



# Full wwPDB NMR Structure Validation Report ⓘ

Feb 10, 2022 – 11:37 AM EST

PDB ID : 1EVO  
Title : NMR OBSERVATION OF A NOVEL C-TETRAD  
Authors : Patel, P.K.; Bhavesh, N.S.; Hosur, R.V.  
Deposited on : 2000-04-20

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.

---

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*

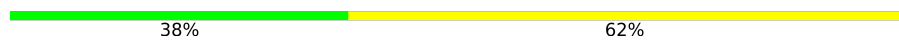



The overall completeness of chemical shifts assignment was not calculated.

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 (#Entries)	NMR archive (#Entries)
Clashscore	158937	12864

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	O	8	
1	P	8	
1	Q	8	
1	R	8	

## 2 Ensemble composition and analysis

This entry contains 10 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 [i](#)

There is only 1 type of molecule in this entry. The entry contains 1032 atoms, of which 368 are hydrogens and 0 are deuteriums.

- Molecule 1 is a DNA chain called DNA (5'-D(\*TP\*GP\*GP\*GP\*CP\*GP\*GP\*T)-3').

Mol	Chain	Residues	Atoms					Trace	
			Total	C	H	N	O		P
1	O	8	258	79	92	32	48	7	0
1	P	8	258	79	92	32	48	7	0
1	Q	8	258	79	92	32	48	7	0
1	R	8	258	79	92	32	48	7	0

## 4 Residue-property plots

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

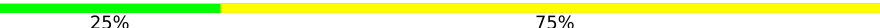
These plots are provided for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic is the same as shown in the summary in section 1 of this report. The second graphic shows the sequence where residues are colour-coded according to the number of geometric quality criteria for 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: DNA (5'-D(\*TP\*GP\*GP\*GP\*CP\*GP\*GP\*T)-3')

Chain O: 




- Molecule 1: DNA (5'-D(\*TP\*GP\*GP\*GP\*CP\*GP\*GP\*T)-3')

Chain P: 



- Molecule 1: DNA (5'-D(\*TP\*GP\*GP\*GP\*CP\*GP\*GP\*T)-3')

Chain Q: 



- Molecule 1: DNA (5'-D(\*TP\*GP\*GP\*GP\*CP\*GP\*GP\*T)-3')

Chain R: 




### 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(\*TP\*GP\*GP\*GP\*CP\*GP\*GP\*T)-3')

Chain O:  25% 75%



- Molecule 1: DNA (5'-D(\*TP\*GP\*GP\*GP\*CP\*GP\*GP\*T)-3')

Chain P:  25% 75%



- Molecule 1: DNA (5'-D(\*TP\*GP\*GP\*GP\*CP\*GP\*GP\*T)-3')

Chain Q:  25% 75%



- Molecule 1: DNA (5'-D(\*TP\*GP\*GP\*GP\*CP\*GP\*GP\*T)-3')

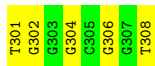
Chain R:  25% 75%



### 4.2.2 Score per residue for model 2

- Molecule 1: DNA (5'-D(\*TP\*GP\*GP\*GP\*CP\*GP\*GP\*T)-3')

Chain O:  38% 62%



- Molecule 1: DNA (5'-D(\*TP\*GP\*GP\*GP\*CP\*GP\*GP\*T)-3')

Chain P:  25% 75%

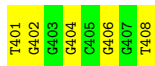


- Molecule 1: DNA (5'-D(\*TP\*GP\*GP\*GP\*CP\*GP\*GP\*T)-3')

Chain Q:  38% 62%



- Molecule 1: DNA (5'-D(\*TP\*GP\*GP\*GP\*CP\*GP\*GP\*T)-3')



#### 4.2.3 Score per residue for model 3

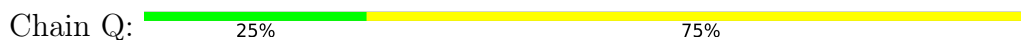
- Molecule 1: DNA (5'-D(\*TP\*GP\*GP\*GP\*CP\*GP\*GP\*T)-3')



- Molecule 1: DNA (5'-D(\*TP\*GP\*GP\*GP\*CP\*GP\*GP\*T)-3')



- Molecule 1: DNA (5'-D(\*TP\*GP\*GP\*GP\*CP\*GP\*GP\*T)-3')



- Molecule 1: DNA (5'-D(\*TP\*GP\*GP\*GP\*CP\*GP\*GP\*T)-3')



