



# wwPDB X-ray Structure Validation Summary Report ⓘ

Oct 12, 2021 – 01:27 PM EDT

PDB ID : 1YG8  
Title : The structure of a V6A variant of ClpP.  
Authors : Bewley, M.C.; Graziano, V.; Griffin, K.; Flanagan, J.M.  
Deposited on : 2005-01-04  
Resolution : 2.60 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 following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

MolProbity : 4.02b-467  
Xtriage (Phenix) : **NOT EXECUTED**  
EDS : **NOT EXECUTED**  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.23.2

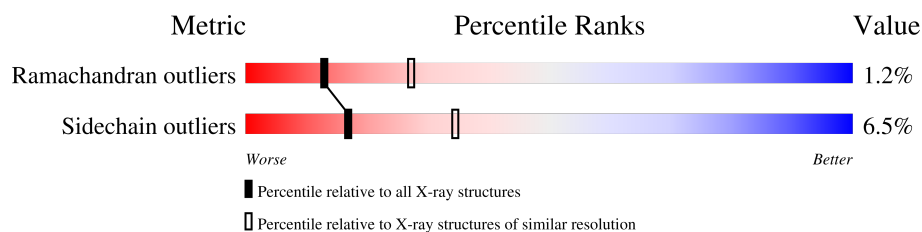
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.60 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))
Ramachandran outliers	138981	3455 (2.60-2.60)
Sidechain outliers	138945	3455 (2.60-2.60)












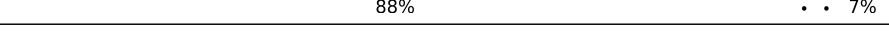







The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for  $\geq 3$ , 2, 1 and 0 types of geometric quality criteria 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  $\leq 5\%$ .

Note EDS was not executed.

Mol	Chain	Length	Quality of chain
1	A	193	
1	B	193	
1	C	193	
1	D	193	
1	E	193	
1	F	193	
1	G	193	
1	H	193	
1	I	193	

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Length	Quality of chain
1	J	193	 82% 10% 7%
1	K	193	 86% 6% 7%
1	L	193	 88% • 7%
1	M	193	 87% 6% 7%
1	N	193	 88% 5% 7%
1	O	193	 81% 10% 7%
1	P	193	 87% 5% 7%
1	Q	193	 88% 5% 7%
1	R	193	 86% 6% 7%
1	S	193	 85% 7% 7%
1	T	193	 88% • 7%
1	U	193	 88% • 7%
1	V	193	 86% 7% 7%
1	W	193	 84% 8% 7%
1	X	193	 86% 6% 7%
1	Y	193	 87% 5% 7%
1	Z	193	 82% 10% 7%
1	a	193	 86% 7% 7%
1	b	193	 86% 6% 7%

## 2 Entry composition

There is only 1 type of molecule in this entry. The entry contains 39312 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 ATP-dependent Clp protease proteolytic subunit.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	179	Total	C	N	O	S	0	0	0
			1404	885	244	264	11			
1	B	179	Total	C	N	O	S	0	0	0
			1404	885	244	264	11			
1	C	179	Total	C	N	O	S	0	0	0
			1404	885	244	264	11			
1	D	179	Total	C	N	O	S	0	0	0
			1404	885	244	264	11			
1	E	179	Total	C	N	O	S	0	0	0
			1404	885	244	264	11			
1	F	179	Total	C	N	O	S	0	0	0
			1404	885	244	264	11			
1	G	179	Total	C	N	O	S	0	0	0
			1404	885	244	264	11			
1	H	179	Total	C	N	O	S	0	0	0
			1404	885	244	264	11			
1	I	179	Total	C	N	O	S	0	0	0
			1404	885	244	264	11			
1	J	179	Total	C	N	O	S	0	0	0
			1404	885	244	264	11			
1	K	179	Total	C	N	O	S	0	0	0
			1404	885	244	264	11			
1	L	179	Total	C	N	O	S	0	0	0
			1404	885	244	264	11			
1	M	179	Total	C	N	O	S	0	0	0
			1404	885	244	264	11			
1	N	179	Total	C	N	O	S	0	0	0
			1404	885	244	264	11			
1	O	179	Total	C	N	O	S	0	0	0
			1404	885	244	264	11			
1	P	179	Total	C	N	O	S	0	0	0
			1404	885	244	264	11			

