



# wwPDB X-ray Structure Validation Summary Report ⓘ

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PDB ID : 1JFI  
Title : Crystal Structure of the NC2-TBP-DNA Ternary Complex  
Authors : Kamada, K.; Shu, F.; Chen, H.; Malik, S.; Stelzer, G.; Roeder, R.G.; Meisterernst, M.; Burley, S.K.; New York SGX Research Center for Structural Genomics (NYSGXRC)  
Deposited on : 2001-06-20  
Resolution : 2.62 Å(reported)

This is a wwPDB X-ray Structure Validation Summary 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/XrayValidationReportHelp>

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
Xtriage (Phenix)	:	1.13
EDS	:	2.16
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.16

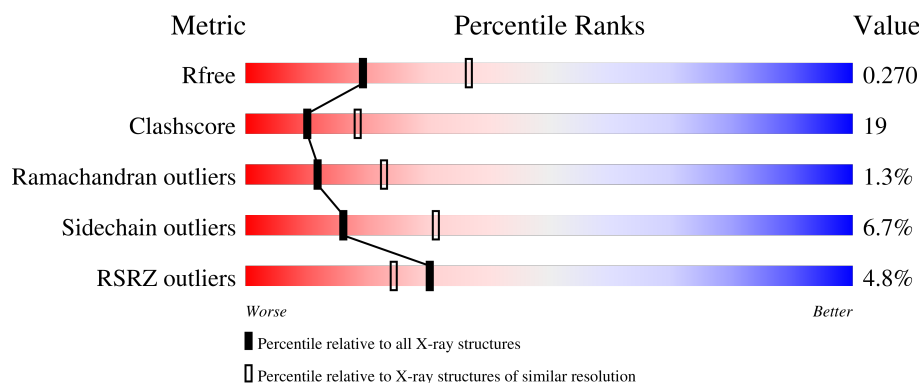
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.62 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
$R_{free}$	130704	3797 (2.64-2.60)
Clashscore	141614	4168 (2.64-2.60)
Ramachandran outliers	138981	4093 (2.64-2.60)
Sidechain outliers	138945	4093 (2.64-2.60)
RSRZ outliers	127900	3731 (2.64-2.60)

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

Mol	Chain	Length	Quality of chain
1	D	19	
2	E	19	
3	A	98	
4	B	179	
5	C	185	

## 2 Entry composition

There are 6 unique types of molecules in this entry. The entry contains 3743 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, the ZeroOcc column contains the number of atoms modelled with zero occupancy, the AltConf column contains the number of residues with at least one atom in alternate conformation and the Trace column contains the number of residues modelled with at most 2 atoms.

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

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	D	18	Total	C	N	O	P	0	0	0
			369	177	69	106	17			

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

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	E	18	Total	C	N	O	P	0	0	0
			363	175	65	106	17			

- Molecule 3 is a protein called Transcription Regulator NC2 alpha chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	A	63	Total	C	N	O	S	0	0	0
			490	311	87	88	4			

There are 21 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	78	GLY	-	cloning artifact	UNP Q14919
A	79	ASP	-	cloning artifact	UNP Q14919
A	80	PRO	-	cloning artifact	UNP Q14919
A	81	ALA	-	cloning artifact	UNP Q14919
A	82	ALA	-	cloning artifact	UNP Q14919
A	83	ASN	-	cloning artifact	UNP Q14919
A	84	LYS	-	cloning artifact	UNP Q14919
A	85	ALA	-	cloning artifact	UNP Q14919
A	86	ARG	-	cloning artifact	UNP Q14919
A	87	LYS	-	cloning artifact	UNP Q14919
A	88	GLU	-	cloning artifact	UNP Q14919
A	89	ALA	-	cloning artifact	UNP Q14919

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Chain	Residue	Modelled	Actual	Comment	Reference
A	90	GLU	-	cloning artifact	UNP Q14919
A	91	LEU	-	cloning artifact	UNP Q14919
A	92	ALA	-	cloning artifact	UNP Q14919
A	93	ALA	-	cloning artifact	UNP Q14919
A	94	ALA	-	cloning artifact	UNP Q14919
A	95	THR	-	cloning artifact	UNP Q14919
A	96	ALA	-	cloning artifact	UNP Q14919
A	97	GLU	-	cloning artifact	UNP Q14919
A	98	GLN	-	cloning artifact	UNP Q14919

- Molecule 4 is a protein called Transcription Regulator NC2 beta chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
4	B	135	Total	C	N	O	S	0	0	0
			1059	655	190	209	5			

There are 3 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	98	GLY	-	cloning artifact	UNP Q01658
B	99	PRO	-	cloning artifact	UNP Q01658
B	100	HIS	-	cloning artifact	UNP Q01658

- Molecule 5 is a protein called TATA-BOX-BINDING PROTEIN (TBP).

