



# Full wwPDB NMR Structure Validation Report ⓘ

Feb 7, 2022 – 04:29 PM EST

PDB ID : 1A60  
Title : NMR STRUCTURE OF A CLASSICAL PSEUDOKNOT: INTERPLAY OF SINGLE-AND DOUBLE-STRANDED RNA, 24 STRUCTURES  
Authors : Kolk, M.H.; Van Der Graaf, M.; Wijmenga, S.S.; Pleij, C.W.A.; Heus, H.A.; Hilbers, C.W.  
Deposited on : 1998-03-04

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We welcome your comments at [validation@mail.wwpdb.org](mailto:validation@mail.wwpdb.org)

A user guide is available at

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

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  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
RCI : v\_1n\_11\_5\_13\_A (Berjanski et al., 2005)  
PANAV : Wang et al. (2010)  
ShiftChecker : 2.26  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.26

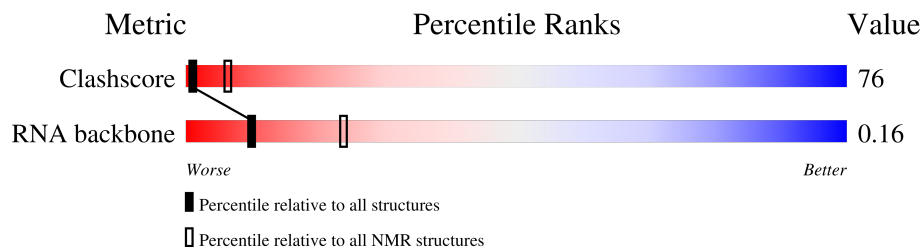
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*SOLUTION NMR*

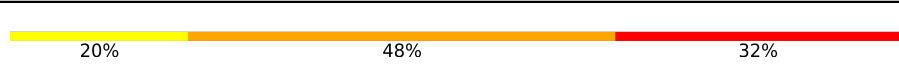
The overall completeness of chemical shifts assignment was not calculated.

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<br>(#Entries) | NMR archive<br>(#Entries) |
|--------------|-----------------------------|---------------------------|
| Clashescore  | 158937                      | 12864                     |
| RNA backbone | 4643                        | 676                       |

The table below summarises the geometric issues observed across the polymeric chains and their fit to the experimental data. The red, orange, yellow and green segments indicate the fraction of residues that contain outliers for  $\geq 3$ , 2, 1 and 0 types of geometric quality criteria. A cyan segment indicates the fraction of residues that are not part of the well-defined cores, and 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   | A     | 44     |  |

## 2 Ensemble composition and analysis

This entry contains 24 models. This entry does not contain polypeptide chains, therefore identification of well-defined residues and clustering analysis are not possible. All residues are included in the validation scores.

### 3 Entry composition

There is only 1 type of molecule in this entry. The entry contains 1400 atoms, of which 477 are hydrogens and 0 are deuteriums.

- Molecule 1 is a RNA chain called TYMV PSEUDOKNOT.

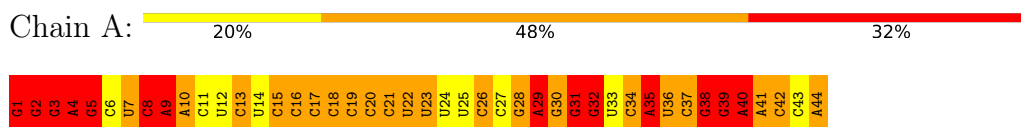
| Mol | Chain | Residues | Atoms |     |     |     |     | Trace |   |
|-----|-------|----------|-------|-----|-----|-----|-----|-------|---|
|     |       |          | Total | C   | H   | N   | O   |       | P |
| 1   | A     | 44       | 1400  | 414 | 477 | 159 | 307 | 43    | 0 |

## 4 Residue-property plots

### 4.1 Average score per residue in the NMR ensemble

These plots are provided for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic is the same as shown in the summary in section 1 of this report. The second graphic shows the sequence where residues are colour-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 outliers are shown as green connectors. Residues which are classified as ill-defined in the NMR ensemble, are shown in cyan with an underline colour-coded according to the previous scheme. Residues which were present in the experimental sample, but not modelled in the final structure are shown in grey.

- Molecule 1: TYMV PSEUDOKNOT

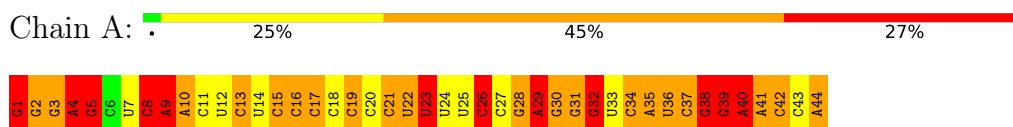


### 4.2 Scores per residue for each member of the ensemble

Colouring as in section 4.1 above.

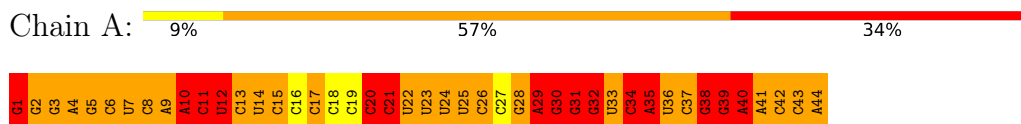
#### 4.2.1 Score per residue for model 1

- Molecule 1: TYMV PSEUDOKNOT



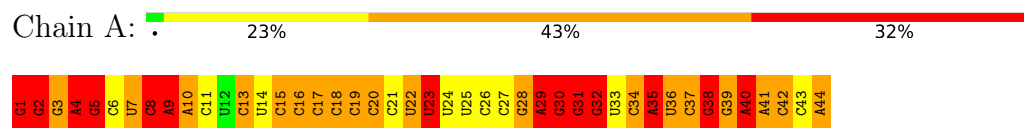
#### 4.2.2 Score per residue for model 2

- Molecule 1: TYMV PSEUDOKNOT



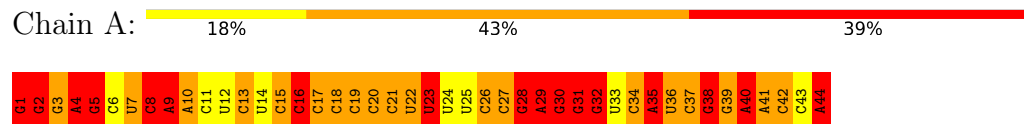
#### 4.2.3 Score per residue for model 3

- Molecule 1: TYMV PSEUDOKNOT



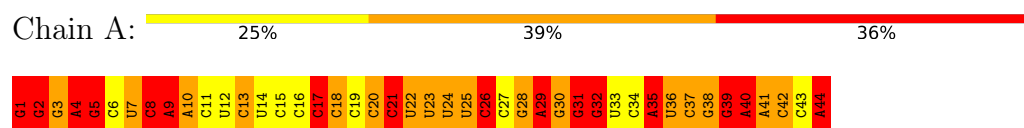
#### 4.2.4 Score per residue for model 4

- Molecule 1: TYMV PSEUDOKNOT



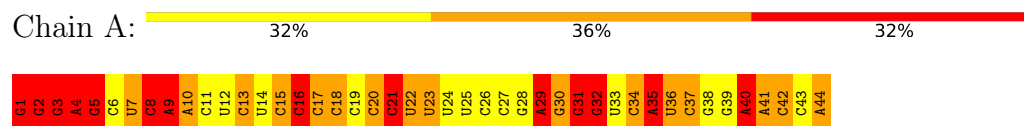
#### 4.2.5 Score per residue for model 5

- Molecule 1: TYMV PSEUDOKNOT



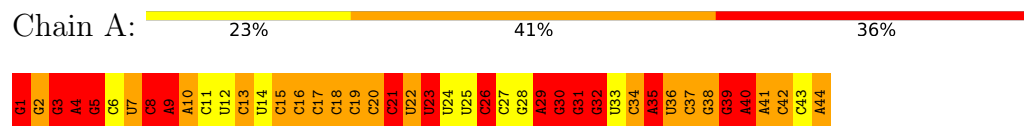
#### 4.2.6 Score per residue for model 6

- Molecule 1: TYMV PSEUDOKNOT



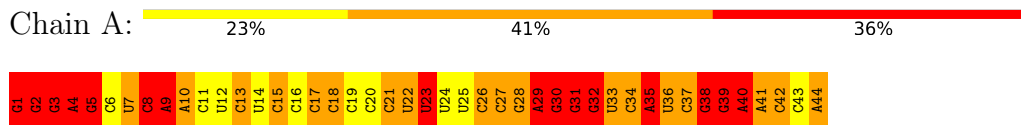
#### 4.2.7 Score per residue for model 7

- Molecule 1: TYMV PSEUDOKNOT



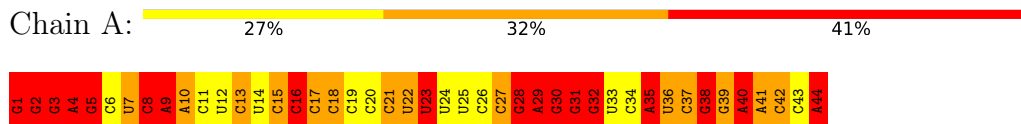
#### 4.2.8 Score per residue for model 8

- Molecule 1: TYMV PSEUDOKNOT



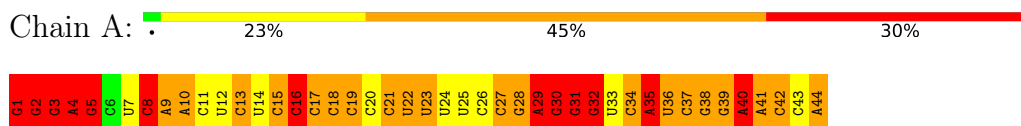
#### 4.2.9 Score per residue for model 9

- Molecule 1: TYMV PSEUDOKNOT



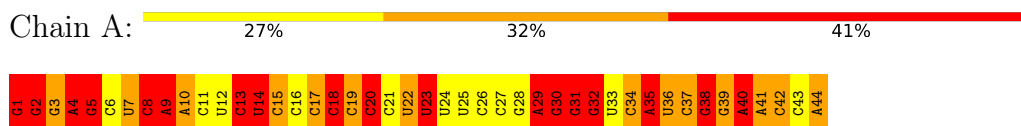
#### 4.2.10 Score per residue for model 10

- Molecule 1: TYMV PSEUDOKNOT



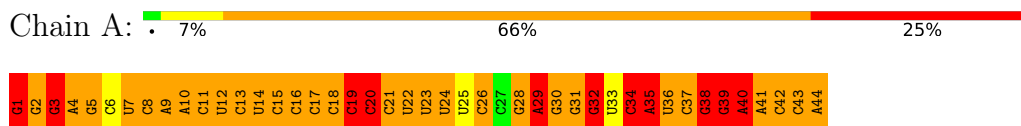
#### 4.2.11 Score per residue for model 11

- Molecule 1: TYMV PSEUDOKNOT



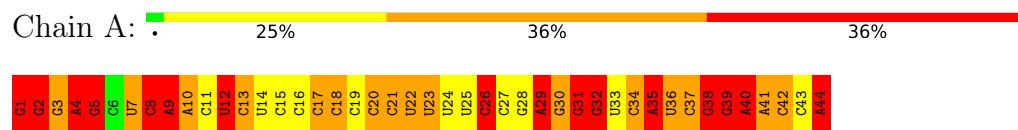
#### 4.2.12 Score per residue for model 12

- Molecule 1: TYMV PSEUDOKNOT



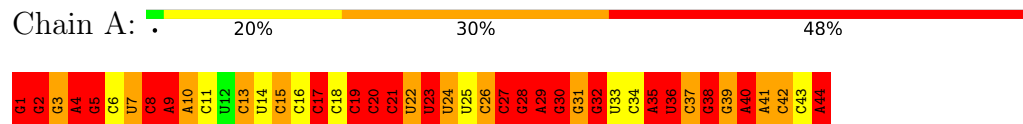
#### 4.2.13 Score per residue for model 13

- Molecule 1: TYMV PSEUDOKNOT



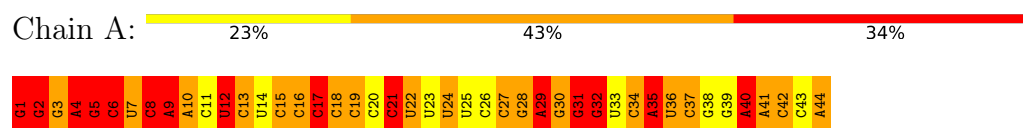
#### 4.2.14 Score per residue for model 14

- Molecule 1: TYMV PSEUDOKNOT



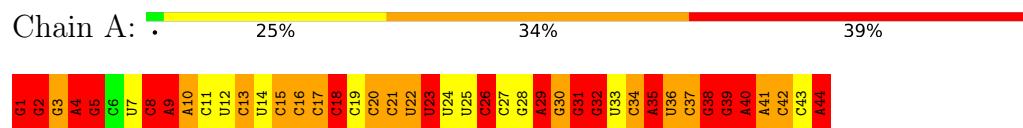
#### 4.2.15 Score per residue for model 15

- Molecule 1: TYMV PSEUDOKNOT



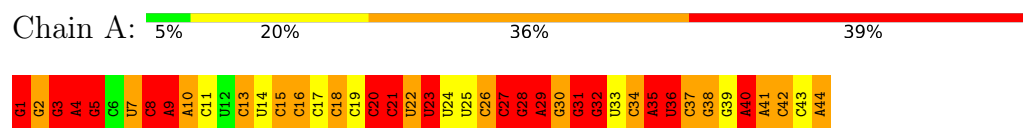
#### 4.2.16 Score per residue for model 16