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	Q	179	Total	C	N	O	S	0	0	0
			1404	885	244	264	11			
1	R	179	Total	C	N	O	S	0	0	0
			1404	885	244	264	11			
1	S	179	Total	C	N	O	S	0	0	0
			1404	885	244	264	11			
1	T	179	Total	C	N	O	S	0	0	0
			1404	885	244	264	11			
1	U	179	Total	C	N	O	S	0	0	0
			1404	885	244	264	11			
1	V	179	Total	C	N	O	S	0	0	0
			1404	885	244	264	11			
1	W	179	Total	C	N	O	S	0	0	0
			1404	885	244	264	11			
1	X	179	Total	C	N	O	S	0	0	0
			1404	885	244	264	11			
1	Y	179	Total	C	N	O	S	0	0	0
			1404	885	244	264	11			
1	Z	179	Total	C	N	O	S	0	0	0
			1404	885	244	264	11			
1	a	179	Total	C	N	O	S	0	0	0
			1404	885	244	264	11			
1	b	179	Total	C	N	O	S	0	0	0
			1404	885	244	264	11			

There are 28 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	3	ALA	VAL	engineered mutation	UNP P19245
B	3	ALA	VAL	engineered mutation	UNP P19245
C	3	ALA	VAL	engineered mutation	UNP P19245
D	3	ALA	VAL	engineered mutation	UNP P19245
E	3	ALA	VAL	engineered mutation	UNP P19245
F	3	ALA	VAL	engineered mutation	UNP P19245
G	3	ALA	VAL	engineered mutation	UNP P19245
H	3	ALA	VAL	engineered mutation	UNP P19245
I	3	ALA	VAL	engineered mutation	UNP P19245
J	3	ALA	VAL	engineered mutation	UNP P19245
K	3	ALA	VAL	engineered mutation	UNP P19245
L	3	ALA	VAL	engineered mutation	UNP P19245
M	3	ALA	VAL	engineered mutation	UNP P19245
N	3	ALA	VAL	engineered mutation	UNP P19245
O	3	ALA	VAL	engineered mutation	UNP P19245

*Continued on next page...*

*Continued from previous page...*


Chain	Residue	Modelled	Actual	Comment	Reference
P	3	ALA	VAL	engineered mutation	UNP P19245
Q	3	ALA	VAL	engineered mutation	UNP P19245
R	3	ALA	VAL	engineered mutation	UNP P19245
S	3	ALA	VAL	engineered mutation	UNP P19245
T	3	ALA	VAL	engineered mutation	UNP P19245
U	3	ALA	VAL	engineered mutation	UNP P19245
V	3	ALA	VAL	engineered mutation	UNP P19245
W	3	ALA	VAL	engineered mutation	UNP P19245
X	3	ALA	VAL	engineered mutation	UNP P19245
Y	3	ALA	VAL	engineered mutation	UNP P19245
Z	3	ALA	VAL	engineered mutation	UNP P19245
a	3	ALA	VAL	engineered mutation	UNP P19245
b	3	ALA	VAL	engineered mutation	UNP P19245

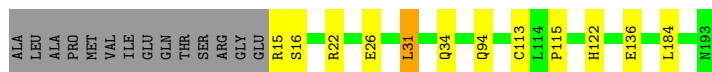
### 3 Residue-property plots [i](#)

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.


Note EDS was not executed.

- Molecule 1: ATP-dependent Clp protease proteolytic subunit

Chain A:  87% 6% • 7%




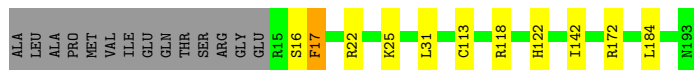
- Molecule 1: ATP-dependent Clp protease proteolytic subunit

Chain B:  88% 5% • 7%




- Molecule 1: ATP-dependent Clp protease proteolytic subunit

Chain C:  87% 5% • 7%




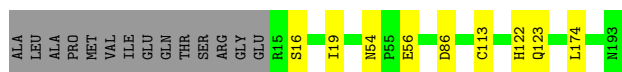
- Molecule 1: ATP-dependent Clp protease proteolytic subunit

Chain D:  88% 5% 7%




- Molecule 1: ATP-dependent Clp protease proteolytic subunit

Chain E:  88% 5% 7%




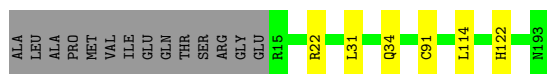
- Molecule 1: ATP-dependent Clp protease proteolytic subunit

