



wwPDB X-ray Structure Validation Summary Report ⓘ

Aug 16, 2023 – 02:43 AM EDT

PDB ID : 1Y69
Title : RRF domain I in complex with the 50S ribosomal subunit from *Deinococcus radiodurans*
Authors : Wilson, D.N.; Schluenzen, F.; Harms, J.M.; Yoshida, T.; Ohkubo, T.; Albrecht, R.; Buerger, J.; Kobayashi, Y.; Fucini, P.
Deposited on : 2004-12-04
Resolution : 3.33 Å(reported)

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

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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) : 1.13
EDS : 2.35
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac : 5.8.0158
CCP4 : 7.0.044 (Gargrove)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.35

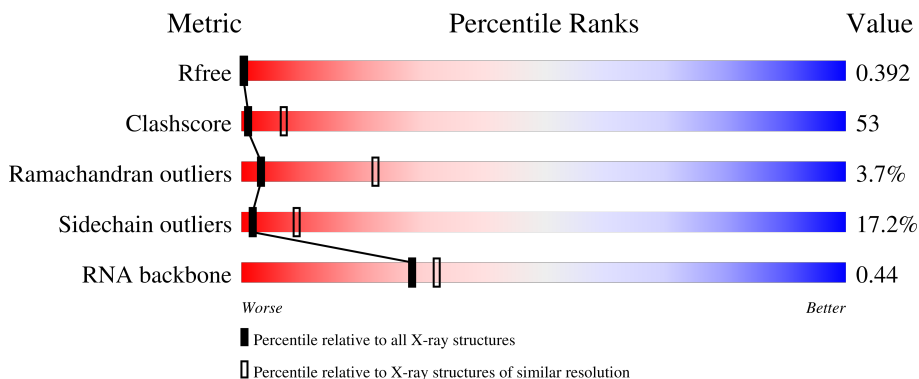
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 3.33 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}	130704	1060 (3.38-3.30)
Clashscore	141614	1111 (3.38-3.30)
Ramachandran outliers	138981	1090 (3.38-3.30)
Sidechain outliers	138945	1089 (3.38-3.30)
RNA backbone	3102	1129 (3.78-2.90)

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 $\leq 5\%$.

Mol	Chain	Length	Quality of chain
1	0	2880	10% 60% 22% . .
2	9	124	13% 69% 14% 5%
3	K	141	33% 43% 19% . .
4	U	91	44% 40% 9% 8%
5	8	113	40% 53% 6% .

2 Entry composition [i](#)

There are 5 unique types of molecules in this entry. The entry contains 64484 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 RNA chain called 23S ribosomal RNA.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	P			
1	0	2766	59359	26479	10949	19166	2765	0	0	0

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
0	1526	U	C	conflict	GB 1026245073

- Molecule 2 is a RNA chain called 5S ribosomal RNA.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	P			
2	9	118	2516	1124	464	811	117	0	0	0

- Molecule 3 is a protein called 50S ribosomal protein L16.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
3	K	136	1090	696	202	185	7	0	0	0

- Molecule 4 is a protein called 50S ribosomal protein L27.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
4	U	84	625	393	122	109	1	0	0	0

- Molecule 5 is a protein called Ribosome-recycling factor.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
5	8	113	894	541	170	179	4	0	0	0

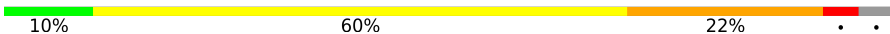
There are 3 discrepancies between the modelled and reference sequences:

