



# wwPDB X-ray Structure Validation Summary Report ⓘ

Dec 2, 2023 – 02:25 pm GMT

PDB ID : 1GTN  
Title : Structure of the trp RNA-binding attenuation protein (TRAP) bound to an RNA molecule containing 11 GAGCC repeats  
Authors : Hopcroft, N.H.; Wendt, A.L.; Gollnick, P.; Antson, A.A.  
Deposited on : 2002-01-16  
Resolution : 2.50 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.

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  
Mogul : 1.8.4, CSD as541be (2020)  
Xtriage (Phenix) : 1.13  
EDS : 2.36  
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) : 2.36

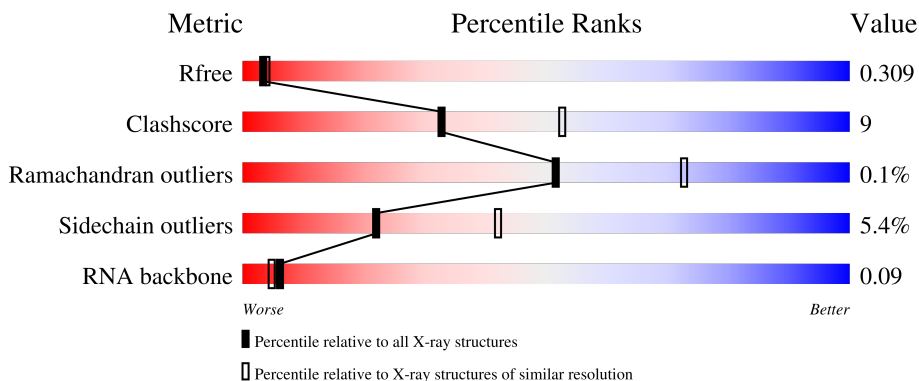
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.50 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.













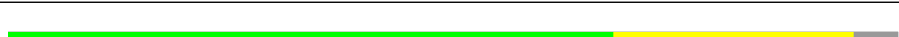


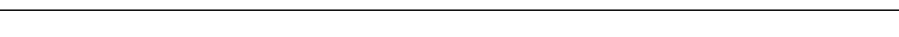
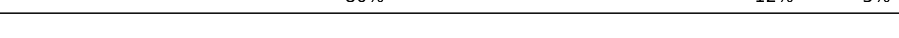
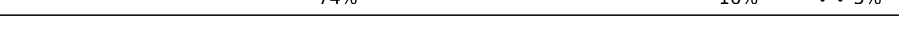

Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
$R_{free}$	130704	4661 (2.50-2.50)
Clashscore	141614	5346 (2.50-2.50)
Ramachandran outliers	138981	5231 (2.50-2.50)
Sidechain outliers	138945	5233 (2.50-2.50)
RNA backbone	3102	1008 (2.84-2.16)

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  $\leq 5\%$

Mol	Chain	Length	Quality of chain
1	A	74	73% (green), 18% (yellow), 8% (red)
1	B	74	70% (green), 19% (yellow), 7% (red)
1	C	74	69% (green), 22% (yellow), 7% (red)
1	D	74	74% (green), 19% (yellow), 7% (red)
1	E	74	78% (green), 11% (yellow), 8% (red)
1	F	74	73% (green), 16% (yellow), 7% (red)

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Mol	Chain	Length	Quality of chain
1	G	74	 77% 15% • 5%
1	H	74	 70% 20% • 7%
1	I	74	 69% 24% 7%
1	J	74	 68% 23% • 8%
1	K	74	 73% 16% • 7%
1	L	74	 72% 20% • 5%
1	M	74	 78% 15% • •
1	N	74	 77% 16% • 5%
1	O	74	 77% 16% • •
1	P	74	 74% 20% 5%
1	Q	74	 68% 27% 5%
1	R	74	 81% 14% 5%
1	S	74	 80% 15% 5%
1	T	74	 80% 12% • 5%
1	U	74	 74% 16% • • 5%
1	V	74	 70% 23% • 5%
2	W	56	 29% 41% 9% 21%

