



# Full wwPDB X-ray Structure Validation Report ⓘ

Feb 1, 2016 – 05:14 PM GMT

PDB ID : 4HN5  
Title : GR DNA Binding Domain - TSLP nGRE Complex  
Authors : Hudson, W.H.; Youn, C.E.; Ortlund, E.A.  
Deposited on : 2012-10-18  
Resolution : 1.90 Å(reported)

This is a Full wwPDB X-ray 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  
<http://wwpdb.org/validation/2016/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  
Mogul : 1.7 (RC4), CSD as536be (2015)  
Xtriage (Phenix) : 1.9-1692  
EDS : rb-20026688  
Percentile statistics : 20151230.v01 (using entries in the PDB archive December 30th 2015)  
Refmac : 5.8.0135  
CCP4 : 6.5.0  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : trunk26865

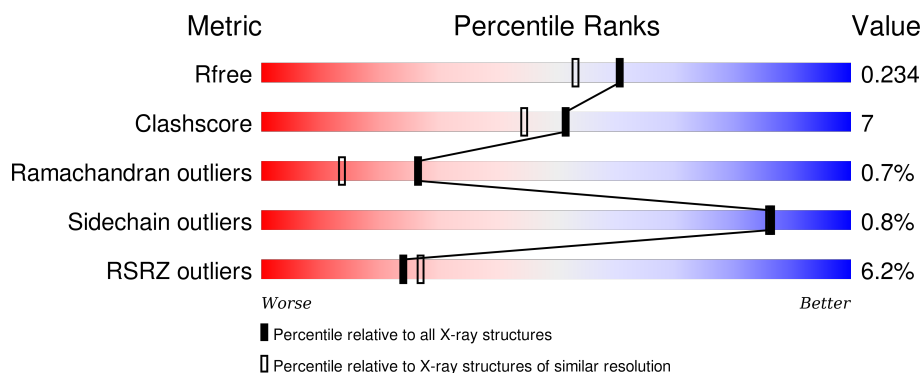
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

## *X-RAY DIFFRACTION*

The reported resolution of this entry is 1.90 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))
$R_{free}$	91344	4755 (1.90-1.90)
Clashscore	102246	5398 (1.90-1.90)
Ramachandran outliers	100387	5338 (1.90-1.90)
Sidechain outliers	100360	5339 (1.90-1.90)
RSRZ outliers	91569	4766 (1.90-1.90)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments on the lower bar indicate the fraction of residues that contain outliers for  $\geq 3$ , 2, 1 and 0 types of geometric quality criteria. 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	A	117	<div> <div>4%</div> <div>53%</div> <div>8%</div> <div>38%</div> </div>
1	B	117	<div> <div>5%</div> <div>56%</div> <div>7%</div> <div>38%</div> </div>
2	C	16	<div> <div>69%</div> <div>25%</div> <div>6%</div> </div>
3	D	16	<div> <div>31%</div> <div>63%</div> <div>6%</div> </div>

## 2 Entry composition

There are 5 unique types of molecules in this entry. The entry contains 1929 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 protein called Glucocorticoid receptor.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	72	Total	C	N	O	S	0	0	0
			553	339	106	97	11			
1	B	73	Total	C	N	O	S	0	0	0
			560	344	107	98	11			

There are 54 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	390	MET	-	EXPRESSION TAG	UNP P04150
A	391	HIS	-	EXPRESSION TAG	UNP P04150
A	392	HIS	-	EXPRESSION TAG	UNP P04150
A	393	HIS	-	EXPRESSION TAG	UNP P04150
A	394	HIS	-	EXPRESSION TAG	UNP P04150
A	395	HIS	-	EXPRESSION TAG	UNP P04150
A	396	HIS	-	EXPRESSION TAG	UNP P04150
A	397	SER	-	EXPRESSION TAG	UNP P04150
A	398	SER	-	EXPRESSION TAG	UNP P04150
A	399	GLY	-	EXPRESSION TAG	UNP P04150
A	400	VAL	-	EXPRESSION TAG	UNP P04150
A	401	ASP	-	EXPRESSION TAG	UNP P04150
A	402	LEU	-	EXPRESSION TAG	UNP P04150
A	403	GLY	-	EXPRESSION TAG	UNP P04150
A	404	THR	-	EXPRESSION TAG	UNP P04150
A	405	GLU	-	EXPRESSION TAG	UNP P04150
A	406	ASN	-	EXPRESSION TAG	UNP P04150
A	407	LEU	-	EXPRESSION TAG	UNP P04150
A	408	TYR	-	EXPRESSION TAG	UNP P04150
A	409	PHE	-	EXPRESSION TAG	UNP P04150
A	410	GLN	-	EXPRESSION TAG	UNP P04150
A	411	SER	-	EXPRESSION TAG	UNP P04150
A	412	ASN	-	EXPRESSION TAG	UNP P04150
A	413	ALA	-	EXPRESSION TAG	UNP P04150
A	414	SER	-	EXPRESSION TAG	UNP P04150

