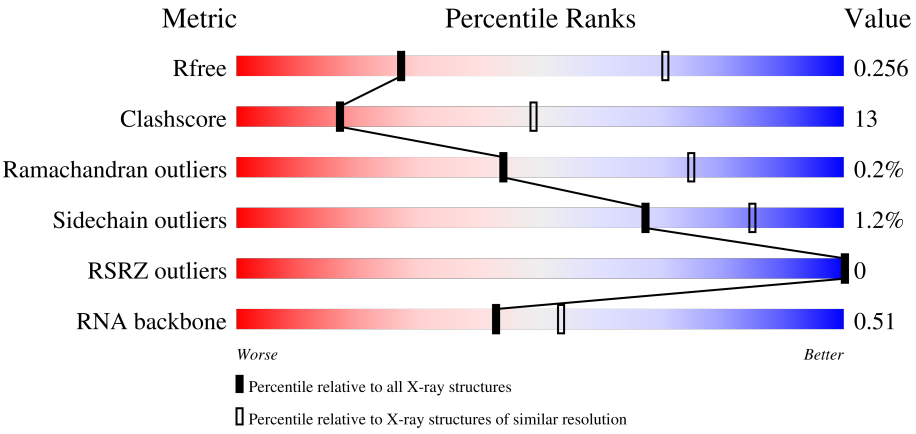
MolProbity	:	4.02b-467
Xtriage (Phenix)	:	1.21
EDS	:	3.0
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4	:	9.0.004 (Gargrove)
Density-Fitness	:	1.0.11
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.40

1 Overall quality at a glance (i)

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

The reported resolution of this entry is 3.20 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.



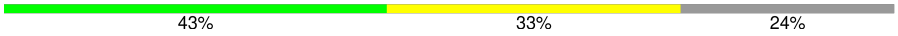
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	164625	1370 (3.20-3.20)
Clashscore	180529	1497 (3.20-3.20)
Ramachandran outliers	177936	1479 (3.20-3.20)
Sidechain outliers	177891	1478 (3.20-3.20)
RSRZ outliers	164620	1371 (3.20-3.20)
RNA backbone	3690	1111 (3.50-2.90)

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

Mol	Chain	Length	Quality of chain
1	A	642	64% 34% .
1	D	642	71% 28% .
2	B	21	10% 76% 10% 5%
2	E	21	24% 52% 10% 14%

Continued on next page...

Continued from previous page...

Mol	Chain	Length	Quality of chain
3	C	21	
3	F	21	

2 Entry composition (i)

There are 3 unique types of molecules in this entry. The entry contains 12237 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	632	Total	C	N	O	S	0	0	0
			5323	3502	840	974	7			
1	D	639	Total	C	N	O	S	0	0	0
			5376	3535	847	987	7			

There are 10 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
A	516	ALA	ASP	engineered mutation	UNP H2J4R4
D	-2	GLY	-	expression tag	UNP H2J4R4
D	-1	ALA	-	expression tag	UNP H2J4R4
D	0	ASN	-	expression tag	UNP H2J4R4
D	1	ALA	-	expression tag	UNP H2J4R4
D	516	ALA	ASP	engineered mutation	UNP H2J4R4

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

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	20	Total	C	N	O	P	0	0	0
			415	188	71	137	19			
2	E	18	Total	C	N	O	P	0	0	0
			373	169	64	123	17			

- Molecule 3 is a DNA chain called DNA (5'-D(P*AP*TP*GP*AP*GP*GP*TP*AP*GP*TP*AP*GP*GP*TP*TP*GP*TP*AP*CP*C)-3').