## 2 Entry composition [i](#)

There are 4 unique types of molecules in this entry. The entry contains 13241 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 TRP RNA-BINDING ATTENUATION PROTEIN.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
1	A	68	527	330	96	101	0	0	0
1	B	69	535	334	98	103	0	0	0
1	C	69	535	334	98	103	0	0	0
1	D	69	536	336	98	102	0	0	0
1	E	68	527	330	96	101	0	0	0
1	F	69	536	336	98	102	0	0	0
1	G	70	544	340	100	104	0	0	0
1	H	69	536	336	98	102	0	0	0
1	I	69	536	336	98	102	0	0	0
1	J	68	527	330	96	101	0	0	0
1	K	69	536	336	98	102	0	0	0
1	L	70	542	338	99	105	0	0	0
1	M	71	551	344	101	106	0	0	0
1	N	70	542	338	99	105	0	0	0
1	O	71	551	344	101	106	0	0	0
1	P	70	542	338	99	105	0	0	0

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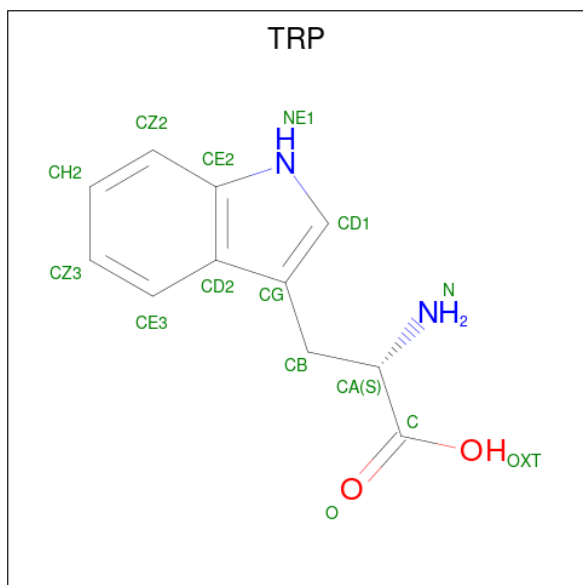
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Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
1	Q	70	Total	C	N	O	0	0	0
			542	338	99	105			
1	R	70	Total	C	N	O	0	0	0
			542	338	99	105			
1	S	70	Total	C	N	O	0	0	0
			542	338	99	105			
1	T	70	Total	C	N	O	0	0	0
			542	338	99	105			
1	U	70	Total	C	N	O	0	0	0
			542	338	99	105			
1	V	70	Total	C	N	O	0	0	0
			542	338	99	105			

- Molecule 2 is a RNA chain called (GAGCC)11G 56-NUCLEOTIDE RNA.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	W	44	Total	C	N	O	P	88	0	0
			968	429	198	297	44			

- Molecule 3 is TRYPTOPHAN (three-letter code: TRP) (formula: C<sub>11</sub>H<sub>12</sub>N<sub>2</sub>O<sub>2</sub>).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
3	A	1	Total	C	N	O	0	0
			15	11	2	2		
3	A	1	Total	C	N	O	0	0
			15	11	2	2		

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Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	N	O		
3	B	1	Total 15	C 11	N 2	O 2	0	0
3	C	1	Total 15	C 11	N 2	O 2	0	0
3	D	1	Total 15	C 11	N 2	O 2	0	0
3	E	1	Total 15	C 11	N 2	O 2	0	0
3	F	1	Total 15	C 11	N 2	O 2	0	0
3	G	1	Total 15	C 11	N 2	O 2	0	0
3	H	1	Total 15	C 11	N 2	O 2	0	0
3	I	1	Total 15	C 11	N 2	O 2	0	0
3	J	1	Total 15	C 11	N 2	O 2	0	0
3	K	1	Total 15	C 11	N 2	O 2	0	0
3	L	1	Total 15	C 11	N 2	O 2	0	0
3	M	1	Total 15	C 11	N 2	O 2	0	0
3	N	1	Total 15	C 11	N 2	O 2	0	0
3	O	1	Total 15	C 11	N 2	O 2	0	0
3	P	1	Total 15	C 11	N 2	O 2	0	0
3	Q	1	Total 15	C 11	N 2	O 2	0	0
3	R	1	Total 15	C 11	N 2	O 2	0	0
3	S	1	Total 15	C 11	N 2	O 2	0	0
3	T	1	Total 15	C 11	N 2	O 2	0	0
3	U	1	Total 15	C 11	N 2	O 2	0	0
3	V	1	Total 15	C 11	N 2	O 2	0	0