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Chain	Residue	Modelled	Actual	Comment	Reference
A	415	ASN	-	EXPRESSION TAG	UNP P04150
A	416	ALA	-	EXPRESSION TAG	UNP P04150
B	390	MET	-	EXPRESSION TAG	UNP P04150
B	391	HIS	-	EXPRESSION TAG	UNP P04150
B	392	HIS	-	EXPRESSION TAG	UNP P04150
B	393	HIS	-	EXPRESSION TAG	UNP P04150
B	394	HIS	-	EXPRESSION TAG	UNP P04150
B	395	HIS	-	EXPRESSION TAG	UNP P04150
B	396	HIS	-	EXPRESSION TAG	UNP P04150
B	397	SER	-	EXPRESSION TAG	UNP P04150
B	398	SER	-	EXPRESSION TAG	UNP P04150
B	399	GLY	-	EXPRESSION TAG	UNP P04150
B	400	VAL	-	EXPRESSION TAG	UNP P04150
B	401	ASP	-	EXPRESSION TAG	UNP P04150
B	402	LEU	-	EXPRESSION TAG	UNP P04150
B	403	GLY	-	EXPRESSION TAG	UNP P04150
B	404	THR	-	EXPRESSION TAG	UNP P04150
B	405	GLU	-	EXPRESSION TAG	UNP P04150
B	406	ASN	-	EXPRESSION TAG	UNP P04150
B	407	LEU	-	EXPRESSION TAG	UNP P04150
B	408	TYR	-	EXPRESSION TAG	UNP P04150
B	409	PHE	-	EXPRESSION TAG	UNP P04150
B	410	GLN	-	EXPRESSION TAG	UNP P04150
B	411	SER	-	EXPRESSION TAG	UNP P04150
B	412	ASN	-	EXPRESSION TAG	UNP P04150
B	413	ALA	-	EXPRESSION TAG	UNP P04150
B	414	SER	-	EXPRESSION TAG	UNP P04150
B	415	ASN	-	EXPRESSION TAG	UNP P04150
B	416	ALA	-	EXPRESSION TAG	UNP P04150

- Molecule 2 is a DNA chain called DNA (5'-D(\*CP\*GP\*CP\*CP\*TP\*CP\*CP\*GP\*GP\*GP\*AP\*GP\*AP\*GP\*CP\*T)-3').

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	C	16	Total	C	N	O	P	0	0	0
			325	154	62	94	15			

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

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	D	16	Total	C	N	O	P	0	0	0
			325	154	62	94	15			

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

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	B	2	Total	Zn	0	0
			2	2		
4	A	2	Total	Zn	0	0
			2	2		

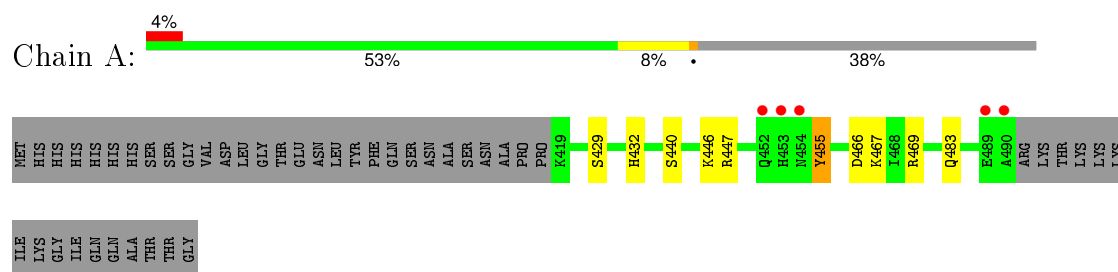
- Molecule 5 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	73	Total	O	0	0
			73	73		
5	C	17	Total	O	0	0
			17	17		
5	D	23	Total	O	0	0
			23	23		
5	B	49	Total	O	0	0
			49	49		