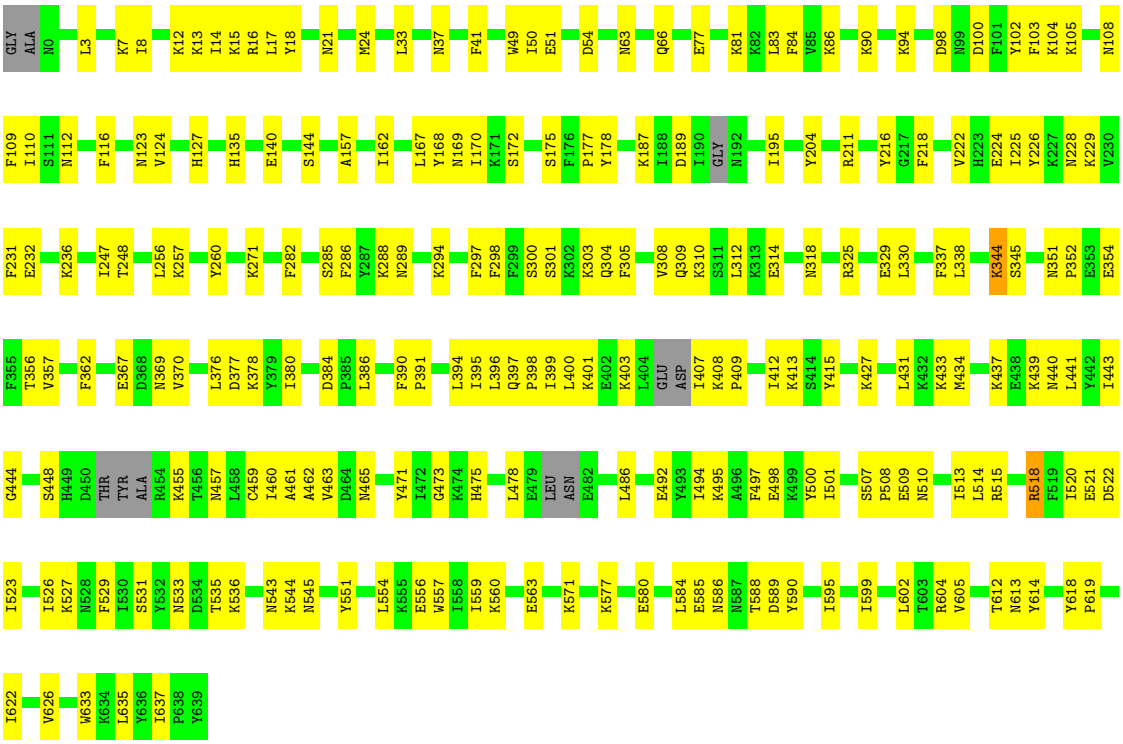
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	C	20	Total 417	C 198	N 78	O 121	P 20	0	0	0
3	F	16	Total 333	C 158	N 61	O 98	P 16	0	0	0

3 Residue-property plots (i)

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red dot above a residue indicates a poor fit to the electron density (RSRZ > 2). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

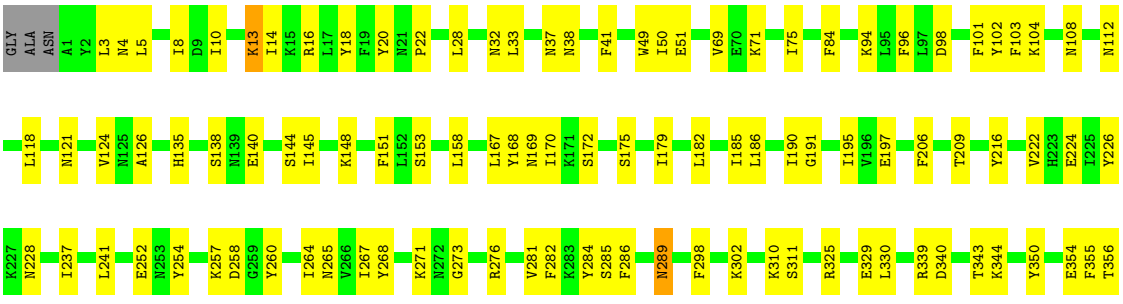
• Molecule 1: Argonaute protein

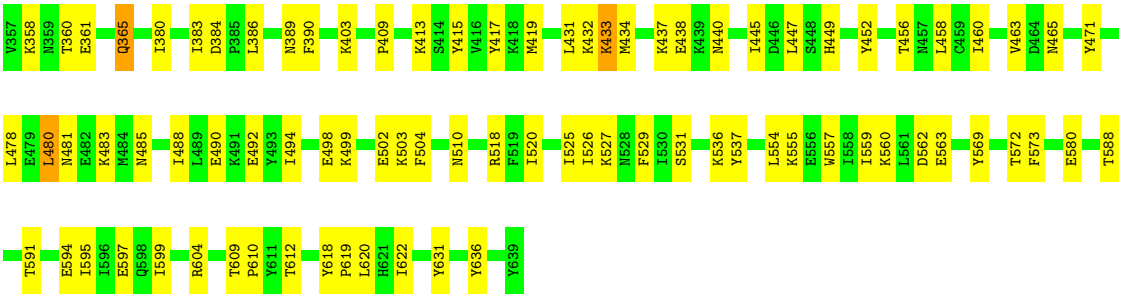
Chain A:



• Molecule 1: Argonaute protein

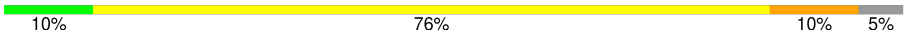
Chain D:

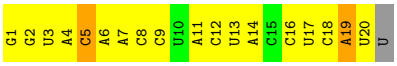




• Molecule 2: RNA (5'-R(*G*GP*UP*AP*CP*AP*AP*CP*CP*UP*AP*CP*UP*AP*CP*CP*UP*CP*AP*U)-3')

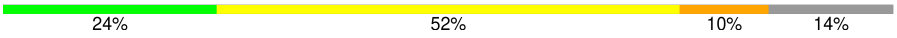
Chain B:





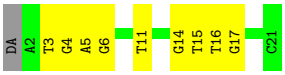
• Molecule 2: RNA (5'-R(*G*GP*UP*AP*CP*AP*AP*CP*CP*UP*AP*CP*UP*AP*CP*CP*UP*CP*AP*U)-3')

Chain E:



