



# Full wwPDB NMR Structure Validation Report ⓘ

Feb 24, 2022 – 06:33 AM EST

PDB ID : 1YUJ  
Title : SOLUTION NMR STRUCTURE OF THE GAGA FACTOR/DNA COM-  
PLEX, 50 STRUCTURES  
Authors : Clore, G.M.; Omichinski, J.G.; Gronenborn, A.M.  
Deposited on : 1996-12-31

This is a Full wwPDB NMR Structure Validation Report for a publicly released PDB entry.

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

A user guide is available at

<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

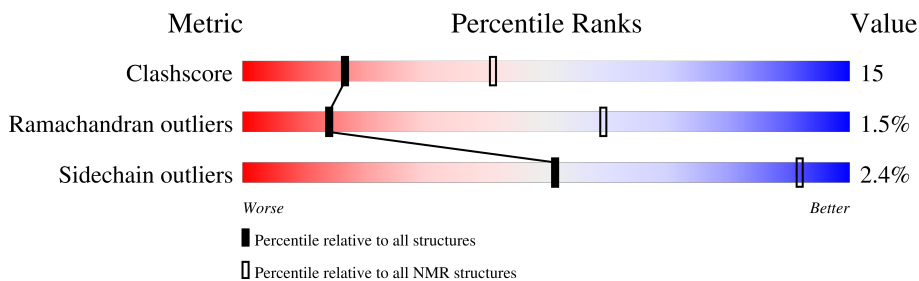
# 1 Overall quality at a glance

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) |
|-----------------------|-----------------------------|---------------------------|
| Clashscore            | 158937                      | 12864                     |
| Ramachandran outliers | 154571                      | 11451                     |
| Sidechain outliers    | 154315                      | 11428                     |

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   | B     | 11     | 9% (red) 82% (yellow) 9% (orange)   |
| 2   | C     | 11     | 27% (red) 55% (yellow) 18% (orange) |
| 3   | A     | 54     | 56% (red) 28% (yellow) 17% (cyan)   |

## 2 Ensemble composition and analysis i

This entry contains 50 models. Model 5 is the overall representative, medoid model (most similar to other models).

The following residues are included in the computation of the global validation metrics.

| Well-defined (core) protein residues |                       |                   |              |
|--------------------------------------|-----------------------|-------------------|--------------|
| Well-defined core                    | Residue range (total) | Backbone RMSD (Å) | Medoid model |
| 1                                    | A:15-A:59 (45)        | 0.28              | 5            |

Ill-defined regions of proteins are excluded from the global statistics.

Ligands and non-protein polymers are included in the analysis.

The models can be grouped into 8 clusters and 5 single-model clusters were found.

| Cluster number        | Models                           |
|-----------------------|----------------------------------|
| 1                     | 1, 8, 10, 11, 21, 26, 35, 36, 40 |
| 2                     | 4, 5, 17, 22, 27, 44, 48, 49     |
| 3                     | 9, 13, 16, 18, 28, 32, 38, 47    |
| 4                     | 19, 20, 34, 37, 39, 41, 50       |
| 5                     | 2, 7, 23, 42, 45, 46             |
| 6                     | 6, 15, 31                        |
| 7                     | 12, 29                           |
| 8                     | 3, 24                            |
| Single-model clusters | 14; 25; 30; 33; 43               |

### 3 Entry composition [i](#)

There are 4 unique types of molecules in this entry. The entry contains 1578 atoms, of which 697 are hydrogens and 0 are deuteriums.

- Molecule 1 is a DNA chain called DNA (5'-D(\*GP\*CP\*CP\*GP\*AP\*GP\*AP\*GP\*TP\*AP\*C)-3').

| Mol | Chain | Residues | Atoms |     |     |    |    |    | Trace |
|-----|-------|----------|-------|-----|-----|----|----|----|-------|
|     |       |          | Total | C   | H   | N  | O  | P  |       |
| 1   | B     | 11       | 347   | 107 | 122 | 46 | 62 | 10 | 0     |

- Molecule 2 is a DNA chain called DNA (5'-D(\*GP\*TP\*AP\*CP\*TP\*CP\*TP\*CP\*GP\*GP\*C)-3').

| Mol | Chain | Residues | Atoms |     |     |    |    |    | Trace |
|-----|-------|----------|-------|-----|-----|----|----|----|-------|
|     |       |          | Total | C   | H   | N  | O  | P  |       |
| 2   | C     | 11       | 344   | 106 | 124 | 38 | 66 | 10 | 0     |

- Molecule 3 is a protein called GAGA-FACTOR.

| Mol | Chain | Residues | Atoms |     |     |    |    |   | Trace |
|-----|-------|----------|-------|-----|-----|----|----|---|-------|
|     |       |          | Total | C   | H   | N  | O  | S |       |
| 3   | A     | 54       | 886   | 268 | 451 | 93 | 72 | 2 | 0     |

- Molecule 4 is ZINC ION (three-letter code: ZN) (formula: Zn).

| Mol | Chain | Residues | Atoms |    |
|-----|-------|----------|-------|----|
|     |       |          | Total | Zn |
| 4   | A     | 1        | 1     | 1  |

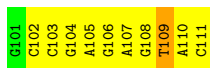
## 4 Residue-property plots

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

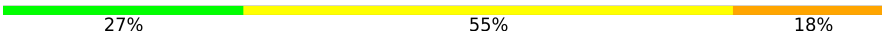
These plots are provided for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic is the same as shown in the summary in section 1 of this report. The second graphic shows the sequence where residues are colour-coded according to the number of geometric quality criteria for 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: DNA (5'-D(\*GP\*CP\*CP\*GP\*AP\*GP\*AP\*GP\*TP\*AP\*C)-3')

Chain B: 



- Molecule 2: DNA (5'-D(\*GP\*TP\*AP\*CP\*TP\*CP\*TP\*CP\*GP\*GP\*C)-3')

Chain C: 



- Molecule 3: GAGA-FACTOR

Chain A: 

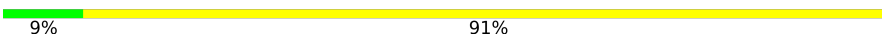


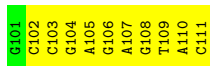
### 4.2 Scores per residue for each member of the ensemble

Colouring as in section 4.1 above.

#### 4.2.1 Score per residue for model 1

- Molecule 1: DNA (5'-D(\*GP\*CP\*CP\*GP\*AP\*GP\*AP\*GP\*TP\*AP\*C)-3')

Chain B: 



- Molecule 2: DNA (5'-D(\*GP\*TP\*AP\*CP\*TP\*CP\*TP\*CP\*GP\*GP\*C)-3')

Chain C: 




- Molecule 3: GAGA-FACTOR

Chain A: 



#### 4.2.2 Score per residue for model 2

- Molecule 1: DNA (5'-D(\*GP\*CP\*CP\*GP\*AP\*GP\*AP\*GP\*TP\*AP\*C)-3')

Chain B: 



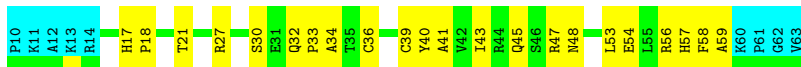
- Molecule 2: DNA (5'-D(\*GP\*TP\*AP\*CP\*TP\*CP\*TP\*CP\*GP\*GP\*C)-3')

Chain C: 



- Molecule 3: GAGA-FACTOR

Chain A: 



#### 4.2.3 Score per residue for model 3

- Molecule 1: DNA (5'-D(\*GP\*CP\*CP\*GP\*AP\*GP\*AP\*GP\*TP\*AP\*C)-3')

Chain B: 



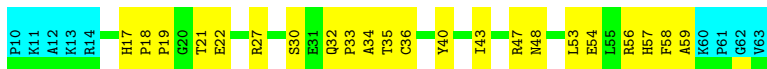
- Molecule 2: DNA (5'-D(\*GP\*TP\*AP\*CP\*TP\*CP\*TP\*CP\*GP\*GP\*C)-3')

Chain C:  45% 45% 9%



- Molecule 3: GAGA-FACTOR

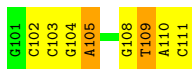
Chain A:  43% 41% 17%



#### 4.2.4 Score per residue for model 4

- Molecule 1: DNA (5'-D(\*GP\*CP\*CP\*GP\*AP\*GP\*AP\*GP\*TP\*AP\*C)-3')

Chain B:  27% 55% 18%



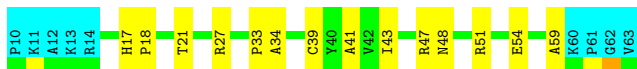
- Molecule 2: DNA (5'-D(\*GP\*TP\*AP\*CP\*TP\*CP\*TP\*CP\*GP\*GP\*C)-3')