#### 4.2.4 Score per residue for model 4

- Molecule 1: DNA (5'-D(\*TP\*GP\*GP\*GP\*CP\*GP\*GP\*T)-3')



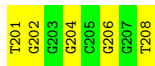
- Molecule 1: DNA (5'-D(\*TP\*GP\*GP\*GP\*CP\*GP\*GP\*T)-3')

Chain P:  38% 62%



- Molecule 1: DNA (5'-D(\*TP\*GP\*GP\*GP\*CP\*GP\*GP\*T)-3')

Chain Q:  38% 62%



- Molecule 1: DNA (5'-D(\*TP\*GP\*GP\*GP\*CP\*GP\*GP\*T)-3')

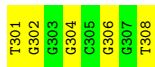
Chain R:  25% 75%



#### 4.2.5 Score per residue for model 5

- Molecule 1: DNA (5'-D(\*TP\*GP\*GP\*GP\*CP\*GP\*GP\*T)-3')

Chain O:  38% 62%

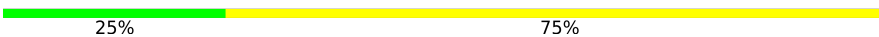


- Molecule 1: DNA (5'-D(\*TP\*GP\*GP\*GP\*CP\*GP\*GP\*T)-3')

Chain P:  25% 75%

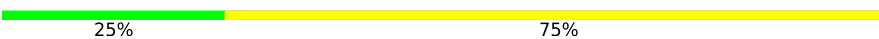


- Molecule 1: DNA (5'-D(\*TP\*GP\*GP\*GP\*CP\*GP\*GP\*T)-3')

Chain Q:  25% 75%



- Molecule 1: DNA (5'-D(\*TP\*GP\*GP\*GP\*CP\*GP\*GP\*T)-3')

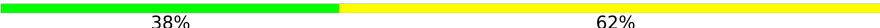
Chain R:  25% 75%



T401  
G402  
G403  
G404  
C405  
G406  
G407  
T408

#### 4.2.6 Score per residue for model 6

- Molecule 1: DNA (5'-D(\*TP\*GP\*GP\*GP\*CP\*GP\*GP\*T)-3')

Chain O:  38% 62%

T301  
G302  
G303  
G304  
C305  
T308

- Molecule 1: DNA (5'-D(\*TP\*GP\*GP\*GP\*CP\*GP\*GP\*T)-3')

Chain P:  25% 75%

T101  
G102  
G103  
G104  
C105  
G106  
G107  
T108

- Molecule 1: DNA (5'-D(\*TP\*GP\*GP\*GP\*CP\*GP\*GP\*T)-3')

Chain Q:  38% 62%

T201  
G202  
G203  
G204  
C205  
G206  
G207  
T208

- Molecule 1: DNA (5'-D(\*TP\*GP\*GP\*GP\*CP\*GP\*GP\*T)-3')

Chain R:  38% 62%

T401  
G402  
G403  
G404  
C405  
G406  
G407  
T408

#### 4.2.7 Score per residue for model 7

- Molecule 1: DNA (5'-D(\*TP\*GP\*GP\*GP\*CP\*GP\*GP\*T)-3')

Chain O:  25% 75%


T301  
G302  
G303  
G304  
C305  
G306  
G307  
T308

- Molecule 1: DNA (5'-D(\*TP\*GP\*GP\*GP\*CP\*GP\*GP\*T)-3')

Chain P:  25% 75%


T101  
G102  
G103  
G104  
C105  
G106  
G107  
T108

- Molecule 1: DNA (5'-D(\*TP\*GP\*GP\*GP\*CP\*GP\*GP\*T)-3')

Chain Q:  38% 62%

T201  
G202  
G203  
G204  
C205  
G206  
G207  
T208

- Molecule 1: DNA (5'-D(\*TP\*GP\*GP\*GP\*CP\*GP\*GP\*T)-3')

Chain R:  25% 75%

T401  
G402  
G403  
G404  
C405  
G406  
G407  
T408

#### 4.2.8 Score per residue for model 8

- Molecule 1: DNA (5'-D(\*TP\*GP\*GP\*GP\*CP\*GP\*GP\*T)-3')

Chain O:  38% 62%

T301  
G302  
G303  
G304  
C305  
G306  
G307  
T308

- Molecule 1: DNA (5'-D(\*TP\*GP\*GP\*GP\*CP\*GP\*GP\*T)-3')