- Molecule 4 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	4	Total O 4 4	0	0
4	B	2	Total O 2 2	0	0
4	C	6	Total O 6 6	0	0
4	D	2	Total O 2 2	0	0
4	E	5	Total O 5 5	0	0
4	F	4	Total O 4 4	0	0
4	G	4	Total O 4 4	0	0
4	H	4	Total O 4 4	0	0
4	I	6	Total O 6 6	0	0
4	J	2	Total O 2 2	0	0
4	K	2	Total O 2 2	0	0
4	L	1	Total O 1 1	0	0
4	M	5	Total O 5 5	0	0
4	N	4	Total O 4 4	0	0
4	O	2	Total O 2 2	0	0
4	P	6	Total O 6 6	0	0
4	Q	2	Total O 2 2	0	0
4	R	3	Total O 3 3	0	0
4	S	2	Total O 2 2	0	0
4	T	1	Total O 1 1	0	0
4	V	1	Total O 1 1	0	0

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<b>Mol</b>	<b>Chain</b>	<b>Residues</b>	<b>Atoms</b>		<b>ZeroOcc</b>	<b>AltConf</b>
4	W	5	Total	O	0	0
			5	5		



### 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. 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. 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: TRP RNA-BINDING ATTENUATION PROTEIN

Chain A: 



- Molecule 1: TRP RNA-BINDING ATTENUATION PROTEIN

Chain B: 



- Molecule 1: TRP RNA-BINDING ATTENUATION PROTEIN

Chain C: 




- Molecule 1: TRP RNA-BINDING ATTENUATION PROTEIN

Chain D: 



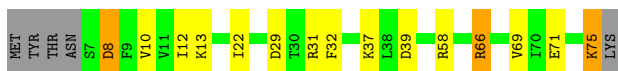
- Molecule 1: TRP RNA-BINDING ATTENUATION PROTEIN

Chain E: 



- Molecule 1: TRP RNA-BINDING ATTENUATION PROTEIN

Chain F: 



- Molecule 1: TRP RNA-BINDING ATTENUATION PROTEIN

Chain G: 77% 15% 5%



- Molecule 1: TRP RNA-BINDING ATTENUATION PROTEIN

Chain H: 70% 20% 7%



- Molecule 1: TRP RNA-BINDING ATTENUATION PROTEIN

Chain I: 69% 24% 7%



- Molecule 1: TRP RNA-BINDING ATTENUATION PROTEIN

Chain J: 68% 23% 8%



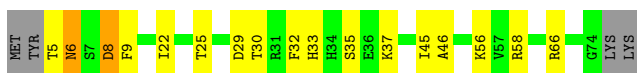
- Molecule 1: TRP RNA-BINDING ATTENUATION PROTEIN

Chain K: 73% 16% 7%



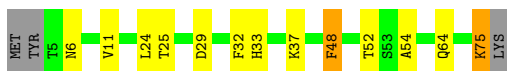
- Molecule 1: TRP RNA-BINDING ATTENUATION PROTEIN

Chain L: 72% 20% 5%



- Molecule 1: TRP RNA-BINDING ATTENUATION PROTEIN

Chain M: 78% 15% 5%



- Molecule 1: TRP RNA-BINDING ATTENUATION PROTEIN

Chain N: 77% 16% 5%



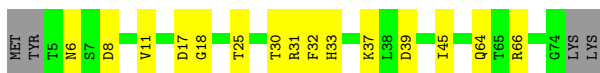
- Molecule 1: TRP RNA-BINDING ATTENUATION PROTEIN