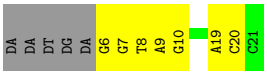
• Molecule 3: DNA (5'-D(P*AP*TP*GP*AP*GP*GP*TP*AP*GP*TP*AP*GP*GP*TP*TP*GP*TP*AP*CP*C)-3')

Chain C:



• Molecule 3: DNA (5'-D(P*AP*TP*GP*AP*GP*GP*TP*AP*GP*TP*AP*GP*GP*TP*TP*GP*TP*AP*CP*C)-3')

Chain F:



4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α, β, γ	85.00Å 130.99Å 171.47Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	47.43 – 3.20 47.43 – 3.20	Depositor EDS
% Data completeness (in resolution range)	99.7 (47.43-3.20) 99.7 (47.43-3.20)	Depositor EDS
R_{merge}	0.15	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.79 (at 3.19Å)	Xtriage
Refinement program	PHENIX 1.10_2155	Depositor
R, R_{free}	0.215 , 0.259 0.215 , 0.256	Depositor DCC
R_{free} test set	30706 reflections (5.00%)	wwPDB-VP
Wilson B-factor (Å^2)	75.5	Xtriage
Anisotropy	0.369	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.29 , 55.2	EDS
L-test for twinning[2]	$< \|L\| > = 0.44$, $< L^2 > = 0.27$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.93	EDS
Total number of atoms	12237	wwPDB-VP
Average B, all atoms (Å^2)	81.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.04% 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	0.27	0/5451	0.48	2/7347 (0.0%)
1	D	0.27	0/5509	0.47	0/7433
2	B	0.27	0/462	0.90	1/716 (0.1%)
2	E	0.29	0/415	0.89	0/643
3	C	0.56	0/468	1.00	0/722
3	F	0.57	0/373	0.93	0/575
All	All	0.30	0/12678	0.57	3/17436 (0.0%)

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	A	345	SER	N-CA-CB	8.17	122.76	110.50
2	B	5	C	N1-C2-O2	-5.90	115.36	118.90
1	A	344	LYS	N-CA-C	-5.85	95.20	111.00

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	5323	0	5361	144	0
1	D	5376	0	5411	122	0
2	B	415	0	215	19	0
2	E	373	0	196	12	0

Continued on next page...

Continued from previous page...

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	C	417	0	227	10	0
3	F	333	0	182	8	0
All	All	12237	0	11592	295	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 13.

All (295) 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:D:361:GLU:O	1:D:365:GLN:NE2	2.08	0.86
1:D:339:ARG:NH1	1:D:344:LYS:O	2.11	0.83
2:B:16:C:O2	3:C:6:DG:N2	2.08	0.83
1:D:440:ASN:HD22	1:D:510:ASN:HB2	1.45	0.80
1:A:604:ARG:NH1	1:A:613:ASN:OD1	2.17	0.78
1:A:433:LYS:O	1:A:437:LYS:NZ	2.21	0.73
1:D:562:ASP:OD1	1:D:563:GLU:N	2.22	0.73
1:A:544:LYS:O	1:A:577:LYS:NZ	2.21	0.73
1:D:354:GLU:O	1:D:389:ASN:ND2	2.22	0.72
1:D:257:LYS:H	1:D:257:LYS:HD2	1.54	0.72
1:D:555:LYS:NZ	1:D:572:THR:O	2.21	0.72
1:A:33:LEU:O	1:A:37:ASN:ND2	2.22	0.71
2:B:18:C:H42	3:C:4:DG:H1	1.37	0.71
1:D:449:HIS:HD2	1:D:520:ILE:HD11	1.56	0.71
1:D:28:LEU:O	1:D:32:ASN:ND2	2.24	0.71
1:A:294:LYS:HB3	1:A:338:LEU:HD11	1.73	0.69
2:B:16:C:N3	3:C:6:DG:N1	2.33	0.69
1:A:588:THR:HG23	1:A:590:TYR:H	1.57	0.69
1:A:288:LYS:HD2	1:A:427:LYS:HD3	1.75	0.68
1:A:448:SER:OG	1:A:457:ASN:OD1	2.11	0.68
1:D:433:LYS:O	1:D:437:LYS:NZ	2.27	0.68
1:A:518:ARG:NH2	1:A:580:GLU:OE1	2.27	0.67
1:D:471:TYR:HB2	1:D:499:LYS:HG3	1.75	0.67
2:B:8:C:H2'	2:B:9:C:C6	2.29	0.67
1:A:83:LEU:HA	1:A:86:LYS:HE2	1.75	0.67
1:D:267:ILE:HD11	1:D:432:LYS:HD3	1.74	0.67
1:A:560:LYS:HE3	1:A:563:GLU:HA	1.76	0.66
1:A:443:ILE:HA	1:A:461:ALA:O	1.97	0.65
1:A:396:LEU:HD23	1:A:635:LEU:HD21	1.78	0.65
1:D:33:LEU:O	1:D:37:ASN:ND2	2.28	0.65
1:D:158:LEU:HD12	1:D:158:LEU:H	1.62	0.64