Chain P:  25% 75%

T101  
G102  
G103  
G104  
C105  
G106  
G107  
T108

- Molecule 1: DNA (5'-D(\*TP\*GP\*GP\*GP\*CP\*GP\*GP\*T)-3')

Chain Q:  38% 62%

T201  
G202  
G203  
G204  
C205  
T208

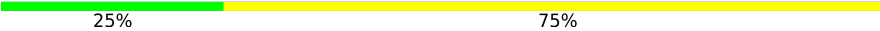
- Molecule 1: DNA (5'-D(\*TP\*GP\*GP\*GP\*CP\*GP\*GP\*T)-3')

Chain R:  25% 75%

T401  
G402  
G403  
G404  
C405  
G406  
G407  
T408

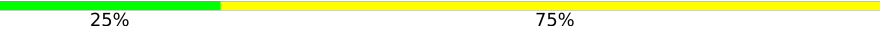
#### 4.2.9 Score per residue for model 9

- Molecule 1: DNA (5'-D(\*TP\*GP\*GP\*GP\*CP\*GP\*GP\*T)-3')

Chain O:  25% 75%

T301  
G302  
G303  
G304  
C305  
G306  
G307  
T308

- Molecule 1: DNA (5'-D(\*TP\*GP\*GP\*GP\*CP\*GP\*GP\*T)-3')

Chain P:  25% 75%


T101  
G102  
G103  
G104  
C105  
G106  
G107  
T108

- Molecule 1: DNA (5'-D(\*TP\*GP\*GP\*GP\*CP\*GP\*GP\*T)-3')

Chain Q:  38% 62%

T201  
G202  
G203  
G204  
C205  
G206  
G207  
T208

- Molecule 1: DNA (5'-D(\*TP\*GP\*GP\*GP\*CP\*GP\*GP\*T)-3')

Chain R:  25% 75%

T401  
G402  
G403  
G404  
C405  
G406  
G407  
T408

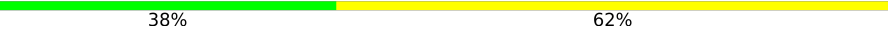
#### 4.2.10 Score per residue for model 10

- Molecule 1: DNA (5'-D(\*TP\*GP\*GP\*GP\*CP\*GP\*GP\*T)-3')

Chain O:  38% 62%

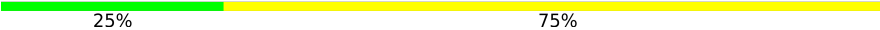
T301  
G302  
G303  
G304  
C305  
T308

- Molecule 1: DNA (5'-D(\*TP\*GP\*GP\*GP\*CP\*GP\*GP\*T)-3')

Chain P:  38% 62%

T101  
G102  
G103  
G104  
C105  
T108

- Molecule 1: DNA (5'-D(\*TP\*GP\*GP\*GP\*CP\*GP\*GP\*T)-3')

Chain Q:  25% 75%

T201  
G202  
G203  
G204  
C205  
G206  
G207  
T208

- Molecule 1: DNA (5'-D(\*TP\*GP\*GP\*GP\*CP\*GP\*GP\*T)-3')

Chain R:  38% 62%

T401	G402	G403	G404	C405	G406	G407	T408
------	------	------	------	------	------	------	------

## 5 Refinement protocol and experimental data overview

The models were refined using the following method: *Relaxation matrix refinement*.

Of the 10 calculated structures, 10 were deposited, based on the following criterion: *all calculated structures submitted*.

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

Software name	Classification	Version
Discover	structure solution	3.1
IRMA	refinement	2.3

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	O	1.55±0.00	1±0/186 ( 0.5± 0.0%)	2.12±0.02	7±1/287 ( 2.6± 0.3%)
1	P	1.56±0.01	1±0/186 ( 0.4± 0.2%)	2.13±0.02	8±1/287 ( 2.7± 0.3%)
1	Q	1.56±0.00	1±0/186 ( 0.5± 0.2%)	2.12±0.03	7±1/287 ( 2.6± 0.3%)
1	R	1.56±0.01	1±0/186 ( 0.5± 0.2%)	2.14±0.03	8±1/287 ( 2.9± 0.4%)
All	All	1.56	36/7440 ( 0.5%)	2.13	309/11480 ( 2.7%)