Chain O: 77% 16% 5%



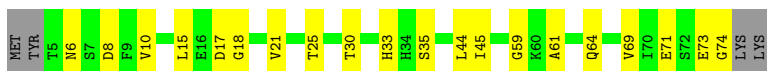
- Molecule 1: TRP RNA-BINDING ATTENUATION PROTEIN

Chain P: 74% 20% 5%



- Molecule 1: TRP RNA-BINDING ATTENUATION PROTEIN

Chain Q: 68% 27% 5%



- Molecule 1: TRP RNA-BINDING ATTENUATION PROTEIN

Chain R: 81% 14% 5%



- Molecule 1: TRP RNA-BINDING ATTENUATION PROTEIN

Chain S: 80% 15% 5%

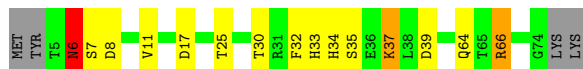


- Molecule 1: TRP RNA-BINDING ATTENUATION PROTEIN

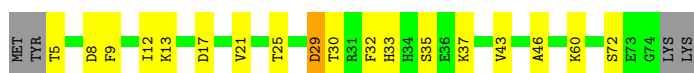
Chain T: 80% 12% 5%



- Molecule 1: TRP RNA-BINDING ATTENUATION PROTEIN



- Molecule 1: TRP RNA-BINDING ATTENUATION PROTEIN



- Molecule 2: (GAGCC)11G 56-NUCLEOTIDE RNA



## 4 Data and refinement statistics

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	145.84Å 111.72Å 138.72Å 90.00° 117.78° 90.00°	Depositor
Resolution (Å)	19.84 – 2.50 19.83 – 2.50	Depositor EDS
% Data completeness (in resolution range)	100.0 (19.84-2.50) 95.2 (19.83-2.50)	Depositor EDS
$R_{merge}$	0.05	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	2.69 (at 2.50Å)	Xtrriage
Refinement program	REFMAC 5.1.07	Depositor
R, $R_{free}$	0.235 , 0.273 0.285 , 0.309	Depositor DCC
$R_{free}$ test set	1312 reflections (2.03%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	48.2	Xtrriage
Anisotropy	0.285	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.34 , 32.7	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.52$ , $\langle L^2 \rangle = 0.35$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
$F_o, F_c$ correlation	0.90	EDS
Total number of atoms	13241	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	15.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 7.34% 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 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	0.76	0/534	0.94	2/717 (0.3%)
1	B	0.84	1/542 (0.2%)	0.97	1/728 (0.1%)
1	C	0.80	0/542	0.94	1/728 (0.1%)
1	D	0.84	0/543	1.02	4/728 (0.5%)
1	E	0.93	1/534 (0.2%)	0.98	2/717 (0.3%)
1	F	0.92	1/543 (0.2%)	1.08	4/728 (0.5%)
1	G	0.90	0/551	0.97	2/739 (0.3%)
1	H	0.87	0/543	0.98	1/728 (0.1%)
1	I	0.83	0/543	0.96	2/728 (0.3%)
1	J	0.80	0/534	0.93	2/717 (0.3%)
1	K	0.80	1/543 (0.2%)	0.96	3/728 (0.4%)
1	L	0.92	0/549	1.04	3/738 (0.4%)
1	M	1.00	1/558 (0.2%)	1.04	1/749 (0.1%)
1	N	0.94	0/549	1.04	3/738 (0.4%)
1	O	0.94	1/558 (0.2%)	0.96	1/749 (0.1%)
1	P	0.96	0/549	1.13	4/738 (0.5%)
1	Q	0.99	1/549 (0.2%)	1.04	1/738 (0.1%)
1	R	0.85	0/549	0.95	1/738 (0.1%)
1	S	0.88	0/549	1.02	3/738 (0.4%)
1	T	0.84	1/549 (0.2%)	0.96	0/738
1	U	0.85	1/549 (0.2%)	1.00	4/738 (0.5%)
1	V	0.97	0/549	1.05	3/738 (0.4%)
2	W	3.52	64/1078 (5.9%)	4.17	191/1661 (11.5%)
All	All	1.32	73/13087 (0.6%)	1.59	239/17787 (1.3%)