- Molecule 1: TYMV PSEUDOKNOT



#### 4.2.17 Score per residue for model 17

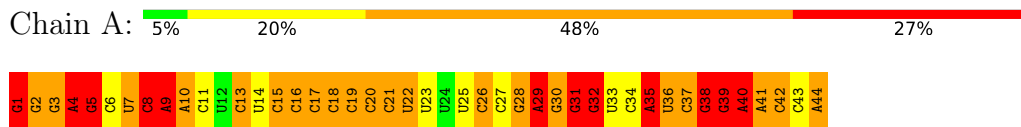
- Molecule 1: TYMV PSEUDOKNOT



#### 4.2.18 Score per residue for model 18

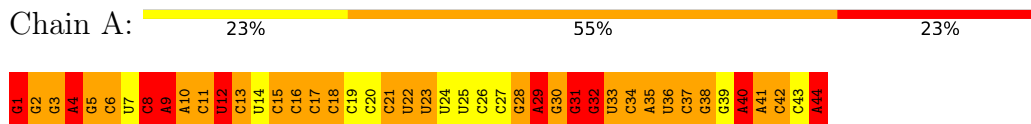
- Molecule 1: TYMV PSEUDOKNOT





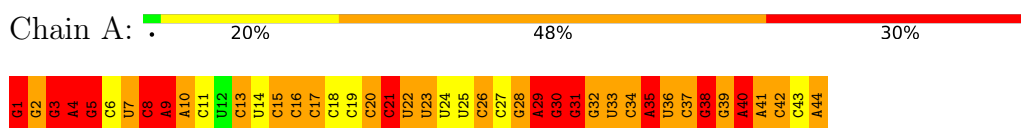
#### 4.2.19 Score per residue for model 19

- Molecule 1: TYMV PSEUDOKNOT



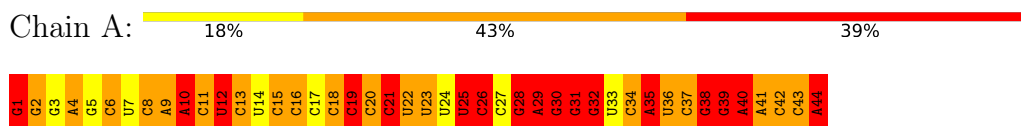
#### 4.2.20 Score per residue for model 20

- Molecule 1: TYMV PSEUDOKNOT



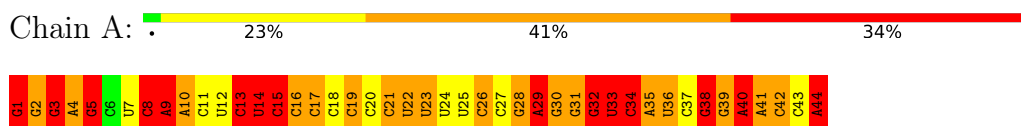
#### 4.2.21 Score per residue for model 21

- Molecule 1: TYMV PSEUDOKNOT




#### 4.2.22 Score per residue for model 22

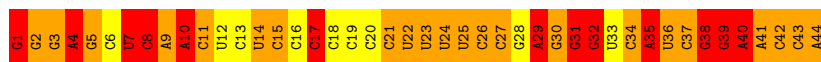
- Molecule 1: TYMV PSEUDOKNOT



#### 4.2.23 Score per residue for model 23

- Molecule 1: TYMV PSEUDOKNOT

Chain A:  20% 50% 30%



#### 4.2.24 Score per residue for model 24

- Molecule 1: TYMV PSEUDOKNOT

Chain A:  25% 41% 32%



## 5 Refinement protocol and experimental data overview

The models were refined using the following method: *TORSION ANGLE DYNAMICS/ SIMULATED ANNEALING*.

Of the 140 calculated structures, 24 were deposited, based on the following criterion: *LEAST RESTRAINT VIOLATIONS*.

The following table shows the software used for structure solution, optimisation and refinement.

| Software name | Classification     | Version |
|---------------|--------------------|---------|
| X-PLOR        | refinement         | 3.851   |
| X-PLOR        | structure solution | 3.851   |

No chemical shift data was provided.

## 6 Model quality i

### 6.1 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 (average) 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     | 1.29±0.02    | 1±1/1028 ( 0.1± 0.1%) | 2.09±0.03   | 60±5/1598 ( 3.7± 0.3%) |
| All | All   | 1.29         | 31/24672 ( 0.1%)      | 2.09        | 1432/38352 ( 3.7%)     |

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 | Planarity |
|-----|-------|-----------|-----------|
| 1   | A     | 0.0±0.0   | 14.0±2.3  |
| All | All   | 0         | 337       |

All unique bond outliers are listed below. They are sorted according to the Z-score of the worst occurrence in the ensemble.

| Mol | Chain | Res | Type | Atoms   | Z     | Observed(Å) | Ideal(Å) | Models |       |
|-----|-------|-----|------|---------|-------|-------------|----------|--------|-------|
|     |       |     |      |         |       |             |          | Worst  | Total |
| 1   | A     | 35  | A    | N9-C8   | -7.12 | 1.32        | 1.37     | 22     | 14    |
| 1   | A     | 1   | G    | N9-C8   | -5.64 | 1.33        | 1.37     | 8      | 11    |
| 1   | A     | 40  | A    | C2'-C1' | -5.14 | 1.47        | 1.53     | 2      | 2     |
| 1   | A     | 4   | A    | C2'-C1' | -5.08 | 1.47        | 1.53     | 10     | 3     |
| 1   | A     | 20  | C    | N1-C6   | -5.05 | 1.34        | 1.37     | 12     | 1     |

All unique angle outliers are listed below. They are sorted according to the Z-score of the worst occurrence in the ensemble.

| Mol | Chain | Res | Type | Atoms      | Z     | Observed(°) | Ideal(°) | Models |       |
|-----|-------|-----|------|------------|-------|-------------|----------|--------|-------|
|     |       |     |      |            |       |             |          | Worst  | Total |
| 1   | A     | 32  | G    | N7-C8-N9   | 11.72 | 118.96      | 113.10   | 14     | 24    |
| 1   | A     | 2   | G    | O4'-C1'-N9 | 11.58 | 117.47      | 108.20   | 12     | 13    |
| 1   | A     | 3   | G    | N7-C8-N9   | 10.49 | 118.34      | 113.10   | 12     | 24    |
| 1   | A     | 1   | G    | N7-C8-N9   | 10.28 | 118.24      | 113.10   | 14     | 24    |
| 1   | A     | 35  | A    | N7-C8-N9   | 10.02 | 118.81      | 113.80   | 22     | 24    |

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| Mol | Chain | Res | Type | Atoms       | Z     | Observed(°) | Ideal(°) | Models |       |
|-----|-------|-----|------|-------------|-------|-------------|----------|--------|-------|
|     |       |     |      |             |       |             |          | Worst  | Total |
| 1   | A     | 2   | G    | N7-C8-N9    | 9.91  | 118.06      | 113.10   | 4      | 24    |
| 1   | A     | 28  | G    | N7-C8-N9    | 9.88  | 118.04      | 113.10   | 17     | 24    |
| 1   | A     | 5   | G    | N7-C8-N9    | 9.87  | 118.03      | 113.10   | 15     | 24    |
| 1   | A     | 29  | A    | O4'-C1'-N9  | 9.81  | 116.05      | 108.20   | 14     | 2     |
| 1   | A     | 16  | C    | O4'-C1'-N1  | 9.79  | 116.03      | 108.20   | 15     | 17    |
| 1   | A     | 31  | G    | N7-C8-N9    | 9.55  | 117.87      | 113.10   | 11     | 24    |
| 1   | A     | 14  | U    | O4'-C1'-N1  | 9.51  | 115.81      | 108.20   | 11     | 2     |
| 1   | A     | 32  | G    | C8-N9-C4    | -9.39 | 102.64      | 106.40   | 14     | 24    |
| 1   | A     | 38  | G    | N7-C8-N9    | 9.24  | 117.72      | 113.10   | 17     | 24    |
| 1   | A     | 39  | G    | N7-C8-N9    | 9.17  | 117.69      | 113.10   | 15     | 24    |
| 1   | A     | 30  | G    | N7-C8-N9    | 9.05  | 117.63      | 113.10   | 21     | 24    |
| 1   | A     | 26  | C    | O4'-C1'-N1  | 8.82  | 115.26      | 108.20   | 21     | 10    |
| 1   | A     | 4   | A    | N7-C8-N9    | 8.23  | 117.92      | 113.80   | 10     | 24    |
| 1   | A     | 3   | G    | C8-N9-C4    | -8.23 | 103.11      | 106.40   | 12     | 24    |
| 1   | A     | 31  | G    | O4'-C1'-N9  | 8.16  | 114.73      | 108.20   | 14     | 2     |
| 1   | A     | 3   | G    | P-O3'-C3'   | 8.09  | 129.41      | 119.70   | 6      | 4     |
| 1   | A     | 41  | A    | N7-C8-N9    | 8.02  | 117.81      | 113.80   | 12     | 24    |
| 1   | A     | 9   | A    | N7-C8-N9    | 7.93  | 117.76      | 113.80   | 21     | 24    |
| 1   | A     | 39  | G    | C3'-C2'-C1' | 7.87  | 107.80      | 101.50   | 23     | 11    |
| 1   | A     | 40  | A    | N7-C8-N9    | 7.79  | 117.70      | 113.80   | 8      | 24    |
| 1   | A     | 1   | G    | C8-N9-C4    | -7.76 | 103.29      | 106.40   | 22     | 24    |
| 1   | A     | 3   | G    | O4'-C1'-N9  | 7.76  | 114.41      | 108.20   | 12     | 1     |
| 1   | A     | 28  | G    | C8-N9-C4    | -7.72 | 103.31      | 106.40   | 17     | 24    |
| 1   | A     | 29  | A    | N7-C8-N9    | 7.71  | 117.65      | 113.80   | 24     | 24    |
| 1   | A     | 20  | C    | O4'-C1'-N1  | 7.71  | 114.36      | 108.20   | 11     | 2     |
| 1   | A     | 31  | G    | C8-N9-C4    | -7.66 | 103.33      | 106.40   | 4      | 24    |
| 1   | A     | 44  | A    | N7-C8-N9    | 7.62  | 117.61      | 113.80   | 10     | 24    |
| 1   | A     | 10  | A    | N7-C8-N9    | 7.53  | 117.56      | 113.80   | 19     | 24    |
| 1   | A     | 5   | G    | C8-N9-C4    | -7.52 | 103.39      | 106.40   | 15     | 24    |
| 1   | A     | 13  | C    | P-O3'-C3'   | 7.42  | 128.60      | 119.70   | 11     | 2     |
| 1   | A     | 2   | G    | C8-N9-C4    | -7.33 | 103.47      | 106.40   | 24     | 24    |
| 1   | A     | 3   | G    | C3'-C2'-C1' | 7.32  | 107.35      | 101.50   | 9      | 24    |
| 1   | A     | 40  | A    | O4'-C1'-N9  | 7.31  | 114.05      | 108.20   | 18     | 14    |
| 1   | A     | 39  | G    | C8-N9-C4    | -7.18 | 103.53      | 106.40   | 22     | 24    |
| 1   | A     | 38  | G    | C8-N9-C4    | -7.10 | 103.56      | 106.40   | 12     | 24    |
| 1   | A     | 12  | U    | O4'-C1'-N1  | 7.08  | 113.86      | 108.20   | 19     | 5     |
| 1   | A     | 26  | C    | C5'-C4'-O4' | 6.99  | 117.49      | 109.10   | 5      | 6     |
| 1   | A     | 30  | G    | C8-N9-C4    | -6.97 | 103.61      | 106.40   | 21     | 24    |
| 1   | A     | 23  | U    | C3'-C2'-C1' | 6.91  | 107.03      | 101.50   | 15     | 16    |
| 1   | A     | 39  | G    | P-O3'-C3'   | 6.80  | 127.87      | 119.70   | 12     | 9     |
| 1   | A     | 19  | C    | O4'-C1'-N1  | 6.76  | 113.61      | 108.20   | 14     | 3     |