Chain F:  88% 5% • 7%




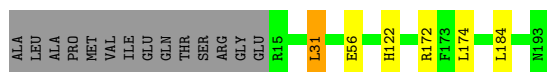
- Molecule 1: ATP-dependent Clp protease proteolytic subunit

Chain G:  90% • 7%




- Molecule 1: ATP-dependent Clp protease proteolytic subunit

Chain H:  90% • • 7%




- Molecule 1: ATP-dependent Clp protease proteolytic subunit

Chain I:  87% 6% 7%




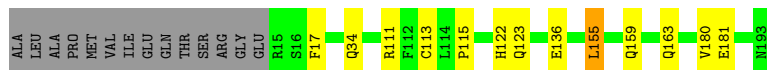
- Molecule 1: ATP-dependent Clp protease proteolytic subunit

Chain J:  82% 10% 7%




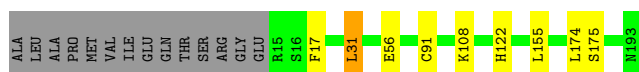
- Molecule 1: ATP-dependent Clp protease proteolytic subunit

Chain K:  86% 6% • 7%




- Molecule 1: ATP-dependent Clp protease proteolytic subunit

Chain L:  88% • • 7%




- Molecule 1: ATP-dependent Clp protease proteolytic subunit



Chain M:  87% 6% 7%




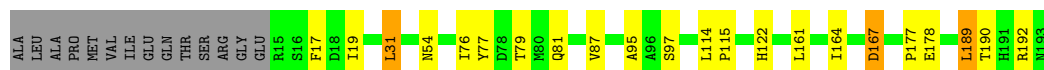
- Molecule 1: ATP-dependent Clp protease proteolytic subunit

Chain N:  88% 5% 7%




- Molecule 1: ATP-dependent Clp protease proteolytic subunit

Chain O:  81% 10% 7%




- Molecule 1: ATP-dependent Clp protease proteolytic subunit

Chain P:  87% 5% 7%




- Molecule 1: ATP-dependent Clp protease proteolytic subunit

Chain Q:  88% 5% 7%




- Molecule 1: ATP-dependent Clp protease proteolytic subunit

Chain R:  86% 6% 7%




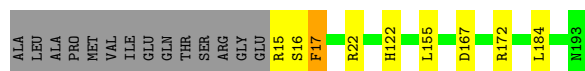
- Molecule 1: ATP-dependent Clp protease proteolytic subunit

Chain S:  85% 7% 7%




- Molecule 1: ATP-dependent Clp protease proteolytic subunit

Chain T:  88% • • 7%



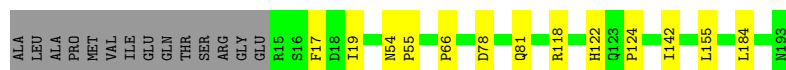
- Molecule 1: ATP-dependent Clp protease proteolytic subunit

Chain U:  88% • • 7%




- Molecule 1: ATP-dependent Clp protease proteolytic subunit

Chain V:  86% 7% 7%



- Molecule 1: ATP-dependent Clp protease proteolytic subunit

Chain W:  84% 8% • 7%




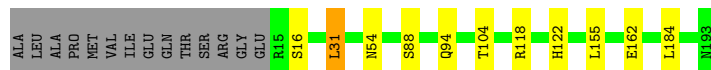
- Molecule 1: ATP-dependent Clp protease proteolytic subunit

Chain X:  86% 6% • 7%




- Molecule 1: ATP-dependent Clp protease proteolytic subunit

Chain Y:  87% 5% • 7%



- Molecule 1: ATP-dependent Clp protease proteolytic subunit

Chain Z:  82% 10% • 7%



- Molecule 1: ATP-dependent Clp protease proteolytic subunit

Chain a: 

86%

7%

7%



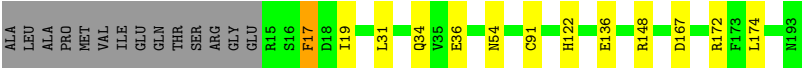
● Molecule 1: ATP-dependent Clp protease proteolytic subunit

Chain b: 

86%

6%

7%



## 4 Data and refinement statistics

Xtriage (Phenix) and EDS were not executed - this section is therefore incomplete.