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
2	W	8	4

The worst 5 of 73 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	W	107	A	O3'-P	37.05	2.05	1.61
2	W	142	A	O3'-P	35.38	2.03	1.61
2	W	132	A	O3'-P	26.13	1.92	1.61
2	W	127	A	O3'-P	24.30	1.90	1.61
2	W	139	C	C1'-N1	-24.14	1.12	1.48

The worst 5 of 239 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	W	104	C	O4'-C1'-N1	40.15	140.32	108.20
2	W	154	C	O4'-C1'-N1	39.15	139.52	108.20
2	W	124	C	O4'-C1'-N1	36.89	137.71	108.20
2	W	149	C	O4'-C1'-N1	34.74	136.00	108.20
2	W	129	C	O4'-C1'-N1	33.64	135.11	108.20

5 of 8 chirality outliers are listed below:

Mol	Chain	Res	Type	Atom
2	W	104	C	C1'
2	W	109	C	C1'
2	W	114	C	C1'
2	W	119	C	C1'
2	W	129	C	C1'

All (4) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
2	W	119	C	Sidechain
2	W	129	C	Sidechain
2	W	134	C	Sidechain
2	W	139	C	Sidechain

## 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	527	0	528	10	0
1	B	535	0	534	21	0
1	C	535	0	534	17	2
1	D	536	0	541	6	0
1	E	527	0	528	6	0
1	F	536	0	541	12	2
1	G	544	0	547	12	0
1	H	536	0	541	10	0
1	I	536	0	541	15	0
1	J	527	0	528	17	0
1	K	536	0	541	14	0
1	L	542	0	541	15	0
1	M	551	0	554	11	0
1	N	542	0	541	6	0
1	O	551	0	554	12	0
1	P	542	0	541	9	0
1	Q	542	0	541	10	0
1	R	542	0	541	7	0
1	S	542	0	541	13	0
1	T	542	0	541	14	0
1	U	542	0	541	10	0
1	V	542	0	541	12	0
2	W	968	0	497	36	0
3	A	30	0	18	2	0
3	B	15	0	9	1	0
3	C	15	0	9	0	0
3	D	15	0	9	2	0
3	E	15	0	9	1	0
3	F	15	0	9	0	0
3	G	15	0	9	0	0
3	H	15	0	9	1	0
3	I	15	0	9	0	0
3	J	15	0	9	1	0
3	K	15	0	9	3	0
3	L	15	0	9	0	0
3	M	15	0	9	1	0
3	N	15	0	9	1	0
3	O	15	0	9	1	0
3	P	15	0	9	1	0
3	Q	15	0	9	1	0
3	R	15	0	9	0	0
3	S	15	0	9	2	0
3	T	15	0	9	1	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	U	15	0	9	0	0
3	V	15	0	9	2	0
4	A	4	0	0	0	0
4	B	2	0	0	0	0
4	C	6	0	0	0	0
4	D	2	0	0	0	0
4	E	5	0	0	0	0
4	F	4	0	0	0	0
4	G	4	0	0	0	0
4	H	4	0	0	1	0
4	I	6	0	0	1	0
4	J	2	0	0	0	0
4	K	2	0	0	0	0
4	L	1	0	0	0	0
4	M	5	0	0	0	0
4	N	4	0	0	0	0
4	O	2	0	0	0	0
4	P	6	0	0	0	0
4	Q	2	0	0	0	0
4	R	3	0	0	0	0
4	S	2	0	0	0	0
4	T	1	0	0	0	0
4	V	1	0	0	0	0
4	W	5	0	0	1	0
All	All	13241	0	12585	223	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 9.