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| Mol | Chain | Res | Type | Atoms       | Z     | Observed(°) | Ideal(°) | Models |       |
|-----|-------|-----|------|-------------|-------|-------------|----------|--------|-------|
|     |       |     |      |             |       |             |          | Worst  | Total |
| 1   | A     | 2   | G    | C3'-C2'-C1' | 6.68  | 106.84      | 101.50   | 12     | 3     |
| 1   | A     | 17  | C    | O4'-C1'-N1  | 6.64  | 113.51      | 108.20   | 15     | 7     |
| 1   | A     | 37  | C    | O4'-C1'-N1  | 6.59  | 113.47      | 108.20   | 11     | 23    |
| 1   | A     | 1   | G    | O4'-C1'-N9  | 6.58  | 113.47      | 108.20   | 15     | 1     |
| 1   | A     | 16  | C    | C3'-C2'-C1' | 6.47  | 106.68      | 101.50   | 15     | 10    |
| 1   | A     | 8   | C    | C3'-C2'-C1' | 6.45  | 106.66      | 101.50   | 13     | 21    |
| 1   | A     | 20  | C    | C5'-C4'-O4' | 6.40  | 116.78      | 109.10   | 11     | 1     |
| 1   | A     | 1   | G    | P-O3'-C3'   | 6.26  | 127.21      | 119.70   | 15     | 1     |
| 1   | A     | 29  | A    | C8-N9-C4    | -6.26 | 103.30      | 105.80   | 14     | 24    |
| 1   | A     | 42  | C    | C3'-C2'-C1' | 6.20  | 106.46      | 101.50   | 21     | 24    |
| 1   | A     | 35  | A    | C5-N7-C8    | -6.14 | 100.83      | 103.90   | 22     | 22    |
| 1   | A     | 41  | A    | C8-N9-C4    | -6.11 | 103.36      | 105.80   | 16     | 24    |
| 1   | A     | 1   | G    | C3'-C2'-C1' | 6.08  | 106.36      | 101.50   | 14     | 10    |
| 1   | A     | 40  | A    | C8-N9-C4    | -6.08 | 103.37      | 105.80   | 19     | 13    |
| 1   | A     | 33  | U    | C5'-C4'-C3' | -6.03 | 106.35      | 116.00   | 22     | 1     |
| 1   | A     | 10  | A    | C8-N9-C4    | -5.96 | 103.42      | 105.80   | 19     | 24    |
| 1   | A     | 9   | A    | C8-N9-C4    | -5.90 | 103.44      | 105.80   | 21     | 24    |
| 1   | A     | 21  | C    | O4'-C1'-N1  | 5.88  | 112.91      | 108.20   | 12     | 14    |
| 1   | A     | 21  | C    | C3'-C2'-C1' | 5.88  | 106.20      | 101.50   | 21     | 20    |
| 1   | A     | 44  | A    | C3'-C2'-C1' | 5.81  | 106.15      | 101.50   | 12     | 24    |
| 1   | A     | 39  | G    | O4'-C1'-N9  | 5.79  | 112.83      | 108.20   | 2      | 10    |
| 1   | A     | 1   | G    | C5-N7-C8    | -5.78 | 101.41      | 104.30   | 8      | 13    |
| 1   | A     | 24  | U    | O4'-C1'-N1  | 5.69  | 112.75      | 108.20   | 12     | 4     |
| 1   | A     | 6   | C    | C3'-C2'-C1' | 5.69  | 106.05      | 101.50   | 15     | 4     |
| 1   | A     | 10  | A    | O4'-C1'-N9  | 5.68  | 112.74      | 108.20   | 15     | 2     |
| 1   | A     | 3   | G    | C5'-C4'-O4' | 5.67  | 115.90      | 109.10   | 12     | 1     |
| 1   | A     | 1   | G    | N9-C1'-C2'  | -5.67 | 105.77      | 112.00   | 15     | 1     |
| 1   | A     | 4   | A    | C8-N9-C4    | -5.62 | 103.55      | 105.80   | 17     | 20    |
| 1   | A     | 5   | G    | C3'-C2'-C1' | 5.58  | 105.97      | 101.50   | 15     | 2     |
| 1   | A     | 31  | G    | C3'-C2'-C1' | 5.55  | 105.94      | 101.50   | 14     | 2     |
| 1   | A     | 3   | G    | C5-N7-C8    | -5.53 | 101.53      | 104.30   | 10     | 23    |
| 1   | A     | 7   | U    | C3'-C2'-C1' | 5.51  | 105.91      | 101.50   | 2      | 23    |
| 1   | A     | 28  | G    | P-O3'-C3'   | 5.50  | 126.30      | 119.70   | 17     | 1     |
| 1   | A     | 26  | C    | C1'-O4'-C4' | -5.49 | 105.51      | 109.90   | 21     | 5     |
| 1   | A     | 44  | A    | C8-N9-C4    | -5.46 | 103.61      | 105.80   | 12     | 21    |
| 1   | A     | 32  | G    | O4'-C1'-N9  | 5.45  | 112.56      | 108.20   | 4      | 8     |
| 1   | A     | 30  | G    | C5-N7-C8    | -5.45 | 101.58      | 104.30   | 12     | 24    |
| 1   | A     | 2   | G    | C5-N7-C8    | -5.43 | 101.58      | 104.30   | 6      | 18    |
| 1   | A     | 40  | A    | C3'-C2'-C1' | 5.43  | 105.84      | 101.50   | 19     | 11    |
| 1   | A     | 6   | C    | O4'-C1'-N1  | 5.43  | 112.54      | 108.20   | 15     | 1     |
| 1   | A     | 20  | C    | C3'-C2'-C1' | 5.40  | 105.82      | 101.50   | 2      | 1     |

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| Mol | Chain | Res | Type | Atoms       | Z     | Observed(°) | Ideal(°) | Models |       |
|-----|-------|-----|------|-------------|-------|-------------|----------|--------|-------|
|     |       |     |      |             |       |             |          | Worst  | Total |
| 1   | A     | 19  | C    | C3'-C2'-C1' | 5.39  | 105.81      | 101.50   | 14     | 4     |
| 1   | A     | 11  | C    | C3'-C2'-C1' | 5.36  | 105.79      | 101.50   | 12     | 3     |
| 1   | A     | 39  | G    | C5-N7-C8    | -5.35 | 101.62      | 104.30   | 23     | 12    |
| 1   | A     | 34  | C    | C3'-C2'-C1' | 5.34  | 105.77      | 101.50   | 22     | 3     |
| 1   | A     | 40  | A    | N9-C1'-C2'  | -5.34 | 106.13      | 112.00   | 2      | 5     |
| 1   | A     | 32  | G    | C3'-C2'-C1' | 5.33  | 105.77      | 101.50   | 11     | 6     |
| 1   | A     | 20  | C    | C1'-O4'-C4' | -5.32 | 105.64      | 109.90   | 11     | 1     |
| 1   | A     | 31  | G    | C5-N7-C8    | -5.29 | 101.66      | 104.30   | 14     | 9     |
| 1   | A     | 28  | G    | C5-N7-C8    | -5.28 | 101.66      | 104.30   | 13     | 16    |
| 1   | A     | 2   | G    | N9-C1'-C2'  | -5.28 | 106.19      | 112.00   | 12     | 1     |
| 1   | A     | 5   | G    | C5-N7-C8    | -5.27 | 101.66      | 104.30   | 22     | 8     |
| 1   | A     | 32  | G    | C5-N7-C8    | -5.26 | 101.67      | 104.30   | 16     | 17    |
| 1   | A     | 25  | U    | O4'-C1'-N1  | 5.25  | 112.40      | 108.20   | 5      | 2     |
| 1   | A     | 38  | G    | C5-N7-C8    | -5.20 | 101.70      | 104.30   | 13     | 20    |
| 1   | A     | 40  | A    | N1-C2-N3    | -5.20 | 126.70      | 129.30   | 7      | 2     |
| 1   | A     | 4   | A    | O4'-C1'-N9  | 5.18  | 112.35      | 108.20   | 20     | 4     |
| 1   | A     | 2   | G    | C8-N9-C1'   | 5.18  | 133.74      | 127.00   | 12     | 1     |
| 1   | A     | 4   | A    | C5-N7-C8    | -5.17 | 101.32      | 103.90   | 10     | 3     |
| 1   | A     | 41  | A    | C3'-C2'-C1' | 5.15  | 105.62      | 101.50   | 12     | 2     |
| 1   | A     | 36  | U    | O4'-C1'-N1  | 5.14  | 112.31      | 108.20   | 14     | 2     |
| 1   | A     | 12  | U    | C3'-C2'-C1' | 5.13  | 105.60      | 101.50   | 12     | 2     |
| 1   | A     | 18  | C    | O4'-C1'-N1  | 5.06  | 112.25      | 108.20   | 11     | 2     |
| 1   | A     | 27  | C    | O4'-C1'-N1  | 5.05  | 112.24      | 108.20   | 2      | 2     |
| 1   | A     | 2   | G    | N9-C4-C5    | 5.04  | 107.42      | 105.40   | 12     | 1     |
| 1   | A     | 28  | G    | C3'-C2'-C1' | 5.03  | 105.53      | 101.50   | 21     | 1     |
| 1   | A     | 9   | A    | O4'-C1'-N9  | 5.01  | 112.21      | 108.20   | 12     | 1     |
| 1   | A     | 35  | A    | N1-C2-N3    | -5.01 | 126.79      | 129.30   | 11     | 1     |

There are no chirality outliers.

All unique planar outliers are listed below. They are sorted by the frequency of occurrence in the ensemble.

| Mol | Chain | Res | Type | Group     | Models (Total) |
|-----|-------|-----|------|-----------|----------------|
| 1   | A     | 13  | C    | Sidechain | 24             |
| 1   | A     | 32  | G    | Sidechain | 24             |
| 1   | A     | 5   | G    | Sidechain | 22             |
| 1   | A     | 29  | A    | Sidechain | 22             |
| 1   | A     | 15  | C    | Sidechain | 21             |
| 1   | A     | 31  | G    | Sidechain | 20             |
| 1   | A     | 3   | G    | Sidechain | 19             |
| 1   | A     | 17  | C    | Sidechain | 17             |

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| Mol | Chain | Res | Type | Group     | Models (Total) |
|-----|-------|-----|------|-----------|----------------|
| 1   | A     | 38  | G    | Sidechain | 17             |
| 1   | A     | 18  | C    | Sidechain | 17             |
| 1   | A     | 4   | A    | Sidechain | 16             |
| 1   | A     | 27  | C    | Sidechain | 15             |
| 1   | A     | 40  | A    | Sidechain | 15             |
| 1   | A     | 20  | C    | Sidechain | 13             |
| 1   | A     | 1   | G    | Sidechain | 12             |
| 1   | A     | 26  | C    | Sidechain | 12             |
| 1   | A     | 19  | C    | Sidechain | 10             |
| 1   | A     | 30  | G    | Sidechain | 10             |
| 1   | A     | 39  | G    | Sidechain | 9              |
| 1   | A     | 16  | C    | Sidechain | 6              |
| 1   | A     | 34  | C    | Sidechain | 6              |
| 1   | A     | 28  | G    | Sidechain | 5              |
| 1   | A     | 35  | A    | Sidechain | 5              |

## 6.2 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 each 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 averaged over the ensemble.

| Mol | Chain | Non-H | H(model) | H(added) | Clashes |
|-----|-------|-------|----------|----------|---------|
| 1   | A     | 923   | 477      | 477      | 107±24  |
| All | All   | 22152 | 11448    | 11447    | 2559    |

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 76.

All unique clashes are listed below, sorted by their clash magnitude.

| Atom-1       | Atom-2        | Clash(Å) | Distance(Å) | Models |       |
|--------------|---------------|----------|-------------|--------|-------|
|              |               |          |             | Worst  | Total |
| 1:A:20:C:O2  | 1:A:35:A:C2   | 1.34     | 1.81        | 14     | 24    |
| 1:A:20:C:O2  | 1:A:35:A:N1   | 1.25     | 1.66        | 14     | 24    |
| 1:A:17:C:H6  | 1:A:17:C:P    | 1.23     | 1.56        | 15     | 1     |
| 1:A:19:C:O2' | 1:A:20:C:O5'  | 1.23     | 1.57        | 14     | 1     |
| 1:A:39:G:H2' | 1:A:40:A:N7   | 1.22     | 1.50        | 13     | 11    |
| 1:A:32:G:O2' | 1:A:33:U:H3'  | 1.15     | 1.41        | 22     | 1     |
| 1:A:1:G:O2'  | 1:A:2:G:C8    | 1.15     | 1.98        | 8      | 12    |
| 1:A:22:U:O2' | 1:A:23:U:H5'' | 1.15     | 1.41        | 8      | 19    |