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	94.80Å 161.00Å 186.60Å 90.00° 90.30° 90.00°	Depositor
Resolution (Å)	30.00 – 2.60	Depositor
% Data completeness (in resolution range)	(Not available) (30.00-2.60)	Depositor
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	(Not available)	Depositor
Refinement program	CNS 1.0	Depositor
R, $R_{free}$	0.220 , 0.267	Depositor
Estimated twinning fraction	No twinning to report.	Xtriage
Total number of atoms	39312	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	37.0	wwPDB-VP

## 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	A	0.59	0/1427	0.81	1/1921 (0.1%)
1	B	0.60	0/1427	0.81	1/1921 (0.1%)
1	C	0.59	0/1427	0.80	1/1921 (0.1%)
1	D	0.60	0/1427	0.77	0/1921
1	E	0.57	0/1427	0.82	0/1921
1	F	0.58	0/1427	0.79	0/1921
1	G	0.56	0/1427	0.80	0/1921
1	H	0.60	0/1427	0.78	1/1921 (0.1%)
1	I	0.59	0/1427	0.82	1/1921 (0.1%)
1	J	0.62	1/1427 (0.1%)	0.82	0/1921
1	K	0.62	0/1427	0.83	0/1921
1	L	0.58	0/1427	0.78	1/1921 (0.1%)
1	M	0.58	0/1427	0.80	0/1921
1	N	0.60	0/1427	0.81	0/1921
1	O	0.62	0/1427	0.79	1/1921 (0.1%)
1	P	0.62	0/1427	0.85	1/1921 (0.1%)
1	Q	0.59	0/1427	0.79	0/1921
1	R	0.57	0/1427	0.77	1/1921 (0.1%)
1	S	0.61	0/1427	0.82	0/1921
1	T	0.59	0/1427	0.82	1/1921 (0.1%)
1	U	0.61	0/1427	0.85	1/1921 (0.1%)
1	V	0.62	0/1427	0.85	2/1921 (0.1%)
1	W	0.59	0/1427	0.84	3/1921 (0.2%)
1	X	0.56	0/1427	0.81	1/1921 (0.1%)
1	Y	0.58	0/1427	0.83	1/1921 (0.1%)
1	Z	0.59	0/1427	0.78	0/1921
1	a	0.58	0/1427	0.79	0/1921
1	b	0.57	0/1427	0.81	1/1921 (0.1%)
All	All	0.59	1/39956 (0.0%)	0.81	19/53788 (0.0%)

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	B	0	1
1	S	0	1
All	All	0	2

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	J	91	CYS	CB-SG	-5.19	1.73	1.81

The worst 5 of 19 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	V	78	ASP	CB-CG-OD1	-7.39	111.65	118.30
1	U	31	LEU	CA-CB-CG	6.66	130.62	115.30
1	A	31	LEU	CA-CB-CG	6.23	129.62	115.30
1	X	31	LEU	CA-CB-CG	6.20	129.56	115.30
1	V	78	ASP	CB-CG-OD2	6.08	123.77	118.30

There are no chirality outliers.

All (2) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	B	60	TYR	Sidechain
1	S	60	TYR	Sidechain

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

Due to software issues we are unable to calculate clashes - this section is therefore empty.

## 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	177/193 (92%)	167 (94%)	8 (4%)	2 (1%)	14	30
1	B	177/193 (92%)	166 (94%)	10 (6%)	1 (1%)	25	47
1	C	177/193 (92%)	162 (92%)	14 (8%)	1 (1%)	25	47
1	D	177/193 (92%)	165 (93%)	11 (6%)	1 (1%)	25	47
1	E	177/193 (92%)	165 (93%)	10 (6%)	2 (1%)	14	30
1	F	177/193 (92%)	163 (92%)	12 (7%)	2 (1%)	14	30
1	G	177/193 (92%)	161 (91%)	16 (9%)	0	100	100
1	H	177/193 (92%)	170 (96%)	7 (4%)	0	100	100
1	I	177/193 (92%)	162 (92%)	14 (8%)	1 (1%)	25	47
1	J	177/193 (92%)	162 (92%)	12 (7%)	3 (2%)	9	18
1	K	177/193 (92%)	156 (88%)	18 (10%)	3 (2%)	9	18
1	L	177/193 (92%)	160 (90%)	16 (9%)	1 (1%)	25	47
1	M	177/193 (92%)	167 (94%)	10 (6%)	0	100	100
1	N	177/193 (92%)	163 (92%)	14 (8%)	0	100	100
1	O	177/193 (92%)	144 (81%)	22 (12%)	11 (6%)	1	1
1	P	177/193 (92%)	154 (87%)	20 (11%)	3 (2%)	9	18
1	Q	177/193 (92%)	166 (94%)	10 (6%)	1 (1%)	25	47
1	R	177/193 (92%)	171 (97%)	6 (3%)	0	100	100
1	S	177/193 (92%)	158 (89%)	16 (9%)	3 (2%)	9	18
1	T	177/193 (92%)	162 (92%)	13 (7%)	2 (1%)	14	30
1	U	177/193 (92%)	157 (89%)	18 (10%)	2 (1%)	14	30
1	V	177/193 (92%)	154 (87%)	19 (11%)	4 (2%)	6	11
1	W	177/193 (92%)	157 (89%)	16 (9%)	4 (2%)	6	11
1	X	177/193 (92%)	162 (92%)	14 (8%)	1 (1%)	25	47
1	Y	177/193 (92%)	161 (91%)	14 (8%)	2 (1%)	14	30
1	Z	177/193 (92%)	164 (93%)	10 (6%)	3 (2%)	9	18
1	a	177/193 (92%)	168 (95%)	5 (3%)	4 (2%)	6	11
1	b	177/193 (92%)	161 (91%)	13 (7%)	3 (2%)	9	18
All	All	4956/5404 (92%)	4528 (91%)	368 (7%)	60 (1%)	13	27