The worst 5 of 223 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:B:6:ASN:ND2	1:B:6:ASN:O	1.60	1.34
2:W:142:A:O3'	2:W:143:G:P	2.03	1.16
1:F:75:LYS:H	1:F:75:LYS:HD3	1.13	1.14
2:W:107:A:O3'	2:W:108:G:P	2.05	1.14
1:F:75:LYS:HD3	1:F:75:LYS:N	1.63	1.09

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:C:33:HIS:O	1:F:37:LYS:NZ[4_545]	2.18	0.02
1:C:31:ARG:NH1	1:F:58:ARG:CD[4_545]	2.19	0.01

## 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	66/74 (89%)	66 (100%)	0	0	100	100
1	B	67/74 (90%)	64 (96%)	2 (3%)	1 (2%)	10	18
1	C	67/74 (90%)	66 (98%)	1 (2%)	0	100	100
1	D	67/74 (90%)	67 (100%)	0	0	100	100
1	E	66/74 (89%)	64 (97%)	2 (3%)	0	100	100
1	F	67/74 (90%)	66 (98%)	1 (2%)	0	100	100
1	G	68/74 (92%)	68 (100%)	0	0	100	100
1	H	67/74 (90%)	67 (100%)	0	0	100	100
1	I	67/74 (90%)	67 (100%)	0	0	100	100
1	J	66/74 (89%)	66 (100%)	0	0	100	100
1	K	67/74 (90%)	67 (100%)	0	0	100	100
1	L	68/74 (92%)	66 (97%)	2 (3%)	0	100	100
1	M	69/74 (93%)	68 (99%)	1 (1%)	0	100	100
1	N	68/74 (92%)	65 (96%)	3 (4%)	0	100	100
1	O	69/74 (93%)	68 (99%)	1 (1%)	0	100	100
1	P	68/74 (92%)	64 (94%)	4 (6%)	0	100	100
1	Q	68/74 (92%)	66 (97%)	2 (3%)	0	100	100
1	R	68/74 (92%)	65 (96%)	3 (4%)	0	100	100
1	S	68/74 (92%)	63 (93%)	5 (7%)	0	100	100
1	T	68/74 (92%)	66 (97%)	2 (3%)	0	100	100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	U	68/74 (92%)	64 (94%)	3 (4%)	1 (2%)	10	18
1	V	68/74 (92%)	65 (96%)	3 (4%)	0	100	100
All	All	1485/1628 (91%)	1448 (98%)	35 (2%)	2 (0%)	51	73

All (2) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	U	66	ARG
1	B	7	SER

### 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	56/62 (90%)	53 (95%)	3 (5%)	22	42
1	B	57/62 (92%)	54 (95%)	3 (5%)	22	43
1	C	57/62 (92%)	53 (93%)	4 (7%)	15	29
1	D	57/62 (92%)	54 (95%)	3 (5%)	22	43
1	E	56/62 (90%)	54 (96%)	2 (4%)	35	61
1	F	57/62 (92%)	53 (93%)	4 (7%)	15	29
1	G	58/62 (94%)	54 (93%)	4 (7%)	15	30
1	H	57/62 (92%)	51 (90%)	6 (10%)	7	13
1	I	57/62 (92%)	51 (90%)	6 (10%)	7	13
1	J	56/62 (90%)	54 (96%)	2 (4%)	35	61
1	K	57/62 (92%)	53 (93%)	4 (7%)	15	29
1	L	58/62 (94%)	55 (95%)	3 (5%)	23	44
1	M	59/62 (95%)	57 (97%)	2 (3%)	37	63
1	N	58/62 (94%)	55 (95%)	3 (5%)	23	44
1	O	59/62 (95%)	54 (92%)	5 (8%)	10	21
1	P	58/62 (94%)	56 (97%)	2 (3%)	37	63

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	Q	58/62 (94%)	54 (93%)	4 (7%)	15	30
1	R	58/62 (94%)	57 (98%)	1 (2%)	60	82
1	S	58/62 (94%)	58 (100%)	0	100	100
1	T	58/62 (94%)	56 (97%)	2 (3%)	37	63
1	U	58/62 (94%)	54 (93%)	4 (7%)	15	30
1	V	58/62 (94%)	55 (95%)	3 (5%)	23	44
All	All	1265/1364 (93%)	1195 (94%)	70 (6%)	22	41