Chain C:  45% 45% 9%



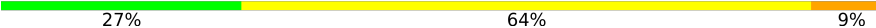
- Molecule 3: GAGA-FACTOR

Chain A:  57% 26% 17%



#### 4.2.5 Score per residue for model 5 (medoid)

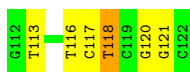
- Molecule 1: DNA (5'-D(\*GP\*CP\*CP\*GP\*AP\*GP\*AP\*GP\*TP\*AP\*C)-3')

Chain B:  27% 64% 9%

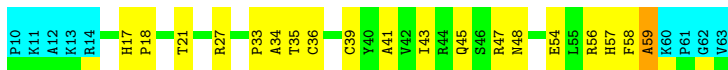


- Molecule 2: DNA (5'-D(\*GP\*TP\*AP\*CP\*TP\*CP\*TP\*CP\*GP\*GP\*C)-3')

Chain C:  45% 45% 9%



- Molecule 3: GAGA-FACTOR



#### 4.2.6 Score per residue for model 6

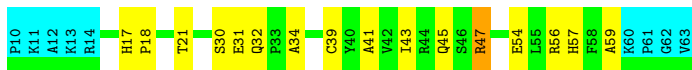
- Molecule 1: DNA (5'-D(\*GP\*CP\*CP\*GP\*AP\*GP\*AP\*GP\*TP\*AP\*C)-3')



- Molecule 2: DNA (5'-D(\*GP\*TP\*AP\*CP\*TP\*CP\*TP\*CP\*GP\*GP\*C)-3')

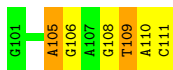


- Molecule 3: GAGA-FACTOR

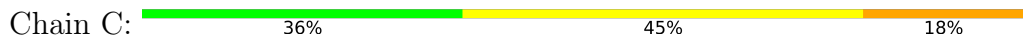


#### 4.2.7 Score per residue for model 7

- Molecule 1: DNA (5'-D(\*GP\*CP\*CP\*GP\*AP\*GP\*AP\*GP\*TP\*AP\*C)-3')



- Molecule 2: DNA (5'-D(\*GP\*TP\*AP\*CP\*TP\*CP\*TP\*CP\*GP\*GP\*C)-3')





- Molecule 3: GAGA-FACTOR

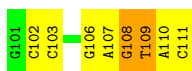
Chain A: 



#### 4.2.8 Score per residue for model 8

- Molecule 1: DNA (5'-D(\*GP\*CP\*CP\*GP\*AP\*GP\*AP\*GP\*TP\*AP\*C)-3')

Chain B: 



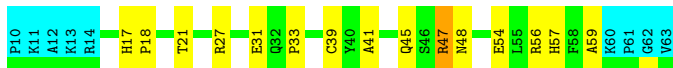
- Molecule 2: DNA (5'-D(\*GP\*TP\*AP\*CP\*TP\*CP\*TP\*CP\*GP\*GP\*C)-3')

Chain C: 




- Molecule 3: GAGA-FACTOR

Chain A: 



#### 4.2.9 Score per residue for model 9

- Molecule 1: DNA (5'-D(\*GP\*CP\*CP\*GP\*AP\*GP\*AP\*GP\*TP\*AP\*C)-3')

Chain B: 



- Molecule 2: DNA (5'-D(\*GP\*TP\*AP\*CP\*TP\*CP\*TP\*CP\*GP\*GP\*C)-3')

Chain C: 



- Molecule 3: GAGA-FACTOR

Chain A: 

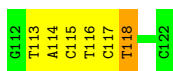


#### 4.2.10 Score per residue for model 10

- Molecule 1: DNA (5'-D(\*GP\*CP\*CP\*GP\*AP\*GP\*AP\*GP\*TP\*AP\*C)-3')



- Molecule 2: DNA (5'-D(\*GP\*TP\*AP\*CP\*TP\*CP\*TP\*CP\*GP\*GP\*C)-3')



- Molecule 3: GAGA-FACTOR

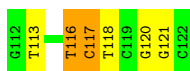


#### 4.2.11 Score per residue for model 11

- Molecule 1: DNA (5'-D(\*GP\*CP\*CP\*GP\*AP\*GP\*AP\*GP\*TP\*AP\*C)-3')



- Molecule 2: DNA (5'-D(\*GP\*TP\*AP\*CP\*TP\*CP\*TP\*CP\*GP\*GP\*C)-3')

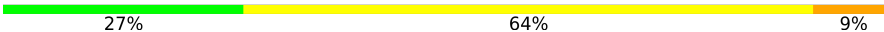


- Molecule 3: GAGA-FACTOR



#### 4.2.12 Score per residue for model 12

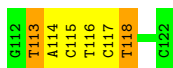
- Molecule 1: DNA (5'-D(\*GP\*CP\*CP\*GP\*AP\*GP\*AP\*GP\*TP\*AP\*C)-3')

Chain B:  27% 64% 9%



- Molecule 2: DNA (5'-D(\*GP\*TP\*AP\*CP\*TP\*CP\*TP\*CP\*GP\*GP\*C)-3')

Chain C:  45% 36% 18%



- Molecule 3: GAGA-FACTOR

Chain A:  48% 33% 17%



#### 4.2.13 Score per residue for model 13

- Molecule 1: DNA (5'-D(\*GP\*CP\*CP\*GP\*AP\*GP\*AP\*GP\*TP\*AP\*C)-3')

Chain B:  45% 45% 9%



- Molecule 2: DNA (5'-D(\*GP\*TP\*AP\*CP\*TP\*CP\*TP\*CP\*GP\*GP\*C)-3')

Chain C:  36% 45% 18%



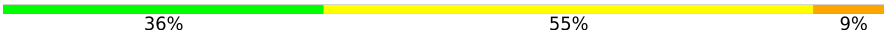
- Molecule 3: GAGA-FACTOR

Chain A:  57% 24% 17%



#### 4.2.14 Score per residue for model 14

- Molecule 1: DNA (5'-D(\*GP\*CP\*CP\*GP\*AP\*GP\*AP\*GP\*TP\*AP\*C)-3')

Chain B:  36% 55% 9%



- Molecule 2: DNA (5'-D(\*GP\*TP\*AP\*CP\*TP\*CP\*TP\*CP\*GP\*GP\*C)-3')

Chain C:  27% 45% 27%



- Molecule 3: GAGA-FACTOR

Chain A:  59% 24% 17%



#### 4.2.15 Score per residue for model 15

- Molecule 1: DNA (5'-D(\*GP\*CP\*CP\*GP\*AP\*GP\*AP\*GP\*TP\*AP\*C)-3')

Chain B:  18% 73% 9%



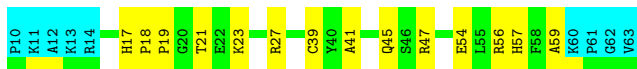
- Molecule 2: DNA (5'-D(\*GP\*TP\*AP\*CP\*TP\*CP\*TP\*CP\*GP\*GP\*C)-3')

Chain C:  45% 27% 27%



- Molecule 3: GAGA-FACTOR

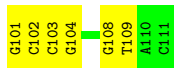
Chain A:  57% 26% 17%



#### 4.2.16 Score per residue for model 16

- Molecule 1: DNA (5'-D(\*GP\*CP\*CP\*GP\*AP\*GP\*AP\*GP\*TP\*AP\*C)-3')

Chain B:  45% 55%



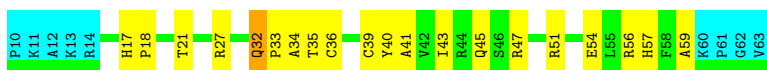
- Molecule 2: DNA (5'-D(\*GP\*TP\*AP\*CP\*TP\*CP\*TP\*CP\*GP\*GP\*C)-3')

Chain C:  45% 36% 18%



- Molecule 3: GAGA-FACTOR

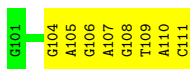
Chain A:  46% 35% 17%



#### 4.2.17 Score per residue for model 17

- Molecule 1: DNA (5'-D(\*GP\*CP\*CP\*GP\*AP\*GP\*AP\*GP\*TP\*AP\*C)-3')

Chain B:  27% 73%



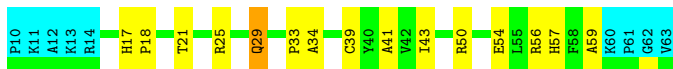
- Molecule 2: DNA (5'-D(\*GP\*TP\*AP\*CP\*TP\*CP\*TP\*CP\*GP\*GP\*C)-3')

Chain C:  45% 36% 18%



- Molecule 3: GAGA-FACTOR

Chain A:  56% 26% 17%



#### 4.2.18 Score per residue for model 18

- Molecule 1: DNA (5'-D(\*GP\*CP\*CP\*GP\*AP\*GP\*AP\*GP\*TP\*AP\*C)-3')

Chain B: 27% 55% 18%



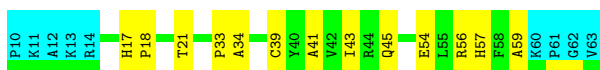
- Molecule 2: DNA (5'-D(\*GP\*TP\*AP\*CP\*TP\*CP\*TP\*CP\*GP\*GP\*C)-3')