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| Atom-1        | Atom-2       | Clash(Å) | Distance(Å) | Models |       |
|---------------|--------------|----------|-------------|--------|-------|
|               |              |          |             | Worst  | Total |
| 1:A:20:C:H6   | 1:A:20:C:OP2 | 1.12     | 1.27        | 11     | 1     |
| 1:A:17:C:C6   | 1:A:17:C:OP2 | 1.12     | 2.01        | 15     | 1     |
| 1:A:1:G:N2    | 1:A:2:G:C5   | 1.11     | 2.18        | 5      | 7     |
| 1:A:16:C:H2'  | 1:A:17:C:O4' | 1.10     | 1.45        | 5      | 7     |
| 1:A:31:G:H2'  | 1:A:32:G:O4' | 1.07     | 1.49        | 17     | 13    |
| 1:A:17:C:P    | 1:A:17:C:C6  | 1.07     | 2.48        | 15     | 1     |
| 1:A:1:G:N3    | 1:A:2:G:N7   | 1.06     | 2.03        | 5      | 5     |
| 1:A:3:G:H2'   | 1:A:4:A:N7   | 1.06     | 1.65        | 6      | 4     |
| 1:A:17:C:H2'  | 1:A:18:C:O4' | 1.04     | 1.50        | 8      | 20    |
| 1:A:22:U:H1'  | 1:A:24:U:OP2 | 1.03     | 1.53        | 10     | 5     |
| 1:A:26:C:OP2  | 1:A:26:C:H6  | 1.03     | 1.37        | 1      | 6     |
| 1:A:20:C:OP2  | 1:A:20:C:C6  | 1.03     | 2.12        | 11     | 1     |
| 1:A:31:G:H21  | 1:A:35:A:N6  | 1.03     | 1.52        | 11     | 21    |
| 1:A:22:U:H1'  | 1:A:24:U:OP1 | 1.01     | 1.55        | 3      | 11    |
| 1:A:1:G:H5'   | 1:A:33:U:OP2 | 1.01     | 1.55        | 22     | 2     |
| 1:A:31:G:N2   | 1:A:35:A:H61 | 1.01     | 1.53        | 5      | 20    |
| 1:A:21:C:H5'' | 1:A:22:U:OP1 | 1.00     | 1.56        | 19     | 4     |
| 1:A:1:G:N2    | 1:A:2:G:C6   | 1.00     | 2.30        | 5      | 5     |
| 1:A:16:C:C4   | 1:A:17:C:C4  | 0.99     | 2.50        | 8      | 5     |
| 1:A:42:C:O2'  | 1:A:43:C:H5' | 0.99     | 1.57        | 12     | 24    |
| 1:A:39:G:O2'  | 1:A:40:A:H8  | 0.98     | 1.40        | 5      | 2     |
| 1:A:32:G:H8   | 1:A:32:G:P   | 0.97     | 1.82        | 14     | 1     |
| 1:A:39:G:O2'  | 1:A:40:A:C8  | 0.97     | 2.17        | 5      | 6     |
| 1:A:34:C:O2'  | 1:A:35:A:C4' | 0.97     | 2.12        | 20     | 15    |
| 1:A:32:G:C8   | 1:A:32:G:OP2 | 0.97     | 2.18        | 14     | 1     |
| 1:A:34:C:O2'  | 1:A:35:A:H5' | 0.97     | 1.59        | 19     | 22    |
| 1:A:39:G:C2   | 1:A:40:A:N6  | 0.95     | 2.34        | 5      | 2     |
| 1:A:31:G:H21  | 1:A:35:A:H61 | 0.95     | 0.99        | 8      | 15    |
| 1:A:7:U:H2'   | 1:A:9:A:OP2  | 0.95     | 1.60        | 13     | 13    |
| 1:A:31:G:O2'  | 1:A:32:G:H5' | 0.95     | 1.60        | 16     | 13    |
| 1:A:21:C:H1'  | 1:A:28:G:O6  | 0.94     | 1.62        | 22     | 3     |
| 1:A:1:G:C2'   | 1:A:2:G:C8   | 0.94     | 2.51        | 15     | 1     |
| 1:A:32:G:P    | 1:A:32:G:C8  | 0.93     | 2.61        | 14     | 1     |
| 1:A:30:G:N2   | 1:A:35:A:N1  | 0.93     | 2.17        | 22     | 11    |
| 1:A:8:C:O2'   | 1:A:9:A:H5'  | 0.93     | 1.62        | 23     | 7     |
| 1:A:1:G:O2'   | 1:A:2:G:H8   | 0.92     | 1.31        | 8      | 11    |
| 1:A:21:C:HO2' | 1:A:37:C:H5  | 0.92     | 0.95        | 11     | 8     |
| 1:A:25:U:C4   | 1:A:26:C:C4  | 0.91     | 2.58        | 8      | 12    |
| 1:A:29:A:H2'  | 1:A:30:G:O4' | 0.90     | 1.64        | 22     | 24    |
| 1:A:20:C:O2'  | 1:A:21:C:OP1 | 0.90     | 1.88        | 17     | 1     |
| 1:A:8:C:HO2'  | 1:A:9:A:H8   | 0.90     | 0.93        | 9      | 7     |

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| Atom-1        | Atom-2       | Clash(Å) | Distance(Å) | Models |       |
|---------------|--------------|----------|-------------|--------|-------|
|               |              |          |             | Worst  | Total |
| 1:A:40:A:O2'  | 1:A:41:A:H5' | 0.90     | 1.64        | 8      | 13    |
| 1:A:22:U:H5'  | 1:A:37:C:OP2 | 0.89     | 1.66        | 7      | 2     |
| 1:A:1:G:H2'   | 1:A:2:G:O4'  | 0.88     | 1.66        | 18     | 12    |
| 1:A:16:C:O3'  | 1:A:17:C:O4' | 0.88     | 1.91        | 15     | 1     |
| 1:A:34:C:HO2' | 1:A:35:A:C4' | 0.88     | 1.82        | 10     | 6     |
| 1:A:38:G:H2'  | 1:A:39:G:O4' | 0.88     | 1.69        | 13     | 20    |
| 1:A:31:G:N2   | 1:A:35:A:N6  | 0.87     | 2.21        | 5      | 9     |
| 1:A:28:G:C6   | 1:A:29:A:C6  | 0.87     | 2.63        | 17     | 2     |
| 1:A:1:G:HO2'  | 1:A:2:G:H8   | 0.86     | 1.10        | 14     | 4     |
| 1:A:22:U:H3'  | 1:A:37:C:OP2 | 0.86     | 1.69        | 18     | 1     |
| 1:A:21:C:O2'  | 1:A:37:C:N4  | 0.85     | 2.09        | 22     | 8     |
| 1:A:1:G:C2    | 1:A:2:G:N7   | 0.84     | 2.45        | 5      | 5     |
| 1:A:22:U:H2'  | 1:A:24:U:OP2 | 0.84     | 1.73        | 19     | 1     |
| 1:A:26:C:OP2  | 1:A:26:C:C6  | 0.84     | 2.27        | 1      | 6     |
| 1:A:10:A:H2'  | 1:A:11:C:O4' | 0.84     | 1.73        | 13     | 3     |
| 1:A:22:U:O2'  | 1:A:23:U:C5' | 0.83     | 2.25        | 20     | 17    |
| 1:A:10:A:O2'  | 1:A:11:C:H5' | 0.83     | 1.73        | 13     | 2     |
| 1:A:1:G:C2    | 1:A:2:G:C5   | 0.82     | 2.67        | 5      | 10    |
| 1:A:31:G:O2'  | 1:A:32:G:C5' | 0.82     | 2.27        | 16     | 12    |
| 1:A:31:G:O2'  | 1:A:32:G:C4' | 0.82     | 2.27        | 8      | 11    |
| 1:A:11:C:C2   | 1:A:12:U:C5  | 0.82     | 2.67        | 15     | 4     |
| 1:A:32:G:H8   | 1:A:32:G:OP1 | 0.82     | 1.56        | 14     | 1     |
| 1:A:39:G:C2'  | 1:A:40:A:N7  | 0.82     | 2.42        | 13     | 10    |
| 1:A:21:C:O2'  | 1:A:37:C:H5  | 0.81     | 1.57        | 11     | 14    |
| 1:A:25:U:C5   | 1:A:26:C:N4  | 0.81     | 2.48        | 13     | 11    |
| 1:A:39:G:H2'  | 1:A:40:A:C8  | 0.81     | 2.11        | 1      | 9     |
| 1:A:39:G:H4'  | 1:A:40:A:OP1 | 0.81     | 1.72        | 5      | 2     |
| 1:A:17:C:OP2  | 1:A:17:C:C3' | 0.81     | 2.27        | 15     | 1     |
| 1:A:11:C:N3   | 1:A:12:U:O4  | 0.81     | 2.13        | 19     | 4     |
| 1:A:1:G:C2    | 1:A:2:G:C6   | 0.81     | 2.69        | 8      | 5     |
| 1:A:32:G:C8   | 1:A:32:G:OP1 | 0.81     | 2.34        | 14     | 1     |
| 1:A:11:C:O2'  | 1:A:12:U:P   | 0.81     | 2.39        | 2      | 2     |
| 1:A:8:C:O2'   | 1:A:9:A:H8   | 0.81     | 1.58        | 19     | 12    |
| 1:A:39:G:C2   | 1:A:40:A:C6  | 0.81     | 2.68        | 5      | 11    |
| 1:A:31:G:C2'  | 1:A:32:G:O4' | 0.81     | 2.29        | 8      | 11    |
| 1:A:39:G:N3   | 1:A:40:A:N7  | 0.80     | 2.29        | 8      | 2     |
| 1:A:40:A:O2'  | 1:A:41:A:O4' | 0.80     | 2.00        | 19     | 14    |
| 1:A:25:U:C4   | 1:A:26:C:N4  | 0.80     | 2.50        | 8      | 13    |
| 1:A:39:G:N1   | 1:A:40:A:N6  | 0.80     | 2.30        | 8      | 2     |
| 1:A:36:U:C4   | 1:A:37:C:N4  | 0.80     | 2.50        | 17     | 2     |
| 1:A:16:C:H2'  | 1:A:17:C:C6  | 0.80     | 2.12        | 15     | 12    |

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| Atom-1        | Atom-2        | Clash(Å) | Distance(Å) | Models |       |
|---------------|---------------|----------|-------------|--------|-------|
|               |               |          |             | Worst  | Total |
| 1:A:1:G:H2'   | 1:A:2:G:N7    | 0.80     | 1.91        | 15     | 1     |
| 1:A:17:C:P    | 1:A:17:C:O4'  | 0.79     | 2.39        | 15     | 1     |
| 1:A:10:A:C2   | 1:A:11:C:C2   | 0.78     | 2.71        | 10     | 22    |
| 1:A:21:C:H4'  | 1:A:22:U:OP1  | 0.78     | 1.76        | 5      | 7     |
| 1:A:22:U:HO2' | 1:A:23:U:H5'' | 0.78     | 1.39        | 13     | 5     |
| 1:A:16:C:N4   | 1:A:17:C:C4   | 0.78     | 2.51        | 13     | 5     |
| 1:A:28:G:C5   | 1:A:29:A:N7   | 0.78     | 2.51        | 14     | 2     |
| 1:A:16:C:C2'  | 1:A:17:C:C6   | 0.78     | 2.67        | 15     | 1     |
| 1:A:25:U:C5   | 1:A:26:C:C4   | 0.78     | 2.72        | 5      | 11    |
| 1:A:19:C:C2   | 1:A:20:C:C5   | 0.77     | 2.72        | 14     | 1     |
| 1:A:39:G:HO2' | 1:A:40:A:H8   | 0.77     | 0.81        | 8      | 2     |
| 1:A:11:C:O5'  | 1:A:11:C:H6   | 0.77     | 1.62        | 13     | 2     |
| 1:A:1:G:O3'   | 1:A:2:G:C8    | 0.77     | 2.36        | 15     | 1     |
| 1:A:24:U:OP2  | 1:A:25:U:H5   | 0.77     | 1.62        | 14     | 2     |
| 1:A:13:C:H6   | 1:A:13:C:O5'  | 0.76     | 1.63        | 14     | 21    |
| 1:A:40:A:C2   | 1:A:41:A:C4   | 0.76     | 2.72        | 10     | 20    |
| 1:A:39:G:O2'  | 1:A:40:A:P    | 0.76     | 2.43        | 8      | 2     |
| 1:A:13:C:C4   | 1:A:14:U:C4   | 0.76     | 2.73        | 22     | 2     |
| 1:A:24:U:C5   | 1:A:25:U:C4   | 0.76     | 2.74        | 20     | 7     |
| 1:A:8:C:O2'   | 1:A:9:A:C8    | 0.76     | 2.38        | 13     | 12    |
| 1:A:34:C:O2'  | 1:A:35:A:C5'  | 0.76     | 2.34        | 21     | 21    |
| 1:A:35:A:O2'  | 1:A:36:U:C6   | 0.76     | 2.39        | 22     | 22    |
| 1:A:4:A:H2'   | 1:A:5:G:O4'   | 0.76     | 1.79        | 15     | 18    |
| 1:A:23:U:C4   | 1:A:24:U:C5   | 0.76     | 2.74        | 22     | 8     |
| 1:A:43:C:O2'  | 1:A:44:A:C8   | 0.76     | 2.39        | 5      | 3     |
| 1:A:36:U:H2'  | 1:A:37:C:O4'  | 0.75     | 1.81        | 21     | 19    |
| 1:A:20:C:O2'  | 1:A:21:C:P    | 0.75     | 2.44        | 17     | 1     |
| 1:A:11:C:C2   | 1:A:12:U:C4   | 0.75     | 2.74        | 13     | 7     |
| 1:A:6:C:C2    | 1:A:11:C:N4   | 0.75     | 2.55        | 24     | 8     |
| 1:A:20:C:OP2  | 1:A:20:C:O4'  | 0.75     | 2.03        | 11     | 1     |
| 1:A:32:G:O5'  | 1:A:32:G:H8   | 0.75     | 1.64        | 5      | 3     |
| 1:A:10:A:C2   | 1:A:11:C:O2   | 0.75     | 2.40        | 10     | 22    |
| 1:A:13:C:C4   | 1:A:14:U:O4   | 0.75     | 2.40        | 22     | 2     |
| 1:A:32:G:O2'  | 1:A:35:A:N6   | 0.75     | 2.19        | 11     | 6     |
| 1:A:32:G:O4'  | 1:A:34:C:N4   | 0.75     | 2.20        | 14     | 1     |
| 1:A:30:G:H2'  | 1:A:31:G:O4'  | 0.75     | 1.82        | 12     | 3     |
| 1:A:28:G:C6   | 1:A:29:A:C5   | 0.75     | 2.74        | 14     | 2     |
| 1:A:3:G:C2'   | 1:A:4:A:N7    | 0.75     | 2.49        | 6      | 4     |
| 1:A:30:G:H8   | 1:A:30:G:OP2  | 0.74     | 1.64        | 14     | 1     |
| 1:A:31:G:C2   | 1:A:35:A:N6   | 0.74     | 2.55        | 22     | 2     |
| 1:A:17:C:OP2  | 1:A:17:C:H3'  | 0.74     | 1.80        | 15     | 1     |