5 of 70 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	Q	8	ASP
1	Q	73	GLU
1	U	35	SER
1	H	8	ASP
1	H	7	SER

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 16 such sidechains are listed below:

Mol	Chain	Res	Type
1	U	6	ASN
1	T	6	ASN
1	L	20	ASN
1	Q	6	ASN
1	L	6	ASN

### 5.3.3 RNA [i](#)

Mol	Chain	Analysed	Backbone Outliers	Pucker Outliers
2	W	41/56 (73%)	3 (7%)	8 (19%)

All (3) RNA backbone outliers are listed below:

Mol	Chain	Res	Type
2	W	133	G
2	W	138	G
2	W	153	G

5 of 8 RNA pucker outliers are listed below:

Mol	Chain	Res	Type
2	W	146	G
2	W	141	G
2	W	131	G
2	W	116	G
2	W	136	G

## 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](#)

23 ligands are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. 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  $|Z| > 2$  is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
3	TRP	V	81	-	14,16,16	0.80	0	16,22,22	1.52	3 (18%)
3	TRP	G	81	-	14,16,16	1.01	1 (7%)	16,22,22	1.39	2 (12%)
3	TRP	T	81	-	14,16,16	0.85	1 (7%)	16,22,22	1.21	2 (12%)
3	TRP	I	81	-	14,16,16	0.92	1 (7%)	16,22,22	1.11	1 (6%)
3	TRP	L	81	-	14,16,16	0.77	0	16,22,22	1.04	2 (12%)
3	TRP	M	81	-	14,16,16	0.77	0	16,22,22	1.19	2 (12%)
3	TRP	D	81	-	14,16,16	0.94	0	16,22,22	1.17	1 (6%)
3	TRP	A	181	-	14,16,16	1.20	3 (21%)	16,22,22	1.00	0
3	TRP	B	81	-	14,16,16	0.90	0	16,22,22	1.56	2 (12%)
3	TRP	E	81	-	14,16,16	0.97	2 (14%)	16,22,22	1.23	2 (12%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
3	TRP	N	81	-	14,16,16	0.79	0	16,22,22	1.14	2 (12%)
3	TRP	U	81	-	14,16,16	0.84	0	16,22,22	1.58	3 (18%)
3	TRP	P	81	-	14,16,16	0.76	0	16,22,22	1.13	2 (12%)
3	TRP	Q	81	-	14,16,16	0.75	0	16,22,22	1.42	3 (18%)
3	TRP	F	81	-	14,16,16	0.92	1 (7%)	16,22,22	0.67	0
3	TRP	K	81	-	14,16,16	0.92	1 (7%)	16,22,22	1.63	2 (12%)
3	TRP	C	81	-	14,16,16	0.94	0	16,22,22	0.89	0
3	TRP	O	81	-	14,16,16	0.92	1 (7%)	16,22,22	1.02	1 (6%)
3	TRP	A	81	-	14,16,16	0.95	1 (7%)	16,22,22	1.32	2 (12%)
3	TRP	H	81	-	14,16,16	0.97	1 (7%)	16,22,22	0.92	0
3	TRP	S	81	-	14,16,16	0.80	1 (7%)	16,22,22	0.96	1 (6%)
3	TRP	J	81	-	14,16,16	0.90	1 (7%)	16,22,22	1.06	1 (6%)
3	TRP	R	81	-	14,16,16	0.81	0	16,22,22	1.11	1 (6%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '2' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	TRP	V	81	-	-	0/7/8/8	0/2/2/2
3	TRP	G	81	-	-	0/7/8/8	0/2/2/2
3	TRP	T	81	-	-	0/7/8/8	0/2/2/2
3	TRP	I	81	-	-	0/7/8/8	0/2/2/2
3	TRP	L	81	-	-	0/7/8/8	0/2/2/2
3	TRP	M	81	-	-	0/7/8/8	0/2/2/2
3	TRP	D	81	-	-	0/7/8/8	0/2/2/2
3	TRP	A	181	-	-	0/7/8/8	0/2/2/2
3	TRP	B	81	-	-	0/7/8/8	0/2/2/2
3	TRP	E	81	-	-	0/7/8/8	0/2/2/2
3	TRP	N	81	-	-	2/7/8/8	0/2/2/2
3	TRP	U	81	-	-	1/7/8/8	0/2/2/2
3	TRP	P	81	-	-	0/7/8/8	0/2/2/2
3	TRP	Q	81	-	-	2/7/8/8	0/2/2/2
3	TRP	F	81	-	-	0/7/8/8	0/2/2/2
3	TRP	K	81	-	-	0/7/8/8	0/2/2/2
3	TRP	C	81	-	-	0/7/8/8	0/2/2/2
3	TRP	O	81	-	-	1/7/8/8	0/2/2/2
3	TRP	A	81	-	-	0/7/8/8	0/2/2/2