Chain C: 36% 45% 18%



- Molecule 3: GAGA-FACTOR

Chain A: 59% 24% 17%



#### 4.2.19 Score per residue for model 19

- Molecule 1: DNA (5'-D(\*GP\*CP\*CP\*GP\*AP\*GP\*AP\*GP\*TP\*AP\*C)-3')

Chain B: 27% 64% 9%



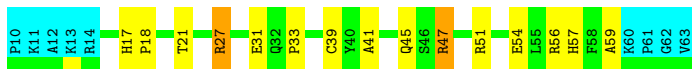
- Molecule 2: DNA (5'-D(\*GP\*TP\*AP\*CP\*TP\*CP\*TP\*CP\*GP\*GP\*C)-3')

Chain C: 27% 45% 27%



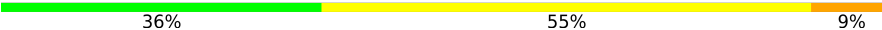
- Molecule 3: GAGA-FACTOR

Chain A: 56% 24% 17%



#### 4.2.20 Score per residue for model 20

- Molecule 1: DNA (5'-D(\*GP\*CP\*CP\*GP\*AP\*GP\*AP\*GP\*TP\*AP\*C)-3')

Chain B: 



- Molecule 2: DNA (5'-D(\*GP\*TP\*AP\*CP\*TP\*CP\*TP\*CP\*GP\*GP\*C)-3')

Chain C: 



- Molecule 3: GAGA-FACTOR

Chain A: 



#### 4.2.21 Score per residue for model 21

- Molecule 1: DNA (5'-D(\*GP\*CP\*CP\*GP\*AP\*GP\*AP\*GP\*TP\*AP\*C)-3')

Chain B: 



- Molecule 2: DNA (5'-D(\*GP\*TP\*AP\*CP\*TP\*CP\*TP\*CP\*GP\*GP\*C)-3')

Chain C: 



- Molecule 3: GAGA-FACTOR

Chain A: 



#### 4.2.22 Score per residue for model 22

- Molecule 1: DNA (5'-D(\*GP\*CP\*CP\*GP\*AP\*GP\*AP\*GP\*TP\*AP\*C)-3')

Chain B:  45% 45% 9%



- Molecule 2: DNA (5'-D(\*GP\*TP\*AP\*CP\*TP\*CP\*TP\*CP\*GP\*GP\*C)-3')

Chain C:  27% 55% 18%



- Molecule 3: GAGA-FACTOR

Chain A:  54% 30% 17%



#### 4.2.23 Score per residue for model 23

- Molecule 1: DNA (5'-D(\*GP\*CP\*CP\*GP\*AP\*GP\*AP\*GP\*TP\*AP\*C)-3')

Chain B:  55% 45%



- Molecule 2: DNA (5'-D(\*GP\*TP\*AP\*CP\*TP\*CP\*TP\*CP\*GP\*GP\*C)-3')

Chain C:  45% 45% 9%



- Molecule 3: GAGA-FACTOR


Chain A:  57% 26% 17%





#### 4.2.24 Score per residue for model 24

- Molecule 1: DNA (5'-D(\*GP\*CP\*CP\*GP\*AP\*GP\*AP\*GP\*TP\*AP\*C)-3')

Chain B:  27% 73%



- Molecule 2: DNA (5'-D(\*GP\*TP\*AP\*CP\*TP\*CP\*TP\*CP\*GP\*GP\*C)-3')

Chain C:  55% 18% 27%



- Molecule 3: GAGA-FACTOR

Chain A:  50% 28% 6% 17%



#### 4.2.25 Score per residue for model 25

- Molecule 1: DNA (5'-D(\*GP\*CP\*CP\*GP\*AP\*GP\*AP\*GP\*TP\*AP\*C)-3')

Chain B:  27% 64% 9%



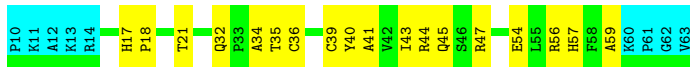
- Molecule 2: DNA (5'-D(\*GP\*TP\*AP\*CP\*TP\*CP\*TP\*CP\*GP\*GP\*C)-3')

Chain C:  36% 36% 27%



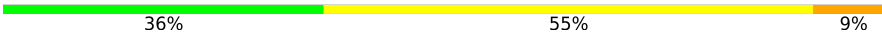
- Molecule 3: GAGA-FACTOR

Chain A:  50% 33% 17%



#### 4.2.26 Score per residue for model 26

- Molecule 1: DNA (5'-D(\*GP\*CP\*CP\*GP\*AP\*GP\*AP\*GP\*TP\*AP\*C)-3')

Chain B:  36% 55% 9%



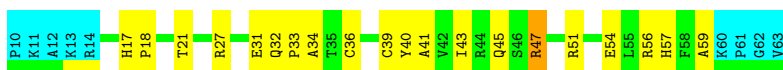
- Molecule 2: DNA (5'-D(\*GP\*TP\*AP\*CP\*TP\*CP\*TP\*CP\*GP\*GP\*C)-3')

Chain C:  27% 55% 18%



- Molecule 3: GAGA-FACTOR

Chain A:  46% 35% 17%



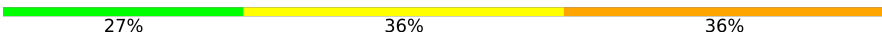
#### 4.2.27 Score per residue for model 27

- Molecule 1: DNA (5'-D(\*GP\*CP\*CP\*GP\*AP\*GP\*AP\*GP\*TP\*AP\*C)-3')

Chain B:  27% 64% 9%



- Molecule 2: DNA (5'-D(\*GP\*TP\*AP\*CP\*TP\*CP\*TP\*CP\*GP\*GP\*C)-3')

Chain C:  27% 36% 36%




- Molecule 3: GAGA-FACTOR

Chain A:  52% 31% 17%



#### 4.2.28 Score per residue for model 28

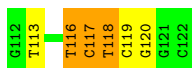
- Molecule 1: DNA (5'-D(\*GP\*CP\*CP\*GP\*AP\*GP\*AP\*GP\*TP\*AP\*C)-3')

Chain B: 



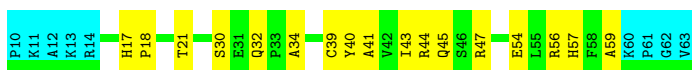
- Molecule 2: DNA (5'-D(\*GP\*TP\*AP\*CP\*TP\*CP\*TP\*CP\*GP\*GP\*C)-3')

Chain C: 



- Molecule 3: GAGA-FACTOR

Chain A: 



#### 4.2.29 Score per residue for model 29

- Molecule 1: DNA (5'-D(\*GP\*CP\*CP\*GP\*AP\*GP\*AP\*GP\*TP\*AP\*C)-3')

Chain B: 



- Molecule 2: DNA (5'-D(\*GP\*TP\*AP\*CP\*TP\*CP\*TP\*CP\*GP\*GP\*C)-3')

Chain C: 



- Molecule 3: GAGA-FACTOR

Chain A: 



#### 4.2.30 Score per residue for model 30

- Molecule 1: DNA (5'-D(\*GP\*CP\*CP\*GP\*AP\*GP\*AP\*GP\*TP\*AP\*C)-3')

Chain B: 9% 91%

G101  
C102  
C103  
G104  
A105  
G106  
A107  
G108  
T109  
A110  
C111

- Molecule 2: DNA (5'-D(\*GP\*TP\*AP\*CP\*TP\*CP\*TP\*CP\*GP\*GP\*C)-3')

Chain C: 45% 45% 9%

G112  
T113  
A114  
C115  
T116  
C117  
T118  
C122

- Molecule 3: GAGA-FACTOR

Chain A: 56% 26% 17%

P10  
K11  
A12  
K13  
R14  
H17  
P18  
T21  
R27  
A34  
C39  
Y40  
A41  
V42  
I43  
R44  
Q45  
S46  
R47  
N48  
E54  
L55  
R56  
H57  
F58  
A59  
R60  
P61  
G62  
V63

#### 4.2.31 Score per residue for model 31

- Molecule 1: DNA (5'-D(\*GP\*CP\*CP\*GP\*AP\*GP\*AP\*GP\*TP\*AP\*C)-3')

Chain B: 18% 82%

G101  
C102  
C103  
G104  
A105  
G106  
A107  
G108  
T109  
A110  
C111

- Molecule 2: DNA (5'-D(\*GP\*TP\*AP\*CP\*TP\*CP\*TP\*CP\*GP\*GP\*C)-3')

Chain C: 27% 64% 9%

G112  
T113  
A114  
C115  
T116  
C117  
T118  
G119  
G120  
G121  
C122


- Molecule 3: GAGA-FACTOR

Chain A: 52% 28% 17%

P10  
K11  
A12  
K13  
R14  
H17  
P18  
T21  
P24  
E31  
A34  
T35  
C36  
C39  
Y40  
A41  
V42  
I43  
R44  
Q45  
S46  
R47  
E54  
L55  
R56  
H57  
F58  
A59  
R60  
P61  
G62  
V63