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| Atom-1        | Atom-2       | Clash(Å) | Distance(Å) | Models |       |
|---------------|--------------|----------|-------------|--------|-------|
|               |              |          |             | Worst  | Total |
| 1:A:34:C:HO2' | 1:A:35:A:C5' | 0.74     | 1.95        | 21     | 1     |
| 1:A:20:C:C2   | 1:A:35:A:N1  | 0.74     | 2.53        | 14     | 4     |
| 1:A:25:U:O4   | 1:A:39:G:C6  | 0.73     | 2.41        | 13     | 11    |
| 1:A:18:C:O2'  | 1:A:19:C:O4' | 0.73     | 2.04        | 8      | 18    |
| 1:A:15:C:H2'  | 1:A:16:C:O4' | 0.73     | 1.83        | 15     | 13    |
| 1:A:14:U:O2'  | 1:A:15:C:O4' | 0.73     | 2.05        | 11     | 18    |
| 1:A:1:G:N2    | 1:A:2:G:C4   | 0.73     | 2.57        | 16     | 6     |
| 1:A:21:C:O2   | 1:A:37:C:N4  | 0.73     | 2.22        | 15     | 17    |
| 1:A:28:G:O6   | 1:A:29:A:N6  | 0.72     | 2.22        | 14     | 2     |
| 1:A:39:G:C2'  | 1:A:40:A:C8  | 0.72     | 2.72        | 13     | 11    |
| 1:A:16:C:N4   | 1:A:17:C:N4  | 0.72     | 2.37        | 8      | 5     |
| 1:A:34:C:O2'  | 1:A:35:A:H4' | 0.72     | 1.84        | 20     | 10    |
| 1:A:19:C:H4'  | 1:A:20:C:OP1 | 0.72     | 1.83        | 14     | 1     |
| 1:A:17:C:C2'  | 1:A:18:C:O4' | 0.72     | 2.37        | 19     | 14    |
| 1:A:19:C:H2'  | 1:A:20:C:C6  | 0.72     | 2.19        | 20     | 22    |
| 1:A:24:U:C4   | 1:A:25:U:O4  | 0.72     | 2.42        | 9      | 13    |
| 1:A:39:G:N2   | 1:A:40:A:C6  | 0.71     | 2.58        | 8      | 2     |
| 1:A:28:G:C5   | 1:A:29:A:C5  | 0.71     | 2.78        | 14     | 2     |
| 1:A:1:G:H2'   | 1:A:2:G:C8   | 0.71     | 2.18        | 15     | 1     |
| 1:A:31:G:N3   | 1:A:35:A:N6  | 0.71     | 2.37        | 22     | 4     |
| 1:A:1:G:O2'   | 1:A:2:G:P    | 0.71     | 2.47        | 11     | 4     |
| 1:A:19:C:O2'  | 1:A:20:C:P   | 0.71     | 2.49        | 14     | 1     |
| 1:A:33:U:H6   | 1:A:33:U:O5' | 0.71     | 1.67        | 22     | 1     |
| 1:A:30:G:N2   | 1:A:35:A:C2  | 0.71     | 2.58        | 22     | 19    |
| 1:A:16:C:N3   | 1:A:17:C:C2  | 0.71     | 2.58        | 5      | 5     |
| 1:A:17:C:OP2  | 1:A:18:C:C6  | 0.70     | 2.44        | 15     | 1     |
| 1:A:39:G:C5   | 1:A:40:A:N6  | 0.70     | 2.59        | 16     | 9     |
| 1:A:43:C:N4   | 1:A:44:A:C2  | 0.70     | 2.60        | 24     | 1     |
| 1:A:21:C:H1'  | 1:A:37:C:H41 | 0.70     | 1.46        | 14     | 6     |
| 1:A:40:A:C2   | 1:A:41:A:N3  | 0.70     | 2.59        | 15     | 12    |
| 1:A:21:C:N3   | 1:A:27:C:C5  | 0.70     | 2.60        | 14     | 1     |
| 1:A:19:C:O2   | 1:A:35:A:N6  | 0.69     | 2.24        | 18     | 2     |
| 1:A:21:C:C2   | 1:A:37:C:N4  | 0.69     | 2.61        | 7      | 7     |
| 1:A:23:U:C4   | 1:A:24:U:C4  | 0.69     | 2.80        | 2      | 8     |
| 1:A:11:C:O2'  | 1:A:12:U:O5' | 0.69     | 2.10        | 2      | 2     |
| 1:A:24:U:C4   | 1:A:25:U:C4  | 0.69     | 2.81        | 20     | 11    |
| 1:A:39:G:O2'  | 1:A:40:A:O5' | 0.69     | 2.10        | 8      | 2     |
| 1:A:32:G:O3'  | 1:A:34:C:N4  | 0.68     | 2.26        | 24     | 3     |
| 1:A:1:G:H5''  | 1:A:34:C:OP1 | 0.68     | 1.87        | 12     | 2     |
| 1:A:16:C:C5   | 1:A:17:C:C5  | 0.68     | 2.81        | 8      | 5     |
| 1:A:34:C:O2'  | 1:A:35:A:O4' | 0.68     | 2.12        | 3      | 8     |

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| Atom-1       | Atom-2       | Clash(Å) | Distance(Å) | Models |       |
|--------------|--------------|----------|-------------|--------|-------|
|              |              |          |             | Worst  | Total |
| 1:A:8:C:O2'  | 1:A:9:A:O5'  | 0.68     | 2.10        | 15     | 19    |
| 1:A:1:G:C2'  | 1:A:2:G:N7   | 0.68     | 2.54        | 15     | 1     |
| 1:A:18:C:H2' | 1:A:19:C:C6  | 0.68     | 2.24        | 5      | 6     |
| 1:A:21:C:O2' | 1:A:37:C:C5  | 0.68     | 2.46        | 5      | 10    |
| 1:A:22:U:OP1 | 1:A:22:U:H6  | 0.68     | 1.71        | 10     | 8     |
| 1:A:40:A:O2' | 1:A:41:A:C5' | 0.68     | 2.42        | 18     | 16    |
| 1:A:16:C:C4  | 1:A:17:C:N3  | 0.68     | 2.62        | 13     | 5     |
| 1:A:21:C:O2  | 1:A:27:C:N4  | 0.67     | 2.27        | 14     | 1     |
| 1:A:14:U:C2' | 1:A:15:C:O4' | 0.67     | 2.42        | 4      | 18    |
| 1:A:31:G:O2' | 1:A:32:G:H4' | 0.67     | 1.89        | 8      | 4     |
| 1:A:24:U:C5  | 1:A:25:U:O4  | 0.67     | 2.47        | 24     | 6     |
| 1:A:16:C:C3' | 1:A:17:C:C6  | 0.67     | 2.78        | 15     | 1     |
| 1:A:14:U:H2' | 1:A:15:C:O4' | 0.67     | 1.90        | 7      | 17    |
| 1:A:12:U:O2' | 1:A:13:C:O4' | 0.67     | 2.12        | 15     | 4     |
| 1:A:3:G:C8   | 1:A:3:G:OP2  | 0.67     | 2.48        | 12     | 1     |
| 1:A:6:C:O2   | 1:A:10:A:N6  | 0.66     | 2.28        | 19     | 1     |
| 1:A:8:C:HO2' | 1:A:9:A:C5'  | 0.66     | 2.03        | 5      | 5     |
| 1:A:21:C:O2' | 1:A:22:U:P   | 0.66     | 2.53        | 6      | 4     |
| 1:A:6:C:C2   | 1:A:10:A:N6  | 0.66     | 2.63        | 19     | 1     |
| 1:A:22:U:C1' | 1:A:24:U:OP2 | 0.66     | 2.39        | 10     | 3     |
| 1:A:36:U:O4  | 1:A:37:C:N4  | 0.66     | 2.28        | 17     | 2     |
| 1:A:30:G:OP2 | 1:A:30:G:C8  | 0.66     | 2.49        | 14     | 1     |
| 1:A:42:C:H2' | 1:A:43:C:C6  | 0.66     | 2.26        | 14     | 22    |
| 1:A:10:A:C6  | 1:A:11:C:N3  | 0.66     | 2.64        | 4      | 16    |
| 1:A:25:U:C2  | 1:A:41:A:C2  | 0.66     | 2.84        | 16     | 5     |
| 1:A:7:U:C2   | 1:A:9:A:OP2  | 0.65     | 2.49        | 5      | 15    |
| 1:A:21:C:C2  | 1:A:28:G:O6  | 0.65     | 2.49        | 19     | 10    |
| 1:A:43:C:O2' | 1:A:44:A:N7  | 0.65     | 2.27        | 13     | 3     |
| 1:A:2:G:N2   | 1:A:17:C:O2  | 0.65     | 2.30        | 6      | 6     |
| 1:A:34:C:H4' | 1:A:35:A:OP1 | 0.65     | 1.91        | 21     | 1     |
| 1:A:22:U:OP1 | 1:A:22:U:C6  | 0.65     | 2.49        | 9      | 6     |
| 1:A:36:U:C2' | 1:A:37:C:O4' | 0.65     | 2.44        | 9      | 19    |
| 1:A:33:U:OP2 | 1:A:34:C:H5  | 0.65     | 1.73        | 8      | 1     |
| 1:A:1:G:H4'  | 1:A:2:G:OP1  | 0.65     | 1.91        | 15     | 2     |
| 1:A:28:G:O6  | 1:A:29:A:C6  | 0.65     | 2.50        | 14     | 2     |
| 1:A:11:C:O2' | 1:A:12:U:OP1 | 0.65     | 2.15        | 21     | 5     |
| 1:A:29:A:C2' | 1:A:30:G:O4' | 0.65     | 2.44        | 14     | 3     |
| 1:A:8:C:H2'  | 1:A:9:A:N7   | 0.64     | 2.08        | 13     | 1     |
| 1:A:31:G:O2' | 1:A:32:G:O4' | 0.64     | 2.14        | 18     | 6     |
| 1:A:17:C:OP2 | 1:A:17:C:C1' | 0.64     | 2.45        | 15     | 1     |
| 1:A:16:C:O2' | 1:A:17:C:C1' | 0.64     | 2.45        | 15     | 1     |

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| Atom-1        | Atom-2       | Clash(Å) | Distance(Å) | Models |       |
|---------------|--------------|----------|-------------|--------|-------|
|               |              |          |             | Worst  | Total |
| 1:A:11:C:C2   | 1:A:12:U:O4  | 0.64     | 2.50        | 13     | 3     |
| 1:A:39:G:C2   | 1:A:40:A:C5  | 0.64     | 2.86        | 8      | 2     |
| 1:A:4:A:C6    | 1:A:5:G:C6   | 0.64     | 2.85        | 22     | 2     |
| 1:A:42:C:O2'  | 1:A:43:C:C5' | 0.64     | 2.46        | 19     | 20    |
| 1:A:2:G:C2'   | 1:A:3:G:O4'  | 0.64     | 2.46        | 6      | 5     |
| 1:A:17:C:OP2  | 1:A:17:C:C4' | 0.64     | 2.45        | 15     | 1     |
| 1:A:2:G:H2'   | 1:A:3:G:O4'  | 0.63     | 1.93        | 9      | 4     |
| 1:A:43:C:C2'  | 1:A:44:A:C8  | 0.63     | 2.82        | 22     | 6     |
| 1:A:16:C:C2'  | 1:A:17:C:O4' | 0.63     | 2.47        | 3      | 5     |
| 1:A:1:G:C2    | 1:A:2:G:O6   | 0.63     | 2.51        | 8      | 5     |
| 1:A:22:U:C2   | 1:A:25:U:OP2 | 0.63     | 2.52        | 5      | 1     |
| 1:A:31:G:HO2' | 1:A:32:G:C4' | 0.63     | 2.07        | 19     | 1     |
| 1:A:39:G:C4   | 1:A:40:A:N6  | 0.63     | 2.67        | 13     | 9     |
| 1:A:22:U:C2   | 1:A:24:U:OP2 | 0.63     | 2.51        | 5      | 2     |
| 1:A:22:U:O2'  | 1:A:24:U:OP2 | 0.63     | 2.15        | 5      | 2     |
| 1:A:8:C:O2'   | 1:A:9:A:C5'  | 0.63     | 2.47        | 10     | 4     |
| 1:A:3:G:C6    | 1:A:14:U:O4  | 0.63     | 2.52        | 20     | 4     |
| 1:A:1:G:H5'   | 1:A:34:C:OP2 | 0.63     | 1.93        | 19     | 1     |
| 1:A:17:C:C5   | 1:A:18:C:C2  | 0.62     | 2.86        | 15     | 1     |
| 1:A:14:U:H2'  | 1:A:15:C:C6  | 0.62     | 2.29        | 15     | 22    |
| 1:A:38:G:C2'  | 1:A:39:G:O4' | 0.62     | 2.47        | 1      | 12    |
| 1:A:21:C:C5'  | 1:A:22:U:OP1 | 0.62     | 2.46        | 15     | 3     |
| 1:A:21:C:O2'  | 1:A:22:U:O5' | 0.62     | 2.18        | 4      | 8     |
| 1:A:15:C:C2'  | 1:A:16:C:O4' | 0.62     | 2.47        | 12     | 11    |
| 1:A:26:C:H2'  | 1:A:27:C:C6  | 0.62     | 2.29        | 6      | 9     |
| 1:A:2:G:O2'   | 1:A:3:G:O4'  | 0.62     | 2.17        | 6      | 4     |
| 1:A:3:G:P     | 1:A:3:G:O4'  | 0.62     | 2.58        | 12     | 1     |
| 1:A:36:U:O2'  | 1:A:37:C:O4' | 0.61     | 2.18        | 10     | 13    |
| 1:A:12:U:H2'  | 1:A:13:C:O4' | 0.61     | 1.96        | 13     | 4     |
| 1:A:7:U:C4    | 1:A:10:A:OP2 | 0.61     | 2.53        | 15     | 1     |
| 1:A:16:C:C5   | 1:A:17:C:C4  | 0.61     | 2.87        | 8      | 4     |
| 1:A:25:U:N3   | 1:A:41:A:C2  | 0.61     | 2.69        | 16     | 4     |
| 1:A:5:G:C6    | 1:A:11:C:N4  | 0.61     | 2.69        | 13     | 2     |
| 1:A:24:U:C6   | 1:A:25:U:C5  | 0.61     | 2.88        | 22     | 5     |
| 1:A:28:G:O2'  | 1:A:29:A:O4' | 0.61     | 2.16        | 3      | 9     |
| 1:A:29:A:N7   | 1:A:30:G:C5  | 0.61     | 2.68        | 2      | 8     |
| 1:A:22:U:C2'  | 1:A:24:U:OP2 | 0.61     | 2.49        | 5      | 2     |
| 1:A:24:U:C5   | 1:A:25:U:C5  | 0.61     | 2.89        | 20     | 5     |
| 1:A:35:A:H8   | 1:A:35:A:OP2 | 0.61     | 1.79        | 20     | 1     |
| 1:A:22:U:N3   | 1:A:25:U:OP2 | 0.60     | 2.34        | 5      | 1     |
| 1:A:25:U:C4   | 1:A:26:C:N3  | 0.60     | 2.69        | 5      | 3     |