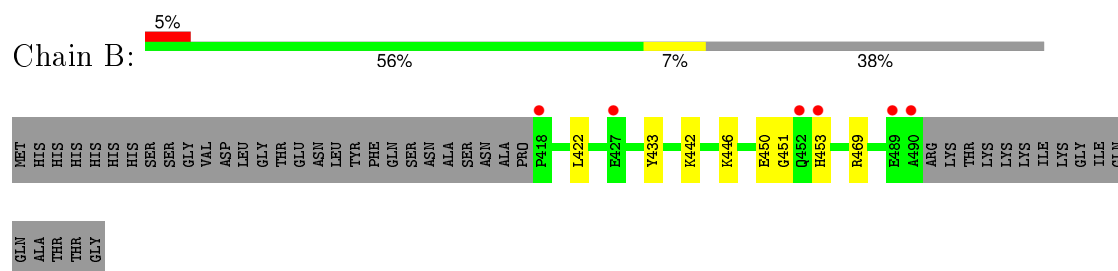
### 3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA and DNA chains in the entry. The first graphic for a chain summarises the proportions of errors displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red dot above a residue indicates a poor fit to the electron density ( $RSRZ > 2$ ). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

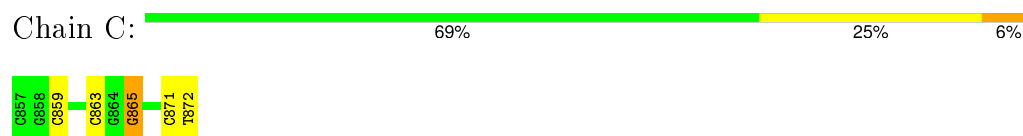
- Molecule 1: Glucocorticoid receptor



- Molecule 1: Glucocorticoid receptor



- Molecule 2: DNA (5'-D(\*CP\*GP\*CP\*CP\*TP\*CP\*CP\*GP\*GP\*GP\*AP\*GP\*AP\*GP\*CP\*T)-3')



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



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	39.35Å 96.57Å 104.00Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	26.01 – 1.90 48.28 – 1.90	Depositor EDS
% Data completeness (in resolution range)	99.5 (26.01-1.90) 95.3 (48.28-1.90)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	2.95 (at 1.91Å)	Xtriage
Refinement program	PHENIX (phenix.refine: 1.8_1069)	Depositor
R, $R_{free}$	0.207 , 0.235 0.206 , 0.234	Depositor DCC
$R_{free}$ test set	1920 reflections (6.31%)	DCC
Wilson B-factor (Å <sup>2</sup> )	32.2	Xtriage
Anisotropy	0.355	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.35 , 48.9	EDS
Estimated twinning fraction	No twinning to report.	Xtriage
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.48$ , $\langle L^2 \rangle = 0.31$	Xtriage
Outliers	3 of 31814 reflections (0.009%)	Xtriage
$F_o, F_c$ correlation	0.95	EDS
Total number of atoms	1929	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	45.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 8.20% 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, 0.375 respectively for untwinned datasets, and 0.333, 0.2 for perfectly twinned datasets.

## 5 Model quality [i](#)

### 5.1 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 root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	$\# Z  > 5$	RMSZ	$\# Z  > 5$
1	A	0.42	0/560	0.55	0/747
1	B	0.37	0/568	0.50	0/758
2	C	0.59	0/364	1.26	3/560 (0.5%)
3	D	0.63	0/364	1.24	3/560 (0.5%)
All	All	0.49	0/1856	0.91	6/2625 (0.2%)

There are no bond length outliers.

All (6) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	C	863	DC	O4'-C1'-N1	7.46	113.22	108.00
2	C	865	DG	O4'-C1'-C2'	-5.68	101.36	105.90
3	D	845	DT	N3-C4-O4	5.51	123.21	119.90
3	D	847	DT	C5-C4-O4	-5.49	121.06	124.90
3	D	847	DT	N3-C4-O4	5.41	123.14	119.90
2	C	859	DC	C1'-O4'-C4'	-5.15	104.95	110.10

There are no chirality outliers.

There are no planarity outliers.

### 5.2 Too-close contacts [i](#)

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	553	0	547	8	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	B	560	0	555	5	0
2	C	325	0	180	2	0
3	D	325	0	180	10	0
4	A	2	0	0	0	0
4	B	2	0	0	0	0
5	A	73	0	0	2	0
5	B	49	0	0	1	0
5	C	17	0	0	0	0
5	D	23	0	0	2	0
All	All	1929	0	1462	21	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 7.