#### 4.2.32 Score per residue for model 32

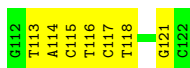
- Molecule 1: DNA (5'-D(\*GP\*CP\*CP\*GP\*AP\*GP\*AP\*GP\*TP\*AP\*C)-3')

Chain B: 



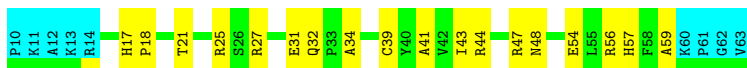
- Molecule 2: DNA (5'-D(\*GP\*TP\*AP\*CP\*TP\*CP\*TP\*CP\*GP\*GP\*C)-3')

Chain C: 



- Molecule 3: GAGA-FACTOR

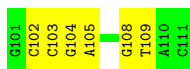
Chain A: 



#### 4.2.33 Score per residue for model 33

- Molecule 1: DNA (5'-D(\*GP\*CP\*CP\*GP\*AP\*GP\*AP\*GP\*TP\*AP\*C)-3')

Chain B: 



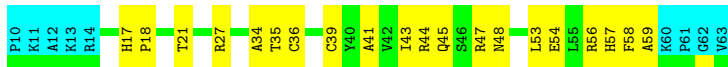
- Molecule 2: DNA (5'-D(\*GP\*TP\*AP\*CP\*TP\*CP\*TP\*CP\*GP\*GP\*C)-3')

Chain C: 



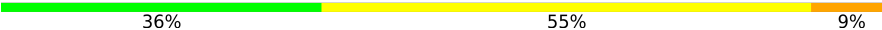
- Molecule 3: GAGA-FACTOR

Chain A: 



#### 4.2.34 Score per residue for model 34

- Molecule 1: DNA (5'-D(\*GP\*CP\*CP\*GP\*AP\*GP\*AP\*GP\*TP\*AP\*C)-3')

Chain B:  36% 55% 9%



- Molecule 2: DNA (5'-D(\*GP\*TP\*AP\*CP\*TP\*CP\*TP\*CP\*GP\*GP\*C)-3')

Chain C:  55% 27% 18%



- Molecule 3: GAGA-FACTOR

Chain A:  57% 26% 17%



#### 4.2.35 Score per residue for model 35

- Molecule 1: DNA (5'-D(\*GP\*CP\*CP\*GP\*AP\*GP\*AP\*GP\*TP\*AP\*C)-3')

Chain B:  27% 55% 18%



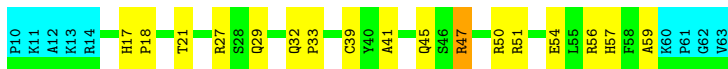
- Molecule 2: DNA (5'-D(\*GP\*TP\*AP\*CP\*TP\*CP\*TP\*CP\*GP\*GP\*C)-3')

Chain C:  45% 45% 9%



- Molecule 3: GAGA-FACTOR

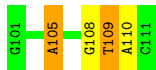
Chain A:  52% 30% 17%



#### 4.2.36 Score per residue for model 36

- Molecule 1: DNA (5'-D(\*GP\*CP\*CP\*GP\*AP\*GP\*AP\*GP\*TP\*AP\*C)-3')

Chain B:  64% 18% 18%



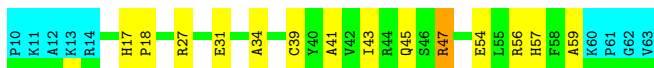
- Molecule 2: DNA (5'-D(\*GP\*TP\*AP\*CP\*TP\*CP\*TP\*CP\*GP\*GP\*C)-3')

Chain C:  36% 45% 18%



- Molecule 3: GAGA-FACTOR

Chain A:  57% 24% 17%



#### 4.2.37 Score per residue for model 37

- Molecule 1: DNA (5'-D(\*GP\*CP\*CP\*GP\*AP\*GP\*AP\*GP\*TP\*AP\*C)-3')

Chain B:  27% 64% 9%



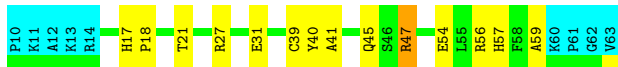
- Molecule 2: DNA (5'-D(\*GP\*TP\*AP\*CP\*TP\*CP\*TP\*CP\*GP\*GP\*C)-3')

Chain C:  36% 45% 18%



- Molecule 3: GAGA-FACTOR

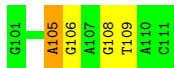
Chain A:  57% 24% 17%



### 4.2.38 Score per residue for model 38

- Molecule 1: DNA (5'-D(\*GP\*CP\*CP\*GP\*AP\*GP\*AP\*GP\*TP\*AP\*C)-3')

Chain B:  64% 27% 9%



- Molecule 2: DNA (5'-D(\*GP\*TP\*AP\*CP\*TP\*CP\*TP\*CP\*GP\*GP\*C)-3')

Chain C:  36% 36% 27%



- Molecule 3: GAGA-FACTOR

Chain A:  56% 24% 17%



### 4.2.39 Score per residue for model 39

- Molecule 1: DNA (5'-D(\*GP\*CP\*CP\*GP\*AP\*GP\*AP\*GP\*TP\*AP\*C)-3')

Chain B:  27% 64% 9%



- Molecule 2: DNA (5'-D(\*GP\*TP\*AP\*CP\*TP\*CP\*TP\*CP\*GP\*GP\*C)-3')

Chain C:  36% 45% 18%



- Molecule 3: GAGA-FACTOR


Chain A:  56% 28% 17%





#### 4.2.40 Score per residue for model 40

- Molecule 1: DNA (5'-D(\*GP\*CP\*CP\*GP\*AP\*GP\*AP\*GP\*TP\*AP\*C)-3')

Chain B: 



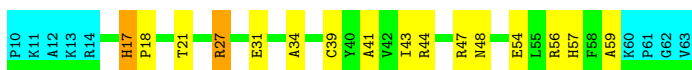
- Molecule 2: DNA (5'-D(\*GP\*TP\*AP\*CP\*TP\*CP\*TP\*CP\*GP\*GP\*C)-3')

Chain C: 



- Molecule 3: GAGA-FACTOR

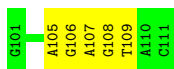
Chain A: 



#### 4.2.41 Score per residue for model 41

- Molecule 1: DNA (5'-D(\*GP\*CP\*CP\*GP\*AP\*GP\*AP\*GP\*TP\*AP\*C)-3')

Chain B: 



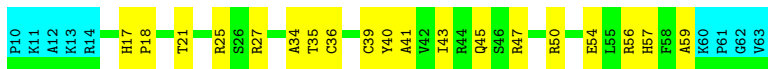
- Molecule 2: DNA (5'-D(\*GP\*TP\*AP\*CP\*TP\*CP\*TP\*CP\*GP\*GP\*C)-3')

Chain C: 



- Molecule 3: GAGA-FACTOR

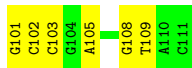
Chain A: 



#### 4.2.42 Score per residue for model 42

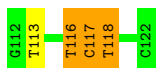
- Molecule 1: DNA (5'-D(\*GP\*CP\*CP\*GP\*AP\*GP\*AP\*GP\*TP\*AP\*C)-3')

Chain B:  45% 55%



- Molecule 2: DNA (5'-D(\*GP\*TP\*AP\*CP\*TP\*CP\*TP\*CP\*GP\*GP\*C)-3')

Chain C:  64% 9% 27%



- Molecule 3: GAGA-FACTOR

Chain A:  50% 30% 17%



#### 4.2.43 Score per residue for model 43

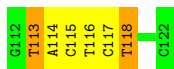
- Molecule 1: DNA (5'-D(\*GP\*CP\*CP\*GP\*AP\*GP\*AP\*GP\*TP\*AP\*C)-3')

Chain B:  27% 64% 9%



- Molecule 2: DNA (5'-D(\*GP\*TP\*AP\*CP\*TP\*CP\*TP\*CP\*GP\*GP\*C)-3')

Chain C:  45% 36% 18%



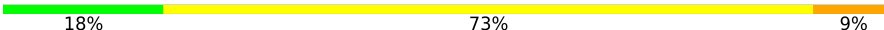
- Molecule 3: GAGA-FACTOR

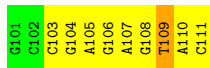
Chain A:  59% 24% 17%



#### 4.2.44 Score per residue for model 44

- Molecule 1: DNA (5'-D(\*GP\*CP\*CP\*GP\*AP\*GP\*AP\*GP\*TP\*AP\*C)-3')

Chain B:  18% 73% 9%



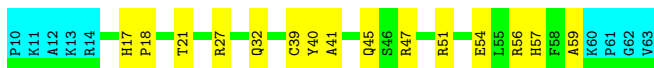
- Molecule 2: DNA (5'-D(\*GP\*TP\*AP\*CP\*TP\*CP\*TP\*CP\*GP\*GP\*C)-3')