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| Atom-1        | Atom-2       | Clash(Å) | Distance(Å) | Models |       |
|---------------|--------------|----------|-------------|--------|-------|
|               |              |          |             | Worst  | Total |
| 1:A:1:G:N1    | 1:A:2:G:O6   | 0.60     | 2.34        | 8      | 4     |
| 1:A:17:C:OP2  | 1:A:17:C:O4' | 0.60     | 2.19        | 15     | 1     |
| 1:A:33:U:C6   | 1:A:33:U:OP1 | 0.60     | 2.54        | 19     | 1     |
| 1:A:16:C:O2   | 1:A:17:C:H1' | 0.60     | 1.96        | 5      | 3     |
| 1:A:16:C:O2'  | 1:A:17:C:O4' | 0.60     | 2.13        | 4      | 5     |
| 1:A:35:A:C8   | 1:A:35:A:OP2 | 0.60     | 2.54        | 12     | 2     |
| 1:A:35:A:OP2  | 1:A:35:A:H8  | 0.60     | 1.79        | 12     | 2     |
| 1:A:18:C:H2'  | 1:A:19:C:O4' | 0.60     | 1.96        | 14     | 1     |
| 1:A:34:C:H3'  | 1:A:34:C:OP2 | 0.60     | 1.97        | 12     | 1     |
| 1:A:6:C:O2'   | 1:A:7:U:O4'  | 0.60     | 2.19        | 15     | 1     |
| 1:A:28:G:C6   | 1:A:29:A:N6  | 0.60     | 2.69        | 17     | 1     |
| 1:A:34:C:HO2' | 1:A:35:A:H4' | 0.60     | 1.56        | 4      | 3     |
| 1:A:25:U:O4   | 1:A:39:G:N1  | 0.60     | 2.34        | 5      | 4     |
| 1:A:30:G:H2'  | 1:A:31:G:C8  | 0.60     | 2.32        | 11     | 6     |
| 1:A:24:U:O4   | 1:A:41:A:N6  | 0.60     | 2.34        | 14     | 1     |
| 1:A:42:C:C4   | 1:A:43:C:C4  | 0.60     | 2.90        | 17     | 3     |
| 1:A:5:G:O6    | 1:A:11:C:N4  | 0.60     | 2.34        | 15     | 1     |
| 1:A:21:C:O2   | 1:A:27:C:C5  | 0.60     | 2.55        | 22     | 1     |
| 1:A:3:G:OP2   | 1:A:3:G:C3'  | 0.60     | 2.50        | 12     | 1     |
| 1:A:28:G:C4   | 1:A:29:A:C8  | 0.60     | 2.90        | 14     | 2     |
| 1:A:1:G:O3'   | 1:A:2:G:H8   | 0.60     | 1.79        | 15     | 1     |
| 1:A:21:C:C2'  | 1:A:37:C:H41 | 0.59     | 2.10        | 24     | 10    |
| 1:A:1:G:H2'   | 1:A:2:G:C5   | 0.59     | 2.31        | 15     | 1     |
| 1:A:42:C:O2'  | 1:A:43:C:O4' | 0.59     | 2.20        | 14     | 7     |
| 1:A:2:G:C2    | 1:A:17:C:O2  | 0.59     | 2.55        | 6      | 6     |
| 1:A:10:A:N1   | 1:A:11:C:C2  | 0.59     | 2.70        | 4      | 20    |
| 1:A:21:C:H1'  | 1:A:37:C:N4  | 0.59     | 2.12        | 18     | 20    |
| 1:A:40:A:O2'  | 1:A:41:A:C4' | 0.59     | 2.51        | 18     | 10    |
| 1:A:6:C:O2    | 1:A:11:C:N4  | 0.59     | 2.36        | 4      | 4     |
| 1:A:1:G:O2'   | 1:A:2:G:O5'  | 0.59     | 2.21        | 14     | 4     |
| 1:A:2:G:N1    | 1:A:17:C:O2  | 0.59     | 2.36        | 5      | 4     |
| 1:A:17:C:C4   | 1:A:18:C:C2  | 0.59     | 2.91        | 15     | 1     |
| 1:A:36:U:C4   | 1:A:37:C:C4  | 0.59     | 2.91        | 17     | 1     |
| 1:A:17:C:C5   | 1:A:18:C:C4  | 0.59     | 2.90        | 9      | 3     |
| 1:A:21:C:C4'  | 1:A:22:U:OP1 | 0.59     | 2.50        | 15     | 4     |
| 1:A:7:U:C2'   | 1:A:9:A:OP2  | 0.58     | 2.51        | 5      | 12    |
| 1:A:40:A:HO2' | 1:A:41:A:C4' | 0.58     | 2.10        | 18     | 5     |
| 1:A:23:U:C5   | 1:A:24:U:C5  | 0.58     | 2.91        | 5      | 6     |
| 1:A:36:U:H2'  | 1:A:37:C:C6  | 0.58     | 2.32        | 22     | 4     |
| 1:A:29:A:N6   | 1:A:30:G:C2  | 0.58     | 2.72        | 2      | 7     |
| 1:A:40:A:H2'  | 1:A:41:A:O4' | 0.58     | 1.99        | 23     | 6     |

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| Atom-1        | Atom-2       | Clash(Å) | Distance(Å) | Models |       |
|---------------|--------------|----------|-------------|--------|-------|
|               |              |          |             | Worst  | Total |
| 1:A:40:A:C2   | 1:A:41:A:C2  | 0.58     | 2.91        | 15     | 6     |
| 1:A:43:C:H2'  | 1:A:44:A:C8  | 0.58     | 2.34        | 5      | 9     |
| 1:A:21:C:O2'  | 1:A:22:U:OP1 | 0.58     | 2.20        | 14     | 1     |
| 1:A:10:A:C2'  | 1:A:11:C:O4' | 0.58     | 2.52        | 19     | 1     |
| 1:A:21:C:O2   | 1:A:21:C:H2' | 0.58     | 1.98        | 15     | 23    |
| 1:A:12:U:C2'  | 1:A:13:C:O4' | 0.58     | 2.51        | 13     | 3     |
| 1:A:1:G:C5'   | 1:A:33:U:O4' | 0.58     | 2.52        | 20     | 1     |
| 1:A:22:U:O2'  | 1:A:23:U:O5' | 0.58     | 2.21        | 5      | 1     |
| 1:A:15:C:H2'  | 1:A:16:C:C6  | 0.57     | 2.33        | 13     | 19    |
| 1:A:22:U:C1'  | 1:A:24:U:OP1 | 0.57     | 2.48        | 17     | 4     |
| 1:A:22:U:H2'  | 1:A:24:U:OP1 | 0.57     | 1.98        | 15     | 1     |
| 1:A:43:C:C4   | 1:A:44:A:C2  | 0.57     | 2.93        | 24     | 1     |
| 1:A:21:C:HO2' | 1:A:37:C:N4  | 0.57     | 1.98        | 9      | 3     |
| 1:A:25:U:H2'  | 1:A:26:C:C6  | 0.57     | 2.35        | 1      | 6     |
| 1:A:35:A:O2'  | 1:A:36:U:H6  | 0.57     | 1.81        | 2      | 12    |
| 1:A:39:G:C6   | 1:A:40:A:N6  | 0.57     | 2.72        | 18     | 9     |
| 1:A:7:U:N3    | 1:A:10:A:OP2 | 0.57     | 2.37        | 15     | 1     |
| 1:A:16:C:O3'  | 1:A:17:C:C6  | 0.57     | 2.58        | 15     | 1     |
| 1:A:11:C:N3   | 1:A:12:U:C4  | 0.56     | 2.73        | 19     | 7     |
| 1:A:11:C:O2   | 1:A:12:U:C4  | 0.56     | 2.57        | 15     | 2     |
| 1:A:24:U:N3   | 1:A:25:U:C4  | 0.56     | 2.73        | 1      | 4     |
| 1:A:30:G:C2'  | 1:A:31:G:O4' | 0.56     | 2.53        | 12     | 2     |
| 1:A:3:G:C2'   | 1:A:4:A:C8   | 0.56     | 2.88        | 6      | 4     |
| 1:A:7:U:O4    | 1:A:10:A:OP2 | 0.56     | 2.22        | 15     | 1     |
| 1:A:31:G:H22  | 1:A:35:A:H61 | 0.56     | 1.43        | 18     | 2     |
| 1:A:3:G:OP2   | 1:A:3:G:O4'  | 0.56     | 2.23        | 12     | 1     |
| 1:A:42:C:N4   | 1:A:43:C:N4  | 0.56     | 2.53        | 17     | 2     |
| 1:A:1:G:C3'   | 1:A:2:G:C8   | 0.56     | 2.87        | 15     | 1     |
| 1:A:24:U:OP2  | 1:A:25:U:C5  | 0.56     | 2.54        | 14     | 1     |
| 1:A:1:G:C4'   | 1:A:34:C:OP2 | 0.56     | 2.54        | 24     | 2     |
| 1:A:13:C:N4   | 1:A:14:U:O4  | 0.56     | 2.39        | 22     | 2     |
| 1:A:19:C:O2   | 1:A:20:C:C6  | 0.55     | 2.59        | 14     | 1     |
| 1:A:21:C:C2   | 1:A:28:G:N7  | 0.55     | 2.74        | 20     | 1     |
| 1:A:1:G:C5'   | 1:A:34:C:OP1 | 0.55     | 2.53        | 12     | 1     |
| 1:A:35:A:OP2  | 1:A:35:A:C8  | 0.55     | 2.60        | 20     | 1     |
| 1:A:21:C:O2   | 1:A:21:C:C2' | 0.55     | 2.54        | 22     | 20    |
| 1:A:6:C:N4    | 1:A:11:C:H41 | 0.55     | 2.00        | 5      | 2     |
| 1:A:16:C:N4   | 1:A:17:C:N3  | 0.55     | 2.54        | 13     | 5     |
| 1:A:21:C:C2'  | 1:A:21:C:O2  | 0.55     | 2.54        | 12     | 3     |
| 1:A:16:C:H2'  | 1:A:17:C:C5  | 0.55     | 2.36        | 15     | 1     |
| 1:A:43:C:C4   | 1:A:44:A:N7  | 0.55     | 2.74        | 4      | 1     |