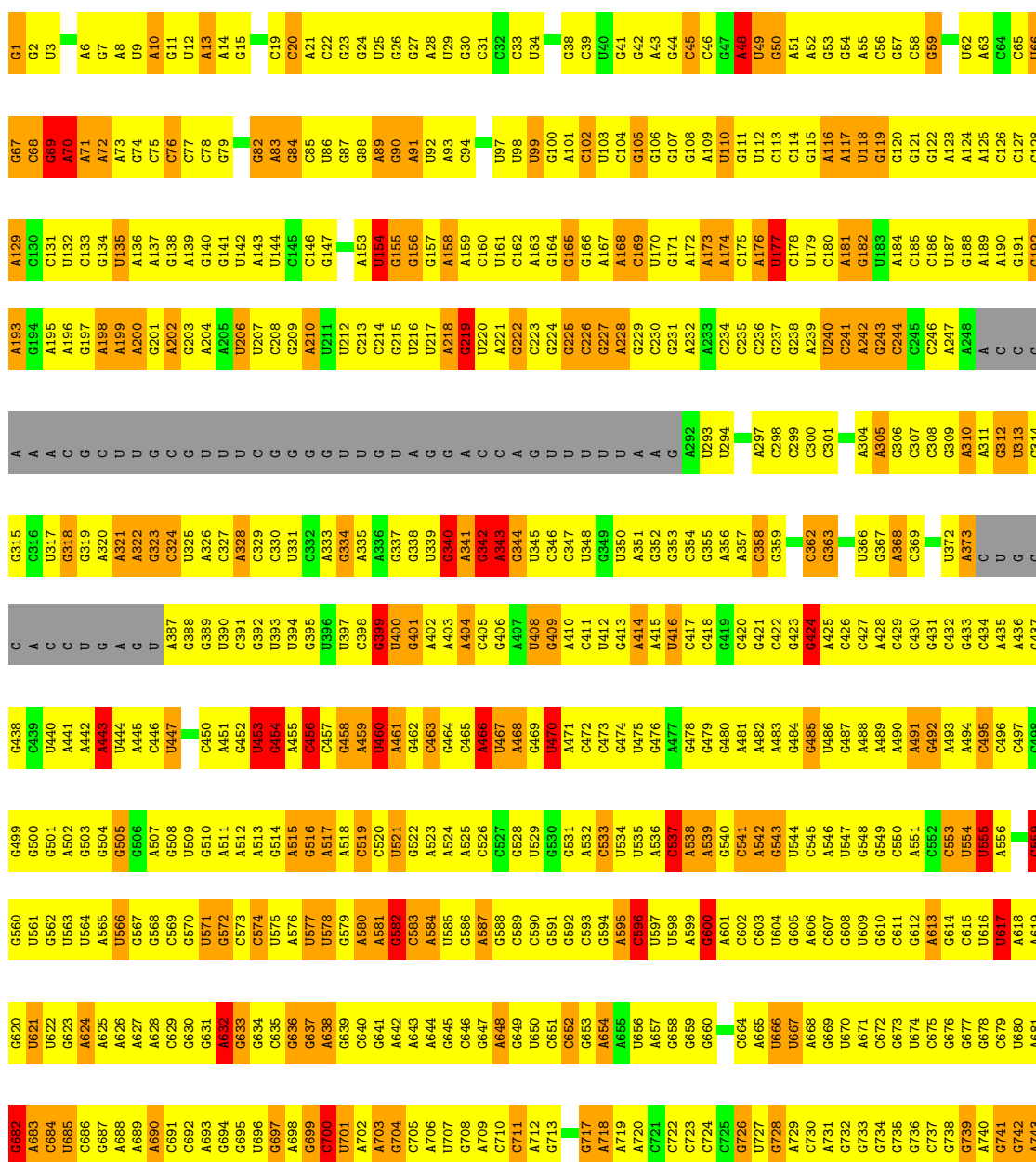
Chain	Residue	Modelled	Actual	Comment	Reference
8	31	GLY	-	linker	UNP P0A805
8	32	GLY	-	linker	UNP P0A805
8	33	GLY	-	linker	UNP P0A805

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. 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. 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.

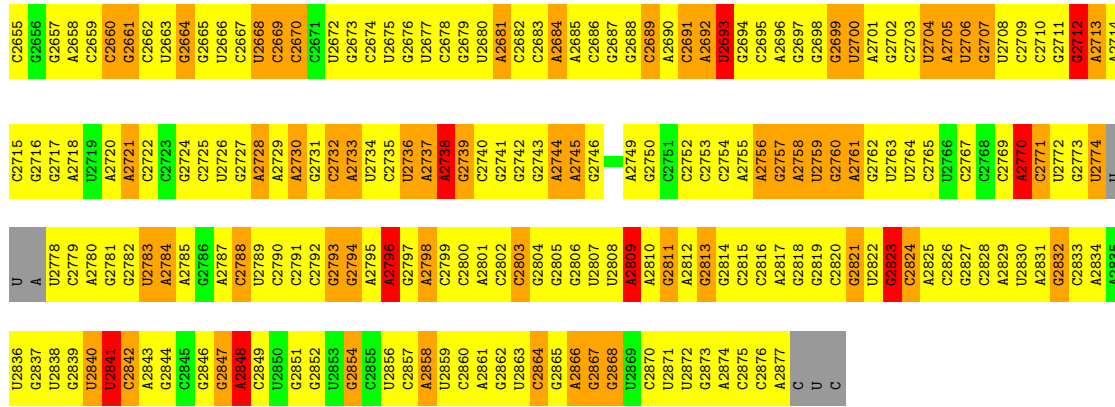
- Molecule 1: 23S ribosomal RNA

Chain 0: 