Chain C:  36% 45% 18%



- Molecule 3: GAGA-FACTOR

Chain A:  56% 28% 17%



#### 4.2.45 Score per residue for model 45

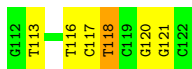
- Molecule 1: DNA (5'-D(\*GP\*CP\*CP\*GP\*AP\*GP\*AP\*GP\*TP\*AP\*C)-3')

Chain B:  18% 64% 18%



- Molecule 2: DNA (5'-D(\*GP\*TP\*AP\*CP\*TP\*CP\*TP\*CP\*GP\*GP\*C)-3')

Chain C:  45% 45% 9%



- Molecule 3: GAGA-FACTOR

Chain A:  48% 33% 17%



#### 4.2.46 Score per residue for model 46

- Molecule 1: DNA (5'-D(\*GP\*CP\*CP\*GP\*AP\*GP\*AP\*GP\*TP\*AP\*C)-3')

Chain B:  45% 45% 9%



- Molecule 2: DNA (5'-D(\*GP\*TP\*AP\*CP\*TP\*CP\*TP\*CP\*GP\*GP\*C)-3')

Chain C:  45% 45% 9%



- Molecule 3: GAGA-FACTOR

Chain A:  48% 33% 17%



#### 4.2.47 Score per residue for model 47

- Molecule 1: DNA (5'-D(\*GP\*CP\*CP\*GP\*AP\*GP\*AP\*GP\*TP\*AP\*C)-3')

Chain B:  27% 64% 9%



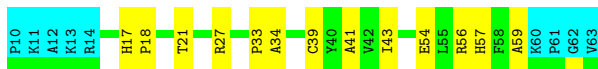
- Molecule 2: DNA (5'-D(\*GP\*TP\*AP\*CP\*TP\*CP\*TP\*CP\*GP\*GP\*C)-3')

Chain C:  36% 45% 18%



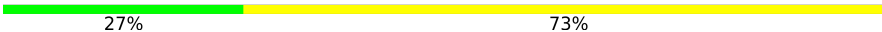
- Molecule 3: GAGA-FACTOR

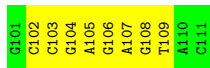
Chain A:  59% 24% 17%



#### 4.2.48 Score per residue for model 48

- Molecule 1: DNA (5'-D(\*GP\*CP\*CP\*GP\*AP\*GP\*AP\*GP\*TP\*AP\*C)-3')

Chain B:  27% 73%



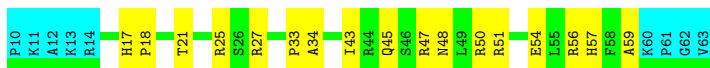
- Molecule 2: DNA (5'-D(\*GP\*TP\*AP\*CP\*TP\*CP\*TP\*CP\*GP\*GP\*C)-3')

Chain C:  45% 45% 9%



- Molecule 3: GAGA-FACTOR

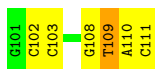
Chain A:  52% 31% 17%



#### 4.2.49 Score per residue for model 49

- Molecule 1: DNA (5'-D(\*GP\*CP\*CP\*GP\*AP\*GP\*AP\*GP\*TP\*AP\*C)-3')

Chain B:  45% 45% 9%



- Molecule 2: DNA (5'-D(\*GP\*TP\*AP\*CP\*TP\*CP\*TP\*CP\*GP\*GP\*C)-3')

Chain C:  36% 45% 18%



- Molecule 3: GAGA-FACTOR

Chain A:  63% 20% 17%



#### 4.2.50 Score per residue for model 50

- Molecule 1: DNA (5'-D(\*GP\*CP\*CP\*GP\*AP\*GP\*AP\*GP\*TP\*AP\*C)-3')

Chain B:  27% 55% 18%



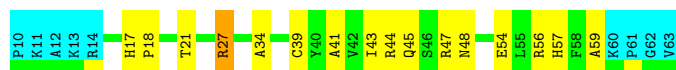
- Molecule 2: DNA (5'-D(\*GP\*TP\*AP\*CP\*TP\*CP\*TP\*CP\*GP\*GP\*C)-3')

Chain C:  18% 64% 18%



- Molecule 3: GAGA-FACTOR

Chain A:  54% 28% 17%



## 5 Refinement protocol and experimental data overview

The models were refined using the following method: *simulated annealing*.

Of the ? calculated structures, 50 were deposited, based on the following criterion: ?.

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

| Software name             | Classification     | Version |
|---------------------------|--------------------|---------|
| X-PLOR (SEE ABOVE) ABOVE) | structure solution | ABOVE)  |
| X-PLOR (SEE ABOVE) ABOVE) | refinement         | ABOVE)  |

No chemical shift data was provided.

## 6 Model quality i

### 6.1 Standard geometry i

Bond lengths and bond angles in the following residue types are not validated in this section:  
ZN

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   | B     | 1.07±0.02    | 1±0/253 ( 0.2± 0.2%) | 1.83±0.01   | 2±1/389 ( 0.6± 0.3%) |
| 2   | C     | 1.19±0.03    | 3±1/245 ( 1.0± 0.3%) | 1.87±0.01   | 5±1/376 ( 1.2± 0.4%) |
| 3   | A     | 1.09±0.01    | 0±0/376 ( 0.0± 0.0%) | 0.84±0.01   | 0±0/508 ( 0.0± 0.0%) |
| All | All   | 1.11         | 156/43700 ( 0.4%)    | 1.53        | 344/63650 ( 0.5%)    |

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 |
| 2   | C     | 118 | DT   | C5-C7 | 6.97 | 1.54        | 1.50     | 44     | 45    |
| 2   | C     | 113 | DT   | C5-C7 | 6.66 | 1.54        | 1.50     | 49     | 40    |
| 2   | C     | 116 | DT   | C5-C7 | 6.51 | 1.53        | 1.50     | 41     | 43    |
| 1   | B     | 109 | DT   | C5-C7 | 6.35 | 1.53        | 1.50     | 13     | 28    |

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 |
| 2   | C     | 116 | DT   | C6-C5-C7   | -6.82 | 118.81      | 122.90   | 39     | 43    |
| 2   | C     | 113 | DT   | C6-C5-C7   | -6.73 | 118.86      | 122.90   | 11     | 37    |
| 2   | C     | 118 | DT   | C6-C5-C7   | -6.54 | 118.97      | 122.90   | 35     | 11    |
| 2   | C     | 118 | DT   | O4'-C1'-N1 | 6.20  | 112.34      | 108.00   | 39     | 25    |
| 2   | C     | 117 | DC   | O4'-C1'-N1 | 6.18  | 112.33      | 108.00   | 41     | 12    |
| 1   | B     | 109 | DT   | C6-C5-C7   | -6.15 | 119.21      | 122.90   | 38     | 39    |
| 1   | B     | 105 | DA   | O4'-C1'-N9 | 5.97  | 112.18      | 108.00   | 50     | 22    |
| 2   | C     | 114 | DA   | O4'-C1'-N9 | 5.93  | 112.15      | 108.00   | 29     | 3     |
| 2   | C     | 119 | DC   | O4'-C1'-N1 | 5.69  | 111.98      | 108.00   | 28     | 2     |
| 1   | B     | 109 | DT   | C4-C5-C6   | 5.55  | 121.33      | 118.00   | 41     | 39    |
| 2   | C     | 120 | DG   | O4'-C1'-N9 | 5.55  | 111.89      | 108.00   | 28     | 6     |

*Continued on next page...*



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| Mol | Chain | Res | Type | Atoms      | Z    | Observed(°) | Ideal(°) | Models |       |
|-----|-------|-----|------|------------|------|-------------|----------|--------|-------|
|     |       |     |      |            |      |             |          | Worst  | Total |
| 2   | C     | 113 | DT   | C4-C5-C6   | 5.49 | 121.29      | 118.00   | 26     | 33    |
| 1   | B     | 108 | DG   | O4'-C1'-N9 | 5.44 | 111.81      | 108.00   | 2      | 6     |
| 2   | C     | 118 | DT   | C4-C5-C6   | 5.43 | 121.26      | 118.00   | 39     | 33    |
| 2   | C     | 116 | DT   | C4-C5-C6   | 5.38 | 121.23      | 118.00   | 27     | 25    |
| 1   | B     | 104 | DG   | O4'-C1'-N9 | 5.35 | 111.74      | 108.00   | 31     | 4     |
| 2   | C     | 121 | DG   | O4'-C1'-N9 | 5.15 | 111.61      | 108.00   | 27     | 1     |
| 2   | C     | 112 | DG   | O4'-C1'-N9 | 5.09 | 111.56      | 108.00   | 44     | 1     |
| 1   | B     | 109 | DT   | O4'-C1'-N1 | 5.08 | 111.55      | 108.00   | 11     | 1     |
| 1   | B     | 111 | DC   | O4'-C1'-N1 | 5.02 | 111.51      | 108.00   | 35     | 1     |

There are no chirality outliers.

There are no planarity outliers.