5 of 60 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	16	SER
1	B	54	ASN
1	J	16	SER
1	J	155	LEU
1	O	54	ASN

### 5.3.2 Protein sidechains ⓘ

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	151/162 (93%)	141 (93%)	10 (7%)	16	33
1	B	151/162 (93%)	143 (95%)	8 (5%)	22	45
1	C	151/162 (93%)	141 (93%)	10 (7%)	16	33
1	D	151/162 (93%)	143 (95%)	8 (5%)	22	45
1	E	151/162 (93%)	144 (95%)	7 (5%)	27	51
1	F	151/162 (93%)	142 (94%)	9 (6%)	19	39
1	G	151/162 (93%)	145 (96%)	6 (4%)	31	57
1	H	151/162 (93%)	145 (96%)	6 (4%)	31	57
1	I	151/162 (93%)	141 (93%)	10 (7%)	16	33
1	J	151/162 (93%)	135 (89%)	16 (11%)	6	12
1	K	151/162 (93%)	140 (93%)	11 (7%)	14	28
1	L	151/162 (93%)	143 (95%)	8 (5%)	22	45
1	M	151/162 (93%)	139 (92%)	12 (8%)	12	24
1	N	151/162 (93%)	142 (94%)	9 (6%)	19	39
1	O	151/162 (93%)	138 (91%)	13 (9%)	10	20
1	P	151/162 (93%)	141 (93%)	10 (7%)	16	33
1	Q	151/162 (93%)	142 (94%)	9 (6%)	19	39
1	R	151/162 (93%)	138 (91%)	13 (9%)	10	20
1	S	151/162 (93%)	141 (93%)	10 (7%)	16	33
1	T	151/162 (93%)	144 (95%)	7 (5%)	27	51

*Continued on next page...*



*Continued from previous page...*

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	U	151/162 (93%)	144 (95%)	7 (5%)	27	51
1	V	151/162 (93%)	143 (95%)	8 (5%)	22	45
1	W	151/162 (93%)	141 (93%)	10 (7%)	16	33
1	X	151/162 (93%)	138 (91%)	13 (9%)	10	20
1	Y	151/162 (93%)	142 (94%)	9 (6%)	19	39
1	Z	151/162 (93%)	133 (88%)	18 (12%)	5	9
1	a	151/162 (93%)	142 (94%)	9 (6%)	19	39
1	b	151/162 (93%)	141 (93%)	10 (7%)	16	33
All	All	4228/4536 (93%)	3952 (94%)	276 (6%)	17	34

5 of 276 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	Y	88	SER
1	Y	184	LEU
1	a	31	LEU
1	K	155	LEU
1	K	122	HIS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 159 such sidechains are listed below:

Mol	Chain	Res	Type
1	U	156	HIS
1	Z	156	HIS
1	V	123	GLN
1	X	41	ASN
1	a	163	GLN

### 5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

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

EDS was not executed - this section is therefore empty.

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

EDS was not executed - this section is therefore empty.

### 6.3 Carbohydrates

EDS was not executed - this section is therefore empty.

### 6.4 Ligands

EDS was not executed - this section is therefore empty.

### 6.5 Other polymers

EDS was not executed - this section is therefore empty.