



# Full wwPDB X-ray Structure Validation Report ⓘ

Sep 26, 2023 – 04:18 AM EDT

PDB ID : 6BJV  
Title : CIRV p19 protein in complex with siRNA  
Authors : Foss, D.V.; Schirle, N.; Pezacki, J.P.; Macrae, I.J.  
Deposited on : 2017-11-07  
Resolution : 2.20 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

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

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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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  
Xtrriage (Phenix) : 1.13  
EDS : 2.35.1  
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) : 2.35.1

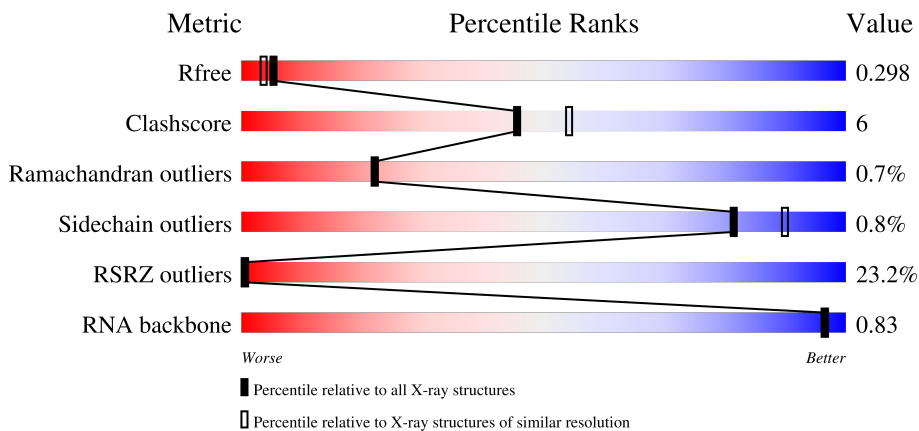
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.20 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	4898 (2.20-2.20)
Clashscore	141614	5594 (2.20-2.20)
Ramachandran outliers	138981	5503 (2.20-2.20)
Sidechain outliers	138945	5504 (2.20-2.20)
RSRZ outliers	127900	4800 (2.20-2.20)
RNA backbone	3102	1032 (2.60-1.80)

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	A	172	
1	B	172	
2	C	21	
3	D	21	

## 2 Entry composition [i](#)

There are 4 unique types of molecules in this entry. The entry contains 5811 atoms, of which 2520 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 RNA silencing suppressor p19.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
			Total	C	H	N	O	S			
1	A	148	2211	730	1035	216	227	3	0	0	0
1	B	146	2226	720	1066	214	223	3	0	0	0

- Molecule 2 is a RNA chain called RNA (5'-R(P\*UP\*CP\*GP\*AP\*AP\*GP\*UP\*AP\*UP\*UP\*CP\*CP\*GP\*CP\*GP\*UP\*AP\*CP\*GP\*UP\*U)-3').

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
			Total	C	H	N	O	P			
2	C	21	648	198	204	74	151	21	3	0	0

- Molecule 3 is a RNA chain called RNA (5'-R(P\*CP\*GP\*UP\*AP\*CP\*GP\*CP\*GP\*GP\*AP\*AP\*UP\*AP\*CP\*UP\*UP\*CP\*GP\*AP\*UP\*U)-3').

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
			Total	C	H	N	O	P			
3	D	21	661	199	215	77	149	21	4	0	0

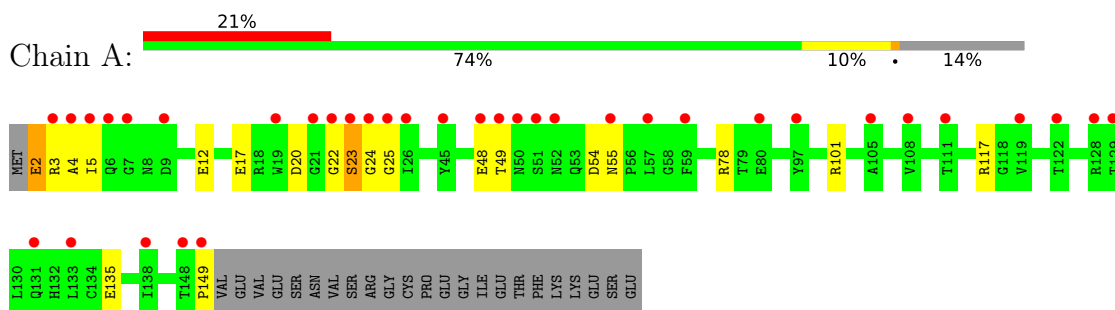
- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	20	Total	O	0	0
			20	20		
4	B	19	Total	O	0	0
			19	19		
4	C	16	Total	O	0	0
			16	16		
4	D	10	Total	O	0	0
			10	10		