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:545:ASN:ND2	3:C:11:DT:OP2	2.32	0.63
1:D:403:LYS:NZ	2:E:2:G:OP1	2.31	0.63
2:B:17:U:H3	3:C:5:DA:H62	1.46	0.63
1:A:399:ILE:HD12	2:B:2:G:H5'	1.80	0.63
1:D:69:VAL:HG12	1:D:71:LYS:H	1.64	0.63
2:E:11:A:H2'	2:E:12:C:C6	2.34	0.62
1:A:351:ASN:ND2	1:A:356:THR:O	2.32	0.62
1:D:104:LYS:HB3	1:D:108:ASN:HB2	1.81	0.62
1:D:573:PHE:HB3	3:F:19:DA:H4'	1.81	0.62
1:D:265:ASN:OD1	1:D:276:ARG:NH2	2.33	0.62
1:A:224:GLU:O	1:A:228:ASN:HB2	2.00	0.61
1:D:135:HIS:ND1	1:D:144:SER:OG	2.32	0.61
2:B:5:C:H2'	2:B:6:A:C8	2.35	0.61
1:A:282:PHE:CZ	1:A:413:LYS:HB3	2.36	0.61
1:A:8:ILE:HA	1:A:248:THR:HG22	1.81	0.61
1:A:622:ILE:HG23	1:A:637:ILE:HD13	1.84	0.60
1:A:211:ARG:HD2	3:C:15:DT:H4'	1.81	0.60
1:D:438:GLU:HA	1:D:465:ASN:ND2	2.16	0.60
1:A:612:THR:C	1:A:613:ASN:HD22	2.05	0.60
1:D:158:LEU:HD11	1:D:186:LEU:HD23	1.84	0.59
1:D:447:LEU:HD21	1:D:458:LEU:HD12	1.82	0.59
1:A:116:PHE:CE1	1:A:225:ILE:HD11	2.38	0.59
1:A:515:ARG:HH12	1:A:520:ILE:HG12	1.68	0.59
2:B:4:A:H2'	2:B:5:C:O4'	2.03	0.59
3:F:6:DG:H2'	3:F:7:DG:H8	1.67	0.59
1:A:297:PHE:HE2	1:A:312:LEU:HD11	1.68	0.58
1:A:305:PHE:O	1:A:309:GLN:HB2	2.03	0.58
1:D:438:GLU:HA	1:D:465:ASN:HD22	1.67	0.58
1:D:554:LEU:HD22	1:D:559:ILE:HD11	1.86	0.58
1:D:103:PHE:O	1:D:168:TYR:OH	2.16	0.58
2:B:12:C:H2'	2:B:13:U:C6	2.39	0.58
1:A:247:ILE:HG13	1:A:248:THR:HG23	1.85	0.58
1:A:441:LEU:HD11	1:A:462:ALA:HB1	1.86	0.58
1:D:282:PHE:CE2	1:D:413:LYS:HB3	2.39	0.58
1:D:16:ARG:NH1	1:D:51:GLU:OE2	2.37	0.57
1:A:471:TYR:OH	1:A:492:GLU:OE1	2.10	0.57
1:D:185:ILE:HG23	1:D:197:GLU:HG3	1.87	0.57
1:D:267:ILE:O	1:D:433:LYS:NZ	2.37	0.57
1:A:224:GLU:O	1:A:228:ASN:CB	2.53	0.57
1:A:271:LYS:HB2	1:A:286:PHE:O	2.05	0.57
1:A:526:ILE:HA	1:A:529:PHE:CE2	2.40	0.57