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	R	408	DT	C4'-O4'	-5.48	1.39	1.45	6	9
1	O	308	DT	C4'-O4'	-5.46	1.39	1.45	4	10
1	Q	208	DT	C4'-O4'	-5.40	1.39	1.45	1	9
1	P	108	DT	C4'-O4'	-5.37	1.39	1.45	1	8

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	R	408	DT	C6-C5-C7	-8.12	118.03	122.90	1	10
1	Q	208	DT	C6-C5-C7	-7.92	118.15	122.90	4	10
1	P	108	DT	C6-C5-C7	-7.73	118.26	122.90	1	10
1	O	308	DT	C6-C5-C7	-7.50	118.40	122.90	4	10
1	R	401	DT	O4'-C1'-C2'	-6.50	100.70	105.90	4	10
1	O	305	DC	O4'-C1'-N1	6.46	112.52	108.00	10	2
1	R	404	DG	O4'-C1'-C2'	-6.41	100.77	105.90	10	10
1	O	302	DG	O4'-C1'-C2'	-6.41	100.77	105.90	4	10
1	P	104	DG	O4'-C1'-C2'	-6.41	100.78	105.90	1	10
1	Q	202	DG	O4'-C1'-C2'	-6.38	100.80	105.90	2	10
1	R	405	DC	O4'-C1'-N1	6.33	112.43	108.00	1	2
1	R	402	DG	O4'-C1'-C2'	-6.33	100.84	105.90	9	10

*Continued on next page...*

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)	Models	
								Worst	Total
1	P	101	DT	O4'-C1'-C2'	-6.28	100.87	105.90	4	8
1	O	304	DG	O4'-C1'-C2'	-6.28	100.88	105.90	5	10
1	P	102	DG	O4'-C1'-C2'	-6.27	100.88	105.90	8	10
1	Q	204	DG	O4'-C1'-C2'	-6.27	100.89	105.90	6	10
1	O	301	DT	O4'-C1'-C2'	-6.05	101.06	105.90	9	10
1	P	105	DC	O4'-C1'-C2'	-5.94	101.15	105.90	8	9
1	Q	205	DC	O4'-C1'-N1	5.90	112.13	108.00	10	1
1	O	305	DC	O4'-C1'-C2'	-5.83	101.24	105.90	1	4
1	O	301	DT	C6-C5-C7	-5.80	119.42	122.90	10	5
1	P	101	DT	C6-C5-C7	-5.69	119.48	122.90	4	6
1	Q	205	DC	O4'-C1'-C2'	-5.69	101.35	105.90	3	4
1	R	405	DC	O4'-C1'-C2'	-5.67	101.36	105.90	8	4
1	R	401	DT	C6-C5-C7	-5.65	119.51	122.90	4	9
1	R	408	DT	C1'-O4'-C4'	-5.64	104.45	110.10	1	8
1	O	306	DG	C4'-C3'-C2'	-5.64	98.03	103.10	9	8
1	P	106	DG	C4'-C3'-C2'	-5.63	98.03	103.10	1	9
1	Q	206	DG	C4'-C3'-C2'	-5.63	98.03	103.10	1	9
1	R	405	DC	O4'-C4'-C3'	-5.50	102.30	104.50	1	1
1	Q	201	DT	O4'-C1'-C2'	-5.47	101.53	105.90	1	10
1	O	308	DT	C1'-O4'-C4'	-5.46	104.64	110.10	2	8
1	P	108	DT	C1'-O4'-C4'	-5.45	104.65	110.10	3	9
1	R	406	DG	C4'-C3'-C2'	-5.42	98.22	103.10	10	10
1	R	401	DT	N1-C1'-C2'	5.38	122.81	112.60	4	9
1	Q	201	DT	N1-C1'-C2'	5.35	122.77	112.60	1	7
1	P	101	DT	N1-C1'-C2'	5.35	122.77	112.60	7	7
1	O	301	DT	N1-C1'-C2'	5.32	122.71	112.60	4	7
1	Q	201	DT	C6-C5-C7	-5.30	119.72	122.90	2	6
1	Q	208	DT	C1'-O4'-C4'	-5.26	104.84	110.10	4	7

There are no chirality outliers.

There are no planarity outliers.

## 6.2 Too-close contacts

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in 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
All	All	6640	3680	3680	-

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 -.

There are no clashes.

## 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](#)

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](#)

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

There are no chain breaks in this entry.

## 7 Chemical shift validation

No chemical shift data were provided