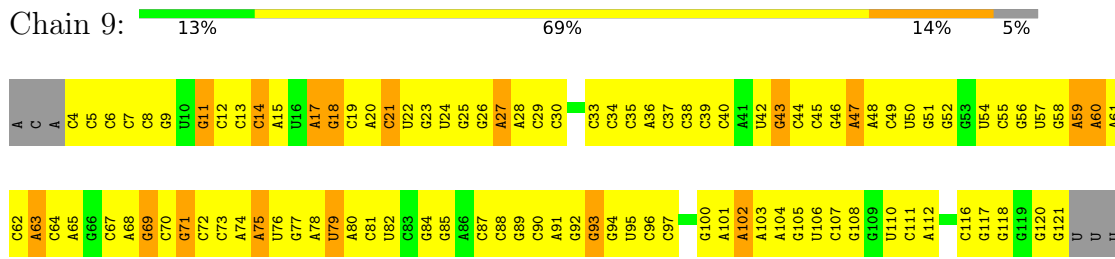


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A1534	C1535	C1536	U1537	A1538	U1539	C1540	C1541	A1542	A1543	A1544	A1545	U1548	C1549	C1550	U1551	C1552	C1553	C1554	A1555	A1556	C1557	C1558	C1559	A1560	A1561	C1562	A1563	U1564	U1567	A1568	A1569	C1570	C1571	C1572	C1573	A1574	C1575	C1576	C1577	C1578	C1579	C1580	C1581	A1582	A1583	C1584	A1585	A1586	A1587	A1588	C1589	C1590	U1591	U1592	C1593	A1594	A1595																	
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C864	A865	U866	C867	U868	C869	C870	U871	U872	U873	C874	U875	C876	U877	C878	C879	C880	U881	U882	U883	C884	C885	C886	U887	U888	C889	U890	U891	A892	C893	A894	C895	U896	U897	C898	C899	U900	U901	U902	U903	U904	U905	U906	U907	U908	U909	U910	U911	U912	U913	U914	C915	C916	U917	U918	U919	U920	U921	A922	A923															
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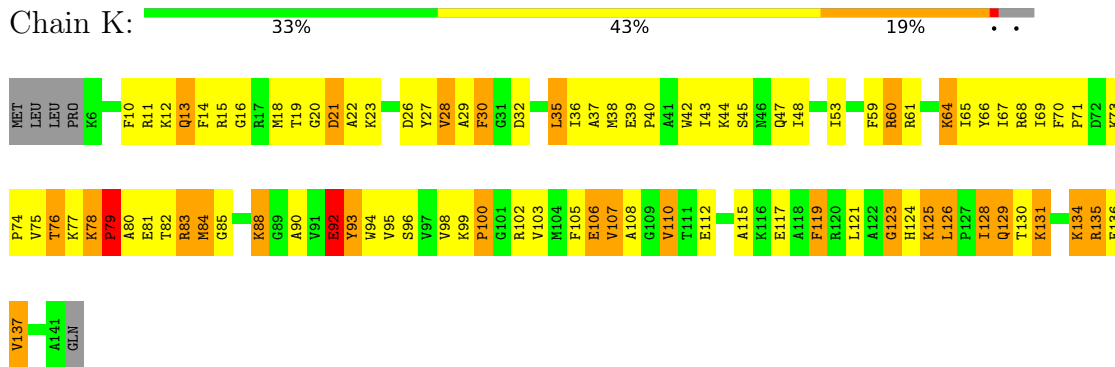
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G2623	C2494	U2376	A2315	A2253	A2253	U2192	G	U2067	G2007	G1944	U1881	G1816	U1753
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G2628	C2499	U2384	U2322	G2258	G2258	U2198	G	C2072	A2012	A1949	G1886	A1821	C1758
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G2636	C2507	C2392	C2330	A2266	A2266	C2205	C	U2080	G2020	G1957	U1894	G1831	U1766
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G2641	U2512	C2397	U2335	U2271	U2271	C2210	U	U2088	A2025	G1963	A1899	C1836	A1771
G2642	C2513	U2398	U2336	A2272	A2272	U2211	C	A1964	C2026	A1964	G1837	G1837	C1772
G2643	U2514	C2399	G2337	C2273	C2273	U2212	G	C2027	C2027	U1965	A1902	G1838	C1773
G2644	C2515	G2400	A2338	C2274	C2274	G2213	A	U2090	G2028	C1966	A1903	A1839	A1774
G2645	U2516	C2396	A2339	U2275	U2275	G2214	A	G2091	C2029	U1967	G1904	A1840	A1775
G2646	C2517	C2397	C2340	C2276	C2276	G2215	A	U2092	U2030	G1968	C1908	A1776	A1776
G2647	U2518	U2398	C2341	A2277	A2277	G2216	U	G2093	A2031	G1969	U1909	C1844	U1777
G2648	C2519	C2399	U2342	C2278	C2278	G2218	A	G2094	G2032	G1970	U1909	C1844	U1778
G2649	U2520	G2400	A2343	U2279	U2279	G2219	C2157	G2095	C2033	C1971	A1910	A1845	C1779