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:167:LEU:HD22	1:A:204:TYR:HB3	1.87	0.57
1:A:303:LYS:H	1:A:303:LYS:HD2	1.70	0.57
2:B:11:A:H2'	2:B:12:C:C6	2.40	0.57
1:D:526:ILE:HA	1:D:529:PHE:CE2	2.40	0.57
1:A:370:VAL:HG23	1:A:394:LEU:HG	1.84	0.57
1:D:224:GLU:OE2	1:D:228:ASN:ND2	2.38	0.57
1:D:190:ILE:HG22	1:D:191:GLY:H	1.69	0.56
1:D:271:LYS:HB2	1:D:286:PHE:O	2.05	0.56
1:D:14:ILE:HD11	1:D:84:PHE:HB2	1.87	0.56
1:A:13:LYS:NZ	1:A:54:ASP:OD2	2.33	0.56
1:D:254:TYR:OH	1:D:257:LYS:NZ	2.38	0.56
1:D:536:LYS:HB3	1:D:588:THR:HG22	1.87	0.56
1:A:376:LEU:HB2	1:A:400:LEU:HD23	1.87	0.56
1:D:179:ILE:HD12	1:D:195:ILE:HG23	1.88	0.56
1:A:177:PRO:HD2	1:A:189:ASP:O	2.05	0.56
1:A:463:VAL:HG22	1:A:619:PRO:HG3	1.88	0.56
1:D:380:ILE:HD11	1:D:383:ILE:HD12	1.87	0.56
1:A:222:VAL:O	1:A:225:ILE:HG22	2.07	0.55
1:D:456:THR:HG21	1:D:480:LEU:HD13	1.87	0.55
1:A:439:LYS:HD2	1:A:509:GLU:OE1	2.07	0.55
1:D:356:THR:HG22	1:D:389:ASN:HB3	1.87	0.55
2:E:3:U:H2'	2:E:4:A:C8	2.42	0.55
1:A:187:LYS:HE2	1:A:195:ILE:HG22	1.89	0.55
2:E:8:C:H2'	2:E:9:C:C6	2.42	0.55
1:D:121:ASN:HB3	1:D:124:VAL:HG22	1.87	0.55
1:D:289:ASN:ND2	1:D:330:LEU:O	2.38	0.55
1:D:273:GLY:HA3	1:D:284:TYR:CD1	2.42	0.55
1:D:518:ARG:NH2	1:D:580:GLU:OE1	2.33	0.54
1:A:228:ASN:ND2	1:D:252:GLU:OE2	2.36	0.54
1:A:167:LEU:O	1:A:175:SER:HA	2.08	0.54
2:E:12:C:H2'	2:E:13:U:C6	2.43	0.54
1:D:471:TYR:OH	1:D:492:GLU:OE1	2.15	0.54
3:C:3:DT:H2"	3:C:4:DG:C8	2.43	0.54
1:D:167:LEU:O	1:D:175:SER:HA	2.07	0.54
1:D:636:TYR:OH	2:E:1:G:N2	2.39	0.54
1:D:16:ARG:NH2	1:D:75:ILE:HD11	2.23	0.54
1:D:257:LYS:HD3	1:D:260:TYR:CG	2.43	0.54
1:A:256:LEU:HD21	1:A:559:ILE:HG23	1.89	0.53
1:D:463:VAL:HG22	1:D:619:PRO:HG3	1.89	0.53
3:F:9:DA:H1'	3:F:10:DG:H5'	1.89	0.53
3:C:14:DG:H2"	3:C:15:DT:H71	1.90	0.53

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:556:GLU:HG3	1:A:571:LYS:HB2	1.91	0.52
1:A:300:SER:HB2	1:A:352:PRO:HG3	1.90	0.52
1:D:325:ARG:O	1:D:329:GLU:HG3	2.09	0.52
1:A:162:ILE:HD12	1:A:216:TYR:CE2	2.44	0.52
1:A:397:GLN:O	1:A:415:TYR:OH	2.27	0.52
1:A:459:CYS:HA	1:A:473:GLY:O	2.08	0.52
3:F:8:DT:H2"	3:F:9:DA:C8	2.45	0.52
1:A:380:ILE:O	2:B:1:G:N1	2.27	0.52
1:A:618:TYR:CE2	1:A:622:ILE:HD11	2.45	0.52
1:D:302:LYS:H	1:D:302:LYS:HD2	1.74	0.52
1:A:225:ILE:HG13	1:A:229:LYS:HE3	1.91	0.51
1:A:518:ARG:NH1	1:A:543:ASN:HB2	2.25	0.51
1:D:384:ASP:OD1	1:D:631:TYR:HB2	2.10	0.51
1:A:380:ILE:HG12	2:B:1:G:C2	2.45	0.51
1:A:390:PHE:CD2	1:A:391:PRO:HD2	2.46	0.51
1:D:8:ILE:HG22	1:D:10:ILE:HG12	1.93	0.51
1:A:325:ARG:O	1:A:329:GLU:HG3	2.10	0.51
1:A:431:LEU:HB2	1:A:434:MET:HB2	1.93	0.51
1:A:497:PHE:CE1	1:A:508:PRO:HD2	2.45	0.51
2:E:6:A:H2'	2:E:7:A:C8	2.46	0.51
1:D:118:LEU:HD11	1:D:126:ALA:HB2	1.92	0.51
1:A:12:LYS:O	1:A:77:GLU:HB2	2.11	0.51
1:A:377:ASP:HA	1:A:401:LYS:HE2	1.94	0.50
1:A:116:PHE:CZ	1:A:225:ILE:HD11	2.47	0.50
1:D:498:GLU:O	1:D:502:GLU:HG3	2.10	0.50
1:D:554:LEU:O	1:D:557:TRP:HB2	2.12	0.50
3:F:8:DT:H2"	3:F:9:DA:H8	1.76	0.50
1:A:367:GLU:OE1	1:A:367:GLU:N	2.35	0.50
2:B:6:A:H2'	2:B:7:A:C8	2.47	0.50
1:D:340:ASP:HB3	1:D:343:THR:O	2.12	0.50
3:F:6:DG:H2'	3:F:7:DG:C8	2.46	0.50
2:E:4:A:H2'	2:E:5:C:O4'	2.12	0.50
1:D:209:THR:HG22	2:E:9:C:H1'	1.92	0.50
1:A:21:ASN:OD1	1:A:24:MET:N	2.41	0.49
1:A:232:GLU:O	1:A:236:LYS:HG2	2.12	0.49
1:A:515:ARG:HH22	1:A:521:GLU:HG3	1.78	0.49
2:E:13:U:H2'	2:E:14:A:C8	2.46	0.49
1:A:494:ILE:O	1:A:498:GLU:HG3	2.12	0.49
2:B:13:U:H2'	2:B:14:A:C8	2.48	0.49
1:A:104:LYS:HB3	1:A:108:ASN:HB2	1.94	0.49
1:D:310:LYS:HG3	1:D:311:SER:H	1.77	0.49