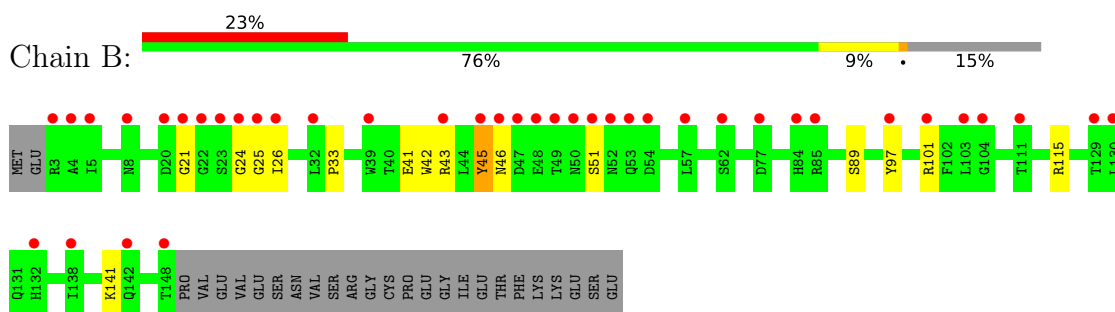
### 3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes 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.

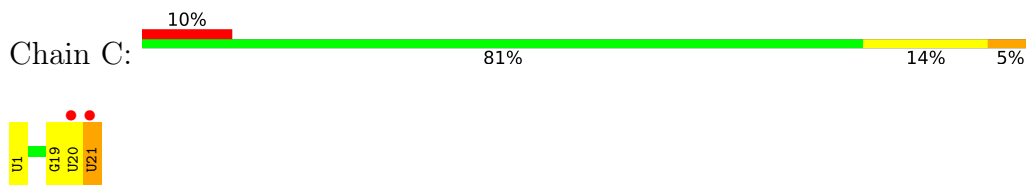
- Molecule 1: RNA silencing suppressor p19



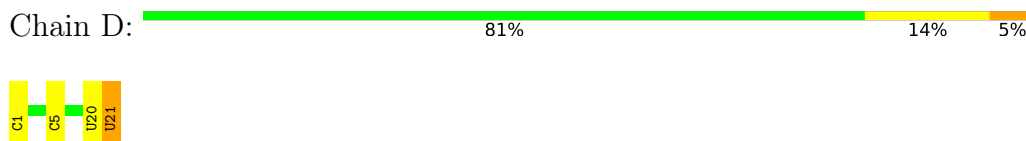
- Molecule 1: RNA silencing suppressor p19



- Molecule 2: RNA (5'-R(P\*UP\*CP\*GP\*AP\*AP\*GP\*UP\*AP\*UP\*UP\*CP\*CP\*GP\*CP\*GP\*U P\*AP\*CP\*GP\*UP\*U)-3')



- Molecule 3: RNA (5'-R(P\*CP\*GP\*UP\*AP\*CP\*GP\*CP\*GP\*GP\*AP\*AP\*UP\*AP\*CP\*UP\*U P\*CP\*GP\*AP\*UP\*U)-3')



## 4 Data and refinement statistics i

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	46.59Å 47.00Å 54.88Å 109.44° 111.11° 96.78°	Depositor
Resolution (Å)	46.81 – 2.20 46.81 – 2.20	Depositor EDS
% Data completeness (in resolution range)	93.5 (46.81-2.20) 93.8 (46.81-2.20)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	2.53 (at 2.20Å)	Xtrriage
Refinement program	PHENIX (1.10.1_2155)	Depositor
R, $R_{free}$	0.260 , 0.297 0.262 , 0.298	Depositor DCC
$R_{free}$ test set	960 reflections (5.10%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	48.6	Xtrriage
Anisotropy	0.599	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.35 , 56.9	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.51$ , $\langle L^2 \rangle = 0.34$	Xtrriage
Estimated twinning fraction	0.000 for -k,-h,-l	Xtrriage
$F_o, F_c$ correlation	0.93	EDS
Total number of atoms	5811	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	78.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 19.81 % of the origin peak, indicating pseudo-translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo-translational symmetry is equal to 9.9875e-03. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