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| Atom-1        | Atom-2       | Clash(Å) | Distance(Å) | Models |       |
|---------------|--------------|----------|-------------|--------|-------|
|               |              |          |             | Worst  | Total |
| 1:A:31:G:C2'  | 1:A:32:G:C4' | 0.55     | 2.85        | 9      | 5     |
| 1:A:40:A:C6   | 1:A:41:A:C5  | 0.55     | 2.95        | 10     | 2     |
| 1:A:39:G:N2   | 1:A:40:A:C5  | 0.55     | 2.75        | 8      | 2     |
| 1:A:22:U:C2'  | 1:A:24:U:OP1 | 0.55     | 2.54        | 15     | 1     |
| 1:A:28:G:C4   | 1:A:29:A:N7  | 0.55     | 2.75        | 17     | 2     |
| 1:A:40:A:HO2' | 1:A:41:A:H5' | 0.55     | 1.60        | 1      | 1     |
| 1:A:39:G:C4'  | 1:A:40:A:OP1 | 0.55     | 2.49        | 8      | 2     |
| 1:A:21:C:C1'  | 1:A:28:G:O6  | 0.54     | 2.51        | 20     | 2     |
| 1:A:32:G:C1'  | 1:A:35:A:H62 | 0.54     | 2.16        | 2      | 1     |
| 1:A:10:A:O2'  | 1:A:11:C:O4' | 0.54     | 2.26        | 19     | 1     |
| 1:A:24:U:C2   | 1:A:25:U:C5  | 0.54     | 2.96        | 1      | 2     |
| 1:A:1:G:C5'   | 1:A:33:U:OP2 | 0.54     | 2.51        | 2      | 1     |
| 1:A:2:G:O3'   | 1:A:3:G:O4'  | 0.54     | 2.26        | 12     | 1     |
| 1:A:16:C:C4   | 1:A:17:C:C5  | 0.53     | 2.97        | 13     | 5     |
| 1:A:3:G:OP2   | 1:A:3:G:C4'  | 0.53     | 2.55        | 12     | 1     |
| 1:A:10:A:N1   | 1:A:11:C:O2  | 0.53     | 2.42        | 4      | 13    |
| 1:A:11:C:O2'  | 1:A:12:U:O4' | 0.53     | 2.19        | 10     | 3     |
| 1:A:28:G:N7   | 1:A:29:A:N7  | 0.53     | 2.56        | 14     | 1     |
| 1:A:23:U:O4   | 1:A:24:U:C4  | 0.53     | 2.62        | 5      | 7     |
| 1:A:34:C:H2'  | 1:A:35:A:O4' | 0.53     | 2.04        | 9      | 7     |
| 1:A:1:G:C5'   | 1:A:34:C:OP2 | 0.53     | 2.57        | 18     | 3     |
| 1:A:21:C:H1'  | 1:A:37:C:H42 | 0.53     | 1.63        | 22     | 2     |
| 1:A:7:U:O2    | 1:A:9:A:OP2  | 0.53     | 2.27        | 7      | 6     |
| 1:A:24:U:O4   | 1:A:39:G:O6  | 0.53     | 2.27        | 8      | 1     |
| 1:A:13:C:OP2  | 1:A:13:C:C5  | 0.53     | 2.62        | 13     | 3     |
| 1:A:25:U:O4   | 1:A:39:G:O6  | 0.53     | 2.25        | 18     | 8     |
| 1:A:23:U:O4   | 1:A:24:U:O4  | 0.53     | 2.27        | 12     | 3     |
| 1:A:21:C:N3   | 1:A:27:C:C4  | 0.53     | 2.77        | 14     | 1     |
| 1:A:1:G:O2'   | 1:A:2:G:N7   | 0.53     | 2.32        | 8      | 1     |
| 1:A:32:G:C1'  | 1:A:34:C:N4  | 0.53     | 2.71        | 14     | 1     |
| 1:A:22:U:O2   | 1:A:24:U:OP2 | 0.53     | 2.27        | 19     | 1     |
| 1:A:33:U:O5'  | 1:A:33:U:C6  | 0.53     | 2.56        | 22     | 1     |
| 1:A:7:U:O2    | 1:A:10:A:OP2 | 0.53     | 2.27        | 24     | 4     |
| 1:A:21:C:HO2' | 1:A:22:U:P   | 0.53     | 2.27        | 6      | 2     |
| 1:A:21:C:N3   | 1:A:28:G:N7  | 0.53     | 2.56        | 20     | 1     |
| 1:A:6:C:H42   | 1:A:11:C:H41 | 0.52     | 1.47        | 7      | 5     |
| 1:A:12:U:O2'  | 1:A:13:C:H5' | 0.52     | 2.04        | 13     | 2     |
| 1:A:3:G:OP2   | 1:A:3:G:H8   | 0.52     | 1.85        | 12     | 1     |
| 1:A:29:A:C6   | 1:A:30:G:C2  | 0.52     | 2.98        | 4      | 5     |
| 1:A:33:U:OP1  | 1:A:33:U:C5  | 0.52     | 2.63        | 19     | 1     |
| 1:A:34:C:C2'  | 1:A:35:A:H5' | 0.52     | 2.35        | 19     | 7     |

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| Atom-1        | Atom-2       | Clash(Å) | Distance(Å) | Models |       |
|---------------|--------------|----------|-------------|--------|-------|
|               |              |          |             | Worst  | Total |
| 1:A:18:C:C2'  | 1:A:19:C:O4' | 0.52     | 2.57        | 14     | 3     |
| 1:A:34:C:H6   | 1:A:34:C:O5' | 0.52     | 1.87        | 22     | 7     |
| 1:A:32:G:O5'  | 1:A:32:G:C8  | 0.52     | 2.56        | 5      | 3     |
| 1:A:24:U:O4   | 1:A:25:U:O4  | 0.52     | 2.28        | 9      | 1     |
| 1:A:18:C:H2'  | 1:A:19:C:C1' | 0.52     | 2.35        | 14     | 1     |
| 1:A:1:G:H4'   | 1:A:34:C:OP2 | 0.52     | 2.05        | 18     | 2     |
| 1:A:40:A:C2'  | 1:A:41:A:O4' | 0.52     | 2.58        | 13     | 5     |
| 1:A:22:U:O2   | 1:A:24:U:O5' | 0.52     | 2.27        | 5      | 1     |
| 1:A:22:U:O2   | 1:A:24:U:OP1 | 0.52     | 2.28        | 6      | 3     |
| 1:A:4:A:C2'   | 1:A:5:G:O4'  | 0.52     | 2.56        | 15     | 1     |
| 1:A:24:U:N3   | 1:A:25:U:C5  | 0.51     | 2.78        | 1      | 2     |
| 1:A:32:G:C1'  | 1:A:34:C:H41 | 0.51     | 2.18        | 14     | 1     |
| 1:A:43:C:C5   | 1:A:44:A:N7  | 0.51     | 2.79        | 4      | 1     |
| 1:A:34:C:HO2' | 1:A:35:A:H5' | 0.51     | 1.64        | 22     | 2     |
| 1:A:9:A:O2'   | 1:A:10:A:O4' | 0.51     | 2.28        | 15     | 1     |
| 1:A:8:C:C2'   | 1:A:9:A:C8   | 0.51     | 2.93        | 13     | 1     |
| 1:A:13:C:H2'  | 1:A:14:U:O4' | 0.51     | 2.06        | 13     | 3     |
| 1:A:22:U:O2'  | 1:A:24:U:OP1 | 0.51     | 2.24        | 14     | 1     |
| 1:A:17:C:C5   | 1:A:18:C:N3  | 0.50     | 2.78        | 15     | 1     |
| 1:A:15:C:O2'  | 1:A:16:C:O4' | 0.50     | 2.28        | 9      | 4     |
| 1:A:3:G:OP2   | 1:A:3:G:H3'  | 0.50     | 2.05        | 12     | 1     |
| 1:A:30:G:C6   | 1:A:31:G:C5  | 0.50     | 2.98        | 14     | 1     |
| 1:A:31:G:H8   | 1:A:31:G:O5' | 0.50     | 1.88        | 22     | 3     |
| 1:A:21:C:C1'  | 1:A:37:C:H41 | 0.50     | 2.19        | 13     | 8     |
| 1:A:10:A:C2   | 1:A:11:C:H1' | 0.50     | 2.41        | 13     | 2     |
| 1:A:40:A:C6   | 1:A:41:A:C6  | 0.50     | 3.00        | 10     | 1     |
| 1:A:1:G:C3'   | 1:A:2:G:N7   | 0.50     | 2.75        | 15     | 1     |
| 1:A:33:U:OP2  | 1:A:34:C:C5  | 0.50     | 2.62        | 8      | 1     |
| 1:A:3:G:H2'   | 1:A:4:A:C8   | 0.50     | 2.37        | 10     | 1     |
| 1:A:11:C:O2   | 1:A:12:U:O4  | 0.50     | 2.30        | 15     | 2     |
| 1:A:4:A:N6    | 1:A:5:G:O6   | 0.50     | 2.45        | 22     | 1     |
| 1:A:25:U:O4   | 1:A:26:C:N4  | 0.49     | 2.45        | 8      | 2     |
| 1:A:20:C:N3   | 1:A:31:G:N2  | 0.49     | 2.60        | 14     | 1     |
| 1:A:6:C:C4    | 1:A:11:C:N4  | 0.49     | 2.80        | 3      | 2     |
| 1:A:12:U:O2'  | 1:A:13:C:C4' | 0.49     | 2.61        | 13     | 2     |
| 1:A:19:C:O2   | 1:A:20:C:C5  | 0.49     | 2.66        | 14     | 1     |
| 1:A:16:C:HO2' | 1:A:17:C:C1' | 0.49     | 2.21        | 15     | 1     |
| 1:A:40:A:H2'  | 1:A:41:A:C8  | 0.49     | 2.43        | 15     | 12    |
| 1:A:41:A:O2'  | 1:A:42:C:H5' | 0.49     | 2.07        | 12     | 1     |
| 1:A:2:G:H2'   | 1:A:3:G:C8   | 0.49     | 2.43        | 12     | 8     |
| 1:A:12:U:H2'  | 1:A:13:C:C6  | 0.49     | 2.43        | 16     | 9     |

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| Atom-1        | Atom-2       | Clash(Å) | Distance(Å) | Models |       |
|---------------|--------------|----------|-------------|--------|-------|
|               |              |          |             | Worst  | Total |
| 1:A:29:A:C5   | 1:A:30:G:C4  | 0.49     | 3.01        | 2      | 4     |
| 1:A:15:C:C6   | 1:A:15:C:OP2 | 0.49     | 2.66        | 11     | 1     |
| 1:A:9:A:O2'   | 1:A:10:A:C5' | 0.48     | 2.61        | 15     | 1     |
| 1:A:26:C:O2'  | 1:A:27:C:O4' | 0.48     | 2.25        | 6      | 1     |
| 1:A:17:C:OP2  | 1:A:17:C:N1  | 0.48     | 2.43        | 15     | 1     |
| 1:A:20:C:C2   | 1:A:31:G:N2  | 0.48     | 2.81        | 14     | 1     |
| 1:A:4:A:N6    | 1:A:5:G:C6   | 0.48     | 2.81        | 22     | 1     |
| 1:A:38:G:C6   | 1:A:39:G:C6  | 0.48     | 3.01        | 10     | 2     |
| 1:A:2:G:HO2'  | 1:A:3:G:C4'  | 0.48     | 2.21        | 6      | 3     |
| 1:A:27:C:H2'  | 1:A:28:G:C8  | 0.48     | 2.43        | 10     | 7     |
| 1:A:3:G:O2'   | 1:A:4:A:C8   | 0.48     | 2.63        | 6      | 3     |
| 1:A:36:U:N3   | 1:A:37:C:C4  | 0.48     | 2.82        | 17     | 2     |
| 1:A:19:C:C4   | 1:A:20:C:N4  | 0.48     | 2.82        | 22     | 1     |
| 1:A:17:C:OP2  | 1:A:18:C:C5  | 0.48     | 2.67        | 15     | 1     |
| 1:A:13:C:O5'  | 1:A:13:C:C6  | 0.48     | 2.59        | 18     | 13    |
| 1:A:1:G:C4'   | 1:A:2:G:OP1  | 0.48     | 2.61        | 5      | 4     |
| 1:A:9:A:O2'   | 1:A:10:A:C4' | 0.48     | 2.61        | 15     | 1     |
| 1:A:21:C:O4'  | 1:A:36:U:C5  | 0.47     | 2.66        | 18     | 16    |
| 1:A:1:G:N2    | 1:A:2:G:N7   | 0.47     | 2.54        | 5      | 2     |
| 1:A:39:G:N3   | 1:A:40:A:C5  | 0.47     | 2.81        | 5      | 2     |
| 1:A:38:G:O2'  | 1:A:39:G:O4' | 0.47     | 2.31        | 12     | 2     |
| 1:A:20:C:C4   | 1:A:31:G:N2  | 0.47     | 2.82        | 14     | 1     |
| 1:A:16:C:O2   | 1:A:17:C:C1' | 0.47     | 2.62        | 3      | 2     |
| 1:A:28:G:C8   | 1:A:29:A:N7  | 0.47     | 2.83        | 14     | 1     |
| 1:A:42:C:C4   | 1:A:43:C:N4  | 0.47     | 2.82        | 17     | 2     |
| 1:A:20:C:H1'  | 1:A:35:A:C6  | 0.47     | 2.45        | 14     | 3     |
| 1:A:12:U:HO2' | 1:A:13:C:C4' | 0.47     | 2.22        | 13     | 2     |
| 1:A:31:G:N2   | 1:A:35:A:C6  | 0.47     | 2.83        | 18     | 1     |
| 1:A:44:A:OP1  | 1:A:44:A:H8  | 0.47     | 1.93        | 16     | 1     |
| 1:A:11:C:O5'  | 1:A:11:C:C6  | 0.47     | 2.55        | 13     | 1     |
| 1:A:28:G:H2'  | 1:A:29:A:C8  | 0.47     | 2.45        | 22     | 2     |
| 1:A:11:C:N3   | 1:A:12:U:C5  | 0.46     | 2.84        | 19     | 3     |
| 1:A:20:C:O2   | 1:A:35:A:C6  | 0.46     | 2.57        | 14     | 1     |
| 1:A:21:C:C1'  | 1:A:37:C:N4  | 0.46     | 2.78        | 22     | 10    |
| 1:A:16:C:C2   | 1:A:17:C:N1  | 0.46     | 2.83        | 5      | 3     |
| 1:A:2:G:N2    | 1:A:17:C:C2  | 0.46     | 2.83        | 10     | 4     |
| 1:A:21:C:O3'  | 1:A:22:U:C6  | 0.46     | 2.69        | 15     | 1     |
| 1:A:11:C:O2   | 1:A:12:U:C2  | 0.46     | 2.69        | 9      | 2     |
| 1:A:32:G:H1'  | 1:A:34:C:H41 | 0.46     | 1.69        | 14     | 1     |
| 1:A:21:C:O4'  | 1:A:36:U:O4  | 0.46     | 2.34        | 20     | 1     |
| 1:A:19:C:H6   | 1:A:19:C:O5' | 0.46     | 1.94        | 18     | 2     |