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:100:ASP:O	1:A:112:ASN:OD1	2.31	0.49
1:A:285:SER:OG	1:A:286:PHE:N	2.45	0.49
1:A:286:PHE:CE1	1:A:330:LEU:HD22	2.48	0.49
1:D:409:PRO:O	1:D:413:LYS:HG3	2.12	0.49
1:D:258:ASP:OD1	1:D:258:ASP:N	2.44	0.49
1:D:591:THR:HG23	1:D:594:GLU:H	1.78	0.49
1:A:523:ILE:O	1:A:527:LYS:HG2	2.12	0.48
1:A:398:PRO:HB2	2:B:1:G:H4'	1.95	0.48
1:A:102:TYR:HB2	1:A:110:ILE:HB	1.94	0.48
1:A:102:TYR:CE1	1:A:170:ILE:HG23	2.49	0.48
1:A:103:PHE:O	1:A:168:TYR:OH	2.27	0.48
1:D:179:ILE:HD11	1:D:195:ILE:HD12	1.96	0.48
1:A:102:TYR:O	1:A:109:PHE:HA	2.14	0.48
1:D:267:ILE:H	1:D:433:LYS:NZ	2.11	0.48
1:D:282:PHE:CZ	1:D:413:LYS:HB3	2.49	0.48
1:D:38:ASN:ND2	1:D:98:ASP:OD1	2.45	0.47
1:D:16:ARG:HH22	1:D:75:ILE:HD11	1.77	0.47
1:A:167:LEU:CD1	1:A:178:TYR:HB2	2.44	0.47
1:A:394:LEU:HD23	1:A:395:ILE:N	2.30	0.47
1:A:403:LYS:HE2	2:B:2:G:N7	2.29	0.47
1:A:455:LYS:HB3	1:A:478:LEU:HA	1.95	0.47
1:D:358:LYS:O	1:D:360:THR:HG23	2.14	0.47
1:D:494:ILE:O	1:D:498:GLU:HG3	2.15	0.47
1:A:294:LYS:NZ	1:A:367:GLU:HG3	2.29	0.47
1:A:444:GLY:O	1:A:460:ILE:HA	2.15	0.47
1:A:41:PHE:CE1	1:A:50:ILE:HD12	2.50	0.47
1:D:237:ILE:HG23	1:D:241:LEU:HD12	1.96	0.47
1:D:339:ARG:HG2	1:D:344:LYS:O	2.14	0.47
1:D:96:PHE:O	1:D:101:PHE:HB2	2.15	0.47
1:A:135:HIS:CD2	1:A:144:SER:HB3	2.49	0.46
2:B:5:C:H2'	2:B:6:A:H8	1.76	0.46
1:D:153:SER:HB3	1:D:206:PHE:HB2	1.97	0.46
2:E:7:A:H2'	2:E:8:C:C6	2.50	0.46
1:A:500:TYR:CD2	1:A:508:PRO:HD3	2.50	0.46
1:D:298:PHE:HB3	1:D:350:TYR:CD2	2.50	0.46
1:D:102:TYR:CZ	1:D:112:ASN:HB3	2.50	0.46
1:A:16:ARG:NH2	1:A:51:GLU:OE2	2.34	0.46
1:A:338:LEU:HB3	1:A:362:PHE:HZ	1.81	0.46
1:A:15:LYS:HE2	1:A:17:LEU:HD21	1.97	0.46
1:A:86:LYS:O	1:A:90:LYS:HG3	2.16	0.46
1:A:409:PRO:O	1:A:413:LYS:HG3	2.16	0.46