All (21) 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:D:848:DC:H2''	3:D:849:DC:H5''	1.65	0.77
1:A:447:ARG:NH2	3:D:844:DC:OP2	2.25	0.70
1:A:467:LYS:NZ	5:A:735:HOH:O	2.27	0.65
3:D:842:DA:H2'	3:D:843:DG:C8	2.34	0.62
1:A:440:SER:OG	3:D:846:DC:OP2	2.19	0.59
3:D:845:DT:OP1	5:D:920:HOH:O	2.17	0.57
3:D:857:DG:N7	5:D:914:HOH:O	2.33	0.54
1:B:469:ARG:NH2	5:B:741:HOH:O	2.34	0.51
1:A:455:TYR:O	5:A:765:HOH:O	2.18	0.51
1:A:466:ASP:OD2	1:A:469:ARG:NH2	2.34	0.51
3:D:844:DC:H2'	3:D:845:DT:H71	1.94	0.50
1:B:446:LYS:HE2	1:B:450:GLU:OE2	2.13	0.47
3:D:848:DC:C2'	3:D:849:DC:H5''	2.40	0.45
1:A:446:LYS:HE3	2:C:865:DG:OP2	2.18	0.44
2:C:871:DC:H2'	2:C:872:DT:C6	2.53	0.43
1:A:447:ARG:HH22	3:D:844:DC:P	2.38	0.43
3:D:851:DG:H2'	3:D:852:DG:C8	2.55	0.42
1:B:451:GLY:HA3	1:B:453:HIS:CD2	2.54	0.42
1:B:433:TYR:CE2	1:B:442:LYS:HG3	2.55	0.41
1:B:422:LEU:HD23	1:B:422:LEU:HA	1.92	0.41
1:A:429:SER:OG	1:A:432:HIS:NE2	2.54	0.40

There are no symmetry-related clashes.

## 5.3 Torsion angles [i](#)

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

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	70/117 (60%)	66 (94%)	3 (4%)	1 (1%)	14	4
1	B	71/117 (61%)	68 (96%)	3 (4%)	0	100	100
All	All	141/234 (60%)	134 (95%)	6 (4%)	1 (1%)	26	14

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	455	TYR

### 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	
1	A	60/98 (61%)	59 (98%)	1 (2%)	68	64
1	B	61/98 (62%)	61 (100%)	0	100	100
All	All	121/196 (62%)	120 (99%)	1 (1%)	86	86

All (1) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	483	GLN

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. There are no such sidechains identified.

### 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 carbohydrates in this entry.

### 5.6 Ligand geometry [i](#)

Of 4 ligands modelled in this entry, 4 are monoatomic - leaving 0 for Mogul analysis.

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

### 5.7 Other polymers [i](#)

There are no such residues in this entry.

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

There are no chain breaks in this entry.

## 6 Fit of model and data ⓘ

### 6.1 Protein, DNA and RNA chains ⓘ

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	A	72/117 (61%)	0.84	5 (6%) 20 22	24, 34, 53, 61	0
1	B	73/117 (62%)	0.64	6 (8%) 14 16	26, 41, 62, 84	0
2	C	16/16 (100%)	0.00	0 100 100	44, 56, 68, 69	0
3	D	16/16 (100%)	0.14	0 100 100	44, 56, 65, 65	0
All	All	177/266 (66%)	0.62	11 (6%) 24 27	24, 41, 65, 84	0

All (11) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	452	GLN	5.6
1	B	418	PRO	4.7
1	A	454	ASN	4.5
1	B	490	ALA	3.8
1	A	490	ALA	3.3
1	B	453	HIS	3.0
1	B	489	GLU	3.0
1	A	452	GLN	2.5
1	A	489	GLU	2.4
1	B	427	GLU	2.4
1	A	453	HIS	2.3

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

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

### 6.3 Carbohydrates ⓘ

There are no carbohydrates in this entry.

## 6.4 Ligands [i](#)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. LLDF column lists the quality of electron density of the group with respect to its neighbouring residues in protein, DNA or RNA chains. The B-factors column lists the minimum, median, 95<sup>th</sup> percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	LLDF	B-factors(Å <sup>2</sup> )	Q<0.9
4	ZN	B	602	1/1	0.98	0.13	1.05	37,37,37,37	0
4	ZN	A	602	1/1	1.00	0.16	1.05	25,25,25,25	0
4	ZN	B	601	1/1	1.00	0.16	0.65	26,26,26,26	0
4	ZN	A	601	1/1	0.99	0.14	-0.18	30,30,30,30	0

## 6.5 Other polymers [i](#)

There are no such residues in this entry.