## 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   | B     | 225   | 122      | 124      | 6±2     |
| 2   | C     | 220   | 124      | 126      | 4±1     |
| 3   | A     | 366   | 368      | 368      | 15±4    |
| All | All   | 40600 | 30700    | 30900    | 1106    |

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 15.

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

| Atom-1          | Atom-2          | Clash(Å) | Distance(Å) | Models |       |
|-----------------|-----------------|----------|-------------|--------|-------|
|                 |                 |          |             | Worst  | Total |
| 3:A:54:GLU:O    | 3:A:59:ALA:HB2  | 0.81     | 1.74        | 18     | 50    |
| 3:A:21:THR:O    | 3:A:21:THR:HG23 | 0.70     | 1.87        | 11     | 36    |
| 3:A:45:GLN:HE22 | 3:A:47:ARG:NH2  | 0.65     | 1.89        | 16     | 10    |
| 3:A:45:GLN:NE2  | 3:A:47:ARG:NH2  | 0.65     | 2.44        | 16     | 11    |
| 1:B:106:DG:H2'' | 1:B:107:DA:O5'  | 0.64     | 1.91        | 24     | 18    |
| 3:A:17:HIS:N    | 3:A:18:PRO:CD   | 0.64     | 2.61        | 31     | 47    |
| 1:B:102:DC:H2'' | 1:B:103:DC:O5'  | 0.62     | 1.94        | 39     | 32    |
| 1:B:101:DG:H8   | 1:B:101:DG:HO5' | 0.62     | 1.35        | 31     | 7     |

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| Atom-1          | Atom-2          | Clash(Å) | Distance(Å) | Models |       |
|-----------------|-----------------|----------|-------------|--------|-------|
|                 |                 |          |             | Worst  | Total |
| 3:A:39:CYS:SG   | 3:A:41:ALA:HB2  | 0.62     | 2.34        | 28     | 44    |
| 3:A:47:ARG:CG   | 3:A:47:ARG:HH11 | 0.62     | 2.08        | 42     | 2     |
| 3:A:32:GLN:NE2  | 3:A:32:GLN:N    | 0.62     | 2.48        | 21     | 1     |
| 2:C:115:DC:H2'' | 2:C:116:DT:O5'  | 0.61     | 1.94        | 36     | 9     |
| 1:B:109:DT:H2'' | 1:B:110:DA:O5'  | 0.61     | 1.96        | 2      | 27    |
| 3:A:45:GLN:OE1  | 3:A:47:ARG:NH2  | 0.60     | 2.35        | 48     | 8     |
| 3:A:56:ARG:O    | 3:A:57:HIS:ND1  | 0.60     | 2.34        | 46     | 35    |
| 2:C:120:DG:H2'' | 2:C:121:DG:O5'  | 0.59     | 1.97        | 4      | 15    |
| 3:A:31:GLU:OE2  | 3:A:47:ARG:NH1  | 0.59     | 2.36        | 8      | 10    |
| 3:A:45:GLN:NE2  | 3:A:47:ARG:HH21 | 0.59     | 1.96        | 34     | 6     |
| 2:C:116:DT:H2'' | 2:C:117:DC:O5'  | 0.59     | 1.97        | 46     | 24    |
| 3:A:45:GLN:OE1  | 3:A:47:ARG:NH1  | 0.57     | 2.36        | 42     | 2     |
| 3:A:47:ARG:CG   | 3:A:47:ARG:NH1  | 0.57     | 2.68        | 35     | 2     |
| 2:C:113:DT:H2'' | 2:C:114:DA:O5'  | 0.56     | 1.99        | 27     | 17    |
| 3:A:45:GLN:OE1  | 3:A:47:ARG:NE   | 0.56     | 2.38        | 7      | 7     |
| 1:B:107:DA:N7   | 3:A:27:ARG:NE   | 0.56     | 2.54        | 35     | 4     |
| 2:C:114:DA:C2   | 2:C:115:DC:C2   | 0.56     | 2.94        | 14     | 16    |
| 3:A:32:GLN:N    | 3:A:32:GLN:OE1  | 0.56     | 2.39        | 3      | 4     |
| 3:A:36:CYS:O    | 3:A:40:TYR:N    | 0.55     | 2.39        | 16     | 11    |
| 1:B:108:DG:O6   | 3:A:27:ARG:NE   | 0.55     | 2.39        | 30     | 12    |
| 1:B:107:DA:H2'' | 1:B:108:DG:O5'  | 0.55     | 2.01        | 18     | 5     |
| 3:A:45:GLN:NE2  | 3:A:48:ASN:ND2  | 0.55     | 2.55        | 5      | 1     |
| 3:A:56:ARG:O    | 3:A:57:HIS:CG   | 0.55     | 2.59        | 25     | 34    |
| 2:C:114:DA:C2   | 2:C:115:DC:N3   | 0.55     | 2.75        | 41     | 10    |
| 2:C:114:DA:N7   | 3:A:27:ARG:NH1  | 0.55     | 2.54        | 12     | 2     |
| 1:B:106:DG:N2   | 1:B:107:DA:C2   | 0.55     | 2.75        | 2      | 3     |
| 3:A:39:CYS:O    | 3:A:41:ALA:N    | 0.55     | 2.39        | 28     | 6     |
| 1:B:103:DC:C6   | 3:A:51:ARG:NH2  | 0.55     | 2.75        | 24     | 5     |
| 2:C:120:DG:N2   | 2:C:121:DG:C2   | 0.55     | 2.75        | 49     | 5     |
| 3:A:45:GLN:HE22 | 3:A:47:ARG:HH21 | 0.54     | 1.45        | 34     | 5     |
| 1:B:108:DG:N7   | 3:A:27:ARG:NH2  | 0.54     | 2.55        | 7      | 7     |
| 3:A:31:GLU:OE2  | 3:A:47:ARG:NH2  | 0.54     | 2.41        | 38     | 5     |
| 1:B:108:DG:O6   | 3:A:27:ARG:NH1  | 0.54     | 2.41        | 48     | 21    |
| 3:A:34:ALA:N    | 3:A:43:ILE:O    | 0.54     | 2.40        | 23     | 30    |
| 2:C:114:DA:C5   | 2:C:115:DC:C4   | 0.54     | 2.96        | 3      | 2     |
| 1:B:105:DA:C8   | 3:A:45:GLN:NE2  | 0.54     | 2.76        | 6      | 5     |
| 3:A:17:HIS:N    | 3:A:17:HIS:ND1  | 0.54     | 2.56        | 40     | 3     |
| 1:B:104:DG:H2'' | 1:B:105:DA:O5'  | 0.54     | 2.02        | 40     | 11    |
| 1:B:110:DA:H2'' | 1:B:111:DC:O5'  | 0.53     | 2.03        | 31     | 25    |
| 3:A:53:LEU:O    | 3:A:58:PHE:N    | 0.53     | 2.41        | 22     | 8     |
| 2:C:117:DC:H2'' | 2:C:118:DT:O5'  | 0.53     | 2.03        | 42     | 26    |