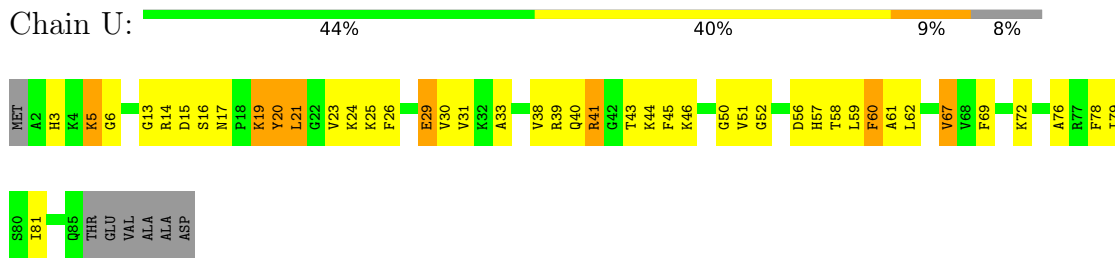
• Molecule 2: 5S ribosomal RNA



• Molecule 3: 50S ribosomal protein L16

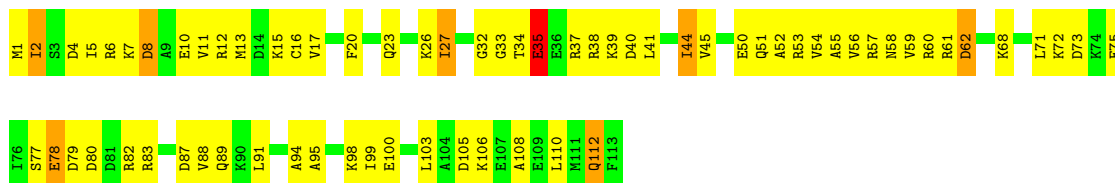


• Molecule 4: 50S ribosomal protein L27



• Molecule 5: Ribosome-recycling factor





4 Data and refinement statistics

Property	Value	Source
Space group	I 2 2 2	Depositor
Cell constants a, b, c, α , β , γ	168.70Å 405.00Å 693.00Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	8.13 – 3.33 29.66 – 3.30	Depositor EDS
% Data completeness (in resolution range)	74.5 (8.13-3.33) 89.1 (29.66-3.30)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	0.10	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.85 (at 3.31Å)	Xtrriage
Refinement program	CNS	Depositor
R, R_{free}	0.275 , 0.338 0.364 , 0.392	Depositor DCC
R_{free} test set	15675 reflections (5.01%)	wwPDB-VP
Wilson B-factor (Å ²)	74.3	Xtrriage
Anisotropy	0.779	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.17 , 6.7	EDS
L-test for twinning ²	$\langle L \rangle = 0.45$, $\langle L^2 \rangle = 0.28$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.78	EDS
Total number of atoms	64484	wwPDB-VP
Average B, all atoms (Å ²)	50.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.27% 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 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	0	0.71	2/66467 (0.0%)	0.85	112/103673 (0.1%)
2	9	0.53	0/2813	0.78	0/4384
3	K	0.59	0/1113	0.80	2/1486 (0.1%)
4	U	0.55	0/633	0.69	0/838
5	8	0.57	0/895	0.71	0/1189
All	All	0.70	2/71921 (0.0%)	0.85	114/111570 (0.1%)