<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 [i](#)

### 5.1 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 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	0.25	0/1203	0.43	0/1626
1	B	0.31	0/1186	0.48	0/1602
2	C	0.50	1/494 (0.2%)	0.69	0/765
3	D	0.50	1/497 (0.2%)	0.70	0/770
All	All	0.36	2/3380 (0.1%)	0.54	0/4763

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	C	1	U	OP3-P	-10.45	1.48	1.61
3	D	1	C	OP3-P	-10.44	1.48	1.61

There are no bond angle outliers.

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	1176	1035	1120	25	2
1	B	1160	1066	1107	11	1
2	C	444	204	225	1	0
3	D	446	215	226	1	1
4	A	20	0	0	0	0
4	B	19	0	0	2	0
4	C	16	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
4	D	10	0	0	0	0
All	All	3291	2520	2678	38	2

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 6.

All (38) 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)
1:A:2:GLU:CB	1:A:4:ALA:HB2	1.62	1.28
1:A:2:GLU:HB3	1:A:4:ALA:CB	1.69	1.21
1:A:3:ARG:N	1:A:4:ALA:HA	1.92	0.82
1:A:2:GLU:CB	1:A:3:ARG:HA	2.24	0.68
1:A:3:ARG:N	1:A:4:ALA:CA	2.56	0.67
1:B:43:ARG:C	1:B:45:TYR:H	2.01	0.64
1:A:2:GLU:HB3	1:A:4:ALA:HB2	0.73	0.62
1:A:4:ALA:HB1	1:A:5:ILE:HA	1.81	0.62
1:A:135:GLU:N	1:A:135:GLU:OE1	2.33	0.61
1:A:55:ASN:OD1	1:A:78:ARG:NH2	2.37	0.57
1:B:43:ARG:C	1:B:45:TYR:N	2.60	0.55
1:B:97:TYR:OH	1:B:101:ARG:NH2	2.40	0.55
2:C:19:G:O2'	2:C:21:U:OP2	2.26	0.54
1:A:2:GLU:CG	1:A:4:ALA:HB2	2.35	0.53
1:A:2:GLU:O	1:A:5:ILE:O	2.28	0.52
1:A:23:SER:N	1:A:24:GLY:HA3	2.25	0.51
1:A:2:GLU:HB2	1:A:3:ARG:HA	1.94	0.50
1:B:41:GLU:OE2	4:B:201:HOH:O	2.19	0.50
1:A:48:GLU:N	1:A:48:GLU:OE1	2.39	0.49
1:A:117:ARG:HH12	1:A:149:PRO:HD3	1.78	0.49
1:A:3:ARG:H	1:A:4:ALA:HA	1.74	0.48
1:B:21:GLY:O	1:B:33:PRO:HB3	2.15	0.47
1:A:23:SER:H	1:A:25:GLY:H	1.61	0.47
1:B:46:ASN:OD1	1:B:51:SER:OG	2.32	0.47
1:A:49:THR:HG23	1:A:49:THR:O	2.16	0.46
1:A:2:GLU:CB	1:A:3:ARG:CA	2.93	0.46
1:B:24:GLY:O	1:B:26:ILE:N	2.50	0.45
1:B:115:ARG:NH1	4:B:204:HOH:O	2.49	0.44
3:D:21:U:H2'	3:D:21:U:O2	2.17	0.44
1:B:42:TRP:O	1:B:45:TYR:CB	2.66	0.43
1:B:42:TRP:O	1:B:45:TYR:HB2	2.19	0.43
1:A:2:GLU:C	1:A:4:ALA:HA	2.38	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:20:ASP:OD1	1:A:22:GLY:HA3	2.19	0.42
1:A:22:GLY:CA	1:A:23:SER:CB	2.98	0.42
1:A:54:ASP:HA	1:A:55:ASN:HA	1.88	0.41
1:A:23:SER:N	1:A:24:GLY:CA	2.84	0.41
1:A:17:GLU:HA	1:A:20:ASP:OD1	2.21	0.41
1:B:89:SER:OG	1:B:141:LYS:NZ	2.52	0.41

All (2) 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)
1:A:12:GLU:OE2	3:D:21:U:O2'[1_566]	2.11	0.09
1:A:101:ARG:HH11	1:B:24:GLY:O[1_556]	1.52	0.08