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:314:GLU:O	1:A:318:ASN:ND2	2.48	0.46
1:D:285:SER:OG	1:D:286:PHE:N	2.47	0.46
1:A:586:ASN:OD1	1:A:588:THR:HG22	2.15	0.45
1:A:309:GLN:HA	1:A:312:LEU:HB3	1.99	0.45
1:D:595:ILE:O	1:D:599:ILE:HG12	2.16	0.45
1:A:14:ILE:HG23	1:A:84:PHE:HD1	1.81	0.45
1:D:618:TYR:O	1:D:622:ILE:HG13	2.15	0.45
1:D:281:VAL:HG13	1:D:282:PHE:HD1	1.82	0.45
1:A:169:ASN:HB3	1:A:172:SER:HB3	1.99	0.45
1:D:298:PHE:HB3	1:D:350:TYR:HD2	1.82	0.45
1:A:116:PHE:HE1	1:A:225:ILE:HD11	1.82	0.45
1:D:94:LYS:NZ	1:D:98:ASP:OD2	2.37	0.45
1:D:108:ASN:HD22	1:D:148:LYS:HE2	1.80	0.45
1:A:18:TYR:CD2	1:A:49:TRP:HB3	2.53	0.44
1:A:63:ASN:O	1:A:66:GLN:HG2	2.17	0.44
1:A:378:LYS:HB2	1:A:378:LYS:HE3	1.82	0.44
1:D:452:TYR:HB2	2:E:13:U:O3'	2.16	0.44
1:A:465:ASN:OD1	1:A:465:ASN:N	2.50	0.44
1:D:554:LEU:O	1:D:569:TYR:HB2	2.17	0.44
1:D:179:ILE:CD1	1:D:195:ILE:HD12	2.47	0.44
1:A:440:ASN:HA	1:A:510:ASN:O	2.17	0.44
1:A:110:ILE:HG23	1:A:127:HIS:HB3	2.00	0.44
1:A:443:ILE:HG12	1:A:513:ILE:HD13	2.00	0.44
1:A:444:GLY:HA2	1:A:514:LEU:O	2.18	0.44
1:A:618:TYR:O	1:A:622:ILE:HG13	2.18	0.44
1:A:614:TYR:HE2	1:A:618:TYR:HE1	1.66	0.43
1:A:486:LEU:HD11	1:A:522:ASP:HB3	2.00	0.43
1:D:267:ILE:H	1:D:433:LYS:HZ1	1.66	0.43
1:D:503:LYS:HE2	1:D:504:PHE:CZ	2.53	0.43
1:D:573:PHE:HZ	3:F:20:DC:H4'	1.32	0.43
1:A:536:LYS:HB3	1:A:588:THR:HA	1.99	0.43
1:A:595:ILE:O	1:A:599:ILE:HD13	2.18	0.43
1:A:614:TYR:HE2	1:A:618:TYR:CE1	2.36	0.43
1:A:286:PHE:HE1	1:A:330:LEU:HD22	1.84	0.43
1:A:124:VAL:HG21	1:A:218:PHE:CE2	2.53	0.43
1:A:297:PHE:HE1	1:A:337:PHE:CD1	2.37	0.43
1:D:478:LEU:HD13	1:D:488:ILE:HG13	2.00	0.43
1:D:618:TYR:CE2	1:D:622:ILE:HD11	2.52	0.43
1:A:498:GLU:HA	1:A:501:ILE:HG12	2.00	0.43
1:D:264:ILE:HD12	1:D:597:GLU:HG3	2.00	0.43
1:D:437:LYS:HB3	1:D:440:ASN:OD1	2.19	0.43

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:298:PHE:CE1	1:A:357:VAL:HG11	2.53	0.43
2:B:18:C:N4	3:C:4:DG:H22	2.16	0.43
1:D:169:ASN:HB3	1:D:172:SER:HB2	2.01	0.43
1:D:620:LEU:HD23	1:D:620:LEU:HA	1.84	0.43
1:A:77:GLU:OE2	1:A:81:LYS:HE2	2.19	0.43
1:D:3:LEU:HD23	1:D:5:LEU:HD12	2.01	0.43
1:D:355:PHE:HB3	1:D:386:LEU:HA	2.00	0.43
1:A:308:VAL:O	1:A:312:LEU:HB2	2.18	0.43
1:A:554:LEU:O	1:A:557:TRP:HB2	2.19	0.43
1:D:138:SER:O	1:D:138:SER:OG	2.30	0.43
1:D:4:ASN:ND2	1:D:145:ILE:O	2.43	0.42
1:D:609:THR:HG23	1:D:612:THR:H	1.83	0.42
1:D:483:LYS:HD3	1:D:525:ILE:HD11	2.01	0.42
1:A:94:LYS:HE2	1:A:98:ASP:OD2	2.19	0.42
1:A:310:LYS:O	1:A:314:GLU:HG2	2.19	0.42
1:A:475:HIS:NE2	1:A:492:GLU:OE2	2.49	0.42
1:D:121:ASN:HD22	1:D:216:TYR:HB3	1.84	0.42
1:D:148:LYS:HB2	1:D:226:TYR:OH	2.19	0.42
1:D:573:PHE:CB	3:F:19:DA:H4'	2.48	0.42
1:A:157:ALA:HB2	1:A:167:LEU:HD21	2.01	0.42
1:D:527:LYS:HD2	1:D:537:TYR:OH	2.19	0.42
1:A:7:LYS:NZ	1:A:140:GLU:OE1	2.52	0.42
1:D:20:TYR:CE2	1:D:22:PRO:HG3	2.55	0.42
1:D:560:LYS:HE3	1:D:563:GLU:HA	2.02	0.42
2:B:18:C:H2'	2:B:19:A:O4'	2.20	0.42
1:D:431:LEU:HB2	1:D:434:MET:HB2	2.01	0.42
1:A:351:ASN:OD1	1:A:354:GLU:HB2	2.19	0.42
1:A:527:LYS:O	1:A:531:SER:CB	2.68	0.42
1:D:415:TYR:O	1:D:419:MET:HG3	2.20	0.42
1:A:407:ILE:HD12	1:A:408:LYS:H	1.84	0.41
1:A:407:ILE:HD11	1:A:412:ILE:HG12	2.00	0.41
3:C:16:DT:H2"	3:C:17:DG:H8	1.85	0.41
1:A:501:ILE:HG22	1:A:507:SER:HA	2.02	0.41
1:A:344:LYS:HE3	1:A:344:LYS:HB3	1.88	0.41
1:D:490:GLU:HG3	1:D:529:PHE:CD1	2.55	0.41
1:A:584:LEU:HD12	1:A:584:LEU:HA	1.90	0.41
1:A:602:LEU:O	1:A:605:VAL:HG22	2.19	0.41
1:A:123:ASN:HB3	1:A:162:ILE:HG12	2.02	0.41
1:D:18:TYR:CD2	1:D:49:TRP:HB3	2.55	0.41
1:A:439:LYS:H	1:A:439:LYS:HG2	1.41	0.41
1:A:471:TYR:CE1	1:A:495:LYS:HD2	2.55	0.41