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| Atom-1        | Atom-2       | Clash(Å) | Distance(Å) | Models |       |
|---------------|--------------|----------|-------------|--------|-------|
|               |              |          |             | Worst  | Total |
| 1:A:22:U:O2   | 1:A:25:U:OP2 | 0.46     | 2.34        | 5      | 1     |
| 1:A:13:C:N3   | 1:A:14:U:C4  | 0.46     | 2.84        | 22     | 2     |
| 1:A:15:C:OP2  | 1:A:15:C:H6  | 0.46     | 1.94        | 11     | 1     |
| 1:A:31:G:C2'  | 1:A:32:G:C5' | 0.45     | 2.93        | 11     | 7     |
| 1:A:16:C:O2'  | 1:A:17:C:H5' | 0.45     | 2.11        | 3      | 1     |
| 1:A:32:G:C5'  | 1:A:34:C:N4  | 0.45     | 2.79        | 16     | 2     |
| 1:A:11:C:C4   | 1:A:12:U:O4  | 0.45     | 2.70        | 5      | 1     |
| 1:A:20:C:OP2  | 1:A:20:C:C4' | 0.45     | 2.64        | 11     | 1     |
| 1:A:17:C:O2'  | 1:A:18:C:O4' | 0.45     | 2.33        | 18     | 2     |
| 1:A:39:G:O2'  | 1:A:40:A:OP1 | 0.45     | 2.33        | 8      | 2     |
| 1:A:34:C:C4'  | 1:A:35:A:OP1 | 0.45     | 2.64        | 21     | 1     |
| 1:A:17:C:O2   | 1:A:18:C:H1' | 0.45     | 2.12        | 23     | 1     |
| 1:A:21:C:O2   | 1:A:28:G:O6  | 0.45     | 2.35        | 20     | 3     |
| 1:A:10:A:C2'  | 1:A:11:C:H5' | 0.45     | 2.41        | 13     | 1     |
| 1:A:1:G:N2    | 1:A:2:G:N3   | 0.45     | 2.64        | 9      | 3     |
| 1:A:16:C:HO2' | 1:A:17:C:C4' | 0.45     | 2.24        | 16     | 1     |
| 1:A:16:C:C2   | 1:A:17:C:C1' | 0.45     | 3.00        | 5      | 1     |
| 1:A:20:C:H1'  | 1:A:35:A:C5  | 0.45     | 2.47        | 14     | 1     |
| 1:A:9:A:HO2'  | 1:A:10:A:C4' | 0.45     | 2.24        | 15     | 1     |
| 1:A:21:C:C4   | 1:A:28:G:N7  | 0.44     | 2.85        | 2      | 1     |
| 1:A:34:C:C2'  | 1:A:35:A:C5' | 0.44     | 2.95        | 17     | 2     |
| 1:A:1:G:O2'   | 1:A:2:G:OP1  | 0.44     | 2.35        | 11     | 2     |
| 1:A:10:A:C2'  | 1:A:11:C:C5' | 0.44     | 2.95        | 13     | 1     |
| 1:A:11:C:H2'  | 1:A:12:U:C6  | 0.44     | 2.47        | 10     | 3     |
| 1:A:10:A:C6   | 1:A:11:C:C2  | 0.44     | 3.06        | 4      | 3     |
| 1:A:16:C:O2'  | 1:A:17:C:C4' | 0.44     | 2.65        | 16     | 1     |
| 1:A:22:U:H1'  | 1:A:24:U:P   | 0.44     | 2.48        | 3      | 2     |
| 1:A:3:G:H8    | 1:A:3:G:OP2  | 0.44     | 1.95        | 8      | 1     |
| 1:A:12:U:O2'  | 1:A:13:C:C5' | 0.44     | 2.65        | 13     | 1     |
| 1:A:1:G:H5''  | 1:A:33:U:O4' | 0.44     | 2.13        | 20     | 1     |
| 1:A:38:G:C5   | 1:A:39:G:C5  | 0.44     | 3.06        | 10     | 1     |
| 1:A:24:U:H2'  | 1:A:25:U:C6  | 0.44     | 2.47        | 17     | 5     |
| 1:A:22:U:HO2' | 1:A:23:U:P   | 0.44     | 2.36        | 5      | 1     |
| 1:A:21:C:O5'  | 1:A:22:U:OP1 | 0.44     | 2.36        | 21     | 1     |
| 1:A:7:U:C2    | 1:A:10:A:OP2 | 0.43     | 2.71        | 13     | 1     |
| 1:A:10:A:HO2' | 1:A:11:C:H5' | 0.43     | 1.71        | 15     | 1     |
| 1:A:14:U:C5   | 1:A:15:C:N4  | 0.43     | 2.86        | 20     | 1     |
| 1:A:26:C:OP2  | 1:A:26:C:O4' | 0.43     | 2.36        | 5      | 1     |
| 1:A:2:G:O2'   | 1:A:3:G:C4'  | 0.43     | 2.66        | 6      | 1     |
| 1:A:25:U:O2   | 1:A:41:A:C2  | 0.43     | 2.71        | 7      | 2     |
| 1:A:29:A:C5   | 1:A:30:G:C5  | 0.43     | 3.06        | 2      | 2     |

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| Atom-1       | Atom-2       | Clash(Å) | Distance(Å) | Models |       |
|--------------|--------------|----------|-------------|--------|-------|
|              |              |          |             | Worst  | Total |
| 1:A:2:G:H8   | 1:A:2:G:O5'  | 0.43     | 1.95        | 15     | 1     |
| 1:A:34:C:O2' | 1:A:35:A:P   | 0.43     | 2.77        | 21     | 1     |
| 1:A:1:G:C5   | 1:A:32:G:N2  | 0.43     | 2.87        | 23     | 1     |
| 1:A:21:C:N4  | 1:A:28:G:N7  | 0.43     | 2.66        | 2      | 1     |
| 1:A:32:G:H4' | 1:A:34:C:N4  | 0.43     | 2.28        | 8      | 1     |
| 1:A:21:C:H1' | 1:A:36:U:C4  | 0.43     | 2.49        | 14     | 1     |
| 1:A:23:U:N3  | 1:A:24:U:C5  | 0.43     | 2.87        | 12     | 2     |
| 1:A:1:G:O3'  | 1:A:2:G:N7   | 0.43     | 2.51        | 15     | 1     |
| 1:A:20:C:O5' | 1:A:20:C:H6  | 0.43     | 1.97        | 20     | 1     |
| 1:A:1:G:C1'  | 1:A:2:G:OP1  | 0.43     | 2.67        | 14     | 4     |
| 1:A:1:G:C2'  | 1:A:2:G:OP1  | 0.43     | 2.66        | 11     | 2     |
| 1:A:10:A:N3  | 1:A:11:C:O4' | 0.43     | 2.52        | 13     | 1     |
| 1:A:8:C:H2'  | 1:A:9:A:C8   | 0.43     | 2.49        | 13     | 1     |
| 1:A:8:C:HO2' | 1:A:9:A:P    | 0.43     | 2.36        | 15     | 1     |
| 1:A:29:A:C8  | 1:A:30:G:N7  | 0.42     | 2.87        | 2      | 1     |
| 1:A:10:A:O2' | 1:A:11:C:C5' | 0.42     | 2.58        | 13     | 1     |
| 1:A:31:G:N3  | 1:A:32:G:H1' | 0.42     | 2.30        | 6      | 3     |
| 1:A:40:A:N1  | 1:A:41:A:C5  | 0.42     | 2.88        | 16     | 2     |
| 1:A:2:G:C2'  | 1:A:3:G:C8   | 0.42     | 3.03        | 12     | 1     |
| 1:A:5:G:OP2  | 1:A:5:G:H8   | 0.42     | 1.97        | 10     | 1     |
| 1:A:17:C:P   | 1:A:18:C:C5  | 0.42     | 3.13        | 15     | 1     |
| 1:A:37:C:H2' | 1:A:38:G:C8  | 0.42     | 2.50        | 20     | 2     |
| 1:A:21:C:O4' | 1:A:37:C:N4  | 0.41     | 2.52        | 2      | 1     |
| 1:A:1:G:N3   | 1:A:2:G:C8   | 0.41     | 2.83        | 5      | 1     |
| 1:A:16:C:O2' | 1:A:17:C:C5' | 0.41     | 2.67        | 3      | 1     |
| 1:A:17:C:H2' | 1:A:18:C:C6  | 0.41     | 2.50        | 22     | 1     |
| 1:A:2:G:N2   | 1:A:17:C:H1' | 0.41     | 2.30        | 6      | 1     |
| 1:A:3:G:C4   | 1:A:4:A:N6   | 0.41     | 2.89        | 6      | 1     |
| 1:A:40:A:N1  | 1:A:41:A:C2  | 0.41     | 2.89        | 11     | 1     |
| 1:A:19:C:H2' | 1:A:20:C:H6  | 0.41     | 1.73        | 14     | 1     |
| 1:A:24:U:O2  | 1:A:41:A:N1  | 0.41     | 2.54        | 1      | 1     |
| 1:A:17:C:C6  | 1:A:18:C:C6  | 0.41     | 3.09        | 15     | 1     |
| 1:A:6:C:H42  | 1:A:11:C:N4  | 0.41     | 2.14        | 21     | 1     |
| 1:A:21:C:C2' | 1:A:37:C:N4  | 0.40     | 2.82        | 9      | 2     |
| 1:A:43:C:C4  | 1:A:44:A:N3  | 0.40     | 2.89        | 24     | 1     |
| 1:A:38:G:H8  | 1:A:38:G:O5' | 0.40     | 1.99        | 14     | 1     |
| 1:A:1:G:H5'' | 1:A:34:C:P   | 0.40     | 2.56        | 19     | 1     |
| 1:A:25:U:C6  | 1:A:26:C:C5  | 0.40     | 3.09        | 5      | 1     |
| 1:A:16:C:C6  | 1:A:17:C:C5  | 0.40     | 3.09        | 8      | 1     |

## 6.3 Torsion angles [i](#)

### 6.3.1 Protein backbone [i](#)

There are no protein molecules in this entry.

### 6.3.2 Protein sidechains [i](#)

There are no protein molecules in this entry.

### 6.3.3 RNA [i](#)

| Mol | Chain | Analysed        | Backbone Outliers | Pucker Outliers | Suiteness |
|-----|-------|-----------------|-------------------|-----------------|-----------|
| 1   | A     | 43/44 (98%)     | 13±3 (30±8%)      | 3±1 (6±3%)      | 0.16±0.05 |
| All | All   | 1044/1056 (99%) | 307 (29%)         | 67 (6%)         | 0.16      |

The overall RNA backbone suiteness is 0.16.

All unique RNA backbone outliers are listed below:

| Mol | Chain | Res | Type | Models (Total) |
|-----|-------|-----|------|----------------|
| 1   | A     | 8   | C    | 24             |
| 1   | A     | 22  | U    | 24             |
| 1   | A     | 33  | U    | 24             |
| 1   | A     | 36  | U    | 24             |
| 1   | A     | 44  | A    | 24             |
| 1   | A     | 23  | U    | 22             |
| 1   | A     | 9   | A    | 19             |
| 1   | A     | 35  | A    | 18             |
| 1   | A     | 34  | C    | 13             |
| 1   | A     | 2   | G    | 12             |
| 1   | A     | 40  | A    | 11             |
| 1   | A     | 32  | G    | 9              |
| 1   | A     | 39  | G    | 9              |
| 1   | A     | 4   | A    | 8              |
| 1   | A     | 26  | C    | 6              |
| 1   | A     | 14  | U    | 6              |
| 1   | A     | 12  | U    | 5              |
| 1   | A     | 3   | G    | 5              |
| 1   | A     | 43  | C    | 4              |
| 1   | A     | 6   | C    | 3              |
| 1   | A     | 10  | A    | 3              |
| 1   | A     | 17  | C    | 3              |

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| Mol | Chain | Res | Type | Models (Total) |
|-----|-------|-----|------|----------------|
| 1   | A     | 21  | C    | 3              |
| 1   | A     | 25  | U    | 3              |
| 1   | A     | 5   | G    | 3              |
| 1   | A     | 20  | C    | 3              |
| 1   | A     | 38  | G    | 3              |
| 1   | A     | 24  | U    | 3              |
| 1   | A     | 11  | C    | 2              |
| 1   | A     | 30  | G    | 2              |
| 1   | A     | 15  | C    | 2              |
| 1   | A     | 27  | C    | 2              |
| 1   | A     | 28  | G    | 2              |
| 1   | A     | 29  | A    | 2              |
| 1   | A     | 7   | U    | 1              |

All unique RNA pucker outliers are listed below:

| Mol | Chain | Res | Type | Models (Total) |
|-----|-------|-----|------|----------------|
| 1   | A     | 8   | C    | 20             |
| 1   | A     | 35  | A    | 16             |
| 1   | A     | 1   | G    | 12             |
| 1   | A     | 21  | C    | 7              |
| 1   | A     | 33  | U    | 4              |
| 1   | A     | 11  | C    | 2              |
| 1   | A     | 39  | G    | 2              |
| 1   | A     | 34  | C    | 2              |
| 1   | A     | 19  | C    | 1              |
| 1   | A     | 20  | C    | 1              |

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

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

## 6.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

## 6.6 Ligand geometry [i](#)

There are no ligands in this entry.

## 6.7 Other polymers [i](#)

There are no such molecules in this entry.

## 6.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.



## 7 Chemical shift validation

No chemical shift data were provided