## 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	146/172 (85%)	135 (92%)	10 (7%)	1 (1%)	22	22
1	B	144/172 (84%)	133 (92%)	10 (7%)	1 (1%)	22	22
All	All	290/344 (84%)	268 (92%)	20 (7%)	2 (1%)	22	22

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	23	SER
1	B	25	GLY



### 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	125/147 (85%)	124 (99%)	1 (1%)	81	90
1	B	123/147 (84%)	122 (99%)	1 (1%)	81	90
All	All	248/294 (84%)	246 (99%)	2 (1%)	81	90

All (2) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	2	GLU
1	B	45	TYR

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

### 5.3.3 RNA [i](#)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
2	C	20/21 (95%)	2 (10%)	0
3	D	20/21 (95%)	3 (15%)	0
All	All	40/42 (95%)	5 (12%)	0

All (5) RNA backbone outliers are listed below:

Mol	Chain	Res	Type
2	C	20	U
2	C	21	U
3	D	5	C
3	D	20	U
3	D	21	U

There are no RNA pucker outliers to report.

## 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

### 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	148/172 (86%)	1.46	36 (24%) 0 0	38, 64, 128, 160	0
1	B	146/172 (84%)	1.67	40 (27%) 0 0	37, 62, 128, 184	0
2	C	21/21 (100%)	0.17	2 (9%) 8 7	51, 65, 94, 209	0
3	D	21/21 (100%)	-0.26	0 100 100	54, 75, 98, 172	0
All	All	336/386 (87%)	1.37	78 (23%) 0 0	37, 64, 135, 209	0

All (78) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	4	ALA	11.2
1	B	52	ASN	11.2
1	B	25	GLY	9.1
1	A	5	ILE	9.0
1	B	5	ILE	8.9
1	B	23	SER	8.5
2	C	21	U	7.5
1	B	22	GLY	7.1
1	A	52	ASN	7.1
1	A	149	PRO	6.7
1	A	21	GLY	6.6
1	A	49	THR	5.3
1	B	53	GLN	5.2
1	B	48	GLU	5.2
1	B	57	LEU	5.1
1	B	21	GLY	4.6
1	B	111	THR	4.2
1	A	23	SER	4.2
1	B	51	SER	4.0
1	B	47	ASP	3.9
1	B	4	ALA	3.8

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>	<b>RSRZ</b>
1	B	26	ILE	3.7
1	B	148	THR	3.7
1	B	49	THR	3.7
1	A	45	TYR	3.7
1	A	57	LEU	3.5
1	B	24	GLY	3.5
1	B	50	ASN	3.4
1	A	48	GLU	3.4
1	A	24	GLY	3.4
1	B	20	ASP	3.2
1	B	132	HIS	3.2
1	B	54	ASP	3.1
1	B	97	TYR	3.1
1	A	51	SER	3.0
1	A	122	THR	2.9
1	A	55	ASN	2.9
1	A	105	ALA	2.9
1	B	3	ARG	2.9
1	A	80	GLU	2.9
1	A	26	ILE	2.8
1	B	129	THR	2.8
1	B	84	HIS	2.8
1	A	50	ASN	2.8
1	A	111	THR	2.7
1	B	103	LEU	2.7
1	A	7	GLY	2.6
1	A	148	THR	2.6
1	A	25	GLY	2.6
1	B	39	TRP	2.6
1	A	97	TYR	2.5
1	B	130	LEU	2.5
1	A	19	TRP	2.5
1	B	46	ASN	2.5
1	A	108	VAL	2.4
1	B	43	ARG	2.4
1	B	104	GLY	2.4
1	B	138	ILE	2.4
1	A	9	ASP	2.4
1	B	8	ASN	2.3
1	A	128	ARG	2.3
2	C	20	U	2.3
1	B	101	ARG	2.3

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Mol	Chain	Res	Type	RSRZ
1	A	133	LEU	2.2
1	A	3	ARG	2.2
1	B	85	ARG	2.2
1	A	131	GLN	2.2
1	B	45	TYR	2.2
1	B	77	ASP	2.2
1	A	138	ILE	2.1
1	A	6	GLN	2.1
1	B	62	SER	2.0
1	A	119	VAL	2.0
1	A	129	THR	2.0
1	B	142	GLN	2.0
1	B	32	LEU	2.0
1	A	22	GLY	2.0
1	A	59	PHE	2.0

## 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.