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:417:TYR:CG	1:D:610:PRO:HD3	2.56	0.41
1:A:386:LEU:O	1:A:390:PHE:HB2	2.20	0.41
1:A:626:VAL:HG22	1:A:633:TRP:CD2	2.55	0.41
1:D:268:TYR:OH	1:D:604:ARG:HD2	2.20	0.41
1:D:310:LYS:HG3	1:D:311:SER:N	2.35	0.41
1:A:105:LYS:O	1:A:108:ASN:ND2	2.53	0.41
1:A:301:SER:OG	1:A:304:GLN:HG2	2.21	0.41
1:D:481:ASN:HB2	1:D:485:ASN:OD1	2.20	0.41
1:D:13:LYS:HE3	1:D:13:LYS:HB3	1.81	0.40
1:D:151:PHE:CE1	1:D:222:VAL:HG13	2.56	0.40
1:A:231:PHE:HD1	1:A:551:TYR:HB2	1.86	0.40
1:A:257:LYS:HB2	1:A:260:TYR:CD1	2.56	0.40
1:D:445:ILE:HG23	1:D:460:ILE:HG22	2.02	0.40
1:A:3:LEU:HD12	1:A:3:LEU:HA	1.91	0.40
1:A:533:ASN:O	1:A:535:THR:HG23	2.21	0.40
1:D:102:TYR:CE1	1:D:170:ILE:HB	2.56	0.40
1:A:613:ASN:HD22	1:A:613:ASN:N	2.18	0.40
1:D:41:PHE:CE1	1:D:50:ILE:HD12	2.56	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	622/642 (97%)	608 (98%)	13 (2%)	1 (0%)	44	75
1	D	637/642 (99%)	619 (97%)	17 (3%)	1 (0%)	44	75
All	All	1259/1284 (98%)	1227 (98%)	30 (2%)	2 (0%)	44	75

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	289	ASN
1	D	289	ASN

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	593/599 (99%)	587 (99%)	6 (1%)	73	87
1	D	598/599 (100%)	590 (99%)	8 (1%)	65	83
All	All	1191/1198 (99%)	1177 (99%)	14 (1%)	67	85

All (14) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	226	TYR
1	A	369	ASN
1	A	384	ASP
1	A	518	ARG
1	A	585	GLU
1	A	589	ASP
1	D	13	LYS
1	D	140	GLU
1	D	182	LEU
1	D	365	GLN
1	D	390	PHE
1	D	433	LYS
1	D	480	LEU
1	D	531	SER

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	135	HIS
1	A	369	ASN
1	D	440	ASN

5.3.3 RNA

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
2	B	19/21 (90%)	3 (15%)	0
2	E	17/21 (80%)	2 (11%)	0
All	All	36/42 (85%)	5 (13%)	0

All (5) RNA backbone outliers are listed below:

Mol	Chain	Res	Type
2	B	3	U
2	B	19	A
2	B	20	U
2	E	3	U
2	E	13	U

There are no RNA pucker outliers to report.

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

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	632/642 (98%)	-0.44	0	100	100	33, 78, 126, 175	0
1	D	639/642 (99%)	-0.46	0	100	100	34, 71, 113, 150	0
2	B	20/21 (95%)	-0.45	0	100	100	61, 99, 173, 182	0
2	E	18/21 (85%)	-0.60	0	100	100	53, 70, 162, 168	0
3	C	20/21 (95%)	-0.17	0	100	100	72, 110, 148, 161	0
3	F	16/21 (76%)	-0.19	0	100	100	79, 103, 162, 181	0
All	All	1345/1368 (98%)	-0.44	0	100	100	33, 75, 126, 182	0

There are no RSRZ outliers to report.

6.2 Non-standard residues in protein, DNA, RNA chains

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

6.3 Carbohydrates

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.