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| Atom-1          | Atom-2          | Clash(Å) | Distance(Å) | Models |       |
|-----------------|-----------------|----------|-------------|--------|-------|
|                 |                 |          |             | Worst  | Total |
| 3:A:17:HIS:ND1  | 3:A:17:HIS:O    | 0.53     | 2.41        | 21     | 2     |
| 1:B:106:DG:N2   | 2:C:118:DT:C2   | 0.53     | 2.76        | 34     | 2     |
| 2:C:116:DT:O4   | 3:A:47:ARG:NH1  | 0.53     | 2.41        | 44     | 5     |
| 3:A:54:GLU:O    | 3:A:59:ALA:CB   | 0.52     | 2.58        | 2      | 40    |
| 1:B:105:DA:N7   | 3:A:45:GLN:OE1  | 0.52     | 2.42        | 21     | 19    |
| 3:A:35:THR:HG22 | 3:A:36:CYS:N    | 0.52     | 2.19        | 22     | 14    |
| 1:B:107:DA:OP1  | 3:A:22:GLU:N    | 0.52     | 2.42        | 3      | 1     |
| 3:A:34:ALA:O    | 3:A:43:ILE:N    | 0.52     | 2.38        | 34     | 24    |
| 2:C:120:DG:C6   | 2:C:121:DG:C6   | 0.52     | 2.98        | 13     | 2     |
| 2:C:116:DT:H4'  | 2:C:117:DC:OP1  | 0.52     | 2.05        | 26     | 6     |
| 1:B:102:DC:OP1  | 3:A:56:ARG:NH2  | 0.52     | 2.43        | 49     | 3     |
| 3:A:45:GLN:OE1  | 3:A:48:ASN:ND2  | 0.52     | 2.43        | 46     | 5     |
| 3:A:22:GLU:N    | 3:A:22:GLU:OE1  | 0.52     | 2.42        | 10     | 1     |
| 2:C:116:DT:H73  | 3:A:47:ARG:NH1  | 0.52     | 2.19        | 36     | 5     |
| 1:B:103:DC:C5   | 3:A:51:ARG:NH2  | 0.52     | 2.78        | 4      | 9     |
| 3:A:21:THR:O    | 3:A:21:THR:CG2  | 0.51     | 2.59        | 24     | 23    |
| 3:A:54:GLU:OE1  | 3:A:54:GLU:N    | 0.51     | 2.43        | 24     | 1     |
| 1:B:104:DG:C6   | 1:B:105:DA:C6   | 0.51     | 2.99        | 46     | 3     |
| 2:C:120:DG:C2   | 2:C:121:DG:C5   | 0.51     | 2.99        | 49     | 7     |
| 1:B:105:DA:N3   | 1:B:106:DG:N7   | 0.51     | 2.59        | 27     | 1     |
| 1:B:103:DC:H2'' | 1:B:104:DG:O5'  | 0.51     | 2.06        | 45     | 7     |
| 1:B:106:DG:C1'  | 3:A:16:LYS:HZ1  | 0.51     | 2.18        | 9      | 1     |
| 3:A:50:ARG:NH1  | 3:A:50:ARG:CG   | 0.50     | 2.74        | 13     | 4     |
| 1:B:108:DG:H2'' | 1:B:109:DT:O5'  | 0.50     | 2.06        | 12     | 6     |
| 3:A:47:ARG:HH11 | 3:A:47:ARG:HG2  | 0.50     | 1.66        | 35     | 2     |
| 3:A:45:GLN:CD   | 3:A:47:ARG:HH21 | 0.50     | 2.09        | 44     | 4     |
| 1:B:105:DA:OP1  | 3:A:44:ARG:NH2  | 0.50     | 2.44        | 46     | 3     |
| 2:C:119:DC:H2'' | 2:C:120:DG:O5'  | 0.50     | 2.06        | 50     | 5     |
| 3:A:27:ARG:NH1  | 3:A:27:ARG:CG   | 0.49     | 2.74        | 50     | 7     |
| 2:C:116:DT:H71  | 2:C:116:DT:OP2  | 0.49     | 2.07        | 6      | 5     |
| 3:A:31:GLU:CG   | 3:A:47:ARG:HH21 | 0.49     | 2.19        | 40     | 4     |
| 3:A:47:ARG:CG   | 3:A:48:ASN:N    | 0.49     | 2.75        | 49     | 20    |
| 1:B:106:DG:OP1  | 3:A:23:LYS:NZ   | 0.49     | 2.43        | 24     | 2     |
| 1:B:107:DA:N7   | 3:A:27:ARG:NH1  | 0.49     | 2.60        | 45     | 1     |
| 1:B:106:DG:O4'  | 3:A:16:LYS:NZ   | 0.49     | 2.45        | 9      | 1     |
| 3:A:50:ARG:CG   | 3:A:50:ARG:HH11 | 0.49     | 2.21        | 13     | 3     |
| 3:A:30:SER:O    | 3:A:32:GLN:OE1  | 0.49     | 2.31        | 2      | 3     |
| 3:A:45:GLN:CD   | 3:A:47:ARG:NH1  | 0.49     | 2.66        | 35     | 2     |
| 3:A:44:ARG:NH1  | 3:A:44:ARG:CG   | 0.48     | 2.75        | 33     | 5     |
| 3:A:47:ARG:HH12 | 3:A:48:ASN:ND2  | 0.48     | 2.06        | 42     | 1     |
| 3:A:25:ARG:HH11 | 3:A:25:ARG:CG   | 0.48     | 2.21        | 45     | 1     |

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| Atom-1          | Atom-2          | Clash(Å) | Distance(Å) | Models |       |
|-----------------|-----------------|----------|-------------|--------|-------|
|                 |                 |          |             | Worst  | Total |
| 3:A:32:GLN:CD   | 3:A:32:GLN:N    | 0.48     | 2.67        | 32     | 5     |
| 2:C:120:DG:N1   | 2:C:121:DG:C6   | 0.48     | 2.81        | 13     | 4     |
| 3:A:25:ARG:CG   | 3:A:25:ARG:NH1  | 0.48     | 2.74        | 45     | 1     |
| 1:B:106:DG:N2   | 1:B:107:DA:N3   | 0.48     | 2.61        | 2      | 2     |
| 1:B:102:DC:H6   | 1:B:102:DC:O5'  | 0.47     | 1.92        | 34     | 2     |
| 1:B:107:DA:C6   | 1:B:108:DG:O6   | 0.47     | 2.67        | 28     | 3     |
| 2:C:114:DA:N3   | 2:C:115:DC:C2   | 0.47     | 2.83        | 44     | 3     |
| 2:C:116:DT:H73  | 2:C:116:DT:OP2  | 0.47     | 2.09        | 42     | 1     |
| 1:B:104:DG:O6   | 3:A:51:ARG:NH1  | 0.47     | 2.48        | 35     | 2     |
| 3:A:29:GLN:NE2  | 3:A:29:GLN:C    | 0.47     | 2.69        | 9      | 1     |
| 1:B:105:DA:C8   | 3:A:45:GLN:OE1  | 0.47     | 2.68        | 29     | 2     |
| 3:A:44:ARG:CG   | 3:A:44:ARG:HH11 | 0.47     | 2.23        | 33     | 1     |
| 2:C:114:DA:H2'' | 2:C:115:DC:O5'  | 0.46     | 2.10        | 12     | 3     |
| 3:A:34:ALA:HB3  | 3:A:43:ILE:O    | 0.46     | 2.10        | 12     | 1     |
| 1:B:107:DA:C8   | 3:A:27:ARG:NH2  | 0.46     | 2.83        | 19     | 2     |
| 3:A:31:GLU:CG   | 3:A:47:ARG:NH2  | 0.46     | 2.79        | 38     | 1     |
| 3:A:17:HIS:N    | 3:A:18:PRO:HD2  | 0.46     | 2.25        | 28     | 3     |
| 3:A:27:ARG:CG   | 3:A:27:ARG:HH11 | 0.46     | 2.23        | 19     | 5     |
| 1:B:101:DG:H8   | 1:B:101:DG:O5'  | 0.46     | 1.93        | 31     | 1     |
| 2:C:120:DG:C2   | 2:C:121:DG:C4   | 0.46     | 3.04        | 13     | 1     |
| 3:A:29:GLN:O    | 3:A:32:GLN:NE2  | 0.46     | 2.49        | 35     | 1     |
| 1:B:103:DC:O2   | 2:C:121:DG:N2   | 0.46     | 2.49        | 32     | 2     |
| 1:B:107:DA:P    | 3:A:21:THR:HG1  | 0.46     | 2.34        | 24     | 1     |
| 2:C:116:DT:H71  | 3:A:47:ARG:HD2  | 0.46     | 1.88        | 35     | 2     |
| 3:A:16:LYS:CB   | 3:A:16:LYS:NZ   | 0.45     | 2.79        | 14     | 1     |
| 2:C:121:DG:H2'' | 2:C:122:DC:O5'  | 0.45     | 2.11        | 9      | 1     |
| 1:B:106:DG:N2   | 2:C:118:DT:O2   | 0.45     | 2.50        | 39     | 1     |
| 3:A:32:GLN:N    | 3:A:32:GLN:HE21 | 0.45     | 2.08        | 21     | 1     |
| 2:C:113:DT:N3   | 2:C:114:DA:C6   | 0.45     | 2.85        | 12     | 1     |
| 1:B:104:DG:C2   | 1:B:105:DA:C2   | 0.45     | 3.05        | 22     | 5     |
| 3:A:18:PRO:O    | 3:A:19:PRO:O    | 0.45     | 2.35        | 12     | 1     |
| 3:A:39:CYS:C    | 3:A:41:ALA:N    | 0.45     | 2.70        | 28     | 2     |
| 2:C:118:DT:H2'' | 2:C:119:DC:O5'  | 0.45     | 2.11        | 49     | 3     |
| 1:B:106:DG:O6   | 3:A:47:ARG:NH1  | 0.45     | 2.50        | 45     | 1     |
| 3:A:34:ALA:O    | 3:A:43:ILE:O    | 0.45     | 2.35        | 50     | 11    |
| 3:A:56:ARG:C    | 3:A:57:HIS:CG   | 0.44     | 2.91        | 43     | 8     |
| 3:A:54:GLU:O    | 3:A:59:ALA:CA   | 0.44     | 2.66        | 40     | 3     |
| 1:B:105:DA:H2'' | 1:B:106:DG:O5'  | 0.44     | 2.12        | 6      | 2     |
| 1:B:108:DG:O6   | 3:A:27:ARG:CZ   | 0.44     | 2.65        | 3      | 3     |
| 3:A:25:ARG:NH1  | 3:A:25:ARG:CG   | 0.44     | 2.81        | 22     | 4     |
| 1:B:106:DG:C1'  | 3:A:16:LYS:NZ   | 0.44     | 2.81        | 9      | 1     |