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
5	C	183	Total	C	N	O	S	0	0	0
			1453	941	257	247	8			

There are 4 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
C	355	GLY	-	cloning artifact	UNP P20226
C	356	SER	-	cloning artifact	UNP P20226
C	357	HIS	-	cloning artifact	UNP P20226
C	358	MET	-	cloning artifact	UNP P20226

- Molecule 6 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	D	1	Total	O	0	0
			1	1		

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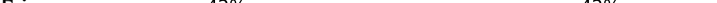
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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	A	1	Total 1	O 1	0	0
6	B	1	Total 1	O 1	0	0
6	C	6	Total 6	O 6	0	0



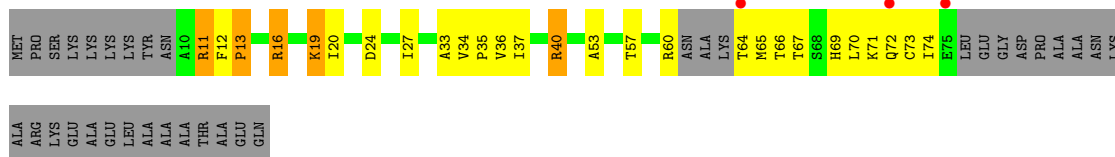
● Molecule 1: 5'-D(\*TP\*TP\*GP\*GP\*CP\*TP\*AP\*TP\*AP\*AP\*AP\*AP\*GP\*GP\*GP\*CP\*TP\*CP\*C)-3'



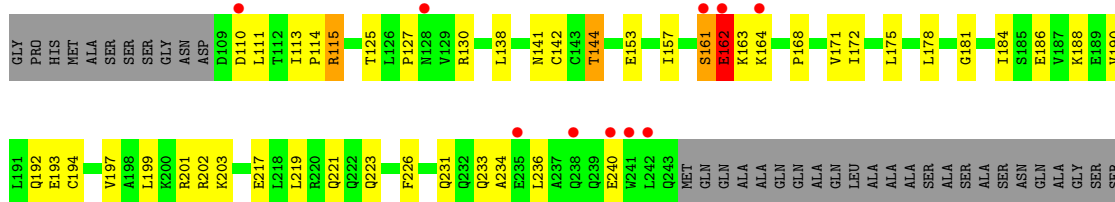
Chain E:  5% 42% 42% 11% 5%



Chain A: 

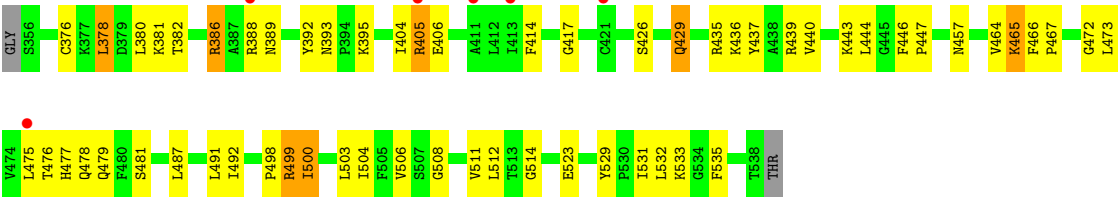


Chain B:  6% 50% 23% .. 25%



GLN  
ASP  
GLU  
GLU  
ASP  
ASP  
ASP  
ASP  
ILE

● Molecule 5: TATA-BOX-BINDING PROTEIN (TBP)



## 4 Data and refinement statistics

Property	Value	Source
Space group	C 2 2 21	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	76.68Å 119.08Å 155.08Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	19.84 – 2.62 19.84 – 2.62	Depositor EDS
% Data completeness (in resolution range)	97.4 (19.84-2.62) 98.8 (19.84-2.62)	Depositor EDS
$R_{merge}$	0.06	Depositor
$R_{sym}$	0.06	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	4.23 (at 2.63Å)	Xtriage
Refinement program	CNS 0.9	Depositor
R, $R_{free}$	0.233 , 0.277 0.230 , 0.270	Depositor DCC
$R_{free}$ test set	1499 reflections (7.01%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	60.6	Xtriage
Anisotropy	0.088	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.32 , 39.9	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.48$ , $\langle L^2 \rangle = 0.32$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
$F_o, F_c$ correlation	0.93	EDS
Total number of atoms	3743	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	61.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.50% of the height of the origin peak. No significant pseudotranslation is detected.*

<sup>1</sup>Intensities estimated from amplitudes.

<sup>2</sup>Theoretical values of  $\langle |L| \rangle$ ,  $\langle L^2 \rangle$  for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.