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	TRP	H	81	-	-	0/7/8/8	0/2/2/2
3	TRP	S	81	-	-	1/7/8/8	0/2/2/2
3	TRP	J	81	-	-	0/7/8/8	0/2/2/2
3	TRP	R	81	-	-	0/7/8/8	0/2/2/2

The worst 5 of 15 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	181	TRP	CZ3-CE3	2.88	1.43	1.36
3	O	81	TRP	OXT-C	-2.57	1.22	1.30
3	H	81	TRP	OXT-C	-2.48	1.22	1.30
3	A	81	TRP	OXT-C	-2.29	1.23	1.30
3	A	181	TRP	OXT-C	-2.23	1.23	1.30

The worst 5 of 35 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	K	81	TRP	OXT-C-O	-5.10	112.51	124.09
3	B	81	TRP	OXT-C-O	-4.68	113.47	124.09
3	U	81	TRP	OXT-C-O	-4.53	113.81	124.09
3	V	81	TRP	OXT-C-O	-4.32	114.29	124.09
3	Q	81	TRP	OXT-C-O	-3.84	115.37	124.09

There are no chirality outliers.

5 of 7 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	N	81	TRP	OXT-C-CA-N
3	U	81	TRP	OXT-C-CA-N
3	N	81	TRP	O-C-CA-N
3	Q	81	TRP	O-C-CA-N
3	Q	81	TRP	OXT-C-CA-N

There are no ring outliers.

15 monomers are involved in 21 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	V	81	TRP	2	0
3	T	81	TRP	1	0
3	M	81	TRP	1	0
3	D	81	TRP	2	0

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Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	B	81	TRP	1	0
3	E	81	TRP	1	0
3	N	81	TRP	1	0
3	P	81	TRP	1	0
3	Q	81	TRP	1	0
3	K	81	TRP	3	0
3	O	81	TRP	1	0
3	A	81	TRP	2	0
3	H	81	TRP	1	0
3	S	81	TRP	2	0
3	J	81	TRP	1	0

## 5.7 Other polymers [i](#)

There are no such residues in this entry.

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

The following chains have linkage breaks:

Mol	Chain	Number of breaks
2	W	11

The worst 5 of 11 chain breaks are listed below:

Model	Chain	Residue-1	Atom-1	Residue-2	Atom-2	Distance (Å)
1	W	107:A	O3'	108:G	P	2.05
1	W	142:A	O3'	143:G	P	2.03
1	W	132:A	O3'	133:G	P	1.92
1	W	127:A	O3'	128:G	P	1.90
1	W	147:A	O3'	148:G	P	1.89



## 6 Fit of model and data

### 6.1 Protein, DNA and RNA chains

Unable to reproduce the depositors R factor - this section is therefore empty.

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

Unable to reproduce the depositors R factor - this section is therefore empty.

### 6.3 Carbohydrates

Unable to reproduce the depositors R factor - this section is therefore empty.

### 6.4 Ligands

Unable to reproduce the depositors R factor - this section is therefore empty.

### 6.5 Other polymers

Unable to reproduce the depositors R factor - this section is therefore empty.