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	0	0	217
2	9	0	2
All	All	0	219

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	0	841	G	C5-C6	-5.21	1.37	1.42
1	0	1285	A	N9-C4	5.07	1.40	1.37

The worst 5 of 114 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	0	582	G	N9-C1'-C2'	10.45	127.58	114.00
1	0	1154	A	OP1-P-O3'	8.68	124.30	105.20
1	0	466	A	N9-C1'-C2'	8.54	125.10	114.00
1	0	788	G	N9-C1'-C2'	8.41	124.94	114.00
1	0	1979	C	N1-C1'-C2'	8.27	124.75	114.00

There are no chirality outliers.

5 of 219 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	0	1	G	Sidechain
1	0	10	A	Sidechain
1	0	20	C	Sidechain
1	0	48	A	Sidechain
1	0	66	U	Sidechain

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	0	59359	0	29917	4726	0
2	9	2516	0	1286	165	0
3	K	1090	0	1125	185	0
4	U	625	0	655	83	0
5	8	894	0	925	101	0
All	All	64484	0	33908	5144	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 53.

The worst 5 of 5144 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)
1:0:1333:G:N2	1:0:1344:C:H41	1.39	1.21
1:0:2548:G:C2'	1:0:2549:G:H5''	1.73	1.17
1:0:1073:G:H2'	1:0:1074:G:H5''	1.18	1.17
1:0:1978:U:H3'	1:0:1979:C:H5''	1.28	1.15
3:K:76:THR:HG21	3:K:88:LYS:HB2	1.22	1.15

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	
3	K	134/141 (95%)	109 (81%)	19 (14%)	6 (4%)	2	17
4	U	82/91 (90%)	63 (77%)	16 (20%)	3 (4%)	3	22
5	8	111/113 (98%)	95 (86%)	13 (12%)	3 (3%)	5	28
All	All	327/345 (95%)	267 (82%)	48 (15%)	12 (4%)	3	22

5 of 12 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
3	K	79	PRO
5	8	112	GLN
3	K	80	ALA
3	K	135	ARG
4	U	13	GLY

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	
3	K	110/115 (96%)	83 (76%)	27 (24%)	0	2
4	U	62/67 (92%)	54 (87%)	8 (13%)	4	18
5	8	95/95 (100%)	84 (88%)	11 (12%)	5	22
All	All	267/277 (96%)	221 (83%)	46 (17%)	2	9

5 of 46 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
4	U	16	SER
5	8	2	ILE
4	U	19	LYS
4	U	58	THR
5	8	27	ILE

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 8 such sidechains are listed below:

Mol	Chain	Res	Type
5	8	89	GLN
5	8	58	ASN
5	8	23	GLN
4	U	57	HIS
5	8	51	GLN

5.3.3 RNA [i](#)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
1	0	2757/2880 (95%)	636 (23%)	121 (4%)
2	9	117/124 (94%)	16 (13%)	0
All	All	2874/3004 (95%)	652 (22%)	121 (4%)

5 of 652 RNA backbone outliers are listed below:

Mol	Chain	Res	Type
1	0	45	C
1	0	48	A
1	0	49	U
1	0	50	G
1	0	51	A

5 of 121 RNA pucker outliers are listed below:

Mol	Chain	Res	Type
1	0	1634	A
1	0	2592	U
1	0	1820	G
1	0	2588	U
1	0	2823	G

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 monosaccharides 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

Unable to reproduce the depositors R factor - this section is therefore empty.

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

Unable to reproduce the depositors R factor - this section is therefore empty.

6.3 Carbohydrates

Unable to reproduce the depositors R factor - this section is therefore empty.

6.4 Ligands

Unable to reproduce the depositors R factor - this section is therefore empty.

6.5 Other polymers

Unable to reproduce the depositors R factor - this section is therefore empty.