## 5 Model quality

### 5.1 Standard geometry

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with  $|Z| > 5$  is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z  >5	RMSZ	# Z  >5
1	D	0.52	0/414	0.99	0/638
2	E	0.43	0/406	0.83	0/624
3	A	0.35	0/494	0.57	0/662
4	B	0.37	0/1068	0.55	0/1437
5	C	0.39	0/1480	0.63	0/1991
All	All	0.40	0/3862	0.68	0/5352

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	D	0	4
2	E	0	2
All	All	0	6

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

5 of 6 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	D	604	DG	Sidechain
1	D	605	DC	Sidechain
1	D	606	DT	Sidechain
1	D	612	DA	Sidechain
2	E	712	DA	Sidechain

## 5.2 Too-close contacts ⓘ

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	D	369	0	205	17	0
2	E	363	0	205	11	0
3	A	490	0	529	37	0
4	B	1059	0	1073	41	0
5	C	1453	0	1542	49	1
6	A	1	0	0	1	0
6	B	1	0	0	0	0
6	C	6	0	0	0	0
6	D	1	0	0	0	0
All	All	3743	0	3554	138	1

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 19.

The worst 5 of 138 close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:A:33:ALA:O	3:A:36:VAL:HG22	1.78	0.83
1:D:613:DG:H2''	1:D:614:DG:C8	2.14	0.82
2:E:712:DA:H2''	2:E:713:DT:H5'	1.62	0.81
3:A:36:VAL:HG21	4:B:194:CYS:SG	2.20	0.81
4:B:115:ARG:HG2	4:B:115:ARG:HH11	1.45	0.81

All (1) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:C:386:ARG:NH2	5:C:386:ARG:NH2[3_755]	1.88	0.32

## 5.3 Torsion angles [i](#)

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

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the backbone conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
3	A	59/98 (60%)	56 (95%)	1 (2%)	2 (3%)	3	5
4	B	133/179 (74%)	123 (92%)	8 (6%)	2 (2%)	10	19
5	C	181/185 (98%)	170 (94%)	10 (6%)	1 (1%)	25	45
All	All	373/462 (81%)	349 (94%)	19 (5%)	5 (1%)	12	23

All (5) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
5	C	388	ARG
4	B	162	GLU
4	B	161	SER
3	A	72	GLN
3	A	13	PRO

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

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
3	A	55/80 (69%)	51 (93%)	4 (7%)	14	27
4	B	117/151 (78%)	110 (94%)	7 (6%)	19	37
5	C	158/159 (99%)	147 (93%)	11 (7%)	15	29
All	All	330/390 (85%)	308 (93%)	22 (7%)	16	31

5 of 22 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
4	B	178	LEU
5	C	380	LEU
5	C	499	ARG
4	B	233	GLN
5	C	378	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 11 such sidechains are listed below:

Mol	Chain	Res	Type
4	B	223	GLN
4	B	239	GLN
5	C	457	ASN
4	B	173	GLN
5	C	389	ASN

### 5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

## 5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

## 5.6 Ligand geometry [i](#)

There are no ligands in this entry.

## 5.7 Other polymers [i](#)

There are no such residues in this entry.

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

There are no chain breaks in this entry.

## 6 Fit of model and data [i](#)

### 6.1 Protein, DNA and RNA chains [i](#)

In the following table, the column labelled ‘#RSRZ > 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95<sup>th</sup> percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled ‘Q < 0.9’ lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å <sup>2</sup> )	Q<0.9
1	D	18/19 (94%)	-0.32	0 <span>100</span> <span>100</span>	37, 51, 100, 110	0
2	E	18/19 (94%)	-0.03	1 (5%) <span>24</span> <span>19</span>	42, 53, 120, 139	0
3	A	63/98 (64%)	0.23	3 (4%) <span>30</span> <span>24</span>	39, 58, 109, 128	0
4	B	135/179 (75%)	0.13	10 (7%) <span>14</span> <span>10</span>	36, 60, 114, 132	0
5	C	183/185 (98%)	0.00	6 (3%) <span>46</span> <span>40</span>	30, 52, 76, 98	0
All	All	417/500 (83%)	0.06	20 (4%) <span>30</span> <span>24</span>	30, 56, 100, 139	0

The worst 5 of 20 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
4	B	240	GLU	4.1
4	B	241	TRP	3.9
5	C	388	ARG	3.8
3	A	75	GLU	3.7
4	B	238	GLN	3.6

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

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

### 6.3 Carbohydrates [i](#)

There are no monosaccharides in this entry.

### 6.4 Ligands [i](#)

There are no ligands in this entry.

## 6.5 Other polymers [i](#)

There are no such residues in this entry.