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| Atom-1          | Atom-2          | Clash(Å) | Distance(Å) | Models |       |
|-----------------|-----------------|----------|-------------|--------|-------|
|                 |                 |          |             | Worst  | Total |
| 2:C:114:DA:C6   | 2:C:115:DC:N4   | 0.44     | 2.86        | 12     | 1     |
| 3:A:32:GLN:O    | 3:A:44:ARG:O    | 0.44     | 2.35        | 25     | 2     |
| 3:A:35:THR:CG2  | 3:A:36:CYS:N    | 0.44     | 2.81        | 22     | 3     |
| 1:B:107:DA:P    | 3:A:22:GLU:O    | 0.43     | 2.76        | 3      | 1     |
| 1:B:105:DA:H2   | 2:C:119:DC:O2   | 0.43     | 1.97        | 7      | 1     |
| 2:C:114:DA:C8   | 3:A:27:ARG:NH1  | 0.43     | 2.86        | 29     | 1     |
| 3:A:29:GLN:NE2  | 3:A:29:GLN:O    | 0.43     | 2.51        | 9      | 1     |
| 2:C:120:DG:C6   | 2:C:121:DG:O6   | 0.43     | 2.71        | 4      | 1     |
| 1:B:106:DG:OP1  | 3:A:23:LYS:CE   | 0.43     | 2.67        | 7      | 1     |
| 3:A:26:SER:O    | 3:A:30:SER:OG   | 0.43     | 2.32        | 29     | 1     |
| 3:A:23:LYS:CB   | 3:A:23:LYS:HZ2  | 0.43     | 2.27        | 24     | 1     |
| 1:B:106:DG:H8   | 1:B:106:DG:O5'  | 0.43     | 1.95        | 29     | 3     |
| 1:B:108:DG:N7   | 3:A:27:ARG:NH1  | 0.43     | 2.67        | 32     | 1     |
| 1:B:110:DA:C2   | 2:C:114:DA:C2   | 0.42     | 3.08        | 12     | 1     |
| 2:C:115:DC:OP2  | 3:A:31:GLU:OE2  | 0.42     | 2.37        | 21     | 1     |
| 3:A:55:LEU:C    | 3:A:56:ARG:HE   | 0.42     | 2.16        | 27     | 1     |
| 3:A:31:GLU:CD   | 3:A:47:ARG:HH21 | 0.42     | 2.18        | 32     | 1     |
| 2:C:114:DA:C4   | 2:C:115:DC:C4   | 0.42     | 3.08        | 8      | 3     |
| 3:A:30:SER:O    | 3:A:32:GLN:NE2  | 0.42     | 2.52        | 6      | 1     |
| 2:C:113:DT:C4   | 2:C:114:DA:N6   | 0.42     | 2.88        | 13     | 1     |
| 3:A:23:LYS:HZ2  | 3:A:23:LYS:HB3  | 0.42     | 1.75        | 24     | 1     |
| 3:A:17:HIS:ND1  | 3:A:17:HIS:C    | 0.42     | 2.73        | 21     | 1     |
| 3:A:44:ARG:HH11 | 3:A:44:ARG:HG2  | 0.42     | 1.74        | 33     | 1     |
| 3:A:25:ARG:CG   | 3:A:25:ARG:HH11 | 0.42     | 2.28        | 7      | 1     |
| 1:B:104:DG:C6   | 1:B:105:DA:N6   | 0.42     | 2.87        | 46     | 1     |
| 3:A:25:ARG:HH11 | 3:A:25:ARG:HG2  | 0.41     | 1.76        | 32     | 3     |
| 1:B:106:DG:O5'  | 1:B:106:DG:C8   | 0.41     | 2.73        | 30     | 2     |
| 3:A:45:GLN:CD   | 3:A:47:ARG:NH2  | 0.41     | 2.73        | 48     | 1     |
| 1:B:105:DA:C2   | 2:C:119:DC:O2   | 0.41     | 2.73        | 7      | 1     |
| 3:A:31:GLU:OE2  | 3:A:47:ARG:CZ   | 0.41     | 2.68        | 46     | 1     |
| 3:A:44:ARG:HG2  | 3:A:44:ARG:HH11 | 0.41     | 1.76        | 50     | 1     |
| 3:A:51:ARG:CB   | 3:A:51:ARG:NH1  | 0.41     | 2.83        | 7      | 1     |
| 1:B:106:DG:OP1  | 3:A:23:LYS:CD   | 0.41     | 2.68        | 29     | 1     |
| 3:A:27:ARG:HH11 | 3:A:27:ARG:HG2  | 0.41     | 1.75        | 50     | 1     |
| 1:B:103:DC:C5   | 3:A:51:ARG:NH1  | 0.41     | 2.89        | 11     | 1     |
| 2:C:116:DT:C4'  | 2:C:117:DC:OP1  | 0.41     | 2.68        | 20     | 3     |
| 2:C:114:DA:OP2  | 3:A:30:SER:OG   | 0.41     | 2.37        | 39     | 1     |
| 1:B:107:DA:OP1  | 3:A:21:THR:OG1  | 0.41     | 2.38        | 24     | 1     |
| 3:A:44:ARG:CG   | 3:A:44:ARG:NH1  | 0.41     | 2.82        | 28     | 1     |
| 2:C:114:DA:C5   | 2:C:115:DC:N4   | 0.41     | 2.88        | 1      | 1     |
| 1:B:106:DG:C2   | 1:B:107:DA:C2   | 0.41     | 3.08        | 40     | 2     |

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| Atom-1          | Atom-2          | Clash(Å) | Distance(Å) | Models |       |
|-----------------|-----------------|----------|-------------|--------|-------|
|                 |                 |          |             | Worst  | Total |
| 3:A:50:ARG:HG2  | 3:A:50:ARG:HH11 | 0.41     | 1.74        | 48     | 1     |
| 3:A:29:GLN:O    | 3:A:29:GLN:OE1  | 0.40     | 2.39        | 17     | 1     |
| 3:A:32:GLN:NE2  | 3:A:32:GLN:H    | 0.40     | 2.13        | 21     | 1     |
| 2:C:122:DC:H6   | 2:C:122:DC:O5'  | 0.40     | 2.00        | 50     | 1     |
| 3:A:50:ARG:HH11 | 3:A:50:ARG:HG2  | 0.40     | 1.76        | 17     | 1     |
| 3:A:32:GLN:HE21 | 3:A:32:GLN:H    | 0.40     | 1.59        | 21     | 1     |
| 2:C:116:DT:O5'  | 2:C:116:DT:H6   | 0.40     | 2.00        | 42     | 1     |

## 6.3 Torsion angles [i](#)

### 6.3.1 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 PDB entries followed by that with respect to all NMR entries. 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   | A     | 45/54 (83%)     | 39±1 (87±3%) | 5±1 (12±3%) | 1±1 (1±1%) | 14          | 59 |
| All | All   | 2250/2700 (83%) | 1954 (87%)   | 263 (12%)   | 33 (1%)    | 14          | 59 |

All 7 unique Ramachandran outliers are listed below. They are sorted by the frequency of occurrence in the ensemble.

| Mol | Chain | Res | Type | Models (Total) |
|-----|-------|-----|------|----------------|
| 3   | A     | 33  | PRO  | 20             |
| 3   | A     | 40  | TYR  | 5              |
| 3   | A     | 19  | PRO  | 3              |
| 3   | A     | 59  | ALA  | 2              |
| 3   | A     | 37  | PRO  | 1              |
| 3   | A     | 24  | PRO  | 1              |
| 3   | A     | 18  | PRO  | 1              |

### 6.3.2 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 PDB entries followed by that with respect to all NMR entries. 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   | A     | 40/47 (85%)     | 39±1 (98±3%) | 1±1 (2±3%) | 51          | 92 |
| All | All   | 2000/2350 (85%) | 1953 (98%)   | 47 (2%)    | 51          | 92 |

All 11 unique residues with a non-rotameric sidechain are listed below. They are sorted by the frequency of occurrence in the ensemble.

| Mol | Chain | Res | Type | Models (Total) |
|-----|-------|-----|------|----------------|
| 3   | A     | 21  | THR  | 13             |
| 3   | A     | 47  | ARG  | 12             |
| 3   | A     | 27  | ARG  | 5              |
| 3   | A     | 17  | HIS  | 3              |
| 3   | A     | 25  | ARG  | 3              |
| 3   | A     | 23  | LYS  | 3              |
| 3   | A     | 29  | GLN  | 2              |
| 3   | A     | 50  | ARG  | 2              |
| 3   | A     | 32  | GLN  | 2              |
| 3   | A     | 16  | LYS  | 1              |
| 3   | A     | 54  | GLU  | 1              |

### 6.3.3 RNA [i](#)

There are no RNA molecules in this entry.

## 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](#)

Of 1 ligands modelled in this entry, 1 is monoatomic - leaving 0 for Mogul analysis.

## 6.7 Other polymers [i](#)

There are no such molecules in this entry.

## 6.8 Polymer linkage issues

There are no chain breaks in this entry.



## 7 Chemical shift validation

No chemical shift data were provided